METTLER TOLEDO

Q.iMPACT™

Matroller

Technical Manual

A16506600A
(1-05).01

This manual describes the operation and functionality of the Q.iMPACT terminal. The software number is displayed during the power-up sequence.

CUSTOMER FEEDBACK

Your feedback is important to us! If you have a problem with this product or its documentation, or a suggestion on how we can serve you better, please fill out and send this form to us. Or, send your feedback via email to: quality_feedback.mtwt@mt.com. If you are in the United States, you can mail this postpaid form to the address on the reverse side or fax it to (614) 438-4355. If you are outside the United States, please apply the appropriate amount of postage before mailing.

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		Serial Number:
		Company Name for Installation:
Phone Number: ( )	Fax Number: ( )	Contact Name:
E-mail Address:		Phone Number:

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	Met and exceeded my needs
	Met all needs
	Met most needs
	Met some needs
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INTRODUCTION

This publication is provided solely as a guide for individuals who have received Technical Training in servicing the METTLER TOLEDO product. Information regarding METTLER TOLEDO Technical Training may be obtained by writing to:

METTLER TOLEDO
1900 Polaris Parkway
Columbus, Ohio USA 43240
Phone (US and Canada): 614-438-4511
Phone (International): 614-438-4888

FCC Notice

This device complies with Part 15 of the FCC Rules and the Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

ORDERING INFORMATION

It is most important that the correct part number is used when ordering parts. Parts orders are machine processed, using only the part number and quantity as shown on the order. Orders are not edited to determine if the part number and description agree.

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PRECAUTIONS

READ this manual BEFORE operating or servicing this equipment.

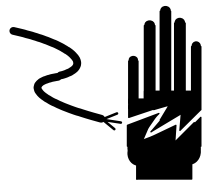
FOLLOW these instructions carefully.

SAVE this manual for future reference.

DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

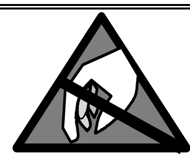
ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL METTLER TOLEDO for parts, information, and service.



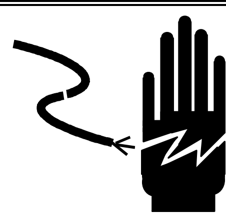
⚠ WARNING

DISCONNECT ALL POWER TO THIS UNIT BEFORE INSTALLING, SERVICING, CLEANING, OR REMOVING THE FUSE. FAILURE TO DO SO COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.



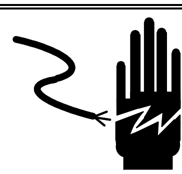
⚠ CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.



⚠ WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.



⚠ WARNING

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD, CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.

CONTENTS

1 Introduction

Q.i Strategy and Q.iMPACT Matroller Overview

This manual provides an overview and instructions for setting up, maintaining and troubleshooting the Q.iMPACT matroller (material transfer controller). While the matroller is typically used as the hardware component of METTLER TOLEDO's Q.i Material Transfer (Ingredient Addition) Control Strategy, it also has the functionality of METTLER TOLEDO's JAGXTREME industrial terminal and may be used for standard weighing applications.

Q.iMPACT Matroller – Harsh Environment Enclosure

Q.iMPACT Matroller – Panel-Mount Enclosure

Before setting up and using the Q.iMPACT matroller, it is important to understand how the Q.i material transfer control strategy works and the role that the Q.iMPACT matroller plays in it.

The Q.i Material Transfer Control Strategy

Q.i is a material transfer control strategy for batch, blending and/or filling systems. It consists of three major components:

- Hardware, Technology and Software
- Integration
- Services

Hardware, Technology & Software

The first component is comprised of a robust hardware platform – the Q.iMPACT matroller (material transfer controller) embedded with advanced process control technology that enhances and optimizes control of a key phase of the production cycle -- material transfer (ingredient addition). It also includes a software data acquisition and analysis tool (Qi365) designed to measure "real time" operating parameters and to help maintain the platform and facilitate benchmarking.

Integration

The second component is a system integration strategy which is required to integrate with a supervisory batch or filling control platform..

Services

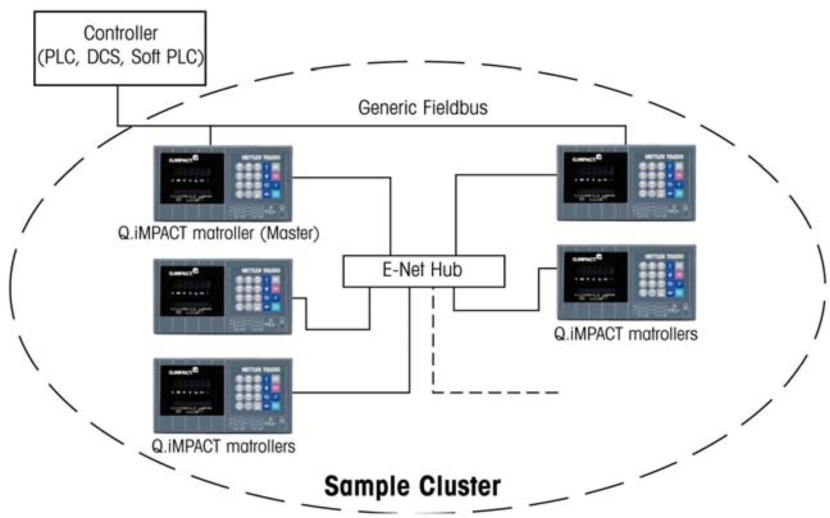
The third component is a collection of collaborative services that are used to leverage internal and external process, measurement and control knowledge to sustain profitable gains and to strategically generate consistent reductions in manufacturing costs, increased throughput, and improvements in quality year after year.

Together, these three components impact design simplicity and manufacturing efficiency to yield improved profitability, performance and quality of real-time production information.

The Q.iMPACT Matroller's Role in the Q.i Strategy

NOTE: Qi Lite is a standalone instrument and does not support Clustering

The Q.iMPACT matroller (material transfer controller) is basically a weight indicator that supports flow meters as well as load cell-based instrumentation. Communication with the Q.iMPACT matroller is done via ControlNet or Profibus. (others under development)



The Q.iMPACT matroller is embedded with patented predictive control algorithms (PAC). These algorithms enable the matroller to control material transfer (ingredient addition) to a very high degree of accuracy using only a single fast feed (Qi Lite supports Two Speed Feed control) material feed. Each material transfer or feed is treated as a separate transaction. The Host system (normally a PLC or DCS) will send a setpoint to the matroller for a particular scale or flow meter. The matroller will then control the addition of the material. After the completion of the transfer, the results are sent to the Supervisory Control system.

For any instrument (scale or flow meter,) parallel transfers are possible. For example, if the matroller has two scale and three flow meter inputs, it is possible to have the matroller controlling five material transfers simultaneously.

Normally, in order to create a batch, a number of material transfers must take place. The exact order, sequence, and amounts of each material transfer is determined by the "Recipe". As each material transfer is completed, the matroller reports the results back to the Supervisory Control system, which then sends the next setpoint to the matroller. This sequence of events is repeated until the batch is complete.

A single Q.iMPACT matroller can support up to four (4) scales and 12 flow meters. A single matroller cannot have more than 12 instruments connected to it. If more instruments than this are required, simply use more matrollers. In order to create a single manageable system, all the matrollers are connected via an Ethernet network to create a "cluster" of matrollers which all share a single common database. A cluster can contain up to 20 matrollers. (Standard Qi Matroller only)

Not all of the matrollers must have a direct communications link via (for example, ControlNet to a Supervisory Control system.) If there is a cluster of three (3) matrollers, only one would require the ControlNet interface board. This matroller is referred to as having a "bridge" in it.

One matroller in the cluster must be assigned as the database master (or master) matroller. This matroller is responsible for distributing the database variables throughout the cluster and monitoring their status.

PAC Algorithms

The PAC algorithms that are embedded in the matroller are used to build a real-time mathematical model of the material transfer process for each material. The algorithms then automatically learn and compensate for (auto-tune) process variations in each active material transfer. By using the PAC algorithms during a transfer, the actual weight at which the matroller will stop the addition of material is adjusted continuously during the transfer. This allows the matroller to adjust to changes in flow rate of the material during the transfer -- not after the fact. Among the factors causing flow rate changes are:

- Changes in viscosity because of temperature change of material.
- Different supplier of raw product.
- Different level of material in silo.

Channels

Each instrument that is connected to a Q.iMPACT is a channel. For a given cluster, all channels are unique. For example, you can have three (3) matrollers in a cluster. One of the matroller has a dual channel scale board (accommodates two scales). The other two matrollers each have a quad channel flow meter board installed (four flow meters for each matroller). Therefore, there are a total of 2 + 4 + 4 = 10 channels in the cluster. They would be referred to as channel 1 to 10. There are no duplicate channels.

Material Paths

Each control valve, feed conveyor, etc. is assigned a Material Path (MP) number. This number identifies a unique path that a material will take from a source container to the final scale or flow meter.

Example A:

We have a scale with two valves controlling the addition of materials ABC and DEF. The scale also has a discharge valve. We now have a system with a single channel (scale) and three material paths. Two are additions to the scale and the third is the scale discharge. Each is a unique path that the material must follow, and each has its own characteristics such as flow rate. These three material paths could be referred to as MP1, MP2 and MP3.

Example B:

Using Example A, imagine that demand for the product being manufactured in this operation has skyrocketed. Production needs to be increased, so a second scale Is added right next to the one in example A. It will use the same raw materials from the same bulk storage container and discharge into the same bulk storage tank. However, it has its own control valves allowing production to be doubled. This means that even though it is the same raw material, we have added three new unique material paths associated with the second scale. The system now looks as like this:

Channel 1 (scale 1)	MP1	addition of material ABC
Channel 1 (scale 1)	MP2	addition of material DEF
Channel 1 (scale 1)	MP3	discharge out of scale 1
Channel 2 (scale 2)	MP4	addition of material ABC
Channel 2 (scale 2)	MP5	addition of material DEF
Channel 2 (scale 2)	MP6	discharge out of scale 2

Example C:

NOTE: Qi Lite does not support Overlapping Feeds

Taking the system described in Example B above, we now add colorant into each scale using a flow meter for each scale. This gives us two more channels (flow meters 1 and 2) and two more material paths, one for each flow meter. As production runs 24 hours a day seven days a week, we do not want to increase the batch cycle time. By using the Q.i strategy's advanced overlapping feed capabilities (Qi Standard only), we are able to add the colorant while the material ABC is being added. Therefore, batch cycle time is not increased at all. The system now looks like this:

Channel 1 (scale 1)	MP1	addition of material ABC
Channel 1 (scale 1)	MP2	addition of material DEF
Channel 1 (scale 1)	MP3	discharge out of scale 1
Channel 2 (scale 2)	MP4	addition of material ABC
Channel 2 (scale 2)	MP5	addition of material DEF
Channel 2 (scale 2)	MP6	discharge out of scale 2
Channel 3 (Flowmeter 1)	MP7	addition via Flowmeter 1
Channel 4 (Flowmeter 2)	MP8	addition via Flowmeter 2

Communicating with and Controlling the Q.iMPACT Matroller

Communicating with and controlling the Q.iMPACT matroller is simple. There are only three basic flows of data:

- Scheduled
- Write a command to the Q.iMPACT matroller
- Read the result of the above write in order to confirm all is OK

The following provides a brief overview of each. More detailed information is found in other sections of this manual.

Scheduled (cyclic) data

Routine information about the status of each channel (instrument) is received by the Host control system. This data is updated twice per second.

The scheduled data has a fixed length of 496 bytes. The first 8 words are reserved. Thereafter, each group of 10 words has information relating to a specific channel. For example, words:

00 to 07	reserved (00 and 01 are the checksum and checksum inverted)
08 to 17	Status of Channel 1
18 to 27	Status of Channel 2
"	
"	(Last Channel is 20)

Typical information to be found in the channel status is: Scale under capacity, Material Transfer Active, Auto mode, Feed failed, Scale Gross Weight etc. In total, there are approximately 30 bits and values per channel in the scheduled data. This provides the Host system with a continuous and comprehensive status of each channel in a cluster.

NOTE: Each matroller with a ControlNet (bridge) interface will return this scheduled data. The scheduled data transmitted by each bridge is unique.

When setting up a system with more than one bridge one of the channel configuration parameters is to identify which bridge belongs to which channel. In this way the channel data can be spread between bridges.

Unscheduled data

Upon demand, whenever a command is required to be sent to a matroller, an unscheduled message is sent. Typical commands are: "Start a Material Transfer", "Acknowledge a Material Transfer" and "Abort Material Transfer". There are 17 commands in total.

Whenever an unscheduled message is sent, it is good practice to wait for a short period and to then read the "Status" of the previous sent command. This would be the confirmation that the command had been accepted. If for any reason the command was rejected, the reason for the rejection is embedded in the response. Action would then have to be taken.

NOTE: There is an Application Interface Module (AIM) available which will do all of the above handshaking, thus greatly reducing the amount of time required to implement a robust handshaking strategy with the Q.iMPACT matroller. Information is available from your METTLER TOLEDO representative.

NOTE: the above description refers to the ControlNet communications interface. Refer to the relevant section for other communications interfaces

Q.iMPACT Matroller Specifications

Model	Panel Mount	Panel Mount – Blind Chassis	Harsh Environment
Dimensions	10.05 in (25.5 cm) x 5.6 in (14 cm) at front of matroller 9.5 in (24 cm) x 4.91 in (12.5 cm) at the rear 8.03 in (21 cm) deep	10.75 in (27 cm) x 4.31 in (10.9 cm) at base 10.25 in (26 cm) x 3.91 in (10 cm) c-c mounting 9.5 in (24.1 cm) x 5.00 in (13 cm) chassis	9.42 (23.93 cm) in x 11.12 in (28.24 cm) x 9 in (22.86 cm)
Construction	Aluminum		Stainless steel
Mounting Options	Panel	Blind panel	Wall, column
Degree of Protection	TYPE 4 (front panel)	TYPE 1	TYPE 4X
Ethernet Connection	10BASE-T. Uses crossover cable from RJ-45 Ethernet port on the back of the Q.iMPACT matroller to a PC (point to-point connection) or standard cable to connect to other equipment through a switch.		
Display	Two vacuum fluorescent displays. Upper display: 7 segment 0.5" (13 mm); lower display: 16-character, 5 x 7 dot matrix display 0.25" (6 mm)		
Keypad	4 x 5 matrix tactile-feel keypad with 0-9, letters A-Z, and function keys		
Interfaces	Ethernet, serial, discrete, analog		
A/D Rate	>300 per second		
Digital Input/Output	Maximum 12 in/12 out		
Maintenance Monitoring	TraxEMT™ Embedded Maintenance Technician system for self-diagnosis and predictive failure analysis		
Signal Processing	TraxDSP® three-stage filtering		
Power Requirements	85 to 264 VAC with a line frequency of 47 to 63 Hz Power consumption -- 20 Watts maximum. The wire size range -- 12 to 16 AWG.		
Setup	Via embedded web server, with the front keypad or using the JagXFILES tool box.		
Scripting Language	JagBASIC (standard)		
Operating Temperature	14° F to 113° F (-10° C to 45° C) at 10% to 95% relative humidity, non-condensing		
Storage Temperature	40° F to 140° F (-40° C to 60° C) at 10% to 95% relative humidity, non-condensing		
Options	Analog, Reduced Excitation Analog, Dual Analog, Dual Analog Reduced Excitation, Multifunction I/O, High Precision, POWERCELL, ControlNET, Profibus and Flow Meter		

Accessories

Note: The Q.iMPACT model configurator is found on page 1-6 of this document.

A number of accessories are available for use with the Q.iMPACT matroller. The model configurator designation number appears in parentheses. Please contact your authorized Q.i team representative for more information.

Quad Flow Meter Interface Board (F)

METTLER TOLEDO's Q.i Quad Flow Meter Interface Board is a four-channel isolated Counter/Flow Meter board for use in the METTLER TOLEDO Q.i matroller. The flow meter board is intended to provide a flow-meter totalizer setpoint comparison to directly control on-board discrete outputs. The module is capable of counting the input pulses up to 50 kHz on each of four isolated input channels, as well as measuring the frequency of the input signal. A jumper selectable switching threshold for each input channel is available, as well as a jumper-selectable 15 kHz analog filter. The input levels for the AC mode are 50mV to 50Vrms. The input level for the DC mode are 2.5 volts to 50 volts.

The outputs are non isolated 7406 open-collector drivers. Each module provides 150 mA of 5V power to drive opto-22 or similar devices. A total of four flow meters may be connected to a single flow meter card. Three flow meter cards can be installed in a Q.iMPACT matroller; thus, each matroller can connect to up to 12 flow meters.

You should consult the documentation for the specific flow meters with which you are working.

ControlNet Interface Board (C)

The ControlNet Interface Board enables the Q.iMPACT matroller to communicate with process automation devices. It supports two different physical/data link connection types -- CIP/Ethernet (EtherNetIP) and CIP/ControlNet. However, only one of the two physical/data link connection types can be selected for use on this device. The CIP/Ethernet (also called Ethernet/IP) uses a standard RJ45 connector and 10BASE-T physical layer. It provides ControlNet (CIP) services over TCP/IP. Both implicit and explicit messaging services are supported. Data bit rate is 10 Mb/S. The CIP/ControlNet interface board provides two redundant BNC jacks and hosts CIP over ControlNet media. Data bit rate is 5 Mb/S. By default CIP/Controlnet is enabled.

Dual Analog Scale Interface Board (A)

This option is required when interfacing analog-type load cells. A 15-volt excitation voltage is used to power up to 16 350-ohm load cells from one analog channel. The Q.iMPACT's power supply can support a maximum of 20 load cells. A jumper is provided to select operation with either 2mV/V or 3mV/V load cells. The matroller will operate with load cells of impedances other than 350 ohms or other mV/V specifications, but the total scale resistance must not be less than 22 ohms.

A quiet analog signal section, combined with an analog-to-digital converter and co-processor that use METTLER TOLEDO TraxDSP filters, provides weighing and vibration rejection performance unequaled in the industry. The zero temperature coefficient is 0.15 uV/degree C. The span temperature coefficient is 6 ppm/degree C.

When using this option, the display update rate is limited to 10 updates per second. The actual A/D conversion rate exceeds 300 cycles per second. The high-speed process allows the matroller to filter out noise while providing a weight update rate up to 50 updates per second for setpoint control and other functions.

The dual channel analog scale option board has a removable EEPROM for each scale channel that stores calibration parameters for that scale channel. If an EEPROM is transferred to another board, all calibration parameters transfer as well.

A detachable seven-position terminal strip is used to terminate each analog load cell cable on the rear of the PCB. Signal, excitation, sense, and shield connections are provided with easy-to-read descriptions. Two LEDs are visible through holes in the rear panel of the PCB to indicate the status of the Analog PCB. The matroller supports up to two dual analog scale cards for a total of up to four scale platforms.

Reduced Excitation Dual Analog Scale Interface Board (B)

This option is used with a protective load cell barrier to permit operation of a Q.iMPACT matroller with analog load cells located in an area classified as hazardous by the National Electrical Code. The excitation voltage is lowered to 5 volts. A METTLER TOLEDO Reduced Excitation module is required for these applications. The standard matroller cannot be located inside the hazardous area as is. Purged enclosures are available from METTLER TOLEDO if the matroller must be located inside a hazardous area. The Reduced Excitation module can only support up to 12 analog load cells or a total resistance of 58 ohms. Jumpers are provided to select operation with 2mV/V or 3mV/V load cells. The matroller will operate with load cells of impedances other than 350 ohms or other mV/V specifications, but the total scale resistance must not be less than 58 ohms.

The zero temperature coefficient is 0.15 uV/degree C. The span temperature coefficient is 6 ppm/degree C. When using this option, the display update rate is limited to 10 updates per second. The actual A/D conversion rate exceeds 300 cycles per second. The high-speed process allows the matroller to filter out noise and still provide a weight update rate up to 50 updates per second for setpoint control and other scale functions.

The dual channel analog scale board has a removable EEPROM for each scale channel that stores calibration parameters for that scale channel. If an EEPROM is transferred to another board, all calibration parameters transfer as well.

A detachable seven-position terminal strip is used to terminate each analog load cell cable on the rear of this PCB. Signal, excitation, sense, and shield connections are provided, each with an easy-to-read description. Two LEDs are visible through holes in the rear panel of this PCB to indicate the status of the Analog PCB. The Q.iMPACT matroller will support one or two Reduced Excitation dual analog scale cards for a total of up to four scale platforms.

Analog Scale Interface Board (1)

This option is required when interfacing analog-type load cells. A 15-volt excitation voltage is used to power up to 16 350-ohm load cells from one analog PCB. A jumper is provided to select operation with 2 mV/V or 3 mV/V load cells. The Q.iMPACT matroller will operate with load cells of impedances other than 350 ohms or other mV/V specifications, but the total scale resistance must not be less than 22 ohms. A quiet analog signal section, combined with a proprietary analog-to-digital converter and coprocessor implementing METTLER TOLEDO TraxDSP® filters, provides weighing and vibration rejection performance unequaled in the industry.

The zero temperature coefficient is 0.15 μV/degree C. The span temperature coefficient is 6 ppm/degree C. When using this option, the display update rate is limited to 10 updates per second. The actual A/D conversion rate exceeds 300 cycles per second. This high-speed process allows the matroller to filter out noise while providing a weight update rate of up to 50 updates per second for setpoint control and other functions.

Each analog scale interface board has a removable EEPROM that stores calibration parameters for the scale. If an EEPROM is transferred to another board, all calibration parameters transfer. A detachable seven-position terminal strip is used to terminate the analog load cell cable on the rear of the PCB. Signal, excitation, sense, and shield connections are provided with easy-to-read descriptions. Two LEDs are visible through holes in the rear panel of the PCB to indicate the status of the analog PCB.

Reduced Excitation Analog Scale Interface Board (2)

This option, when used with a protective load cell barrier, allows operation of the Q.iMPACT matroller with analog load cells located in an area classified as hazardous by the National Electrical Code. This option is required if the matroller is to be used as a Division 2 approved instrument. The excitation voltage is lowered to 5 volts for this option. The Q.iMPACT matroller cannot be located inside a Division 1 or Zone 0/1 hazardous area without special precautions. Purged enclosures are available from METTLER TOLEDO for applications which require the matroller to be located inside a Division 1 or Zone 0/1 classified area.

The zero temperature coefficient is 0.15 µV/degree C. The span temperature coefficient is 6 ppm/degree C. When using this option, the display update rate is limited to 10 updates per second. The actual A/D conversion rate exceeds 300 cycles per second. This high-speed process allows the matroller to filter out noise while providing a weight update rate of up to 50 updates per second for setpoint control and other functions.

Each interface board has a removable EEPROM that stores calibration parameters for the scale. If an EEPROM is transferred to another board, all calibration parameters transfer as well. A detachable seven-position terminal strip is used to terminate the analog load cell cable on the rear of the PCB. Signal, excitation, sense, and shield connections are provided, each with an easy-to-read description. Two LEDs are visible through holes in the rear panel of the PCB to indicate its operating status.

POWERCELL Interface Board (3)

Note: Use of POWERCELLs is not recommended where high flow rates are involved.

The POWERCELL interface Board must be used when the Q.iMPACT matroller is used with a METTLER TOLEDO POWERCELL load cell system or RAAD box(es). It supports up to a total of 24 POWERCELLs or six RAAD boxes. An external power supply is needed when using more than 14 POWERCELLs or three RAAD boxes. METTLER TOLEDO also offers intrinsically safe barriers for use with POWERCELL systems located in hazardous areas. Please contact your METTLER TOLEDO representative for more information about applications in hazardous environments.

IDNET Interface Board (4)

Note: If a single IDNET card is installed, it has to be designated as Scale 1.

The IDNET interface allows you to interface a METTLER TOLEDO multi-range base or lab balance with the IDNET option with the Q.iMPACT matroller. When utilizing this interface, the matroller acts as a "front end" for the base. Setup and calibration of the base is identical to the procedure used by the ID family of indicators. Scale-related information is stored in the scale base as well as the matroller, allowing its access by external devices such as a PLC.

Multifunction I/O Interface Board (7)

Note: Using the multifunction I/O option may reduce the number of devices that a Q.iMPACT matroller can support.

The Multifunction board expands the number of serial and discrete input and output ports supported by the Q.iMPACT matroller. The Multifunction PCB adds two serial ports. COM3 can be used for RS-232 communications. COM4 can be used for RS-232 or RS-422/RS-485 communications. The Multifunction PCB adds eight programmable discrete inputs (PAR 3). Eight programmable discrete outputs (PAR 4). PAR 3 and PAR 4 assignments are user-configurable.

When using the **Qi Matroller Lite** for two speed control the Multifunction I/O board is required in order to provide the Fast Feed control signal.

Software

JagBASIC

JagBASIC software is standard in the Q.iMPACT matroller. JagBASIC is a tool for customizing the Q.iMPACT industrial scale matroller. JagBASIC programs reside along side the standard Q.iMPACT matroller program. The JagBASIC interpreter runs as a separate task using the matroller's multi-tasking operating system. This allows the custom JagBASIC program to interact with the other Q.iMPACT matroller tasks and resources using the matroller's exclusive shared memory design. For example, to monitor a scale gross weight, the JagBASIC program relates a BASIC variable to the matroller shared data variable for gross weight then uses the BASIC variable as desired. All of the shared memory in the matroller may be accessed by the JagBASIC program using this construct.

The high level of integration permits the programmer to exploit the standard functions in the Q.iMPACT matroller, making it easier to implement solid solutions in record time. To print a standard ticket or report, a JagBASIC program can load data into a Q.iMPACT matroller shared data variable then print by using a standard template that is designed in the matroller setup.

Model Identification

Refer to the following chart to verify the model with which you are working.

Q.iMPACT MATROLLER MODEL CONFIGURATION						
JX	**XX**	**X**	**X**	**X**	**X**	**XXX**
Terminal	**Enclosure Display**	**Slot #1 Accessory**	**Slot #2 Accessory**	**Slot #3 Accessory**	**Application Software**	**Destination Market**
Q.iMPACT Matroller	PB=Panel, Blind PA=Panel, A/N HA=Harsh, A/N	0=None 1= Analog L/C, 15 V 2= RE*Analog L/C, 5V 3= POWERCELL 4=High Precision (IDNET) A=Dual Analog Scale L/C 15V B=Dual RE* Analog Scale L/C 5V F=Quad Flow Meter	0=None 1= Analog L/C, 15 V 2= RE*Analog L/C, 5V 4=High Precision (IDNET) 7=MultiFunction I/O A=Dual Analog Scale L/C 15V B=Dual RE* Analog Scale L/C 5V F=Quad Flow Meter	0=None 7=Multi-function I/O 9=Profibus DP C=ControlNet F=Quad Flow meter	**Q**=Q.iMPACT	000=USA See the Market Codes in the Appendix for additional destination codes

*RE Reduced Excitation

As an example, JXPAA0FQ000 refers to a panel-mount Q.iMPACT matroller with a dual analog scale card and quad flow meter card for sale in the USA.

NOTE: Be sure to use a "Q" in the Application Software space of the model number to denote this is a Q.iMPACT matroller.

Matroller Features/Components

Controller PCB

- Four discrete inputs (PAR1); four discrete outputs (PAR2)(5 to 30 volts DC).
- The output current is 35 mA per discrete output up to 115 mA maximum total current draw on the +5 Volts DC supply.
- Inputs can be defined as clear, tare, print, zero, and other keyboard functions. By default the inputs are used to Ack Hand Additions for Scale A, B, C & D.
- Outputs 1 to 4 are pre-assigned to control the feeds for Scale A, B, C & D
- The COM1 serial port can be either RS-232 or 20 mA current loop active transmit. Both are available simultaneously; the COM2 serial port can be either RS-232 or RS-422/RS-485.
- Keyboard input is a standard 6-pin PS2 type mini DIN connection for a compatible keyboard.
- The Ethernet network connection uses a RJ45 connection.
- Connections to the Controller PCB are made using four removable terminal strips. The wire size range is 16 to 23 AWG.
- If analog load cell scale(s) are installed, the calibration parameters for each scale are stored in the EEPROM of the Analog PCB. High Precision (IDNET) calibration parameters are stored in the high precision base.

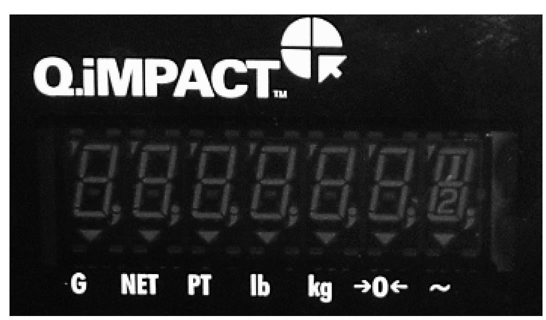
Alphanumeric Display

The Q.iMPACT matroller has two displays where scale data and operational messages are presented. The lens on the panel mount model display is polycarbonate with hardcoating. The harsh environment model's lens is polyester with hardcoating.

Upper Display

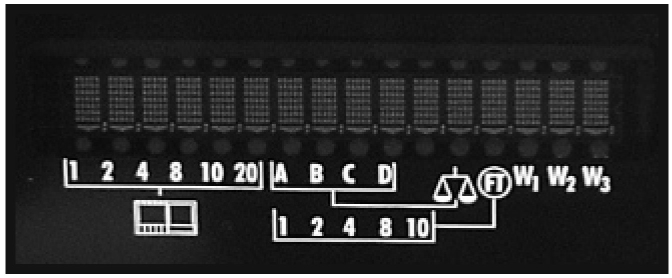
Note: Refer to the User's Guide Section for additional information.

The upper display is a seven-digit, seven-segment 0.5 in. (13 mm) high vacuum fluorescent numeric display and is normally used to indicate scale weight and/or flow meter totalizer. It can display up to seven numbers with a decimal point, and status annunciators. Each of the seven digits has a decimal point and an annunciator associated with it. The annunciators are used to indicate gross or net weights, a preset tare value, pound or kilogram weights, the center of zero, and motion.



Lower Display

The lower display is a 16-character, 5×7 dot matrix, 0.25 in. (6 mm) high vacuum fluorescent alphanumeric display. Each character has a period and an annunciator associated with it. The display is used for flow rates and for various prompts and messages generated by the matroller. The first 10 annunciators are used to indicate which matroller number (1 through 6) and internal scale (A-D) are currently displayed. The remainder indicate weighing range.



Keypad

Each Q.iMPACT matroller is equipped with a 20-key keypad as shown here:

The keypad consists of a tactile-feel membrane switch covered with a polyester overlay. Audible beeps sound when a key is depressed.

The keypad consists of numeric keys (0-9), decimal point, space and eight function keys. The numeric keys, decimal point key and space key also contain the alphabet characters and some special symbols.

Using an Optional PC Keyboard

Note: Refer to the User's Guide Section for additional information.

An external keyboard can be attached to the Q.iMPACT matroller for alphanumeric data entry and access to other characters and lowercase letters. The Q.iMPACT Controller board has a PC keyboard controller and plug-in connector to support a keyboard. (Refer to the section on Installation.)

The PC keyboard and Q.iMPACT keypad send the same data to the matroller and operate concurrently.

Enclosure

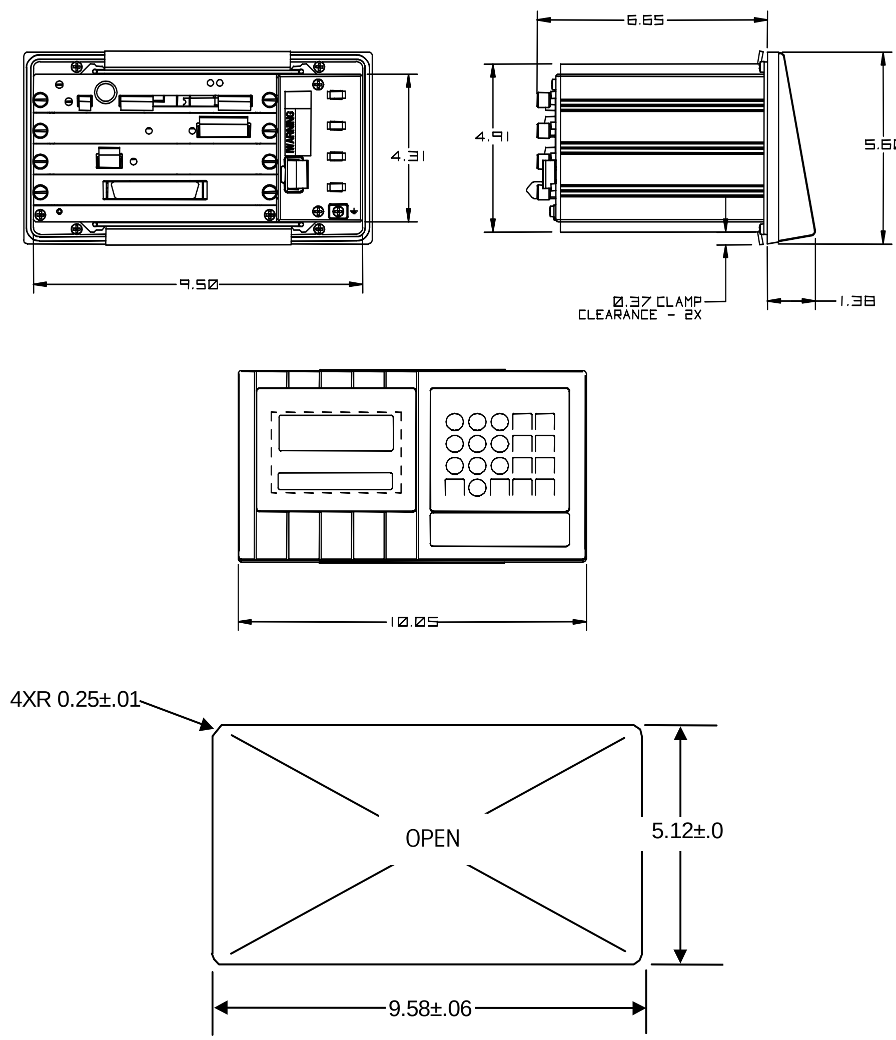
The Q.iMPACT matroller is available in an aluminum panel-mount or blind panel-mount enclosure or in a stainless steel harsh environment enclosure.

Panel Mount Enclosure (PA)

Two integral brackets are used to mount this unit through a flat panel. The front panel and associated panel clamping mechanism are designed to provide a TYPE 4 seal and accommodate a panel thickness from 11 to 16 gauge.

The panel-mount model measures:

- 10.05 in. (25.5 cm) × 5.6 in. (14 cm) at the front of the matroller
- 9.5 in. (24 cm) × 4.91 in. (12.5 cm) at the rear
- 8.03 in. (21 cm) deep



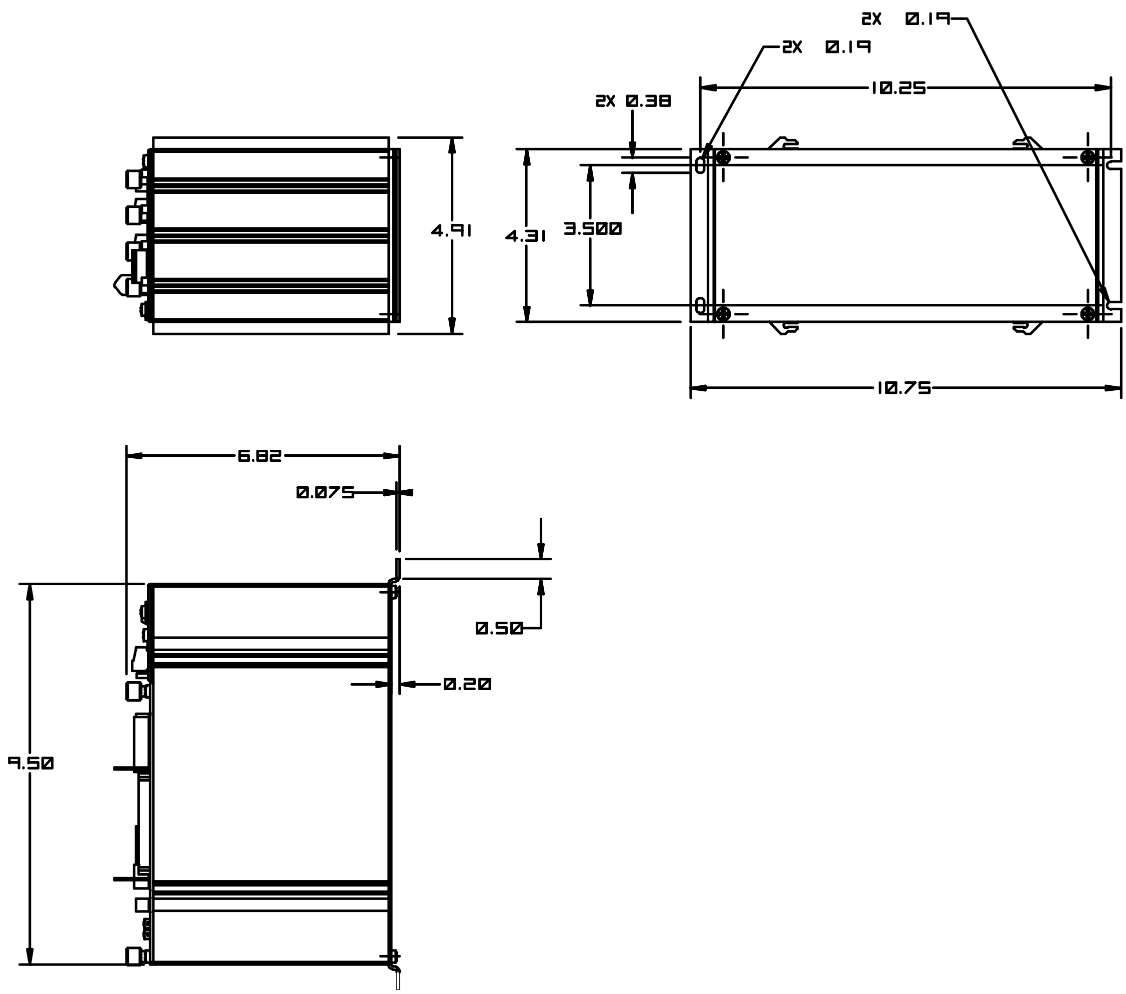
Q.iMPACT Panel-Mount Model and Cutout Dimensions

Panel-Mount Enclosure—Blind Chassis (PB)

The front of the panel-mount enclosure has a blank plate to cover the electronics and to provide a method of mounting. There is no keyboard or display on the front of the unit. This allows the matroller's use as a "blind" terminal (installed behind a panel,) sharing another Q.iMPACT matroller's keyboard and display via the Ethernet connection. The enclosure designed to TYPE 1 requirements with a "blind" front panel.

The blind unit measures:

- 10.75 in. (27 cm) × 4.31 in. (10.9 cm) at the base



- 10.25 in. (26 cm) × 3.91 in. (10 cm) c-c mounting
- 9.5 in. (24.1 cm) × 5.00 in. (13 cm) chassis

Q.iMPACT Blind Chassis Model Dimensions

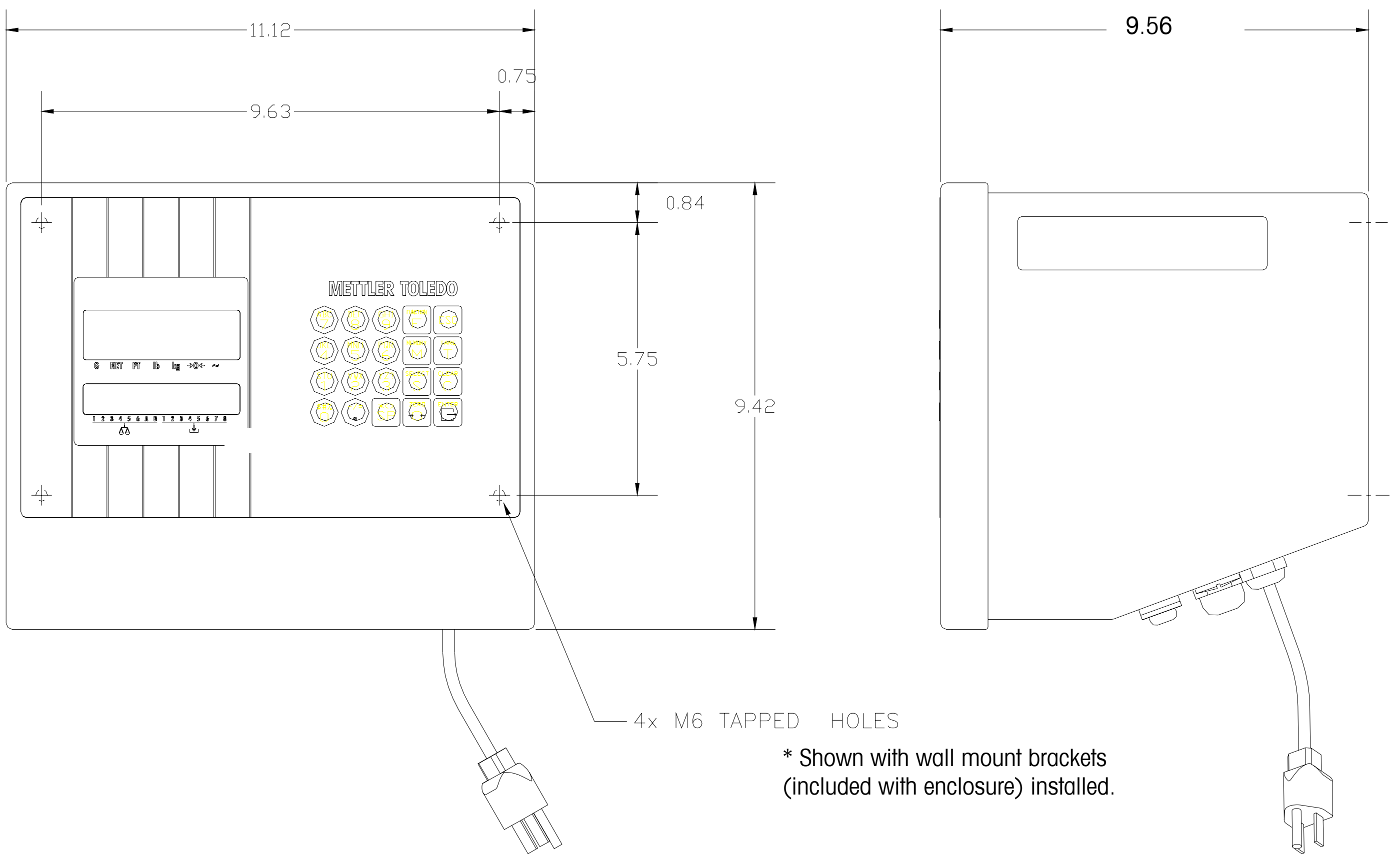
Harsh Environment Enclosure (HA)

The harsh environment enclosure provides TYPE 4 protection and is intended for applications in which the matroller is exposed to high humidity, direct washdown, or corrosive environments. It is constructed of 304 stainless steel and meets US FDA and comparable European requirements.

A full 4-slot Q.iMPACT chassis is mounted inside the enclosure. All field wiring enters into the unit through cable seals that maintain the washdown protection of the enclosure. The cable seals are located at the bottom rear of the unit. Two brackets are provided for wall mount applications. An interface adapter (0917-0233) is available for column mount applications.

The harsh environment unit measures:

9.42 (23.93 cm) in x 11.12 in (28.24 cm) x 9.56 in (22.86 cm)



Harsh Environment Model Dimensions

Use in Standard Weighing Applications

The Q.iMPACT matroller can also be used for standard weighing applications. Additional information is provided in Chapter 3 of this manual and in the Operator's Manual on the Documentation CD.

2 Installing the Q.iMPACT Matroller

Introduction

The following chapter provides instructions for physically inspecting and installing the Q.iMPACT matroller and connecting the external wiring. This information is also provided in the installation guide that accompanies the Q.iMPACT matroller.

NOTE: Because the matroller is part of a larger system, its installation may be impacted by other components of the system. You should refer to any additional documentation supplied with optional interface boards provided by METTLER TOLEDO, or any documentation supplied by vendors of other components used in the system. The operator information and configuration information is provided in the relevant operator manual and/or technical manual found on the CD-ROM supplied with the Q.iMPACT matroller.

Also, only qualified technicians should perform any internal wiring, installation of options or programming. Refer to the appropriate documents on the Documentation CD-ROM.

Unpacking and Inspection

1. If upon delivery the shipping container for the matroller appears damaged, check for internal damage and file a freight claim with the carrier if required.
2. If the container is undamaged, unpack the matroller from its protective package and inspect each component for damage.
3. Verify that you have the correct package contents. To install the matroller, you need the matroller, the screwdriver provided, and these instructions. You may also need common hand tools, such as a drill and wrenches for use with the harsh environment unit. All other package contents should remain in the box.

   Package contents for all Q.iMPACT matrollers include:

   - Q.iMPACT matroller
   - This Installation Guide (*)16596200A
   - Weights and Measures sealing screws
   - Mating connectors for the I/O port
   - Screwdriver
   - Set of capacity labels
   - Q.i Documentation CD-ROM
   - Qi License Certificate

   The panel-mount and blind chassis Q.iMPACT matroller also include:

   - Hardware kit (*) 15411600A

   The harsh environment Q.iMPACT matroller includes:

   - 2 stainless steel wall mount brackets
   - 4 stainless steel bolts for attaching the wall mount brackets
   - Hardware kit (*) 15411500A

   (*) May be proceeded by a letter designation

Environmental Considerations

Temperature and Humidity

- Operating temperature: 14 to 113ºF (-10 to 45ºC) at 10% to 95% humidity, non-condensing.
- Storage temperature: -40 to 140ºF (-40 to 60ºC) at 10% to 95% humidity, non-condensing.

Environmental Protection

The Q.iMPACT matroller is not intrinsically safe and must not be installed in areas classified as hazardous by the National Electric Code (NEC) unless appropriate hazardous area options provided by METTLER TOLEDO are used, and a qualified service technician performs the installation.

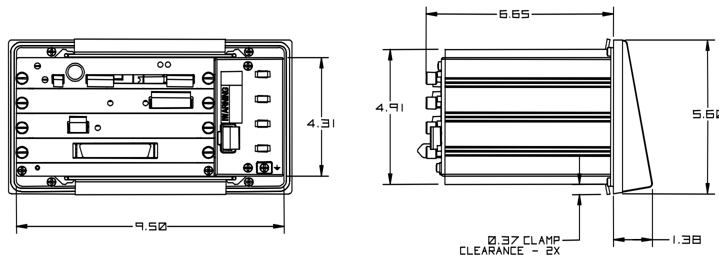
WARNING!

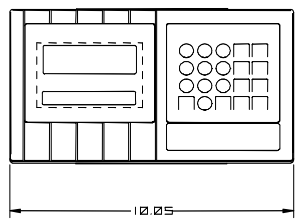
THE Q.IMPACT MATROLLER IS NOT INTRINSICALLY SAFE! DO NOT USE IN AREAS CLASSIFIED AS HAZARDOUS BY THE NATIONAL ELECTRIC CODE (NEC) BECAUSE OF COMBUSTIBLE OR EXPLOSIVE ATMOSPHERES.

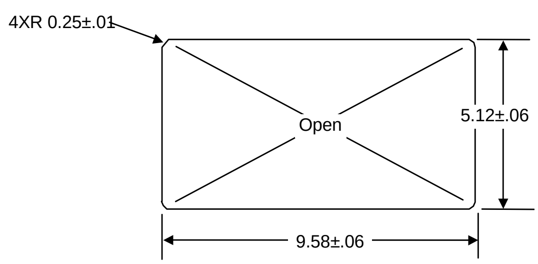
Installing the Panel-Mount Model

Dimensions:

- 10.05 in. (255 mm) x 5.6 in. (140 mm) at the front of the matroller
- 9.5 in. (240 mm) x 4.91 in. (125 mm) at the rear
- 8.03 in. (210 mm) deep







1. Refer to the illustrations provided.
2. Cut an opening 9.58 in. (243.3 mm) × 5.12 in. (130 mm) to accommodate the matroller. The tolerance for the panel cutout is ±0.06 in. (01.5 mm).
3. Using the Allen wrench included, remove the four retaining set screws (A) located at the rear of the enclosure in the top and bottom mounting plate grooves.
4. Remove both mounting plates (B).
5. Insert the matroller through the panel opening from the front until it is flush against the panel. Confirm that the matroller is installed right side up.
6. Slide the top and bottom mounting plates back in the grooves. Push them flush against the panel from the back. The flared end of the plate should contact the back of the panel.
7. Holding the unit in place, replace the four set screws and tighten until the unit is secured and the front panel gasket is compressed.
8. Inspect the front of the matroller for a good seal to the front of the enclosure.
9. You can now make the electrical connections. (Ethernet and keyboard connections can be made directly to the Controller PCB.)

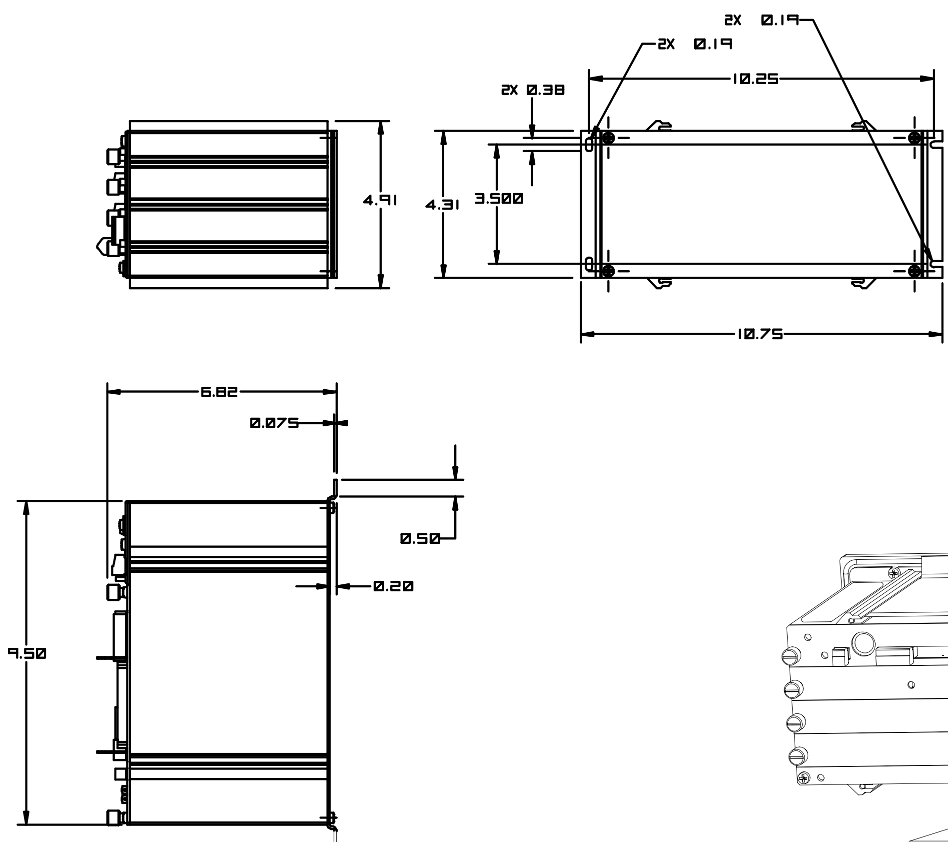
Installing the Blind Panel-Mount Unit

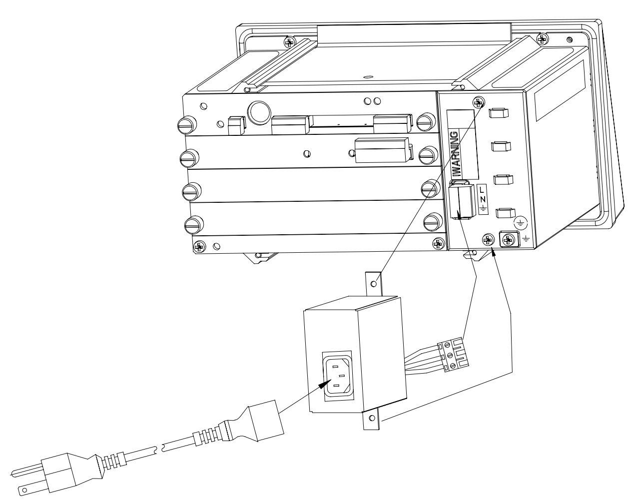
Panel-Mount Enclosure—Blind Chassis (PB)

The front of the panel-mount enclosure has a blank plate to cover the electronics and to provide a method of mounting. There is no keyboard or display on the front of the unit. This allows the matroller's use as a "blind" matroller (installed behind a panel,) sharing another Q.iMPACT matroller's keyboard and display via the Ethernet connection. The matroller enclosure has a TYPE 1 or IP30 rating with a "blind" front panel.

The blind chassis mount model measures:

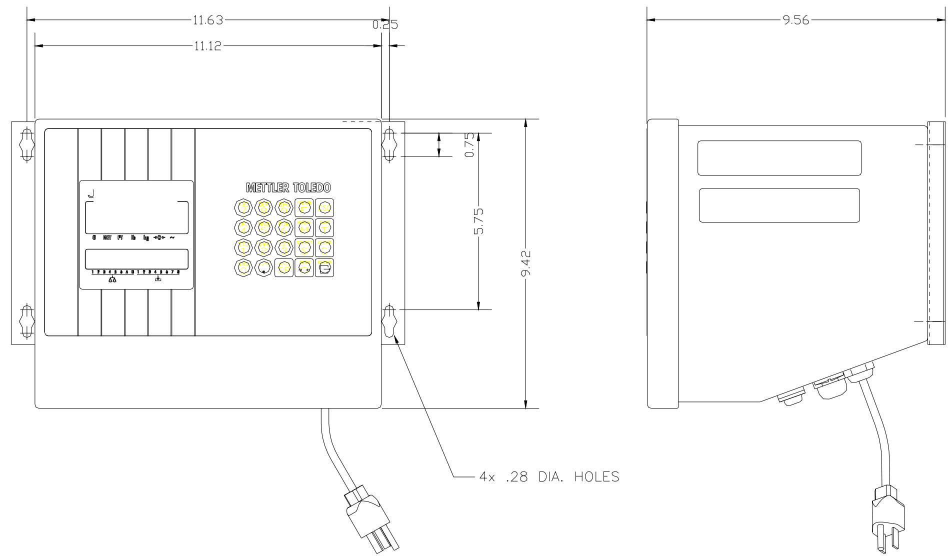
- 10.75 in. (270 mm) × 4.31 in. (109 mm) at the base
- 10.25 in. (260 mm) × 3.91 in. (100 mm) c-c mounting
- 9.5 in. (241 mm) × 5.00 in. (130 mm) chassis





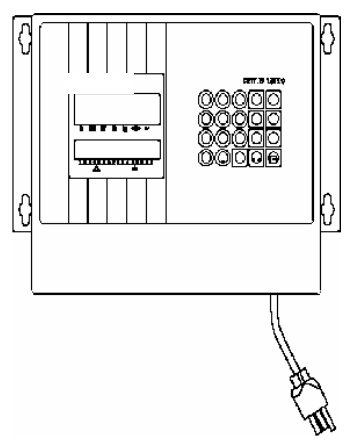
Installing the Harsh Environment Matroller

Dimensions: 9.42 x 11.12 x 9.56" (239.3 x 282.4 x 242.8 mm)



Mounting the Harsh Environment Matroller

1. Locate the two mounting brackets that came in the Q.iMPACT matroller package.
2. Mount the brackets using the four stainless steel screws supplied with the unit. Refer to the figure below and note the correct positioning of the brackets. The slotted holes must protrude beyond the enclosure and the bracket tabs must point toward the front as shown.

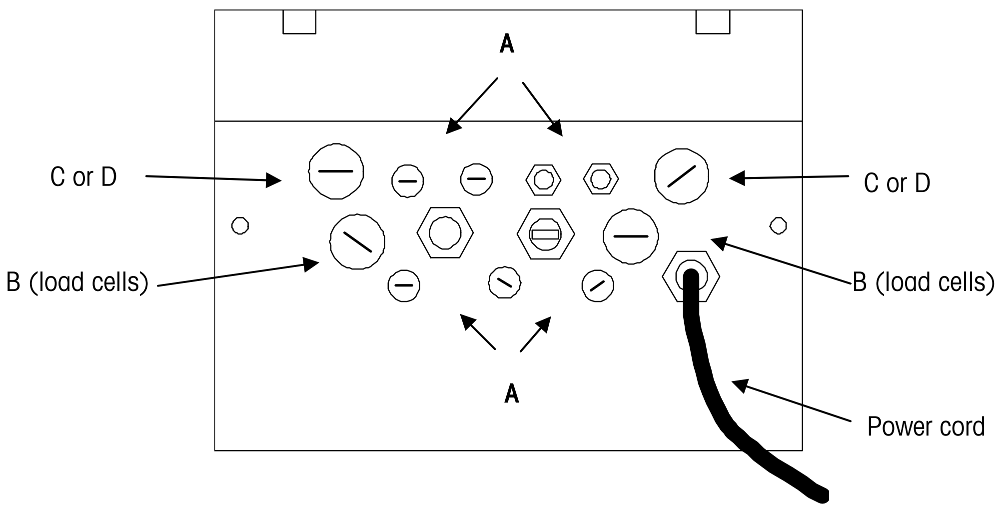


* Shown with wall mount brackets (included with enclosure) installed.

3. Tighten the brackets to the back of the enclosure (torque 25 inch pounds or 2.83 N•m).
4. Using the dimensions on the previous page, prepare the mounting surface to accept the enclosure. The mounting surface and brackets must be able to support 45 lb (20 kg).
5. Place the enclosure on the mounting surface and secure with appropriate fasteners. You can now make the electrical connections.

Opening the Harsh Environment Matroller

1. Disconnect power.
2. Locate the two slots on the bottom lip of the front of the harsh environment enclosure.
3. Gently insert the blade of a slotted screwdriver into one of the slots and press inward (toward the enclosure). This releases a pressure tab that allows the access panel of the enclosure to open slightly.
4. Repeat steps 2 and 3 for the other slot.
5. Remove the access panel away from the enclosure. The access panel is connected to the Controller PCB by a cable and cannot be removed without disconnecting the cable. You should be able to access the unit with the front panel connected.
6. With the access cover removed, you are now ready to make connections to the unit. The illustration and table that follow describe the recommended wiring connections.



Reference Letter	Suggested Cable
A	Serial I/O Cables PLC I/F Cabling
B	Load Cell Cabling
C	Ethernet Cabling RJ-45 Category 5
D	QWERTY Keyboard PS/2

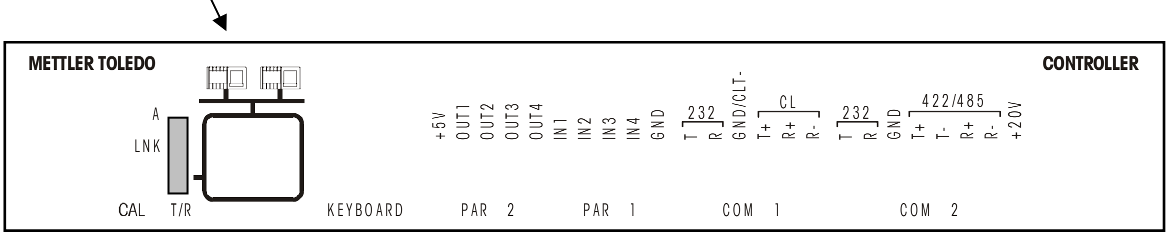
Ethernet Connection

The Q.iMPACT matroller can be connected to LAN, WAN, automation or enterprise systems using ETHERNET, a standard network hardware platform.

The ETHERNET connection on the rear of the Q.iMPACT Controller PCB is designed for an RJ45 connector. The type of cable used is dependent on the site and environment. Consult your IT/IS department for recommendations.

- When connecting directly between a PC and a Q.iMPACT matroller (point-to-point connection), a crossover cable is used.
- To connect the Q.iMPACT matroller to other equipment through a switch, a standard cable is normally used as the switch provides the crossover connections. Refer to the specifications of the switch used to determine if a crossover cable is required.
- To connect the Q.iMPACT matroller to other equipment through a hub, a standard cable is normally used as the hub provides the crossover connections. Refer to the specifications of the hub used to determine if a crossover cable is required.

Ethernet connection



Making the Load Cell Connections

Make the load cell connection to the controller PCB following the instructions provided here.

WARNING!

IF AN ANALOG SCALE IS TO BE USED AND IT WILL BE LOCATED IN A HAZARDOUS (EXPLOSIVE) AREA, SPECIAL PRECAUTIONS MUST BE TAKEN. LOAD CELLS APPROVED FOR USE IN HAZARDOUS LOCATIONS MUST BE USED AND A LOAD CELL BARRIER AND/OR A LOW VOLTAGE ANALOG PCB MAY BE REQUIRED. CONTACT YOUR AUTHORIZED METTLER TOLEDO REPRESENTATIVE FOR DETAILS ON EACH SPECIFIC APPLICATION.

CAUTION

TO AVOID DAMAGE TO THE PCB OR LOAD CELL, REMOVE POWER FROM THE Q.IMPACT MATROLLER AND WAIT AT LEAST 30 SECONDS BEFORE CONNECTING OR DISCONNECTING ANY HARNESS.

Load Cell Connections

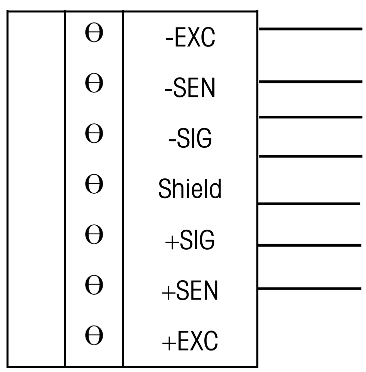
The maximum cable length for analog load cell connections to the matroller depends on the total scale resistance (TSR) of the scale base. To calculate TSR:

$$TSR = \frac{\text{Load Cell Input Resistance (Ohms)}}{\text{\#Load Cells}}$$

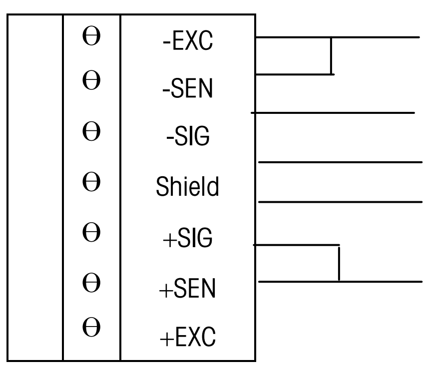
Recommended Maximum Cable Length			
TSR (Ohms)	**24 Gauge* (feet/meters)**	**20 Gauge (feet/meters)**	**16 Gauge (feet/meters)**
350	800/243.84	2000/609.6	4000/1219.2
87	200/60.96	600/182.88	1000/304.8
58	100/30.48	300/91.44	500/152.4
35	70/21.336	190/57.91	350/106.68

The following diagrams describe analog load cell terminal strip wiring for standard 6-wire cable and standard 4-wire cable.

Standard 6-wire Cable



4-wire Cable



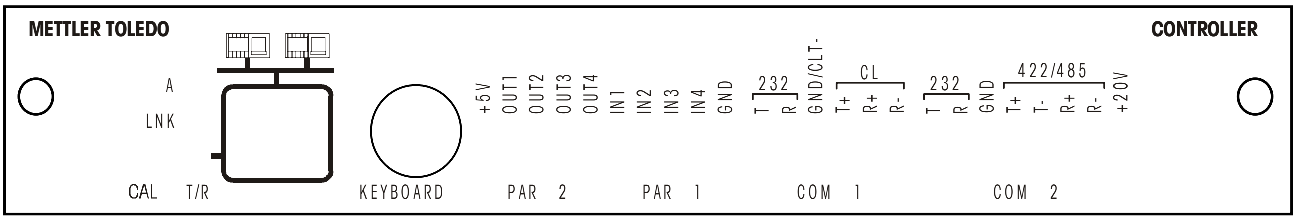
* If an increase in load results in a decrease in weight display, reverse the signal wires (+SIG and -SIG).

Serial Port Connections Controller PCB

Note: Keyboard wedges and other non-keyboard devices are not supported.

Refer to the following diagrams for proper cable connections to the Q.iMPACT matroller's serial ports COM1 and COM2. COM1 and COM2 are located on the Controller board, which is positioned in the top slot of the matroller.

The COM1 and COM2 terminal strips will accommodate wire sizes from 16 to 22 AWG. The terminal strips may be removed to facilitate wiring. Removal of the terminal strips permits easier viewing of the terminal designations printed on the board back plate.



For enclosures using the pass-through cable grips, you must pass the cable through the grip, grommet, and housing before wiring to the connector.

COM1 20 mA (Controller PCB Serial Port)

The following diagram describes COM1 pin-to-pin cable connections using a 20 mA loop. The maximum recommended cable length for 20 mA interfacing is 1000 feet (300 meters).

Q.iMPACT Matroller COM1

Θ	TXDA	
Θ	RXDA	
Θ	Gnd	Signal Ground (Active Current Loop Transmit -)
Θ	CLTX+	Active Current Loop Transmit +
Θ	CLRX+	Current Loop Receive +
Θ	CLRX-	Current Loop Receive -

COM1 RS-232 (Controller PCB Serial Port)

The following diagram describes COM1 pin-to-pin cable connections using an RS-232 cable. Maximum recommended cable length is 50 feet (15 meters).

Q.iMPACT Matroller COM 1

Θ	TXD	RS-232 Transmit
Θ	RXD	RS-232 Receive
Θ	GND	Signal Ground
Θ	CLTX+	
Θ	CLRX+	
Θ	CLRX-	

COM2/COM4 RS-232 (Controller PCB Serial Port)

The following describes COM2 pin-to-pin cable connections using an RS-232 cable and the connections to COM4 when an optional Multifunction I/O PCB is installed. The maximum recommended cable length for RS-232 is 50 feet (15 meters). Maximum recommended total distance for RS-422 and RS-485 is 2000 feet (600 meters).

The W2 jumper on the Multifunction I/O PCB determines the COM4+20 V matroller voltage output.

Q.iMPACT Matroller COM2/COM4

Θ	TXD	RS-232 Transmit
Θ	RXD	RS-232 Receive
Θ	GND	Signal Ground
Θ	TXD+	RS-422/485 Transmit +
Θ	TXD-	RS-422/485 Transmit -
Θ	RXD+	RS-422/485 Receive +
Θ	RXD-	RS-422/485 Receive -
Θ	+20 V	+20 VDC Supply

Discrete Wiring

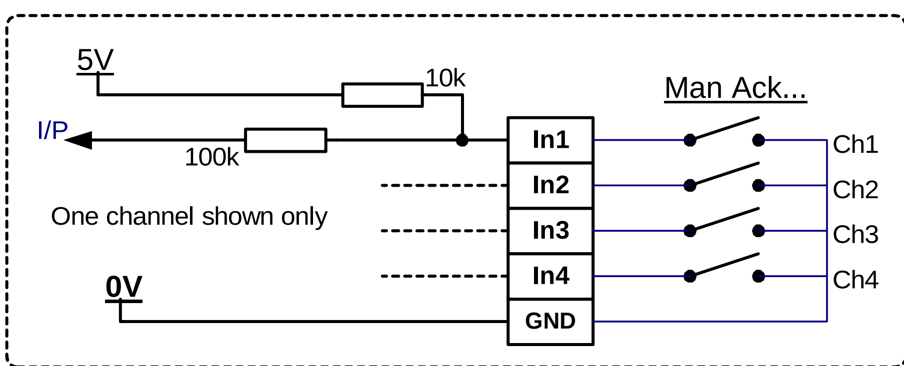
The Controller PCB contains four non-isolated discrete input and four non-isolated discrete output connections.

PAR 1 Input Connections

The input connections must be referenced to ground. A switch or relay contact may be used to make this connection. The remote device should hold the input at logic ground for at least 100 ms. Scale functions are performed when the input is held to ground (leading edge triggered). The maximum recommended cable length between the remote device and the Q.iMPACT matroller is 10 feet (3 meters).

Each of the four PAR 1 inputs can be configured for different remote inputs including input from the keypad for remote print, unit switching, alternate scale selection, or template selection. Polarity (switch to ground or open a ground connection to initiate remote input) can also be selected. By default these I/Ps are used to Ack Hand Adds for the four Scales, A, B, C & D

PAR 1 Terminal



Input Wiring Example

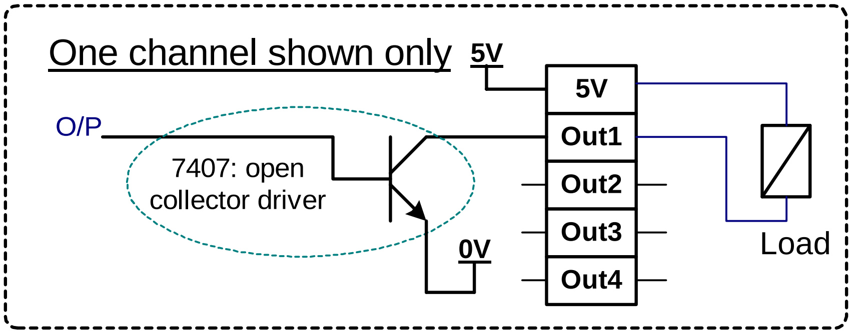
PAR 2 Output Connections

The PAR 2 outputs are reserved for Material Feed control. O/P1 is assigned to Scale A. O/P 2 is assigned to Scale B etc. It is possible to use these outputs for other functions, however the Qi PAC has highest priority and will override any other functions.

Outputs are negative-true, open collector type.

PAR 2 outputs can be referenced to the 5 volt supply available on the PAR2 connector or can sink up to 35 mA of current and have a maximum voltage of 30 volts DC from an external source. The maximum cable length between the remote device and Q.iMPACT matroller is 10 feet (3 meters).

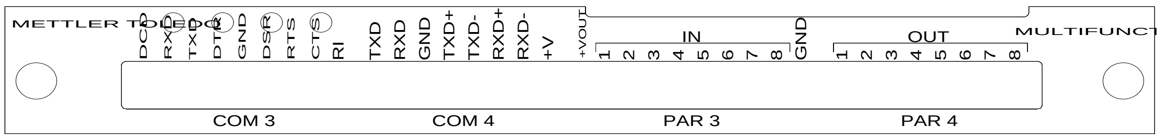
PAR 2



Output Wiring Example

Optional Multifunction I/O PCB Serial and Discrete Connections

This section gives proper cable connections to COM 3, COM 4, PAR 3, AND PAR 4, which are located on the optional Multifunction I/O PCB.



COM3 Interconnect Wiring

COM3 supplies all inputs and outputs to allow full handshaking and modem interfacing. The COM3 port is only available with the optional Multifunction PCB. When interfacing COM3 to devices other than those listed for COM2 RS-232, refer to the documentation for the particular device for handshaking needs and suggested wiring. The following general interconnect options are offered for the 9- and 25-pin connectors.

COM3 With Full Handshaking

	COM3	DB25	DB9	DCE
θ	DCD	—	—	
	RXD	2	2**	**This connection is only required for devices that input data to the matroller, such as devices that send ASCII "C, T, P, Z, or U".
θ				
θ	TXD	3	3	
θ	DTR	6	6	
θ	GND	7	5	
θ	DSR	20	4	
θ	RTS	5	8	
θ	CTS	4	7	
θ	RI	—	—	

COM4 Interconnect Wiring

The wiring instructions for the COM2 serial port apply to COM4 on the Multifunction PCB.

PAR 3 Discrete Input Port

Each of the eight PAR 3 inputs can be configured for different remote inputs including input from the Q.iMPACT keypad (Tare, Clear, Zero, Select, Escape, and Enter). PAR 3 inputs can also be configured for remote print, unit switching, alternate scale selection, or template selection. Polarity (switch to ground or open a ground connection to initiate remote input) can also be selected.

The wiring instructions for the PAR 1 discrete inputs apply to PAR 3 on the Multifunction PCB.

PAR 4 Discrete Output Port

When using a Qi Lite these outputs are used to control the material Fast Feed. The allocation of the outputs is user defined. Ie Scale A can use O/P 3 for its Fast Feed control.

Each of the eight PAR 4 outputs can also be configured to announce Setpoints 1 through 12 coincidence. The 12 setpoint outputs can be configured to request either Feed or Fast Feed, or to announce setpoint tolerance status. PAR 4 outputs can also be configured to announce "current scale status" conditions such as:

- Net or Gross Mode
- Motion
- Over Capacity or Under Zero

The +VOUT terminal supplies a jumper selectable voltage of +5, +12, or +20 VDC.

The wiring instructions for the PAR 2 discrete outputs apply to PAR 4 on the Multifunction PCB. Please refer to the section entitled PAR 2 Output Connections for wiring details.

Wiring Instructions for Interface Boards

The following interface boards (card) are compatible with the Q.iMPACT matroller. The specific board slots must be adhered to for proper operation of the matroller.

Board Slot 1

- Analog Load Cell, 15 V and Reduced Excitation
- DigiTOL POWERCELL, & High Precision (IDNET)
- Dual Analog Load Cell, 15 V and Reduced Excitation
- Quad Flow Meter

Board Slot 2

- Analog Load Cell, 15 V and Reduced Excitation
- High Precision (IDNET)
- Dual Analog Load Cell, 15 V and Reduced Excitation
- Quad Flow Meter
- Multifunction

Board Slot 3

- ControlNet & Profibus DP
- Quad Flow Meter
- multifunction

Consult the installation instructions provided with the option card(s) for specific information on the use of the interface card, link or dip switch settings, and wiring requirements. Wiring instructions for the flow meter board are also found in the section on flow meters in the technical manual on the Documentation CD-ROM.

NOTE: Knowledge of interfacing to a ControlNet and Profibus network is required for installing the ControlNet or Profibusinterface board.

Power Considerations

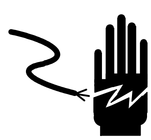
- 85 to 264 VAC with a line frequency of 47 to 63 Hz.
- Power consumption -- 20 Watts maximum.
- Power termination -- single three-position removable terminal strip (panel-mount)
  -- integral power cord (harsh)
- The wire size range -- 12 to 16 AWG.

The integrity of the power ground for equipment is important for safety and for the dependable operation of the matroller and its associated scale bases. A poor ground can result in an unsafe condition if an electrical short develops in the equipment. A good ground connection is needed to assure extraneous electrical noise pulses are minimized. The power line for the matroller must not be shared with equipment such as motors, relays, or heaters that generate line noise. If adverse power conditions exist, a dedicated power circuit or power line conditioner may be required.

To confirm ground integrity, a commercial branch circuit analyzer is recommended. This instrument uses a high amperage pulse to check ground resistance. It measures the voltage from the neutral wire to the ground connection and will provide an assessment of the line loading. Instructions with the instrument give guidelines about limits that assure good connections.

WARNING!

USE ONLY THE POWER CORD SUPPLIED OR AN EQUIVALENT TYPE. U.S. MODELS USE UL APPROVED TYPE SJT CORD; EC MODELS USE HARMONIZED APPROVED TYPE H05VV-F CORDS.



WARNING!

IMPROPER INSTALLATION OF THE POWER CABLE WILL RESULT IN PERSONAL INJURY AND/OR DAMAGE TO THE EQUIPMENT. THE HOT WIRE MUST BE APPLIED TO "L", NEUTRAL TO "N" AND GROUND TO ⏚

CAUTION

FOR PANEL-MOUNT INSTALLATIONS:

- **INCLUDE A POWER DISCONNECT SWITCH IN AC POWER WIRING.**
- **SWITCH MUST BE WITHIN 10 FEET (3 METERS) AND EASILY ACCESSIBLE TO OPERATOR.**
- **SWITCH MUST BE CLEARLY IDENTIFIED AS DISCONNECT FOR MATROLLER POWER.**
- **SWITCH AND/OR CIRCUIT BREAKER MUST COMPLY WITH APPROPRIATE ELECTRICAL CODES (FOR EC—IEC947).**

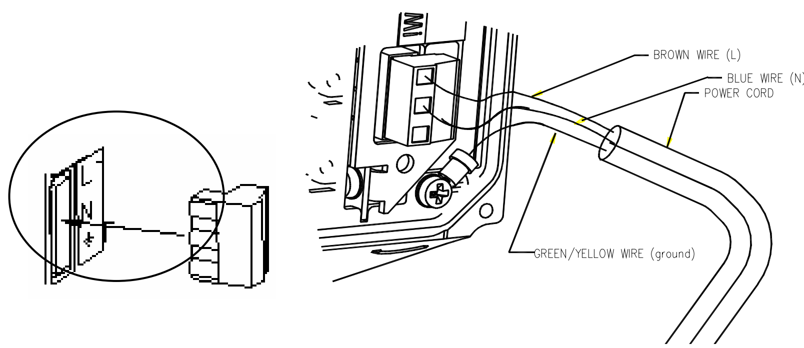
FOR DESK/WALL INSTALLATIONS:

- **POWER CORD PLUG MUST BE CLEARLY IDENTIFIED AS DISCONNECT FOR MATROLLER POWER.**
- **POWER CORD MUST BE PLUGGED INTO OUTLET WITHIN 10 FEET (3 METERS) AND EASILY ACCESSIBLE TO OPERATOR.**

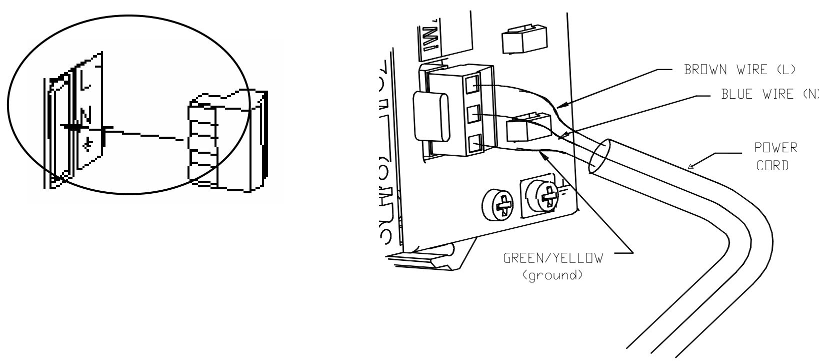
CAUTION
DO NOT APPLY AC POWER TO THE Q.IMPACT MATROLLER. POWER SHOULD NOT BE APPLIED UNTIL A QUALIFIED SERVICE TECHNICIAN HAS COMPLETED ALL INTERNAL WIRING.

Connecting the Power Cable

A power cord is provided with harsh environment Q.iMPACT matrollers. Connection to the panel-mount Q.iMPACT matroller must be made at installation. The AC power connection must be wired as follows for harsh environment models:



Power Connection for Harsh Environment Q.iMPACT Matroller



Power Connections for Panel-Mount and Blind Panel-Mount Matrollers

The terminal strip will accommodate wire sizes from 12 to 16 AWG. The wire size used must meet all local and national electrical codes. On panel-mount models, you must secure the wiring with a cable tie as a strain relief. Cable ties are supplied loose. If the power terminal strip is removed from the matroller, reinsert it until it is completely seated in the jack at the rear of the enclosure.

An auxiliary chassis ground screw is located at the lower right corner of the power supply cabinet. This ground connection is provided for surge voltage protection applications and for chassis ground. On panel-mount models, you must connect a safety ground to this screw.

Additional Information

The Q.iMPACT matroller can be configured via the front panel or web server interface (certain functionalities are only available when configured via the web server). This procedure should be performed only by qualified technicians following the instructions provided in the technical manual on the documentation CD-ROM that accompanies the matroller. Once setup is complete, the unit can be sealed if required.

Heat Dissipation

The Qi Matroller and Qi Matroller Lite is supplied standard with a Cooling Fan which is mounted to the rear of the Power Supply Module.

Should this fan not be fitted please contact your local supplier for the Fan upgrade kit. Part no:

If a jagXtreme is being upgraded to a Qi Matroller Standard or Lite this Fan should be fitted.

The fan is required whenever more than one option board is installed in the chassis.

3 Setup

Note: You may configure any scales or set the parameters for any flow meters in the system prior to configuring the Q.iMPACT matroller to access its PAC (predictive adaptive control) capabilities.

This chapter provides instructions for setting up the Q.iMPACT matroller from the front panel. The matroller also contains an embedded web server, which allows you to configure it using web pages. **NOTE: You must use a web browser to configure the PAC (known as predictive adaptive control) functionality. However, you can configure all other aspects of the matroller via its front panel.**

To program and calibrate the non-PAC portions of the Q.iMPACT matroller, you must enter setup (Program mode) from the front panel of your matroller. When the matroller is powered up, it comes up in Run mode by default. Refer to Chapter 4 of this manual if you wish to program and calibrate the matroller using the embedded web server.

Upon entering setup mode, you will find a series of program blocks that allow you to set the various parameters, which dictate how the matroller will work. (Refer to the chart on page 3-6 for an overview of these program blocks.)

Note: Whether you choose to program the matroller from the front panel or using the embedded web server, you should refer the information in this chapter as it provides important information about each of the program blocks.

General Information

Front Panel Display

The Q.iMPACT matroller can be programmed using the keypad on the front panel of the matroller. The keypad consists of numeric keys 0 through 9 which contain alphabet characters and symbols, a decimal point (.), a space (SP) and eight function keys containing graphic symbols.

The front panel also contains an upper and lower display. In run mode, the top display shows the current gross or net weight values with annunciators that indicate the status of the display and the weighing mode (NET or GROSS). In setup mode, the bottom display shows the name of the program block or sub-block or a display prompt requesting an action by the programmer.

Key Functions

The numeric keys are used to input numeric entries such as threshold values and scale capacity. They are also used for alphanumeric entries unless a PC type keyboard is installed.

The FUNCTION key is used to enter setup mode and access the program blocks. Depending on the Q.iMPACT matroller's setup configuration, the FUNCTION key is also used for Switch Units, Recall Tare, and Recall Gross.

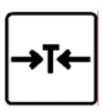
The SELECT key is used to scroll through a list of choices. As the SELECT key is pressed, programming items appear in the lower display area.

The ENTER key is used to complete a response. Press ENTER after you have used the numeric keys to input data or the SELECT key to display an option.

The ESC key is used to exit the current location. The parameters you have configured prior to pressing ESC are saved when you exit. Each time you press ESC, you exit back to the previous level of setup. You may have to press ESC several times to return to a desired location.

Pressing the CLEAR key clears the last character of a response and allows you to re-key the response. This is similar to the backspace key on a computer keyboard.

Pressing the ZERO allows you to back up in the current program block and return to the previous step if you are in the first two levels of setup. The ZERO key does not function when you are beyond the second level in setup.



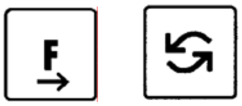
The TARE key is not used in setup mode. In normal operating mode, it is used to perform a pushbutton tare if that function is enabled in setup.

The MEMORY key is not used in setup mode. In normal operating mode, it is used to access memory functions, depending on the Q.iMPACT matroller's setup configuration, including Prompt List, Consecutive Number, Enter Setpoint, Time, and Date.

Accessing Setup

The matroller is shipped from the factory with the legal-for-trade switch (S2-1) set in the 'OFF' position. Upon powering up the matroller, you should be able to directly enter setup mode.

1. Plug the matroller in. It will go through a power-up sequence during which time the lower display will first read **METTLER TOLEDO,** followed by the software number, and then **lb GROSS** on the lower display and **0.000** on the upper display.



2. Press the FUNCTION key then the SELECT key until **Enter Setup?** is displayed. If the **Enter Setup?** prompt is not displayed, try the following steps:
    - Remove AC power.
    - Remove the controller board and set S2-1 to the off position, or
    - Push in the CAL switch while entering setup.
    - Replace the controller board or option board.
    - Apply power to the matroller and repeat steps 1 and 2.
    - Perform a master reset.

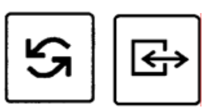
3. Press ENTER. The first program block, **Scale Interface**, should be displayed. Once **Scale Interface** is displayed, press ENTER to open this block or press SELECT to move to the next program block.

Note: Use anti-static protection straps whenever touching electronics boards.

Navigating

To move through the various program blocks and sub-blocks:

1. Press SELECT to scroll through the program blocks. When the desired block is displayed, press ENTER to open it.



2. Program blocks contain sub-blocks that handle specific areas of functionality. Once you are in a program block, press the SELECT key to move through the sub-blocks. Use the ENTER key to confirm your parameter option selection in the sub-blocks.

3. After configuring a sub-block, the matroller proceeds to the next sub-block. When you finish configuring the last sub-block in a program block, the matroller proceeds to the next program block. Continue through each program block until you have finished configuring each one.

4. To return to normal operation after configuring the parameters in each sub-block, press ESC several times until the prompt **Exit Setup?** is displayed.

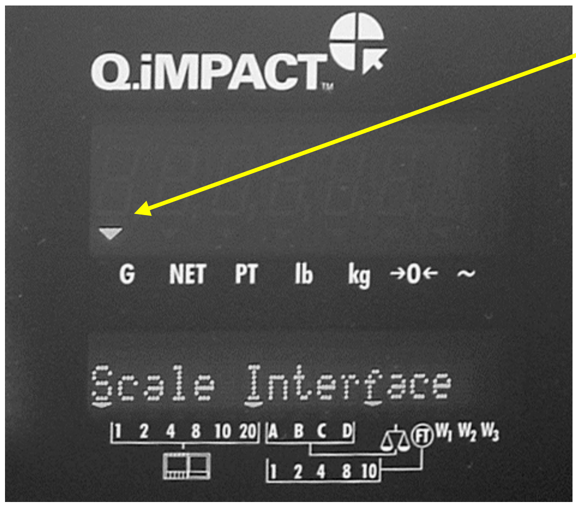
5. Press ENTER to confirm that you want to exit setup mode.

6. If you do not wish to exit, press SELECT to choose another program block within setup mode.

7. To protect the setup parameters from being changed once you have configured them, power-down the matroller and set S2-1 to the ON position.

You can exit your position in a program block by pressing ESC several times at any time. Arrows in the upper display indicate your position within a program block. See the table below. (These arrows are also shown on the program block overviews in this manual.) You can also exit setup from a web browser by clocking on the "Run Mode" button the left side of the screen.

Arrows	Block Position
1 Arrow ▼	You are in Setup Mode, top level.
2 Arrows ▼▼	You are in a Program Block.
3 Arrows ▼▼▼	You are in a sub-block.
4 Arrows ▼▼▼▼	You are configuring an element within a sub-block.



In the display shown here, the single arrow indicates you are in setup mode, top level.

Audible Messages

Refer to the section of this manual on programming the Application Environment program block for instructions on enabling and disabling the beeper.

The Q.iMPACT matroller has a system of audible beeps that give immediate feedback for each keystroke and matroller response. These audible messages can be programmed ON or OFF in setup. The matroller is programmed at the factory with the audible messages OFF and the alarm beeps ON.

Beep Description	Indication
One short beep	A key has been pressed and recognized.
One long beep	The keystroke(s) you have entered are invalid.
Three quick beeps	The entry is acknowledged and function is performed.

Reset to Factory

Note: You cannot reset a single value or specify only a few of the sub-block values.

Note: Using the reset option is the same for all program blocks except the Diagnostics program block.

The last sub-block in each program block is Reset to Factory. Selecting **Y(es)** at the **Reset to Factory?** prompt returns all parameters in the current block to the original factory settings.

The Diagnostics block has a Master Reset option that lets you reset all parameters in all blocks, including or excluding the Scale Interface program block. Refer to the section entitled Diagnostics Program Block at the end of this chapter. The default values for all program block parameters are listed in the appendix.

To reset the program block parameters:

1. Press ENTER at the **[Reset to Factory]** prompt. The matroller responds with the prompt **[Are You Sure?]**
2. Press SELECT to display **Y(es)** to confirm that you want to reset the matroller to the original factor settings. Press ESC to exit the sub-block.
3. Press SELECT to continue to the next program block. Use caution when resetting the values for the Scale Interface program block as all calibration values will be reset.

Program Block Overview

The following chart shows the various program blocks and sub-blocks. Instructions for configuring each follow.

Note: These Program Blocks are accessible from Qi front panel. Webpages have a different structure

Enter Setup? (from FUNCTION)

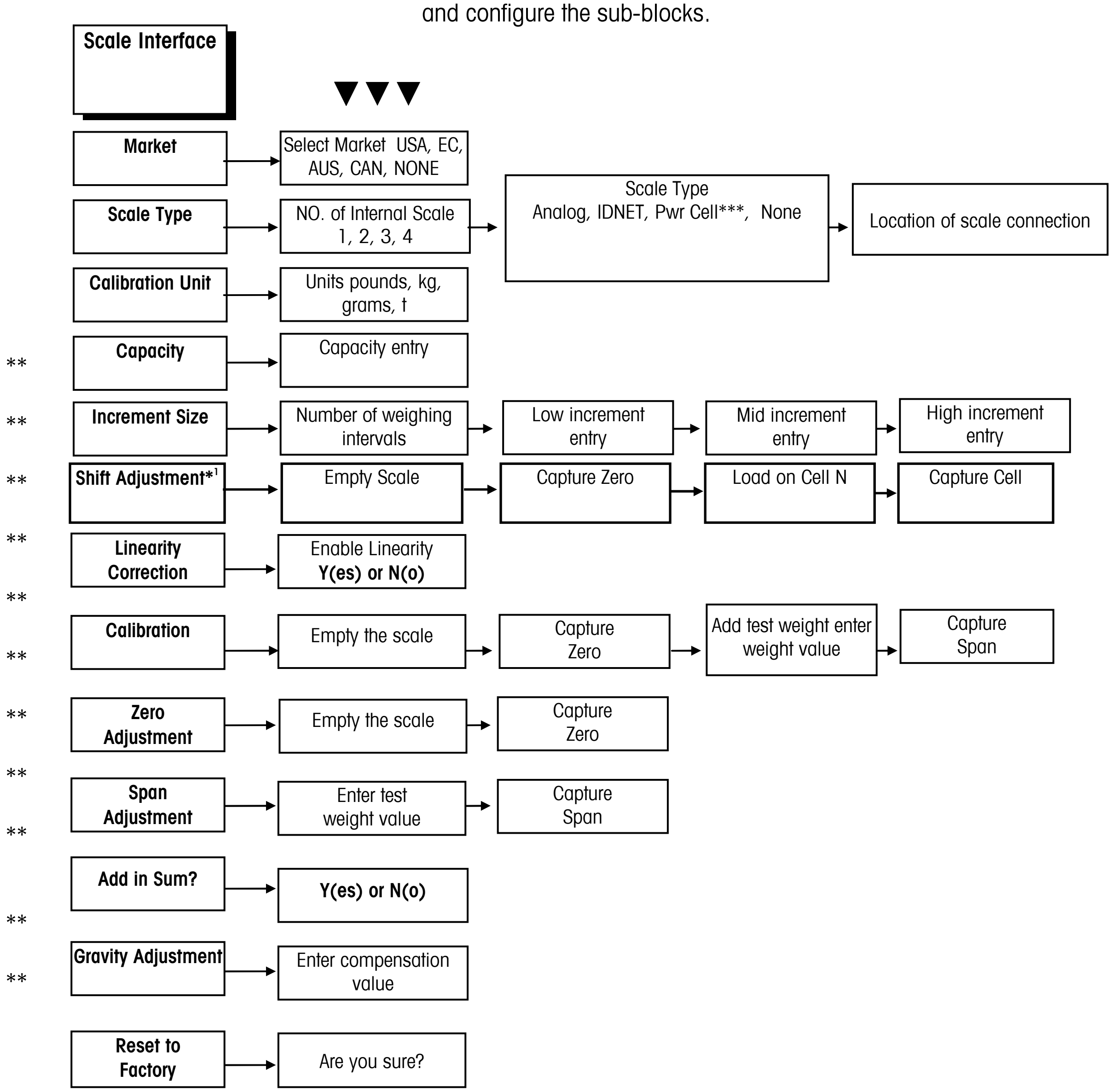
- **Scale Interface***
  - Market
  - Scale Type
  - Calibration Unit
  - Capacity
  - Increment Size
  - Shift Adjustment
  - Linearity Correction
  - Calibration
  - Zero Adjustment
  - *Span Adjustment
  - Scale Test
  - Gravity Adjustment
  - Reset to Factory
- **Flow Meter Interface**
  - Configuration
  - Select Flow Meter
  - ID
  - Units
  - Increment
  - Rate Units
  - K Factor
  - K Factor Unit
  - M Factor
  - Reset to Factory
- **Application Environment***
  - Character Set
  - Language
  - Keyboard Type
  - Scale ID
  - Time and Date
  - Alternate Weight Units
  - Power Up Operation
  - Tare Operation
  - Zero Operation
  - Stability Detection
  - Beeper Operation
  - Inhibit Memory
  - Application Type
  - Vibration Rejection
  - Reset to Factory
- **Configure Serial**
  - Configure Port ****
  - Configure Template
  - Reset to Factory
- **Configure Discrete**
  - Parallel Inputs
  - Parallel Outputs
  - Assign Setpoints
  - Reset to Factory
- **Configure Memory**
  - Configure Literals ****
  - Configure Prompts ****
  - Configure Consec. Numbering
  - Reset to Factory
- **Configure JagBASIC**
  - Password
  - Keyboard
  - Display
  - Auto Start
  - Manual Start
  - Sent RAM files
  - Initialize Ram Disk
  - Password Maintenance
  - Reset to Factory
- **Configure Network**
  - Ethernet
  - FTP Name-Password
  - PC Data Access
  - Email
  - Web Server
  - FTP Server
  - PLC SP Control
  - Reset to Factory
- **Diagnostics**
  - Memory Test
  - Display Test
  - Keyboard Test
  - Scale Test
  - Flow Meter Test
  - Serial Test
  - Parallel I/O Test
  - Network Test
  - Email
  - Ethernet Send BRRAM
  - Zmodem Send BRAM
  - Print Setup Log
  - Reset to Factory
- **Maintenance**
  - Calib Management
  - Calib Chk Parms
  - Calib Mon Parms
  - Calib Check ****
  - Maint Reports
  - Network Stats
  - Reset to Factory
- **Configure Options**
  - ControlNet
  - ProfiBus

Note: If no scale cards are used or the flow meter weight and rate are displayed when setup is entered, the sequence of steps in these program blocks will be shortened. Refer to the descriptions of these specific program blocks for more information.

Scale Interface Program Block

The Scale Interface program block lets you set and calibrate the features that affect weighing performance. The following diagram describes this block (when scale cards are used) Refer to the table on the next page for information on the sequence if no scale cards are used or if flow meter weight and rate are displayed when setup is entered.

Press ENTER at the **[Scale Interface]** prompt to access the Scale Interface program block and configure the sub-blocks.



*Multiple load cell scales (POWERCELLs, RAAD Boxes) only.

**These menu selections are replaced by "Service mode" and its associated menu when Scale Type = IDNET.

***Applies to use of RAAD box(es)

1 Appears only if POWERCELL (RAAD box) selected in Scale Type sub-block.

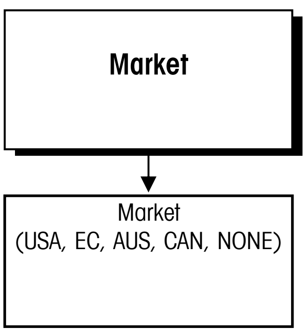
Alternate Scale Interface Sequence

This is the setup sequence to be followed f no scale cards are used or if flow meter weight and rate are displayed when setup is entered

Parameter	Scale selected prior to setup	Flow meter selected prior to setup or no scale cards used
Market	Accessible	Accessible
Scale Type	Accessible	Accessible*
Calibration Unit	Accessible	Not Accessible
Capacity	Accessible	Not Accessible
Increment Size	Accessible	Not Accessible
Linearity Corr	Accessible	Not Accessible
Calibration	Accessible	Not Accessible
Zero Adjustment	Accessible	Not Accessible
Span Adjustment	Accessible	Not Accessible
Scale Test	Accessible	Not Accessible
Gravity Adjust	Accessible	Not Accessible
Reset to Factory	Accessible	Accessible

* -Required to allow a user to add a scale card to a matroller that did not have one.

1. Market Sub-block

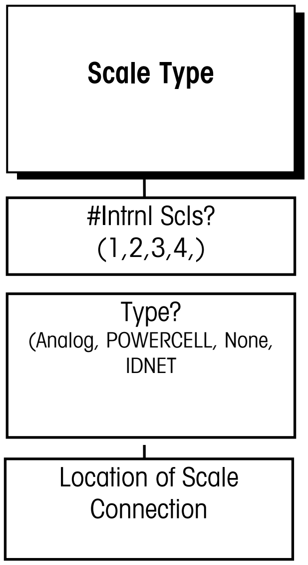


Note: You can exit the setup mode any time during configuration. You may need to press ESC several times to return to the **EXIT Setup?** prompt, then press ENTER.

The Q.iMPACT matroller is factory set for the market you specified when you ordered the matroller. The Market sub-block lets you select a new country or market area and limit parameters that affect legal-for-trade programming options.

1. Press ENTER at the **Market?** prompt to access this sub-block.
2. Press SELECT until the desired market area is displayed, then press ENTER. Market areas include:
   - USA—United States
   - EC—European Community
   - AUS—Australia
   - CAN—Canada
   - NONE—disables legal-for-trade option
3. Continue to the next sub-block, or press ESC twice to exit the setup mode.

2. Scale Type Sub-block



The Scale Type sub-block prompts you for the number of internal scales and type of scale that will be used.

1. Press ENTER at the **Scale Type** prompt to open the sub-block.
2. At the **# Intrnl Scls?** prompt, select the number of internal scales. Choose 1, 2, 3 or 4, depending on the number of scales connected to the matroller.
3. When configuring matrollers with two or more scales, select the first scale (A) to calibrate by pressing SELECT (not in setup mode), then enter setup and calibrate scale A. To calibrate the second scale you must exit setup mode, select the second scale (B) with the SELECT key, then reenter setup and calibrate scale B. Follow the same procedure for any additional scales.
4. Press SELECT at the **Type?** prompt until the desired scale type is displayed, then press ENTER. Scale types include:
   - Analog
   - POWERCELL**
   - None
   - High Precision (IDNET)***

**Applies to use of RAAD box(es). Note: Use of POWERCELLs is not recommended in applications where high flow rates are involved.

*** Use of High Precision bases is not recommended in applications where high flow rates are involved.

If Analog is Selected

Select board #1 (BD1) or board #2 (BD2), depending on the address of the Analog PCB connected to the scale. Jumper W3 on the Analog PCB determines the board address. If two analog PCBs are installed, they must have different board addresses. If two dual analog cards are installed, you may also select board #3 and board #4.

If POWERCELL (RAAD Box) is Selected

Example: If scale A of a two-scale Q.iMPACT matroller has 6 cells and Scale B has 8 cells, Scale A would be addressed as 1 through 6. Scale B cells would be addressed as 31 through 38.

1. At the **Loc? prompt**, select the address of the scale's first cell.
2. To address the cells of a single scale or Scale A, select **PwrCell #1.** To configure cells of the second scale (Scale B), select **PwrCell #31.** To configure cells of the third scale (Scale C), select **PwrCell#61**. To configure cells of the fourth scale (Scale D), select **PwrCell #91.** You must configure each scale of a two-scale Q.iMPACT matroller separately.
3. At the **# Load Cells?** prompt, use the numeric keys to enter the number of load cells in the scale you are configuring.
4. At the **Shift by?** prompt, select to perform the shift procedure by single load cells or by pairs of cells (by section). Select **Cells** if there is an odd number of load cells. You must address the individual POWERCELLs or RAAD boxes through the Diagnostics program block. Proceed to the section entitled Scale Test sub-block in the Diagnostics program block.

If None is Selected

No scale is active. The Q.iMPACT matroller will go to the Calibration Unit sub-block.

If High Precision (IDNET) is Selected

At the **Service Mode** prompt, you may enter the service mode for the understructure.

1. Press SELECT to choose between **Y(es)** and **N(o),** allowing entry into the service mode or to quit without changing any parameters.
2. When the appropriate response is displayed, press ENTER .
3. If you choose to enter service mode, the sequence of operation follows the normal calibration sequence for an ID matroller. This is different from other scale

types. If you are not entering service mode, the display will continue as described in the next section.

3. Calibration Unit Sub-block

Calibration Unit

Units?
pounds, kg, grams,
t (metric tons)

Note: The Calibration, Capacity and Increment Size sub-blocks appear only if summing scale was selected.

This sub-block lets you enter the units of measure to use when calibrating the scale and configuring capacity and increment size**.** Recalibration is required if you change the calibration unit.

1. Press ENTER at the **Calibration Unit** prompt to open the sub-block.
2. At the **Units?** prompt, press SELECT until the desired calibration unit is displayed, then press ENTER.

   Calibration units include:

   - Pounds
   - Kilograms
   - Grams
   - Metric Tons
3. Choices are limited to the current settings for the primary and secondary weight units specified in the Application Environment program block.
4. Continue to the next sub-block or press ESC to exit the setup mode.

4. Capacity Sub-block

Capacity

Wgt?
Capacity Entry

The Capacity sub-block lets you enter the maximum scale capacity. The capacity is given in the calibration units.

1. Press ENTER at the **Capacity** prompt to open the sub-block.
2. At the **Wgt?** prompt, input the desired scale capacity using the numeric keys.
3. Press ENTER to set the capacity.
4. Continue to the next sub-block or exit the setup mode.

5. Increment Size Sub-block

Increment Size

Number of
intervals

Note: W1, W2, and W3 on the display reflect the active weighing intervals in a multiranging configuration.

With a single weighing range configuration, the W1, W2, and W3 cursors are not used.

This sub-block lets you specify the increment size for one or more weighing intervals. Increment size is the smallest change in weight value that the matroller is able to display. For example, if the increment size is specified as 0.1 then, starting at 0.0 on the scale, adding an increasing load will cause the matroller to display 0.1, 0.2, 0.3 and so on through the entire weighing range of the scale.

If two or three intervals are selected, the operation is as described above except that two or three increments are now used over portions of the weighing range. For example, consider a scale configured for two intervals with the low increment specified as 0.1 and the high increment as 0.2. The scale displays weight by 0.1 increments through the first interval until the weight reaches the "low to high" (LoHi) threshold point, then by 0.2 increments through the second interval to capacity. Increments may count by 1, 2, or 5.

There are two types of multiple increment size operation. Multiple range weighing applies to all scale bases except METTLER TOLEDO's high precsion (IDNET) bases. Multi-interval weighing applies only to METTLER TOLEDO's high precsion (IDNET) bases. The matroller will determine which type of operation to use according to the scale type selected in setup.

To configure the increment size:

1. Press ENTER at the **Increment Size** prompt to open the sub-block.
2. At the **Nbr of Intvls?** prompt, use the SELECT key to choose 1, 2 or 3 intervals.

If 1 Interval Selected

At the **Low?** prompt, enter the low increment size (0.00001-100).

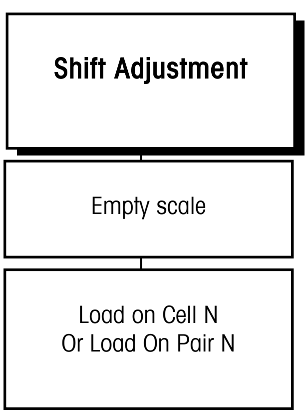
If 2 Intervals Selected

1. At the **Low?** prompt, enter the low increment size (0.00001-100).
2. At the **High?** prompt, enter the high increment size (0.00001-100). The high increment must be greater than the low increment.
3. At the **LoHi?** prompt, enter the weight value where the scale will switch from the low increment to the high increment.

If 3 Intervals Selected

1. At the **Low?** prompt, enter the low increment size (0.00001-100).
2. At the **Mid?** prompt, enter the mid increment size (0.00001-100). The mid increment must be greater than the low increment.
3. At the **High?** prompt, enter the high increment size (0.00001-100). The high increment must be greater than the mid increment.
4. At the **LoMid?** prompt, enter the weight value where the scale will switch from the low increment to the mid increment.
5. At the **MidHi?** prompt, enter the weight value where the scale will switch from the mid increment to the high increment. The MidHi threshold must be higher than the LoMid threshold. Continue to the next sub-block or exit the setup mode.

6. Shift Adjustment Sub-block



The Shift Adjustment sub-block lets you adjust multiple load cells connected to a POWERCELL (or RAAD box) scale. NOTE: It only appears if you selected POWERCELL in the Scale Type sub-block.

1. Press ENTER at the **Shift Adjustment** prompt to open the sub-block.
2. At the **Empty the Scale** prompt, remove any weight on the platform, then press ENTER. The display reads **Capturing Zero** as the matroller captures zero.
3. At the **Load On Cell N** or **Load On Pair N** prompt, place a test weight on the platform that weighs approximately 50% of the scale's capacity. The Q.iMPACT matroller automatically shift adjusts the scale for the current load cell as the display reads **Capturing Cell N** or **Capturing Pair N**.
4. Repeat steps 2 and 3 for each load cell/pair connected to the POWERCELL (RAAD Box). When all load cells are shift adjusted, the matroller indicates **Shift Complete**. Continue to the next sub-block or exit setup.

7. Linearity Correction Sub-block

Linearity Correction

Enable Linearity
Y(es) or No

Linearity correction lets you calibrate the scale using reference weights at mid-scale and full-scale ranges. It allows for compensation of the non-linear performance of a load cell(s) or weighing system. If linearity correction is enabled, the calibration process requires additional steps. The matroller must be calibrated or recalibrated **after** you enable linearity correction.

1. Press ENTER at the **Linearity Corr** prompt to open the sub-block.
2. Select **Y(es)** to enable or **N(o)** to disable linearity correction. Continue to the next sub-block or exit the setup mode.

8. Calibration Sub-block

Calibration

Empty the scale

Note: The prompts that follow the **Empty the Scale** prompt will be depend on if you are calibrating the scale with or without linearity correction.

Calibration involves emptying the scale then placing a known test weight on an empty platform and allowing the Q.iMPACT matroller to capture values for zero and span. You can calibrate a scale with or without linearity correction. The Q.iMPACT matroller prompts you through the calibration. If you are calibrating two internal scales, you must have two scales selected (Scale Type sub-block), then exit the setup mode after the first scale is calibrated. After exiting, select the second scale. Finally, enter setup mode to calibrate and set the other parameters associated with the scale.

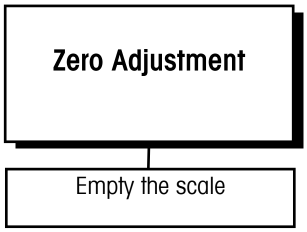
Without Linearity Correction

1. Press ENTER at the **Calibration** prompt to open the sub-block.
2. At the **Empty the Scale** prompt, remove any weight on the platform, then press ENTER. The matroller automatically captures zero and the cursor moves across the lower display indicating the operation is in progress.
3. At the **Add Test Weight** prompt, place on the platform a test weight equaling the scale's capacity or another practical weight. Press ENTER.
4. A minimum of 20% of scale capacity is necessary for calibration; METTLER TOLEDO recommends 60 to 100%. A calibration error will result if insufficient weight is used.
5. At the **Wgt?** prompt, input the amount of weight you added in step 3. Press ENTER. The matroller automatically captures span and the cursor moves across the lower display indicating the operation is in progress.
6. When the display reads **Calibration Successful**, continue to the next sub-block or exit the setup mode.

With Linearity Correction Enabled

1. Press ENTER at the **Calibration** prompt to open the sub-block.
2. At the **Empty the Scale** prompt, remove any weight on the platform then press ENTER. The matroller automatically captures zero and the cursor moves across the lower display indicating the operation is in progress.
3. At the **Add MidScale Wgt** prompt, place a weight on the platform equaling between 35% and 65% of the scale's capacity.
4. At the **Wgt?** prompt, input the amount of weight you added in step 3. Press ENTER. The matroller automatically captures mid-scale.
5. At the Add **FulScale Wgt** prompt, place weight on the platform equaling at least 90% of scale capacity or as much as is practical. Press ENTER.
6. At the **Wgt?** prompt, input the amount of weight you added in step 5. Press ENTER. The matroller automatically captures full scale and the cursor moves across the lower display indicating the operation is in progress.
7. When the matroller indicates **Calibration Successful**, press ENTER. Continue to the next sub-block or exit the setup mode.

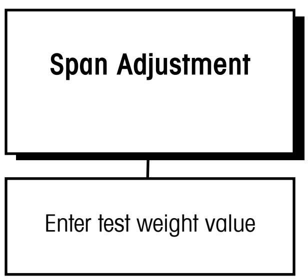
9. Zero Adjustment Sub-block



The zero value is the scale-empty reference as determined during calibration. The Zero Adjustment block lets you re-establish this value to compensate for any change since the last calibration. The scale must be empty before resetting the zero value.

1. Press ENTER at the **Zero Adjust** prompt to open the sub-block.
2. At the **Empty the Scale** prompt, remove any weight on the platform and press ENTER. The matroller automatically captures zero and displays the message **Zero Adjusted**. Continue to the next sub-block or exit the setup mode.

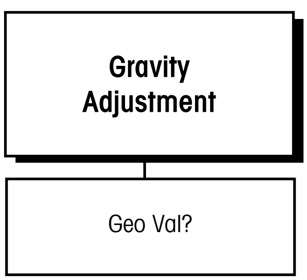
10. Span Adjustment Sub-block



The Span Adjustment sub-block lets you make minor span adjustments without completely recalibrating the scale.

1. Place a test weight on the platform and press ENTER at the **Span Adjust** prompt to open the sub-block.
2. At the **Add Test Weight** prompt, enter the amount of weight placed on the platform in step 1.
3. The matroller captures the new span. When finished the matroller displays the message **Span Adjusted**. Continue to the next sub-block or exit setup.

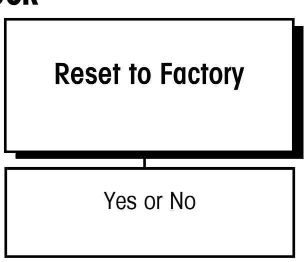
12. Gravity Adjustment Sub-block



This sub-block allows you to enter a factor to compensate for gravitational differences between the factory calibration location and where the scale is currently located. If on-site calibration has already been performed, leave this value set to the factory default. When you access the **Gravity Adjust** sub-block, the current value is displayed.

1. Press ENTER at the **Gravity Adjust** prompt to open the sub-block. The display reads **Geo Val?** and shows the current adjustment value.
2. Press ENTER to accept the current factor or to enter a new gravitational factor. Use the GEO table in the appendix to determine the appropriate constant.
3. Return to the first sub-block or exit setup mode.

13. Reset to Factory Sub-block



Reset to Factory returns all parameters in the current block to the original factory settings.

1. Select **Y(es)** to return all parameters to the original factory settings.
2. Select **N(o)** to retain the new parameters.

Using the Q.iMPACT Matroller with High Precision (IDNET) Bases

The following information is preliminary at this time. The procedure outlined here is for use with multi-range K-bases only. By following the sequential steps listed below, you can calibrate a typical multi-range K-base with a Q.iMPACT matroller. Note: For calibrating other compatible scales such as the PR/SR, PM/SM or others, see the appropriate menu. For more specific information on K-bases (IDNET bases), you should refer to the documentation for the specific base with which you are working.

Service Mode for High Precision (IDNET) Bases

The service mode for High Precision bases is used for:

- Input of parameters specific to the weighing platform after replacement of the measuring cell
- Calibration of the base with the calibration weight built into the measuring cell or externally by loading the base with the required weights
- Adjustment of linearity
- Resetting of the measuring cell parameters to the factory setting
- Clearing of a previously assigned scale number.

A High Precision base can generate three different types of communications errors and a general function failure indication during Service Mode operation. They may be cleared by pressing the ENTER or ESC keys.

High Precision (IDNET) Calibration Procedure

Use the procedure described on the next few pages to configure the Q.iMPACT scale interface for use with High Precision (IDNET) bases.


The SERVICE mode is navigated by using a combination of the SELECT and ENTER keys as responses to the various displayed menu prompts.

The SETUP mode is entered by pressing the FUNCTION key. (SW2-1 is off).

To begin:

Press the FUNCTION key. SWITCH UNITS

The SWITCH UNITS block appears only if unit switching is enabled in the Application Environment program block.

Press the SELECT key. CAL VALUES

If CAL VALUES is selected, the contents of a counter will be displayed (IDENTCODE =) which indicates the number of times the scale has been calibrated if it has been configured as "Legal for Trade" (APPROVED). Non-certified scales will only show (-- --) following (IDENTCODE =). This selection will also show the software version installed in the K-cell. The ESC key must be used to exit this menu step.

Press the SELECT key. ENTER SETUP?

If SELECT is pressed, the display will return to the normal weighing mode.

Press ENTER. SCALE INTERFACE

If SELECT is pressed, the menu choices will be diverted to the APPLICATION ENVIRONMENT menu. (Refer to Chapter 2, Programming and Configuration, for an overview of the options available in this menu.) Use the ESC key to escape from this menu and return to the SCALE INTERFACE menu.

Press ENTER. MARKET

If ENTER is selected, the operation of the matroller will be limited by the "Legal-for-Trade" requirements of the country selected.

Press SELECT. SCALE TYPE

If the SELECT key is pressed, the next three steps in the menu are by-passed and SERVICE MODE is displayed.

Press ENTER. #INTRNL SCLS?
1 or 2

Use the SELECT key to select number of installed IDNet boards.

Note: In some models, the display may read **TYPE? HI PREC**

Press ENTER. TYPE? IDNET

Use the SELECT key to select IDNET.

Press ENTER. LOC? IDNET BD1

Use the SELECT key to choose which scale board to configure.

Press ENTER. SERVICE MODE

If SELECT is pressed the menu loops on RESET to FACTORY, MARKET, and SCALE TYPE. Pressing ESC allows exit to the normal weighing mode.

Press ENTER.

Wait until the RETURN prompt appears on the **Q.iMPACT** display. RETURN

Esc

Press the ESC key to begin exiting the SETUP mode.

Press either SELECT or ENTER to access the beginning of the SERVICE MODE menu.

If ENTER is pressed, this step allows the scale number to be replaced by a question mark in preparation for reassigning a different scale number, as well as setting the scale parameters to the factory defaults. RESET

Press SELECT. NATION

This allows you to select the country where the matroller is being used. As a result, the certification regulations of the country are set.

Press SELECT. SCALE

Pressing ENTER allows the scale to be set for either APPROVED (legal-for-trade) or NON-APPROVED.

Press ENTER. NO APPR

Press the SELECT key to configure scale as Approved or Legal-for-Trade. The operation of the scale will then be bound by the legal requirements of the country in which it is being installed. Be sure to select the appropriate country in the NATION step.

Press ENTER. | Model e.g., KA15 |

Pressing SELECT scrolls through the various scale model selections.

Press ENTER. | CAP e.g., 15 kg |

Press SELECT to choose from various maximum weighing ranges in either pounds or Kilograms. This selection will determine the primary unit of weight.

Press ENTER. | D=0.0001 kg (readability) |

Press SELECT to choose readability. The selections preceded by MR switch through three weight-dependent ranges (3X 3000 divisions) with the readability varying as the ranges change. The selections preceded by D are single-weight ranges in which the readability remains the same throughout the weighing range. Those platforms containing MONOBLOC cells permit the selection of grams as the primary unit. To select grams as the primary unit, select KG in the capacity step and grams in the readability step.

Press ENTER. | MODE |

This menu step only appears when a MONOBLOC cell is installed in the weighing platform. The MONOBLOC cells can be recognized by the stainless steel case enclosing the weighing cell. Conventional weighing cells are enclosed in black, epoxy painted, cast aluminum housings. If the ENTER key is pressed, a selection of OPEN or STANDARD can be chosen. OPEN refers to "Open Zero", sometimes referred to as 100 % preload. This selection allows any weight within the normal weighing range plus the scale specific preload range to be zeroed on power up.

Press SELECT. | LINEA |

This allows the linearity of the scale to be corrected. This is a complex procedure and should only be performed by scale Technicians trained in the proper correction method.

Press SELECT. | CAL |

This program sub-block is used to calibrate the scale. Calibration can be performed using either the internal calibration weight contained within the weighing cell (in those scale models that contain internal weights) or by using external calibration weights. If external weights are used, care should be given to the class of weights used. For example, K-bases should be calibrated with class F1 weights. If other scale types are used, e.g., SM/PM, RGB, refer to their respective operating instructions for the correct classification.

Press ENTER. | PRELOAD |

This step establishes the deadload (Initial) weight of K-base weighing platforms. This step cannot be bypassed. If a fixed load such as a container or roller track is to be kept on the scale base, it should be put in place now. The load may not exceed the preload specification for the platform currently being calibrated even though 100% preload software is installed in the base. This is also true if a monobloc cell is being installed and the mode is selected for "Open Zero".Refer to the sale base Operating Instruction for the maximum preload value. If no fixed load is to be used, simply press ENTER.

Press ENTER. | CAL EXT |

If the scale is to be calibrated using external calibration weights, press ENTER. To calibrate with the internal calibration weight in the weighing cell, press the SELECT key.

Press ENTER. | --CAL-- | | FULL CAP |

If external calibration is to be performed using weights equal to the maximum capacity of the scale, press ENTER. | C (MAX CAPACITY) |

Place calibration weights equivalent to the maximum weighing capacity of the scale and press ENTER.

Press SELECT. | C_ _ _ _0; UNIT |

If the scale is to be calibrated with calibration weights that are less than full capacity, press the SELECT key.

The amount of weight to be used for calibration can be entered using a combination of the ENTER and SELECT keys according to the follow procedure:

- Use the ENTER key to fill in the spaces to the left of the right most zero.
- Pressing the SELECT key will increment the right most zero to the desired value.

Example: If a calibration weight value of 25 kg is to be entered, press the ENTER key three times so that the display will show C _ 0000:kg. | C_0000: KG |

Press the SELECT key twice to increment the right most zero to a 2. The display will now show C_ 0002:kg. | C_0002: KG |

If the digit is mistakenly incremented beyond 2, repeatedly press SELECT until the correct number is displayed. NOTE: The digit cannot be decremented.

Press ENTER to fill in another zero resulting in a display of C 0002:kg. | C00020: KG |

Use the SELECT key to increment the right most digit to a 5. The display should now show C 00025:kg.

C00025: KG

Place the 25 kg weight on the platform and press ENTER.

The scale goes through the calibration sequence.

--CAL--

Remove the calibration weights.

UNLOAD

Press ENTER.

--CAL--

By pressing ENTER, any changes made in the Service Mode will be saved.

SAVE

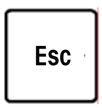
Press ENTER to access the scale summary parameter.

ADD IN SUM?

Y(es) adds this scale into the logical sum.

N(o) does not add the scale into the logical sum.

Press ENTER.



Press Esc to exit Setup mode.

NATION Sub-block

This program sub-block allows the selection of the country of use, which sets the certification regulations for that country. Use the SELECT key to display the various country codes. The codes and country names are listed below.

Code	Country	Code	Country	Code	Country
A	Austria	AS	Saudi Arabia	AUS	Australia
B	Belgium	BR	Brazil	CDN	Canada
CH	Switzerland	D	Federal Republic of Germany	DK	Denmark
E	Spain	ET	Egypt	F	France
FL	Liechtenstein	GB	Great Britain	GR	Greece
HK	Hong Kong	I	Italy	IL	Israel
IND	India	IRL	Ireland	IS	Iceland
J	Japan	JOR	Jordan	KWT	Kuwait
L	Luxembourg	MAL	Malaysia	MEX	Mexico
N	Norway	NL	Netherlands	NZ	New Zealand
P	Portugal	RA	Argentina	RC	Taiwan
RCH	Chile	S	Sweden	SF	Finland
SGP	Singapore	SUD	Sudan	T	Thailand
TJ	China	USA	United States	YU	Yugoslavia
ZA	South Africa	ZK	South Korea		

When the appropriate country code is displayed, press ENTER to accept the choice.

RESET Sub-block

In this program sub-block, the certification capability, maximum capacity, range and graduation size can be reset to the factory default settings.

1. To reset the parameters to factory default, press SELECT until the display shows **Y(es).**
2. Press ENTER. The display will show **NO RES**.
3. To exit this sub-block, press ENTER. To reset the parameters, press SELECT until the display shows an **N(o)**. Press ENTER. The display will then show **RES ALL Y**.
4. Press ENTER to confirm your choice. If you wish to exit without resetting the parameters, press SELECT then ENTER.
5. If you have chosen to reset to factory defaults, **POWER OFF** appears in the display. The matroller must be powered down and then power reapplied. The base will be calibrated internally. The weighing platform will be assigned a new scale number.

SCALE PARAMETERS Sub-block

The display shows **SCALE**, allowing you to set certification capability, maximum capacity, range, and graduation.

1. With **Y(es)** displayed, press ENTER.
2. The display shows **NO APPR** to allow selecting the scale for a non-certified mode of operation. Use the SELECT key to change to **APPR**, then confirm your choice by pressing ENTER.
3. The various types of K bases are displayed using the SELECT key. When the appropriate base model number appears in the display, use the ENTER key to select that choice.
4. The display shows **CAP xxx kg**, indicating the maximum capacity of the selected weighing platform. The maximum capacity at which the scale operates is selectable in three stages (full, half, or quarter). Press SELECT to step through the capacity choices. Press ENTER to choose the displayed answer.
5. The readability of the base can be set using the SELECT key. When the display shows **MR**, the display shows the display readability of the first range of a multirange scale. When the display shows **D**, the displayed accuracy of a single range base is shown.

Note: Depending on the country selected in the NATION sub-block, the capacity may be displayed in pounds.

LINEARITY Sub-block

After a measuring cell is replaced, or the stored linearity code is changed, it must be re-entered. The linearity code is located at the rear of the identcode bracket.

1. The display shows **LINEA**. Press ENTER to enter this sub-block.
2. The display indicates the current stored value **LINEA +XXXX.** Choose the sign of the linearity code by using the SELECT key. When the proper sign is displayed, use the ENTER key to confirm your choice.
3. Enter the linearity code using a combination of the SELECT key and the ENTER key. The ENTER key will insert zeros in place of the dashes.
4. The SELECT key is used to increment the right-most zero to the desired number. When the displayed value is correct, press ENTER.

CALIBRATION Sub-block

This program sub-block is used to calibrate the scale.

1. The display shows **PRELOAD**. Empty the scale. If a vessel or other container is to be included, place this on the weighing platform. Press ENTER. The display shows **CALIB**, and internally calibrates.
2. The display shows **CAL EXT**. If calibration using test weights is desired, press ENTER. To go on to internal calibration, press SELECT.
3. If external calibration has been selected, the display shows **FULL CAP**. Press ENTER to calibrate using test weights equal to the maximum capacity of the base. Press SELECT to use the selected capacity of the base. Press SELECT again to enter a calibration weight other than the preset values. Enter the test weight value using a combination of the SELECT key and the ENTER key as follows:
   - Press the ENTER key to insert zeros from right to left.
   - Press the SELECT key to increment the required position.
4. When the desired weight value is displayed, place the corresponding test weights on the platform and press ENTER.
5. The base completes the calibration process with the test weight. The display then shows **UNLOAD**. Remove the test weight. The base re-establishes the zero value when you press ENTER.

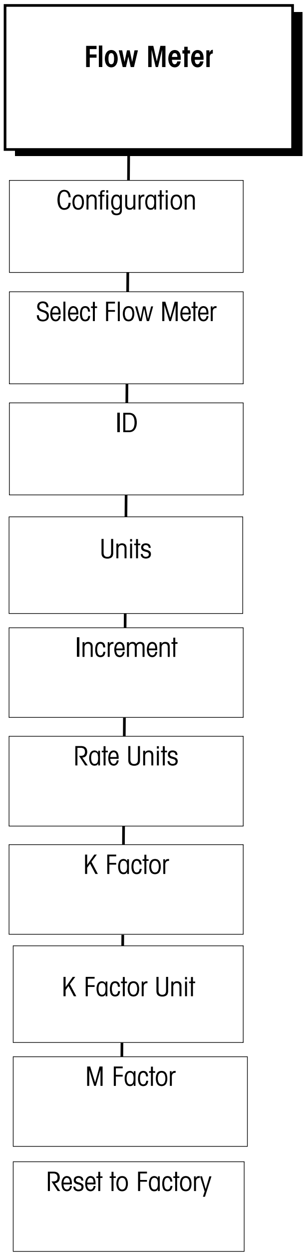
SAVE PARAMETERS Program Sub-block

To save the programmed values, press ENTER. For certified scale applications (legal for trade), the identcode counter increments by one after confirmation (pressing of the ENTER key). This corresponds to destroying the certification seal. Recertification of the scale must be implemented according to local regulations.

RETURN Sub-block

If the parameters were not stored using the previous program sub-block, you may return to normal operation by pressing ENTER at this step. Changes to parameters and calibration will NOT be stored, and the identcode counter will not increment.

Flow Meter Program Block



The Flow Meter Program Block is used to set the parameters for any flow meters connected to the system. (A flow meter option card must be installed.) At the Flow Meter Interface program block, press ENTER to access the block. At the Configuration sub-block, press ENTER. At the **[Select F.M.? 1]** prompt, choose the flow meter for which you are setting the parameters. At the **[ID? FlwMtr01]** prompt, the ID of the flow meter you are configuring will be displayed.

At the **[Units? pounds]** prompt, use the SELECT key to choose the units of measurement. The choices are:

- pounds (default)
- Kilograms
- Grams
- Metric ton

Press ENTER. At the **[Incr? 0.001]** lb prompt, use the SELECT key to choose the increment size. Press ENTER.

At the **[Rate Units? None]** prompt, use the SELECT key to choose the rate units. The choices are:

- None (default)
- Sec.
- Min.
- Hour

PRESS ENTER.

At the **[K Factor? 0]** prompt, you can enter the counts per engineering unit factor specified for the flow meter. If no K Factor is specified it can be determined by direct measurement. See Flowmeter section in 4.4

At the **[Kfac. Unit? PpL]** prompt, you can enter the input units to be used in the accumulated flow register. Choices are:

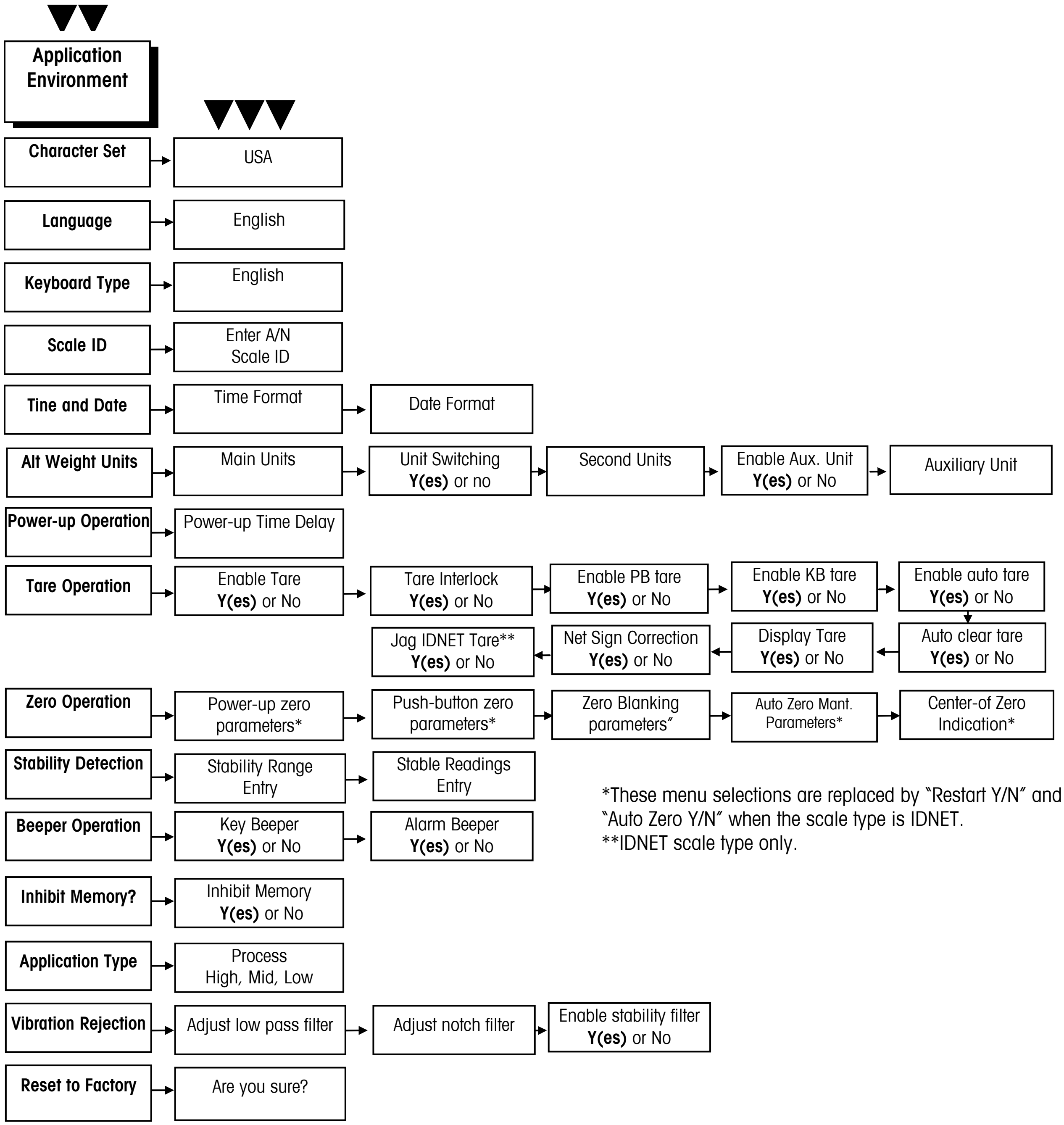
- PpL (pulses per liter)
- Ppcc (pulses per cc)
- PpG (pulses per gallon)
- Pplb (pulses per pound)
- Ppkg (pulses per kg)
- Ppg (pulses per gram)

At the **M Factor? 1.0000** prompt, enter the M factor (flow rate adjustment multiplier). The M factor scales the input counts used in the accumulated flow register according to the formula: Accumulated flow = (input counts * M * C) / K, where C is the density of water at 60°F (0.999014 gr/cc or 8.337176 lb./gal.) and K is the counts per engineering unit factor specified for the flow meter. Use M to correct for material densities different from water. Each M factor register is used to store a meter calibration value that is used to scale the accumulated flow value and optionally the rate value. This is normally left at its default value of 1

At the **[Reset to Factory]** prompt, you can reset all prompts to original factory defaults.

Application Environment Program Block

The Application Environment program block lets you set the features of the scale that are specific to the customer's application. The following diagram describes this block. Refer to the table on the next page for information on the sequence if no scale cards are used or if flow meter weight and rate are displayed when setup is entered.



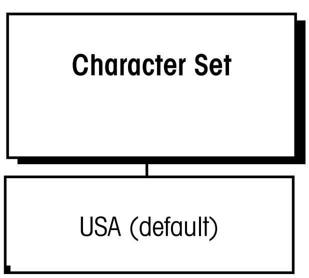
*These menu selections are replaced by "Restart Y/N" and "Auto Zero Y/N" when the scale type is IDNET.
**IDNET scale type only.

Alternate Sequence

This is the setup sequence to be followed f no scale cards are used or if flow meter weight and rate are displayed when setup is entered

Parameter	Scale selected prior to setup	Flow meter selected prior to setup or no scale cards used
Character Set	Accessible	Accessible
Language	Accessible	Accessible
Keyboard Type	Accessible	Accessible
Scale ID	Accessible	Not Accessible
Time and Date	Accessible	Accessible
Alt Weight Units	Accessible	Not Accessible
Power-Up Oper	Accessible	Accessible
Tare Operation	Accessible	Not Accessible
Zero Operation	Accessible	Not Accessible
Stability Detect	Accessible	Not Accessible
Beeper Operation	Accessible	Accessible
Inhibit Memory	Accessible	Accessible
Application Type	Accessible	Not Accessible
Vibration Reject	Accessible	Not Accessible
Reset to Factory	Accessible	Accessible

1. Character Set Sub-block

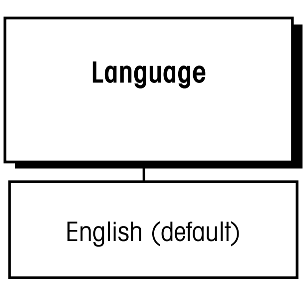


The Character Set sub-block lets you select a display character set appropriate for the location where the matroller is used. Depending on the character set, some ASCII characters will be replaced with specific international characters.

To configure the sub-block:

1. Press ENTER at the **Character Set** prompt.
2. At the **USA** prompt, press SELECT to display the desired character set.
3. Press ENTER to continue to the next sub-block or ESC to exit setup.

2. Language Sub-block

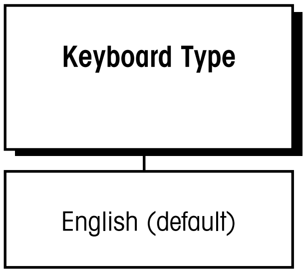


The Language sub-block lets you select the language in which all Q.iMPACT matroller prompts and messages are displayed.

To configure the sub-block:

1. Press ENTER at the **Language** prompt.
2. At the **English** prompt, press SELECT to display the desired language:
   - English
   - French
   - German
   - Spanish
3. Press ENTER to continue to the next sub-block or ESC to exit setup.

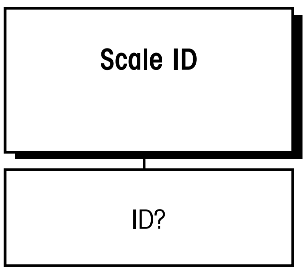
3. Keyboard Type Sub-block



The Keyboard Type sub-block lets you select the type of alternate computer-type keyboard (if used). It does not configure the Q.iMPACT matroller keypad.

1. Press ENTER at the **Keyboard Type** prompt.
2. At the **English** prompt, press SELECT to display the desired keyboard type:
   - English
   - French
   - German
   - Spanish
3. Press ENTER to continue to the next sub-block or ESC to exit setup.

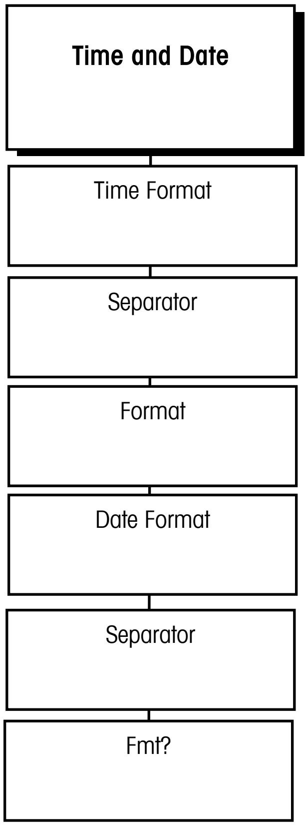
4. Scale ID Sub-block



The Scale ID sub-block lets you assign an identification code to a scale for use in printing and when selecting a scale for operator viewing or interaction. The Scale ID can be up to 8 alphanumeric characters.

1. Press ENTER at the **Scale ID** prompt.
2. At the **ID?** prompt you can either select a predefined scale identification or create a new ID using the numeric keys to enter the scale identification label.
3. Press ENTER to continue to the next sub-block or ESC to exit setup.

5. Time and Date Sub-block



Note: The time format choices are given with the separator you selected in step 2.

A Julian date is maintained by the matroller and is available for printing.

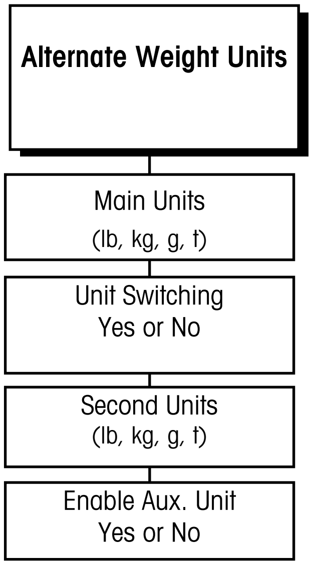
The date format choices are given with the separator you selected in step 5.

This sub-block lets you set the time and date format. If you do not select a format, the default time and date format based on the Market location will be used.

To configure the sub-block:

1. Press ENTER at the **Time and Date** prompt and again at **Time Format?**
2. At the **Separator?** prompt, select a character to separate hour, minutes, and seconds:
   - (:) colon
   - (-) dash
   - (.) period
   - (sp) space
   - None
3. At the **Format?** prompt, select the desired time format:
   - 24:MM 24 hour clock, no seconds
   - 24:MM:SS 24 hour clock with seconds
   - 12:MM 12 hour clock, no seconds
   - 12:MM:SS 12 hour clock with seconds
   - None Time disabled through MEMORY key
4. Press ENTER at the **Date Format?** prompt.
5. At the **Separator?** prompt, select a character to separate month, day, and year:
   - (:) colon
   - (-) dash
   - (.) period
   - (sp) space
   - (/) slash
   - None
6. At the **Fmt?** prompt, select the desired date format:
   - DD/MMM/YYYY Day (num), Month (alpha), Year (4 digits)
   - DD/MM/YY Day (num), Month (num), Year (2 digits)
   - MM/DD/YY Month (num), Day (num), Year (2 digits)
   - MMM/DD/YYYY Month (alpha), Day (num), Year (4 digits)
   - YY/MM/DD Year (2 digits), Month (num), Day (num)
   - YYYY/MMM/DD Year (4 digits), Month (alpha), Day (num)
   - None Date disabled through MEMORY key
7. Press ENTER to continue to the next sub-block or press ESC to exit the setup mode.

6. Alternate Weight Units Sub-block



Note: After the **Enable Aux Unit** prompt, the prompts will depend on whether or not auxiliary units were enabled or disabled and if a custom unit was selected.

The unit selected for calibration must be either main or secondary units.

If auxiliary units are enabled, tare cannot be displayed in the lower display.

Alternate weight units selection is reset to factory default under the Scale Interface Program Block, NOT the Application Environment Program Block.

The Alternate Weight Units sub-block lets you select the unit(s) of measure for the top weight display, enable or disable units switching, or specify another unit of measure for the lower display in addition to the main units shown in the top display. You can select an alternate weight unit from various pre-programmed standard units or create a special unit with a custom name and conversion factor.

To configure the sub-block:

1. Press ENTER at the **Alt Weight Units** prompt to open the sub-block.
2. At the **Main Units?** prompt, select a main unit. Choose one:
   - lb (pounds)
   - kg (kilograms)
   - g (grams)—a decal over the kg legend is required
   - t (metric tons)—a decal is required
3. At the **Unit Switching?** prompt, select **Y(es)** or **N(o)** to enable or disable unit switching. If unit switching is enabled, it will switch between Main Units and Second Units. METTLER TOLEDO recommends disabling unit switching to avoid confusion if setpoints are used.
4. At the **Second Units?** prompt, select a secondary weight unit. Choose one:
   - lb (pounds)
   - kg (kilograms)
   - g (grams)—a decal over the kg legend is required
   - t (metric tons)—a decal is required
5. If the main units selected above are not the calibration units (as selected in the Scale Interface Program Block, Calibration Units Sub-Block), this choice is restricted to the Calibration Units.
6. At the **Enbl Aux Unit?** prompt, select **Y(es)** or **N(o)** to enable or disable the display of another unit of measure on the bottom display.

If Auxiliary Units Are Enabled

1. At the **Aux Unit?** prompt, select the desired pre-programmed auxiliary unit conversion factor or define a custom unit. The auxiliary unit selected here also applies to the rate function. Selections include:

   lb • dwt

   kg • t

   g • ton

   oz • custom

   lb-oz • ozt

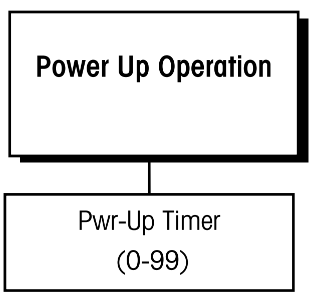
If Custom Unit Is Selected

1. At the **Factor?** prompt, enter a conversion factor. This factor is the number that will by multiplied by the main units to calculate the custom unit. Some rounding error may occur since this calculation uses a higher internal resolution to determine the converted value. Make sure that the maximum converted value does not exceed the display capacity of the lower display.
2. At the **Name?** prompt, enter the name for the custom unit, up to six characters.

Note: Auxiliary Units must be enabled to use the rate function.

3. At the **Rate Enabled?** prompt, select **Y(es)** or **N(o)** to enable or disable the rate parameters for the custom unit. Rate parameters define the period of time Q.iMPACT matroller uses when displaying average weight change. If disabled, Q.iMPACT matroller continues to the next sub-block. If enabled, configure the next two parameters.
4. At the **Time Units?** prompt, select the rate function time units. Options include:
   - Sec—average weight change per second
   - Min—average weight change per minute
   - Hour—average weight change per hour
5. At the **Int Period?** prompt, use the numeric keys to enter the sampling period (in seconds) that the matroller will use to calculate the average weight change for the time units selected above. You must enter a value between 1 and 60.
6. At the **Intrval?** prompt, use the SELECT key to select 1/2 sec(ond),1 sec(ond), or 5 sec(onds). This determines how often the matroller calculates a new rate value. Use 1 sec if you have a fast process which requires the most current rate value. Use 5 sec when you want a smoother rate value.
7. Continue to the next sub-block or exit the setup mode.

7. Power Up Operation Sub-block

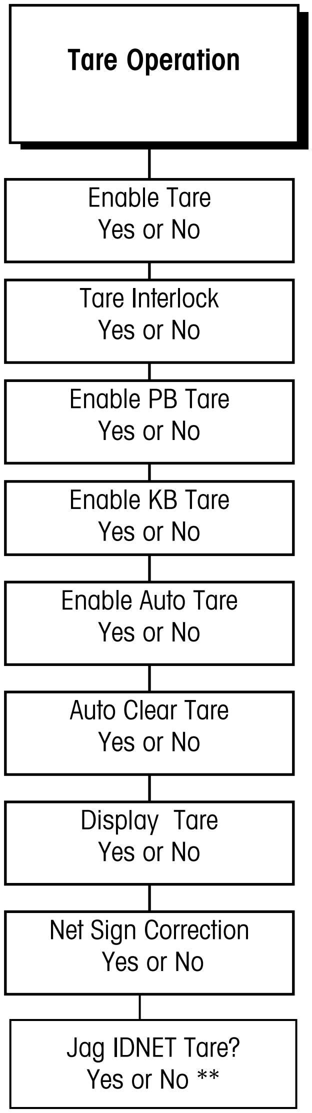


The Power Up Operation sub-block lets you specify a time delay before the scale is operational. This allows a sufficient warm-up period for stabilizing the scale and load cell electronics. The matroller displays a countdown clock indicating the time remaining in the specified warm-up period.

To configure the sub-block:

1. Press ENTER at the **Power-Up Oper** prompt.
2. At the **Pwr-Up Timer?** prompt, enter the number of minutes (0-99) that the matroller will delay before indicating the weight in normal operating mode. Power up zero capture is delayed while the timer runs.
3. Continue to the next sub-block or exit the setup mode.

8. Tare Operation Sub-block



**Applies only to IDNET bases.

The Tare Operation sub-block lets you enable or disable the various tare options offered in the Q.iMPACT matroller.

Pushbutton Tare—If enabled, pushbutton tare subtracts the weight of an empty container on the scale when the TARE key is pressed. The Q.iMPACT matroller displays the net weight when a sample is placed in the container.

Keyboard Tare—If keyboard tare (preset tare) is enabled, you can enter the known tare weight of a filled container, then press the ENTER key to subtract the container tare weight from the gross weight and display the net weight of the sample.

Auto Tare—If auto tare is enabled the matroller automatically tares the scale when the load on the platform exceeds a predetermined threshold value.

You can also configure:

Auto Clear Tare—If auto clear tare is enabled tare is automatically cleared and the indicator returns to gross mode when the weight goes above, then drops below a predetermined threshold value. You can also specify that tare be automatically cleared after a print operation.

Tare Interlock—If tare interlock is enabled limits are placed on how tare values can be cleared and entered in legal-for-trade applications.

Net Sign Correction—If you enable the Net Sign Correction feature, A Truck In/Out facility can handle two situations:

Weighing a full truck first and, after emptying the truck, taking the tare weight of the empty truck to find the net weight of its contents.

Taking the tare weight of an empty truck and, after loading the truck, taking the full weight of the truck to find the net weight of its contents.

Net Sign Correction delays the decision of which weighment is the gross weight and which weighment is the tare weight until the operator prints the ticket. At that time, the Q.iMPACT matroller compares the two weighments and takes the lower weight value as the tare weight. The net weight is always a positive value.

To configure the Tare Operation sub-block:

1. Press ENTER at the **Tare Operations** prompt to open the sub-block.
2. At the **Enable Tare?** prompt, select **Y(es)** or **N(o)** to enable or disable tare. If you select **N(o)**, the matroller proceeds to the Zero Operation sub-block. Access to other tare features is not possible if tare is disabled.
3. At the **Tare Interlck?** prompt, select **Y(es)** or **N(o)** to enable or disable tare interlock.
4. At the **Enabl PB Tare?** prompt, select **Y(es)** or **N(o)** to enable or disable pushbutton tare.
5. At the **Enabl KB Tare?** prompt, select **Y(es)** or **N(o)** to enable or disable keyboard tare.
6. At the **Enb Auto Tare?** prompt, select **Y(es)** or **N(o)** to enable or disable auto tare.

If Auto Tare Is Enabled

1. Press ENTER at the **Tare Threshold** prompt; at the **Wgt?** prompt, enter the desired threshold value. The threshold value is a unit value such as 1.5 pounds. When weight on the platform exceeds the threshold value, then settles to no-motion, the matroller automatically tares.
2. Press ENTER at the **Reset Threshold** prompt. At the **Wgt?** prompt, enter the desired reset threshold value. This is a unit value and must be less than the tare threshold. When weight on the platform falls below the reset threshold value, as when the load has been removed, the matroller automatically rearms the auto tare trigger.
3. At the **Check Motion?** prompt, select **Y(es)** or **N(o)** to enable or disable the motion check. If enabled, the matroller checks for stability of the load on the platform before resetting the auto tare trigger.
4. At the **Auto Clr Tare** prompt, select **Y(es)** or **N(o)** to enable or disable auto clear tare. Auto clear tare depends on the tare interlock condition.

Note: Printing and tare operations will wait until a stable condition exists before proceeding with the action. See Stability Detect sub-block in this chapter for more information on setting the sensitivity.

Tare will clear only at gross zero if tare interlock and auto clear tare are both enabled.

If Tare Interlock and Auto Clear Tare Are Enabled

The matroller proceeds to the **Display Tare** prompt. Continue to step 8.

If Tare Interlock Is Disabled, and Auto Clear Tare Is Enabled

At the **After Print?** prompt, select **Y(es)** to clear tare after a print command is issued, or select **N(o)** to clear tare at a predetermined threshold value.

Note: If auto clear tare is enabled, the matroller does not display the **Clear Threshold** prompt.

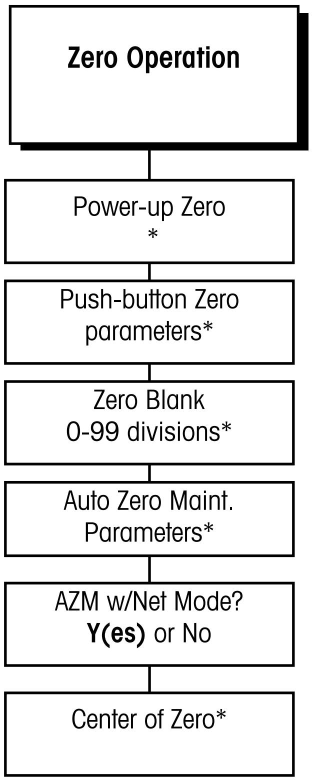
Tare will not be displayed if an auxiliary unit is selected. Otherwise, tare is displayed in the lower display area.

If Auto Clear Tare After Print Is Disabled

1. Press ENTER at the **Clear Threshold** prompt; at the **Wgt?** prompt enter a unit value. When the gross scale weight exceeds then falls below the threshold value, the matroller automatically clears tare and returns to gross mode.
2. At the **Check Motion?** prompt, select **Y(es)** or **N(o)** to enable or disable the motion check. If enabled, the matroller checks for stability of the load on the platform before proceeding with auto clear tare.
3. At the **Display Tare?** prompt, select **Y(es)** or **N(o)** to enable or disable the tare display. If enabled, the matroller displays the current tare value on the lower display, provided the display is not showing other operator messages.
4. At the **Net Sign Corr?** prompt, select **Y(es)** or **N(o)** to enable or disable the net sign correction feature.
5. At the **JagIDNET Tare?** prompt, select **Y(es)** or **N(o)** to enable or disable this feature. NOTE: This prompt only occurs when you have an IDNET base. If you enable this feature, Tare is done in the matroller. If you disable this feature, Tare is done in the IDNET base.
   - When Tare is done in the matroller, the command is executed immediately. Tare is not successful when there is motion on the scale or if there is zero or negative weight on the scale. The DataOK bit is never turned off during this operation.

   When Tare is done in the IDNET base, the matroller sends the Tare command to the IDNET base. If the scale is in motion, the IDNET base holds the tare command and suspends communications with the matroller. If communication is suspended for more than four seconds, the matroller turns off the DataOK bit and blanks the display. When motion stops, the IDNET base completes the tare operation and resumes communications with the Q.iMPACT matroller. The matroller then turns on the DataOK bit.
6. Press ENTER to continue to the next sub-block or ESC to exit setup.

9a. Zero Operation Sub-block



*These menu selections are replaced by "Restart? Y/N" when Scale Type is High Precision (IDNET).

Note: A pre-determined number of consecutive readings from the scale must fall within the range specified before the scale compensates for changes in the zero reference

Power-up zero should be disabled by setting the positive and negative ranges to 0% for scales such as tanks and hoppers which may lose power in the middle of a control process.

Pushbutton zero values are stored in the Q.iMPACT matroller's memory. In case of power loss, the matroller will display an accurate weight when power is restored.

The Zero Operation sub-block lets you set the zero reference parameters. For matrollers connected to an IDNET base, only the Auto Zero Maintenance portion of the sub-block is accessed. For all other scale base types, you can configure any or all of these options:

Power-up Zero—automatically zeros the matroller at power-up if weight on the scale is within a given range. If the weight on the scale is beyond the designated range, the display will not read zero until weight falls within the range.

Pushbutton Zero—manually compensates for material build-up on the scale and recaptures zero. NOTE: after a successful Dump To Empty the Scale will automatically be Zeroed. The range is controlled by the Pushbutton Zero range

Zero Blank—determines when the display will go blank if weight falls below zero.

Auto Zero Maintenance (AZM)—automatically compensates for small changes in zero resulting from material build-up on the scale or temperature fluctuations.

AZM w/Net Mode—automatically corrects zero close to net zero and gross zero.

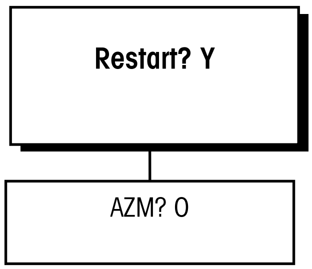
Center of Zero—determines if the center-of-zero annunciator lights at gross zero only or at gross and net zero.

Power-up zero capture and pushbutton zero ranges are based on the actual calibrated zero. If the positive and/or negative range value for power-up zero is greater than that for pushbutton zero, it is possible for the scale to automatically capture more weight on power-up than can be compensated for manually.

To configure the sub-block:

1. Press ENTER at the **Zero Operation** prompt to open the sub-block, then press ENTER at the **Power Up Zero** prompt to configure the power up zero option.
2. At the **Positve Rng?** prompt, enter a numeric value for the positive range of zero capture. This value is a percent of scale capacity.
3. At the **Negatve Rng?** prompt, enter a numeric value for the negative range of zero capture. This value is also a percent of scale capacity.
4. Press ENTER at the **Pushbutton Zero?** prompt to access these parameters.
5. At the **Positve Rng?** prompt, enter a numeric value for the positive capture range. This value is a percent of scale capacity.
6. At the **Negatve Rng?** prompt, enter a numeric value for the negative capture range. This value is also a percent of scale capacity.
7. At the **Zero Blank?** prompt, enter 0-98 to specify the display divisions behind zero before display blanking. The default is 5. A setting of 99 programs the matroller to display up to 50% of the calibrated capacity under gross zero. NOTE: if the display is blanked the Qi will NOT start a feed.
8. Press ENTER at the **Auto Zero Maint?** prompt to enable the option.
9. At the **Range?** prompt, enter a range (in divisions) within which the Q.iMPACT matroller adjusts for small changes in zero. Enter divisions +/- 0.1 - 10. Adjustments are made at a rate of 0.03 increments per second
10. At the **AZM w/Net Mode?** prompt, select **Y(es)** to automatically correct zero close to net zero and gross zero. Select **N(o)** for AZM to function only near gross zero.
11. At the **COZ?** prompt, select if the center-of-zero annunciator should illuminate at **Gross Only** or at **Gross and Net** zero.
12. Press ENTER to continue to the next sub-block or ESC to exit setup.

9b. Zero Operation Sub-block for High Precision Bases

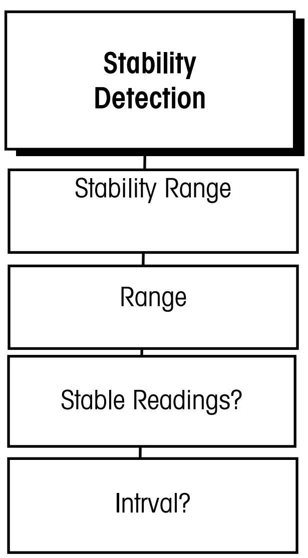


Scale zeroing is done within the High Precision base. The matroller sends the Zero command to the base. If the scale is in motion, the base holds the zero command and suspends communication with the matroller. If communication is suspended for more than four seconds, the matroller turns off the DataOK bit and blanks the display. When motion stops, the base completes the zero operation, resuming communications with the matroller. The matroller then turns on the DataOK bit and the display.

To configure the sub-block:

1. At the **Restart? Y** prompt press ENTER to accept or SELECT, followed by ENTER to change the response to **N(o)** and to accept that selection. When the restart feature is enabled, the current zero setting is saved and restored after a power loss. When the restart feature is NOT selected, the IDNET base "re-zeroes" at power up.
2. Press ENTER at the **AZM? 0** prompt to turn autozero maintenance OFF. To turn it ON, press SELECT until the prompt displays a **1**. Press ENTER.

10a. Stability Detect Sub-block



The stability detection feature determines when a no-motion condition exists on the scale. The sensitivity level determines what is considered stable. Printing and tare operations will wait for scale stability before carrying out a command.

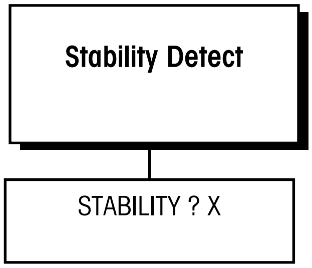
Stability detection occurs over a predefined period of time and allows a predetermined "acceptable" amount of motion in scale divisions. The acceptable amount of motion is considered the range and the period of time is called the interval. When the Q.iMPACT matroller is used with a High Precision base, there are four settings of stability filtering available.

To configure the sub-block:

SPECIAL NOTE:

The Stability values can only be viewed here and not adjusted. The adjustment of the stability values is done via the Channel Zero Flow Threshold.

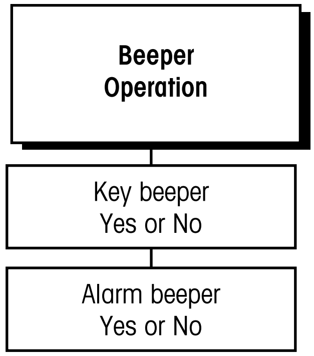
10b. Stability Detect Sub-block for IDNET Bases



Stability Detection of a High Precision base is determined by the base electronics. The stability detection feature determines when a no-motion condition exists on the weighing platform. The sensitivity level determines what is considered stable. Printing and tare operations will wait for scale stability before carrying out the command.

The only prompt that will appear will be **STABILITY ? X**. Use the SELECT key to change the value of the stability filter from 0 (no stability detection) or 1 (fast indication of weight) through 4 (slow indication of weight).

11. Beeper Operation Sub-block

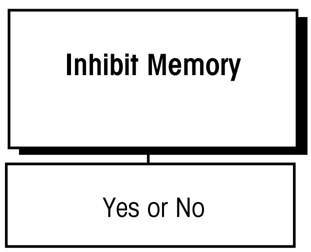


The Q.iMPACT matroller is capable of making an audible beep each time a key is pressed and an error alarm when an inappropriate key is pressed. This sub-block lets you enable or disable the keyboard sound.

To configure the sub-block:

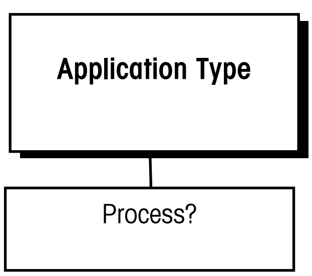
1. Press ENTER at the **Beeper Operation** prompt to open the sub-block.
2. At the **Key Beeper?** prompt, select **Y(es)** or **N(o)** to enable or disable sound when a key is pressed, as well as the double beep acknowledgment message.
3. At the **Alarm Beeper** prompt, select **Y(es)** or **N(o)** to enable or disable an alarm that sounds when an error occurs or an inappropriate button is pressed.
4. Continue to the next sub-block or exit the setup mode.

12. Inhibit Memory Sub-Block



The Inhibit Memory sub-block is used to disable the MEMORY key on the Q.iMPACT matroller keypad. If **Y(es)** is selected, the MEMORY key will be disabled. If **N(o)** is selected, the key will function as normal.

13. Application Type Sub-block

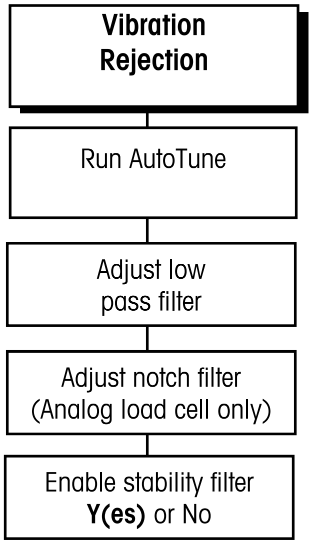


The Application Type sub-block indicates whether or not the scale is used for a process application. This sub-block affects the A/D rate and the ability to enable and/or disable the stability filter. To configure the sub-block:

At the **Process?** prompt,

1. Select **Low** – The stability filter can be enabled or disabled. The A/D rate is 10 updates per second. The continuous output is at 5 Hz.
2. Select **Mid.** The stability filter can be enabled or disabled. For analog load cells, the A/D and setpoint comparison rates are 20 Hz, and the standard continuous output updates the weight 10 times per second for all scale types. If the A/D update rate is less than 10, the continuous output will be at the A/D update rate. For **IDNET,** or **POWERCELL** load cells, the A/D rate is the rate of which the load cell is capable, ad the standard continuous output update rate is the same as the A/D rate.
3. Select **High.** The stability filter cannot be enabled. For analog load cells, the A/D rate is 17 Hz and the setpoint comparison rate is 50 Hz, and the standard continuous output updates the weight 17 times per second.

14a. Vibration Rejection Sub-block



The Q.iMPACT matroller has several filters to compensate for environmental disturbances such as vibration or noise. This sub-block lets you configure the TraxDSP filters for optimum vibration/disturbance rejection.

The Vibration Rejection sub-block allows programming of values including:

- **Low Pass Filter Frequency—**Low Pass Frequency is the frequency above which all disturbances are filtered out. The lower the frequency, the better the disturbance rejection, but the longer the settling time required for the scale.
- **Poles—**The number of poles determines the slope of the filtering cutoff. For most applications, a slope value of 8 is acceptable; however, decreasing this number will improve settling time slightly. Do not enter a value lower than 4 for this parameter.
- **Notch Filter Frequency—**The Notch Filter allows selection of one specific frequency below the lowpass filter value that can also be filtered out. This enables setting the lowpass filter higher to filter out all but one frequency (that the notch filter will handle) and obtain a faster settling time.
- **Stability Filter—**The Stability Filter eliminates weight changes within a given range around a stable weight reading. You cannot enable the stability filter if the **Process Application Type** parameter is configured "High" for dynamic weighing such as batching applications. The filter uses very stiff filtering as long as there is no motion on the scale so that the weight display changes slowly. Once the matroller detects a "motion" condition, it switches the stability filter to the standard lowpass filter. As a result, the weight quickly moves to its final value.

Note: Autotune is available only with analog load cell scale I/P PCBs of the revisions (or higher) listed below:
- A15290700A Dual Analog Load Cell
- B15360100A Reduced Excitation Dual Analog Load Cell

TraxDSP™ filtering is not available with IDNET bases. These bases allow you to select between three types of process applications and three filter settings.

To configure the sub-block:

1. Press ENTER at the **Vibration Reject** prompt to open the sub-block.
2. At the **Run Autotune?** prompt, select **N(o)** to bypass the auto tune process or select **Y(es)** to automatically tune the low pass and notch filers for analog scales only.
   - If **Y(es)** is selected, the display reads **Adjust 1** and the cursor moves across the display while the matroller measures the vibration under current conditions. The matroller automatically displays **Measure 1** and the cursor moves across the display while the matroller adjusts the vibration filter accordingly.
   - The matroller can repeat the measure and adjust process up to six times, depending on the amount and regularity of the vibration. When the vibration adjustment is made, the matroller indicates either **Success** or **Auto Tune Failed** then continues to the next prompt.

Note: The Adjust Notch parameter appears only if you are configuring an analog load cell.

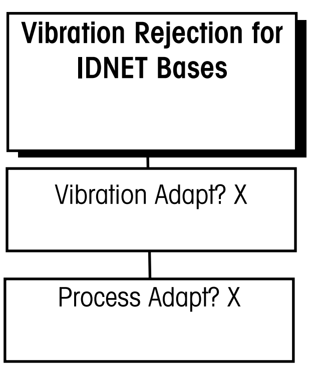
3. Press ENTER at **Adjust Lowpass?** to configure the parameters governing the low pass filter. Disturbances falling below these parameters pass through the filter; disturbances above the parameters are filtered out.
4. At the **Frequency?** prompt, enter the frequency above which disturbances are filtered.
5. At the **Poles?** prompt, enter the number of poles.
6. At the **Adjust Notch?** prompt, press ENTER to configure the parameters governing selective filtering.
7. At the **Frequency?** prompt, enter the frequency at which any disturbance is filtered out.
8. You cannot enable the stability filter if the **Process Application** parameter is configured **Y(es)** for dynamic weighing such as batching or filling applications.

9. At the **Stable Filter?** prompt, select **Y(es)** or **N(o)** to enable or disable the stability filter. Use this for static weighing applications only.

The default values for vibration rejection that are programmed in the factory are good for most applications; however, if you find that the weight display is still unstable, the following steps may help:

1. Set the Low Pass filter to 9.9, poles to 8, and the Notch Filter to 0.0.
2. Lower the frequency setting of the Low Pass Filter by increments of 1.0 and observe the amount of variation at each setting. When you see a noticeable improvement in display stability, vary the Low Pass Filter setting slightly below the frequency setting in increments of 0.1 for minimum fluctuation.
3. Record the frequency and approximate number of increments variation for the settings that show noticeable reduction in display fluctuation. This is the lowest frequency of vibration causing the display to fluctuate.
4. Set the Low Pass Filter back to 9.9.
5. Set the Notch Filter to the frequency that caused the largest reduction in increments change (recorded in step c.).
6. If the display is still fluctuating too much, repeat step b. observing the display fluctuation. Reduce the Low Pass Filter setting until the display is acceptable.
7. Always check the weight display update time after each filter adjustment to be sure that the update rate is fast enough for the application.

14b. Vibration Rejection Sub-block for High Precision Bases



When the Q.iMPACT matroller is used with a High Precision (IDNET) base, the following prompts and selections are possible:

1. Press ENTER at the **VIBRATION ADAPT? X** prompt to select the type of vibration filtering:
2. Use the SELECT key to display the appropriate filter level, then press ENTER. Options include:
   - 1 (low), use for virtually disturbance free, stable surroundings. The indicator responds quicker to changes in weight, and is more sensitive to external conditions.
   - 2 (med), use for normal ambient conditions. This is the factory default setting.
   - 3 (high), use for unstable surroundings. The scale is less responsive than the factory default setting, and is less sensitive to external influences.
3. Press ENTER at the **PROCESS ADAPT? X** prompt, then select the desired option:
   - **1**—use for the dispensing of liquids or powders.
   - **2**—use for all types of normal weighing applications. This is the factory default setting.
   - **3**—use for checkweighing types of applications.

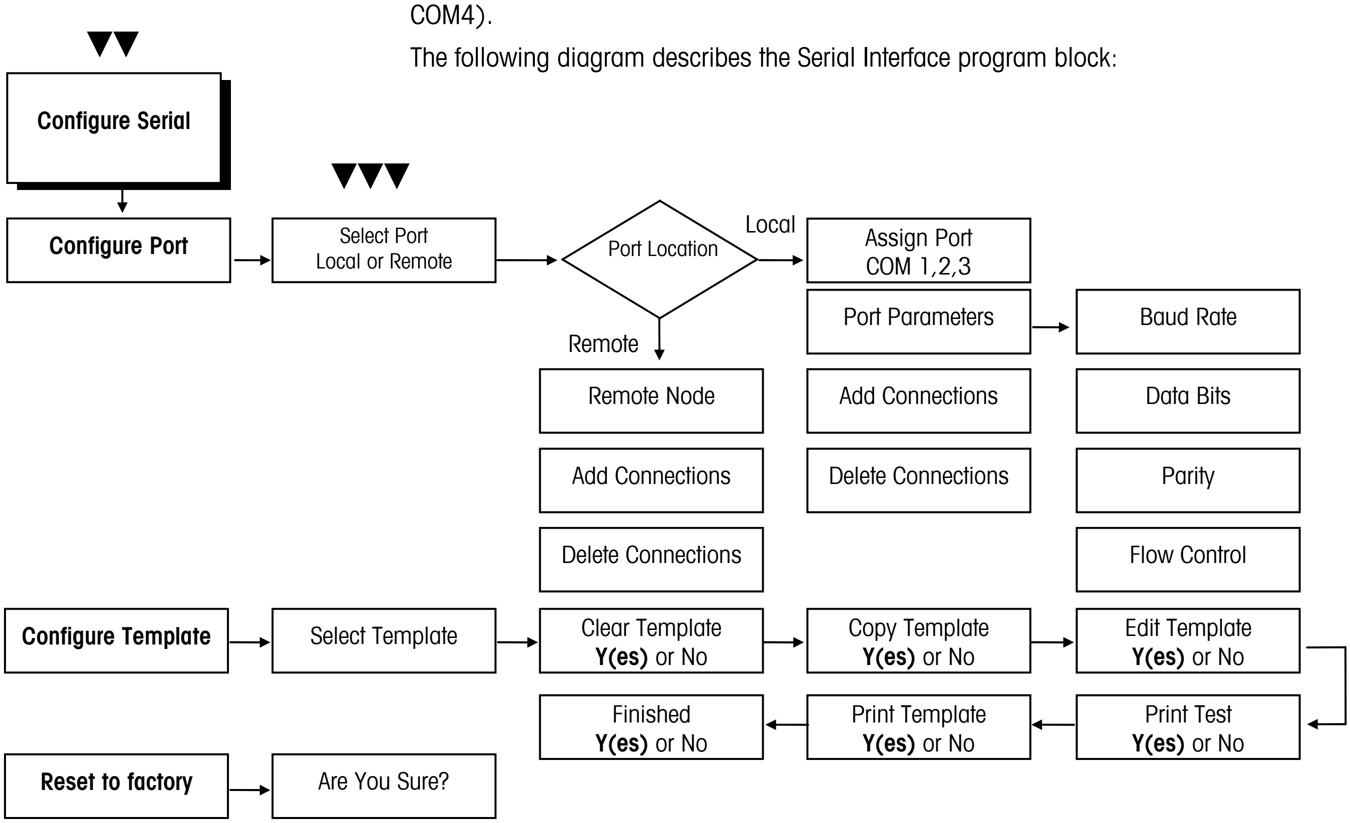
Serial Interface Program Block

The Serial Interface program block lets you set parameters to control data flow across the Q.iMPACT matroller's serial communication (COM) ports. This includes assigning port parameters and adding or and deleting a connection.

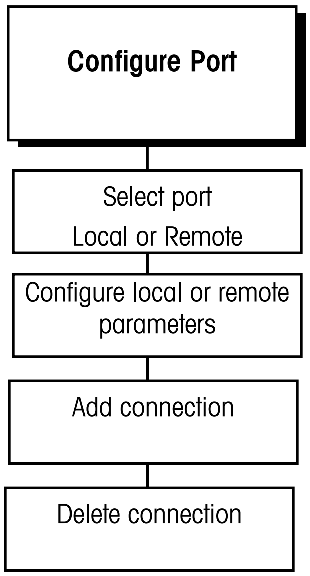
The input and output COM ports are used to communicate data on demand or continuously. COM ports may also be used for information exchange between a PC and the matroller.

Q.iMPACT matrollers have two serial I/O ports (COM1 and COM2). If an optional Multifunction PCB is connected, two additional serial I/O ports are available (COM3 and COM4).

The following diagram describes the Serial Interface program block:



1. Configure Port Sub-block



This sub-block lets you configure the serial ports on your local matroller for data exchange. You can configure only those ports that are physically available. For example, on a standard Q.iMPACT matroller with a single analog scale, you may have a remote display connected to COM 1 and a printer connected to COM 2.

To configure the program block:

1. Press ENTER at the **Configure Serial** prompt to open the program block. Press ENTER at the **Configure Port** prompt. Press ENTER at the **Select Port** prompt.
2. At the **Location?** prompt, select **Local** or **Remote**. Local refers to COM ports on the Q.iMPACT matroller you are working with at the time. Remote refers to COM ports on other matrollers connected in an Ethernet cluster.
3. Add the connection you just configured. It may be necessary to delete an existing connection that conflicts with the new one. For example, to connect a printer you must configure a COM port and add that port before the matroller can communicate with the printer.

If You Select Local

Configuring a local COM port involves defining the parameters that govern how data is transmitted through the port. You can configure communication parameters only for your local matroller. Communication parameters for remote matrollers must be configured at the remote locations.

1. At the **Assign Prt?** prompt, select the local COM port to be configured (COM1 or COM2). COM3 and COM4 are available if an optional Multifunction PCB is installed.
2. Press ENTER at the **Port Parameters?** prompt. Configure these parameters:

- Interface Type (COM2 only)
- Data Bots
- Baud Rate
- Parity

Interface Type

If COM2 is being configured, you must identify the interface type. The interface type prompt does not appear if you are configuring COM1.

1. At the **I/F Type?** prompt, select the desired interface type. Choices include:

- RS-232
- RS-422
- RS-485

Baud Rate

The baud rate is the rate of information transfer in bits-per-second.

1. At the **Baud Rate?** prompt, select the desired rate for the selected port:

- 300
- 600
- 1200
- 2400
- 4800
- 9600
- 19.2k
- 38.4k
- 57.6k
- 76.8k
- 115.2k

Data Bits

Data bits refers to the number of bits that make up an ASCII character that is transferred between units. Most METTLER TOLEDO equipment communicates using 7 data bits.

1. At the **Data Bits?** prompt, select 7 or 8 data bits.

Note: COM1 and COM2 always have 1 stop bit.

XON/XOFF requires character input. It will only work if the serial port has no other input connections. For example, you cannot configure CTPZSU In.

Parity

Parity is an error checking mechanism for each byte.

1. At the **Parity?** prompt, select the desired option. Parity options include:
   - **Even**—the matroller sends an even number of logic 1 data bits. If the sum is odd, an eighth logic 1 bit is added for an even total. If the sum is even, a 0 bit is included to leave it unchanged.
   - **Odd**—the matroller sends an odd number of logic 1 data bits. If the sum is even, a logic 1 bit is added for an odd total. If the sum is odd, a 0 bit is included to leave it unchanged.
   - **None—**for use with eight data bits.

Flow

The flow parameter lets you control data flow from the selected port to a peripheral device that supports XON/XOFF data flow. If enabled, the Q.iMPACT matroller monitors the XON/XOFF characters and controls data flow to help eliminate buffer overflow problems that can cause printing errors.

1. At the **Flow?** prompt, select the desired data flow option:

   None—The Q.iMPACT matroller does not respond to XON/XOFF.

   XON/XOFF—The Q.iMPACT matroller stops transmission on receipt of the XOFF character (13h) and resumes on receipt of the XON character (11h).

The remote matroller's communication parameters, such as baud rate, are configured in the remote matroller. You cannot configure remote communication parameters through this program block.

If you see the CONFLICT EXISTS error, you must first delete the existing connection before adding a new connection.

If You Select Remote

The following steps will identify and list remote Q.iMPACT matrollers with which your matroller can communicate through its serial ports.

1. At the **Node?** prompt, select the remote matroller with which you will communicate. Five are available; the matroller you are configuring is excluded. Matroller numbers are configured in the "Cluster IP" sub-block.
2. At the **Assign Prt?** prompt, select the COM port through which communication will take place. COM1, 2, 3 and 4 are available.

Add a Connection

The Q.iMPACT matroller is programmed at the factory for COM1 to output scale 1 data on demand. COM2 is not configured at the factory. Before adding connections, METTLER TOLEDO recommends deleting the existing COM1 connection.

1. Press ENTER at the **Add Connection?** prompt.
2. At the **Type?** prompt, select the type of serial connection for the scale:

• Serial Out	• CTPZSU In
• Cust Print from template (1-5)	• Bar Code In
Multi Cont1	• Keyboard In
Multi Cont 2	• BasMatroller

Note: You must include a summing scale when using Multi Cont 1 or 2. If Multi Cont 1 or 2 is used, no other port connection can be made to continuous or Multi Cont 1 or 2.

If Serial Out is Selected

Note: To print data for both scales in a two-scale system regardless of the scale displayed, you must make a connection for scale A and an identical connection for B.

1. At the **Enter Scale#?** prompt, select the internal scale (A, B, or E).
2. Press ENTER. The scale selected must be displayed on the matroller in order to use the PRINT key to complete the operation.
3. At the **Mode?** prompt, select **Demand** (information that is sent upon request) or **Continuous** (a constant stream of information that is sent from the remote matroller).

Serial Out— Demand Mode

Templates determine the data to be sent for demand printing and are discussed in the Configure Template sub-block.

The minimum print and print interlock features are related to the scale, not the connection. Programming these features applies to any demand connection for that scale.

To change any of these parameters, you must delete the entire connection then recreate the connection. It is not possible to reenter setup and change a parameter.

1. Press ENTER at the **Flexible Print?** prompt. Select **Y(es)** or **N(o)** at each of the prompts **Template 1-5?** indicating which template(s) you will print.
2. At the **Minimum Print?** prompt, select **Y(es)** or **N(o)** to enable or disable minimum print. If you select **Y(es)**, at the **Wgt?** prompt, enter a weight value below which printing cannot be initiated.
3. At the **Print Interlock?** prompt, select **Y(es)** or **N(o)** to enable or disable feature.

   If Y(es), Print interlock allows only one print operation if scale weight is above a threshold value. To print again, the weight must fall below the reset threshold value then settle above the threshold value. Print interlock must be enabled to access the Auto Print feature.
4. Configure the following parameters if print interlock is enabled:
   - **Print Threshold—**Press ENTER at the **Print Threshold?** prompt. At the **Wgt?** prompt, enter the weight value that must be reached before printing can begin.
   - **Reset Threshold—**Press ENTER at the **Reset Threshold?** prompt. At the **Wgt?** prompt, enter the weight value below which the weight on the scale must fall before enabling the next print operation.
   - **Check Motion—**Select **Y(es)** or **N(o)** to enable or disable this parameter. If enabled, check motion prohibits the next print operation until weight on the scale stabilizes (no-motion) below the reset threshold.
   - **Auto-Print—**Select **Y(es)** or **N(o)** to enable or disable automatic printing. If enabled, printing will begin when a no-motion condition exists and scale weight is above the print threshold. Auto-print requires the weight to drop below the reset threshold before another auto print operation can take place. If **N(o),** Continue to the next sub-block or exit setup.

Serial Out—Continuous Mode

Refer to the appendix for complete status byte information.

If you assign Scale A and Scale B to the same continuous output port, the currently selected scale data is output to the continuous port.

Control characters affect the selected scale unless preceded by a specific scale designation character (A or B).

Refer to the appendix for more details on CTPZSU and remote ASCII control character input.

1. At the **Status?** prompt, select the mode for the status bits in continuous mode:
   - **Standard**—for continuous mode to operate normally. If the Alternate weight units is enabled and Flow Rate is enable then the value transmitted out of the serial port is the Flow Rate of the Intsrument.
   - **Setpnt**—to include the status of setpoints 1 through 4 in the continuous output format. If enabled, the first setpoint assigned to a scale becomes the first setpoint in the continuous output.
   - **Template**—to use one of the five print templates for continuous output. Select the desired template (1 through 5).
2. At the **Checksum?** prompt, select **Y(es)** or **N(o)** to enable or disable checksum. Checksum is a method of checking each line of data transmitted by encoding a check digit character at the end of the string. The receiving device must be able to calculate and compare this character to verify the data is correct. Checksum is the 2s complement of the 7 low-order bits of the binary sum of all characters preceding the checksum, including control characters. Bit 8 is the parity bit (if enabled) of the 7 low-order bits of the checksum character.

If CTPZSU In is Selected

N(o) further parameters need to be configured. CTPZSU In is a serial connection enabling the matroller to perform several basic functions when specific ASCII control characters are received through the serial port.

Control characters affect the selected scale unless preceded by a specific scale designation character (A, B, or E). E indicates the summing scale.

C—clears the scale to gross

T—tares the scale

P—initiates a print command

Z—zeros the scale

S—selects the scale

U1—selects primary units

U2—selects secondary units

A Keyboard Tare can be entered by preceding the "T" with a numeric value. For example, 10.5T enters a Tare value of 10.5. If there is no preceding numeric value, "T" causes a Pushbutton Tare.

If Bar Code In is Selected

This connection type is used for input of serial data (requested from a prompt list step) The prompt list response source, configured in the Memory program block, must be Serial or Both. Refer to Appendix 1 for more information. **N(o)** additional parameters need to be configured.

If Keyboard In is Selected

This connection is used to receive serial characters emulating keyboard input. Refer to the appendix. **N(o)** additional parameters need to be configured.

If Custom Print from Template is Selected

This connection directs the serial port to output the selected characters and information from the corresponding template (Templates 1 though 5). This selection differs from the demand custom template print. The demand custom template print will cause the template to be sent serially when:

- The print button is pressed.
- An ASCII "P" command is sent to a COM port configured for "CTPZSU" input.
- A discrete input command to print is given.
- A print command is sent via a PLC interface. Or --
- A demand print is triggered through JagBASIC.
- A Custom Print from Template will only cause the template to be sent serially when a cust_prt discrete input for that template is used, or a JagBASIC program triggers the custom template print.

At the **Template 1?** prompt, select **Y(es)** or **N(o)** to include the template in the output. You must select **Y(es)** or **N(o)** for each template 1 through 5.

If BasMatroller is Selected

JagBASIC supports a serial matroller, such as a dumb tube or a PC running a matroller emulator, as a console for JagBASIC program development and debugging. You can type commands at the serial matroller keyboard then view them on the serial matroller display. You must attach the serial matroller to a serial port on the local Q.iMPACT matroller.

Configuring BasMatroller

The Configure Serial menu allows you to set up the JagBASIC keyboard input from a serial port. You select the appropriate COM port and assign the BasMatroller connection to it. When you assign the BasMatroller connection port, the input characters from the serial port are routed to JagBASIC. This connection is for keyboard input to the JagBASIC interpreter. The Interpreter displays the "BASIC:" prompt and input keystrokes to the BasMatroller. You must assign the keyboard to JagBASIC in the JagBASIC setup menus.

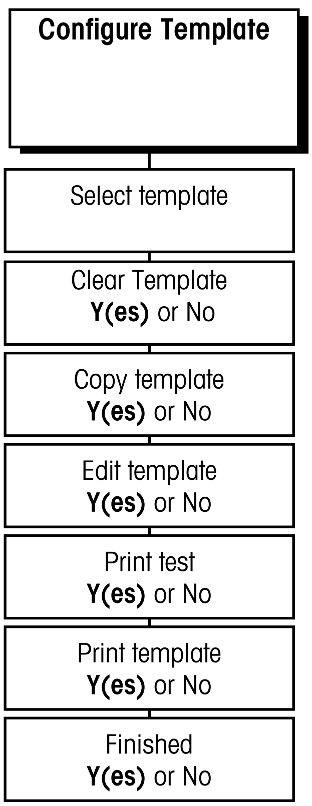
If Multi Cont (1 or 2) is Selected

Note: Refer to the appendix for information on output format.

Multiplexed Continuous Outputs in two formats to interface with scoreboards and other devices. The continuous output message contains weight data for all local scales. Select the connection you wish to delete through the Select Port, Location, and Assign Port steps.

1. Press SELECT until the **Delete Connect?** prompt is displayed, then press ENTER. The matroller displays the name of the port you have chosen. If the connection you want to delete is not displayed, press SELECT to display the desired connection.
2. Press ENTER to delete the connection.
3. Press ENTER to continue to the next sub-block or press ESC to setup.

2. Configure Template Sub-Block



This sub-block lets you define up to five flexible templates. Templates are preconfigured output strings that are transmitted when a print operation is requested. Appendix 1 lists the default templates. You can use the five stored default templates as given, edit them, or clear them and create custom templates.

Templates are composed of any printed character, special character, or field. Each template can store up to 400 format characters. When configuring a template, you should occasionally test print since the matroller cannot determine if it has run out of space until it "compiles" all the data in the template and tries to print it. If you do overfill the allocated space, a **TEMPLATE OVERFLOW** error will be displayed. Any data exceeding the 400-character limit will be lost.

The elements are recorded then sent sequentially when the template is used when a demand print request is received.

The configuration steps that follow pertain to the currently selected scale.

1. Press ENTER at the **Config Template?** prompt to open the sub-block.
2. At the **Temp?** prompt, press SELECT to choose the number and name of the template you wish to edit or create. If an existing template has a customized name assigned to it, the name appears to the right of the prompt: **Temp? 1 Mettler**.
3. Select the action you want to take with the selected template. Actions include:
   - Clear Template
   - Copy Template
   - Edit/Create Template
4. You must respond **Y(es)** or **N(o)** to each prompt.

Clear Template

1. Select **Y(es)** or **N(o)** at the **Clear Template?** prompt.
2. If **Y(es)**, you must confirm your decision at the **Are You Sure?** prompt.

If you are creating multiple templates that are similar to each other, use the copy and edit template features to save time.

Copy Template

1. Select **Y(es)** or **N(o)** to copy another template into the current template.
2. If **Y(es)**, select the new template ID number. Confirm your decision at the **Are You Sure?** prompt. The current template will be cleared before the new one is copied.

Edit/Create Template

1. Select **Y(es)** or **N(o)** if you wish to edit the current template.
2. If **Y(es)**, you can edit the template name and/or edit, insert, or delete template components. The display reads **Name?** with the current name of the template given to the right of the prompt.
3. Change the template name by entering a new name (maximum 8 characters), or keep the current name by pressing ENTER.
4. The Q.iMPACT matroller displays **E001** in the top display indicating that the first element of the template is displayed in the lower display area. If **End of Template** appears on the lower display, the template is empty.
5. Press SELECT to display the next element in the template. Press ZERO to display the previous element in the template. You can access any element in the template using the SELECT and ZERO keys.
6. You can also access specific elements by entering the number of the desired element. After entering the first digit of a new element, the lower display reads **Element? X**. X is the digit just entered. When the complete element number has been entered, press ENTER to access it.
7. Press ENTER to begin editing the displayed element. You can also begin editing at the **End of Template** position.
8. At the **Action?** prompt, select an editing option.
9. **EDIT** allows you to "replace" the current element with new data. The current element is automatically deleted.
10. **INSERT** allows you to insert a new field or character before the currently displayed element. The elements that follow are moved back one element number.
11. **DELETE** deletes the current element and moves each remaining element up one element number.
12. **DEL END** deletes all remaining elements from the displayed position to the end of the template.
13. If you are editing or inserting, at the **What?** prompt, select a data type. Data can be field information, printable ASCII characters, or special characters.
14. **FIELD** refers to actual data fields available through the matroller such as time, date, prompts, literals and weight data. Enter a field code from the table on the next page. NOTE: Although the table shows codes in lower case, the Q.iMPACT matroller accepts field codes entered in upper or lower case.

If the element number you enter is greater than the last element number in the template, the Q.iMPACT automatically displays the last element in the template.

Note: The lengths shown in the table reflect the length of the field when matching the template to the desired result. When calculating the number of elements in the template, Q.iMPACT data fields only take up seven characters.

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Q.iMPACT Data Field	Field Code*	Length
Tare Source	wsx07	1 N (0=none, 1=pb, 2=kb, 3=auto)**
Scale ID	csx18	8 A/N
Setpoint Value x = setpoint 1-8	spx05	10 A/N
Current Time[1]	jag20	11 A/N
Current Date[1]	jag19	11 A/N
Day of Week[1]	jag21	10 A/N
Julian Date[1]	jag07	5 A/N
Consecutive Number	jag09	8 N
Literal 01†	lit01	40 A/N
Literal 02†, etc	lit02, lit..	40 A/N
Prompt 01‡	pmt01	16 A/N
Prompt 02‡, etc	pmt02, pmt..	16 A/N
Prompt 01 Response	var01	As Programmed
Prompt 02 Response, etc	var02, var..	As Programmed
Template 1***	ptp01	As Programmed
Template 2***, etc	ptp02, ptp..	As Programmed

* The "x" character in a code represents the number of the internal scale from which data will come (unless otherwise noted). Number 1 represents internal Scale A, 2 represents internal Scale B, and 5 represents scale E, which is the summing scale. For example, to print the scale ID for scale A, the field code is "cs118."

** pb = pushbutton tare, kb = keyboard (preset) tare.

† Refer to the section entitled Configure Literals Sub-block in the Configure Memory program block later in this chapter for more information on entering literals.

‡ Refer to the section entitled **Configure Prompts** Sub-block in the Configure Memory Program Block later in this chapter for more information on entering prompts.

*** Using a template field code within a template will insert the entire template into the output.

1 Updated only at "print" time.

Although the Weight Data field table shows codes in lower case, the Q.iMPACT matroller accepts field codes entered in upper or lower case.

NOTE: For a complete list of field codes, refer to the JAGBASIC Programmer's Guide.

Weight Data Field	Field Code*	Length
Gross WT.	wtx01	12 A/N
Tare WT.	wsx02	12 A/N
Net WT.	wtx02	12 A/N
WT. Units	wtx03	2 A/N
Auxiliary Gross WT.	wtx04	12 A/N
Auxiliary Tare WT.	wsx03	12 A/N
Auxiliary NetWT.	wtx05	12 A/N
Auxiliary WT. Units	wtx06	6 A/N
Scale Mode (Gross/Net)	wsx01	1 A/N (G or N)
Custom Unit Conversion Factor	csx03	8 A/N
Custom Unit Name	csx02	6 A/N

The "x" character in each code represents the number of the internal scale from which data will come (unless otherwise noted). Number 1 represents internal Scale A, 2 represents internal Scale B, and 5 represents scale E, which is the summing scale. For example, to print the displayed gross weight for scale A, the field code is "wt101."

At the **[Format?]** prompt, select the data position (justification) and field width. If field width is less than the code length default specified in the Field Code tables (above), characters will be stripped off automatically. Justification choices include:

- **[DEFAULT]** prints data as defined by Mettler-Toledo default.
- Format options Left, Center, and Right use more memory than Default. Each justification takes up six characters in the template.
- **[LEFT]** prints data left justified within the field width. At the **[Field Width?]** prompt, enter the number of characters to define the field width.
- **[CENTER]** prints data centered within the field. At the **[Field Width?]** prompt, enter the number of characters to define the field width.
- **[RIGHT]** prints data right justified within the field. At the **[Field Width?]** prompt, enter the number of characters to define the field width.

Note: When calculating the number of elements in the template, the individual ASCII characters and special ASCII characters take up one character each. CR/LF and repeat characters take up six characters each.

Refer to the appendix for a list of special characters and their decimal equivalents.

CHAR refers to normal printable ASCII characters and CR/LF (carriage return and line feed) characters. You can enter ASCII characters from the remote QWERTY keyboard or the Q.iMPACT matroller keypad. CR/LF makes terminating a printed line faster than selecting each character individually. It also allows quick addition of multiple new lines to advance to the end of the page or to position a line on a page. To choose CR/LF as a character, press SELECT at the **Character?** prompt.

SPEC CHAR refers to "special" control characters that are not printable ASCII characters such as ASCII SO (shift out - 0E hex) which may be used for printer control. Special characters include lower case letters and various punctuation not available on the standard Q.iMPACT matroller keypad. Use the Q.iMPACT matroller's SELECT and ZERO keys to scroll through the list of these characters and choose a character, or use the numeric keys to enter the decimal value of any special character between 0-255.

Formatting options allow you to customize the appearance of printed data and helps align data on the page. You can also limit the data field width which can help to eliminate unwanted characters.

Format options Left, Center, and Right use more memory than Default. Each justification takes up six characters in the template.

At the **Format?** prompt, select the data position (justification) and field width. If field width is less than the code length default specified in the Field Code tables (above), characters will be stripped off automatically. Justification choices include:

- **DEFAULT** prints data as defined by METTLER TOLEDO default.
- **LEFT** prints data left justified within the field width. At the **Field Width?** prompt, enter the number of characters to define the field width.
- **CENTER** prints data centered within the field. At the **Field Width?** prompt, enter the number of characters to define the field width.
- **RIGHT** prints data right justified within the field. At the **Field Width?** prompt, enter the number of characters to define the field width.

When the element is viewed on the lower display, the data is shortened to fit in the display area. The following examples illustrate the displayed data format.

Example 1: /wt101 L 15 where:

"/" indicates a Q.iMPACT Data Field. The other possibility is "A" for ASCII character.

"wt101" is the gross weight field code for Scale A.

"L" indicates the field is left justified. "R" means right, "C" means center.

"15" is the specified field width.

Example 2: A 'G' 001 where:

"A" indicates an ASCII character. The other possibility is "/" for a Q.iMPACT matroller Data Field.

"G" is the ASCII character selected.

"001" is the quantity of the "G" character to be transmitted. Printing multiple characters is a quick way to add spacing or create custom printouts. For example, multiple underscores (_) can create a signature line.

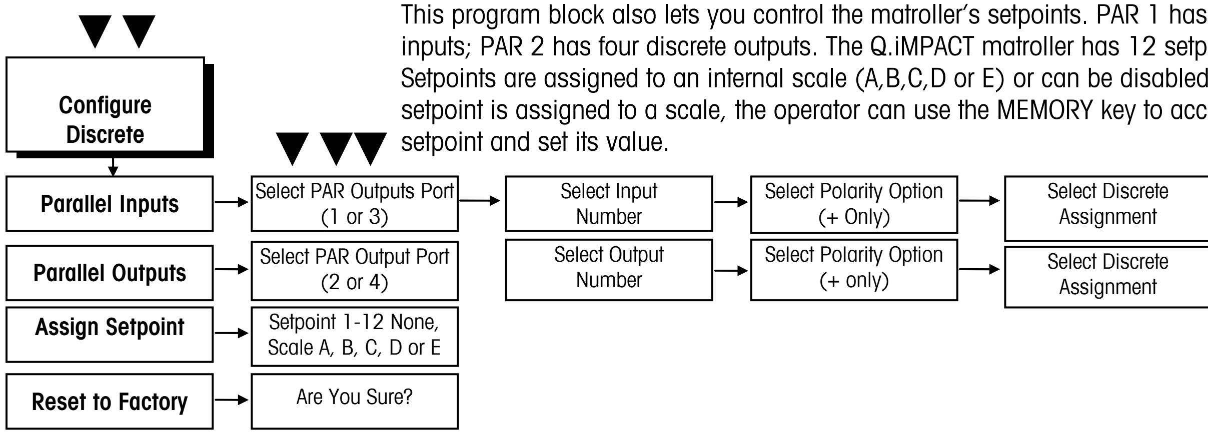
Note: Print test allows you to check your data output without exiting the template sub-block.

Print template gives a hard-copy record of the template configuration that can be useful for "debugging" a format as you configure the template.

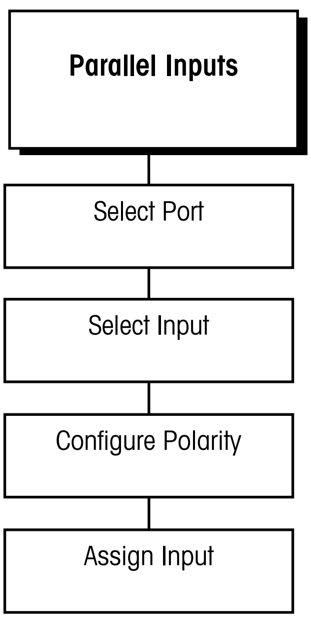
1. At the **Print Test?** prompt, select **Y(es)** or **N(o)** to initiate or skip a test print of the template. If **Y(es)**, the data defined by the template will be output to the first COM port selected for Demand Mode.
2. At the **Print Temp?** prompt, select **Y(es)** or **N(o)** to print the template elements. If **Y(es)**, template elements are output in the shortened format described above to the first COM port selected for Demand Mode.
3. At the **Finished?** prompt, select **Y(es)** if you are finished or **N(o)** to continue editing.
4. Continue to the Reset to Factory sub-block or exit setup mode.

Configure Discrete Program Block

The Configure Discrete program block lets you configure inputs and outputs for PAR 1 and PAR 2 ports. (PAR 3 and PAR 4 are available if an optional Multifunction PCB is installed). This program block also lets you control the matroller's setpoints. PAR 1 has four discrete inputs; PAR 2 has four discrete outputs. The Q.iMPACT matroller has 12 setpoints. Setpoints are assigned to an internal scale (A,B,C,D or E) or can be disabled. When a setpoint is assigned to a scale, the operator can use the MEMORY key to access the setpoint and set its value.



1. Discrete Inputs Sub-block



The setpoints that are available correspond to the selected scale.

NOTE: Qi tasks will override any functions assigned to the I/O if there is a contention ie the Inputs are also used by the Qi to ack and adds. It would be advisable to test functionality before implementation

The Discrete Inputs sub-block lets you configure each of the four discrete inputs through PAR 1 (and an additional 8 on PAR 3 if an optional Multifunction PCB is installed). To configure inputs:

1. Press ENTER at the **Config Discrete** prompt and again at **Parallel Inputs**.
2. At the **Port?** prompt, select PAR 1 or PAR 3.
3. At the **Discrete?** prompt, select the specific input number (1 through 4 for PAR 1; 1 through 8 for PAR 3) to configure.
4. At the **Polarity?** prompt, select the input polarity option that defines the input active state. Options include:
   - **Positive (+)** —The assigned action will take place when the input IN 1-12 is grounded to the GND matroller on PAR 1 (or PAR 3).
   - **Negative (–)** —The assigned action will take place when the connection between the GND matroller on PAR 1 or PAR 3 and the input IN 1-12 is open.
5. At the **Assign?** prompt, select the action corresponding to the input you are configuring. The assigned action will happen when the input becomes active.

Tare—causes the matroller to tare a load on the scale when the input is active.

Clear—causes the matroller to clear the scale to gross zero when input is active.

Print—initiates a print command when the input is active.

Zero—causes the matroller to zero the scale when the input is active.

Pri Unit—changes the weight unit to the primary unit when the input is active.

Sec Unit—changes weight unit to secondary unit when the input is active.

Sw Units—toggles between the primary and secondary weighing units when the input is active.

Sel Scale—causes the matroller to display the second scale data (from scale A or B) when the input is active.

Sel Key—corresponds to pressing SELECT when the input is active.

Escape—corresponds to pressing ESC when the input is active.

Enter—corresponds to pressing ENTER when the input is active.

Cust_Prt (1 through 5)—initiates a command to print the contents of the selected template when the input is active.

Blank Display—puts dashes in upper display.

DisSetup—disables Setup Entry.

DisKeyPad—disables Keypad.

Prompts—start prompts remotely.

None—assigns no function to the input when it is active.

6. At the **Scale?** prompt, press SELECT to choose the scale from which discrete data will come. Options include:

   Active—the scale selected during normal operation

   A—Scale A

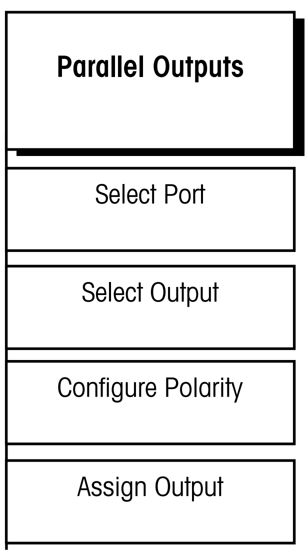
   B—Scale B

   C—Scale C

   D—Scale D

7. When you have finished configuring the first input assignment, Q.iMPACT matroller returns to the **Port?** prompt where you can repeat steps 2 through 5 for each additional input you wish to configure.
8. When you are finished configuring all input assignments, at the **Port?** prompt, press ESC to return to the **Parallel Inputs** prompt. Press SELECT to display the **Parallel Outputs** prompt and continue.

2. Discrete Outputs Sub-block



The Discrete Outputs sub-block lets you configure each of the four discrete outputs through PAR 2 (and an additional eight outputs for PAR 4 if an optional Multifunction PCB is installed). To configure outputs:

1. Press ENTER at the **Parallel Outputs** prompt.
2. At the **Port?** prompt, select PAR 2 or PAR 4 for the port you wish to configure.
3. At the **Discrete?** prompt, select the output number (1 through 12) to configure.
4. At the **Polarity? + only** prompt, press ENTER to set the output polarity option that defines the output active state. In the active state, the output is actually switched to ground internally showing 0 VDC and supplying a ground as an output.

NOTE: Qi tasks will override any functions assigned to the I/O if there is a contention ie the Outputs are also used by the Qi to control the feeds. It would be advisable to test functionality before implementation

5. At the **Assign?** prompt, select the output action corresponding to the output you are configuring. The condition exists when the output becomes active. Options include:
   - **Net Gross—**output is active when the Q.iMPACT matroller is in the net mode.
   - **Zero—**output is active when the displayed weight of the scale is within ± 0.25 increment of gross zero.
   - **Motion—**output is active when the matroller is experiencing a motion condition.
   - **Over Cap—**indicates weight on the scale exceeds the calibrated capacity when the output is active.
   - **Undr Zero—**indicates the Q.iMPACT matroller is displaying weight that is below gross zero when the output is active.
   - **Setpoint—**indicates weight on scale reached a predetermined target weight.
   - **Alarm**
   - **None—**assigns no function to the output when it is active.

If Setpoint is Selected

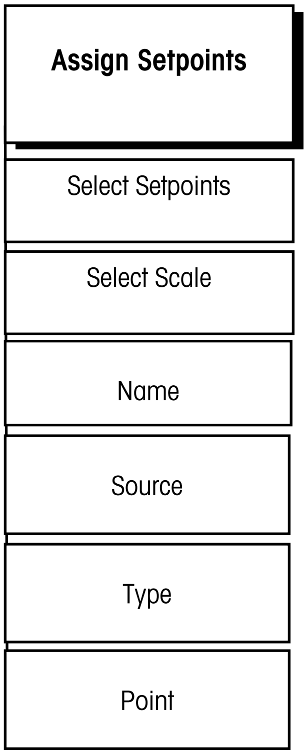
Note: Dribble value is equal to the target value minus the preact and dribble value.

1. At the **Setpoint?** prompt, select the particular output setpoint (1 through 12) you wish to configure.
2. At the **Out?** prompt, select the desired setpoint function. Options include:
   - **Feed**—the output turns the feeder off when weight on the scale reaches a predetermined cutoff value.
   - **Fast Feed**—the output controls the transition from fast to slow speed in dual-speed batching applications.
   - **Tolerance**—the output indicates whether residual weight on the scale is within a predetermined tolerance value. Please refer to the section entitled Memory Key Operations in chapter 4 for more information.

If An Assignment Other Than Setpoint is Selected

1. At the **Scale?** prompt, select the scale to which the output refers (Scale A, Scale B, Scale C, Scale D or Summing Scale E).
2. When you have finished configuring the first output assignment, Q.iMPACT matroller returns to the **Port?** prompt where you can repeat steps 2 through 5 for each additional output you wish to configure.
3. When you are finished configuring all output assignments, at the **Port?** prompt, press ESC to return to the **Parallel Outputs** prompt. Press SELECT to display the **Assign Setpoints** prompt and continue.

3. Assign Setpoints Sub-block



NOTE: Qi tasks will override any functions assigned to the I/O if there is a contention ie the Outputs are also used by the Qi to control the feeds. It would be advisable to test functionality before implementation.

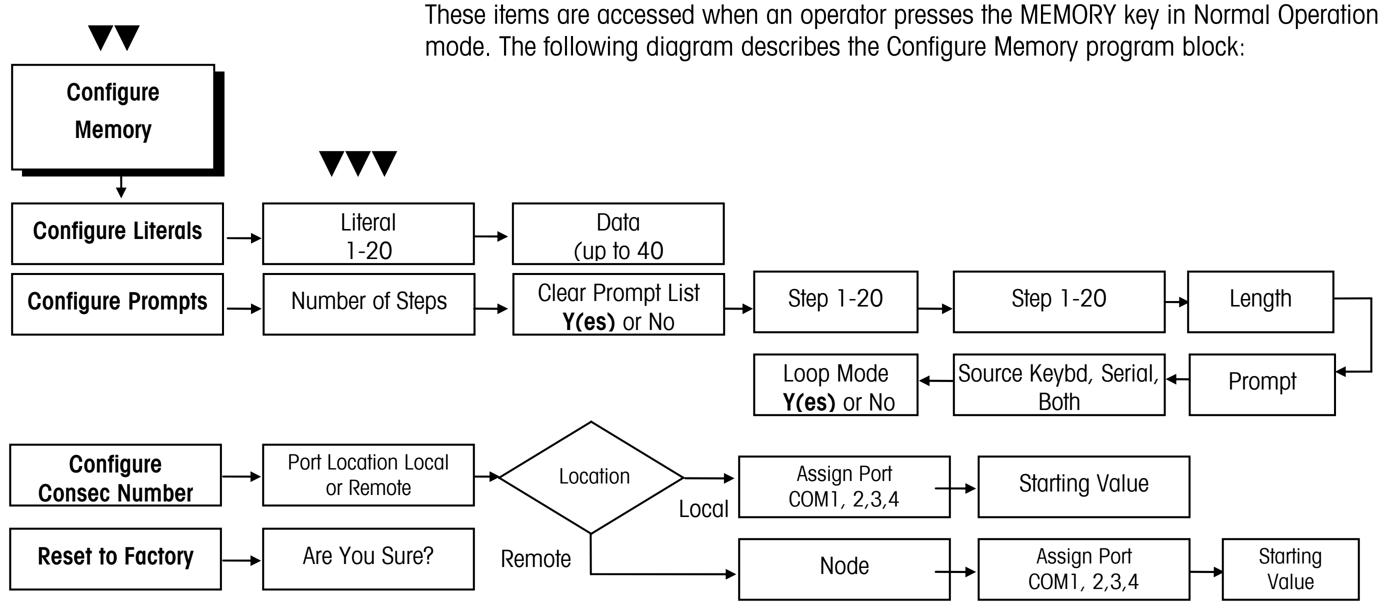
This sub-block lets you assign the matroller's setpoints to a scale or to disable setpoints.

To configure setpoints:

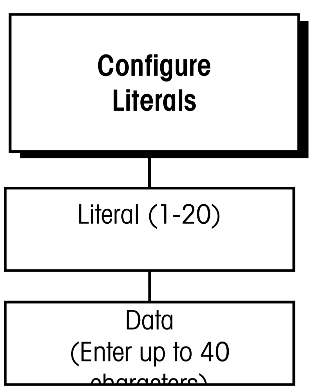
1. Press ENTER at the **Assign Setpoints** prompt.
2. At the **Point?** prompt, select the setpoint you wish to configure (1 through 12).
3. At the **Scale?** prompt, select Scl A, Scl B, Scl C, Scl D, Scl E, or None to assign the setpoint selected in step 2 to scale A-D, summing scale, or to disable the setpoint (none).
4. At the **Name?** prompt, use the numeric keys to enter a description for this setpoint. Please refer to the section entitled Alphabetical and Special Character Entry in Chapter 4 for more information on entering alphanumeric characters.
5. At the **Source?** prompt, select a scale reference to which the setpoint will respond. Options include:
   - **Net**—the net weight of the selected scale.
   - **Gross**—the gross weight of the selected scale.
   - **Rate**—the calculated rate of weight change over a predetermined period of time as configured in the Alternate Weight Units sub-block.
6. At the **Type?** prompt, select the setpoint operation condition. Options include:
   - **Fill**—if the setpoint will work when weight on the scale is increasing.
   - **Discharge**—if the setpoint will work when weight on the scale is decreasing.
7. When you have finished assigning the first setpoint, the Q.iMPACT matroller returns to the **Point?** prompt where you can repeat steps 2 and 3 for each additional setpoint you wish to assign.
8. After you finish assigning all setpoints, at the **Point?** prompt press ESC to return to the **Assign Setpoints** prompt. Press ESC to return to the **Config Discrete** prompt. Then press SELECT to continue to the Configure Memory program block.

Configure Memory Program Block

This program block lets you configure literals, prompt lists, and consecutive numbers. These items are accessed when an operator presses the MEMORY key in Normal Operation mode. The following diagram describes the Configure Memory program block:



1. Configure Literals Sub-block

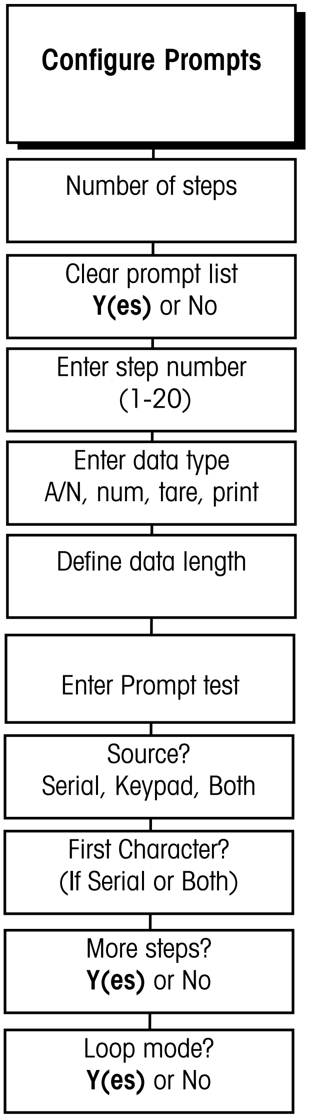


Literals are text strings, such as site name or address, that can be printed in a template. They can be up to 40 characters in length and are referenced by a field code (see the Configure Template Sub-block in this chapter). You can program up to 20 literals.

To configure literals:

1. Press ENTER at the **Config Literals?** prompt to open the sub-block.
2. At the **Literal? 0** prompt, enter a number for the literal you are creating or editing (01-20).
3. At the **Data?** prompt, enter the text for the literal. You can enter up to 40 alphanumeric characters. To enter lowercase letters and characters other than those on the Q.iMPACT matroller keypad, you will need a QWERTY keyboard. Repeat steps 2 and 3 for each literal you wish to configure.
4. Press ENTER to continue to the next sub-block or ESC to exit the setup mode.

2. Configure Prompts Sub-block



A prompt list displays written cues for an operator to perform a task while in Normal Operation mode. You can include up to 20 steps in a prompt list.

1. Press ENTER at the **Config Prompts?** prompt to open the sub-block.
2. Press ENTER at the **N(o) of Steps** prompt. This number tells you how many steps are in the current prompt list.
3. At the **Clr Prmpt Lst?** prompt, select **Y(es)** if you wish to clear the existing prompt list and reset the step number to 0, or select **N(o)** if you want to edit or add steps in the existing prompt list.

   If Y(es), at the **Are You Sure?** prompt, select **Y(es)** or **N(o)** to clear or keep the current prompt list.
   If N(o), at the **Step 1** prompt, begin entering data. If you are editing an existing prompt list, you must scroll through each step in the list to get to the desired step you wish to edit or create.
4. At the **Data Type?** prompt, select the type of data that will be entered by the operator in response to the prompt. Choices include:

Option	Data Type	Max. Length
A/N	Alpha-numeric	40 characters
Num	Numeric	8 numbers
Tare	Tare Weight	N/A
Print	N/A	N/A

Numeric data type prohibits the operator from entering anything other than numbers or a decimal point. Tare data type allows a preset (keyboard), or pushbutton tare entry. Print data type causes a print output to occur when the operator presses ENTER at a print step in the template. If no prompt is entered, print output will occur automatically.

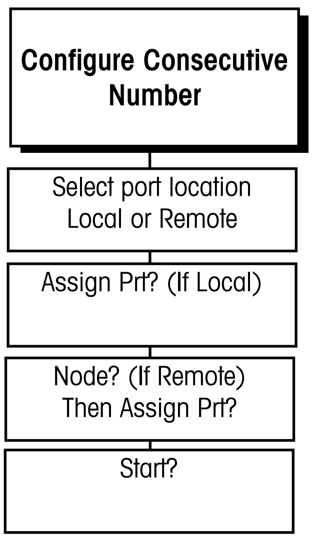
1. At the **Length?** prompt, enter the maximum number of characters that the operator will enter in response to the prompt according to the type of data selected above.
2. Press ENTER at the **Prompt?** prompt, then input the actual text for the operator prompt (up to 16 characters). Press ENTER to accept the text after you finish keying the string.
3. At the **Source?** prompt, select the entry source for the data. Options include:
   - **Serial**—Data input will be from a Q.iMPACT matroller serial port such as from a bar code reader
   - **Kybd**—Data input will be from the Q.iMPACT keypad or an external PC keyboard
   - **Both**—Data input will be from a keyboard or serial port source
   - METTLER TOLEDO recommends using both to accommodate input regardless of specific source.

If Serial or Both

1. At the **First Character?** prompt, enter the number of the first character position to be used by the Q.iMPACT matroller for the prompt response. For example, consider the prompt response "1521" that is received in the following serial input string: <STX> <SP> <SP> <SP> 1521 <CR>
2. The first character of the response ("1") is the fifth character in the string, so you would enter "5" at the **First Character?** prompt. Refer to Appendix 1 for more information.

3. At the **More Steps?** prompt, select **Y(es)** or **N(o)** if more steps will be entered in the prompt list. If **Y(es)**, the matroller automatically increments to the next step.
4. At the **Loop Mode?** prompt, select **Y(es)** or **N(o)** to enable or disable the prompt list loop mode. This feature causes the Q.iMPACT matroller to remain in the prompt list (in normal operating mode) until the operator presses ESC.
5. Continue to the next sub-block or press ESC to exit setup mode.

3. Configure Consecutive Numbering Sub-block



Consecutive numbering is used for sequencing purposes. The Q.iMPACT matroller automatically increments the number from a defined starting point.

To configure consecutive numbering:

1. Press ENTER at the **Configure CN?** prompt to open the sub-block.
2. At the **Port Loc?** prompt, select the port location through which data will flow triggering the next consecutive number. You must select a port configured for demand output from this specific Q.iMPACT matroller. Choose local or remote.

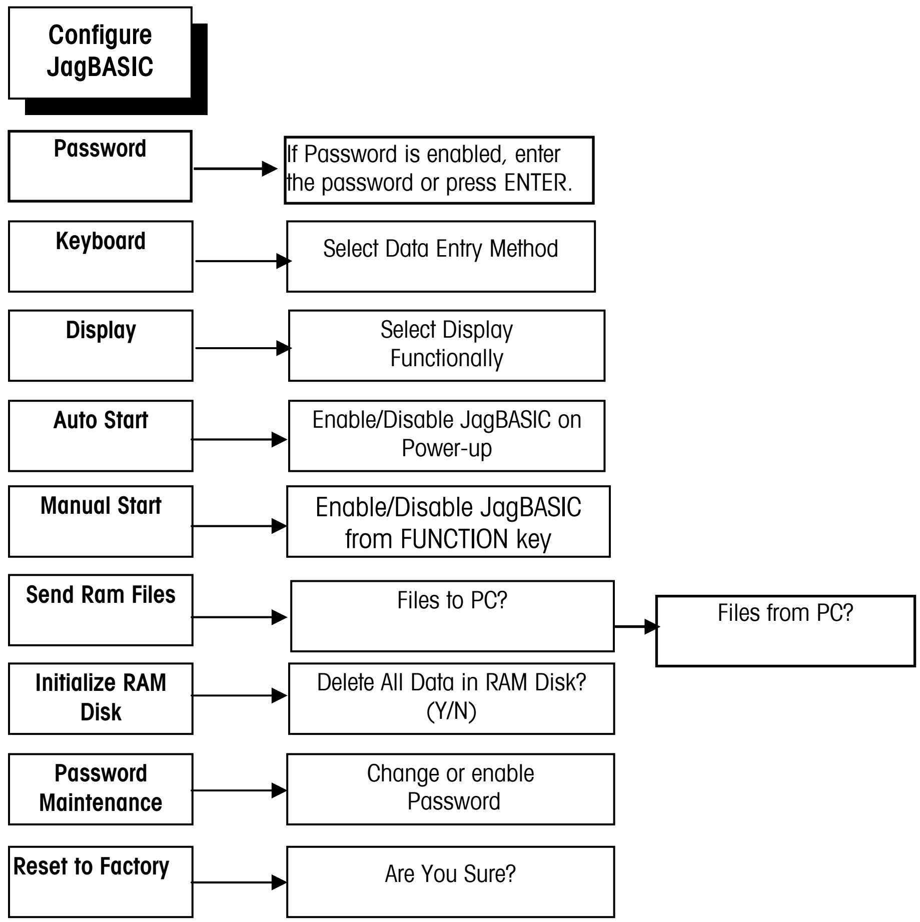
   ### If Local
   At the **Assign Prt?** prompt, select the appropriate COM port.

   ### If Remote
   At the **Node?** prompt, select the appropriate remote Q.iMPACT matroller (1-6), then select the COM port at the **Assign Prt?** prompt as for local.
3. At the **Start?** prompt, enter the first consecutive number to be used (0-99999999) after a reset.
4. Press ENTER to continue to the next sub-block or press ESC to exit setup mode.

Configure JagBASIC Program Block

This sub-block details how to configure JagBASIC.

NOTE: Consult the JagBASIC Programmer's Guide on the documentation CD that accompanies the Q.iMPACT matroller for more information about JagBASIC.



Enter the JagBASIC password to access the program block. If none has been entered since the last Master Reset, press ENTER to access the program block.

1. Keyboard Sub-block

Keyboard

Select Input option (None, Keypad, Keyboard, Both)

The Keyboard sub-block lets you select the type of device that will be used to input data to JagBASIC at an input or inkey prompt. The selected device is also used for BASIC command line mode.

To configure the Keyboard sub-block:

1. Press ENTER at the **Config JagBASIC** prompt to access the program block.
2. Press ENTER at the **Keyboard** prompt, then select the desired input device:
   - **None—N(o)** keyboard input is required. This option is used with programs designed to operate in the background and monitor data input and output without operator intervention.
   - **Keypad**—The Q.iMPACT matroller keypad will be used for JagBASIC input **and** standard Q.iMPACT matroller functions.
   - **Kboard—**An optional PC-type QWERTY keyboard will be used for JagBASIC input and standard Q.iMPACT matroller functions.
   - **Both—**The Q.iMPACT matroller keypad and an optional keyboard will be used for JagBASIC input.
   - If **Both** is selected, standard matroller functions (including setup) cannot be accessed with the keyboard. If you need to access setup with both keyboard and keypad selected, turn switch 2 off, then power up to enter setup and change this option to Keyboard. Turn switch 2 on when finished.
3. Press ENTER to continue to the next sub-block or ESC to exit the setup mode.

2. Display Sub-block

Display

Select Display function (None, Q.iMPACT)

This sub-block lets you select the display area to be used by a Jag BASIC program when a Print statement is executed.

To configure the sub-block:

1. Press ENTER at the **Display** prompt, then select the display area for JagBASIC output:
   - **None**—JagBASIC output is not displayed.
   - **Q.iMPACT matroller—**The Q.iMPACT matroller lower display area shows JagBASIC output and standard Q.iMPACT matroller output.
2. Press ENTER to select the display option and continue to the next sub-block.

3. Auto Start Sub-block

Auto Start

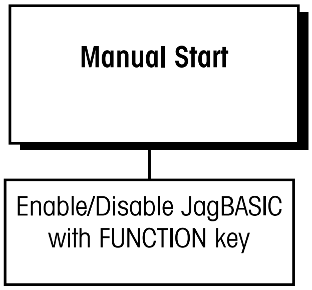
Enable JagBASIC on power-up (Y/N)

The Auto Start sub-block lets you start the JagBASIC program (file1.bas) automatically on power-up.

To configure the sub-block:

1. Press ENTER at the **Autostart** prompt, then press SELECT to display **Y(es)** or **N(o)**. If enabled **Y(es)**, the JagBASIC program will automatically start each time power is applied to the Q.iMPACT matroller.
2. Press ENTER to select the auto start option and continue to the next sub-block.

4. Manual Start Sub-block

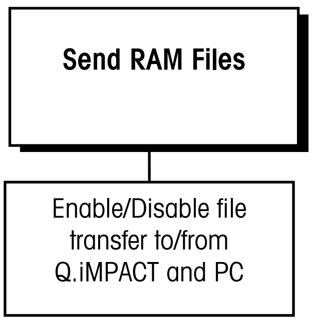


The Manual Start sub-block lets you configure JagBASIC as an operation associated with the FUNCTION key.

To configure the sub-block:

1. Press ENTER at the **Manual Start** prompt, then press SELECT to display Enable or Disable. If enabled, JagBASIC programs can be started manually when the operator presses the FUNCTION key.
2. Press ENTER to select the manual start option and continue to the next sub-block.

5. Send RAM Files Sub-block



Refer to the JagBASIC Programmer's Guide for more details.

This sub-block works with the JagBASIC send and receive programs that must be installed in your PC and lets you configure file transfer to and from the matroller and your PC. File transfer is initiated and transferred in setup mode.

Communications must be established between the PC and Q.iMPACT matroller to transfer files. If communications are not established, the matroller will time-out and return to the beginning of this sub-block.

To transfer files:

1. Press ENTER at the **Send RAM Files** prompt.
2. At the **Files to PC?** prompt, select **Y(es)** if you want to enable file transfer from the matroller to your PC, or **N(o)** if you do not want file transfer in this direction.

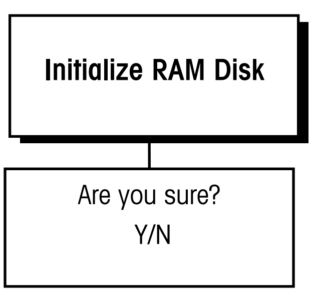
   If Y(es) is Selected

   - At the **Are You Sure?** prompt, select **Y(es)** to enable the Q.iMPACT matroller to transfer files from its RAM disk to your PC. If you respond **N(o)** to this prompt, Q.iMPACT matroller prompts **Files From PC?**

   If N(o) is Selected

   - At the **Files From PC?** prompt, select **Y(es)** to enable file transfer from your PC to the Q.iMPACT matroller, then respond **Y(es)** at the Are You Sure? prompt. The matroller displays "Recving from PC."
3. Press ENTER to continue to the next sub-block.

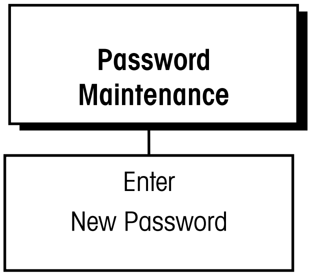
6. Initialize RAM Disk Sub-block



This sub-block lets you delete all files in the Q.iMPACT matroller's RAM disk and initialize it for new files.

1. Press ENTER at the **Init RAM Disk?** prompt.
2. At the **Are You Sure?** prompt, select **Y(es)** to delete the RAM disk files. Select **N(o)** if you do not wish to erase all files on the RAM disk at this time.
3. Use caution if you select **Y(es)** to delete all RAM disk files. These files cannot be recovered once they are deleted.
4. Press ENTER to continue to the next sub-block.

7. Password Maintenance Sub-block



METTLER TOLEDO recommends that you distribute the password to only those who need access to the JagBASIC program block.

The Password Maintenance sub-block lets you enter a password that must be used each time the JagBASIC program block is accessed. The password secures the JagBASIC programs against unauthorized access and changes.

To configure the sub-block:

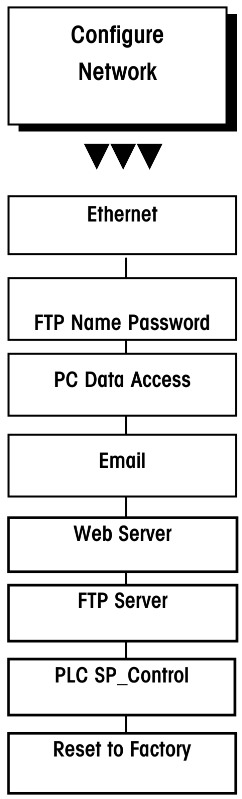
1. Press ENTER at the **Password Maint** prompt.
2. At the **Passwd?** prompt, enter a unique password (up to eight characters).
3. Press ENTER to accept the password and continue to the next sub-block.

After exiting the Configure JagBASIC program block the first time, you must use the password each time you reenter the program block.

Please record the password and keep it in a secure location. If the password is lost, the only way to access the JagBASIC program block again is by performing a Master Reset which will return **all** Q.iMPACT matroller configuration parameters to default values and clears the RAMDISK which stores any JagBASIC programs.

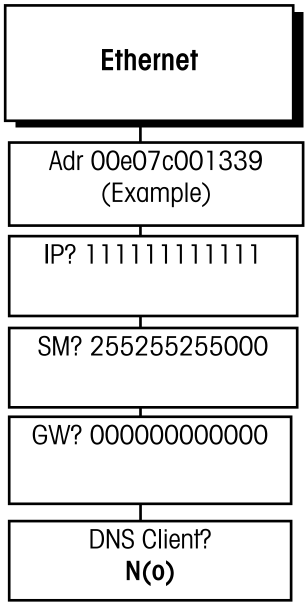
Configure Network Program Block

The Q.iMPACT matroller can be configured as a network device on a local area network (LAN). The Network Interface block lets you configure the network port and identify which matroller nodes it may access. The following diagram describes this block:



To successfully connect to a Q.iMPACT matroller and browse it via Internet Explorer (4.0 or higher only) over a network that is using a proxy server, make sure that the matroller's IP address is added to the Internet Explorer LAN connection Proxy Server Settings Exceptions list.

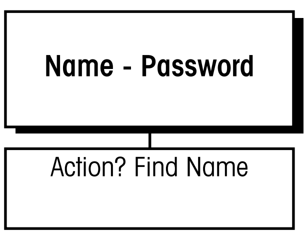
1. Ethernet Sub-block



This sub-block lets you configure the TCP/IP Ethernet Address options. To configure this sub-block:

1. Press ENTER at the **Configure Network** prompt, then press ENTER again at the **Ethernet** prompt. The display will read **Adr 00e07coo1339** (example only). This is the Ethernet MAC address entered at the factory. It cannot be modified in the field. Press ENTER.
2. The display reads **IP? 111111111111**. This is the permanent IP address that will be used for the web server and for JagBASIC access to the matroller. Enter your desired IP address and press ENTER.
3. The display reads **SM? 255255255000**. This is the IP address sub-mask. Enter your desired sub-mask and press ENTER.
4. The display reads **GW? 000000000000**. This is the gateway IP address. Enter your desired gateway address (if any) and press ENTER.

2. FTP Name-Password Sub-block



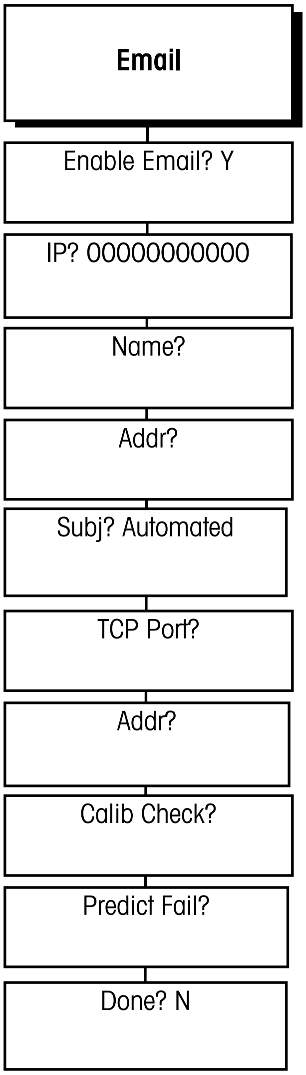
This sub-block allows you to edit a list of six name-password pairs. The name-password pairs are used to authenticate access to the Q.iMPACT matroller via the FTP server and the modem auto-answer.

1. At the **Action?Find Name** prompt, press ENTER to find an existing name-password pair or press SELECT to create a new pair.
2. If you press ENTER to find an existing name-password, the display reads **Name0 xxxxxxx**. Press ENTER. The display reads **This Name? N**
3. Press ENTER to confirm **N(o)** and return to the **Action?** prompt. Or, press SELECT for **Y(es)** then ENTER to edit this name.
4. If you selected to change the name, the display will read **Action? Change**. Press ENTER. The display will read **Pswd? Xxxxxxxxx**. Enter the new password here.

3. PC Data Access

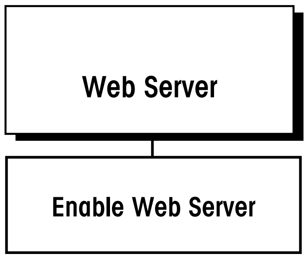
Press ENTER to enter the PC Data Access sub-block. At the **Host Node?_Y** prompt, press ENTER if this matroller is to be the host or press SELECT then ENTER for N(o).

4. Email



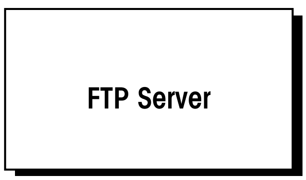
1. At the **Enable Email? Y** prompt, select **Y(es)** to enable Email Alerter, a send-only Email client. Select **N(o)** to disable and skip this section.
2. If you selected **Y(es),** press ENTER. The display will read **IP? 000000000000.** This is the IP address for the SMTP server that will forward the Email. Press ENTER.
3. The display will now read **Name?** prompt. Use the numeric keys to enter the name that will be used in the Email message "Sender" field. Press ENTER.
4. At the **Addr?** prompt, enter the Email address to use in the Email "Sender's Email Address" field. The Q.iMPACT matroller cannot accept return Email. However, entering this address is useful for identifying the sending machine. Press ENTER.
5. At the **Subj? Automated** prompt, enter the string to use in the Email message "Subject" field. Press ENTER.
6. The display will read **TCP Port?** Choose the TCP port number for sending the Email. Press ENTER. The display will read **Email Recip? 1.** Up to six (6) recipients can be specified for the Email message. Each recipient has a separate configuration for Email generated from this Q.iMPACT matroller. Select a recipient number (1-6) here.
7. The display will read **Addr?.** Enter the Email address for the recipient number selected in the previous step. Press ENTER.
8. The display will read **Calib Check?** Press ENTER to select **N(o)** and disable Email transmission for all calibration check failures for this recipient. Press SELECT then ENTER to select **Y(es)** and send Email for all configured alerts to this recipient.
9. The display reads **Predict Fail?** Press ENTER to select **N(o)** and disable Email transmission for all predictive failure conditions for this recipient. Press SELECT then ENTER to choose **Y(es)** and send an Email for all predictive failure conditions for this recipient.
10. The display reads **Done? N** Press ENTER to select **N(o)** and loop back to ask for another recipient. Press SELECT then ENTER to choose **Y(es)** and exit this section.

5. Web Server Sub-block



1. At the **Web Server** display, press ENTER.
2. The display will read **Enable Web Ser? Y** Press ENTER to select **Y(es)** and enable remote access via the embedded web server. Or, press SELECT then ENTER to choose **N(o)** and disable the web server. Press ENTER to move to the next sub-block.

6. FTP Server Sub-block



At the **Enable FTP Ser?** prompt, select **Y(es)** to enable remote file transfer access via the embedded FTP Server. Select **N(o)** to disable the FTP server.

7. PLC SP Control Sub-block

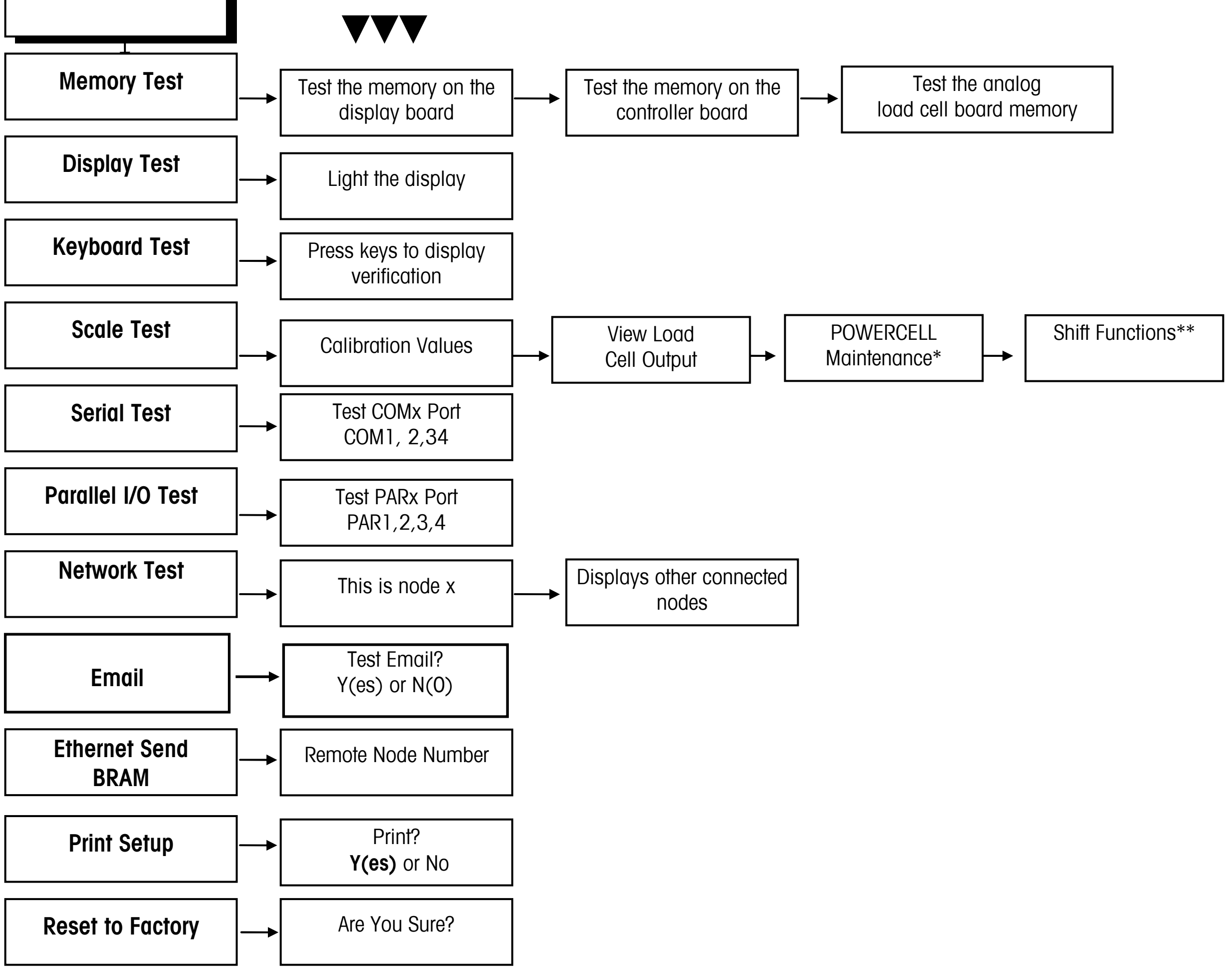
The PLC SP Control sub-block is used to let the PLC control setpoints. To configure the sub-block:

1. Press ENTER at the **PLC SP Control** prompt.
2. Select **Y(es)** to control setpoints through the PLC option (in either a local or remote matroller). Select **N(o)** if no control.
3. Press ENTER to continue to the next sub-block or ESC to exit the setup mode.
4. For Qi and HOST controller functionality leave this setting on NO

Configure Diagnostics Program Block

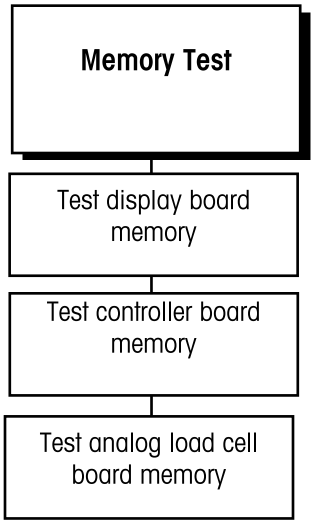
Every Q.iMPACT matroller can perform a series of diagnostic tests. The tests are done through this block while you are in the setup mode. The following diagram describes this block:

Diagnostics



*If scale type POWERCELL (RAAD Box) is selected. **If scale type POWERCELL (RAAD box) is selected.

1. Memory Test Sub-block

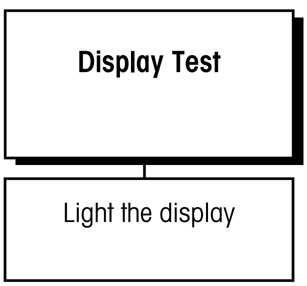


The Memory Test sub-block tests the matroller's internal memory. These diagnostics test the Flash memory, RAM, and EEPROM on the Controller board and any optional boards that are installed. The results of the memory tests are displayed on the matroller.

To execute the memory tests:

1. Press ENTER at the **Memory Test** prompt. The Q.iMPACT matroller automatically tests the Controller board, and proceeds to any optional boards that are installed. The matroller flashes the software revision and part number of the component currently being tested and its status.
2. As the tests are complete, the matroller flashes the results on the lower display.
3. Continue to the next sub-block or exit the setup mode.

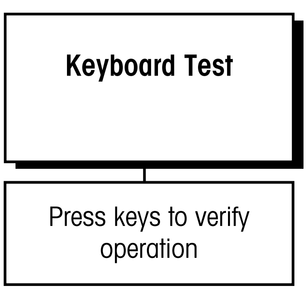
2. Display Test Sub-block



This sub-block tests the upper and lower display areas of the matroller and tests display ROM and RAM.

1. Press ENTER at the **Display Test** prompt to initiate the display test. The matroller automatically tests the display by lighting each segment. The matroller then displays the software revision and part number, tests display ROM and RAM, and flashes the results on the lower display.
2. When the test is finished, continue to the next sub-block or exit setup.

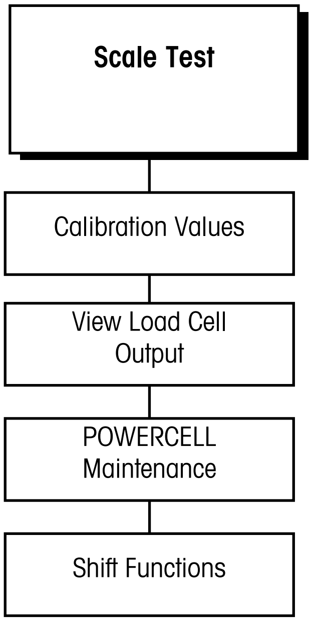
3. Keyboard Test Sub-block



The keyboard test verifies the operation of each key on the Q.iMPACT matroller keypad or an externally connected PC/2 keyboard.

1. Press ENTER at the **Keyboard Test** prompt to initiate the test. You can press ESC to exit the keyboard test.
2. Press each key on the Q.iMPACT matroller keyboard or PC keyboard if attached. If the depressed key works, the key name is displayed. If the depressed key does not work, the matroller does not respond.
3. For example, to test the MEMORY key, press MEMORY on the keypad. If it works properly, the display reads **Memory**. If it is inoperative, the display remains blank.
4. Repeat step 2 to test as many keys as you like.
5. When finished, exit the keyboard test by pressing ESC.

4. Scale Test Sub-block



This sub-block holds several scale operation and calibration parameters that were used when you calibrated the scale through the Scale Interface program block. You can use this sub-block to:

- View and record calibration values.
- Reenter the values quickly when you replace the load cell, or if the load cell fails.
- Verify the IDENTCODE value and software version of a connected IDNET base.

If you need to re-enter calibration values due to a failure, this program block lets you get the scale back into operation. You may experience error in linearity or zero reference up to 2% until the scale is recalibrated.

If the scale type is POWERCELL (or RAAD box), the scale test sub-block lets you address each individual POWERCELL or RAAD box at the time of installation and configuration, or you can re-address POWERCELLs or RAAD boxes if necessary.

POWERCELL Bases or RAAD Box

If the scale type is POWERCELL (or RAAD Box), the scale test sub-block lets you reset the shift value.

1. Press ENTER at the **Scale Test** prompt.
2. Press ENTER at the **Cal Values** prompt, then view or enter new calibration values for the following:

   ZeroCnts—View/enter the zero reference number at gross zero.

   If linearity correction is disabled:

   - **HighWt**—is the test weight used for calibration
   - **HighCnts**—is the analog count at the high weight

   If linearity correction is enabled:

   - **MidWt—**is the test weight used for mid weight during calibration
   - **MidCnts—**is the analog count at mid weight
   - **HighWt—**is the test weight used for calibration
   - **HighCnts—**is the analog count at the high weight
   - **Cell 01-4—**For CMOS POWERCELL or RAAD box applications, the prompt may read Cells 1-24 for scale 1, 31-35 for scale 2, 61-89 for scale 3 or 91-124 for scale 4,depending on the number of scales and the number of cells in each scale.

Note: The **PwrCell Maint.** prompt appears only if POWERCELL is selected as the scale type. Choose POWERCELL if you will be using RAAD boxes.

The re-address feature lets you address CMOS POWERCELLs or RAAD boxes when you install a new scale.

3. Press ENTER at the **View LC Output** prompt to view the output count of the Analog PCB. For POWERCELL or RAAD box scales, you can view each load cell individually.
4. Press ENTER at the **Cell Counts** prompt to view the raw count data. The Cell Counts feature is useful for observing scale output for slow drift, shift adjustment, or for locating an unstable load cell.
5. Press ENTER at the **PwrCell Maint.** prompt, then select the maintenance procedure to perform. POWERCELL (or RAAD box) maintenance options include Re-Address Cell, Diagnose Cell, AutoAddress Cell, and Address All 240.

If Re-Address Cell is Selected

1. Press ENTER at the **Re-Address Cell** prompt. The matroller disconnects power to the POWERCELL or RAAD box and displays **Power Now Off.**
2. With the power disconnected to the POWERCELL or RAAD box, connect the first cell to be addressed (cell 1 for a single scale configuration, cell 31 for a second scale, cell 61 for a third scale or cell 91 for a fourth scale). NOTE: No cells other than the POWERCELL or RAAD box to be addressed should be connected at this time.

3. Press ENTER at the **Power Now Off** prompt when the cell is connected.
4. At the **What Addrs? 0** prompt, use the numeric keys to enter the first cell's address. Enter 1 for a single scale configuration or 31 for the first cell in a second scale. While the cell address is being changed, the display will show **Addressing X**, where X is the cell address which has been entered. When the matroller has re-addressed the POWERCELL or RAAD box, it displays the message "Addressed OK." When you press ENTER, the matroller re-displays the message **Power Now Off**.
5. At the **Power Now Off** prompt, disconnect the first cell, then connect the second cell to be addressed.
6. Repeat this procedure to address or re-address each POWERCELL or RAAD box. When all cells have been addressed and with the **Power Now Off** message displayed, reconnect all cells.

If Diagnose Cell is Selected

1. Press ENTER at the **Diagnose Cell** prompt. The Q.iMPACT matroller disconnects power to the POWERCELL or RAAD box and displays the message **Power Now Off.**
2. With the power disconnected to the POWERCELL or RAAD box, connect the first cell to be diagnosed (cell 1 for a single scale configuration or cell 31 for a second scale). No cells other than the POWERCELL or the RAAD box to be diagnosed should be connected at this time.
3. Press ENTER at the **Power Now Off** prompt when the cell is connected. The matroller will search for the cell and confirm its correct address with the message **Address=address found**. An error message appears if the cell address is not correct. The matroller displays cell counts on the upper display. When the cell is diagnosed, the matroller re-displays the message **Power Now Off**.
4. At the **Power Now Off** prompt, disconnect the first cell then connect the second cell to be diagnosed.
5. Repeat for each POWERCELL or RAAD box. When all cells have been diagnosed and with the **Power Now Off** message displayed, reconnect all cells.

If AutoAddressing POWERCELLs (or RAAD Boxes) is Selected

The AutoAddressing Menu Selection helps you to address RAAD boxes or the POWERCELLs in a new POWERCELL scale or to replace a single POWERCELL in an existing POWERCELL scale. AutoAddressing searches POWERCELL or RAAD box addresses in the network, finds the first missing address in the addressing sequence, and readdresses a POWERCELL or RAAD box with address #240 to the missing address. You can have only one POWERCELL or RAAD box with address #240 on-line at a time. New POWERCELLs or RAAD boxes have address #240.

The beginning of the searching sequence for a POWERCELL scale or RAAD box is address #1 or #31, whichever is the starting address of the for RAAD boxes or the POWERCELLs in the scale. You select the starting address for the scale in the **Scale Interface, Scale Type, Loc?** menu selection.

Use the following procedure to address the RAAD boxes or the POWERCELLs in a new POWERCELL scale:

1. Press ENTER at the **AutoAddress** prompt. The matroller turns off the electrical power to the network and displays the message "**Power Now Off**."
2. Connect POWERCELL #1 (or RAAD box #1) to the network. It must have default address #240.
3. Press ENTER. The matroller displays the message "**Searching...**" while it is searching for the first missing cell. Once it finds #1 is the missing cell, the matroller displays "**Addressing 1**." When it completes addressing the cell, the matroller displays "**Addressed OK**."

Note: Do not disconnect POWERCELLs or RAAD boxes that you have already addressed.

4. Press ENTER. The matroller turns off the network and displays "**Power Now Off**."
5. Connect the next POWERCELL or RAAD box, #N, to the network. #N represents the sequence of cell addresses #2, #3, #4 up to all cells in the scale. #N must have default address #240.
6. Press ENTER. The matroller displays the message **"Searching..."** while it is searching for the first missing cell. Once it finds that #N is the missing cell, the matroller displays "**Addressing N**." When it completes addressing the cell, the matroller displays "**Addressed OK**."
7. Repeat steps 5-7 until you have addressed all the POWERCELLs or RAAD boxes. If the matroller does not find any missing cells when it is doing the search in Step 7, the matroller displays "**N(o) Missing Cell!**"
8. Use the following procedure to replace a RAAD box or a POWERCELL in a POWERCELL scale:
   - Go to **Diagnostics, Scale Test, PwrCell Maint, AutoAddress** in the matroller setup menus.
   - Press ENTER. The Q.iMPACT matroller turns off the electrical power to the POWERCELL network and displays the message "**Power Now Off**".
   - Replace the POWERCELL or RAAD box, #N, in the network. #N represents the cell to be replaced. It must have default address #240. Do not disconnect the other POWERCELLs or RAAD boxes.
   - Press ENTER. The Q.iMPACT matroller displays the message "**Searching...**" while it is searching for the first missing cell. Once it finds that #N is the missing cell, the matroller displays "**Addressing N**." When it completes addressing the cell, the matroller displays "**Addressed OK**."

Note: These shift adjust functions allow you quickly reset all the shift adjust parameters or to do a quick shift adjust approximation when a single bad cell is replaced. We recommend that you go through the full shift adjust procedure in the Scale Interface Setup section.

If Address All 240 is Selected

1. When you press ENTER, the matroller displays "**Power Now Off**."
2. Connect all POWERCELLs or RAAD boxes to the network that you want to re-address to 240.
3. When you press ENTER, the matroller displays the message "**Addressing 240**." It can take a few minutes to re-address all cells depending on the number of cells and their old addresses.
4. When addressing is complete, the Q.iMPACT matroller displays "**Addressed OK**."
5. Press ENTER at the **Shift Functions** prompt to access the shift functions.
6. At the **Reset Shift** prompt, press ENTER to reset the shift adjustment factors for a POWERCELL or RAAD box (resets all to 1.0.)
7. At the **Are You Sure?** prompt, select **Y(es)** or **N(o)** to confirm or abort the reset operation.
8. Press ENTER at the **Adjust Cell/Pair** prompt to begin the POWERCELL/RAAD box adjustment procedure.
9. At the **What Cell?** prompt, enter the number of the cell or pair of cells to be adjusted.
10. At the **Empty the Scale** prompt, remove any weight on the platform, then press ENTER. The display reads **Capturing Zero** as the matroller captures zero.

11. At the **Load On Cell N** or **Load On Pair N** prompt, place on the platform a test weight equaling approximately 50% of the scale's capacity.

    The matroller automatically shift adjusts the scale for the current load cell as the display reads **Capturing Cell N** or **Capturing Pair N**. The single-cell shift adjust procedure described here allows you to perform a quick approximation of the shift adjust value when a single, bad cell is being replaced on the scale. A complete shift adjust is more accurate and should be used if more than one POWERCELL or RAAD box is being replaced on the scale.

12. Continue to the next sub-block or exit the setup mode.

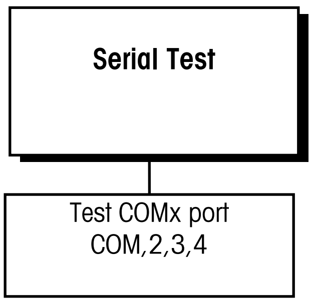
5. Flow Meter Test

CAUTION: this test should only be performed by suitable qualified personnel. Turning on the Flowmeter boards Outputs could result in field equipment activating control valves with unpredictable results.

1. At the **Tst All Chans? N** prompt, select **Y(es)** or **N(o)** to test all channels.
2. At the **Select_ F.M?** prompt, select which flow meter to test.
3. At the **Force Output? N** prompt, select **Y(es**) to force the output into a particular state or **N(o)** to turn the output off.
4. At the **K Factor?** prompt, use the alphanumeric keypad to enter the K factor. Each K factor register is used to store a meter scaling factor that is used to scale the number of input counts into an accumulated flow value.
5. At the **M Factor?** prompt, use the alphanumeric keypad to enter the M factor. Each M factor register is used to store a meter calibration value that is used to scale the accumulated flow value and optionally the rate value.
6. At the **R Factor?** prompt, use the alphanumeric keypad to enter the R factor. Each R factor register is used to store a rate scaling factor that is used to scale the count frequency before it is stored in the rate register.
7. At the **Preset?** prompt, use the alphanumeric keypad to enter the preset register. Each preset register is used to store the flow meter preset value.
8. At the **Limit?** prompt, use the alphanumeric keypad to enter the limit register value at which the counter will stop counting
9. At the **Rate Limit?** use the alphanumeric keypad to enter the rate limit. Each rate limit register is used to store the maximum expected rate. When the value in the rate register is greater than or equal to the value in this register, the "max rate" flag is set in the status register.
10. At the **Rate Mode?** prompt, select:
    - **Inst** (instantaneous mode. Instantaneous mode measures the time between consecutive input pulses on a channel. Instant measurements are fast, in that they calculate a flow rate based on one cycle.
    - **1 Hz** averaging mode. The 1 Hz averaging mode counts the number of input transitions over a 1 second interval and calculates the flow rate based on the this count. The average mode is slow, in that it reports updated flow rates once per two seconds.
11. At the **Polarity? On** prompt, press ENTER for polarity ON or use the SELECT key to choose OFF. This bit controls whether the output for a channel is on or off while counting from the preset value to the limit value. Turn the output on when the value in the accumulated flow register is at the preset value or between the preset value and the limit value and off when the value in the accumulated flow register is at or beyond the limit value. Turn output off when the value in the accumulated flow register is at the preset value or between the preset value and the limit value and on when the value in the accumulated flow register is at or beyond the limit value.

12. At the **Stop on Limit? N**, press ENTER for **N(o)** or SELECT then ENTER for **Y(es)** to determine whether or not the counter stops counting when the accumulated flow register value reaches the limit register value.
13. At the **Start Test?** prompt, if you select **Y(es), WARNING** will flash on the display, followed by the prompt **Are You Sure?** Select **N(o)** to move on to the Serial Test sub-block.

6. Serial Test Sub-block

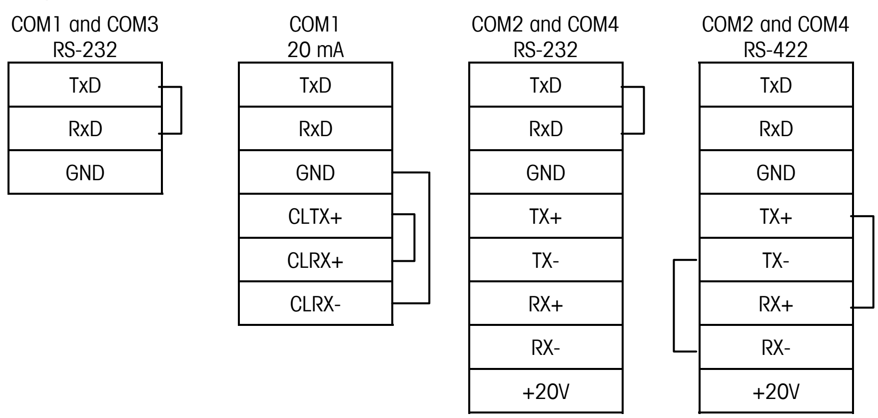


The Serial Test sub-block tests the serial I/O ports. You can transmit a test string of data to a designated port, or receive a string of input data. The input data scrolls across the lower display as received. You may see special characters representing control characters in the test string.

1. Press ENTER at the **Serial Test** prompt to test serial ports.
2. At the **Test COM Port?** prompt, press SELECT to choose the serial port you wish to test (COM1 or COM2).
3. You can test only COM ports that are physically available on your Q.iMPACT matroller. You cannot test remotely located ports.
4. The lower display reads **Testing COMx:** until a serial input is received. When input is received, the characters are displayed in the lower display. The matroller is constantly outputting the string **Testing COMx: NN** where x is the COM port number and NN is a transmission number beginning at 00 and counting through 99.

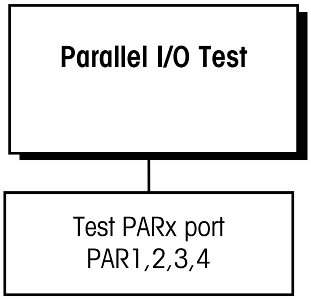
If a jumper wire is placed between the transmit and receive matrollers on the serial port being tested, you can test both the input and output of a port and view the string of data being transmitted on the lower display.

The following diagram shows how to connect the output to the input for both serial ports and all types of communication.



1. Press ESC to exit the serial test when you are finished.
2. Repeat steps 2 and 3 to test additional COM ports.
3. Continue to the next sub-block or exit the setup mode.

6. Parallel I/O Test Sub-block



Note: PN 082523020 LED/SWITCH simulator is available for testing PAR 1/PAR 2.

The Parallel I/O Test sub-block tests the discrete I/O ports. The test can "turn on" each output and monitors inputs. Refer to the appendix for more information.

1. When you enter the Parallel I/O test, the **!WARNING!** message is flashed on the display four times. The prompt **"Are You Sure?"** is displayed. Select **Y(es)** to continue or **N(o)** to exit the test.
2. At the **Test Par Port** prompt, select the desired port to test. The matroller only offers parallel ports that are physically available on your Q.iMPACT matroller.

⚠ WARNING!

THIS TEST ALLOWS YOU TO TURN THE OUTPUTS ON AND OFF FROM THE MATROLLER KEYBOARD. IT IS UNRELATED TO THE WEIGHT. IF ELECTRICAL EQUIPMENT IS CONNECTED TO THE OUTPUT OF THE Q.IMPACT MATROLLER DURING THIS TEST, IT MAY START AUTOMATICALLY. TAKE ALL APPROPRIATE PRECAUTIONS TO PREVENT PERSONAL INJURY DURING THIS TEST. METTLER TOLEDO SUGGESTS UNPLUGGING THE DISCRETE I/O CONNECTOR FROM THE MATROLLER AND USING LEDS OR A VOLT METER TO VERIFY CORRECT OPERATION OF THESE OUTPUTS.

PAR 1 or PAR 3 (Discrete Input)

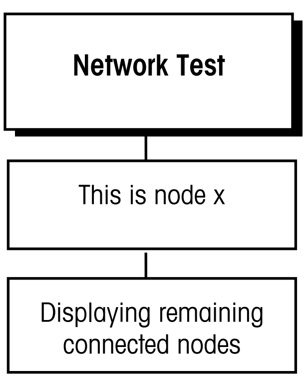
The display will read **PAR 1 = FFFF** or **PAR 3 = FFFFFFFF** indicating that the four or eight discrete inputs are all false or "OFF". When one of the inputs is held to logic ground for 100 ms or longer, the **F** will change to a **T** to indicate a true or "ON" condition. When done, press ESC to exit the test routine for the discrete inputs.

PAR 2 or PAR 4 (Discrete Output)

The display will read **PAR 2 = 0000** or **PAR 4 = 00000000** indicating that the 4 or 8 setpoint outputs are all logic 0 or "OFF". The first digit will blink, indicating that output 1 is the active output to be changed for test.

1. To turn this output on, press the "1" key. Pressing "0" returns the output to the "OFF" condition. To move to the next output (output 2), press SELECT. The second digit now blinks. Each setpoint output can be turned "ON" or "OFF".
2. Press ESC to exit the test routine for the discrete outputs.
3. Press ESC to exit the parallel I/O test and continue to the next sub-block, or exit the setup mode.

7. Network Test Sub-block

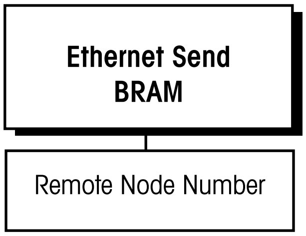


This sub-block tests the network connections. The test is done by first displaying the number of the local matroller, then requesting and receiving the node number and type of all other active nodes on the network.

1. Press ENTER at the **Network Test** prompt. The matroller automatically acquires the local network connection information. Connection information is displayed in the lower display area.

   This is node x refers to the local matroller being tested.
2. **Node x Connected** where "x" is the address of the next matroller in the network. This process continues until all active nodes in the cluster have been identified, then the display sequence starts over again.
3. To end the test, press ESC. Continue to the next sub-block or exit the setup mode.

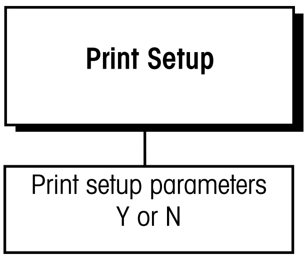
8. Ethernet Send BRAM Sub-block



This sub-block allows you to send the Shared Data BRAM parameters from one matroller to another over the Ethernet LAN. You can setup the BRAM parameters on one matroller and duplicate them on another. Scale calibration parameters are NOT sent.

1. Press ENTER at the **Ethernet Send BRAM** prompt.
2. Select the appropriate node and press ENTER.

9. Print Setup Sub-block



Note: If METTLER TOLEDO model 8857 is used at 9600 baud, connect both TXD and RXD lines. Configure the port for XON/XOFF operation.

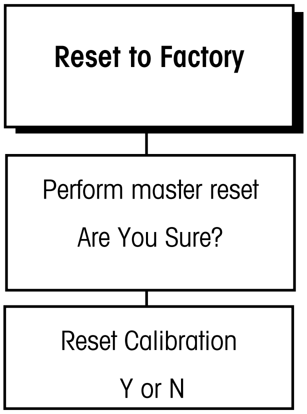
The Print Setup sub-block prints the matroller setup information as it is defined in the program blocks. It may be useful to have a hard copy of each matroller's setup parameters as back-up. Print setup data will be sent out the port that has been selected for demand output. If a network port has been selected, the data is sent through it.

1. Press ENTER at the **Print Setup** prompt. Press ENTER again at the **Print?** prompt if you wish to print the setup parameters as defined in the program blocks for this matroller. If you do not want to print the setup, press ESC.

   Setup data is printed in a 40-column format that is compatible with the METTLER TOLEDO 8857 Strip Printer. A standard 80-column printer will also work. Label printers are not acceptable devices for printing this information since there are many lines of data.

Press ENTER at the **Reset to Factory** prompt to continue or exit setup.

11. Reset to Factory Sub-block



Note: Reset to Factory clears the RAM Disk! YOU WILL LOSE ALL JagBASIC PROGRAMS AND DATA FILES.

The Reset to Factory sub-block in this program block differs from other blocks. Because this program block has no unique parameters to set, Reset to Factory performs a master reset which returns all of the parameters for all blocks to their original settings.

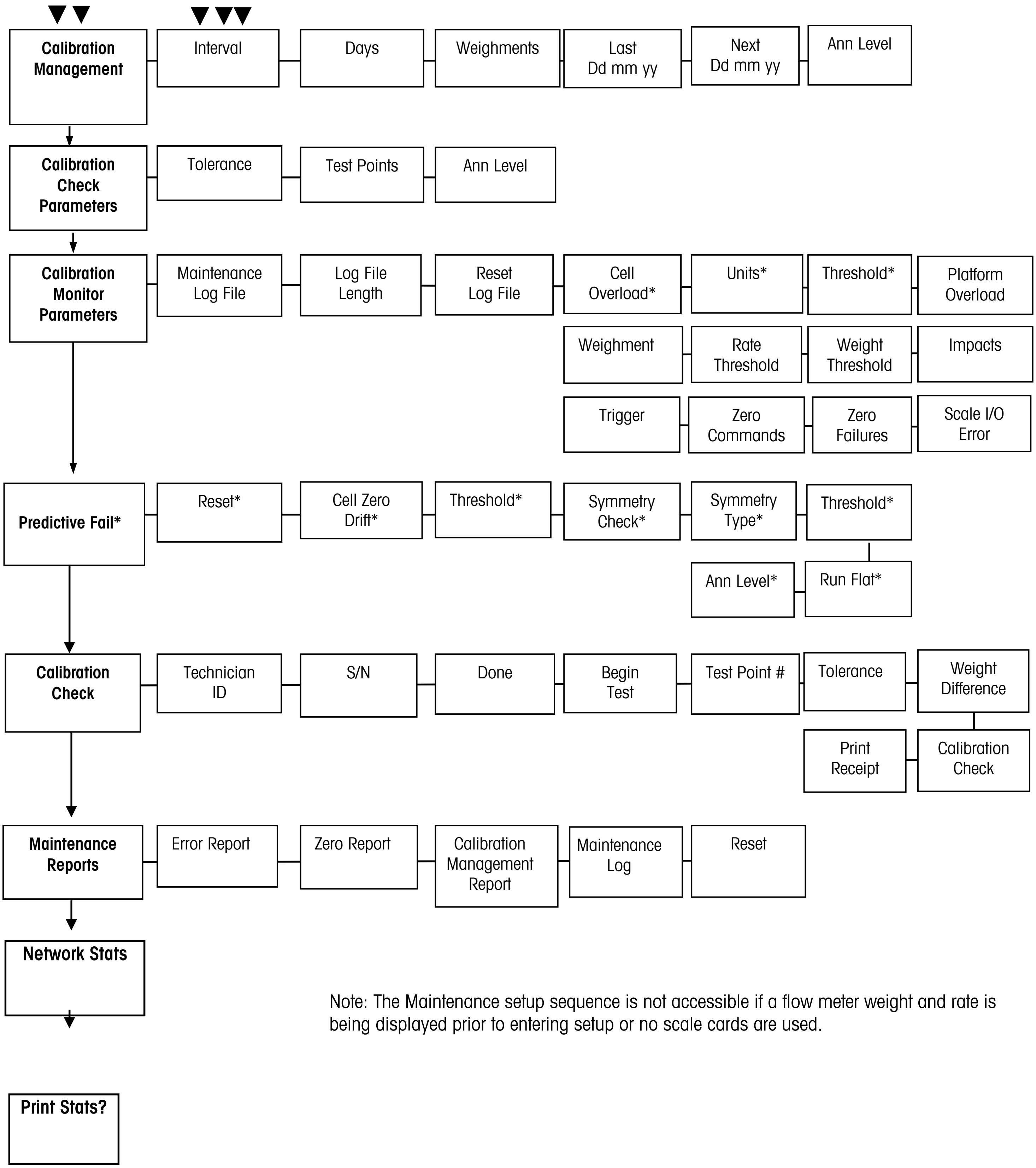
To perform a master reset:

1. Press ENTER at the **Reset to Factory** prompt.
2. Select **Y(es)** at the **Are You Sure?** prompt to confirm your intention to reset. Or, select **N(o)** to exit without resetting all parameters.

   If **Y(es),** at the **Reset Calib?** prompt select **N(o)** to reset all parameters except calibration or **Y(es)** to reset all parameters including the scale calibration parameters.

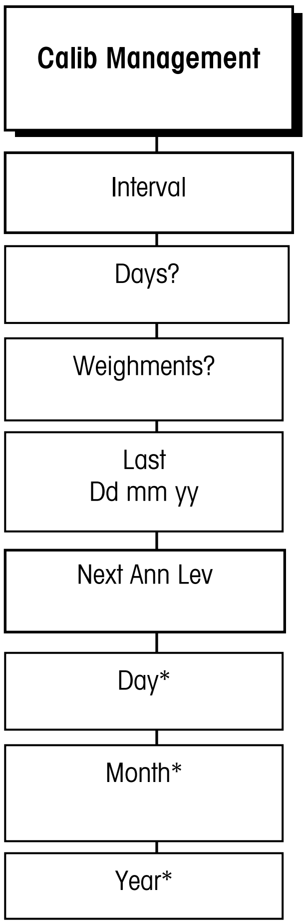
   If you choose to reset the calibration values, the current scale capacity, increment size, and span and zero values will all be lost and scale recalibration will be required. The matroller displays **Performing Reset** and all parameters are returned to factory settings.
3. After resetting, the Q.iMPACT matroller will perform its normal power-up sequence.

Configure Maintenance Program Block



Note: The Maintenance setup sequence is not accessible if a flow meter weight and rate is being displayed prior to entering setup or no scale cards are used.

1. Calibration Management Sub-block

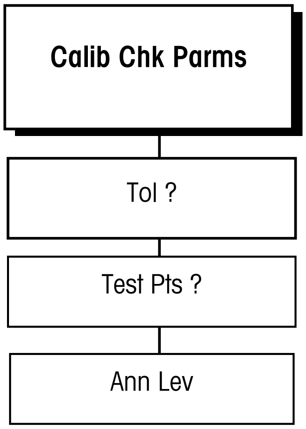


*Appear only if there is valid late date.

The Calibration Management sub-block section enables users to specify the calibration checking interval (by time or use) that the matroller will use to notify the user that the scale needs to be checked and verified with test weights. (A calibration test weight check is manually performed on the complete weighing system to determine accuracy). The matroller has incorporated the calibration test weight check into its operating system under the "Calibration Check" sub-block to assist the user through the calibration test. The parameters below specify the interval or when the test is to be performed.

1. Press **ENTER** at the **Interval** prompt to specify how often the scale will require calibration checking. The checking interval can be expressed in days of use, number of weighments, or both.
2. At **Days?** enter the number of days allowed between calibration checks (0-999).
3. At the **Weighments?** prompt, enter the number of weighments between calibration checks (0-99999).
4. The **Last dd mm yyyy** prompt shows the last date of the last calibration check. If the date comes up as dashes, then the next series of prompts will ask the user to enter the date of the last calibration check. (Day, Month, Year)
5. The **Next dd mm yyyy** prompt shows the date of the next calibration check (based on date of last calibration and number of days allowed between calibration).
6. At the **Ann Lev?** prompt, use the **SELECT** key to choose the action to be performed when the calibration interval has expired.
   - **Alarm** (alarm displayed on lower display)
   - **Log only** (alarm displayed on lower display and recorded in log file)
   - **Disable Scale** (alarm displayed on lower display and scale disabled)
   - **Email** (alarm displayed on lower display and Email sent)
7. Press **ENTER** to continue to the next sub-block or **ESC** to exit setup.

2. Calib Chk Parms Sub-block



The Calibration Check Parameters sub-block enables you to specify the test parameters (default tolerance, number of test weight checks and alarm level) used in the calibration check procedure. The user will enter the number of test points and the starting value of the tolerance permitted between the test weight and the weight displayed on the scale.

1. Press ENTER at the **Calib Chk Parms** prompt to configure this sub-block.
2. At the **Tol ?** prompt, enter the calibration check tolerance in weighing units.
3. At the **Test Pts ?** prompt, enter the number of test points to be used for the calibration check (0-99).
4. At the **Ann Lev?** prompt use the SELECT keys to choose the announcement level action to be performed when the calibration interval has expired.
   - **Alarm** (alarm displayed on lower display)
   - **Log only** (alarm displayed on lower display and recorded in log file)
   - **Disable Scale** (alarm displayed on lower display and scale disabled)
   - **Email** (alarm displayed on lower display and Email sent)
5. Press ENTER to continue to the next sub-block or ESC to exit setup.

3. Calib Mon Parms Sub-block

This sub-block enables the user to specify equipment condition monitoring activities (cell overload, weighing platform overload, weighing platform impacts, zero drift). To ensure maximum uptime, the matroller performs equipment condition monitoring during its normal operation based on comparisons made against installer-selected thresholds configured in this sub-block. If the matroller determines that the equipment is operating outside the selected thresholds, a record will be added to the maintenance log file

1. At the **Calib Mon Parms** prompt, press ENTER to set up the calibration monitoring parameters
2. At the **Maint Log File**? prompt, select **Y(es)** to enable Maintenance Log file usage or **N(o)** to disable logging and go to the Calibrate Check sub-block.
3. At the **Log Length?** prompt, enter the number of log files record to maintain. The file is a circular buffer. When the file is full, the oldest record will be written over by the next log entry. The file can be 1-9999 records in length.
4. At the **Reset?** prompt, select **Y(es)** to reset the log file and erase any old data. You will be asked to confirm your choice with an **Are You Sure?** prompt, or select **N(o)** to not reset the log file and continue.

   Note: If a POWERCELL interface option is not installed, skip to the **Plat Ovrld** prompt.
5. At the **Cell Ovrld?** prompt, select **N(o)** to disable individual POWERCELL load cell overload monitoring and move to **Plat Ovrld?** (step 3.8). Or select:
   - **Cnt** to count individual cell overloads.
   - **Log** to log the file for each occurrence.
6. **Units?** prompt, enter how you want the load cell counts expressed. Choose:
   - load cell Counts weighing units
   - load cell Primary weighing units.
7. At the **Threshold?** prompt, enter the value of the threshold using the units selected in step 6. (0-999999)
8. At the **Plat Ovrld?** prompt, you can select:

   Cnt to count scale platform overload conditions.

   Log to count and log the file for each overload
9. At the **Impacts?** prompt, you can select:

   N(o) to disable impact load monitoring and move to step 12.

   Cnt to count impact loads.

   Log to log and count impact loads.
10. At the **WgtThres? Xxxx** prompt, enter the threshold weight in primary weight units.(0-999999)
11. At the **RateThrs**? **Xxxx** prompt by entering a rate of change threshold value in primary weight units/second.(0-999999)
12. At the **Weighment** prompt, select:

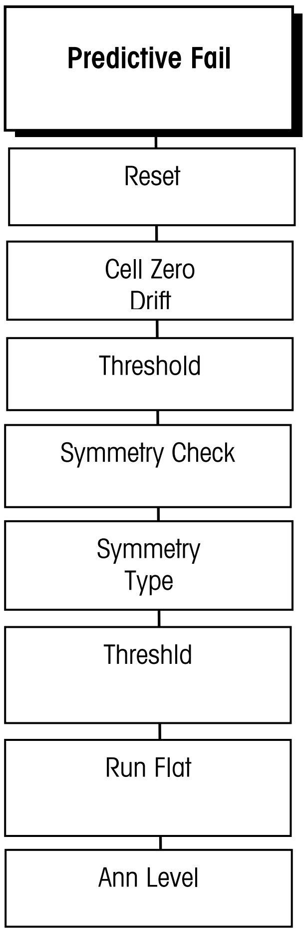
    N(o) to disable weighment monitoring and move to Zero Commands.

    Cnt to count weighments.

    Log to log and count weighments.
13. Press **ENTER**.

14. At **Trig?** prompt, you can choose:
    - **Print Cmd** to trigger the completion of a weighment when ever a PRINT is initiated
    - **UpScl WtG** to trigger the completion of a weighment when ever the gross scale weight goes above threshold
    - **UpScl WtN** to trigger the completion of a weighment when ever the net scale weight goes above threshold
    - **DwnScl WtG** to trigger the completion of a weighment when ever the gross scale goes above a threshold and below a reset threshold
    - **DwnScl WtN** to trigger the completion of a weighment when ever the net scale weight scale goes above a threshold and below a reset threshold
15. At the **Wgt Thres? X.xxx** prompt, enter the threshold weight that must be exceeded to set the trigger point defined in step 13
16. At the **Rset Thres? X.xxx** prompt, enter the threshold weight the scale must return to set the trigger point defined in step 13
17. At the **Zero Cmds?** prompt, you can select:
    - **Cnt** to count scale zero commands.
    - **Log** to log and count scale zero commands.
18. At the **Zero Fail?** prompt, you can choose:
    - **Cnt** to count scale zero command failures.
    - **Log** to log and count scale zero command failures.
19. At the **Scl I/O Err?** prompt, you can choose:
    - **Cnt** to count Scale I/O errors.
    - **Log** to count and log Scale I/O errors.

4. Predictive Failure (Only for RAAD Box and POWERCELL Platforms) Sub-block



This sub-block enables the user to configure the predictive failure algorithms and "run flat" operation. This enables the matroller to monitor and predict the operating condition of each load cell in a POWERCELL or RAAD box weighing system by comparing current operating parameters against empirical data stored in the matroller at the time of calibration. It compares the current load cell readings to the readings established when the scale was calibrated. A shift in the load cell output may indicate either current or impending load cell failure. The Q.iMPACT matroller has selectable levels of alerting the scale operator or scale technician when it detects a potential fault.

If the Q.iMPACT matroller determines that a load cell is operating out of tolerance, it can invoke the "Run Flat" algorithm to compensate for it until a replacement is made. Successful operation of the run flat algorithm requires symmetry in the installation of the load cells (pair or radial arrangement). If you are unsure of your load cell arrangement, consult you METTLER TOLEDO representative. The Q.iMPACT matroller will monitor the individual load cell ZERO DRIFT and SYMMETRY based on parameters set in this sub-block.

If a POWERCELL or RAAD box has individual load cells arranged in a logical symmetry, the Q.iMPACT scale monitoring can periodically cross-check the fitness of the individual load cells. The Q.iMPACT matroller determines the likely reading for an individual cell by using the readings from one or more cells that are symmetrical to it. If the readings do not match within a tolerance, a fault condition is likely.

Example of left-right symmetry: A railroad track scale or vehicle scale exemplifies left-right symmetry. The scale has two or more pairs of load cells. Since each cell of a pair usually sees the same loading pattern, the scale monitoring can cross-check individual readings from the pair.

Example of radial symmetry. Cylindrical tank or hopper scales often have identical net weight loading on all load cells, although they may have an off-center dead load due to the mounting of the discharge feeder machinery. This symmetry is especially true if liquid or powder materials are being weighted. The Q.iMPACT matroller can cross check readings from all the individual cells.

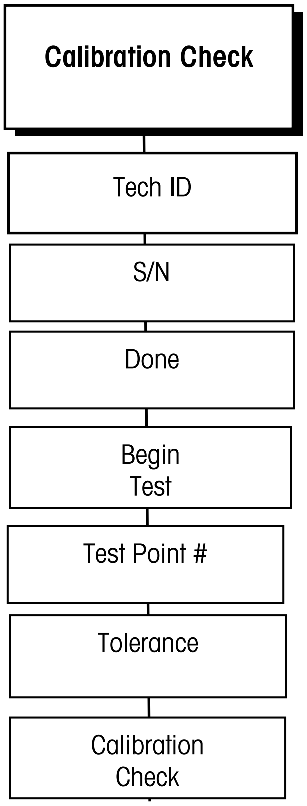
Example of no symmetry. A floor scale or an overhead monorail scale provides an example of no symmetry. A load could be placed at any location and any single cell could see all, some or none of the load. The Q.iMPACT scale monitoring cannot cross check readings form individuals cells in these scales.

1. At the **Predictive Fail** prompt, press ENTER to setup the Predictive Failure monitoring parameters
2. At the **Reset?** prompt, press **Y(es)** if you replaced the defective load cell and want to reset the predictive failure and run flat analysis. Press **N(o)** if you do not want to reset them.

If a scale periodically returns to zero, the Q.iMPACT matroller automatically tests the individual load cell readings when the scale is at zero. If the current zero reading does not match the calibrated zero values within a tolerance, it is likely there is a fault condition. However, there are many scales that cannot be verified at zero. For example, a hopper scale may accumulate material on the hopper surfaces. In store tanks, the scale may never be at zero.

3. At the **Cell Zr Drf?** prompt, the user may select:
   - **Cnt** to count individual load cell zero drifts.
   - **Log** to log and count individual load cell zero drifts
   - **No** to ignore individual load cell zero drifts.
4. If you selected **Cnt** or **Log**, the **Threshold** prompt will be displayed. At the **Threshold** prompt, enter the zero drift tolerance as a percentage of load cell span.
5. At the **Symmetry Chk?** prompt, the user may select:
   - **Cnt** to count individual load cell symmetry errors.
   - **Log** to log and count individual load cell symmetry error.
   - **No** to ignore individual load cell symmetry errors
6. At the **Symmetry Typ?** prompt, the user may select:
   - **Rad** for load cells arranged in a radial symmetry.
   - **Pair** for load cells arranged as pairs.
7. At the **Start Threshld?** prompt, the user enters the maximum acceptable deviation tolerance, in percent, that any individual load cell can be compared to the other load cells in the system.
8. At the **Diff Thres%?** prompt, enter the percentage of span in percent, the difference between symmetrical cells.
9. At the **Run Flat?** prompt, press **Y(es)** to enable the "Run Flat" algorithm; press **N(o)** to disable the "Run Flat" algorithm. If you selected **Y(es),** the display will read **Apply To Cel?**
10. At the **Ann Lev?** prompt ,use the SELECT key to choose the announcement level action to be performed when the predictive failure system detects an error.
    - **Alarm** (alarm displayed on lower display)
    - **Log** (alarm displayed on lower display and recorded in log file)
    - **Email** (alarm displayed on lower display and Email sent)
    - **Disable Scale** (alarm displayed on lower display and scale disabled)
    - **None**

5. Calibrate Check Sub-block



The Calibration Check sub-block section enables the user to perform the calibration test weight check with assistance from the Q.iMPACT matroller. The matroller will instruct the user through the test based on parameters entered in the Calibration Check Parameters section.

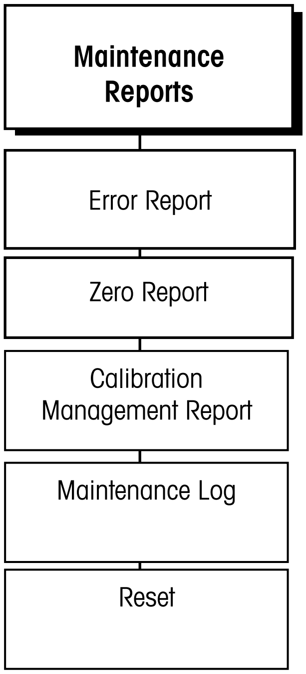
At the **Calibrate Check** prompt, you can request that the Q.iMPACT matroller check the calibration of its scale(s). Doing so here will reset the calibration management interval conditions

1. At the **Tech ID?** prompt, enter the Technician ID (1-6 characters).
2. At the **S/N?** prompt, enter the serial number for a test weight to be used (1-10 characters)
3. At the **Done?** prompt, select **Y(es)** to confirm that all test weight serial numbers entered, then proceed to step 5. Or, press **N(o)** to indicate there are more test weight serial numbers to enter. (The S/N? prompt will keep appearing until you have entered all test weight serial numbers and then pushed **Y(es**). Repeat step 3 until you have entered all test weight serial numbers.
4. At the **Begin Test?** prompt select **Y(es)** to start the test.
5. At the prompt **Tst Pt01? X.xxx** , enter the value of the 1st test weigh load. The test weight value will be displayed in order to perform a build-up test.
6. At the **Tol?** prompt, enter the tolerance.
7. At the prompt **Wt01 Dif Y.yyy**. The deviation between the entered weight and the scale reading is displayed and recorded

Note: These two steps are repeated until all test points are completed.

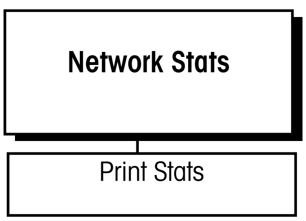
8. Upon completion, the display will show the **Calib Chk** prompt and then whether the calibration check passed or failed. Press ENTER
9. The display reads **Print Receipt?** You can select:
   - **Y(es)** to print receipt
   - **N(o)** to not print receipt

6. Maintenance Reports Sub-block



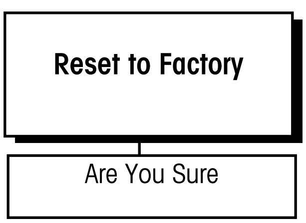
1. Press ENTER to configure this sub-block. The display reads **Error Report?** Select Y**(es)** to print the report or N**(o)** to not print it and move on to the next step.
2. The prompt reads **Zero Report?** Press **Y(es)** to print or **N(o)** to not print the calibration management report.
3. At the **Cal Mng Report?** prompt, press **Y(es)** to print or **N(o)** to not print the report.
4. At the **Maint Log?** prompt, press **Y(es)** to print or **N(o)** to not print the maintenance log report.
5. At the **Reset?** prompt, press **Y(es)** to reset the report log file and counters. You will be asked to confirm your choice at the **Are You Sure?** prompt. Press **N(o)** to not reset the report log and counters.

7. Network Stats Sub-block



1. At the **Network Stats** prompt, press ENTER to configure this block.
2. At the **Print Stats?** prompt, press **Y(es)** to print the Network Statistics report or **N(o)** to not print the report. Press ENTER.

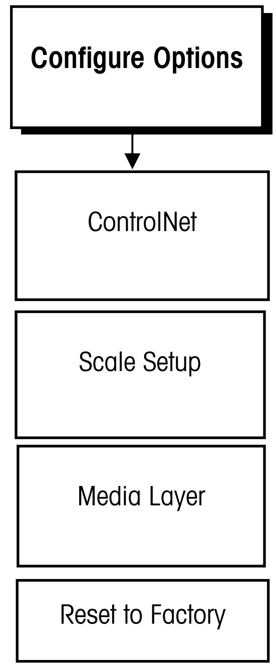
8. Reset to Factory



1. At the **Reset to Factory** prompt, select **Y(es)** to reset this block to factory default values.
2. You will be asked to confirm your choice at the **Are You Sure?** prompt. Select **N(o)** to not reset this block.

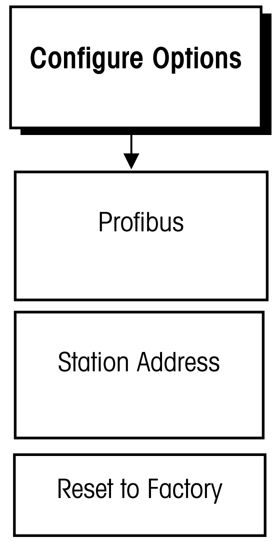
Options Program Block - ControlNet

This program block will not appear if the ControlNet option card is not installed. The following diagram describes this program block:



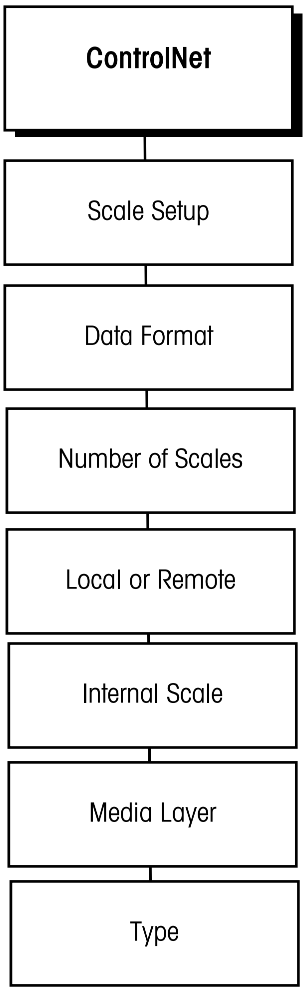
Options Program Block - Profibus

This program block will not appear if the Profibus option card is not installed. The following diagram describes this program block:



- At the Station Adr? Prompt enter the desired Profibus Node address

ControlNet



Note: Use of the ControlNet Interface Board requires familiarity with ControlNet networks. Refer to the appropriate documentation on ControlNet.

1. At the **ControlNet_** prompt, press ENTER to enter the sub-block.
2. At the **Scale Setup** prompt, press ENTER.
3. At the **Data Format? Div** prompt, select the data format. Choices are:
   - Wgt (Weight)
   - Div (increments)
   - Ext (extended weight)
   - Flt (floating point)
4. At the **Nbr of_ Scales 1** prompt, enter the number of scales (1-4). Configure each scale by making the proper selections at the prompts that follow.
5. At the **Scale 1? Local** prompt, choose local or remote.
   - **Local** refers to COM ports on the Q.iMPACT matroller you are working with at the time.
   - **Remote** refers to COM ports on other matrollers connected in an Ethernet cluster. If you choose **Remote**, you must assign the matroller node (2-6).
6. At the **Internal Scl? A** prompt, choose A, B, C, D. or E.
7. At the **Media Layer** prompt, press ENTER.
8. At the **Type? ControlNet** prompt, press enter to select **ControlNet** or press SELECT then ENTER to choose **Ethernet IP** (depending on the PLC communications.)
   - If you choose **ControlNet**, you must enter the MAC (media access control) ID for that matroller at the **MAC ID_** prompt.

NOTES

4 Using the Web Server

System Requirements

Note: The screen shots shown in this chapter do not reflect the most recent versions in the Q.iMPACT matroller and are intended for reference purposes only.

The Q.iMPACT matroller has an embedded web server, allowing you to program and calibrate a scale from anywhere within a facility – and from anywhere in the world – via the Internet. To use this feature, you must have the following:

- A connection to the matroller via modem or Ethernet with the appropriate communications protocols configured. (A crossover cable is required for a direct connection via Ethernet.)
- Internet Explorer 4.0 or higher revision.

In addition, you must:

- Disable or bypass the proxy server.
- Enable cookies and active scripting.
- Specify the address to bypass the proxy for the Q.iMPACT matroller. If you are unsure about these settings consult with your network administrator.
- Type in the IP address in the URL window and push ENTER to connect to the Q.iMPACT matroller. An example looks like this: http://172.18.55.136. Make sure the Q.iMPACT matroller has a unique IP address.

NOTE: Do not use any leading zeroes in an IP address.

You can test the communications by pinging the Q.iMPACT matroller. From any Windows based PC:

- Go to start, programs, MS-DOS prompt
- Type ping xxx.xxx.xxx.xxx (where x's denote the IP address)
- The device should return 4 replies with no timeout.

If the ping times out, verify that the proper cable is being used by consulting the networking overview section of this manual.

You may find it helpful to review Chapter 3 of this manual to better understand the various program blocks and options for configuring the scale. More in-depth information on networking is provided in the appendix.

Setup

CAUTION!
Entering Program mode will disrupt any process.

Setup (program mode) can be accessed from the HTML (web) pages by clicking on the "PROGRAM MODE" button on the left side of the screen. However, entering setup in the HTML pages can only be accomplished if the JagBASIC program is stopped.

A series of screens will guide you through the setup procedure. You should review the information in this chapter prior to going through the setup procedures.

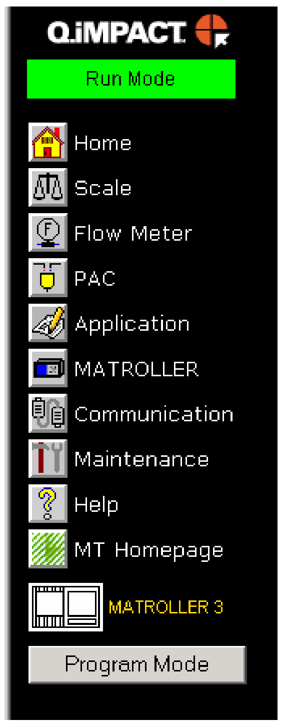
Operating Modes

Run Mode is the standard operating mode. You cannot make changes to the Q.iMPACT matroller's setup in this mode. To change modes, simply click on the mode wish to use. The active mode will appear at the top of the navigation bar. (See the illustration on the next page under Navigation Bar.)

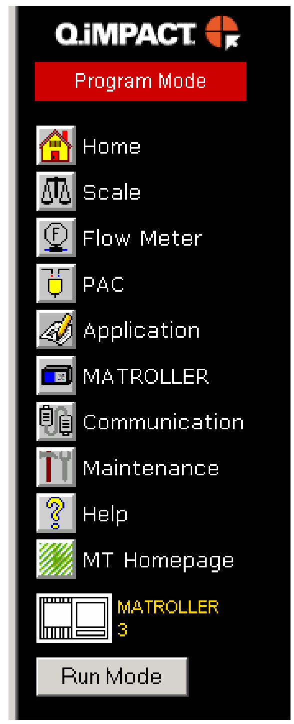
Program Mode enables you to make changes to the Q.iMPACT matroller's setup.

Navigation Bar Menu

All Q.iMPACT web pages include a navigation bar at the left side of the screen (see below). The information on the following pages describes the various icons that appear in the navigation bar. Clicking on them will you lead you to the various screens that will guide you through the setup and configuration processes. Descriptions of each menu item can also be found by clicking on the **Help** icon.



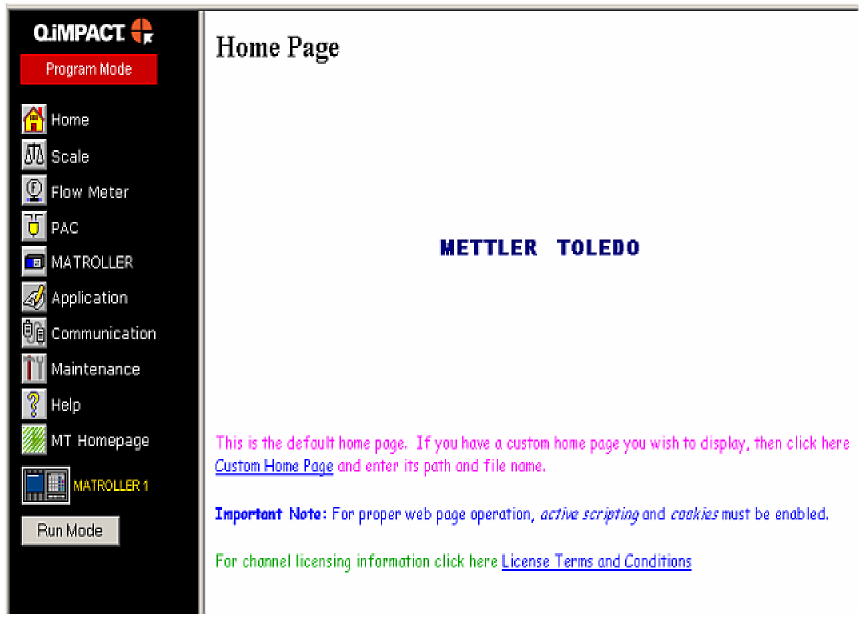
Navigation bar shown with Q.iMPACT matroller in Run mode.



Navigation bar shown with Q.iMPACT matroller in Program mode.

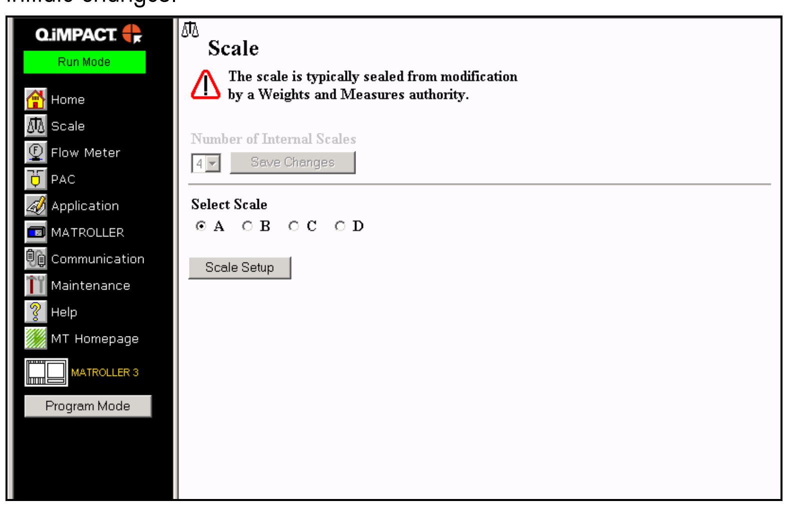
Home

This is the default home page that is displayed when you connect to the matroller via an Internet browser. Clicking on the **Home** icon in the Navigation Bar at any time will take you back to this screen. The default home page can be changed by clicking on the **Custom Home Page** link.

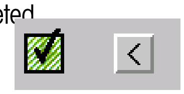


Scale

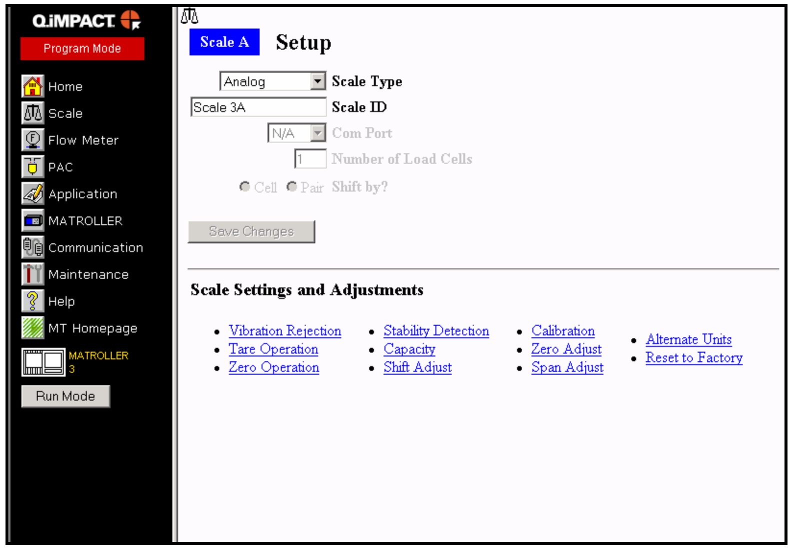
Clicking on the **Scale** icon takes you to the scale setup screen. While in **Run Mode**, all information is read-only. While in **Program Mode**, Read-Write access is allowed. This section can be changed on the fly but will reset the matroller to initiate changes.



Clicking on the **Scale Setup** button takes you to the following screen. Set the parameters for the scale settings and adjustments. Click on **Save Changes** after setting up each step. A screen will appear with these symbols to denote that the step has been completed.

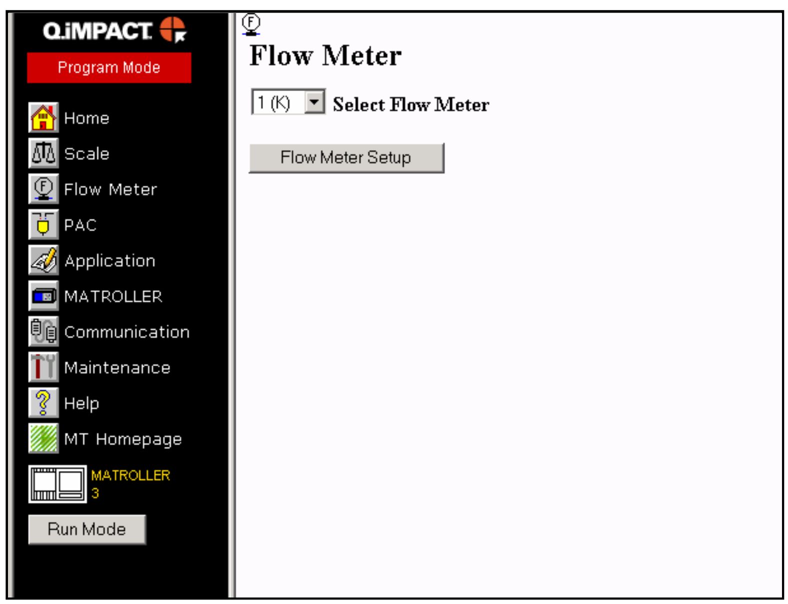


Click on the Next arrow button to go to the next step.

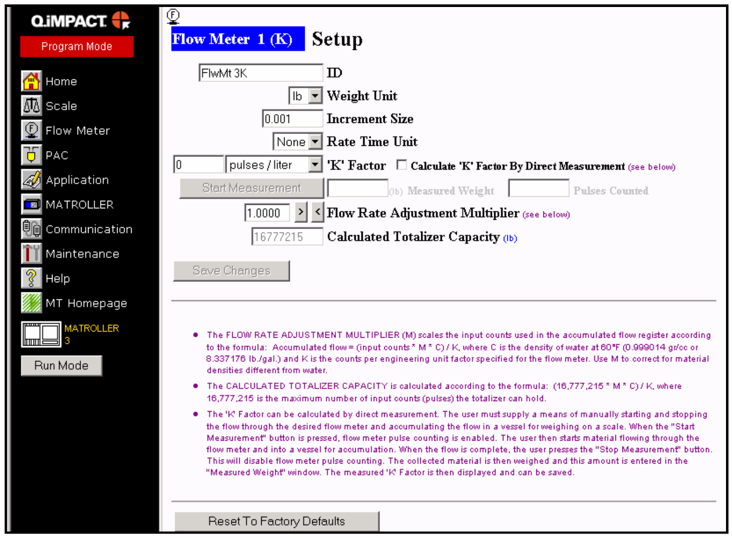


Flow Meter

Click on the Flow Meter icon to go to the flow meter page. Select the flow meter for which you need to set the parameters and then click on the Flow Meter Setup button.



Additional information on Flowmeter setup in chapter 5.5



Fill in the weight unit, increment size, rate time unit, "K" factor, and the flow rate adjustment multiplier.

The flow rate adjustment multiplier (M) scales the input counts used in the accumulated flow register according to the formula: Accumulated flow = (input counts * M * C) / K, where C is the density of water at 60°F (0.999014 gr/cc or 8.337176 lb./gal.) and K is the counts per engineering unit factor specified for the flow meter. Use M to correct for material densities different from water.

The calculated totalizer capacity is calculated according to the formula: (16,777,215 * M * C) / K, where 16,777,215 is the maximum number of input counts (pulses) the totalizer can hold.

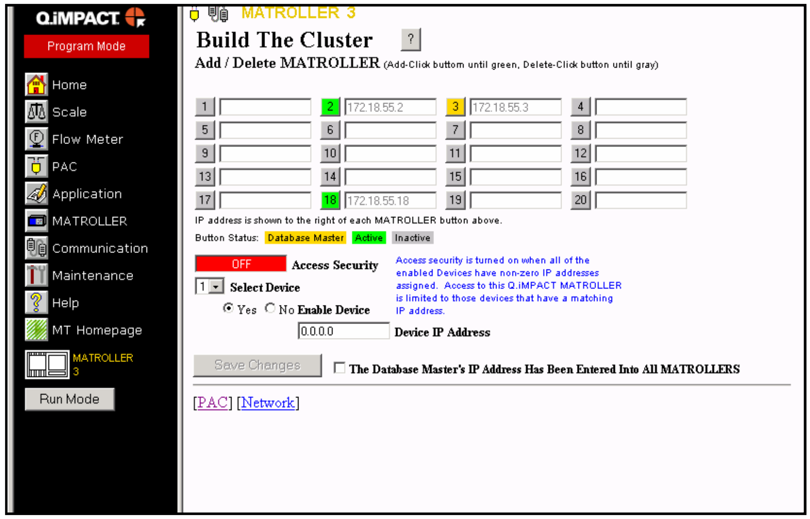
PAC

Click on the PAC icon to go to the Predictive Adaptive Control page where you can setup the PAC functionality.

When using this screen, you will have access to help files to prompt you through the various steps as needed. Click on the "?" tO access the help files.

Building a Cluster - !! Cluster building NOT applicable to Qi Lite

To begin the process, you must build a cluster. Click on the Build The Cluster link.



!NOTE: All Matrollers in the Cluster MUST have a unique matroller number between 1 and 20. See Matroller section following

Determine how many matrollers you will have in a cluster. There may be up to 20 Q.iMPACT matrollers, 200 instruments, and 1000 material-paths in a Q.iMPACT cluster. In determining the type of cluster with which you will be working, note the following definitions:

- **Units** are tanks or vessels that hold the materials.
- **Instruments** are scales and flow meters that measure the movement of material between the Units. Each instrument has a discrete output that is the "Final Control Element" (FCE) for turning on and off the material flow in a flow path.
- A **material-path** identifies the unique combination of a material and a flow path along which the material moves. Scale-type instruments generally have multiple material-paths associated with them. Flow meter-type instruments general have a single material-path.

Assigning Unique IP Addresses for Each Matroller

Each matroller is assigned a unique IP address along with a subnet mask and gateway address that meets the configuration of the LAN (local area network). You may do this through the keypad on the matroller itself or via the web pages. (You must change the default numbers that currently exist.) Once you have assigned the IP address, an automatic reset of the matroller occurs.

To build a cluster, you must:

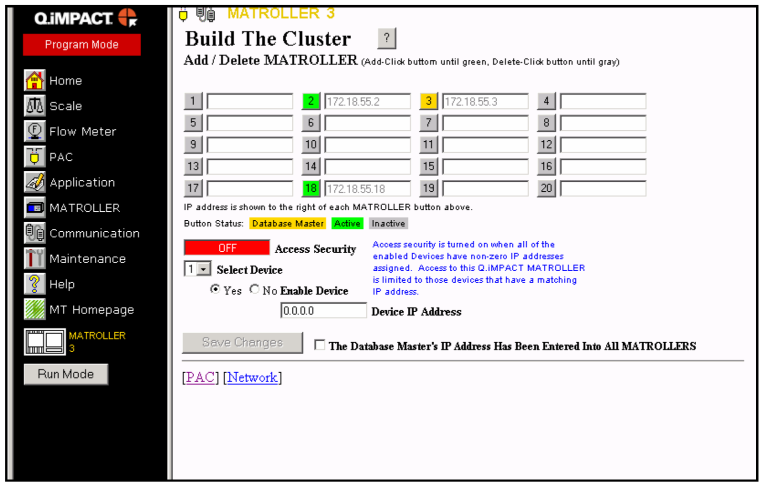
- Select which matroller will be assigned as the Database Master. This matroller contains all of the Q.i shared data parameters. It is also responsible for distributing all of the Q.i parameters to the other matrollers in the cluster. This choice is completely arbitrary. Any matroller can serve in this capacity.
- Connect to that matroller with the Web browser and place it in Program Mode by clicking on the Program Mode button located on the navigation bar at the left side of your screen.

- Click on the PAC icon on the left side of the screen.

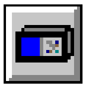
Assigning the Database Master (In Program Mode)

One matroller in the cluster is arbitrarily assigned as the Database Master. This matroller contains all of the PAC shared data parameters. It is also responsible for distributing all of these parameters to the other matrollers in the cluster.

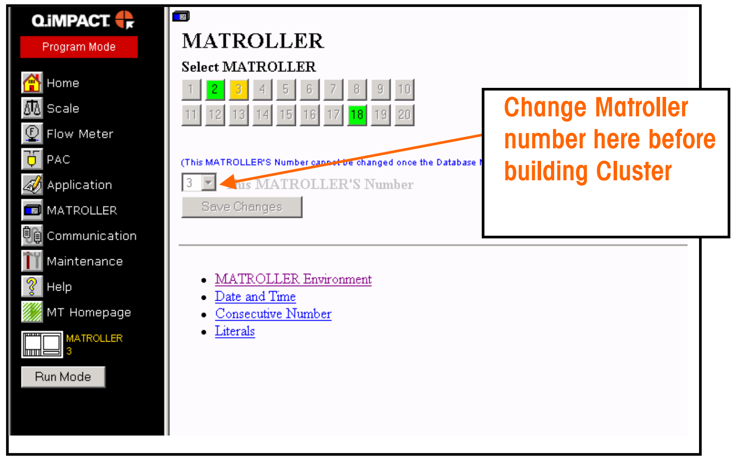
- Click on the Build The Cluster link in the main window. This takes you to the Build the Cluster screen where you will need to click on the "Check To Assign The Database Master To Matroller" checkbox to assign this matroller as the Database Master.



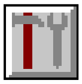
- Now select the other matrollers in the cluster and enter their IP addresses. You will notice a checkbox next to the Save Changes button. Leave this unchecked for now.
- Press the "Save Changes" button to store the network configuration in the Database Master.
- The other matrollers in cluster now need to know which matroller is the Database Master. You need to connect to each matroller separately and specify the Database Master matroller number IP address. To connect to another matroller from the Database Master, click on the Matroller icon on the left side of the screen to go to the Matroller screen.



Matroller

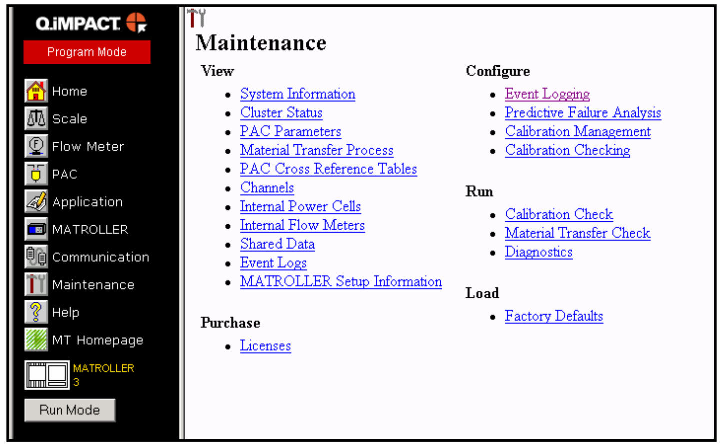


- On the Matroller screen, click on the desired Matroller Number button.
- Once you have connected to the desired matroller, place it in Program Mode by clicking on the Program Mode button (left page).
- Now click on the PAC icon (left page) and then the <u>Build The Cluster</u> link.
- Click on the Matroller number button that was assigned as the Database Master and then enter the IP address of the Database Master Matroller.
- Save the changes by clicking on the Save Changes button.
- Once again, click on the Matroller icon (left page) and then click on the Matroller number button that is the Database Master. This will connect you with the Database Master again.
- Click on the Matroller icon and then select the next matroller in the cluster to configure with the Database Master Matroller number and IP address.
- When connected to this matroller, once again go to the **Build The Cluster** page and click on the Matroller number assigned to the Database Master and enter its IP address.
- Repeat the above procedures until all of the matrollers contain the Database Master IP address.
- Connect to the Database Master Matroller again and navigate to the **Build The Cluster** page. This time click on ☐ All Matrollers Are Aware of the Database Master IP Address and then click on the "Save Changes" button. This will distribute rest of the network parameters to all of the matrollers in the cluster.
- To confirm that cluster information has been distributed to all matrollers in the cluster, click on the Maintenance icon.

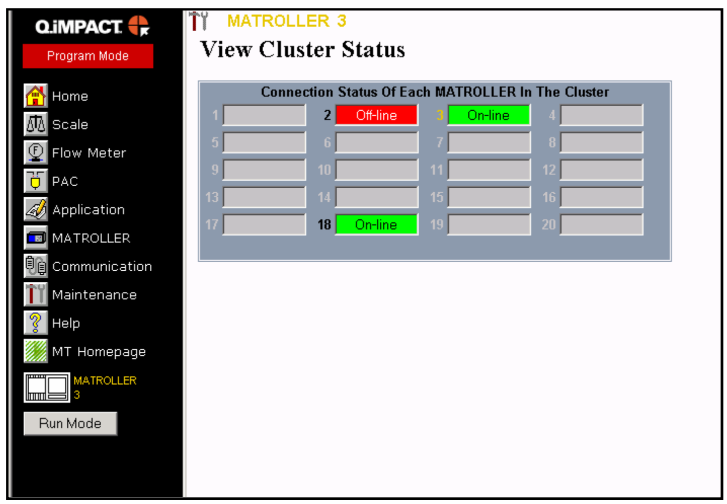


Maintenance

Clicking on the Maintenance icon takes you to the Maintenance screen where you can choose to monitor or test various aspects of the cluster, system and process.



Under View, click on Cluster Status. This will take you to a screen that shows the online and offline status on each matroller in the cluster. The information refreshes every second. It may take up to 10 seconds if a matroller goes offline.



Global Settings

These settings affect all Channels and all Material Paths. These settings can only be viewed in "**Program Mode**"

Short Feed Enable – by default the PAC algorithms need at least 5 seconds of Feed Time within which the Flow Rate must be within the limits. Should ANY of your Materials have a feed time that is less than or near to 5 seconds in length, then enable this option.

K1 and K2 limiting – in certain (rare) circumstances it may be desirable to limit the K1 and K2 constants. Consult your local MT Qi consultant for further details. Process's which may require limiting would have very short feeds with a high and erratic flow rate

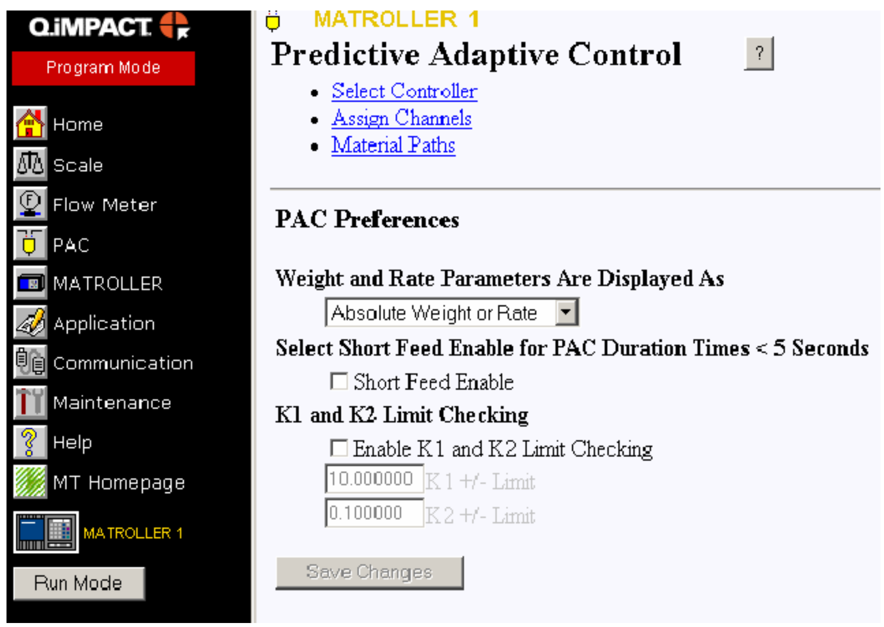
Weight and Rate Parameters are Displayed as:

Option 1: Absolute Weight …..

Various Channel and Material Path parameters are entered as absolute values.

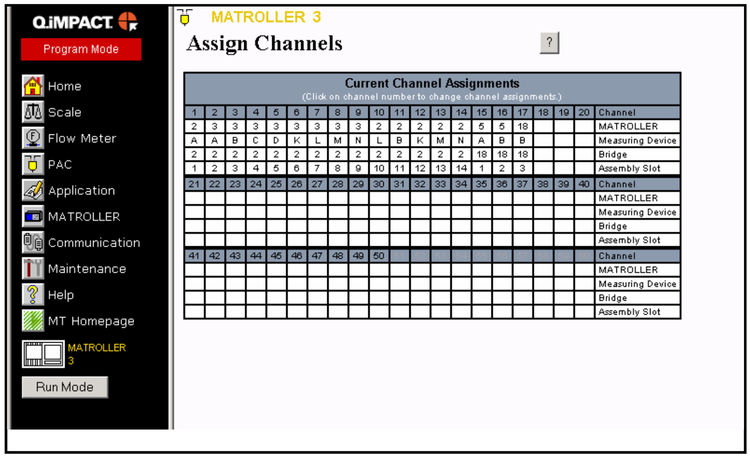
Option 2: Percentage of Scale Capacity

Some Channel and Material Path parameters can be specified as a % of the Instruments Capacity



Assign Channels

After building the cluster, go back to the PAC page and click on the link Assign Channels. (The QILite Channel assignment page only shows 12 channels



Where applicable, typical settings are provided at the end of each description

A channel is a specific measuring device interface (for a scale or flow meter) located in one of the matrollers in the cluster. There can be up to a maximum of 200 channels in a cluster. Each channel has specific parameters that must be assigned.

Click on the channel number that would like to configure or edit.

Q.iMPACT Matroller with Bridge – Select the matroller containing the ControlNet interface card associated with this channel.

Assign Measuring Device To Channel - Check this box to assign a measuring device to the specified channel.

Fast Feed Output on MFIO card (QiLite) – Select which O/P on the Multi Function board will be used for the Fast Feed control. This feature requires the installation of a MultiFunction board (related parameter: Slow Feed Time in Material Path setup)

Q.iMPACT Matroller – Select the number of the physical matroller containing the measuring device interface.

Measuring Device – Select the scale letter or flow meter number that specifies a unique matroller input.

Scale / Flow Meter Capacity – This displays the name assigned to the current measuring device capacity. It cannot be changed here.

Measuring Device Name – This displays the name assigned to the measuring device via the scale or flow meter page. It is set during the scale or flow meter setup. It cannot be changed here.

Current Scale Zero – This displays the weight of the current-scale-zero as compared to the calibrated-scale-zero. The Q.i process (also referred to as PAC for predictive, adaptive, control) automatically attempts to re-zero the scale after a successful Dump to Empty operation. You cannot manually change this value. However, in the Scale Setup menus, you can set the limits for the automatic zeroing of the scale. A large value here indicates a large "heel" build-up of material in the tank or vessel.

Minimum Material Addition – This sets the smallest amount of material the system will attempt to transfer with this measuring device. (0)

Dump Trip Point – This sets the level at which the Q.i process starts looking for Zero Flow, once zero flow is detected the drain timer will start . After expiration of the drain timer, the Q.i process shuts off the Dump-to-Empty operation. (1 to 2 % of capacity)

Flow Rate Thresholds, Zero – This sets the flow rate below which the system assumes a zero flow. In a dump-to-empty mode, the Q.i process uses this value to determine when the dump-to-empty is complete. (5 to 10 divisions)

Flow Rate Thresholds, Unstable – This sets the flow rate above which the Q.i process generates a Noisy Scale condition while waiting for a stable scale reading. (1.5 x Zero Flow Rate threshold)

Flow Rate Thresholds, Minimum PAC – This sets the flow rate above which the Q.i process begins to apply the predictive algorithms. (2 x Zero Flow Rate Threshold

Process Times, Feed Override Time – This is the time in seconds before the completion of a material transfer when the Q.i algorithm ignores all attempts to turn the FCE OFF.. Examples of this type of external logic are slow step timers, an operator changing operational modes or an Abort command. (0)

Process Times, Minimum Slow Step Time – The Q.i algorithm uses this value when it's computed slow step time value is less than this minimum value. The Slow Step Time is the timeout value for the material transfer. (20)

Process Times, Stable Measuring Device Wait Time – This is the number of seconds to wait for a stable measuring device reading before returning an unstable measuring device failure status. If the flow rate is above the Unstable Scale Threshold, the Q.i algorithm returns a failure status at the completion of this wait time. If the flow rate is between eh Zero Flow and the Unstable Scale Thresholds, the Q.i algorithm returns a success status at the completion of this wait time. (3)

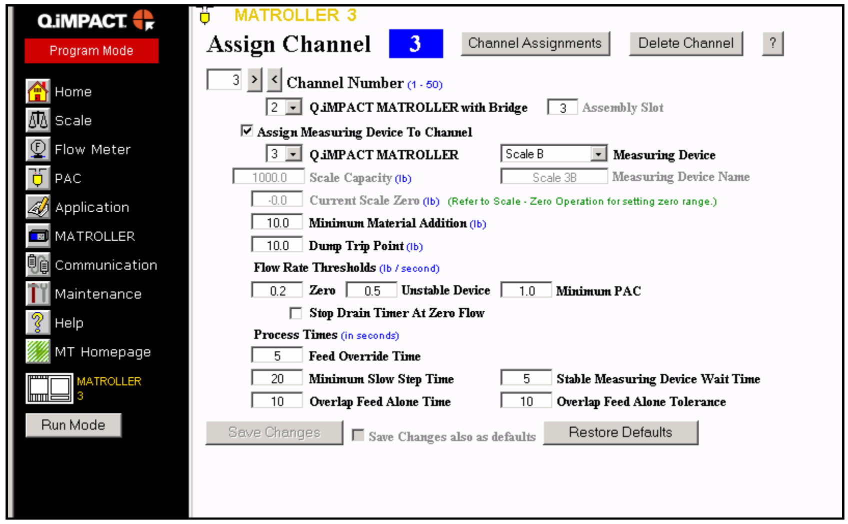
Process Times, Overlap Feed Alone Time (Standard Qi)– The Q.iMPACT matroller can issue commands to start concurrent overlapped feeds to a single destination vessel. There is always one primary overlapped feed. There may be one or more secondary overlapped feeds. The scale device at the destination vessel controls the primary overlapped feed. In order for the predictive algorithm to have time to accurately predict the cutoff, you must set the time in seconds that the primary overlapped feed must feed alone before cutoff. (8).

Process Times, Overlap Feed Alone Tolerance (Standard Qi) – Set the additional time tolerance in seconds allowed for a primary overlapping feed to complete. You may use it to compensate for potential time variations that may occur in completing secondary fees. (7)

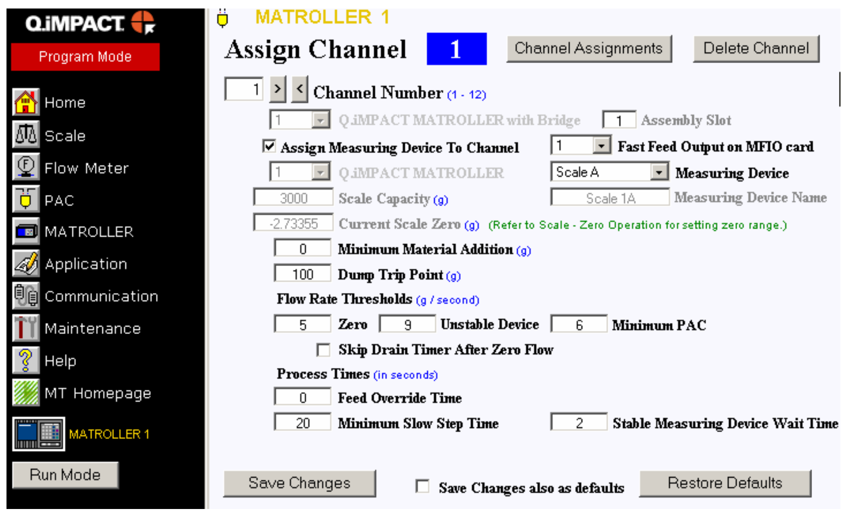
Once the channel parameters have been entered, they must be saved before selecting another channel or the changes will be lost. Changes can also be saved as the default settings by checking the "Save Changes also as defaults" box before clicking on the "Save Changes" button. These defaults can be used for other channels by clicking on the "Restore Defaults" button.

To assign the parameters for each channel, click on the channel number of the Assign Channels page. The following screen will appear where you can set the parameters for that channel.

Standard Qi Channel



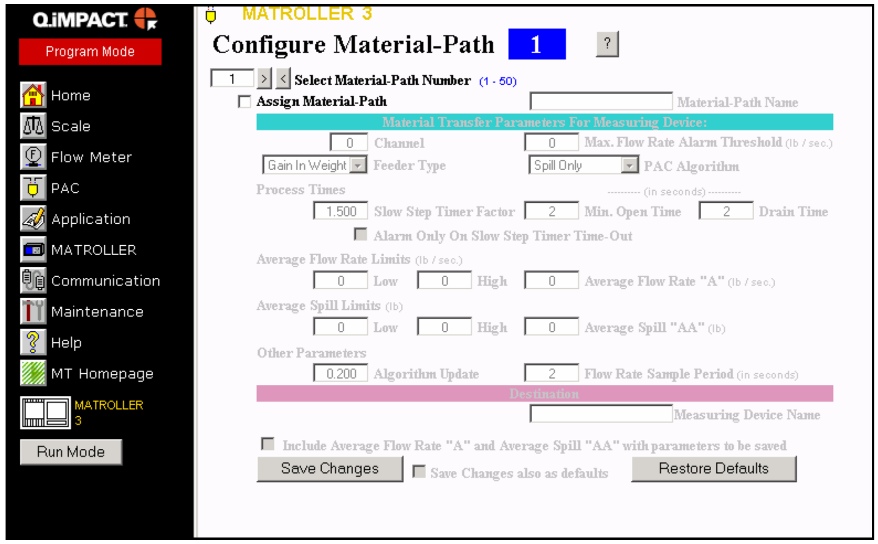
Qi Lite Channel. Note Fast Feed O/P option



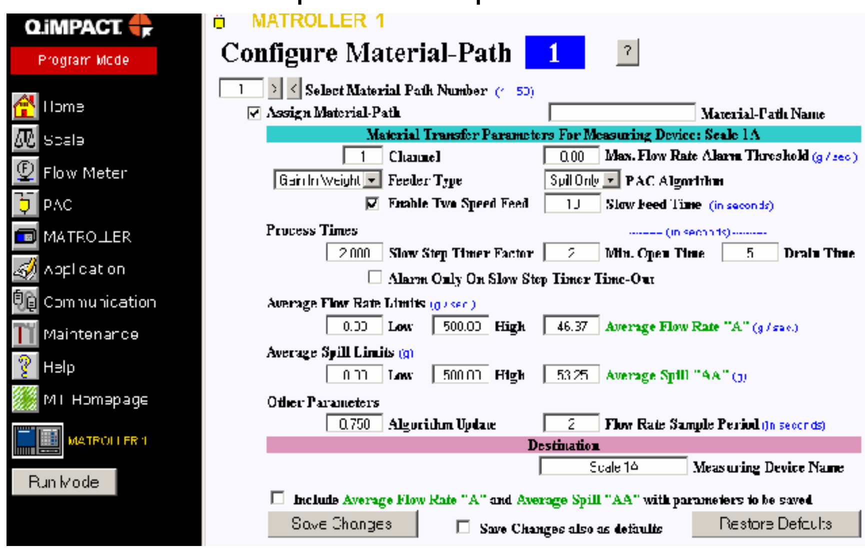
Configuring Material-Paths

Go back to the PAC screen (by clicking on the PAC icon), and click on the Configure Material-Path link.

Standard Qi



QiLite – note: Enable two speed and Slow speed time



Where applicable typical settings are provided at the end of each description

A material-path is the flow path for a particular material through a Final Control Element (FCE) such as a feeder or valve. The material-path holds the flow measuring parameters that are unique for each material along each path. The action of an operator manually adding material (referred to as a hand-add) can also be considered a material-path. The cluster can support up to 1000 material-paths. Each material-path has specific parameters that must be configured:

Assign Material-Path - Check this box to assign the material-path to the cluster.

Material-Path Name – Enter a text description of the material-path.

Channel – Select the measuring device channel that will process this material-path. This entry points to an entry in the Channel Table.

Max. Flow Rate Alarm Threshold – Optionally, set the flow rate at which the Q.i process terminates the feed and sets an alarm. If you set this value to zero, the Q.i algorithm does not check the maximum flow rate.

Feeder Type – This is the type of feed that controls the material flow:

- Select **Gain in Weight** when a scale channel is measuring the material automatically transferred into a holding vessel.
- Select **Loss in Weight** when a scale channel is measuring material automatically transferred out of a vessel.
- Select **Flow Meter** when an accumulating flow meter is measuring the delivered material.
- Select **Hand Add** when an operator manually adds material to a vessel. A scale measures the resulting addition.

PAC Algorithm – These are the predictive algorithms that handle the material transfer:

- Select **Spill Only** to cutoff very slow feeds or feeds with very erratic, unpredictable flow rates. (preferred starting mode)
- Select the **K1** algorithm to predict the cutoff for feeds that have constant, very predictable flow rates. For example, use it with horizontal feeds that do not have any initial downward velocity. Flow meters normally use this algorithm.
- Select the **K2** algorithm to predict the cutoff for feeds that are variable but predictable. For example, use it with vertical feeds through valves where the variation in head pressure can cause variable flow rates.
- Select the **Dump To Empty** algorithm to completely empty a tank or vessel.

Enable Two Speed Feed (QiLite) – Check this box if you want to use the QiLites two speed functionality (Multifunction board must be installed)

Slow Feed Time (QiLite) – Enter in the time in seconds that the Slow Feed should be active for. NOTE: requires that the above mentions checkbox is checked and MultiFunction board must be installed

Process Times, Slow Step Timer Factor - This sets the Slow Step Timer calculation factor. Slow Step Timer=Factor* (target/average flow). The Slow Step Timer measures when a material transfer is taking too long and aborts the process when the process exceeds the timer value. (1.5)

Process Times, Min. Open Time – Set the time in seconds in which the Q.i process does not apply spill compensation immediately following the start of the feed. It allows the material flow to come up to speed before beginning to apply the predictive algorithm. A feed must be active for this length of time before the Q.i algorithm considers it successful and automatically updates the Q.i parameters. (2)

Process Times, Drain Time – This sets the time in seconds that the system will wait for material to drain into or from a vessel after the Q.i process has cutoff the feed and before it tests the material delivery tolerance. (5)

Material Transfer Check Fields - The following four fields define a "box" around the key material transfer parameters, which the Q.i process captures at the instance of cutoff. The Q.i process uses these check fields in conjunction with the tolerance values sent by the Q.iMPACT matroller to determine when a feed is good. If the material transfer falls within the middle 50% range of the box values when offset from the average values, the Q.i process considers the feed good and updates the Q.i parameters based on the values of the current feed. If the values fall outside of this range, the Q.i process considers the feed as bad and does not update the Q.i process parameters. Initially, you may want to set these fields to a wide range to capture the process settings and then later set a more narrow range to more closely control the process.

Average Flow Rate Limits, Low – This sets the lower limit for the Average Flow Rate. (0)

Average Flow Rate Limits, High – This sets the upper limit for the Average Flow Rate. (2.5 x what you are expecting)

Average Spill Limits, Low – This sets the lower alarm limit for the Average Spill. (half the High limit negated)

Average Spill Limits, High – This sets the upper alarm limit for the Average Spill. (2.5 x what you are expecting)

Key Process Parameters. The following two fields are the key material transfer control parameters. The Q.i algorithm constantly updates these parameters after a good feed in order to adapt the process to evolutionary changes. If you have a process that is running well, you should NOT change these parameters. You also should NOT change them if you have only minor aberrations in the process. In these cases, these fields are information only fields to display the current values. However, if you are initially setting up the material-path, making radical changes to the material transfer process, or you are consistently getting bad cutoffs, you may need to manually set new seed values here. There is a check box at the bottom of the web page that allows you to indicate you are setting new seed values.

Average Flow Rate - Typically, this displays the average flow rate at cutoff in weight per second. You may also use this field initially for setting new seed values for the process.

Average Spill - Typically, this displays the average spill in weight at cutoff. You may also use this field initially for setting new seed values for the process.

Algorithm Update – The Q.i process uses this value in calculating Average Flow Rate and Average Spill to control how quickly the system responds to a change in operating conditions. When using K1 or K2 algorithms use

Flow Rate Sample Period - Set this value to specify the period of time in seconds (from 1 to 60) over which the rate is calculated. Smaller values allow the Q.i process to respond more quickly to changes in rate, while larger values permit the rate to change more smoothly. In most cases, lower values give better cutoff results.

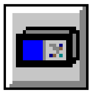
Destination Channel - Set the channel number of the scale device for the destination vessel, where material is being fed. Enter a destination channel of 255 if the destination is outside of the cluster.

Measuring Device Name – This displays the name of the scale device at the destination vessel. You can only set this name on the Scale Setup web pages.

Once the material-path parameters have been entered, they must be saved before selecting another material-path or the changes will be lost. Changes can also be saved as the default settings by checking the "Save Changes also as Defaults" box before clicking on the "Save Change" button. These defaults can be used for other channels by clicking on the "Restore Defaults" button.

Application

Clicking on the **Application** icon leads you to the Application screen where you will find the Prompts, Discrete I/O, and JagBASIC menus. While in **Run Mode**, all information is read-only. While in **Program Mode**, Read-Write access is allowed. Remember to click on **Save Changes** after each step. For additional information on JagBASIC, refer to the JagBASIC Programmer’s Guide on the documentation CD.



Matroller

Clicking on the **Matroller** icon takes you to the matroller setup screen. It also contains sub-menus for Matroller Environment, Date and Time, Consecutive Number, and Literals. Click on each of these sub-menus to fill in the appropriate parameters or information.

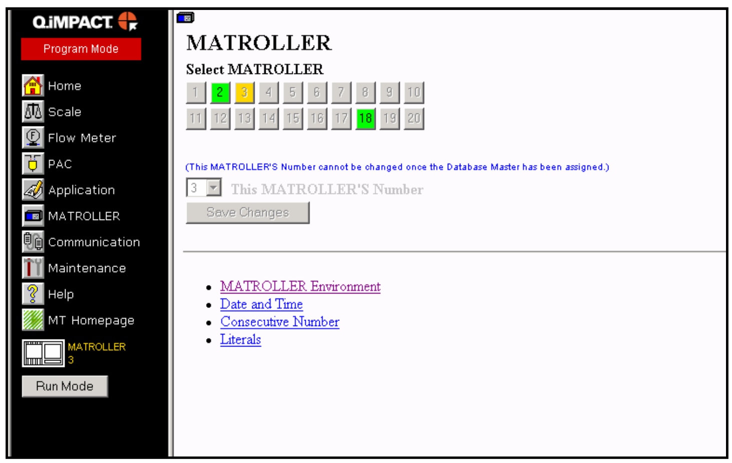
Matroller Environment – set language, time and date format, power up timer, beeper modes and memory key.

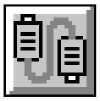
Date and Time – set the date and time on the matroller

Consecutive Number – configure consecutive number parameters

Literals – configure literal strings.

Matrollers Number – the Matrollers ID or number is set here. This can only be set before the Cluster is configured or a Master Qi is assigned. Setting the Matroller number is one of the first things that must be done after setting the IP address. After the numbers of all the Qi's have been assigned the Cluster can be built. (**NOT applicable to QiLite**)





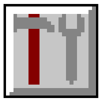
Communication

Clicking on the **Communication** icon takes you to the communication setup screen.

The sub-menus are:

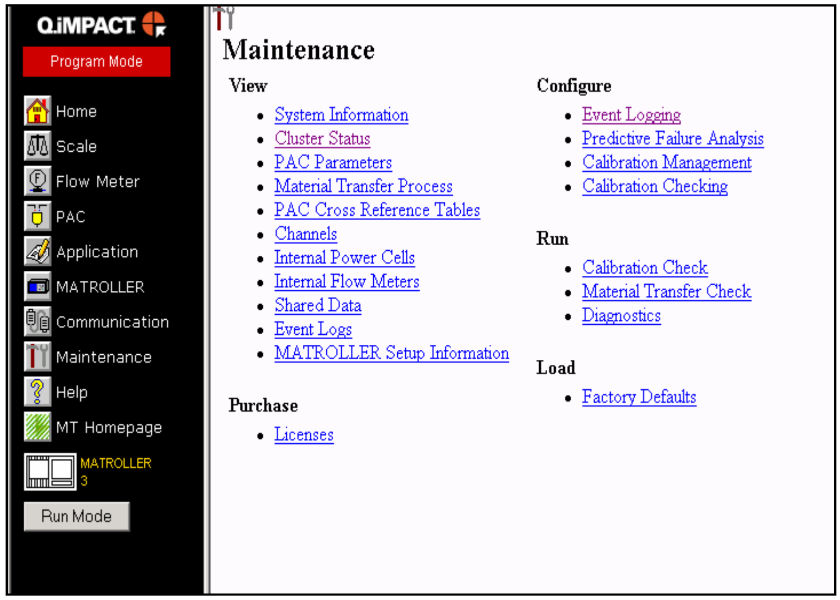
- Serial I/O
- Network
- ControlNet PLC Interface
- Profibus PLC Interface.

You can only configure these screens only if the appropriate interfaces are installed on the Q.iMPACT matroller.



Maintenance

Clicking on the Maintenance icon in the navigation bar takes you to the Maintenance screen.

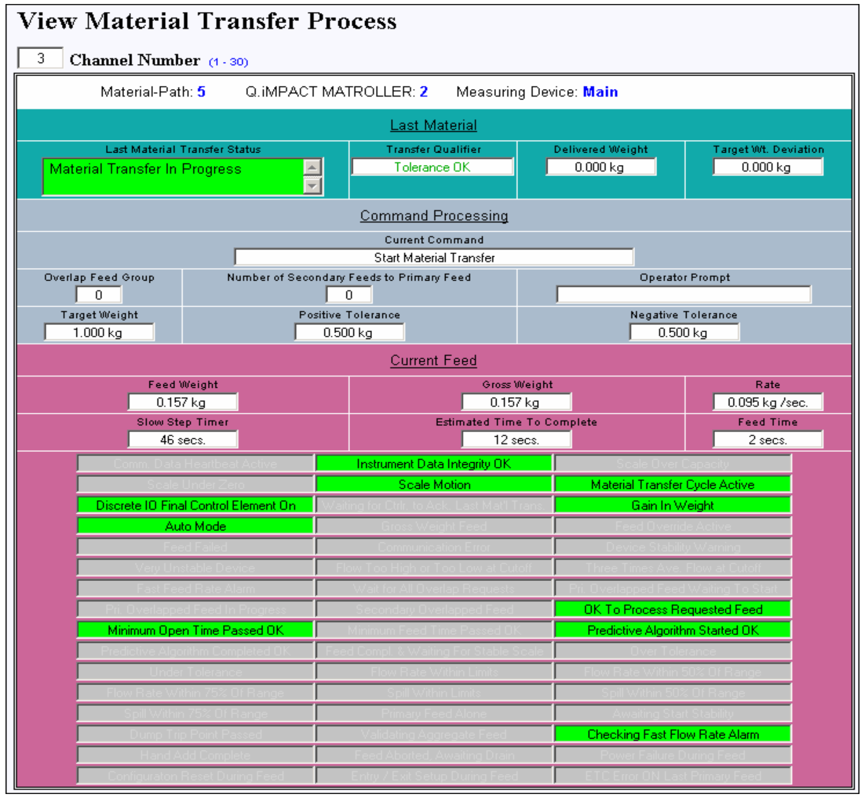


This screen provides various options that allow you to monitor or test various aspects of the material transfer operation. A few of the more commonly used screens are described below.

WARNING! If you select Factory Defaults under **Load**, note that loading factory defaults will destroy all network cluster settings, channel assignments, material-paths, and field upgrades.

View Material Transfer Process

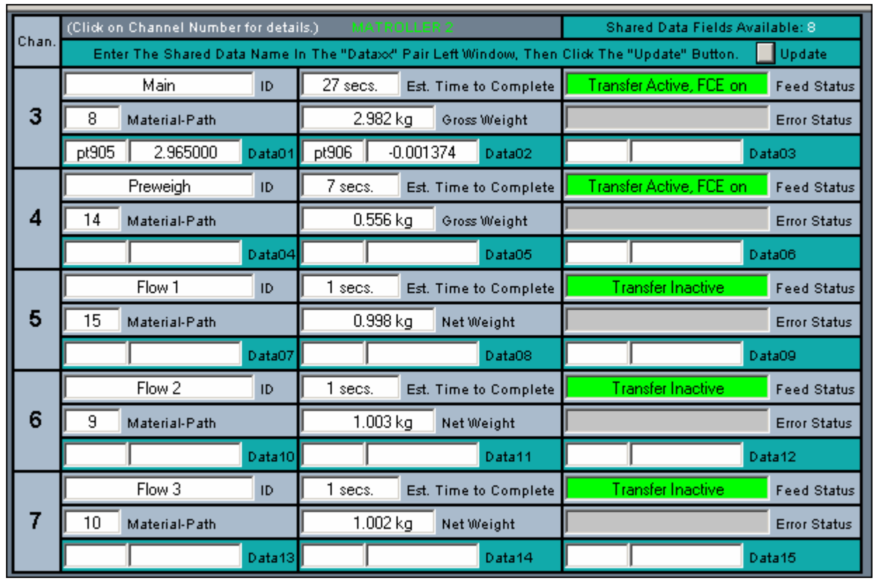
This screen is used to display information on a selected channel during a material transfer. After entering in the desired channel number all relevant information about that channels current state is displayed.



Channels

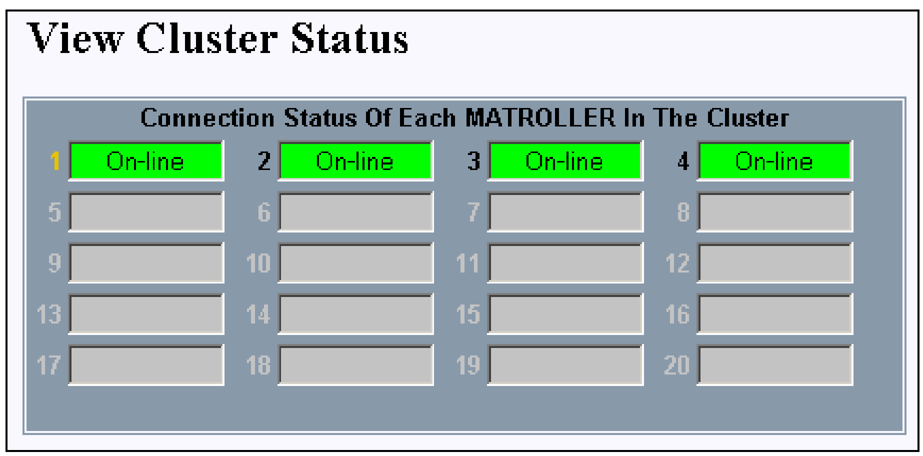
This screen can only be viewed from a Q.iMPACT matroller database master. It is useful for viewing the state of a number of channels simultaneously, but does not show as much detail per channel as the View Transfer Process screen.

One very useful feature is the ability to view shared data. There are three display boxes per channel in which you can enter the Shared data name. In the example below Channels 3 and 4 are busy transferring material. Channel 3 is also displaying two shared data variables: Gross weight and flow rate. The shared data names can be found in a document called Shared Data in the reference section of the documentation CD. Note the 9 in pt905 refers to the first scale. Numbers 1 to 8 would be the 8 possible flow meters that could be in this chassis.



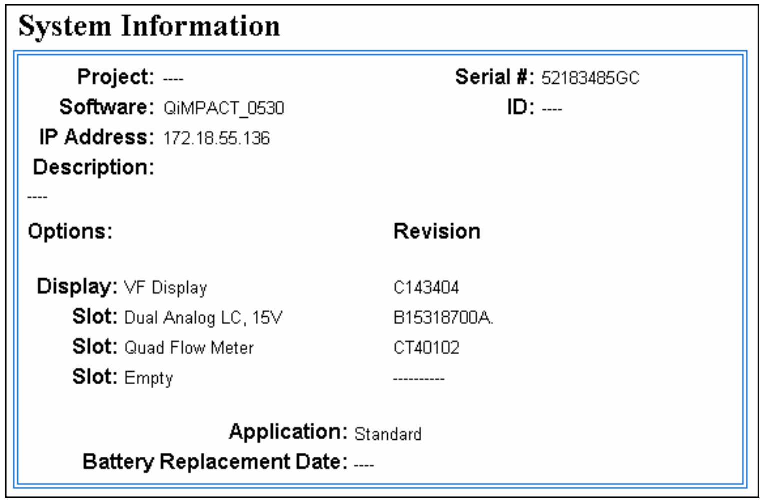
Cluster status

This screen is used to check the status of all the matrollers in a cluster. Any color besides green would indicate a problem that must be fixed immediately in order to use the system.



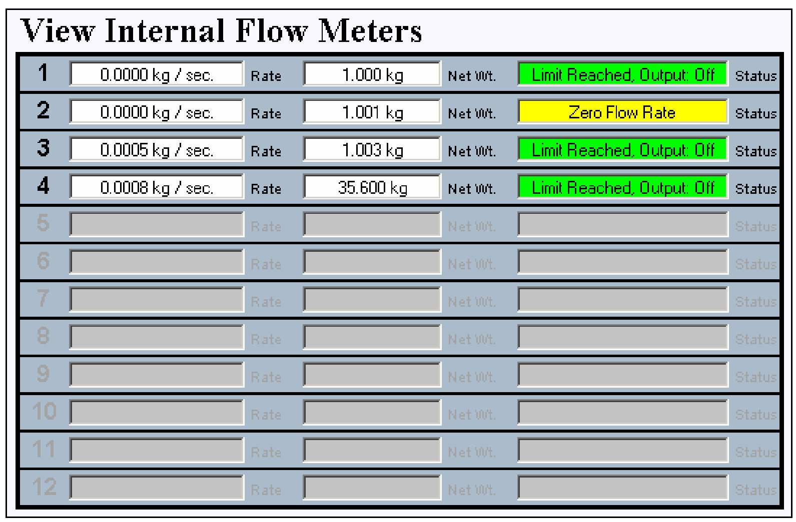
System Information

This screen displays installed hardware information that may be required for support and maintenance purposes.



View Internal Flow Meter

This screen simply provides a grouped view of basic status of the matroller's installed flow meters.



Material Transfer Check – Auto mode

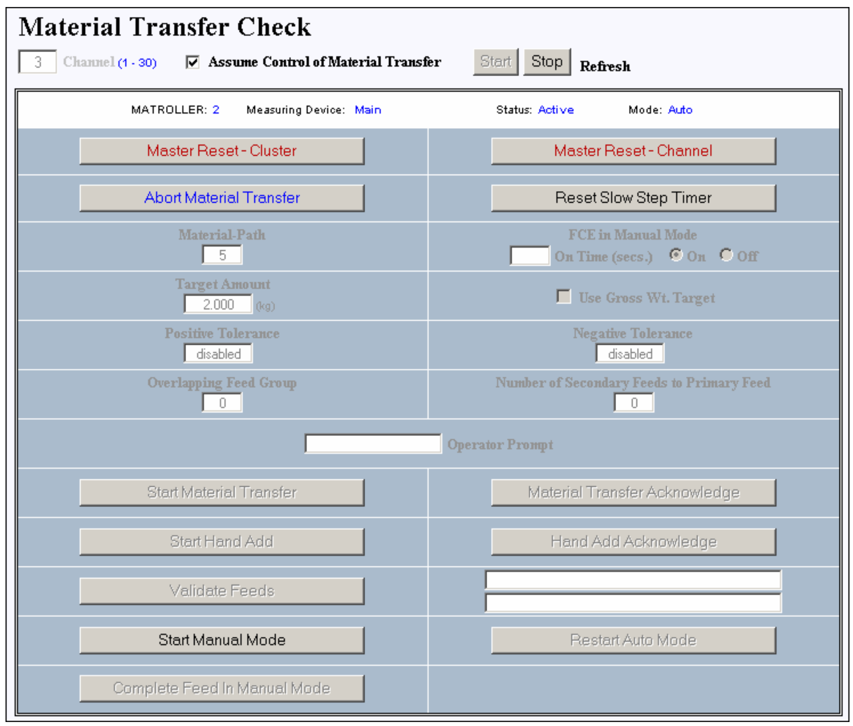
This screen is particularly useful during startup and commissioning. This screen allows you to perform a material transfer independent of the host control system. You are able to enter in all the parameters necessary to start a transfer.

NOTE: The host control system will normally have an interlock in series with the matroller FCE. In order to physically perform a material transfer, this associated O/P in the PLC will most likely have to be forced or turned on.

Enter in the channel number. Then check the "Assume Control of Material Transfer" option. Enter in the desired material path, target amount and, optionally, the tolerances.

The screen below shows you what the screen should look like at this point in time. All that is required now is to click on the "Start Material Transfer" button.

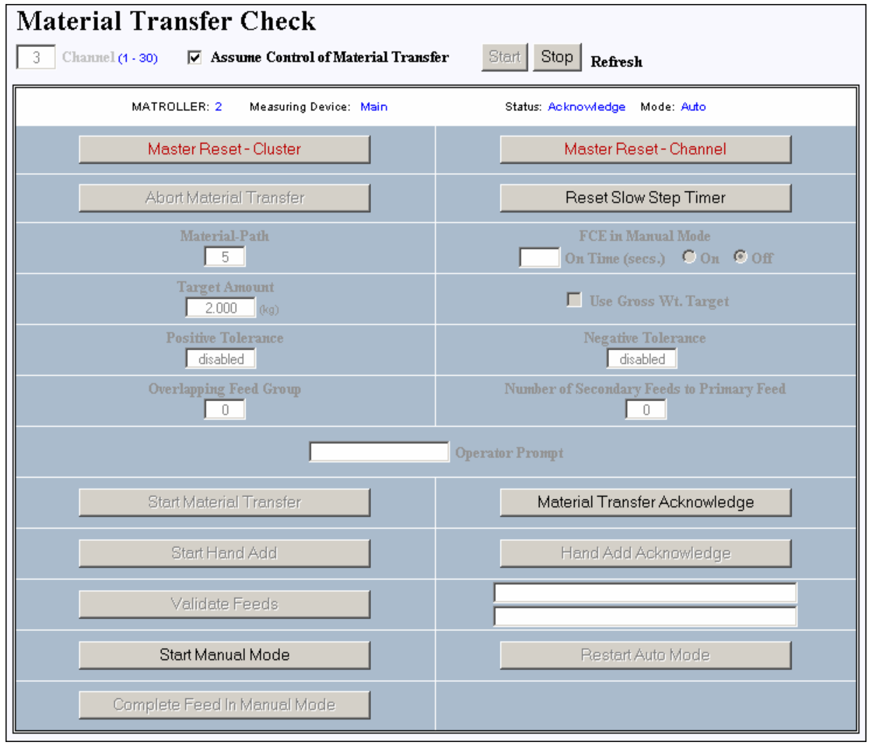
The Status text field will display the result/state of the operation. Should there be a problem, an error code will be displayed in the status field. Hold the mouse pointer over this code and a verbal description of it will appear as a tool tip. At the successful completion of the transfer the "Material Transfer Ack" button will be visible. You must click on this button in order to complete the process.



This screen is only available in "RUN" mode

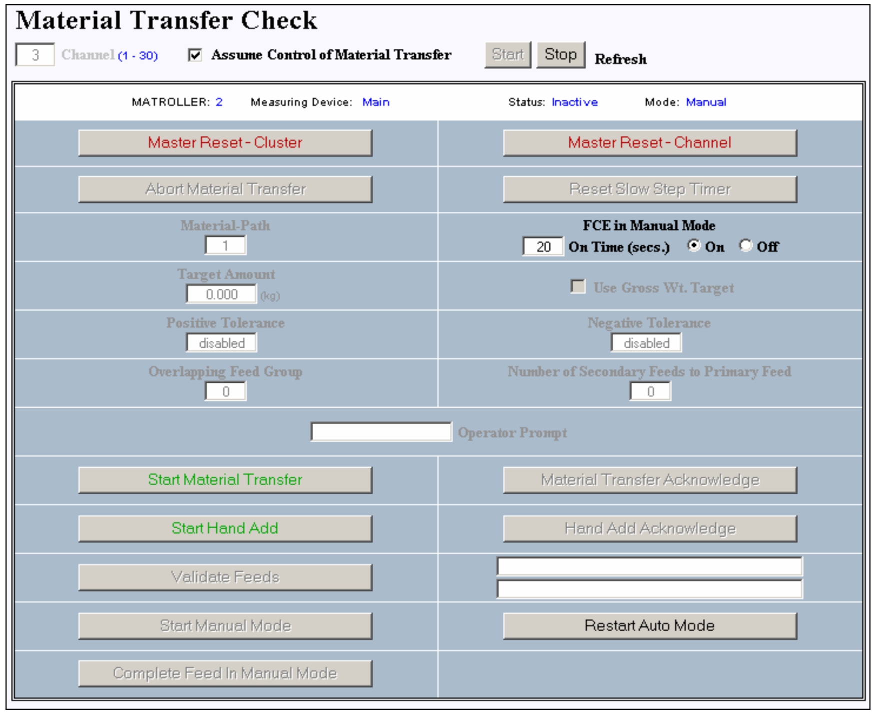
Material Transfer Check – Acknowledge Mode

This screen shows the matroller having completed a transfer and that is now waiting for an Acknowledge command. Until the "Material Transfer Ack" button is activated, this channel will not accept material transfer commands



Material Transfer Check – Manual Mode

This screen shows the "Start Manual mode" button has been activated. You are now able to turn on the channel's FCE for a preset number of minutes. "20" has been entered in the On Time box. After that the ON option selected. The FCE O/P will then turn on for 20 seconds. No Material Acknowledge commands are required during or after this process, and it can be repeated as desired. It is advisable to return the matroller to the Auto mode upon completion.



NOTE: The state of the buttons will indicate the state of the material path. If either of the "Ack" buttons are not grayed out, you must acknowledge them before continuing.

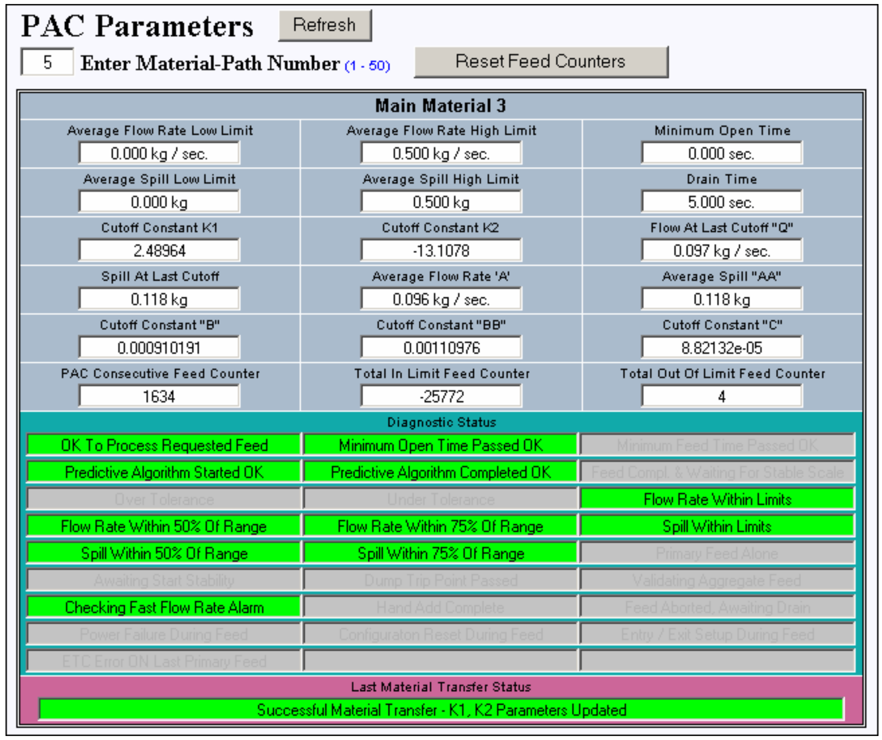
PAC Cross Reference Tables

This screen displays what can be sorted by material path or channel, and provides you with an overview of the cluster's most basic level of configuration. It is very useful as a crosscheck after you have set up a cluster.

Channel No.	Material-Path	MATROLLER	Bridge:Slot	Measuring Device
1	1	1	1: 1	Scale 1A
1	2	1	1: 1	Scale 1A
2	3	1	1: 2	Scale 1B
2	4	1	1: 2	Scale 1B
3	5	2	1: 3	Main
3	6	2	1: 3	Main
3	7	2	1: 3	Main
3	8	2	1: 3	Main
4	12	2	1: 4	Preweigh
4	13	2	1: 4	Preweigh
4	14	2	1: 4	Preweigh
5	15	2	1: 5	Flow 1
6	9	2	1: 6	Flow 2
7	10	2	1: 7	Flow 3
8	11	2	1: 8	Flow 4
9	16	3	1: 9	FlwMt 3K
10	17	3	1:10	FlwMt 3L
11	18	3	1:11	FlwMt 3M
12	19	3	1:12	FlwMt 3N
13	20	4	1:13	Scale 4A
14	21	4	1:14	Scale 4B
15	22	4	1:15	Scale 4C
16	23	4	1:16	Scale 4D
16	24	4	1:16	Scale 4D

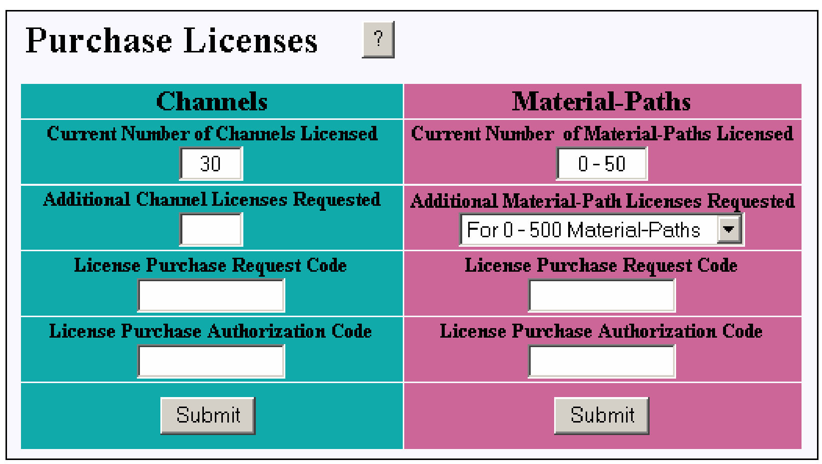
PAC Parameters

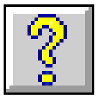
This screen provides you with in depth information on each material path's PAC parameters, including the state of the last material transfer.



Purchase Licenses

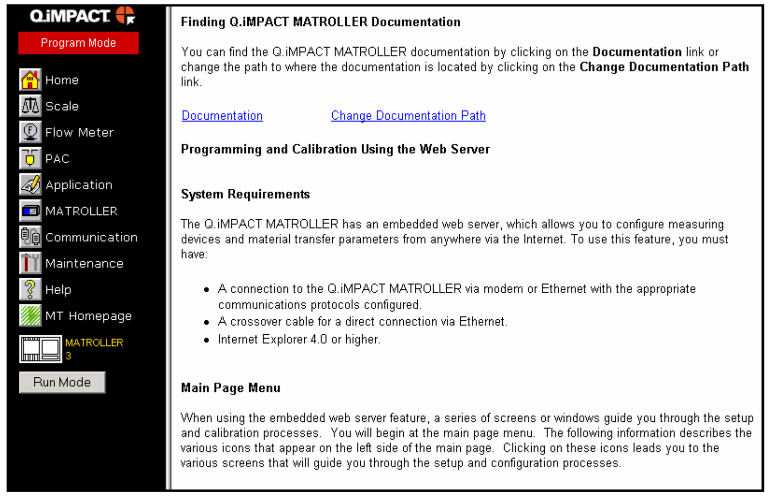
This screen provides you with your current system's license information. You must also use this screen when purchasing additional licenses.



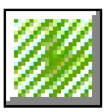


Help

Clicking on the **Help** icon takes you the screen shown here.

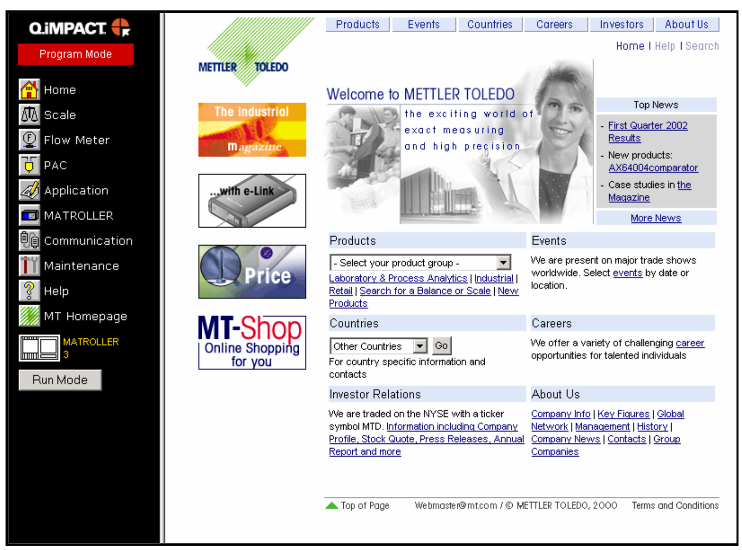


Instructions are provided for finding technical documentation or changing the document path. Clicking on **Documentation** takes you to the following screen. The Help screen also provides an overview of the system requirements and a brief description of each of the menu items found on the left side of the screen.



METTLER TOLEDO Home Page

If your PC is connected to the Internet, clicking on METTLER TOLEDO icon connects you the METTLER TOLEDO web site where you can find additional information on the company and its products.



METTLER TOLEDO

For your notes

5 Flow Meter Interface Board

Overview

The Flow Meter Interface Board is a four-channel isolated counter/flow meter board for use in the Q.iMPACT matroller. It provides a flow meter totalizer setpoint comparison to directly control on-board discrete outputs.

The flow meter interface board is capable of counting the input pulses up to 50 kHz on each of four isolated input channels, as well as measuring the frequency of the input signal. Four-jumper selectable switching threshold for each input channel are available as well as a jumper selectable 15 kHz analog filter and a software selectable 30 kHz digital filter. The required peak input levels for the AC mode are 50mV to 50Vrms. The required peak input level for the DC mode is 2.5 volts to 50 volts. The state of the input counter levels is also available to the processor, so that any channel can be used as a discrete input.

The control outputs are 7407 open-collector drivers. Each control output is capable of sinking 40 mA. The maximum off state output voltage is 30V. This enables the control output to drive interposing relays such as those by Opto-22.

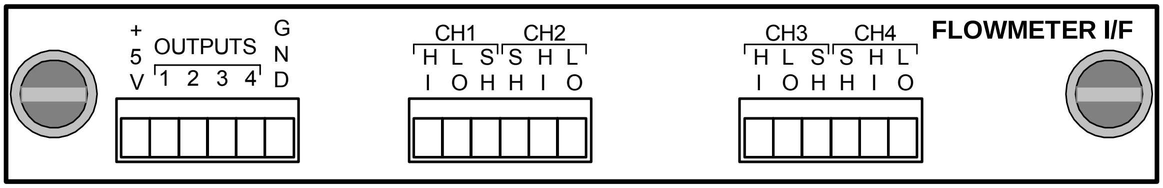
Each flow meter interface board in a Q.iMPACT matroller must have a unique address. This is achieved by jumper settings on the board. Calibration of the flow meter channels is done using the web pages and is covered in Chapter 4.

Features

- Four individually isolated input channels
- Jumper selectable 15 kHz analog filter for each input
- Software selectable 30 kHz digital filter for each input
- Four jumper selectable input switching thresholds (0.0V, 2.3V, 6.0V, 8.0V)
- Input frequency: +- 42 VAC or +-42 VDC
- Maximum count value: 16,777,215
- Channel update time of 1.5 msec per channel maximum
- Frequency output mode
- Four open-collector output switches
- Current limited 5V output power
- Input to backplane isolation of 750VDC
- Input channel to channel isolation of 750VDC
- Easy calibration using actual throughput or calculated settings.
- Power supply: The digital circuitry runs off the controller's +5V supply; the isolated input circuitry is powered by the controller's 20V supply.

Terminal Blocks

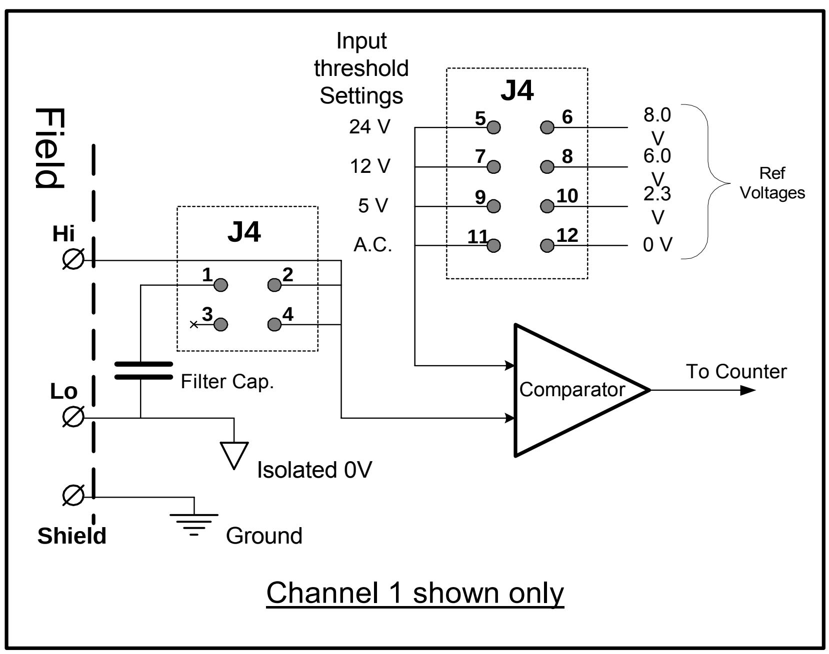
The flow meter card's front panel has three Phoenix Contact terminal blocks: two for the input signals and one for the outputs. The terminal blocks are labeled as shown below.



Terminal Block #3 (J3)	
PIN #	SIGNAL NAME
1	+5VDC
2	OUTPUT 1
3	OUTPUT 2
4	OUTPUT 1
5	OUTPUT 4
6	GROUND

Terminal Block #2 (J2)	
PIN #	SIGNAL NAME
1	CH 3 HI INPUT
2	CH 3 LOW INPUT
3	FRAME GROUND (SHIELD)
4	FRAME GROUND (SHIELD)
5	CH 4 HI INPUT
6	CH 4 LOW INPUT

Terminal Block #1 (J1)	
PIN #	SIGNAL NAME
1	CH 1 HI INPUT
2	CH 1 LOW INPUT
3	FRAME GROUND (SHIELD)
4	FRAME GROUND (SHIELD)
5	CH 2 HI INPUT
6	CH 2 LOW INPUT



Schematic of Channel 1 Counter Input

Board Components

The flow meter board consists of digital circuitry, four isolated analog input circuits, and four open-collector outputs with a 150mA, 5V power source.

Digital Circuitry

The digital circuitry consists of a microprocessor, a single port RAM, a dual port RAM, a flash ROM, an FPGA, an EEPROM, a CPLD, and glue logic. The FPGA counts input pulses and measures flow rate for each isolated input circuit. It also does limit comparisons on the inputs and sets the outputs based on the results. The flash ROM provides the program memory for the microprocessor. The single port RAM provides data storage for the microcontroller. The EEPROM is used to store configuration data that should not be lost at power-down. The dual port RAM is used to hold data that is being passed between the microcontroller and the Q.iMPACT processor board. The CPLD is used to implement the Q.iMPACT bus interface.

Isolated Analog Input Circuits

Each isolated input circuit consists of a comparator, an optocoupler, two sets of hardware jumpers and discrete resistors, capacitors, diodes, and a transient voltage suppressor. The comparator is used to compare the input voltage to the switching voltage. Each input section has a hardware jumper to select one of the four available input switching voltages. A second hardware jumper is provided to enable or disable a 15 kHz analog filter on each input. The optocoupler isolates the output of the comparator from the FPGA count input. The transient voltage suppressor provides ESD protection for each input. The diodes provide over voltage protection of each input.

Open Collector Outputs

The output circuitry contains four non-isolated open collector 7407 drivers that can be used to drive the input to an Opto 22 output module. The module also provides a 150 mA, 5V power source that can be used to provide power to an Opto 22 output module.

NOTE
The Q.iMPACT flow meter board may only be used with flow meter outputs that do not exceed Class 2 limits according to The National Electric Code.

Hardware Jumpers Settings

The flow meter card has ten sets of hardware jumpers.

Filter Enable (4 each):

Each input channel has a set of six jumper settings as shown in the table below. Jumper location 1-2 enables the analog RC filter. The jumper controls whether the 15kHz analog RC filter is used to filter noise on the input. It is recommended that the user enable the analog filter for counter or flow meter applications running at speeds less than 15 kHz. All AC range applications should make use of the analog filter for all input frequencies. AC application running at less than 30KHz should also use the digital filter for additional high frequency immunity. All applications with input frequencies less that 30KHz should use the digital filter.

Enable Analog RC Filter	1	2
Spare Location to hold Jumper	3	4
24V Range	5	6
12V Range	7	8
5V Range	9	10
AC Range	11	12

Input Switching Threshold (4 each):

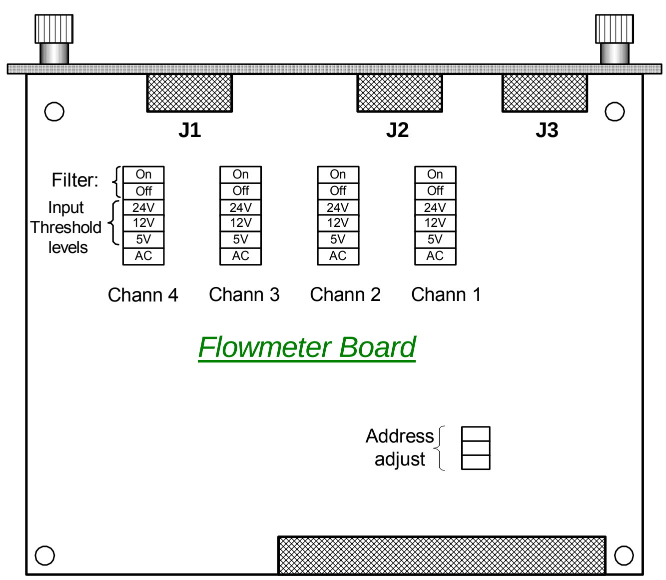
This jumper has four possible positions. It sets the comparison voltage level for the input comparator. Voltage levels are 0.0V, 2.4V, 6.0V, and 8.0V.

Module ID Select (1):

This jumper has three possible positions. It sets the module ID. ID values are 1, 2, and 3. The module ID must be assigned sequentially starting with "1" or the module may not be recognized by the Q.iMPACT matroller.

Interrupt Request Select (1):

This jumper has three possible positions. It selects the module's interrupt request line. The selections are IRQ4, IRQ5, and IRQ7. The interrupt lines are currently not used by the module, but are included as a future option.



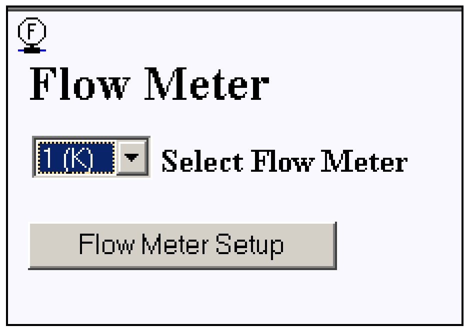
Flow Meter Calibration

The flow meter inputs can calibrated in one of two ways:

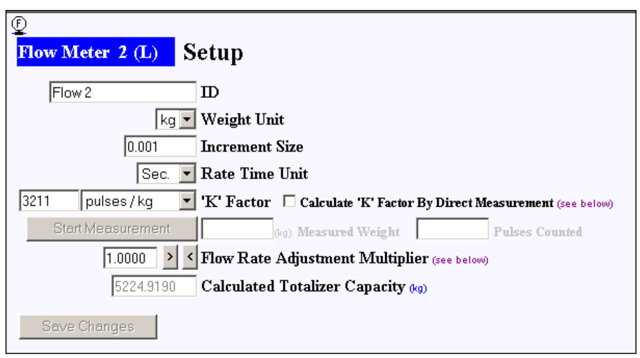
- Calculation
- Measured throughput

Calibration by Calculation

1. From the main menu click on the Flow Meter icon. You will see the screen on the left. If the screen you see has the button grayed out, you are logged on to a Q.iMPACT matroller which does not have any flow meters installed. Verify that you are connected to the correct matroller.
2. From the selection box select the Flow meter that you want to set up. And then click the button.



3. At first the screen, the parameters will be grayed out. You must switch the matroller to Program mode in order to continue. The screen below will then be displayed.

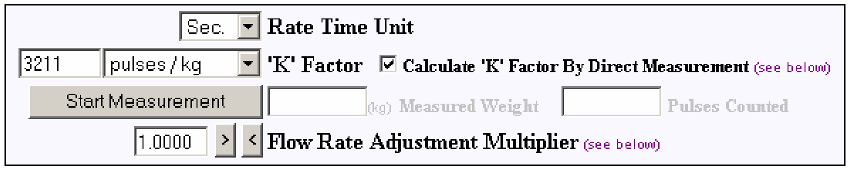


4. Enter in the weight units and increment sizes.
5. Select the time unit for flow rate calculations. This must be selected in order for the flow meter channel to work. The default will not work.
6. You must know or have calculated how many pulses per weight unit the flow meter outputs in order to continue. Now enter in the pulses per weight unit that the flow meter is calibrated to in the 'K' Factor box. This example has a value of 3211.
7. You can leave the flow rate adjustment multiplier at its default of 1.00000.
8. Save your changes. Switch the matroller to Run mode. The unit is now ready.

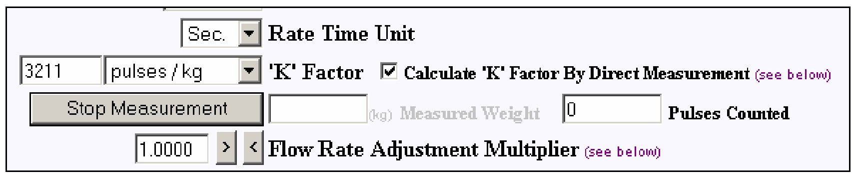
Calculation by Measured Throughput

You are required to let a known quantity of material flow through the flow meter.

1. First check the box by Calculate 'K' Factor By Direct Measurement as shown below.



2. Now activate the "Start Measurement" button. The button will change to "Stop Measurement". At this point you must let material flow through the flow meter. You should see the Pulses Counted value incrementing. Once enough product has passed through (the more the better,) activate the "Stop Measurement" button.



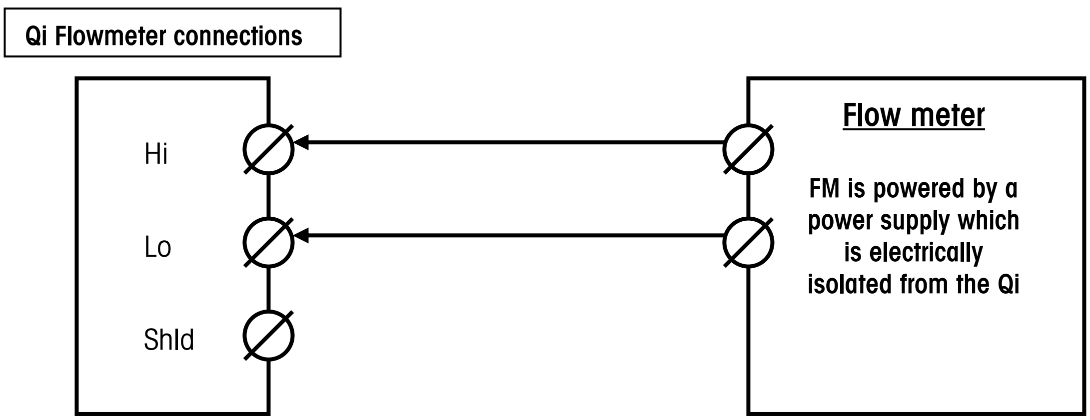
3. You will now be able to enter in the actual amount of material that passed through. **After doing this be sure to activate the "Save Changes" button.** The channel will now be calibrated. Change the matroller back to Run mode.

Wiring a Flowmeter

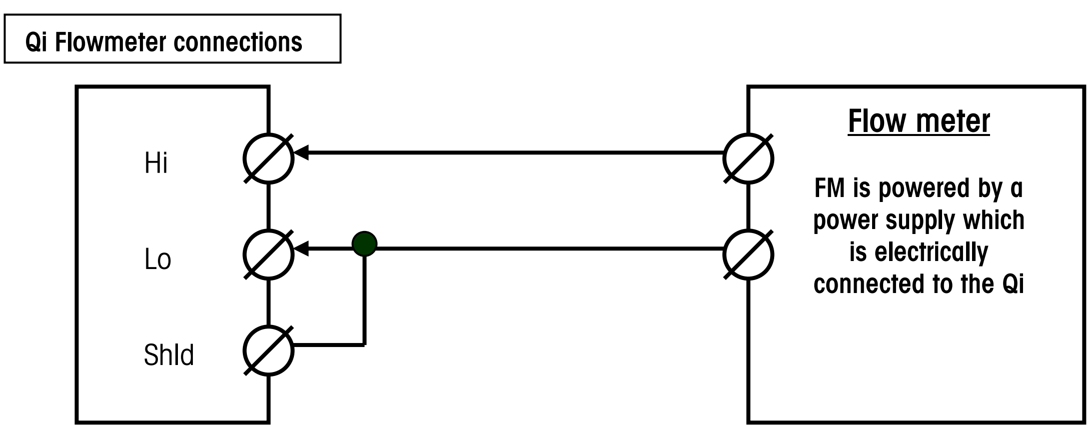
A Flowmeter can be either isolated with respect to the Qi 0V or it can be non-isolated and share a common 0V.

The circuit s below illustrate two methods of connecting a Flow meters pulse O/Ps to a Qi Flow meter board

Isolated connections



NON - Isolated connections



Electrical Specifications

Specification	Description			
Configuration	4 channels of differential flow meter inputs; 4 open collector output switches			
Input Modes	AC or 3 levels of DC inputs			
Voltage Range	AC (rms)	DC (5V)	DC (12V)	DC (24V)
VIL*	-50mV	+1.4V	+3.0V	+4.0V
VIH*	+50mV	+3.4V	+9.0V	+12.0V
Vmax	+/-50V	+/-50V	+/-50V	+/-50V
Maximum Input Voltage	+- 42 VAC or +-42 VDC			
Maximum Input Current	7 mA			
Minimum Input Impedance	11 KΩ			
Input Specifications				
Maximum Input Frequency	50 KHz			
Min. Input Frequency for Rate Measurement	1 Hz			
Duty Cycle	Input Range, Frequency Max, Duty Cycle, Max Duty Cycle, Min Pulse Width **5V, 50kHz**, 35, 55, 7 usec **12V,** 50kHz, 40, 60, 8 usec **24V,** 50kHz, 40, 60, 8 usec **AC,** 50kHz, 40, 50, 8 usec			
Minimum Input Low Time	8 usec (input filter disabled); 16 usec (input filter enabled)			
Minimum Input High Time	8 usec (input filter disabled); 16 usec (input filter enabled)			
Channel Update Time				
Accumulated Flow Data	1.5 msec per channel maximum			
Rate Data				
Instantaneous	Larger of (2/FREQ) or channel update time.			
Average	2 seconds			
Accuracy				
1 Hz Averaging Mode	+/- 1 Hz			
Instantaneous mode	+/- 1% @ 50KHz			
Maximum Count Value	16,777,215			
Maximum Rate Value	65,535			
Fault detection	ROM error, RAM error, EEPROM error, CPU error, Configuration error.			
Isolation				
Input Channel to Backplane	750 VDC Continuous			
Input Channel to Input Channel	750 VDC Continuous			

Discrete Output	
Setpoint latency time (turn off time)	200 usec maximum
Preset to output on time	20 msec maximum
5V output current	40 mA minimum
Power-up state	Off
Bus Timing	
RD′ low to data valid	100 msec maximum
RD′ high to High Z	50 msec maximum
Data hold time from write end	5 msec minimum
Data Transfer Request hi to Data Transfer Acknowledge hi time	70 usec maximum
Data Transfer Request low to Data Transfer Acknowledge low time	100 msec maximum
Power Requirements	
Internal Supply +5V (no Output current)	230mA maximum
Internal Supply +5V (with 150mA Output current)	440mA maximum
Internal Supply +20V	150mA maximum
Aux Power Supply	
Output Power	5V @ 150 mA, current limited
Control Outputs	
Output Type	Open collector, negative true
Maximum Output Current	Sink 40 mA
Maximum Output Voltage	30 VDC

METTLER TOLEDO

For your notes

6 PROFIBUS Interface board

Introduction

The following information is for persons responsible for setting up and commissioning a Q.iMPACT matroller-based system. Skills required are Q.iMPACT matroller setup knowledge, PLC programming, and PROFIBUS experience. For further in depth information on Profibus, contact Siemens.

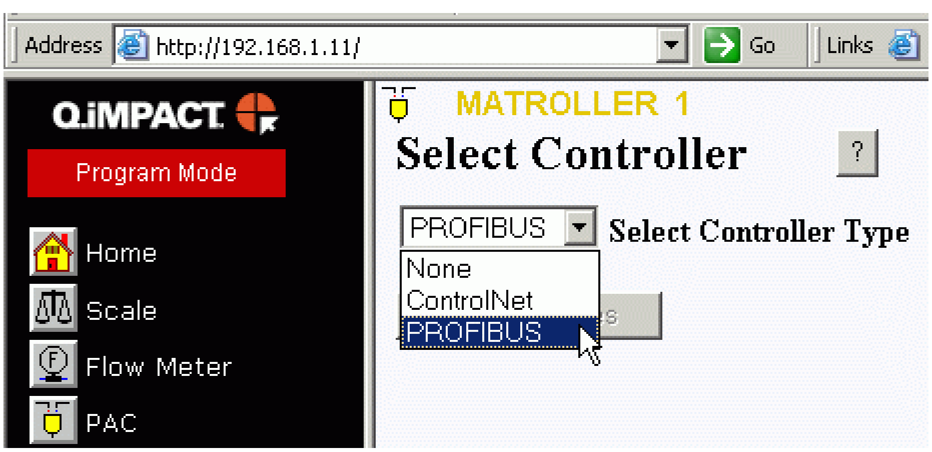
Topics covered:

- Q.iMPACT matroller Profibus interface board
- Setting up and adding a Q.iMPACT matroller to a Profibus network
- Siemens S7 program examples
- Q.iMPACT matroller supported commands
- Technical information
- Qi GSD file details

Enabling the Profibus board

Once the PROFIBUS board has been installed in the Matroller it is NOT enabled by default. You MUST enable this board before it will work.

How? While in Program mode click on the "PAC" button and then on "Select Controller". You must then Select the Profibus option from the pull down list as shown below.



Overview

The Controller communicates to the Q.iMPACT cluster or QiLite through a "Bridge MATROLLER" using PROFIBUS communications. A Bridge MATROLLER, a MATROLLER that contains a PROFIBUS interface card, may support run-time messaging for up to 10 instrument channels located in either the local or remote MATROLLER. MATROLLER's communicate with each other through a separate TCP/IP/Ethernet link.

The PROFIBUS interface card enables the Bridge MATROLLER to communicate to a PROFIBUS L2-DP master according to DIN 19 245. It consists of a MATROLLER backplane-compatible module and software that resides in the MATROLLER, which implements the data exchange.

240 bytes of data are transmitted from the Matroller to the Host Controller. This block of data contains the status of up to 10 instruments (Scales or Flowmeters) and other system information. This data block is cyclic in nature and is continuously retrieved by the Host Controller. We shall refer to this is the **INPUT DATA**.

72 bytes of data are transmitted from the Host Controller to the Qi Matroller. This data block is used to "Control" the Qi. Ie to send Start Feed or Abort Feed commands as well as to read and write to variables (most often referred to as shared data variables) within the Q.iMPACT MATROLLER. We shall refer to this is the **OUTPUT DATA**.

The maximum number of instrument channels is limited to 168 based on the optimum configuration of PROFIBUS interface cards and flow meter interface cards only. This optimum configuration is comprised of 18 Bridge MATROLLERs with two flow meter cards each (8 instrument channels total) and 2 standard MATROLLERs with three flow meter cards each (12 instrument channels total). For a scale only system, the maximum number of instrument channels is limited to 80. This configuration is comprised of 8 Bridge MATROLLERs with two dual scale cards each (4 instrument channels total) and 12 standard MATROLLERs with two dual scale cards each (4 instrument channels total). Other optimum system configurations are shown in Appendix II.

The address of the QiMPACT is software configurable within the QiMPACT.

Baud rate from 9.6k to 12MB is supported. The Profibus board will autodetect the Profibus baud rate.

Material Transfer status is normally updated twice a second per instrument channel. This status is then made available to the Controller from the Bridge MATROLLER. Instrument channels that are remote to their assigned Bridge MATROLLER also send their Material Transfer statuses to this Bridge MATROLLER at a rate of twice a second per instrument channel. This means that even though the actual data from the Matroller may be reaching the Controller ever 20 mS the actual data will only be changing every 500mS. As a result you should not use this data for high speed control external to the QiMPACT. The QiMPACT should always be in direct control of a Feed

The Qi.GSD file is supplied with the Qi on the CD and must be installed prior to commissioning the Qi Profibus network

The PROFIBUS interface card installed in a MATROLLER supports three types of data exchange: Shared data reads / writes, PAC command / response pairs, and Cyclic Messaging for Multiple PAC Instrument Channels.

For further technical information on the Profibus interface please refer to:

Profibus Data Messaging For Phase II.doc

Command Sequence Overview

There is no dedicated "Start bit" to trigger the Qi. Ie there is no bit that when turned ON will cause the Qi to evaluate the Data in its Input Buffer and act on it, such as Start a Feed. The Qi relies on detecting that there has been a data "change". Whenever the Input Buffer has changed ie there is new data the Qi sees this as an implied "trigger" or "Start bit". In order to separate the Commands **a NULL command MUST BE SENT**.

In other words, once you have loaded the Command Data into the Output Buffer, it is normally left there for about 100 to 200 mS. This will allow enough time for the data to reach and be evaluated by the Qi**. You must then place NULLS (zeroes) into the Output Buffer BEFORE sending the next Command**

Upon Startup of the PLC or Controller by default NULLS should be placed into the Output Buffer

Data Input to Controller

This Input data block is 240 bytes in length and is structured as follows:

Bytes 0 > 1	**Checksum [1]**	**Integer**	
Bytes 2 > 3	**Inverted Checksum [2]**	**Integer**	
Bytes 4… 15	**Reserved**		
Bytes 16… 35	**Instrument 1 [3]**	**10 words**	**(Assembly slot 1)**
Bytes 36… 55	**Instrument 2**	**10 words**	**(Assembly slot 2)**
Bytes 56… 75	**Instrument 3**	**10 words**	**(Assembly slot 3)**
Bytes 76… 95	**Instrument 4**	**10 words**	**(Assembly slot 4)**
Bytes 96… 115	**Instrument 5**	**10 words**	**(Assembly slot 5)**
Bytes 116… 135	**Instrument 6**	**10 words**	**(Assembly slot 6)**
Bytes 136… 155	**Instrument 7**	**10 words**	**(Assembly slot 7)**
Bytes 156… 175	**Instrument 8**	**10 words**	**(Assembly slot 8)**
Bytes 176… 195	**Instrument 9**	**10 words**	**(Assembly slot 9)**
Bytes 196… 215	**Instrument 10**	**10 words**	**(Assembly slot 10)**
Bytes 216 > 217	**Shared Data Status [4]**	**1 word**	
Bytes 218 … 239	**Shared Data Read Value [5]**	**11 words**	

1. This is the integer (word) sum of words starting with the word composed of Data Byte 16 and ending with the word composed of Data Byte 215. The carry is discarded during the summing process.
2. This is the bit inverse of the Checksum
3. This is all the input data for one Instrument. NOTE: the assembly slot is the "key" to which Channels data is contained in these words. The Assembly slot number can be seen on the Channel setup page of the Qi. See **Input Assembly** below for breakdown of this data
4. The status of data writes to the Qi is provided here
   00 – **Null Status**
   01 – **Command Completed Successfully**
   02 – **Invalid Shared Data Name** (Shared Data Writes only)
   03 – **Invalid Shared Data Command**
   04 – **Cannot Write Because This Is A Legal-For-Trade Field** (Shared Data Writes only)
   05 – **Cannot Access Remote MATROLLER**
5. The Shared Data read command returns the data here. See **Read Response** below for details.

Input Assembly for one Instrument (item [3])

The following block of data exists for each of the 10 Assembly Slots (Instruments) in the Data Block Input to the Controller. The following table describes the content of just one of the 10 word data blocks.

Offset	"Data Descriptor Label"	Short Name	Type		Comment
0	Channel Number	Channel	Byte		
1	**Status 1** 0 "PAC Data Integrity Bit" 1 "Instrument Data Integrity OK " 2 "Scale Over Capacity" 3 "Scale Under Zero" 4 "Scale Motion" 5 "Material Transfer Cycle Active" 6 "Final Control Element Output" 7 "Waiting for Controller to Acknowledge Last Material Transfer/Hand Add complete"	DataIntegrity DataOK OverCapacity UnderZero ScaleMotion CycleActive FCE_Output AwaitingACK	8 bit Binary		alternates polarity every 5 seconds. 0 = Off , 1 = On Qi will not accept a new Start Feed command until the Ack (4) command has been sent
2	**Status 2** 0 "Feed Type", 0=Gain In Weight 1 "Feed Type", 1= Loss In Weight, 2= Flow Meter, 3 = Hand Add 2 "Manual-Not Auto-Mode" 3 "Gross Weight Feed" 4 "Feed Override Active" 5 "Feed Failed" 6 "Communication Error" 7 "Device Stability Warning" 8 "Very Unstable Device" 9 "Too High or Too Low Flow" at cutoff 10 "Three Times Average Flow" at cutoff 11 "Fast Feed Rate Alarm" 12 "Wait for All Overlap Requests" 13 "Waiting to Start Primary" Overlapped Feed 14 "Primary Overlapped Feed" In Progress 15 "Secondary Overlapped Feed" In Progress	FeedType ManualMode GrossWeight FeedOverride FeedFailed CommError WgtUnstable VeryUnstable ErraticFlow 3TimesFlow RateAlarm WaitOvlpReq DelayPrimary PrimOverlap SecOverlap	16 bit Binary		The two bits represent a number between 0 and 3 Qi will Ignore Commands to Stop a Feed
4	"Feed Weight". This field is reset to zero at the beginning of a feed. During most feeds, this field contains the Net Accumulated Weight for the single feed. During Primary Overlapped feeds, this field contains the combined weight of all feeds. At completion of the feed, it contains the Delivered Weight for this feed.	FeedWeight	Float 32 (4 bytes)		This value will remain until the next Start Feed command
8	"Gross Weight". For scales, this field the gross weight. For flow meters, this field is the same as Feed Weight.	GrossWeight	Float 32 (4 bytes)		This value is always active and can be used by the HMI for weight display purposes
12	"Rate of Change of Weight"	Flow Rate	Float 32 (4 bytes)		This value is always active and can be used by the HMI for Flow Rate display purposes
16	"Time until Slow Step Timer Expires" in Seconds. 0 = Alarm.	SlowStepTimr	Integer (Word)		
18	"Estimated Time to Complete" in Seconds	TimeToFinish	Integer		
	Message Length = 20 bytes				

Read Response (Item 5)

This area has a dual function.

Function A - It contains the response to a Command sent to the Qi. The Qi responds to each Command received with a response "number" (SEE Command Response list below). The Controller should always evaluate this response number in order to determine whether the command sent was successful. In some case the Qi will reject a command as being invalid. Ie the Feed Target may be to large for the scale and overflow the scale. In this case the Qi would respond with a code of "21"

Some of the Command Data is "echoed" back in the response data. This is so that you can match the correct Command and response data by ensuring that the Channel, Sequence number and Material Path match the Commands ones.

The structure and content of this response is detailed in the Table below. And the Command response's are listed below that.

Function B – Whenever the Controller sends a Shared data Read command to the Qi the value of the Shared Data is placed in this area. The data is left justified and in ASCII format

Offset	"Data Descriptor Label"	Short Name	Type	
0	"Channel Number" as in PAC command	Channel	Byte	
1	"Message Sequence Number" as in PAC command	SequenceNum	Byte	
2	"Material-Path Index" as in PAC command	MaterialPath	Integer	
4	"Command" Number as in PAC command	Command	Byte	
5	"Command Status" See Listing below.	ComandStatus	Byte	
The following fields typically are only applicable in the "Acknowledge Material Transfer Complete" Command Response. However, when a Start Material Transfer command fails immediately, these fields will contain values indicating a Material Transfer failure.				
6	"Material Transfer Status" See Listing below.	MxferStatus	Byte	
7	"Reserved"	Reserved	Reserved	
8	"Material Transfer Status Qualifiers" 0 "Over Tolerance" 1 "Under Tolerance" 2 "Power Failure" during feed 3-15 Reserved	MxferStatQ	16 Binary	
10	"Reserved"	Reserved	Integer	
12	"Delivered Weight"	FeedWeight	Float 32	
16	"Deviation Error from Target Weight"	TargetError	Float 32	
	Message Length = 20			

Command Status Values:

0	SUCCESS – Start Gain-In-Weight Material Transfer Command Complete
1	SUCCESS – Start Loss-In-Weight Material Transfer Complete.
2	SUCCESS – Start Flow Meter Material Transfer Complete.
3	SUCCESS – Start Validate Aggregate Feed Complete.
4	SUCCESS – Start Hand Add Command Complete.
5	SUCCESS – Command Complete
6	Command Not Complete – Request status again after a short delay
7	ERROR – Communications Error
8	ERROR – Invalid Instrument Channel Number
9	ERROR – Invalid Command
10	ERROR – Invalid Material-Path Table Index Number
11	ERROR – Invalid Algorithm in Material-Path Table Entry
12	ERROR – Invalid Feed Type in Material-Path Table Entry
13	ERROR – Invalid Measuring Device Channel Table Index in Material-Path Table Entry
14	ERROR – Invalid Gain In Weight Feed and Dump to Empty Algorithm Combination in Material-Path Table
15	ERROR – Invalid Destination in Material-Path Table Entry.
16	ERROR – Other invalid data in Material-Path Table Entry
17	ERROR – Overlap Feed Request Error, including invalid Loss In Weight Feed in Material-Path Entry and Overlapping Feed Command.
18	ERROR – Invalid data In Measuring Device Channel Table Entry
19	ERROR – Invalid Mode for Command, e.g., Controller is requesting to start a new material transfer before the last feed is complete or before the controller has acknowledged that the last material transfer is complete.
20	ERROR – Requested add amount too small
21	ERROR – Requested add amount would bring Scale Device over capacity
22	ERROR – Scale Device Currently over Capacity
23	ERROR – Scale Device Currently under Zero
24	ERROR – Instrument Malfunction
25	ERROR – Target Weight is less than Spill
26	ERROR – Response Timeout
27	ERROR – Too many overlapping feeds
28	WARNING – Delayed start to feed due to overlapping feed.
29	WARNING – Abort ignored since Time to Complete was less than Feed Override Time
30	ERROR – Invalid overlap group number
31	WARNING – Waiting for All Secondary Requests.
32	WARNING – Waiting for Measuring Device Stability.
33	ERROR – Not Enough Material.
34	ERROR – Device not configured or calibrated properly.
35	SUCCESS – Secondary Feed Start command queued.
36	ERROR – License Violation.
95	ERROR – Scale Capacity Problem.
96	ERROR – Scale Instrument Problem.
97	ERROR – Scale Loss-In-Wt Busy.
98	ERROR – Abort Unstable Scale.
99	ERROR – Not Overlap Commands being processed.

Material Transfer Status Values:

0 Successful Material Transfer – K1, K2 parameters updated
1 Successful Material Transfer – Spill Only
2 Successful Material Transfer- Dump to Empty
3 Successful Hand Add
4 Material Transfer Complete - Parameters NOT updated
5 Material Transfer Complete – Parameters reset.
6 Material Transfer Complete with Manual Operation
7 Failed – Unstable Scale
8 Failed – Overlapping Feed Error Corrupted Flow
9 Failed – Erratic Flow Error
10 Failed - Low Flow Error
11 Failed - High Flow Rate Alarm Error
12 Failed – Communication Error
13 Failed – Instrument Error
14 Failed – Scale Device Capacity Error
15 Failed – Predictive Algorithm Error
16 Failed – Material Transfer with Manual Operation
17 Failed – Amount of material transferred did not match in source and destination.
18 Failed – Controller Aborted Material Transfer
19 Failed – Controller Reset Channel
20 Failed – Reserved
21 Failed – Controller Reset Cluster
22 Failed – Slow Step Timer Timeout
23 Failed – Secondary Requests Timeout
24 Failed – Power Failure During Feed
25 Failed – Start Material Transfer Command Failed Immediately – Transfer Did Not Start
26 Status Only – Material Transfer Is In Progress.

Data output to Controller

The Data Output Block is 72 bytes in length. By changing the content of a few of the values we are able to perform functions such send a Command to the Matroller or write data to a shared data variable or read data from a shared data variable.

There is only one of these data blocks per bridge Qi (A bridger Qi is a Qi with a comms board installed and functioning. Ie it is communicating directly with a PLC or similar)

The Structure is as follows:

Function	Address	Type	Comment
Reserved	Byte 0	Byte	
Commmand Type	Byte 1	Byte	0 – **Null Command** 1 – **Read Shared Data** 2 – **Write Shared Data** 10 – PAC Command [0x0A] [1] 20 – PAC Command Status [0x14] [2]
Reserved	Byte 2	Byte	
MATROLLER Node	Byte 3	ASCII	Ranges from '1' to 'k'. This corresponds with numbers 1 to 20. This is the Matroller ID or number, and is an ASCII character. Ie a '5' would be a 0x35 or 53 decimal.
Variable name (Shared data variable)	Bytes 4…9	6 ASCII chars	When using command type 1 or 2 the Shared Data variable must be specified here. The variable name is preceded with an '/'. Ie '/ws102' In decimal the bytes would contain the following values: 92,119,115,49,48,50.
reserved	Byte 10 & 11	2 bytes	
Write Value [3]	Byte 12 … 71	60 bytes	This is either the data that you want written to a Shared Data Variable OR it is the PAC Command data, see below for the 60 byte structure of this Command Data
	Total length	**72 bytes**	

1. No remote MATROLLER node or variable name is required. The shared data write value contains the **Controller->Q.iMPACT Command Assembly for Single Instrument Channel.**
2. No remote MATROLLER node, variable name, or shared data write value is required (any data in these fields will be ignored).
3. If you are writing to a variable (Command type 2), then the data that you are writing will be here. If you are sending a PAC Command such as Start Feed or Abort Feed then these 60 bytes contain the details of this command such as Target, Channel and Material Path. See PAC Command Structure below

PAC Command Structure

Offset	"Data Descriptor Label"	Name	Data Type	
0	"Channel Number" (1 – 160)	Channel	Byte	
1	"Message Sequence Number". The controller should generate a new sequence number for each new command.	SequenceNum	Byte	
2	"Material-Path Index" (1- 1000)	MaterialPath	Integer, 16 bits	
4	1 Start Material Transfer. 2 Start Material Transfer with Gross Weight Target. This command is only valid for a scale device. 3 Start Hand Add. 4 Acknowledge Material Transfer or Hand Add Complete 5 Abort Material Transfer 6 Reset Slow Step Timer 7 Start Manual Mode 8 Turn on FCE in Manual Mode 9 Turn off FCE in Manual Mode 10 Restart Auto Mode 11 Complete Feed in Manual Mode 12 Master Reset – Instrument channel 13 Report Last Status 14 Master Reset – Cluster 15 Validate Aggregate Secondary Feeds 16 Reset ETC Error from Last Pri. Feed 20 Queue Start Material Transfer * 21 Queue Start Mat'l Transfer, Gross Wt * 22 Start Queued Material Transfers * 23 Reset Queued Material Transfers * 25 Turn on Fast FCE in Manual Mode * 26 Turn off Fast FCE in Manual Mode * 30 Reset Local PROFIBUS Card 31 Reset all PROFIBUS Cards in Cluster	**Command Number** * - Q.i Lite version only	Byte	
The following fields are only applicable to the "Start Material Transfer Cycle" Command				
5	"Group Number" for Start Material Transfer Command. This field identifies which Primary and Secondary feed requests belong to the group of feeds that make up an overlapping feed. A value = 0 indicates that this NOT an overlapped feed request.	GroupNumber (NOT QiLite)	Byte	
6	"Number of Overlapping Secondary Feeds" that are being fed into a Unit simultaneously with THIS Primary Feed. This field is only meaningful in a Primary Feed using scale instrument for the Vessel. The Material-Path must indicate this Gain-In-Weight feed. The APC turns on the FCE for the Primary Feed when it determines there will be enough time after the overlap completes to run the APC algorithm with the scale.	OverlapNum (NOT QiLite)	Byte	
7	"Reserved"	Reserved	Byte	
8	For "Start Material Transfer" or "Start Hand Add" commands, this field *must* contain the target weight for the feed. For "Turn On FCE In Manual Mode", this field *must* contain the number of seconds to keep the FCE on". The value "-9999" is a 32-year timeout. All other negative values are a 0-second timeout. For "Reset Slow Step Timer", this field *may* contain the number of seconds to set the slow step timer. If this field is 0, the Q.iMPACT resets the slow step timer to its original value for the feed.	**TargetWeight**	Float, 32 bits	
12	"Tolerance +" Value "-9999" disables tolerance check.	PosTolerance	Float, 32 bits	
16	"Tolerance –"Value "-9999" disables tolerance check.	NegTolerance	Float, 32 bits	
20	"Material Transfer ID" is an identifier field that is sent from the Material Transfer Controller. The Q.iMPACT reports this field as part of the data collection record. If there is a "~" in the field, the Q.iMPACT displays the data following the "~".	MatTranID	40 Character	
	Message Length = 60 bytes			

To issue a PAC Command, the Controller must load the Shared Data Command with a 10 and the Shared Data Write Value with the PAC Command Assembly . The MATROLLER Node and Variable Name fields can be left blank. The Controller must examine the Shared Data Status after the PAC Command to determine if the operation has completed successfully . The Controller must then send a Null command to complete the sequence. This is needed in order to reset the status back to "null status" so that the Controller does not use the status of the previous command.

To get a PAC Command Response, the Controller must load the Shared Data Command with a 20. The Shared Data Write Value, the MATROLLER Node, and the Variable Name fields can be left blank (any data in these fields will be ignored). The Controller must examine the Shared Data Status after issuing the PAC Command Response command to determine if the operation has completed successfully. If successful, the Shared Data Read Value contains the Q.iMPACT->Controller Response Assembly . The Controller must then send a Null command to complete the sequence.

Controller Response (Assembly)

Offset	**"Data Descriptor Label"**	**Short Name**	**Data Type**	
0	"Channel Number" as in PAC command	Channel	Byte	
1	"Message Sequence Number" as in PAC command	SequenceNum	Byte	
2	"Material-Path Index" as in PAC command	MaterialPath	Integer, 16bits	
4	"Command" Number as in PAC command	Command	Byte	
5	"Command Status" See Listing below.	ComandStatus	Byte	
The following fields typically are only applicable in the "Acknowledge Material Transfer Complete" Command Response. However, when a Start Material Transfer command fails immediately, these fields will contain values indicating a Material Transfer failure.				
6	"Material Transfer Status" See Listing below.	MxferStatus	Byte	
7	"Reserved"	Reserved	Reserved byte	
8	"Material Transfer Status Qualifiers" 3 "Over Tolerance" 4 "Under Tolerance" 5 "Power Failure" during feed 3-15 Reserved	MxferStatQ	16 Binary	
10	"Reserved"	Reserved	Integer	
12	"Delivered Weight"	FeedWeight	Float 32	
16	"Deviation Error from Target Weight"	TargetError	Float 32	
	Message Length = 20 bytes			

Controller writes | **MATROLLER response**

Typical Controller to Matroller Sequence for Sending a Command

Shared Data Command = Null Command (00)
Shared Data Write Value =-NA-
Note: *This step synchronizes Controller and MATROLLER. Repeat until Null Status is*

Shared Data Status = Null Status (00)
Cyclic Assembly =
Ch 1 Idle
Ch 2 Idle
.
Ch 10 Idle
Shared Data Read Value =- NA-

START FEED CMD

Shared Data Command = PAC Command (10)
Shared Data Write Value =
Ch2, MP129, SQ32
CMD = Start Feed,
Target, T+, T-

Shared Data Status =
Command Completed Successfully (01)
Cyclic Assembly =
Ch 1 Idle
Ch 2 Idle
.
Ch 10 Idle
Shared Data Read Value = -NA-

Ignore Cyclic data until valid response

Shared Data Command = Null Command (00)
Shared Data Write Value =
-NA-
Note: *Follow a successful command with a Null command to re-synchronize the next command / response pair.*

Shared Data Status = Null Status (00)
Cyclic Assembly =
Ch 1 Idle
Ch 2 Idle
.
Ch 10 Idle
Shared Data Read Value = -NA-

CMD RESPONSE READ

Shared Data Command =
PAC Command Status (20)
Shared Data Write Value = -NA-

Shared Data Status =
Command Completed Successfully (01)
Cyclic Assembly =
Ch 1 Idle
Ch 2 Active, Status=OK, Wt, Rate
.
Ch 10 Idle
Shared Data Read Value =
Ch2, MP129, SQ32,
CMD = Start Feed,
Status = SUCCESS

Shared Data Command = Null Command (00)
Shared Data Write Value = -NA-

Shared Data Status = Null Status (00)
Cyclic Assembly =
Ch 1 Idle
Ch 2 Active, Status=OK, Wt, Rate
.
Ch 10 Idle
Shared Data Read Value = -NA-

Shared Data Status = Null Status (00)
Cyclic Assembly =
Ch 1 Idle
Ch 2 Active, Status=OK, Wt, Rate
.
Ch 10 Idle
Shared Data Read Value = -NA-

TIP1: By default, when not sending a Command fill the Output Buffer with Nulls.
TIP2: The "Cmd Response Read" is not required for the system to function.
TIP3: The data should be kept in the O/P buffer for at least 150mS. This time will also depend on the BAUD rate that you have set up
TIP4: More examples of this type can be found in the "Profibus Messaging for Phase II.doc" found on your CD

Practical Examples – S7 PLC

The next section will show you how to interface to a Siemens S7 PLC. It is assummed that you are familiar with programming a Siemens S7 PLC and configuring a ProfibusDP network.

In our examples:

- A Siemens S7-314C-2DP is used
- The Qi Output Buffer (240 bytes) is mapped to the S7 PIB data area from address 256
- The Qi Input Buffer (72 bytes) is mapped to the S7 PQB data area from address 256
- The PQB[256] is mapped into DB10….
- The PQB[72] is mapped from DB1…

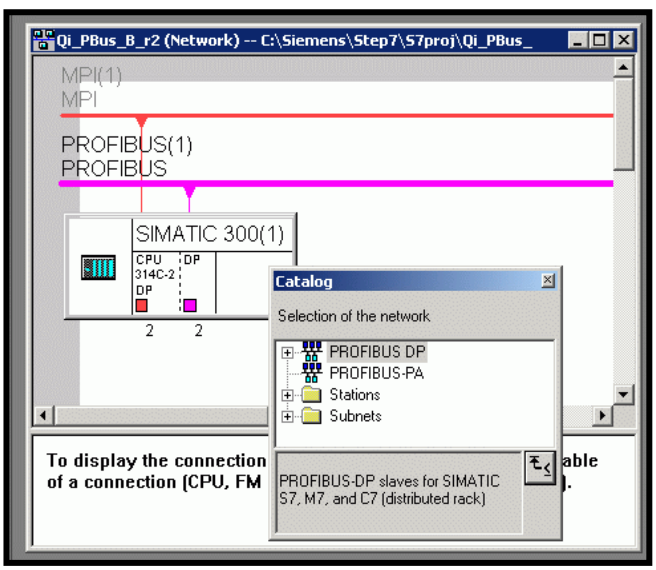
The code examples shown below have been simplified for clarity, and although they will work. A functioning system should add to and expand this functionality. The actual PLC code shown below is included on your CD. Or it can be downloaded from the Qi website.

Adding a Qi Matroller to a Profibus network

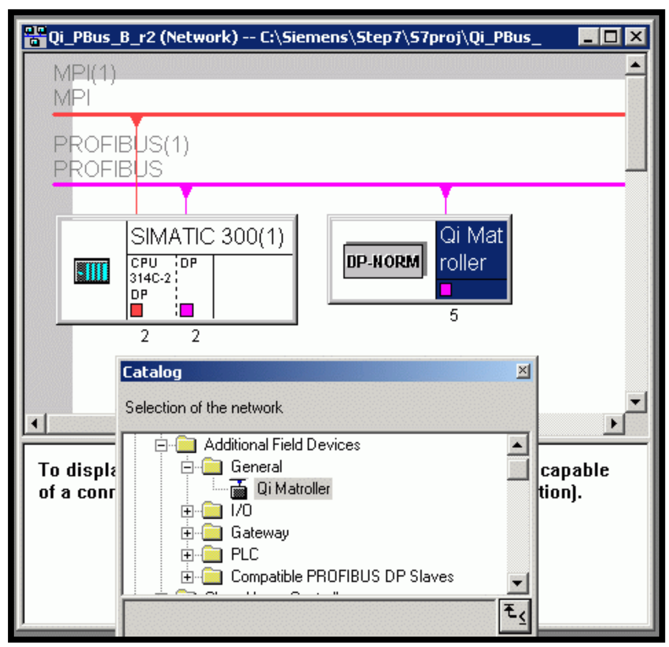
Note: Before adding the Matroller, the Qi.GSD (supplied on your Qi MAtroller CD) file must be installed. The following pictures show the sequence of adding the Matroller.

Step one: Add the Matroller to the Network

1) the Profibus catalogue is opened for viewing



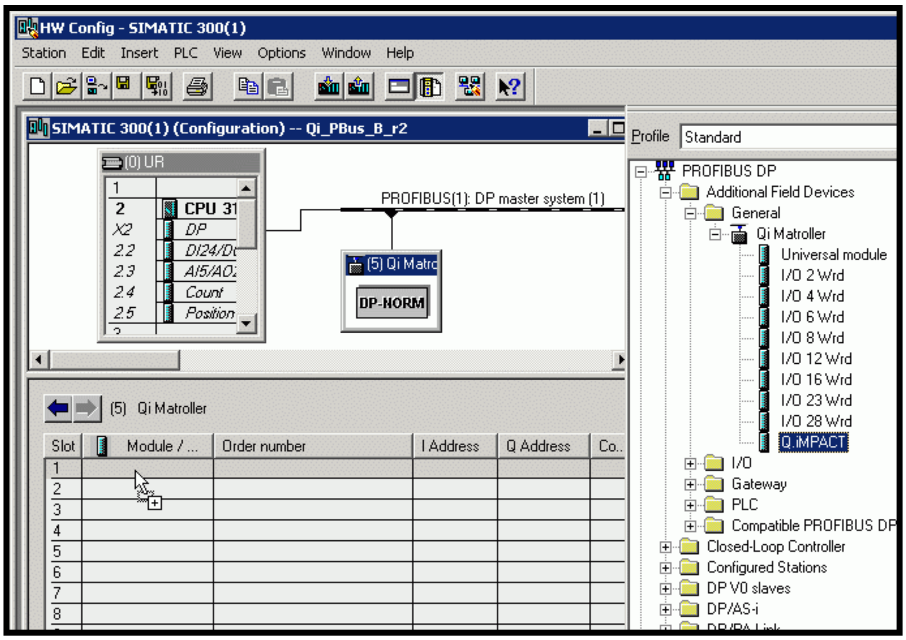
2.) The Qi Matroller is then dragged onto the Profibus Network



Step two is to configure the hardware. This means defining the I/O address locations.

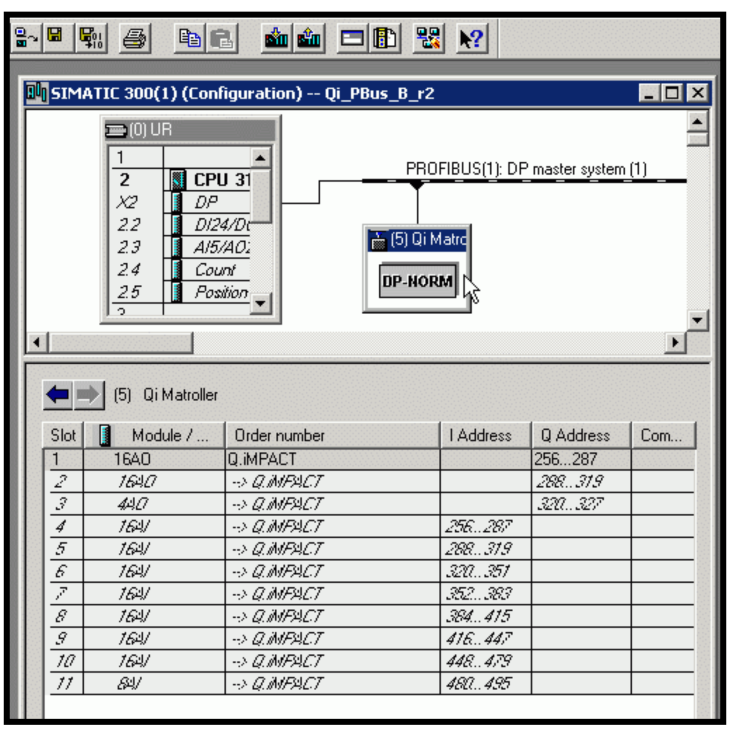
Select the QiMPACT from the list of I/O options. (All the other options refer to a jagXtreme and cannot be used by the Matroller)

The QiMPACT address options are then dragged into slot 1 as shown.



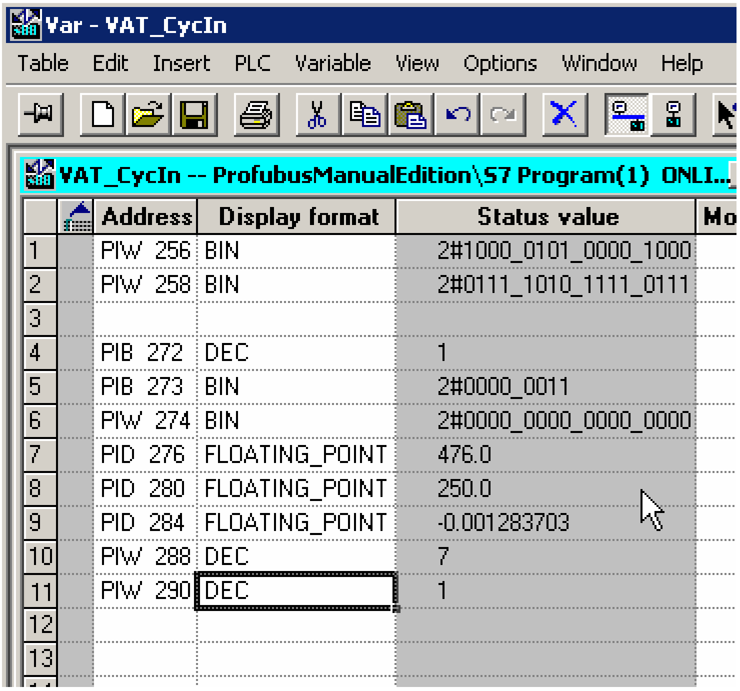
This shows the address mapping after adding the I/O mapping. In this example the Peripheral addressing starts at 256 for both Inputs and Outputs. The starting address's can be changed to suit your needs.

Note the 72 bytes of Output buffer size and the 240 bytes of Input buffer size.



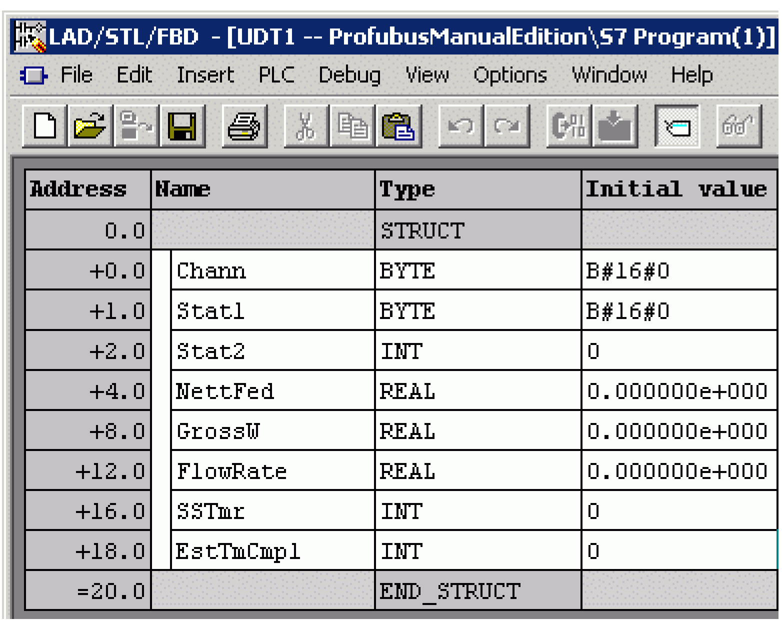
The Input Data

This is a view of the Input Buffer that the data from the Matroller is copied into by the ProfiBus network. The correct display format has been chosen for each variable. PIW 256 and PIW 258 are the Checksum and Checksum inverted. The inverted bits can clearly be seen. The gap between PIW 258 and PIB 272 are the unused "reserved" system bytes for future use. The actual Channel (Instrument) data starts at PIB 272. The format from this point on is based on the table above called " Input Assembly …" Each Channel uses 10 words. This data should be copied into a Data Block area for use by your program.



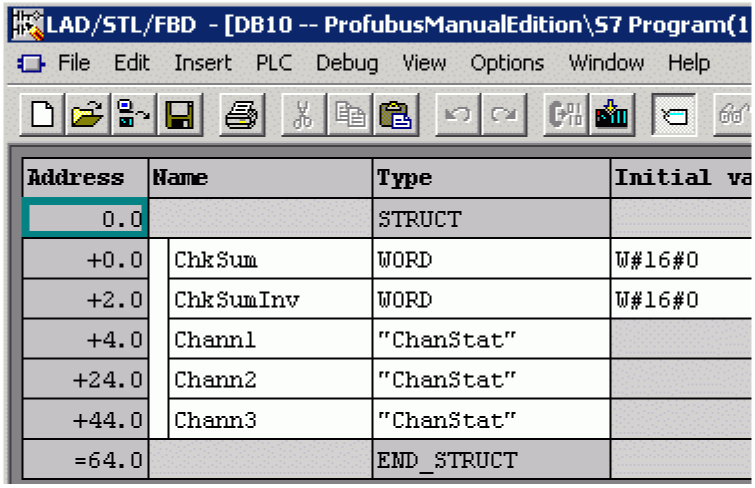
		Address	Display format	Status value	Mo
1		PIW 256	BIN	2#1000_0101_0000_1000	
2		PIW 258	BIN	2#0111_1010_1111_0111	
3					
4		PIB 272	DEC	1	
5		PIB 273	BIN	2#0000_0011	
6		PIW 274	BIN	2#0000_0000_0000_0000	
7		PID 276	FLOATING_POINT	476.0	
8		PID 280	FLOATING_POINT	250.0	
9		PID 284	FLOATING_POINT	-0.001283703	
10		PIW 288	DEC	7	
11		PIW 290	DEC	1	
12					
13					

Channel Specific UDT – below is an example of a channel specific UDT formatted to display the channel input data in the correct format.



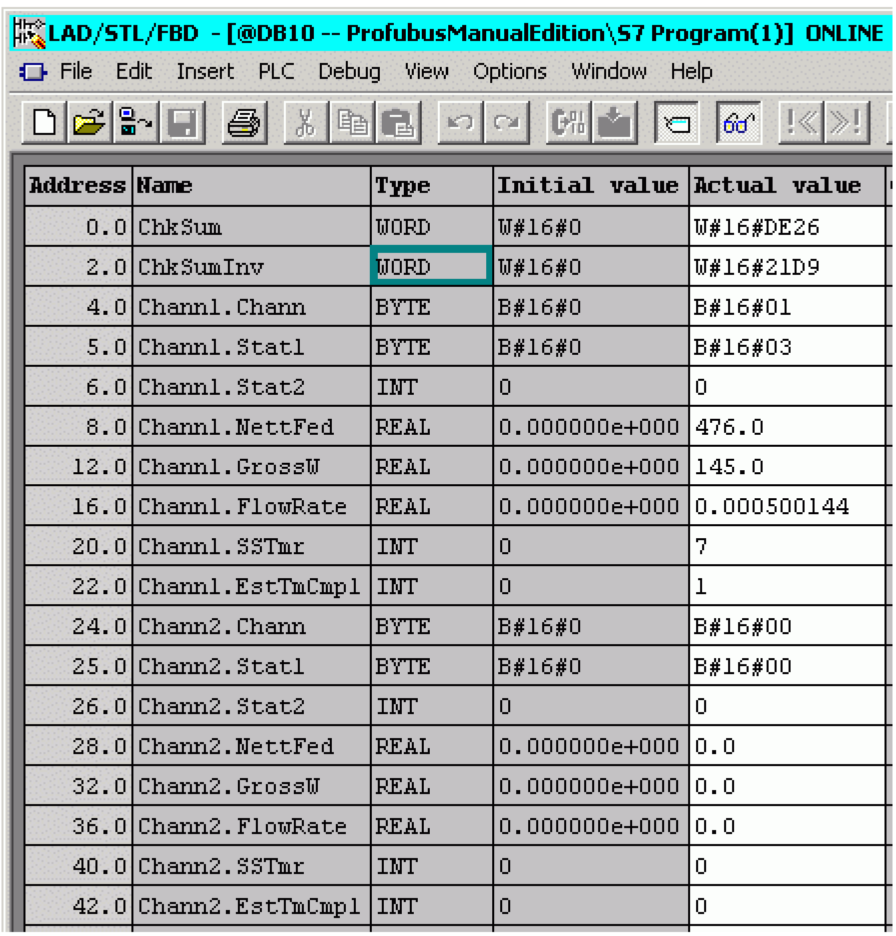
Address	Name	Type	Initial value
0.0		STRUCT	
+0.0	Chann	BYTE	B#16#0
+1.0	Stat1	BYTE	B#16#0
+2.0	Stat2	INT	0
+4.0	NettFed	REAL	0.000000e+000
+8.0	GrossW	REAL	0.000000e+000
+12.0	FlowRate	REAL	0.000000e+000
+16.0	SSTmr	INT	0
+18.0	EstTmCmpl	INT	0
=20.0		END_STRUCT	

This is a view of DB10 Structured to accept the data from the PIW area. The UDT shown above has the symbolic name of "ChanStat". In the example below space for the display of 3 channels only has been created. This is shown in the "Declaration view"



Address	Name	Type	Initial va
0.0		STRUCT	
+0.0	ChkSum	WORD	W#16#0
+2.0	ChkSumInv	WORD	W#16#0
+4.0	Chann1	"ChanStat"	
+24.0	Chann2	"ChanStat"	
+44.0	Chann3	"ChanStat"	
=64.0		END_STRUCT	

Here is the same DB shown in "Data View". Data from a configured channel is shown. The Gross weight for the channels is in address 12.0 and has a value of 145.0



Address	Name	Type	Initial value	Actual value
0.0	ChkSum	WORD	W#16#0	W#16#DE26
2.0	ChkSumInv	WORD	W#16#0	W#16#21D9
4.0	Chann1.Chann	BYTE	B#16#0	B#16#01
5.0	Chann1.Stat1	BYTE	B#16#0	B#16#03
6.0	Chann1.Stat2	INT	0	0
8.0	Chann1.NettFed	REAL	0.000000e+000	476.0
12.0	Chann1.GrossW	REAL	0.000000e+000	145.0
16.0	Chann1.FlowRate	REAL	0.000000e+000	0.000500144
20.0	Chann1.SSTmr	INT	0	7
22.0	Chann1.EstTmCmpl	INT	0	1
24.0	Chann2.Chann	BYTE	B#16#0	B#16#00
25.0	Chann2.Stat1	BYTE	B#16#0	B#16#00
26.0	Chann2.Stat2	INT	0	0
28.0	Chann2.NettFed	REAL	0.000000e+000	0.0
32.0	Chann2.GrossW	REAL	0.000000e+000	0.0
36.0	Chann2.FlowRate	REAL	0.000000e+000	0.0
40.0	Chann2.SSTmr	INT	0	0
42.0	Chann2.EstTmCmpl	INT	0	0

This is an example of code to copy the data from the PIW area into DB10. In this case we have not copied the PIB 260 to PIB271 data into the DB10 as this area is currently unused by the Qi and contains no useful data at this point in time.

```
// Checksum data
      L     PIW  256
      T     DB10.DBW    0              // Checksum
      L     PIW  258
      T     DB10.DBW    2              // Inverted Checksum

// Assembly Slot1 (Scale A in this example)
      L     PIW  272
      T     DB10.DBW    4
      L     PIW  274
      T     DB10.DBW    6
      L     PIW  276
      T     DB10.DBW    8
      L     PIW  278
      T     DB10.DBW   10
      L     PIW  280
      T     DB10.DBW   12
      L     PIW  282
      T     DB10.DBW   14
      L     PIW  284
      T     DB10.DBW   16
      L     PIW  286
      T     DB10.DBW   18
      L     PIW  288
      T     DB10.DBW   20
      L     PIW  290
      T     DB10.DBW   22
```

The Output Data

The Output data is used to Write and Read to (Shared) Variables in the Qi Matroller as well as to send Commands such as "Start a Feed" and "Abort a Feed".

In our examples below the S7's output buffer starts from PQB256 and is 72 bytes in length. By changing the value of certain variables we can perform the various functions. It is important to remember that the Output Buffer must be filled with zeroes between placing data in the output buffer. These zeroes (nulls) are required so that the Qi can separate and recognize a new command.

As there is no actual "Start bit". The Matroller assumes that new or fresh data at its input buffer is an implied start. It will then evaluate any new data in its input buffer and act on it, if it is valid.

Here is an example of a UDT (called "Output") structured for the Output Buffer. Note: there is a nested UDT called "CommStruct" within this UDT which is 60 bytes long. This UDT is based on the Data Output Buffer which is described elsewhere in this chapter.

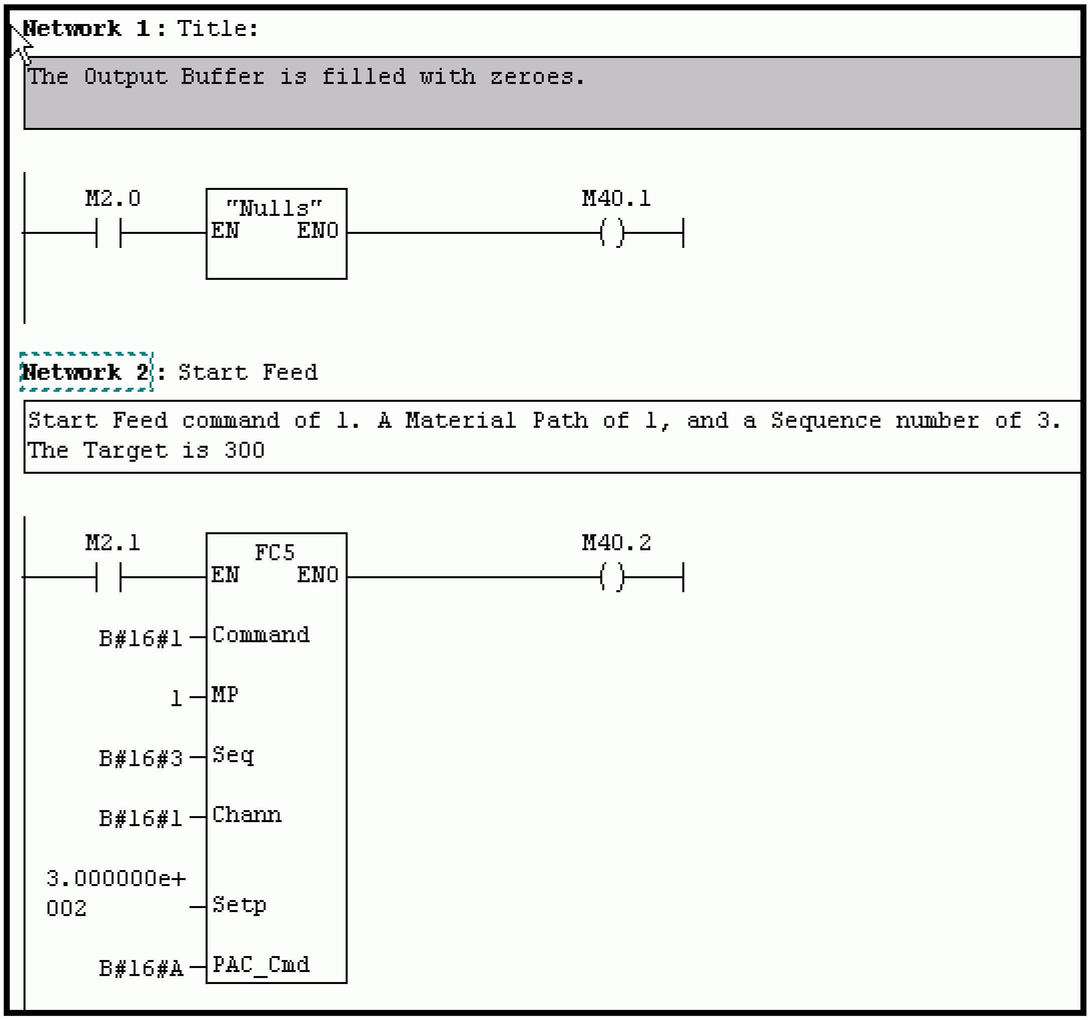
Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	Res1	BYTE	B#16#0	
+1.0	CmdType	BYTE	B#16#0	
+2.0	Res2	BYTE	B#16#0	
+3.0	Node	CHAR	' '	
+4.0	VarName	ARRAY[1..6]		
*1.0		CHAR		
+10.0	Res3	WORD	W#16#0	
+12.0	IntCmd	"CommStruct"		
=72.0		END_STRUCT		

This is the structure of the nested UDT "CommStruct" embedded in the UDT above.

Address	Name	Type	Initial value	Co
0.0		STRUCT		
+0.0	Chann	BYTE	B#16#0	
+1.0	Seq	BYTE	B#16#0	
+2.0	MatPath	INT	0	
+4.0	Command	BYTE	B#16#0	
+5.0	Grp	BYTE	B#16#0	
+6.0	GrpQty	BYTE	B#16#0	
+7.0	Res	BYTE	B#16#0	
+8.0	Target	REAL	0.000000e+000	
+12.0	TolP	REAL	0.000000e+000	
+16.0	TolN	REAL	0.000000e+000	
+20.0	MatId	ARRAY[1..40]		
*1.0		CHAR		
=60.0		END_STRUCT		

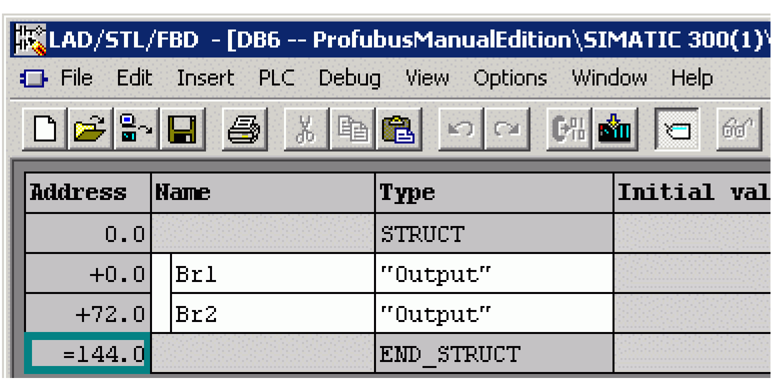
Here we are passing Start Feed data to FC5. In this example we are passing the minimum amount of data. A more complete set of parameters would include Tolerance values and Material ID etc.

The "Nulls" Function places zeroes into the Output Buffer



DB6 has had two instances of the output UDT added. They have been called BR1 and BR2. Br1 will most probably be communicating with "Bridge1". In the example code on the next page you can see BR1 being used.

"BR1"



This is the FC5 code. The parameters passed to FC5 are then copied into the correct locations of the "Output" UDT. NOTE: these examples are intended to assist you to get started. A fully programmed system should pass more parameters. There are a number of parameters which have been embedded in the code for clarification and display purposes. Parameters such as the Node address and Tolerances would normally also be variables that are passed to the FC.

In the example below "Op_Cmd" is the symbol for DB6. BR1 is one instance of the "Output" UDT

FC5

Address	Declaration	Name	Type	Initial value	Comment
0.0	in	Command	BYTE		
2.0	in	MP	INT		
4.0	in	Seq	BYTE		
5.0	in	Chann	BYTE		
6.0	in	Setp	REAL		
10.0	in	PAC_Cmd	BYTE		
	out				

FC5 : Start Feed Parameters

Comment:

Network 1 : Title:

Passed parameters are copied to their correct locations in the "Output" UDT Output

```
      L     #Command                    // Command
      T     "Op_Cmd".Br1.IntCmd.Command
      L     #MP                         // Material Path
      T     "Op_Cmd".Br1.IntCmd.MatPath
      L     #Seq                        // Sequence number
      T     "Op_Cmd".Br1.IntCmd.Seq
      L     #Chann                      // Channel number of Material Path
      T     "Op_Cmd".Br1.IntCmd.Chann
      L     #Setp                       // Target
      T     "Op_Cmd".Br1.IntCmd.Target
      L     #PAC_Cmd                    // Type of Command data
      T     "Op_Cmd".Br1.CmdType
```

Network 2 : Title:

This is the Matroller Node Address (49 = "1")
Cyrrently Embedded in the code, should be passed by the calling Function

```
      L     49
      T     "Op_Cmd".Br1.Node
```

Copying the Output Buffer (DB6) to the Peripheral Output Area

The following is a portion of the code that copies DB6 to the PQB area. From the PQB area it gets copied into the Qi Input Buffer by the ProfibusDP network. The complete code is on the CD supplied with the Qi Matroller.

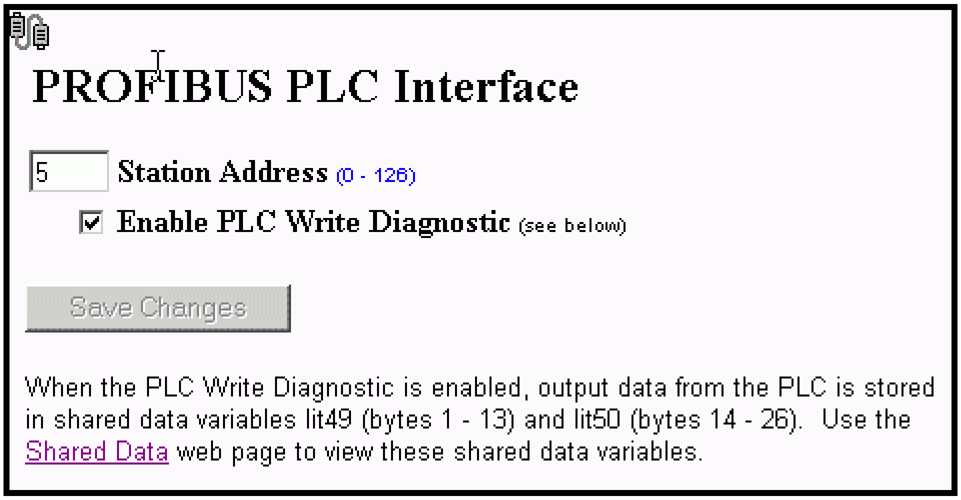
Note the swapping of the some of the bytes in this area.

```
      L     "Op_Cmd".Brl.VarName[4]
      T     PQB  263
      L     "Op_Cmd".Brl.VarName[5]
      T     PQB  264
      L     "Op_Cmd".Brl.VarName[6]
      T     PQB  265
      L     DB6.DBB   10
      T     PQB  266
      L     DB6.DBB   11
      T     PQB  267
      L     "Op_Cmd".Brl.IntCmd.Chann
      T     PQB  269                    // byte swap with Seq
      L     "Op_Cmd".Brl.IntCmd.Seq
      T     PQB  268                    // byte swap with Chann
      L     DB6.DBB   14
      T     PQB  270
      L     DB6.DBB   15
      T     PQB  271
      L     "Op_Cmd".Brl.IntCmd.Command
      T     PQB  273                    // byte swap "B"
      L     "Op_Cmd".Brl.IntCmd.Grp
      T     PQB  272                    // byte swap "B"
      L     "Op_Cmd".Brl.IntCmd.GrpQty
      T     PQB  275                    // byte swap "C"
      L     "Op_Cmd".Brl.IntCmd.Res
      T     PQB  274                    // byte swap "C"
      L     DB6.DBB   20
      T     PQB  276
      L     DB6.DBB   21
      T     PQB  277
```

Commissioning and debugging

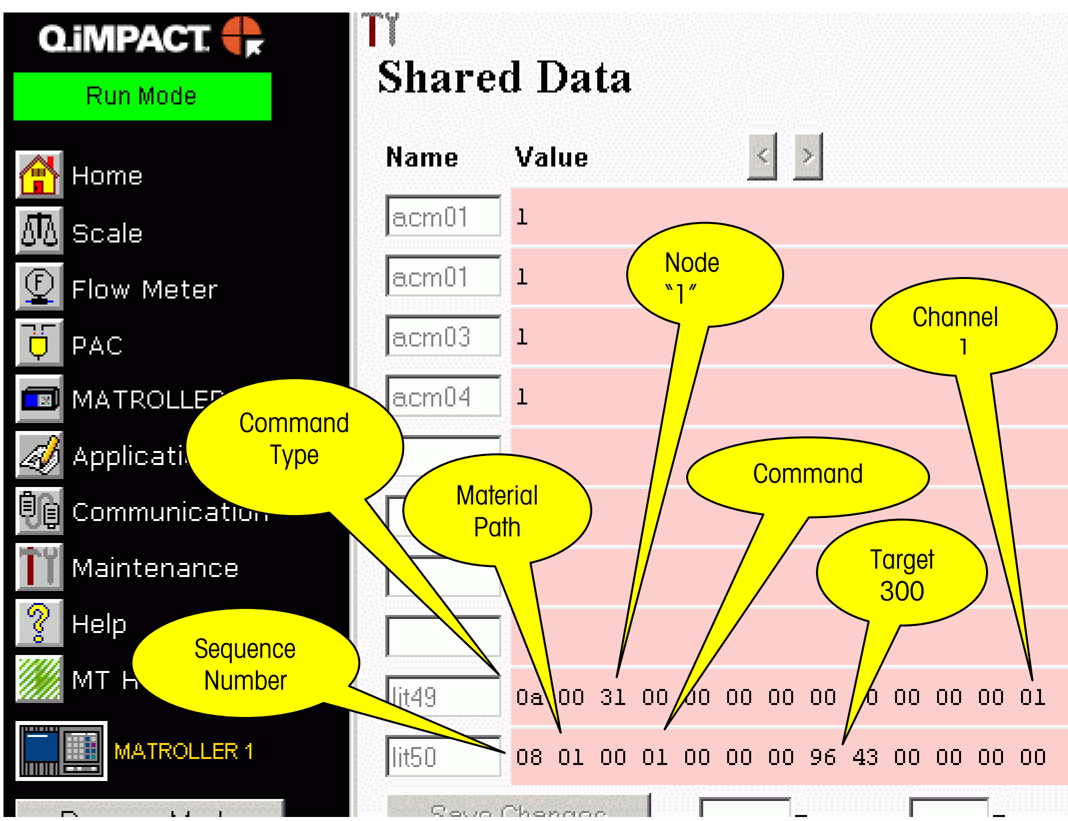
In order to assist in commissioning the Profibus <> Qi interface, it is possible to view the data that is received by the Qi. This option must be enabled. Once it is enabled the received data is placed in Lit49 and Lit50 Shared data variables. You can then display these variables in order to see whether the Qi is receiving your data.

Goto, Communication >> ProfibusPLC Interface >> and check option as shown below:



NOTE: in some versions of firmware you may have to then set the Profibus Node address from the Qi Matroller front panel.

Here is an example of data in the Lit49 and Lit50 Shared data variables. The data content is as indicated on the picture.



Content of DB6, the "Output Buffer"

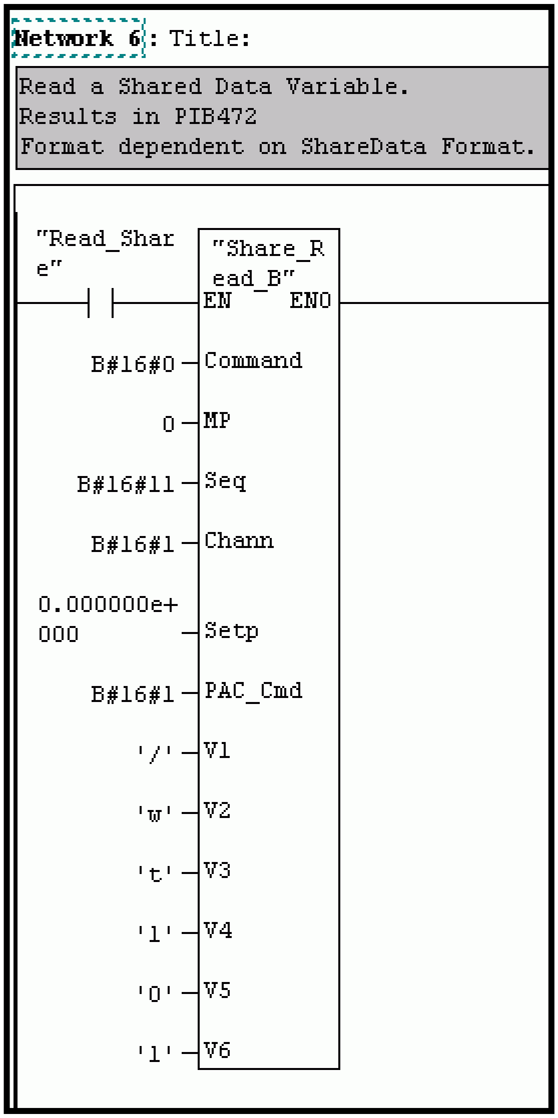
This is the same data, but shown in the PLC output buffer, which in this example is in DB6. The Lit49 and Lit50 show only the first portion of the input buffer due to limited length of these variables

@VT_PQB -- ProfubusManualEdition\SIMATIC 300(1)\CPU 314C-2 DP\S7 Progr

	Address	Symbol	Display format	Status value
1	DB6.DBB 0	"Op_Cmd".Br1.Res1	DEC	0
2	DB6.DBB 1	"Op_Cmd".Br1.CmdType	DEC	10
3	DB6.DBB 2	"Op_Cmd".Br1.Res2	DEC	0
4	DB6.DBB 3	"Op_Cmd".Br1.Node	DEC	49
5	DB6.DBB 4	"Op_Cmd".Br1.VarName[1]	DEC	0
6	DB6.DBB 5	"Op_Cmd".Br1.VarName[2]	DEC	0
7	DB6.DBB 6	"Op_Cmd".Br1.VarName[3]	DEC	0
8	DB6.DBB 7	"Op_Cmd".Br1.VarName[4]	DEC	0
9	DB6.DBB 8	"Op_Cmd".Br1.VarName[5]	DEC	0
10	DB6.DBB 9	"Op_Cmd".Br1.VarName[6]	DEC	0
11	DB6.DBB 12	"Op_Cmd".Br1.IntCmd.Chann	DEC	1
12	DB6.DBB 13	"Op_Cmd".Br1.IntCmd.Seq	DEC	8
13	DB6.DBW 14	"Op_Cmd".Br1.IntCmd.MatPat	DEC	1
14	DB6.DBB 16	"Op_Cmd".Br1.IntCmd.Comma	DEC	1
15	DB6.DBB 17	"Op_Cmd".Br1.IntCmd.Grp	DEC	0
16	DB6.DBB 18	"Op_Cmd".Br1.IntCmd.GrpQty	DEC	0
17	DB6.DBB 19	"Op_Cmd".Br1.IntCmd.Res	DEC	0
18	DB6.DBD 20	"Op_Cmd".Br1.IntCmd.Target	FLOATING_POINT	300.0
19	DB6.DBD 24	"Op_Cmd".Br1.IntCmd.TolP	FLOATING_POINT	0.0
20	DB6.DBD 28	"Op_Cmd".Br1.IntCmd.TolN	FLOATING_POINT	0.0
21	DB6.DBB 32	"Op_Cmd".Br1.IntCmd.MatId[1]	DEC	32
22	DB6.DBB 33	"Op_Cmd".Br1.IntCmd.MatId[2]	DEC	32
23	DB6.DBB 34	"Op_Cmd".Br1.IntCmd.MatId[3]	DEC	32

Reading s Shared Data Variable

In this example, we are using a different Function (FC7). In order to read a Shared data variable the PAC_Cmd is now 1. And the Shared Data name is 'wt101', which is the gross weight of Scale A. The value is returned in bytes 218 to 239 of the cyclic data input. The Share data name is always preceded by a '/'.



This is the view of the Cyclic Input Buffer after the above mentioned Function has been called. The Gross weight is 591 and can be seen in DBB215 …DBB217. The format of the returned data will change depending on the Share data. The Share Data document will specify the format of the returned Share Data variable

@VT_IP -- ProfubusManualEdition\SIMATIC 300(1)\CPU 314C-2 DP\S7 Prog...

		Address	Symbol	Display format	Status value	Mo
1		DB10.DBW 0	"IP_Buff".ChkSum	DEC	11682	
2		DB10.DBW 2	"IP_Buff".ChkSumInv	DEC	-11683	
3		DB10.DBB 4	"IP_Buff".Chann1.Chann	DEC	1	
4		DB10.DBB 5	"IP_Buff".Chann1.Stat1	HEX	B#16#02	
5		DB10.DBW 6	"IP_Buff".Chann1.Stat2	HEX	W#16#0000	
6		DB10.DBD 8	"IP_Buff".Chann1.NettFed	FLOATING_POINT	325.0	
7		DB10.DBD 12	"IP_Buff".Chann1.GrossW	FLOATING_POINT	591.0	
8		DB10.DBD 16	"IP_Buff".Chann1.FlowRate	FLOATING_POINT	-0.001500432	
9						
10		DB10.DBB 204		HEX	B#16#00	
11		DB10.DBB 205		HEX	B#16#01	
12		DB10.DBB 206		CHARACTER	' '	
13		DB10.DBB 207		CHARACTER	' '	
14		DB10.DBB 208		CHARACTER	' '	
15		DB10.DBB 209		CHARACTER	' '	
16		DB10.DBB 210		CHARACTER	' '	
17		DB10.DBB 211		CHARACTER	' '	
18		DB10.DBB 212		CHARACTER	' '	
19		DB10.DBB 213		CHARACTER	' '	
20		DB10.DBB 214		CHARACTER	' '	
21		DB10.DBB 215		CHARACTER	'5'	
22		DB10.DBB 216		CHARACTER	'9'	
23		DB10.DBB 217		CHARACTER	'1'	
24		DB10.DBB 218		CHARACTER	B#16#00	
25		DB10.DBB 219		CHARACTER	B#16#00	
26		DB10.DBB 220		CHARACTER	B#16#00	
27		DB10.DBB 221		CHARACTER	B#16#00	
28		DB10.DBB 222		CHARACTER	B#16#00	
29		DB10.DBB 223		CHARACTER	B#16#00	
30		DB10.DBB 224		CHARACTER	B#16#00	
31		DB10.DBB 225		CHARACTER	B#16#00	
32		DB10.DBB 226		CHARACTER	B#16#00	
33		DB10.DBB 227		CHARACTER	B#16#00	

Q.i supported Commands - Overview

Command 1 - Start Material Transfer

This command will result in the Q.i transferring an exact amount based on the Target embedded within the command. If the Target was 35 kg for example, 35 kg will be added into the scale regardless of what the weight was prior to the command being issued. (Note: the final result must still be within the scale capacity)

Command 2 - Start Material Transfer with Gross

This command will result in the Q.i transferring material to a target amount. For example if there already was 10kg in the scale and Command 2 was sent with a Target of 50kg only 40 kg will be added. This command can only be used with a scale

Command 3 - Start Hand Add

This is a Pseudo material. It is treated as a normal material except that the Q.i does not control the addition of the material. This would be done manually by an operator. Once the additions have been made the Q.i must be informed of this fact either by activating one of the Qi's digital inputs. The Q.i will calculate the net amount transferred and any errors. A normal report is created identical to a normal material transfer.

Command 4 – Acknowledge Material Transfer

Whenever a Material Transfer has been successfully started by the Q.i, the cycle must be completed by sending a Command 4 when the bit "Waiting for Controller to Ack Last Material Transfer" (bit7) goes high. The Q.i will not accept another command once it is expecting Command 4. This even applies for Aborts and Power failures occurring during a Material Transfer. The one exception is a Channel or Cluster Reset action issued from a Web Page. The Reset action clears all registers.

Command 5 – Abort Material Transfer

This Command will cause the Q.i FCE (Final Control element) to turn OFF and the Q.i to report net amount Transferred up until the Abort Command was sent. A Command 4 must still be sent in order to complete the Cycle.

SPECIAL NOTE: If the Q.i is within the Feed Override period the Abort Command will not be accepted and the Q.i will complete the Transfer

Command 6 – Reset Slow Step Timer

The Slow Step Timer will be reset to either the value embedded within the command OR if a zero was sent as the target it will be reset to its default value entered in the Material Path Setup Page

Command 7 – Start Manual Mode

This will cause the Q.i to go from Auto to Manual mode. If this occurs during a Material Transfer the FCE will turn OFF. Various options are now available such as:

Add material by Manually controlling FCE O/P using Commands 8 and 9.

Add material by hand.

Return to Auto mode with Command 10

Option 1 – once you are finished adding manually are you are not using option 3 route, the command 11 (complete Feed in Manual) must now be used. The Q.i will now add up how much was added in Auto mode <u>together</u> with how much was added in Manual mode and use this total amount in the Transfer Report. The "Waiting for Controller to Ack Last Material Transfer" (bit7) will then turn ON. The Command 4 must now be issued in order to complete the cycle

Option 2 - once you are finished adding by hand and are not using option 3 route, the command 11 (complete Feed in Manual) must now be used. The Q.i will now add up how much was added in Auto mode together with how much was added in Manual mode and use this total amount in the Transfer Report. The "Waiting for Controller to Ack Last Material Transfer" (bit7) will then turn ON. The Command 4 must now be issued in order to complete the cycle

Option 3 – returning to Auto will cause the Q.i to carry on where it left off. The FCE will turn ON and the Transfer will complete

Command 8 – Turn ON FCE in Manual

This command will turn ON the Q.i FCE only when the Q.i has been switched to manual mode. If a value is entered in the target such as 5 then the FCE will turn on for 5 seconds. If 0 is entered it will stay ON indefinitely.

Command 9 – Turn OFF FCE in Manual

This command will turn OFF the Q.i FCE only when the Q.i has been switched to manual mode.

Command 10 – Restart Auto Mode

If during a Mat Transfer the Q.i has been put in the Manual Mode this command will return it to Auto mode. NOTE: If a Transfer has not completed it will automatically continue with the Mat. Transfer

Command 11 – Complete Feed in Manual Mode

If during a Mat Transfer the Q.i has been switched to Manual mode and additional material has been added. This command is used to signal that the Transfer is complete a Mat Transfer report is generated and the cycle must be completed with an Ack (Cmd 4) when prompted.

NOTE: The report will add up total added during Auto mode as well as manually.

Command 12 – Master Reset Instrument Channel

This command will completely reset a channel no matter what it is doing at the time. No further commands are required to be sent to the Q.i. It is now ready for the next Material Transfer i.e. Command 1 or 2

NOTE: this action can also be initiated from the Web Pages

Command 13 – Report last status

It is possible to retrieve the results of a Material Transfer again at a later time with this command. Obviously it will report the last material transfer

Command 14 – Master Reset Instrument Channel

This command will completely all channels no matter what the Quip's are doing at the time. No further commands are required to be sent to the Quip's. They are now ready for the next Material Transfer i.e. Command 1 or 2

NOTE: this action can also be initiated from the Web Pages

Command 15 – Validate aggregate Secondary Feeds

This command is used to crosscheck the accuracy of Flow meters with a Scale. The Flow meters would need to feed into the scale, which is doing the validating.

Usage:

Send Command 15 specifying a group number (x) and number of secondary feeds (y). The channel must be a valid scale.

If (y) was 2 then two more Start Material Transfers must be sent. One to each Flow meter, embedded in this command would be a group number, which must be identical to (x). The group number associates/links the three channels. Once the two Flow meters have completed their Transfer the Q.i checks their total net amounts against the scales changed weight. A Valid Material Transfer report for this scale is then generated. This scale will set its "Waiting for Controller to Ack Last Material Transfer" bit as if it had actually performed a Transfer even though it did not actually control one. The scale would then have to be Ack'd and the resulting report can be read.

Command 20 – Queue Material Transfer Start (Qi Lite Only)

Command 21 – Queue Material Transfer Start with Gross Weight Target (Qi Lite Only)

Command 22 – Start All Queued Material Feeds (Qi Lite Only)

Command 23 – Reset All Queued Material Feeds (Qi Lite Only)

The Q.i Lite has been enhanced to permit queuing of multiple material-transfer-start commands. A single command starts all of the queued material-transfer-start requests nearly simultaneously

When a command 20 or 21 is received, the channel number, material-path, target weight, and tolerances are validated. This data is then stored in the command queue assigned to the process. There can be up to twelve processes per Q.i Lite. When a command 22 is received, the data in the command queue is processed just like a regular start material transfer command. A command 20 is processed like a command 1 (Start Material Transfer) and a command 21 is processed like a command 2 (Start Material Transfer with Gross Weight Target). When this group of feeds have completed, another command 22 will start the feeds again. A command 20 or 21 with the same channel and material-path as one already queued can be sent during idle times if the target weight or tolerances need to be updated. A command 23 will erase all command queues.

Note: Sending a command 22 with no commands queued will result in an Invalid-Command command status (9).

The Reset Channel (command 12) or Reset Cluster (command 14) does not affect the command queues. Only command 23 will erase the command queues.

Warning: Queued commands are NOT power-fail protected.

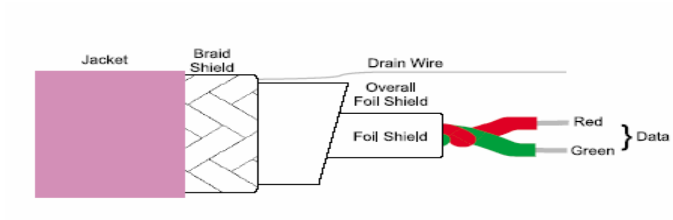
The Material Transfer Check web page contains the necessary controls to queue and start multiple feeds.

Command 30 – Reset the Cluster (WARNING: USE WITH CAUTION!)

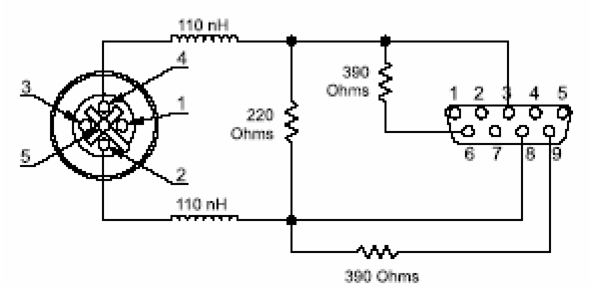
This command will completely reset the entire Cluster. Any Material feeds in progress will stop and all pending Material Acknowledges will be reset. All channels will be in a rest state ready to accept new material transfer commands

PROFIBUS-DP Cable Specifications

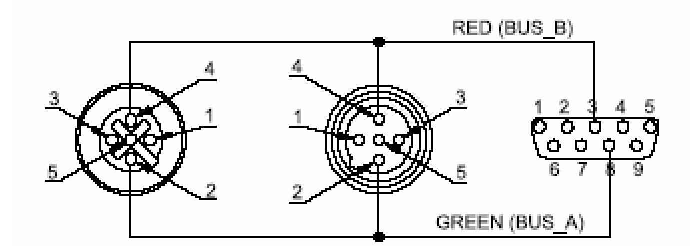
Baud Rate (k baud)	9.6	19.2	93.75	187.5	500	1500	12000
Maximum Cable Length	1200 m	1200 m	1200 m	1000 m	400 m	200 m	100 m



Schematic for RKSW D9S/T 455-1M

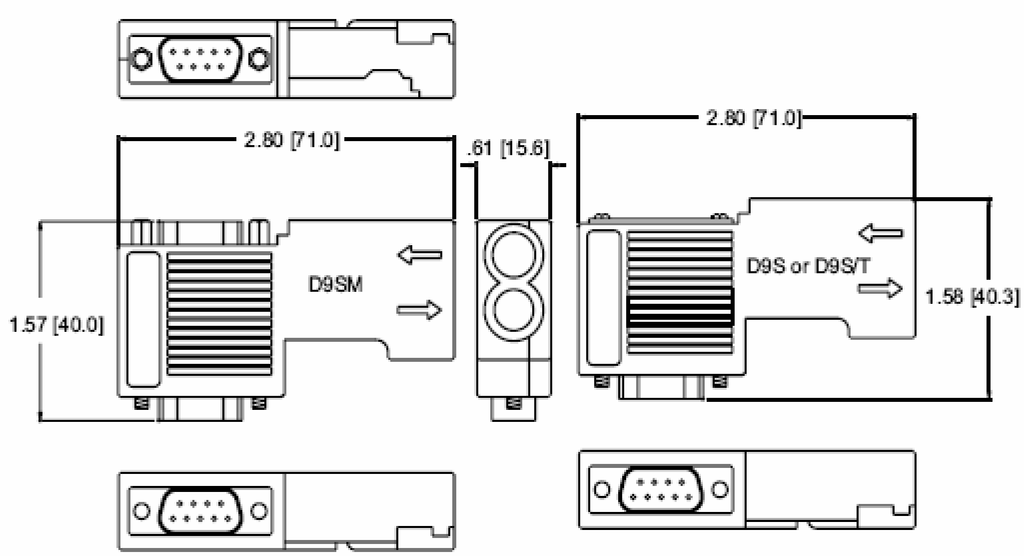


Schematic for RSSW D9S RKSW 455-1M-1M



D9 Sub Connector

PROFIBUS-DP D9 Sub Connector



D9SM-*

D9S or D9S/T-*

Pinouts

1 - N/C
2 - N/C
3 - Red (Bus_B)
4 - N/C
5 - N/C
6 - N/C
7 - N/C
8 - Green (Bus_A)
9 - N/C

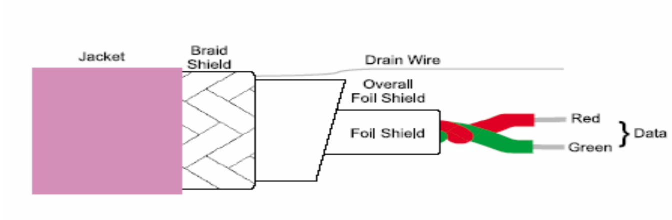
Cluster Configurations for 20 MATROLLERs

The following table shows the possible configurations of PROFIBUS, scale, and flow meter interface cards for 20 MATROLLERs (except where noted) in a cluster. The "Number of Bridges" is the number of Bridge MATROLLERs.

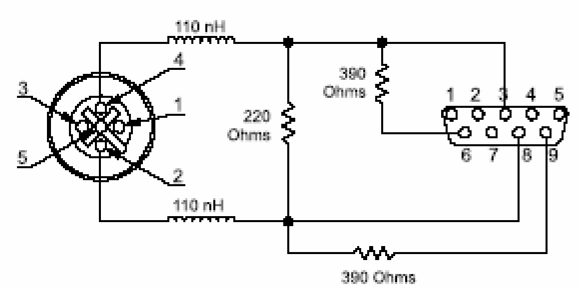
Table 3. Cluster Configurations for 20 MATROLLERs

Number of Scale Channels	Number of Flow Meter Channels	Number of Bridges	Board Configuration per MATROLLERs F = Flow Meter PCB (4 channels each) S = Scale PCB (2 channels each) P = PROFIBUS PCB
0	168	18	18*(2F+P) + 2*(3F)
2	168	17	17*(2F+P) + 2*(3F) + 1*(2F+S)
4	164	17	17*(2F+P) + 2*(3F) + 1*(F+2S)
6	160	17	16*(2F+P) + 2*(3F) + 1*(2F+S) + 1*(2S+P)
8	156	17	16*(2F+P) + 2*(3F) + 1*(F+2S) + 1*(2S+P)
10	152	17	15*(2F+P) + 2*(3F) + 1*(2F+S) + 1*(2S) + 1*(2S+P)
12	148	17	15*(2F+P) + 2*(3F) + 1*(F+2S) + 1*(2S) + 1*(2S+P)
14	144	16	14*(2F+P) + 2*(3F) + 1*(F+2S) + 2*(2S+P) + 1*(F+S+P)
16	144	16	14*(2F+P) + 2*(3F) + 1*(F+2S) + 2*(2S+P) + 1*(F+2S)
18	140	16	14*(2F+P) + 1*(3F) + 1*(2F+S) + 2*(2S+P) + 2*(F+2S)
20	136	16	14*(2F+P) + 1*(3F) + 3*(F+2S) + 2*(2S+P)
22	132	16	13*(2F+P) + 1*(3F) + 1*(2F+S) + 2*(F+2S) + 3*(2S+P)
24	128	16	13*(2F+P) + 1*(3F) + 3*(F+2S) + 3*(2S+P)
26	124	16	12*(2F+P) + 1*(3F) + 1*(2F+S) + 2*(F+2S) + 4*(2S+P)
28	120	16	12*(2F+P) + 1*(3F) + 3*(F+2S) + 4*(2S+P)
30	120	15	11*(2F+P) + 1*(3F) + 1*(2F+S) + 3*(F+2S) + 4*(2S+P)
32	116	15	11*(2F+P) + 1*(3F) + 4*(F+2S) + 4*(2S+P)
34	112	15	10*(2F+P) + 1*(3F) + 1*(2F+S) + 3*(F+2S) + 5*(2S+P)
36	108	15	10*(2F+P) + 1*(3F) + 4*(F+2S) + 5*(2S+P)
38	104	15	9*(2F+P) + 1*(3F) + 1*(2F+S) + 3*(F+2S) + 6*(2S+P)
40	100	15	9*(2F+P) + 1*(3F) + 4*(F+2S) + 6*(2S+P)
42	96	15	8*(2F+P) + 1*(3F) + 1*(2F+S) + 3*(F+2S) + 7*(2S+P)
44	96	14	7*(2F+P) + 2*(3F) + 4*(F+2S) + 7*(2S+P)
46	92	14	7*(2F+P) + 1*(3F) + 1*(2F+S) + 4*(F+2S) + 7*(2S+P)
48	88	14	7*(2F+P) + 1*(3F) + 5*(F+2S) + 7*(2S+P)
50	84	14	6*(2F+P) + 1*(3F) + 1*(2F+S) + 4*(F+2S) + 8*(2S+P)
52	80	14	6*(2F+P) + 1*(3F) + 5*(F+2S) + 8*(2S+P)
54	76	14	5*(2F+P) + 1*(3F) + 1*(2F+S) + 4*(F+2S) + 9*(2S+P)
56	72	14	5*(2F+P) + 1*(3F) + 5*(F+2S) + 9*(2S+P)
58	72	13	4*(2F+P) + 1*(3F) + 1*(2F+S) + 5*(F+2S) + 9*(2S+P)
60	68	13	4*(2F+P) + 1*(3F) + 6*(F+2S) + 9*(2S+P)
62	64	13	3*(2F+P) + 1*(3F) + 1*(2F+S) + 5*(F+2S) + 10*(2S+P)
64	60	13	3*(2F+P) + 1*(3F) + 6*(F+2S) + 10*(2S+P)
66	56	13	2*(2F+P) + 1*(3F) + 1*(2F+S) + 5*(F+2S) + 11*(2S+P)
68	52	13	2*(2F+P) + 1*(3F) + 6*(F+2S) + 11*(2S+P)
70	48	13	1*(2F+P) + 1*(3F) + 1*(2F+S) + 5*(F+2S) + 12*(2S+P)
72	48	12	2*(3F) + 6*(F+2S) + 12*(2S+P)
74	36	11	1*(2F+S) + 7*(F+2S) + 11*(2S+P) [19 MATROLLERs]
76	24	10	1*(3F) + 3*(F+2S) + 6*(2S) + 10*(2S+P)
78	12	9	1*(2F+S) + 1*(F+2S) + 9*(2S) + 9*(2S+P)
80	0	8	12*(2S) + 8*(2S+P)

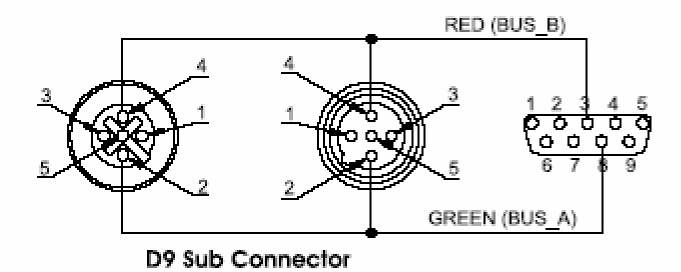
Baud Rate (k baud)	9.6	19.2	93.75	187.5	500	1500	12000
Maximum Cable Length	1200 m	1200 m	1200 m	1000 m	400 m	200 m	100 m



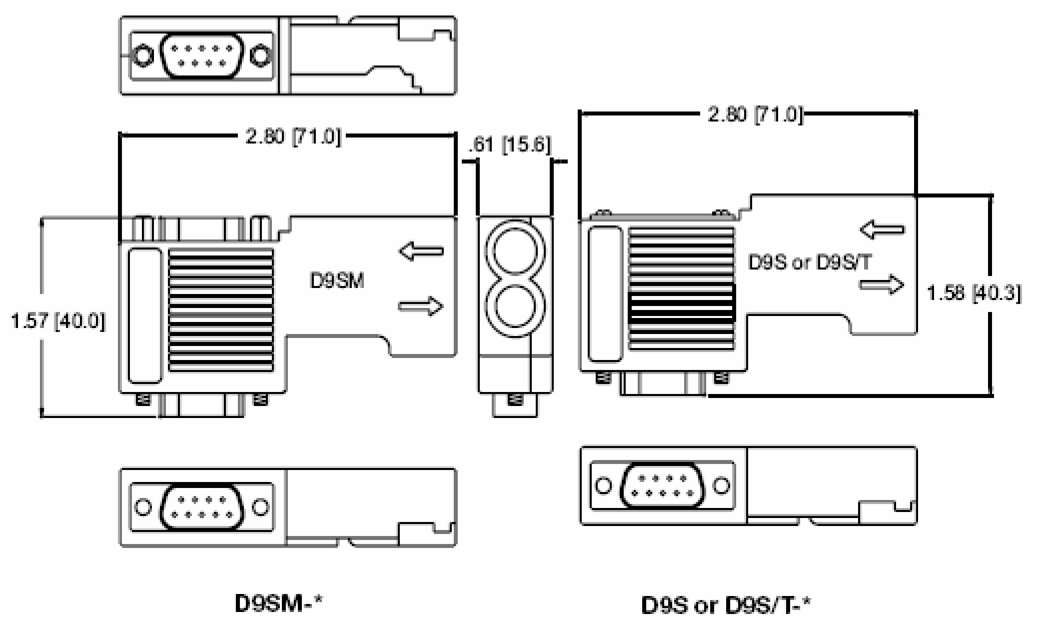
Schematic for RKSW D9S/T 455-1M



Schematic for RSSW D9S RKSW 455-1M-1M



PROFIBUS-DP D9 Sub Connector



Pinouts

1 - N/C
2 - N/C
3 - Red (Bus_B)
4 - N/C
5 - N/C
6 - N/C
7 - N/C
8 - Green (Bus_A)
9 - N/C

PROFIBUS GSD file content

```
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;GSD file for
;Product : Jaguar Industrial Terminal
;Manufacturer: Mettler Toledo
;Status : Part Number:  Revision: M.2
;==================
#Profibus_DP
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Model_Name = "Qi Matroller "
Revision = "VM.2      "
Ident_number = 0x6713
Protocol_Ident = 0
Station_Type = 0
FMS_supp = 0
Hardware_Release = "V 1.0  "
Software_Release = "M.2"
9.6_supp = 1
19.2_supp = 1
93.75_supp = 1
187.5_supp = 1
500_supp = 1
1.5M_supp = 1
3M_supp = 1
6M_supp = 1
12M_supp = 1
MaxTsdr_9.6 = 60
MaxTsdr_19.2 = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500 = 100
MaxTsdr_1.5M = 150
MaxTsdr_3M = 250
MaxTsdr_6M = 450
MaxTsdr_12M = 800
Redundancy = 0
Repeater_Ctrl_Sig = 0
24V_Pins = 0
Freeze_Mode_supp = 0
Sync_Mode_supp = 0
Auto_Baud_supp = 1
Set_Slave_Add_supp = 0
User_Prm_Data_Len = 0x01
User_Prm_Data = 0
Min_Slave_Intervall = 0x0001
Modular_Station = 1
Max_Module = 0x01
Max_Input_Len = 0xF0
Max_Output_Len = 0x48
Max_Data_Len = 0x0138
```

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Module= "I/O 2 Wrd" 0x61,0x51
EndModule
Module= "I/O 4 Wrd" 0x63,0x53
EndModule
Module= "I/O 6 Wrd" 0x65,0x55
EndModule
Module= "I/O 8 Wrd" 0x67,0x57
EndModule
Module= "I/O 12 Wrd" 0x6b,0x5b
EndModule
Module= "I/O 16 Wrd" 0x6f,0x5f
EndModule
Module= "I/O 23 Wrd" 0x6f,0x66,0x5f,0x56
EndModule
Module= "I/O 28 Wrd" 0x6f,0x6b,0x5f,0x5b
EndModule
Module= "Q.iMPACT" 0x6f,0x6f,0x63,0x5f,0x5f,0x5f,0x5f,0x5f,0x5f,0x5f,0x57
EndModule
```

7 ControlNet Interface Board

Introduction

The following information is for persons responsible for setting up and commissioning a Q.iMPACT matroller-based system. Skills required are Q.iMPACT matroller setup knowledge, PLC programming, and ControlNet experience. For further in depth information on ControlNet, contact Rockwell Automation.

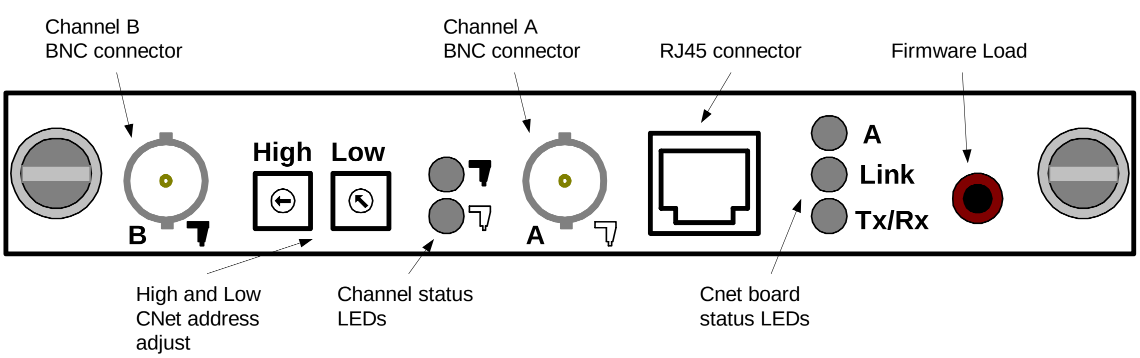
Special note: Detailed information is provided below. If you are using the ATR AIM software interface you will not need to configure a system to the level described below. Consult the AIM user guide in order to learn how to interface to the Q.iMPACT matroller

Topics covered:

- Q.iMPACT matroller ControlNet interface board
- ControlNet message types
- PLC5 and C-Logix message setup examples
- Q.iMPACT matroller supported commands
- Setting up and adding a Q.iMPACT matroller to a ControlNet network.
- Typical ControlNet settings

Overview

The ControlNet Interface Board enables the Q.iMPACT matroller to communicate with Allen-Bradley and Honeywell process automation devices. It supports two different physical/data link connection types: CIP/Ethernet and CIP/ControlNet. However, only one of the two physical data link connection types can be selected for use on this device. The selection is done in the Q.iMPACT matroller's setup mode. The CIP/Ethernet (also referred to as Ethernet/IP) uses a standard RJ45 connector and 10BASE-T physical layer. It provides ControlNet (CIP) services over TCP/IP. Both implicit and explicit messaging services are supported. Data bit rate is 10 Mb/S. The CIP/ControlNet interface provides two redundant BNC jacks and hosts CIP over ControlNet media. Data bit rate is 5 Mb/S. There are no user selectable jumper settings on this board.



ControlNet Interface Board

Channel Status LED's	Cause	Action
Both OFF	No Power	None or Power UP
Steady Red	Faulted unit	Cycle Power
Alternating Red/Green	Self Test	None
Alternating Red/Off	Incorrect node configuration media fault	Check network address and other ControlNet configuration parameters Check media for broken cables, loose connectors missing terminators, etc
Steady Green	Normal operation	None
Flashing Green/Off	Temporary errors	None, node will self correct
Flashing Red/Off	Media fault	Check media for broken cables, loose connectors missing terminators, etc
Flashing Red/Green	Incorrect network configuration	Cycle power, check setup of QiMPACT ControlNet card

Status LED's	OFF	ON
A	Interface card not active. Check power, reset JAGXTREME.	Normal Operation
T/R	No network activity. Check network activity, check network addressing.	Normal Operation
Link	Bad media. Check media connection.	Normal Operation

ControlNet Message Types

The Q.iMPACT matroller supports two types of CIP messages: scheduled and unscheduled.

Scheduled Messaging (Cyclic)

A large block of data is transmitted by every Q.iMPACT matroller with a ControlNet board installed. The data block is 496 bytes in length. Its length is fixed and cannot by altered. The content and structure is also fixed. Each instrument, whether it is a scale or a flow meter, will have 10 words of data allocated to it. The 10 words contain a comprehensive amount of data relevant to each instrument. Information such as: the gross weight, scale status and warnings, state of material transfer are contained in each group of 10 words.

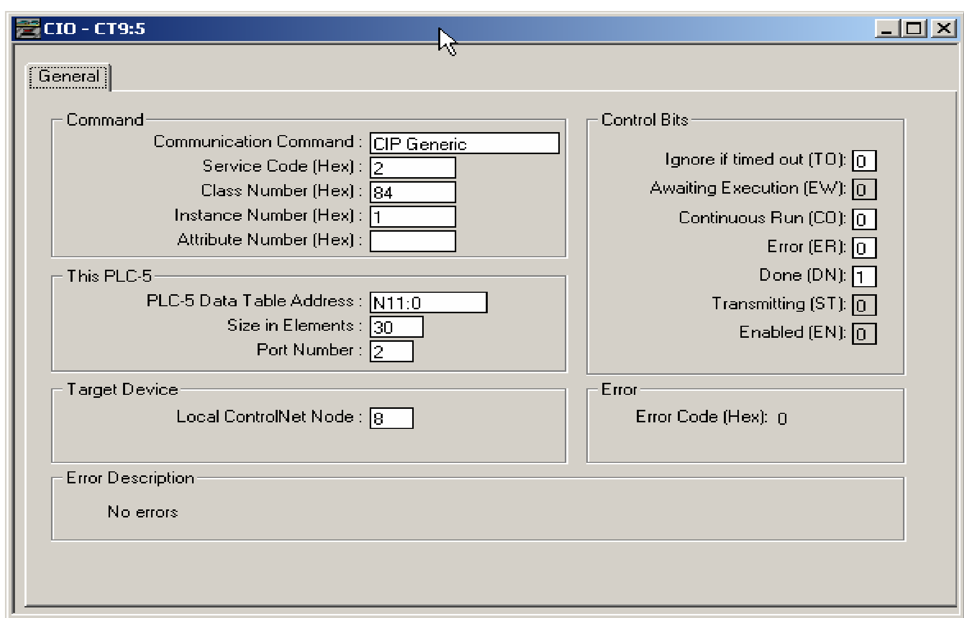
The rate at which the cyclic data is retrieved from the Q.iMPACT matroller is determined by parameter settings during the Network configuration. However the Q.iMPACT matroller will only update its cyclic data output buffer every 500 mS regardless of how often the cyclic data output buffer is transmitted to the PLC

Unscheduled Messages

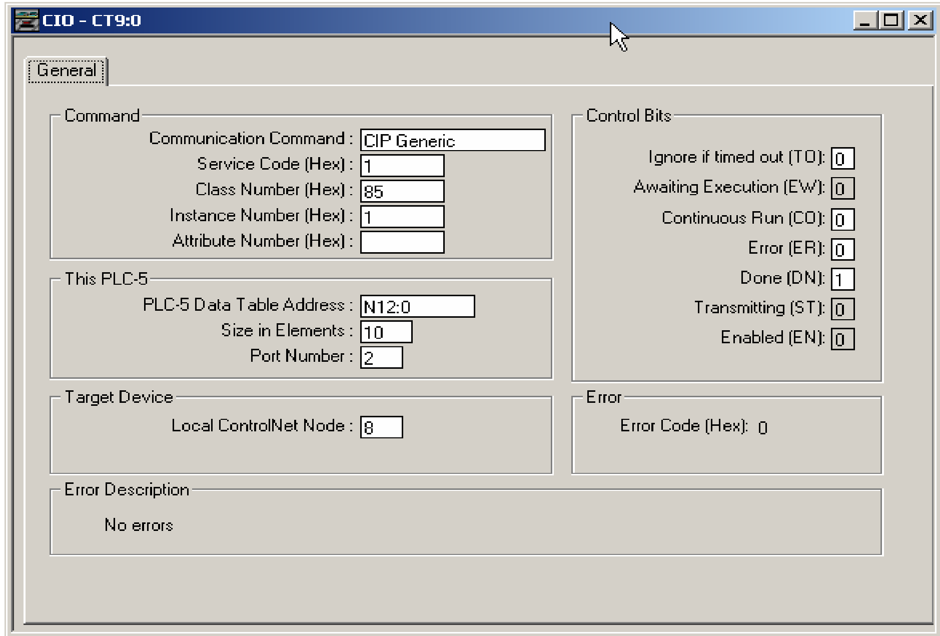
Using unscheduled messaging you can access all of the data within a Q.iMPACT matroller. This data, referred to as Shared Data, is organized into groups or blocks. Entire blockes as well as individual fields can be read or written to.. Some data can only be read. Other data may be written to as well.

Using a PLC5 or a Clogix PLC, the commands that are used would be the CIO and MSG (Message) commands. Although you are able to read any of the Shared Data blocks, in order to create a working system only two of the Shared Data blocks are required. These are the ControlNet class codes of 84h and 85h. You would normally write data to class 84h and read data from class 85h.

Note: A comprehensive list of the Shared Data is found in the Appendix of this manual.



Example of PLC5 CIO write to Q.iMPACT matroller – class code 84h (note service code of 2).



Example of PLC5 CIO read from Q.iMPACT matroller – class code 85 (note service code of 1)

Cyclic Data Messages (Detailed Description)

All Q.iMPACT matrollers in a cluster that do NOT have a ControlNet board installed must be linked to a Q.iMPACT matroller with a ControlNet board. (At least one matroller must have a ControlNet board installed if comms to a host control system is required). This is done during the configuration of the system. Matrollers in a cluster that do NOT have a ControlNet board installed are referred to as "remote matrollers".

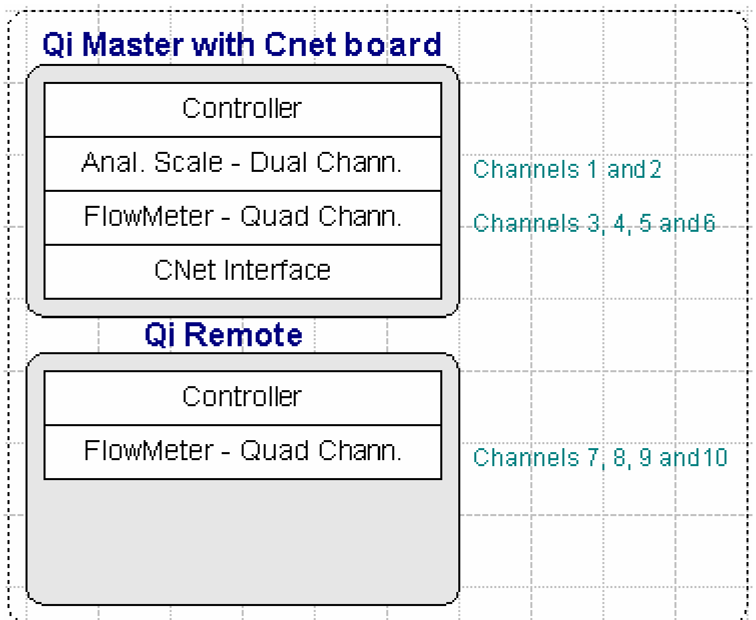
The channel (instrument) data from a remote matroller is marshaled by the associated Q.iMPACT matroller with a ControlNet board. All the channel data from the remote matroller is then included in the cyclic data transmitted by the matroller with the ControlNet board. The maximum number of channels that can be associated (linked) to a Q.iMPACT matroller with a ControlNet board installed is 24.

An example:

We have a cluster of two Q.iMPACT matrollers: a master with a ControlNet board and one remote. The master has one analog scale board, one flow meter board and a ControlNet board. The remote matroller has a single flow meter board installed. We now have a total of 2 + 4 + 4 = 10 channels or instruments, numbered from 1 to 10.

The size of the cyclic data block sent to the Host PLC will always be 248 words in length (496 bytes). The structure is as follows:

Words 00 to 07	reserved for system data
Words 08 to 17	Channel 1 data
Words 18 to 27	Channel 2 data
"	
Words 98 to 107	Channel 10 data
Words 108 to 117	zeroes (if installed it would have been channel 11 data)
"	
Words 238 to 249	zeroes (if installed it would have been channel 24 data)



Rear view of Q.iMPACT matrollers showing placement of installed boards

Assembly Slots are similar to channels except that assembly slot numbering starts from 1 with every ControlNet board, whereas channel numbering starts from one and never repeats. The maximum assembly slot number is 24.

Cyclic Data Content

Word 0 – contains the 16-bit checksum of all the channel data. Sum all data from word 9 to 248 ignoring overflows.

Word 1 contains the exact logical inverse of word 0.

By performing this calculation, and ignoring the cyclic data if the calculated checksum and received checksum are not equal, a high level of data integrity is achieved.

It is recommended that your software logs any occurrences of this type of error

NOTE: The ATR supplied AIM software module has this feature included. It can be disabled. If you are using this module, verify that this feature is enabled.

Example.

Let us assume that the cyclic data values are all zeroes except for the following numbers: 203, 204, 205, 206, 307, 208, 999A, 3F99, 1480, 3747. (All numbers in hex.) The calculated checksum will be 321B (hex).

Examining the Channel 1 data in this example we get the following: (The word numbers are the absolute addresses counting from the beginning of the cyclic data including the reserved addresses.)

Word 8 (low byte) Channel number

Word 8 (high byte)

0. PAC Data Integrity Bit alternates polarity every 5 seconds.
1. Instrument Data Integrity OK
2. Scale Over Capacity
3. Scale Under Zero
4. Scale Motion
5. Material Transfer Cycle Active
6. Final Control Element Output, 0 = Off, 1 = On
7. Waiting for Controller to Acknowledge Last Material Transfer/Hand Add complete

Word 9 (word)

1. Feed Type
2. Feed Type, 0=Gain In Weight, 1= Loss In Weight, 2= Flow Meter, 3 = Hand Add
3. Manual-Not Auto-Mode
4. Gross Weight Feed
5. Feed Override Active – external logic inhibited from removing feed permissive
6. Feed Failed
7. Communication Error
8. Device Stability Warning
9. Very Unstable Device
10. Too High or Too Low Flow at cutoff
11. Three Times Average Flow at cutoff
12. Fast Feed Rate Alarm
13. Wait for All Overlap Requests
14. Waiting to Start Primary" Overlapped Feed
15. Primary Overlapped Feed" In Progress
16. Secondary Overlapped Feed" In Progress

Word 10 Float (2x word)

"Feed Weight". This field is reset to zero at the beginning of a feed. During most feeds, this field contains the Net Accumulated Weight for the single feed. During Primary Overlapped feeds, this field contains the combined weight of all feeds. At completion of the feed, it contains the Delivered Weight for this feed.

Word 12 Float (2x word)

"Gross Weight". For scales, this is the gross weight. For flow meters, this field is the same as Feed Weight.

Word 14 Float (2x word)

Rate of Change of Weight

Word 16 Word

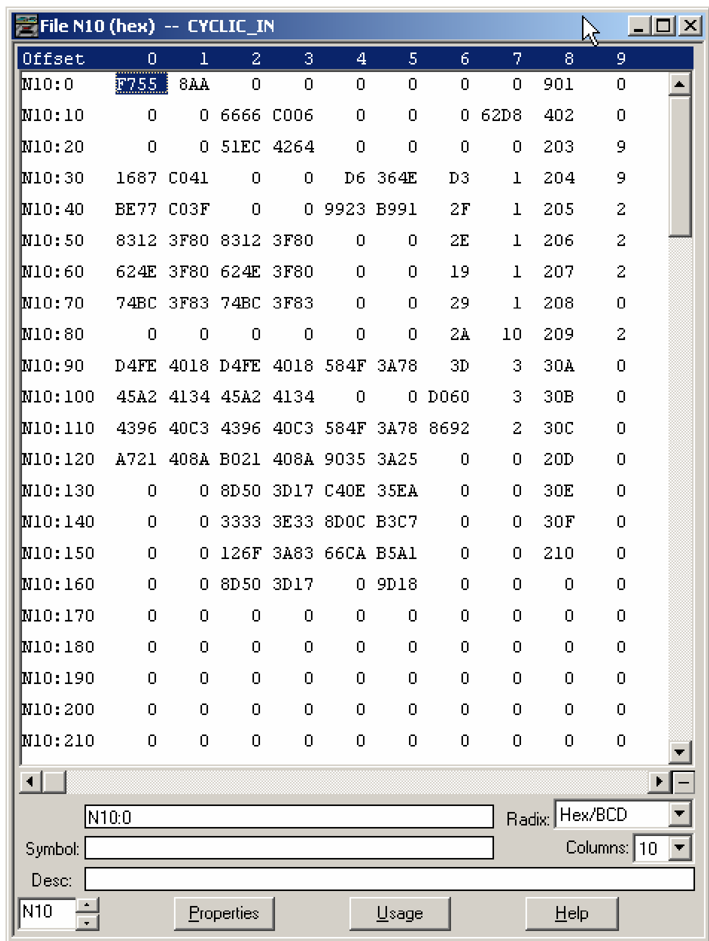
Time until Slow Step Timer Expires" in Seconds. 0 = Alarm.

Word 17 Word

Estimated Time to Complete in Seconds

Total number of words used by channel 1 data is 10 words. This pattern is repeated for each channel.

NOTE: You will have noticed that the first byte of each channels data is the channel number. This may seem self-evident. However it is possible, but not recommended, to alter the channel number sequence when configuring the system. Under most circumstances the first 10 words of data would be channel 1 data etc.



File N10 (hex) -- CYCLIC_IN

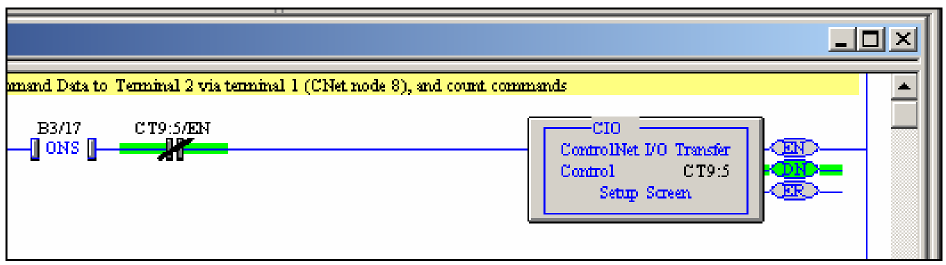
Offset	0	1	2	3	4	5	6	7	8	9
N10:0	F755	8AA	0	0	0	0	0	0	901	0
N10:10	0	0	6666	C006	0	0	0	62D8	402	0
N10:20	0	0	51EC	4264	0	0	0	0	203	9
N10:30	1687	C041	0	0	D6	364E	D3	1	204	9
N10:40	BE77	C03F	0	0	9923	B991	2F	1	205	2
N10:50	8312	3F80	8312	3F80	0	0	2E	1	206	2
N10:60	624E	3F80	624E	3F80	0	0	19	1	207	2
N10:70	74BC	3F83	74BC	3F83	0	0	29	1	208	0
N10:80	0	0	0	0	0	0	2A	10	209	2
N10:90	D4FE	4018	D4FE	4018	584F	3A78	3D	3	30A	0
N10:100	45A2	4134	45A2	4134	0	0	D060	3	30B	0
N10:110	4396	40C3	4396	40C3	584F	3A78	8692	2	30C	0
N10:120	A721	408A	B021	408A	9035	3A25	0	0	20D	0
N10:130	0	0	8D50	3D17	C40E	35EA	0	0	30E	0
N10:140	0	0	3333	3E33	8D0C	B3C7	0	0	30F	0
N10:150	0	0	126F	3A83	66CA	B5A1	0	0	210	0
N10:160	0	0	8D50	3D17	0	9D18	0	0	0	0
N10:170	0	0	0	0	0	0	0	0	0	0
N10:180	0	0	0	0	0	0	0	0	0	0
N10:190	0	0	0	0	0	0	0	0	0	0
N10:200	0	0	0	0	0	0	0	0	0	0
N10:210	0	0	0	0	0	0	0	0	0	0

Screen Capture of PLC5 Cyclic Data File in Hex

In this case the cyclic data has been setup to use data file N10. N10:0 is the checksum and N10: 1 is the inverted value. N10:8 shows the start on the 1st channels data with channel number 1 in the lower byte. N10:18 is the start of the 2nd channels data etc. In this case there are only 16 channels configured. N10:158 is the start of the 16th channels data. As you can see the rest of the data file is all zeroes. Performing a 16 bit summation of all the values from N10:8 to N10:165 will result in a value of F755(h). (adding more zeroes does not influence the result).

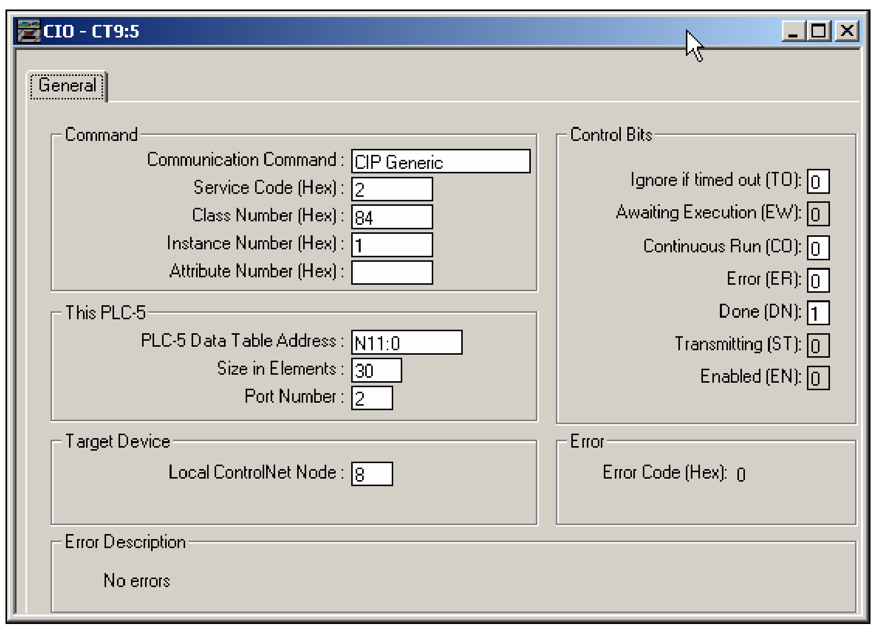
Unscheduled Messaging (Detailed Description)

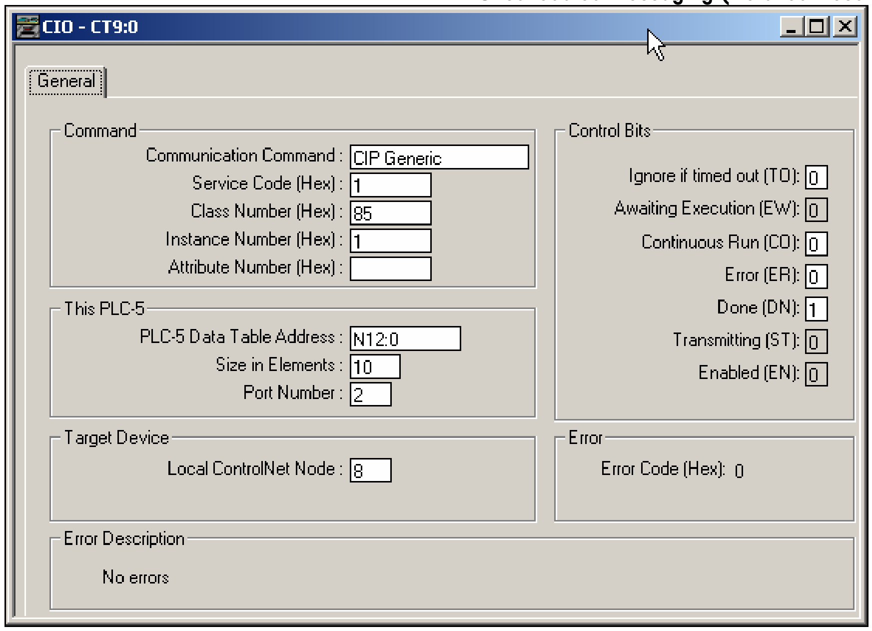
Using a CIO (PLC5) or a MSG (Clogix) instruction allows you to read and write to various data blocks within the Q.iMPACT matroller. At last count there were approximately 40,000 variables within the Q.iMPACT matroller. Fortunately in order to create a functioning system only a few of them need to be accessed.



Screen Capture of PLC5 Showing Rung with CIO Instruction

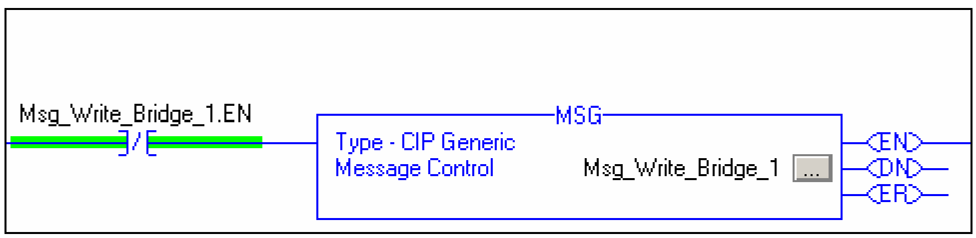
The above CIO instructions internal configuration for writing to a Q.iMPACT matroller



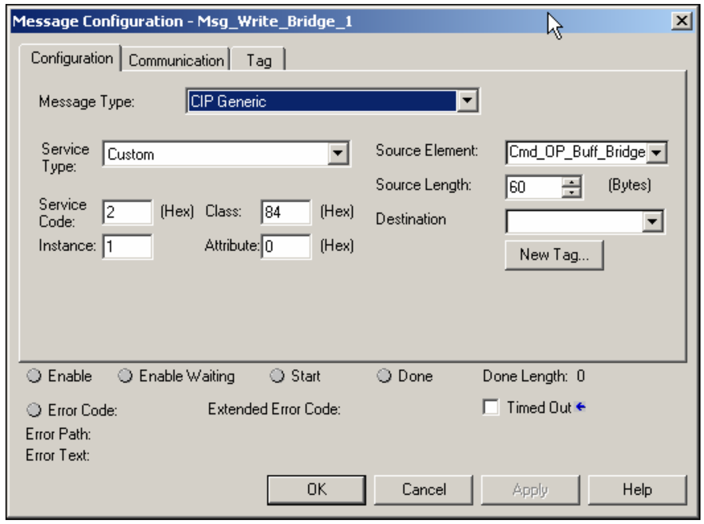


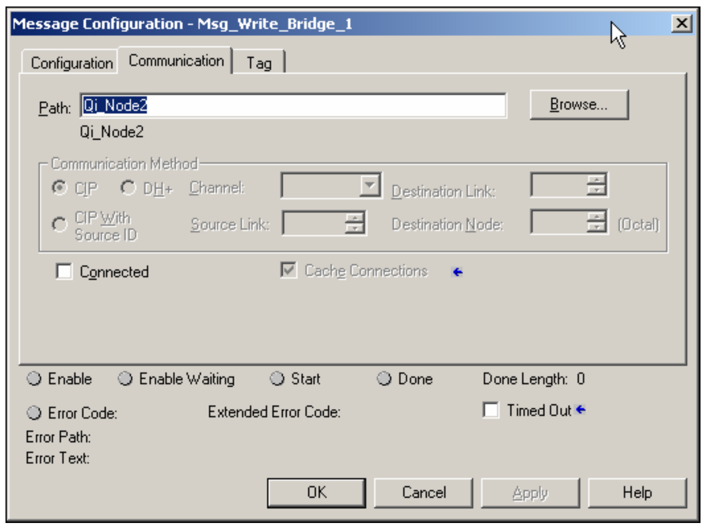
An Example of a CIO Configured for reading from a Q.iMPACT Matroller

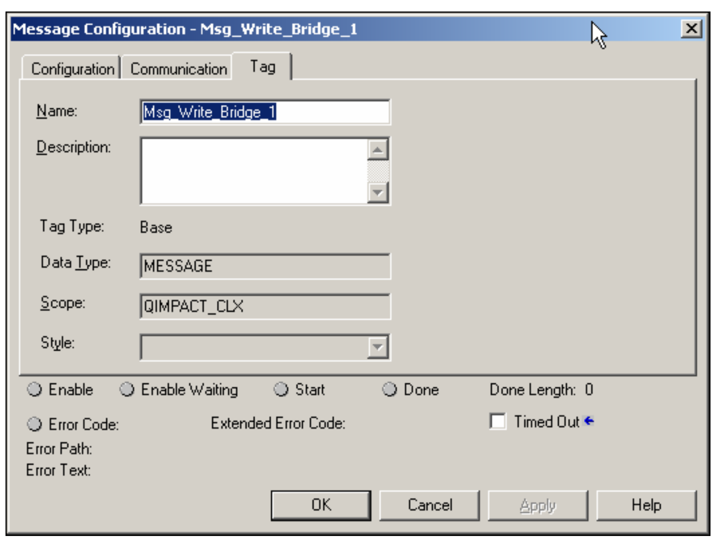
ControlLogix – screen shots showing configuration of the MSG instruction used to Write data to the Q.iMPACT matroller



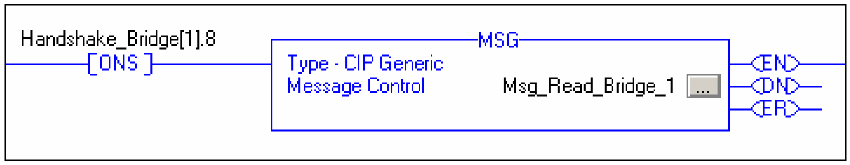
Examples of the three configuration screens follow:

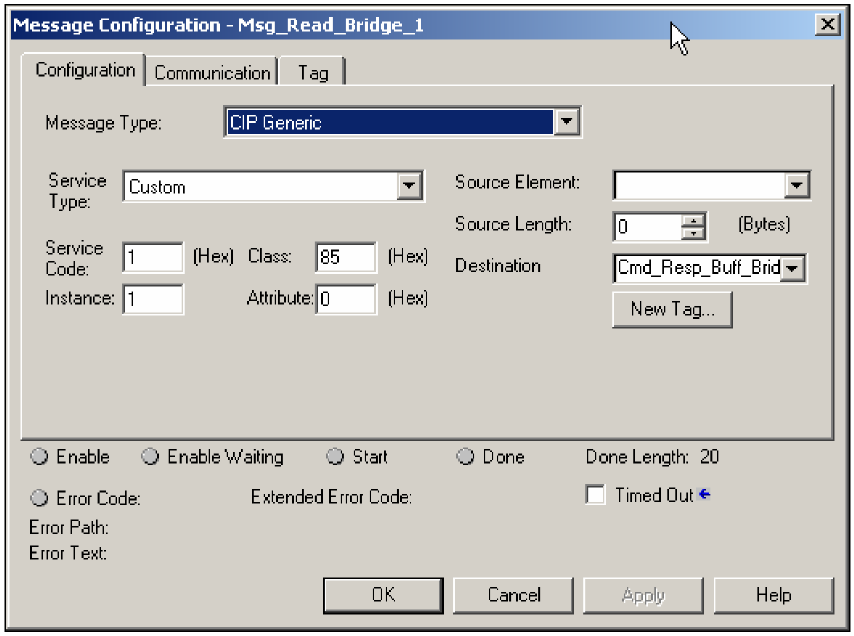


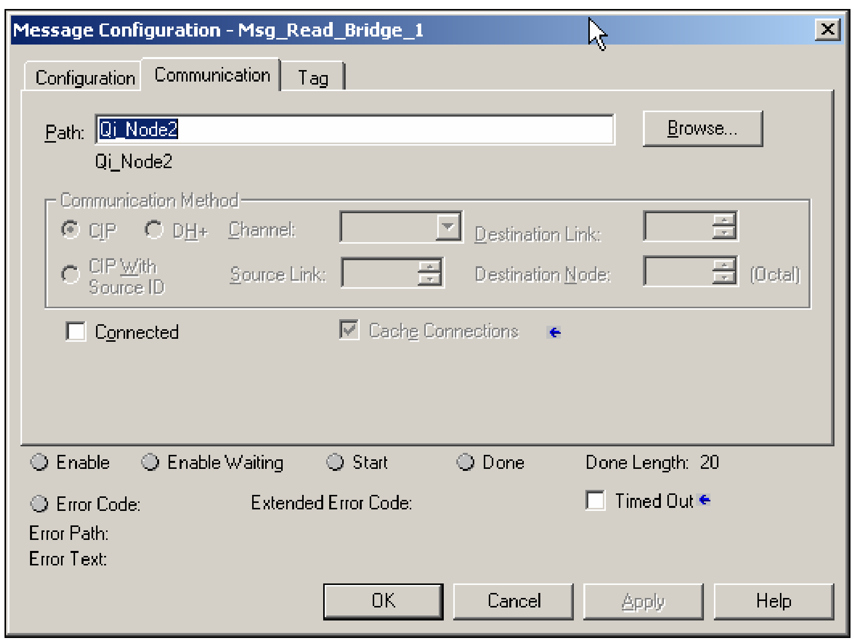


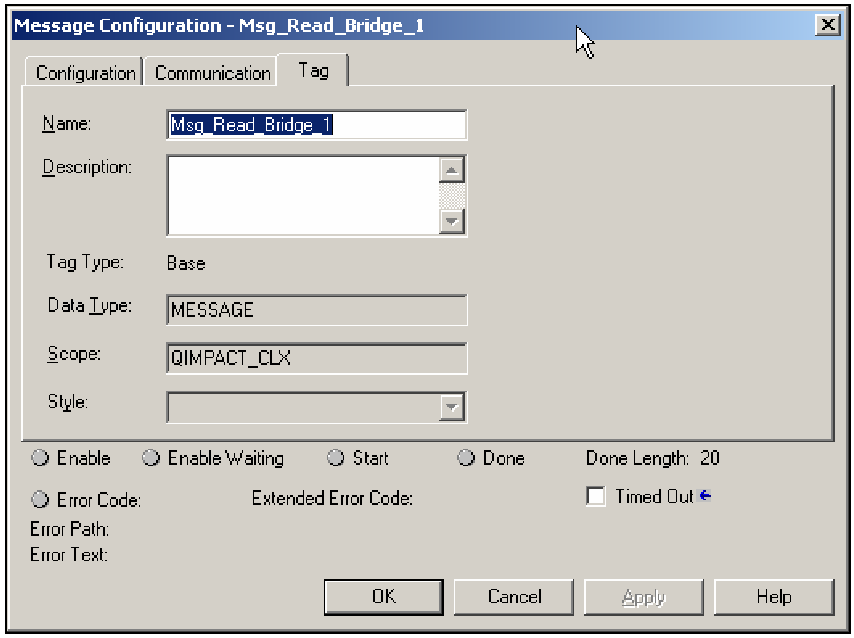


ControlLogix – screen shots showing configuration of the MSG instruction used to Read data to the Q.iMPACT matroller


Handshake_Bridge[1].8
ONS
MSG
Type - CIP Generic
Message Control
Msg_Read_Bridge_1
EN
DN
ER


Message Configuration - Msg_Read_Bridge_1
Configuration
Communication
Tag
Message Type:
CIP Generic
Service Type:
Custom
Source Element:
Source Length:
0
(Bytes)
Destination
Cmd_Resp_Buff_Brid
New Tag...
Service Code:
1
(Hex)
Class:
85
(Hex)
Instance:
1
Attribute:
0
(Hex)
Enable
Enable Waiting
Start
Done
Done Length: 20
Error Code:
Extended Error Code:
Timed Out
Error Path:
Error Text:
OK
Cancel
Apply
Help


Message Configuration - Msg_Read_Bridge_1
Configuration
Communication
Tag
Path:
Qi_Node2
Browse...
Qi_Node2
Communication Method
CIP
DH+
Channel:
Destination Link:
CIP With Source ID
Source Link:
Destination Node:
(Octal)
Connected
Cache Connections
Enable
Enable Waiting
Start
Done
Done Length: 20
Error Code:
Extended Error Code:
Timed Out
Error Path:
Error Text:
OK
Cancel
Apply
Help



As can be seen from the above screen shots, in order to create a working system only two blocks of data are required: ControlNet Class 84h and 85h. Class 84h is data that is written to the matroller and contains all the information required by the matroller to start and successfully complete a material transfer. Normally, after a pause of between 100 and 500 mS, a class 85h read is performed to confirm that the write instruction did get to the matroller and that the material transfer started. Should the matroller not start due to an interlock condition, then the status code can be decoded in order to determine which condition has not been met. The status codes are listed at the end of this chapter.

Writing Data to the Q.iMPACT Matroller

Using ControlNet class 84h a block of data is written to the Q.iMPACT matroller. The structure of the data block is as follows. Descriptions follow at the end.

Word 0,	low byte	Channel number
Word 0,	high byte	Sequence number
Word 1,	word	Material Path
Word 2,	low byte	Command
Word 2,	high byte	Group number
Word 3,	low byte	Number or overlapping secondary feed
Word 3,	high byte	reserved
Word 4,	float	Setpoint, (target weight)
Word 6,	float	pos tolerance (enter a positive number)
Word 8,	float	neg tolerance (enter a positive number)
Word 10,	ASCII	Material ID. This string is included in the material transfer report.
		(string length = 20 bytes)

Explanation

Channel number	Channel to be used
Sequence number	An incrementing number used to separate and track commands
Material Path	Desired Material Path to be used
Command	The actual task/command that the Q.iMPACT matroller will perform.
Group number	During an overlapping feed an arbitrary number is assigned to the "group". In this way multiple "groups" of overlapping feeds can be done simultaneously. Scale A scale and 2 flow meter feeds are all part of group "1". Another scale and 3 flow meter feeds could be part of group "2"
# overlapping feeds	The Q.iMPACT matroller must be informed of how many secondary overlapping feeds there will be. It needs this information in order to know when the final command has been received as it will only start the transfers once all commands associated with the group have been received. This is the case as the Q.iMPACT matroller must perform various feasibility checks before it actually starts the transfers.
Setpoint	The actual target weight required.
Tolerances	The actual maximum absolute error that is allowed.
Material ID	A name for the Material

Command List

1 Start material transfer.
2 Start material transfer with Gross Weight Target. This command is only valid for a scale device.
3 Start Hand Add.
4 Acknowledge material transfer or Hand Add Complete
5 Abort material transfer
6 Reset Slow Step Timer
7 Start Manual mode
8 Turn on FCE (Final Control Element) in Manual mode
9 Turn off FCE (Final Control Element) in Manual Mode
10 Restart Auto mode
11 Complete feed in Manual mode
12 Master Reset – Instrument channel
13 Report last status
14 Master Reset – Cluster
15 Validate aggregate secondary feeds
30 Reset the ControlNet Board
31 Reset the Channel

NOTE: Misuse of the two commands above will interfere with the process.

Q.i supported Commands Overview

Command 1 - Start Material Transfer

This command will result in the Q.i transferring an exact amount based on the Target embedded within the command. If the Target was 35 kg for example, 35 kg will be added into the scale regardless of what the weight was prior to the command being issued. (Note: the final result must still be within the scale capacity)

Command 2 - Start Material Transfer with Gross

This command will result in the Q.i transferring material to a target amount. For example if there already was 10kg in the scale and Command 2 was sent with a Target of 50kg only 40 kg will be added. This command can only be used with a scale

Command 3 - Start Hand Add

This is a Pseudo material. It is treated as a normal material except that the Q.i does not control the addition of the material. This would be done manually by an operator. Once the additions have been made the Q.i must be informed of this fact either by activating one of the Q.i's digital inputs. The Q.i will calculate the net amount transferred and any errors. A normal report is created identical to a normal material transfer.

Command 4 – Acknowledge Material Transfer

Whenever a Material Transfer has been successfully started by the Q.i, the cycle must be completed by sending a Command 4 when the bit "Waiting for Controller to Ack Last Material Transfer" (bit7) goes high. The Q.i will not accept another command once it is expecting Command 4. This even applies for Aborts and Power failures occurring during a Material Transfer. The one exception is a Channel or Cluster Reset action issued from a Web Page. The Reset action clears all registers.

Command 5 – Abort Material Transfer

This Command will cause the Q.i FCE (Final Control element) to turn OFF and the Q.i to report net amount Transferred up until the Abort Command was sent. A Command 4 must still be sent in order to complete the Cycle.

SPECIAL NOTE: If the Q.i is within the Feed Override period the Abort Command will not be accepted and the Q.i will complete the Transfer

Command 6 – Reset Slow Step Timer

The Slow Step Timer will be reset to either the value embedded within the command OR if a zero was sent as the target it will be reset to its default value entered in the Material Path Setup Page

Command 7 – Start Manual Mode

This will cause the Q.i to go from Auto to Manual mode. If this occurs during a Material Transfer the FCE will turn OFF. Various options are now available such as:

Add material by Manually controlling FCE O/P using Commands 8 and 9.

Add material by hand.

Return to Auto mode with Command 10

Option 1 – once you are finished adding manually are you are not using option 3 route, the command 11 (complete Feed in Manual) must now be used. The Q.i will now add up how much was added in Auto mode together with how much was added in Manual mode and use this total amount in the Transfer Report. The "Waiting for Controller to Ack

Last Material Transfer" (bit7) will then turn ON. The Command 4 must now be issued in order to complete the cycle

Option 2 - once you are finished adding by hand and are not using option 3 route, the command 11 (complete Feed in Manual) must now be used. The Q.i will now add up how much was added in Auto mode together with how much was added in Manual mode and use this total amount in the Transfer Report. The "Waiting for Controller to Ack Last Material Transfer" (bit7) will then turn ON. The Command 4 must now be issued in order to complete the cycle

Option 3 – returning to Auto will cause the Q.i to carry on where it left off. The FCE will turn ON and the Transfer will complete

Command 8 – Turn ON FCE in Manual

This command will turn ON the Q.i FCE only when the Q.i has been switched to manual mode. If a value is entered in the target such as 5 then the FCE will turn on for 5 seconds. If 0 is entered it will stay ON indefinitely.

Command 9 – Turn OFF FCE in Manual

This command will turn OFF the Q.i FCE only when the Q.i has been switched to manual mode.

Command 10 – Restart Auto Mode

If during a Mat Transfer the Q.i has been put in the Manual Mode this command will return it to Auto mode. NOTE: If a Transfer has not completed it will automatically continue with the Mat. Transfer

Command 11 – Complete Feed in Manual Mode

If during a Mat Transfer the Q.i has been switched to Manual mode and additional material has been added. This command is used to signal that the Transfer is complete a Mat Transfer report is generated and the cycle must be completed with an Ack (Cmd 4) when prompted.

NOTE: The report will add up total added during Auto mode as well as manually.

Command 12 – Master Reset Instrument Channel

This command will completely reset a channel no matter what it is doing at the time. No further commands are required to be sent to the Q.i. It is now ready for the next Material Transfer i.e. Command 1 or 2

NOTE: this action can also be initiated from the Web Pages

Command 13 – Report last status

It is possible to retrieve the results of a Material Transfer again at a later time with this command. Obviously it will report the last material transfer

Command 14 – Master Reset Instrument Channel

This command will completely reset all channels no matter what the Qi's are doing at the time. No further commands are required to be sent to the Qi's. They are now ready for the next Material Transfer i.e. Command 1 or 2

NOTE: this action can also be initiated from the Web Pages

Command 15 – Validate aggregate Secondary Feeds

This command is used to crosscheck the accuracy of Flow meters with a Scale. The Flow meters would need to feed into the scale, which is doing the validating.

Usage:

Send Command 15 specifying a group number (x) and number of secondary feeds (y). The channel must be a valid scale.

If (y) was 2 then two more Start Material Transfers must be sent. One to each Flow meter, embedded in this command would be a group number, which must be identical to (x). The group number associates/links the three channels. Once the two Flow meters have completed their Transfer the Q.i checks their total net amounts against the scales changed weight. A Valid Material Transfer report for this scale is then generated. This scale will set its "Waiting for Controller to Ack Last Material Transfer" bit as if it had actually performed a Transfer even though it did not actually control one. The scale would then have to be Ack'd and the resulting report can be read.

Command 30 – Reset the Controlnet board (! WARNING: USE WITH CAUTION!)

This command will completely reset the Contronet board on the bridge to which the command was sent. Communications will be disrupted for about 20 secs

Reading Data from the Matroller

Using ControlNet class 85h a block of data is written to the Q.iMPACT matroller. The structure of the data block is as follows. Descriptions follow at end.

Word 0, low byte	Channel number
Word 0, high byte	Sequence number
Word 1, word	Material Path
Word 2, low byte	Command
Word 2, high byte	Command Status
Word 3, low byte	Transfer Status
Word 3, high byte	Reserved
Word 4, word	Material Transfer Status Qualifiers
	0 Over Tolerance"
	1 "Under Tolerance"
	2 "Power Failure" during feed
	3-15 Reserved
Word 5, word	Reserved
Word 6, float	Delivered weight
Word 8, float	Material Transfer error

Explanation

The first four bytes of the received data are identical to the first four bytes of transmitted data. This enables you to compare the sent with the received. If they match then your last command was received by the Q.iMPACT matroller.

Command Status – this is the response to your command. By analyzing this number you will be able to determine whether your command was received accepted, rejected. The various responses are listed below. As you can see a response in the range 0 to 5 is desirable!

Command Status codes

0 SUCCESS – Start Gain-In-Weight Material Transfer Command Complete

1 SUCCESS – Start Loss-In-Weight Material Transfer Complete.

2 SUCCESS – Start Flow Meter Material Transfer Complete.

3 SUCCESS – Start Validate Aggregate Feed Complete.

4 SUCCESS – Start Hand Add Command Complete.

5 SUCCESS – Command Complete

6 Command Not Complete – Request status again after a short delay

7 ERROR – Communications Error

8 ERROR – Invalid Instrument Channel Number

9 ERROR – Invalid Command

10 ERROR – Invalid Material-Path Table Index Number

11 ERROR – Invalid Algorithm in Material-Path Table Entry

12 ERROR – Invalid Feed Type in Material-Path Table Entry

13 ERROR – Invalid Measuring Device Channel Table Index in Material Path Table

14 ERROR – Invalid Gain In Weight Feed and Dump to Empty Algorithm Combination in Material Path Table

15 ERROR – Invalid Destination in Material Path Table Entry.

16 ERROR – Other invalid data in Material Path Table Entry

17 ERROR – Overlap Feed Request Error, including invalid Loss In Weight Feed in Material Path Entry and Overlapping Feed Command.

18 ERROR – Invalid data In Measuring Device Channel Table Entry

19 ERROR – Invalid Mode for Command, e.g., Controller is requesting to start a new material transfer before the last feed is complete or before the controller has acknowledged that the last material transfer is complete.

20 ERROR – Requested add amount too small

21 ERROR – Requested add amount would bring Scale Device over capacity

22 ERROR – Scale Device Currently over Capacity

23 ERROR – Scale Device Currently under Zero

24 ERROR – Instrument Malfunction

25 ERROR – Target Weight is less than Spill

26 ERROR – Response Timeout

27 ERROR – Too many overlapping feeds

28 WARNING – Delayed start to feed due to overlapping feed.

29 WARNING – Abort ignored since Time to Complete was less than Feed Override Time

30 ERROR – Invalid overlap group number

31 WARNING – Waiting for All Secondary Requests.

32 WARNING – Waiting for Measuring Device Stability.

33 ERROR – Not Enough Material.

34 ERROR – Device not configured or calibrated properly.

Transfer Status – At the end of the Material Transfer, this code will indicate the status of the Transfer.

0 Successful Material Transfer – K1, K2 parameters updated

1 Successful Material Transfer – Spill Only

2 Successful Material Transfer- Dump to Empty

3 Successful Hand Add

4 Material Transfer Complete - Parameters NOT updated

5 Material Transfer Complete – Parameters reset.

6 Material Transfer Complete with Manual Operation

7 Failed – Unstable Scale

8 Failed – Overlapping Feed Error Corrupted Flow

9 Failed – Erratic Flow Error

10 Failed - Low Flow Error

11 Failed - High Flow Rate Alarm Error

12 Failed – Communication Error

13 Failed – Instrument Error

14 Failed – Scale Device Capacity Error

15 Failed – Predictive Algorithm Error

16 Failed – Material Transfer with Manual Operation

17 Failed – Amount of material transferred did not match in source and destination.

18 Failed – Controller Aborted Material Transfer

19 Failed – Controller Reset Channel

20 Failed – Controller Reset Cluster

21 Failed - Reserved

22 Failed – Slow Step Timer Timeout

23 Failed – Secondary Requests Timeout

24 Failed – Power Failure During Feed

25 Failed – Start Material Transfer Command Failed Immediately – Transfer Did Not Start

26 Status Only – Material Transfer Is In Progress.

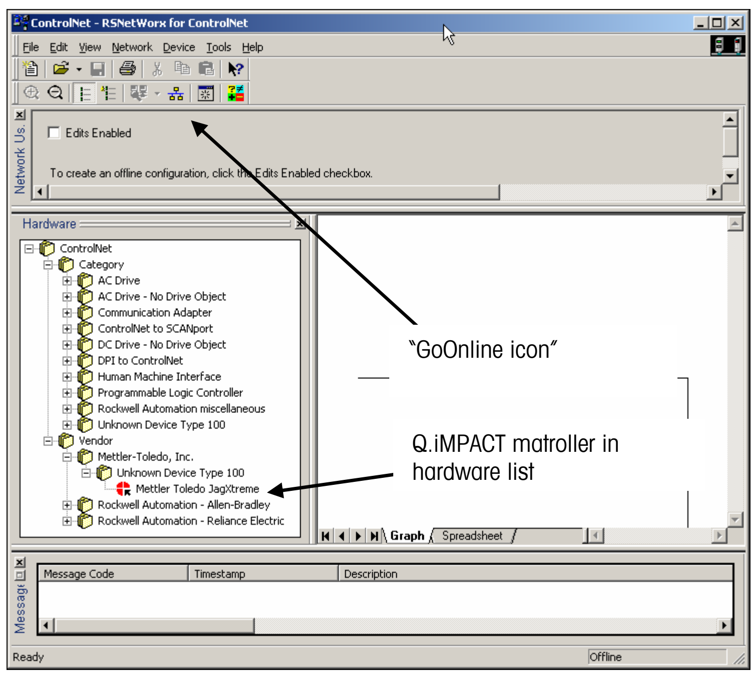
Setting up a ControlNet Network with Q.iMPACT Matroller(s)

This section deals only with the inclusion of the Q.iMPACT matroller hardware in a ControlNet network. Other equipment is not described. It is assumed that you are reasonably familiar with ControlNet and its terminology.

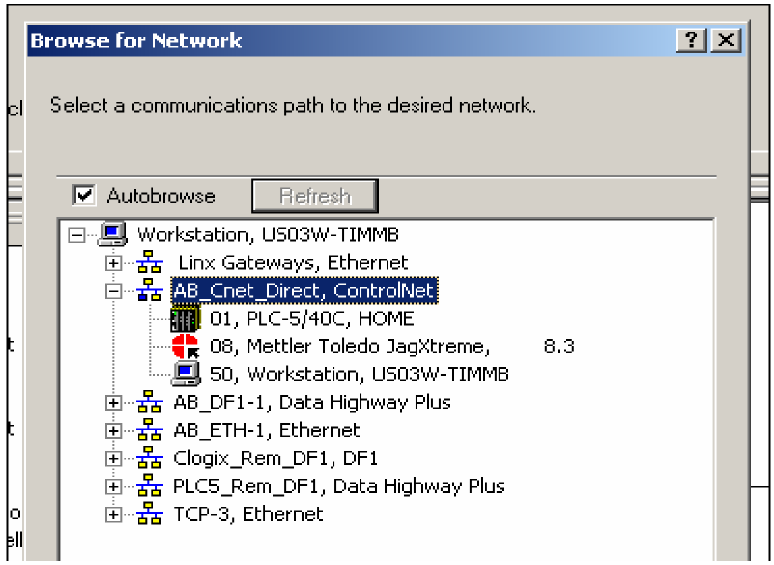
Step 1 Using the Rockwell EDS installation wizard, add the Q.iMPACT matroller to the list of supported equipment. Included on the CD are two files. 029A006400010100.eds and 029A_JAGX.ico. These are the EDS and Icon files which must be installed first. The EDS installation wizard can normally be found on the RSLinxTools folder.

Step 2 Set the Q.iMPACT matroller's ControlNet address using the 10 position rotary switches found on the rear of the ControlNet board. Physically connect the Q.iMPACT matroller to the ControlNet using an Allen Bradley Tap. In our example we have used an address of 8.

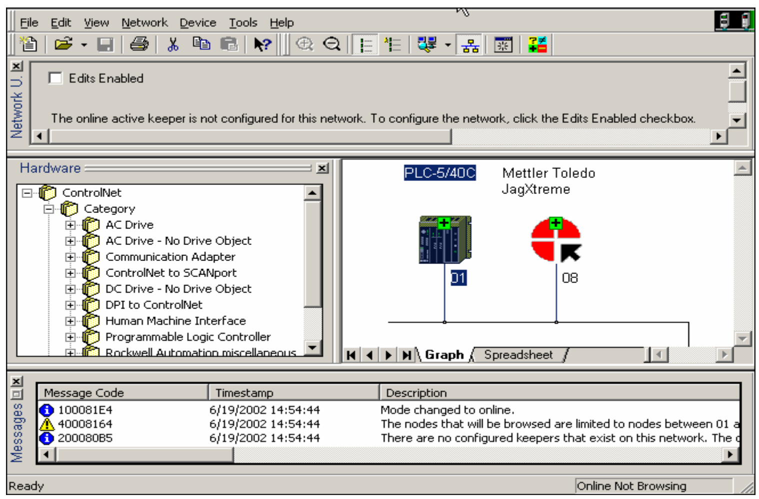
Step 3 Start RSNetworks ver 3.00 or higher and select a new project. Your screen should look as follows. Note the METTLER TOLEDO Icon in the Hardware list tree.



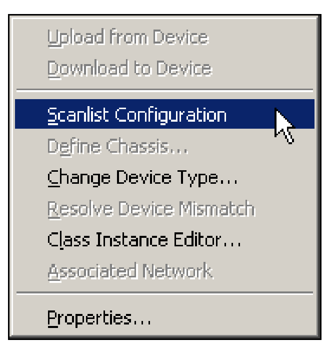
Step 4 Click on the "GoOnline" icon. A window, as shown below, will pop up. Select the path to the ControlNet network. If a driver to the desired ControlNet network is not on the selection then from within RSLinx this driver must be added. Consult Rockwell Automation documentation on how to do this. The SNetworx will the browse the network searching for equipment connected to the network.

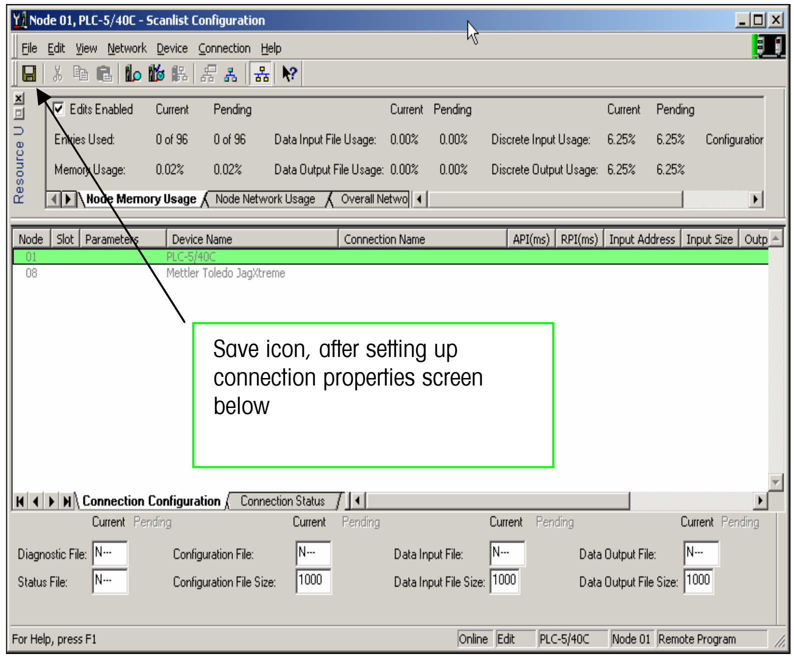


The screen below shows the result of the search. Results may vary depending on what type and how many devices are on the Network. Our example only has a single Q.iMPACT matroller with an address of 8.

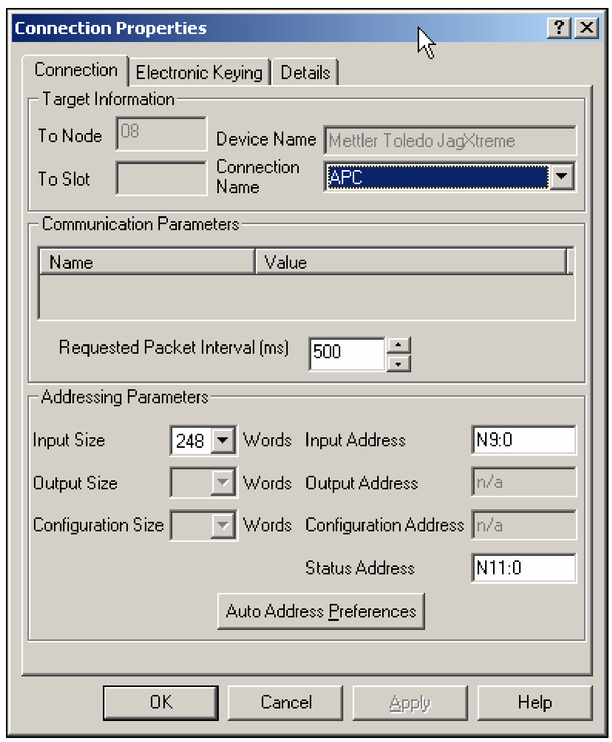


Step 5 Check "edits enabled". With the PLC5 icon in focus select Scanlist Configuration from the Device pulldown menu.



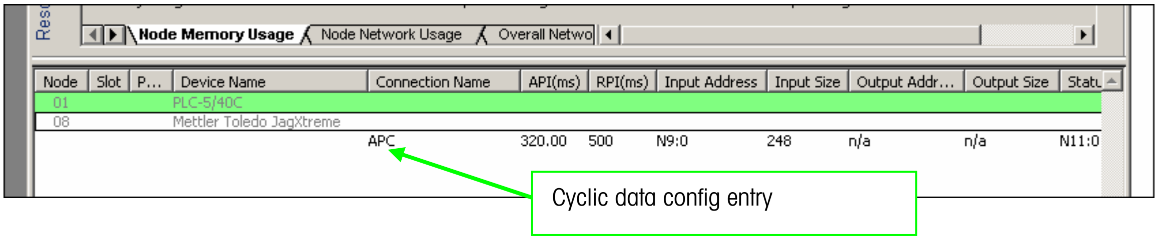


The screen below will appear. Double click on the Mettler Toledo Device name.



This window allows you to setup the cyclic data. First select the APC option from the "Connection Name" combo box. Then in the Input Address box enter the data file that the cyclic data should use. A recommended Requested Packet Interval would be between 250 and 500 ms. Assign the status data to the desired data file.

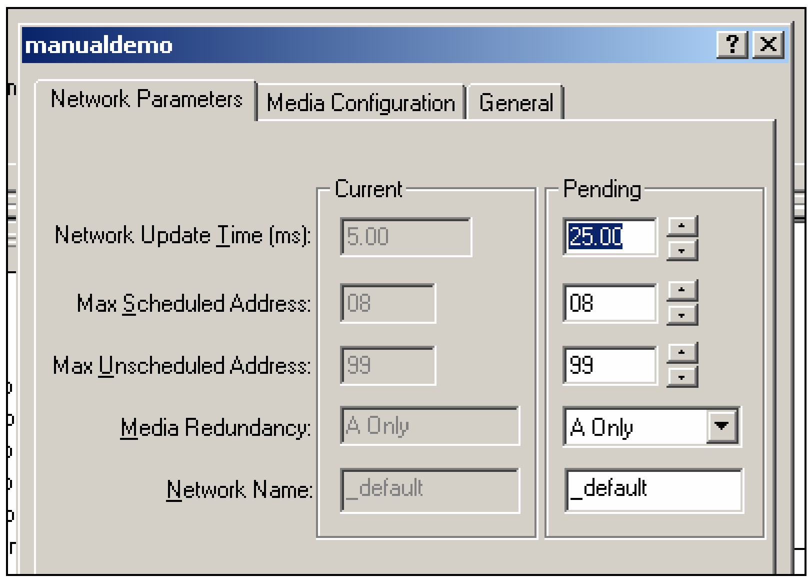
Click OK and then Save by clicking on the disc icon on the Scanlist Configuration screen. See above screen shot.



The scanlist configuration screen will now have a new entry as shown below. Repeat for all Bridge Q.iMPACT matroller's. When done, close the scanlist configuration file.

Step 6 Back on the main networx screen make sure that "edits enabled" is checked. With the PLC5 in focus select the "Properties option" from the Network pulldown menu.

The window shown here can now be edited. Typically, network update times for a Q.iMPACT matroller system are between 25 and 50 ms. Change and then apply/save changes.



RSNetWorx will save configuration and update the keeper. Your Control Network is now ready for use with the Q.iMPACT matroller.

EDS File Installation for ControlNet, RSLogix 5,RSLogix5000 and RSLinx Recognition

EDS is an abbreviation for Electronic Data Sheet. It provides definitions of a device's configurable parameters and public interfaces to those parameters. Every type of configurable device has its own unique EDS. The EDS is a simple text file that allows product-specific information to be made available by a vendor for all other vendors. This makes possible user-friendly configuration tools that can be easily updated without having to constantly revise the configuration software tool.

Software: Beginning with the following revisions, EDS (Electronic Data Sheet) files are required for RSNetworx for ControlNet, RSLinx RSLogix5 and RSLogix 5000 to recognize a device:

- RSNetworx for ControlNet: Version 2.21
- RSLinx; Version 1.10.176
- RSLogix5: Version 4.0
- RSLogix5000: Version 5.12

Symptoms:

When a device that has no EDS file is selected OFFLINE in RSNetWorx for ControlNet to be added to the Scan List, no error will be reported until you attempt to go ONLINE. The device will display a "?" in it, unknown device.

RSLinx can "see" a device, going online, uploading or downloading may not be possible. The EDS file for that device has not been installed

ControlLogix modules cannot be browsed in RSWho, the backplane does not show after clicking the "+" to expand the tree or the ControlLogix modules show up as a yellow "?" without a red "X". The EDS files for the modules were not installed on the system. This is usually the result of unchecking "ControlNet EDS files" during the install of RSLinx

Solutions:

When no EDS files have been installed, RSLinx can be reinstalled, checking "ControlNet EDS files".

Getting the EDS File

The EDS file is available on the documentation CD under ControlNet. To install the EDS file into RSNetworx, go to:

> Tools

> Eds wizard

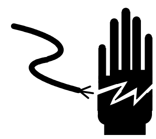
> Register an EDS file

> Register a single file

METTLER TOLEDO

For your notes

8 Service and Maintenance



⚠ WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.

This chapter provides basic information for servicing the Q.iMPACT matroller. Information on the Maintenance function within the Q.i system (the various options that allow you to monitor or test various aspects of the material transfer operation) can be found in Chapter 4.

Tools and Supplies

Keep the following items on hand for service and maintenance of the Q.iMPACT matroller. Common hand tools may also be required.

- Volt-Ohm meter
- Analog load cell simulator - Part Number 8245100A (variable) or 10086500A (10-step)
- Soft, lint-free cleaning cloth
- Antistatic bags for PCBs - Part Number 14006300A (5x8)
- Antistatic wrist strap and mat
- METTLER TOLEDO screwdriver Part Number A14476100A
- Phillips head screw driver
- Allen wrench (2 mm)

Cleaning and Regular Maintenance

Wipe the keyboard and covers with a clean, soft cloth that has been dampened with a mild glass cleaner. Do not use any type of industrial solvent such as toluene or isopropanol (IPA) as they may damage the material transfer controller's finish. Do not spray cleaner directly onto the material transfer controller. Regular maintenance inspections by a qualified service technician are recommended.

Troubleshooting

If problems occur, do not attempt to repair the matroller before you have determined the source of the problem. Record as much information as possible about what has happened including any error messages and physical responses of the matroller. If the Q.iMPACT matroller is malfunctioning, perform the troubleshooting tests detailed in this chapter to identify the problem.

Status Lights

The two red lights on the back of the Analog A/D board are diagnostic tools and indicate the status of the matroller. The following table describes the possible light indications. Refer to the Error Codes and Actions section for corrective action suggestions.

A	B	Status
Blink	Blink	OK
On	On	RAM Error
On	Off	EPROM Error
Off	On	MELSI Error
Off	Blink	MMR Cell Error

Error Codes and Actions

The following table lists the Q.iMPACT material transfer controller's error messages, probable cause, and remedy.

Error Message	Description	Probable Cause	Remedy
ALC_EE_CHKSM_ER	A Checksum Error was detected in accessing the Scale Calibration parameters on the Analog load cell card.	Static, power problems, inductive noise. Bad EEPROM.	Reset to Factory in Scale Interface Menu. Recalibrate scale. If problem persists, replace the Analog load cell card.
ALC_EE_NO_ACCESS	The Q.iMPACT material transfer controller cannot access Scale Calibration parameters on the Analog load cell card.	You have configured the Q.iMPACT material transfer controller for a nonexistent Analog load cell card; the Analog load cell card is not jumpered properly; the Analog load cell is not seated properly; or the Analog load cell card is not working.	Check your configuration; check the jumpers on the load cell card; reseat the load cell card. If none of these actions correct the problem, put in a new Analog load cell card.
ALC_EEPROM_ERROR	Analog load cell EEPROM memory error.	Static, power problems, inductive noise. Bad EEPROM.	Re-power and recalibrate. Check for good power, suppress noise; take static precautions. Replace Analog PCB.
ALC_EPROM_ERROR	Analog load cell EPROM memory error.	Defective Analog PCB.	Replace appropriate Analog PCB.
ALC_MELSI_ERROR	Analog load cell A/D error.	A/D error has occurred.	Re-power the unit. Check with weight simulator. If error persists, replace Analog PCB.
ALC_NO_RESPONSE	Analog load cell A/D communications error.	A/D error has occurred.	Re-power the unit. Check all ALC jumpers. Check with weight simulator. If error persists, replace Analog PCB.
ALC_RAM_ERROR	Analog load cell A/D RAM error.	Static, power problems, inductive noise. Bad Analog PCB.	Re-power and recalibrate. Check for good power, suppress noise; take static precautions. Replace Analog PCB.
ALC_RESPONSE_ERR	Analog load cell A/D communications response error.	Internal error.	Re-power the unit. Check with weight simulator. If error persists, replace Analog PCB.
ALC_UNDEFINED_ERR	Analog load cell A/D undefined error.	Analog load cell A/D memory error has occurred.	Verify programming and jumpers for Analog PCB are correct. If error persists in software prior to "B" revision, upgrade software to "C" revision or later.
APC_CHANNEL_ERR	APC channel error	Error in PAC channel configuration table	Correct error in configuration table.

Error Message	Description	Probable Cause	Remedy
APC.FLOW_MTR_ERR	APC flow meter error	Flow Meter configured in PAC Tables is not responding - it probably does not exist.	Correct error in configuration table.
APC_SCALE_ERR	APC scale error	Scale configured in PAC table is not responding (may not exist)	Correct error in configuration table.
APC_UNITS_ERROR	APC units error	Error in PAC scale configuration in scale configuration table.	Correct error in configuration table.
BAD_NUMBER_CELLS	The material transfer controller has been configured with an illegal number of load cells in a POWERCELL scale or J-Box scale.	Improper setup.	Check number of load cells configured for both scales. Correct the setup.
BRAM Bad - Rst?	Battery-backed RAM error.	Setup parameters in battery-backed RAM have been corrupted. Most likely causes are too long of storage for the material transfer controller, power removed from the material transfer controller memory too long, battery failure, or hardware failure.	Respond Y(es) to reset to factory settings. Reprogram setup parameters. If problem persists, you may have to replace battery, power supply, or controller card.
BRAM CKSUM ERROR	Setup variables corrupt.	Electrical malfunction. Power removed from the material transfer controller memory for too long. The battery and super-cap on the controller card drained.	Press ENTER to continue. Check setup parameters for desired settings.
BRAM Err - Rst? Y (Will appear during power-up sequence only after loading new software.) BRAM VERSION ERR	Different program version detected. Storage locations for setup parameters and memory locations have been moved in a new software up date.	New software version has been downloaded to the Q.iMPACT material transfer controller.	Press ENTER to accept the reset default Y (es) response. All parameters will be reset to factory default values. Reprogram the material transfer controller's setup parameters.
BRAM Power Fail!	The Q.iMPACT material transfer controller detected low power supply voltage while attempting to write permanent data to BRAM Shared Data.	You have an early version of the Q.iMPACT material transfer controller power supply or a bad power supply.	Upgrade the power supply on the material transfer controller with the latest version.
CALIBRATION_ERR	Calibration error.	Improper setup or calibration sequence, or bad load cell.	Check wiring. Check with simulator. Check load cell and recalibrate. Verify calibration setup parameters.
Can't redim. var	JagBASIC programming error.	Once a JagBASIC application has declared a variable or an array, it cannot be re-dimensioned to a different size array.	Correct JagBASIC program.

Error Message	Description	Probable Cause	Remedy
CELL CALIB ERROR	CELL CALIBRATION ERROR	The calibration counts for the cell are in error.	Either the POWERCELL is bad or you did an invalid scale calibration.
CELL ZERO ERR	CELL ZERO DRIFT FAILURE	An individual POWERCELL zero has exceeded its established zero limits	Check the individual POWERCELL indicated in error message. You should perform diagnostics checks on the cell. You may have to replace the cell.
CELL ZERO OK	CELL_ZERO_DRIFT_OK	Previous cell zero drift error has now gone back within the established limits	There may still be a potential POWERCELL hardware problem. You should perform diagnostics checks the cell.
CHANGE PWCEL ERR	There was an error when attempting to change a POWERCELL address.	Communications error with POWERCELL.	Run the cell diagnostics to verify the POWERCELL address. If it is still at its old address, try changing the address. If the problem persists, replace the POWERCELL.
CLEAR_TARE_AT_0	According to the scale setup parameters, the scale must be at gross zero in order to clear tare.	If you select Tare Interlock, the scale must be at gross 0 in order to clear tare.	Check local legal-for-trade requirements. If you do not want this feature, turn off the Tare Interlock selection.
CNET_IF_TIMEOUT	A timeout error has occurred.	Timeout error in talking from Controller Card to CNET interface board.	Will most likely reset within approximately 20 seconds.
CNET_ASSMBLY_ERR		The PLC has attempted to configure an improper assembly type.	
Command error	An error occurred in trying to access a file from the JagBASIC interpreter.	Most likely, you tried to access a file that does not exist. It is also possible that the file system has been corrupted.	Use the DIR command from the JagBASIC Interpreter to verify the directory of the RAM disk. If the file system has been corrupted, you need to re-initialize it from the JagBASIC setup menus and rebuild it from the backup files you are maintaining on a PC.
CONECT_NOT_ FOUND	Serial connection not found.	Improper serial setup.	Reset serial programming block to factory defaults. Reprogram serial setup parameters.
CTL_EE_CHKSM_ERR	Checksum error on accessing the EEPROM on the Controller Board. This EEPROM holds the calibration parameters for single-cell DigiTOL and J-Box scales.	Electrical noise, static discharge, or bad EEPROM chip.	Recalibrate DigiTOL scale. If problem persists, replace the EEPROM on the controller board or the controller board itself.

Error Message	Description	Probable Cause	Remedy
CTL_EE_NO_ACCESS	Physical error on accessing the EEPROM on the Controller Board. This EEPROM holds the calibration parameters for single-cell scales.	Hardware malfunction.	Power down/up the material transfer controller. If problem persists, replace the EEPROM on the controller board or the controller board itself.
DEST_NOT_CONNECT	The remote Q.iMPACT matroller that is the destination for a cluster communications message is not connect ed.	The remote matroller that is the destination for a cluster communications message is not connected.	Verify network setup; verify Ethernet wiring, addresses, and terminations.
Device error	JagBASIC programming error.	The JagBASIC program has referred to an illegal device or a device that is not open.	Correct the JagBASIC program.
DIM not array	JagBASIC programming error.	The JagBASIC program has attempted to dimension a variable that is not an array.	Correct the JagBASIC program.
Divide by zero	JagBASIC programming error.	The JagBASIC program has attempted to divide a number by zero.	Correct the JagBASIC program.
EE A CErr - Rst? Y EE B CErr - Rst? Y	EEPROM Checksum Error. The scale calibration parameters stored on the EEPROM have been corrupted.	Hardware failure.	Press ENTER to accept the reset default Y(es) response. You must recalibrate Q.iMPACT scale.
EE A VErr - Rst? Y EE B VErr - Rst? Y EE VERSION ERROR	Version number in the EEPROM does not match that expected by the operating system.	Matroller was calibrated with an earlier version of the operating system.	Press ENTER to accept the reset default Y(es) response. You must recalibrate the measuring device.
EE Reset Error	An attempt to access the EEPROM for the selected measuring device has failed.	Matroller improperly configured with nonexistent scale devices. It can be also be caused by an improperly seated scale board or a hardware malfunction on the scale board.	Check your configuration in setup. You may have to do Reset to Factory. Try reseating the boards. If these efforts fail, replace the interface board.
EF	Functional error in the weighing cell of a High Precision (IDNET) base.	Static, power problems, inductive noise or unexpected operation.	Press the ESC key to continue. Take steps to eliminate probable cause.
EL	A command transmitted to a High Precision (IDNET) base has been received, but cannot be executed.	Static, power problems, inductive noise or unexpected operation.	Press the ESC key to continue. Take steps to eliminate probable cause.
END_OF_FILE	End of File encountered while reading Shared Data.	End of File encountered while reading Shared Data.	None.
END_OF_SHIFT_ADJ	Last load cell or pair completed during shift adjust procedure.	Last load cell or pair completed during shift adjust procedure.	None.
ERROR in line	JagBASIC programming error. This message indicates the line in which the error occurred.	JagBASIC programming error. There will also be an error code indicating the type of programming error.	Correct the JagBASIC program.

Error Message	Description	Probable Cause	Remedy
ES	A command or string transmitted to a High Precision (IDNET) base has been received, but is not a recognized command.	Static, power problems, inductive noise or unexpected operation.	Press the ESC key to continue. Take steps to eliminate probable cause.
ET	A transmission to a High Precision (IDNET) base was received with a transmission error such as parity, stop- or start-bit, or over flow error.	Static, power problems, inductive noise or unexpected operation.	Press the ESC key to continue. Take steps to eliminate probable cause.
ETHERNET_BAD_ADDRS ETHERNET_DUP_ADDRS	You have configured the Ethernet address with either a duplicate address with another node on the network or an illegal Ethernet address.	The Ethernet address is not set up properly.	Check network address on Q.iMPACT matroller.
ETHERNET_TEST_ERR	The standard power up testing of the Ethernet adapter failed.	Ethernet Adapter Failure.	Re-power up the Q.iMPACT matroller. If problem persists, replace the controller card.
Event def error	JagBASIC programming error.	There is a programming error in defining an event.	Correct JagBASIC program.
File open failed	JagBASIC programming error.	Most likely, the JagBASIC program has attempted to open a nonexistent RAM disk file or serial communications device.	Correct JagBASIC program.
FOS_RESP_TIMEOUT	The Formatted Output Server (FOS) generates demand print and continuous print messages. They may be directed to a local or remote serial port. This error occurs when the FOS does not receive a response serial port driver within a specified amount of time.	This error usually occurs when print data is directed to a remote serial port. If the Ethernet LAN is disconnected while the FOS is waiting for a response, this error may occur.	Check Ethernet wiring.
FTP COMM ERROR	FTP COMMUNICATION ERROR	An FTP communication error occurred,	If the problem persists, carefully record the conditions that cause the error and contact the METTLER TOLEDO Technical Services.
FTP COMMAND ERR	FTP COMMAND ERROR	The FTP server received a command that it does not support.	Do not use the command that caused this error.
FTP FILE ERROR	FTP FILE ERROR	The FTP server detected an error in accessing a file	If the problem persists, carefully record the conditions that cause the error and contact the METTLER TOLEDO Technical Services.

Error Message	Description	Probable Cause	Remedy
IDN BUFF OVRFLOW	Excessive data.	Unexpected operation.	Power down, then up. If error still occurs, reset the Q.iMPACT matroller to Factory settings and reprogram setup parameters.
IDN EPROM ERROR	Damaged EPROM chip.	Electrical malfunction.	Replace High Precision interface board.
IDN NO RESPONSE	No response from base.	Bad wiring or pcb(s).	Check wiring. Replace High Precision interface board. Replace High Precision interface board.
IDN RAM ERROR	Damaged RAM chip.	Electrical malfunction.	Replace High Precision interface board.
IDN RESPNSE ERR	Unexpected response.	Unexpected operation.	Power down, then up. If error still occurs, reset the Q.iMPACT matroller to factory settings and repro gram setup parameters.
Illegal command	JagBASIC programming error.	The JagBASIC program has issued a command that is not a legal command.	Correct the JagBASIC program.
Incomplete line	JagBASIC programming error.	The JagBASIC program contains a line that does not have the full syntax required for a line.	Correct JagBASIC program.
INCRM_CHAIN_TARE	A decreasing chain tare was attempted in a market where only incremental chain taring is permitted.	Chain taring that causes a decrease in the tare weight is not permitted in some markets in legal-for-trade applications. An incremental chain tare is a new tare on top of an already existing tare value where the new tare value is greater than the old tare value.	Check the market setting in setup. Check the "tare interlock" setting in setup. Check the legal-for-trade switch on the controller board. Verify that these are set properly.
Internal Errors 1 Through 13	Various errors.	Programming failure, hardware failure.	Power down, then up. If error still occurs, reset the Q.iMPACT material transfer controller to factory settings and reprogram setup parameters. Replace controller or Analog board
Invalid device #	JagBASIC programming error.	The JagBASIC program is referencing a device # that is not open.	Correct the JagBASIC program.
Invalid SD name	JagBASIC programming error.	The JagBASIC program is referencing an invalid Shared Data name.	Correct the JagBASIC program.

Error Message	Description	Probable Cause	Remedy
INVALID_FILE_NAME	There was an attempt to access Shared Data with an invalid file name.	This could be caused by an internal or external access of Shared Data.	Determine if an internal or external access caused the error. If an external access is causing the error correct the Host PC program. If an internal source appears to be causing the problem, power down, then up. If error still occurs, reset the material transfer controller to factory settings and reprogram setup parameters.
LADDER_EMPTY	Discrete I/O setup error.	User attempted to delete a rung from the ladder that is empty.	Reset discrete configuration to factory and setup discretes.
LADDER_FULL	Discrete I/O setup error.	User attempted to add a rung to the ladder that is full.	Reset discrete configuration to factory and setup discretes.
Line # invalid	JagBASIC programming error.	The JagBASIC program contains a line number greater than 30000 or a duplicate of an existing number.	Correct the JagBASIC program.
Line too big	JagBASIC programming error.	The size of a JagBASIC line is greater than 80 characters.	Correct the JagBASIC program.
LOAD::no filename	JagBASIC programming error.	The LOAD command does not contain a file name.	Correct the JagBASIC command.
Memory find fail	JagBASIC programming error.	The JagBASIC program has exceeded the memory limits of the system.	Reduce memory usage of a JagBASIC program by reducing the number of lines, eliminating unnecessary spaces in the program, reducing the number of variables, or reducing the size of the arrays. When chaining JagBASIC programs, always load largest program first to reduce memory fragmentation.
MN THRESHOLD ERR	WEIGHMENT MONITORING THRESHOLD ERROR	Error in setting the weight thresholds used for monitoring weighments	Check your setup for these thresholds.
NETWORK_XMIT_ERR	Ethernet communications transmission error.	Faulty Ethernet addresses, wiring, line termination, or adapter.	Check the Ethernet wiring for bad connections, wiring breaks, or improper line terminations.
NEXT without FOR	JagBASIC programming error.	There is a NEXT statement without the required FOR statement.	Correct JagBASIC program.
No line number	JagBASIC programming error.	The program line does not have a line number.	Correct JagBASIC program.

Error Message	Description	Probable Cause	Remedy
No Remote Access	JagBASIC programming error.	The program is attempting to access a device that is already in use by a serial connection or by another JagBASIC program in the Q.iMPACT material transfer controller cluster.	To access a serial device, remove all serial connections to the device in setup. To share a serial device among JagBASIC programs, set up a scheme where only one program has the de vice open at a time.
No Scale A Type No Scale B Type No Scale E Type	Scale type definition is missing.	No scale type entered in Scale Interface menu.	Go to "Scale Interface" setup menu and set scale type.
NO_CHAIN_TARE	User attempted to take a second or "chain" tare after a tare was already taken.	When the tare interlock is selected in setup, chain taring is illegal in certain markets.	Check the local "legal for trade" requirements. Check the market selection and tare interlock settings in setup. The system will continue to operate properly but will not allow the chain tare.
NO_DISCRETE_CBCK	There are no more discrete callback structures available.	The setup of this system and the JagBASIC application has exceeded this system limit.	Power down, then up. If error still occurs, reset the material transfer controller to factory settings and reprogram setup parameters.
NO_DMD_PRNT_CON	There is demand print connection configured in setup.	No demand print entered in the "Configure Serial, Configure Port" menu.	Change setup parameters.
NO_KEYBOARD_TARE	Keyboard tare disabled.	Keyboard Tare is disabled in the "Application Envn,Tare Operation" setup menu.	Change setup parameters to enable this feature.
NO_PUSHBUTT_TARE	Pushbutton tare disabled.	Pushbutton Tare is disabled in the "Application Envn, Tare Operation" setup menu.	Change setup to enable this feature.
NO_PWCEL_OLD_ADR	POWERCELL readdressing error.	When readdressing a POWERCELL, no POWERCELL was found at the specified old address. This problem could be caused by a entering an invalid address or by a POWERCELL communications error.	Run the cell diagnostics to verify the POWERCELL address. If the cell is at its old address, try changing the address again. If the problem persists, you may have to replace the POWERCELL.
NO_SECOND_UNITS	Secondary units not specified.	No secondary units selected in "Application Envn, Alt Weight Units" mode setup.	Change setup to enable the feature.
OFF LINE ERROR	The Q.iMPACT material transfer controller on ETHERNET network not responding	Loss of communication between Q.iMPACT material transfer controllers	Check Ethernet cabling. Check Q.iMPACT material transfer controllers on network. Power down, then up affected Q.iMPACT material transfer controllers.

Error Message	Description	Probable Cause	Remedy
ON no GOSUB	JagBASIC programming error.	ON statement is present without required GOSUB.	Correct JagBASIC program.
OPER. FILE ERROR	Cannot read language messages file.	Unexpected operation.	Power down, then up. If error still occurs, reset Q.iMPACT to factory settings and reprogram setup parameters.
OPTION BASE->DIM	JagBASIC programming error.	The program must define the OPTION BASE before dimensioning an array.	Correct JagBASIC program.
Out of data	JagBASIC programming error.	The JagBASIC program has issued more READ commands to initialize system variables than there is data specified in DATA statements.	Correct JagBASIC program.
OUT_OF_COMM_BUFS	Cluster communications error.	The system has exceeded the fixed limit on the number of communication buffers that can be used at one time. Most likely one Q.iMPACT is sending messages to a second faster than the second can process them.	Power down, then up. If error still occurs, reset the material transfer controller to factory settings and reprogram setup parameters.
OUT_OF_MEMORY	The Q.iMPACT software cannot get the dynamic memory it needs to continue running.	The system is using more dynamic "heap" memory than is available or the heap memory has become fragmented.	Reduce the size of a JagBASIC program. Eliminate unnecessary spaces in the program. Reduce the number of variables. Reduce the size of the arrays. When chaining JagBASIC programs, always chain in the largest program first to reduce memory fragmentation. Eliminate unused network connections, serial connections, and printer templates.
OUT_OF_ZERO_RANG	Operator has attempted to zero the scale outside of the legal zeroing range.	The zeroing limits are set up in the "Application Envn, Zero Operation" menu.	Change zeroing range in set up, if necessary.
OVERFLOW	JagBASIC programming error.	A JagBASIC program causes an overflow error by exceeding certain system limits. The maximum size of the "gosub" stack, the "for-next" stack, and the "while-wend" stack is 9 entries each. Overflow errors can also be caused by particular language syntax errors.	Correct JagBASIC program.

Error Message	Description	Probable Cause	Remedy
PRINT REQUESTED	The operator has re- quested a Demand Print through the Control Panel.	None.	None.
PRINT_IN_PROGRES	The operator has requested a second demand print while the first is in progress.	None.	None.
PRINT_NOT_READY	Scale is in motion while attempting to print.	None.	None.
PROGRAM TOO BIG	JagBASIC programming error.	First problem: The pro gram exceeds 400 text lines or 18KB. Second problem: This error can also occur while you are typing in a JagBASIC program when the temporary program buffer becomes full.	For the first problem, separate the program into smaller files that can be run independently or chained together. When chaining, always start execution with the largest program to avoid memory fragmentation. For the second problem, save the current program and load it in again. This will cause a larger temporary program buffer to be allocated.
PWC_PROTOCOL_ERR PWC_TIMEOUT_ERR PWC_UNDEFIND_ERR PWC_BUFF_OVFLOW	Communication Error between controller card and POWERCELL card.	Bad POWERCELL card.	If error persists, replace the POWERCELL card.
PWC_CHECKSUM_ERR	Checksum error on firmware on POWERCELL card.	Bad POWERCELL card.	If error persists, replace the POWERCELL card.
PWC_EEPROM_ACCES	Unable to access EE PROM on POWERCELL card.	Bad POWERCELL card.	If error persists, replace the POWERCELL card.
PWC_EEPROM_ERR PWC_EEPROM_CHECK	Checksum error on power scale calibration data stored on EEPROM on POWERCELL card.	New version of Q.iMPACT software. Hardware failure caused corruption of EEPROM data.	Recalibrate scale. If problem persists, replace the POWERCELL card.
PWC_NO_ERROR PWC_NO_ERROR2	None.	None.	None.
PWC_RAM_ERR	RAM memory error on POWERCELL card.	Bad POWERCELL card.	If error persists, replace the POWERCELL card.
PWCEL_AT_NEW_ADR	You attempted to readdress a POWERCELL to a new address that already exists on the POWERCELL network.	Your addressing procedure for the POWERCELLs has created duplicate ad dresses.	Recheck your addressing scheme. If necessary, reset all POWERCELL addresses to the factory default address of 240. Begin addressing the cells again. Use the AutoAddress capability to minimize addressing errors.

Error Message	Description	Probable Cause	Remedy
PWCEL_BAD_FMT	The format of the data from the remote POWERCELL is invalid.	Most likely, this is a communication error or power supply problem for the re mote POWERCELLs. Bad remote POWERCELL.	If problem persists, validate wiring, line terminations, and power in the POWERCELL network. Replace the remote POWERCELL, if necessary
PWCEL_EEP_ERR	The remote POWERCELL has reported a checksum error in its EEPROM.	Bad remote POWERCELL.	Replace remote POWERCELL.
PWCEL_NEG_RNG	The weight reported by a remote POWERCELL is in the negative weight range.	Bad remote POWERCELL.	Replace remote POWERCELL.
PWCEL_NO_DATA	No weight data is being reported by a remote POWERCELL.	Most likely, this is a communication error or power supply problem for the re mote POWERCELLs. It could also be caused by a bad remote POWERCELL.	If problem persists, validate wiring, line terminations, and power in the POWERCELL network. Replace the remote POWERCELL, if necessary
PWCEL_NO_RESP	The remote POWERCELL is not responding to polls from the Q.iMPACT material transfer controller.	Most likely, this is a communication error or power supply problem for the re mote POWERCELLs. It could also be caused by a bad re mote POWERCELL.	If problem persists, validate wiring, line terminations, and power in the POWERCELL network. Replace the remote POWERCELL, if necessary
PWCEL_ROM_ERR PWCEL_RAM_ERR	The remote POWERCELL is reporting an error in its local memory.	Bad remote POWERCELL.	Replace remote POWERCELL.
PWCEL_RESTART	The Q.iMPACT material transfer controller has restarted a remote POWERCELL after the POWERCELL has not responded with valid data.	Most likely, this is a communication error or power supply problem for the re mote POWERCELLs. It could also be caused by a bad re mote POWERCELL.	If problem persists, validate wiring, line terminations, and power in the POWERCELL network. Replace the remote POWERCELL, if necessary
Record not found	JagBASIC programming error.	A record specified in GET statement for an indexed sequential file could not be found in the file.	There should be an ON ERROR statement in the JagBASIC program to handle these potential situations.
NETWORK PRINT ERR	There was a network error in attempting to print a demand print, continuous print, or setup report.	This error typically occurs when the demand print or continuous print is directed to a remote Q.iMPACT. It occurs when Ethernet network messaging fails.	Check network setup, addresses, wiring, terminations, and connections.

Error Message	Description	Probable Cause	Remedy
Resource in use	JagBASIC programming error.	The JagBASIC application tried to access a system resource that is already in use by another Q.iMPACT task. In particular, a JagBASIC application cannot open a serial port that has been assigned to a serial port connection in setup. Also, when two or more JagBASIC applications are sharing a remote serial port, only one application can have the port open at a time.	Correct JagBASIC application. To share remote serial ports between multiple JagBASIC applications, you will have to develop sharing logic that checks for this specific error code.
RETURN no GOSUB	JagBASIC programming error.	RETURN statement is present without required GOSUB.	Correct JagBASIC application.
SCALE_IN_MOTION	Scale in motion. This is a normal occurrence and not necessarily an error.	Motion on the scale during taring or zeroing the scale.	Try mechanical methods to stabilize the scale base first. Then, try changing the filtering to a stiffer setting in set up. Then, try changing the motion stability settings to make it less sensitive.
SCALE_UNDER_ZERO	The scale gross weight has gone more than "n" divisions below the current zero. The default "n" is 5, but it can be adjusted in set up.	The zero value for the scale could have been re set by hitting the zero but ton. There could be a connection problem to the base, particularly, with an analog base.	Take all weight off the scale base and reset the zero value. Zero settings in setup determine the range of how far from the calibrated zero that you can set a new zero value. If your weighing process uses below zero weight values, you can disable the under zero by setting the zero blanking value to 99 divisions. Check the analog base wiring.
SCL_OVERCAPACITY	The weight on the scale exceeds the calibrated capacity of the scale by more than 5 divisions.	There is too much weight on the scale based on calibration parameters.	Reduce the weight on the scale.
SD string > max.	JagBASIC programming error.	JagBASIC can only access Shared Data fields whose length is less than the maximum JagBASIC string size of 80 bytes.	Correct JagBASIC program.
SD_BAD_BUFFER	There was an invalid access to Shared Data.	A Shared Data access re quest provided a buffer that is not long enough.	Make sure that the external agency is providing a large enough buffer to match the requested Shared Data field.
SD_WRITE_DISABLE	There was an invalid access to Shared Data.	An external agency at tempted to access a protected Shared Data field in legal-for-trade mode.	Check external agency program.

Error Message	Description	Probable Cause	Remedy
SER CONST ERROR	The Q.iMPACT could not start or restart a logical serial connection.	Q.iMPACT software error.	Power down, then up. If error still occurs, reset the Q.iMPACT matroller to factory settings and reprogram setup parameters.
SER_BUFFER_FULL	The Q.iMPACT demand print buffer is full.	Q.iMPACT software error.	Power down, then up. If error still occurs, reset the Q.iMPACT matroller to factory settings and reprogram setup parameters.
SER_IN_TIMEOUT	There was a timeout waiting for serial input.	The serial device talking to the material transfer controller has not sent the required input to the matroller. This could also be caused by communication errors.	Verify message exchange between the Q.iMPACT matroller and serial device.
SER_MSG_SEQ_ERR	There was an error in the sequencing of demand print messages.	Most likely, when one matroller is printing at a remote matroller, a message was lost in the Ethernet communications.	If problem persists, check Ethernet wiring, terminations, and connections.
SERIAL_MSG_ERROR	The serial services software modules got an in valid request.	Q.iMPACT software error.	Power down, then up. If error still occurs, reset the Q.iMPACT matroller to factory settings and reprogram setup parameters.
SETPOINT_NO_RATE	The user has configured a rate setpoint, but has not configured rate calculation.	The user has not configured the rate calculation.	Configure the rate function in the Alternate Weight Units sub-block.
SHIFT_ADJUST_ERROR	The shift adjustment factors could not be calculated.	The weight placements during the shift adjust procedure was incorrect.	Carefully redo the shift adjustment, perhaps, with bigger weights.
SPX_NET_ERROR	SPX returned a network error status.	Most likely, there is a problem with the Ethernet wiring.	Check the network setup, wiring, connections, addressing, and terminations.
SYMMETRY OK	SYMMETRY CHECK OK	Previous symmetry error has now gone back within the established limits,	There may still be a potential POWERCELL hardware problem. You should perform diagnostics checks the individual cells in the symmetry set.
Syntax error	JagBASIC programming error.	The JagBASIC program has a syntax error.	Correct the JagBASIC program.
TARE_ABOVE_LIMIT	Tare value exceeds the allowed limit.	In a legal for trade environment in certain markets, the tare value cannot exceed the highest weight in the lowest range of a multi-range scale.	Check local legal-for-trade requirements.
TARE_NOT_IN_INCR	Keyboard Tare is not entered in a rounded value to the nearest increment.	In certain markets, the keyboard tare value must be entered in as a value rounded to the nearest increment.	Make sure the keyboard tare value is rounded to the nearest increment.

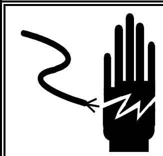
Error Message	Description	Probable Cause	Remedy
TARE_OVER_CAPCTY	Tare exceeds the capacity of the scale.	The tare value cannot exceed the capacity of the scale.	Make sure the tare value is less than the capacity of the scale.
TARE_TOO_SMALL	Pushbutton tare value is less than one division.	Weight on scale must be at least one division when taking Pushbutton tare.	Make sure scale has at least one division of weight before taking pushbutton tare.
TARE_UNDER_ZERO	Attempted to take tare when scale is under zero and has an invalid weight.	Cannot take tare when scale is under zero.	Make sure scale has valid weight before taking tare.
TEMPLATE_ERROR	Template error.	Error detected in template configuration.	Check template configuration. Correct it as necessary. If problem persists, reset template to factory and reenter template.
TOO MANY DIMENS.	JagBASIC programming error.	JagBASIC arrays can have at most three dimensions.	Correct the JagBASIC program.
TOO_SMALL_INCRMT	Increment size is too small.	The scale increment size is too small so that you are asking for more resolution than the scale base is capable of supporting.	Choose a larger increment size parameter in setup and recalibrate the scale.
TYPE MISMATCH	JagBASIC programming error.	JagBASIC statement is using an invalid data type or is relating two in compatible data types.	Correct the JagBASIC program.
UNDEFINED FUNCT.	JagBASIC programming error.	JagBASIC statement referring to an undefined function.	Correct the JagBASIC program.
VALUE OUT RANGE	JagBASIC programming error.	The JagBASIC statement is referring to a value out of the range of acceptable values.	Correct the JagBASIC program.
WRONG SCALE MODE	Zeroing scale in net mode.	User attempted to zero the scale in net mode.	Clear tare to put scale in gross mode before zeroing scale.
ZERO_NOT_CAPTURED	Tare attempted before power up zero value was captured.	Tare attempted before power up zero value was captured.	Wait a few seconds after power up before attempting a tare.
SYMMETRY ERR	SYMMETRY DRIFT ERROR	POWERCELL symmetry has drifted beyond the established limits	Check the POWERCELL load cells for the symmetry set indicated in the error message. You should perform diagnostics checks the cells. You may have to replace a bad cell.

Diagnostic Tests

AC Power Test

Using the Volt-Ohm meter, check the AC input power. Input power must be within -15% to +10% of the nominal AC line voltage.

Voltage Test



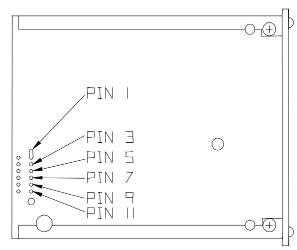
WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.

Power Supply Voltage

When testing power supply voltages, remove the power supply from the Q.iMPACT enclosure. Extreme caution must be taken since the board components will be exposed.

1. Unplug the Q.iMPACT matroller from the external power source.
2. Remove the power supply assembly from the enclosure and lay it component side down on a non-conductive surface.
3. Verify that the fuse located on the power supply board is good before testing any of the voltages. If the fuse is bad, replace it and recheck the power wiring and connections for damage.
4. Locate the 12 solder connections for the connector that plugs into the back panel connector board. Refer to Figure 7-a. Use caution not to short adjacent pins.
5. Reapply AC power to the power supply using extreme caution.



Test Points	Voltage Readings
Chassis GND & Pin 1	4.75 to 5.2 VDC
Chassis GND & Pin 3	4.75 to 5.2 VDC
Chassis GND & Pin 5	4.75 to 5.2 VDC
Chassis GND & Pin 7	4.75 to 5.2 VDC
Chassis GND & Pin 9	18 to 22 VDC
Chassis GND & Pin 11	4.75 to 5.2 VDC

Figure 7-a: Power Supply Test Points (viewed from solder side) and Voltage Chart

If any of the test point voltages listed are missing or incorrect, verify that the power supply fuse and AC line voltage input are OK. If they are good, replace the power supply board and retest.

Analog PCB Voltage

The only place to test output from the Analog board is at the load cell connection. Verify voltage of 15 VDC between + and - Excitation (DC volts). If the Q.iMPACT matroller has power and the analog board has no voltage, replace the board.

Discrete Output Voltage

1. With no load applied and the matroller at zero the following voltages should be measured. Refer to the controller panel diagram and the following table.

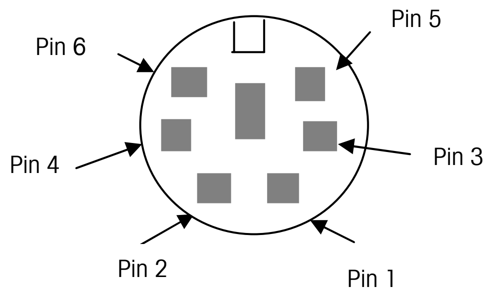
Test Points	Voltage Readings
GND & +5 VDC	5 VDC*
+5 VDC & OUT1	5 VDC*
+5 VDC & OUT2	5 VDC*
+5 VDC & OUT3	5 VDC*
+5 VDC & OUT4	5 VDC*

*If voltages are not within the +4.5 to +5.2 VDC range, check for:

- Correct wiring.
- Correct programming parameter configuration.
- Correct setpoint weight values.

QWERTY Keyboard Voltage

1. Test the voltages at the keyboard jack on the Controller PCB panel with the keyboard plug removed. Refer to Figure 5-c.



Test Points	Voltage Readings
PIN 1 & PIN 3	5 VDC
PIN 5 & PIN 3	5 VDC
PINS 4 & 3	5 VDC

Figure 5-c: QWERTY Plug Jack and Voltage Chart

2. If the voltages are correct and the keyboard still does not work, try connecting another keyboard.

Backup Battery Test

Disconnect the connector plug from J3 of the power supply PCB and put your voltmeter leads at pin 1 (+ red) and pin 4 (- black). If your reading is between 3.7 volts and 4.2 volts, the battery should be considered operational.

Ground Test

If the ground is insufficient, the Q.iMPACT matroller may lock up frequently or give unstable weight readings.

To confirm ground integrity, a commercial branch circuit analyzer is recommended. This instrument uses a high amperage pulse to check ground resistance. It measures the voltage from the neutral wire to the ground connection and will provide an assessment of the line loading. Instructions with the instrument give guidelines about limits that assure good connections. Visual inspections and a query of the user will provide information about equipment sharing the power line.

Using a Volt-Ohm meter to check for excessive voltage between neutral and ground on the AC input is not suitable to confirm power grounding integrity. In some cases, a power line conditioner may help to correct adverse power conditions.

External Equipment Test

1. Disconnect all nonessential external equipment and retest the scale.
2. Reconnect one at a time to isolate a problem with peripheral equipment.
3. If the analog scale option is installed, connect an analog load cell simulator to the I/O port point assigned to this option.
4. Verify that the positive sense is connected to the positive excitation and the negative sense is connected to the negative excitation.

Internal Testing

Access the Diagnostics program block and perform the tests to detect internal problems.

- **Memory—**to test memory on the controller board, flash memory, RAM, and the EEPROM.
- **Display—**to test each segment of the upper and lower display areas and the display ROM and RAM.
- **Keyboard—**to test each key of the keypad, and/or an external PC keyboard.
- **Scale—**to test the weighing functions of a scale that is connected or simulate weighing functions in the expanded x 10 display mode.
- **Flow Meter**—to test the parameters on each flow meter board connected to the system.
- **Serial ports—**to test the serial I/O ports, including a loop back test.
- **Parallel ports—**to test the discrete I/O ports.
- **Network—**to test the network connections.

20 mA /RS-232 Printer Tests

When measuring the higher baud rates in the Demand mode, the meter display will fluctuate for a shorter period of time.

20 mA Terminal Output Test

If you suspect the matroller may not be transmitting data to the printer when using 20 mA current loop, follow this test procedure:

1. Remove power from the matroller and the printer and disconnect the data cable from the printer.

2. Connect the red voltmeter lead to the + 20 mA receive pin on the printer end of the cable.
3. Connect the black voltmeter lead to the - 20 mA receive pin on the printer end of the cable. Set the meter to read DC milliamps.
4. Apply power. The meter should read as follows:
   - For 300 to 9600 baud in Demand mode, the meter should display a stable reading between 18.0 and 40.0 mA. Any reading below 18.0 mA or above 40.0 mA indicates a malfunction in the sending device.
   - For 2400 to 9600 in Continuous mode, the meter should fluctuate continuously between 16 mA and 22 mA. The constant fluctuation on the meter display indicates the scale/indicator is transmitting information. To test the Demand baud rates, press PRINT on the material transfer controller. The display should fluctuate from 1/2 to 3/4 of the initial reading, then become stable again. This indicates the matroller has transmitted data.

RS-232 Terminal Output Test

Use the following procedure to determine if the RS-232 serial port is operational.

1. Remove power from the matroller and the printer and disconnect the data cable from the printer.
2. Set the voltmeter to read 20 volts DC.
3. Connect the red lead to pin 2 of the printer end of the data cable and connect the black lead to pin 7.
4. Apply power. The meter should read as follows:
   - For 300 to 9600 baud in Demand mode, the meter should read between -5 and -15 with no fluctuation.
   - For 2400 to 9600 baud in Continuous mode, the meter should fluctuate between -5 and +5 continuously. The constant fluctuation on the meter display indicates the scale/indicator is transmitting information.

When measuring the higher baud rates in the Demand mode, the meter display will fluctuate for a shorter period of time.

To test the Demand baud rates, press PRINT on the Q.iMPACT matroller. The display should fluctuate between -5 volts and +5 volts for the duration of the transmission, then become stable again. This indicates the matroller has transmitted data.

Replacing the Power Supply

Follow the instructions in this section if you should ever need to replace the power supply due to damage from power surges or malfunction.

⚠ CAUTION

DISCONNECTING BOTH THE POWER SUPPLY AND THE BATTERY BACK-UP CAN RESULT IN LOSS OF ALL PROGRAMMING.

It may be necessary to loosen the PCB right thumbscrews and gently pry the power supply assembly away from the panel mount unit.

The Controller board has a Super Action Cap that supports its RAM for up to 24 hours. It is unlikely that disconnecting the power supply or battery will result in loss of setup data; however, you should have a record of the setup parameters for added security.

To replace the Q.iMPACT matroller's power supply unit:

1. Disconnect AC power to the matroller.
2. Disconnect the power cable at the rear of the unit.
3. Using a Phillips head screwdriver, remove the two screws located on the top and bottom of the power supply assembly, freeing it from the power supply housing.
4. Carefully pull the power supply assembly toward you and slide the assembly from the Q.iMPACT enclosure. Disconnect the battery harness from J3.
5. Remove the two screws holding the Power Supply PCB to the power supply back panel assembly.
6. Attach the new PCB to the back panel, then reattach the battery harness to J3 and slide the assembly back into the Q.iMPACT matroller.
7. Replace and tighten the power supply retention screws removed in step 3.
8. Reconnect the power cable and reapply power.

WARNING!

IMPROPER INSTALLATION OF THE POWER CABLE WILL RESULT IN APPLYING 120 VAC TO GROUND. THE HOT WIRE MUST BE ON TOP. THE TERMINAL SCREWS SHOULD FACE AWAY FROM THE INTERFACE BOARD SLOTS.

Replacing the Battery Back-up

A 4.5 volt alkaline battery (Part Number 145486 00A) is installed as a back-up in case the power to the unit should fail. You should check the battery periodically to ensure it is working properly and change it as necessary. Refer to the Battery Back-up Test section later in this chapter.

Q.iMPACT matrollers use a standard PC-type battery that is available in most computer service centers.

⚠ CAUTION

DISCONNECTING BOTH THE POWER SUPPLY AND THE BATTERY BACK-UP CAN RESULT IN LOSS OF ALL PROGRAMMING.

To replace the battery back-up:

1. Disconnect AC power to the matroller.

2. Disconnect the power cable at the rear of the unit.

3. Using a Phillips head screwdriver, remove the two screws located on the top and bottom of the power supply assembly, freeing it from the power supply housing.

4. Carefully pull the power supply assembly toward you and slide the assembly from the Q.iMPACT enclosure. Disconnect the battery harness from J3.

⚠ CAUTION

BATTERY MAY EXPLODE OR LEAK IF INSERTED IMPROPERLY, RECHARGED, OR DISPOSED OF IN FIRE. DISPOSE OF BATTERY PROPERLY.

5. Remove the old battery and install the new battery ensuring that pin 1 on J3 is on the (+) side (red wire) of the battery. Connect the battery harness to J3 on the power supply and slide it back into the Q.iMPACT matroller.

6. Replace and tighten the power supply retention screws removed in step 3.

7. Reconnect the power cable and reapply power.

⚠ WARNING!

IMPROPER INSTALLATION OF THE POWER CABLE WILL RESULT IN APPLYING 120 VAC TO GROUND. THE HOT WIRE MUST BE ON TOP. THE TERMINAL SCREWS SHOULD FACE AWAY FROM THE OPTION CIRCUIT BOARD SLOTS.

Loading Q.i Software

The Q.iMPACT matroller is designed for easy software installation and upgrade. Using METTLER TOLEDO's EFLASH or "Flashpro" installation programs from a personal computer (PC), you can load the latest version of Q.iMPACT software and burn it into the matroller's flash memory. Upgrade software is available from METTLER TOLDEO.

STOP!

IF THE Q.IMPACT MATROLLER YOU ARE UPGRADING HAS ONE OR MORE ANALOG LOAD CELL SCALES ATTACHED, YOU MUST FIRST VERIFY THAT THE PROGRAM ON THE ANALOG INTERFACE BOARD(S) HAS BEEN UPGRADED TO "A" REVISION OR HIGHER. REFER TO THE INSTRUCTIONS SUPPLIED WITH THE MODEL 0901-0392 (146070 00A) "A" REVISION ANALOG SOFTWARE KIT FOR COMPLETE INSTRUCTIONS. THE Q.IMPACT MATROLLER MUST BE REPROGRAMMED AND CALIBRATED AFTER YOU LOAD NEW SOFTWARE.

Using E_FLASH

E-FLASH is a windows program utility designed to download Q.iMPACT software from a personnel computer to a Q.iMPACT matroller. E-FLASH can be configured to download the software point-point via the Q.iMPACT RS232 COM 2 serial port or through the Q.iMPACT Ethernet port. It is provided free of charge on the Q.iMPACT documentation CD shipped with every Q.iMPACT matroller.

E-FLASH is launched from the windows START menu under the METTLER TOLEDO program tree.

Navigation of the E-FLASH utility is through the seven "hot buttons" located on the E-FLASH dialogue box. The "hot buttons" perform the following functions:

OK - starts the Ethernet file transfer

QUIT - exits E-FLASH program utility

OPEN - accesses the personal computer filing system to locate the Q.iMPACT program to be transferred

CHANGE IP - allows the entry of the Q.iMPACT IP address

SERIAL - configures the PC serial port and starts the serial port file transfer

FTP SITE - configures a file transfer using Ethernet FTP (file transfer protocol) and starts the FTP transfer

HELP - provides online help into the operation of E-FLASH

E-FLASH Serial

Disconnect power to the Q.iMPACT

Connect a bi-directional RS-232 cable from the PC to the Q.iMPACT material transfer controller's COM2 serial port. Wire the cable as follows:

1. Open the file to be downloaded on the PC using E-FLASH.
2. Configure the PC serial port in E-FLASH.
3. Using a small, non-conducting object, press and hold the pushbutton switch behind the CAL opening on the back of the Q.iMPACT controller PCB. Apply power to the material transfer controller. The lower display of the material transfer controller will begin flashing its IP address, Subnet Mask and Gateway IP address.
4. With CAL switch still depressed, start the serial transfer from the PC.
5. Once the transfer has begun the lower display of the matroller will begin showing a "% Complete " counter. At this point the CAL switch can be released on the matroller.
6. Continue as in the "flash pro procedure".

E-FLASH Ethernet

1. Disconnect power to the Q.iMPACT.
2. Connect a 10BaseT cross over cable between the PC and the Q.iMPACT.
3. Open the file to be downloaded on the PC using E-FLASH.
4. Enter the Q.iMPACT IP address into E-FLASH .
5. Using a small, non-conducting object, press and hold the pushbutton switch behind the CAL opening on the back of the Q.iMPACT controller PCB. Apply power to the material transfer controller.
6. The lower display of the Q.iMPACT will begin flashing it's IP address, Subnet Mask and Gateway IP address.
7. With CAL switch still depressed, start the serial transfer from the PC.
8. Once the transfer has begun the lower display of the Q.iMPACT will begin showing a "% Complete" counter. At this point the CAL switch can be released on the Q.iMPACT.

FTP File Transfer Utility

The Q.iMPACT matroller's setup and configuration information exists as separate files that can be uploaded, and downloaded to it.

It is recommended that you upload and keep these files in a safe location. Should you replace a matroller for any reason the system can be restored to its original configuration within minutes by downloading these files back into the new matroller

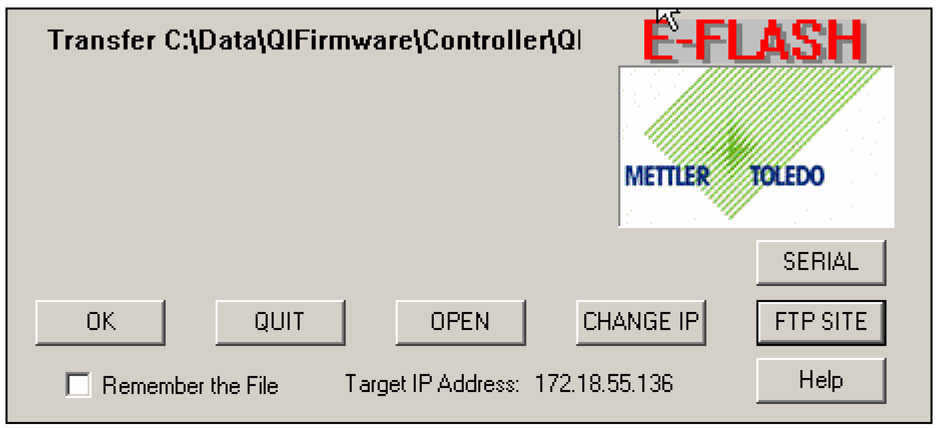
Please note the exception is the scale calibration. The scale will be close to the original accuracy but will not be exactly the same.

The files that exist within a matroller are:

JAGXSRAM.DMT	- miscellaneous data and shared data
JAGXCAL.DMT	- scale setup and calibration data
JAGXLIT.DMT	- literals
JAGXAPC.DMT	- PAC setup and configuration data
MONITOR.LOG	- Maintenance and calibration log
(DEVNAMES.LOG)	- miscellaneous internal data, do not upload
(MATLCHAN.LOG)	- miscellaneous internal data, do not upload

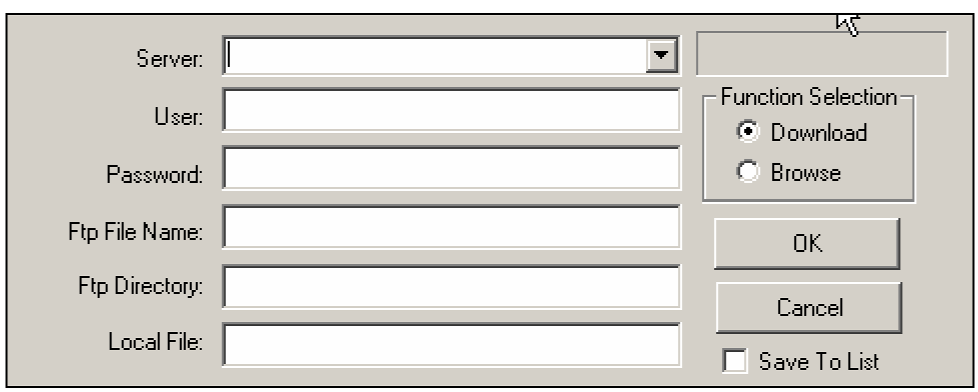
Procedure for Uploading *.DMT files out of the Matroller using E-Flash

Start the E-Flash software. The window shown below will be displayed. Click on "FTP SITE" button. Note: unfortunately the "download" button is used in order to "upload" out of the Matroller, which may be a bit confusing.

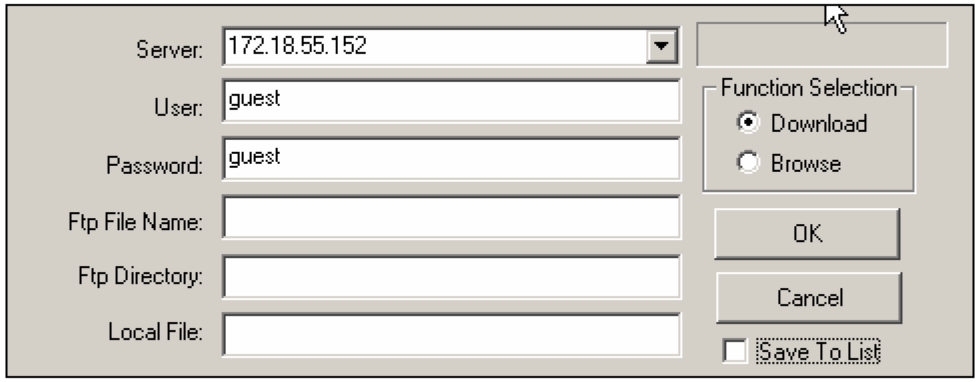


This screen will be displayed. You may find the "Server:" data box has an address in it.

In the "Server:" data box enter in the matroller's IP address. In "User:" and "Password:" enter "guest"



An example is shown below:



Click on "Browse" and then the "OK" button. You should see a screen similar to the one below.

During the browse the following text descriptors will appear in the "status box" in the top right hand corner.

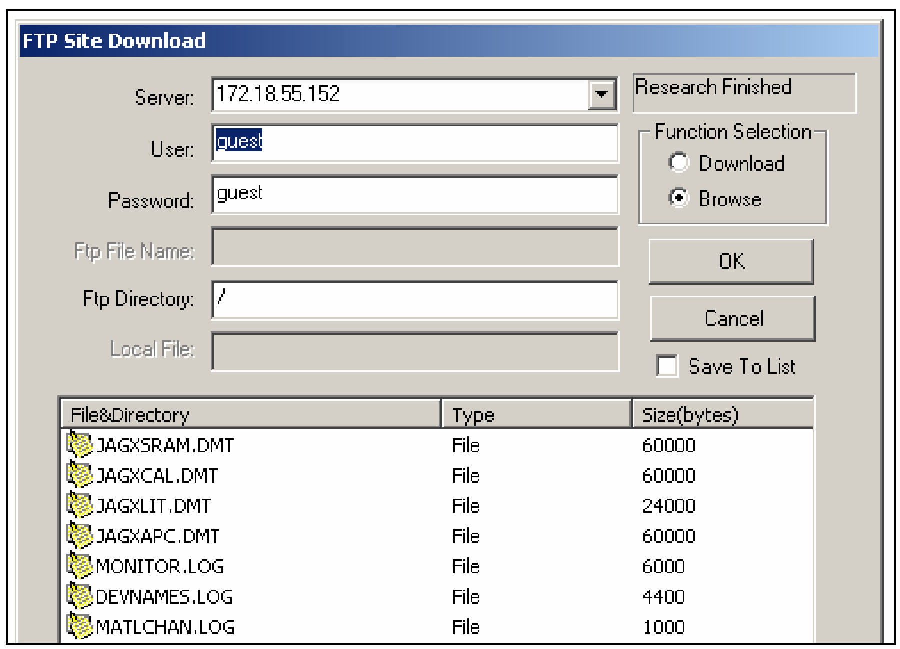
"Connection Established"

"Downloading"

"Research finished"

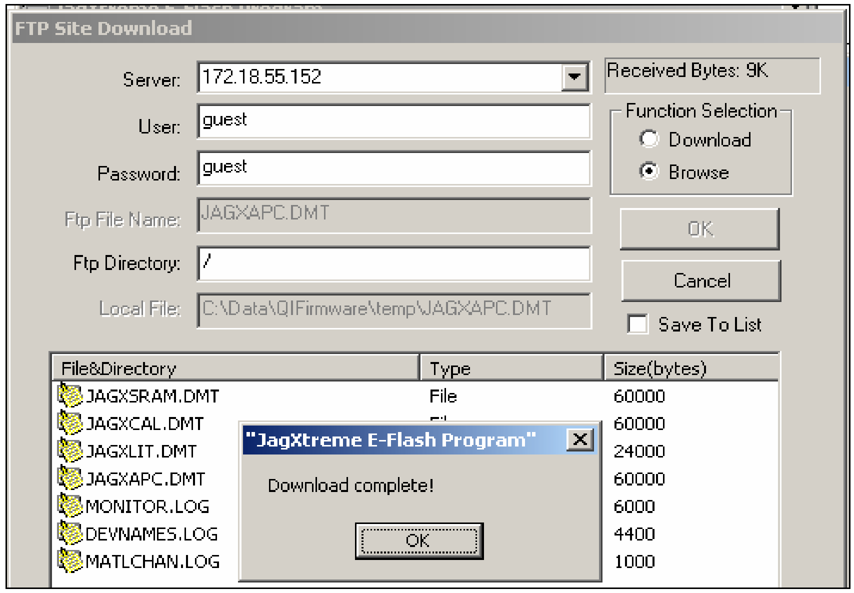
If not you may not have a link. Check your IP address and also try pinging the matroller.

At any point you may also check the "Save To List". This will save the FTP site data so in future you will only have to select the address from the combo box.



In order to upload a file, click on "Download" and then you can either double click on the file name or manually enter the data.

After double clicking on the file name, you will be asked for a destination path and file name, which you must supply. After clicking OK the status box will change to "Waiting". After the upload is complete the screen below will be displayed. Repeat for each file you want to upload.



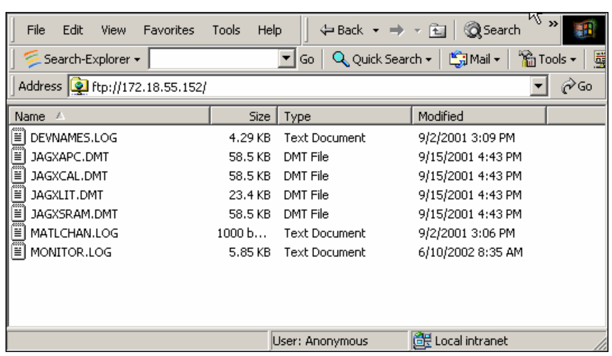
You will now have a backup of your matroller's system files for future reference and for restoration of your system.

NOTE: the E-Flash utility does not support downloading to the matroller.

Downloading to the QI

There are many FTP utilities available for downloading and uploading files. If you have a windows based PC you will have at least two ways of uploading and downloading, using FTP. DOS itself supports FTP commands that will work with the matroller. In addition your Internet Explorer also supports FTP transfers.

The following is a screen shot showing how Internet Explorer can view the matroller's files. Note: the address prefix of **ftp://xxxxxxxx** You can now right click and copy and paste the files out of and into the matroller.



Using DOS and Other FTP Utilities

Although it is possible to use the DOS FTP commands, they are not very user friendly. If using IE is not satisfactory there are many free and cheap FTP utilities available on the Internet such as FreeFTP by Brandyware software. This is not an endorsement of the use of any 3rd party software. Usage of any software is at the user's own risk.

Purchasing and/or Activating Technology Licenses

To activate a Q.i technology license (channel or material path licenses), you should follow the instructions provided in the Q.i Technology Portfolio you received. The process for activating a license and for purchasing additional licenses is the same. That process if provided here:

1. Connect the database master Q.iMPACT matroller that will be used in the Q.i cluster to a PC using the appropriate Ethernet cable. (Refer to the manual for the appropriate cable to use for a direct connection or hub connection.)
2. Using the web browser, place the master matroller into **Setup mode**.
3. Using the web browser from the home web page, click on the **Maintenance icon** (found on the left hand side of the page)
4. On the Maintenance page select the **Licenses** option under the **Purchase** sub heading. This will lead you to the web page that is illustrated here. This is the **License Activation** page.

5. Look at the **License Tag** placed on the **License Page** in both portfolios you have (one each for the Material Path license and for the Channel license). The license tag located in the box on the front of the license page.
6. Using the examples sited on the license page, determine if this is a **Material Path License** or a **Channel License.**
7. If it is a Material Path license, determine if it is for 0-500 or 0 -1000 material paths. (The 0-50 material path license is a default in the matroller and does not require license activation). Refer to the example on the license page. You will need this information for the next step.
8. If it is a Channel license, determine how many licenses have been purchased and supplied with the license portfolio. Again, the example on the license page will assist you in verifying this information.
9. Next, enter the number of Material Paths or Channels to be licensed into the appropriate blue or pink sections on the **Purchase Licenses** page.
10. Under the **Current Number of Channel Licenses** field enter the number of licenses you determined from the information on the License tag (for example 10 for the channels). For Material Paths, select the appropriate option using the scroll down menu (such as 0-500 or 0-1000 material paths).

11. When you have done this in either the Material Path or Channel sections, press the Tab key. You will be given a **License Purchase Request Code**. You should now have entered both licensing numbers and have been returned two **License Purchase Request Codes**.

DO NOT CHANGE THE STATE OF THE MATROLLER AFTER THESE CODES HAVE BEEN ASSIGNED OR ELSE YOU WILL NEED TO GO THROUGH STEPS 9 to 11 again.

12. Now call (see alternate below) the number at the bottom of the web page to activate the license. This number is available between 0:800H and 17:00H Eastern Standard Time in the USA. You must have the following information available:
    - The serial number(s) on the license tags
    - The part number(s) on the license tags
    - The company and site location where the license is to be used
    - The name of the person activating the license
    - The License Purchase Request Codes as generated by the license page

You will be supplied with the activation number(s). Make sure that you enter them in the correct field (for material path or channels) and press the corresponding **Activate** button on the web page. The license should now be activated. You may return the matroller to the **Run mode**.

If you must reactivate a matroller because you had an equipment failure, please follow the same procedure.

13. It is also possible to activate your Channels and Material Paths via the Internet. If you have acces s to the Internet go to: **http://www.my-mt.com/softwarereg/** and follow the instructions provided.

Temporary Licensing

From version A.xxx onwards additional measures have been added to secure your system against downtime due to loss of a license.

Initially you will have 7 days to license your Channels and Material Paths. This 7 days grace is initiated by the creating of Channels in your new system. During this period you will have full access to all the QiMPACT functions and Algorithms.

After the 7 day period has expired or should you lose your licenses the QiMPACT algorithms will deafualt back to Spill only Algorithms. However, all Qi functionality will still be available except for the K1 and K2 Algorithms

For your notes

9

Parts and Accessories

Refer to the following diagrams and data tables when ordering parts and accessories for the Q.iMPACT matroller.

Panel Mount Parts

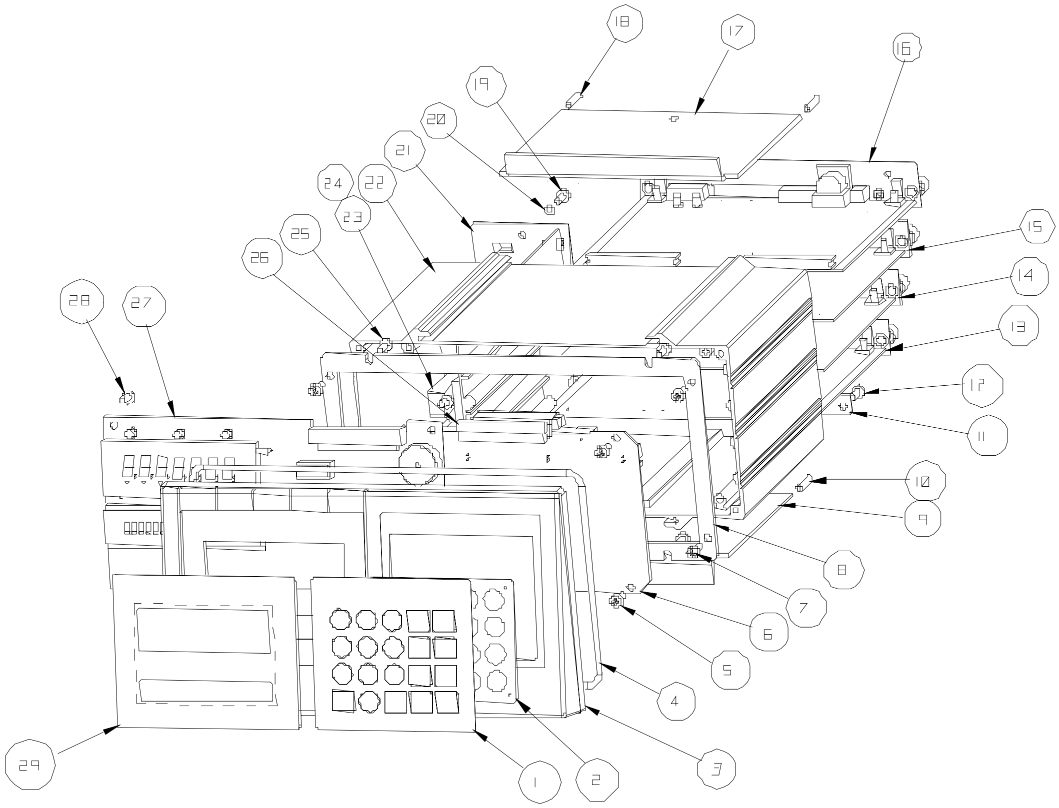


Figure 7-a: Panel Mount Model Parts

Parts List—Panel Mount			
Ref #	**Part Number**	**Description**	**Qty**
1 and 2	(*)14538600A	Keyboard Assembly	1
3	(*)14162800A	Front Panel	1
4	(*)14016100A	Seal, Panel O-Ring	1
5	R0511100A	Screw, M4 x 10 Taptite	4
6	(*)14146200A	Connector (mother) PCB	1
7	R051100A	Screw, M4 x 10 Taptite	4
8	(*)14014100A	Plate, Interface	1
9	(*)14015200A	Clamp Bracket	1
10	R0511300A	Screw, Set M4 x 20	2
11	(*)14015800A	Rear Cover Plate, Bottom	1
12	R0511100A	Screw, M4 10 Taptite	4
13	Slot 3	Refer to the Optional Panels Table**	1
14	Slot 2	Refer to the Optional Panels Table**	1
15	Slot 1	Refer to the Optional Panels Table**	1
16	(*)15740100A	Controller PCB Assembly	1
17	(*)14015200A	Bracket Clamp	1
18	R0511300A	Screw, Set M4 x 20	2
19	R0511100A	Screw, M4 x 10 Taptite	3
20	R00589130	Lock washer, #8 Int. Tooth	2
21	(*)14163600A	Power Supply Assembly	1
22	(*)14546400A	Indicator Chassis	1
23	(*)14901700A	Capacity Label	1
24	(*)14548600A	Battery 4.5 Volt	1
25	R0511100A	Screw, M4 x 10 Taptite	4
26	(*)14015900A	Harness	1
27	(*)14091800A	Display PCB	1
28	R0511100A	Screw, M4 x 10 Taptite	4
29	(*)16302100A	Display Lens	1

(*) May have a revision level prefix.
** Table is located near the end of this chapter.
*** Refer to the section entitled Controller PCB in this chapter for part numbers and details.

Harsh Environment Parts

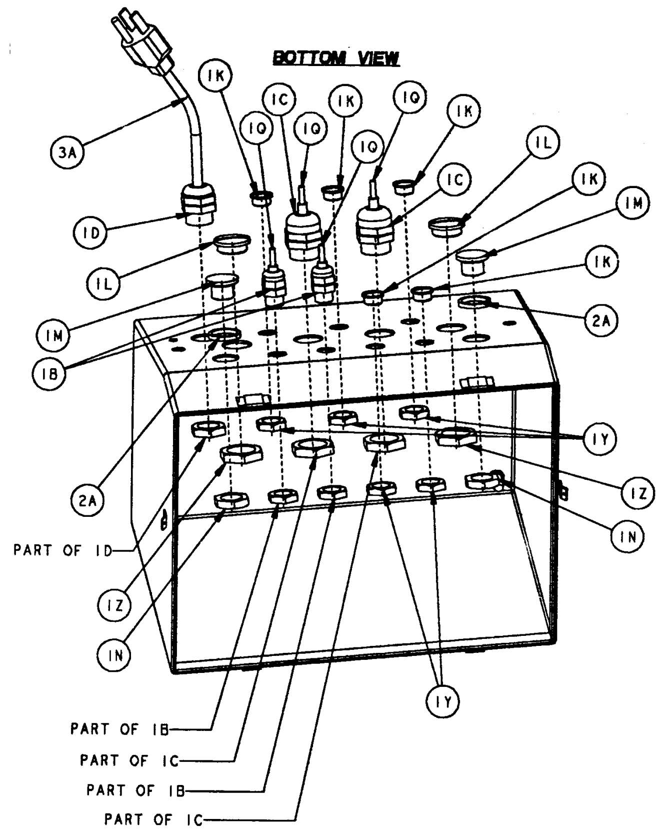


Figure 7-b: Harsh Environment Parts (Bottom View)

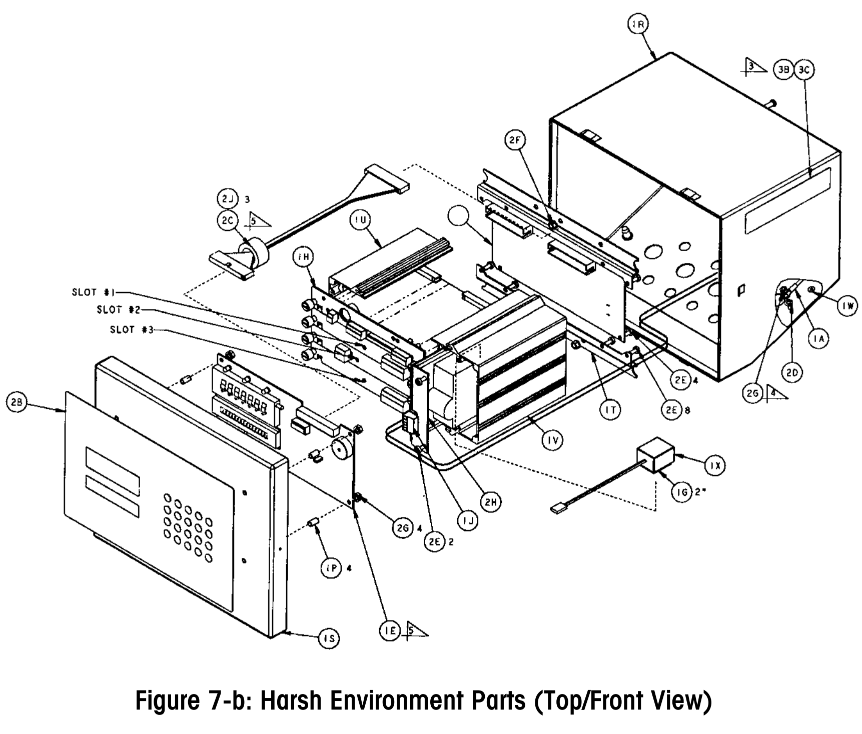


Figure 7-b: Harsh Environment Parts (Top/Front View)

Parts List—Harsh Environment			
Ref #	**Part Number**	**Description**	**Qty**
1B	(*)12901800A	Conn. Cord w/ Lock nut (0.118-0.255)	2
1C	(*)12903900A	Conn. Cord w/ Lock nut (0.240-0.470)	2
1E	(*)14091800A	PCB Assembly, VF Display	1
1F	(*)14146200A	PCB Assembly, Connector	1
1H	(*)15740100A	Controller PCB	1
1J	(*)14636400A	Conn. Term. Plug	1
1K	(*)14399900A	Hole Plug (PG7)	5
1L	(*)14400100A	Hole Plug (PG13.5)	2
1M	(*)14400200A	Hole Plug, 18 mm	2
1N	(*)14400300A	Hex Nut, PG9	2
1P	(*)14465900A	Spacer, RD, M4	4
1Q	(*)14467600A	Hole Plug (.24/.38 Diameter)	4
1R	(*)14519800A	Enclosure Assembly (Bottom)	1
1S	(*)14519900A	Enclosure Assembly (Top)	1
1T	(*)14520200A	Bracket, Mounting	2
1U	(*)14520600A	Card Guide (Left)	1
1V	(*)14528600A	Card Guide (Right)	1
1W	(*)14531400A	Label, Ground BSI	1
1X	(*)14548600A	Battery, Alkaline, 4.5 V	1
1Y	(*)14577900A	Hex Nut, PG7	5
1Z	(*)14578000A	Hex Nut PG 13.5	2
2A	(*)14578300A	Gasket, Grip	2
2B	(*)16380100A	Assembly Keyboard/SW (JTHx)	1
2C	(*)14636500A	Harness, Display	1
2D	R00589130	Washer #8 I.T. Lock	1
2E	R0511100A	Screw, Pan HD M4x10, PH, Taptite	14
2F	R0519200A	Nut, Hex KEPS, M5	3
2G	R0519600A	Nut, Hex KEPS M4	5
2H	(*)14130400A	Power Supply	1
2J	(*)09827100A	Cable Tie	2
3A	Line Cord	Refer to Line Cord Assemblies Table	
3B	(*)148000000A	Label, Data, Blank (no available for re-order)	1
3C	(*)14801800A	Shield, Data Label	2
3D	(*)13971000A	FCC Label	1
3E	(*)14724100A	Nut, PG11	1
Slot 1	Slot 1	Refer to Optional Panels Table	1
Slot 2	Slot 2	Refer to Optional Panels Table	1
Slot 3	Slot 3	Refer to Optional Panels Table	1
Not Shown	(*)14520400A	Wall Mounting Bracket	2
Not Shown	R0520600A	Wall Mounting Hardware (SS "Hex Head" screw M6 8)	4

(*) May have revision level prefix.

Controller PCB (Board)

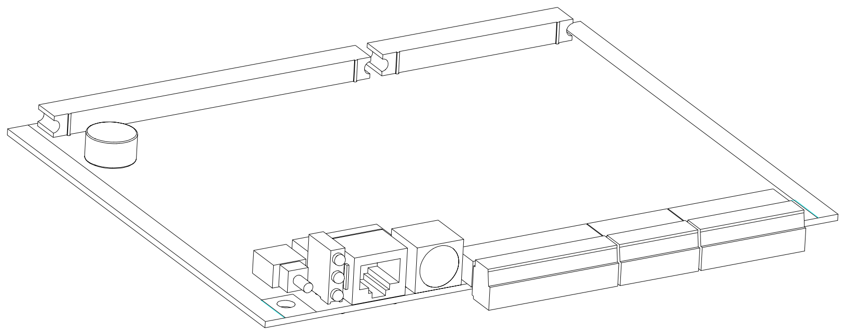


Figure 7-d: Controller PCB Assembly

Parts List—Controller PCB			
Ref #	**Part Number**	**Description**	**Qty**
1	(*)xxxxxx00A	Controller PCB, Latest Revision Operating Software (w/o parts Ref #2-6)	1
2	(*)14113300A	Connector, 8 Position Terminal Block	1
3	(*)14113100A	Connector, 6 Position Terminal Block	1
4	(*)14113400A	Connector, 10 Position Terminal Block	1
5	(*) 15740200A	I/O Plate Assembly, Controller	1
6	R0511100A	Screw, M4 x 10 Taptite	2
**1	(*)15740100A	Controller PCB (w/ parts Ref #2-6)	1

(*) May have a revision level prefix.

Dual Analog Load Cell Interface Board

Refer to the Interface Board Slot Assignment chart on page 8-15.

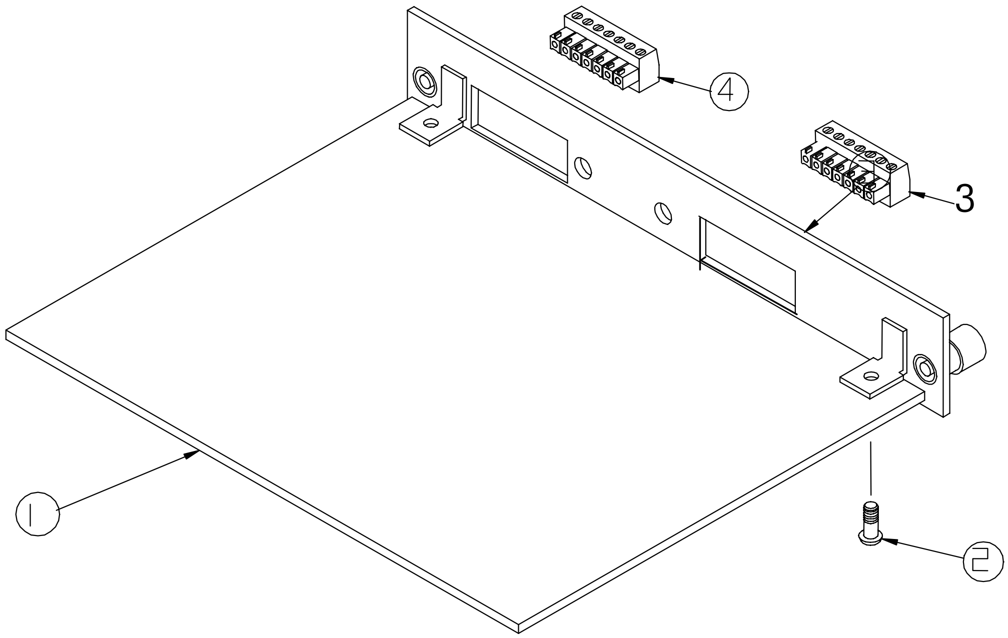


Figure 7e: Dual Analog Load Cell PCB Assembly

Parts List—Analog Load Cell PCB			
Ref #	**Part Number**	**Description**	**Qty**
1	(*)15290700A (*)15360100A	PCB Assembly, Dual Analog Load Cell, (w/o Ref # 2-7) PCB Assembly, Reduced Excitation Dual Analog PCB (w/o Ref # 2-7)	1
2	R0511100A	Screw, M4 x 10 Taptite	2
3	(*)14517500A (*)15360700A	I/O Plate Assembly, Analog L/C I/O Plate Assembly, Reduced Excitation Analog L/C	1
4	(*)11924100A	Connector, 7 Position Terminal Block	2
**	(*)14517700A (*)15360300A	I/O Assembly, Dual Analog PCB Assembly, Non-hazardous I/O Assembly, Dual Analog PCB Assembly, Reduced Excitation	1

(*) May have a revision level prefix.

** Includes all parts listed as a complete assembly.

Power Supply

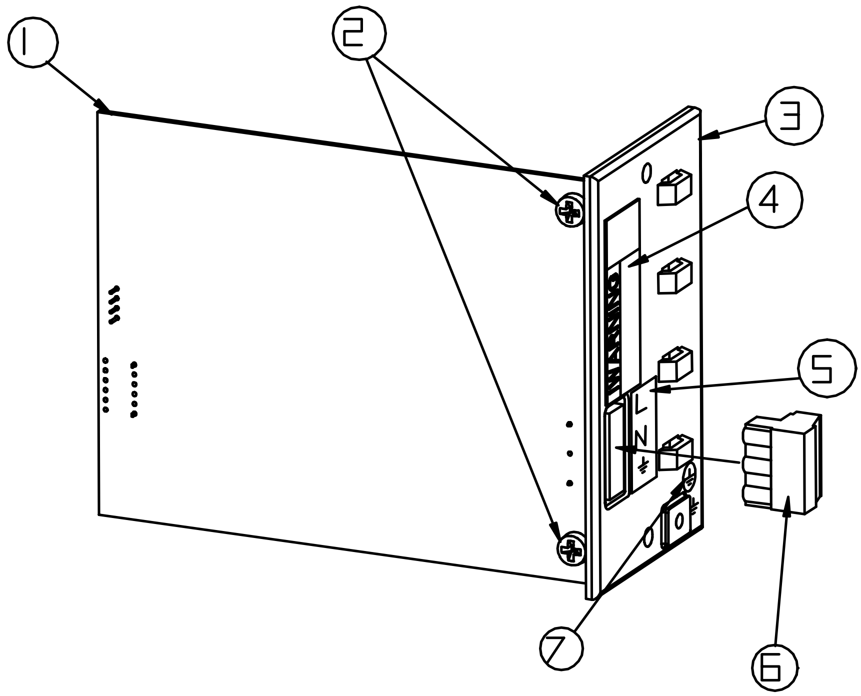


Figure 7f: Power Supply Assembly

Parts List—Power Supply

Ref #	Part Number	Description	Qty
1	(*)14200200A	Power Supply PCB	1
2	R0511100A	Screw, M4 x 10 Taptite	2
3	(*)14015100A (*)14520300A (*)14399500A	Panel Assembly, Power Supply (Panel Mount) Bracket, Power Supply (Harsh Environment) Panel, Power Supply (Desk/Wall)	1 1
4	(*)12699700A	Label, Warning – Power	1
5	(*)14400500A	Label, AC Power In	1
6	(*)14636400A	Connector, 3 Position Terminal Block	1
7	(*)145531400A	Label, Ground, BSI	1
*	(*)14163600A	Power Supply PCB Assembly, Panel/Blind	1
*	(*)14399600A	Power Supply PCB Assembly, Desk/Wall	1
*	(*)14130400A	Power Supply PCB Assembly, Harsh	1

(*) May have revision level prefix.
* Includes all parts listed above as an assembly.

POWERCELL Interface Board

Refer to the Interface Board Slot Assignment chart on page 8-15.

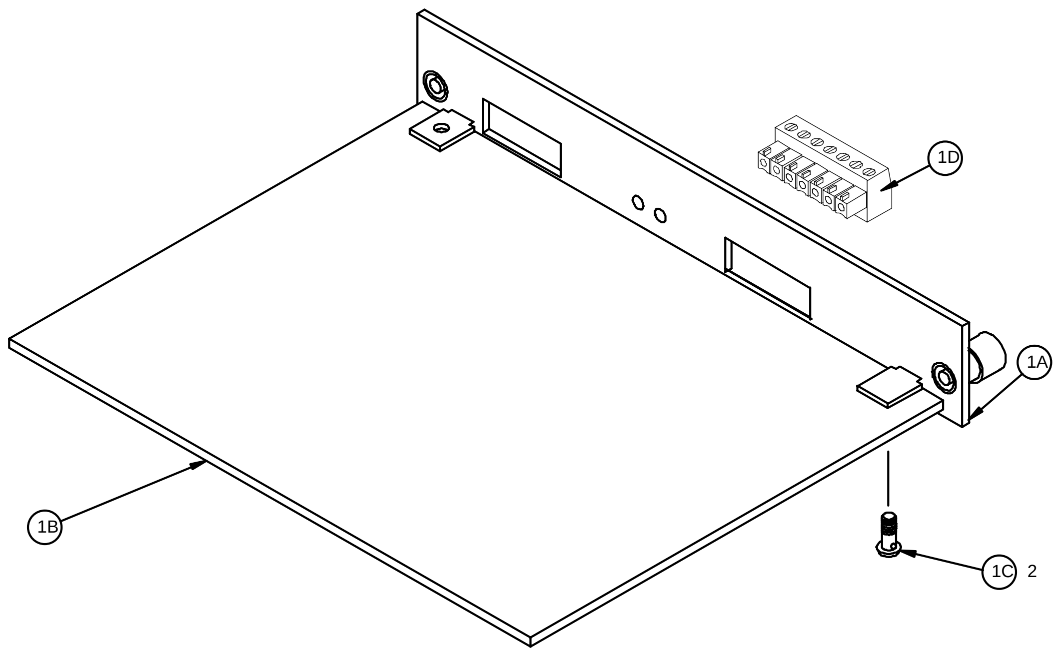


Figure 6-n: POWERCELL PCB

Ref #	Part Number	Description	Qty
1A	(*)14546100A	POWERCELL Assembly I/O Plate	1
1B	(*)14092600A	POWERCELL PCB Assembly	1
1C	R0511100A	Screw, M4 x 10, ST PHD	2
1D	(*)14113300A	Connector, 8 Pos. Terminal Block	1
Not Shown	0917-0240 14749600A	External Power Supply (for applications with more than 14 cells per POWERCELL PCB)	1
*	(*)14546200A	POWERCELL PCB Assembly	1

(*) May have a revision level prefix.

* Includes all parts listed above as an assembly.

Multifunction Interface Board

Refer to the Interface Board Slot Assignment chart on page 8-15.

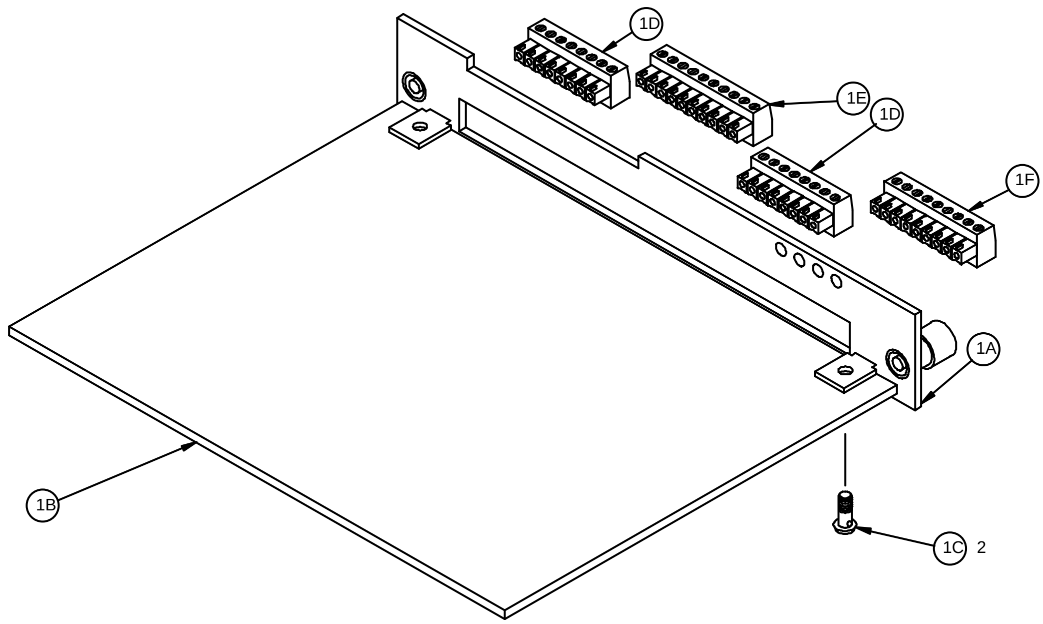


Figure 6-o: Multifunction PCB

Ref #	Part Number	Description	Qty
1A	(*)14164900A	Multifunction I/O Plate	1
1B	(*)14094200A	Multifunction PCB Assembly	1
1C	R0511100A	Screw, M4 x 10 Taptite	2
1D	(*)14113300A	Connector, 8 Pos. Terminal Block	2
1E	(*)14113400A	Connector, 10 Pos. Terminal Block	1
1F	(*)14405300A	Connector, 9 Pos. Terminal Block	1
*	(*)14164000A	Multifunction PCB Assembly	1

(*) May have a revision level prefix.

* Includes all parts listed above as an assembly.

High Precision (IDNET) Interface Board

Refer to the Interface Board Slot Assignment chart on page 8-15.

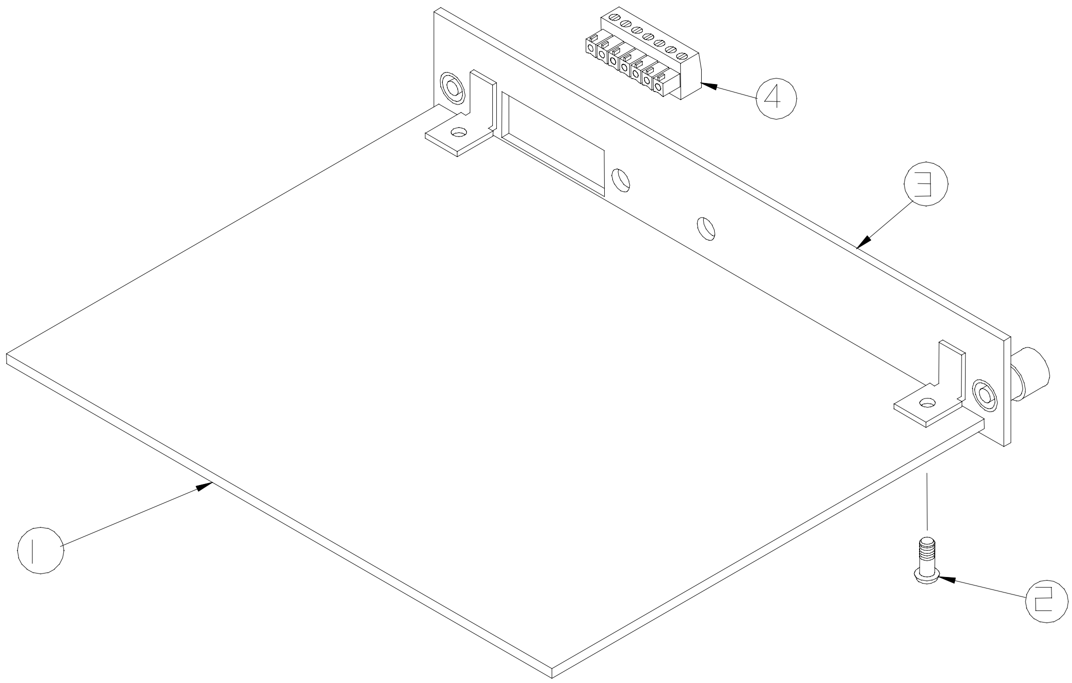


Figure 6-p: High Precision (IDNET) PCB Assembly

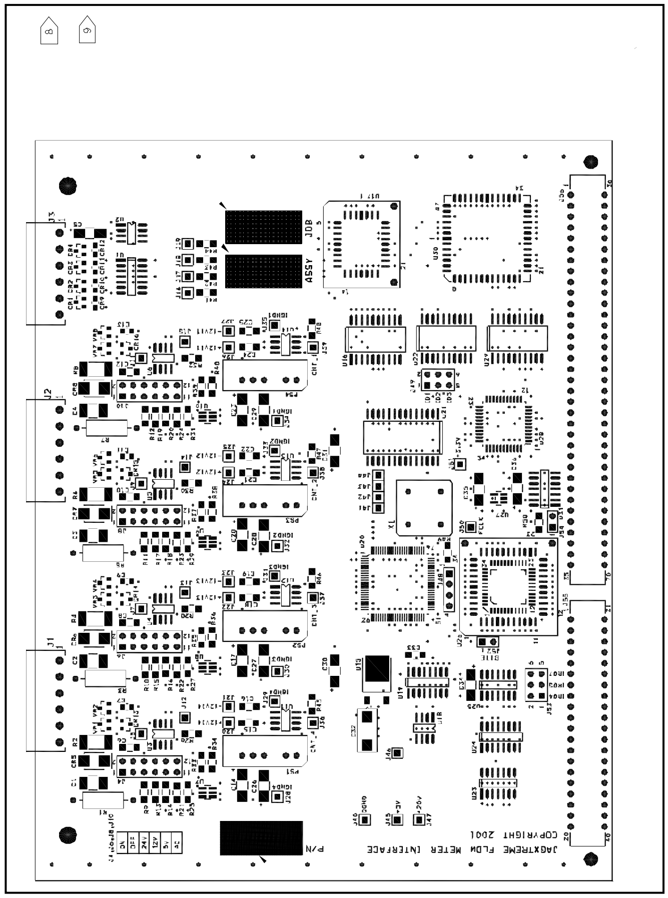
Parts List— High Precision (IDNET) PCB			
Ref #	**Part Number**	**Description**	**Qty**
1	(*)14714800A	High Precision (IDNET) I/F PCB	1
2	R0511100A	Screw, M4 x 10 Taptite	2
3	(*)14547300A	I/O Plate Assembly, High Precision	1
4	(*)14113200A	Connector, 7 Position Terminal Block	1
*	(*)14547500A	High Precision (IDNET) PCB Assembly	1

(*) May have a revision level prefix.

* Includes all parts listed as a complete assembly.

Flow Meter Interface Board

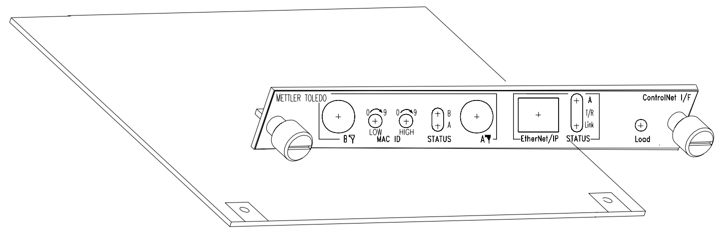
Refer to the Interface Board Slot Assignment chart on page 8-15.



Parts List—Flow Meter Card			
Ref #	Part Number	Description	Qty
1	(*)16293100A	I/O Plate, Flow Meter I/F	1
2	(*)16279500A	PCB Assembly, Flow Meter I/F	1
3	R0511100A	Screw, M4 x 10 Taptite	2
4	(*)14113100A	Connector, 6-position terminal block	3
*	(*)16279800A	Flow Meter PCB/Panel Assembly	1

ControlNet Interface Board

Refer to the Interface Board Slot Assignment chart on page 8-15.



Parts List—ControlNet Card			
Ref #	**Part Number**	**Description**	**Qty**
1	(*)16280200A	ControlNet I/O Plate	1
2	(*)16119600A	ControlNet PCB Assembly	1
3	R0511100A	Screw, M4 x 10 Taptite	2
4	(*)16280100A	ControlNet PCB/Panel Assembly	1

PROFIBUS Option

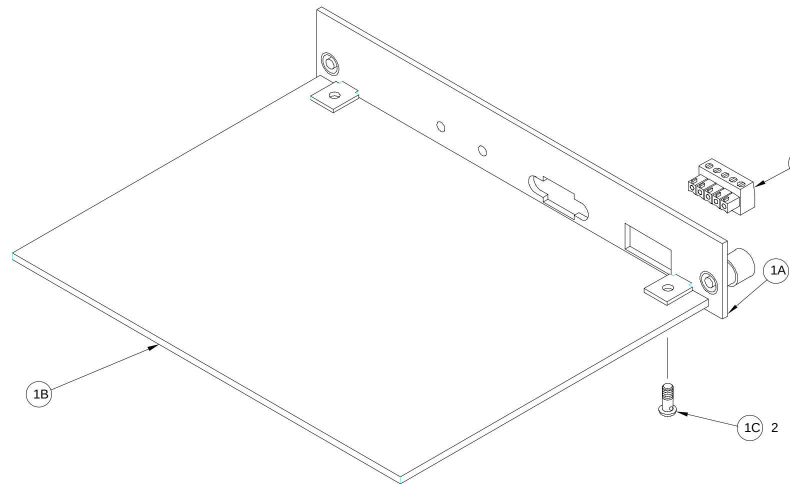


Figure 6-k PROFIBUS I/F Assembly

Ref #	Part Number	Description	Qty
1A	(*)14517000A	I/O Plate	1
1B	(*)14688900A	PCB, PROFIBUS (w/o Hardware)	1
1C	R0511100A	Screw, M4 x 10 Taptite	2
1D	(*)14374900A	Connector, 5-Position Terminal Block**	0
*	(*)14517100A	PROFIBUS PCB/Panel Assembly	1

(*) May have a revision level prefix.

Optional Accessories

Optional Accessories		
Part Number	**Description**	**Factory Number**
(*)10086500A	Analog Load Cell Simulator (10-step)	0917-0178
	Analog Load Cell Simulator (variable)	---
	METTLER TOLEDO Screw Driver	---
(*)14411800A	2mm Allen Wrench For JTPA Models	
	RS-232/20 mA Converter	0964-0065
	Multifunction Kit	0917-0223
	POWERCELL Kit	0917-0242
	High Precision (IDNET) Kit	0917-0244
	High Precision Cable Adapter	0900-0284
	External Power Supply	0917-0240
	QWERTY Keyboard	0917-0274
	JagBASIC Programmer's Kit	0917-0230
	NMOS POWERCELL Aux Power Supply 100/110/120 VAC	0917-0168
	NMOS POWERCELL Aux Power Supply 220/240 VAC	0917-0169
	Flow Meter I/F Kit	0917-0316
	ControlNet Kit	0917-0315

Interface Board Slot Assignments

Optional Panels		
Slot Number	**Part Number**	**Description**
Slot 1		POWERCELL PCB Panel Assembly Dual Analog Load Cell PCB Assembly Reduced Excitation Dual Analog Load Cell PCB Panel Assembly Multifunction PCB Panel Assembly High Precision PCB Panel Assembly Flow Meter PCB Assembly
Slot 2		Blank Panel Assembly Reduced Excitation Analog PCB Panel Assembly Reduced Excitation Dual Analog Load Cell PCB Assembly Multifunction PCB Panel Assembly High Precision PCB Panel Assembly Flow Meter PCB Assembly
Slot 3		Multifunction PCB Panel Assembly Dual Analog Out PCB Panel Assembly ControlNet PCB Panel Assembly Flow Meter PCB Assembly

(*) May have a revision level prefix.

Recommended Spare Parts

Recommended Spare Parts		
Part Number	**Description**	**Qty**
(*)15905900A	Controller PCB	1
(*)14200200A	Power Supply PCB	1
(*)15345400A	Analog Load Cell PCB (if used)	1
(*)14485300A	Reduced Excitation Analog PCB (if used)	1
(*)15290700A	Dual Analog PCB (if used)	1
(*)15360100A	Reduced Excitation Dual Analog PCB (if used)	1
(*)14092600A	POWERCELL PCB (if used)	1
*(*)14094200A	Multifunction PCB (if used)	1
(*)14538600A	Keyboard Assembly	1
*(*)14548600A	4.5 Volt Battery	
(*)14016100A	Front Seal, Panel O-Ring	

(*) May have a revision level prefix.

* For specific part numbers and details on each PCB, refer to the section in this chapter describing the specific PCB.

** For part numbers for the different enclosure types, refer to the enclosure assemblies in the front of this chapter.

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For your notes

10 Appendices

Appendix 1: Serial Interface Reference

Two serial ports are standard on the Q.iMPACT Controller PCB. They are designated COM1 and COM2.

- COM1 provides both RS-232 and 20 mA current loop interfaces. Both types of interfaces can be output simultaneously; however, only one input can be connected.
- COM2 provides either RS-232, RS-422 or RS-485 interfaces. Both RS-232 and RS-422 can be output simultaneously; however, only one input can be connected. If RS-485 is selected for COM2, it is the only type of interface that can be used.
- Two additional serial ports (COM3 and COM4) are available on optional Multifunction PCB. COM3 has the same functionality as COM1 but COM 3 does not have 20mA; COM4 has the same functionality as COM2.

Character framing is programmable in the setup mode. Framing can be:

1 start bit
7 or 8 ASCII data bits (selectable)
0 or 1 parity bit (even, odd, or none)
1 stop bit

You can also configure the baud rate (from 300 to 115.2k baud) and checksum character interface parameters.

The Q.iMPACT matroller uses software handshaking to control data flow commonly referred to as XON/XOFF handshaking. When a receiving device (typically a printer) is getting information from a Q.iMPACT matroller and cannot receive any more in its buffer, it sends an ASCII XOFF (13h) telling the Q.iMPACT matroller to temporarily stop sending data until its buffer clears.

When the device can receive more data, it sends an ASCII XON (11h) telling the Q.iMPACT matroller to begin sending data again. This process can occur as often as required by receiving device.

The XON/XOFF method is the only type of handshaking supported by the Q.iMPACT matroller at this time.

Hardware Connections

All connections to the serial ports on the Q.iMPACT matroller are made using terminal strips. The terminal strips are removable for ease of connection or replacement of the PCB. The panel mount enclosure has loops on the rear of the power supply assembly allowing you to secure cables with nylon wire ties.

The standard 15-foot (4.57 m) RS-232 printer cable available for the Q.iMPACT matroller (Factory Number 0900-0258, part number 133218 00A) is wired as shown below:

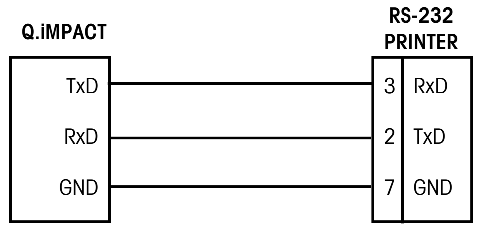


Figure A1-1: RS-232 Printer Cable Wiring

A custom cable can also be used. METTLER TOLEDO recommends using either 20 or 22 gauge wire size. The maximum cable length is determined by the interface type used. As a rule, the following limitations apply:

Cable	Maximum Length	
RS-232	50 feet	15.24 m
20 mA	1000 feet	304.8 m
RS-422	2000 feet	609.6 m
RS-485	2000 feet	609.6 m

Connections other than RS-232 are shown in the section entitled Serial Port Connections in Chapter 2. A custom cable to a computer (or other RS-232 device) should be configured as shown below:

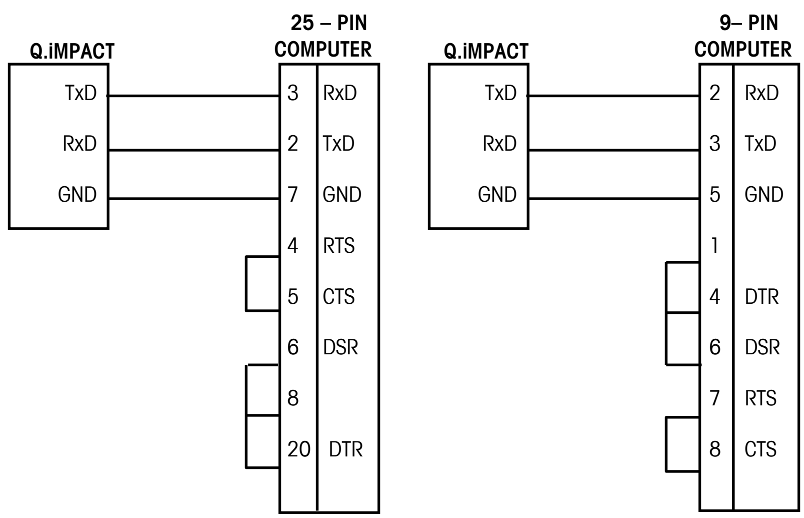


Figure A1-2: Custom Cable Configuration

Output Modes and Formats

The Q.iMPACT matroller supports two different modes of data output—demand or continuous.

The demand mode transmits data only if the **ENTER** key is pressed, an auto-print command is received if discrete input IN3 is grounded. When triggered, data is transmitted in a string selected in the template editing portion of setup. If no templates are selected, a single line output of gross, tare, and net weight will be sent to the demand port. Demand mode is used typically when sending data to a printer.

Continuous mode transmits a predetermined 18-byte string of data from the serial port five or more times a second (without any request). This mode is used typically when continuous monitoring of the scale weight is required by an external device. Typically, continuous output is used to drive a remote display, scoreboard or PC interface.

If **4 Setpnt** status is selected in the Serial Interface program block, setpoints one through four will be included in the continuous output format. The first setpoint assigned to a scale becomes the first setpoint in the continuous output. For example, if the Q.iMPACT matroller's setpoints 5 through 8 are assigned to scale A, then setpoints 5 through 8 are mapped to continuous setpoint bits 1 through 4.

The continuous output format is the same for standard mode and 4-setpoint status mode. This format is shown below:

STX	SW A	SW B	SW C	X	X	X	X	X	X	X	X	X	X	X	X	CR	CKS
1	2 STATUS BYTES			3 GROSS / NET WEIGHT						4 TARE WEIGHT						5	6

Table Notes

1. <STX> ASCII Start of Text Character, Hex 02.
2. <SWA>, <SWB>, <SWC> Status Word Bytes A, B, and C. Refer to the Bit Identification Tables for individual bit definition.
3. Displayed weight, either Gross or Net weight. Six digits, no decimal point or sign. Non-significant leading zeros are replaced with spaces.
4. Tare weight. Six digits, no decimal point or sign.`
5. <CR> ASCII Carriage Return, Hex 0d.
6. <CKS> Checksum character, 2's complement of the 7 low order bits of the binary sum of all characters on a line preceding the checksum, including the STX and CR.

Standard Status Bytes A, B, and C

The mode of operation for the status bytes A, B, and C (standard or 4-setpoint) is determined when the continuous connection is made in the Configure Serial program block.

The following tables detail the standard status bytes for continuous output.

Bit Identification Table for Status Byte A			
Bits 0, 1, and 2			
0	**1**	**2**	**Decimal Point Location**
0	0	0	XXXX00
1	0	0	XXXXX0
0	1	0	XXXXXX
1	1	0	XXXXX.X
0	0	1	XXXX.XX
1	0	1	XXX.XXX
0	1	1	XX.XXXX
1	1	1	X.XXXXX
Bits 3 and 4			
3	**4**		**Build Code**
1	0		X1
0	1		X2
1	1		X5
Bit 5			Always = 1
Bit 6			Always = 0

Bit Identification Table for Status Byte B	
Status Bits	**Function**
Bit 0	Gross = 0, Net = 1
Bit 1	Sign, Positive = 0, Negative = 1
Bit 2	Out of Range = 1 (Over capacity or Under Zero)
Bit 3	Motion = 1
Bit 4	lb = 0, kg = 1 (see also Status Byte C, bits 0-2)
Bit 5	Always = 1
Bit 6	In Power Up = 1

Bit Identification Table for Status Byte C			
Bits 0, 1, and 2			
0	**1**	**2**	**Weight Description**
0	0	0	lb or kg, selected by Status Byte B, bit 4
1	0	0	Grams (g)
Bit 3			Print Request = 1
Bit 4			Expand Data x 10 = 1
Bit 5			Always = 1
Bit 6			Always = 0

4-Setpoint Status Bytes A, B, and C

The mode of operation for the status bytes A, B, and C (standard or 4-setpoint) is determined when the continuous connection is made in the configure Serial program block.

The following tables detail the 4-setpoint status bytes for continuous output.

Bit Identification Table for Status Byte A			
Bits 0, 1, and 2			
0	**1**	**2**	**Decimal Point Location**
0	0	0	XXXX00
1	0	0	XXXXX0
0	1	0	XXXXXX
1	1	0	XXXXX.X
0	0	1	XXXX.XX
1	0	1	XXX.XXX
0	1	1	XX.XXXX
1	1	1	X.XXXXX
Bit 3	Setpoint 1 (1st assigned to this scale), Feeding = 0		
Bit 4	Setpoint 2 (2nd assigned to this scale), Feeding = 0		
Bit 5	Always = 1		
Bit 6	Setpoint 3 (3rd assigned to this scale), Feeding = 0		

Bit Identification Table for Status Byte B	
Status Bits	**Function**
Bit 0	Gross = 0, Net = 1
Bit 1	Sign, Positive = 0, Negative = 1
Bit 2	Out of Range = 1 (Over capacity or Under Zero)
Bit 3	Motion = 1
Bit 4	lb = 0, kg = 1 (see also Status Byte C, bits 0-2)
Bit 5	Always = 1
Bit 6	In Power Up = 1

Bit Identification Table for Status Byte C			
Bits 0, 1, and 2			
0	**1**	**2**	**Weight Description**
0	0	0	lb or kg, selected by Status Byte B, bit 4
1	0	0	Grams (g)
Bit 3			Print Request = 1
Bit 4			Setpoint 4 (4th assigned to this scale), Feeding = 0
Bit 5			Always = 1
Bit 6			Always = 0

Multi Cont 1

This continuous output is used with multi-scale scoreboards (set for protocol P:23). The string consists of separate messages for every enabled scale and the sum of the structure for each scale's message is shown below:

ADR	SW A	SW B	SW C	X	X	X	X	X	X	X	X	X	X	X	X	CR	CKS
1	2 STATUS BYTES			3 GROSS / NET WEIGHT						4 TARE WEIGHT						5	6

Table Notes

1. ASCII Character in hex that represents the scale address 01=scale A, 02=scale B, 03=scale C, 04=scale D, 05=scale E (sum)
2. <SWA>, <SWB>, <SWC> Status Word Bytes A, B, and C. Refer to the Standard Bit Identification Tables for individual bit definition.
3. Displayed weight, either Gross or Net weight. Six digits, no decimal point or sign. Non significant leading zeros are replaced with spaces.
4. Tare weight. Six digits, no decimal point or sign.
5. <CR> ASCII Carriage Return, Hex 0d.
6. <CKS> Checksum character, 2's complement of the 7 low order bits of the binary sum of all characters on a line preceding the checksum, including the STX and CR.

Multi Cont 2

This continuous output is used with multi-scale remote displays (set for protocol P:22). The string consists of separate messages for every enabled scale and the sum of the structure for each scale's message is shown below:

STX	SW A	SW B	SW C	X	X	X	X	X	X	X	X	X	X	X	X	CR	CKS
1	2 STATUS BYTES			3 GROSS / NET WEIGHT						4 TARE WEIGHT						5	6

Note: The scale must be set up for sum and cannot have continuous output selected on any other port.

Table Notes

1. <STX> ASCII Start of Text Character, Hex 02.
2. <SWA>, <SWB>, <SWC> Status Word Bytes A, B, and C. Refer to the Bit Identification Tables for individual bit definition.
3. Displayed weight, either Gross or Net weight. Six digits, no decimal point or sign. Non-significant leading zeros are replaced with spaces.
4. Tare weight. Six digits, no decimal point or sign.
5. <CR> ASCII Carriage Return, Hex 0d.
6. <CKS> Checksum character, 2's complement of the 7 low order bits of the binary sum of all characters on a line preceding the checksum, including the STX and CR.

The following tables detail the standard status bytes for continuous output.

Bit Identification Table for Status Byte A			
Bits 0, 1, and 2			
0	**1**	**2**	**Decimal Point Location**
0	0	0	XXXX00
1	0	0	XXXXX0
0	1	0	XXXXXX
1	1	0	XXXXX.X
0	0	1	XXXX.XX
1	0	1	XXX.XXX
0	1	1	XX.XXXX
1	1	1	X.XXXXX
Bits 3 and 4			**Build Code**
3	**4**		
1	0		X1
0	1		X2
1	1		X5
Bit 5			Always = 1
Bit 6			Always = 0

Bit Identification Table for Status Byte B	
Status Bits	**Function**
Bit 0	Gross=0, Net=1
Bit 1	Sign, Positive=0, Negative=1
Bit 2	Out of Range =1 (Over capacity or under zero)
Bit 3	Motion=1
Bit 4	lb=0, kg=1 (see also Status Byte C, bits 0-2)
Bit 5	Always=1
Bit 6	In Power Up=1

Bit Identification Table for Status Byte C			
Bits 0- 2			Weight Description
0	1	2	
1	0	0	Scale A
0	1	0	Scale B
1	1	0	Scale C
0	0	1	Scale D
1	0	1	Scale E (Sum)
Bit 3			Print Request=1
Bit 4			Expand Data x 10=1
Bit 5			Always=1
Bit 6			Always=0

Default Template Formats

Default templates 1 through 4 contain weight data from Scale A only. Template 5 contains weight data from Scale B only. Do not select template 5 unless you have a scale B or unless you have cleared template 5 and created your own format using an existing scale.

Template 1

Gross Weight:	XX.XX lb
Tare Weight:	XX.XX lb
Net Weight:	XX.XX lb

Template 2

Current Date	Current Time	Scale ID
Gross Weight:	XX.XX lb	
Tare Weight:	XX.XX lb	
Net Weight:	XX.XX lb	

Template 3

Current Date	Current Time	Scale ID CN
Literal #1		
Literal #2		
Gross Weight:	XX.XX lb	
Tare Weight:	XX.XX lb	
Net Weight:	XX.XX lb	

Template 4

Current Date	Current Time	Scale ID CN
Literal #1		
Literal #2		
Literal #3		
Prompt #1	Response #1	
Prompt #2	Response #2	
Prompt #3	Response #3	
Prompt #4	Response #4	
Gross Weight:	XX.XX lb	
Tare Weight:	XX.XX lb	
Net Weight:	XX.XX lb	

Template 5

Template 5 is the same as Template 3 except Template 5 contains weight data from summing scale.

Current Date	Current Time	Scale ID CN
Literal #1		
Literal #2		
Gross Weight:		XX.XX lb
Tare Weight:		XX.XX lb
Net Weight:		XX.XX lb

You can use the Q.iMPACT matroller and weight data in templates. The Q.iMPACT matroller's templates are limited to 400 characters. The total number of characters used by each template can be calculated using the following chart:

Print Field	Space Used
Q.iMPACT Data Field	7 characters
ASCII Character	1 character
Special ASCII Character	1 character
Justify a Field	2 characters justify letter (L, R, C) space limit (1, 2, or 3 characters)
CR/LF Characters	6 characters quantity (1 or 2)
Repeat Character	5 characters

Consider the following example where a customer ticket has three centered literals in a 40 character-wide field, and an asterisk underline. You can calculate how much of the template remains for field data as follows:

MAXINE'S SHIPPING SERVICES

BOXES ● PACK ● SHIP ● FAX

GREAT PRICES

****

The space required for this ticket heading information is

Character Description	**Character Total**
Literal 1	7 (Q.iMPACT data field)
Centered (Justify in 40 character field)	2 1 (letter C) 2 (two digits for quantity 40)
CR/LF	6 1 (one digit for quantity 1)
Total space required (each line)	19
Total for all three lines (19 x 3)	57
ASCII (*)	1 (ASCII character)
Repeat (*) 40 times	5 (repeat function)
CR/LF	6 1 (one digit for quantity 1)
Total space for line of asterisks	13
Grand total of characters (57 13)	70
Therefore 330 characters remain in this template (400-70)	

The following hints apply to template space calculation:

- Regardless of the number of characters in a Q.iMPACT matroller's data field, a template uses only seven characters (the field code).
- Use the CR then the LF special ASCII characters (two characters) instead of the CR/LF combination (7 to 8 characters).
- Justification uses four to six characters that are not used if the field remains unjustified.

Input Modes

This section gives additional information pertaining to the CTPZSU, Bar Code, and Keyboard input modes supported by the Q.iMPACT matroller.

CTPZSU In Remote ASCII Control Character Input

The Serial Interface program block gives you the option of configuring a CTPZSU In serial connection that allows the Q.iMPACT matroller to perform several basic functions when a control character is received. Remote ASCII control characters and the Q.iMPACT matroller's responses include:

ASCII control characters can be sent in upper or lower case.

Characters other than those listed at right are ignored.

If a scale designation character (A or B) is used, it must be followed by the command character(s) within three seconds or the command will be discarded.

C—clears the scale to gross

T—tares the scale

P—initiates a print command

Z—zeros the scale

S—selects a scale

U1—selects primary units

U2—selects secondary units

The ASCII control character pertains to the scale currently selected unless a scale designation character is included in the ASCII control command. You can specify a scale to receive the control character by preceding the command character(s) with the designation A, B, C, D or E.

For example, to take a Pushbutton tare on scale A regardless of which scale is selected, send the command AT. Alternately, the command BT takes a Pushbutton tare on scale B regardless of the selected scale.

You can enter Keyboard Tare by preceding the "T" with a numeric value. For example, 10.5T enters a tare value of 10.5 on the currently selected scale. For two scales, enter Keyboard Tare using the designation A, B, or E before the tare value. For example, A2000T enters a tare of 2000 on Scale A. If there is no preceding numeric value, "T" causes a Pushbutton Tare.

Bar Code In

The Q.iMPACT matroller supports serial data input from bar code readers if the serial type connection is configured as Serial or Both in the Configure Port Sub-block.

The bar code reader must be a type that sends decoded bar code data as ASCII, and RS-232 data as an output string. Most bar code readers are of this type.

Power to the bar code reader can be supplied by the reader vendor as an auxiliary power supply, or power can be supplied by the Q.iMPACT matroller through the PAR 2 connector on the controller board (5 VDC, 115 mA maximum current).

Keyboard In

The Q.iMPACT matroller supports serial input that emulates keyboard input. The serial characters are received and acted upon exactly as if using a keyboard. The matroller's operating mode is important because it can affect how the input is read. For example, the "Enter" serial character received in normal operating mode has a different result than if that same character is received when the Q.iMPACT matroller is in setup mode.

The following serial characters are received:

Serial Character	Q.iMPACT Key Emulated
0-9	Numeric Keys
A-Z, ?, $, #, %, , /, =, *, (,)	Alpha Keys
Ctrl A*	FUNCTION
Ctrl B*	ESCAPE
Ctrl C*	MEMORY
Ctrl D*	TARE
Ctrl E*	SELECT
Ctrl F*	CLEAR
Ctrl G*	ZERO
Ctrl H*	ENTER
Other printable characters	May be input to prompts that accept alpha-numeric input
Non-printable characters	Not used

* Press and hold the Control (Ctrl) key as you press the desired function letter key.

BasTerminal Protocol

The JagBASIC commands and special keys used with the BasTerminal are listed below.

- **TPRINT command**
  You can output messages to the BasTerminal from a BASIC application using the TPRINT command. It has the same syntax as the PRINT and LPRINT commands.

  For example, this is a simple program for entering data and echoing it to BasTerminal using the inkey$ function and tprint.

```
10   tprint "enter line"
20   x$=""
30   c$=inkey$
40   if c$="" then goto 30
50   if c$=chr$(08) then goto 90
60   tprint c$;
70   x$=x$+c$
80   goto 30
90   tprint ""
100  nt "input line= ";x$
110  goto 10
```

- **Configuring LPRINT**
  The Configure Serial menus also allow you to setup the LPRINT device for JagBASIC. The LPRINT device is the first demand print port for Scale A. When you assign the LPRINT device and the BasTerminal connection to the same serial port, then that serial port operates as an interactive serial port for JagBASIC.

- **Special Keys**
  BasTerminal translates the following standard serial input keys to these Q.iMPACT internal key values.

Serial input character		Translated Q.iMPACT character	
backspace	0x08	delete	0x7f
tab	0x09	select	0x05
escape	0x1b	escape	0x02
enter	0x0d	enter	0x08

You can use these following keys on a standard serial keyboard to simulate the function keys on the Q.iMPACT matroller's keypad.

Ctrl+a	function
Ctrl+b	escape
Ctrl+c	memory
Ctrl+d	tare
Ctrl+e	select
Ctrl+f	clear
Ctrl+g	zero
Ctrl+h	enter

- **Sending and Receiving Files**
  Two JagBASIC commands allow you to exchange JagBASIC files between a Q.iMPACT and a PC running a terminal emulator. The JagBASIC command "rz" initiates receiving files at the Q.iMPACT matroller from a PC using the ZMODEM protocol over the BasTerminal serial communication line. The JagBASIC command "sz" initiates sending files from the Q.iMPACT matroller to a PC. If you want to use the rz and sz commands from the BasTerminal, you need to set up the serial communications to use the "8 bits, No Parity" data format.

ASCII Characters

The charts on the following pages list the ASCII Standard and Control characters and ASCII Special characters that are used in the Q.iMPACT matroller's templates.

The first chart below gives replacement characters for display (and printing) purposes depending on the character set selected in the Application Environment program block (see Chapter 3) and the printer setup selection.

The second chart, ASCII Standard and Control Characters, gives the ASCII character, decimal (Dec.), and hexadecimal (Hex.) value for each ASCII character from 00 to 127 hex.

The third chart, ASCII Characters in Special Character Set, gives the ASCII character, name, and hexadecimal (Hex.) value for the characters that can be used as "special characters" in template programming. These include all of the characters not already available on the standard Q.iMPACT matroller's keypad.

ASCII Character (Hexadecimal)												
Country	23h	24h	40h	5Bh	5Ch	5Dh	5Eh	60h	7Bh	7Ch	7Dh	7Eh
USA	#	$	@	[	\	]	^	`	{	|	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
England	£	$	@	[	\	]	^	`	{	|	}	~
Denmark-1	#	$	@	Æ	Ø	Å	^	`	œ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
Spain-1	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	$	@	[	¥	]	^	`	{	|	}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	œ	ø	å	ü
Denmark-2	#	$	É	Æ	Ø	Å	Ü	é	œ	ø	å	ü
Spain-2	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
Latin Am.	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú

ASCII Standard and Control Characters

Char.	Dec.	Hex.	Char.	Dec.	Hex.	Char.	Dec.	Hex.	Char.	Dec.	Hex.
NUL	0	00	SP	32	20	@	64	40	`	96	60
SOH	1	01	!	33	21	A	65	41	a	97	61
STX	2	02	″	34	22	B	66	42	b	98	62
ETX	3	03	#	35	23	C	67	43	c	99	63
EOT	4	04	$	36	24	D	68	44	d	100	64
ENQ	5	05	%	37	25	E	69	45	e	101	65
ACK	6	06	&	38	26	F	70	46	f	102	66
BEL	7	07	′	39	27	G	71	47	g	103	67
BS	8	08	(	40	28	H	72	48	h	104	68
HT	9	09	)	41	29	I	73	49	i	105	69
LF	10	0A	*	42	2A	J	74	4A	j	106	6A
VT	11	0B	+	43	2B	K	75	4B	k	107	6B
FF	12	0C	,	44	2C	L	76	4C	l	108	6C
CR	13	0D	-	45	2D	M	77	4D	m	109	6D
SO	14	0E	.	46	2E	N	78	4E	n	110	6E
SI	15	0F	/	47	2F	O	79	4F	o	111	6F
DLE	16	10	0	48	30	P	80	50	p	112	70
DC1	17	11	1	49	31	Q	81	51	q	113	71
DC2	18	12	2	50	32	R	82	52	r	114	72
DC3	19	13	3	51	33	S	83	53	s	115	73
DC4	20	14	4	52	34	T	84	54	t	116	74
NAK	21	15	5	53	35	U	85	55	u	117	75
SYN	22	16	6	54	36	V	86	56	v	118	76
ETB	23	17	7	55	37	W	87	57	w	119	77
CAN	24	18	8	56	38	X	88	58	x	120	78
EM	25	19	9	57	39	Y	89	59	y	121	79
SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
FS	28	1C	<	60	3C	\	92	5C	|	124	7C
GS	29	1D	=	61	3D	]	93	5D	}	125	7D
RS	30	1E	>	62	3E	^	94	5E	~	126	7E
US	31	1F	?	63	3F	_	95	5F		127	7F

ASCII Standard and Control Characters

Char.	Dec.	Hex.	Char.	Dec.	Hex.	Char.	Dec.	Hex.	Char.	Dec.	Hex.
Ç	128	80	á	160	A0	lb	192	C0	°	248	F8
ü	129	81	í	161	A1		193	C1	¨	249	F9
é	130	82	ó	162	A2		194	C2		250	FA
ã	131	83	ú	163	A3		195	C3	§	251	FB
ä	132	84	ñ	164	A4	oz	196	C4		252	FC
à	133	85	Ñ	165	A5		197	C5		253	FD
å	134	86		166	A6		198	C6		254	FE
ç	135	87		167	A7		199	C7		255	FF
	136	88	¿	168	A8		224	E0			
ë	137	89		169	A9	ß	225	E1			
è	138	8A		170	AA		226	E2			
ï	139	8B		171	AB		227	E3			
î	140	8C		172	AC		228	E4			
ì	141	8D	¡	173	AD		229	E5			
Ä	142	8E	«	174	AE		230	E6			
Å	143	8F	»	175	AF		231	E7			
É	144	90		176	B0		232	E8			
œ	145	91		177	B1		233	E9			
Æ	146	92		178	B2		234	EA			
ô	147	93		179	B3		235	EB			
ö	148	94		180	B4		236	EC			
ò	149	95		181	B5		237	ED			
û	150	96		182	B6		238	EE			
ù	151	97		183	B7		239	EF			
_	152	98		184	B8		240	F0			
ö	153	99		185	B9		241	F1			
Ü	154	9A		186	BA		242	F2			
	155	9B		187	BB		243	F3			
	156	9C		188	BC	Ø	244	F4			
	157	9D		189	BD	ø	245	F5			
Pt	158	9E		190	BE		246	F6			
ƒ	159	9F		191	BF		247	F7			

ASCII Characters in Special Character Set								
Char.	**Name**	**Hex.**	**Char.**	**Name**	**Hex.**	**Char.**	**Name**	**Hex.**
NUL	Null	00	SP	Space	20	`	Left Single Quote	60
SOH	Start of Header	01	!	Exclamation	21	a		61
STX	Start of Text	02	″	Quote	22	b		62
ETX	End of Text	03	#	Number Sign	23	c		63
EOT	End of Trans.	04	$	Dollar	24	d		64
ENQ	Enquire	05	%	Percent	25	e		65
ACK	Acknowledge	06	&	Ampersand	26	f		66
BEL	Bell	07	′	Apostrophe	27	g		67
BS	Backspace	08	(	Left Parenthesis	28	h		68
HT	Horizontal Tab	09	)	Right Parenthesis	29	i		69
LF	Line Feed	0A	*	Asterisk	2A	j		6A
VT	Vertical Tab	0B	+	Plus	2B	k		6B
FF	Form Feed	0C	,	Comma	2C	l		6C
CR	Carriage Return	0D	-	Hyphen	2D	m		6D
SO	Shift Out	0E	.	Period	2E	n		6E
SI	Shift In	0F	/	Forward Slash	2F	o		6F
DLE	Data Link Escape	10	:	Colon	3A	p		70
DC1	Device Control 1	11	;	Semicolon	3B	q		71
DC2	Device Control 2	12	<	Less Than	3C	r		72
DC3	Device Control 3	13	=	Equal	3D	s		73
DC4	Device Control 4	14	>	Greater Than	3E	t		74
NAK	Negative Ack.	15	?	Question	3F	u		75
SYN	Synchronous Idle	16	@	At	40	v		76
ETB	End Trans. Block	17	[	Left Bracket	5B	w		77
CAN	Cancel	18	\	Back Slash	5C	x		78
EM	End of Medium	19	]	Right Bracket	5D	y		79
SUB	Substitute	1A	^	Caret	5E	z		7A
ESC	Escape	1B	_	Underline	5F	{	Left Brace	7B
FS	Field Separator	1C				|	Pipe	7C
GS	Group Separator	1D				}	Right Brace	7D
RS	Record Separator	1E				~	Tilde	7E
US	Unit Separator	1F				DEL	Delete	7F

Appendix 2: Discrete I/O Reference

The Q.iMPACT matroller has a discrete I/O port with four input matrollers and four setpoint output terminals on the controller board. The default input assignments are:

- IN1—Hand Add Complete, Scale A
- IN2—Hand Add Complete, Scale B
- IN3—Hand Add Complete, Scale C
- IN4—Hand Add Complete, Scale D

These are the PAC default assignments if you are using Hand Add Materials.

These input assignments can be changed in the Configure Discrete program block in setup.

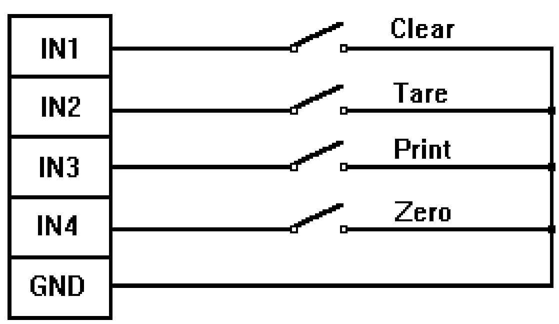
The default outputs represent Scales 1, 2, 3, and 4 respectively. Outputs are configured in the Configure Discrete program block in setup.

Inputs

The inputs are TTL compatible and are capable of handling from 5- to 30-volt DC signals. To initiate one of the inputs, you must ground the input terminal for the desired function and hold the input at logic ground level for at least 100 ms. The inputs are leading edge triggered. The maximum recommended "ON" time for an input is 1 second.

It is not necessary to supply any voltage to the inputs when not triggering (grounding). Internally, a 5-volt power supply with a pull-up resistor keeps the inputs in the "OFF" condition.

Because the signals are low level, the maximum recommended distance between the Q.iMPACT matroller and the device triggering the input (a switch or relay contact) is 10 feet (3 meters) or less. The Q.iMPACT matroller has an internal diagnostic test to verify that each input is functional. The following diagram shows a typical wiring scheme.



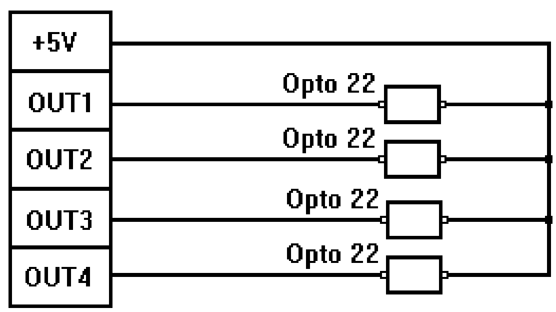
Outputs

The outputs are TTL compatible, current-sinking components, which can handle from 5- to 30-volt DC signals at a maximum of 35 mA current. A solid-state relay or Opto 22 is typically connected to buffer the Q.iMPACT outputs to a 120 or 220-volt AC signal.

An output terminal supplies a 5 volt DC signal for reference to the setpoint outputs. Because the supply is rated at 115 mA of DC current, make sure that the current draw from the devices used (relays or optos) do not exceed this limit. If the calculated current draw exceeds 115 mA, an external power supply is required. External power supplies are available from your authorized METTLER TOLEDO representative.

The outputs are negative true and "ON" when the displayed weight is below the setpoint coincidence value. The setpoints operate on the absolute value of the setpoint value so they can be used for weigh-in and weigh-out processes. There are no interlocks or relay logic included with the standard Q.iMPACT matroller. If start-stop logic is required, METTLER TOLEDO recommends that you purchase this hardware (and design) through your local authorized METTLER TOLEDO representative.

The Q.iMPACT matroller has an internal diagnostic test to verify that each output is functional. The following diagram shows a typical wiring scheme.

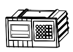
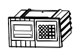
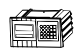
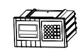


Appendix 3: Network Reference

The Q.iMPACT matroller provides an Ethernet local area network connection. This connection allows Q.iMPACT matrollers to be combined to share display/keyboards and serial ports, and to exchange data with personal computers and file servers.

Keyboard/Display Sharing

Cluster IP Example Setup Chart

Description	**Term #1**	**Term #2**	**Term #3**	**Term #4**	**Term #5**	**Term #6**	**Network Hub**
Standard Ethernet RJ-45							
IP Address	200.200.200.201	200.200.200.202	200.200.200.203	200.200.200.204	200.200.200.205	200.200.200.206	N/A
Sub-Net Mask	255.255.255.000	255.255.255.000	255.255.255.000	255.255.255.000	255.255.255.000	255.255.255.000	N/A
Gateway	000.000.000.000	000.000.000.000	000.000.000.000	000.000.000.000	000.000.000.000	000.000.000.000	N/A
Net Console	Y	Y	Y	Y	Y	Y	N/A
Web Server	Y	Y	Y	Y	Y	Y	N/A
PC Data Access	Y	Y	Y	Y	Y	Y	N/A

You can press **ESCAPE** at the Q.iMPACT 2 terminal to unlock the keyboard when another Q.iMPACT controls the terminal.

Any Q.iMPACT matroller that has a keyboard/display may be used to interact with any other Q.iMPACT matroller in its cluster. A Q.iMPACT matroller with the keyboard/display must be configured as a network console, and it must be set up to have access to the other Q.iMPACT matrollers. If Terminal 1 is to be used as a network console and can access Terminals 2, 3, and 6, Terminal 1 will be set up as follows:

Terminal 1 Network Set Up	
Net Console	YES
Terminal #2	YES
Terminal #3	YES
Terminal #4	NO
Terminal #5	NO
Terminal #6	YES

Terminal 1 does not appear in this list since a Q.iMPACT always has access to its own internal scale(s).

The other matrollers (2, 3, 6) that Terminal 1 can access must have Terminal 1 marked as YES in their Terminal lists. In other words, each pair of matrollers that need to interact with each other across Ethernet must have the other's matroller number marked YES in its Configure Network program block. This rule also applies to two matrollers that must exchange print data.

Using the previous example:

Terminal 2 Network Set Up	
Net Console	NO
Terminal #1	YES
Terminal #3	NO
Terminal #4	NO
Terminal #5	NO
Terminal #6	YES

Notice that Terminal 2 is configured to allow access from Terminals 1 and 6. Terminal 1 is used as the keyboard/display for Terminal 2 which has its printer output redirected to Terminal 6.

Terminal 2 is a blind terminal so its Net Console parameter is set to NO. Blind terminals power up with defaults allowing data access from all other matrollers. These defaults permit other matrollers access to the blind terminal for setup.

NOTE: It is important to set up a blind terminal so that all other matrollers that do NOT need access to it are turned off in its Configure Network program block. Failure to do this will result in lower performance of the blind terminal and network.

Refer to Chapter 3 for details on how to set these parameters.

Selecting a Network Scale for Interaction

The **SELECT** key is used to connect to another Q.iMPACT matroller from a keyboard/display. For example, if you wish to connect to Terminal 2 from Terminal 1:

1. Press **SELECT** until the name for Terminal 2's Scale A is displayed.
2. Press **ENTER** to select.

You are now connected to Q.iMPACT 2 Scale A. The annunciators under the lower display point to **2** and to **A**, reminding you which scale is current. Interacting with this scale is now identical to interacting with an internal scale.

Redirecting Serial Output

Any serial port on any Q.iMPACT matroller in a cluster can be used to output serial data from other Q.iMPACT matrollers in the same cluster. The same demand port can be used by multiple matrollers.

In the previous illustration, Terminal 6 has a printer connected to COM1. The set up of COM1's communication port parameters, such as baud rate, are set up on Terminal 6. Let's assume that this printer will be shared by Terminal 1 as an audit trail printer. The preceding table entitled "Terminal 1 Network Set Up" shows that Terminal 6 has been marked YES. Terminal 6's Configure Network program block must also have Terminal 1 marked YES.

Example

To redirect the data output from Terminal 1 to Terminal 6 you must also make a connection for this output. This is done on Terminal 1 in the Configure Serial program block as follows:

1. Access setup mode.

2. Press SELECT until Configure Serial is displayed, then press **ENTER** to access this program block.
3. Press ENTER to access the Configure Port sub-block.
4. Press ENTER at the **Select Port?** prompt to select the desired port.
5. Press SELECT to display **Location? Remote** and press **ENTER**.
6. Press SELECT to display **Node? Terminal 6** and press **ENTER**.
7. Press ENTER to acknowledge **Assign Port?** COM1.
8. Open the **Add Connection?** sub-block and select the desired scale (A or B), demand print template, and demand print options.

With this configuration you can now print from Terminal 1 to the printer connected to Terminal 6 COM1 by selecting the appropriate scale connected to Terminal 6, (A or B) and pressing ENTER.

The Auto Print or discrete print input features can also be used to initiate the print output.

Internet Explorer Proxy Server Setup

To successfully connect to a Q.iMPACT matroller and browse it via Internet Explorer (4.0 or higher only) over a network that is using a proxy server, make sure that the matroller's IP address is added to the Internet Explorer LAN connection Proxy Server Settings Exceptions list.

In Internet Explorer, pull down the Tools menu, select Internet Options, Connections tab, LAN Settings button, then Advanced button to reach Proxy Settings.

Appendix 4: Q.iMPACT Default Values

The following lists the factory default values for each program block. Use the As Configured column to record your actual setup configuration.

Scale Interface program block			
Default	**As Configured**	**Default**	**As Configured**
Market - USA		Linearity Correction – No	
Scale Type		Calibration - No defaults	
# Internal Scales - 1			
Type - Analog		Zero Adjustment - No defaults	
Location - Analog Bd 1			
Calibration Unit - Pounds		Zero Adjustments - No defaults	
Capacity - 2.0 lb		Span Adjustment - No defaults	
Increment Size		Gravity Adjust – 1.0	
Number of Intervals - 1			
Low - 0.001			

Flow Meter Interface program block			
Default	**As Configured**	**Default**	**As Configured**

Application Environment program block			
Default	As Configured	Default	As Configured
Character Set – USA		Zero Operation	
		Power-up Zero	
Language – English		Positive Range - 0%	
		Negative Range - 0%	
Keyboard Type – English		Pushbutton Zero	
		Positive Range - 2%	
Scale ID – SCALExA		Negative Range - 2%	
		Blank Zero - 5 divisions	
Time and Date Format		Auto Zero Maintenance	
Time Separator - :		Range - 1.00 divisions	
Time Format - 24:MM:SS		AZM w/ Net Mode - N	
Date Separator – space		Center of Zero - Gross Only	
Date Format - DD MMM YYYY		Stability Detection	
Alternate Weight Units		Stability Range - 1.0 divisions	
Main Units – pounds		Stability Readings - 0.3 sec	
Unit Switching – Yes		Beeper Operation	
Second Units – kilograms		Key Beeper - N	
Enable Aux. Units – No		Alarm Beeper - Y	
Power-up Operations		Process Application	
Timer – 0		Process - High	
Tare Operation		Vibration Rejection	
Enable Tare – Y		Adjust Lowpass	
Tare Interlock – N		Frequency - 2.0	
Enable Pushbutton Tare - Y		Poles - 8	
Enable Keyboard Tare - Y		Adjust Notch	
Enable Auto Tare – N		Frequency - 30.0	
Auto Clear Tare – N		Stable Filter - N	
Display Tare – Y			
Net Sign Correction - N			
Jag IDNET Tare - N			

Configure Serial program block			
Default	As Configured	Default	As Configured
Configure Port		Flexible Print	
Select Port Location - Local		Template 1 - N	
Assign Port - COM1		Template 2 - N	
Port Parameters		Template 3 - N	
Baud Rate - 9600		Template 4 - N	
Data Bits - 7		Template 5- N	
Parity - Even		Minimum Print - N	
Flow - XON/XOFF		Print Interlock - N	
COM1 Add Connection		COM2 Connection	
Type - Serial Out		No connections	
Mode - Demand			

Configure Discrete program block			
Default	As Configured	Default	As Configured
Assign Setpoints			
Setpoint 1 - None		Setpoint 5 - None	
Setpoint 2 - None		Setpoint 6 - None	
Setpoint 3 - None		Setpoint 7 - None	
Setpoint 4 - None		Setpoint 8 - None	

Configuration of Discrete Inputs and Outputs			
Discrete Inputs	As Configured	Discrete Outputs	As Configured
Controller Card		Controller Card	
PAR 1.1 Hand Add Complete Scale A		PAR 2.1 Scale A Final Control	
PAR 1.2 Hand Add Complete Scale B		PAR 2.2 Scale B Final Control	
PAR 1.3 Hand Add Complete Scale C		PAR 2.3 Scale C Final Control	
PAR 1.4 Hand Add Complete Scale D		PAR 2.4 Scale D Final Control	
Multifunction Card		Multifunction Card	
PAR 3.1		PAR 4.1	
PAR 3.2		PAR 4.2	
PAR 3.3		PAR 4.3	
PAR 3.4		PAR 4.4	
PAR 3.5		PAR 4.5	
PAR 3.6		PAR 4.6	
PAR 3.7		PAR 4.7	
PAR 3.8		PAR 4.8	

Configure Memory program block			
Default	As Configured	Default	As Configured
Configure Literals		Configure CN	
All literals blank (literals 11-20 are preset literals)		Port Location - Local	
Configure Prompts		Assign Port - COM1	
All prompts blank		Start - 0	

Literals and Prompts as Programmed			
Literals		Prompts	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	

Configure JagBASIC			
Default	**As Configured**	**Default**	**As Configured**
Keyboard – None		**Send RAM Files**	
		Files to PC - N	
Display – None		**Files From PC - N**	
		Initialize RAM Disk	
Auto Start – N		**Delete RAM Disk Files - N**	
		Password Maintenance	
Manual Start – N		**Password - N/A**	

Configure Network program block			
Default	**As Configured**	**Default**	**As Configured**
Ethernet IP Address -- 111.111.111.111		WebServer Home Page -- home.htm	
Ethernet Subnet Mask -- 255.255.255.000		WebServer Document Page -- document.htm	
Ether. Gateway IP Address -- 0.0.0.0		WebServer Help Page -- help.htm	
PPP IP Address -- 0.0.0.0		FTP User Name 1 -- SUPERVISOR	
PPP Subnet Mask – 255.255.255.000		FTP User Password 1 -- ----	
PPP Gateway IP Address -- 0.0.0.0		FTP User Password 5 -- ----	
PPP Timeout – 600 seconds		FTP User Name 6 -- ----	
Local PPP User Name -- ----		FTP User Password 6 -- ----	
Local PPP User Password -- ----		Node Number -- 1	
Remote PPP User Name -- ----		Cluster IP Address 1 – 111.111.111.111	
Remote PPP User Password -- ----		Cluster IP Address 2 – 111.111.111.112	
PPP Dial Phone Number -- ----		Cluster IP Address 3 – 111.111.111.113	
PPP Modem AT InitString -- AT&U0&N10		Cluster IP Address 4 – 111.111.111.114	
SMTP Server IP Address -- 0.0.0.0		Cluster IP Address 5 – 111.111.111.115	
Email Machine Name -- Jaguar		Cluster IP Address 6 – 111.111.111.116	
Sender Email Address -- jaguar@xx.com		Host IP Address – 0.0.0.0	
Email Subject -- Automated Email Alert		Enable DHCP Client -- 0	
SMTP Server TCP Port -- 25			

* Defaults for blind units are Y(es)

Diagnostics and Maintenance program block			
Default	**As Configured**	**Default**	**As Configured**

Appendix 5: Shared Data Variables

Shared Data is the global data storage for the Q.iMPACT matroller. Shared Data "blocks" contain related "fields" of data. The scale threads, the control panel setup, and the web pages set many of the Shared Data fields. Applications, such as JagBASIC programs, the PC OPC Server, the PC Windows API, and Save/Load Utilities may also read or write Shared Data.

When the Q.iMPACT detects that the Legal-for-Trade switch is ON, it prohibits applications from writing to the blocks marked below as "External Read Only". When the Q.iMPACT detects that Legal-for-Trade switch is OFF, it does not enforce any application write access restrictions.

ControlNet PLC's can access the numbered instance attributes.

Refer to the Shared Data document under References on the documentation CD that accompanies the Q.iMPACT matroller.

Appendix 6: Gravity Factors

The values for gravity adjustment [Geo Val?XX] are a series of numbers in the range 0 to 31, as shown in the Table.

Geo Value Table	Height above sea level in meters										
	0	325	650	975	1300	1625	1950	2275	2600	2925	3250
North or south latitude	Height above sea level in feet										
in degrees and minutes	0	1060	2130	3200	4260	5330	6400	7460	8530	9600	10660
0° 0′ - 5° 46′	5	4	4	3	3	2	2	1	1	0	0
5° 46′ - 9° 52′	5	5	4	4	3	3	2	2	1	1	0
9° 52′ - 12° 44′	6	5	5	4	4	3	3	2	2	1	1
12° 44′ - 15° 6′	6	6	5	5	4	4	3	3	2	2	1
15° 6′ - 17° 10′	7	6	6	5	5	4	4	3	3	2	2
17° 10′ - 19° 2′	7	7	6	6	5	5	4	4	3	3	2
19° 2′ - 20° 45′	8	7	7	6	6	5	5	4	4	3	3
20° 45′ - 22° 22′	8	8	7	7	6	6	5	5	4	4	3
22° 22′ - 23° 54′	9	8	8	7	7	6	6	5	5	4	4
23° 54′ - 25° 21′	9	9	8	8	7	7	6	6	5	5	4
25° 21′ - 26° 45′	10	9	9	8	8	7	7	6	6	5	5
26° 45′ - 28° 6′	10	10	9	9	8	8	7	7	6	6	5
28° 6′ - 29° 25′	11	10	10	9	9	8	8	7	7	6	6
29° 25′ - 30° 41′	11	11	10	10	9	9	8	8	7	7	6
30° 41′ - 31° 56′	12	11	11	10	10	9	9	8	8	7	7
31° 56′ - 33° 9′	12	12	11	11	10	10	9	9	8	8	7
33° 9′ - 34° 21′	13	12	12	11	11	10	10	9	9	8	8
34° 21′ - 35° 31′	13	13	12	12	11	11	10	10	9	9	8
35° 31′ - 36° 41′	14	13	13	12	12	11	11	10	10	9	9
36° 41′ - 37° 50′	14	14	13	13	12	12	11	11	10	10	9
37° 50′ - 38° 58′	15	14	14	13	13	12	12	11	11	10	10
38° 58′ - 40° 5′	15	15	14	14	13	13	12	12	11	11	10
40° 5′ - 41° 12′	16	15	15	14	14	13	13	12	12	11	11
41° 12′ - 42° 19′	16	16	15	15	14	14	13	13	12	12	11
42° 19′ - 43° 26′	17	16	16	15	15	14	14	13	13	12	12
43° 26′ - 44° 32′	17	17	16	16	15	15	14	14	13	13	12
44° 32′ - 45° 38′	18	17	17	16	16	15	15	14	14	13	13
45° 38′ - 46° 45′	18	18	17	17	16	16	15	15	14	14	13
46° 45′ - 47° 51′	19	18	18	17	17	16	16	15	15	14	14
47° 51′ - 48° 58′	19	19	18	18	17	17	16	16	15	15	14
48° 58′ - 50° 6′	20	19	19	18	18	17	17	16	16	15	15
50° 6′ - 51° 13′	20	20	19	19	18	18	17	17	16	16	15
51° 13′ - 52° 22′	21	20	20	19	19	18	18	17	17	16	16
52° 22′ - 53° 31′	21	21	20	20	19	19	18	18	17	17	16
53° 31′ - 54° 41′	22	21	21	20	20	19	19	18	18	17	17
54° 41′ - 55° 52′	22	22	21	21	20	20	19	19	18	18	17
55° 52′ - 57° 4′	23	22	22	21	21	20	20	19	19	18	18
57° 4′ - 58° 17′	23	23	22	22	21	21	20	20	19	19	18
58° 17′ - 59° 32′	24	23	23	22	22	21	21	20	20	19	19
59° 32′ - 60° 49′	24	24	23	23	22	22	21	21	20	20	19
60° 49′ - 62° 9′	25	24	24	23	23	22	22	21	21	20	20
62° 9′ - 63° 30′	25	25	24	24	23	23	22	22	21	21	20
63° 30′ - 64° 55′	26	25	25	24	24	23	23	22	22	21	21
64° 55′ - 66° 24′	26	26	25	25	24	24	23	23	22	22	21
66° 24′ - 67° 57′	27	26	26	25	25	24	24	23	23	22	22
67° 57′ - 69° 35′	27	27	26	26	25	25	24	24	23	23	22
69° 35′ - 71° 21′	28	27	27	26	26	25	25	24	24	23	23
71° 21′ - 73° 16′	28	28	27	27	26	26	25	25	24	24	23
73° 16′ - 75° 24′	29	28	28	27	27	26	26	25	25	24	24
75° 24′ - 77° 52′	29	29	28	28	27	27	26	26	25	25	24
77° 52′ - 80° 56′	30	29	29	28	28	27	27	26	26	25	25
80° 56′ - 85° 45′	30	30	29	29	28	28	27	27	26	26	25
85° 45′ - 90° 0′	31	30	30	29	29	28	28	27	27	26	26

Appendix 7: Multiple Range and Multi-Interval Operation

Multiple Range Operation

With multiple range weighing, there can be up to three weighing ranges and each has a threshold. Each weighing range extends from zero to its range threshold. Each range has an associated increment size. The increment size and threshold value are larger for each successive weighing range from the lowest to highest ranges. The difference between the largest and smallest increment size is at most one decimal place. You manually set the increment sizes and thresholds in setup.

The Q.iMPACT terminal only supports automatic selection of the "current weighing range". When weight is increasing, the current weighing range proceeds from the lower range to the next higher range once the weight exceeds the range threshold. Switchover to the next higher range occurs at the range threshold. When weight is decreasing, the current weighing range returns from the current weighing range to the lowest range only when the weight falls within half-a-division of zero.

The matroller has a permanent display that clearly indicates the current weighing range. The matroller indicates weighing ranges 1, 2, and 3 respectively. As of this printing, a new display overlay identifies these cursors as weighing range indicators. The matroller maintains the same decimal point position in the Displayed Weight even when the current weighing range changes. There is at most one trailing, non-significant "0". When right of the decimal point, the non-significant "0" must be in the third place to the right of the decimal point. Manually set this in setup. A Tare may be taken in any weighing range. The Displayed Weight and Printed Weight are always the same.

In Gross Mode

The Q.iMPACT matroller determines the current weighing range by comparing the Fine Gross Weight to the range thresholds. If scale is within half-a-division of zero, the matroller returns to the lowest weighing range as the current weighing range.

The Q.iMPACT matroller calculates the Displayed Gross Weight by rounding the Fine Gross Weight to the nearest weight increment for the current weighing range.

In Net Mode

- The matroller determines current weighing range by comparing the Fine Gross Weight to the range thresholds. If the scale is within half-a-division of zero for gross mode: the matroller returns to the lowest weighing range as the current weighing range.
- The Q.iMPACT matroller calculates the Displayed Net Weight by rounding the Fine Net Weight to the nearest weight increment for the current weighing range.
- The Q.iMPACT matroller calculates the Displayed Tare Weight by rounding the Fine Tare Weight to the nearest weight increment for the current weighing range.

Displayed Gross Weight = Displayed Tare Weight + Displayed Net Weight

When you select the "Div" or divisions weight option in the <Config Options><plc type><Scale Setup><Data Format?> menu selection, the Q.iMPACT matroller only reports the number of divisions calculated from the increment size of the highest weighing range to the PLC since there is no interface to report the current weighing range. You can select the "Wgt", "Flt" or "Ext" options to report weight to the PLC that reflects weight calculated in the actual weighing range.

Multi-Interval Operation

The Q.iMPACT matroller uses multi-interval weighing rules only when the scale base is a Mettler high precision base. There can be up to three weighing intervals. Each weighing interval has a threshold. Each weighing interval extends from the threshold of the next lower interval to its threshold. Each interval has an associated increment size. The increment size and threshold value are larger for each successive weighing interval from the lowest to highest intervals. The METTLER TOLEDO high precision base sets the increment sizes and thresholds.

The matroller only supports automatic selection of "current weighing interval". When weight is increasing, the current weighing interval proceeds from the lower interval to the next higher interval when the weight exceeds the interval threshold. The matroller uses setpoint cursors 6, 7, and 8 to indicate weighing ranges 1, 2, and 3 respectively. As of this printing, there is a new display overlay to identify these cursors as weighing range indicators. The matroller enforces taking tare through the high precision base when the Legal for Trade jumper is ON. The Legal For Trade option takes precedence over <Application Envn><Tare Operation><Jag IDNET Tare> menu selection.

The <Application Envn><Zero Operation><Restart> setup menu selects the power up operation of the base. When Restart=N is selected, the Q.iMPACT matroller/high precision base clears the current tare and enforces a re-zeroing of the base after a restart of the base. When Restart=Y, the matroller/high precision base preserves the current zero and tare values after a restart of the base.

In Europe and Australia, Pushbutton and AutoTare may be taken in any interval. In legal for trade mode, Preset Tare entries must be within the lowest interval. The matroller generates an error message when the entry is too large. If not in legal for trade mode, Preset Tare entries may be in any interval. In the U.S. legal-for-trade mode, all tare entries must be in the lowest weighing range. Displayed Weight and Printed Weight are always the same.

In Gross Mode

The matroller determines the current weighing interval by comparing the Fine Gross Weight to the interval thresholds. The matroller calculates the Displayed Gross Weight by rounding the Fine Gross Weight to the nearest weight increment for the current weighing interval.

In Net Mode

The matroller determines the "net weight current weighing interval" by comparing the Fine Net Weight to the interval thresholds. It calculates the Displayed Net Weight by rounding the Fine Net Weight to the nearest weight increment for the "net weight current weighing interval". The matroller determines the "tare weight current weighing interval" by comparing the Fine Tare Weight to the interval thresholds. It calculates the Displayed Tare Weight by rounding the Fine Net Weight to the nearest weight increment for the "tare weight current weighing interval".

Displayed Gross Weight = Displayed Tare Weight + Displayed Net Weight

When you select the "Div" or divisions weight option in the <Config Options><plc type><Scale Setup><Data Format?> menu selection, the Q.iMPACT matroller only reports the number of divisions calculated from the increment size of the highest weighing interval to the PLC since there is no interface to report the current weighing interval. You can select the "Wgt", "Flt" or "Ext" options to report weight to the PLC that reflects weight calculated in the actual weighing interval.

11 Standards Compliance and Approvals

Standards

The following standards compliance and approvals information is preliminary as of this printing.

UL and cUL Listing

The Q.iMPACT matroller has been tested and complies with UL 1950 and CSA 22.2 No. 950-M95. The Q.iMPACT matroller carries the UL and cUL labels.

Weights and Measures Approvals

Note: Weights and Measures approvals listed here are applicable to scale channels only.

United States

The Q.iMPACT matroller meets or exceeds requirements for Class III or IIIL weighing devices. Certificate of Conformance No. 94-096A6 was issued under the National Type Evaluation Program of the National Conference on Weights and Measures.

Canada

The Q.iMPACT matroller meets or exceeds requirements for a 10,000 division rating for a weighing device and approval AM-5041 has been issued by statutory authority of the Minister of Industry, Science and Technology of Canada.

Australia

The Q.iMPACT matroller meets or exceeds the requirements for Class III and IIIL non-automatic weighing instruments as defined in the National Standards Commission, Document 100. The National Standards Commission has approved the Q.iMPACT matroller for use with approved and compatible platforms.

Europe

The Q.iMPACT matroller was submitted for approval to The Nederlands Meetindtituut (NMi) in the Netherlands. After evaluation, the Q.iMPACT matroller was found to meet and/or exceed the requirements for a Class III weighing instrument. EC type approval certificate TC2618 (Revision 5) was issued by the NMi in accordance to Council Directive 90/384/EEC.

CE Conformity

The Q.iMPACT matroller conforms to the following European Union regulations:

- 90/384/EU—Non-automatic Balances and Scales
- EN45501:1992—Adopted European Standard
- 89/336/EU—EMC Directive
- EN55022, A 01.04.87

Conducted and Radiated Emissions (RFI)

The Q.iMPACT matroller meets or exceeds FCC Part 15 for conducted and radiated emissions requirements as a Class A digital device.

Radio Frequency Interference Susceptibility

The Q.iMPACT matroller meets US, Canadian, and European requirements for RFI susceptibility as listed in the following table with a maximum of one display increment of change when calibrated for recommended builds.

Radio Interference Frequency	Field Strength
26-1000 MHz	3 volts/meter

AC Power Line Voltage Variation

The Q.iMPACT matroller meets NIST H-44, Canadian Gazette Part 1, and OIML-SP7/SP2 line voltage variation specifications as listed in the following table.

AC Power Line Voltages						
Specification	**AC Line Voltage**			**Line Frequency in Hz**		
Line Voltage Variation	**Minimum**	**Nominal**	**Maximum**	**Minimum**	**Nominal**	**Maximum**
NIST H-44	100	120	130	59.5	60	60.5
Canadian	108	120	132	58.8	60	61.2
OIML-SP7/SP2	102 187 204	120 220 264	132 242 264	58.8 49.0 49.0	60 50 50	61.2 51 51

12 Glossary

Terms and Definitions

Term	Definition
Absolute Setpoint	Setpoint mode which treats the setpoint downloaded to the PAC as the vessel weight required at feed cutoff (e.g., fill the vessel to 1800 KG).
Absolute Tolerance Checks	Absolute feed tolerance checks test the feed error (in weight units) directly against the tolerance numbers, also in weight units.
Additive Setpoint (Nett)	Setpoint mode that treats the setpoint downloaded to the PAC as the total amount of material desired to move into the vessel (e.g., add 800 KG of material to the vessel).
Assembly slot	Similar to a channel, however the numbering starts from one again with each bridge Q.iMPACT. The Channel setup page displays the channels Assembly Slot. This is the channels position in the block of data transmitted from the Qi to the Controller. i.e. If channel 3 (which could be Flow Meter 2) is assigned to Assembly Slot 2. Then this channels data is the 2nd "set data (10 words) in the cyclic (scheduled) data.
Board	A printed circuit board
Bridge	Also referred to as a "node." A Q.iMPACT with a ControlNet or Profibus interface board. Not all matrollers must be populated with a bridge.
Channel	An instrument connected to a Q.iMPACT matroller (scale or flow meter). There can be a maximum of four scales (labeled A-D) or 12 flow meters (labeled K-V) on each matroller or any combination that does not exceed 12 channels. Channel numbers are unique.
Card	A printed circuit board
Cluster	Group of Q.iMPACT matrollers which share a common configuration database.
Controller	A PLC, DCS or other programmable device. In our case the Controller supervises the Qi
ControlNet	Proprietary fieldbus developed by Allen-Bradley
ControlNet Bridge	Q.iMPACT with a ControlNet interface board
Cyclic data	Data blocks received by the Host control system at regular intervals. Contains the important information from each Channel (instrument) that is routed through the Bridge Qi. Cyclic data is transmitted from each Qi with a communications board installed. (i.e. Bridge Qi's)
Digital Rate Filter	When a vessel is executing a function that induces noise into the reading of the weight, such as an agitator, it is necessary to remove the noise by using the digital rate filter. While it is desirable to leave this filter on in these cases, some processes require dynamic control of the filtering. The Jaguar provides for both a low pass filter and a notch filter.

Term	Definition
Drain Time	Time delay from cutting the material feed to reading the delivered weight. The Drain Time allows the material to drain out of the pipes, chutes etc.
Dump to Empty	A Material Path that will completely empty a Scale. Any Target sent with this command is ignored
Dynamic Slow Step Monitoring	This Function monitors the time taken to add a Material compared the time it should have taken. The amount of "extra time" taken before an Alarm is generated is setup in the Material Paths
Ethernet	Widely used local area network environment
Feed	Adding Material
Feed Finish	Success/Fail Status after completion of operation
Feed Start	The equipment and system are in ready state and the transfer of material starts
Feed Stop	The instrument will interrupt the transfer at right time
Fieldbus (generic term)	Fieldbus is a method of connecting field instrumentation using a communications network linking the field instruments rather than connecting each field instrument individually to the control system. Fieldbus uses digital communication protocols which allows information to be communicated between the control system and the field instrument in addition to the process signal. Instrumentation connected to a fieldbus network is always of the smart instrumentation type.
Final Control Element FCE	This is the Control O/P of the Qi. There is only one FCE for each instrument. Additional logic is required to route this control signal if an instrument has more than one material feeding into (or out of) a Channel
Flow Meter	An instrument which measures the flow rate of material passing through it, converting the flow into pulses or a digital signal which is processed by the control system.
Function Block Module	
Gain-In-Weight System (GIW)	A feed system that adds material to a vessel by detecting the gain in weight on the receiving vessel.
Histogram	Statistical control charting technique used to visualize the distribution of a set of process data samples, such as feed error, as a plot of frequency of occurrence versus deviation from mean.
Host control system	Supervising control system, controls and monitors the Q.iMPACT
Hub	Connection point for equipment on an Ethernet network when using a star topology.
Instrument	In the Q.iMPACT context, a scale or flow meter.
K1 Algorithm	A Feed Algorithm which dynamically adjusts the Feed cutoff point as the Flow Rate of the Material varies. This algorithm is used for materials which have an initial downwards velocity of zero. (ie a horizontal direction.) Flowmeters always use this Algorithm. Whenever the plot of Spill versus Flow Rate is a straight line, the K1 Algorithm is used

Term	Definition
K2 Algorithm	A Feed Algorithm which dynamically adjusts the Feed cutoff point as the Flow Rate of the Material varies. This algorithm is used for materials which have a high initial downwards velocity. Ie vertical pipe. Whenever the plot of Spill versus Flow Rate is not a straight line, the K2 Algorithm is used
LAN	Local Area Network
Load Cell	An instrument which measures the live load of the added material and dead weight of the vessel in units of weight; the weight is transmitted digitally from the weigh scale interface to the control system.
Loss-In-Weight Feeders/ Loss-In-Weight System (LIW)	A feed system that removes material from a vessel by detecting the loss of weight of the vessel.
Low Flow Alarm Management	The PAC sets an alarm bit if the flow is less than the minimum allowed flow (as configured by the engineer) once the feed has started. Various functions, such as updating the cutoff constants, are not allowed to proceed if the flow at cutoff is not within the configured tolerances.
Management of Filters and Rate Calculation	The flow rate provided by the Jaguar Load Cell Conditioner or the CFM is filtered and made available for use by other PAC functions. The PAC flow rate is filtered using a two-stage filter, with the degree of filtering set by the configuration engineer. A larger filter constant provides a faster response but less filtering; a smaller filter constant provides a slower response but a higher degree of filtering.
Material Movement Calculation and Reporting	At the conclusion of a feed, the amount of material moved, the feed error, the flow rate at cutoff, and the actual spill of the feed are calculated and made available for reporting functions. The feed amount and feed error are "pushed" back to the calling Equipment Module for inclusion in the feed's report parameters.
Material Error Detection and Intervention	When materials are moved into or out of a vessel, it is necessary to verify that they have been moved within the specified tolerances. The PAC will check the feed error against either a fixed amount or a percentage of setpoint and inform the system if the feed error is outside of the tolerance amount. Separate positive and negative tolerances are supported on a material-by-material basis.
Material Feed Problem Diagnostics	Problems detected by the PAC before, during, and after the execution of a feed are reported to the operator in the form of diagnostic messages.
Matroller	Trademarked name for the METTLER TOLEDO material transfer controller
Noisy Scale	If the rate of change in weight is greater than the configured "zero" flow rate, the scale is flagged as "noisy". If the scale is noisy but within an acceptable limit, the operator is notified, but the current PAC function may proceed. If the scale is too noisy, the current PAC function is not allowed to continue without operator interaction.
Operator – Feed Abort	PAC feeds cannot be requested in Operator mode. Any PAC feed in progress for a unit transitioned to Operator mode will halt. The operator can then return to System or Single mode to continue the feed, or select Abort to force the finishing the feed.
Overlapping Feeds	A technique where more than one material is fed into a Scale simultaneously. The primary material is added based on the Scale weight. The secondary materials are fed via a Flow meter or LIW's out of other Scales.
Percentage of Setpoint Tolerance Checks	Percentage of feed setpoint tolerance checks test the feed error (in weight units) against the calculated percentage of the feed setpoint, as indicated by the configured tolerance.

Term	Definition
Predictive Adaptive Control (PAC)	A set of control algorithms that is used to maintain tight feed cutoffs (+/- 0.05% of vessel full-scale weight) through the measurement of vessel weight and flow rate. The algorithms are able to Adapt to normal variations in the process and Predict the proper cutoff point based on these measurements.
Post Feed	Operator and Phase are informed of the Completion and take whatever actions.
Pre Feed	Necessary actions to perform a feed
Q.iMPACT Master	One Q.iMPACT within a cluster must be assigned the master. The Master performs certain Cluster housekeeping functions. A single Qi cluster must still have a Master, (itself) .
Q.iMPACT Remote	Q.iMPACT without a ControlNet interface board installed
Reasonable Request	If a material transfer is requested and it is less than what can reasonably be added, the transfer is not attempted and the operator is informed of the situation.
Router	Hub with more features
Shared data	Variables found within a Q.iMPACT
Shared data block	A group of related shared data
Spill	The amount of material that moves into the receiving vessel from the time the final control element is instructed to close until the drain time is complete.
Spill Only	A feed algorithm that predicts the cutoff point for a feed based only on the average Spill of the material (the amount of material which flows into the vessel from the time the cutoff command is given and the time flow completely stops). This algorithm is used for materials which are unpredictable in nature and/or have extreme and random variations in their Flow Rate ie the Flow Rate is not a reliable value
Stable Scale	When using the weight reading of a vessel scale, it is necessary to know if the scale is stable when the reading is acquired. The stable scale function provides information as to the reliability of the scale reading: Scale Reading OK, Scale Reading Questionable but OK, and Scale Reading Not OK.
Tare of Load Cell	If requested, the PAC will provide a value, which represents the total amount of weight that has arrived or left a vessel since the tare function was last requested.

Term	Definition
Unit Feed Comparison and Alarming	The PAC monitors the amounts of material requested to be transferred from all sources (one source for a single feed, multiple sources for an overlapping preweigh feed or simultaneous flow meter feeds), and compares this number to the actual amount transferred into the vessel at the conclusion of all feeds. If the two amounts differ by more than the configured tolerance, the operator is notified.
Update Constants	At the conclusion of a feed, the cutoff constants are updated based on the performance of the current feed. Provided the updated cutoff constants meet the required reasonability tests (average flow and spill are compared to high and low limit values), the values are written back to the material database so that they can be used the next time the material is fed.
Vessel Empty Management	A common problem when emptying a vessel is that the dump process may end prematurely. While the dump appears to be finished, there is still too much material left in the vessel. This function makes certain that a reasonable amount of material has been transferred out of the vessel before a detected "zero" flow is allowed to indicate a completed dump condition.
Vessel Overflow	Just before a material is transferred to a vessel, the vessel's capacity is checked. If an attempt to add a material will cause an overflow condition, the transfer is aborted and the operator is informed of the overflow situation.
Weigh Scales (Gain-In-Weight Feeders)	A feed system that adds material to a vessel by detecting the gain of weight of the destination vessel.
Workstation	The system component used to configure the view settings in a cluster and from which to log and analyze data from the cluster.
X-Bar and R-Bar charts	Statistical control charting techniques used to visualize the behavior of a set of process data samples, such as feed target and error.
X-Bar and R-Bar charts	Statistical control charting techniques used to visualize the behavior of a set of process data samples, such as feed target and error.
Zero Shift Management	As the process runs, the zero point (empty point) of the vessel will drift due to material buildup, temperature variations at the sensing devices, etc. As the system is used, this drift is tracked and automatically compensated for. If too much drift is detected, the operator is alerted to take corrective action.

METTLER TOLEDO

For your notes

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