IQ 700

Digital Weight Indicator

Installation Manual

RICE LAKE WEIGHING SYSTEMS
Industrial Solutions on a Global Scale®

ISO 9001 REGISTERED

16821

Contents

About This Manual 1

1.0 Introduction 1

1.1 Front Panel Keypad and Annunciators 2

2.0 Installation and Wiring 4

2.1 Unpacking and Assembly 4
2.2 Enclosure Disassembly 4
2.3 Cable Connections 4
2.4 Power Connections 4
2.4.1 AC Units 4
2.4.2 VAC Conversion 4
2.5 Board Removal 5
2.6 Replacement Parts 5
2.7 Instrumentation Setup 5
2.8 Load Cell Wiring 6
2.9 Standard Surge Protection Board 7
2.10 Serial Port Wiring 8
2.10.1 Serial Port #1 Wiring: CPU KGR8924–1 9
2.10.2 Serial Port #2 Wiring: CPU KGR8924–1 10
2.11 Digital I/O Wiring 10

3.0 Configuration 12

3.1 Digital Configuration 12
3.1.1 Parameter Overview 12
3.1.2 Configuration Procedure 12
3.1.3 Digital Configuration Parameters 12
3.1.4 Normal Configuration Setup Parameters 18
3.2 Serial Configuration 19

4.0 Options Configuration 21

4.1 Option 1 – Expanded Resolution 22
4.2 Option 2 – Analog Output Option 23
4.2.1 Specifications 23
4.2.2 Test Modes 23
4.2.3 Error Checking 23
4.2.4 Communication Verification 23
4.2.5 Analog Wiring to Host Indicator 26
4.2.6 Analog Module Serial Pass-Through 26
4.3 Option 3 – Time and Date 27
4.4 Option 4 – Accumulator 28
4.5 Option 5 – Expanded Serial Communications 29
4.6 Option 6 – Linear Calibration 31
4.7 Option 7 – Serial I/O 32
4.7.1 Customizing Files 32
4.7.2 Macro File Setup 34
4.7.3 Standard Serial Configuration 35
4.7.4 Option 7 Configuration 35
4.8 Option 8 – Analog Output/Relay Option 37
4.8.1 Analog Output Option Wiring 37
4.9 Option 9 – Front Panel Key Lockout Option 38

4.10 Option 10 – Setpoints 39
4.11 Option 11 – Remote Input Option 39
4.12 Additional Options 40
4.12.1 Relay Output Board KHL8924 40
4.12.2 Relay Output/Input Board (KJN8924–) 42
4.12.3 Serial Command Option Parameters 45
5.0 Calibration 46
5.1 Zero Calibration 46
5.2 Single Slope Span Calibration 46
5.3 Five-Point Linear Calibration 47
6.0 Normal Weighing Mode Operations 48
6.1 Display Test 48
6.1.1 Display Check 48
6.1.2 EPROM Verification 48
6.2 LED Annunciators 48
6.3 Function Keys 48
6.4 Gross/Tare/Net Weighing Operations 48
6.4.1 Display Mode on Power Up 48
6.4.2 ZERO Key Function 48
6.4.3 TARE Key Function 49
6.4.4 Overload and Underrange Conditions 49
6.5 Fixed Tare Entry 49
6.5.1 Lb/Kg Conversion 49
6.6 Serial Output 50
6.6.1 Serial Data Formats 50
6.6.2 Demand Mode versus Continuous Data Output 51
6.6.3 Demand Print with Identification Number 51
6.7 Truck Weighing Mode 52
7.0 Setpoints 54
8.0 Optional and Advanced Features 61
8.1 Expanded Serial Communications 61
8.1.1 Demand Output Serial Data Format 61
8.1.2 Continuous Condec Output Serial Data Format 62
8.1.3 RS485 Data Formats 62
8.1.4 Port 1 Remote Serial Commands 63
8.1.5 Full Duplex Parameter Entry/Recall 64
8.2 Delay Demand Print 64
8.3 Battery Option 64
9.0 Appendix 65
9.1 ASCII Character Chart 65
9.2 Parameter Control Code Chart 66
9.3 Display and Error Messages 66
9.4 Specifications 67
IQ 700 Limited Warranty 69

About This Manual

The IQ 700 indicator represents the latest in state-of-the-art microprocessor technology specifically applied to the weighing marketplace. This manual provides information on installation, calibration, configuration, and operation of the IQ 700.

Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at **www.rlws.com**.

1.0 Introduction

The IQ 700 is a single-channel digital weight indicator designed to operate in a wide variety of scale and weighing applications. The indicator is housed in a NEMA 4X stainless steel sealed case. The standard unit is equipped with a tilt stand base for tabletop or wall mounting applications. The indicator front panel consists of a 21-button keypad, six seven-segment display digits, and six LED annunciators (see Figure 1-1 on page 2).

Features of the IQ 700 include:

- Full front panel digital configuration and calibration.
- Zero and span temperature compensation to ensure compliance with NTEP and Canadian temperature range requirements (–10 to 40°C).
- Nonvolatile memory stores data for calibration, temperature compensation, configuration parameters, auto or fixed tare values, PAZ and AZM values, and setpoint values.
- 10,000 displayed graduations in legal-for-trade applications; 80,000 displayed graduation in non-legal-for-trade, process weighing applications.

NOTE: *Use of more than 20,000 graduations may cause undesirable display instability in some applications.*

- Analog sensitivity to 0.3 μV/grad at 20,000 graduations.
- Ten updates per second, with selectable digital averaging and auto averaging; 5 Hz active analog filter for smooth response.
- Excitation for eight 350Ω load cells at 10VDC.
- Time and date print selection.

1.1 Front Panel Keypad and Annunciators

Figure 1-1 shows the IQ 700 front panel. The IQ 700 display consist of six seven-segment display digits. Table 1-1 lists the front panel keys and their functions.

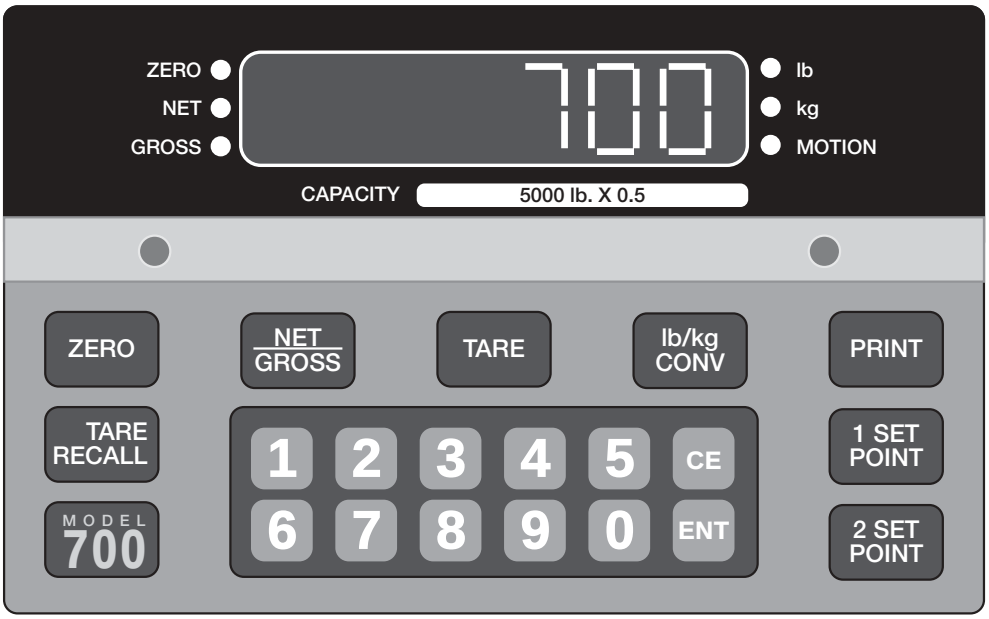


Figure 1-1. IQ 700 Front Panel

Panel Key	Function
ZERO	Provides push-button auto zero (PAZ) over ±1.9% or 100% full scale capacity. Operates only in gross weighing mode.
GROSS/NET	Switches the unit between gross and net weighing modes.
TARE	Provides push-button tare entry over 100% of scale capacity. Pressing **TARE** key switches to net mode and enters tare.
PRINT	Provides a manual print function if unit is wired to serial printer or other data device. Also initiates truck in/out weighing function if that feature is enabled. See Section 4.7 on page 31 for serial output specifications.
lb/kg CONV	Switches the displayed weight unit between pounds and kilograms.
TARE RECALL	Press to recall tare value; LED annunciator lit when tare value is displayed. Also used as ID RECALL in truck weighing mode and recalls total value when the totalizer option is enabled.
ON/OFF MODEL 700	Provides power to the indicator. NOTE: *On AC units, the ON/OFF switch is replaced by the Model 700 which becomes a start key in setpoint batching modes.*
SETPOINT 1 & 2	Push to enter or recall associated setpoint values.
0–9, CE, ENT	Numeric keyboard for entry of manual tare, setpoint values, and calibration data. **CE** (Clear Entry) and **ENT** (Enter) keys.

Table 1-1. Front Panel Key Functions

Table 1-2 summarizes the front panel annunciator functions.

Annunciator	Function
ZERO	On when scale weight is within ±0.25 displayed graduations of zero. Used in gross or net weighing mode.
NET	On when the indicator is in net weighing mode.
GROSS	On when the indicator is in gross weighing mode.
lb/kg	lb or kg LED is lit to show the current displayed weight units.
MOTION	On when scale is in motion.
1 SETPOINT 2 SETPOINT	On when the appropriate setpoint is energized or are flashing when the appropriate setpoint is recalled on the display.
TARE RECALL	Part of the TARE RECALL key, LED flashes when tare value is displayed.

Table 1-2. Front Panel Annunciators

2.0 Installation and Wiring

This section describes the procedures for connecting load cell and serial communications cables to the IQ 700 indicator. Instructions for CPU board replacement are included, along with assembly drawings and parts list for the service technician.

Caution *Use a wrist strap to ground youself and protect components from electrostatic discharge (ESD) when working inside the indicator.*

2.1 Unpacking and Assembly

All indicators are configured and tested prior to shipment to ensure that they are fully functional.

Immediately after unpacking, visually inspect the IQ 700 to ensure all components are included and undamaged. The shipping carton should contain the indicator with attached tilt stand, this manual, and a parts kit. If any parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

2.2 Enclosure Disassembly

The indicator enclosure consists of a load cell connector and cord grips for communication cables. The enclosure must be opened to connect the communication cables.

Warning *The IQ 700 has no on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.*

Ensure power to the indicator is disconnected then remove the screws that hold the enclosure body. Place the indicator face-down on an antistatic work mat, then lift the enclosure away from the front bezel. Set the enclosure aside.

2.3 Cable Connections

The IQ 700 provides a load cell connector and three cord grips for cabling into the indicator; one for the power, two to accomodate communications, digital input, and analog output cables.

One of the two free cord grips comes with a plug installed to prevent moisture from entering the enclosure. Depending on your application, remove the plug from the appropriate cord grip and install cables as required.

Figure 2-1 shows the recommended assignments for the IQ 700.

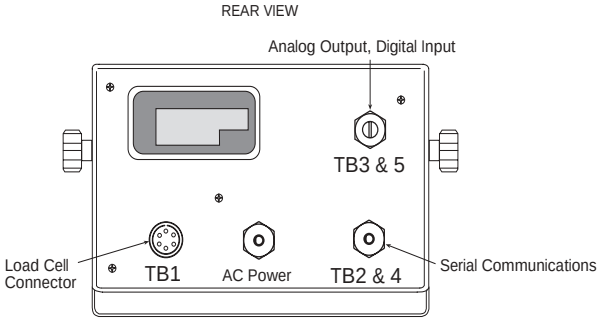


Figure 2-1. IQ 700 Backplate

2.4 Power Connections

Standard units are powered by either 115 or 230 VAC volts or by optional battery pack.

2.4.1 AC Units

Units are powered by standard AC power. The AC power cord must be plugged into a 3-prong grounded AC wall socket.

2.4.2 VAC Conversion

The IQ 700 can be converted from 115VAC to 230VAC. The following steps are necessary to complete this conversion.

Warning *Before beginning, disconnect the AC power source. Failure to do so can result in injury or death.*

1. Disconnect the power source from the unit.
2. Remove rear outer case of the IQ 700.
3. Remove the rear connector bracket, remove the four corner screws from the standoffs, then remove the four screws from the corners of the CPU board.
4. Remove the CPU assembly.
5. Remove the protective insulator panel from the solder side of the CPU board.

6. Cut circuit traces between E7/E8 and E9/E10 as indicated with a sharp instrument like a razor blade or an X-acto® knife. Refer to Figure 2-2.

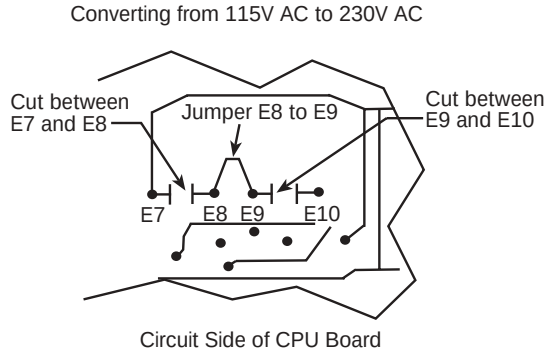


Figure 2-2. Circuit Trace Setup

7. Add jumper, E8 to E9 using a properly insulated wire with a minimum size of #22 AWG.
8. Replace the protective insulator panel.
9. Change the power cord.
10. Reassemble the unit, test, and label unit for 230VAC.

2.5 Board Removal

If you must remove the IQ 700 CPU board, use the following procedure:

1. Disconnect power to the indicator. Loosen cord grips and remove enclosure as described in Section 2.2.
2. Unplug all connections to the CPU board.
3. Remove the four corner screws from the standoffs.
4. Remove the four screws from the corners of the CPU board.
5. Remove the CPU board from the enclosure.

To replace the CPU board, reverse the procedure. Be sure to reinstall cable ties to secure all cables inside the indicator enclosure. Replace the enclosure and torque screws.

2.6 Replacement Parts

Table 2-1 lists the replacement parts for the IQ 700.

19571	AC CPU RFI assembly
19573	LED display board
19574	21-keyboard assembly
19404	Overlay
19600	LCD display board

Table 2-1. IQ 700 Replacement Parts

2.7 Instrumentation Setup

The IQ 700 operates with the EPROM program KDA1921-1(27C512). To verify the program installed in the indicator, turn on the indicator and observe the displayed value at the EP prompt (see Figure 2-3). The EP prompt displays the family, set, and version level of the installed EPROM.

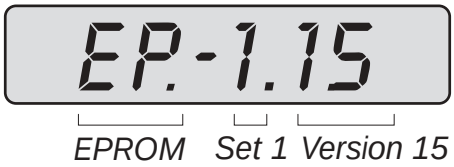


Figure 2-3. EPROM Display

To ensure that the IQ 700 is in proper operating condition, the indicator can be tested with a load cell simulator. The input signal should be as close as possible to the normal system millivolt value. Figure 2-4 shows the simulator-to-indicator wiring connection in a six-wire configuration. See Section 2.8 on page 6 for more information.

NOTE: *Six-wire configuration requires that the +SEN lead be shorted to +EXC and the –SEN lead be shorted to –EXC at the simulator only.*

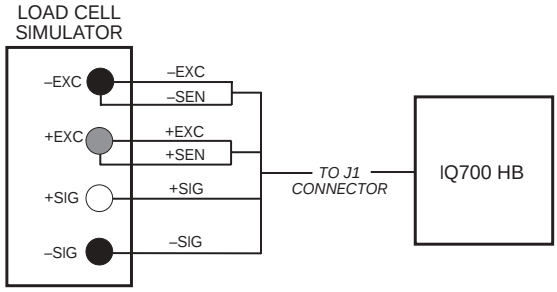


Figure 2-4. Wiring Connection to Simulator

Caution *Exceeding rated load cell load or shorting excitation wires may damage power supply.*

NOTES:

Unprotected cable runs need to be installed in a method to protect the cable from damage from crimping.

All wiring must conform to the National Electrical Code and RP 12.6.

2.8 Load Cell Wiring

Units are equipped with a six-wire load cell connection. Figure 2-5 shows the load cell output connector and the location of TB1 on the back of the indicator. Table 2-2 (in the following column), shows load cell connector pin assignments.

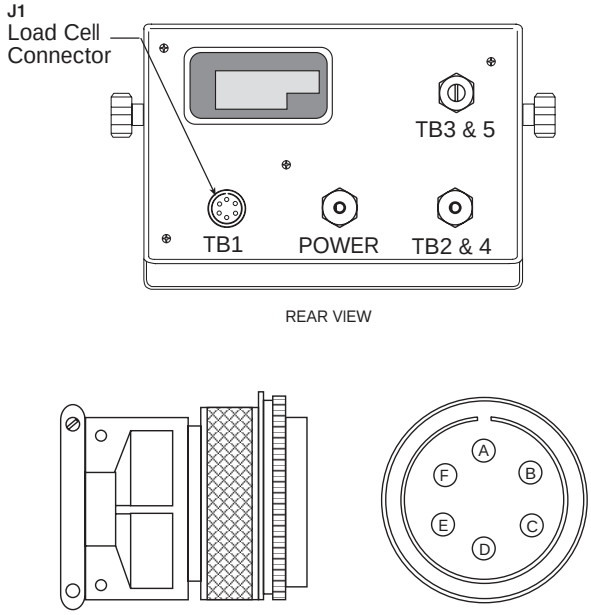


Figure 2-5. J1 Load Cell Connector

Pin	Function
A	+EXCITATION
B	–EXCITATION
C	+SIGNAL
D	–SIGNAL
E	+SENSE
F	–SENSE

Table 2-2. Load Cell Connector Pin Assignments

The standard connection is designed for 4-wire (non remote sensing) use. To convert to 6-wire (remote sensing) applications, cut the two PC traces on either end of TB1 as shown in Figure 2-6.

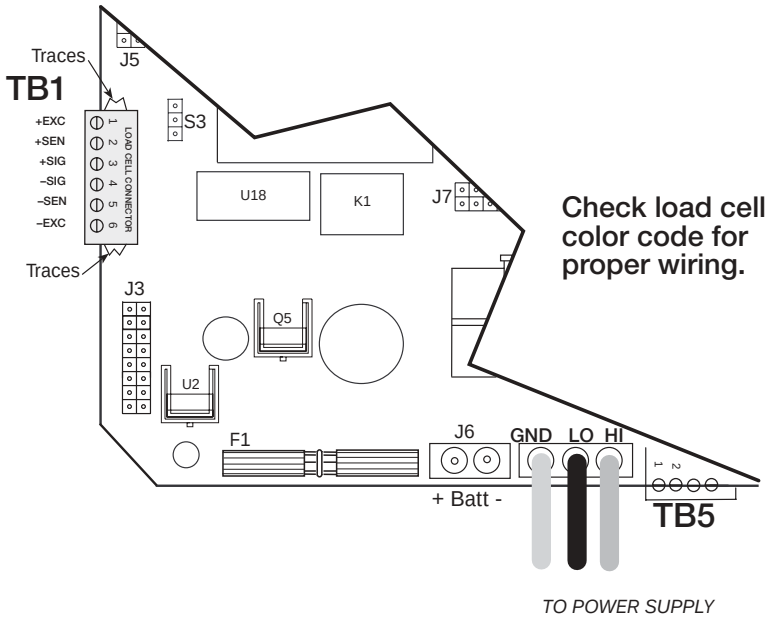


Figure 2-6. Load Cell Wiring From Indicator

NOTE: *The load cell shield wire should be connected to one of the load cell cable clamp screws located on the load cell mating connector.*

Caution *Shielding is connected at only one end (typically at the indicator end). If connected at the strain gauge end, disregard Figure 2-7.*

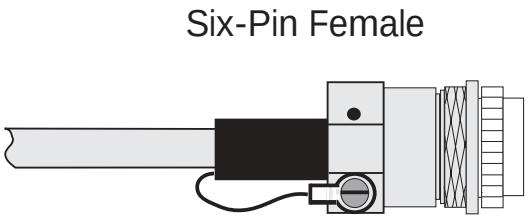


Figure 2-7. Load Cell Shield Wire Connection

2.9 Standard Surge Protection Board

The IQ 700 digital indicator comes with a factory installed surge suppression board. The suppression board stops the flow of excess voltage to the CPU board and attaches to TB1 on the CPU board just by pressing it onto TB1 and tightening the connector screws.

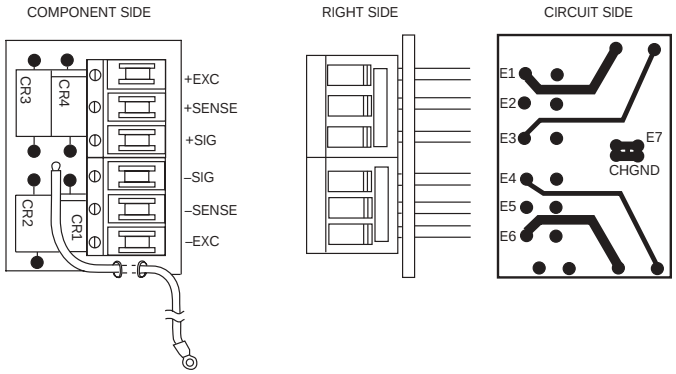


Figure 2-8. Surge Protection Diagram

2.10 Serial Port Wiring

The IQ 700 serial port can be configured to communicate directly to a printer, remote display, or other device using 20 mA active/passive, RS-232, or RS-485.

Access to this serial communication port is through the water seal cap (TB2 and TB4) located on the back of the IQ 700 indicator (see Figure 2-9). Wiring is extended through this connector and wired inside the indicator. See the output connector diagram in Figure 2-10 for connector and wire identification. Select the appropriate terminals and set switch S1 accordingly.

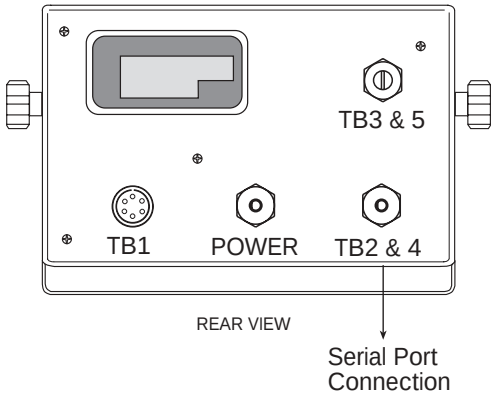


Figure 2-9. Serial Port TB2 Location

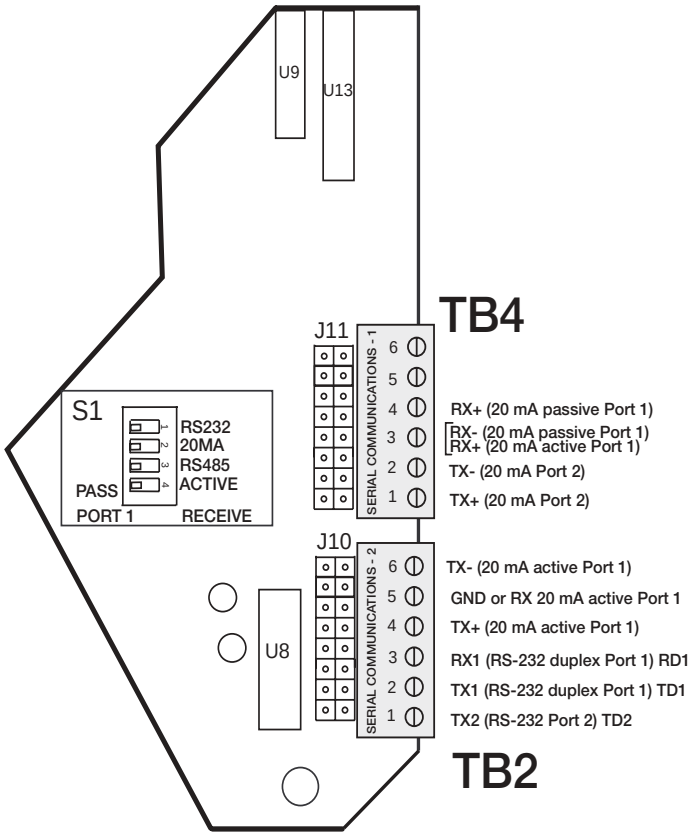


Figure 2-10. Serial I/O Wiring Locations

2.10.1 Serial Port #1 Wiring: CPU KGR8924–1

Serial Port 1 is a bidirectional (full duplex) port supporting active/passive 20 mA, current loop, RS-232, or RS-485 communications.

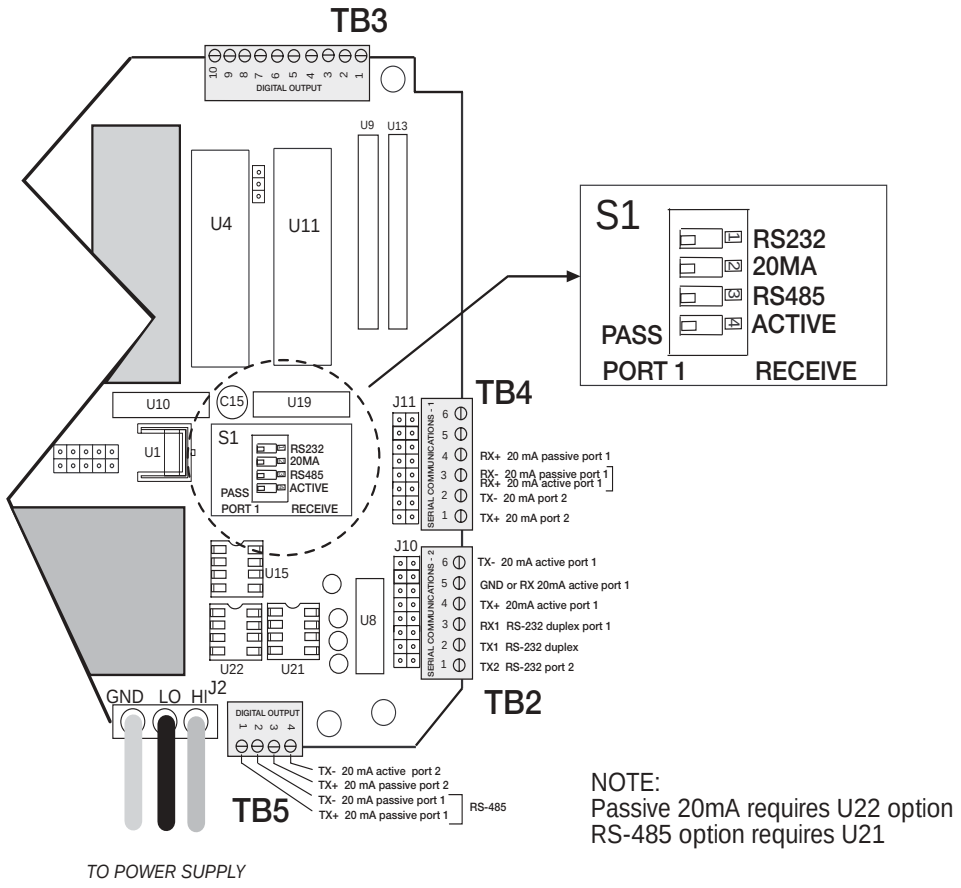


Figure 2-11. Serial Port #1 Switch Location

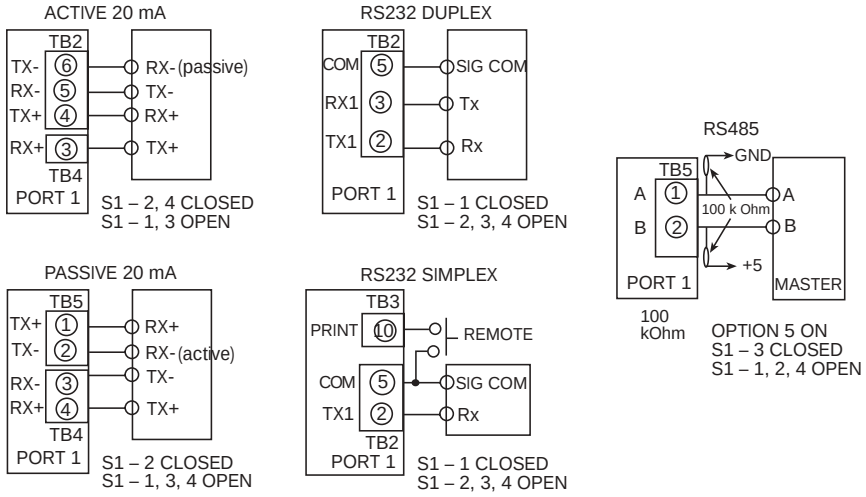


Figure 2-12. Port #1 Switch Settings

NOTE: *The pull-up and pull-down resistors shown in the RS485 wiring diagram (100 KΩ typical) should be installed at the indicator. GND may be tied to TB2-5 and +5 VDC to TB2-4 on CPU board (KGR8924-).*

2.10.2 Serial Port #2 Wiring: CPU KGR8924–1

Serial port #2 is a simplex port using RS232, or 20 mA active/passive (passive 20 mA requires U15 installed) communication.

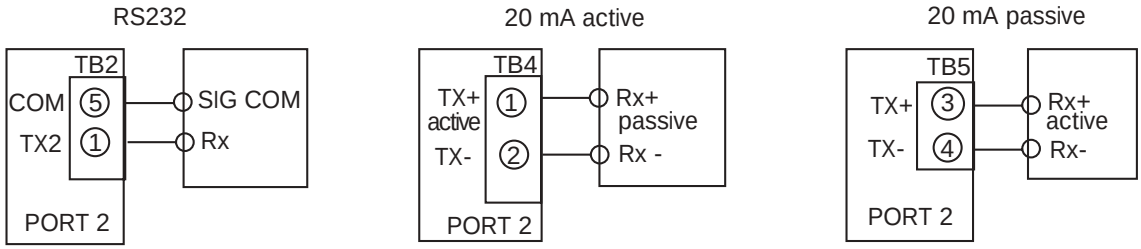


Figure 2-13. Port #2 Switch Settings

2.11 Digital I/O Wiring

The standard unit has four outputs for setpoint and zero band control and four discrete inputs that allow the zero, net/gross, and print function to be operated remotely by contact closure of these inputs to digital ground. Wire any active digital input and outputs to connector TB3 on the CPU board. Table 2-3 shows the digital I/O assignments for the TB3 connector and their description.

TB3 Pin	Signal	Description	
		Outputs	
1	+5 VDC		
2	DIG OUT 4	Dribble control assigned to setpoint 2 (defined in parameter 11), or a zero band output when parameter 12 is selected for 1-50.	
3	DIG OUT 3	Setpoint 2 output (defined in parameter 11).	
4	DIG OUT 2	Dribble control assigned to setpoint 1 (defined in parameter 11).	
5	DIG OUT 1	Setpoint 1 output (defined in parameter 11).	
Inputs			
		Normal Mode	Batch Mode
6	GND		
7	DIG IN 1	Net/gross	Abort
8	DIG IN 2	Zero	Zero
9	DIG IN 3	Tare	Start Batch
10	DIG IN 4	Print	Print

Table 2-3. TB3 Pin Assignments (Digital I/O)

Inputs 7 through 10 allow the zero, net/gross, tare, and print functions to be operated remotely by contact closure of these inputs to digital ground.

Typically, digital outputs control relays which operate other equipment. Outputs 1 through 4 allow for setpoint and zero band control.

Operational Mode		Relay Board TB3	TTL Inputs J11 KGR8924 CPU
Normal	Batch		
Tare	Start Batch	TB3-6	IN2
Zero	Zero	TB3-5	IN3
Net/Gross	Abort	TB3-4	IN4
Print	Print	TB3-3	IN5

Table 2-4. Relay Input Wiring

3.0 Configuration

Prior to calibration, the IQ 700 must be digitally configured, or assigned a set of operating parameters. The three parameters listed in Section 3.1 are directly related to calibration and must be set before proceeding to calibration mode.

3.1 Digital Configuration

3.1.1 Parameter Overview

Table 3-1 on page 13 lists configuration parameters and describes their values. The following paragraphs give the procedure for configuring the IQ 700.

3.1.2 Configuration Procedure

1. Unscrew the two screws on the face plate bracket (Figure 3-1). The bracket drops down, exposing four program switches on the left.

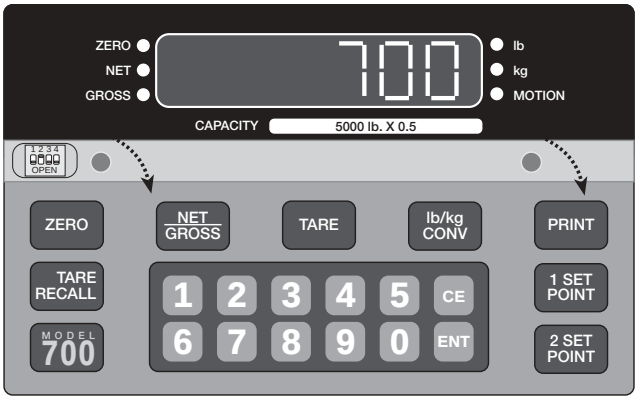


Figure 3-1. Accessing the Program Switches

2. Temporarily remove the unit's flexible black display panel by gently pushing down and lifting the panel up and out at its center to expose the configuration and calibration instructions printed on the surface below. The switch function table defines the appropriate front panel switch settings for the **CONF** and **CAL** modes.
3. Close switch SW1-2, marked **CONF** (2), by moving to the up position (see Figure 3-2). A prompt appears with a parameter number and data value.

The parameter identifier is a number, 1–14, that correlates to the **CONFIG** chart on the upper left of the switch map panel. Selected data represents the value being entered into the unit configuration data. For example, 1 100 sets the indicator to 10,000 graduations (see Table 3-2 on page 15).

When configuration is complete, set SW1-2 down to return the unit to normal operating mode.

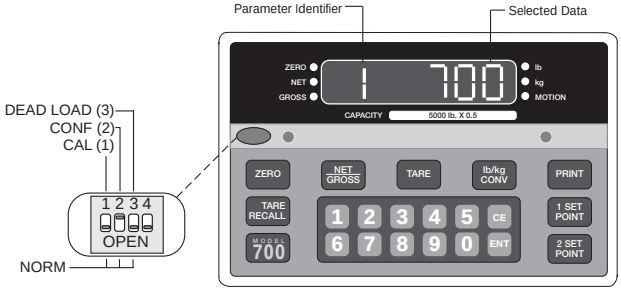


Figure 3-2. Closing Switch 2

Figure 3-3 defines the functional operation of each key on the front panel of the indicator when the unit is in the the setup mode.

Zero	Net/Gross	Tare	Units
Parameter Select	Parameter Data Select	Subparameter Select	Subparameter Data Select

Figure 3-3. Front Panel Key Functions

NOTE: *The* **TARE RECALL** *key functions as a previous screen key in CONFIG mode.*

3.1.3 Digital Configuration Parameters

Table 3-2 on page 15 lists the configuration display prompts (Prompt 1), and their value selections for displayed graduations. Prior to calibration, the IQ 700 must be digitally configured, or given its set of operating parameters. The first three parameter selections are directly related to calibration and must be set up before proceeding to the calibration mode. These parameters include;

- number of graduation
- resolution
- decimal point location in the weight data, all of which define the scale capacity.

Table 3-3 lists Prompts 2 and 3, Table 3-4 lists Prompts 4, and Table 3-4 has Prompts 5, 6, and 7. Prompts 8, 9, and 10 are shown in Table 3-5 and Prompts 11 through 14 are listed in Table 3-6 on page 17.

Parameter	Description	Values
1	Graduations	NTEP to 10,000 (up to 80,000 available).
2	Display resolution	1, 2, 5, 10, 20, 50, 100
3	Decimal point	0.0, 0.00, 0.000, 0.0000, no decimal
5	Digital averaging	1, 2, 4, 8, 16, 32, A1 = 8-4-2; A2 = 16-8-4
6	Tare mode	ATNR, AUTO, FIXED, BOTH (inhibit with motion)
7	AZM band	Off, 0.5, 1, 3, 5, and 10 divisions Use 0.5 for H-44, bench, counter and livestock applications; use 3 for vehicle, axle-load, and railroad scales
8	AZM/PAZ aperture	±1.9%, 100% of capacity includes push-to-zero, H-44: 1.9%
9	Motion	Off, 1, 3, 5 divisions H-44: vehicle, axle, livestock, RR, 3.0; all other 1.0
10	Displayed units	Lb, kg, con
11	Setpoint mode	See Section 7.0 on page 52 for settings
12	Zero band	Off, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50
13	Weigh mode	Normal, truck mode with transaction cancelled/stored, fixed/auto tare
14	Serial output	Port 1, Port 2, demand, continuous, baud rate, G/T/N, or display

Table 3-1. Parameter Overview

Figure 3-4 provides a graphic representation of configuration parameters associated with the IQ 700.

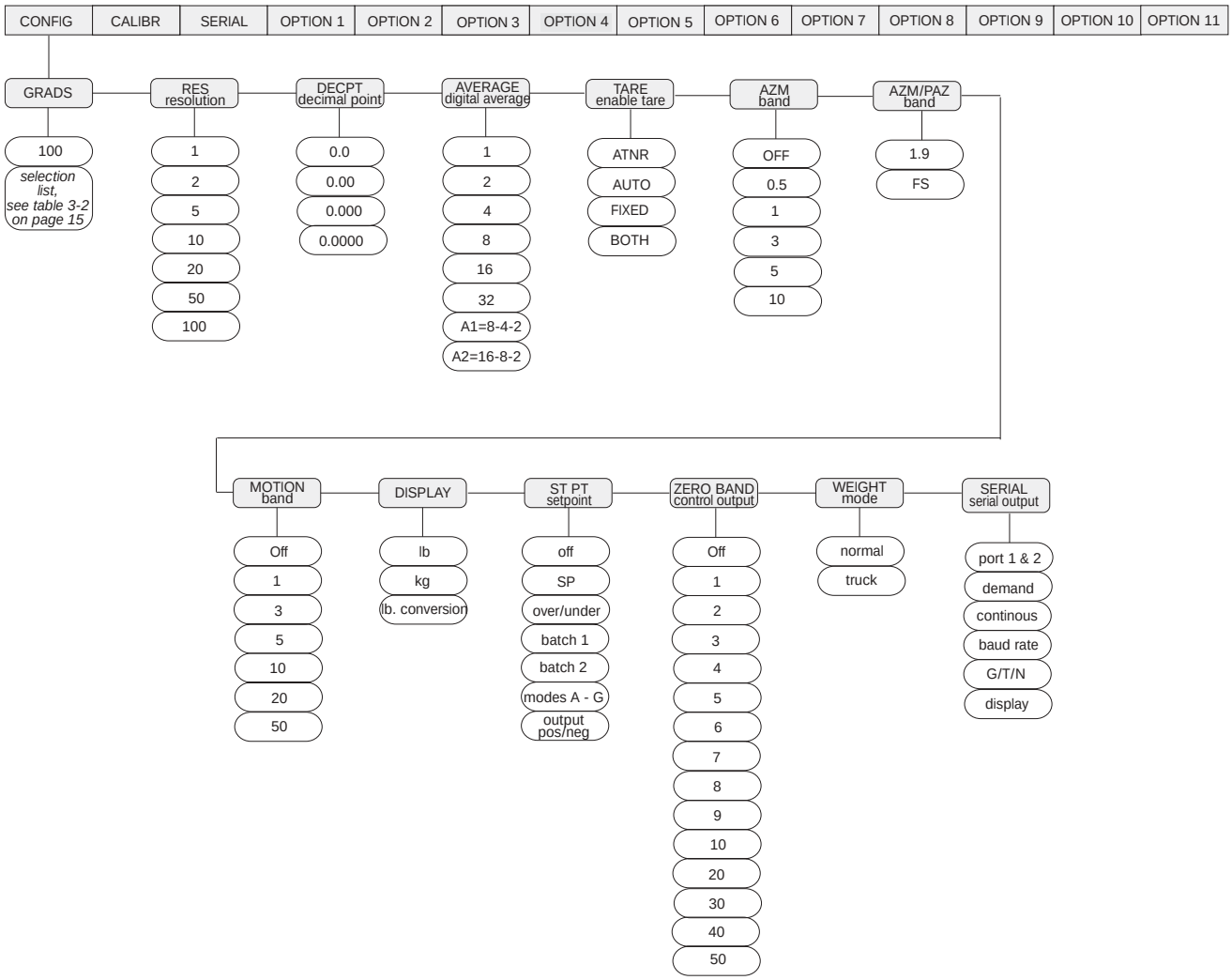


Figure 3-4. Configuration Menu

Prompt Display		Interpretation	Notes
Displayed Graduations			*Number of Graduations* = $\frac{\textit{Scale Capacity}}{\textit{Resolution}}$ Legal for trade values: 500–10000 graduations
1	5	500	
1	10	1000	
1	15	1500	
1	20	2000	
1	25	2500	
1	30	3000	
1	40	4000	
1	50	5000	
1	60	6000	
1	80	8000	
1	100	10000	
1	120	12000	Not valid in legal-for-trade applications
1	140	14000	
1	160	16000	
1	180	18000	
1	200	20000	
1	300	30000	Not valid in legal-for-trade applications These selections available only if option 1 (expanded resolution) is enabled
1	400	40000	
1	500	50000	
1	600	60000	
1	700	70000	
1	800	80000	

Table 3-2. Configuration Display Prompt 1

Prompt Display		Interpretation	Notes
Resolution / display divisions			*Scale capacity = displayed graduations x resolution* Resolution is determined by the combination of parameters 2 and 3. For example: • If Parameter 2 = 1 and Parameter 3 = 0.00, display resolution is 0.01 • If Parameter 2 = 5 and Parameter 3 = 0.0, display resolution is 0.5 • If Parameter 2 = 10 and Parameter 3 = 0, display resolution is 10
2	1	1	
2	2	2	
2	5	5	
2	10	10	
2	20	20	
2	50	50	
2	100	100	
Decimal Point Location			
3	0	No decimal point	
3	0.0	*xxxxx.x*	
3	0.00	*xxxx.xx*	
3	0.000	*xxx.xxx*	
3	0.0000	*xx.xxxx*	

Table 3-3. Configuration Display Prompts 2 – 3

Prompt Display		Interpretation		Notes
Digital Averaging		No. Averages	Update Rate	
5	1	1	10/sec	
5	2	2	5/sec	
5	4	4	2.5/sec	
5	8	8	1 sec	
5	16	16	2 sec	
5	32	32	4 sec	
5	A1	8-4-2	Variable	
5	A2	16-8-4	Variable	
5	A3	8-4-2	Variable	Selection available when option 1 is enabled
5	A4	16-8-2	Variable	
Tare Enable				Selection of either fixed tare (Ft) or fixed tare and auto tare both in parameter 6 allows up to a six digit fixed tare entry to be made using the numeric **front panel keys or, when configured for full duplex serial communication, a fixed tare entry can be down loaded through the serial port.**
6	Atnr	Auto (stored) tare only – no recall		
6	Auto	Auto (stored) tare only		
6	Ft	Fixed (manual) tare only		
6	both	Auto or fixed tare		
AZM Capture Band (Displayed Grads)				
7	oFF	Off		
7	0.5	±0.5		
7	1	±1.0		
7	3	±3.0		
7	5	±5.0		Selection available when option 1 is enabled
7	10	±10.0		

Table 3-4. Configuration Display Prompts 5 – 7

Prompt Display		Interpretation	Notes
PAZ Aperture			
8	1.9	±1.9% of full scale	
8	FS	100% of full scale	
Motion Band			
		Display Grads/sec	
9	oFF	Off	
9	1	±1.0	
9	3	±3.0	
9	5	±5.0	
9	10	±10.0	
9	20	±20.0	Selections available when option 1 is enabled
9	50	±50.0	

Table 3-5. Configuration Display Prompts 8 –10

Prompt Display	Interpretation	Notes
Display Base (lb/kg)		lb/kg CONV key functions only if parameter 10 is set to 10 Con
10 lb	lb display only	
10 kg	kg display only	
10 Con	lb (base) conversion	

Table 3-5. Configuration Display Prompts 8 –10 Configuration Display Prompt 1 (Continued)

Prompt Display	Interpretation	Notes
Setpoint mode		Four independent modes, three dependent modes. See Section 7.0 on page 52 for settings.
11		
Zero band control output		Parameter 12 (zero band output) is not functional in certain setpoint configurations. See Section 7.0 on page 52 for details.
12 oFF	off	
12 1	±1	
12 2	±2	
12 3	±3	
12 4	±4	
12 5	±5	
12 6	±6	
12 7	±7	
12 8	±8	
12 9	±9	
12 10	±10	
12 20	±20	
12 30	±30	
12 40	±40	
12 50	±50	
Truck mode		See “Truck Weighing Mode in Section 6.7, page 50, for details
13		
Serial configuration		Section 3.2 for details
14		

Table 3-6. Configuration Display Prompts 11 – 14

3.1.4 Normal Configuration Setup Parameters

You must be in the configuration mode (SW 2 closed to set the indicator from the PC) to be able to write configuration parameters. To write commands the following *Jxxyyzz<CR>* sequence must be used. The following parameters and their setup numbers are as follows:

Parameter 1 = Grads	J0600 03 = Both	J1100 02 = Ov.Un	J1103 06 = 6	J1200 14 = 50
J0100 00 = 500		J1101 00 = HL	J1103 07 = 7	
J0100 01 = 1000	Parameter 7 = AZM Capture	J1101 01 = TGT	J1103 08 = 8	Parameter 13 = Truck in/out
J0100 02 = 1500	J0700 00 = Off		J1103 09 = 9	J1300 00 = Nor
J0100 03 = 2000	J0700 01 = .5	J1102 00 = Pos	J1103 10 = 10	J1300 01 = Tru
J0100 04 = 2500	J0700 02 = 1	J1102 01 = Zer		J1301 00 = Can
J0100 05 = 3000	J0700 03 = 3		J1103 00 = Off	J1301 01 = Str
J0100 06 = 4000		J1103 00 = Pos	J1103 01 = 1	
J0100 07 = 5000	Parameter 8 = Zero Range	J1103 01 = Zer	J1103 02 = 2	J1302 00 = Off
J0100 08 = 6000	J0800 00 = 1.9		J1103 03 = 3	J1302 01 = On
J0100 09 = 8000	J0800 01 = FS	J1104 00 = Pos	J1103 04 = 4.	
J0100 10 = 10000		J1104 01 = Zer		Parameter 14 = Serial
J0100 11 = 12000	Parameter 9 = Motion Band		J1104 00 = Off	J1400 00 = Off
J0100 12 = 14000	J0900 00 = Off	J1100 03 = Bat 1	J1104 01 = S1	J1400 01 = SI
J0100 13 = 16000	J0900 01 = 1	J1101 00 = Off	J1104 02 = S1.P	J1400 02 = DU
J0100 14 = 18000	J0900 02 = 3	J1101 01 = S1	J1104 03 = S1.D	(J1401 – 1405 for SI and DU)
J0100 15 = 20000	J0900 03 = 5	J1101 02 = S1.P	J1104 04 = S.P.D.	J1401 00 = Net
	J0900 04 = 10	J1101 03 = S1.D		J1401 01 = GTN
Parameter 2 = Resolution		J1101 04 = S.P.D.	J1105 00 = Pos	
J0200 00 = 1	Parameter 10 = Units		J1105 01 = Zer	J1402 00 = Off
J0200 01 = 2	J1000 00 = Lb only	J1102 00 = Pos		J1402 01 = 1
J0200 02 = 5	J1000 01 = Kg only	J1102 01 = Zer	J1106 00 = Off	J1402 02 = 2
J0200 03 = 10	J1000 02 = Lb/Kg Conversion		J1106 01 = 1	J1402 03 = 3
J0200 04 = 20		J1103 00 = Off	J1106 02 = 2	J1402 04 = 4
J0200 05 = 50	Parameter 11 - Setpoints	J1103 01 = S2	J1106 03 = 3	
J0200 06 = 100	J1100 00 = Off	J1103 02 = S2.P	J1106 04 = 4.	J1403 00 = Off
	J1100 01 = SP	J1103 03 = S2.D	J1106 05 = 5	J1403 01 = Co
Parameter 3 = Decimal Point	J1101 00 = Off	J1103 04 = S.P.D.	J1106 06 = 6	J1403 02 = De
J0300 00 = 0	J1101 01 = S1		J1106 07 = 7	
J0300 01 = 0.0	J1101 02 = S1.P	J1104 00 = Pos	J1106 08 = 8	J1404 00 = 3
J0300 02 = 0.00	J1101 03 = S1.D	J1104 01 = Zer	J1106 09 = 9	J1404 01 = 6
J0300 03 = 0.000	J1101 04 = S.P.D.		J1106 10 = 10	J1404 02 = 12
J0300 04 = 0.0000		J1100 04 = Bat2		J1404 03 = 24
	J1102 00 = Pos	J1101 00 = Off	Parameter 12 = Zero Band	J1404 04 = 48
Parameter 5 = Digital Averaging	J1102 01 = Zer	J1101 01 = S1	J1200 00 = Off	J1404 05 = 96
J0500 00 = 1		J1101 02 = S1.P	J1200 01 = 1	
J0500 01 = 2	J1103 00 = Off	J1101 03 = S1.D	J1200 02 = 2	J1405 00 = Off
J0500 02 = 4	J1103 01 = S2	J1101 04 = S.P.D.	J1200 03 = 3	J1405 01 = Co
J0500 03 = 8	J1103 02 = S2.P		J1200 04 = 4	J1405 02 = De
J0500 04 = 16	J1103 03 = S2.D	J1102 00 = Pos	J1200 05 = 5	
J0500 05 = 32	J1103 04 = S.P.D.	J1102 01 = Zer	J1200 06 = 6	(J1406 for SI only)
J0500 06 = A1	J1103 05 = tol.		J1200 07 = 7	J1406 00 = 3
J0500 07 = A2		J1103 00 = Off	J1200 08 = 8	J1406 01 = 6
	J1104 00 = Pos	J1103 01 = 1	J1200 09 = 9	J1406 02 = 12
Parameter 6 = Tare	J1104 01 = Zer	J1103 02 = 2	J1200 10 = 10	J1406 03 = 24
J0600 00 = ATNR		J1103 03 = 3	J1200 11 = 20	J1406 04 = 48
J0600 01 = Auto		J1103 04 = 4.	J1200 12 = 30	J1406 05 = 96
J0600 02 = FT		J1103 05 = 5	J1200 13 = 40	

Table 3-7. Configuration Setup Parameters

3.2 Serial Configuration

The IQ 700 has two serial ports. Both serial ports 1 and 2 are ASCII-compatible, 20 mA current loop, or RS-232 outputs. The serial format is compatible with most printers, scoreboards, and other remote devices. Each output can be disabled, set for print on demand mode, or set to output data continuously.

Table 3-7 shows the configuration selections for parameter 14, which control the configuration of ports 1 and 2.

Settings for simplex (14.S1) and duplex (14.dU) are the same except that ports 1 and 2 must have the same baud rate when in duplex mode.

Parameter	Subparameter Selection	Subparmeter Data Selection	Explanation
Net/Gross	Tare	Lb/Kg Conversion	Key which affects associated parameters
14. oFF			Serial communications disabled
14. Sl			Port 1 and 2: simplex
	14.1		Demand print configuration in net mode
		14.1Gtn 14.1nEt	Three-line output G-N-T Single line, net print
	14.2		Delay after carriage return (CR) enable
		14.2oFF 14.2 1 14.2 2 14.2 3 14.2 4	No delay after CR 1 second delay after CR 2 seconds delay after CR 3 second delay after CR 4 second delay after CR
	14.3		Port 1 configuration
		14.3oFF 14.3 Co 14.3 dE	Port 1 disabled Continuous output Demand print
	14.4		Port 1 baud rate
		14.4 3 14.4 6 14.4 12 14.4 24 14.4 48 14.4 96	300 bps 600 bps 1200 bps 2400 bps 4800 bps 9600 bps
	14.5		Port 2 configuration
		14.5oFF 14.5 Co 14.5 dE	Port 2 disabled Continuous output Demand print
	14.6		Port 2 baud rate
		14.6 3 14.6 6 14.6 12 14.6 24 14.6 48 14.6 96	300 bps 600 bps 1200 bps 2400 bps 4800 bps 9600 bps

Table 3-8. Parameter 14 Configuration Parameters

Parameter	Subparameter Selection	Subparmeter Data Selection	Explanation
Net/Gross	Tare	Lb/Kg Conversion	Key which affects associated parameters
14. dU			Port 1 duplex
	14.1		Demand print configuration in net mode
		14.1Gtn 14.1nE	Three line output G-N-T Single line, NET print
		14.2oFF 14.2 1 14.2 2 14.2 3 14.2 4	No delay after CR 1 second delay after CR 2 seconds delay after CR 3 second delay after CR 4 second delay after CR
	14.3		Port 1 configuration
		14.3oFF 14.3 Co 14.3 dE	Port 1 disabled Continuous output Demand print
	14.4 In full duplex 14.4 is the baud selection for ports 1 and 2		Ports 1 and 2 baud rate
		14.6 3 14.6 6 14.6 12 14.6 24 14.6 48 14.6 96	300 bps 600 bps 1200 bps 2400 bps 4800 bps 9600 bps
	14.5		Port 2 configuration
		14.3oFF 14.3 Co 14.3 dE	Port 2 disabled Continuous output Demand print

Table 3-8. Parameter 14 Configuration Parameters

All serial characters in the data format are in ASCII and consist of the following default settings:

Data Formats
1 Start Bit
7 Data Bits
1 Parity Bit (Odd Parity)
1 Stop Bit

Table 3-9. Data Formats

The transmission of serial data can be initiated in either demand mode, continuous mode, or RS485. Refer to Section 6.6 on page 48 for advanced detailed information on serial configuration options.

4.0 Options Configuration

The IQ 700 offers a selection of optional features that are available in the configuration of the indicator. The options setup mode allows the operator to expand the capabilities of the indicator. The available features are:

- Option 1 - Expanded resolution
- Option 2* - Analog output
- Option 3 - Time and date
- Option 4 - Accumulator
- Option 5* - Local area network\tag\id\counter
- Option 6 - Five-point linearization
- Option 7 - Smart serial I/O
- Option 8* - Analog output relay
- Option 9 - Keyboard lockout
- Option 10 - Setpoints
- Option 11 - Remote Input

NOTE: **Options 2, 5, and 8 require additional hardware support. Options 1 through 11 are currently available in the standard EPROM KDA1921-1.*

To access digital option configuration, close switches SW1-2 and 3 (Figure 4-1). Press and hold the **ENT** key until *OPtion* appears on the display. If the option mode is not enabled (all options turned off), dashes appear across the display (**- - - - -**).

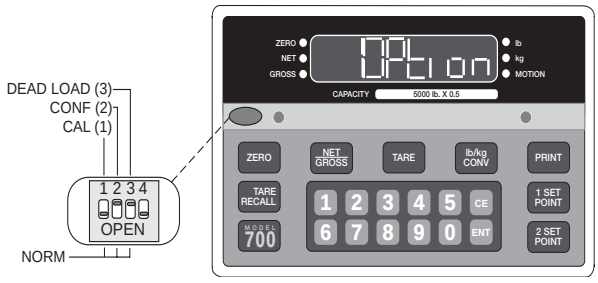


Figure 4-1. Close Switches SW1-2 and 1-3 for Option Configuration

In the option mode, primary function keys (**ZERO**, **GROSS/NET**, etc.) operate as secondary function keys (Figure 4-2).

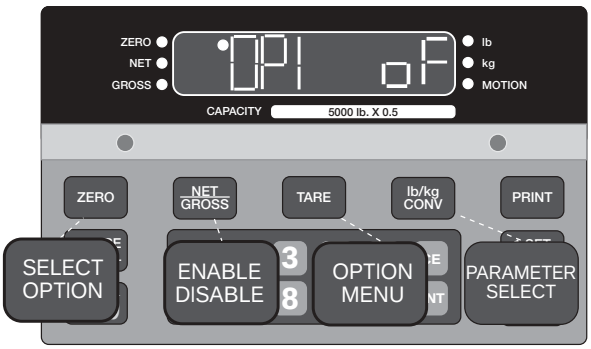


Figure 4-2. Front Panel Keys with Alternate Functions in Options Menu

Use the **ZERO** key to select options 1 through 11 or the **TARE RECALL** key to scroll backward through the options. To enable a selected option, use the **GROSS/NET** key.

Some options, once enabled, may have an option submenu available. Use the **TARE** key to access the option submenu. To make parameter selections in the option submenu, use the **lb/kg CONV** key. Display prompting is provided in each case.

Key Functions Summary

Use the list below (Figure 4-3), as a quick reference when selecting and configuring the options.

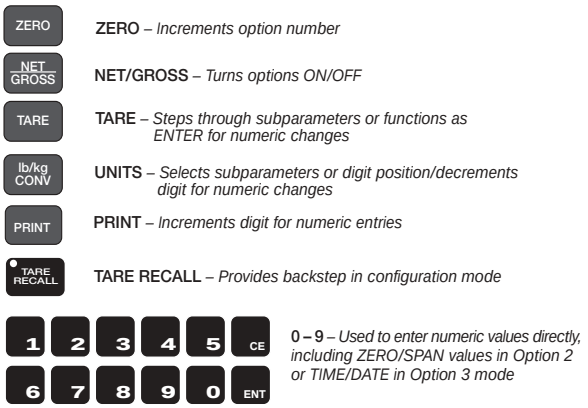


Figure 4-3. Quick Key Functions

4.1 Option 1 – Expanded Resolution

Enabling option 1 increases the indicator resolution by allowing display graduation selections beyond the normal 20,000 in parameter 1 of the configuration mode.

Up to 80,000 displayed graduations are available when this option is on; however, applying such high gains to the data may cause undesirable display instability in some applications.

The expanded resolution (OP.1) is shown in Table 4-1 and its menu structure in Figure 4-4.

Prompt Display	Interpretation
Expanded Resolution	
OP.1 oF OP.1 on	Off On (expanded up to 80,000 displayed graduations)

Table 4-1. Expanded Resolution Options

Option 1 Menu

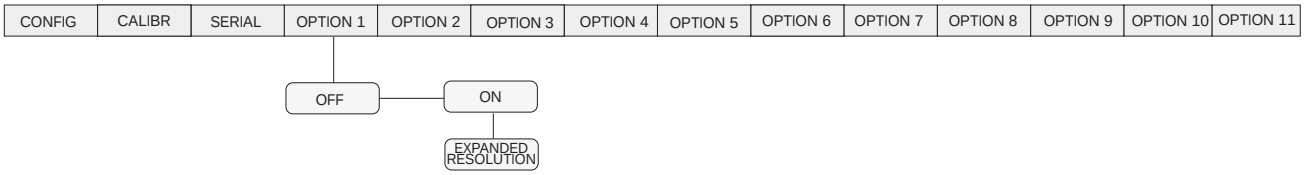


Figure 4-4. Option 1 Menu

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 1.

4.2 Option 2 – Analog Output Option

Option 2 enables the analog output option. The following features of analog output are:

- Converts serial data into analog: 0–10 VDC or 4–20 mA.
- Ordered as a kit, it must be operated remotely from the digital weight indicator.
- Self powered, 115/230 VAC provides isolated output.
- Automatic data checking/verification.
- Analog output tracks gross, net, or displayed weight.
- Full digital calibration (indicator front panel).

Serial data from the indicator is modified to include scaled information specifically for the analog output module. The standard communications are also included to allow the module to pass-through printer or scoreboard information.

NOTE: *The serial pass-through does not have duplex capability.*

The analog output is fully isolated with its own power supply and current loop communications. The analog module can be located remotely up to 1000 feet from the indicator. After wiring and setting the module's baud rate, the remaining setup and calibration is done at the indicator.

4.2.1 Specifications

Current output is 4–20 mA with a maximum impedance less than or equal to 600Ω.

Voltage output is 0–10 VDC with a minimum load resistance of 1kΩ.

4.2.2 Test Modes

Switch settings are provided to force the analog output to zero, full scale, or to provide a continuous sawtooth waveform for system checking.

4.2.3 Error Checking

Serial data is continually checked for parity, valid characters, and presence of communication. Loss of data is indicated by forcing the analog output to a minimum value of 0.5 VDC or 3.2 mA (approximate). If the indicator is in an overload condition, the analog output is forced to 5% over full scale. With the 4–20 mA output, an additional alarm is provided to detect the lack of current (break) in the loop.

4.2.4 Communication Verification

An LED (DS1) is provided on the analog module:

- ON = Communications OK
- Pulse = Communications errors
- OFF = No power

Table 4-2 shows the option 2 configuration parameters.

Option	Prompt Display	Interpretation	Notes
All off	--------	Mode not enabled (options 1 through 10 turned off)	—
OP.2	OP.2 o F OP.2 o n	Off Analog option disabled On Analog option enabled	—
	2.1 dSP Gr net	Analog tracks display Analog tracks gross weight Analog tracks net weight	—
	2.2 P.1 P.2	Indicator data out on port 1 (to analog) This port is not used	Use standard indicator setup for serial configuration under menu 14 (configuration Switch S-2 closed) to establish communications before using the option 2 menu. Port 1 from the indicator to the analog module must be set for the desired baud rate and be in continuous output mode. In the option 2 menu, set the indicator port to 1. On analog board S1, set baud rate switches (1 and 2) to match menu 14.
	2.3 OFF dE Co	Analog module does not pass serial data Analog module outputs serial on demand Analog module outputs serial continuously	
	2.4 12 24 48 96	Pass-through serial output baud rate 1200 baud 2400 baud 4800 baud 9600 baud	—
	2.5 Zr	Enter weight value for analog zero using the numeric keys. The TARE key stores new value; the display responds with ENTER.	The display for parameters 2.5 through 2.8 alternate between the parameter selection and the actual data value currently entered. This alternation will continue until the data for the parameter has been increased or decreased. **NOTE:** *After entering new data, use TARE key to store.* The display will again resume switching between parameter and data.
	2.6 FS	Use the same procedure as 2.5 to enter analog full scale value.	
	2.7 Zr.A	ZERO TRIM: While measuring analog output, use lb/kg CONV and PRINT keys to increment/decrement the zero value. Increment/decrement function forces a test mode zero output. The TARE key stores the new value.	
	2.8 SP.A	SPAN TRIM: Same as 2.7 except a span test mode output is provided.	

Table 4-2. Option 2 Configuration

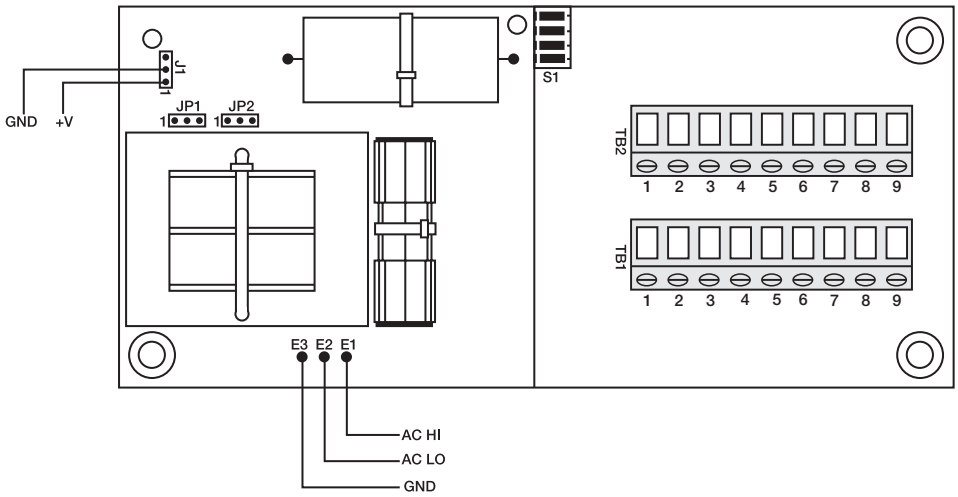


Figure 4-5. Analog Module Setup and Wiring

Baud rate	SW1 Setting	
	1	2
1200	Off	Off
2400	On	Off
4800	Off	On
9600	On	On
Mode	3	4
Normal operation	Off	Off
0 VDC/4 mA (test only)	On	Off
10 VDC/20 mA (test only)	Off	On
0–10 VDC/4–20 mA ramp (test only)	On	On

Table 4-3. Baud Rate and Switch SW1 Settings

TB1	Description	TB2	Description
1	4–20 mA	1	Zero
2	Ground	2	Gross/Net
3	0–10 Vdc output	3	Tare
4	Alarm	4	Start
5	Ground A	5	Ground (–20 mA input) common
6	+20 mA TXD	6	RS-232 TXD
7	–20 mA TXD	7	+5 VDC
8	+20 mA RXD	8	–20 mA
9	-20 mA RXD (input)	9	Demand print
NOTE: Jumper TB1-8 to TB2-7 (5 VDC) to make the analog output module an active device.			

Table 4-4. Description of Terminal Boards TB1 and TB2

4.2.5 Analog Wiring to Host Indicator

The following diagram illustrates the wiring layout to the host indicator.

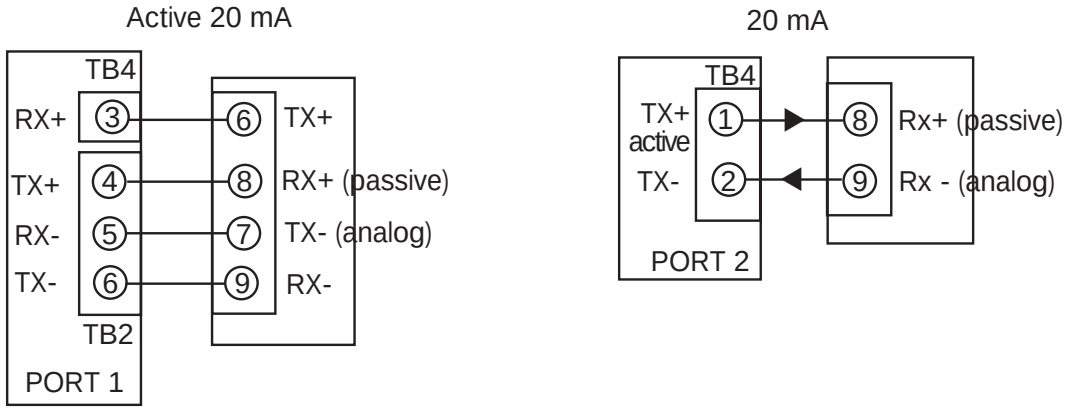


Figure 4-6. Analog Wiring to Indicator

4.2.6 Analog Module Serial Pass-Through

The serial data from the host digital weight indicator is provided as a simplex output with the same format as the host.

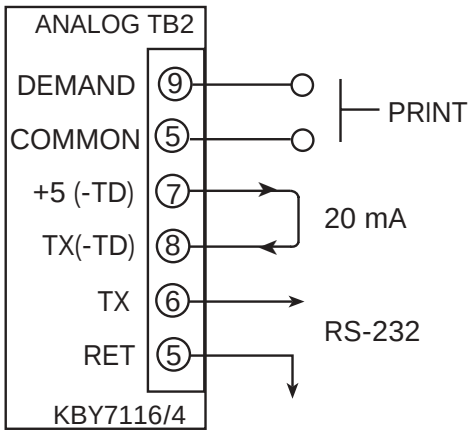


Figure 4-7. Pass Through Wiring

The Option 2 configuration parameters are graphically illustrated in Figure 4-8, shown below.

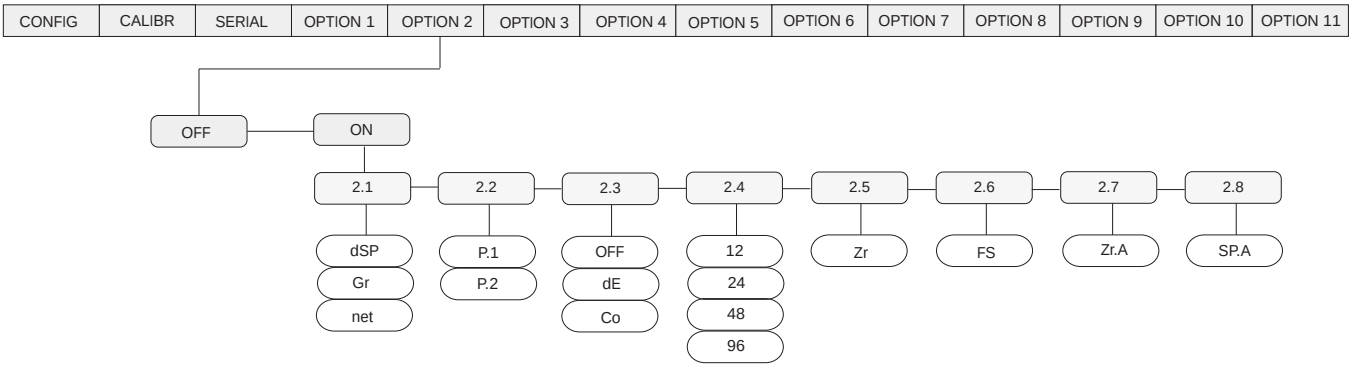


Figure 4-8. Option 2 Menu

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 2.

4.3 Option 3 – Time and Date

The main purpose for time and date is to allow the operator to quickly change the time when the time changes between standard and daylight savings time.

The time and date clock is attached to the battery-backed memory (U4) and will continue running when the indicator is off.)

Prompt Display		Interpretation	Notes
Time and date option			Time and date settings can be directly accessed in normal running mode by holding down both the **0** and **3** keys for a few seconds. The operator can then make changes without using option switches. To exit, press the **0** key.
OP.3	oFF	Off (time and date disabled)	
OP.3	On	On (time and date enabled)	
3.1	Std dLs	Standard Time Daylight Savings Time	
3.2	12 24	Selects 12- or 24-hour time display	
3.3	A P	AM (A) or PM (P) setting when 12-hour clock is selected	
3.4	Un Ab on	Selects the location of printed time and date data: under (Un), above (Ab), or on the same line (On) as weight data.	
3.5	LEt nO	Prints date in letters (LEt) or numbers (nO). For example: Sept 1, 1999 vs. 09/01/99	
3.6	tI	Time. Use numeric keys to enter the time in hours, minutes and seconds (HHMMSS), then press the **ENTER** key (see Note below)	The display for parameters 3.5 and 3.6 alternates between the parameter and the current data value. This continues until new data is entered using the numeric keys. After entering new data, press **ENTER** again to alternate the display.
3.7	dA	Date. Use numeric keys to enter the date in month, day and year format (MMDDYY), then press the **ENTER** key (see Note below)	

Table 4-5. Option 3 Configuration Selections

NOTES:

- Prior to setting the time and date, select the current time (dLs–daylight savings or Std–standard). This feature selection allows the operator to increment or decrement the time by one hour when clocks are changed from dLs or Std without having to re-program the entire time.
- Time and date can be directly accessed in normal running mode by pressing both the **0** and **3** keys for a few seconds. This allows the time or date to be changed without using the option switches. To exit,you must be at 3.1 to 3.5 and then press the **0** key. This sequence does not work with 3.6 or 3.7.

Option 3 configuration parameters are graphically illustrated in Figure 4-9.

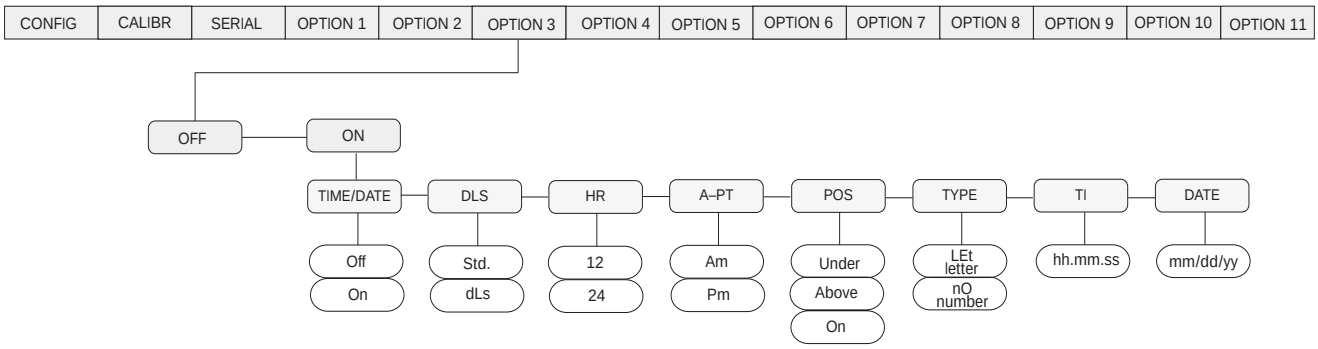


Figure 4-9. Option 3 Menu

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 3.

4.4 Option 4 – Accumulator

The accumulate function is used to add weight data to a register for later access by the user. The accumulator can keep a running total of weights entered, either automatically using setpoints, or manually pressing the **PRINT** key when the accumulate function is active.

The IQ 700 has a ten digit accumulator available when Option 4 is enabled. To protect against multiple accumulations of data, the accumulator option has a selectable return to **ZERO ACCUMULATION BAND** feature. This feature ensures that the weight display must return to a value inside the zero band before the accumlator can be performed.

Caution *Parameter 10 in the configuration mode be set for lb or kg base only. This avoids adding incorrect data to the accumulator when switching between lb base and kg conversion. Clear the total whenever the capacity is changed.*

Option	Prompt Display	Description
OP.4	OP.4 oF OP.4 on	off on – accumulator enabled
	4.1 oFF	Zero band "off" data accumulator, anytime the **PRINT** key is pressed.
	1	± 1 Display graduations
	2	± 2 Display graduations
	3	± 3 Display graduations
	4	± 4 Display graduations
	5	± 5 Display graduations
	6	± 6 Display graduations
	7	± 7 Display graduations
	8	± 8 Display graduations
	9	± 9 Display graduations
	10	± 10 Display graduations
	20	± 20 Display graduations
	30	± 30 Display graduations
	40	± 40 Display graduations
	50	± 50 Display graduations

Table 4-6. Option 4 Configuration Parameters

Accumulation

Accumulators are activated in the following ways.

- Activated by pressing the **PRINT** key.
- Activated by the **PRINT COMMAND** in the auto batch mode (parameter 11 **bAt2**).
- If the data is valid (not in motion, overload, etc.) the display data is added to the content of the accumulator and the display prompts with **PRINT** when configured for demand print or **Acc** if not in demand.

To prevent multiple accumulations of weight data, a **ZERO** threshold detection band (in display graduations), requires the display data to return to zero before another accumulation/print can be performed.

Total Recall

To view the contents of the accumulation register on the display, use the following steps: press **TARE RECALL** which is redefined as **TOTAL RECALL** key when option 4 is enabled. The tare recall LED flashes indicating the instrument is in the total recall mode. While in total recall, the contents of the accumulator can be printed out when the **PRINT** key is pressed. If the serial output is configured for continuous output, the total is continuously printed out anytime the indicator is placed in total recall mode.

Total Reset

The total can be cleared to zero when in the **TOTAL RECALL** display mode by:

1. Press the **CE** key. The unit prompts with the display message **Sure.**
2. Press **CE** a second time to clear the contents of the accumulator resetting it back to zero. The display prompts **Clear.**

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 4.

4.5 Option 5 – Expanded Serial Communications

The expanded serial communications options provide RS485 communications for the IQ 700. Option 5 features include:

- Duplex communication for up to two weight indicators on a single serial port.
- RS485 half-duplex with U21 installed.
- RS485 full-duplex available with U21 and the **KBT7116-13** kit installed.
- Direct keyboard access to the indicator address in normal operating mode.
- Poll/answer protocol.
- Unit address 1 - 98.
- Tag mode that adds the programmed address to standard serial output format.
- Stored ID mode allows an identification number to be held until written over by a new one.
- Counter sequentially counts on each valid print. Counts from 1 – 999,999.

TAG/LAN

Under option 5 there are two modes of serial operation that can be selected:

- TAG mode – Adds a two digit address to the standard serial format which "tags" printed data with the IQ 700's address. This feature is useful when more than one indicator is set up on a site and serial data needs to be identified with the indicator from which it was generated.
- LAN mode – Local Area Network can be configured as a two wire (half duplex) RS485 serial communication by installing the driver chip into socket U21 or 5.2 LAN (full duplex) RS485/RS422 with the additional installation of the KBT7116-13 kit.

Option	Prompt Display	Explanation	Additional Notes
OP.5	OP.5 oF OP.5 on	off on Option 5 enabled	
	5.1. tAg LAn	Tag mode (data labeled with an address Local Area Networking (RS485)	
	5.2. Addr	Allows selection of indicator address from 1 – 98).	When either 5.2 or 5.5 is selected, the display alternates between 5.2 Addr or 5.5 cnt, respectively and its current numeric value. The alternation of the display occurs until a new value is selected. Addresses can be accessed in the normal operating mode by pressing **0** and **5** simultaneously. Pressing **0** and **2** for several seconds allows changes to be made without having to access the dip switches. To exit, press **TARE RECALL** for several seconds.
	5.3. oF on	ID held option off ID option enabled	
	5.4. oF on	Counter off Counter option enabled	
	5.5. cnt	Preset initial counter value from 0 – 999,999	See notes from 5.2

Table 4-7. Option 5 Configuration

NOTE: *Port 1 configuration (parameter 14) must be set for duplex, (du), demand mode (de), and the appropriate baud rate. See Section 3.2 for wiring and serial protocol.*

The option 5 configuration parameters are graphically illustrated in Figure 4-10, shown on the page 29.

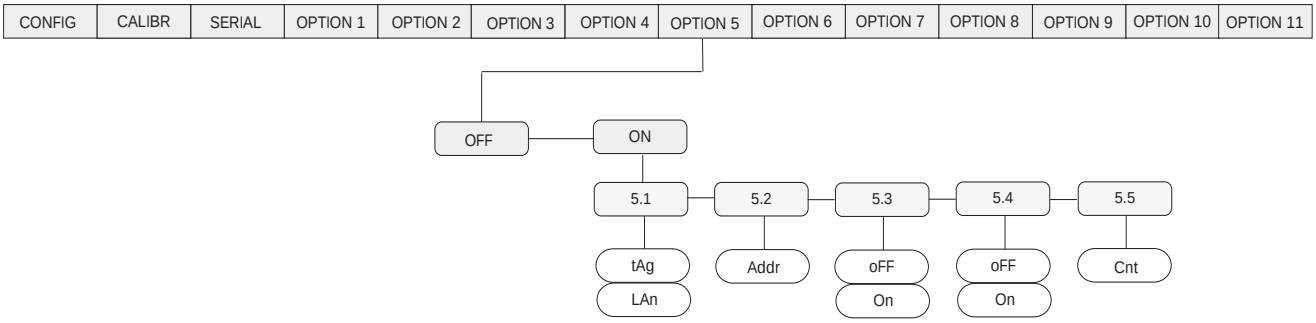


Figure 4-10. Option 5 Menu

Receive From Indicator			Transmit From Indicator	
Data Entry	Command	Type	Echo	Data Resp.
Poll	P	Wt. Poll	P	Weight data
Remote	Z	Zero	Z	Status
	G	Gross	G	Status
	N	Net	N	Status
	T	Tare	T	Status
	B	Start Bat	B	Status
Setpoint				
(*xxxxx*)	SEn	Enter	SRn	Setpoint value
	SRn	Recall	SRn	Setpoint value
Fixed Tare				
(*xxxxx*)	FE	Enter	FR	Fixed tare value
	FR	Recall	FR	Fixed tare value
Calibration (*xxxxx*)	Z	Zero Cal	No response	
	SE	Span Cal		
Calibration Data				
Zero Cal	CZE	Zero Entry	CZR	Zero Cal Data
	CZR	Zero Recall	CZR	Zero Cal Data
Span Cal	CSE	Span Entry	CSR	Span Cal Data
	CSR	Span Recall	CSR	Span Cal Data

Table 4-8. Table of Commands and Data

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 5.

ID HELD

This function is enabled when 5.3 is selected On. When ID held is enabled, the current keyed in ID number is stored in memory and is sent out with each valid demand serial print. There are two methods of ID entry.

- Gross/Net mode – use numeric keys to enter the desired ID number, then press **PRINT**.
- Gross mode only – key in numeric value and press **ENTER**. This stores the new ID number for the next print command.

NOTE: *Leading zero entry not allowed.*

NOTE: *If a zero value is entered as an ID number, there is no printout of an ID number.*

Counter

The counter feature is a six digit counter that sequentially increments by one on each valid print command in the net mode only. It is enabled when 5.4 is on and has a range from 0 - 999,999.

4.6 Option 6 – Linear Calibration

There are five calibration points that can be entered sequentially. Calibrations using fewer than five points will linearize the curve up to the last data point.

Enabling option 6 places the indicator in a linearization calibration when the unit is in the calibration mode (SW1-1 closed on front panel DIP switch). Use the five-point linearization procedure outlined in Section 5.3 on page 45 to perform a scale calibration when option 6 is enabled.

The five-point linearization calibration (OP.6) is shown in Table 4-9.

Prompt Display	Interpretation	Notes
Five-point linearization		
OP.6 oFF	Off	—
OP.6 on	On	Enter up to five linearization points

Table 4-9. Option 6 Configuration Selections

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 6.

4.7 Option 7 – Serial I/O

The serial I/O option offers flexibility for an operator to customize the serial output format for individual system requirements. The selections under option 7 may be divided into three groups.

- Customizing of serial output data.
- Setup of MACRO files.
- Those files that affect serial operation.

These sections are addressed in detail below.

4.7.1 Customizing Files

The serial I/O option offers flexibility for an operator to customize the serial output format for individual system requirements. The selection of the associated custom print file is performed automatically by serial port and the data mode (gross, net, total recall, or special) that the IQ 700 is currently in at the time of a print.

The custom print supports:

- Specifying starting and terminating characters (STX, CR, LF)
- Adding printer control characters
- Custom headers and titles
- Customizing units to ounce, tons, or pounds
- Customized parameters such as gross weight instead of GR
- Custom insertion of special parameters such as time/date and identification number
- Delays where and when required
- Truck mode custom printing
- Custom continuous serial protocol
- Custom “P” print out in duplex mode

NOTE: *Custom print does not support RS485 protocol.*

Customizing					
	File	Normal Mode	Truck Mode	Macros (8)	Macro Parameter Codes
Port 1	7.1	Gross data	Truck mode data is printed only on Port 2. Port 1 files remain in normal mode. Option 7 disabled - unit prints in default format. Option 7 enabled - print mode will print to its default format unless a designated file is set to off.	7.9	600
	7.2	Net data		7.10	601
	7.3	Total data		7.11	602
	7.4	Special (future use)		7.12	603
Port 2	7.5	Gross data	Truck entry	7.13	604
	7.6	Net data	Truck out empty	7.14	605
	7.7	Total data	Truck out full	7.15	606
	7.8	Special (future use)	Truck fixed tare	7.16	607

Table 4-10. Customized Serial I/O Format

Option 7 Menu

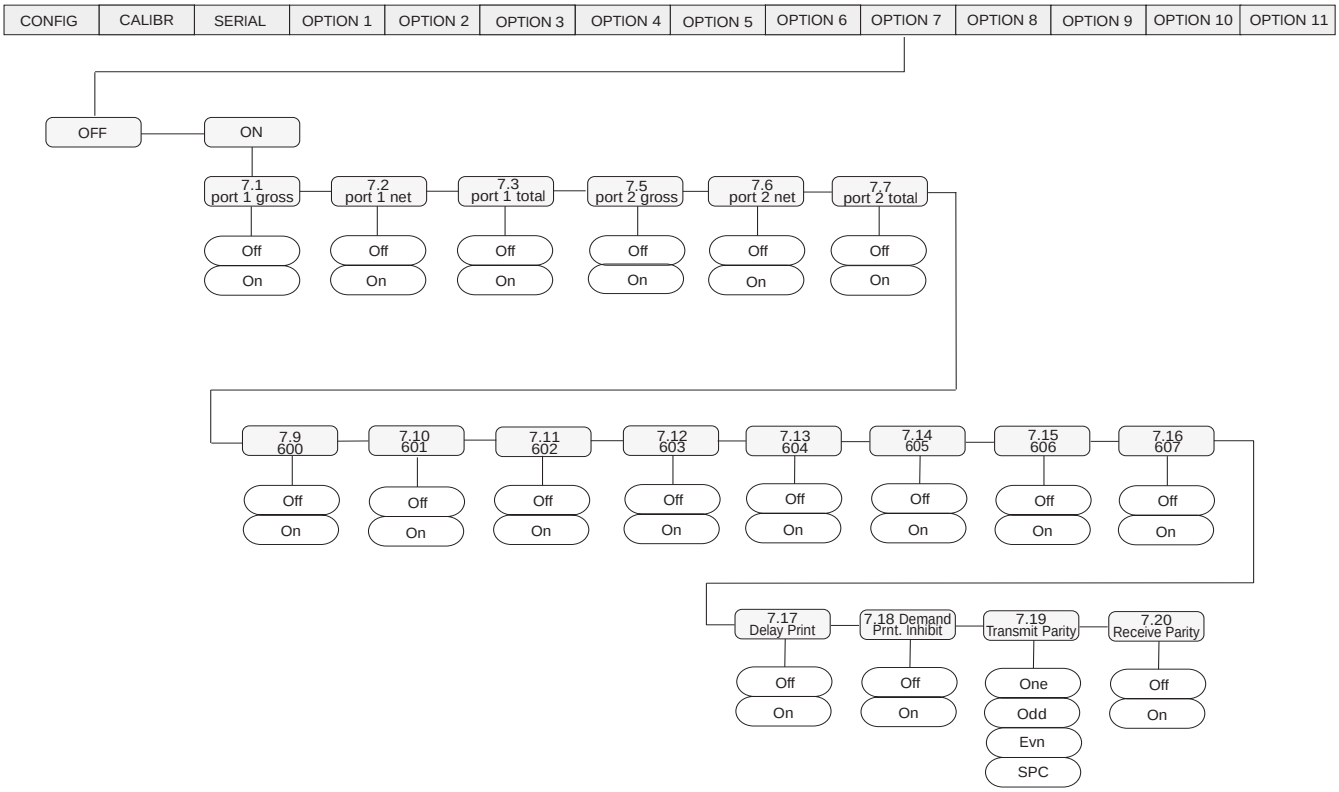


Figure 4-11. Option 7 Menu

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 7.

4.7.2 Macro File Setup

There are eight macro files that can be accessed in any of the prime print files 1–8 (7.1 to 7.8), using the 600 series codes listed in Table 4-10 on page 31 and Table 9-2 on page 64. Each macro file holds up to 30 ASCII characters and parameter codes. Refer to the ASCII characters and Table 9-2 for parameter codes.

Print File 7.1 – Port 1 gross mode data		
Line #	Code	Code definition
01	002	STX start of text
02	600	* macro file #1 (7.9)
03	200	gross weight with lb/kg gr
04	032	SP (space)
05	601	* macro file #2 (7.10)
06	013	CR (carriage return)
07	010	LF (line feed)
08	999	end of file

Table 4-11. Print File Definition Codes

Code 600 – macro file 7.9		
Line #	Code	Code definition
01	065	A character
02	067	C character
03	032	SP (space)
04	105	i character
05	110	n character
06	099	c character
07	046	. (period)
08	013	CR (carriage return)
09	010	LF (line feed)
10	999	end of file

Table 4-12. Code 600 Definitions

Code 601 – macro file 7.10		
Line #	Code	Code definition
01	402	date per setup
02	032	SP (space)
03	401	time per setup
04	999	end of file

Table 4-13. Code 601 Definitions

4.7.3 Standard Serial Configuration

The Serial I/O option allows standard serial output ports, configured in parameter 14 of the configuration mode, and options OP3 (time and date), OP5 (tag, ID, counter), and OP4 (accumulator), to be modified and imported into the serial output data stream. The following table lists configuration parameters in 14 and option modes that are associated with the customized print.

Parameter	Function	Custom Print
14.	Port 1 mode selection (OFF, SI, dU)	Port 1 files 7.1 – 7.4 set for simplex or duplex mode.
14.1	Net mode (Gtn/net) multi line (Gtn) or single line net data print only.	This selection is not applicable to the custom print.
14.2	Print delay – off, 1, 2, 3, 4 second delay.	Code 700 delays serial transmission for number of seconds selected in 14.2.
14.3	Port 1 mode (off/Co/dE) set for continuous or demand	Sets port 1 for Co or dE custom print.
14.4	Baud rate selection for Port 1	Port 1 custom print baud selection.
14.5	Port 2 mode (off/Co/dE) set for continuous or demand	Port 2 files 7.5 – 7.8 set for simplex or duplex mode.
14.6	Baud rate selection for Port 2	Port 2 custom print baud selection.
Options		
OP3	Time/Date setup	Codes 400 to 402 brings time and date into the serial data.
OP4	Accumulator setup	Codes 230 to 233 total data.
OP5	Tag mode setup Identification number setup Ticket number (counter) setup	Code 502 – two digit address code. Codes 503 and 504 – ID number codes Codes 510 and 511 – ticket number codes.

Table 4-14. Standard Serial Configuration

4.7.4 Option 7 Configuration

Option 7 configuration allows the user to create or edit files. The following table illustrates the option 7 configuration parameters.

Option	Prompt Display	Interpretation
All Off	-------	Mode not enabled (options 1 through 11 off)
OP.7	OP.7 oF OP.7 on	Custom print option off option disabled on option enabled
	7.1 – 7.8 oFF on	Main print files 1 through 8 Selected file disabled (default printout) Selected file enabled (custom printout)
	7.9 – 7.16 oFF on	Macro files 1 – 8 Selected file disabled Select file enabled
	7.17 oFF on	Delay print file Disabled Enabled – print command delayed until data is out of motion
	7.18 oFF on	Port 1 demand print inhibit Disabled Enabled – the print key, remote print (TB3-10), and auto batch (BAT2) print command are inhibited from executing a demand print out of port 1

Option	Prompt Display	Interpretation
	7.19 one odd evn SPC	Transmit parity selection Mark parity Odd parity Even parity Space
	7.20 oFF on	Receive data parity Disabled – parity observed when receiving data. Enabled – parity is ignored when receiving data.

Table 4-15. Option 7 Configuration Parameters (continued)

NOTE: *Selections 7.19 and 7.20 are available in EPROM (KDA1921-3).*

To Create a File

To create a new file use the following steps:

1. Go to the desired file (7.1–7.16) using the **TARE** key.
2. Set file to on using the **lb/kg CONV** key.
3. Step to the first file line (01) using **1 SETPOINT** key.
4. Using the numeric keyboard, enter the ASCII character or parameter code using the tables in Section 9.0 on page 63. NOTE: all codes are three digit decimal numbers and leading zeros need not be entered.
5. Go to the next line using the **1 SETPOINT** key.
6. Repeat steps 4 and 5 until the file is complete. End file with the code 999.

To Edit a File

Files may be edited in one of three ways:

- A new code can be added/modified
- Codes can be deleted from a file
- Codes can be inserted into a file

Add/Modify a Code

To add or modify an existing code:

1. Select the file position to be added or modified using the **1 SETPOINT** key to increase or the **2 SETPOINT** key to decrease to the desired file number.
2. Enter a new code using the numeric keys.

Delete a Code

To delete a code:

1. Select the file position to be deleted using the **1 SETPOINT** key to increase or the **2 SETPOINT** key to decrease to the desired file number.
2. Press **CE** key.

Insert a Code

To insert a code:

1. Select the file position where the new code is to be inserted using Setpoint keys as described above.
2. Press **ENT** key (observe 000 code).
3. Enter the new code using numeric keys.

NOTE: *Refer to the Parameter Control Chart in Section 9.0 , Table 9-2 for commands.*

4.8 Option 8 – Analog Output/Relay Option

NOTE: *Option 8 only addresses the setup of the analog output section on the dual function circuit board.*

Option 8 utilizes the KJN8924, a dual function circuit board mounted internally to the back plate of the indicator. It provides a four relay output for setpoint process control and a 4 - 20mA or 0 - 10 VDC analog output which is configured and trimmed for zero and span in similar fashion as the older option 2 analog output (KHD8924). Besides its dual function capabilities, the board uses a 16-bit DAC.

Table 4-16 shows the Option 8 configuration.

Option	Prompt Display	Interpretation
OP.8	OP.8 oF OP.8 on	Off On – Analog option enabled
	8.1 dSP Gr net	Analog tracks display Analog tracks gross weight Analog tracks net weight
	8.2 zR	Enter weight value for analog *Zero* using the numeric keys. The **TARE** key will store new value, while the display responds with *Enter.*
	8.3 FS	Use the same procedure as 8.2 to enter the analog *Full Scale* value.
	8.4 Zr.A	*Zero Trim*, while measuring the analog output, use the **lb/kg CONV** and **PRINT** keys to increase/decrease the zero value. Inc.dec function forces a test mode zero output. The **TARE** key stores the new value.
	8.5 SP.A	*Span Trim*, same as 8.4 except a span test mode output is provided.

Table 4-16. Option 8 Configuration Parameters

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 8.

4.8.1 Analog Output Option Wiring

Table 4-17 and Figure 4-12 show the analog output wiring.

Terminal Block	Function
TB4 – 1	+ Battery Supply
TB4 – 2	RET (common)
TB1 – 1	0 – 10VDC analog output
TB1 – 2	Common
TB1 – 3	4 – 20mA analog output

Table 4-17. Analog Output Wiring

Ribbon Cable Connection

The ribbon cable is a sixteen conductor cable that connects the TTL control logic levels (inputs and outputs) on J11 of the CPU board KGR8924 to J1 on the analog/relay option board.

Caution *When connecting the ribbon cable from J11 of the CPU board to J1 of the analog relay option board, be sure to match pin one of J11 to pin one of J1. Use the color strip on the cable to identify pin on at each connector end.*

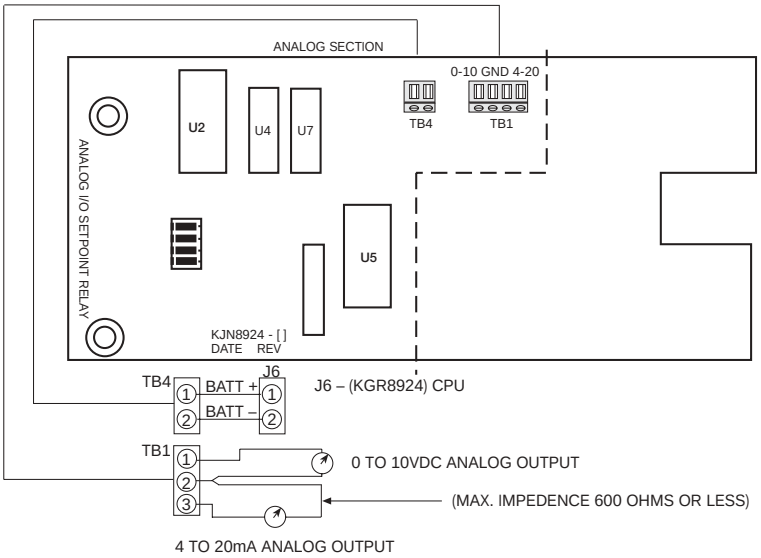


Figure 4-12. Analog Output Wiring to Indicator CPU Board

4.9 Option 9 – Front Panel Key Lockout Option

In some applications it is desirable that the front panel keys cannot be accessed while operating in normal mode. When option 9 is on, the zero, net/gross, tare, print, and setpoint front panel keys can be disabled by turning on the appropriate parameter (9.1 – 9.4) selections.

Setpoints 9.5 and 9.6 can be completely disabled from viewing and modifying by selecting off.

Note that option 9 only disables the front panel keys and does not lockout the functions that these keys perform. The zero, gross/net, tare, and print command are still accessible from the remote inputs on TB3 7–10 of the CPU board or through full duplex serial communication.

Table 4-18 shows the option 9 parameters.

Option	Prompt Display	Interpretation
OP.9	OP.9 oFF OP.9 on	Front panel key lockout option Off On – key lockout option enabled
	9.1 oFF on	Zero key enabled. Front panel key performs zero function when pushed. Zero key disabled.
	9.2 oFF on	Net/gross key enabled. Front panel key selects gross/net modes when pushed. Net/gross key disabled.
	9.3 oFF on	Tare key enabled. Front panel key performs tare function when pushed. Tare key disabled.
	9.4 oFF on	Print key enabled. Front panel key performs demand print function when pushed. Print key disabled.
	9.5 oFF rcL Chg	Setpoint 1 locked out from front key access. Setpoint 1 may be viewed but not changed. Setpoint 1 may be viewed and changed.
	9.6 oFF rcL Chg	Setpoint 2 locked out from front key access. Setpoint 2 may be viewed but not changed. Setpoint 2 may be viewed and changed

Table 4-18. Option 9 Parameters

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 9.

4.10 Option 10 – Setpoints

This option allows an active setpoint to be operated using the display, gross, or net data. When option 10 is turned on the selection of data that setpoint 1 operates off of is configured in 10.1 and 10.2 for setpoint 2.

Table 4-19 shows the option 10 parameters.

Option	Prompt Display	Interpretation	Interpretation
All Off	--------	Mode not enabled (options one through ten turned off)	
OP.10	OP.10 oFF OP.10 on	Off On – setpoint option enabled	
	10.1 dSP Gr net	Setpoint 1 uses display data Setpoint 1 uses gross weight data Setpoint 1 uses net weight data	
	10.2 dSP Gr net	Setpoint 2 uses display data Setpoint 2 uses gross weight data Setpoint 2 uses net weight data	
	10.3 oFF Gr net	Either mode Batching while in gross display mode Batching while in net display mode	Control the Batch 1 start mode
	10.4 oFF (0 - 50)	No zero restriction to start the batch. +/- 1 display grad band	Control the Batch 1 start zero band

Table 4-19. Option 10 Parameters

For additional information on setpoints refer to Section 7 on page 52.

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 10.

4.11 Option 11 – Remote Input Option

The remote input option provides a means of connecting remote inputs to the indicator and option 11 is used to configure those digital inputs to something other than to the defaults.

Table 4-20 shows the option 11 parameters.

Option	Prompt Display	Interpretation			
Off	-------	Mode not enabled			
OP.11	OP.11 oFF OP.11 On	Off - remote input option disabled On - remote input option enabled		Default Settings Normal	Batch
	11.1	Input 1 (TB3-10)	Data Selection for all: Zer Zero Scale n-G Net/Gross toggle tar Auto Tare Prt Print Sta Batch Start Pau Batch Pause Abo Batch Abort	Print	Print
	11.2	Input 2 (TB3-9)		Tare	Start Batch
	11.3	Input 3 (TB3-8)		Abort	Zero
	11.4	Input 4 (TB3-7)		Net/Gr	Abort
	11.5	Input 5 (TB4-5)		Print	Print

Table 4-20. Option 11 Parameters

Selecting any of these options, 11.1 - 11.5 enables the user to access the data selection for each of the inputs 1-5.

Refer to Section 4.12.3 on page 45 for individual serial command option parameters for Option 11.

4.12 Additional Options

Additional options are available with the IQ 700. While they are not digitally accessed and set up under the option mode (front panel switches 2 and 3 closed), they are available. Additional options include the following:

- Relay board (KHL8924) installed or when ordered as a kit (KBT7116-11/12).
- Relay board (KJN8924) installed or when ordered as a kit (KBT7116-16).
- Parallel BCD Option kit (KBY7116-1).

4.12.1 Relay Output Board KHL8924

This unit can be ordered with the relay output board(KHL8924) installed. Refer to Figure 4-13 on page 41 for detailed board wiring. This option provides four solid state relays to control 115/230 VAC lines directly.

For applications requiring dry contacts, reed relays can be ordered. Ordered in kit form, order:

- Solid state relays installed order KBT7116-11
- Reed relays installed order KBT7116-12

A rear access hole in the indicator is required for accessing output from the relay board. Newer indicators now come standard equipped with this hole.

Additional features of KHL8924 include:

- Power-up reset protection – all relays are held off until the CPU re-establishes proper operating conditions caused by power interruptions.
- Watchdog circuitry – A hardware timer is provides to automatically turn off all relays if the instrument is not running.
- Solid state optically isolated relays – Rated 20VAC to 120VAC, 5ma to 1 amp.
- Dry contact reed relays DC only – Rated 0.5 amp, 10va contact rating max. and 100VDC switching volts max.
- All outputs provided with terminal strip connections.

The following table shows the relay output wiring and is shown generically for either solid state or dry contact output relay options.

		Output Mode						
TB1	Output	A	B	C	D	E	F	G
1	1	Setpoint 1	Setpoint 1 with preact	Setpoint 1	Setpoint 1 with preact	Setpoint 1 with preact	Low	Low
2								
3	2			Setpoint 1 (dribble)	Setpoint 1 (dribble)	Setpoint 1 (dribble)	Accept	Accept
4								
5	3	Setpoint 2	Setpoint 2 with preact	Setpoint 2	Setpoint 2 with preact	Tolerance	High	High
6								
7	4	Zero band	Zero band	Setpoint 2 (dribble)	Setpoint 2 (dribble)	Zero band	Zero band	Zero band
8								
9	Spare							
10								

Table 4-21. KHL8924 Relay Output Wiring

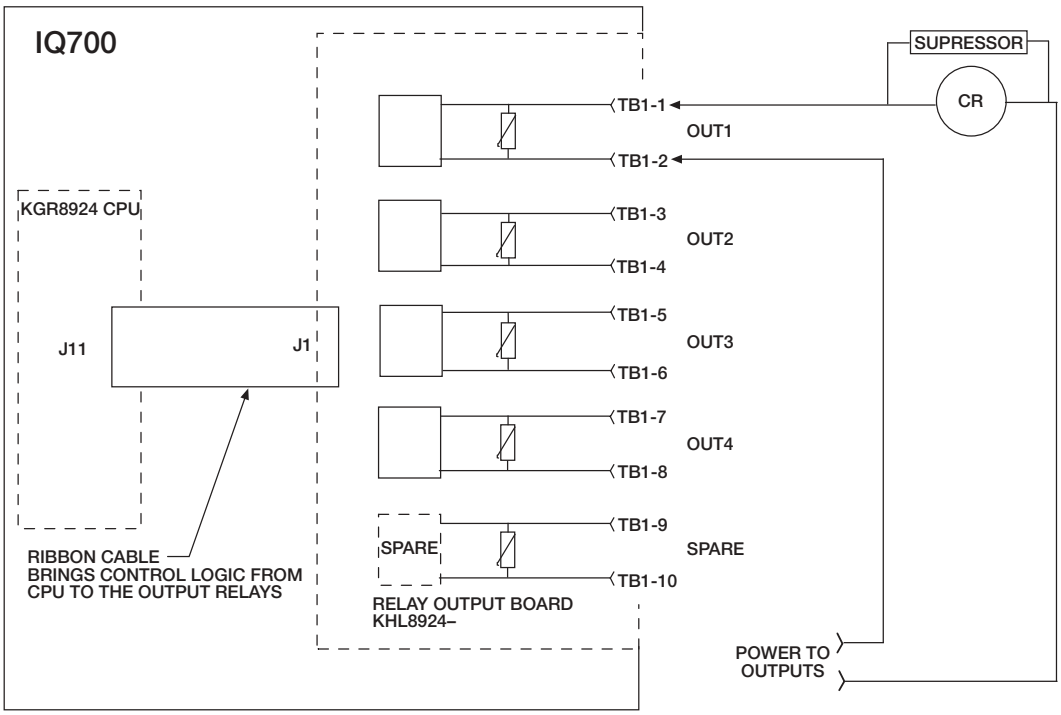


Figure 4-13. KHL8924 Relay Output Wiring

NOTES:

- The indicator power must be clean and isolated from the control power used to run relays, solenoids, and motors. Also the indicator ground must be separate from the control power ground.
- Solid state relays typically leak some current during their off state (4ma to 10ma). When used with certain relays or neon indicator lights, a resistor wired in parallel to the load may be required to shunt this current and allow the device to turn off.
- When using these outputs to drive other relays, suppressors are required on the external relay's coil.
- Insure that the load cell wiring is routed separately from all control wiring.

4.12.2 Relay Output/Input Board (KJN8924–)

The relay output board KJN8924– is a dual function circuit board that contains both an analog output section (0 – 10VDC or 4 – 20ma) and a relay output/input section with four solid state relays and four solid state input relays. Additional features of KJN8924– include:

- Power up reset protection – all relays are held off until the CPU re-establishes proper operating conditions caused by power interruptions.
- Watchdog circuitry – a hardware timer is provided to automatically turn off all relays if the instrument is not running.
- Solid state optically isolated relays – rated 20VAC to 120VAC, 5ma to 1 amp
- Outputs and inputs are provided with terminal strip connections.

Table 4-22 shows the setpoint relay output/input wiring

Outputs		Inputs	
Terminal Block	Function	Terminal Block	Function
TB2 - 1	Out 1	TB3 - 6	IN 2
TB2 - 2	Out 2	TB3 - 5	IN 3
TB2 - 3	Out 3	TB3 - 4	IN 4
TB2 - 4	Out 4	TB3 - 3	IN 5
TB2 - 5	AC Common		
TB3 - 1 & 2			
TB5 - 4			

Table 4-22. Setpoint Relay Option Output/Input Wiring

The following table shows the relay output wiring for KJN8924.

		Output Mode						
TB2	Output	A	B	C	D	E	F	G
1	1	Setpoint 1	Setpoint 1 with preact	Setpoint 1	Setpoint 1 with preact	Setpoint 1 with preact	Low	Low
2	2			Setpoint 1 (dribble)	Setpoint 1 (dribble)	Setpoint 1 (dribble)	Accept	Accept
3	3	Setpoint 2	Setpoint 2 with preact	Setpoint 2 with preact	Setpoint 2 with preact	Tolerance	High	High
4	4	Zero band	Zero band	Setpoint 2 (dribble)	Setpoint 2 (dribble)	Zero band	Zero band	Zero band

Table 4-23. KJN8924 Relay Output Wiring

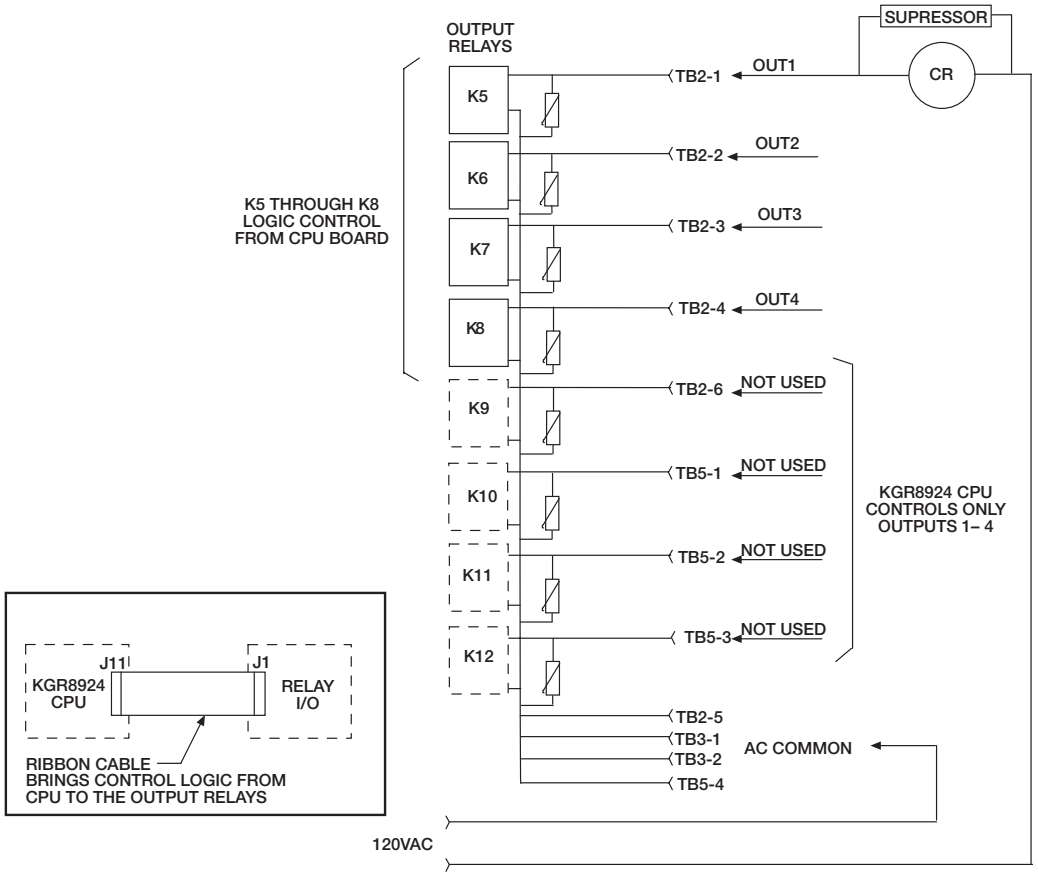


Figure 4-14. Output Relays Wiring Diagram

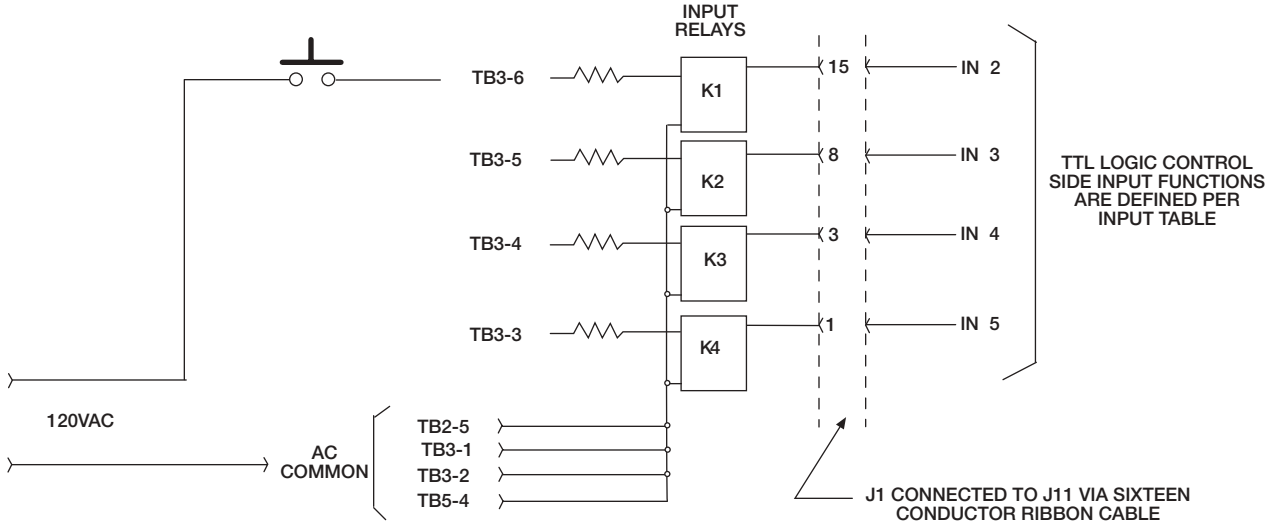


Figure 4-15. Input Relay Wiring Diagram

Operational Mode		Relay Board TB3	TTL Inputs J11 KGR8924 CPU
Normal	Batch		
Tare	Start Batch	TB3-6	IN2
Zero	Zero	TB3-5	IN3
Net/Gross	Abort	TB3-4	IN4
Print	Print	TB3-3	IN5
		Relay Board TB-4	
Print	Print	TB4-5	IN

Table 4-24. Relay Input Wiring

4.12.3 Serial Command Option Parameters

The following table lists the option parameter serial commands for the IQ 700.

Option 1	K0306 00 = TI (time entry)	K0701 00 = Off	K0717 00 = Off	K0906 00 = CHG
K0100 00 = Off	K0306 01 = DA (date entry)	K0701 01 = On	K0717 01 = On	K0906 01 = OFF
K0100 01 = On				K0906 02 = RCL
	Option 4	K0702 00 = Off	K0718 00 = Off	
Option 2	K0400 00 = Off	K0702 01 = On	K0718 01 = On	Option 10
K0200 00 = Off	K0400 01 = On			K1000 00 = Off
K0200 01 = On	K0401 00 = Off	K0703 00 = Off	K0719 00 = ODD	K1000 01 = On
K0201 00 = DSP	K0401 01 = 1	K0703 01 = On	K0719 01 = EVN	K1001 00 = DSP
K0201 01 = GR	K0401 02 = 2		K0719 02 = SPC	K1001 01 = GR
K0201 02 = NET	K0401 03 = 3	K0704 00 = Off	K0719 13 = ONE	K1001 02 = NET
	K0401 04 = 4	K0704 01 = On		
K0202 00 = P.1	K0401 05 = 5		K0720 00 = Off	K1002 00 = DSP
K0202 01 = P.2	K0401 06 = 6	K0705 00 = Off	K0720 01 = On	K1002 01 = GR
	K0401 07 = 7	K0705 01 = On		K1002 02 = NET
K0203 00 = Off	K0401 08 = 8		Option 8	
K0203 01 = DE	K0401 09 = 9	K0706 00 = Off	K0800 00 = Off	K1003 00 = OFF
K0203 02 = CO	K0401 10 = 10	K0706 01 = On	K0800 01 = On	K1003 01 = GR
	K0401 11 = 20		K0801 00 = DSP	K1003 02 = NET
K0204 00 = 12	K0401 12 = 30	K0707 00 = Off	K0801 01 = GR	
K0204 01 = 24	K0401 13 = 40	K0707 01 = On	K0801 02 = DSP	K1004 00 = OFF
K0204 02 = 48	K0401 14 = 50			K1004 01 = 0
K0204 03 = 96		K0708 00 = Off	K0802(*xxxxxxxx*) – Zero	K1004 02 = 1
	Option 5	K0708 01 = On	K0803(*xxxxxxxx*) – Span	K1004 03 = 2
K0205(*xxxxxxxx*)–Zero	K0500 00 = Off		K0804(*xxxxxxxx*) – Zero Trim	K1004 04 = 3
K0206(*xxxxxxxx*)–Span	K0500 01 = On	K0709 00 = Off	K0805(*xxxxxxxx*) – span trim	K1004 05 = 4
K0207(*xxxxxxxx*)–Zero Trim	K0501 00 = TAG	K0709 01 = On		K1004 06 = 5
K0208(*xxxxxxxx*)–Span Trim	K0501 01 = LAN		Option 9	K1004 07 = 6
	K0501 02 = OFF	K0710 00 = Off	K0900 00 = Off	K1004 08 = 7
Option 3		K0710 01 = On	K0900 01 = On	K1004 09 = 8
K0300 00 = Off	K0502 00 = Addr (RS-485 address entry)		K0901 00 = Off	K1004 10 = 9
K0300 01 = On		K0711 00 = Off	K0901 01 = On	K1004 11 = 10
K0301 00 = STD	K0503 00 = Off	K0711 01 = On		K1004 12 = 20
K0301 01 = DLS	K0503 01 = On		K0902 00 = Off	K1004 13 = 30
		K0712 00 = Off	K0902 01 = On	K1004 14 = 40
K0302 00 = 24	K0504 00 = Off	K0712 01 = On		K1004 15 = 50
K0302 01 = 12	K0504 01 = Off		K0903 00 = Off	
		K0713 00 = Off	K0903 01 = On	Option 11
K0303 00 = A	K0505 00 = Cnt (num entry)	K0713 01 = On		K1100 00 = Off
K0303 01 = P			K0904 00 = Off	K1100 01 = On
	Option 6	K0714 00 = Off	K0904 01 = On	K1101 00 = ZER
K0304 00 = Ab	K0600 00 = Off	K0714 01 = On		K1101 01 = N-G
K0304 01 = On	K0600 01 = On		K0905 00 = CHG	K1101 02 = TAR
K0304 02 = Un		K0715 00 = Off	K0905 01 = OFF	K1101 03 = PRT
	Option 7	K0715 01 = On	K0905 02 = RCL	K1101 04 = STA
K0305 00 = No.	K0700 00 = Off			K1101 05 = PAU
K0305 01 = Let	K0700 01 = On	K0716 00 = Off		K1101 06 = ABO
		K0716 01 = On		(K1102 - 05 same as K1101)

Table 4-25. Serial Command Option Parameter Codes

5.0 Calibration

The IQ 700 indicator can be calibrated using single slope span calibration or five-point linearization. Zero must be calibrated (see Section 5.1) before either span or linearization calibration can be performed.

Indicator option 2 (Section 4.2 on page 22) provides settings for zero, span, and trim adjustments. The settings are all digital therefore no potentiometers are required. During the trim adjustments for zero/span, the analog output is forced to the zero/span previously selected in option mode parameters 2.5 and 2.6. While reading the analog output, the trim is increased or decreased from 0 to ± 175 until the reading corresponds with the values entered in parameters 2.5 and 2.6.

5.1 Zero Calibration

Zero calibration is accomplished by the following steps:

1. Clear the scale (no load).
2. Close SW1-3 (dead load). The leftmost display digit should be flashing *C* as shown in Figure 5-1.

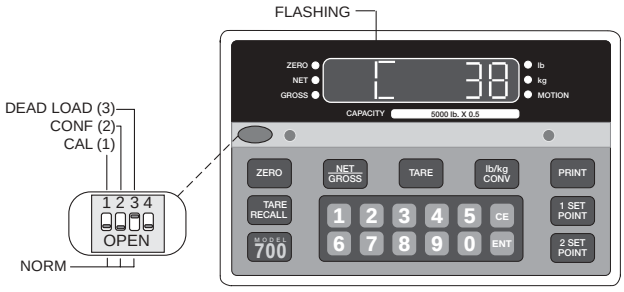


Figure 5-1. Close Switch 3

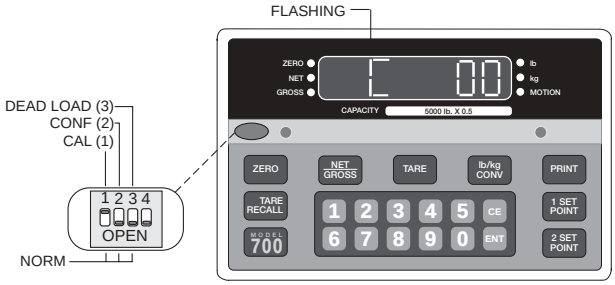


Figure 5-2. Close Switch 3 and Open Switch 1

3. Adjust dead load potentiometer to obtain a reading at or near zero (see Figure 5-2).
4. Open SW1-3 and close SW1-1 to put the indicator in the digital calibration mode. The display may change from a zero reading, which is acceptable.
5. Press the **ZERO** key. The display should read ---*CAL*, then return to a zero reading.

5.2 Single Slope Span Calibration

1. Place a test weight on the scale and wait for the motion LED to go out.
2. Enter weight value using keyboard. When correct, press **ENT**. The display will read ---*CAL* briefly, then return to the correct reading.
3. Recheck by clearing scale.
4. Open all switches to place the unit in normal weighing mode (Figure 5-3).

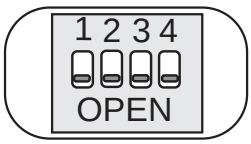


Figure 5-3. SW1 with All Switches Open

5. Close center bar and tighten center bar screws. Seal the unit if used in a legal-for-trade application.

5.3 Five-Point Linear Calibration

There are five calibration points (La, Lb, Lc, Ld, and Le) that can be entered sequentially. Calibrations using fewer than five points will linearize the curve up to the last data point. The curve is then extrapolated from the last entry point. For best results, use values of 20%, 40%, 60%, 80%, and 100% of full scale for the five linearization points.

1. Turn on option 6 (see Section 4-6 on page 30).
2. After performing a zero calibration as described in Section 5.1, place the first test weight on the scale platform. Allow ten or more seconds for stabilization (motion LED goes out).

NOTE: *Straight averaging is applied during calibration.*

3. Enter test weight value for the first calibration point using the numeric keyboard.
4. When the display is correct, press the **ENT** key. The display will read *CAL* briefly. The value of the last calibration point entered then appears with a flashing display prompt *L_* indicating the next calibration point to be entered (Lb, Lc, Ld, or Le).
5. Recheck Steps 2, 3 and 4 for Lb, Lc, Ld, and Le with the appropriate test weights.
6. Recheck the zero weight by emptying the scale.

NOTE: *AZM is off during calibration. Dead load display provides signal reference.*

7. When complete, open all switches on SW1.
8. Re-install faceplate bracket and tighten the knurled fasteners. Seal the unit if used in a legal-for-trade application.

Calculations Example

Capacity = 200,000 lb x 20 lb

Number of graduations = 200,000 ÷ 20 = 10,000

Configuration:

- Parameter 1 = 100 (10,000 graduations)
- Parameter 2 = 20 (resolution)
- Parameter 3 = 0 (no decimal point)

Other Factors to Note

PAZ: 1.9% x 200,000 = 3800 lb

Overrange: 103% x 200,000 = 206,000 lb

Minimum calibrated load: 10% x 200,000 = 20,000 lb

Analog Sensitivity

Analog signal input range: 0.7 to 3.2 mV/V

Analog signal sensitivity: 0.3 μV/graduations at 20,000

For H-44 requirements, use a factor of 4 (1.2 μV/grad). If the lower signal range is used for calibration, the indicator may fail acceptance testing with 0.3 μV/grad.

NOTE: *Check for a minimum live load of 12 mV for 10,000 graduations. If less than 12 mV, decrease the number of graduations accordingly.*

6.0 Normal Weighing Mode Operations

This section provides the operator with a description of front panel key functions and associated annunciators (LEDs) used to operate the IQ 700 in the normal weighing mode.

After the unit is configured and calibrated, the unit is placed in the weighing or normal weighing mode (SW1-1 through SW1-4 open). In this mode, the weight indicator displays live weight data that is presently on the scale.

6.1 Display Test

The display check and EPROM verification are used to test the indicator LED.

6.1.1 Display Check

Observe the display when power is first applied to the indicator. All six indicator LEDs (zero, net, gross, lb, kg, and motion) should be turned on and each seven segment display, with its associated decimal point, will advance across the display field, allowing the operator to check for any missing segments or decimal points.

6.1.2 EPROM Verification

Upon completion of the display check the software version momentarily appears on the display. This value indicates to the operator the current EPROM that has been installed in the IQ 700. The IQ 700 operates with an EPROM family group KDA 49.x (*x* is the version).

6.2 LED Annunciators

Table 6-1 shows the display panel annunciator and the definitions of the annunciator.

Annunciator	Annunciator Definition
ZERO	On when gross weight data is within ±1/4 graduation of the center of zero
NET	On when indicator is in net weighing mode
GROSS	On when indicator is in gross weighing mode
lb/kg	Shows units of displayed weight data
MOTION	On when display data is changing by the number of graduations selected in parameter 9 in configuration mode

Table 6-1. Annunciator Definitions

6.3 Function Keys

Table 6-2 describes the various functions of the IQ 700 keys.

Key	Functional Description
ZERO	Rezeroes scale if the gross weight is within the band of zero selected in the configuration mode (1.9% or full scale)
GROSS / NET	Selects the desired weight data to be viewed (GROSS or NET). The gross and net LED annunciators indicate which display mode is active.
TARE	When used in the gross mode, the indicator will acquire the tare value and automatically shift to the net display mode. If a tare acquisition is negative or the weight data is in motion, the indicator remains in the present mode and no tare is performed.
UNIT	If the indicator is set up to perform lb/kg conversion, this key toggles weight data between its calibrated base weight unit in lb to kg units. The lb and kg annunciator LEDs indicate which units are displayed.
PRINT	Issues a demand print command to the serial output.

Table 6-2. Function Key Description

6.4 Gross/Tare/Net Weighing Operations

In normal mode, the IQ 700 displays gross, tare, or net weights using the LED annunciators to indicate scale status and the type of weight value displayed.

6.4.1 Display Mode on Power Up

When the IQ 700 is initially powered up, the display automatically appears in the gross mode.

6.4.2 ZERO Key Function

If the gross weight zero is within the zero band, press the **ZERO** key. There are various things that would make invalid zero conditions. They are:

- Gross weight data above the defined zero band
- Gross weight data in motion
- Overload/underload condition

6.4.3 TARE Key Function

If the tare acquisition is greater than zero (+1/2 graduation), set the display to the net mode and apply the new tare.

If the tare acquisition is negative or in motion, the indicator stays in the current mode and no tare is performed.

6.4.4 Overload and Underrange Conditions

Overload conditions occur when the weight exceeds the selected scale capacity by greater than 105%, or overload may indicate a defective load cell or load cell simulator input.

NOTE: *If the indicator is configured for legal-for-trade (PAZ = 1.9%), overload occurs at 103% of full scale capacity if push-to-zero has already captured 2% of full scale (105% minus 2% = 103%).*

Underload conditions will occur when scale input is greater than -400 grads, or underload may indicate a defective load cell or load cell simulator input. Figure 6-1 shows the indicator display associated with over and underrange conditions.

See Section 9.3 on page 64 for information about additional error and display messages.

Overload

Underrange

Figure 6-1. Overload and Underrange Error Displays

6.5 Fixed Tare Entry

Do the following to enter a fixed tare through the front panel:

1. From normal weighing mode, press **GROSS/ NET** to place unit in net mode.
2. Using the front panel numeric keys, key in the desired tare weight. If the displayed tare value is correct, press the Enter (**ENT**) key. Press the Clear Entry (**CE**) key to clear an incorrect value.

Both auto and fixed tare values can be recalled by pressing the **TARE RECALL** key. The flashing LED on the **TARE RECALL** key indicates that the unit is displaying the current tare value.

6.5.1 Lb/Kg Conversion

When parameter 10 in the configuration mode is set to Con (conversion), pressing the **UNIT** key toggles the weight display units from lb (calibrated base units) to kg units (converted units from base weight data) and vice versa.

6.6 Serial Output

Pressing the local **PRINT** key or issuing a serial print command (unit must be set up for bidirectional serial communication).

6.6.1 Serial Data Formats

Serial data is transmitted in ASCII-compatible format and consists of the following:

- One start bit
- Seven data bits
- One parity bit (odd)
- One stop bit

Table 6-3 lists characters used in the IQ 700 serial data string.

Character	Description
<STX>	Non-recording “start of text” character
<POL>	Polarity sign; space for positive data, minus (–) for negative data
<DATA>	Seven-digit numeric data field including decimal point or fixed (dummy) zero when selected. Leading zero suppression with leading zeroes transmitted as space characters.
<ID DATA>	Six-digit numeric data field with no decimal point and no leading zeroes.
<ID>	Two character label field for identification (ID)
<NO>	Three ASCII character label field for Identification Number (NO)
<SP>	Space character
<LB/KG>	Two-character data field identification for weighing units in demand mode: Weight in lb = <LB> Weight in kg = <KG>
<L/K>	One-character data field identification for weighing in continuous mode: Weight in lb = <L> Weight in kg = <K>
<GR/NT>	Two-character data field identification for weighing mode in demand mode: Gross mode = <GR> Net mode = <NT>
<G/N>	One-character data field identification for continuous output mode: Gross mode = <G> Net mode = <N>
<P>	Print command
<CR>	Carriage return (message terminator)
<CR/LF>	Two-character data field: carriage return followed by line feed; used in both transmission modes to indicate end of message
<STAT>	One-character data field identification in continuous mode, used to indicate the status of the indicator display. Characters are listed in order of priority: higher priority status characters override lower priority status characters.
NOTE: Bracket delimiters (< and >) are shown for clarity only; delimiters are not sent in the serial data stream.	

Table 6-3. Serial Data Character Descriptions

Serial Commands for Setting up Options

Command is *Kxxyy zz<CR>*

where *xx* is the option number, *yy* is the subparameter number, and *zz* is the setting choice.

Status Character Definitions

The status character (<STAT>) provides information to the receiving device about the current indicator operation. Table 6-4 shows the status characters returned by the IQ 700 indicator.

Status Characters	Description
<D> (44H)	Digital calibration mode
<A> (41H)	Analog calibration mode
<I> (49H)	Invalid data
<O> (4FH)	Over or under range
<M> (4DH)	Scale in motion
<X> (58H)	Setpoint 1 displayed
<Y> (59H)	Setpoint 2 displayed
<Z> (5AH)	Tare recall data displayed
<SP> (20H)	Normal display (valid data)

Table 6-4. Status Data Character Descriptions

NOTES: *Response data (xxxxxx) is six characters with no decimal point, seven with decimal point. Leading zeroes are shown as space characters.*

Invalid data requests or entries are responded to with an echo of valid portion and the letter I indicating the invalid portion.

6.6.2 Demand Mode versus Continuous Data Output

Demand mode is used to interface with printers and requires a manual print command from the front panel to initiate the output data. To comply with legal-for-trade regulations, demand output data is inhibited during the following conditions:

- Scale in motion
- Positive overload
- Negative overload
- Negative gross weight displayed
- Unit in display check mode
- Other display modes

NOTE: *In legal-for-trade applications, the Motion Detection Parameter (parameter 9) must be turned ON.*

In demand mode, the operator may choose to print Gross/Tare/Net when in net mode. If the serial port is set to print on demand mode, the format is:

<STX><POL><DATA><SP><LB/KG><SP><GR/NT>
<SP><CR><LF>

6.6.3 Demand Print with Identification Number

In normal mode, the demand print output data can be labeled with a six-digit ID number. To print label data, the operator must enter six digits (maximum) using the numeric keys (no leading zeroes), then press the **PRINT** key. The format to set demand print with ID number is:

<STX><SP><SP><6DIGITS><SP><ID><SP><NO><CR>
<LF><STX><POL><DATA><SP><LB/KG><SP>
<GR/NT><SP><CR><LF>

General Continuous Mode Output Data Format

Continuous mode is used to interface to computers, scoreboards, and other remote devices requiring constant data updating. Continuous mode transmission occurs at the end of each display update.

<STX><POL><DATA><L/K><G/N><STAT><CR><LF>

Downloading/Recall of Fixed Tare

The format to fixed tare data entry (see Table 6-5) is:

<FE>(XXXXXX)<CR>

The format with unit echo (see Table 6-5) is:

<FR>(XXXXXX)<CR>

Character	Identification Definition
<,>	Bracket delimiters are not sent
SE	Setpoint entry (53H, 45H)
SR	Setpoint recall (53H, 52H)
FE	Fixed tare entry (46H, 45H)
FR	Fixed tare recall (46H, 45H)
n	Setpoint parameter 0-6
(	Data opening parenthesis (28H)
)	Data closing parenthesis (29H)
CR	Command terminator (0DH)
xxxxxx	DATA characters must be six or less including decmal point if configured: 999999 or 999.99. Space and polarity characters can not be used in fixed tare data entry.

Table 6-5. Data String Characters

6.7 Truck Weighing Mode

The truck weighing mode provides a weigh-in/weigh-out system for single scale applications. The IQ 700 has a system capacity of up to three hundred transactions, each with up to six digit identification numbers (ID's).

The truck weighing system is configured using parameter 13 and transaction printouts are performed only on port 2 and the operation is only in gross mode.

During configuration the installer has the following options:

- Turn the truck weighing system on or off.
- Store ID numbers and tare weights after a transaction or automatic cancellation of the ID number/tare.

NOTE: *Storing truck transactions may eventually fill the transaction buffer. To delete stored transactions, use the clear procedure described in "Transaction buffers: view/print/clear" on page 53.*

- Enable or disable the fixed tare entry mode.

NOTE: *The IQ 700 operates in gross mode only while in truck weighing mode.*

Table 6-6 shows the configuration selections for parameter 13.

Parameter	Subparameter		
Net/Gross	Tare	Lb/kg conversion	Interpretation
13 nor			Normal weighing mode
13 tru			Truck weighing mode
	13.1		Truck transaction disposition
		13.1Can	Truck transaction record deleted after print
		13.1Str	Truck transaction store ID number and tare weight
	13.2		Fixed tare entry select
		13.2 on	Enables fixed tare entry while ID number is being displayed
		13.2 oFF	Fixed tare entry disabled

Table 6-6. Parameter 13 Configuration Selections

The truck weighing mode is broken down into three categories:

- Full truck in mode
- Empty truck in mode
- Fixed tare mode

Table 6-7 on page 53 describes the functional operation of each truck weighing modes:

Mode	Functional Description
Full Truck In mode	Transaction begins with a full truck (gross weight) entering landfill, and leaves empty (tare weight). The transaction uses the following steps. 1. Truck enters the scale full. Scale settles out of motion. 2. Driver inserts ticket and presses **PRINT**. 3. Display responds with ID No prompt. 4. Driver enters truck ID number (6 digit maximum). 5. Driver presses **ENT**. 6. Ticket prints: (*xxxxxx*) ID. NO (*xxxxx*) LB GR 7. Truck goes to landfill and empties load. 8. Empty truck returns to scale and gives ticket to operator. Scale settles out of motion. 9. Driver presses **PRINT** key and ID No. prompt appears. 10. Driver enters same ID number as printed on the ticket, then presses **ENT**. 11. Printer prints final transaction which includes ID Number, Lb Gr recall, Tare, NT
Empty Truck In mode	Transaction begins with an empty truck (tare weight) entering ie: gravel pit, enters the scale, is filled, and is then weighed full (gross weight) on the way out. The transaction uses the following steps. 1. Empty truck enters the scale. Scale settles out of motion. 2. Driver inserts ticket and presses **PRINT**. 3. Display responds with ID No prompt. 4. Driver enters truck ID number (6 digits maximum) 5. Driver presses **ENT**. 6. Ticket prints: (*xxxxxx*) ID. NO (*xxxxx*) LB GR 7. Truck exits scale and fills. 8. Truck re-enters scale and the driver puts ticket back in the printer. Scale settles out of motion. 9. Driver presses **Print** key and ID No. prompt appears. 10. Driver enters same ID number as printed on the ticket 11. Driver presses **Ent**. 12. Printer prints final transaction which includes ID Number, Lb Gr recalled Tare, Lb NT
Fixed Tare Mode	Many truck weighing applications require the entry of a known fixed (manual) tare weight when the truck is on the scale; the advantage of a fixed tare function is that the truck needs to go over the scale only once. The fixed tare entry function operates as follows: 1. Truck enters the scale full. Scale settles out of motion. 2. Driver inserts ticket and presses **PRINT**. 3. Display responds with ID No prompt. 4. Driver enters truck ID number (6 digits maximum). 5. Driver press the **TARE** key *not* the **ENT** key as in previous transactions. 6. Display responds with a **tAre** prompt, asking for a fixed tare entry. 7. Driver enter the truck tare weight. 8. Driver press **ENT**. 9. Printer prints transaction which includes ID Number, Lb Gr, Lb Tr keyed, Lb NT

Table 6-7. Truck Mode Descriptions

Transaction buffers: View/Print/Clear

Tare Recall: Provides viewing of entered identification numbers. Each push will step to the next ID. When donE appears, that is the end of the buffer.

Print: Pressing print with identification displayed will cause output (print) of the whole buffer.

CE: Pressing clear entry with identification displayed will clear that location. Consecutive clear entries until donE prompt appears, will clear entire buffer.

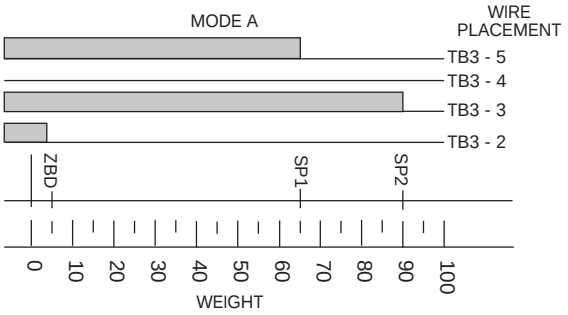
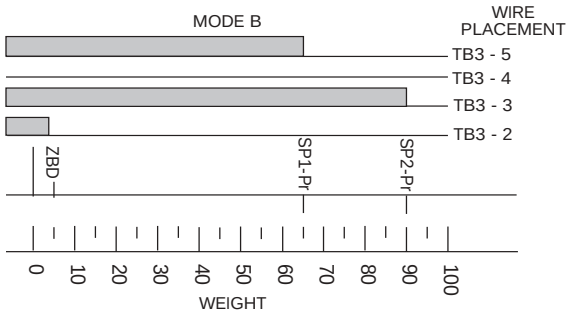
The transmission of serial data can be initiated in either demand mode, continuous mode, or RS485.

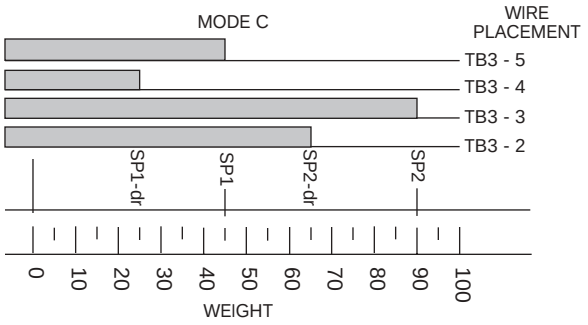
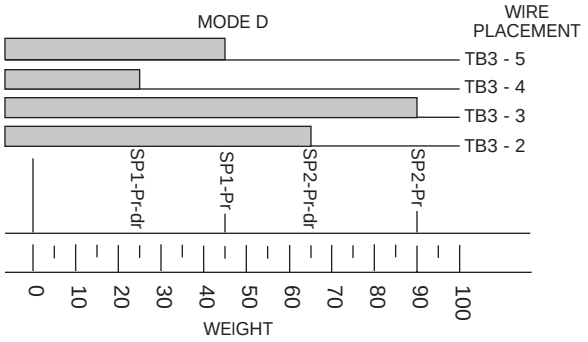
7.0 Setpoints

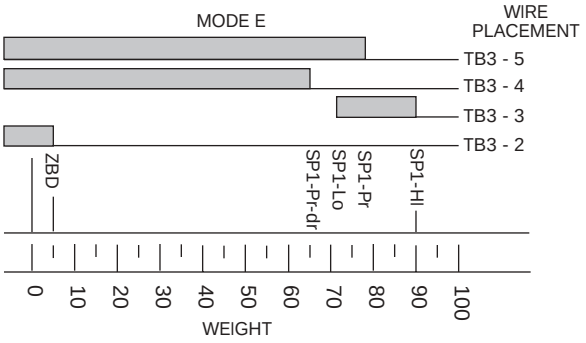
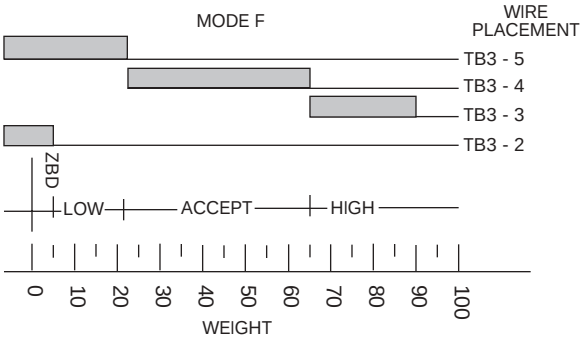
The IQ 700 is equipped with four independent control outputs, which are 5VDC logic level signals capable of sinking 12ma. Setpoints can be configured in the following modes:

- Mode A – Setpoint and zero band
- Mode B – Setpoint, with preact, and zero band
- Mode C – Setpoint, with dribble control
- Mode D – Setpoint, with preact and dribble control
- Mode E – One setpoint with preact, dribble control, and tolerance band output
- Mode F – High-low alarm control
- Mode G – Over/under checkweigh control

The following table describes the various modes.

Mode	Description	Setpoint
Mode A	Setpoint and zero band Cutoff occurs when WT ≥ SP. Use the following steps to set Mode A setpoint values: 1. Press **SETPOINT 1** or **SETPOINT 2** on front panel. 2. Enter desired setpoint value, (display times out if no number is entered for several seconds). 3. Press **ENT**, then display returns to normal operation. 4. The setpoint value can be recalled any time by pressing the appropriate setpoint key. 	SP1 SP2 ZBD
Mode B	Setpoint, with preact and zero band The preact value provides for material that is in suspension. Cutoff occurs when WT ≥ SP – Pr Use the following steps to set Mode B setpoint values. 1. Press **SETPOINT 1** or **SETPOINT 2** on front panel. 2. Enter desired setpoint value, (display times out if no number is entered for several seconds). 3. Press **ENT**. Display flashes number value alternated with Pr. 4. Enter desired preact value, then press **ENT** key. Display returns to normal operation. 5. The setpoint value can be recalled any time by pressing the appropriate setpoint key. 	SP1-Pr SP2-Pr ZBD

Mode	Description	Setpoint
Mode C	Setpoint with dribble control Dribble control provides two-speed cutoff (fast or slow feed) to enhance accuracy. Cutoff occurs when WT≥ SP – dr – Pr. Use the following steps to set Mode C setpoint values. 1. Press **SETPOINT 1** or **SETPOINT 2** on front panel. 2. Enter desired setpoint value, (display times out if no number is entered for several seconds). 3. Press **ENT**. Display flashes number value alternated with dr. 4. Enter desired dribble value, then press **ENT** key. Display returns to normal operation. 5. The setpoint value can be recalled any time by pressing the appropriate setpoint twice.  	SP1 SP1-Dr SP2 SP2-dr
Mode D	Setpoint with preact and dribble control Slow feed cutoff occurs when WT ≥ SP – Pr. Fast feed cutoff occurs when WT ≥ SP – Pr – dr. Use the following steps to set Mode D setpoint values. 1. Press **SETPOINT 1** or **SETPOINT 2** on front panel. 2. Enter desired setpoint value, (display times out if no number is entered for several seconds). 3. Press **ENT**. Display flashes number value alternated with Pr. 4. Enter the desired preact value; then press **ENT** key. 5. Enter the desired dribble value; then press **ENT** key. 6. The setpoint value can be recalled any time by pressing the appropriate setpoint twice for preact and a third time for dribble value.  	SP1-Pr SP1-Pr-dr SP2-Pr SP2-Pr-dr

Mode	Description	Setpoint
Mode E	One setpoint with preact, dribble control, and tolerance band output Converts setpoint two (SP2) to be a tolerance output when WT > SP1 – Lo, but < SP1 + HI. Use the following steps to set Mode E setpoint values 1. Enter value for **SETPOINT 1**. 2. Press **SETPOINT 2** 3. Enter desired setpoint value, (display times out if no number is entered for several seconds). 4. Press **ENT** key. Display flashes number value alternated with **HI**. 5. Enter the desired high tolerance value; then press **ENT** key. 6. Repeat steps for the low tolerance value (Lo) (Low tolerance = SP1 – Lo). 	SP1-Pr SP1-Pr-dr TOL ZBD
Mode F	High-Low alarm control Outputs with low level on when WT < SP1. High level on when WT > SP2. Use the following steps to set Mode F setpoint values. 1. Press **SETPOINT 1**. 2. Enter the desired low level value, (display times out if no number is entered for several seconds). 3. Press **ENT** key 4. Press **SETPOINT 2**. 5. Enter the desired high level value, (display times out if no number is entered for several seconds). 6. Press **ENT** key, display returns to normal operation. 7. The setpoint value can be recalled any time by pressing the appropriate setpoint key. 	LOW ACCEPT HIGH ZBD

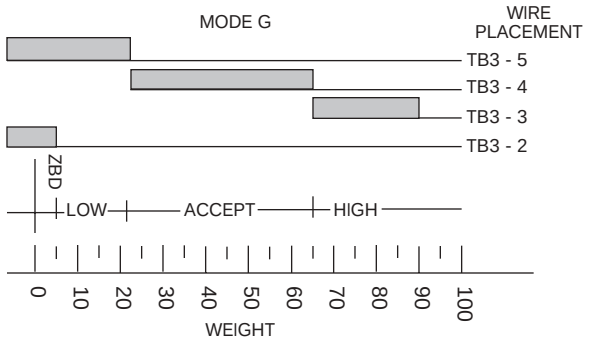
<table>
<tr><th>Mode</th><th>Description</th><th>Setpoint</th></tr>
<tr><td>Mode G</td><td>Over/Under checkweigh control
Provides High, Low, and Accept outputs except a direct entry is made for a target weight and high/low settings become dependent.
Use the following steps to set Mode G setpoint values.
1. Press SETPOINT 1
2. Enter the desired target value; then press ENT.
3. Press SETPOINT 2
4. Enter the desired high tolerance (HI) value and press ENT.
5. Enter the desired low tolerance (L0) value and press ENT.
 
</td><td>LOW
ACCEPT
HIGH
ZBD</td></tr>
<tr><td>Manual Batching Mode</td><td colspan="2">The manual batching mode operates as follows:
1. Press the START key located in the lower left corner of the front panel. The setpoint LED is on.
2. Setpoint 1 is activated if enabled. If enabled, skip step D.
3. When the displayed weight reaches or exceeds the setpoint value, the setpoint is deactivated.
4. The unit enters a pause mode locking out zero, net/gross, and tare keys during run. During Pause, the tare key is still functional.
5. Press the START key again and setpoint 2 is activated.
6. When the display weight reaches or exceeds the setpoint 2 value, the setpoint is deactivated.
7. Press START and the unit returns to normal operation with all keys active.
If the CE key is pressed at any time during the batching process, the setpoints are deactivated and the unit returns to the normal operating mode.</td></tr>
<tr><td>Automatic Batching Mode</td><td colspan="2">The automatic batching mode operates as follows:
1. Press the START key, and the setpoint LED light turns on.
2. The unit is switched to the net weighing mode.
3. An automatic auto tare operation takes place.
4. Setpoint 1 is activated.
5. When the displayed weight reaches or exceeds the setpoint value, the setpoint value is deactivated.
6. The setpoint indicator LED turns off
7. Timer 1 phase begins. If timer 1 is turned off, the unit enters an indefinite pause mode and the start key must be pressed to continue to setpoint 2. Otherwise the unit pauses for 1 to 10 seconds, depending on the timer 1 value.
8. Upon timeout (or pressing the START key), the unit will do a demand printout (1 or 3 lines depending upon configuration).
9. An auto-tare operation takes place.
10. Setpoint 2 is activated until the displayed weight reaches or exceeds the setpoint value.
11. Timer 2 phase begins and the same conditions apply as in number 7.
12. Upon timeout, the unit does a demand printout.
13. The unit returns to normal operation in the gross mode.
If the CE key is pushed at any time during the batching process, the batch process is aborted, the setpoints deactivated, and the unit returning to normal operating mode. During batch run mode, front panel functions are disabled.</td></tr>
</table>

Table 7-1. Setpoint Configuration Modes

Modes A, B, C, and D can be used in a independent straight setpoint system or as part of either a manual batching or automatic batching system. When configured for batching, the setpoints are de-energized except when the batch is in process. When the setpoint cutoff is reached, the setpoints are latched and will not reactivate until the next batching sequence.

Modes E, F, and G are dependent modes.

A zero band (ZBD) selectable from ±1 to ±50 displayed graduations around 0 is available in all modes except Mode C or Mode D, for monitoring an empty scale.

The setpoint parameters are defined in Table 7-2.

Parameter	Description	ID	Output Change
Setpoint	Weight value desired at the end of a weighing operation.	SP	Wt > or = SP
Preact	Weight value which is set to allow for material in suspension.	Pr	WT > or = SP – Pr
Dribble	Weight value at which material flow changes, usually from fast to slow feed.	dr	WT > or = SP – dr – Pr
Tolerance Band	Weight band around the setpoint	Hl, Lo	Hl > WT > Lo
Zero Band	Weight band ± around 0 used to define an empty scale.	ZBD	0 + x > WT > 0 – x (where x = 1 thru 50)

Table 7-2. Setpoint Parameter Definitions

NOTES:

- Display indication 11.---- is a default condition created during setup changes to other parameters (**Err 1**). Re-enter to clear.
- Logic levels on TB-3 are on at 0VDC (current sinking) and off at 5VDC.
- Front panel LED's for setpoints 1 and 2 follow logic level outputs.
- Setpoints track display readings and will therefore be affected by Gross/Net and Auto Tare operations.
- In batching modes (**BAT1** and **BAT2**) the setpoint outputs are latched.
- Internal jumpers S4 and S5 must be in 2-3 position to enable the front panel start switch (S21).

Table 7-3 lists setpoint selections, subparameter information, and their explanation.

Parameter Data Selection	Subparameter Selection	Subparameter Data Selection	Explanation
Net/Gross	Tare	Lb/Kg	Key which affects associated parameters
11 oFF	N/A	N/A	Setpoints off. Zero band (parameter 12) still functional
11 SP			Setpoint operation
	11.1	11.1oFF 11.1 Sl 11.1S1.P 11.1S1.d 11.1S.P.d.	Setpoint 1 = off Setpoint 1 = Mode A Setpoint 1 = Mode B Setpoint 1 = Mode C Setpoint 1 = Mode D
	11.2	11.2POS 11.2zEr	Setpoint 1 is off when weight < SP Setpoint 1 is on when weight < SP
	11.3	11.3oFF 11.3 S2 11.3S2.P 11.3S2.d 11.3S.P.d 11.3.toL	Setpoint 2 = off Setpoint 2 Mode A Setpoint 2 Mode B Setpoint 2 Mode C Setpoint 2 Mode D Setpoint 2 Mode E
	11.4	11.4.POS 11.4.zEr	Setpoint 2 is off when weight < SP Setpoint 2 is on when weight < SP

Table 7-3. Parameter 11 Configuration Selections

Parameter Data Selection	Subparameter Selection	Subparameter Data Selection	Explanation
Net/Gross	Tare	Lb/Kg	Key which affects associated parameters
11.Ou.Un			Over/Under scale configuration
	11.1	11.1.hL 11.1.tGt	Mode F entry Mode G entry
	11.2	11.2POS 11.2.zEr	Low is off when weight is below range Low is on when weight is below range
	11.3	11.3POS 11.3.zEr	Accept is off when weight is above range Accept is on when weight is above range
	11.4	11.4POS 11.4.eZr	High is off when weight is above range High is on when weight is above range
11.bAt1			Manual batching mode
	11.1	11.1oFF 11.1 Sl 11.1S1.P 11.1S1.d 11.1S.P.d	Setpoint 1 = off Setpoint 1 = Mode A Setpoint 1 = Mode B Setpoint 1 = Mode C Setpoint 1 = Mode D
	11.2	11.2.POS 11.2.zEr	Setpoint 1 is off when weight is < SP Setpoint 1 is on when weight is < SP
	11.3	11.3oFF 11.3 S2 11.3S2.P 11.3S2.d 11.S2.P.d	Setpoint 2 = off Setpoint 2 = Mode A Setpoint 2 = Mode B Setpoint 2 = Mode C Setpoint 2 = Mode D
	11.4	11.4.POS 11.4.Zer	Setpoint 2 is off when weight < SP Setpoint 2 is on when weight < SP
11.bAt2			Automatic batching
	11.1	11.1oFF 11.1 Sl 11.1S1.P 11.1S1.d 11.1S.P.d	Setpoint 1 = off Setpoint 1 = Mode A Setpoint 1 = Mode B Setpoint 1 = Mode C Setpoint 1 = Mode D
	11.2	11.2.POS 11.2.zEr	Setpoint 1 is off when weight < SP Setpoint 1 is on when weight < SP
	11.3	11.3oFF 11.3 1 11.3 2 11.3 3 11.3 4 11.3 5 11.3 6 11.3 7 11.3 8 11.3 9 11.3 10	Timer #1 oFF (pause) 1 delay (seconds) 2 3 4 5 6 7 8 9 10
	11.4	11.4 oFF 11.4 S2 11.4S2.P 11.4S2d 11.4S.P.d	Setpoint 2 = off Setpoint 2 = Mode A Setpoint 2 = Mode B Setpoint 2 = Mode C Setpoint 2 = Mode D

Table 7-3. Parameter 11 Configuration Selections (Continued)

Parameter Data Selection	Subparameter Selection	Subparameter Data Selection	Explanation
Net/Gross	Tare	Lb/Kg	Key which affects associated parameters
	11.5	11.5.POS 11.5.zEr	Setpoint 2 is off when weight < SP Setpoint 2 is on when weight < SP
	11.6	11.6 oFF 11.6 1 11.6 2 11.6 3 11.6 4 11.6 5 11.6 6 11.6 7 11.6 8 11.6 9 11.6 10	Timer #1 oFF (pause) 1 delay (seconds) 2 3 4 5 6 7 8 9 10

Table 7-3. Parameter 11 Configuration Selections (Continued)

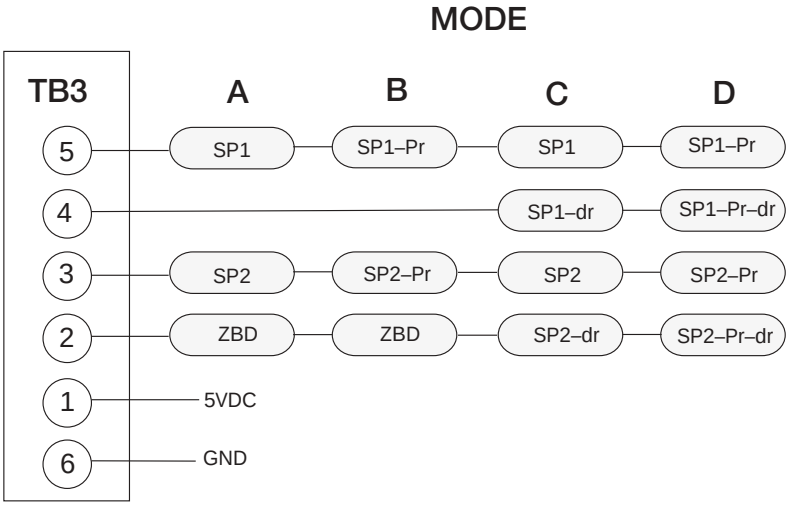


Figure 7-1. Parameter 11 Setpoint Modes A-D

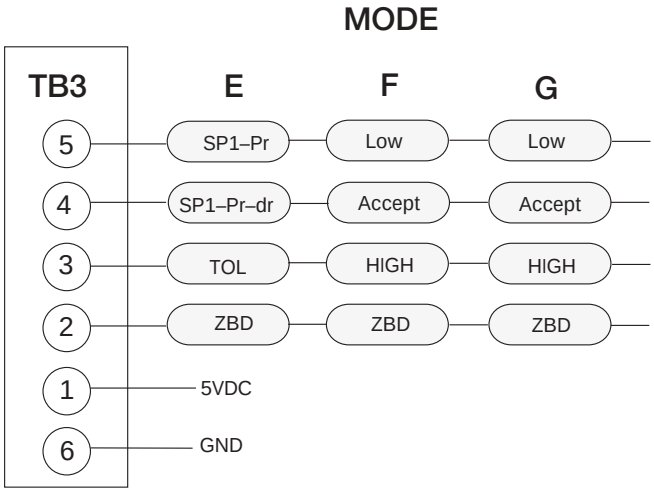


Figure 7-2. Parameter 11 Setpoint Modes E-G

8.0 Optional and Advanced Features

8.1 Expanded Serial Communications

The IQ 700 has two serial ports. Both serial ports 1 and 2 are ASCII-compatible, RS-232, or 20 mA current loop outputs. The serial format is compatible with most printers, scoreboards, and other remote devices. Each output can be disabled, set for “print on demand” mode, or set to output data continuously.

8.1.1 Demand Output Serial Data Format

You can use the port or keypad to fully customize the ticket to work with a wide variety of printers, scoreboard displays, and other remote equipment. To comply with legal-for-trade regulations, demand output data is inhibited during the following conditions:

- Scale in motion
- Negative gross weight displayed
- Positive overload
- Negative overload
- Unit in “display check” mode
- Other “non normal” display mode

In demand mode, selection can be made to print gross/tare/net when in net. If either port is set to print on demand mode, use the following format.

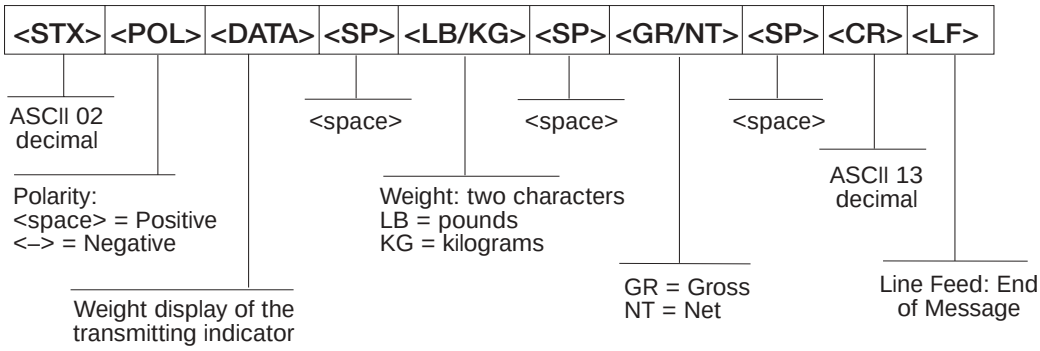


Figure 8-1. Demand Output Serial Data Format

8.1.2 Continuous Condec Output Serial Data Format

The continuous mode output serial data format is used to interface computers, scoreboards, and other remote devices requiring constant data updating. Continuous mode transmission occurs at the end of each display update.

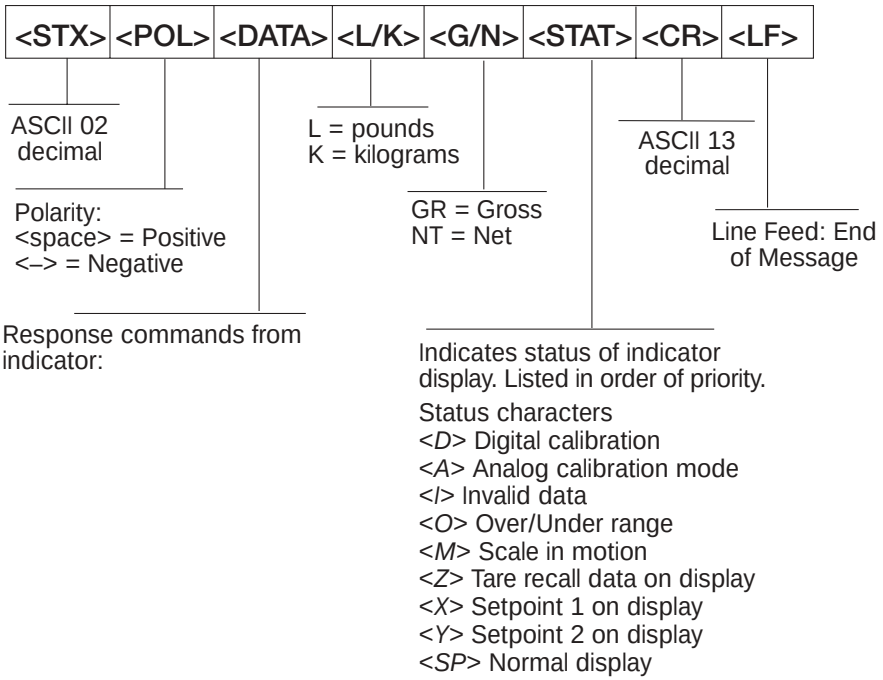


Figure 8-2. Continuous Output Serial Data Format

8.1.3 RS485 Data Formats

The IQ 700 has a built-in RS485 software protocol which is enabled when you assign an address to the indicator. Settings for RS485 are required on port 1 and are as follows:

- 14.dU, 14.3dE, and 14.4 (baud rate selection)
- Option 5 must be turned on. See Section 4.5 on page 28.

All remote command are initiated using the following data format

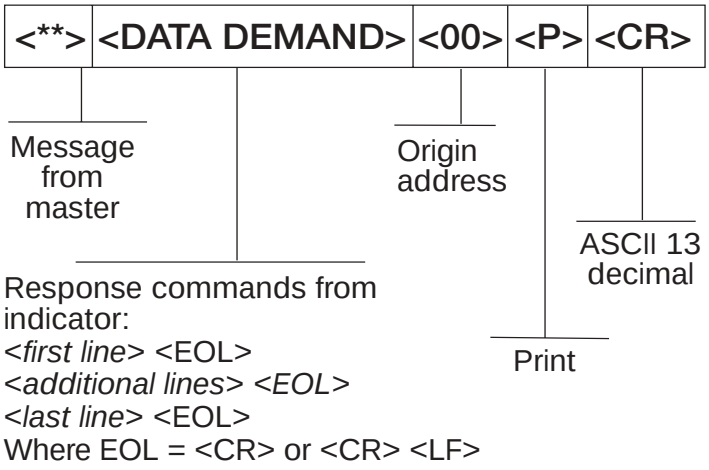


Figure 8-3. RS485 Send Data Format

If the initiating device address matches the port address of an IQ 700 listening on the RS485 network, the indicator responds with the following format shown in Figure 8-4.

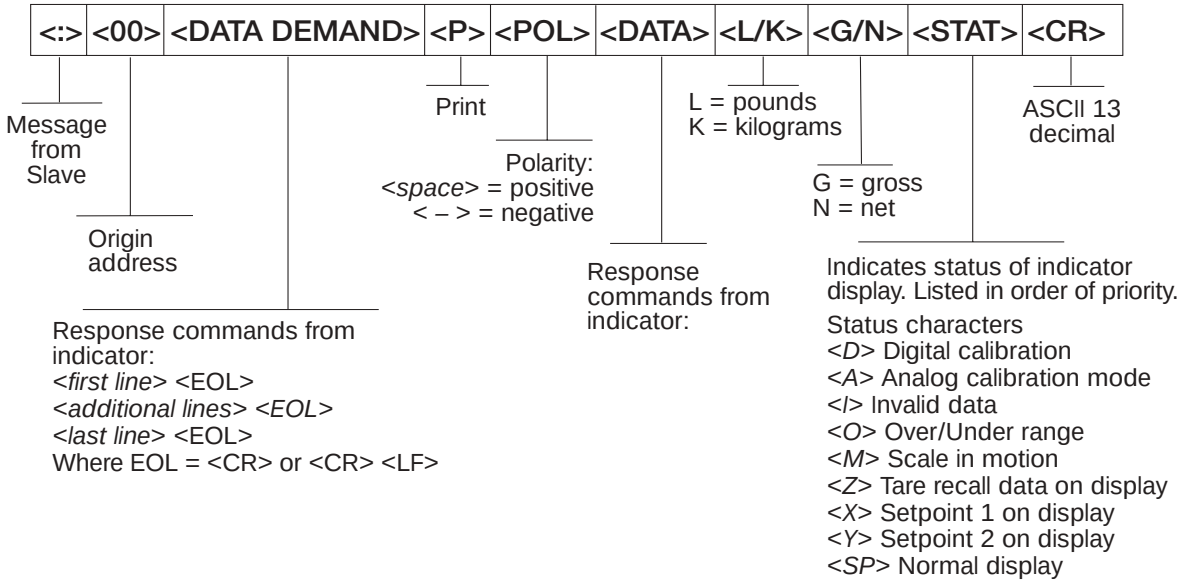


Figure 8-4. RS485 Respond Data Format

8.1.4 Port 1 Remote Serial Commands

Port 1 has a unique set of remote serial commands.

Function	Command	Description
Zero scale	<Z> <CR>	Cell must be out of motion or command is ignored and no “echo” is received unless motion is set to off.
Gross mode	<G> <CR>	Change to gross
Net mode	<N> <CR>	Change to net
Auto tare	<T> <CR>	Cell must be out of motion or command is ignored and no “echo” is received unless motion is set to off. Sending auto-tare command puts scale into net mode.
Print	<P> <CR>	Cell must be out of motion or command is ignored and no “echo” is received unless motion is set to off Remote print command acts as a data request or in truck mode, initiates sequence
Start	<B> <CR>	A remote start command used in batch mode
Computer format	<PC> <CR>	PC and PG commands request serial output data in tis computer format (continuous mode). There are no delays between commands and data transmission is not inhibited for invalid data conditions as defined under demand mode.
Computer format	<PG> <CR> requests gross data in net mode	
Operating mode	<K> <CR> <L> <CR>	Changes the unit of measure to kilograms Changes the unit of measure to pounds
Option mode	<K> <CR> <R> <CR> <W> <CR>	When in the option mode: Dumps all options as they are configured Reads smart serial files Writes to smart serial files
Configuration mode	<J> <CR>	Command configuration dump

Table 8-1. Port 1 Remote Serial Commands

8.1.5 Full Duplex Parameter Entry/Recall

One of the capabilities of the IQ 700, with the full duplex serial port 1 is the ability to enter or recall setpoints from a computer or terminal. The following table illustrates full duplex setpoint parameter entry/recall.

Setpoint Parameter SE<n> (entry) SR<n> (recall)	0	1	2	3	4	5	6
Mode A	all	SP1			SP2		
Mode B	all	SP1	Pr1		SP2	Pr2	
Mode C	all	SP1		dr1	SP2		dr2
Mode D	all	SP1	Pr1	dr1	SP2	Pr2	dr2
Mode E	all	SP1	Pr1	dr1		HI	Lo
Mode F	all	SP1			HIGH		
Mode G	all	SP1				LOW	HIGH

Table 8-2. Full Duplex Setpoint Parameter Entry/Recall

The response data (*xxxxx*) is corrected for count-by round off and is six characters in length if there is no decimal point and seven with the decimal point. Leading zeros are spare characters.

Invalid data requests or entries are responded to with an echo of the valid portion and an **I** indicating the invalid portion.

8.2 Delay Demand Print

When file 7.17 is enabled, a demand print, from either the print key or the remote print (TB3-10), is delayed for up to 25 seconds if the scale is in motion. If the scale comes out of motion before the 25-second timer times out, the IQ 700 will do a print of the data. If the scale remains in motion, the demand print is aborted.

8.3 Battery Option

The IQ 700 has an optional battery that can be installed. The indicator enclosure must be opened to connect the battery to the CPU board. Use the following steps:

1. Disconnect AC power by uplugging the indicator.
2. Remove the screws that hold the front bezel to the enclosure body.
3. Place the indicator face down on an antistatic work mat, then lift the back of the indicator away from the front bezel.
4. Set the enclosure aside.
5. Locate the battery plug in on the CPU board (J6) shown in the diagram below.

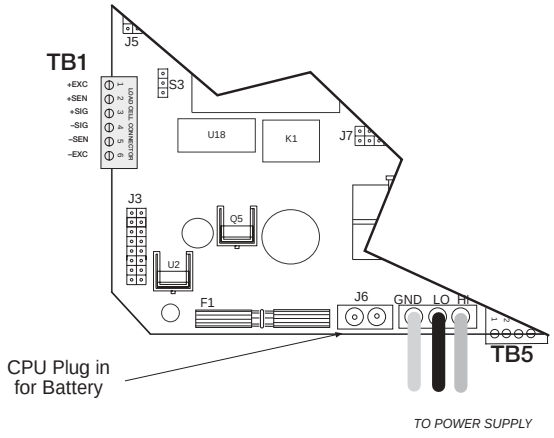


Figure 8-5. Battery Location

6. Plug other end into battery located on the enclosure backplate.

9.0 Appendix

9.1 ASCII Character Chart

Use the decimal values for ASCII characters listed in Table 9.1 when specifying print format string. The actual character depends on the character mapping used by the output device.

The IQ 700 can send or receive any ASCII character value (decimal 0-255), but the characters that can be shown on the indicator are limited by the 14-segment display. Text strings formatted for display on the indicator should be limited to upper case, unaccented character to ensure legibility.

Control	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex
Ctrl-@	NUL	000	00	space	032	20	@	064	40	`	096	60
Ctrl-A	SOH	001	01	!	033	21	A	065	41	a	097	61
Ctrl-B	STX	002	02	“	034	22	B	066	42	b	098	62
Ctrl-C	ETX	003	03	#	035	23	C	067	43	c	099	63
Ctrl-D	EOT	004	04	$	036	24	D	068	44	d	100	64
Ctrl-E	ENQ	005	05	%	037	25	E	069	45	e	101	65
Ctrl-F	ACK	006	06	&	038	26	F	070	46	f	102	66
Ctrl-G	BEL	007	07	’	039	27	G	071	47	g	103	67
Ctrl-H	BS	008	08	(	040	28	H	072	48	h	104	68
Ctrl-I	HT	009	09	)	041	29	I	073	49	i	105	69
Ctrl-J	LF	010	0A	*	042	2A	J	074	4A	j	106	6A
Ctrl-K	VT	011	0B	+	043	2B	K	075	4B	k	107	6B
Ctrl-L	FF	012	0C	,	044	2C	L	076	4C	l	108	6C
Ctrl-M	CR	013	0D	-	045	2D	M	077	4D	m	109	6D
Ctrl-N	SO	014	0E	.	046	2E	N	078	4E	n	110	6E
Ctrl-O	SI	015	0F	/	047	2F	O	079	4F	o	111	6F
Ctrl-P	DLE	016	10	0	048	30	P	080	50	p	112	70
Ctrl-Q	DC1	017	11	1	049	31	Q	081	51	q	113	71
Ctrl-R	DC2	018	12	2	050	32	R	082	52	r	114	72
Ctrl-S	DC3	019	13	3	051	33	S	083	53	s	115	73
Ctrl-T	DC4	020	14	4	052	34	T	084	54	t	116	74
Ctrl-U	NAK	021	15	5	053	35	U	085	55	u	117	75
Ctrl-V	SYN	022	16	6	054	36	V	086	56	v	118	76
Ctrl-W	ETB	023	17	7	055	37	W	087	57	w	119	77
Ctrl-X	CAN	024	18	8	056	38	X	088	58	x	120	78
Ctrl-Y	EM	025	19	9	057	39	Y	089	59	y	121	79
Ctrl-Z	SUB	026	1A	:	058	3A	Z	090	5A	z	122	7A
Ctrl-[	ESC	027	1B	;	059	3B	[	091	5B	{	123	7B
Ctrl-\	FS	028	1C	<	060	3C	\	092	5C	|	124	7C
Ctrl-]	GS	029	1D	=	061	3D	]	093	5D	}	125	7D
Ctrl-^	RS	030	1E	>	062	3E	^	094	5E	~	126	7E
Ctrl-_	US	031	1F	?	063	3F	_	095	5F	DEL	127	7F

Table 9-1. ASCII Character Chart

9.2 Parameter Control Code Chart

Use the following code values for parameter descriptions listed in Table 9.2 when specifying the format string. The actual character depends on the character mapping used by the output device.

Code	Description	Code	Description	Code	Description
200	Gross weight & *LB/KG GR*	240	Truck gross *lb/kg GR*	600	Macro file 1 (7.9)
201	Gross weight & *LG/KG*	241	Truck gross only	601	Macro file 2 (7.10)
202	Gross weight	242	Truck tare *lb/kg TR*	↕	↕ (7.11 – 7.15)
203	Gross weight (no 0 blanking)	243	Truck tare only	607	Macro file 8 (7.16)
		244	Truck net *lb/kg NT*		
210	Net weight & *LB/KG NT*	245	Truck net only	700	Delay per setup
211	Net weight & *LN/KN*			800	*Setpoint 1* & SP1 data
212	Net weight	300	Status character	801	SP1 data only
213	Net weight (no 0 blanking)	400	Time & date per setup	802	*Setpoint* 2 & SP2 data
		401	Time per setup	803	SP2 data only
220	Tare weight & *LB/KG TR*	402	Date per setup		
221	Tare weight & *LT/KT*	500	Ident no. & *ID. NO.*	999	End of file
222	Tare weight	501	Ident no. only		
223	Tare weight (no 0 blanking)	502	Tag		
		503	held ID NO. & *ID. NO.*		
230	Total WEIGHT & *lb/kg TOTAL*	504	Held ID NO. (no label)		
231	Total weight & *LA/KA*	510	*TICKET NO.* & counter data		
232	Total weight only	511	Counter data only		
233	Total weight (no 0 blanking)				

Table 9-2. Parameter Control Code Chart

9.3 Display and Error Messages

Display Messages		
Display	Explanation	Corrective Action
Err 1 Err 1a, 1b, 1c	Loss of configuration Loss of option configuration	Enter configuration Enter option mode reconfigure
Err 2	Loss of zero calibration	Enter digital calibration mode and recalibrate unit
Err 3	Loss of span calibration	
Err 5	Loss of auto tare	Acquire tare
Err 6	Loss of auto zero	Acquire zero
Err 9	Not in span calibration	Program in desired value before entering
Err 10H Err 10L	Input > 3.3mV/V @ full scale Input < 0.4mV/V @ full scale	Recalibrate span so FS ≤ 3.3mV/V Recalibrate span so FS ≥ 0.4mV/V
Err 10P Err 10-	PTZ (push to zero) > 2.0% PTZ > weight used for span calibration	Perform zero calibration
CAL	Indicates successful calibration	
OL	Gross overload	Check load cell wiring
UL	Gross underrange	

Table 9-3. Display and Error Messages

9.4 Specifications

Power

Power Input 115/230 VAC, 50-60 Hz AC

Analog Specifications

Full Scale Input Signal	Up to 33 mV
Load Cell Excitation	10 VDC, fixed
Load Cell Current	240 mA (8 x 350 Ω load cells)
Load Cell Cabling	4-wire standard; 6-wire with remote sensing
Analog Signal Input Range	-0.6 mV/V to 3.3 mV/V
Analog Signal Sensitivity	0.3 μV/graduation
Resolution	10 000 (NTEP), 80 000 expanded
Measurement Rate	10 measurements/sec
Display Increments	1, 2, 5, 10, 20, 50, 100
Decimal Point	0, 0.0, 0.00, 0.000, 0.0000
AZM (Zero Tracking)	Gross mode only: configurable to ±0.5 grads, ±1.0 grads, ±3.0 grads, or off
PAZ and ATM Aperture	Configurable to ±1.9%full scale or 100% FS
Motion Band	Configurable to ±1 or ±3 grads; 1-second delay or no delay
Calibration Method	Software, with optional five-point linearization

Serial Communications

Port 1	Full duplex RS-232 or 20 mA at 9600, 4800, 2400, 1200, 600, or 300 bps
Port 2	Simplex RS-232 or 20 mA current loop at 9600, 4800, 2400, 1200, 600, or 300 bps, 7 data bits, odd, 1 stop bit, truck IN/OUT only on Port 2

Operator Interface

Display	6-digit LED or LCD display. 7-segment, .6 in (15 mm) digits
Annunciators	Center of zero, Gross, Net, Motion, lb/kg
Keyboard	21-key flat membrane panel with 0–9 numeric keys, ENT (Enter), CE (Clear Entry), ZERO, GROSS/NET, TARE, TARE RECALL, PRINT, lb/kg CONV, SP1, SP2, ON/OFF

Setpoint Control Outputs

Four bi-polar 5VDC logic level signals

Truck In/Out Weighing Mode

Specialized truck in/out mode automatically computes, stores, and prints Gross, Tare, Net weights for up to 300 trucks. Also allows entry of 6-digit ID number for each truck.

Environmental

Operating Temperature –10 to +40 °C (14 °F to 104 °F)

Enclosure

Enclosure Dimensions	9.0 in x 6.44 in x 4.0 in 23 cm x 16 cm x 10 cm
Rating/Material	NEMA 4X, polished stainless steel

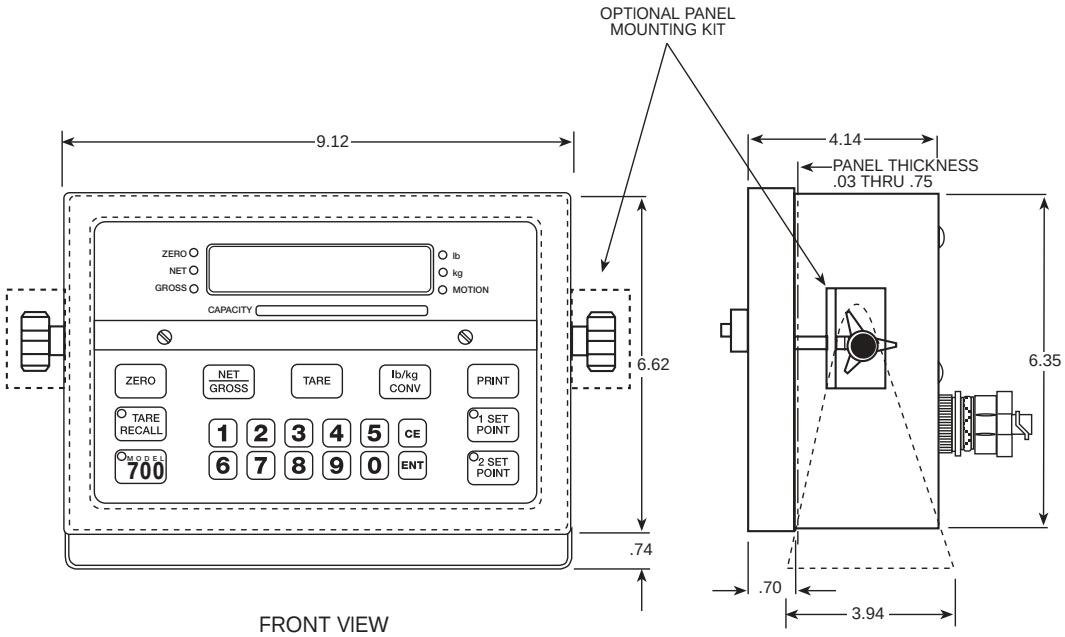
Certifications and Approvals

NTEP

CoC Number	89-023A299-010
Accuracy Class	III/III L n_{max} : 10 000

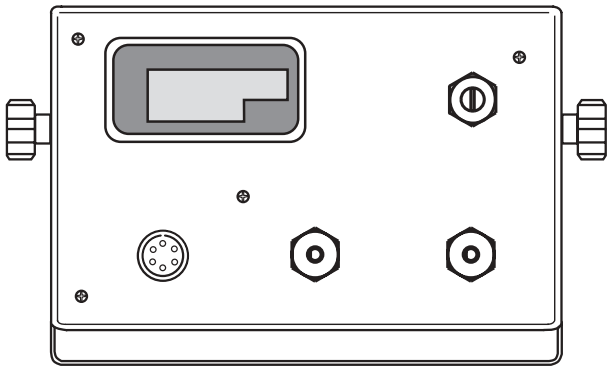
Measurement Canada

S. WA-4131

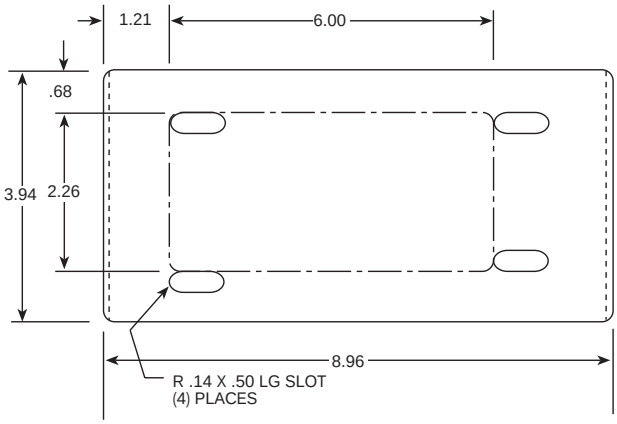


FRONT VIEW

SIDE VIEW



REAR VIEW



BOTTOM VIEW

IQ 700 Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for two years.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, *Protecting Your Components From Static Damage in Shipment*, available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER RLWS NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

RLWS AND BUYER AGREE THAT RLWS'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.

SHOULD THE SELLER BE OTHER THAN RLWS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

NO TERMS, CONDITIONS, UNDERSTANDING, OR AGREEMENTS PURPORTING TO MODIFY THE TERMS OF THIS WARRANTY SHALL HAVE ANY LEGAL EFFECT UNLESS MADE IN WRITING AND SIGNED BY A CORPORATE OFFICER OF RLWS AND THE BUYER.

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