

Understanding the Features

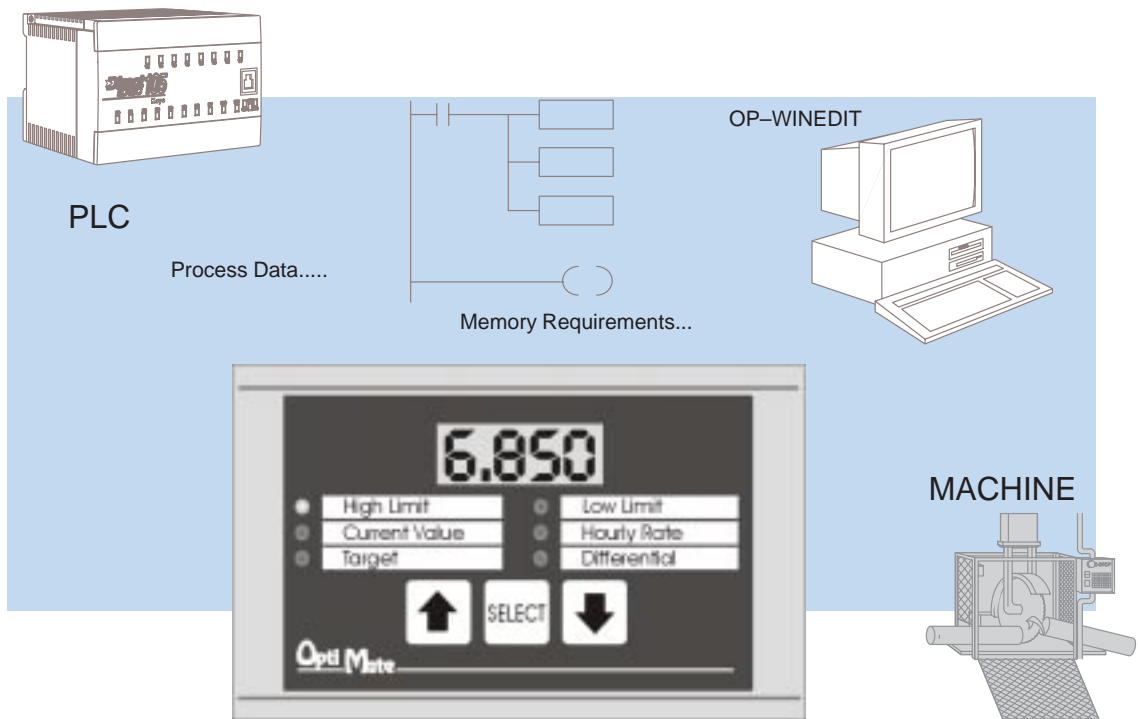
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- Learning the Features
 - Display and Setpoint Operations
 - Numerical Data Types
 - Decimal Point
 - PLC Registers
 - *Direct*LOGIC User Memory Overview
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Learning the Features

In this section, the subject of how to use the OP-413 features is described. We recommend that you study this chapter before attempting to configure and use the OP-panel. As you proceed through this chapter, relate the topics discussed with how your operator panel may be implemented. The concepts discussed in this chapter are applicable to all PLCs.

- Display and Setpoint Operations
- Numeric Data Types
- Decimal Point
- PLC Registers
- User Memory Overview

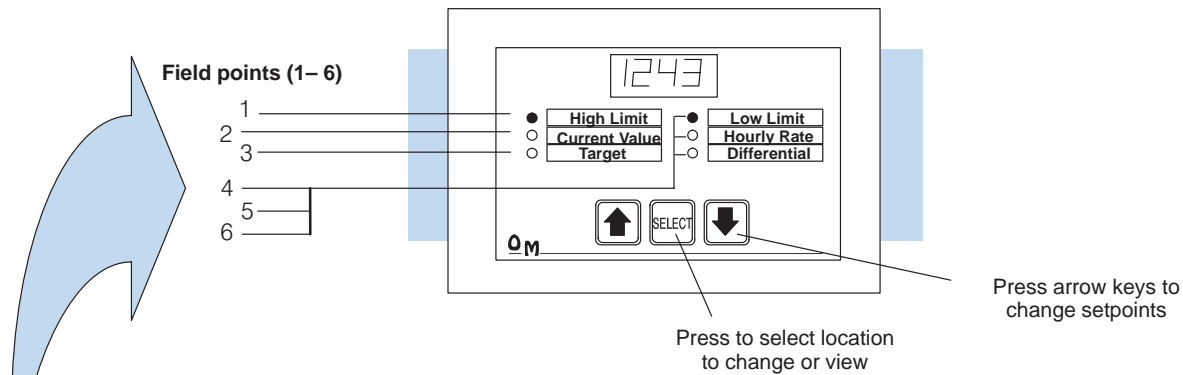


Display and Setpoint Operations

Display and Setpoint Data

The OP-413 has six LEDs with a label for each one. Each LED (with its label) refers to a user-defined field point. These field points are actually memory locations in the PLC where data is stored. You can make a field point a read only location—in which case, we refer to it as **display data**. Or you can designate a field point to store **setpoint data**—in which case, the field point is a read/write location. The panel allows you to either read the display data or read and write the setpoint data. When an LED is on, the corresponding field point (in the PLC) is displayed on the panel. Look at the illustrated example below.

Pressing the <SELECT> key scrolls through the field points, turning the LED on and displaying the data from the PLC. If you move to a label whose field point has been configured as **setpoint data**, then you can use the UP or DOWN ARROWS to change the value shown in the window. However, the UP or DOWN ARROWS have no effect on field points that have been configured as **display data**.



OP-413 Panel PLC Register Map

PLC Registers are mapped to Field points (1- 6)

PLC Register	Register Function
M+0	Field point 1 data cell
M+1	Field point 2 data cell
M+2	Field point 3 data cell
M+3	Field point 4 data cell
M+4	Field point 5 data cell
M+5	Field point 6 data cell
M+6	Field point force data cell
M+7	Force control

Reading or Writing a Setpoint

Setpoint data is continually and transparently written to the associated PLC register(s). To access and use the setpoint data, reference the relevant PLC register(s) (M+0 through M+5) in your PLC program.

Reading a Display Point

When a value is written to a PLC register (M+0 through M+5) designated as display data, the OP-413 automatically retrieves and displays the data.



NOTE: The OP-413 can read and write setpoint data, but can only read display data.

Forcing a Setpoint

There are times when it is necessary for the PLC program to initialize or override a setpoint. The capability to do so is provided as the Force Setpoint function.

To force a setpoint to a given value, place the value in register M+6. Next, set the bit(s) FP1-FP6 corresponding to the setpoint(s) to be forced and set the FSP bit. Once the OP-413 has forced the setpoint(s) to the required value, it will clear registers M+6 and M+7.



NOTE: If the Force Setpoint option is not selected in the OP-WINEDIT configuration software, then setpoints cannot be forced and registers M+6 and M+7 cannot be used.

Numeric Data Types

There are two types of data that the OP-413 can display: BCD and Binary.

BCD Data

BCD data has a value range of 0-9999.

To display a BCD number, place the number into the field point data cell. To read a setpoint BCD value, the OP-413 continuously places digits into the corresponding field point data cell. Simply reference the register in your PLC program to use the setpoint value.

For example, if the displayed value or the setpoint value is 5678, then the PLC register will display the following (shown in BCD/Hex format):

BCD Data	PLC Register
Field point data cell	5678

Binary Data

Binary data has a range of 0 – 256 (0 – FF in Hex format).

To display a Binary number in a display point, simply place the Binary value in the appropriate data cell.

To read a Binary setpoint value, reference the PLC register in your PLC program. For example, if the displayed value or the setpoint value is 40500, the PLC register will display the following (shown in BCD/Hex format):

Binary Data	PLC Register
Field point data cell	9E34

Decimal Point

The number of digits displayed after the decimal point is configured in the OP-WINEDIT Configuration Software. The decimal point location is configured separately for each field point.

The decimal point is for displaying purposes only and cannot be changed by or written to a PLC register for use in the PLC program. Once configured, it is fixed and can only be changed by reconfiguring the OP-413.

For BCD numbers, the number of digits that can be displayed after the decimal varies from 0 to 3.

For Binary numbers, the number of digits that can be displayed after the decimal varies from 0 to 3 but the highest number that can be displayed is 256 (that is, 0.256).

PLC Registers

PLC Register Overview

The OP400 panels communicate to the PLC through user defined PLC data registers. The starting or “Base” register is assigned during panel configuration and automatically occupies eight consecutive 16-bit data registers. In this manual the registers are identified as M+0, M+1, M+2, thru M+7. Force control register M+7 contains bit-of-word information to force a setpoint to a specified value. The term PLC register is used for the area of memory within the PLC used for data exchange with the OP-413. PLC registers (addresses) are sometimes known as data registers, internal registers or 16-bit (word) addresses.

PLC Register Map

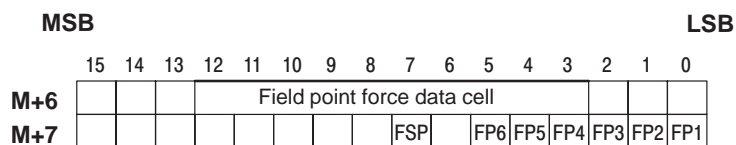
The OP-413 uses a bank of 8 contiguous PLC registers. The register set is shown in the table below.

OP-413 Panel PLC Register Map

PLC Register	Register Function
M+0	Field point 1 data cell
M+1	Field point 2 data cell
M+2	Field point 3 data cell
M+3	Field point 4 data cell
M+4	Field point 5 data cell
M+5	Field point 6 data cell
M+6	Field point force data cell
M+7	Force control

Force Control Registers

Force Control Registers



Register Definition The following describes the function of each of the registers shown in the table.

- **Register M+0**– Field point 1 data. Either setpoint or display, as configured. Numeric data is either a Binary or BCD value.
- **Register M+1** – Field point 2 data.
- **Register M+2** – Field point 3 data.
- **Register M+3** – Field point 4 data.
- **Register M+4** – Field point 5 data.
- **Register M+5** – Field point 6 data.
- **Register M+6** – Field point force data. Value to force setpoint equal to when force operation is initiated by the PLC program.
- **Register M+7** – Force control. Controls the forcing of setpoints.
 - > **FSP** bit: When set, the field point force data (M+6) will be forced into the field points that are set to be forced selected by FP1–FP6. Once the force is finished, the OP-413 will clear M+6 and M+7.
 - > **FP1–FP6** bits: Identifies the setpoints to be forced.

PLC Register Assignment Examples

Examine the address conventions for *Automationdirect (DirectLOGIC)* and Allen-Bradley. For example, the *DirectLOGIC* address references are **octal**, and the Allen-Bradley's are **decimal**. The *DirectLOGIC* DL05/DL105/DL205/D3-350/DL405 OP-panel address uses V-memory registers which are 16-bit registers. The DL305 family uses reference assignments with 8-bit registers. This means that the DL305 will require sixteen 8 bit registers for data handling. The Allen-Bradley memory is defined with a reference (**Nx**) which represents the memory area, and (**:n**) which defines the word within the memory area. Please refer to the appropriate CPU User manual for the PLC product you are using.

DirectLOGIC DL05/DL105/DL205/D3-350/DL405

Example Address		Function
V2000	M+0	Field point 1 data cell
V2001	M+1	Field point 2 data cell
V2002	M+2	Field point 3 data cell
V2003	M+3	Field point 4 data cell
V2004	M+4	Field point 5 data cell
V2005	M+5	Field point 6 data cell
V2006	M+6	Field point force data cell
V2007	M+7	Force control

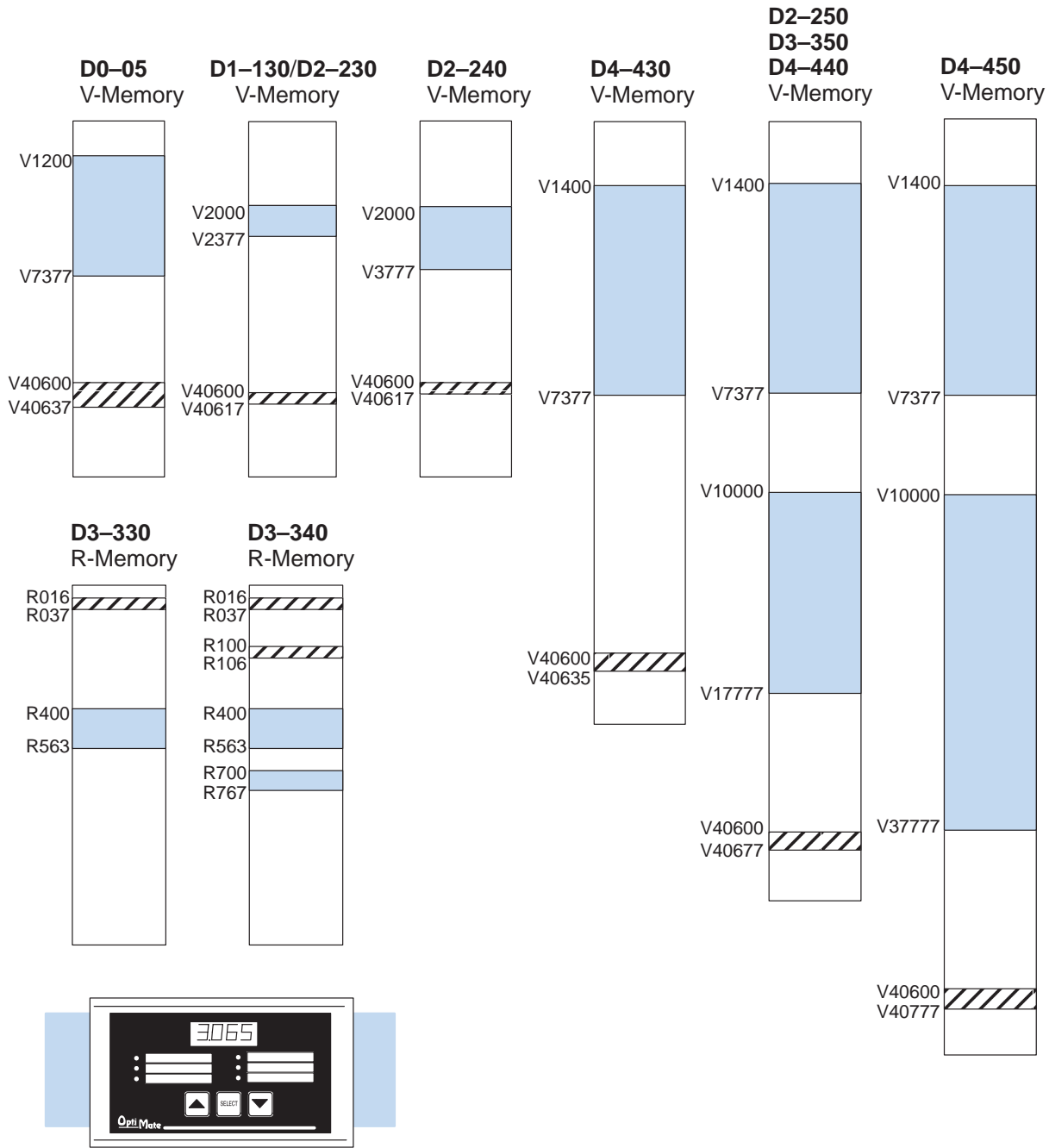
DirectLOGIC DL305 (D3-330 & D3-340)

Example Address		Function
R400/R401	M+0	Field point 1 data cell
R402/R403	M+1	Field point 2 data cell
R404/R405	M+2	Field point 3 data cell
R406/R407	M+3	Field point 4 data cell
R410/R411	M+4	Field point 5 data cell
R412/R413	M+5	Field point 6 data cell
R414/R415	M+6	Field point force data cell
R416/R417	M+7	Force control

Allen-Bradley SLC 5/03, 5/04 and Micrologix

Example Address		Function
N7:0	M+0	Field point 1 data cell
N7:1	M+1	Field point 2 data cell
N7:2	M+2	Field point 3 data cell
N7:3	M+3	Field point 4 data cell
N7:4	M+4	Field point 5 data cell
N7:5	M+5	Field point 6 data cell
N7:6	M+6	Field point force data cell
N7:7	M+7	Force control

DirectLOGIC User Memory Overview



- User Data Space available for OP-panels
- Internal Relay Memory

DirectLOGIC PLCs use octal addressing, as indicated by the shaded areas.

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