

# Micro-Tech™ 9106 Impact Flow Meter User Manual

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Part number 127428—English



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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 9106 Impact Flowmeter Integrator User Manual</i> .
Rev B	February 2013	3044	On field wiring drawing, add "VDC ONLY" for pulse
Rev C	May 2013	3322	Corrected Error on 9106 field wiring (removed load cell wiring)
Rev D	September 2013	3363	Corrections.
Rev E	November 2013	3403	Corrections.
Rev F	July 2014	3488	New software version 145.00.01.04 (Added German language software). 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

defective equipment, transportation charges prepaid, to the seller's factory in Minneapolis, Minnesota, and the submission of reasonable proof to seller prior to return of the equipment that the defect is due to a matter embraced within seller's warranty hereunder. Any such defect in material and workmanship shall be presented to seller as soon as such alleged errors or defects are discovered by purchaser and seller is given opportunity to investigate and correct alleged errors or defects and in all cases, buyer must have notified seller thereof within one (1) year after delivery, or one (1) year after installation if the installation was accomplished by the seller.

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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Though the information provided herein is believed to be accurate, be advised that the information contained herein is not a guarantee for satisfactory results. Specifically, this information is neither a warranty nor guarantee, expressed or implied, regarding performance, merchantability, fitness, or any other matter with respect to the products, and recommendation for use of the product/process information in conflict with any patent. Please note that Thermo Fisher Scientific reserves the right to change and/or improve the product design and specifications without notice.

# 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  $+158^{\circ}\text{F}$  ( $-30^{\circ}$  to  $+70^{\circ}\text{C}$ ).

### Overview of the Micro-Tech

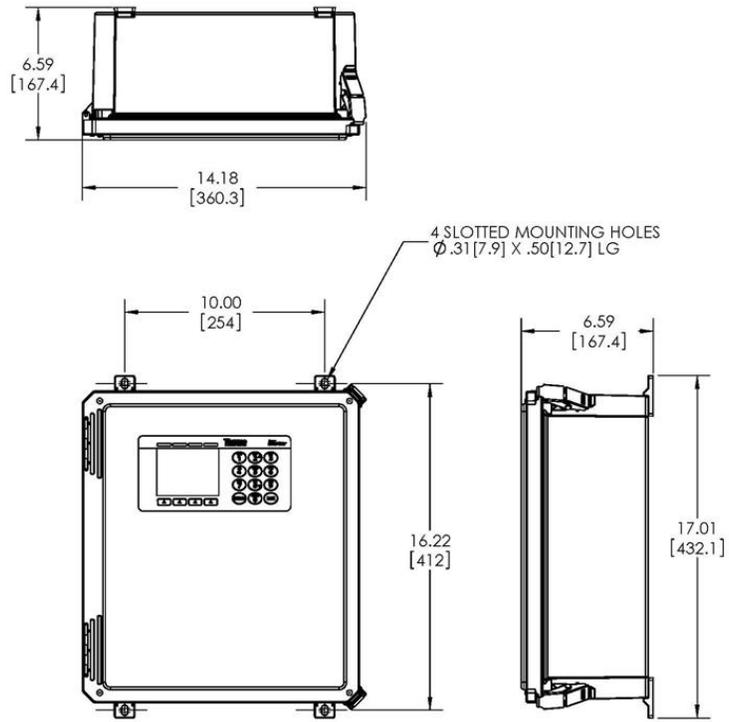
The Micro-Tech 9000 Field Mount Integrator (Figure 1-1) or Panel Mount Integrator (Figure 1-2) is a bus-based microcomputer driven instrument.

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.

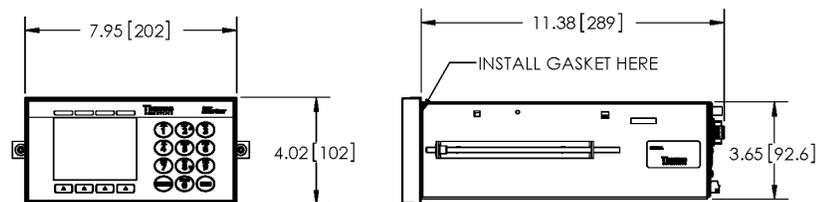
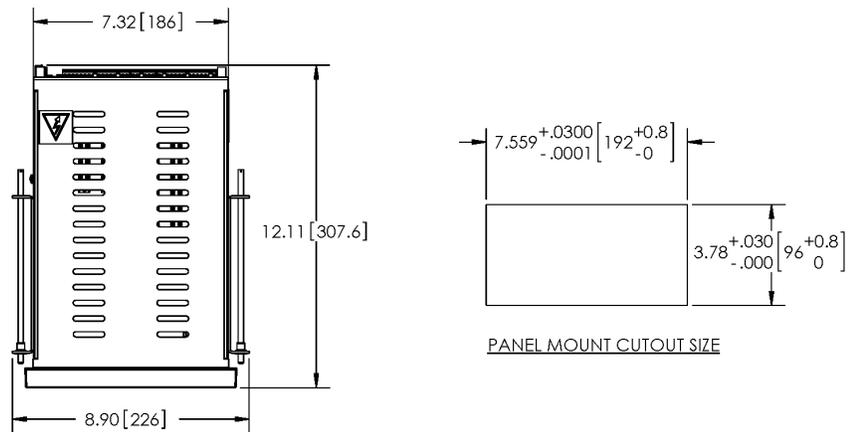
The Micro-Tech has provisions for four outputs on the digital output board, plus one DC output from the mother board—making a total of five, one of which can be defined as a Fault output. In addition, many automatic and check functions are available to monitor its calibration functions and maintenance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

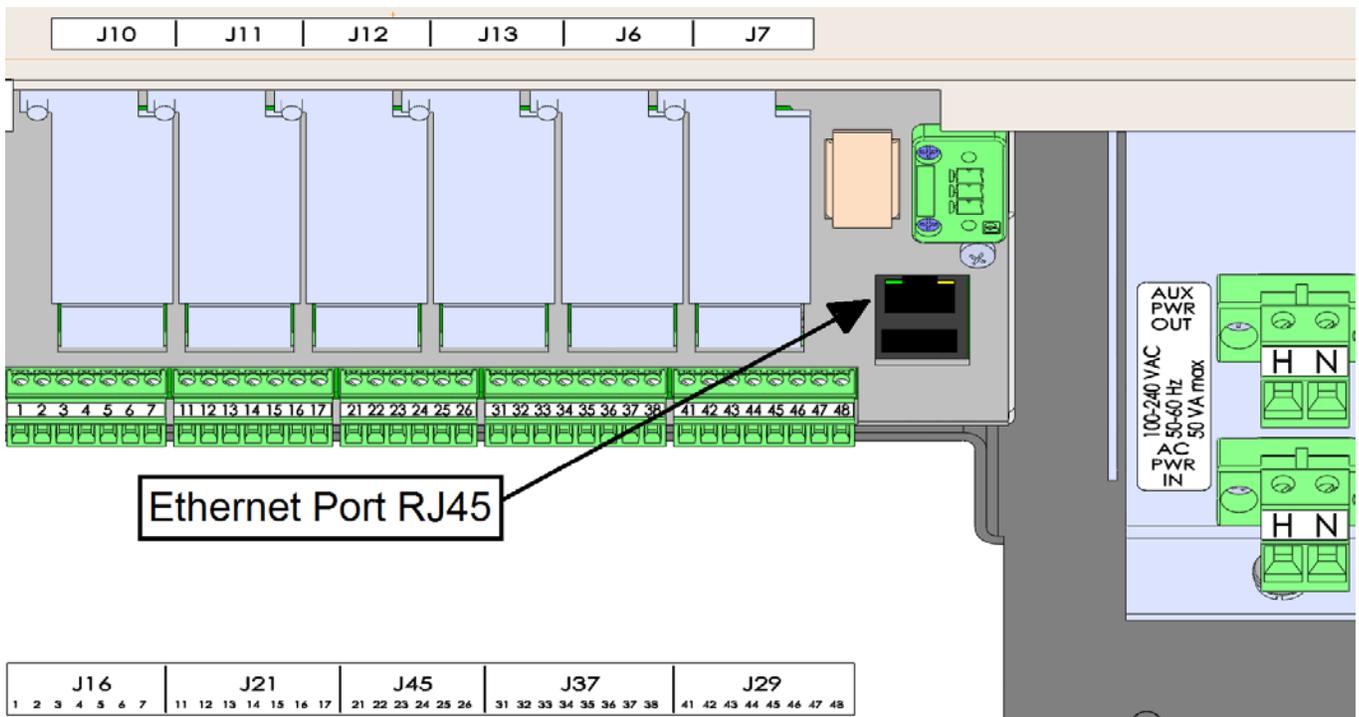
### Mounting

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

## Introduction

### Micro-Tech Menus and Functions

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.

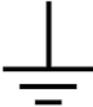
There are three types of standard communication functions, as described below.

- | 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.

**Introduction**  
Specifications

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

<b>Description</b>	<b>Specification</b>
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

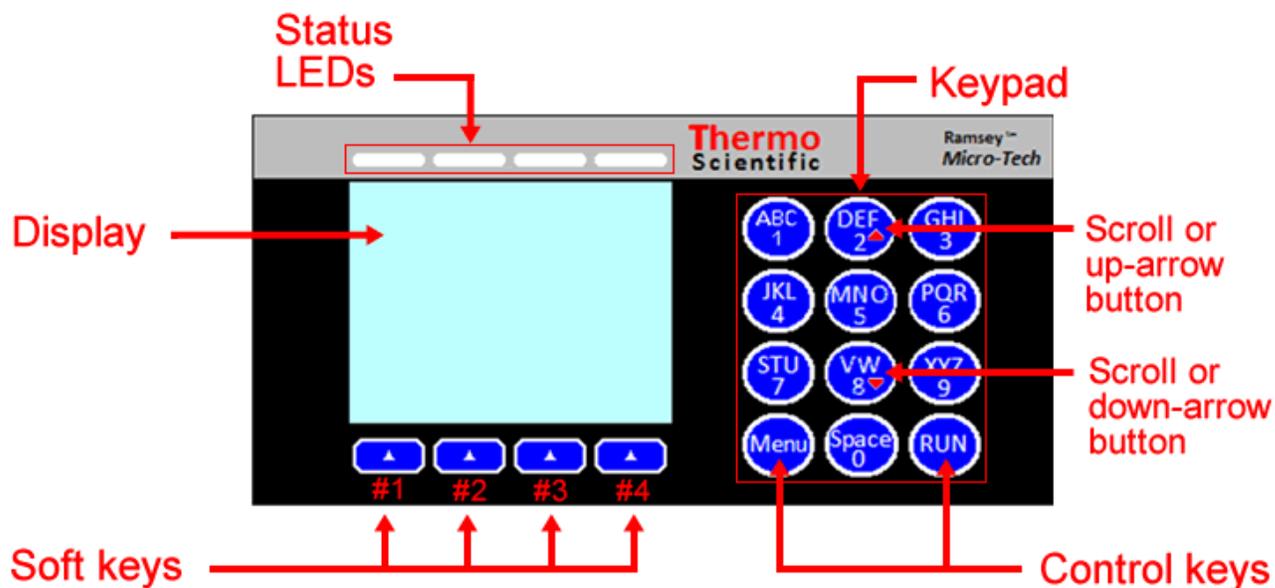


Figure 2–1. Main Features of the Micro-Tech Console

## 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.

Prod (Product) soft key – Used to select a different Product number. See section “Product Set-up” for further details.

## Status LEDs

The four indicators show the status of the Impact Flow Meter.

- BATCH
- CALIB (CALIBRATION)
- ALARM
- READY

## Measuring Functions

The Micro-Tech 9106 Integrator receives the force signal from the impact sensor and converts the force signal into a numeric value with very high accuracy and resolution (more than 2,000,000 counts at full scale).

Rate is calculated as decrement or increment of weight in time. Total is computed on three individual registers: total, reset total, operator total.

Analog (current) output signals or communications can be used to transmit rate to other control devices.

Displayed variables and analog outputs can be smoothed via damping filters, individually programmable.

The Micro-Tech can perform automatic zero and span calibrations. Auto Zero (AZ) Track enables the scale system to automatically zero itself during extended periods when the scale is empty.

## 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 impact flow meter.

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

### Scale Capacity

Determine the flow meter's capacity and record the capacity below.  
(Example: 400.0)

\_\_\_\_\_ Scale #1

## 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. ▲

**Overview** There are five steps in the software initialization process, as follows.

- | Enter the correct date and *exact* current time.
- | Choose 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.
- | Performing an initial zero and span calibration

## 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			

5. 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.
6. 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.

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

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

READY	BATCH	ALARM	CALIB
- DISPLAY SCROLL 1 - Measure Units > <u>English</u> <			
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 Totalization units screen.
5. In pages 2-9 through 2-11, do the following.
  1. Follow the “English” headings, if you are using English units.
  1. Follow the “Metric” headings, if you are using metric units.

## Setting the Totalization Units

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

### English Totalization Units

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

READY	BATCH	ALARM	CALIB
- DISPLAY SCROLL 2 -			
Totalization Units			
> Tons <			
CHOICE			

1. Tons is the default value.
2. To choose long tons or pounds, repeatedly press the Choice button until the unit you want is displayed, then press the Enter button.

3. Press the down-arrow button to bring up the Rate units screen (go to page 2-10).

### **Metric Totalization Units**

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

READY	BATCH	ALARM	CALIB
- DISPLAY SCROLL 2 -			
Totalization Units			
> t <			
CHOICE			

1. Metric tonnes (“t”) is the default value.
2. To choose kilograms (“kg”) press the Choice button, then press the Enter button.
3. Press the down-arrow button to bring up the Rate units screen (see the next section).

### **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	BATCH	ALARM	CALIB
- DISPLAY SCROLL 4 -			
Rate Units			
> Tph <			
CHOICE			

1. Standard U.S. tons (equivalent to British “short tons”) per hour (“Tph”) 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	BATCH	ALARM	CALIB
- DISPLAY SCROLL 4 -			
Rate Units			
> t/h <			
CHOICE			

1. Metric tonnes per hour (“t/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			
> t/h <			
CHOICE			

1. Metric tonnes per hour (“t/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

### **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 *Rate*— for example, tons per hour (Tph), tonnes per hour (t/h), and so on. In other words, do *not* enter the maximum weight the scale can be loaded with, because the Micro-Tech is looking for a rate.

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

READY	BATCH	ALARM	CALIB
- SC DATA SCROLL 1 -			
Max. scale capacity			
<u>500.0</u> Tph			
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.
  1. If you need to enter a value such as 1234.5 Tph, soft key 3 allows you to enter the decimal point. (See screen shot below.)
  1. 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.)
  1. Whatever value you enter cannot contain more than *seven* characters, not including the decimal point.
  1. The maximum rate (that is, the scale capacity) cannot exceed 200,000 units of measure.
2. Press the Enter key.
3. 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 175 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—174.8 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	BATCH	ALARM	CALIB
- SC DATA SCROLL 2 -			
Scale divisions			
> 0.1 <			
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, 0.01, 0.005, 0.002, and 0.001.
2. To choose the appropriate scale division, press the Choice button until the division you want is displayed, then press the Enter button.
3. When finished press the down-arrow key to begin calibration.

## **Automatic Zero and Span Calibrations**

The flow meter is first zeroed then spanned using material. Zero Calibration is done with all equipment such as screw conveyors, rotary airlock feeders, bucket elevators, dust collection, etc., in the area of the DE10/DE20 sensor, on/running with no material flowing.

Span calibration must be done at maximum expected flow rate of the system. Because all materials behave differently when they strike and then rebound off the impact plate, the Span Calibration must be done using a ‘material test’. This test is done by running material through the flow meter for a period of time (at least 5 minutes). The longer the material test the better the result will be. All of the material should be pre-weighed or post-weighed on a high accuracy static scale to obtain the actual weight of the material.

## Quick Automatic Calibration of the Flow Meter

The flow meter is first zeroed then calibrated using material. During any ZERO CALIBRATION all equipment such as screw conveyors, rotary airlock feeders, bucket elevators, dust collection, etc. in the area of the DE10/DE20 sensor, should be on/running with no material flowing.

### Initial Zero Calibration

Your display should look like this

READY	BATCH	ALARM	CALIB
ZERO CAL			
Stop Material Flow, then press START			
START			

1. Make sure the material flow has completely stopped and all other equipment is running. Then press the start soft key, and the following screen is display.

READY	BATCH	ALARM	CALIB
AUTO ZEROING			
Please Wait			

2. After running for roughly 30 seconds the following screen appears. Your Zero number of course will be different.

READY	BATCH	ALARM	CALIB
AUTO ZERO COMPLETED  ZERO # CHANGED  New Zero # 15095			
CONTINUE			

3. Press CONTINUE.

**Initial Span Calibration**

Span Calibration must be done at maximum expected flow rate of the system. Because all materials behave differently when they strike and then rebound off the impact plate of the Flow Meter, the Span Calibration must be done using the actual material in a “material test”. This test is done by running material through the flow meter for a period of time (at least 5 minutes). The longer the material test is run, the more accurate the Flow Meter will be.

All of the material in the material test should be pre-weighed actual weight of the test material. This actual weight is then entered into the integrator to complete the test.

After initial Zero Calibrate is complete and CONTINUE has been pressed, the following screen appears:

READY	BATCH	ALARM	CALIB
Press start softkey then run material			
START		ABORT	

If unable to do a material test at this point press ABORT and the Run Screen appears. The “Ready” light is off, the flow meter is not

calibrated. An uncalibrated flow rate will appear in the display if product is run over the impact plate, all totalizers display -0- and do not function.

To continue with the material test press the START soft key and immediately run material over the impact plate. The following screen appears.

READY	BATCH	ALARM	CALIB
9.91 Tons			
159.04 Tph			
press DONE to end			
DONE			

During the Auto Span procedure, the resolution of total is 10 times higher than normal.

Wait until all of the material has passed over the impact plate, then press DONE.

At the end of the test, the system prompts the operator for the reference weight of the material run during the test.

READY	BATCH	ALARM	CALIB
50.91 Tons			
Enter reference weight			
0.00 Tons			
EDIT		ABORT	

The operator must enter the actual weight of the material passed over the impact plate during the material test. Use the numeric keys to enter the actual weight and confirm with the ENTER key.

After the reference weight has been successfully entered, the “Ready” light is on and the following screen is displayed:

**Set-up**  
Initializing the Software

READY	BATCH	ALARM	CALIB
SPAN # CHANGED			
New Span # 1456277			
CONTINUE			



**NOTE:** An option to Change the span (yes or no) is not present during the cold start calibration since this is the first span number the system will acquire.

Press CONTINUE and the following screen appears:

READY	BATCH	ALARM	CALIB
SPAN CALIBRATION			
Add reference weight to totals?			
YES	NO		

If YES is pressed, the amount of material used for the test is added to the master, reset and operator totals. If NO is pressed, the information is lost. The “Ready” light is on, the flow meter is only calibrated at the flow rate just run.

Pressing YES or NO advances to the following screen.

READY	BATCH	ALARM	CALIB
SCALE CALIBRATED			
Press RUN to Start			
or MENU for Scrolls			



**NOTE:** Moisture compensation is inhibited during material calibration. This is done to make the check of the totalized quantity easier. The static scale provides the weight of the material including moisture. The weight of the water is removed immediately before adding to total at the end of the procedure so that the master, reset, and operator's totals are still correct.

If the DE10/DE20 sensor is not connected or a failure is detected, the Flow Meter is not calibrated and the following screen is displayed:

READY	BATCH	ALARM	CALIB
SCALE NOT CALIBRATED			
Press RUN to Start			
or MENU for Scrolls			

If the Flow Meter is not calibrated, the failure must be corrected and a repeat /material test must be done, see section "TROUBLESHOOTING" and "DOING A MATERIAL SPAN CALIBRATION".

After the Initial Zero and Span calibrations, the Flow Meter functions normally. Subsequent Zero and Span Calibrations have slightly different processes. See Section "Doing a Material calibration" for details on subsequent calibration. If calibration is required for additional flow rates different than just run for Span, see Section "LINEARIZATION" in the Reference Manual.

If ABORT was pressed before a Span Calibration/material test was done, running a Material Calibration will get the totalizers to function and the “Ready” light will come on.

## **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 is currently being displayed.
3. Begin material flow over your scale.

## **Run Screen**

Line 1 of the display always displays the Master Total, which is the amount of weight totalized by the Integrator Flow Meter since installation. Also displayed on this line is the product number.

Line 2 of the display displays the Rate of material flow. The letter “Z” appears on the second line of the display indicating Auto Zero Track option is enable.

Line 3 of the display is by default blank, but can be selected to show:  
No Display, product, Date/Time

## **Doing a Material Span Calibration**

Span Calibration must be done at maximum expected flow rate of the system. Because all materials behave differently when they strike, and then rebound off, the impact plate of the Flow Meter, the Span Calibration must be done using the actual material in a “material test”. The test must conform to the following:

- The test must be at least 5 minutes long
- The flow rate must be constant/steady for the entire test.
- The test must be at least 200 counts on the 9106 Integrator.

A count is defined as 1 tenth of a unit of what is set in the Integrator totalizer. If the Integrator totalizer is set to pounds, one count is .1 pound; if the totalizer is set to tons, one count is .1 ton, etc.

The longer the material test is run, the more accurate the flow meter will be. All of the material in the material test should be pre-weighed or post-weighed on a high accuracy static scale to obtain the actual weight of the

test material. This actual weight is entered into the Integrator to complete the test. Before any Span Calibration, Linearization in Main Menu 6 must be set to NO.

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

READY	BATCH	ALARM	CALIB
MAIN MENU 1  Press MENU for more			
ZERO CAL	SPAN CAL	SETUP	

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

READY	BATCH	ALARM	CALIB
AUTO SPAN R Cal  Stop material flow,  then press START			
START	EXIT	MANUAL	

4. After your material flow has come to a stop, press the start button. This stops totalization and the next screen appears.

READY	BATCH	ALARM	CALIB
Press start softkey then run material			
START			

5. Press start and immediately start running material.

READY	BATCH	ALARM	CALIB
9.91 Tons 159.04 Tph press DONE to end			
DONE			

During the Auto Span procedure, the resolution of total is 10 times higher than normal.

Pressing ABORT returns the display to Main Menu 1.

Wait until all material has passed over the impact plate, then press DONE. The following screen displays

READY	BATCH	ALARM	CALIB
9.91 Tons Ref. Weight known?			
YES	NO		

When NO is selected, the system is notified that the reference (actual) weight of the material is not known. The Run Screen is displayed and MAT'L is shown flashing to remind the operator that the material test is incomplete.

READY	BATCH	ALARM	CALIB
#1                      95.0 Tons 450.0 Tph			
MAT'L	PROD		

(The numbering below is continued from page 2-21.)

6. Press MAT'L when actual material weight is known.
7. If YES was answered to Ref. weight known?, or if the MAT'L key has been pressed when flashing the following screen displays.

READY	BATCH	ALARM	CALIB
50.91 Tons  Enter reference weight  <u>0.00</u> Tons			
DONE			

If ABORT is pressed, the information acquired during the test is lost and the system goes back to Main Menu 1.

The operator must enter the actual weight of the material passed over the impact plate during the material test. Use the numeric keys to enter the actual weight and confirm with the ENTER key. If a number is entered for actual weight which the Integrator will not accept, the following screen is displayed.

READY	BATCH	ALARM	CALIB
- SETTING ERROR -			
max	35000	Tons	
min	0.1	Tons	
RETURN			

Press RETURN to return to the “Enter reference weight” screen. A number for actual weight between the min and max must be entered. After entering an actual weight between min and max, the following screen is displayed.

READY	BATCH	ALARM	CALIB
SPAN CAL. COMPLETE			
Error		0.15%	
Change span?			
YES	NO	ADV	

Pressing the ADV key changes the screen from “Error %” to “Diff. X.XX Tons” to “XXXX.X PFM”. The “XXXX.X PFM” shows the average PFM signal acquired from the DE10/DE20 sensor during the material test.

8. Press the Yes button to set the span.

READY	BATCH	ALARM	CALIB
SPAN # CHANGED			
New span #	2000000		
Old span #	1999800		
RUN	MENU		

9. Press the Menu button (in the display not the keypad) to return the Micro-Tech to the Main Menu 1. Press the RUN button to return to the run screen.

(The numbering below is continued from page 2-21.)

6. If the No button is pressed (this should be done after the initial calibration as subsequent calibrations are for repeatability.) The following screen is shown.

READY	BATCH	ALARM	CALIB
SPAN # UNCHANGED			
New span #		1999800	
Old span #		1999800	
RUN	MENU		

7. Press the Menu soft key in the display to return the Micro-Tech to Main Menu 1. Press the Run Key at this point to return to Run mode.
8. Run several span calibrations to assess the repeatability of the readings.

## **Product Set-up**

Product Setup scroll consists of one screen for local or remote product selection.

1. Press the RUN key for the Run Screen unless already there. Press the MENU key for Main Menu 1. Press the PROD SETUP key and the following screen is displayed.

READY	BATCH	ALARM	CALIB
ENTER PRODUCT  SELECTION MODE:			
EXIT	LOCAL		

- Pressing the EXIT soft key returns the operator to Main Menu 1. Pressing the 2nd soft key switches between Local and Remote.

## Changing Product Number

Make sure integrator is at the run screen. By pressing soft key 2 “PROD” if the selection of the product is executed from local, the following screen is displayed:

READY	BATCH	ALARM	CALIB
CHANGE THE PRODUCT  NUMBER?			
YES	NO		

If NO is pressed the Run Screen is displayed.

If YES is pressed, the following screen displays:

READY	BATCH	ALARM	CALIB
PROD. NUMBER <u>1</u>  NO NAME			
EDIT	EXIT	NAME	

A different product number (1-99) can be entered by pressing the EDIT soft key.

To change the name of the product, press the NAME soft key. Type the product name by pressing the appropriate alphanumeric keys. Example: To type a "C", press the "1" key four times. The soft keys labeled < and > may be used to scroll to the proper location of the product name. Press the ENTER key after the product name is typed. Then, press the RUN key to return to the Run Screen.

READY	BATCH	ALARM	CALIB
NO NAME		1	
ENTER	<	>	CLEAR



**NOTE:** The purpose of the different product numbers is to allow different products to be run through the flow meter. If different products have different bulk densities or size distribution the impact force on the impact plate will change thus changing calibration.

Each product can have its own Span Calibration, Linearization, and Zero if required to make the flowmeter more accurate with these products. Each product must be initially calibrated when it is first run through the flow meter.

The Integrator then saves the calibration information. When the product number is selected again, the Integrator is already correctly calibrated. Max Scale Capacity is not affected by selecting a new/different product.

The Zero calibration should not change after selecting a new product. If Zero has changed, either the mechanical installation has changed or the electronic calibration has changed.

## 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 for assistance or the local Thermo contact listed in Chapter 4. To expedite your service request, please have your Micro-Tech model, serial number.

### 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												
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"><li>• Your scale is only as good as the repeatability of your error on repeated zero calibrations.</li><li>• The span should never change drastically, if the zero is properly maintained.</li></ul> <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?	<p>The scale should only need daily preventive-maintenance checks for material build up in critical areas, such as under the impact plate. The exception to this is, when changes are made to the scale area.</p>												
Why do I need to see repeatability during calibrations?	<p>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.</p>												
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?	<p>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.</p>												
What kind of information is available from the digital output?	<p>The programmable outputs are as follows.</p> <table><tbody><tr><td>Alarm cumulative</td><td>Fault</td></tr><tr><td>Shutdown cumulative</td><td></td></tr><tr><td>Ready</td><td></td></tr><tr><td>Totalizer</td><td></td></tr><tr><td>Air purge</td><td></td></tr><tr><td>Custom 1-7</td><td></td></tr></tbody></table>	Alarm cumulative	Fault	Shutdown cumulative		Ready		Totalizer		Air purge		Custom 1-7	
Alarm cumulative	Fault												
Shutdown cumulative													
Ready													
Totalizer													
Air purge													
Custom 1-7													

## 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, 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) form 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,MT9106	127655
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, OPTO-22 INPUT, MT9000	102999

**Service, Repair, and Replacement Parts**  
Parts List

Description	Part Number
PCBA, OPTO-22 OUTPUT BD, MT9000	103003
PCBA, RELAY OUTPUT BD, MT9000	102479
PCBA, COMM BOARD, MT2K/9K	102942
PCBA, PROFIBUS BD, MT2000/MT9000	102936
PCBA, DIO, 8IN / 8OUT	103017
PCBA, PFM INPUT BD MT2000/9000	101019
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

# Appendix A Additional Installation Information

## Door Label

Here is a copy of a typical Door Label for the Micro-Tech.

<p>MICRO TECH MODEL 9106 IMPACT FLOW METER</p>	
<p><u>ZERO SCROLL</u> ZERO <input style="width: 100px;" type="text"/></p>	<p><u>CALIB. DATA SCROLL</u> 1 CALIBRATION INTERVAL <input style="width: 100px;" type="text"/> 2 CALIBRATION DATE LAST <input style="width: 100px;" type="text"/> 3 AUTO ZERO TRACKING YES <input type="checkbox"/> NO <input type="checkbox"/> 3A AUTO ZERO TRACKING RANGE <input style="width: 100px;" type="text"/> 3B AUTO ZERO TRACKING MAX. DEV. <input style="width: 100px;" type="text"/> 3C AUTO ZERO TRACKING TIME <input style="width: 100px;" type="text"/></p>
<p><u>SPAN SCROLL</u> SPAN <input style="width: 100px;" type="text"/></p>	<p><u>I/O DEFINE SCROLL</u> 1 CURRENT OUT DEFINE #1 <input style="width: 100px;" type="text"/> CURRENT OUT DEFINE #2 <input style="width: 100px;" type="text"/> 1A CURRENT OUT RANGE #1 <input style="width: 100px;" type="text"/> CURRENT OUT RANGE #2 <input style="width: 100px;" type="text"/> 1B CURRENT OUT DELAY #1 <input style="width: 100px;" type="text"/> CURRENT OUT DELAY #2 <input style="width: 100px;" type="text"/> 1C CURRENT OUT DAMPING #1 <input style="width: 100px;" type="text"/> CURRENT OUT DAMPING #2 <input style="width: 100px;" type="text"/> 2 ANALOG INPUT #1 DEFINE <input style="width: 100px;" type="text"/> 2A MOISTURE CALIB. LOW <input style="width: 100px;" type="text"/> 2B MOISTURE CALIB. HIGH <input style="width: 100px;" type="text"/> 6 REMOTE COUNTER DIV. <input style="width: 100px;" type="text"/> 7 REMOTE COUNTER PULSE WIDTH <input style="width: 100px;" type="text"/> 8 AIR PURGE INTERVAL <input style="width: 100px;" type="text"/> 9 AIR PURGE DURATION <input style="width: 100px;" type="text"/></p>
<p><u>DISPLAY SCROLL</u> 1 MEASURE UNITS <input style="width: 100px;" type="text"/> 2 TOTALIZATION UNITS <input style="width: 100px;" type="text"/> 3 RATE UNITS <input style="width: 100px;" type="text"/> 4 LANGUAGE <input style="width: 100px;" type="text"/> 5 TIME <input style="width: 100px;" type="text"/> 6 DATE <input style="width: 100px;" type="text"/> 7 RUN DISPLAY, LINE 3 <input style="width: 100px;" type="text"/> 8 DAMPING DISPLAY <input style="width: 100px;" type="text"/></p>	<p><u>SCALE DATA SCROLL</u> 1 MAX SCALE CAPACITY <input style="width: 100px;" type="text"/> 2 SCALE DIVISIONS <input style="width: 100px;" type="text"/> 3 ZERO DEAD-BAND RANGE <input style="width: 100px;" type="text"/></p>
<p><u>SCALE DATA SCROLL</u> 1 MAX SCALE CAPACITY <input style="width: 100px;" type="text"/> 2 SCALE DIVISIONS <input style="width: 100px;" type="text"/> 3 ZERO DEAD-BAND RANGE <input style="width: 100px;" type="text"/></p>	<p><u>ALARMS</u> RATE ALARM 1A LO RATE SET POINT <input style="width: 100px;" type="text"/> 1B HIGH RATE SET POINT <input style="width: 100px;" type="text"/></p>
<p><b>Thermo</b> SCIENTIFIC</p> <p style="text-align: right;">PROJECT FILE NO. <input style="width: 150px;" type="text"/> (127308-A)</p>	

# 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 NOT USED	LOADCELL 2 NOT USED	COMM B	COMM A	SPU and PULSE OUT

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)

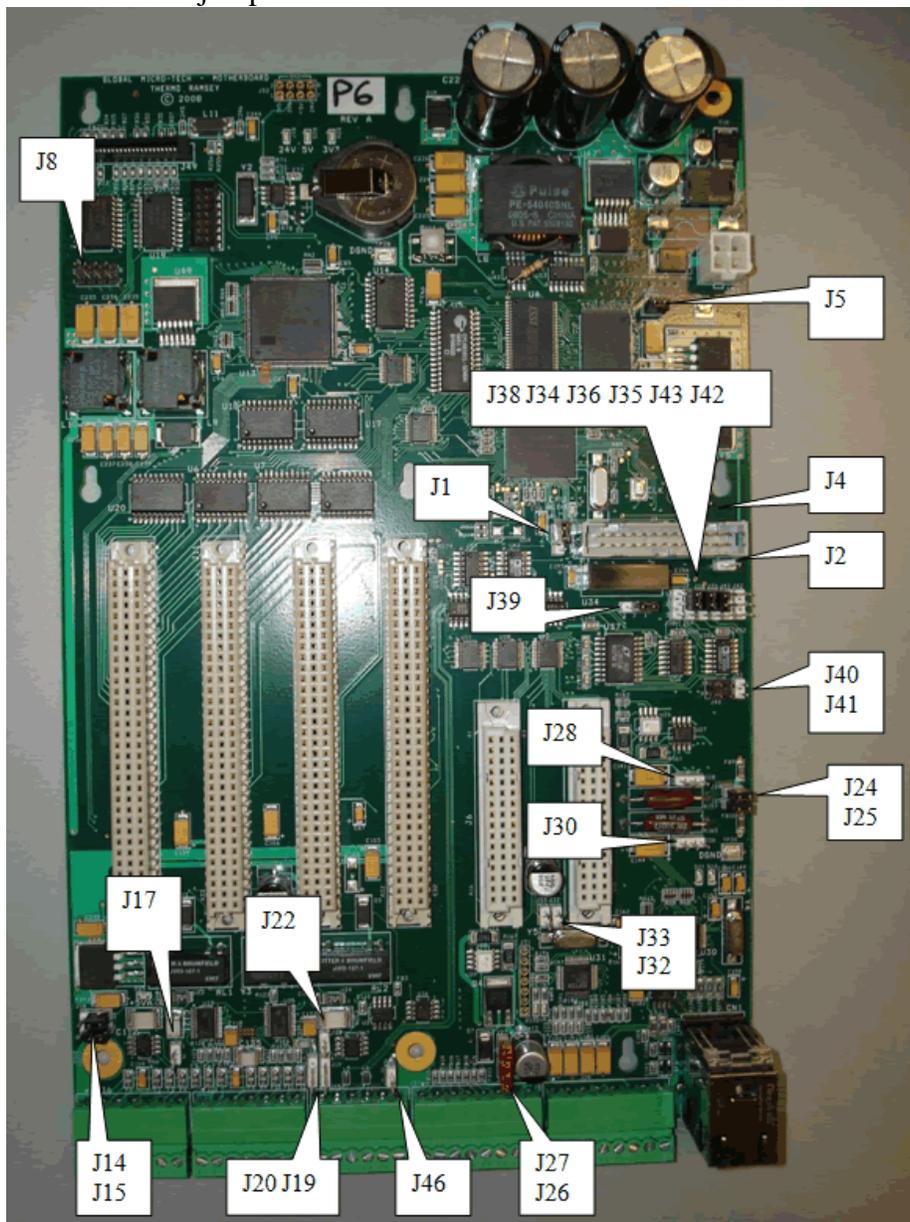
J29	Inputs #1 & #2 and Output #5
41	+24VDC
42	SIGNAL 1 (SPU)
43	COMMON
44	SHEILD (EARTH)
45	SIGNAL 2 (SPU)

**Additional Installation Information**  
 Motherboard Jumper Locations

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

## UART Configuration Jumpers

Jumper	Jumper Settings	Default
J34	COMM A, (UART 0)	
	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)	
	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)	
	Jumper Setting	Description
	Pins 1-2	RS-485 Receive → U0RXD
	Pins 2-3	RS-485 Receive → U0CTS
J40	COMM A Termination, (UART 0)	
	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)	
	Jumper Setting	Description
	Pins1-2	Enable RS-485 Termination
J42 J43	COMM A Termination, (UART 0)	
	Jumper Setting	Description
	Pins 1-2	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)	
	Jumper Setting	Description
	Installed	120Ω termination
		J46 Not Installed

## Sensor Specifications

**Table A-1.** Sensor Technical Specifications

LVDT (Linear Variable Differential Transformer) with preamplifier.

The preamplifier is excited by an 11 – 15 VDC signal provided by the Integrator.

The LVDT/preamplifier combination returns a frequency in the range of 100 to 2500 Hz

Maximum distance between the LVDT and the Integrator is 1000 feet (305 m)

## 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

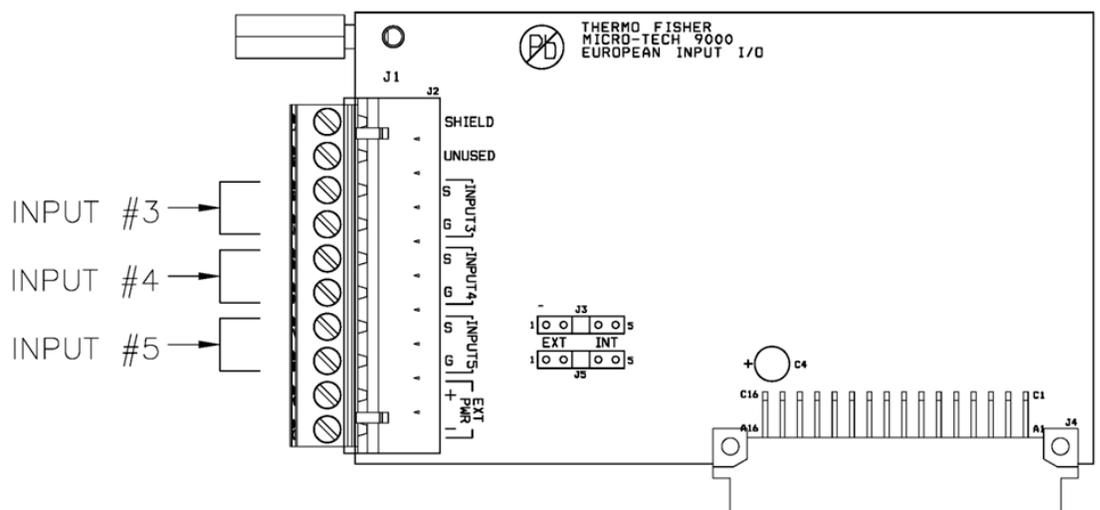
The board options are as follows.

- | 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.



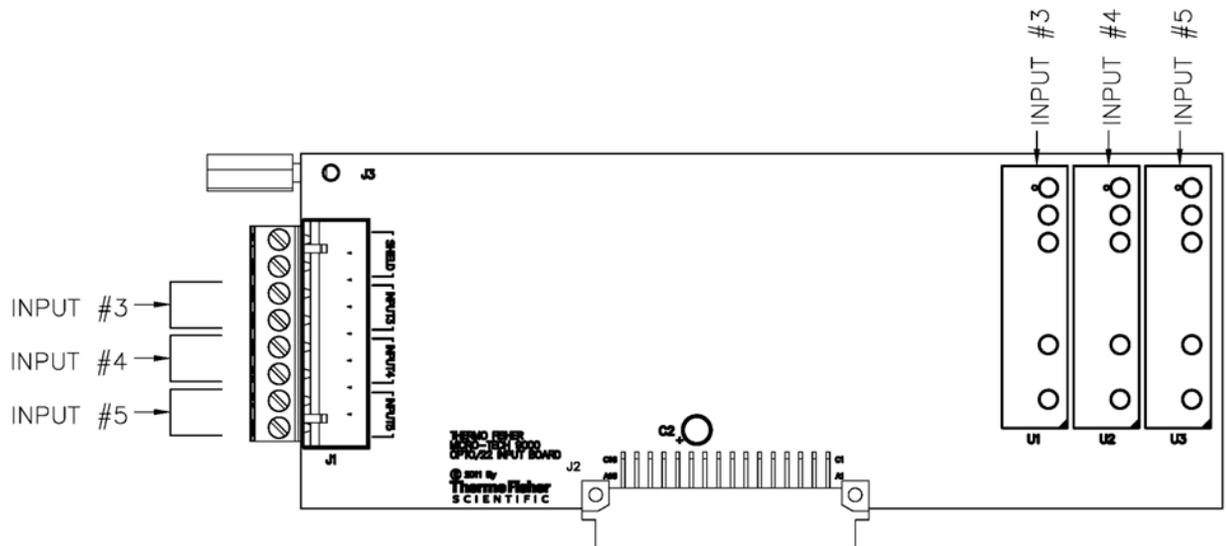
Part number = 100785

## 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.

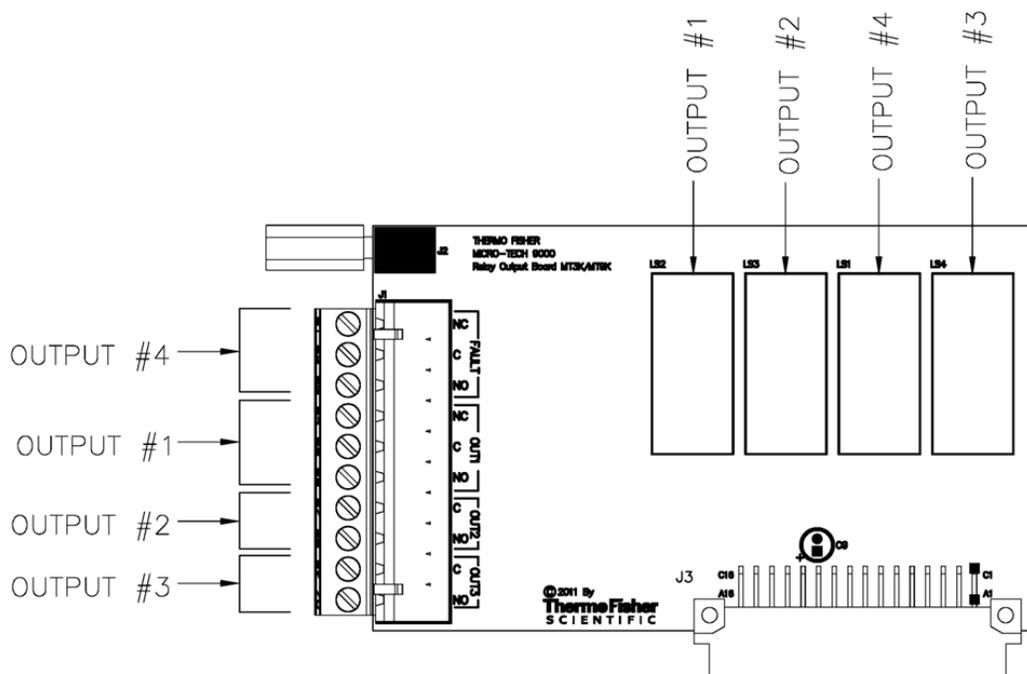
- | Relay Output Board
- or
- | Opto-22 Output Board

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.

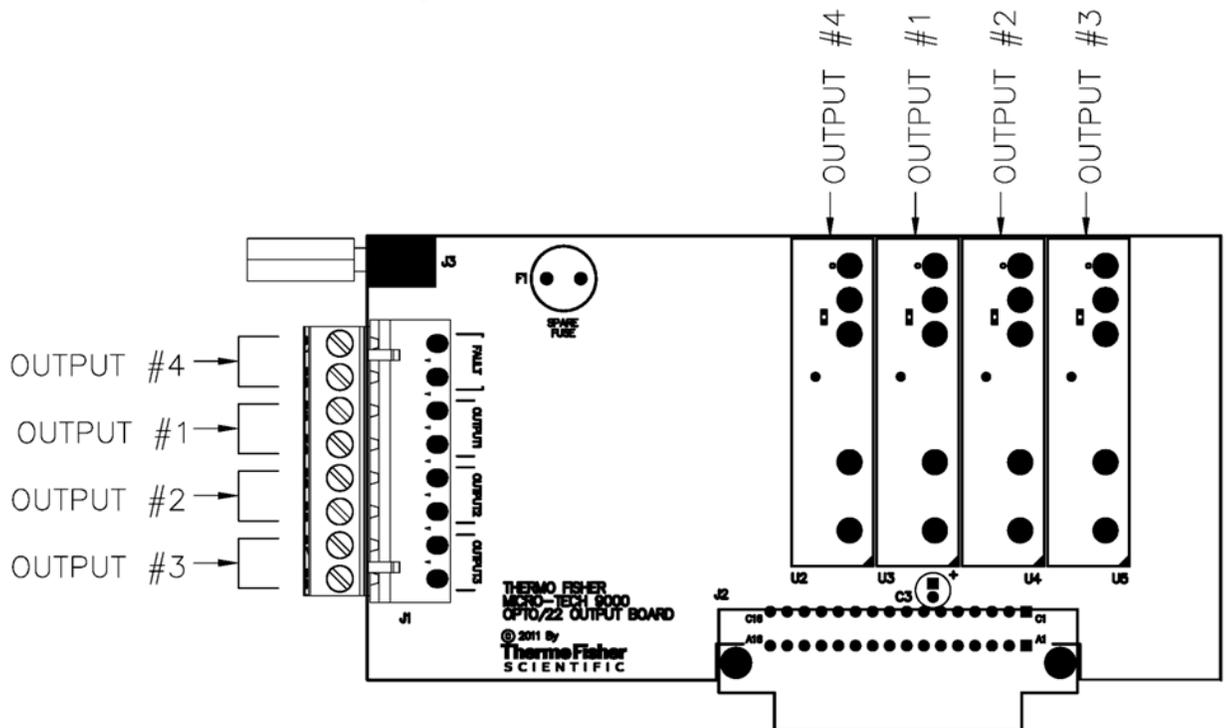


Part number = 102479

## 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.

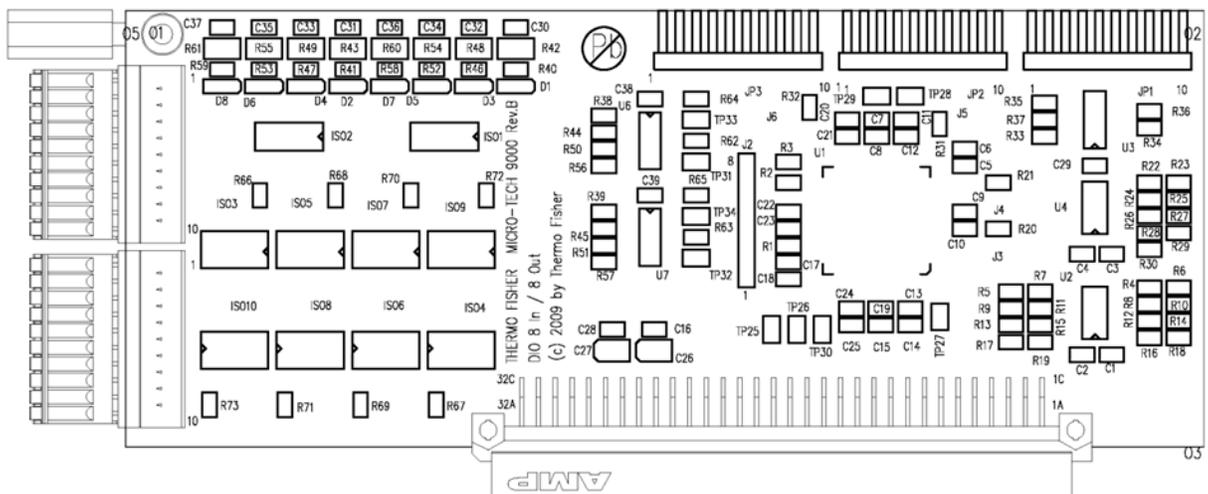
The DIO board provides isolated contact closure inputs and 24-volt current sinking or current sourcing isolated outputs. Output current must be limited to 80 mA maximum, continuous.

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

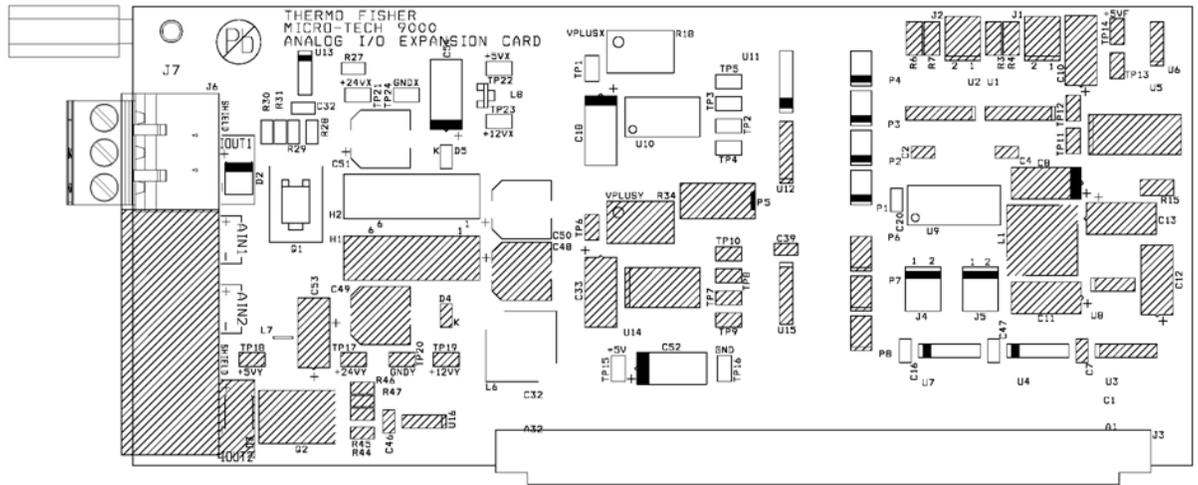
The analog I/O board is available in two configurations described below. Type A has one current output only, whereas, Type B has two voltage inputs and two current outputs. The Micro-Tech can support up to two analog inputs and four analog outputs.

### 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.

- | Output
  - | Rate
  
- | 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
  - | Moisture compensation
- | Outputs
  - | Rate

#### High-Level Inputs (Two Channels)

Only 1 input is available on the Micro-Tech 9106

Differential voltage.

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

Current (Requires Jumper Selection)

- | Input Range (mA)

**Additional Installation Information**  
Analog I/O Boards

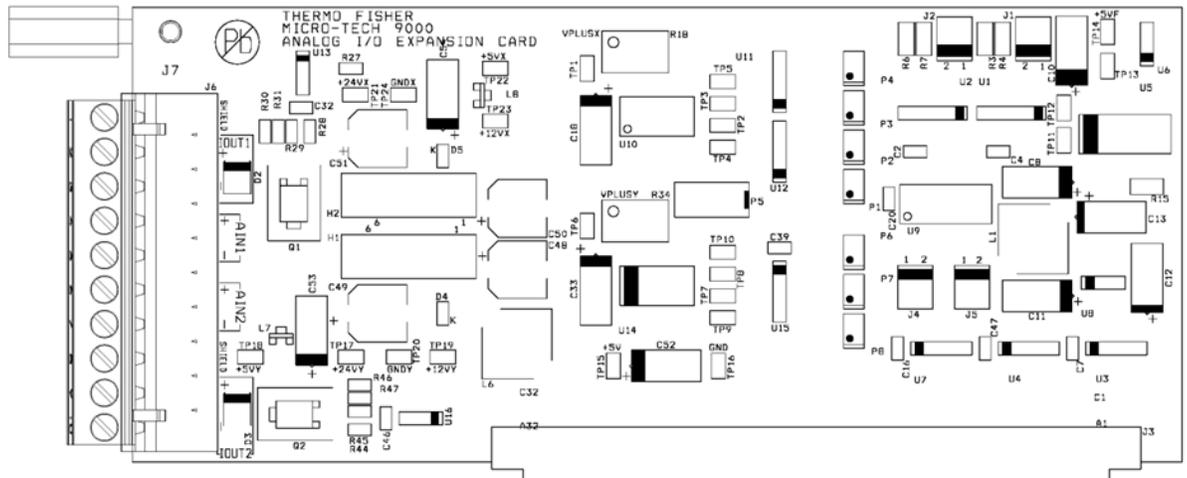
- | 0 to +20 mA
- | +4 to 20 mA
- | Converted Display (Volts)
  - | 0 to +5 V
  - | +1 to +5 V
- | Jumpers J1 and/or J2 are used to select 250 ohm resistance for the Current inputs.
- | Input impedance: 100 k nominal (differential)
- | Maximum usable input voltage: 106% of full scale
- | Non-isolated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

## 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:  $\pm 30$  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 9106 Reference Manual.

**Installation**

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.

<b>Jumpers</b>						
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

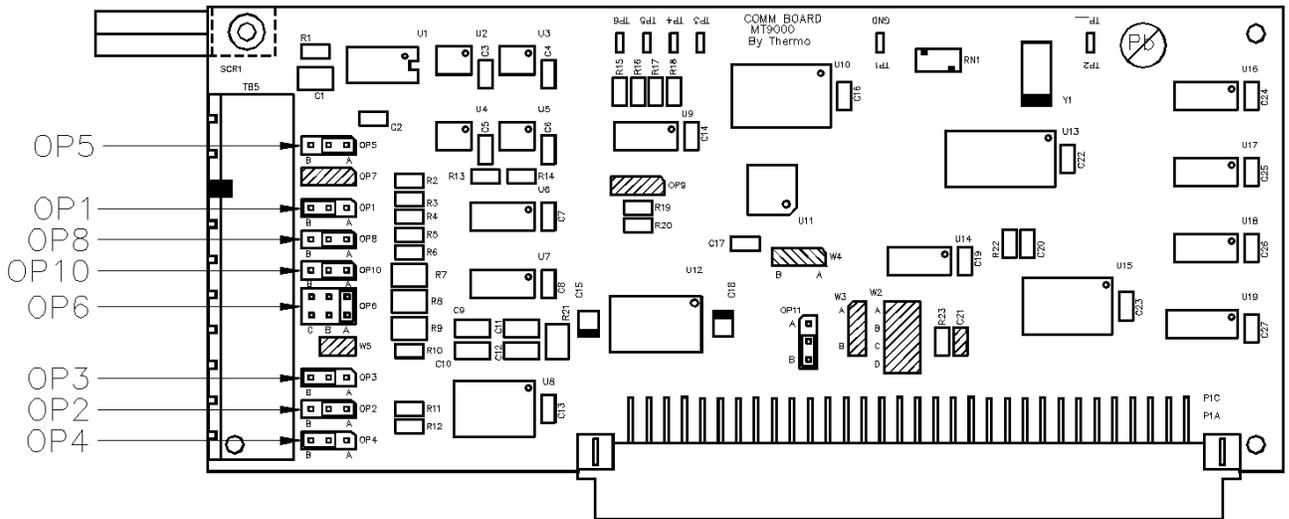
"A" Terminated

"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.

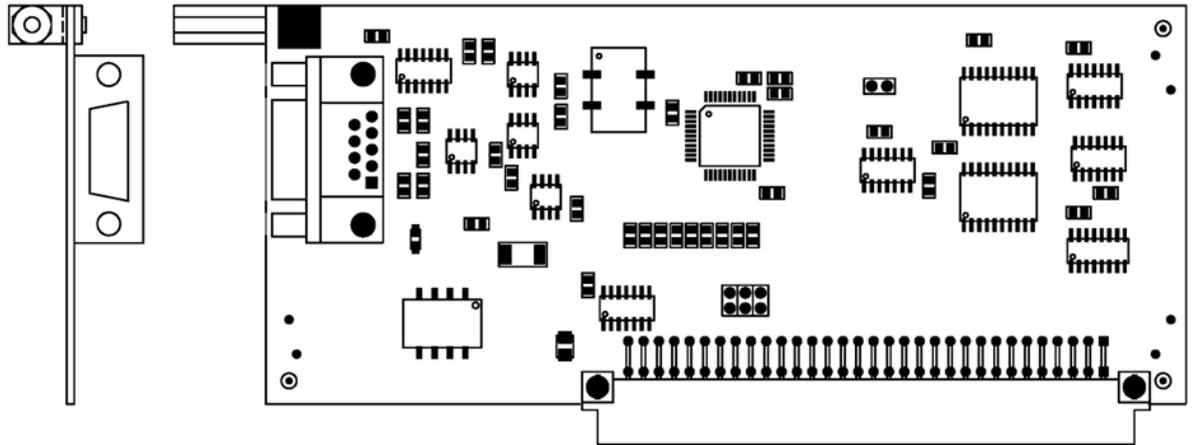
Profibus-DP is the performance-optimized version specifically dedicated to time-critical communication between automation systems and distributed peripherals. It is typically used to transfer I/O images between a main PLC and remote devices (sensors, actuators, transmitters, etc.). In this case, it will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

**Additional Installation Information**  
PFM Board

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

**Board Diagram**

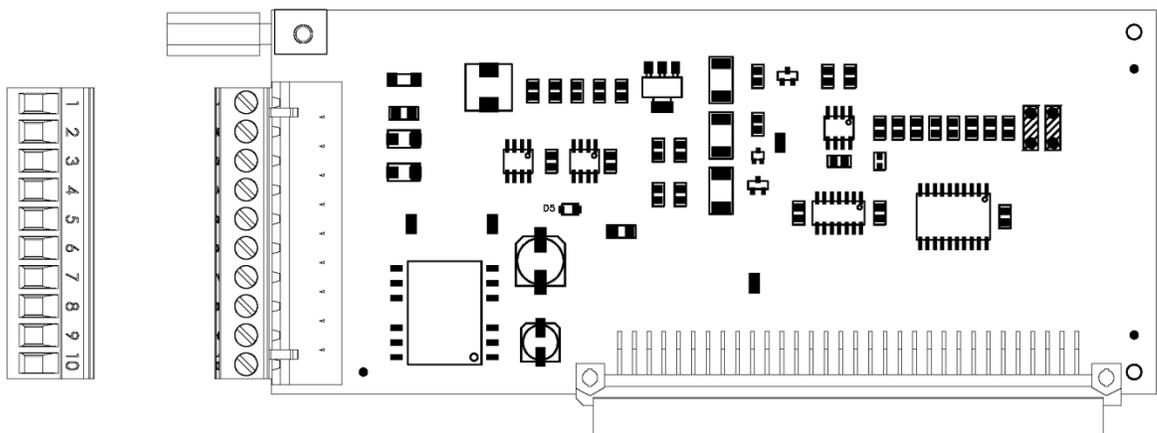


Part number = 102936

**PFM Board**

The PFM (Pulse Frequency Modulation) board can be installed into any of the 4 expansion slots on the Mother Board. This board accepts the unconditioned/raw mass flow PFM signal from the DE10/DE20 sensor. No configuration jumpers or switches are located on this board.

**Board Diagram**



Part number = 101019



# 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.

**AZT** Auto zero-tracking.

**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.

**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.

**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.

**Ton** Standard (2,000# or 2,000 lb.).

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

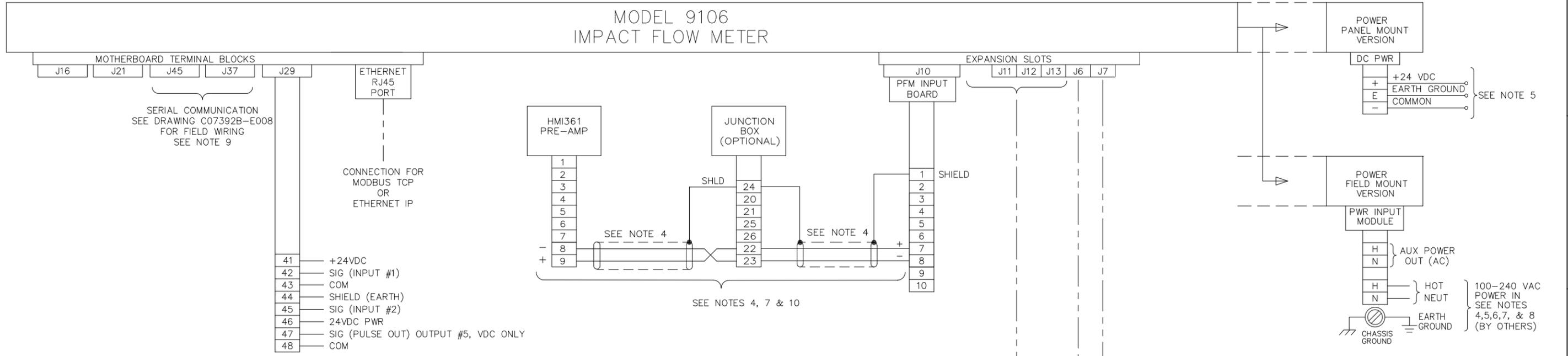
**PFM (Pulse Frequency Modulation) Board** The PFM board is located on the motherboard (Any of the 4 expansion slots). This board accepts the unconditioned mass flow signal from the impact sensor. No configuration jumpers or switches are located on this board.

# Attached Drawings

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

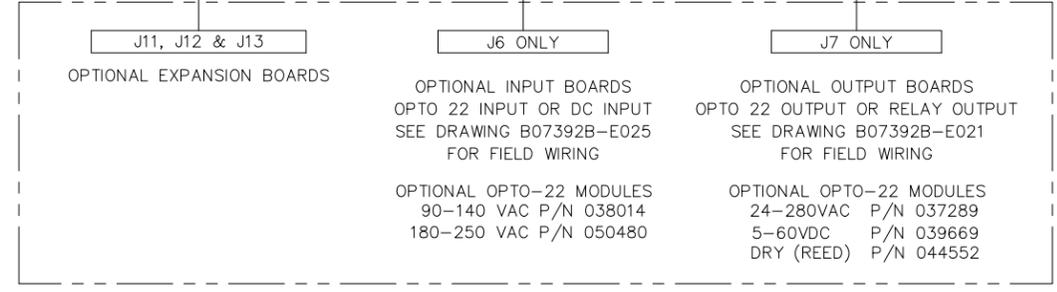
Description	Document
Field-Wiring Diagrams	
Micro-Tech 9106	D07392B-E031
Analog I/O Board	B07392B-E003
8-In/8-Out Digital Board	B07392B-E005
Serial Communication	C07392B-E008
Siemens Profibus Board	C07392B-E011
Communication Board	C07392B-E017
Notes—Micro-Tech 9000	C07392B-E018
Digital Output Boards	C07392B-E021
Anybus Comm for Device Net	B07392B-E022
Digital Input Boards	B07392B-E025
4–20mA Out Board	B07392B-E026

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



**NOTES: READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM**

- NOT APPLICABLE.
- NOT APPLICABLE.
- 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).
- 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.
- USE BELDEN #8760 (P/N 003249) 18 AWG 2 CONDUCTOR SHIELDED CABLE OR EQUIVALENT. MAXIMUM TOTAL CABLE RUN IS 1000 FEET(305M). CONNECT SHIELDS ONLY WHERE SHOWN.



**OPTIONAL BOARDS**

**MODEL 9106 IMPACT FLOW METER  
DIGITAL INPUTS AND OUTPUTS**

**REQUIRED DIGITAL INPUTS AND OUTPUTS**  
 INPUT: NONE  
 OUTPUT: NONE

**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)

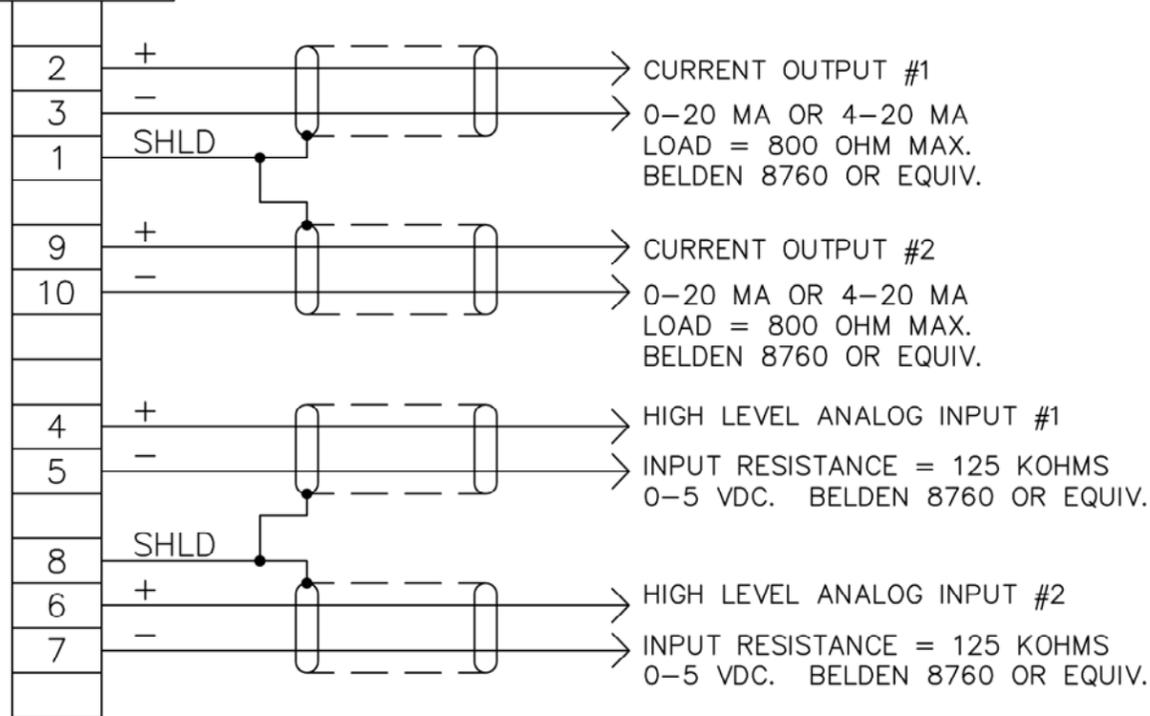
CADD DATABASE: AUTOCAD

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 inadvertent or deliberate 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	TOLERANCE X ± .1 ± 3 mm .X ± .06 ± 1.5 mm .XX ± .03 ± .75 mm .XXX ± .010 ± .254 mm FRACT. ± 1/16 ± N/A ANGLES ± 1/2° ± 1/2°	
NEXT ASS'Y		ENG PEP DATE 11/7/12 DWN PEP DATE 11/7/12 CHK MFM DATE 11/7/12
CUST ORDER NO		<b>ThermoFisher</b> <b>SCIENTIFIC</b> FIELD WIRING DIAGRAM MICRO-TECH 9106
CUSTOMER LOCATION		
USER LOCATION		PART NO: D 07392B-E031 DRAWING NUMBER: C REV: C

REV	ECO NO	MICRO	DESCRIPTION	DATE	BY	APPD
C	3322		REMOVE LOAD CELL WIRING, NOT PART OF 9106.	4/18/13	PEP	TMN
B	3044		ADD "VDC ONLY" TO MOTHERBOARD PULSE OUTPUT	2/28/13	PEP	TMN
A	3027		RELEASED	11/7/12	PEP	MFM

INTEGRATOR  
MICRO-TECH 9000

ANALOG I/O  
BOARD



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

CURRENT OUTPUT #2  
0-20 MA OR 4-20 MA  
LOAD = 800 OHM MAX.  
BELDEN 8760 OR EQUIV.

HIGH LEVEL ANALOG INPUT #1  
INPUT RESISTANCE = 125 KOHMS  
0-5 VDC. BELDEN 8760 OR EQUIV.

HIGH LEVEL ANALOG INPUT #2  
INPUT RESISTANCE = 125 KOHMS  
0-5 VDC. BELDEN 8760 OR EQUIV.

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  
JOB NO

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

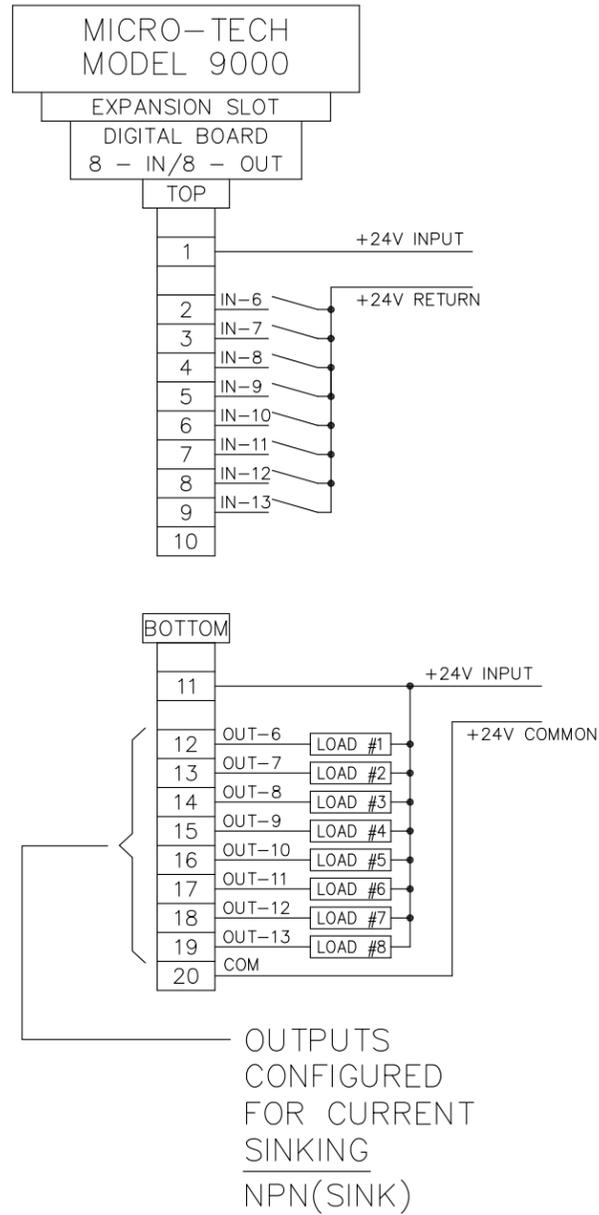
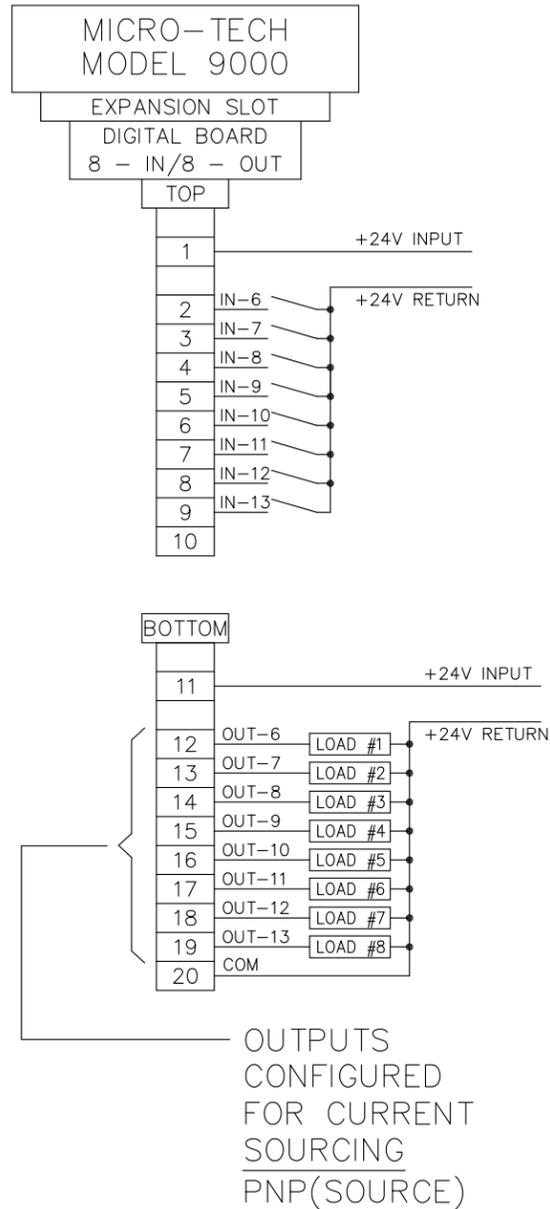
PART NO DRAWING NUMBER REV

**B**07392B-E003 A

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

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		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 ± .15 mm	CHK MFM	DATE 8/26/11
.XXX	± .03 ± .76 mm		
FRACT.	± .010 ± .254 mm		
ANGLES	± 1/16 ± N/A		
	± 1/2° ± 1/2°		

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SCIENTIFIC

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

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

NEXT ASS'Y	
CUST ORDER NO	
CUSTOMER LOCATION	
USER LOCATION	

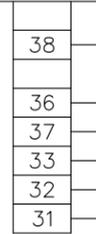
PART NO	DRAWING NUMBER	REV
	<b>C07392B-E005</b>	B

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

INTEGRATOR  
MODEL 9000

COMMUNICATION A

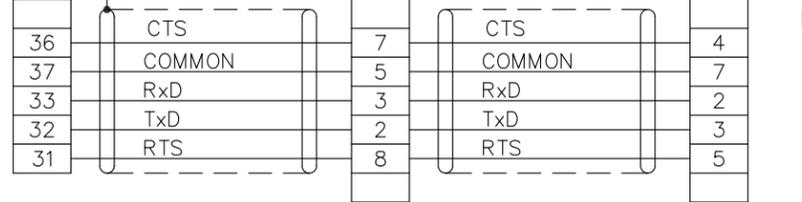
J37



RS-232  
STANDARD  
9 PIN  
CONNECTOR

OR

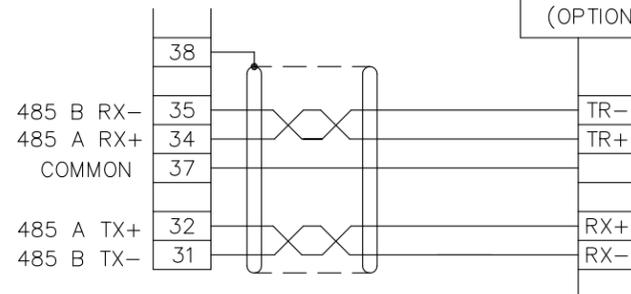
RS-232  
STANDARD  
25 PIN  
CONNECTOR



RS-232 SERIAL OUTPUT  
CABLE: 8 CONDUCTOR, SHIELDED,  
(DEPENDING ON APPLICATION)  
MAXIMUM LENGTH: 50 FT  
BELDEN 9538 OR EQUIVALENT  
(SEE INSTRUCTION MANUAL)

OR

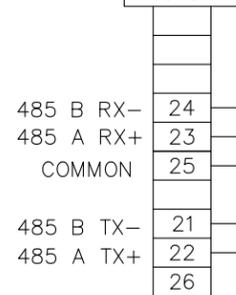
RS-485  
REMOTE  
DEVICE  
(OPTIONAL)



RS-485 SERIAL OUTPUT  
MAXIMUM LENGTH: 4000 FT  
BELDEN 9830 OR EQUIVALENT  
(SEE INSTRUCTION MANUAL)

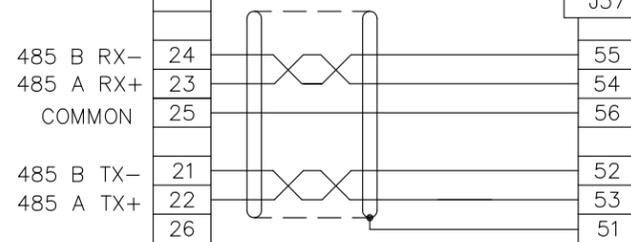
COMMUNICATION B

J45



RS-485  
REMOTE  
DIGITIZER  
(ONLY)

J37



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
TOLERANCE UNLESS SPECIFIED OTHERWISE DIMENSIONS ARE IN INCHES AND (mm)	ENG MFM DATE 8/26/11
	DWN RAE DATE 8/26/11
	CHK MFM DATE 8/26/11
	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	

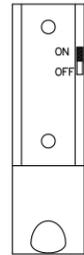
PART NO	DRAWING NUMBER	REV
	C07392B-E008	C

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

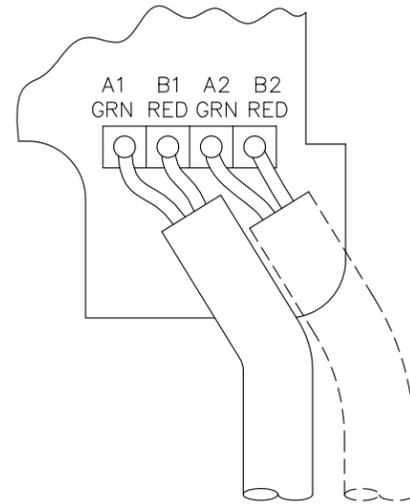
INTEGRATOR  
MICRO-TECH  
9000 SERIES

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	

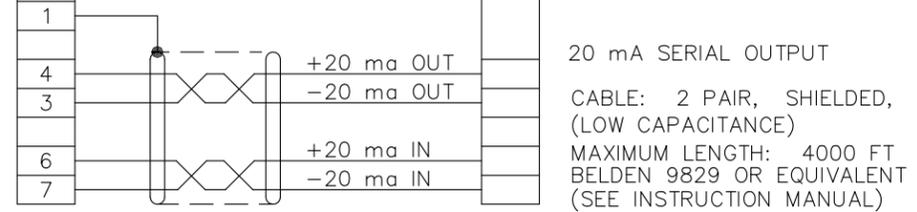
PART NO	DRAWING NUMBER	REV
	C07392B-E011	A

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

INTEGRATOR  
MICRO-TECH  
9000 SERIES

COMM  
BOARD  
(OPTIONAL)

20 MA.  
REMOTE  
DEVICE  
(OPTIONAL)

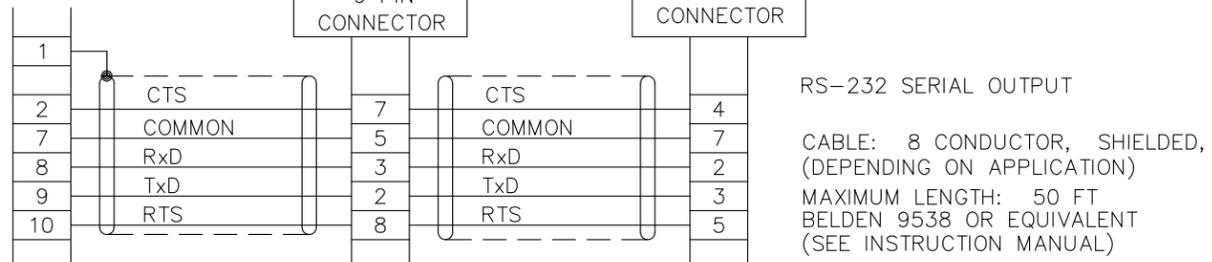


OR

RS-232  
STANDARD  
9 PIN  
CONNECTOR

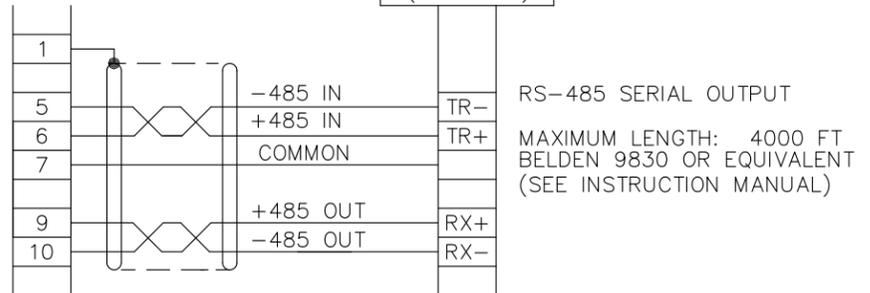
OR

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 ± .15 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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# ThermoFisher SCIENTIFIC

FIELD WIRING DRAWING  
COMMUNICATION BOARD  
MICRO-TECH 9000

PART NO	DRAWING NUMBER	REV
	<b>C</b> 07392B-E017	A

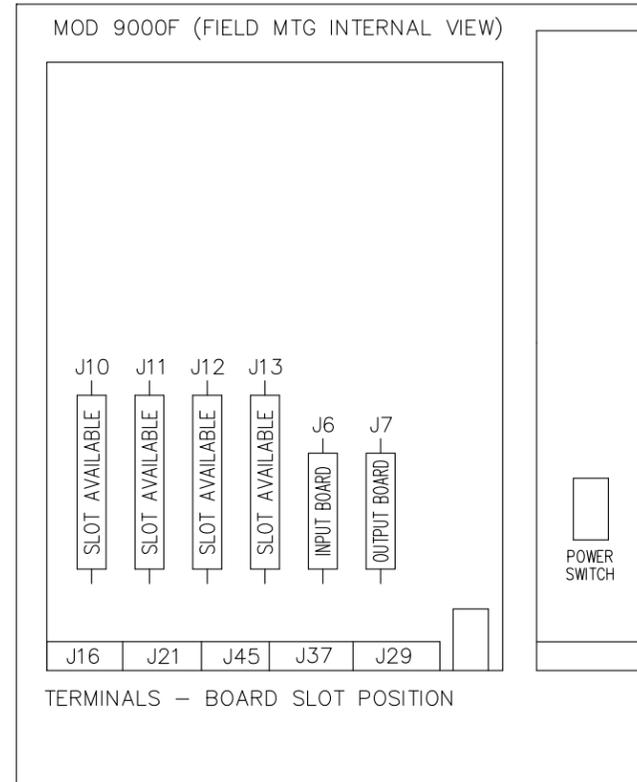
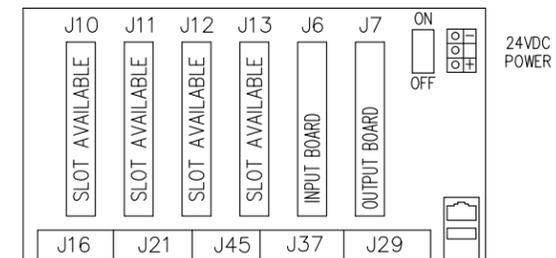
A	2959	RELEASED	6/6/12	PEP	MFM
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY APPD

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)



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	± .06	DWN MFM	DATE 8/26/11
.XX	± .03	CHK MFM	DATE 8/26/11
.XXX	± .010		
FRACT.	± 1/16		
ANGLES	± 1/2°		
NEXT ASS'Y			
CUST ORDER NO			
CUSTOMER LOCATION		USER LOCATION	

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FIELD WIRING DIAGRAM  
NOTES  
MICRO-TECH 9000

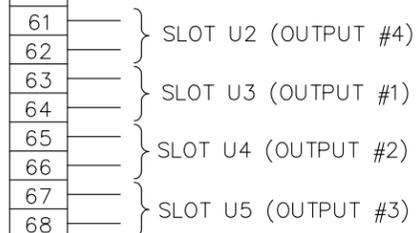
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY	APPD
B	3013		CORRECTED FIELD MNT VOLTS AND FREQUENCY	9/21/12	PEP	TMN
A	2959		RELEASED	6/6/12	PEP	MFM

PART NO	DRAWING NUMBER	REV
	<b>C</b> 07392B-E018	B

INTEGRATOR  
MICRO-TECH 9000

J7

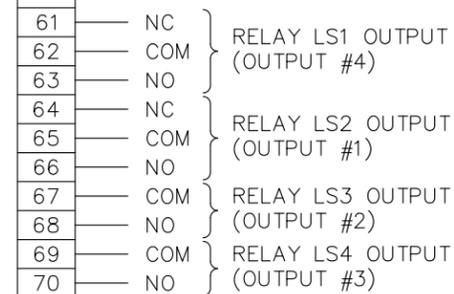
OPTO22  
OUTPUT BOARD



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
	<b>C07392B-E021</b>	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

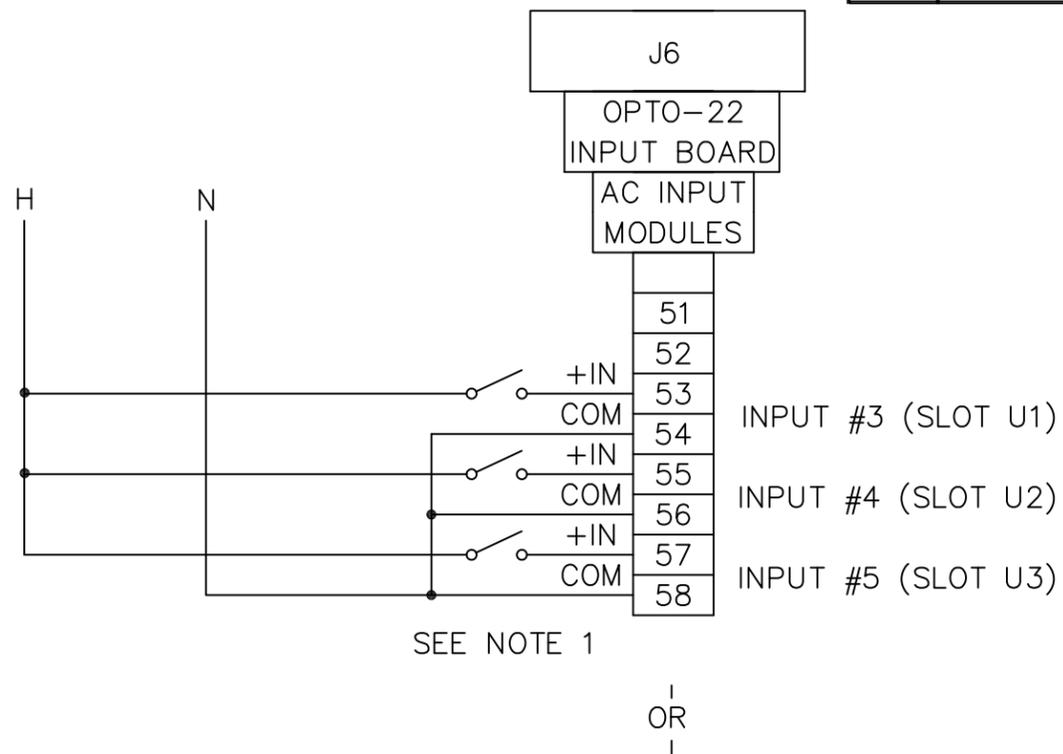
NEXT ASS'Y
CUST ORDER NO
CUSTOMER LOCATION
USER LOCATION

PART NO	DRAWING NUMBER	REV
	<b>B07392B-E022</b>	A

B

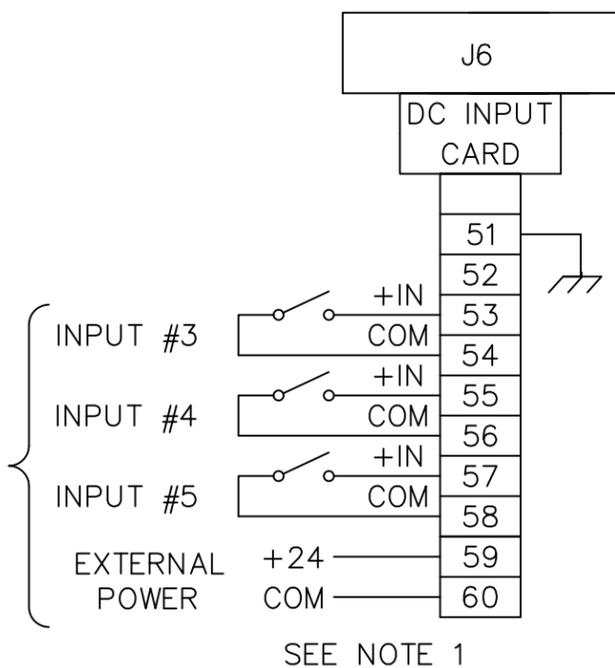
A

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
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- 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.

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



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
	<b>B07392B-E025</b>	B

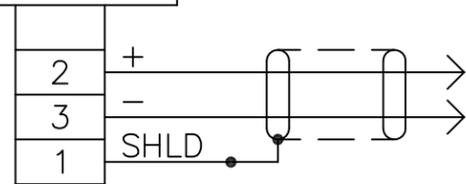
B	3027	ADDED NOTE 2. ADD SLOT NAME FOR OPTO22 BD	11/6/12	PEP	MFM
A	2959	RELEASED	6/6/12	RAE	MFM
REV	ECO NO	MICRO	DESCRIPTION	DATE	BY APPD

Derived From B07361B-E006

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4-20mA OUT BOARD



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

ITEM	PART NO	QTY	DESCRIPTION	DWG NO/SPEC
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**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
	<b>B07392B-E026</b>	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

Derived From B07361B-E006

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