

LOSS OF WEIGHT INDICATING SCALE

BOOK NO.: IM 370.130AA UA ISSUE A

LOSS OF WEIGHT INDICATING SCALE

EQUIPMENT SERIAL NO. _____

DATE OF START-UP _____

START-UP BY _____

Prompt service available from nationwide authorized service contractors.

ORDERING INFORMATION

In order for us to fill your order immediately and correctly, please order material by description and part number, as shown in this book. Also, please specify the serial number of the equipment on which the parts will be installed.

WARRANTY

Seller warrants for a period of one year after shipment that the equipment or material of its manufacture is free from defects in workmanship and materials. Corrosion or other decomposition by chemical action is specifically excluded as a defect covered hereunder, except this exclusion shall not apply to chlorination equipment. Seller does not warrant (a) damage caused by use of the items for purposes other than those for which they were designed, (b) damage caused by unauthorized attachments or modifications, (c) products subject to any abuse, misuse, negligence or accident, (d) products where parts not made, supplied, or approved by Seller are used and in the sole judgement of the Seller such use affects the products' performance, stability or reliability, and (e) products that have been altered or repaired in a manner in which, in the sole judgement of Seller, affects the products' performance, stability or reliability. **SELLER MAKES NO OTHER WARRANTY OF ANY KIND, AND THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS OF THE MATERIAL OR EQUIPMENT FOR ANY PARTICULAR PURPOSE EVEN IF THAT PURPOSE IS KNOWN TO SELLER.** If Buyer discovers a defect in material or workmanship, it must promptly notify Seller in writing; Seller reserves the right to require the return of such defective parts to Seller, transportation charges prepaid, to verify such defect before this warranty is applicable. In no event shall such notification be received by Seller later than 13 months after the date of shipment. No action for breach of warranty shall be brought more than 15 months after the date of shipment of the equipment or material.

LIMITATION OF BUYER'S REMEDIES. The **EXCLUSIVE REMEDY** for any breach of warranty is the replacement f.o.b. shipping point of the defective part or parts of the material or equipment. Any equipment or material repaired or replaced under warranty shall carry the balance of the original warranty period, or a minimum of three months. Seller shall not be liable for any liquidated, special, incidental or consequential damages, including without limitation, loss of profits, loss of savings or revenue, loss of use of the material or equipment or any associated material or equipment, the cost of substitute material or equipment, claims of third parties, damage to property, or goodwill, whether based upon breach of warranty, breach of contract, negligence, strict tort, or any other legal theory; provided, however, that such limitation shall not apply to claims for personal injury.

Statements and instructions set forth herein are based upon the best information and practices known to U.S. Filter/Wallace & Tiernan, Inc., but it should not be assumed that every acceptable safety procedure is contained herein. Of necessity this company cannot guarantee that actions in accordance with such statements and instructions will result in the complete elimination of hazards and it assumes no liability for accidents that may occur.

The logo for US Filter, featuring the letters "US" in a bold, italicized font, followed by "Filter" in a stylized font with horizontal lines through the letters.

WALLACE & TIERNAN PRODUCTS
1901 West Garden Road, Vineland, NJ 08360

LOSS OF WEIGHT INDICATING SCALE

INTRODUCTION

This instruction book provides installation, operation and maintenance instructions for the USFilter's Wallace & Tiernan Products (USF/W&T) Loss of Weight Indicating Scale. This equipment displays the amount of material remaining to be fed starting from an initial value. It can also provide a hardcopy record if the optional circular chart recorder is used. When a volumetric screw feeder is mounted on the scale, the system provides a graphical record of dry material delivered by the feeder. If chlorine or other compressed gas cylinders are mounted on the scale, the system tracks gas consumption. The column-mounted indicator contains four alarm relays that can be preset to trip at specific weight levels using the keypad. The indicator also provides a 4-20 mA analog output proportional to indicated weight and can be used as an input signal to the optional circular chart recorder.



WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR DAMAGE TO THE EQUIPMENT, THIS EQUIPMENT SHOULD BE INSTALLED, OPERATED AND SERVICED ONLY BY TRAINED, QUALIFIED PERSONNEL WHO ARE THOROUGHLY FAMILIAR WITH THE ENTIRE CONTENTS OF THIS INSTRUCTION BOOK.

NOTE: When ordering material always specify model and serial number of apparatus.

TABLE OF CONTENTS

Very Important Safety Precautions	SP-1, -2
Regional Offices	1.010-1
Technical Data	Section 1
Installation	Section 2
Operation	Section 3
Service	Section 4
Illustrations	Section 5
Spare Parts	Section 6

LOSS OF WEIGHT INDICATING SCALE

VERY IMPORTANT SAFETY PRECAUTIONS

This page provides very important safety information related to safety in installation, operation, and maintenance of this equipment.

WARNING

TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR EQUIPMENT DAMAGE, OBSERVE THE FOLLOWING PRECAUTIONS:

WHEN USING HAZARDOUS MATERIAL IT IS THE RESPONSIBILITY OF THE EQUIPMENT USER TO OBTAIN AND FOLLOW ALL SAFETY PRECAUTIONS OF THE MATERIAL MANUFACTURER/SUPPLIER.

SECURE CYLINDERS SO THAT THEY STAND UPRIGHT AND CANNOT TIP OVER.

TO AVOID POSSIBLE SEVERE PERSONAL INJURY FROM ELECTRICAL SHOCK, TURN POWER OFF BEFORE SERVICING. THERE MAY BE MORE THAN ONE LIVE CIRCUIT PRESENT SINCE THE RELAY OUTPUTS MAY BE ENERGIZED SEPARATELY FROM THE INDICATOR.

TO ENSURE PROPER AND SAFE OPERATION OF THIS EQUIPMENT, USE ONLY USF/W&T LISTED PARTS EXCEPT COMMERCIALY AVAILABLE PARTS AS IDENTIFIED BY COMPLETE DESCRIPTION ON PARTS LIST. THE USE OF UNLISTED PARTS CAN RESULT IN EQUIPMENT MALFUNCTIONS CAUSING POSSIBLE SEVERE PERSONAL INJURY.

THIS EQUIPMENT SHOULD BE INSTALLED, OPERATED AND SERVICED ONLY BY TRAINED, QUALIFIED PERSONNEL WHO ARE THOROUGHLY FAMILIAR WITH THE ENTIRE CONTENTS OF THIS INSTRUCTION BOOK.

DO NOT DISCARD THIS INSTRUCTION BOOK UPON COMPLETION OF INSTALLATION. INFORMATION PROVIDED IS ESSENTIAL TO PROPER AND SAFE OPERATION AND MAINTENANCE.

ADDITIONAL OR REPLACEMENT COPIES OF THIS INSTRUCTION BOOK ARE AVAILABLE FROM:

USFilter's Wallace & Tiernan Products
1901 West Garden Road
Vineland, NJ 08360
PHONE: (856) 507-9000
FAX: (856) 507-4125

LOSS OF WEIGHT INDICATING SCALE

VERY IMPORTANT SAFETY PRECAUTIONS (CONT'D)

NOTE

Minor part number changes may be incorporated into USF/W&T products from time to time that are not immediately reflected in the instruction book. If such a change apparently has been made in your equipment and does not appear to be reflected in your instruction book, contact you local USF/W&T sales office for information.

Please include the equipment serial number in all correspondence. It is essential for effective communication and proper equipment identification.

LOSS OF WEIGHT INDICATING SCALE

REGIONAL OFFICES

INSTALLATION, OPERATION, MAINTENANCE, AND SERVICE INFORMATION

Direct any questions concerning this equipment that are not answered in the instruction book to the Reseller from whom the equipment was purchased. If the equipment was purchased directly from USFilter's Wallace & Tiernan Products (USF/W&T), contact the office indicated below.

UNITED STATES

1901 West Garden Road
Vineland, NJ 08360
TEL: (856) 507-9000
FAX: (856) 507-4125

CANADA

If the equipment was purchased directly from USF/W&T Canada, contact the nearest office indicated below.

ONTARIO

250 Royal Crest Court
Markham, Ontario
L3R3S1
(905) 944-2800

QUEBEC

243 Blvd. Brien
Bureau 210
Repentigny, Quebec
(514) 582-4266

MEXICO

If the equipment was purchased directly from USF/W&T de Mexico, contact the office indicated below.

Via Jose López Portillo No. 321
Col. Sta. Ma. Cuauhtepac, Tultitlan
Edo. México 54900
TEL: +52 55 2159 2976 / +52 55 2159 2989
FAX: +52 55 2159 2985

LOSS OF WEIGHT INDICATING SCALE

SECTION 1 - TECHNICAL DATA

Maximum Scale Capacity:	1000 pounds, minus zero deadweight
Full Scale Ranges:	100, 150, 200, 250, 300, 400, 500 & 600 pounds
Overall Scale Dimensions:	25W x 35D x 45H inches
Scale Platform Dimensions:	19W x 28D inches
Overall Indicator Dimensions:	13.5W x 8.6H x 4.6D inches
Accuracy:	Minimum 0.5% of full scale
Resolution:	0.5 pounds standard
Operating Temperature:	14 to 104° F (-10 to 40° C)
Indicator Display:	6-digit, 7-segment, 1 inch high LCD with 30 element bar graph in column mounted NEMA 4X enclosure standard
Indicator Analog Output:	4-20 mA into a maximum resistance of 500 ohms or 1-10 Vdc across a minimum resistance of 2000 ohms
Indicator Alarm Outputs:	Two normally-open and two normally-closed solid state relay outputs rated 0.020 amp minimum and 1 amp maximum with a resistive load at 24-280 Vac
Printer Output:	RS232 or 20 mA current loop
Serial Interface Output:	Access is through a 25-pin D-sub connector using bi-directional command strings from a terminal or computer
Power Requirements:	Maximum 0.8 amps, 60 Hz, for 115 Vac, weight indicator Maximum 0.8 amps, 50/60 Hz, for 230 Vac, weight indicator 120 Vac, 50/60 Hz or 240 Vac, 50/60 Hz, jumper-selectable, for recorder

LOSS OF WEIGHT INDICATING SCALE

TECHNICAL DATA (CONT'D)

Recorder Chart Ranges: 0-100, 0-150, 0-200, 0-250, 0-300, 0-400, 0-500 & 0-600, 24 hour or 7 day, linear format, with time interval selected in the recorder by moving jumpers

Operating Weights:

Scale with Indicator: 136 pounds

Recorder: 12 pounds

Volumetric Feeder Stand: 30 pounds

Volumetric Feeder: 210 pounds

LOSS OF WEIGHT INDICATING SCALE

SECTION 2 - INSTALLATION

List Of Contents

	PARA./DWG.NO.
Unpacking.....	2.1
Assembly of Scale Base and Column.....	2.2
Assembly of Digital Indicator to Scale Column.....	2.3
General.....	2.4
Wiring.....	2.5
Line Voltage Power.....	2.5.1
Load Cell.....	2.5.2
Analog Output.....	2.5.3
Alarm Relays.....	2.5.4
Printer Output.....	2.5.5
Bi-directional Serial Interface.....	2.5.6
Optional Circular Chart Recorder.....	2.5.7
Illustrations	
Typical Installation - Scale Base and Column.....	370.130.110.001
Typical Installation - Digital Indicator.....	370.130.110.002
Installation Wiring	
Enclosure and Main Printed Circuit Board.....	370.130.130.001
Analog Output Printed Circuit Board.....	370.130.130.002
Alarm Relay Output Printed Circuit Board.....	370.130.130.003
Bi-directional Serial Interface.....	370.130.130.004
Circular Chart Recorder.....	370.130.130.005
Typical Installation - Dry Feed and Gas Feed Systems.....	370.130.110.003

2.1 Unpacking

The Series 37-130 Loss of Weight Indicating Scale is shipped as a disassembled unit consisting of two separate cartons. One carton contains the 1000 pound platform scale and the other carton contains the digital indicator with instruction manual.

When the equipment and accessory items are unpacked, check all items against the packing list to be sure that no parts are discarded with the packing material. Whenever possible, unpack the equipment at the installation site. Items such as spare parts not required at the time of installation should be set aside where they will be available when needed.

NOTE: Do not discard or remove this instruction book when the installation is complete. The operator will need it.

2.2 Assembly of Scale Base and Column (See Dwgs. 370.130.110.001 and 370.130.000.001)

NOTE: Do not remove shipping strap holding platform to scale base until assembly is complete.

Follow the directions below for details on assembling the scale base and vertical column.

- a. If wheels are desired, assemble each wheel to the scale base with four 5/8-11 x 3-1/2" hex head bolts, four sleeves and eight 5/8" flat washers. To secure the wheel, tighten the bolt against the sleeve to scale base.
- b. Insert column into scale base assembly and secure the front two studs only (platform side) with two 3/8" split lock washers and two 3/8-16 hex. nuts. The notch on top of the column should be facing away from platform.
- c. Assemble the overload stop to the column's back two studs and secure with two 3/8" split lockwashers and two 3/8-16 hex. nuts. Use the four 3/8" flat washers between the overload stop and base to provide 1/8" clearance between overload stop and long lever.
- d. Attach the steelyard hanger to the long end of the shock absorber assembly.

LOSS OF WEIGHT INDICATING SCALE

- e. Partially lower the shock absorber assembly into the column with the open side of the steelyard hanger facing towards the back of the scale.
- f. Hook the short end of the shock absorber assembly into one end of the load cell assembly.



CAUTION: To prevent possible damage to the equipment, handle load cell with care. Do not drop, bend or twist.

- g. Slide the grommet away from the load cell to the other end of the cable.
- h. Slide the grommet into the slot at the top of the column. This slot should be on the back side of the column.
- i. Lower the load cell and shock absorber assemblies into the column. The steelyard hanger must drop through the opening in the scale base assembly.
- j. Attach the steelyard hanger to the nose iron pivot.
- k. Lift and fasten the top hook bolt of the load cell assembly to the column hanger.
- l. Pull out the excess load cell cable in the column, leaving enough slack in the cable so that there is no side pull on the load cell.
- m. Before continuing to the next step, remove shipping strap and check scale platform for ease of movement. If rubbing or binding, check to make sure the scale has been correctly assembled.

NOTE: Steelyard hanger should not rub against overload stop. The displayed weight reading will be inaccurate and not repeatable. To correct, shorten overall length of load cell assembly by screwing in the top and bottom hook bolts of load cell, evenly. When adjustment is complete, tighten nuts against load cell block. If displayed weight reading is still inaccurate and non-repeatable, after adjustment, remove overload stop.



CAUTION: The nose iron pivot has been preset at the factory and should not be adjusted in the field. If there is an alignment problem with the nose iron pivot, contact USF/W&T.

LOSS OF WEIGHT INDICATING SCALE

NOTE: Scale setup and operation must be on a level surface. The scale is level when the air bubble is in the target on the bulls-eye level. Use shims as required.

- n. Scale base and column assembly is complete. Refer to the next paragraph for instructions on assembling the digital indicator to the column.

2.3 Assembly of Digital Indicator to Scale Column (See Dwgs. 370.130.110.002 and 370.130.000.001)

Follow the directions below for details on mounting the digital indicator to the column.

- a. Assemble mounting plate to the top of column and line up threaded holes with clearance holes in column. Secure end cap with four 1/4-20 x 1" hex. head bolts and four 1/4" split lockwashers.



CAUTION: To avoid possible equipment damage, make sure that load cell cable does not become pinched between end cap and column. Cable and grommet must be seated in slot on back side of column.

- b. Assemble both mounting brackets to the display indicator using four 1/4-20 x 1" hex. head bolts, four 1/4" split lockwashers and four 1/4-20 hex. nuts.
- c. Assemble both mounting brackets to the mounting plate with four 1/4-20 x 1" hex. head bolts, four 1/4" split lockwashers, eight 1/4" flat washers and four 1/4-20 hex. nuts.

NOTE: The digital indicator must be positioned at the extreme left-hand end of the mounting plate.

- d. The assembly of the digital indicator to the column is complete. Refer to paragraph 2.5, Wiring, for instructions on wiring the load cell cable to the digital indicator.

2.4 General

The digital indicator is housed in a NEMA 4X stainless steel enclosure that is secured to the top of the scale column. It contains one main printed circuit board, an analog output board, an alarm relay board and a plug-in power supply adapter. To open the enclosure, loosen the four retaining screws and rotate the clips to the side but do not remove the screws. Since the front cover is hinged along the bottom, pull outward on the top edge

LOSS OF WEIGHT INDICATING SCALE

and pivot the cover downward to expose the internal circuit boards. Refer to Dwg. 370.130.130.001 for details on the enclosure and main circuit board layouts.

2.5 Wiring

2.5.1 Line Voltage Power

Power is supplied to the instrument through a factory-wired line cord. One end has a three-prong connector that plugs into an appropriate AC outlet and the other end has an AC to DC adapter module that plugs into connector P3 on the main printed circuit board. Refer to Dwg. 370.130.130.001 for details.

2.5.2 Load Cell

The cable from the column-mounted load cell must be wired to the main printed circuit board through terminal block P2. Loosen the cable gland connector for the load cell, which is located along the bottom of the enclosure on the right-hand side, and slip the load cell cable through it and into the enclosure.

Remove about two inches of the cable insulating jacket and then 1/4 inch of the insulation from each of the wires. Refer to the table below for wire color identification and Dwg. 370.130.130.001 to make the proper connections on pressure-type terminal block P2. To terminate a wire, first press down on the release bar for the terminal, insert the wire into the terminal opening and then allow the release bar to return to its original position, locking the wire in place.

<u>Wire Color</u>	<u>Function</u>
Green	+Excitation
Black	-Excitation
Red	+Signal
White	-Signal

NOTE: Verify that plug-in jumpers J1 & J3 adjacent to the terminal block have been installed. These jumpers attach the sense leads to the excitation leads if the sense leads are not used.

2.5.3 Analog Output

The analog output board is mounted on the main printed circuit board and plugs into it through connector P5. Loosen one of the unused gland connectors along the bottom of the enclosure and slip the wire(s) through it

LOSS OF WEIGHT INDICATING SCALE

and into the enclosure. It is recommended that jacketed twisted-pair cable, AWG 22 or heavier, is used. Remove about two inches of the cable insulating jacket and then 1/4 inch of the insulation from each of the wires. A small adapter cable has been provided that brings the customer connections to a screw-type terminal block mounted inside the enclosure. Refer to Dwg. 370.130.130.002 to make the proper connections to connector P2.

NOTE: Both 0-10 Vdc and 4-20 mA outputs are available but only one should be used at a time. Each tracks the displayed weight reading.

2.5.4 Alarm Relays

The alarm relay board is mounted on standoffs welded to the inside of the enclosure and is wired to the main printed circuit board through a pressure-type terminal block P12. Loosen one of the unused gland connectors and slip the wire(s) through it and into the enclosure. It is recommended that jacketed twisted-pair cable, AWG 20 or heavier, is used. Remove about 2 inches of the cable insulating jacket and then 1/4 inch of the insulation from each of the wires. Refer to Dwg. 370.130.130.003 to make the proper connections on the two-piece screw-type terminal blocks P2 and P3 on alarm relay output board. To terminate a wire, first pull off the top piece of the terminal block that contains the screws and wire entry holes. The enclosed male header will remain on the printed circuit board. Rotate the appropriate screw counterclockwise, insert the bare wire into the terminal opening and turn the screw clockwise until the wire is securely held. Repeat this for any other positions on the block and then snap the top connector back into its corresponding header. Connect the hot wire of the line voltage supply to only one of the terminals identified as “L1 HOT Vac”.



CAUTION: To avoid possible equipment damage, connect to only one L1 terminal. All four L1 terminals are commonly connected on the circuit board and provide power.

Customer wiring must conform to local and National Electrical Code (NEC) standards. Two green hex nuts have been supplied mounted on an unused welded stud next to the relay board as a convenient point to earth-ground the enclosure as required.



WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY FROM ELECTRICAL SHOCK, TURN POWER OFF BEFORE SERVICING. THERE MAY BE MORE THAN ONE LIVE CIRCUIT PRESENT SINCE THE RELAY OUTPUTS MAY BE ENERGIZED SEPARATELY FROM THE INDICATOR.



CAUTION: To avoid possible equipment damage, note that the rating of alarm relays is 0.020 amp minimum and one amp maximum, with resistive load at 24-280 Vac. If heavier loads are to be switched, external interface relays must be provided.

The relays associated with “OUTPUT #1” & “OUTPUT #3” are normally-closed while the relays associated with “OUTPUT #2” & “OUTPUT #4” are normally-open. Each solid-state relay will actuate when the displayed weight equals or exceeds its corresponding preset weight comparator alarm point.

NOTE: OUTPUT #1 & OUTPUT #3 will be energized with line voltage only when the displayed weight drops below its corresponding preset comparator alarm point; OUTPUT #2 & OUTPUT #4 will be energized with line voltage only when the displayed weight equals or exceeds its corresponding preset comparator alarm point.

2.5.5 Printer Output

The printer output can be either RS232 or 20 mA current loop. For complete details on the format of the printed information, refer to paragraph 3.3, Record Format Specifications For Printer Output Port.

Loosen one of the unused gland connectors and slip the wire(s) through it and into the enclosure. It is recommended that jacketed twisted-pair cable, AWG 22 or heavier, is used. Remove about two inches of the cable insulating jacket and then 1/4 inch of the insulation from each of the wires. Refer to Dwg. 370.130.130.001 to make the proper connections on pressure-type terminal block P10 located on the main board. To terminate a wire, first press down on the release bar for the terminal, insert the wire into the terminal opening and then allow the release bar to return to its original position, locking the wire in place.

2.5.6 Bi-Directional Serial Interface

The bi-directional serial port interface is located on the main printed circuit board and can be used to control the operation of the scale remotely.

A command string is transmitted, then acted upon as if it were received from the indicator’s keypad. For complete details on the command strings, refer to paragraph 3.4, Data Format Specifications for Bi-Directional Serial Port.

Loosen one of the unused gland connectors along the bottom of the enclosure and slip the wire(s) through it and into the enclosure. It is recommended that jacketed twisted-pair cable, AWG 22 or heavier, is used. Remove about two inches of the cable insulating jacket and then 1/4 inch of the insulation from each of the wires. A small adapter cable has been provided that consists of a 25-pin d-subminiature female connector on one end and a 26-position female connector on the other end. The 26-position female connector mates with the corresponding 26-position male header on the printed circuit board. Because of the large number of signals involved, it is recommended that a mating 25-pin d-subminiature male connector be used to hook up your cable to the interface. Refer to Dwg. 370.130.130.004 to make the proper connections to connector P7.

2.5.7 Optional Circular Chart Recorder

The circular chart recorder is preconfigured at the factory with the following default settings:

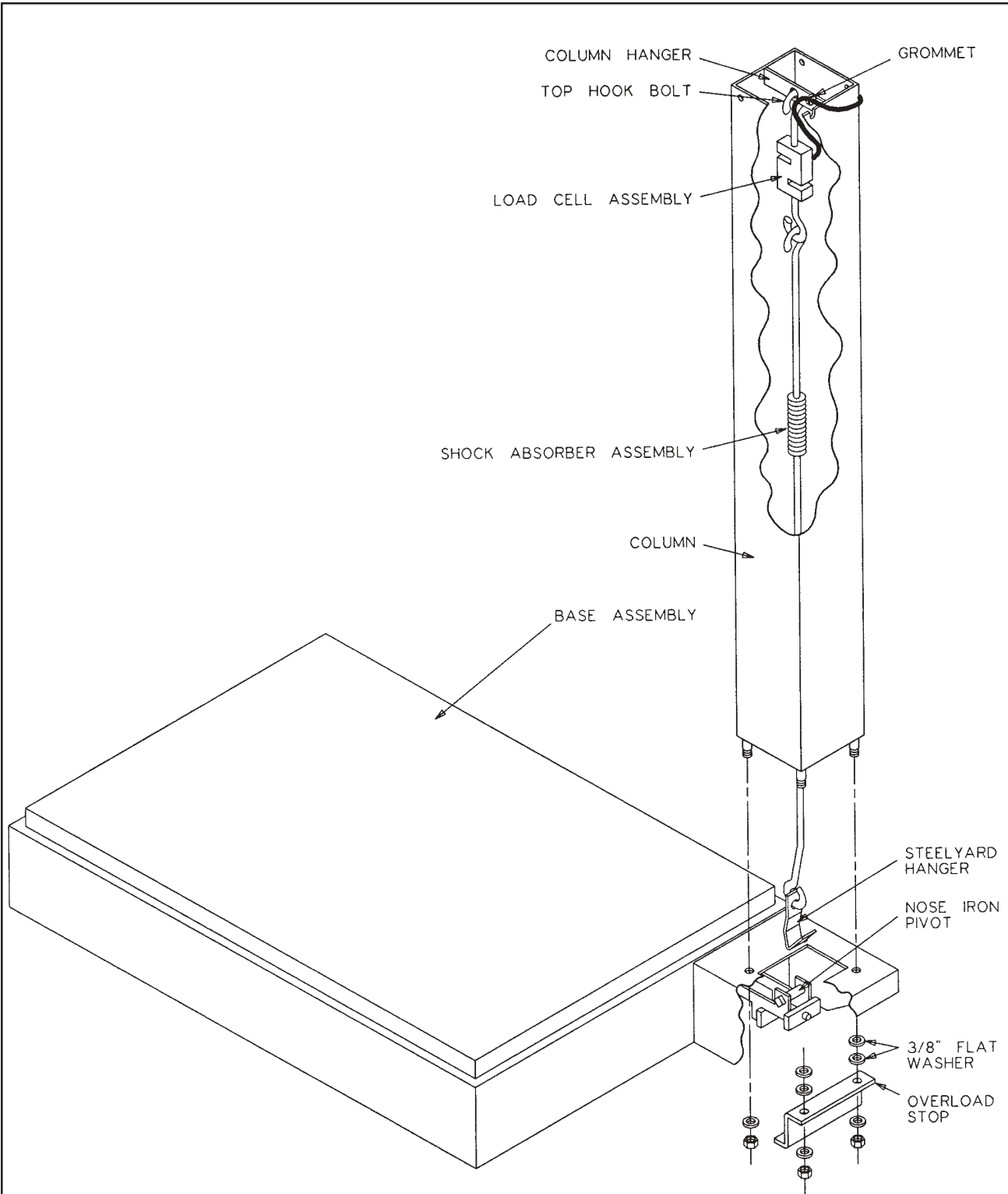
- 4-20 mA current input.
- 24 hour chart rotation.
- 0-100% even, linear chart range.
- Run mode.
- 120 Vac 60 Hz power requirement.

Since the recorder has already been set up, only power and signal input need to be connected as indicated in Dwg. 370.130.130.005. For complete details on the recorder and other possible configurations, refer to the instruction manual that came with the recorder.



CAUTION: After all terminations have been made, remove excess slack cable from the instrument enclosure and securely tighten each of the gland connectors. Do not over-tighten these connectors, but make certain they are snug. Do not use tools. Tighten with fingers only.

LOSS OF WEIGHT INDICATING SCALE

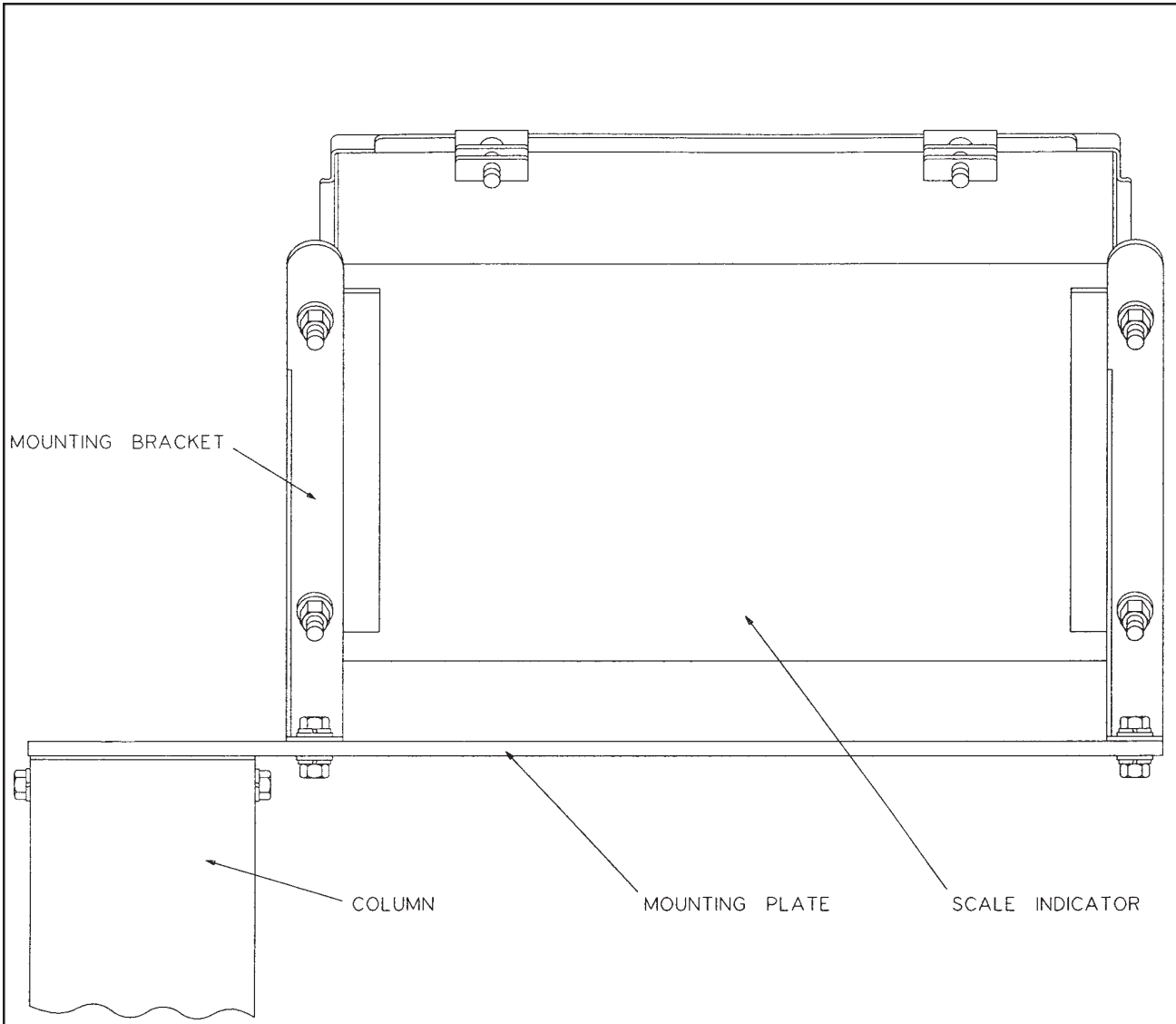


SCALE BASE AND COLUMN - TYPICAL INSTALLATION

370.130.110.001

ISSUE 0 1-94

LOSS OF WEIGHT INDICATING SCALE



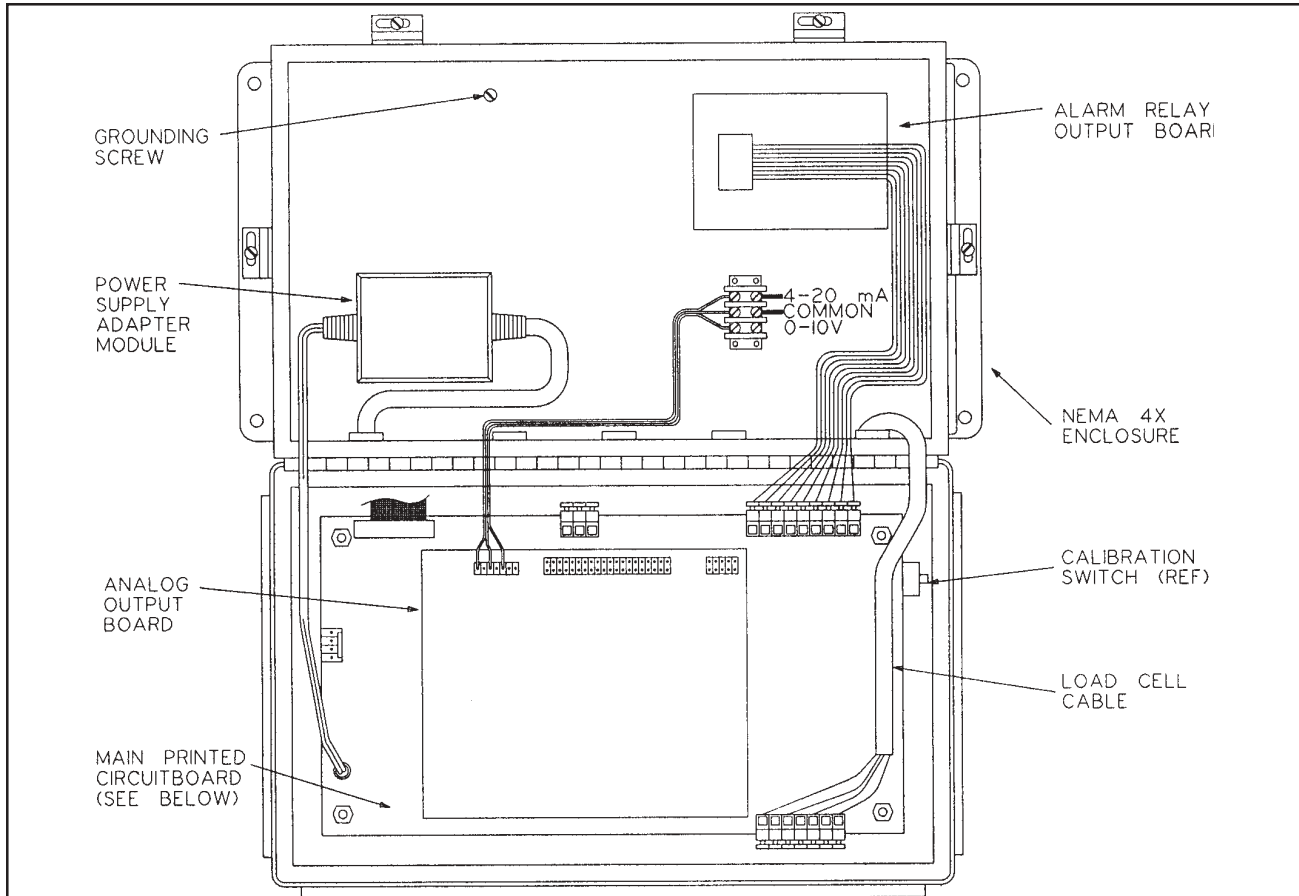
REAR VIEW

DIGITAL INDICATOR - TYPICAL INSTALLATION

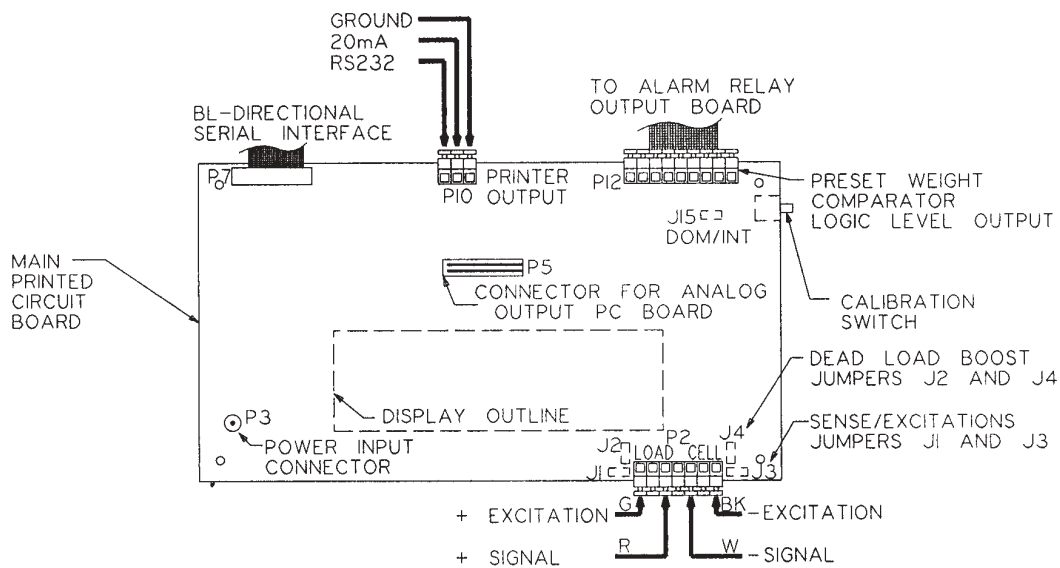
370.130.110.002

ISSUE 1 7-94

LOSS OF WEIGHT INDICATING SCALE



FRONT VIEW, (COVER OPENED)



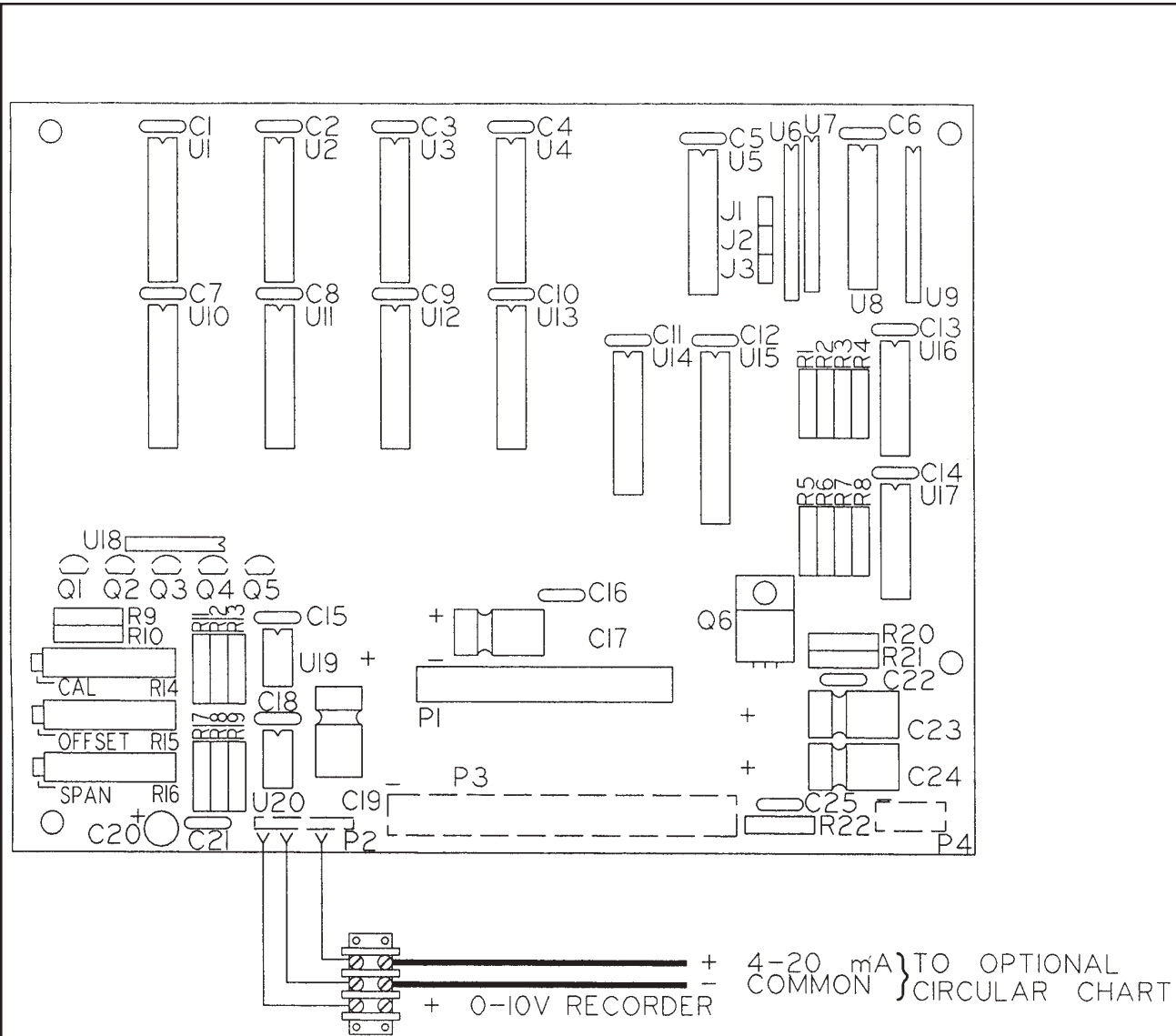
NOTE: — WIRING BY USF/W&T.
 — FIELD WIRING (NOT BY USF/W&T) MUST CONFORM TO LOCAL ELECTRICAL CODES.

ENCLOSURE AND MAIN PRINTED CIRCUIT BOARD - INSTALLATION WIRING

370.130.130.001

ISSUE 1 7-94

LOSS OF WEIGHT INDICATING SCALE



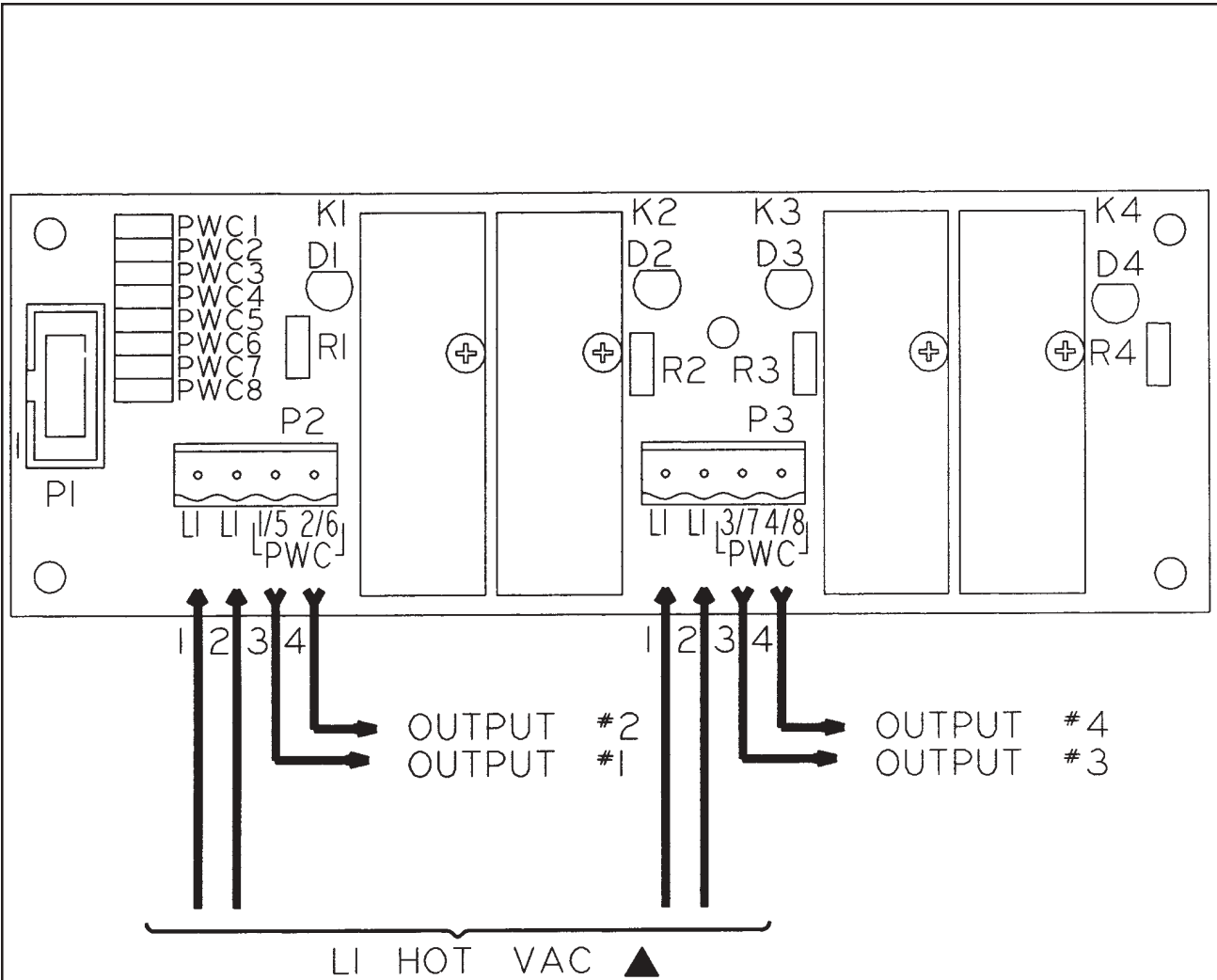
NOTE: P2, P3, P4 ARE LOCATED ON SOLDER SIDE.
 — WIRING BY USF/W&T.
 — FIELD WIRING (NOT BY USF/W&T) MUST CONFORM TO LOCAL ELECTRICAL CODES.

ANALOG OUTPUT PRINTED CIRCUIT BOARD - INSTALLATION WIRING

370.130.130.002

ISSUE 0 1-94

LOSS OF WEIGHT INDICATING SCALE



NOTE:

TO AVOID POSSIBLE EQUIPMENT DAMAGE, CONNECT TO ONLY ONE L1 TERMINAL. ALL FOUR L1 TERMINALS ARE COMMONLY CONNECTED ON THE CIRCUIT BOARD AND PROVIDE POWER.

OUTPUT #1 AND OUTPUT #3 ARE NORMALLY CLOSED; OUTPUT #2 AND OUTPUT #4 ARE NORMALLY OPEN; THEY ARE RATED 1 AMP MAXIMUM WITH A RESISTIVE LOAD AT 24-280 VAC.

— WIRING BY USF/W&T.

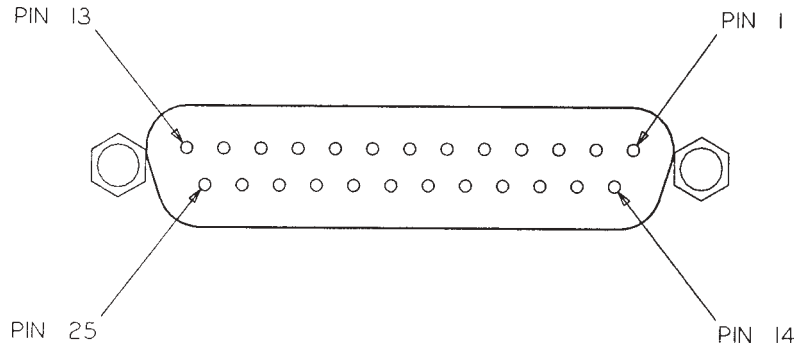
— FIELD WIRING (NOT BY USF/W&T) MUST CONFORM TO LOCAL ELECTRICAL CODES.

ALARM RELAY OUTPUT PRINTED CIRCUIT BOARD - INSTALLATION WIRING

370.130.130.003

ISSUE 1 7-94

LOSS OF WEIGHT INDICATING SCALE



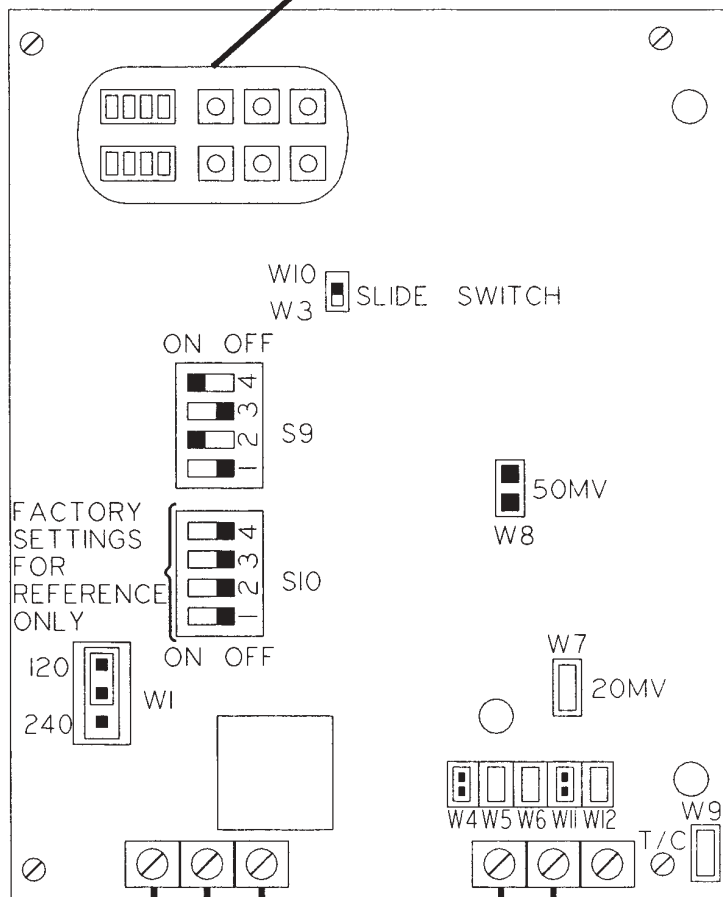
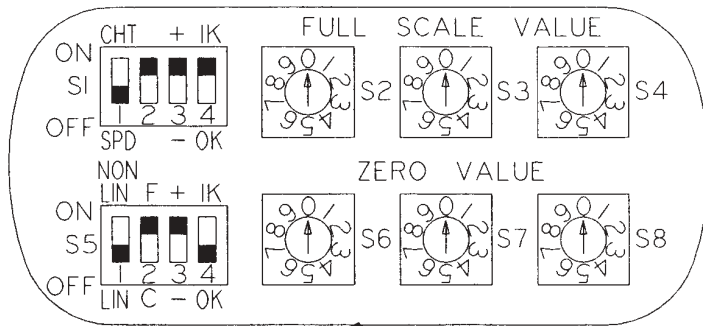
PIN NUMBER	FUNCTION
4	RTS
5	CTS
7	GROUND
19	GROUND
2	Tx D
3	Rx D
11	Tx D RETURN
13	Rx D RETURN
10	Tx D SRC
12	Rx D SRC
23	Tx D ACTIVE
25	Rx D ACTIVE
24	GROUND
9	+5 VDC
6	+5 VDC

BI-DIRECTIONAL SERIAL INTERFACE - INSTALLATION WIRING

370.130.130.004

ISSUE 0 1-94

LOSS OF WEIGHT INDICATING SCALE



L1 L2 GND
(HOT) (NEUT)

4-20 mA
INPUT

JUMPER PRESENT

JUMPER NOT PRESENT

NOTE: — WIRING BY USF/W&T.

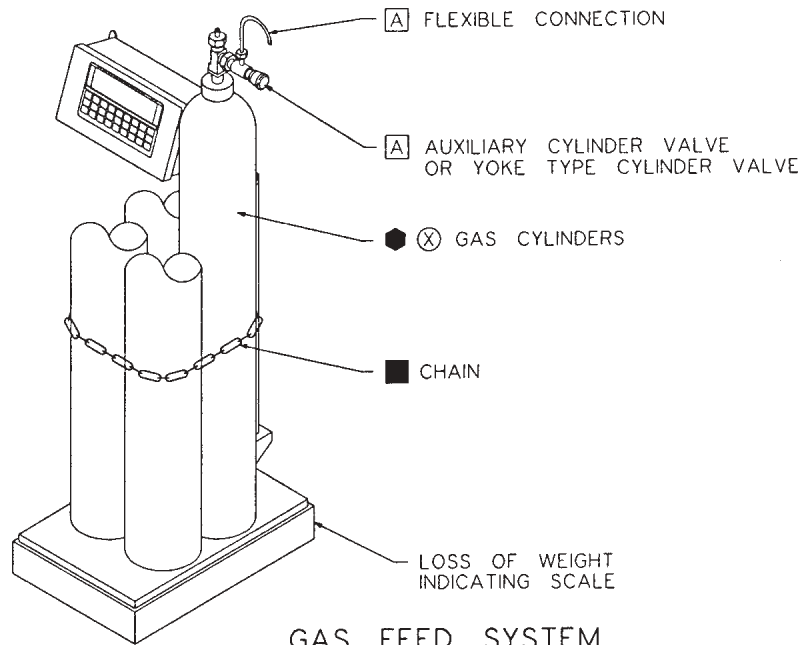
— FIELD WIRING (NOT BY USF/W&T) MUST CONFORM TO LOCAL ELECTRICAL CODES.

CIRCULAR CHART RECORDER - INSTALLATION WIRING

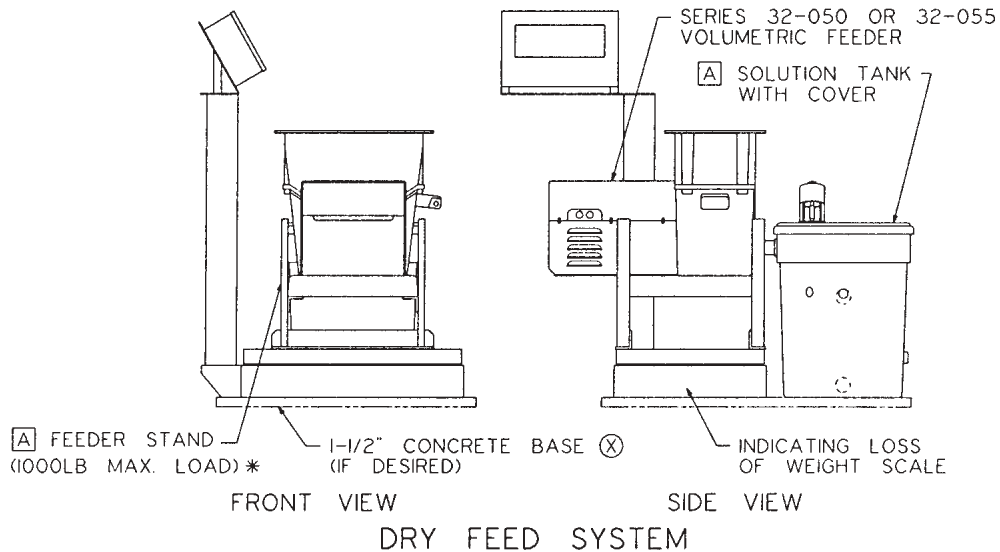
370.130.130.005

ISSUE 0 1-94

LOSS OF WEIGHT INDICATING SCALE



GAS FEED SYSTEM



DRY FEED SYSTEM

- NOTE:**
- (X) NOT FURNISHED BY USF/W&T.
 - (A) ACCESSORY ITEM FURNISHED ONLY IF SPECIFICALLY LISTED IN QUOTATION.
 - * TOTAL WEIGHT OF FEEDER, HOPPERING, AND CHEMICAL NOT TO EXCEED 1000 LB.

- WARNING:**
- TO PREVENT POSSIBLE PERSONAL INJURY OR EQUIPMENT DAMAGE, GAS CYLINDERS MUST BE SECURED IN SUCH A MANNER (e.g. CHAIN) AS TO PREVENT THEIR BEING KNOCKED OVER.
 - AMMONIA GAS SHOULD NOT BE STORED IN OR FED FROM THE SAME ROOM WITH CHLORINE, CONTACT OF THE GASES MAY RESULT IN AN EXPLOSIVE MIXTURE, WHICH CAN CAUSE SERIOUS DAMAGE OR INJURY TO PERSONNEL.

DRY FEED AND GAS FEED SYSTEMS - TYPICAL INSTALLATION

370.130.110.003

ISSUE 0 2-94

LOSS OF WEIGHT INDICATING SCALE

SECTION 3 - OPERATION

List Of Contents

	PARA./DWG. NO.
Explanation of Keypad Functions	3.1
Key Functions	3.1.1
Annunciators	3.1.2
Setup and Calibration	3.2
Factory Default Settings Setup/Calibration	
Parameters	3.2.1
Setup Review Mode	3.2.2
Dry Chemical Volumetric Screw Feeder	
Application	3.2.3
Compressed Chlorine Gas Cylinder	
Application	3.2.4
General Weighing Application	3.2.5
Record Format Specifications for Printer Output	
Port	3.3
Non-Continuous Printer Output	3.3.1
Continuous Printer Output	3.3.2
Data Format Specifications for Bi-Directional	
Serial Port	3.4
Input Commands	3.4.1
Responses to Input Commands	3.4.2
Continuous Data Output	3.4.3
Non-Continuous Weight on Demand Data	
Output	3.4.4
Illustrations	
Operation - Digital Indicator Keypad	370.130.170.001
Flow Diagram - Setup and Calibration	370.130.180.001A&B
Flow Diagram - Setup Review	370.130.180.002A&B

3.1 Explanation of Keypad Functions (See Dwg. 370.130.170.001)

The Series 37-130 Loss of Weight Indicating Scale has a 27-key membrane keypad for entering commands and parameters.

NOTE: The keypad is covered with a protective plastic film that prevents soiling during installation. It should be peeled off when setup is complete.

3.1.1 Key Functions

The keys are referenced by number and the annunciators are located around the perimeter of the display area next to the corresponding text label.

- ON/ZERO KEY (11): This is a dual function key. If the unit is “off”, pressing it will apply power to the indicator. If the unit is “on”, pressing it will zero the weight display.
- OFF KEY (18): Press this key to turn the unit “off”.
- E ← KEY (16): The E ← or ENTER key serves two purposes. First, pressing the ENTER key will display the current value of a parameter when reviewing during setup or calibration. Second, the ENTER key signals the end of data entry for a parameter and makes the scale process the new value.
- CLEAR KEY (10): Pressing this key removes an incorrect entry from the display and allows you to re-enter the correct value. Once the ENTER key has been pressed, the CLEAR key can no longer be used to correct an error.
- GROSS KEY (12): Press this key to display gross weight and turn “on” the GROSS annunciator.
- TARE KEYS (13,5): There are two TARE keys. Pressing the upper TARE key (13) momentarily displays the currently stored tare value.

The lower TARE key (5) is used to enter a new tare weight value. If pushbutton tare is selected during setup, pressing the lower TARE key stores the current gross weight on the scale as the new tare weight value. If keyboard tare is selected during setup, pressing the lower tare key will display the currently stored tare value and turn “on” the TARE annunciator. The tare weight may be retained by pressing the ENTER key or a new value can be typed in using the numeric keypad and then pressing ENTER. The current gross weight on the scale can

LOSS OF WEIGHT INDICATING SCALE

also be stored as the new tare weight by pressing the GROSS key and then the ENTER key. Once a tare weight has been entered, the display will automatically change to indicate net weight and the NET annunciator will turn “on”.

- NET KEY (14): Pressing this key makes the scale display net weight and turns “on” the NET annunciator. Net weight is understood to be gross weight minus tare weight. If a tare weight value has not been entered, the scale ignores this key.
- PRESET KEY (3): This key performs two functions. If the preset weight comparator (PWC) annunciator is “off” when this key is pressed, the bar graph display mode will change to show PWC status and the PWC annunciator will turn “on”. The preset weights are programmable alarm points that work together with the alarm relays. When the displayed weight equals or exceeds the value of the weight preset, the two bar graph elements directly beneath the corresponding preset number will turn “on”. The factory default for the scale provides four presets and actuates the corresponding four alarm relays. If the PWC annunciator is “on”, pressing the PRESET key will allow the preset target values to be entered. The display will show PSEtx= where x is the preset number being considered and will range from 1 to 4. Press the ENTER key to display the currently stored value of the first preset. If the displayed alarm weight is correct, press the ENTER key to advance to the trim value. If the displayed alarm weight is incorrect, use the numeric keypad to type in the correct weight and then press the ENTER key to store it and advance to the trim value. The display will then show trx=, which asks for the trim weight of the corresponding alarm point. Press the ENTER key to display the currently stored trim value. The trim weight is used to compensate for material in transit and causes the alarm to actuate when the displayed weight equals or exceeds the preset value less its associated trim value. If the trim value is correct, press the ENTER key to store it. If the displayed trim value is incorrect, use the numeric keypad to type in the correct weight and then press the ENTER key to store it and advance to the next preset. During entry of the preset and trim weights, the two bar graph elements corresponding to the PWC selected will flash. After all presets have been set, the scale will return to normal operation. However, the procedure may be aborted by pressing the CLEAR key at a PSEtx=prompt.

NOTE: PWC #1, #2, #3 & #4 correspond to alarm relay OUTPUTS #1, #2, #3 & #4 respectively. Alarm relays #1 & #3 are normally-closed while #2 & #4 are normally-open. Therefore, OUTPUTS #1 & #3 will be energized with line voltage only when the displayed weight

LOSS OF WEIGHT INDICATING SCALE

drops below its corresponding preset comparator alarm point and OUTPUTS #2 & #4 will be energized with line voltage only when the displayed weight equals or exceeds its corresponding preset comparator alarm point.

- **BAR KEY (7):** The BAR key is used to control the operation of the 30- element bar graph display. If the PWC annunciator is “on”, the bar graph is currently displaying the preset weight comparator status. Pressing the BAR key will change the bar graph to a weight display and turn the PWC annunciator “off”. In this weight display mode, the bar graph provides an analog representation of a preselected weight range. If the PWC annunciator is “off”, pressing the BAR key will allow entry of the start and stop weights for this weight range by first displaying StArt=. Press the ENTER key to display the current value of weight where the bar graph will start from the left end. If the displayed start weight is correct, press the ENTER key to advance to the stop weight. If the displayed start weight is incorrect, use the numeric keypad to type in the correct value and then press the ENTER key to store it and advance to the stop weight. The display will then show StoP=, which is the weight where the bar graph will stop at the right end. Press the ENTER key to display the current value of stop weight. If the displayed stop weight is correct, press the ENTER key. If the displayed stop weight is incorrect, use the numeric keypad to type in the correct value and then press the ENTER key to store it. The scale will now resume normal operation using the new start and stop weights for the bar graph display.

NOTE: The start and stop weights can be any value greater than zero but less than the full capacity specified in the setup routine. The stop weight must also be greater than the start weight.

- **TEST KEY (1):** The TEST key is used to check that all display elements can turn on and to show the calibration “C” numbers. The test consists of six steps, each lasting about two seconds, as follows:
 - a. All vertical segments and the left 1/3 of the bar graph will turn “on” but no annunciators.
 - b. All horizontal segments and the center 1/3 of the bar graph will turn “on” but no annunciators.
 - c. All annunciators, decimal points and the right 1/3 of the bar graph will turn “on”.
 - d. All display elements are turned “off”.

LOSS OF WEIGHT INDICATING SCALE

- e. The calibration numbers C1, C2, C3 and C4 will be displayed in sequence. These numbers correspond to the particular values of the setup parameters and the calibration settings. It is a good idea to write these numbers on a piece of paper and store them in a safe place after completion of the setup and calibration instructions. By recording these numbers, you will be able to return the scale to its present setup and calibration settings without using test weights if for some reason they ever become erased or corrupted. They would be entered at the beginning of the calibration routine as discussed in SETUP REVIEW MODE.

NOTE: If any components have been changed that affect calibration and your scale is used in a commercial application where it must be “legal for trade”, you can not use “C” numbers to re-calibrate.

- f. The model number 748 and the software version X.X are displayed.
- lb/kg KEY (9): Using the factory default setting, pressing this key will alternate the weighing units between pounds and kilograms. If the lb annunciator is “on”, pressing the lb/kg key will change the displayed weight units to kilograms and turn the kg annunciator “on”. Pressing the lb/kg key again will return the scale to displaying pounds again.
 - TIME/DATE KEY (2): Pressing the TIME/DATE key will display the current time in 24 hour military format with 12 added to all times after noon. If the displayed time is correct, press the ENTER key to display the date. If the displayed time is incorrect, use the numeric keypad to type in the correct time and press the ENTER key to reset the time and display the date. If the displayed date is correct, press the ENTER key to resume normal operation. If the displayed date is incorrect, use the numeric keypad to type in the correct date and press the ENTER key to reset the date and resume normal operation. Remember to enter the date in the same format as is selected by the DOM/INT jumper on the main printed circuit board. The DOM or DOMestic position requires month-day-year and the INT or INTernational position requires day-month-year. The factory default setting is DOM.
 - PRINT KEY (15): Pressing this key will start the transmission of weight data via the printer port. The printer port parameters must first be specified in the setup and calibration routine as discussed in SETUP REVIEW MODE and a printer connected before using this key. The scale will not respond to this key if the displayed weight is unstable or less

than zero. It will also not respond to this key if continuous printer output has been selected in the setup and calibration routine.

- ID KEY (8): This key is used to display and enter an identification number for printing and truck storage. If the truck storage feature was not selected in the setup and calibration routine, pressing this key will display the current identification number. If this number is correct, press the ENTER key to retain it. If the number must be changed, use the numeric keypad to type in up to a six-digit identification number and press the ENTER key to save it. The ID annunciator turns on when the display is showing an identification number.
- F1 & F2 KEYS (4, 6): These keys are used as function keys in other applications such as truck storage and are not applicable here.
- 0 through 9 KEYS (17): These keys are used to enter numeric data during the setup and calibration routine as well as during normal operation of the instrument.

3.1.2 Annunciators

The annunciators are located around the perimeter of the display area and turn “on” to indicate that the display is in the mode corresponding to the adjacent text label. The annunciators flash on and off to indicate that the scale is waiting for an input from the keyboard for the mode indicated by the flashing annunciator.

- GROSS: Indicates that the displayed weight is the gross weight.
- TARE: Indicates that the displayed weight is the tare weight.
- NET: Indicates that the displayed weight is the net weight, which is gross weight minus tare weight.
- ZERO: Indicates that the displayed weight is within +/- 1/4 graduation of the center of zero.
- PWC: Indicates that the bar graph elements under the numerals 1 through 8 to the left of the arrow show preset weight comparator status. Two bar graph elements, located beneath each of the eight preset weight numbers, turn “on” to indicate that the displayed weight equals or exceeds the corresponding preset weight value less its trim weight value. When this annunciator is turned “off”, the bar graph is an analog representation of a selected portion of the weight range.

- **STABLE:** The STABLE annunciator is identified with two small triangle shapes and turns on when the weight display is stable. This means that the change in successive weight samples is less than the motion limits selected during setup and calibration.
- **lb/kg:** The lb annunciator indicates that the units of displayed weight are pounds. The kg annunciator indicates that the units of displayed weight are kilograms.
- **TIME/DATE:** The TIME/DATE annunciator turns “on” when the display shows either the time or date.

3.2 Setup and Calibration

Throughout the setup and calibration processes, a “YES” response is provided by pressing the “1” key and a “no” response is provided by pressing the “0” key. Also, the ENTER key has a dual function in that it can display the current value of a parameter and store the value of a newly entered parameter.

3.2.1 Factory Default Settings for Setup/Calibration Parameters (See Dwg. 370.130.180.001)

The FLOW DIAGRAM drawing contains details of possible selections and configurations. To begin the Setup/Calibration process, locate the calibration pushbutton on the main printed circuit board (see Dwg. 370.130.130.001 in Section 2). To access this switch, open the door of the enclosure. First press the OFF key to turn “off” the indicator. Press and hold the calibration pushbutton, press and release the ON/ZERO key and then release the calibration pushbutton. The indicator will first display 748 X.X and then dUAL r.

- **dUAL r :** Press the ENTER key to display the current value. The display should indicate “no,” which means that dual ranging is disabled and the scale will contain only a single range. Dual ranging might be desirable, for example, if you want fine resolution for the lower 10% of capacity but coarse resolution for the upper 90%. Press the ENTER key to advance to int= .
- **int= :** Press the ENTER key to display the current value. The display should indicate 5, which means that it will indicate weight in intervals of 0.5 pounds or 0.5 kilograms. Press the ENTER key to advance to dP= .

LOSS OF WEIGHT INDICATING SCALE

- **dP=** : Press the ENTER key to display the current value. The display should indicate 1, which means that it will indicate weight as XXXXX.X with only 1 digit after the decimal point. Press the ENTER key to advance to CAP=.
- **CAP=** : Press the ENTER key to display the current value. The display should indicate 600.0, which means that the full scale capacity is 600.0 pounds. Press the ENTER key to advance to UnitS=.
- **UnitS=** : Press the ENTER key to display the current value. The display should indicate 3, which means that the scale will power up and calibrate in units of pounds but alternate between pounds and kilograms when the lb/kg key is pressed. Press the ENTER key to advance to CAL?.
- **CAL?** : Press the ENTER key to display the current value. The display should indicate “no,” which means that it will bypass the calibration process. Since we do not want to re-calibrate the scale at this time, press the ENTER key to advance to trA=.
- **trA=** : Press the ENTER key to display the current value. The display should indicate 0.0, which means that zero tracking is disabled. If the displayed number was 3.0, for example, the scale would consider itself to be at zero when displaying weight if it is within 3 intervals or 1.5 pounds (3 X 0.5) of zero. The weight display would then be automatically re-zeroed to indicate 0.0 pounds. This is not a desirable feature in most applications since the zeroed amount accumulates. Press the ENTER key to advance to trL=.
- **trL=** : Press the ENTER key to display the current value. The display should indicate “no,” which means that there is no limit on the zero range and up to full scale capacity can be used for zeroing. Press the ENTER key to advance to PUO=.
- **PUO=** : Press the ENTER key to display the current value. The display should indicate “no,” which means that the scale will not automatically re-zero on power-up. Press the ENTER key to advance to FLt=.
- **FLt=** : Press the ENTER key to display the current value. The display should indicate 1, which means that a minimal number of weight samples will be averaged before being displayed. This has the effect of making the weight display more stable. Applications that have substantial vibration or shifting load may require more filtering to

LOSS OF WEIGHT INDICATING SCALE

dampen a jittery weight display. Refer to the FLOW DIAGRAM drawing for more details. Press the ENTER key to advance to UnSt=.

- UnSt= : Press the ENTER key to display the current value. The display should indicate 3, which means that the STABLE annunciator will turn “off” to signify an unstable weight reading when the difference between successive weight samples equals or exceeds 1.5 pounds (3 X 0.5). Some applications with substantial motion or vibration may need a motion range greater than 1.5 pounds. Refer to the FLOW DIAGRAM drawing for additional details. Press the ENTER key to advance to bL= .
- bL= : Press the ENTER key to display the current value. The display should indicate “no,” which means that the weight display will not blank if the scale encounters motion beyond the limits specified by the UnSt value. Press the ENTER key to advance to Sr= .
- Sr= : Press the ENTER key to display the current value. The display should indicate 2, which means that the display will update 2 times a second. Press the ENTER key to advance to ASH= .
- ASH= : Press the ENTER key to display the current value. The display should indicate 0, which means that automatic shutoff is disabled and the scale will not automatically shut off if the weight reading has not changed within a specified number of minutes. Press the ENTER key to advance to SLP= .
- SLP= : Press the ENTER key to display the current value. The display should indicate 0, which means that the sleep mode is disabled and the scale will not go into a “sleep” or “standby” mode if the weight reading has remained at zero for a specified number of minutes. Press the ENTER key to advance to PSEtS= .
- PSEtS= : Press the ENTER key to display the current value. The display should indicate 4, which means that 4 preset weight comparator points are specified and the scale has 4 alarm relays available. Press the ENTER key to advance to trSto= .
- Undr 1,2,3,4= : Press the ENTER key to display the current value for each preset weight comparator. The display should indicate “off,” which means the alarm relays actuate normally. Changing this selection to “on” reverses the sense of their actuation. In this case, normally-open becomes normally-closed and normally-closed becomes normally-open.

LOSS OF WEIGHT INDICATING SCALE

- **trSto=** : Press the ENTER key to display the current value. The display should indicate “no,” which means that the truck storage capability is disabled. Press the ENTER key to advance to **PbtAr=** .
- **PbtAr=** : Press the ENTER key to display the current value. The display should indicate “no,” which means that the red TARE key requires a keypad entry and cannot automatically tare out the weight currently on the platform. Press the ENTER key to advance to **CLtAr=** .
- **CLtAr=** : Press the ENTER key to display the current value. The display should indicate “no,” which means that the currently stored tare value will not automatically clear on power-up. Press the ENTER key to advance to **bAUd?** .
- **bAUd?** : Press the ENTER key to display the current value. The display should indicate “no,” which means that none of the serial ports will be configured. If you are using a printer or the bi-directional serial interface, its port parameters must first be configured before using it. Refer to the FLOW DIAGRAM drawing for additional details. Press the ENTER key to advance to **tAbS?** .
- **tAbS?** : Press the ENTER key to display the current value. The display should indicate “no,” which means that the locations for printable items will not be specified. If you are using a printer and need to specify the exact location of the printable items, refer to the FLOW DIAGRAM drawing for additional details. Press the ENTER key to advance to **CALdAC**.
- **CALdAC** : Press the ENTER key to display the current value. The display should indicate no. If you do not have the optional recorder or are not using the analog outputs, press the ENTER key again to advance to the “C” numbers. If you have the optional recorder and want to calibrate the 4-20 mA analog output against the actual recorder pen positions, press “1” to display YES and then ENTER. The display should indicate **bH 0=** . Press the ENTER key to display the current value. The display should indicate 0.0 for the value of back hand zero. Press the ENTER key to advance to **dAC H=**. Press the ENTER key to display the current value. The display should indicate 10.000 for the reference voltage of the D/A converter. Press the ENTER key to advance to **dAC HI** and 20 mA will be sent to the recorder. Adjust the SPAN potentiometer (R16) on the analog output board to make the pen pointer indicate full scale. The SPAN potentiometer is the one closest to the edge. Refer to Dwg. 370.130.130.002 in Section 2, for its location. After the adjustment is complete, press

the ENTER key to advance to dAC Lo and 4 mA will be sent to the recorder. Adjust the OFFSET potentiometer (R15) on the analog output board to make the pen pointer indicate zero. The OFFSET potentiometer is the one in the middle. After the adjustment is complete, press the ENTER key to again display CALdAC. Since the SPAN and OFFSET adjustments interact, it may be necessary to repeat the adjustment procedure until the pen positions are accurate. When the procedure is complete, answer no to CALdAC and press the ENTER key to advance to the “C” numbers.

- C1=, C2=, C3=, C4= : The display will show all four numbers in sequence and then indicate donE. Press the OFF key to exit the Setup/Calibration mode and then the ON/ZERO key to resume normal operation.

3.2.2 Setup Review Mode (See Dwg. 370.130.180.002)

The FLOW DIAGRAM drawing contains details of possible selections and configurations. The Setup Review mode differs from the Setup/Calibration mode in that the calibration and weight display steps are missing so that the settings can not be changed by mistake. To begin the Setup Review process, first press the OFF key to turn “off” the indicator. Press and hold the GROSS key, press and release the ON/ZERO key and then release the GROSS key. The indicator will first display 748 X.X and then PUO=. Use the same procedure as described in FACTORY DEFAULT SETTINGS SETUP/CALIBRATION PARAMETERS to view and/or change any parameters.

3.2.3 Dry Chemical Volumetric Screw Feeder Application

The application involves a USF/W&T Series 32-055 Volumetric Screw Feeder with the appropriate hopping and stand, mounted on the scale platform. Perform the following steps to put the system into service.

- a. With the scale turned “off” and nothing on the weighing platform, press the ON/ZERO key to turn it “on”. Verify that the display indicates a gross weight of -350.0 lbs +/- 0.5 lbs, tare weight of 0.0 lbs and net weight not defined. If the readings are not correct, record them and contact the factory for assistance.
- b. Press the ON/ZERO key to display a gross weight of 0.0 lbs.
- c. Assemble feeder stand according to directions in feeder instruction manual and place on scale platform. Secure the stand to scale platform by engaging “J” bolts into the total of four holes along the front

LOSS OF WEIGHT INDICATING SCALE

and back edges of the scale platform. When facing the front of the scale indicator display, position the feeder on the stand so that screw discharge points to the right and secure according to the directions in the feeder instruction manual.

- d. Note and record the displayed value of empty feeder zero deadweight. If this weight exceeds 350.0 lbs, it will be necessary to calibrate the scale as outlined in GENERAL WEIGHING APPLICATION. If it is less than or equal to 350.0 lbs, then press the ON/ZERO key to zero out the empty feeder zero deadweight. This deadweight includes empty feeder accessories as well. The display should then indicate 0.0 lbs.
- e. Get into the Setup/Calibration mode as directed in the FACTORY DEFAULT SETTINGS SETUP/CALIBRATION PARAMETERS paragraph.
- f. Press the ENTER key multiple times until the display indicates CAP=. Press the ENTER key one more time to display the current value. Use the numeric keypad to type in the desired capacity from the choices of: 100.0, 150.0, 200.0, 250.0, 300.0, 400.0, 500.0 or 600.0 lbs. Select the capacity that is equal to or just slightly greater than the desired batch amount. For example, a batch amount of 420.0 lbs needs a capacity of 500.0 lbs. Press the ENTER key to store the capacity and then press the OFF key to exit the Setup/Calibration mode.
- g. Press the ON/ZERO key and verify that the display still indicates a gross weight of 0.0 lbs. The Loss of Weight Indicating Scale is now ready for operation. Fill the feeder hopper with the desired batch amount.

3.2.4 Compressed Chlorine Gas Cylinder Application

The application involves compressed chlorine gas cylinders possibly manifolded together and mounted on the scale platform. The actual tare weight of each empty cylinder is usually stamped on the cylinder itself and is nominally 100 lbs. It is assumed that 150 lbs of compressed liquid chlorine are in a full cylinder, which makes the nominal gross weight of a full cylinder 250 lbs. A maximum of four cylinders can be accommodated. Perform the following steps to put the system into service.

- a. With the scale turned “off” and nothing on the weighing platform, press the ON/ZERO key to turn it “on”. Verify that the display indicates a gross weight of -350.0 lbs +/- 0.5 lbs, tare weight of 0.0 lbs

LOSS OF WEIGHT INDICATING SCALE

and net weight not defined. If the readings are not correct, record them and contact the factory for assistance.

- b. Press the ON/ZERO key to display a gross weight of 0.0 lbs.
- c. Get into the Setup/Calibration mode as directed in paragraph 3.2.1, Factory Default Settings Setup/Calibration Parameters.
- d. Press the ENTER key multiple times until the display indicates CAP= . Press the ENTER key one more time to display the current value. Use the numeric keypad to type in the desired capacity from the choices of: 100.0, 150.0, 200.0, 250.0, 300.0, 400.0, 500.0 or 600.0 lbs. Select the capacity that is equal to or just slightly greater than the weight of compressed chlorine gas. For full cylinders, the weight of compressed gas in each cylinder is assumed to be 150 lbs. As an example, if we want to manifold three full cylinders, the weight of compressed gas is assumed to be $(150 \times 3) = 450$ lbs and the capacity would be 500 lbs. For partially filled cylinders, first weigh each cylinder and then subtract its tare weight to arrive at the weight of compressed gas. Press the ENTER key one time to store the capacity and then several more times until the display indicates CAL?.
- e. Press the ENTER key to display the current value. The display should indicate no.
- f. Press the “1” key to change the display to YES and press the ENTER key to begin the weight calibration process. The display should indicate C1= .
- g. Press the ENTER key to display the current value.

NOTE: If the scale was calibrated previously and the four “C” numbers had been recorded, they should be entered now to return the scale to those settings without having to use test weights.

NOTE: If any components have been changed that affect calibration and the scale is used in a commercial application where it must be “legal for trade”, “C” numbers can not be used to re-calibrate.

Since test weights must be used for this procedure, leave the “C1” value unchanged and press the ENTER key to advance to the next step. The display will indicate CAL 1= , which is the “no load” or “zero” calibration weight.

LOSS OF WEIGHT INDICATING SCALE

- h. Press the ENTER key to display the current value. The display will indicate 0 for “zero” weight. Place test weights on the empty scale platform equal to the sum of all the cylinder tare weights plus the weight of any cylinder-mounted valves or piping. Press the ENTER key to store this “zero” deadweight and advance to the next step. There will be a period of a few seconds during which the display indicates a sequence of dashes - - - -. The display will eventually indicate CAL 2= , which is the “span” calibration weight.
- i. Press the ENTER key to display the current value. The display will indicate 0. Without removing the “zero” deadweight, place an additional 250.0 lbs on the scale platform and use the numeric keypad to type in 250.0 lbs. Press the ENTER key to store this “span” weight and advance to the next step. There will be a period of a few seconds during which the display indicates a sequence of dashes - - - -. The display will eventually indicate trA= .
- j. Press the OFF key to exit the Setup/Calibration mode and then remove all calibration weights from the scale platform.
- k. With the scale turned “off” and nothing on the weighing platform, press the ON/ZERO key to turn it “on”. Verify that the display indicates a negative gross weight equal to the magnitude of the “zero” deadweight used during calibration in step “h” above. In addition, the tare weight will be 0.0 lbs and net weight not defined.
- l. Place the chlorine cylinders on the scale platform along with any cylinder-mounted valves and piping.



WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR DAMAGE TO EQUIPMENT FROM FALLING CYLINDERS OR GAS RELEASE, SECURE CYLINDERS SO THAT THEY STAND UPRIGHT AND CAN NOT TIP OVER.

- m. The display will now indicate the weight of compressed chlorine gas. The Loss of Weight Indicating Scale is now ready for operation.

3.2.5 General Weighing Application

Perform the following steps to put the system into service.

- a. With the scale turned “off” and nothing on the weighing platform, press the ON/ZERO key to turn it “on”. Verify that the display indicates a gross weight of -350.0 lbs +/- 0.5 lbs, tare weight of 0.0 lbs

LOSS OF WEIGHT INDICATING SCALE

and net weight not defined. If the readings are not correct, record them and contact the factory for assistance.

- b. Press the ON/ZERO key to display a gross weight of 0.0 lbs.
- c. Get into the Setup/Calibration mode as directed in paragraph 3.2.1, Factory Default Settings Setup/Calibration Parameters.
- d. Press the ENTER key multiple times until the display indicates CAP=. Press the ENTER key one more time to display the current value. Use the numeric keypad to type in the desired capacity from the choices of: 100.0, 150.0, 200.0, 250.0, 300.0, 400.0, 500.0 or 600.0 lbs. Select the capacity that is equal to or just slightly greater than the desired batch amount.

NOTE: Capacity can not exceed (1000-“zero” deadweight). The “zero” deadweight is the weight of the empty equipment that may be placed on the scale platform in step h below.

For example, a batch amount of 420.0 lbs needs a capacity of 500.0 lbs. Press the ENTER key one time to store the capacity and then several more times until the display indicates CAL?.

- e. Press the ENTER key to display the current value. The display will indicate no.
- f. Press the “1” key to change the display to YES and press the ENTER key to begin the weight calibration process. The display will indicate C1=.
- g. Press the ENTER key to display the current value.

NOTE: If the scale was calibrated previously and the four “C” numbers had been recorded, they should be entered now to return the scale to those settings without having to use test weights.

NOTE: If any components have been changed that affect calibration and the scale is used in a commercial application where it must be “legal for trade”, “C” numbers can not be used to re-calibrate.

Since test weights must be used for this procedure, leave the “C1” value unchanged and press the ENTER key to advance to the next step. The display will indicate CAL 1= , which is the “no load” or “zero” calibration weight.

LOSS OF WEIGHT INDICATING SCALE

- h. Press the ENTER key to display the current value. The display will indicate 0 for “zero” weight. Place test weights on the empty scale platform equal to the weight of the empty equipment. Press the ENTER key to store this “zero” deadweight and advance to the next step. There will be a period of a few seconds during which the display indicates a sequence of dashes - - - -. The display will eventually indicate CAL 2= , which is the “span” calibration weight.
- i. Press the ENTER key to display the current value. The display will indicate 0. Without removing the “zero” deadweight, place an additional 250.0 lbs on the scale platform and use the numeric keypad to type in 250.0 lbs. Press the ENTER key to store this “span” weight and advance to the next step. There will be a period of a few seconds during which the display indicates a sequence of dashes - - - -. The display will eventually indicate trA= .
- j. Press the OFF key to exit the Setup/Calibration mode and then remove all calibration weights from the scale platform.
- k. With the scale turned “off” and nothing on the weighing platform, press the ON/ZERO key to turn it “on”. Verify that the display indicates a negative gross weight equal to the magnitude of the “zero” deadweight used during calibration in step “h” above. In addition, the tare weight will be 0.0 lbs and net weight not defined.
- l. Place the empty equipment on the scale platform.
- m. The display will now indicate a gross weight of 0.0 lbs. If it reads only slightly positive or negative by a few pounds, press the ON/ZERO key again to re-zero the reading to 0.0 lbs. The Loss of Weight Indicating Scale is now ready for operation. Fill the equipment with your desired batch amount.

3.3 Record Format Specifications for Printer Output Port

The information transmitted by the printer output port depends on the operation mode of the scale at the time the PRINT key is pressed as well as the print format selected. Refer to the setup and calibration information in Dwg. 370.130.180.001 for additional details on programming the printer output format.

3.3.1 Non-Continuous Printer Output

If continuous printer output has not been selected in the setup and calibration routine, then the printer will provide a hardcopy record only when the

LOSS OF WEIGHT INDICATING SCALE

PRINT key is pressed. The two general non-continuous printout formats are explained below.

- GROSS WEIGHT MODE:
ID[^]nnnnnn[^]hh:mm:ss[^]MM/dd/yy CRLF
xxxxxx[^]LB[^]G CRLF
- NET WEIGHT MODE:
ID[^]nnnnnn[^]hh:mm:ss[^]MM/dd/yy CRLF
xxxxxx[^]LB[^]G CRLF
xxxxxx[^]LB[^]TG CRLF
xxxxxx[^]LB[^]N CRLF

where:

- nnnnnn = six(6) digits of numeric identification with leading zeros suppressed
- hh = hours, two(2) digits; refer to Dwg.370.130.180.001 for additional information on 12 or 24 hour format
- mm = minutes, two(2) digits
- ss = seconds, two(2) digits
- MM = month, two(2) digits; refer to Dwg.370.130.180.001 for additional information on date format
- dd = day, two(2) digits
- yy = year, two(2) digits
- ID = ASCII letters “I” and “D” to identify data as identification
- LB = ASCII letters “L” and “B” to identify weight units as pounds. May also be “OZ” for ounces or “KG” for kilograms
- xxxxxx = six(6) numeric digits of weight with decimal point if required and leading zeros suppressed
- G = ASCII letter “G” for gross weight
- T = ASCII letter “T” for tare weight
- N = ASCII letter “N” for net weight
- CRLF = carriage return and line feed commands
- [^] = space(hex 20)

3.3.2 Continuous Printer Output

If continuous printer output has been selected in the setup and calibration routine, then the printer will provide a continuous hardcopy record in the following format.

CRPxxxxxxC[^]LB[^]M^{^^}ETX

LOSS OF WEIGHT INDICATING SCALE

where:

- CR = carriage return(0D hex)
- P = weight polarity; space for positive polarity or a “-” for negative polarity
- xxxxxx = six(6) numeric digits of weight with decimal point if required and leading zeros suppressed
- C = over capacity; space if weight is less than or equal to the scale capacity or ASCII letter “C” if weight exceeds scale capacity
- ^ = space(hex 20)
- LB = ASCII letters “L” and “B” to identify weight units as pounds. May also be “OZ” for ounces or “KG” for kilograms
- M = motion; space if there is no motion or ASCII letter “M” if there is motion
- ETX = (hex 03); last character in the weight data

3.4 Data Format Specifications for Bi-Directional Serial Port

In addition to the printer port, there is a second serial port in the weight indicator that can both receive and transmit serial data. The operation of the scale can be controlled by transmitting commands to it through this bi-directional port. The transmitted command string is acted upon as if it were received from the keypad.

3.4.1 Input Commands

The basic format for the input key commands is as follows:

STXKey Command[SubCommand][Weight Value]ETX

where:

- STX = (hex 02); must precede all serial commands
- KeyCommand = One of several predefined command functions that are listed below. All commands are subject to rejection just as they would be from the keypad.
- SubCommand = Optional command parameter
- Weight Value = Optional weight value required by some Key Commands. The weight value must meet the displayed interval, capacity and decimal point location of the indicator.
- ETX = (hex 03); must terminate all serial commands

LOSS OF WEIGHT INDICATING SCALE

The available KeyCommand functions are as follows:

- 0 : Switches the indicator to gross weight mode and performs the same function as pressing the GROSS key. The format for this function is STX0ETX.
- 1 : Switches the indicator to net weight mode and performs the same function as pressing the NET key. The format for this function is STX1ETX.
- 2 : Switches the indicator between the lb and kg modes and performs the same function as pressing the lb/kg key. The format for this function is STX2ETX.
- 3 : Zeros the weight display and performs the same function as pressing the ON/ZERO key. The format for this function is STX3ETX.
- 4 : Initiates a print sequence at the serial printer port and performs the same function as pressing the PRINT key. The format for this function is STX4ETX.
- 5 : Enters a tare weight value and performs the same function as pressing the TARE key and then entering a tare weight value. The format for this function is STX5xxxxxxETX, with xxxxxx being the tare weight value.
- 6 : Enters the bar graph limits and performs the same function as pressing the BAR key and then entering the start and stop values for the bar graph display. This function requires one command to enter the start weight and a second to enter the stop weight value. The format for this function is STX60xxxxxxETX, with xxxxxx being the start weight followed by STX61yyyyyyETX, with yyyyyy being the stop weight value. This command will not change the display from PWC to bar graph mode. Bar graph mode must first be selected manually.
- 7 : Enters the preset weight comparator (PWC) values and performs the same function as pressing the PRESET key and then entering a preset weight for one or all four preset weight comparators. The format for this function is STX7nxxxxxxETX, with n being the preset weight comparator number(1 through 4) and xxxxxx being the corresponding weight value. This command will not change the display from bar graph mode to PWC mode. PWC mode must first be selected manually.

3.4.2 Responses to Input Commands

The indicator will respond to every serial command received. The format of the response will serve to indicate the manner in which the serial command was processed. The general format for the response to a serial command is as follows:

STXResponse[RejectCode]ETX

where:

STX = (hex 02); precedes all responses

Response = ACK if the command was processed; NAK if the command was not processed

RejectCode = If NAK was transmitted to show that the command was not processed, a code number will be transmitted to indicate the reason for the rejection as follows:

0 : Unable to process the command (e.g., PRINT command sent while weight was unstable)

1 : Invalid data (e.g., improper key command format)

2 : Invalid weight data (e.g., wrong interval value, exceeds scale capacity, etc.)

ETX = (hex 03); last character of the response

3.4.3 Continuous Data Output

If continuous bi-directional serial port output has been selected in the setup and calibration routine, then weight data will be transmitted continuously in the following format.

CRPxxxxxxC^LB^M^ETX

where:

CR = carriage return (0D hex)

P = weight polarity; space for positive polarity or a "-" for negative polarity

xxxxxx = six (6) numeric digits of weight with decimal point if required and leading zeros suppressed

C = over capacity; space if weight is less than or equal to the scale capacity or ASCII letter "C" if weight exceeds scale capacity

^ = space(hex 20)

LOSS OF WEIGHT INDICATING SCALE

LB = ASCII letters “L” and “B” to identify weight units as pounds. May also be “OZ” for ounces or “KG” for kilograms

M = motion; space if there is no motion or ASCII letter “M” if there is motion

ETX = (hex 03); last character in the weight data

3.4.4 Non-Continuous Weight-On-Demand Data Output

If continuous bi-directional serial port output has not been selected in the setup and calibration routine, then weight data will be transmitted only in response to a weight request (ENQ).

The host device(e.g., computer) sends:

ENQ = (hex 05)

The indicator will respond:

Sxxxxxx^UU^M^CC^CR, if there is no decimal point in the weight display or SxxxxxxD^UU^M^CC^CR, if there is a decimal point in the weight display

where:

S = sign; space if weight is positive or a “-” if weight is negative

xxxxxx = six (6) numeric digits of weight with leading zeros suppressed

^ = space (hex 20)

D = decimal point embedded in weight, if decimal point selected during setup and calibration

UU = weight units, either lb or kg

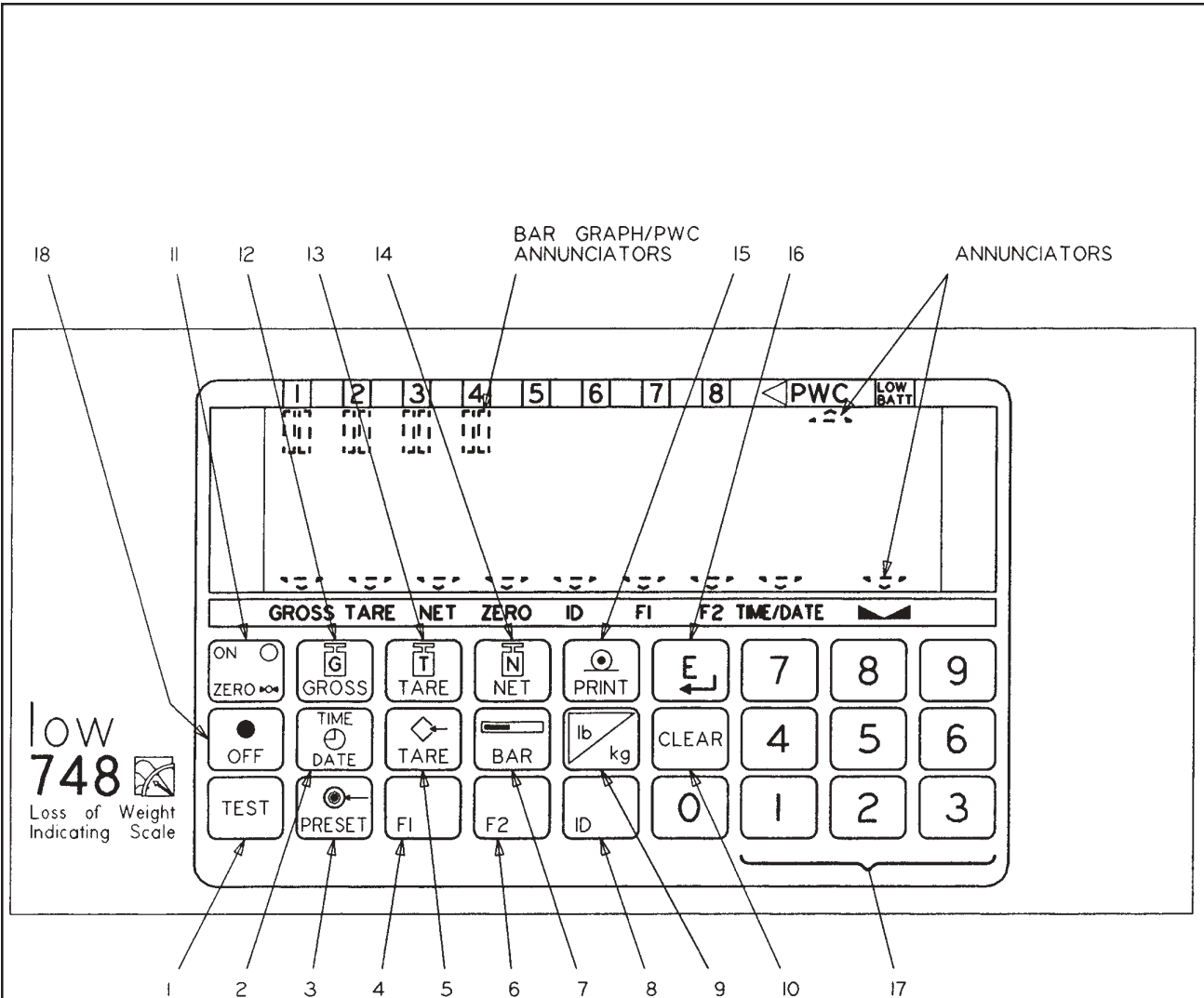
M = weight mode; ASCII letter “G” if displaying gross weight or ASCII letter “N” if displaying net weight

motion = space if there is no motion or ASCII letter “M” if there is motion

CC = weight status; ASCII letters “OC” if weight exceeds scale capacity, ASCII letters “BZ” if weight is below zero or ASCII letters “MO” if there is motion

CR = carriage return (hex 0d)

LOSS OF WEIGHT INDICATING SCALE



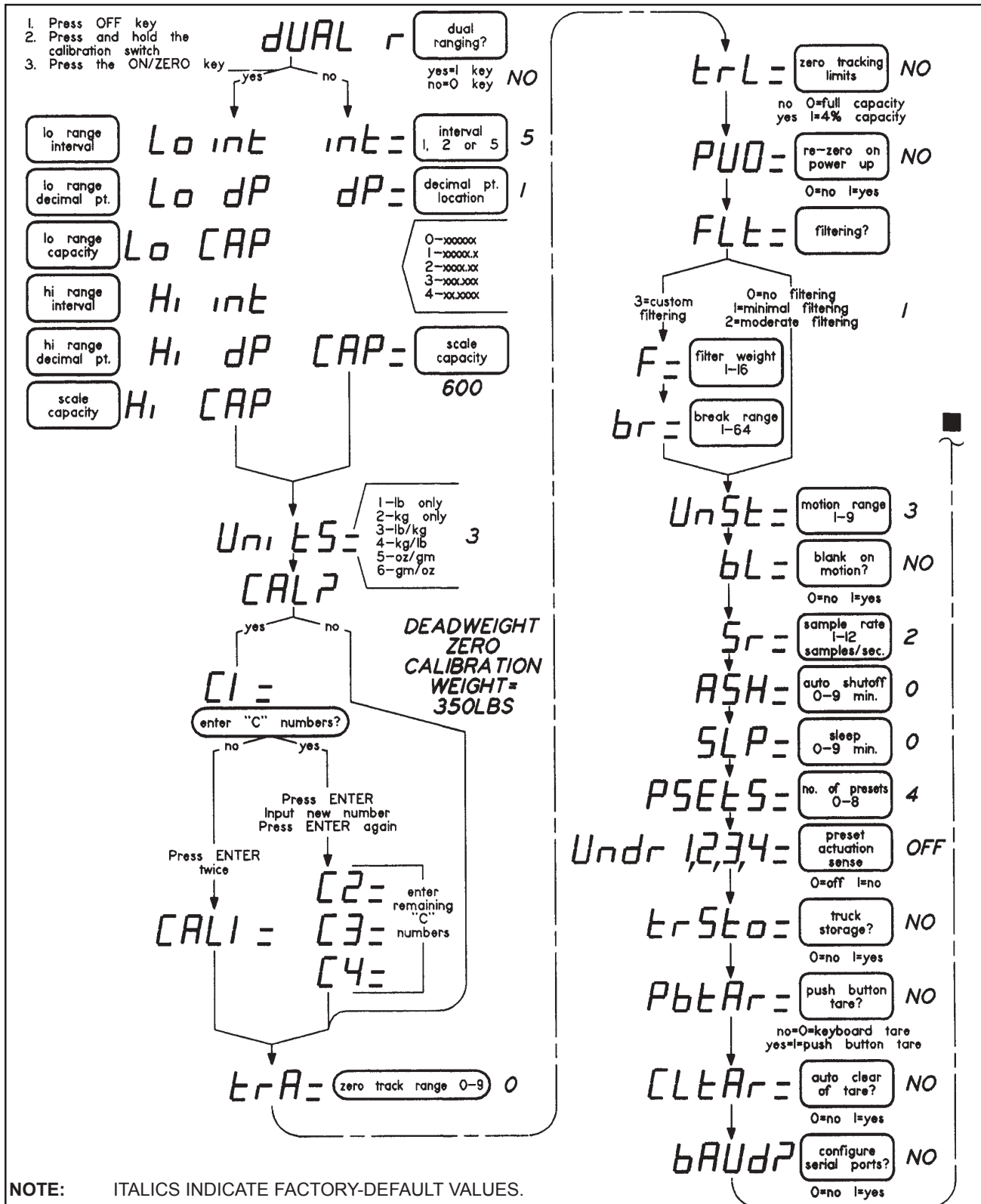
NOTE: SEE INSTRUCTION BOOK TEXT FOR FUNCTION OF INDIVIDUAL FRONT PANEL COMPONENTS.

DIGITAL INDICATOR KEYPAD - OPERATION

370.130.170.001

ISSUE 0 1-94

LOSS OF WEIGHT INDICATING SCALE

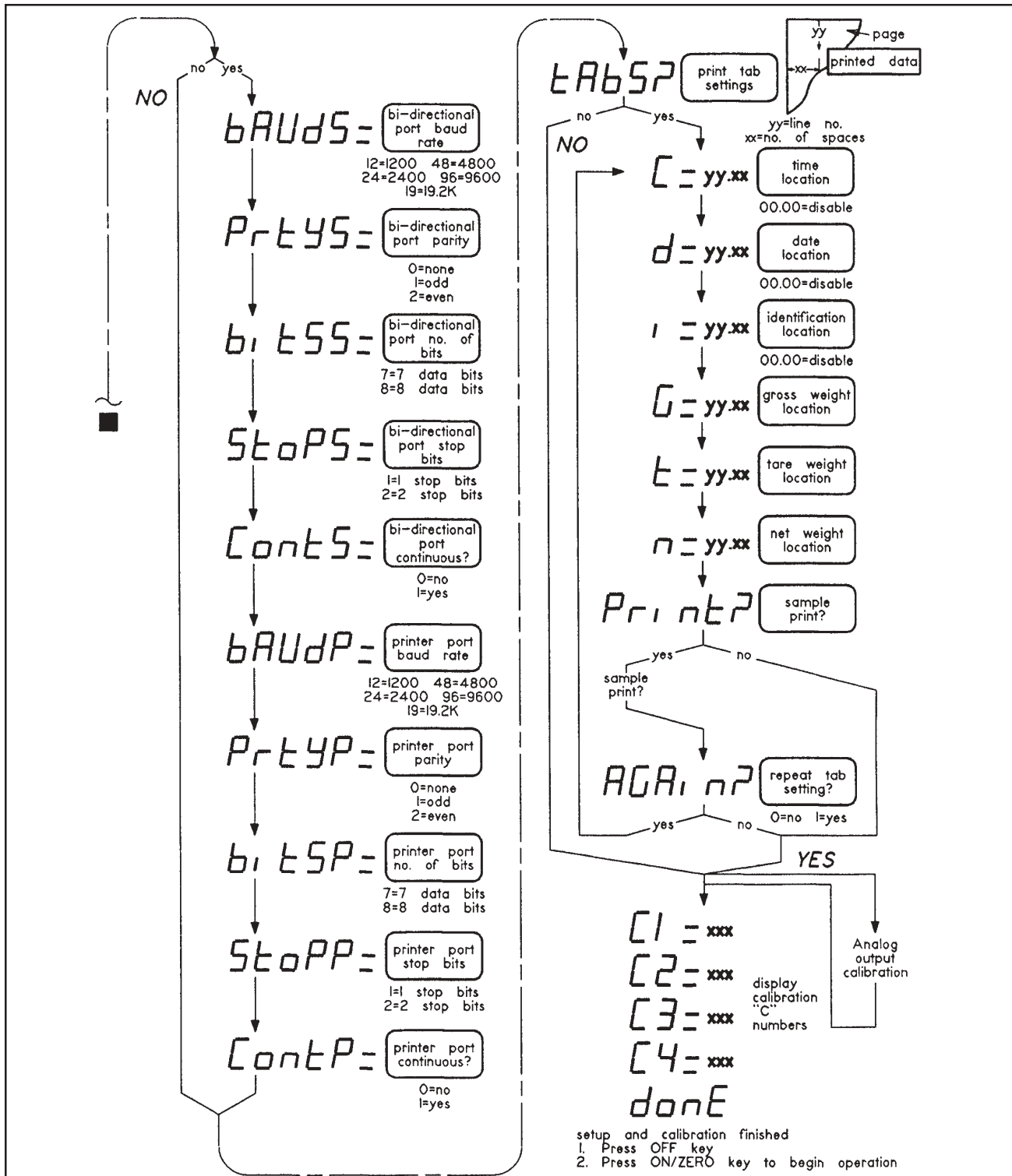


SETUP AND CALIBRATION - FLOW DIAGRAM

370.130.180.001A

ISSUE 1 7-94

LOSS OF WEIGHT INDICATING SCALE



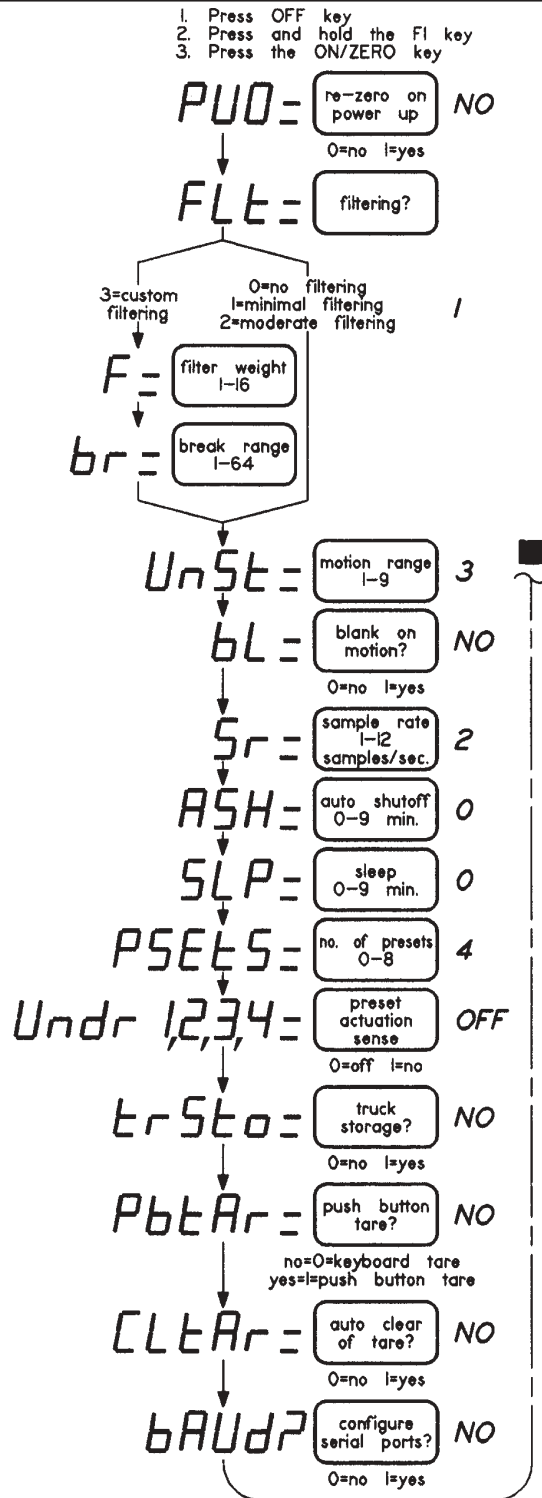
NOTE: ITALICS INDICATE FACTORY-DEFAULT VALUES.
 ■ CONTINUED FROM 370.130.180.001B.

SETUP AND CALIBRATION - FLOW DIAGRAM

370.130.180.001B

ISSUE 1 7-94

LOSS OF WEIGHT INDICATING SCALE



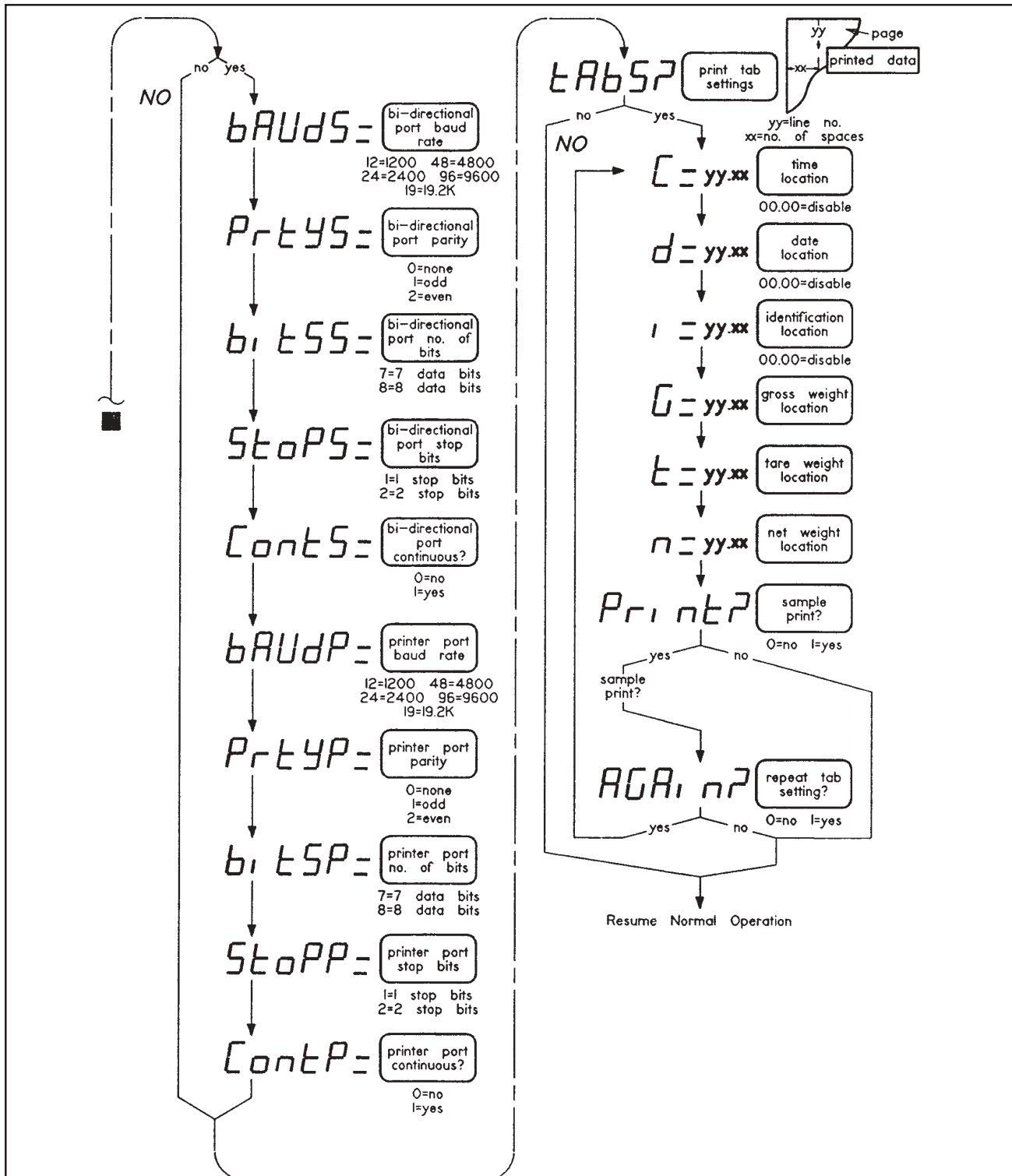
NOTE: ITALICS INDICATE FACTORY-DEFAULT VALUES.
■ CONTINUED ON 370.130.180.002B.

SETUP REVIEW - FLOW DIAGRAM

370.130.180.002A

ISSUE 1 7-94

LOSS OF WEIGHT INDICATING SCALE



NOTE: ITALICS INDICATE FACTORY-DEFAULT VALUES.
 ■ CONTINUED FROM 370.130.180.002B.

SETUP REVIEW - FLOW DIAGRAM

370.130.180.002B

ISSUE 1 7-94

LOSS OF WEIGHT INDICATING SCALE

SECTION 4 - SERVICE

List Of Contents

	PARA. NO.
General	4.1
Lubrication	4.2
Calibration	4.3
Warning Summary Page	1 Page

4.1 General

The Series 37-130 Loss of Weight Indicating Scale contains software that indicates when an error in operation takes place. Once the source of the problem has been identified, it is a matter of either retrying the keypad command or replacing a defective part. The list of available spare parts is found in Section 6.

The following is a list of error code displays along with their meaning.

- **UnStb** : Motion is present when trying to power up, zero or perform a pushbutton tare function. If this message occurs, wait for a stable weight display as signaled by the STABLE annunciator turning on before performing the operation again.
- **UnLod** : The weight on the scale exceeds the zero range when powering up. If this message occurs, remove the excess load and then press the ON/ZERO key.
- **LoAd** : The scale deadload is less than the zero range when powering up. If this message occurs, replace the scale platform or other items normally on the scale and press the ON/ZERO key.
- **-oF-** : The indicator is attempting to display a positive number greater than six(6) digits in length or a negative number of more than five(5) digits. If this message occurs, return to the gross weight mode and review the tare value.
- **-oL-** : The weight on the scale exceeds the scale capacity plus nine(9) intervals. If this message occurs, remove the over capacity load from the scale platform.
- **CALb** : An E2PROM checksum failure has occurred on the main printed circuit board. If this message occurs, first try to recalibrate with “C” numbers or test weights, see paragraph 3.2.5, General Weighing Application. If that does not fix the problem, then the main board may be defective and need to be replaced.
- **ErrA** : There has been a loss of the voltage-to-frequency signal to the processor on the main board. If this message occurs, a load cell connection may be loose, the load cell may be defective or the main board may be defective. Tighten a loose load cell connection. If necessary, replace the load cell or the main board.

LOSS OF WEIGHT INDICATING SCALE

- Err1 : A program checksum mismatch has been detected. If this message occurs, the problem may be a defective main board. The main board may need to be replaced.
- Err2 : An illegal write to the NOVRAM has been detected. If this message occurs, the problem may be a defective main board. The main board may need to be replaced.
- Err 3 : An internal RAM failure has occurred. If this message occurs, the problem may be a defective main board. The main board may need to be replaced.
- Err r : The RAM test has detected one or more failures in the internal RAM memory. If this message occurs, the problem may be a defective main board. The main board may need to be replaced.
- E.r.r.o.r. : If this message occurs, the problem may be any one of the following illegal keypad entries. First determine which of the reasons for the error display is applicable as described below:
 - PRINT key pressed with a negative weight.
 - TARE key pressed to enter a pushbutton tare value of zero or a negative value.
 - ENTER key pressed to enter a tare weight value that exceeds the scale capacity.
 - ENTER key pressed to enter a tare weight value that is inconsistent with the scale's interval value; (e.g., attempting to enter a tare of 123 with scale intervals of 5).
 - ZERO key pressed when the gross weight is outside the scale's zero weight range.
 - lb/kg key pressed to change to kilograms when the kilogram tare weight value exceeds four(4) digits in length.

Take the appropriate corrective action as determined by reading the corresponding text for the Keypad Function as described in paragraph 3.1.1.

4.2 Lubrication

Lubrication of scale components is not required.

4.3 Calibration

The scale is setup and calibrated at the factory prior to shipment. Unless the load cell, circuit boards or weighing members are replaced, recalibration will not normally be required. However, if recalibration is necessary refer to paragraph 3.2.3, Dry Chemical Volumetric Feeder Application, paragraph 3.2.4, Compressed Chlorine Gas Cylinder Application or paragraph 3.2.5, General Weighing Application.

LOSS OF WEIGHT INDICATING SCALE

WARNING LABEL

The following warning label has been attached to the equipment:

L2016: TO AVOID POSSIBLE SEVERE PERSONAL INJURY FROM
ELECTRICAL SHOCK, TURN POWER OFF BEFORE SER-
VICING.

LOSS OF WEIGHT INDICATING SCALE

LOSS OF WEIGHT INDICATING SCALE

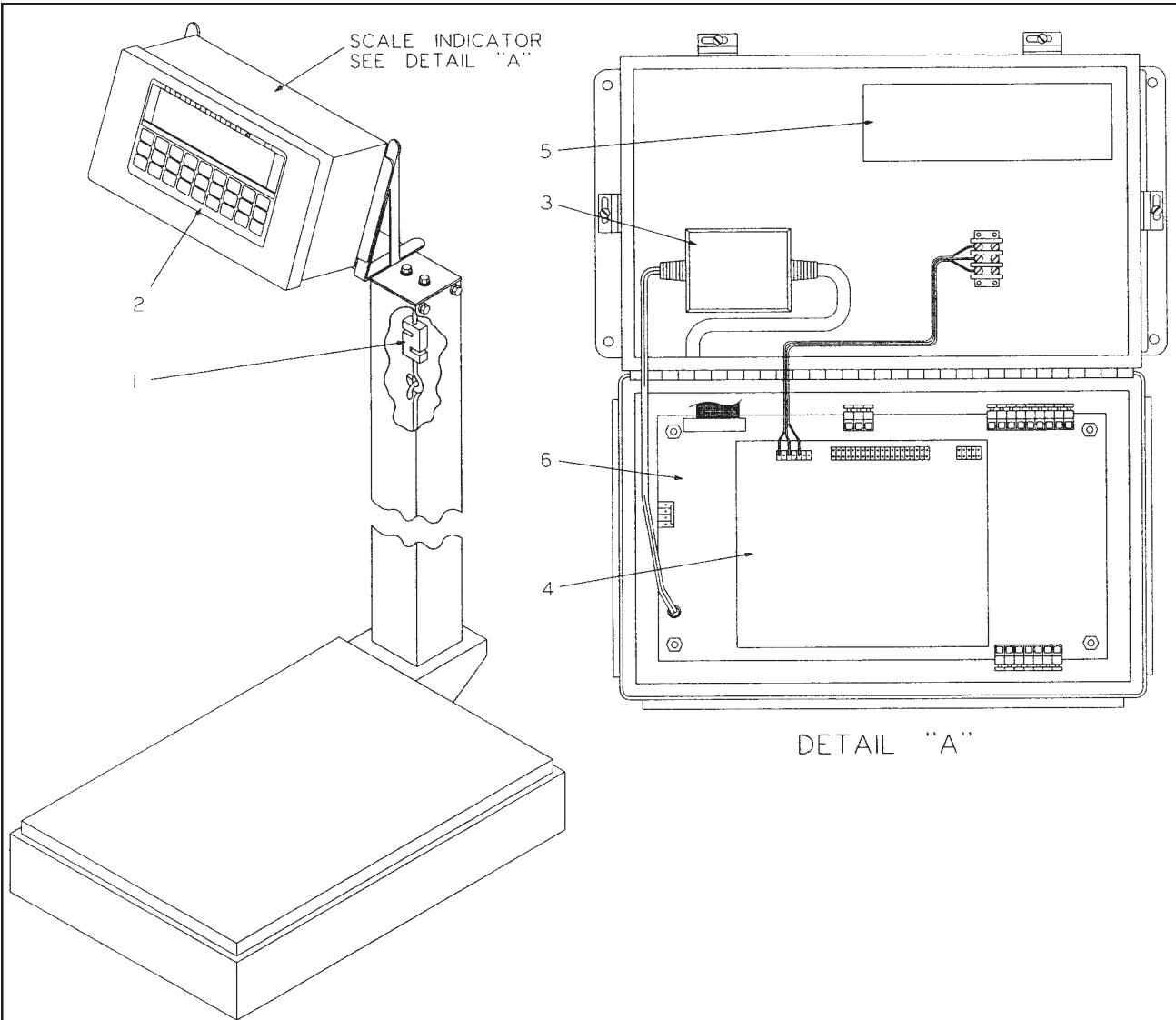
SECTION 5 - ILLUSTRATIONS

List Of Contents

DRAWING NO.

Parts	
Indicating Scale	370.130.000.001

LOSS OF WEIGHT INDICATING SCALE



KEY NO.	PART NO.	QTY.	DESCRIPTION
1	U 29348	1	LOAD CELL ASSEMBLY
2	U 29347	1	KEYPAD
3	U 29346	1	POWER ADAPTER FOR 230 VAC, 50/60 HZ
	OR		
	U 29345	1	POWER ADAPTER FOR 115 VAC, 60 HZ
4	U 29344	1	ANALOG OUTPUT CIRCUIT BOARD
5	U 29343	1	ALARM RELAY OUTPUT CIRCUIT BOARD
6	U 29342	1	MAIN CIRCUIT BOARD
-	L 2016	1	WARNING LABEL (NOT SHOWN)

NOTE: ▲ PART OF U29367.

■ PART OF U29341.

U29367 - 230VAC, 50/60HZ; U29341 - 115VAC, 60HZ
LOSS OF WEIGHT INDICATING SCALE - PARTS

370.130.000.001

ISSUE 0 1-94

LOSS OF WEIGHT INDICATING SCALE

SECTION 6 - SPARE PARTS LIST

SERIES 37-130 LOSS OF WEIGHT INDICATING SCALE

<u>QTY.</u>	<u>DESCRIPTION</u>	<u>PART NO.</u>
1	Load Cell Assembly	U29348
1	Keypad	U29347
1	Power Adapter for 230 Vac, 50 Hz	U29346
1	Power Adapter for 115 Vac, 60 Hz	U29345
1	Analog Output Circuit Board	U29344
1	Alarm Relay Output Circuit Board	U29343
1	Main Circuit Board	U29342
Box of 100	Chart Paper, 7 Day, 0-100	PXA60373
Box of 100	Chart Paper, 7 Day, 0-150	PXB60373
Box of 100	Chart Paper, 7 Day, 0-200	PXC60373
Box of 100	Chart Paper, 7 Day, 0-250	PXD60373
Box of 100	Chart Paper, 7 Day, 0-300	PXE60373
Box of 100	Chart Paper, 7 Day, 0-400	PXF60373
Box of 100	Chart Paper, 7 Day, 0-500	PXG60373
Box of 100	Chart Paper, 7 Day, 0-600	PXH60373
Box of 100	Chart Paper, 24 Hour, 0-100	PXA60372
Box of 100	Chart Paper, 24 Hour, 0-150	PXB60372
Box of 100	Chart Paper, 24 Hour, 0-200	PXC60372
Box of 100	Chart Paper, 24 Hour, 0-250	PXD60372
Box of 100	Chart Paper, 24 Hour, 0-300	PXE60372

LOSS OF WEIGHT INDICATING SCALE

<u>QTY.</u>	<u>DESCRIPTION</u>	<u>PART NO.</u>
Box of 100	Chart Paper, 24 Hour, 0-400	PXF60372
Box of 100	Chart Paper, 24 Hour, 0-500	PXG60372
Box of 100	Chart Paper, 24 Hour, 0-600	PXH60372