SET-UP, INSTALLATION, CALIBRATION AND OPERATION

INTRODUCTION

This chapter includes instructions for setting up, installing and calibrating the unit. These procedures should be complete before attempting to set up the operating conditions for any installed options.

For the standard configuration, the system parameter set-up, calibration and installation are accomplished in four steps:

Configuring the internal switch set-ups that program the instrument for the desired operating modes.

Connecting the load cell system to the 7-wire strip connector.

Connecting the correct AC power source.

Mounting the instrument for the panel-mounting installation.

If the ZT, D2 or D3 option(s) are installed, the option board must be removed before proceeding with the standard set-up and analog calibration.

CONFIGURING INTERNAL SWITCH SETUP FUNCTION

Obtaining Access to the Internal Program Switches
The switches are mounted on the top side of the main PC board and are accessible after removing the top case cover and the digital option board. Remove the three hold-down screws at the rear of the cover and lift the top cover. There are three DIP switches and two jumpers that must be set up. They are:

SW-1: Full Scale display resolution, Count-by increment and lb/kg full scale calibration. (8-position DIP switch.)

SW-2: Coarse Deadload Zero, load cell excitation, and sense amplifier scaling. (7-position DIP switch.)

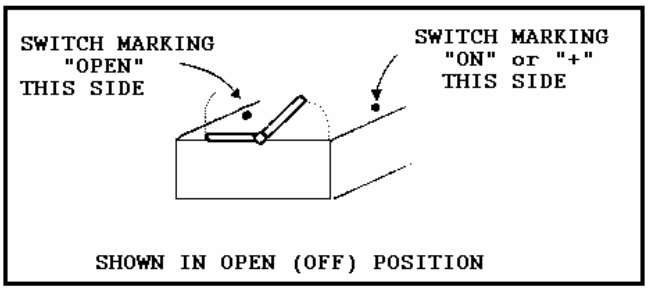
SW-3: Medium span set-up. (6-position DIP switch.)

7-Position Jumper: Decimal point position selection.

2-Position Jumper: Coarse span selection. (E7 - E8, or E8 - E9)

Selecting the Decimal Point Position
The “Load Cell Connection” section that follows shows the 7 jumper locations on the rear of the Display Assembly into which the decimal point jumper wire may be inserted for a fixed decimal point position in the display. The jumper locations are labeled DP6, 5, 4, 3, 2, 1 and NC. These correspond to decimal point locations beginning with the left of the MSB of the display.

Select the decimal point for the installation, and insert the jumper wire accordingly.



ANALOG SWITCH SET-UPS

DEADLOAD ZERO OFFSET: SW2 (4-7)
EXCITATION VOLTAGE: SW2 (1)
SENSE AMPLIFIER SCALING: SW2 (2)

SW2 SWITCH SEGMENTS							FUNCTION
1	2	3	4	5	6	7	
ON	.....	.....	.....	.....	.....	.....	10V EXCITATION
OFF	.....	.....	.....	.....	.....	.....	15V EXCITATION
	ON	.....	.....	.....	.....	.....	15V SENSE
	OFF	.....	.....	.....	.....	.....	10V SENSE
			ON				15mV DEADLOAD ZERO OFFSET
				ON			7.5V DEADLOAD ZERO OFFSET
					ON		3.8mV DEADLOAD ZERO OFFSET
						ON	1.9mV DEADLOAD ZERO OFFSET
			ON	ON	ON	ON	28.2mV DEADLOAD ZERO OFFSET
			OFF	OFF	OFF	OFF	0mV DEADLOAD ZERO OFFSET

DIGITAL SWITCH SET-UPS

FULL SCALE DISPLAY RESOLUTION: SW1 (5-8)
COUNT-BY DISPLAY INCREMENT: SW1 (3,4)
LB/KG SET-UP UNITS: SW1 (1,2)

SW 1 SWITCH SEGMENTS								
8	7	6	5	4	3	2	1	
					ON	OPEN		LB SET-UP UNITS
					OPEN	ON		KG
				ON	ON	.....	.....	COUNT-BY 1
				ON	OPEN	.....	.....	COUNT-BY 2
				OPEN	ON	.....	.....	COUNT-BY 5
				OPEN	OPEN	.....	.....	COUNT-BY 10* (or option 20)**
ON	ON	ON	OPEN	.....	.....	.....	.....	FULL SCALE RESOLUTION: 1,000
ON	ON	OPEN	ON	.....	.....	.....	.....	FULL SCALE RESOLUTION: 2,000
ON	ON	OPEN	OPEN	....	.....	.....	.....	FULL SCALE RESOLUTION: 3,000
ON	OPEN	ON	ON	....	.....	.....	.....	FULL SCALE RESOLUTION: 4,000
ON	OPEN	ON	OPEN	....	.....	.....	.....	FULL SCALE RESOLUTION: 5,000
ON	OPEN	OPEN	ON	....	.....	.....	.....	FULL SCALE RESOLUTION: 6,000
ON	OPEN	OPEN	OPEN	....	.....	.....	.....	FULL SCALE RESOLUTION: 7,000
OPEN	ON	ON	ON	.....	.....	.....	.....	FULL SCALE RESOLUTION: 8,000
OPEN	ON	ON	OPEN	.....	.....	.....	.....	FULL SCALE RESOLUTION: 9,000
OPEN	ON	OPEN	ON	.....	.....	.....	.....	FULL SCALE RESOLUTION: 10,000

* Do not use 10,000 full scale counts when selecting Count-By display increments.

* Need option board with Y20 EPROM & Main BD A3 Pin 7 enable pulled to +5V instead of GND. See SCH 5-7794 LOC 4G. Make trace change on circuit side.

** When X20 is specified, set up for X10. No other increment size can be selected.

CAUTION: Maximum display is 99990. To comply with Weights & Measurements Req., DO NOT EXCEED 9000 full capacity scale display.

Selecting Full-Scale Display Resolution (SW-1)
The 8-position DIP switch has four positions (5 through 8) for full scale display resolution. Positions 3 and 4 select the Count-By increments of X1, X2 X5 or X10. Position 2 selects the full-scale calibration in kilograms and position 1 selects the full-scale calibration in pounds.

CAUTION: Maximum display is 99,990. To maintain compliance with Weight & Measures Regulations regarding Overload blanking, DO NOT exceed 9,000 full-scale display count Resolution with a selected Count-By 10.

Refer to the "Switch Set-Up diagrams". Set the switch positions to the appropriate positions (ON or OFF) for the operational functions and for the method of calibration (in kilograms or in pounds).

NOTE: Refer to the inset for the switch configurations for the ON (CLOSED) or OFF (OPEN) selections.

Selecting Coarse Zero and Load Cell Excitation (SW-2)
Positions 4 through 7 control the Coarse Zero Calibration, detailed in the following "Connecting Power" section, page 4.

Position 4 exercises the maximum effect (15mV), and position 7 the minimum (1.9mV).

Position 1 selects a load cell excitation of 10 volts in the ON selection, and an excitation of 15 volts in the OFF selection.

Position 2 selects the sense amplifier scaling of 15 volts when in the ON selection, and 10 volts when in the OFF selection.

(Position 3 of this switch is not currently used.)

Medium Zero adjustment is accomplished by potentiometer R24, while fine control is obtained by front-panel control. See Calibration Instructions for that procedure.

Medium SPAN Setup (SW-3)
Positions 1 through 6 select the medium gain calibration of SPAN. Position 1 has the maximum effect; position 6 the minimum, in a binary relationship where OFF increases the resulting gain.

Coarse Span Selection
The two-position jumper selects the low gain range of 60 to 148 (Terminals E8 to E9) or high gain range of 110 to 270 (E8 to E7).

Load Cell Connection
The seven-position screw terminal connector, as indicated by a label on the rear panel, has the following connection points:

PIN #	SIGNAL	COLOR CODE
1	Excitation LO (-)	Black
2	Excitation HI (+)	Green
3	Sense LO (-)	Blue
4	Sense HI (+)	Brown
5	Shield	Yellow
6	Signal LO (-)	Red
7	Signal HI (+)	White

Connect the load cell system leads to the terminal connector.
To insure precision measurements, connect Sense to Excitation (HI to HI and LO to LO) at the Load Cell. For very short distances only, Sense leads may be connected to the Excitation at the rear panel connector terminals.

Connecting Power

Power is supplied to the instrument by a 3-wire cord, through the rear panel. The M1500 includes a "universal" transformer with primary taps for 100, 117, 230 or 240 VAC power inputs. The primary is protected by a fuse mounted above the transformer. The rear panel label indicates the particular power source for which the instrument has been configured at the factory.

While the top cover is removed, check the transformer tap connections; verify that connections correspond to the available supply.

Connect the 3-wire power cord.

Calibration

General

Turn power ON and allow the instrument and the Load Cell to warm up for approx. 1 hour prior to calibration. The procedure accomplishes the calibration in the following general sequence.

Coarse and Medium Zero are adjusted for approximate zero indication with no live weight on the system.

Coarse, Medium & Fine Span are adjusted with a full-scale calibrating weight on the system.

Zero is re-adjusted, this time including Fine zero adjustment. (To Center-of-Zero).]

Fine Span is re-adjusted.

Zero is re-checked and adjusted if necessary.

Fine Span is re-adjusted if Zero was modified in the previous step.

Zero Calibration (First Pass)

1. Remove any live weight from the load cell system.
2. Remove Dead load offsets by operation of appropriate positions of the Coarse ZERO DIP switch (SW-2, positions 4-7). Start with the maximum effect (position 4). Turn the switch ON; if it causes the display to indicate a negative gross value, return to OFF. Continue same operation with position 5,6 and 7. The 16 switch combinations will remove from 0 to 28.2 millivolts from the analog signal.
3. Adjust Medium Zero potentiometer R2 for a zero display with Fine Zero potentiometer (front panel) in mid-position.

Span Calibration

1. Place the calibrating weight on the load cell system. This should be as near to the full scale value as possible. Check to see that the calibrating weight is in the weight units (kilograms or pounds) for which the setup switch has been selected.
2. Place the switches of SW-3 (Medium SPAN) ON for minimum contribution.
3. Jumper E8 to E7 for the high gain operation and observe the display. If it indicates a value greater that the calibrating weight (or an overload indication if the weight is greater than full scale), then the jumper should be changed, and connect terminals E8 and E9. If not, then leave the E8 to E7 connection.
4. Staring with Position 1 of SW-3, select the OFF operation and check the display. If the change causes the display value to exceed the calibrating weight, return that position to tits previous status. Proceed with each switch position in turn. A total of 64 possible combinations of the switch positions for Medium Span is possible.
5. Adjust fine span potentiometer R17 until the display reads the calibrated weight value.

NOTE: If the digital option board is installed, access to R17 is obtained through a hole in that board directly above the potentiometer R17 control.

Zero Calibration (Second Pass)
Adjust the front panel Zero Adjust control until the Center-of-Zero indication is on and stable.
Check the full-scale SPAN and repeat Step 5 of "Span Calibration" as required.
Re-check the fine Zero adjustment by observing the Center-of-Zero indication.

Operation

The M1500 is ready for operation when installed, set-up and calibrated as described in the previous paragraphs. After power is applied, operate the front-panel VERIFY push-button.* Thereafter, operation of the standard configuration is controlled at the front panel. Figure 3-6 illustrate the front panel controls and indicators. The following table defines the items and their functions:

FRONT PANEL CONTROLS & INDICATORS

ITEM	NAME	DESCRIPTION / FUNCTION
1	Display	5 active digits, automatic minus (-) polarity, selected decimal point position (fixed)
2	lb	LED status indicator, lighted when displayed weight value is calibrated in pounds
3	kg	LED status indicator, lighted when displayed weight value is calibrated in kilograms
4	NET	LED status indicator, lighted when displayed weight value is NET + GROSS - TARE
5	GROSS	LED status indicator, lighted when displayed value is GROSS
6	ZERO	Fine ZERO adjustment
7	NET / GROSS	Push-push pressure switch, changes weighing mode from NET / GROSS / NET
8	lb / kg	Push-push pressure switch, changes displayed calibration from lb / kg / lb
9	TARE	Push pressure switch, acquires GROSS value as TARE. Tare must be re-acquired after a power loss
10	VERIFY (also clear tare)	Push pressure switch, lights all segments of each decimal digit and toggles all status indicators. Must be operated after power is first applied, and after recover from any power loss
11	PRINT	Push pressure switch, transmits weight data via 20 mA current loop with option D3 present.
12	CENTER-OF-ZERO	LED status indicator, lighted when displayed value is within 1/4 display increment of the center-of -zero code.

*If the option board is installed, a display message "BAD" appears when power if first applied and whenever power returns after a power loss. VERIFY must be operated, and TARE must be re-acquired. Any Zero-Tracked offsets will be removed at a power loss.