

REVISION HISTORY

REVISION	DATE	SOFTWARE VERSION
A	NOVEMBER 1996	-
B	DECEMBER 1998	-
C	MAY 2000	42.00.03.05

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**PLEASE READ AND OBSERVE THE FOLLOWING SAFETY
PRECAUTIONS FOUND THROUGHOUT THIS MANUAL.**

DANGER

FAILURE TO OBSERVE WILL CAUSE VERY SERIOUS PERSONAL INJURY OR DEATH.

WARNING

FAILURE TO OBSERVE COULD CAUSE SERIOUS PERSONAL INJURY.

CAUTION

FAILURE TO OBSERVE MAY CAUSE MINOR OR MODERATE PERSONAL INJURY
OR DAMAGE TO THE EQUIPMENT.

RAMSEY PRODUCTS
MICRO-TECH 2000 MODEL 2100/2200 STATIC WEIGHT INDICATOR

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* If option is supplied.

CHAPTER 1.0 INTRODUCTION

1.1 GENERAL

This instruction manual contains information on the installation and maintenance of the Micro-Tech 2000 Model 2100 or 2200 Static Weight Indicator. The Model 2100 is designed for noncommercial use and the Model 2200 for higher accuracy and in cases where weights and measures approval is required. The manual refers to Model 2100 only as both operate the same.

1.2 DESCRIPTION

The Micro-Tech 2100/2200 Field Mount Static Weight Indicator (Figure 1-1) or Panel Mount (Figure 1-2) is a bus-based microcomputer driven instrument used for static weighing of bulk materials. Common applications are C-Level, Unitrain Loadout, 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

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

3. Static Weight Indicator

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 standards. 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 to multidrop 4 wire bidirectional communications, maximum 4000 ft (1200 m).
- Current Loop For high immunity bidirectional asynchronous communications. Passive only.



P00435

MICRO-TECH 2000
 MODEL 2100/2200 FIELD MOUNT
 INTEGRATOR
 FIGURE 1-1



P00436

MICRO-TECH 2000
 MODEL 2100/2200 PANEL MOUNT INTEGRATOR
 FIGURE 1-2

1.3 WARRANTY

RAMSEY TECHNOLOGY, INC.

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."

FIELD SERVICE

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

RAMSEY TECHNOLOGY, INC.
501 90th Avenue N.W.
Minneapolis, MN 55433
Phone: (763) 783-2500
Fax: (763) 783-2525

1.4 UNPACKING AND INSPECTION

The Micro-Tech 2100/2200 Static Weight Indicator has been properly packaged for shipment and storage, when necessary. Refer to the appropriate manual in the Appendix for unpacking procedures for optional equipment.

Inspect all packages for damage before opening as oftentimes the carrier may be responsible for shipping damage. Refer to the appropriate manual in the Appendix for inspection procedures for optional equipment.






1.5 STORAGE

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

1.6 SYMBOLS

Symbols used in this manual are described in Table 1-1.

**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)

1.7 MODEL 2100/2200 STATIC WEIGHT INDICATOR HARDWARE SPECIFICATIONS

1.7.1 Enclosure

1. Field
 - ! NEMA 4X, dust and watertight
 - ! size 15 x 13 x 7 inches
 - ! fiberglass reinforced polyester molded blue
 - ! door window UVA acrylic UL#E64358
 - ! Stainless steel "Quick" type latch
 - ! 2 position mounting feet
 - ! Steel chassis providing EMI/RFI shielding
 - ! Provision for 7 solid-state input/output modules (4 output, 3 input)
 - ! power on/off switch (field terminal board option)
2. Panel mount
 - ! size: DIN43700 96 X 288 mm
 - ! enlarged bezel for field mount and U.S. panel mount to allow "dust seal"
 - ! Material: chromated mild steel

1.7.2 Environmental Conditions

1. Indoor/outdoor. Should be mounted as close to the load cells as possible without being exposed to excessive heat, or moisture.
2. Altitude up to 6,561 feet (2000 M)
3. Temperature:
 - Storage: -40E to +158E F (-40E to +70E C)
 - Operating: -40E to +122E F (-40E to +50E C)
4. Maximum relative humidity up to 95% non-condensing
5. Pollution degree (Pollution Degree 2)

1.7.3 Power Requirements

1. Nominal voltage: 110/120/220/240 VAC, selectable
2. Nominal frequency: 50/60 Hz
3. Operating range: Nominal voltage +10%, -15%
 - 93.5 VAC - 121 VAC (110 VAC Nom.)
 - 102.0 VAC - 132 VAC (120 VAC Nom.)
 - 187.0 VAC - 242 VAC (220 VAC Nom.)
 - 204.0 VAC - 264 VAC (240 VAC Nom.)
4. Fusing:
 - L1 side of line
 - 1.0 Amp Slo-Blo 110/120 VAC, Type T
 - 0.50 Amp Slo-Blo 220/240 VAC, Type T
5. Power consumption: 50 VA max
6. Maximum non-destructive input voltage: 150/300 VAC for 1 minute
7. Power Switch: Field mount: switches both L1 and L2.
8. Transient overvoltage according to installation category (Overvoltage Category II)

1.7.4 AC Power Supply

- ! EMI/RFI protection
- ! 110/120/220/240 VAC input selection by means of TWO switches (UL, CSA, VDE approved) mounted internally.
- ! 50/60 Hz transformer

1.7.5 DC Power Supplies

1. ! Auxiliary Power Supply Output (Alarm Contacts, etc.)
 - Output voltage: +24 VDC +27/-21%
(19.0/30.4) (unregulated).
 - Isolation: Yes 500 volts
 - Output ripple: 1.0 V peak to peak typical.
 - Output current: 600 mA maximum.
 - Short-circuit protection

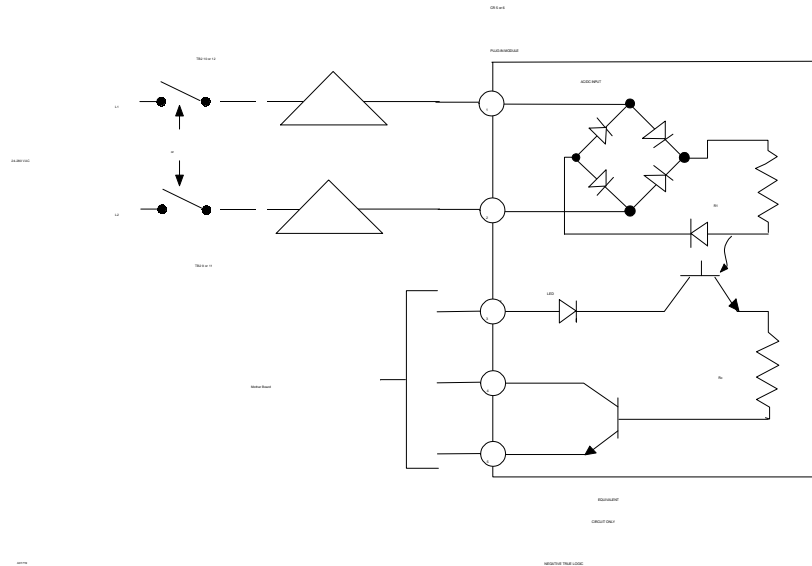
1.7.6 Load Cell (Weight)

1. Load cell input circuits
 - ! Number: Up to SIX 350 ohm load cells in parallel. Cable distance 200 ft or less.
 - ! Sensitivity: 0.5 mV/V to 3.5 mV/V (keyboard selectable).
 - ! Input impedance: 100 kS minimum.
 - ! Maximum usable signal: 114% of 3mV/V.
 - ! Isolation: Non-isolated.
 - ! Maximum nondestructive input voltage: $\pm 6V$ relative to ground.
 - ! Transient/RFI protection: NO
 - ! Load cell cable shield: Connected to earth ground.
2. Load Cell Excitation Power Supply
 - ! 10 VDC $\pm 10\%$, 220 mA
 - ! Minimum load impedance (operating) 58 ohms
 - ! Output short circuit, 1.5 A maximum
3. 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: 38 kS minimum.
 - ! Jumper selectable: Local or remote sense.

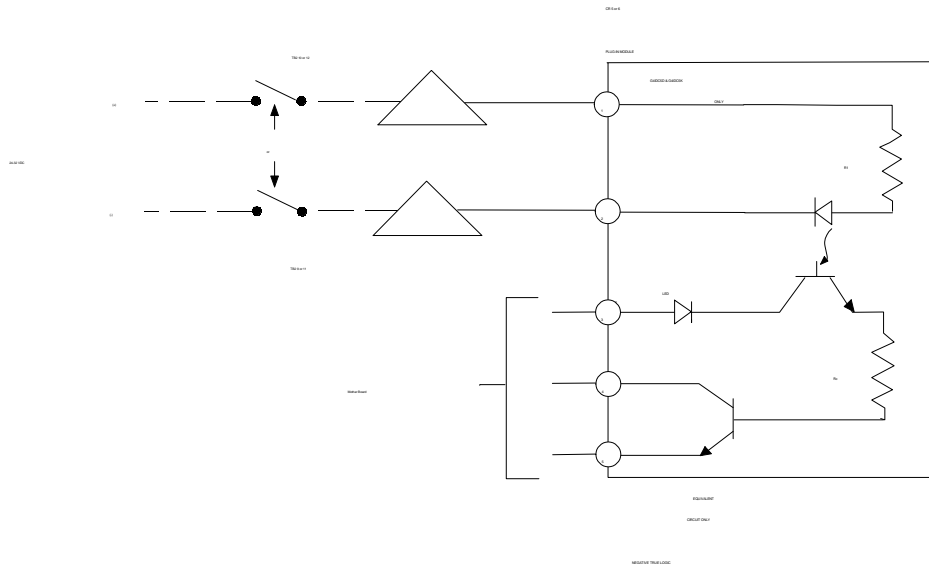
1.7.7 Mother Board Digital Inputs

The field mount Static Weight Indicator has provision on the field terminal board for three OPTO 22/Generation 4 modules. The programmable status inputs may be AC or DC (see Figures 1-3 or 1-4).

The panel mount Static Weight Indicator version only accepts a dry contact input. See Appendix A/2 for specifications and a typical wiring diagram.



AC INPUT MODULE
FIGURE 1-3

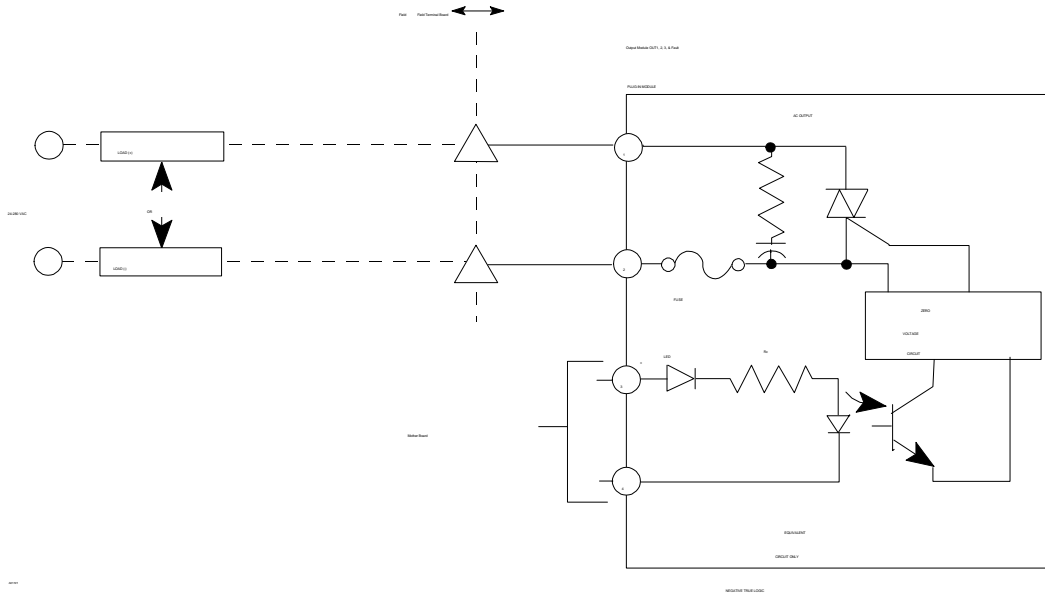


DC INPUT MODULE
FIGURE 1-4

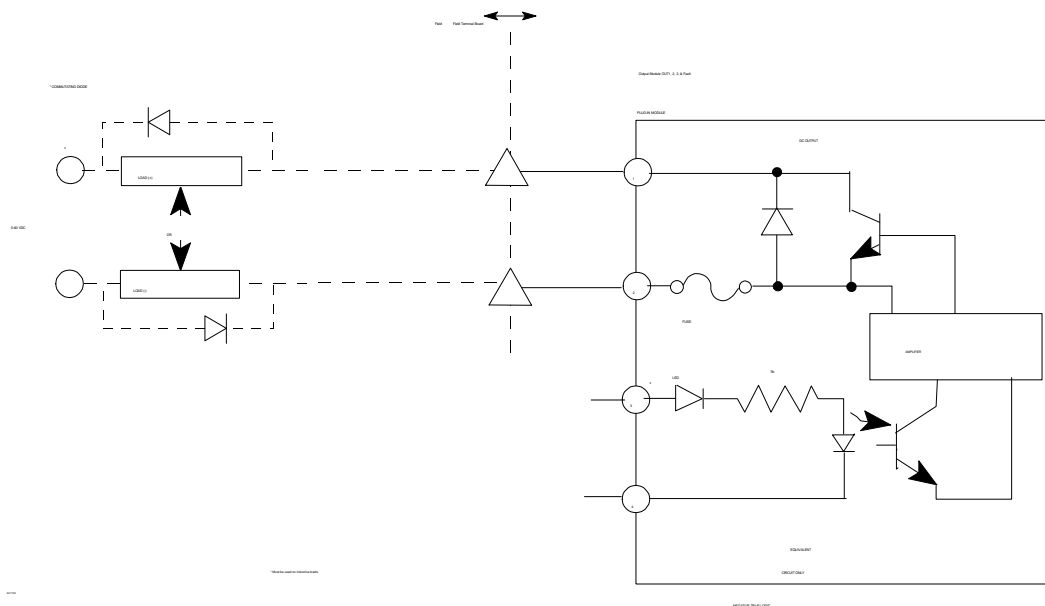
1.7.8 Mother Board Digital Outputs and Fault Output

The field mount Static Weight Indicator has provision on the field terminal board for four OPTO 22/Generation 4 modules. Three are programmable and one is a dedicated fail-safe fault output. All outputs may be AC or DC (see Figures 1-5 or 1-6).

The panel mount Static Weight Indicator version outputs are 24 VDC open collector. See Appendix A/2 for specifications and a typical wiring diagram.



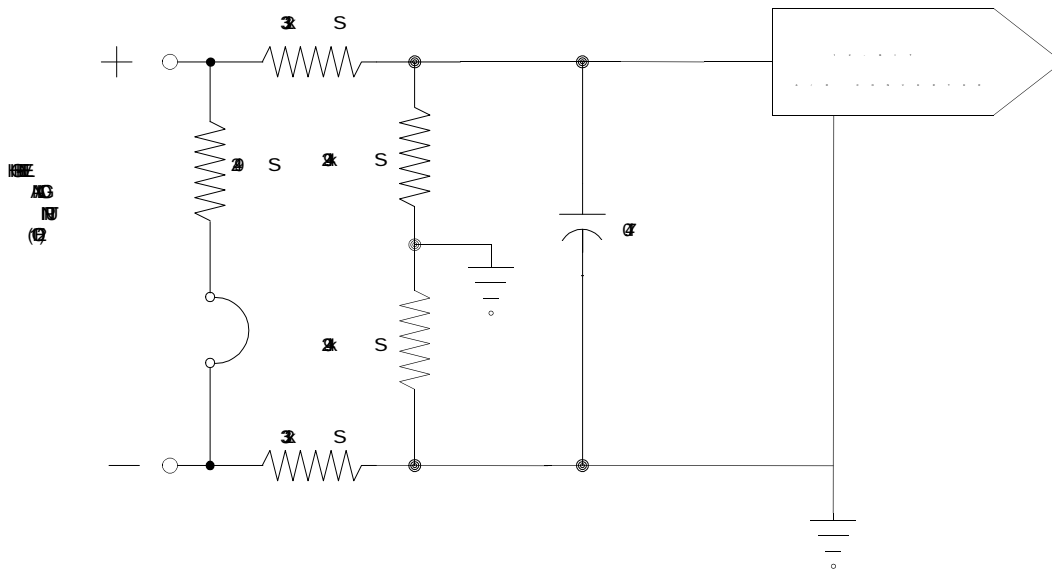
AC OUTPUT MODULE
FIGURE 1-5



DC OUTPUT MODULE
FIGURE 1-6

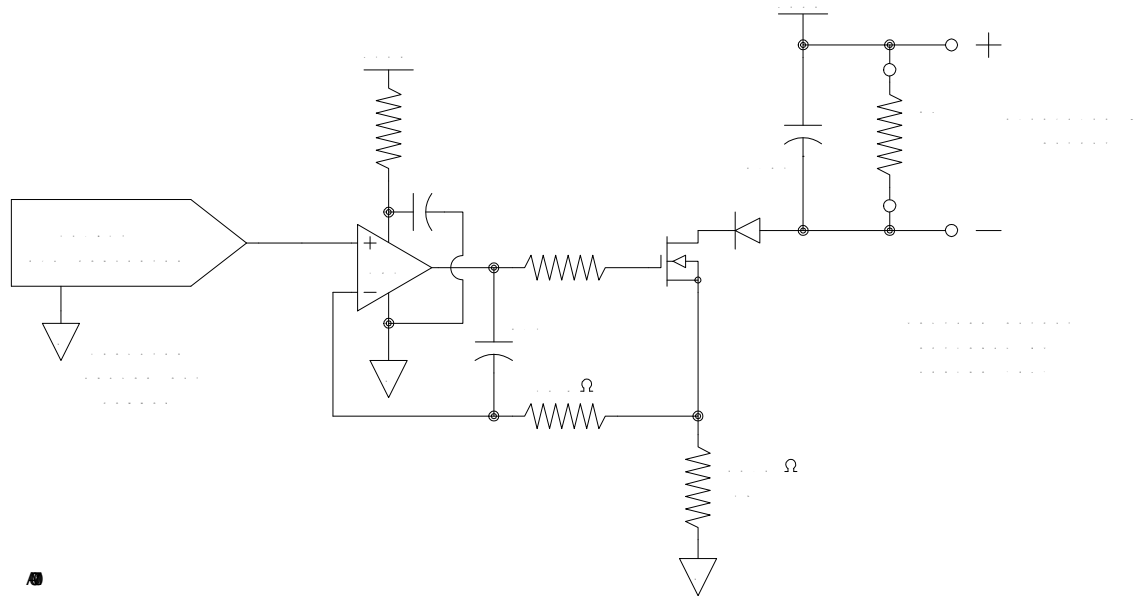
1.7.9 Analog I/O Board B (Optional)

- (2) high level inputs (Figure 1-7)
 - ! 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.
 - ! Maximum non-destructive input voltage: 12 V peak



HIGH-LEVEL ANALOG INPUT
FIGURE 1-7

- (2) current outputs (Figure 1-8)
 - ! optically isolated
 - ! isolated power source
 - ! Voltage output by adding an internal dropping resistor.
 - ! Output range: User selectable 0-20 mA or 4-20 mA, representing 0 to 100% variable.
 - ! Resistive load: 800 ohms maximum
 - ! Capacitive load: no limit



HIGH-LEVEL ANALOG OUTPUT
FIGURE 1-8

1.7.10 Analog I/O Board A (Optional)

Depopulated version of Analog I/O board B:

1. (1) current output (Figure 1-8)

- ! Output range: User selectable 0-20 mA or 4-20 mA, representing 0 to 100% variable.
- ! Resistive load: 800 ohm maximum loop
- ! Capacitive load: no limit

1.7.11 Communication Board A

(See Field Wiring Diagram in Chapter 2.0.)

1. 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.
- ! Selection: One interface mode only
- ! Interfacing: RS-485 supports 2-wire or 4-wire multi-drop networking; RS-232C provides support for modem.
- ! Data rate: 300 to 19200, operator selectable from the 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 maximum (RS-232C), 4000 feet maximum (RS-485 and 20 mA)

2. Clock Calendar

! Type: Dallas DS1285 with battery backup; provisions of clock/calendar with integrated battery.

3. Refer to Serial Communications manual (REC 3948) if this option is installed.

1.7.12 Allen-Bradley Remote I/O

Refer to Allen-Bradley Remote I/O manual (REC 4013) if this option is installed.

1.7.13 PROFIBUS-DP

Refer to PROFIBUS-DP manual REC 4062 if this option is installed.

CHAPTER 2.0 INSTALLATION

2.1 GENERAL

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 static weight indicator scale parameters. After all parameters have been entered, the static weight indicator performs an unassisted zero and span calibration.

2.2 FIELD MOUNT INSTALLATION

The field mount Static Weight Indicator should be mounted in a control room environment and not be exposed to excessive vibration, heat or moisture. The Static Weight Indicator may be mounted up to 3,000 feet from the scale.

2.2.1 Mounting

Mount the Static Weight Indicator to a rigid, flat, vertical surface using four mounting holes provided on the back of the enclosure (Figure 2-1).

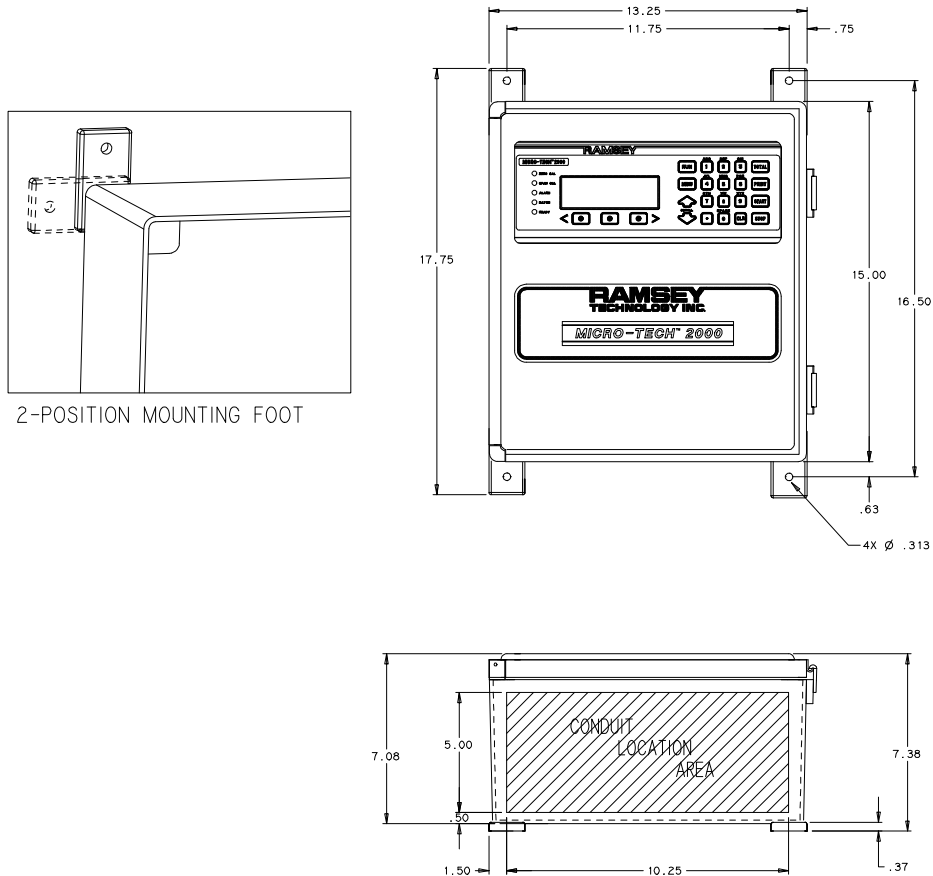
Care should be taken to insure the mounting surface is flat so as not to twist or warp the fiberglass enclosure when tightening the mounting bolts.

2.2.2 Safety Precautions



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

1. Do not connect power to the electronics, nor turn on the unit until you have read and understood this entire manual. The precautions and procedures presented in this manual must be followed carefully in order to prevent equipment damage and protect the operator from possible injury.
2. **CAUTION**
Hands and clothing must be kept away from all moving or rotating parts.
3. **WARNING**
Covers over the electronics should always remain in place during operation. They should be removed only for maintenance procedures with the machine's power OFF. Be sure to replace all covers before resuming operation.
4. **WARNING**
All switches (such as control or power) must be OFF when checking input AC electrical connections, removing or inserting printed circuit boards, or attaching voltmeters to the system.
5. Incoming voltages must be checked with a voltmeter before being connected to the electronics.



ELECTRICAL AND MOUNTING GUIDELINES MICRO-TECH 2000
 MODEL 2100/2200 (FIELD MOUNT) STATIC WEIGHT INDICATOR
 FIGURE 2-1

6. 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.
- Maintenance procedures should be performed only by qualified service personnel and in accordance with procedures/instructions given in this manual.
- During maintenance, a safety tag (not supplied by Ramsey) should be displayed in the ON/OFF switch areas as a precaution instructing others not to operate the unit.
- Only qualified service technicians should be allowed to open and work in the electronics, power supply, control, or switch boxes.
- Objects should never be placed or stored on the Static Weight Indicator.
- This equipment should not be operated, nor utilized in applications other than those stated in the original order. (To adapt production rates or applications, consult Ramsey Products Customer Service for recommendations.)
- 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.

2.2.3 OSHA - Occupational Safety and Health Act

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 judgement decision on the part of the local inspection. Hence, Ramsey Technology, Inc. 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. Ramsey Technology, Inc. will use their best efforts to remedy such violation at a reasonable cost to the buyer.

2.2.4 Utility Connections (Incoming Power)



DO NOT CONNECT POWER UNTIL YOU HAVE READ AND UNDERSTOOD THIS ENTIRE SECTION. IMPROPER CONNECTION MAY RESULT IN DAMAGE TO YOUR INTEGRATOR.

CAUTION

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

CAUTION

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

CAUTION

A READILY ACCESSIBLE DISCONNECT DEVICE SHALL BE INCORPORATED IN THE FIXED WIRING.

CAUTION

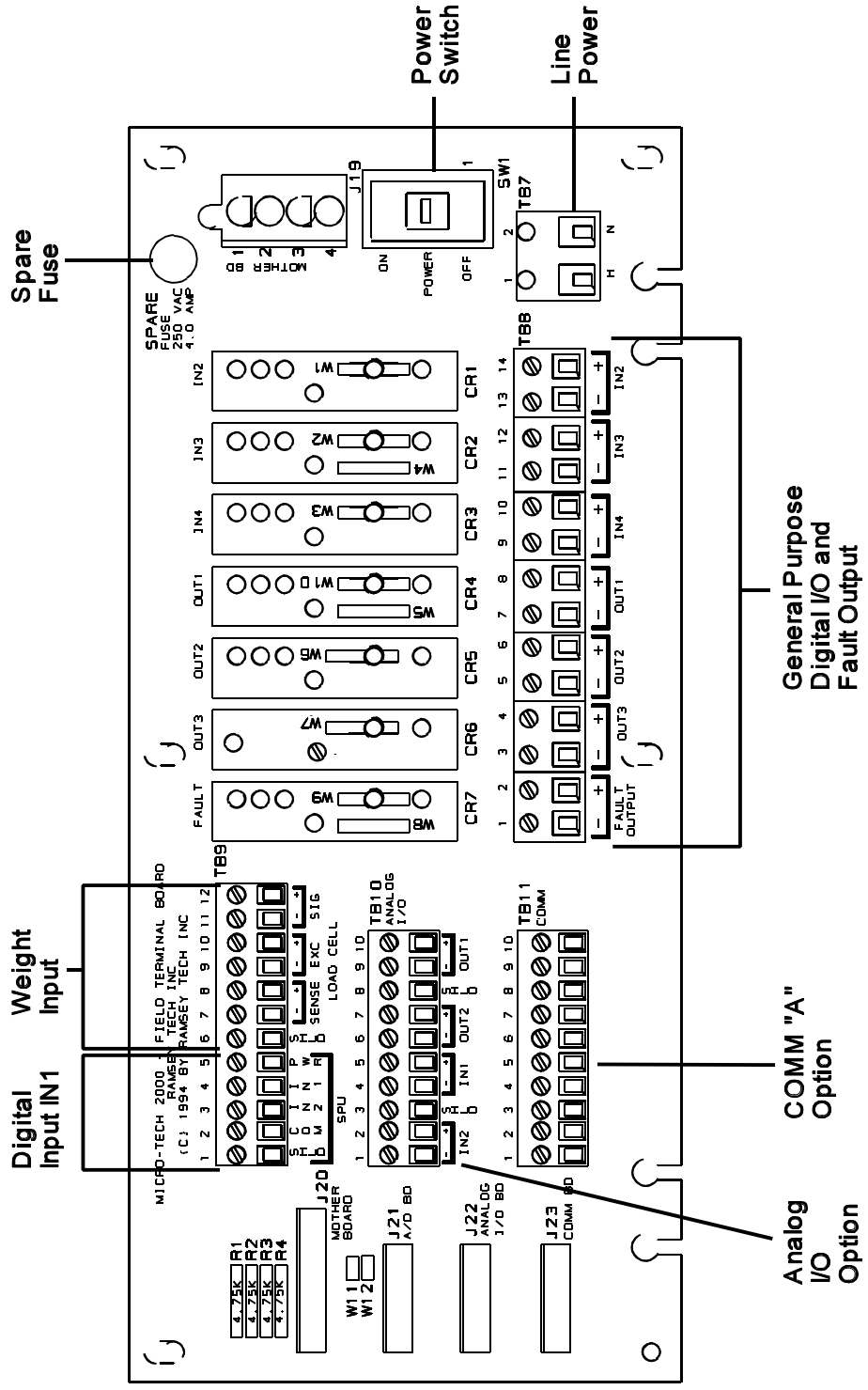
REFER TO THE FIELD WIRING DIAGRAM (FIGURES 2-2 AND 2-3) AS A GUIDE IF YOU DO NOT HAVE A SPECIFIC WIRING DIAGRAM FOR YOUR SYSTEM. FOLLOW YOUR LOCAL ELECTRICAL CODES AND REGULATIONS FOR MINIMUM WIRE SIZE AND ROUTING.

2.2.5 Wiring

1. Critical wiring conditions:
 - A. Insure power is off.
 - B. Do not route load cell and signal cables in the same conduit with power cables or any large source of electrical noise.
 - C. Earth ground all enclosures and conduits. A ground connection between all conduits is required.
 - D. Wiring should be long enough to allow the field terminal entry panel to swing down for circuit board access.
 - E. Connect the shields ONLY where shown.
 - F. Check that all wires are tight in their connections.
 - G. Never use a "megger" to check the wiring.
 - H. A readily accessible disconnect device (maximum 20 amps) 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.
 - I. All conduits should enter the bottom of the enclosure. Do not run conduit through the top or sides of the enclosure.
2. To connect incoming power, use the following procedure (refer to Figure 2-1).

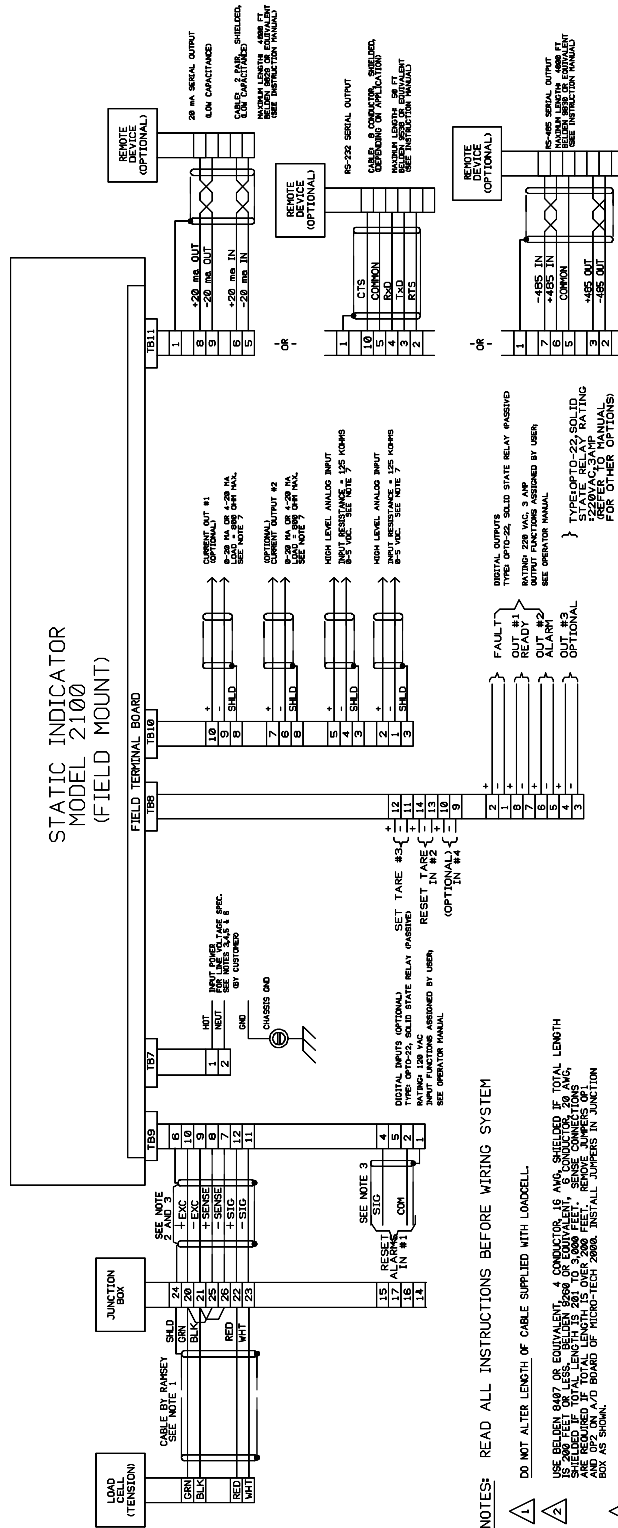
(ALL UNITS SHIPPED FROM THE FACTORY ARE CONFIGURED FOR 120 VAC. IF ANOTHER INPUT SELECTION IS DESIRED, REFER TO SECTION 2.5.1.)

 - A. Rotate the screw latch mounted on the lower left corner of the front chassis counterclockwise. Open the door.
 - B. Route incoming power wiring through a conduit hole at the bottom right of the enclosure. Leave enough loose wiring so that if the field terminal board is moved, there will be enough length. Typically 8 inches is sufficient.
 - C. Wire safety ground terminal located on the side of the chassis.
 - D. Wire HOT to H on TB7.
 - E. Wire NEUTRAL to N on TB7.
 - F. If additional I/O is required operation at line voltages, these wires should be routed through a conduit hole on the bottom right of the enclosure. Leave enough loose wiring so that if the field terminal board is moved, there will be enough length. Typically 8 inches is sufficient.
 - G. All additional field wiring operation at voltages less than 30 V must be located on the left bottom of the enclosure. Leave enough loose wiring so that if the field terminal board is moved, there will be enough length. Typically 8 inches is sufficient.
 - H. Close front chassis cover and rotate screw lock on lower left corner counter-clockwise until locked. Verify door is locked.



FIELD TERMINAL BOARD
FIGURE 2-2

A01223



FIELD WIRING DIAGRAM
FIELD MOUNT WITH TERMINAL BOARD
FIGURE 2-3

- NOTES:** READ ALL INSTRUCTIONS BEFORE WIRING SYSTEM
- 1 DO NOT ALTER LENGTH OF CABLE SUPPLIED WITH LOADCELL
 - 2 USE BELDEN 9447 OR EQUIVALENT, 4 CONDUCTOR, 16 AWG, SHELDED IF TOTAL LENGTH IS 20 FEET OR LESS. BELDEN 9286 OR EQUIVALENT, 6 CONDUCTOR, 20 AWG, ARE REQUIRED IF TOTAL LENGTH IS OVER 2000 FEET. REMOVE JUMPEES OF 100 FEET AS SHOWN.
 - 3 DO NOT RUN SIGNAL OR LOADCELL CABLES IN SAME CONDUIT AS POWER WIRING. CONNECT SHELDS ONLY WHERE SHOWN.
 - 4 INPUT POWER REQUIREMENTS (FACTORY SET AT 115 VAC)
 - A. 110 VAC *100%-15% 1/2 AMP 50 VA/50/60HZ
 - B. 220 VAC *100%-15% 1/4 AMP 50 VA/50/60HZ
 - C. 230 VAC *100%-15% 1/4 AMP 50 VA/50/60HZ
 - D. 240 VAC *100%-15% 1/4 AMP 50 VA/50/60HZ
 - 5 EARTH GROUND ALL ELECTRICAL ENCLOSURES.
 - 6 ALL WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE RESPONSIBILITY OF THE CUSTOMER.
 - 7 CONNECT SHELDS ONLY AS SHOWN. CABLE TYPE: BELDEN

A01838

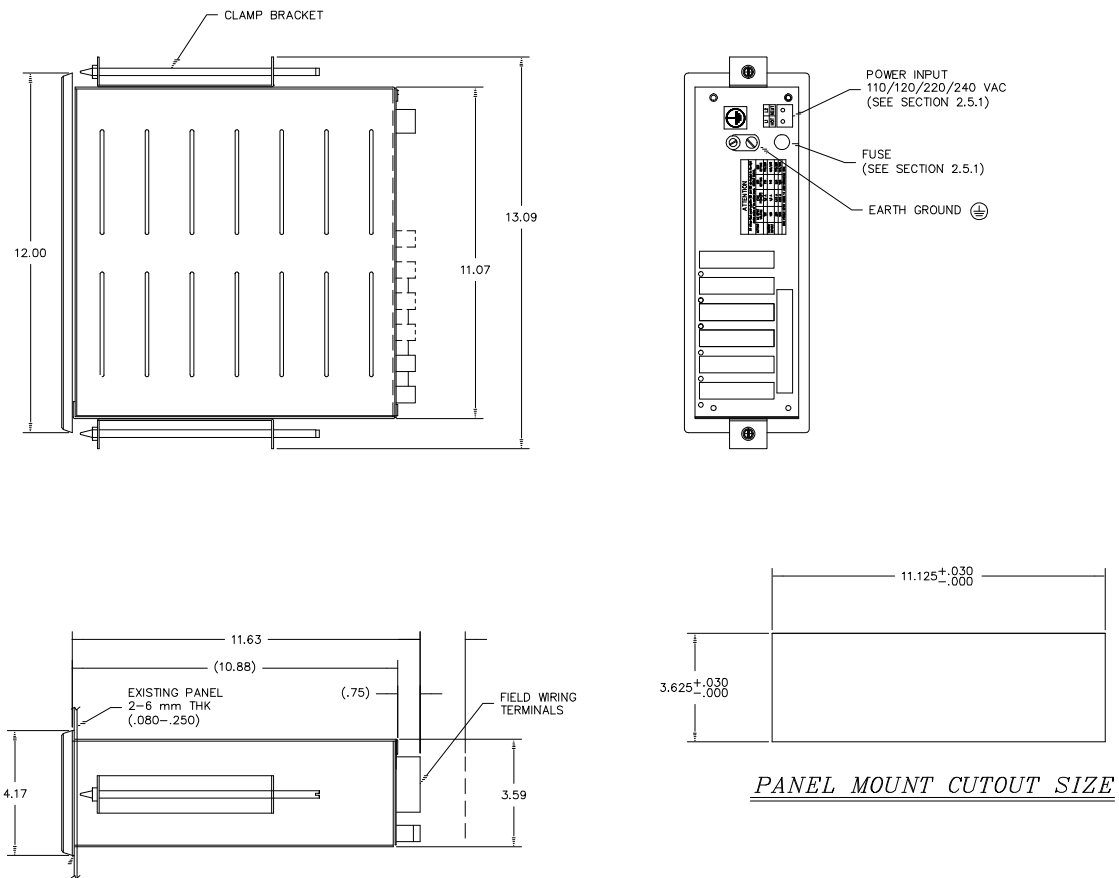
2.3 PANEL MOUNT INSTALLATION

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

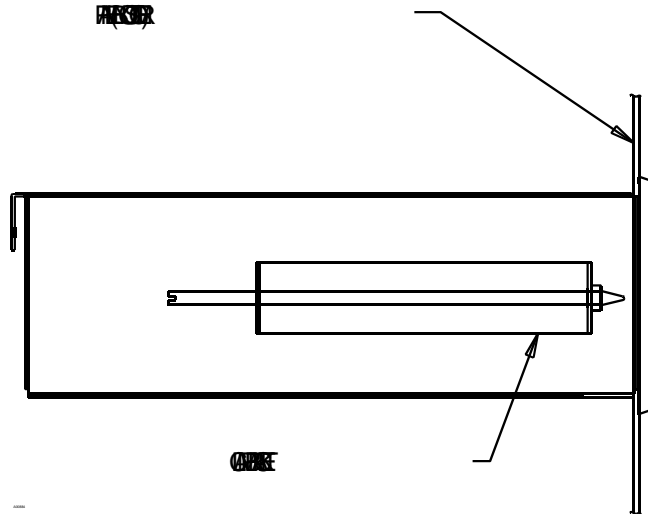
A two (2) inch clearance around the top and bottom of the Static Weight Indicator is required for convection cooling. Additional clearances may be required if equipment mounted directly below generates excessive heat. Clearance in the back is necessary for wiring access and fuse replacement. Clearance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

2.3.1 Mounting

Provide a cutout in the panel and insert the Static Weight Indicator after removing the holding brackets (see Figures 2-4 and 2-5). From the back, insert the holding brackets on both sides of the Static Weight Indicator. Tighten the holding brackets to support the Static Weight Indicator and form the dust seal.



ELECTRICAL AND MOUNTING GUIDELINES MICRO-TECH 2000
MODEL 2100/2200 (PANEL MOUNT) STATIC WEIGHT INDICATOR
FIGURE 2-4



INSTALLATION MICRO-TECH 2000
 MODEL 2100/2200 (PANEL MOUNT) STATIC
 WEIGHT INDICATOR
 FIGURE 2-5

NOTES:

1. See Figure 2-4 for panel cutout and outline and mounting dimensions.
2. The large rubber band shipped with the unit can be used to hold clamp brackets in place during installation.
3. Remove clamp brackets and slide chassis assembly through front of cut-out. Re-install clamp brackets into chassis and tighten threaded rods against back of panel until unit is secure.

2.3.2 Safety Precautions



CAUTION

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

1. Do not connect power to the electronics, nor turn on the unit until you have read and understood this entire manual. The precautions and procedures presented in this manual must be followed carefully in order to prevent equipment damage and protect the operator from possible injury.
2. **CAUTION**
 Hands and clothing must be kept away from all moving or rotating parts.
3. **WARNING**
 Covers over the electronics should always remain in place during operation. They should be removed only for maintenance procedures with the machine's power OFF. Be sure to replace all covers before resuming operation.

4. **WARNING**

All switches (such as control or power) must be OFF when checking input AC electrical connections, removing or inserting printed circuit boards, or attaching voltmeters to the system.

5. Incoming voltages must be checked with a voltmeter before being connected to the electronics.

6. **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.

7. Maintenance procedures should be performed only by qualified service personnel and in accordance with procedures/instructions given in this manual.
8. During maintenance, a safety tag (not supplied by Ramsey) should be displayed in the ON/OFF switch areas as a precaution instructing others not to operate the unit.
9. Only qualified service technicians should be allowed to open and work in the electronics, power supply, control, or switch boxes.
10. Objects should never be placed or stored on the integrator.
11. This equipment should not be operated, nor utilized in applications other than those stated in the original order. (To adapt production rates or applications, consult Ramsey Products Customer Service for recommendations.)
12. 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.

2.3.3 OSHA - Occupational Safety and Health Act

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 judgement decision on the part of the local inspection. Hence, Ramsey Technology, Inc. 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. Ramsey Technology, Inc. will use their best efforts to remedy such violation at a reasonable cost to the buyer.

2.3.4 Utility Connections (Incoming Power)



DO NOT CONNECT POWER UNTIL YOU HAVE READ AND UNDERSTOOD THIS ENTIRE SECTION. IMPROPER CONNECTION MAY RESULT IN DAMAGE TO YOUR STATIC WEIGHT INDICATOR.

CAUTION

VERIFY THAT THE INPUT VOLTAGE IS CORRECT WITH AN AC VOLTMETER BEFORE YOU CONNECT IT TO THE STATIC WEIGHT INDICATOR.

CAUTION

EARTH GROUND MUST BE PROVIDED TO THE STATIC WEIGHT INDICATOR. DO NOT USE CONDUIT TO PROVIDE THIS GROUND.

CAUTION

A READILY ACCESSIBLE DISCONNECT DEVICE (MAXIMUM 20 AMPS) 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.

CAUTION

REFER TO THE FIELD WIRING DIAGRAM (FIGURE 2-6) AS A GUIDE IF YOU DO NOT HAVE A SPECIFIC WIRING DIAGRAM FOR YOUR SYSTEM. FOLLOW YOUR LOCAL ELECTRICAL CODES AND REGULATIONS FOR MINIMUM WIRE SIZE AND ROUTING.

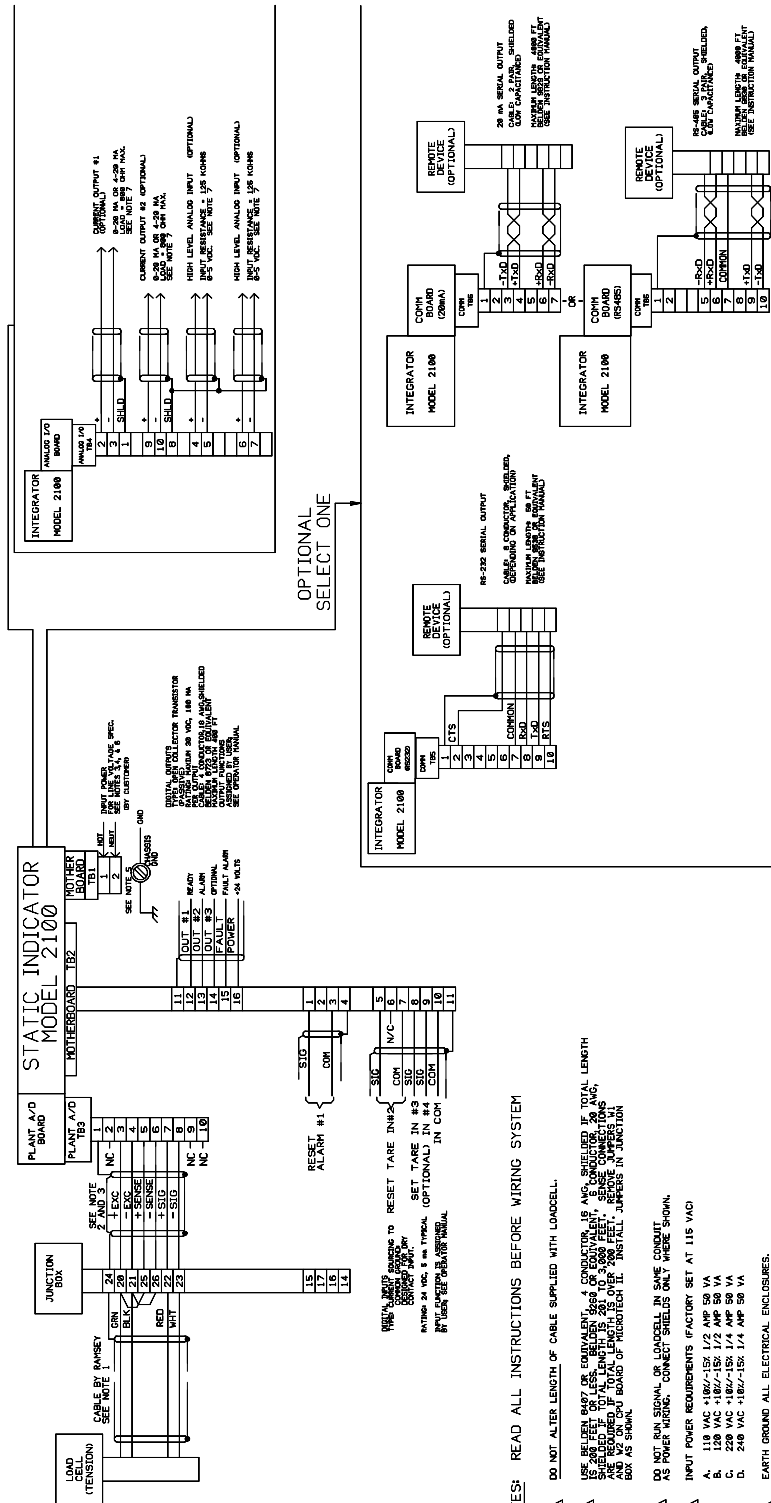
2.3.5 Wiring

1. Some critical wiring considerations:
 - A. Insure power is off.
 - B. Do not route load cell and signal cables in the same conduit with power cables or any large source of electrical noise.
 - C. Wiring should be long enough, and routed to allow the chassis to be removed from the front for servicing if necessary.
 - D. Connect the shields ONLY where shown.
 - E. Check that all wires are tight in their connections.
 - F. Earth ground all enclosures and conduit.
 - G. Never use a "megger" to check the wiring.
 - H. A readily accessible disconnect device (maximum 20 amps) 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.
2. To connect incoming power, use the following procedure (refer to Figure 2-4).

(ALL UNITS SHIPPED FROM THE FACTORY ARE CONFIGURED FOR 120 VAC. IF ANOTHER INPUT SELECTION IS DESIRED, REFER TO SECTION 2.4.1.)

 - A. For input power, use 14 AWG stranded wire.

- B. Wire safety ground terminal located on the right back side of the enclosure.
- C. Wire the HOT to terminal labeled HOT.
- D. Wire the NEUTRAL to the terminal labeled NEUTRAL.



FIELD WIRING DIAGRAM
PANEL MOUNT
FIGURE 2-6

A01639

2.4 INTEGRATOR CONFIGURATION

The Micro-Tech 2100/2200 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.

2.4.1 Configuration Jumpers and Switches



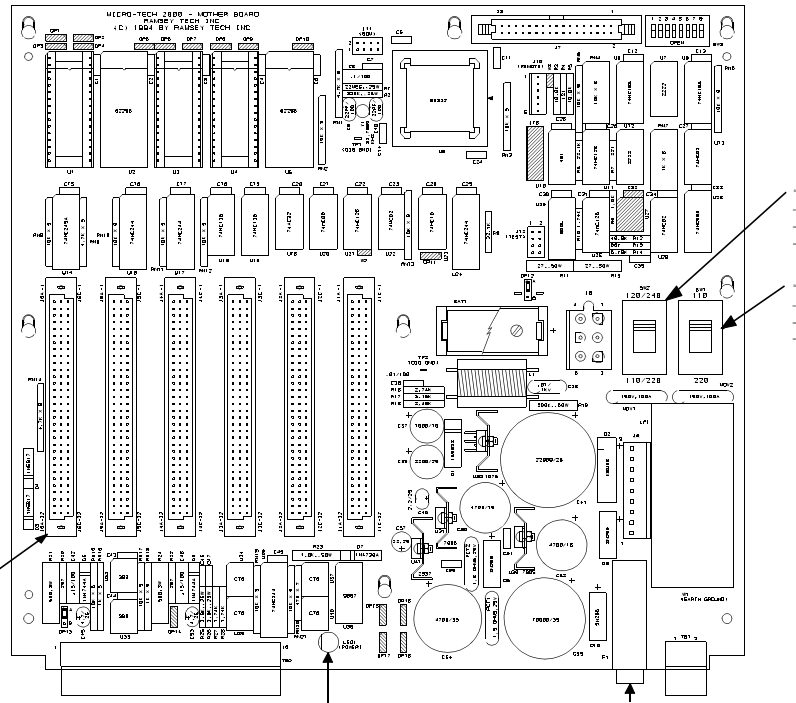
TO BE PERFORMED BY QUALIFIED SERVICE PERSONNEL ONLY.

1. AC voltage input power selection SW1 and SW2 are located on the right center section of the mother board (see Figure 2-7).

	AC INPUT VOLTAGE	FUSE F1 (SB)	SW1 SETTING	SW2 SETTING
Default	110	1.0 A	110	110/220
	120	1.0 A	110	120/240
	220	0.5 A	220	110/220
	240	0.5 A	220	120/240

First, set SW1 for nominal 110 VAC or 220 VAC. Next, set SW2 close to the actual input voltage.

Example: Input Voltage = 117 VAC
SW1 = 110
SW2 = 120/240



MODEL 2100/2200 MOTHER BOARD
FIGURE 2-7

2. General Purpose Digital Inputs

Located on the Field Terminal board are provisions for three status input optional OPTO/22 plug-in modules. The programmable inputs may be configured as normally open or normally closed. External AC or DC power for input logic is required.

The programmable input choices are:

- External alarm 1
- External alarm 2
- External alarm 3
- 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
Hold S4
Reset peak
Reset peak 1
Reset peak 2
Reset peak 3
Reset peak 4

Any three inputs may be selected. An optional AC or DC OPTO/22 module is required for each input. Additional inputs can be selected by adding additional DIO board. See Appendix A/2.

3. General Purpose, Digital Outputs

Located on the Field Terminal board are provisions for four programmable output optional OPTO/22 plug-in modules. Three digital outputs are programmable and the fourth one is permanently assigned as integrator fault. The three programmable digital outputs may be configured as normally open or normally closed. The fault output is normally closed and cannot be reconfigured or used as a programmable output. External AC or DC power is required for all external devices wired to the output modules. One OPTO/22 AC output module is included for remote totalization.

The programmable output choices are:

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

Threshold#2 S2
Threshold#2 S3
Threshold#2 S4
Threshold#3
Threshold#3 S1
Threshold#3 S2
Threshold#3 S3
Threshold#3 S4
Threshold#4
Threshold#4 S1
Threshold#4 S2
Threshold#4 S3
Threshold#4 S4
Totalized
Totalized S1
Totalized S2
Totalized S3
Totalized S4

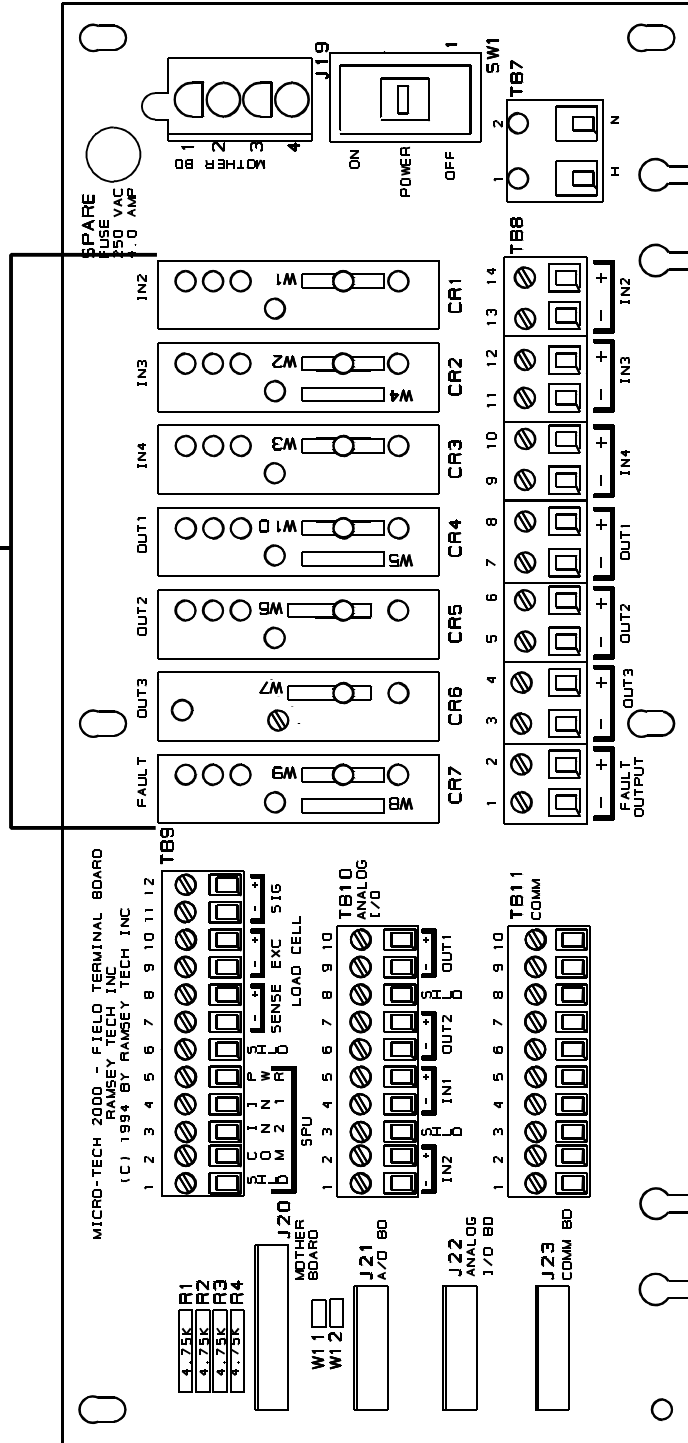
Any three (3) outputs may be selected. An optional AC or DC OPTO/22 module is required for each output. Additional outputs can be selected by adding additional DIO boards. See Appendix A/2.

4. Field Terminal Board (Field Mount Only)

The field terminal board is not available on the panel mount version. An optional solid-state module rack is required to interface with the panel mount version when solid-state modules are required (see Figure 2-8).

NOTE: You must choose between wiring dry contact inputs and open collector outputs direct or through the solid-state relay module options. The two options cannot be mixed.

Solid-State Relay Sockets W1 through W10 Wire Jumpers



FIELD TERMINAL BOARD
FIGURE 2-8

A00381

2.4.2 A/D Board Jumpers

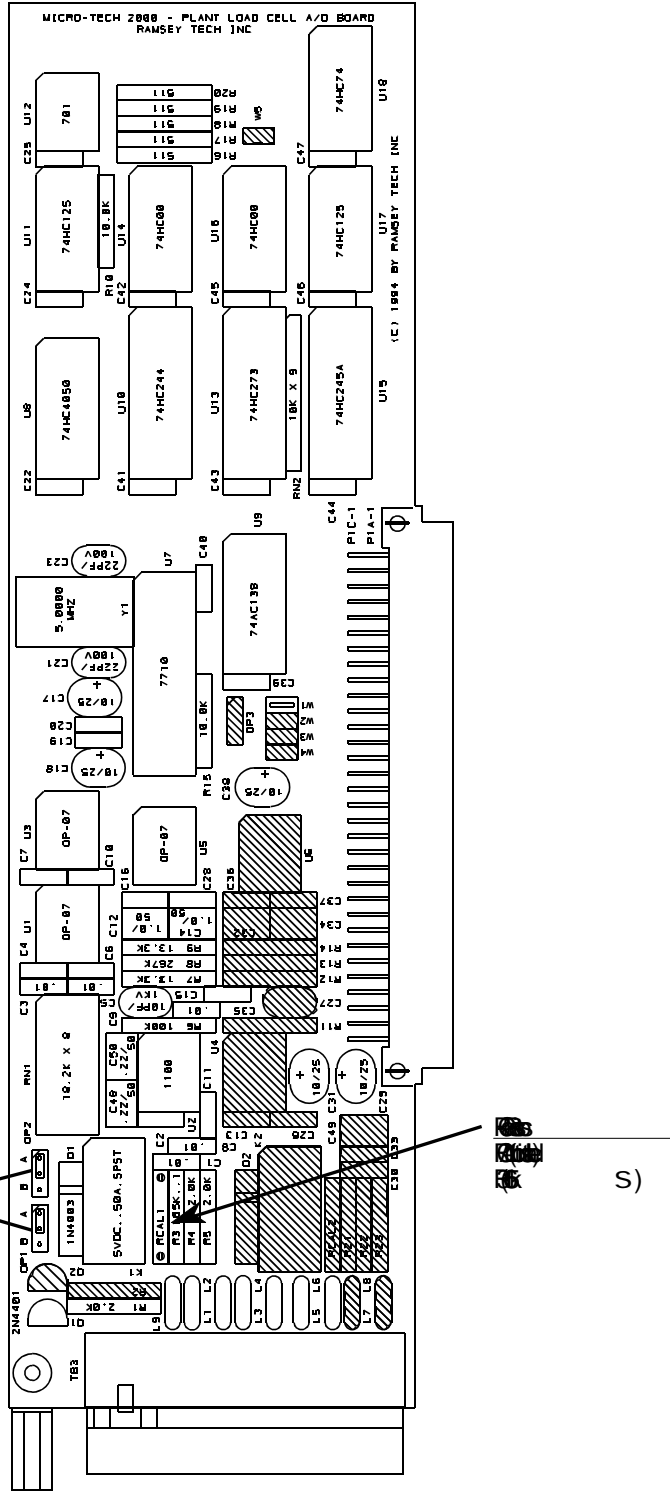
Load Cell Sense

Load cell sense is controlled by selectable jumpers OP1 and OP2 located on the lower left corner of the A/D board located in mother board slot #6 (Figures 2-9 and 2-10). The jumpers should be in position "A" local sense if the distance is less than 200 feet between load cell and static weight indicator.

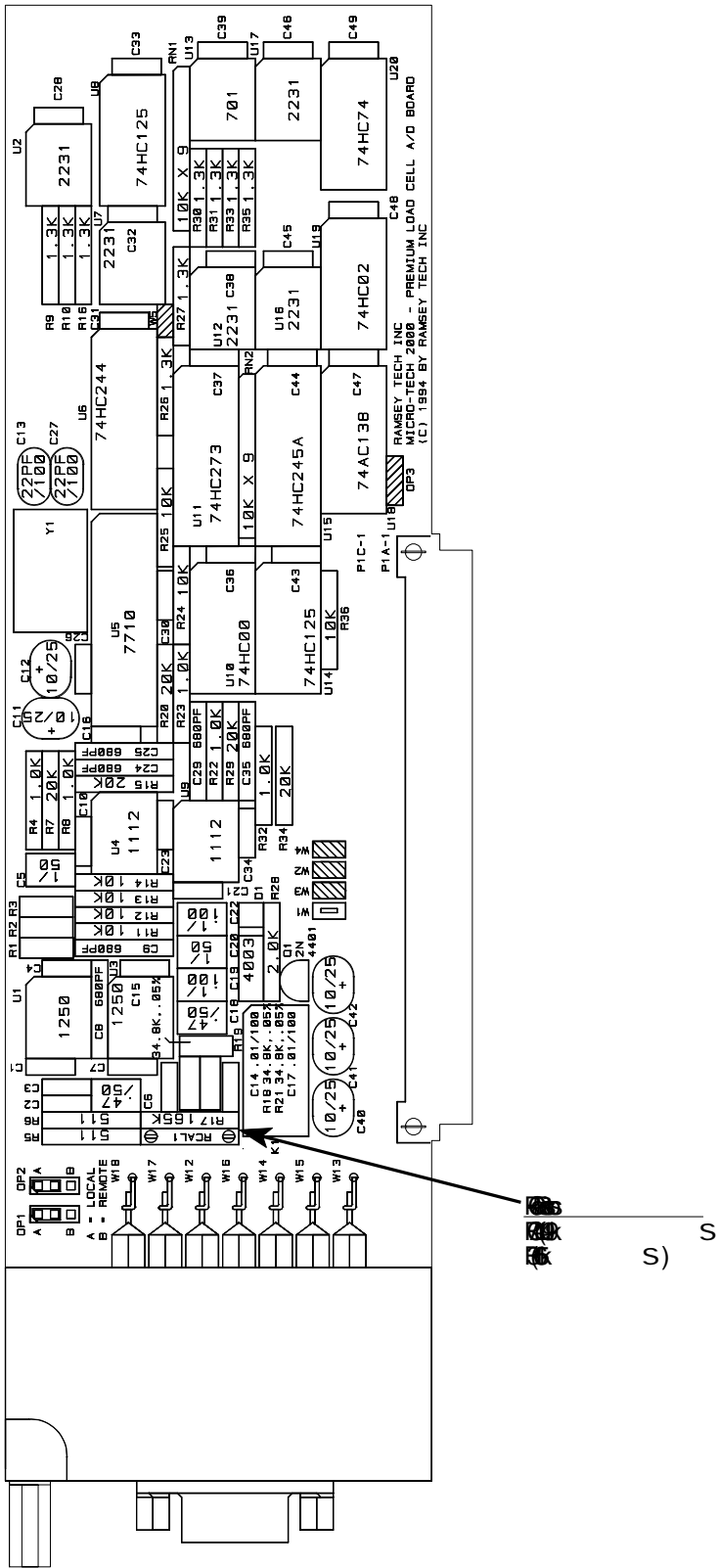
For distances greater than 200 feet and less than 3,000 feet, the jumper should be in position "B". A special 6 wire cable is required. Refer to the field wiring drawing for jumper requirement in the scale junction box.

JUMPERS		
Mode	OP1	OP2
Less than 200 feet	"A"	"A"
Greater than 200 feet	"B"	"B"

[Default]



LOAD CELL SINGLE CHANNEL A/D BOARD
FIGURE 2-9



LOAD CELL PREMIUM A/D BOARD
FIGURE 2-10

2.4.3 Analog Input/Output Board

The optional analog input/output board is available in two configurations described below. (A) has one current output only; whereas, (B) has two voltage inputs and two current outputs (Figure 2-11).

No configuration jumpers or switches exist on the current output board.

The static weight indicator is supplied with a type (A) one out analog board. An additional optional type (A) or type (B) can be added at any time.

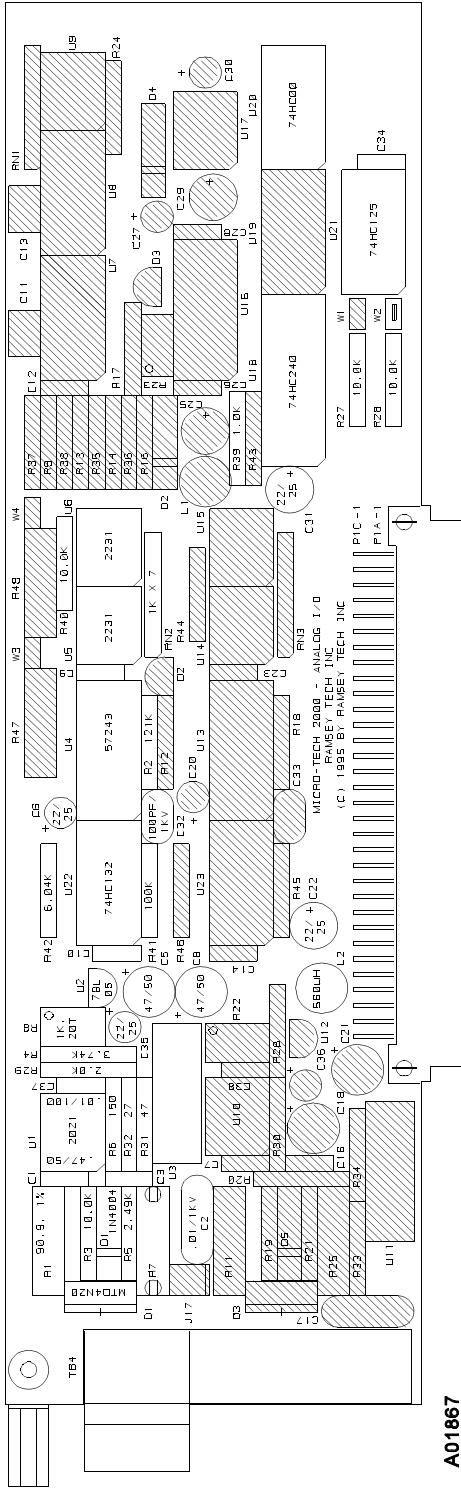
A. One user definable 0-20/4-20 or 20-4/20-0 mA output.

- Net
- Gross
- Tare, or
- Peak

B. Two +/- 5 VDC differential inputs and two user definable 0-20/4-20 or 20-4/20-0 mA outputs.

- Inputs
 - None
 - Moisture Compensation

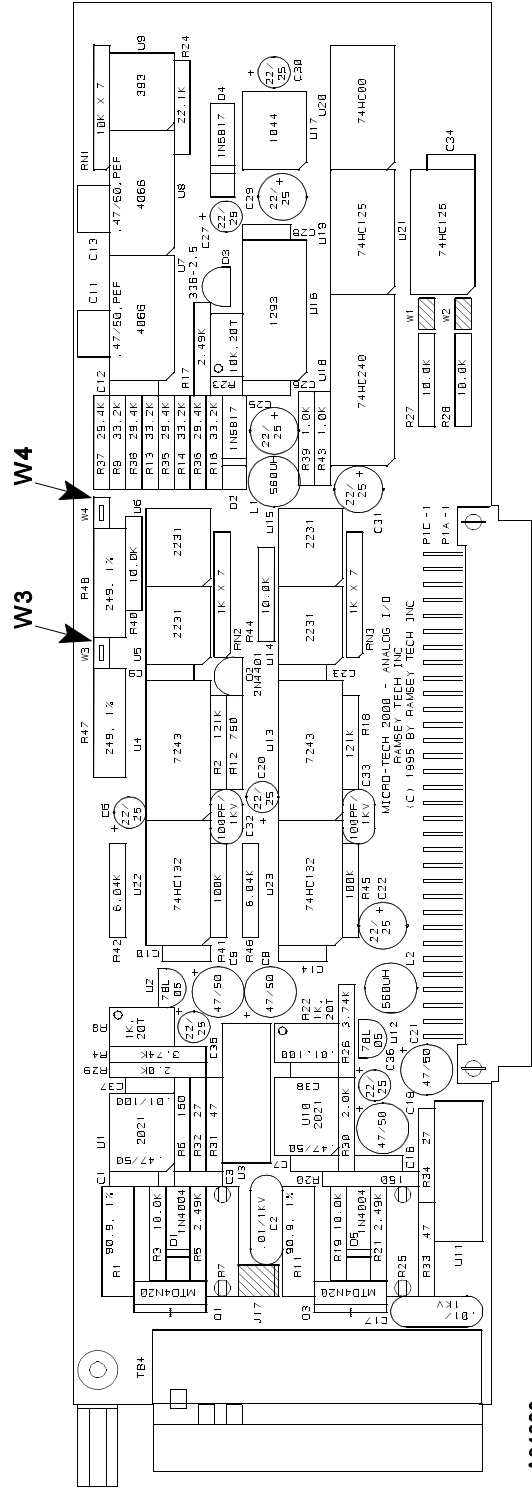
- Outputs
 - None
 - Net
 - Gross
 - Tare, or
 - Peak



Depopulated 1 Output

A01867

ANALOG I/O BOARD
FIGURE 2-11



Populated 2 Inputs / 2 Outputs

A01868

2.4.4 Communications Board Configuration

The communication protocol allows a remote intelligent device to read and eventually write the contents of the registers.

During the communication activity, the static weight indicator always acts as Slave, meaning it responds to a request from a Master device on the line, but never attempts to send messages out.

The static weight indicator reads the message and looks for the address, which is contained into an address byte in the query package. The message is then processed only if the address contained in the message matches the address specified in the set up data of the instrument.

The clock/calendar is located on the communication board. During AC losses or power off, RAM data retention and operation of the clock/calendar is provided by the battery located on the mother board.

Only the electrical interface selected may be accessed through one communication port. Up to three communication boards may be installed.

Below is a table which summarizes the jumper positions required for selection of each electrical interface mode (see Figure 2-12).

JUMPERS						
Mode	OP1	OP2	OP3	OP4	OP5	OP6
RS-232	"A"	"A"	"A"	"A"	"A"	"B"
RS-485	"B"	"A"	"B"	"B"	"MDP"	"TRM"
20 mA	"B"	"B"	"A"	"A"	"A"	"C"

[Default)

TABLE "MDP"
FOR RS-485 ONLY

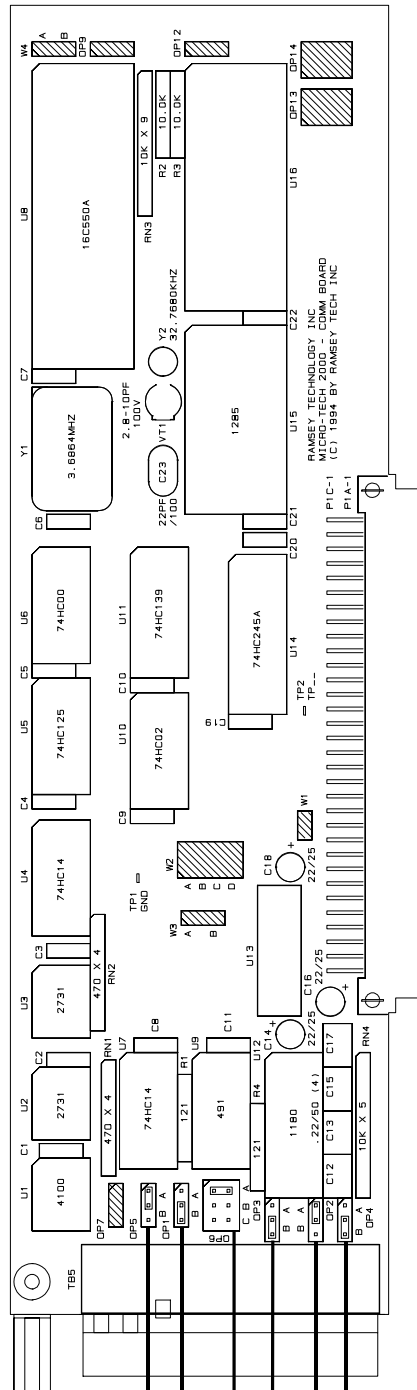
OP5

"A" NORMAL
"B" MULTI-DROP

TABLE "TRM"
FOR RS-485 ONLY

OP6

"A" TERMINATED
"B" NOT TERMINATED



OP5
OP1
OP6
OP3
OP2
OP4
A00927b
COMM "A" BOARD
FIGURE 2-12

2.5 INITIAL SETUP PROCEDURE

Following mechanical and electrical installation, it is necessary that you program field data that is specific to your application into the Micro-Tech 2100 Static Weight Indicator memory. The following setup procedure should be completed before programming your static weight indicator. Refer to Chapter 3 of this manual if more details or assistance is necessary.

2.5.1 Determining Installation Parameters

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

1. Scale Capacity

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

_____ (Pounds) Scale #1

_____ (Pounds) Scale #2

_____ (Pounds) Scale #3

_____ (Pounds) Scale #4

2. Number of Load Cells

_____ Scale #1

_____ Scale #2

_____ Scale #3

_____ Scale #4

3. Load Cell Capacity

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

_____ pounds (Load Cell Weight) Scale #1

_____ pounds (Load Cell Weight) Scale #2

_____ pounds (Load Cell Weight) Scale #3

_____ pounds (Load Cell Weight) Scale #4

4. Load Cell Sensitivity

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

_____ (Load Cell Sensitivity) Scale #1

_____ (Load Cell Sensitivity) Scale #2

_____ (Load Cell Sensitivity) Scale #3

_____ (Load Cell Sensitivity) Scale #4

5. 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

6. R-CAL Resistance

Record which R-CAL resistors are installed on the A/D circuit board (see Figure 2-9).

R-CAL1 (value) _____ (49.9 kS)

R3 (value) _____ (165.0 kS) single channel A/D board only

R17 (value) _____ (165.0 kS) premium A/D board only

NOTE: If both resistors are installed, the R-CAL resistor value will be the parallel resistance (38313 ohms).

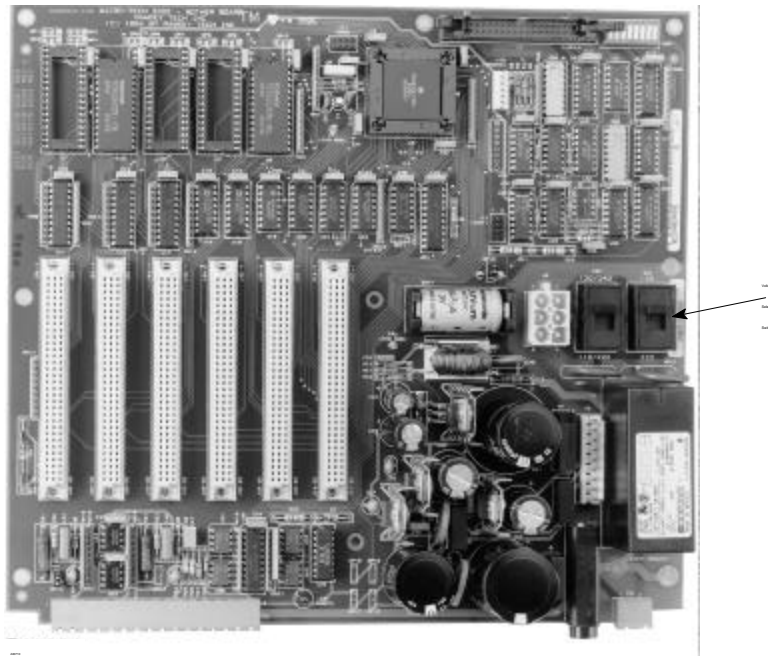
2.5.2 Programming the Micro-Tech 2100\2200 Static Weight Indicator

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.



Inside the Static Weight Indicator's front panel are two voltage selection slide switches (Figure 2-12). Ensure they are in the correct position—either 110/120 or 220/240 VAC—before applying power. See Section 2.4.



MICRO-TECH 2100/2200 CPU BOARD
FIGURE 2-13

1. Programming the Static Weight Indicator

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.

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

The static weight indicator is a dual language instrument. USA is always the first language. The standard configuration provides 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 word above it.  
MORE          RETURN
```

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

Press the **MORE** key.

```
Use down SCROLL key  
to advance through  
the menus.  
MORE          RETURN
```

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

Press the **DOWN** scroll key.

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

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

2. Select Measure Units

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

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

Default: ENGLISH (if USA language)
METRIC (if ESP language)
Selections: ENGLISH, METRIC, MIXED
If English, all units in English
If Metric, all units in 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 will change but the calibration will remain the same.

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

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

If ENGLISH: Default: POUNDS
Selections: PERC %, POUNDS, TONS, LTONS
If METRIC: Default: KG
Selections: PERC %, KG, TONNES
If MIXED: Default: POUNDS
Selections: 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.

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

```

- DISPLAY SCROLL 3 -
Total Units
> tons <
CHOICE   ENTER

```

If ENGLISH: Default: TONS
 Selections: TONS, LTONS, POUNDS
 If METRIC: Default: TONNES
 Selections: TONNES, KG
 If MIXED: Default: TONS
 Selections: 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.

3. Define the 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 boards installed.

If only an A/D board single channel is installed, 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 depends on the combination of A/D boards installed. The following boards are available:
 - Plant scale A/D 1 channel
 - Plant scale A/D 2 channels
 - 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

```

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.

Logical 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 a 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.

4. The Scale  Soft Key

There are many parameters that must be defined for each scale. If you have more than 1 scale, the SCALE soft key is displayed in the scroll positions where data needs to be entered. This key has a double function, first it indicates at which scale the parameter is referring, for example:  1 indicates that you are entering a parameter 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#.

5. Define Scale Capacity and Scale 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 with **ENTER**. Scroll down.

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

Default: 500.0
Min: 1
Max: 1000000

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 Divisions" parameter to 0.1. Advancing to the next scroll, the operator first 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 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
Selections: 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 0.01, 0.02, 0.05, 0.001, 0.002, 0.005

6. Defining the Load Cells

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

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

```
- SC DATA SCROLL 5 -  
Load cell capacity  
250 Lbs  
ENTER          SCALE#
```

If ENGLISH or MIXED:
Default: 250.0 Lbs
Min: 1 lbs
Max: 500000

If METRIC:
Default: 250 kg
Min: 1 kg
Max: 500000

Enter the load cell sensitivity in mV/V as marked on the label of the load cell.
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 belt feeder controller 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 specified for each scale.

```
- SC DATA SCROLL 7A -  
Load cell #1 res  
350.000 Ohms  
ENTER          SCALE#
```

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

If # of Load Cells is 2 or more:

```
- SC DATA SCROLL 7B -  
Load cell #2 res  
350.000 Ohms  
ENTER          SCALE#
```

Same default and limits of load cell #1.

If # of Load Cells is 3 or more:

```
- SC DATA SCROLL 7C -  
Load cell #3 res  
350.000 Ohms  
ENTER          SCALE#
```

Same default and limits of load cell #1.

If # of Load Cells is 4 or more:

```
- SC DATA SCROLL 7D -  
Load cell #4 res  
350.000 Ohms  
ENTER          SCALE#
```

Same default and limits of load cell #1.

If # of Load Cells is 5 or more:

```
- SC DATA SCROLL 7E -  
Load cell #5 res  
350.000 Ohms  
ENTER          SCALE#
```

Same 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#
```

Same default and limits of load cell #1.

7. 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 then calibrated using the load cell capacity, sensitivity and resistance just entered. During this time, the following screen is displayed:

```
CALIBRATION  
IN  
PROGRESS
```

When calibration procedure is completed, the following message is 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 2100 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 alignment of the scale. Therefore, verify this by performing a span calibration procedure.

CHAPTER 3.0 OPERATION

3.1 GENERAL

Your Ramsey static weight system is capable of accurate weighing, provided it is installed, calibrated, operated, and maintained in complete accordance with the instructions contained in this manual, along with your weighbridge installation manual.

3.2 OVERVIEW

Model 2100/2200 static weight indicator is a bus-based 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 cable.

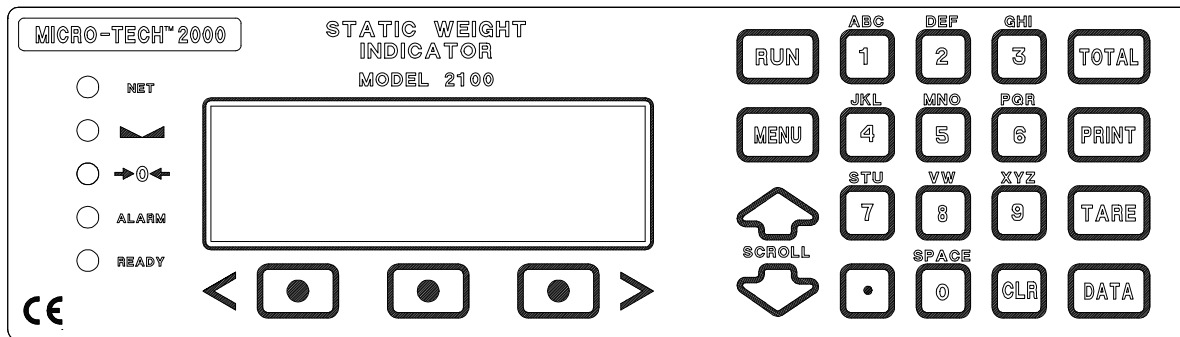
Auto Zero (AZ) Track enables the scale system to automatically zero itself during extended periods when the scale is empty. Auto Zero Track is menu selectable. The letter "Z" appears on the first line of the display indicating Auto Zero Track option is enabled.

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 will be 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 the system or improper operation.

3.3 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 2.4.



MODEL 2100 STATIC WEIGHT INDICATOR FRONT PANEL
FIGURE 3-1

3.3.1 LED Status Indicators

The five red status indicators show the status of the static weight indicator.

1. 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.

2. 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 indication turns on.

If more than one scale is defined, the ON indication refers to the displayed scale.

3. 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 before zero weight indication is turned on.

If more than one scale is defined, the ON indication refers to the displayed scale.

4. Alarm

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

5. 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 displayed scale.

3.3.2 Keyboard

1. **Run** - Access the Run Menu. Returns static weight indicator to Run Mode whenever pressed, see Section 3.5 for detailed description.
2. **Menu** - Permits entry to menus, see Section 3.4.
3. **Up and Down Arrow** - Scrolls up or down in the selected menu.
4. **Soft Keys** - Select displayed function directly above the key. Moves cursor left and right during string editing.
5. **Alpha/Numeric Keys 1 through 0** - Enter numerals and letters when string editing. Similar to telephone keys.
6. **Decimal Point Key** - Enters decimal point.
7. **Clear Key** - Removes wrong entries prior to pressing **ENTER** soft key.
8. **Total** - Total key accesses menus that contain detailed information on the totalizer.
9. **Print** - Starts printout. COMM option is required, see Section 3.6.3 for detailed description.

10. Tare - Pressing the 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.

11. Data - This key has no function.

3.3.3 Display

The four-line display indicates actual running information or displays menu entry information.

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 the **MENU** key until the desired menu screen is displayed. Menu scrolls may be selected by pressing the soft key directly below the desired scroll, and then using the Up/Down scroll key.

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 scrolls are only available if the available option has been installed. The following screens are activated by the **MENU** key.

```
-      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
```

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

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

```
-      MAIN MENU 5      -  
Press MENU for more  
  
COMM A COMM B PRINT
```

* Can be AB I/O or Pro DB

```
-      MAIN MENU 6      -  
Press MENU for more  
AUDIT  
TRAIL   LINEAR
```

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.

```
z  00000000  lbs
SCALE #
```

3.5.1 Hardware Configuration

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

```
-SLOT #   n  CHANGED
Acquire new
configuration ?
YES      NO
```

The 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 (see Appendix A/3, Section 3.6.1).

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:

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 I/O Definition.

2. A board is added:

The static weight indicator resumes normal operation without recognizing the new board.

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

3.6 RUN MENU

When the static weight indicator is normally powered on after initial programming, the main Run Menu is displayed. The Run Menu can always be accessed by pressing the RUN key on the front panel.

3.6.1 Main Run

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

The Run Menu appears as follows:

<u>ZT</u>	<u>0000,00</u>	lbs
(1)		
(2)		
SCALE#	(3)	(4)

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.

3.6.2 Totals

The TOTAL key accesses the Master Total and Reset Total screens. UP and DOWN keys move between screens.

MASTER TOTAL	
SINCE	00-00-0000
<u>0000000.0</u>	<u>Tons</u>

Master Total cannot be reset. The second line only appears if the optional COMM "A" board is installed. The date is entered during initial programming.

```
RESET TOTAL
SINCE 00-00-0000
0000000.0 Tons
RESET
```

Reset Total can be reset at any time. No password is required for reset. The second line appears if the optional COMM "A" board is installed.

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

```
Do you wish to clear
RESET total?

YES NO
```

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

3.6.3 Print Key

If the optional COMM "A" board is installed, the **PRINT** key is active if selected in COMM Scroll, Appendix A/3, Section 3.7.1.

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

```
- PRINTER SCROLL -
COM #1 no data
Start print TOTALS
PRINT RETURN COM
```

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 than one is defined).
- TOTALS S1** Print totals scale 1 (only if enabled)
- TOTALS S2** Print totals scale 2 (only if enabled)
- TOTALS S3** Print totals scale 3 (only if enabled)
- TOTALS S4** Print totals scale 4 (only if enabled)
- 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: 11-10-1998

TIME: 8:12a

MASTER TOTAL: 0.00 Tons

RESET TOTAL: 0.00 Tons

If more than one scale is defined:

TOTALS REPORT

DATE: 11-10-1998

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

RESET TOTAL: 0.00 Tons

If more than two scales

SCALE 4

MASTER TOTAL: 0.00 Tons

RESET TOTAL: 0.00 Tons

If four scales

Print ALARM:

11-10-1998 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 11-10-1998 TIME 11:59p

VARIABLE scale cap

NEW 400.00

OLD 500.00

TRAIL RECORD NR 2

DATE 11-10-1998 TIME 11:31p

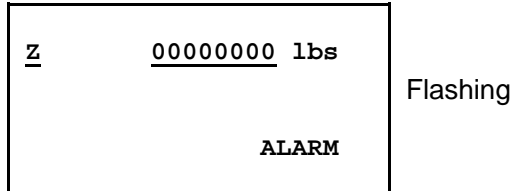
VARIABLE span
NEW 250000
OLD 300000

TRAIL RECORD NR 1

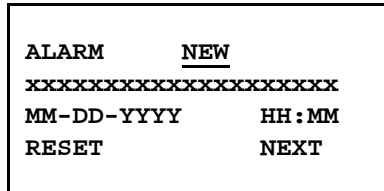
See Appendix A/3, Section 3.7, Main Menu 5, for additional printer setup information.

3.6.4 Alarm Pending

The message ALARM appears in the right soft key if an alarm is pending. The alarm status indicator also is flashing.



The following menu is displayed after pressing the ALARM soft key.



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 only if the optional COMM board is installed.

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

Pressing RUN returns to Main RUN Menu.

- 1 - Clock Fail
- 2/6 - Load Cell Fail
- 7 - Ram Fail
- 8 - Rom Fail
- 9/13 - Threshold #1 S#
- 14/18 - Threshold #2 S#
- 19/23 - Threshold #3 S#
- 24/28 - Threshold #4 S#
- 29 - Warm Start
- 30 - Cold Start
- 31 - P. D. Calibration
- 32/36 - Calibration Time S#
- 37 - External Alarm #1
- 38 - External Alarm #2
- 39 - External Alarm #3
- 40/44 - AZT Limit S#

- 45/50 - Hardware Configuration Changed
- 51 - BCD Overflow
- 52 - Math Error
- 53 - Printer Error
- 54 - Communication Error

Refer to Chapter 4.0, Maintenance, for more alarm information.

3.7 LOAD OUT

The Load Systems Menu is visible if the Load Out option is installed. See Load Out, Appendix A/4, 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.

3.8 CALIBRATION

Main Menu 1 contains the Calibration Menu. Menu 1 is selected by pressing the MENU key until Main Menu 1 appears. Desired calibration scrolls are selected by pressing the soft keys directly below the desired scroll.

The Main Menu 1 is dedicated to calibrations:

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

3.8.1 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
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.

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 enabled 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	<u>000.0</u> lbs
AZT %	<u>000.0</u> %
SCALE#	ADV

3.9 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 calibration. The selection is made in CAL DATA scroll 1.

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.

A. Starting an R-CAL Calibration

```
- AUTOSPAN R-CAL -  
Empty scale, then  
press START.  
START SCALE# MANUAL
```

Password: OPERATOR

After **START** is pressed, the R-CAL relay is energized and a half seconds delay is used for the weight to stabilize. The operator must insure that the scale is empty before pressing start.

B. Executing the Span Calibration

Indication **S#** in the following scrolls appears only if more scales are defined. # represents the active scale number.

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

(1) 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 10 seconds to be completed, remaining time is displayed in line 2. The END key can be used to conclude the function in less time.

C. Record the Material 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 material 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 material factors, but wants to use the test results for changing the span number.

After **EXIT** is pressed, go to (2) below. If **REPEAT** is pressed, go to (1) 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 (2) below. If **YES** is pressed, the following screen is displayed:

```
R-CAL Mat1 FACTOR
Old factor: 00.00 %
New factor: 00.00 %
RUN REPEAT
```

Can be R-CAL, TEST WEIGHTS, or CHAINS

THE **REPEAT** key returns the operator to (1) above. Pressing **RUN** ends the procedure.

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

D. 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 (1) 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 (2) above.

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

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

E. Ending an Auto Span Procedure With R-CAL

In case of auto-span with R-CAL, after **RUN** is pressed, the R-CAL relay is de-energized and the display is locked for 3 seconds.

2. Automatic Span Calibration With Test Weights

A. Starting a TEST WEIGHTS Calibration

```
- 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.

B. 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:

(1) 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 during normal. The entire function takes 10 seconds to be completed, remaining time is displayed in line 2. The END key can be used to conclude the function in less time.

C. Recording the New Span

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

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

The word "COMPLETE" is flashing.

If **YES** is pressed, the following screen is displayed:

(2)

```
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 (1) 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 (2) above.

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

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

3. Manual Span

If the span constant is known, the manual span procedure allows the operator to make a direct span change.

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** key returns to Run Menu.

3.9.1 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  
ENTER  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 W.U.
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
```

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
```

COMPLETE is flashing

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

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

COMPLETE is flashing

3.10 PERMANENT SCROLL RECORD - SETUP SCROLLS

MAIN MENU 1

1. ZERO SCROLL

Zero # _____

2. 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. Loadcell Capacity Scale #1 ____ Scale #2 ____ Scale #3 ____ Scale #4 ____

- | | | | | | |
|------|------------------------|---------------|---------------|---------------|---------------|
| 8. | Loadcell Sensitivity | Scale #1 ____ | Scale #2 ____ | Scale #3 ____ | Scale #4 ____ |
| 9A. | Loadcell Resistance #1 | _____ | ohms | | |
| 9B. | Loadcell Resistance #2 | _____ | ohms | | |
| 9C. | Loadcell Resistance #3 | _____ | ohms | | |
| 9D. | Loadcell Resistance #4 | _____ | ohms | | |
| 9E. | Loadcell Resistance #5 | _____ | ohms | | |
| 9F. | Loadcell 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 ____ |

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 ____ |

MAIN MENU 3

PROTECTION SCROLL

- | | | | | |
|----|------------------|--------|-------|--------|
| 1. | Protection Level | G None | G Ltd | G Prot |
|----|------------------|--------|-------|--------|

DIAGNOSTICS 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

- 8. Board Type Slot #1

- 9. Board Type Slot #2

- 10. Board Type Slot #3

- 11. Board Type Slot #4

- 12. Board Type Slot #5

- 13. Board Type Slot #6

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

- Current Output #2 Delay sec

- Current Output #3 Delay sec

- Current Output #4 Delay sec

- 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	%	V
2B. Moisture Input Calibrate	%	V
4. Digital Input Define	Physical Input	Status NC/NO
Ext Alarm 1		
Ext Alarm 2		
Ext Alarm 3		
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		
Hold S4		
Reset Peak		
Reset Peak 1		
Reset Peak 2		
Reset Peak 3		
Reset Peak 4		
5. Digital Output Define	Physical Output	Status NC/NO
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	
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	

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. Threshold #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 ____%
2B. Threshold #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. Threshold #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.	Threshold #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	G Alarm	G Shutdown	G None	
	#1 - Clock Fail	G Alarm	G Shutdown	G None	
	#2/6 - Load Cell Fail	G Alarm	G Shutdown	G None	
	#7 - Ram Fail	G Alarm	G Shutdown	G None	
	#8 - Rom Fail	G Alarm	G Shutdown	G None	
	#9/13 - Threshold #1 S#	G Alarm	G Shutdown	G None	
	#14/18 - Threshold #2 S#	G Alarm	G Shutdown	G None	
	#19/23 - Threshold #3 S#	G Alarm	G Shutdown	G None	
	#24/28 - Threshold #4 S#	G Alarm	G Shutdown	G None	
	#29 - Warm Start	G Alarm	G Shutdown	G None	
	#30 - Cold Start	G Alarm	G Shutdown	G None	
	#31 - P.D. Calibration	G Alarm	G Shutdown	G None	
	#32/36 - Calib. Time S#	G Alarm	G Shutdown	G None	
	#37 - External Alarm #1	G Alarm	G Shutdown	G None	
	#38 - External Alarm #2	G Alarm	G Shutdown	G None	
	#39 - External Alarm #3	G Alarm	G Shutdown	G None	
	#40/44 - AZT Limit S#	G Alarm	G Shutdown	G None	
	#45/50 - Hdw. Cnfg. Chg.	G Alarm	G Shutdown	G None	
	#51 - BCD Overflow	G Alarm	G Shutdown	G None	

#52 - Math Error	G Alarm	G Shutdown	G None
#53 - Printer Error	G Alarm	G Shutdown	G None
#54 - Comm. Error	G Alarm	G Shutdown	G None
#55 - AB RI/O Error	G Alarm	G Shutdown	G None
#56 - PROFIBUS DP Error	G Alarm	G Shutdown	G 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 Num. X = _____ Y = _____
- 8. Position Batch Quant. X = _____ Y = _____
- 9. Position Batch Total X = _____ Y = _____

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 _____
- 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 _____
- 9A. Number of Strings _____
- 9B. Contents String #1 _____
- 9C. Position String Number #1 _____

- 9D. Contents String #2 _____
- 9E. Position String #2 _____
- 9F. Contents String #3 _____
- 9G. Position String #3 _____
- 9H. Position Oper. Total _____
- 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

1. Audit Trails G Yes G No

LINEARIZATION SCROLL

1. Linearization G Yes G No

LIN Factor #1 _____

LIN Factor #2 _____

LIN Factor #3 _____

LIN Factor #4 _____

LIN Factor #5 _____

CHAPTER 4.0 MAINTENANCE

4.1 SERVICE AND REPAIR

The maintenance information in this manual should meet your service needs. If problems occur that require technical assistance, please call (763)783-2700.

Ramsey 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.

When returning parts for repair, please use the Return Material Authorization form located in the Replacement parts section of this manual.

4.2 FREQUENT CHECKPOINTS

The Micro-Tech™ 2100/2200 Static Weight Indicator is a solid-state device, and as such, 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 that 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 does develop, check the following before proceeding to more specific troubleshooting procedures.

1. Check Power
 - A. Check that the two (2) Line Voltage Selector Switches are set to the correct line voltage (see Section 2.4.1).
 - B. Check the fuses.
 - C. Check that the power switch is ON and that power is supplied to the unit.
2. Check Connections
 - A. Check that all terminations are secure.
 - B. Check that the Display Module and Keyboard connectors are firmly seated in their connectors.
 - C. Check that the Remote Counter and optional input/output modules are secure in their sockets.
 - D. Check that all Jumpers are in their correct position.

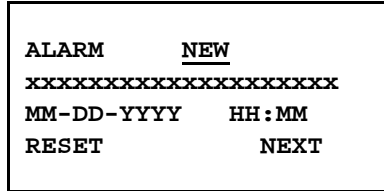
4.3 TROUBLESHOOTING

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.

4.3.1 Alarm Message

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.



The keyword "NEW" indicates an alarm that has not yet been acknowledged. 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 only if the optional COMM board is installed.

The **NEXT** key is used to scroll between the pending alarms. The string "XXXXXXXXXXXXXXXXXXXX" represents one of the following alarm conditions.

4.3.2 Alarms List

1 - Clock Fail

The system has detected a failure on the clock calendar circuit. This alarm only occurs if the optional COMM board is installed.

! Check the COMM board to see if it is properly inserted.

! Replace the COMM board.

2/6 - Load Cell Fail S#

S# identifies the scale if more scales 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 checksum during the internal periodical test. The RAM (Random Access Memory) is used to store variables and set up data.

! Replace the CPU board.

8 - ROM Fail

The system has detected an error on the ROM checksum during the internal periodical test. The ROM (Read Only Memory) is used to store the program.

- ! Replace the CPU 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 of time.
- 30 - Cold Start

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

! Replace either the mother board or the battery.
- 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 period 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 of time.

! Check calibration.
- 37 - Extern 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 - Extern Alarm 2

! Check external alarm #2.
- 39 - Extern 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 appears. Refer to Section 3.5.1 of this document (normal power on).

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 variables 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

This message is only displayed if the optional COMM board is installed. It indicates that 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 RI/O board will be flashing. The alarm does not come on if communication has never started.

56. PROFIBUS-DP COMM Error

This message is only displayed if the optional PROFIBUS board is installed. The following two conditions activate the alarm.

- a. If the Siemens SPC3 controller installed on the PROFIBUS interface board does not recognize any successful data transfer within the watch dog timer interval.
- b. If the received data contains errors (value overlaps limits, register number does not exist, group number does not exist).

4.3.3 Micro-Tech 2000 Cold Start

It may be necessary to cold start the Micro-Tech 2000 in the event the software becomes corrupted. You have the option of installing the factory default constants or simply returning the Micro-Tech 2000 to its previous running state.

There are two methods of forcing a cold start via the front panel: in RUN mode or from the DIAGNOSTIC SCROLL.

1. To force a cold start from RUN mode:

Press and hold in at the same time the LEFT HAND ARROW key and the CLEAR key until the following screen appears.

```
Install Factory
  Defaults ?

NO                YES
```

2. Pressing NO returns the Micro-Tech 2000 to the RUN mode.
3. If YES is pressed, the following screen appears.

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

4. When the above screen appears, all field entry data has been replaced by the factory default constants. Proceed to Initial Setup Procedure, Section 2.5.

NOTE: If the software corruption was catastrophic and the memory would not erase in the above steps, do the following step.

5. Press and hold in the LEFT HAND ARROW key 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.
6. To force a cold start from the DIAGNOSTIC SCROLL:

Press **MENU** until MAIN MENU 3 appears, then press **DIAG** soft key. Press the down arrow key until the following screen is displayed:

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

ENTER
```

When you press **ENTER**, the following screen is displayed:

```
ATTENTION
ARE YOU SURE?

YES    RETURN
```

Pressing **RETURN** will return to DIAGNOSTIC SCROLL 15.

Pressing **YES** displays the following screen:

```
Install Factory
Defaults?
YES    RETURN
```

Pressing **RETURN** will return to DIAGNOSTIC SCROLL 15.

Pressing **YES** clears all field entry data and installs factory default constants. The following screen is displayed"

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

Proceed to Initial Serup Procedure, Section 2.5.

4.3.4 Internal Test Procedure

Pressing **START** on the screen (located in Main Menu 3) enacts a self-test of the internal microprocessor.

```
- 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.

If the internal test has failed, call Ramsey's Customer Service Department.

4.3.5 Load Cell Excitation and Signal Voltage (Field Mount)

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 Integrator across terminal TB9-9 negative and TB9-10 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 (3mV/V load cell).
4. Measure DC millivolt signal voltage across terminal TB9-12 positive and TB9-11 negative in the Integrator. 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.

4.3.6 Load Cell Excitation and Signal Voltage (Panel Mount)

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 Integrator across terminal TB3-4 negative and TB3-3 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 (3mV/V load cell).
4. Measure DC millivolt signal voltage across terminal TB3-7 positive and TB3-8 negative in the Integrator. 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.

4.3.7 Resetting Master Total Procedure

Steps required to reset master total or to reset remote counter overflow are given below.

- A. If No Password is Installed
 1. Select Main Menu 3.
 2. Press **DIAG** soft key and scroll down to the Service 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. Press **PROT** scroll and press **PROT** soft key.
 7. Press the **NONE** soft key.
 8. Type in password 7832500 and press **ENTER**. The protection level should be RAMSEY.
 9. Press the **TOTAL** key on the touch panel. Scroll up or down if needed to reach the Master Total screen.
 10. Press the **RESET** soft key and answer YES to Reset Master Total?
 11. Select Main Menu 3. Press the **DIAG** soft key and scroll down to Service Password.
 12. Press **ENTER** twice, erasing the password installed in Step 3.
 13. Press the **RUN** key to return to normal operation.
- B. If Password is Already Active
1. Select Main Menu 3.
 2. Press the **PROT** scroll and press the **PROT** soft key.
 3. Press the **NONE** soft key.
 4. Type in password 7832500 and press **ENTER**. The protection level should be RAMSEY.
 5. Press the **TOTAL** key on the touch panel. Scroll up or down if needed to reach the Master Total screen.
 6. Press the **RESET** soft key and answer YES to Reset Master Total?
 7. Select Main Menu 3.
 8. Press the **PROT** scroll and choose the password level desired.

4.3.8 To Remove a Forgotten Password

1. Select Main Menu 3.
2. Press the **PROTECT** scroll and press the **PROT** soft key.
3. Press the **NONE** soft key.
4. Type in password 7832500 and press **ENTER**. The protection level should be RAMSEY.
5. Press **NONE**.
6. Select Main Menu 3.
7. Press the **DIAG** soft key and scroll down 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** should appear, repeat Steps 1 through 9.

11. See Appendix A/3, Section 3.5 for entering new passwords.

4.3.9 Disposal of Hazardous Waste

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

As an alternative, you may return product supplied by Ramsey, freight prepaid for disposal. Contact our repair department for a Return Authorization Number before shipping any product for disposal.

4.4 LITHIUM BATTERY REPLACEMENT

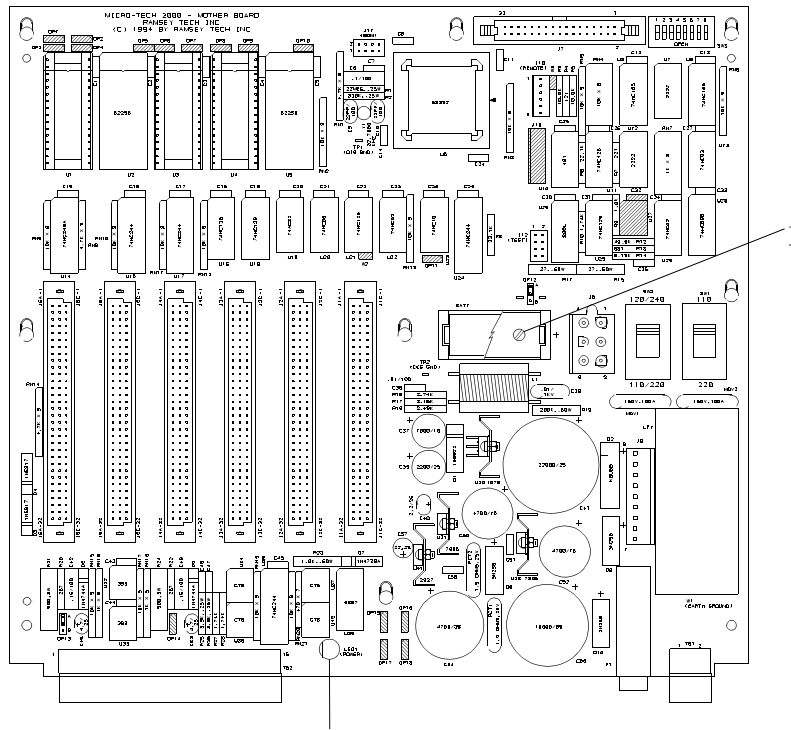
The Micro-Tech volatile memory backup battery can be replaced without any special tools. See Figure 4-1 for battery location on the mother board.

WARNING

DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED.

Replace only with same or equivalent type recommended by Ramsey. Dispose of used battery according to manufacturers instruction on battery or return to Ramsey; see Section 4.5.

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. Battery Type = Lithium, 3 V, 1.2 AH, 2/3 A, Ramsey Part Number 037188.
5. Insert battery.
6. Restore power to the Micro-Tech.
7. Cold start the Micro-Tech. See cold start procedure in Section 4.3.
8. Re-enter all data recorded in Step 1.



MODEL 2100/2200 MOTHER BOARD
FIGURE 4-1

4.5 DISPOSAL OF HAZARDOUS WASTE

Disposal of lithium batteries and soldered printed circuit boards should be in accordance with your local hazardous waste policy.

As an alternate, you can return product supplied by Ramsey, freight prepaid for disposal. Contact our repair department for a Return Material Authorization number before shipping any product for disposal.

4.6 CLEANING INSTRUCTIONS

The Micro-Tech 2100/2200 Static Weight Indicator is a solid-state device, and as such, 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 that all wires, plugs, and integrated circuits are tight in their connectors. Also keep the enclosure door tightly closed to prevent dirt infiltration.

CHAPTER 5.0 REPLACEMENT PARTS

5.1 GENERAL

This chapter gives information on how to order replacement parts for your Micro-Tech 2100/2200 Static Weight Indicator.

5.2 ORDER INFORMATION

For faster service when ordering parts, fax or telephone Ramsey Parts Department.

The recommended procedure for ordering 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. Write or telephone:

Ramsey Technology, Inc.
Customer Service Department
501 90th Ave. NW
Minneapolis, MN 55433
Fax: (763)783-2525

Customers A through I - (763)783-2775
Customers J through Z - (763)783-2773
Repair and Returns - (763)783-2774

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

5. With your order, list the following information:
Static Weight Indicator 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.

5.2.1 Return Material Authorization



RMR

The following information is required to process your return.

Qty _____

Part No. _____

Part Description _____

Lot No. _____

Serial No. _____

Customer Name _____

Customer Address _____

Customer City/State/Zip _____

Customer Phone _____

Customer Fax _____

Reason for Return

Original Date of Purchase

Original Invoice No.

Ref

Ref _____

Ref _____

Customer Name _____

Customer Address _____

Customer City/State/Zip _____

Customer Phone _____

Customer Fax _____

Return Reason

Part No.

Original Date of Purchase

Original Invoice No.

Serial No.

Original Description

Return Description/Disposition

Return to Ramsey

Date

Customer Name (for shipping address)

5.2.2 Parts List

MICRO-TECH 2000 Model 2100 or 2200 Static Weight Indicator

<u>EQUIPMENT</u>	<u>PART NUMBER</u>
Chassis Assembly, Panel Mount, Model 2100	050175
Chassis Assembly, Field Mount, Model 2100	050615
Chassis Assembly, Panel Mount, Model 2200	050157
Chassis Assembly, Field Mount, Model 2200	051317
PCBA, Mother Board, Model 2100	051319
PCBA, Mother Board, Model 2200	051325
PCBA, Plant A/D, 1 Channel, Model 2100	046409
PCBA, Plant A/D, 2 Channel, Model 2100	048985
PCBA, Premium A/D, 1 Channel, Model 2200	046856
PCBA, Analog Output (1 out)	049004
PCBA, Analog Output (2 in/2 out)	049003
PCBA, DIO (4 in/16 out)	046841
PCBA, DIO (16 in/4 out)	046844
PCBA, Comm "A" Select one only	046853
RS-232C	
RS-485, std. (point to point)	
RS-485, multi-drop	
20 mA (digital) current loop	
PCBA, LED Assembly	046847
PCBA, Display Assembly	046860
PCBA, Field Terminal Entry	047572
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
PROM, U1 MT-2000 Audit Trails	050500
Touch Panel Model 2100	047074
Touch Panel Model 2200	050155
Fuse, Slo-Blo, .5 Amp (F1 220V) (Type T)	001366
Fuse, Slo-Blo, 1.0 Amp (F1 110V) (Type T)	002443
Fuse, Fast-Blo, 4.0 Amp (FT Board) (Type T)	037287
Battery, Lithium, 3.0 V, 1.2 AH, 2/3 A	037188
Transformer, Power	046863
Module, Power Input 180-240 VAC	047646
Module, Power Input 90-120 VAC	047575
Module, Power Input 10-32 VDC	048162
Module, Power Output 24-240 VAC	046814
Module, Power Output 5-60 VDC	046815

**APPENDIX A/1
STATIC WEIGHT INDICATOR
WEIGHTS AND MEASURES OPTION**

1.1 ENABLE WEIGHT AND MEASURE OPTION

The Micro-Tech 2200 can be programmed to comply with the directives of the Weight and Measure offices of different countries for use in approved certified scales.

OIML can be selected in the "SCALE DATA 10" scroll.

The proper selection is automatically set if a Premium A/D board is installed.

1.2 METROLOGICAL REQUIREMENTS

1.2.1 Minimum Scale Division (e)

[OIML only]

The instrument automatically determines what is the minimum scale divisions on the basis of the entered scale capacity. The scale division is computed in order to preserve the possibility to work internally with a 1/5 of the displayed division (0.2 e).

When the scale capacity is entered, the division is computed as follows:



The value is then approximated to the nearest larger value in the list of selections: 50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.2, 0.05, 0.02, 0.01, 0.005, 0.002, 0.001

The divisions can be manually changed but only with a larger one.

1.2.2 Under-Load and Over-Load Conditions

The Max and Min Weight determines the limits of the range of weight values the instrument can display and print.

When the gross weight is lower than the Min Weight, an Under-Load condition occurs, and the weight values are substituted by the indication '-----'.

[OIML] The Min Weight is determined depending upon the division as Scale capacity - 9e.

Similarly, when the gross weight exceeds the Max Weight, an Over-Load condition occurs, forcing the system to display '+++++++' instead of the weight values.

[OIML] The Max Weight is determined depending upon the division as scale capacity + 9e.

When in Over-Load or Under-Load status, both the Weight Stable and the Center of Zero indications are turned off while the Ready indication is not affected.

1.2.3 Weight Stable Indication

A LED on the front panel indicates when the weight is stable. The stable weight condition is determined on the basis of two parameters: motion band and motion delay.

Motion band defines the band on which the weight can move without determining a turn off of the stable weight indication. It is expressed in number of divisions: 1 means a band of $\pm 0.5e$. Limits are 0 and 3. If zero is entered, the stable weight indication is always off.

Motion delay defines the time the weight should stay into the motion band before stable weight indication turns on.

The Weight Stable indication stays off if in Over-Load or Under-Load condition.

A digital output can be assigned to monitor the status of the Weight Stable.

1.2.4 Center of Zero Indication

A LED on the front panel indicates when the net weight is zero.

[OIML] It turns on if the net weight differs from zero less than $\pm 0.5e$ for at least two seconds after the weight is stable.

1.2.5 Auto Zero Tracking Function

[OIML] The zero tracking function cannot compensate more than 4% of the initial zero value.

A zero tracking procedure cannot start if the weight is not stable and it is interrupted if it becomes unstable during the function.

1.2.6 Printing Function

Total and weights printout is inhibited if the weight is not stable.

1.2.7 Tare Acquisition

A new tare cannot be acquired (set tare) if gross weight is not stable or it is negative.

The tare can be always zeroed (reset tare).

A LED in the front panel (NET) turns on when a tare value is acquired.

1.2.8 Totalization

Totalization is inhibited if the weight is not stable.

1.3 WARMUP PROCEDURE

It is a special procedure performed after power-on. It is in three parts.

1.3.1 Warmup Procedure - Phase 1, Lamp Test

A lamp test procedure is executed for 3 seconds. All the pixels and the LED's of the front panel are lit.

1.3.2 Warmup Procedure - Phase 2, R-Cal Verification

The instrument connects the R-Cal and executes a reading of the A/D converter. If the value is different from a value previously stored in memory by more than +/- 5%, an error message is displayed and the instrument does not go to RUN. Only the intervention of the operator can force the instrument to go to RUN.

The reference value is stored at the end of the AUTOZERO function or at the end of the QUICK CALIBRATION, after the first initialization.

NOTE: The reference value is not acquired during the two points calibration function even though a new zero is also computed in this occasion.

1.3.3 Warmup Procedure - Phase 3, Check Stability

The instrument waits for ten seconds to allow the electronics circuitry to become stable, and then automatically goes to RUN.

1.4 INTERNAL TEST PROCEDURES

A series of internal functions insure all the components of the instrument are in good condition. These tests are executed automatically, but most can also be started on command.

1.4.1 Automatic Tests

1. RAM Verification

At the power on:

The checksum of the ROM memory (sum of all values stored in each location) is compared with the value stored in a particular location of the RAM memory. If the two values are different, the RAM memory is re-initialized and COLD START alarm is generated.

At the power on and during normal operation:

All locations of the RAM memory are tested (written and read). If a difference is detected between the written and the read values, the RAM FAIL alarm is generated.

2. ROM Verification

At the power on:

The checksum of the ROM memory (sum of all values stored in each location of the ROM) is compared with the value stored in memory after the first initialization. If the two values are different, the RAM memory is re-initialized and COLD START alarm is generated.

3. A/D Converter Verification

The instrument reads the A/D converter each 100 mS. If any failure is detected for more than five consecutive times, the A/D FAIL alarm is generated.

Moreover, the same alarm is generated if the value read from the converter stays at zero or at the maximum value for at least five seconds.

1.4.2 On Command Tests

A series of tests can be started by the TEST scroll. They can be used to verify each instrument's device (keyboard, display, analog and digital outputs, analog and digital inputs). The automatic tests described above can be run by starting the internal test of the microprocessor.

1. Internal Test of Microprocessor

This test is composed of four parts. They are consecutively executed after the Start command is given. If one test fails, the procedure stops and the operator should manually operate the Indicator to restart or abort the procedure.

- 1 RAM TEST (see Section 1.4.1, number 1.)
- 2 ROM TEST (see Section 1.4.1, number 2.)
- 3 E2PROM TEST (if the E2PROM device is installed)

A byte of the E2PROM is written and read. The values must be equal.

- 4 Test with R-Cal (see Section 1.3.2)

1.5 AUDIT TRAILS

The Audit Trails function is a method for recording changes in setup data by creating a record of the changes of the most important parameters along the history of the scale. Each time the operator changes a value which effects weighing or starts a calibration procedure, the new parameter or track of the function is recorded with time and date. Records can be printed and displayed, but there is no way to clear them.

The maximum number of records is 1000. When all the records are full, the oldest one is over-written.

This function requires the E2PROM be installed.

**APPENDIX A/2
DIGITAL INPUT/OUTPUT**

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
2.0	GENERAL	A/2-2
2.1	MOTHER BOARD DIGITAL I/O	A/2-2
	2.1.1 Digital Inputs	A/2-2
	2.1.2 Digital Outputs	A/2-2
2.2	DIGITAL INPUT/OUTPUT BOARD CONFIGURATION	A/2-3
	2.2.1 16 In\4 Out DIO Board Specification (Figure A/2-4)	A/2-5
	2.2.2 4 In/16 Out DIO Board Specification (Figure A/2-4)	A/2-5
2.3	BCD INPUT OPTION	A/2-7

APPENDIX A/2 DIGITAL INPUT/OUTPUT

2.0 GENERAL

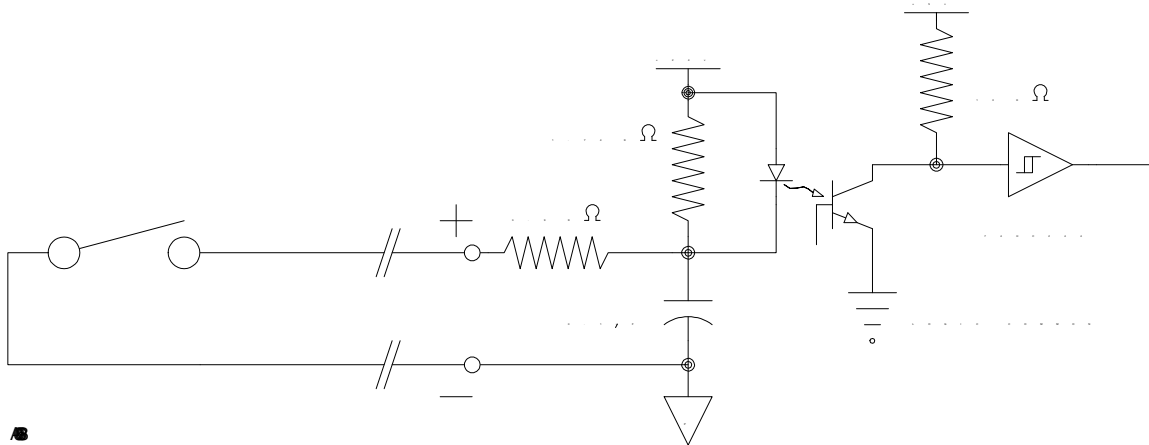
The Static Weight Indicator has provision for up to 24 programmable digital inputs and 24 programmable digital outputs. Located on the Mother Board are four programmable inputs, three programmable outputs, and one non-programmable Micro-Tech hardware fault output.

Optional DIO boards can be added if additional I/O is required.

2.1 MOTHER BOARD DIGITAL I/O

2.1.1 Digital Inputs

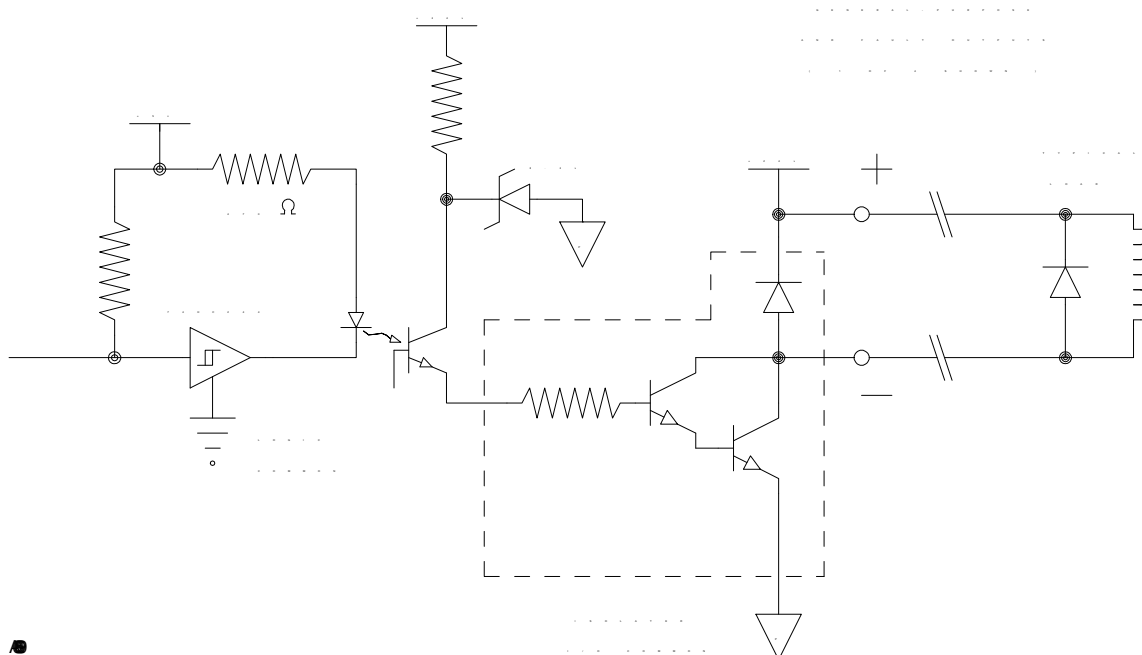
- ! (4) programmable digital (DC) inputs (Figure A/2-1)
 - optically isolated
 - powered by internal +24 V DIO supply, 6 mA maximum
 - Cable Length: 150 ohm maximum. (7500 ft of 20 AWG)



GENERAL PURPOSE DIGITAL INPUTS
FIGURE A/2-1

2.1.2 Digital Outputs

- ! (3) programmable and (1) non-programmable failure digital open collector outputs (Figure A/2-2)
 - able to drive TTL, CMOS, or relay solenoids
 - current sinking socketed drivers
 - +24 VDC internal supply, 100 mA DC maximum per output
 - failure output is "fail safe", turns off under fault condition



GENERAL PURPOSE FAULT OUTPUT
FIGURE A/2-2

2.2 DIGITAL INPUT/OUTPUT BOARD CONFIGURATION

In addition to the programmable digital inputs and outputs on the Mother board, optional Digital I/O (DIO) expansion boards can be added. Available boards are DIO input board 16 inputs/4 outputs, output board 16 outputs/4 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 sourcing (consult Factory) isolated outputs. The DIO input board connector J16 is a male 25 pin sub-miniature D connector and the DIO output board connector J15 is a female connector.

Internal or external 24 VDC power for the DIO boards is controlled by selectable jumpers OP1 and OP2 located on the lower right hand side of the DIO boards (Figure A/2-3). All inputs and outputs use the same selected power supply. See table below for jumper positions.

JUMPERS		
POWER SOURCE	OP1	OP2
Internal	"A"	"A"
External	"B"	"B"

[Default]

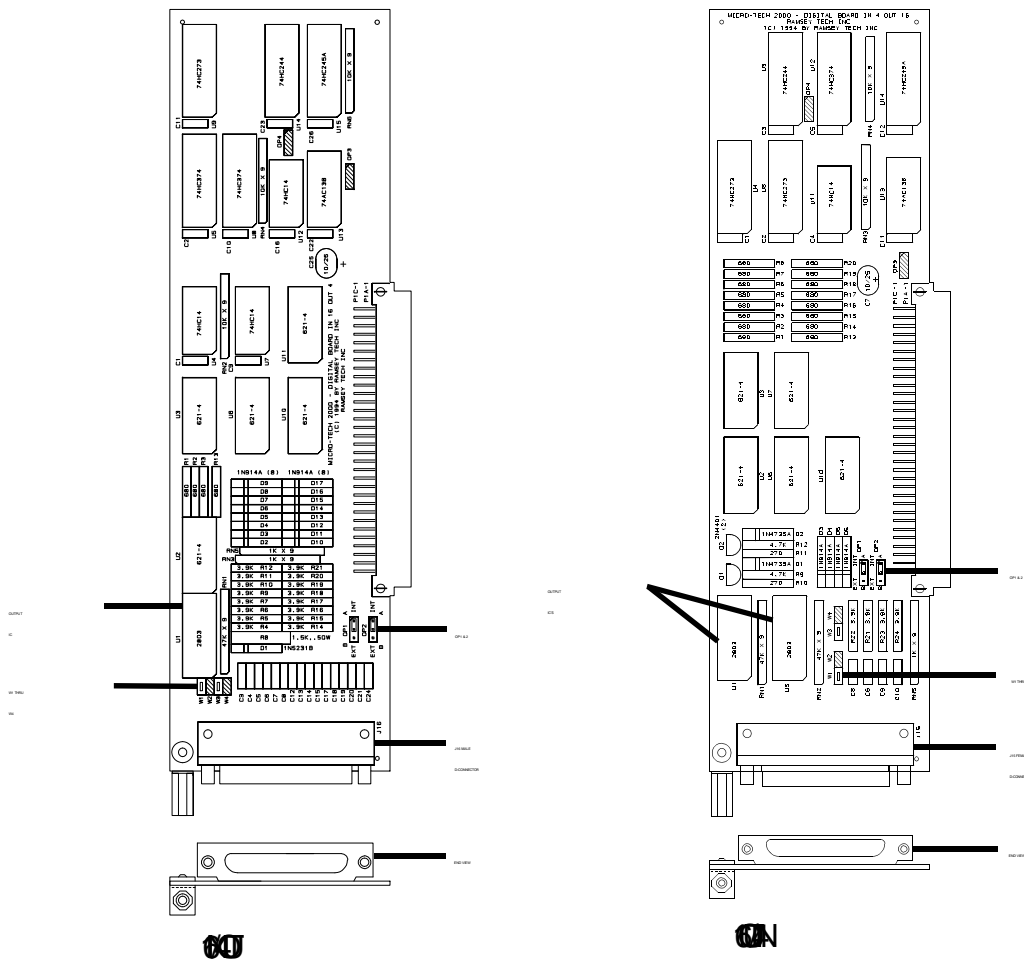
The isolated contact closure inputs are activated by completing the circuit from the input to the negative side of the 24 VDC supply. Approximately 6 mA of current flows out of each input during contact closure.

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 thru W4 must be relocated for current sourcing (see Figure A/2-3). In most cases, it is recommended that the boards be returned to the factory for converting from current sinking (default) to current sourcing. See table below for jumper positions.

JUMPERS				
CURRENT	W1	W2	W3	W4
Sinking	"Yes"	"No"	"Yes"	"No"
Sourcing	"No"	"Yes"	"No"	"Yes"

[Default]



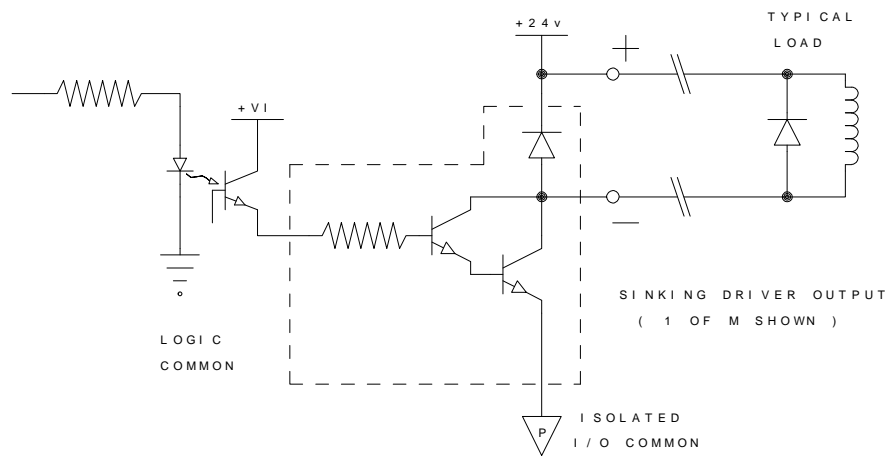
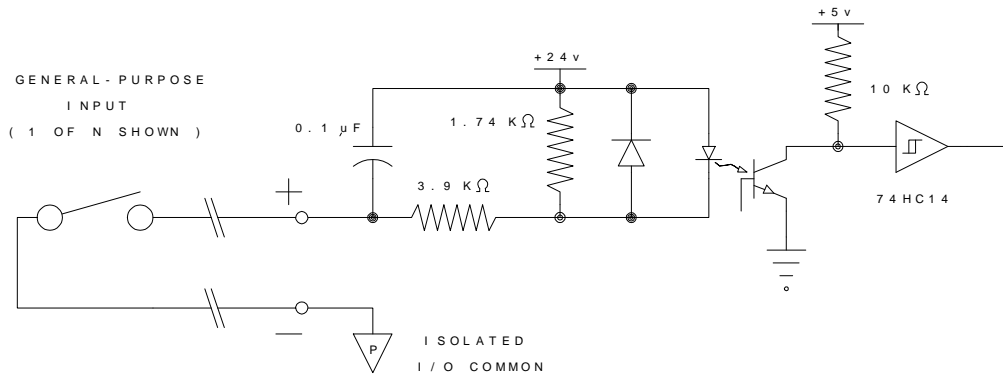
DIGITAL INPUT/OUTPUT BOARDS
FIGURE A/2-3

2.2.1 16 In/4 Out DIO Board Specification (Figure A/2-4)

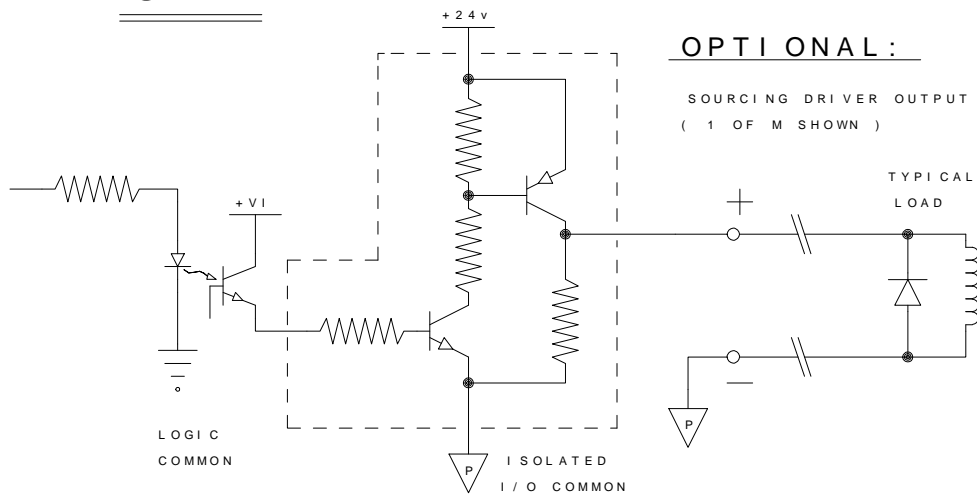
1. (16) programmable inputs
See Section 2.1.1 specifications.
2. (4) programmable outputs
See Section 2.1.2 specifications.
3. Connector
25 pin D connector (male). Connector is intermateable with a 20 or 22 pin subminiature D connector dimensionally complying with MIL-C-24308.

2.2.2 4 In/16 Out DIO Board Specification (Figure A/2-4)

1. (4) programmable inputs
See Section 2.1.1 specifications.
2. (16) programmable outputs
See Section 2.1.2 specifications.
3. Connector
25 pin D connector (female). Connector is intermateable with a 20 or 22 pin subminiature D connector dimensionally complying with MIL-C-24308.



OR:

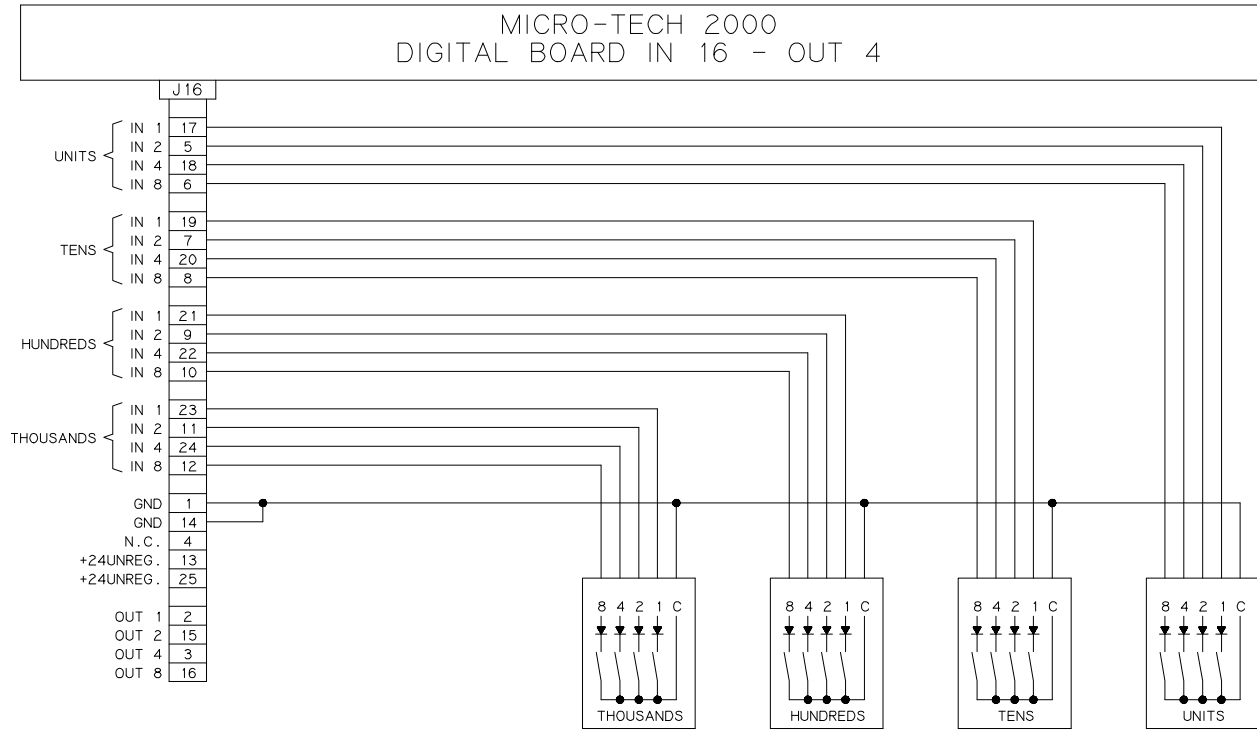


DIGITAL INPUT/OUTPUTS
FIGURE A/2-4

2.3 BCD INPUT OPTION

Load sizes for load out or batching applications can be remotely entered by BCD. An optional Load Out input output board is required.

See Figure A2-5 for wiring.



BCD INPUT
FIGURE A/2-5

**APPENDIX A/3
MT 2100/2200 MENUS**

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
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3.3	MAIN MENU 2	A/3-15
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3.4	MAIN MENU 3	A/3-27
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3.7	MAIN MENU 6	A/3-71
	3.7.1 Audit Trail	A/3-71
	3.7.2 Linearization	A/3-73

**APPENDIX A/3
MT 2100/2200 MENUS**

3.0 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 the **MENU** key until the desired menu screen is displayed. Menu scrolls may be selected by pressing the soft key directly below the desired scroll, and then using the Up/Down scroll key.

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 scrolls are only available if the available option has been installed. The following screens are activated by the **MENU** key.

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

```
-      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    ALARMS  LOAD  
DEF.   DEFIN.  OUT
```

```
-      MAIN MENU 5      -  
Press MENU for more  
  
COMM A COMM B PRINT
```

* Can be AB I/O or Pro DB

- MAIN MENU 6 -
Press MENU for more
AUDIT
TRAIL LINEAR

3.1 MAIN MENU 1

Main Menu 1 contains the Calibration Menu. Menu 1 is selected by pressing the MENU key until Main Menu 1 appears. Desired calibration scrolls are selected by pressing the soft keys directly below the desired scroll.

The Main Menu 1 is dedicated to calibrations:

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

3.1.1 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
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.

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 enabled 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	<u>000.0</u> lbs
AZT %	<u>000.0</u> %
SCALE#	ADV

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 calibration. The selection is made in CAL DATA scroll 1.

1. Automatic Span Calibration With R-CAL
 - A. Starting an R-CAL Calibration

```
- AUTOSPAN R-CAL -  
Empty scale, then  
press START.  
START SCALE# MANUAL
```

Password: OPERATOR

After **START** is pressed, the R-CAL relay is energized and a half seconds delay is used for the weight to stabilize. The operator must insure that the scale is empty before pressing start.

- B. Executing the Span Calibration

Indication **S#** in the following scrolls appears only if more scales are defined. # represents the active scale number.

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

(1) 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 10 seconds to be completed, remaining time is displayed in line 2. The END key can be used to conclude the function in less time.

- C. Record the Material 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 material 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 material factors, but wants to use the test results for changing the span number.

After **EXIT** is pressed, to (2). If **REPEAT** is pressed, go to (1) 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 (2) below. If **YES** is pressed, the following screen is displayed:

```
R-CAL Mat1 FACTOR
Old factor: 00.00 %
New factor: 00.00 %
RUN      REPEAT
```

Can be R-CAL, TEST WEIGHTS, or CHAINS

THE **REPEAT** key returns the operator to (1) above. Pressing **RUN** ends the procedure.

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

D. Recording the New Span

The system calculates the new span.

(2)

```
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 (1) 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 (2) above.

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

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

E. Ending an Auto Span Procedure With R-CAL

In case of auto-span with R-Cal, after **RUN** is pressed, the R-CAL relay is de-energized and the display is locked for 3 seconds.

2. Automatic Span Calibration With Test Weights

A. Starting a TEST WEIGHTS Calibration

```
- 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.

B. 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:

(1) 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 during normal. The entire function takes 10 seconds to be completed, remaining time is displayed in line 2. The END key can be used to conclude the function in less time.

C. Recording the New Span

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

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

The word "COMPLETE" is flashing.

If **YES** is pressed, the following screen is displayed:

(2)

```
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 (1) 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 (2) above.

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

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

3. Manual Span

If the span constant is known, the manual span procedure allows the operator to make a direct span change.

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** key returns to Run Menu.

3.2.1 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' 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  
ENTER  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 W.U.
END ABORT
```

4. Defining Second Point

```
S# ENTER 2st 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 2st 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
```

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
```

COMPLETE is flashing

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

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

COMPLETE is flashing

3.3 MAIN MENU 2

Main Menu 2 contains the setup and configuration menus. Main Menu 2 is selected by pressing the MENU key until Main Menu 2 appears. Setup scrolls are selected by pressing the key directly below the desired scroll.

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

3.3.1 Display Scrolls

1. Defining 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 will be used.

Press the **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 1 -  
Measure units  
> English <  
CHOICE ENTER
```

Password: SERVICE

If USA or ENG:	Default: ENGLISH
If other language:	Default: METRIC
Selections:	ENGLISH, METRIC, MIXED

NOTE: If the Measure units are changed from English to Metric (or vice versa) after the scale is calibrated, the span number will change but the calibration will remain the same.

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.

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

Password: SERVICE

If ENGLISH:	Default: POUNDS
	Selections: Perc. %, TONS, LTONS, POUNDS
If METRIC:	Default: KG
	Selections: Perc. %, TONNES, KG
If MIXED:	Default: POUNDS
	Selections: Perc. %, TONS, LTONS, POUNDS, TONNES, KG

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.

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

Password: SERVICE

If ENGLISH: Default: TONS
Selections: TONS, LTONS, POUNDS
If METRIC: Default: TONNES
Selections: TONNES, KG
If MIXED: Default: TONS
Selections: TONS, LTONS, POUNDS, TONNES, KG

2. Defining the Language

The Micro Tech 2000 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: OPERATOR

Default: USA
Selections: USA, SPANISH (ESP)

3. Setting Time and Date Mode

This section applies only if COM board is installed. The operator defines the format for displaying and printing time and date.

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

Password: SERVICE

If USA or English: Default: AM/PM
If other language: Default: 24 H
Selections: 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
Selections: DD-MM-YYYY, MM-DD-YYYY, YYYY-MM-DD

4. Setting Line 2 and 3 of the RUN Menu

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

```
- DISPLAY SCROLL 7 -  
RUN display line 2  
> No Display <  
CHOICE ENTER SCALE#
```

Password: OPERATOR

Default: NO DISPLAY
Selections: NO DISPLAY, GROSS, TARE, PEAK, RESET TOT,
MASTER TOT, DATE/TIME (Only if COMM board
installed), BARGRAPH

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

Password: OPERATOR

Default: NO DISPLAY
Selections: NO DISPLAY, GROSS, TARE, PEAK, RESET TOT,
MASTER TOT, DATE/TIME (Only if COMM board
installed), BARGRAPH

5. Setting Damping Factors for the Display

The process variables 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  2  sec
ENTER          SCALE#
```

Password: OPERATOR

Default: 2 sec
Min: 0 sec
Max: 16 sec

6. Enable ALTERNATE Function on RUN Scroll

The ALTERNATE function allows skipping automatically from one scale to the next without pressing the scale # key in the RUN scroll. Time interval in seconds can be entered in this scroll. 0 disables this function.

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

Password: OPERATOR

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

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.

```
- MENU DISPLAY 11 -
Tare Mode
>Acquire<
CHOICE ENTER
```

Password: SERVICE

Default: ACQUIRE
Selections: ACQUIRE/MANUAL

3.3.2 Scale Data Scroll

Scale data defines the specific parameters of the scale.

1. Define the Number and Type of Scales

The static weight indicator can control from one to four independent scales. The number of scales that can be programmed depends on the number of A/D boards installed.

The following boards are available:

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

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

Password: SERVICE

Default: 1
Min: 1
Max: 4

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

If only one A/D board single channel is installed, this scroll is not displayed.

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 three A/D channels are installed.

```
- SC DATA SCROLL 1B -  
Type of scale 4  
> S1-S2 <  
CHOICE ENTER
```

Password: SERVICE

Default: A/D INPUT S1-S2
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.

Logical 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 a range of 200 Tons. When long trucks need to be weighed, both scales are used. Scale #3 is defined as S1+S2, so that Scale #3 indicates the weight of Scale #1 plus the weight of Scale #2. Scale #3 has a range of 300 Tons.

2. Defining 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 with **ENTER**. Scroll down.

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

Password: SERVICE

Default: 500.0
Min: 1
Max: 1000000

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 Divisions" 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 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#
```

Password: SERVICE

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

3. Enter Number of Load Cells of Your Scales

Enter the number of load cells of your scale.

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

Password: SERVICE

Default: 1
Min: 1
Max: 6

4. Defining the Load Cell(s)

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

```
- SC DATA SCROLL 7 -  
Load cell capacity  
250.0 lbs  
ENTER          SCALE#
```

Password: SERVICE

If ENGLISH or MIXED:
Default: 250.0 Lbs
Min: 1
Max: 500000

If METRIC:
Default: 250 kg
Min: 1
Max: 50000

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

```
- SC DATA SCROLL 8 -  
Load cell sensit.  
3.000 mV/V  
ENTER          SCALE#
```

Password: SERVICE

Default: 3.000 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 scrolls depends on the number of load cells specified per each scale.

```
- SC DATA SCROLL 9A -  
Load cell #1  
Res 350 Ohms  
ENTER          SCALE#
```

Password: SERVICE

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

If # of Load Cells is 2 or more:

```
- SC DATA SCROLL 9B -  
Load cell #2  
Res 350 Ohms  
ENTER          SCALE#
```

Password: SERVICE

Same default and limits of load cell #1.

If # of Load Cells is 3 or more:

```
- SC DATA SCROLL 9C -  
Load cell #3  
Res 350 Ohms  
ENTER SCALE#
```

Password: SERVICE

Same default and limits of load cell #1.

If # of Load Cells is 4 or more:

```
- SC DATA SCROLL 9D -  
Load cell #4  
Res 350 Ohms  
ENTER SCALE#
```

Password: SERVICE

Same default and limits of load cell #1.

If # of Load Cells is 5 or more:

```
- SC DATA SCROLL 9E -  
Load cell #5  
Res 350 Ohms  
ENTER SCALE#
```

Password: SERVICE

Same default and limits of load cell #1.

If # of Load Cells is 6:

```
- SC DATA SCROLL 9F -  
Load cell #6  
Res 350 Ohms  
ENTER SCALE#
```

Password: SERVICE

Same default and limits of load cell #1.

5. Selecting a W&M Mode

This scroll only appears if the Micro-Tech Model 2200 Static Weight Indicator is used in an approved scale. The selection details specific requirements of local Weight & Measure offices in certain countries.

See Appendix A/1.

```
- SC DATA SCROLL 10-  
W&M mode  
>NONE<  
CHOICE ENTER
```

Password: SERVICE

Default: NONE

Selections: NONE, OIML

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.

```
- SC DATA SCROLL 11A-  
Motion band  
divisions 1  
ENTER SCALE#
```

Password: SERVICE

Default: 1
Min: 0
Max: 3

```
- SC DATA SCROLL 11B-  
Motion delay  
1.0 sec  
ENTER SCALE#
```

Password: SERVICE

Default: 1.0
Min: 0
Max: 60

3.3.3 Calibration Data Scroll

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

1. Defining the Calibration Mode

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

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

Password: OPERATOR

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

A. 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

If ENGLISH or MIXED:
 Default: 0.000 Lbs
 Min: 0.000
 Max: 5000.000

If METRIC:
 Default: 0.000 kg
 Min: 0.000
 Max: 5000.000

B. 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 R-Cal resistor installed in the Static Weight Indicator. If no changes have been made after the Static Weight Indicator has left 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 Scale Data. This menu is for reference only.

```

- CAL DATA SCROLL 4-
R-CAL constant
xx.xx lbs
                        SCALE#

```

The R-CAL factor can be computed during the autospan function and it is used to make equal the result of 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 %

2. Entering a Calibration Interval

If an optional COM A board is installed, 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 DD-MM-YYYY  
Next DD-MM-YYYY SCALE#
```

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 the 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 action 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%

Define the maximum amount of tare (with reference to the scale capacity) that the system can automatically compensate with AZT.

```
-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

3.4 MAIN MENU 3

Main Menu 3 is used for protecting and unprotecting 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).

3.4.1 Changing the Protection Level

The static weight indicator has three protection levels to which specific passwords are related.

The protection levels and the passwords are defined using the following scheme:

Protection	Password	Status
NONE	SERVICE	The system is totally 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 **LIMITED** 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 into desired level. Going from a low level to a higher level forces the password entry.

1. On Line 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 appears.

```
- 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.

3.4.2 Diagnostics Scroll

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 131070 numbers.

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

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

3. Change Passwords

The password can be changed by entering a new one. The operator 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.

```
-DIAGNOST. SCROLL 3-  
ENTER SERVICE  
PASSWORD      *****  
ENTER
```

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.

```
-DIAGNOST. SCROLL 4-  
REENTER SERVICE  
PASSWORD      *****  
ENTER
```

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

```
-DIAGNOST. SCROLL 4-  
NEW PASSWORD  
ACQUIRED  
RETURN
```

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

```
-DIAGNOST. SCROLL 4-  
INVALID PASSWORD  
  
RETURN
```

```
-DIAGNOST. SCROLL 4-  
ENTER OPERATOR  
PASSWORD      *****  
MENU ENTER
```

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 4.3.8 to remove a forgotten password.

4. Display Software Version

The software version is displayed for reference only.

```
-DIAGNOST. SCROLL 5-  
Main software  
version:  
42.00.00.00
```

5. Setup Date and Time

This section only applies if a COMM board is installed. 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:      MM-DD-YYYY  
DAY: DD  
ENTER
```

Password: SERVICE

Default: 00-00-0000
Min: 01-01-0000
Max: 12-31-1999

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: HH  
ENTER AM/PM
```

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

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 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

-DIAGNOST. SCROLL 11
Board type slot #4
BOARD TYPE

-DIAGNOST. SCROLL 12
Board type slot #5
BOARD TYPE

-DIAGNOST. SCROLL 13
Board type slot #6
BOARD TYPE

BOARD TYPE can be:

- Premium A/D Board A/D board approved version.
- AD Board #1 channel - #1 Load cell input channel
An optional depopulated version of the
standard A/D board.
- AD Board #2 channels - #1 Load cell input channel
The standard 2 channels A/D board.
- Dig I/O 16in/4out - #2 Load cell input channels
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
- Analog I/O Optional analog input output board.
 - #2 Current outputs
 - #2 Voltage inputs
- Current Out Optional current output board.
 - #1 Current output
- Communication A Serial communication board (RS232, RS485)
- Communication B Field bus board (Not Available)

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 field entry data will be replaced

```

-DIAGNOST.SCROLL 15-
  Force cold start

ENTER
```

3.4.3 Tests

1. Lamp Test

Press **START** to begin a Lamp Test of the integrator. All LED's and digits of the display blink for a number of seconds.

```

- TEST SCROLL 1 -
LAMP TEST

START
```

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.

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.

```
- TEST SCROLL 3 -  
Dig input test  
Slot#0      ----0000  
          NEXT
```

Slots are numbered 1 to 6, slot 0 is the mother board. **Digit#** (displayed instead of **slot #**) identifies the four Digitizer's inputs. Inputs are shown from right to left. If a board has 16 inputs, two screens are used to show the first and the second half, the lower half is shown first.

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 **ON/OFF** 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 to 6, slot 0 is the mother board.

WARNING

**FORCING THE DIGITAL OUTPUTS MAY CAUSE MACHINERY TO START.
AFTER THE USER TRIES TO FORCE AN OUTPUT, THE FOLLOWING
MESSAGE WILL BE 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.

5. Test Current Outputs

This section tests the current output board.

```
- 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. Press **NEXT** key to pass to the next current output channel.

6. Test Communication A

If a communication board is detected, the following screen is shown. The "Port 2" soft key is only shown if two boards are detected.

```
- TEST SCROLL 7 -  
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.

NOTE: This test requires a hardware jumper to be installed between TX and RX terminals of the communication board.

7. Test Communication B

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

```
- TEST SCROLL 8 -  
Test communication B  
  
START
```

Password: SERVICE

8. Test Load Out Output Board

The following test is displayed if an optional load out board is detected.

```
- TEST SCROLL 10 -  
BCD Output test  
  0000  
ENTER      CLEAR
```

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

To force the outputs, enter a number followed by **ENTER**. The **CLEAR** key appears indicating that the output is being forced to a value. By pressing **CLEAR**, the output is freed.

9. Test BCD Load Out Board

If an optional 16In/4Out load out board is detected, the following screen appears. The test is similar to the digital input test.

```
- TEST SCROLL 9 -  
BCD Input test  
0000
```

10. Test the CPU Serial Line

```
- TEST SCROLL 11 -  
Test CPU serial line  
  
START
```

Password: SERVICE

If **START** is pressed, the system performs a test of the serial line of the CPU board.

NOTE: The CPU serial line is not implemented in the current hardware, therefore the normal response is TEST FAILED.

11. Test the Keyboard and Switches

```
- TEST SCROLL 12 -  
Keyboard + switches  
Key: _____  
Switches: 00000000
```

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

3.5 MAIN MENU 4

Main Menu 4 is dedicated to the definition of 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
```

3.5.1 I/O Definition Scroll

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.

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 out define
#1 > None <
CHOICES  ENTER  NEXT
```

Password: SERVICE

Default: NONE
Selections: NONE, NET, GROSS, TARE, PEAK
Or, if more than one scale is defined:
Selections:

NONE,
NET S1, GROSS S1, TARE S1, PEAK S1 (2 scales)
NET S2, GROSS S2, TARE S2, PEAK S2 (2 scales)
NET S3, GROSS S3, TARE S3, PEAK S3 (3 scales)
NET S4, GROSS S4, TARE S4, PEAK S4 (4 scales)

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 you want to have an increase in current for any increase of the variable. Select 20-0 or 20-4 if you want to have a decrease of current for any increase of the variable.

```
- I/O DEF SCROLL 1A -
Current out range
#1 > 4-20 mA <
CHOICES  ENTER  NEXT
```

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.

```
- I/O DEF SCROLL 1B-  
Current out delay  
#1 0 sec  
ENTER NEXT
```

Password: SERVICE

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

A damping factor can be also selected for each current channel. This damping only affects the current output, not the displayed variable, which has a separate damping factor, selectable in MAIN MENU 2, DISPLAY.

```
- I/O DEF SCROLL 1C -  
Current out damping  
#1 4 sec  
ENTER NEXT
```

Password: OPERATOR

Default: 4 sec
Min: 0 sec
Max: 16 sec

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

2. Define Analog Input

If an analog input board is installed (not the Load Cell board), the following screens are displayed. Analog input can be used for measuring the moisture.

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

Password: SERVICE

Default: NONE
Selections: NONE, MOISTURE

A. Setup MOISTURE Input

If an analog input has been programmed for reading the moisture signal, and **CALIB** was pressed, the following screens appear. The operator 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 **Volts** key to enter the corresponding number of volts. Confirm with **ENTER**.


```

- I/O DEF SCROLL 2A -
Moist. input cal.#1
  %M =  V
ENTER %MOIST Volts

```

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:

```

- I/O DEF SCROLL 2B -
Moist. input cal. #2
  %M =  V
ENTER %MOIST VOLT

```

Password: SERVICE

Default: 20.0 % 5.0 V
 Min: 1.0 % 1.0 V
 Max: 20.0 % 5.0 V

3. Define Digital Inputs

Digital inputs can be programmed. The following screen shows one logical function per time, and allows the operator 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 the **NEXT** key until the function is displayed, then enter the number of the physical input 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 NO
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, Reset tare defaulted to #2 NO and Set tare defaulted to #3 NO. Default selections can be reassigned to any physical input if desired. External alarms 1, 2 and 3 can be assigned to logical functions not on the selection list.

Logical selections should not be reassigned after the physical inputs have been wired.

CAUTION

LOGICAL SELECTIONS RETURN TO THE DEFAULT IF THE STATIC WEIGHT INDICATOR IS COLD STARTED.

SELECTIONS:	DEFAULT:
External alarm 1	0 NO
External alarm 2	0 NO
External alarm 3	0 NO
Print	0 NO (Only if COM installed)
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 alarms	1 NO
Reset tare	2 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)
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
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	0 NO (Only if more than 3 scales installed)
Reset peak	0 NO
Reset peak 1	0 NO (Only if more than 1 scale installed)
Reset peak 2	0 NO (Only if more than 1 scale installed)
Reset peak 3	0 NO (Only if more than 2 scales installed)
Reset peak 4	0 NO (Only if more than 3 scales installed)

Four assignable inputs are standard on the mother board.

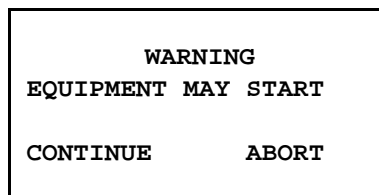
MOTHER BOARD INPUTS

PHYSICAL INPUT NUMBER	ASSIGNED FUNCTION	FIELD MOUNT	PANEL MOUNT
1	_____	TB9 4 & 2	TB2 1 & 3
2	_____	TB8 13 & 14	TB2 5 & 7
3	_____	TB8 11 & 12	TB2 8 & 10
4	_____	TB8 9 & 10	TB2 9 & 10

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.

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

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



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

4. Define Digital Outputs

Digital outputs can be programmed. The following screen shows one logical function per time, and allows the operator 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. Assigning a function to 0 disables the function.

```

- I/O DEF SCROLL 5 -
Dig. output def.
Alarms      NC
ENTER NC/NO  NEXT

```

Password: SERVICE

The following table shows the available logical selections that may be assigned to any available physical output. Typical field wiring drawings and customer specific field wiring drawings show READY defaulted to #1 and ALARM defaulted to #2 NC. 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 STATIC WEIGHT INDICATOR IS COLD STARTED.

SELECTIONS:	DEFAULT:
Alarm	2 NC
Shut down	0 NC
Ready	1 NO
W. stable	0 NO (Only if 1 scale installed)
W. stable S1	0 NO (Only if more than 1 scale installed)
W. stable S2	0 NO (Only if more than 1 scale installed)
W. stable S3	0 NO (Only if more than 2 scales installed)
W. 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)
Thres. #1	0 NO (Only if Threshold #1 enabled)
Thres. #1 S1	0 NO (Only if more than 1 scale installed)
Thres. #1 S2	0 NO (Only if more than 1 scale installed)
Thres. #1 S3	0 NO (Only if more than 2 scales installed)
Thres. #1 S4	0 NO (Only if more than 3 scales installed)
Thres. #2	0 NO (Only if Threshold #2 enabled)
Thres. #2 S1	0 NO (Only if more than 1 scale installed)
Thres. #2 S2	0 NO (Only if more than 1 scale installed)
Thres. #2 S3	0 NO (Only if more than 2 scales installed)
Thres. #2 S4	0 NO (Only if more than 3 scales installed)
Thres. #3	0 NO (Only if Threshold #3 enabled)
Thres. #3 S1	0 NO (Only if more than 1 scale installed)
Thres. #3 S2	0 NO (Only if more than 1 scale installed)
Thres. #3 S3	0 NO (Only if more than 2 scales installed)
Thres. #3 S4	0 NO (Only if more than 3 scales installed)
Thres. #4	0 NO (Only if Threshold #4 enabled)
Thres. #4 S1	0 NO (Only if more than 1 scale installed)
Thres. #4 S2	0 NO (Only if more than 1 scale installed)
Thres. #4 S3	0 NO (Only if more than 2 scales installed)
Thres. #4 S4	0 NO (Only if more than 3 scales installed)
Totalized	0 NO

SELECTIONS:	DEFAULT:
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)

One non-assignable Fault output and three assignable outputs are standard on the mother board.

MOTHER BOARD OUTPUTS

PHYSICAL OUTPUT NUMBER	ASSIGNED FUNCTION	FIELD MOUNT	PANEL MOUNT
	Fault Output	TB8 1 & 2	TB2 15 & 16
1	_____	TB8 7 & 8	TB2 12 & 16
2	_____	TB8 5 & 6	TB2 13 & 16
3	_____	TB8 3 & 4	TB2 14 & 16

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

DIGITAL INPUT/OUTPUT BOARD OUTPUTS

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

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

```
WARNING
EQUIPMENT MAY START

CONTINUE      ABORT
```

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

5. Define BCD Output Data

If a optional load out output board is installed, the operator can select the related BCD variable.

```
-I/O DEF SCROLL 6 -
BCD output variable
> Net <
CHOICES ENTER
```

Password: SERVICE

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

Or, if more than one scale enabled:

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

If a selection other than **NONE** is made, the following screens allow the operator 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.

```
-I/O DEF SCROLL 6A -
BCD output polarity
> Positive <
CHOICES ENTER
```

Password: SERVICE

Default: NEGATIVE
Selections: POSITIVE, NEGATIVE

```
-I/O DEF SCROLL 6B -  
BCD output parity  
> Yes <  
CHOICES ENTER
```

Password: SERVICE

Default: NO
Selections: NO, YES

6. Define BCD Input Data

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

```
-I/O DEF SCROLL 7 -  
BCD input variable  
> Thresholds <  
CHOICES ENTER
```

Password: SERVICE

Default: NONE
Selections: NONE, THRESHOLDS

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.

```
-I/O DEF SCROLL 7A -  
BCD input polarity  
> Positive <  
CHOICES ENTER
```

Password: SERVICE

Default: NEGATIVE
Selections: POSITIVE, NEGATIVE

3.5.2 Alarms Definition

The alarms of the static weight indicator can be programmed. Process alarms such as low and high rate 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. Time and date are also displayed if the optional COMM board is installed.
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 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.

1. Define Threshold #1

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

2. Define Threshold #2

Use the **CHOICE** key to turn on or off the threshold #1 alarm. Confirm with **ENTER**.

```
- ALARM SCROLL 2 -  
Threshold #2  
> 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 2A -  
Threshold #2,  
set 20 %  
ENTER UNITS SCALE#
```

Password: OPERATOR

Default: 20 %
Min: 0 %
Max: 105 %

Enter the desired delay time before the alarm is monitored.

```
- ALARM SCROLL 2B -  
Threshold #2,  
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 2C -  
Threshold #2,  
hyst. 1 %  
ENTER UNITS SCALE#
```

Password: OPERATOR

Default: 1 %
Min: 0 %
Max: 105 %

```
- ALARM SCROLL 2D -  
Threshold #2, mode  
> Low level <  
CHOICE ENTER SCALE#
```

Password: OPERATOR

Default: LOW LEVEL
Selections: LOW LEVEL, HIGH LEVEL

```
- ALARM SCROLL 2E -  
Threshold #2,  
var. > Net <  
CHOICE ENTER SCALE#
```

Password: OPERATOR

Default: NET

Selections: NET, GROSS, NET ABS, GROSS ABS

3. Define Threshold #3

Use the **CHOICE** key to turn on or off the threshold #1 alarm. Confirm with **ENTER**.

```
- ALARM SCROLL 3 -  
Threshold #3  
> 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 3A -  
Threshold #3,  
set 30 %  
ENTER UNITS SCALE#
```

Password: OPERATOR

Default: 30 %

Min: 0 %

Max: 105 %

Enter the desired delay time before the alarm is monitored.

```
- ALARM SCROLL 3B -  
Threshold #3,  
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 3C -  
Threshold #3,  
hyst. 1 %  
ENTER UNITS SCALE#
```

Password: OPERATOR

Default: 1 %
Min: 0 %
Max: 105 %

```
- ALARM SCROLL 3D -  
Threshold #3, mode  
> Low level <  
CHOICE ENTER SCALE#
```

Password: OPERATOR

Default: LOW LEVEL
Selections: LOW LEVEL, HIGH LEVEL

```
- ALARM SCROLL 3E -  
Threshold #3,  
var. > Net <  
CHOICE ENTER SCALE#
```

Password: OPERATOR

Default: NET
Selections: NET, GROSS, NET ABS, GROSS ABS

4. Define Threshold #4

Use the **CHOICE** key to turn on or off the threshold #1 alarm. Confirm with **ENTER**.

```
- ALARM SCROLL 4 -  
Threshold #4  
> 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 4A -  
Threshold #4,  
set 80 %  
ENTER UNITS SCALE#
```

Password: OPERATOR

Default: 80 %
Min: 0 %
Max: 105 %

Enter the desired delay time before the alarm is monitored.

```
- ALARM SCROLL 4B -  
Threshold #4,  
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 4C -  
Threshold #4,  
hyst. 1 %  
ENTER UNITS SCALE#
```

Password: OPERATOR

Default: 1 %
Min: 0 %
Max: 105 %

```
- ALARM SCROLL 4D -  
Threshold #4, mode  
> Low level <  
CHOICE ENTER SCALE#
```

Password: OPERATOR

Default: LOW LEVEL
Selections: LOW LEVEL, HIGH LEVEL

```

- ALARM SCROLL 4E -
Threshold #4,
var.  > Net <
CHOICE  ENTER  SCALE#

```

Password: OPERATOR

Default: NET
 Selections: NET, GROSS, NET ABS, GROSS ABS

5. Setup Alarm Modes

The following message is displayed for 3 seconds:

```

- ALARM SCROLL 5 -
- ALARM DEFINITION -
Use NEXT key or
enter alarm number.

```

After 3 seconds, the following screen is displayed. The operator 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

3.5.3 Alarms List

SELECTIONS:	DEFAULT:
1 - Clock Fail	ALARM (Only if COM board is installed)
2/6 - Load Cell Fail	SHUTDOWN
7 - Ram Fail	ALARM
8 - Rom Fail	ALARM
9/13 - Threshold #1 S#	ALARM (Only if threshold is enabled)
14/18 - Threshold #2 S#	ALARM (Only if threshold is enabled)
19/23 - Threshold #3 S#	ALARM (Only if threshold is enabled)
24/28 - Threshold #4 S#	ALARM (Only if threshold is enabled)
29 - Warm Start	NONE
30 - Cold Start	ALARM
31 - P. D. Calibration	ALARM
32/36 - Calibration Time S#	ALARM (Only if COM board is installed)
37 - External Alarm #1	NONE (Only if external alarm 1 selected)
38 - External Alarm #2	NONE (Only if external alarm 2 selected)
39 - External Alarm #3	NONE (Only if external alarm 3 selected)
40/44 - AZT Limit S#	ALARM (Only if AZT option enabled)
45/50 - HD Config Changed	ALARM
51 - BCD Overflow	NONE (Only if BCD output selected)

SELECTIONS:

- 52 - Math Error
- 53 - Printer Error
- 54 - Communication Error
- 55 - AB R I/O COMM Error
- 56 - PROFIBUS-DP COMM Error

DEFAULT:

- ALARM
- ALARM (Only if COM board is installed)
- ALARM (Only if COM board is installed)
- ALARM (Only if AB R I/O board is installed)
- ALARM (Only if PROFIBUS-DP board is installed)

3.5.4 Load Out

See Appendix A/4 for optional load out menu.

3.6 MAIN MENU 5

Main Menu 5 is dedicated to the serial options. **COMM A** is used to set up the serial line of the optional board Communication A, and **PRINT** is used for setting up the printer output. Main Menu 5 does not appear unless an optional COMM A or COMM B board is installed.

```
-      MAIN MENU 5      -  
Press MENU for more  
  
COMM A  COMM B  PRINT
```

3.6.1 Communication A Scroll

The communication board A has one serial channel, which can be configured using jumpers as an RS232 or an RS485 channel. Two COMM "A" boards can be installed and programmed, typically one for the printer and one for the supervisor.

See Serial Communication manual REC 3948 if option is installed.

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 Serial Communications manual for details. Possible selections are:

- PC-MASTER 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
> MODBUS <
CHOICE ENTER

```

Password: SERVICE

Default: MODBUS
 Selections: PC-MASTER, SIEMENS 3964R, ALLEN-BRADLEY DF1, AEG MODBUS, PRINTER, FREE RUN SHORT FORMAT, FREE RUN LONG FORMAT

3.6.2 Free Run Protocols

As the free run protocol is selected, the instrument starts to send a fixed length data string at a frequency of 10 per second.

There are two formats: LONG and SHORT.

LONG Format

SS N1 ... N8 T1 ... T8 S1 S2 S3 CR

SHORT Format

SS N1 ... N8 S1 S2 S3 CR

Where:

- SS is the scale number in ASCII format:
 - 30h for scale #1
 - 31h #2
 - 32h #3
 - 33h #4

If only a scale has been defined, this value is fixed at 30h. In a multi scales system, the scale number increases at each transmission and goes back to 30h after data about the last active scale has been sent.

N1-N8 is the net weight. It is on 8 digit ASCII format, N1 is the MSD and N8 the LSD. The string does not contain sign and decimal point and the digits before the first significant digit are zero (30h).

The passed value is the filtered net weight if the stable weight indication on the instrument front panel is lit, the unfiltered value if the light is off.

T1-T8 is the tare weight. It is on 8 digit ASCII format, T1 is the MSD and T8 the LSD. The string does not contain sign and decimal point and the digits before the first significant digit are zero (30h).

S1 Status byte #1 - Display status.

Bit #0 - Unit measure: 0 English, 1 Metric

Bit #1 - Net weight sign: 0 positive, 1 negative

Bit #2 - Unit size: 0 small (kg, lb), 1 large (t, TONS, LTONS)

Bit #3 - Always 0

Bit #4 - Always 0

Bit #5 - Always 0

Bit #6 - Always 0

Bit #7 - Always 0

S2 Status byte #2 - Data status.

Bit #0 - Motion: 0 no motion (stable weight), 1 motion

Bit #1 - Alarm: 0 no alarm, 1 alarm

Bit #2 - Print valid: 0 yes, 1 no

Bit #3 - Always 0

Bit #4 - Always 0

Bit #5 - Always 1

Bit #6 - Always 0

Bit #7 - Always 0

S3 - Status byte #3 - Decimal position.

Bit #0 - one decimal.

Bit #1 - two decimals.

Bit #2 - three decimals.

(If all zero, no decimals)

Bit #3 - Always 0

Bit #4 - Always 0

Bit #5 - Always 1

Bit #6 - Always 0

Bit #7 - Always 0

CR String terminator, carriage return ODh.

It is possible to use the CTS signal to slow down the transmission rate. The instrument checks the CTS before to start a new transmission. If CTS is active, data is not sent. If CTS becomes active during a transmission, it is completed in any case. For this purpose, it is necessary to define ACTIVE in the CTS selection of the setup.

If a second communication A board is installed, the following screen appears. These screens operate exactly as the ones dedicated to communication board 1.

```
- COMM. A SCROLL 6 -  
Baud rate port #2  
> 9600 <  
CHOICE ENTER
```

Password: SERVICE

Default: 9600

Selections: 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200

```
- COMM. A SCROLL 7 -  
Set parity port #2  
> No parity <  
CHOICE ENTER
```

Password: SERVICE

Default: NO PARITY

Selections: EVEN PARITY, ODD PARITY, NO PARITY

```
- COMM. A SCROLL 8 -  
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 9 -  
Wordlength port #2  
> 8 bits <  
CHOICE ENTER
```

Password: SERVICE

Default: 8 BITS

Selections: 7 BITS, 8 BITS

```
-COMM. A SCROLL 10-  
Protocol port #2  
> Printer <  
CHOICE ENTER
```

Password: SERVICE

Default: PRINTER
Selections: PC-MASTER, SIEMENS 3964R, ALLEN BRADLEY DF1, AEG
MODICON, PRINTER

If the selected protocol is not PRINTER on one of the two lines, the following screens define the use of the CTS handshake signal, 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, the supervisor can only access those variables that are accessible with the OPERATOR password. If PROTECTED is selected, the unit can only be read by the supervisor.

```
- COMM. A SCROLL 11 -  
Cts port #1  
> disactive <  
CHOICE ENTER
```

Password: SERVICE

Default: DISACTIVE
Selections: DISACTIVE, ACTIVE

```
- COMM. A SCROLL 12-  
Address port #1  
      
ENTER
```

Password: SERVICE

Default: 1
Min: 1
Max: 255

```
-COMM. A SCROLL 13 -  
Access lev. port #1  
> None <  
CHOICE ENTER
```

Password: SERVICE

Default: NONE
Selections: NONE, LIMITED, PROTECTED

3.6.3 Communication B Scroll

See Allen-Bradley Remote I/O manual REC 4013 or PROFIBUS-DP manual if this option is installed.

3.6.4 Print

The Micro-Tech 2000 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 any 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.

```
-PRINTER SCROLL 1 -  
Handshaking  
> None <  
CHOICE ENTER
```

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.

```
-PRINTER SCROLL 2 -  
End of line  
> CR <  
CHOICE ENTER
```

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.

```
-PRINTER SCROLL 3 -  
Delay end of line  
0 sec  
ENTER
```

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.

```
-PRINTER SCROLL 4 -  
Form Feed  
> NO <  
CHOICE ENTER
```

Password: SERVICE

Default: NO
Selections: NO, YES

2. Periodical Printing

If you want to generate periodical printing, enter the number of minutes, hours or days in the following screen. By entering 0, the periodical printing is prevented. 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

Default: OFF
Selections: ON, OFF
Min: 00:00
Max: 23:59

```
- PRINTER SCROLL 7 -  
Print alarms  
> No <  
CHOICE ENTER
```

Password: SERVICE

Default: NO
Selections: YES, NO

There are two ways for defining the printing format. The first is to use the predefined format (see Section 3.6.5).

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.

```
- PRINTER SCROLL 8 -  
Total report format  
> Default <  
CHOICE ENTER
```

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. Up to three strings 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
-----
< ENTER >

```

Password: OPERATOR

Default: " "

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:

```

0000000000111111111122222222223...
0123456789012345678901234567890...
+-----> 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 -
String #1 pos.
X = __, Y = __
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 9E -  
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 #2  
< yes >  
CHOICE ENTER
```

Password: OPERATOR

Default: NO
Selections: YES, NO

If YES was selected, the next two scrolls are displayed.

SCALE# key allows the user to select the scale.

```
- PRINTER SCROLL 11A-  
Contents string #3  
  
SCALE#
```

Password: OPERATOR

Default: " "

If only 1 scale is defined or if 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. Variables are: MASTER TOTAL, RESET TOTAL, DATE, TIME, NET WEIGHT, GROSS WEIGHT, TARE WEIGHT and PEAK WEIGHT.

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 pos.  
X: ____ Y: ____  
ENTER X\Y-Pos
```

Password: OPERATOR

	X	Y
Default:	7	1
Min:	0	1
Max:	24	80

```
- PRINTER SCROLL 15-  
Master total pos.  
X = ____, Y = ____  
ENTER X\Y-Pos
```

Password: OPERATOR

	X	Y
Default:	6,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 16-  
Net weight pos.  
X = ____, Y = ____  
ENTER X\Y-Pos
```

Password: OPERATOR

	X	Y
Default:	0,	1
Min:	0,	1
Max:	24,	80

```
- PRINTER SCROLL 17-  
Gross weight pos.  
X = ____, Y = ____  
ENTER X\Y-pos
```

Password: OPERATOR

	X	Y
Default:	0,	1
Min:	0,	1
Max:	24,	80

```

- PRINTER SCROLL 18-
Tare weight pos.
X = ____, Y = ____
ENTER      X\Y-Pos

```

Password: OPERATOR

	X	Y
Default:	0,	1
Min:	0,	1
Max:	24,	80

```

- PRINTER SCROLL 19-
Peak weight pos.
X = ____, Y = ____
ENTER      X\Y-Pos

```

Password: OPERATOR

	X	Y
Default:	0,	1
Min:	0,	1
Max:	24,	80

3.6.5 The PRINT Key

If the optional COM board is installed, the PRINT key allows the operator to print data.

The following screen is displayed:

```

- PRINTER SCROLL -
COM #1 no data (1)
Start print TOTALS (2)
PRINT      COM (3)

```

Password: Not Required

The second line (1) 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 (2) 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 totals scale 1 (only if enabled)

TOTALS S2 Print totals scale 2 (only if enabled)

TOTALS S3 Print totals scale 3 (only if enabled)

TOTALS S4 Print totals scale 4 (only if enabled)

SETUP Print the setup data of the instrument

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

Print starts after the **PRINT** key is pressed.

The **COM** key (3) 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: 11-10-1998

TIME: 8:12a

MASTER TOTAL: 0.00 Tons

RESET TOTAL: 0.00 Tons

If more scales are defined:

TOTALS REPORT

DATE: 11-10-1998

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:

11-10-1998 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 3

DATE 11-10-1998 TIME 11:59p

VARIABLE scale cap

NEW 400.00

OLD 500.00

TRAIL RECORD NR 2
DATE 11-10-1998 TIME 11:31p
VARIABLE span
NEW 250000
OLD 300000

TRAIL RECORD NR 1
DATE 11-10-1998 TIME 11:59p
NEW 0.05
OLD 0.1

3.7 MAIN MENU 6

Main Menu 6 is dedicated to Audit Trails and Linearization.

```
- MAIN MENU 6 -
Press MENU for more
AUDIT
TRAIL   LINEAR
```

3.7.1 Audit Trail

This menu is only displayed if the Audit Trails option is installed.

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 Static Weight Indicator's display or printed out by an on-site printer.

The logger records the before and after setting of 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 listed below, indicating each by an event number:

<u>Parameter's Name</u>	<u>Meaning & Functions</u>
w unit	weight units
t unit	total units
damp w	damping weight
s cap	scale capacity
s div	scale division
lc sen	load cell sensitivity
lc cap	load cell capacity
lc nr	load cells number
lc r1	load cell 1 resistance
.....
lc r6	load cell 6 resistance
test w	test weights for WTS span calibration
rcal r	Rcal resistance for R-CAL span calibration
aztrng	Auto Zero Tracking range
aztdev	Auto Zero Tracking max deviation
lin 1	linearization factor 1 (0-10%)
.....
line 10	linearization factor 1 (90-100%)
span	span
zero	zero

Parameter's Name	Meaning & Functions
rcal c	R-CAL calibration constant
Audits	Audit trail option

Function's Name	Meaning
Autozero	autozero function has been executed
Autospan Rcal	autospan with R-CAL method has been executed
Autospan WTS	autospan with test weights method has been executed
Autospan 2 pnt	autospan on 2 points method has been executed
Cold start	all instrument data has been lost
AZT limit reached	the auto zero tracking function has reached the max deviation limit
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(ld)
ss nnnnnn = vvvvvvv/N(ew)

```

hh:mm Time of change
dd-mm-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 values, before change (old) and after change (new).

Time and date are only shown if an optional Communication board is installed.

The operator can scroll between events which are displayed in order of date and time. The operator can also enter a number to display a specific event.

3.7.2 Linearization

Request REC 3909 from the factory if it becomes necessary to linearize the scale.

OPERATING & SERVICE MANUAL

FOR RAMSEY

MICRO-TECH™ 2000

MODEL 2100/2200

STATIC WEIGHT INDICATOR