

Micro-Tech™ 9104 Loss in Weight Feeder Controller User Manual

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Revision History

Revision Number	Date Released	Eco Number	Details of the Release
Rev A	January 2013	3034	First release of the <i>Micro-Tech 9104 Loss-In-Weight Feeder Controller User Manual</i> .
Rev B	February 2013	3044	On field wiring drawing, add "VDC ONLY" for pulse
Rev C	May 2013	3322	Corrected error motherboard jumpers & Dual plant A/D jumpers
Rev D	September 2013	3363	Corrections.
Rev E	November 2013	3403	Corrections.
Rev F	July 2014	3488	New software version 143.00.01.11. Added notes requiring use of certified bushings for openings.

Occupational Safety and Health Act (OSHA)

The Occupational Safety and Health Act clearly places the burden of compliance on the user of the equipment and the act is generalized to the extent that determination of compliance is a judgment decision on the part of the local inspection. Hence, Thermo Fisher Scientific will not be responsible for meeting the full requirements of OSHA in respect to the equipment supplied or for any penalty assessed for failure to meet the requirements, in respect to the equipment supplied, as interpreted by an authorized inspector. Thermo Fisher Scientific will use their best efforts to remedy such violation at a reasonable cost to the buyer.

Safety in Transportation and Handling

The Micro-Tech is an integral part of your plant and when transporting, handling, and installing the unit, your own plant safety instructions must be applied. Because your Micro-Tech and associated systems are tailored to application requirements, it is impossible to be precise about product mass/weight. If precise values are required, the shipping crate will be marked with the overall shipping mass of the product and this may be used as a reasonable guideline.

Safe Practices During Use, Maintenance, and Repair

This manual contains details, as appropriate, including the appropriate tools. However, because of its importance, the warning contained in the installation section is repeated here.

TO GUARANTEE PERSONAL SAFETY, CARE MUST BE TAKEN WHEN WORKING ON OR AROUND THE MICRO-TECH. AS WITH ALL SUCH DEVICES THE MAIN SUPPLIES (ELECTRICAL AND OTHER) TO THE SYSTEM MUST BE LOCKED OFF WHEN PERFORMING REPAIR OR MAINTENANCE WORK.

Low Voltage Directives

All of the recommendations for LVD apply to the prevention of electrical shock. If access to the electronics enclosure is required, the incoming AC power supply should be isolated remotely and locked-off. Access to the electronics enclosure by untrained personnel is not recommended.

Circuit Breaker

The Micro-Tech should be permanently connected to its AC supply. Please ensure that when installing the Micro-Tech, a switch or circuit breaker is used and is positioned close to the Micro-Tech in easy reach of the operator. The switch or circuit breaker shall be marked as the disconnecting device for the Micro-Tech.

DO NOT install the Micro-Tech in a position that makes it hard to use the AC mains isolator.

Thermo Fisher Scientific Warranty

The seller agrees, represents, and warrants that the equipment delivered hereunder shall be free from defects in material and workmanship. Such warranty shall not apply to accessories, parts, or material purchased by the seller unless they are manufactured pursuant to seller's design, but shall apply to the workmanship incorporated in the installation of such items in the complete equipment. To the extent, purchased parts or accessories are covered by the manufacturer's warranty; seller shall extend such warranty to buyer.

Seller's obligation under said warranty is conditioned upon the return of the

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Said warranty shall not apply if the equipment shall not have been operated and maintained in accordance with seller's written instructions applicable to such equipment, or if such equipment shall have been repaired or altered or modified without seller's approval; provided, however, that the foregoing limitation of warranty insofar as it relates to repairs, alterations, or modifications, shall not be applicable to routine preventive and corrective maintenance which normally occur in the operation of the equipment.

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About This Manual

This manual tells you how to install, operate, and troubleshoot the Micro-Tech. If you encounter a technical term or unit of measure that you do not recognize in the manual or in the Micro-Tech screens, please consult the glossary at the end of the manual.

Conventions

The following conventions are used in this manual.

The names of Micro-Tech buttons, functions, and so on are shown using initial upper-case letters—for example, Menu, Run, Edit, Choice, Tons.

Italics are used in the text for emphasis.



NOTE. Provides information of special importance. ▲



HINT. Indicates a hint about understanding or operating the Micro-Tech. ▲

Safety Precautions

Listed below are the safety messages for your Micro-Tech and its associated scale system. Please read all safety messages *very carefully*, because this information is important—for your own personal safety and the safety of others.



WARNING. Failure to observe could result in death or serious injury. ▲



CAUTION. Failure to observe may cause minor injury or damage to the equipment. ▲

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Chapter 1

Introduction

This manual provides the information you need to install, operate, and troubleshoot the Micro-Tech. Please read the entire manual before installing your Micro-Tech. For personal and system safety, and for the best product performance, make sure you thoroughly understand the manual before installing or using your Micro-Tech. If you have a question not covered in this manual please refer to the Reference manual.

Unpacking the Micro-Tech

The Micro-Tech has been properly packaged for shipment at the factory. Please inspect all packages for damage *before* opening the shipping package, because the carrier is likely responsible for any damage. Once removed from the package, the Micro-Tech can be safely stored with its cover and latches secured and with the hole plugs installed. During storage, do not expose the Micro-Tech to moisture or to temperatures outside the range of -22 to $+158^{\circ}\text{F}$ (-30° to $+70^{\circ}\text{C}$).

Overview of the Micro-Tech

The Micro-Tech 9000 Field Mount Integrator (Figure 1-1) or Panel Mount Integrator (Figure 1-2) is a bus-based microcomputer driven instrument.

By suitable processing of input signals, the Integrator delivers visible and electrical output representing the rate of material movement or other factors specific to the model.

The Micro-Tech has provisions for four outputs on the digital output board, plus one DC output from the mother board—making a total of five, one of which can be defined as a Fault output. In addition, many automatic and check functions are available to monitor its calibration functions and maintenance schedule.

There are two models of Micro-Tech: the field-mounted version (figure 1–1) and the panel-mounted version (figure 1–2). For the panel-mounted version, provide a cut-out (see figure 1–2 for dimensions) in the panel and, after removing the holding brackets and installing the gasket, insert the Micro-Tech.

Introduction

Overview of the Micro-Tech

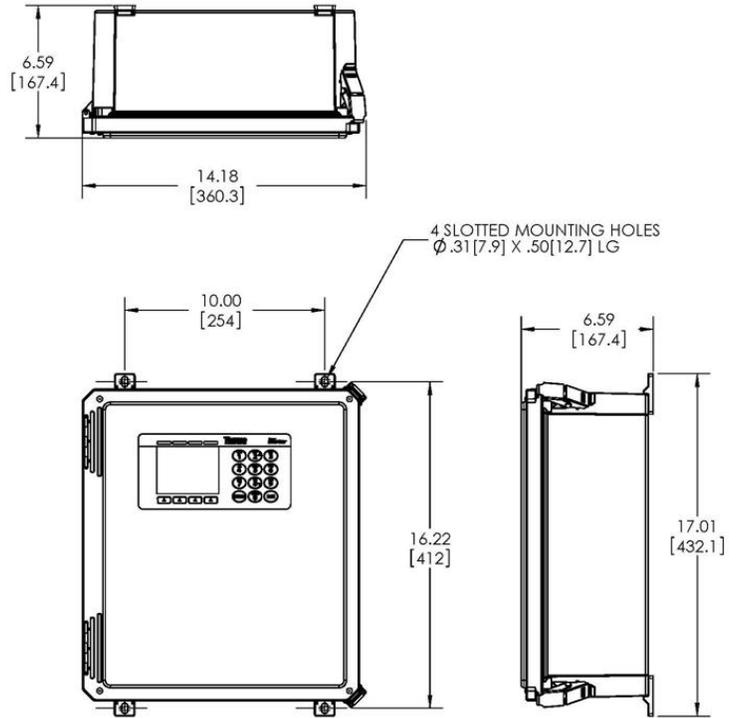


Figure 1–1. Field-Mounted Version of the Micro-Tech

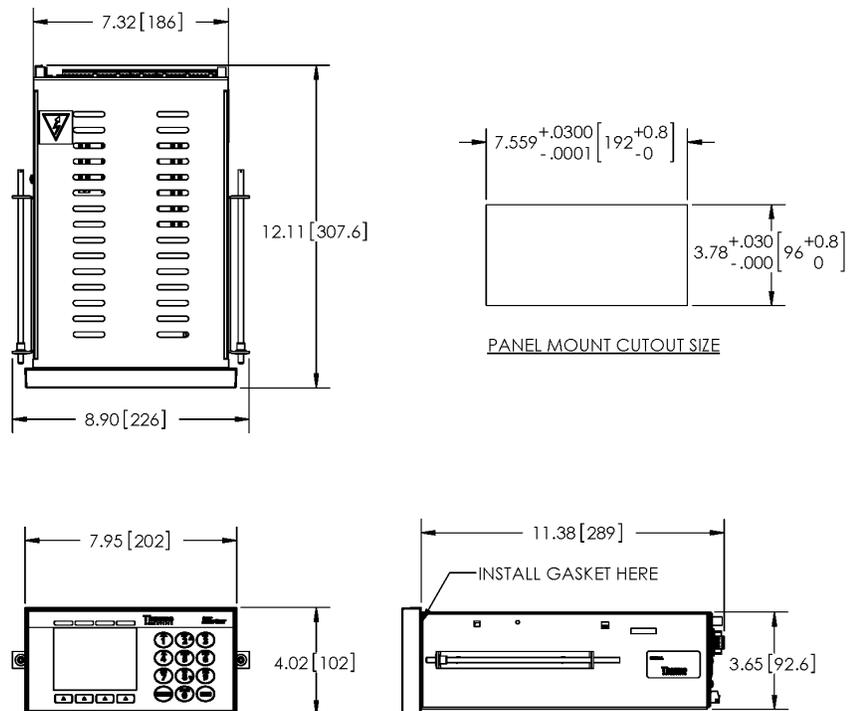


Figure 1–2. Panel-Mounted Version of the Micro-Tech

Important Safety Information

Please read the following warnings and cautions before installing, operating, or maintaining the Micro-Tech.

General Safety Precautions

-  **CAUTION.** Do not install, operate, or perform any maintenance procedures until you have read all the safety precautions listed below. ▲
-  **CAUTION.** Do not connect power to the electronics or turn on the unit until you have read and understood this entire manual. The precautions and procedures presented in this manual must be followed carefully in order to prevent equipment damage and protect the operator from possible injury. ▲
-  **CAUTION.** For North America locations a certified Nema 4/4X bushing must be used for openings. For other locations see your local Electrical Authorities. ▲
-  **WARNING.** Covers over the electronics should always remain in place during operation. They should be removed only for maintenance procedures with the machine's power OFF. Be sure to replace all covers before resuming operation. ▲
-  **WARNING.** All switches (such as control or power) must be OFF when checking input AC electrical connections, removing or inserting printed circuit boards, or attaching voltmeters to the system. ▲
-  **WARNING.** Incoming voltages must be checked with a voltmeter before being connected to the electronics. ▲
-  **WARNING.** Extreme caution must be used in testing in, on, or around the electronics, PC boards, or modules. There are voltages in excess of 115V or 230V in these areas. Avoid high voltage and static electricity around the printed circuit boards. ▲
-  **WARNING.** Maintenance procedures should be performed only by qualified service personnel and in accordance with procedures/instructions given in this manual. ▲
-  **WARNING.** During maintenance, a safety tag (not supplied by Thermo Fisher Scientific) should be displayed in the ON/OFF switch areas as a precaution instructing others not to operate the unit. ▲
-  **WARNING.** Only qualified service technicians should be allowed to open and work in the electronics, power supply, control, or switch boxes. ▲
-  **WARNING.** This equipment should not be operated or utilized in applications other than those stated in the original order. ▲
-  **WARNING.** All panels covering the electronics must be in place and tight before wash down procedures. Damage to the electronics could result from water, moisture, or contamination in the electronics housing. ▲

Incoming Power Safety

-  Please read the following warnings and cautions, when working with incoming power to the Micro-Tech or its associated systems.
-  **CAUTION.** Do not connect power until you have read and understood this entire section. Improper connection may result in damage to your Micro-Tech. ▲
-  **WARNING.** All wiring must be in accordance with standards (IEC, EN) national and local codes (NEC, VDE, and so forth) outline provisions, for safely installing electrical equipment. Installation must comply with specifications regarding wire types, conductor sizes, branch circuit protection, and disconnect devices. Failure to do so may result in personal injury and/or equipment damage. ▲
-  **WARNING.** Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes. The integrity of all ground connections should be periodically checked. For installations within a cabinet, a single safety ground-point or ground bus-bar connected directly to building steel should be used. All circuits including the AC input ground conductor should be grounded independently and directly to this point/bar. Grounding all enclosures and conduits is strongly recommended. ▲
-  **CAUTION.** Verify that the input voltage is correct with an AC voltmeter before you connect it to the Micro-Tech. ▲
-  **CAUTION.** Earth ground must be provided to the Micro-Tech. Do not use conduit to provide this ground. ▲
-  **CAUTION.** A readily accessible disconnect device (maximum 20 amp) must be incorporated in the field wiring. This disconnect device should be within easy reach of the operator and must be marked as the disconnecting device for the equipment. ▲
-  **EMC Instructions**
The Micro-Tech may cause radio interference if used in a residential or domestic environment. The installer is required to take measures to prevent interference, in addition to the essential requirements for CE compliance provided in this manual, if necessary.

Conformity of the Micro-Tech with CE/EMC requirements does not guarantee an entire machine or installation complies with CE/EMC requirements.

Hardware Installation

This section tells you how to complete the hardware installation for your Micro-Tech. Please go to the appropriate section, depending on which model of Micro-Tech you purchased (field-mounted or panel-mounted).

Important Wiring and Safety Information

Before installing the Micro-Tech, please read the following important safety information about wiring up the Micro-Tech.

- | Ensure power is OFF at the main disconnect.
- | Do not route load-cell and signal cables in the same conduit with power cables or any large source of electrical noise.
- | Earth ground all instrument chassis' and conduits. A ground connection between all conduits is required.
- | Connect the shields *only* where shown.
- | Check that all wires are tight in their connections.
- | Never use a “megger” to check the wiring.
- | A readily accessible disconnect device must be incorporated in the field wiring. This disconnect should be within easy reach of the operator and must be marked as the disconnecting device for the Micro-Tech and associated equipment.
- | All conduits should enter the bottom of the enclosure. Do not run conduit through the top or sides of the enclosure.

Installing the Field Model

The integrator should not be exposed to excessive vibration, heat, direct sunlight, or moisture. The ideal mounting location would be on a separate wall or beam in view of the device being monitored. Refer to system wiring diagram for the maximum allowed distance from the monitored device to the Micro-Tech.

Mounting

Mount the Micro-Tech to a rigid, flat, vertical surface using four mounting holes provided on the back of the enclosure. Care should be taken to ensure the mounting surface is flat, so as not to twist or warp the fiberglass enclosure when tightening the mounting bolts.

Connecting the Incoming Power Supply

To connect the incoming power, use the following procedure. Please note that all units shipped from the factory are configured for 100 to 240 VAC.

1. A customer-supplied 2 Amp 250 VAC normal-blow fuse must be connected in the “Hot” power lead between the AC Mains and the Micro-Tech “AC Power Input” terminal block.
2. Unlatch and open the enclosure door.
3. Route incoming power wiring through a conduit hole at the bottom right of the enclosure. For North America locations a certified Nema 4/4X bushing must be used for openings. For other locations see your local Electrical Authorities. Leave ample loose wiring (typically 8 inches / 20 cm) to facilitate removing the terminal connectors.
4. Locate the wiring panel (see figure 1-3 below), which lies on the underside of the electronics enclosure. The wire-safety ground-terminal is located on the enclosure back panel.
5. Wire HOT to Terminal H on the AC PWR IN terminal.
6. Wire NEUTRAL to Terminal N on the AC PWR IN terminal.
7. If additional I/O is required using the line voltages, these wires should be routed through a conduit hole on the bottom right of the enclosure. Leave ample loose wiring (typically 8 inches / 20 cm) to facilitate removing the terminal connectors.
8. In the case of sourcing power for the AC outputs/inputs from the Micro-Tech, source the power from the AUX PWR OUT terminal.
9. All additional field wiring operation at voltages less than 30 V must be located on the left bottom of the enclosure. Leave ample loose wiring (typically 8 inches / 20 cm) to facilitate removing the terminal connectors.
10. Close and latch the enclosure door.

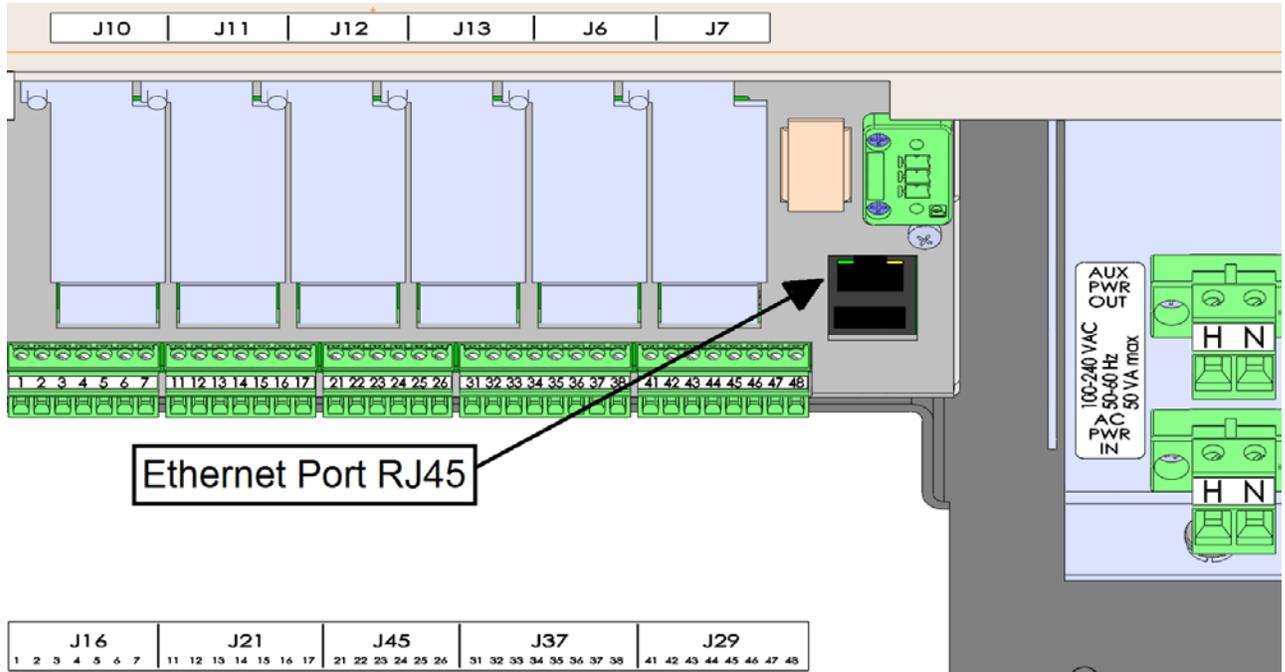


Figure 1–3. Connectors on Underside of Enclosure

Installing the Panel Model

This model of the Micro-Tech is designed to be mounted in an instrument panel. The instrument panel should not be exposed to excessive vibration, heat, or moisture. The front bezel, when properly seated, forms a dust seal. A 2 inch (50 mm) clearance around the top and bottom of the Micro-Tech is required for convection cooling. Additional clearances may be required if other equipment mounted directly below the Micro-Tech generates excessive heat. A 2-3 inch (50-75mm) clearance in the back is necessary for wiring access and fuse replacement. A 1 inch (25 mm) clearance on each side is necessary for inserting the chassis-holding brackets from the back after inserting the Micro-Tech.

Mounting

Provide a cut-out (see figure 1-2 for dimensions) in the panel and, after removing the holding brackets, and installing the gasket, insert the Micro-Tech. From the back, insert the holding brackets on both sides of

the Micro-Tech. Tighten the holding brackets to support the Micro-Tech and form a dust seal.

Connecting the Incoming Power Supply

To connect the incoming power to the Micro-Tech, use the following procedure. Please note that all units are 24VDC *only*.

1. For input power, use 16 AWG / 1.5 mmsq standard wires.
2. Wire the safety ground to the terminal labeled “E” on the Power Input Terminal.
3. Wire the +24VDC to the terminal labeled “+” on the Power Input Terminal.
4. Wire the 24VDC Common to the terminal labeled “-” on the Power Input Terminal.

Configuring Jumpers and Switches

In most instances, your Micro-Tech is shipped to you from the factory with all the needed jumpers installed and the switches set in the correct positions for your particular installation and application. As a result, you should not need to connect any jumpers or set any switches but, if you do, all the appropriate settings are shown in the specific model reference manual.

Micro-Tech Features

The following sections give you a quick overview of the Micro-Tech’s features, functions, and capabilities.

Standard Features

The Micro-Tech has many hardware and software features. The standard features of the Micro-Tech are listed below.

- | Menu-driven scroll entries on a four line display.
- | Four LED status indicators.
- | Audit trail.
- | Automatic zero and span calibration.
- | Auto zero tracking (where applicable).

Introduction

Micro-Tech Menus and Functions

- | Several software options that may be turned on by keypad entry or by installing optional plug-in PC boards.
- | Optically coupled digital inputs and outputs.
- | Alarms and failure detection.
- | Communication standards such as RS232C, RS485, and networking multi-drop.
- | Allen-Bradley DF1 and Modbus RTU.
- | Ethernet/IP and Modbus/TCP

Inputs and Outputs

The standard Micro-Tech configuration is as follows. For more information about the Micro-Tech's communication protocols, see the specific model reference manual.

- | USB port.
- | Two serial communication ports.
- | Two Digital Inputs on motherboard
- | One DC output from the mother board (J29)
- | Ethernet TCP/IP.
- | Four circuit board expansion slots that can accommodate the following boards, if needed.
 - | Three programmable digital inputs on plug-in card.
 - | Four programmable digital outputs on a plug-in card.
 - | Single channel current output board
 - | Dual channel current output, analog input board (2 analog in and 2 analog out)
 - | 8 digital inputs/8 digital outputs board
 - | Serial communication board
 - | Profibus-DP board

Micro-Tech Menus and Functions

Each Micro-Tech has been designed for a specific application and is capable of performing all of the necessary measuring functions. All of the required functions are resident in the software of the microprocessor. Optional functions are automatically turned on when the relevant hardware is installed, or after the operator has selected them through the

keypad. Setup of the Micro-Tech is easy and is performed via the keypad on the front of the device. The setup parameters may be divided into the following main groups.

- | Menu 1: Calibration
- | Menu 2: Set-up
- | Menus 3–6: Options Configuration

Monitoring Functions

The Integrator includes internal diagnostics that generate alarms in case of hardware failures or programming errors.

Alarms are visible on the display and can be acknowledged and reset through the keypad, digital input, or serial line. Alarms can be delayed to avoid intervention in case of short time peaks. Each individual alarm can be programmed to operate as alarm, shut down, or none. Two LED's indicate the cumulative status of alarms and shut down. Digital outputs are also provided for the following:

- Hardware failure
- Alarm cumulative
- Shut down cumulative

Print Functions

Timed or command reports can be obtained by connecting a serial printer to the Comm output on the motherboard, or an optional communication board. Data may also be downloaded to a USB memory device. The Micro-Tech Set-Up, Totals, Zero results, and Audit Trail of the instrument can be printed.

Communication Functions

There are two communication ports on the Motherboard. Comm A is RS232C/RS-485 (jumper selectable), isolated. Comm B is RS-485 only, non-isolated. One additional communication board may be installed. For detailed descriptions of communication protocols, see the specific model reference manual.

There are three types of standard communication functions, as described below.

- | **Serial Communications**
The communication protocol allows a remote intelligent device to read the contents of the registers and write to some registers. During the communication activity, the Micro-Tech always acts as a Slave, responding to a request from a Master device on the line, but never attempting to send messages out. One electrical interface may be selected and accessed through one communication port.

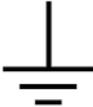
- | **Field Bus I/O**
Profibus-DP I/O, communication protocol board is typically used to transfer I/O images between a main PLC and the remote devices (normally remote I/O racks—rack adapters) or to transfer (read and write blocks of data with intelligent remote devices (node adapters), the Micro-Tech in this case. The Remote I/O is a typical master/slave communication where the main PLC is the master or scanner and the remote devices are slaves or adapters.

- | **Ethernet Port**
The Micro-Tech has a built-in Ethernet port. Communications protocols Ethernet/IP and Modbus/TCP can be used. The Micro-Tech is a slave device only, and cannot initiate messages.

Symbol Identification

Here are the details of the symbols used on the Micro-Tech.

Table 1–1. Symbol Identification

Symbol	Description
	Alternating current
	Earth (ground) TERMINAL
	PROTECTIVE CONDUCTOR TERMINAL
	Caution, risk of electric shock



Caution (refer to accompanying documents)

Standards Applied

Conformity with the Low Voltage (LVD) Directive and Electromagnetic Compatibility (EMC) Directive has been demonstrated using harmonized European Norm (EN) standards published in the Official Journal of the European Communities, and International (IEC) applicable standard used in North America.

The Micro-Tech™ 9000 series comply with the EN and IEC standards listed below, when properly installed in accordance with this and other relevant manuals.

- | CAN/CSA-C22.2 No.61010.1-04
Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.
Part 1: General Requirements.
- | UL 6101-1(2nd Edition)
Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.
Part 1: General Requirements.
- | UL 60950-1
Information Technology Equipment—Safety
Part 1: General Requirements.
- | IEC/EN 61010-1:2001
Safety requirements for electrical equipment for Measurement, Control, and laboratory use.
Part 1: General requirements.

The Micro-Tech™ 9000 series has been tested with the EN and IEC standards listed below.

- | IEC/EN 61326-1
Electrical equipment for measurement, control and laboratory use—EMC requirements.
Part 1: General requirements
- | EN 55011
Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.
- | EN 55022
Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement.

The Micro-Tech™ 9000 series complies with the following EN directives.

- | 2006/95/CE—Low Voltage Directive.
- | 2004/108/CE—EMC Directive.

Specifications

Table 1–2. Micro-Tech Technical Specifications

Description	Specification
Field Mount Enclosure	NEMA 4X, IP66, dust and watertight, 17.01 [432] x 14.18 [360] x 6.59 [167] inches. Fiberglass reinforced polyester. Steel chassis providing EMI/RFI shielding.
Panel Mount Enclosure	Size: 12.11 [308] x 4 [102] x 7.95 [202] inches. Material: Zinc-plated mild steel.
Environmental Conditions Mounting	Mount as close to the measuring device as possible without exposing to excessive heat or moisture. Field Mount suitable for outdoor mounting.
Temperature (Ambient)	Storage: -22° to +158° F (-30° to +70° C). Operating: -4° to +140° F (-20° to +60° C).
Relative Humidity	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% humidity at 40°C.
Pollution Degree	Level 2 per IEC 61010-1
Altitude	Up to 6,561 ft (2000m)
Installation Category	2
Shock	15G peak for 11ms duration (±1.0 ms)
Vibration	0.006 in./0.152 mm displacement, 1G peak
Emission Limitation	According to IEC/EN 61326-1, Class A
Noise Immunity	According to IEC/EN 61326-1, Industrial Environmental
Nominal Voltage	Field Mount: 100-240 VAC. Panel Mount: 24VDC +10%,-15% (user supplied).
Nominal Frequency	Field Mount: 50-60 Hz. Panel Mount: DC only.
Fusing	250VAC, 2A fast acting, on motherboard
Power Consumption	50 VA max.
Maximum Non-Destructive Input Voltage	Field Mount: 265 VAC. Panel Mount: 28VDC.
DC Power Supply Required for Panel Mount	Output voltage: 24 VDC Isolation: No. Output current: 2A minimum, short circuit protected.

Description	Specification
Processor	Coldfire MCF5234 32-bit microprocessor 2 MB Flash memory 128K NVRam 2 Integrated UARTs and Ethernet communication peripherals.
Removable Storage	USB flash driver port
RAM Battery	Life expectancy of the RAM support battery is a minimum of 10 years, if power is not applied. Under normal operation where power is on continuously, life expectancy is much longer.
Inputs #1, #2	Optically isolated. Powered by + 24VDC supply. Built-in current source for dry contact use.(Gold plated contacts recommended) Frequency range Voltage/current type sensor: 0.25 to 2.0 kHz. Contact closure type sensor: 0.25 to 30 Hz. Low threshold: +1.3 VDC min. High threshold: +2.2 VDC max. Low or High Pulse Duration Voltage/current type sensor: 200 us min. Contact closure type sensor: 15 ms min. Hysteresis 0.8 VDC minimum. Input impedance 10 k-ohm typical, 500 ohm minimum. Input source current -2 mA nom. at 0 VDC. Max. non-destructive input voltage ±28 peak, continuous.
Digital Output (Output #5)	Able to drive TTL, CMOS, or relay solenoids. Current sinking driver. +24 VDC internal supply, 100mA DC maximum.
Standard Communication Serial Interface UART 0	RS-232C provides support for modem. RS-485; 2 and 4 wire multi-drop. Data rate: 110 to 19200 bits/second, operator selectable from the keypad. Data format: Asynchronous, bit-serial, selectable parity, data length, and stop bits. Optical isolation: 250 VRMS max. Input Voltage: ±30 Vdc max. (RS-232C) ±15/-10 Vdc max. (RS-485). Cable length: RS-232C, 50ft [15m] max; RS-485, 4000 ft [1219m] max.
Standard Communication Serial Interface UART 2 (For use with Thermo Fisher Scientific equipment only.)	RS-485; 2 and 4 wire multi-drop in RS- 485. Data rate: 110 to 19200 bits/second, operator selectable from the keypad. Data Format: Asynchronous, bit-serial, selectable parity, data length, and stop bits. Isolation: Non-Isolated. Cable Length: 4000ft [1219m] max.

Introduction
Specifications

Description	Specification
Ethernet Communication	Physical: 100baseT, RJ45 Ethernet port Embedded Web server Supported Protocols: Modbus TCP, Ethernet IP.

Chapter 2 Set-up

This chapter tells you how to start up your Micro-Tech, initialize its software, and get your Micro-Tech and its associated scale up and running. As part of the initialization process you will initialize the software, once this is done, do the initial zero and span calibrations of the scale. Your Micro-Tech is then ready to go into operation.

Using the Console

There are four major parts to the Micro-Tech console, as follows.

- | Display screen
- | Keypad
- | Soft keys
- | Status LEDs

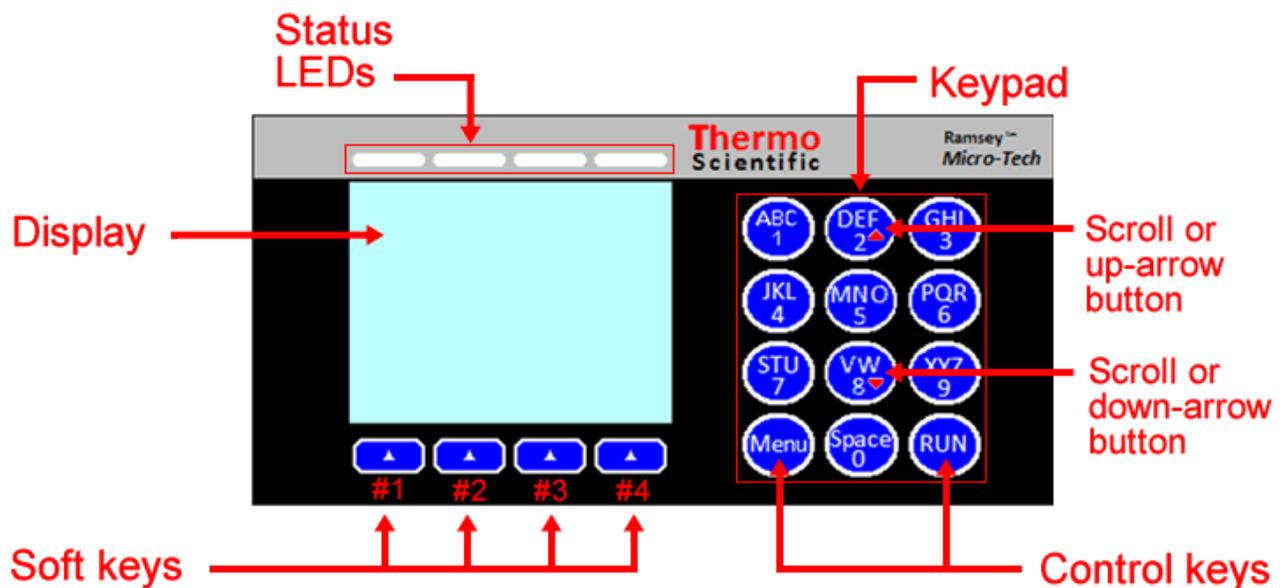


Figure 2–1. Main Features of the Micro-Tech Console

Display Screen

This displays the built-in Micro-Tech menus as well as any entries you make using the keypad. The display also shows the current functions (such as Edit, Enter, and Clear) that are assigned to the four Micro-Tech soft keys situated below the display.

Keypad

The keypad allows you to scroll through the Micro-Tech menus, enter numbers and letters into the Micro-Tech's menus, and control the operation of the Micro-Tech using the Run button. As you will already have noticed—similar to the keys on a cell phone—the Micro-Tech's number keys have multiple uses. All are context sensitive, meaning, for example, that when the Micro-Tech is displaying a *menu*, the number “8” key operates as a down-arrow key, but when the Micro-Tech is expecting you to enter a number, it operates as an “8” key. Similarly, in the print menu, when you are naming your output, repeatedly pressing the “8” key brings up, in succession, the letters *V* and *W*.

| Arrow Keys

The up-arrow and down-arrow keys allow you to scroll through the Micro-Tech menu screens—up and down as well as left and right in some menus.

| Control Keys

The Micro-Tech has two control keys—the Menu button and the Run button. Once the Micro-Tech is up and running, pressing the Menu button brings up the menu screens. Pressing the Run button returns the Micro-Tech to its normal operating mode.

Soft Key Buttons

The four blue keys below the display screen are “soft keys,” that is, they have different functions depending on which menu you are using. The soft keys are assigned to various menu-selection and data-entry functions—such as Edit, Clear, Reset, Totals, and so forth.

Status LEDs

The four indicators show the status of the Loss-In-Weight Feeder Controller.

- REMOTE
- AUTO
- ALARM
- READY

Measuring Functions

The Loss-in-Weight Controller can be directly connected to up to six 350 ohm load cells and converts the weight signal into a numeric value with very high accuracy and resolution.

Rate is calculated as decrease or increase of weight in time. Total is computed on two individual registers: master total and reset total. It is calculated as difference of weight at given time intervals.

The unit can perform automatic zero and span calibrations. Analog (current) output signals or communications can be used to transmit rate, net and gross weight to other control devices. Displayed variables and analog outputs can be smoothed via damping filters, individually programmable.

The system fully handles the refill of the bin, by acting in volumetric mode during the refilling time and adjusting the volumetric constants according to the current net weight. One single instrument can control one or two completely independent loss in weight feeders.

Determining Installation Parameters

Following mechanical and electrical installation, it is necessary that you program field data that is specific to your application into the Micro-Tech memory. The following setup procedure should be completed before programming your Loss-In-Weight Feeder Controller.

Before applying power to the weighing system, it is necessary to complete the following statements.

Scale Capacity

Determine the maximum scale capacity in one of the following weight units (Pounds, Tons, LTons, kg, t) and record the capacity and weight units below. (Example: 400.0 pounds)

_____Scale #1

_____Scale #2

Number of Load Cells

Enter the number of load cells.

_____ (Number of Load Cells) Scale #1

_____ (Number of Load Cells) Scale #2

**Load Cell Capacity,
Sensitivity, and
Resistance**

All Thermo Fisher load cells have the capacity, sensitivity, and resistance marked (as shown below) on the end of the cable. In case the label is not present please refer to the data sheet supplied with the load cell. Enter the capacity, sensitivity, and resistance below.



Figure 2–2. Location of Load-Cell Data

**Load Cell
Capacity**

Determine the load cell size in weight units (Pounds, Tons, LTons, kg, t). Record the weight and units below.(Example: 250.0 Pounds)

_____ (Load Cell Capacity) Scale #1
_____ (Load Cell Capacity) Scale #2

**Load Cell
Sensitivity**

From the load cell nameplate, determine the load cell sensitivity in mV/V. Record the sensitivity below. (Example 3.000 mV/V)

_____ mV/V (Load Cell Sensitivity) Scale #1
_____ mV/V (Load Cell Sensitivity) Scale #2

**Load Cell
Resistance**

Determine the load cell resistance from the label or data sheet or measure the signal (output) resistance with a digital VOM. You must determine the resistance separately for each individual load cell. Record the individual resistances below. (Example: 350.000)

_____ (Ohms) Scale #1
_____ (Ohms) Scale #2

Using the Console

Please see page 2-1 of the manual to familiarize yourself with the Micro-Tech's console and how to use it.

Initializing the Software

This section gives you step-by-step instructions to guide you through the software-initialization process.



NOTE. You *must* complete the entire software initialization and scale-calibration procedure before putting the Micro-Tech into operation. There are no shortcuts! ▲

Overview

There are four steps in the software initialization process, as follows.

- | Enter the correct date and *exact* current time.
- | Choose the appropriate language for the display.
- | Choose the appropriate units of measure (standard tons, long tons, metric tons, and on).
- | Enter the installation parameters recorded above.

Cold-Starting the Micro-Tech

The first time you power up the Micro-Tech, you are doing what is known as a “cold-start.” Once the Micro-Tech is up and running, you can use the cold-start procedure (described below) to—in computer terms—“reboot” the Micro-Tech. In other words, when you do a cold start, the Micro-Tech's RAM memory is erased and everything is returned to its initial start-up state. As a result, cold-starts are used, for example, to restore all the Micro-Tech settings from a previously made back-up flash drive.

To cold-start the Micro-Tech, do the following.

1. Turn on the Micro-Tech's power switch while *simultaneously* pressing and holding soft-key #1 and the Run button. (See figure 2-1 for the location of these buttons.)
2. The Micro-Tech starts up, and the Alarm LED will light to indicate that the Micro-Tech has not yet been initialized or calibrated. After a brief delay the Default screen appears, as shown in the section below.

Setting the Date

You are now ready to set the current date and time. (In the following example we are going to set the date to May 21, 2013.)

READY	BATCH	ALARM	CALIB
Install Factory Defaults?			
NO	YES		

1. Make sure the scale is empty.
2. Press the Yes button and the date screen appears.

READY	BATCH	ALARM	CALIB
Exact date?			
- Date 01 - <u>01</u> - 2012			
DAY <u>1</u>			
EDIT			

3. Press the Edit button. (The Micro-Tech clears the Day entry field leaving just the underline.)

- Use the keypad to enter the correct day. Remember to enter *two* numbers for the day. If you make a mistake, press the Clear button. (We entered 21 for day, as shown below.)

READY	BATCH	ALARM	CALIB
Exact date?			
- Date 01 - <u>01</u> - 2012			
DAY <u>21</u>			
EDIT			



NOTE. The Micro-Tech displays the date in the month-day-year format, and requires two numbers in the month and day fields and four numbers in the year field (MM-DD-YYYY). In addition, the Micro-Tech will *not* display the correct date in the Date line until you have completed the entire process. You can change the date and time formats later, if you would like to use a different one. ▲

- Press the Enter button. Follow steps 3 and 4 above to enter the correct month and year.
- Press the Enter button. The display should now look something like this. (You may have to repeatedly press the Edit and Enter buttons on start up, scrolling through the fields again, to get to this screen.) Either way, make sure this screen is displayed before proceeding.

READY	BATCH	ALARM	CALIB
Exact date?			
- Date 05 - 21 - <u>2013</u>			
YEAR <u>2013</u>			
EDIT			

- You are now ready to enter the correct time, as described below.

Setting the Time

In the following example we are going to set the time to 2:09 p.m. To set the correct time, do the following.

1. Press the down-arrow button (see figure 2–1). The display should currently look like this.

READY	BATCH	ALARM	CALIB
Exact time? - Time <u>12</u> :00 am			
EDIT	AM/PM		

2. Press the Edit button. (The Micro-Tech clears the hour entry field leaving just the underline.)
3. Use the keypad to enter the correct hour. Remember to enter *two* numbers for the hour.
4. Press the Enter button.
5. Press the *down-arrow button* to move to the minute field.

READY	BATCH	ALARM	CALIB
Exact time? - Time 2: <u>00</u> am			
EDIT	AM/PM		

6. Press the Edit button. (The Micro-Tech clears the minute entry field leaving just the underline.)
7. Use the keypad to enter the correct minutes. Remember to enter *two* numbers for the minutes.

8. Press the Enter button.
9. Press the “AM/PM” button to toggle the setting to “PM.”
10. The time is now set. Press the *down-arrow button* to bring up the USB screen. The Micro-Tech pauses for about 10 seconds, while it checks for the presence of a flash drive in the USB port. (If you were rebooting the Micro-Tech to restore your previously saved settings, this is where you would insert the back-up flash drive into the USB port.)

Choosing a Language

The default language shown in the Micro-Tech display is English. You can, however, choose other languages.

1. The Micro-Tech display should currently look like this.

READY	BATCH	ALARM	CALIB
- MEMORY ERASED - Choose the language key to continue to > ENGLISH <			
CHOICE	ENTER		CLEAR



NOTE. Ignore the “Memory Erased” message. The date and time you already entered have been retained. ▲

2. To select the current language, press the Enter button and the scale set-up screen appears.
3. To choose another language, repeatedly press the Choice button until the language you want is displayed, then press the Enter button.
4. The Micro-Tech display should currently look like this.

READY	BATCH	ALARM	CALIB
Initial scale setup and calibration Press down SCROLL			

- The Micro-Tech menus are also known as the Micro-Tech “scrolls.” Please go to figure 2–1 and note that the Micro-Tech keypad contains an up-scroll button and a down-scroll button, which are also known as the up-arrow and down-arrow buttons. Thus, the notation in the display saying “Press down SCROLL,” is a cue to press the down-arrow (or down-scroll) button, as described the next step.
- Press the down-arrow button (or Scroll button) and the “Display Scroll 1” screen appears.

Selecting English/Metric Units

This menu allows you to choose what units of measurement the Micro-Tech uses when displaying its results. The Micro-Tech can display information using the following units of measurement.

- | Standard English units—such as pounds, standard tons, and long tons.
- | Metric units—such as kilograms and tonnes.
- | Both English *and* metric units. (The “Mixed” option.)

- The Micro-Tech display should currently look like this.

READY	AUTO	ALARM	REMOTE
- DISPLAY SCROLL 1 - Measure Units > English <			
CHOICE			

2. The default selection for Measure Units depends on which Language was selected initially.
3. To Choose a different selection (English, Metric, or Mixed), repeatedly press the Choice button until the choice you want is displayed, then press the Enter button.
4. Press the down-arrow button to bring up the rate units screen.
5. In pages 2-10 through 2-14, do the following.
 - ┆ Follow the “English” headings, if you are using English units.
 - ┆ Follow the “Metric” headings, if you are using metric units.
 - ┆ Go to page 2-11, if you are using mixed units.

Setting the Rate Units

This menu allows you to choose the rate units used by the Micro-Tech. Clearly, which rate units are available in this menu depends on the choices you made in previous menus (English, Metric, Mixed).

English Rate Units

The Micro-Tech display should currently look like this, if you chose English units.

READY	AUTO	ALARM	REMOTE
- DISPLAY SCROLL 2 - Rate Units > Lb/h <			
CHOICE			

1. Pounds per hour (“Lb/h”) is the default value.

2. Repeatedly press the Choice button to select other rate units (shown below), then press the Enter button.

- | “LTph”—Long tons per hour
- | “Lb/mn”—Pounds per minute
- | “T/mn”—Standard tons per minute
- | “Lt/mn”—Long tons per minute
- | “percent %”
- | “Lb/hr”—Pounds per hour

Metric Rate Units

The Micro-Tech display should currently look like this, if you chose metric units.

READY	AUTO	ALARM	REMOTE
- DISPLAY SCROLL 2 - Rate Units > kg/h <			
CHOICE			

1. Kilograms per hour (“kg/h”) is the default value.
2. Repeatedly press the Choice button to select other rate units (shown below), then press the Enter button.
 - | “kg/mn”—Kilograms per minute
 - | “t/mn”—Metric tonnes per minute
 - | “percent %”
 - | “kg/h”—Kilograms per hour

Mixed Rate Units

The Micro-Tech display should currently look like this, if you chose mixed units.

READY	BATCH	ALARM	CALIB
- DISPLAY SCROLL 4 -			
Rate Units			
> kg/h <			
CHOICE			

1. Kilograms per hour (“kg/h”) is the default value.

2. Repeatedly press the Choice button to select other rate units (shown below), then press the Enter button.
 - | “Lb/h”—Pounds per hour
 - | “Tph”—Standard tons per hour
 - | “LTph”—Long tons per hour
 - | “kg/mn”—Kilograms per minute
 - | “t/mn”—Metric tonnes per minute
 - | “Lb/mn”—Pounds per minute
 - | “T/mn—Standard tons per minute
 - | “LT/min”—Long tons per minute
 - | “percent %”
 - | “kg/h”—Kilograms per hour

3. Press the down-arrow button to bring up the weight units screen (see the next section).

Setting the Weight Units

This menu allows you to choose the weight units used by the Micro-Tech. Clearly, which weight units are available in this menu depends on the choices you made in previous menus (English, Metric, Mixed).

English Weight Units

The Micro-Tech display should currently look like this, if you chose English units.

READY	AUTO	ALARM	REMOTE
- DISPLAY SCROLL 3 -			
Weight Units			
> Pounds <			
CHOICE			

1. Pounds is the default value.
2. Repeatedly press the Choice button to select other weight units (shown below), then press the Enter button.
 - a. “Pounds”
 - b. “Tons”
 - c. “LTons”
 - d. “Percent %

Metric Weight Units

The Micro-Tech display should currently look like this, if you chose metric units.

READY	AUTO	ALARM	REMOTE
- DISPLAY SCROLL 3 -			
Weight Units			
> kg <			
CHOICE			

1. Kilograms is the default value.
2. Repeatedly press the Choice button to select other weight units (shown below), then press the Enter button.
 - a. “kg”—Kilograms
 - b. “t”—Metric tonnes

- c. “percent %”

Mixed Weight Units

The Micro-Tech display should currently look like this, if you chose mixed units.

READY	BATCH	ALARM	CALIB
- DISPLAY SCROLL 3 - Weight Units > kg <			
CHOICE			

1. Kilograms is the default value.
2. Repeatedly press the Choice button to select other weight units (shown below), then press the Enter button.
 - a. “kg”—Kilograms
 - b. “t”—Metric tonnes
 - c. “percent %”
 - d. Pounds
 - e. Tons
 - f. LTons

Setting the Total Units

This menu allows you to select the specific units of measure that are displayed by the Micro-Tech when reporting its results (known as “Totalization”). Clearly, which units of measure are available in this menu depends on the choice you made in previous topic (“Selecting English/Metric Units”).

English Total Units

The Micro-Tech display should currently look like this, if you chose English units.

READY	AUTO	ALARM	REMOTE
- DISPLAY SCROLL 4 -			
Total Units			
> Tons <			
CHOICE			

Tons (the standard U.S. ton, 2,000 lbs—also known as the British “short ton”) is the default value.

1. To choose long tons (“LTons” 2,240 lbs) or pounds (“Pounds”), repeatedly press the Choice button until the unit you want is displayed, then press the Enter button.

Metric Total Units

The Micro-Tech display should currently look like this, if you chose metric units.

READY	AUTO	ALARM	REMOTE
- DISPLAY SCROLL 4 -			
Total Units			
> t <			
CHOICE			

1. t -Metric tonnes (1,000 kg) is the default value.
2. To choose kilograms (“kg”), press the Choice button (“kg” is displayed), then press the Enter button

Entering Scale Data

Press the down-arrow button (or Scroll button) and the “Number of scales” screen appears. On this scroll you can choose between 1 to 2 scales.

If multiple scales are being used Scale 1 is always assigned to Motherboard A/D channel #1 (J16). When using only 1 scale there are other A/D channel assignment options available, which are described later.

When activated, Scale 2 is always assigned to Motherboard A/D #2 (J21).

READY	STABLE	ALARM	ZERO
- SC DATA SCROLL 1 - Number of scales <u>1</u>			
EDIT			

Entering the type of Scale

When the Number of scales is set to 1, the following “Type of scale” screen is shown. When using only 1 scale you have the capability to utilize multiple loadcell A/D channels (2,3,4) to match the number of load cells on your scale.

READY	AUTO	ALARM	REMOTE
- SC DATA SCROLL 1A - Type of scale > One A/D Channel <			
CHOICE			

READY	AUTO	ALARM	REMOTE
- SC DATA SCROLL 1A - Type of scale > Two A/D Channel <			
CHOICE			

In you have an optional Dual A/D expansion board installed you also have the following choices:

READY	AUTO	ALARM	REMOTE
- SC DATA SCROLL 1A -			
Type of scale			
> Three A/D Channel <			
CHOICE			

READY	AUTO	ALARM	REMOTE
- SC DATA SCROLL 1A -			
Type of scale			
> Four A/D Channel <			
CHOICE			

The default value is “One” A/D channel. However, if your scale has 2, 3, or 4 load cells, choose the “Two”, “Three”, or “Four” A/D channels option. Review the system-specific wiring diagram to determine the number of load cells on your scale.

Note: When the Number of scales is set to 2, the Micro-Tech automatically assigns only one available A/D channel to each scale and the “Type of scale” screen is not displayed.

Entering the Maximum Scale Capacity

This menu allows you to enter the maximum scale capacity of the particular scale you are using in your facility. Please note that the maximum scale capacity is expressed as a *weight*, Pounds (lbs), Tons, (T), and so on.

The Micro-Tech display should look something like this, depending on the choices you made in the menus above.

READY	AUTO	ALARM	REMOTE
- SC DATA SCROLL 2 -			
Max. scale capacity			
<u>100.00</u> lbs			
EDIT			

1. To enter the maximum capacity of your particular scale, press the Edit button and use the keypad to enter the appropriate value, using the decimal point, if needed. In addition, please note the following.
 - | If you need to enter a value such as 1234.5 tons per hour, soft key 3 allows you to enter the decimal point. (See screen shot below.)
 - | There cannot be more than three numerals after the decimal. (Thus, 12.345 is allowed but not 12.3456, which will be truncated to three decimal places.)
 - | Whatever value you enter cannot contain more than *seven* characters, including the decimal point.
 - | The maximum rate (that is, the scale capacity) cannot exceed 200,000 units of measure.

2. We entered 1,750 Pounds (lbs), as shown below.

READY	AUTO	ALARM	REMOTE
<p>- SC DATA SCROLL 2 -</p> <p>Max. scale capacity</p> <p><u>1750</u> lbs</p>			
ENTER		.	CLEAR

3. Press the Enter key.

4. Press the down-arrow key to bring up the scale-divisions screen.

Entering the Scale Divisions

This menu allows you to tell the Micro-Tech how to report the quantity of material that crosses the scale in one hour. For example, if 1,750 tons cross the scale in an hour and you want the results reported to *one* decimal place (that is, to the nearest 200 lbs.), you would choose a scale division of 0.1. As a result, hourly rates would be reported as—for example—1742.8 Tph (tons per hour).

Please note that the choice of division has no bearing on the accuracy of the underlying numbers, and that if your control system contains a PLC

(programmable logic controller), you may need to choose a smaller (or larger) scale division.

The Micro-Tech display should look something like this.

READY	AUTO	ALARM	REMOTE
- SC DATA SCROLL 3 - Scale divisions <u>> 0.1 <</u>			
CHOICE			

1. The Micro-Tech displays an appropriate scale division depending on the value you entered in the “Maximum Scale Capacity” menu. Possible scale divisions are 50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.1, 0.05, 0.02, and 0.01.

2. To choose the appropriate scale division, press the Choice button until the division you want is displayed, then press the Enter button.

Entering Number of Load Cells

Enter the number of load cells on each scale, then press the down-arrow button to move on.

READY	AUTO	ALARM	REMOTE
- SC DATA SCROLL 4 - # of load cells <u> 1 </u>			
EDIT			

Load Cell Capacity, Sensitivity, and Resistance

Enter the load cell Capacity, Sensitivity and Resistance for each scale. Note: You must enter the resistance separately for each load cell

Entering Lever Ratio Defining the Lever Ratio

Enter the lever ratio of the system.

READY	AUTO	ALARM	REMOTE
- SC DATA SCROLL 8 -			
Lever Ratio			
<u>1</u>			
EDIT			

When finished press the down-arrow key to begin calibration.

Calibration The following screen appears. The Micro-Tech is now setting the appropriate span number for the scale.

READY	AUTO	ALARM	REMOTE
CALIBRATION			
IN			
PROGRESS			

1. When the span number has been set, the following screen appears briefly in the display. Notice that the red “Alarm” LED in the console goes off and the green “Ready” LED comes on.

READY	AUTO	ALARM	REMOTE
S1 calibrated			

If you get an “S1 not calibrated” message, check all the numbers you entered in the previous steps. Then go back to the “Entering the Scale Data” section above (see page 2-14) and carefully re-enter all the data into the Micro-Tech. If the calibration fails again, check the load cell (or cells) are working and sending signals to the Micro-Tech.

2. After a brief pause, the following screen appears.

READY	AUTO	ALARM	REMOTE
Press RUN to start or MENU for scrolls			

3. Press the Run button and the Micro-Tech Run screen appears, which looks like this.

READY	AUTO	ALARM	REMOTE
PV		0.0 lb/h	
	TOTALS		

4. Continue with the following steps, finishing with “Calibrating the Micro-Tech”, and perform the initial zero and span calibrations for your scale. This is a very important step, because the scale will not give accurate readings until these calibrations are done.

Running the Micro-Tech

To run the Micro-Tech, do the following.

1. Make sure the Micro-Tech is powered up.
2. Make sure the Run screen (see below) is currently being displayed.

Run Screen

The screen below is known as the Run screen. This screen shows the process variable (rate).

Model 9104 Run Screen

READY	AUTO	ALARM	REMOTE
PV 0.0 lb/h			
	TOTALS		

Figure 2–3. Run Screen

Line 1 of the display always displays the Process Variable. A “R” will appear when the system is in refill.

Lines 2 and 3 of the display are by default blank, but can be selected to show:

Weight, Reset tot, Master tot, Date/Time, Bargraph

READY	AUTO	ALARM	REMOTE
R PV 50.0 Lb/h Gross 146.0 lbs R. Tot 142.0 lbs			
TOTALS			

Calibrating the Micro-Tech

Depending on your particular application, the Micro-Tech should be calibrated on a daily, weekly, monthly, or other regularly scheduled basis. You should run the zero calibration routine often to ensure that the accuracy of the scale is optimized.

Doing a Zero Calibration

To run a zero calibration on your scale, do the following.

1. Make sure the Run screen is currently being displayed.
2. Press the Menu button and the “Main Menu 1” screen appears.

READY	AUTO	ALARM	REMOTE
MAIN MENU 1 Press MENU for more			
ZERO CAL	SPAN CAL		

3. Press the Zero Calibration button and the following screen appears.

READY	AUTO	ALARM	REMOTE
ZERO CAL Empty Scale, Then press START			
START		MANUAL	

4. Make sure your scale is completely empty, then press the Start button. The count-down screen appears. (The data in your screen will, of course, be different.)

READY	AUTO	ALARM	REMOTE
AUTO ZEROING Time remaining 59 Gross 0.00 Tons			
END	ABORT		

5. A complete zeroing procedure will count down from 60 seconds, but can be reduced by pressing the END key. When the counter reaches zero, the calibration is complete and the change-zero screen appears.

READY	AUTO	ALARM	REMOTE
AUTOZERO COMPLETE Error 0.01% Change zero?			
YES	NO		

In our example, the display shows that the newly established zero is just 0.01% different from the previous zero, meaning that both zeros are essentially the same and the scale is performing consistently. However, as there has been a small amount of drift, we decide to reset the zero to the newly established zero point.

6. Press the Yes button to accept the new zero, and the zero-changed screen appears.

READY	AUTO	ALARM	REMOTE
<p>ZERO # CHANGED</p> <p>New zero # 20000</p> <p>Old zero # 19980</p>			
RUN	MENU		

7. Press the Run soft key in the display to return the Micro-Tech to the Run mode.

8. Run several zero calibrations to assess the repeatability of the readings.

Doing an R-Cal Span Calibration

To perform an R-Cal span calibration for your scale, do the following.

1. Make sure the Run screen is currently being displayed.

2. Press the Menu button and the “Main Menu 1” screen appears.

READY	AUTO	ALARM	REMOTE
MAIN MENU 1 Press MENU for more			
ZERO CAL	SPAN CAL		

- Press the Span Calibration button and the following screen appears.

READY	AUTO	ALARM	REMOTE
AUTO SPAN R Cal Empty scale, then press START			
START		MANUAL	

- Make sure the scale is empty, then press the Start button. The count-down screen appears. (The data in your screen will, of course, be different.)

READY	AUTO	ALARM	REMOTE
AUTO SPANNING Time remaining 59 0.000 Tons			
END	ABORT		

- The calibration time (60 seconds) will start counting down. The End key can be used to conclude the function in less time. When

the counter reaches zero, the calibration is complete and the change-span screen appears.

READY	AUTO	ALARM	REMOTE
<p>AUTOSPAN COMPLETE</p> <p>Error 0.01%</p> <p>Change span?</p>			
YES	NO		

Performing an R-Cal For the First Time During Initialization

If you are performing an R-Cal for the *first time* as part of the Micro-Tech initialization process, make sure that the R-Cal error is less than 0.75%. (If the error is greater than 0.75%, there may be a problem. See the manual's the troubleshooting section on page 3-1 for additional help.)

6. Press the Yes button to set the span.

7. Press the Run button (in the display not the keypad) to return the Micro-Tech to the Run mode. Congratulations! You are now ready to put your Micro-Tech into operation.

Performing Any Subsequent R-Cal

Once you have initialized your Micro-Tech and are doing an R-Cal as part of your weekly, daily, or other routing testing, proceed as follows.

In the example screen above, the display shows that the established span is just 0.01% different from the previous span, meaning that both spans are essentially the same and the scale is performing consistently. This error is below the critical threshold error of 0.5%. As a result, the span should *not* be changed. Record the span results for future reference.

However, if the error is greater than 0.5% there may be a problem—see the manual’s troubleshooting section in the following chapter for additional help. Record the span results for future reference.

(The numbering below is continued from page 2-24.)

6. This is important! Press the No button (that is, *do not change* the span) and the following screen appears. (Your numbers will, of course, be different.)

READY	BATCH	ALARM	CALIB
SPAN # UNCHANGED New span # 199980 Old span # 199980			
RUN	MENU	ADV	

7. Press the Run soft key in the display to return the Micro-Tech to the Run mode.
8. Run several span calibrations to assess the repeatability of the readings.

Chapter 3

Maintenance and Troubleshooting

The maintenance information in this manual should meet your service needs. If problems occur requiring technical assistance, please call 1-800-445-3503 or the local Thermo contact listed in Chapter 4. Thermo Scientific has a repair center located at our plant in Minneapolis, Minnesota. Contact one of our technical representatives at 1-800-445-3503, or the local Thermo contact listed in Chapter 4 for assistance. To expedite your service request, please have your Micro-Tech model, serial number, and scale data available.

Critical Checkpoints

The Micro-Tech is a solid-state device and should require very little maintenance. The front panel can be wiped clean with a damp cloth, and if necessary, a mild detergent (never use abrasive cleaners, especially on the display window). As a preventative measure, check to ensure all wires, plugs, and integrated circuits are tight in their connectors. Also, keep the enclosure door tightly closed to prevent dirt infiltration. More often than not, a quick visual inspection leads to the source of trouble. If a problem develops, check the following before proceeding to more specific troubleshooting procedures.

- | Check Power
 - | Check the fuse.
 - | Check that the power switch is ON and that power is supplied to the unit.
- | Check Connections
 - | Check that all terminations are secure.
 - | Check to ensure the display, module, and keypad connectors are firmly seated in their connectors.
 - | Check that all jumpers are in their correct position.

Frequently Asked Questions

Here is a list of frequently-asked questions (FAQs) to help you resolve common problems and concerns about operating, calibrating, and maintaining your scale.

Question	Answer
What is the best way to calibrate my scale?	The best way to calibrate your scale is to use the “Test Weight Calibration” method. If, for whatever reason, you cannot use the Weights method (capacity of the system too big) another suggested method is to load the scale with a known weight of material. As a last possibility you can run a “simulated-calibration” test. For example, all Micro-Techs can be calibrated using the “R-Cal” procedure.
How often should the zero and span be calibrated?	<p>As a general rule, if you make or receive payments based upon the weight readings from your scale, the scale should be zeroed daily and the span checked weekly.</p> <ul style="list-style-type: none">• Your scale is only as good as the repeatability of your error on repeated zero calibrations.• The span should never change drastically, if the zero is properly maintained. <p>If an external contractor is responsible for maintaining your scale, he or she will establish an appropriate schedule for testing your scale’s zero and span.</p>
How often should I check the mechanical installation of the scale?	The scale should only need weekly preventive-maintenance checks for material build up in critical areas, such as where the load cells are located. This schedule is dependent on the type of operations that are performed over the scale (e.g. manual loading of product, high possibility of material escape, and so forth.)
Why do I need to see repeatability during calibrations?	The repeatability of a scale is important for the accuracy of the scale. If the scale cannot repeat tests within the scale’s percentage of accuracy, then you should investigate why the scale is not repeating within the appropriate tolerances.
Every time I complete a zero or span test and get a percentage of error, do I say “Yes” each time to change the zero or span?	The only time you should change zero or span is on the initial, start-up test. Press the “Yes” button to change the span. In any subsequent test, even when there is an error, press the “No” button—as any additional tests are for repeatability, which is a maintenance feature of calibrations.

Question	Answer
What kind of information is available from the digital output?	The programmable outputs are as follows. Alarm cumulative Shutdown cumulative Ready High Weight Low Weight High Rate Low Rate Totalization Custom Fault Load Weights Deviation alarms

Chapter 4

Service, Repair, and Replacement Parts

Listed below is information about how to get help servicing, repairing, and obtaining replacement parts for your Micro-Tech. In addition, Thermo Fisher Scientific provides experienced, on-site service technicians who can assist you with installing, setting up, calibrating, maintaining, and repairing your Micro-Tech. They can also help you train your operators and solve virtually any Micro-Tech-related problem.

Overview

For a detailed list of the spare parts available for your Micro-Tech, please see the Parts List in table 4-1 on page 4-3.

Before returning the Micro-Tech or any other equipment to Thermo Fisher Scientific, you must contact your nearest Thermo Fisher Scientific office for a Return Material Authorization (RMA) number, which will authorize you to make the return. In addition, you will need to complete the appropriate RMA Form, Product Information Sheet, and Hazard Declaration Form, before returning anything to Thermo Fisher Scientific.

For more information about contacting Thermo Fisher Scientific, see page 4-2.

RMA

The Return Material Authorization (RMA) you will need before returning your Micro-Tech to Thermo Fisher Scientific.

Getting Ready to Order

The quickest way to get the parts you need for your Micro-Tech is to do the following.

1. Identify the broken or faulty parts.

2. See whether the part is shown in table 4–1, which lists parts that may need to be replaced. Note the part number from the table. If the part is not listed in the table, contact Thermo Fisher Scientific directly (as described in the following pages).
3. Before you contact Thermo Fisher Scientific for commonly needed parts, make sure you have the following information ready.
 - 1 Your Micro-Tech model number and serial number.
 - 1 Your company’s purchase order (PO) number. Please note that a *hard copy* of your PO is required before parts can be sent. In addition, your PO must reflect the current and correct prices for all parts ordered. So, please email or fax us your PO to expedite the process.
 - 1 The date the parts are needed.
 - 1 Your preferred shipping method.
 - 1 A list of all the part numbers—together with descriptions and the quantities needed.
4. Then contact Thermo Fisher Scientific by email, fax, or telephone—as described on the following page.



WARNING. Major repairs and/or modifications to your Micro-Tech *must* be performed by Thermo Fisher Scientific personnel. ▲

Contacting Thermo Fisher Scientific

Please verify and write down your Micro-Tech model number and serial number *before* contacting us. Things will go a lot more quickly and efficiently once we know this information.

North America

1-800-445-3503

1-763-783-2525

Service.bulk.us@thermofisher.com

parts.bulk.us@thermofisher.com

Brazil

+55-11-2367-2192

+55-11-2367-2192 fax

Germany

+49 (0) 208-824930

+49 (0) 208-852310 fax

service.oberhausen@thermofisher.com

Chile

+56 2 2378 5080

+56 2 2370 1082 fax

Italy

+39 02-959514-1
+39 02-953200-15 fax
service.bulk.emea@thermofisher.com

China

+86 10-8419-3588
+86 10-8419-3580 fax

Spain

+34 91-484-5965
+34 91-484-3597 fax

India

+91-22-4157-8800
+91-22-4157-8801 fax

United Kingdom

+44 (0) 1452-337800
+44 (0) 1452-415156 fax

Mexico

+52 55 1253 9410
+52 55 1253 9424 fax

Australia

+61 (0) 8 8208-8200
+61 (0) 8 8234-3772 fax
service.auadl@thermofisher.com

South Africa

+27 (0) 11-609-3101
+27 (0) 11-609-3110 fax

Parts List

Here is the parts list for your Micro-Tech.

Table 4–1. Micro-Tech Parts List

Description	Part Number
PCBA,MOTHERBOARD,MT9104	127653
DISPLAY,LCD,6 DIGIT,QVGA,MT9000	100775
PCBA,HMI BOARD,MT9000	100802
CONN,PWR,3POS,3.81MM,HDR,M	100781
POWER SUPPLY,SGL, 24V, 3.2A	100755
CABLE,USB,M/F,2.0,1.6FT,PNL MT	100792
PCBA, ANALOG I/O BOARD, MT9000	102949
PCBA, 4-20MA OUTPUT BD, 1 CH, MT9000	100744
PCBA, DC INPUT BD, MT9K	100785
PCBA, PLANT A/D BD, MT9000	102450
PCBA, OPTO-22 INPUT, MT9000	102999
PCBA, OPTO-22 OUTPUT BD, MT9000	103003

Description	Part Number
PCBA, RELAY OUTPUT BD, MT9000	102479
PCBA, COMM BOARD, MT2K/9K	102942
PCBA, PROFIBUS BD, MT2000/MT9000	102936
PCBA, DIO, 8IN / 8OUT	103017
MODULE, POWER, IN, 140VAC, G4- 5	038014
MODULE, POWER, IN, 280VAC, G4- 5	050480
MODULE, POWER, IN, 32VDC, G4- 5	044551
MODULE, POWER, OUT, 240VAC, G4- 5	037289
MODULE, POWER, OUT, 60VDC, G4- 5	039669
MODULE, POWER, OUT, DRY, N/O, G4- 5	044552
FUSE, FAST-BLOW, 2A, 250V, 5X20MM	103190
DRIVE, FLASH, USB 2, 4GB, BRANDED	112183

R-Cal Factoring

When the possibility exists that multiple calibration methods are available, one must be selected to achieve a span number.

Calibration Method	Availability
R-Cal	Built-in
Weights	Weights required by User.

When a Weights span calibration has been done to achieve a span number the R-Cal calibration method should be Factored to the proven span number.

Reset Weight Factor

To reset the existing R-Cal factor, do the following.

1. Press the Menu button twice to bring up “Main Menu 2.”

READY	AUTO	ALARM	REMOTE
- MAIN MENU 2 - Press MENU for more			
DISPLAY	SCALE DATA	CALIB DATA	

2. Press the Calibration Data button and the following screen appears.

READY	AUTO	ALARM	REMOTE
- START OF SCROLL - Use SCROLL keys to view selections.			

3. Press the down-arrow button repeatedly until the “Cal Data Scroll 5” screen appears.

READY	AUTO	ALARM	REMOTE
- CAL DATA SCROLL 5 - R-Cal Factor <u>x.xx</u> %			
EDIT			

4. Press the Edit button.

READY	AUTO	ALARM	REMOTE
- CAL DATA SCROLL 5 - R-Cal factor _____%			
ENTER	+/-	●	CLEAR

5. Use the keypad to enter a zero value (0). Then press the Enter button. Your screen will now look like this.

READY	AUTO	ALARM	REMOTE
- CAL DATA SCROLL 5 - R-Cal factor _____ 0.00 %			
EDIT			

R-Cal Span

The auto-span procedure determines the percent R-Cal span-error.

1. Press the Menu button to bring up the “Main Menu 1” screen.

READY	AUTO	ALARM	REMOTE
- MAIN MENU 1 - Press MENU for more			
ZERO CAL	SPAN CAL		

2. Press Span Cal button and the following screen appears.

READY	AUTO	ALARM	REMOTE
AUTOSPAN R Cal Empty scale, then press START			
START		MANUAL	

3. Make sure the scale is empty, then press the Start button. The following Auto Spanning screen appears.

READY	AUTO	ALARM	REMOTE
AUTO SPANNING Time remaining 59 44.12 lbs			
END	ABORT		

4. When the Auto Span procedure is completed, the span percent-error is displayed. Record the percent-error results and note whether the error is positive or negative.

READY	AUTO	ALARM	REMOTE
AUTOSPAN COMPLETE Error -0.07 % Change Span?			
Yes	NO	FACTOR	

5. Press the No button (meaning you *do not* want to change the span), and the following screen appears.

READY	AUTO	ALARM	REMOTE
SPAN UNCHANGED Old span # 1002010 New span # 1002010			
MENU	REPEAT		

Set R-Cal Factor

Now to set the new R-Cal factor, do the following.

1. Press the Menu button to bring up the “Main Menu 2” screen.

READY	AUTO	ALARM	REMOTE
- MAIN MENU 2 - Press MENU for more			
DISPLAY	SCALE DATA	CALIB DATA	

2. Press the Calibration Data soft-key. Press the down-arrow button and the R-Cal Factor screen appears.

READY	AUTO	ALARM	REMOTE
- CAL DATA SCROLL 5 - R-Cal factor <u>0.00</u> %			
EDIT			

- Press the Edit button and use the keypad to enter the R-Cal error. Then press the Enter button. The error you entered is displayed in the screen below.

READY	AUTO	ALARM	REMOTE
- CAL DATA SCROLL 5 - R-Cal factor <u>-0.07</u> %			
EDIT	+/-	.	CLEAR

- Factoring R-Cal is now complete. Press the Run button and the Micro-Tech Run screen reappears, as shown below.

READY	AUTO	ALARM	REMOTE
PV xxxxx.x lb/h			
	TOTALS		

Terminal Block Definitions

The terminal-block definitions for the motherboard are shown below.

J16	J21	J45	J37	J29
1 2 3 4 5 6 7	11 12 13 14 15 16 17	21 22 23 24 25 26	31 32 33 34 35 36 37 38	41 42 43 44 45 46 47 48
LOADCELL 1	LOADCELL 2	COMM B	COMM A	SPU and PULSE OUT

J16	Load Cell 1
1	SHIELD (EARTH)
2	+ EXCITATION
3	- EXCITATION
4	+ SENSE
5	- SENSE
6	+ SIGNAL
7	- SIGNAL

J21	Load Cell 2
11	SHIELD (EARTH)
12	+ EXCITATION
13	- EXCITATION
14	+ SENSE
15	- SENSE
16	+ SIGNAL
17	- SIGNAL

Additional Installation Information
Terminal Block Definitions

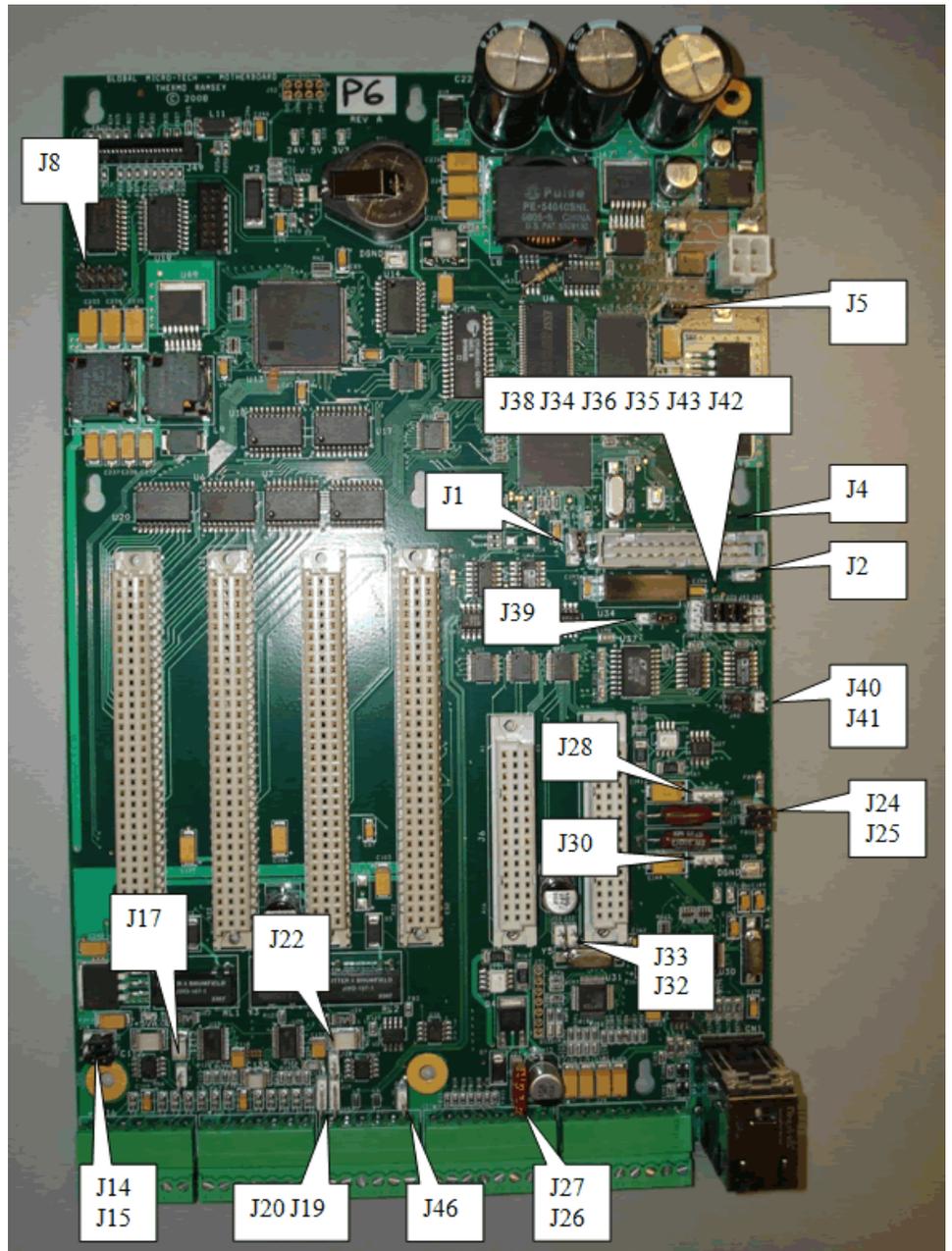
J45	COMM B (Non-isolated RS-485)
21	RS-485 Z TX -
22	RS-485 Y TX +
23	RS-485 A RX +
24	RS-485 B RX -
25	COMMON
26	SHIELD (EARTH)

J37	COMM A (Isolated RS-485/232)
31	RTS/-485 OUT
32	TXD/+485 OUT
33	RXD
34	+485 IN
35	-485 IN
36	CTS/DCO
37	UART GND (ISOLATED)
38	SHIELD (EARTH)

J29	Input #1 & #2 and Output #5
41	+24VDC
42	Input #1
43	COMMON
44	SHEILD (EARTH)
45	Input #2
46	24VDC POWER
47	OUTPUT #5 (24V) (OPEN-DRAIN)
48	COMMON

Motherboard Jumper Locations

Here are the jumper locations the Micro-Tech motherboard.



Jumper Settings

Here are the jumper settings for the Micro-Tech.

Load-Cell Interrupt Selection Jumper

Jumper	Jumper Settings	Default	
J8	Jumper Setting	Description	J8 Not Installed
	Pins 1-2	Load Cell IRQ 1	
	Pins 3-4	Load Cell IRQ 2	
	Pins 5-6	Load Cell IRQ 3	
	Pins 7-8	Load Cell IRQ 4	

Load-Cell Sense Selection Jumpers

Jumper	Jumper Settings	Default	
J14 J15	Jumper Setting	Description	J14 1-2 Installed J15 1-2 Installed
	Pins 1-2	Local Sense Channel 1	
	Pins 2-3	Remote Sense Channel 1	
	Not Installed	Remote Sense Channel 1	
J17	Optional R-CAL resistor Channel 1	Not Installed	
J19 J20	Jumper Setting	Description	J19 1-2 Installed J20 1-2 Installed
	Pins 1-2	Local Sense Channel 2	
	Pins 2-3	Remote Sense Channel 2	
	Not Installed	Remote Sense Channel 2	
J22	Optional R-CAL resistor Channel 2	J22 Not Installed	

UART Configuration Jumpers

Jumper	Jumper Settings	Default	
J34	COMM A, (UART 0)		J34 Installed 1-2
	Jumper Setting	Description	
	Pins 1-2	RS-485 Normal Operation	
	Pins 2-3	RS-485 Multi-Drop Operation	

J35 J36 J39	COMM A, (UART 0)		J35 Installed Pins 1-2 J36 Installed Pins 1-2 J39 Installed Pins 1-2
	Jumper Setting	Description	
	Pins 1-2	RS-232 Mode	
	Pins 2-3	RS-485 Mode	
	Not Installed	RS-232 Mode	
J38	COMM A, (UART 0)		J38 Installed 1-2
	Jumper Setting	Description	
	Pins 1-2	RS-485 Receive → U0RXD	
	Pins 2-3	RS-485 Receive → U0CTS	
J40	COMM A Termination, (UART 0)		J40 Installed 3-4
	Jumper Setting	Description	
	Pins 1-2	Enable RS-485 Termination	
	Pins 3-4	Disable RS-485 Termination	
	Not Installed	Disable RS-485 Termination	
J41	COMM A Termination, (UART 0)		J41 Installed
	Jumper Setting	Description	
	Pins1-2	Enable RS-485 Termination	
J42 J43	COMM A Termination, (UART 0)		J42 Installed 1-2 J43 Installed 1-2
	Jumper Setting	Description	
	Pins1-2	1.2kΩ termination enable	
	Pins 2-3	600Ω Bias Enabled	
	Not Installed	No additional termination	

UART Configuration Jumpers (continued)

Jumper	Jumper Settings		Default
J46	COMM B Termination, (UART 2)		J46 Not Installed
	Jumper Setting	Description	
	Installed	120Ω termination	

A/D Jumpers— Load-Cell Sense

Load-cell sense is controlled by selectable jumpers (J14 and J15 for channel 1, and J19 and J20 for channel 2) located on the motherboard. The jumpers should be in position “1-2” local sense, if the distance is less than 200 feet between the load cell and the Micro-Tech. For distances greater than 200 feet and less than 3,000 feet, the jumper should be in position “2-3” and a special 6-wire cable is required. Refer to the field wiring diagram that is appended to this manual, for jumper requirement in the scale junction box.

Load-Cell Specifications

Table A–1. Load-Cell Technical Specifications

Load Cell Excitation Power Supply	5 VDC \pm 10%, 90 mA, minimum load impedance (58 ohms). Output short circuit, 0.5 A maximum.
Load Cell	Number: Up to six (6) 350-ohm load cells in parallel. Cable distance: 200ft [61m] or less without sense, or 3000ft [914m] with sense.
Load cell input circuits (2 each)	Sensitivity: 0.5mV/V to 3.5 mV/V (keypad selectable). Input Impedance: 1M-ohm minimum. Maximum Usable Signal: 114% of 3mV/V. Internal A/D counts: (3mV/V): 6,440,000. Isolation: Non-isolated. Max non-destructive input voltage: \pm 6 V relative to ground. Load Cell Cable Shield: Connected to earth ground.
Load Cell	4 wire system: cable distance not exceed 200ft [61m]. 6 wire system: cable distance not to exceed 3000ft [914m].
Excitation-Sense Circuitry (2 each)	Nominal input voltage: 5 VDC. Input impedance: 100 k-ohm minimum. Jumper selectable: Local or remote sense.

Programmable Digital Inputs/Outputs

The Micro-Tech has provision for up to 21 programmable digital inputs and 21 programmable digital outputs. Motherboard I/O includes two digital inputs and one digital pulse output. Optional I/O includes three programmable inputs and four programmable outputs. Optional DIO boards can be added, if additional I/O is required.

┆ Digital Inputs

- ┆ Two (2) (DC) inputs on the motherboard. (See the Specifications in chapter 1.)
- ┆ Three (3) programmable dry-contact inputs on the optional DC Input Board, or three (3) programmable opto-22 inputs modules on the optional Opto22 Input Board.
- ┆ Eight (8) programmable inputs on the optional Digital I/O 8in/8out Board. Two of these boards may be installed for a total of sixteen (16) inputs.

┆ Digital Outputs

- ┆ One (1) Digital Pulse Output on the motherboard. (See the Specifications in chapter 1.)
- ┆ Four (4) programmable relay outputs on the optional Relay Output Board, or four (4) programmable opto-22 output modules on the optional Opto22 Output Board.
- ┆ Eight (8) programmable outputs on the optional Digital I/O 8in/8out Board. Two of these boards may be installed for a total of sixteen (16) outputs.

Digital Input Expansion Boards

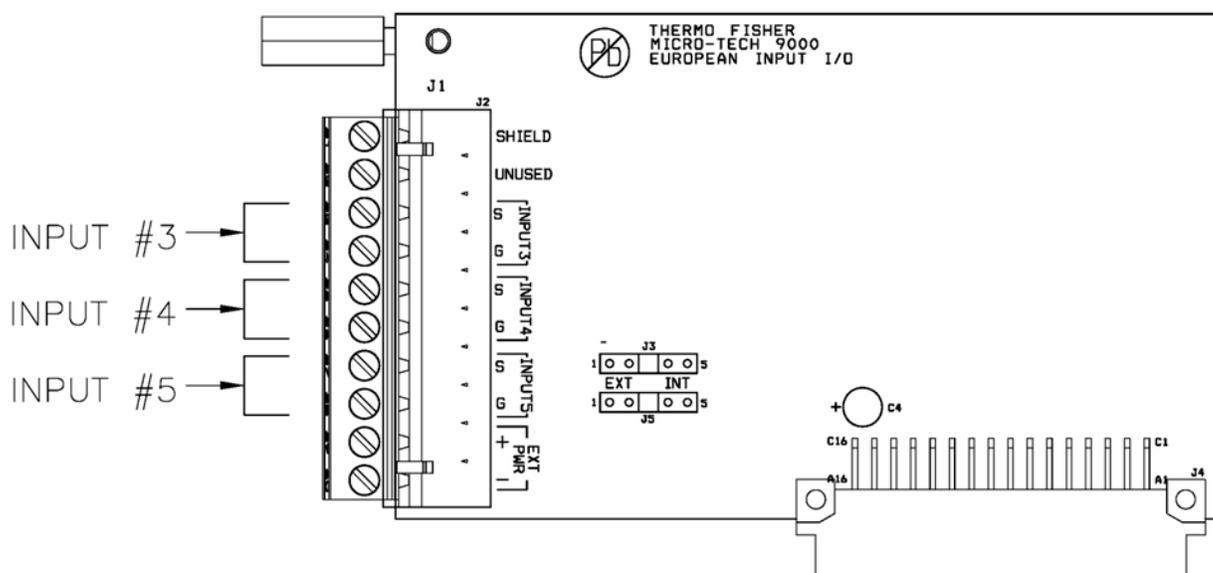
The board options are as follows.

- ┆ DC Input Board
- or*
- ┆ Opto-22 Input Board

Install in expansion slot J6 on the motherboard. Use UL 1015 wire, 16AWG / 1 sq.mm or smaller.

DC Input Board

This is an optional board with three inputs (inputs #3–5).
Type: Current sourcing to common ground. Designed for dry-contact input. Rated: 24VDC, 5mA typical. Input function is assigned by user.



Part number = 100785

Opto22 Input Board

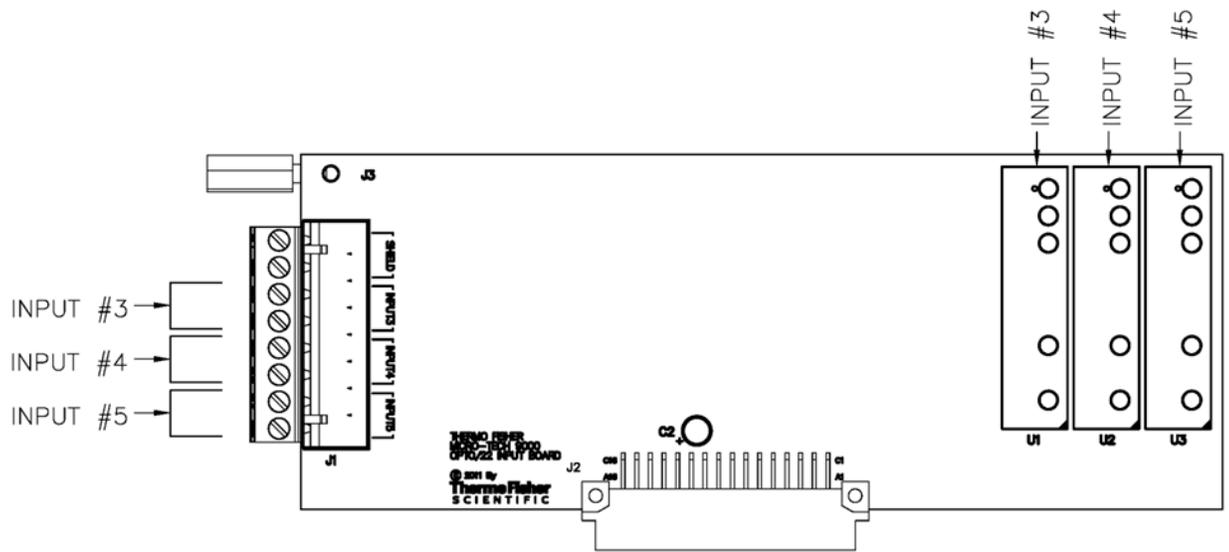
This is an optional board with three inputs (inputs #3–5). The module options are as follows.

- | 240VAC In Module (G4IAC5A)
 - | Input voltage range: 180-280 VAC or VDC.
 - | Input current at maximum line: 5mA.

- | 120VAC In Module (G4IAC5)
 - | Input voltage range: 90-140 VAC or VDC.
 - | Input current at maximum line: 5mA.

- | 32VDC In Module (G4IDC5)
 - | Input voltage range: 10-32VDC; 12-32VAC.
 - | Input current at maximum line: 25mA.

Install in slots U1–U3 on the input board.



Part number = 102999

Digital Output Expansion Boards

The board options are as follows.

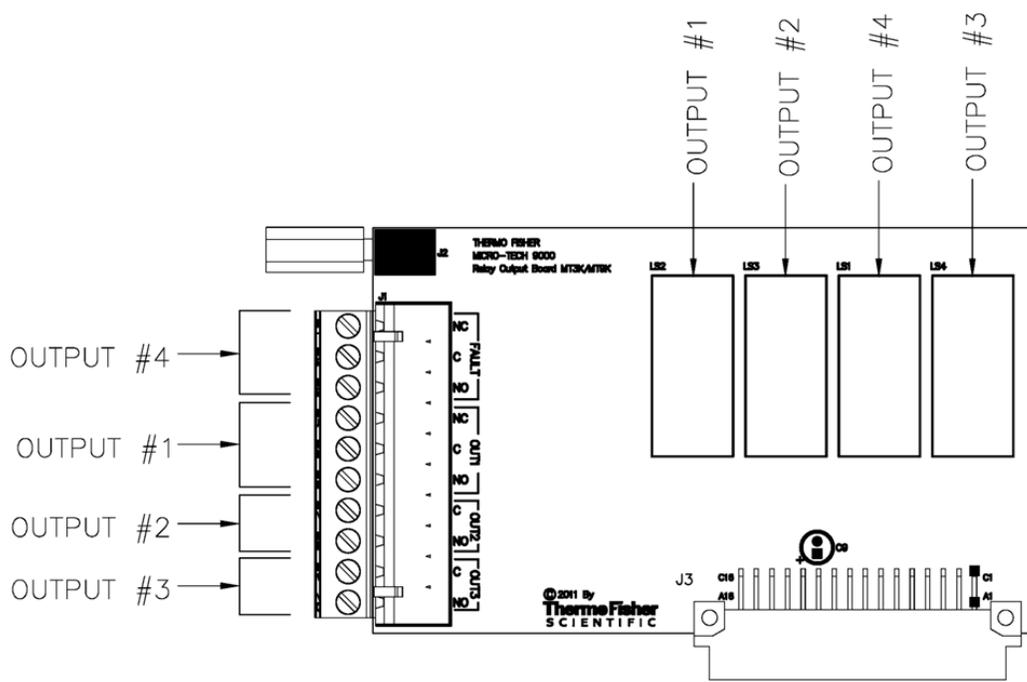
- | Relay Output Board
- or*
- | Opto-22 Output Board

Install in expansion slot J7 on the motherboard. Use UL 1015 wire, 16AWG / 1 sq.mm or smaller.

Relay Output Board

This is an optional board.

- | Four (4) outputs (outputs #1–4)
- | Panel version
 - | Rated: 33 VAC at 2A. Fusing requirement: 3A.
 - | Rated: 70 VDC at 0.5A. Fusing requirement: 1A.
- | Field version
 - | Rated: 240 VAC at 3A. Fusing requirement: 5A.
 - | Rated: 70 VDC at 0.5A. Fusing requirement 1A.

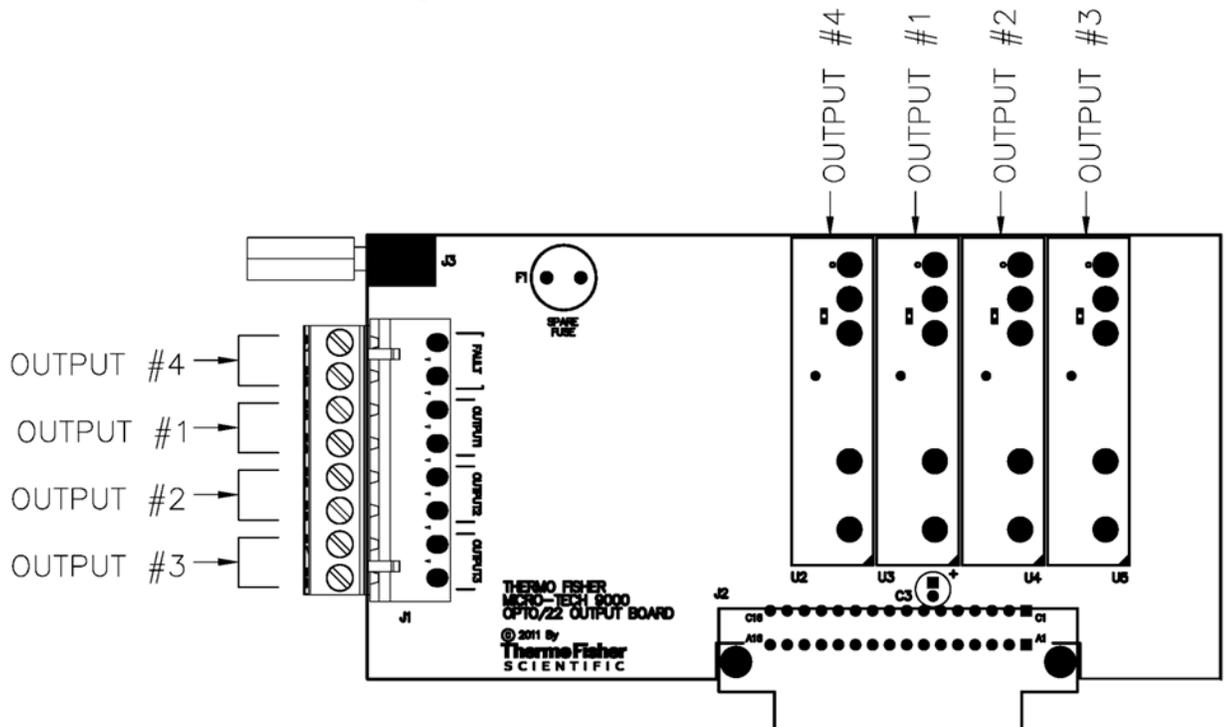


Part number = 102479

Opto22 Output Board

This is an optional board. There are four (4) outputs (outputs #1–4). Modules are installed in slots U2–U5 on the output board. One spare fuse is located on the output board. The module options are as follows.

- | 240VAC Out Module, G4OAC5A.
 - | Output voltage range: 24-280 VAC.
 - | 2A at 50°C ambient.
 - | Replaceable 250V 4A fuse.
- | 60VDC Out Module, G4ODC5.
 - | Output voltage range: 5-60 VDC.
 - | 2A at 50°C ambient.
 - | Replaceable 250V 4A fuse.
- | Dry (Reed) Out Module, G4ODC5R.
 - | Contact rating: 10 VA.
 - | Maximum switching voltage: 100VDC, 130VAC.
 - | Maximum switching current: 0.5A.
 - | Replaceable 250V 1A fuse.



Part number = 103003

DIO 8in/8out Board

This is an optional board with eight (8) inputs (inputs #6–13) and eight (8) outputs (outputs #6–13). Install in one of the motherboard expansion slots J10–J13. Up to two boards may be installed for a total of 16 inputs/16 outputs.

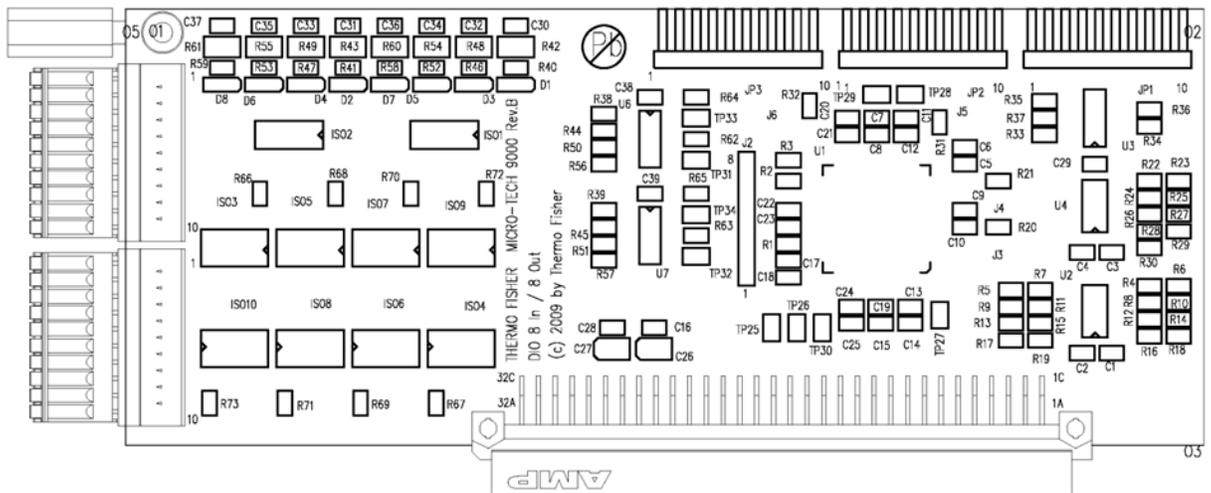
The DIO board provides isolated contact closure inputs and 24-volt current sinking or current sourcing isolated outputs. Output current must be limited to 80 mA maximum, continuous.

The inputs and outputs are powered by an external 24 VDC power source.

The isolated contact closure inputs are activated by completing the circuit from the input to the negative side of the 24 VDC supply. Approximately 12 mA of current flows out of each input during contact closure.

Output current sinking or sourcing is selectable thru a menu screen. Inputs are always current sourcing.

Board Diagram



Part number = 103017

Analog I/O Boards

The analog I/O board is available in two configurations described below. Type A has one current output only, whereas, Type B has two voltage inputs and two current outputs. The Micro-Tech can support up to four analog inputs and four analog outputs.

Type A: 4–20mA Output Board

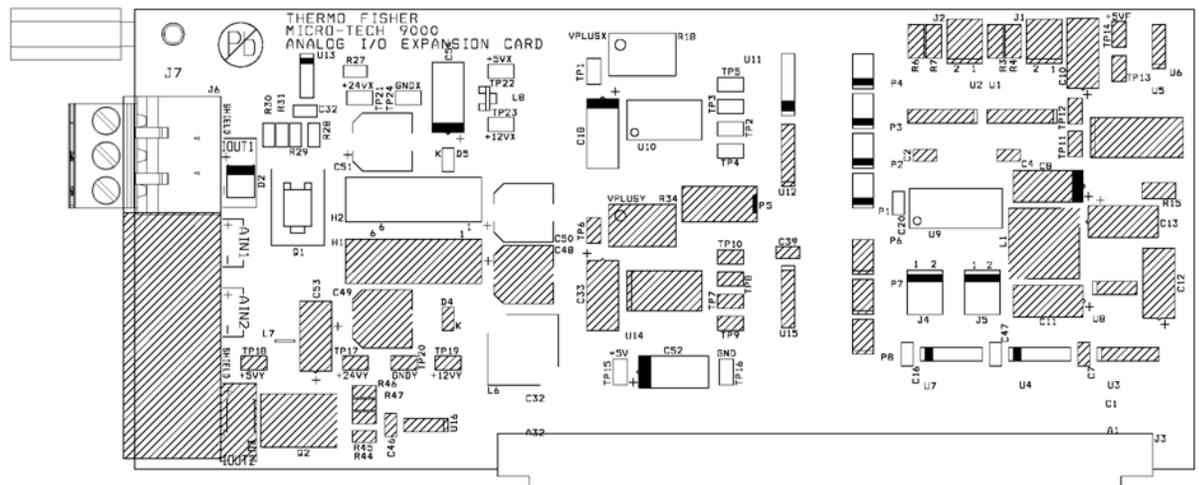
This is an optional board. Install in one of the motherboard expansion slots J10–J13. Single channel high-level current output.

- | Outputs
 - | Rate
 - | Load
- | Optically isolated
- | Isolated power source
- | Voltage output by adding an internal dropping resistor

- | Output range (mA)
 - | 0 to 20 mA
 - | +4 to 20 mA
 - | +20 to 4 mA
 - | +20 to 0 mA

- | Resistive load: 800 ohms max.
- | Capacitive load: No limit
- | Field wiring: Connections are made to the terminal strip on end of the 4-20mA Output Board. Note that connector is removable for ease of termination.

Board Diagram



Part number = 100744

Type B: Analog I/O Board

This is an optional board. Install in one of the motherboard expansion slots J10–J13.

- | Inputs
 - | Incline compensation
 - | Moisture compensation
- | Outputs
 - | Rate
 - | Load

High-Level Inputs (Two Channels)

Differential voltage.

- | Input Range (Volts)
 - | 0 to +5 V
 - | +1 to +5 V
 - | -5 to +5 V

Current (Requires Jumper Selection)

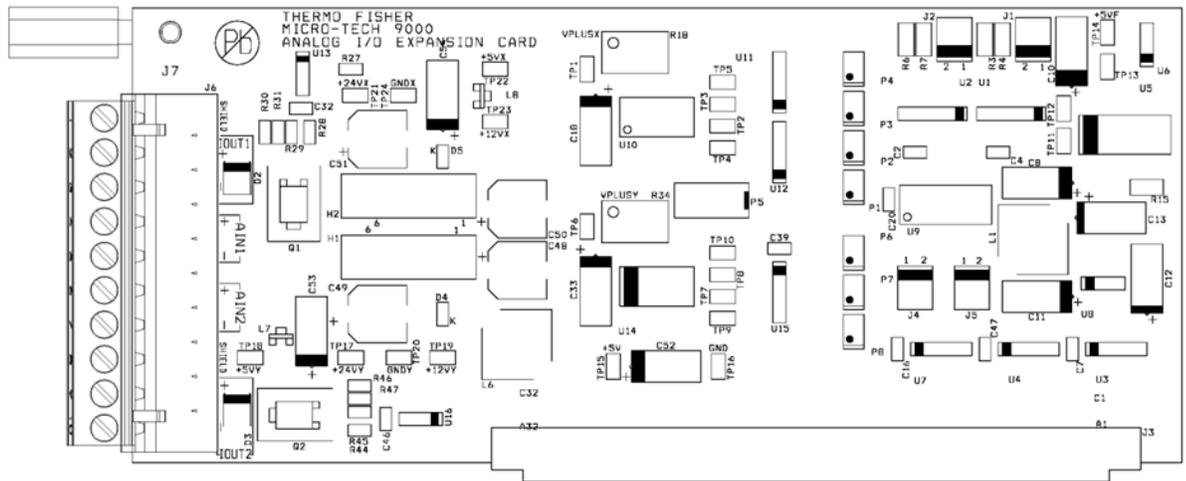
- | Input Range (mA)
 - | 0 to +20 mA
 - | +4 to 20 mA
- | Converted Display (Volts)
 - | 0 to +5 V
 - | +1 to +5 V
- | Jumpers J1 and/or J2 are used to select 250 ohm resistance for the Current inputs.
- | Input impedance: 100 k nominal (differential)
- | Maximum usable input voltage: 106% of full scale
- | Non-isolated voltage
- | Max. non-destructive input voltage: 12V peak

Current Outputs (Two Channels)

Here are the specifications.

- | Optically isolated
- | Isolated power source
- | Output Range (mA)
 - | 0 to 20 mA
 - | +4 to 20 mA
- | Voltage output by adding an internal dropping resistor.
- | Resistive load: 800 ohms max.
- | Capacitive load: No limit
- | Field wiring: Connections are made to the terminal strip on end of the Analog I/O Board. Note that connector is removable for ease of termination.

Board Diagram



Part number = 102949

Dual-Plant Load-Cell A/D Board

This is an optional board. Install in one of the motherboard expansion slots J10–J13.

Each load-cell channel provides its own buffer amplifiers for driving the A/D converter IC's differential reference voltage from the excitation sense voltage resistive divider. The load-cell signals are individually filtered then connected directly to the differential signal input of the A/D converter. Each load-cell also has an individual R-Cal relay and individual R-Cal resistor.

“Channel 1,” top connector has jumpers J14 and J15 that allow selection of either external excitation sense (6-wire LC hook-up) or internal excitation sense (4-wire LC hook-up).

“Channel 2,” bottom connector has jumpers J19 and J20 that allow selection of either external excitation sense (6-wire LC hook-up) or internal excitation sense (4-wire LC hook-up).

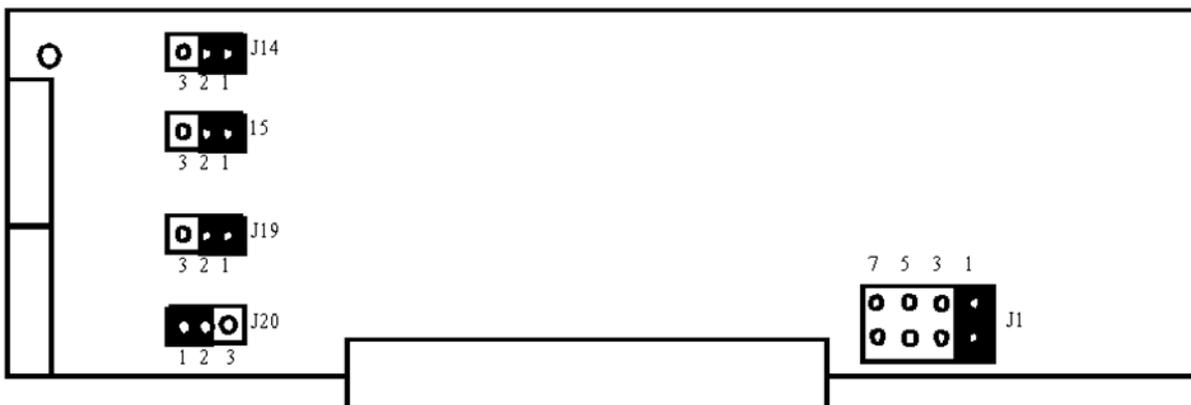
One of four different interrupt channels can be selected from J1 jumper. J1 is board interrupt 1-2 this is a factory installed jumper, do not move.

Load-Cell Sense Jumper Defaults

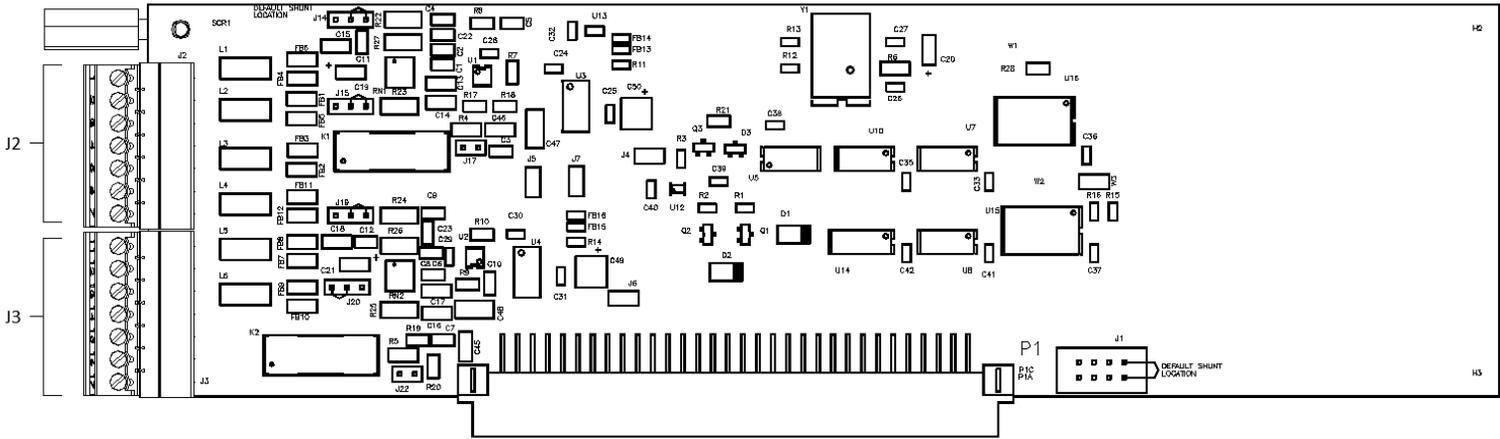
Jumper	Four-Wire Load-Cell (internal sense)	Six-Wire Load-Cell (external sense)
J14	1-2	2-3
J15	1-2	2-3
J19	1-2	2-3
J20	1-2	2-3

Factory option jumpers W2 and W3 allow the A/D converters to operate at either 10 conversions per second or at 80 conversions per second, which may be useful for “loss-in-weight” applications. The standard board is hard-wired for 10 conversions per second. Altering the W2/W3 option jumpers allows software selection of the desired conversion rate, so do *not* change.

Jumper Locations



Board Diagram



Part number = 102450

Communication Board

This is an optional board. Installed in one of the motherboard expansion slots J10–J13.

Serial Interface

- | Type: Conforms to RS-232C, RS-485/422, and 20 mA standards; supports 2 and 4 wire multi-drop in RS-485. 20 mA loop is passive ONLY.
- | Interfacing: RS-485 supports 2-wire or 4-wire multi-drop networking; RS-232C provides support for modem.
- | Data rate: 300 to 19200, operator selectable from the keypad.
- | Data format: Asynchronous, bit-serial, selectable parity, data length, and stop bits.
- | Optical isolation, 250 Vrms max.
- | Input voltage: ±30 Vdc max. (RS-232C)
- | +15/-10 Vdc max. (RS-485)
- | Cable length: 50 feet maximum (RS-232C)
- | 4000 feet maximum (RS-485 and 20 mA)

For more information, see “Model 9104 Reference Manual”

Installation

To install the COMM board(s), do the following.

1. Select the jumper positions on the COMM board for the desired communication standard. Below is a table which summarizes the jumper positions for selection of the electrical interface. The jumper locations are shown below.

Jumpers						
Mode	OP1	OP2	OP3	OP4	OP5	OP6
RS-232	“A”	“A”	“A”	“A”	“A”	“B”
RS-485*	“B”	“A”	“B”	“B”	“MDP”	“TRM”
20 mA	“B”	“B”	“A”	“A”	“A”	“C”

* Default

“MDP”

For RS-485 *only*

OP5

“A” Normal

“B” Multi-drop

“TRM”

For RS-485 *only*

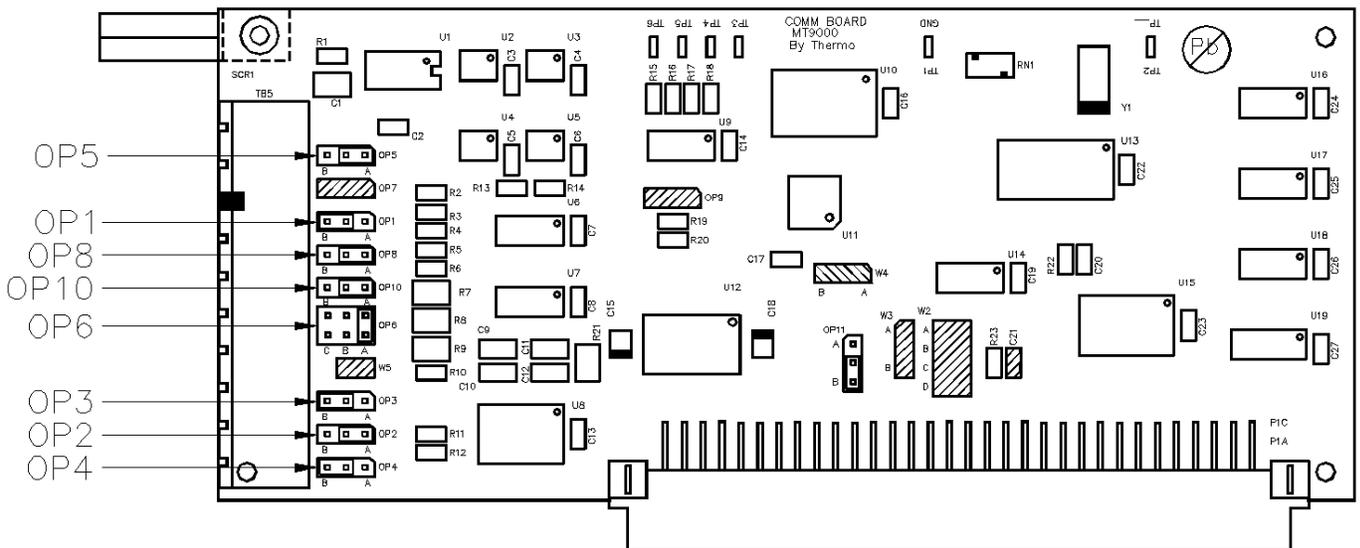
OP6

“A” Terminated

“B” Not terminated

2. Open the Micro-Tech wall mount enclosure and turn power off at the mains, or remove panel mount enclosure from the panel and remove top cover allowing access to the motherboard.
3. Remove the field mating connector. Wire the connector per the supplied field-wiring diagram at the end of the manual.
4. Remove the hex head mounting screw from the connector end of the COMM board.
5. Insert the COMM board in any available expansion slot on the motherboard.

Board Diagram



Part number = 102942

Profibus-DP Board

This is an optional board. Install in one of the motherboard expansion slots J10–J13. No hardware configuration jumpers or switches are present on the Profibus-DP board.

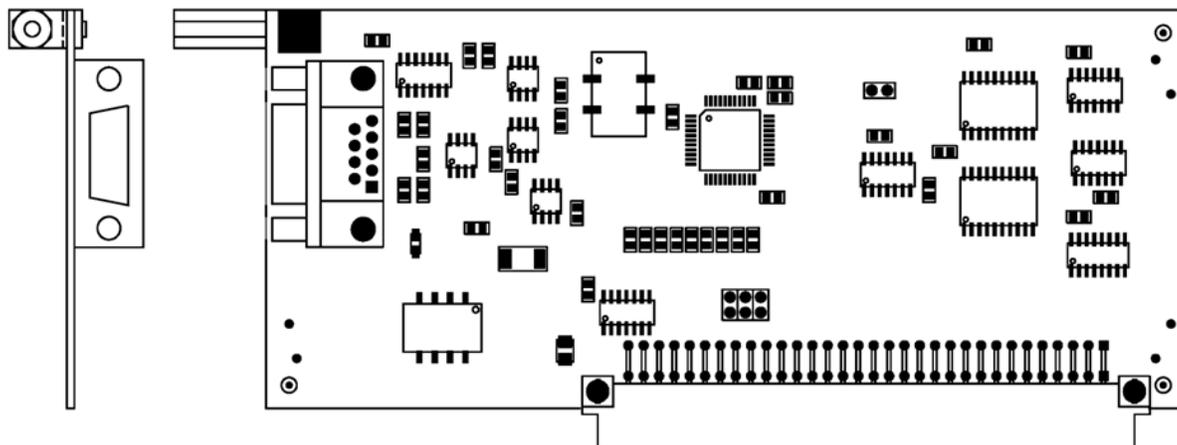
Profibus is a typical master/slave communication where the main PLC is the master or scanner, and the Micro-Tech device is a slave. The connection is EIA RS 485 through a 2-wire twinax Siemens cable.

Profibus-DP is the performance-optimized version specifically dedicated to time-critical communication between automation systems and distributed peripherals. It is typically used to transfer I/O images between a main PLC and remote devices (sensors, actuators, transmitters, etc.). In this case, it will be used to transfer (read and write) blocks of data.

The Profibus-DP interface board contains the Siemens SPC3 Profibus-DP controller ASIC. The SPC3 controller is an integrated circuit provided by Siemens that handles the interface between the Micro-Tech slave and the master.

See REC 4372 for details about the Profibus-DP option card.

Board Diagram



Part number = 102936

Glossary

A/D channel Analog/Digital channel. An electronic sub-unit on the Micro-Tech motherboard that handles the load-cell(s) input. Your Micro-Tech motherboard is equipped with two A/D channels, but the dual A/D printed-circuit-board assembly can be ordered as an option.

Console The main operating panel of the Micro-Tech including the display, keypad, arrow buttons, and soft keys.

DIO A digital-input/output board.

display In the console, the small square screen that displays Micro-Tech results, menus, and so forth.

kg Kilogram.

kg/h Kilograms per hour.

kg/min Kilograms per minute.

Lb/hr Pounds per hour.

Lb/mn Pounds per minute.

Lt/min Long tons per minute.

LTons The “long ton,” equivalent to 2,240 lbs.

LTph Long tons per hour.

Mixed units A menu choice that allows the Micro-Tech to display a mixture of English and metric units.

mV/V Millivolts per volt. A measure of the sensitivity of a load cell.

pcba Printed-circuit board assembly.

PEIC Periodic-error-integrating control.

PID Proportional, integral, derivative control.

Scroll When used as a noun (for example, when the word appears in the Micro-Tech display), it means “menu.” When used as a verb (for example, “Scroll down to...”), it means press the up- or down-arrow button to move to one of the Micro-Tech menus.

Soft key One of the four buttons at the bottom of the Micro-Tech display that allows you to access various context-sensitive Micro-Tech commands—such as Edit, Enter, Continue, and so forth.

Standard (US) ton Equivalent to 2,000 lbs.

t/hr Metric tons per hour.

t/min Metric tons per minute.

T/mn Standard US tons/minute.

Ton Standard (2,000# or 2,000 lb.) tons per hour.

tonne The “metric tonne” equivalent to 1,000 kg.

Tph Tons per hour.

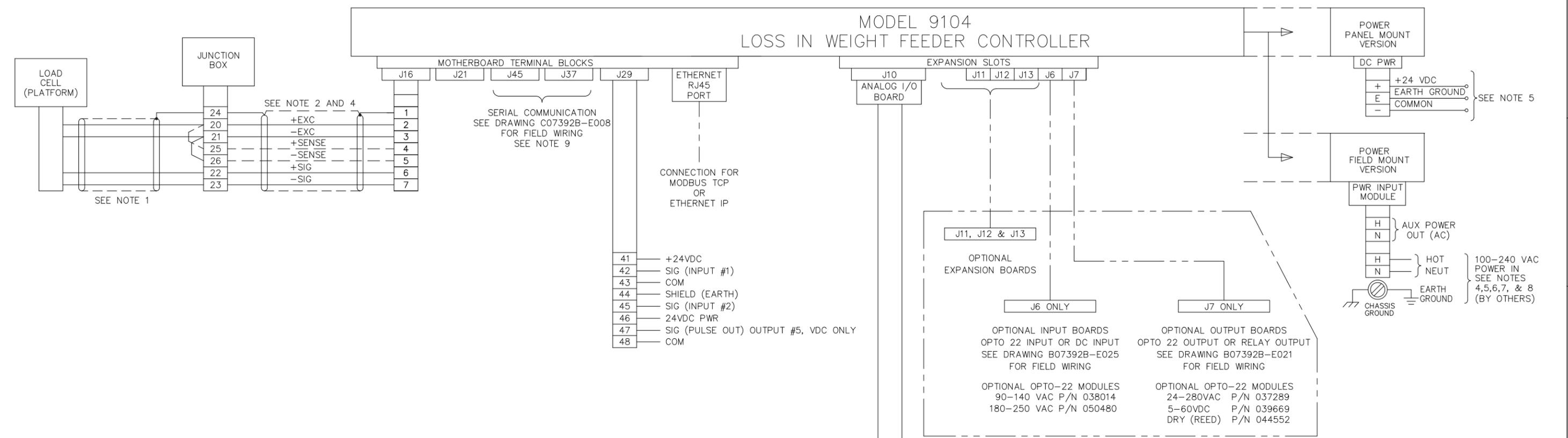
Totalizer The Totalizer shows the total tons accumulated by the Micro-Tech.

Attached Drawings

The following information is appended to the manual to help you install and maintain your Micro-Tech.

Description	Document
Field-Wiring Diagrams	
Micro-Tech 9104	D07392B-E030
Analog I/O Board	B07392B-E003
8-In/8-Out Digital Board	B07392B-E005
Serial Communication	C07392B-E008
Siemens Profibus Board	C07392B-E011
Communication Board	C07392B-E017
Notes—Micro-Tech 9000	C07392B-E018
Digital Output Boards	C07392B-E021
Anybus Comm for Device Net	B07392B-E022
Digital Input Boards	B07392B-E025
4–20mA Out Board	B07392B-E026
Dual Plant LC A/D Board	B07392B-E027

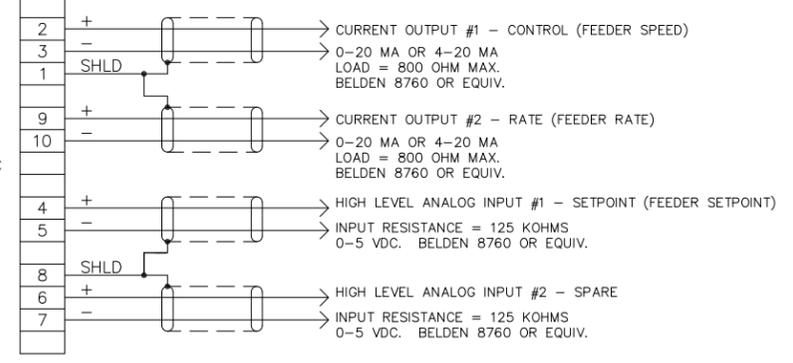
MODEL 9104 LOSS IN WEIGHT FEEDER CONTROLLER



NOTES: READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM

- DO NOT ALTER LENGTH OF CABLE SUPPLIED WITH LOADCELL.
- IF TOTAL CABLE LENGTH IS LESS THAN 200 FT (61 M), USE BELDEN 8407 (P/N 003727) OR EQUIVALENT, 4 CONDUCTOR, 16 AWG SHIELDED.
IF TOTAL LENGTH IS 201-3,000 FT (61-915 M), USE BELDEN 9260 (P/N 011416) OR EQUIVALENT, 6 CONDUCTOR, 20 AWG SHIELDED. SET JUMPERS ON MOTHER BOARD FOR REMOTE SENSE - PIN 2-3. (J14 & J15 FOR A/D CHANNEL #1)
- SPEED SENSOR AND ANALOG OUTPUT (2 WIRE): USE BELDEN 8760 (P/N 003249) OR EQUIVALENT, 2 CONDUCTOR, 18 AWG, SHIELDED, IF TOTAL CABLE RUN IS LESS THAN 200 FT (61 M). USE BELDEN 8780 (P/N 003236) 2 CONDUCTOR, 16 AWG, SHIELDED, IF TOTAL CABLE RUN IS 201 TO 3,000 FT (61-915 M).
SPEED SENSOR (3 WIRE): USE BELDEN 8772 (P/N 002346) OR EQUIVALENT, 3 CONDUCTOR, 20 AWG, SHIELDED, MAXIMUM TOTAL CABLE RUN IS 200 FT (61 M).
- DO NOT RUN SIGNAL, LOADCELL, OR SPEED SENSOR CABLES IN SAME CONDUIT AS POWER WIRING. CONNECT SHIELDS ONLY WHERE SHOWN.
- INPUT POWER REQUIREMENTS
FIELD MOUNT VERSION: 100-240 VAC, 1/2 AMP 50 VA, 50-60HZ
PANEL MOUNT VERSION: 24VDC, 2 AMP REQUIRED, FUSE AT 3A
- EARTH GROUND ALL ELECTRICAL ENCLOSURES.
- ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES. ALL WIRING EXCEPT AS NOTED IS BY OTHERS. FOR INPUT POWER USE 14 AWG STRANDED WIRE.
- A READILY ACCESSIBLE DISCONNECT DEVICE (MAXIMUM 20 AMP) SHALL BE INCORPORATED IN THE FIELD WIRING. THIS DISCONNECT DEVICE SHOULD BE IN EASY REACH OF THE OPERATOR AND IT MUST BE MARKED AS THE DISCONNECTING DEVICE FOR THE EQUIPMENT.
- SELECTION OF SERIAL COMMUNICATION (RS-232 OR RS-485) IS DETERMINED BY COMM JUMPER OPTIONS. REFER TO OPERATING & SERVICE MANUAL FOR CONFIGURATION INSTRUCTIONS.

SEE NOTES 3 & 4 FOR CABLE SPEC



**MODEL 9104 LOSS IN WEIGHT FEEDER CONTROLLER
DIGITAL INPUTS AND OUTPUTS**

REQUIRED DIGITAL INPUTS AND OUTPUTS
INPUT: RUNNING (FEEDER RUNNING)
INPUT: REFILL (REFILLING)
OUTPUT: REFILL (COMMAND)

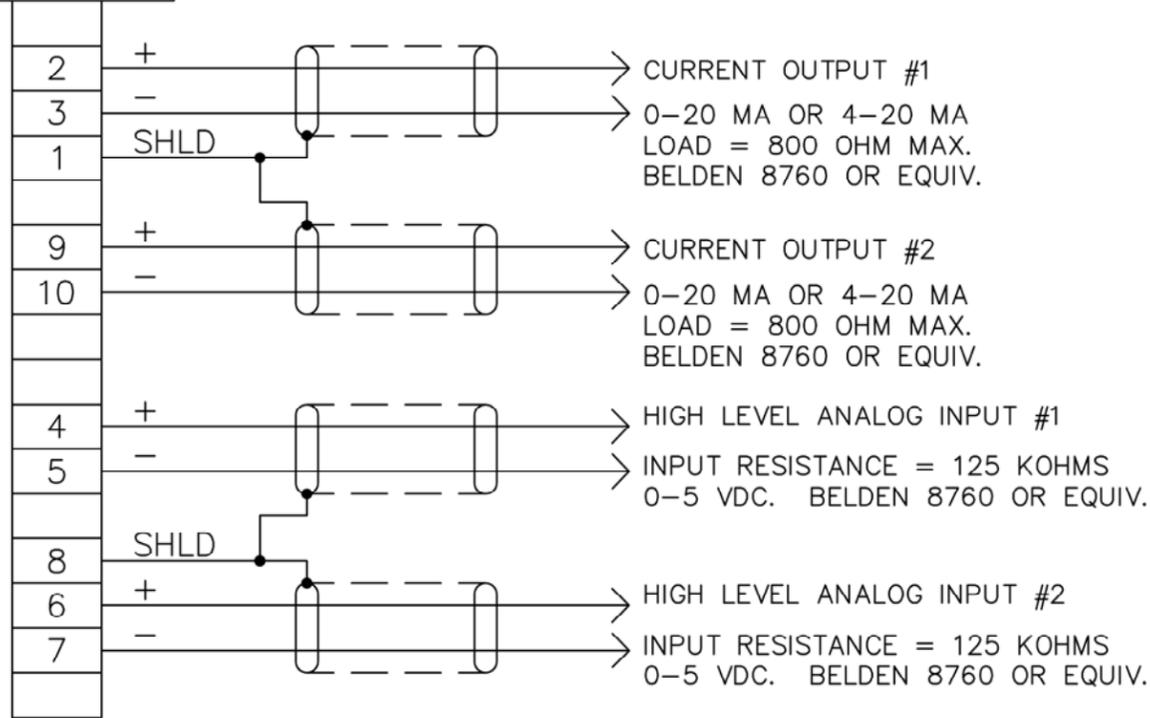
AVAILABLE DIGITAL INPUT AND OUTPUT ASSIGNMENT CHOICES
MOTHERBOARD TERMINAL BLOCK J29 - (INPUTS #1, #2 AND OUTPUT #5)
EXPANSION SLOT J6 - OPTIONAL INPUT BOARD (INPUTS #3, #4, #5)
EXPANSION SLOT J7 - OPTIONAL OUTPUT BOARD (OUTPUTS #1, #2, #3, #4)

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES	SCALE JOB NO	<small>This document is confidential and is the property of Thermo Fisher Scientific. It may not be copied or reproduced in any way without the expressed written consent of Thermo Fisher Scientific. This document also is an unpublished work of Thermo Fisher Scientific. Thermo Fisher Scientific intends to and is maintaining the work as confidential information. Thermo Fisher Scientific also may seek to protect this work as an unpublished copyright. In the event of either independent or separate publication, Thermo Fisher Scientific intends to enforce its right to this work under the copyright law as a published work. Those having access to this work may not copy, use or disclose the information in this work unless expressly authorized by Thermo Fisher Scientific.</small>																	
UNLESS SPECIFIED OTHERWISE	<table border="1"> <tr><td>ENG</td><td>PEP</td><td>DATE</td></tr> <tr><td>11/7/12</td><td></td><td></td></tr> <tr><td>DWN</td><td>PEP</td><td>DATE</td></tr> <tr><td>11/7/12</td><td></td><td></td></tr> <tr><td>CHK</td><td>MFM</td><td>DATE</td></tr> <tr><td>11/7/12</td><td></td><td></td></tr> </table>		ENG	PEP	DATE	11/7/12			DWN	PEP	DATE	11/7/12			CHK	MFM	DATE	11/7/12	
ENG	PEP	DATE																	
11/7/12																			
DWN	PEP	DATE																	
11/7/12																			
CHK	MFM	DATE																	
11/7/12																			
NEXT ASS'Y		<p>FIELD WIRING DIAGRAM MICRO-TECH 9104</p>																	
CUST ORDER NO																			
CUSTOMER LOCATION																			
REV	ECO NO	DESCRIPTION	DATE	BY	APPD	USER LOCATION	PART NO	DRAWING NUMBER	REV										
B	3044	ADD "VDC ONLY" TO MOTHERBOARD PULSE OUTPUT	2/28/13	PEP	TMN														
A	3027	RELEASED	11/7/12	PEP	MFM														
							D	07392B-E030	B										

INTEGRATOR
MICRO-TECH 9000

ANALOG I/O
BOARD



ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
------	---------	-----	-------------	-------------

NOTES: READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM

- DO NOT RUN ANALOG SIGNAL CABLES IN SAME CONDUIT AS POWER WIRING. CONNECT SHIELDS ONLY WHERE SHOWN.
- ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES. ALL WIRING, EXCEPT AS NOTED, IS THE RESPONSIBILITY OF THE CUSTOMER.
- INSTALL IN ONE OF THE EXPANSION SLOTS J10 TO J13.
- CONNECT SHIELDS ONLY AS SHOWN.
CABLE TYPE: BELDEN 8760 OR EQUIVALENT.

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES	SCALE N/A	This document is confidential and is the property of Thermo Fisher Scientific. It may not be copied or reproduced in any way without the expressed written consent of Thermo Fisher Scientific. This document also is an unpublished work of Thermo Fisher Scientific. Thermo Fisher Scientific intends to and is maintaining the work as confidential information. Thermo Fisher Scientific also may seek to protect this work as an unpublished copyright. In the event of either inadvertent or deliberate publication, Thermo Fisher Scientific intends to enforce its right to this work under the copyright laws as a published work. Those having access to this work may not copy, use or disclose the information in this work unless expressly authorized by Thermo Fisher Scientific.
JOB NO		
TOLERANCE		

UNLESS SPECIFIED OTHERWISE	ENG	DATE
X ± .1 ± 3 mm	MFM	8/26/11
.X ± .06 ± 1.5 mm	DWN	DATE
.XX ± .03 ± .76 mm	MFM	8/28/11
.XXX ± .010 ± .254 mm	CHK	DATE
FRACT. ± 1/16 ± N/A	MFM	8/26/22
ANGLES ± 1/2° ± 1/2°		

Thermo Fisher
SCIENTIFIC

FIELD WIRING DIAGRAM
ANALOG INPUT/OUTPUT BOARD
MICRO-TECH 9000

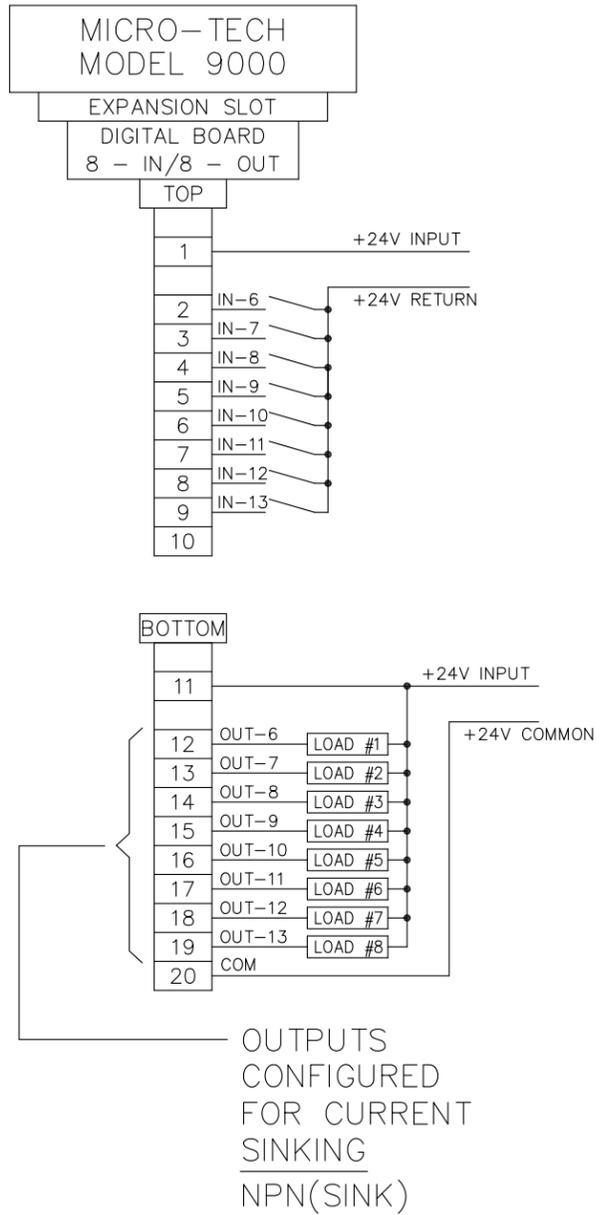
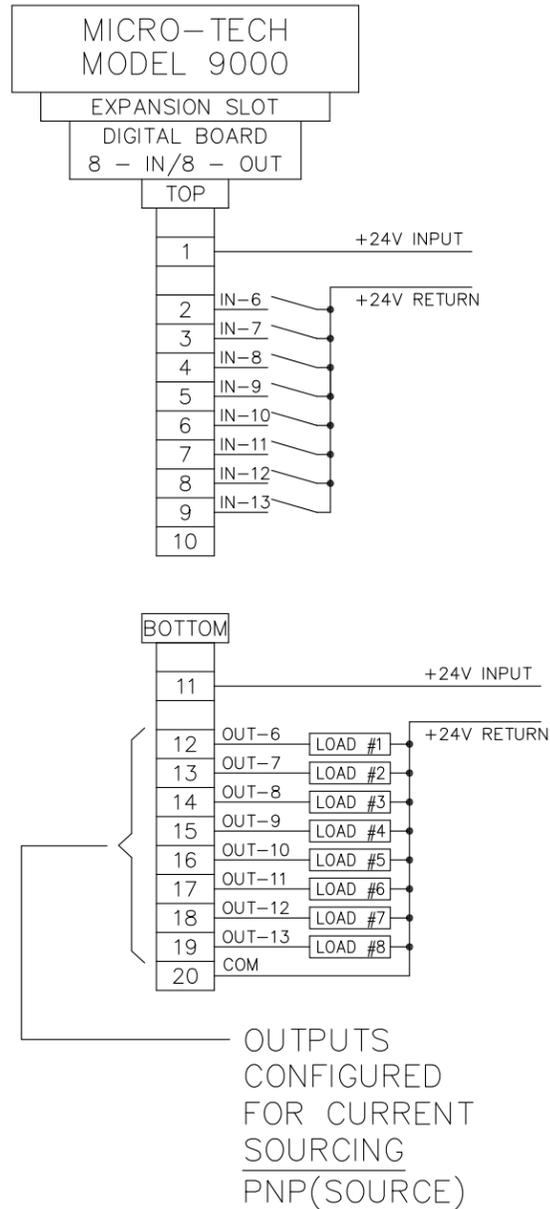
NEXT ASS'Y	
CUST ORDER NO	
CUSTOMER LOCATION	
USER LOCATION	

PART NO	DRAWING NUMBER	REV
	B07392B-E003	A

A	2959	RELEASED	6/6/12	PEP	MFM
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY APPD

Derived From C07361B-E003

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ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
------	---------	-----	-------------	-------------

NOTES: READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM

- ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES. ALL WIRING, EXCEPT AS NOTED, IS THE RESPONSIBILITY OF THE CUSTOMER.
- INSTALL IN ONE OF THE MOTHERBOARD EXPANSION SLOTS, J10 TO J13.

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG
REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES

SCALE N/A
JOB NO

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TOLERANCE	SPECIFIED	OTHERWISE	ENG	DATE
UNLESS	.1	±.3 mm	MFM	8/26/11
X	.06	±.5 mm	DWN	8/26/11
.XX	.03	±.76 mm	CHK	8/26/11
.XXX	.010	±.254 mm		
FRACT.	± 1/16	± N/A		
ANGLES	± 1/2°	± 1/2°		

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NEXT ASS'Y
CUST ORDER NO

FIELD WIRING DIAGRAM
8-IN/8-OUT DIGITAL BOARD
MICRO-TECH 9000

CUSTOMER LOCATION
USER LOCATION

PART NO	DRAWING NUMBER	REV
	C07392B-E005	B

REV	ECO NO	MICRO	DESCRIPTION	DATE	BY	APPD
B	3322		ADDED PNP(SOURCE) & NPN(SINK)	4/22/13	PEP	DCS
A	2959		RELEASED	6/6/12	RAE	DCS

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
------	---------	-----	-------------	-------------

INTEGRATOR
MODEL 9000

COMMUNICATION A

J37

38
36
37
33
32
31

CTS
COMMON
Rx D
Tx D
RTS

RS-232
STANDARD
9 PIN
CONNECTOR

7
5
3
2
8

CTS
COMMON
Rx D
Tx D
RTS

OR

RS-232
STANDARD
25 PIN
CONNECTOR

4
7
2
3
5

CTS
COMMON
Rx D
Tx D
RTS

RS-232 SERIAL OUTPUT

CABLE: 8 CONDUCTOR, SHIELDED,
(DEPENDING ON APPLICATION)
MAXIMUM LENGTH: 50 FT
BELDEN 9538 OR EQUIVALENT
(SEE INSTRUCTION MANUAL)

OR

485 B RX-
485 A RX+
COMMON
485 A TX+
485 B TX-

38
35
34
37
32
31

TR-
TR+
RX+
RX-

RS-485
REMOTE
DEVICE
(OPTIONAL)

TR-
TR+
RX+
RX-

RS-485 SERIAL OUTPUT

MAXIMUM LENGTH: 4000 FT
BELDEN 9830 OR EQUIVALENT
(SEE INSTRUCTION MANUAL)

COMMUNICATION B

J45

24
23
25
21
22
26

485 B RX-
485 A RX+
COMMON
485 B TX-
485 A TX+

RS-485
REMOTE
DIGITIZER
(ONLY)

55
54
56
52
53
51

RS-485 SERIAL OUTPUT

MAXIMUM LENGTH: 4000 FT
BELDEN 9830 OR EQUIVALENT
(SEE INSTRUCTION MANUAL)

NOTES: READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM

- DO NOT RUN COMMUNICATION WIRING IN SAME CONDUIT AS POWER WIRING. CONNECT SHIELDS ONLY WHERE SHOWN.
- ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES. ALL WIRING, EXCEPT AS NOTED, IS THE RESPONSIBILITY OF THE CUSTOMER.
- SELECTION OF SERIAL COMMUNICATION (20mA, RS-232, OR RS-485) IS DETERMINED BY COMM JUMPER OPTIONS. REFER TO OPERATING & SERVICE MANUAL FOR CONFIGURATION INSTRUCTIONS. FACTORY SET FOR 20mA/RS-485.

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG	SCALE	N/A
REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES	JOB NO	
UNLESS SPECIFIED OTHERWISE DIMENSIONS ARE IN INCHES AND [mm] X.X [X] ± .06 ± 1.5 mm X.XX [X.X] ± .03 ± .8 mm X.XXX [X.XX] ± .01 ± .3 mm FRACT. ± 1/16 ± N/A ANGLES ± 1/2° ± 1/2°	ENG	MFM
	DATE	8/26/11
	DWN	RAE
	DATE	8/26/11
	CHK	MFM
	DATE	8/26/11

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FIELD WIRING DIAGRAM
SERIAL COMMUNICATION
MICRO-TECH 9000

REV	ECO NO	MICRO	DESCRIPTION	DATE	BY	APPD
C	3459		CORRECTED DIGITIZER TERMINALS AND SHIELD	4/2/14	PEP	PEP
B	3403		CORRECTED POLARITIES ON TERMINAL DESCRIPTIONS.	11/18/13	PEP	MFM
A	2959		RELEASED	6/6/12	RAE	MFM

NEXT ASS'Y	
CUST ORDER NO	
CUSTOMER LOCATION	
USER LOCATION	

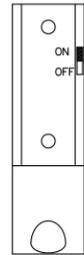
PART NO	DRAWING NUMBER	REV
	C07392B-E008	C

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
1	102936	1 EA	PCBA,PROFIBUS BD,MT2000/MT9000	D07392A-E010
2	057415	1 EA	CABLE,SHLD, STD,"PROFIBUS"	6XV1830-OAH10
3	057416	1 EA	CONN,HSG,"D","PROFIBUS",SWIVEL	
4	048501	1 EA	LABEL,PCBA,COMM BD,M-T 2000	B07257B-Y001-03

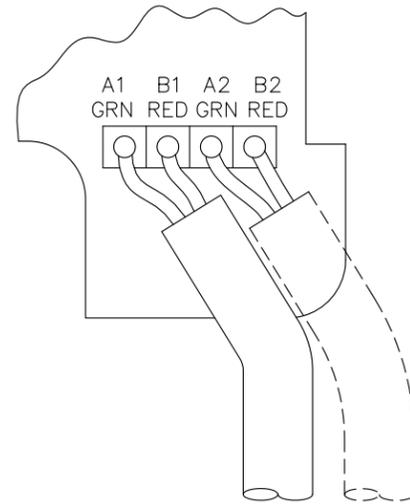
INTEGRATOR
MICRO-TECH
9000 SERIES

PROFIBUS

9 PIN "D" CONNECTOR, FEMALE



SWITCH, RESISTOR TERMINATION
"ON" IF WIRING ENDS HERE
"OFF" IF WIRING LOOPS IN, OUT



NOTES: READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM

- DO NOT RUN PROFIBUS CABLES IN SAME CONDUIT AS POWER WIRING. CONNECT SHIELDS ONLY WHERE SHOWN.
- ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES. ALL WIRING, EXCEPT AS NOTED, IS THE RESPONSIBILITY OF THE CUSTOMER.
- CONNECT SHIELDS ONLY AS SHOWN. CABLE TYPE: SIEMENS 6XV1830-OAH10
- INSTALL IN ONE OF THE EXPANSION SLOTS J10 TO J13.

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG		SCALE N/A	
REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES		JOB NO	
TOLERANCE UNLESS SPECIFIED OTHERWISE	ENG MFM	DATE	8/26/11
X ± .1 ± 3 mm	DWN MFM	DATE	8/26/11
.X ± .06 ± 1.5 mm	CHK MFM	DATE	8/26/11
.XX ± .03 ± 76 mm			
.XXX ± .010 ± 254 mm			
FRACT. ± 1/16 ± N/A			
ANGLES ± 1/2° ± 1/2°			

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FIELD WIRING DIAGRAM
SIEMENS PROFIBUS BOARD
MICRO-TECH 9000

A	2959	RELEASED	6/6/12	PEP	MFM
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY APPD

CUSTOMER LOCATION	
USER LOCATION	

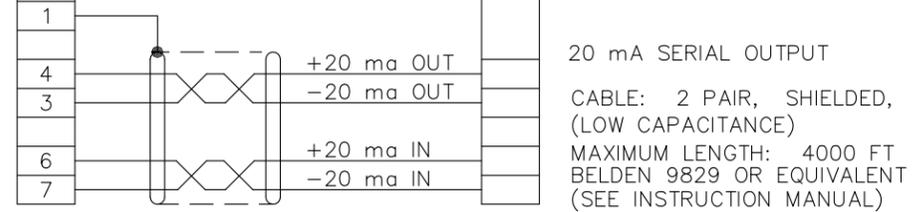
PART NO	DRAWING NUMBER	REV
	C07392B-E011	A

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
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INTEGRATOR
MICRO-TECH
9000 SERIES

COMM
BOARD
(OPTIONAL)

20 MA.
REMOTE
DEVICE
(OPTIONAL)

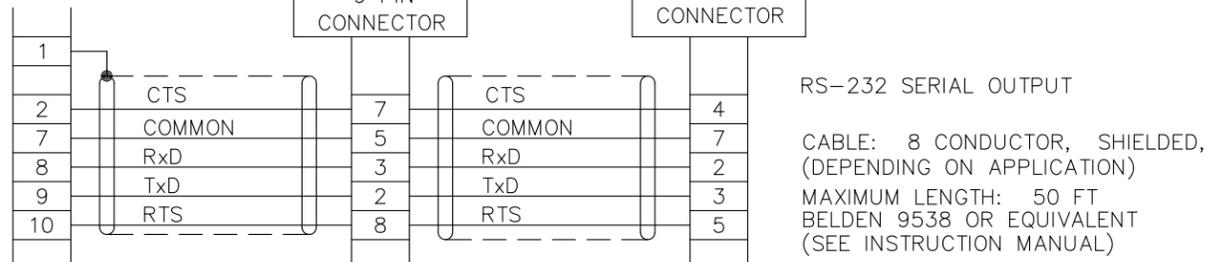


OR

RS-232
STANDARD
9 PIN
CONNECTOR

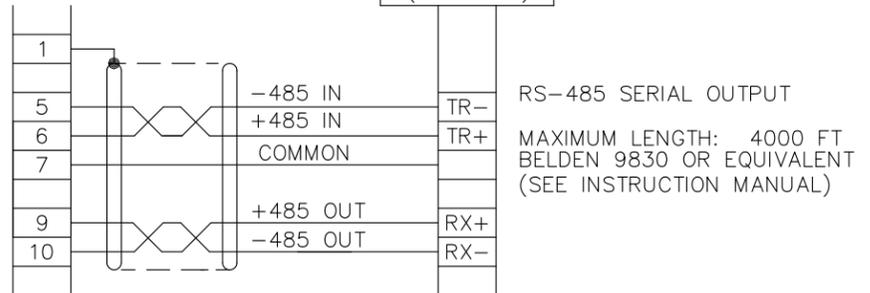
OR

RS-232
STANDARD
25 PIN
CONNECTOR



OR

RS-485
REMOTE
DEVICE
(OPTIONAL)



CADD DATABASE: AUTOCAD

DO NOT SCALE DWG REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES		SCALE N/A	JOB NO	
TOLERANCE	UNLESS SPECIFIED OTHERWISE	ENG MFM	DATE	8/26/11
X	± .1 ± 3 mm	DWN MFM	DATE	8/26/11
.XX	± .06 ± 1.5 mm	CHK MFM	DATE	8/26/11
.XXX	± .03 ± .76 mm			
FRACT.	± .010 ± .254 mm			
ANGLES	± 1/16 ± N/A			
	± 1/2 ± 1/2			
NEXT ASS'Y				
CUST ORDER NO				
CUSTOMER LOCATION				
USER LOCATION				

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FIELD WIRING DRAWING
COMMUNICATION BOARD
MICRO-TECH 9000

PART NO	DRAWING NUMBER	REV
	C07392B-E017	A

A	2959	RELEASED	6/6/12	PEP	MFM
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY APPD

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
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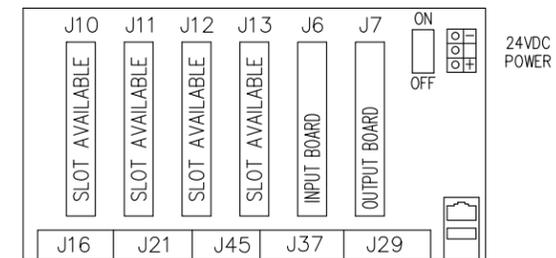
NOTES: READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM

- DO NOT ALTER LENGTH OF CABLE SUPPLIED WITH LOADCELL.
- USE BELDEN 8407 OR EQUIVALENT, 4 CONDUCTOR, 16 AWG, SHIELDED IF TOTAL LENGTH IS 200 FEET OR LESS.

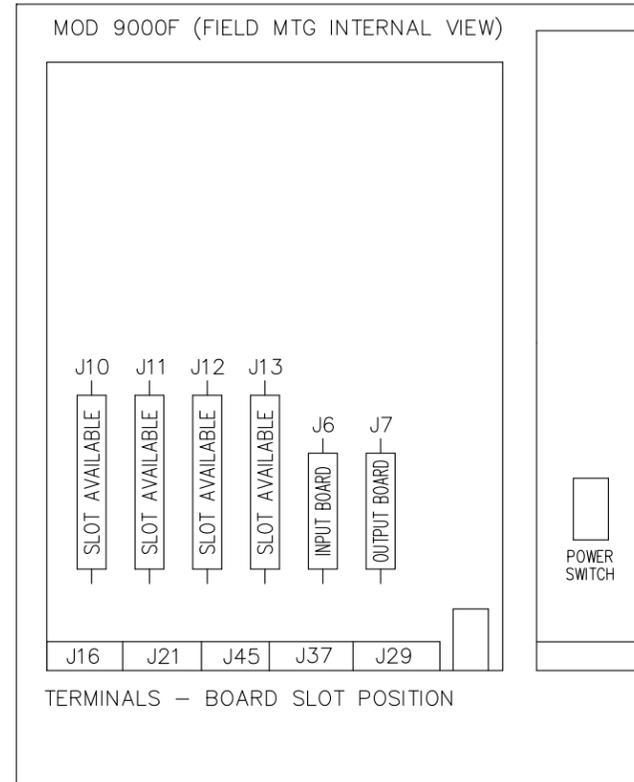
USE BELDEN 9260 OR EQUIVALENT, 6 CONDUCTOR, 20 AWG, SHIELDED IF TOTAL LENGTH IS 201 TO 3,000 FEET. SENSE CONNECTIONS ARE REQUIRED IF TOTAL LENGTH IS OVER 200 FEET.
- SPEED SENSOR CABLE 60-12C – THE 60-12C DOES NOT REQUIRE EXTERNAL POWER. USE BELDEN 8760 OR EQUIVALENT, 2 CONDUCTOR, 18 AWG, SHIELDED IF TOTAL IS 200 FEET OR LESS. USE BELDEN 8780, 2 CONDUCTOR, 16 AWG, SHIELDED IF TOTAL LENGTH IS 201 TO 3,000 FEET.

SPEED SENSOR 60-12F – USE BELDEN 8772 OR EQUIVALENT, 3 CONDUCTOR, 20 AWG, SHIELDED. MAXIMUM DISTANCE IS 200 FEET.
- DO NOT RUN SIGNAL, LOADCELL, OR SPEED SENSOR CABLES IN SAME CONDUIT AS POWER WIRING. CONNECT SHIELDS ONLY WHERE SHOWN.
- INPUT POWER REQUIREMENTS
FIELD MOUNT 100 TO 240 VAC, 50-60HZ, 1/2 AMP
PANEL MOUNT 24VDC, +10%, -15% (USER SUPPLIED), (50VA MAXIMUM LOAD)
- EARTH GROUND ALL ELECTRICAL ENCLOSURES.
- ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES. ALL WIRING, EXCEPT AS NOTED, IS THE RESPONSIBILITY OF THE CUSTOMER. FOR INPUT POWER USE 14 AWG STRANDED WIRE.
- CONNECT SHIELDS ONLY AS SHOWN.
CABLE TYPE: BELDEN 8760 OR EQUIVALENT.
- FOR FIELD MOUNT VERSION ONLY: AN EXTERNAL BIPOLAR LINK SWITCH (CSA-UL) MUST BE PROVIDED AT INSTALLATION TIME (115 VAC OR 230 VDC, 5A) WITH MAGNETHERMAL SWITCH NOMINAL CURRENT 16 AMP. MAX DISTANCE FORM INSTRUMENT 5 FT [1.5 M]. THIS DISCONNECT DEVICE SHOULD BE IN EASY REACH OF THE OPERATOR AND IT MUST BE MARKED AS THE DISCONNECTING DEVICE FOR THE EQUIPMENT.

MOD 9000P (PANEL MTG BACK VIEW)



MOD 9000F (FIELD MTG INTERNAL VIEW)



CADD DATABASE: AUTOCAD

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REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES		JOB NO			
TOLERANCE		ENG	MFM	DATE	8/26/11
UNLESS SPECIFIED OTHERWISE					
X	± .06			DATE	8/26/11
.X	± .03			DATE	8/26/11
.XX	± .03			DATE	8/26/11
.XXX	± .010			DATE	8/26/11
FRACT.	± 1/16			DATE	8/26/11
ANGLES	± 1/2°			DATE	8/26/11
NEXT ASS'Y					
CUST ORDER NO					
CUSTOMER LOCATION					
USER LOCATION					
PART NO		DRAWING NUMBER		REV	
		C07392B-E018		B	

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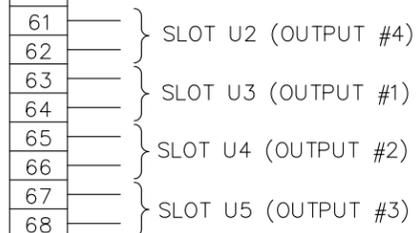
FIELD WIRING DIAGRAM
NOTES
MICRO-TECH 9000

B	3013	CORRECTED FIELD MNT VOLTS AND FREQUENCY	9/21/12	PEP	TMN
A	2959	RELEASED	6/6/12	PEP	MFM
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY APPD

INTEGRATOR
MICRO-TECH 9000

J7

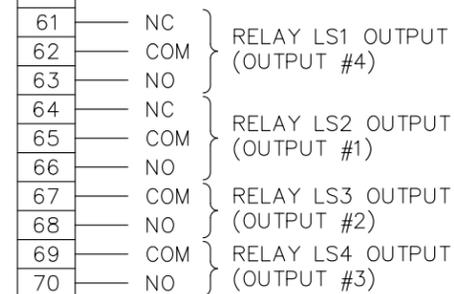
OPTO22
OUTPUT BOARD



INTEGRATOR
MICRO-TECH 9000

J7

RELAY OUTPUT
BOARD



OPTO-22 MODULES
24-280VAC P/N 037289
5-60VDC P/N 039669
DRY (REED) P/N 044552

RELAYS RATED:
PANEL VERSION:
33 VAC AT 2 AMP
70 VDC AT .5 AMP

FIELD VERSION:
240 VAC AT 3 AMP
70 VDC AT .5 AMP

NOTES: READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM

- DO NOT RUN SIGNAL, LOADCELL OR SPEED SENSOR CABLES IN SAME CONDUIT AS ALARM WIRING.
- ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES. ALL WIRING, EXCEPT AS NOTED, IS THE RESPONSIBILITY OF THE CUSTOMER.
- OUTPUT FUNCTIONS ASSIGNED BY USER, SEE O & S MANUAL.
- INSTALL IN SLOT J7.
- USE UL 1015 WIRE, 16 AWG [1 SQ.mm] OR SMALLER.
- WHEN SOURCING POWER FOR THE AC OUTPUTS/INPUTS FROM THE MICRO-TECH, SOURCE THE POWER FROM THE AUXILLARY POWER OUT (AUX PWR OUT) TERMINAL.

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG		SCALE	N/A
REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES		JOB NO	
TOLERANCE UNLESS SPECIFIED	OTHERWISE	ENG MFM	DATE 8/26/11
X ± .1	± .3 mm	DWN MFM	DATE 8/26/11
.XX ± .06	± .5 mm	CHK MFM	DATE 8/26/11
.XX ± .03	± .76 mm		
.XXX ± .010	± .254 mm		
FRACT. ± 1/16	± N/A		
ANGLES ± 1/2°	± 1/2°		

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FIELD WIRING DIAGRAM
DIGITAL OUTPUT BOARDS
MICRO-TECH 9000

REV	ECO NO	MICRO	DESCRIPTION	DATE	BY	APPD
B	3027		ADDED NOTES 5 & 6	11/6/12	PEP	TMN
A	2959		RELEASED	6/6/12	RAE	MFM

CUSTOMER LOCATION	
USER LOCATION	

PART NO	DRAWING NUMBER	REV
	C07392B-E021	B

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
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MICRO-TECH
MODEL 9000 SERIES

ANYBUS 7001 DEVICENET

J37

32
33
37
31
36
38

SUB NETWORK CONN

1	+5V OUT
2	RS232 Rx
3	RS232 Tx
4	NC
5	SIGNAL GND
6	RS422 RX+
7	RS422 RX-
8	RS485+/RS422 Tx+
9	RS485-/RS422 Tx-

CASING - PE

DEVICENET CONNECTOR

1	V-
2	CAN L
3	SHIELD
4	CAN H
5	V+
POWER	
1	+24VDC
2	GND
PC CONNECTOR	
1	GND
2	GND
3	RS232 Rx
4	RS232 Tx



CADD DATABASE: AUTOCAD

DO NOT SCALE DWG REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES		SCALE N/A	
		JOB NO	
TOLERANCE UNLESS SPECIFIED OTHERWISE		ENG	DATE
X	± .1 ± 3 mm	MFM	4/10/12
.X	± .06 ± 1.5 mm	DWN	DATE
.XX	± .03 ± .76 mm	RAE	4/10/12
.XXX	± .010 ± .254 mm	CHK	DATE
FRACT.	± 1/16 ± N/A	MFM	4/10/12
ANGLES	± 1/2° ± 1/2°		

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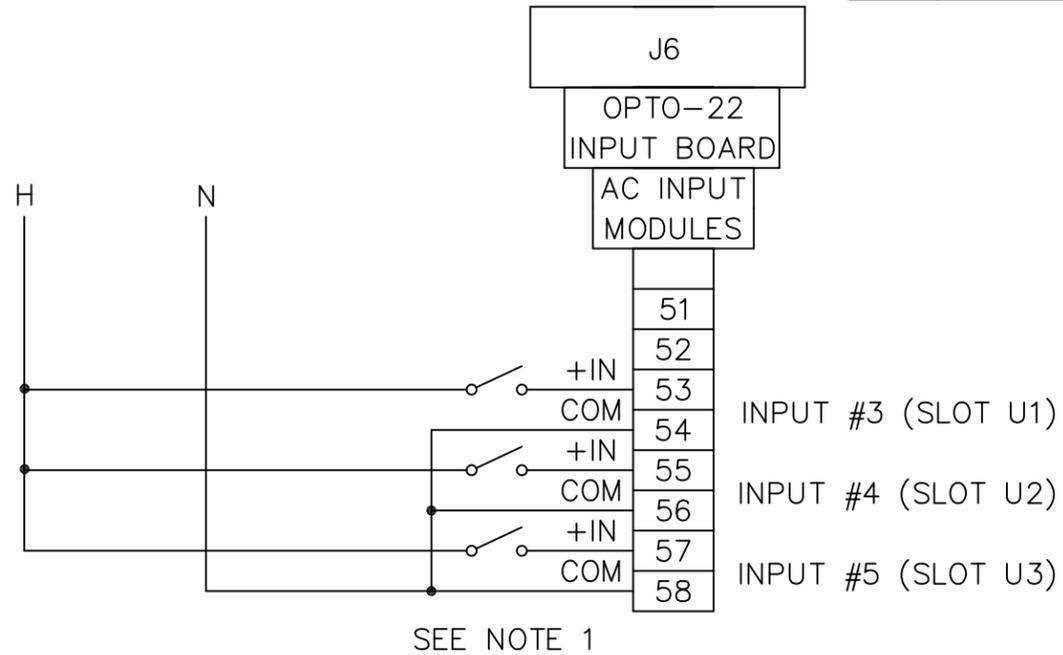
FIELD WIRING DIAGRAM
ANYBUS COMMUNICATOR
FOR DEVICE NET
MICRO-TECH 9000

A	2959	RELEASED	6/6/12	RAE	MFM
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY APPD

NEXT ASS'Y	
CUST ORDER NO	
CUSTOMER LOCATION	
USER LOCATION	

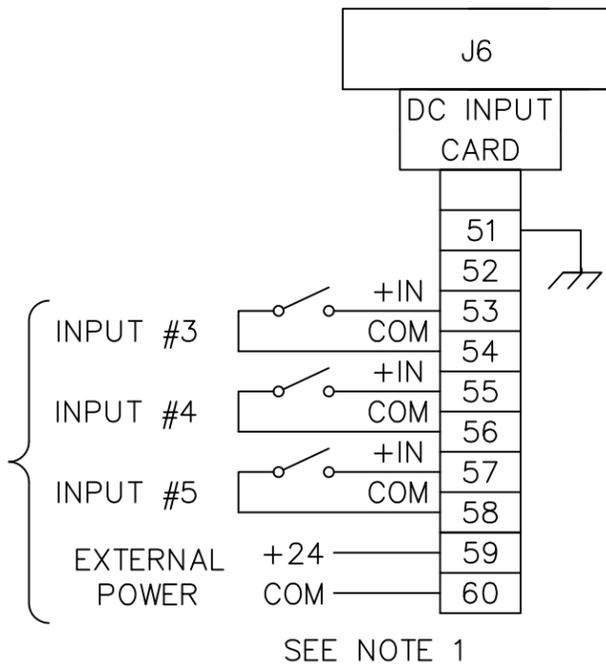
PART NO	DRAWING NUMBER	REV
	B07392B-E022	A

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
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SEE NOTE 1

OR



SEE NOTE 1

DIGITAL INPUTS
 TYPE: CURRENT SOURCING TO COMMON GROUND:
 DESIGNED FOR DRY CONTACT INPUT.
 RATING: 24 VDC, 5 mA TYPICAL
 INPUT FUNCTION IS ASSIGNED BY
 USER; SEE OPERATOR MANUAL

NOTES:

1. USE UL 1015 WIRE, 16AWG [1 SQ.mm] OR SMALLER.
2. WHEN SOURCING POWER FOR THE AC OUTPUTS/INPUTS FROM THE MICRO-TECH, SOURCE THE POWER FROM THE AUXILLARY POWER OUT (AUX PWR OUT) TERMINAL.

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES		SCALE N/A	
UNLESS SPECIFIED OTHERWISE		ENG	DATE
X	± .1 ± 3 mm	MFM	8/26/11
.X	± .06 ± 1.5 mm	DWN	DATE
.XX	± .03 ± .76 mm	MFM	8/26/11
.XXX	± .010 ± .254 mm	CHK	DATE
FRACT.	± 1/16 ± N/A	MFM	8/26/11
ANGLES	± 1/2° ± 1/2°		

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FIELD WIRING DIAGRAM
 DC INPUT & OPTO-22 INPUT BOARDS
 MICRO-TECH 9000

NEXT ASS'Y	
CUST ORDER NO	
CUSTOMER LOCATION	
USER LOCATION	

PART NO	DRAWING NUMBER	REV
	B07392B-E025	B

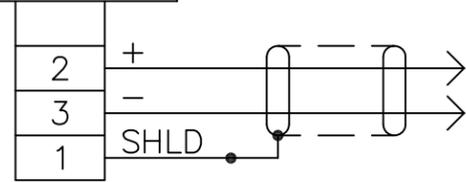
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY	APPD
B	3027		ADDED NOTE 2. ADD SLOT NAME FOR OPTO22 BD	11/6/12	PEP	MFM
A	2959		RELEASED	6/6/12	RAE	MFM

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
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MOTHERBOARD EXPANSION SLOTS

4-20mA OUT BOARD



CURRENT OUTPUT #1
0-20 MA OR 4-20 MA
LOAD = 800 OHM MAX.
BELDEN 8760 OR EQUIV.

NOTES:

- DO NOT RUN ANALOG SIGNAL CABLES IN SAME CONDUIT AS POWER WIRING. CONNECT SHIELDS ONLY WHERE SHOWN.
- ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL CODES. ALL WIRING, EXCEPT AS NOTED, IS THE RESPONSIBILITY OF THE CUSTOMER.
- INSTALL IN ONE OF THE MOTHERBOARD EXPANSION SLOTS J10-J13.
- CABLE TYPE: USE BELDEN 8760 OR EQUIVALENT

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES		SCALE N/A	
UNLESS SPECIFIED OTHERWISE		ENG	DATE
X	± .1 ± 3 mm	MFM	8/26/11
.X	± .06 ± 1.5 mm	DWN	DATE
.XX	± .03 ± .76 mm	MFM	8/26/11
.XXX	± .010 ± .254 mm	CHK	DATE
FRACT.	± 1/16 ± N/A	MFM	8/26/11
ANGLES	± 1/2° ± 1/2°		

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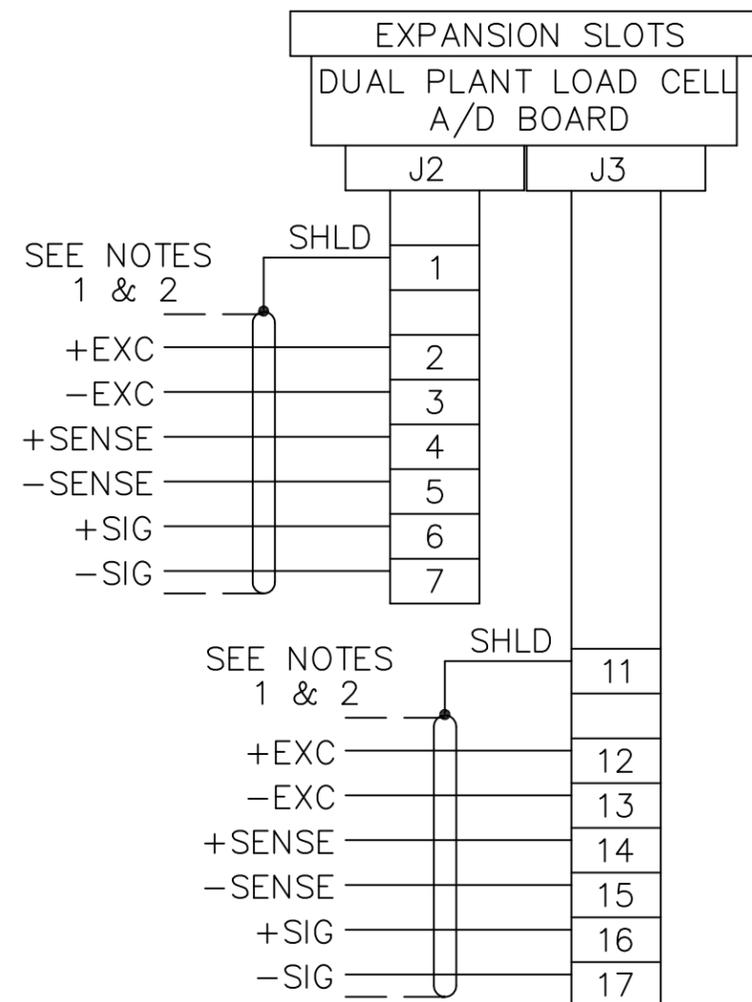
FIELD WIRING DIAGRAM
4-20mA OUT BOARD
MICRO-TECH 9000

NEXT ASS'Y	
CUST ORDER NO	
CUSTOMER LOCATION	
USER LOCATION	

PART NO	DRAWING NUMBER	REV
	B07392B-E026	B

REV	ECO NO	MICRO	DESCRIPTION	DATE	BY	APPD
B	3027		ADDED NOTES.	11/7/12	PEP	MFM
A	2959		RELEASED	6/6/12	RAE	MFM

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
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NOTES:

- USE BELDEN 8407 (P/N 003727) OR EQUIVALENT, 4 CONDUCTOR, 16 AWG, SHIELDED, IF TOTAL CABLE RUN IS LESS THAN 200 FT (61 M). USE BELDEN 9260 (P/N 011416) OR EQUIVALENT, 6 CONDUCTOR, 20 AWG, SHIELDED, IF TOTAL CABLE IS 200 TO 3,000 FT (61-915 M). SENSE CONNECTIONS ARE REQUIRED IF TOTAL LENGTH IS OVER 200 FEET. INSTALL JUMPERS IN JUNCTION BOX AS SHOWN, OR IF USING 4 CONDUCTOR CABLE JUMPER TB1 2 TO 4 AND TB1 3 TO 5. OR IF USING 4 CONDUCTOR CABLE JUMPER TB2 12 TO 14 AND TB2 13 TO 15.
- DO NOT RUN SIGNAL, LOADCELL, OR SPEED SENSOR CABLES IN SAME CONDUIT AS POWER WIRING. CONNECT SHIELDS ONLY WHERE SHOWN.

CADD DATABASE: AUTOCAD

DO NOT SCALE DWG
REMOVE ALL BURRS AND UNNECESSARY SHARP EDGES

SCALE N/A
JOB NO

TOLERANCE		ENG	DATE
UNLESS SPECIFIED	OTHERWISE	MFM	8/26/11
X ± .1	± 3 mm	DWN	8/26/11
.X ± .06	± 1.5 mm	CHK	8/26/11
.XX ± .03	± .76 mm		
.XXX ± .010	± .254 mm		
FRACT. ± 1/16	± N/A		
ANGLES ± 1/2°	± 1/2°		

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FIELD WIRING DIAGRAM
DUAL PLANT LOAD CELL A/D BOARD
MICRO-TECH 9000

NEXT ASS'Y

CUST ORDER NO

CUSTOMER LOCATION

USER LOCATION

PART NO	DRAWING NUMBER	REV
	B07392B-E027	A

REV	ECO NO	MICRO	DESCRIPTION	DATE	BY	APPD
A	2959		RELEASED	6/6/12	RAE	MFM