# Fisher® FIELDVUE™ DVC6200f Digital Valve Controller for FOUNDATION™ fieldbus

**This manual applies to:**

| Device Type | 4602 |
|---|---|
| Device Revision | 2 |
| Hardware Revision | 8 |
| Firmware Revision | 2.0 |
| DD Revision | 2 and 3 |
| Instrument Level | FD, PD, AD |

PlantWeb

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The FIELDVUE DVC6200f Digital Valve Controller is a core component of the PlantWeb™ digital plant architecture. The digital valve controller powers PlantWeb by capturing and delivering valve diagnostic data. Coupled with ValveLink™ software, the DVC6200 provides users with an accurate picture of valve performance, including actual stem position, instrument input signal, and pneumatic pressure to the actuator. Using this information, the digital valve controller diagnoses not only itself, but also the valve and actuator to which it is mounted.

# Contents

Figure 1-1. FIELDVUE DVC6200f Digital Valve
Controller



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# Section 1 Introduction and Specifications

## Installation, Pneumatic and Electrical Connections, and Initial Configuration

Refer to the DVC6200 Series Quick Start Guide (D103556X012) for DVC6200 installation, connection, and initial configuration information. If a copy of this quick start guide is needed scan or click the QR code at the right, contact your Emerson Process Management sales office, or visit our website at www.Fisher.com.

Scan or click
to access
field support

## Scope of Manual

This instruction manual is a supplement to the quick start guide that ships with every instrument. This instruction manual includes product specifications, supplementary installation information, reference materials, custom setup information, maintenance procedures, and replacement part details for the FIELDVUE DVC6200f digital valve controller.

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**Note**

All references to the DVC6200f digital valve controller include the DVC6205f base unit unless otherwise indicated.

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This manual describes device setup using the 475 or 375 Field Communicator. For information on using Fisher ValveLink software with the instrument, refer to the appropriate user guide or help.

Do not install, operate, or maintain a DVC6200f digital valve controller without being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance. **To avoid personal injury or property damage, it is important to carefully read, understand, and follow all of the contents of this manual, including all safety cautions and warnings.** If you have any questions about these instructions, contact your Emerson Process Management sales office before proceeding.

## Instrument Description

DVC6200f digital valve controllers for FOUNDATION fieldbus are communicating, microprocessor-based instruments. In addition to the traditional function of converting a digital signal to a pneumatic output pressure, the DVC6200f digital valve controller, using FOUNDATION fieldbus communications protocol, gives easy access to information critical to process operation as well as process control. This can be done using a DeltaV™ console, another FOUNDATION fieldbus system console, or with ValveLink software version 10.2 or later.

Using a compatible fieldbus configuration device, you can obtain information about the health of the instrument, the actuator, and the valve. You can also obtain asset information about the actuator or valve manufacturer, model, and serial number. You can set input and output configuration parameters and calibrate the instrument.

Using the FOUNDATION fieldbus protocol, information from the instrument can be integrated into control systems.

DVC6200f digital valve controllers can be mounted on single or double-acting sliding-stem actuators, as shown in figure 1-2, or on rotary actuators. It can also be integrally mounted to the Fisher GX control valve and actuator system, as shown in figure 1-3. The DVC6200f mounts on most Fisher and other manufacturers' rotary and sliding-stem actuators.

Figure 1-2 FIELDVUE DVC6200f Digital Valve Controller Mounted on a Fisher Sliding-Stem Valve Actuator



W9643_fieldbus

Figure 1-3. FIELDVUE DVC6200f Digital Valve Controller Integrally Mounted to a Fisher GX Control Valve and Actuator System



W9616_fieldbus

DVC6200f digital valve controllers are available with several selections of control and diagnostic capability. Control selections include:

● **Standard Control (SC)**— Digital valve controllers with Standard Control have the AO, PID, ISEL, OS, AI, MAI, DO, and four DI function blocks in addition to the resource and transducer blocks.

● **Fieldbus Control (FC)**—Digital valve controllers with Fieldbus Control have the AO function block in addition to the resource and transducer blocks.

● **Fieldbus Logic (FL)**—Digital valve controllers with Fieldbus Logic have the DO, and four DI function blocks, in addition to the resource and transducer block.

The diagnostic capabilities include:

● Performance Diagnostics (PD)

● Advanced Diagnostics (AD)

● Fieldbus Diagnostics (FD)

Performance and Advanced Diagnostics are available with ValveLink software. They provide visibility to instrument alerts. Fieldbus Diagnostics can be viewed with any host system.

# Instrument Blocks

The digital valve controller is a block-based device. For detailed information on the blocks within the digital valve controller, see the Detailed Setup section of this manual.

The DVC6200f digital valve controller includes the resource and transducer block:

- **Resource Block**—The resource block contains the hardware specific characteristics associated with a device; it has no input or output parameters. The resource block monitors and controls the general operation of other blocks within the device. For example, when the mode of the resource block is Out of Service, it impacts all function blocks.

- **Transducer Block**—The transducer block connects the analog output function block to the I/P converter, relay, and travel sensor hardware within the digital valve controller.

# Function Blocks

In addition to the resource and transducer block, the digital valve controller may contain the following function blocks. For additional information on function blocks, refer to Appendix D, FOUNDATION fieldbus Communication.

- **Analog Output (AO) Function Block**—The analog output function block accepts the output from another function block (such as a PID block) and transfers it as an actuator control signal to the transducer block. If the DO block is selected, the AO block is not functional.

- **Proportional-Integral-Derivative (PID) Function Block**—The PID function block performs proportional-plus-integral-plus-derivative control.

- **Input Selector (ISEL) Function Block**—The input selector function block selects from up to four inputs and may provide the selected signal as input to the PID block. The input selection can be configured to select the first good input signal; a maximum, minimum or average value; or a hot spare.

- **Output Splitter (OS) Function Block**—The output splitter function block accepts the output from another function block (such as a PID block) and creates two outputs that are scaled or split, according to the user configuration. This block is typically used for split ranging of two control valves.

- **Analog Input (AI) Function Block**—The analog input function block monitors the signal from a DVC6200f sensor or internal measurement and provides it to another block.

- **Multiple Analog Input (MAI) Function Block**—The Multiple Analog Input (MAI) function block has the ability to process up to eight DVC6200f measurements and make them available to other function blocks.

- **Discrete Output (DO) Function Block**—The discrete output function block processes a discrete set point and sends it to a specified output channel, which can be transferred to the transducer block for actuator control. In the digital valve controller, the discrete output block provides both normal open/closed control and the ability to position the valve in 5% increments for course throttling applications. If the AO block is selected, the DO block is not functional.

- **Discrete Input (DI) Function Block**—The discrete input function block processes a single discrete input from a DVC6200f and makes it available to other function blocks. In the digital valve controller, the discrete input function block can provide limit switch functionality and valve position proximity detection.

# Using This Manual

Navigation paths and fast-key sequences are included for procedures and parameters that can be accessed using the Field Communicator.

For example, to access Resource Block Mode:

| Field Communicator | RB > Configure/Setup > Setup > Resource Block Mode |
|---|---|

An overview of the resource and transducer block menu structures are shown in Appendix B. Menu structures for the function blocks are included with each function block section in Detailed Setup.

Throughout this document, parameters are typically referred to by their common name or label, followed by the parameter name and index number; for example, Write Priority (WRITE_PRI [39]). However, not all interface systems support the use of the parameter label and instead use only the Parameter Name, followed by the index number, when referring to the block parameters.

# Specifications

Specifications for the DVC6200f digital valve controller are shown in table 1-1.

Table 1-1. Specifications

## Available Mounting

DVC6200f digital valve controller and DVC6215 feedback unit: ■ Integral mounting to the Fisher GX Control Valve and Actuator System ■ Integral mounting to Fisher rotary actuators, ■ Sliding-stem linear applications ■ Quarter-turn rotary applications

DVC6205f base unit for 2 inch pipestand or wall mounting (for remote-mount)

The DVC6200f digital valve controller or DVC6215 feedback unit can also be mounted on other actuators that comply with IEC 60534-6-1, IEC 60534-6-2, VDI/VDE 3845 and NAMUR mounting standards.

## Function Block Suites

■ Standard Control (throttling control) Includes AO, PID, ISEL, OS, AI, MAI, DO, and four DI function block
■ Fieldbus Control (throttling control) Contains the AO function block
■ Fieldbus Logic [discrete (on/off) connectivity] Includes DO, and four DI function blocks

## Block Execution Times

| | |
|---|---|
| AO Block: 15 ms | AI Block: 15 ms |
| PID Block: 20 ms | MAI BLock: 35 ms |
| ISEL Block: 20 ms | DO Block: 15 ms |
| OS Block: 20 ms | DI Block: 15 ms |

## Electrical Input

Voltage Level: 9 to 32 volts
Maximum Current: 19 mA
Reverse Polarity Protection: Unit is not polarity sensitive
Termination: Bus must be properly terminated per ISA SP50 guidelines

## Digital Communication Protocol

FOUNDATION fieldbus registered device

Physical Layer Type(s):

121—Low-power signaling, bus-powered, Entity Model I.S.

511—Low-power signaling, bus-powered, FISCO I.S.

## Fieldbus Device Capabilities

Backup Link Master capable

## Supply Pressure[1]

Minimum Recommended: 0.3 bar (5 psig) higher than maximum actuator requirements

Maximum: 10.0 bar (145 psig) or maximum pressure rating of the actuator, whichever is lower

## Supply Medium

Air or natural gas

Air: Supply pressure must be clean, dry air that meets the requirements of ISA Standard 7.0.01.

Natural Gas: Natural gas must be clean, dry, oil-free, and noncorrosive. $H_2S$ content should not exceed 20 ppm.

A maximum 40 micrometer particle size in the air system is acceptable. Further filtration down to 5 micrometer particle size is recommended. Lubricant content is not to exceed 1 ppm weight (w/w) or volume (v/v) basis. Condensation in the air supply should be minimized.

Per ISO 8573-1
*Maximum particle density size:* Class 7
*Oil content:* Class 3
*Pressure Dew Point:* Class 3 or at least 10 K less than the lowest ambient temperature expected

## Output Signal

Pneumatic signal, up to full supply pressure
Minimum Span: 0.4 bar (6 psig)
Maximum Span: 9.5 bar (140 psig)
Action: ■ Double, ■ Single Direct or ■ Reverse

## Steady-State Air Consumption[2][3]

Standard Relay: *At 1.4 bar (20 psig) supply pressure:* Less than 0.38 normal $m^3$/hr (14 scfh)
*At 5.5 bar (80 psig) supply pressure:* Less than 1.3 normal $m^3$/hr (49 scfh)

Low Bleed Relay: *At 1.4 bar (20 psig) supply pressure:* Average value 0.056 normal $m^3$/hr (2.1 scfh)
*At 5.5 bar (80 psig) supply pressure:* Average value 0.184 normal $m^3$/hr (6.9 scfh)

## Maximum Output Capacity[2][3]

*At 1.4 bar (20 psig) supply pressure:* 10.0 normal $m^3$/hr (375 scfh)
*At 5.5 bar (80 psig) supply pressure:* 29.5 normal $m^3$/hr (1100 scfh)

-continued-

Table 1-1. Specifications (continued)

**Operating Ambient Temperature Limits[1][4]**

-40 to 85°C (-40 to 185°F)
-52 to 85°C (-62 to 185°F) for instruments utilizing the Extreme Temperature option (fluorosilicone elastomers)
-52 to 125°C (-62 to 257°F) for remote-mount feedback unit

**Independent Linearity[5]**

Typical Value: ±0.50% of output span

**Electromagnetic Compatibility**

Meets EN 61326-1 (First Edition)
Immunity—Industrial locations per Table 2 of the EN 61326-1 standard. Performance is shown in table 1-2 below.
Emissions—Class A
ISM equipment rating: Group 1, Class A

Lightning and Surge Protection—The degree of immunity to lightning is specified as Surge immunity in table 1-2. For additional surge protection commercially available transient protection devices can be used.

**Vibration Testing Method**

Tested per ANSI/ISA-75.13.01 Section 5.3.5. A resonant frequency search is performed on all three axes. The instrument is subjected to the ISA specified 1/2 hour endurance test at each major resonance.

**Humidity Testing Method**

Tested per IEC 61514-2

**Electrical Classification**

Hazardous Area Approvals

CSA— Intrinsically Safe, FISCO, Explosion-proof, Division 2, Dust Ignition-proof

FM— Intrinsically Safe, FISCO, Explosion-proof, Non-Incendive, Dust Ignition-proof

ATEX— Intrinsically Safe, FISCO, Flameproof, Type n

IECEx— Intrinsically Safe, FISCO, Flameproof, Type n

Electrical Housing

CSA— Type 4X, IP66

FM— Type 4X, IP66

ATEX— IP66

IECEx— IP66

**Other Classifications/Certifications**

Natural Gas Certified, Single Seal Device— CSA, FM, ATEX, and IECEx

CUTR— Customs Union Technical Regulations (Russia, Kazakhstan and Belarus)

INMETRO— National Institute of Metrology, Quality and Technology (Brazil)

KGS— Korea Gas Safety Corporation (South Korea)

NEPSI— National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation (China)

PESO CCOE— Petroleum and Explosives Safety Organisation - Chief Controller of Explosives (India)

TIIS— Technology Institution of Industrial Safety (Japan)

Contact your Emerson Process Management sales office for classification/certification specific information

**Connections**

Supply Pressure: 1/4 NPT internal and integral pad for mounting 67CFR regulator
Output Pressure: 1/4 NPT internal
Tubing: 3/8-inch recommended
Vent: 3/8 NPT internal
Electrical: 1/2 NPT internal, M20 adapter optional

**Actuator Compatibility**

Stem Travel (Sliding-Stem Linear)

*Minimum:* 6.35 mm (0.25 inch)
*Maximum:* 606 mm (23-7/8 inches)

Shaft Rotation (Quarter-Turn Rotary)

*Minimum:* 45°
*Maximum:* 90°

**Weight**

DVC6200f
*Aluminum:* 3.5 kg (7.7 lbs)
*Stainless Steel:* 8.6 kg (19 lbs)

*DVC6205f:* 4.1 kg (9 lbs)
*DVC6215:* 1.4 kg (3.1 lbs)

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Table 1-1. Specifications (continued)

| **Construction Materials** | |
| --- | --- |

**Construction Materials**

Housing, module base and terminal box: A03600 low copper aluminum alloy (standard)
Stainless steel (optional)
**Cover:** Thermoplastic polyester
**Elastomers:** Nitrile (standard)
Fluorosilicone (extreme temperature)

**Options**

■ Supply and output pressure gauges or ■ Tire valves ■ Integral mounted filter regulator
■ Low-Bleed Relay ■ Extreme Temperature
■ Natural Gas Certified, Single Seal Device ■ Remote Mount[6] ■ Stainless Steel

Contact your Emerson Process Management sales office or go to www.FIELDVUE.com for additional information.

**Declaration of SEP**

Fisher Controls International LLC declares this product to be in compliance with Article 3 paragraph 3 of the Pressure Equipment Directive (PED) 97 / 23 / EC. It was designed and manufactured in accordance with Sound Engineering Practice (SEP) and cannot bear the CE marking related to PED compliance.

However, the product *may* bear the CE marking to indicate compliance with *other* applicable European Community Directives.

NOTE: Specialized instrument terms are defined in ANSI/ISA Standard 51.1 - Process Instrument Terminology.
1. The pressure/temperature limits in this document and any other applicable code or standard should not be exceeded.
2. Normal m$^3$/hour - Normal cubic meters per hour at 0°C and 1.01325 bar, absolute. Scfh - Standard cubic feet per hour at 60°F and 14.7 psia.
3. Values at 1.4 bar (20 psig) based on a single-acting direct relay; values at 5.5 bar (80 psig) based on double-acting relay.
4. Temperature limits vary based on hazardous area approval.
5. Not applicable for travels less than 19 mm (0.75 inch) or for shaft rotation less than 60 degrees. Also not applicable for digital valve controllers in long-stroke applications.
6. 4-conductor shielded cable, 18 to 22 AWG minimum wire size, in rigid or flexible metal conduit, is required for connection between base unit and feedback unit. Pneumatic tubing between base unit output connection and actuator has been tested to 91 meters (300 feet). At 15 meters (50 feet) there was no performance degradation. At 91 meters there was minimal pneumatic lag.

Table 1-2. EMC Summary Results—Immunity

| Port | Phenomenon | Basic Standard | Test Level | Performance Criteria[1] |
| --- | --- | --- | --- | --- |
| Enclosure | Electrostatic discharge (ESD) | IEC 61000-4-2 | 4 kV contact<br>8 kV air | A[2] |
| | Radiated EM field | IEC 61000-4-3 | 80 to 1000 MHz @ 10V/m with 1 kHz AM at 80%<br>1400 to 2000 MHz @ 3V/m with 1 kHz AM at 80%<br>2000 to 2700 MHz @ 1V/m with 1 kHz AM at 80% | A |
| | Rated power frequency magnetic field | IEC 61000-4-8 | 30 A/m at 50/60 Hz | A |
| I/O signal/control | Burst | IEC 61000-4-4 | 1 kV | A[2] |
| | Surge | IEC 61000-4-5 | 1 kV | B |
| | Conducted RF | IEC 61000-4-6 | 150 kHz to 80 MHz at 3 Vrms | A |

Performance criteria: +/- 1% effect.
1. A = No degradation during testing. B = Temporary degradation during testing, but is self-recovering.
2. Excluding Simulate function, which meets Performance Criteria B.

# Related Information

## Fieldbus Installation and Wiring Guidelines

This manual describes how to connect the fieldbus to the digital valve controller. For a technical description, planning, and installation information for a FOUNDATION fieldbus, refer to the FOUNDATION fieldbus Technical Overview, available from the Fieldbus Foundation and Fieldbus Installations in a DeltaV System, available from your Emerson Process Management sales office.

## Related Documents

Other documents containing information related to the DVC6200f digital valve controller include:

- Bulletin 62.1:DVC6200f—Fisher FIELDVUE DVC6200f Digital Valve Controller (D103399X012)

- Bulletin 62.1:DVC6200f FD—Fisher FIELDVUE DVC6200f Digital Valve Controller (D103422X012)

- Bulletin 62.1:DVC6200(S1)—Fisher FIELDVUE DVC6200 Digital Valve Controller Dimensions (D103543X012)

- Fisher FIELDVUE DVC6200 Series Quick Start Guide (D103556X012)

- 475 Field Communicator User's Manual

- ValveLink Software Help or Documentation

All documents are available from your Emerson Process Management sales office. Also visit our website at www.FIELDVUE.com.

# Educational Services

For information on available courses for the DVC6200f digital valve controller, as well as a variety of other products, contact:

Emerson Process Management
Educational Services - Registration
Phone: +1-641-754-3771 or +1-800-338-8158
e-mail: education@emerson.com
http://www.emersonprocess.com/education

# Section 2 Wiring Practices

## Quick Connect Cable Entry

The DVC6200f is offered with a quick connect cable entry option, shown in figure 2-1, for the FOUNDATION fieldbus signal. The quick connect cable entry provides an easier and more reliable interface to fieldbus devices and support modules by providing a standard connection.

Figure 2-1. Quick Connect Connector
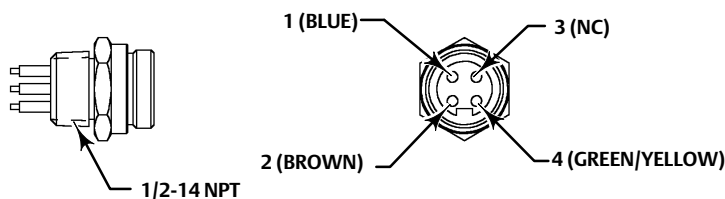


NOTES:
1. COLORS ARE WIRE COLORS.
2. NC=NO CONNECTION.
18B9424-A

**Note**

The quick connect cable entry option is only available for intrinsically safe and non-incendive installations.

Refer to figure 8-2 for identification of parts.

### ⚠ WARNING

**Personal injury or property damage, caused by fire or explosion, can result from the discharge of static electricity. Connect a 14 AWG (2.08 mm$^2$) ground strap between the digital valve controller and earth ground when flammable or hazardous gases are present. Refer to national and local codes and standards for grounding requirements.**

**To avoid static discharge from the plastic cover, do not rub or clean the cover with solvents. Clean with a mild detergent and water only.**

**To avoid personal injury or property damage, do not use the Quick Connect option on instruments in explosion-proof or flameproof installations.**

1. The quick connect cable entry should be installed on the digital valve controller at the factory. If it is, proceed to step 3. If not continue with step 2.

2. To install the Quick Connect:

   a. Remove the terminal box cap (key 4) from the terminal box (key 3).

   b. Apply sealant to the threads of the quick connector.

   c. Insert the wire pigtail into the desired conduit opening on the terminal box. Tighten the quick connector in the conduit opening.

   d. Cut and trim the wire ends.

   e. The instrument is not polarity sensitive. Refer to figure 2-2. Connect the blue wire to one of the LOOP terminals in the terminal box. Connect the brown wire to the other LOOP terminal. Cut the green/yellow wire off inside of the DVC6200f, and ensure that the shield is totally isolated at the instrument end.

Figure 2-2. Loop Connections Terminal Box



GE41456-A
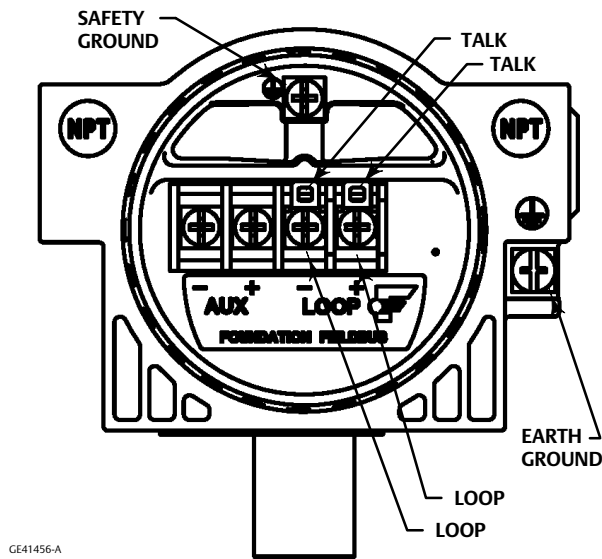
**Note**

The green/yellow wire is cut off inside the DVC6200f to help prevent ground loop issues. The only wires that should be installed and left on the connector are the two signal wires.

   f. Replace the terminal box cap on the terminal box. To secure the terminal box cap engage the lock screw.

3. Connect the field wiring connector to the installed quick connector.

# Communication Connections

**⚠ WARNING**

**Personal injury or property damage caused by fire or explosion may occur if this connection is attempted in a potentially explosive atmosphere or in an area that has been classified as hazardous. Confirm that area classification and atmosphere conditions permit the safe removal of the terminal box cap before proceeding.**

A FOUNDATION fieldbus communicating device, such as a Field Communicator or a personal computer running ValveLink software, interfaces with the DVC6200f digital valve controller from any wiring termination point in the segment. If you choose to connect the fieldbus communicating device directly to the instrument, attach the device to the LOCAL connections inside the terminal box to provide local communications with the instrument.

# Simulate Enable Jumper

## ⚠ WARNING

**Personal injury or property damage caused by fire or explosion may occur if this connection is attempted in a potentially explosive atmosphere or in an area that has been classified as hazardous. Confirm that area classification and atmosphere conditions permit the safe removal of the terminal box cap before proceeding.**

Install a jumper across the SIMULATE ENABLE terminals to enable the instrument to accept a simulate command. (These terminals are marked AUX on the terminal board, see figure 2-2). With the jumper in place and the simulate parameter in the AO or DO block set to enabled, the transducer block ignores the output of the AO or DO block. The simulate value and status become the readback value and status to the AO or DO block and the transducer block is ignored. For more information on running simulations, see the Detailed Setup section of this manual, the FOUNDATION fieldbus specifications, and the host documentation.

## ⚠ WARNING

**Removing the jumper will disable the simulate, which may cause the valve to move. To avoid personal injury and property damage caused by the release of pressure or process fluid, provide some temporary means of control for the process.**

# Section 3 Basic Setup

## Basic Setup

| Field Communicator | TB > Configure/Setup > Basic Setup |
|---|---|

> ⚠ **WARNING**
>
> **Changes to the instrument setup may cause changes in the output pressure or valve travel. Depending on the application, these changes may upset process control, which may result in personal injury or property damage.**

When the DVC6200f digital valve controller is ordered as part of a control valve assembly, the factory mounts the digital valve controller and sets up the instrument as specified on the order. When mounting to a valve in the field, the instrument needs to be setup to match the instrument to the valve and actuator.

Before beginning basic setup, be sure the instrument is correctly mounted as described in the Installation section.

Basic Setup includes the following procedures:

- Device Setup

- Auto Travel Calibrate

- Performance Tuner (Optional)

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**Note**

The DVC6200f may keep the Transducer Block Mode Out-of-Service if the instrument is not properly mounted.

To setup and calibrate the instrument, the Transducer Block Mode must be Manual, and the Protection must be None.

When using DD methods the method will request that you change the mode, but make changes in Protection automatically. If you have a host system that overrides transducer block parameters ensure that the Protection setting is <u>not</u> left as None. Doing so will result in transducer block parameters being overwritten.

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## Transducer Block Mode

| Field Communicator | TB > Configure/Setup > Detailed Setup > Transducer Block Mode |
|---|---|

To setup and calibrate the instrument, the transducer block mode must be in Manual. For more information about transducer block mode, refer to page 38.

## Protection

| Field Communicator | TB > Configure/Setup > Detailed Setup > Protection |
|---|---|

To setup and calibrate the instrument, the protection must be set to *None* with the Field Communicator. For more information about configuration protection refer to page 38.

# Device Setup

| Field Communicator | TB > Configure/Setup > Basic Setup > Device Setup |
|---|---|

Follow the prompts on the Field Communicator display to automatically setup the instrument using specified actuator information. Table 3-2 provides the actuator information required to setup and calibrate the instrument.

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**Note**

If reverse-acting relay B is used, you must manually set the Relay Type (BASIC_SETUP.RELAY_TYPE [42.5]) to B. This will not be set during Device Setup.

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1. Select whether Travel, Travel with Pressure fallback (auto recovery or manual recovery) or Pressure Control is desired. Refer to page 42 for additional information.

2. Enter the pressure units: kPa, bar, psi, inHg, inH$_2$O, or kg/cm$^2$.

3. Enter the maximum instrument supply pressure and output pressure range (if required).

4. Enter the manufacturer of the actuator on which the instrument is mounted. If the actuator manufacturer is not listed, select Other.

5. Enter the actuator model or type. If the actuator model is not listed, select Other.

6. Enter the actuator size.

7. Indicate whether a Volume Booster is being used.

8. Specify if factory defaults should be used for basic setup. If you select YES for factory default, the Field Communicator sets the setup parameters to the values listed in table 3-1. If you select NO for the factory defaults, the setup parameters listed in the table remain at their previous settings.

Table 3-1. Factory Default Settings

| Setup Parameter | Default Setting |
|---|---|
| Travel Cutoff Hi<br>Travel Cutoff Lo<br>Travel Integral Gain<br>Travel Calibration Trigger | 99.5%<br>0.5%<br>9.4 repeats/min<br>No |
| Travel Integral Enable<br>Travel Integral Limit Hi<br>Travel Integral Limit Lo<br>Travel Integral Deadzone | On<br>30%<br>-30%<br>0.25% |
| Pressure Cutoff Hi<br>Pressure Cutoff Lo<br>Pressure Integral Deadzone<br>Pressure Integral Hi Limit<br>Pressure Integral Lo Limit | 99.5%<br>-0.5%<br>0.25%<br>50.0%<br>-50.0% |
| Input Characterization<br>Shutdown Trigger<br>Shutdown Recovery<br>Output Block Timeout | Linear<br>All Off<br>All Auto Recovery<br>600 sec |

Table 3-2. Actuator Information for Initial Setup

| Actuator Manufacturer | Actuator Model | Actuator Size | Actuator Style | Starting Tuning Set | Travel Sensor Motion[2] Relay A or C[3] | |
|---|---|---|---|---|---|---|
| Fisher | 585C & 585CR | 25<br>50<br>60<br>68, 80<br>100, 130 | Piston Dbl w/ or w/o Spring. See actuator instruction manual and nameplate. | E<br>I<br>J<br>L<br>M | User Specified | |
| | 657 | 30<br>34, 40<br>45, 50<br>46, 60, 70, 76, & 80-100 | Spring & Diaphragm | H<br>K<br>L<br><br>M | Away from the top of the instrument | |
| | 667 | 30<br>34, 40<br>45, 50<br>46, 60, 70, 76, & 80-100 | Spring & Diaphragm | H<br>K<br>L<br><br>M | Towards the top of the instrument | |
| | 1051 & 1052 | 20, 30<br>33<br>40<br>60, 70 | Spring & Diaphragm (Window-mount) | H<br>I<br>K<br>M | Away from the top of the instrument | |
| | 1061 | 30<br>40<br>60<br>68, 80, 100, 130 | Piston Dbl w/o Spring | J<br>K<br>L<br>M | Depends upon pneumatic connections. See description for Travel Sensor Motion | |
| | 1066SR | 20<br>27, 75 | Piston Sgl w/Spring | G<br>L | **Mounting Style**<br>A<br>B<br>C<br>D | **Travel Sensor Motion**<br>Away from the top of the instrument<br>Towards the top of the instrument<br>Towards the top of the instrument<br>Away from the top of the instrument |
| | 2052 | 1<br>2<br>3 | Spring & Diaphragm (Window-mount) | H<br>K<br>M | Away from the top of the instrument | |
| | 3024 | 30, 30E<br>34, 34E, 40, 40E<br>45, 45E | Spring & Diaphragm | E<br>H<br>K | For $P_o$ operating mode (air opens):<br>Towards the top of the instrument<br>For $P_s$ operating mode (air closes):<br>Away from the top of the instrument | |
| | GX | 225<br>750<br>1200 | Spring & Diaphragm | X[1]<br>K<br>M | **Air to Open**<br>Towards the top of the instrument | **Air to Close**<br>Away from the top of the instrument |
| Baumann | Air to Extend | 16<br>32<br>54 | Spring & Diaphragm | C<br>E<br>H | Towards the top of the instrument<br>Away from the top of the instrument | |
| | Air to Retract | | | | | |
| | Rotary | 10<br>25<br>54 | | E<br>H<br>J | Specify | |

NOTE: Refer to table 4-10 for feedback connection (magnet assembly) information.
1. X = Expert Tuning. Proportional Gain = 4.2; Velocity Gain = 3.0; Minor Loop Feedback Gain = 18.0
2. Travel Sensor Motion in this instance refers to the motion of the magnet assembly.
3. Values shown are for Relay A and C. Reverse for Relay B.

Typically Device Setup determines the required setup information based upon the actuator manufacturer and model specified. However, if you enter OTHER for the actuator manufacturer or the actuator model, then you will be prompted for setup parameters such as:

- **Actuator Style**—Select spring & diaphragm, piston double-acting without spring, piston single-acting with spring, piston double-acting with spring.

- **Valve Style**—Select the valve style, rotary or sliding-stem.

- **Zero Power Condition**—this identifies whether the valve is fully open or fully closed when the input is 0%. If you are unsure how to set this parameter, disconnect the instrument from the segment. (With double-acting and single-acting direct digital valve controllers, disconnecting the instrument from the segment is the same as setting the output A pressure to zero. For single-acting reverse digital valve controllers, disconnecting the instrument from the segment is the same as setting the output B pressure to supply.)

### ⚠ WARNING

**If you answer YES to the prompt for permission to move the valve when setting the Travel Sensor Motion, the instrument will move the valve through its full travel range. To avoid personal injury and property damage caused by the release of pressure or process fluid, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.**

- **Travel Sensor Motion**—Device Setup asks if it can move the valve to determine travel sensor motion. If you answer Yes, the instrument will stroke the valve the full travel span to determine travel sensor motion. If you answer No, then you must specify the direction of travel movement. For quarter-turn actuators determine rotation by viewing the rotation of the magnet assembly from the back of the instrument.

**Note**

Travel Sensor Motion in this instance refers to the motion of the magnet assembly. Note that the magnet assembly may be referred to as a magnetic array in user interface tools.

**For instruments with relay A or C** If increasing air pressure at output A causes the magnet assembly to move up, or the actuator shaft to rotate counterclockwise, enter "Towards Top of Instrument/CCW." If it causes the magnet assembly to move down, or the actuator shaft to rotate clockwise, enter "Away From Top of Instrument/CW." For instruments with relay B.

**For instruments with relay B** If decreasing air pressure at output B causes the magnet assembly to move up, or the actuator shaft to rotate counterclockwise, enter "Towards Top of Instrument/CCW." If it causes the magnet assembly to move down, or the actuator shaft to rotate clockwise, enter "Away From Top of Instrument/CW."

**Note**

Relay A adjustment may be required before Device Setup can determine travel sensor motion. Follow the prompts on the Field Communicator display if relay adjustment is necessary.

Table 3-2 lists the required Travel Sensor Motion selections for Fisher and Baumann actuators.

● Tuning Set—There are twelve tuning sets to choose from. Each tuning set provides a preselected value for the digital valve controller gain settings. Tuning set C provides the slowest response and M provides the fastest response. For smaller actuators use tuning set C or D. For larger actuators using tuning set F or G. Table 3-3 lists the values for preselected tuning sets.

---

**Note**

Tuning set B is only available in Pressure Control Mode.

---

Table 3-3. Gain Values for Preselected Tuning Sets

| Tuning Set | Travel | | | Pressure | | |
|---|---|---|---|---|---|---|
| | **Proportional Gain** | **Velocity Gain** | **Minor Loop Feedback Gain** | **Proportional Gain** | **Integrator Gain** | **Minor Loop Feedback Gain** |
| B | - - - | - - - | - - - | 0.5 | 0.3 | 35 |
| C | 4.4 | 3.0 | 35 | 2.2 | 0.1 | 35 |
| D | 4.8 | 3.0 | 35 | 2.4 | 0.1 | 35 |
| E | 5.5 | 3.0 | 35 | 2.8 | 0.1 | 35 |
| F | 6.2 | 3.1 | 35 | 3.1 | 0.1 | 35 |
| G | 7.2 | 3.6 | 34 | 3.6 | 0.1 | 34 |
| H | 8.4 | 4.2 | 31 | 4.2 | 0.1 | 31 |
| I | 9.7 | 4.8 | 27 | 4.8 | 0.1 | 27 |
| J | 11.3 | 5.6 | 23 | 5.6 | 0.1 | 23 |
| K | 13.1 | 6.0 | 18 | 6.6 | 0.1 | 18 |
| L | 15.5 | 6.0 | 12 | 7.8 | 0.1 | 12 |
| M | 18.0 | 6.0 | 12 | 9.0 | 0.1 | 12 |
| X (Expert) | User Adjusted | User Adjusted | User Adjusted | User Adjusted | User Adjusted | User Adjusted |

---

### ⚠ WARNING

**Changes to the tuning set may cause the valve/actuator assembly to stroke. To avoid personal injury or property damage caused by moving parts, keep hands, tools, and other objects away from the valve/actuator assembly.**

---

In addition, you can select Expert, which allows you to individually set the proportional gain, velocity gain, and minor loop feedback gain for travel tuning and pressure proportional gain, pressure integrator gain, and pressure minor loop feedback gain for pressure tuning. Refer to page 39 for additional information on travel tuning and page 41 for pressure tuning.

---

**Note**

Use Expert tuning only if standard tuning has not achieved the desired results.

Stabilize/Optimize or Performance Tuner may be used to achieve the desired results more rapidly than expert tuning.

---

Table 3-2 provides tuning set selection guidelines for Fisher and Baumann actuators. These tuning sets are only recommended starting points. After you finish setting up and calibrating the instrument, use Stabilize/Optimize to adjust the tuning set to get the desired response.

When Device Setup is complete you are asked if you wish to run Auto Calibration now. Select yes to automatically calibrate instrument travel at this time. Follow the prompts on the Field Communicator display. The calibration procedure uses the valve and actuator stops as the 0% and 100% calibration points. For additional information, refer to Auto Calibration in the Calibration section.

---

**Note**

Single-acting relay B and C are not user-adjustable. However, it is recommended that you check the relay adjustment for double-acting relay A in new installations before proceeding with travel calibration.

Refer to page 191 for relay adjustment instructions.

---

If after completing setup and calibration the valve cycles or overshoots (unstable), or is unresponsive (sluggish), you can improve operation by running *Performance Tuner* or *Stabilize/Optimize.*

# Performance Tuner

| Field Communicator | TB > Configure/Setup > Basic Setup > Performance Tuner |
|---|---|

### ⚠ WARNING

**During performance tuning the valve may move, causing process fluid or pressure to be released. To avoid personal injury and property damage caused by the release of process fluid or pressure, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.**

---

The Performance Tuner is used to determine digital valve controller tuning. It will move the valve slightly and monitor the effects of small tuning changes until an optimum control response is achieved. Because the Performance Tuner can detect internal instabilities before they become apparent in the travel response, it can generally optimize tuning more effectively than manual tuning. Typically, the Performance Tuner takes 3 to 5 minutes to tune an instrument, although tuning instruments mounted on larger actuators may take longer.

# Section 4 Detailed Setup

# Resource Block

## Overview

The resource block contains the hardware specific characteristics associated with a device; it has no input or output parameters. The resource block monitors and controls the general operation of other blocks within the device. Most of the resource block parameters are operational parameters that provide information about the instrument such as identification, hardware information, available options, etc. and are read only. Configuration of the resource block involves selecting features from those that are available, setting the mode, setting write lock, and setting up alert reporting details.

The following procedures address only the key resource block parameters; however, all resource block parameters are listed in table 4-3.

# Configure/Setup

## Setup

## Resource Block Mode

| Field Communicator | RB > Configure/Setup > Setup > Resource Block Mode |
|---|---|

### Modes

The resource block can be in one of two modes (MODE_BLK [5]):

○ **Automatic (Auto)**—This is the operational mode for this block. When the resource block is in the Auto mode, all other function blocks are allowed to function normally.

○ **Out of Service (OOS)**—Placing the resource block in Out of Service mode stops all function block execution, by setting their modes to Out of Service as well. The actual mode of the function blocks is changed to Out of Service, but the function block target modes are retained. Placing the resource block in the Out of Service mode does not affect the mode of the transducer block.

## Write Lock

| Field Communicator | RB > Configure/Setup > Write Lock |
|---|---|

● Write Lock

Write Lock (WRITE_LOCK [34]) determines if writes are permissible to other device parameters. The Firmware Write Lock feature must be selected to be able to use Write Lock (see Features). When Write Lock is set to Locked, no writes are permitted to any parameters within the device except to set Write Lock to Not Locked. When locked, the device functions normally, updating inputs and outputs and executing algorithms. When Write Lock is set to Not Locked, the Write Alarm (WRITE_ALM [40]) alert is active.

● Write Priority

Write Priority (WRITE_PRI [39]) sets the priority for Write Alarm. The lowest priority is 0. The highest is 15.

# Communication Time Out

| Field Communicator | RB > Configure/Setup > Communication Time Out |
|---|---|

● Shed Remote Cascade

---

**Note**

Typically this parameter does not need to be changed. The unit will be operational using the default values assigned by the factory. Perform this procedure only if a remote computer is sending setpoints from your "advanced" control.

Default value for RCas Timeout is 20 seconds.

---

Shed Remote Cascade (SHED_RCAS [26]) determines how long function blocks in the DVC6200f should wait before giving up on remote computer writes to RCas parameters. When the timeout is exceeded, the block sheds to the next mode as defined by the block shed options. If Shed Remote Cascade is set to 0, the block will not shed from RCas. Enter a positive value in the Shed Remote Cascade field. Time duration is in 1/32 milliseconds (640000 = 20 secs).

● Shed Remote Out

---

**Note**

Typically this parameter does not need to be changed. The unit will be operational using the default values assigned by the factory. Perform this procedure only if a remote computer is sending setpoints from your "advanced" control.

Default value for Shed Remote Out is 20 seconds.

---

Shed Remote Out (SHED_ROUT [27]) determine how long function blocks in the DVC6200f should wait before giving up on computer writes to ROut parameters. When the timeout is exceeded, the block sheds to the next mode as defined by the block shed options. If Shed Remote Out is set to 0, the block will not shed from ROut. Enter a positive value in the Shed Remote Out field. Time duration is in 1/32 milliseconds (640000 = 20 secs).

# Options

| Field Communicator | RB > Configure/Setup > Options |
|---|---|

● Diagnostic Options

Diagnostic Options (DIAG_OPTIONS [45]) shows the diagnostic options available in the instrument.

● Function Block Options

Function Block Options (FB_OPTIONS [44]) shows which function blocks are available in the instrument.

- Miscellaneous Options

Miscellaneous Options (MISC_OPTIONS [46]) indicates which miscellaneous licensing options are enabled.

- Features Available

Features Available (FEATURES [17]) indicates which Resource Block Options features are available.

○ **Reports**—Reports enables alert and event reporting. Reporting of specific alerts may be suppressed. See Alerts on page 45.

○ **Fault State**—Fault state enables the ability of the output block to react to various abnormal conditions by shedding mode. See parameter descriptions for Set Fault State (SET_FSTATE [29]) and Clear Fault State (CLR_FSTATE [30]) in table 4-3 and "Action on Fault Detection".

○ **Soft Write Lock**—Soft Write lock permits using Write Lock (WRITE_LOCK [34]) to prevent any external change to parameter values. Block connections and calculation results will proceed normally, but the configuration is locked. Also see Write Lock, on page 21.

○ **Multi-bit Alarm (Bit-Alarm) Support**— Multi-bit Alarm (Bit-Alarm) Support permits the instrument to treat each PlantWeb alert separately when broadcast to the Host. Without Multi-Bit Alarm Support, an individual PlantWeb alert must be acknowledged before another PlantWeb alert can be broadcast to the Host

- Features Selected

---

**Note**

Typically this parameter does not need to be changed. The unit will be operational using the default values assigned by the factory.

Fault State, Software Write Lock, and Output Readback are set by default.

---

Features Selected (FEATURE_SEL [18]) indicates which Resource Block Options features have been selected and is used to select the desired features.

○ **Reports**—Selecting reports enables alert and event reporting. Reporting of specific alerts may be suppressed. See Alerts on page 45.

○ **Fault State**—Selecting fault state enables the ability of the output block to react to various abnormal conditions by shedding mode. See parameter descriptions for Set Fault State (SET_FSTATE [29]) and Clear Fault State (CLR_FSTATE [30]) in table 4-3 and "Action on Fault Detection".

○ **Soft Write Lock**—When selected, permits using Write Lock (WRITE_LOCK [34]) to prevent any external change to parameter values. Block connections and calculation results will proceed normally, but the configuration is locked. Also see Write Lock, on page 21.

○ **Multi-bit Alarm (Bit-Alarm) Support**— When selected, the instrument will allow the instrument to treat each PlantWeb alert separately when broadcast to the Host.

# Alarm Handling

| Field Communicator | RB > Configure/Setup > Alarm Handling |
|---|---|

- **Alert Key**—Alert Key (ALERT_KEY [4]) is a number that permits grouping alerts. This number may be used to indicate to the operator the source of the alert, such as the instrument, plant unit, etc. Enter a value between 1 and 255.

- **Confirm Time**—Confirm Time (CONFIRM_TIME [33]) determines the time, in 1/32 of a millisecond, the instrument waits for confirmation of receipt of a report before trying again. If Confirm Time is 0, the instrument does not retry to send the report. Enter 0 or a value between 320000 (10 secs) and 640000 (20 secs).

- **Limit Notify**—Limit Notify (LIM_NOTIFY [32]) is the number of alert reports that the device can send without getting a confirmation up to the maximum permitted in Maximum Notify (MAX_NOTIFY [31]). If Limit Notify is set to zero, no alerts are reported. Enter a value between 0 and 3.

  To have the instrument report alerts without having the host poll the alerts parameters, select the Reports feature (see Feature Select).

- **Maximum Notify**—Maximum Notify (MAX_NOTIFY [31]) indicates the maximum number of alert reports that the device can send without getting a confirmation. This limit is determined by the amount of memory available for alert messages. The number can be set lower, to control alert flooding, by adjusting Maximum Alerts Allowed (LIM_NOTIFY [32]).

- **Block Alarm Disabled**—The Block Alarm (BLOCK_ALM [36]) is used for all configuration, hardware, connection failure or system problems in the block. Alarm Summary (ALARM_SUM [37]) determines if the Write Alarm (WRITE_ALM [40]) and Block Alarm [BLOCK_ALM [36]) are disabled.

- **Block Alarm Auto Acknowledge**—Acknowledge Option (ACK_OPTION [38]) determines if the block alarm will be automatically acknowledged.

- **Discrete Alarm Disabled**—The Write Alarm (WRITE_ALM [40]) is used to alert when parameters are writeable to the device. Alarm Summary (ALARM_SUM [37]) determines if the Discrete Alarm is disabled.

- **Discrete Alarm Auto Acknowledge**—Acknowledge Option (ACK_OPTION [38]) determines if the Write Alarm associated with the block will be automatically acknowledged.

# Identification

| Field Communicator | RB > Configure/Setup > Identification |
|---|---|

- **Device ID**—The 32 character Device ID (DEVICE_ID [54]).

- **Electronics Serial Number**—The Electronics Serial Number (ELECTRONICS_SN [49]) set at the factory.

- **Factory Serial Number**—The Factory Serial Number (FACTORY_SN [50]) is the instrument serial number set at the factory.

- **Field Serial Number**——The Field Serial Number (FIELD_SN [51]) is the serial number of instrument assigned in field.

- **Tag Description**—The Tag Description (TAG_DESC [2]) is used to assign a unique 32 character description to each block within the digital valve controller to describe the intended application for the block.

- **Strategy**—Strategy (STRATEGY [3]) permits strategic grouping of blocks so the operator can identify where the block is located. The blocks may be grouped by plant area, plant equipment, etc. Enter a value between 0 and 65535 in the Strategy field.

- **Manufacturer**—Manufacturer Identification (MANUFAC_ID [10]) identifies the manufacturer of the instrument. It is used by the host system to locate the DD file for the device. For Fisher the Manufacturer ID is 0x5100.

- **Device Type**—Device Type (DEV_TYPE [11]) identifies the type of device. It is used by the host system to locate the DD file for the device. For a DVC6200f digital valve controller the device type is 0x4602.

- **Diagnostic Options**—Diagnostic Options (DIAG_OPTIONS [45]) shows the diagnostic options available in the instrument.

## Version

| Field Communicator | RB > Configure/Setup > Version |
|---|---|

- **Device Revision**—The Device Revision (DEV_REV [12]) is the manufacturer's revision number associated with the resource, used by an interface device to locate the DD file for the resource.

- **Firmware Revision**—Firmware Revision (FIRMWARE_REVISION [47]) identifies the revision of the firmware that is currently in use.

- **Standby Firmware Revision**—Standby Firmware Revision (STBY_FIRMWARE_REVISION [55]) identifies the revision of the alternative firmware.

- **Hardware Revision**—Hardware Revision (HARDWARE_REV [48]) identifies the revision of the electronic hardware.

- **ITK Version**—ITK Version (ITK_VER [41]) identifies the major version of the Interoperability Tester used by the Fieldbus Foundation in certifying the device as interoperable. This device revision meets the requirements of version 5.

## Block Errors

Table 4-1 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are not applicable for the Resource block and are provided only for your reference.

Table 4-1. Resource Block BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | **Other** - Set if a device initialization error occurred. |
| 1 | **Block Configuration Error** - Set if FEATURE_SEL, CYCLE_SEL, or CYCLE_TYPE is set incorrectly. |
| 2 | *Link Configuration Error - N/A* |
| 3 | **Simulate Active** - Indicates that the simulation jumper is in place on the aux terminals. This is not an indication that the I/O blocks are using simulation data. See AO block parameter SIMULATE [10] and DO block parameter SIMULATE_D [10]. |
| 4 | *Local Override - N/A* |
| 5 | **Device Fault State** - Indicates the device is in Fault State. |
| 6 | **Device Needs Maintenance Soon** - Indicates a Maintenance or Advisory PlantWeb Alert condition is active. |
| 7 | *Input failure/process variable had Bad status - N/A* |
| 8 | *Output failure - N/A* |
| 9 | **Memory failure** - Indicates a pending Flash or NVM failure. |
| 10 | **Lost Static Data** - Indicates failure of the memory containing static parameters. |
| 11 | **Lost NV Data** - Indicates failure of the memory containing non-volatile parameters. |
| 12 | *Readback Check Failed - NA* |
| 13 | **Device Needs Maintenance Now** - Indicates a Failed PlantWeb Alert condition is active. |
| 14 | **Power Up** - Indicates the device has been powered up and the Resource Block is <u>not</u> running normally. |
| 15 | **Out of Service (MSB)** - The resource block actual mode is Out of Service. |

Table 4-2. Parameters Affected by Restart with Defaults

| Index Number | Parameter Name | Initial Value |
|---|---|---|
| | **Resource Block** | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |
| 5 | MODE_BLK | |
| | TARGET | Auto |
| | PERMITTED | Auto or Out of Service |
| | NORMAL | Auto |
| 14 | GRANT_DENY | All bits: 0 |
| 18 | FEATURE_SEL | Set by mfgr. |
| 20 | CYCLE_SEL | 0:0 |
| 26 | SHED_RCAS | 640000 |
| 27 | SHED_ROUT | 640000 |
| 28 | FAULT_STATE | 1=Clear |
| 32 | LIM_NOTIFY | MAX_NOTIFY |
| 33 | CONFIRM_TIME | 640000 |
| 34 | WRITE_LOCK | 1=Unlocked |
| 37 | ALARM_SUM | |
| | DISABLED | All bits: 0 |
| 38 | ACK_OPTION | Disabled |
| 39 | WRITE_PRI | 0 |
| | **AO Block** | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | OOS+MAN+AUTO+CAS+RCAS |
| | NORMAL | Auto |
| 8 | SP | Dynamic |
| 9 | OUT | Dynamic |
| 11 | PV_SCALE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal Places | 2 |
| 12 | XD_SCALE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal Places | 2 |
| 14 | IO_OPTS | All off |
| 15 | STATUS_OPTS | All off |
| 17 | CAS_IN | BAD: |
| | | NC: |
| | | const |
| | | 0 |
| 18 | SP_RATE_DN | +INF |
| 19 | SP_RATE_UP | +INF |
| 20 | SP_HI_LIM | 100 |
| 21 | SP_LO_LIM | 0 |
| 22 | CHANNEL | 1=analog valve input |

-Continued-

Table 4-2. Parameters Affected by Restart with Defaults (Continued)

| Index Number | Parameter Name | Initial Value |
|---|---|---|
| | **AO Block (continued)** | |
| 23 | FSTATE_TIME | 0 |
| 24 | FSTATE_VAL | 0 |
| 26 | RCAS_IN | |
| | Status | BAD: |
| | | NoComm: |
| | | NoVal: |
| | | const |
| | Value | 0 Trk |
| 27 | SHED_OPT | All off |
| | **PID Block Parameters** | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | OOS+MAN+AUTO+CAS+ |
| | | RCAS+ROUT |
| | NORMAL | Auto |
| 8 | SP | Dynamic |
| 9 | OUT | Dynamic |
| 10 | PV_SCALE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal Places | 2 |
| 11 | OUT_SCALE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal Places | 2 |
| 13 | CONTROL_OPTS | 0: Bypass enable |
| 14 | STATUS_OPTS | All off |
| 15 | IN | |
| | Status | BAD: |
| | | NC: |
| | | const |
| | Value | 0 |
| 16 | PV_FTIME | 0 |
| 17 | BYPASS | 0 |
| 18 | CAS_IN | |
| | Status | BAD: |
| | | NC: |
| | | const |
| | Value | 0 |
| 19 | SP_RATE_DN | +INF |
| 20 | SP_RATE_UP | +INF |
| 21 | SP_HI_LIM | 100 |
| 22 | SP_LO_LIM | 0 |
| 23 | GAIN | 1 |
| 24 | RESET | +INF |
| 25 | BAL_TIME | 0 |
| 26 | RATE | 0 |
| 27 | BKCAL_IN | |
| | Status | BAD: |
| | | NC: |
| | | const |
| | Value | 0 |

-Continued-

Table 4-2. Parameters Affected by Restart with Defaults (Continued)

| Index Number | Parameter Name | Initial Value |
|---|---|---|
| **PID Block (continued)** | |
| 28 | OUT_HI_LIM | 100 |
| 29 | OUT_LO_LIM | 0 |
| 30 | BKCAL_HYS | 0.5% |
| 32 | RCAS_IN | |
| | Status | BAD: NoCom: NoVal: const |
| | Value | 0 Trk |
| 33 | ROUT_IN | |
| | Status | BAD: NoCom: NoVal: const |
| | Value | 0 Trk |
| 34 | SHED_OPT | 0 |
| 37 | TRK_SCALE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal places | 2 |
| 38 | TRK_IN_D | |
| | Status | BAD: NC: const |
| | Value | 0 |
| 39 | TRK_VAL | |
| | Status | BAD: NC: const |
| | Value | 0 |
| 40 | FF_VAL | |
| | Status | BAD: NC: const |
| | Value | 0 |
| 41 | FF_SCALE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal Places | 2 |
| 42 | FF_GAIN | 0 |
| 45 | ALARM_SUM | |
| | DISABLED | 0 |
| 46 | ACK_OPTION | Disabled |
| 47 | ALARM_HYS | 0.5% |
| 48 | HI_HI_PRI | 0 |
| 49 | HI_HI_LIM | +INF |
| 50 | HI_PRI | 0 |
| 51 | HI_LIM | +INF |
| 52 | LO_PRI | 0 |
| 53 | LO_LIM | -INF |
| 54 | LO_LO_PRI | 0 |
| 55 | LO_LO_LIM | -INF |
| 56 | DV_HI_PRI | 0 |
| 57 | DV_HI_LIM | +INF |
| 58 | DV_LO_PRI | 0 |
| 59 | DV_LO_LIM | -INF |

-Continued-

Table 4-2. Parameters Affected by Restart with Defaults (Continued)

| Index Number | Parameter Name | Initial Value |
|---|---|---|
| **PID Block (continued)** | |
| 66 | BIAS | |
| 69 | SP_FTIME | 0 |
| 70 | MATHFORM | 0 |
| 71 | STRUCTURECONFIG | 0 |
| 72 | GAMMA | |
| 73 | BETA | |
| 74 | IDEABAND | 0 |
| **ISEL Block** | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | OOS+MAN+AUTO |
| | NORMAL | Auto |
| 7 | OUT | |
| 8 | OUT_RANGE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal Places | 2 |
| 10 | STATUS_OPTS | All off |
| 11 | IN_1 | |
| | Status | BAD NC cons |
| | Value | 0 |
| 12 | IN_2 | |
| | Status | BAD NC cons |
| | Value | 0 |
| 13 | IN_3 | |
| | Status | BAD NC cons |
| | Value | 0 |
| 14 | IN_4 | |
| | Status | BAD NC cons |
| | Value | 0 |
| 15 | DISABLE_1 | |
| | Status | BAD NC cons |
| | Value | 0 |
| 16 | DISABLE_2 | |
| | Status | BAD NC cons |
| | Value | 0 |

-Continued-

Table 4-2. Parameters Affected by Restart with Defaults (Continued)

| Index Number | Parameter Name | Initial Value |
|---|---|---|
| ISEL Block (continued) | | |
| 17 | DISABLE_3 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 18 | DISABLE_4 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 19 | SELECT_TYPE | All off |
| 20 | MIN_GOOD | 0 |
| 22 | OP_SELECT | |
| | Status | BAD |
| | | NC |
| | | constant |
| | Value | 0 |
| 25 | IN_5 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 26 | IN_6 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 27 | IN_7 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 28 | IN_8 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 29 | DISABLE_5 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 30 | DISABLE_6 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 31 | DISABLE_7 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 32 | DISABLE_8 | |
| | Status | BAD |
| | | NC |
| | | cons |
| | Value | 0 |
| 33 | AVG_USE | 0 |
| 34 | ALARM_SUM | |
| | DISABLED | 0 |
| 35 | ACK_OPTION | 0 |
| 36 | ALARM_HYS | 0.5% |
| 37 | HI_HI_PRI | 0 |

-Continued-

Table 4-2. Parameters Affected by Restart with Defaults (Continued)

| Index Number | Parameter Name | Initial Value |
|---|---|---|
| ISEL Block (continued) | | |
| 38 | HI_HI_LIM | 0 |
| 39 | HI_PRI | 0 |
| 40 | HI_LIM | 0 |
| 41 | LO_PRI | 0 |
| 42 | LO_LIM | 0 |
| 43 | LO_LO_PRI | 0 |
| 44 | LO_LO_LIM | 0 |
| 49 | OUT_D | |
| 50 | ALM_SEL | All bits: 0 |
| DI Block | | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | OOS+MAN+AUTO |
| | NORMAL | Auto |
| 8 | OUT_D | |
| 10 | XD_STATE | 0 |
| 11 | OUT_STATE | 0 |
| 13 | IO_OPTS | All off |
| 14 | STATUS_OPTS | All off |
| 15 | CHANNEL | 0 |
| 16 | PV_FTIME | 0 |
| 20 | ALARM_SUM | |
| | DISABLED | 0 |
| 21 | ACK_OPTION | All off |
| 22 | DISC_PRI | 0 |
| 23 | DISC_LIM | 0 |
| OS Block | | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | OOS+MAN+AUTO |
| | NORMAL | AUTO+CAS |
| 7 | SP | |
| 8 | OUT_1 | |
| 9 | OUT_2 | |
| 10 | OUT_1_RANGE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal Places | 2 |
| 11 | OUT_2_RANGE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Engineering Units | % |
| | Decimal Places | 2 |
| 13 | STATUS_OPTS | disabled |
| 14 | CAS_IN | |
| | Status | BAD |
| | | NC |
| | | const |
| | Value | 0 |

-Continued-

## Table 4-2. Table Parameters Affected by Restart with Defaults (Continued)

| Index Number | Parameter Name | Initial Value |
|---|---|---|
| **OS Block (continued)** | | |
| 19 | BKCAL_1_IN | |
| | Status | BAD |
| | | NC |
| | | const |
| | Value | 0 |
| 20 | BKCAL_2_IN | |
| | Status | BAD |
| | | NC |
| | | const |
| | Value | 0 |
| 21 | BAL_TIME | 0 |
| **AI Block** | | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | OOS, MAN, AUTO |
| | NORMAL | Auto |
| 8 | OUT | |
| 10 | XD_SCALE | |
| | EU at 100% | 100 |
| | EU 0% | 0 |
| | Units Index | % |
| | Decimal point | 2 |
| 11 | OUT_SCALE | |
| | EU 100% | 100 |
| | EU 0% | 0 |
| | Units Index | Trk s/b% |
| | Decimal point | 2 |
| 13 | I/O OPTS | disabled |
| 14 | STATUS OPTS | disabled |
| 15 | CHANNEL | 0 |
| 16 | L_TYPE | 0 |
| 17 | LOW_CUT | 0 |
| 18 | PV_FTIME | 0 |
| 22 | ALARM_SUM | |
| | DISABLED | 0 |
| 23 | ACK_OPTION | Disabled |
| 24 | ALARM_HYS | 0.5% |
| 25 | HI_HI_PRI | 0 |
| 26 | HI_HI_LIM | 0 |
| 27 | HI_PRI | 0 |
| 28 | HI_LIM | 0 |
| 29 | LO_PRI | 0 |
| 30 | LO_LIM | 0 |
| 31 | LO_LO_PRI | 0 |
| 32 | LO_LO_LIM | 0 |
| 37 | OUT_D | |
| 38 | ALM_SEL | unselected |
| **MAI Block** | | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |

-Continued-

## Table 4-2. Parameters Affected by Restart with Defaults (Continued)

| Index Number | Parameter Name | Initial Value |
|---|---|---|
| **MAI Block (continued)** | | |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | OOS, MAN, AUTO |
| | NORMAL | Auto |
| 7 | CHANNEL | |
| 8 | OUT_1 | TB.FINAL_VALUE |
| 9 | OUT_2 | TB.TRAVEL_TARGET |
| 10 | OUT_3 | TB.FINAL_POSITION_VALUE |
| 11 | OUT_4 | TB.TRAVEL |
| 12 | OUT_5 | TB.SUPPLY_PRESS |
| 13 | OUT_6 | TB.ACT_PRESS_A |
| 14 | OUT_7 | TB.ACT_PRESS_B |
| 15 | OUT_8 | TB.ACT_PRESS_DIFF |
| **DO Block** | | |
| 1 | ST_REV | 0 |
| 2 | TAG_DESC | spaces |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 0 |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | OOS+MAN+AUTO+CAS+ RCAS |
| | NORMAL | AUTO+CAS |
| 8 | SP_D | |
| 9 | OUT_D | |
| 11 | PV_STATE | 0 |
| 12 | XD_STATE | 0 |
| 14 | IO_OPTS | All off |
| 15 | STATUS_OPTS | All off |
| 17 | CAS_IN_D | |
| | Status | BAD |
| | | NC |
| | | const |
| | Value | 0 |
| 18 | CHANNEL | 22 |
| 19 | FSTATE_TIME | 0 |
| 20 | FSTATE_VAL_D | 0 |
| 22 | RCAS_IN_D | |
| | Status | BAD |
| | | NoComm |
| | | NoVal |
| | | const |
| | Value | 0 |
| 23 | SHED_OPT | All off |
| 27 | SP_RATE_UP | 0 |
| 28 | SP_RATE_DN | 0 |
| **Transducer Block** | | |
| 1 | ST_REV | N/A |
| 2 | TAG_DESC | NULL |
| 3 | STRATEGY | 0 |
| 4 | ALERT_KEY | 1 |
| 5 | MODE_BLK | |
| | TARGET | Out of Service |
| | PERMITTED | AUTO, MAN, OOS |
| | NORMAL | Auto |
| 87 | PROTECTION | None |

# Resource Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter
- Double indentation and shaded Index Number indicates sub-parameter.

Table 4-3. Resource Block Parameter Definitions

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision ST_REV | 1 | RO | NA | 0 to 65535 | 0 | Data Type: Unsigned16 The revision level of the static data. Increments by one each time a static parameter changes. The value is reset to 0 whenever a Restart with Defaults is performed. See Restarting the Instrument. |
| Tag Description TAG_DESC | 2 | RW | NA | 7 bit ASCII | Spaces | Data Type: Octet String The user description of the intended application of the block. Null characters are not allowed in this data type. |
| Strategy STRATEGY | 3 | RW | ALL | 0 to 65535 | 0 | Data Type: Unsigned16 Used to identify groupings of blocks. The data is not checked or processed by the block. |
| Alert Key ALERT_KEY | 4 | RW | ALL | 1 to 255 | 0 | Data Type: Unsigned8 The identification number of the plant unit. Devices in a loop or plant section can be assigned with a common alert key to aid the operator in determining location of alerts. |
| Block Mode MODE_BLK | 5 | | | | | |
| TARGET_MODE | 5.1 | RW | ALL | 3: Auto 7: OOS | 3: Auto | Data Type: DS-69 The actual, target, permitted, and normal modes. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target |
| ACTUAL_MODE | 5.2 | RO | NA | 3: Auto 6: IMAN (only during initialization 7: OOS | N/A | |
| PERMITTED_MODE | 5.3 | RW | ALL | 3: Auto 7: OOS | 3: Auto 7: OOS | |
| NORMAL_MODE | 5.4 | RW | ALL | 3: Auto | 3: Auto | |
| Block Error BLOCK_ERR | 6 | RO | N/A | 0: Other 1: Block Configuration Error 3: Simulate Active 6: Device needs Maintenance Soon 9: Memory Failure 10: Lost Static Data 11: Lost Non-Volatile Memory 13: Device needs Maintenance Now 14: Power-up 15: Out-of-Service (MSB) | Dynamic | Data Type: Bit String 0 = Inactive 1 = Active Error status associated with hardware or software for the resource block. When an error is shown it may be broadcast to the host through BLOCK_ALM. |
| Device State RS_STATE | 7 | RO | N/A | 2: Initialization, Actual mode=IMAN 4: On-line, Actual Mode=Auto 5: Standby, Actual Mode=OOS 6: Failure, Actual Mode=OOS | 5: Standby | Data Type: Unsigned8 State of the function block application state machine. |
| Test Read Write TEST_RW | 8 | | ALL | | 0 | This parameter may be used in interoperability testing to read and write all standard data types supported by the Fieldbus Foundation. |

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Table 4-3. Resource Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial<br>Value | Description |
|---|---|---|---|---|---|---|
| DD Resource<br>DD_RESOURCE | 9 | RO | N/A | | Spaces | Data Type: Visible String<br>String identifying the VFD tag of the resource that contains the Device Description for this resource. |
| Manufacturer Id<br>MANUFAC_ID | 10 | RO | N/A | | 0x5100 | Data Type: Unsigned32<br>Manufacturer identification number, used by an interface device or host to locate the DD file for the resource. All manufacturer identification numbers are maintained by the Fieldbus Foundation. A host usually will have a base directory for DD files. In this directory is a subdirectory for each manufacturer id. In each manufacturer id subdirectory is a directory for each device type made by that manufacturer. The device type directories contain files named by combining the device revision for the particular device type with the revision of the device description. The manufacturer id for Fisher is 0x005100. |
| Device Type<br>DEV_TYPE | 11 | RO | N/A | | 4602 | Data Type: Unsigned16<br>Manufacturer's model number associated with the resource, used by an interface device to locate the DD file for the resource. |
| Device Revision<br>DEV_REV | 12 | RO | N/A | | Varies with release | Data Type: Unsigned8<br>Manufacturer's revision number associated with the resource, used by an interface device to locate the DD file for the resource. |
| DD Revision<br>DD_REV | 13 | RO | N/A | | Varies with release | Data Type: Unsigned8<br>The minimum revision of the device description (DD) than can be used with the device revision of the instrument. Used by the interface device to prevent the use of DDs that are incompatible with the firmware in the instrument. |
| Grant Deny<br>GRANT_DENY | 14 | | | | | |
| GRANT | 14.1 | RW | ALL | Valid Bits:<br>0: Program<br>1: Tune<br>2: Alarm<br>3: Local | All bits: 0 | Data Type: DS-70<br>Options for controlling access of a host computer and to block parameters. Parameter contains two attributes Grant and Deny each with program, tune, alarm and local permissions. Clearing a grant permission sets the corresponding deny permission, 0 = N/A, 1 = granted. |
| DENY | 14.2 | RW | ALL | | All bits: 0 | Deny permissions may be cleared through the Deny attribute but not set, 0 = N/A, 1 = denied. |
| Hard Types<br>HARD_TYPES | 15 | RO | N/A | 0: Scalar Input<br>1: Scalar Output<br>2: Discrete Input<br>3: Discrete Output | 0: 1<br>1: 1<br>2: 1<br>3: 1 | Data Type: Bit String<br>0 = Inactive<br>1 = Active<br>The types of hardware available as channel numbers in this resource. |
| Restart<br>RESTART | 16 | RW | ALL | 1=Run<br>2=Restart resource<br>3=Restart with defaults<br>4=Restart processor | 1=Run | Data Type: Unsigned8<br>Allows a manual restart to be initiated. For details see Restarting the Instrument in this section. |
| Features<br>FEATURES | 17 | RO | ALL | 1: Reports supported<br>2: Fault State supported<br>3: Software Write lock supported<br>10: Reannunciation supported | 1: 1<br>2: 1<br>3: 1<br>10: 1 | Data Type: Bit String<br>0 = Inactive<br>1 = Active<br>Shows the supported resource block options. Options are turned on and off via FEATURE_SELECT. |

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Table 4-3. Resource Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial<br>Value | Description |
|---|---|---|---|---|---|---|
| Features Selected<br>FEATURE_SEL | 18 | RW | ALL | 1: Reports Supported<br>2: Fault State supported<br>3: Software Write lock supported<br>10:Reannunciation supported | 1:0<br>2:1<br>3:1<br>10:0 | Data Type: Bit String<br>0 = Inactive<br>1 = Active<br>Shows the selected resource block options. For details see Device Features in this section. |
| Cycle Type<br>CYCLE_TYPE | 19 | RO | NA | 0: Scheduled | 0: 1 | Data Type: Bit String<br>0 = Inactive<br>1 = Active<br>Identifies the block execution methods available for this resource, may be scheduled, completion of block execution |
| Cycle Selection<br>CYCLE_SEL | 20 | | ALL | 0: Scheduled | 0: 0 | Data Type: Bit String<br>0 = Inactive<br>1 = Active<br>Identifies the block execution method selected for this resource. |
| Minimum Cycle Time<br>MIN_CYCLE_T | 21 | RO | NA | 3200 | 3200 | Data Type: Unsigned32<br>Time duration of the shortest cycle interval (in 1/32 millisecond) of which the resource is capable. In the digital valve controller this value is fixed at 3200 (100 milliseconds). |
| Memory Size<br>MEMORY_SIZE | 22 | RO | NA | 45 | 45 | Date Type: Unsigned16<br>Memory, in kilobytes, available for additional function blocks. Because no additional function blocks may be added to DVC6200f instruments, this parameter value is fixed at 45. |
| Nonvolatile Cycle Time<br>NV_CYCLE_T | 23 | RO | NA | Positive | 576,000 | Date Type: Unsigned32<br>This parameter identifies the minimum time interval (in 1/32 milliseconds) between copies of NV class data to NV memory. NV memory is updated only if there has been a change in the dynamic value. The last value saved in NV memory will be available for the restart procedure or a power cycle. A non-zero value regulates the frequency of writes, thus protecting the life span of the device. If the value is zero, data will never be automatically copied. Changes made by other than publishing to NV parameters will be copied to non-volatile memory immediately. For DVC6200f instruments, this parameter value is fixed at 576,000 (18 seconds). |
| Free Space<br>FREE_SPACE | 24 | RO | NA | 0 to 100% | 0 | Data Type: Float<br>Percent of memory available for additional function blocks (see also MEMORY_SIZE). Because no additional function blocks may be added to DVC6200f instruments, this parameter value is fixed at 0. |
| Free Time<br>FREE_TIME | 25 | RO | NA | 0 to 100% | 0 | Data Type: Float<br>Percent of block processing time that is free to process additional blocks. Because no additional function blocks may be added to DVC6200f instruments, this parameter value is fixed at 0. |
| RCAS Timeout<br>SHED_RCAS | 26 | RW | ALL | Positive | 640000 | Date Type: Unsigned32<br>Time duration (in 1/32 millisecond) at which to give up on computer writes to function block RCAS parameters. If this time is exceeded then the function block will change to a mode other than RCAS based on the SHED_OPT parameter setting. Shed from RCAS mode never happens when SHED_RCAS is set to zero. |

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Table 4-3. Resource Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| ROUT Timeout SHED_ROUT | 27 | RW | ALL | Positive | 640000 | Data Type: Unsigned32 Time duration (in 1/32 millisecond) at which to give up on computer writes to function block ROUT parameters. If this time is exceeded then the function block will change to a mode other than ROUT based on the SHED_OPT parameter setting. Shed from ROUT mode never happens when SHED_ROUT is set to zero. |
| Fault State FAULT_STATE | 28 | RO | N/A | 1=Clear 2=Active | 1=Clear | Data Type: Unsigned8 Forces output function blocks that are not Out of Service to the fault state condition. While this parameter is active the output function blocks will go to an actual mode of Local Override (LO) and will perform their fault state actions (see Action On Fault Detection for the output blocks on pages 94 and 170 of this section). This parameter is used to test the fault state behavior that normally occurs when there is a communication problem between devices. This parameter is changed by the SET_FSTATE and CLR_FSTATE parameters so long as the feature Fault State is selected (see Feature Selection [index number 18] in this table). |
| Set Fault State SET_FSTATE | 29 | RW | ALL | 1=Off 2=Set | 1=Off | Data Type: Unsigned8 Selecting Set changes the parameter FAULT_STATE to Active. This is essentially a "write only" parameter as it will always read OFF because it is defined as momentary. Writing a value of OFF has no affect. To use this parameter the feature Fault State must be selected (see Features Selected on page 23). |
| Clear Fault State CLR_FSTATE | 30 | RW | ALL | 1=Off 2= Clear | 1=Off | Data Type: Unsigned8 Selecting Clear changes the parameter FAULT_STATE to Clear and clears the output function blocks of the FAULT_STATE if the field condition, if any, has cleared. This is essentially a "write only" parameter as it will always read OFF because it is defined as momentary. Writing a value of OFF has no affect. To use this parameter the feature Fault State must be selected (see Features Selected on page 23. |
| Maximum Notify MAX_NOTIFY | 31 | RO | N/A | 3 | 3 | Data Type: Unsigned8 The maximum number of alert reports that this device can send without getting a confirmation. To control alert flooding, the number can be set lower by adjusting the LIM_NOTIFY parameter value. For DVC6200f instruments, this value is fixed at 3. |
| Maximum Alerts Allow LIM_NOTIFY | 32 | RW | ALL | 0 to MAX_NOTIFY | MAX_NOTIFY | Data Type: Unsigned8 The number of alert reports that this device can send without getting a confirmation up to the maximum permitted in the parameter MAX_NOTIFY. If set to zero, then no alerts are reported. |
| Confirm Time CONFIRM_TIME | 33 | RW | ALL | > 0 Set by FCS | 640000 | Data Type: Unsigned32 The time (in 1/32 millisecond) the device waits for confirmation of receipt of an alert report before trying again. |

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Table 4-3. Resource Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial<br>Value | Description |
|---|---|---|---|---|---|---|
| Write Lock<br>WRITE_LOCK | 34 | RW | ALL | 0=Undefined<br>1=Unlocked<br>2=Locked | 1=Unlocked | Data Type: Unsigned8<br>If set to Locked, no writes from anywhere are allowed except to clear WRITE_LOCK by entering Unlocked. Block inputs will continue to be updated if they are subscribers. The feature Soft Write Lock must be selected to enable writing to this parameter (see Device Features in this section). |
| Update Event<br>UPDATE_EVT | 35 | | | | | |
| UNACKNOWLEDGED | 35.1 | RW | ALL | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=Undefined | Data Type: DS-73<br>This alert is generated by any change to the static data. To support tracking changes in static parameter values, the blocks static revision parameter will be incremented each time a static parameter value is changed. Also, the blocks static revision parameter may be incremented if a static parameter is written but the value is not changed. If the Actual Mode is not Out of Service and Reports is selected in the Feature Select parameter, then this parameter will be sent to the host system providing the host has set up alert communications. Changes to static data while the block is Out of Service will be reported when the block transitions to another mode. |
| UPDATE_STATE | 35.2 | RO | NA | 0=Undefined<br>1=Update reported<br>2=Update not reported | 0=Undefined | |
| TIME_STAMP | 35.3 | RO | NA | | 0 | |
| STATIC_REVISION | 35.4 | RO | NA | | 0 | |
| RELATIVE_INDEX | 35.5 | RO | NA | | 0 | |
| Block Alarm<br>BLOCK_ALM | 36 | | | | | |
| UNACKNOWLEDGED | 36.1 | RW | ALL | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=Undefined | Data Type: DS-72<br>This alarm is generated by a nonzero value in the Block Error. parameter. This alarm has a fixed priority of 2. For a BLOCK_ALM to be broadcast to the host the following conditions must be met:<br>    The feature Reports must be selected<br>    Alert communication with the host must be setup<br>    In the ALARM_SUM parameter, the disable bit for Block Alarm must be clear. |
| ALARM_STATE | 36.2 | RO | NA | 0=Undefined<br>1=Clear reported<br>2=Clear not reported<br>3=Active reported<br>4=Active not reported | 0=Undefined | |
| TIME_STAMP | 36.3 | RO | NA | | 0 | |
| SUBCODE | 36.4 | RO | NA | | 0 | |
| VALUE | 36.5 | RO | NA | | 0 | |
| Alarm Summary<br>ALARM_SUM | 37 | | | | | |
| CURRENT | 37.1 | RO | NA | 0: Discrete alarm<br>7: Block Alarm | All bits: 0 | Data Type: DS-74<br>0=clear, acknowledged, reported, enabled<br>Current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block. The Resource block only has two alarms: Write Alarm and Block Alarm. |
| UNACKNOWLEDGED | 37.2 | RO | NA | 0: Discrete alarm<br>7: Block Alarm | All bits: 0 | |
| UNREPORTED | 37.3 | RO | NA | 0: Discrete alarm<br>7: Block Alarm | All bits: 0 | |
| DISABLED | 37.4 | RW | ALL | 0: Discrete alarm<br>7: Block Alarm | All bits: 0 | |
| Acknowledge Option<br>ACK_OPTION | 38 | RW | ALL | 0: Discrete Alarm<br>(Write Lock off)<br>7: Block Alarm | 0: 0<br>7: 0 | Data Type: Bit String<br>0=Disable<br>1=Enable<br>Selection of whether alarms associated with the block will be automatically acknowledged. |
| Write Priority<br>WRITE_PRI | 39 | RW | ALL | 0 to 15 | 0 | Data Type: Unsigned8<br>Priority of the alarm generated by setting WRITE_LOCK to Unlocked. |

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Table 4-3. Resource Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Write Alarm<br>WRITE_ALM | 40 | | | | | Data Type: DS-72<br>This alarm is generated when Unlocked in the WRITE_LOCK parameter is set. This alarm has a priority of WRITE_PRI. For a WRITE_ALM to be broadcast to the host the following conditions must be met:<br>    The feature Reports must be selected<br>    Alert communication with the host must be setup<br>    In the ALARM_SUM parameter, the disable bit for Write Alarm must be clear.<br>    WRITE_PRI must be greater than 1. |
| UNACKNOWLEDGED | 40.1 | RW | ALL | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=Undefined | |
| ALARM_STATE | 40.2 | RO | NA | 0=Undefined<br>1=Clear reported<br>2=Clear not reported<br>3=Active reported<br>4=Active not reported | 0=Undefined | |
| TIME_STAMP | 40.3 | RO | NA | | 0 | |
| SUBCODE | 40.4 | RO | NA | | 0 | |
| VALUE | 40.5 | RO | NA | | 0 | |
| ITK Version<br>ITK_VER | 41 | RO | N/A | | * | Data Type: Unsigned16<br>Major version of ITK test this device has been tested to. *Initial value depends on the revision of the DVC6200f. |
| **Extended Parameters** | | | | | | |
| Private Label Distributor<br>DISTRIBUTOR | 42 | RO | NA | | 0x5100 | Data Type: Unsigned32<br>Private label distributor |
| Device String Array<br>DEV_STRING | 43 | | | | | Unused extended parameter. |
| Function Block Options<br>FB_OPTIONS | 44 | RO | | Bits<br>0: AO<br>1: DO<br>2: AI<br>3: DI<br>4: PID<br>5: ISEL<br>6: OS<br>7: MAI | All options enabled | Data Type: Bit String<br>0=disabled<br>1=enabled<br>Indicates which function block licensing options are enabled. One bit for each block type that is supported. Unlicensed blocks cannot be scheduled and the Actual block mode will remain OOS. |
| Diagnostic Options<br>DIAG_OPTIONS | 45 | RO | NA | 1=FD Fieldbus Diagnostics<br>2=AD Advanced Diagnostics<br>3=PD Performance Diagnostics | * | Data Type: Enum<br>Indicates which diagnostics licensing options are enabled. *Initial value depends on the licensed DVC6200f options. |
| Miscellaneous Options<br>MISC_OPTIONS | 46 | RO | NA | 0: Software Download<br>10: Travel Control Capable<br>11: Pressure Control Capable<br>12: Fallback Capable | FD<br>0: 1<br>10: 1<br>11: 1<br>AD/PD<br>0: 1<br>10: 1<br>11: 1<br>12: 1 | Data Type: Bit String<br>0=Disable<br>1=Enable<br>Indicates which miscellaneous licensing options are enabled. |
| Firmware Revision<br>FIRMWARE_REVISION | 47 | | | | | Data Type: Uint8<br>Describes software revision information. This is the revision of the firmware that is currently in use.<br>*Initial value depends on revision of DVC6200f. |
| FIRMWARE_REV_MAJOR | 47.1 | RO | NA | 0-255 | * | |
| FIRMWARE_REV_MINOR | 47.2 | RO | NA | 0-255 | * | |
| FIRMWARE_REV_BUILD | 47.3 | RO | NA | 0-255 | * | |
| IO_FIRMWARE_REV | 47.4 | RO | NA | 0-255 | * | |
| DIAG_CAL_REV | 47.5 | RO | NA | 0-255 | * | |
| FIRMWARE_REV_ALL | 47.6 | RO | NA | XX.XX.XX | * | Data Type: Visible String<br>Describes software revision information.<br>The range of this parameter consists of 47.1 through 47.5 values, converted to text, and linked together.<br>*Initial value depends on revision of DVC6200f |
| Hardware Revision<br>HARDWARE_REV | 48 | RO | NA | Hardware revision number | Factory Set | Data Type: Uint8<br>Describe electronic hardware revision information. |

-Continued-

Table 4-3. Resource Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Electronics Serial Number<br>ELECTRONICS_SN | 49 | RO | NA | NA | Factory Set | Data Type: Visible String    Electronics serial number set by manufacturing. |
| Factory Serial Number<br>FACTORY_SN | 50 | RO | NA | NA | spaces | Data Type: Visible String<br>Instrument serial number set by manufacturing. |
| Field Serial Number<br>FIELD_SN | 51 | RW | NA | Any String | spaces | Data Type: Visible String<br>Instrument serial number set in the field. |
| Detailed Status<br>DETAILED_STATUS | 52 | RO | NA | NA | 0 | Data Type: Uint32<br>Not used |
| Time Since Reset<br>TIME_SINCE_RESET | 53 | RO | NA | NA | 0 | Number of seconds since the last time DVC6200f was restarted. Restart due to power up or restart command. |
| Device ID<br>DEVICE ID | 54 | RO | NA | NA | Device ID | Data Type: Visible String<br>Unique 32 character ID used to identify the device. |
| STBY_FIRMWARE_REV | 55 | | | | | |
| STBY_FIRMWARE_REV_MAJOR | 55.1 | RO | NA | 0-255 | * | Data Type: Uint8<br>Describes firmware revision information. This is the revision of the alternative firmware.<br>*Initial value depends on revision of firmware in standby. |
| STBY_FIRMWARE_REV_MINOR | 55.2 | RO | NA | 0-255 | * | |
| STBY_FIRMWARE_REV_BUILD | 55.3 | RO | NA | 0-255 | * | |
| STBY_IO_FIRMWARE_REV | 55.4 | RO | NA | 0-255 | * | |
| STBY_DIAG_CAL_REV | 55.5 | RO | NA | 0-255 | * | |
| STBY_FIRMWARE_REV_ALL | 55.6 | RO | NA | XX.XX.XX | NA | Data Type: Visible String<br>Describes firmware revision information.<br>*Initial value depends on revision of firmware in standby. The range of this parameter consists of 55.1 through 55.5 values, converted to text, and linked together. |
| FB_AVAILABLE | 56 | RO | NA | Bits<br>0: AO<br>1: DO<br>2: AI<br>3: DI<br>4: PID<br>5: ISEL<br>6: OS<br>7: MAI | All options enabled | Data Type: Bit String<br>0=disabled<br>1=enabled<br>Indicates which function blocks are included in the device. |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-4. Resource Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | RS_STATE |
| 25 | FREE_TIME |
| 28 | FAULT_STATE |
| 37.1 | ALARM_SUM.CURRENT |
| 37.2 | ALARM_SUM.UNACKNOWLEDGED |
| 37.3 | ALARM_SUM.UNREPORTED |
| 37.4 | ALARM_SUM.DISABLED |

Table 4-5. Resource Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 14.1 | GRANT_DENY.GRANT |
| 14.2 | GRANT_DENY.DENY |
| 18 | FEATURE_SEL |
| 20 | CYCLE_SEL |
| 23 | NV_CYCLE_T |
| 24 | FREE_SPACE |
| 26 | SHED_RCAS |
| 27 | SHED_ROUT |
| 32 | LIM_NOTIFY |
| 33 | CONFIRM_TIME |
| 34 | WRITE_LOCK |

Table 4-6. Resource Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | RS_STATE |
| 25 | FREE_TIME |
| 28 | FAULT_STATE |
| 37.1 | ALARM_SUM.CURRENT |
| 37.2 | ALARM_SUM.UNACKNOWLEDGED |
| 37.3 | ALARM_SUM.UNREPORTED |

-continued-

Table 4-6. Resource Block, View 3 (continued)

| Index Number | Parameter |
|---|---|
| 37.4 | ALARM_SUM.DISABLED |
| 44 | FB_OPTIONS |
| 52 | DETAILED_STATUS |
| 53 | TIME_SINCE_RESET |
| 54 | DEVICE_ID |

Table 4-7. Resource Block, View 4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 10 | MANUFAC_ID |
| 11 | DEV_TYPE |
| 12 | DEV_REV |
| 13 | DD_REV |
| 15 | HARD_TYPES |
| 17 | FEATURES |
| 19 | CYCLE_TYPE |
| 21 | MIN_CYCLE_T |
| 22 | MEMORY_SIZE |
| 31 | MAX_NOTIFY |
| 38 | ACK_OPTION |
| 39 | WRITE_PRI |
| 41 | ITK_VER |
| 42 | DISTRIBUTOR |
| 43 | DEV_STRING |
| 45 | DIAG_OPTIONS |
| 46 | MISC_OPTIONS |
| 47.1 | FIRMWARE_REVISION.FIRMWARE_REV_MAJOR |
| 47.2 | FIRMWARE_REVISION.FIRMWARE_REV_MINOR |
| 47.3 | FIRMWARE_REVISION.FIRMWARE_REV_BUILD |
| 47.4 | FIRMWARE_REVISION.IO_FIRMWARE_REV |
| 47.5 | FIRMWARE_REVISION.DIAG_CAL_REV |
| 47.6 | FIRMWARE_REVISION.FIRMWARE_REV_ALL |
| 48 | HARDWARE_REV |
| 49 | ELECTRONICS_SN |
| 50 | FACTORY_SN |
| 51 | FIELD_SN |
| 55.1 | STBY_FIRMWARE_REV.STBY_FIRMWARE_REV_MAJOR |
| 55.2 | STBY_FIRMWARE_REV.STBY_FIRMWARE_REV_MINOR |
| 55.3 | STBY_FIRMWARE_REV.STBY_FIRMWARE_REV_BUILD |
| 55.4 | STBY_FIRMWARE_REV.STBY_IO_FIRMWARE_REV |
| 55.5 | STBY_FIRMWARE_REV.STBY_DIAG_CAL_REV |
| 55.6 | STBY_FIRMWARE_REV.STBY_FIRMWARE_REV_ALL |

# Transducer Block

## Overview

The transducer block accepts a signal from an output block as a set point to position a valve using a pneumatic actuator. Input to the transducer block is in percent. Closed is 0%, and open is 100%. The transducer block contains setup and calibration information and can be tuned to closely match the actuator. Input characterization permits modifying the overall characteristic of the instrument-actuator-valve combination in order to modify the installed gain characteristic of the loop. The transducer block can also be used to perform instrument and valve diagnostics and trigger performance alerts.

The following procedures address only the key transducer block parameters; however, all transducer block parameters are listed in table 4-14.

# Detailed Setup

---

**Note**

To setup and calibrate the instrument, the transducer block Mode must be Manual and the Protection must be None.

---

## Transducer Block Mode

| Field Communicator | TB > Configure/Setup > Detailed Setup > Transducer Block Mode |
|---|---|

### Modes

The transducer block can be in one of three modes (MODE_BLK [5]):

○ **Automatic (Auto)**— This is the normal mode for this block. When the transducer block is in the auto mode, it accepts the output from the AO or DO block as a set point and outputs a drive signal to the I/P converter based upon this set point.

○ **Out of Service (OOS)**— Placing the transducer block in Out of Service mode changes the output to the zero power (no I/P drive) condition.

| Field Communicator | |
|---|---|

○ **Manual (MAN)**— Placing the transducer block in Manual will hold the value at the current setpoint (FINAL_VALUE [13]). The transducer block will not accept changes from the AO or DO blocks. This mode is required to change some parameters and to run some diagnostics.

## Protection

| Field Communicator | TB > Configure/Setup > Detailed Setup > Protection |
|---|---|

To configure any parameters in the digital valve controller Write Lock (WRITE_LOCK [34]), in the resource block, must be set to Unlocked (refer to page 21). In addition, protection is provided for various transducer block parameters, as

indicated in the Protect Category column of table 4-14, to prevent inadvertently overwriting key data by the host system or user.

○ **All**— will protect all transducer block Parameters.

○ **Setup and Calibration**— will protect only Setup and Calibration transducer block parameters.

○ **Calibration**— will protect only Calibration transducer block parameters.

○ **None**— will not protect any transducer block parameters.

---

**Note**

The Device Setup Auto Travel and Manual Travel methods automatically change transducer block protection for the user.

---

See table 4-14 for individual parameter details.

# Response Control

## Travel Tuning

| Field Communicator | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning |
|---|---|

## ⚠ WARNING

**Changes to the tuning set may cause the valve/actuator assembly to stroke. To avoid personal injury or property damage caused by moving parts, keep hands, tools, and other objects away from the valve/actuator assembly.**

---

● Travel Tuning Set—There are eleven Travel Tuning Sets (TVL_TUNING_SET [42.10]) to choose from. Each tuning set provides a preselected value for the digital valve controller gain settings.

Tuning set C provides the slowest response and M provides the fastest response. Table 4-8 lists the proportional gain, velocity gain and minor loop feedback gain values for preselected tuning sets.

In addition, you can specify Expert tuning and individually set the proportional gain, velocity gain, and minor loop feedback gain. Individually setting or changing any tuning parameter or running the Performance Tuner or Stabilize/Optimize will automatically change the tuning set to X (expert).

Table 4-8. Gain Values for Preselected Travel Tuning Sets

| Tuning Set | Travel Proportional Gain | Travel Velocity Gain | Travel Minor Loop Feedback Gain |
|---|---|---|---|
| C | 4.4 | 3.0 | 35 |
| D | 4.8 | 3.0 | 35 |
| E | 5.5 | 3.0 | 35 |
| F | 6.2 | 3.1 | 35 |
| G | 7.2 | 3.6 | 34 |
| H | 8.4 | 4.2 | 31 |
| I | 9.7 | 4.8 | 27 |
| J | 11.3 | 5.6 | 23 |
| K | 13.1 | 6.0 | 18 |
| L | 15.5 | 6.0 | 12 |
| M | 18.0 | 6.0 | 12 |
| X (Expert) | User Adjusted | User Adjusted | User Adjusted |

---

**Note**

Use Expert tuning if standard tuning has not achieved the desired results.

Stabilize/Optimize may be used to achieve the desired results more rapidly than Expert tuning.

Table 3-2 provides tuning set selection guidelines for Fisher and Baumann actuators. These tuning sets are recommended starting points. After you finish setting up and calibrating the instrument, you may have to select either a higher or lower tuning set to get the desired response.

For an actuator not listed in table 3-2, you can estimate a starting tuning set by calculating the casing or cylinder volume. Then, find an actuator in table 3-2 with the closest equivalent volume and use the tuning set suggested for that actuator.

- Travel Proportional Gain—Travel Proportional Gain (SERVO_GAIN [18]) is the proportional gain for the travel control tuning set. Changing this parameter will also change the tuning set to Expert.

- Travel Velocity Gain—Travel Velocity Gain (SERVO_RATE [20]) is the velocity gain for the travel control tuning set. Changing this parameter will also change the tuning set to Expert.

- Travel MLFB Gain—Travel MLFB Gain (TVL_MLFB_GAIN [44.5]) is the minor loop feedback gain for the travel control tuning set. Changing this parameter will also change the tuning set to Expert.

- Travel Integral Enable—Travel Integral Enable (TVL_INTEG_ENABLE [44.1]) is used to enable the integral setting to improve static performance by correcting for error that exists between the travel target and actual travel.

- Travel Integral Gain—Travel Integral Gain (SERVO_RESET [19]) (also called reset) is the ratio of the change in output to the change in input, based on the control action in which the output is proportional to the time integral of the input.

- Travel Integral Dead Zone—Travel Integral Dead Zone (TVL_INTEG_DEADZ [44.4]) is a window around the Primary Setpoint in which the integral action is disabled. The dead band is configurable from 0 to 2%.

- Travel Integral Limit Hi—Travel Integral Limit Hi (TVL_INTEG_LIM_HI [44.2]) provides an upper limit to the integrator output. The high limit is configurable from 0 to 100% of the I/P drive signal.

- Travel Integral Limit Lo—The Travel Integral Limit Lo (TVL_INTEG_LIM_LO [44.3]) provides a lower limit to the integrator output. The low limit is configurable from -100 to 0% of the I/P drive signal.

- Performance Tuner

### ⚠ WARNING

**During performance tuning the valve may move, causing process fluid or pressure to be released. To avoid personal injury and property damage caused by the release of process fluid or pressure, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.**

Performance Tuner is used to determine digital valve controller tuning. It will move the valve slightly and monitor the effects of small tuning changes until an optimum control response is achieved. Because the Performance Tuner can detect internal instabilities before they become apparent in the travel response, it can generally optimize tuning more effectively than manual tuning.

- Stabilize/Optimize

### ⚠ WARNING

**During Stabilize/Optimize the valve may move, causing process fluid or pressure to be released. To avoid personal injury and property damage caused by the release of process fluid or pressure, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.**

If after completing initial setup and calibration the valve cycles or overshoots, or is sluggish, you can improve operation by running Stabilize/Optimize.

Stabilize/Optimize is included with the device description (DD) firmware. Stabilize/Optimize is accessible from the transducer block and permits changing the transducer block set point a small amount to see if the valve is unstable or unresponsive. If valve response is unsatisfactory, the method permits adjusting the digital valve controller tuning to improve response.

If the valve is unstable, select *Decrease Response* to stabilize valve operation. This selects the next lower tuning set (e.g., F to E). If the valve response is sluggish, select *Increase Response* to make the valve more responsive. This selects the next higher tuning set (e.g., F to G).

If after selecting *Decrease Response* or *Increase Response* the valve travel overshoot is excessive, *Increase Damping* or *Decrease Damping* can be used to select a damping value not represented in a predefined tuning set. Select *Decrease Damping* to select a damping value that allows more overshoot. Select *Increase Damping* to select a damping value that will decrease the overshoot.

When valve operation is satisfactory, select Exit. Before exiting, you are asked if you want to return the transducer block mode to Auto. Select Yes to change the transducer block mode to Auto. Select No to leave the transducer block in its current mode.

## Pressure Tuning

| Field Communicator | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning |
|---|---|

### ⚠ WARNING

**Changes to the tuning set may cause the valve/actuator assembly to stroke. To avoid personal injury or property damage caused by moving parts, keep hands, tools, and other objects away from the valve/actuator assembly.**

● Pressure Tuning Set

There are twelve Pressure Tuning Sets (PRESS_TUNING_SET [42.11]) to choose from. Each tuning set provides a preselected value for the digital valve controller gain settings.

Tuning set C provides the slowest response and M provides the fastest response. Tuning set B is appropriate for controlling a pneumatic positioner. Table 4-9 lists the proportional gain, pressure integrator gain and minor loop feedback gain values for preselected tuning sets.

In addition, you can specify Expert tuning and individually set the pressure proportional gain, pressure integrator gain, and pressure minor loop feedback gain. Individually setting or changing any tuning parameter will automatically change the tuning set to X (expert).

Table 4-9. Gain Values for Preselected Pressure Tuning Sets

| Tuning Set | Pressure Proportional Gain | Pressure Integrator Gain | Pressure Minor Loop Feedback Gain |
|---|---|---|---|
| B | 0.5 | 0.3 | 35 |
| C | 2.2 | 0.1 | 35 |
| D | 2.4 | 0.1 | 35 |
| E | 2.8 | 0.1 | 35 |
| F | 3.1 | 0.1 | 35 |
| G | 3.6 | 0.1 | 34 |
| H | 4.2 | 0.1 | 31 |
| I | 4.8 | 0.1 | 27 |
| J | 5.6 | 0.1 | 23 |
| K | 6.6 | 0.1 | 18 |
| L | 7.8 | 0.1 | 12 |
| M | 9.0 | 0.1 | 12 |
| X (Expert) | User Adjusted | User Adjusted | User Adjusted |

**Note**

Use Expert tuning only if standard tuning has not achieved the desired results.

Stabilize/Optimize may be used to achieve the desired results more rapidly than Expert tuning.

- Pressure Proportional Gain—Pressure Proportional Gain (PRESS_PROP_GAIN [47.3]) is the proportional gain for the pressure control tuning set. Changing this parameter will also change the tuning set to Expert.

- Pressure MLFB Gain—Pressure MLFB Gain (PRESS_MLFB_GAIN [47.11]) is the minor loop feedback gain for the pressure control tuning set. Changing this parameter will also change the tuning set to Expert.

- Pressure Integral Gain—Pressure Integral Gain (PRESS_INTEG_GAIN [47.4]) (also called reset) is the ratio of the change in output to the change in input, based on the control action in which the output is proportional to the time integral of the input. Changing this parameter will also change the tuning set to Expert.

- Pressure Integral Dead Zone—Pressure Integral Dead Zone (PRESS_INTEG_DEADZ [47.6]) is a window around the Primary Setpoint in which the integral action is disabled. The dead band is configurable from 0 to 2%.

- Pressure Integral Limit Hi—Pressure Integral Limit Hi (PRESS_INTEG_HI_LIM [47.7]) provides an upper limit to the integrator output. The high limit is configurable from 0 to 100% of the I/P drive signal.

- Pressure Integral Limit Lo—Pressure Integral Limit Lo (PRESS_INTEG_LO_LIM [47.8]) provides a lower limit to the integrator output. The low limit is configurable from -100 to 0% of the I/P drive signal.

## Travel Pressure Control

| Field Communicator | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control |
|---|---|

- Travel/Pressure State—Travel/Pressure State (TVL_PRESS.STATE [41.2]) indicates if the instrument is being used for travel control (position control) or as an I/P (pressure control)

- Travel/Pressure Select

## CAUTION

**When using Pressure Fallback Manual Recovery or Pressure Fallback Auto Recovery, the valve travel has the potential of moving rapidly causing potential process instability when returning to Travel Control.**

**Note**

Travel / Pressure Select must be set to Travel for double acting actuators.

Travel / Pressure Select (TVL_PRESS_SELECT [41.1]) determines if the instrument is setup for position or pressure control. Select Travel, Pressure, Travel with Pressure Fallback/Auto recovery or Travel with Pressure Fallback/Manual Recovery. If the travel sensor fails, and Travel with Pressure Fallback/Auto Recovery is selected, it will return to travel control when the travel sensor starts working again. Travel with Pressure Fallback/Manual recovery will stay in pressure control until Travel Pressure Select is changed to Travel or Travel with Pressure Fallback/Auto recovery. It is not necessary to enable the Travel Sensor Alert for Pressure Fallback to occur.

- Travel Deviation Pressure Fallback—Travel Deviation Pressure Fallback occurs when the instrument detects that the travel sensor is outside of its normal range of operation or that a gross deviation exists between set point and actual travel. It switches to Pressure Control and no longer uses the travel sensor to position the valve.

- Travel Cutoff Hi—Travel Cutoff Hi (FINAL_VALUE_CUTOFF_HI [15]) defines the high cutoff point for the travel in percent (%) of pre-characterized setpoint. Above this cutoff, the travel target is set to 123.0% of the ranged travel. Travel Cutoff Hi is deactivated by setting it to 125.0%.

- Travel Cutoff Lo—Travel Cutoff Lo (FINAL_VALUE_CUTOFF_LO [16]) defines the low cutoff point for the travel in percent (%) of pre-characterized setpoint. Below this cutoff, the travel target is set to -23%. A Travel Cutoff Lo of 0.5% is recommended to help ensure maximum shutoff seat loading. Travel Cutoff Lo is deactivated by setting it to -25.0%

- Pressure Cutoff Open—Pressure Cutoff Open (PRESS_CUTOFF_HI [47.1]) defines the high cutoff point for the pressure in percent (%) of pre-characterized setpoint. Above this cutoff, the pressure target is set to 123.0%. A Pressure Cutoff Open of 99.5% is recommended to ensure valve goes fully open. Pressure Cutoff Hi is deactivated by setting it 125%.

- Pressure Cutoff Closed—Pressure Cutoff Closed (PRESS_CUTOFF_LO [47.2]) defines the low cutoff point for the pressure in percent (%) of pre-characterized setpoint. Below this cutoff, the pressure target is set to -23%. A Pressure Cutoff Closed of 0.5% is recommended to help ensure maximum shutoff seat loading. Pressure Cutoff Closed is deactivated by setting it to -25.0%

- Pressure Range Hi—Pressure Range Hi (PRESS_RANGE_HI [42.7]) is the high end of output pressure range. Enter the pressure that corresponds with 100% valve travel when Zero Power Condition is closed, or 0% valve travel when Zero Power Condition is open. This pressure *must be greater* than the Pressure Range Lo.

- Pressure Range Lo—Pressure Range Lo (PRESS_RANGE_LO [42.8]) is the low end of the output pressure range. Enter the pressure that corresponds to 0% valve travel when Zero Power Condition is closed, or 100% valve travel when Zero Power Condition is open. The pressure *must be less* than the Pressure Range Hi.

## Input Characterization

| Field Communicator | TB > Configure/Setup > Detailed Setup > Response Control > Input Characterization |
|---|---|

Input Characterization (INPUT_CHAR [50]) defines the relationship between the travel target and the setpoint received from the output block. Travel target is the output from the characterization function.

## Custom Characterization Table

| Field Communicator | TB > Configure/Setup > Detailed Setup > Response Control > Custom Characterization Table |
| --- | --- |

You can select from the three fixed input characteristics shown in figure 4-1 or you can select a custom characteristic. Figure 4-1 shows the relationship between the travel target and travel set point for the fixed input characteristics.

You can specify 21 points on a custom characteristic curve. Each point defines a travel target, in % of ranged travel, for a corresponding set point, in % of ranged set point. Set point values range from -25.0% to 125%. Before modification, the custom characteristic is linear. You cannot modify the custom points if the Input Characterization (INPUT_CHAR [50]) is set to custom.

Figure 4-1. Travel Target Versus Ranged Set Point, for Various Input Characteristics (Zero Power Condition = Closed)
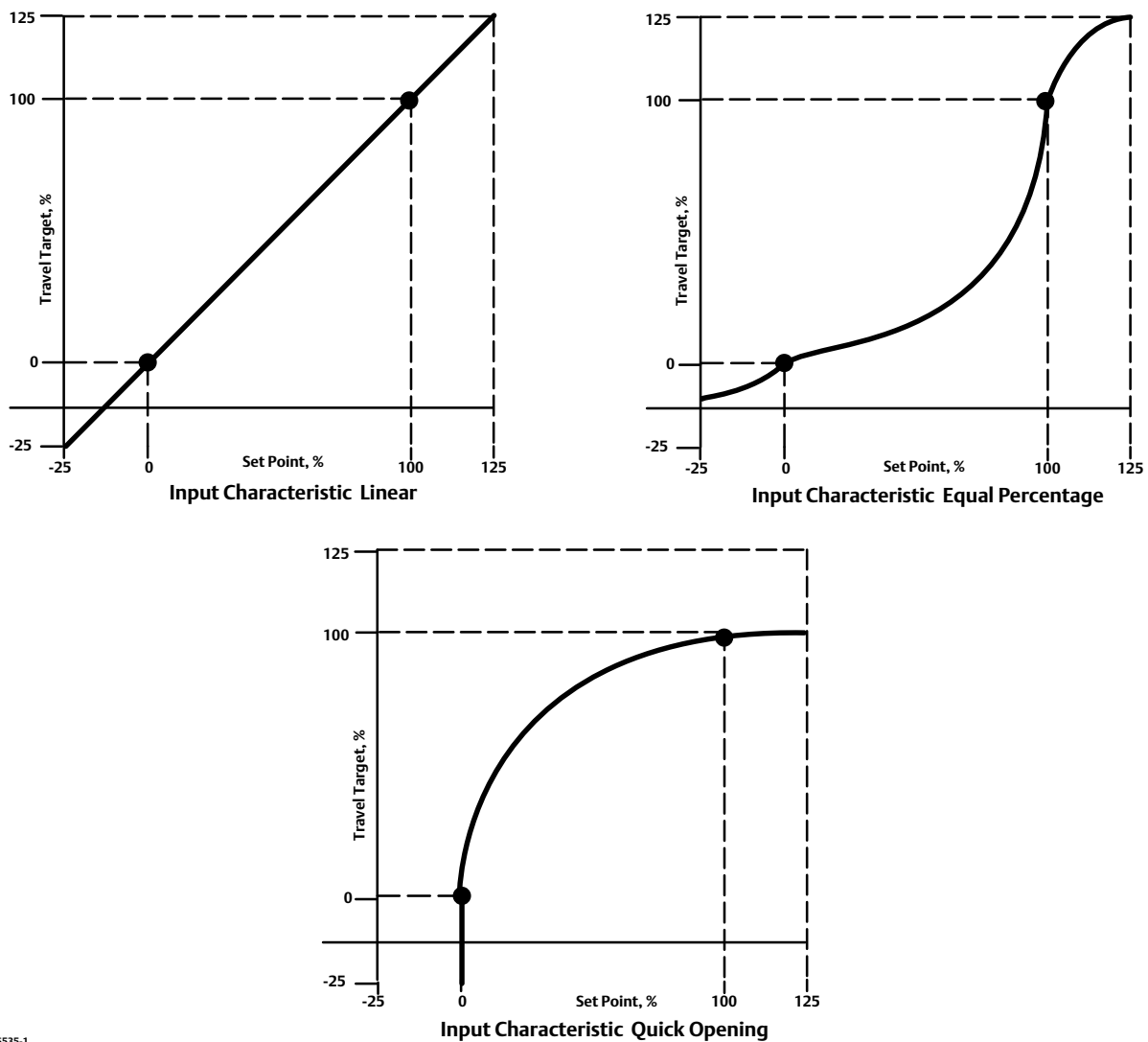
## Outblock Selection

| Field Communicator | TB > Configure/Setup > Detailed Setup > Response Control > Outblock Selection |
|---|---|

Outblock Selection (OUTBLOCK_SEL [96]) defines which output function block will control the setpoint of the valve. The output block that is <u>not</u> selected will shed its mode to reflect that it does not have control of the valve.

# Alerts

The DVC6200f provides two levels of alerts; Instrument alerts and PlantWeb alerts.

## Instrument Alert Conditions

Instrument Alert Conditions, when enabled, detect many operational and performance issues that may be of interest. To view these alerts, the user must open the appropriate status screen on a host such as DeltaV, ValveLink software or a Field Communicator.

## PlantWeb Alerts

Some instrument alert conditions can also be used to trigger PlantWeb alerts that will be reported in Failed, Maintenance or Advisory categories, as configured by the user. PlantWeb alerts, when enabled, can participate in the DeltaV alarm interface tools such as the alarm banner, alarm list and alarm summary.

When a PlantWeb alert occurs, the DVC6200f sends an event notification and waits a specified period of time for an acknowledgment to be received. This occurs even if the condition that caused the alert no longer exists. If the acknowledgment is not received within the pre-specified time-out period, the event notification is retransmitted. This reduces the possibility of alert messages getting lost.

PlantWeb alerts are mode-based. Refer to table C-1 for details.

---

**Note**

Additional details on setting up and using PlantWeb Alerts can be found in Appendix C of this manual.

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## Electronics Alerts

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts |
|---|---|

**Drive Current**

- Drive Current—Drive Current (DRIVE_CURRENT [54]) displays the measured Drive Current actually flowing through the I/P converter in percent of maximum drive.

- Drive Current Alert—This alert is active when the difference between the expected Drive Current and the actual Drive Current has exceeded the Drive Current Alert Time.

- Drive Current Alert Enable—When enabled Drive Current Alert Enable activates the Drive Current Alert.

- Drive Current Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [76.1]) permits enabling or disabling Self Test Shutdown for the Drive Current alert. When enabled, and the alert condition is present, the transducer Actual

mode is placed Out of Service. The instrument will attempt to drive the valve to the Zero Power Condition and will no longer execute transducer control function.

- Drive Current Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [76.2]) permits enabling or disabling Automatic recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when Drive Current Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.

- Drive Current Alert Point—The Drive Current Alert Point (DRIVE_CURRENT_ALRT_PT [76.4]) is when the absolute difference between the Drive Current and Drive Signal exceeds the set threshold for greater than the Drive Current Alert Time.

- Drive Current Alert Time—The Drive Current Alert Time (DRIVE_CURRENT_TIME [76.5]) is the maximum time that the Drive Current Alert Point can be exceeded before the Drive Current Alert is active.

Drive Signal

- Drive Signal—The Drive Signal (DRIVE_SIGNAL [53]) displays the commanded Drive Signal being sent to the I/P converter as a percentage of the maximum drive.

- Drive Signal Alert

The Drive Signal Alert is active if one of the following conditions exist:

Where Zero Power Condition is defined as closed:

Drive Signal < 10% and Calibrated Travel > 3%

Drive Signal > 90% and Calibrated Travel < 97%

Where Zero Power Condition is defined as open:

Drive Signal < 10% and Calibrated Travel < 97%

Drive Signal > 90% and Calibrated Travel > 3%

- Drive Signal Alert Enable—When enabled Drive Signal Alert Enable activates the Drive Signal Alert.

Processor Impaired

- Program Memory Alert—This alert is active if a pending Flash or NVM failure is present.

- Program Memory Alert Enable—When enabled Program Memory Alert Enable activates the Program Memory Alert.

- Program Memory Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [76.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Program Memory Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.

- Program Memory Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [76.2]) permits enabling or disabling Automatic recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when the condition that caused Program Memory Shutdown clears. If not enabled, the transducer block will

remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.

- Static Memory Alert—This alert is active if a failure occurs in the FRAM memory where the static parameters are stored.

- Static Memory Alert Enable—When enabled Static Memory Alert Enable activates the Static Memory Alert.

- Static Memory Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [76.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Static Memory Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.

- Static Memory Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [76.2]) permits enabling or disabling Automatic recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when the condition that caused Static Memory Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.

- Processor Alert—This alert is active if a failure occurs in the main processor.

- Processor Alert Enable—When enabled Processor Alert Enable activates the Processor Alert.

- I/O Processor Alert—This alert is active if a failure occurs in the I/O processor.

- I/O Processor Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [76.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the I/O Processor Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.

- I/O Processor Man Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [76.2]) permits enabling or disabling Automatic recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when the condition that caused I/O Processor Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.

## Configuration Alerts

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts |
|---|---|

### Output Block Timeout

- Output Block Timeout Alert—This alert is active if the analog or discrete output block has not executed for longer than the configured timeout.

- Output Block Timeout Alert Enable—When enabled Output Block Timeout Alert Enable activates the Output Block Timeout Alert.

- Output Block Timeout Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [76.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Output Block Timeout Alert is active, the transducer Actual

mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.

● Output Block Timeout Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [76.2]) permits enabling or disabling Manual recovery from Self Test Shutdown. When enabled, the transducer block will return to Target mode when the condition that caused Output Block Timeout Shutdown clears. If not enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service if the condition that caused the shutdown remains or until the shutdown trigger is disabled.

● Output Block Timeout—The Output Block Timeout (OUTPUT_BLK_TIMEOUT [76.3]) is the maximum time between updates from the AO or DO block to the transducer block setpoint.

### Blocks Set to Default

● Blocks Set to Defaults Alert—This alert is active if the resource block has undergone Restart with Defaults. This will stay active until the transducer block is changed from Out of Service.

● Blocks Set to Defaults Alert Enable—When enabled Blocks Set to Defaults Alert Enable activates the Blocks Set to Default Alert.

### Alert Key

The Alert Key (ALERT_KEY [4]) is the identification number of the plant unit. Devices in a loop or plant section can be assigned with a common alert key to aid the operator in determining location of alerts.

## Sensor Alerts

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts |
|---|---|

### Travel Sensor

● Travel Sensor Alert—This alert is active if the Travel Sensor reading is outside the functional range, or the sensor becomes disconnected.

● Travel Sensor Alert Enable—When enabled Travel Sensor Alert Enable activates the Travel Sensor Alert.

● Travel Sensor Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [76.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Travel Sensor alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.

● Travel Sensor Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [76.2]) permits enabling or disabling Manual recovery from Self Test Shutdown. When not enabled, the transducer block will return to Target mode when Travel Sensor Shutdown clears. If enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.

### Pressure Sensors

● Pressure A Sensor Alert—This alert is active if the Port A Pressure Sensor reading is outside the functional range.

● Pressure A Sensor Alert Enable—When enabled Pressure A Sensor Alert Enable activates the Pressure A Sensor Alert.

- Pressure A Sensor Shutdown—The Shutdown Trigger (SHUTDOWN_TRIGGER [76.1]) permits enabling or disabling Self Test Shutdown. When enabled, and the Port A Pressure Sensor Alert is active, the transducer Actual mode is placed out of service. The instrument will attempt to drive the valve to the zero power condition and will no longer execute transducer control function.

- Pressure A Sensor Manual Recovery—Shutdown Recovery (SHUTDOWN_RECOVERY [76.2]) permits enabling or disabling Manual recovery from Self Test Shutdown. When not enabled, the transducer block will return to Target mode when Pressure A Sensor Shutdown clears. If enabled, the transducer block will remain Out of Service until power is removed and restored or the user changes the transducer block target mode to Manual or Auto. In any case, the target mode will remain Out of Service, if the condition that caused the shutdown remains or until the shutdown trigger is disabled.

- Pressure B Sensor Alert—This alert is active if the Port B Pressure Sensor reading is outside the functional range.

- Pressure B Sensor Alert Enable—When enabled Pressure B Sensor Alert Enable activates Pressure B Sensor Alert.

- Supply Pressure Sensor Alert—This alert is active if the Supply Pressure Sensor reading is outside the functional range.

- Supply Pressure Sensor Alert Enable—When enabled Supply Pressure Sensor Alert Enable activates the Supply Pressure Sensor Alert.

**Pressure Fallback**

- Pressure Fallback Alert—This alert is active if a travel sensor failure or a gross travel deviation has resulted in fallback to pressure control.

- Pressure Fallback Alert Enable—When enabled Pressure Fallback Alert Enable activates the Pressure Fallback Alert.

**Temperature Sensor**

- Temperature Sensor Alert—This alert is active if the Temperature Sensor reading is outside the functional range.

- Temperature Sensor Alert Enable—When enabled Temperature Sensor Alert Enable activates the Temperature Sensor Alert.

## Environment Alerts

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts |
|---|---|

**Supply Pressure**

- Supply—Supply (SUPPLY_PRESSURE.VALUE [35.2]) displays the instrument supply pressure in kPa, bar, or psi.

- Supply Pressure Hi Alert—This alert is active when the supply pressure exceeds the Supply Pressure Hi Alert Point.

- Supply Pressure Hi Alert Enable—When enabled Supply Pressure Hi Alert Enable activates Supply Pressure Hi Alert.

- Supply Pressure Hi Alert Point—The Supply Pressure Hi Alert is active when supply pressure exceeds the Supply Pressure Hi Alert Point (SUP_PRES_HI_ALRT_PT [76.8]).

- Supply Pressure Lo Alert—This alert is active when the supply pressure is lower than the Supply Pressure Lo Alert Point.

- Supply Pressure Lo Alert Enable—When enabled Supply Pressure Lo Alert Enable activates Supply Pressure Lo Alert.

- Supply Pressure Lo Alert Point—Supply Pressure Lo Alert Point (SUP_PRES_LO_ALRT_PT [76.9]). When the supply pressure falls below the supply pressure alert point, the supply pressure alert is active. To disable the supply pressure alert, set Supply Pressure Alert Point to zero.

Temperature Limit

- Temperature—Degrees Fahrenheit or Celsius. The temperature (TEMPERATURE [48]) is measured from a sensor mounted on the digital valve controller's printed wiring board.

- Temperature Hi Alert—This alert is active if the temperature is greater than the Temperature Hi Alert Point.

- Temperature Hi Alert Enable—When enabled Temperature Hi Alert Enable activates the Temperature Hi Alert.

- Temperature Hi Alert Point—The Temperature Hi Alert is active when the instrument temperature exceeds the Temperature Hi Alert Point (TEMP_HI_ALRT_PT [76.6]).

- Temperature Lo Alert—This alert is active if the temperature is lower than the Temperature Lo Alert Point.

- Temperature Lo Alert Enable—When enabled Temperature Lo Alert Enable activates the Temperature Lo Alert.

- Temperature Lo Alert Point—The Temperature Lo Alert is active when the instrument temperature is lower than the Temperature Lo Alert Point (TEMP_LO_ALRT_PT [76.7]).

## Travel Alerts

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts |
|---|---|

**Note**

The alerts contained in this section are valid for both travel and pressure control.

Travel Target

Travel target is the output from the characterization function.

Travel

Travel (TRAVEL.VALUE [34.2]) displays the actual position of the valve in percent (%) of calibrated travel.

Travel Deviation

- Travel Deviation—Travel Deviation (TRAVEL_DEVIATION [52]) displays the absolute difference in percent between Travel Target and Actual Travel.

- Travel Deviation Alert—This alert is active if the Travel deviation exceeds the Travel Deviation Alert Point by more than the Travel Deviation Time.

- Travel Deviation Alert Enable—When enabled Travel Deviation Alert Enable actives the Travel Deviation Alert.

- Travel Deviation Alert Point—The Travel Deviation Alert Point (TVL_DEV_ALRT_PT [77.1]) is the alert point for the difference, expressed in percent (%), between the travel target and the actual travel. When the difference exceeds the alert point for more than the Travel Deviation Time, the Travel Deviation Alert is set.

- Travel Deviation Time—Travel Deviation Time (TVL_DEV_TIME [77.2]) is the time, in seconds, that the travel deviation must exceed the Travel Deviation Alert Point before the alert is set.

- Travel Deviation Deadband—Travel Deviation Deadband (TVL_DEV_DB [77.3]) is the travel in percent threshold (%) of ranged travel required to clear a Travel Deviation alert, once it has been set. See figure 4-2.
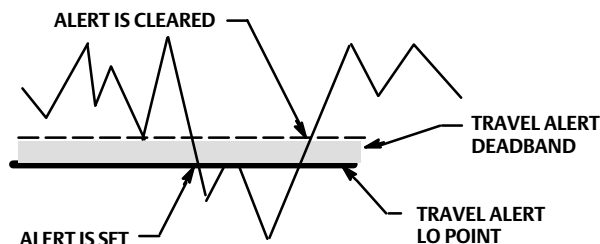
Figure 4-2. Travel Hi Alert Deadband
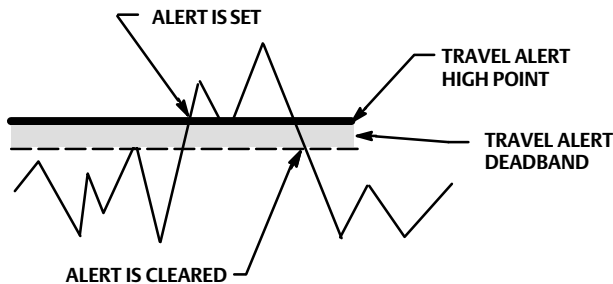


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## Travel Limit

- Travel Hi Hi Alert—This alert is active if the Travel exceeds the Travel Hi Hi Alert point.

- Travel Hi Hi Alert Enable—When enabled Travel Hi Hi Alert Enable activates the Travel Hi Hi Alert.

- Travel Hi Hi Alert Point—Travel Hi Hi Alert Point (TVL_HI_HI_ALRT_PT [77.18]) is the value of the travel, in percent (%) of ranged travel, which, when exceeded, sets the Travel Alert Hi Hi alert.

- Travel Hi Hi Deadband—Travel Hi Hi Deadband (TVL_HI_HI_DB [77.19]) is the travel, in percent (%) of ranged travel, required to clear a Travel Hi Hi alert, once it has been set. See figure 4-2.

- Travel Lo Lo Alert—This alert is active if the Travel is lower than the Travel Lo Lo Alert point.

- Travel Lo Lo Alert Enable—When enabled Travel Lo Lo Alert Enable activates the Travel Lo Lo Alert.

- Travel Lo Lo Alert Point—The Travel Lo Lo alert is set when the value of the travel, in percent (%) of ranged travel, goes below the Travel Lo Lo Alert Point (TVL_LO_LO_ALRT_PT [77.12]).

- Travel Lo Lo Deadband—Travel Lo Lo Deadband (TVL_LO_LO_DB [77.13]) is the travel, in percent (%) of ranged travel, required to clear a Travel Lo Lo alert once it has been set. See figure 4-3.

Figure 4-3. Travel Lo Alert Deadband



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## Travel Hi/Lo

● Travel Hi Alert—This alert is active if the Travel exceeds the Travel Hi Alert point.

● Travel Hi Alert Enable—When enabled Travel Hi Alert Enable activates the Travel Hi Alert.

● Travel Hi Alert Point—Travel Hi Alert is set if the ranged travel rises above the Travel Hi Alert Point (TVL_HI_ALRT_PT [77.16]). Once the alert is set, the ranged travel must fall below the alert high point set by the Travel Hi Deadband before the alert is cleared. See figure 4-2.

● Travel Hi Deadband—Travel Hi Deadband (TVL_HI_DB [77.17]) is the travel, in percent (%) of ranged travel, required to clear a Travel Hi Alert, once it has been set. See figure 4-2.

● Travel Lo Alert—This alert is active if the Travel is lower than the Travel Lo Alert point.

● Travel Lo Alert Enable—When enabled Travel Lo Alert Enable activates the Travel Lo alert.

● Travel Lo Alert Point—The Travel Alert Lo alert is set when the value of the travel, in percent (%) of ranged travel, goes below the Travel Lo Alert Point (TVL_LO_ALRT_PT [77.14]).

● Travel Lo Deadband—Travel Lo Deadband (TVL_LO_DB [77.15]) is the travel, in percent (%) of ranged travel, required to clear a travel lo alert, once it has been set. See figure 4-3.

## Proximity Alerts

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts |
|---|---|

**Note**

See page 179 for additional details on using Proximity detection.

## Travel

Travel displays the actual position of the valve in percent (%) of calibrated travel.

Travel Open

- Travel Open Alert—This alert is active if the Travel is greater than the Travel Open Alert Point.

- Travel Open Alert Enable—When enabled Travel Open Alert Enable activates the Travel Open Alert.

- Travel Open Alert Point—Travel Open Alert Point (TVL_OPEN_ALRT_PT [77.8]) is the value of the travel in percent (%) or ranged travel, which, when exceeded, sets the Travel Open Alert.

- Travel Open Deadband—Travel Open Deadband (TVL_OPEN_DB [77.9]) is the travel in percent (%) of ranged travel required to clear a Travel Open alert, once it has been set.

Travel Closed

This alert is active if the Travel is lower than the Travel Closed Alert Point.

- Travel Closed Alert—This alert is active is the Travel goes below the Travel Closed Alert Point.

- Travel Closed Alert Enable—When enabled Travel Closed Alert Enable activates the Travel Closed Alert.

- Travel Closed Alert Point—The Travel Closed Alert is set when the value of the travel, in percent (%) of ranged travel, goes below the Travel Closed Alert Point (TVL_CLOSED_ALRT_PT [77.10]).

- Travel Closed Deadband—Travel Closed Deadband (TVL_CLOSED_DB [77.11]) is the travel in percent (%) of ranged travel required to clear a Travel Closed alert, once it has been set.

Proximity

- Proximity Hi Hi Alert—This alert is active if the Travel is within the detection band set by the Travel Hi Hi Alert Point and the Travel Hi Hi Deadband.

- Proximity Hi Hi Alert Enable—When enabled Proximity Hi Hi Alert Enable activates the Proximity Hi Hi Alert.

- Proximity Hi Alert—This alert is active if the Travel is within the detection band set by the Travel Hi Alert Point and the Travel Hi Deadband.

- Proximity Hi Alert Enable—When enabled Proximity Hi Alert Enable activates the Proximity Hi Alert.

- Proximity Lo Alert—This alert is active if the Travel is within the detection band set by the Travel Lo Alert Point and the Travel Lo Deadband.

- Proximity Lo Alert Enable—When enabled Proximity Lo Alert Enable activates the Proximity Lo Alert.

- Proximity Lo Lo Alert—This alert is active if the Travel is within the detection band set by the Travel Lo Lo Alert Point and the Travel Lo Lo Deadband.

- Proximity Lo Lo Alert Enable—When enabled Proximity Lo Lo Alert Enable activates the Proximity Lo Lo Alert.

## Travel History Alerts

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts |
|---|---|

### Cycle Counter

- Cycle Counter—The Cycle Counter (CYCLE_COUNT [73]) records the number of times the travel changes direction. The change in direction must occur after the deadband has been exceeded before it can be counted as a cycle. See figure 4-4. You can reset the Cycle Counter by configuring it as zero.

Figure 4-4. Cycle Counter Deadband (set at 10%)
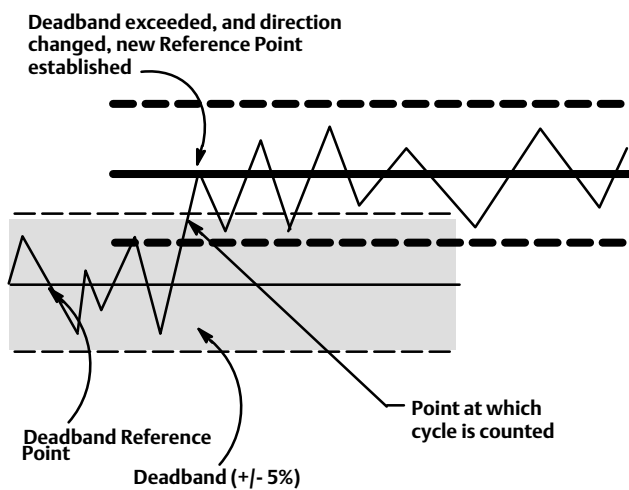


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- Cycle Counter Alert—This alert is active if the Cycle Counter exceeds the Cycle Counter Alert Point. It is cleared after you reset the Cycle Counter to a value less than the alert point.

- Cycle Counter Alert Enable—When enabled Cycle Counter Alert Enable activates checking of the difference between the Cycle Counter and the Cycle Counter Alert point.

- Cycle Counter Alert Point—Cycle Counter Alert Point (CYCLE_COUNT_ALRT_PT [77.6]) is the value of the Cycle Counter, in cycles, which, when exceeded, sets the Cycle Counter Alert.

- Cycle Counter Deadband—Cycle Counter Deadband (CYCLE_COUNT_DB [77.7]) is the area around the travel reference point, in percent (%) of ranged travel, that was established at the last increment of the Cycle Counter. This area must be exceeded before a change in travel direction can be counted as a cycle. See figure 4-4.

### Travel Accumulator

- Travel Accumulator—Travel Accumulator (TRAVEL_ACCUM [72]) records the total change in travel, in percent (%) of ranged travel, since the accumulator was last cleared. The value of the Travel Accumulator increments when the magnitude of the change exceeds the Travel Accumulator Dead-band. See figure 4-5. You can reset the Travel Accumulator by configuring it to zero.

Figure 4-5. Travel Accumulator Deadband (set at 10%)
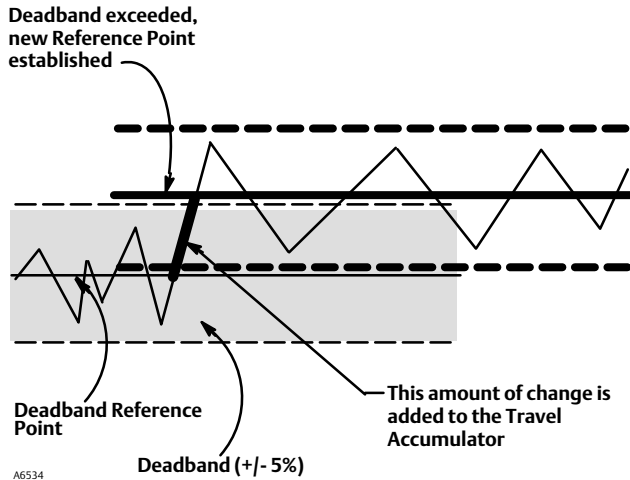


- Travel Accumulator Alert—This alert is active if the Travel Accumulator exceeds the Travel Accumulator Alert Point. The Travel Accumulator Alert is set when the Travel Accumulator value exceeds the Travel Accumulator Alert Point. It is cleared after you reset the Travel Accumulation to a value less than the alert point.

- Travel Accumulator Alert Enable—When enabled Travel Accumulator Alert Enable activates checking of the difference between the Travel Accumulator value and the Travel Accumulator Alert Point.

- Travel Accumulator Alert Point—Travel Accumulator Alert Point (TVL_ACCUM_ALRT_PT [77.4]) is the value of the Travel Accumulator, in percent (%) of ranged travel, which, when exceeded, sets the Travel Accumulator Alert.

- Travel Accumulator Deadband—Travel Accumulator Deadband (TVL_ACCUM_DB [77.5]) is the area around the travel reference point, in percent (%) of ranged travel, that was established at the last increment of the accumulator. This area must be exceeded before a change in travel can be accumulated. See figure 4-5.

## Performance Alerts

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > Performance Alerts |
|---|---|

**Note**

Performance Alerts are only available with a PD tier instrument. Additionally, for the PD alerts to function properly:

- The transducer block mode must not be out of service.

- The travel/pressure control state must be in travel control mode, and

- Bench Set Hi, Bench Set Lo, and Nominal Supply Pressure must be set in the Spec Sheets, then enable the Performance Information instrument alert (PERF_ENABLE [75.7]).

### PD Inside Status

PD Inside Status shows the status of Performance Diagnostics.

PD Run

PD Run enables or disables Performance Diagnostics in the instrument (PD Inside). Selecting PD Off disables PD Inside. Selecting PD On enables PD Inside.

Performance Critical

- Performance Critical Alert—This alert is active if the instrument is no longer able to control the valve or performance has been dramatically reduced.

- Performance Critical Alert Enable—When enabled Performance Critical Alert Enable activates the Performance Critical Alert.

Performance Reduced

- Performance Reduced Alert—This alert is active if the instrument has detected a reduction in performance.

- Performance Reduced Alert Enable—When enabled Performance Reduced Alert Enable activates the Performance Reduced Alert.

Performance Information

- Performance Information Alert—This alert is active if the instrument has detected a condition that may pertain to control performance.

- Performance Information Alert Enable—When enabled Performance Information Alert Enable activates the Performance Information Alert.

## PlantWeb Alert Enable

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > PlantWeb Alert Enable |
|---|---|

- Failed Enable—Failed Enable (FAILED_ENABLE [62]) enables or disables conditions that can cause a failed alert. A failed alert indicates a failure within the device that will make the device or some part of the device non-operational. Table C-2 lists the available PlantWeb alerts.

- Maintenance Enable—Maintenance Enable (MAINT_ENABLE [63]) enables or disables conditions that can cause a maintenance alert. A maintenance alert indicates the device or some part of the device needs maintenance soon. Table C-2 lists the available PlantWeb alerts.

- Advise Enable—Advise Enable (ADVISE_ENABLE [64]) enables or disables conditions that can cause an advisory alert. An advisory alert indicates informative conditions that do not have a direct impact on the device's primary functions. Table C-2 lists the available PlantWeb alerts.

## PlantWeb Alert Reporting

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alerts > PlantWeb Alert Reporting |
|---|---|

- Failed Suppress—Failed Suppress (FAILED_MASK [65]) determines which of the failed alert conditions are suppressed so that they are not reported. Even if reporting is suppressed, the bit in Failed Active (FAILED_ACTIVE [59]) is still set.

- Maintenance Suppress—Maintenance Suppress (MAINT_MASK [66]) determines which of the maintenance alert conditions are suppressed so that they are not reported. Even if reporting is suppressed, the bit in Maintenance Active (MAINT_ACTIVE [60]) is still set.

- Advise Suppress—Advise Suppress (ADVISE_MASK [67]) determines which of the advise alert conditions are suppressed so that they are not reported. Even if reporting is suppressed, the bit in Advise Active (ADVISE_ACTIVE [61]) is still set.

# Instrument

| Field Communicator | TB > Configure/Setup > Detailed Setup > Instrument |
|---|---|

- Tag Description—The Tag Description (TAG_DESC [2]) is a 32 character description used to assign a unique description to each block within the digital valve controller to describe the intended application for the block.

- Pressure Units—Define the output and supply pressure units (PRESSURE_UNITS [90]) in either psi, bar, or kPa.

- Temperature Units—Enter the temperature units (TEMPERATURE_UNITS [89]) in degrees Fahrenheit or Celsius. The temperature is measured from a sensor mounted on the digital valve controller's printed wiring board.

- Travel Units—Define the units for valve travel (TVL_UNITS [91]) in inches, centimeters, millimeters or degrees.

- Length Units—Define the units for valve dimensions (LENGTH_UNITS [92]) in inches, centimeters, or millimeters.

- Area Units—Define the units for actuator area (AREA_UNITS [93]) in inches$^2$, centimeter$^2$ or millimeter$^2$.

- Spring Rate Units—Define the units for actuator spring rate (SPRING_RATE_UNITS [94]) in lbs/in$^2$ or N/M.

- Relay Type—Enter the Relay Type (RELAY_TYPE [42.5]).There are three categories of relays that result in combinations from which to select.
    *Relay Type*: The relay type is printed on the label affixed to the relay body:
     A = double-acting or single acting
     B = single-acting, reverse
     C= single-acting, direct
    *Lo Bleed*: The label affixed to the relay body indicates it is a low bleed version.

- Zero Power Condition—Zero Power Condition (ZERO_PWR_COND [42.2]) identifies whether the valve is open or closed when instrument power is lost. If you are unsure how to set this parameter, disconnect the segment loop power to the instrument. The resulting valve travel is the Zero Power Condition.

- Maximum Supply Pressure—Enter the maximum supply pressure (MAX_SUPP_PRESS [42.6]) in psi, bar, or kPa, depending on what was selected for pressure units.

- Calibration Person—Name of the person performing last calibration (XD_CAL_WHO [31]).

- Calibration Location—Indicates the location of the last instrument calibration (XD_CAL_LOC [29]).

- Calibration Date—Enter a date with the format MM/DD/YY. Date is a user-defined variable that provides a place to save the date of the last calibration (XD_CAL_DATE [30]).

- Last Calibration Type—Indicates the type of the last calibration performed on the instrument. Possible values are: Not Calibrated, Single Point Calibration, Auto Calibration, Manual Calibration.

# Valve and Actuator

| Field Communicator | TB > Configure/Setup > Detailed Setup > Valve and Actuator |
|---|---|

Valve

- Valve Manufacturer—Enter the identification number of the manufacturer of the valve (VALVE_MAN_ID [25]) on which the instrument is mounted. Select from the drop-down list or enter the manufacturer's identification number as defined by the Fieldbus Foundation. For Fisher, the manufacturer ID hex value is 005100.

- Valve Model Number—Enter the valve model number (VALVE_MODEL_NUM [26]), (design letter or type number) for the valve on which the instrument is mounted.

- Valve Serial Number—Enter the serial number of the valve (VALVE_SN [27]) on which the instrument is mounted.

- Valve Style—Enter the type of valve (VALVE_TYPE [28]), sliding-stem or rotary, on which the instrument is mounted.

- Valve Size—Enter the size of the valve (VALVE_SIZE [83.1]) on which the instrument is mounted.

- Valve Class—Enter the valve pressure class rating (VALVE_CLASS [83.2]).

- Rated Travel—Enter the valve rated travel (RATEDTRAVEL [83.3]) in inches or mm for sliding-stem valves, or in degrees of rotation for rotary valves.

- Actual Travel—Enter the actual travel (ACTUAL_TRAVEL [83.4]) in inches or mm for sliding-stem valves, or in degrees of rotation for rotary valves.

- Shaft Stem Diameter—Enter the valve stem diameter (SHAFT_STEM_DIA [83.5]) in inches or millimeters.

- Packing Type—Enter the valve packing construction (PACKING_TYPE [83.6]).

- Inlet Pressure—Enter the valve inlet pressure (INLET_PRESSURE [83.7]).

- Outlet Pressure—Enter the valve outlet pressure (OUTLET_PRESSURE [83.8]) in psig, kPa, Bar, inHg, inH$_2$O, or kg/cm$^2$.

Trim

- Seat Type—Enter the valve seat type (SEAT_TYPE [84.1]).

- Leak Class—Enter the valve leak class (LEAK_CLASS [84.2]).

- Port Diameter—Enter the valve port diameter (PORT_DIAMETER [84.3]) in inches or mm.

- Port Type—Enter the valve port type (PORT_TYPE [84.4]).

- Flow Direction—Enter the flow direction (FLOWDIRECTION [84.5]) through the valve.

- Push Down To—Enter the effect on valve movement when the stem is moved down (PUSH_DOWN_TO [84.6]).

- Flow Tends To—Enter the effect on valve travel with increasing flow (FLOW_TENDS_TO [84.7]).

- Unbalanced Area—Enter the valve unbalanced area (UNBALANCED_AREA [84.8]) in in$^2$ or mm$^2$.

Actuator

- Actuator Manufacturer—Enter the manufacturer's identification number (ACT_MAN_ID [22]) of the actuator on which the instrument is mounted. Select from the drop-down list or enter the manufacturer's identification number as defined by the Fieldbus Foundation. For Fisher, the manufacturer ID hex value is 005100.

- Actuator Model Number—Enter the type number for the actuator (ACT_MODEL_NUM [23]) on which the instrument is mounted.

- Actuator Style—Select the Actuator Style (ACTUATOR_STYLE [42.1]), spring & diaphragm, piston double-acting without spring, piston single-acting with spring, or piston double-acting with spring.

- Actuator Serial Number—Enter the serial number (ACT_SN [24]) for the actuator on which the instrument is mounted.

- Actuator Size—Enter the size of the actuator (ACTUATOR_SIZE [85.1]) on which the instrument is mounted.

- Actuator Fail Action—Sets actuator action to be performed upon loss of actuator air pressure (ACT_FAIL_ACTION [21]).

- View / Edit Feedback Connection—Refer to table 4-10 for Feedback Connection options. Choose the assembly that matches the actuator travel range.

---

**Note**

As a general rule, do not use less than 60% of the magnet assembly travel range for full travel measurement. Performance will decrease as the assembly is increasingly subranged.

The linear magnet assemblies have a valid travel range indicated by arrows molded into the piece. This means that the hall sensor (on the back of the DVC6200f housing) has to remain within this range throughout the entire valve travel. The linear magnet assemblies are symmetrical. Either end may be up.

---

Table 4-10. Feedback Connection Options

| Magnet Assembly | Travel Range | | |
| --- | --- | --- | --- |
| | mm | Inch | Degrees |
| SStem #7 | 4.2-7 | 0.17-0.28 | - |
| SStem #19 | 8-19 | 0.32-0.75 | - |
| SStem #25 | 20-25 | 0.76-1.00 | - |
| SStem #38 | 26-38 | 1.01-1.50 | - |
| SStem #50 | 39-50 | 1.51-2.00 | - |
| SStem #110 | 51-110 | 2.01-4.125 | - |
| SStem #210 | 110-210 | 4.125-8.25 | - |
| SStem #1 Roller | > 210 | > 8.25 | 60-90° |
| RShaft Window #1 | - | - | 60-90° |
| RShaft Window #2 | - | - | 60-90° |
| RShaft End Mount | - | - | 60-90° |

- Travel Sensor Motion

### ⚠ WARNING

**If you answer YES to the prompt for permission to move the valve when setting the Travel Sensor Motion, the instrument will move the valve through its full travel range. To avoid personal injury and property damage caused by the release of**

**pressure or process fluid, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.**

Travel Sensor Motion (TRAVEL_SEN_MOTION [42.3]) establishes the proper valve travel sensor (feedback) rotation/movement. For quarter-turn actuators determine rotation by viewing the rotation of the magnet assembly from the back of the instrument.

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**Note**

Travel Sensor Motion in this instance refers to the motion of the magnet assembly. Note that the magnet assembly may be referred to as a magnetic array in user interface tools.

---

**For instruments with relay A or C** If increasing air pressure at output A causes the magnet assembly to move up, or the actuator shaft to rotate counterclockwise, enter "Towards Top of Instrument/CCW." If it causes the magnet assembly to move down, or the actuator shaft to rotate clockwise, enter "Away From Top of Instrument/CW." For instruments with relay B.

**For instruments with relay B** If decreasing air pressure at output B causes the magnet assembly to move up, or the actuator shaft to rotate counterclockwise, enter "Towards Top of Instrument/CCW." If it causes the magnet assembly to move down, or the actuator shaft to rotate clockwise, enter "Away From Top of Instrument/CW."

- Lever Style—Enter the lever style (LEVER_STYLE [85.10]) for rotary actuators as either Pivot Point or Rack and Pinion.

- Lever Arm Length—Defines the lever arm length (MOMENT_ARM [85.11]) for rotary actuators.

- Effective Area—Enter the actuator effective area (EFFECTIVE_AREA [85.2]) in in$^2$, cm$^2$, or mm$^2$.

- Air—Select Opens or Closes, indicating the effect of increasing air pressure (AIR [85.3]) on the valve travel.

- Upper Bench Set—Enter the upper actuator operating pressure (UPPER_BENCH_SET [85.5]).

- Lower Bench Set—Enter the lower actuator operating pressure (LOWER_BENCH SET [85.4]).

- Nominal Supply Pressure—Enter the nominal instrument supply pressure (NOMINAL_SUPPLY PRESSURE [85.6]).

- Spring Rate—Enter the actuator spring rate (SPRING_RATE [85.7]) in lbs•in or N•m.

Reference

- Trim Style 1—Enter the valve trim style (TRIM_STYLE_1 [84.9]).

- Trim Style 2—Enter the valve trim style (TRIM_STYLE_2 [84.10]).

- Stroking Time Open—Enter the time required to stroke the valve from closed to open (STROKING_TIME_OPEN [85.8]).

- Stroking Time Close—Enter the time required to stroke the valve from open to close (STROKING_TIME_CLOSE [85.9]).

Table 4-11. Output Block PV Status

| FEATURE_SEL PW Alarms Set PV Status | Transducer Mode, Actual | Active PlantWeb Alarms | AO / DO PV Status[2] | AO / DO PV Substatus | AO/DO PV Limit Substatus[1] |
|---|---|---|---|---|---|
| Enabled | OOS | X | Bad | Device Failure | Constant |
| | Man | X | Bad | Non-specific | Constant |
| | Auto | Fail | Uncertain | Subnormal | See table 4-12 |
| | Auto | Maintenance, no Fail | Uncertain | Non-specific | See table 4-12 |
| | Auto | Advisory, no Fail, no Maintenance | Good | Advisory | See table 4-12 |
| | Auto | None | Good | Non-Specific | See table 4-12 |
| Not Enabled | OOS | X | Bad | Device Failure | Constant |
| | Man | X | Bad | Non-Specific | Constant |
| | Auto | Fail | Good | Non-Specific | See table 4-12 |
| | Auto | Maintenance, no Fail | Good | Non-Specific | See table 4-12 |
| | Auto | Advisory, no Fail, no Maintenance | Good | Non-Specific | See table 4-12 |
| | Auto | None | Good | Non-Specific | See table 4-12 |

NOTES:
X = No Effect
1. PV limit substatus reflects only READBACK limit substatus. SP limit substatus reflects only out block rate limits.
2. Firmware Revision 1.1 and earlier will set AO/DO PV Status to Bad if Feedback Sensor has failed, i.e.; Travel Sensor Fail. However, if the Travel Sensor fails, and the instrument falls back to pressure, PV Status will remain good.

# MAI Channel Map

| Field Communicator | TB > Configure/Setup > Detailed Setup > MAI Channel Map |
|---|---|

Allows the user to specify which transducer block parameter is available through each of the MAI Block channels (MAI_CHANNEL_1 through MAI_CHANNEL_8 [95.1 through 95.8]). Transducer block parameters available to each channel:

| | | | | | |
|---|---|---|---|---|---|
| 1 | = | FINAL_VALUE | 8 | = | ACT_PRESS_DIFF |
| 2 | = | TRAVEL_TARGET | 9 | = | DRIVE_SIGNAL |
| 3 | = | FINAL_POSITION_VALUE | 10 | = | TRAVEL_DEVIATION |
| 4 | = | TRAVEL | 11 | = | TEMPERATURE |
| 5 | = | SUPPLY_PRESS | 12 | = | CYCLE_COUNT |
| 6 | = | ACT_PRESS_A | 13 | = | TRAVEL_ACCUM |
| 7 | = | ACT_PRESS_B | | | |

Table 4-12. Limit Sub Status

| Out Block | Transducer Mode | In Cutoff Region | Rate Limited | Limit Sub-Status |
|---|---|---|---|---|
| AO, DO | OOS | X | X | Constant |
| AO, DO | MAN | X | X | Constant |
| AO | AUTO | High | X | High Limited |
| AO | AUTO | Low | X | Low Limited |
| AO | AUTO | X | High | High Limited |
| AO | AUTO | X | Low | Low Limited |
| AO | AUTO | None | None | Not Limited |
| DO | AUTO | X | High | High Limited |
| DO | AUTO | X | Low | Low Limited |
| DO | AUTO | X | None | Not Limited |

NOTE: X = No Effect

# Alert Handling

| Field Communicator | TB > Configure/Setup > Detailed Setup > Alert Handling |
|---|---|

### PlantWeb Alert Simulate

When enabled, PlantWeb Alert Simulate (PWA_SIMULATE [39]) allows the user to write to the following PlantWeb and Instrument alert parameters; Failed Active, Maintenance Active, Advise Active, Environment Active, Travel Active, Proximity Active, Travel History Active, Performance Active, PD Event Active, PD Detail 1 Active, PD Detail 2 Active, PD Detail 3 Active, PD Detail 4 Active, PD Detail 5 Active, PD Detail 6 Active. This provides a way to simulate these alerts for testing. In order to enable PWA Simulate, the Aux Terminal must be jumpered.

PlantWeb Alert Simulate is cleared on a power cycle. It can also be cleared manually, or by removing the Aux terminal jumper.

### Simulate Active Alerts

- Failed Active—Permits simulating an active Failed alarm (FAILED_ACTIVE [59]).

- Maintenance Active—Permits simulating an active Maintenance alarm (MAINT_ACTIVE [60]).

- Advise Active—Permits simulating an active Advisory alarm (ADVISE_ACTIVE [61]).

### PlantWeb Alert Handling

- PlantWeb Alerts Set PV Status—When selected, PlantWeb alerts will set the PV status according to table 4-11.

- Block Error Reporting—When enabled, the AO or DO BLOCK_ERR [6] parameter will report PlantWeb Alerts. the same as Block Error in the resource block.

Block Error bit 6 (Device Needs Maintenance Soon) will report any active PlantWeb Maintenance Alert.

Block Error bit 13 (Device Needs Maintenance Now) will report any active PlantWeb Failed Alert.

# Block Errors

Table 4-13 lists conditions reported in the BLOCK_ERR [6] and XD_ERR [11] parameters. Conditions in *italics* are not applicable for the transducer block and are provided only for your reference.

Table 4-13. Transducer Block BLOCK_ERR and XD_ERROR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other - (N/A)* |
| 1 | **Block Configuration Error** - Indicates that one of the following parameters have been configured out of the proper range: 15, 16, 47.1, 47.2, 46.3, 46.5, 42.7, 42.8. |
| 2 | *Link Configuration Error - (N/A)* |
| 3 | **Simulate Active** - Indicates that the simulation jumper is in place on the aux terminals. This is not an indication that the I/O blocks are using simulation data. See AO block parameter SIMULATE [10] and DO block parameter SIMULATE_D [10]. |
| 4 | *Local Override - (N/A)* |
| 5 | *Device Fault State - (NA)* |
| 6 | *Maintenance Needed Soon - (N/A)* |
| 7 | *Input failure/process variable has Bad status - (N/A)* |
| 8 | *Output failure - (N/A)* |
| 9 | *Memory failure - (N/A)* |
| 10 | **Lost Static Data** - Indicates that manufacturing functional or thermal tests were incomplete |
| 11 | *Lost NV Data - (N/A)* |
| 12 | *Readback Check Failed - (N/A)* |
| 13 | **Device Needs Maintenance Now** - Indicates that manufacturing functional or thermal tests were incomplete |
| 14 | *Power Up - (N/A)* |
| 15 | **Out of Service** - Indicates Out of Service Mode. |

# Transducer Block Parameter List

- Read/Write Capability: RO - Read Only, RW - Read Write

- Mode: The block mode(s) required to write to the parameter

- Protection Category: Indicates whether or not the parameter is writable while the PROTECTION parameter is set to a particular level.
  -N/A indicates a read-only parameter that is never writable, regardless of the value of the PROTECTION parameter
  -NONE indicates a read-only parameter that is always writable, regardless of the value of the PROTECTION parameter
  -CAL indicates a parameter that is only writable while the value of the PROTECTION parameter is "NONE".
  -SETUP indicates a parameter that is only writable while the value of the PROTECTION parameter is "NONE" or "CAL".
  -ALL indicates a parameter that is writable while the value of the PROTECTION parameter is "NONE", "CAL", or "SETUP & CAL".

- Double indentation and shaded Index Number indicates sub-parameter

Table 4-14. Transducer Block Parameter Definitions

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| Static Revision<br>ST_REV | 1 | RO | N/A | 0 to 65535 | N/A | N/A | Data Type: Uint16<br>The revision level of the static data. Increments by one each time a static parameter is written. The value is reset to 0 whenever a Restart with Defaults is performed. See Restarting the Instrument. |
| Tag Description<br>TAG_DESC | 2 | RW | ALL | | NULL | SETUP | Data Type: String<br>The description of the block. |
| Strategy<br>STRATEGY | 3 | RW | ALL | 0 to 65535 | 0 | SETUP | Data Type: Uint16<br>Used to help group blocks. |
| Alert Key<br>ALERT_KEY | 4 | RW | ALL | 1 to 255 | 1 | SETUP | Data Type: Uint8<br>The identification number of the plant unit. Devices in a loop or plant section can be assigned with a common alert key to aid the operator in determining location of alerts. |
| Block Mode<br>MODE_BLK | 5 | | | | | | Data Type: DS-69<br>The actual, target, permitted, and normal modes.<br>    Target: The requested block mode<br>    Actual: The current mode of the block<br>    Permitted: Allowed modes for Target<br>    Normal: Most common mode for Target |
| TARGET | 5.1 | RW | ALL | 3:  AUTO<br>4:  MANUAL<br>7:  OOS | 7: OOS | NONE | |
| ACTUAL | 5.2 | RO | N/A | | N/A | N/A | |
| PERMITTED | 5.3 | RW | ALL | | 3:AUTO<br>4:MANUAL<br>7: OOS | NONE | |
| NORMAL | 5.4 | RW | ALL | | 3:AUTO | NONE | |
| Block Error<br>BLOCK_ERR | 6 | RO | N/A | 3: Simulate Active<br>10: Static Memory Failed (Functional or thermal data missing)<br>13: Maintenance Needed Now (Functional or thermal data missing)<br>15: Out-of-Service | N/A | N/A | Data Type: Bit String (2 byte)<br>Error status associated with hardware or firmware for the transducer block. |

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### Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| Update Event<br>UPDATE_EVT | 7 | | | | | | |
| UNACKNOWLEDGED | 7.1 | RW | ALL | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0 | NONE | Data Type: DS-73<br>Alert generated by change to static data. |
| UPDATE_STATE | 7.2 | RO | N/A | 0=Undefined<br>1=Updated reported<br>2=Update Not reported | 0 | N/A | |
| TIME_STAMP | 7.3 | RO | N/A | | 0 | N/A | |
| STATIC_REVISION | 7.4 | RO | N/A | | 0 | N/A | |
| RELATIVE_INDEX | 7.5 | RO | N/A | | 0 | N/A | |
| Block Alarm<br>BLOCK_ALM | 8 | | | | | | |
| UNACKNOWLEDGED | 8.1 | RW | ALL | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0 | NONE | Data Type: DS-72<br>Used to report the BLOCK_ERR alarm to the host system |
| ALARM_STATE | 8.2 | RO | N/A | 0=Undefined<br>1=Clear-reported<br>2=Clear-not reported<br>3=Active-reported<br>4=Active-not reported | 0 | N/A | |
| TIME_STAMP | 8.3 | RO | N/A | | 0 | N/A | |
| SUBCODE | 8.4 | RO | N/A | Subcode: Bit Number in BLOCK_ERR | 0 | N/A | |
| VALUE | 8.5 | RO | N/A | Value of parameter at alarm time for a single alarm, 0 for multiple alarms | 0 | N/A | |
| Transducer Directory<br>TRANSDUCER_DIRECTORY | 9 | RO | N/A | 1,1 | 1,1 | N/A | Data Type: Array [2] of Unit16<br>Not used |
| Transducer Type<br>TRANSDUCER_TYPE | 10 | RO | | 106 | 106 | N/A | Data Type: Uint16<br>Identifies the type of the transducer. |
| Transducer Error<br>XD_ERROR or TDC_ERROR | 11 | RO | | Valid Numbers: 0 = No Error | 0 | N/A | Data Type: Uint8<br>Error code for the transducer block. |
| Collection Directory<br>COLLECTION_DIRECTORY | 12 | RO | | 1,1,1,1,1 | 1,1,1,1,1 | N/A | Data Type: Array [5] of Unit32<br>Not used |
| FINAL_VALUE | 13 | | | | | | Data Type: DS-65<br>In Travel Control: Setpoint for valve travel in %, prior to characterization.<br>In Pressure Control: Setpoint for implied valve travel as % or pressure range, prior to characterization.<br>FINAL_VALUE is not updated unless the AO block is selected in FEATURE_SELECT. For example, FINAL_VALUE still has last value written by AO channel 1 when DO is in control. |
| Setpoint Status<br>STATUS | 13.1 | RW | MAN OOS | | N/A | NONE | |
| Setpoint<br>VALUE | 13.2 | RW | MAN OOS | -25 to 125 | N/A | NONE | |
| Setpoint Range<br>FINAL_VALUE_RANGE | 14 | | | | | | Data Type: DS-68<br>High and Low range limit values, engineering units code, and number of digits to the right of the decimal place to be used to display the Final Value. |
| EU_100 | 14.1 | RO | N/A | 100 | 100 | N/A | |
| EU_0 | 14.2 | RO | N/A | 0 | 0 | N/A | |
| UNITS_INDEX | 14.3 | RO | N/A | PERCENT | 1342 | N/A | |
| DECIMAL | 14.4 | RO | N/A | 2 | 2 | N/A | |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| Travel Cutoff Hi FINAL_VALUE_CUTOFF_HI | 15 | RW | MAN OOS | -25 to 125 | 99.5 | SETUP | Data Type: Float When the servo goes above this % of span, the stem position goes to the upper limit. Cutoffs are OFF when Low is at -25% and high is at +125%. Must be > low cutoff + .625%. |
| Travel Cutoff Lo FINAL_VALUE_CUTOFF_LO | 16 | RW | MAN OOS | -25 to 125 | 0.5 | SETUP | Data Type: Float When the servo goes below this % of span, the stem position goes to the lower limit. Cutoffs are OFF when Low is at -25% and high is at +125%. Must be < hi cutoff - .625%. |
| FINAL_POSITION_VALUE | 17 | | | | | | Data Type: DS-65 In Travel Control: Valve travel in %, decharacterized to correlate with Setpoint (FINAL_VALUE [13]). In Pressure Control: Implied valve travel as a % of pressure range, decharacterized to correlate with Setpoint (FINAL_VALUE [13]). Controls AI channel 3. |
| Travel Status (Decharacterized) STATUS | 17.1 | RO | N/A | | N/A | N/A | |
| Travel (Decharacterized) VALUE | 17.2 | RO | N/A | -25 to 125% | | N/A | |
| Travel Proportional Gain SERVO_GAIN | 18 | RW | MAN OOS | > = 0 | 4.4 | SETUP | Data Type: Float Travel Control Only. Gain of servo. |
| Travel Integral Gain SERVO_RESET | 19 | RW | MAN OOS | > = 0 , = 0 causes wind down | 9.4 | SETUP | Data Type: Float Travel Control Only. If set to 0, will cause integrator to wind down. |
| Travel Velocity Gain SERVO_RATE | 20 | RW | MAN OOS | > = 0 | 3.0 | SETUP | Data Type: Float Travel Control Only. Rate of servo. |
| Actuator Fail Action ACT_FAIL_ACTION | 21 | RW | MAN OOS | 0=Uninitialized 1=Self Closing 2=Self Opening | 1= Self Closing | SETUP | Data Type: Enum (Uint8) Action performed by actuator in the event of air pressure. |
| Actuator Manufacturer ACT_MAN_ID | 22 | RW | ALL | | 0x5100 | SETUP | Data Type: Uint32 The actuator manufacturer identification number. |
| Actuator Model Number ACT_MODEL_NUM | 23 | RW | ALL | | Null | SETUP | Data Type: Visible String Model number of actuator. |
| Actuator Serial Number ACT_SN | 24 | RW | ALL | | Null | SETUP | Data Type: Visible String Serial number of actuator. |
| Valve Manufacturer VALVE_MAN_ID | 25 | RW | ALL | | 0x5100 | SETUP | Data Type: Uint32 The valve manufacturer identification number. |
| Valve Model Number VALVE_MODEL_NUM | 26 | RW | ALL | | Null | SETUP | Data Type: Visible String The valve model number. |
| Valve Serial Number VALVE_SN | 27 | RW | ALL | | Null | SETUP | Data Type: Visible String The valve serial number. |
| Valve Style VALVE_TYPE | 28 | RW | ALL | 1=sliding-stem 2=Rotary | 1=sliding-stem | SETUP | Data Type: Enum (Uint8) Selects Rotary or sliding-stem. |
| Calibration Location XD_CAL_LOC | 29 | RW | ALL | | Null | CAL | Data Type: Visible String Where device was last calibrated. |
| Calibration Date XD_CAL_DATE | 30 | RW | ALL | | Uninitialized | CAL | Data Type: Date Date of last calibration. |
| Calibration Person XD_CAL_WHO | 31 | RW | ALL | | Null | CAL | Data Type: Visible String Name of person performing last calibration. |

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| SETPOINT_D | 32 | | | | | | Data Type: DS_66<br>SETPOINT_D is not updated unless the DO block is selected in FEATURE_SEL.<br>STATUS indicates the validity of value, set by the DO block OUT.STATUS<br>VALUE is the discrete value of setpoint. Only values of 0, 1, or increments of 5 up to 95 are allowed. Written by DO channel 22. |
| Setpoint(D) Status<br>STATUS | 32.1 | RW | MAN<br>OOS | | | NONE | |
| Setpoint(D)<br>VALUE | 32.2 | RW | MAN<br>OOS | 0 = closed  1 = open<br>5,10,15.. = % | | NONE | |
| TRAVEL_D | 33 | | | | | | Data Type: DS_66<br>STATUS indicates the validity of VALUE.<br>VALUE: 0=closed , 1=open 5,10,15.. = %. Controls DI Channel 23 |
| Travel(D) Status<br>STATUS | 33.1 | RO | N/A | | | N/A | |
| Travel (D)<br>VALUE | 33.2 | RO | N/A | 0 = closed  1 = open<br>5,10,15.. = % | | N/A | |
| TRAVEL | 34 | | | | | | Data Type: DS-65<br>In Travel Control: Actual valve travel in % of calibrated travel range.<br>In Pressure Control: Implied valve travel in % of pressure range.<br>Controls AI channel 4. |
| Travel Status<br>STATUS | 34.1 | RO | N/A | | | N/A | |
| Travel<br>VALUE | 34.2 | RO | N/A | | | N/A | |
| SUPPLY_PRESSURE | 35 | | | | | | Data Type: DS-65<br>STATUS indicates the validity of VALUE. VALUE is pressure of air supply, controls AI channel 5. |
| Supply Pressure Status<br>STATUS | 35.1 | RO | N/A | | | N/A | |
| Supply Pressure<br>VALUE | 35.2 | RO | N/A | | | N/A | |
| PRESSURE_A | 36 | | | | | | Data Type: DS-65<br>STATUS Indicates the validity of VALUE.<br>Pressure of primary air output, controls AI channel 6. |
| Pressure A Status<br>STATUS | 36.1 | RO | N/A | | | N/A | |
| Pressure A<br>VALUE | 36.2 | RO | N/A | | | N/A | |
| PRESSURE_B | 37 | | | | | | Data Type: DS-65<br>STATUS indicates the validity of VALUE. VALUE is the Pressure on secondary output, controls AI channel 7. |
| Pressure B Status<br>STATUS | 37.1 | RO | N/A | | | N/A | |
| Pressure B<br>VALUE | 37.2 | RO | N/A | | | N/A | |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| PRESSURE_DIFF | 38 | | | | | | Data Type: DS-65 STATUS indicates the validity of VALUE. VALUE is the difference between PRESSURE_A and PRESSURE_B, controls AI channel 8. |
|   Pressure Differential Status STATUS | 38.1 | RO | N/A | | | N/A | |
|   Pressure Differential VALUE | 38.2 | RO | N/A | | | N/A | |
| PWA Simulate PWA_SIMULATE | 39 | RO or RW* | ALL | 1=Simulate Off 2=Simulate Enabled | 1=Simulate Off | ALL | Data Type: Enum (Uint8) When this is set to 2 all the alert ACTIVE parameters can be written, except for INST_ALERTS_ACTIVE. SHUTDOWN_ALERT_ACTIVE. This allows alerts to be simulated for testing with hosts. NOTE: only ACTIVE parameters are affected by this. * PWA Simulate is RW only if a jumper is installed across the Aux Terminal. If no jumpered is installed across the Aux Terminal, PWA Simulate is RO. |
| Grant Deny GRANT_DENY | 40 | | | | | | |
|   GRANT | 40.1 | RW | ALL | 0:  Program 1:  Tune 2:  Alarm 3:  Local | all bits cleared | NONE | Data Type: DS-50 Options for controlling access of host computer and local control panels to operating, tuning, and alarm parameters of the block. Has no effect on the DVC6200f. GRANT: 0=N/A, 1= granted DENY: 0=N/A, 1= denied |
|   DENY | 40.2 | RW | ALL | | all bits cleared | NONE | |
| Travel Pressure Control TVL_PRESS_CONTROL | 41 | | | | | | |
|   Travel/Pressure Select TVL_PRESS_SELECT | 41.1 | RW | ALL | 1=Travel 2=Pressure 3=TVL/PRESS Auto Recv 4=TVL/PRESS Man Recv | 1=Travel | SETUP | Data Type: Enum (Uint8) Selects whether travel sensor or port A pressure is used for feedback. |
|   Travel/Pressure State TVL_PRESS_STATE | 41.2 | RO | N/A | 1=Travel 2=Pressure | | N/A | Data Type: Enum (Uint8) Indicates which sensor is used for feedback |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| Basic Setup<br>BASIC_SETUP | 42 | | | | | | |
| Actuator Style<br>ACTUATOR_STYLE | 42.1 | RW | MAN OOS | 1=Spring & Diaphragm<br>2=Piston-Dbl w/o Spring<br>3=Piston-Dbl w/Spring<br>4=Piston Sgl w/Spring | 1=Spring & Diaphragm | SETUP | Data Type: Enum (Uint8) |
| Zero Power Condition<br>ZERO_PWR_COND | 42.2 | RW | MAN OOS | 1=Valve Closed<br>2=Valve Open | 1=Valve Closed | SETUP | Data Type: (Uint8)<br>Enum Identifies whether the valve is open or closed when instrument power is lost. |
| Travel Sensor Motion<br>TRAVEL_SEN_MOTION | 42.3 | RW | MAN OOS | 1=Counter Clockwise<br>2=Clockwise | 1=Counter Clockwise | SETUP | Data Type: Enum (Uint8) |
| Feedback Connection<br>FEEDBACK_CONN | 42.4 | RW | MAN OOS | 100: Default Array<br>64: SStem #19 Array<br>65: SStem #25 Array<br>66: SStem #38 Array<br>67: SStem #50 Array<br>70: SStem #100 Array<br>74: SStem #200 Array<br>85: SStem #1 Roller Array<br>90: RShaft End Array<br>95: RShaft #1 Window Array<br>97: RShaft #2 Window Array | | SETUP | Data Type: Enum (Uint8) |
| Relay Type<br>RELAY_TYPE | 42.5 | RW | MAN OOS | 1=Relay A or C--Double or Single Direct<br>2=Relay B--Single Reverse<br>5=Relay C-Special App.--Single Direct<br>6=Relay B-Special App.--Single Reverse<br>9=Lo-Bleed Relay A or C--Double or Single Direct<br>10=Lo-Bleed Relay B--Single Reverse<br>13=Lo-Bleed Relay C-Special App.--Single Direct<br>10=Lo-Bleed Relay B-Special App.--Single Reverse | =Relay A or C--Double or Single Direct | SETUP | Data Type: Enum (Uint8) |
| Maximum Supply Pressure<br>MAX_SUPP_PRESS | 42.6 | RW | MAN OOS | > 0, < = 150 | 35 psig | SETUP | Data Type: Float |
| Pressure Range Hi<br>PRESS_RANGE_HI | 42.7 | RW | MAN OOS | > 0, < = 150 | 15.0 psig | SETUP | Data Type: Float<br>Defines pressure corresponding to max pressure in pressure control mode. |
| Pressure Range Lo<br>PRESS_RANGE_LO | 42.8 | RW | MAN OOS | > = 0, < = 150 | 3.0 psig | SETUP | Data Type: Float<br>Defines pressure corresponding to minimum pressure in pressure control mode. |
| Travel Calibration Trigger<br>TVL_CAL_TRIGGER | 42.9 | RW | MAN OOS | 1 = Aux Term ignored | 1 | SETUP | Not available in the DVC6200f |
| Travel Tuning Set<br>TVL_TUNING_SET | 42.10 | RW | MAN OOS | 1=B, 2= C, ...12=M 23=X | 2=C | SETUP | Data Type: Enum (Uint8)<br>Letter (B through M or X) |
| Pressure Tuning Set<br>PRESS_TUNING_SET | 42.11 | RW | MAN OOS | 1=B, 2=C, ...12= M 23=X | 2=C | SETUP | Data Type: Enum (Uint8)<br>Letter (B through M or X) |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| TRAVEL_CAL | 43 | | | | | | |
| Travel Count<br>TVL_COUNT | 43.1 | RO | N/A | | | | Data Type: Uint16<br>Raw feedback from Travel Sensor |
| Travel Hi Calibration<br>TVL_HI_CAL | 43.2 | RW | MAN<br>OOS | <TVL_FAC_HI<br>>TVL_LO_CAL | | CAL | Data Type: Uint16<br>Maximum drive calibration point |
| Travel Lo Calibration<br>TVL_LO_CAL | 43.3 | RW | MAN<br>OOS | >TVL_FAC_LO<br><TVL_HI_CAL | | CAL | Data Type: Uint16<br>Minimum drive calibration point |
| Travel Crossover<br>TVL_CROSSOVER | 43.4 | RW | MAN<br>OOS | >0%  < = 100% | 50% | CAL | Data Type: Float<br>Not used for the DVC6200f |
| Travel Fac Hi<br>TVL_FAC_HI | 43.5 | RO | N/A | | Set by Factory | N/A | Data Type: Uint16<br>Maximum value of travel sensor counts. Set at factory. |
| Travel Fac Lo<br>TVL_FAC_LO | 43.6 | RO | N/A | | Set by Factory | N/A | Data Type: Uint16<br>Minimum value of travel sensor counts. Set at factory. |
| Travel IP Bias<br>TVL_IP_BIAS | 43.7 | RW | MAN<br>OOS | 0% - 100% | 70% | CAL | Data Type: Float |
| Travel MLFB Bias<br>TVL_MLFB_BIAS | 43.8 | RW | MAN<br>OOS | 0 - 100% | 50% | CAL | Data Type: Float |
| Last Calibration Type<br>TVL_CAL_TYPE | 43.9 | RW | MAN<br>OOS | 0: Not Calibrated<br>1: Single Point Calibration<br>2: Auto Calibration<br>3: Manual Calibration | 2: Auto Calibration | CAL | Data Type: Enum (Uint8) |
| TRAVEL_TUNE | 44 | | | | | | |
| Travel Integral Enable<br>TVL_INTEG_ENABLE | 44.1 | RW | MAN<br>OOS | 1=Off<br>2=On | 2=On | SETUP | Data Type: Enum (Uint8) |
| Travel Integral Limit Hi<br>TVL_INTEG_LIM_HI | 44.2 | RW | MAN<br>OOS | 0% - 100% | 30% | SETUP | Data Type: Float |
| Travel Integral Limit Lo<br>TVL_INTEG_LIM_LO | 44.3 | RW | MAN<br>OOS | -100% - 0% | -30% | SETUP | Data Type: Float |
| Travel Integral Dead Zone<br>TVL_INTEG_DEADZ | 44.4 | RW | MAN<br>OOS | 0% - 2% | 0.25% | SETUP | Data Type: Float |
| Travel MLFB Gain<br>TVL_MLFB_GAIN | 44.5 | RW | MAN<br>OOS | > = 0 | 35 | SETUP | Data Type: Float |

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| TRAVEL_CAL_RUN | 45 | | | | | | |
| Travel Calibration Command<br>TVL_CAL_CMD | 45.1 | RW | MAN | 1: Operating<br>2: Autocalibrate<br>3: Not Used by DVC6200f<br>4: Mark Full Open<br>5: Mark Full Closed<br>6: Manual Calibrate Final<br>7: Abort<br>8: Clear Cal Status<br>9: Manual Calibrate Init<br>10: Manual Calibrate Restore<br>11: Reset Travel Sensor Error<br>12: Reserved<br>13: Execute Performance Tuner<br>14: Execute Performance Tuner (Graphite Packing)<br>16: Execute Performance Tuner (Booster)<br>17: Execute Performance Tuner (Graphite Packing and Booster)<br>19: Autocalibration, Set Filter<br>20: Autocalibrate Extended, Set Filter | 1=Operating | CAL | Data Type: Enum (Uint8)<br>Resets to 1 after a write |
| Travel Calibration Prog<br>TVL_CAL_PROG | 45.2 | RO | N/A | | 0% | N/A | Data Type: Uint8 |
| Travel Calibration Status<br>TVL_CAL_STATUS | 45.3 | RO | N/A | 0: auto cal complete<br>1: calibration complete<br>2: auto cal in progress<br>3: manual cal in progress<br>3: Not Used by DVC6200f<br>5: upper position marked<br>6: lower position marked<br>7: calibration error<br>8: Performance Tuner active<br>9: Performance Tuner Success<br>10: Performance Tuner Error (No movement)<br>11: Performance Tuner Error (Accessories unstable)<br>12: Performance Tuner Error (Other) | no bits set | N/A | Data Type: Bit String (2 bytes)<br>All bits set to 0 when mode changes from OOS. 0 = FALSE,<br>1 = TRUE |
| Reserved<br>TVL_CAL_RESERVED | 45.4 | | | | | | Reserved |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| PRESS_CAL | 46 | | | | | | |
| Supply Pressure Scale<br>SUPP_PRESS_SCALE | 46.1 | RW | MAN OOS | > 0 | | CAL | Data Type: Float |
| Supply Pressure Offset<br>SUPP_PRESS_OFFSET | 46.2 | RW | MAN OOS | 0 to 16383 | | CAL | Data Type: Uint16 |
| Pressure A Scale<br>PRESS_A_SCALE | 46.3 | RW | MAN OOS | > 0 | | CAL | Data Type: Float |
| Pressure A Offset<br>PRESS_A_OFFSET | 46.4 | RW | MAN OOS | 0 to 16383 | | CAL | Data Type: Uint16 |
| Pressure B Scale<br>PRESS_B_SCALE | 46.5 | RW | MAN OOS | > 0 | | CAL | Data Type: Float |
| Pressure B Offset<br>PRESS_B_OFFSET | 46.6 | RW | MAN OOS | 0 to 16383 | | CAL | Data Type: Uint16 |
| Pressure IP Bias<br>PRESS_IP_BIAS | 46.7 | RW | MAN OOS | 0-100% | 70% | CAL | Data Type: Float |
| Pressure MLFB Bias<br>PRESS_MLFB_BIAS | 46.8 | RW | MAN OOS | 0-100% | 50% | CAL | Data Type: Float |
| PRESS_TUNE | 47 | | | | | | |
| Pressure Cutoff Hi<br>PRESS_CUTOFF_HI | 47.1 | RW | MAN OOS | -25 -125%,<br>> CUTOFF_LO | 99.50% | SETUP | Data Type: Float |
| Pressure Cutoff Lo<br>PRESS_CUTOFF_LO | 47.2 | RW | MAN OOS | -25 -125% < CUTOFF_HI | 0.50% | SETUP | Data Type: Float |
| Pressure Proportional Gain<br>PRESS_PROP_GAIN | 47.3 | RW | MAN OOS | > = 0, < 32 | 2.2 | SETUP | Data Type: Float<br>Proportional gain |
| Pressure Integral Gain<br>PRESS_INTEG_GAIN | 47.4 | RW | MAN OOS | > = 0, < 32 | 0.1 | SETUP | Data Type: Float<br>Integral resets per second |
| Pressure Rate Gain<br>PRESS_RATE_GAIN | 47.5 | RW | MAN OOS | > = 0, < = 512 | 0 | SETUP | Data Type: Float<br>Derivative gain |
| Pressure Integral Dead Zone<br>PRESS_INTEG_DEADZ | 47.6 | RW | MAN OOS | = 0%, < = 2.0% | 0.25% | SETUP | Data Type: Float<br>Integrator Deadzone, 1/2 width |
| Pressure Integral Limit Hi<br>PRESS_INTEG_HI_LIM | 47.7 | RW | MAN OOS | > = 0%, < = 100%,<br>>INTEG_LO | 20% | SETUP | Data Type: Float<br>Integrator limits |
| Pressure Integral Limit LO<br>PRESS_INTEG_LO_LIM | 47.8 | RW | MAN OOS | < = 0%, > = -100%,<br><INTEG_HI | -20% | SETUP | Data Type: Float<br>Integrator limits |
| Pressure Integral IC Hi<br>PRESS_INTEG_IC_HI | 47.9 | RW | MAN OOS | >= -100%, < = 100% | 12% | | Not used by the DVC6200f |
| Pressure Integral IC Lo<br>PRESS_INTEG_IC_LO | 47.10 | RW | MAN OOS | >= -100%, < = 100% | -12% | | Not used by the DVC6200f |
| Pressure MLFB Gain<br>PRESS_MLFB_GAIN | 47.11 | RW | MAN OOS | > 0, < = 100 | 35 | SETUP | Data Type: Float |
| Temperature<br>TEMPERATURE | 48 | RO | N/A | | N/A | N/A | Data Type: Float<br>Electronics temperature - Controls AI channel 11 |
| Target Travel<br>TRAVEL_TARGET | 49 | RO | | | | | |
| Status<br>STATUS | 49.1 | RO | MAN OOS | | | N/A | Data Type: DS-65<br><u>In Travel Control:</u> Setpoint for valve travel in %, post characterization.<br><u>In Pressure Control:</u> Setpoint for implied valve travel as a % or pressure range, post characterization. |
| Value<br>VALUE | 49.2 | RO | MAN OOS | | | N/A | |
| Input Characterization<br>INPUT_CHAR | 50 | RW | MAN OOS | 1=Linear<br>2=Equal %<br>3=Quick Opening<br>4=Reserved<br>5=Custom | 1=Linear | SETUP | Data Type: Enum (Uint8) |

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| Custom Points<br>CUSTOM_POINTS | 51 | RW | MAN OOS | | Linear, Y=X | SETUP | Data Type: Unit16 Array[43]<br>Each item - 2500 to 12500<br>First integrator is number of valid points. Followed by up to 21 X values and then 21 Y values.<br>X values must be increasing.<br>Y values must be increasing or same.<br>A value of 2050 represent 20.50%<br>Custom Points can be written only if Input Characterization (INPUT_CHAR [50]) is not custom. |
| Travel Deviation<br>TRAVEL_DEVIATION | 52 | RO | N/A | 0 to 100% | | N/A | Data Type: Float<br>Absolute value of (TRAVEL_TARGET [49] - TRAVEL [34]), Controls AI channel 10 |
| Drive Signal<br>DRIVE_SIGNAL | 53 | RO | N/A | 0 to 100% | | N/A | Data Type: Float<br>Controls AI channel 9 |
| Drive Current<br>DRIVE_CURRENT | 54 | RO | N/A | 0 to 100% | | N/A | Data Type: Float |
| MLFB<br>MLFB | 55 | RO | N/A | -100% to 100% | | N/A | Data Type: Float |
| Failed Alarm<br>FAILED_ALM | 56 | | | | | | Data Type: DS-71<br>Used to report alerts to host system. |
| UNACKNOWLEDGED | 56.1 | RW | ALL | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=Undefined | NONE | |
| ALARM_STATE | 56.2 | RO | N/A | 0=Undefined<br>1=Clear-reported<br>2=Clear-not reported<br>3=Active-reported<br>4=Active-not reported | 0=Undefined | N/A | |
| TIME_STAMP | 56.3 | RO | N/A | | 0 | N/A | |
| SUBCODE | 56.4 | RO | N/A | | 0 | N/A | |
| VALUE | 56.5 | RO | N/A | | 0 | N/A | Data Type: Float<br>Value of parameter at alarm time for single alarm, 0 for multiple alarms |
| Maintenance Alarm<br>MAINT_ALM | 57 | | | | | | Data Type: DS-71<br>Used to report alerts to host system |
| UNACKNOWLEDGED | 57.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=Undefined | NONE | |
| ALARM_STATE | 57.2 | RO | N/A | 0=Undefined<br>1=Clear-reported<br>2=Clear-not reported<br>3=Active-reported<br>4=Active-not reported | 0=Undefined | N/A | |
| TIME_STAMP | 57.3 | RO | N/A | | 0 | N/A | |
| SUBCODE | 57.4 | RO | N/A | | 0 | N/A | |
| VALUE | 57.5 | RO | N/A | | 0 | N/A | Data Type: Float<br>Value of parameter at alarm time for single alarm, 0 for multiple alarms |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| Advise Alarm<br>ADVISE_ALM | 58 | | | | | | Data Type: DS-71<br>Used to report alerts to host system |
| UNACKNOWLEDGED | 58.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=Undefined | NONE | |
| ALARM_STATE | 58.2 | RO | N/A | 0: Undefined<br>1: Clear-reported<br>2: Clear-not reported<br>3: Active-reported<br>4: Active-not reported | 0=Undefined | N/A | |
| TIME_STAMP | 58.3 | RO | N/A | | 0 | N/A | |
| SUBCODE | 58.4 | RO | N/A | | 0 | N/A | |
| VALUE | 58.5 | RO | N/A | | 0 | N/A | Data Type: Float<br>Value of parameter at alarm time for single alarm, 0 for multiple alarms |
| Failed Active<br>FAILED_ACTIVE | 59 | RO[1] | N/A | 0: Drive Current<br>1: Drive Signal<br>2: Processor Impaired<br>3: Output Block Timeout<br>4: Blocks Set to Defaults<br>5: Travel Sensor<br>6: Outlet Pressure Sensor<br>7: Supply Pressure Sensor<br>8: Temperature Sensor<br>9: Supply Pressure<br>10: Temperature Limit<br>11: Travel Deviation<br>12: Travel Limit<br>13: Travel Accumulator<br>14: Cycle Counter<br>15: Performance Critical<br>16: Performance Reduced<br>17: Performance Information<br>18: Shutdown Alert | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Failed Alert Status |
| Maintenance Active<br>MAINT_ACTIVE | 60 | RO[1] | N/A | 0: Drive Current<br>1: Drive Signal<br>2: Processor Impaired<br>3: Output Block Timeout<br>4: Blocks Set to Defaults<br>5: Travel Sensor<br>6: Outlet Pressure Sensor<br>7: Supply Pressure Sensor<br>8: Temperature Sensor<br>9: Supply Pressure<br>10: Temperature Limit<br>11: Travel Deviation<br>12: Travel Limit<br>13: Travel Accumulator<br>14: Cycle Counter<br>15: Performance Critical<br>16: Performance Reduced<br>17: Performance Information<br>18: Shutdown Alert | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Maintenance Alert Status |

1. These parameters can be written when PWA_SIMULATE is active and Protect Category is not ALL.

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| Advise Active<br>ADVISE_ACTIVE | 61 | RO[1] | N/A | 0: Drive Current<br>1: Drive Signal<br>2: Processor Impaired<br>3: Output Block Timeout<br>4: Blocks Set to Defaults<br>5: Travel Sensor<br>6: Outlet Pressure Sensor<br>7: Supply Pressure Sensor<br>8: Temperature Sensor<br>9: Supply Pressure<br>10: Temperature Limit<br>11: Travel Deviation<br>12: Travel Limit<br>13: Travel Accumulator<br>14: Cycle Counter<br>15: Performance Critical<br>16: Performance Reduced<br>17: Performance Information<br>18: Shutdown Alert | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Advise Alert Status |
| Failed Enable<br>FAILED_ENABLE | 62 | RW | ALL | Same as for FAILED_ACTIVE above | Enabled Bits:<br>0: Drive Current<br>2: Processor Impaired<br>4: Blocks Set to Default<br>5: Travel Sensor<br>15: Performance Critical<br>18: Shutdown Alert | ALL | Data Type: Bit String (4 byte)<br>0=disable<br>1=enable<br>Failed alert enable. Enable allows detection of alert. All alerts can be disabled. |
| Maintenance Enable<br>MAINT_ENABLE | 63 | RW | ALL | Same as for MAINT_ACTIVE above | Enabled Bits:<br>1: Drive Signal<br>3: Output Block Timeout<br>6: Outlet Pressure Sensor<br>9: Supply Pressure<br>11: Travel Deviation<br>13: Travel Accumulator<br>14: Cycle Counter<br>16: Performance Reduced | ALL | Data Type: Bit String (4 byte)<br>0=disable<br>1=enable<br>Maintenance alert enable. Enable allows detection of alert. All alerts can be disabled. |
| Advise Enable<br>ADVISE_ENABLE | 64 | RW | ALL | Same as for ADVISE_ENABLE above | Enabled Bits:<br>7: Supply Pressure Sensor<br>8: Temperature Sensor<br>10: Temperature Limit<br>12: Travel Limit | ALL | Data Type: Bit String (4 byte)<br>0=disable<br>1=enable<br>Advise alert enable. Enable allows detection of alert. All alerts can be disabled. |
| Failed Suppress<br>FAILED_MASK | 65 | RW | ALL | Same as for FAILED_ACTIVE above | All bits: 0 | ALL | Data Type: Bit String (4 byte)<br>0=disable<br>1=enable       Failed alert mask. MASK controls whether an alert is reported. If alert is enabled the alert condition is evaluated and the ACTIVE parameter is updated to reflect if alert is active or not. If the bit is set reporting is suppressed. Default is all bits cleared. |

1. These parameters can be written when PWA_SIMULATE is active and Protect Category is not ALL.

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| Maintenance Suppress<br>MAINT_MASK | 66 | RW | ALL | Same as for<br>MAINT_ACTIVE above | All bits: 0 | ALL | Data Type: Bit String (4 byte)<br>0=disable<br>1=enable<br>Maintenance alert mask. MASK controls whether an alert is reported. If alert is enabled the alert condition is evaluated and the ACTIVE parameter is updated to reflect if alert is active or not. If the bit is set reporting is suppressed. Default is all bits cleared. |
| Advise Suppress<br>ADVISE_MASK | 67 | RW | ALL | Same as for<br>ADVISE_ENABLE above | All bits: 0 | ALL | Data Type: Bit String (4 byte)<br>0=disable<br>1=enable<br>Advise alert mask. MASK controls whether an alert is reported. If alert is enabled the alert condition is evaluated and the ACTIVE parameter is updated to reflect if alert is active or not. If the bit is set reporting is suppressed. Default is all bits cleared. |
| Failed Priority<br>FAILED_PRI | 68 | RW | ALL | 0 to 15 | 2 | SETUP | Data Type: Uint8<br>Failed alert priority |
| Maintenance Priority<br>MAINT_PRI | 69 | RW | ALL | 0 to 15 | 2 | SETUP | Data Type: Uint8<br>Maintenance alert priority |
| Advise Priority<br>ADVISE_PRI | 70 | RW | ALL | 0 to 15 | 2 | SETUP | Data Type: Uint8<br>Advise alert priority |
| Recommended Action<br>RECOMMENDED_ACTION | 71 | RO | N/A | 0 to 65535 | 0 | N/A | Data Type: Uint16<br>Fix for most serious condition |
| Travel Accumulator<br>TRAVEL_ACCUM | 72 | RW | ALL | Write:  Anything<br>Read:  Actual | | CAL | Data Type: Uint32<br>Total travel expressed in integer % terms. Controls AI channel 13. |
| Cycle Count<br>CYCLE_COUNT | 73 | RW | ALL | Write:  Anything<br>Read:  Actual | | CAL | Data Type: Uint32<br>Number of cycle transitions above a certain threshold of movement. Controls AI channel 12. |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| INST_ALERTS_ACTIVE | 74 | | | | | | |
| Electronics Active ELECT_ACTIVE | 74.1 | RO[1] | ALL | 0: Drive Current<br>1: Drive Signal<br>2: Memory Failure - Pending<br>3: Static Memory<br>4: Processor<br>5: I/O Processor<br>6: Output Block Timeout<br>7: Block Set to Defaults | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Electronics Alert status |
| Sensor Active SENSOR_ACTIVE | 74.2 | RO[1] | ALL | 0: Travel Sensor<br>1: Port A Pressure Sensor<br>2: Port B Pressure Sensor<br>3: Supply Pressure Sensor<br>4: Temperature Sensor<br>5: Pressure Fallback | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Sensor Alert status |
| Environment Active ENVIRO_ACTIVE | 74.3 | RO[1] | ALL | 0: Supply Pressure High<br>1: Supply Pressure Low<br>2: Temperature High<br>3: Temperature Low | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Environment Alert status |
| Travel Active TRAVEL_ACTIVE | 74.4 | RO[1] | ALL | 0: Travel Deviation<br>1: Travel High High<br>2: Travel Low Low<br>3: Travel High<br>4: Travel Low | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Travel Alert status |
| Proximity Active PROX_ACTIVE | 74.5 | RO[1] | N/A | 0: Travel Open<br>1: Travel Closed<br>2: Proximity High High<br>3: Proximity High<br>4: Proximity Low<br>5: Proximity Low Low | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Proximity Alert status. |
| Travel History Active TVL_HISTORY_ACTIVE | 74.6 | RO[1] | ALL | 0: Cycle Counter<br>1: Travel Accumulator | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Travel History Alert status |
| Performance Active PERF_ACTIVE | 74.7 | RO[1] | ALL | 0: Performance Critical<br>1: Performance Reduced<br>2: Performance Information | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Performance Diagnostic Alert status |
| PD Event Active PD_EVENT_ACTIVE | 74.8 | RO[1] | ALL | 0: High I/P Drive Signal<br>1: Low I/P Drive Signal<br>2: High Air Mass Flow<br>3: Large Travel Deviation<br>4: Low Supply Pressure<br>5: High Supply Pressure<br>6: High Crossover Pressure<br>7: Low Crossover Pressure<br>8: No Air Mass Flow Estimate | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Performance Diagnostic event status. |

1. These parameters can be written when PWA_SIMULATE is active and Protect Category is not ALL.

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| PD Detail 1 Active<br>PD_DETAIL1_ACTIVE | 74.9 | RO[1] | ALL | 0: I/P Primary Plugged<br>1: I/P Nozzle Plugged<br>2: I/P Latched<br>3: Reserved<br>4: Relay Jammed<br>5: Relay Cross Misadj<br>6: Relay Bias Diaph Leak<br>7: Relay Port A Diaph Leak<br>8: Relay Port B Diaph Leak<br>9: Reserved<br>10: Valve Stuck Low or Sensor Arm Damage<br>11: Valve Stuck High or Sensor Arm Damage<br>12: Piston Ring Leak<br>13: Reserved<br>14: Low Supply Pressure<br>15: External Leak<br>16: SOV Trip<br>17: Air Line Blocked<br>18: Reserved<br>19: Reserved<br>20: Unknown | All bits:0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Performance Diagnostic Critical possible cause. |
| PD Detail 2 Active<br>PD_DETAIL2_ACTIVE | 74.10 | RO[1] | ALL | Reserved | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Performance Diagnostic Detail status. |
| PD Detail 3 Active<br>PD_DETAIL3_ACTIVE | 74.11 | RO[1] | ALL | 0: I/P Primary Plugging<br>1: I/P Nozzle Plugging<br>2: I/P Calibration Shift<br>3: Reserved<br>4: Relay Cross Misadj<br>5: Relay Port A Diaph Leak<br>6: Relay Port B Diaph Leak<br>7: Reserved<br>8: Piston Ring Leak<br>9: Reserved<br>10: Reserved<br>11: Low Supply Pressure<br>12: Reserved<br>13: External Leak<br>14: Reserved<br>15: Travel Calibration Shift<br>16: Unknown<br>17: Reserved<br>18: Reserved | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Performance Diagnostic Reduce possible cause. |
| PD Detail 4 Active<br>PD_DETAIL4_ACTIVE | 74.12 | RO[1] | ALL | Reserved | All bits: 0 | N/A | Data Type: Bit String (4 byte)<br>0=inactive<br>1=active<br>Performance Diagnostic Detail status |

1. These parameters can be written when PWA_SIMULATE is active and Protect Category is not ALL.

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| PD Detail 5 Active PD_DETAIL5_ACTIVE | 74.13 | RO[1] | ALL | 0: Relay Disengaged 1: Insufficient Pressure Differential 2: Travel Calibration Error 3: Reserved 4: High Supply Pressure* 5: Reserved 6: Near a Travel Cutoff Or Stop 7:Reserved 8: Spec Sheet Fields Incomplete* 9: Sensor Failure* 10: Pressure Control Active 11: Transducer Block Mode OOS 12: Not Authorized for PD 13: PD Run Disabled* 14: Trigger Data Available* | All bits: 0 | N/A | Data Type: Bit String (4 byte) 0=inactive 1=active Performance Diagnostic Detail status  *Bits which, when set, will trigger PERF_ACTIVE bit 2. |
| PD Detail 6 Active PD_DETAIL6_ACTIVE | 74.14 | RO[1] | ALL | Reserved | All bits: 0 | N/A | Data Type: Bit String (4 byte) 0=inactive 1=active Performance Diagnostic Detail status |
| Shutdown Alerts SHUTDOWN_ALERTS_ACTIVE | 74.15 | RO | N/A | 0: Drive Current 1: Program Memory 2: Static Memory 3: Processor or I/O Processor 4: Travel Sensor 5: Port A Pressure Sensor 6: Output Block Timeout 7-31: (Reserved) | All bits: 0 | N/A | Data Type: Bit String (4 byte) 0=inactive 1=active Indicates what caused an Instrument Shutdown. Bit remains set even if condition has passed if Shutdown Recovery is Manual. All bits are cleared when MODE_BLK.TARGET is written. Always enabled whenever the corresponding SHUTDOWN_TRIGGER is enabled. |

1. These parameters can be written when PWA_SIMULATE is active and Protect Category is not ALL.

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| INST_ALERTS_ENABLE | 75 | | | | | | |
| Electronics Enable ELECT_ENABLE | 75.1 | RW | ALL | 0: Drive Current 1: Drive Signal 2: Program Memory 3: Static Memory 4: Processor 5: I/O Processor 6: Output Block Timeout 7: Blocks Set to Defaults | Enabled Bits: 0: Drive Current 1: Drive Signal 2: Program Memory 3: Static Memory 4: Processor 5: I/O Processor 7: Block Set to Default | SETUP | Data Type: Bit String (4 byte) 0=disable 1=enable Electronic Alerts Enable |
| Sensor Enable SENSOR_ENABLE | 75.2 | RW | ALL | 0: Travel Sensor 1: Port A Pressure Sensor 2: Port B Pressure Sensor 3: Supply Pressure Sensor 4: Temperature Sensor | Enabled Bits: 0: Travel Sensor 1: Port A Pressure Sensor 2: Port B Pressure Sensor 3: Supply Pressure Sensor 4: Temperature Sensor | SETUP | Data Type: Bit String (4 byte) 0=disable 1=enable Sensor Alerts Enable |
| Environment Enable ENVIRO_ENABLE | 75.3 | RW | ALL | 0: Supply Pressure High 1: Supply Pressure Low 2: Temperature High 3: Temperature Low | Enabled Bits: 0: Supply Pressure High 2: Temperature High 3: Temperature Low | SETUP | Data Type: Bit String (4 byte) 0=disable 1=enable Environment Alerts Enable |
| Travel Enable TRAVEL_ENABLE | 75.4 | RW | ALL | 0: Travel Deviation 1: Travel High High 2: Travel Low Low 3: Travel High 4: Travel Low | Enabled Bits: 0: Travel Deviation | SETUP | Data Type: Bit String (4 byte) 0=disable 1=enable Travel Alerts Enable |
| Proximity Enable PROX_ENABLE | 75.5 | RW | ALL | 0: Travel Open 1: Travel Closed 2: Proximity High High 3: Proximity High 4: Proximity Low 5: Proximity Low Low | All bits: 0 | SETUP | Data Type: Bit String (4 byte) 0=disable 1=enable Proximity Alerts Enable |
| Travel History Enable TVL_HISTORY_ENABLE | 75.6 | RW | ALL | 0: Cycle Counter 1: Travel Accumulator | All bits: 0 | SETUP | Data Type: Bit String (4 byte) 0=disable 1=enable Travel History Alerts Enable |
| Performance Enable PERF_ENABLE | 75.7 | RW | ALL | 0: Performance Critical 1: Performance Reduced 2: Performance Information | Enabled Bits: 0: Performance Critical 1: Performance Reduced | SETUP | Data Type: Bit String (4 byte) 0=disable 1=enable Performance Alerts Enable |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| INST_ALERTS_CONFIG | 76 | | | | | | |
| Shutdown Trigger<br>SHUTDOWN_TRIGGER | 76.1 | RW | ALL | 0: Drive Current<br>1: Program Memory<br>2: Static Memory<br>3: Processor or I/O Processor<br>4: Travel Sensor<br>5: Port A Pressure Sensor<br>6: Output Block Timeout<br>7-31: (Reserved) | All bits: 0 | SETUP | Data Type: Bit String (4 byte)<br>0=attempt control,<br>1=fail to zero drive e.g. OOS mode<br>Action on specific instrument alerts: |
| Shutdown Recovery<br>SHUTDOWN_RECOVERY | 76.2 | RW | ALL | 0: (reserved)<br>1: Program Memory<br>2: Static Memory<br>3: Processor or I/O Processor<br>4: Travel Sensor<br>5: Port A Pressure Sensor<br>6: Output Block Timeout<br>7-31: (Reserved) | All bits: 0 | SETUP | Data Type: Bit String (4 byte)<br>0=Auto<br>1=Manual<br>Recovery action after a shutdown trigger "fail to zero drive" above, |
| Output Blk Timeout<br>OUTPUT_BLK_TIMEOUT | 76.3 | RW | ALL | Time > = 0, < = 800 seconds | 600 sec | SETUP | Data Type: Float<br>The maximum time between updates from the AO or DO block to the transducer block setpoint. |
| Drive Current Alert Point<br>DRIVE_CURRENT_ALRT_PT | 76.4 | RW | ALL | > = 5,  < = 100 | 25% | SETUP | Data Type: Float<br>(percent different) drive signal not reaching I/P accurately. |
| Drive Current Alert Time<br>DRIVE_CURRENT_TIME | 76.5 | RW | ALL | = 0.25,  < = 120 seconds | 5 sec | SETUP | Data Type: Float<br>(percent different) drive signal not reaching I/P accurately. |
| Temperature Hi Alert Point<br>TEMP_HI_ALRT_PT | 76.6 | RW | ALL | > -76 F, < 257 F | 186 deg F | SETUP | Data Type: Float<br>Temperature HI Limits |
| Temperature Lo Alert Point<br>TEMP_LO_ALRT_PT | 76.7 | RW | ALL | > -76 F, < 257 F | -63 deg F | SETUP | Data Type: Float<br>Temperature LO Limits |
| Supply Pressure Hi Alert Point<br>SUP_PRES_HI_ALRT_PT | 76.8 | RW | ALL | > = 0, < = 150 | 145 psig | SETUP | Data Type: Float<br>Maximum supply pressure |
| Supply Pressure Lo Alert Point<br>SUP_PRES_LO_ALRT_PT | 76.9 | RW | ALL | > = 0, < = 150 | 15 psig | SETUP | Data Type: Float<br>Minimum supply pressure |
| INST_ALERTS_CONFIG2 | 77 | | | | | | |
| Travel Deviation Alert Point<br>TVL_DEV_ALRT_PT | 77.1 | RW | ALL | > 0%, <= 125% | 5% | SETUP | Data Type: Float<br>Alerts when difference between sp and pv is too large for too long. |
| Travel Deviation Time<br>TVL_DEV_TIME | 77.2 | RW | ALL | > = 0, < = 120 seconds | 10 sec | SETUP | Data Type: Float |
| Travel Deviation Deadband<br>TVL_DEV_DB | 77.3 | RW | ALL | > = 0%, < = 100% | 2% | SETUP | Data Type: Float |
| Travel Accumulator Alert Point<br>TVL_ACCUM_ALRT_PT | 77.4 | RW | ALL | > = 0 | 1,000,000 | SETUP | Data Type: Uint32<br>Alerts when accumulated travel is too much |
| Travel Accumulator Deadband<br>TVL_ACCUM_DB | 77.5 | RW | ALL | 0 - 100% | 1% | SETUP | Data Type: Float<br>Deadband |
| Cycle Count Alert Point<br>CYCLE_COUNT_ALRT_PT | 77.6 | RW | ALL | > = 0 | 1,000,000 | SETUP | Alerts when number of cycles is too large. |
| Cycle Count Deadband<br>CYCLE_COUNT_DB | 77.7 | RW | ALL | 0 - 100% | 1% | SETUP | Data Type: Float<br>Deadband |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| Travel Open Alert Point<br>TVL_OPEN_ALRT_PT | 77.8 | RW | ALL | -25% to 125% | 99.5% | SETUP | Data Type: Float<br>Alert when valve is open. Control DI channel 24 regardless of alert enable state. |
| Travel Open Deadband<br>TVL_OPEN_DB | 77.9 | RW | ALL | > = 0%, < =100% | 1% | SETUP | Data Type: Float<br>Deadband |
| Travel Closed Alert Point<br>TVL_CLOSED_ALRT_PT | 77.10 | RW | ALL | -25% to 125% | 0.5% | SETUP | Data Type: Float<br>Alerts when valve closed. Controls DI channel 25 regardless of alert enable state. |
| Travel Closed Deadband<br>TVL_CLOSED_DB | 77.11 | RW | ALL | > = 0%, < = 100% | 1% | SETUP | Data Type: Float<br>Deadband |
| Travel Lo Lo Alert Point<br>TVL_LO_LO_ALRT_PT | 77.12 | RW | ALL | -25% to 125% | -25% | SETUP | Data Type: Float<br>Alert when valve position is less than alert point. Controls DI channels 26 & 30 regardless of alert enable state. |
| Travel Lo Lo Deadband<br>TVL_LO_LO_DB | 77.13 | RW | ALL | > = 0%, < = 100% | 5% | SETUP | Data Type: Float<br>Deadband |
| Travel Lo Alert Point<br>TVL_LO_ALRT_PT | 77.14 | RW | ALL | -25% to 125% | -25% | SETUP | Data Type: Float<br>Alert when valve position is less than alert point. Controls DI channels 27 & 31 regardless of alert enable state. |
| Travel Lo Deadband<br>TVL_LO_DB | 77.15 | RW | ALL | > = 0%, < = 100% | 5% | SETUP | Data Type: Float<br>Deadband |
| Travel Hi Alert Point<br>TVL_HI_ALRT_PT | 77.16 | RW | ALL | -25% to 125% | 125% | SETUP | Data Type: Float<br>Alert when valve position is less than alert point. Controls DI channels 28 & 32 regardless of alert enable state. |
| Travel Hi Deadband<br>TVL_HI_DB | 77.17 | RW | ALL | > = 0%, < = 100% | 5% | SETUP | Data Type: Float<br>Deadband |
| Travel Hi Hi Alert Point<br>TVL_HI_HI_ALRT_PT | 77.18 | RW | ALL | -25% to 125% | 125% | SETUP | Data Type: Float<br>Alert when valve position is less than alert point. Controls DI channels 29 & 33 regardless of alert enable state. |
| Travel Hi Hi Deadband<br>TVL_HI_HI_DB | 77.19 | RW | ALL | > = 0%, < = 100% | 5% | SETUP | Data Type: Float<br>Deadband |

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| Self Test Status<br>SELFTEST_STATUS | 78 | RO | N/A | 0:<br>2: Integrator Limited Low<br>3: Integrator Limited High<br>4: Travel Sensor Span Error<br>5: MLFB Error<br>7: Travel Sensor High Error<br>8: Travel Sensor Low Error<br>9: Pressure Sensor B<br>10: Pressure Sensor A<br>11: Supply Pressure Sensor<br>13: IOP Failure<br>14: Drive Current<br>15: Simulate Jumper ON | All bits: 0 | | Data Type: Bit String (2 byte)<br>0=inactive<br>1=active<br>Indicates the status of the instrument self test.<br>**Integrator Limited Low:** Indicates the integrator reached its limit and cannot move the valve any further. High valve friction may cause this situation.<br>**Integrator Limited High:** Indicates the integrator reached its limit and cannot move the valve any further. High valve friction may cause this situation.<br>**Travel Sensor Span Error:** Indicates that span between the endpoints of travel are not far enough apart. This error is reported during automatic calibration.<br>**MLFB Error:** Indicates that the Minor Loop Feedback sensor gave a non-valid value during automatic calibration.<br>**Travel Sensor High Error:** Indicates the travel sensor has reported a travel position that is significantly above the normal operating range, and has failed.<br>**Travel Sensor Low Error:** Indicates the travel sensor has reported a travel position that is significantly below the normal operating range, and has failed.<br>**Pressure B Sensor Failure:** Indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure, and has failed.<br>**Pressure A Sensor Failure:** Indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure, and has failed.<br>**Supply Sensor Failure:** Indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure, and has failed.<br>**IOP Failure:** Indicates the I/O processor has failed.<br>**Drive Current:** Indicates that the Drive Current has exceeded the Drive Current Alert Point for more than the Drive Current Alert Time.<br>**Simulate Jumper ON:** Indicates the simulate jumper is connected to the DVC6200f between the two AUX terminals. |
| Health Index<br>HEALTH_INDEX | 79 | RO | N/A | 0 - 100 | 100 | N/A | Data Type: Uint8<br>Represents overall health of device. 100 is perfect, 0 is completely bad. Settings for DVC6200f will range from 10 to 100. |
| Reserved A<br>RESERVED_A | 80 | RW | ALL | | N/A | SETUP | Data Type: Array, 118 x Unit8<br>Reserved |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Protect<br>Category | Description |
|---|---|---|---|---|---|---|---|
| Reserved AI<br>RESERVED_AI | 81 | RW | ALL | | 0 | SETUP | Data Type: Uint16<br>Reserved |
| Upgrade Progress<br>UPGRADE_PROGRESS | 82 | RO | N/A | | 1 | N/A | Data Type: Enum (Uint8)<br>Not used by the DVC6200f |
| SPEC_SHEET_VALVE | 83 | | | | | | |
| Valve Size<br>VALVE_SIZE | 83.1 | RW | ALL | | NULL | ALL | Data Type: Visible String |
| Valve Class<br>VALVE_CLASS | 83.2 | RW | ALL | | NULL | ALL | Data Type: Visible String |
| Rated Travel<br>RATEDTRAVEL | 83.3 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Actual Travel<br>ACTUAL_TRAVEL | 83.4 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Shaft Stem Diameter<br>SHAFT_STEM_DIA | 83.5 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Packing Type<br>PACKING_TYPE | 83.6 | RW | ALL | | NULL | ALL | Data Type: Visible String |
| Inlet Pressure<br>INLET_PRESSURE | 83.7 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Outlet Pressure<br>OUTLET_PRESSURE | 83.8 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| SPEC_SHEET_TRIM | 84 | | | | | | |
| Seat Type<br>SEAT_TYPE | 84.1 | RW | ALL | | NULL | ALL | Data Type: Visible String |
| Leak Class<br>LEAK_CLASS | 84.2 | RW | ALL | ANSI Seat Leakage Classification<br>1: I<br>2: II<br>3: III<br>4: IV<br>5: V<br>6: VI<br>7: BFW<br>8: STD AIR<br>9: BFW II<br>10: BFW III<br>11: BFW IV<br>12: BFW V<br>13: BFW VI<br>14: 1/10th of IV<br>15: Bubble Tight | 1= I | ALL | Data Type: Enum (Uint8) |
| Port Diameter<br>PORT_DIAMETER | 84.3 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Port Type<br>PORT_TYPE | 84.4 | RW | ALL | 1=balanced<br>2=unbalanced | 0 | ALL | Data Type: Enum (Uint8) |
| Flow Direction<br>FLOWDIRECTION | 84.5 | RW | ALL | 1=up<br>2=down | 0 | ALL | Data Type: Enum (Uint8) |
| Push Down To<br>PUSH_DOWN_TO | 84.6 | RW | ALL | 1=open<br>2=close | 0 | ALL | Data Type: Enum (Uint8) |
| Flow Tends To<br>FLOW_TENDS_TO | 84.7 | RW | ALL | 1=open<br>2=close | 0 | ALL | Data Type: Enum (Uint8) |
| Unbalanced Area<br>UNBALANCED_AREA | 84.8 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Trim Style 1<br>TRIM_STYLE_1 | 84.9 | RW | ALL | | NULL | ALL | Data Type: Visible String |
| Trim Style 2<br>TRIM_STYLE_2 | 84.10 | RW | ALL | | NULL | ALL | Data Type: Visible String |

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## Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| SPEC_SHEET_ACT | 85 | | | | | | |
| Actuator Size ACTUATOR SIZE | 85.1 | RW | ALL | | NULL | ALL | Data Type: Visible String |
| Effective Area EFFECTIVE AREA | 85.2 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Air AIR | 85.3 | RW | ALL | 1=open 2=close | 0 | ALL | Data Type: Enum (Uint8) |
| Lower Bench Set LOWER_BENCH_SET | 85.4 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Upper Bench Set UPPER_BENCH_SET | 85.5 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Nominal Supply Pressure NOMINAL_SUPPLY_PRESSURE | 85.6 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Spring Rate SPRING_RATE | 85.7 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| Stroking Time Open STROKING_TIME_OPEN | 85.8 | RW | ALL | | 0.00 | ALL | Data Type: Float Seconds |
| Stroking Time Close STROKING_TIME_CLOSE | 85.9 | RW | ALL | | 0.00 | ALL | Data Type: Float Seconds |
| Lever Style LEVER_STYLE | 85.10 | RW | ALL | 1=Pivot Point 2=Rack & Pinion | 0 | ALL | Data Type: Enum (Uint8) |
| Lever Arm Length MOMENT_ARM | 85.11 | RW | ALL | | 0.00 | ALL | Data Type: Float |
| DEVICE_RECORD | 86 | | | | | | These parameters can only reset through VL/DD. |
| Temperature Maximum TEMP_MAX | 86.1 | RO | N/A | | -9999.99 | N/A | Data Type: Float Highest temperature recorded |
| Temperature Maximum Time TEMP_MAX_TIME | 86.2 | RO | N/A | | Zero time | N/A | Data Type: Time Value |
| Temperature Minimum TEMP_MIN | 86.3 | RO | N/A | | 9999.99 | N/A | Data Type: Float Lowest temperature recorded |
| Temperature Minimum Time TEMP_MIN_TIME | 86.4 | RO | N/A | | Zero time | N/A | Data Type: Time Value |
| Supply Pressure Maximum SUPP_PRESS_MAX | 86.5 | RO | N/A | | 0.0 | N/A | Data Type: Float Highest supply pressure recorded |
| Supply Pressure Maximum Time SUPP_PRESS_MAX_TIME | 86.6 | RO | N/A | | Zero time | N/A | Data Type: Time Value |
| Supply Pressure Minimum SUPP_PRESS_MIN | 86.7 | RO | N/A | | 9999.99 | N/A | Data Type: Float Lowest supply pressure recorded |
| Supply Pressure Minimum Time SUPP_PRESS_MIN_TIME | 86.8 | RO | N/A | | Zero time | N/A | Data Type: Time Value |
| Comm Error Count COMM_ERROR_COUNT | 86.9 | RW | N/A | | 0 | SETUP | Not used by the DVC6200f |
| Protection PROTECTION | 87 | RW | ALL | 1=None 2=Calibration 3=Setup & Calibration 4=All | 2=Calibration | NONE | Data Type: Enum Write lock enable/disable. If setting is at or above a parameters protection level then that parameter is read-only. |

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| PERF_DIAG | 88 | | | | | | |
| PD Run<br>PD_COMMAND | 88.1 | RW | AUTO MAN | 1=PD On<br>2=PD Off | 1=PD On | NONE | Data Type: Enum<br>Controls whether PD will run or not. |
| PD Status<br>PD_STATUS | 88.2 | RO | ALL | 1=Not Running<br>2=Running | | NONE | Data Type: Enum<br>Status of performance diagnostics. |
| PD Configuration<br>PD_CONFIG | 88.3 | RW | ALL | 0 | | NONE | Data Type: Bit String<br>Bit string for configuring PD setup and options. |
| PD Extra<br>PD_EXTRA | 88.4 | RW | ALL | | 0 | NONE | Data Type: Uint32<br>Extra 32 bit integer for sending values to PD. |
| Temperature Units<br>TEMPERATURE_UNITS | 89 | RW | ALL | C=1001<br>F=1002 | C | SETUP | Data Type: Enum (Uint8) |
| Pressure Units<br>PRESSURE_UNITS | 90 | RW | ALL | kPa=1133<br>bar=1137<br>psig=1143<br>inHg=1155<br>inH2O=1146<br>Kg/cm$^2$=1145 | kPa | SETUP | Data Type: Enum (Uint8) |
| Travel Units<br>TVL_UNITS | 91 | RW | ALL | cm=1012<br>mm=1013<br>in=1019<br>deg=1005 | mm | SETUP | Data Type: Enum (Uint8)<br>Travel units for spec sheet ACTUAL_TRAVEL and RATEDTRAVEL only. |
| Length Units<br>LENGTH_UNITS | 92 | RW | ALL | cm=1012<br>mm=1013<br>in=1019 | mm | SETUP | Data Type: Enum (Uint8)<br>Not used for spec sheet ACTUAL_TRAVEL OR RATEDTRAVEL |
| Area Units<br>AREA_UNITS | 93 | RW | ALL | cm$^2$=1025<br>mm$^2$=1027<br>in$^2$=1030 | cm$^2$ | SETUP | Data Type: Enum (Uint8) |
| Spring Rate Units<br>SPRING_RATE_UNITS | 94 | RW | ALL | N/m=1165<br>lb/in=1596 | N/m | SETUP | Data Type: Enum (Uint8) |
| MAI_CHANNEL_MAP | 95 | | | | | | Data Type:Uint16   This defines which transducer block channels will be sent to each of the 8 MAI channels. No scaling or other conversion will be done. Values will be sent in the currently defined units. If set to 0, then no output to MAI (status will be set to BAD).<br>1=FINAL_VALUE<br>2=TRAVEL_TARGET<br>3=FINAL_POSITION_VALUE<br>4=TRAVEL<br>5=SUPPLY_PRESS<br>6=ACT_PRESS_A<br>7=ACT_PRESS_B<br>8=ACT_PRESS_DIFF<br>9=DRIVE_SIGNAL<br>10=TRAVEL_DEVIATION<br>11=TEMPERATURE<br>12=CYCLE_COUNT<br>13=TRAVEL_ACCUM |
| MAI Channel 1<br>MAI_CHANNEL_1 | 95.1 | RW | MAN, OOS | 1 through 13 | 1 | SETUP | |
| MAI Channel 2<br>MAI_CHANNEL_2 | 95.2 | RW | MAN, OOS | 1 through 13 | 2 | SETUP | |
| MAI Channel 3<br>MAI_CHANNEL_3 | 95.3 | RW | MAN, OOS | 1 through 13 | 3 | SETUP | |
| MAI Channel 4<br>MAI_CHANNEL_4 | 95.4 | RW | MAN, OOS | 1 through 13 | 4 | SETUP | |
| MAI Channel 5<br>MAI_CHANNEL_5 | 95.5 | RW | MAN, OOS | 1 through 13 | 5 | SETUP | |
| MAI Channel 6<br>MAI_CHANNEL_6 | 95.6 | RW | MAN, OOS | 1 through 13 | 6 | SETUP | |
| MAI Channel 7<br>MAI_CHANNEL_7 | 95.7 | RW | MAN, OOS | 1 through 13 | 7 | SETUP | |
| MAI Channel 8<br>MAI_CHANNEL_8 | 95.8 | RW | MAN, OOS | 1 through 13 | 8 | SETUP | |
| Output Block Selection<br>OUTBLOCK_SEL | 96 | RW | MAN, OOS | 1: AO Block<br>2: DO Block | 1: AO Block | SETUP | Data Type: Enum (Uint8)<br>Controls which output block (AO or DO) the transducer block will respond to. |
| PlantWeb Alerts Set PV Status<br>PWA_SET_STATUS | 97 | RW | MAN, OOS | 1: No<br>2: Yes | 1: No | SETUP | Data Type: Enum (Uint8)<br>Controls whether the status of the PV fed back to the output block from the transducer block will be affected by an active PlantWeb alert. |

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Table 4-14. Transducer Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Protect Category | Description |
|---|---|---|---|---|---|---|---|
| Block Information BLOCK_INFO | 98 | RO | | Bit 0: Travel feedback sensor detected Bit 1: Output Block Scheduled Bit 2: Trigger Capturing Bit 3: Output Block in Normal Mode Bit 4: Write Lock is on Bit 5: Resource Block in Auto Mode | | | Data Type: Bit String (2 bytes) |
| Reserved B RESERVED_B | 99 | RW | | | | | Data Type: Bit String (4 bytes) |
| Travel Always TRAVEL_ALWAYS | 100 | RO | | | | | Data Type: DS-65 |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-15. Transducer Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET |
| 5.2 | MODE_BLK.ACTUAL |
| 5.3 | MODE_BLK.PERMITTED |
| 5.4 | MODE_BLK.NORMAL |
| 6 | BLOCK_ERR |
| 10 | TRANSDUCER_TYPE |
| 11 | XD_ERROR |
| 13.1 | FINAL_VALUE.STATUS |
| 13.2 | FINAL_VALUE.VALUE |
| 17.1 | FINAL_POSITION_VALUE.STATUS |
| 17.2 | FINAL_POSITION_VALUE.VALUE |
| 32.1 | SETPOINT_D.STATUS |
| 32.2 | SETPOINT_D.VALUE |

Table 4-16. Transducer Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 10 | TRANSDUCER_TYPE |
| 14.1 | FINAL_VALUE_RANGE.EU_100 |
| 14.2 | FINAL_VALUE_RANGE.EU_0 |
| 14.3 | FINAL_VALUE_RANGE.UNITS_INDEX |
| 14.4 | FINAL_VALUE_RANGE.DECIMAL |
| 15 | FINAL_VALUE_CUTOFF_HI |
| 16 | FINAL_VALUE_CUTOFF_LO |
| 18 | SERVO_GAIN |
| 19 | SERVO_RESET |
| 20 | SERVO_RATE |
| 21 | ACT_FAIL_ACTION |
| 40.1 | GRANT_DENY.GRANT |
| 40.2 | GRANT_DENY.DENY |
| 50 | INPUT_CHAR |

**Note**

Because individual views are limited in size, View Lists 3 and 4 have multiple parts.

Table 4-17. Transducer Block, View 3.1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLOCK.TARGET |
| 5.2 | MODE_BLOCK.ACTUAL |
| 5.3 | MODE_BLOCK.PERMITTED |
| 5.4 | MODE_BLOCK.NORMAL |
| 6 | BLOCK_ERR |
| 10 | TRANSDUCER_TYPE |
| 11 | XD_ERROR |
| 13.1 | FINAL_VALUE.STATUS |
| 13.2 | FINAL_VALUE.VALUE |
| 17.1 | FINAL_POSITION_VALUE.STATUS |
| 17.2 | FINAL_POSITION_VALUE.VALUE |
| 32.1 | SETPOINT_D.STATUS |
| 32.2 | SETPOINT_D.VALUE |
| 35.1 | SUPPLY_PRESSURE.STATUS |
| 35.2 | SUPPLY_PRESSURE.VALUE |
| 36.1 | PRESSURE_A.STATUS |
| 36.2 | PRESSURE_A.VALUE |
| 37.1 | PRESSURE_B.STATUS |
| 37.2 | PRESSURE_B.VALUE |
| 38.1 | PRESSURE_DIFF.STATUS |
| 38.2 | PRESSURE_DIFF.VALUE |
| 48 | TEMPERATURE |
| 49 | TRAVEL_TARGET |
| 52 | TRAVEL_DEVIATION |
| 53 | DRIVE_SIGNAL |
| 54 | DRIVE_CURRENT |
| 55 | MLFB |
| 59 | FAILED_ACTIVE |
| 60 | MAINT_ACTIVE |
| 61 | ADVISE_ACTIVE |
| 71 | RECOMMEND_ACTION |
| 72 | TRAVEL_ACCUM |
| 73 | CYCLE_COUNT |
| 75.1 | INST_ALERTS_ENABLE.ELECT_ENABLE |
| 75.2 | INST_ALERTS_ENABLE.SENSOR_ENABLE |
| 75.3 | INST_ALERTS_ENABLE.ENVIRO_ENABLE |
| 75.4 | INST_ALERTS_ENABLE.TRAVEL_ENABLE |
| 75.5 | INST_ALERTS_ENABLE.PROX_ENABLE |
| 75.6 | INST_ALERTS_ENABLE.TVL_HISTORY_ENABLE |
| 75.7 | INST_ALERTS_ENABLE.PERF_ENABLE |

Table 4-18. Transducer Block, View 3.2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 74.1 | INST_ALERTS_ACTIVE.ELECT_ACTIVE |
| 74.2 | INST_ALERTS_ACTIVE.SENSOR_ACTIVE |
| 74.3 | INST_ALERTS_ACTIVE.ENVIRO_ACTIVE |
| 74.4 | INST_ALERTS_ACTIVE.TRAVEL_ACTIVE |
| 74.5 | INST_ALERTS_ACTIVE.PROX_ACTIVE |
| 74.6 | INST_ALERTS_ACTIVE.TVL_HISTORY_ACTIVE |
| 74.7 | INST_ALERTS_ACTIVE.PERF_ACTIVE |
| 74.8 | INST_ALERTS_ACTIVE.PD_EVENT_ACTIVE |
| 74.9 | INST_ALERTS_ACTIVE.PD_DETAIL1_ACTIVE |
| 74.10 | INST_ALERTS_ACTIVE.PD_DETAIL2_ACTIVE |
| 74.11 | INST_ALERTS_ACTIVE.PD_DETAIL3_ACTIVE |
| 74.12 | INST_ALERTS_ACTIVE.PD_DETAIL4_ACTIVE |
| 74.13 | INST_ALERTS_ACTIVE.PD_DETAIL5_ACTIVE |
| 78 | SELFTEST_STATUS |
| 79 | HEALTH_INDEX |
| 86.1 | DEVICE_RECORD.TEMP_MAX |
| 86.2 | DEVICE_RECORD.TEMP_MAX_TIME |
| 86.3 | DEVICE_RECORD.TEMP_MIN |
| 86.4 | DEVICE_RECORD.TEMP_MIN_TIME |
| 86.5 | DEVICE_RECORD.SUPP_PRESS_MAX |
| 86.6 | DEVICE_RECORD.SUPP_PRESS_MAX_TIME |
| 86.7 | DEVICE_RECORD.SUPP_PRESS_MIN |
| 86.8 | DEVICE_RECORD.SUPP_PRESS_MIN_TIME |

Table 4-19. Transducer Block, View 4.1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 10 | TRANSDUCER_TYPE |
| 22 | ACT_MAN_ID |
| 23 | ACT_MODEL_NUM |
| 24 | ACT_SN |
| 25 | VALVE_MAN_ID |
| 26 | VALVE_MODEL_NUM |

### Table 4-20. Transducer Block, View 4.2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 27 | VALVE_SN |
| 28 | VALVE_TYPE |
| 29 | XD_CAL_LOC |
| 30 | XD_CAL_DATE |
| 31 | XD_CAL_WHO |
| 89 | TEMPERATURE_UNITS |
| 90 | PRESSURE_UNITS |
| 91 | TVL_UNITS |
| 92 | LENGTH_UNITS |
| 93 | AREA_UNITS |
| 94 | SPRING_RATE_UNITS |

### Table 4-21. Transducer Block, View 4.3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 39 | PWA_SIMULATE |
| 41.1 | TVL_PRESS_CONTROL.TVL_PRESS_SELECT |
| 41.2 | TVL_PRESS_CONTROL.TVL_PRESS_STATE |
| 42.1 | BASIC_SETUP.ACTUATOR_STYLE |
| 42.2 | BASIC_SETUP.ZERO_PWR_COND |
| 42.3 | BASIC_SETUP.TRAVEL_SEN_MOTION |
| 42.4 | BASIC_SETUP.FEEDBACK_CONN |
| 42.5 | BASIC_SETUP.RELAY_TYPE |
| 42.6 | BASIC_SETUP.MAX_SUPP_PRESS |
| 42.7 | BASIC_SETUP.PRESS_RANGE_HI |
| 42.8 | BASIC_SETUP.PRESS_RANGE_LO |
| 42.9 | BASIC_SETUP.TVL_CAL_TRIGGER |
| 42.10 | BASIC_SETUP.TVL_TUNING_SET |
| 42.11 | BASIC_SETUP.PRESS_TUNING_SET |
| 44.1 | TRAVEL_TUNE.TVL_INTEG_ENABLE |
| 44.2 | TRAVEL_TUNE.TVL_INTEG_LIM_HI |
| 44.3 | TRAVEL_TUNE.TVL_INTEG_LIM_LO |
| 44.4 | TRAVEL_TUNE.TVL_INTEG_DEADZ |
| 44.5 | TRAVEL_TUNE.TVL_MLFB_GAIN |
| 47.1 | PRESS_TUNE.PRESS_CUTOFF_HI |
| 47.2 | PRESS_TUNE.PRESS_CUTOFF_LO |
| 47.3 | PRESS_TUNE.PRESS_PROP_GAIN |
| 47.4 | PRESS_TUNE.PRESS_INTEG_GAIN |
| 47.5 | PRESS_TUNE.PRESS_RATE_GAIN |
| 47.6 | PRESS_TUNE.PRESS_INTEG_DEADZ |
| 47.7 | PRESS_TUNE.PRESS_INTEG_HI_LIM |
| 47.8 | PRESS_TUNE.PRESS_INTEG_LO_LIM |
| 47.9 | PRESS_TUNE.PRESS_INTEG_IC_HI |
| 47.10 | PRESS_TUNE.PRESS_INTEG_IC_LO |
| 47.11 | PRESS_TUNE.PRESS_MLFB_GAIN |
| 62 | FAILED_ENABLE |
| 63 | MAINT_ENABLE |
| 64 | ADVISE_ENABLE |
| 65 | FAILED_MASK |
| 66 | MAINT_MASK |

-continued-

### Table 4-21. Transducer Block, View 4.3 (continued)

| Index Number | Parameter |
|---|---|
| 67 | ADVISE_MASK |
| 68 | FAILED_PRI |
| 69 | MAINT_PRI |
| 70 | ADVISE_PRI |

### Table 4-22. Transducer Block, View 4.4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 76.1 | INST_ALERTS_CONFIG.SHUTDOWN_TRIGGER |
| 76.2 | INST_ALERTS_CONFIG.SHUTDOWN_RECOVERY |
| 76.3 | INST_ALERTS_CONFIG.OUTPUT_BLK_TIMEOUT |
| 76.4 | INST_ALERTS_CONFIG.DRIVE_CURRENT_ALRT_PT |
| 76.5 | INST_ALERTS_CONFIG.DRIVE_CURRENT_TIME |
| 76.6 | INST_ALERTS_CONFIG.TEMP_HI_ALRT_PT |
| 76.7 | INST_ALERTS_CONFIG.TEMP_LO_ALRT_PT |
| 76.8 | INST_ALERTS_CONFIG.SUP_PRES_HI_ALRT_PT |
| 76.9 | INST_ALERTS_CONFIG.SUP_PRES_LO_ALRT_PT |
| 77.1 | INST_ALERTS_CONFIG2.TVL_DEV_ALRT_PT |
| 77.2 | INST_ALERTS_CONFIG2.TVL_DEV_TIME |
| 77.3 | INST_ALERTS_CONFIG2.TVL_DEV_DB |
| 77.4 | INST_ALERTS_CONFIG2.TVL_ACCUM_ALRT_PT |
| 77.5 | INST_ALERTS_CONFIG2.TVL_ACCUM_DB |
| 77.6 | INST_ALERTS_CONFIG2.CYCLE_COUNT_ALRT_PT |
| 77.7 | INST_ALERTS_CONFIG2.CYCLE_COUNT_DB |
| 77.8 | INST_ALERTS_CONFIG2.TVL_OPEN_ALRT_PT |
| 77.9 | INST_ALERTS_CONFIG2.TVL_OPEN_DB |
| 77.10 | INST_ALERTS_CONFIG2.TVL_CLOSED_ALRT_PT |
| 77.11 | INST_ALERTS_CONFIG2.TVL_CLOSED_DB |
| 77.12 | INST_ALERTS_CONFIG2.TVL_LO_LO_ALRT_PT |
| 77.13 | INST_ALERTS_CONFIG2.TVL_LO_LO_DB |
| 77.14 | INST_ALERTS_CONFIG2.TVL_LO_ALRT_PT |
| 77.15 | INST_ALERTS_CONFIG2.TVL_LO_DB |
| 77.16 | INST_ALERTS_CONFIG2.TVL_HI_ALRT_PT |
| 77.17 | INST_ALERTS_CONFIG2.TVL_HI_DB |
| 77.18 | INST_ALERTS_CONFIG2.TVL_HI_HI_ALRT_PT |
| 77.19 | INST_ALERTS_CONFIG2.TVL_HI_HI_DB |
| 82 | UPGRADE_PROGRESS |
| 87 | PROTECTION |

### Table 4-23. Transducer Block View, 4.5

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 95.1 | MAI_CHANNEL_1 |
| 95.2 | MAI_CHANNEL_2 |
| 95.3 | MAI_CHANNEL_3 |
| 95.4 | MAI_CHANNEL_4 |
| 95.5 | MAI_CHANNEL_5 |
| 95.6 | MAI_CHANNEL_6 |
| 95.7 | MAI_CHANNEL_7 |
| 95.8 | MAI_CHANNEL_8 |
| 96 | OUTBLOCK_SEL |
| 97 | PWA_SET_STATUS |

# Analog Output Function Block

## Overview

The Analog Output (AO) function block (figure 4-6) assigns an output value to a field device through a specified I/O channel. The block supports mode control, signal status calculation, and simulation. Figure 4-7 illustrates the internal components of the AO function block, and table 4-25 lists the definitions of the block parameters. The digital valve controller measures and uses actual valve position for READBACK [16].

Figure 4-6. Analog Output (AO) Function Block
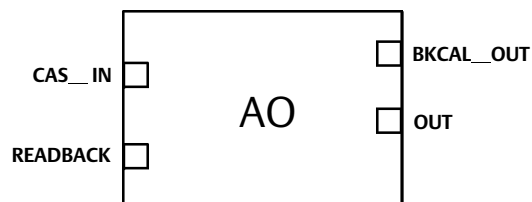


CAS_IN = The remote setpoint value from another function block.

BKCAL_OUT = The value and status required by the BKCAL_IN input of another block to prevent reset windup and to provide bumpless transfer to closed loop control.

OUT = The block output and status.

READBACK = Actual valve position.

B2716-1

**Note**

The AO block actual mode will not move to Auto unless:

● Resource Block actual mode is Auto, and

● AO SHED_OPT [27] is set to a non-zero value.

**Note**

Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain out of service and the block cannot be scheduled if the block has not been licensed. Contact your Emerson Process Management sales office to upgrade product licensing.

**Note**

Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain in IMAN and the block Readback status will be Bad - Not Connected if the Output Block Selection is set incorrectly. From the transducer block method Outblock Selection, select the desired output block, see page 45.

Figure 4-7. Analog Output Function Block Schematic



B2717
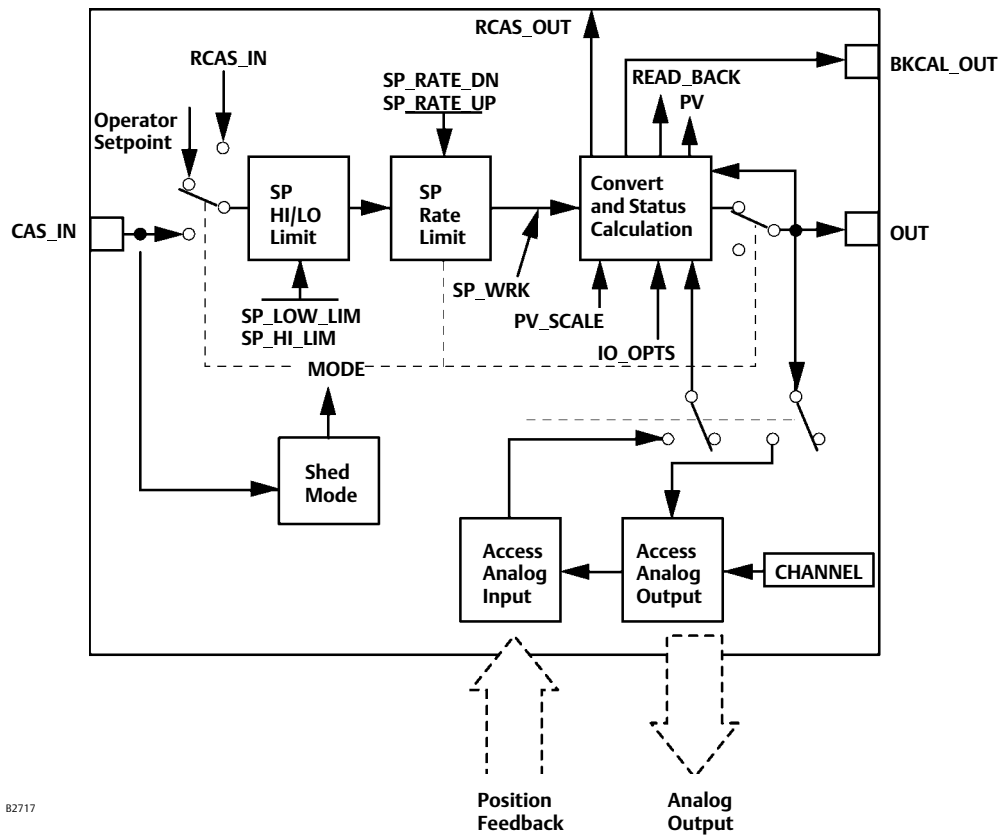
# Modes

The Analog Output function block supports the following modes:

- **Manual (Man)**—You can manually set the output to the I/O channel through the OUT [9] attribute. This mode is used primarily for maintenance, calibration and diagnostics.

- **Automatic (Auto)**—The block output (OUT [9]) reflects the target operating point specified by the setpoint (SP [8]) attribute. Typically the setpoint is set by the user.

- **Cascade (Cas)**—The SP [8] attribute is set by another function block through a connection to CAS_IN [17]. The SP [8] value is used to set the OUT [9] attribute automatically. This is the most frequently used mode in the digital valve controller.

---

**Note**

The transducer block must be in Auto for the mode to go to AUTO, CAS, MAN, or RCAS.

---

- **RemoteCascade (RCas)**—The SP [8] is set by a host computer by writing to the RCAS_IN [28] parameter. The SP [8] value is used to set the OUT [9] attribute automatically.

- **Out of Service (OOS)**—The block is not processed. The output channel is maintained at the last value and the status of OUT [9] is set to Bad: Out of Service. The BLOCK_ERR [6] attribute shows Out of Service.

- **Initialization Manual (Iman)**—The path to the output hardware is broken and the AO block output will remain at the last position. This means the transducer block mode is Out of Service or Manual or configured to respond to the DO block.

- **Local Override (LO)**—The output of the block is not responding to inputs because the fault state action is active. OUT [9] freezes or goes to value per IO_OPTS [14].

The target mode of the block may be restricted to one or more of the following modes: Man, Auto, Cas, RCas, or OOS.

# Mode Handling

## Shed Options—RCAS Mode Only

Automatically changing through the permitted modes when starting from a remote mode, fall from (or shed) or climb to a remote mode is determined by the parameter SHED_OPT [27]. A block climbs and sheds through the same path. For example, if SHED_OPT [27] specifies that a block should shed to Auto, then, if the block target mode is set to RCas, the block goes through Auto on the way to RCas.

When the block is in Cas mode and the CAS_IN [17] input goes bad, the block sheds mode to the next lower permitted mode.

You can configure the shed option as follows:

### Shed With Return Options

Remote cascade connection failure shifts actual mode but keeps trying to restore remote cascade (in other words, the remote cascade target mode stays in effect).

---

**Note**

During Shed with Return Options, the actual mode is changed, while the target mode stays the same.

---

**Normal**—On failure of a remote cascade connection the block attempts to attain the highest permitted non-remote mode until remote cascade is restored. Cas is the highest permitted non-remote mode and Auto is is the next permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

**Retained Target**—The retained target mode is the previous target mode before it was changed to RCAS or ROUT. On failure of a remote cascade connection the block attempts to attain the retained target mode.

**Auto**—On failure of a remote cascade connection the block attempts to attain Auto, if permitted, until remote cascade is restored.

**Man**—On failure of a remote cascade connection the block sheds to Man until a remote cascade connection is restored.

### Shed With No Return Options

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**Note**

During Shed with No Return Options, the target mode is changed, while the actual mode stays the same.

---

For any shed with no return option, the target mode changes as determined by the option. Therefore, there is no attempt to restore the connection following failure. The behavior on change to the remote cascade target mode is identical to that for Shed With Return Options.

**Normal**—On failure of a remote cascade connection the block sets the target mode to the highest permitted non-remote mode. Cas is the highest permitted non-remote mode and Auto is is the next highest permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

**Retained Target**—The retained target mode is the previous target mode before it was changed to RCAS or ROUT. On failure of a remote cascade connection the block sets the target mode to the retained target mode.

**Auto**—On failure of a remote cascade connection, the block sets the target mode to Auto, if permitted.

**Man**—On failure of remote cascade connection, the block sets the target mode to Man, if permitted.

The user may configure SHED_OPT [27] so that it calls for a target mode that is not permitted. When doing this, the mode logic uses the following rules as applied by the remote logic:

- Shed logic never results in a non-permitted target mode.

- Shed logic never attempts to attain an actual mode of Auto or Cas if that mode is not permitted.

# Status Handling

Output or readback fault detection is reflected in the status of PV [7], OUT [9], and BKCAL_OUT [25]. A limited SP [8] condition is reflected in the BKCAL_OUT [25] status. When simulation is enabled through the SIMULATE [10] attribute, you can set the value and status for PV [7] and READBACK [16].

When the block is in Cas mode and the CAS_IN [17] input goes bad, the block sheds mode to the next permitted mode.

# Setting the Output

To set the output for the AO block, you must first set the mode to define the manner in which the block determines its setpoint. In Manual mode the value of the output attribute (OUT [9]) must be set manually by the user, and is independent of the setpoint. In Automatic mode, OUT [9] is set automatically based on the value specified by the set point (SP [8]) in engineering units and the I/O Options attribute. In addition, you can limit the SP [8] value and the rate at which a change in the SP [8] is passed to OUT [9].

In Cascade mode, the cascade input connection (CAS_IN [17]) is used to update the SP [8]. The back calculation output (BKCAL_OUT [25]) is wired to the back calculation input (BKCAL_IN [27]) of the upstream block that provides CAS_IN [17]. This provides bumpless transfer on mode changes and windup protection in the upstream block.

---

**Note**

You must wire BKCAL_OUT [25] to BKCAL_IN [27] of the upstream block that provides CAS_IN [17]. Otherwise, the AO will not initialize properly, and the setpoint at CAS_IN [17] will not be passed to OUT [9].

---

An analog readback value, such as valve position, is shown by the process value (PV [7]) attribute in engineering units.

To support testing, you can enable simulation, which allows you to manually set the channel feedback. There is no alarm detection in the AO function block.

To select the manner of processing the SP and the channel output value configure the setpoint limiting options, the tracking options, and the conversion and status calculations.

## Output Block PV Status

The Output Block PV Status is determined by the value of the PlantWeb Alerts Set PV Status parameter in the transducer block (PWA_SET_STATUS [97]), the Transducer Block mode, and enabled Active PlantWeb alarms. Refer to table 4-11.

# Set Point Selection and Limiting

To select the source of the SP [8] value use the MODE [5] attribute. In Automatic (Auto) mode, the local, manually-entered SP [8] is used. In Cascade (Cas) mode, the SP [8] comes from another block through the CAS_IN [17] input connector. In RemoteCascade (RCas) mode, the SP [8] comes from a host computer that writes to RCAS_IN [28]. The range and units of the SP [8] are defined by the PV_SCALE [11] attribute.

In Manual (Man) mode the SP [8] automatically tracks the PV [7] value when you select the SP-PV Track in Man I/O option in IO_OPTS [14]. This option can be used to minimize valve movement when the AO block is transitioned from Manual mode to Auto. You can disable this option in OOS mode only.

The SP [8] value is limited to the range defined by the setpoint high limit attribute (SP_HI_LIM [20]) and the setpoint low limit attribute (SP_LO_LIM [21]).

In Auto mode, the rate at which a change in the SP [8] is passed to OUT [9] is limited by the values of the setpoint upward rate limit attribute (SP_RATE_UP [19]) and the setpoint downward rate limit attribute (SP_RATE_DN [18]). A limit of zero disables rate limiting.

As shown in figure 4-8, the block executes a percentage of the set point change each macrocycle. For example, if the set point rate is set at 10% per second and the macrocycle is 500 milliseconds (0.5 seconds or 50% of 1 second), then during the first macrocycle the set point will change 5% (50% of the 10% per second rate). If the macrocycle is 750 milliseconds (0.75 seconds or 75% of 1 second), then during the first macrocycle the setpoint will change 7.5% (75% of 10).

When the transducer block receives the setpoint change from an AO block with rate limits, it will smoothly move the valve to the requested setpoint at the rate limit configured in the AO block.

In Auto mode, the converted SP [8] value is stored in the OUT [9] attribute. In Man mode, the OUT [9] attribute is set manually, and is used to set the analog output defined by the CHANNEL [22] parameter.

You can access the actuator position associated with the output channel through the READBACK [16] parameter (in OUT units) and in the PV [7] attribute (in engineering units). The digital valve controller supports position feedback and therefore provides the actual valve position in PV [7] and READBACK [16] directly.

Figure 4-8. Analog Output Function Block Timing Diagram
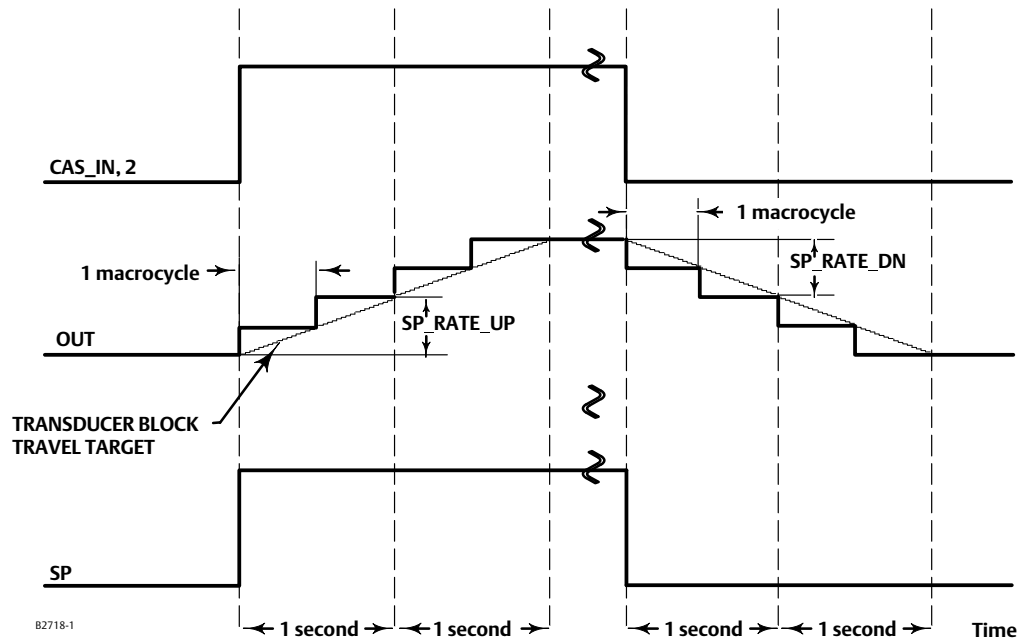


# Action On Fault Detection

To define the action you wish the valve to take when the block is in CAS mode, and the CAS_IN [17] input detects a communication failure, or is commanded to go to fault state by the upstream block or the resource block, configure the following parameters:

IO_OPTS [14]: Determines the action OUT [9] will take upon a fault state. If the IO_OPTS [14] "Fault State to Value" is not selected, then OUT [9] holds its last position when Fault State is set. If "Fault State to Value" is selected, OUT [9] goes to the FSTATE_VAL [24] value when Fault State is set.

FSTATE_TIME [23]: The length of time, in seconds, that the AO block will wait to set Fault State. When Fault State is set, the OUT [9] value goes to either the FSTATE_VAL [24] value or holds its last position, depending on I/O_OPTS [14]. When the block has a target mode of CAS, a fault condition will be detected if the CAS_IN [17] has a BAD status or an Initiate Fault State substatus is received from the upstream block.

FSTATE_VAL [24]: Determines the OUT [9] value if IO_OPTS "Fault State to Value" is selected. The OUT [9] value transitions to FSTATE_VAL [24] after FSTATE_TIME [23] elapses and the fault condition has not cleared.

# I/O Options

The I/O options parameter (IO_OPTS [14]) allows you to select how the I/O signals are processed. You can set I/O options in Out of Service mode only. The following I/O options are available in the AO block:

**Use PV for BKCAL_OUT**—Changes the BKCAL_OUT [25] value to the PV [7] value. When the Use PV for BKCAL_OUT option is not enabled (False), the BKCAL_OUT [25] value is the working setpoint value.

**Target to Man if Fault State Activated**—Set the target mode to Man, thus losing the original target, if Fault State is activated. This latches an output block into the manual mode.

**Use Fault State value on Restart**—Use the value of FSTATE_VAL [24] for SP [8] when power is restored or if the device is restarted, otherwise use the last value saved in non-volatile memory. This does not act like Fault State, it only uses the value of FSTATE_VAL [24].

**Fault State to Value**—The output action to take when a fault occurs (if not selected, use hold last value; if selected, use FSTATE_VAL [24]).

**Increase to Close**—If the Increase to Close bit is set the value to the transducer is inverted, e.g. 20% becomes 80%.

**SP-PV Track in Man**—Permits the setpoint to track the process variable when the target mode of the block is MAN.

**SP-PV Track in LO or IMan**—Permits the setpoint to track the process variable when the actual mode of the block is LO or IMan.

**SP Track retained Target**—Permits the setpoint to track the RCas or Cas parameter based on the retained target mode when the actual mode of the block is LO or Man. When SP-PV track options are enabled, the SP Track retained target will have precedence in the selection of the value to track when the actual mode is Man and LO.

# Simulation

When simulate is active, the transducer sub-parameters show the actual transducer block status and value as normally passed back to the AO block. The Simulate sub-parameters are writable and replace actual transducer values.

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**Note**

When simulate is active, the output block no longer writes values to the transducer block. If the Output Blk Timeout period is exceeded, the transducer block may move the valve to the Zero Power Condition depending on the configuration of the Output Block Timeout Alert.

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# Application Information

The configuration of an AO function block and its associated output channels depends on the specific application. A typical configuration for the Analog Output involves the following attributes:

| | |
|---|---|
| PV_SCALE | Set the range and engineering units to values that correspond to the operation range. For the digital valve controller, PV_SCALE [11] is typically set between 0 and 100%. |
| BKCAL_OUT | If you are using the CAS_IN [17] connector wired from another block, wire the BKCAL_OUT [25] attribute to the other block's BKCAL_IN [27] attribute. |
| IO_OPTS | Set the type of tracking and action upon fault state. |
| SHED_OPT | Set the action to be taken when the set point or output are not updated in a remote mode. |

# Block Errors

Table 4-24 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are not applicable for the AO block and are provided only for your reference.

Table 4-24. BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other (N/A)* |
| 1 | **Block Configuration Error** - CHANNEL and SHED_OPT set to 0 |
| 2 | *Link Configuration Error (N/A)* |
| 3 | **Simulate active** - Simulation is enabled and the block is using a simulated value in its execution. |
| 4 | **Local Override** - Device in fault state. Actual mode LO. |
| 5 | **Device Fault State Set** - AO block in fault state after FSTATE_TIME because of Bad status or IFS substatus on CAS_IN or Resource block commanded fault state. |
| 6 | **Device Needs Maintenance Soon** - Indicates a Maintenance PlantWeb Alert condition is active if Block Error Reporting is enabled. See page 62. |
| 7 | *Input failure/process variable has Bad status (N/A)* |
| 8 | **Output failure** - PV has bad status. |
| 9 | *Memory Failure (N/A)* |
| 10 | *Lost Static Data (N/A)* |
| 11 | *Lost NV Data (N/A)* |
| 12 | *Readback Check Failed (N/A)* |
| 13 | **Device Needs Maintenance Now** - Indicates Failed PlantWeb Alert condition is active if Block Error Reporting is enabled. See page 62. |
| 14 | **Power Up** - This condition exists after power up until actual mode is not Out of Service. |
| 15 | **Out of Service** - The block is in Out of Service (OOS) mode. |

# AO Function Block Parameter List (table 4-25)

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter
- Double indentation and shaded Index Number indicates sub-parameter

Table 4-25. Analog Output Function Block Parameter Definitions

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision<br>ST_REV | 1 | RO | N/A | 0 to 65535 | 0 | Data Type: Unsigned16<br>The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. |
| Tag Description<br>TAG_DESC | 2 | RW | ALL | 7 bit ASCII | Spaces | Data Type: Octet String<br>The user description of the intended application of the block. |
| Strategy<br>STRATEGY | 3 | RW | ALL | 0 to 65535 | 0 | Data Type: Unsigned16<br>The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |
| Alert Key<br>ALERT_KEY | 4 | RW | ALL | 1 to 255 | 0 | Data Type: Unsigned8<br>The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |

-Continued-

Table 4-25. Analog Output Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Block Mode MODE_BLK | 5 | | | | | Data Type: DS-69 Valid Bits: 7: OOS, 6: IMAN, 5: LO, 4: MAN, 3: AUTO, 2: CAS, 1: RCAS The actual, target, permitted, and normal modes of the block. Target: The requested block mode Actual: The current mode of the block (Note: Bit 6 (IMAN) is valid for ACTUAL only) Permitted: Allowed modes for Target Normal: Most common mode for Target |
| TARGET | 5.1 | RW | ALL | OOS MAN AUTO AUTO-CAS AUTO-RCAS | OOS until block is configured, then last valid target | |
| ACTUAL | 5.2 | RO | ALL | | OOS | |
| PERMITTED | 5.3 | RW | ALL | OOS+MAN+AUTO+ CAS+RCAS | OOS+MAN+AUTO+ CAS+RCAS | |
| NORMAL | 5.4 | RW | ALL | | AUTO | |
| Block Error BLOCK_ERR | 6 | RO | N/A | 1: Block Configuration Error 3: Simulate Active 4: Local Override 5: Device Fault State Set 8: Output Failure 14: Power-up 15: Out-of-Service | Dynamic | Data Type: Bit String (2 byte) 0=inactive 1=active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. See table 4-24. |
| Process Variable PV | 7 | RO | N/A | PV Status set equal to READBACK status | Dynamic | Data Type: DS-65 The process variable used in block execution. This value is converted from READBACK to show the actuator position in the same units as the setpoint value. |
| Set Point SP | 8 | | OOS MAN AUTO | PV_SCALE +/- 10% | Dynamic | Data Type: DS-65 The SP of the analog block. Can be derived from CAS_IN, RCAS_IN in normal modes, or can track PV in MAN, IMan or LO modes. IO_OPTS is used to determine value of SP in MAN, IMan or LO. If no IO_OPTS for SP tracking are set, SP will freeze when mode changes from CAS or RCAS. |
| Output OUT | 9 | | MAN OOS | OUT_SCALE +/- 10% | Dynamic | Data Type: DS-65 The primary value and status calculated by the block in Auto mode. OUT may be set manually in Man mode. |
| Simulate SIMULATE | 10 | | | | | Data Type: DS-82 Allows the analog input to be manually supplied when simulate is enabled. When simulation is disabled, the simulate value and status track actual value & status. |
| SIMULATE_STATUS | 10.1 | RW | ALL | | 0 | |
| SIMULATE_VALUE | 10.2 | RW | ALL | | 0 | |
| TRANSDUCER_STATUS | 10.3 | RO | ALL | | 0 | |
| TRANSDUCER_VALUE | 10.4 | RO | ALL | | 0 | |
| ENABLE/DISABLE | 10.5 | RW | ALL | 0: Not Initialized 1: Simulation Disable 2: Simulation Active | 1: Simulation Disabled | |
| Process Value Scale PV_SCALE | 11 | RW | OOS | EU at 100% EU at 0% Units index Decimal Point | 100 0 % 2 | Data Type: DS-68 The high and low scale values, engineering units code, and number of decimal places to be used in displaying the PV parameter and parameters which have the same scaling as PV. |
| Transducer Scale XD_SCALE | 12 | RO | OOS | EU at 100% EU at 0% Units index Decimal Point | 100 only 0 only % only 2 | Data Type: DS-68 The high and low scale values and engineering units code are read only. This parameter determines the number of digits to the right of the decimal point used with the value obtained from the transducer for a specified channel. |

-Continued-

Table 4-25. Analog Output Function Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Block<br>Mode | Range | Initial<br>Value | Description |
|---|---|---|---|---|---|---|
| Grant Deny<br>GRANT_DENY | 13 | | | | | Data Type: DS-70<br>Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters of the block.<br>GRANT: 1 = granted, 0= N/A<br>DENY: 1 = denied, 0 = N/A |
| GRANT | 13.1 | RW | ALL | 0: Program<br>1: Tune<br>2: Alarm<br>3: Local | All bits: 0 | |
| DENY | 13.2 | RW | ALL | | All bits: 0 | |
| I/O Options<br>IO_OPTS | 14 | | OOS | 1: SP tracks PV in Man<br>3: SP tracks PV in LO or Iman<br>4: SP Track retained target in Man or LO<br>5: Increase to Close<br>6: Fault State to value<br>  0=freeze<br>  1=go to Fault State value<br>7: Use Fault State value on restart<br>8: Target to Man if Fault State activated<br>9: Use PV for BKCAL_OUT<br>  0=SP<br>  1=PV | All bits: 0 | Data Type: Bit String (2 byte)<br>0=disable<br>1=enable<br>Allows you to select the type of tracking and the output value when a fault condition occurs. |
| Status Options<br>STATUS_OPTS | 15 | | OOS | 4: Propagate Failure Backward | All bits: 0 | Data Type: Bit String<br>0=disable<br>1=enable<br>Options the user may select for the block processing of status. |
| Readback<br>READBACK | 16 | RO | N/A | Status | | Data Type: DS-65<br>Readback is the de-characterized valve position as reported by the transducer block parameter FINAL_POSITION_VALUE [17]. This correlates with the AO block parameter OUT [9], which is the setpoint to the transducer. READBACK is the simulated input if SIMULATE is enabled or the transducer block feedback if SIMULATE is disabled. |
| | | | | Value | Dynamic | |
| Cascade Input<br>CAS_IN | 17 | | ALL | Status | BAD:<br>NC:<br>const | Data Type: DS-65<br>The setpoint value from another function block. |
| | | | | Value | 0 | |
| Setpoint Rate Down<br>SP_RATE_DN | 18 | | ALL | Positive, 0 disables rate limiting PV units | +INF | Data Type: Float<br>Ramp rate for downward set point changes. When the ramp rate is set to zero, the set point is used immediately. |
| Setpoint Rate Up<br>SP_RATE_UP | 19 | | ALL | Positive, 0 disables rate limiting PV units | +INF | Data Type: Float<br>Ramp rate for upward set point changes. When the ramp rate is set to zero, the setpoint is used immediately. |
| Setpoint High Limit<br>SP_HI_LIM | 20 | | ALL | PV Scale +/- 10% | 100 | Data Type: Float<br>The highest set point value allowed. SP_HI_LIM must be greater than SP_LO_LIM. |
| Setpoint Low Limit<br>SP_LO_LIM | 21 | | ALL | PV Scale +/- 10% | 0 | Data Type: Float<br>The lowest set point value allowed. SP_LO_LIM must be less than SP_HI_LIM. |
| AO Channel<br>CHANNEL | 22 | | OOS | 1=Setpoint | 1=Setpoint | Data Type: Unsigned16<br>Defines which transducer parameter receives the AO output. Select Setpoint to control valve position. |
| Fault State Time<br>FSTATE_TIME | 23 | | ALL | Positive, seconds | 0 | Data Type: Float<br>Time from failure detection to reaction if failure still exists. |

-Continued-

## Table 4-25. Analog Output Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Fault State Value FSTATE_VAL | 24 | | ALL | PV Scale +/- 10% | 0 | Data Type: Float Preset value to use if I/O_OPTS Fault State to Value or Use Fault State Value on Restart is set. |
| Back Calculation Output BKCAL_OUT | 25 | RO | N/A | Status Limits | Dynamic | Data Type: DS-65 The value and status required by the BKCAL_IN input of another block to prevent reset windup and to provide bumpless transfer to closed loop control. |
| | | | | Value | | |
| Remote Cascade Input RCAS_IN | 26 | | ALL | Status | BAD: NoCom: NoVal: const | Data Type: DS-65 Target SP and status by supervisory host |
| | | | | Value | 0 Trk | |
| Shed Options SHED_OPT | 27 | | ALL | Defined by FF spec 0=Invalid 1=Normal Shed, Normal Return 2=Normal Shed, No Return 3=Shed to Auto, normal return 4=Shed to Auto, no return. Target mode changes to Auto on detection of a shed condition 5=Shed to Manual, normal return 6=Shed to Manual, No return. Target mode changes to MAN on detection of a shed condition. 7=Shed to retained target, normal return 8=Shed to retained target, no return. (Change target to retained target) | 0 | Data Type: Unsigned8 Defines the action to be taken when the set point is not updated in a remote mode. |
| Remote Cascade Output RCAS_OUT | 28 | RO | N/A | Status | Dynamic | Data Type: DS-65 Block set point and status after ramping |
| | | | | Value | | |
| Update Event UPDATE_EVT | 29 | | | | | Data Type: DS-73 This alert is generated by any changes to static data. |
| UNACKNOWLEDGED | 29.1 | RW | N/A | 0:Undefined 1:Acknowledged 2:Unacknowledged | 0: Undefined | |
| UPDATE_STATUS | 29.2 | RO | N/A | 0:Undefined 1:Update reported 2:Update not reported | 0: Undefined | |
| TIME_STAMP | 29.3 | RO | N/A | | 0 | |
| STATIC_REVISION | 29.4 | RO | N/A | | 0 | |
| RELATIVE_INDEX | 29.5 | RO | N/A | | 0 | |
| Block Alarm BLOCK_ALM | 30 | | | | | Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure, or system problems in the block. |
| UNACKNOWLEDGED | 30.1 | RW | N/A | 0:Undefined 1:Acknowledged 2:Unacknowledged | 0: Undefined | |
| ALARM_STATE | 30.2 | RO | N/A | 0:Undefined 1:Clear reported 2:Clear not reported 3:Active reported 4:Active not reported | 0: Undefined | |
| TIME_STAMP | 30.3 | RO | N/A | | 0 | |
| SUBCODE | 30.4 | RO | N/A | | 0 | |
| VALUE | 30.5 | RO | N/A | | 0 | |

-Continued-

Table 4-25. Analog Output Function Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Block<br>Mode | Range | Initial<br>Value | Description |
|---|---|---|---|---|---|---|
| **Extended Parameters** | | | | | | |
| StdDev<br>STDDEV | 31 | RO | N/A | positive float | Dynamic | Data Type: Float<br>Standard Deviation. To support DeltaV Variability measurement. |
| Cap StdDev<br>CAP_STDDEV | 32 | RO | N/A | positive float | Dynamic | Data Type: Float<br>Capability Standard Deviation. To support DeltaV Variability measurement. |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-26. AO Function Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV |
| 8 | SP |
| 9 | OUT |
| 16 | READBACK |
| 17 | CAS_IN |

Table 4-27. AO Function Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 11 | PV_SCALE |
| 12 | XD_SCALE |
| 13.1 | GRANT_DENY.GRANT |
| 13.2 | GRANT_DENY.DENY |
| 20 | SP_HI_LIM |
| 21 | SP_LO_LIM |

Table 4-28. AO Function Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV |
| 8 | SP |
| 9 | OUT |
| 16 | READBACK |
| 17 | CAS_IN |
| 25 | BKCAL_OUT |
| 26 | RCAS_IN |
| 28 | RCAS_OUT |
| 31 | STDDEV |
| 32 | CAP_STDDEV |

Table 4-29. AO Function Block, View 4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 14 | IO_OPTS |
| 15 | STATUS_OPTS |
| 18 | SP_RATE_DN |
| 19 | SP_RATE_UP |
| 22 | CHANNEL |
| 23 | FSTATE_TIME |
| 24 | FSTATE_VAL |
| 27 | SHED_OPT |

# Field Communicator Menu Structure

**ANALOG OUTPUT FUNCTION BLOCK**

### Quick Config

Alert Key
Process Value Scale: EU at 100%
Process Value Scale: EU at 0%
Process Value Scale: Units Index
Process Value Scale: Decimal
Simulate: Simulate Status
Simulate: Simulate Value
Simulate: Transducer Status
Simulate: Transducer Value
Simulate: Simulate En/Disable
Setpoint: Status
Setpoint: Value
Setpoint High Limit
Setpoint Low Limit

### Common Config

Alert Key
I/O Options
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Process Value Scale: EU at 100%
Process Value Scale: EU at 0%
Process Value Scale: Units Index
Process Value Scale: Decimal
Setpoint: Status
Setpoint: Value
Setpoint High Limit
Setpoint Low Limit

### Advanced Config

Fault State Time
Fault State Value
Shed Options
Simulate: Simulate Status
Simulate: Simulate Value
Simulate: Transducer Status
Simulate: Transducer Value
Simulate: Simulate En/Disable
Setpoint Rate Down
Setpoint Rate Up
Static Revision
Status Options
Strategy
Transducer Scale: EU at 100%
Transducer Scale: EU at 0%
Transducer Scale: Units Index
Transducer Scale: Decimal

### I/O Reference

AO Channel

### Connectors

Back Calculation Output: Status
Back Calculation Output: Value
Cascade Input: Status
Cascade Input: Value
Output: Status
Output: Value

### Online

Back Calculation Output: Status
Back Calculation Output: Value
Block Error
Cascade Input: Status
Cascade Input: Value
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Output: Status
Output: Value
Process Value: Status
Process Value: Value
Remote Cascade Input: Status
Remote Cascade Input: Value
Remote Cascade Output: Status
Remote Cascade Output: Value
Readback: Status
Readback: Value
Setpoint: Status
Setpoint: Value

### Status

Block Error

### Other

Tag Description
Grant Deny: Grant
Grant Deny: Deny
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
StdDev
Cap StdDev

### All

Characteristics
Static Revision
Tag Description
Strategy
Alert Key
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Block Error
Process Value: Status
Process Value: Value
Setpoint: Status
Setpoint: Value
Output: Status
Output: Value
Simulate: Simulate Status
Simulate: Simulate Value
Simulate: Transducer Status
Simulate: Transducer Value
Simulate: Simulate En/Disable
Process Value Scale: EU at 100%
Process Value Scale: EU at 0%
Process Value Scale: Units Index
Process Value Scale: Decimal
Transducer Scale: EU at 100%
Transducer Scale: EU at 0%
Transducer Scale: Units Index
Transducer Scale: Decimal
Grant Deny: Grant
Grant Deny: Deny
I/O Options
Status Options
Readback: Status
Readback: Value
Cascade Input: Status
Cascade Input: Value
Setpoint Rate Down
Setpoint Rate Up
Setpoint High Limit
Setpoint Low Limit
AO Channel
Fault State Time
Fault State Value
Back Calculation Output: Status
Back Calculation Output: Value
Remote Cascade Input: Status
Remote Cascade Input: Value
Shed Options
Remote Cascade Output: Status
Remote Cascade Output: Value
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
StdDev
Cap StdDev

# PID Function Block

## Overview

The PID function block (figure 4-9) combines all of the necessary logic to perform proportional/integral/derivative (PID) control. The block supports mode control, signal scaling and limiting, feedforward control, override tracking, alarm limit detection, and signal status propagation.

Figure 4-9. Proportional+Integral+Derivative (PID) Function Block
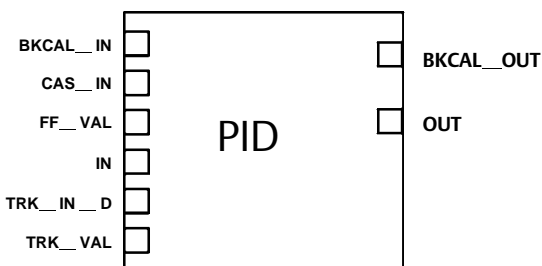


BKCAL_IN = THE ANALOG INPUT VALUE AND STATUS FROM ANOTHER BLOCK'S BKCAL _OUT OUTPUT THAT IS USED FOR BACKWARD OUTPUT TRACKING FOR BUMPLESS TRANSFER AND TO PASS LIMIT STATUS.

CAS_IN = THE REMOTE SETPOINT VALUE FROM ANOTHER FUNCTION BLOCK.

FF_VAL = THE FEEDFORWARD CONTROL INPUT VALUE AND STATUS.

IN = THE CONNECTION FOR THE PROCESS VARIABLE FROM ANOTHER FUNCTION BLOCK.

TRK_IN_D = INITIATES THE EXTERNAL TRACKING FUNCTION.

TRK_VAL = THE VALUE AFTER SCALING APPLIED TO OUT IN LOCAL OVERRIDE MODE.

BKCAL_OUT = THE VALUE AND STATUS REQUIRED BY THE BKCAL_IN INPUT OF ANOTHER FUNCTION BLOCK TO PREVENT RESET WINDUP AND TO PROVIDE BUMPLESS TRANSFER TO CLOSED LOOP CONTROL.

OUT = THE BLOCK OUTPUT AND STATUS.

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The block supports two forms of the PID equation: Standard and Series. You can choose the appropriate equation using the MATHFORM [70] parameter. The Standard ISA PID equation is the default selection.

$$\text{Standard Out} = \text{GAIN} \times \text{ex} \times \left( 1 + \frac{1}{\tau_r s + 1} + \frac{\tau_d s}{\propto \times \tau_d s + 1} \right) +$$

$$\text{Series Out} = \text{GAIN} \times \text{ex} \times \left[ \left( 1 + \frac{1}{\tau_r s} \right) + \left( \frac{\tau_d s + 1}{\propto \times \tau_d s + 1} \right) \right] + I$$

where

GAIN: proportional gain value

$\tau_r$: integral action time constant (RESET parameter) in seconds

s: laplace operator

$\tau_d$: derivative action time constant (RATE parameter)

α:     fixed smoothing factor of 0.1 applied to RATE

F:     feedforward control contribution from the feedforward input (FF_VAL)

E:     error between setpoint and process variable

To further customize the block for use in your application, you can configure filtering, feedforward inputs, tracking inputs, setpoint and output limiting, PID equation structures, and block output action. Table 4-32 lists the PID block parameters and their descriptions, units of measure, and index numbers, and figure 4-10 illustrates the internal components of the PID function block.

Figure 4-10. PID Function Block Schematic
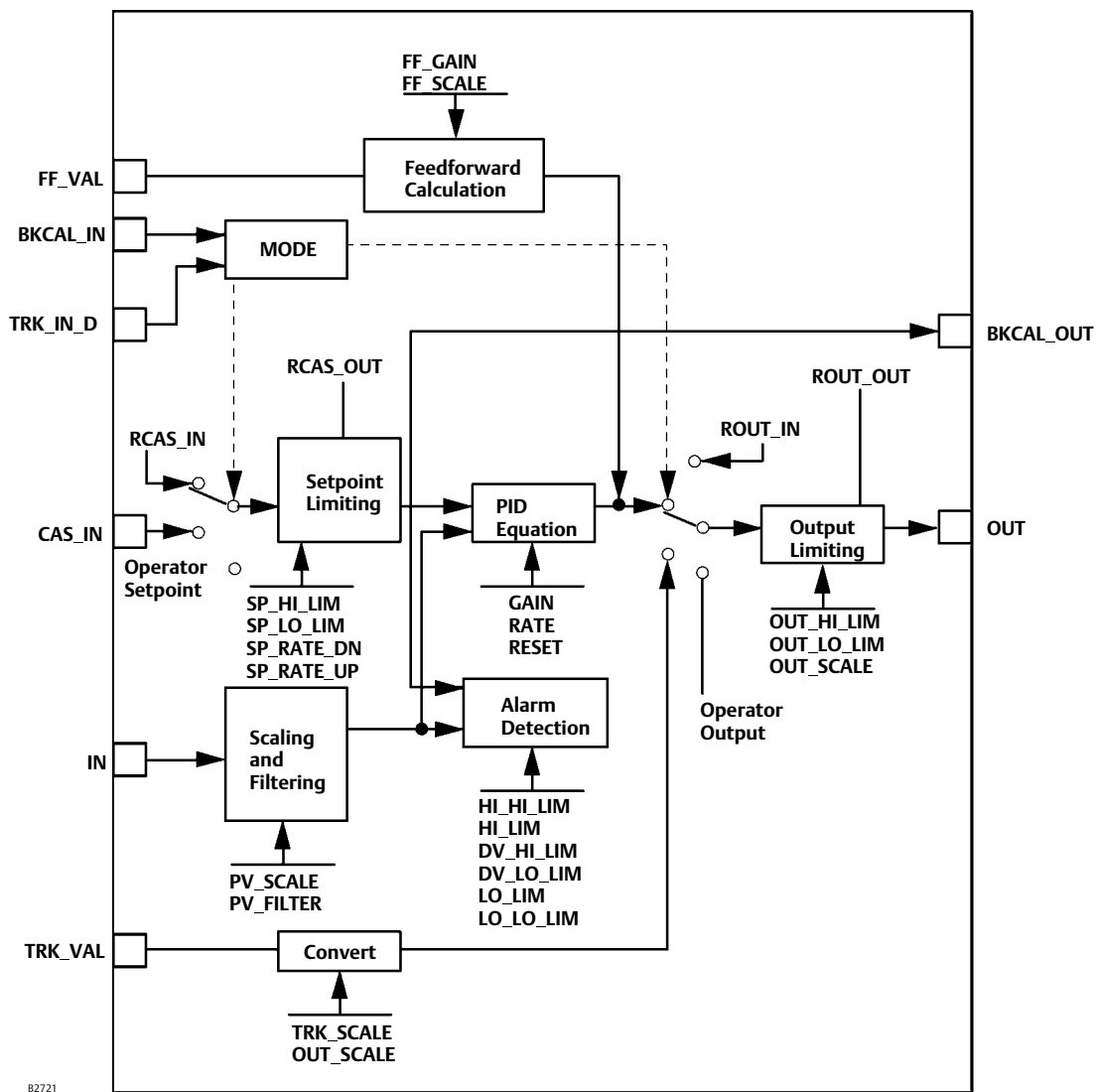
# Modes

The PID function block supports the following modes:

- **Manual (Man)**—The block output (OUT [9]) may be set manually.

- **Automatic (Auto)**—The SP [8] may be set manually and the block algorithm calculates OUT [9].

- **Cascade (Cas)**—The SP [8] is calculated in another block and is provided to the PID block through the CAS_IN [18] connection.

- **RemoteCascade (RCas)**—The SP [8] is provided by a host computer that writes to the RCAS_IN [32] parameter.

- **RemoteOutput (ROut)**—The OUT [9] is provided by a host computer that writes to the ROUT_IN [33] parameter.

- **Local Override (LO)**—The track function is active. OUT [9] is set by TRK_VAL [39]. The BLOCK_ERR [6] parameter shows Local override.

- **Initialization Manual (IMan)**—The output path is not complete (for example, the cascade-to-slave path might not be open). In IMan mode, OUT [9] tracks BKCAL_IN [27].

- **Out of Service (OOS)**—The block is not processed. The OUT [9] status is set to Bad: Out of Service. The BLOCK_ERR [6] parameter shows Out of service.

You can configure the Man, Auto, Cas, and OOS modes as permitted modes for operator entry.

# Mode Handling

## Shed Options—RCAS Mode Only

Shed from or climb to a remote mode is determined by the parameter SHED_OPT [34]. A block climbs and sheds through the same path. For example, if SHED_OPT [34] specifies that a block should shed to Auto, then, if the block target mode is set to RCas, the block goes through Auto on the way to RCas. You can configure the shed option as follows:

### Shed With Return Options

Remote cascade or remote output connection failure shifts actual mode but keeps trying to restore remote cascade or remote output (in other words, the remote cascade or remote output target mode stays in effect).

**Normal**—On failure of a remote connection, the block attempts to attain the highest permitted non-remote mode until the remote connection is restored. Cas is the highest permitted non-remote mode and Auto is is the next highest permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

**Retained Target**—The retained target mode is the mode the block was in before changing to one of the remote target modes. On failure of a remote connection, the block attempts to attain the retained target mode.

**Auto**—On failure of a remote connection, the block attempts to attain Auto, if permitted, until the remote connection is restored.

**Man**—On failure of a remote connection, the block sheds to Man until a remote connection is restored.

## Shed With No Return Options

For any shed with no return option, the target mode changes as determined by the option. Therefore, there is no attempt to restore the connection following failure. The behavior on change to a remote target mode is identical to that for Shed With Return Options.

**Normal**—On failure of a remote connection, the block sets the target mode to the highest permitted non-remote mode. Cas is the highest permitted non-remote mode and Auto is is the next permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

**Retained Target**—The retained target mode is the mode the block was in before changing to one of the remote target modes. On failure of a remote connection, the block sets the target mode to the retained target mode.

**Auto**—On failure of a remote connection, the block sets the target mode to Auto, if permitted.

**Man**—On failure of a remote connection, the block sets the target mode to Man, if permitted.

The user may configure SHED_OPTS [34] so that it calls for a target mode that is not permitted. When doing this, the mode logic uses the following rules as applied by the remote logic:

● Shed logic never results in a non-permitted target mode.

● Shed logic never attempts to attain an actual mode of Auto or Cas if that mode is not permitted.

# Status Handling

If the input status on the PID block is Bad, the mode of the block reverts to Manual. In addition, you can select the Target to Manual if Bad IN status option to direct the target mode to revert to manual. You can set the status option in Manual or Out of Service mode only.

# Set Point Selection and Limiting

The set point of the PID block is only valid when the block is in Auto, Cas, or RCas. Figure 4-11 illustrates the method for set point selection. You can configure the SP_HI_LIM [21] and SP_LO_LIM [22] parameters to limit the set point. In Cascade or Remote Cascade mode, the set point is adjusted by another function block or by a host computer, and the output is computed based on the set point.

Figure 4-11. PID Function Block Set Point Selection
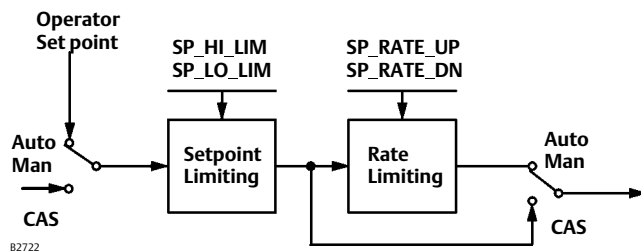


In Automatic mode, the set point is entered manually by the operator, and the output is computed based on the set point. In Auto mode, you can also adjust the set point limit and the set point rate of change using the SP_RATE_UP [20] and SP_RATE_DN [19] parameters.

In Manual mode the output is entered manually by the operator. In Remote Output mode, the output is entered by a host computer.

# Output Selection and Limiting

Output selection is determined by the mode and the set point. In Automatic, Cascade, or Remote Cascade mode, the output is computed by the PID control equation. In Manual and Remote Output mode, the output may be entered manually (see also Set Point Selection and Limiting). You can limit the output by configuring the OUT_HI_LIM [28] and OUT_LO_LIM [29] parameters.

# Filtering

The filtering feature changes the response time of the device to smooth variations in output readings caused by rapid changes in input. You can adjust the filter time constant (in seconds) using the PV_FTIME [16] or SP_FTIME [69] parameters. Set the filter time constant to zero to disable the filter feature.

# Feedforward Calculation

The feedforward value (FF_VAL [40]) is scaled (FF_SCALE [41]) to a common range for compatibility with the output scale (OUT_SCALE [11]). A gain value (FF_GAIN [42]) is applied to achieve the total feedforward contribution.

# Output Tracking

Output tracking is enabled through the control options. You can set control options in Manual or Out of Service mode only.

The Track Enable control option must be set to True for the track function to operate. When the Track in Manual control option is set to True, the operator cannot override the tracking function in Manual mode. When Track in Manual is False, the operator can override the tracking function when the block is in Manual mode. Activating the track function causes the block's actual mode to revert to Local Override.

The TRK_VAL [38] parameter specifies the value to be converted and tracked into the output when the track function is operating. The TRK_SCALE [37] parameter specifies the range of TRK_VAL [38].

When the TRK_IN_D [38] parameter is True and the Track Enable control option is True, the TRK_VAL [38] input is converted to the appropriate value and output in units of OUT_SCALE [11].

# Set Point Tracking

You can configure the method for tracking the set point by configuring the following control options (CONTROL_OPTS [12]):

● **SP-PV Track in Man**—Permits the SP [8] to track the PV [7] when the actual mode of the block is Man.

● **SP-PV Track in LO or IMan**—Permits the SP [8] to track the PV [7] when the actual mode of the block is Local Override (LO) or Initialization Manual (IMan).

● **SP-PV Track in ROUT**—Permits the SP [8] to track the PV [7] when the actual mode of the block is RemoteOut (ROUT).

● **SP Track retained Target**—Causes the set point to track the RCAS or CAS parameter based on the retained target mode when the actual mode is MAN or LO.

- **Act On IR**—If this option is true, then when IR (Initialization Requested) is received on BKCAL_IN [27], the SP [8] will be adjusted within setpoint limits to provide bumpless transfer when the cascade is closed. If the setpoint required to provide bumpless transfer is outside the setpoint limits, then any difference added to provide bumpless transfer will be removed in the BAL_TIME [25].

When one of these options is set, the SP[8] value is set to the PV [7] value while in the specified mode.

You can select the value that a master controller uses for tracking by configuring the Use PV for BKCAL_OUT control option. The BKCAL_OUT [31] value tracks the PV value. BKCAL_IN [27] on a master controller connected to BKCAL_OUT [31] on the PID block in an open cascade strategy forces its OUT [9] to match BKCAL_IN [27], thus tracking the PV from the slave PID block into its cascade input connection (CAS_IN [18]). If the Use PV for BKCAL_OUT option is not selected, the working set point (SP_WRK [68]) is used for BKCAL_OUT [31].

You can set control options in Manual or Out of Service mode only. When the mode is set to Auto, the SP [8] will remain at the last value (it will no longer follow the PV [7].

# PID Equation Structures for Enhanced PID Block

**Note**

Extended parameters are not available at this time for all host systems. Refer to your host system documentation, or contact your Emerson Process Management sales office for additional information.

Configure the STRUCTURECONFIG [71] parameter to select the PID equation structure. You can select one of the following choices:

- Proportional, integral, and derivative on error (PID)

- Proportional and integral on error, derivative on PV (PI_D)

- Integral on error, proportional and derivative on PV (I_PD)

- Proportional on error, derivative on error (PD)

- Integral on error, derivative on error (ID)

- Integral on error, derivative on PV (I_D)

- Two degrees of Freedom (2DOF)

# Reverse and Direct Action

To configure the block output action, set the Direct Acting control option. This option defines the relationship between a change in PV [7] and the corresponding change in output. With Direct Acting enabled (True), an increase in PV results in an increase in the output.

You can set control options in Manual or Out of Service mode only.

# Alarm Detection

A block alarm will be generated whenever the BLOCK_ERR [6] has an error bit set. The types of block error for the PID block are defined above.

Process alarm detection is based on the PV [7] value. You can configure the alarm limits of the following standard alarms:

- High (HI_LIM [51])

- High high (HI_HI_LIM [49])

- Low (LO_LIM [53])

- Low low (LO_LO_LIM [55])

Additional process alarm detection is based on the difference between SP [8] and PV [7] values and can be configured via the following parameters:

- Deviation high (DV_HI_LIM [57])

- Deviation low (DV_LO_LIM [59])

In order to avoid alarm chattering when the variable is oscillating around the alarm limit, an alarm hysteresis in percent of the PV span can be set using the ALARM_HYS [47] parameter. The priority of each alarm is set in the following parameters:

- HI_PRI [50]

- HI_HI_PRI [48]

- LO_PRI [52]

- LO_LO_PRI [54]

- DV_HI_PRI [56]

- DV_LO_PRI [58]

Alarms are grouped into five levels of priority, as shown in table 4-30.

Table 4-30. PID Function Block Alarm Priorities

| Priority Number | Priority Description[1] |
|---|---|
| 0 | The alarm is disabled |
| 1 | An alarm condition with a priority of 1 can be recognized by the system. The device monitors the alarm but does not report it until requested by the host system. |
| 2 | An alarm condition with a priority of 2 is reported to the operator, but generally does not require operator attention (such as diagnostics and system alerts). |
| 3-7 | Alarm conditions of priority 3 to 7 are advisory alarms of increasing priority. |
| 8-15 | Alarm conditions of priority 8 to 15 are critical alarms of increasing priority. |

1. The priority classes "advise" and critical" have no relationship to Plant Web Alerts.

# Application Information

The PID function block is a powerful, flexible control algorithm that is designed to work in a variety of control strategies. The PID block is configured differently for different applications.

# DeltaV Tune

DeltaV Tune quickly and automatically determines optimal tuning parameters for PID control loops. For more information on DeltaV Tune, refer to DeltaV Books Online or DeltaV documentation.

# Block Errors

Table 4-31 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are not applicable for the PID block and are provided only for your reference.

Table 4-31. BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other (N/A)* |
| 1 | **Block Configuration Error**—SHED_OPT or BYPASS set to 0 |
| 2 | *Link Configuration Error (N/A)* |
| 3 | *Simulate Active (N/A)* |
| 4 | **Local Override**—The actual mode is LO and Track Enable is set. |
| 5 | *Device Fault State Set (N/A)* |
| 6 | *Device Needs Maintenance Soon (N/A)* |
| 7 | **Input failure/process variable has Bad status**—The parameter linked to IN is indicating a Bad status. |
| 8 | *Output Failure (N/A)* |
| 9 | *Memory Failure (N/A)* |
| 10 | *Lost Static Data (N/A)* |
| 11 | *Lost NV Data (N/A)* |
| 12 | *Readback Check Failed (N/A)* |
| 13 | *Device Needs Maintenance Now (N/A)* |
| 14 | **Power Up**—Set if devices was powered up with this block in Out of Service (OOS) mode. Cleared on first change of mode to other than OOS. |
| 15 | **Out of Service**—The actual mode is Out of Service (OOS). |

# PID Function Block Parameter List (table 4-32)

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter
- Double indentation and shaded Index Number indicates sub-parameter

Table 4-32. PID Function Block System Parameters Definitions

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision<br>ST_REV | 1 | RO | N/A | 0 to 65535 | 0 | Data Type: Unsigned16<br>The revision level of the static data associated with the function block. The revision value will be incremented each time a static pa rameter value in the block is changed. |
| Tag Description<br>TAG_DESC | 2 | RW | ALL | 7 bit ASCII | Spaces | Data Type: Octet String<br>The user description of the intended application of the block. |
| Strategy<br>STRATEGY | 3 | RW | ALL | 0 to 65535 | 0 | Data Type: Unsigned16<br>The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |
| Alert Key<br>ALERT_KEY | 4 | RW | ALL | 0 to 255 | 0 | Data Type: Unsigned8<br>The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| Block Mode<br>MODE_BLK | 5 | | | | | Data Type: DS-69<br>Valid Bits: 7: OOS, 6: IMAN, 5: LO, 4: MAN, 3: AUTO, 2: CAS, 1: RCAS, 0: ROUT<br>The actual, target, permitted, and normal modes of the block.<br>    Target: The requested block mode<br>    Actual: The current mode of the block<br>    Permitted: Allowed modes for Target<br>    Normal: Most common mode for Target |
| TARGET | 5.1 | RW | ALL | OOS, MAN, AUTO CAS, RCAS, ROUT | OOS until block is configured, then last valid target | |
| ACTUAL | 5.2 | RO | ALL | | OOS | |
| PERMITTED | 5.3 | RW | ALL | OOS+MAN+AUTO+ CAS+RCAS+ROUT | OOS MAN, AUTO CAS, RCAS ROUT | |
| NORMAL | 5.4 | RW | ALL | | AUTO | |

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### Table 4-32. PID Function Block System Parameters Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Block Error<br>BLOCK_ERR | 6 | RO | N/A | Defined Bits<br>1: Block Configuration Error<br>4: Local Override<br>7: Input Failure/ Bad PV status<br>14: Power-up<br>15: Out-of-Service | Dynamic | Data Type: Bit String<br>0 = inactive<br>1 = active<br>This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string so that multiple errors may be shown. |
| Process Value<br>PV | 7 | RO | N/A | | Dynamic | Data Type: DS-65<br>The process variable used in block execution. |
| Setpoint<br>SP | 8 | | OOS<br>MAN<br>AUTO | PV_SCALE +/- 10% | Dynamic | Data Type: DS-65<br>The target block setpoint value. It is the result of setpoint limiting and setpoint rate of change limiting. |
| Output<br>OUT | 9 | | MAN<br>OOS | Status<br>OUT_SCALE +/- 10%<br>Value | Dynamic | DS-65<br>The block output value and status. |
| Process Value Scale<br>PV_SCALE | 10 | | OOS | EU at 100%<br>EU at 0%<br>Units index<br>Decimal Point | 100<br>0<br>%<br>2 | Data Type: DS-68<br>The high and low scale values, engineering units code, and number of digits to the right of the decimal point associated with PV. |
| Output Scale<br>OUT_SCALE | 11 | | OOS | EU at 100%<br>EU at 0%t<br>Units index<br>Decimal Point | 100<br>0<br>%<br>2 | Data Type: DS-68<br>The high and low scale values, engineering units code, and number of digits to the right of the decimal point associated with OUT. |
| Grant Deny<br>GRANT_DENY | 12 | | | | | Data Type: DS-70<br>Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters of the block. Not used by the device.<br>GRANT: 0=N/A, 1=granted<br>DENY: 0 = N/A, 1= denied |
| GRANT | 12.1 | | ALL | 0: Program<br>1: Tune<br>2: Alarm<br>3: Local | All bits: 0 | |
| DENY | 12.2 | | ALL | 0: Program<br>1: Tune<br>2: Alarm<br>3: Local | All bits: 0 | |
| Control Options<br>CONTROL_OPTS | 13 | | OOS | 0: Bypass Enable<br>1: SP tracks PV in MAN<br>2: SP tracks PV in ROUT<br>3: SP tracks PV in LO or MAN<br>4: SP tracks RCAS or CAS in IMAN, LO, MAN or ROUT<br>5: Direct Acting<br>7: Track Enable<br>8: Track in Manual<br>9: Use PV for BKCAL_OUT<br>10: Act on IR<br>12: Restrict SP to limits in Cas and RCas<br>13: No output limits in MAN | All bits: 0 | Data Type: Bit String<br>0=disable<br>1=enable<br>Allows you to specify control strategy options. |
| Status Options<br>STATUS_OPTS | 14 | | OOS | 0: IFS (Initiate Fault State) if BAD IN<br>1: IFS if BAD CAS_IN<br>2: Use Uncertain as Good<br>5: Target to MAN if BAD IN | All bits: 0 | Data Type: Bit String<br>0=disable<br>1=enable<br>Allows you to select options for status handling and processing. |
| Input<br>IN | 15 | | ALL | Status<br>Value | BAD: NC: const<br>0 | Data Type: DS-65<br>The primary input value of the block. |
| Process Value Filter Time<br>PV_FTIME | 16 | | ALL | Positive | 0 | Data Type: Float<br>The time constant of the first-order PV filter. It is the time, in seconds, required for a 63 percent change in the IN value. |

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Table 4-32. PID Function Block System Parameters Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Block<br>Mode | Range | | Initial Value | Description |
|---|---|---|---|---|---|---|---|
| Bypass<br>BYPASS | 17 | | MAN<br>OOS | 1=Off<br>2=On | | 0=undefined | Data Type: Enum<br>Used to override the calculation of the block. When enabled, the SP is sent directly to the output. |
| Cascade Input<br>CAS_IN | 18 | | ALL | Status | | BAD<br>NC:<br>const | Data Type: DS-65<br>The setpoint value from another block. |
| | | | | Value | | 0 | |
| Setpoint Rate Down<br>SP_RATE_DN | 19 | | ALL | Positive | | + INF | Data Type: Float<br>Ramp rate for downward SP changes. When the ramp rate is set to zero, the SP is used immediately. PV per second |
| Setpoint Rate UP<br>SP_RATE_UP | 20 | | ALL | Positive | | + INF | Data Type: Float<br>Ramp rate for upward SP changes. When the ramp rate is set to zero, the SP is used immediately. PV per second |
| Setpoint High Limit<br>SP_HI_LIM | 21 | | ALL | PV Scale +/- 10%, must be greater than SP_LO_LIM | | 100 | Data Type: Float<br>The highest SP value allowed. |
| Setpoint Low Limit<br>SP_LO_LIM | 22 | | ALL | PV Scale<br>+/- 10%, must be less than SP_HI_LIM | | 0 | Data Type: Float<br>The lowest SP value allowed. |
| Gain<br>GAIN | 23 | | ALL | greater than 0 | | 1 | Data Type: Float<br>The proportional gain value. |
| Reset<br>RESET | 24 | | ALL | Positive | | + INF | Data Type: Float<br>The integral action time constant. Seconds per repeat |
| Balance Time<br>BAL_TIME | 25 | | ALL | Positive | | 0 | Data Type: Float<br>The specified time, in seconds, for the internal working value of bias to return to the operator set bias. Also used to specify the time constant at which the integral term will move to obtain balance when the output is limited and the mode is AUTO, CAS, or RCAS. |
| Rate<br>RATE | 26 | | ALL | Positive | | 0 | Data Type: Float<br>The derivative action time constant, in seconds. |
| Back Calculation Input<br>BKCAL_IN | 27 | | ALL | Status | | BAD:<br>NC:<br>const | Data Type: DS-65<br>The analog input value and status from another block's BKCAL_OUT output that is used for backward output tracking for bumpless transfer and to pass limit status. |
| | | | | Value | | 0 | |
| Output High Limit<br>OUT_HI_LIM | 28 | | ALL | OUT_SCALE +/- 10% | | 100 | Data Type: Float<br>Limits the maximum output value for modes other than manual. |
| Output Low Limit<br>OUT_LO_LIM | 29 | | ALL | OUT_SCALE +/- 10% | | 0 | Data Type: Float<br>Limits the minimum output value for modes other than manual. |
| Back Calculation Hysteresis<br>BKCAL_HYS | 30 | | ALL | 0 to 50% | | 0.50% | Data Type: Float<br>The amount the output value must change away from the its output limit before limit status is turned off. |
| Back Calculation Output<br>BKCAL_OUT | 31 | RO | N/A | | | Dynamic | Data Type: DS-65<br>The value and status required by the BKCAL_IN input of another block to prevent reset windup and to provide bumpless transfer of closed loop control. |
| Remote Cascade Input<br>RCAS_IN | 32 | | ALL | Status | | BAD:<br>NoCom:<br>NoVal:<br>const | Data Type: DS-65<br>Target setpoint and status that is provided by a supervisory host. Used when mode is RCAS. |
| | | | | Value | | 0 Trk | |

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## Table 4-32. PID Function Block System Parameters Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | | Initial Value | Description |
|---|---|---|---|---|---|---|---|
| Remote Out Input ROUT_IN | 33 | | ALL | Status | | BAD: NoCom: NoVal: const | Data Type: DS-65 Target output and status that is provided by a supervisory host. Used when mode is ROUT. |
| | | | | Value | | 0 Trk | |
| Shed Options SHED_OPT | 34 | | ALL | 0=Invalid 1=Normal Shed, Normal Return 2=Normal Shed, No Return 3=Shed to Auto, normal return 4=Shed to Auto, no return. Target mode changes to Auto on detection of a shed condition 5=Shed to Manual, normal return 6=Shed to Manual, No return. Target mode changes to MAN on detection of a shed condition. 7=Shed to retained target, normal return 8=Shed to retained target, no return. (Change target to retained target) | | 0=Invalid | Data Type: Uint8 Defines action to be taken on remote control device timeout. Normal Return - actual mode changes to the next lowest priority non-remote mode permitted but returns to the target remote mode when the remote computer completes the initialization handshake. No Return - Target mode changes to the next lowest priority non-remote mode permitted. The target remote mode is lost, so no return occurs. |
| Remote Cascade Output RCAS_OUT | 35 | RO | N/A | | | Dynamic | Data Type: DS-65 Block setpoint and status after ramping, filtering, and limiting that is provided to a supervisory host for back calculation to allow action to be taken under limiting conditions or mode change. Used when mode is RCAS. |
| Remote Out Output ROUT_OUT | 36 | RO | N/A | | | Dynamic | Data Type: DS-65 Block output that is provided to a supervisory host for a back calculation to allow action to be taken under limiting conditions or mode change. Used when mode is RCAS. |
| Tracking Scale TRK_SCALE | 37 | | MAN OOS | | | 100 0 % 2 | Data Type: DS-68 The high and low scale values, engineering units code, and number of digits to the right of the decimal point associated with the external tracking value (TRK_VAL). |
| Tracking Input Discrete TRK_IN_D | 38 | | ALL | Status | | BAD: NC: const | Data Type: DS-66 Discrete input that initiates external tracking of the block output to the value specified by TRK_VAL. |
| | | | | Value | | 0 | |
| Tracking Value TRK_VAL | 39 | | ALL | Status | | BAD: NC: const | Data Type: DS-65 The value (after scaling from TRK_SCALE to OUT_SCALE) applied to OUT in LO mode when external tracking is enabled by TRK_IN_D. |
| | | | | Value | | 0 | |
| Feed Forward Value FF_VAL | 40 | | ALL | Status | | BAD: NC: const | Data Type: DS-65 The feedforward control input value and status. |
| | | | | Value | | 0 | |
| Feed Forward Scale FF_SCALE | 41 | | MAN OOS | | | 100 0 % 2 | Data Type: DS-68 The high and low scale values, engineering units code, and number of digits to the right of the decimal point associated with the feedforward value (FF_VAL). |
| Feed Forward Gain FF_GAIN | 42 | | MAN OOS | | | 0 | Data Type: Float The feedforward gain value. FF_VAL is multiplied by FF_GAIN before it is added to the calculated control output. A value of 0 disables feedforward. |

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## Table 4-32. PID Function Block System Parameters Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Block<br>Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Update Event<br>UPDATE_EVT | 43 | | | | | |
|     UNACKNOWLEDGED | 43.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0 | Data Type: DS-73<br>This alert is generated by any changes to the static data. |
|     UPDATE_STATE | 43.2 | RO | N/A | 0=Undefined<br>1=Update reported<br>2=Update not reported | 0 | |
|     TIME_STAMP | 43.3 | RO | N/A | | 0 | |
|     STATIC_REVISION | 43.4 | RO | N/A | | 0 | |
|     RELATIVE_INDEX | 43.5 | RO | N/A | | 0 | |
| Block Alarm<br>BLOCK_ALM | 44 | | | | | |
|     UNACKNOWLEDGED | 44.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0 | Data Type: DS-72<br>The block alarm is used for all configuration, hardware, connection failure, or system problems in the block. The cause of the alarm will be set in the subcode.<br><br>VALUE Data Type: Unsigned8 |
|     ALARM_STATE | 44.2 | RO | N/A | 0=Undefined<br>1=Clear-reported<br>2=Clear-not reported<br>3=Active  reported<br>4=Active not reported | 0 | |
|     TIME_STAMP | 44.3 | RO | N/A | | 0 | |
|     SUBCODE | 44.4 | RO | N/A | | 0 | |
|     VALUE | 44.5 | RO | N/A | | 0 | |
| Alarm Summary<br>ALARM_SUM | 45 | | | | | |
|     CURRENT | 45.1 | RO | ALL | 1: High High Alarm<br>2: High Alarm<br>3: Low Low Alarm<br>4: Low Alarm<br>5: Deviation High Alarm<br>6: Deviation Low Alarm<br>7: Block Alarm | Dynamic | Data Type: DS-74<br>Current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block. |
|     UNACKNOWLEDGED | 45.2 | RO | ALL | | | |
|     UNREPORTED | 45.3 | RO | ALL | | | |
|     DISABLED | 45.4 | RW | ALL | | | |
| Acknowledge Option<br>ACK_OPTION | 46 | | N/A | 1: High High Alarm<br>2: High Alarm<br>3: Low Low Alarm<br>4: Low Alarm<br>5: Deviation High Alarm<br>6: Deviation Low Alarm<br>7: Block Alarm | All bits: 0 | Data Type: Bit String<br>0=Disable<br>1=Enable<br>Used to set auto acknowledgment of alarms. |
| Alarm Hysteresis<br>ALARM_HYS | 47 | | ALL | 0 to 50% | 0.50% | Data Type: Float<br>The amount the alarm value must return to within the alarm limit before the associated active alarm condition clears. |
| High High Priority<br>HI_HI_PRI | 48 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8<br>The priority of the HI HI Alarm. |
| High High Limit<br>HI_HI_LIM | 49 | | ALL | PV_SCALE, or +INF | +INF | Data Type: Float<br>The setting for the alarm limit used to detect the HI HI alarm condition. |
| High Priority<br>HI_PRI | 50 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8<br>The priority of the HI alarm. |
| High Limit<br>HI_LIM | 51 | | ALL | PV_SCALE, or +INF | +INF | Data Type: Float<br>The setting for the alarm limit used to detect the HI alarm condition. |
| Low Priority<br>LO_PRI | 52 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8<br>The priority of the LO alarm. |
| Low Limit<br>LO_LIM | 53 | | ALL | PV_SCALE, or -INF | -INF | Data Type: Float<br>The setting for the alarm limit used to detect the LO alarm condition. |
| Low Low Priority<br>LO_LO_PRI | 54 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8<br>The priority of the LO LO alarm. |

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Table 4-32. PID Function Block System Parameters Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Low Low Limit LO_LO_LIM | 55 | | ALL | PV_SCALE, or -INF | -INF | Data Type: Float The setting for the alarm limit used to detect the LO LO alarm condition. |
| Deviation High Priority DV_HI_PRI | 56 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8 The priority of the deviation high alarm. |
| Deviation High Limit DV_HI_LIM | 57 | | ALL | PV_SCALE, or +INF | +INF | Data Type: Float The setting for the alarm limit used to detect the deviation high alarm condition. |
| Deviation Low Priority DV_LO_PRI | 58 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8 The priority of the deviation low alarm. |
| Deviation Low Limit DV_LO_LIM | 59 | | ALL | -INF, or -PV span to 0 | -INF | Data Type: Float The setting for the alarm limit use to detect the deviation low alarm condition. |
| High High Alarm HI_HI_ALM | 60 | | | | | Data Type: DS-71 The HI HI alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm. VALUE Data Type: Float |
| UNACKNOWLEDGED | 60.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0=undefined | |
| ALARM_STATE | 60.2 | RO | N/A | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | 0=undefined | |
| TIME_STAMP | 60.3 | RO | N/A | | 0 | |
| SUBCODE | 60.4 | RO | N/A | | 0 | |
| VALUE | 60.5 | RO | N/A | | 0 | |
| High Alarm HI_ALM | 61 | | | | | Data Type: DS-71 The HI alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm. VALUE Data Type: Float |
| UNACKNOWLEDGED | 61.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0=undefined | |
| ALARM_STATE | 61.2 | RO | N/A | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | 0=undefined | |
| TIME_STAMP | 61.3 | RO | N/A | | 0 | |
| SUBCODE | 61.4 | RO | N/A | | 0 | |
| VALUE | 61.5 | RO | N/A | | 0 | |
| Low Alarm LO_ALM | 62 | | | | | Data Type: DS-71 The LO alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm. VALUE Data Type: Float |
| UNACKNOWLEDGED | 62.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0=undefined | |
| ALARM_STATE | 62.2 | RO | N/A | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | 0=undefined | |
| TIME_STAMP | 62.3 | RO | N/A | | 0 | |
| SUBCODE | 62.4 | RO | N/A | | 0 | |
| VALUE | 62.5 | RO | N/A | | 0 | |

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## Table 4-32. PID Function Block System Parameters Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Block<br>Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Low Low Alarm<br>LO_LO_ALM | 63 | | | | | |
|     UNACKNOWLEDGED | 63.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=undefined | Data Type: DS-71<br>The LO LO alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm.<br><br>VALUE Data Type: Float |
|     ALARM_STATE | 63.2 | RO | N/A | 0=Undefined<br>1=Clear reported<br>2=Clear not reported<br>3=Active reported<br>4=Active not reported | 0=undefined | |
|     TIME_STAMP | 63.3 | RO | N/A | | 0 | |
|     SUBCODE | 63.4 | RO | N/A | | 0 | |
|     VALUE | 63.5 | RO | N/A | | 0 | |
| Deviation High Alarm<br>DV_HI_ALM | 64 | | | | | |
|     UNACKNOWLEDGED | 64.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=undefined | Data Type: DS-71<br>The DV HI alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm.<br><br>VALUE Data Type: Float |
|     ALARM_STATE | 64.2 | RO | N/A | 0=Undefined<br>1=Clear reported<br>2=Clear not reported<br>3=Active reported<br>4=Active not reported | 0=undefined | |
|     TIME_STAMP | 64.3 | RO | N/A | | 0 | |
|     SUBCODE | 64.4 | RO | N/A | | 0 | |
|     VALUE | 64.5 | RO | N/A | | 0 | |
| Deviation Low Alarm<br>DV_LO_ALM | 65 | | | | | |
|     UNACKNOWLEDGED | 65.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0=undefined | Data Type: DS-71<br>The DV LO alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm.<br><br>VALUE Data Type: Float |
|     ALARM_STATE | 65.2 | RO | N/A | 0=Undefined<br>1=Clear reported<br>2=Clear not reported<br>3=Active reported<br>4=Active not reported | 0=undefined | |
|     TIME_STAMP | 65.3 | RO | N/A | | 0 | |
|     SUBCODE | 65.4 | RO | N/A | | 0 | |
|     VALUE | 65.5 | RO | N/A | | 0 | |
| **Extended Parameters** | | | | | | |
| Bias<br>  BIAS | 66 | | ALL | OUT_SCALE +/- 10% | 0 | Data Type: Float<br>The bias value used to calculate output for a PD structure. |
| Error<br>  ERROR | 67 | RO | N/A | | Dynamic | Data Type: Float<br>The error (SP-PV) used to determine the control action. |
| SP Work<br>  SP_WRK | 68 | RO | N/A | | Dynamic | Data Type: Float<br>The working set point of the block after limiting and filtering is applied. EU of PV_SCALE |
| SP FTime<br>  SP_FTIME | 69 | | ALL | Positive | 0 | Data Type: Float<br>The time constant of the first-order SP filter. It is the time, in seconds, required for a 63 percent change in the IN value. Applied after SP rate limiting. |
| Math Form<br>  MATHFORM | 70 | | OOS | 0=Standard<br>1=Series | 0=Standard | Data Type: Unsigned8<br>Selects equation form (series or standard) |

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Table 4-32. PID Function Block System Parameters Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Structureconfig<br>STRUCTURECONFIG | 71 | | OOS | 0=PID terms on error<br>1=PI terms on error, D term on PV<br>2=I terms on error, PD term on PV<br>3=PD terms on error<br>4= P term on error, D term on PV<br>5=ID terms on error<br>6=I term on error, D term on PV<br>7=2 Deg. of Freedom PID | 0=PID terms on error | Data Type: Unsigned8<br>Defines PID equation structure to apply controller action. |
| UGamma<br>GAMMA (ugamma) | 72 | | OOS | > = 0, < = 1 | 1.0 | Data Type: Float<br>Fraction of derivative action taken on error versus PV. For a value of 0.6, then 60% of the derivative action will be based on error and 40% on PV. The value of GAMMA may be changed over a range of 0-1 if STRUCTURE is set to Two Degrees of Freedom Control. Otherwise, it is automatically set to a value of 1 or 0 based on the Structure selection. |
| UBeta<br>BETA (ubeta) | 73 | | OOS | > = 0, < = 1 | 1.0 | Data Type: Float<br>Fraction of proportional action taken on error versus PV. For a value of 0.6, then 60% of the proportional action will be based on error and 40% on PV. The value of BETA may be changed over a range of 0-1 if STRUCTURE is set to Two Degrees of Freedom Control. Otherwise, it is automatically set to a value of 1 or 0 based on the Structure selection. |
| IDeadBand<br>IDEADBAND | 74 | | OOS | Positive | 0 | Data Type: Float<br>Integral action stops when ERROR is within IDEADBAND, proportional and derivative action continue. EU of PV_SCALE |
| StdDev<br>STDDEV | 75 | RO | N/A | | Dynamic | Data Type: Float<br>Standard deviation of PV. |
| Cap StdDev<br>CAP_STDDEV | 76 | RO | N/A | | Dynamic | Data Type: Float<br>Standard deviation of PV changes. |
| T Request<br>T_REQUEST | 77 | RO | ALL | 0=Request Tuning<br>1=Force Tuning<br>2=Reset Tuner | 0 | Data Type: Bit String<br>Operator request to initiate/control autotuning. |
| T State<br>T_STATE | 78 | RO | NONE | | 0 | Data Type: Unsigned8<br>Current autotuner state. |
| T Status<br>T_STATUS | 79 | RO | N/A | 0=Scan Rate Too Low Warning<br>1=Insufficient Process Response (obsolete)<br>2=Scan Rate Too High Warning<br>3=Inverse Direct Acting Error<br>4=PV Deviation Too Large<br>5=Initial PV Deviation Too Large<br>6=PV Limited or Constant<br>7=PV Bad<br>8=Invalid Mode for Tuning<br>9=BKCAL_IN Non Good or Limited<br>10=Out Limited<br>11=Bypass Active<br>12=Mode Changed<br>13=Tracking Active<br>14=Disconnected<br>15=SP Changed | 0 | Data Type: Bit String<br>Autotuner status. |

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Table 4-32. PID Function Block System Parameters Definitions (Continued)

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| T Ipgain<br>T_IPGAIN | 80 | RO | N/A | | 0.0 | Data Type: Float<br>Integrated process gain. |
| T Ugain<br>T_UGAIN | 81 | RO | N/A | | 0.0 | Data Type: Float<br>Ultimate gain. |
| T Uperiod<br>T_UPERIOD | 82 | RO | N/A | | 0.0 | Data Type: Float<br>Ultimate period. |
| T Psgain<br>T_PSGAIN | 83 | RO | N/A | | 0.0 | Data Type: Float<br>Process static gain. |
| T Ptimec<br>T_PTIMEC | 84 | RO | N/A | | 0.0 | Data Type: Float<br>Process time constant. |
| T Pdtime<br>T_PDTIME | 85 | RO | N/A | | 0.0 | Data Type: Float<br>Process dead time. |
| T Targetop<br>T_TARGETOP | 86 | | ALL | | 2 | Data Type: Unsigned8<br>Target oscillation periods. |
| T Hyster<br>T_HYSTER | 87 | | ALL | > = 0.0 | 0.0 | Data Type: Float<br>Hysteresis |
| T Relayss<br>T_RELAYSS | 88 | | ALL | > = 0.0 | 3.0 | Data Type: Float<br>Relay step size. |
| T Gain Magnifier<br>T_GAIN_MAGNIFIER | 89 | | ALL | > 0.1, < 100 | 1.0 | Data Type: Float<br>Scales amount of gain. |
| T Auto Extra DT<br>T_AUTO_EXTRA_DT | 90 | | ALL | | 0 | Data Type: Unsigned8<br>Allow additional cycle with extra deadtime. |
| T Auto Hysteresis<br>T_AUTO_HYSTERESIS | 91 | | ALL | | 0 | Data Type: Unsigned8<br>Allows calculation of hysteresis based on CAP_STDDEV |
| T Aoperiods<br>T_AOPERIODS | 92 | RO | N/A | | 0 | Data Type: Unsigned8<br>Actual oscillation periods. |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-33. PID Function Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV |
| 8 | SP |
| 9 | OUT |
| 18 | CAS_IN |
| 38 | TRK_IN_D |
| 39 | TRK_VAL |
| 45.1 | ALARM_SUM.CURRENT |
| 45.2 | ALARM_SUM.UNACKNOWLEDGED |
| 45.3 | ALARM_SUM.UNREPORTED |
| 45.4 | ALARM_SUM.DISABLED |

Table 4-34. PID Function Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 10 | PV_SCALE |
| 11 | OUT_SCALE |
| 12.1 | GRANT_DENY.GRANT |
| 12.2 | GRANT_DENY.DENY |
| 17 | BYPASS |
| 21 | SP_HI_LIM |
| 22 | SP_LO_LIM |
| 28 | OUT_HI_LIM |
| 29 | OUT_LO_LIM |

Table 4-35. PID Function Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV |
| 8 | SP |
| 9 | OUT |
| 15 | IN |
| 18 | CAS_IN |
| 27 | BKCAL_IN |
| 31 | BKCAL_OUT |
| 32 | RCAS_IN |
| 33 | ROUT_IN |
| 35 | RCAS_OUT |
| 36 | ROUT_OUT |
| 38 | TRK_IN_D |
| 39 | TRK_VAL |
| 40 | FF_VAL |
| 45.1 | ALARM_SUM.CURRENT |
| 45.2 | ALARM_SUM.UNACKNOWLEDGED |
| 45.3 | ALARM_SUM.UNREPORTED |
| 45.4 | ALARM_SUM.DISABLED |
| 67 | ERROR |
| 68 | SP_WORK |
| 71 | STRUCTURECONFIG |
| 75 | STDDEV |
| 76 | CAP_STDDEV |

**Note**

Because individual views are limited in size, View List 4 has two parts.

Table 4-36. PID Function Block, View 4.1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 13 | CONTROL_OPTS |
| 14 | STATUS_OPTS |
| 16 | PV_FTIME |
| 19 | SP_RATE_DN |
| 20 | SP_RATE_UP |
| 23 | GAIN |
| 24 | RESET |
| 25 | BAL_TIME |
| 26 | RATE |
| 30 | BKCAL_HYS |
| 34 | SHED_OPT |
| 37 | TRK_SCALE |
| 41 | FF_SCALE |
| 42 | FF_GAIN |
| 46 | ACK_OPTION |
| 47 | ALARM_HYS |
| 48 | HI_HI_PRI |
| 49 | HI_HI_LIM |
| 50 | HI_PRI |
| 51 | HI_LIM |
| 52 | LO_PRI |
| 53 | LO_LIM |
| 54 | LO_LO_PRI |
| 55 | LO_LO_LIM |
| 56 | DV_HI_PRI |
| 57 | DV_HI_LIM |
| 58 | DV_LO_PRI |
| 59 | DV_LO_LIM |

Table 4-37. PID Function Block, View 4.2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 66 | BIAS |
| 69 | SP_FTIME |
| 70 | MATHFORM |
| 71 | STRUCTURECONFIG |
| 72 | GAMMA (ugamma) |
| 73 | BETA |
| 74 | IDEADBAND |

# Field Communicator Menu Structure

**PID FUNCTION BLOCK**

**Quick Config**

| |
|---|
| Alert Key |
| Control Options |
| Deviation High Limit |
| Deviation Low Limit |
| Gain |
| High High Limit |
| High Limit |
| Low Limit |
| Low Low Limit |
| Output Scale: EU at 100% |
| Output Scale: EU at 0% |
| Output Scale: Units Index |
| Output Scale: Decimal |
| Process Value Scale: EU at 100% |
| Process Value Scale: EU at 0% |
| Process Value Scale: Units Index |
| Process Value Scale: Decimal |
| Reset |
| Setpoint: Status |
| Setpoint: Value |
| Setpoint High Limit |
| Setpoint Low Limit |

**Common Config**

| |
|---|
| Alarm Hysteresis |
| Alert Key |
| Control Options |
| Deviation High Limit |
| Deviation Low Limit |
| Gain |
| High High Limit |
| High Limit |
| Low Limit |
| Low Low Limit |
| Block Mode: Target |
| Block Mode: Actual |
| Block Mode: Permitted |
| Block Mode: Normal |
| Output High Limit |
| Output Low Limit |
| Output Scale: EU at 100% |
| Output Scale: EU at 0% |
| Output Scale: Units Index |
| Output Scale: Decimal |
| Process Value Filter Time |
| Process Value Scale: EU at 100% |
| Process Value Scale: EU at 0% |
| Process Value Scale: Units Index |
| Process Value Scale: Decimal |
| Rate |
| Reset |
| Setpoint: Status |
| Setpoint: Value |
| Setpoint High Limit |
| Setpoint Low Limit |

**Advanced Config**

| |
|---|
| Back Calculation Hysteresis |
| Feed Forward Gain |
| Feed Forward Scale: EU at 100% |
| Feed Forward Scale: EU at 0% |
| Feed Forward Scale: Units Index |
| Feed Forward Scale: Decimal |
| Shed Options |
| Setpoint Rate Down |
| Setpoint Rate Up |
| Static Revision |
| Status Options |
| Strategy |
| Tracking Scale: EU at 100% |
| Tracking Scale: EU at 0% |
| Tracking Scale: Units Index |
| Tracking Scale: Decimal |
| Tracking Value: Status |
| Tracking Value: Value |

**Connectors**

| |
|---|
| Back Calculation Input: Status |
| Back Calculation Intput: Value |
| Back Calculation Output: Status |
| Back Calculation Output: Value |
| Cascade Input: Status |
| Cascade Input: Value |
| Feed Forward Value: Status |
| Feed Forward Value: Value |
| Input: Status |
| Input: Value |
| Output: Status |
| Ouput: Value |
| Tracking Input Discrete: Status |
| Tracking Input Descrete: Value |
| Tracking Value: Status |
| Tracking Value: Value |

**Online**

| |
|---|
| Back Calculation Input: Status |
| Back Calculation Intput: Value |
| Back Calculation Output: Status |
| Back Calculation Output: Value |
| Block Error |
| Bypass |
| Cascade Input: Status |
| Cascade Input: Value |
| Feed Forward Value: Status |
| Feed Forward Value: Value |
| Gain |
| Input: Status |
| Input: Value |
| Block Mode: Target |
| Block Mode: Actual |
| Block Mode: Permitted |
| Block Mode: Normal |
| Output: Status |
| Output: Value |
| Process Value: Status |
| Process Value: Value |
| Remote Cascade Input: Status |
| Remote Cascade Input: Value |
| Remote Cascade Output: Status |
| Remote Cascade Output: Value |
| Remote Out Input: Status |
| Remote Out Input: Value |
| Remote Out Output: Status |
| Remote Out Output: Value |
| Setpoint: Status |
| Setpoint: Value |
| Tracking Input Discrete: Status |
| Tracking Input Descrete: Value |
| Tracking Value: Status |
| Tracking Value: Value |

**Status**

| |
|---|
| Block Error |

---

**PID FUNCTION BLOCK cont.**

Other

Tag Description
Grant Deny: Grant
Grant Deny: Deny
Balance Time
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Alarm Summary: Current
Alarm Summary: Unacknowledged
Alarm Summary: Unreported
Alarm Summary: Disabled
Acknowledge Option
High High Alarm: Unacknowledged
High High Alarm: Alarm State
High High Alarm: Time Stamp
High High Alarm: Subcode
High High Alarm: Float Value
High Alarm: Unacknowledged
High Alarm: Alarm State
High Alarm: Time Stamp
High Alarm: Subcode
High Alarm: Float Value
Low Alarm: Unacknowledged
Low Alarm: Alarm State
Low Alarm: Time Stamp
Low Alarm: Subcode
Low Alarm: Float Value
Low Low Alarm: Unacknowledged
Low Low Alarm: Alarm State
Low Low Alarm: Time Stamp
Low Low Alarm: Subcode
Low Low Alarm: Float Value
Deviation High Alarm: Unacknowledged
Deviation High Alarm: Alarm State
Deviation High Alarm: Time Stamp
Deviation High Alarm: Subcode
Deviation High Alarm: Float Value
Deviation Low Alarm: Unacknowledged
Deviation Low Alarm: Alarm State
Deviation Low Alarm: Time Stamp
Deviation Low Alarm: Subcode
Deviation Low Alarm: Float Value
Bias

Other
(continued)

Error
SP Work
SP FTime
mathform
structureconfig
Ugamma
UBeta
IDeadBand
StdDv
Cap StdDev
T Request
T State
T Status
T Ipgain
T Ugain
T Uperiod
T Psgain
T Ptimec
T Pdtime
T Targetop
T Hyster
T Relayss
T Gain Magnifier
T Auto Extra DT
T Auto Hysteresis
T Aoperiods

All

Characteristics: Block Tag
Static Revision
Tag Description
Strategy
Alert Key
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Block Error
Process Value: Status
Process Value: Value
Setpoint: Status
Setpoint: Value
Output: Status
Output: Value
Process Value Scale: EU at 100%
Process Value Scale: EU at 0%
Process Value Scale: Units Index
Process Value Scale: Decimal
Output Scale: EU at 100%
Output Scale: EU at 0%
Output Scale: Units Index
Output Scale: Decimal
Grant Deny: Grant
Grant Deny: Deny
Control Options
Status Options
Input: Status
Input: Value
Process Value Filter Time
Bypass
Cascade Input: Status
Cascade Input: Value
Setpoint Rate Down
Setpoint Rate Up
Setpoint High Limit
Setpoint Low Limit
Gain
Reset
Balance Time
Rate
Back Calculation Input: Status
Back Calculation Input: Value
Output High Limit
Output Low Limit
Back Calculation Hysteresis
Back Calculation Output: Status
Back Calculation Output: Value
Remote Cascade Input: Status
Remote Cascade Input: Value
Remote Out Input: Status
Remote Out Input: Value
Shed Options
Remote Cascade Output: Status
Remote Cascade Output: Value
Remote Out Output: Status
Remote Out Output: Value
Tracking Scale: EU at 100%
Tracking Scale EU at 0%
Tracking Scale: Units Index
Tracking Scale: Decimal
Tracking Input Discrete: Status
Tracking Input Descrete: Value
Tracking Value: Status
Tracking Value: Value
Feed Forward Value: Status
Feed Forward Value: Value
Feed Forward Scale: EU at 100%
Feed Forward Scale: EU at 0%
Feed Forward Scale: Units Index
Feed Forward Scale: Decimal
Feed Forward Gain

All (continued)

Updated Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Alarm Summary: Current
Alarm Summary: Unacknowledged
Alarm Summary: Unreported
Alarm Summary: Disabled
Acknowledge Option
Alarm Hysteresis
High High Priority
High High Limit
High Priority
High Limit
Low Priority
Low Limit
Low Low Priority
Low Low Limit
Deviation High Priority
Deviation High Limit
Deviation Low Priority
Deviation Low Limit
High High Alarm: Unacknowledged
High High Alarm: Alarm State
High High Alarm: Time Stamp
High High Alarm: Subcode
High High Alarm: Float Value
High Alarm: Unacknowledged
High Alarm: Alarm State
High Alarm: Time Stamp
High Alarm: Subcode
High Alarm: Float Value
Low Alarm: Unacknowledged
Low Alarm: Alarm State
Low Alarm: Time Stamp
Low Alarm: Subcode
Low Alarm: Float Value
Low Low Alarm: Unacknowledged
Low Low Alarm: Alarm State
Low Low Alarm: Time Stamp
Low Low Alarm: Subcode
Low Low Alarm: Float Value
Deviation High Alarm: Unacknowledged
Deviation High Alarm: Alarm State
Deviation High Alarm: Time Stamp
Deviation High Alarm: Subcode
Deviation High Alarm: Float Value
Deviation Low Alarm: Unacknowledged
Deviation Low Alarm: Alarm State
Deviation Low Alarm: Time Stamp
Deviation Low Alarm: Subcode
Deviation Low Alarm: Float Value
Bias
Error
SP Work
SP FTime
mathform
structureconfig
UGamma
UBeta
IDeadBand
StdDev

All (continued)

Cap StdDev
T Request
T State
T Status
T Ipgain
T Ugain
T Uperiod
T Psgain
T Ptimec
T Pdtime
T Targetop
T Hyster
T Relayss
T Gain Magnifier
T Auto Extra DT
T Auto Hysteresis
T Aoperiods

# Input Selector Function Block

## Overview

The Input Selector (ISEL) function block (figure 4-12) can be used to select the first good, maximum, minimum, average, or hot backup from as many as eight input values and place it at the output. The block supports signal status propagation. There is no process alarm detection in the Input Selector function block. Figure 4-13 illustrates the internal components of the ISEL function block. Table 4-40 lists the ISEL block parameters, their index numbers, and descriptions.

Figure 4-12. Input Selector Function Block



| | |
|---|---|
| IN (1–8) | = Input used in the selection algorithm. |
| DISABLE (1–8) | = Discrete input used to enable or disable the associated input channel. |
| OP_SELECT | = Input used to override algorithm. |
| SELECTED | = The selected channel number. |
| OUT | = The block output and status. |
| OUT_D | = Discrete output that signals a selected alarm condition. |
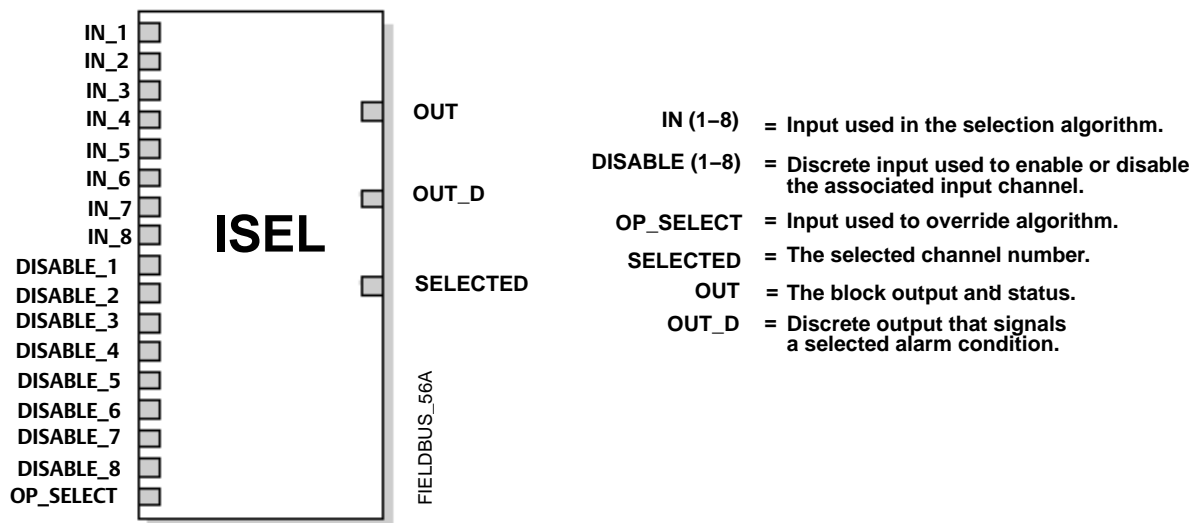
## Modes

The ISEL function block supports three modes of operation as defined by the MODE_BLK [5] parameter:

● **Manual (Man)**—The block output (OUT [7]) may be entered manually.

● **Automatic (Auto)**—OUT [7] reflects the selected input value.

● **Out of Service (OOS)**—The block is not processed. The BLOCK_ERR [6] parameter shows Out of Service. In this mode, you can make changes to all configurable parameters. The target mode of a block may be restricted to one or more of the supported modes.

The Input Selector block Actual mode will be Out of Service if any of the following are true:

● The Actual mode of the resource block is not Auto

● The Input Selector block Target mode is Out of Service

● The Input Selector block Target mode is Auto, OP_SELECT [22] is not being used, and SELECT_TYPE [19] is 0. In this case, the BLOCK_ERR [6] parameter shows a Block Configuration Error.

The Input Selector block Actual mode will be Manual if all of the above is not true and the Target mode is Manual.

Figure 4-13. Input Selector Function Block Schematic



NOTE: THIS FIGURE DOES NOT INCLUDE THE ADDITIONAL 4 INPUTS IN THE EXTENDED PARAMETERS.
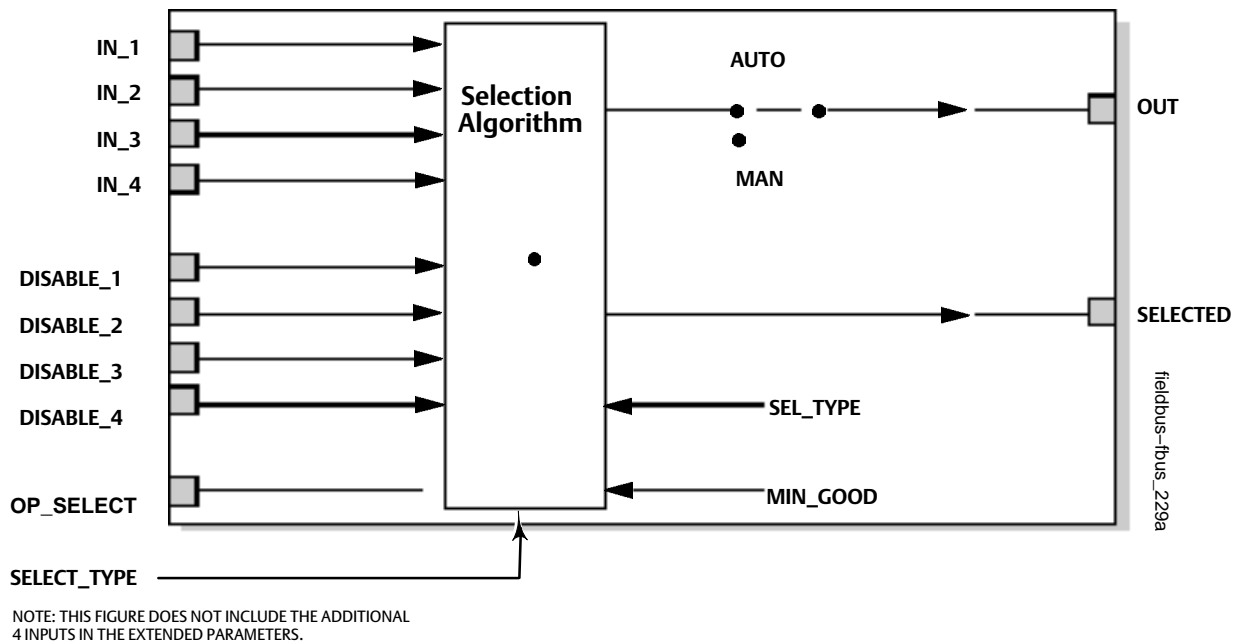
# Status Handling

## Quality Use and Propagation

In Auto mode, OUT [7] reflects the value and status of the selected input based on the following criteria:

● A bad or disabled input is never used by any of the selection algorithms

● For a selection algorithm to use an input with status of Uncertain, the STATUS_OPTS [10] parameter must have "Use Uncertain as Good."

● STATUS_OPTS [10] is applied before selection.

● If the number of good inputs is less than MIN_GOOD [20], or if the number of inputs evaluated is 0, the status of OUT [7] and SELECTED [21] will be Bad.

● If an input is disabled or its status is Bad and is selected via OP_SELECT [22], then the status of OUT [7] and SELECTED [21] will be Bad. If the quality of the input is Uncertain, and the selection for the STATUS_OPTS [10] parameter is "Use Uncertain as Good," then the status of OUT [7] and SELECTED [21] will be Uncertain. Otherwise the status of OUT [7] and SELECTED [21] will be Good Noncascade.

When the block is in the Manual mode the status and substatus of OUT [7] and SELECTED [21] will be as follows:

● Substatus will be non-specific and the limit will be constant.

● Quality of OUT [7] and SELECTED [21] will be Uncertain if STATUS_OPTS [10] is "Uncertain if in Manual mode." Otherwise, the quality of OUT [7] and SELECTED [21] will be Good Noncascade.

# Limit Propagation

Refer to figure 4-14. When SELECT_TYPE [19] is Average, Not Limited is propagated unless all inputs have the same limit status. If ll inputs have the same limit status, the limit status of the inputs is propagated.

If SELECT_TYPE [19] is Middle and the number of inputs used by the algorithm is greater than one: Not Limited is propagated unless all selected inputs have the same limit status, in which case the limit status of the inputs is propagated.

If SELECT_TYPE [19] is Middle and a single input, or if Maximum or Minimum then: If the selected input is a constant and Middle, Constant is propagated. Otherwise, if the selected input is a constant and Maximum or Minimum, propagate low if Maximum, propagate high if Minimum. If the selected input is not a constant, propagate selected input limit as is.

When SELECT_TYPE [19] is First Good or Hot Spare or if OP_SELECT [22] is non-zero, propagate selected input limit as is.

# Substatus Propagation

Refer to figure 4-15. For SELECT_TYPE [19] of Maximum, Minimum, First Good, Hot Spare, and Middle with only one input, simply propagate substatus as is.

For SELECT_TYPE [19] of Maximum and Minimum with more than one input with the same value, propagate substatus if all inputs are the same.

For SELECT_TYPE [19] of Average or Middle with more than one input, propagate NonSpecific.

If the status of OUT [7] is Bad, then the substatus will be as follows:

● Out of Service if the Target mode is Out of Service.

● Configuration Error with a BLOCK_ERR [6] of Configuration Error if the Actual mode is Out of Service.

● Otherwise a substatus of Non-Specific.

Figure 4-14. Input Selector Block Limit Propagation



NOTES:
[1] LIMIT MANIPULATION FOR A CONSTANT INPUT FOR MAXIMUM AND MINIMUM IS BASED UPON THE FOUNDATION FIELDBUS SPECIFICATION. THE REASONING IS BASED ON HIGH SELECT PROVIDING A LOW LIMIT STATUS AND LOW SELECT PROVIDING A HIGH LIMIT STATUS.
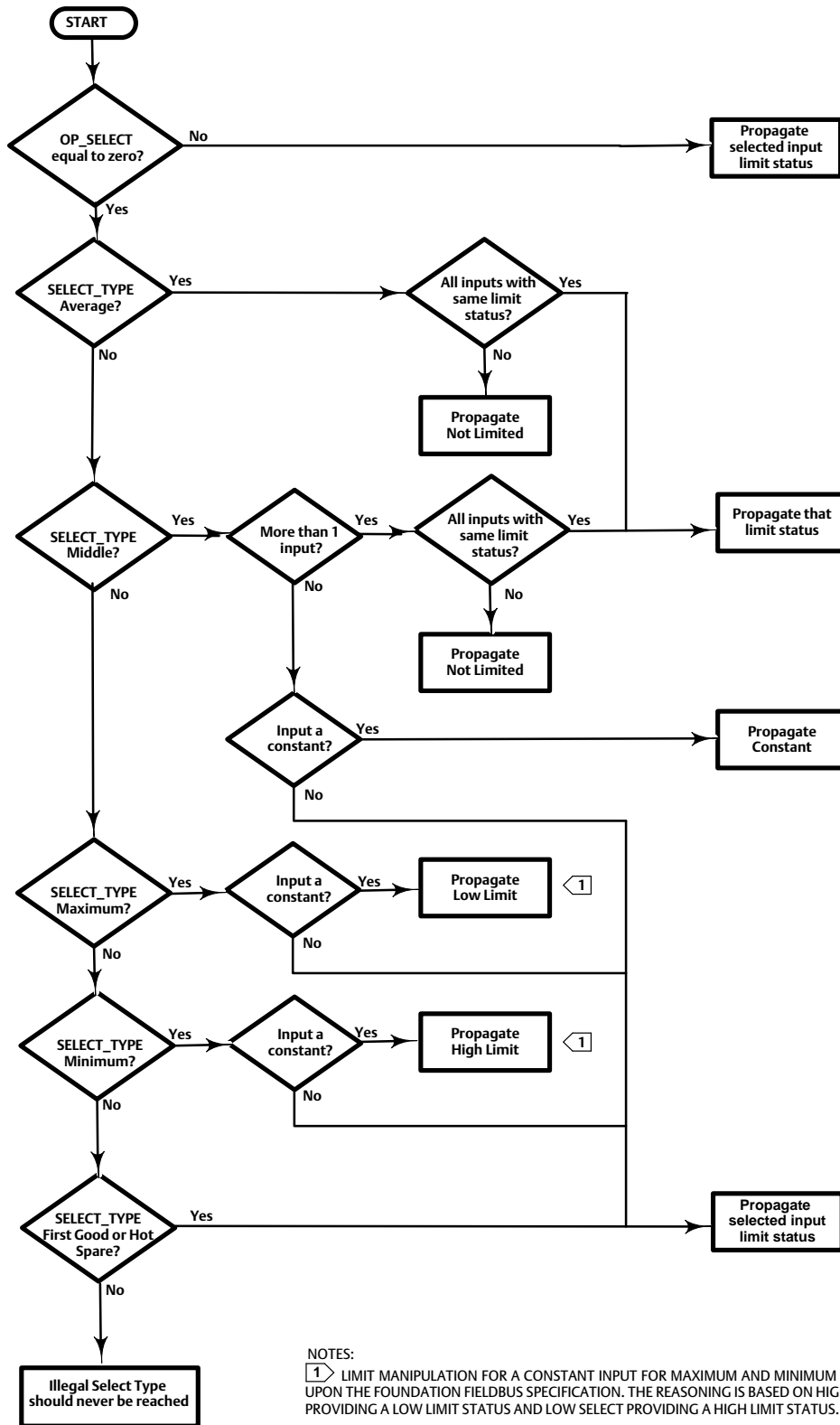
Figure 4-15. Input Selector Block Substatus Propagation
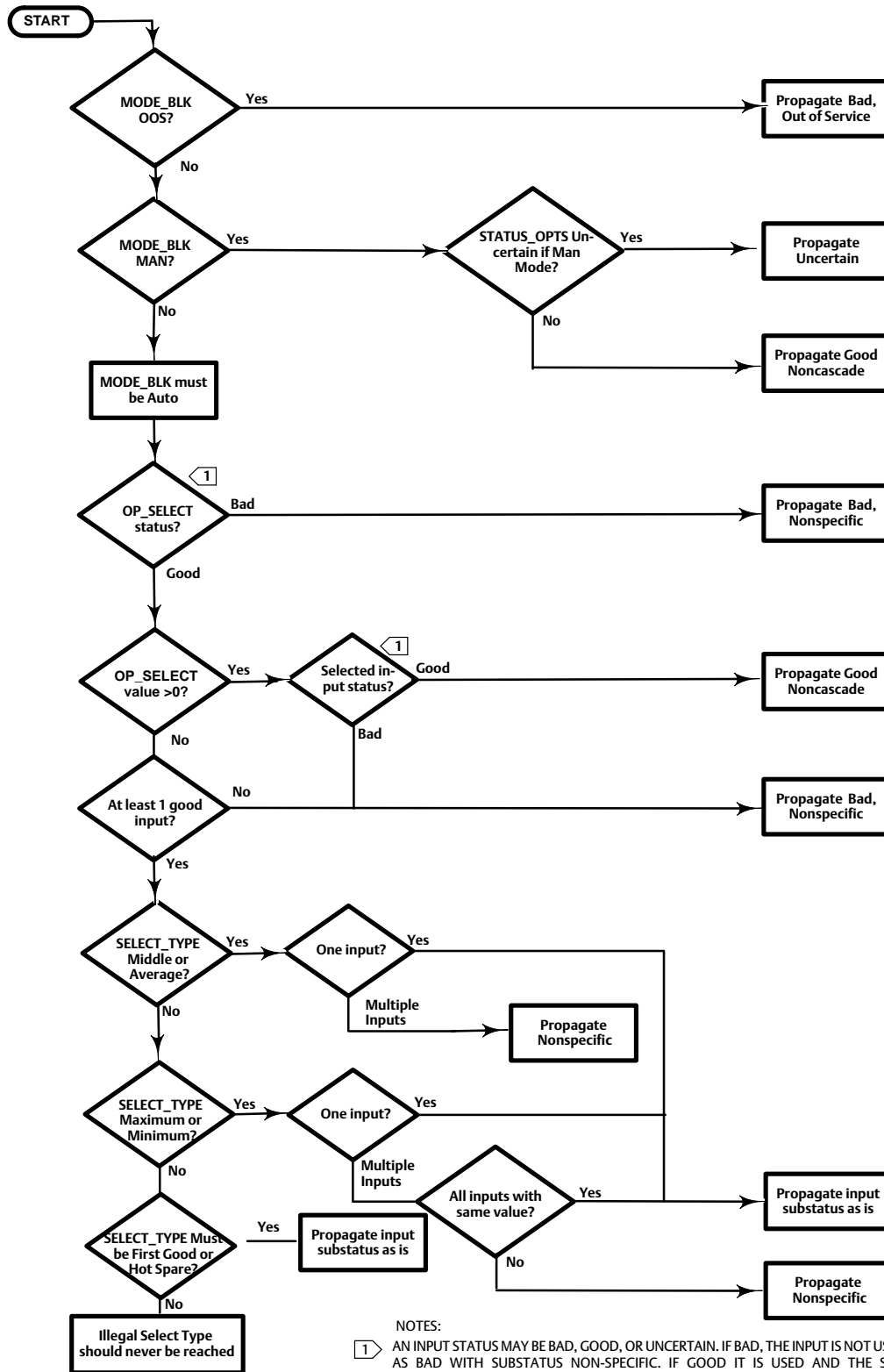


NOTES:

⟨1⟩ AN INPUT STATUS MAY BE BAD, GOOD, OR UNCERTAIN. IF BAD, THE INPUT IS NOT USED AND THE STATUS IS PROPAGATED AS BAD WITH SUBSTATUS NON-SPECIFIC. IF GOOD IT IS USED AND THE STATUS IS PROPAGATED AS GOOD (NON-CASCADE). IF UNCERTAIN, AND STATUS_OPTS IS "USE UNCERTAIN AS GOOD" THEN THE INPUT IS USED AND THE STATUS IS PROPAGATED AS GOOD (NON-CASCADE), OTHERWISE IT IS NOT USED AND THE STATUS IS PROPAGATED AS BAD WITH SUBSTATUS NON-SPECIFIC.

## STATUS_OPTS Supported

In the STATUS_OPTS [10] parameter, you can select from the following options to control the status handling:

- **Use Uncertain as Good**—sets the OUT [7] status to Good when the selected input status is Uncertain.

- **Uncertain if in Manual mode**: sets the OUT [7] status to Uncertain when the mode is Manual.

---

**Note**

The block mode must be Out of Service to set STATUS_OPTS [10].

---

# Input Selection

The ISEL function block reads the values and statuses of as many as eight inputs (IN_1 [11], IN_2 [12], IN_3 [13], IN_4 [14], IN_5 [25], IN_6 [26], IN_7 [27], IN_8 [28]). To use any of the six selection algorithms to select the output, OP_SELECT [22] must be 0. To specify which algorithm to use, configure the selector type parameter (SELECT_TYPE [19]) as follows:

- **Maximum**—selects the input with the highest value from the inputs that are not bad and not disabled.

- **Minimum**—selects the input with the lowest value from the inputs that are not bad and not disabled.

- **Average**—calculates the average value of the inputs that are not bad and not disabled and provides it as the output. For example, if the number used to average (AVG_USE [33]) is 4 and the number of connected inputs is 6, then the highest and lowest values would be dropped prior to calculating the average. If AVG_USE [33] is 2 and the number of connected inputs is 7, then the two highest and lowest values would be dropped prior to calculating the average and the average would be based on the middle three inputs.

- **Middle**—If the number of good usable inputs is odd, then it selects the middle value. If the number of good usable inputs is even, then it averages the middle two values and selects status as worst of two. If both inputs' limit status are not the same then it sets limit status of Not Limited.

- **First Good**—selects the first input that is not bad and not disabled, starting with IN_1 [11].

- **Hot Spare**—initially uses the input selected as first good. If the selected input goes bad, the first good selection is repeated. If the selected input remains good, it stays selected. If the originally selected input returns to good status the selection does not change. Selection changes only if the currently selected input goes bad.

## Disabling Inputs

Use the parameters DISABLE_1 [15], DISABLE_2 [16], DISABLE_3 [17], DISABLE_4 [18], DISABLE_5 [29], DISABLE_6 [30], DISABLE_7 [31] and DISABLE_8 [32] to disable the corresponding inputs. An input that is disabled will not be used by any of the selection algorithms.

The status of the disable parameter must be "Good," "Good_Cascade," or "Uncertain" with a STATUS_OPTS [10] of "Use Uncertain as Good" in order to be evaluated. If the status of the disable parameter is Bad, its last usable value is maintained and acted upon. If the device restarts, losing the last usable value, the last usable value is set to disabled.

IN_1 through IN_8 and DISABLE_1 through DISABLE_8 are non-volatile type parameters so if they are Linked they will automatically have Bad status until connections are re-established. If they are not Linked, they will be restored with the previous value from NVM across device restarts.

## Direct Selection of Inputs

The parameter OP_SELECT [22] can be used to select a particular input. If OP_SELECT [22] is non-zero, the selection algorithm is bypassed and the value of OP_SELECT [22] is interpreted as the input number to select. If the OP_SELECT [22] value is greater than the number of inputs, then the highest input is selected. The status of OP_SELECT [22] must be "Good," "Good_Cascade," or "Uncertain" with a STATUS_OPTS [10] of "Use Uncertain as Good" in order to be evaluated. If the status of OP_SELECT [22] is Bad, then the OUT [7] status is Bad.

## Identification of Selected Inputs

For a SELECT_TYPE [19] of Maximum, Minimum, Middle, First Good, and Hot Spare, SELECTED [21] indicates the number of the selected input. When Middle is computed from more than one input, SELECTED [21] is set to 0.

For a SELECT_TYPE [19] of Average, SELECTED [21] indicates the number of inputs used in the average calculation.

When the block mode is Manual, SELECTED [21] is set to 0.

# Alarm Detection

A block alarm will be generated whenever the BLOCK_ERR [6] has an error bit set. The types of block error for the PID block are defined above.

Process alarm detection is based on OUT [7] value. You can configure the alarm limits of the following standard alarms:

- High (HI_LIM [40])

- High high (HI_HI_LIM [38])

- Low (LO_LIM [42])

- Low low (LO_LO_LIM [44])

In order to avoid alarm chattering when the variable is oscillating around the alarm limit, an alarm hysteresis in percent of the PV span can be set using the ALARM_HYS [36] parameter. The priority of each alarm is set in the following parameters:

- HI_PRI [39]

- HI_HI_PRI [37]

- LO_PRI [41]

- LO_LO_PRI [43]

ACK_OPTION [35] is used to set automatic acknowledgement of alarms.

ALARM_SUM [34] indicates the current alert status, unacknowledged states, and disabled states of the alarms associated with the function block.

Alarms are grouped into five levels of priority, as shown in table 4-38.

Table 4-38. ISEL Function Block Alarm Priorities

| Priority Number | Priority Description(1) |
|---|---|
| 0 | The priority of an alarm condition changes to 0 after the condition that caused the alarm is corrected. |
| 1 | An alarm condition with a priority of 1 can be recognized by the system. The device monitors the alarm but does not report it until requested by the host system. |
| 2 | An alarm condition with a priority of 2 is reported to the operator, but generally does not require operator attention (such as diagnostics and system alerts). |
| 3-7 | Alarm conditions of priority 3 to 7 are advisory alarms of increasing priority. |
| 8-15 | Alarm conditions of priority 8 to 15 are critical alarms of increasing priority. |
| 1. The priority classes "advise" and "critical" have no relationship to Plant Web Alerts. | |

# Block Errors

Table 4-39 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are not applicable for the ISEL block and are provided only for your reference.

Table 4-39. BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other (N/A)* |
| 1 | **Block Configuration Error** - If OP_SELECT is not being used, and SELECT_TYPE = 0. This implies OP_SELECT status is good and actual mode is AUTO. |
| 2 | *Link Configuration Error (N/A)* |
| 3 | *Simulate Active (N/A)* |
| 4 | *Local Override (N/A)* |
| 5 | *Device Fault State Set (N/A)* |
| 6 | *Device Needs Maintenance Soon (N/A)* |
| 7 | **Input failure/process variable has Bad status** - Set if any IN or any DISABLE or OP_SELECT is bad and connected. This means that a status of BAD NC would not cause an input failure but a status of BAD LUV or BAD no LUV would cause and input failure. |
| 8 | Output failure - Set if OUT quality is bad and the Actual mode is not Out of Service. |
| 9 | *Memory Failure (N/A)* |
| 10 | *Lost Static Data (N/A)* |
| 11 | *Lost NV Data (N/A)* |
| 12 | *Readback Check Failed (N/A)* |
| 13 | *Device Needs Maintenance Now (N/A)* |
| 14 | **Power Up** - Set if the Target mode is Out of Service when powered up until the mode is changed. |
| 15 | **Out of Service** - The block is in Out of Service (OOS) mode |

# ISEL Function Block Parameter List (table 4-40)

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter
- Double indentations and shaded Index Numbers indicate sub-parameters

Table 4-40. Input Selector Function Block Parameter Definitions

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision ST_REV | 1 | RO | N/A | 0 to 65535 | 0 | Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. |
| Tag Description TAG_DESC | 2 | RW | ALL | 7 bit ASCII | spaces | Data Type: Octet String The user description of the intended application of the block. |
| Strategy STRATEGY | 3 | RW | ALL | 0 to 65535 | 0 | Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |
| Alert Key ALERT_KEY | 4 | RW | ALL | 1 to 255 | 0 | Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| Block Mode MODE_BLK | 5 | | | | | Data Type: DS-69 Valid Bits: 7: OOS, 4: MAN, 3: AUTO The actual, target, permitted, and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target |
| TARGET | 5.1 | RW | ALL | OOS, MAN, AUTO | OOS until block is configured, then last valid target | |
| ACTUAL | 5.2 | RO | ALL | | | |
| PERMITTED | 5.3 | RW | ALL | OOS+MAN+AUTO | OOS+MAN +AUTO | |
| NORMAL | 5.4 | RW | ALL | | AUTO | |
| Block Error BLOCK_ERR | 6 | RO | N/A | 1: Block Configuration Error 7: Input Failure / Bad PV status 8: Output Failure 14: Power Up 15: Out-of-Service | Dynamic | Data Type: Bit String 0=Inactive 1=Active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. |
| Output OUT | 7 | | MAN OOS | Status OUT_RANGE | Dynamic | Data Type: DS-65 The block output value and status. |
| | | | | Value | | |
| Output Range OUT_RANGE | 8 | | ALL | EU at 100% EU at 0% Units Index Decimal Point | 100 0 % 2 | Data Type: DS-67 High and low scale values, engineering units code, and number of digits to the right of the decimal point associated with OUT. |
| Grant Deny GRANT_DENY | 9 | | | | | Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters of the block. Not used by device. GRANT: 0=N/A, 1=granted DENY: 0=N/A, 1=denied |
| GRANT | 9.1 | | ALL | 0: Program 1: Tune 2: Alarm 3: Local | All bits: 0 | |
| DENY | 9.2 | | ALL | | All bits:0 | |
| Status Options STATUS_OPTS | 10 | | OOS | 2: Use Uncertain as GOOD 8: Uncertain if MAN | All bits: 0 | Data Type: Bit String Allows you to select options for status handling and processing. The supported status option for the input selector block is: "Use Uncertain as Good", "Uncertain if Man mode." |
| Input 1 IN_1 | 11 | | ALL | Status | BAD NC constant | Data Type: DS-65 The block input value and status. |
| | | | | Value | 0 | |
| Input 2 IN_2 | 12 | | ALL | Status | BAD NC constant | Data Type: DS-65 The block input value and status. |
| | | | | Value | 0 | |

-Continued-

Table 4-40. Input Selector Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | | Initial Value | Description |
|---|---|---|---|---|---|---|---|
| Input 3 IN_3 | 13 | | ALL | Status | | BAD NC constant | Data Type: DS-65 The block input value and status. |
| | | | | Value | | 0 | |
| Input 4 IN_4 | 14 | | ALL | Status | | BAD NC constant | Data Type: DS-65 The block input value and status. |
| | | | | Value | | 0 | |
| Disable Analog Input 1 DISABLE_1 | 15 | | ALL | Status | | BAD NC constant | Data Type: DS-66 Enable/Disable for Input_1, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated. |
| | | | | Value 0=Use 1=Disable | | 0 | |
| Disable Analog Input 2 DISABLE_2 | 16 | | ALL | Status | | BAD NC constant | Data Type: DS-66 Enable/Disable for Input_2, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated. |
| | | | | Value 0=Use 1=Disable | | 0 | |
| Disable Analog Input 3 DISABLE_3 | 17 | | ALL | Status | | BAD NC constant | Data Type: DS-66 Enable/Disable for Input_3, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated. |
| | | | | Value 0=Use 1=Disable | | 0 | |
| Disable Analog Input 4 DISABLE_4 | 18 | | ALL | Status | | BAD NC constant | Data Type: DS-66 Enable/Disable for Input_4, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated. |
| | | | | Value 0=Use 1=Disable | | 0 | |
| Select Type SELECT_TYPE | 19 | | ALL | 1=First Good 2=Minimum 3=Maximum 4=Middle 5=Average 6=Hot Spare | | 0 | Data Type: Unsigned8 Determines the selector action |
| Min Good MIN_GOOD | 20 | | ALL | 1 - 4 0 initial value only | | 0 | Data Type: Unsigned8 The minimum number of inputs which are "good" is less than the value of MIN_GOOD then set the OUT status to "bad". |
| Selected SELECTED | 21 | RO | N/A | Status | | | Data Type: DS-66 The integer indicating the selected input number. |
| | | | | Value 0 - 8 | | Dynamic | |
| Operator Select OP_SELECT | 22 | | ALL | Status | | BAD NC constant | Data Type: DS-66 An operator settable parameter to force a given input to be used. |
| | | | | Value 0 - 8 | | 0 | |

-Continued-

Table 4-40. Input Selector Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | | Initial Value | Description |
|---|---|---|---|---|---|---|---|
| Update Event UPDATE_EVT | 23 | | | | | | |
| UNACKNOWLEDGED | 23.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | | 0 | Data Type: DS-73 This alert is generated by any change to the static data. |
| UPDATE_STATE | 23.2 | RO | N/A | 0=Undefined 1=Update Reported 2=Updated not reported | | 0 | |
| TIME_STAMP | 23.3 | RO | N/A | | | 0 | |
| STATIC_REVISION | 23.4 | RO | N/A | | | 0 | |
| RELATIVE_INDEX | 23.5 | RO | N/A | | | 0 | |
| Block Alarm BLOCK_ALM | 24 | | | | | | |
| UNACKNOWLEDGED | 24.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | | 0 | Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure, or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the active status in BLOCK_ERR. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed. |
| ALARM_STATE | 24.2 | RO | N/A | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | | 0 | |
| TIME_STAMP | 24.3 | RO | N/A | | | 0 | |
| SUBCODE | 24.4 | RO | N/A | | | 0 | |
| VALUE | 24.5 | RO | N/A | | | 0 | |
| **Extended Parameters** | | | | | | | |
| In 5 IN_5 | 25 | | ALL | Status | BAD NC constant | | Data Type: DS-65 Input value and status. |
| | | | | Value | 0 | | |
| In 6 IN_6 | 26 | | ALL | Status | BAD NC constant | | Data Type: DS-65 Input value and status. |
| | | | | Value | 0 | | |
| In 7 IN_7 | 27 | | ALL | Status | BAD NC constant | | Data Type: DS-65 Input value and status. |
| | | | | Value | | | |
| In 8 IN_8 | 28 | | ALL | Status | BAD NC constant | | Data Type: DS-65 Input value and status. |
| | | | | Value | 0 | | |
| Disable Analog Input 5 DISABLE_5 | 29 | | ALL | Status | BAD NC constant | | Data Type: DS-66 Enable/Disable for Input_5, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated. |
| | | | | Value 0=Use 1=Disable | 0 | | |
| Disable Analog Input 6 DISABLE_6 | 30 | | ALL | Status | BAD NC constant 0 | | Data Type: DS-66 Enable/Disable for Input_6, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated. |
| | | | | Value 0=Use 1=Disable | 0 | | |

-Continued-

### Table 4-40. Input Selector Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Disable Analog Input 7 DISABLE_7 | 31 | | ALL | Value | BAD NC constant | Data Type: DS-66 Enable/Disable for Input_7, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated. |
| | | | | Status 0=Use 1=Disable | 0 | |
| Disable Analog Input 8 DISABLE_8 | 32 | | ALL | Value | BAD NC constant | Data Type: DS-66 Enable/Disable for Input_8, If parameter is TRUE then input is disabled. If parameter status is BAD it is not evaluated. |
| | | | | Status 0=Use 1=Disable | 0 | |
| Number used to average AVG_USE | 33 | | | 1 to 8 | 0 | Data Type: Unsigned8 Number used to average the output. The number of min and max dropped is the number of inputs minus AVG_USE. |
| Alarm Summary ALARM_SUM | 34 | | | | | Data Type: DS-74 Current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block. |
| CURRENT | 34.1 | RO | NA | 1: Hi Hi 2: Hi 3: Lo Lo 4: Lo | | |
| UNACKNOWLEDGED | 34.2 | RO | NA | | | |
| UNREPORTED | 34.3 | RO | NA | | | |
| DISABLED | 34.4 | RW | ALL | | | |
| Acknowledge Option ACK_OPTION | 35 | | ALL | 1: Hi Hi 2: Hi 3: Lo Lo 4: Lo | 0 | Data Type: Bit String Selection of whether alarms associated with the block will be automatically acknowledged. 0=Disable 1=Enable |
| Alarm Hysteresis ALARM_HYS | 36 | | ALL | 0 to 50% | 0.50% | Data Type: Float Hysteresis on alarms |
| High High Priority HI_HI_PRI | 37 | | ALL | 0 TO 15 | 0 | Data Type: Unsigned8 Priority of the alarm |
| High High Limit HI_HI_LIM | 38 | | ALL | | 0 | Data Type: Float Value of analog input which will generate an alarm |
| High Priority HI_PRI | 39 | | ALL | 0 TO 15 | 0 | Data Type: Unsigned8 Priority of the alarm |
| High Limit HI_LIM | 40 | | ALL | | 0 | Data Type: Float Value of analog input which will generate an alarm |
| Low Priority LO_PRI | 41 | | ALL | 0 TO 15 | 0 | Data Type: Unsigned8 Priority of the alarm |
| Low Limit LO_LIM | 42 | | ALL | | 0 | Data Type: Float Value of analog input which will generate an alarm |
| Low Low Priority LO_LO_PRI | 43 | | ALL | 0 TO 15 | 0 | Data Type: Unsigned8 Priority of the alarm |
| Low Low Limit LO_LO_LIM | 44 | | ALL | | 0 | Data Type: Float Value of analog input which will generate an alarm |
| High High Alarm HI_HI_ALM | 45 | | | | | Data Type: DS-71 The high high alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm. |
| UNACKNOWLEDGED | 45.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0 | |
| ALARM_STATE | 45.2 | RO | N/A | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | 0 | |
| TIME_STAMP | 45.3 | RO | N/A | | 0 | |
| SUBCODE | 45.4 | RO | N/A | | 0 | |
| VALUE | 45.5 | RO | N/A | | 0 | |

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Table 4-40. Input Selector Function Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO / RW | Block<br>Mode | Range | Initial<br>Value | Description |
|---|---|---|---|---|---|---|
| High Alarm<br>HI_ALM | 46 | | | | | |
| UNACKNOWLEDGED | 46.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0 | Data Type: DS-71<br>The high alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm. |
| ALARM_STATE | 46.2 | RO | N/A | 0=Undefined<br>1=Clear reported<br>2=Clear not reported<br>3=Active reported<br>4=Active not reported | 0 | |
| TIME_STAMP | 46.3 | RO | N/A | | 0 | |
| SUBCODE | 46.4 | RO | N/A | | 0 | |
| VALUE | 46.5 | RO | N/A | | 0 | |
| Low Alarm<br>LO_ALM | 47 | | | | | |
| UNACKNOWLEDGED | 47.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0 | Data Type: DS-71<br>The low alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm. |
| ALARM_STATE | 47.2 | RO | N/A | 0=Undefined<br>1=Clear reported<br>2=Clear not reported<br>3=Active reported<br>4=Active not reported | 0 | |
| TIME_STAMP | 47.3 | RO | N/A | | 0 | |
| SUBCODE | 47.4 | RO | N/A | | 0 | |
| VALUE | 47.5 | RO | N/A | | 0 | |
| Low Low Alarm<br>LO_LO_ALM | 48 | | | | | |
| UNACKNOWLEDGED | 48.1 | RW | N/A | 0=Undefined<br>1=Acknowledged<br>2=Unacknowledged | 0 | Data Type: DS-71<br>The low low alarm data, which includes a value of the alarm, a timestamp of occurrence, and the state of the alarm. |
| ALARM_STATE | 48.2 | RO | N/A | 0=Undefined<br>1=Clear reported<br>2=Clear not reported<br>3=Active reported<br>4=Active not reported | 0 | |
| TIME_STAMP | 48.3 | RO | N/A | | 0 | |
| SUBCODE | 48.4 | RO | N/A | | 0 | |
| VALUE | 48.5 | RO | N/A | | 0 | |
| Output Discrete<br>OUT_D | 49 | | MAN<br>OOS | Status<br>Value<br>0, 1 | | Data Type: DS-66<br>Discrete output to indicate a selected alarm value |
| Alarm Select<br>ALM_SEL | 50 | | ALL | Status<br>1: Hi Hi<br>2: Hi<br>3: Lo Lo<br>4: Lo | All bits:0 | Data Type: Bit String<br>Used to select the process alarm conditions that will cause the OUT_D parameter to be set. |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-41. ISEL Function Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | OUT |
| 11 | IN_1 |
| 12 | IN_2 |
| 13 | IN_3 |
| 14 | IN_4 |
| 15 | DISABLE_1 |
| 16 | DISABLE_2 |
| 17 | DISABLE_3 |
| 18 | DISABLE_4 |
| 21 | SELECTED |
| 22 | OP_SELECT |
| 25 | IN_5 |
| 26 | IN_6 |
| 27 | IN_7 |
| 28 | IN_8 |
| 29 | DISABLE_5 |
| 30 | DISABLE_6 |
| 31 | DISABLE_7 |
| 32 | DISABLE_8 |
| 34.1 | ALARM_SUM.CURRENT |
| 34.2 | ALARM_SUM.UNACKNOWLEDGED |
| 34.3 | ALARM_SUM.UNREPORTED |
| 34.4 | ALARM_SUM.DISABLED |

Table 4-42. ISEL Function Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 8 | OUT_RANGE |
| 9.1 | GRANT_DENY.GRANT |
| 9.2 | GRANT_DENY.DENY |

Table 4-43. ISEL Function Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | OUT |
| 11 | IN_1 |
| 12 | IN_2 |
| 13 | IN_3 |
| 14 | IN_4 |
| 15 | DISABLE_1 |
| 16 | DISABLE_2 |
| 17 | DISABLE_3 |
| 18 | DISABLE_4 |
| 21 | SELECTED |
| 22 | OP_SELECT |
| 25 | IN_5 |
| 26 | IN_6 |
| 27 | IN_7 |
| 28 | IN_8 |
| 29 | DISABLE_5 |
| 30 | DISABLE_6 |
| 31 | DISABLE_7 |
| 32 | DISABLE_8 |
| 34.1 | ALARM_SUM.CURRENT |
| 34.2 | ALARM_SUM.UNACKNOWLEDGED |
| 34.3 | ALARM_SUM.UNREPORTED |
| 34.4 | ALARM_SUM.DISABLED |
| 49 | OUT_D |

Table 4-44. ISEL Function Block, View 4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 10 | STATUS_OPTS |
| 19 | SELECT_TYPE |
| 20 | MIN_GOOD |
| 33 | AVG_USE |
| 35 | ACK_OPTION |
| 36 | ALARM_HYS |
| 37 | HI_HI_PRI |
| 38 | HI_HI_LIM |
| 39 | HI_PRI |
| 40 | HI_LIM |
| 41 | LO_PRI |
| 42 | LO_LIM |
| 43 | LO_LO_PRI |
| 44 | LO_LO_LIM |
| 50 | ALM_SEL |

# Field Communicator Menu Structure

**INPUT SELECTOR FUNCTION BLOCK**

**Quick Config**

Alert Key
Min Good
Output Range: EU at 100%
Output Range: EU at 0%
Output Range: Units Index
Output Range: Decimal
Select Type

**Common Config**

Min Good
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Output Range: EU at 100%
Output Range: EU at 0%
Output Range: Units Index
Output Range: Decimal
Select Type

**Advanced Config**

Alert Key
Static Revision
Status Options
Strategy

**Connectors**

Disable Analog Input 1: Status
Disable Analog Input 1: Value
Disable Analog Input 2: Status
Disable Analog Input 2: Value
Disable Analog Input 3: Status
Disable Analog Input 3: Value
Disable Analog Input 4: Status
Disable Analog Input 4 : Value
Input 1: Status
Input 1: Value
Input 2: Status
Input 2: Value
Input 3: Status
Input 3: Value
Input 4: Status
Input 4: Value
Operator Select: Status
Operator Select: Value
Output: Status
Output: Value
Selected: Status
Selected: Value

**Online**

Block Error
Disable Analog Input 1: Status
Disable Analog Input 1: Value
Disable Analog Input 2: Status
Disable Analog Input 2: Value
Disable Analog Input 3: Status
Disable Analog Input 3: Value
Disable Analog Input 4: Status
Disable Analog Input 4: Value
Input 1: Status
Input 1: Value
Input 2: Status
Input 2: Value
Input 3: Status
Input 3: Value
Input 4: Status
Input 4: Value
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Operator Selected: Status
Operator Selected: Value
Output: Status
Output: Value
Selected: Status
Selected: Value

**Status**

Block Error

**All**

Characteristics
Static Revision
Tag Description
Strategy
Alert Key
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Block Error
Output: Status
Output: Value
Output Range: EU at 100%
Output Range: EU at 0%
Output Range: Units Index
Output Range: Decimal
Grant Deny: Grant
Grant Deny: Deny
Status Options
Input 1: Status
Input 1: Value
Input 2: Status
Input 2: Value
Input 3: Status
Input 3: Value
Input 4: Status
Input 4: Value
Disable Analog Input 1: Status
Disable Analog Input 1: Value
Disable Analog Input 2: Status
Disable Analog Input 2: Value
Disable Analog Input 3: Status
Disable Analog Input 3: Value
Disable Analog Input 4: Status
Disable Analog Input 4: Value
Select Type
Min Good
Selected: Status
Selected: Value
Operator Select: Status
Operator Select: Value
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Analog Input 5: Status
Analog Input 5: Value
Analog Input 6: Status
Analog Input 6: Value
Analog Input 7: Status
Analog Input 7: Value
Analog Input 8: Status
Analog Input 8: Value
Disable Analog Input 5: Status
Disable Analog Input 5: Value
Disable Analog Input 6: Status
Disable Analog Input 6: Value
Disable Analog Input 7: Status
Disable Analog Input 7: Value
Disable Analog Input 8: Status
Disable Analog Input 8: Value
Number Used to average

**All continued**

Alarm Summary: Current
Alarm Summary: Unacknowledged
Alarm Summary: Unreported
Alarm Summary: Disabled
Acknowledge Option
Alarm Hysteresis
High High Priority
High High Limit
High Priority
High Limit
Low Priority
Low Limit
Low Low Priority
Low Low Limit
High High Alarm: Unacknowledged
High High Alarm: Alarm State
High High Alarm: Time Stamp
High High Alarm: Subcode
High High Alarm: Float Value
High Alarm: Unacknowledged
High Alarm: Alarm State
High High Alarm: Time Stamp
High Alarm: Subcode
High Alarm: Float Value
Low Alarm: Unacknowledged
Low Alarm: Alarm State
Low Alarm: Time Stamp
Low Alarm: Subcode
Low Alarm: Float Value
Low Low Alarm: Unacknowledged
Low Low Alarm: Alarm State
Low Low Alarm: Time Stamp
Low Low Alarm: Subcode
Low Low Alarm: Float Value
Alarm Output: Status
Alarm Output: Value
Alarm Select

# Output Splitter Function Block

## Overview

The Output Splitter (OS) block (figure 4-16) provides the capability to drive two control outputs from a single input. Each output is a linear function of some portion of the input. Back calculation support is provided using the same linear function in reverse. Cascade initialization is supported by a decision table for combinations of input and output conditions.

Figure 4-16. Output Splitter (OS) Function Block
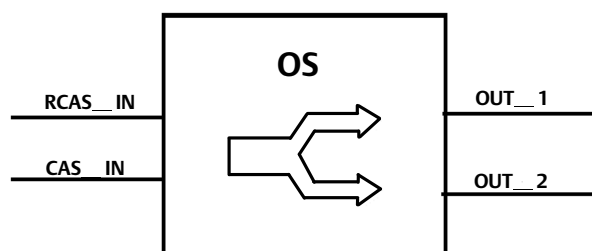


This block is normally used in split ranging or sequencing of multiple valve applications. A typical split range application has both valves closed when the splitter input is 50%. One valve opens fully as the input drops to 0%. The other valve opens as the input rises above 50%.

A typical sequencing application has both valves closed at 0% input. One valve fully opens as the input rises to 50% and the other stays shut. The second valve opens as the input rises above 50%, and the first valve may remain open or shut off quickly.

Because this block is in the control path, it is able to pass limit and cascade initialization information back to the upstream block. Table 4-48 lists the OS block parameters and their descriptions, units of measure, and index numbers. Figures 4-17 and 4-18 illustrate the internal components of the OS function block.

Figure 4-17. Output Splitter Function Block Schematic
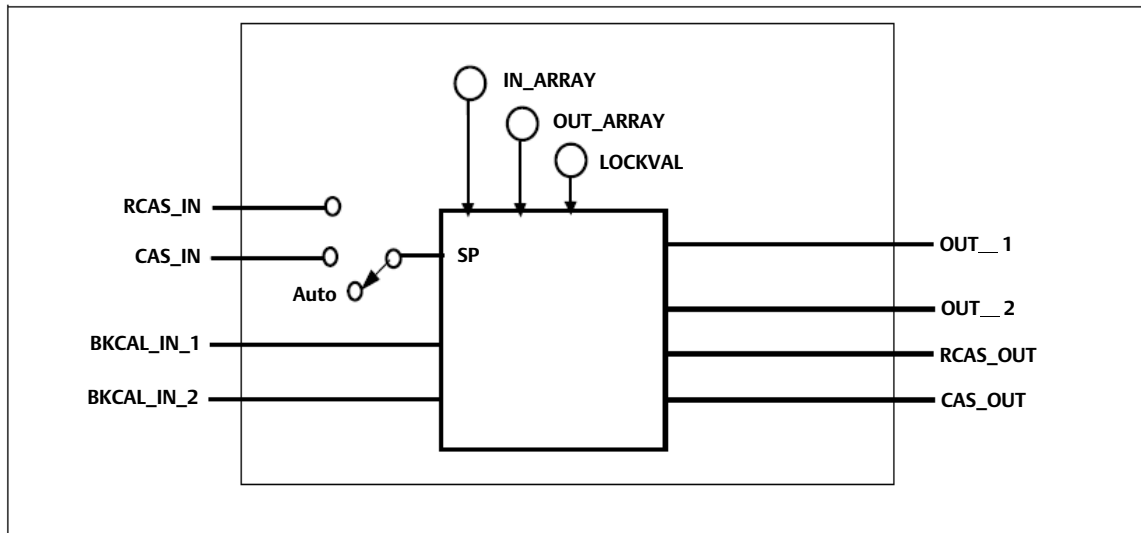


Figure 4-18. Output Splitter Function Block Schematic Diagram
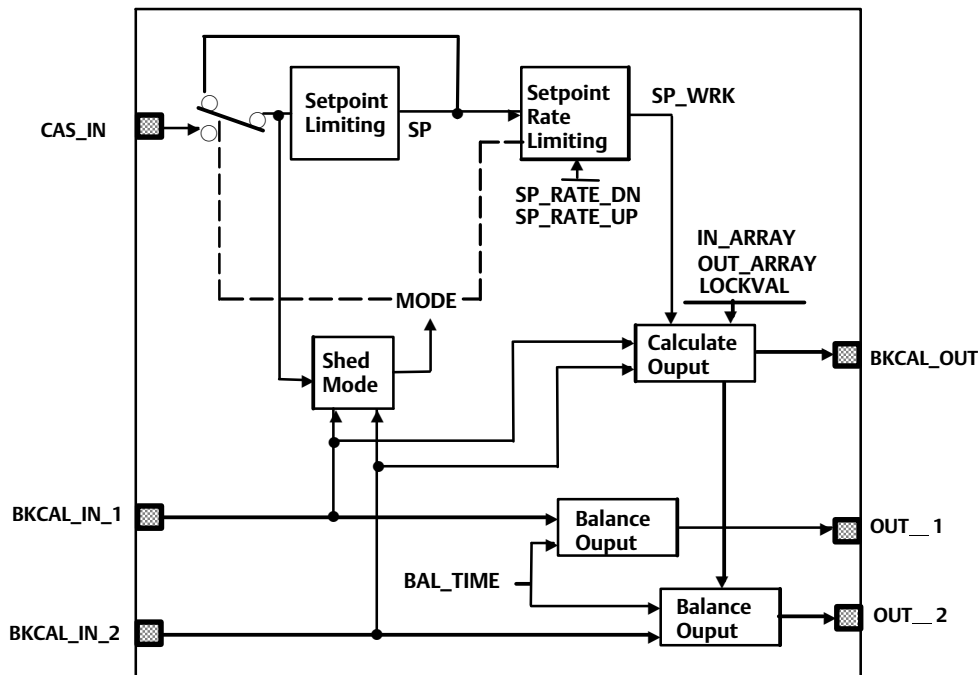


# Modes

The Output Splitter function block supports the following actual modes:

- **Out of Service (OOS)**—The block is not processed. FIELD_VAL and PV are not updated and the OUT status is set to Bad: Out of Service. The BLOCK_ERR parameter shows Out of Service. In this mode, you can make changes to all configured parameters.

By using permitted mode the target mode of a block may be restricted to one or more of the following modes: Cas, Auto or OOS.

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**Note**

The output splitter function block must be in Auto for the mode to go to CAS.

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- **Initialization Manual (IMan)**—The output path is not complete (for example, the cascade-to-slave path might not be open). In IMan mode, OUT tracks BKCAL_IN, which allows for bumpless transfer of control.

- **Automatic (Auto)**—The block outputs (OUT_1 and OUT_2) reflect the target operating point specified by the setpoint (SP) parameter.

- **Cascade (Cas)**—The SP parameter is set by another function block through a connection to CAS_IN. The SP value is used to set the OUT parameters automatically. This is the most frequently used mode in this block.

The block's normal mode is Cascade (Cas). You can isolate the block for testing by using Automatic (Auto) mode and adjusting the setpoint.

When a block attached to an output requests initialization, one of the following actions might occur:

- When the other output is not in Cas mode, the block attached to the input is initialized.

- When the other output is in Cas mode, this output returns to the value calculated from its slope in a specified time period.

# Status Handling

Sub-status value received at CAS_IN [14] is passed to both outputs, except for those used in the cascade handshake. An IFS goes to both outputs. The status option IFS if Bad CAS_IN is available.

If the Status Option to Propagate failure is set, the block propagates device failure only if both BKCAL_IN show failed status. Otherwise the upstream cascade would be broken by a failure at either output.

The statuses of OUT_1 [8] and OUT_2 [9] are determined by the statuses of BKCAL_IN_1 and BKCAL_IN_2 and the actual mode of the block.

When a BKCAL_IN input sees that its downstream block is not in Cas mode, the Splitter function block sets the corresponding OUT value to the BKCAL_IN value. However, this may not be the same value that is calculated by the splitter algorithm. When the mode of the downstream block is changed to Cas, the difference between the calculated output and the back-calculation input is computed and the difference is added to the calculated output. Next, the difference is reduced to zero over the time defined by the BAL_TIME parameter.

When both BKCAL_IN_1 and BKCAL_IN_2 indicate that the downstream blocks are not in Cas mode or have Bad status, the first downstream block that goes to Cas mode causes the upstream block to initialize so that there is no difference between the calculated output and the back-calculation input. This provides bumpless transfer for the first downstream block.

# Limit Handling

The splitter function block is designed to combine the limit information from the two downstream blocks into limits for the upstream block. The general principle is to allow the upstream block to continue control for as long as possible.

The upstream block is high-limited (BKCAL_OUT of the Splitter block has high-limited status) when:

- Both downstream blocks are high-limited (both BKCAL_INS of the Splitter block have high-limited status)

or

- One downstream block is high-limited, the associated output slope is positive, and the other block has Bad status or is not in Cas mode

or

- One downstream block is low-limited, the associated output slope is negative, and the other block has Bad status or is not in Cas mode

or

- SP is greater than or equal to X22

The upstream block is low-limited when:

- Both downstream blocks are low-limited

or

- One downstream block is low-limited, the associated output slope is positive, and the other block has Bad status or is not in Cas mode

or

- One downstream block is high-limited, the associated output slope is negative, and the other block has Bad status or is not in Cas mode

or

- SP is less than or equal to X11

# Input to Output Mapping

The relationship of each output to the input may be defined by a line. Each line may be defined by its endpoints. Examples of graphical representations of OUT_1 and OUT_2 vs. SP are shown in figure 4-19 for a split range and a sequencing application.

The block has the same SP structure as the PID block, except that there is no limiting applied to the SP. The SP may be used in Auto mode for testing. The operator would use the output of the PID to accomplish the same purpose. Each downstream block can be taken out of cascade if it becomes necessary to gain control of them.

The examples shown in figure 4-19 do not show the full range of possibilities. The lines could overlap like an X, or both start from the origin but have different slopes. The endpoints do not have to lie within 0-100%. Limits in the external

blocks may effect the useful range of a line. Units of percent are used in the examples because the common application of this block is to valves, but any units may be used to suit the application.

Figure 4-19. Split Range and Sequence Operation
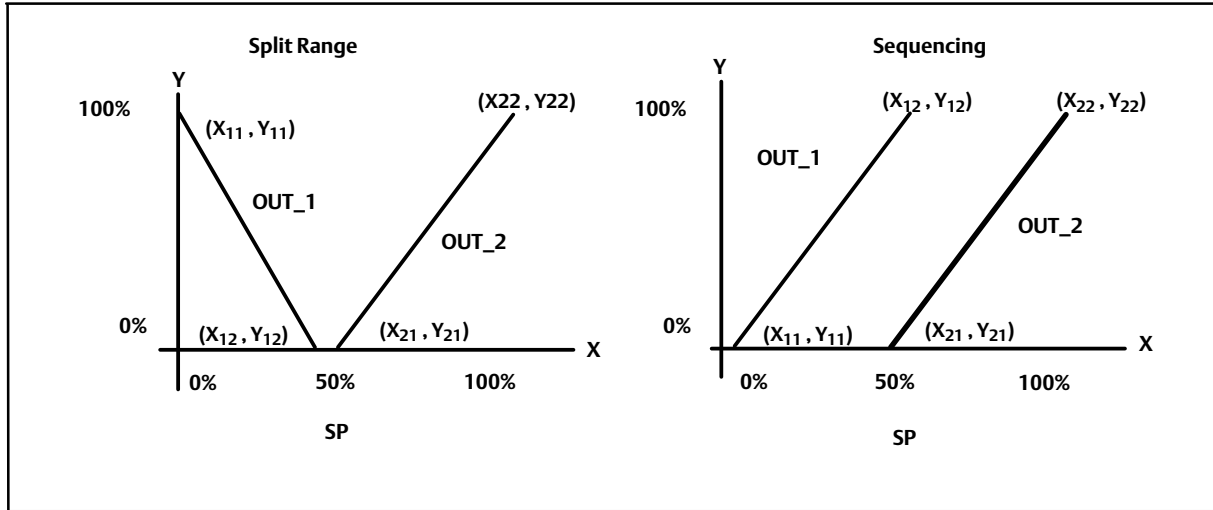


The following parameters as paired coordinates are used to specify the output splitter operation:

$X_{11}, Y_{11}, X_{12}, Y_{12}$

$X_{21}, Y_{21}, X_{22}, Y_{22}$

Where $X_{nJ}$ is the value of SP associated with OUT_n and $X_{n1}$ and $X_{n2}$ refer to the 1st and 2nd coordinates of the nth curve respectively. $Y_{nJ}$ is the value of OUT_n and $Y_{n1}$ and $Y_{n2}$ refer to the 1st and 2nd coordinates of the nth curve respectively.

By specifying the coordinates as shown in tables 4-45 and 4-46, the endpoints of the lines are defined. The contents of the respective X's are held in the IN_ARRAY parameter and the contents of the respective Y's are held in the OUT_ARRAY parameter. If a set of points are specified such that a region of the input range is not specified, then the corresponding OUT_n will be set to the closest endpoint of the input value, either high or low, when the specified region is exceeded.

Table 4-45. IN_ARRAY Coordinates

| Index | Coordinate |
|-------|------------|
| 0 | $X_{11}$ - Start value of SP for the OUT_1 line. ($X_{11} < X_{12}$) |
| 1 | $X_{12}$ - End value of SP for the OUT_1 line. ($X_{11} < X_{12}$) |
| 2 | $X_{21}$ - Start value of SP for the OUT_2 line. ($X_{21} < X_{22}$) |
| 3 | $X_{22}$ - End value of SP for the OUT_2 line. ($X_{21} < X_{22}$) |

Table 4-46. OUT_ARRAY Coordinates

| Index | Coordinate |
|-------|------------|
| 0 | $Y_{11}$ - Value of OUT_1 at $X_{11}$ |
| 1 | $Y_{12}$ - Value of OUT_1 at $X_{12}$ |
| 2 | $Y_{21}$ - Value of OUT_2 at $X_{21}$ |
| 3 | $Y_{22}$ - Value of OUT_2 at $X_{22}$ |

A configuration error is set in BLOCK_ERR and the actual mode of the block goes to Out of Service if the X values have any of the following conditions: $X_{21} < X_{11}$, $X_{12} <= X_{11}$, $X_{22} <= X_{21}$.

Refer to figure 4-20 for an example of LOCKVAL = true, and figure 4-21 for an example of LOCKVAL = false. The parameter LOCKVAL provides an option to specify whether OUT_1 remains at its ending level when control is switched

to OUT_2, or goes to $Y_{11}$. If LOCKVAL is true, OUT_1 remains at its ending value when X is greater than $X_{12}$. If LOCKVAL is false, then OUT_1 goes to $Y_{11}$ when X is greater than $X_{12}$.

Figure 4-20. OUT with LOCKVAL True
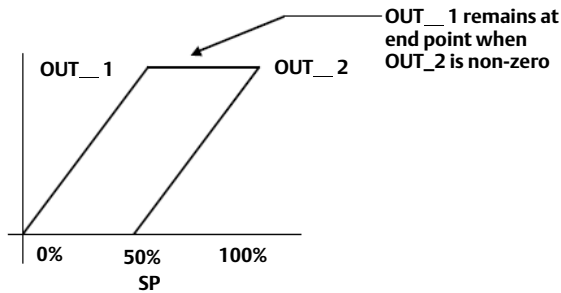


Figure 4-21. OUT with LOCKVAL False
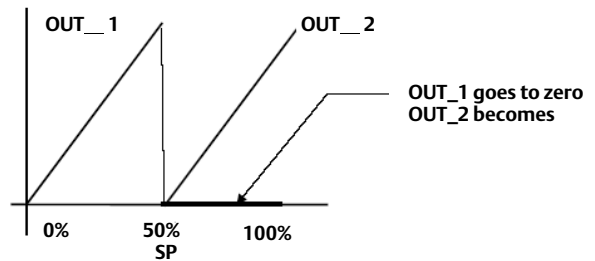


Some hysteresis in the switching point may be required because the output may change by a full stroke of the valve. HYSTVAL [12] contains the amount of hysteresis. If X <= X12-HYSTVAL, OUT_1 may be determined by the calculated y value. If X12-HYSTVAL < X < X12 and X has not reached X12 since it was less than X12-HYSTVAL, OUT_1 may be determined by the calculated y value. If X12-HYSTVAL < X < X12 and X has reached X12 since it was less than X12-HYSTVAL, OUT_1 may be determined by the LOCKVAL setting. If X12 < X, OUT_1 may be determined by the LOCKVAL setting.

# Initialization and Back Calculation Requirements

Refer to figure 4-22, Output Splitter Configuration, where:

   PID1 = Upstream driving controller or function block.

   Splitter = Split range function block being described.

   AO = Receiver of OUT_1 for 0-50% range of SP

   PID2 = Receiver of OUT_2 for 50-100% range of SP

Figure 4-22. Output Splitter Configuration
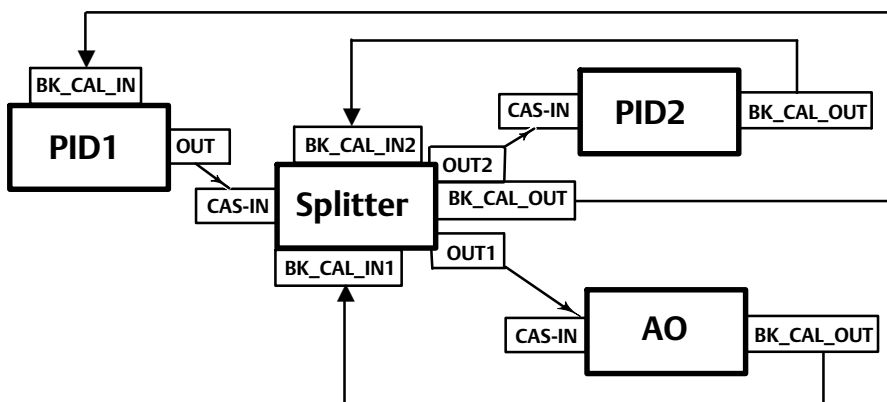
CAS_IN of the Splitter receives the OUT of PID1. BKCAL_IN of PID1 receives BKCAL_OUT of the Splitter. CAS_IN of the AO receives OUT_1 of the Splitter and PID2 receives OUT_2 of the Splitter. BKCAL_IN_1 of the Splitter receives BKCAL_OUT of the AO and BKCAL_IN_2 of the Splitter receives BKCAL_OUT of PID2.

The discussion in this section defines the behavior which is used to handle  the initial value calculation and status which can in turn be sent to PID1. This behavior is defined in such a way that no "bumps" are generated by changing modes, and that PID1 does not wind up.

The splitter utilizes special handling for cascade initialization because it has two independent outputs. When a downstream block indicates to the splitter that it wants to initialize, by asserting IR (initialization request) on its BKCAL_OUT, one of two things happens. Under some circumstances, it is possible to pass an initialization request from a downstream block back up to the block upstream of the splitter, so that all three blocks balance for bumpless transfer to cascade mode. Otherwise, the requested splitter output goes to the requested value by placing an internal offset between that output and the output of the curve, and then ramping that offset to zero in BAL_TIME seconds after the cascade is made up.

The splitter normally runs with both outputs connected to blocks in cascade mode. If one or both of the blocks is not in cascade mode, special limiting action is taken. Specifically, if one block indicates that it is not in cascade by NI (not invited) status on its BKCAL_OUT, then the BKCAL_OUT of the splitter asserts limits at the range extremes of the block that is still in cascade mode. Even if the upstream controller does not want to operate in that range, there will be no reset windup when it can move into the range. If both downstream blocks show NI, then the splitter can only wait until one of them requests cascade initialization. BKCAL_OUT of the splitter can hold the upstream block at the value of the SP. The actual mode is IMan.

When cascade initialization is requested, by IR substatus on a BKCAL_IN, it is first necessary to determine if the other BKCAL_IN has NI substatus. If so, the value at the BKCAL_IN asserting IR is taken as the Y value for its curve, and the resulting X value is sent on BKCAL_OUT to PID1. If the other substatus is OK, then the internal offset and BAL_TIME is used. If both blocks have IR substatus, then one output is processed until its cascade is closed. The choice is based on the presence of limit status in BKCAL_IN. If BKCAL_IN_1 is limited, then if BKCAL_IN_2 is not limited then OUT_2 is processed first, else OUT_1 is processed first.

Cascade initialization is also required when the block transitions from Auto to Cas mode. This action is identical to that described for the PID block.

The required actions are summarized in table 4-47.

Table 4-47. OUT_ARRAY Coordinates

| BKCAL_IN_1 | BKCAL_IN_2 | BKCAL_OUT | Action |
|---|---|---|---|
| NI | NI | NI | Not Specified |
| NI | OK | OK | BKCAL_OUT limited to X21 low and X22 high |
| OK | NI | OK | BKCAL_OUT limited to X11 and X12 high |
| IR | NI | IR | Initialize cascade to value given by curve X1 vs Y1 |
| IR | OK | OK | Initialize OUT_1 using internal offset from Y1 |
| NI | IR | IR | Initialize cascade to value given by curve X2 vs Y2 |
| OK | IR | OK | Initialize OUT_2 using internal offset from Y2 |
| Note 1: OK means the cascade is closed. Note 2: Recommend using the average of BKCAL_IN_1 and BKCAL_IN_2, or just SP. | | | |

The BKCAL_OUT status shows limited high if an increase in SP cannot be effectively passed on to either output because the BKCAL_IN_n of both outputs indicates that a move in the needed direction is limited. Similarly, limited low is set if a decrease in SP cannot be effectively passed on to either output. The slope of the limited line(s) affects the limit direction. BKCAL_OUT also shows limit status at the X extremes X11 and X22.

Initialization is not automatic under all circumstance because some situations have conflicting needs. In general, when a control region is in trouble, the upstream controller is limited so it will not drive further into that region. When you want to move to the other active region, you can put the upstream controller into Man mode and move it, or you can

drop the good downstream block out of Cas mode for one evaluation cycle and then restore Cas mode. This initializes the upstream controller to the remaining good region of control.

# OS Function Block Parameter List (table 4-48)

- Read/Write Capability: RO - Read Only, RW - Read Write

- Mode: The block mode(s) required to write to the parameter

- Double indentation and shaded Index Number indicates sub-parameter

Table 4-48. Output Splitter Function Block Parameter Definitions

| Label<br>PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision<br>ST_REV | 1 | RO | N/A | 0 to 65535 | 0 | Data Type: Unsigned16<br>The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. |
| Tag Description<br>TAG_DESC | 2 | RW | ALL | 7 bit ASCII | Spaces | Data Type: Octet String<br>The user description of the intended application of the block. |
| Strategy<br>STRATEGY | 3 | RW | ALL | 0 to 65535 | 0 | Data Type: Unsigned 16:<br>The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |
| Alert Key<br>ALERT_KEY | 4 | RW | ALL | 1 to 255 | 0 | Data Type: Unsigned8<br>The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| Block Mode<br>MODE_BLK | 5 | | | | | Data Type: DS-69<br>The actual, target, permitted, and normal modes of the block.<br>    Target: The requested block mode<br>    Actual: The current mode of the block<br>    Permitted: Allowed modes for Target<br>    Normal: Most common mode for Target |
| TARGET | 5.1 | RW | | 7:OOS<br>3:AUTO<br>2:CAS | OOS until block configured, then last valid target | |
| ACTUAL | 5.2 | RO | | | OOS | |
| PERMITTED | 5.3 | RW | | OOS+AUTO+CAS | OOS AUTO CAS | |
| NORMAL | 5.4 | RW | | | AUTO+CAS | |
| Block Error<br>BLOCK_ERR | 6 | RO | N/A | 1: Block Configuration Error<br>7: Input Failure/Bad PV Status<br>8: Output Failure<br>14: Power-up<br>15: Out-of-Service | Dynamic | Data Type: Bit String<br>0=Inactive<br>1=Active<br>This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. |
| Setpoint<br>SP | 7 | | | PV_SCALE +/- 10% | | Data Type: DS-65<br>Analog setpoint of the block |
| Output 1<br>OUT_1 | 8 | | MAN OOS | OUT_SCALE<br> +/- 10% | | Data Type: DS-65<br>The primary analog output value calculated as a result of executing the function (the first output value and status). |
| Output 2<br>OUT_2 | 9 | | MAN OOS | OUT_SCALE<br>+/- 10% | | Data Type: DS-65<br>The primary analog output value calculated as a result of executing the function (the second output value and status). |
| Output 1 Range<br>OUT_1_RANGE | 10 | RO | | EU at 100%<br>EU at 0 %<br>Unit Index<br>Decimal Point | 100<br>0<br>%<br>2 | Data Type: DS-68<br>The high and low scale values, engineering units code, and number of decimal places to be used in displaying the OUT value, this parameter has no effect on this block. |

-Continued-

Table 4-48. Output Splitter Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Output 2 Range OUT_2_RANGE | 11 | RO | | EU at 100% EU at 0 % Unit Index Decimal Point | 100 0 % 2 | Data Type: DS-68 The high and low scale values, engineering units code, and number of decimal places to be used in displaying the OUT value, this parameter has not effect on this block. |
| Grant Deny GRANT_DENY | 12 | | | | | Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters of the block. GRANT:0=N/A, 1=granted DENY: 0=N/A, 1= denied |
| GRANT | 12.1 | | N/A | 0: Program 1: Tune | All bits: 0 | |
| DENY | 12.2 | | N/A | 2: Alarm 3: Local | All bits: 0 | |
| Status Options STATUS_OPTS | 13 | | OOS | 1: IFS if BAD CAS_IN | All bits: 0 | Data Type: Bit String 0=Disabled 1=Enabled User option for status |
| Cascade Input CAS_IN | 14 | | | Status | BAD: NC: const | Data Type: DS-65 The remote setpoint from another block. |
| | | | | Value | 0 | |
| Back Calculation Output BKCAL_OUT | 15 | RO | | Status Limits | | Data Type: DS-65 Output value to another block for backwards output tracking. |
| Input Array IN_ARRAY | 16 | | | | All: 0 | Data Type: Float Used with OUT_ARRAY to map input to output. See Input to Output Mapping, page 139. |
| Output Array OUT_ARRAY | 17 | | | | All: 0 | Data Type: Float Used with IN_ARRAY to map input to output. See Input to Output Mapping, page 139. |
| Lockval LOCKVAL | 18 | | | 0=Undfined 1=no lock 2=lock | 0= Undefined | Data Type: Enum Used with OUT_ARRAY to map input to output. See Input to Output Mapping, page 139. |
| Back Calculation Input 1 BKCAL_1_IN | 19 | | | Status | BAD: NC: const | Data Type: DS-65 The value and status reflecting the BKCAL_OUT of the lower block associated with OUT_1. It is used for initialization and to prevent windup in upstream blocks. |
| | | | | Value | 0 | |
| Back Calculation Input 2 BKCAL_2_IN | 20 | | | Status | BAD: NC: const | Data Type: DS-65 The value and status reflecting the BKCAL_OUT of the lower block associated with OUT_2. It is used for initialization and to prevent windup in upstream blocks. |
| | | | | Value | 0 | |
| Balance Time BAL_TIME | 21 | | | Positive | 0 | Data Type: Float Specifies the time for the internal working value of bias or ratio to return to the operator set bias or ratio, in seconds. |
| Hystval HYSTVAL | 22 | | | | | |
| Update Event UPDATE_EVT | 23 | RO | N/A | | | |
| UNACKNOWLEDGED | 23.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0= Undefined | Data Type: DS-73 This alert is generated by any change to the static data. |
| UPDATE STATE | 23.2 | RO | N/A | 0=Undefined 1=Update Reported 2=Updated not reported | 0= Undefined | |
| TIME_STAMP | 23.3 | RO | N/A | | 0 | |
| STATIC_REVISION | 23.4 | RO | N/A | | 0 | |
| RELATIVE_INDEX | 23.5 | RO | N/A | | 0 | |

-Continued-

Table 4-48. Output Splitter Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Block Alarm BLOCK_ALM | 24 | | | | | |
| UNACKNOWLEDGED | 24.1 | RW | N/A | 0: Undefined 1: Acknowledged 2: Unacknowledged | | Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure, or system problems in the block. The cause of the alert is entered in the subcode field. |
| ALARM_STATE | 24.2 | RO | N/A | 0: Undefined 1: Clear reported 2: Clear not reported 3: Active reported 4: Active not reported | | |
| TIME_STAMP | 24.3 | RO | N/A | | | |
| SUBCODE | 24.4 | RO | N/A | | | |
| VALUE | 24.5 | RO | N/A | | | |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-49. OS Function Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | SP |
| 8 | OUT_1 |
| 9 | OUT_2 |
| 14 | CAS_IN |

Table 4-50. OS Function Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 10 | OUT_1_RANGE |
| 11 | OUT_2_RANGE |
| 12.1 | GRANT_DENY.GRANT |
| 12.2 | GRANT_DENY.DENY |

Table 4-51. OS Function Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | SP |
| 8 | OUT_1 |
| 9 | OUT_2 |
| 14 | CAS_IN |
| 15 | BKCAL_OUT |
| 19 | BKCAL_1_IN |
| 20 | BKCAL_2_IN |

Table 4-52. OS Function Block, View 4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 13 | STATUS_OPTS |
| 16 | IN_ARRAY |
| 17 | OUT_ARRAY |
| 18 | LOCKVAL |
| 21 | BAL_TIME |

# Field Communicator Menu Structure

**OUTPUT SPLITTER FUNCTION BLOCK**

All

Characteristics
Static Revision
Tag Description
Strategy
Alert Key
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Block Error
Setpoint: Status
Setpoint: Value
Output 1: Status
Output 1: Value
Output 2: Status
Output 2: Value
Output 1 Range: EU at 100%
Output 1 Range: EU at 0%
Output 1 Range: Units Index
Output 1 Range: Decimal
Output 2 Range: EU at 100%
Output 2 Range: EU at 0%
Output 2 Range: Units Index
Output 2 Range: Decimal
Grant Deny: Grant
Grant Deny: Deny
Status Options
Cascade Input: Status
Cascade Input: Value
Back Calculation Output: Status
Back Calculation Output: Value
Input Array[1]
Input Array[2]
Input Array[3]
Input Array[4]
Output Array[1]
Output Array[2]
Output Array[3]
Output Array[4]
Lockval
Back Calculation Input 1: Status
Back Calculation Input 1: Value
Back Calculation Input 2: Status
Back Calculation Input 2: Value
Balance Time
Hystval
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value

# Analog Input Function Block

## Overview

The Analog Input (AI) function block (figure 4-23) processes field device measurements and makes them available to other function blocks. The output value from the AI block is in engineering units and contains a status indicating the quality of the measurement. The measuring device may have several measurements or derived values available in different channels. Use the channel number to define the variable that the AI block processes.

---

Figure 4-23. Analog Input (AI) Function Block



| | |
|---|---|
| **OUT** | **= THE BLOCK OUTPUT VALUE AND STATUS** |
| **OUT_D** | **= DISCRETE OUTPUT THAT SIGNALS A SELECTED ALARM CONDITION** |

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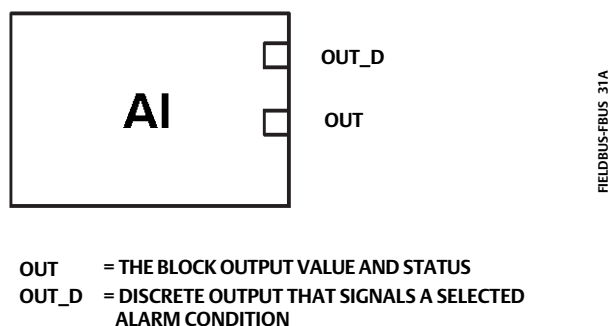
The AI block supports alarming, signal scaling, signal filtering, signal status calculation, mode control, and simulation. In Automatic mode, the block's output parameter (OUT [8]) reflects the process variable (PV [7]) value and status. In Manual mode, OUT [8] may be set manually. The Manual mode is reflected on the output status. A discrete output (OUT_D [37]) is provided to indicate whether a selected alarm condition is active. Alarm detection is based on the OUT [8] value and user specified alarm limits. Figure 4-24 illustrates the internal components of the AI function block, and table 4-57 lists the AI block parameters and their units of measure, descriptions, and index numbers.

## Modes

The AI function block supports three modes of operation as defined by the MODE_BLK [5] parameter:

- **Manual (Man)** The block output (OUT [8]) may be set manually.

- **Automatic (Auto)** OUT reflects the analog input measurement or the simulated value when simulation is enabled.

- **Out of Service (OOS)** The block is not processed. FIELD_VAL [19] and PV [7] are not updated and the OUT [8] status is set to Bad: Out of Service. The BLOCK_ERR [6] parameter shows Out of Service. In this mode, you can make changes to all configured parameters. The target mode of a block may be restricted to one or more of the supported modes.

## Alarm Detection

A block alarm will be generated whenever the BLOCK_ERR [6] has an error bit set. The types of block errors for the AI block are defined in table 4-55.

Figure 4-24. Analog Input Function Block Schematic
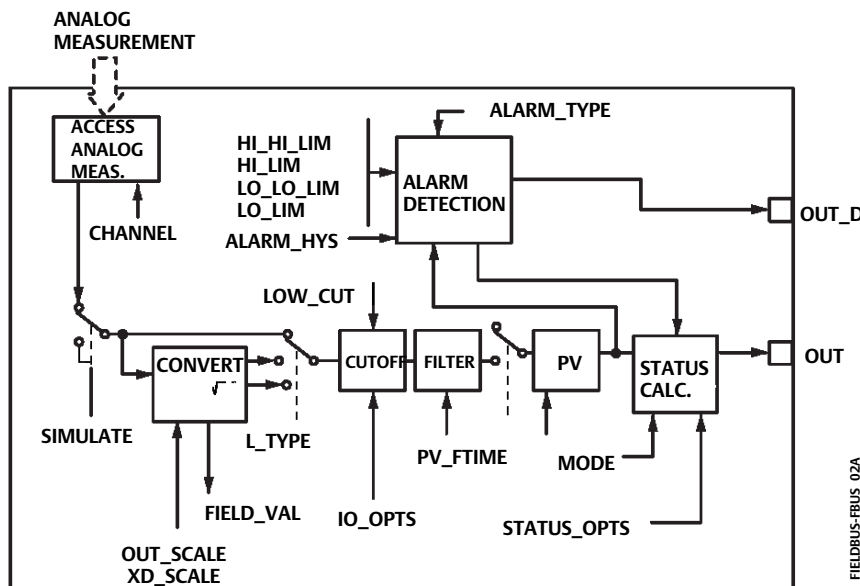


NOTES:
OUT     = BLOCK OUTPUT VALUE AND STATUS
OUT_D = DISCRETE OUTPUT THAT SIGNALS A SELECTED ALARM CONDITION.

Process Alarm detection is based on the OUT [8] value. You can configure the alarm limits of the following standard alarms:

- High (HI_LIM [28])
- High high (HI_HI_LIM [26])
- Low (LO_LIM [30])
- Low low (LO_LO_LIM [32])

In order to avoid alarm chattering when the variable is oscillating around the alarm limit, an alarm hysteresis in percent of the PV [7] span can be set using the ALARM_HYS [24] parameter. The priority of each alarm is set in the following parameters:

- HI_PRI [27]
- HI_HI_PRI [25]
- LO_PRI [29]
- LO_LO_PRI [31]

Alarms are grouped into five levels of priority, as shown in table 4-53.

Table 4-53. AI Function Block Alarm Priorities

| Priority Number | Priority Description[1] |
|---|---|
| 0 | The priority of an alarm condition changes to 0 after the condition that caused the alarm is corrected. |
| 1 | An alarm condition with a priority of 1 is recognized by the system, but is not reported to the operator. |
| 2 | An alarm condition with a priority of 2 is reported to the operator, but generally does not require operator attention (such as diagnostics and system alerts). |
| 3-7 | Alarm conditions of priority 3 to 7 are advisory alarms of increasing priority. |
| 8-15 | Alarm conditions of priority 8 to 15 are critical alarms of increasing priority. |
| 1. The priority classes "advise" and "critical" have no relationship to PlantWeb Alerts. | |

Table 4-54. Channel Selections for the Analog Input Function Block

| Channel | Parameter[1] | Block | Index Number | XD_SCALE Units |
|---|---|---|---|---|
| 2 | TRAVEL_TARGET | TB | 49 | % (1342) |
| 3 | FINAL_POSITION_VALUE | TB | 17 | % (1342) |
| 4 | TRAVEL | TB | 34 | % (1342) |
| 5 | SUPPLY_PRESS | TB | 35 | psig (1143), bar (1137), kPa (1133), inHg (1155), inH20 (1146), kg/cm2 (1145) |
| 6 | PRESSURE_A | TB | 36 | psig (1143), bar (1137), kPa (1133), inHg (1155), inH20 (1146), kg/cm2 (1145) |
| 7 | PRESSURE_B | TB | 37 | psig (1143), bar (1137), kPa (1133), inHg (1155), inH20 (1146), kg/cm2 (1145) |
| 8 | PRESSURE_DIFF | TB | 38 | psig (1143), bar (1137), kPa (1133), inHg (1155), inH20 (1146), kg/cm2 (1145) |
| 9 | DRIVE_SIGNAL | TB | 53 | % (1342) |
| 10 | TRAVEL_DEVIATION | TB | 52 | % (1342) |
| 11 | TEMPERATURE | TB | 48 | °C (1001), °F (1002) |
| 12 | CYCLE_COUNT | TB | 73 | no units (1588) |
| 13 | TRAVEL_ACCUMULATION | TB | 72 | % (1342) |

1. Refer to table 4-14 for transducer block parameter descriptions and table 4-25 for AO parameter descriptions.

# Status Handling

The AI block only gets Good Non-Specified Unlimited or Bad Device Failure for status from the transducer. This is reflected in FIELD_VAL.STATUS [19.1]. PV.STATUS [7.1] is the same as FIELD_VAL.STATUS [19.1]. OUT.STATUS [8.1] can also reflect Bad, Out of Service in addition to PV.STATUS [7.1] values.

In the STATUS_OPTS [14] parameter, you can select from the following options to control the status handling:

**Propagate Fail Forward**—If the status from the sensor is Bad, Device failure or Bad, Sensor failure, propogate it to OUT without generating an alarm. The use of these sub-status in OUT is determined by this option. Through this option, you may determine whether alarming (sending out an alert) will be done by the block or propagated downstream for alarming.

Figure 4-25. Analog Input Function Block Timing Diagram
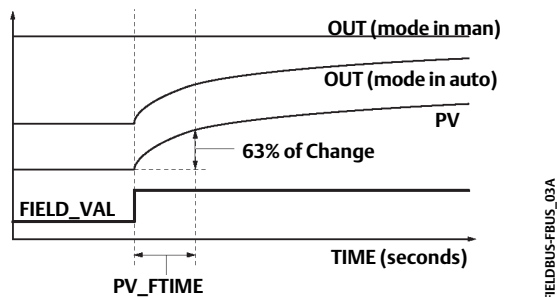


**Uncertain if in Manual mode**—The status of the Output is set to *Uncertain* when the mode is set to Manual.

**Note**

1. The instrument must be in Out of Service mode to set the status option.

2. The AI block only supports the Uncertain if in Manual and Propagate failure. Unsupported options are not grayed out; they appear on the screen in the same manner as supported options.

# Filtering

The filtering feature changes the response time of the device to smooth variations in output readings caused by rapid changes in input. You can adjust the filter time constant (in seconds) using the PV_FTIME [18] parameter. Set the filter time constant to zero to disable the filter feature.

# Signal Conversion

You can set the signal conversion type with the Linearization Type (L_TYPE [16]) parameter. You can view the converted signal (in percent of XD_SCALE [10]) through the FIELD_VAL [19] parameter.

$$FIELD\_VAL = \frac{100 \times (Channel\ Value) - EU \text{ *@0\%}}{(EU \text{ *@100\%} - EU \text{ *@0\%})}$$

*XD_SCALE values

You can choose from direct, indirect, or indirect square root signal conversion with the L_TYPE [16] parameter.

## Direct

Direct signal conversion allows the signal to pass through the accessed channel input value (or the simulated value when simulation is enabled).

PV = Channel Value

## Indirect

Indirect signal conversion converts the signal linearly to the accessed channel input value (or the simulated value when simulation is enabled) from its specified range (XD_SCALE [10]) to the range and units of the PV [7] and OUT [8] parameters (OUT_SCALE [11]).

$$PV = \left(\frac{FIELD\_VAL}{100}\right) \times (EU \text{ **@100\%} - EU \text{ **@0\%}) + EU \text{ **@0\%}$$

**OUT_SCALE values

## Indirect Square Root

Indirect Square Root signal conversion takes the square root of the value computed with the indirect signal conversion and scales it to the range and units of the PV [7] and OUT [8] parameters.

$$PV = \sqrt{\left(\frac{FIELD\_VAL}{100}\right)} \times (EU \text{ **@100\%} - EU \text{ **@0\%}) + EU \text{ **@0\%}$$

**OUT_SCALE values

When the converted input value is below the limit specified by the LOW_CUT [17] parameter, a value of zero is used for the converted value (PV [7]). This option is useful to eliminate false readings when the differential pressure measurement is close to zero.

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**Note**

Invert is the only I/O option supported by the AI block. You can set the I/O option in Out of Service mode only.

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# Advanced Features

The AI function block provided with the DVC6200f provides added capability through the addition of the following parameters:

ALARM_SEL—Allows one or more of the process alarm conditions detected by the AI function block to be used in setting its OUT_D [37] parameter.

OUT_D—Discrete output of the AI function block based on the detection of process alarm condition(s). This parameter may be linked to other function blocks that require a discrete input based on the detected alarm condition.

STDDEV and CAP_STDDEV— are diagnostic parameters that can be used to determine the variability of the process.

# Simulation

To support testing, you can either change the mode of the block to manual and adjust the output value, or you can enable simulation through the configuration tool and manually enter a value for the measurement value and its status. To enable simulation, you must first install the Simulate Enable jumper across the instrument AUX terminals (see page 13). Next you must use the configuration tool to enable the parameter SIMULATE [9].

With simulation enabled, the actual measurement value has no impact on the OUT [8] value or the status.

# Block Errors

Table 4-55 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are inactive for the AI block and are given here only for your reference.

Table 4-55. BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other* |
| 1 | **Block Configuration Error** - the selected channel carries a measurement that is incompatible with the engineering units selected in XD_SCALE, the L_TYPE parameter is not configured, or CHANNEL = zero. |
| 2 | *Link Configuration Error* |
| 3 | **Simulate Active** - Simulation is enabled and the block is using a simulated value in its execution. |
| 4 | *Local Override* |
| 5 | *Device Fault State* |
| 6 | *Device Needs Maintenance Soon* |
| 7 | **Input failure/process variable had Bad status** - The hardware is bad, or a bad status is being simulated |
| 8 | *Output failure* |
| 9 | *Memory failure* |
| 10 | *Lost Static Data* |
| 11 | *Lost NV Data* |
| 12 | *Readback Check Failed* |
| 13 | *Device Needs Maintenance Now* |
| 14 | **Power Up** - This condition exists until the AI function block executes for the first time. |
| 15 | **Out of Service** - The actual mode is Out of Service. |

# Troubleshooting

Refer to table 4-56 to troubleshoot any problem that you encounter.

Table 4-56. Troubleshooting

| Symptom | Possible Causes | Corrective Action |
|---|---|---|
| Mode will not leave OOS | Target mode is not set | Set target mode to something other than OOS |
| | Configuration error | BLOCK_ERR [6] will show the configuration error bit set. The following are parameters that must be set before the block is allowed out of OOS:<br><br>● CHANNEL [15] must be set to a valid value and cannot be left at initial value of 0.<br><br>● XD_SCALE [10]. UNITS_INDEX must match the units in the transducer block channel value.<br><br>● L_TYPE [16] must be set to Direct, Indirect, or Indirect Square Root and cannot be left at an initial value of 0. |
| | Resource block | The actual mode of the Resource block is OOS. See Resource Block Diagnostics for corrective action. |
| | Schedule | Block is not scheduled and therefore cannot execute to go to Target Mode. Schedule the block to execute. |
| Process and/or block alarms will not work | Features | FEATURES_SEL [18] in the resource block does not have Alerts enabled. Enable the Reports Supported bit. |
| | Notification | LIM_NOTIFY [32] in the resource block is not high enough. Set equal to MAX_NOTIFY [31], also in the resource block. |
| | Status Options | STATUS_OPTS [14] has Propagate Fault Forward bit set. This should be cleared to cause an alarm to occur. |
| Value of output does not make sense | Linearization Type | L_TYPE [16] must be set to Direct, Indirect, or Indirect Square Root and cannot be left at an initial value of 0. |
| | Scaling | Scaling parameters are set incorrectly:<br><br>● XD_SCALE.EU0 and EU100 should match that of the transducer block channel value.<br><br>● OUT_SCALE.EU0 and EU100 are not set properly. |
| Cannot set HI_LIMIT [28], HI_HI_LIMIT [26], LO_LIMIT [30], or LO_LO_LIMIT [32] VALUES | Scaling | Limit values are outside the OUT_SCALE.EU0 and OUT_SCALE.EU100 values. Change OUT_SCALE [11] or set values within range. |

# AI Function Block Parameter List (table 4-57)

● Read/Write Capability: RO - Read Only, RW - Read Write

● Mode: The block mode(s) required to write to the parameter

● Double indentation and shaded Index Number indicates sub-parameter

## Table 4-57. Analog Input Block Parameter Definitions

| Label PARAMETER_NAME | Index Number | RO / RW | Write Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision ST_REV | 1 | RO | N/A | 0 to 65535 | 0 | Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed |
| Tag Description TAG_DESC | 2 | | ALL | 7 bit ASCII | spaces | Data Type: Octet String The user description of the intended application of the block. |
| Strategy STRATEGY | 3 | | ALL | 0 to 65535 | 0 | Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |
| Alert Key ALERT_KEY | 4 | | ALL | 1 to 255 | 0 | Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| Block Mode MODE_BLK | 5 | | | | | Data Type: DS-69 Valid Bits: 7: OOS, 4: MAN, 3: AUTO The actual, target, permitted, and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target |
| TARGET | 5.1 | RW | ALL | OOS MAN AUTO | OOS until block is configured, then last valid target | |
| ACTUAL | 5.2 | RO | ALL | | OOS | |
| PERMITTED | 5.3 | RW | ALL | OOS+MAN+AUTO | OOS, MAN, AUTO | |
| NORMAL | 5.4 | RW | ALL | | AUTO | |
| Block Error BLOCK_ERR | 6 | RO | | 1: Block Configuration Error 3: Simulate Active 7: Input Failure/ Bad PV Status 14: Power-up 15: Out-of-Service | | Data Type: Bit String 0=Inactive 1=Active Error status associated with the hardware or software for the AI block. |
| Process Value PV | 7 | RO | | PV Status set equal to FIELDV_VAL Status | | Data Type: DS-65 Reflects the scaled value from the configured channel. Units set by OUT_SCALE and L_TYPE. |
| Primary Output OUT | 8 | | OOS, MAN | OUT_STATE | | Data Type: DS-68 The block output value and status. |
| Simulate SIMULATE | 9 | | | | | Data Type: DS-82 A group of data that contains the current transducer value and status, the simulated transducer value and status, and the enable/disable bit. |
| SIMULATE_STATUS | 9.1 | | ALL | | 0 | |
| SIMULATE_VALUE | 9.2 | | ALL | | 0 | |
| TRANSDUCER_STATUS | 9.3 | RO | | | 0 | |
| TRANSDUCER_VALUE | 9.4 | RO | | | 0 | |
| ENABLE/DISABLE | 9.5 | | ALL | 0=Not Initialized 1=Simulation Disabled 2=Simulation Active | 1=simulate disabled | |
| Transducer Scale XD_SCALE | 10 | | OOS | EU at 100% EU at 10% Units Index Decimal Point | 100 0 % 2 | Data Type: DS-68 Transducer scaling (XD_SCALE) is applied to the value from the channel to produce the FIELD_VAL in percent. The XD_SCALE units code must match the channel units code (if one exists), or the block will remain in OOS mode after being configured. |
| Output Scale OUT_SCALE | 11 | | OOS | EU at 100% EU at 10% Units Index Decimal Point | 100 0 % 2 | Data Type: DS-68 The high and low scale values, engineering units code, and number of decimal places to be used in displaying the OUT parameter and parameters which have the same scaling as OUT. |

-Continued-

Table 4-57. Analog Input Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Write Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Grant Deny GRANT_DENY | 12 | | | | | Data Type: DS-70 Options for controlling access of host computer and local control panels to operating, tuning, and alarm parameters of the block. GRANT: 0=N/A, 1=granted DENY: 0=N/A, 1=denied |
| GRANT | 12.1 | | ALL | Valid Bits 0: Program 1: Tune 2: Alarm 3: Local | All bits: 0 | |
| DENY | 12.2 | | ALL | | All bits: 0 | |
| I/O Options IO_OPTS | 13 | | OOS | 10: Low cutoff | All bits: 0 | Data Type: Bit String 0=Disable 1=Enable User options for Output Control. |
| Status Options STATUS_OPTS | 14 | | OOS | 3: Propagate Failure forward 6: Uncertain if Limited 7: Bad if Limited 8: Uncertain in Man Mode | All bits: 0 | Data Type: Bit String 0=Disable 1=Enable User options for Status |
| AI Channel CHANNEL | 15 | | OOS | See table 4-54 | 0: Undefined | Data Type: Unsigned16 Used to select the type of threshold that is used to set the output. |
| Linearization Type L_TYPE | 16 | | OOS, MAN | 0: Undefined 1: Direct 2: Indirect 3: Ind. Sqr. Root | 0: Undefined | Data Type: Enum Linearization type. Determines whether the field value is used directly (Direct), is converted linearly (Indirect), or is converted with the square root (Indirect Square Root). The OUT_SCALE is normally the same as the transducer, but if L_TYPE is set to Indirect or Ind Sqr Root, OUT_SCALE determines the conversion from FIELD_VAL to the output. |
| Low Cutoff LOW_CUT | 17 | | ALL | Positive | 0 | Data Type: Float If calculated output is below this value the output is 0. |
| Process Value Filter Time PV_FTIME | 18 | | ALL | Positive | 0 | Data Type: Float Time constant of first order filter on PV, in seconds. |
| Field Value FIELD_VAL | 19 | RO | | | 0 | Data Type: DS-65 Value of the field device analog input, with a status reflecting the Transducer condition. |
| Updated Event UPDATE_EVT | 20 | | | | | Data Type: DS-73 This alarm is generated whenever a static parameter is changed. |
| UNACKNOWLEDGED | 20.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0=Undefined | |
| UPDATE_STATE | 20.2 | RO | N/A | 0=Undefined 1=Update reported 2=Update not reported | 0=Undefined | |
| TIME_STAMP | 20.3 | RO | N/A | | 0 | |
| STATIC_REVISION | 20.4 | RO | N/A | | 0 | |
| RELATIVE_INDEX | 20.5 | RO | N/A | | 0 | |
| Block Alarm BLOCK_ALM | 21 | | | | | Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. |
| UNACKNOWLEDGED | 21.1 | RW | | 0=Undefined 1=Acknowledged 2=Unacknowledged | | |
| ALARM_STATE | 21.2 | RO | | 0=Undefined 1=Clear-reported 2=Clear-not reported 3=Active-reported 4=Active-not reported | | |
| TIME_STAMP | 21.3 | RO | | | | |
| SUBCODE | 21.4 | RO | | | | |
| VALUE | 21.5 | RO | | | | |

-Continued-

Table 4-57. Analog Input Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Write Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Alarm Summary ALARM_SUM | 22 | | | | | Data Type: DS-74   Current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block. 0=clear 0=acknowledged 0=reported 0=enabled |
| CURRENT | 22.1 | RO | ALL | 0: Discrete alarm 1: Hi Hi alarm 2: Hi Alarm 3: Lo Lo Alarm 4: Lo Alarm 7: Block alarm | | |
| UNACKNOWLEDGED | 22.2 | RO | ALL | | | |
| UNREPORTED | 22.3 | RO | ALL | | | |
| DISABLED | 22.4 | RW | ALL | | All bits: 0 | |
| Acknowledge Option ACK_OPTION | 23 | | ALL | 0: Discrete alarm 1: Hi Hi alarm 2: Hi Alarm 3: Lo Lo Alarm 4: Lo Alarm 7: Block alarm | All bits: 0 | Data Type: Bit String 0=Disable 1=Enable Selection of whether alarms associated with the block will be automatically acknowledged. |
| Alarm Hysteresis ALARM_HYS | 24 | | ALL | 0 - 50% | 0.50% | Data Type: Float Hysteresis on alarms. |
| High High Priority HI_HI_PRI | 25 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8 The priority of the hi hi alarm. |
| High High Limit HI_HI_LIM | 26 | | ALL | OUT_SCALE | 0 | Data Type: Float Value of analog input which will generate an alarm. |
| High Priority HI_PRI | 27 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8 The priority of the high alarm. |
| Hi Limit HI_LIM | 28 | | ALL | OUT_SCALE | 0 | Data Type: Float Value of analog input which will generate an alarm. |
| Low Priority LO_PRI | 29 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8 The priority of the low alarm. |
| Low Limit LO_LIM | 30 | | ALL | OUT_SCALE | 0 | Data Type: Float Value of analog input which will generate an alarm. |
| Low Low Priority LO_LO_PRI | 31 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8 The priority of the low low alarm. |
| Low Low Limit LO_LO_LIM | 32 | | ALL | OUT_SCALE | 0 | Data Type: Float Value of analog input which will generate an alarm. |
| High High Alarm HI_HI_ALM | 33 | | | | | |
| UNACKNOWLEDGED | 33.1 | RW | | | 0 | Data Type: DS-71 The status of the hi hi alarm and its associated time stamp. |
| ALARM_STATE | 33.2 | RO | | | 0 | |
| TIME_STAMP | 33.3 | RO | N/A | | 0 | |
| SUBCODE | 33.4 | RO | | | 0 | |
| VALUE | 33.5 | RO | | | 0 | |
| High Alarm HI_ALM | 34 | | | | | |
| UNACKNOWLEDGED | 34.1 | RW | | | 0 | Data Type: DS-71 The status of the hi alarm and its associated time stamp. |
| ALARM_STATE | 34.2 | RO | | | 0 | |
| TIME_STAMP | 34.3 | RO | N/A | | 0 | |
| SUBCODE | 34.4 | RO | | | 0 | |
| VALUE | 34.5 | RO | | | 0 | |
| Low Alarm LO_ALM | 35 | | | | | |
| UNACKNOWLEDGED | 35.1 | RW | | | 0 | Data Type: DS-71 The status of the lo alarm and its associated time stamp. |
| ALARM_STATE | 35.2 | RO | | | 0 | |
| TIME_STAMP | 35.3 | RO | N/A | | 0 | |
| SUBCODE | 35.4 | RO | | | 0 | |
| VALUE | 35.5 | RO | | | 0 | |

-Continued-

Table 4-57. Analog Input Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Write Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Low Low Alarm LO_LO_ALM | 36 | | | | | |
|     UNACKNOWLEDGED | 36.1 | RW | N/A | | 0 | Data Type: DS-71 The status of the lo lo alarm and its associated time stamp. |
|     ALARM_STATE | 36.2 | RO | | | 0 | |
|     TIME_STAMP | 36.3 | RO | | | 0 | |
|     SUBCODE | 36.4 | RO | | | 0 | |
|     VALUE | 36.5 | RO | | | 0 | |
| Extended Parameter | | | | | | |
| Output Discrete OUT_D | 37 | | OOS, MAN | OUT_STATE | | Data Type: DS-66 Discrete Output this is true (1) if any of the alarms selected in ALM_SEL are active. |
| Alarm Select ALM_SEL | 38 | | ALL | 1: Hi Hi alarm 2: Hi Alarm 3: Lo Lo Alarm 4: Lo Alarm | All bits: 0 | Data Type: Bitstring 0=unselected 1=selected Selected alarms that activate the alarm output. |
| StdDev STDDEV | 39 | RO | N/A | Positive float | | Data Type: Float Standard deviation of the measurement. |
| Cap StdDev CAP_STDDEV | 40 | RO | N/A | Positive float | | Data Type: Float Capability standard deviation, the best deviation that can be achieved. |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-58. AI Function Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV |
| 8 | OUT |
| 19 | FIELD_VAL |
| 22.1 | ALARM_SUM.CURRENT |
| 22.2 | ALARM_SUM.UNACKNOWLEDGED |
| 22.3 | ALARM_SUM.UNREPORTED |
| 22.4 | ALARM_SUM.DISABLED |

Table 4-59. AI Function Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 10 | XD_SCALE |
| 11 | OUT_SCALE |
| 12.1 | GRANT_DENY.GRANT |
| 12.2 | GRANT_DENY.DENY |

Table 4-60. AI Function Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV |
| 8 | OUT |
| 19 | FIELD_VAL |
| 22.1 | ALARM_SUM.CURRENT |
| 22.2 | ALARM_SUM.UNACKNOWLEDGED |
| 22.3 | ALARM_SUM.UNREPORTED |
| 22.4 | ALARM_SUM.DISABLED |
| 37 | OUT_D |
| 38 | ALM_SEL |
| 39 | STDDEV |
| 40 | CAP_STDDEV |

Table 4-61. AI Function Block, View 4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 13 | IO_OPTS |
| 14 | STATUS_OPTS |
| 15 | CHANNEL |
| 16 | L_TYPE |
| 17 | LOW_CUT |
| 18 | PV_FTIME |
| 23 | ACK_OPTION |
| 24 | ALARM_HYS |
| 25 | HI_HI_PRI |
| 26 | HI_HI_LIM |
| 27 | HI_PRI |
| 28 | HI_LIM |
| 29 | LO_PRI |
| 30 | LO_LIM |
| 31 | LO_LO_PRI |
| 32 | LO_LO_LIM |

# Field Communicator Menu Structure

**ANALOG INPUT FUNCTION BLOCK**

## Quick Config

AI Channel
Linearization Type
Transducer Scale: EU at 100%
Transducer Scale: EU at 0%
Transducer Scale: Units Index
Transducer Scale: Decimal
Output Scale: EU at 100%
Output Scale: EU at 0%
Output Scale: Units Index
Output Scale: Decimal

## Common Config

Acknowledge Option
Alarm Hysteresis
Alert Key
High High Limit
High High Priority
High Limit
High Priority
I/O Options
Linearization Type
Low Low Limit
Low Low Priority
Low Limit
Low Priority
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Output Scale: EU at 100%
Output Scale: EU at 0%
Output Scale: Units Index
Output Scale: Decimal
Process Value Filter Time

## Advanced Config

Low Cutoff
Simulate: Simulate Status
Simulate: Simulate Value
Simulate: Transducer Status
Simulate: Transducer Value
Simulate: Simulate En/Disable
Static Revision
Status Options
Strategy
Transducer Scale: EU at 100%
Transducer Scale: EU at 0%
Transducer Scale: Units Index
Transducer Scale: Decimal

## I/O Reference

AI Channel

## Connectors

Output: Status
Output: Value

## Online

Block Error
Field Value: Status
Field Value: Value
Cascade Input: Status
Cascade Input: Value
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Output: Status
Output: Value
Process Value: Status
Process Value: Value

## Status

Block Error

## Other

Tag Description
Grant Deny: Grant
Grant Deny: Deny
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Alarm Summary: Current
Alarm Summary: Unacknowledged
Alarm Summary: Unreported
Alarm Summary: Disabled
High Alarm: Unacknowledged
High Alarm: Alarm State
High Alarm: Time Stamp
High Alarm: Subcode
High Alarm: Float Value
High High Alarm: Unacknowledged
High High Alarm: Alarm State
High High Alarm: Time Stamp
High High Alarm: Subcode
High High Alarm: Float Value
Low Alarm: Unacknowledged
Low Alarm: Alarm State
Low Alarm: Time Stamp
Low Alarm: Subcode
Low Alarm: Float Value
Low Low Alarm: Unacknowledged
Low Low Alarm: Alarm State
Low Low Alarm: Time Stamp
Low Low Alarm: Subcode
Low Low Alarm: Float Value
Alarm output: Status
Alarm output: Value
Alarm Select
StdDev
Cap StdDev

## All

Characteristics
Static Revision
Tag Description
Strategy
Alert Key
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Block Error
Process Value: Status
Process Value: Value
Output: Status
Output: Value
Simulate: Simulate Status
Simulate: Simulate Value
Simulate: Transducer Status
Simulate: Transducer Value
Simulate: Simulate En/Disable
Transducer Scale: EU at 100%
Transducer Scale: EU at 0%
Transducer Scale: Units Index
Transducer Scale: Decimal
Output Scale: EU at 100%
Output Scale: EU at 0%
Output Scale: Units Index
Output Scale: Decimal
Grant Deny: Grant
Grant Deny: Deny
I/O Options
Status Options
AI Channel
Linearization Type
Low Cutoff
Process Value Filter TIme
Field Value: Status
Field Value: Value
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Alarm Summary: Current
Alarm Summary: Unacknowledged
Alarm Summary: Unreported
Alarm Summary: Disabled
Acknowledge Option

## All (continued)

Alarm Hysteresis
High High Priority
High High Limit
High Priority
High Limit
Low Priority
Low Limit
Low Low Priority
Low Low Limit
High High Alarm: Unacknowledged
High High Alarm: Alarm State
High High Alarm: Time Stamp
High High Alarm: Subcode
High High Alarm: Float Value
High Alarm: Unacknowledged
High Alarm: Alarm State
High Alarm: Time Stamp
High Alarm: Subcode
High Alarm: Float Value
Low Alarm: Unacknowledged
Low Alarm: Alarm State
Low Alarm: Time Stamp
Low Alarm: Subcode
Low Alarm: Float Value
Low Low Alarm: Unacknowledged
Low Low Alarm: Alarm State
Low Low Alarm: Time Stamp
Low Low Alarm: Subcode
Low Low Alarm: Float Value
Alarm output: Status
Alarm output: Value
Alarm select
StdDev
Cap StdDev

# Multiple Analog Input Function Block

## Overview

The Multiple Analog Input (MAI) function block (figure 4-26) has the ability to process up to eight field device measurements and make them available to other function blocks. The output values from the MAI block are in engineering units and contain a status indicating the quality of the measurement. The measuring device may have several measurements or derived values available in different channels. Use the channel numbers to define the variables that the MAI block processes.

Figure 4-26. Multiple Analog Input (MAI) Function Block



Out1 = The block output value and status for the first channel
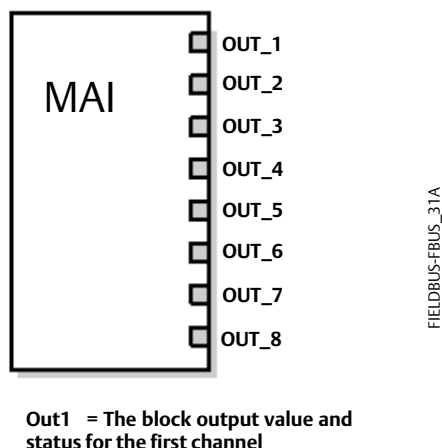
The MAI block supports mode control. In Automatic mode, the block's output parameters (OUT_1 to OUT_8 [8 through 15]) reflects the process variable (PV) values and status. In Manual mode, OUT may be set manually. The Manual mode is reflected in the output status. Table 4-64 lists the MAI block parameters, and their units of measure, description and index numbers.

## Modes

The MAI Function Block supports three modes of operation as defined by the MODE_BLK [5] parameter:

- **Manual (Man)**—The block output (OUT_1 to OUT_8 [8 through 15]) may be set manually.

- **Automatic (Auto)**—OUT_1 to OUT_8 [8 through 15] reflects the analog input measurement or the simulated value when the simulation is enabled.

- **Out of Service (OOS)**—The block is not processed. PV is not updated and the OUT status is set to Bad: Out of Service. The BLOCK_ERR [6] parameter shows Out of Service. In this mode, you can make changes to all configurable parameters. The target mode of a block may be restricted to one or more of the supported modes.

## Status Handling

In Man mode, the OUT status constant limit is set to indicate that the value is a constant and the OUT status is *Good.*

OUT_X status will be Bad if the transducer detects a problem with sensor associated with the channel.

# Application Information

The intended use is for applications where it is necessary to convey DVC6200f measurements from a function.

The configuration of the MAI function block and its associated output channels depends on the specific application.

- CHANNEL [7]: Channel must always be set to 21.

The output parameters (OUT_1 to OUT_8 [8 through 15]) are set through the transducer block Instrument menu. Each output has a channel assigned to it in MAI Channel Map (TB.MAI_CHANNEL_MAP [95]) in the transducer block. For additional information, refer to table 4-64.

# Block Errors

Table 4-62 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are inactive for the MAI block and are given here only for your reference.

Table 4-62. BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other* |
| 1 | **Block Configuration Error:** the selected channel carries a measurement that is incompatible with the engineering units selected in XD_SCALE, the L_TYPE parameter is not configured, or WRITE_CHECK = 0. |
| 2 | *Link Configuration Error* |
| 3 | *Simulate Active* |
| 4 | *Local Override* |
| 5 | *Device Fault State* |
| 6 | *Device Needs Maintenance Soon* |
| 7 | **Input failure/process variable had Bad status** - The hardware is bad, or a bad status is being simulated |
| 8 | *Output failure* |
| 9 | *Memory failure* |
| 10 | *Lost Static Data* |
| 11 | *Lost NV Data* |
| 12 | *Readback Check Failed* |
| 13 | *Device Needs Maintenance Now* |
| 14 | **Power Up** - This condition exists after power up until the MAI function executes for the first time. |
| 15 | **Out of Service** - The actual mode is Out of Service. |

# Troubleshooting

Refer to table 4-63 to troubleshoot any problem that you encounter.

Table 4-63. Troubleshooting

| Symptom | Possible Causes | Corrective Action |
|---|---|---|
| Mode will not leave OOS | Target mode is not set | Set target mode to something other than OOS |
| | Resource block | The actual mode of the Resource block is OOS. See Resource Block Diagnostics for corrective action. |
| | Schedule | Block is not scheduled and therefore cannot execute to go to Target Mode. Typically, BLOCK_ERR [6] will show "Power-Up" for all blocks that are not scheduled. Schedule the block to execute. |
| Block alarms will not work | Features | FEATURES_SEL [18] in the resource block does not have Alerts enabled. Enable the Alerts bit. |
| | Notification | LIM_NOTIFY [32] in the resource block is not high enough. Set equal to MAX_NOTIFY [31], also in the resource block. |

# MAI Function Block Parameter List (table 4-64)

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter
- Double indentation and shaded Index Number indicates sub-parameter

Table 4-64. MAI Function Block Parameter Definitions

| Label<br>Parameter Name | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision<br>ST_REV | 1 | RO | N/A | 0 to 65535 | 0 | Data Type: Unsigned16<br>The revision level of the static data associated with the input selector block. The revision value will be incremented each time a static parameter value in the block is changed. |
| Tag Description<br>TAG_DESC | 2 | | | 7 bit ASCII | spaces | Data Type: Octet String<br>The user description of the intended application of the block. |
| Strategy<br>STRATEGY | 3 | | | 0 to 65535 | 0 | Data Type: Unsigned16<br>The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |
| Alert Key<br>ALERT_KEY | 4 | | | 1 to 255 | 0 | Data Type: Unsigned8<br>The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| Block Mode<br>MODE_BLK | 5 | | | | | Data Type: DS-69<br>The actual, target, permitted, and normal modes of the block.<br>　Target: The requested block mode<br>　Actual: The current mode of the block<br>　Permitted: Allowed modes for Target<br>　Normal: Most common mode for Target |
| 　　TARGET | 5.1 | RW | ALL | OOS, MAN, AUTO | OOS | |
| 　　ACTUAL | 5.2 | RO | ALL | | OOS | |
| 　　PERMITTED | 5.3 | RW | ALL | OOS+MAN+AUTO | OOS, MAN, AUTO | |
| 　　NORMAL | 5.4 | RW | ALL | AUTO | AUTO | |
| Block Error<br>BLOCK_ERR | 6 | RO | | 1: Block Configuration Error<br>7: Input Failure/ Bad PV Status<br>14: Power-up<br>15: Out-of-Service | | Data Type: Bit String<br>0 = Inactive<br>1 = Active<br>This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. |
| MAI Channel<br>CHANNEL | 7 | | | 21 only | 0 = undefined | This variable must be set to 21. Channel assignments to the 8 outputs is done through MAI_CHANNEL_MAP parameter in transducer block.<br><br>1=FINAL_VALUE<br>2=TRAVEL_TARGET<br>3=FINAL_POSITION_VALUE<br>4=TRAVEL<br>5=SUPPLY_PRESS<br>6=ACT_PRESS_A<br>7=ACT_PRESS_B<br>8=ACT_PRESS_DIFF<br>9=DRIVE_SIGNAL<br>10=TRAVEL_DEVIATION<br>11=TEMPERATURE<br>12=CYCLE_COUNT<br>13=TRAVEL_ACCUM |

-Continued-

Table 4-64. MAI Function Block Parameter Definitions (Continued)

| Label Parameter Name | Index Number | RO / RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Output 1 OUT_1 | 8 | | OOS MAN | Channel assigned by TB.MAI_CHANNEL_MAP | TB.FINAL_VALUE | Data Type: DS-65 The block output value and status. |
| Output 2 OUT_2 | 9 | | OOS MAN | Channel assigned by TB.MAI_CHANNEL_MAP | TB.TRAVEL_TARGET | Data Type: DS-65 The block output value and status. |
| Output 3 OUT_3 | 10 | | OOS MAN | Channel assigned by TB.MAI_CHANNEL_MAP | TB.FINAL_POSITION_VALUE | Data Type: DS-65 The block output value and status. |
| Output 4 OUT_4 | 11 | | OOS MAN | Channel assigned by TB.MAI_CHANNEL_MAP | TB.TRAVEL | Data Type: DS-65 The block output value and status. |
| Output 5 OUT_5 | 12 | | OOS MAN | Channel assigned by TB.MAI_CHANNEL_MAP | TB.SUPPLY_PRESS | Data Type: DS-65 The block output value and status. |
| Output 6 OUT_6 | 13 | | OOS MAN | Channel assigned by TB.MAI_CHANNEL_MAP | TB.ACT_PRESS_A | Data Type: DS-65 The block output value and status. |
| Output 7 OUT_7 | 14 | | OOS MAN | Channel assigned by TB.MAI_CHANNEL_MAP | TB.ACT_PRESS_B | Data Type: DS-65 The block output value and status. |
| Output 8 OUT_8 | 15 | | OOS MAN | Channel assigned by TB.MAI_CHANNEL_MAP | TB.ACT_PRESS_DIFF | Data Type: DS-65 The block output value and status. |
| Update Event UPDATE_EVT | 16 | | | | | Data Type: DS-73 This alarm is generated whenever a static parameter is changed. |
| UNACKNOWLEDGED | 16.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0=Undefined | |
| UPDATE_STATE | 16.2 | RO | N/A | 0=Undefined 1=Update reported 2=Updated not reported | 0=Undefined | |
| TIME_STAMP | 16.3 | RO | N/A | | 0 | |
| STATIC_REVISION | 16.4 | RO | N/A | | 0 | |
| RELATIVE_INDEX | 16.5 | RO | N/A | | 0 | |
| Block Alarm BLOCK_ALM | 17 | | | | | Data Type: DS-72 The block alarm is used for all configuration , hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. |
| UNACKNOWLEDGED | 17.1 | RW | | 0=Undefined 1=Acknowledged 2=Unacknowledged | | |
| ALARM_STATE | 17.2 | RO | | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | | |
| TIME_STAMP | 17.3 | RO | | | | |
| SUBCODE | 17.4 | RO | | | | |
| VALUE | 17.5 | RO | | | | |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-65. MAI Function Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 8 | OUT_1 |
| 9 | OUT_2 |
| 10 | OUT_3 |
| 11 | OUT_4 |
| 12 | OUT_5 |
| 13 | OUT_6 |
| 14 | OUT_7 |
| 15 | OUT_8 |

Table 4-66. MAI Function Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |

Table 4-67. MAI Function Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 8 | OUT_1 |
| 9 | OUT_2 |
| 10 | OUT_3 |
| 11 | OUT_4 |
| 12 | OUT_5 |
| 13 | OUT_6 |
| 14 | OUT_7 |
| 15 | OUT_8 |

Table 4-68. MAI Function Block, View 4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 7 | CHANNEL |

# Field Communicator Menu Structure

**MULTIPLE ANALOG INPUT FUNCTION BLOCK**

**Quick Config**

| |
|---|
| MAI Channel |

**Common Config**

| |
|---|
| Alert Key |
| Block Mode: Target |
| Block Mode: Actual |
| Block Mode: Permitted |
| Block Mode: Normal |

**Advanced Config**

| |
|---|
| Static Revision |
| Strategy |

**I/O Reference**

| |
|---|
| MAI Channel |

**Connectors**

| |
|---|
| Output 1: Status |
| Output 1: Value |
| Output 2: Status |
| Output 2: Value |
| Output 3: Status |
| Output 3: Value |
| Output 4: Status |
| Output 4: Value |
| Output 5: Status |
| Output 5: Value |
| Output 6: Status |
| Output 6: Value |
| Output 7: Status |
| Output 7: Value |
| Output 8: Status |
| Output 8: Value |

**Online**

| |
|---|
| Block Error |
| Block Mode: Target |
| Block Mode: Actual |
| Block Mode: Permitted |
| Block Mode: Normal |
| Output 1: Status |
| Output 1: Value |
| Output 2: Status |
| Output 2: Value |
| Output 3: Status |
| Output 3: Value |
| Output 4: Status |
| Output 4: Value |
| Output 5: Status |
| Output 5: Value |
| Output 6: Status |
| Output 6: Value |
| Output 7: Status |
| Output 7: Value |
| Output 8: Status |
| Output 8: Value |

**Status**

| |
|---|
| Block Error |

**Other**

| |
|---|
| Tag Description |
| Update Event: Unacknowledged |
| Update Event: Update State |
| Update Event: Time Stamp |
| Update Event: Static Rev |
| Update Event: Relative Index |
| Block Alarm: Unacknowledged |
| Block Alarm: Alarm State |
| Block Alarm: Time Stamp |
| Block Alarm: Subcode |
| Block Alarm: Value |

**All**

| |
|---|
| Characteristics |
| Static Revision |
| Tag Description |
| Strategy |
| Alert Key |
| Block Mode: Target |
| Block Mode: Actual |
| Block Mode: Permitted |
| Block Mode: Normal |
| Block Error |
| MAI Channel |
| Output 1: Status |
| Output 1: Value |
| Output 2: Status |
| Output 2: Value |
| Output 3: Status |
| Output 3: Value |
| Output 4: Status |
| Output 4: Value |
| Output 5: Status |
| Output 5: Value |
| Output 6: Status |
| Output 6: Value |
| Output 7: Status |
| Output 7: Value |
| Output 8: Status |
| Output 8: Value |
| Update Event: Unacknowledged |
| Update Event: Update State |
| Update Event: Time Stamp |
| Update Event: Static Rev |
| Update Event: Relative Index |
| Block Alarm: Unacknowledged |
| Block Alarm: Alarm State |
| Block Alarm: Time Stamp |
| Block Alarm: Subcode |
| Block Alarm: Value |

# Discrete Output Function Block

## Overview

The Discrete Output (DO) function block (figure 4-27) processes a discrete set point and outputs it to the specified I/O channel to produce an output signal. The DVC6200f digital valve controller discrete output block provides both normal open/closed control and the ability to position the valve in 5% increments for coarse throttling applications. The digital valve controller measures and uses actual valve position for READBACK_D [16].

Figure 4-27. Discrete Output (DO) Function Block
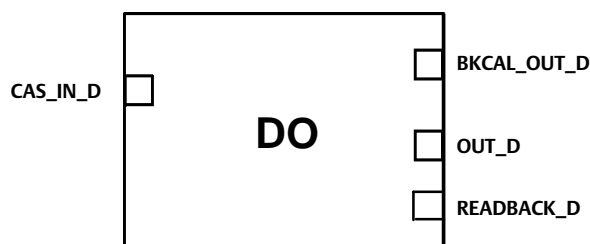


CAS_IN_D= The remote set point value from another function block.
BKCAL_OUT_D = The value and status required by the
BKCAL_IN_D input of another block for output tracking.
OUT_D = The block output and status.
READBACK_D = Actual valve position

The DO block supports mode control and simulation. In operation, the DO function block determines its set point and sets the output. The transducer block provides a readback signal of actual position from the instrument. Figure 4-27 illustrates the primary inputs and outputs of the DO function block, figure 4-28 illustrates the internal components of the DO function block. Table 4-72 lists definitions for the function block parameters.

Figure 4-28. Discrete Output Function Block Schematic
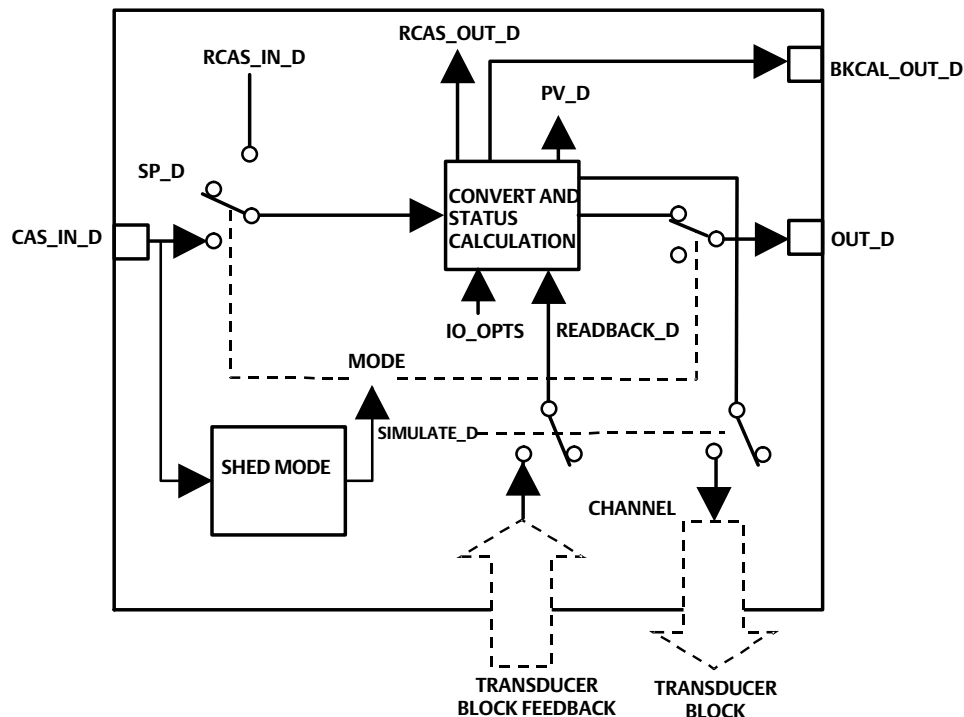


When setting up the DO block, CHANNEL [18] must be set to 22, and SHED_OPT [23] must be non-zero.

---

**Note**

Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain out of service and the block cannot be scheduled if the block has not been licensed. Contact your Emerson Process Management sales office to upgrade product licensing.

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**Note**

Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain in IMAN and the block Readback status will be Bad - Not Connected if the Output Block Selection is set incorrectly. From the transducer block method Outblock Selection, select the desired output block, see page 45.

---

# Modes

The DO block supports the following modes:

- **Manual (Man)**—The block output OUT_D [9] value may be entered manually.

- **Automatic (Auto)**—The block algorithm uses the local set point SP_D [8]value to determine OUT_D [9].

- **Cascade (Cas)**—The block uses a set point supplied by another function block.

---

**Note**

The transducer block must be in Auto for the mode to go to AUTO, CAS or MAN.

---

- **RemoteCascade (RCas)**—The block uses a set point supplied by a host computer.

- **Out of Service (OOS)**—The block is not processed and the output is not transferred to I/O. The BLOCK_ERR [6] attribute shows Out of service.

# Mode Handling

## Shed Options — RCAS Mode Only

Shed from or climb to a remote mode is determined by the parameter SHED_OPT [23]. A block climbs and sheds through the same path. For example, if SHED_OPT [23] specifies that a block should shed to Auto, then, if the block target mode is set to RCas, the block goes through Auto on the way to RCas. You can configure the shed option as follows:

### Shed With Return Options

Remote cascade connection failure shifts actual mode but keeps trying to restore remote cascade (in other words, the remote cascade target mode stays in effect).

**Normal**—On failure of a remote cascade connection, the block attempts to attain the highest permitted non-remote mode until remote cascade is restored. Cas is the highest permitted non-remote mode and Auto is is the next permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

**Retained Target**—The retained target mode is the target mode for the block before changing the target mode to a remote mode. On failure of a remote cascade connection, the block attempts to attain the retained target mode.

**Auto**—On failure of a remote cascade connection, the block attempts to attain Auto, if permitted, until remote cascade is restored.

**Man**—On failure of a remote cascade connection, the block sheds to Man until a remote cascade connection is restored.

### Shed With No Return Options

For any shed with no return option, the target mode changes as determined by the option. Therefore, there is no attempt to restore the connection following failure. The behavior on change to the remote cascade target mode is identical to that for Shed With Return Options.

**Normal**—On failure of a remote cascade connection, the block sets the target mode to the highest permitted non-remote mode. Cas is the highest permitted non-remote mode and Auto is is the next highest permitted non-remote mode. If Cas or Auto are not available, the block will shed by default to Man.

**Retained Target**—The retained target mode is the target mode for the block before changing the target mode to a remote mode. On failure of a remote cascade connection, the block sets the target mode to the retained target mode.

Auto—On failure of a remote cascade connection, the block sets the target mode to Auto, if permitted.

Man—On failure of remote cascade connection, the block sets the target mode to Man, if permitted.

The user may configure SHED_OPT [23] so that it calls for a target mode that is not permitted. When doing this, the mode logic uses the following rules as applied by the remote logic:

● Shed logic never results in a non-permitted target mode.

● Shed logic never attempts to attain an actual mode of Auto or Cas if that mode is not permitted.

# Block Initialization

The Fieldbus Foundation specification requires that certain parameters have initial values of uninitialized in function blocks. In addition to setting the Resource block mode to AUTO, the control system or the user must change those parameters from their uninitialized value to a valid value in order for the function block to move from the Out of Service mode. For the DO function block, the parameters that must be initialized are:

SHED_OPT [23] (see page 167 for valid values)

CHANNEL [18]

# Status Handling

Under normal operating conditions, the status of OUT_D [9] is Good Non-Cascade, and the status of BKCAL_OUT_D [21] is Good:Cascade. If the output hardware fails, the status of BKCAL_OUT_D [21] is set to Bad:Device Fail, and the BLOCK_ERR [6] shows Output Failure. If the hardware used for output feedback fails, the status of READBACK_D [16] and PV_D [7] is set to Bad:DeviceFail, and the BLOCK_ERR [6] shows Process Variable has Bad Status. If the transducer block mode is Out of Service, the status of READBACK_D [16] and PV_D [7] is set to Bad:Out of Service.

# I/O Selection

To select the I/O associated with the discrete output, configure the value of the CHANNEL [18] parameter. Table 4-69 lists the valid Channel selections for the DO block.

Table 4-69. Channel Selections for the Discrete Output Function Block

| Selection | Transducer Block Parameter | Transducer block Index | Description |
|-----------|---------------------------|------------------------|-------------|
| 22 | SETPOINT_D | 32 | Discrete Valve Control |
| 0 | - | - | Uninitialized |

# Setting the Output

To set the output for the DO block, you must first set the mode to define the manner in which the block determines its set point and output. In Cascade mode, the set point equals the input value at the CAS_IN_D [17] parameter. In Automatic or Manual mode, the set point must be entered manually by the user. For Automatic, the value must be written to the SP_D [8] parameter and for Manual, the value must be written to OUT_D [9]. In Remote Cascade mode, the set point is determined by a host computer that is writing to the RCAS_IN_D [22] parameter. Table 4-70 lists discrete states used by the digital valve controller for the set point.

Table 4-70. Valve Set Point for Discrete State

| Discrete State | Valve Set Point with IO_OPTS Invert = 0 | Valve Set Point with IO_OPTS Invert = 1 |
|---|---|---|
| 0 | Closed | Open |
| 1 | Open | Closed |
| 5 | 5% | Closed |
| 10 | 10% | Closed |
| 15 | 15% | Closed |
| 20 | 20% | Closed |
| 25 | 25% | Closed |
| 30 | 30% | Closed |
| 35 | 35% | Closed |
| 40 | 40% | Closed |
| 45 | 45% | Closed |
| 50 | 50% | Closed |
| 55 | 55% | Closed |
| 60 | 60% | Closed |
| 65 | 65% | Closed |
| 70 | 70% | Closed |
| 75 | 75% | Closed |
| 80 | 80% | Closed |
| 85 | 85% | Closed |
| 90 | 90% | Closed |
| 95 | 95% | Closed |
| 100 | Open | Closed |

To further customize the output, configure the following supported I/O options: SP tracks PV in Man,

SP tracks PV in LO, SP Track retained target in Man or LO, Fault State to Value, Use Fault State value on restart, Target to Man if Fault State activated, and US PV for BKCAL_OUT.

---

**Note**

You can configure the supported I/O options in Out of Service mode only.

---

The SP_PV Track in Man option permits the set point to track the process variable when the block is in Manual mode. With this option enabled, the set point (SP_D [8]) becomes a copy of the process variable

(PV_D [7]), and a manually-entered SP_D [8] value is overwritten on the block's next execution cycle. This option can prevent a state change when transitioning from Manual to Automatic mode. You can disable this option in Manual or Out of Service mode only.

The Invert option inverts the set point at SP_D [8] before it is stored in OUT_D [9]. With this option enabled, OUT_D [9] becomes an inverted copy of SP_D [8] where non-zero values of SP_D [8] are considered a logic 1. With this option disabled, OUT_D [9] is a direct copy of SP_D [8]. The readback value is processed through the Invert option to become PV_D [7]. The Use PV for BKCAL_OUT option specifies that BKCAL _OUT equal the value of the process variable (PV_D [7]) instead of the set point (SP_D [8]). If you do not enable this option, BKCAL_OUT will equal SP_D [8].

# Output Block PV Status

The Output Block PV Status is determined by the value of the PlantWeb Alerts Set PV Status parameter in the transducer block (PWA_SET_STATUS [97]), the Transducer Block mode, and enabled Active PlantWeb alarms. Refer to table 4-11.

# Block Errors

Table 4-71 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are not applicable for the DO block and are provided only for your reference.

Table 4-71. BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other (N/A)* |
| 1 | **Block Configuration Error** - SHED_OPT or CHANNEL set to 0 (uninitialized) |
| 2 | *Link Configuration Error (N/A)* |
| 3 | **Simulate active** - Simulation is enabled and the block is using a simulated value in its execution. |
| 4 | **Local Override** - Device in fault state. Actual mode LO. |
| 5 | **Device Fault State Set** - DO block in fault state after FSTATE_TIME because of Bad status or IFS substatus on CAS_IN_D or Resource block commanded fault state. |
| 6 | **Device Needs Maintenance Soon** - Indicates a Maintenance PlantWeb Alert condition is active if Block Error Reporting is enabled. See page 62. |
| 7 | **Input failure/process variable has Bad status** - PV has bad status and Feature Select in the Resource block has the Out Readback bit set or the transducer block mode is Out of Service. |
| 8 | **Output failure** - PV has bad status or the transducer block mode is Out of Service. |
| 9 | *Memory Failure (N/A)* |
| 10 | *Lost Static Data (N/A)* |
| 11 | *Lost NV Data (N/A)* |
| 12 | *Readback Check Failed (N/A)* |
| 13 | **Device Needs Maintenance Now** - Indicates Failed PlantWeb Alert condition is active if Block Error Reporting is enabled. See page 62. |
| 14 | **Power Up** - This condition exists after power up until actual mode is not Out of Service. |
| 15 | **Out of Service** - The block is in Out of Service (OOS) mode. |

# Action on Fault Detection

Fault State is caused by one of three sources: A status pertaining to CAS, A status pertaining to RCAS, or SET_FSTATE [29] in the resource block. To implement Fault State, configure the following parameters:

IO_OPTS [14]: Determines the action OUT_D [9] will take upon a fault state. If the IO_OPTS [14] "Fault State to Value" is not selected, then OUT_D [9] holds its last position when Fault State is set. If "Fault State to Value" is selected, OUT_D [9] goes to the FSTATE_VAL_D [20] value when Fault State is set.

FSTATE_TIME [19]: The length of time, in seconds, that the DO block will wait to set Fault State. When

Fault State is set, the OUT_D [9] value goes to either the FSTATE_VAL_D [20] value or holds its last position, depending on I/O_OPTS [14]. When the block has a target mode of CAS, a fault condition will be detected if the CAS_IN_D [17] has a BAD status or an Initiate Fault State substatus is received from the upstream block.

FSTATE_VAL_D [20]: Determines the OUT_D [9] value if IO_OPTS [14] "Fault State to Value" is selected. The OUT_D [9] value transitions to FSTATE_VAL_D [20] after FSTATE_TIME [19] elapses and the fault condition has not cleared.

# Simulation

To support testing of the control strategy, you can enable the SIMULATE_D [17] parameter. Normally, the valve position value and status used for READBACK_D [16] in the DO block reflect actual process values to the nearest 5%, as provided by the transducer block. When the SIMULATE_D [17] parameter is enabled, value and status used for READBACK_D [16] is supplied by the user manually. To enable simulation in the DO function block, the simulate jumper must be installed. Refer to page 13 of the Installation section for information on the installation of this jumper.

**Note**

When simulate is active, the output block no longer writes values to the transducer block. If the Output Blk Timeout period is exceeded, the transducer block may move the valve to the Zero Power Condition depending on the configuration of the Output Block Timeout Alert.

The SIMULATE_D [10] parameter has three components:

● Simulate Enable_Disable determines whether the function block will use the actual valve position value and status, or Simulate Value and Simulate Status.

● Transducer Value and Status reflect the process values provided by the transducer block.

● Simulate Value and Status may be entered by the user when Simulate Enable_Disable is set to Enabled.

To use simulate, first install the simulate jumper in the terminal box, then set Simulate Enable_Disable to Enabled, then enter the desired values for Simulate Value and Status.

When SIMULATE_D [10] is Enabled, the Simulate Active bit of the BLOCK_ERR [6] parameter is set (refer to the Block Errors description). When the simulate jumper is installed, the Simulate Jumper bit of the transducer block parameter SELFTEST_STATUS [78] is set.

# DO Function Block Parameter List (table 4-72)

● Read/Write Capability: RO - Read Only, RW - Read Write
● Mode: The block mode(s) required to write to the parameter
● Double indentation and shaded Index Number indicates sub-parameter

Table 4-72. Discrete Output Function Block Parameter Definitions

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision<br>ST_REV | 1 | RO | N/A | 0 to 65535 | 0 | Data Type: Unsigned16<br>The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. |
| Tag Description<br>TAG_DESC | 2 | RW | ALL | 7 bit ASCII | Spaces | Data Type: Octet String<br>The user description of the intended application of the block. |
| Strategy<br>STRATEGY | 3 | RW | ALL | 0 to 65535 | 0 | Data Type: Unsigned16<br>The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |
| Alert Key<br>ALERT_KEY | 4 | RW | ALL | 1 to 255 | 0 | Data Type: Unsigned8<br>The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |

-Continued-

### Table 4-72. Discrete Output Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Block Mode MODE_BLK | 5 | | | | | |
| TARGET | 5.1 | RW | ALL | OOS MAN AUTO AUTO-CAS, AUTO-RCAS | OOS until block is configured, then last valid target | Data Type: DS-69 Valid Bits: 7: OOS, 5: LO, 4: MAN, 3: AUTO 2: CAS, 1: RCAS The actual, target, permitted, and normal modes of the block. |
| ACTUAL | 5.2 | RO | ALL | | OOS | Target: The requested block mode Actual: The current mode of the block |
| PERMITTED | 5.3 | RW | ALL | OOS+MAN+AUTO+ CAS+RCAS | OOS+MAN+AUTO+CAS +RCAS | Permitted: Allowed modes for Target Normal: Most common mode for Target |
| NORMAL | 5.4 | RW | ALL | | AUTO+CAS | |
| Block Error BLOCK_ERR | 6 | RO | N/A | 1: Block Configuration Error 3: Simulate Active 4: Local Override 5: Device Fault State Set 7: Input Failure / Bad PV Status 8: Output Failure 14: Power-up 15: Out-of-Service | Dynamic | Data Type: Bit String 0=Inactive 1=Active This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown. |
| Process Value Discrete PV_D | 7 | RO | N/A | PV_D Status set equal to Readback_D Status | Dynamic | Data Type: DS-66 The discrete process variable calculated from READBACK_D. |
| Setpoint Discrete SP_D | 8 | | OOS MAN AUTO | PV_STATE | | Data Type: DS-66 The discrete target block output value (set point). |
| Output Discrete OUT_D | 9 | | MAN | OUT_STATE | | Data Type: DS-66 Position target of valve. 0=closed, 1=open, 2-100 position the value in 5% steps. |
| Simulate Discrete SIMULATE_D | 10 | | | | | |
| SIMULATE_STATUS | 10.1 | | ALL | | 0 | Data Type: DS-83 Allows the transducer discrete input or output to the block to be manually supplied when simulate is enabled. When simulation is disabled, the simulate value and status track the actual value and status. |
| SIMULATE_VALUE | 10.2 | | ALL | | 0 | |
| TRANSDUCER_STATUS | 10.3 | RO | | | 0 | |
| TRANSDUCER_VALUE | 10.4 | RO | | | 0 | |
| ENABLE/DISABLE | 10.5 | | ALL | 0=Not initialized 1=Simulation Disabled 2=Simulation Active | 1 | |
| Process Value State PV_STATE | 11 | | ALL | | 0 | Data Type: Uint16 Index to the text describing the states of a discrete output. |
| Transducer State XD_STATE | 12 | | ALL | | 0 | Data Type: Uint16 Index to the text describing the states of a discrete for the value obtained from the transducer. |
| Grant Deny GRANT_DENY | 13 | | | | | Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters of the block. GRANT:0=N/A, 1=granted DENY: 0=N/A, 1=denied |
| GRANT | 13.1 | | N/A | 0: Program 1: Tune 2: Alarm 3: Local | All bits: 0 | |
| DENY | 13.2 | | N/A | | All bits: 0 | |

-Continued-

## Table 4-72. Discrete Output Function Block Parameter Definitions (Continued)

| Label<br>PARAMETER_NAME | Index<br>Number | RO /<br>RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| I/O Options<br>IO_OPTS | 14 | | OOS | Valid Bits<br>0: Invert<br>1: SP tracks PV in Man<br>3: SP tracks PV in LO<br>4: SP Track retained target in Man or LO<br>6: Fault State to value<br>  0: freeze<br>  1: go to Fault State value<br>7: Use Fault State value on restart<br>8: Target to Man if Fault State activated<br>9: Use PV for BKCAL_OUT<br>  0: SP<br>  1: PV | All bits: 0 | Data Type: Bit String<br>0=Disable<br>1=Enable<br>Allows you to select the type of tracking and the output value when a fault condition occurs. Supported I/O options for the DO function block are SP Tracks PV in Man, SP Tracks PV in LO, SP Tracks Retained Target in Man or LO, Fault State to Value, Use Fault state on Restart, Target to Man if Fault State Activated, and Use PV for BKCAL_OUT. |
| Status Options<br>STATUS_OPTS | 15 | | OOS | 4: Propagate Failure Backward | All bits: 0 | Data Type: Bit String<br>0=Disable<br>1=Enable<br>Options the user may select for the block processing of status. |
| Readback Discrete<br>READBACK_D | 16 | RO | N/A | | Dynamic | Data Type: DS-66<br>0=closed, 1=open, 5, 10, 15, 30...etc. are position in 5% increments. |
| Cascade Input Discrete<br>CAS_IN_D | 17 | | ALL | Status | BAD:<br>NC:<br>const | Data Type: DS-66<br>The remote set point value from another block. |
| | | | | Value | 0 | |
| DO Channel<br>CHANNEL | 18 | | OOS | 0=undefined<br>22=Setpoint (D) | 22=<br>Setpoint (D) | Data Type: Unsigned16<br>Defines which transducer parameter receives the DO output. Select Setpoint (D) to control valve position. |
| Fault State Time<br>FSTATE_TIME | 19 | | ALL | Positive | 0 | Data Type: Float<br>Time from detection of a fault in the remote set point to the Fault State output action. |
| Fault State Value Discrete<br>FSTATE_VAL_D | 20 | | ALL | | 0 | Date Type: Unsigned8<br>Preset discrete SP_D value to use if I/O_OPTS Fault State to Value is set. |
| Back Calculation Output Discrete<br>BKCAL_OUT_D | 21 | RO | N/A | | Dynamic | Data Type: DS-66<br>The value and status required by the BKCAL_IN_D input of another block for output tracking |
| Remote Cascade Input Discrete<br>RCAS_IN_D | 22 | | ALL | Status | BAD:<br>NoCom:<br>NoVal:<br>const | Date Type: DS-66<br>Target set point and status provided by a supervisory host to a discrete control or output block. |
| | | | | Value | 0 | |

-Continued-

Table 4-72. Discrete Output Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Shed Options SHED_OPT | 23 | | ALL | 0=Uninitialized 1=Normal Shed, Normal Return 2=Normal Shed, No Return 3=Shed to Auto, normal return 4=Shed to Auto, no return. Target mode changes to Auto on detection of a shed condition 5=Shed to Manual, normal return 6=Shed to Manual, No return. Target mode changes to MAN on detection of a shed condition. 7=Shed to retained target, normal return 8=Shed to retained target, no return. (Change target to retained target) | 0 | Data Type: Unsigned8 Defines action to be taken on remote control device timeout. Normal Return - actual mode changes to the next lowest priority non-remote mode permitted but returns to the target remote mode when the remote computer completes the initialization handshake. No Return - Target mode changes to the next lowest priority non-remote mode permitted. The target remote mode is lost, so no return occurs. |
| Remote Cascade Output Discrete RCAS_OUT_D | 24 | RO | N/A | | Dynamic | Data Type: DS-66 Block set point and status after ramping, provided to a supervisory host for back calculation and to allow action to be taken under limiting conditions or mode change. |
| Update Event UPDATE_EVT | 25 | | | | | Data Type: DS-73 This alert is generated by any change to the static data. |
| UNACKNOWLEDGED | 25.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0=Undefined | |
| UPDATE_STATE | 25.2 | RO | N/A | 0=Undefined 1=Update reported 2=Update not reported | 0=Undefined | |
| TIME_STAMP | 25.3 | RO | N/A | | 0 | |
| STATIC_REVISION | 25.4 | RO | N/A | | 0 | |
| RELATIVE_INDEX | 25.5 | RO | N/A | | 0 | |
| Block Alarm BLOCK_ALM | 26 | | | | | Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure, or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the active status in the status parameter. As soon as the Unreported status is cleared by the alert reporting procedure, and other block alert may be reported without clearing the Active status, if the subcode has changed. |
| UNACKNOWLEDGED | 26.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0 | |
| ALARM_STATE | 26.2 | RO | N/A | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | 0 | |
| TIME_STAMP | 26.3 | RO | N/A | | 0 | |
| SUBCODE | 26.4 | RO | N/A | | 0 | |
| VALUE | 26.5 | RO | N/A | | 0 | |
| **Extended Blocks** | | | | | | |
| Setpoint Rate Up SP_RATE_UP | 27 | | | > = 0 | 0 | Data Type: Float The ramp rate for SP up in AUTO, CAS, and RCAS modes. Measured in PV units/sec. |
| Setpoint Rate Down SP_RATE_DN | 28 | | | > = 0 | 0 | Data Type: Float The ramp rate for SP down in AUTO, CAS, and RCAS modes. Measured in PV units/sec. |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-73. DO Function Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV_D |
| 8 | SP_D |
| 9 | OUT_D |
| 16 | READBACK_D |
| 17 | CAS_IN_D |

Table 4-74. DO Function Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 11 | PV_STATE |
| 12 | XD_STATE |
| 13.1 | GRANT_DENY.GRANT |
| 13.2 | GRANT_DENY.DENY |

Table 4-75. DO Function Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV_D |
| 8 | SP_D |
| 9 | OUT_D |
| 16 | READBACK_D |
| 17 | CAS_IN |
| 21 | BKCAL_OUT_D |
| 22 | RCAS_IN_D |
| 24 | RCAS_OUT_D |

Table 4-76. DO Function Block, View 4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 14 | IO_OPTS |
| 15 | STATUS_OPTS |
| 18 | CHANNEL |
| 19 | FSTATE_TIME |
| 20 | FSTATE_VAL_D |
| 24 | SHED_OPT |
| 27 | SP_RATE_UP |
| 28 | SP_RATE_DN |

# Field Communicator Menu Structure

**DISCRETE OUTPUT FUNCTION BLOCK**

### Quick Config

Alert Key
Process Value Discrete: Status
Process Value Discrete: Value
Setpoint Discrete: Status
Setpoint Discrete: Value

### Common Config

Alert Key
I/O Options
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Setpoint Discrete: Status
Setpoint Discrete: Value

### Advanced Config

Fault State Time
Fault State Value Discrete
Process Value State
Shed Options
Simulate Discrete: Simulate Status
Simulate Discrete: Simulate Value
Simulate Discrete: Transducer Status
Simulate Discrete: Transducer Value
Simulate Discrete: Simulate En/Disable
Static Revision
Status Options
Strategy
Transducer State

### I/O Reference

DO Channel

### Connectors

Back Calculation Output Discrete: Status
Back Calculation Output Discrete: Value
Cascade Input Discrete: Status
Cascade Input Discrete: Value
Output Discrete: Status
Output Discrete: Value

### Online

Back Calculation Output Discrete: Status
Back Calculation Output Discrete: Value
Block Error
Cascade Input Discrete: Status
Cascade Input Discrete: Value
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Output Discrete: Status
Output Discrete: Value
Process Value Discrete: Status
Process Value Discrete: Value
Remote Cascade Input Discrete: Status
Remote Cascade Input Discrete: Value
Remote Cascade Output Discrete: Status
Remote Cascade Output Discrete: Value
Readback Discrete: Status
Readback Discrete: Value
Setpoint Discrete: Status
Setpoint Discrete: Value

### Status

Block Error

### Other

Tag Description
Grant Deny: Grant
Grant Deny: Deny
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Setpoint Rate Up
Setpoint Rate Down

### All

Characteristics
Static Revision
Tag Description
Strategy
Alert Key
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Block Error
Process Value Discrete: Status
Process Value Discrete: Value
Setpoint Discrete: Status
Setpoint Discrete: Value
Output Discrete: Status
Output Discrete: Value
Simulate Discrete: Simulate Status
Simulate Discrete: Simulate Value
Simulate Discrete: Transducer Status
Simulate Discrete: Transducer Value
Simulate Discrete: Simulate En/Disable
Process Value State
Transducer State
Grant Deny: Grant
Grant Deny: Deny
I/O Options
Status Options
Readback Discrete: Status
Readback Discrete: Value
Cascade Input Discrete: Status
Cascade Input Discrete: Value
DO Channel
Fault State Time
Fault State Value
Back Calculation Output Discrete: Status
Back Calculation Output Discrete: Value
Remote Cascade Input Discrete: Status
Remote Cascade Input Discrete: Value
Shed Options
Remote Cascade Output Discrete: Status
Remote Cascade Output Discrete: Value
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Setpoint Rate Up
Setpoint Rate Down

# Discrete Input Function Block

## Overview

The Discrete Input (DI) function block (figure 4-29) processes a single discrete input from a field device and makes it available to other function blocks. You can configure inversion and alarm detection on the input value. In the DVC6200f digital valve controller, the discrete input function block can provide limit switch functionality and valve position proximity detection. The DI function block supports mode control, signal status propagation, and simulation.

Figure 4-29. Discrete Input (DI) Function Block



OUT_D = The block output and status
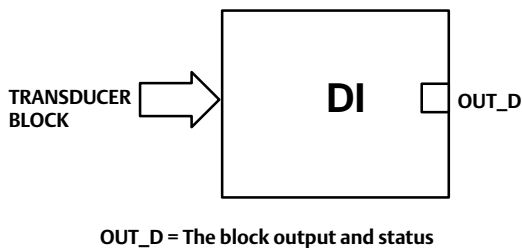
Normally, the block is used in Automatic mode so that the process variable (PV_D [7]) is copied to the output (OUT_D [8]). You can change the mode to Manual to disconnect the field signal and substitute a manually-entered value for the output. In this case, PV_D [7] continues to show the value that will become the OUT_D [8] when the mode is changed to Automatic.

To support testing, you can enable simulation, which allows the measurement value to be supplied manually through the SIMULATE_D [9] parameter. Figure 4-30 illustrates the internal components of the DI function block, and table 4-81 lists the definitions of the block parameters.

Figure 4-30. Discrete Input Function Block Schematic
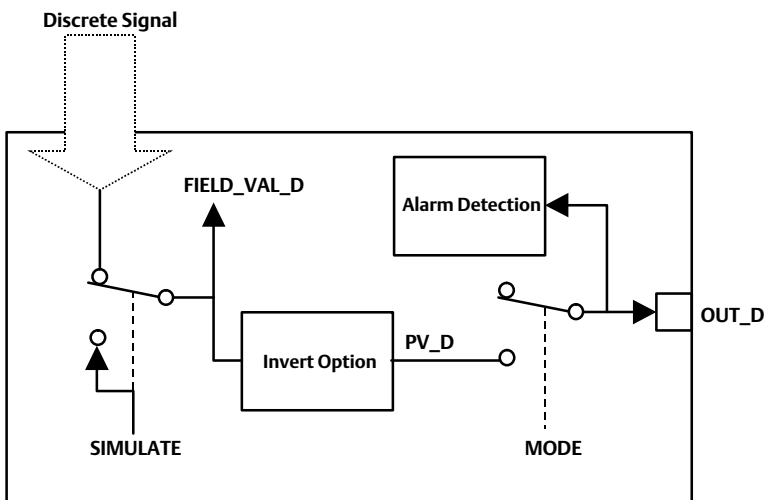
# Modes

The Discrete Input function block supports the following modes:

- **Manual (Man)**—The block output (OUT_D [8]) is disconnected from the field and set manually.

- **Automatic (Auto)**—The block algorithm determines output.

- **Out of Service (OOS)**—The block is not processed. The OUT_D [8] status is set to Bad: Out of Service. The BLOCK_ERR [6] parameter shows Out of Service.

# Block Initialization

The Fieldbus Foundation specification requires that certain parameters in the function blocks have initial values of uninitialized. In addition to setting the Resource block mode to AUTO, the control system or the user must change those parameters from their uninitialized value to a valid value in order for the function block to move from the Out of Service mode. For the DI function block, the CHANNEL [15] parameter must be initialized.

# Status Handling

Under normal conditions, a Good: Non-Cascade status is passed through to OUT_D [8]. The block also supports the Status Action On Failure and BLOCK_ERR [6] indications.

When SIMULATE_D [9] is enabled, FIELD_VAL_D [7], PV_D [7], and OUT_D [8] change to the simulated status. When the block is set to Manual mode, OUT_D [7] is set to Good: Non-cascade, Constant status.

# I/O Selection

To select the I/O associated with the discrete measurement, configure the value of the CHANNEL [15] parameter.

In the digital valve controller, the four classes of channels are

- Valve travel

- Open/Closed limit switch

- Variable limit switch based on transducer block travel alarm settings.

- Proximity position detection based on transducer block travel alarm settings.

The CHANNEL [15] parameter for each of the four DI blocks available in the digital valve controller may be set independently to achieve the desired position detection. The DI block CHANNEL [15] definitions are listed in table 4-77. Refer to the following descriptions for details of the operation of these channels.

# Valve Travel

Channel 23 provides valve travel.

0 = Closed, 1 = 100% open, 5 = 5% open, 10 = 10% open, 15 = 15% open, etc.

Table 4-77. Channel Selection for the Discrete Input Function Block

| Selection | Transducer Block Parameter[1] | Transducer Block Index Number | Bit Number[2] |
|---|---|---|---|
| 23 | TRAVEL_D | 33 | N/A |
| 24 | INST_ALERTS_ACTIVE:PROX_ACTIVE | 74.5 | 0: Travel Open |
| 25 | INST_ALERTS_ACTIVE:PROX_ACTIVE | 74.5 | 1: Travel Closed |
| 26 | INST_ALERTS_ACTIVE:TRAVEL_ACTIVE | 74.4 | 2: Travel Limit Lo Lo |
| 27 | INST_ALERTS_ACTIVE:TRAVEL_ACTIVE | 74.4 | 4: Travel Limit Lo |
| 28 | INST_ALERTS_ACTIVE:TRAVEL_ACTIVE | 74.4 | 3: Travel Limit Hi |
| 29 | INST_ALERTS_ACTIVE:TRAVEL_ACTIVE | 74.4 | 1: Travel Limit Hi Hi |
| 30 | INST_ALERTS_ACTIVE:PROX_ACTIVE | 74.5 | 5: Proximity Lo Lo |
| 31 | INST_ALERTS_ACTIVE:PROX_ACTIVE | 74.5 | 4: Proximity Lo |
| 32 | INST_ALERTS_ACTIVE:PROX_ACTIVE | 74.5 | 3: Proximity Hi |
| 33 | INST_ALERTS_ACTIVE:PROX_ACTIVE | 74.5 | 2: Proximity Hi Hi |

1. Refer to table 4-14 for parameter descriptions.
2. See pages 50 and 52, Travel ALerts and Prox Alerts, for information on accessing these alerts. Refer to Appendix F for information on accessing these alerts through DeltaV.

# Open/Closed Limit Switch

Channels 24 and 25 provide valve open and closed limit switch functionality for the DI block. These channels will detect if the valve position is more than the Travel Open Alert Point for open detection or less than the Travel Closed Alert Point for closed detection. These channels provide an adjustable deadband to clear the detected position.

0= Not Active, 1= Active

# Variable Limit Switch

Channels 26 through 29 provide variable limit switch functionality for the DI block. Trip points for this limit switch functionality are based on the Travel Alert settings in the transducer Block. The DI function block provides the same type of position detection as the travel alerts in the transducer block. Table 4-78 lists the transducer block parameters used with DI block channels 26 through 29. Refer to Travel and Prox, on page 50 for more information on the transducer block travel alerts.

0= Not Active, 1= Active

Table 4-78. Transducer Block Parameters Used with Discrete Input Function Block Channels 26 through 29 (Variable Limit Switch)

| Transducer Block Parameter | Parameter Function |
|---|---|
| Travel Lo Lo Alert Point | Lo Lo Limit Switch Trip Point |
| Travel Lo Lo Alert Deadband | Lo Lo Limit Switch Deadband |
| Travel Lo Alert Point | Lo Limit Switch Trip Point |
| Travel Lo Alert Deadband | Lo Limit Switch Deadband |
| Travel Hi Alert Point | Hi Limit Switch Trip Point |
| Travel Hi Alert Deadband | Hi Limit Switch Deadband |
| Travel Hi Hi Alert Point | Hi Hi Limit Switch Trip Point |
| Travel Hi Hi Alert Deadband | Hi Hi Limit Switch Deadband |

# Valve Position Proximity Detection

Channels 30 through 33 provide valve position proximity detection for the DI block. The transducer block Travel Alert Point and Travel Alert Deadband parameters are also used with the valve position proximity, but they provide a different function. The Travel Alert Point for the selected channel determines the center point for the position to be detected. The Travel Alert Deadband for the selected channel sets the upper and lower trigger points, or the width of the proximity detection band. A 1% deadzone exists above and below this band that the travel must exceed to clear

the detected position. Figure 4-31 illustrates the operation of the proximity detection function. Travel Alert Point refers to Travel Lo Alert Point, Travel Hi Alert Point, Travel Lo Lo Alert Point, and Travel Hi Hi Alert Point in table 4-79. Travel Alert Deadband refers to Travel Lo Alert Deadband, Travel Hi Alert Deadband, Travel Lo Lo Alert Deadband, and Travel Hi Hi Alert Deadband in table 4-79.

Figure 4-31. Discrete Input Proximity Detection Function
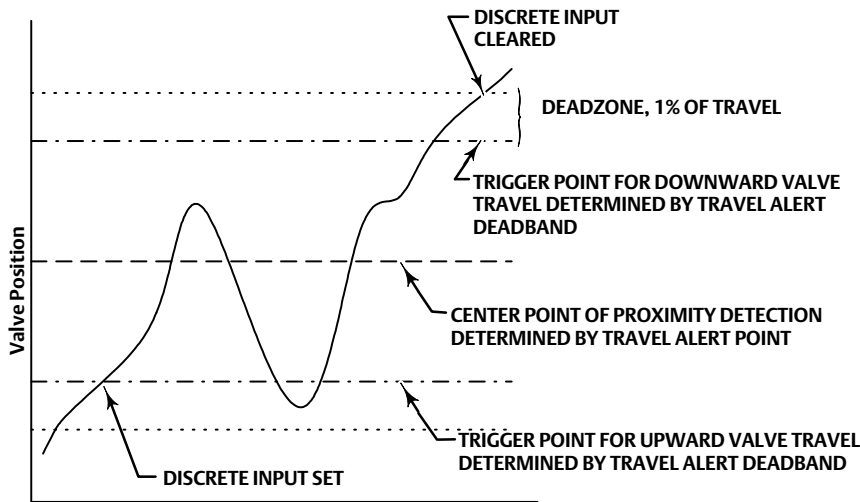


0= Not Active, 1= Active

Table 4-79 lists the transducer block parameters used for proximity detection with DI block channels 30 through 33.

Table 4-79. Transducer Block Parameters Used with Discrete Input Function Block Channels 30 through 33

| Transducer Block Parameter | Parameter Function |
|---|---|
| Travel Lo Lo Alert Point | Lo Lo Proximity Detection Center Point |
| Travel Lo Lo Alert Deadband | Lo Lo Proximity Detection Width |
| Travel Lo Alert Point | Lo Proximity Detection Center Point |
| Travel Lo Alert Deadband | Lo Proximity Detection Width |
| Travel Hi Alert Point | Hi Proximity Detection Center Point |
| Travel Hi Alert Deadband | Hi Proximity Detection Width |
| Travel Hi Hi Alert Point | Hi Hi Proximity Detection Center Point |
| Travel Hi Hi Alert Deadband | Hi Hi Proximity Detection Width |

# Field Value Processing

The Invert bit of the IO_OPTS [13] parameter may be used to logically invert the value of FIELD_VAL_D [17] before it is stored as PV_D [7]. PV_FTIME [16] may

be used to set the length of time that FIELD_VAL_D [17] must be in a new state before that new state is reflected in PV_D. The PV_D [7] value goes to the mode switch where it becomes OUT_D [8] when the actual mode is AUTO. OUT_D [8] is also tested for an alarm state.

**Note**

Invert is the only I/O option that the DI block supports. You can set the I/O option only when the block mode is Out of Service.

# Alarm Detection

To select the state that initiates an input alarm, and to set discrete alarm substatus in the output, configure the DISC_LIM [23] parameter. You can enter any value between 0 and 255. A value of 255 disables the alarm. When OUT_D [8] matches the DISC_LIM [23] state, the discrete value of an alarm is set.

# Block Errors

Table 4-80 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are not applicable for the DI block and are provided only for your reference.

Table 4-80. BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other (N/A)* |
| 1 | **Block Configuration Error**—CHANNEL set to 0 through 10 (uninitialized) |
| 2 | *Link Configuration Error (N/A)* |
| 3 | **Simulate Active**—Simulate is enabled. Output does not reflect process conditions |
| 4 | *Local Override (N/A)* |
| 5 | *Device Fault State Set (N/A)* |
| 6 | *Device Needs Maintenance Soon (N/A)* |
| 7 | **Input failure/process variable has Bad status**—The hardware is bad or the transducer block mode is Out of Service |
| 8 | *Output Failure (N/A)* |
| 9 | *Memory Failure (N/A)* |
| 10 | *Lost Static Data (N/A)* |
| 11 | *Lost NV Data (N/A)* |
| 12 | *Readback Check Failed (N/A)* |
| 13 | *Device Needs Maintenance Now (N/A)* |
| 14 | **Power Up**—Set after power-up until actual mode is not Out of Service |
| 15 | **Out of Service**—The actual mode is Out of Service (OOS). The block is not being processed. |

# Action on Failure

In case of hardware failure, FIELD_VAL_D [17], PV_D [7], and OUT_D [8] change to a Bad status and the BLOCK_ ERR [6] parameter shows Process Variable has Bad Status. If the transducer block mode is Out of Service, the status of FIELD_VAL_D [17], PV_D [7], and OUT_D [8] is set to Bad:Out of Service.

# Simulation

To support testing of the control strategy, you can enable the SIMULATE_D [9] parameter. Normally the measurement value and status used for FIELD_VAL_D [17] in the DI block reflect actual process values as provided by the transducer block. When the SIMULATE_D [9] parameter is enabled, value and status used for FIELD_VAL_D [17] is supplied by the user manually. To enable simulation in the DI function block, the simulate jumper must be installed. For information on the installation of this jumper, see the Installation section.

The SIMULATE_D [9] parameter has three components:

- Simulate_D enable/disable determines whether the function block will use the actual process value and status, or Simulate Value and Simulate Status.

- Transducer Value and Status reflect the process values provided by the transducer block.

- Simulate Value and Status may be entered by the user when enable/disable is set to enabled.

To use simulate, first install the simulate jumper in the terminal box, then set Simulate_D enable/disable to enabled, then enter the desired values for Simulate Value and Status.

When SIMULATE_D [9] is enabled, the Simulate Active bit of the BLOCK_ERR [6] parameter is set (refer to the Block Errors description). When the simulate jumper is installed, the Simulate Jumper bit of the transducer block parameter SELFTEST_STATUS [78] is set.

# Application Information

Figure 4-32 compares the operation of a standard discrete input to a proximity discrete input. With the standard discrete input, the discrete input changes state when the valve position passes a configurable trip point. This can be used to indicate if the valve position is above or below the trip point.

Figure 4-32. Proximity Discrete Input Compared to a Standard Discrete Input
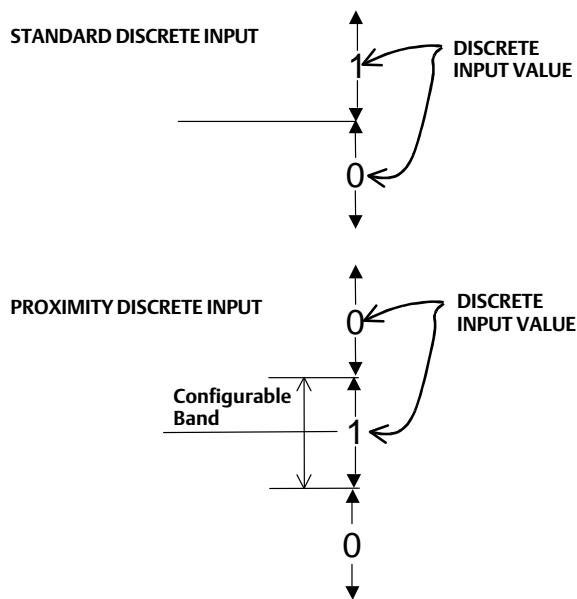


With the proximity discrete input a configurable band can be established about a central point. Whenever the valve position enters this configurable band, the discrete input changes state. A proximity discrete input is useful for applications which require knowing the location of the valve when the valve is not near 0% or 100%.

# DI Function Block Parameter List (table 4-81)

- Read/Write Capability: RO - Read Only, RW - Read Write
- Mode: The block mode(s) required to write to the parameter
- Double indentation and shaded Index Number indicates sub-parameter

Table 4-81. Discrete Input Function Block Parameter Definitions

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Static Revision ST_REV | 1 | RO | N/A | 0 to 65535 | 0 | Data Type: Unsigned16 The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed. |
| Tag Description TAG_DESC | 2 | RW | ALL | 7 bit ASCII | Spaces | Data Type: Octet String The user description of the intended application of the block. |
| Strategy STRATEGY | 3 | RW | ALL | 0 to 65535 | 0 | Data Type: Unsigned16 The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block. |
| Alert Key ALERT_KEY | 4 | RW | ALL | 1 to 255 | 0 | Data Type: Unsigned8 The identification number of the plant unit. This information may be used in the host for sorting alarms, etc. |
| Block Mode MODE_BLK | 5 | | | | | Data Type: DS-69 Valid Bits: 7:OOS, 4:MAN, 3:AUTO The actual, target, permitted, and normal modes of the block. Target: The requested block mode Actual: The current mode of the block Permitted: Allowed modes for Target Normal: Most common mode for Target |
| TARGET | 5.1 | RW | ALL | OOS MAN AUTO | OOS until block is configured, then last valid target | |
| ACTUAL | 5.2 | RO | ALL | | OOS | |
| PERMITTED | 5.3 | RW | ALL | OOS+MAN+AUTO | OOS+MAN+AUTO | |
| NORMAL | 5.4 | RO | ALL | | AUTO | |
| Block Error BLOCK_ERR | 6 | RO | N/A | Defined Bits 1: Block Configuration Error 3: Simulate Active 7: Input Failure / Bad PV Status 14: Power-up 15: Out-of-Service | Dynamic | Data Type: Bit String 0=Inactive 1=Active This parameter reflects the error status associated with the hardware or software components associated with a block. Multiple errors may be shown, see table 4-80. |
| Process Value Discrete PV_D | 7 | RO | N/A | PV_D Status set equal to Field_Val_D Status | Dynamic | Data Type: DS-66 The process variable used in block execution. Value is converted from Readback to show the actuator position in the same units as the set point value. |
| Output Discrete OUT_D | 8 | | OOS MAN | OUT_STATE | | Data Type: DS-66 The primary discrete value calculated as a result of executing the function. |
| Simulate Discrete SIMULATE_D | 9 | | | | | Data Type: DS-83 Allows the transducer discrete input or output to the block to be manually supplied when simulate is enabled. When simulation is disabled, the simulate value and status track the actual value and status. |
| SIMULATE_STATUS | 9.1 | | ALL | | 0 | |
| SIMULATE_VALUE | 9.2 | | ALL | | 0 | |
| TRANSDUCER_STATUS | 9.3 | RO | ALL | | 0 | |
| TRANSDUCER_VALUE | 9.4 | RO | ALL | | 0 | |
| ENABLE/DISABLE | 9.5 | | | 0=Not initialized 1=Simulation Disabled 2=Simulation Active | 1=Simulation Disabled | |
| Transducer State XD_STATE | 10 | | ALL | | 0 | Data Type: Uint16 Index to the text describing the states of a discrete for the value obtained from the transducer. |
| Output State OUT_STATE | 11 | | ALL | | 0 | Data Type: Unsigned16 Index to the text describing the states of a discrete output. |

-Continued-

## Table 4-81. Discrete Input Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Grant Deny GRANT_DENY | 12 | | | | | Data Type: DS-70 Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters of the block. GRANT: 0=NA, 1=granted DENY: 0=NA, 1=denied |
| GRANT | 12.1 | | ALL | 0: Program 1: Tune | All bits:0 | |
| DENY | 12.2 | | ALL | 2: Alarm 3: Local | All bits: 0 | |
| I/O Options IO_OPTS | 13 | | OOS | 0: Invert | All bits:0 | Data Type: Bit String 0=Disable 1=Enable Allows you to select how the I/O signals are processed. |
| Status Options STATUS_OPTS | 14 | | OOS | 3=Propagate Failure Forward 8=Uncertain in MAN mode | All bits:0 | Data Type: Bit String 0=Disable 1=Enable Options the user may select for the block processing of status. |
| DI Channel CHANNEL | 15 | | OOS | 0=undefined 23=Valve Position or Pressure (Discrete) 24= PV > 97% 25= PV < 3% 26=PV Below LO LO limit 27=PV Below LO limit 28=PV Above HI limit 29=PV Above HI HI limit 30=PV Within Proximity of LO LO 31=PV Within Proximity of LO 32=PV within Proximity of HI 33=PV within Proximity of HI HI | 0=Undefined | Data Type: Unsigned16 Defines the functionality of the discrete input. See I/O Selection for details. Refer to table 4-77. |
| Process Value Filter Time PV_FTIME | 16 | | ALL | Positive | 0 | Data Type: Float Time that FIELD_VAL_D must be in a new state, before the change is reflected to PV_D and OUT_D. |
| Field Value Discrete FIELD_VAL_D | 17 | RO | | | 0 | Data Type: DS-66 Raw value of the field device discrete input, with a status reflecting the transducer condition. |
| Update Event UPDATE_EVT | 18 | | | | | Data Type: DS-73 This alert is generated by any change to the static data. |
| UNACKNOWLEDGED | 18.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | 0=Undefined | |
| UPDATE_STATE | 18.2 | RO | N/A | 0=Undefined 1=Update Reported 2=Updated not reported | 0=Undefined | |
| TIME_STAMP | 18.3 | RO | N/A | | 0 | |
| STATIC_REVISION | 18.4 | RO | N/A | | 0 | |
| RELATIVE_INDEX | 18.5 | RO | N/A | | 0 | |

-Continued-

## Table 4-81. Discrete Input Function Block Parameter Definitions (Continued)

| Label PARAMETER_NAME | Index Number | RO / RW | Block Mode | Range | Initial Value | Description |
|---|---|---|---|---|---|---|
| Block Alarm BLOCK_ALM | 19 | | | | Dynamic | Data Type: DS-72 The block alarm is used for all configuration, hardware, connection failure, or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the active status in the status parameter. As soon as the unreported status is cleared by the alert reporting procedure, and other block alert may be reported without clearing the active status, if the subcode has changed. |
|     UNACKNOWLEDGED | 19.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | | |
|     ALARM_STATE | 19.2 | RO | N/A | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | | |
|     TIME_STAMP | 19.3 | RO | N/A | | | |
|     SUBCODE | 19.4 | RO | N/A | | | |
|     VALUE | 19.5 | RO | | | | |
| Alarm Summary ALARM_SUM | 20 | | | 0: Discrete alarm 7: Block Alarm | | Data Type: DS-74 The current alert status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block. 0=clear reported 0=acknowledged 0=reported 0=enabled |
|     CURRENT | 20.1 | RO | | | All bits: 0 | |
|     UNACKNOWLEDGED | 20.2 | RO | | | All bits: 0 | |
|     UNREPORTED | 20.3 | RO | | | All bits: 0 | |
|     DISABLED | 20.4 | RW | | | All bits: 0 | |
| Acknowledge Option ACK_OPTION | 21 | | ALL | 0: Discrete 1: Block Alarm | All bits: 0 | Data Type: Bit String 0=Disable 1=Enable Used to set auto acknowledgement of alarms |
| Discrete Priority DISC_PRI | 22 | | ALL | 0 to 15 | 0 | Data Type: Unsigned8 Priority of the discrete alarm. |
| Discrete Limit DISC_LIM | 23 | | ALL | PV_STATE | 0 | Data Type: Unsigned8 State of discrete input which will generate an alarm. |
| Discrete Alarm DISC_ALM | 24 | | | | | Data Type: DS-72 The discrete alarm is used for indication of a state change in selected discrete channel. |
|     UNACKNOWLEDGED | 24.1 | RW | N/A | 0=Undefined 1=Acknowledged 2=Unacknowledged | | |
|     ALARM_STATE | 24.2 | RO | N/A | 0=Undefined 1=Clear reported 2=Clear not reported 3=Active reported 4=Active not reported | | |
|     TIME_STAMP | 24.3 | RO | N/A | | | |
|     SUBCODE | 24.4 | RO | N/A | | | |
|     VALUE | 24.5 | RO | N/A | | | |

# View Lists

View lists allow the values of a set of parameters to be accessed at the same time. Views 1 and 2 contain operating parameters and are defined by the Fieldbus Foundation. View 3 contains dynamic parameters and View 4 contains static parameters with configuration and maintenance information. Views 3 and 4 are defined by the manufacturer.

Table 4-82. DI Function Block, View 1

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV_D |
| 8 | OUT_D |
| 17 | FIELD_VAL_D |
| 20.1 | ALARM_SUM.CURRENT |
| 20.2 | ALARM_SUM.UNACKNOWLEDGED |
| 20.3 | ALARM_SUM.UNREPORTED |
| 20.4 | ALARM_SUM.DISABLED |

Table 4-83. DI Function Block, View 2

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 10 | XD_STATE |
| 11 | OUT_STATE |
| 12.1 | GRANT_DENY.GRANT |
| 12.2 | GRANT_DENY.DENY |

Table 4-84. DI Function Block, View 3

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 5.1 | MODE_BLK.TARGET_MODE |
| 5.2 | MODE_BLK.ACTUAL_MODE |
| 5.3 | MODE_BLK.PERMITTED_MODE |
| 5.4 | MODE_BLK.NORMAL_MODE |
| 6 | BLOCK_ERR |
| 7 | PV_D |
| 8 | OUT_D |
| 17 | FIELD_VAL_D |
| 20.1 | ALARM_SUM.CURRENT |
| 20.2 | ALARM_SUM.UNACKNOWLEDGED |
| 20.3 | ALARM_SUM.UNREPORTED |
| 20.4 | ALARM_SUM.DISABLED |

Table 4-85. DI Function Block, View 4

| Index Number | Parameter |
|---|---|
| 1 | ST_REV |
| 3 | STRATEGY |
| 4 | ALERT_KEY |
| 13 | IO_OPTS |
| 14 | STATUS_OPTS |
| 15 | CHANNEL |
| 16 | PV_FTIME |
| 21 | ACK_OPTION |
| 22 | DISC_PRI |
| 23 | DISC_LIM |

# Field Communicator Menu Structure

**DISCRETE INPUT FUNCTION BLOCK**

### Quick Config

Alert Key
Process Value Discrete: Status
Process Value Discrete: Value

### Common Config

Alert Key
Discrete Limit
I/O Options
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Process Value Filter Time

### Advanced Config

DI Channel
Output State
Simulate Discrete: Simulate Status
Simulate Discrete: Simulate Value
Simulate Discrete: Transducer Status
Simulate Discrete: Transducer Value
Simulate Discrete: Simulate En/Disable
Static Revision
Status Options
Transducer State

### Connectors

Output Discrete: Status
Output Discrete: Value
Strategy

### Online

Block Error
Field Value Discrete: Status
Field Value Discrete: Value
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Output Discrete: Status
Output Discrete: Value
Process Value Discrete: Status
Process Value Discrete: Value

### Status

Block Error

### Other

Tag Description
Grant Deny: Grant
Grant Deny: Deny
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Alarm Summary: Current
Alarm Summary: Unacknowledged
Alarm Summary: Unreported
Alarm Summary: Disabled
Acknowledge Option
Discrete Alarm: Unacknowledged
Discrete Alarm: Alarm State
Discrete Alarm: Time Stamp
Discrete Alarm: Subcode
Discrete Alarm: Discrete Value

### All

Characteristics
Static Revision
Tag Description
Strategy
Alert Key
Block Mode: Target
Block Mode: Actual
Block Mode: Permitted
Block Mode: Normal
Block Error
Process Value Discrete: Status
Process Value Discrete: Value
Output Discrete: Status
Output Discrete: Value
Simulate Discrete: Simulate Status
Simulate Discrete: Simulate Value
Simulate Discrete: Transducer Status
Simulate Discrete: Transducer Value
Simulate Discrete: Simulate En/Disable
Transducer State
Output State
Grant Deny: Grant
Grant Deny: Deny
I/O Options
Status Options
DI Channel
Process Value Filter Time
Field Value Discrete: Status
Field Value Discrete: Value
Update Event: Unacknowledged
Update Event: Update State
Update Event: Time Stamp
Update Event: Static Rev
Update Event: Relative Index
Block Alarm: Unacknowledged
Block Alarm: Alarm State
Block Alarm: Time Stamp
Block Alarm: Subcode
Block Alarm: Value
Alarm Summary: Current
Alarm Summary: Unacknowledged
Alarm Summary: Unreported
Alarm Summary: Disabled
Acknowledge Option
Discrete Priority
Discrete Limit
Discrete Alarm: Unacknowledged
Discrete Alarm: Alarm State
Discrete Alarm: Time Stamp
Discrete Alarm: Subcode
Discrete Alarm: Discrete Value

# Section 5 Calibration

## Calibration Overview

When a DVC6200f digital valve controller is ordered as part of a control valve assembly, the factory mounts the digital valve controller on the actuator and connects the necessary tubing, then sets up and calibrates the controller.

For digital valve controllers that are ordered separately, recalibration of the pressure sensors generally is unnecessary. However, after mounting on an actuator, perform the initial setup then calibrate travel by selecting *Configure / Setup > Calibration > Auto Calibration*. For more detailed calibration information, refer to the following calibration procedures.

## Calibration

| Field Communicator | TB > Configure/Setup > Calibration |
|---|---|

- **Auto Calibration** —This procedure automatically calibrates the travel. The calibration procedure uses the valve and actuator stops as the 0% and 100% calibration points. See page 190.

- **Manual Calibration** —This procedure permits manual calibration of the travel. This calibration procedure allows you to determine the 0% and 100% calibration points. See page 190.

- **Relay** —This procedure permits adjustment of the pneumatic relay. See page 191.

- **Supply Pressure** —This procedure permits calibrating the supply pressure sensor. Normally the sensor is calibrated at the factory and should not need calibration. See page 192.

- **Pressure A**— This procedure permits calibrating the pressure A sensor. Normally the sensor is calibrated at the factory and should not need calibration. See page 193.

- **Pressure B** —This procedure permits calibrating the pressure B sensor. Normally the sensor is calibrated at the factory and should not need calibration. See page 193.

---

**Note**

The Instrument Mode must be Out Of Service and the Protection set to None before the instrument can be calibrated.

If you are operating in burst mode, we recommend that you disable burst before continuing with calibration. Once calibration is complete, burst mode may then be turned back on.

---

### ⚠ WARNING

**During calibration the valve will move full stroke. To avoid personal injury and property damage caused by the release of pressure or process fluid, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.**

If a double-acting relay is used, you will be prompted to run the relay adjustment when auto or manual calibration is selected. Select Yes to adjust the relay, select No to proceed with calibration. For additional information, refer to Relay Adjustment in this section.

---

**Note**

Relay Adjustment is only available for the double-acting relay (Relay A).

---

## Auto Calibration

| Field Communicator | TB > Configure/Setup > Calibration > Auto Calibration |
|---|---|

Follow the prompts on the Field Communicator display to automatically calibrate travel.

1. The auto calibration procedure is automatic. It is completed when the *Calibration* menu appears.

During calibration, the instrument seeks the high and low end points and the minor loop feedback (MLFB) and output bias. By searching for the end points, the instrument establishes the limits of physical travel, i.e. the actual travel 0 and 100% positions. This also determines how far the relay beam swings to calibrate the sensitivity of the MLFB sensor.

2. Place the instrument In Service and verify that the travel properly tracks the current source.

## Manual Calibration

| Field Communicator | TB > Configure/Setup > Calibration > Manual Calibration |
|---|---|

---

**Note**

0% Travel = Valve Closed ; 100% Travel = Valve Open

---

1. From the adjustment menu, select the direction and size of change required to set the travel at 0% (move the valve to close). Selecting large, medium, and small adjustments causes changes of approximately 10.0%, 1.0%, and 0.1%, respectively, to the travel feedback movement. Selecting Next will implement the adjustment.

If another adjustment is required, repeat step 1. Otherwise, select Done and go to step 2.

2. From the adjustment menu, select the direction and size of change required to set the travel to 100% (move the valve to open).

If another adjustment is required, repeat step 2. Otherwise, select Done and go to step 3.

3. Enter the name of the person performing the calibration procedure.

4. Enter the location of the calibration procedure.

5. Enter the date of the calibration procedure.

6. Place the Transducer Block Mode in Manual and verify that the travel properly tracks the setpoint changes.

# Relay

| Field Communicator | TB > Configure/Setup > Calibration > Relay |
|---|---|

Follow the prompts on the Field Communicator display to check relay adjustment. Replace the digital valve controller cover when finished.

---

**Note**

Relay B and C are not user-adjustable.

---

## Double-Acting Relay

The double-acting relay is designated by "Relay A" on a label affixed to the relay itself. For double-acting actuators, the valve must be near mid-travel to properly adjust the relay. The Field Communicator will automatically position the valve when *Relay* is selected.

## CAUTION

**Care should be taken during relay adjustment as the adjustment disc may disengage if rotated too far.**

---

Rotate the adjustment disc, shown in figure 5-1, until the output pressure displayed on the Field Communicator is between 50 and 70% of supply pressure. This adjustment is very sensitive. Be sure to allow the pressure reading to stabilize before making another adjustment (stabilization may take up to 30 seconds or more for large actuators).

---

Figure 5-1. Relay A Adjustment (Shroud Removed for Clarity)



FOR SINGLE-ACTING DIRECT RELAYS: ROTATE ADJUSTMENT DISC IN THIS DIRECTION UNTIL IT CONTACTS THE BEAM

FOR DOUBLE-ACTING RELAYS: ROTATE ADJUSTMENT DISC IN THIS DIRECTION TO DECREASE OUTPUT PRESSURE

FOR DOUBLE-ACTING RELAYS: ROTATE ADJUSTMENT DISC IN THIS DIRECTION TO INCREASE OUTPUT PRESSURE

ADJUSTMENT DISC

RELAY A

W9034
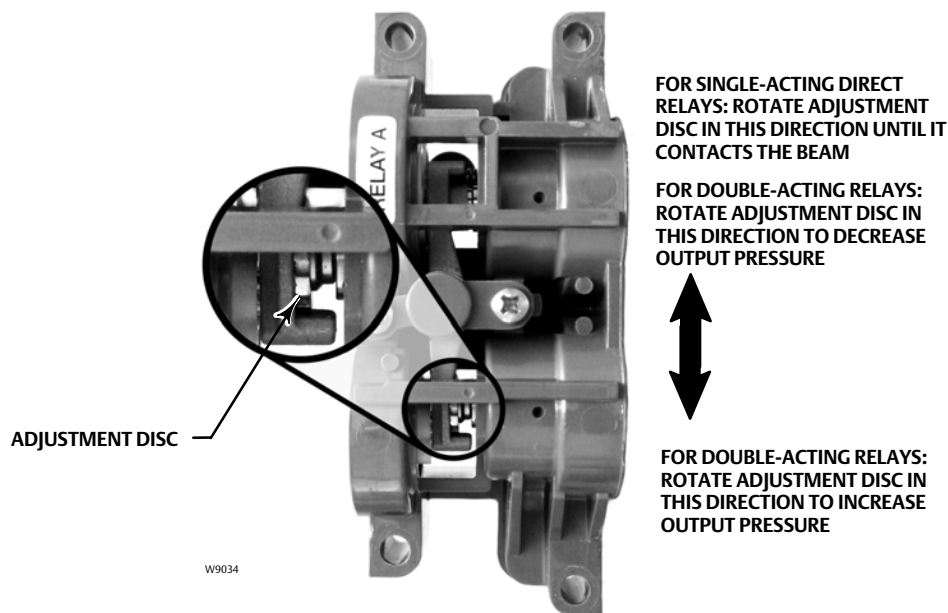
If the low bleed relay option has been ordered stabilization may take approximately two minutes longer than the standard relay.

Relay A may also be adjusted for use in single-acting- direct applications. Rotate the adjustment disc as shown in figure 5-1 for single-acting direct operation.

## Single-Acting Relays

### ⚠ WARNING

**For instrument level PD only:**

**If the unused port is monitoring pressure, ensure that the pressure source conforms to ISA Standard 7.0.01 and does not exceed the pressure supplied to the instrument.**

**Failure to do so could result in personal injury or property damage caused by loss of process control.**

### Single-Acting Direct Relay

The single-acting direct relay is designated by "Relay C" on a label affixed to the relay itself. Relay C requires no adjustment.

### Single-Acting Reverse Relay

The single-acting reverse relay is designated by "Relay B" on a label affixed to the relay itself. Relay B is calibrated at the factory and requires no further adjustment.

# Supply Pressure Sensor

| Field Communicator | TB > Configure/Setup > Calibration > Supply Pressure |
|---|---|

---

**Note**

The pressure sensor is calibrated at the factory and should not require calibration.

---

To calibrate the supply pressure sensor, connect an external reference gauge to the output side of the supply regulator. The gauge should be capable of measuring maximum instrument supply pressure. Select  Follow the prompts on the Field Communicator display to calibrate the instrument's supply pressure sensor.

1. Select a) Zero Only, or b) Zero and Span (gauge required).

    a. If Zero Only calibration is selected, adjust the supply pressure regulator to remove supply pressure from the instrument. Press OK. Once calibration is complete, go to step 5.

    b. If Zero and Span calibration is selected, adjust the supply pressure regulator to remove supply pressure from the instrument. Press OK. Adjust the supply regulator to the maximum instrument supply pressure. Press OK. Proceed with step 2.

2. The following message appears:

> Use the Increase and
> Decrease selections until
> the displayed pressure
> matches the instrument
> supply pressure.

Press OK when you have read this message.

3. The value of the pressure appears on the display.

4. From the adjustment menu, select the direction and size of adjustment to the displayed value. Selecting large, medium, and small adjustments causes changes of approximately 3.0 psi/0.207 bar/20.7 kPa, 0.30 psi/0.0207 bar/2.07 kPa, and 0.03 psi/0.00207 bar/0.207 kPa, respectively. Adjust the displayed value until it matches the supply pressure, select Done and go to step 5.

5. Place the instrument In Service and verify that the displayed pressure matches the measured supply pressure.

# Pressure A or B Sensor

| Field Communicator | TB > Configure/Setup > Calibration > Pressure A |
|---|---|

| Field Communicator | TB > Configure/Setup > Calibration > Pressure B |
|---|---|

To calibrate the output pressure sensor, connect an external reference gauge to the output being calibrated. The gauge should be capable of measuring maximum instrument supply pressure. Select . Follow the prompts on the Field Communicator display to calibrate the instrument's output pressure sensor.

1. Adjust the supply pressure regulator to the maximum instrument supply pressure. Press OK.

2. The instrument reduces the output pressure to 0. The following message appears.

> Use the Increase and
> Decrease selections
> until the displayed
> pressure matches the
> output x pressure.

Press OK when you have read the message.

3. The value of the output pressure appears on the display. Press OK to display the adjustment menu.

4. From the adjustment menu, select the direction and size of adjustment to the displayed value. Selecting large, medium, and small adjustments causes changes of approximately 3.0 psi/0.207 bar/20.7 kPa, 0.30 psi/0.0207 bar/2.07 kPa, and 0.03 psi/0.00207 bar/0.207 kPa, respectively. If the displayed value does not match the output pressure, press OK, then repeat this step (step 4) to further adjust the displayed value. When the displayed value matches the output pressure, select Done and go to step 5.

5.  The instrument sets the output pressure to full supply. The following message appears.

> Use the Increase and Decrease selections until the displayed pressure matches the output x pressure.

Press OK when you have read the message.

6.  The value of the output pressure appears on the display. Press OK to display the adjustment menu.

7.  From the adjustment menu, select the direction and size of adjustment to the displayed value. If the displayed value does not match the output pressure, press OK, then repeat this step (step 7) to further adjust the displayed value. When the displayed value matches the output pressure, select Done and go to step 8.

8.  Place the instrument In Service and verify that the displayed pressure matches the measured output pressure.

# Section 6 Viewing Device Variables and Diagnostics

## View Lists

View Lists allow the values of a set of parameters to be accessed at the same time. View lists are available for the resource and transducer blocks, and the function blocks.

Resource Block—tables 4-4 through 4-7

Transducer Block—tables 4-15 through 4-23

AO Function Block—tables 4-26 through 4-29

PID Function Block—tables 4-33 through 4-37

IS Function Block—tables 4-41 through 4-44

OS Function Block—tables 4-49 through 4-52

AI Function Block—tables 4-58 through 4-61

MAI Function Block—tables 4-65 through 4-68

DO Function Block—tables 4-73 through 4-76

DI Function Block—tables 4-82 through 4-85

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**Note**

Views Lists are used by hosts for efficient monitoring of multiple parameters. Normally you will not be aware of view list usage, as they are hidden by the host software.

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## Resource Block

This section contains information on the DVC6200f digital valve controller resource block. The resource block defines the physical resources of the device. The resource block also handles functionality that is common across multiple blocks. The block has no linkable inputs or outputs.

Table 6-1. Resource Block BLOCK_ERR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | **Other** - Set if a device initialization error occurred. |
| 1 | **Block Configuration Error** - Set if FEATURE_SEL, CYCLE_SEL, or CYCLE_TYPE is set incorrectly. |
| 2 | *Link Configuration Error - N/A* |
| 3 | **Simulate Active** - Indicates that the simulation jumper is in place on the aux terminals. This is not an indication that the I/O blocks are using simulation data. See AO block parameter SIMULATE [10] and DO block parameter SIMULATE_D [10]. |
| 4 | *Local Override - N/A* |
| 5 | *Device Fault State  - N/A* |
| 6 | **Device Needs Maintenance Soon** - Indicates a Maintenance PlantWeb Alert condition is active. |
| 7 | *Input failure/process variable had Bad status - N/A* |
| 8 | *Output failure - N/A* |
| 9 | **Memory failure** - Indicates a pending Flash or NVM failure. |
| 10 | **Lost Static Data** - Indicates failure of the memory containing static parameters |
| 11 | **Lost NV Data** - Indicates failure of the memory containing non-volatile parameters. |
| 12 | *Readback Check Failed - NA* |
| 13 | **Device Needs Maintenance Now** - Indicates a Failed PlantWeb Alert condition is active. |
| 14 | **Power Up** - Indicates the device has been powered up and the Resource Block is not running normally. |
| 15 | **Out of Service (MSB)** - The resource block actual mode is Out of Service. |

# Device Diagnostics

## Resource Block Error

(RB > Device Diagnostics > Resource Block Error)

| Field Communicator | RB > Device Diagnostics > Resource Block Error |
|---|---|

Block Error (BLOCK_ERR [6]) indicates an error status associated with hardware or software for the resource block.

Table 6-1 lists conditions reported in the BLOCK_ERR [6] parameter. Conditions in *italics* are not applicable for the resource block and are provided only for your reference.

## Device State

| Field Communicator | RB > Device Diagnostics > Device State |
|---|---|

Device State (RS_STATE [7]) indicates the state of the function blocks. Four states are possible:

○ **Initialization**—The instrument enters this state upon restart or failure. The function blocks are in the IMan mode. During the initialization state, all unreported function block alarms are automatically confirmed and acknowledged. Once the instrument is considered operational, block execution is scheduled and the instrument state moves to Online.

○ **Online**—The instrument will be in this state if it is operational. The function blocks are initially in the Auto mode, but can be changed to a higher level mode.

○ **Standby**—The instrument enters this state if the resource block mode is Out of Service (OOS). In this state all function block modes are forced to Out of Service. The transducer block mode is not affected. When the resource block mode is changed to Auto, the instrument state moves to Online.

○ **Failure**— The instrument moves to this state whenever a hardware or memory failure is detected which would prevent reliable operation. All function blocks and the transducer block modes are Out of Service.

## Write Lock

| Field Communicator | RB > Device Diagnostics > Write Lock |
|---|---|

● Write Alarm: Alarm State

● Write Lock

Write Lock (WRITE_LOCK [34]) determines if writes are permissible to other device parameters. The Soft Write Lock feature must be selected to be able to use Write Lock (see Selecting Features). When Write Lock is set to Locked, no writes are permitted to any parameters within the device except to set Write Lock to Not Locked. When locked, the block functions normally, updating inputs and outputs and executing algorithms. When Write Lock is set to Not Locked, the Write Alarm alert is active.

# Block Alarm

| Field Communicator | RB > Device Diagnostics > Block Alarm |
|---|---|

The Block Alarm (BLOCK_ALM [36]) is used for all configuration, hardware, connection failure or system problems in the block.

● Block Alarm: Alarm State

Block Alarm: Alarm State (BLOCK_ALM. ALARM_STATE [36.2]) indicates the state of the Block Alarm. Five states are possible:

- ○ Undefined
- ○ Clear reported
- ○ Clear not reported
- ○ Active reported
- ○ Active not reported

● Block Alarm: Unacknowledged

Block Alarm: Unacknowledged (BLOCK_ALARM. UNACKNOWLEDGED [36.1])

1 = Undefined
2 = Acknowledged
3 = Unacknowledged

# Maintenance

| Field Communicator | RB > Device Diagnostics > Maintenance |
|---|---|

● Restart Actions

## ⚠ WARNING

**Restarting the instrument may cause loss of process control. To avoid personal injury and property damage caused by the release of pressure of process fluid, isolate the valve from the process and equalize pressure on both sides of the valve or bleed off the process fluid.**

You can restart the instrument to reset parameters, links, etc. within the instrument. However, due to the effect that a restart can have on the instrument, and therefore the control loop, restarting the instrument should be used cautiously and only as a last measure. The following procedure describes how to use Restart Options to restart the instrument with a Field Communicator. You can also restart the instrument using ValveLink software or from a host system using the Restart method included with the device description (DD) software.

You can restart the instrument any time it is connected to an active segment.

| Field Communicator | RB > Device Diagnostics > Maintenance > Restart Actions |
|---|---|

1. Restart informs you about what can happen when an instrument restart is performed. Select *Yes* to continue, or *No* to abort without restarting.

2. Select the desired restart action or select *EXIT* to exit Restart. Select Help (not the Help button) to get information on restart actions.

There are two different restarts: Restart Processor, and Restart with Defaults:

When selecting either of these options, Restart informs you of the consequences of this action and asks if you want to continue. Select *Yes* to perform the restart action, select *No* to select another action or exit. Restart informs you when the restart is completed. You must acknowledge the message to continue.

*Restart Processor*—Performing a Restart Processor has the same effect as removing power from the instrument and re-applying power. Configuration and calibration do not change.

*Restart with Defaults*—Performing a Restart with Defaults should be done with care. This restart resets most of the static and non-volatile parameters for all of the blocks in the instrument to their initial value, as listed in table 4-2. After a Restart with Defaults, you should place the instrument in service (the transducer block mode to auto) and run Device Setup and download the instrument configuration from the control system to properly setup the instrument. You also may need to re-establish communication links and trends.

- Fault State—Fault State (FAULT_STATE [28]), when active, indicates that the resource block is currently forcing the output block to perform its FSTATE action. Selecting Fault State enables the ability to manually set and clear the fault state.

- Set Fault State—Selecting Set Fault State (SET_FSTATE [29]) changes the Fault State (FAULT_STATE [28]) to Active. Setting Set FState (SET_FSTATE [29]) to SET manually places the instrument in the fault state.

- Clear Fault State—Setting Clear FState (CLR_FSTATE [30]) to CLEAR clears the device fault state, if no faults are currently active. You can test the actions the output blocks will perform by manually setting fault state active.

# Device Variables

## Instrument

| Field Communicator | RB > Device Variables > Instrument |
|---|---|

The following parameters are contained in the the Instrument menu of the resource block.

### Identification

- **Device ID**—The 32 character Device ID (DEVICE_ID [54]).

- **Electronics Serial Number**—The Electronics Serial Number (ELECTRONICS_SN [49]) set at the factory.

- **Factory Serial Number**—The Factory Serial Number (FACTORY_SN [50]) is the instrument serial number set at the factory.

- **Field Serial Number**—The Field Serial Number (FIELD_SN [51]) is the serial number of the valve and actuator on which the instrument is mounted.

- **Tag Description**—The Tag Description (TAG_DESC [2]) is unique description of each block within the digital valve controller, used to describe the intended application for the block. Follow the prompts on the Field Communicator to enter an up to 32 character description for the block in the Tag Description field. (This parameter is read/write.)

- **Strategy**—Strategy (STRATEGY [3]) permits strategic grouping of blocks so the operator can identify where the block is located. The blocks may be grouped by plant area, plant equipment, etc. Enter a value between 0 and 65535 in the Strategy field.

- **Manufacturer—**Manufacturer Identification (MANUFAC_ID [10]) identifies the manufacturer of the instrument. It is used by the host system to locate the DD file for the device. For Fisher the Manufacturer ID is 0x5100.

- **Device Type—**Device Type (DEV_TYPE [11]) identifies the type of device. It is used by the host system to locate the DD file for the device. For a DVC6200f digital valve controller with Standard Control the device type is 0x4602.

## Version

- **Device Revision—**Device Revision (DEV_REV [12]) identifies the device revision number. It is used by the host system to locate the DD file for the device.

- **Firmware Revision—**Firmware Revision (FIRMWARE_REV_ALL [47.6]) shows all device firmware revisions currently in operation.

- **Standby Firmware Revision—**Standby Firmware Revision (STBY_FIRMWARE_REV_ALL [55.6]) shows all device firmware revisions currently in standby.

- **Hardware Revision—**Hardware Revision(HARDWARE_REV[48]) identifies the electronic hardware revision.

- **ITK Version—**ITK Version (ITK_VER [41]) identifies the major version of the Interoperability Tester used by the Fieldbus Foundation in certifying the device as interoperable. This device revision meets the requirements of version 5.

## Options

| Field Communicator | RB > Device Variables > Options |
| --- | --- |

The following parameters are contained in the the Options menu of the resource block.

- **Diagnostic Options—**Diagnostic Options (DIAG_OPTIONS [45]) shows the diagnostic options available in the instrument.

- **Function Block Options—**Function Block Options (FB_OPTIONS [44]) shows which function blocks are licenced and enabled in the instrument.

- **Miscellaneous Options—**Miscellaneous Options (MISC_OPTIONS [46]) indicates which miscellaneous licensing options are enabled.

- **Features Available—**Features (FEATURES [17]) shows the supported resource block options.

## DD Information

| Field Communicator | RB > Device Variables > DD Information |
| --- | --- |

DD Information contains information about the Device Description (DD).

# Transducer Block

This section contains information on the DVC6200f digital valve controller transducer block. Descriptions of all transducer block parameters are included. The transducer block decouples function blocks from the local output functions required to command output hardware. The transducer block typically contains setup and calibration information.

# Device Diagnostics

## Active PlantWeb Alerts

| Field Communicator | TB > Device Diagnostic > Active PlantWeb Alerts |
| --- | --- |

To view the active PlantWeb alerts select Active PlantWeb Alerts.

## Alert Conditions

| Field Communicator | TB > Device Diagnostic > Active Conditions |
| --- | --- |

Instrument Alert Conditions, when enabled, detect many operational and performance issues that may be of interest. The alert conditions for each group of alerts are listed below. If there are no alerts active for a particular group the group will not be displayed on the Field Communicator.

- **Electronics**—if an electronics alert is active it will appear under ELECT ALERTS

Drive Current
   *Drive Current Alert*—This alert is active when the difference between the expected Drive Current and the actual Drive Current has exceeded the Drive Current Alert Time.

Drive Signal
   *Drive Signal Alert*—The Drive Signal Alert is active if one of the following conditions exist:

Where Zero Power Condition is defined as closed:

   Drive Signal < 10% and Calibrated Travel > 3%

   Drive Signal > 90% and Calibrated Travel < 97%

Where Zero Power Condition is defined as open:

   Drive Signal < 10% and Calibrated Travel < 97%

   Drive Signal > 90% and Calibrated Travel > 3%

Processor Impaired
   *Program Memory Alert*—This alert is active if a pending flash or NVM failure is present.

   *Static Memory Alert*—This alert is active when there is a failure of the FRAM memory where static parameters are stored.

   *Processor Alert*—This alert is active when there is a failure of the main processor.

   *I/O Processor Alert*—This alert is active when there is a failure of the I/O processor.

- **Configuration**—If a configuration alert is active it will appear under CONFIG ALERTS

Output Block Timeout
   *Output Block Timeout Alert*—This alert is active if the output block has not executed for a period of time longer than the configured timeout.

Blocks Set to Default
   *Blocks Set to Default Alert*—This alert is active if the resource block has undergone Restart with Defaults. This will stay active until the transducer block is changed from Out of Service.

● **Sensor**—If a configuration alert is active it will appear under SENSOR ALERTS

Travel Sensor
   *Travel Sensor*—This alert is active if the Travel Sensor reading is outside the functional range, or the sensor becomes disconnected.

Pressure Sensors
   *Pressure A Sensor Alert*—This alert is active if the Port A Pressure Sensor reading is outside the functional range.

   *Pressure B Sensor Alert*—This alert is active if the Port B Pressure Sensor reading is outside the functional range.

   *Supply Pressure Sensor Alert*—This alert is active if the Pressure Sensor reading is outside the functional range.

Pressure Fallback
   *Pressure Fallback Alert*—This alert is active if a travel sensor failure or a gross travel deviation has resulted in fallback to pressure control.

Temperature Sensor
   *Temperature Sensor Alert*—This alert is active if the temperature sensor reading is outside the functional range of the sensor.

● **Environment**—If an environment alert is active it will appear under ENVIRO ALERTS

Supply Pressure
   *Supply Pressure Hi Alert*—This alert is active if the supply pressure exceeds the Supply Pressure Hi Alert.

   *Supply Pressure Lo Alert*—This alert is active if the supply pressure exceeds the Supply Pressure Lo Alert.

Temperature Limit
   *Temperature Hi Alert*—This alert is active if the temperature is greater than the Temperature Hi Alert Point.

   *Temperature Lo Alert*—This alert is active if the temperature is greater than the Temperature Lo Alert Point.

● **Travel**—If a travel alert is active it will appear under TRAVEL ALERTS

Travel Deviation
   *Travel Deviation Alert*—This alert is active if the Travel deviation exceeds the Travel Deviation Alert Point by more than the Travel Deviation Time.

Travel Limit
   *Travel Limit Hi Hi Alert*—This alert is active if Travel exceeds the Travel Limit Hi Hi Alert point.

   *Travel Limit Lo Lo Alert*—This alert is active if Travel is lower than the Travel Limit Lo Lo Alert point.

Travel Hi/Lo
   *Travel Limit Hi Alert*—This alert is active if Travel exceeds the Travel Limit Hi Alert point.

   *Travel Limit Lo Alert*—This alert is active if Travel is lower than the Travel Limit Lo Alert point.

● **Proximity**—If a proximity alert is active it will appear under PROX ALERTS

Travel Open
   *Travel Open Alert*—This alert is active if the travel is greater than the travel open alert point.

Travel Closed
   *Travel Closed Alert*—This alert is active if the travel is greater than the travel closed alert point.

Proximity
   *Proximity Hi Hi Alert*—This alert is active if the Travel is within the detection band set by the Travel Hi Hi Alert Point and the Travel Hi Hi Deadband.

   *Proximity Hi Alert*—This alert is active if the Travel is within the detection band set by the Travel Hi Alert Point and the Travel Hi Deadband.

   *Proximity Lo Alert*—This alert is active if the Travel is within the detection band set by the Travel Lo Alert Point and the Travel Lo Deadband.

   *Proximity Lo Lo Alert*—This alert is active if the Travel is within the detection band set by the Travel Lo Lo Alert Point and the Travel Lo Lo Deadband.

- **Travel History**—If a travel history alert is active it will appear under TVL HIST ALERTS

Cycle Counter
   *Cycle Counter Alert*—This alert is active if the Cycle Counter exceeds the Cycle Count Alert Point.

Travel Accumulator
   *Travel Accumulator Alert*—This alert is active if the Travel Accumulator exceeds the Travel Accumulator Alert Point.

- **Performance**—if a performance alert is active it will appear under PERF ALERTS

Performance Critical
   *Performance Critical Alert*—This alert is active if the instrument is no longer able to control the valve or performance has been dramatically reduced.

   *Performance Reduced Alert*—This alert is active if the instrument has detected a reduction in performance.

   *Performance Information Alert*—This alert is active if the instrument has detected a condition that may pertain to control performance.

# Status

| Field Communicator | TB > Device Diagnostic > Status |
|---|---|

## Self Test Status

*Integrator Suspended*—The integrator function is temporarily suspended. The integrator is suspended if any of the following conditions are met:

- The setpoint and actual travel are greater than 98% or less than 2%.

- The set point is in cutoff

- The Transducer block is Out of Service (OOS)

*Integrator Limited Lo*—Indicates the integrator reached its limit and cannot move the valve any further. High valve friction may cause this situation.

*Integrator Limited Hi*—Indicates the integrator reached its limit and cannot move the valve any further. High valve friction may cause this situation.

*Travel Sensor Span Error*—Indicates that span between the endpoints of travel are not far enough apart. This error is reported during automatic calibration.

*MLFB Error*—Indicates that the Minor Loop Feedback sensor gave a non-valid value during automatic calibration.

*Travel Sensor Hi Error*—Indicates the travel sensor has reported a travel position that is significantly above the normal operating range, and has failed.

*Travel Sensor Lo Error*—Indicates the travel sensor has reported a travel position that is significantly below the normal operating range, and has failed.

*Pressure B Sensor Failure*—Indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure, and has failed.

*Pressure A Sensor Failure*—Indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure, and has failed.

*Supply Sensor Failure*—Indicates the pressure sensor is reporting a pressure that is significantly outside of the normal operating pressure, and has failed.

*IOP Failure*—Indicates the I/O processor has failed.

*Drive Current Alert*—Indicates that the Drive Current has exceeded the Drive Current Alert Point for more than the Drive Current Alert Time.

*Simulate Jumper ON*—Indicates the simulate jumper is connected to the DVC6200f between the two AUX terminals.

## Block Error

Table 6-2 lists conditions reported in the BLOCK_ERR [6] and XD_ERROR [11] parameters. Conditions in *italics* are not applicable for the transducer block and are provided only for your reference.

Table 6-2. Transducer Block BLOCK_ERR and XD_ERROR Conditions

| Condition Number | Condition Name and Description |
|---|---|
| 0 | *Other - (N/A)* |
| 1 | **Block Configuration Error** - Indicates that one of the following parameters have been configured out of the proper range: 15, 16, 47.1, 47.2, 46.3, 46.5, 42.7, 42.8. |
| 2 | *Link Configuration Error - (N/A)* |
| 3 | **Simulate Active** - Indicates that alerts are being simulated. This is not an indication that the I/O blocks are using simulation data. See AO block parameter SIMULATE [10] and DO block parameter SIMULATE_D [10]. |
| 4 | *Local Override - (N/A)* |
| 5 | *Device Fault State - (NA)* |
| 6 | *Maintenance Needed Soon - (N/A)* |
| 7 | *Input failure/process variable has Bad status - (N/A)* |
| 8 | *Output failure - (N/A)* |
| 9 | *Memory failure - (N/A)* |
| 10 | **Lost Static Data** - Indicates that manufacturing functional or thermal tests were incomplete |
| 11 | *Lost NV Data - (N/A)* |
| 12 | *Readback Check Failed - (N/A)* |
| 13 | **Device Needs Maintenance Now** - Indicates that manufacturing functional or thermal tests were incomplete |
| 14 | *Power Up - (N/A)* |
| 15 | **Out of Service** - Indicates Out of Service Mode. |

# Device Record

| Field Communicator | TB > Device Diagnostic > Device Record |
|---|---|

The following parameters are contained in the Device Record menu of the transducer block.

● **Maximum Recorded Temperature**—Maximum Recorded Temperature (TEMP_MAX [86.1]) shows the maximum temperature the instrument has experienced since installation.

● **Maximum Recorded Temperature Time**—Maximum Recorded Temperature Time (TEMP_MAX_TIME [86.2]) shows the date and time when the Temperature Maximum occurred.

● **Minimum Recorded Temperature**—Minimum Recorded Temperature (TEMP_MIN [86.3]) shows the minimum temperature the instrument has experienced since installation.

● **Minimum Recorded Temperature Time**—Minimum Recorded Temperature Time (TEMP_MIN_TIME [86.4]) shows the date and time when the Temperature Minimum occurred.

● **Maximum Recorded Supply Pressure**—Maximum Recorded Supply Pressure (SUPPLY_PRESS_MAX [86.5]) shows the maximum supply pressure the instrument has experienced since installation.

● **Maximum Recorded Supply Pressure Time**—Maximum Recorded Supply Pressure Time (SUPP_PRESS_MAX_TIME [86.6]) shows the date and time when the Supply Pressure Maximum occurred.

● **Minimum Recorded Supply Pressure**—Minimum Recorded Supply Pressure (SUPP_PRESS_MIN [86.7]) shows the minimum supply pressure the instrument has experienced since installation.

● **Minimum Recorded Supply Pressure Time**—Minimum Recorded Supply Pressure Time (SUPP_PRESS_MIN_TIME [86.8]) shows the date and time when the Supply Pressure Minimum occurred.

# Stroking the Digital Valve Controller Output

| Field Communicator | TB > Device Diagnostic > Stroke Valve |
|---|---|

Stroke Valve is used to confirm proper valve operation. Follow the prompts on the Field Communicator display to select from the following: *Done, Ramp Open, Ramp Closed, Ramp to Target, Step to Target,* and *Stop.*

● *Done*—Select this if you are done. All ramping is stopped when DONE is selected.

● *Ramp Open*—ramps the travel toward open at the rate of 1.0% per second of the ranged travel.

● *Ramp Closed*—ramps the travel toward closed at the rate of 1.0% per second of the ranged travel.

● *Ramp to Target*—ramps the travel to the specified target at the rate of 1.0% per second of the ranged travel.

● *Step to Target*—steps the travel to the specified target.

● *Stop*—stops the command.

# Trend

| Field Communicator | TB > Device Diagnostic > Trend |
|---|---|

Trend chart of Setpoint (FINAL_VALUE.VALUE [13.2]), Travel (TRAVEL.VALUE [34.2]), and Pressure A (PRESSURE_A.VALUE [36.2]).

# Device Variables

| Field Communicator | TB > Device Variables |
|---|---|

## All Block Modes

### Block Mode: Target

The Target (TARGET [5.1]) mode is the mode requested by the user or host system. Generally, only one mode is allowed to be set, and it must be a permitted mode as defined by the permitted attribute of the mode parameter. Additionally, all cascade targets (Cas, Rcas) must have AUTO set.

### Block Mode: Actual

This is the current mode of the block. The actual (ACTUAL [5.2]) mode may differ from the target mode due to operating conditions of the block.

---

**Note**

Block Mode:Actual drops the AUTO bit for the cascade targets. For example, target mode might have Cas and Auto set, but actual mode will only have Cas set.

---

### Block Mode: Permitted

The permitted (PERMITTED [5.3]) mode defines the modes allowed for the block. This is set by the user or host system but is restricted by the instrument to modes supported by the instrument for the particular block. Any change request to the Target or Normal attribute is checked against the permitted attribute to ensure the requested mode is permitted. When setting the Permitted mode, there is no check against any of the other attributes (Normal or Target modes). Therefore, the normal or target mode attributes may have a value that is not permitted because the permitted attribute was modified after the Normal or Target mode was set. This will have no effect on the instrument until the user attempts to modify the Target or Normal mode. At this time these attributes are tested against the Permitted modes, thus the user cannot change the Normal or Target modes to what was formerly permitted.

### Block Mode: Normal

The normal (NORMAL [5.4]) mode is the mode the block should be in during normal operating conditions. The normal mode is set by the user or host system and can only be set to a permitted mode (see permitted mode). The user or host system can compare the actual mode to the normal mode and, based on the results, determine if the block is operating normally.

# AO Control - Pre-Characterization

● Setpoint

Setpoint (FINAL_VALUE.VALUE [13.2]) shows the value of the setpoint in % (percent) of ranged travel or pressure. Setpoint is used for both travel and pressure control. This parameter will be written directly if the transducer block is in MAN mode, or will be written automatically by the AO block if the transducer block is in AUTO mode.

● Setpoint Status

Shows the Foundation Fieldbus status of Setpoint Value (FINAL_VALUE.STATUS [13.2]); Good, Uncertain, or Bad.

● Travel (DeChar)

Travel (FINAL_POSITION_VALUE.VALUE [17.2]) shows the value of the travel in % (percent) of ranged travel. Travel always represents how far the valve is open.

# AO Control-Post Characterization

● Travel Target

Travel target is the output from the characterization function.

● Travel

Travel (TRAVEL.VALUE [34.2]) displays the actual position of the valve in percent (%) of calibrated travel.

● Travel Status

Shows the Foundation Fieldbus status of Travel Value (TRAVEL.STATUS [34.1]); Good, Uncertain, or Bad.

# DO Control

● Setpoint(D)

Discrete Setpoint (SETPOINT_D.VALUE [32.2]) shows the value of the setpoint in discrete values.
0 = closed, 1 = open, 5, 10, 15... = setpoint in 5% units. This parameter will be written directly if the transducer block is in MAN mode, or will be written automatically by the DO block if the transducer block is in AUTO mode.

● Travel(D)

Travel (TRAVEL_D.VALUE [33.2]) shows the value of the setpoint in discrete values.
0 = closed, 1 = open, 5, 10, 15... = setpoint in 5% units.

# Input Characterization

Input Characterization (INPUT_CHAR [50]) defines the relationship between the setpoint specified by the output function block and the desired valve position.

# Travel/Pressure State

Travel/Pressure State (TVL_PRESS.STATE [41.2]) indicates if the instrument is being used for travel control (position control) or as an I/P (pressure control).

# PD Inside Status

PD Inside Status shows the status of Performance Diagnostics.

# Protection

Indicates the status of Protection.

# Drive Signal

Drive Signal (DRIVE_SIGNAL [53]) indicates the drive signal, as a percentage of the maximum drive available, going to the I/P converter from the printed wiring board. In most applications, the drive signal ranges between 50% and 75% of the maximum drive signal.

# Temperature

Temperature (TEMPERATURE [48]) displays the internal temperature of the instrument in either degrees Fahrenheit or Celsius.

# Cycle Counter

Cycle Counter (CYCLE_COUNT [73]) records the number of times the travel changes direction. The change in direction must occur after the deadband has been exceeded before it can be counted as a cycle.

# Travel Accumulator

Travel Accumulator (TRAVEL_ACCUM [72]) indicates the total change in travel, in percent of ranged travel. The accumulator only increments when travel exceeds the deadband. Then the greatest amount of change in one direction from the original reference point (after the deadband has been exceeded) will be added to the Travel Accumulator.

# Travel Count

Travel Count (TVL_COUNT [43.1]) is the Travel Sensor readback displayed in A/D counts.

# Pressures

- Supply

Supply (SUPPLY_PRESSURE_VALUE [35.2]) shows the value of the supply pressure in psi, bar, kPa, inHg, inH$_2$O, or kg/cm$^2$.

- Pressure A

Pressure A (PRESSURE_A.VALUE [36.2]) shows the value of Output Pressure A in psi, bar, kPa, inHg, inH$_2$O, or kg/cm$^2$.

- Pressure B

Pressure B (PRESSURE_B.VALUE [37.2]) shows the value of Output Pressure B in psi, bar, kPa, inHg, inH$_2$O, or kg/cm$^2$.

- A Minus B

A Minus B (PRESSURE_DIFF.VALUE [38.2]) shows the value of the output pressure differential in psi, bar, kPa, inHg, inH$_2$O, or kg/cm$^2$.

# Section 7 Maintenance and Troubleshooting

The DVC6200f digital valve controller enclosure is rated Type 4X and IP66, therefore periodic cleaning of internal components is not required. If the DVC6200f is installed in an area where the exterior surfaces tend to get heavily coated or layered with industrial or atmospheric contaminants, however, it is recommended that the vent (key 52) be periodically inspected to ensure it is fully open. If the vent appears to be clogged, it can be removed, cleaned and replaced. Lightly brush the exterior of the vent to remove contaminants and run a mild water/detergent solution through the vent to ensure it is fully open. Allow the vent to dry before reinstalling.

## ⚠ WARNING

**Personal injury or property damage can occur from cover failure due to overpressure. Ensure that the housing vent opening is open and free of debris to prevent pressure buildup under the cover.**

## ⚠ WARNING

**To avoid static discharge from the plastic cover when flammable gases or dust are present, do not rub or clean the cover with solvents. To do so could result in a spark that may cause the flammable gases or dust to explode, resulting in personal injury or property damage. Clean with a mild detergent and water only.**

## ⚠ WARNING

**Avoid personal injury or property damage from sudden release of process pressure or bursting of parts. Before performing any maintenance procedures on the DVC6200f digital valve controller:**

- **Always wear protective clothing, gloves, and eyewear.**

- **Do not remove the actuator from the valve while the valve is still pressurized.**

- **Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.**

- **Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure from both sides of the valve.**

- **Vent the pneumatic actuator loading pressure and relieve any actuator spring precompression.**

- **Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.**

- **Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

## ⚠ WARNING

**When using natural gas as the supply medium, or for explosion proof applications, the following warnings also apply:**

- **Remove electrical power before removing the housing cap. Personal injury or property damage from fire or explosion may result if power is not disconnected before removing the cap.**

- **Remove electrical power before disconnecting any of the pneumatic connections.**

- **When disconnecting any of the pneumatic connections or any pressure retaining part, natural gas will seep from the unit and any connected equipment into the surrounding atmosphere. Personal injury or property damage may result**

from fire or explosion if natural gas is used as the supply medium and appropriate preventive measures are not taken. Preventive measures may include, but are not limited to, one or more of the following: ensuring adequate ventilation and the removal of any ignition sources.

● Ensure that the cover is correctly installed before putting this unit back into service. Failure to do so could result in personal injury or property damage from fire or explosion.

## CAUTION

When replacing components, use only components specified by the factory. Always use proper component replacement techniques, as presented in this manual. Improper techniques or component selection may invalidate the approvals and the product specifications, as indicated in table 1-1, and may also impair operations and the intended function of the device.

Because of the diagnostic capability of the DVC6200f, predictive maintenance is available through the use of ValveLink software. Using the digital valve controller, valve and instrument maintenance can be enhanced, thus avoiding unnecessary maintenance. For information on using ValveLink software, refer to the ValveLink software online help.

# Removing the Magnetic Feedback Assembly

To remove the magnet assembly from the actuator stem, perform the following basic steps.

1. Make sure that the valve is isolated from the process.

2. Remove the instrument terminal box cover.

3. Disconnect the field wiring from the terminal board.

4. Shut off the instrument air supply.

5. Disconnect the pneumatic tubing and remove the DVC6200f or the DVC6215 from the actuator.

6. Remove the screws holding the magnet assembly to the connector arm.

When replacing the instrument, be sure to follow the mounting guidelines in the Installation section. Setup and calibrate the instrument prior to returning to service.

# Module Base Maintenance

The digital valve controller contains a module base consisting of the I/P converter, printed wiring board assembly, and pneumatic relay. The module base may be easily replaced in the field without disconnecting field wiring or tubing.

## Tools Required

Table 7-1 lists the tools required for maintaining the DVC6200f digital valve controller.

Table 7-1. Tools Required

| Tool | Size | Component |
|---|---|---|
| Phillips Screwdriver | | Relay, printed wiring board assembly, and cover screws |
| Hex key | 5 mm | Terminal box screw |
| Hex key | 1.5 mm | Terminal box cover screw |
| Hex key | 2.5 mm | I/P converter screws |
| Hex key | 6 mm | Module base screws |

# Component Replacement

When replacing any of the components of the DVC6200f, the maintenance should be performed in an instrument shop whenever possible. Make sure that the electrical wiring and pneumatic tubing is disconnected prior to disassembling the instrument.

# Removing the Module Base

Refer to figure 8-2 or 8-4 for key number locations.

## ⚠ WARNING

**To avoid personal injury or equipment damage from bursting of parts, turn off the supply pressure to the digital valve controller and bleed off any excess supply pressure before attempting to remove the module base assembly from the housing.**

1. Unscrew the four captive screws in the cover (key 43) and remove the cover from the module base (key 2).

2. Using a 6 mm hex socket wrench, loosen the three-socket head screws (key 38). These screws are captive in the module base by retaining rings (key 154).

### Note

The module base is linked to the housing by two cable assemblies. Disconnect these cable assemblies after you pull the module base out of the housing.

## CAUTION

**To avoid affecting performance of the instrument, take care not to damage the module base seal or guide surface. Do not bump or damage the bare connector pins on the PWB assembly. Damaging either the module base or guide surface may result in material damage, which could compromise the instruments ability to maintain a pressure seal.**

3. Pull the module base straight out of the housing (key 1). Once clear of the housing, swing the module base to the side of the housing to gain access to the cable assemblies.

4. The digital valve controller has two cable assemblies, shown in figure 7-1, which connect the module base, via the printed wiring board assembly, to the travel sensor and the terminal box. Disconnect these cable assemblies from the printed wiring board assembly on the back of the module base.

Figure 7-1. Printed Wiring Board Cable Connections
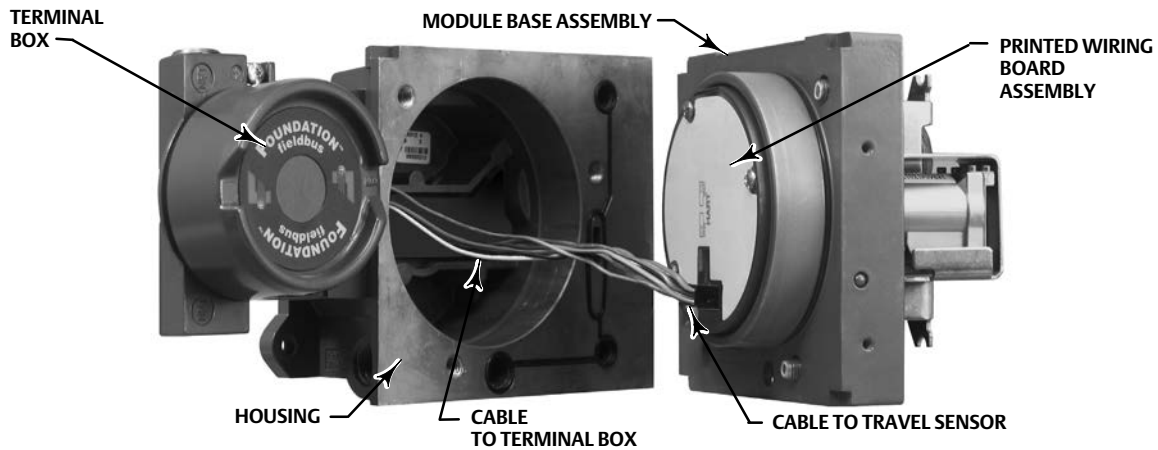


## Replacing the Module Base

Refer to figure 8-2 or 8-4 for key number locations. Refer to figure 7-2 for a view of the back of the PWB assembly sub-module.

Figure 7-2. Back View of PWB Assembly Sub-Module
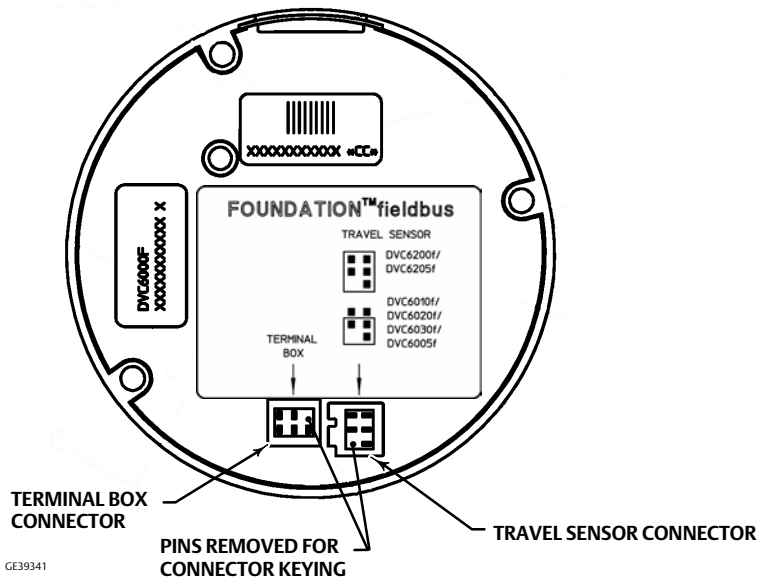


**Note**

To avoid affecting performance of the instrument, inspect the guide surface on the module and the corresponding seating area in the housing before installing the module base assembly. These surfaces must be free of dust, dirt, scratches, and contamination.

Ensure the module base seal is in good condition. Do not reuse a damaged or worn seal.

1. Ensure the module base seal (key 237) is properly installed in the housing (key 1). Ensure the O-ring (key 12) is in place on the module base assembly.

2. Connect the terminal box connector to the PWB assembly (key 50). Orientation of the connector is required.

3. Connect the travel sensor connector to the PWB assembly (key 50). Orientation of the connector is required.

4. Insert the module base (key 2) into the housing (key 1).

5. Install three socket head screws (key 38) in the module base into the housing. If not already installed, press three retaining rings (key 154) into the module base. Evenly tighten the screws in a crisscross pattern to a final torque of 16 N•m (138 lbf•in).

## CAUTION

**Personal injury, property damage, or disruption of process control can result if the cable assemblies/wiring are damaged when attaching the cover to the module base assembly**

**Ensure that the cable assemblies/wiring are positioned in the cavity of the module base so they do not get compressed or damaged when attaching the cover to the module base assembly in step 6.**

6. Attach the cover (key 43) to the module base assembly.

# Submodule Maintenance

The digital valve controller's module base contains the following submodules: I/P converter, PWB assembly, and pneumatic relay. If problems occur, these submodules may be removed from the module base and replaced with new submodules. After replacing a submodule, the module base may be put back into service.

## CAUTION

**Exercise care when performing maintenance on the module base. Reinstall the cover to protect the I/P converter and gauges when servicing other submodules.**

**In order to maintain accuracy specifications, do not strike or drop the I/P converter during submodule maintenance.**

# I/P Converter

Refer to figure 8-2 or 8-4 for key number locations. The I/P converter (key 41) is located on the front of the module base.

---

**Note**

After I/P converter submodule replacement, calibrate the digital valve controller to maintain accuracy specifications.

---

## Replacing the I/P Filter

A screen in the supply port beneath the I/P converter serves as a secondary filter for the supply medium. To replace this filter, perform the following procedure:

1. Remove the I/P converter (key 41) and shroud (key 169) as described in the Removing the I/P Converter procedure.

2. Remove the screen (key 231) from the supply port.

3. Install a new screen in the supply port as shown in figure 7-3.

4. Inspect the O-ring (key 39) in the I/P output port. if necessary, replace it.

5. Reinstall the I/P converter (key 41) and shroud (key 169) as described in the Replacing the I/P Converter procedure.

Figure 7-3. I/P Filter Location



O-RING LOCATED IN I/P
CONVERTER OUTPUT PORT
W8072

SCREEN (FILTER) LOCATED IN I/P
CONVERTER SUPPLY PORT
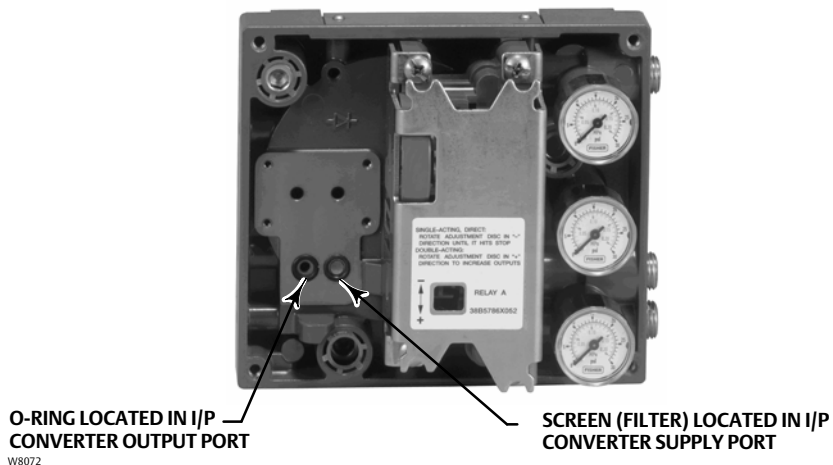
## Removing the I/P Converter

1. Remove the front cover (key 43), if not already removed.

2. Refer to figure 7-4. Using a 2.5 mm hex socket wrench, remove the four socket-head screws (key 23) that attach the shroud (key 169) and I/P converter (key 41) to the module base (key 2).

3. Remove the shroud (key 169); then pull the I/P converter (key 41) straight out of the module base (key 2). Be careful not to damage the two electrical leads that come out of the base of the I/P converter.

4. Ensure that the O-ring (key 39) and screen (key 231) stay in the module base and do not come out with the I/P converter (key 41).

## Replacing the I/P Converter

1. Refer to figure 7-3. Inspect the condition of the O-ring (key 39) and screen (key 231) in the module base (key 2). Replace them, if necessary. Apply silicone lubricant to the O-rings.

2. Ensure the two boots (key 210) shown in figure 7-4 are properly installed on the electrical leads.

Figure 7-4. I/P Converter



SHROUD
(KEY 169)

I/P CONVERTER
(KEY 41)

SOCKET-HEAD
SCREWS (4)
(KEY 23)

BOOTS
(KEY 210)

W9328
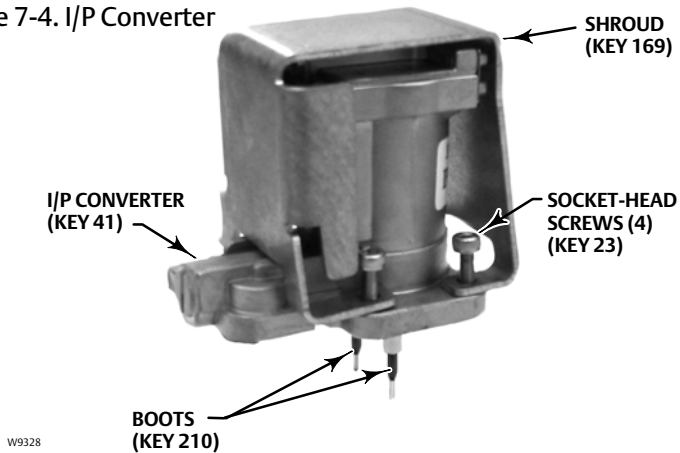
3. Install the I/P converter (key 41) straight into the module base (key 2), taking care that the two electrical leads feed into the guides in the module base. These guides route the leads to the printed wiring board assembly submodule.

4. Install the shroud (key 169) over the I/P converter (key 41).

5. Install the four socket-head screws (key 23) and evenly tighten them in a crisscross pattern to a final torque of 1.6 N•m (14 lbf•in).

6. After replacing the I/P converter, calibrate travel or perform touch-up calibration to maintain accuracy specifications.

# Printed Wiring Board (PWB) Assembly

Refer to figure 8-2 or 8-4 for key number locations. The PWB assembly (key 50) is located on the back of the module base assembly (key 2).

---

**Note**

The DVC6200f PWB assembly must be firmware revision 2.0 or later.

---

**Note**

If the PWB assembly submodule is replaced, calibrate and configure the digital valve controller to maintain accuracy specifications.

---

## Removing the Printed Wiring Board Assembly

1. Separate the module base from the housing by performing the Removing the Module Base procedure.

2. Remove three screws (key 33).

3. Lift the PWB assembly (key 50) straight out of the module base (key 2).

4. Ensure that the O-rings (key 40) remain in the pressure sensor bosses on the module base assembly (key 2) after the PWB assembly (key 50) has been removed.

## Replacing the Printed Wiring Board Assembly

1. Apply silicone lubricant to the pressure sensor O-rings (key 40) and install them on the pressure sensor bosses in the module base assembly.

2. Properly orient the PWB assembly (key 50) as you install it into the module base. The two electrical leads from the I/P converter (key 41) must guide into their receptacles in the PWB assembly and the pressure sensor bosses on the module base must fit into their receptacles in the PWB assembly.

3. Push the PWB assembly (key 50) into its cavity in the module base.

4. Install and tighten three screws (key 33) to a torque of 1 N•m (10.1 lbf•in).

5. Reassemble the module base to the housing by performing the Replacing the Module Base procedure.

6. Setup and calibrate the digital valve controller.

---

**Note**

Calibration is required for either Travel or Pressure Control after PWB Assembly replacement.

Note that only one calibration is needed, depending on control selection.

---

# Pneumatic Relay

Refer to figure 8-2 or 8-4 for key number locations. The pneumatic relay (key 24) is located on the front of the module base.

---

**Note**

After relay submodule replacement, calibrate the digital valve controller to maintain accuracy specifications.

---

## Removing the Pneumatic Relay

1. Loosen the four screws that attach the relay (key 24) to the module base. These screws are captive in the relay.

2. Remove the relay.

## Replacing the Pneumatic Relay

1. Visually inspect the holes in the module base to ensure they are clean and free of obstructions. If cleaning is necessary, do not enlarge the holes.

2. Apply silicone lubricant to the relay seal and position it in the grooves on the bottom of the relay as shown in figure 7-5. Press small seal retaining tabs into retaining slots to hold relay seal in place.

Figure 7-5. Pneumatic Relay Assembly



RELAY SEAL

W8074

3. Position the relay (with shroud) on the module base. Tighten the four screws, in a crisscross pattern, to a final torque of 2 N•m (20.7 lbf•in).

4. Using the Field Communicator, verify that the value for Relay Type parameter matches the relay type installed.

5. After replacing the relay and verifying the relay type, calibrate travel or perform touch-up calibration to maintain accuracy specifications

## Gauges, Pipe Plugs, or Tire Valves

Depending on the options ordered, the DVC6200f will be equipped with either gauges (key 47), pipe plugs (key 66), or tire valves (key 67). Single-acting direct instruments will also have a screen (key 236, figure 8-3). These are located on the top of the module base next to the relay.

Perform the following procedure to replace the gauges, tire valves, or pipe plugs. Refer to figure 8-2and 8-3 for key number locations.

1. Remove the front cover (key 43).

2. Remove the gauge, pipe plug, or tire valve as follows:

**For gauges (key 47),** the flats are on the gauge case. Use a wrench on the flats of the gauge to remove the gauge from the module base. For double-acting instruments, to remove the supply gauge remove one of the output gauges.

**For pipe plugs (key 66) and tire valves (key 67),** use a wrench to remove these from the module base.

3. Apply zinc based anti-seize sealant (key 64) to the threads of the replacement gauges, pipe plugs, or tire valves.

4. Using a wrench, screw the gauges, pipe plugs, or tire valves into the module base.

# Terminal Box

### ⚠ WARNING

**Refer to the Maintenance WARNING at the beginning of this section.**

Refer to figure 8-2 or 8-4 for key number locations.

The terminal box is located on the housing and contains the terminal strip assembly for field wiring connections.

## Removing the Terminal Box

### ⚠ WARNING

**To avoid personal injury or property damage caused by fire or explosion, remove power to the instrument before removing the terminal box cover in an area which contains a potentially explosive atmosphere or has been classified as hazardous.**

1. Loosen the set screw (key 58) in the cap (key 4) so that the cap can be unscrewed from the terminal box.

2. After removing the cap (key 4), note the location of field wiring connections and disconnect the field wiring from the terminal box.

3. Separate the module base from the housing by performing the Removing the Module Base procedure.

4. Disconnect the terminal box wiring connector from the PWB assembly (key 50).

5. Remove the screw (key 72). Pull the terminal box assembly straight out of the housing.

# Replacing the Terminal Box

---

**Note**

Inspect all O-rings for wear and replace as necessary.

---

1. Apply lubricant, silicone sealant to the O-ring (key 34) and install the O-ring over the stem of the terminal box.

2. Insert the terminal box assembly stem into the housing until it bottoms out. Position the terminal box assembly so that the hole for the screw (key 72) in the terminal box aligns with the threaded hole in the housing. Install the screw (key 72).

3. Connect the terminal box wiring connector to the PWB assembly (key 50).

4. Reassemble the module base to the housing by performing the Replacing the Module Base procedure.

5. Reconnect the field wiring as noted in step 2 in the Removing the Terminal Box procedure.

6. Apply lubricant, silicone sealant to the O-ring (key 36) and install the O-ring over the 2-5/8 inch threads of the terminal box. Use of a tool is recommended to prevent cutting the O-ring while installing it over the threads.

7. Apply lithium grease (key 63) to the 2-5/8 inch threads on the terminal box to prevent seizing or galling when the cap is installed.

8. Screw the cap (key 4) onto the terminal box.

9. Install a set screw (key 58) into the cap (key 4). Loosen the cap (not more than 1 turn) to align the set screw over one of the recesses in the terminal box. Tighten the set screw (key 58).

# Stroking the Digital Valve Controller Output

After completing maintenance procedures, confirm proper valve operation by stroking the digital valve controller output. Refer to page 204.

# Instrument Troubleshooting

## What to Do First

When a problem occurs, check the following first:

## Mounting

- Is the feedback linkage connected correctly? See the beginning of this section.

## Utility Connections

- Are pneumatic connections correct? Are there any air leaks? See the Installation section.

- Is the air supply pressure sufficient to drive the valve?

- Is the digital valve controller correctly connected to the fieldbus? See the Installation section.

- Is there power to the device? Is the terminal voltage between 9 and 32 volts? See the Installation section.

- Is the segment terminated correctly? See host system documentation.

- Is the host system connected to the segment? See host system documentation.

If communication or output difficulties are experienced with the instrument, refer to the troubleshooting information provided in table 7-2.

Also see the Technical Support Checklist found on page 224.

Table 7-2. Instrument Troubleshooting

| Symptom | Possible Cause | Action |
|---|---|---|
| 1 Instrument will not communicate. | 1a No power to device | 1a1 Ensure device is connected to the segment (see host system documentation). |
| | | 1a2 Measure the terminal voltage. Terminal voltage should be between 9 and 32 VDC. |
| | | 1a3 Check to be sure device is drawing current. There should be approximately 19 mA. |
| | 1b Internal device wiring problems. | 1b1 Verify connectors are plugged into the printed wiring board correctly (see Printed Wiring Board Assembly on page 215). |
| | | 1b2 Check continuity of cable between terminal box and printed wiring board. If necessary, replace the terminal box assembly (see Replacing the Terminal Box on page 218). |
| | | 1b3 Check for damaged printed wiring board lands and terminals. If necessary, replace the terminal box assembly (see Replacing the Terminal Box on page 218). |
| | 1c Incompatible network settings | 1c Change host parameters. Refer to host documentation for procedure. |
| | 1d Defective printed wiring board (PWB) assembly. | 1d Replace printed wiring board (see Replacing the PWB Assembly on page 215. |
| | 1e Defective terminal box. | 1e Check continuity from each screw terminal to the corresponding PWB connector pin. If necessary, replace the terminal box assembly (see Replacing the Terminal Box on page 218). |
| | 1f Defective Field Communicator or ValveLink modem cable. | 1f If necessary, repair or replace cable. |
| | 1g Fieldbus card defective or not compatible with PC. | 1g Replace Fieldbus card. |
| 2 Device does not stay on segment. | 2a Incorrect signal level. | 2a1 Check that segment is properly terminated (see host system documentation). |
| | | 2a2 Wrong cable type or segment length too long. See Site Planning Guide. |
| | | 2a3 Bad power supply or conditioner. |
| | 2b Excess noise on segment. | 2b1 Check integrity of wiring connections. Make sure cable shield is grounded only at the control system. |
| | | 2b2 Check for corrosion or moisture on terminals in terminal box (refer to page 218 for terminal box information). |
| | | 2b3 Check for bad power supply. |
| | 2c Electronics failing. | 2c. Replace printed wiring board assembly (see Replacing the PWB Assembly on page 215). |
| 3 A value cannot be written to a parameter. | 3a Resource block parameter Write Lock may be set to Locked. | 3a Change Write Lock to Not Locked (refer to page 21). |
| | 3b If a transducer block parameter, the mode may be incorrect or the parameter may be protected. | 3b1 Check table 4-14. If necessary change the transducer block target mode to Manual. |
| | | 3b2 Check table 4-14. If necessary change data protection. |
| | 3c You have attempted to write a value that is outside the valid range. | 3c Check the range values listed for the parameter (refer to the parameter tables in Section 4). |
| | 3.d Function block or in/out block mode may be incorrect. | 3.d. Confirm that block is in correct mode for writing to any given parameter. |

-Continued--Continued-

Table 7-2. Instrument Troubleshooting (Continued)

| Symptom | Possible Cause | Action |
|---|---|---|
| 4 Function block actual mode does not change with target mode. | 4a Resource block actual mode is Out of Service. | 4a Change Resource block target mode to Auto (see page 21, Resource Block Mode, or host system documentation). |
| | 4b Transducer block actual mode is not Auto. | 4b Change transducer block target mode to Auto (see page 38, Transducer Block Mode or host system documentation). |
| | 4c Schedules that define when function blocks execute are not set correctly. | 4c Set the schedules using host system or configuration tool. All function blocks must be in a schedule that is downloaded to the device. |
| | 4d Configuration error | 4d Look for configuration error bit in BLOCK_ERR. By default, all enumerature type parameters are initialized to 0 (undefined). They must be configured before the block can be put into service. |
| 5 Input or Output Block does not go to mode target | 5a Resource block actual mode is Out of Service | 5a Change Resource block target mode to Auto (see page 21, Resource Block Mode, or host system documentation). |
| | 5b Transducer block actual mode is not Auto. | 5b Change transducer block target mode to Auto (see page 38, Transducer Block Mode or host system documentation). |
| | 5c Transducer has detected a hardware failure. | 5c A bad status is passed to the block's READBACK or FIELD_VAL parameter. See transducer section of Detailed Setup for repair information. |
| | 5d Wrong output block is active. | 5d Use Outblock Selection to select the desired output block. The deselected block will have a bad status for READBACK. This will keep it in IMAN mode when target is other than OOS. |
| | 5e Output block is not licensed. | 5e The Actual Block Mode (MODE_BLK.ACTUAL [5.2]) will remain out of service and the block cannot be scheduled if the block has not bee licensed. Contact your Emerson Process Management sales office to upgrade product licensing. |
| | 5f Schedules that define when function blocks execute are not set correctly. | 5f Set the schedules using host system or configuration tool. All function blocks must be in a schedule that is downloaded to the device. |
| | 5g Configuration error. | 5g Look for configuration error bit in BLOCK_ERR. By default, all enumerature type parameters are initialized to 0 (undefined). They must be configured before the block can be put into service. |
| 6 Block dynamic parameters do not update | 6a Block actual mode is Out of Service | 6a Change the block target mode to an operational mode (see Appendix D, FOUNDATION fieldbus Communication and host system documentation). |
| 7 Transducer block Setpoint (FINAL_VALUE [13]) is not being automatically updated from the AO block. | 7a Transducer block mode in not Auto. | 7a Change transducer block mode to Auto. |
| | 7b AO block is not active. | 7b Change Outblock Selection to AO Control. |
| 8 Transducer block setpoint Setpoint(D) (SETPOINT_D [32]) is not being automatically updated from the DO block. | 8a Transducer block mode is not Auto. | 8a Change transducer block mode to Auto. |
| | 8b DO block is not active. | 8.b Change Outblock Selection to DO Control. |
| 9 Valve does not move when the set point is changed | 9a A function block actual mode is Out of Service or Transducer Block Actual mode is Out of Service or Manual. | 9a1 Change the target mode to an operational mode (see Appendix D, FOUNDATION fieldbus Communication and host system documentation). |
| | | 9a2 Verify that the correct block (AO or DO) is configured in Feature Select in the resource block. Only the selected out block is able to set the transducer setpoint and move the valve. |
| | 9b Pneumatic connections are incorrect or supply pressure is incorrect | 9b Check pneumatic connections and supply pressure. Be sure supply pressure regulator is set correctly. |

-Continued-

Table 7-2. Instrument Troubleshooting

| Symptom | Possible Cause | Action |
|---|---|---|
| 9 Valve does not move when the set point is changed | 9c Instrument is in fault state. | 9c Set Clear FState to Clear (Refer to Fault State on page 23 of the Detailed Setup / Blocks Section, or host system documentation). |
| | 9d The valve has failed. | 9d Apply a pneumatic pressure to the valve actuator and check valve action. |
| | 9e The I/P converter or relay has failed. | 9e Replace the I/P converter or relay (see Replacing the I/P Converter on page 214). |
| 10 Valve does not stroke from 0 to 100% with set point change | 10a Insufficient supply pressure or leak in pneumatic connections. | 10a Check supply pressure and supply pressure regulator setting. Check for leaks around pneumatic connections. |
| | 10b Setpoint may be limited. | 10b Check the AO Block values of SP_HI_LIMIT and SP_LO_LIMIT (see page 98 or host system documentation). |
| 11 Deviation between set point and actual valve position remains. | 11a  Digital valve controller output is in cutoff. | 11a Check values for Travel Cutoff High and Travel Cutoff Low (see page 43 or host system documentation). |
| | 11b Digital valve controller is not calibrated correctly | 11b Perform Auto or Manual Travel Calibration (Travel Calibration on page 190.) |
| | 11c Incorrect turning. Tuning that is too conservative will result in excess error. | 11c Perform Stabilizing/Optimize Valve Response procedure to  adjust tuning and stabilize/optimize valve response (see Stabilize/Optimize on page 40). |
| 12 The valve cycles, does not stay on set point. | 12a Large amount of packing friction. | 12a1 Perform Stabilizing/Optimize Valve Response procedure to  adjust tuning and stabilize/optimize valve response (see Stabilize/Optimize on page 40). |
| | | 12a2 Use a larger size actuator. |
| 13 Valve responds too slowly. | 13a Insufficient instrument gain. | 13a Perform Stabilize/Optimize Valve Response procedure to  adjust tuning and stabilize valve response (see Stabilize/Optimize on page 40). |
| | 13b I/P converter input filter clogged or air blockage in I/P ass'y nozzle block. | 13b1 Replace I/P converter filter (see Replacing the I/P Filter on page 213). |
| | | 13b2 Replace I/P converter (see Replacing the I/P Converter on page 214). |
| | 13c O-ring(s) between I/P converter missing or hard and flattened losing seal. | 13c Replace O-ring(s) (refer to the I/P Converter section on page 213). |
| | 13d I/P ass'y out of spec. | 13d I/P ass'y nozzle may have been adjusted. Verify drive signal (55% to 80%) (refer to Elect and Config on page 45 or host system documentation). Replace I/P ass'y if drive signal is continuously high or low (see Replacing the I/P Converter on page 214). |
| | 13e Defective gasket. | 13e Check gasket for closed holes, excessive deformation due to overtightening or "oozing". If necessary, replace gasket (see the beginning of this section). |
| | 13f Defective relay. | 13f Remove relay, inspect for missing Belleville washer, missing valve spring, missing valve plug. Inspect "lip" under top O-ring for breakage due to relay removal. Inspect O-rings and replace if hard or damaged. Replace parts or relay if I/P ass'y good and air passages not blocked (see Replacing the Pneumatic Relay on page 216). |
| | 13g If responds slowly only upon air demand, there may be a restriction in the air line, the supply run may be excessively long, or the supply regulator may be defective or capacity not large enough. | 13g1 Check supply line to ensure it is not clogged or damaged. Replace if necessary. |
| | | 13g2 If supply run is excessively long, a volume tank may need to be installed on the the supply side of the pressure regulator |
| | | 13g3 Replace supply regulator |

-Continued-

Table 7-2. Instrument Troubleshooting (Continued)

| Symptom | Possible Cause | Action |
|---|---|---|
| 14 Instrument will not calibrate, has sluggish performance or oscillates. | 14a Travel sensor failed. | 14a Replace the housing (key 1) |
| | 14b Travel feedback is out of accepted range | 14b Check the mounting. Ensure the correcting mounting kit has been selected and the magnetic array is properly installed. |
| | 14c Cables not plugged into PWB correctly. | 14c Inspect connections and correct. |
| | 14d Configuration errors. | 14d Verify configuration. Use Device Setup on page 16. |
| | 14e Restricted pneumatic passages in I/P converter | 14e Check screen in I/P converter supply port of the module base. Replace if necessary. If passages in I/P converter restricted, replace I/P converter (see Replacing the I/P Converter on page 214). |
| | 14f O-ring(s) between I/P converter ass'y missing or hard and flattened losing seal. | 14f Replace O-ring(s) (refer to the I/P Converter section on page 213). |
| | 14g I/P converter ass'y damaged/corroded/clogged. | 14g Check for bent flapper, open coil (continuity), contamination, staining, or dirty air supply. Coil resistance should be between 1680 - 1860 ohms. Replace I/P ass'y if damaged, corroded, clogged, or open coil (see Replacing the I/P Converter on page 214). |
| | 14h I/P converter ass'y out of spec. | 14h I/P converter ass'y nozzle may have been adjusted. Verify drive signal (55 to 80% for double-acting; 60 to 85% for single-acting) with the valve off the stops. Replace I/P converter ass'y if drive signal is continuously high or low (see Replacing the I/P Converter on page 214). |
| | 14i Defective module base seal. | 14i Check module base seal for condition and position. If necessary, replace seal. Refer to Module Base Maintenance on page 210. |
| | 14j Defective relay. | 14j Depress relay beam at adjustment location in shroud, look for increase in output pressure. Remove relay, inspect relay seal. Replace relay seal or relay if I/P converter ass'y good and air passages not blocked (refer to Replacing the Pneumatic Relay on page 216). Check relay adjustment (refer to page 191). |
| | 14k Defective 67CFR regulator, supply pressure gauge jumps around. | 14k Replace 67CFR regulator. |
| 15 Instrument will not calibrate. | 15a Configuration errors. | 15a Verify configuration. |
| | 15b Magnet assembly is not correctly installed. | 15b Check the mounting. Ensure the correcting mounting kit has been selected and the magnetic array is properly installed. |
| | 15c Cables not plugged into PWB correctly. | 15c Inspect connections and correct. |
| 16 ValveLink diagnostic tests provide erroneous results. | 16a Defective pressure sensor(s). | 16a Replace PWB (see Replacing the PWB Assembly on page 215). |
| | 16b Pressure sensor O-ring(s) missing. | 16b Replace O-ring(s). |
| 17 Cannot perform advanced diagnostics. | 17a Instrument does not have proper tiering. | 17a Upgrade tiering. |
| 18 A PlantWeb alert is active, but not reported (broadcast) automatically. | 18a PlantWeb alerts in firmware 1.5 and higher are mode-based. Transducer block mode may be in MAN or OOS. | 18a Check transducer block mode. Change to AUTO if appropriate. |
| 19 Field Communicator does not turn on. | 19a Battery pack not charged. | 19a Charge battery pack. Note: Battery pack can be charged while attached to the Field communicator or separately. The Field Communicator is fully operable while the battery pack is charging. Do not attempt to charge the battery pack in a hazardous area. |

# Technical Support Checklist

Have the following information available prior to contacting your Emerson Process Management sales office for support.

## Reference

1. Instrument serial number as read from nameplate _____

2. What is the firmware version of the DVC6200f? _____

3. What is the hardware version of the DVC6200f? _____

4. What is the Diagnostic Tier of the DVC6200f? FD____   AD____   PD____

5. What is the Control Tier of the DVC6200f? SC____   FL____   FC____

6. What is the address of the DVC6200f? _____

## Mode and Status

7. What are the DVC6200f Block Modes?

   Actual Modes:              Resource Block _____   Transducer Block_____   Analog Output Block _____

   Target Modes:              Resource Block _____   Transducer Block_____   Analog Output Block _____

   Permitted Modes:           Resource Block _____   Transducer Block_____   Analog Output Block _____

8. What is the status of the individual function blocks?

## Operational

9. Does the digital valve controller respond to the control signal?   Yes _____   No _____
   If No, describe

10. Is it on Travel or Pressure control?

11. What are the following parameter readings?

    Setpoint _____              Drive Signal _____%

    Supply Pressure _____       Pressure A _____        Pressure B _____

    Travel Target _____%        Travel _____%           Pressure B _____

12. What is the safe position of the valve?  Fail Closed _____   Fail Open _____

## Interface and Diagnostic Tools

13. What interface and diagnostic tools are available?_____

14. Provide any available supporting documentation, such as Status Monitor, Detailed Setup, any alert readings.

# Mounting

## Reference

1. Actuator application:   sliding-stem? _____ Rotary? _____

2. Which digital valve controller do you have?  DVC6200f _____   DVC6205f/DVC6215 _____

3. What Make, Brand, Style, Size, etc. actuator is the DVC6200f mounted on? _____

## Operational

4. What is the full travel of the valve?_____

5. What is the Mounting Kit part number? _____

## Other

6. If mounting kits are made by LBP/Customer, please provide pictures of installation.

# Section 8 Parts

## Parts Ordering

Whenever corresponding with your Emerson Process Management sales office about this equipment, always mention the controller serial number. When ordering replacement parts, refer to the 11-character part number of each required part as found in the following parts list. Part numbers are shown for kits and recommended spares only. For part numbers not shown, contact your Emerson Process Management sales office.

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### ⚠ WARNING

**Use only genuine Fisher replacement parts. Components that are not supplied by Emerson Process Management should not, under any circumstances, be used in any Fisher instrument. Use of components not supplied by Emerson Process Management may void your warranty, might adversely affect the performance of the instrument, and could cause personal injury and property damage.**

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## Parts Kits

| Kit | Description | Part Number |
|---|---|---|
| 1* | Elastomer Spare Parts Kit (kit contains parts to service one digital valve controller) | |
| | Standard | 19B5402X012 |
| | Extreme Temperature option (fluorosilicone elastomers) | 19B5402X022 |
| 2* | Small Hardware Spare Parts Kit (kit contains parts to service one digital valve controller) | 19B5403X012 |
| 3* | Seal Screen Kit [kit contains 25 seal screens (key 231) and 25 O-rings (key 39)] | |
| | Standard and Extreme Temperature option (fluorosilicone elastomers) | 14B5072X182 |
| 4* | Terminal Box Kit | |
| | Aluminum | |
| | Standard | GE44077X012 |
| | Standard, Natural Gas approved | GE44081X012 |
| | Extreme Temperature option (fluorosilicone elastomers) | GE44078X012 |
| | Extreme Temperature option (fluorosilicone elastomers) Natural Gas Approved | GE44082X012 |
| | Stainless Steel, fluorosilicone elastomers | GE44080X012 |
| 5* | I/P Converter Kit | |
| | Standard | 38B6041X152 |
| | For Extreme Temperature option (fluorosilicone elastomers) | 38B6041X132 |

| Kit | Description | Part Number |
|---|---|---|
| 6* | Spare Module Base Assembly Kit [kit contains module base (key 2); drive screws, qty. 2, (key 11); shield/label (key 19); hex socket cap screw, qty. 3, (key 38); self tapping screw, qty. 2 (key 49); pipe plug, qty. 3 (key 61); retaining ring, qty. 3 (key 154); screen (key 236); and flame arrestors, qty. 3 (key 243)] | |
| | Aluminum | GE18654X012 |
| | Stainless Steel | GE18654X022 |
| 7* | Spare Housing Assembly Kit, [kit contains housing (key 1); vent assembly (key 52); seal (only included in Housing A kits) (key 288); seal (key 237); O-ring (key 34); O-ring (only used with integrally mounted regulator) (key 5)] | |
| | Aluminum | |
| | *Housing A (used for GX actuator)* | |
| | Standard (nitrile elastomers) | GE48798X032 |
| | Extreme Temperature option (fluorosilicone elastomers) | GE48798X042 |
| | *Housing B (used for all actuators except GX)* | |
| | Standard (nitrile elastomers) | GE48798X072 |
| | Extreme Temperature option (fluorosilicone elastomers) | GE48798X082 |
| | Stainless Steel | |
| | *Housing B (used for all actuators except GX)* | |
| | Standard (nitrile elastomers) | GE48798X092 |
| | Extreme Temperature option (fluorosilicone elastomers) | GE48798X102 |

*Recommended spare parts

| Kit | Description | Part Number |
|-----|-------------|-------------|
| 8* | Spare I/P Shroud Kit<br>[kit contains shroud (key 169) and<br>hex socket cap screw, qty. 4 (key 23)] | GE29183X012 |
| 9 | Remote Mount Feedback Unit Kit (see figure 8-5)<br>[remote housing assembly (key25); hex socket set<br>screw (key 58); 1/2 NPT pipe plug (key 62); wire retainer, qty 2<br>(key 131); terminal cover (key 255); o-ring (key 256); gasket<br>(Housing A only, used for GX actuator) (key 287); seal<br>(Housing A only, used for GX actuator) (key 288)] | |
| | Housing A (used for GX actuator) | GE46670X012 |
| | Housing B (used for all actuators except GX) | GE40178X012 |
| 10 | Feedback Array Kit | |

Sliding Stem (Linear)
[kit contains feedback array and hex socket cap screws, qty.2,
washer, plain, qty.2, external tooth lock washer, qty.2 (only with
aluminum feedback array kit) and alignment template.
  210 mm (8-1/4 inch) kit contains feedback array and hex
socket cap screws, qty. 4,washer, plain, qty. 4, external tooth
lock washer, qty. 4 (only with aluminum feedback array kit),
alignment template and insert]. Stainless steel kits only for use
with stainless steel mounting kits.

| | | |
|---|---|---|
| 7 mm (1/4-inch) | | |
| | Aluminum | GG20240X012 |
| 19 mm (3/4-inch) | | |
| | Aluminum | GG20240X022 |
| | Stainless steel | GE65853X012 |
| 25 mm (1-inch) | | |
| | Aluminum | GG20240X032 |
| | Stainless steel | GE65853X022 |
| 38 mm (1-1/2 inch) | | |
| | Aluminum | GG20240X042 |
| | Stainless steel | GE65853X032 |
| 50 mm (2-inch) | | |
| | Aluminum | GG20240X052 |
| | Stainless steel | GE65853X042 |
| 110 mm (4-1/8 inch) | | |
| | Aluminum | GG20240X082 |
| | Stainless steel | GE65853X062 |
| 210 mm (8-1/4 inch) | | |
| | Aluminum | GG20243X012 |
| | Stainless steel | GE65853X072 |

Rotary
[Kit contains feedback assembly, pointer assembly, travel
indicator scale and M3 machine pan head screws qty.2].
Stainless steel kits only for use with stainless steel mounting kits.

| | | |
|---|---|---|
| | Aluminum | GE71982X012 |
| | Stainles steel | GE71982X022 |
| 11 | Mounting Shield Kit<br>[kit contains shield, qty. 3 and machine<br>screws, qty. 6] | GG05242X022 |
| 12* | Gasket/Seal Kit, for use with GX actuator<br>[kit contains insulating gasket (key 287)<br>and seal (key 288)] | GE45468X012 |

# Parts List

**Note**
Part numbers are shown for recommended spares only. For part
numbers not shown, contact your Emerson Process Management sales
office.
Parts with footnote numbers are available in parts kits; see footnote
information at the bottom of the page.

| Key | Description | Part Number |
|-----|-------------|-------------|

## Housing (see figure 8-2 and 8-4)
### DVC6200f and DVC6205f

| | | |
|---|---|---|
| 1 | Housing[7] | |
| 11 | Drive Screw (2 req'd) (DVC6205f only) | |
| 20 | Shield (DVC6205f only) | |
| 52 | Vent, plastic[2] | |
| 74 | Mounting Bracket (DVC6205f only) | |
| 248 | Screw, hex head (4 req'd) (DVC6205f only) | |
| 249 | Screw, hex head (4 req'd) (DVC6205f only) | |
| 250 | Spacer (4 req'd) (DVC6205f only) | |
| 267 | Standoff (2 req'd) (DVC6205f only) | |
| 271 | Screen[7] | |
| 287 | Gasket, Housing A only (used for GX actuator) (DVC6200f only) | |
| 288 | Seal, Housing A only (used for GX actuator) (DVC6200f only) | |

## Common Parts (see figure 8-2, 8-3, and 8-4)
### DVC6200f and DVC6205f

| | | |
|---|---|---|
| 16* | O-ring[1] (3 req'd) | |
| 29 | Warning label, for use only with LCIE hazardous area classifications | |
| 33 | Mach Screw, pan hd, SST[2] (3 req'd) | |
| 38 | Cap Screw, hex socket, SST[2][6] (3 req'd) | |
| 43* | Cover Assembly (includes cover screws) | |
| | Standard | 38B9580X022 |
| | Extreme temperature option<br>(fluorosilicone elastomers) | 38B9580X032 |
| 48 | Nameplate | |
| 49 | Screw, self tapping (2 req'd)[6] | |
| 61 | Pipe Plug, hex socket[6] | |
| | Housing A with relay C (2 req'd ) (used for GX actuator) | |
| | Housing A with relay B (1 req'd) (used for GX actuator) | |
| | Housing B with relay B and C (1 req'd)<br>(used for all actuators except GX) | |
| | Not required for relay A | |
| 63 | Lithium grease (not furnished with the instrument) | |
| 64 | Zinc based anti-seize compound (not furnished with the instrument) | |
| 65 | Lubricant, silicone sealant (not furnished with the instrument) | |
| 154 | Retaining Ring[2] (3 req'd) | |
| 236 | Screen (required for relay B and C only)[7] | |
| 237 | Module Base Seal[1] | |

*Recommended spare
1. Available in the Elastomer Spare Parts Kit
2. Available in the Small Hardware Spare Parts Kit
6. Available in the Spare Module Base Assembly Kit
7. Available in the Spare Housing Assembly Kit

## Figure 8-1. Terminal Box of Natural Gas Certified FIELDVUE DVC6200f Digital Valve Controller



**WIRING CONNECTOR**

**GAS-BLOCKING PRESS-FIT ADAPTOR**

W9923-1
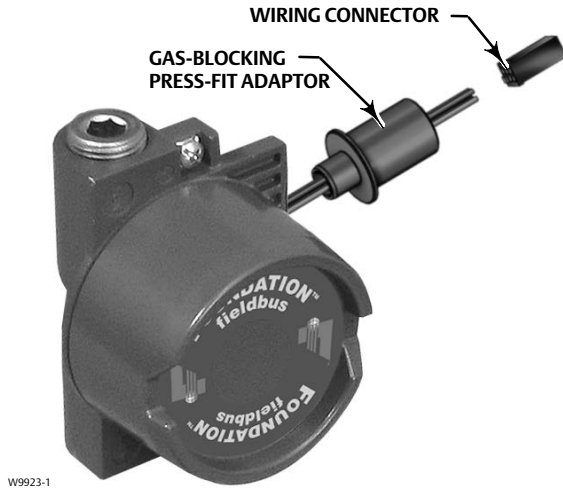
Key    Description

# Module Base
# (see figure 8-2 and 8-4)

## DVC6200f and DVC6205f

| Key | Description |
|---|---|
| 2 | Module Base[6] |
| 11 | Drive Screw[6] (2 req'd) |
| 12 | O-ring[1] |
| 19 | Label, Shield Assembly[6] |
| 61 | Pipe Plug, hex socket[6] (3 req'd) |
| 243 | Slotted Pin (flame arrestor)[6] (3 req'd) |

# I/P Converter Assembly
# (see figure 8-2 and 8-4)

## DVC6200f and DVC6205f

| Key | Description |
|---|---|
| 23 | Cap Screw, hex socket, SST[2][8] (4 req'd) |
| 39* | O-ring[1][3][5] |
| 41 | I/P Converter[5] |
| 169 | Shroud[5][8] (not shown, see figure 7-4) |
| 210* | Boot, nitrile[1][5] (2 req'd) (see figure 7-4) |
| 231* | Seal Screen[1][3][5] |

*Recommended spare
1. Available in the Elastomer Spare Parts Kit
2. Available in the Small Hardware Spare Parts Kit
3. Available in the Seal Screen Kit
4. Available in the Terminal Box Kit
5. Available in the I/P Converter Kit
6. Available in the Spare Module Base Assembly Kit
8. Available in the Spare Shroud Kit

Key    Description    Part Number

# Relay (see figure 8-2 and 8-4)

## DVC6200f and DVC6205f

| | | Part Number |
|---|---|---|
| 24* | Relay Assembly, (includes shroud, relay seal, mounting screws) | |
| | **Standard (nitrile elastomers)** | |
| | Standard Bleed | |
| | *Housing A (used for GX actuator)* | |
| | Single-/acting direct (relay C) | 38B5786X182 |
| | Single-acting reverse (relay B) | 38B5786X172 |
| | *Housing B (used for all actuators except GX)* | |
| | Single-acting direct (relay C) | 38B5786X132 |
| | Double-acting (relay A) | 38B5786X052 |
| | Single-acting reverse (relay B) | 38B5786X092 |
| | Low Bleed | |
| | *Housing A (used for GX actuator)* | |
| | Single-acting direct (relay C) | 38B5786X202 |
| | Single-acting reverse (relay B) | 38B5786X192 |
| | *Housing B (used for all actuators except G)* | |
| | Single-acting direct (relay C) | 38B5786X152 |
| | Double-acting (relay A) | 38B5786X072 |
| | Single-acting reverse (relay B) | 38B5786X112 |
| | **Extreme Temperature option (fluorosilicone elastomers)** | |
| | Standard Bleed | |
| | Single-acting direct (relay C) | 38B5786X142 |
| | Double-acting (relay A) | 38B5786X032 |
| | Single-acting reverse (relay B) | 38B5786X102 |
| | Low Bleed | |
| | Single-acting direct (relay C) | 38B5786X162 |
| | Double-acting (relay A) | 38B5786X082 |
| | Single-acting reverse (relay B) | 38B5786X122 |

# Loop Connections Terminal Box
# (see figure 8-2 and 8-4)

## DVC6200f and DVC6205f

| Key | Description |
|---|---|
| 4 | Terminal Box Cap |
| 34* | O-ring[1][4] |
| 36* | O-ring[1][4] |
| 58 | Set Screw, hex socket, SST[2] |
| 72 | Cap Screw, hex socket, SST[2] |
| 164 | Terminal Box Assembly |

| Key | Description | Part Number |
| --- | --- | --- |

| Key | Description | Part Number |
| --- | --- | --- |

## Feedback Connections Terminal Box (see figure 8-4)

### DVC6205f

| | | |
| --- | --- | --- |
| 4 | Terminal Box Cap | |
| 34* | O-ring[1][4] | |
| 36* | O-ring[1][4] | |
| 58 | Set Screw, hex socket, SST[2] | |
| 62 | Pipe Plug, hex hd, SST | |
| 64 | Anti-seize compound (not furnished with the instrument) | |
| 262 | Adapter | |
| 263* | O-ring | |
| | Standard | 1F463606992 |
| | Extreme temperature option, (fluorosilicone) | 1F4636X0092 |
| 264 | Terminal Box Assembly, remote | |

## PWB Assembly (see figure 8-2 and 8-4)

### DVC6200f and DVC6205f

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**Note**

Contact your Emerson Process Management sales office if a replacement PWB is needed.

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| | |
| --- | --- |
| 50* | PWB Assembly |
| | **Standard Control** |
| | Fieldbus Diagnostics |
| | Advanced Diagnostics |
| | Performance DIagnostic |
| | **Fieldbus Control** |
| | Fieldbus Diagnostics |
| | Advanced Diagnostics |
| | Performance Diagnostics |
| | **Fieldbus Logic** |
| | Fieldbus Diagnostics |
| | Advanced Diagnostics |
| | Performance Diagnostics |

## Pressure Gauges, Pipe Plugs, or Tire Valve Assemblies (see figure 8-3)

### DVC6200f and DVC6205f

| | | |
| --- | --- | --- |
| 47* | Pressure Gauge, nickel-plated brass case, brass connection | |
| | Double-acting (3 req'd); Single-acting (2 req'd) | |
| | PSI/MPA Gauge Scale | |
| | To 60 PSI, 0.4 MPa | 18B7713X042 |
| | To 160 PSI, 1.1 MPa | 18B7713X022 |
| | PSI/bar Gauge Scale | |
| | To 60 PSI, 4 bar | 18B7713X032 |
| | To 160 PSI, 11 bar | 18B7713X012 |
| | PSI/KG/CM$^2$ Gauge Scale | |
| | To 60 PSI, 4 KG/CM$^2$ | 18B7713X072 |
| | To 160 PSI, 11 KG/CM$^2$ | 18B7713X082 |
| 66 | Pipe Plug, hex hd | |
| | For double-acting and single-acting direct w/gauges (none req'd) | |
| | For single-acting reverse w/gauges (1 req'd) | |
| | For all units w/o gauges (3 req'd) | |
| 67 | Tire Valve, used with Tire Valve Option only | |
| | Double-acting (3 req'd); Single-acting (2 req'd) | |

## DVC6215 Feedback Unit (see figure 8-5)

| | | |
| --- | --- | --- |
| 65 | Lubricant, silicone sealant (not furnished with the instrument) | |
| 256* | O-Ring, fluorosilicone | 1K1810X0122 |

*Recommended spare parts

Figure 8-2. FIELDVUE DVC6200f Digital Valve Controller Housing Assembly



HOUSING A—BACK VIEW
(USED FOR GX ACTUATOR)

HOUSING B—BACK VIEW
(USED FOR ALL
ACTUATORS EXCEPT GX)

DOUBLE-ACTING

DIRECT-ACTING

REVERSE-ACTING

☐ APPLY LUBRICANT, SEALANT, OR THREAD LOCK

65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED

GE40185 sheet 1 of 3

Figure 8-2. FIELDVUE DVC6200f Digital Valve Controller Housing Assembly (continued)



SECTION A-A

SECTION C-C
SCALE 2 : 1

SECTION E-E
SCALE 2 : 1

SECTION F-F
SCALE 2 : 1

APPLY LUBRICANT, SEALANT, OR THREAD LOCK
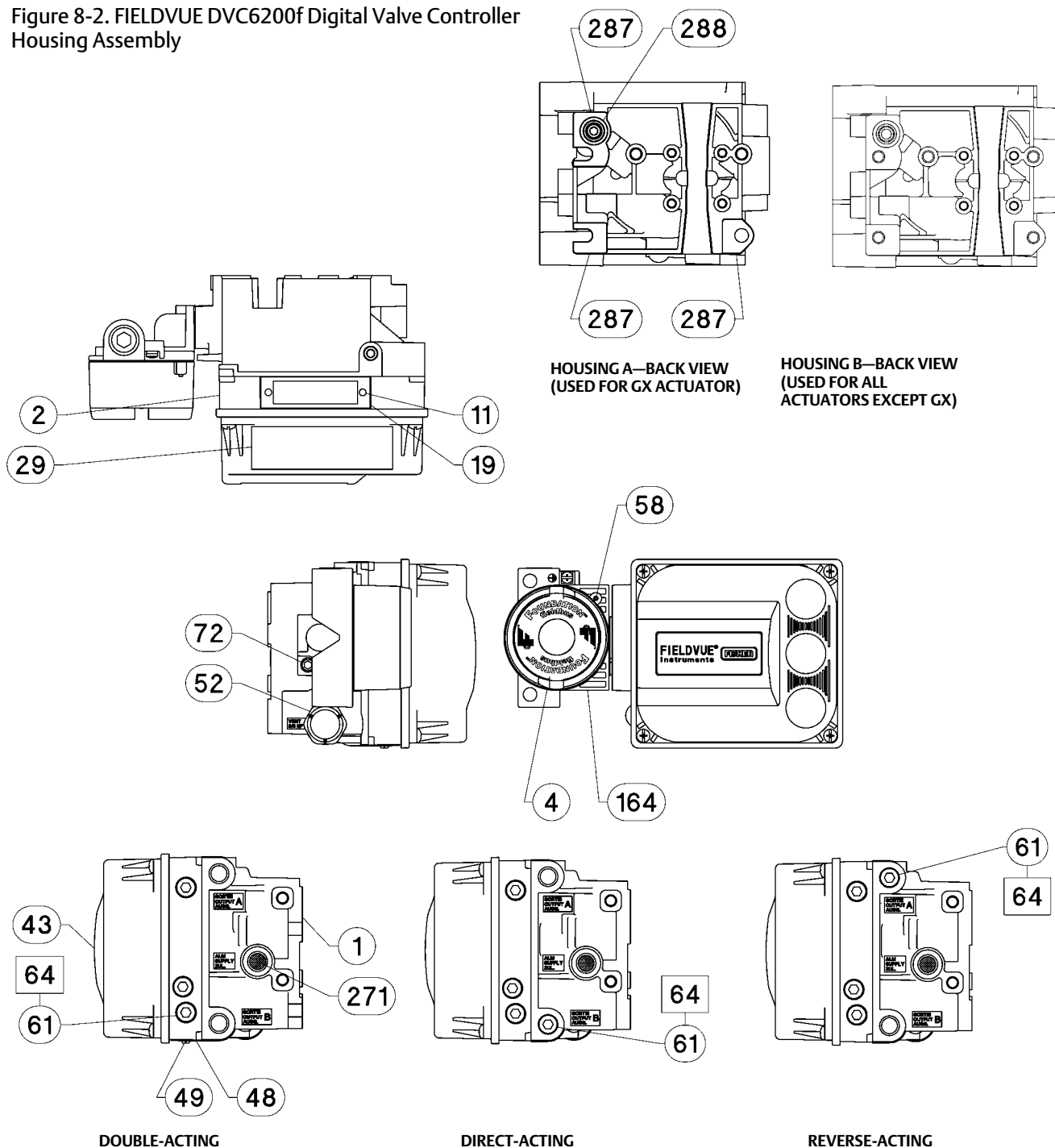
65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED
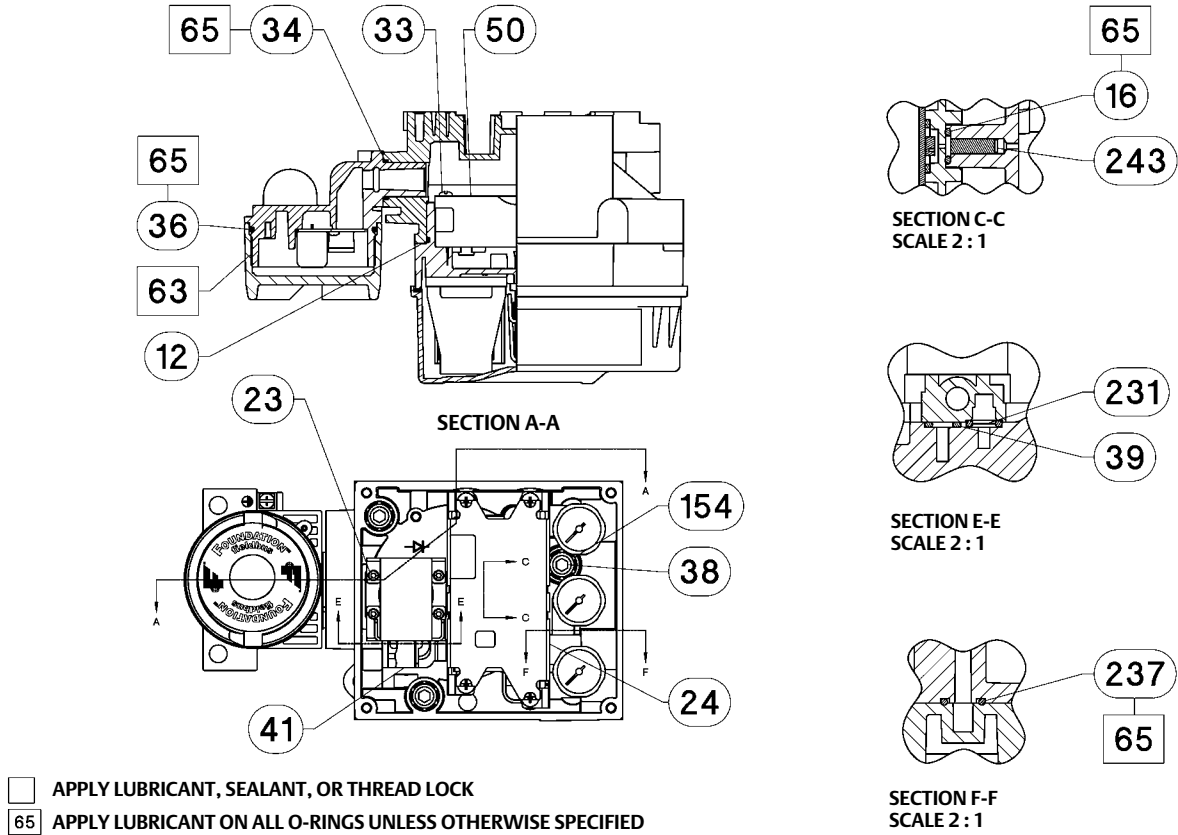
GE40185 sheet 2 of 3

Figure 8-3. Gauge Configuration



DOUBLE-ACTING

DIRECT-ACTING

REVERSE-ACTING

FOR PIPE PLUG OPTION REPLACE 47 WITH 66
FOR TIRE VALVE OPTION REPLACE 47 WITH 67

APPLY LUBRICANT, SEALANT, OR THREAD LOCK

65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED
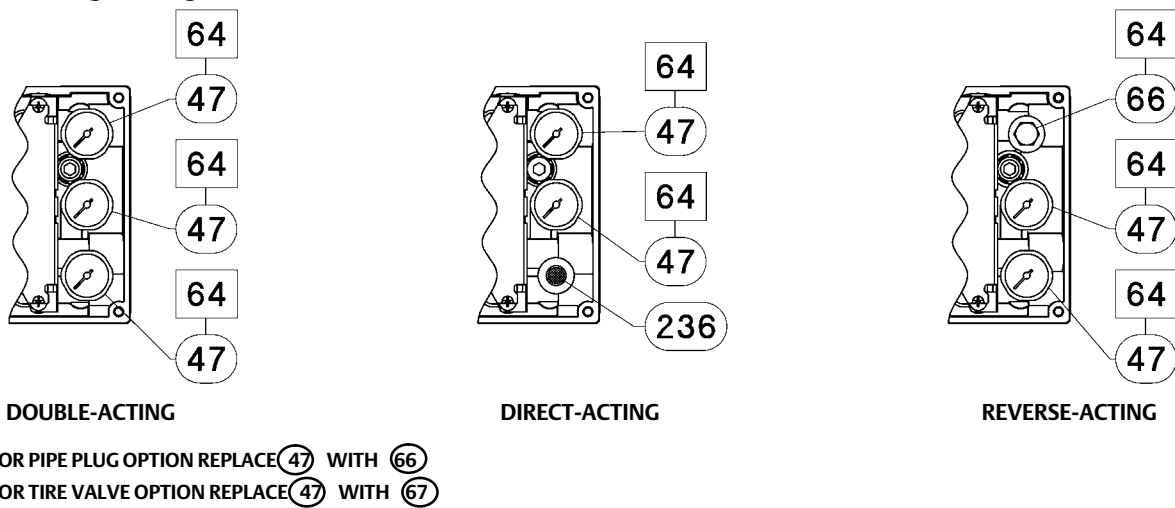
GE40185 sheet 3 of 3

Figure 8‑4. FIELDVUE DVC6205f Base Unit Housing Assembly
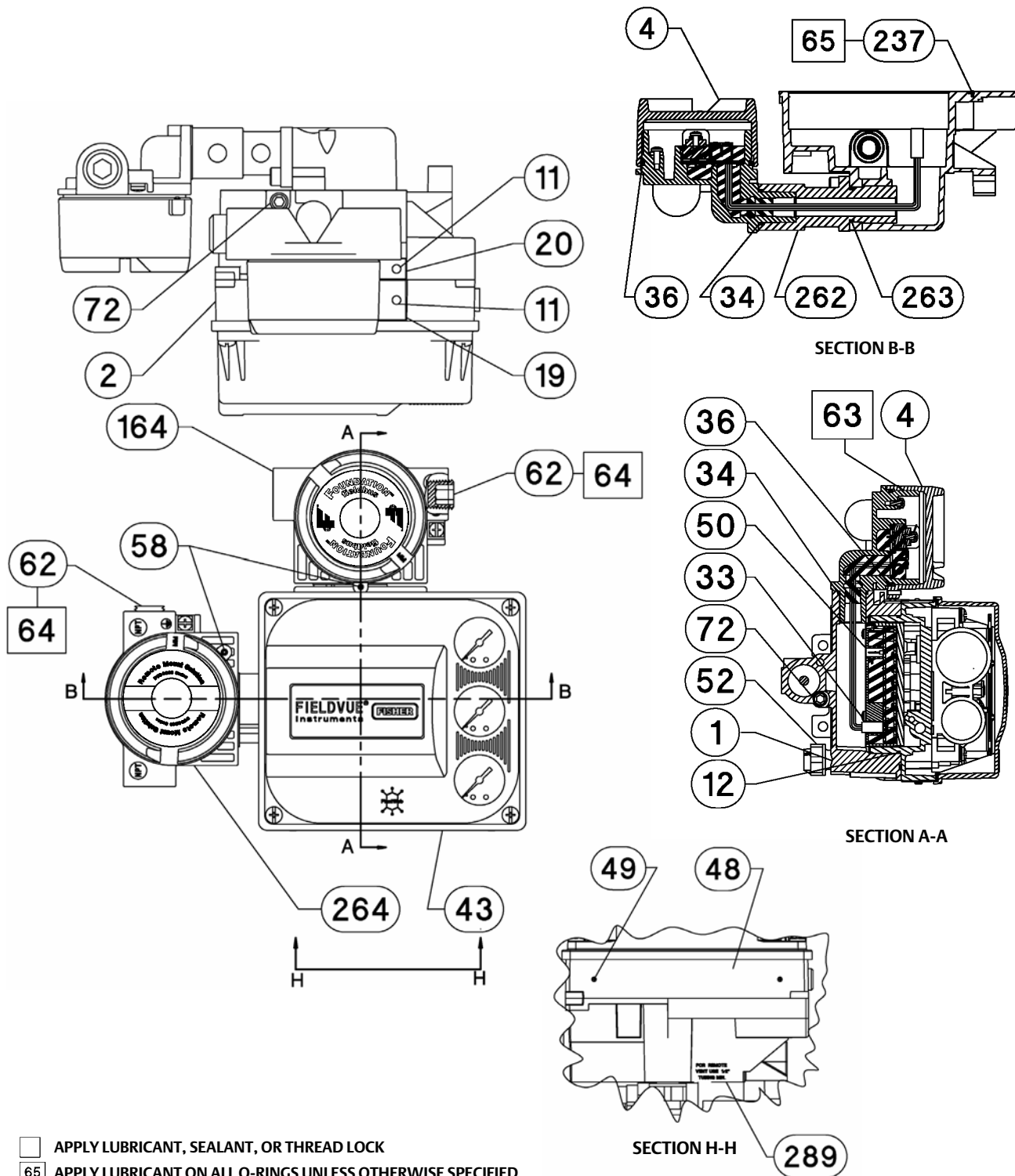


SECTION B-B

SECTION A-A

SECTION H-H

☐ APPLY LUBRICANT, SEALANT, OR THREAD LOCK

65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED

GE40181

Figure 8-4. FIELDVUE DVC6205f Base Unit Housing Assembly (continued)

SECTION C-C
SCALE 2 : 1

SECTION E-E
SCALE 2 : 1

DOUBLE-ACTING SHOWN

DOUBLE-ACTING

DIRECT-ACTING

REVERSE-ACTING

☐ APPLY LUBRICANT, SEALANT, OR THREAD LOCK

65 APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED

GE40181

Figure 8-4. FIELDVUE DVC6205f Base Unit Housing Assembly (continued)



WALL MOUNTING

PIPE MOUNTING
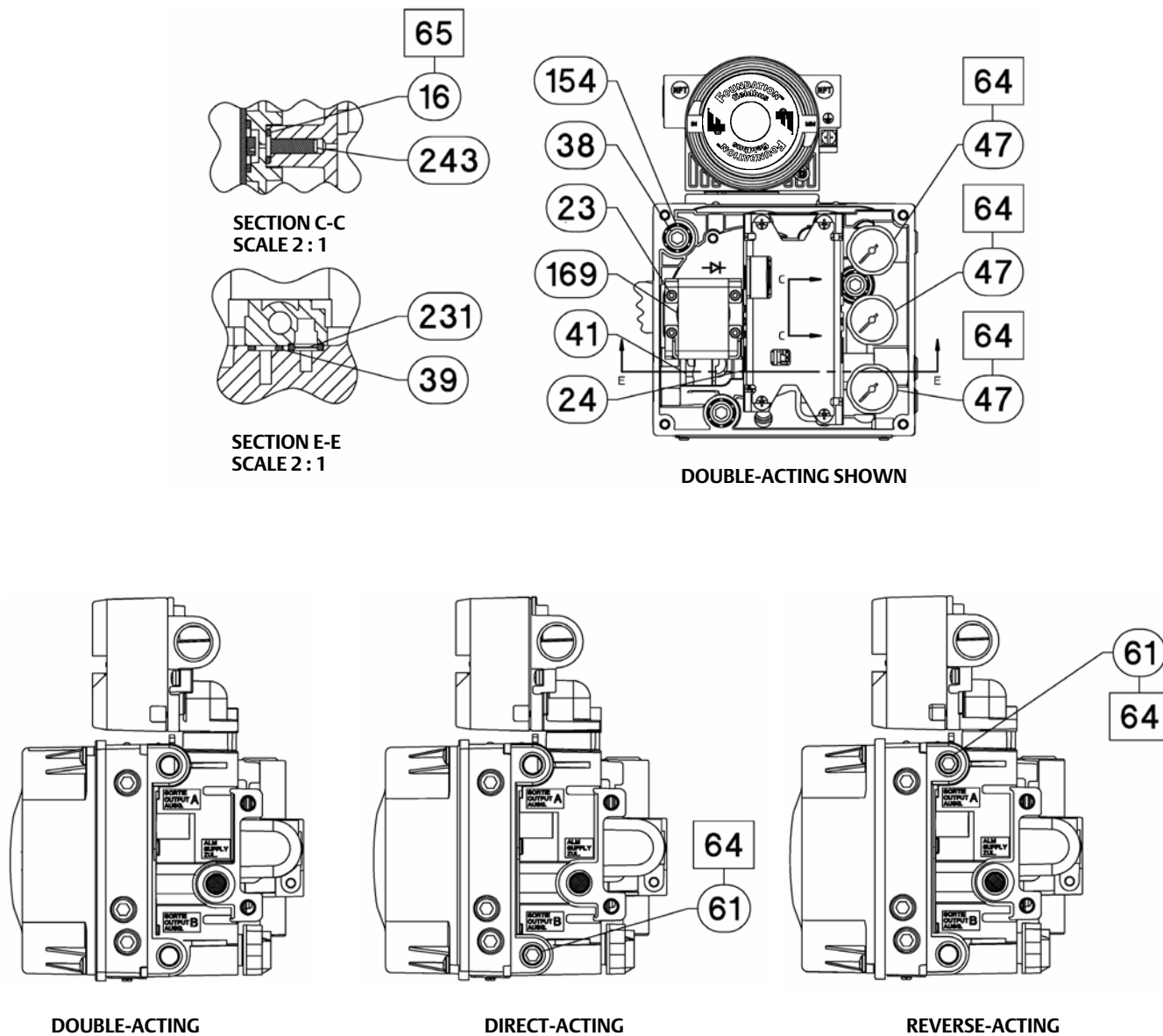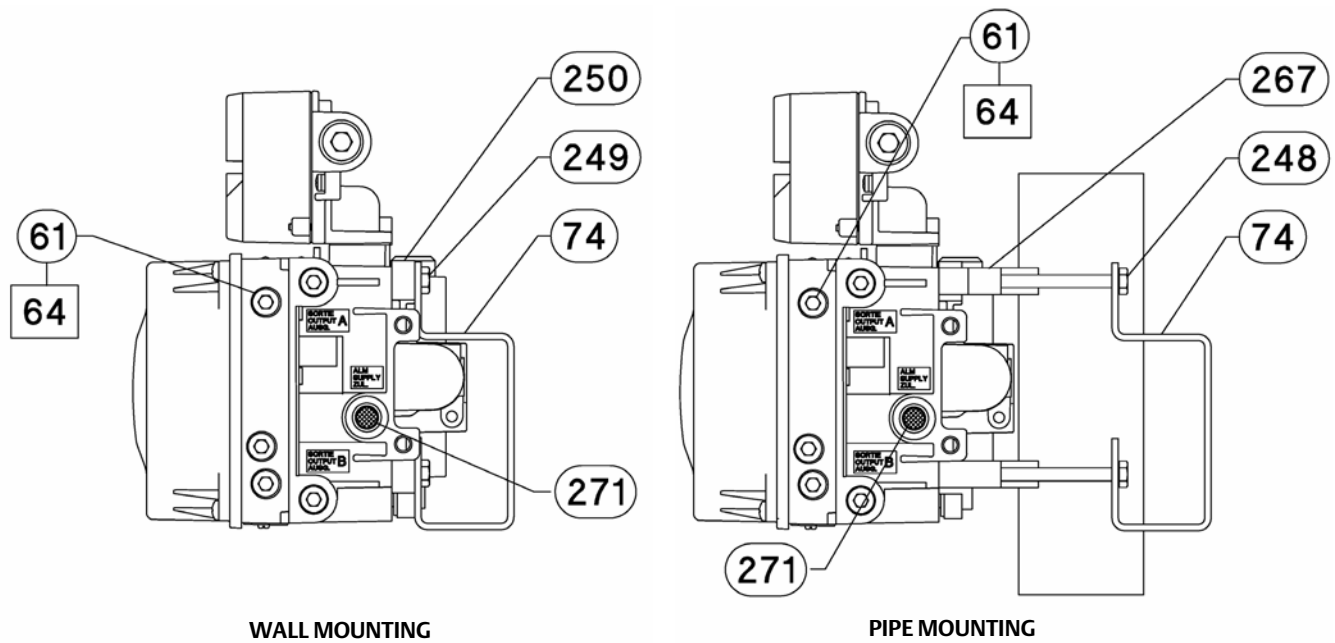
☐   APPLY LUBRICANT, SEALANT, OR THREAD LOCK

65   APPLY LUBRICANT ON ALL O-RINGS UNLESS OTHERWISE SPECIFIED

GE40181

Figure 8-5. FIELDVUE DVC6215 Remote Feedback Assembly



PARTS NOT SHOWN: 158

☐ **APPLY LUBRICANT/SEALANT**

GE46670-B

**HOUSING A
(USED FOR GX ACTUATOR)**
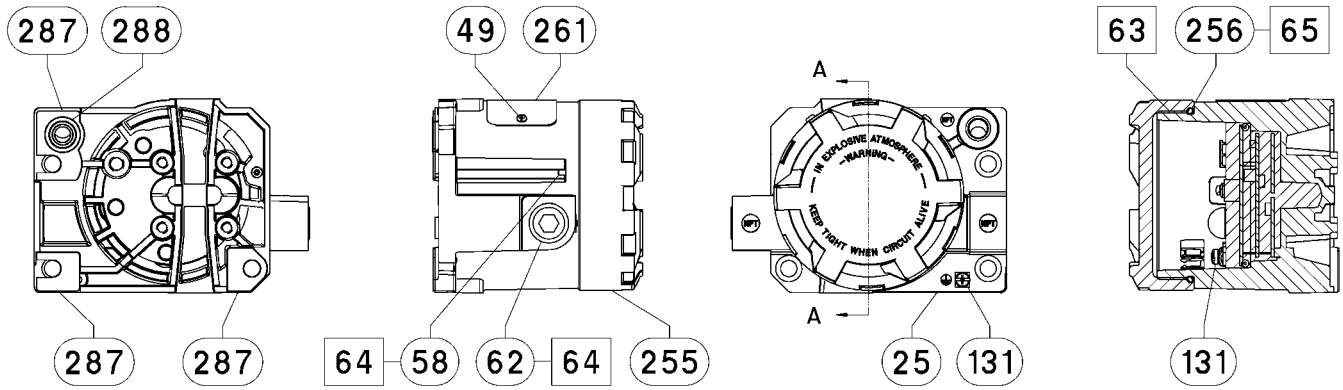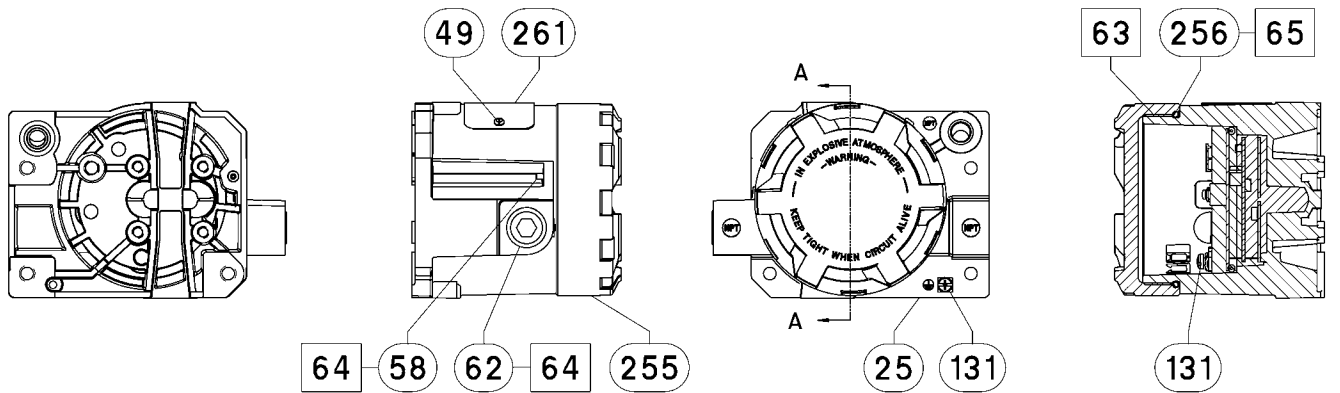
**SECTION A-A**



PARTS NOT SHOWN: 158

☐ **APPLY LUBRICANT/SEALANT**

GE40178-B

**SECTION A-A**

**HOUSING B
(USED FOR ALL ACTUATORS EXCEPT GX)**

# Appendix A Principle of Operation

## Digital Valve Controller Operation

The DVC6200f digital valve controller has a single module base that may be easily replaced in the field without disconnecting field wiring or tubing. The master module contains the following submodules: current-to-pneumatic (I/P) converter, printed wiring board assembly, and pneumatic relay. The relay position is detected by sensing the magnet on the relay beam via a detector on the printed wiring board. This sensor is used for the minor loop feedback (MLFB) reading. The master module can be rebuilt by replacing the submodules. See figures A-1 and A-2.

Figure A-1. FIELDVUE DVC6200f Digital Valve Controller Block Diagram
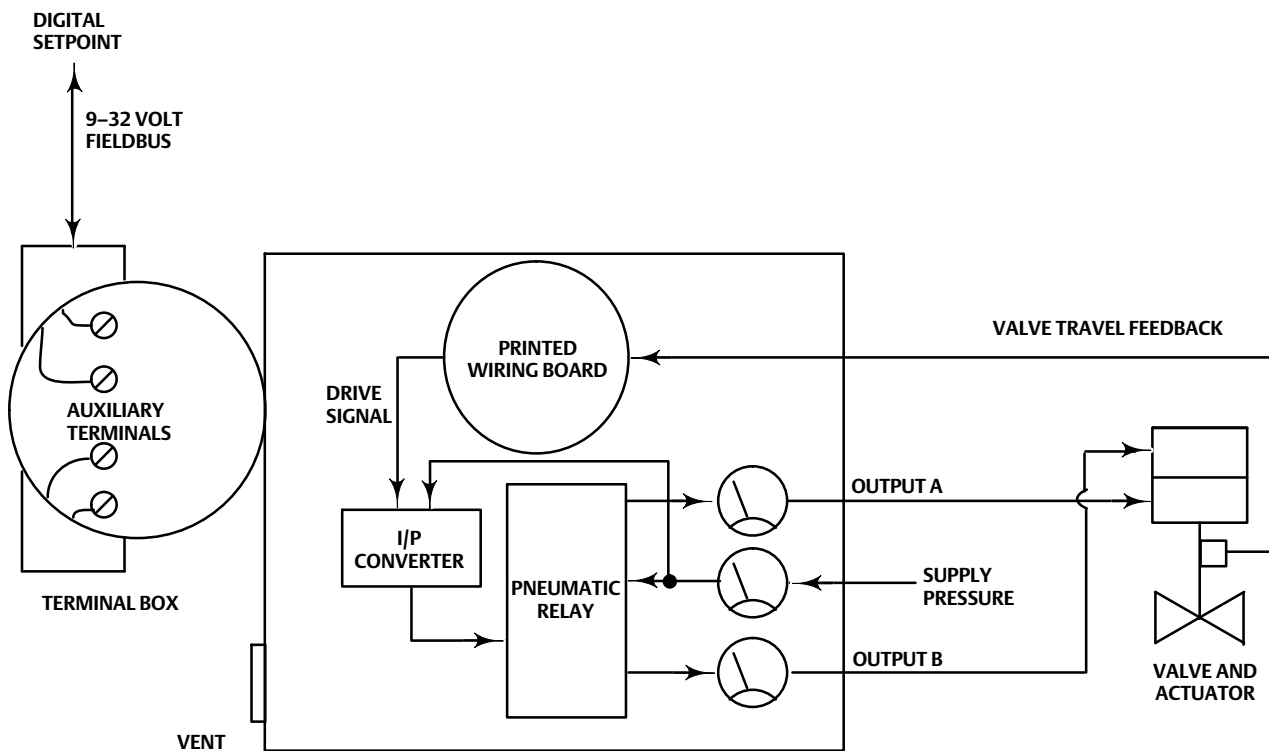


E1376

The DVC6200f digital valve controller is a bus-powered instrument that provides a control valve position in response to a digital setpoint from the control room. The following describes a direct acting DVC6200f digital valve controller mounted on a sliding-stem piston actuator, where the valve is closed with zero power to the instrument.

The setpoint is routed into the terminal box through a single pair of wires and then to the printed wiring board assembly submodule where it is read by the microprocessor, processed by a digital algorithm, and converted into an analog I/P drive signal.

As the setpoint increases, the drive signal to the I/P converter increases, increasing the I/P output pressure. The I/P output pressure is routed to the pneumatic relay submodule. The relay is also connected to supply pressure and amplifies the small pneumatic signal from the I/P converter. The relay accepts the amplified pneumatic signal and provides two output pressures. With relay A, an increasing setpoint will produce increasing pressure at output A and decreasing pressure at output B. With relay B an increasing setpoint will produce decreasing pressure at output B (output A is not available). With relay C an increasing setpoint will produce an increasing pressure on output A (output B is not available). The output A pressure is used for double-acting and single-acting direct applications. The output B pressure is used for double-acting and single-acting reverse applications.

Figure A-2. FIELDVUE DVC6200f Digital Valve Controller Assembly
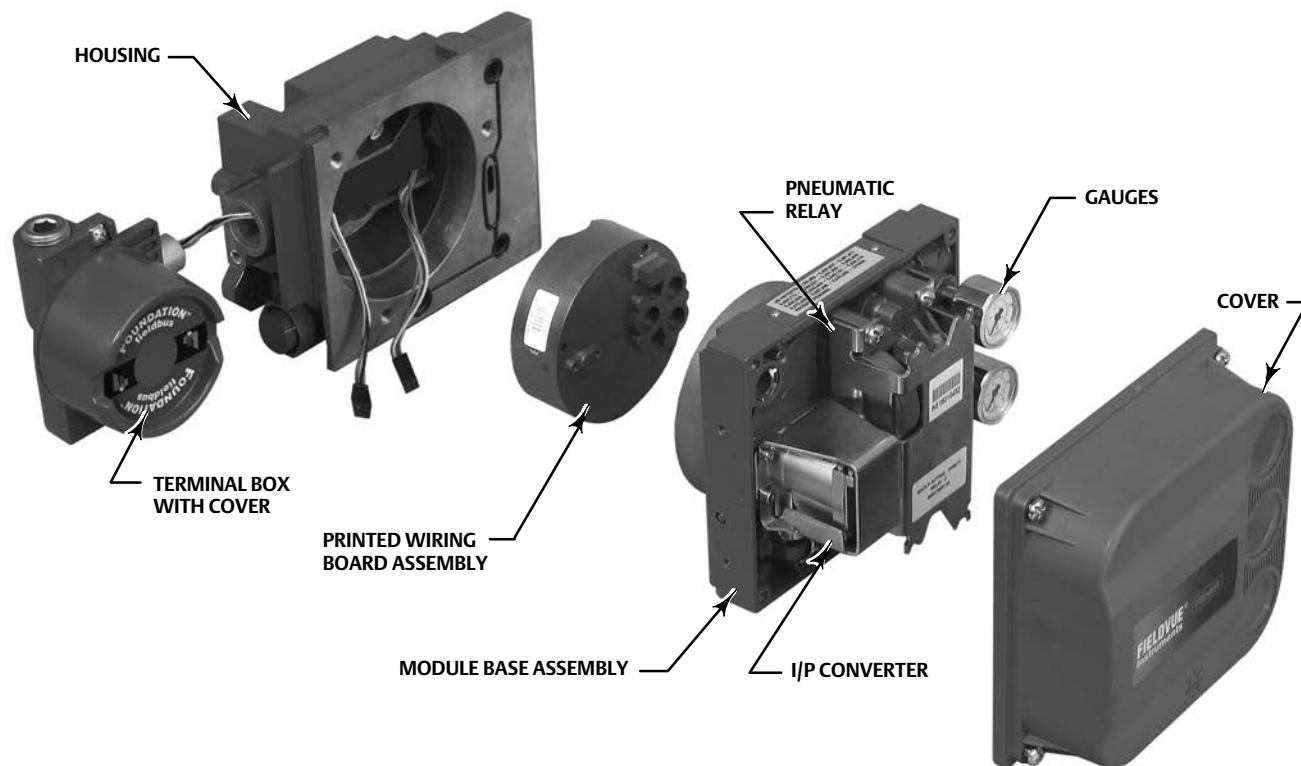


W9925-1

As shown in figure A-1, the increased output A pressure causes the actuator stem to move upward. The stem position is sensed by the travel sensor. The stem continues to move upward until the correct stem position is attained. At this point the printed wiring board assembly stabilizes the I/P drive signal. This prevents any further increase in the pneumatic signal from the I/P converter.

As the digital setpoint decreases, the drive signal to the I/P converter submodule decreases, decreasing the I/P output pressure. The pneumatic relay decreases the output A pressure and increases the output B pressure. The stem moves downward until the correct position is attained. At this point the printed wiring board assembly stabilizes the I/P drive signal. This prevents any decrease in the pneumatic signal from the I/P converter.

# Appendix B Field Communicator Menu Structure

This section contains the Field Communicator menu trees for the transducer block and the resource block. It also contains Fast Key Sequence tables with coordinates to help locate the function/variable on the appropriate menu tree.

Transducer Block (TB) Menu Structure

| Parameter Label | Menu Structure |
|---|---|
| A Minus B | TB > Device Variables > Pressures > A Minus B |
| Actual Travel | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Actual Travel |
| Actuator Fail Action | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Fail Action |
| Actuator Manufacturer | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Manufacturer |
| Actuator Model Number | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Model Number |
| Actuator Serial Number | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Serial Number |
| Actuator Size | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Size |
| Actuator Style | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Style |
| Advise Active | TB > Configure/Setup > Detailed Setup > Alert Handling > Simulate Active Alerts > Advise Active |
| Advise Enable | TB > Configure/Setup > Detailed Setup > Alerts > PlantWeb Alert Enable > Advise Enable |
| Advise Suppress | TB > Configure/Setup > Detailed Setup > Alerts > PlantWeb Alert Reporting > Advise Suppress |
| Air | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Air |
| Alert Conditions | TB > Device Diagnostics > Alert Conditions |
| Alert Key | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts > Alert Key |
| Area Units | TB > Configure/Setup > Detailed Setup > Instrument > Area Units |
| Block Configuration Error | TB > Device Diagnostics > Status > Block Error > Block Configuration Error |
| Blocks Set to Defaults Alert | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts > Blocks Set to Defaults > Block Set to Defaults Alert |
| Blocks Set to Defaults Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts > Blocks Set to Defaults > Block Set to Defaults Alert Enable |
| Calibration Date | TB > Configure/Setup > Detailed Setup > Instrument > Calibration Date |
| Calibration Location | TB > Configure/Setup > Detailed Setup > Instrument > Calibration Location |
| Calibration Person | TB > Configure/Setup > Detailed Setup > Instrument > Calibration Person |
| Custom Characterization Table | TB > Configure/Setup > Detailed Setup > Response Control > Custom Characterization Table |
| Cycle Counter | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Cycle Counter > Cycle Counter |
| | TB > Device Variables > Cycle Counter |
| Cycle Counter Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Cycle Counter > Cycle Counter Alert |
| Cycle Counter Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Cycle Counter > Cycle Counter Alert Enable |
| Cycle Counter Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Cycle Counter > Cycle Counter Alert Point |
| Cycle Counter Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Cycle Counter > Cycle Counter Deadband |
| Device Needs Maintenance Now | TB > Device Diagnostics > Status > Block Error > Device Needs Maintenance Now |
| Drive Current | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Current > Drive Current |
| Drive Current Alert | TB > Device Diagnostics > Status > Self Test Status > Drive Current Alert |
| | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Current > Drive Current Alert |
| Drive Current Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Current > Drive Current Alert Enable |
| Drive Current Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Current > Drive Current Alert Point |
| Drive Current Alert Time | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Current > Drive Current Alert Time |
| Drive Current Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Current > Drive Current Manual Recovery |
| Drive Current Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Current > Drive Current Shutdown |
| Drive Signal | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Signal > Drive Signal |
| | TB > Device Variables > Drive Signal |
| Drive Signal Alert | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Signal > Drive Signal Alert |
| Drive Signal Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Drive Signal > Drive Signal Alert Enable |
| Effective Area | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Effective Area |
| Failed Active | TB > Configure/Setup > Detailed Setup > Alert Handling > Simulate Active Alerts > Failed Active |
| Failed Enable | TB > Configure/Setup > Detailed Setup > Alerts > PlantWeb Alert Enable > Failed Enable |
| Failed Suppress | TB > Configure/Setup > Detailed Setup > Alerts > PlantWeb Alert Reporting > Failed Suppress |
| Feedback Connection | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Feedback Connection |
| Flow Direction | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Flow Direction |
| Flow Tends To | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Flow Tends To |
| I/O Processor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > I/O Processor Alert |
| I/O Processor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > I/O Processor Alert Enable |
| I/O Processor Man Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > I/O Processor Man Recovery |
| I/O Processor Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > I/O Processor Shutdown |
| Inlet Pressure | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Inlet Pressure |

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## Transducer Block (TB) Menu Structure (Continued)

| Parameter Label | Menu Structure |
|---|---|
| Input Characterization | TB > Configure/Setup > Detailed Setup > Response Control > Input Characterization |
| | TB > Device Variables > Input Characterization |
| Integrator Limited Hi | TB > Device Diagnostics > Status > Self Test Status > Integrator Limited Hi |
| Integrator Limited Lo | TB > Device Diagnostics > Status > Self Test Status > Integrator Limited Lo |
| Integrator Suspended | TB > Device Diagnostics > Status > Self Test Status > Integrator Suspended |
| IOP Failure | TB > Device Diagnostics > Status > Self Test Status > IOP Failure |
| Last Calibration Type | TB > Configure/Setup > Detailed Setup > Instrument > Last Calibration Type |
| Leak Class | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Leak Class |
| Length Units | TB > Configure/Setup > Detailed Setup > Instrument > Length Units |
| Lever Arm Length | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Lever Arm Length |
| Lever Style | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Lever Style |
| Lost Static Data | TB > Device Diagnostics > Status > Block Error > Lost Static Data |
| Lower Bench Set | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Lower Bench Set |
| MAI Channel 1 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 1 |
| MAI Channel 2 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 2 |
| MAI Channel 3 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 3 |
| MAI Channel 4 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 4 |
| MAI Channel 5 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 5 |
| MAI Channel 6 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 6 |
| MAI Channel 7 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 7 |
| MAI Channel 8 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 8 |
| Maint Active | TB > Configure/Setup > Detailed Setup > Alert Handling > Simulate Active Alerts > Maint Active |
| Maintenance Enable | TB > Configure/Setup > Detailed Setup > Alerts > PlantWeb Alert Enable > Maintenance Enable |
| Maintenance Suppress | TB > Configure/Setup > Detailed Setup > Alerts > PlantWeb Alert Reporting > Maintenance Suppress |
| Maximum Recorded Supply Pressure | TB > Device Diagnostics > Device Record > Maximum Recorded Supply Pressure |
| Maximum Recorded Supply Pressure Time | TB > Device Diagnostics > Device Record > Maximum Recorded Supply Pressure Time |
| Maximum Recorded Temperature | TB > Device Diagnostics > Device Record > Maximum Recorded Temperature |
| Maximum Recorded Temperature Time | TB > Device Diagnostics > Device Record > Maximum Recorded Temperature Time |
| Maximum Supply Pressure | TB > Configure/Setup > Detailed Setup > Instrument > Maximum Supply Pressure |
| Minimum Recorded Supply Pressure | TB > Device Diagnostics > Device Record > Minimum Recorded Supply Pressure |
| Minimum Recorded Supply Pressure Time | TB > Device Diagnostics > Device Record > Minimum Recorded Supply Pressure Time |
| Minimum Recorded Temperature | TB > Device Diagnostics > Device Record > Minimum Recorded Temperature |
| Minimum Recorded Temperature Time | TB > Device Diagnostics > Device Record > Minimum Recorded Temperature Time |
| MLFB Error | TB > Device Diagnostics > Status > Self Test Status > MLFB Error |
| Nominal Supply Pressure | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Nominal Supply Pressure |
| Out of Service | TB > Device Diagnostics > Status > Block Error > Out of Service |
| Outlet Pressure | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Outlet Pressure |
| Outblock Selection | TB > Configure/Setup > Detailed Setup > Response Control > Outblock Selection |
| Output Block Timeout | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts > Output Block Timeout |
| Output Block Timeout Alert | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts > Output Block Timeout > Output Block Timeout Alert |
| Output Block Timeout Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts > Output Block Timeout > Output Block Timeout Alert Enable |
| Output Block Timeout Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts > Output Block Timeout > Output Block Timeout Manual Recovery |
| Output Block Timeout Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Configuration Alerts > Output Block Timeout > Output Block Timeout Shutdown |
| Packing Type | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Packing Type |
| PD Inside Status | TB > Configure/Setup > Device Variables > PD Inside Status |
| PD Run | TB > Configure/Setup > Detailed Setup > Alerts > Performance Alerts > PD Run |

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## Transducer Block (TB) Menu Structure (Continued)

| Parameter Label | Menu Structure |
|---|---|
| Performance Critical Alert | TB > Configure/Setup > Detailed Setup > Alerts > Performance Alerts > Performance Critical Alert |
| Performance Critical Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Performance Alerts > Performance Critical Alert Enable |
| Performance Information Alert | TB > Configure/Setup > Detailed Setup > Alerts > Performance Alerts > Peformance Information Alert |
| Performance Information Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Performance Alerts > Peformance Information Alert Enable |
| Performance Reduced Alert | TB > Configure/Setup > Detailed Setup > Alerts > Performance Alerts > Peformance Reduced Alert |
| Performance Reduced Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Performance Alerts > Peformance Reduced Alert Enable |
| Performance Tuner | TB > Configure/Setup > Basic Setup > Performance Tuner |
| | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Performance Tuner |
| PlantWeb Alert Simulate | TB > Configure/Setup > Detailed Setup > Alert Handling > PlantWeb Alert Simulate |
| Port Diameter | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Port Diameter |
| Port Type | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Port Type |
| Pressure A | TB > Device Variables > Pressures > Pressure A |
| Pressure A Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Sensors > Pressure A Sensor Alert |
| Pressure A Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Sensors > Pressure A Sensor Alert Enable |
| Pressure A Sensor Failure | TB > Device Diagnostics > Status > Self Test Status > Pressure A Sensor Error |
| Pressure A Sensor Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Sensors > Pressure A Sensor Manual Recovery |
| Pressure A Sensor Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Sensors > Pressure A Sensor Shutdown |
| Pressure B | TB > Device Variables > Pressures > Pressure B |
| Pressure B Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Sensors > Pressure B Sensor Alert |
| Pressure B Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Sensors > Pressure B Sensor Alert Enable |
| Pressure B Sensor Failure | TB > Device Diagnostics > Status > Self Test Status > Pressure B Sensor Error |
| Pressure Cutoff Closed | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Pressure Cutoff Closed |
| Pressure Cutoff Open | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Pressure Cutoff Open |
| Pressure Fallback Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Fallback > Pressure Fallback Alert |
| Pressure Fallback Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Fallback > Pressure Fallback Alert Enable |
| Pressure Integral Dead Zone | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning > Pressure Integral Dead Zone |
| Pressure Integral Gain | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning > Pressure Integral Gain |
| Pressure Integral Limit Hi | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning > Pressure Integral Limit Hi |
| Pressure Integral Limit Lo | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning > Pressure Integral Limit Lo |
| Pressure MLFB Gain | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning > Pressure MLFB Gain |
| Pressure Proportional Gain | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning > Pressure Proportional Gain |
| Pressure Range Hi | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Pressure Range Hi |
| Pressure Range Lo | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Pressure Range Lo |
| Pressure Tuning Set | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning > Pressure Tuning Set |
| Pressure Units | TB > Configure/Setup > Detailed Setup > Instrument > Pressure Units |
| Processor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Processor Alert |
| Processor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Processor Alert Enable |
| Program Memory Alert | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Program Memory Alert |
| Program Memory Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Program Memory Alert Enable |
| Program Memory Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Program Memory Manual Recovery |
| Program Memory Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Program Memory Shutdown |
| Protection | TB > Device Variables > Protection |
| Proximity Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Proximity > Proximity Hi Alert |
| Proximity Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Proximity > Proximity Hi Alert Enable |
| Proximity Hi Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Proximity > Proximity Hi Hi Alert |
| Proximity Hi Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Proximity > Proximity Hi Hi Alert Enable |
| Proximity Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Proximity > Proximity Lo Alert |
| Proximity Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Proximity > Proximity Lo Alert Enable |
| Proximity Lo Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Proximity > Proximity Lo Lo Alert |
| Proximity Lo Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Proximity > Proximity Lo Lo Alert Enable |
| Push Down To | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Push Down To |

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## Transducer Block (TB) Menu Structure (Continued)

| Parameter Label | Menu Structure |
|---|---|
| Rated Travel | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Rated Travel |
| Relay Type | TB > Configure/Setup > Detailed Setup > Instrument > Relay Type |
| Seat Type | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Seat Type |
| Setpoint | TB > Device Variables > AO Control-Pre-Char > Setpoint |
| Setpoint Status | TB > Device Variables > AO Control-Pre-Char > Setpoint Status |
| Setpoint(D) | TB > Device Variables > DO Control > Setpoint(D) |
| Shaft Stem Diameter | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Shaft Stem Diameter |
| Simulate Active | TB > Device Diagnostics > Status > Block Error > Simulate Active |
| Simulate Jumper ON | TB > Device Diagnostics > Status > Self Test Status > Simulate Jumper ON |
| Spring Rate | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Spring Rate |
| Spring Rate Units | TB > Configure/Setup > Detailed Setup > Instrument > Spring Rate Units |
| Static Memory Alert | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Static Memory Alert |
| Static Memory Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Static Memory Alert Enable |
| Static Memory Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Static Memory Manual Recovery |
| Static Memory Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Elect Alerts > Processor Impaired > Static Memory Shutdown |
| Stroke Time Close | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Reference > Stroke Time Close |
| Stroke Time Open | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Reference > Stroke Time Open |
| Supply | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Supply Pressure > Supply |
| | TB > Device Variables > Pressures > Supply |
| Supply Pressure Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Supply Pressure > Supply Pressure Hi Alert |
| Supply Pressure Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Supply Pressure > Supply Pressure Hi Alert Enable |
| Supply Pressure Hi Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Supply Pressure > Supply Pressure Hi Alert Point |
| Supply Pressure Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Supply Pressure > Supply Pressure Lo Alert |
| Supply Pressure Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Supply Pressure > Supply Pressure Lo Alert Enable |
| Supply Pressure Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Supply Pressure > Supply Pressure Lo Alert Point |
| Supply Pressure Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Sensors > Supply Pressure Sensor Alert |
| Supply Pressure Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Pressure Sensors > Supply Pressure Sensor Alert Enable |
| Supply Sensor Failure | TB > Device Diagnostics > Status > Self Test Status > Supply Sensor Failure |
| Tag Description | TB > Configure/Setup > Detailed Setup > Instrument > Tag Description |
| Temperature | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Temperature Limit > Temperature |
| Temperature Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Temperature Limit > Temperature Hi Alert |
| Temperature Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Temperature Limit > Temperature Hi Alert Enable |
| Temperature Hi Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Temperature Limit > Temperature Hi Alert Point |
| Temperature Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Temperature Limit > Temperature Lo Alert |
| Temperature Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Temperature Limit > Temperature Lo Alert Enable |
| Temperature Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment Alerts > Temperature Limit > Temperature Lo Alert Point |
| Temperature Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Temperature Sensor > Temperature Sensor Alert |
| Temperature Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Temperature Sensors > Temperature Sensor Alert Enable |
| Temperature Units | TB > Configure/Setup > Detailed Setup > Instrument > Temperature Units |
| Travel | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel |
| Travel (DeChar) | TB > Device Variables > AO Control-Pre-Char > Travel(DeChar) |
| Travel Accumulator | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Travel Accumulator > Travel Accumulator |
| | TB > Device Variables > Travel Accumulator |
| Travel Accumulator Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Travel Accumulator > Travel Accumulator Alert |
| Travel Accumulator Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Travel Accumulator > Travel Accumulator Alert Enable |
| Travel Accumulator Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Travel Accumulator > Travel Accumulator Alert Point |
| Travel Accumulator Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel History Alerts > Travel Accumulator > Travel Accumulator Deadband |
| Travel Closed Alert | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel Closed > Travel Closed Alert |
| Travel Closed Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel Closed > Travel Closed Alert Enable |
| Travel Closed Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel Closed > Travel Closed Alert Point |
| Travel Closed Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel Closed > Travel Closed Deadband |
| Travel Count | TB > Device Variables > Travel Count |
| Travel Cutoff Hi | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Travel Cutoff Hi |

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## Transducer Block (TB) Menu Structure (Continued)

| Parameter Label | Menu Structure |
|---|---|
| Travel Cutoff Lo | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Travel Cutoff Lo |
| Travel Deviation | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Deviation > Travel Deviation |
| Travel Deviation Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Deviation > Travel Deviation Alert |
| Travel Deviation Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Deviation > Travel Deviation Alert Enable |
| Travel Deviation Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Deviation > Travel Deviation Alert Point |
| Travel Deviation Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Deviation > Travel Deviation Deadband |
| Travel Deviation Pressure Fallback | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Travel Deviation Pressure Fallback |
| Travel Deviation Time | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Deviation > Travel Deviation Time |
| Travel Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Hi/Lo > Travel Hi Alert |
| Travel Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Hi/Lo > Travel Hi Alert Enable |
| Travel Hi Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Hi/Lo > Travel Hi Alert Point |
| Travel Hi Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Hi/Lo > Travel Hi Deadband |
| Travel Hi Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Limit > Travel Hi Hi Alert |
| Travel Hi Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Limit > Travel Hi Hi Alert Enable |
| Travel Hi Hi Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Limit > Travel Hi Hi Alert Point |
| Travel Hi Hi Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Limit > Travel Hi Hi Deadband |
| Travel Integral Dead Zone | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel Integral Dead Zone |
| Travel Integral Enable | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel Integral Enable |
| Travel Integral Gain | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel Integral Gain |
| Travel Integral Limit Hi | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel Integral Limit Hi |
| Travel Integral Limit Lo | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel Integral Limit Lo |
| Travel Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Hi/Lo > Travel Lo Alert |
| Travel Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Hi/Lo > Travel Lo Alert Enable |
| Travel Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Hi/Lo > Travel Lo Alert Point |
| Travel Lo Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Hi/Lo > Travel Lo Deadband |
| Travel Lo Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Limit > Travel Lo Lo Alert |
| Travel Lo Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Limit > Travel Lo Lo Alert Enable |
| Travel Lo Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Limit > Travel Lo Lo Alert Point |
| Travel Lo Lo Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel Alerts > Travel Limit > Travel Lo Lo Deadband |
| Travel MLFB Gain | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel MLFB Gain |
| Travel Open Alert | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel Open > Travel Open Alert |
| Travel Open Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel Open > Travel Open Alert Enable |
| Travel Open Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel Open > Travel Open Alert Point |
| Travel Open Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Prox Alerts > Travel Open > Travel Open Deadband |
| Travel Proportional Gain | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel Proportional Gain |
| Travel Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Travel Sensor > Travel Sensor Alert |
| Travel Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Travel Sensor > Travel Sensor Alert Enable |
| Travel Sensor Hi Error | TB > Device Diagnostics > Status > Self Test Status > Travel Sensor Hi Error |
| Travel Sensor Lo Error | TB > Device Diagnostics > Status > Self Test Status > Travel Sensor Lo Error |
| Travel Sensor Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Travel Sensor > Travel Sensor Manual Recovery |
| Travel Sensor Motion | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Travel Sensor Motion |
| Travel Sensor Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Sensor Alerts > Travel Sensor > Travel Sensor Shutdown |
| Travel Sensor Span Error | TB > Device Diagnostics > Status > Self Test Status > Travel Sensor Span Error |
| Travel Status | TB > Device Variables > AO Control-Post-Char > Travel Status |
| Travel Tuning Set | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel Tuning Set |
| Travel Units | TB > Configure/Setup > Detailed Setup > Instrument > Travel Units |
| Travel Velocity Gain | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning > Travel Velocity Gain |
| Travel(D) | TB > Device Variables > DO Control > Travel(D) |
| Travel/Pressure Select | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Travel/Pressure Select |
| Travel/Pressure State | TB > Configure/Setup > Detailed Setup > Response Control > Travel Pressure Control > Travel/Pressure State |
| | TB > Device Variables > Travel/Pressure State |
| Trend | TB > Device Diagnostics > Trend |
| Trim Style 1 | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Reference > Trim Style 1 |

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## Transducer Block (TB) Menu Structure (Continued)

| Parameter Label | Menu Structure |
|---|---|
| Trim Style 2 | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Reference > Trim Style 2 |
| Unbalanced Area | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Unbalanced Area |
| Upper Bench Set | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Upper Bench Set |
| Valve Class | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Class |
| Valve Manufacturer | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Manufacturer |
| Valve Model Number | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Model Number |
| Valve Serial Number | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Serial Number |
| Valve Size | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Size |
| Valve Style | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Style |
| Zero Power Condition | TB > Configure/Setup > Detailed Setup > Instrument > Zero Power Condition |

TRANSDUCER BLOCK
BASIC SETUP

TRANSDUCER BLOCK
DETAILED SETUP

**Travel Tuning**

:Travel Tuning Set
Travel Proportional Gain
Travel Velocity Gain
:Travel MLFB Gain
:Travel Integral Enable
:Travel Integral Gain
:Travel Integral Dead Zone
:Travel Integral Limit Hi
:Travel Integral Limit Lo
Performance Tuner
Stabilize / Optimize

**Response Control**

Travel Tuning
Pressure Tuning
Travel Press Control
Input Characterization
Custom Characterization Table
Outblock Selection

**Top Level**

Configure/Setup
Device Diagnostics
Device Variables

**Travel Press Control**

:Travel/Pressure State
:Travel/Pressure Select
Travel Deviation Pressure Fallback
Travel Cutoff Hi
Travel Cutoff Lo
:Pressure Cutoff Open
:Pressure Cutoff Closed
:Pressure Range Hi
:Pressure Range Lo

**Pressure Tuning**

:Pressure Tuning Set
:Pressure Proportional Gain
:Pressure MLFB Gain
:Pressure Integral Gain
:Pressure Integral Dead Zone
:Pressure Integral Limit Hi
:Pressure Integral Limit Lo

**Configure/Setup**

Basic Setup
**Detailed Setup**
Calibration

**Detailed Setup**

Transducer Block Mode
Protection
Response Control
Alerts
Instrument
Valve and Actuator
MAI Channel Map
Alert Handling

**Instrument**

Tag Description
Pressure Units
Temperature Units
Travel Units
Length Units
Area Units
Spring Rate Units
:Relay Type
:Zero Power Condition
:Maximum Supply Pressure
Calibration Person
Calibration Location
Calibration Date
:Last Calibration Type

**Alerts (See facing page)**

Elect Alerts
Configuration Alerts
Sensor Alerts
Environment Alerts
Travel Alerts
Prox Alerts
Travel History Alerts
Performance Alerts
PlantWeb Alert Enable
PlantWeb Alert Reporting

**MAI Channel Map**

:MAI Channel 1
:MAI Channel 2
:MAI Channel 3
:MAI Channel 4
:MAI Channel 5
:MAI Channel 6
:MAI Channel 7
:MAI Channel 8

**Alert Handling**

PlantWeb Alert Simulate
Simulate Active Alerts
PlantWeb Alert Handling

**PlantWeb Alert Handling**

PlantWeb Alerts Set PV Status
Block Error Reporting

**Simulate Active Alarms**

Failed Active
Maint Active
Advise Active

**Valve and Actuator**

Valve
Trim
Actuator
Reference

**Valve**

Valve Manufacturer
Valve Model Number
Valve Serial Number
Valve Style
:Valve Size
:Valve Class
:Rated Travel
:Actual Travel
:Shaft Stem Diameter
:Packing Type
:Inlet Pressure
:Outlet Pressure

**Reference**

:Trim Style 1
:Trim Style 2
:Stroke Time Open
:Stroke Time Close

**Actuator**

Actuator Manufacturer
Actuator Model Number
:Actuator Style
Actuator Serial Number
:Actuator Size
Actuator Fail Action
:Feedback Connection
:Travel Sensor Motion
:Lever Style
:Lever Arm Length
:Effective Area
:Air
:Upper Bench Set
:Lower Bench Set
:Nominal Supply Pressure
:Spring Rate

**Trim**

:Seat Type
:Leak Class
:Port Diameter
:Port Type
:Flow Direction
:Push Down To
:Flow Tends To
:Unbalanced Area

TRANSDUCER BLOCK
DETAILED SETUP > ALERTS
(continued on next page)

Drive Current

Drive Current
:Drive Current Alert
:Drive Current Alert Enable
:Drive Current Shutdown
:Drive Current Manual Recovery
:Drive Current Alert Point
:Drive Current Alert Time

Elect Alerts

Drive Current
Drive Signal
Processor Impaired

Alerts

**Elect Alerts**
**Configuration Alerts**
**Sensor Alerts**
**Environment Alerts**
Travel Alerts
Prox Alerts
Travel History Alerts
Performance Alerts
PlantWeb Alert Enable
PlantWeb Alert Reporting

Drive Signal

Drive Signal
:Drive Signal Alert
:Drive Signal Alert Enable

Processor Impaired

:Program Memory Alert
:Program Memory Alert Enable
:Program Memory Shutdown
:Program Memory Manual Recovery
:Static Memory Alert
:Static Memory Alert Enable
:Static Memory Shutdown
:Static Memory Manual Recovery
:Processor Alert
:Processor Alert Enable
:I/O Processor Alert
:I/O Processor Alert Enable
:I/O Processor Shutdown
:I/O Processor Man Recovery

Configuration Alerts

Output Block Timeout
Blocks Set to Default
Alert Key

Output Block Timeout

:Output Block Timeout Alert
:Output Block Timeout Alert Enable
:Output Block Timeout Shutdown
:Output Block Timeout Manual Recovery
:Output Block Timeout

Blocks Set to Default

:Blocks Set to Defaults Alert
:Blocks Set to Defaults Alert Enable

Sensor Alerts

Travel Sensor
Pressure Sensors
Pressure Fallback
Temperature Sensor

Travel Sensor

:Travel Sensor Alert
:Travel Sensor Alert Enable
:Travel Sensor Shutdown
:Travel Sensor Manual Recovery

Pressure Fallback

:Pressure Fallback Alert
:Pressure Fallback Alert Enable

Pressure Sensors

:Pressure A Sensor Alert
:Pressure A Sensor Alert Enable
:Pressure A Sensor Shutdown
:Pressure A Sensor Manual Recovery
:Pressure B Sensor Alert
:Pressure B Sensor Alert Enable
:Supply Pressure Sensor Alert
:Supply Pressure Sensor Alert Enable

Temperature Sensor

:Temperature Sensor Alert
:Temperature Sensor Alert Enable

Environment Alerts

Supply Pressure
Temperature Limit

Supply Pressure

:Supply
:Supply Pressure Hi Alert
:Supply Pressure Hi Alert Enable
Supply Pressure Hi Alert Point
:Supply Pressure Lo Alert
:Supply Pressure Lo Alert Enable
:Supply Pressure Lo Alert Point

Temperature Limit

Temperature
:Temperature Hi Alert
:Temperature Hi Alert Enable
Temperature Hi Alert Point
:Temperature Lo Alert
:Temperature Lo Alert Enable
:Temperature Lo Alert Point

TRANSDUCER BLOCK
DETAILED SETUP > ALERTS

**Travel Alerts**
:Travel Target
:Travel
Travel Deviation
Travel Limit
Travel Hi/Lo

**Travel Deviation**
Travel Deviation
:Travel Deviation Alert
:Travel Deviation Alert Enable
:Travel Deviation Alert Point
:Travel Deviation Time
:Travel Deviation Deadband

**Alerts**
Elect Alerts
Configuration Alerts
Sensor Alerts
Environment Alerts
**Travel Alerts**
**Prox Alerts**
**Travel History Alerts**
**Performance Alerts**
**PlantWeb Alert Enable**
**PlantWeb Alert Reporting**

**Travel Open**
Travel Open Alert
Travel Open Alert Enable
:Travel Open Alert Point
:Travel Open Deadband

**Prox Alerts**
:Travel
Travel Open
Travel Closed
Proximity

**Travel Limit**
:Travel Hi Hi Alert
:Travel Hi Hi Alert Enable
:Travel Hi Hi Alert Point
:Travel Hi Hi Deadband
:Travel Lo Lo Alert
:Travel Lo Lo Alert Enable
:Travel Lo Lo Alert Point
:Travel Lo Lo Deadband

**Travel Hi/Lo**
:Travel Hi Alert
:Travel Hi Alert Enable
:Travel Hi Alert Point
:Travel Hi Deadband
:Travel Lo Alert
:Travel Lo Alert Enable
:Travel Lo Alert Point
:Travel Lo Deadband

**Proximity**
:Proximity Hi Hi Alert
:Proximity Hi Hi Alert Enable
:Proximity Hi Alert
:Proximity Hi Alert Enable
:Proximity Lo Alert
:Proximity Lo Alert Enable
:Proximity Lo Lo Alert
:Proximity Lo Lo Alert Enable

**PlantWeb Alert   Reporting**
Failed Suppress
Maintenance Suppress
Advise Suppress

**PlantWeb Alert   Enable**
Failed Enable
Maintenance Enable
Advise Enable

**Travel Closed**
:Travel Closed Alert
:Travel Closed Alert Enable
:Travel Closed Alert Point
:Travel Closed Deadband

**Travel History Alerts**
Cycle Counter
Travel Accumulator

**Cycle Counter**
Cycle Counter
:Cycle Counter Alert
:Cycle Counter Alert Enable
:Cycle Counter Alert Point
:Cycle Counter Deadband

**Performance Alerts**
:PD Inside Status
:PD Run
Performance Critical
Performance Reduced
Performance Information

**Travel Accumulator**
Travel Accumulator
:Travel Accumulator Alert
:Travel Accumulator Alert Enable
:Travel Accumulator Alert Point
:Travel Accumulator Deadband

**Performance Information**
Performance Information Alert
Performance Information Alert Enable

**Performance Reduced**
Performance Reduced Alert
Performance Reduced Alert Enable

**Performance Critical**
Performance Critical Alert
Performance Critical Alert Enable

## TRANSDUCER BLOCK CALIBRATION

**Top Level**
- Configure/Setup ——→ **Configure/Setup**
- Device Diagnostics
- Device Variables

**Configure/Setup**
- Basic Setup
- Detailed Setup
- **Calibration** ——→ **Calibration**

**Calibration**
- Auto Calibration
- Manual Calibration
- Relay
- Supply Pressure
- Pressure A
- Pressure B

## TRANSDUCER BLOCK DEVICE DIAGNOSTICS

**Top Level**
- Configure/Setup
- **Device Diagnostics** ——→ **Device Diagnostics**
- Device Variables

**Device Diagnostics**
- Active PlantWeb Alerts
- Alert Conditions
- Status ——→ **Status**
- Device Record ——→ **Device Record**
- Stroke Valve
- Trend

**Status**
- Self Test Status ——→ **Self Test Status**
- Block Error ——→ **Block Error**

**Block Error**
- Block Configuration Error
- Simulate Active
- Lost Static Data
- Device Needs Maintenance Now
- Out of Service

**Self Test Status**
- Integrator Suspended
- Integrator Limited Lo
- Integrator Limited Hi
- Travel Sensor Span Error
- MLFB Error
- Travel Sensor Hi Error
- Travel Sensor Lo Error
- Pressure B Sensor Failure
- Pressure A Sensor Failure
- Supply Sensor Failure
- IOP Failure
- Drive Current Alert
- Simulate Jumper ON

**Device Record**
- :Maximum Recorded Temperature
- :Maximum Recorded Temperature Time
- :Minimum Recorded Temperature
- :Minimum Recorded Temperature Time
- :Maximum Recorded Supply Pressure
- :Maximum Recorded Supply Pressure Time
- :Minimum Recorded Supply Pressure
- :Minimum Recorded Supply Pressure Time

## TRANSDUCER BLOCK DEVICE VARIABLES

**Top Level**
- Configure/Setup
- Device Diagnostics
- **Device Variables** ——→ **Device Variables**

**Device Variables**
- All Block Modes
- AO Control - Pre-Char ——→ **AO Control - Pre-Char**
- AO Control - Post-Char ——→ **AO Control - Post-Char**
- DO Control ——→ **DO Control**
- Input Characterization
- :Travel/Pressure State
- :PD Inside Status
- Protection
- Drive Signal
- Temperature
- Cycle Counter
- Travel Accumulator
- :Travel Count
- Pressures ——→ **Pressures**

**AO Control - Pre-Char**
- :Setpoint
- :Setpoint Status
- :Travel (DeChar)

**AO Control - Post-Char**
- :Travel Target
- :Travel
- :Travel Status

**DO Control**
- :Setpoint(D)
- :Travel(D)

**Pressures**
- :Supply
- :Pressure A
- :Pressure B
- :A Minus B

## Resource Block (RB) Menu Structure

| Parameter Label | Menu Structure |
|---|---|
| Alert Key | RB > Configure/Setup > Alarm Handling > Alert Key |
| Block Alarm: Alarm State | RB > Device Diagnostics > Block Alarm > Alarm State |
| Block Alarm: Unacknowledged | RB > Device Diagnostics > Block Alarm > Unacknowledge |
| Block Alarm Disabled | RB > Configure/Setup > Alarm Handling > Block Alarm Disabled |
| Block Alarm Automatically Acknowledge | RB > Configure/Setup > Alarm Handling > Block Alarm Automatically Acknowledge |
| Confirm Time | RB > Configure/Setup > Alarm Handling > Confirm Time |
| DD Information | RB > Device Variables > DD information |
| Device ID | RB > Configure/Setup > Identification > Device ID  or  RB > Device Variables > Instrument > Identification > Device ID |
| Device Revision | RB > Configure/Setup > Version > Device Revision  or  RB > Device Variables > Instrument > Version > Device Revision |
| Device State | RB > Display > Resource Status > Device State |
| | RB > Device Diagnostics > Device State |
| Device Type | RB > Configure/Setup > Identification > Device Type  or  RB > Device Variables > Instrument > Identification > Device Type |
| Diagnostics Options | RB > Configure/Setup > Options > Diagnostics Options |
| Discrete Alarm Disabled | RB > Configure/Setup > Alarm Handling > Discrete Alarm Disabled |
| Discrete Alarm Automatically Acknowledge | RB > Configure/Setup > Alarm Handling > Discrete Alarm Automatically Acknowledge |
| Electronics Serial Number | RB > Configure/Setup > Identification > Elect S/N  or  RB > Device Variables > Instrument > Identification > Electronics Serial Number |
| Factory Serial Number | RB > Configure/Setup > Identification > Factory S/N  or  RB > Device Variables > Instrument > Identification > Factory Serial Number |
| Fault State | RB > Device Diagnostics > Maintenance >  Fault State |
| Features Available | RB > Configure/Setup > Options > Features Available  or  RB > Device Variables > Options > Features Available |
| Features Selected | RB > Configure/Setup > Options > Features Selected |
| Field Serial Number | RB > Configure/Setup > Identification > Field S/N  or  RB > Device Variables > Instrument > Identification > Field Serial Number |
| Firmware Revision | RB > Configure/Setup > Version > Firmware Revision  or  RB > Device Variables > Instrument > Version > Firmware Revision |
| Function Block Options | RB > Configure/Setup > Options > Function Block Options  or  RB > Device Variables > Options > Function Block Options |
| Hardware Revision | RB > Configure/Setup > Version > Hardware Revision  or  RB > Device Variables > Instrument > Version > Hardware Revision |
| ITK Version | RB > Configure/Setup > Version > ITK Version  or  RB > Device Variables > Instrument > Version > ITK Version |
| Limit Notify | RB > Configure/Setup > Alarm Handling > Limit Notify |
| Manufacturer | RB > Configure/Setup > Identification > Manufacturer  or  RB > Device Variables > Instrument > Identification > Manufacturer |
| Maximum Notify | RB > Configure/Setup > Alarm Handling > Maximum Notify |
| Miscellaneous Options | RB > Configure/Setup > Options > Miscellaneous Options  or  RB > Device Variables > Options > Miscellaneous Options |
| Resource Block Error | RB > Device Diagnostics > Resource Block Error |
| Shed Remote Cascade | RB > Configure/Setup > Communication Time Out > Shed Remote Cascade |
| Shed Remote Out | RB > Configure/Setup > Communication Time Out > Shed Remote Out |
| Standby Firmware Revision | RB > Configure/Setup > Version > Standby Software Revision  or  RB > Device Variables > Instrument > Version > Standby Software Revision |
| Strategy | RB > Configure/Setup > Identification > Strategy  or  RB > Device Variables > Instrument > Identification > Strategy |
| Tag Description | RB > Configure/Setup > Identification > Tag Description  or  RB > Device Variables > Instrument > Identification > Tag Description |
| Write Alarm: Alarm State | RB > Device Diagnostics > Write Lock > Write Alarm: Alarm State |
| Write Lock | RB > Configure/Setup > Write Lock > Write Lock  or  RB > Device Diagnostics > Write Lock > Write Lock |
| Write Priority | RB > Configure/Setup > Write Lock > Write Priority |

## RESOURCE BLOCK CONFIGURE/SETUP

**Top Level**
- **Configure/Setup**
- Device Diagnostics
- Device Variables

**Configure/Setup**
- Resource Block Mode
- Write Lock
- Comm Timeout
- Options
- Alarm Handling
- Identification
- Version

**Write Lock**
- Write Lock
- Write Priority

**Comm Timeout**
- Shed Remote Cascade
- Shed Remote Out

**Function Block Options**
- AO
- DO
- AI
- DI
- PID
- IS
- OS
- MAI

**Options**
- Diagnostics Options
- Function Block Options
- Miscellaneous Options
- Features Available
- Features Selected

**Miscellaneous Options**
- Firmware Download
- Travel Control Capable
- Pressure Control Capable
- Pressure Fallback Capable

**Version**
- Device Revision
- Firmware Revision
- Standby Firmware Revision
- Hardware Rev
- ITK Version

**Alarm Handling**
- Alert Key
- Confirm Time
- Limit Notify
- Maximum Notify
- Block Alm Disabled
- Block Alarm Auto Acknowledge
- Disc Alm Disabled
- Discrete Alarm Auto Acknowledge

**Features Available**
- Reports
- Fault State
- Soft W Lock
- Multi-bit Alarm (Bit-Alarm) Support

**Identification**
- Device ID
- Electronics Serial Number
- Factory Serial Number
- Field Serial Number
- Tag Description
- Strategy
- Manufacturer
- Device Type
- Diagnostics Options

**Features Selected**
- Reports
- Fault State
- Soft W Lock
- Multi-bit Alarm (Bit-Alarm) Support

## RESOURCE BLOCK DEVICE DIAGNOSTICS

**Top Level**
- Configure/Setup
- **Device Diagnostics**
- Device Variables

**Device Diagnostics**
- Resource Block Error
- Device State
- Write Lock
- Block Alarm
- Maintenance

**Resource Block Error**
- Other
- Block Configuration Error
- Simulate Active
- Device Needs Maintenance Soon
- Memory Failure
- Lost Static Data
- Lost NV Data
- Device Needs Maintenance Now
- Power Up
- Out of Service

**Maintenance**
- Restart Actions
- Fault State
- Set Fault State
- Clear Fault State

**Write Lock**
- Write Alarm Alarm State
- Write Lock

## RESOURCE BLOCK DEVICE VARIABLES

**Top Level**
- Configure/Setup
- Device Diagnostics
- **Device Variables**

**Device Variables**
- Instrument
- Options
- DD Information

**Instrument**
- Identification
- Version

**Block Alarm**
- Block Alarm Alarm State
- Block Alarm Unacknowledged

**Options**
- Diagnostics Options
- Function Block Options
- Miscellaneous Options
- Features Available

**Function Block Options**
- AO
- DO
- AI
- DI
- PID
- IS
- OS
- MAI

**Identification**
- Device ID
- Electronics Serial Number
- Factory Serial Number
- Field Serial Number
- Tag Description
- Strategy
- Manufacturer
- Device Type

**Features Available**
- Reports
- Fault State
- Soft W Lock
- Multi-bit Alarm (Bit-Alarm) Support

**Miscellaneous Options**
- Firmware Download
- Travel Control Capable
- Pressure Control Capable
- Pressure Fallback Capable

**Version**
- Device Revision
- Firmware Revision
- Standby Firmware Revision
- Hardware Rev
- ITK Version

# Appendix C PlantWeb Alerts

## Instrument Alert Conditions

Instrument Alert Conditions, when enabled, detect many operational and performance issues that may be of interest. To view these alerts, the user must open the appropriate status screen on a host such as a DeltaV system, ValveLink software or a Field Communicator.

## PlantWeb Alerts

Some instrument alert conditions can also be used to trigger PlantWeb alerts that will be reported in Failed, Maintenance or Advisory categories, as configured by the user. PlantWeb alerts, when enabled, can participate in the DeltaV alarm interface tools such as the alarm banner, alarm list and alarm summary. For specific information on setting up PlantWeb Alerts in a DeltaV system, refer to the PlantWeb Alerts section in Appendix F.

When a PlantWeb alert occurs, the DVC6200f sends an event notification and waits a specified period of time for an acknowledgment to be received. This occurs even if the condition that caused the alert no longer exists. If the acknowledgment is not received within the pre-specified time-out period, the event notification is retransmitted. This reduces the possibility of alert messages getting lost.

### Mode-Based PlantWeb Alerts

Some PlantWeb alerts are not active unless the transducer block (actual) mode is Auto.

1. Alerts which can be triggered by the activities of the service technician are reported only when the transducer block mode is AUTO.

2. Alerts which are unrelated to service technician activities are reported in all transducer block modes.

Exceptions are as follows:

- Alerts can be simulated regardless of transducer block mode but must be enabled to be reported.

- When a shutdown condition exists (either currently active or latched on through the shutdown recovery parameter) in the transducer block, alerts are reported even though the mode of the transducer block is OOS.

Refer to table C-1 for reporting of PlantWeb Alerts.

## Alert Handling

Alert handling is diagrammed in figure C-1. There are two ways of seeing PlantWeb alerts. One way is to see if the instrument alert condition causing a PlantWeb alert is detected. The second is to view alerts reported to the system operator console. For a PlantWeb alert to be active, it has to pass four tests. The first is to check if the Instrument alert condition is enabled. If a condition is not enabled, the instrument does not check for the alert condition.

Second, the condition that will cause an alert must exist. For example, the current travel is above the Travel Limit Hi Alert Point.

Third, the corresponding PlantWeb alert must be enabled in one or more of the three categories: Failed, Maintenance or Advise.

Fourth, the transducer block mode must be correct. See table C-1.

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**Note**

Additional details on setting up and using Instrument Alerts can be found on page 45 of this manual.

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## Figure C-1. Alert Handling



NOTE:
1⟩ CERTAIN PLANTWEB ALERTS ARE MODE-BASED.
SEE TABLE C-1 FOR DETAILS.
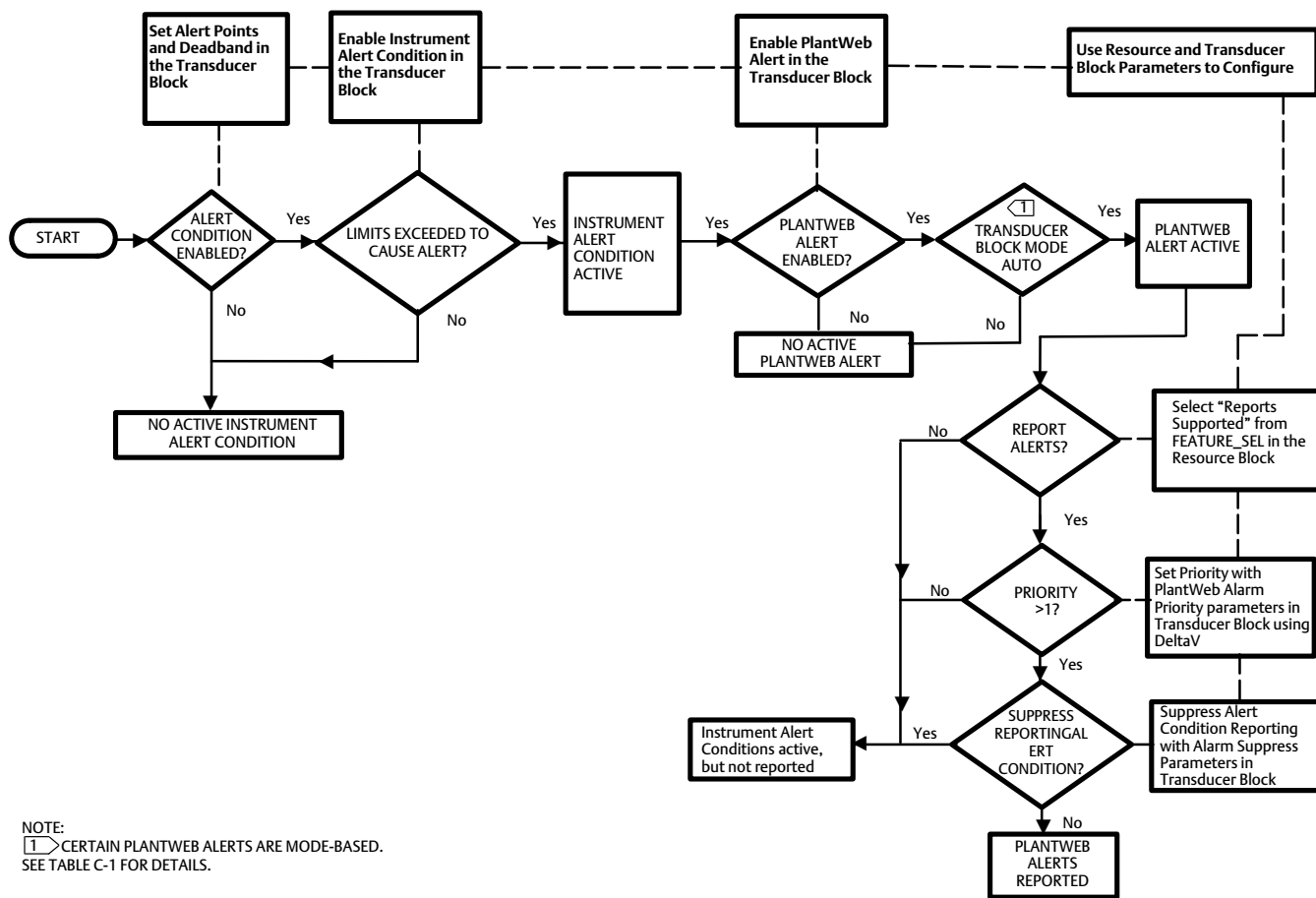
## Table C-1. PlantWeb Alerts Reporting Requirements

| PlantWeb Alert | Transducer Block Mode (Actual) |
|---|---|
| Drive Current | AUTO |
| Drive Signal | AUTO |
| Processor Impaired | Any Mode |
| Output Block Timeout | Any Mode |
| Block Set to Defaults | Any Mode |
| Travel Sensor | AUTO |
| Output Pressure Sensor | Any Mode |
| Supply Pressure Sensor | Any Mode |
| Temperature Sensor | Any Mode |
| Supply Pressure | AUTO |
| Temperature Limit | AUTO |
| Travel Deviation | AUTO |
| Travel Limit | AUTO |
| Cycle Counter | AUTO |
| Travel Accumulator | AUTO |
| Performance Critical | AUTO |
| Performance Reduced | AUTO |
| Performance Information | AUTO |
| Pressure Fallback | AUTO |

# Alert Reporting

For PlantWeb alerts to be reported to the operator console, they must pass four tests:

○ Alerts must be active

○ Reports must be selected in Feature Select

○ Alert priority must be greater than 1

○ Reporting must not be suppressed for those conditions that caused active alerts.

Features Selected in the Resource block determines if reporting by the instrument is supported. Refer to page 23 for additional information on Features Selected.

Failed Priority (FAILED_PRI [68]), Maintenance Priority (MAINT_PRI [69]), and Advise Priority (ADVISE_PRI [70]) determine the PlantWeb alert priorities. Although 16 priorities are available only three are actually meaningful for PlantWeb alerts. If the priority is 0, no reporting occurs. If the priority is 1, reporting is simulated within the instrument, but the alert is not actually reported over the bus. The alert condition is reported for priorities 2 through 15, with the higher priorities taking precedence over the lower priorities.

Failed Suppress (FAILED_MASK [65]), Maintenance Suppress (MAINT_MASK [66]), and Advise Suppress (ADVISE_MASK [67]) determine which of the alert conditions are suppressed so that they are not reported.

# PlantWeb Alerts Set Block Status

If a PlantWeb Alert is active, the AO or DO Block Readback parameter status may change. This behavior is controlled with the PlantWeb Alerts Set PV Status (PWA_SET_STATUS [97]) parameter in the transducer block

# Setting PlantWeb Alerts

Refer to table C-2 for information on setting PlantWeb alerts. When selected, PlantWeb alarms will set the PV status according to table C-4.

# Using PlantWeb Alerts

Refer to table C-3 for information on using PlantWeb alerts.

## Table C-2. Setting PlantWeb Alerts

| PlantWeb Alert (Group) (Default Alert Category) | Alert Condition (Default) | What the Alert is Detecting | Related Parameters (Default) | Guidelines for Setting |
|---|---|---|---|---|
| Drive Current (Electronics) (Failed) | Drive Current (Enabled) | The difference between the expected Drive Current and the actual Drive Current has exceeded the Drive Current Alert Time. | Self Test Shutdown (No) Shutdown Recovery (Auto) Alert Point (50%) Alert Time (5 sec) | Use default settings |
| Drive Signal (Electronics) (Maintenance) | Drive Signal (Enabled) | If one of the following conditions exist:<br><br>Where Zero Power Condition is defined as closed:<br>•Drive Signal < 10% and Calibrated Travel > 3%<br>•Drive Signal > 90% and Calibrated Travel < 97%<br><br>Where Zero Power Condition is defined as open:<br>•Drive Signal < 10% and Calibrated Travel < 97%<br>•Drive Signal > 90% and Calibrated Travel > 3% | | Use default setting |
| Processor Impaired (Electronics) (Maintenance) | Program Memory (Enabled) | A pending Flash or NVM failure is present. | Self Test Shutdown (No) Shutdown Recovery (Auto) | Use default settings |
| | Static Memory (Enabled) | A failure of the FRAM memory where static parameters are stored. | Self Test Shutdown (No) Shutdown Recovery (Auto) | Use default settings |
| | Processor (Enabled) | A failure of the main Processor. | Self Test Shutdown (No) Shutdown Recovery (Auto) | Use default settings |
| | I/O Processor (Enabled) | A failure of the I/O Processor. | Self Test Shutdown (No) Shutdown Recovery (Auto) | Use default settings |
| Output Block Timeout (Configuration) (Maintenance) | Output Block Timeout (Disabled) | If the analog or discrete output block has not executed for longer than the configured timeout. | Timeout Alert Point (600 s) Self Test Shutdown (No) Shutdown Recovery (Auto) | Enable this alert for loops where the execution is critical. If the AO or DO block is not scheduled, or scheduled incorrectly, it will trigger an alert after the Timeout Alert Point has been exceeded. Set the Timeout Alert Point to a value between<br>  a. 30 seconds and<br>  b. the maximum time before a user should be notified. The minimum number depends on the time it takes for a host to download a configuration to the device.<br><br>Shutdown can be enabled if it is desired to move the valve to the Zero Power Condition at the same time that the alert is generated. |
| Blocks Set to Default (Configuration) (Maintenance) | Blocks Set to Default (Enabled) | If the resource block has undergone Restart with Defaults | None | Use default settings |
| Shutdown Alert (Configuration) (Maintenance) | N/A | A user configured Self Test Shutdown condition has taken the instrument to OOS. | None | Use default settings |

-Continued-

Table C-2. Setting PlantWeb Alerts (Continued)

| PlantWeb Alert (Group) (Default Alert Category) | Alert Condition (Default) | What the Alert is Detecting | Related Parameters (Default) | Guidelines for Setting |
|---|---|---|---|---|
| Travel Sensor (Sensors) (Failed) | Travel Sensor (Enabled) | The travel feedback is within acceptable limits. | Self Test Shutdown (No) Shutdown Recovery (Auto) | Double Acting Actuators— Enable the alert and configure it to report in the Failed Alert Category. Self Test Shutdown is generally not enabled. Single Acting Actuators— If Travel / Pressure Control is configured as Travel with Pressure Fallback: enable the alert and configure it to report in the Maintenance Alert Category. Do not enable Self Test Shutdown. IIf Travel / Pressure Control is configured as Travel: Enable the alert and configure it to report in the Failed Alert Category. Self Test Shutdown is generally not enabled. |
| Output Press Sensor (Sensors) (Maintenance) | Port A Pressure Sensor (Enabled) | The pressure sensor reading is outside the functional range of the sensor. | Self Test Shutdown (No) Shutdown Recovery (Auto) | If Travel / Pressure Control is configured as Pressure: enable the alert and configure it to report in the Failed Alert Category. Enable the Self Test Shutdown. For all other Travel / Pressure Control selections, enable the alert to report in the Maintenance Alert Category and do not enable the Self Test Shutdown. |
| | Port B Pressure Sensor (Enabled) | | None | Use default settings |
| Supply Press Sensor (Sensors) (Advisory) | Supply Press Sensor (Enabled) | The pressure sensor reading is outside the functional range of the sensor. | None | Use default settings |
| Temperature Sensor (Sensors) (Advisory) | Temperature Sensor (Enabled) | The temperature sensor reading is outside the functional range of the sensor. | None | Use default settings |
| Pressure Fallback (Sensors) (Maintenance) | Pressure Fallback (Enabled) | A travel sensor failure or large travel deviation has resulted in fallback to pressure control. | None | Use default settings |
| Supply Pressure (Environment) (Maintenance) | Supply Press High (Enabled) | The supply pressure has exceeded the Supply Pressure Hi Alert Point. | Alert Point (145 psig) | Enable the alert in the Maintenance Alert Category. Set the Alert Point to which ever is lower of a. the maximum instrument pressure of 145 psig or b. the maximum actuator casing pressure. |
| | Supply Press Low (Enabled) | The supply pressure is lower than the Supply Pressure Lo Alert Point. | Alert Point (19 psig) | Enable the alert in the Maintenance Alert Category. Double Acting Actuators— Set the Alert Point above the minimum required for valve shutoff and no greater than 1 psig below the supply regulator setting Single Acting Actuators— Set the Alert Point above the minimum required for valve shutoff and no greater than 1 psig below the supply regulator setting. This is generally about 3 psig above the actuator upper bench set (stroking) pressure. |

-Continued-

## Table C-2. Setting PlantWeb Alerts (Continued)

| PlantWeb Alert (Group) (Default Alert Category) | Alert Condition (Default) | What the Alert is Detecting | Related Parameters (Default) | Guidelines for Setting |
|---|---|---|---|---|
| Temperature Limit (Environment) (Advisory) | Temperature High (Enabled) | The temperature is greater than the Temperature Hi Alert Point. | Alert Point ( 186°F) | Use default settings<br><br>Other alert points may be chosen to indicate changes in the instrument environment. |
| | Temperature Low (Enabled) | The temperature is lower than the Temperature Lo Alert Point. | Alert Point ( -63°F) | Enable the alert in the Maintenance Alert Category. Set the Alert Point at -40°F if the instrument uses Nitrile elastomers and -63°F if it uses Fluorosilicone elastomers.<br><br>Other alert points may be chosen to indicate changes in the instrument environment. |
| Travel Deviation (Travel) (Maintenance) | Travel Deviation (Enabled) | The Travel Deviation has exceeded the Travel Deviation Alert Point by more than the Travel Deviation Time. | Alert Point (5%) Alert Time (10 sec) Deadband (2%) | Enable the alert in the Maintenance Alert Category. Use the default settings with valves that are 4 inch and smaller with PTFE packing systems.<br><br>With other valves, the user can refine the settings with ValveLink software Dynamic Error Band and Step Response Tests. Set the related parameters as follows: Tvl Dev Alert Point—set equal times 2 the Maximum Dynamic Error, minimum 3% Tvl Dev DB—set equal to the Dynamic Error Band, minimum 2% Tvl Dev Time—set equal to the T98 time for a Step Test from 0 to 100% Travel, minimum 10 seconds. |
| Travel Limit (Travel) (Advisory) | Travel Limit Hi Hi (Disabled) | The Travel has exceeded the Travel Limit Hi Hi Alert Point | Alert Point (125%) Deadband (5%) | Enable this alert for critical loops, where it is important to alert an operator if the valve is approaching the wide open position. A typical setting might be 95%. |
| | Travel Limit Lo Lo (Disabled) | The Travel is lower than the Travel Limit Lo Lo Alert Point. | Alert Point (-25%) Deadband (5%) | Enable this alert for critical loops, where it is important to alert an operator if the valve is approaching the closed position. A typical setting might be 5%. |
| N/A (Travel) (N/A) | Travel Limit Hi (Disabled) | The Travel has exceeded the Travel Limit Hi Alert Point. | Alert Point (125%) Deadband (5%) | Use the Alert Points and Deadband to configure the Proximity Alerts below. |
| | Travel Limit Lo (Disabled) | The Travel is lower than the Travel Limit Lo Alert Point. | Alert Point (-25%) Deadband (5%) | Use the Alert Points and Deadband to configure the Proximity Alerts below. |
| N/A (Proximity) (N/A) | Travel Open (Disabled) | The Travel is greater than the Open Alert Point | Alert Point (99.5%) Deadband (5%) | Enable and set to report Travel with DI Block |
| | Travel Closed (Disabled) | The Travel is greater than the Closed Alert Point | Alert Point (0.5%) Deadband (5%) | Enable and set to report Travel with DI Block |
| | Proximity Hi Hi (Disabled) | The Travel is within the configured band of the configured center point. | Alert Point (125%) Deadband (5%) | Enable and set to report Travel with DI Block |
| | Proximity Hi (Disabled) | | Alert Point (125%) Deadband (5%) | Enable and set to report Travel with DI Block |
| | Proximity Lo (Disabled) | | Alert Point (-25%) Deadband (5%) | Enable and set to report Travel with DI Block |
| | Proximity Lo Lo (Disabled) | | Alert Point (-25%) Deadband (5%) | Enable and set to report Travel with DI Block |
| Cycle Counter (Travel History) (Maintenance) | Cycle Counter (Disabled) | The number of travel reversals has exceeded the configured limit. | Alert Point (1,000,000) Deadband (1%) | Bellows Seal Bonnets— enable the alert in the Maintenance Alert Category. Use the bellows manufacturer's cycle life data to set cycle limits. |

-Continued-

### Table C-2. Setting PlantWeb Alerts (Continued)

| PlantWeb Alert (Group) (Default Alert Category) | Alert Condition (Default) | What the Alert is Detecting | Related Parameters (Default) | Guidelines for Setting |
|---|---|---|---|---|
| Travel Accumulator (Travel History) (Maintenance) | Travel Accumulator (Disabled) | The accumulated travel has exceeded the configured limit. | Alert Point (1,000,000) Deadband (1%) | Packing Bonnets— enable the alert in the Maintenance Alert Category. When packing leaks are discovered, set the Travel Accumulator alert to 90% of the current Travel Accumulator Value, triggering an alert prior to anticipated leak. |
| Performance Critical (Performance) (Failed) | Performance Critical (Enabled) | Critical performance issues based on continuous PD tests internal to the instrument. | None | Use default setting |
| Performance Reduced (Performance) (Maintenance) | Performance Reduced (Enabled) | Reduced performance issues based on continuous PD tests internal to the instrument. | None | Use default setting |
| Performance Information (Performance) (Advisory) | Performance Information (Enabled) | Performance Information based on continuous PD tests internal to the instrument. | None | Use default setting |

### Table C-3. Using PlantWeb Alerts

| PlantWeb Alert (Group) (Default Alert Category | Alert Condition (Default) | What the Alert is Detecting | Effect on Valve/Instrument | Recommended Action | Help |
|---|---|---|---|---|---|
| Drive Current (Electronics) (Failed) | Drive Current (Enabled) | The difference between the expected Drive Current and the actual Drive Current has exceeded the Drive Current Alert Time. | If configured for Self Test Shutdown, then the transducer Actual mode is placed Out of Service until the problem is fixed. Out of Service results in the instrument output pressure(s) and actuator position being at the Zero Power Condition. | Check I/P module | The instrument has detected that the difference between the expected Drive Current and the actual Drive Current is greater than the configured limit 1) Replace the I/P module 2) Calibrate the device. If the problem persists, replace the printed wiring board (PWB) assembly. |
| Drive Signal (Electronics) (Maintenance) | Drive Signal (Enabled) | If one of the following conditions exist:<br><br>Where Zero Power Condition is defined as closed:<br>Drive Signal < 10% and Calibrated Travel > 3%<br>Drive Signal > 90% and Calibrated Travel < 97%<br><br>Where Zero Power Condition is defined as open:<br>Drive Signal < 10% and Calibrated Travel < 97%<br>Drive Signal > 90% and Calibrated Travel > 3% | None - Indicates reduced performance. | Check instrument pneumatics | The instrument I/P drive signal necessary to generate the pressure output from the instrument is not within the expected range. Potential causes include I/P filter plugged, instrument pneumatic relay failure, low supply pressure, air leaks, or valve sticking. Test the control valve assembly for proper operation. ValveLink diagnostics can be used for this purpose. |

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Table C-3. Using PlantWeb Alerts (Continued)

| PlantWeb Alert (Group) (Default Alert Category | Alert Condition (Default) | What the Alert is Detecting | Effect on Valve/Instrument | Recommended Action | Help |
|---|---|---|---|---|---|
| Processor Impaired (Electronics) (Maintenance) | Program Memory (Enabled) | A pending Flash or NVM failure is present. | If configured for Self Test Shutdown, then the transducer Actual mode is placed Out of Service until the problem is fixed. Out of Service results in the instrument output pressure(s) and actuator position being at the Zero Power Condition. | Replace PWB assembly | An error has been detected in the printed wiring board (PWB) assembly. Replace the PWB assembly. |
| | Static Memory (Enabled) | A failure of the FRAM memory where static parameters are stored. | | | |
| | Processor (Enabled) | A failure of the main Processor. | | | |
| | I/O Processor (Enabled) | A failure of the I/O Processor. | | | |
| Output Block Timeout (Configuration) (Maintenance | Output Block Timeout (Disabled) | If the AO or DO block has not executed for longer than the configured timeout, this alert is detected. | If configured for Self Test Shutdown, then the transducer Actual mode is placed Out of Service until the problem is fixed. Out of Service results in the instrument output pressure(s) and actuator position being at the Zero Power Condition. | Check Output Block | The function block providing the setpoint for the valve position (AO or DO function block) has not executed within the user configured time limit. If configured for Self Test Shutdown, the transducer Actual mode is set to Out of Service.<br><br>1) Download the control schedule from the host configuration device.<br>2) Make sure the Time Out Alert Point is greater than the block execution schedule.<br><br>This alert should only be utilized in very critical loops where execution time is critical. |
| Blocks Set to Default (Configuration) (Failed) | Blocks Set to Default (Enabled) | If the resource block has undergone Restart with Defaults. | The transducer "Actual" mode is placed Out of Service when the defaults are applied. Out of service results in the actuator being at the Zero Power Condition. | Download device configuration | When restoring power to the device, the configuration parameters could not be recalled from non-volatile memory. When the instrument detects this condition, the transducer Actual mode is set to Out of Service.<br><br>To correct this situation, download the configuration to the device and set the Target Mode of the Resource block. |
| Shutdown Alert (Configuration) (Failed) | N/A | A user configured Self Test Shutdown condition has taken the instrument to OOS. | None - Indicates why the instrument remains OOS. | Same as the configured Self Test Shutdown. | The instrument Actual mode remains OOS due to a configured Self Test Shutdown, where Manual Recovery was specified, even though the condition may have cleared. Check Recommended Action for the indicated condition. |

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## Table C-3. Using PlantWeb Alerts (Continued)

| PlantWeb Alert (Group) (Default Alert Category | Alert Condition (Default) | What the Alert is Detecting | Effect on Valve/Instrument | Recommended Action | Help |
|---|---|---|---|---|---|
| Travel Sensor (Sensors) (Failed) | Travel Sensor (Enabled) | The travel feedback is within acceptable limits. | If configured for Self Test Shutdown, then the transducer "Actual" mode is placed Out of Service until the problem is fixed. Out of service results in the actuator being at the Zero Power Condition. | Check mounting and linkage | Travel feedback value is outside expected limits. If this problem occurs during instrument set-up, the most likely cause is faulty mounting or improper adjustment of the travel sensor. If this problem occurs during normal operation, the most likely cause is a failure of the travel sensor.<br><br>To correct,<br>1) Insure proper mounting and linkage adjustment.<br>2) Inspect and test travel sensor<br>3) Toggle the transducer target mode.<br><br>If the problem persists, replace the printed wiring board (PWB) assembly. |
| Output Press Sensor (Sensors) (Maintenance) | Port A Pressure Sensor (Enabled) | The pressure sensor reading is outside the functional range of the sensor. | If configured for Self Test Shutdown, then the transducer "Actual" mode is placed Out of Service until the problem is fixed. Out of service results in the actuator being at the "No Power" condition. | Confirm proper air supply | The pressure sensor on-board the device has failed. This may be due to excessive supply pressure or contaminated air.<br><br>If it is verified that the air supply is ok, replace the printed wiring board (PWB) assembly. |
| | Port B Pressure Sensor (Enabled) | | None - Indicates a possible hardware problem that would degrade diagnostic capability. | | |
| Supply Press Sensor (Sensors) (Advisory) | Supply Press Sensor (Enabled) | The pressure sensor reading is outside the functional range of the sensor. | None - Indicates a possible hardware problem that would degrade diagnostic capability. | Confirm proper air supply | The pressure sensor on-board the device has failed. This may be due to excessive supply pressure or contaminated air.<br><br>If it is verified that the air supply is ok, replace the printed wiring board (PWB) assembly. |
| Temperature Sensor (Sensors) (Advisory) | Temperature Sensor (Enabled) | The temperature sensor reading is outside the functional range of the sensor. | None - Indicates a possible hardware problem that would degrade instrument calibration and diagnostic capability. | Replace PWB assembly. | The temperature sensor on-board the device has failed or the unit has been exposed to an temperature extreme beyond the recommended limits. |

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Table C-3. Using PlantWeb Alerts (Continued)

| PlantWeb Alert (Group) (Default Alert Category | Alert Condition (Default) | What the Alert is Detecting | Effect on Valve/Instrument | Recommended Action | Help |
|---|---|---|---|---|---|
| Pressure Fallback (Sensors) (Maintenance) | Pressure Fallback (Enabled) | A travel sensor failure or large travel deviation has resulted in fallback to pressure control. | None - Indicates a reduced performance condition. | Check instrument feedback linkage and travel sensor. | The instrument has detected that the travel sensor is outside its normal range of operation or that a gross deviation exists between set point and actual travel. It has switched to Pressure Control and is no longer using the travel sensor to position the valve. |
| Supply Pressure (Environment) (Maintenance) | Supply Press High (Enabled) | The supply pressure has exceeded the Supply Pressure Hi Alert Point. | None - Indicates a condition that could cause damage to the instrument or actuator. | Confirm proper air supply. | The Supply Pressure sensor on-board has detected an abnormally high supply pressure. Verify the proper supply pressure and that the alert is properly set. |
| | Supply Press Low (Enabled) | The supply pressure is lower than the Supply Pressure Lo Alert Point. | None - Indicates a condition that could reduce performance or prevent the valve from shutting tightly. | | The Supply Pressure sensor on-board has detected an abnormally low supply pressure. Verify the proper supply pressure and that the alert is properly set. |
| Temperature Limit (Environment) (Advisory) | Temperature High (Enabled) | The temperature is greater than the Temperature Hi Alert Point. | None - Indicates a condition that could shorten service life or lead to reduced performance. | Check instrument environment. | The instrument temperature has exceeded the user configured high temperature limit. Operation of the instrument above the rated temperature may degrade instrument components. This may affect instrument performance and/or reduce the life of the instrument. |
| | Temperature Low (Enabled) | The temperature is lower than the Temperature Lo Alert Point. | | | The instrument temperature has dropped below the user configured low temperature limit. Operation of the instrument below the rated temperature may degrade instrument components. This may affect instrument performance and/or reduce the life of the instrument. |

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## Table C-3. Using PlantWeb Alerts (Continued)

| PlantWeb Alert (Group) (Default Alert Category | Alert Condition (Default) | What the Alert is Detecting | Effect on Valve/Instrument | Recommended Action | Help |
|---|---|---|---|---|---|
| Travel Deviation (Travel) (Maintenance) | Travel Deviation (Enabled) | The Travel Deviation has exceeded the Travel Deviation Alert Point by more than the Travel Deviation Time. | None - Indicates a reduced performance condition. | Check valve friction, supply air, instrument tuning | The valve travel is not following setpoint. Check operation of the valve and instrument. Possible items include; sticking valve, low supply pressure, broken feedback linkage, instrument pneumatic components, actuator, instrument tubing, poor instrument tuning, etc.<br><br>Test the control valve assembly for proper operation. ValveLink software diagnostics can be used for this purpose. |
| Travel Limit (Travel) (Advisory) | Travel Limit Hi Hi (Disabled) | The Travel has exceeded the Travel Limit Hi Hi Alert Point. | None | Check process loop | The actual valve position has exceeded the configurable travel limit (in %). |
|  | Travel Limit Lo Lo (Disabled) | The Travel is lower than the Travel Limit Lo Lo Alert Point. | None | Check process loop | |
| N/A (Travel) (N/A) | Travel Limit Hi (Disabled) | The Travel has exceeded the Travel Limit Hi Alert Point. | None | Check process loop | The actual valve position has exceeded the configurable travel limit (in %). |
|  | Travel Limit Lo (Disabled) | The Travel is lower than the Travel Limit Lo Alert Point. | None | Check process loop | The actual valve position has exceeded the configurable travel limit (in %). |
| N/A (Proximity) (N/A) | Travel Open (Disabled) | The Travel is greater than the Open Alert Point | None | Check process loop | The actual valve position is near the full open position. |
|  | Travel Closed (Disabled) | The Travel is greater than the Closed Alert Point | None | Check process loop | The actual valve position is near the full closed position. |
|  | Proximity Hi Hi (Disabled) | The Travel is within the configured band of the configured center point. | None | Check process loop | The actual valve position is near the configured center point. |
|  | Proximity Hi (Disabled) |  | None | | |
|  | Proximity Lo (Disabled) |  | None | | |
|  | Proximity Lo Lo (Disabled) |  | None | | |
| Cycle Counter (Travel History) (Maintenance) | Cycle Counter (Disabled) | The number of travel reversals has exceeded the configured limit. | None | Perform periodic maintenance | The cycle count limit has been exceeded. Perform periodic maintenance. Check packing, linkages, diaphragms, seals, etc. |
| Travel Accumulator (Travel History) (Maintenance) | Travel Accumulator (Disabled) | The accumulated travel has exceeded the configured limit. | None | Perform periodic maintenance | The travel accumulator limit has been exceeded. Perform periodic maintenance. Check packing, linkages, diaphragms, seals, etc. |

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### Table C-3. Using PlantWeb Alerts (Continued)

| PlantWeb Alert (Group) (Default Alert Category | Alert Condition (Default) | What the Alert is Detecting | Effect on Valve/Instrument | Recommended Action | Help |
|---|---|---|---|---|---|
| Performance Critical (Performance) (Failed) | Performance Critical (Enabled) | Critical performance issues based on continuous PD tests internal to the instrument. | None - Indicates control has been lost or severely reduced. | Check I/P, Relay, Valve, Actuator or Ext. Tubing as indicated. | On-board diagnostics have detected a critical performance issue that may result in loss of control or severe reduction in control performance. Check or replace the component indicated in the possible cause detail. |
| Performance Reduced (Performance) (Maintenance | Performance Reduced (Enabled) | Reduced performance issues based on continuous PD tests internal to the instrument. | None - Indicates reduced performance. | Check I/P, Relay, Valve, Actuator or Ext. Tubing as indicated. | On-board diagnostics have detected a performance issue that has reduced control performance. Check or replace the component indicated in the possible cause detail. |
| Performance Information (Performance) (Advisory) | Performance Information (Enabled) | Performance Information based on continuous PD tests internal to the instrument. | None - Indicates information that may pertain to control performance. | No action required. | On-board diagnostics have detected an abnormal performance condition. No immediate action required. |

### Table C-4. Output Block PV Status

| FEATURE_SEL PW Alarms Set PV Status | Transducer Mode, Actual | Active PlantWeb Alarms | AO / DO PV Status | AO / DO PV Substatus | AO/DO PV Limit Substatus[1] |
|---|---|---|---|---|---|
| Enabled | OOS | X | Bad | Device Failure | Constant |
|  | Man | X | Bad | Non-specific | Constant |
|  | Auto | Fail | Uncertain | Subnormal | See table C-5 |
|  | Auto | Maint, no Fail | Uncertain | Non-specific | See table C-5 |
|  | Auto | Advisory, no Fail, no Maint | Good | Advisory | See table C-5 |
|  | Auto | None | Good | Non-Specific | See table C-5 |
| Not Enabled | OOS | X | Bad | Device Failure | Constant |
|  | Man | X | Bad | Non-Specific | Constant |
|  | Auto | Fail | Good | Non-Specific | See table C-5 |
|  | Auto | Maint, no Fail | Good | Non-Specific | See table C-5 |
|  | Auto | Advisory, no Fail, no Maint | Good | Non-Specific | See table C-5 |
|  | Auto | None | Good | Non-Specific | See table C-5 |

NOTES:
X = No Effect
1. PV limit substatus reflects only READBACK limit substatus. SP limit substatus reflects only out block rate limits.

### Table C-5. Limit Sub Status

| Out Block | Transducer Mode | In Cutoff Region | Rate Limited | Limit Sub-Status |
|---|---|---|---|---|
| AO, DO | OOS | X | X | Constant |
| AO, DO | MAN | X | X | Constant |
| AO | AUTO | High | X | High Limited |
| AO | AUTO | Low | X | Low Limited |
| AO | AUTO | X | High | High Limited |
| AO | AUTO | X | Low | Low Limited |
| AO | AUTO | None | None | Not Limited |
| DO | AUTO | X | High | High Limited |
| DO | AUTO | X | Low | Low Limited |
| DO | AUTO | X | None | Not Limited |

NOTE: X = No Effect

# Appendix D FOUNDATION fieldbus Communication

DVC6200f digital valve controllers use the FOUNDATION fieldbus to communicate with other fieldbus instruments and the control system. Fieldbus is an all digital, serial, two-way communication system which interconnects "field" equipment such as transmitters, digital valve controllers, and process controllers. Fieldbus is a local-area network (LAN) for instruments used in both process and manufacturing automation with built-in capability to distribute the control application across the network.

# Function Block Overview

A fieldbus system is a distributed system composed of field devices and control and monitoring equipment integrated into the physical environment of a plant or factory. Fieldbus devices work together to provide I/O and control for automated processes and operations. The Fieldbus Foundation provides a framework for describing these systems as a collection of physical devices interconnected by a fieldbus network. One of the ways that the physical devices are used is to perform their portion of the total system operation by implementing one or more function blocks.

## Function Blocks

Function blocks within the fieldbus device perform the various functions required for process control. Because each system is different, the mix and configuration of functions are different. Therefore, the Fieldbus Foundation has designed a range of function blocks, each addressing a different need: Analog Input Block (AI), Multiple Analog Input (MAI), Discrete Input Block (DI), Manual Loader Block (ML), Bias/Gain Station Block (BG), Control Selector Block (CS), P, PD Controller Block (PD), PID, PI, I Controller Block (PID), Ratio Station Block (RA), Analog Output Block (AO) and Discrete Output Block (DO).

Function blocks perform process control functions, such as analog input (AI) and analog output (AO) functions as well as proportional-integral-derivative (PID) functions. The standard function blocks provide a common structure for defining function block inputs, outputs, control parameters, events, alarms, and modes, and combining them into a process that can be implemented within a single device or over the fieldbus network. This simplifies the identification of characteristics that are common to function blocks.

The Fieldbus Foundation has established the function blocks by defining a set of parameters used in all function blocks called universal parameters. The Fieldbus Foundation has also defined a standard set of function block classes, such as input, output, control, and calculation blocks. Each of these classes have a set of parameters established for it. Additionally, they have published definitions for transducer blocks commonly used with standard function blocks. Examples include temperature, pressure, level, and flow transducer blocks.

Fieldbus Foundation specifications and definitions allow vendors to add their own, extended parameters, as well as their own algorithms. This approach permits extending function block definitions as new requirements are discovered and as technology advances.

Each block has a tag name. Service personnel need only know the tag name of the block to access or change the appropriate block parameters.

Input events may affect the operation of the algorithm. An execution control function regulates the receipt of input events and the generation of output events during execution of the algorithm. Upon completion of the algorithm, the data internal to the block is saved for use in the next execution, and the output data is snapped, releasing it for use by other function blocks.

Once the inputs are snapped, the algorithm operates on them, generating outputs as it progresses. Algorithm executions are controlled through the setting of internal parameters. Internal parameters do not appear as normal input and output parameters. However, they may be accessed and modified remotely, as specified by the function block.

Figure D-1 illustrates the internal structure of a function block. When execution begins, input parameter values from other blocks are snapped-in by the block. The input snap process ensures that these values do not change during the block execution. New values received for these parameters do not affect the snapped values and will not be used by the function block during the current execution.

Function blocks are also capable of performing short-term data collection and storage for reviewing their behavior.

# Instrument-Specific Blocks

In addition to function blocks, fieldbus devices contain two other block types to support the function blocks. These are the resource block and the transducer block. The resource block contains the hardware specific characteristics associated with a device. Transducer blocks couple the function blocks to local input/output functions.

Figure D-1. Function Block Internal Structure
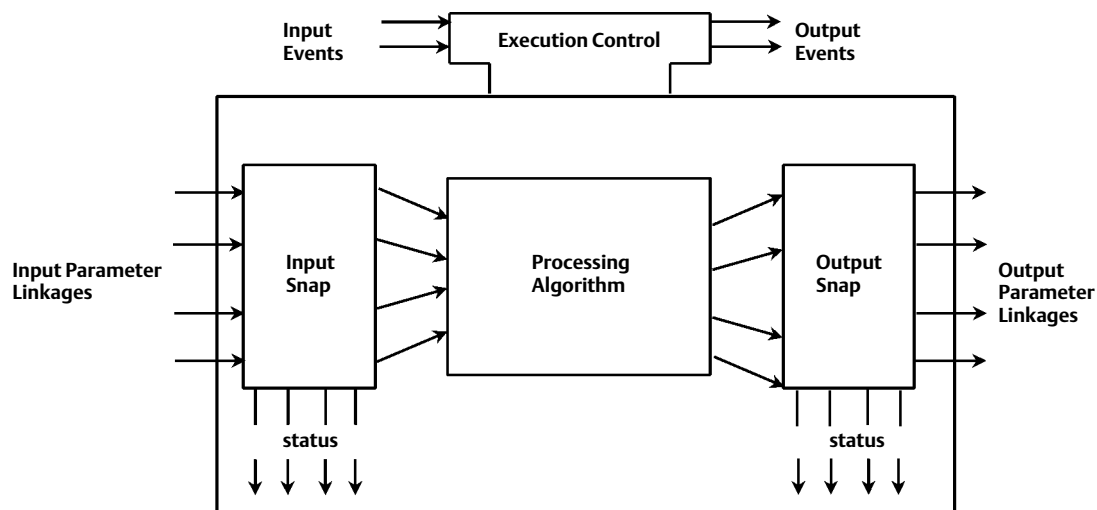


## Resource Blocks

The resource block contains hardware specific characteristics associated with the device; it has no input or output parameters. The algorithm within a resource block monitors and controls the general operation of the physical device hardware. The execution of this algorithm is dependent on the characteristics of the physical device, as defined by the manufacturer. As a result of this activity, the algorithm may cause the generation of events. There is only one resource block defined for a device. For example, placing the resource block in Out of Service mode stops all function block execution, by setting their modes to Out of Service as well. The actual mode of the function blocks is changed to Out of Service, but the function block target modes will not change. Placing the resource block in the Out of Service mode does not affect the mode of the transducer block.

## Transducer Blocks

Transducer blocks connect function blocks to local input/output functions. They read sensor hardware and write to effector (actuator) hardware. This permits the transducer block to execute as frequently as necessary to obtain good data from sensors and ensure proper writes to the actuator without burdening the function blocks that use the data. The transducer block also isolates the function block from the specific characteristics of the physical I/O.

# Block Modes

All blocks have modes. The mode determines the source of the set point, the destination of the output, how the block executes, and the relationship between setpoint and output. The block mode is determined by the Block Mode parameter. It is a structured parameter composed of the attributes actual, target, permitted, and normal. The following defines each of the attributes.

● **Target mode**—The Target mode is the mode requested by the user or host system. Only one mode is allowed to be set and it must be a permitted mode as defined by the permitted attribute of the mode parameter.

● **Actual mode**—This is the current mode of the block. The actual mode may differ from the target mode due to operating conditions of the block.

● **Permitted mode**—The permitted mode defines the modes allowed for the block. This is set by the user or host system but is restricted by the instrument to modes supported by the instrument for the particular block. Any change request to the Target or Normal attribute is checked against the permitted attribute to ensure the requested mode is permitted.

When setting the Permitted mode, there is no check against any of the other attributes (Normal or Target modes). Therefore, the normal or target mode attributes may have a value that is not permitted because the permitted attribute was modified after the Normal or Target mode was set. This will have no effect on the instrument until the user attempts to modify the Target or Normal mode. At this time these attributes are tested against the Permitted modes, thus the user cannot change the Normal or Target modes to what was formerly permitted.

● **Normal mode**—The normal mode is the mode the block should be in during normal operating conditions. The normal mode is set by the user or host system and can only be set to a permitted mode (see permitted mode). The user or host system can compare the actual mode to the normal mode and, based on the results, determine if the block is operating normally.

Table D-1 lists the modes supported by each block contained in the digital valve controller.

Table D-1. DVC6200f Block Modes

| Block | Supported Mode Values |
|---|---|
| Resource | Auto and OOS |
| Transducer | Auto, Manual, and OOS |
| AO | RCas, Cas, Auto, Man, LO[1], IMan[1], and OOS |
| PID | ROut, RCas, Cas, Auto, Man, LO[1], IMan[1], and OOS |
| ISEL | Auto, Man and OOS |
| OS | IMan[1], Auto, Cas and OOS |
| AI | Man, Auto, and OOS |
| MAI | Man, Auto, and OOS |
| DO | RCas, Cas, Auto, Man, LO[1], IMan[1], and OOS |
| DI | Auto, Man, and OOS |
| 1. This mode cannot be specified as a target mode. | |

Changing the block mode requires accessing the Block Mode parameter. For information on using the host system to change the block mode via this parameter, see the appropriate host documentation.

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**Note**

A downstream block changing to Out of Service impacts the mode of the upstream block. Refer to the block hierarchy in figure D-2.

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Figure D-2. Digital Valve Controller Block Hierarchy Example
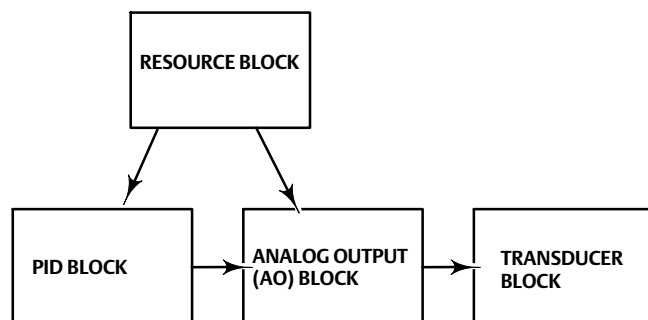


NOTES:
1. CHANGING THE RESOURCE BLOCK TO OUT OF SERVICE CHANGES ALL FUNCTION BLOCKS TO OUT OF SERVICE, BUT DOES NOT AFFECT THE TRANSDUCER BLOCK.
2. CHANGING A DOWNSTREAM BLOCK TO OUT OF SERVICE AFFECTS THE UP STREAM BLOCK. FOR EXAMPLE: WHEN THE TRANSDUCER BLOCK IS OUT OF SERVICE, THE AO BLOCK MODE WILL CHANGE TO IMAN (INITIALIZE MANUAL).

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**Note**

There is no mode associated with the FOUNDATION fieldbus Loop. Mode is dependent on the blocks within the Loop.

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# Explanation of Modes

**Out of Service (OOS)**—The functions performed by the block are not executed. If the block has any outputs, these typically do not update and the status of any values passed to downstream blocks will be "BAD". To make changes to some of the parameters in a block requires that the block be Out of Service.

**Initialization Manual (IMan)**—Only the AO, DO, OS and PID blocks support this mode. When one of these blocks detects a loss of a correct path to the downstream block (such as when the downstream block is in the OOS, Man, or LO mode), it enters the IMan mode. For example, when the transducer block enters the OOS mode, the AO block enters the IMan mode.

**Local Override (LO)**—Only the AO, DO, and PID blocks support this mode. If the PID block enters the LO mode, the block output follows the tracking value (TRK_VAL), if external tracking is enabled by TRK_IN_D. In the AO and DO block, the block enters LO mode when the block detects that fault state is active. In this case, the output is determined by the selection for I/O_OPTS.

**Manual (Man)**—If the data status of a function block's input is bad or its target mode is Man, the block enters the manual mode. In this mode, the function block does not update its OUT value. If the target is Man, the user may write a desired value to the output.

**Automatic (Auto)**—The block performs the specified calculations based on the local set point and outputs the result, independently without interfacing with another block. The user can write to the set point of a block in this mode. Any block outputs continue to update.

**Cascade (Cas)**—The block performs the specified calculations based on the set point from another block via the cascade input parameter and outputs the result. Any block outputs continue to update.

Remote Output (ROut)—The block outputs are set to the value of the remote output parameter that is written by a host computer or others. To prevent a sudden change in output, the block's calculations are initialized when a change in mode occurs.

Remote Cascade (RCas)—The block performs the specified calculations based on a set point from a host computer or others via the remote cascade input and outputs the result. If the block has any outputs, these continue to update.

## Examples of Modes for Various Operational Statuses

Table D-2 shows examples of block mode combinations in a digital valve controller (however it does not show all combinations). When a block changes mode or the data status signal changes for some reason, the other blocks connected to that block identify the change by detecting the change in status of an input signal, and change their modes too. For example, when the data status of BKCAL_IN in a PID block changes to bad, the PID block automatically changes its mode to Iman to initialize the control of its downstream block.

Table D-2. Examples of Block Mode Combinations and Operational statuses for an Instrument with Standard Control

| Operational Status | Blocks | | |
| --- | --- | --- | --- |
| | **PID** | **AO** | **TB[1]** |
| Initial Setup and calibration | - - - | OOS | OOS |
| Modification of some transducer block parameters | - - - | IMan | Manual |
| Constant valve position control | - - - | Auto | Auto |
| PID Single-loop control | Auto | Cas | Auto |
| PID Cascade-loop control | Primary PID, Auto<br>Secondary PID, Cas | Cas | Auto |
| 1. TB=Transducer Block | | | |

The respective modes to which each block should enter upon occurrence of a communication error and at a restart, and the handling of signals in each mode may be defined in the block's option parameters such as IO_OPTS and STATUS_OPTS. For details, see the detailed descriptions of each function block.

# Device Descriptions

Device Descriptions are specified definitions that are associated with blocks. Device descriptions provide for the definition and description of blocks and their parameters.

Device descriptions may also include a set of processing routines called Methods. Methods provide a procedure for accessing and manipulating a series of parameters within a device, such as for setup and calibration. Methods are used for a variety of functions including automatic calibration, setting protection and setting up the instrument. These Methods are a predetermined sequence of steps for information required to setup, calibrate, and perform other functions on the instrument.

# Transducer Block Status and Limit Propagation

Every FOUNDATION fieldbus parameter has a value and a status. The status attribute is divided into three components: Quality, Quality substatus, and a Limit. The Quality can be Good (Cascade), Good (Non-Cascade), Uncertain, and Bad. Each quality can have a substatus as shown in table D-3. Each status attribute also has four possible limit states: Not limited, Low limited, High limited, and Constant. Refer to the Fieldbus Foundation specifications for a more detailed description. The following describes how the transducer block passes status information to the AO block. For information on status handling by the function blocks within the digital valve controller, refer to the Detailed Setup section.

Table D-3. Status Attribute Quality and Substatus Components

| Quality | Substatus |
|---|---|
| Good (NC) | Non-specific |
| Good (NC) | Active Block Alarm |
| Good (NC) | Active Advisory Alarm |
| Good (NC) | Active Critical Alarm |
| Good (NC) | Unack Block Alarm |
| Good (NC) | Unack Advisory Alarm |
| Good (NC) | Unack Critical Alarm |
| Uncertain | Non-specific |
| Uncertain | Last Usable Value |
| Uncertain | Substitute/Manual Entry |
| Uncertain | Initial Value |
| Uncertain | Sensor Conversion not Accurate |
| Uncertain | Engineering Unit Range Violation |
| Uncertain | Sub-normal |
| Good (C) | Non-specific |
| Good (C) | Initialization Acknowledge |
| Good (C) | Initialization Request |
| Good (C) | Not Invited |
| Good (C) | Not Selected |
| Good (C) | Local Override |
| Good (C) | Fault State Active |
| Good (C) | Initiate Fault State |
| Bad | Non-specific |
| Bad | Configuration Error |
| Bad | Not Connected |
| Bad | Device Failure |
| Bad | Sensor Failure |
| Bad | No Comm, with LUV |
| Bad | No Comm, no LUV |
| Bad | Out of Service |
| (NC)=(Non-cascade)  (C)= (Cascade) | |

# Status Propagation

The transducer block accepts the output from the AO block or DO block if the output parameter status is Good (Non-cascade) or Good (Cascade). When the AO or DO block is Out of Service the output parameter status is Bad. In this case, the transducer block holds the last value.

If the transducer block actual mode is Out of Service, the AO block READBACK parameter status is Bad-Out of Service. This could be caused by a Failed Alert. If a Failed Alert is active, the block error parameter (parameter name BLOCK_ERR) for the Resource block will indicate Device Needs Maintenance Now. For more information on the Resource and Transducer block error indications, refer to the Viewing Device Information section of this manual.

If the transducer block is functioning correctly the AO block READBACK parameter status is Good (Non-cascade)-Non-specific. If a Maintenance or Advisory alert is active the substatus will reflect a Unacknowledged or Active advisory alert. When a Maintenance or Advisory alert is active, the block error for the resource block indicates Device Needs Maintenance Soon.

# Limit Propagation

The following describes limit propagation:

## AO Block

- If the valve position is below the low cutoff value, the AO block READBACK status limit is LOW_LIMITED.

- If the valve position is above the high cutoff value, the AO block READBACK status limit is HIGH_LIMITED.

- If the transducer block actual mode is Auto and the above conditions are not true, the AO block READBACK status limit is NOT_LIMITED.

- If the transducer block actual mode is Out of Service, the AO block READBACK status limit is CONSTANT.

## DO Block

- If the transducer block actual mode is Auto, the DO block READBACK_D status is NOT_LIMITED.

- If the transducer block actual mode is Out of Service, the DO block READBACK_D status is CONSTANT.

The control strategy should be configured to monitor the Analog Output block status and take action where appropriate when the status is no longer Good.

# Network Communication

Figure D-3 illustrates a simple fieldbus network consisting of a single segment.

Figure D-3. Simple Single-Link Fieldbus Network
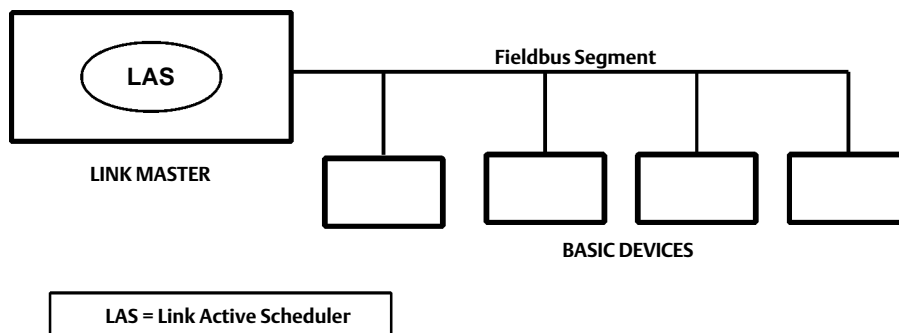


B2712-1

# Device Addressing

Fieldbus uses addresses between 0 and 255. Addresses 0 through 15 are typically reserved for group addressing and for use by the data link layer. If there are two or more devices with the same address, the first device to start will use its programmed address. Each of the other devices will be given one of four temporary addresses between 248 and 251. If a temporary address is not available, the device will be unavailable until a temporary address becomes available. Commission devices use addresses 20-35, and standby devices use addresses 232-247.

# Link Active Scheduler (LAS)

There is only one active Link Active Scheduler (LAS) for the entire fieldbus control system. The digital valve controller includes an LAS. The Link Active Scheduler operates as the bus arbiter for the link, and

● recognizes and adds new devices to the link.

● removes non-responsive devices from the link.

● distributes Data Link (DL) and Link Scheduling (LS) time on the link. Data Link Time is a network-wide

time periodically distributed by the LAS to synchronize all device clocks on the bus. Link Scheduling time is a link-specific time represented as an offset from Data Link Time. It is used to indicate when the LAS on each link begins and repeats its schedule. It is used by system management to synchronize function block execution with the data transfers scheduled by the LAS.

● polls devices for process loop data at scheduled transmission times.

● distributes a priority-driven token to devices between scheduled transmissions.

The DVC6200f can be designated to act as the backup Link Active Scheduler (LAS) in the event that the LAS is disconnected from the segment. As the backup LAS, the DVC6200f will take over the management of communications until the host is restored. The host system may provide a configuration tool specifically designed to designate a particular device as a backup LAS. Otherwise, this can be configured manually as follows:

1. Access the Management Information Base (MIB) for the DVC6200f.

2. To activate the LAS capability, write 0x02 to the BOOT_OPERAT_FUNCTIONAL_CLASS object (Index 605). To deactivate, write 0x01.

Restart the processor.

Only one device can communicate at a time. Permission to communicate on the bus is controlled by a centralized token passed between devices by the LAS. Only the device with the token can communicate. The LAS maintains a list of all devices are a member of the bus. This list is called the "Live List".

Two types of tokens are used by the LAS. A time-critical token, compel data (CD), is sent by the LAS according to a schedule. A non-time critical token, pass token (PT), is sent by the LAS to each device in numerical order according to address.

# Device Communication

## Scheduled Transfers

Information is transferred between devices over the fieldbus using three different types of communication:

● **Publisher/Subscriber:** This type of communication is used to transfer critical process loop data, such as the process variable. The data producers (publishers) post the data in a buffer that is transmitted to the subscriber (S), when the publisher is issued the Compel Data (CD) message from the LAS. The buffer contains only one copy of the data. New data completely overwrites previous data. Updates to published data are transferred simultaneously to all subscribers in a single broadcast. Transfers of this type are scheduled on a precisely periodic basis.

Figure D-4 diagrams the method of scheduled data transfer. Scheduled data transfers are typically used for the regular cyclic transfer of process loop data between devices on the fieldbus. Scheduled transfers use publisher/subscriber type of reporting for data transfer. The Link Active Scheduler maintains a list of transmit times for all publishers in all devices that need to be cyclically transmitted. When it is time for a device to publish data, the LAS issues a Compel Data (CD) message to the device. Upon receipt of the CD, the device broadcasts or "publishes" the data to all devices on the fieldbus. Any device that is configured to receive the data is called a "subscriber".

Figure D-4. Scheduled Data Transfer



LAS=Link Active Scheduler
P=Publisher
S=Subscriber
CD=Compel Data
DT=Data Transfer Packet
B2713-1
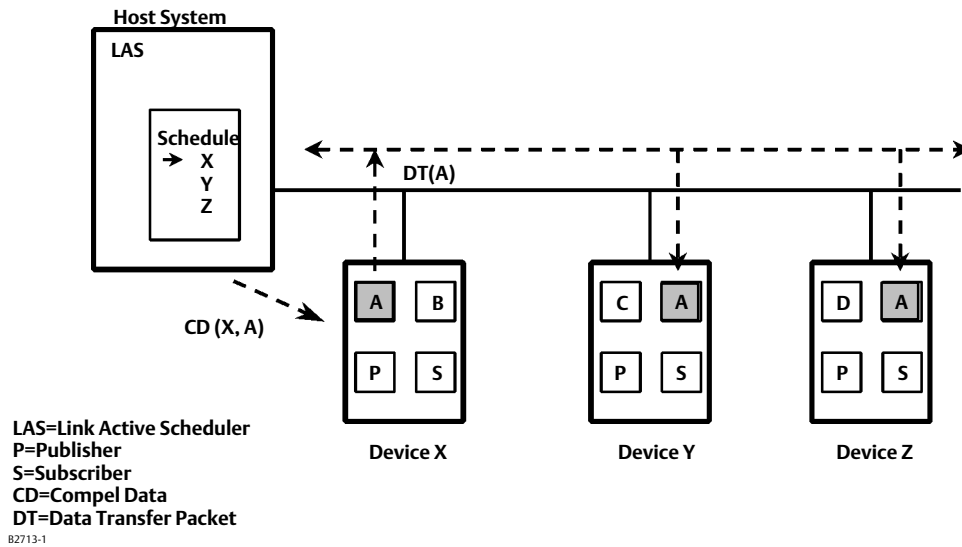
## Unscheduled Transfers

Figure D-5 diagrams an unscheduled transfer. Unscheduled transfers are used for things like user-initiated changes, including set point changes, mode changes, tuning changes, and upload/download. Unscheduled transfers use either report distribution or client/server type of reporting for transferring data.

Figure D-5. Unscheduled Data Transfer



LAS=Link Active Scheduler
P=Publisher
S=Subscriber
PT=Pass Token
M=Message
B2714-1
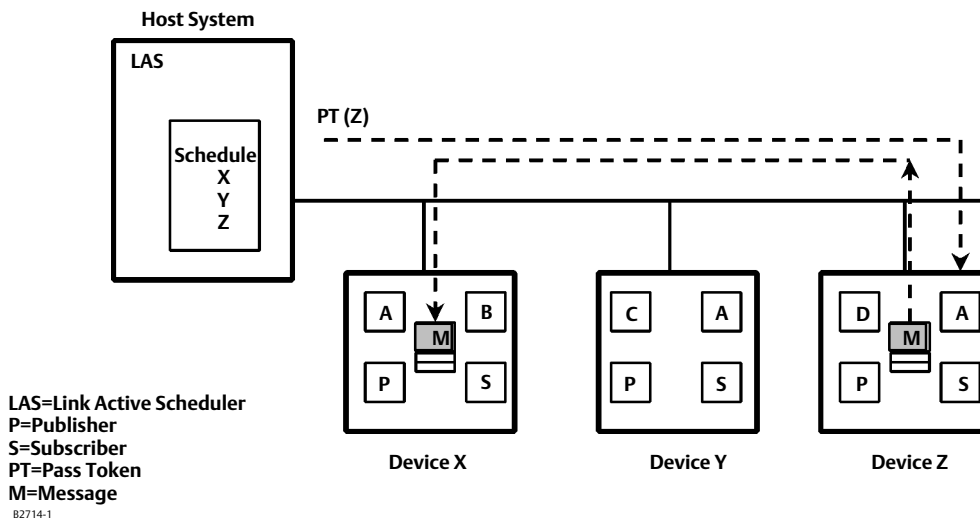
All of the devices on the fieldbus are given a chance to send unscheduled messages between transmissions of scheduled data. The LAS grants permission to a device to use the fieldbus by issuing a pass token (PT) message to the device. When the device receives the PT, it is allowed to send messages until it has finished or until the "maximum token hold time" has expired, whichever is the shorter time. The message may be sent to a single destination or to multiple destinations.

- **Report Distribution:** This type of communication is used to broadcast and multicast event and trend reports.

- **Client/Server:** This type of communication is used for request/ response exchanges between pairs of devices, such as a set point change. Like Report Distribution reporting, the transfers are queued, unscheduled, and prioritized. Queued means the messages are sent and received in the order submitted for transmission, according to their priority, without overwriting previous messages.

# Function Block Scheduling

Figure D-6 shows an example of a link schedule. A single iteration of the link-wide schedule is called the macrocycle. When the system is configured and the function blocks are linked, a master link-wide schedule is created for the LAS. Each device maintains its portion of the link-wide schedule, known as the Function Block Schedule. The Function Block Schedule indicates when the function blocks for the device are to be executed. The scheduled execution time for each function block is represented as an offset from the beginning of the macrocycle start time.

Figure D-6. Example Link Schedule Showing Scheduled and Unscheduled Communication
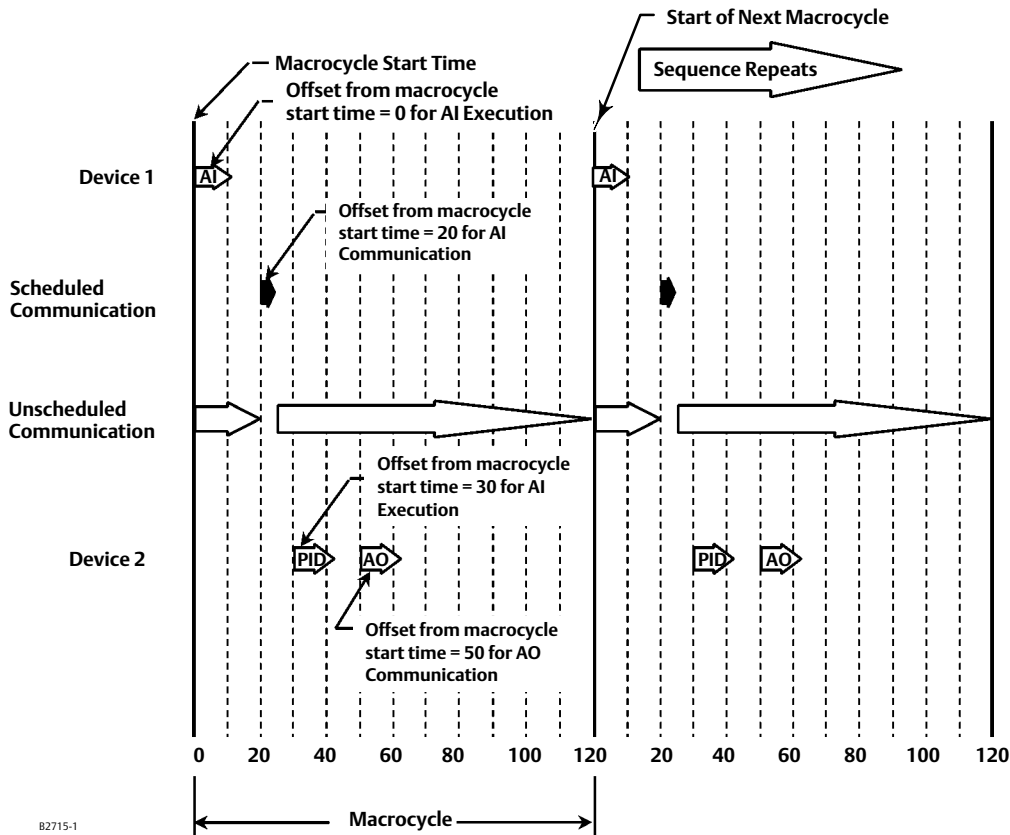


To support synchronization of schedules, periodically Link Scheduling (LS) time is distributed. The beginning of the macrocycle represents a common starting time for all Function Block schedules on a link and for the LAS link-wide schedule. This permits function block executions and their corresponding data transfers to be synchronized in time.

# Network Management

Information for setting up network communications, including Virtual Communication Relationships (VCRs), host timer recommendations, and other network parameters, can be found in the capabilities file (.cff) available from the website www.FIELDVUE.com or from the Fieldbus Foundation website.

# Appendix E Device Description Installation

## Overview

Several support files are required for the DVC6200f digital valve controller. They are:

- **Device Description (DD) files**—These files define the data interface to the digital valve controller (file extensions .sym and .ffo).

- **Capabilities File**—These files allow a host to configure the control system off-line (e.g., without having a device physically attached to the host) (file extension .cff).

- **DeltaV Registry File**—This file is used by DeltaV to define the device interface (file extension .reg)

- **DeltaV fhx File**—This file is used by DeltaV to define the device and the data interface to the device (file extension .fhx).

- **DeltaV Windows Resource File**—These files define the user interface for the device for DeltaV and include the definitions for the transducer block interface and the resource block interface (file extension .dll).

The directory structure defined by the Fieldbus Foundation for device descriptions is as follows:

....\xxxxxx\yyyy\rrddcc.eee

where:

....\     is the path to the DD structure as implemented by the host system. This is typically defined as the base path to the DD since access to the specific device DD is predefined from the base folder. For a DeltaV system, the DDs are included with the support files and are located in a folder named "amsdevices." For other hosts, the Fieldbus Foundation defines a folder named "release" that is included with the CD-ROM, however, you do not need to retain this folder name.

xxxxxx   is the 6-digit hexadecimal equivalent of the manufacturer's identification number as defined by the Fieldbus Foundation. Fisher Controls' ID number is 5100 (or in the folder format 005100). This number is also stored in the instrument Resource Block in the parameter Mfg ID (parameter name MANUFAC_ID).

yyyy     is the 4-digit hexadecimal equivalent of the device type, as defined by the manufacturer. For example, the device type for the DVC6200f digital valve controller is 4602. This number is stored in the instrument Resource Block in the parameter Device Type (parameter name DEV_TYPE).

rr     is the 2-digit hexadecimal equivalent of the device revision, as defined by the manufacturer. It is stored in the instrument Resource Block in the parameter Device Revision (parameter name DEV_REV).

dd     is the 2-digit hexadecimal equivalent of the device description (DD) revision that applies to the device, as defined by the manufacturer. The host will always use the latest version of the DD that it finds for a particular device revision. When part of the name of a capabilities file, this value is always the same as the value of the DD_REV parameter stored in the Resource Block of the instrument. The value of the DD_REV parameter represents the earliest version of the DD that is compatible with the device revision of the instrument.

cc     is a 2-digit hexadecimal equivalent for the capabilities files (.cff) revision, as defined by the manufacturer. The latest revision of the capabilities files, for a particular device revision, is the file with the largest value for this number.

eee     is the file extension. At this time, five extensions exist for files, they are:

     - .sym—This extension denotes a device description (DD) symbol file as defined by the Fieldbus Foundation.

- .ffo—This extension denotes a complete, tokenized, device description for the instrument as defined by the Fieldbus Foundation.

- .cff—This extension denotes a capabilities file for the instrument as defined by the FOUNDATION Fieldbus Common File Format specification.

- .fhx—This extension denotes a DeltaV device definition file.

- .dll—This extension denotes a windows resource file used by DeltaV.

- .reg—This extension denotes a DeltaV registry file.

- .alm—This extension denotes a DeltaV alarm file (DeltaV version 6 only).

# Device Description and Methods

FOUNDATION fieldbus technology uses Device Descriptions (DD) and function blocks to achieve interoperability between instruments and control systems or hosts from various manufacturers. The DD provides information to describe the data interface to the device.

The following table describes the compatibility between the DVC6200f firmware revisions and DD revisions.

| Device Description Compatibility | |
| --- | --- |
| **Firmware Revision** | **DD Compatibility** |
| 2.0 | 2 and 3 |

For fieldbus devices, in addition to providing parameter definitions and other information required by the control system to communicate with the fieldbus device, the DD may also include methods. Methods can be used for a variety of functions including automatic calibration, setting protection, setting up the instrument, etc. These methods are a predetermined sequence of steps for information required to setup, calibrate, and perform other functions on the instrument. How the method prompts the user, and how messages appear is determined by the host system. For information on using methods on the host system see the appropriate host system documentation.

Table E-1 contains the methods available in the DVC6200f, the block it is found in, and the page number where it is described.

# Installing DD on a DeltaV ProfessionalPLUS Workstation

The following is general information that may apply when installing the DD on a DeltaV system during the Add Device Definition procedure. This procedure is accessed from the DeltaV/Library, as shown in figure E-1. For complete information, refer to the DeltaV documentation.

Figure E-1. Add Device Definition
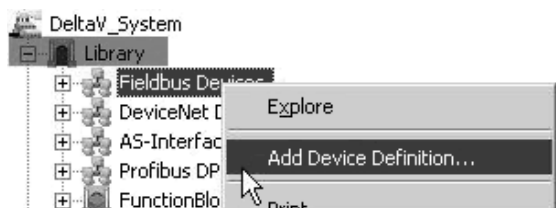
**Note**

Before beginning the Add Device Definition procedure, it is recommended that the Add Device Utility be installed on DeltaV. This may help prevent installation errors from occurring.

Table E-1. Methods

| Method | Block | Description Location |
|---|---|---|
| Auto Calibration | Transducer | page 190 |
| Block Error Reporting | Transducer | page 62 |
| Block Mode | Transducer | page 38 |
| | Resource | page 21 |
| Display DD Version | Resource | page 277 |
| Instrument Alerts | Transducer | page 45 |
| Manual Travel Calibration | Transducer | page 190 |
| Output A Sensor Calibration | Transducer | page 193 |
| Output B Sensor Calibration | Transducer | page 193 |
| PlantWeb Alerts | Transducer | page 45 |
| Relay Adjust | Transducer | page 191 |
| Reset Options | Resource | page 197 |
| Device Setup | Transducer | page 16 |
| Stabilize/Optimize | Transducer | page 40 |
| Stroke Valve | Transducer | page 204 |
| Supply Sensor Calibration | Transducer | page 192 |
| Define Custom Characteristic | Transducer | page 44 |
| Travel Deviation Fallback | Transducer | page 43 |
| Outblock Selection | Transducer | page 45 |
| PlantWeb Alerts Set PV Status | Transducer | page 62 |
| Performance Tuner | Transducer | page 20, 40 |

**Note**

Be sure to select the correct DD for the DeltaV revision being used. The resource files are different for each revision of DeltaV.

● Device descriptions furnished by Fisher contain only those files applicable to Fisher. All the files are located in the manufacturer ID Folder (005100 for xxxxxx in directory structure above). A readme file is included at the top level. Read this file for any additional information regarding DD installation.

● Device descriptions furnished by the Fieldbus Foundation (on CD-ROM or diskette) contain the files for each registered manufacturer and their associated device(s). It is placed on the media starting with the release folder, which then contains a folder (xxxxxx) for each manufacturer as defined above. For Fisher this folder is 005100. A readme file may be included at the top level. Read this file for any additional information regarding the DD.

● **For the DVC6200f**—The device type parameter for this unit is 4602. This device includes the AO, PID, ISEL, OS, AI, MAI, DO and DI function blocks. From DeltaV Explorer, select the amsdevices\005100\4602 folder (refer to figure E-2).

Figure E-2. amsdevices folder
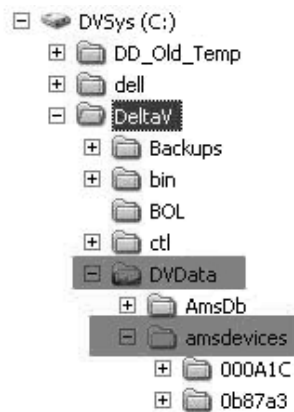


- The most recent device description for Fisher devices can be downloaded from the internet at www.FIELDVUE.com. If you are downloading from the internet, the file on the website will be compressed (zipped) and must be decompressed (unzipped) before proceeding. Refer to the website download and installation procedures for setting up the DD on your system. Note the folder where the decompressed files are placed. This information will be required later in the installation procedure.

**Note**

Record any warning/error messages from the message window in DeltaV Explorer so that it can be communicated to the DeltaV Technical Support Group.

# Installing DDs on Other Fieldbus Host Systems

The following is a generic procedure for installing the device descriptions on a host system. Refer to your host system documentation for specific information. In general the following may apply:

- Device descriptions furnished by Fisher contain only those files applicable to Fisher. All the files are located in the manufacturer ID Folder (005100 for xxxxxx in directory structure above). A readme file is included at the top level. Read this file for any additional information regarding DD installation.

- Device descriptions furnished by the Fieldbus Foundation (on CD-ROM or diskette) contain the files for each registered manufacturer and their associated device(s). It is placed on the media starting with the release folder, which then contains a folder (xxxxxx) for each manufacturer as defined above. For Fisher this folder is 005100. A readme file may be included at the top level. Read this file for any additional information regarding the DD.

- **For the DVC6200f Digital Valve Controller**—The device type parameter for this unit is 4602. This device includes the AO, PID, ISEL, OS, AI, MAI, DO and DI function blocks. From Windows Explorer, select the release\005100\4602 folder.

- The most recent device description for Fisher devices can be downloaded from the internet at www.fisher.com. If you are downloading from the internet, the file on the website will be compressed (zipped) and must be decompressed (unzipped) before proceeding. Refer to the website download and installation procedures for setting

up the DD on your system. Note the folder where the decompressed files are placed. This information will be required later in the installation procedure.

---

**Note**

This procedure will install the necessary Device Description files (*.ffo and *.sym), and Capabilities file  (*.cff) for the device.

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1. Locate or create the folder on the host system to contain all the DD and capabilities files.

If you are creating a folder, you can name this new folder whatever you would like and it can have any path you define. For this installation procedure, this folder will be referred to as the base folder.

2. On the CD-ROM or in the website download files, locate the folder with the new support files. This folder is called \RELEASE.

3. Open this folder and select the folder named 005100.

4. Copy the 005100 folder (and all its subfolders) from the CD-ROM or website download location to the base folder.

If this is an update (the folders already exist), the system informs you that the folders already exist and asks if they should be replaced. Answer Yes or OK so the folders are properly updated.

5. The new support files are now installed. You may have to restart applications and drivers in order for the new files to become active.

DD installation is complete. Consult the system documentation for commissioning new devices or updating existing devices.

# Displaying the Device Description Version

You can use the DD In Use method to display version information for the device descriptions installed on the system. The DD in Use method is included with the device description (DD) software. For information on using methods, see the host system documentation.

DD in Use displays the version number displayed in the format: device type.device revision.DD revision. The Min Compatible DD revision displayed is the latest device description revision that is compatible with the displayed device revision.

This method is available via the resource block.

# Appendix F Operating with a DeltaV System

## Process Systems DeltaV System

### Getting Started with DeltaV Host Systems

☐ Appropriate Device Descriptions (DDs) installed. See the Device Description Compatibility table on page 274. For DD installation information see Appendix E.

☐ Digital valve controller correctly mounted on actuator. For mounting information see the Installation section of this manual and the instructions included with the mounting kit.

☐ Utilities connected. For information on making pneumatic and electrical connections, see the Installation section of this manual. For information on applying power to the segment, see DeltaV books online.

☐ Instrument in standby. For information on placing the instrument in standby, see DeltaV books online.

☐ Perform the initial setup. See the Basic Setup section of this manual. If the valve is shipped from the factory mounted on an actuator, perform basic setup only to verify setup is correct and valve operation is satisfactory.

☐ Device Commissioned. For information on commissioning a device, see DeltaV books online.

☐ Additional configuration required, such as setting alarms, cutoffs, and other resource block and transducer block parameters. See the Detailed Setup section of this manual.

☐ Control strategy defined. For information on defining a control strategy, see DeltaV books online.

☐ Associate I/O with device. See DeltaV books online.

☐ Download device. See DeltaV books online.

Table F-1. Transducer Block (TB) Parameters - Configuration Index

| Parameter Label | Path to Parameter |
|---|---|
| Actual Travel | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Actual Travel |
| Actuator Fail Action | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Fail Action |
| Actuator Manufacturer ID | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Manufacturer ID |
| Actuator Model Number | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Model Number |
| Actuator Serial Number | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Serial Number |
| Actuator Size | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Size |
| Actuator Style | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Actuator Style |
| Air | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Air |
| Alert Conditions | TB > Device Diagnostics > Alert Conditions |
| Alert Key | TB > Configure/Setup > Detailed Setup > Alerts > Configuration > Alert Key |
| Area Units | TB > Configure/Setup > Detailed Setup > Instrument > Units: Area Units |
| Block Configuration Error | TB > Device Diagnostics > Status > Transducer Block Error: Block Configuration Error |
| Blocks Set to Default Alert | TB > Configure/Setup > Detailed Setup > Alerts > Configuration > Blocks Set to Default: Block Set to Default Alert |
| Blocks Set to Default Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Configuration > Blocks Set to Default: Block Set to Default Alert Enable |
| Calibration Date | TB > Configure/Setup > Detailed Setup > Instrument > Calibration: Calibration Date |
| Calibration Location | TB > Configure/Setup > Detailed Setup > Instrument > Calibration: Calibration Location |
| Calibration Person | TB > Configure/Setup > Detailed Setup > Instrument > Calibration: Calibration Person |
| Cycle Count | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Cycle Counter:Cycle Count |
| | TB > Device Variables > Overview > Cycle Count |
| Cycle Count Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Cycle Counter: Cycle Count Alert |
| Cycle Count Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Cycle Counter: Cycle Count Alert Enable |
| Cycle Count Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Cycle Counter Cycle Count Alert Point |
| Cycle Count Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Cycle Counter: Cycle Count Deadband |
| Device Needs Maintenance Now | TB > Device Diagnostics > Status > Transducer Block Error: Device Needs Maintenance Now |
| Drive Current | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Current: Drive Current |
| Drive Current Alert | TB > Device Diagnostics > Status > Self Test Status: Drive Current Alert |
| | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Current: Drive Current Alert |
| Drive Current Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Current: Drive Current Alert Enable |
| Drive Current Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Current: Drive Current Alert Point |
| Drive Current Alert Time | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Current: Drive Current Alert Time |
| Drive Current Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Current: Drive Current Manual Recovery |
| Drive Current Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Current: Drive Current Shutdown |
| Drive Signal | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Signal: Drive Signal |
| | TB > Device Variables > Overview > Drive Signal |
| Drive Signal Alert | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Signal: Drive Signal Alert |
| Drive Signal Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Drive Signal: Drive Signal Alert Enable |
| Effective Area | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Effective Area |
| Feedback Connection | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Feedback Connection |
| Flow Direction | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Flow Direction |
| Flow Tends To | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Flow Tends To |
| I/O Processor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: I/O Processor Alert |
| I/O Processor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: I/O Processor Alert Enable |
| I/O Processor Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: I/O Processor Man Recovery |
| I/O Processor Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: I/O Processor Shutdown |
| Inlet Pressure | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Inlet Pressure |
| Input Characterization | TB > Configure/Setup > Detailed Setup > Response Control > Input Characterization > Input Characterization |
| | TB > Device Variables > Overview > Input Characterization |
| Integrator Limited Hi | TB > Device Diagnostics > Status > Self Test Status: Integrator Limited Hi |
| Integrator Limited Lo | TB > Device Diagnostics > Status > Self Test Status: Integrator Limited Lo |
| Integrator Suspended | TB > Device Diagnostics > Status > Self Test Status: Integrator Suspended |
| IOP Failure | TB > Device Diagnostics > Status > Self Test Status: IOP Failure |
| Last Valid Point | TB > Configure/Setup > Detailed Setup > Response Control > Input Characterization > Last Valid Point |
| Leak Class | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Leak Class |
| Length Units | TB > Configure/Setup > Detailed Setup > Instrument > Units: Length Units |

-Continued-

Table F-1. Transducer Block (TB) Parameters - Configuration Index (Continued)

| Parameter Label | Path to Parameter |
|---|---|
| Lever Style | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Lever Style |
| Lost Static Data | TB > Device Diagnostics > Status > Transducer Block Error: Lost Static Data |
| Lower Bench Set | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Lower Bench Set |
| MAI Channel 1 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 1 |
| MAI Channel 2 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 2 |
| MAI Channel 3 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 3 |
| MAI Channel 4 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 4 |
| MAI Channel 5 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 5 |
| MAI Channel 6 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 6 |
| MAI Channel 7 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 7 |
| MAI Channel 8 | TB > Configure/Setup > Detailed Setup > MAI Channel Map > MAI Channel 8 |
| Maximum Supp Pressure | TB > Configure/Setup > Detailed Setup > Instrument > Application: Max Supp Pressure |
| MLFB Error | TB > Device Diagnostics > Status > Self Test Status: MLFB Error |
| Moment Arm Length | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Moment Arm |
| Nominal Supply Pressure | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Nominal Supply Pressure |
| Out of Service | TB > Device Diagnostics > Status > Transducer Block Error: Out of Service |
| Outlet Pressure | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Outlet Pressure |
| Output Block Timeout | TB > Configure/Setup > Detailed Setup > Alerts > Configuration > Output Block Timeout: Output Blk Timeout |
| Output Block Timeout Alert | TB > Configure/Setup > Detailed Setup > Alerts > Configuration > Output Block Timeout: Output Block Timeout Alert |
| Output Block Timeout Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Configuration > Output Block Timeout: Output Block Timeout Alert Enable |
| Output Block Timeout Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Configuration > Output Block Timeout: Output Block Timeout Manual Recovery |
| Output Block Timeout Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Configuration > Output Block Timeout: Output Block Timeout Shutdown |
| Packing Type | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Packing Type |
| PD Inside Status | TB > Configure/Setup > Detailed Setup > Alerts > Performance > PD Inside Status |
| PD Inside Status | TB > Device Variables > Overview > PD Inside Status |
| PD Run | TB > Configure/Setup > Detailed Setup > Alerts > Performance > PD Run |
| Performance Critical Alert | TB > Configure/Setup > Detailed Setup > Alerts > Performance > Performance Critical: Performance Critical Alert |
| Performance Critical Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Performance > Performance Critical: Performance Critical Alert Enable |
| Performance Information Alert | TB > Configure/Setup > Detailed Setup > Alerts > Performance > Performance Information: Performance Information Alert |
| Performance Information Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Performance > Performance Information: Performance Information Alert Enable |
| Performance Reduced Alert | TB > Configure/Setup > Detailed Setup > Alerts > Performance > Performance Reduced: Performance Reduced Alert |
| Performance Reduced Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Performance > Performance Reduced: Performance Reduced Alert Enable |
| Performance Tuner[1] | TB > Configure/Setup > Basic Setup > Performance Tuner |
| Port Diameter | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Port Diameter |
| Port Type | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Port Type |
| Pressure A Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Sensors: Pressure A Sensor Alert |
| Pressure A Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Sensors: Pressure A Sensor Alert Enable |
| Pressure A Sensor Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Sensors: Pressure A Sensor Manual Recovery |
| Pressure A Sensor Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Sensors: Pressure A Sensor Shutdown |
| Pressure B Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Sensors: Pressure B Sensor Alert |
| Pressure B Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Sensors: Pressure B Sensor Alert Enable |
| Pressure Cutoff Close | TB > Configure/Setup > Detailed Setup > Response Control > Travel / Pressure Control > Pressure Control: Pressure Cutoff Close |
| Pressure Cutoff Open | TB > Configure/Setup > Detailed Setup > Response Control > Travel / Pressure Control > Pressure Control: Pressure Cutoff Open |
| Pressure Integral Deadzone | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning: Pressure Integral Deadzone |
| Pressure Integral Gain | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning: Pressure Integral Gain |
| Pressure Integral Limit Hi | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning: Pressure Integral Limit Hi |
| Pressure Integral Limit Lo | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning: Pressure Integral Limit Lo |
| Pressure MLFB Gain | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning: Pressure MLFB Gain |
| Pressure Proportional Gain | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning: Pressure Prop Gain |
| Pressure Range Hi | TB > Configure/Setup > Detailed Setup > Response Control > Travel / Pressure Control > Pressure Control: Pressure Range Hi |
| Pressure Range Lo | TB > Configure/Setup > Detailed Setup > Response Control > Travel / Pressure Control > Pressure Control: Pressure Range Lo |
| Pressure Tuning Set | TB > Configure/Setup > Detailed Setup > Response Control > Pressure Tuning: Pressure Tuning Set |

-Continued-

Table F-1. Transducer Block (TB) Parameters - Configuration Index (Continued)

| Parameter Label | Path to Parameter |
|---|---|
| Pressure A | TB > Device Variables > Overview > Pressures: Pressure A |
| Pressure A Sensor Failure | TB > Device Diagnostics > Status > Self Test Status: Pressure A Sensor Failure |
| Pressure B | TB > Device Variables > Overview > Pressures: Pressure B |
| Pressure B Sensor Failure | TB > Device Diagnostics > Status > Self Test Status: Pressure B Sensor Failure |
| Pressure Differential | TB > Device Variables > Overview > Pressures: Pressure Diff |
| Pressure Fallback Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Fallback: Pressure Fallback Alert |
| Pressure Fallback Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Fallback: Pressure Fallback Alert Enable |
| Pressure Units | TB > Configure/Setup > Detailed Setup > Instrument > Units: Pressure Units |
| Processor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Processor Alert |
| Processor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Processor Alert Enable |
| Program Memory Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Program Memory Alert Enable |
| Program Memory Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Program Memory Manual Recovery |
| Program Memory Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Program Memory Shutdown |
| Program Memory Alert | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Program Memory Alert |
| Protection | TB > Device Variables > Overview > Protection |
| Proximity Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Proximity: Proximity Hi Alert |
| Proximity Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Proximity: Proximity Hi Alert Enable |
| Proximity Hi Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Proximity: Proximity Hi Hi Alert |
| Proximity Hi Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Proximity: Proximity Hi Hi Alert Enable |
| Proximity Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Proximity: Proximity Lo Alert |
| Proximity Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Proximity: Proximity Lo Alert Enable |
| Proximity Lo Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Proximity: Proximity Lo Lo Alert |
| Proximity Lo Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Proximity: Proximity Lo Lo Alert Enable |
| Push Down To | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Push Down To |
| Simulate PlantWeb Alerts | TB > Configure/Setup > Detailed Setup > Alert Handling > Simulate PlantWeb Alerts |
| Rated Travel | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Rated Travel |
| Relay Type | TB > Configure/Setup > Detailed Setup > Instrument > Application: Relay Type |
| Seat Type | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Seat Type |
| Setpoint | TB > Device Variables > Overview > AO Control-Pre-Characterization: Setpoint |
| Setpoint Status | TB > Device Variables > Overview > AO Control-Pre-Characterization: Setpoint Status |
| Setpoint(D) | TB > Device Variables > Overview > DO Control: Setpoint(D) |
| Shaft Stem Diameter | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Shaft Stem Dia |
| Simulate Active | TB > Device Diagnostics > Status > Transducer Block Error: Simulate Active |
| Simulate Jumper ON | TB > Device Diagnostics > Status > Self Test Status: Simulate Jumper ON |
| Spring Rate | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Spring Rate |
| Spring Rate Units | TB > Configure/Setup > Detailed Setup > Instrument > Units: Spring Rate Units |
| Static Memory Alert | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Static Memory Alert |
| Static Memory Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Static Memory Alert Enable |
| Static Memory Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Static Memory Manual Recovery |
| Static Memory Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Electronic > Processor Impaired: Static Memory Shutdown |
| Stroke Time Close | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Reference > Stroke Time Close |
| Stroke Time Open | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Reference > Stroke Time Open |
| Supply Pressure Maximum | TB > Device Diagnostics > Device Record > Supp Pressure Max |
| Supply Pressure Maximum Time | TB > Device Diagnostics > Device Record > Supp Pressure Maximum Time |
| Supp Pressure Minimum | TB > Device Diagnostics > Device Record > Supp Pressure Minimum |
| Supp Pressure Minimum Time | TB > Device Diagnostics > Device Record > Supp Pressure Minimum Time |
| Supply Pressure | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Supply Pressure: Supply Pressure |
| Supply Pressure | TB > Device Variables > Overview > Pressures: Supply Pressure |
| Supply Pressure Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Supply Pressure: Supply Pressure Hi Alert |
| Supply Pressure Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Supply Pressure: Pressure Hi Alert Enable |
| Supply Pressure Hi Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Supply Pressure: Supply Pressure Hi Alert Point |
| Supply Pressure Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Supply Pressure: Supply Pressure Lo Alert |
| Supply Pressure Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Supply Pressure: Supply Pressure Lo Alert Enable |
| Supply Pressure Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Supply Pressure: Supply Pressure Lo Alert Point |

-Continued-

### Table F-1. Transducer Block (TB) Parameters - Configuration Index (Continued)

| Parameter Label | Path to Parameter |
|---|---|
| Supply Pressure Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Sensors: Supply Pressure Sensor Alert |
| Supply Pressure Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Pressure Sensors: Supply Pressure Sensor Alert Enable |
| Supply Sensor Failure | TB > Device Diagnostics > Status > Self Test Status: Supply Sensor Failure |
| Tag Description | TB > Configure/Setup > Detailed Setup > Instrument > Tag Description |
| Temperature Hi Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Temperature Limit: Temperature Hi Alert Point |
| Temperature Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Temperature Limit: Temperature Lo Alert Point |
| Temperature Maximum | TB > Device Diagnostics > Device Record > Temperature Maximum |
| Temperature Maximum Time | TB > Device Diagnostics > Device Record > Temperature Maximum Time |
| Temperature Minimum | TB > Device Diagnostics > Device Record > Temperature Minimum |
| Temperature Minimum Time | TB > Device Diagnostics > Device Record > Temperature Minimum Time |
| Temperature | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Temperature Limit: Temperature |
| | TB > Device Variables > Overview > Temperature |
| Temperature Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Temperature Limit: Temperature Hi Alert |
| Temperature Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Temperature Limit: Temperature Hi Alert Enable |
| Temperature Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Temperature Limit: Temperature Lo Alert |
| Temperature Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Temperature Limit: Temperature Lo Alert Enable |
| Temperature Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Environment > Temperature Limit: Temperature Lo Alert Point |
| Temperature Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Temperature Sensor: Temperature Sensor Alert |
| Temperature Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Temperature Sensor: Temperature Sensor Alert Enable |
| Temperature Units | TB > Configure/Setup > Detailed Setup > Instrument > Units: Temperature Units |
| Travel | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel |
| | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel |
| | TB > Device Variables > Overview > AO Control - Post-Characterization: Travel |
| Travel(D) | TB > Device Variables > Overview > DO Control: Travel(D) |
| Travel(DeChar) | TB > Device Variables > Overview > AO Control - Pre-Characterization: Travel(DeChar) |
| Travel Status | TB > Device Variables > Overview > AO Control - Post-Characterization: Travel Status |
| Trend | TB > Device Diagnostics > Trend |
| Trim Style 1 | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Reference > Trim Style 1 |
| Trim Style 2 | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Reference > Trim Style 2 |
| Travel Accumulator | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Travel Accumulator: Travel Accumulator |
| | TB > Device Variables > Overview > Travel Accumulator |
| Travel Accumulator Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Travel Accumulator: Travel Accumulator Alert |
| Travel Accumulator Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Travel Accumulator: Travel Accumulator Alert Enable |
| Travel Accumulator Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Travel Accumulator: Travel Accumulator Alert Point |
| Travel Accumulator Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel History > Travel Accumulator: Travel Accumulator Deadband |
| Travel Closed Alert | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel Closed: Travel Closed Alert |
| Travel Closed Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel Closed: Travel Closed Alert Enable |
| Travel Closed Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel Closed: Travel Closed Alert Point |
| Travel Closed Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel Closed: Travel Closed Deadband |
| Travel Count | TB > Device Variables > Overview > Travel Count |
| Travel Cutoff Hi | TB > Configure/Setup > Detailed Setup > Response Control > Travel / Pressure Control > Travel Control: Travel Cutoff Hi |
| Travel Cutoff Lo | TB > Configure/Setup > Detailed Setup > Response Control > Travel / Pressure Control > Travel Control: Travel Cutoff Lo |
| Travel Deviation Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Deviation: Travel Deviation Alert Point |
| Travel Deviation Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel: Travel Deviation Deadband |
| Travel Deviation Time | TB > Configure/Setup > Detailed Setup > Alerts > Travel: Travel Deviation Time |
| Travel Deviation Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Deviation: Travel Deviation Alert |
| Travel Deviation Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Deviation: Travel Deviation Alert Enable |
| Travel Integral Deadzone | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel Integral Deadzone |
| Travel Integral Enable | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel Integral Enable |
| Travel Integral Limit Hi | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel Integral Limit Hi |
| Travel Integral Limit Lo | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel Integral Limit Lo |
| Travel Integral Gain | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel Integral Gain |
| Travel Limit Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit Hi/Lo: Travel Limit Hi Alert |
| Travel Limit Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit Hi/Lo: Travel Limit Hi Alert Enable |

-Continued-

### Table F-1. Transducer Block (TB) Parameters - Configuration Index (Continued)

| Parameter Label | Path to Parameter |
|---|---|
| Travel Hi Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit Hi/Lo: Travel Hi Alert Point |
| Travel Hi Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit Hi/Lo: Travel Hi Deadband |
| Travel Limit Hi Hi Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit: Travel Limit Hi Hi Alert |
| Travel Limit Hi Hi Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit: Travel Limit Hi Hi Alert Enable |
| Travel Limit Hi Hi Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit: Travel Hi Hi Alert Point |
| Travel Limit Hi Hi Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit: Travel Hi Hi Deadband |
| Travel Limit Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit Hi/Lo: Travel Limit Lo Alert |
| Travel Limit Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit Hi/Lo: Travel Limit Lo Alert Enable |
| Travel Limit Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit Hi/Lo: Travel Lo Alert Point |
| Travel Limit Lo Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit Hi/Lo: Travel Lo Deadband |
| Travel Limit Lo Lo Alert | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit: Travel Limit Lo Lo Alert |
| Travel Limit Lo Lo Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit: Travel Limit Lo Lo Alert Enable |
| Travel Limit Lo Lo Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit: Travel Lo Lo Alert Point |
| Travel Limit Lo Lo Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Limit: Travel Lo Lo Deadband |
| Travel MLFB Gain | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel MLFB Gain |
| Travel Open Alert | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel Open: Travel Open Alert |
| Travel Open Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel Open: Travel Open Alert Enable |
| Travel Open Alert Point | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel Open: Travel Open Alert Point |
| Travel Open Deadband | TB > Configure/Setup > Detailed Setup > Alerts > Proximity > Travel Open: Travel Open Deadband |
| Travel Proportional Gain | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel Proportional Gain |
| Travel Sensor Motion | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Travel Sensor Motion |
| Travel Sensor Alert | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Travel Sensor: Travel Sensor Alert |
| Travel Sensor Alert Enable | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Travel Sensor: Travel Sensor Alert Enable |
| Travel Sensor Hi Error | TB > Device Diagnostics > Status > Self Test Status: Travel Sensor Hi Error |
| Travel Sensor Lo Error | TB > Device Diagnostics > Status > Self Test Status: Travel Sensor Lo Error |
| Travel Sensor Manual Recovery | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Travel Sensor: Travel Sensor Manual Recovery |
| Travel Sensor Shutdown | TB > Configure/Setup > Detailed Setup > Alerts > Sensor > Travel Sensor: Travel Sensor Shutdown |
| Travel Sensor Span Error | TB > Device Diagnostics > Status > Self Test Status: Travel Sensor Span Error |
| Travel Target | TB > Configure/Setup > Detailed Setup > Alerts > Travel > Travel Target |
| Travel Target | TB > Device Variables > Overview > AO Control - Post-Characterization: Travel Target |
| Travel Tuning Set | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel Tuning Set |
| Travel Units | TB > Configure/Setup > Detailed Setup > Instrument > Units > Travel Units |
| Travel Velocity Gain | TB > Configure/Setup > Detailed Setup > Response Control > Travel Tuning: Travel Velocity Gain |
| Travel/Pressure Select | TB > Configure/Setup > Detailed Setup > Response Control > Travel / Pressure Control > Travel/Pressure Select |
| Travel/Pressure State | TB > Configure/Setup > Detailed Setup > Response Control > Travel / Pressure Control > Travel/Pressure State |
| | TB > Device Variables > Overview > Travel/Pressure State |
| Unbalanced Area | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Trim > Unbalanced Area |
| Upper Bench Set | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Actuator > Upper Bench Set |
| Valve Class | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Class |
| Valve Manufacturer ID | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Manufacturer ID |
| Valve Model Number | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Model Number |
| Valve Serial Number | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Serial Number |
| Valve Size | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Size |
| | TB > Configure/Setup > Detailed Setup > Valve and Actuator > Valve > Valve Style |
| Zero Power Condition | TB > Configure/Setup > Detailed Setup > Instrument > Application: Zero Power Condition |

Table F-2. Resource Block (RB) Parameters - Configuration Index

| Parameter Name | Path to Parameter |
|---|---|
| Alert Key | RB > Configure/Setup > Setup > Alarm Handling > Alert Key |
| Block Alarm: Alarm State | RB > Device Diagnostics > Status > Block Alarm: Alarm State |
| Block Alarm Disabled | RB > Configure/Setup > Setup > Alarm Handling > Block Alarm: Block Alarm Disabled |
| Block Alarm Auto Acknowledge | RB > Configure/Setup > Setup > Alarm Handling > Block Alarm: Block Alarm Auto Acknowledge |
| Discrete Alarm Auto Acknowledge | RB > Configure/Setup > Setup > Alarm Handling > Write Alarm: Discrete Alarm Auto Acknowledge |
| Confirm Time | RB > Configure/Setup > Setup > Alarm Handling > All Alarms: Confirm Time |
| Device ID | RB > Configure/Setup > Setup > Identification > Identification: Device ID |
| | RB > Device Variables > Instrument > Identification: Device ID |
| Device Revision | RB > Configure/Setup > Setup > Version > Version Information: Device Revision |
| | RB > Device Variables > Instrument > Version Information: Device Revision |
| Device State | RB > Device Diagnostics > Status > Device State |
| Device Type | RB > Configure/Setup > Setup > Identification > Identification: Device Type |
| | RB > Device Variables > Identification: Device Type |
| DD Revision | RB > Configure/Setup > Setup > Version > Version Information: DD Revision |
| | RB > Device Variables > Identification: DD Revision |
| Diagnostic Options | RB > Configure/Setup > Setup > Options > Diagnostic Options |
| | RB > Device Variables > Options > Diagnostics Options |
| Electronics S/N | RB > Configure/Setup > Setup > Identification > Identification:Electronics S/N |
| | RB > Device Variables > Identification: Electronics S/N |
| Factory S/N | RB > Configure/Setup > Setup > Identification > Identification:Factory S/N |
| | RB > Device Variables > Identification: Factory S/N |
| Fault State | RB > Device Diagnostics > Status > Fault State |
| Function Block Options | RB > Configure/Setup > Setup > Options > Function Block Options |
| | RB > Device Variables > Options > Function Block Options |
| Features Available | RB > Configure/Setup > Setup > Options > Features Available |
| | RB > Device Variables > Options > Features Available |
| Features Selected | RB > Configure/Setup > Setup > Options > Features Selected |
| Field S/N | RB > Configure/Setup > Setup > Identification > Identification: Field S/N |
| Field S/N | RB > Device Variables > Identification: Field S/N |
| Hardware Revision | RB > Configure/Setup > Setup > Version > Version Information: Hardware Revision |
| ITK Version | RB > Configure/Setup > Setup > Version > Version Information: ITK Version |
| Manufacturer | RB > Configure/Setup > Setup > Identification > Identification: Manufacturer |
| Manufacturer | RB > Device Variables > Identification: Manufacturer |
| Maximum Alerts Allow | RB > Configure/Setup > Setup > Alarm Handling > All Alarms: Maximum Alerts Allow |
| Maximum Alert Possible | RB > Configure/Setup > Setup > Alarm Handling > All Alarms: Maximum Alerts Possible |
| Miscellaneous Options | RB > Configure/Setup > Setup > Options > Miscellaneous Options |
| | RB > Device Variables > Options > Miscellaneous Options |
| Resource Block Error | RB > Device Diagnostics > Status > Resource Block Error |
| RCas Timeout | RB > Configure/Setup > Setup > Comm Timeout > RCas Timeout |
| ROut Timeout | RB > Configure/Setup > Setup > Comm Timeout > ROut Timeout |
| Firmware Revision | RB > Configure/Setup > Setup > Version > Version Information: Firmware Revision |
| Status | RB > Device Diagnostics > Status |
| Standby Firmware Revision | RB > Configure/Setup > Setup > Version > Version Information: Standby Firmware Revision |
| Strategy | RB > Configure/Setup > Setup > Identification > Identification: Strategy |
| | RB > Device Variables > Identification: Strategy |
| Tag Description | RB > Configure/Setup > Setup > Identification > Identification: Tag Description |
| | RB > Device Variables > Identification: Tag Description |
| Write Alarm: Alarm State | RB > Device Diagnostics > Status > Write Alarm: Alarm State |
| Write Alarm Disabled | RB > Configure/Setup > Setup > Alarm Handling > Write Alarm: Write Alarm Disabled |
| Write Lock | RB > Configure/Setup > Setup > Write Lock > Write Lock |
| | RB > Device Diagnostics > Status > Write Lock |
| Write Priority | RB > Configure/Setup > Setup > Write Lock > Write Priority |

# Introduction

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**Note**

This appendix does not necessarily provide the latest information on the DeltaV system. For the latest information on using the DeltaV system, refer to the on-line help or documentation supplied with the system.

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This appendix provides specific instructions for performing basic setup operations on the DeltaV host system. It is not a comprehensive resource, rather a starting point. For more information, refer to the following sources:

**Section 3: Basic Setup and Tuning** for detailed information regarding initial setup, and stabilizing and optimizing valve response.

**Section 4: Detailed Setup** for detailed information on configuring all of the blocks in the instrument, and an overview of the function blocks.

**Section 5: Calibration** for complete calibration information.

**Appendix A: Principle of Operation** for information on how digital valve controller operation.

**Appendix D: FOUNDATION fieldbus Communication** for an overview of function block and block modes, as well as additional information pertaining to fieldbus communication.

**Appendix E: DD Installation** for information on installing the device description (DD) software on your host system.

**DeltaV On-Line Help or Documentation** for complete and current information about navigating in the DeltaV system.

## Software Functionality/System Requirements

DVC6200f digital valve controllers are designed to permit remote setup, calibration, and testing using Process Systems DeltaV system as the host system.

To use the methods, accessed as described in this appendix, requires that the device description (DD) for the DVC6200f digital valve controller be installed on the host system. For information on installing the device description, refer to DD Installation (Appendix E) and the host system documentation.

## Using AMS Device Manager

Refer to figures F-1 and F-2 to access the digital valve controller using AMS Suite: Intelligent Device Manager.

1. Start DeltaV Explorer by selecting DeltaV Explorer from the Start menu.

2. Locate the the digital valve controller icon in the All Containers pane (the left panel) and right-click once on the digital valve controller icon or name.

3. Locate Open with AMS Device Manager in the context menu and left-click to bring up the Device Connection View.

4. Navigate to the digital valve controller icon or name as shown in figure F-2 and left-click.

Figure F-1. Navigating to AMS Device Manager
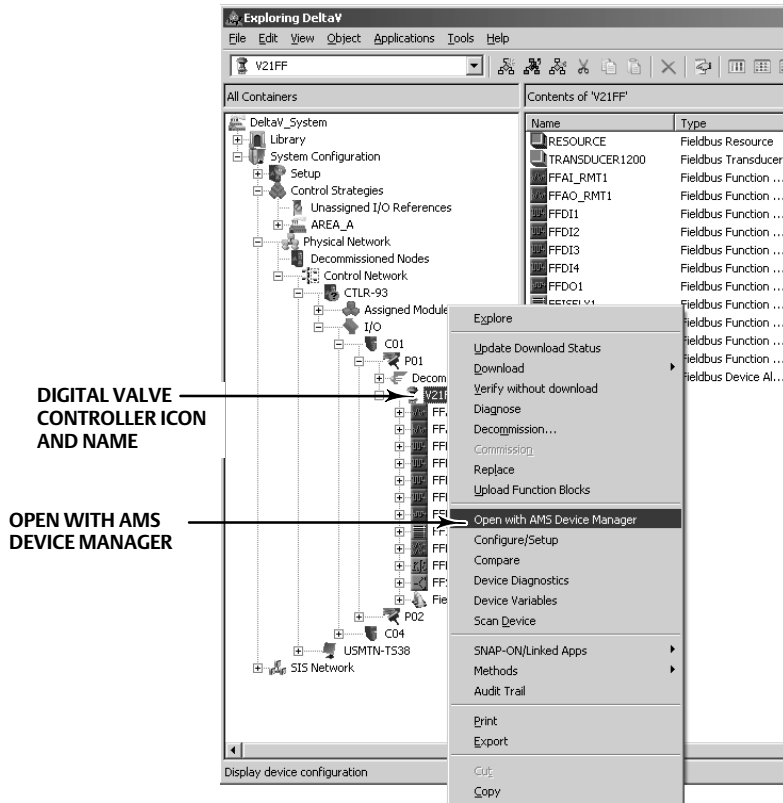


Figure F-2. Accessing the Digital Valve Controller Through AMS Device Manager
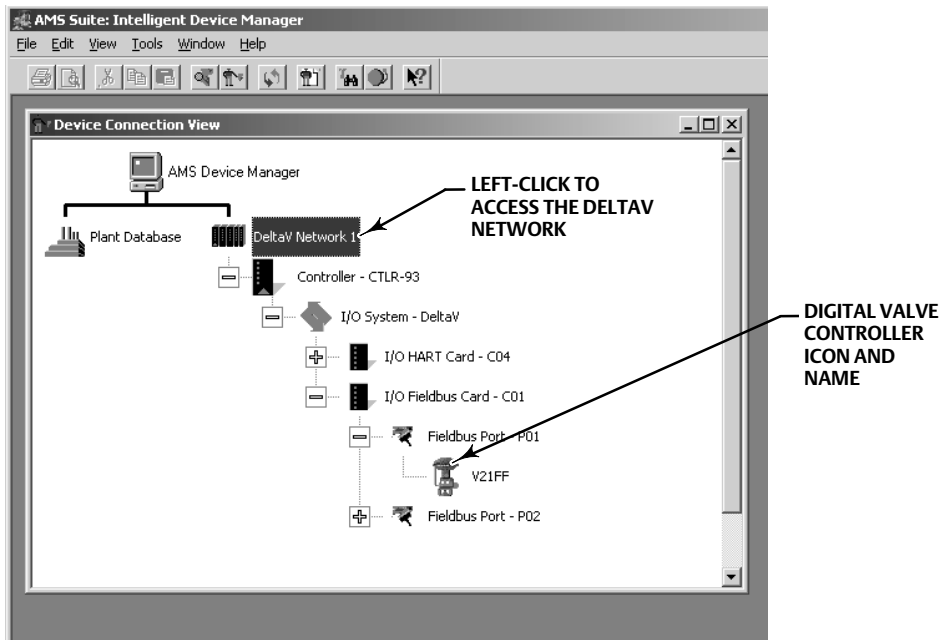
# Methods

## Transducer Block

The following methods are accessed via the transducer block: Device Setup, Auto Travel Calibration, Manual Travel Calibration, Supply Sensor Calibration, Output A Sensor Calibration, Output B Sensor Calibration, Travel Sensor Adjust, Stroke Valve, Performance Tuner, Stabilize/Optimize, and Relay Adjust.

Refer to figures F-1, F-2, and F-3 and the following steps to access these methods.

1. Start DeltaV Explorer by selecting DeltaV Explorer from the Start menu.

2. Locate the the digital valve controller icon in the All Containers pane (the left panel) and right-click once on the digital valve controller icon or name.

3. Locate Open with AMS Device Manager in the context menu and left-click to bring up the Device Connection View.

4. Navigate to the digital valve controller icon or name as shown in figure F-2 and left-click.

5. Locate Methods in the Actions menu, as shown in figure F-3 and right-click once.

6. Select the desired method from the the Actions menu and left-click to start the method.

## Resource Block

The Restart Options method and the DD Information method are available via the resource block. Refer to figure F-3 and the following steps to access these methods.

1. Start DeltaV Explorer by selecting DeltaV Explorer from the Start menu.

2. Locate the digital valve controller icon in the All Containers pane (the left panel) and right-click once on the digital valve controller icon or name.

3. Locate Open with AMS Device Manager in the context menu and left-click to bring up the Device Connection View.

4. Navigate to the digital valve controller icon or name as shown in figure F-2 and left-click.

5. Locate Methods in the Actions menu, as shown in figure F-3 and right-click once.

6. Select the desired method from the the Actions menu and left-click to start the method.

# Accessing Parameters

## Transducer Block

For detailed information on the parameters that are changed via the transducer block, refer to the Detailed Setup section of this manual. Refer to figures F-2, F-3, and F-4 for information on accessing transducer block parameters.

1. Start DeltaV Explorer by selecting DeltaV Explorer from the Start menu.

2. Locate the digital valve controller icon in the All Containers pane and right-click once on the digital valve controller icon or name.

3. Locate Open with AMS Device Manager in the context menu and left-click to bring up the Device Connection View.

4. Navigate to the digital valve controller icon or name as shown in figure F-2 and left-click.

5. Locate Configure/Setup in the Actions menu (see figure F-3) and left-click to access Configuration and Setup parameters.

6. Left-click on Digital Valve Controller (TRANSDUCER) to access the transducer block parameters. Refer to table F-1 for the transducer block configuration menu.

Figure F-3. Actions Menu

Figure F-4. Accessing Configure/Setup, Device Diagnostics, and Device Variables
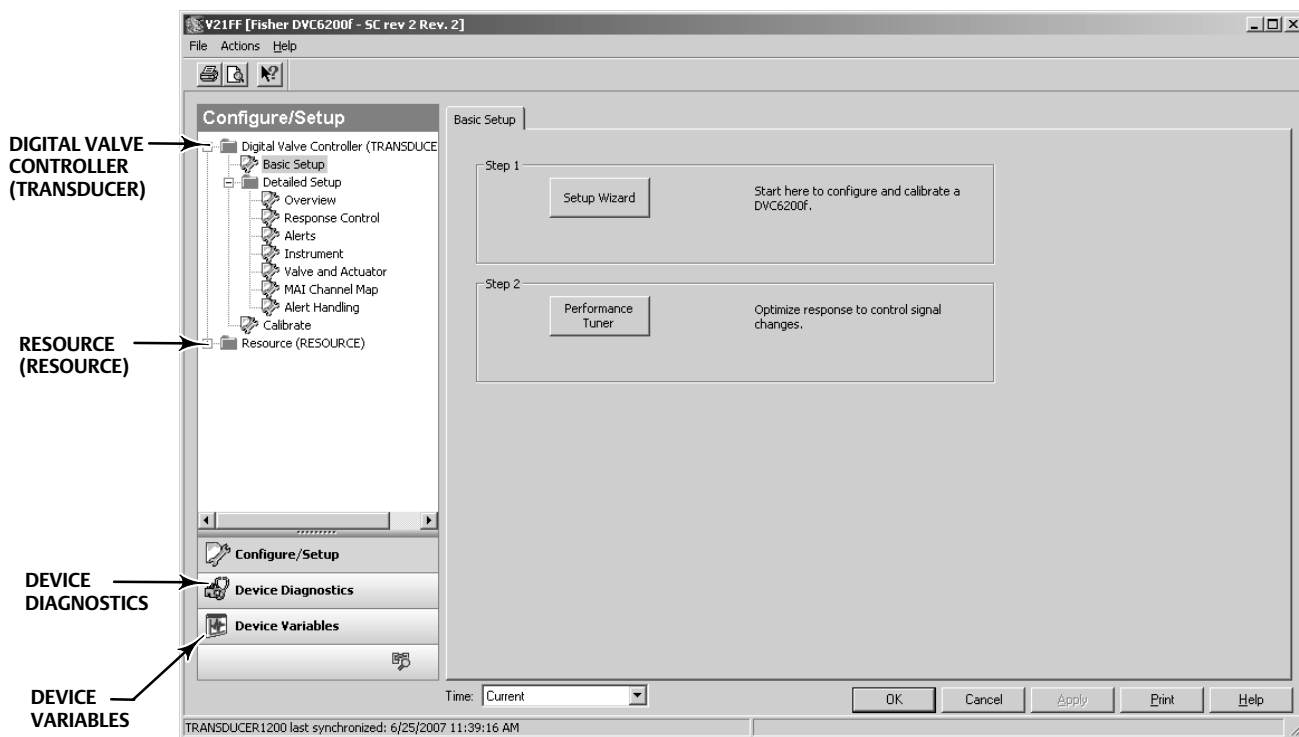


# Resource Block

For detailed information on the parameters that are changed via the resource block, refer to the Detailed Setup section of this manual. Refer to figures F-2, F-3, and F-4 for information on accessing resource block parameters.

1. Start DeltaV Explorer by selecting DeltaV Explorer from the Start menu.

2. Locate the digital valve controller icon in the All Containers pane and right-click once on the block icon or name.

3. Locate Open with AMS Device Manager in the context menu and left-click to bring up the Device Connection View.

4. Navigate to the digital valve controller icon or name as shown in figure F-2 and left-click.

5. Locate Configure/Setup in the Actions menu (see figure F-3) and left-click to access Configuration and Setup parameters.

6. Left-click on Resource (RESOURCE) to access the resource block parameters. Refer to table F-2 for the resource block configuration menu.

**Note**

To access diagnostic parameters left-click on Device Diagnostics, and then on Resource (RESOURCE). See figure F-4.

To access device variables left-click on Device Variables, and then on Resource (RESOURCE). See figure F-4.

# Bringing the Device On-Line

To completely configure the digital valve controller for use in a fieldbus loop, the following conditions must be met. Refer to DeltaV On-Line-Help or documentation for detailed information on accomplishing these steps.

1. A place holder must be created - a place holder is an electronic representation of the digital valve controller that exists in the DeltaV database with no associated physical device.

2. Device must be commissioned - Commissioning the device involves downloading applicable parameters from the device place holder to the physical device.

3. Any additional configuration that is required, such as setting alarms, cutoffs, and other resource block and transducer block parameters. See the Detailed Setup section of this manual.

4. Define the control strategy

5. Associate I/O to the digital valve controller.

6. The device is now ready to be downloaded.

# PlantWeb Alerts

Fieldbus devices detect and report their device alarms to a DeltaV system (or other host system). This includes detecting whether an alert condition is active, reporting the alarm to DeltaV and later clearing the alarm when the condition is no longer active. Whether a particular alert condition can be suppressed, disabled or configured off-line are all determined by the device.

For Fieldbus, the DeltaV system is responsible for knowing which devices have alarms, ensuring that alarms are properly represented (such as after controller switchovers) and reporting to operators, Event Chronicle, AMS, OPC Alarms and Events server, etc. So the only alarms DeltaV shows for a Fieldbus device are those the device has defined as alarms and has reported to DeltaV.

All device alarms are configured and processed in the DeltaV system identically to process alarms. This means that how the alarms are communicated within the system, what workstations are notified, alarm annunciation, graphical representations, event recording, acknowledgement, etc. are identical for process and device alarms. This ensures that device alarms and process alarms are available to all users and applications in a consistent fashion.

## Setting up PlantWeb Alerts

This section walks you through the steps and considerations to implement PlantWeb alerts.

### DeltaV Hardware and Software Requirements

The first step to implement PlantWeb alerts is to have the correct hardware and software:

- DeltaV v6.3 or later

- DeltaV Operate

- MD Controllers

- Fieldbus devices - While device alerts are supported on all fieldbus devices, devices that offer PlantWeb alerts provide significantly more useful information.

- Series 2 H1 cards

## Initial Device Setup

When new FF devices are commissioned on the DeltaV system, device alarms are automatically enabled and default priorities are assigned to the alarms. Select **properties** on the device, then the **Alarms and Displays** tab, as shown in figure F-5 to view whether device alarms are enabled on a particular device.

Figure F-5. Alarms & Display Tab
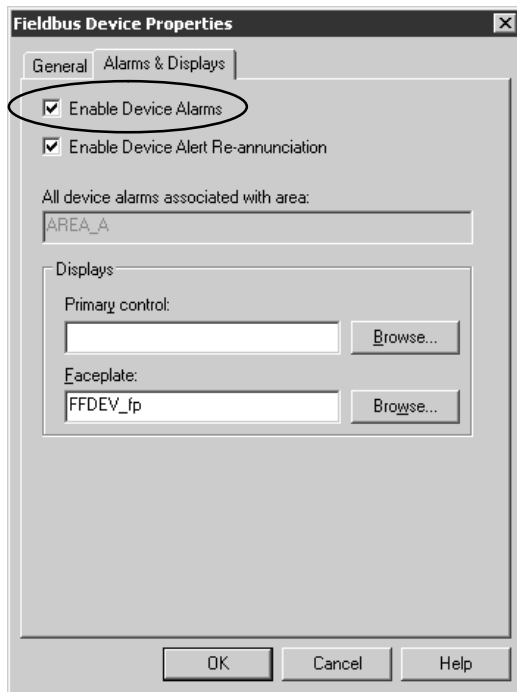


The Enable Device Alarms configuration option modifies the device configuration. Thus changing this setting requires a download to the device. Devices that are migrated from older DeltaV systems will have their device alarms disabled.

**Note**

1. Use the default setting of device alarms enabled. If the user does not want notification of device alarms, this can be configured on each individual alarm. Later on, you can modify the alarm configurations without downloading the device. Disabling device alarms disables all of the alarms, including the device communication failure alarm.

2. Use the same control display for the device as for the control module.

3. If you suspect a rogue device is generating extra H1 bus traffic from device alarms, disabling device alarms stops the device from sending the alarms.

4. If the Alarms and Displays tab is not shown, then you either do not have an MD controller or the device is on a Series 1 H1 card.

## Area Assignment

Controllers use this area assignment to report node status (e.g. not communicating). Devices and control modules use this area assignment to determine where to send their alarms.

Area A is the default area assignment for all controllers and workstations (see figures F-6 and F-7). Also, by default Area A is assigned to all workstations Alarms and Events subsystem. This means that all controller status problems are sent to *all* workstations by default.

Figure F-6. Controller Properties
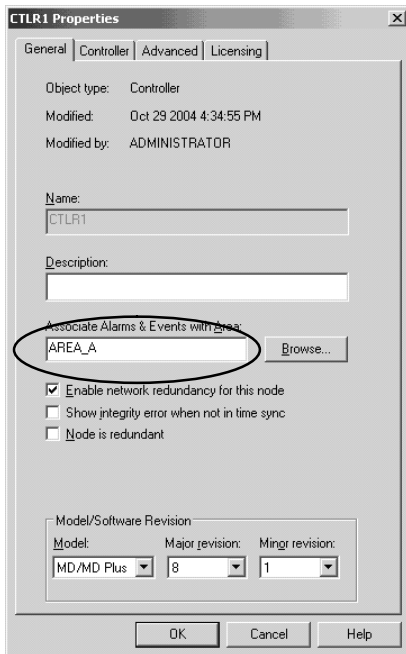


Figure F-7. Device Properties
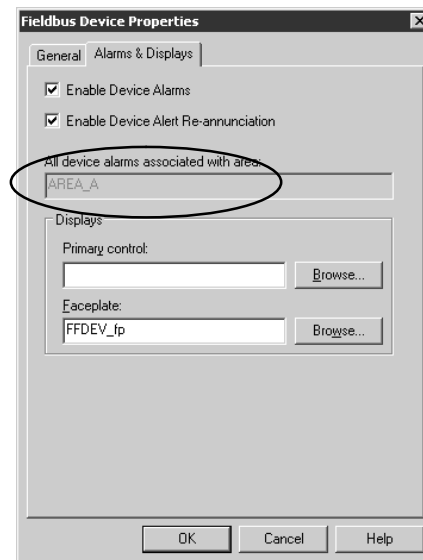


**The controller is assigned to Area A.** *A device that is NOT yet associated with a control module will default to the same area as the controller.*

A fieldbus device will change its area association once the device is configured to a control module. In addition, the device is assigned to the same place in the logical hierarchy as this control module. So if the control module is under a unit, the device is also considered under this same unit.

The device is automatically associated with the same area as the control module that uses the l*owest index number function block* in the device. This block is usually the primary input or output function block of the device. This ensures that wherever the control module is reporting information, all device information that may also be relevant is also reported.

___

**Note**

1. For devices with multiple inputs or outputs (such as the 848), you need to decide which area is best for device alarm reporting and be sure to assign the correct control module to the lowest index number function block. If there is no module assigned to this function block, then the device will always be assigned to the same area as the controller.

2. With controller area default of AREA A, and the default of AREA A being assigned to all workstations, you need to evaluate the alarm settings when commissioning a new fieldbus device with device alarms enabled. If the device detects a FAILED or COM FAIL alarm prior to being assigned to a control module, this device alarm will be reported and annunciated to all workstations. This is

because all workstations have Area A assigned. Consider lowering the priority of these alarms to ADVISORY until the end of the commissioning process.

## Reporting Alarms and Events to a Workstation

Device alarm and event reporting is no different than control module reporting. Alarm and event reporting to workstations is determined by assigning areas to workstations. The workstation area assignment is all you need to do to ensure that you have all of the information (device and process) for that area.

This is important so that ALL of the information about an area -- both the process and device information -- is available at any workstation that is responsible for that area. That way the Event Chronicle has a complete record for that area, and any user can drill into a graphic or tag and access all of the information.

This DOES NOT determine WHO views the device alarms. Who views the alarms is determined by filtering at each workstation.

Now that all of the device (and process) information is assigned to a workstation, the next step is to decide what priority of device and process alarms cause alarm annunciation to the users on that workstation.

## Setting up WHO Sees Device Alarms

The priority of the alarms, and the settings at that workstation determine what alarms are annunciated on a particular workstation. Annunciated means sound the horn and shown in the alarm banner, Alarm List display, etc.

There are two different approaches that can be used to adjust the device alarm filtering for a particular workstation:

● Adjust the default DeltaV Operate alarm settings in the UserRef/UserSettings file

● Adjust the individual device alarm priorities

By default, DeltaV Operator Stations have all process alarms are annunciated, and show up on the Alarm Banner, Alarm List, graphical displays, etc. on all operator workstations. Also by default, the device alarms with priority settings below WARNING (8) are NOT annunciated or shown in the alarm banner. The low priority device alarms can be shown in graphics and on summaries defined to not be limited by the alarm settings.

The DeltaV Maintenance Station uses the same DeltaV Operate alarm setting for device alarm annunciation. This license only shows device alarms on Maintenance Station graphics. NO process alarms are shown in the alarm banner or ANY alarm summary.

*Thus, device alarms and process alarms can be either combined and/or separated for specific user installations, based on their operating philosophy.*

## Setting DeltaV Operate Device Alarm Annunciation Defaults

DeltaV Operate has default settings in the UserRef.grf file for what priority of device alarms will annunciate and show in the alarm banner. The default DeltaV Operate alarm settings annunciate device alarms that are of the priority WARNING (8) or higher. Device alarms below this priority will not sound the horn or show up in the alarm banner.

Operator Station displays can be configured to show any alarms reporting to that workstation. Along with typical display configuration, alarm summaries can be configured to display alarms that match the alarm banner settings, or user specified ranges. The standard AlarmSum display is configured to show all alarms reporting to that workstation (see figure F-8).

Figure F-8. DeltaV Alarm Summary Configuration
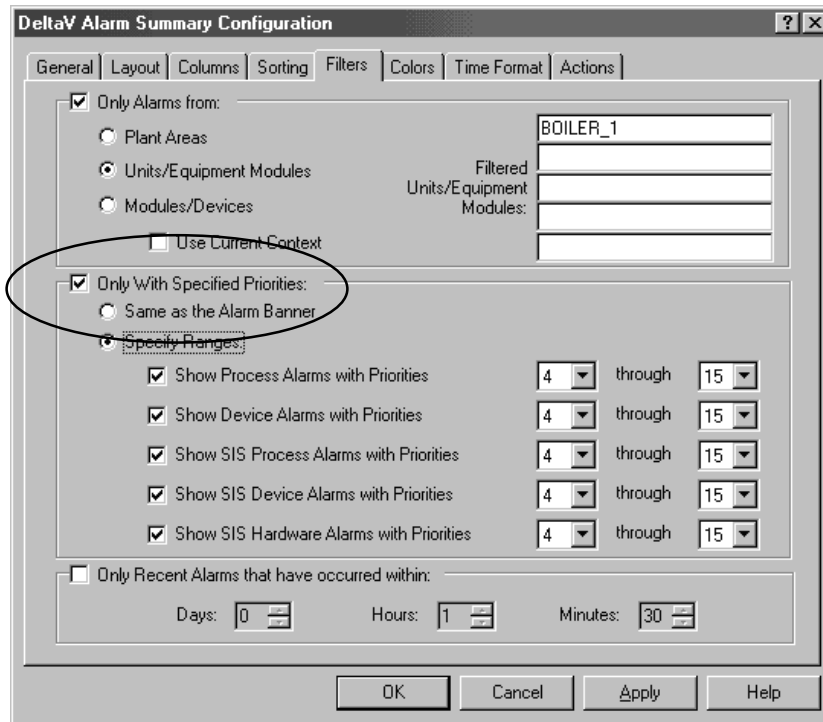


**Each display alarm summary can be configured to match the alarm banner or be uniquely defined.**

**Note**

If you think you should be seeing a device alarm in the alarm banner and it is not there, verify that the device is shown on the AlarmSum display. This display shows ALL of the alarms reporting to that workstation, regardless of the device alarm annunciation settings. If the device is not shown in this display, then it is not reporting to this workstation (or the logged on user does not have responsibility for that area).

The default for device alarm annunciation (sounds the horn and shown in the alarm banner) can be modified for all operator/maintenance stations. Or unique settings can be defined for specific workstations. Use the workstation name to adjust settings for specific workstations in UserSettings.grf.

For example, if an installation has a Maintenance Station named 'MAINT', then the UserRef.grf (then renamed to UserSettings.grf) would contain alarm settings for the MAINT workstation as appropriate for maintenance (e.g. all device alarms in the alarm banner).

**Note**

To easily find the device alarm configuration in UserRef or UserSettings, open the display in the Standard directory, right click and select EDIT SCRIPT, then select Edit, Find and type in DEVICE. This will take you to the location in the file with the device alarm settings.

## Deciding Device Alarm Priorities

Each device alarm, just like every process alarm, has a priority assigned to it. When a device is created, the device alarms are assigned default alarm priorities as shown in figure F-9.

Figure F-9. Default PlantWeb Alert Priorities



**The priority of a device alarm defines whether the alarm is annunciated on a particular workstation, in addition to the color of the alarm and the horn sound.**

The DeltaV workstation default is to annunciate device alarms above the ADVISORY (7) priority.

Therefore, by default both the FAILED and COMM PlantWeb alerts annunciate to the operator.

The priority of each alarm needs to be considered. The priority of a device alarm is determined by how important that device problem is and the consequences to the process.

The priority is not based solely on the type of device. This means that while some DVC6200f's may be critical to operation, other DVC6200f's may not. In this example, the DVC6200f's would have different default alarm priorities.

**Note**

1. If your installation has the Fieldbus devices, but is not ready to use PlantWeb alerts, then you can disable the individual alarms at the device - or through the System Alarm Management application. Later on, individual alarms can be enabled without having to download the device.

2. When you first begin to use device alarms, be sure that your alarm priority settings for the workstations or the individual device alarm priorities are such that they don't cause undue operator burden. This could mean only having a few device alarms set at WARNING or above, or changing the DeltaV Operate default such that only CRITICAL device alarms (or even perhaps NO device alarms annunciate to the operator).

3. DO NOT enable *ALL* of the PlantWeb alerts in a device. Only enable the alerts that are needed.

# Glossary

### Algorithm
A set of logical steps to solve a problem or accomplish a task. A computer program contains one or more algorithms.

### Alphanumeric
Consisting of letters and numbers.

### ANSI (acronym)
The acronym ANSI stands for the American National Standards Institute

### ANSI Class
Valve pressure/temperature rating.

### Bench Set
Pressure, supplied to an actuator, required to drive the actuator through rated valve travel. Expressed in pounds per square inch.

### Byte
A unit of binary digits (bits). A byte consists of eight bits.

### Configuration
Stored instructions and operating parameters for a FIELDVUE Instrument.

### Control Loop
An arrangement of physical and electronic components for process control. The electronic components of the loop continuously measure one or more aspects of the process, then alter those aspects as necessary to achieve a desired process condition. A simple control loop measures only one variable. More sophisticated control loops measure many variables and maintain specified relationships among those variables.

### Controller
A device that operates automatically to regulate a controlled variable.

### Deadband
Region around a reference point that must be exceeded before a new event occurs.

### Deviation
Usually, the difference between set point and process variable. More generally, any departure from a desired or expected value or pattern.

### Device ID
Unique identifier embedded in the instrument at the factory.

### Drive Signal
The signal to the I/P converter from the printed wiring board. It is the percentage of the total microprocessor effort needed to drive the valve fully open. In most applications, drive signal ranges from 55% to 75%.

### Feedback Arm
The mechanical connection between the valve stem linkage and the FIELDVUE Instrument travel sensor.

### Feedback Signal
Indicates to the instrument the actual position of the valve. The travel sensor provides the feedback signal to the instrument printed wiring board assembly. A mechanical linkage connects the travel sensor to the valve stem or shaft.

### Firmware
The combination of a hardware device and computer instructions and data that reside as read-only software on that device.

---

**Note**

1. This term (firmware) is sometimes used to refer only to the hardware device or only to the computer instructions or data, but these meanings are deprecated.

2. The confusion surrounding this term has led some to suggest that it be avoided altogether. The term is included here because of its use in older documentation and culture.

---

## Gain

The ratio of output change to input change.

## Hardware Revision

Revision number of the Fisher instrument hardware. The physical components of the instrument are defined as the hardware.

## Instrument Level

Determines the functions available for the instrument.

## Leak Class

Defines the allowable leakage by a valve when it is closed. Leak class numbers are listed in two standards: ANSI/FCI 70-2 and IEC 534-4.

## Linearity, dynamic

Linearity (independent) is the maximum deviation from a straight line best fit to the opening and closing curves and a line representing the average value of those curves.

## Memory

A type of semiconductor used for storing programs or data. FIELDVUE instruments use three types of memory: Random Access Memory (RAM), Read Only Memory (ROM), and Non-Volatile Memory (NVM).

## Non-Volatile Memory (NVM)

A type of semiconductor memory that retains its contents even though power is disconnected. NVM contents can be changed during configuration unlike ROM which can be changed only at time of instrument manufacture. NVM stores configuration restart data.

## Octet

See byte

## Parallel

Simultaneous: said of data transmission on two or more channels at the same time.

## Pressure Sensor

A FIELDVUE instrument internal device that senses the output pressure from the pneumatic relay.

## Random Access Memory (RAM)

A type of semiconductor memory that is normally used by the microprocessor during normal operation that permits rapid retrieval and storage of programs and data. See also Read Only Memory (ROM) and Non-Volatile Memory (NVM).

## Rate

Amount of change in output proportional to the rate of change in input.

## Read-Only Memory (ROM)

A memory in which information is stored at the time of instrument manufacture. You can examine but not change ROM contents.

## Seat Load

Force exerted on the valve seat, typically expressed in pounds force per lineal inch of port circumference. Seat load is determined by shutoff requirements.

## Software

Computer programs, procedures, and possibly associated documentation and data pertaining to the operation of a computer system.

## Temperature Sensor

A device within the FIELDVUE instrument that measures the instrument's internal temperature.

## Travel

Movement of the valve stem or shaft which changes the amount the valve is open or closed.

## Travel Sensor

A device within the FIELDVUE instrument that senses valve stem or shaft movement. The travel sensor in the DVC6200f is the Hall Effect sensor that measures the position of the magnet assembly.

## Travel Sensor Motion

Increasing or decreasing air pressure causes the magnet assembly to move up or down or the rotary shaft to turn clockwise or counterclockwise. Device Setup asks if it can move the valve to determine travel.

## Tuning

The adjustment of control terms or parameter values to produce a desired control effect.

## Tuning Set

Preset values that identify gain and rate settings for a FIELDVUE instrument. The tuning set and supply pressure together determine an instrument's response to input signal changes.

## Watch Dog Timer

A timer that the microprocessor must pulse periodically. If the microprocessor is unable to pulse the timer, the instrument shuts down.

## Zero Power Condition

The position of the valve (open or closed) when the electrical segment power to the instrument is removed. Zero Power Condition (ZPC) is determined by relay and actuator action where: for Relay A and C, Port A will be at atmosphere pressure, and if double-acting, Port B will be at supply pressure. For Relay B, Port B will be at supply pressure.

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