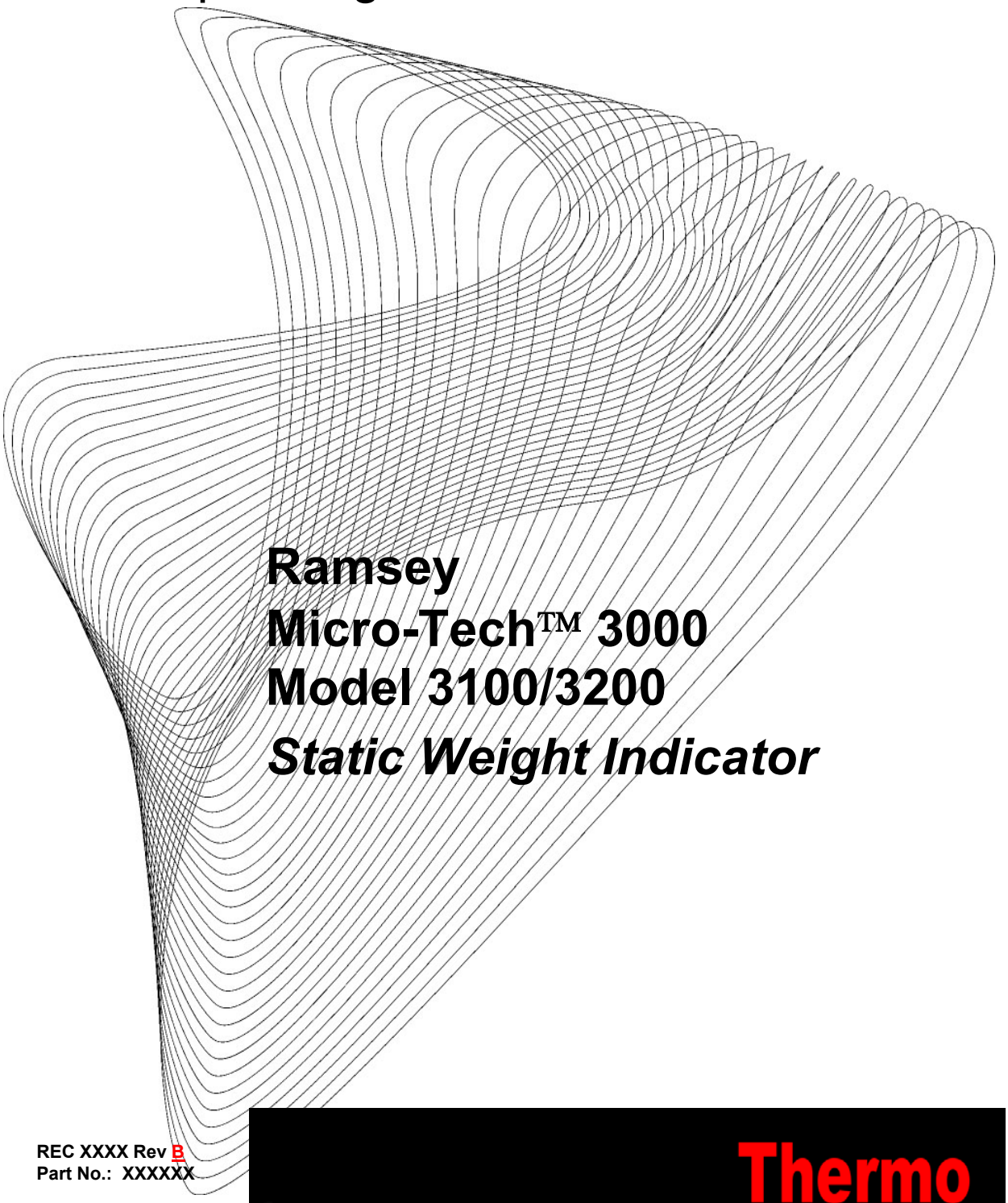
Operating and Service Manual



Ramsey
Micro-Tech™ 3000
Model 3100/3200
Static Weight Indicator

REC XXXX Rev B
Part No.: XXXXXX

Thermo
ELECTRON CORPORATION

Ramsey Micro-Tech ™ 3000 Model 3100/3200 Static Weight Indicator

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Revision History

A Preliminary	April 2003	Manual first released
B	October 2006	Technical Specification Correction (Fusing)

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List of Tables

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About this Manual

This manual provides the information you need to install, operate, and maintain the *Micro-Tech 3100.*

Read this manual before working with the product. For personal and system safety, and for the best product performance, make sure you thoroughly understand the manual before installing or using this product.

Who Should Use this Manual

The *Micro-Tech 3100* manual is a learning resource and reference for anyone concerned with installing, operating, or maintaining *Ramsey Micro-Tech 3100*.

Read this manual before working with the system. For personal and system safety, and for the best product performance, make sure you thoroughly understand the manual before installing, operating, or maintaining this machine.

Organization of the Manual

This manual is organized into five chapters and six Appendixes.

Chapter 1: Introduction to the Micro-Tech 3100 gives an overview of the device's capabilities, describes its functions, and lists its technical specifications.

Chapter 2: Installing the Micro-Tech 3100 provides information about installing the *Static Weight Indicator* including procedures for mounting, wiring, and configuring the *Micro-Tech 3100* system.

Chapter 3: Micro-Tech 3100 Operation provides an overview of the *Micro-Tech 3100* front panel, a description of how the menus operate, and information about setting up, calibrating, and operating the *Static Weight Indicator*.

Chapter 4: Micro-Tech 3100 Maintenance provides an overview of standard maintenance associated with the *Mod. 3100*.

Chapter 5: Micro-Tech 3100 Replacement Parts- provides a list of replacement parts for the *Mod. 3100* and part ordering information.

Appendix A: Micro-Tech 3100 Menu gives an overview of the menus.

Appendix B: Digital Input/Output

Documentation Conventions

The following conventions are used in this manual to help easily identify certain types of information:

- *Italic* is used to introduce new terms and for emphasis.
- *Italic/blue* type is used for references to other sections of the manual and work as links on line and in pdf format.
- The names of setup, calibration displays, menu displays, and variables are shown in **FULL CAPITALS**.
- The names of keys on the front panel are shown in **BOLD CAPITALS**.

Safety Messages

Instructions in this manual may require special precautions to ensure the safety of the personnel performing the operations.

Please read the safety information before performing any operation preceded by this symbol.

There are two levels of safety messages: warnings and cautions. The distinction between the two is as follows:

WARNING

FAILURE TO OBSERVE COULD RESULT IN DEATH OR SERIOUS INJURY.

CAUTION

FAILURE TO OBSERVE MAY CAUSE MINOR INJURY OR DAMAGE THE EQUIPMENT

General Precaution

Do not install, operate, or perform any maintenance procedures until you have read the safety precautions presented.

WARNING

FAILURE TO FOLLOW SAFE INSTALLATION AND SERVICING PROCEDURES COULD RESULT IN DEATH OR SERIOUS INJURY.

- MAKE SURE ONLY QUALIFIED PERSONNEL PERFORM INSTALLATION AND MAINTENANCE PROCEDURES IN ACCORDANCE WITH THE INSTRUCTIONS IN THIS MANUAL.
- ALLOW ONLY QUALIFIED ELECTRICIANS TO OPEN AND WORK IN THE ELECTRONICS CABINET, POWER SUPPLY CABINET, CONTROL CABINET, OR SWITCH BOX.
- COVERS OVER THE ELECTRONICS AND ROTATING PARTS MUST ALWAYS REMAIN IN PLACE DURING NORMAL OPERATION REMOVE ONLY FOR MAINTENANCE, WITH THE MACHINE'S POWER OFF. REPLACE ALL COVERS BEFORE RESUMING OPERATION.
- DURING MAINTENANCE, A SAFETY TAG (NOT SUPPLIED BY THE FACOTRY) IS TO BE DISPLAYED IN THE ON/OFF SWITCH AREAS INSTRUCTING OTHERS NOT TO OPERATE THE UNIT (ANSI:B157.1).

WARNING

HIGH VOLTAGE THAT MAY BE PRESENT ON LEADS COULD CAUSE ELECTRICAL SHOCK.

- ALL SWITCHES MUST BE OFF WHEN CHECKING INPUT AC ELECTRICAL CONNECTIONS, REMOVING OR INSERTING PRINTED CIRCUIT BOARDS, OR ATTACHING VOLTMETERS TO THE SYSTEM.
- USE EXTREME CAUTION WHEN TESTING IN, ON, OR AROUND THE ELECTRONICS CABINET, PC BOARDS, OR MODULES. THERE ARE VOLTAGES IN EXCESS OF 115 V OR 230 V IN THESE AREAS.

WARNING

USE ONLY THE PROCEDURES AND NEW PARTS SPECIFICALLY REFERENCED IN THIS MANUAL TO ENSURE SPECIFICATION PERFORMANCE AND CERTIFICATION COMPLIANCE. UNAUTHORIZED PROCEDURES OR PARTS CAN RENDER THE INSTRUMENT DANGEROUS TO LIFE, LIMB, OR PROPERTY.

WARNING

KEEP HANDS AND CLOTHING AWAY FROM ALL MOVING OR ROTATING PARTS.

WARNING

DO NOT PLACE OR STORE OBJECTS OF ANY KIND ON THE MACHINE.

WARNING

THIS MACHINE SHOULD NOT BE OPERATED AT MORE THAN THE PRODUCTION RATE STATED ON YOUR EQUIPMENT SPECIFICATION SHEET OR USED IN APPLICATIONS OTHER THAN THOSE STATED IN THE ORIGINAL ORDER.

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 Electron* 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, of the Occupational Safety and Health Act, as interpreted by an authorized inspector. *Thermo Electron* will use their best efforts to remedy such violation at a reasonable cost to the buyer.

Thermo Electron 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.

"EXCEPT FOR THOSE WARRANTIES SPECIFICALLY CONTAINED HEREIN, SELLER DISCLAIMS ANY AND ALL WARRANTIES WITH RESPECT TO THE EQUIPMENT DELIVERED HEREUNDER, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE. THE SOLE LIABILITY OF SELLER ARISING OUT OF THE WARRANTY CONTAINED HEREIN SHALL BE EXCLUSIVELY LIMITED TO BREACH OF THOSE WARRANTIES. THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF THE WARRANTIES SET OUT ABOVE SHALL BE LIMITED TO THE REPAIR OR REPLACEMENT OF ANY DEFECTIVE ACCESSORY, PART OR MATERIAL WITH A SIMILAR ITEM FREE FROM DEFECT, AND THE CORRECTION OF ANY DEFECT IN WORKMANSHIP. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES."

Purchaser agrees to underwrite the cost of any labor required for replacement; including time, travel, and living expenses of *Thermo Electron Field Service* Engineer at closest factory base.

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Chapter 1
Introduction to the *Micro-Tech 3100*

This instruction manual contains information on the installation, operation, calibration, and maintenance of the *Micro-Tech™ 3000 Model 3100* or *3200 Static Weight Indicator.* The *Model 3100* is designed for noncommercial use and the *Model 3200* for higher accuracy and in cases where weights and measures approval is required. The manual refers to *Model 3100* only as both operate the same.

1.1 Unpacking and Inspection

The *Micro-Tech 3100* has been properly packaged for shipment and storage, when necessary. Refer to the appropriate manual in the appendix section for unpacking procedures for optional equipment.

Inspect all packages for damage before opening; sometimes the carrier may be responsible for shipping damage. Refer to the appropriate manual in the appendix for inspection procedures for optional equipment.

1.2 Storage

The *Micro-Tech 3100* can be safely stored, with cover, latches secured and hole plugs installed, between -40° to +158° F (-40° to +70° C). The units should be protected against moisture.

1.3 Application

The *Micro-Tech Model 3100 /3200.Field Mount* and *Panel Mount* is a bus-based microcomputer driven instrument used for static weighing of bulk materials. Common application are C-Level, Unitrain Load-out and check weigh bins for in-line conveyor belt scale calibration.

The Static Weight System includes the following principal components :

1. Load Receiving Element

   That element of a scale designed to receive the load to be weighed (for example: platform, deck, rail, hopper, platter, plate, or scoop). See the installation drawing for specific type of load receiving element supplied with your system.

2. Load Cell System

   Thermo Ramsey uses three load cell systems depending on the application. They are tension, compression, and shear beam.

3. Static Weight Indicator Model 3100

   Field mount or panel mount static weight indicator is designed to convert force signals from 1 to 6 strain gauge load cells to an accurate stable signal for local and remote weight indication. The static weight indicator can accept up to four scale inputs depending on the selection of plug-in A/D boards.

Remote indication may be by digital and analog outputs or by serial communications that can be configured according to the following standard. All are optically isolated.

- RS423/RS232C For point-to-point asynchronous bidirectional communications, maximum 50 ft (15 m). Modem capability.

- RS485/RS422 For point-to-point multidrop 4 wire bidirectional communications, maximum 4000 ft (1200 m).

- Current Loop For high immunity bidirectional asynchronous communications. Passive only.

Figure 1-1: ***Micro-Tech 3100/3200*** **Field Mount** ***Static Weight Indicator***

Figure 1-2: ***Micro-Tech 3100/3200*** **Panel Mount** ***Static Weight Indicator***

1.4 Configuration

The standard configuration of the *Static Weight Indicator* includes the following:

- Single channel load cell input to a max of 6 load cells
- Single current output on Mother Board
- 5 programmable digital inputs
- 4 programmable outputs
- 1 fault output
- Serial communications
- Solid state output
- 3 circuit board expansion slots that can accommodate the following boards if needed.

1. Single channel current output board
2. 16 digital inputs/4 digital outputs
3. 4 digital inputs/16 digital outputs
4. Serial communication board
5. *Allen-Bradley remote I/O*
6. *Profibus-DP* board
7. *DeviceNet*

1.5 Symbol Identification

Table 1-1 describes the symbols used in this manual and associated drawings.

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)

1.6 Technical Specifications

Enclosure

Field Mount

NEMA 4X (IP65), dust and watertight
17 x 13 x 7 inches
Fiberglass reinforced polyester
2 position-mounting feet
Steel chassis providing EMI/RFI shielding

Panel Mount

Size: 12 x 4 x 7.5 inches
Material: Chromated mild steel

Environmental Conditions

Mounting

Should be mounted as close to the load cells as possible without being exposed to excessive heat or moisture
Field Mount suitable for outdoor mounting

Temperature (Ambient)

Storage: -40° to +158° F (-40° to +70° C)
Operating: +14E to +122E F (-10E to +50E C)

Relative Humidity

Up to 95%, non-condensing

Pollution Degree

2

Altitude

Up to 6,561 ft (2000m)

Power Requirements

Voltage Range

Nominal voltage +10%, -15%

Nominal Voltage

115/230 VAC, selectable

Nominal Frequency

50/60 Hz

Fusing

400mA Slo-Blo, 110/120 VAC, Type T
200mA Slo-Blo 220/240 VAC, Type T

Formattato: Inglese (U.S.A.)

Power Consumption

50 VA max

Maximum Non-Destructive Input Voltage

150/300 VAC for 1 minute

Over voltage Category

Category II

DC Power Supply

Auxiliary Power Supply Output (Alarm Contacts, etc.)

Output voltage:	24 VDC
Isolation:	Yes – 500 volts
Output ripple:	1.0 V peak to peak typical
Output current:	600 mA maximum

Short circuit protection

Load Cell (Weight)

Load cell input circuits

Number:	Up to six (6) 350-ohm load cells in parallel. Cable distance 200 ft or less (3000 ft with sense)
Sensitivity:	0.5mV/V to 3.5 mV/V (keyboard selectable)
Input Impedance:	100 k-ohm minimum
Maximum Usable Signal:	114% of 3mV/V
Displayed A/D counts	(3mV/V):112368
Isolation:	Non-isolated
Max non-destructive input voltage:	± 6 V relative to ground
Load Cell Cable Shield:	Connected to earth ground

Load Cell Excitation Power Supply

10 VDC ±10%, 220 mA

Minimum load impedance (operating) 58 ohms

Output short circuit, 1.5 A maximum

Excitation-Sense Circuitry

6 Wire System; cable distance over 200 ft. (not to exceed 3000 ft.).

Nominal input voltage:	±5 VDC (10 volts)
Input impedance:	100 k-ohm minimum
Jumper selectable:	Local or remote sense

Digital Input

4 High Frequency Input (DC).
Optocoupled
Internal Power supply for dry contact input.

Power Supply:	+24V external
Tec. Features:	24VDC, 6 mA
Minimum Current Level:	0,25 mA or less
Maximum Current Level:	3 mA or great
Cable Length:	2500 mt. cross section 1,5 mmsq (150 Ω Max.)

Digital Output

3 Configurable Digital Output; interface with TTL,CMOS, RELAY
1 Failure Digital Output (safe output)

"On" State Delay:	10ms
Tec. Features:	28 VDC, 100mA DC max.

With Power Supply or Instrument Error the contact is kept normally OFF

Input source Current

-2 mA nom. at 0 VDC

Max. non-destructive Input voltage

±50 peak, continuous

Current Output

1 current output on Motherboard

Output range: User selectable 0 – 20 mA or 4-20 mA, representing 0 to 100% variable.

Resistive load: 800 ohm max. Loop

Capacitive load:No limit

Standard Communication

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 232 C provides support for modem.
Data rate:	110 to 19200, operator selectable from the keyboard.
Data Format:	Asynchronous, bit-serial, selectable parity, data length, and stop bits.
Optical Isolation:	250 VRMS max.
Input Voltage:	±30 Vdc max. (RS-232C)
	±15/-10 Vdc max. (RS-485)
Cable Length:	50 feet max. (RS-232C)
	4000 feet max (Rs-485 and 20 mA)

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Chapter 2
Installing the Micro-Tech 3100

This chapter describes the *Static Weight Indicator* installation procedure, hardware configuration, and initial programming. Initial programming is a machine directed procedure prompting the operator to enter required conveyor and belt scale parameters. After all parameters have been entered, the *Static Weight Indicator* performs an unassisted zero and span calibration.

2.1 Safety Precautions

CAUTION

DO NOT INSTALL, OPERATE, OR PERFORM ANY MAINTENANCE PROCEDURES UNTIL YOU HAVE READ THE SAFETY PRECAUTIONS THAT FOLLOW.

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.

WARNING

THE *INSTRUMENT* DOOR SHOULD ALWAYS REMAIN CLOSED DURING OPERATION, AND ONLY OPENED FOR MAINTENANCE PROCEDURES. BE SURE TO CLOSE THE COVER 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 VOLT METERS TO THE SYSTEM.

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 115 V OR 230 V 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 ELECTRON) 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.

TO ADAPT PRODUCTION RATES OR APPLICATIONS, CONSULT *THERMO ELECTRON* PRODUCTS *CUSTOMER SERVICE* FOR RECOMMENDATIONS.

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.

2.2 Incoming Power

CAUTION

VERIFY THAT THE INPUT VOLTAGE IS CORRECT WITH AN AC VOLTMETER BEFORE YOU CONNECT IT TO THE *INSTRUMENT*.

CAUTION

EARTH GROUND MUST BE PROVIDED TO THE *INSTRUMENT*. DO NOT USE CONDUIT TO PROVIDE THIS GROUND.

CAUTION

A READILY ACCESSIBLE DISCONNECT DEVICE 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.

2.2.1 Critical Wiring Conditions

1. Ensure power is off at the mains
2. Do not route load cell and signal cables in the same conduit with power cables or any large source of electrical noise.
3. Earth ground all enclosures and conduits. A ground connection between all conduits is required.
4. Connect the shields *ONLY* where shown.
5. Check that all wires are tight in their connections.
6. Never use a "megger" to check the wiring.
7. A readily accessible disconnect device shall be incorporated in the field wiring. This disconnect should be in easy reach of the operator and it must be marked as the disconnecting device for the equipment.
8. All conduits should enter the bottom of the enclosure. Do not run conduit through the top or sides of the enclosure.

2.3 Field Mount Installation

The field mount *Static Weight Indicator* should be mounted in a controlled environment not be exposed to excessive vibration, heat, or moisture, and protected from direct sunlight. The *Static Weight Indicator* may be mounted up to 3,000 feet from the scale (Figure 2-1

2.3.1 Mounting

Mount the *Static Weight Indicator* 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.

Figure 2-1: Typical *Micro-Tech 3100/3200* Installation

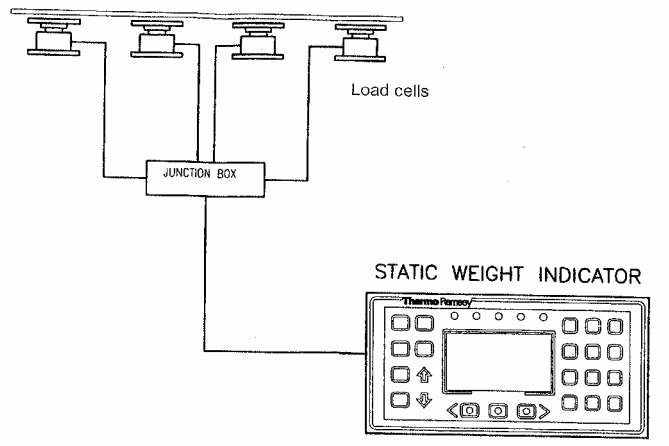
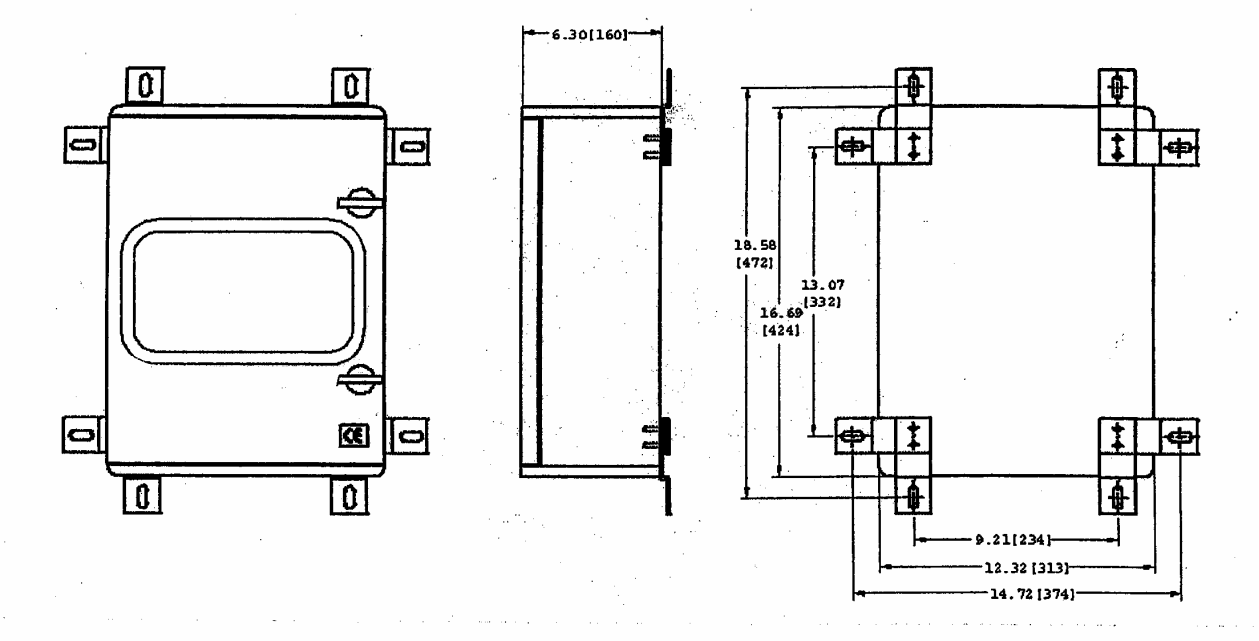


Figure 2-2: Electrical and Mounting Guidelines of the Micro-Tech Model 3100/3200 (Field Mount) ***Static Weight Indicator***



CAUTION

REFER TO THE FILED WIRING DIAGRAM AS A GUIDE IF YOU DO NOT HAVE A SPECIFIC WIRING DIAGRAM FOR YOUR SYSTEM. FOLLOW YOUR LOCAL ELECTRICAL CODES AND REGUATIONS FOR MINIMUM WIRE SIZE AND ROUTING.

2.3.2 Connecting Incoming Power - Field Mount

To connect the incoming power, use the following procedure.

Note: All units shipped from the factory are configured for 115 VAC. If you desired 230 VAC make sure the power selector switch is set to 230 VAC (*Section 2.5.1*).

1. Loosen the screw latch mounted on the front chassis. Open the door (see Figure 2-3*)*.
2. Route incoming power wiring through a conduit hole at the bottom right of the enclosure. Leave ample loose wiring (typically 8”) to facilitate removing the terminal connectors.
3. Wire safety ground terminal located on the side of the chassis.
4. Wire HOT to Terminal L on *Power Input Terminal*.
5. Wire NEUTRAL to Terminal N on *Power Input Terminal.*
6. If additional I/O is required at 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”) to facilitate removing the terminal connectors.

7. All additional field wiring operation at voltages less then 30 V must be located on the left bottom of the enclosure. Leave ample loose wiring (typically 8”) to facilitate removing the terminal connectors.
8. Close the inside panel and tighten the screw to secure the cover.

Figure 2-3: Field Mount Inside Front Panel

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2.4 Panel Mount Installation

The panel mounted *Static Weight Indicator* is suitable for mounting in a control panel. The control panel should not be exposed to excessive vibration, heat, or moisture. The front bezel, when properly seated, forms a dust seal.

A two (2) inch clearance around the top and bottom of the *Static Weight Indicator* is required for convection cooling. Additional clearances may be required if equipment mounted directly below generates excessive heat. Clearance in the back is necessary for wiring access and fuse replacement. Clearance on the side is necessary for inserting the chassis holding brackets from the back after insertion of the *Static Weight Indicator*.

2.4.1 Mounting

Provide a cutout in the panel and insert the *Static Weight Indicator* after removing the holding brackets. From the back, insert the holding brackets on both sides of the instrument. Tighten the holding brackets to support the *Static Weight Indicator* and form the dust seal.

Figure 2-4: Electrical and Mounting Guidelines *Micro-Tech 3100* (Panel Mount)

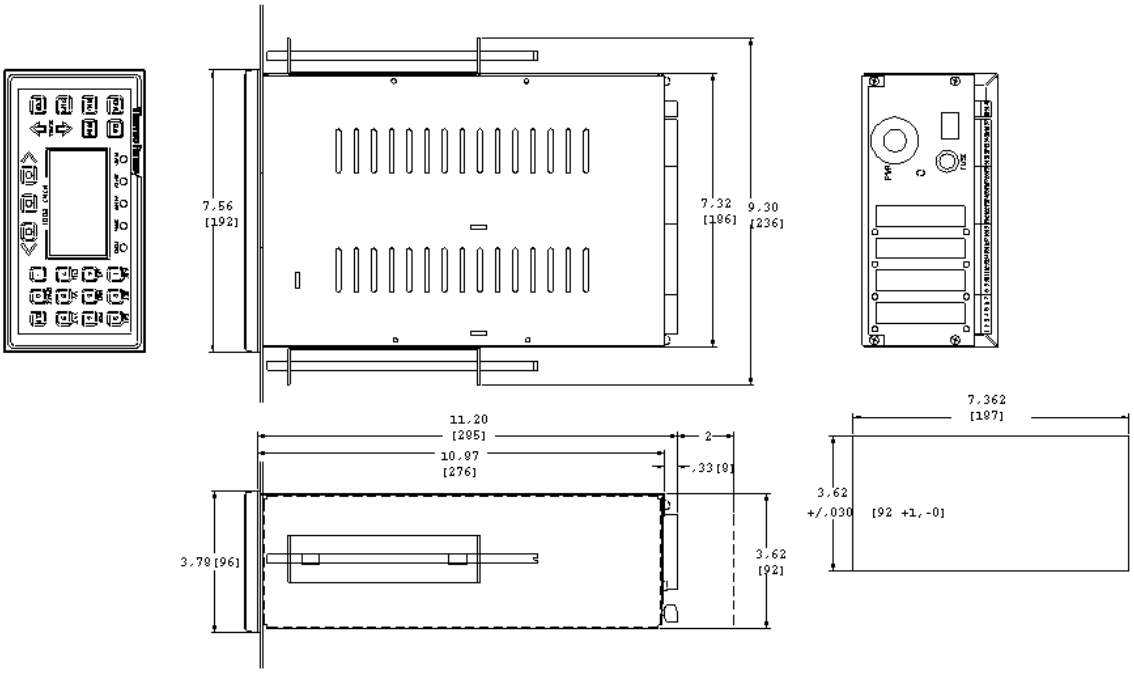

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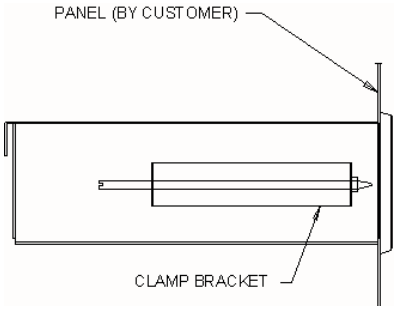
Figure 2-5: Installation *Micro-Tech Model 3100* (Panel Mount)



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- See Figure 2-4 for panel cutout, outline, and mounting dimensions.
- The large rubber band shipped with the unit can be used to hold clamp brackets in place during installation.

Remove clamp brackets and slide chassis assembly through front of cut-out. Re-install clamp brackets into chassis and tighten threaded rods against the back of the panel until the unit is secure.

2.4.2 Connecting Incoming Power – Panel Mount

To connect incoming power for panel mount installation, use the following procedure.

Note: All units shipped from the factory are configured for 115 VAC. If 230 VAC is desired, refer to *Section 2.5.1*, motherboard *configuration Jumpers and Switches*.

- For input power, use 14 AWG standard wire
- Wire the safety ground terminal located on the right backside of the enclosure.
- Wire the HOT to terminal labeled 1 of Terminal L on the Power Input Terminal.
- Wire the NEUTRAL to the terminal labeled 2 of Terminal N on the Power Input Terminal.

2.5 *Static Weight Indicator* Configuration

The *Micro-Tech 3100/3200* is one of a family of products that is supported by a common hardware platform. Configuration of the hardware platform and additional circuit boards enable the hardware platform to be used for several discrete instruments.

Wire jumpers are installed at the factory for the instrument ordered and should not have to be reconfigured in the field.

Switches and removable jumpers are described in this section. The default position is noted in each description and, in most cases, is not changed.

2.5.1 Mother Board Configuration Jumpers and Switches

TO BE PERFORMED BY QUALIFIED SERVICE PERSONNEL ONLY.

1. *General Purpose Digital Inputs*

   Located on the motherboard are provisions for 5 programmable status inputs. The programmable inputs may be configured as normally open or normally closed. Inputs are desigend for dry contacts.

   Input 1 may also be used as a speed senor input. Refer to **Table 2-1** for configuration information.

Figure 2-6: Micro-Tech Motherboard

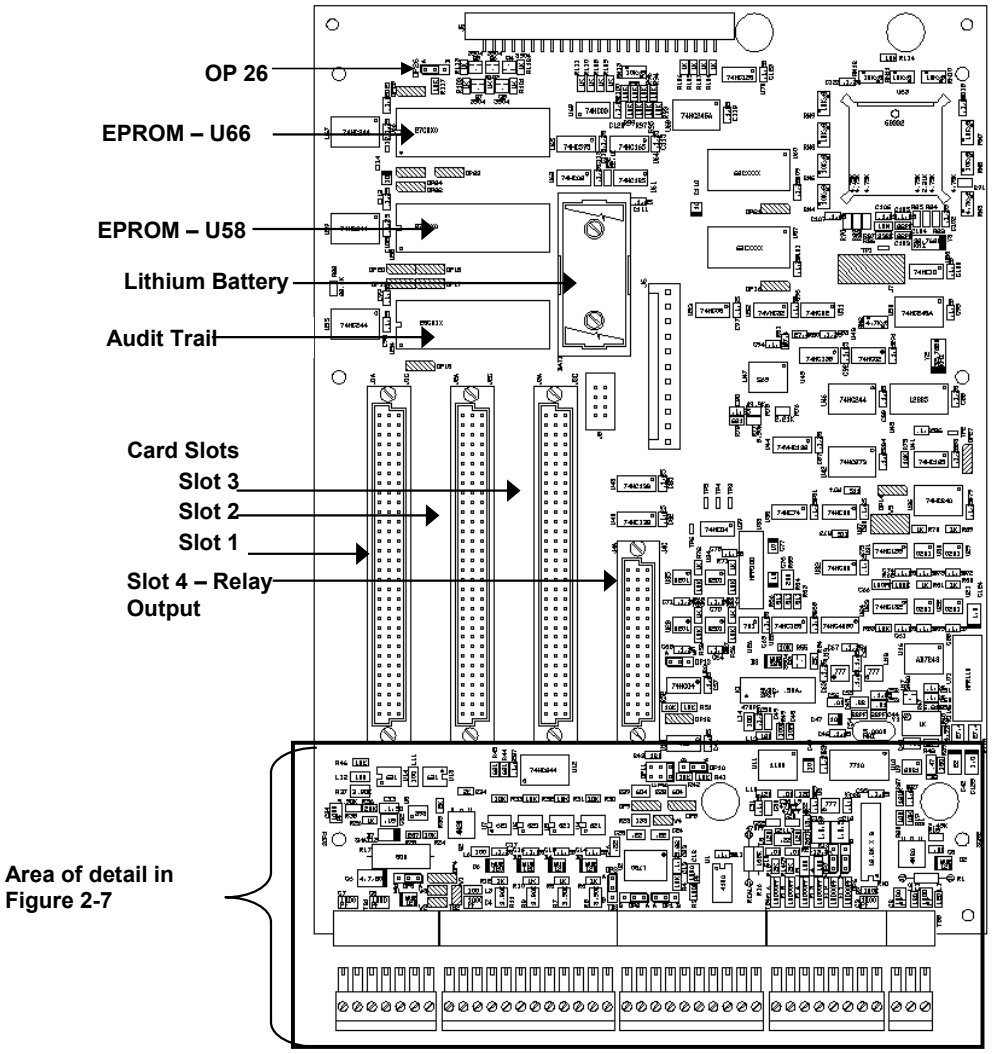

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Table 2-1: Programmable Input Choices

External Alarm 1	Reset Tot S2
External Alarm 2	Reset Tot S3
External Alarm 3	Reset Tot S4
Reset Alarm	Add to tot
Print	Add to tot S1
Print S1	Add to tot S2
Print S2	Add to tot S3
Print S3	Add to tot S4
Print S4	Hold
Reset Tare	Hold S1
Reset Tare S1	Hold S2
Reset Tare S2	Hold S3
Reset Tare S3	Hold S4
Reset Tare S4	Reset peak
Set Tare	Reset peak 1
Set Tare S1	Reset peak 2
Set Tare S2	Reset peak 3
Set Tare S3	Reset peak 4
Set Tare S4	
Reset Tot	
Reset Tot S1	

2. *Digital Outputs*

A relay output board (all dry contacts) and is plugged into slot 4 of the motherboard. One of the realy outputs is permanently assigned as the fault output and cannot be programmed to any other function. The other 3 relays can be programmed to one of the choices shown below in either a normally open or normally closed position.

There is an additional solid-state output (located on the mothrboard), which can also be programmed to one of the functions shown below.

The programmable output choices are listed in **Table 2-2**.

Table 2-2: Programmable Output Choices

Alarm	Threshold #1
Shutdown	Threshold #1 S1
Ready	Threshold #1 S2
Weight stable	Threshold #1 S3
Weight stable S1	Threshold #1 S4
Weight stable S2	Threshold #2
Weight stable S3	Threshold #2 S1
Weight stable S4	Threshold #2 S2
mA #1 signal polarity	Threshold #2 S3
mA #2 signal polarity	Threshold #2 S4
mA #3 signal polarity	Threshold #3
mA #4 signal polarity	Threshold #3 S1

Threshold #3 S2	Threshold #4 S4
Threshold #3 S3	Totalized
Threshold #3 S4	Totalized S1
Threshold #4	Totalized S2
Threshold #4 S1	Totalized S3
Threshold #4 S2	Totalized S4
Threshold #4 S3	

Additional outputs can be selected by adding additional DIO boards.

2.5.2 A/D Jumpers – Load Cell Sense

Load cell sense is controlled by selectable jumpers OP6 and OP7 located on the motherboard (Figure 2-7). The jumpers should be in position "A" local sense if the distance is less than 200 feet between load cell and *Static Weight Indicator*. For distances greater than 200 feet and less than 3,000 feet, the jumper should be in position "B." A special 6-wire cable is required. Refer to the field-wiring diagram for jumper requirement in the scale junction box.

Table 2-3: Load Cell Jumper Settings

LOAD CELL JUMPERS			
Mode	OP6	OP7	
Less than 200 feet	"A"	"A"	**DEFAULT**
Greater than 200 feet	"B"	"B"	

Figure 2-7: Area of Detail

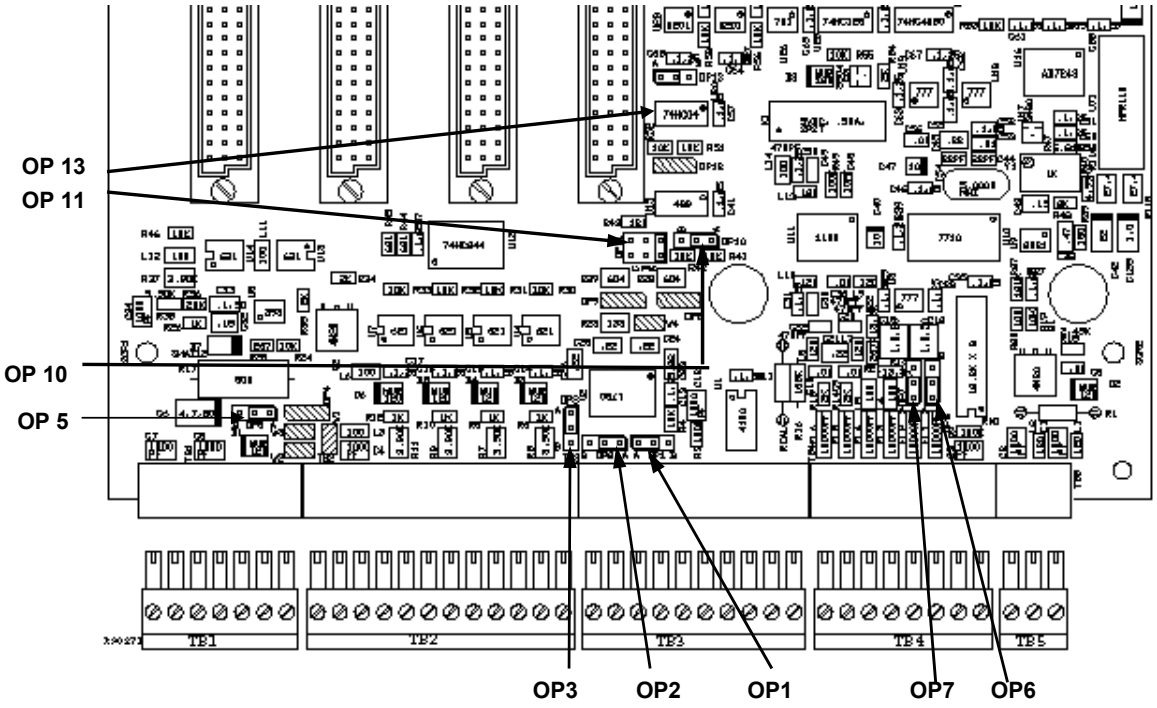


Table 2-4: Micro-Tech Motherboard Jumpers

Jumper Location	Foil/Jumper	Default Position	Description
OP1	Jumper	A	Comm A=RS-485/20mA B=RS-232
OP2	Jumper	A	Comm A=RS-485/20mA B=RS-232
OP3	Jumper	A	Comm A=RS-485/20mA B=RS-232
OP5	Jumper	A	SPU Contact Closure Input (Slow Speed)
OP6	Jumper	A	Sense Jumper A = Less than 200 ft B= Greater than 200 ft
OP7	Jumper	A	Sense Jumper A = Less than 200 ft B= Greater than 200 ft
OP10	Jumper	A	Comm A = RS-485/232 B = 20 mA
OP11	Jumper	A	Comm A = Terminated B = Not Terminated C = 20 mA
OP13	Jumper	A	Comm A = Normal B = Multidrop
OP26	Jumper	A	OIML Calibration Jumper A = Allows Cal B = Restricts Cal

Table 2-5: Terminal Wiring Configurations

TB1 Digital Input/Out

Input #1	Sig	2
	Com	1
		3
		4
Output #4	+ 24 VDC	5
	SIG	6
	COM	7

TB2 Digital Input

8	+24 V	
9		
10	Shield	
11		
12	Sig	In2
13	Com	
14	Sig	In3
15	Com	
16	Sig	In4
17	Com	
18	Sig	In5
19	Com	

TB3 COMM

See

Table 2-8
Table 2-9
Table 2-10

TB4 Load cells

37	Shield
36	
32	+Exc
33	-Exc
34	+Sense
35	-Sense
30	+Sig
31	-Sig

TB5 Analog Out Motherboard

38	+
39	-
40	Shield

Table 2-6: Relay Output Board

Micro-Tech 3100 Relay Output Board		
1	NC	Relay K1 Fault Output
2	COM	
3	NO	
4	NC	Relay K2 Output #1
5	COM	
6	NO	
7	COM	Relay K3 Output #2
8	NO	
9	COM	Relay K4 Output #3
10	NO	

*Relays Rated 33VAC 0.5A, 70VDC 0.5A

2.5.3 Analog Output (Motherboard)

A current output signal is available for customer use on motherboard *Terminal Block 5*. The net weight, gross weight, tare or peak can be selected by the customer to be sent to a recorder, or controller. The output range is adjustable from 0-20 mA, 4-20 mA, 20-0 mA, or 20-4 mA.

Table 2-7: Motherboard Current Output - TB 5

Motherboard Current Output #1 TB5	
38	+
39	-
40	Shield

2.5.4 Analog Input/Output Board (Option)

The (option) analog input/output board is available in two configuration described below. (A) has one current output only; whereas, (B) has two voltage inputs (only 1 input is possible to use for *Mod.3100/3200*) and two current

outputs . No configuration switches or jumpers exist on the analog boards.

The *Static Weight Indicator* can support up to four current outputs.

Board type (A) One user definable 0-20/4-20 or 20-4/20-0 mA output.

The Gross Weight, Net Weight, Tare Weight or Peak can be selected by the customer to be sent to a recorder, or controller.

Board type (B) Two +/- 5VDC differential inputs (only one usable for *Static Weight Controller* and two user definable 0-20/4-20 or 20-4/20-0 mA output.

Inputs – The function that can be selected for input are : None, Moisture Compensation.

Outputs – The functions that can be selected for each output are : None, Net Weight, Gross Weight, Tare, or Peak .

2.5.5 Communications Configuration (Motherboard) COMM

This section describes the setup procedure and hardware configuration for the communications from the motherboard. Use the following steps to configure the communications:

Select the jumper positions for the desired communication standard (see *Table 2-4 and 2-11*). Refer to Figure 2-7 for jumper locations.

1. Wire to the *Terminal Block 3* on the motherboard for the communication standard selected, *RS-485*, *RS-232c*, *20 mA* current loop.
2. Refer to *REC 3949, Chapter 3* for the remainder of the communication setup.

Table 2-8: Motherboard COMM 1 Communications Wiring Configuration - TB3 – RS-485

Motherboard RS-485 Communications TB 3	
25	Shield
29	-RX
28	+Rx
24	Common
21	+TX
20	-TX

Maximum cable length 4000 ft
Use Belden 9830 or equivalent

Table 2-9: Motherboard Wiring Configuration TB 3 – RS-232 Communications

Motherboard RS-232 Communications TB 3	
25	Shield
23	CTS
24	Common
22	RxD
21	TxD
20	RTS

Maximum cable length 50 ft
Use Belden 9538 or equivalent

Table 2-10: Motherboard Wiring Configuration TB 3 – 20mA Serial Communications

Motherboard 20 mA Serial Communications TB 3	
25	Shield
26	+20 mA (out)
27	-20 mA (out)
28	+20 mA (in)
24	-20 mA (in)

Maximum cable length 4000 ft
Use Belden 9829 or equivalent

Table 2-11: Mother Board Communication Jumper Settings

JUMPERS							
Mode	**OP1**	**OP2**	**OP3**	**OP10**	**OP13**	**OP11**	
RS-485	"A"	"A"	"A"	"A"	"A" Normal "B" Multi-drop	"A" Terminated 'B" Not Terminated	Default
RS-232	"B"	"B"	"B"	"A"	"A" Normal	"B" Not Terminated "A" Terminated	**Default**
20 mA	"A"	"A"	"A"	"B"	"A"	"C"	

2.6 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 3100 Static Weight Indicator* memory. The following setup procedure should be completed before programming your static weight indicator. Refer to Chapter 3 of this manual for more details or assistance.

Before applying power to the weighing system, it is necessary to complete the following statements. Refer to your *System Data Sheet* in the front of your feeder manual .

2.6.1 Scale Capacity

Determine the maximum scale's capacity in pounds and record the capacity below.(Example: 400.0)

_____(Pounds) Scale #1

_____(Pounds) Scale #2

_____(Pounds) Scale #3

_____(Pounds) Scale #4

2.6.2 Number of Load Cells

Enter the number of load cells.

_____(Number of Load Cells) Scale #1

_____(Number of Load Cells) Scale #2

_____(Number of Load Cells) Scale #3

_____(Number of Load Cells) Scale #4

2.6.2.1 Load Cell Capacity

From the scale data sheet located in the front of this manual, determine the load cell size in pounds. Record the weight below.(Example: 250.0)

_____pounds (Load Cell Capacity) Scale #1

_____pounds (Load Cell Capacity) Scale #2

_____pounds (Load Cell Capacity) Scale #3

_____pounds (Load Cell Capacity) Scale #4

2.6.2.2 Load Cell Sensitivity

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

_____mV/V (Load Cell Sensitivity) Scale #1

_____mV/V (Load Cell Sensitivity) Scale #2

_____mV/V (Load Cell Sensitivity) Scale #3

_____mV/V (Load Cell Sensitivity) Scale #4

2.6.2.3 Load Cell Resistance

Measure the signal (output) resistance of each load cell with a digital VOM. Record the resistance below. (Example: 350.000)

_____(Load Cell Resistance) Scale #1

_____(Load Cell Resistance) Scale #2

_____(Load Cell Resistance) Scale #3

_____(Load Cell Resistance) Scale #4

2.7 Programming the *Micro-Tech 3100 (Initial Setup)*

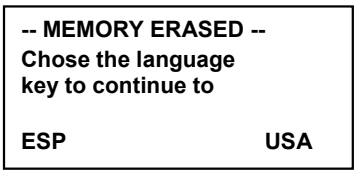
When power is first applied to the *Static Weight Indicator*, the system steps the operator through menus and options that bring the system to a weighing state. Soft keys, numeric keys, and the scroll control keys are used to select choices. The **RUN** and **MENU** control keys are inactive during this procedure. After successful initial programming and scale calibration, proceed to Main Menu 4, I/O Scroll setup.

CAUTION

VERIFY 115/230 VOLT SELECTION IS CORRECT. IMPROPER CONNECTION MAY RESULT IN DAMAGE TO YOUR *INSTRUMENT*.

- The programming mode begins the first time power is applied. Information requested by the instructional screens should be entered before moving to the next screen. The scale is calibrated at the end of this procedure provided the correct information is entered. The alarm light flashes during the programming procedure and clears when calibration is complete.

  The programming mode begins with the following instructional screens.



2.7.1 Language

The *Static Weight Indicator* is a dual language instrument. USA is always the first language. The standard configuration profides *Spanish* (*ESP*) as the second language. Other languages, such as *German* (*GER*), are available upon request (consult factory). Press the desired language.

Initial scale setup and calibration Press down SCROLL.

Press the **DOWN SCROLL** key.

Press key under HELP for more information. HELP	**"HELP" is flashing**

Press the **HELP** soft key.

Key with dot (soft key) performs action of of word above it. MORE RETURN

When **RETURN** is pressed, the user is returned to the previous screen. Pressing **MORE** advances the sytem to the next screen.

Press **MORE**

Use down SCROLL key to advance through the menus MORE RETURN

Pressing **MORE** or **RETURN** reverts the screen back to previous screens in the series.

Press the **DOWN SCROLL** key.

2.7.2 Measure Units

Press **SCROLL DOWN** to accept the default unit, or **CHOICES** to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

NOTE : Menus appearing during initial setup may operate differently in normal operation.

Measure units can be individually selected. The user must first decide if the English units will be used or the Metric ones, or combination of both.

```
-- DISPLAY SCROLL 1 --
Measure units
> English <

CHOICE          ENTER
```

Default: ENGLISH (if USA language)
METRIC (if ESP language)

Choices: ENGLISH, METRIC, MIXED
If English, all units in English
If Metric, all units Metric
If Mixed, units may be a combination of English and Metric

Press **ENTER** soft key to accept the default unit, or **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

Note: If the Measure units are changed from English to Metric (or vice versa) after the scale is calibrated, the span number changes but the calibration remains the same.

2.7.3 Weight Units

The weights will be displayed according to the units selected here.

```
-- DISPLAY SCROLL 2 --
Weight Units
> pounds <
CHOICE          ENTER
```

English	**Metric**	**If Mixed**
Default: Pounds	**Default**: kg	**Default**: Pounds
Choice: Perc %, Pounds Tons, LTons	**Choice**: Perc %,kg Tonnes	**Choice**: Perc %,kg,Tonnes, Pounds, Tons, LTons.

Press **ENTER** soft key to accept the default unit, or **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

2.7.4 Total Units

The units to be used for Total are selected here. Press **ENTER** soft key to accept the default unit, or **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

```
-- DISPLAY SCROLL 3 --
Total Units
> Tons <

CHOICE          ENTER
```

English	Metric	If Mixed
Default: Tons	**Default**: Tonnes	**Default**: Tons
Choices: Tons, Ltons, Pounds	**Choices**: Tonnes, kg	**Choices**: Tons, Ltons, Pounds, Tonnes, kg

Press **ENTER** soft key to accept the default unit, or **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

2.7.5 Number of Scales

The *Static Weight Indicator* can control from one to four independent scales. The number of scales can be programmed according to the number of A/D are installed.

If is available only the A/D (on Motherboard) this scroll is not displayed

```
-- SC DATA SCROLL 1 --
Number of scales
    1
ENTER
```

Default: 1
Min: 1
Max: The absolute maximum number of scales is 4. The actual maximum depend of the combination of A/D boards installed.

- Plant scale A/D 1channel
- Plant scale A/D 2channel
- Premium scale A/D 1channel

The system allows defining a Logical Scale a san alternative to a physical scale. A Logical Scale is a scale combining signals of existing physical scales. For example, Scale #3 could be defined as Scale #1 plus Scale #2.

If the operator has selected more than two scales in the previous scroll, the following scrolls are available.

```
-- SC DATA SCROLL 1A --
Type of scale 3
>  A/D input  <

CHOICE          ENTER
```

Default: A/D Input
Selections: A/D Input, S1+S2, S1-S2, S2-S1

A/D Input selection is displayed only if at least 3 A/D channels are installed in the instrument.

```
-- SC DATA SCROLL 1B --
Type of scale 4
>  A/D input  <

CHOICE          ENTER
```

Default: A/D Input
Selections: A/D Input, S1+S2, S1-S2, S2-S1,
S1+S3, S1-S3, S3-S1,
S2+S3, S2-S3, S3-S2
S1+S2+S3, S1+S2-S3, S1-S2+S3, S1-S2-S3

A/D Input selection is displayed only if 4 A/D channels are installed in the instrument.

Local Scales are computed using gross weights.

Example : A/D channel #1 is used for a platform scale with a range of 100 Tons. A/D channel #2 is used for a platform scale with range of 200 Tons. When long trucks need to be weighed, both scales are used. Scale #3 is defined as S1+S2, so that the Scale #3 indicates the weight of Scale #1 plus the weight of Scale #2. Scale #3 has a range of 300 Tons.

2.7.6 The Scale Soft Key

The scale  soft key

There are many parameters that must be entered for each scale. If you have more than 1 scale, the SCALE soft keys is displayed in the scroll position where data needs to be entered. This keys has double function, first it indicates which scale the parameter is referring, for Example :  **1** indicates that you are entering a parameters for scale 1. Second, it allows you to change scales by pressing the soft key below the indication. The scale number changes.

In the manual, this key is indicated by SCALE #.

2.7.7 Max Scale Capacity

The next entry is the scale capacity, which is the maximum capacity of the scale. This entry also defines the default number of decimal places that are used for displaying weight values. Use numeric keys for entering the number, confirm with **ENTER**. Scroll down.

```
-- SC DATA SCROLL 2 --
Max. scale capacity
      500.0 lbs
ENTER          SCALE #
```

Default: 500.0
Min: 1
Max: 1000000

2.7.8 Scale Divisions

When the Scale capacity is entered, the number of decimal places is also defined. If, for example, the User enters 500.0, this sets the "Scale Divisions" parameter to 0.1. Advancing to the next scroll, the User then sees first the Scale Division corresponding to the just entered Scale Capacity (in the example 0.1). If required, the User is able to alter the Scale Division to any of the available options.

Press the **ENTER** soft key to accept the default divisions, or the **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

```
-- SC DATA SCROLL 3 --
Scale Divisions
>      0.1      <

CHOICE  ENTER     SCALE #
```

Default: 0.1
Choice: 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 0.01, 0.02, 0.05, 0.001, 0.002, 0.005

2.7.9 Load Cells Number

Enter the number of load cells of your scale.

```
-- SC DATA SCROLL 4 --
# of load cells
       1
ENTER           SCALE #
```

Default: 1
Min: 1
Max: 6

2.7.10 Defining Load Cell (s)

Enter the *load cell capacity* as it appears on the label placed on the load cell.

```
-- SC DATA SCROLL -5-
Load cell capacity
250.0   Lbs

ENTER           SCALE #
```

If **English** or **Mixed:**
Default: 250.0 Lbs
Min: 10 Lbs
Max: 500000 Lbs

If **Metric**
Default: 250 kg
Min: 1 kg
Max: 500000 kg

Enter the *load cell sensitivity* in mV/V as marked on the label of the load cell. Thermo Ramsey load cells are normally 2.000 or 3.000 mV/V.

```
-- SC DATA SCROLL -6-
Load cell sens.
3.000   mV/V

ENTER          SCALE #
```

Default: 3.000 mV/V
Min: 0.500 mV/V
Max: 3.500 mV/V

Load cell resistance is entered on this screen. The resistance for the load cell has been recorded on the System Data Sheet in the front of your scale manual. (It is also stamped on the load cell cable.) Enter the ohms for the load cell. The number of scrolls depends on the number of load cells installed.

```
-- SC DATA SCROLL –7A-
Load cell #1
Res     350.000   Ohms

ENTER          SCALE #
```

Default: 350 Ohms
Min: 10 Ohms
Max: 2000 Ohms

- If # of Load Cells is more than 2:

```
-- SC DATA SCROLL –7B-
Load cell #2
Res     350.000   Ohms

ENTER          SCALE #
```

Some default and limits of load cell #1

- If # of Load Cells is more than 3:

```
-- SC DATA SCROLL –7C-
Load cell #3
Res     350.000   Ohms

ENTER          SCALE #
```

Some default and limits of load cell #1

- If # of Load Cells is more than 4:

```
-- SC DATA SCROLL –7D-
Load cell #4
Res     350.000   Ohms

ENTER          SCALE #
```

Some default and limits of load cell #1

- If # of Load Cells is more than 5:

```
-- SC DATA SCROLL –7E-
Load cell #5
Res     350.000   Ohms

ENTER          SCALE #
```

Some default and limits of load cell #1

- If # of Load Cells is 6:

```
-- SC DATA SCROLL –7F-
Load cell #6
Res     350.000   Ohms

ENTER          SCALE #
```

Some default and limits of load cell #1

2.7.11 Quick Automatic Calibration of the Scale (s)

The system performs a quick calibration of the scale (s). The scale is first zeroed (3 seconds) and than calibrated using the load cell capacity, sensitivity resistance just entered. During this time, the following screen is displayed :

```
CALIBRATION IN
PROGRESS
```

When calibration procedure is completed, the following message in displayed for 3 seconds :

```
S1  CALIBRATED
S2  CALIBRATED
S3  CALIBRATED
S4  CALIBRATED
```

In case the load cell is not connected or a failure is detected, the message is "**S# NOT CALIBRATED**".

Then the following message is displayed

Press RUN to start **or MENU for scrolls**

The field data entered during this procedure enabled the Micro-Tech 3100 to perform an unassisted zero balance and span calibration. Assuming no mistakes were made, the scale is calibrated and is ready for use at this time.

NOTE :

The span number was calculated from the data that was entered during this initial calibration setup procedure. This span number is based on a perfect mechanical installation of the scale. Therefore, verify this by performing a span calibration procedure.

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Chapter 3
Micro-Tech 3100 Operation

Your *Thermo Electron Static Weight Indicator System* is capable of accurate weighing, provided it is installed, calibrated, operated, and maintained in complete accordance with the instructions contained in this manual.

3.1 Overview

Micro-Tech 3100/3200 Static Weight Indicator is a microcomputer-based instrument that accepts and conditions weight signals and provides visual and electrical outputs for total weight . A stable 10-volt DC excitation voltage capable of exciting up to six 350 ohm strain gauge load cells is produced by the *Static Weight Indicator*. Sense lead terminations are also provided for six wire load cell cables.

Auto Zero (AZ) Track enables the scale system to automatically zero itself during extended periods when the scale is empty. Auto Zero Track is menu selectable. The letter "Z" appears on the first line of the display indicating Auto Zero Track option is enable.

Life expectancy of the RAM support battery is approximately ten years, if power is not applied. Under normal operation where power is on continuously, life expectancy is much longer.

Errors may occur during initial calibration and their reason must be corrected during initial calibration. During normal operation, an error would most likely indicate a failure in system or improper operation.

3.2 Front Panel

The front panel (Figure 3-1) contains the necessary status indicators and keys to enable the operator to perform calibrations and all required operations after the *Static Weight Indicator* has been configured in Section 2.5.

Figure 3-1: Micro-Tech 3100 Front Panel

3.2.1 System Status Lights

The five red status indicators show the status of the *Static Weight Indicator*.

NET
ON indicates when a net weight is displayed, in other words, it is on when a tare weight has been acquired.
If more than one scale is defined, the ON indication refers to the displayed scale

STABLE WEIGHT
The stable weight condition is determined on the basis of two parameters : motion band and motion delay.
Motion band defines a range in which the weight is stable, and motion delay defines the time the weight should stay in the range before stable weight indications turns on.
If more than one scale is defined, the ON indication refers to the displayed scale.

ZERO WEIGHT
Net weight is considered zero when its value is between +/- 0.5 scale division. The weight must stay in this range for 2 seconds after the weight becomes stable zero weight indication is turned on.
If more than one scale is defined, the ON indication refers to the displayed scale

ALARM
Alarm indication flashes if an alarm is pending, either the alarm is NEW or has been ACKNOLOWLEDGED.

READY
Ready indication turns on if the scale is calibrated (zero and span calibration complete) and no SHUT DOWN conditions are active.
If more than one scale is defined, the READY indication refers to the display scale.

3.2.2 LCD Graphic Display

The LCD graphic display indicates actual running information or displays menu entry information.

3.2.3 Keypad

The keypad is comprised of pad touch keys consisting of the following:

- **RUN** – gives access to the **RUN** menu and returns the *Static Weight Indicator* to *Run* mode whenever pressed.
- **MENU** – gives access to the *Micro-Tech 3100* menus
- **UP/DOWN ARROW KEYS** – scrolls up or down in the selected menu.
- **SOFT KEYS** – selects the displayed function directly above the key. Also moves the cursor left and right during string editing.
- **ALPHL/NUMERIC KEYS 1 THROUGH 0** – used to enter letters and numerals when string editing. Similar to a telephone keypad.
- **DECIMAL POINT KEY** – enters a decimal point

- **CLEAR KEY** – removes incorrect entries prior to pressing **ENTER**.
- **TOTAL KEY** – accesses menus that contain detailed informations on the totalizer..
- **PRINT KEY** – initiates a printout.
- **TARE KEY**– acquires the actual gross weight as tare. If more than one scale is defined, the new tare is acquired only for the displayed scale. Tare key operates as reset tare if a tare was already acquired. Pressing zeros the tare value.
- **DATA KEY**– this key has no function.

3.3 General Navigation

Navigating the menus is the same throughout the setup and operation of the *Micro-Tech 3100*. To follow are a few general guidelines to help in menu navigation.

- Press the **DOWN SCROLL** key to advance through the menus,
- **UP SCROLL** key to return to the previous item displayed on the screen,
- **RETURN** to go back to the previous menu,
- **CHOICES** soft key to view the choices for a selected menu option, and
- **ENTER** to confirm you menu selection

3.4 Menu Displays

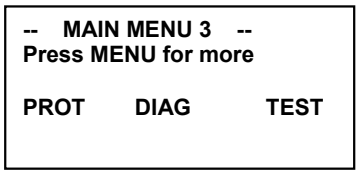
The *Static Weight Indicator* is a menu driven machine that allows the operator to access all setup, test, and calibration parameters. Main menu screens 1 through 6 can be accessed at anytime by pressing **MENU** until the desired menu screen is displayed. Pressing the soft key directly below the desired scroll, and then using the **UP/DOWN** scroll key select menu scrolls.

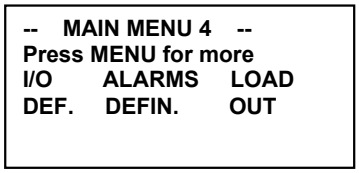
If the *Static Weight Indicator* is password protected, the appropriate password must be entered prior to making changes or performing routine calibration. Menus may be viewed without entering a password, but no entries are allowed unless the password is entered.

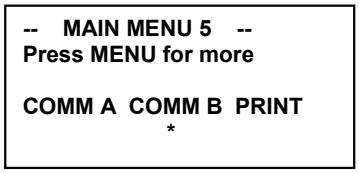
Optional menu scrolls are only available if the option has been installed. The MENU key activates the following screens.

```
--  MAIN MENU 1  --
Press MENU for more
ZERO     SPAN     MAT'L
CAL      CAL      CAL
```

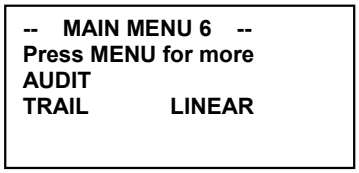
```
--  MAIN MENU 2  --
Press MENU for more
                SCALE   CALIB
DISPLAY         DATA    DATA
```





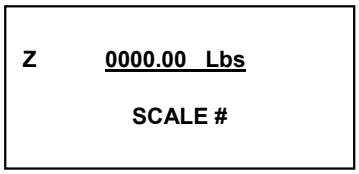


***Can be AB RIO or PRO DP**



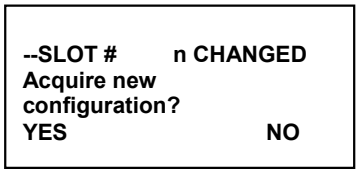
3.5 Normal Power On

When the *Static Weight Indicator* is powered on after initial programming, the Run menu is displayed unless the hardware configuration has been changed.



3.6 Hardware Configuration

If the hardware configuration detected at power on differs from the one recorded in memory, the following screen displays. This only happens if a circuit board has been added or removed during power off, or a board has failed.



This screen disappears after 10 seconds if the question is not answered. The *Static Weight Indicator* assumes the answer is **NO**. "HW CONFIG. CHANGED" alarm is on and cannot be reset. The above screen appears each time power is cycled. If a board is removed or added, and this is a permanent change in configuration, answer **YES**.

1. A board is removed and is not replaced:

   The *Static Weight Indicator* cancels from memory the setup data of the board that is removed. If the board is added again, the setup data for the board has to be entered again.

2. A board is added:

   The *Static Weight Indicator* acquires the new hardware configuration. Setup data for the new board must be entered.

Note: Check the setup configuration in the **I/O DEFINITION SCROLL** if an I/O board is removed or added. I/O assignments change when the number of I/O boards change.

If the reason for the message is not known, or if the change in configuration is temporary and the operator does not want to lose the original setup, answer **NO**.

1. A board is removed:
2. The *Static Weight Indicator* resumes operation, retaining setup data of the board that was removed. All other boards continue working normally. No change occurs in the I/O Definition.
3. A board is added:
4. The *Static Weight Indicator* resumes normal operation without recognizing the new board.

   If **NO** is pressed, the "HW CONFIG CHANGED" alarm stays on.

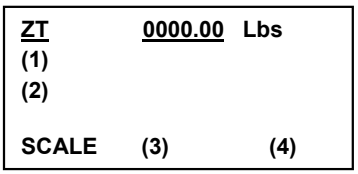
3.7 Run Menu

When the *Static Weight Indicator* is normally powered on after initial programming, the Run menu is displayed. The **RUN** menu can always be accessed by pressing the **RUN** key on the front panel.

3.7.1 Main Run

The **RUN** menu is a single screen menu. It appears after initial programming. The **UP/DOWN** scroll key have no function in RUN.

The Run Menu appears as follows :



The first line always displays the actual NET WEIGHT. A "Z" appears on the left side if the "Auto zero tracking" option is enabled and the scale is unloaded. The load must stay low during the cycle; otherwise, auto zero is aborted.

A “T” appears if tare weight has been acquired. The second (1) and third (2) lines are by default blank, but can be programmed to show :

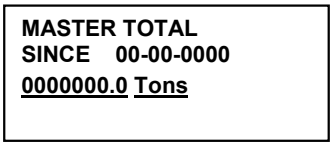
- The tare weight
- The actual gross weight
- The peak weight
- The reset total value
- The master total value
- Date and time
- A bar graph indicator

If peak weight is selected, the message RESET is assigned to key F2 (3). It allows resetting of the peak value. A confirm request scroll is displayed after pressing reset. If reset total or master total are selected, the message ACQ is assigned to key F2 (3). When it is pressed, net weight is added to the actual totals value.

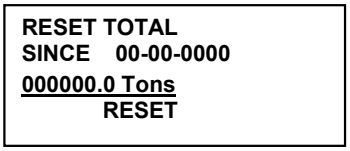
SCALE # key allows switching between scales if more than one scale is selected.

3.7.2 Totals

The **TOTALS** key accesses the Master Total and Reset Total screens.

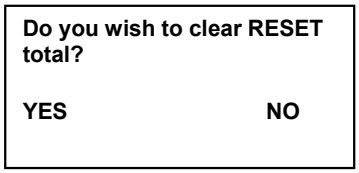


Master Total cannot be reset. The date is entered during initial programming.



RESET TOTAL can be reset at any time. No password is required for reset.

When the **RESET** key is pressed, the following screen is displayed:



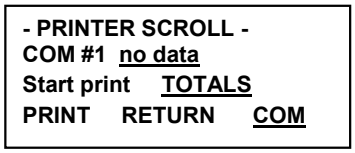
Press "**YES**" to clear the total. Press "**NO**" to skip clearing.

3.7.3 Print Key

The **PRINT** key is active if selected in COMM scroll.

The following screen is displayed:

When **PRINT** is pressed, the following screen displayed :.



Password : Not Required

The second line is the status of the printer :

NO DATA Indicates the printer is idle, no data is being sent to the printer.

IS RUNNING The system is sending data to the printer.

The third line indicates what kind of data is printed , if the PRINT key is pressed. The UP and DOWN keys select between :

TOTALS Print totals (all scales if more scales are defined)

TOTALS S1 Print totals scale 1 (only if enable)

TOTALS S2 Print totals scale 2 (only if enable)

TOTALS S3 Print totals scale 3 (only if enable)

TOTALS S4 Print totals scale 4 (only if enable)

SETUP Print the static weight indicator setup data.

TRAILS If audit trails option is active, print audit trails data.

Print starts after the PRINT key is pressed.

The COM key allows printer selection if more than one printer is installed.

Examples of data that can be printed :

Print **TOTALS**, default :

If one scale is defined :

TOTALS REPORT
DATE : 11-10-2002
TIME : 8:12a

MASTER TOTAL : 0.00 Tons
RESET TOTAL : 0.00 Tons

If more scale are defined :

TOTALS REPORT
DATE : 11-10-2002
TIME : 8:12a

SCALE 1
MASTER TOTAL : 0.00 Tons
RESET TOTAL : 0.00 Tons

SCALE 2
MASTER TOTAL : 0.00 Tons
RESET TOTAL : 0.00 Tons

SCALE 3
MASTER TOTAL : 0.00 Tons If more than two scales
RESET TOTAL : 0.00 Tons

SCALE 4
MASTER TOTAL : 0.00 Tons If four scales
RESET TOTAL : 0.00 Tons

Print **ALARM** :

11-10-2002 8:14a

Clock fail

Print **AUDIT TRAILS** :

When print AUDIT TRAILS command is given, enter the number of records to print. This allows printing of a portion of the recorded trails rather than all the recorded trails.

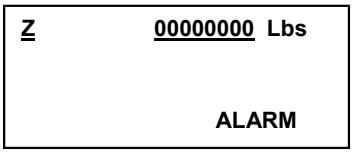
TRAIL RECORD NR. 3
DATE 11-10-2002 TIME 11:59p
VARIABLE scale cap
NEW 400.00
OLD 500.00

TRAIL RECORD NR. 2
DATE 11-11-2002 TIME 11:35p
VARIABLE span
NEW 250000
OLD 300000

See Appendix for additional printer setup informations.

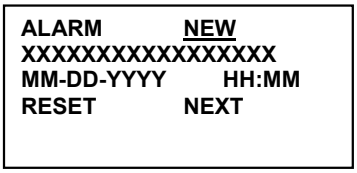
3.7.4 Alarm Pending

The message **ALARM** displays in the right of the screen if an alarm is pending. The alarm LED also flashes.



Flashing

The following menu displays after pressing **ALARM**.



The keyword "NEW" indicates an alarm that has not been acknowledged yet. When the operator presses the RESET key to clear the alarm. The alarm disappears only if the reason that caused the alarm to occur does not exist any more. If the alarm is still pending, the keyword "ACK" is displayed instead of "NEW".

The third line shows the date and time.

The NEXT key is used to scroll between the pending alarms. The string "xxxxxxxxxxxxxxxxxxx" stands for one of the following alarm conditions.

Pressing RUN returns to Main RUN Menu.

Table 3-1: Alarm Conditions

(1) Clock Fail	(32/36) Calibration Time
(2/6) Load Cell Fail	(37) External Alarm #1
(7) Ram Fail	(38) External Alarm #2
(8) Rom Fail	(39) External Alarm #3
(9/13) Threshold #1 S#	(40/44) AZT Limit S#
(14/18) Threshold #2 S#	(45/50) Harrware Configuration Changed
(19/23) Threshold #3 S#	(51) BCD Overflow
(24/28) Threshold #4 S#	(52) Math Error
(29) Warm Start	(53) Printer Error
(30) Cold Start	(54) Communication Error
(31) P.D. Calibration	

Refer to *Chapter 4* for more information.

3.8 LOAD OUT

The Load System Menu is visible if the Load Out option is installed. See Load Out, Appendix , for detailed description of the Load Out option. Press the **DOWN** or **UP** scroll key for access.

```
BATCH #          0 STOP
TOTAL   00000.0  Tons
SETPT   00000.0  Tons
ENTER      CLEAR
```

Password: Operator

BATCH # increments by one after each batch.

The status can be : STOP, RUN H, RUN L, WAIT S, STABIL

ENTER edits the setpoint

CLEAR zeros the batch counter

The symbol S is displayed if the batch is standing by.

3.9 Calibration

MAIN MENU 1 contains the **CALIBRATION** menu. **MENU 1** is selected by pressing **MENU** until **MAIN MENU 1** displays. Desired calibration scrolls are selected by pressing the soft keys directly below the desired scroll.

```
--      MAIN MENU 1      --
Press MENU for more
ZERO      SPAN
CAL       CAL
```

3.9.1 Zero Calibration Scroll

The Zero Calibration is implemented as a machine directed procedure

1. **Auto Zero**

   If only one scale defined :

```
--      ZERO CAL      --
Empty scale, then
press START
START   SCALE #   MANUAL
```

Password: Operator

The scale must be kept empty during auto zero. A complete zeroing procedure requires 10 seconds, but can be reduced by pressing END in the next scroll.

Indication S# in the following scrolls will appear only if more than one scale is defined. # represents the active scale number.

When **START** is pressed, the following screen is displayed :

```
S#   AUTO ZEROING
Time remaining      0000
Gross:          000.0  lbs
END        ABORT
```

During *Auto Zero*, weight resolution is 10 times higher than normal. The number of seconds in line 2 corresponds to the time remaining for completing the test.

When zero is reached or END is pressed, the system displays the following screen :

```
S# AUTO ZERO COMPLETE
Error            ±000.00%
Change zero?
YES        NO
```

The word COMPLETE is flashing. The percentage of error is related to the scale capacity.

If **YES** is pressed, the next screen is shown :

```
S#    ZERO # CHANGED
Old zero        #00000
New zero        #00000
RUN       MENU
```

If **NO** is pressed, the next screen is shown :

```
S#    ZERO # UNCHANGED
Old zero        #00000
New zero        #00000
RUN       MENU
```

Note that in this case old zero and new zero are shown equal.

The zero constants are shown in A/D counts.

2. Manual Zero

The *Manual Zero* procedure allows the operator to directly enter the zero constant if known.

```
--      MANUAL ZERO     --
Gross           000.0 lbs
Zero    #         00000
ENTER     SCALE #    ADV
```

Password: Operator

Default: 40000
Min: 0
Max: 120000

The ADV key is only displayed if Auto Zero Tracking optional function is enable for this scale ; otherwise, the EXIT key is displayed. The AZT function accurately tracks the zero of each scale by calculating an additional zero constant. The portion of zero due to AZT is not incorporated in the zero constant, but is shown separately.

When ADV is pressed, the system scrolls between Zero and AZT.

```
--   ZERO CORRECTION   -
AZT            000.0 lbs
AZT %          000.0 %
            SCALE #    ADV
```

3.9.2 Span Calibration Scroll

The span calibration can be done in two different ways : R-CAL or Test Weights. The system allows the operator to select which one of the two methods to be used for normal calibration and calibration's check. The selection is made in **CAL DATA SCROLL 1**.

3.9.2.1 Automatic Span Calibration With R-CAL

NOTE: Prior to beginning a Span Calibration with R-CAL, confirm the selected R-CAL resistor size in Cal Data Scroll 3.

1. Starting an R-Cal Calibration

The following screen displays

```
    AUTO SPAN R CAL
Empty scale, then
press START
START   SCALE #    MANUAL
```

Password: Operator

When **START** is pressed, the Rcal relay energizes. A half second delay occurs after START for the weight to stabilize.

NOTE : The operator must be insure that the scale is empty before pressing start.

2. Executing the Span Calibration

Indication S# in the following scrolls appears only if more than one scale is defined. # represents the active scale number.

After START is pressed, the following screen is displayed :

(A) Entry point when REPEAT is pressed.

```
 S#  AUTOSPANNING
Time remaining   0000
Gross        000.0  W.U.

END      ABORT
```

During Auto Span, the weight resolution is 10 times higher than normal. The entire function takes 60 seconds to be completed, remaining time is displayed in line 2. The END key can be used to conclude the function in less time.

3. Record the Factor

This part of the procedure is only executed if a calibration with test weights was done before, and if R-CAL has not been factored yet.

It is very important to understand that **when this procedure is executed, the system will not alter the span**. The system assumes the span is set correctly based on a test weight calibration. The system acquires the R-CAL FACTOR. The factored R-CAL can then be used to check the span between test weight calibrations.

CAUTION
SPAN SHOULD ONLY BE CHANGED BASED ON A TEST WEIGHT CALIBRATION

```
S# AUTO SPAN COMPLETE
Error   +/- 00.00 %
Unfactored Calcon

EXIT    FACTOR   REPEAT
```

The word “COMPLETE” is flashing.

If EXIT is pressed, the system acknowledges that the R-CAL factor is not used. The effect of this is that the system does not ask for a factor any more for this calibration method unless a manual span entry is done. By pressing EXIT, the operator tells the system that he does not want to use factors, but wants to use the test results for changing the span number.

After EXIT is pressed, go to point (4.) below. If REPEAT is pressed, go to (A) above. If FACTOR is pressed, the following screen is displayed :

```
 FACTORING R-CAL
New factor   00.00 %
Change factor ?
YES          NO
```

If NO is pressed, the old factor is preserved, go to point (4.) below. If YES is pressed, the following screen is displayed :

```
R-CAL Matl FACTOR
Old factor :  00.00 %
New factor :  00.00 %

RUN       REPEAT
```

Can be R-CAL, TEST WEIGHTS,

The REPEAT key return the operator (A) above. Pressing RUN ends the procedure. After this point is reached, the system does not proceed to the next section.

4. Recording the New Span

The system calculates the new span.

```
 S# AUTO SPAN COMPLETE
Error   +/- 00.00 %
Change span ?

YES        NO      FACTOR
```

The word “COMPLETE” is flashing.

FACTOR key is displayed only if an autospan with test weight has been previously executed.

If YES is pressed, the following screen is displayed :

```
S#  SPAN  #  CHANGED
Old span   #  000000
New span  #  000000
RUN    REPEAT
```

REPEAT moves back to (A) above, and calibration restarts.

If NO is pressed, the following screen is displayed :

```
S#  SPAN  #  UNCHANGED
Old span   #  000000
New span  #  000000
RUN    REPEAT
```

Note the Old span and the New span are shown equally. This is because no change to the span has been done.

If FACTOR is pressed, the RCal factor is computed. The following screen is displayed :

```
S#  FACTOR ACQUIRING
New fact   000000  %
Change factor ?
YES          NO
```

NO moves back to point (4.) above.

YES acquires new factor. If pressed, the following screen is displayed :

```
S#  FACTOR  CHANGED
Old fact     000000  %
New fact    000000  %
RUN    REPEAT
```

5. Ending an Auto Span Procedure with R-CAL

Press RUN. The Rcal relay is de-energized and the display is locked for 3 seconds.

3.9.2.2 Automatic Span Calibration With Test Weights

1. Starting a Test Weights Calibration

The operator must apply the test weights on the scale before pressing start.

NOTE: Prior to beginning a Span Calibration with WEIGHTS, verify that the inserted WEIGHT value is correct.

```
    AUTO SPAN Weights
Apply Weights then
press START.
START   SCALE#   MANUAL
```

Password: Operator

When START is pressed, the span function begin.

2. Executing the Span Calibration

Indication S# in the following scrolls appear only if more than one scale is defined. # represents the active scale number.

Whichever method has been used to start automatic span calibration, after START is pressed, the following screen is displayed :

(B) Entry point when REPEAT is pressed (see below).

```
 S#  AUTOSPANNING
Time remaining   0000
Gross        000.0  W.U.

END      ABORT
```

During Auto Span, the weight resolution is 10 times higher than normal. The entire function takes 60 seconds to be completed, remaining time is displayed in line 2. The END key can be used to conclude the function in less time.

3. Recording the New Span

The system calculates the new span based on the result of the test performed with the selected method :

```
 S#  AUTOSPAN COMPLETE
Error   +/- 00.00 %
Change span ?
YES         NO
```

The word “COMPLETE” is flashing.

If YES is pressed, the following screen is displayed :

(C)

```
S#  SPAN  #  CHANGED
Old span   #  000000
New span  #  000000
RUN    REPEAT   FACTOR
```

FACTOR key is displayed only if an autospan with R-Cal has been previously executed.
REPEAT moves back to (B) above, and calibration restarts.
If NO is pressed, the following screen is displayed :

```
S#  SPAN  # UNCHANGED
Old span   #  000000
New span  #  000000
RUN    REPEAT
```

Note the Old span and the New span are shown equally. This is because no change to the span has been done.

If FACTOR is pressed, the R-cal factor is computed. The following screen is displayed :

```
S#  FACTOR ACQUIRING
New fact   000000  %
Change factor ?
YES          NO
```

NO moves back to (C) above.

YES acquires new factor. If pressed, the following screen is displayed :

```
S#  FACTOR  CHANGED
Old fact     000000  %
New fact     000000  %
RUN    REPEAT
```

3.9.2.3 Manual Span

If the span constant is known, the manual span procedure allows the operator to manually change span.

NOTE. If the span is manually entered, the R-cal factor is set to INVALID.

```
     MANUAL SPAN
Gross         000.0   W.U.
Span  #  0000000

ENTER    SCALE #    EXIT
```

Password: Operator

Default: 1166667
Min: 500000
Max: 45000000

The RUN keys return to Run Menu.

3.9.3 Two Point Calibration

Another way to calibrate the instrument is to use the two point calibration method. This is a method that allows calculating zero and span without knowing the exact zero value.

This function is activated by pressing the SPAN CAL key in MAIN MENU 1 after "2 points" calibration mode has been selected in CAL DATA SCROLL 1.

1 Starting Two Point Calibration

```
    AUTOSPAN Weights
Two points calib.
press START

START   SCALE #   MANUAL
```

Password: Operator

Press START to begin the calibration.

2. Defining First Point

```
S# ENTER 1st POINT
weight       0.00  lb
Actual       0.00 lb

END         ACQ.
```

Password: Operator

Enter the weight corresponding to the first point, then press ACQ.

3. Acquiring First Point

In this phase, the instrument acquires the A/D raw data for a minute. The procedure can be shorted by pressing the END key.

The following scroll is displayed during this phase :

```
S# ACQUIRING 1st PNT
Time remaining  0000
Weight 000.0  lb

END         ABORT
```

4. Defining Second Point

```
S# ENTER 2nd POINT
weight       0.00  lb
Actual       0.00 lb

ENTER       ACQ.
```

Password: Operator

Enter the weight corresponding to the second point, then press ACQ

5. Acquiring Second Point

In this phase, the *Static Weight Indicator* acquires the A/D raw data for a minute. The procedure can be shorted by pressing the END key.

The following scroll is displayed during this phase :

```
S# ACQUIRING 2nd PNT
Time remaining  0000
Weight 000.0 lb

END        ABORT
```

6. Recording the New Zero and Span

At this point, the procedure is completed. The instrument computes the new zero and span and asks for confirmation to acquire the new data.

```
S# CALIB. COMPLETE
Zero error     0.00 %
Set zero and span ?

YES          NO          ADV
```

The word “COMPLETE” is flashing.

ADV key switches indication in second line between zero and span error.

Press YES to accept new values. The following scroll is displayed :

```
S# CALIB. COMPLETE
New zero #  00000
New span #  00000

RUN       MENU
```

The word “COMPLETE” is flashing.

Press NO to abort them. The following scroll is displayed :

```
S# CALIB. COMPLETE
Zero # unch  00000
Span # unch  00000

RUN       MENU
```

The word “COMPLETE” is flashing.

3.10 Setup Scrolls

3.10.1 Main Menu 1 and Main Menu 2

MAIN MENU 1

ZERO SCROLL

Zero # _____

SPAN SCROLL

Span # _____

MAIN MENU 2

DISPLAY SCROLL

1	Measure Units	_____
2	Weight Units	_____
3	Total Units	_____
4	Language	_____
5	Time	_____
6	Date	_____
7	Run Display, Line 2	_____
8	Run Display, Line 3	_____
9	Display Weight	_____ sec
10	Alternate Scales	_____ sec

SCALE DATA SCROLL

1	Number of Scales	_____			
1A	Type of Scale 3	_____			
1B	Type of Scale 4	_____			
2	Max. Scale Capacity	_____			
3	Scale Divisions	_____			
4	Over-Load	_____ %			
5	Under-Load	_____ %			
6	No. of Load Cells	Scale # 1	Scale # 2	Scale # 3	Scale # 4
7	Load Cells Capacity	Scale # 1	Scale # 2	Scale # 3	Scale # 4
8	Load Cells Sensitivity	Scale # 1	Scale # 2	Scale # 3	Scale # 4
9A	Load Cell Resistance # 1			ohms	

9B	Load Cell Resistance # 2			ohms	
9C	Load Cell Resistance # 3			ohms	
9D	Load Cell Resistance # 4			ohms	
9E	Load Cell Resistance # 5			ohms	
9F	Load Cell Resistance # 6			ohms	
10	W & M Mode	_____			
11A	Motion Band div.	Scale # 1	Scale # 2	Scale # 3	Scale # 4
11B	Motion Delay sec	Scale # 1	Scale # 2	Scale # 3	Scale # 4

3.10.2 Calibration Data Scroll

CALIBRATION DATA SCROLL

1	Calibration Mode	_____			
2	Total Test Weight	Scale # 1	Scale # 2	Scale # 3	Scale # 4
3	R-Cal: Resistance	Scale # 1	Scale # 2	Scale # 3	Scale # 4
4	R-Cal Constant	Scale # 1	Scale # 2	Scale # 3	Scale # 4
5	R-Cal Factor	Scale # 1	Scale # 2	Scale # 3	Scale # 4
6	Calibration Interval	Scale # 1	Scale # 2	Scale # 3	Scale # 4
7	Calibration Date	Scale # 1	Scale # 2	Scale # 3	Scale # 4
8	AZ Track	Scale # 1	Scale # 2	Scale # 3	Scale # 4
8A	AZ Track Range	Scale # 1	Scale # 2	Scale # 3	Scale # 4
8B	AZ Track Dev	Scale # 1	Scale # 2	Scale # 3	Scale # 4
8C	AZ Track Dur.	Scale # 1	Scale # 2	Scale # 3	Scale # 4

3.10.3 Main Menu 3

MAIN MENU 3

PROTECTION SCROLL

1	Protection Level	□ None	□ Ltd	□ Prot

DIAGNOSITCS SCROLL

1	A/D Gross	Scale # 1	Scale # 2	Scale # 3	Scale # 4
	A/D Net	Scale # 1	Scale # 2	Scale # 3	Scale # 4
2	Weight on Load Cell	Scale # 1	Scale # 2	Scale # 3	Scale # 4
2A	Load Cell Output Zero	Scale # 1	Scale # 2	Scale # 3	Scale # 4
2B	Load Cell Output Span	Scale # 1	Scale # 2	Scale # 3	Scale # 4
3	Service Password	_____			
4	Operator Password	_____			
5	Software Version	_____			

MAIN MENU 3

8	Board Type Slot # 1	_____
9	Board Type Slot # 2	_____
10	Board Type Slot # 3	_____

3.10.4 Main Menu 4

MAIN MENU 4

I/O DEFINE SCROLL

1	Current Output #1 Define	_____
	Current Output #2 Define	_____
	Current Output #3 Define	_____
	Current Output #4 Define	_____
1A	Current Output #1 Range	_____ mA
	Current Output #2 Range	_____ mA
	Current Output #3 Range	_____ mA
	Current Output #4 Range	_____ mA
1B	Current Output #1 Delay	_____ sec _____ L
	Current Output #2 Delay	_____ sec _____ L
	Current Output #3 Delay	_____ sec _____ L
	Current Output #4 Delay	_____ sec _____ L
1C	Current Output #1 Damping	_____ sec
	Current Output #2 Damping	_____ sec
	Current Output #3 Damping	_____ sec
	Current Output #4 Damping	_____ sec
2	Analog Input #1 Definition	_____
2A	Moisture Input Calibrate	_____ % _____ mA
2B	Moisture Input Calibrate	_____ % _____ mA
4	Digital Input Define	Physical Input/Status
	External Alarm #1	_____ / _____
	External Alarm #2	_____ / _____
	External Alarm #3	_____ / _____

MAIN MENU 4

Reset Alarms	_____/_____
Print	_____/_____
Print S1	_____/_____
Print S2	_____/_____
Print S3	_____/_____
Print S4	_____/_____
Reset Tare	_____/_____
Reset Tare S1	_____/_____
Reset Tare S2	_____/_____
Reset Tare S3	_____/_____
Reset Tare S4	_____/_____
Set Tare	_____/_____
Set Tare S1	_____/_____
Set Tare S2	_____/_____
Set Tare S3	_____/_____
Set Tare S4	_____/_____
Reset Tot	_____/_____
Reset Tot S1	_____/_____
Reset Tot S2	_____/_____
Reset Tot S3	_____/_____
Reset Tot S4	_____/_____
Add to Tot	_____/_____
Add to Tot S1	_____/_____
Add to Tot S2	_____/_____
Add to Tot S3	_____/_____
Add to Tot S4	_____/_____
Hold	_____/_____
Hold S1	_____/_____
Hold S2	_____/_____
Hold S3	_____/_____

MAIN MENU 4

	Hold S4	_____/_____
	Reset Peak	_____/_____
	Reset Peak 1	_____/_____
	Reset Peak 2	_____/_____
	Reset Peak 3	_____/_____
	Reset Peak 4	_____/_____
5	Digital Output Define	Physical Output/Status
	Alarm	_____/_____
	Shutdown	_____/_____
	Ready	_____/_____
	W. Stable	_____/_____
	W. Stable S1	_____/_____
	W. Stable S2	_____/_____
	W. Stable S3	_____/_____
	W. Stable S4	_____/_____
	mA #1 Sig. Pol.	_____/_____
	mA #2 Sig. Pol.	_____/_____
	mA #3 Sig. Pol.	_____/_____
	mA #4 Sig. Pol.	_____/_____
	Thres. #1	_____/_____
	Thres. #1 S1	_____/_____
	Thres. #1 S2	_____/_____
	Thres. #1 S3	_____/_____
	Thres. #1 S4	_____/_____
	Thres. #2	_____/_____
	Thres. #2 S1	_____/_____
	Thres. #2 S2	_____/_____
	Thres. #2 S3	_____/_____
	Thres. #2 S4	_____/_____
	Thres. #3	_____/_____

MAIN MENU 4

	Thres. #3 S1	_____/_____
	Thres. #3 S2	_____/_____
	Thres. #3 S3	_____/_____
	Thres. #3 S4	_____/_____
	Thres. #4	_____/_____
	Thres. #4 S1	_____/_____
	Thres. #4 S2	_____/_____
	Thres. #4 S3	_____/_____
	Thres. #4 S4	_____/_____
	Totalized	_____
	Totalized S1	_____
	Totalized S2	_____
	Totalized S3	_____
	Totalized S4	_____
6	BCD Output Variable	_____
6A	BCD Output Polarity	_____
6B	BCD Output Parity	_____
7	BCD Input Variable	_____
7A	BCD Input Polarity	_____

3.10.5 Alarms Scroll

ALARMS SCROLL

1	Threshold #1	Scale # 1		Scale # 2		Scale # 3		Scale # 4	
1A	Threshold #1 Set	Scale # 1	%	Scale # 2	%	Scale # 3	%	Scale # 4	%
1B	Thresh. #1 Delay	Scale # 1	sec	Scale # 2	sec	Scale # 3	sec	Scale # 4	sec
1C	Threshold #1 Hyst.	Scale # 1	%	Scale # 2	%	Scale # 3	%	Scale # 4	%
1D	Threshold #1 Mode	Scale # 1		Scale # 2		Scale # 3		Scale # 4	
1E	Threshold #1 Var	Scale # 1		Scale # 2		Scale # 3		Scale # 4	
2	Threshold #2	Scale # 1		Scale # 2		Scale # 3		Scale # 4	
2A	Threshold #2 Set	Scale # 1	%	Scale # 2	%	Scale # 3	%	Scale # 4	%

ALARMS SCROLL

2B	Thresh. #2 Delay	Scale # 1	sec	Scale # 2	sec	Scale # 3	sec	Scale # 4 sec
2C	Threshold #2 Hyst.	Scale # 1	%	Scale # 2	%	Scale # 3	%	Scale # 4 %
2D	Threshold #2 Mode	Scale # 1		Scale # 2		Scale # 3		Scale # 4
2E	Threshold #2 Var	Scale # 1		Scale # 2		Scale # 3		Scale # 4
3	Threshold #3	Scale # 1		Scale # 2		Scale # 3		Scale # 4
3A	Threshold #3 Set	Scale # 1	%	Scale # 2	%	Scale # 3	%	Scale # 4 %
3B	Thresh. #3 Delay	Scale # 1	sec	Scale # 2	sec	Scale # 3	sec	Scale # 4 sec
3C	Threshold #3 Hyst.	Scale # 1	%	Scale # 2	%	Scale # 3	%	Scale # 4 %
3D	Threshold #3 Mode	Scale # 1		Scale # 2		Scale # 3		Scale # 4
3E	Threshold #3 Var	Scale # 1		Scale # 2		Scale # 3		Scale # 4
4	Threshold #4	Scale # 1		Scale # 2		Scale # 3		Scale # 4
4A	Threshold #4 Set	Scale # 1	%	Scale # 2	%	Scale # 3	%	Scale # 4 %
4B	Thresh. #4 Delay	Scale # 1	sec	Scale # 2	sec	Scale # 3	sec	Scale # 4 sec
4C	Threshold #4 Hyst.	Scale # 1	%	Scale # 2	%	Scale # 3	%	Scale # 4 %
4D	Threshold #4 Mode	Scale # 1		Scale # 2		Scale # 3		Scale # 4
4E	Threshold #4 Var	Scale # 1		Scale # 2		Scale # 3		Scale # 4

5	Alarm Set As	□ Alarm	□ Shutdown	□ None
#1	Clock Fail	□ Alarm	□ Shutdown	□ None
#2/6	Load Cell Fail	□ Alarm	□ Shutdown	□ None
#7	RAM Fail	□ Alarm	□ Shutdown	□ None
#8	ROM Fail	□ Alarm	□ Shutdown	□ None
#9/13	Threshold #1 S#	□ Alarm	□ Shutdown	□ None
#14/18	Threshold #2 S#	□ Alarm	□ Shutdown	□ None
#19/23	Threshold #3 S#	□ Alarm	□ Shutdown	□ None
#24/28	Threshold #4 S#	□ Alarm	□ Shutdown	□ None
#29	Warm Start	□ Alarm	□ Shutdown	□ None
#30	Cold Start	□ Alarm	□ Shutdown	□ None
#31	P.D. Calibrate	□ Alarm	□ Shutdown	□ None
#32/36	Calib. Time S#	□ Alarm	□ Shutdown	□ None
#37	Ext. Alarm #1	□ Alarm	□ Shutdown	□ None

ALARMS SCROLL

#38	Ext. Alarm #2	□ Alarm	□ Shutdown	□ None
#39	Ext. Alarm #3	□ Alarm	□ Shutdown	□ None
#40/44	AZT Limit S#	□ Alarm	□ Shutdown	□ None
#45/50	Hdw.Cnfg.Chg.	□ Alarm	□ Shutdown	□ None
#51	BCD Overflow	□ Alarm	□ Shutdown	□ None
#52	Math Error	□ Alarm	□ Shutdown	□ None
#53	Printer Error	□ Alarm	□ Shutdown	□ None
#54	COMM Error	□ Alarm	□ Shutdown	□ None
#55	AB RI/O Error	□ Alarm	□ Shutdown	□ None
#56	PROFIBUS-DP Error	□ Alarm	□ Shutdown	□ None

LOAD OUT SCROLL

1	Preset Weight	_____
2	Pre Act Correction	_____
2A	Pre Act Value	_____
2B	Pre Act Range	_____
2C	Pre Act Length	_____
3	Start Delay	_____
4	Coasting Time	_____
5	Batch Deviation	_____
6	Print Batch	_____
7	Position Batch Number	X = _____ Y = _____
8	Position Batch Quant.	X = _____ Y = _____
9	Position Batch Total	X = _____ Y = _____

3.10.6 Main Menu 5 and Main Menu 6

MAIN MENU 5

COMM A SCROLL

1	Baud Rate Port #1	_____
2	Set Parity Port #1	_____
3	Stop Bits Port #1	_____
4	Word Length Port #1	_____

MAIN MENU 5

5	Protocol Port #1	_____
6	Baud Rate Port #2	_____
7	Set Parity Port #2	_____
8	Stop Bits Port #2	_____
9	Word Length Port #2	_____
10	Protocol Port #2	_____
11	Clear to Send #1	_____
12	Address Port #1	_____
13	Access Prot Port #1	_____
14	Clear to Send #2	_____
15	Address Port #2	_____
16	Access Prot Port #2	_____

PRINT SCROLL

1	Handshaking	_____
2	End of Line	_____
3	Delay End of Line	_____
4	Form Feed	_____
5	Print Interval	_____
6	Print Time #1	_____
7	Print Alarms	_____
8	Totals Report Format	_____
9	String #1	_____
9A	Number of String #1	_____
9B	Contents String #1	_____
9C	Position String #1	_____
9D	Contents String #2	_____
9E	Position String #2	_____
9F	Contents String #3	_____
9G	Position String #3	_____
9H	Position Oper. Total	_____

MAIN MENU 5

9I	Position Reset Total	_____
9J	Position Master Total	_____
9K	Position Date	_____
9L	Position Time	_____
9M	Position Rate	_____
9N	Position Avg. Rate	_____
9P	Position Running	_____

MAIN MENU 6

AUDIT TRAIL SCROLL

Audit Trails ☐ Yes ☐ No

LINEARIZATION SCROLL

Linearization ☐ Yes ☐ No

LIN Factor #1	Weight _____	Factor ____
LIN Factor #2	Weight _____	Factor ____
LIN Factor #3	Weight _____	Factor ____
Lin Factor #4	Weight _____	Factor ____
LIN Factor #5	Weight _____	Factor ____

Chapter 4
Micro-Tech 3100 Maintenance

The maintenance information in this manual should meet your service needs. If problems occur requiring technical assistance, please call (763) 783-2500.

Thermo Electron has a repair center located at our plant in Minneapolis, Minnesota. Contact our Repair Representative at (763) 783-2774 for assistance. To expedite your service request, please have your machine model and serial number available.

4.1 Frequent Checkpoints

The *Micro-Tech 3100 Static Weight Indicator* 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
  1. Check the Line Voltage Selector Switches are set to the correct line voltage
  2. Check the fuse
  3. Check that the power switch in ON and that power is supplied to the unit.
- Check Connections
  1. Check that all terminations are secure.
  2. Check to ensure the Display Module and Keyboard connectors are firmly seated in their connectors.
  3. Check that all Jumpers are in their correct position.

4.2 Troubleshooting

This unit has built-in troubleshooting capabilities. A number of possible problems are automatically detected and screen messages are displayed. Also, refer to the *Diagnostics Test Scrolls* in **MAIN MENU 3**.

4.3 Alarm Messages

The ALARM message is assigned to the right hand soft key when an alarm is pending. The Alarm message and its LED flash at the same time.

The following screen is displayed when the right hand soft key is pressed.

ALARM	**NEW**
xxxxxxxxxxxxxxxxxxxx	
MM-DD-YYYY	**HH:MM**
RESET	**NEXT**

- **NEW** indicates an alarm that has not yet been acknowledged. When the operator presses **RESET** to clear the alarm, the alarm disappears only if the trigger for the alarm does not exist any longer. If the alarm is still pending, **ACK** is displayed instead of **NEW**.
- **NEXT** is used to scroll between the pending alarms.
- XXXXXXXXXXXXXXXXX represents one of the conditions listed in *Section.4.3.1.*

4.3.1 Alarms List

1 - Clock Fail

The system has detected a failure on the clock calendar circuit.

- Go to the **DIAGNOSTICS** screen and re-enter the date and time.
- Check the battery
- Replace the motherboard.

2/6 - Load Cell Fail S#

S# identifies the scale if more scale are defined. The system has detected an error on the load cell signal.

- Check the load cell connections.
- Check the load cell(s).

7 - RAM Fail

The system has detected an error on the *RAM* (*Random Access Memory*) checksum during the internal periodic test. The *RAM* is used to store variables and set up data.

- Replace the motherboard.

8 - ROM Fail

The system has detected a failure on the *ROM* (*Read Only Memory*) *checksum* during the internal periodic test. The *ROM* is used to store the program.

- Replace the mother board

9/13 – Threshold #1 S#

S# identifies the scale if more than one scale is defined. The threshold 1 has been reached.

14/18 – Threshold #2 S#

S# identifies the scale if more than one scale is defined. The threshold 2 has been reached.

19/23 – Threshold #3 S#

S# identifies the scale if more than one scale is defined. The threshold 3 has been reached.

24/28 – Threshold #4 S#

S# identifies the scale if more than one scale is defined. The threshold 4 has been reached.

29 - Warm Start

The system has detected a power loss condition, or power was removed for an undefined period.

30 - Cold Start

- The system has detected the loss of the set up data after power was removed. The instrument needs to be setup and calibrated.
- Replace the motherboard

31 – P.D. Calibration

When the system is powered off while a calibration sequence is in progress, the scale may not be properly calibrated.

- Check calibration

32/36 – Calib. Time S#

S# identifies the scale if more than one scale is defined. If a calibration check time is entered and the time expires, this alarm occurs. The purpose is to remind the operator that the calibration has not been checked for a considerably long period.

- Check Calibration

37 - Ext. Alarm 1

Digital inputs can be programmed to detect external alarm conditions such as emergency switches, max level switches or other. This alarm is associated to the external alarm #1.

- Check External alarm #1.

38 - Ext. Alarm 2

- Check external alarm #2.

39 - Ext. Alarm 3

- Check external alarm #3

40/44 – AZT Limit S#

S# identifies the scale if more than one scale is defined. The Auto Zero Tracking function has reached the maximum limit of tare that is allowed to be automatically cleared. The scale may be dirty or misaligned.

- Check and clean the scale.
- Perform an autozero.

45/50 - HW Conf. Changed

When a new board is installed or an old board removed, this message displays.

51 – BCD Overflow

This message is only displayed if the optional BCD output board is installed. If the variable to be converted in the BCD format has more than 4 digits, the alarm is generated.

- Check the size of variable and the BCD data setup.

52 - Math Error

A divide by zero or overflow error is encountered during internal calculations. This message indicates some abnormal dimensional parameter is entered in setup.

- Check setup data

53 - Printer Error

This message is displayed if the system has data to print and the printer is disconnected or the paper feed is empty.

54 - Communication Error

Indicates a time out or handshake error is detected during a data transfer on the COMM line.

- Check the COMM line connections.
- Check the COMM line setup data.

55 – Allen-Bradley Remote I/O COMM Error

This message is displayed if communication is interrupted. The green LED on the A_B R I/O board will be flashing. The alarm does not come on if communication has never started.

56 – PROFIBUS-DP COMM Error

This messages in *only* displayed if the optional Profibus board is installed. The following two conditions activate the alarm.

The *Siemens SPC3 Controller* installed on the *Profibus* interface board does not recognize any successful data transfer within the watchdog timer interval.

The received data contains errors (value overlaps limits, register number does not exist, group number does not exist).

4.4 Micro-Tech 3100 Cold Start

It may be necessary to cold start the *Static Weight Indicator* in the event memory becomes corrupted. In the event of a cold start, you have the option of installing the factory default constants or simply returning the Micro-Tech to its previous running state.

There are two methods of forcing a cold start through the front panel:

- In **RUN** mode
- From the **DIAGNOSITCS SCROLL**

4.4.1 Forcing a Cold Start from Run Mode

Use the following steps to force a cold start from **RUN** mode.

1. Press and hold at the same time the **LEFT HAND ARROW** and the **CLEAR** keys until the following screen displays.

```
Install Factory
Defaults?

NO              YES
```

No, Returns to Run Mode
Yes, the following screen displays:

```
-- MEMORY ERASED --
Choose the language
key to continue to
ESP             USA
```

2. When this screen displays, all field entry data has been replaced by the factory default constants. Proceed to *Section 2.7*and follow the *Initial Setup* procedures.

Note: If the software corruption was catastrophic and the memory *will not* erase do the following:

Press and hold in the **LEFT ARROW** and the **CLEAR** key. While holding in both keys, cycle line power. In the event the **MEMORY ERASED** screen does not appear, consult the factory.

4.4.2 Forcing a Cold Start from the Diagnostic Scroll

Use the following steps to force a cold start from the **DIAGNOSITICS SCROLL**:

1. Press **MENU** until **MAIN MENU 3** appears
2. Press the **DIAG** soft key
3. Press the **DOWN ARROW** until the following screen is displayed:

```
-- DIAGNOST.SCROLL 15 --
Force cold start

ENTER
```

Press **ENTER**, the following screen displays:

```
ATTENTION
ARE YOU SURE?

YES              RETURN
```

RETURN returns to the **DIAGNOSTIC SCROLL 15**
YES, the following screen displays:

```
Install Factory
Defaults

YES              RETURN
```

RETURN returns to the **DIAGNOSTIC SCROLL 15**
YES, clears all field entry data, and installs the factory default constants. The following screen displays:

```
-- MEMORY ERASED --
Choose the language
 key to continue to
ESP              USA
```

4. Select a language and proceed to *Section 2.7*and follow the *Initial Setup* procedures.

4.5 Internal Test Procedure

Pressing **START** on the screen (located in **MAIN MENU 3**) initiates a self-test of the internal processor. The following screen displays:

```
    -- TEST SCROLL 2 --
Internal test of
 microprocessor.
START
```

Password: Service

Press **START**, the following screens display in sequence:

```
    -- TEST SCROLL 2A --
Testing ROM
Test PASSED
```

```
    -- TEST SCROLL 2B --
Testing RAM
Test PASSED
```

The message "Test PASSED" is displayed if the test runs correctly. If something wrong is detected, the message "Test FAILED" is displayed and the soft key **CONTINUE** is shown. Press **CONTINUE** and move to the next test.

If the internal test has failed, call Thermo Electron Customer Service.

4.6 Load Cell Excitation and Signal Voltage

1. Measure excitation voltage across terminal 21 negative and 20 positive in the scale junction box. This should be 10 VDC ± 5%.
2. If the excitation voltage is incorrect then measure the excitation voltage in the *Static Weight Indicator* across terminal TB4-33 negative and the TB4-32 positive. This should be 10 VDC ± 5%.
3. Measure DC millivolt signal voltage across terminal 22 positive and 23 negative in the scale junction box. This should be within 0-30 millivolts DC (3 mV/V load cell).
4. Measure DC millivolt signal voltage across terminal TB4-30 positive and TB4-31 negative in the *Static Weight Indicator*. This should be the same as Step 3 above.
5. The millivolt output is in direct relation to weight applied. As weight is increased, output should increase.

4.7 Resetting Master Total

Use the following steps to reset the *Master Total* or the *Remote Counter Overflow*.

4.7.1 No Password Installed

1. If there is no password installed, select **MAIN MENU 3**
2. Press **DIAG** soft key and scroll down to the **SRVICE PASSWORD** screen.
3. Type in a password (example: 123) and press **ENTER**
4. Re-enter the password and press **ENTER**
5. Select **MAIN MENU 3**
6. Select **PROT** scroll, press **PROT**
7. Press **NONE**
8. Enter the password 7832500 and press **ENTER**. The protection level should be RAMSEY.
9. Press **TOTAL;** scroll up or down if needed to reach the **MASTER TOTAL** screen.
10. Press **RESET** and select **YES** to "Reset Master Total?"
11. Select **MAIN MENU 3**. Press **DIAG** and scroll to **SERVICE PASSWORD**.
12. Press **ENTER** twice, erasing the password installed in Step 3.
13. Press **RUN** to return to normal operation.

4.7.2 Active Password

1. Select **MAIN MENU 3**
2. Select **PROT** scroll, press **PROT**
3. Press **NONE**

4. Enter the password 7832500 and press **ENTER**. The protection level should be RAMSEY.
5. Press **TOTAL;** scroll up or down if needed to reach the **MASTER TOTAL** screen.
6. Press **RESET** and select **YES** to "Reset Master Total?"
7. Select **MAIN MENU 3**
8. Press **PROT** and choose the password level desired.

4.8 Removing a Forgotten Password

Use the following steps to remove a forgotten password from *Instrument* memory.

1. Select **MAIN MENU 3**
2. Select the **PROTECT** scroll and press **PROT**
3. Press **NONE**
4. Enter the password 7832500 and press **ENTER**. The protection level should be RAMSEY.
5. Press **NONE**
6. Select **MAIN MENU 3**
7. Press **DIAG** and scroll to **SERVICE PASSWORD**
8. Press **ENTER** twice. The display should respond with **NEW PASSWORD ACQUIRED**.
9. Scroll down to **OPERATOR PASSWORD**. Press **ENTER** twice. The display should respond with **NEW PASSWORD ACQUIRED**.
10. Select **MAIN MENU 3**. The **PROT** soft key should not appear, indicating all passwords have been erased. If **PROT** does appear, repeat Steps 1 through 9.
11. See Section for entering new passwords.

4.9 Lithium Battery Replacement

The Micro-Tech volatile memory backup battery can be replaced without any special tools.

WARNING
DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED.

Replace only with same or equivalent type recommended by Thermo Electron. Dispose of used battery according to manufactures instruction on battery or return to Thermo Electron. (Refer to *Section 4.10.)*

1. Record *all* configuration, setup, and calibration data before removing battery. All information is lost when the battery is removed.
2. Turn the *Micro-Tech* power off at the mains.
3. Remove the battery from its compression socket.
4. Observe the polarity markings on the battery socket base before inserting the new battery. The lithium battery is .3V, 1.2 AH, 2/3 A, Thermo Electron part number 037188.
5. Insert battery

6. Restore power to the *Micro-Tech.*
7. Cold start the *Micro-Tech*. See *Section 4.4* for cold start procedures.
8. Re-enter all data recorded in Step 1.

4.10 Disposal of Hazardous Waste

Disposal of Lithium batteries and soldered print circuit boards should be in accordance with your local Hazardous Waste Policy.

As an alternative, you may return product supplied by Thermo Electron, freight prepaid for disposal. Contact Thermo Electron Repair Department for a Return Authorization Number before shipping any product for disposal.

4.11 Cleaning Instructions

The *Micro-Tech 3100* is a solid-state device requiring 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 all wires, plugs, and integrated circuits are tight in their connectors. Keep the enclosure door tightly closed to prevent dirt infiltration.

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Chapter 5
Micro-Tech 3100 Replacement Parts

This section gives information on how to order replaceable parts for your *Static Weight Indicator* and includes drawings with corresponding parts lists to enable you to identify parts quickly and accurately.

5.1 Order Information

For faster service when ordering parts, fax or telephone Products Parts Department. Your regional field service representative will also be happy to assist you with parts orders, but his normal scheduling time may delay shipment of your parts order.

The recommended procedure for order parts is as follows:

1. Determine the broken or faulty part(s).
2. Locate the part(s) in the parts list given.
3. Find the part number(s) for the item(s) needed and determine the quantity you require.
4. Fax or telephone:

Thermo Electron
Customer Service Department
501 90th Ave. NW
Minneapolis, MN 55433

Customers A through M	**-**	**(763) 783-2775**
Customers N through Z	**-**	**(763) 783-2773**
Repair and Returns	**-**	**(763) 783-2774**
Fax:	**-**	**(763) 783-2525**

Normal Customer Service hours are 8:00 a.m. to 4:30 p.m., Central time.

5. With your order, list the following information:

- Machine model and serial number
- Purchase order number
- Date required
- Method of shipment preferred
- List of parts, including part number, description and quantity

Your parts order will be handled as expeditiously as possible.

RMA NO. R-_____
(This RMA number must be marked on all paperwork and on the outside of the package.)

Req'd By_____

Date: _____

Customer Contact: _____

Phone No.: (____)_____

Return, Freight Prepaid to:

Thermo Electron
501 90th Avenue N.W.
Minneapolis, MN 55433

Telephone: 763.783.2774
Fax:: 763.783.2525

Bill to Customer #:_____ Ship to #:_____

Returned From:

_____
_____
_____

Return To:

_____
_____
_____

Description of Material Being Returned:

_____
_____
_____

Describe Equipment Malfunction or Defect if any. List symptoms:

_____
_____
_____

Minimum Charge:
☐ Informed Customer of $50.00 Inspection Charge Per Item

Service Requested:

P.O. No.: _____

☐ Repair & Return ☐ Estimate Required

Original P.O. or Job Order No.:_____

☐ Return for Credit

☐ Warranty Repair or Replacement

Serial No.:_____

Original P.O. No: _____

Original Order/Job No.:_____

☐ Return Warranty/Exchange Unit

Shipped on Job Order No.:_____

☐ Other_____

Disposition/Comments: (For internal use only)

_____
_____

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ELECTRON CORPORATION

5.1.1 Parts List

Table 5-1: Parts List

EQUIPMENT	PART NUMBER
Chassis Assembly, Panel Mount	073285
Chassis Assembly, Field Mount	073279
PCBA, MOTHERBOARD	073283
PCBA, Display Assembly	073281
Touch Panel	073264
Bezel Assembly	073289
Fuse, Slo-Blo, .200mA (F1 230V) (Type T)	001366
Fuse, Slo-Blo, 400mA (F1 115V) (Type T)	002443
Prom, U54, MT-3000 Audit Trail	073300
Battery, Lithium, 3.0 V, 1.2 AH, 2/3 A.	037188
Program Disk	068137
Power Module	073280

Table 5-2: Optional *Plugin* Boards

EQUIPMENT	PART NUMBER
PCBA, Analog Output (1 out)	071637
PCBA Analog Output (2 in/2 out)	071636
PCBA, DIO (4 in/16 out)	046841
PCBA, DIO (16 in/4 out)	046844
PCBA, COMM "A" Select one only	068053
RS-232C	
RS-485, std. (point to point)	
RS-485, multi-drop	
20 mA (digital) current loop	
PCBA, Load Out DIO (4 in/16 out)	049475
PCBA, Load Out DIO (16 in/4 out)	049476
PCBA, Allen-Bradley RI/O	055517
PCBA, PROFIBUS-DP	056713
PCBA DeviceNet	068147
Field Marshall PCA	058842
DeviceNet PCBA	067097
Relay Output Board	073284

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Appendix A
Micro-Tech 3100/3200 Menus

The *Static Weight Indicator* is a menu driven machine that allows the operator to access all setup, test, and calibration parameters. **MAIN MENU** screens **1** through **6** can be accessed at any time by pressing **MENU** key until the desired screen is displayed.

Pressing the **SOFT KEY** directly below the desired scroll and then using the **UP/DOWN,** arrow scroll key selects the **MENU** scrolls.

If the *Static Weight Indicator* is password protected, the appropriate password must be entered prior to making changes or performing routine calibration. Menus may be viewed without entering a password, but no entries are allowed unless the password is entered.

A.1. Menu Displays

Optional menu scrolls are only available if the option has been installed. Pressing menu activates the following screens:

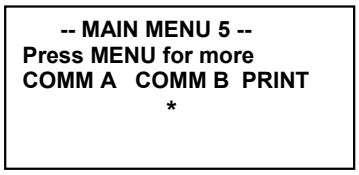
```
    -- MAIN MENU 1 --
Press MENU for more
ZERO   SPAN
CAL    CAL    PRINT
```

```
    -- MAIN MENU 2 --
Press MENU for more
            SCALE   CALIB
DISPLAY  DATA     DATA
```

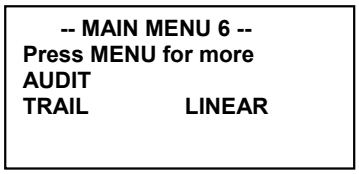
```
    -- MAIN MENU 3 --
Press MENU for more

PROT    DIAG    TEST
```

```
    -- MAIN MENU 4 --
Press MENU for more
I/O       ALAMS   LOAD
DEF       DEFIN.  OUT
```



*** Can be AB RIO or PRO DP**



A.2. Common Key Functions

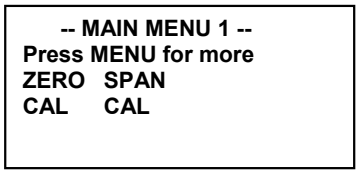
The following functions are common from all scrolls at all times and the use of these keys is not repeated for each procedure:

- **Run** – pressing **RUN** return the *Static Weight Indicator* to the **RUN** menu
- **Exit** – exit appears at the bottom of some screens as a soft key option. Pressing exit moves you back a menu.

A.3. MAIN Menu 1 – Calibration Menu

MAIN MENU 1 contains the **CALIBRATION MENU**. **MENU 1** is selected by pressing **MENU** until **MAIN MENU 1** displays. Desired **CALIBRATION** scrolls are selected by pressing the **SOFT** keys directly below the desired scroll. Calibration scrolls consist of the following:

- *Zero Calibration*
- *Span Calibration*

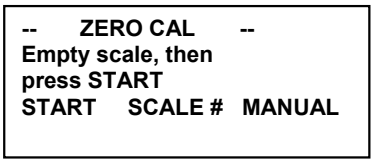


A.3.1. Zero Calibration Scroll

The Zero Calibration is implemented as a machine directed procedure.

Auto Zero

If only one scale defined :



Password: Operator

The scale must be kept empty during auto zero. A complete zeroing procedure requires 10 seconds, but can be reduced by pressing END in the next scroll.
Indication S# in the following scrolls will appear only if more than one scale is defined. # represents the active scale number.

When **START** is pressed, the following screen is displayed :

```
S# AUTO ZEROING
Time remaining      0000
Gross           000.0  lbs
END       ABORT
```

During *Auto Zero*, weight resolution is ten times higher than normal. The number of seconds in Line 2 corresponds to the time remaining for completing the test.
When zero is reached or END is pressed, the system displays the following screen :

```
S# AUTO ZERO COMPLETE
Error           ±000.00%
Change zero?
YES       NO
```

The word **COMPLETE** is flashing. The percentage of error is related to the scale capacity.

If **YES** is pressed , the next screen is shown :

```
S#  ZERO # CHANGED
New zero        #00000
Old zero        #00000
RUN       MENU
```

If **NO** is pressed, the next screen is shown :

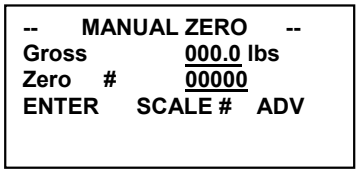
```
S#  ZERO # UNCHANGED
New zero        #00000
Old zero        #00000
RUN       MENU
```

Note that in this case old zero and new zero are shown equal.

The zero constants are shown in A/D counts.

A.3.1.1 Manual Zero

The *Manual Zero* procedure allows the operator to directly enter the zero constant if known.

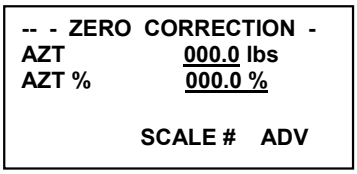


Password: Operator

Default: 40000
Min: 0
Max: 120000

The ADV key is only displayed if Auto Zero Tracking optional function is enable for this scale ; otherwise, the EXIT key is displayed. The AZT function accurately tracks the zero of each scale by calculating an additional zero constant. The portion of zero due to AZT is not incorporated in the zero constant, but is shown separately.

When ADV is pressed, the system scrolls between Zero and AZT.



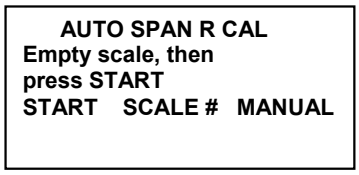
A.3.2. Span Calibration

The span calibration can be done in two different ways : R-Cal or Test Weights. The system allows the operator to select which one of the two methods to be used for normal calibration and calibration's check. The selection is made in **CAL DATA SCROLL 1**

A.3.2.1 Automatic Span Calibration With R-Cal

Use the following steps to begin an *R-Cal Calibration*:

1. **Starting an R-Cal Calibration**



Password: Operator

When **START** is pressed, the Rcal relay energizes. A half second delay occurs after **START** for the weight to stabilize.

Note: The operator must insure that the scale is empty before pressing **START**.

2. Executing the Span Calibration

Indication S# in the following scrolls appears only if more than one scale is defined. # represent the active scale number.

After **START** is pressed, the follwing screen is displayed :

(A) Entry point when **REPEAT** is pressed .

```
S# AUTOSPANNING
Time remaining      0000
Gross             000.0  W.U.
END       ABORT
```

During Auto Span, the weight resolution is 10 time higher than normal. The entire function takes 60 seconds to be completed, remaining time is displayed in line 2. The END key can be used to conclude the function in less time.

3. Record the Factor

This part of the procedure is only executed if a calibration with test weights was done before, and if R-CAL has not been factored yet.

It is very important to understand that **when this procedure is executed, the system will not alter the span**. The system assumes the span is set correctly based on a test weight calibration. The system acquires the R-CAL Factor. The factored R-CAL can then be used to check the span between test weight calibrations.

CAUTION

SPAN SHOULD ONLY BE CHANGED BASED ON A TEST WEIGHT CALIBRATION

```
 AUTO SPAN COMPLETE
Error     +/- 00.00%
Unfactored Calcon
EXIT    FACTOR    REPEAT
```

The word COMPLETE is flashing.

If EXIT is pressed, the system acknowledges that the R-CAL factor is not used. The effect of this is that the system does not ask for a factor any more for this calibration method unless a manual span entry is done. By pressing EXIT, the operator tells the system that he does not want to use factors, but wants to use the test results for changing the span number.

After EXIT is pressed, go to point (4.). If REPEAT is pressed, go to (A) above. If FACTOR is pressed, the following screen is displayed :

```
FACTORING R-CAL
New Factor :   000.00 %
Change factor ?
YES            NO
```

If NO is pressed, the old factor is preserved, go to point (4.) below. If YES is pressed, the following screen is displayed :

```
 R-CAL Matl FACTOR
Old factor :  00.00 %
New factor : 00.00 %
RUN        REPEAT
```

Can be R-CAL or TEST WEIGHTS

The REPEAT key returns the operator to (A) above. Pressing RUN ends the procedure.

After this point is reached, the system does not proceed to the next section.

4. Recording the New Span

The system calculates the new span

```
S#  AUTO SPAN COMPLETE
Error     +/- 00.00%
Change span ?
YES          NO          FACTOR
```

The word “COMPLETE” is flashing.

FACTOR key is displayed only if an autospan with test weight has been previously executed.

If YES is pressed, the following screen is displayed :

```
S#   SPAN#   CHANGED
Old span  #      000000
New span         000000
RUN       REPEAT
```

REPEAT moves back to (A) above, and calibration restarts.

If NO is pressed, the following screen is displayed :

```
S#   SPAN#   UNCHANGED
Old span  #      000000
New span         000000
RUN       REPEAT
```

Note the Old span and the New span are shown equally. This is because no change to the span has been done.

If FACTOR is pressed, the R-CAL factor is computed. The following screen is displayed:

```
S#   FACTOR ACQUIRING
New fact        000000 %
Change factor ?
YES      NO
```

NO moves back to point (4.) above.

YES acquires the new factor. If pressed, the following screen is displayed :

```
S# FACTOR CHANGED
Old fact #      000000 %
New fact        000000 %
RUN      REPEAT
```

5. Ending an Auto Span Procedure with R-CAL

Press RUN. The R-Cal relay is de-energized and the display is locked for 3 seconds.

A.3.2.2 Automatic Span Calibration With Test Weights

1. Starting Span Calibration With Test Weights

```
    AUTOSPAN Weights
Apply Weights, then
press START
START   SCALE #   MANUAL
```

Password: Operator

The operator must apply the test weights on the scale before pressing start.

When **START** is pressed, the span function begins.

2. Executing the Span Calibration

Indication S# in the following scrolls appear only if more than one scale is defined. # represents the active scale number.

Whichever method has been used to start automatic span calibration, after START is pressed, the following screen is displayed :

(B) Entry point when **REPEAT** is pressed (see below)

```
S# AUTOSPANNING
Time remaining      0000
Gross          000.0  W.U.
END      ABORT
```

During Auto Span, the weight resolution is 10 times higher than normal. The entire function takes 60 seconds to be completed, remaining time is displayed in line 2. The END key can be used to conclude the function in less time.

3. Recording the New Span

The system calculates the new span based on the result of the test performed with the selected method :

```
S# AUTOSPAN COMPLETE
Error   +/- 000.00%
Change span?
YES        NO
```

The word COMPLETE is flashing.

If YES is pressed, the following screen is displayed :

(C)

```
S#   SPAN # CHANGED
Old span  #     000000
New span  #     000000
RUN      REPEAT  FACTOR
```

FACTOR key is displayed only if an autospan with R-Cal has been previously executed.

REPEAT moves back (B) above, and calibration restarts.

If **NO** is pressed, the following screen is displayed :

```
S#   SPAN# UNCHANGED
Old span  #     000000
New span  #     000000
RUN      REPEAT
```

Note the Old span and the New span are shown equally. This is because no change to the span has been done.

If **FACTOR** is pressed, the RCAL factor is computed. The following screen is displayed :

```
S#   FACTOR ACQUIRING
New fact        000000 %
Change factor ?
YES      NO
```

NO moves back to (C) above.

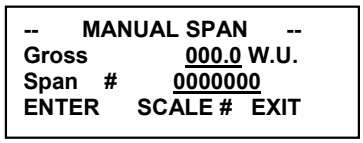
YES acquires new factor. If pressed, the following screen is displayed :

```
S#  FACTOR CHANGED
Old fact  #     000000 %
New fact        000000 %
RUN      REPEAT
```

A.3.2.3 Manual Span

If the span constant is known, the manual span procedure allows the operator to manually change span.

NOTE : If the span is manually entered, the RCAL factor is set to INVALID.



Password: Operator

Default : 1166667
Min : 5000000
Max : 45000000

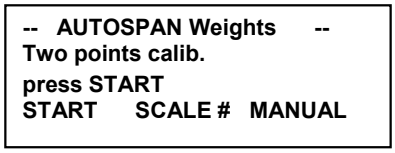
The RUN key return to Run Menu.

A.3.2.4 Two Point Calibration

An other way to calibrate the instrument is to use the two point calibration method. This is a method that allows calculating zero and span without knowing the exact zero value.

This function is activated by pressing the SPAN CAL key in MAIN MENU 1 after "2 points"

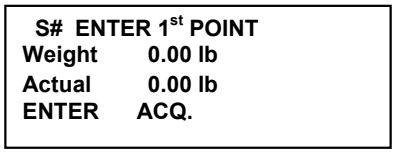
1. Starting Two Point Calibration



Password: Operator

Press START to begin the calibration

2. Defining First Point



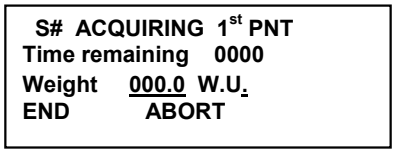
Password: Operator

Enter the weight corresponding to the first point, then press ACQ.

3. Acquiring First Point

In this phase, the instrument acquires the A/D raw data for a minute. The procedure can be shorted by pressing the END key

The following scroll is displayed during this phase :



4. Defining Second Point

```
 S# ENTER 2nd POINT
Weight      0.00 lb
Actual      0.00 lb
ENTER     ACQ.
```

Password: Operator

Enter the weight corresponding to the second point, then press ACQ.

5. Acquiring Second Point

In this phase, the instrument acquires the A/D raw data for a minute. The procedure can be shorted by pressing the END key

The following scroll is displayed during this phase :

```
 S# ACQUIRING 2ndt PNT
Time remaining   0000
Weight    000.0 W.U.
END          ABORT
```

6. Recording the New Zero and Span

A this point, the procedure is completed. The instrument computes the new zero and span and asks for confirmation to acquire the new data

```
S# CALIB. COMPLETE
Zero Error      0.00 %
Set zero and span?
YES       NO       ADV
```

The word COMPLETE is flashing.

ADV key switches indication in second line between zero and span error.

Press YES to accept new values. The following scroll is displayed :

.

```
S# CALIB. COMPLETE
New zero #      00000
New span #      00000
RUN         MENU
```

The word COMPLETE is flashing.

Press NO to abort them. The following scroll is displayed :

```
S# CALIB. COMPLETE
Zero # unch.   00000
Span # unch.   00000
RUN         MENU
```

The word COMPLETE is flashing.

A.4. Main Menu 2 – Setup and Configuration Menus

MAIN MENU 2 contains the **SETUP AND CONFIGURATION MENUS**. **MENU 2** is selected by pressing **MENU** until **MAIN MENU 2** displays. Desired **SETUP AND CONFIGURAITON** scrolls are selected by pressing the **SOFT** keys directly below the desired scroll. Scrolls for **MAIN MENU 2** consist of the following:

- *Display*
- *Scale Data*
- *Calibration Data*

A.4.1. Display

The Display scroll sets up the parameters for how the information at the *Static Weight Indicator* interface will display.

A.4.1.1 Measure Units

Measure units can be individually selected. The operator must first decide if The English or Metric units will be used, or a combination of both (Mixed).

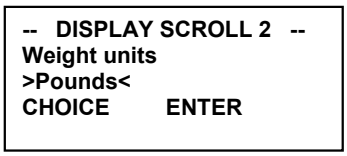
Press **ENTER** soft key to accept the default unit, or **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

Password: Service

Default: ENGLISH In other language Default : METRIC
Choices: ENGLISH, METRIC, MIXED
English - all units in English
Metric - all units in Metric
Mixed – units may be a combination of English and Metric.

The weights are displayed according to the units selected here.

Press **ENTER** soft key to accept the default unit, or **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.



Password:

Default: English = POUNDS
Choices: PERC%, POUNDS, TONS, LTONS

Default: Metric = KG
Choices: PERC%, KG, TONNES

Default: Mixed = POUNDS
Choices: PERC%, KG, TONNES, POUNDS, TONS, LTONS

Press **ENTER** soft key to accept the default unit, or **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

```
-- DISPLAY SCROLL 3 --
Total units
>tons<
CHOICE      ENTER
```

Password: Service

Default: English = TONS
Choices: PERC%, TONS, LTONS, POUNDS

Default: Metric = TONNES
Choices: TONNES, KG

Default: Mixed = TONS
Choices: TONS, LTONS, POUNDS, TONNES, KG

Press **ENTER** soft key to accept the default unit, or **CHOICES** soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

A.4.1.2 Language

The Mod.3100 is a dual language instrument. English (ENG or USA) is always the first language, the second can be one from the following list.

Press **DOWN SCROLL** key.

```
-- DISPLAY SCROLL 4 --
Language
>USA<
CHOICE      ENTER
```

Password: Service

Default: USA
Choices: USA, ENG, ESP, FRA, GER, DUT, ITA

A.4.1.3 Time and Data Mode

The operator defines the format for displaying and printing time and date.

```
-- DISPLAY SCROLL 5 --
Time
>am/pm h<
CHOICE      ENTER
```

Password: Service

If USA or English : **Default** : am/pm
If other language : **Default** : 24 h
Selection : am/pm, 24 h

```
-- DISPLAY SCROLL 6 --
Date
>MM-DD-YYYY<
CHOICE      ENTER
```

Password: Service

If USA : **Default** : MM-DD-YYYY
If other language : **Default** : DD-MM-YYYY
Selection : DD-MM-YYYY, MM-DD-YYYY, YYYY-MM-DD

A.4.1.4 Line 2 and 3 of the RUN Menu

The RUN MENU can be configured to display on line 2 and/or 3 either weight, master total, reset total, date and time and graphic indication of the net weight.

```
-- DISPLAY SCROLL 7 --
Run display line 2
>Weight<
CHOICE ENTER SCALE#
```

Password: Operator

Default: WEIGHT
Choices: NO DISPLAY, WEIGHT, PEAK, RESET TOT, MASTER TOT, DATE/TIME, BARGRAPH

```
-- DISPLAY SCROLL 8 --
Run display line 3
>No Display<
CHOICE ENTER SCALE#
```

Password: Operator

Default: NO DISPLAY
Choices: NO DISPLAY, WEIGHT, PEAK, RESET TOT, MASTER TOT, DATE/TIME, BARGRAPH

A.4.1.5 Damping Factors for the Display

The process variable when displayed on the screen can be damped by a programmable factor, to filter out variations that can be introduced by mechanical vibrations. To tune a damping filter, enter the number of seconds corresponding to the desired time constant. If, for example, 10 seconds is entered, the process variable reaches the stability after a step change in 10 seconds.

```
-- DISPLAY SCROLL 9 --
Display weight
Damping 4 sec
ENTER SCALE#
```

Password: Operator

Default : 4sec
Min : 0sec
Max : 400sec

A.4.1.6 Enable ALTERNATE Function on RUN Scroll

The ALTERNATE function allows the operator to automatically change scales without pressing the SCALE # key at predefined interval of time.

A number of seconds greater than zero enables the function. If only scale is enabled, this scroll is not displayed.

```
-- DISPLAY SCROLL 10 -
-Alternate scales in
RUN      ____sec
ENTER
```

Password: Operator

Default : 0sec (Function disabled)
Min : 0sec
Max : 60sec

A.4.1.7 Enable TARE Mode in RUN Scroll

The TARE mode function, allows tare to be set automatically or manually in the RUN scroll. If ACQUIRE is selected, Tare is automatically acquired when the TARE key is pressed. If Manual is selected, tare may be entered through the keypad when the TARE key is pressed.

```
-- DISPLAY SCROLL 11 -
-Tare Mode
>ACQUIRE<
CHOICE            ENTER
```

Password: SERVICE

Default : Acquire
Selections: Acquire, Manual

A.4.2. Scale Data Scroll

Scale data defines the specific parameters of the scale.

A.4.2.1 Number of Scales

The *Static Weight Indicator* can control from one to four independent scales. The number of scales that can be programmed according to the number of A/D are installed.

```
-- SC DATA SCROLL 1  --
Number of scales
        1
ENTER
```

Password: Service

Default: 1
Min: 1
Max: The Absolute number of scale is 4. The actual maximum depend of the combination of A/D boards installed

- Plant scale A/D 1 channel
- Plant scale A/D 2 channel
- Premium scale A/D 1 channel

The system allows defining a Logical Scale as an alternative to a physical scale. A Logical Scale is a scale combining signals of existing physical scales. For example, Scale #3 could be defined as Scale #1 plus Scale #2.

If the operator has selected more than two scales in the previous scroll, the following scrolls are available.

```
-- SC DATA SCROLL 1A --
Type of scale 3
>  A/D input  <

CHOICE          ENTER
```

Password: Service

Default: A/D Input
Selections: A/D Input, S1+S2, S1-S2, S2-S1

A/D Input selection is displayed only if at least 3 A/D channels are installed in the instrument.

```
-- SC DATA SCROLL 1B --
Type of scale 4
>  A/D input  <

CHOICE          ENTER
```

Default: A/D Input
Selections: A/D Input, S1+S2, S1-S2, S2-S1,
S1+S3, S1-S3, S3-S1,
S2+S3, S2-S3, S3-S2
S1+S2+S3, S1+S2-S3, S1-S2+S3, S1-S2-S3

A/D Input selection is displayed only if 4 A/D channels are installed in the instrument.

Local Scales are computed using gross weights.

Example : A/D channel #1 is used for a platform scale with a range of 100 Tons. A/D channel #2 is used for a platform scale with range of 200 Tons. When long trucks need to be weighed, both scales are used. Scale #3 is defined as S1+S2, so that the Scale #3 indicates the weight of Scale #1 plus the weight of Scale #2. Scale #3 has a range of 300 Tons.

A.4.2.2 Scale Capacity and Divisions

The next entry is the scale capacity, which is the maximum capacity of the scale. This entry also defines the default number of decimal places that are used for display weight values. Use numeric keys for entering the number, confirm **ENTER**. Scroll down.

```
--  SC DATA SCROLL 2  --
Max. scale capacity
100.0   lbs
ENTER              SCALE #
```

Password: Service

Default: 100.0
Min: 1
Max: 200000

When the scale capacity is entered, the number of decimal places is also defined. If, for example, the operator enters 500.0, this sets the “Scale Division” parameter to 0.1. Advancing to the next scroll, the operator then sees the Scale Division corresponding to the just entered Scale Capacity (in the example 0.1).If required, the operator is able to alter the Scale Division to any of the available options.

Press the **ENTER** soft key to accept the default division , or the **CHOICES** Soft key to scroll selections. Press **ENTER** to confirm your selection. Scroll down.

```
-- SC DATA SCROLL 3 --
Scale divisions
>0.1<
CHOICE  ENTER  SCALE #
```

Password: Service

Default: 0.1
Choices: 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 0.01, 0.02, 0.05, 0.001, 0.002, 0.005

A.4.2.3 Number of Load Cells of Your Scale

Enter the number of load cells of your scale.

```
-- SC DATA SCROLL 6 --
# of load cell
   1
ENTER          SCALE #
```

Password: Service

Default: 1
Min: 1
Max: 6

A.4.2.4 Defining the Load Cell(s)

Enter the load cell capacity as it appears on the label placed on the load cell.

```
-- SC DATA SCROLL 7 --
Load cell capacity
250 Lbs
ENTER          SCALE #
```

Password: Service

English/Mixed		**Metric**	
Default:	250.0 Lbs	**Default:**	100 kg
Min:	10 Lbs	**Min:**	1 kg
Max:	15000 Lbs	**Max:**	15000 kg

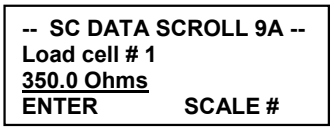
Enter the load cell sensitivity in mV/V as marked on the label of the load cell. Thermo Ramsey load cells are normally 2.000 or 3.000 mV/V.

```
-- SC DATA SCROLL 8 --
Load cell sens.
3.00 mV/V
ENTER          SCALE #
```

Password: Service

Default: 3.0 mV/V
Min: 0.500 mV/V
Max: 3.500 mV/V

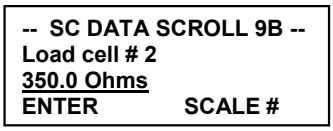
The resistance of the bridge of each load cell has to be entered here. The number of scroll depends on the number of load cells specified per each scale.



Password: Service

Default: 350 Ohms
Min: 10 Ohms
Max: 1000 Ohms

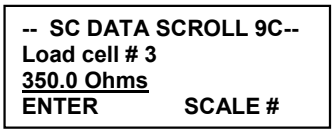
If # of Load Cells is 2 or more :



Password: Service

Same default and limits of load cell #1

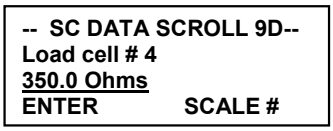
If # of Load Cells is 3 or more :



Password: Service

Same default and limits of load cell #1

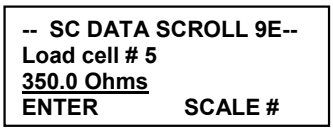
If # of Load Cells is 4 or more :



Password: Service

Same default and limits of load cell #1

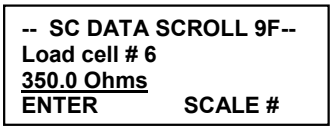
If # of Load Cells is 5 or more :



Password: Service

Same default and limits of load cell #1

If # of Load Cells is 6 :

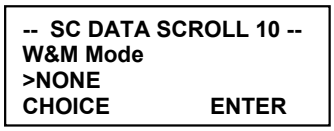


Password: Service

Same default and limits of load cell #1

A.4.2.5 Selecting a W&M Mode

This scroll only appears if the Micro-tech Model 3200 Static Weight Indicator is used in an approved scale. The selection details specific requirements of local Weight & Measure offices in certain countries

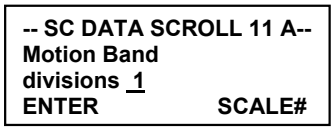


Password: Service

Default: None
Selections: None, OIML

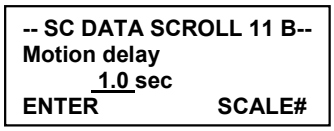
A.4.2.6 Stable Weight Parameters

These Scrolls define the parameters for the stable weight indication. Motion band defines the range on which the weight should stay in order to be considered stable. The motion delay defines how many times this condition should be true before stable weight indication turns on.



Password: Service

Default: 1
Min: 0
Max: 3



Password: Service

Default: 1.0
Min: 0
Max: 60

A.4.3. Calibration Data Scroll

The CAL DATA Scroll allows the operator to set parameters which relate to the calibration of the scale.

A.4.3.1 Calibration Mode

Select which simulated method of automatic calibration is to normally by used. The select method is the only one displayed in the calibration section MENU 1.

-- CAL DATA SCROLL 1 --
Calibration mode:
< R-CAL<
CHOICE ENTER

Password: Operator

Default: R-CAL
Choice: R-CAL, WEIGHTS, 2 POINTS

DETAILING THE TEST WEIGHT PARAMETERS

This section only applies if TEST WEIGHTS mode was selected as the preferred method. Enter the weight of the test weights that are going to be used for the calibration.

-- CAL DATA SCROLL 2 --
Total test weight on
scale 0.000 Lbs
ENTER SCALE #

Password: Service

English/Mixed		**Metric**	
Default:	000.0 Lbs	**Default:**	0.000 kg
Min:	0.000	**Min:**	0.000
Max:	5000.000	**Max:**	5000.000

DETAILING THE R-CAL PARAMETERS

This section only applies if R-CAL mode was selected as the preferred method. Enter the resistance in Ohms of the electronic resistance installed in the instrument. If no changes have been made after the Loss-in-Weight Controller has left Thermo Ramsey, the default value applies.

-- CAL DATA SCROLL 3 --
R-Cal selected res
165000 ohms
ENTER SCALE #

Password: Service

Default: 165000 Ohms
Min: 10 Ohms
Max: 1000000 Ohms

The system calculates the CALCON (Calibration Constant) based on the mechanical and electrical parameters entered in the Scale Data Scroll.

This menu is for reference only.

```
-- CAL DATA SCROLL 4 --
R-Cal constant
   _______ W.U.
                SCALE #
```

The R-Cal factor can be computed during the autospan function and used to correct the error between the two span methods.

```
-- CAL DATA SCROLL 5 --
R-Cal factor
    0  %
ENTER    +/-    SCALE #
```

Password: Service

Default: INVALID (0)
Min: -99.99 %
Max: +99.99 %

A.4.3.2 Calibration Interval

The system can be programmed to prompt the operator when a certain amount of time has passed since the last calibration. If you do not want to use this option, confirm the default 0 days interval, otherwise enter the number of days. The calibration date displayed in Scroll 7 is automatically updated whenever a calibration is performed. If a non zero value is entered, an alarm appears after the time is elapsed. The alarm can only be cleared after a calibration check is executed.

```
-- CAL DATA SCROLL 6 --
Calibration interval
    0  Days
ENTER
```

Password: Operator

Default: 0 Days (function disabled)
Min: 0 Days
Max: 365 Days

This scroll displays the date of the last calibration and the expected date of the next one, based on the entry in the previous screen.

```
-- CAL DATA SCROLL 7 --
Calibration date
Last  MM-DD-YYYY
Nest  MM-DD-YYYY
```

A.4.3.3 Defining Auto Zero Tracking

A periodical auto zero procedure can be automatically executed by the system if the Auto Zero tracking option is set to YES. This compensates for small amounts of material which may fall on weighing section of the scale

```
-- CAL DATA SCROLL 8 --
Auto Zero Tracking
 > yes <
CHOICE  ENTER SCALE#
```

Password: Operator

Default: NO
Selections: YES, NO

The following scrolls are only visible if Auto Zero Tracking is enabled for the selected physical scale.

Define the range of the AZT with reference to the scale capacity

```
-- CAL DATA SCROLL 8A--
Auto Zero Tracking
 range  + 4 %
ENTER              SCALE#
```

Password: Operator

Default: ±4 %
Min: ±0 %
Max: ±10%

```
-- CAL DATA SCROLL 8B--
Auto Zero Tracking
max dev ± 4 %
ENTER              SCALE#
```

Password: Service

Default: ±4 %
Min: ±0 %
if W&M selection is NONE: Max: ±4%
Else: Max ±10%

Define the duration time of the autozero cycle.

```
-- CAL DATA SCROLL 8C--
Auto Zero Tracking
duration  20 sec
ENTER              SCALE#
```

Password: Operator

Default: 20 sec
Min: 2 sec
Max: 60 sec

A.5. Main Menu 3

MAIN MENU 3 is used for protecting and un-protecting the system using passwords, and to perform diagnostic and test functions. The diagnostic functions can only be operated after removing all password protection, and should only be used by experienced technical personnel. Most test functions are not password protected.

```
--    -MAIN MENU 3      -
Press MENU for more
PROT    DIAG    TEST
```

The **PROTECTION** menu only becomes visible after passwords have been defined (see the **DIAGNOSTICS** Menu).

A.5.1. Changing the Protection Level

The *Micro-Tech 3100* has three protection levels to which specific passwords are related.

Appendix Table A-1: Password Protection Levels

Protection	Password	Status
NONE	SERVICE	The system is completely unprotected; all data can be read or changed.
LIMITED	OPERATOR	Operator functions and data are unprotected. All setup and calibration data are protected except zero calibrate.
PROTECTED		The system is totally protected, process data can be read, no change allowed.

A **SERVICE** password is required to access the **NONE** level. An **OPERATOR** or a **SERVICE** password is required to access the **LIMITED** level.

Use the **NONE** key to access the **NONE** protection level. If the current level is not already **NONE**, the **SERVICE** password is required.

Use the **LTD** key to access the limited protection level. If the system is in level **NONE**, change is immediate. If it is in PROT level, the **SERVICE** or **OPERATOR** password is required. Use the **PROT** key to access the protected level. No password is required.

```
- PROTECTION LEVEL -
> NONE <

NONE    LTD    PROT
```

Default: NONE
Selections: NONE, LIMITED, PROTECTED
Password: from NONE to LTD or PROT: not required
from LTD to PROT: not required
from LTD to NONE: SERVICE
from PROT to NONE: SERVICE
from PROT to LTD: OPERATOR or SERVICE

Pressing the soft key gives entry to desired level. Going from a low level to a higher level forces the password entry.

A.5.1.1 Online Procedure for Changing Protection Level

The protection level can be temporarily changed by entering a password "on the fly" during normal operation. When the operator tries to enter a variable or select a function, which is password protected, and the password is installed, the following screen is displayed.

```
- SYSTEM PROTECTED -
PLEASE ENTER
PASSWORD_____
      ENTER
```

The operator can enter either the OPERATOR or the SERVICE passwords. However, if the operator enters the OPERATOR password and the variable or function requires the SERVICE password instead, the access is denied and the following screen is displayed.

```
- SYSTEM PROTECTED -
PLEASE ENTER SERVICE
PASSWORD _____
      ENTER
```

If the operator fails to enter the correct password, the following screen displays.

```
- SYSTEM PROTECTED -
INVALID PASSWORD
ACCESS DENIED
      RETURN
```

Pressing **RETURN** returns the program to the previous function. If the operator enters the correct password, the previous screen appears and access is allowed.

When the protection level is changed using the on line procedure, the system automatically returns to protected status if no keyboard entries are made within 60 seconds.

A.5.2. Diagnostics

A.5.2.1 A/D Raw Data

Diagnostic Scroll 1 shows the raw data from the A/D converter of the *Integrator* (A/D gross) and the net value after the zero constant has been subtracted. The range of the A/D converter is from 0 to 262140 numbers.

```
-DIAGNOST. SCROLL 1-
A/D gross  00000
A/D net    0000
                  SCALE #
```

A.5.2.2 Readout Load Cell mV

The system displays the mV output of the load cell. The reading must be positive and must increase when the load increases.

```
-DIAGNOST. SCROLL 2-
Weight on load cell
0.000 mV
 CALIB            SCALE #
```

Password: Service

If **CALIB** is pressed, the next two scrolls are displayed and can be used to fine-tune the readout of mV/V.

```
-DIAGNOST. SCROLL 2A
Loadcell output zero
15  A/D counts
ENTER            SCALE #
```

Password: Service

Default: 15
Min: 0
Max: 10000

```
-DIAGNOST. SCROLL 2B
Loadcell output span
3497
ENTER            SCALE #
```

Password: Service

Default: 3497
Min: 0
Max: 30000

A.5.2.3 Change Passwords

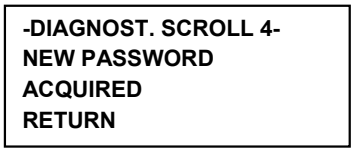
Change the password by entering a new one. The user can enter up to eight characters (numeric keys entries). The entered numbers are not echoed on the screen. Pressing just the **ENTER** key removes the password.

Password: Service

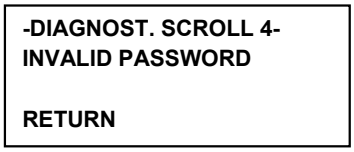
Default: No password

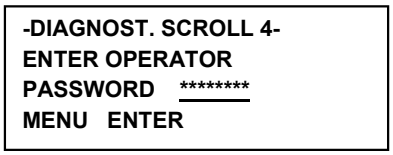
After the password has been entered, the system asks for confirmation. This prevents losing access control due to a typing mistake while entering passwords.

If the password entered the second time matches the first, the following message confirms the entry.



If the two passwords do not match, the system does not accept the new password.





Password: Operator

Default: No password

The OPERATOR password is double checked similarly to the service one.

It is strongly suggested to write down the password and preserve a copy in a safe place. If the password is forgotten, refer to Section 4.8 to remove a forgotten password.

A.5.2.4 Display Software Version

The software version is displayed for reference only.

```
-DIAGNOST. SCROLL 5-
Main software
version:
71.XX.XX.XX
```

A.5.2.5 Setup Date and Time

The user can set the current date and time. A battery operated clock calendar then maintains time and date even if power is removed. Day, Month, and Year are entered in sequence.

```
-DIAGNOST. SCROLL 6-
Date:    DD-MM-YYYY
DAY: DD
ENTER
```

Password: SERVICE

Default: 00-00-0000
Min: 01-01-0000
Max: 31-12-2096

Time is entered in a similar way. The AM/PM key is used when time is in the English mode. See **DISPLAY SCROLL 7 IN MAIN MENU 2**.

```
-DIAGNOST. SCROLL 7-
Time:    HH:MM
HOURS:  _____
ENTER  AM/PM
```

	24-hour	**am/pm**
Default:	00.00	01.00
Min:	00.00	01.00
Max:	23:59	12:59

A.5.2.6 Check Hardware Configuration

The system automatically recognizes when optional boards are installed. The following scrolls are used to show the configuration. Remember that when a board is acknowledged, the related information stays in memory even if the board is removed, until the operator deletes it by responding **YES** to the message shown at power on.

The following screen is displayed for each optional plug-in board installed in each slot.

-DIAGNOST. SCROLL 8-
Board type slot #1

BOARD TYPE

-DIAGNOST. SCROLL 9
Board type slot #2

BOARD TYPE

-DIAGNOST. SCROLL 10
Board type slot #3

BOARD TYPE

Appendix Table A-2 List of Optional Plug-in Board Types

- Dig I/O 16in/4out	Optional digital input output board. - #16 Optocoupled Digital Inputs - #4 Optocoupled digital outputs
- Dig I/O 16out/4in	Optional digital input output board. - #4 Optocoupled Digital Inputs - #16 Optocoupled digital outputs
- Load Out 16in/4in	Optional digital input output board dedicated to the Load Out. - #16 Optocoupled digital inputs - #4 Optocoupled digital inputs
- Load Out 16out/4in	Optional digital input output board dedicated to the Load Out. - #4 Optocoupled digital inputs - #16 Optocoupled digital inputs
- Current Out	Optional current output board. - #1 Current output
- Communication A	Serial communication board (RS232, RS485)
- Communication B	Allen-Bradley Remote I/O PROFIBUS-DP

A.5.2.7 Force Cold Start

This scroll is used to force a cold start of the instrument in the event the software becomes corrupted. Factory defaults will be installed when the instrument restarts; all filed entry data will be replaced

```
-DIAGNOST. SCROLL 15
Force cold start

ENTER
```

A.5.3. Tests

A.5.3.1 Lamp Test

Press **START** to begin a Lamp Test of the *Loss-in-Weight Controller*. All LED's and digits of the display blink for a number of seconds.

```
- TEST SCROLL 1   -
LAMP TEST

START
```

A.5.3.2 Self Test of the Unit

The system can perform some internal test functions, which can be used to detect malfunctions to the hardware devices.

```
- TEST SCROLL 2   -
Internal test of
microprocessor
START
```

Password: Service

After **START** is pressed, the following screens are displayed in sequence.

```
 TEST SCROLL 2A  -
Testing  ROM
Test PASSED
```

```
 TEST SCROLL 2B  -
Testing  RAM
Test PASSED
```

```
 TEST SCROLL 2C  -
Testing  E2Prom
Test PASSED
```

Only if Audit trail option Is installed

The message "Test PASSED" is displayed if the test runs correctly. If something wrong is detected, then the message "Test FAILED" is displayed, and the soft key **CONTINUE** is shown. The operator has to press the key to go on to the next test.

A.5.3.3 Test Digital Inputs

The next screen is used to check the digital input circuitry. The display shows a 1 if the specific input is closed, 0 if open. If more digital I/O boards are installed, the **NEXT** soft key appears, allowing the operator to scroll between boards. Slots are numbered 1-3; slot 0 is the motherboard.

```
- TEST SCROLL 3   -
Dig input test
Slot#0      ----00--
NEXT
```

'Digit' (displayed instead of 'slot#') identifies the four Digitizer's inputs. Inputs are shown from left to right. If a board has 16 inputs, two screens are used to show the first and the second half, the lower half is shown first.

A.5.3.4 Test Digital Outputs

This test shows the status of each digital output and allows the operator to force the output for testing purposes. The output, when forced, stays on until the **CLEAR** soft key is pressed or the Run Menu is entered. If an output is forced and the scroll key is used for reaching some other menu, the output stays in the forced status until **RUN** is pressed. This allows the operator to check inputs while outputs are still in the forced status.

```
- TEST SCROLL 4   -
Dig output test
output # 1 :  ON/OFF
ENTER         ON/OFF
```

Password: Service

To force an output, enter the desired number followed by **ENTER**. Then use the **SET/RESET** key to force it to the **ON** or **OFF** status. After the output has been forced, the **CLEAR** soft key appears in the middle position.

Slots are numbered 1-3; slot 0 is the motherboard.

WARNING

FORCING THE DIGITAL OUTPUTS MAY CAUSE MACHINERY TO START. AFTER THE USER TRIES TO FOURCE AN OUTPUT, THE FOLLOWING MESSAGE DISPLAYS.

```
WARNING
EQUIPMENT MAY START

CONTINUE     ABORT
```

WARNING

IF THE USER PRESSES CONTINUE, BE AWARE THE ACTION MAY CAUSE DAMAGE OR INJURY. IF THE USER PRESSES ABORT, THE SYSTEM RETURNS TO THE PREVIOUS SCROLL.

A.5.3.5 Test Current Outputs

```
- TEST SCROLL 5 -
Current output #1
should be 00.0 mA
ENTER  CLEAR
```

Password: Service

Default: 0.0 mA
Min: 0.0 mA
Max: 20.0 mA

To force the output, enter the desired number of milliamps and press **ENTER**. Press **CLEAR** to free the mA channel.

Then , the following screen is shown (two or more current output are detected).

If a second current output is installed :

```
- TEST SCROLL 6 -
Current output #2
should be 00.0 mA
ENTER  CLEAR
```

Password: Service

Default: 0.0 mA
Min: 0.0 mA
Max: 20.0 mA

If a third current output is installed :

```
- TEST SCROLL 7 -
Current output #3
should be 00.0 mA
ENTER  CLEAR
```

Password: Service

Default: 0.0 mA
Min: 0.0 mA
Max: 20.0 mA

If the (max) fourth current output is installed :

```
- TEST SCROLL 8 -
Current output #4
should be 00.0 mA
ENTER  CLEAR
```

Password: Service

Default: 0.0 mA
Min: 0.0 mA
Max: 20.0 mA

A.5.3.6 Test Current Inputs

The following screen is displayed (analog input board is detected) and shows the status of each analog input channel.

```
- TEST SCROLL 9 -
Current input
#1  00.0 V
#2  00.0 V
```

Password: Service

A.5.3.7 Test Communication A

The following screen allows checking the installed serial lines using a loop back type test. The maximum line number is 2; Transmit must be tied to receive for this test. "**Port 1**" is standard and "**Port 2**" is shown only if optional Comm boards are detected.

```
- TEST SCROLL 10 -
Test Communication A

Port 1          Port 2
```

Password: Service

By pressing the **PORT 1** or the **PORT 2** soft key, the test is initiated. A test pattern is sent out on the TX output and read on the RX input. If the test fails, the message "Test Failed" is shown; otherwise, the message "Test Passed" is displayed.

A.5.3.8 Test RS232

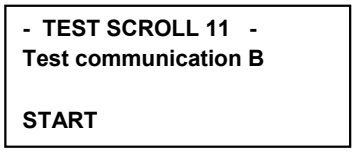
To test RS232 the test requires a hardware jumper to be installed between terminals TB3-22 (RX) and TB3-21 (TX).

A.5.3.9 Test RS485

To test the RS485 the test requires a hardware jumper to be installed between terminals TB3-21 and TB3-28 to TB3-20 and TB3-29.

A.5.3.10 Test Communication B

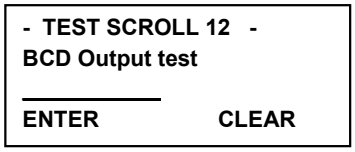
This test is similar to the previous one but works for the field bus version of the communication board.



Password: Service

A.5.3.11 Test BCD Output Board

If an optional 16 Out/4 In load out board is detected, the following screen appears.



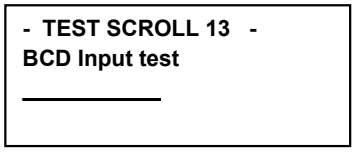
Password: Service

Default: 0
Min: 0
Max: 9999 or 7999 if parity check enable

The force the outputs, enter a number followed by **ENTER** . The **CLEAR** key appears indicating the output is being forced to a value. Pressing **CLEAR** frees the output.

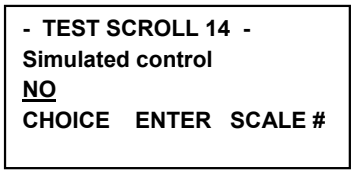
A.5.3.12 Test BCD Input Board

The following test is displayed if an 16 In/4 Out load out board is detected.



The value read on the BCD input is displayed dynamically.

A.5.3.13 Simulated Control



Password: Service

Default: NO
Min: YES,NO

When enabled, the weight is internally simulated, ignoring the load cell signal.

A.5.3.14 Test the Keyboard and Switches

```
- TEST SCROLL 16 -
Keyboard + switches
Key: _____
```

Press the **RUN** key twice to exit. All other keys, including **MENU**, are displayed but not executed.

A.6. Main Menu 4

The following section defines the input output (I/O), alarms and optionally of the load out batch..

```
-  MAIN MENU 4  -
Press MENU for more
I/O          ALARMS
DEFINE       DEFINE
```

A.6.1. I/O Definition

The input output section of the system is fully configurable. All inputs and outputs are conventionally numbered and can be assigned to physical input and output terminals depending on the needs. The following section explains how to configure I/O. However, the standard configuration as provided by the factory is normally satisfactory.

A.6.1.1 Define Current Outputs

The following menus are shown for configuring the current output(s). Use the **CHOICE** key to change the variable and the **ENTER** key to confirm. The **NEXT** key allows the operator to set up to four (4) current outputs if installed.

```
- I/O DEF SCROLL 1 -
Current Output define
#1 > Cntrl  <
CHOICES  ENTER  NEXT
```

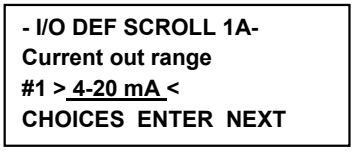
Password: Service

Default: CONTROL, NONE, NONE, NONE
Selections: NONE, WEIGHT, RATE, CONTROL

Or, if more than one scale is defined :

Selections: NONE, NET S1, GROSS S1, TARE S1, PAEAK S1 (1 Scale)
NET S2, GROSS S2, TARE S2, PAEAK S2 (2 Scale)
NET S3, GROSS S3, TARE S3, PAEAK S3 (3 Scale)
NET S4, GROSS S4, TARE S4, PAEAK S4 (4 Scale)

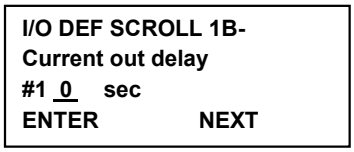
If the selection of the previous screen is not **NONE**, the operator can set up the range, delay and damping of the current output. The range is selectable between the standard 0 to 20 mA and 4 to 20 mA both in direct and reverse mode. Select 0-20 or 4-20 if an increase in current is desired for any increase of the variable. Select 20-0 or 20-4 if a decrease of current is desired for any increase of the variable.



Password: Service

Default: 4-20 mA,
Selections: 0-20 mA, 4-20 mA, 20-0 mA, 20-4 mA

Each current output can be delayed.



Password: Service

Default: 0 sec
Min: 0 sec
Max: 300 sec

A damping factor can also be selected for each current channel. The damping factor is the time for the output to stabilize after a step change. This damping only affects the current output, not the displayed variable, which has a separate damping factor, selectable in Main Menu 2, Display.

Password: Operator

Default: 0 sec,
Min: 0 sec
Max: 400 sec

UP and **DOWN** arrows move between range, delay and damping. **NEXT** moves to the next current output.

A.6.1.2 Define Analog Inputs

Analog input board is installed, the following screens are displayed. Analog inputs can be used for measuring the moisture or as remote setpoint input..

```
- I/O DEF SCROLL 2 -
Analog Input #1 def.
> None <
CHOICES  ENTER CALIB
```

Password: Service

Default: NONE
Selections: NONE, MOISTURE

If more than one scale is defined :
Selections: NONE, MOISTURE S1, MOISTURE S2

```
- I/O DEF SCROLL 3 -
Analog Input #2 def.
> None <
CHOICES  ENTER CALIB
```

Password: Service

Default: NONE
Selections: NONE, MOISTURE

If more than one scale is defined :

Selections: NONE, MOISTURE S1, MOISTURE S2

Pressing the **CALIB** key displays the next scrolls.

A.6.1.3 Setup Moisture Compensation Input

If an analog input has been programmed for reading the moisture signal and **CALIB** was pressed, the following screens appear. The user can calibrate the input signal by entering the equivalence between percent of moisture and voltage on two points. Use the **%Moist** key to enter the percent of moisture, use the volt key to enter the corresponding number of volts, and confirm with **ENTER**.

Only if ANALOG INPUT (moisture) option is enable and CALB is pressed

```
- I/O DEF SCROLL 2A -
Moisture input calibr. #1
0.0 %M  =  2.0 V
ENTER  %Moist     Volt
```

Password: Service

Default:	0.0 %	0.0 V
Min:	0.0 %	0.0 V
Max:	20.0 %	2.5 V

Do the same with the second point shown below.

- I/O DEF SCROLL 2B -
Moisture input calibr. #2
5.0 %M = 5.0 V
ENTER %Moist Volt

Password: Service

Default: 5.0 % 5.0 V
Min: 1.0 % 1.0 V
Max: 100.0 % 5.0 V

A.6.1.4 Define Digital Inputs

Digital inputs can be programmed. The following screen shows one logical function per time, and allows the user to assign it to a physical input. The **NEXT** key scrolls between the logical functions. The **NC/NO** key selects the Normally Open (NO) or Normally Closed (NC) status of the input. Normally Open means the input is inactive when disconnected. To program a function, scroll with **NEXT** until the function is displayed, then enter the physical input number and confirm with **ENTER**; finally scroll with **NC/NO** until the desired mode is displayed. By assigning a function to 0, the function is disabled.

- I/O DEF SCROLL 4 -
Dig. Input def.
Ext Alarm 1 ___ NC
ENTER NC/NO NEXT

Password: Service

The following table shows the available logical selections that can be assigned to any available physical input. Typical field wiring drawings and customer specific field wiring drawings show Reset alarms defaulted to # 1 NO, Refill defaulted to #2 NO and Running defaulted to #3 NC. Default inputs can be reassigned to any physical input if desired. External alarms 1, 2 and 3 can be assigned to logical functions not on the list.
Logical selections should not be reassigned after the physical inputs have been wired.

CAUTION
LOGICAL INPUTS RETURN TO THE DEFAULT IF THE *INSTRUMENT* IS COLD STARTED.

Appendix Table A-1: Available Logical Selections

Selections:	Default:	
External alarm 1	0 NO	(0 = function disabled)
External alarm 2	0 NO	
External alarm 3	0 NO	

Reset alarms	4 NO	
Print	0 NC	(Only if Print is enabled)
Print S1	0 NO	(Only if more than 1 scale installed)
Print S2	0 NO	(Only if more than 1 scale installed)
Print S3	0 NO	(Only if more than 2 scales installed)
Print S4	0 NO	(Only if more than 3 scales installed)
Reset Tare	4 NO	
Reset Tare S1	0 NO	(Only if more than 1 scale installed)
Reset Tare S2	0 NO	(Only if more than 1 scale installed)
Reset Tare S3	0 NO	(Only if more than 2 scales installed)
Reset Tare S4	0 NO	(Only if more than 3 scales installed)
Set Tare	3 NO	
Set Tare S1	0 NO	(Only if more than 1 scale installed)
Set Tare S2	0 NO	(Only if more than 1 scale installed)
Set Tare S3	0 NO	(Only if more than 2 scales installed)
Set Tare S4	0 NO	(Only if more than 3 scales installed)
AutoZero	0 NO	
Reset Tot.	0 NO	
Reset Tot. S1	0 NO	(Only if more than 1 scale installed)
Reset Tot. S2	0 NO	(Only if more than 1 scale installed)
Reset Tot. S3	0 NO	(Only if more than 2 scales installed)
Reset Tot. S4	0 NO	(Only if more than 3 scales installed)
Add to Tot.	0 NO	
Add to Tot. S1	0 NO	(Only if more than 1 scale installed)
Add to Tot. S2	0 NO	(Only if more than 1 scale installed)
Add to Tot. S3	0 NO	(Only if more than 2 scales installed)
Add to Tot. S4	0 NO	(Only if more than 3 scales installed)
Hold	0 NO	(Only if Batch Option installed)
Hold S1	0 NO	(Only if more than 1 scale installed)
Hold S2	0 NO	(Only if more than 1 scale installed)
Hold S3	0 NO	(Only if more than 2 scales installed)

Hold S4	3 NC	(Only if more than 3 scales installed)
Reset Peak	0 NO	
Reset Peak S1	0 NO	(Only if more than 1 scale installed)
Reset Peak S2	0 NO	(Only if more than 1 scale installed)
Reset Peak S3	0 NO	(Only if more than 2 scales installed)
Reset Peak S4	0 NO	(Only if more than 3 scales installed)

Appendix Table A-2: Mother Board Inputs

PHYSICAL INPUT NUMBER	ASSIGNED FUNCTION		
2		TB2-12	TB2-13
3		TB2-14	TB2-15
4		TB2-16	TB2-17
5		TB2-18	TB2-19

Additional assignable logical inputs from the above table can be selected by adding optional I/O boards. Available options are 4in/16out, 16in/4out or 20in/20out by adding both boards.

Appendix Table A-3: Digital Input/Output Board Inputs

		INSTALLED OPTIONS		
PHYSICAL INPUT NUMBER	ASSIGNED FUNCTION	4IN/16OUT ONLY	16IN/4OUT ONLY	4IN/16OUT AND 16IN/4OUT
6		J15 - 2	J16 - 17	J15 – 2
7		J15 - 15	J16 - 5	J15 - 15
8		J15 - 3	J16 - 18	J15 – 3
9		J15 - 16	J16 - 6	J15 - 16
10			J16 - 19	J16 - 17
11			J16 - 7	J16 – 5
12			J16 - 20	J16 - 18
13			J16 - 8	J16 – 6
14			J16 - 21	J16 - 19
15			J16 - 9	J16 – 7
16			J16 - 22	J16 - 20
17			J16 - 10	J16 – 8
18			J16 - 23	J16 - 21
19			J16 - 11	J16 – 9

20			J16 - 24	J16 - 22
21			J16 - 12	J16 - 10
22				J16 - 23
23				J16 - 11
24				J16 - 24
25				J16 - 12

WARNING

CHANGING THE DEFINITION OF THE DIGITAL INPUTS MAY CAUSE MACHINERY TO START. AFTER THE USER TRIES TO CHANGE A DEFINITION, THE FOLLOWING MESSAGE IS DISPLAYED.

WARNING
EQUIPMENT MAY START
CONTINUE ABORT

IF THE USER PRESSES CONTINUE, BE AWARE THE ACTION MAY CAUSE DAMAGE OR INJURY. IF THE USER PRESSES ABORT, THE SYSTEM WILL RETURN TO THE PREVIOUS SCROLL.

A.6.1.5 Define Digital Outputs

Digital outputs can be programmed. The following screen shows one logical function per time, and allows the user to assign it to a physical output. The **NEXT** key scrolls between the logical functions. The **NC/NO** key selects the Normally Open (NO) or Normally Closed (NC) status of the output. Normally Open means the output is not energized in normal conditions. To program a function, scroll with **NEXT** until the function is displayed, then enter the number of the physical output and confirm with **ENTER**; finally scroll with **NC/NO** until the desired mode is displayed. By assigning a function to 0, the function is disabled.

- I/O DEF SCROLL 5 -
Dig. Output def.
Alarm: 0 NC
ENTER NC/NO NEXT

Password: Service

The following table shows the available logical selections that can be assigned to any available physical output. Typical field wiring drawings and customer specific field wiring drawings show Ready defaulted to #1 NC, Alarm defaulted to #2 NC and Refill defaulted to #3 NO. Default selections can be reassigned to any physical output if desired. Logical selections should not be reassigned after the physical outputs have been wired.

CAUTION

LOGICAL SELECTIONS RETURN TO THE DEFAULT IF THE *INSTRUMENT* IS COLD STARTED.

Appendix Table A-4: Available Logical Assignment

Selections	Default	
Alarm	2 NC	
Shut down	0 NC	
Ready	1 NO	
Weight Stable	0 NO	(Only if one scale is defined)
Weight Stable S1	0 NO	(Only if more than 1 scale installed)
Weight Stable S2	0 NO	(Only if more than 1 scale installed)
Weight Stable S3	0 NO	(Only if more than 2 scales installed)
Weight Stable S4	0 NO	(Only if more than 3 scales installed)
mA #1 sig.pol.	0 NO	(Only if current out #1 enabled)
mA #2 sig.pol.	0 NO	(Only if current out # 2 enabled)
mA #3 sig.pol.	0 NO	(Only if current out #3 enabled)
mA #4 sig.pol.	0 NO	(Only if current out #4 enabled)
Threshold #1	0 NO	(Only if Threshold #1 enabled)
Threshold #1 S1	0 NO	(Only if more than 1 scale installed)
Threshold #1 S2	0 NO	(Only if more than 1 scale installed)
Threshold #1 S3	0 NO	(Only if more than 2 scales installed)
Threshold #1 S4	0 NO	(Only if more than 3 scales installed)
Threshold #2	0 NO	(Only if Threshold #2 enabled)
Threshold #2 S1	0 NO	(Only if more than 1 scale installed)
Threshold #2 S2	0 NO	(Only if more than 1 scale installed)
Threshold #2 S3	0 NO	(Only if more than 2 scales installed)
Threshold #2 S4	0 NO	(Only if more than 3 scales installed)
Threshold #3	0 NO	(Only if Threshold #3 enabled)
Threshold #3 S1	0 NO	(Only if more than 1 scale installed)

Threshold #3 S2	0 NO	(Only if more than 1 scale installed)
Threshold #3 S3	0 NO	(Only if more than 2 scales installed)
Threshold #3 S4	0 NO	(Only if more than 3 scales installed)
Threshold #4	0 NO	(Only if Threshold #4 enabled)
Threshold #4 S1	0 NO	(Only if more than 1 scale installed)
Threshold #4 S2	0 NO	(Only if more than 1 scale installed)
Threshold #4 S3	0 NO	(Only if more than 2 scales installed)
Threshold #4 S4	0 NO	(Only if more than 3 scales installed)
Totalized	0 NO	
Totalized S1	0 NO	(Only if more than 1 scale installed)
Totalized S2	0 NO	(Only if more than 1 scale installed)
Totalized S3	0 NO	(Only if more than 2 scales installed)
Totalized S4	0 NO	(Only if more than 3 scales installed)

There are 5 outputs, 4 assignable and 1 non-assignable Fault output standard on the motherboard.

Appendix Table A-5: Relay Board and Motherboard Outputs

PHYSICAL OUTPUT NUMBER	RELAY ASSIGNED FUNCTION	RELAY BOARD		
		NC	COM	NO
FAULT	FAULT	1	2	3
1		4	5	6
2			7	8
3			9	10

PHYSICAL OUTPUT NUMBER	SOLID STATE ASSIGNED FUNCTION	Mother Board Terminals	
4	————————	TB1-5	Power
		TB1-6	Signal
		TB1-7	COM

Additional assignable logical selections from the above table can be selected by adding optional I/O boards. Available options are 4in/16out or 16in/4out by adding both boards.

Appendix Table A-6: Digital Input/Output Board Outputs

		INSTALLED OPTIONS		
PHYSICAL OUTPUT NUMBER	ASSIGNED FUNCTION	4IN/16OUT ONLY	16IN/4OUT ONLY	4IN/16OUT AND 16IN/4OUT
5		J15-17	J16 - 2	J16 - 2
6		J15 - 5	J16 - 15	J16 - 15
7		J15 - 18	J16 - 3	J16 - 3
8		J15 - 6	J16 - 16	J16 - 16
9		J15 - 19		J15 - 17
10		J15 - 7		J15 - 5
11		J15 - 20		J15 - 18
12		J15 - 8		J15 - 6
13		J15 - 21		J15 – 19
14		J15 - 9		J15 – 7
15		J15 - 22		J15 – 20
16		J15 - 10		J15 – 8
17		J15 - 23		J15 – 21
18		J15 - 11		J15 – 9
19		J15 - 24		J15 – 22
20		J15 - 12		J15 – 10
21				J15 – 23
22				J15 – 11
23				J15 – 24
24				J15 – 12

WARNING

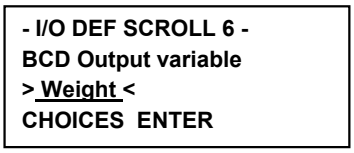
CHANGING THE DEFINITION OF THE DIGITAL OUTPUTS MAY CAUSE MACHINERY TO START AFTER THE USER TRIES TO CHANGE A DEFINITION. THE FOLLOWING MESSAGE IS DISPLAYED.

WARNING
EQUIPMENT MAY START
CONTINUE ABORT

IF THE USER PRESSES CONTINUE, BE AWARE THE ACTION MAY CAUSE DAMAGE OR INJURY. IF THE USER PRESSES ABORT, THE SYSTEM RETURNS TO THE PREVIOUS SCROLL.

A.6.1.6 Define BCD Output Data

If an optional load out board is installed, the user can select the related variable.



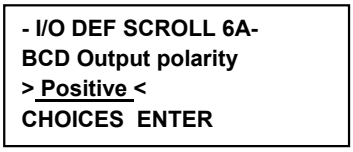
Password: Service

Default: NONE
Selections: NONE, NET, GROSS, TARE, PEAK

Or, if more than one scales are enabled :

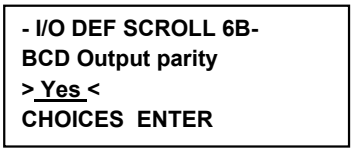
Selections: NONE,
NET S1, GROSS S1, TARE S1, PEAK S1, (2 scale)
NET S2, GROSS S2, TARE S2, PEAK S2, (2 scale)
NET S3, GROSS S3, TARE S3, PEAK S3, (3 scale)
NET S4, GROSS S4, TARE S4, PEAK S4, (4 scale)

If a selection other than **NONE** is made, the following screens allow the user to define the polarity and the parity check of the BCD output. The polarity selection reverses the signals from NO to NC and vice versa. If a parity criterion is selected, the most significant bit of the BCD output is used for parity check.



Password: Service

Default: NEGATIVE
Selections: POSITIVE, NEGATIVE

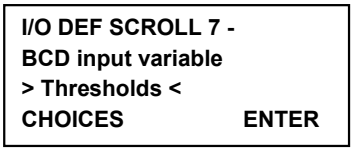


Password: Service

Default: NO
Selections: NO, YES

A.6.1.7 Define BCD Input Data

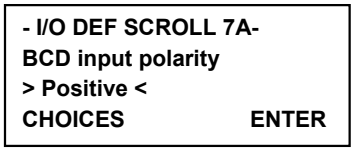
If a optional load out input board is installed, the operator can select the related variable..



Password: Service

Default: NONE
Selections: NONE, TRESHOLDS

If a selection other than NONE is made, the following screen allows the operator to define the polarity of the BCD input. The polarity selection reverses the signals from NO to NC and vice versa.



Password: Service

Default: NEGATIVE
Selections: POSITIVE, NEGATIVE

A.6.2. Alarms Definition

The alarms of the Micro-Tech 3100 can be programmed. Process alarms such as low and high weight can be set to the desired range. In addition, all alarms can be defined to be:

- **ALARM-**When an alarm occurs, the front panel ALARM status indicator illuminates. An ALARM message flashes in the lower, right hand RUN display. Pressing ALARM displays the alarm.
- Pressing RESET clears the alarm message if the alarm parameter has cleared. If the alarm parameter has not cleared, the message "ACK" appears when RESET is pressed. When the alarm parameter clears, the alarm indication clears.

  Pressing RUN at any time returns the operator to the RUN menu.

  Alarms can be automatically printed if the print option is enabled.
- **SHUT DOWN** The alarm handler operates as above except the READY status indicator goes off and the SHUTDOWN physical output changes state at the same time as the ALARM status indicator comes on.

  In the I/O definition scroll, alarm and ready can be assigned to N/C or N/O physical outputs. The output activates and deactivates at the same time as the front panel status indicators.
- **NONE** Alarm is deactivated.

A.6.2.1 Define Threshold #1 Alarm

Use the **CHOICE** key to turn on or off the threshold #1 alarm. Confirm with **ENTER**.

```
- ALARM  SCROLL 1 -
Threshold #1
> NO <
CHOICE  ENTER   SCALE #
```

Password: Operator

Default: NO
Selections: YES, NO, BCD Input (if the BCD input option is active)

If the selection in the previous screen was YES, enter the threshold set points for the alarm. If the selection is BCD input, the value read from the external preset is displayed.

The **UNITS** key allows the operator to specify the set points in engineering units. The **% key** selects set points in percent referring to scale capacity

```
- ALARM  SCROLL 1A -
Threshold #1,
set  10  %
ENTER   UNITS   SCALE #
```

Password: Operator

Default: 10%
Min: 0 %
Max: 105 %

Enter the desired delay time before the alarm is monitored.

```
- ALARM  SCROLL 1B -
Threshold #1,
delay  2  sec
ENTER              SCALE #
```

Password: Operator

Default: 2 sec
Min: 0 sec
Max: 90 sec

The **UNITS** key allows the operator to specify the set points in engineering units. The **% key** selects set points in percent referring to scale capacity.

```
- ALARM  SCROLL 1C -
Threshold #1,
Hyst.  1  %
ENTER     UNITS   SCALE #
```

Password: Operator

Default: 1 %
Min: 0 %
Max: 105 %

- ALARM SCROLL 1D - Threshold #1, mode > Low level < CHOICE ENTER SCALE #	Password: Operator

Default: LOW LEVEL
Selections: LOW LEVEL, HIGH LEVEL

- ALARM SCROLL 1E - Threshold #1, Var. > Net < CHOICE ENTER SCALE #	Password: Operator

Default: NET
Selections: NET, GROSS, NET ABS, GROSS ABS

A.6.2.2 Define Threshold #2 Alarm

The definition of threshold #2 can be made with the same modalities defined in A.6.6.1

A.6.2.3 Define Threshold #3 Alarm

The definition of threshold #3 can be made with the same modalities defined in A.6.6.1

A.6.2.4 Define Threshold # 4 Alarm

The definition of threshold #3 can be made with the same modalities defined in A.6.6.1

A.6.2.5 Setup Alarm Modes

The following message is displayed for three seconds.

```
- ALARM  SCROLL 5
- ALARM DEFINITION -
Use NEXT key or
enter alarm number
```

After three seconds, the **ALARM** screen is displayed. The user can use the CHOICE soft key to select the desired mode between ALARM (just a warning message), SHUT DOWN (Warning plus fault output) and NONE (no action). Confirm with ENTER. Use the NEXT key to scroll between alarms, or enter the alarm number.

```
- ALARM  NUMBER # 1
  Clock Fail
Set as    >_ALARM <
  CHOICE  ENTER   NEXT
```

Password: Service

A.7. MAIN MENU 5

Main Menu 5 is dedicated to the serial option. **COMM A** is used to set up the serial line and **PRINT** is used for setting up the printer output. Main Menu 5 does not appear unless an optional COMM A is installed.

```
-  MAIN MENU 5
  Press MENU for more

COMM A   COMM B    PRINT
```

A.7.1. Communication A Scroll

The *MT 3100* has one serial channel, which can be configured using jumpers as an RS232 or an RS485 channel. The serial channel can be used for printing or for a serial communication with an intelligent device such as a PLC or a PC. An additional COMM A board can be installed and programmed, typically one for the printer and one for networking.

The following screens define the communication parameters for the first and the second channel.

```
COMM A SCROLL 1
Baud Rate port #1
>  2400  <
CHOICE          ENTER
```

Password: Service

Default: 9600
Selections: 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200

```
- COMM. A SCROLL 2 -
Set parity port #1
> No parity <
CHOICE  ENTER
```

Password: Service

Default: NO PARITY
Selections: EVEN PARITY, ODD PARITY, NO PARITY

```
- COMM. A SCROLL 3 -
Stop bits port #1
> 1 stop bit <
CHOICE  ENTER
```

Password: Service

Default: 1 STOP BIT
Selections: 1 STOP BIT, 2 STOP BITS

```
- COMM. A SCROLL 4 -
Wordlength port #1
> 8  bits <
CHOICE  ENTER
```

Password: Service

Default: 8 BITS
Selections: 7 BITS, 8 BITS

Some commonly used protocols are implemented in the system. See Communication Protocols, REC 3949, for the details. Possible selections are:

- *PC-MASTER* -Thermo Ramsey proprietary protocol: Multi Drop, Master Slave.
- *SIEMENS 3964R* - A proprietary protocol of Siemens. Point to point, Multi Master.
- *ALLEN BRADLEY DF1* - A proprietary protocol of Allen Bradley. Multi Drop, Master Slave.
- *MODBUS* - A proprietary protocol of AEG. Multi Drop, Master Slave.
- *PRINTER* - Not a protocol, selects printer output.

```
-COMM. A SCROLL  5 -
Protocol port #1
> PC MASTER <
CHOICE  ENTER
```

Password: Service

Default: MODBUS
Selections: PC-MASTER, SIEMENS 3964R, ALLEN BRADLEY DF1, MODBUS, PRINTER

If the selected protocol is not PRINTER, the following screens define the ADDRESS of the device in the multi drop line, and the access permission from the remote supervisor. If NONE is selected, the supervisor has full access to the device. If LIMITED is selected; there is supervisor only access to those variables. If PROTECTED is selected, the unit is write protected.

```
-COMM. A SCROLL 5A -
Clear to send #1
> disabled <
CHOICE  ENTER
```

Password: Service

Default: DISABLED
Selections: DISABLED, ENABLED

-COMM. A SCROLL 6 - Address port #1 1 ENTER	Password: Service

Default: 1
Min: 1
Max: 255

-COMM. A SCROLL 7 - Access lev. prot. port #1 > None < CHOICE ENTER	Password: Service

Default: NONE
Selections: NONE, LIMITED, PROTECTED

If an optional communication board is installed, the following screen appears. These screens operate exactly as the ones dedicated to Port 1.

- COMM. A SCROLL 8 - Baud rate port #2 > 2400 < CHOICE ENTER	Password: Service

Default: 9600
Selections: 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200

- COMM. A SCROLL 9 - Set parity port #2 > No parity < CHOICE ENTER	Password: Service

Default: NO PARITY
Selections: NO PARITY, EVEN PARITY, ODD PARITY

- COMM. A SCROLL 10 - Stop bits port #2 > 1 stop bit < CHOICE ENTER	Password: Service

Default: 1 STOP BIT
Selections: 1 STOP BIT, 2 STOP BITS

- COMM. A SCROLL 11-
Wordlength port #2
> 8 bits <
CHOICE ENTER

Password: Service

Default: 8 BITS
Selections: 7 BITS, 8 BITS

-COMM. A SCROLL 12 -
Protocol port #2
> PC MASTER <
CHOICE ENTER

Password: Service

Default: MODBUS
Selections: PC MASTER, SIEMENS 3964R, ALLEN BRADLEY DF1, MODBUS, PRINTER

Only if protocol of port #2 is not PRINTER:

- COMM. A SCROLL 12A
Clear to send #2
> Disabled <
CHOICE ENTER

Password: Service

Default: DISABLED
Selections: DISABLED, ENABLED

- COMM. A SCROLL 13-
Address port #2
1
ENTER

Password: Service

Default: 1
Min: 1
Max: 255

- COMM. A SCROLL 14-
Access port. port #2
> None <
CHOICE ENTER

Password: Service

Default: NONE
Selections: NONE, LIMITED, PROTECTED

A.7.2. Communication B (Field Bus)

Refer to the Field Bus manual if this option is installed.

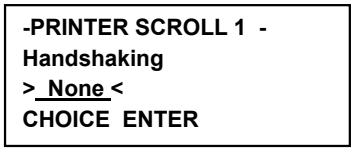
A.7.3. Print

The *Micro-Tech 3100* has a fully programmable printer format. The following section explains how to program it according to the specific needs.

1. Define Handshaking

   The system can be configured to operate without a handshake (NONE), or using the Clear to Send signal (CTS) or the XON-XOFF sequence. Refer to the printer instruction manual to define which selection is required. The selection NONE is only used for testing purposes. It is not recommended for normal use. If NONE is selected, the system is not able to recognize if the printer is on line or not, or if the paper is empty.

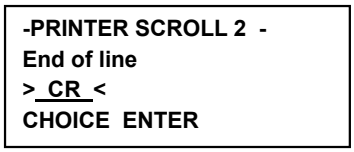
   The most commonly used protocol is the CTS, which is a signal generated by the printer to indicate whether it is ready to receive data or not.



Password: Service

Default: NONE
Selections: NONE, CTS, XON-XOFF

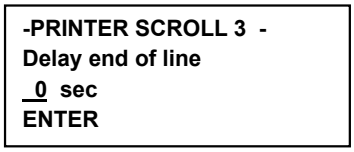
Different printers use different end of line patterns. Select the one you need for your printer.



Password: Service

Default: CR
Selections: CR, LF, CR+LF

Some printers cannot accept characters while they are printing. In some cases, the handshake is not well controlled by the printer, so a delay at end of line is helpful.



Password: Service

Default: 0 sec
Min: 0 sec
Max: 5 sec

A form feed character can be sent to the printer after each report to force the printer to eject the paper. If NO is selected, a normal END OF LINE character(s) is printed at the end of the report.

```
PRINTER SCROLL 4  -
Form Feed
> NO <
CHOICE  ENTER
```

Password: Service

Default: NO
Selections: NO, YES

A.7.3.1 Periodical Printing

If you want to generate periodical printing, enter the number of minutes, hours, or days in the following screen. Entering 0 prevents periodical printing. Use the INTV key to switch from minutes to hours and to days.

```
-PRINTER SCROLL 5  -
Print interval
 0  min
ENTER         INTV
```

Password: Operator

Default: **0 min**
Min: 0 min, 0 hour, 0 days
Max: 59 min, 23 hour, 365 days

The system can print at specific times during the day. Enter the time you want to obtain the printing. Use the NEXT key to scroll between the print times (maximum 4). The ON/OFF key enables or disables the displayed print time.

```
-PRINTER SCROLL 6  -
Print time # 1
time  HH:MM
ENTER  ON/OFF  NEXT
```

Password: Operator

	If 24 hours	If am/pm
Default:	OFF	OFF
Min:	00:00	01:00
Max:	23:59	12:59

A.7.3.2 Define Print Format

By selecting YES in the following screen, the system is instructed to print one line each time a new alarm condition occurs. The alarm is printed as follows:

xx-xx-xxxx yy:yyz

kkkkkkkkkkkkkkkkkkkk

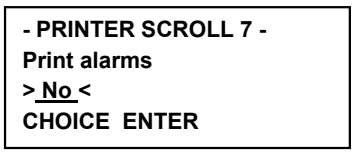
Where:

xx-xx-xxxx	Day, Month, Year, printed according to the local format as defined in Main Menu 2 - Display Scroll, Section 4.1 of this Appendix.
yy:yyz	Hour, Minutes, am/pm printed according to the local format as defined in Main Menu 2 - Display Scroll, Section 4.2 of this Appendix.
kkkkkkkkkkkkkkkkkkkk	Alarm message, same message appearing on the screen

For example:

01-22-1998 8:14a

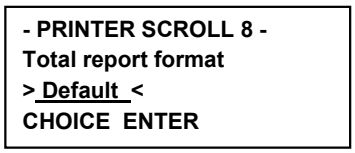
Clock Fail



Password: Operator

Default: NO
Selections: YES, NO

There are two ways for defining the printing format. The first is to use the predefined format (see Section A.7.3.3).
The second is to define your own format, using the printer setup screens listed below.
Select DEFAULT if you want the predefined format. Select USER DEFINED if you want to set up your own format.



Password: Service

Default: DEFAULT.
Selections: DEFAULT , USER DEFINED

If your selection is USER DEFINED, the following screens are displayed.

Define if you want to add a heading string in your report. String can be used to add the Customer name as well as other information that you want to include in the print format.

- PRINTER SCROLL 9 -
String #1
> yes <
CHOICE ENTER

Password: Operator

Default: NO
Selections: YES, NO

If you selected YES, the next two scrolls are displayed.

This first one allows the operator to define the string. Use the alphanumeric keypad, pressing the numeric key corresponding to the letter that you want to type. Every time you press a new key, the cursor moves to the right one place. If you need to use two times the same key (example for double letters), move the cursor right using the arrow keys (left and right soft keys).

- PRINTER SCROLL 9A -
Contents string #1
xxxxxxxxxxxxxxxxxxx
< ENTER >

Password: Operator

Default: xxxxxxxxxxxxxxxxxxx

Once you have defined the string, specify where the string has to be placed on the printed report. The coordinate is given in the following way:

```
   00000000001111111112222222223...
   01234567890123456789012345678 90...
  +-----------------------------------------------> X
00|This line printed first
01|This line printed second          ^
02|                                  | DIRECTION OF
03|                                  | PAPER
04|
05|
06|
. v
. Y
```

Use the X-pos and Y-pos keys to enter the X and Y coordinates. Confirm with ENTER. By specifying 0,0, the string is not printed.

- PRINTER SCROLL 9B -
Position string #1
X = 0 , Y = 0
ENTER X\Y-pos

Password: Operator

	X	Y
Default:	1,	1
Min:	0,	1
Max:	24,	80

Define if you want to add a second heading string in your report.

```
- PRINTER SCROLL 10 -
String #2
> yes <
CHOICE          ENTER
```

Password: Operator

Default: NO
Selections: YES, NO
If you selected YES, the next two scrolls are displayed.

```
- PRINTER SCROLL 10A -
Contents string #2

_____________
<   ENTER    >
```

Password: Operator

Default: = =

```
- PRINTER SCROLL 10B -
String #2  pos.
X =___, Y =___
ENTER      X\Y-pos
```

Password: Operator

	X	Y
Default:	2,	1
Min:	0,	1
Max:	24,	80

There is a third string. If only one scale is defined, it is a third heading string exactly as the previous two. If more scales are defined, it may be used to define a scale identifier. String definition is different for each scale and it is used as scale heading.

```
- PRINTER SCROLL 11 -
String #3
> yes <
CHOICE          ENTER
```

Password: Operator

Default: NO
Selections: YES, NO
If you selected YES, the next two scrolls are displayed

SCALE # key allows the operator to select the scale.

- PRINTER SCROLL 11A -
Contents string #3
_____
SCALE #

Password: Operator

Default: = =

If only 1 scale is defined or more scales are defined, the ENTER and ARROWS keys compare in the fourth line of the display when the numeric or alphanumeric key is pressed.

- PRINTER SCROLL 11B -
String #3 pos.
X =___, Y =___
ENTER X\Y-pos

Password: Operator

	X	Y
Default:	3,	1
Min:	0,	1
Max:	24,	80

A series of variables can be added in the report. Variable are : MASTER TOTAL, RESET TOTAL, DATE, TIME, NET WEIGHT, GROSS WEIGHT TARE and PEAK

The position must be defined for each variable. If you do not intend to add a variable in the report, you should set its X position to 0.

- PRINTER SCROLL 12 -
Date position
X =___, Y =___
ENTER X\Y-pos

Password: Operator

	X	Y
Default:	4,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 13 -
Time position
X =___, Y =___
ENTER      X\Y-pos
```

Password: Operator

	X	Y
Default:	5,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 14 -
Reset total position
X =___, Y =___
ENTER      X\Y-pos
```

Password: Operator

	X	Y
Default:	6,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 15 -
Master total position
X =___, Y =___
ENTER      X\Y-pos
```

Password: Operator

	X	Y
Default:	7,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 16 -
Net Weight position
X =___, Y =___
ENTER      X\Y-pos
```

Password: Operator

	X	Y
Default:	0,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 17 -
Gross Weight position
X =___, Y =___
ENTER      X\Y-pos
```

Password: Operator

	X	Y
Default:	0,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 18 -
Tare position
X =___, Y =___
ENTER      X\Y-pos
```

Password: Operator

	X	Y
Default:	0,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 19 -
Peak position
X =___, Y =___
ENTER      X\Y-pos
```

Password: Operator

	X	Y
Default:	0,	1
Min:	0,	1
Max:	24,	80

A.7.3.3 The PRINT Key

The PRINT MENU is accessible by press the PRINT key in the Run Menu or, if more scales are defined, in Main Menu 1. It is a single screen menu which allows the operator to select and start a print report.

The following screen is displayed:

```
- PRINTER SCROLL-
COM #1 no data
Start print TOTALS
PRINT  RETURN  COM
```

Password: Not required

The second line gives the status of the printer:

NO DATA Indicates the printer is idle, no data are being sent to the printer.

IS RUNNING The system is sending data to the printer.

The third line indicates what kind of data is printed if the PRINT key is pressed. The UP and DOWN keys select between:

TOTALS Print totals (all scales if more scales defined).

TOTALS S1 Print total scale 1 (only if enable).

TOTALS S2 Print total scale 2 (only if enable).

TOTALS S3 Print total scale 3 (only if enable).

TOTALS S4 Print total scale 4 (only if enable).

SETUP Print the setup data of the instrument.

TRAILS If audit trails option is active, audit trail data is printed

Print starts after the **PRINT** key is pressed.

The **COM** key allows the operator to select the printer in case more than one is installed.

Here are some examples of data that can be printed:

Print TOTALS, default

If one scale is defined :

TOTALS REPORT

DATE: 01-22-2003

TIME: 8:12a

MASTER TOTAL: 0.00 Tons

RESET TOTAL: 0.00 Tons

If more scales are defined :

TOTALS REPORT

DATE: 01-22-2003

TIME: 8:12a

SCALE 1

MASTER TOTAL: 0.00 Tons

RESET TOTAL: 0.00 Tons

SCALE 2

MASTER TOTAL: 0.00 Tons

RESET TOTAL: 0.00 Tons

Print ALARM:

01-22-2003 8:14a

Clock fail

Print AUDIT TRAILS: (Optional)

When print AUDIT TRAILS command is given, the number of records to print is required. This allows the operator to print a portion of the recorded trails.

TRAIL RECORD NR 1

DATE 01-22-2003 TIME 11:59p

VARIABLE scale cap

NEW 400.00

OLD 500.00

TRAIL RECORD NR 2

DATE 01-22-2003 TIME 11:31p

VARIABLE span

NEW 250000

OLD 300000

TRAIL RECORD NR 3

DATE 01-22-2003 TIME 11:59p

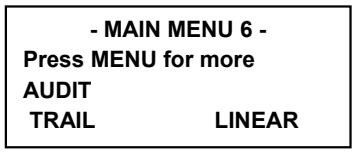
VARIABLE div (e)

NEW 0.05

OLD 0.1

A.8. MAIN MENU 6

Main Menu 6 is dedicated to Audit Trails and Linearization.



A.8.1. Audit Trail

This menu is only displayed if the Audit Trails option is installed.

Audit trail meets NIST HB 44 Category 3: Remote configuration capability, access may be unlimited or controlled through a password. It consists of an event logger that includes an event counter (000 to 999), the parameter description, the date, and time of the change, and the old and new value of the parameter. Parameters may be configuration parameters or routine calibration.

Events and changes may be viewed on the *Instrument'* s display or printed out by an on-site printer.

The Logger records the before and after setting all configuration parameters that affects the calibration of the scale. It also records when calibration was performed. The **Event Counter** increments one count for each event.

Audit trail records the time and displays the new and old data for any change in the parameters and functions listed below, indicating each by an event number:

Parameter's Name	***Meaning***
w unit	Weight unit
r unit	Rate unit
t unit	Total unit
s div	Scale division
audit	Audit trail option
Ic sen	Load cell sensitivity
s cap	Scale capacity
r cap	Rate capacity
lc cap	Load cell capacity
lc nr	Load cell number
lc rl	Load cell 1 resistance
……	…….
lc r6	Load cell 6 resistance

test w	Test weights for WTS span calib.
rcal r	Rcal resistance for Rcal span calib.
damp w	Damping weight
damp rq	Damping rate
line 1	Linearization factor 1 (0-10%)
……	…….
line 10	Linearization factor (90-100%)
span	Span
zero	Zero
rcal c	Rcal calibration constant
rcal f	Rcal factor

Function's Name	***Meaning***
Autozero	Autozero function has been executed
Autospan Rcal	Autospan with Rcal method has been excecuted
Autospan WTS	Autospan with test weight method has been executed
Cold Start	All instrument data has been lost
M.Total cleared	Master total register has been cleared

```
- AUDIT TRAILS 1 -
Audit trails
NO
CHOICE  ENTER
```

Password: Service

Default: No
Selections: Yes, No

If the audit trails are enabled, meaning YES is selected, the following screen appears for a short time (3 seconds):

```
- AUDIT TRAILS -
Use scroll keys or
enter trail number
```

After 3 seconds, the next screen is shown:

```
TRAIL EVENT No. 0000
hh:mm    dd-mm-yyyy
ss  nnnnnn = vvvvvvv/O (Id)
ss  nnnnnn = vvvvvvv/N (ew)
```

hh:mm	Time of change
mm-dd-yyyy	Date of change, the format may vary depending on the Country
ss	Identifies the scale (only if more scales are defined)
nnnnnn	Parameter's name
vvvvvv	Parameter's value, before change (old) after change (new)

Time and date are shown only if an optional Communication board is installed.

The user can scroll between events, which are displayed in order of date, and time. The user can also enter a number to display a specific event.

A.8.2. Linearization

Manual linearization can be accomplished by applying a known test weight(s) or loading the bin with pre-weighed material and calculation the scale error. Pressing the ACQuire soft key display the scale weight for the applied known weight. The operator can ten enter in a correction factor. Up to five correction factors can be installed in any order and will be internally sorted by scale loading.

Linearization must first enable in Main Menu 6 before any menu screens will appear.

NOTE: Prior to performing a manual linearization, the scale should be properly zeroed.

1. Press the **MENU** key repeatedly until Main Menu 6 appears.

```
- MAIN MENU 6 -
Press MENU for more

          LINEAR
```

Press **LINEAR** soft key to access the Linearization scroll. The following screen appears.

Press **CHOICE** for selections, **YES** to enable, or **NO** to disable linearization. Once enabled, no linearization is done until the operator manually enters the linearization factors.

```
    - LINEARIZATION 1 -
Linearization
NO
CHOICE          ENTER
```

Password: Service

Default: NO
Selections: YES, NO

NO turns off linearization and sets all factors to 1.00. **YES** turn on linearization.

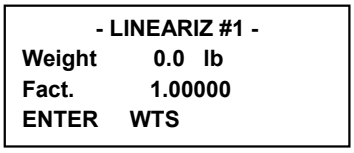
2. Set linearization to **NO** and return to the **RUN** screen.
3. Apply bin loading at the points to be linearized. Record the indicated weight for each point.
4. Calculate the correction factor for each point using the following formula :

Correction Factor = Actual or reference weight / Displayed weight

5. Enter linearization factors

Once the factors have been computed, they must be entered. Press the **MENU** key repeatedly until the **LINEAR** soft key is displayed. Press this soft key and then **DOWN ARROW**. Set linearize to **YES**, press **ENTER**. Press the **DOWN ARROW** key to LINEARIZ #1.

Type in the first weight recorded in Step 4 and press **ENTER**



If ENGLISH or MIXED

Default: 0.0 lbs
Min: 0.0 lbs
Max: 500.0 lbs

If METRIC

Default: 0.0 lbs
Min: 0.0 lbs
Max: 226.8 lbs

Type in the first factor calculated in Step 4 and press **ENTER**

If you enter 1.000 (default value), the load will not be corrected in that portion of the range. A number lower than 1.000 will reduce the span, while a number larger than 1.000 will increase the span.

Default: 1.000000
Min: 0.000000
Max: 1.500000

Press the **DOWN ARROW**. Repeat Step 5 for all remaining calculated factors.

Appendix B
Digital and Analog Input/Output

The *Static Weight Indicator* has provision for up to 24 programmable digital inputs and 24 programmable digital outputs. Standard I/O includes one speed input, four programmable inputs, four programmable outputs, and one non-programmable Micro-Tech hardware fault output.

Optional DIO boards can be added if additional I/O is required.

B.1 Mother Board Digital I/O

B.1.1 Digital Inputs

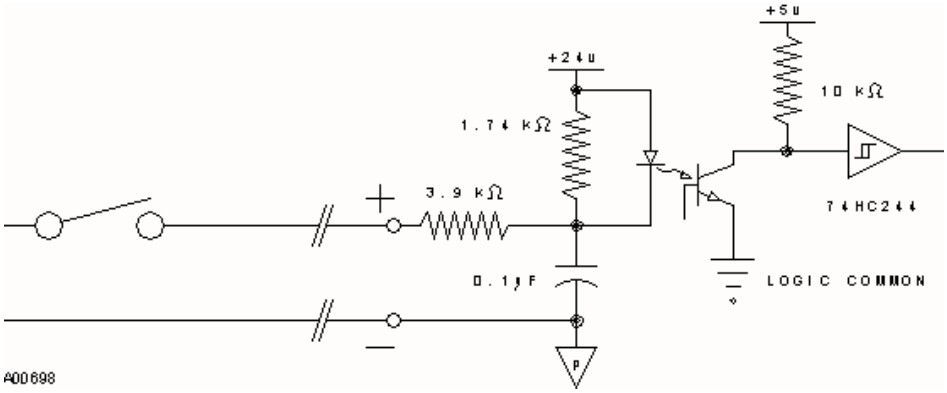
One (1) speed and four (4) programmable digital (DC) inputs (Appendix Figure B-1)

Eliminato: Appendix Figure B-1

Inserimento: Appendix Figure B-1

- Optically isolated
- Powered by internal 24 V DC supply, 5 mA
- Cable Length: 150 ohm maximum (7500 ft of 20 AWG)

Appendix Figure B-1: General Purpose Digital Inputs

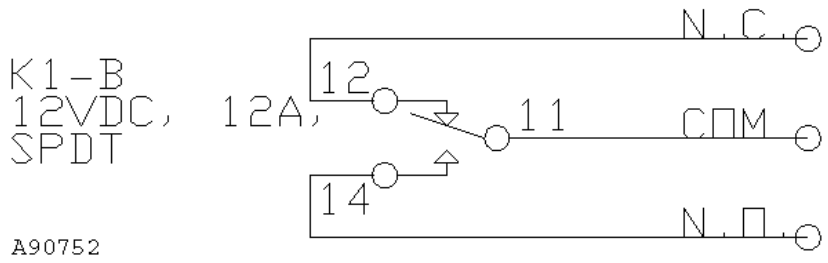


B.1.2 Digital Outputs

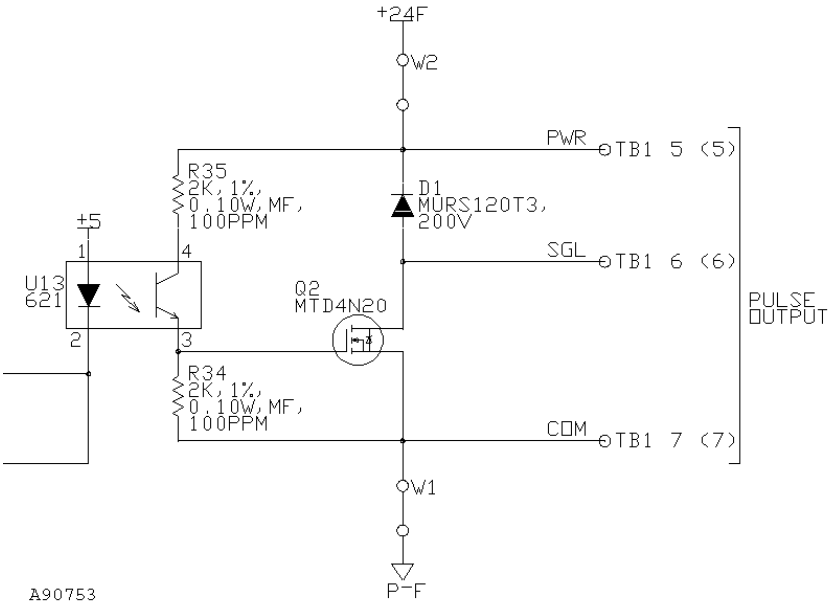
Four (4) programmable, and one (1) non-programmable failure, outputs (Appendix Figure B-2).

- Isolated Relay Outputs
- Solid state Output

Appendix Figure B-2: Isolated Relay Outputs



Appendix Figure B-3: Solid State Output



B.2 Digital Input/Output Board Configuration

In addition to the programmable digital inputs and outputs on the motherboard, optional Digital I/O (DIO) expansion boards can be added. Available boards are DIO input board 16 inputs/4 outputs, output board 16 outputs/14 inputs or 20 inputs/20 outputs by adding both boards.

Both DIO boards provide isolated contact closure inputs and 24-volt current sinking (default) or current coursing (consult Factory) isolated outputs. The DIO input board connector J16 is male 25 pin sub-miniature D Connector and the DIO output board connector J15 is a female connector.

Selectable jumpers OP1 and OP2 located on the lower right hand side of the DIO boards control internal or external 24 VDC power for the DIO boards. All inputs and outputs use the same selected power supply.

Appendix Table B-1: DIO Board Jumper Settings (OP1/OP2)

DIO BOARD JUMPER SETTINGS		
POWER SOURCE	OP1	OP2
INTERNAL	“A”	“A:
EXTERNAL	“B”	“B”

The isolated contact closure inputs are activated by completing the circuit from the input to the negative side of the 24 VDC supply. Approximately 5 mA of current flows out of each input during contact closure.

The outputs of the DIO boards use 2803 current sinking (default) type IC’s. The output IC’s are installed in sockets to allow replacing the output IC only rather than the board if the IC is damaged.

The output IC’s can be replaced with 2981 type IC’s for current sourcing applications. Wire jumpers W1 through W4 must be relocated for current sourcing. In most cases, it is recommended the boards be returned to the factory for converting from current sinking (default) to current sourcing.

Appendix Table B-2: DIO Board Jumper Settings for Current Sourcing

JUMPERS				
CURRENT	W1	W2	W3	W4
Sinking (default)	“Yes”	“No”	“Yes”	“No”
Sourcing	“No”	“Yes”	“No”	“Yes”

B.2.1 16 In/4 Out DIO Board Specifications

- (16) Programmable inputs

  See *Section 0* specifications
- (4) Programmable outputs

  See *Section 0* specifications
- Connector

  25 pin D connector (male). Connector is interchangeable with a 20 or 22 pin subminiature D connector dimensionally complying with MIL-C-24308.

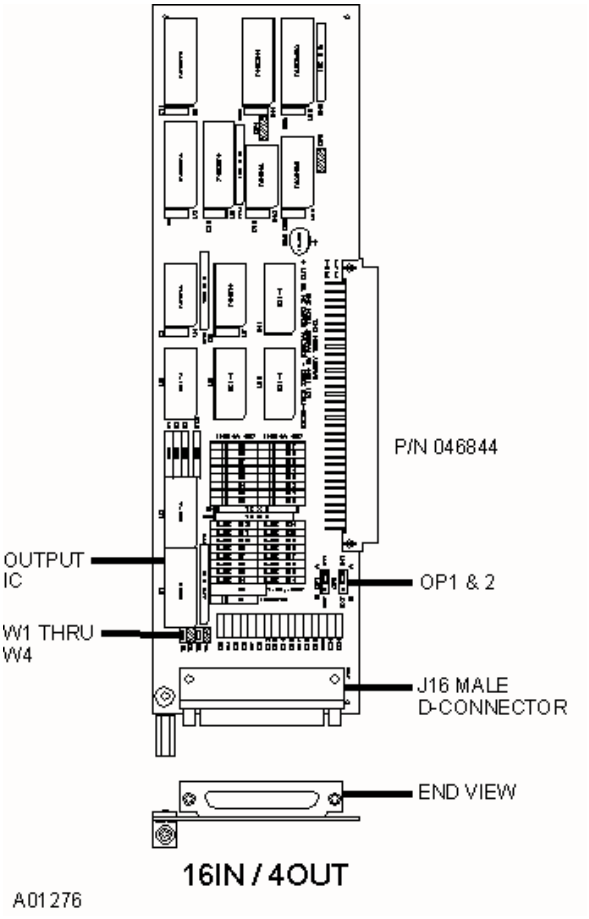
B.2.2 4 In/16 Out DIO Board Specifications

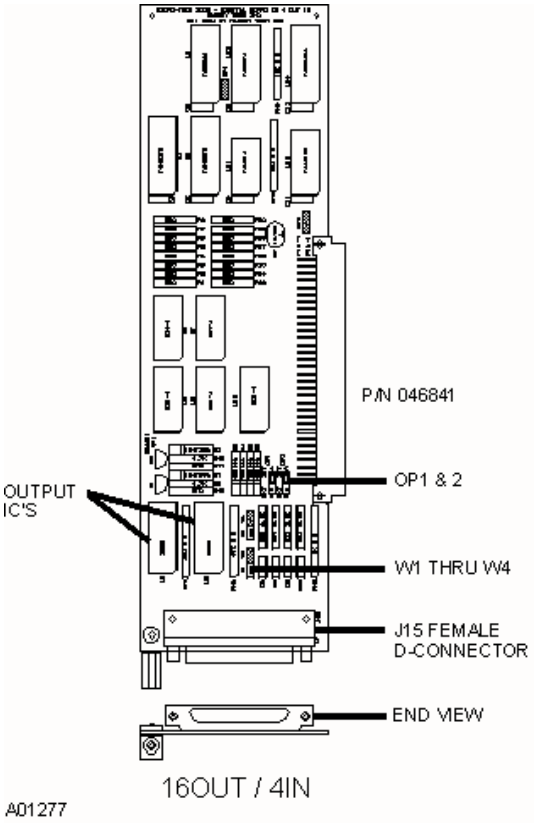
- (4) Programmable inputs

  See *Section 0* specifications
- (16) Programmable outputs

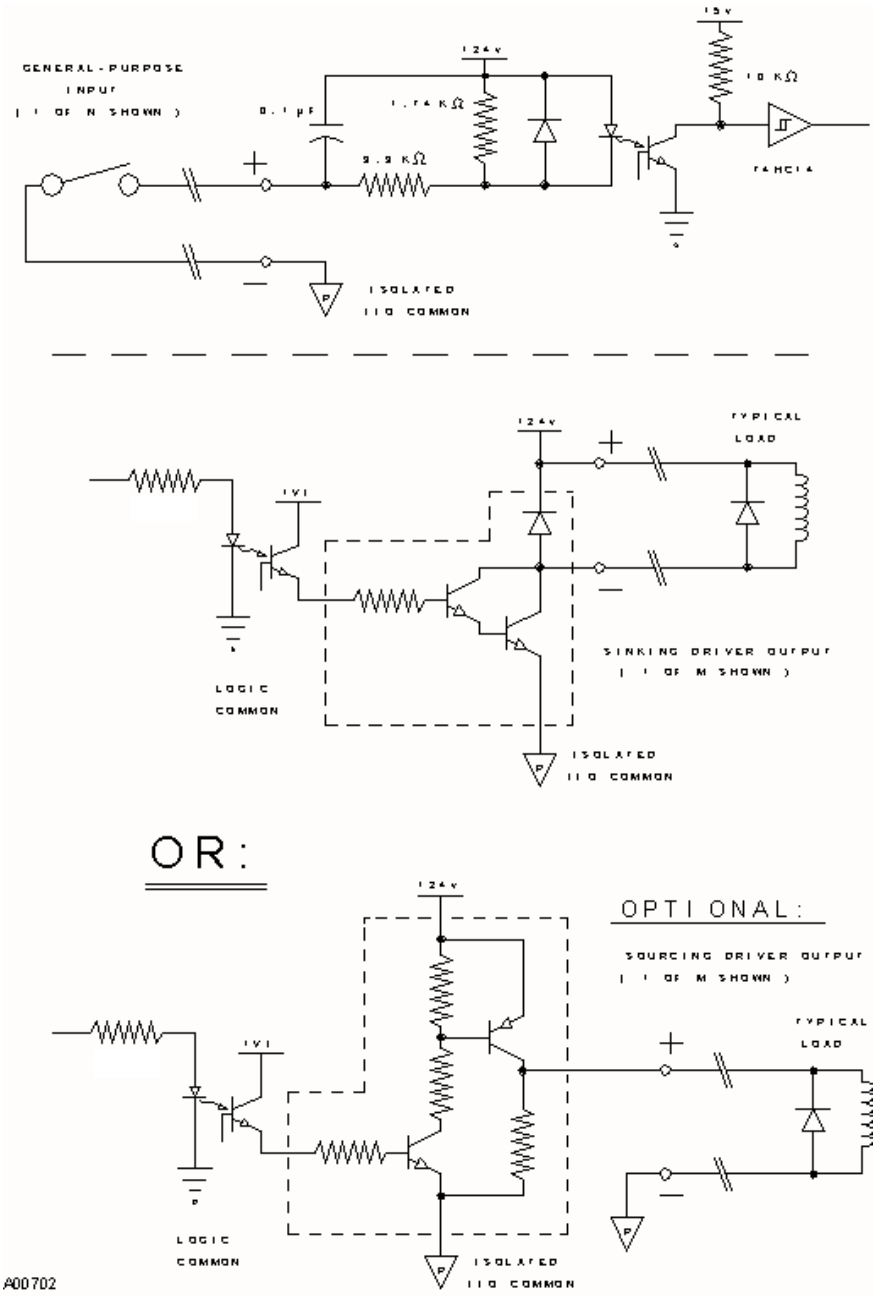
  See *Section 0* specifications
- Connector

  25 pin D connector (female). Connector is interchangeable with a 20 or 22 pin subminiature D connector dimensionally complying with MIL-C-24308.


P/N 046844
OUTPUT IC
OP1 & 2
W1 THRU W4
J16 MALE D-CONNECTOR
END VIEW
16IN / 4OUT
A01276


P/N 046841
OUTPUT
IC'S
OP1 & 2
W1 THRU W4
J15 FEMALE
D-CONNECTOR
END VIEW
16OUT / 4IN
A01277

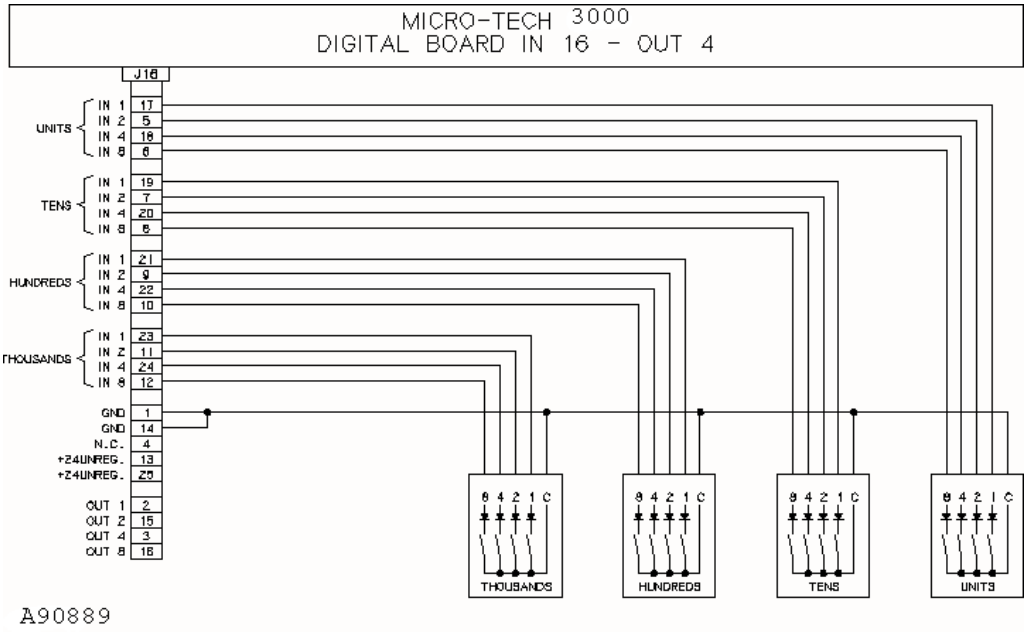
Appendix Figure B-4: Digital Inputs/Outputs



B.3 BCD Input Option

BCD can remotely enter load sizes for load out or batching applications. An optional Load Out input board is required. See Appendix Figure B-5 for wiring instructions.

Appendix Figure B-5: BCD Input Option Wiring



B.4 Analog I/O Boards

The analog I/O board is available in two configurations described below. *Type A* (option) has one current output only, whereas, *Type B* has two voltage inputs and two current outputs. The Micro-Tech 3100 can support up to four analog inputs and four analog outputs.

Type A: Current Output Board is a user definable 0-24/4-20 or 20-4/20-0 mA output (*Appendix figure B-7*).

Net Weight, Gross Weight, Tare, Peak

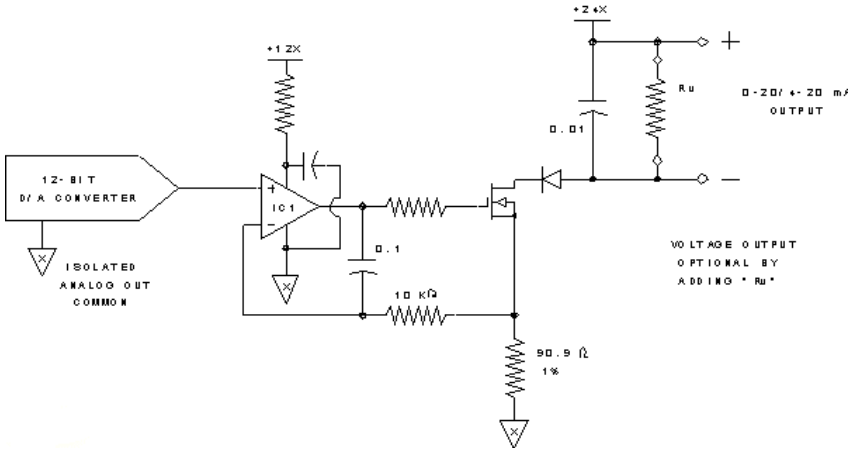
Optically isolated

Isolated power source

Voltage output by adding an internal dropping resistor

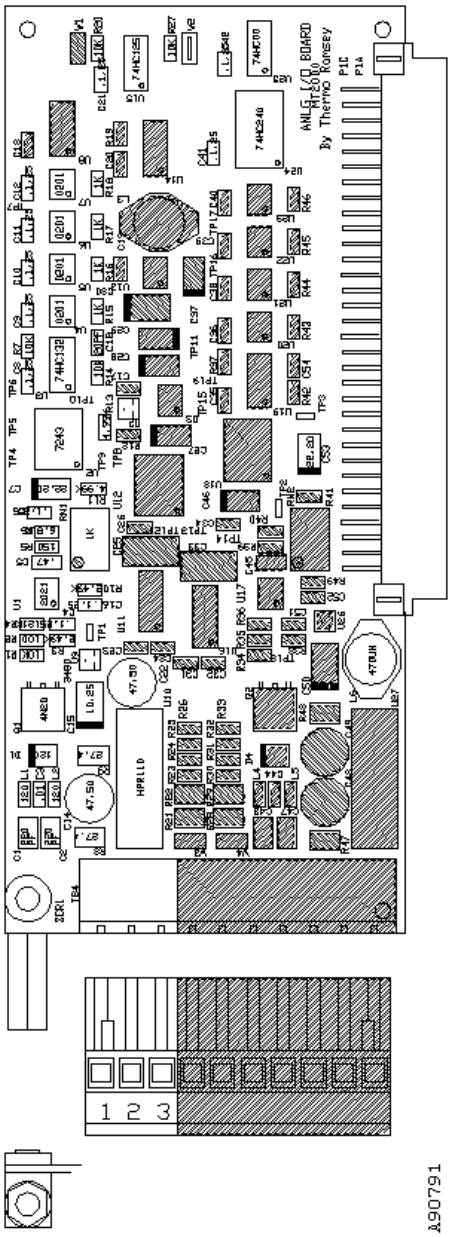
Output range:	User selectable 0-20mA or 4-20 mA, representing 0 to 100% variable.
Resistive load:	800 ohms max.
Capacitive load:	No limit
Field wiring:	Connections are made to the terminal strip on bottom edge of the analog board. Note that connector is removable for ease of termination.

Appendix Figure B-6: Current Output

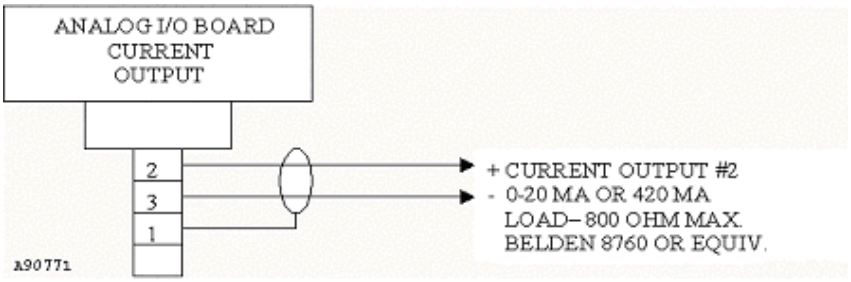


A00701

Appendix Figure B-7: Current Output PC Board (Type A)



Appendix Figure B-8: Current Output Board Wiring Diagram (Type A)



Type B: Analog Input/Output board has two ±5 VDC differential inputs (Appendix Figure B-9) and two user definable 0-20/4-20 or 20-4/20-0 mA outputs (Appendix Figure B-6).

Inputs

None

Moisture Compensation

Outputs

None

Net Weight

Gross Weight

Tare

Peak

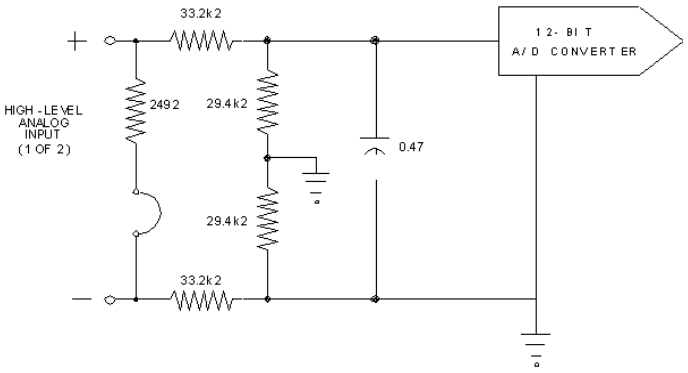
Analog inputs are +/-5 VDC. Jumpers W3 and/or W4 are used to select 240 ohm impedance for 0-20/4-20 mA inputs (see *Appendix Figure B-10*).

Formattato: XRef_Link

Type:	Differential voltage input (0-20 mA or 4-20 mA with internal resistor, jumper selectable)
Range:	0-5 volt, or ±5 volt, programmable
Input impedance:	100 k nominal (differential)
Maximum usable input voltage:	106% of full scale
Non-isolated	
Max. non-destructive input voltage:	12 V peak

Field wiring: Connections are made to the terminal strip on bottom edge of the analog board. Note that connector is removable for ease of termination.

Appendix Figure B-9: Analog Input



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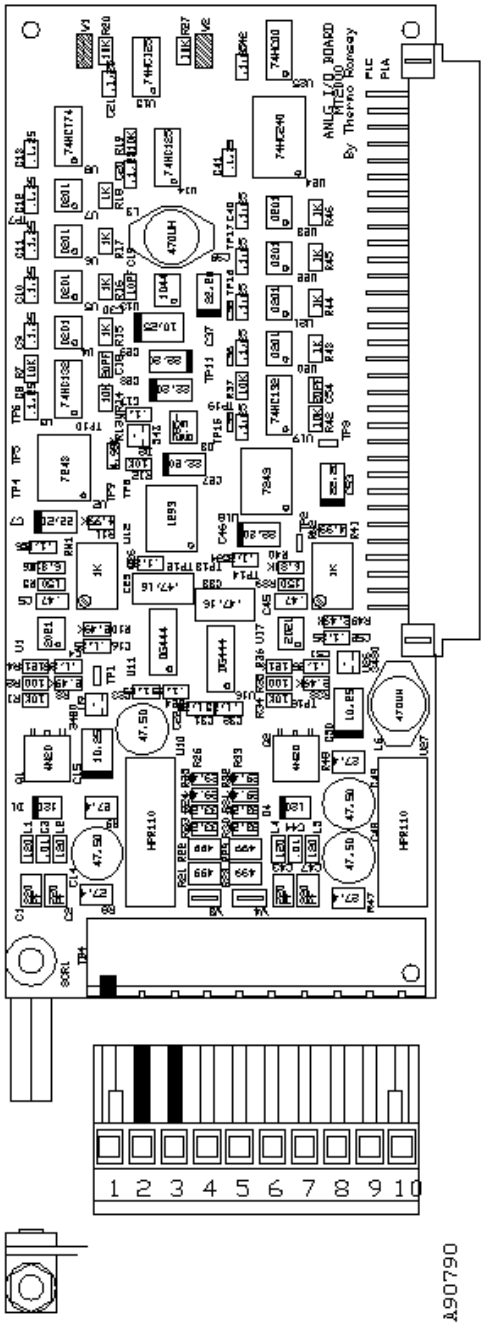
2 current outputs (see Appendix Figure B-6*)*. Same as described in Type A board

Appendix Figure B-10: Analog I/O PC Board (Type B)



B.5 Communications Options

The following table gives references for specific communications options.

Appendix Table B-3: Communications Options Reference

Part Number	Reference Manual	REC Number
068053	Standard Comm A Board	REC 3949
055517	Allen Bradley RIO	REC 4012
056713	Profibus-DP	REC 4063
068147	DeviceNet	REC 4150

B.5.1 Standard Comm A Board

Refer to *REC 3949* if the optional communication board is installed.

B.5.2 Allen-Bradley Remote I/O

Refer to *Allen-Bradley Remote I/O, REC 4012* if this option is installed.

B.5.3 Profibus-DP

Refer to *Profibus-DP, REC 4063* if this option is installed.

B.5.4 DeviceNet

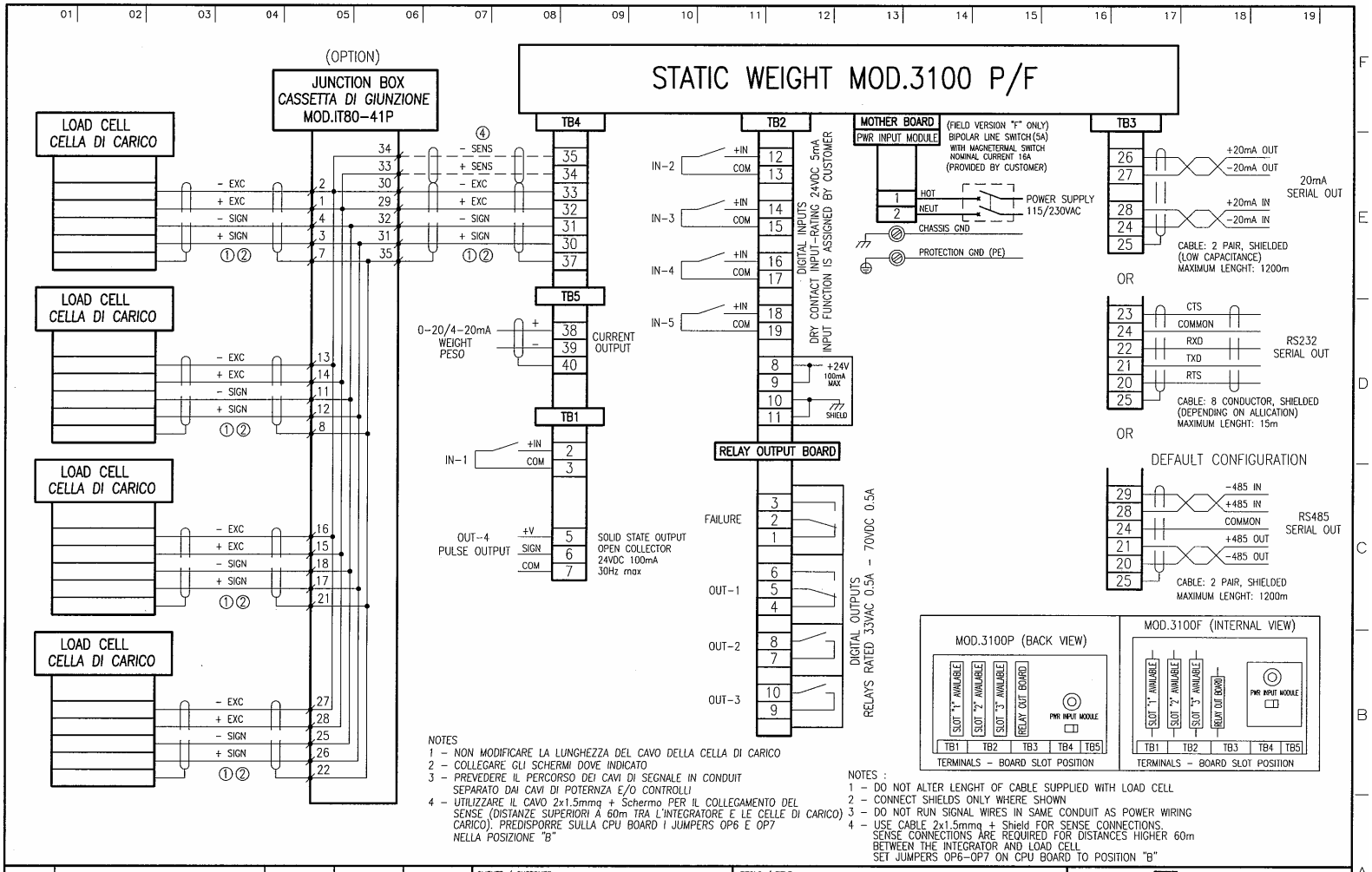
Refer to *REC 4150* if this option is installed.

Appendix C
Optional Documentation

This appendix contains references to documents that may be useful for installation and operation of your *Micro-Tech 3104*.

- *Serial Communications Manual Micro-Tech 3000*
- *Allen-Bradley Remote I/O Manual Micro-Tech 3000*
- *- PROFIBUS-DP Slave Protocol Micro-Tech 3000*
- *REC 4153 - DeviceNet Comm Manual MT 3000*

STATIC WEIGHT MOD.3100 P/F



NOTES
1 - NON MODIFICARE LA LUNGHEZZA DEL CAVO DELLA CELLA DI CARICO
2 - COLLEGARE GLI SCHERMI DOVE INDICATO
3 - PREVEDERE IL PERCORSO DEI CAVI DI SEGNALE IN CONDUIT SEPARATO DAI CAVI DI POTERNZA E/O CONTROLLI
4 - UTILIZZARE IL CAVO 2x1.5mmq + Schermo PER IL COLLEGAMENTO DEL SENSE (DISTANZE SUPERIORI A 60m TRA L'INTEGRATORE E LE CELLE DI CARICO) CARICO). PREDISPORRE SULLA CPU BOARD I JUMPERS OP6 E OP7 NELLA POSIZIONE "B"

NOTES :
1 - DO NOT ALTER LENGHT OF CABLE SUPPLIED WITH LOAD CELL
2 - CONNECT SHIELDS ONLY WHERE SHOWN
3 - DO NOT RUN SIGNAL WIRES IN SAME CONDUIT AS POWER WIRING
4 - USE CABLE 2x1.5mmq + Shield FOR SENSE CONNECTIONS. SENSE CONNECTIONS ARE REQUIRED FOR DISTANCES HIGHER 60m BETWEEN THE INTEGRATOR AND LOAD CELL
SET JUMPERS OP6-OP7 ON CPU BOARD TO POSITION "B"

REV.	DESCRIZIONE / DESCRIPTION	DATA / DATE	COMP / BY	VISTO / CHECK
B	MODIFIED	12-11-2003	D.C.	
A	ISSUED	7-7-2003	D.C.	

CLIENTE / CUSTOMER

DATA / DATE

FILE N° MT-0003100-E001B

TITOLO / TITLE

STATIC WEIGHT MOD.3100 P/F

WIRING DIAGRAM

SCHEMA INTERCONN. MORSETTIERE

Thermo ELECTRON CORPORATION
Thermo Ramsey Italia S.r.l. - Strada Rivoltana Km6/7 Rodano (MI)

DISEGNO N° / DRAWING N°	FOGLIO / SHEET	CONTINUA / CONT.D ON
MT-0003100-E001B	001	—