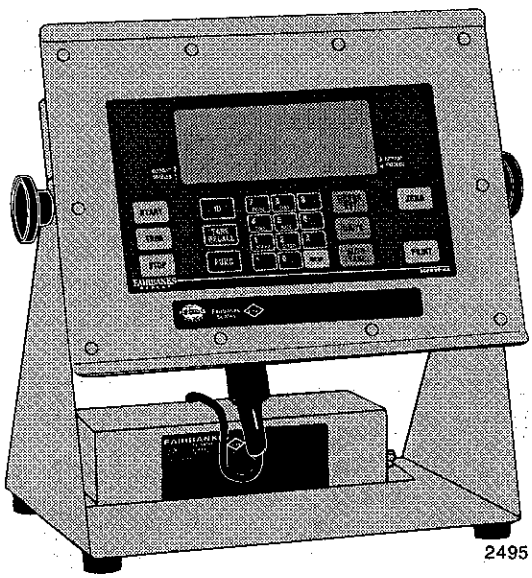
OPERATING MANUAL

Fairbanks® Scales

Ultra Low Power Instrument

Models H90-3051
H90-3051C1 – H90-3051C4



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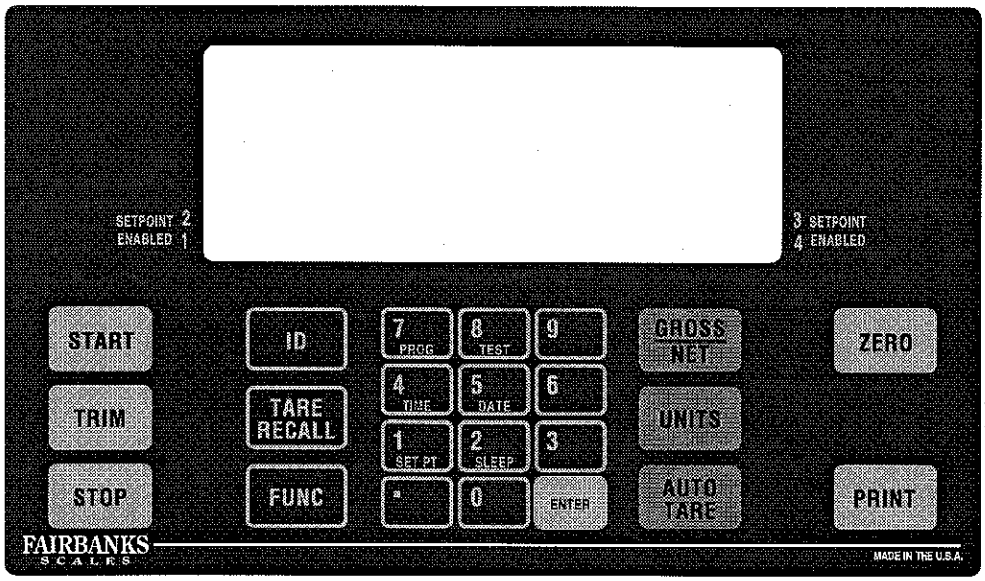
DISCLAIMER

Every effort has been made to provide complete and accurate information in this manual. However, although this manual may include a specifically identified warranty notice for the product, Fairbanks Scales makes no representations or warranties with respect to the contents of this manual, and reserves the right to make changes to this manual without notice when and as improvements are made to the product.



ULPI Model H90-3051 Front Panel

SECTION 1: DESCRIPTION OF EQUIPMENT

1.1 Introduction

The information in this Section provides a general description of the product, customer/operator responsibilities, technical specifications/features, safety and lists various accessories available for the product.

> *WARNING*
> *For Factory Mutual Approved Installation in hazardous areas see control drawing 3-56060 in Appendix III included in this manual.*

1.2 General Description

Fairbanks Low Power Series Digital Instruments, H90-3051, are designed to function as weight indicating and control elements of electronic or electro-mechanical (Levetronic) weighing systems. The Instrument converts the analog weight signal from the Load Receiver to digital display and output data.

Major features of the Low Power Series include pushbutton programming/calibration and an alphanumeric status display. Microprocessor-controlled weight conversion circuits allow the Instrument to be rapidly programmed at installation to meet the specific requirements of the application.

1.3 Customer/Operator Responsibilities

Do not break the seals on the instrument or attempt any internal adjustments. It is the customer/operators' responsibility to maintain the platform, instrument, and peripheral Accessories provided by Fairbanks in good order, and to protect the equipment from accidental or malicious damage. Other than the procedures authorized in Section 6 "Instrument Service", no service, repair, or adjustment may be performed by untrained personnel.

1.4 Specifications/Design Features

A. Technical Specifications

1. Capacities:
   Up to 500,000 lb, kg, oz, g, ton, tonne, or lbs-to-gallon conversion

2. Division Sizes:
   Service Programmed for 0.00001 to 200

3. Resolution/Accuracy:
   Up to 10,000 divisions maximum in commercial applications
   Up to 20,000 divisions maximum in non-commercial applications

   Accuracy - meets Handbook H-44 requirements

4. Sensitivity:

   1 microvolt/division
   Maximum signal input: 3mV/V

5. Rounding:
   Nearest division (0.5 division rounded upwards), per NIST H-44.

6. Display:

   a. High contrast liquid crystal numerals

   b. 6 active digits; 5 active digits with minus sign

   c. 7 segment, 1.25" high, Decimal points

   d. Center-of-Zero legend

   e. Weighing mode legends and any required prompts

   f. Various displays that will light up giving the operator an indication of which function the instrument is in.

7. Rezero Range:
   2% or 100% of capacity, service programmable.

8. Display Update Rate:
   Service programmable 0.3, 0.5, 0.8 or 1.0 seconds

9. Out of Weight Range Warning:

   a. Overcapacity Warning:
      When the gross weight exceeds the capacity by 5% or more, the instrument will indicate an overload condition by displaying "- - - - -".

   b. Underload Warning:
      Displays "- - - - -" if weight on platform is below the instruments operating range.

10. Auto Zero Tracking (AZT):
    Compensates for gradual buildup of material on the load receiver. Service-programmable for OFF, ± 0.6, 1.0, or 3.0 divisions.

11. Warm-Up Time:
    Warm-up approximately 10 seconds; displays "-Init-" during warm-up.

12. Radio Frequency Interference (RFI):
    Protected against RFI radiation.

13. Motion Detection:
    Programmable for 0.6, 1.0, 2.0, 3.0 divisions.

14. Calibration Program Protection:
    100% retention of calibration/programming data in nonvolatile EEPROM.

15. Outputs (Accessories required):

    a. Setpoint Accessory #584 and #5804 provide 2 and 4 outputs respectively for use in controlling alarms, gates, etc. Refer to Section 5 for details.

    b. The SMART 4-20 mA Accessory #5810 is driven by either the net or gross weight or by the output from the instruments A/D converter. Refer to Section 5 for details.

    c. Printer/Remote Display Data Output is only available when Interface Accessories #5805, #5806, #5807 and #5808 are included in installation. Refer to Sections 5 and 6 and Appendix V for details.

16. Load Cell Excitation:
    8 volts pulsed; passing through current limiting resistors.

17. Load Cell Cable Length:
    Use only shielded Cable as specified below.

    a. Single or multiple load cells, up to 25 feet of cable without sense leads - use Fairbanks cable #701125.

    b. Single or multiple load cells, up to 500 feet of cable with sense leads - use Fairbanks cable #701025.

18. Load Cells:
    Up to 4 - 350 ohm; 8 - 750/1000 ohm cells

19. Sleep Mode:
    Two "Battery Saver" functions for maximum battery life.

    a. Instrument can be programmed to automatically shut-off after a period of time if no Instrument functions are used.

    b. Instrument can be manually turned OFF by pushing the FUNC and then 2 SLEEP key.

20. Battery Life:
    Battery Life is affected by the load on the Instrument excitation circuit, the Sleep Mode function and the accessories used.

B. Requirements

The following requirements apply to the Instrument only. If Accessories are interfaced, consideration must be given to any further limitations or requirements described in the particular device's Instruction Manual.

1. Power Requirements:
   Power - Battery Pack, Accessory #575, supplied with Instrument or Accessory #575D (dual battery pack)

> *NOTE*
> *For hazardous area installations, Battery Pack must be removed to safe area for recharging or may be trickle charged in the hazardous areas through the use of accessories.*

2. Grounding Auxilliary Equipment:
   Any auxilliary equipment (e.g. 5800 accessory) connected to an AC line (117 VAC ± 10%; 50/60 Hz, ± 0.5 HZ) must be connected to a grounded powerline having maximum 3.0 ohms resistance to true earth ground. Instrument chassis should be connected to true earth ground.

3. Environment:

   a. Temperature:
      Operating –10°C (14°F) to + 40°C (104°F)
      Maximum change rate ±10°C (20°F)/hour

      Storage: – 40°C (– 40°F) to + 60°C (140°F)

   b. Relative Humidity: 0% to 100%, Suitable for water wash-down

1.5 Accessories

The H90-3051 is compatible with the Fairbanks Accessories described below.

> *NOTE*
> *Accessories can be installed in hazardous areas where specifically indicated. For hazardous area installations, some Accessories must be located in safe area except where otherwise indicated.*

A. Interface Accessory #5800

A NEMA 4x, water-tight/dust tight corrosion resistant box installed in a safe area, is required:

1. to house Accessories 5804, 5811, and 584.
2. to provide trickle charge for all battery accessories.
3. to provide power to instrument when used with Accessory 5810 or 5814.

Dimensions 15½" x 14" x 6⅜.

B. Battery Pack Accessory #575/575D

These corrosion resistant rechargeable Battery Pack Accessories provide 8.0 VDC to the Instrument and are the **only** batteries to be used with the Low Power Instruments and may be installed in hazardous areas.

1. Cycle Life
   Battery can be recharged from 200 to 2000 times dependent on depth of discharge. Approximately 200 cycles at 100% discharge when LobAtt is displayed or 2000 cycles at 25%. A recharge schedule which would prevent the battery from becoming completely discharged is therefore recommended. It is recommended that the recharging of the batteries be as frequent as is practical.

2. Battery Storage
   Spare batteries or Instruments should be stored in a cool place to prevent battery self-discharge. At 40°C the battery will self discharge in 5 months, as compared to 20 months at 20°C. Batteries can be stored to temperatures to – 40°C.

3. Battery Charging
   Charging time is 12 hours for fully discharged battery, Accessory 575, or 24 hours for Accessory 575D. A fully charged battery will read approximately 8.6 VDC (open circuit) at 20° C.

C. AC Adapter Accessory #579

This Accessory will convert 117VAC to DC for use by the Instrument. Depending on how it is used, it may also supply a trickle charge for the battery. **It cannot be used in a hazardous area.**

The Accessory may be used in one of the following two ways. This option is suggested where the Instrument will be continuously in the ON state, and Accessory 5800 is not in place.

1. In a safe area application, it can be plugged directly into the battery jack (J2) on the bottom of the Instrument.

2. In a safe area application, it can be plugged into the Analog Output Connector (J3) on the bottom of the Instrument. The Accessory will provide power for the Instrument and supply a trickle charge for the battery (assuming Accessory 5810 or 5814 is used).

D. Interface Cable Accessory #576

Cable required for interface from the hazardous area Instrument to the safe area 5800 Interface Box. The maximum length must not exceed 500 feet in hazardous applications.

E. SMART 4-20mA Accessory #5810

This Accessory is in installed in the H90-3051 instrument and will provide the following outputs when used with Interface Accessory #5800:

1. 4-20mA analog current output. For more information see Section 5, Analog Outputs.
2. This accessory is necessary to operate Setpoint Accessory 584 or 5804.
3. Trickle charge for the instrument

F. Setpoints Accessory #584 and #5804

Two or four user selectable setpoints, Accessory #584 and #5804 are available. Accessory 5810, 5800 and 5811 must be installed with the setpoint accessories in hazardous locations. Grading scale operations do not require any accessories. Accessories 584 or 5804 are installed in the 5800 Interface Box located in a safe area.

G. Single Set of Safe Area Intrinsic Barriers Accessory #5811

Required for hazardous environment applications. There are two barriers per set. Installed in Accessory 5800. They are the connection between hazardous and safe areas.

H. Safe Area Battery Recharger Accessory #578

Replaced by Accessory 5815. This Accessory is used to recharge Battery Pack Accessory #575 or 575D and must be used only in the safe area. The accessory has no over-charge protection. It can only be used for 12 hours on a fully discharged 575 Battery Accessory or 24 hours on a fully discharged 575D Battery Accessory.

I. Battery Float Output Assembly #5814

Adapter located within the H90-3051 which enables the instrument to be trickle charged via the Interface Accessory #5800 in hazardous area applications or Accessory #579 in safe area applications without the need for a SMART 4-20mA Accessory.

J. Serial Communications Assembly #5805

This accessory is installed in the H90-3051 instrument and provides dual bi-directional fiber optic digital output board for interface to Accessory 5808.

K. Fiber Optic Cable #5806

Furnished in 25 feet multiples. One cable is required for each digital output. Maximum length is 150 feet. Contact Inquiry for longer distances.

L. One Pair Fiber Optic Digital Cable Connectors #5807

Required for each digital output of the H90-3051 and must be used with Accessory 5806.

M. Fiber Optic/RS232/Current Loop Transceiver #5808

Required for each digital output of the H90-3051. Bi-directional translator to convert Fiber Optics to RS232 20mA Current Loop signals.

N. 19" Rack Mount Adapter #5813

Replaces the front panel of the instrument and allows the instrument to be mounted in a standard 19" rack.

O. Interface Accessory #580

NEMA 4X, water-tight/dust-tight corrosion resistant box. Interface box is required when analog data interface to instrument is required. Battery trickle charge which continually recharges battery is included within this accessory. (Dimensions 15½" x 14" x 6⅜"). Refer to SJ4328 for further information. Replaced by Accessory 5800.

P. Smart Charger Accessory #5815

This accessory is a safe area battery charger which will provide overnight charging of a battery and then switch to a trickle charge mode to maintain full charge on the battery.

Q. Power Supply Accessory #5816

This accessory is an explosion proof junction box containing a conduit seal and a power supply. It is intended for use in all hazardous area locations except Group A and B locations. It is designed to be used in place of Battery Accessory 575.

Figure 2-1, on the following page, shows some of the relationships between the H90-3051 and the various accessories.

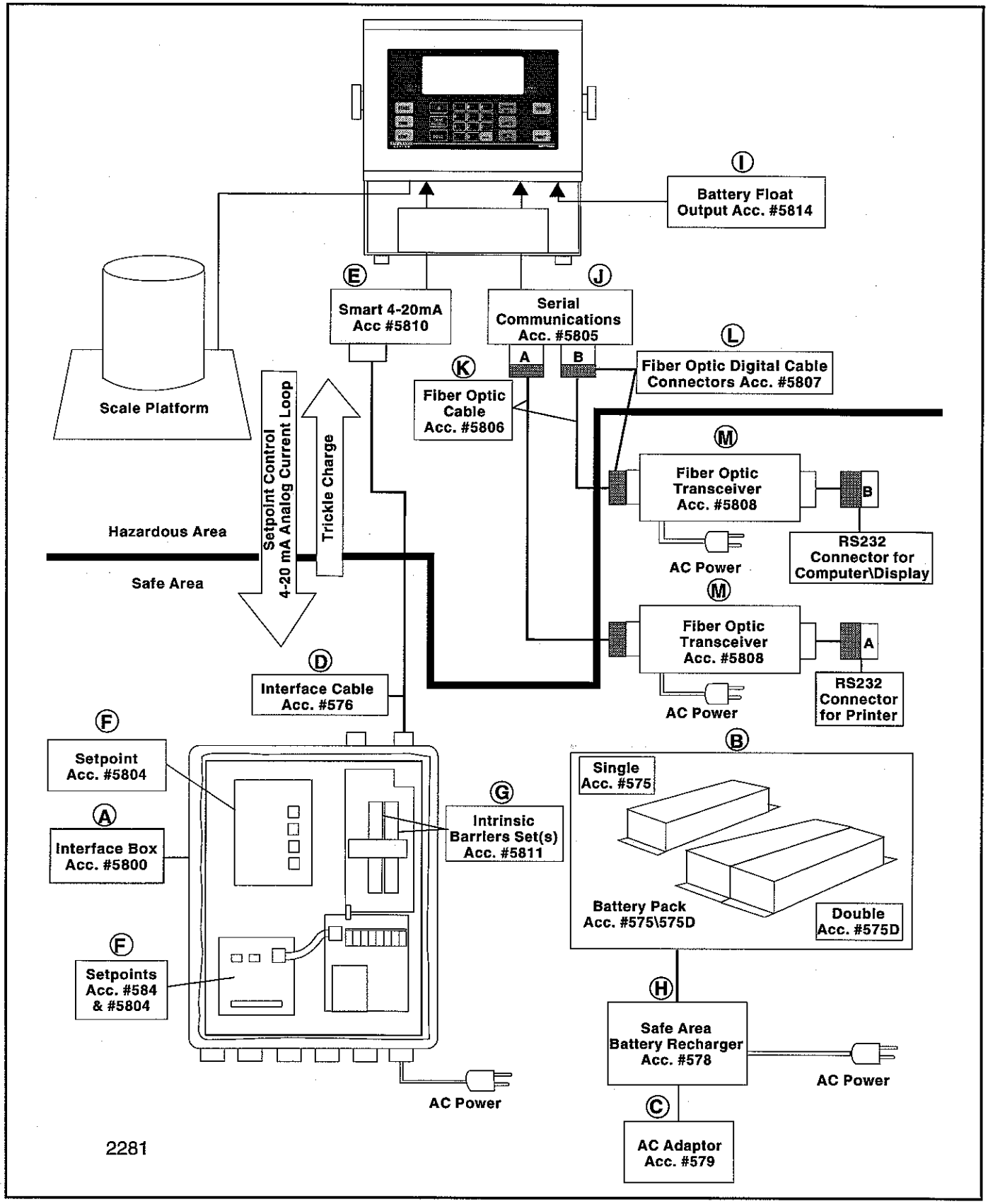


FIGURE 2-1
ACCESSORY FLOW CHART

SECTION 2: GENERAL INSTALLATION PROCEDURES

2.1 General Service Policy

Prior to installation, it must be verified that the equipment will satisfy the customer's requirements as supplied, and as described in this manual. If the equipment cannot satisfy the application and the application cannot be modified to meet the design parameters of the equipment, the installation should not be attempted.

The complete installation consists of:

1. Verifying application
2. Unpacking
3. Instrument checkout
4. Customer and site readiness:
   a. Is Location ready?
   b. Is Load Receiver ready?
   c. Is the customer aware there will be work disruptions?
   d. Is operator available for training?
5. Making Platform connections
6. Doing Calibration and Adjustments
7. Doing Customer training

NOTICE

A. These instructions apply to the instrument only; installation procedures for Printers and other Accessories are given in Manuals specifically provided for those units. The instructions include a pre-installation checkout, which must be performed, either at the Service Shop before the Technician goes to the site, or at the site before he places the equipment on-line.

B. All electronic and mechanical calibrations and/or adjustments required to make this equipment perform to accuracy and operational specifications are considered to be part of the installation, and are included in the installation charge. Only those charges which are incurred as a result of the equipment's inability to be adjusted or calibrated to performance specifications may be charged to warranty.

C. Absolutely no physical, electrical or program modifications other than selection of standard options and Accessories are to be made to this equipment. Electrical connections other than those specified may not be performed, and no physical alterations (mounting holes, etc.) are allowed.

D. The installing Technician is responsible to make certain that personnel are fully trained and familiar with the equipment's capabilities and limitations before he considers the installation complete.

2.2 Pre-Installation Checklist

The following points should be checked and discussed with the Field Engineer and/or Customer if necessary before the Technician goes to the site to install the equipment.

☐ Has the customer's application been checked to make certain that it is within the capabilities and design parameters of the equipment?

☐ If the installation will disrupt the customer's normal operations, is he aware and has he made arrangements?

☐ Is properly-grounded power available at the installation location?

☐ Will the equipment operator(s) be available for training?

☐ Has the Service Technician thoroughly reviewed the installation procedures?

☐ Has the Service Technician reviewed the recommended set-up with the Field Engineer or "Request for Service", and identified all necessary variations to satisfy the customer's particular application?

2.3 Unpacking

1. Check that all components and Accessories are on hand, and agree with the customer's order.
2. Remove all components from their packing material, checking to make certain that all parts are accounted for and no parts are damaged. Advise the shipper immediately if damage has occured. Order any parts necessary to replace those which have been damaged. Keep the shipping container and packing material for future use. Check the packing list.
3. Collect all necessary installation manuals for the instrument and accessories.
4. Open the Instrument:
   a. Using a 5/16" nut driver, loosen (but do not remove) the 4 screws along the bottom of the Front Panel.
   b. Remove the remaining six screws from around the Front Panel.
   c. Carefully tilt the Front Panel out from the enclosure.
5. Perform an inspection, making certain that all hardware, electrical connections and PC Assemblies are secure. Do not reinstall cover if final installation is to be performed after the pre-installation checkout.

2.4 Instrument Location

The Instrument should be positioned away from direct sunlight which would make the display difficult to read.

2.5 Printer/Remote Display Installation

Interface of a standard Fairbanks Printer or Remote Display requires the installation of Accessories #5805, #5806, #5807, and #5809. Refer to Fiber Optic Output Accessory Manual (SJ4326), and to the appropriate Printer or Remote Display Service Manual for set-up and programming procedures.

2.6 Safety

As is the case with any material handling equipment, certain safety precautions should be observed during operation:

1. Never load the platform beyond its rated capacity. Refer to the rating on the serial number plate if in doubt.
2. Ensure that any structure which supports the platform is capable of withstanding the weight of the platform plus it's rated capacity load.
3. Do not load the platform if there is any evidence of damage to the platform or supporting structure.
4. Use safety chains or other suitable restraining devices if there is any possibility of the load shifting, falling, or rolling from its position on the load receiver.
5. Do not leave the platform unattended when it is loaded.

SECTION 3: PRINTER SET-UP

3.1 Introduction

Programming the instrument outputs allows the instrument to be used with various printers and/or remote displays. This Section describes the procedures to setup a selected printer.

The Customer may have a Security Code that must be entered to enable Customer/Operator programming.

The following printers may be interfaced to the H90-3051 Series Instrument. The switch settings are furnished to aid in setting up these printers.

1. Interface to a Fairbanks Model 50-3920 Form Printer:

   Using the Printer Handbook, included with the printer, set the printer internal switches per the following tables:

	Switch on Controller PCB							
Function	1	2	3	4	5	6	7	8
ASCII - US	ON	OFF	OFF					
11" Form Length				OFF	ON			
No Auto LF						OFF		
8 Bit Data							ON	
Not Used *								OFF
* Must remain in the OFF Position								

	Switch on Serial Interface PCB							
Function	1	2	3	4	5	6	7	8
Busy Signal (SSD)	ON							
Baud Rate (2400)		ON	OFF	ON				
Not Used *					OFF			
Parity (8 Bit System)						ON		
Pin 20 Busy (DTR)							OFF	
Not Used *								OFF
* Must remain in the OFF position								

1a. Interface to a Fairbanks Model 50-3921 Serial Printer

Using the Printer Handbook included with the printer set the printer internal switches per the following table:

	Switch block on Controller PCB/Switch #							
Function	1	2	3	4	5	6	7	8
Ascii; slashed 0	OFF	OFF	OFF					
Form Length: 11 inches				OFF	ON			
Auto Line Feed: OFF						OFF		
Data Bits: 8							ON	
Front Panel: Enabled								OFF

	Switch Block # 1 on Super Speed Serial Board/Switch #							
Function	1	2	3	4	5	6	7	8
Parity: Odd	OFF							
Without Parity		ON						
Data Bits: 8			ON					
Protocol: Ready/Busy				ON				
Test Select: Circuit					ON			
Mode Select: Print						ON		
Busy Line; DTR "—" Pin # 20							ON	ON

	Switch Block # 2 on Super Speed Serial Board/Switch #							
Function	1	2	3	4	5	6	7	8
2400 Baud	OFF	OFF	ON					
DSR Input Signal: Inactive				OFF				
Buffer Threshold: 256 Bytes					OFF			
Buffer Signal Timing: 200MS (Min)						ON		
DTR Signal: Space After Power On							ON	
* Not Used								OFF

* Must remain in "OFF" position

** The printer will work only if the Busy H option is selected when programming the outputs

2. Interface to a Fairbanks Model 50-3710 Tape Printer:

   Using the manual included with the Printer, set the printer internal switches per the following tables:

	Printer Switch 1									
Function	1	2	3	4	5	6	7	8	9	10
7 or 8 Bit Data	OFF	OFF								
Parity Check			ON							
Even/Odd Parity				ON						
Stop Bit Length					ON					
RS232						ON				
TTL							OFF			
20mA Current Loop								OFF		
Right Home Position									OFF	
24 Column										OFF

	Printer Switch 2						
Baud Rate	1	2	3	4	5	6	7
9600	OFF						
4800		OFF					
2400			ON				
1200				OFF			
600					OFF		
300						OFF	
150							OFF

3. Interface to a Fairbanks 50-3925 Ticket Printer. Set the switches on bottom of printer to the following:

9 Position Switch	
Open	Closed
1, 4, 5, 6	2, 3, 7, 8, 9

4. Interface to a Fairbanks 50-3715 Tape Printer. Set the switches on bottom of printer to the following:

8 Position Switch	
DS1	DS2
6 ON All others OFF	2, 6, 7 ON 1, 3, 4, 5, 8 OFF

SECTION 4: OPERATIONS

4.1 Introduction and Overview

This Section describes operating procedures for the Low Power Instrument, H90-3051, when connected to a standard load receiver.

The operator should have a thorough understanding of the control functions and methods before attempting to operate this equipment.

Instructions apply to the instrument only. Refer to appropriate Accessory Manuals for their instructions.

4.2 Instrument Controls

This subsection provides a specific functional description of all instrument controls and indicators. Some control functions may be disabled as a result of service-programmed parameters.

A. Instrument Inhibits

Some of the instrument functions (zeroing, printing, etc.) will be inhibited if the instrument detects any of the following conditions:

i. Motion on the platform
ii. Underload
iii. Overload
iv. Out of re-zero range

B. Front Panel Keys

The functions of the front panel keys vary depending on the mode in which the instrument is operated. This Subsection defines the operation of each front panel key when in the weighing mode.

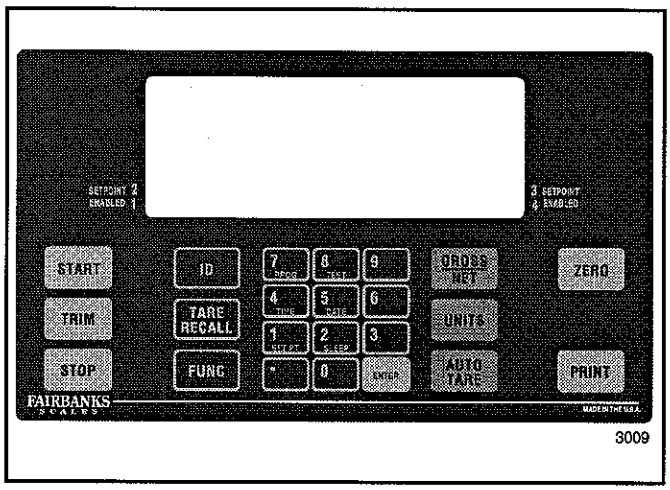


FIGURE 4-1: FRONT PANEL CONTROLS

1. ZERO

In Gross or Net Mode, this key will set the Gross weight equal to zero, if no inhibits are active.

a. If motion exists, the ZERO command will be retained and executed once the weight has stablized.

b. If the weight on the platform exceeds the zero limit and the ZERO key is pressed, the ZERO command will not be executed, nor will it be saved in memory.

c. If the instrument is in the NETmode and the ZERO key is pressed, the instrument will automatically revert to the gross mode and the ZERO command will be executed.

2. AUTO TARE

In Gross or Net Mode, this key will set Tare memory equal to the Gross weight on the Platform. The instrument will display "0" weight and enter the Net Weigh Mode. The NET Legend will be ON. Auto Tare will only operate if no inhibits are active and the Gross weight is positive.

3. UNITS

This key will toggle the displayed weight between the units that were selected in the Service Program e.i. kg to lb or lb to kg.

4. PRINT

This key is used to transmit weight data to an external device.

5. GROSS / NET

This key toggles between the Gross and Net Weigh Modes. If the instrument is in the Tare Mode , it will change to the Net Mode.

6. START

This key is used to initiate the set-point operation.

7. TRIM

This key is used to override the setpoint cycle and to add weight in touch controlled increments.

8. STOP

This key terminates the setpoint cycle. Also, it is used to select desired setpoint for subsequent setpoint operation.

9. ID

This key is used to enter a 6-digit numeric ID for printer/computer printout.

10. TARE RECALL

This key displays the current Tare value for 5 seconds.

11. ENTER

This key enters Tare data.

12. FUNC

This key gives access to the special function keys; time, date, setpoint, program, test, and sleep

13. Numeric Keys

Keys 0 through 9 and • are used to enter Tares.

14. Displays

Displays weight on load receiver.

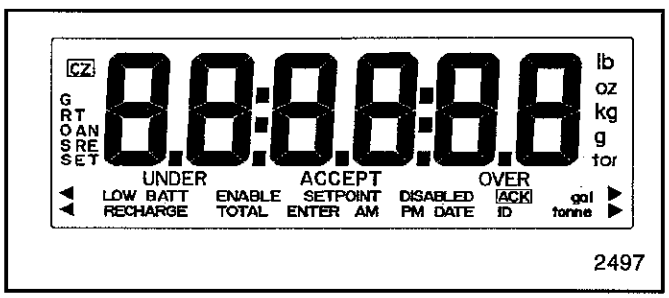


FIGURE 4-2: LEGENDS AND INDICATORS

15. Legends

There are 25 legends that can be displayed. While most are self explanatory, the following need some definition:

a. CZ Center of Zero

b. RECHARGE

Battery power is low and will need to be recharged soon. The RECHARGE legend appears when the input voltage to the instrument (either from a battery or through a barrier) falls below a threshold of approximately 7.8 volts.

b. LOW BATT

Battery requires immediate recharging. The LOWBATT legend appears (and the RECHARGE legend disappears) when the voltage falls below approximately 7.0 volts. The instrument will also shut itself OFF leaving a blank display except for the LOWBATT legend.

d. TOTAL (Not Used)

16. Indicators

There are four indicators that show that specific setpoints are active.

◀ ▶
◀ ▶

C. Input-Output Connections

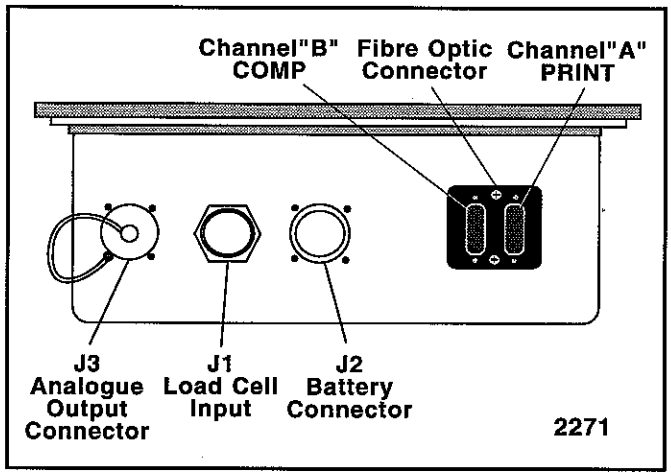


FIGURE 4-3: BOTTOM OF INSTRUMENT CASE

1. J1

Load receiver cable input connector.

2. J2

Battery power input connector.

3. J3

Analog output connector to Accessory #5800 Interface Box for use with Fairbanks Accessories. J3 is part of either Accessory 5810 or Accessory 5814.

4. Fiber Optic Output Connectors

Two 9-pin fiber optic connectors for output of printer or remote display data using channels "A" and "B". These connectors are part of Accessory 5805.

4.3 Instrument Weighing Functions

The industry uses three terms which describe the apportionment of an object's weight. These terms are GROSS WEIGHT, TARE WEIGHT, and NET WEIGHT.

Gross weight is the total weight of an object. This would include any incidental materials as well as the primary materials which comprise the object. Tare weight is the weight of the incidental materials. Net weight is the weight of the primary materials. Tare weight and Net weight together equal the Gross weight. A can of house paint is an object to be weighed. The can is incidental material used to hold the primary material, paint, and the label is incidental material used to identify the paint. All of the incidental materials' taken together make up the tare weight. All of the primary materials' weights together make up the Net weight; in this case pigment, vehicle, and solvent. The object is made up of incidental materials, can and label, and primary material, paint. Taken together, this is the gross weight.

The three weights can be expressed mathematically in terms of each other as follows:

GROSS = NET + TARE
TARE = GROSS – NET
NET = GROSS – TARE

The equation, NET = GROSS – TARE, is particularly important because it is the equation that a scale uses to figure net weights in NET WEIGHING MODE. The gross weight is a function of the weight on the platform and the zero reference. Tare weight is always an operator defined value.

A. Basic Weighing

1. Press the GROSS/NET key to select Gross as indicated by the legend.
2. With the platform empty, press the ZERO key. The display will indicate zero and the Center-of-Zero legend will appear.
3. Place the object to be weighed on the platform.
4. The weight will be displayed.

The instrument is only able to measure the weight on the platform. The instrument can not tell if the weight is from the object to be weighed or from some other objects left on the platform. The operator must tell the scale when there is nothing on the platform to be weighed. This is done by pressing the ZERO key. The instrument will assign what ever weight happens to be on the platform a zero weight value. This is called the instrument's zero reference.

Starting with an empty platform is not required. The ZERO key sets the display to "0", regardless of what is on the platform. Weighing in the Gross mode consists of pressing the ZERO key and placing a weight on the platform. The display will show the Gross weight of the object. The instrument understands Gross weight as the total weight placed on the platform after the ZERO key was pressed.

B. Tare Weights

The tare weight is operator defined. There are two ways to tell the instrument a tare weight to use. The first is to simply enter the tare value by the keyboard. This is called a keypad tare. The tare materials would have had to have been previously weighed so the operator would know what value to enter. The AUTO TARE key is the second way to enter tare values. If the tare weight is not known, then the operator has to weigh the tare materials. While the tare weight is displayed, the operator can avoid entering the displayed weight by pressing the AUTO TARE key. This will enter the displayed weight as a tare value.

The tare weight value will remain unaltered in memory until:

1. Power is removed.
2. The AUTO TARE key is pressed.
3. A new tare weight is entered via the keypad.
4. The Service Program mode is accessed.

If the value of the tare weight entered via the keypad does not correspond to an exact division size, the number will first be truncated to the correct decimal location and then rounded to the nearest division size, ie. for a division size of .1 an entered tare of 2.19 is truncated to 2.1 and then rounded to a final tare of 2.1. For a division size of 20 an entered tare of 511 will be truncated to 510 and then rounded to a final tare of 520.

Correct entry errors by entering "0's" until a single "0" is displayed.

C. Net Weighing Using The Keypad Tare

1. Enter the known tare weight of the empty carrier using the numeric keys. The instrument will automatically enter the Tare mode.
2. Push [ENTER] to select the Net Mode. The display will indicate a negative net value equal to the tare in memory.
3. Place the loaded carrier on the platform and read the Net weight at the display.
4. Repeat Step 3 for carriers of the same Tare.
5. Repeat from Step 1 for carriers of a different Tare.
6. To read Gross weight, push [GROSS/NET] to select Gross.
7. When the load is removed from the platform, the display will indicate a negative net value equal to the tare in memory.

D. Net Weighing Using AUTO TARE

1. Press the [ZERO] key. The display will read "0" and the GROSS Legend will be ON.
2. Place the empty carrier on the platform.
3. Press the [AUTO TARE] key. The display will show "0" and the NET Legend will be ON. The weight of the container on the platform will be entered into the scales memory as a Tare weight.
4. Place the material to be weighed in the container. The display will show the weight of the material in the container. This is the net weight.

> *NOTE*
> *Net weighing of pre-packaged carriers can be accomplished by first placing an empty carrier that is the same as the product carrier on the platform, and pushing* [AUTO TARE] *before beginning weighing operations.*

E. Batching Using AUTO TARE

1. Select the Gross Mode and place the empty carrier on the platform. The display indicates the Tare.
2. Push [ZERO].
3. Fill the carrier with the first item until the desired weight is achieved. Instrument display indicates the net weight of the first item (Mode is in GROSS).
4. Push [AUTO TARE] to reset the display to zero. Instrument display indicates zero net weight.
5. Place the next item into the carrier until the desired weight has been met.
6. Repeat Steps 4 and 5 until all items have been put into the carrier.
7. Switch to Gross and read the total net weight of the batch.
8. Repeat Steps 1 through 7 for other batches.
9. To clear the operation:
   a. Select the Gross Mode.
   b. Remove all material from the platform.
   c. Push [ZERO] to zero the display.
   d. Push [AUTO TARE] to reset.
   e. Select Gross Mode.

4.4 Entering ID's

1. Place the instrument into the weighing mode.
2. Press [ID] key. The current ID number and ID legend will be displayed.
3. Use the numeric keypad to enter a new ID number 0 through 999999.
4. Press the [ENTER] key to save the displayed ID number and return the instrument to the weighing mode.

The ID number will be printed as part of each print cycle if selected in function key programming.

4.5 Setpoint Requirements

A. Hardware Requirements

1. Operation of setpoints require accessories 5810, 5800 and 5804 (Quad Setpoint) or 584 (Dual Setpoint) to be installed.

NOTE
The "Grading Scale" mode does not require these accessories.

4.5.1 Service Requirements

1. At the time of installation, one of nine setpoint options must have been selected at Service Program Step 14.

Programming Step 14 (Setpoints)			
Subsection	Code	Option	
5.7.A.1	1	Acc 584	Independent Setpoints, Zero Start
5.7.A.2	2	Acc 584	Independent Setpoints, Zero End
5.7.B.1	3	Acc 584	Paired Setpoints, Zero Start
5.7.B.2	4	Acc 584	Paired Setpoints, Zero End
5.6	5	Grading Scale	
5.7.B.1	6	Acc 5804	Paired Setpoints, Zero Start
5.7.B.2	7	Acc 5804	Paired Setpoints, Zero End
5.7.A.1	8	Acc 5804	Independent Setpoints, Zero Start
5.7.A.2	9	Acc 5804	Independent Setpoints, Zero End

These codes will be referred to in the Setpoint Operation, Section 5.6

A. User Setpoint And Grading Scale Programming Requirements

User Setpoint and Grading Scale Programming is done according to directions given in Section 5, Function Key Programming.

4.6 Grading Scale Mode

NOTE
The ACC 5804 will not function in a Grading application. ACC 584 must be used.

A. General Instructions

In the Grading Scale Mode, the setpoint option is used to operate the "Under", "Over", and "Accept" legends on the front panel of the instrument.

In this mode, Setpoint 1 is the lower Accept limit and Setpoint 2 is the upper Accept limit. Setpoints 3 and 4 are not used.

1. "UNDER" is ON when the displayed weight is less than the Setpoint 1 value.
2. "OVER" is ON when the displayed weight is greater than the Setpoint 2 value.
3. "ACCEPT" is ON when the displayed weight is greater than or equal to the Setpoint 1 value but less than or equal to the Setpoint 2 value.

The Grading Scale option is functional in both Gross and Net Modes but only for positive weight displays.

The Grading Scale will not function if:

a. the weight on the platform is outside the weighing range,

b. the instrument is not in the weighing mode, or

c. a negative weight is displayed

The START, STOP and TRIM keys are disabled in the Grading Scale Mode.

B. Accessory 584

Accessory 584 can be used to provide dual relay outputs in the Grading Scale Mode.

The Setpoint 1 relay is engerized if the displayed weight is less than the Setpoint 1 value. This is the same range as for the "Under" legend on the display.

The Setpoint 2 relay will de-energize if the displayed weight is greater than the Setpoint 2 value. This is the same range as for the "Over" legend on the instrument display.

The "Accept" range is represented when setpoint 1 relay is de-energized and the Setpoint 2 relay is engerized.

	Acc 584 Relay State		
	Under	Accept	Over
Setpoint 1 Relay	E	D	D
Setpoint 2 Relay	E	E	D
D = De-energized E = Energized			

Both Setpoint Relay 1 and 2 will be in the energized state under the following conditions:

a. the weight on the platform is outside the weighing range,

b. the instrument is not in the weighing mode, or

c. a negative weight is displayed

If Accessory 584 is installed, pressing the START, STOP or TRIM key will momentarily de-energize the relays.

4.7 Setpoint Operation

A setpoint is a user defined weight value placed in the instrument's memory to trigger the opening or closing of a relay.

A setpoint cycle begins when the START key is pressed and terminates when the weight on the platform reaches the setpoint value contained in the instrument's memory, or the STOP key is pressed.

The instrument can have up to 4 setpoint values stored in memory called "Setpoints 1, 2, 3, and 4". The operator must indicate to the instrument which setpoint is to be used in the current weighing cycle. The operator must step through the setpoint indicators by repeatedly pressing the STOP key. The step sequence will be:

Setpoints disabled
Setpoint 1 selected
Setpoint 2 selected
* Setpoints 1 and 2 selected
Setpoint 3 selected
Setpoint 4 selected
* Setpoints 3 and 4 selected

* This selection will only appear when paired setpoint operation has been selected in program step 14. Paired setpoint operation pairs Setpoints 1 and 2 together and Setpoints 3 and 4 together.

When the desired setpoint indicator is lighted, the setpoint operation can proceed.

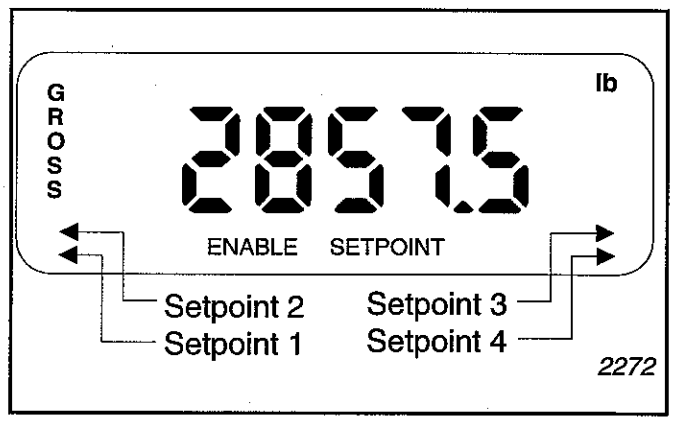


FIGURE 4-4: SETPOINT INDICATOR LOCATIONS

The setpoint cycle will terminate and all setpoint relays will reset, de-energize in Accessory 5804 or energize in Accessory 584 under the following conditions:

a. When not in the weighing mode

b. When the scale is showing under or over capacity

c. Operation of any key other than the START key.

All the setpoints operate in both Gross or Net modes and positive or negative displayed weights.

A. Independent Setpoints

The STOP key will terminate the setpoint cycle at any point after the START key has been pressed.

If the TRIM key is pressed when no setpoint cycle is in operation, it will change the polarity of the setpoint relay. This change will remain in effect until the TRIM key is released. If a setpoint cycle is in operation, pressing and releasing the TRIM key will terminate the cycle.

1. SINGLE SETPOINT, Zero Start, codes 1 or 8

Setpoint Range
When a value is assigned to a single setpoint, a weight range is defined. The weight range is 0 plus and minus the setpoint value.

Mode Code
A code number is chosen to relate the START weight to the setpoint range. If a 1 or an 8 is selected, the START weight must be inside the setpoint range.

Operation

1. With a setpoint range defined, place a weight on the platform that falls within the range.
2. Press the START key. The setpoint cycle is initiated and the relay will change polarity. The weight on the platform can be changed until the setpoint weight is reached, at which time the polarity of the relay will reverse and the setpoint cycle is terminated.
3. If the weight on the platform is outside the setpoint range, NOTHING will happen if the START key is pressed and nothing will happen if the weight on the platform is changed.

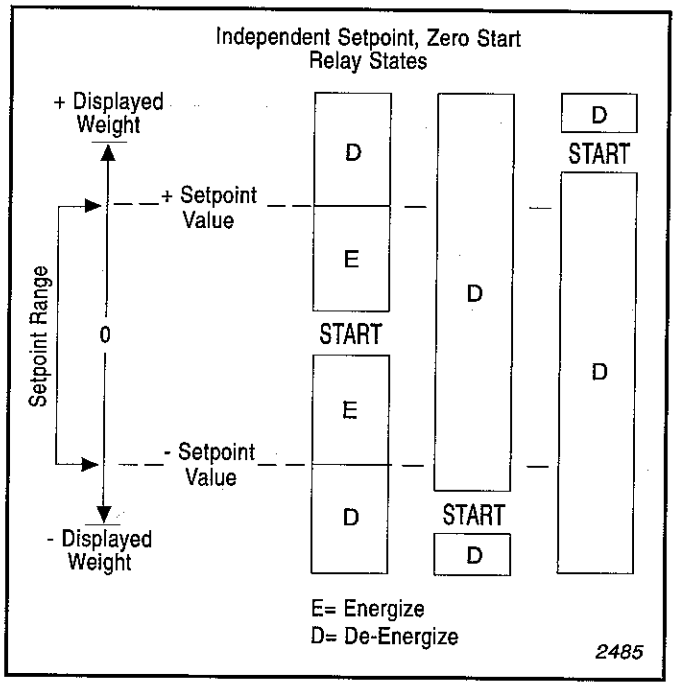


FIGURE 4-5: ACCESSORY 5804

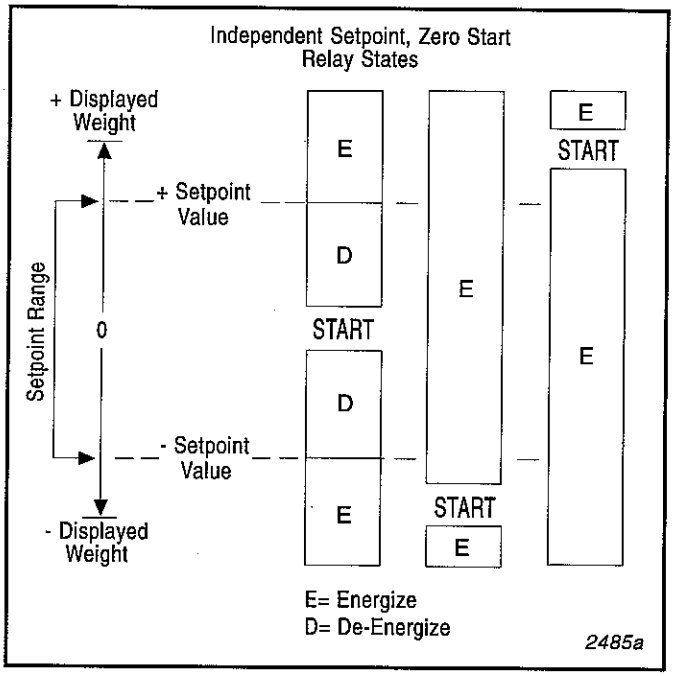


FIGURE 4-6: ACCESSORY 584

2. SINGLE SETPOINT, Zero End, codes 2 or 9

Setpoint Range

When a value is assigned to a setpoint, a weight range is defined. The weight range is 0 plus and minus the setpoint value.

Mode Code

A code number is chosen to relate the START weight to the setpoint range. If a 2 or a 9 is selected, the START weight must be outside the setpoint range.

Operation

1. With a setpoint range defined, place a weight on the platform that falls outside the range.
2. Press the START key. The setpoint cycle is initiated and the relay will change polarity. The weight on the platform can be changed until the setpoint weight is reached, at which time the polarity of the relay will reverse, and the setpoint cycle is terminated.
3. If the weight on the platform is inside the setpoint range, NOTHING will happen if the START key is pressed and nothing will happen if the weight on the platform is changed.

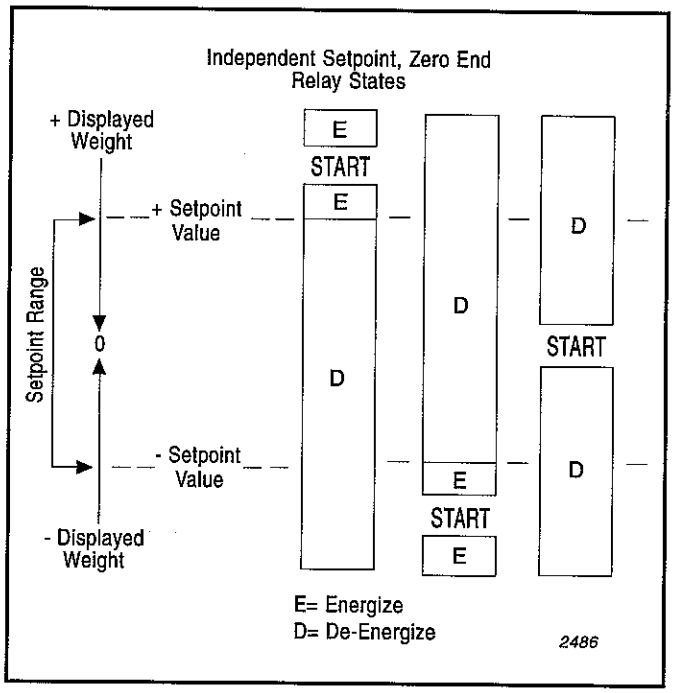


FIGURE 4-7: ACCESSORY 5804

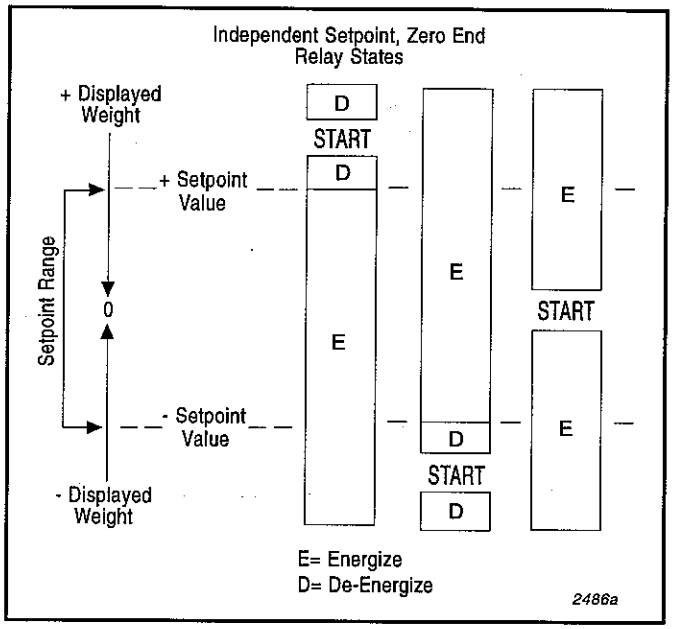


FIGURE 4-8: ACCESSORY 584

B. PAIRED SETPOINTS

The STOP key will terminate the setpoint cycle at any point after the START key has been pressed.

If the TRIM key is pressed when no setpoint cycle is in operation, the polarity of Setpoint 2 relay is changed. When the TRIM key is released, the polarity of Setpoint 2 relay will return to its original state.

If the TRIM key is pressed during a setpoint cycle, the Setpoint 1 relay will reset. The Setpoint 2 relay will not respond. When the TRIM key is released, Setpoint 2 relay will change polarity, and the cycle will be terminated.

1. PAIRED SETPOINTS, Zero Start, Code 3 Or 6, With Setpoint 1 And 2 Selected Or Setpoint 3 And 4 Selected

> *NOTE*
> *Paired Setpoints 3 and 4 work the same as paired Setpoints 1 and 2.*

In this mode the setpoints are paired in the setpoint cycle. A weight value is assigned to setpoint 1 and another value is assigned to Setpoint 2. When the setpoint cycle is initiated by pressing the START key each setpoint changes the polarity of the relay it controls. When the weight on the platform reaches the first setpoint value, the setpoint changes the polarity of the relay. When the weight reaches the second setpoint value, it changes the polarity of its relay and the cycle is terminated.

Setpoint Range
When a weight value is assigned a setpoint, a weight range is defined. The weight range is zero, plus and minus the setpoint value.

The Setpoint 1 value must be smaller than the Setpoint 2 value.

Mode Code
A code number is choosen to relate the START weight to the setpoint range. If a code of 3 or 6 is selected, the start weight must be inside the Setpoint 1 range.

Operation

1. With the setpoint ranges defined, place a weight on the platform that is within the Setpoint 1 range.
2. Press the START key. This initiates the setpoint cycle and the relays will change polarity. When the weight on the platform reaches the Setpoint 1 value, relay 1 will change its polarity. When the weight on the platform reaches the Setpoint 2 value, the second relay will change its polarity and the cycle will terminate.

A setpoint cycle is only terminated when the Setpoint 2 weight value is achieved. Until the cycle is terminated by Setpoint 2, the setpoint 1 relay will respond to weight changes that pass through Setpoint 1 range limits.

If the weight on the platform is beyond the Setpoint 2 range, nothing happens when the START key is pressed and nothing will happen if the weight on the platform is changed.

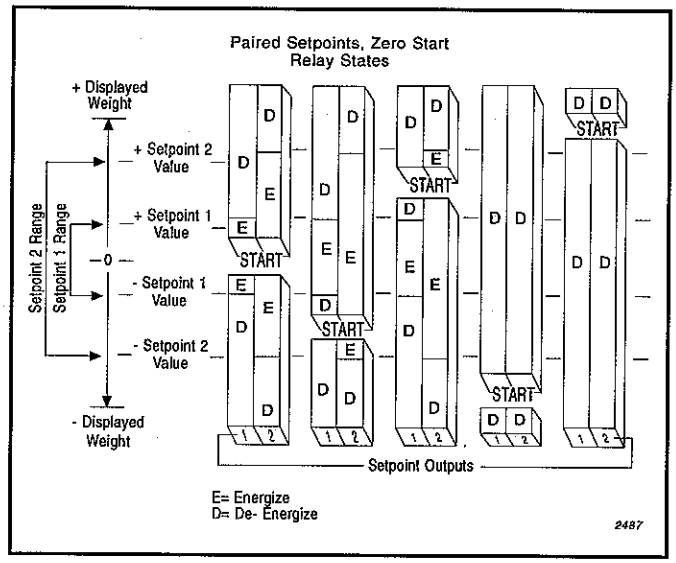


FIGURE 4-9: ACCESSORY 5804

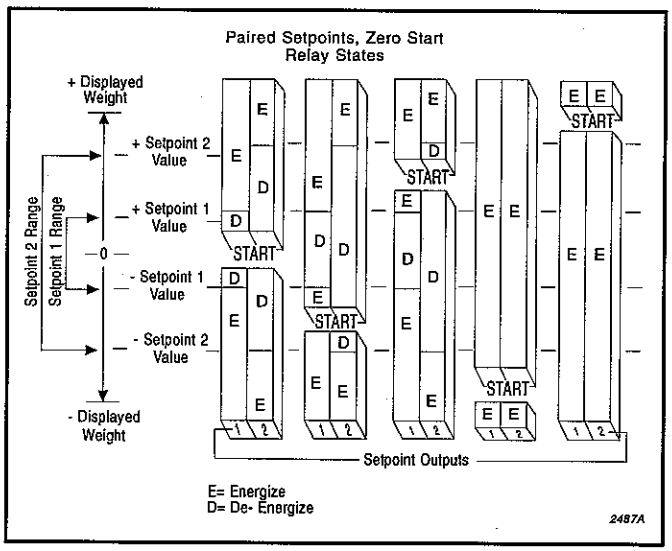


FIGURE 4-10: ACCESSORY 584

2. PAIRED SETPOINTS, Zero End, Code 4 Or 7, With Setpoints 1 And 2 Selected Or Setpoints 3 And 4 Selected.

In this mode the setpoints are paired in the setpoint cycle. A weight value is assigned to setpoint 1 and another value is assigned to Setpoint 2. When the setpoint cycle is initiated by pressing the START key each setpoint changes the polarity of the relay it controls. When the weight on the platform reaches the first setpoint value, the setpoint changes the polarity of the relay. When the weight reaches the second setpoint value, it changes the polarity of its relay and the cycle is terminated.

Setpoint Range

When a weight value is assigned a setpoint, a weight range is defined. The weight range is zero, plus and minus the setpoint value.

The Setpoint 1 value must be greater than the Setpoint 2 value.

Mode Code

A code number is choosen to relate the START weight to the setpoint range. If a code of 3 or 6 is selected, the start weight must be outside the setpoint 1 range.

Operation

1. With the setpoint range defined, place a weight on the platform that is outside the Setpoint 1 range.
2. Press the START key. Both relays will change polarity. When the weight on the platform reaches the Setpoint 1 value, relay 1 will change its polarity. When the weight on the platform reaches the Setpoint 2 value, the second relay will change its polarity and the cycle will terminate.

A setpoint cycle is only terminated when the Setpoint 2 weight value is achieved. Until the cycle is terminated by Setpoint 2, the setpoint 1 relay will respond to weight changes that pass through Setpoint 1 range limits.

If the weight on the platform is inside the Setpoint 2 range, nothing happens when the START key is pressed and nothing will happen if the weight on the platform is changed.

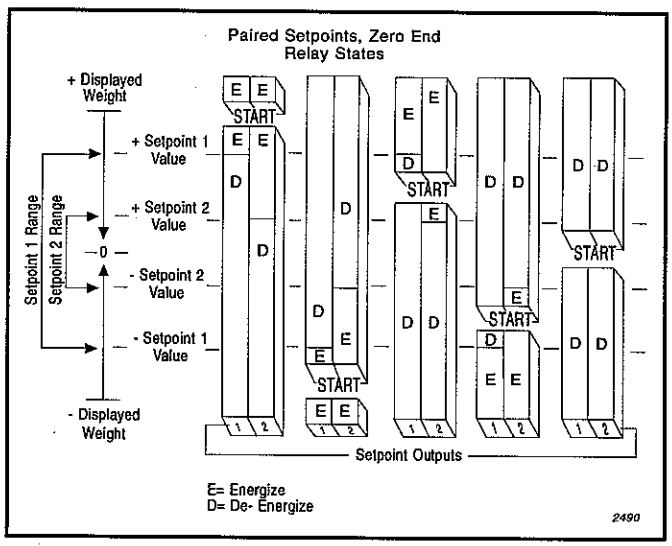


FIGURE 4-11: ACCESSORY 5804

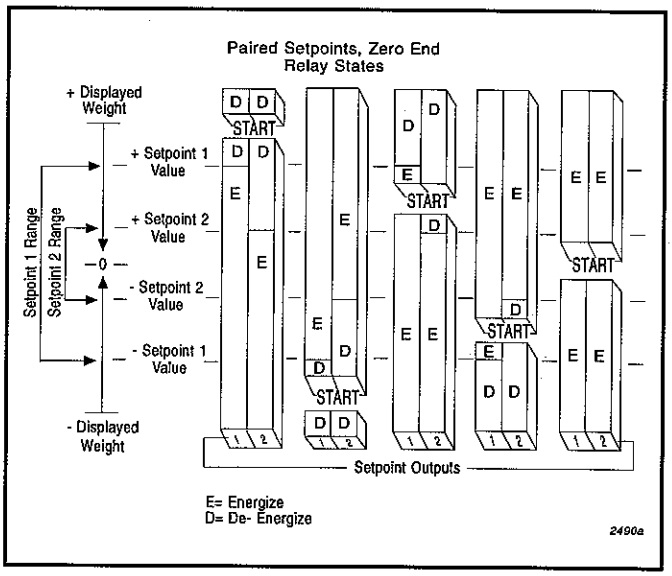


FIGURE 4-12: ACCESSORY 584

3. PAIRED SETPOINTS, Code 3, 4, 6, Or 7, With Only Setpoints 1 Or 3 Selected.

Setpoint Range

When a weight value is assigned a setpoint, a weight range is defined. The weight range is zero, plus and minus the setpoint value.

Operation

1. Press the START key to initiate the operation.
2. As weight is added or removed from the platform, the setpoint relay changes polarity each time the weight value passes the setpoint value.
3. The operation may be ended at any time by pressing the STOP or the TRIM key.

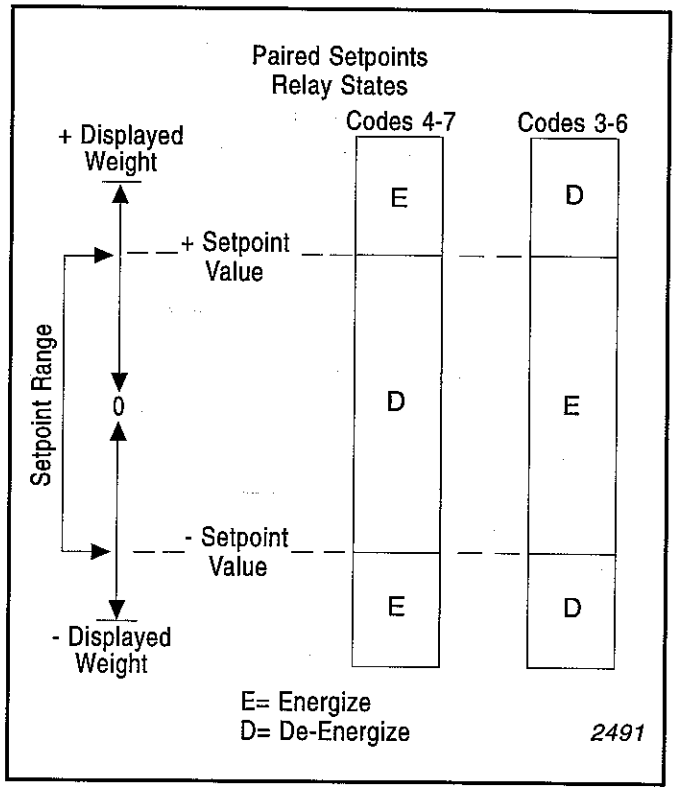


FIGURE 4-13: ACCESSORY 5804

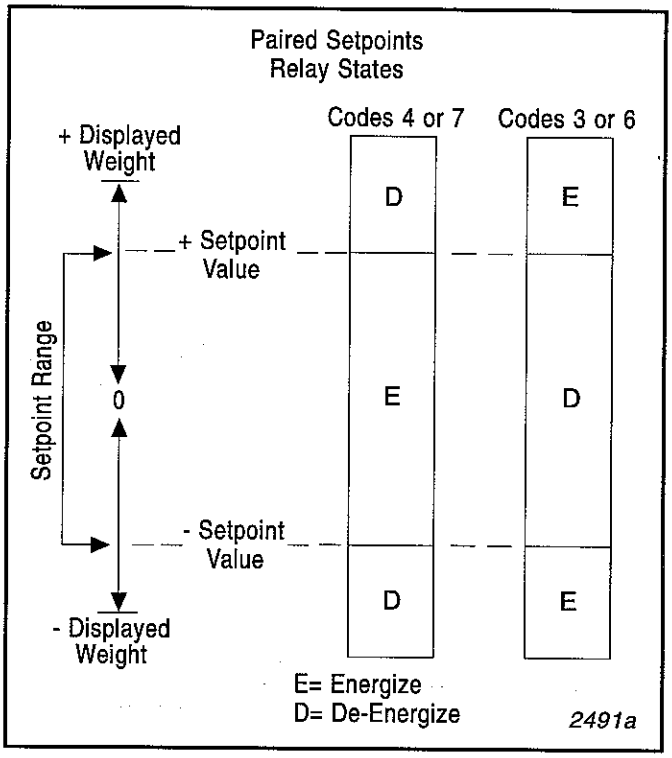


FIGURE 4-14: ACCESSORY 584

4. Paired Setpoints, Code 3, 4, 6 or 7 With Only Setpoints 2 or 4 Selected

See "Independent Setpoints".

4.8 Lbs/Gallons Operation and Programming

A. Operation

1. The gallons unit of measure is available as a net weighing function only.

   a. When pressing the UNITS key to select "gal" (gallons), the instrument will also enter the net weighing mode.

   b. When printing or transmitting to a remote display, the gallons data will be available in the net weight data field.

2. When displaying "Gallons"

   a. The "Tare Recall" and "SETPOINT" programming functions are not available in this mode.

   b. The "Auto Tare" key will enter the weight on the platform into tare memory and exit to the "NET" "Lb" mode.

B. Programming The Conversion Factor

This procedure describes changing the lb/gal conversion factor. At no time is the conversion factor available for viewing after the initial entry.

1. Select the "gallons" display mode by pressing the UNITS key.

2. Use the numeric keypad to enter a conversion factor, then press ENTER key. A conversion factor up to 6 digits may be entered. The conversion factor must be greater than 5 and must be entered as lbs/gal.

   Correct entry errors by entering "0's" until a single "0" is displayed.

If the keyboard tare function has been disabled, ie. program Step 8 has been set to "0", gallons conversion factor programming will also be disabled. The current conversion factor will be retained in memory.

4.9 4-20mA Current Output Operation

The 4-20mA Analog Output requires Accessory 5810 and 5800 and Service Program Step 13 enabled. The information programmed at Service Step 13 determines if the output current is directly (current increases with increasing weight) or inversely (current decreases with increasing weight) proportional to the weight on the platform.

Condition	Output
1. Out of Weighing Range	24mA
2. ASLEEP Mode	0mA
3. LobAtt	0mA
4. All other non-weighing modes	remains at last value just prior to exiting the weighing mode

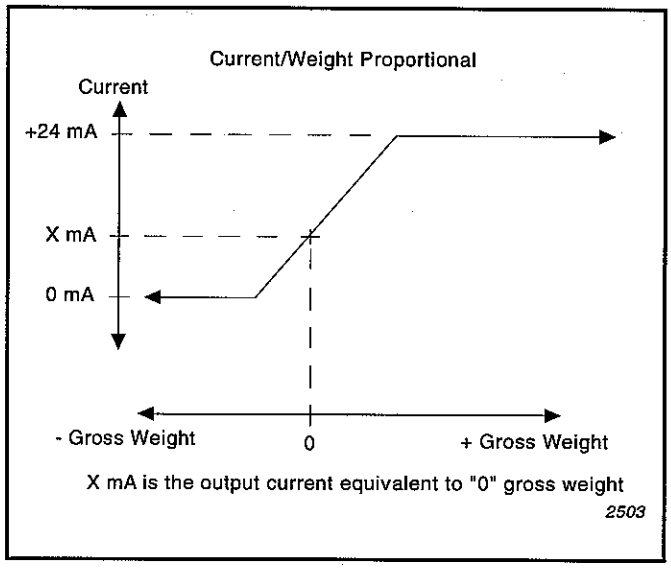


FIGURE 4-15: GROSS WEIGH MODE

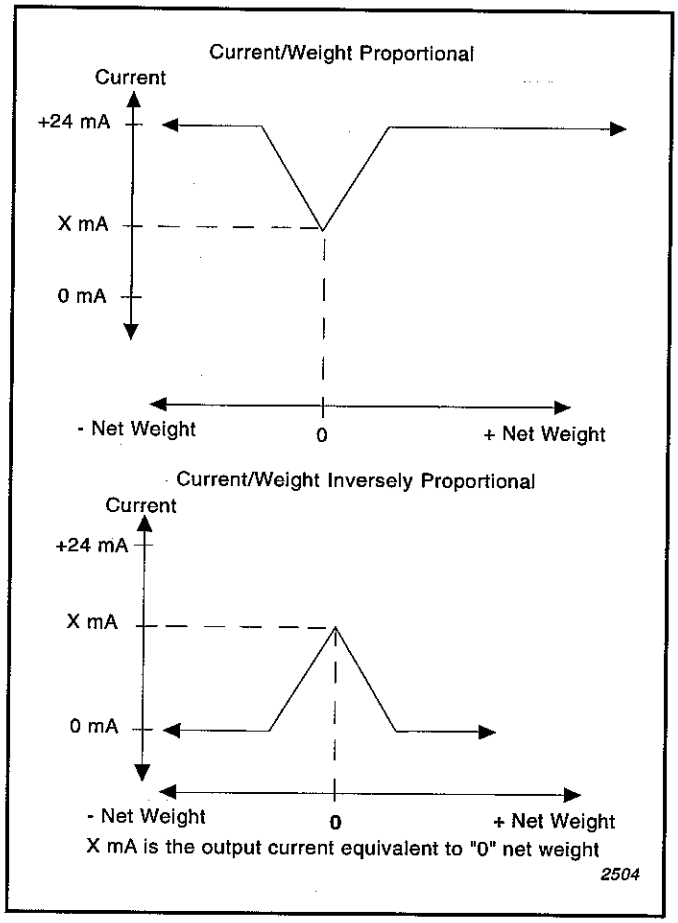


FIGURE 4-16: NET WEIGH MODE

4.10 Digital Output Operation

A. Channel A, Printers

See Appendix III or typical output formats.

1. Data available to be printed

   Gross weight
   Tare weight
   Net weight
   Time
   Date
   ID

   This data cannot be formatted, however the above data items can be enabled or disabled for printing. See Function Key Programming, Channel A.

2. The data will be transmitted over Channel A each time the PRINT key is pressed if there is no motion on the platform and a valid weight is displayed, ie. not out of weighing range or in a non-weighing mode. "ACK" legend will appear momentarily.

3. If the PRINT key is pressed during an inhibit condition, printing will not occur once the inhibiting condition ends. The PRINT key will have to be pressed again.

B. Channel B, Computers

See Appendix III for output protocol.

1. If continuous output was selected, see Function Key Programming, Channel B, the displayed weight will be transmitted at the display update rate.

2. Pressing the PRINT key will inhibit transmission to the computer until transmission over Channel A is complete.

3. If polled output was selected, see Function Key Programming, Channel B, the displayed weight will be transmitted each time the instrument is polled. If the PRINT key is pressed, Channel A output data will be transmitted on Channel B.

C. Channel B, Remote Displays

See Appendix III for output protocol.

1. The displayed weight will be transmitted at the display update rate.

2. Pressing the PRINT key will inhibit transmission to the remote display until transmission over Channel A is complete.

SECTION 5: FUNCTION KEY PROGRAMMING

When programming setpoints, grading scale, and 4-20mA analog output current, the weight values entered must be in the same units as were displayed just prior to exiting the weighing mode.

All of the following programming parameters use the FUNC key as part of the programming step. If the FUNC key is inadvertently pressed, it is possible to return to the Weigh mode by pressing the FUNC key again.

5.1 "PASS" Prompt

All FUNC key operations can be protected by an Access Code to prevent unauthorized entry to FUNC key operations. When "PASS" appears in the display, the operator must enter the correct Access Code and press ENTER in order to continue. If "PASS" is displayed, it is possible to return to the Weigh mode by pressing ENTER. The Access Code is assigned during Service Programming. To correct entry errors, press 0 until a single zero is displayed.

5.2 Test Mode (Program Code, A/D Counts, and Display Test)

FUNC 8 TEST

This program enables the operator to check each of the display segments and operator legend prompts for proper operation.

1. Select the Gross or Net Mode.
2. Press the FUNC key then the 8 TEST key. Display will show A/D counts.
3. Instrument will display in the following sequence when the ENTER key is pushed:
   a. Program code, "P189", followed by a revision letter
   b. All segments and status indicators
4. Instrument will return to the Gross or Net Mode

5.3 Time

FUNC 4 TIME

Accessory 5805 must be installed before the time function will operate.

1. From a gross or net weight display, press FUNC.

   The display will indicate "FunC ".
2. Press 4 TIME key.
3. The display will indicate a time (e.g. "11:36 ") with the AM or PM legend ON. If the time was initially set in military format (00:00 thru 23:59), the AM or PM legends will not be shown.

> *NOTE*
> *If Accessory #5805 was **not** installed, then the* time display will be "--:--" .

4. Press ENTER if time is correct. The instrument will return to the weigh mode. If the time is incorrect, press any numeric key 0 through 9 to clear the display. ("PASS" may appear at this time. Take appropriate action.)
5. Enter the correct time by pressing the numeric keys 0 through 9. Enter the hours first and then the minutes. Both hours and minutes must be entered as two digit numbers. To enter the time 8:05, enter "08" then "05".
6. To select the time format, press the 4 TIME key.

   The following legends will be displayed in sequence.

   AM (Standard Time)
   PM (Standard Time)
   No AM or PM Legend (Military Time)

7. When the desired format is displayed, press the ENTER key to store the format and displayed time.

5.4 Date

FUNC 5 DATE

> *NOTE*
> *The year **must** be reset each January 1st and the day **must** be reset every February 29th.*

Accessory 5805 must be installed before the date function can be used.

1. From a gross or net weight display, press FUNC.

   The display will indicate "FunC ".

2. Press the 5 DATE key and a date and date legend will be displayed.

   The display will show a date e.g. "12:30:89". If the "ACK" legend is lit, the date is in international format.

   Standard format – MM:DD:YY
   International format – DD:MM:YY

> *NOTE*
> *If Accessory #5805 was **not** installed, then date* display will be "--:--:--".

3. Press ENTER if the date is correct. The instrument will return to the weight display.

4. Press any key 0 through 9 to clear the display.

5. Enter the date by pressing the numeric keys 0 through 9.

   Enter the date as day/month/year or month/day/year format.

   All entries must be two digit numbers. To enter June 1, 1991, use 06, 01, 91.

6. With the ACK legend turned off, the entered date will be stored in the month/day/year format.

   To change format, press the 5 DATE key. The ACK legend will light.

   The following legends will be displayed in sequence.

   ACK legend OFF (month/day/year format)

   ACK legend ON (day/month/year format)

7. When the correct date and format is displayed, press the ENTER key to store the displayed date and format.

5.5 Asleep

FUNC 2 SLEEP

The instrument can enter the "ASLEEP" Mode either automatically or manually to conserve battery power.

To put the instrument asleep manually:

1. From a gross or net weight display, press FUNC.

   The display will indicate "FunC ".

2. Press the 2 SLEEP key. The display will indicate "ASLEEP".

3. If the instrument displays "ASLEEP", press one of the following keys to return to the Weigh Mode:

   4 TIME GROSS/NET 5 DATE
   ID 6 START

5.6 Setpoints

FUNC 1 SET PT

A. Introduction

1. Hardware Requirements

Operation of setpoints require accessories 5810, 5800 and 5804 (Quad Setpoint) or 584 (Dual Setpoint) to be installed.

> *NOTE*
> *Only the "Grading Scale" mode does not require these accessories.*

2. Service Programming Requirements

At the time of installation, one of 9 options (setpoints) listed below must be selected at program step 14. Setpoint function for each of the options is contained in Subsection 5.6.

Programming Step 14 (Setpoints)		
Subsection	Code	Option
	0	Disable All Setpoint Operations
5.7.A.1	1	Acc 584 Independent Setpoints, Zero Start
5.7.A.2	2	Acc 584 Independent Setpoints, Zero End
5.7.B.1	3	Acc 584 Paired Setpoints, Zero Start
5.7.B.2	4	Acc 584 Paired Setpoints, Zero End
5.6	5	Grading Scale
5.7.B.1	6	Acc 5804 Paired Setpoints, Zero Start
5.7.B.2	7	Acc 5804 Paired Setpoints, Zero End
5.7.A.1	8	Acc 5804 Independent Setpoints, Zero Start
5.7.A.2	9	Acc 5804 Independent Setpoints, Zero End

3. Setpoint Programming

In addition to the service programming above, each setpoint must be assigned a weight value. Negative weight values cannot be used. For Setpoint Programming, refer to part B of this Subsection.

4. Grading Scale Programming

For Grading Scale Programming, refer to Subsection 6.9.

5.6.1 Setpoint Programming

The Setpoint Programming Mode is used to assign weight values to the individual setpoints, view the setpoint values, or disable individual setpoints.

A setpoint is enabled when the setpoint is selected by the operator during programming. If a setpoint has been disabled, that setpoint will not appear as an option in the STOP key menu, see Setpoint operation.

Programming of setpoints requires the operator to select the setpoint to be programmed, then assign a weight value to that setpoint. The weight assigned must be in the same weight units as were displayed prior to entering the programming mode. Knowledge of the operating mode selected in instrument programing step 14 is required to ensure the appropriate weight is being assigned to the setpoint. Refer to Subsection 5.6, Setpoint Operation, for a description of operating modes.

1. Press FUNC and 1 SET PT keys and the display will show "SEt".
   a. Press the 0 key to return the instrument to the weighing mode.
   b. Select Setpoints 1, 2, 3, or 4 using the numeric keypad.
2. The selected setpoint may be disabled by pressing the 0 key. The disable legend will appear.
3. Press the ENTER key to view the selected setpoint value.
4. Press any key and "ALtEr" will be displayed.
   a. Press the ENTER key to save the current setpoint value. The instrument will return to the weighing mode.
   b. A new value may be entered using the numeric keypad. The new value will be displayed. Press the ENTER key to save the new value. The instrument will return to the weighing mode. To correct entry errors, press 0 until a single zero is displayed.

5.7 Grading Scale

FUNC 1 SET PT

The Grading Scale option must be selected in Service Program Step 14. The weight assigned must be in the same weight units as were displayed prior to entering the programming mode.

Place the instrument into the Weigh Mode.

1. Press FUNC, 1 SET PT keys "grAdE" will be displayed.
2. The operator must choose to view the "UNDER" range value or the "OVER" range value or exit to the Weigh Mode.
   a. Press 1 SET PT and ENTER to view the "under" range value.
   b. Press 2 SLEEP and ENTER to view the "over" range value.
   c. Press 3 or 4 TIME to exit to the Weigh Mode.
3. Press any key and "ALtEr" will be displayed.

a. Press [ENTER] to save the current value.

b. A new value may be entered using the numeric keypad. The new value will be displayed. Press the [ENTER] key to save the new value. The instrument will return to the weighing mode. To correct entry errors, press [0] until a single zero is displayed.

4. The instrument will then return to the Weigh Mode.

5.8 Printer Output Channel A

[FUNC] [7 PROG] [PRINT]

In addition to I/O Output Accessory #5805 being installed in the instrument, Accessories 5806, 5807, and 5808 must be installed and Channel A must be enabled at Service Program Step 15.

1. Place the instrument into the weighing mode.

2. Press [FUNC]. "FunC" will be displayed.

3. Press [7 PROG] and the display will show "CuSt".

4. Press [PRINT] key and the display will show "Chan".

   a. Press [ENTER] to return to the Weigh mode.

   b. Press [PRINT] and "Chan A" is displayed.

5. With "Chan A" prompt displayed, press the [ENTER] key. The display will show the Channel A baud rate.

> *NOTE*
> *Do not set a baud rate of 19200 on one channel and 38400 for another. Any other combination is acceptable.*

Set the Output Format as listed in the following chart. The [PRINT] key toggles the operator through the available options. The [ENTER] key saves the displayed options and advances to the next parameter.

Programming Chart, Channel A

Baud Rate Options	
Displayed Options	
300	
600	
1200	
2400	For Fairbanks Models 3710, 3920, 3921 and 3925 Printers
4800	
9600	
19200	
38400	
Stop Bits Options	
Displayed Options	
Stop 1	For Fairbanks Models 3710, 3920, 3921 and 3925 Printers
Stop 2	
Parity Options	
Displayed Options	
EuEn	
Odd	For Fairbanks Models 3920, 3921 and 3925 Printers
nonE	For Fairbanks Model 3710 Printer
Character Data Bits Options	
Displayed Options	
Char 7 (7 bit character)	For Fairbank Models 3925 Printer
Char 8 (8 bit character)	For Fairbanks Models 3710, 3920 and 3921 Printers
Time/Date/ID Output Format Options	
Displayed Options	
no tdi	Time, date and ID will not be printed.
t	Time only is printed
d	Date only is printed
td	Both time and date are printed
i	ID only is printed
ti	Both time and ID are printed
di	Both date and ID are printed
tdi	Time, date and ID are printed
Net Output FormatOptions	
Displayed Options	
gnt	Gross/Net/Tare Weights are enabled to be printed when in the Net Weighing Mode
nEt	Net Weigh only is enabled to be printed when in the Net Weighing Mode

Line Terminator Options	
Displayed Options	
CrLF	A carridge return and line feed will be inserted at the end of each data string
Cr	A carridge return will be inserted at the end of each data string

7. Instrument returns to the Weigh Mode.

5.9 Computer/Remote Display Output (Channel B)

> *NOTE*
> *In order for Channel B to be enabled, Program Step #15 must be 2 or 3.*

1. Place the instrument into the weighing mode.
2. Press FUNC ."FunC" will be displayed.
3. Press 7 PROG and the display will show "CuSt".
4. Press PRINT key and the display will show "Chan".
   a. Press ENTER to return to the Weigh mode.
   b. Press PRINT and "Chan A" is displayed. Pressing PRINT toggles between Channel A and Channel B
5. With "Chan B" prompt displayed, press the ENTER key. The baud rate for Channel B will be displayed.
6. Set the Output Format from the following chart. The PRINT key toggles through the options. The ENTER key saves the displayed options and advances to the next parameter.

Programming Chart, Channel B

Baud Rate Options	
Displayed Options	
300	
600	
1200	
2400	
4800	
9600	
19200	
38400	
Stop Bits Options	
Displayed Options	
Stop 1	
Stop 2	
Parity Options	
Displayed Options	
EuEn	
odd	
nonE	
Character Data Bits Options	
Displayed Options	
Char 7 (7 bit character)	
Char 8 (8 bit character)	
Device Type Options	
Displayed Options	
Putr	Selects computer output protocol. Following this selection, the current computer output format selection will be displayed.
diSPLA	Selects output protocol for Fairbanks remote displays. Following this selection, the instrument will return to the Weigh mode.

If "Putr" was selected:

Computer Output Format Options	
Displayed Options	
Cont	Weight data is transmitted continuously at the display update rate programmed. Following this selection, the instrument will return to the Weight mode.
PoLLEd	Weight data is transmitted only when requested. Following this selection, the instrument will display the current Polling Format.

If "PoLLEd" was selected:

Polling Format Options	
Displayed Options	
Cr	Weight data is transmitted when the instrument receives a carridge return
Crld	Weight data is transmitted when the instrument receives an "ID" followed by a carridge return. The "ID" must be programmed. in Program Step 12.

5.10 Analog Output (4-20mA)

FUNC 7 PROG •

The 4-20mA analog output requires Accessory 5810 (Smart 4-20) and Service Program Step 13 enabled. The information programmed at Step 13 determines if the output current is directly (current increases with weight increase) or inversely (current decreases with weight increase) proportional to the weight on the platform. The weight assigned must be in the same weight units as were displayed prior to entering the programming mode.

The output can be driven by one of the following:

1. **Gross Weight:**
   In this mode the output current is proportional to the Gross weight. The 4-20mA output remains proportional to the Gross weight even when Net weight is being displayed.

2. **Net Weight:**
   In this mode the output current is proportional to the Net weight. The absolute value of the Net weight is used, the sign is ignored. The 4-20mA output remains proportional to the Net weight even when Gross weight is being displayed.

3. **A/D Counts Output:**
   In this mode the output current is proportional to the weight on the platform expressed as A/D counts. The A/D Counts Output Mode can only be directly proportional to the weight on the platform.

The Accessory 5810 can resolve a minimum increment of 6 microamps at a resolution of 1 in 4096. The maximum source compliance voltage is + 40VDC. The Accessory 5810's output is a 24 milliamp current sink referenced to ground.

When the instrument is not in a weighing mode, the 4-20mA output will stop responding at the value just prior to exiting the weighing mode and will not respond to weight changes on the platform.

The design of the Accessory 5810 will never allow the output current to exceed 24mA or be less than 0mA. If the instrument is out of the weighing range, over or under, the output current will be 24mA.

5.10.14-20mA Analog Output Current Calibration For Gross Or Net Mode

To calibrate the current output values, the current output must be monitored with a milliampmeter. The precision of the calibration depends on the accuracy and resoultion of the monitoring device.

For equipment protection, any control equipment driven by the Accessory 5810 must be disconnected or in some way disabled during calibration.

1. Press FUNC. The display will show "FunC ".
2. Press the 7 PROG key. The display shows "CuSt".
3. Press the • key. The display will then show "AnA-Log".

4a. Press ENTER to return to the Weigh mode.

4b. Press the • key. "HiLooP" is displayed. Repeatedly pressing • will toggle the display between "HiLooP" and "LoLooP".

The Accessory 5810 Analog Output needs two calibration points to define the operation range. The calibration points need to be separated by the widest range possible to obtain the maximum accuracy. "LoLooP" is the calibration procedure for assigning the lower current calibration weight value. "HiLooP" is the calibration procedure for assigning the upper current calibration weight value.

5. When the desired prompt is displayed, press ENTER. The display will show a number between 0 and 4095.
6. Look at the milliampmeter reading and establish whether the current must be increased or decreased from its present value to achieve the desired calibration value.

   To decrease the output current, use keys 1, 4 and 7. To increase the output current, use keys 3, 6 and 9.

Refer to the following chart:

Key	Instrument Display/Milliammeter
	Decreasing
1	Decreases by 1, the displayed number. Current decreases by 6 microamps.
4	Decreases by 10, the displayed number. Current decreases by 60 microamps.
7	Decreases by 100, the displayed number. Current decreases by 600 microamps.
	Increasing
3	Increases by 1, the displayed number. Current increases by 6 microamps.
6	Increases by 10, the displayed number. Current increases by 60 microamps.
9	Increases by 100, the displayed number. Current increases by 600 microamps.

7. When the milliampmeter shows the calibration value, press ENTER. The previously programmed calibration weight will be displayed.

8. Press any key and "ALtEr" will be displayed.

9. To keep the previous calibration value, press ENTER. To change the value, use the keypad to enter a new weight and press ENTER. The instrument will then return to the weighing mode. To correct entry errors, press the 0 key until a single "0" is displayed.

> *NOTE*
> *Remember to calibrate both "HiLooP" and "LoLooP".*

5.10.24-20mA Analog Output Current Calibration For A/D Counts Mode

To calibrate the current output values, the current output must be monitored with a milliampmeter. The precision of the calibration depends on the accuracy and resoultion of the monitoring device.

For equipment protection, any control equipment driven by the Accessory 5810 must be disconnected or in some way disabled during calibration.

1. Place the calibration weight on the platform. This is the weight that will be assigned to the "HiLooP" or "LoLooP" programmed current.

2. Press FUNC. The display will show "FunC ".

3. Press the 7 PROG key. The display shows "CuSt".

4. Press the key. The display will then show "AnA-Log".

   a. Press ENTER to return to the Weigh mode.

   b. Press the key. "HiLooP" is displayed. Repeatedly pressing will toggle the display between "HiLooP" and "LoLooP".

   The Accessory 5810 Analog Output needs two calibration points to define the operation range. The calibration points need to be separated by the widest range possible to obtain the maximum accuracy. "LoLooP" is the calibration procedure for assigning the lower current calibration weight value. "HiLooP" is the calibration procedure for assigning the upper current calibration weight value.

5. When the desired prompt is displayed, press ENTER. The display will show a number between 0 and 4095.

6. Look at the milliampmeter reading and establish whether the current must be increased or decreased from its present value to achieve the desired calibration value.

   To decrease the output current, use keys 1, 4 and 7.

   To increase the output current, use keys 3, 6 and 9. Refer to the following chart:

Key	Instrument Display/Milliammeter
	Decreasing
1	Decreases by 1, the displayed number. Current decreases by 6 microamps.
4	Decreases by 10, the displayed number. Current decreases by 60 microamps.
7	Decreases by 100, the displayed number. Current decreases by 600 microamps.
	Increasing
3	Increases by 1, the displayed number. Current increases by 6 microamps.
6	Increases by 10, the displayed number. Current increases by 60 microamps.
9	Increases by 100, the displayed number. Current increases by 600 microamps.

7. When the milliampmeter shows the calibration value, press ENTER.

8. The display will show the A/D counts related to the weight on the platform. Press the ENTER key to complete the calibration and the instrument will return to the weigh mode.

> *NOTE*
> *Remember to calibrate both "HiLooP" and "LoLooP".*

SECTION 6: CUSTOMER/OPERATOR SERVICE

6.1 Basic Maintenance and Troubleshooting

A. Introduction

This Section describes Basic Customer Maintenance and Troubleshooting Procedures. Tampering with the service seal or attempting to open the Instrument Enclosure may expose dangerous electrical voltage. Adjustments and modifications require the services of a Fairbanks Trained Technician.

B. Basic Maintenance

1. Cleaning

   The instrument cabinet may be washed down with low pressure water and mild cleaning solutions.

   Avoid the use of abrasive cleansers or chemical solvents which may scratch or mar the enclosure surface and display window.

2. Lubrication Restriction

   Do not attempt to lubricate any parts of this equipment.

C. Basic Troubleshooting

In case of malfunction, the operator should check the following chart for problems and suggested remedies before contacting Fairbanks Service.

A. No Display

1. Batteries discharged: Recharge
2. Battery disconnected at rear panel: Reconnect

B. Display Segment(s) Fail TEST

1. Contact Fairbanks Service for repair.

C. [ZERO] Key Does Not Zero Display

1. Instrument is in other than GROSS or NET Mode: Press MODE/on to select Gross.
2. Load receiver in motion: Remove source of vibration or motion.
3. Weight outside programmed zero range.

D. Incorrect Weight

1. Incorrect procedure: Review Procedures.
2. Net Weight error can result if Tare in memory is not correct: Make certain correct Tare is in memory.
3. Faulty Load Receiver: Contact Fairbanks Service.

E. Display Locked-up or Inoperative

1. Unplug connectors at J2 and J3 at the Instrument Rear Panel. Reconnect after approxiamtely 20 seconds. If display is still inoperative then repeat the above.
2. Faulty Instrument: Contact Fairbanks Service.

F. Recharge Legend Lighted

1. Battery should be recharged: Remove battery to safe area for recharging.
2. LoBatt Legend: Battery must be recharged.

6.2 Periodic Inspection Procedures

This Section describes inspection procedures which should be performed at periodic intervals such as required for units covered by Maintenance Contracts or Service Agreement.

These instructions apply only to the Instrument; inspection procedures for Load Receiver and any Accessories are given in Manuals applicable to the particular unit.

A. Physical Inspection

Check that all cable connections are secure.

B. Built-in Tests

The [8 TEST] key is used to enable the operator to check each of the display segments and operator legend prompts for proper operation.

1. Select the Gross or Net Mode.
2. Push the [FUNC] key then the [8 TEST] key
3. Instrument will display in the following sequence when the [ENTER] key is pushed:
   a. Displays internal counts equal to weight on platform
   b. Program revision
   c. All segments and legends

d. Instrument will return to the Gross or Net Mode

6.3 Battery Packs 575 and 575D

Each battery pack consists of four 2 volt cell. The cells are grouped into two 4 volts sections, with a total nominal output of 8 volts. The H90-3051 and H90-3052 indicators will show a re-charge legend when the battery pack voltage drops to 7.75 volts, and will turn OFF when the level drops to 7 volts.

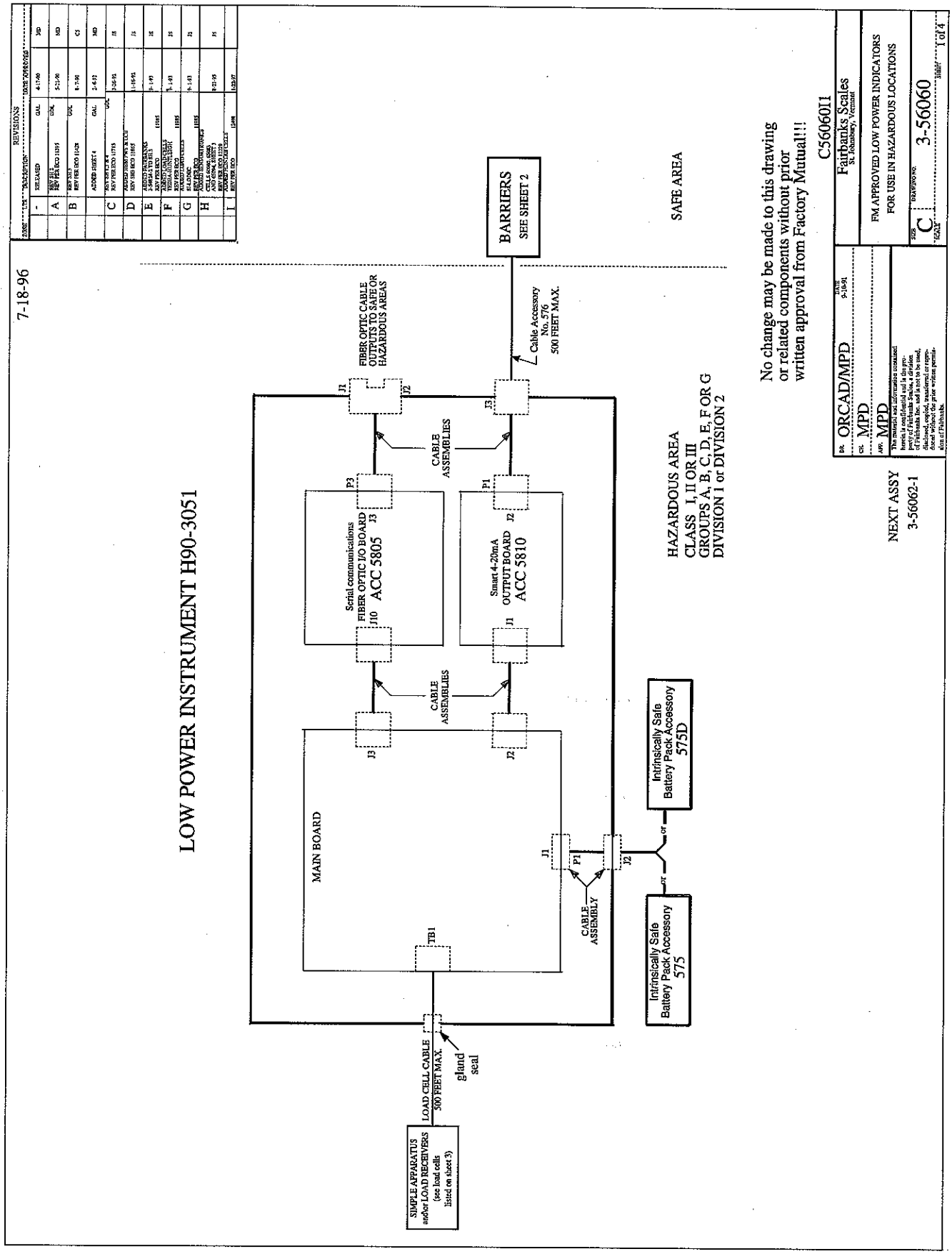
The battery pack should be placed on the "Smart" charger as soon as the indicator displays the "recharge" or "Lo bAtt" legend.

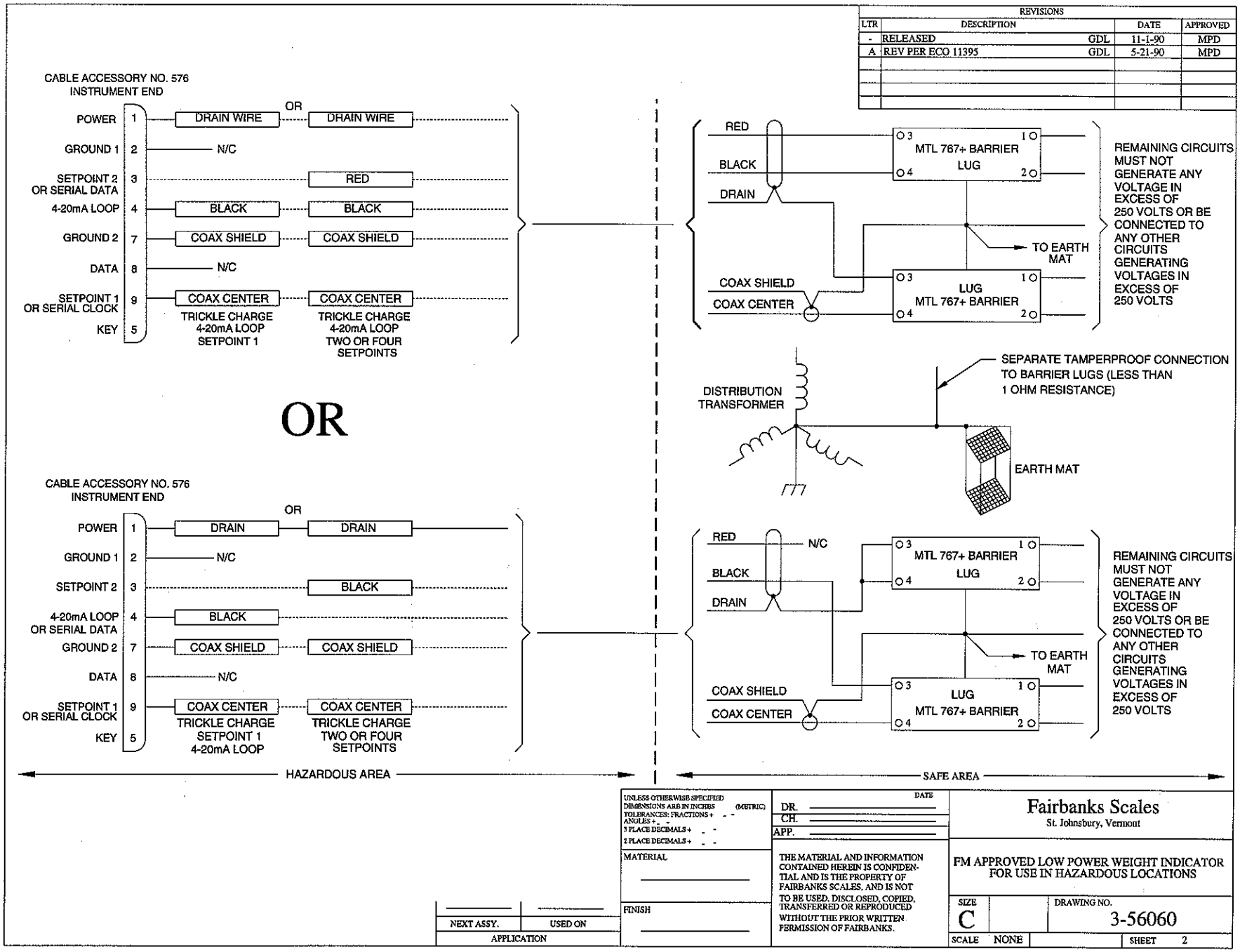
If the indicator turns "OFF", because of low battery voltage, the battery voltage should be checked before it is put on the "Smart" charger.

OPEN CIRCUIT VOLTAGE - The DC voltage, measured between pins 1 and 2 on the connector on the Accessory 575, 575D battery, when disconnected from the indicator.

1. If the OPEN CIRCUIT VOLTAGE (OCV) is 6.6 volts or greater, the battery pack is good and can be re-charged.
2. If the OCV is 6.4 volts or less, at least one of the four cells is internally shorted and the charger will be damaged if connected to the battery pack. REPLACE THE BATTERY PACK.

APPENDIX I: CONTROL DRAWING




REVISIONS
LTR DESCRIPTION DATE APPROVED
- RELEASED GDL 11-1-90 MPD
A REV PER ECO 11395 GDL 5-21-90 MPD
CABLE ACCESSORY NO. 576
INSTRUMENT END
OR
POWER 1
GROUND 1 2
SETPOINT 2 OR SERIAL DATA 3
4-20mA LOOP 4
GROUND 2 7
DATA 8
SETPOINT 1 OR SERIAL CLOCK 9
KEY 5
DRAIN WIRE
DRAIN WIRE
N/C
RED
BLACK
BLACK
COAX SHIELD
COAX SHIELD
N/C
COAX CENTER
COAX CENTER
TRICKLE CHARGE 4-20mA LOOP SETPOINT 1
TRICKLE CHARGE 4-20mA LOOP TWO OR FOUR SETPOINTS
OR
RED
BLACK
DRAIN
COAX SHIELD
COAX CENTER
MTL 767+ BARRIER LUG
LUG MTL 767+ BARRIER
TO EARTH MAT
REMAINING CIRCUITS MUST NOT GENERATE ANY VOLTAGE IN EXCESS OF 250 VOLTS OR BE CONNECTED TO ANY OTHER CIRCUITS GENERATING VOLTAGES IN EXCESS OF 250 VOLTS
DISTRIBUTION TRANSFORMER
SEPARATE TAMPERPROOF CONNECTION TO BARRIER LUGS (LESS THAN 1 OHM RESISTANCE)
EARTH MAT
CABLE ACCESSORY NO. 576
INSTRUMENT END
OR
POWER 1
GROUND 1 2
SETPOINT 2 3
4-20mA LOOP OR SERIAL DATA 4
GROUND 2 7
DATA 8
SETPOINT 1 OR SERIAL CLOCK 9
KEY 5
DRAIN
DRAIN
N/C
BLACK
BLACK
COAX SHIELD
COAX SHIELD
N/C
COAX CENTER
COAX CENTER
TRICKLE CHARGE SETPOINT 1 4-20mA LOOP
TRICKLE CHARGE TWO OR FOUR SETPOINTS
RED
N/C
BLACK
DRAIN
COAX SHIELD
COAX CENTER
MTL 767+ BARRIER LUG
LUG MTL 767+ BARRIER
TO EARTH MAT
REMAINING CIRCUITS MUST NOT GENERATE ANY VOLTAGE IN EXCESS OF 250 VOLTS OR BE CONNECTED TO ANY OTHER CIRCUITS GENERATING VOLTAGES IN EXCESS OF 250 VOLTS
HAZARDOUS AREA
SAFE AREA
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (METRIC)
TOLERANCES: FRACTIONS + _ -
ANGLES + _ -
3 PLACE DECIMALS + _ -
2 PLACE DECIMALS + _ -
MATERIAL
FINISH
NEXT ASSY.
USED ON
APPLICATION
DR.
CH.
APP.
DATE
THE MATERIAL AND INFORMATION CONTAINED HEREIN IS CONFIDENTIAL AND IS THE PROPERTY OF FAIRBANKS SCALES, AND IS NOT TO BE USED, DISCLOSED, COPIED, TRANSFERRED OR REPRODUCED WITHOUT THE PRIOR WRITTEN PERMISSION OF FAIRBANKS.
Fairbanks Scales
St. Johnsbury, Vermont
FM APPROVED LOW POWER WEIGHT INDICATOR FOR USE IN HAZARDOUS LOCATIONS
SIZE C
DRAWING NO. 3-56060
SCALE NONE
SHEET 2

SJ4321

LOAD CELL MANUFACTURER	MANUFACTURER PART NUMBER		FWD PLATFORM (for reference only)
SENSORTRONICS	60001 FAMILY		
	60001- 500		1106 &
			1170
	60001- 750		1107
	60001- 1K		1108
	60001- 1.5K		60-5400
	60001- 2K		1109
	60001- 3K		1111
	60001- 5K		1112
	60008 FAMILY		
	60018 FAMILY		
	60030 FAMILY		
	60036 FAMILY		
	60040 FAMILY		
	60045 FAMILY		
	60048 FAMILY		
	60051 FAMILY		
	60058 FAMILY		
	60060 FAMILY		
	65016 FAMILY		
	65016- 5K	TWA	80-9114
	65016- 15K	TWA	80-9118
	65016- 25K	TWA	80-9108
	65016- 50K	TWA	80-9110
	65016- 0104-15K	TWA	H80-9119
	65016- 0104-25K	TWA	H80-9109
	65023 FAMILY		
	65023- 2.5K-1107		23-2554AFM
	65023A- 2.5K		H70-4100AFM
	65023A- 2.5K -0140		H23-2502FM
	65023A- 2.5K -0140		H23-2500AFM
	65023A- 2.5K -1107		23-2502AFM
	65023A- 2.5K -1107		23-2500AFM
	65023A- 2.5K -0140		23-2520A
	65023A- 1K		H70-4100BFM
	65023A- 1K -5140		H23-2512FM
	65023A- 5K-0140		H23-2503AFM
	65023A- 5K-0140		23-2503AFM
	65023A- 5K-0140		23-2557
	65023A- 10K-0140		23-2558
	65024 FAMILY		
	65029 FAMILY		
	65032 FAMILY		
	65041 FAMILY		
	65058 FAMILY		
	65059 FAMILY		
	65059- 75	TWA	80-9016
	65059- 100	TWA	80-9111
	65059- 250	TWA	80-9117
	65059- 500	TWA	80-9112
	65059- 1K	TWA	80-9113
	65061 FAMILY		
	65083 FAMILY		
	65094 FAMILY		
TEDEA-HUNTLEIGH	1000 SERIES		
	3400 SERIES		
	9010 SERIES		
GEC AVERY	8701 FAMILY		
	8707 FAMILY		
	8708 FAMILY		
	8713 FAMILY		
	T101 FAMILY		
	T103 FAMILY		
	T105 FAMILY		

LOAD CELL MANUFACTURER	MANUFACTURER PART NUMBER	FWD PLATFORM (for reference only)
FAIRBANKS	3-53776-1	H23-2511 &
		23-2511
	3-54723-1	70-4070
	3-54824-1	70-4170
	3-54824-2	
	3-55122-1	21-2102 &
		21-2104
	3-55157-1	21-2101
	3-55176-1	H70-4814
	3-55177-1	H70-4820
	3-55383-1	
REVERE TRANSDUCERS INCORPORATED	SSB FAMILY	
	SSB-10-30-S1398	H80-9104
	USP FAMILY	
	CBU1 FAMILY	
	UPF FAMILY	
	LT01 FAMILY	
	TO FAMILY	
	LPC1 FAMILY	
	KB FAMILY	
	CSP FAMILY	
	CP FAMILY	
	UMP FAMILY	
	UEP FAMILY	
	SSS FAMILY	
	TSP FAMILY	
	HSB FAMILY	
	USPF FAMILY	
HBM INC. (HOTTINGER BALDWIN MEASUREMENTS INC)	SB2 FAMILY	FLINTAB
	SB3 FAMILY	SB4 SERIES
	BBS FAMILY	SB5 SERIES
	SBF FAMILY	SB6 SERIES
	UIT FAMILY	SB7 SERIES
	TLC FAMILY	UB1 SERIES
	USB FAMILY	UB5 SERIES
	PLC FAMILY	UB6 SERIES
	BLC FAMILY	UB7 SERIES
	BLF FAMILY	PC1 SERIES
	PLX FAMILY	RC1 SERIES
	TRT FAMILY	PBX SERIES
	JRT FAMILY	
	THC FAMILY	
	HLC FAMILY	
	RSC FAMILY	
	PW2C3 FAMILY	
	PW2-2 FAMILY	
	LCB FAMILY	
	PWS FAMILY	
GSE SCALE SYSTEMS	4515 PLATFORMS	

MANUFACTURER SI-LODEC
83-00360-10
83-00370-10
83-00270-10
83-00420-10
83-00420-11
83-00460-10
83-00490-10
83-00500-10
83-00505-10
83-00520-10
83-00520-12
83-00520-13
83-00525-12
83-00530-10
83-00540-10
83-00550-10
83-00550-20
83-00600-10
83-00600-13
83-00610-10
83-00610-13
83-00615-10
83-00625-10
83-00635-10
83-00755-10
83-00755-15
83-00800-10

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	-	RELEASED	4-17-90	MPD
	B	REV PER ECO 11428	8-7-90	MPD
	C	ADDED HBM CELLS ADDED GSE 4515 ADDED GEC AVERY LOAD CELLS REV PER ECO 11712	3-26-92	MPD
	D	ADDED HBM CELLS PBS & LCB REV PER ECO [illegible]	11-16-92	JS
	E	ADDED FAIRBANKS 3-54824-2 REV PER ECO	[illegible]	JS
	F	ADDED LOAD CELLS TEDEA-HUNTLEIGH REV PER ECO	[illegible]	JS
	G	ADDED LOAD CELLS SI-LODEC REV PER ECO [illegible]	[illegible]	JS
	H	ADDED LOAD CELLS SENSORTRONICS 60040, 65083 AND 65094. REV PER ECO [illegible]	8-21-95	JS
	I	ADDED FLINTAB CELLS REV PER ECO 11415	1-22-97	GAL

7-18-96

No change may be made to this drawing or related components without prior written approval from Factory Mutual!!!

C56060I3

DR. ORCAD/MPD DATE 9-10-91
CH. MPD
APP. MPD

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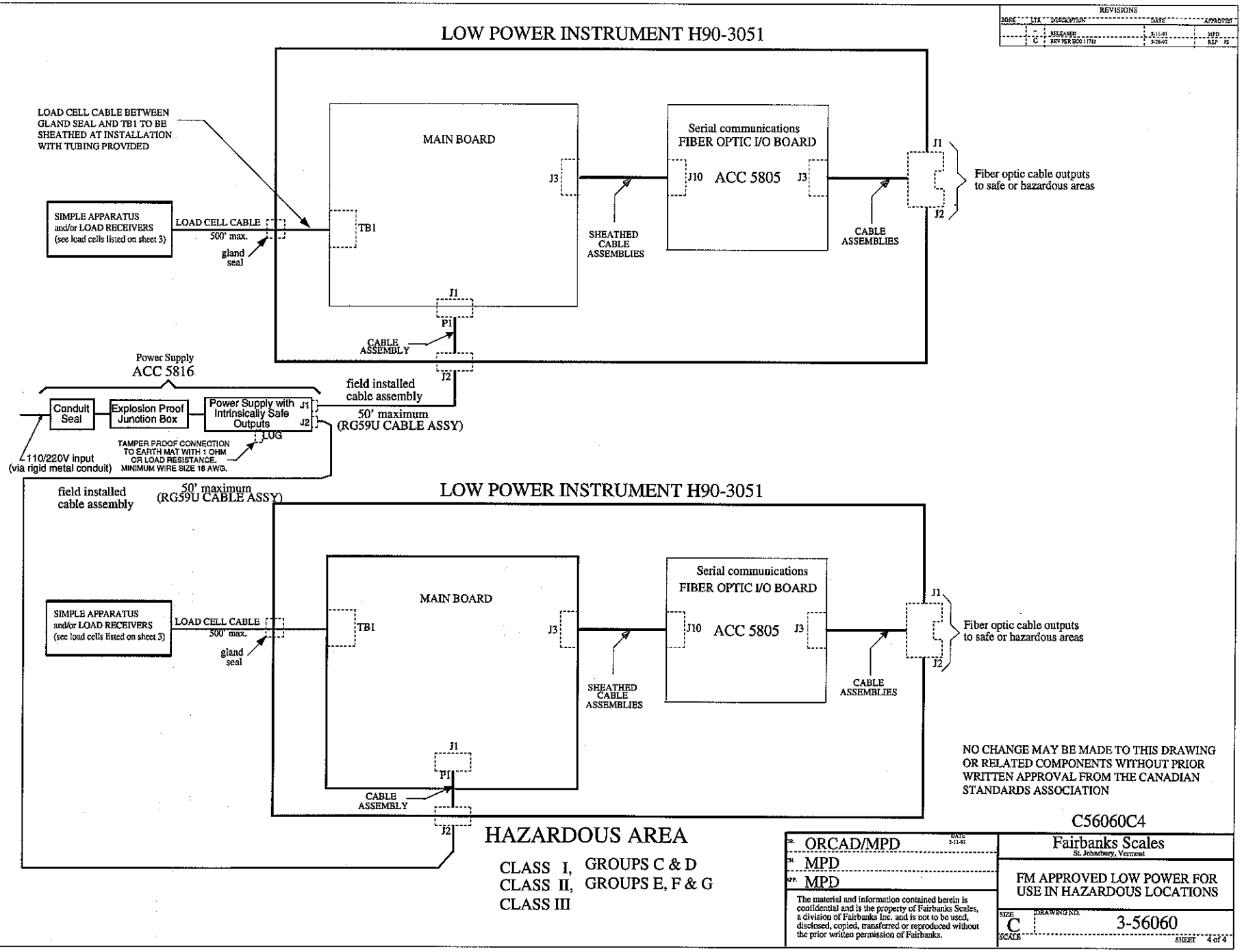
Fairbanks Scales
St. Johnsbury, Vermont

FM APPROVED LOW POWER INDICATORS FOR USE IN HAZARDOUS LOCATIONS

SIZE C DRAWING NO. 3-56060 SCALE SHEET 3 of 4


REVISIONS
ZONE LTR DESCRIPTION DATE APPROVED
C RELEASED 5-11-95 MPD
C REVISED PER ECO 11783 5-26-95 REF IS
LOW POWER INSTRUMENT H90-3051
LOAD CELL CABLE BETWEEN GLAND SEAL AND TB1 TO BE SHEATHED AT INSTALLATION WITH TUBING PROVIDED
MAIN BOARD
Serial communications FIBER OPTIC I/O BOARD
J3
J10 ACC 5805 J3
J1
J2
Fiber optic cable outputs to safe or hazardous areas
SIMPLE APPARATUS and/or LOAD RECEIVERS (see load cells listed on sheet 3)
LOAD CELL CABLE 500' max.
gland seal
TB1
SHEATHED CABLE ASSEMBLIES
CABLE ASSEMBLIES
J1
P1
CABLE ASSEMBLY
J2
Power Supply ACC 5816
field installed cable assembly
50' maximum (RG59U CABLE ASSY)
Conduit Seal
Explosion Proof Junction Box
Power Supply with Intrinsically Safe Outputs J1 J2
LUG
TAMPER PROOF CONNECTION TO EARTH MAT WITH 1 OHM OR LOAD RESISTANCE. MINIMUM WIRE SIZE 18 AWG.
110/220V input (via rigid metal conduit)
field installed cable assembly
50' maximum (RG59U CABLE ASSY)
LOW POWER INSTRUMENT H90-3051
MAIN BOARD
Serial communications FIBER OPTIC I/O BOARD
J3
J10 ACC 5805 J3
J1
J2
Fiber optic cable outputs to safe or hazardous areas
SIMPLE APPARATUS and/or LOAD RECEIVERS (see load cells listed on sheet 3)
LOAD CELL CABLE 500' max.
gland seal
TB1
SHEATHED CABLE ASSEMBLIES
CABLE ASSEMBLIES
J1
P1
CABLE ASSEMBLY
J2
NO CHANGE MAY BE MADE TO THIS DRAWING OR RELATED COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE CANADIAN STANDARDS ASSOCIATION
C56060C4
HAZARDOUS AREA
CLASS I, GROUPS C & D
CLASS II, GROUPS E, F & G
CLASS III
DR. ORCAD/MPD DATE 5-11-95
CH. MPD
APP. MPD
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Fairbanks Scales
St. Johnsbury, Vermont
FM APPROVED LOW POWER FOR USE IN HAZARDOUS LOCATIONS
SIZE C
DRAWING NO. 3-56060
SCALE
SHEET 4 of 4

APPENDIX II: ASCII CHARACTER TO NUMERIC VALUES

Decimal	Octal	Hex	ASCII	B7	B6	B5	B4	B3	B2	B1
0	000	00	NUL	0	0	0	0	0	0	0
10	012	0A	LF	0	0	0	1	0	1	0
11	013	0B	VT	0	0	0	1	0	1	1
12	014	0C	FF	0	0	0	1	1	0	0
13	015	0D	CR	0	0	0	1	1	0	1
14	016	0E	S0	0	0	0	1	1	1	0
15	017	0F	SI	0	0	0	1	1	1	1
27	033	1B	ESC	0	0	1	1	0	1	1
28	034	1C	FS	0	0	1	1	1	0	0
29	035	1D	GS	0	0	1	1	1	0	1
30	036	1E	RS	0	0	1	1	1	1	0
31	037	1F	US	0	0	1	1	1	1	1
32	040	20	SP	0	1	0	0	0	0	0
33	041	21	!	0	1	0	0	0	0	1
34	042	22	"	0	1	0	0	0	1	0
35	043	23	#	0	1	0	0	0	1	1
36	044	24	$	0	1	0	0	1	0	0
37	045	25	%	0	1	0	0	1	0	1
38	046	26	&	0	1	0	0	1	1	0
39	047	27	'	0	1	0	0	1	1	1
40	050	28	(	0	1	0	1	0	0	0
41	051	29	)	0	1	0	1	0	0	1
42	052	2a	*	0	1	0	1	0	1	0
43	053	2b	+	0	1	0	1	0	1	1
44	054	2C	,	0	1	0	1	1	0	0
45	055	2D	-	0	1	0	1	1	0	1
46	056	2E	.	0	1	0	1	1	1	0
47	057	2F	/	0	1	0	1	1	1	1
48	060	30	0	0	1	1	0	0	0	0
49	061	31	1	0	1	1	0	0	0	1
50	062	32	2	0	1	1	0	0	1	0
51	063	33	3	0	1	1	0	0	1	1
52	064	34	4	0	1	1	0	1	0	0
53	065	35	5	0	1	1	0	1	0	1
54	066	36	6	0	1	1	0	1	1	0
55	067	37	7	0	1	1	0	1	1	1
56	070	38	8	0	1	1	1	0	0	0
57	071	39	9	0	1	1	1	0	0	1
58	072	3A	:	0	1	1	1	0	1	0
59	073	3B	;	0	1	1	1	0	1	1
60	074	3C	<	0	1	1	1	1	0	0
61	075	3D	=	0	1	1	1	1	0	1
62	076	3E	>	0	1	1	1	1	1	0
63	077	3F	?	0	1	1	1	1	1	1
64	100	40	@	1	0	0	0	0	0	0
65	101	41	A	1	0	0	0	0	0	1
66	102	42	B	1	0	0	0	0	1	0
67	103	43	C	1	0	0	0	0	1	1
68	104	44	D	1	0	0	0	1	0	0
69	105	45	E	1	0	0	0	1	0	1
70	106	46	F	1	0	0	0	1	1	0
71	107	47	G	1	0	0	0	1	1	1
72	110	48	H	1	0	0	1	0	0	0
73	111	49	I	1	0	0	1	0	0	1
74	112	4A	J	1	0	0	1	0	1	0
75	113	4B	K	1	0	0	1	0	1	1
76	114	4C	L	1	0	0	1	1	0	0
77	115	4D	M	1	0	0	1	1	0	1
78	116	4E	N	1	0	0	1	1	1	0
79	117	4F	O	1	0	0	1	1	1	1
80	120	50	P	1	0	1	0	0	0	0
81	121	51	Q	1	0	1	0	0	0	1
82	122	52	R	1	0	1	0	0	1	0
83	123	53	S	1	0	1	0	0	1	1
84	124	54	T	1	0	1	0	1	0	0
85	125	55	U	1	0	1	0	1	0	1
86	126	56	V	1	0	1	0	1	1	0
87	127	57	W	1	0	1	0	1	1	1
88	130	58	X	1	0	1	1	0	0	0
89	131	59	Y	1	0	1	1	0	0	1
90	132	5A	Z	1	0	1	1	0	1	0
91	133	5B	[	1	0	1	1	0	1	1
92	134	5C	\	1	0	1	1	1	0	0
93	135	5D	]	1	0	1	1	1	0	1
94	136	5E	^	1	0	1	1	1	1	0
95	137	5F	_	1	0	1	1	1	1	1
96	140	60	`	1	1	0	0	0	0	0
97	141	61	a	1	1	0	0	0	0	1
98	142	62	b	1	1	0	0	0	1	0
99	143	63	c	1	1	0	0	0	1	1
100	144	64	d	1	1	0	0	1	0	0
101	145	65	e	1	1	0	0	1	0	1
102	146	66	f	1	1	0	0	1	1	0
103	147	67	g	1	1	0	0	1	1	1
104	150	68	h	1	1	0	1	0	0	0
105	151	69	i	1	1	0	1	0	0	1
106	152	6A	j	1	1	0	1	0	1	0
107	153	6B	k	1	1	0	1	0	1	1
108	154	6C	l	1	1	0	1	1	0	0
109	155	6D	m	1	1	0	1	1	0	1
110	156	6E	n	1	1	0	1	1	1	0
111	157	6F	o	1	1	0	1	1	1	1
112	160	70	p	1	1	1	0	0	0	0
113	161	71	q	1	1	1	0	0	0	1
114	162	72	r	1	1	1	0	0	1	0
115	163	73	s	1	1	1	0	0	1	1
116	164	74	t	1	1	1	0	1	0	0
117	165	75	u	1	1	1	0	1	0	1
118	166	76	v	1	1	1	0	1	1	0
119	167	77	w	1	1	1	0	1	1	1
120	170	78	x	1	1	1	1	0	0	0
121	171	79	y	1	1	1	1	0	0	1
122	172	7A	z	1	1	1	1	0	1	0
123	173	7B	{	1	1	1	1	0	1	1
124	174	7C	|	1	1	1	1	1	0	0
125	175	7D	}	1	1	1	1	1	0	1
126	176	7E	~	1	1	1	1	1	1	0
127	177	7F	DEL							

APPENDIX III: OUTPUT FORMATS

Typical Channel A, Printer Output

```
  2000 lb     GR


03:02 PM
 4- 9-91
    0
```

GROSS MODE

```
  2000 lb     GR
  1000 lb     TA
  1000 lb     NT
03:02 PM
 4- 9-91
    0
```

NET MODE

```
  1999 lb     GR
  5000 lb     TA
       lb     NT
03:03 PM
 4- 9-91
    0
```

NET MODE with NEGATIVE NET

```
       lb     GR
  1999 lb     TA
       lb     NT
03:04 PM
 4- 9-91
    0
```

NET MODE, NEGATIVE GROSS and NET

```
       lb     GR


03:04 PM
 4- 9-91
    0
```

GROSS MODE, NEGATIVE GROSS *2494*

Remote Display

1. 20mA current loop set-up

Baud Rate	:	Programmable
Stop Bits	:	Programmable
Parity	:	Programmable
Character Data Bits	:	Programmable

2. Output Format

Character #	Description
1	STX (Start of Text Character)
2 and 3	2 character ID, data field defined as follows: Calibration Units Gross Weight = 40 Calibration Units Net Weight = 41 Alternate Units Gross Weight = 43 Alternate Units Net Weight = 44
4 through 10	7 character, weight data field, characters 0 through 9, decimal point and minus sign. The minus sign will always appear in the first character location. Leading zeroes are blanked. Overcapacity is transmitted as a string of minus signs.
11	ETX (End of Text Character)

Computer Output

1. RS232 Channel set-up

Baud Rate	:	Programmable
Stop Bits	:	Programmable
Parity	:	Programmable
Character Data Bits	:	Programmable

2. Output format for all set-ups, ie. continuous or polled.

	Description in order of transmission
1	6 to 7 character weight data field, characters 0 through 9, decimal point and minus sign. The minus sign will appear in the first character location. Leading zeros are blank
2	Space
3	5 character units legend data field: lb, kg, g, oz, tonne. Left justified and the trailing zeros are blank.
4	Space
5	2 character weighing mode data field, GR (Gross), NT (Net). Lower case characters are transmitted if the scale is in motion.
6	Carridge return
7	Line feed, programmable

APPENDIX IV: CANADIAN STANDARD ASSOCIATION APPROVED INSTRUMENTS

Models H90-3051C1 through C4 are Canadian instruments. Each model has accessories installed at the factory.

H90-3051C1	No input/output accessories
H90-3051C2	Accessory 5810 (SMART 4/20mA Analog Current Output) installed
H90-3051C3	Accessory 5805 (Serial Communications Assembly) installed
H90-3051C4	Accessories 5810 and 5805 installed

10-13-95

REVISIONS				
CONT. LTR	DESCRIPTION		DATE APPROVED	
-	RELEASED	GDL	9-5-95	MPD
A	ADD SHEET 3 REV PER ECO 12407		10-13-95	

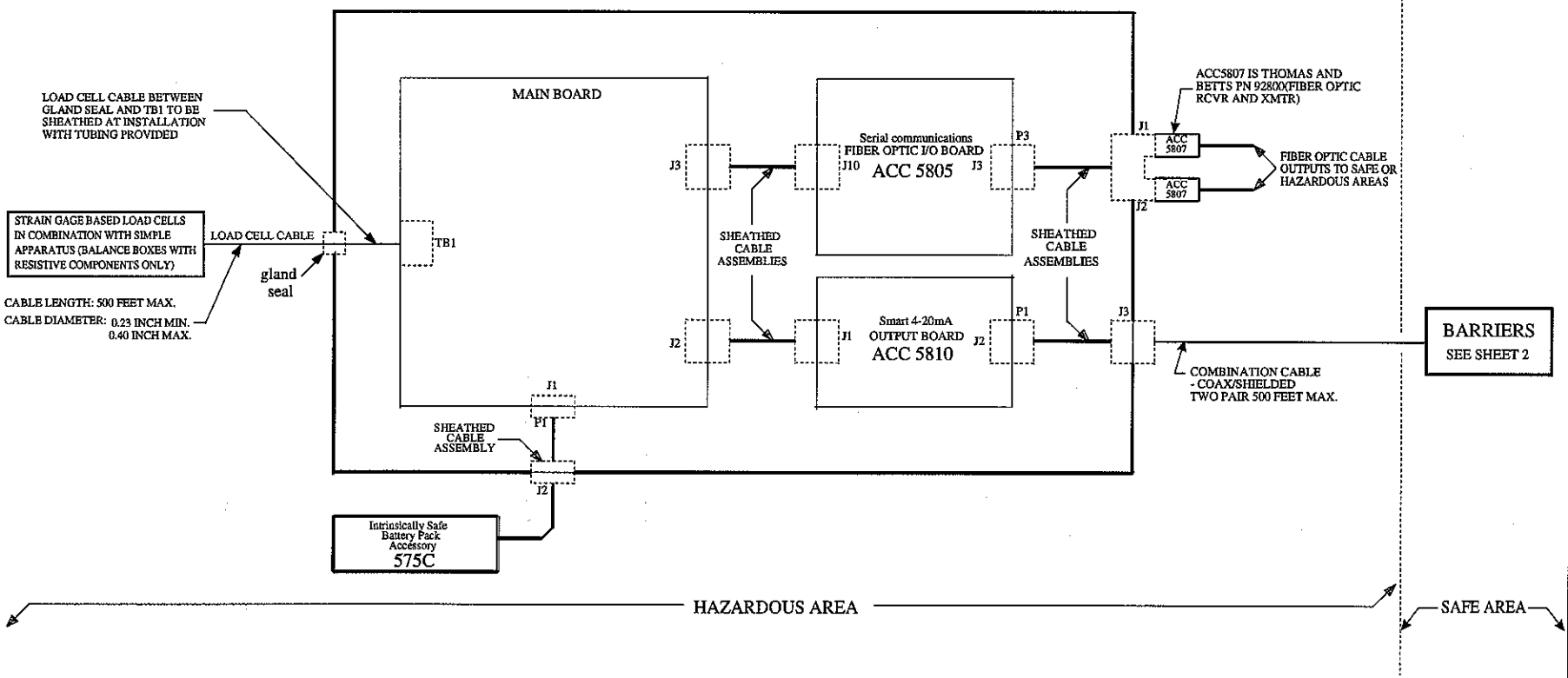
LOW POWER INSTRUMENT H90-3051Cx

H90-3051C1 - NO INPUT/OUTPUT ACCESSORIES

H90-3051C2 - ACCESSORY 5810

H90-3051C3 - ACCESSORY 5805

H90-3051C4 - ACCESSORIES 5810 AND 5805



CLASS I, GROUPS A, B, C & D
CLASS II, GROUPS E, F & G
CLASS III

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INSTALLATION NOTICE: ANY CABLING CONNECTED TO THE INSTRUMENT MUST HAVE SUFFICIENT SLACK TO ENABLE THE INSTRUMENT TO BE CALIBRATED AND PROPER OPERATION VERIFIED WHILE THE INSTRUMENT IS RESTING ON A CONVENIENT SURFACE SUCH AS A TABLE TOP, WORKBENCH OR FLOOR. SEE SJ4437 (ATTACHED TO INSTRUMENT).

C57481A1

DR. CAD/GDL	DATE 9-5-95	Fairbanks Scales, St. Johnsbury, Vermont
CH. MPD		CSA CERTIFICATION DRAWING FOR LOW POWER WEIGHT INDICATOR FOR USE IN HAZARDOUS LOCATIONS
APP. MPD		SIZE C — DRAWING NO. 3-57481
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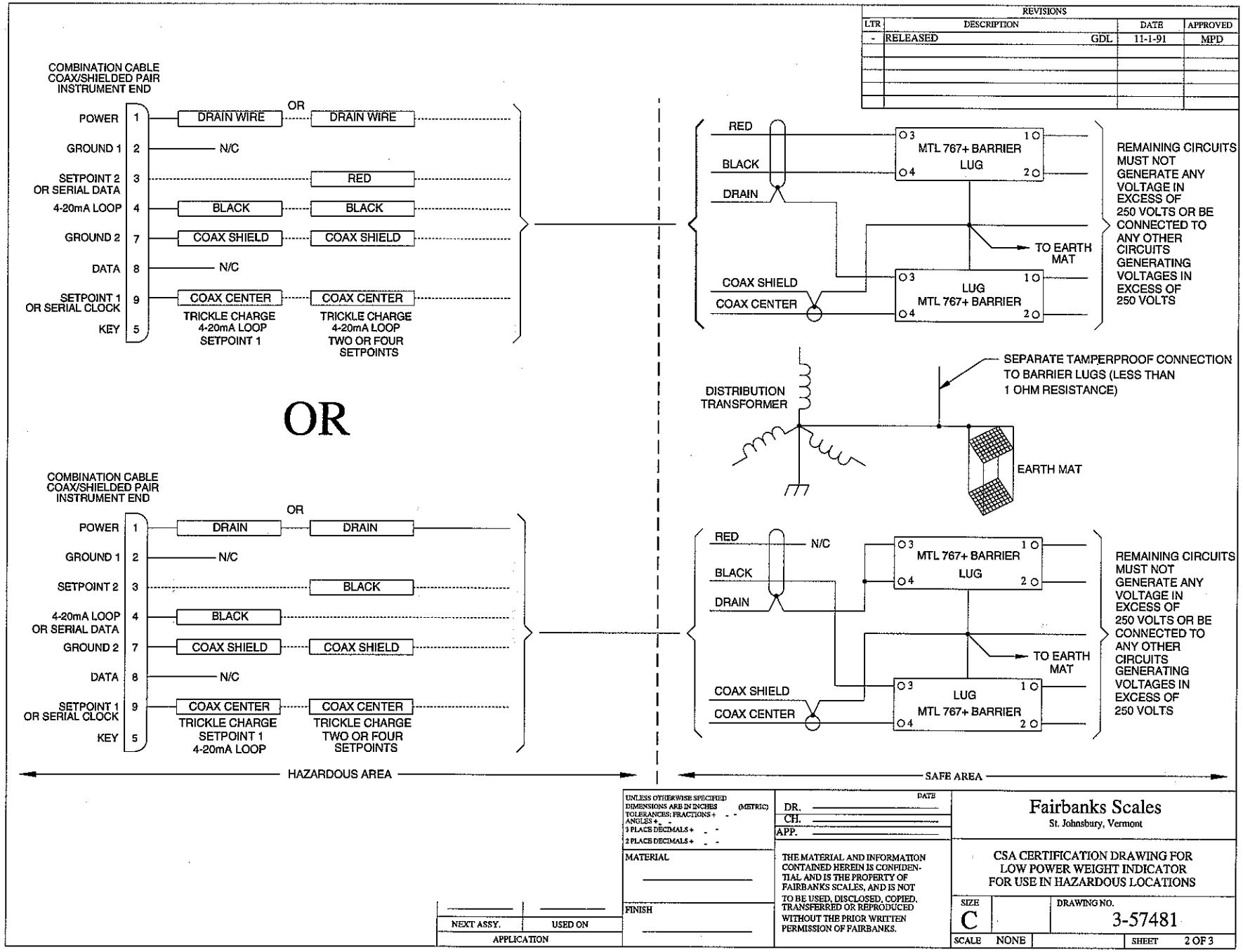
SJ4321


REVISIONS
LTR DESCRIPTION DATE APPROVED
- RELEASED GDL 11-1-91 MPD
COMBINATION CABLE
COAX/SHIELDED PAIR
INSTRUMENT END
OR
POWER 1 DRAIN WIRE DRAIN WIRE
GROUND 1 2 N/C
SETPOINT 2 OR SERIAL DATA 3 RED
4-20mA LOOP 4 BLACK BLACK
GROUND 2 7 COAX SHIELD COAX SHIELD
DATA 8 N/C
SETPOINT 1 OR SERIAL CLOCK 9 COAX CENTER COAX CENTER
KEY 5
TRICKLE CHARGE 4-20mA LOOP SETPOINT 1
TRICKLE CHARGE 4-20mA LOOP TWO OR FOUR SETPOINTS
RED
BLACK
DRAIN
COAX SHIELD
COAX CENTER
MTL 767+ BARRIER
LUG
LUG
MTL 767+ BARRIER
TO EARTH MAT
REMAINING CIRCUITS MUST NOT GENERATE ANY VOLTAGE IN EXCESS OF 250 VOLTS OR BE CONNECTED TO ANY OTHER CIRCUITS GENERATING VOLTAGES IN EXCESS OF 250 VOLTS
OR
DISTRIBUTION TRANSFORMER
SEPARATE TAMPERPROOF CONNECTION TO BARRIER LUGS (LESS THAN 1 OHM RESISTANCE)
EARTH MAT
COMBINATION CABLE
COAX/SHIELDED PAIR
INSTRUMENT END
OR
POWER 1 DRAIN DRAIN
GROUND 1 2 N/C
SETPOINT 2 3 BLACK
4-20mA LOOP OR SERIAL DATA 4 BLACK
GROUND 2 7 COAX SHIELD COAX SHIELD
DATA 8 N/C
SETPOINT 1 OR SERIAL CLOCK 9 COAX CENTER COAX CENTER
KEY 5
TRICKLE CHARGE SETPOINT 1 4-20mA LOOP
TRICKLE CHARGE TWO OR FOUR SETPOINTS
RED
N/C
BLACK
DRAIN
COAX SHIELD
COAX CENTER
MTL 767+ BARRIER
LUG
LUG
MTL 767+ BARRIER
TO EARTH MAT
REMAINING CIRCUITS MUST NOT GENERATE ANY VOLTAGE IN EXCESS OF 250 VOLTS OR BE CONNECTED TO ANY OTHER CIRCUITS GENERATING VOLTAGES IN EXCESS OF 250 VOLTS
HAZARDOUS AREA
SAFE AREA
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (METRIC)
TOLERANCES: FRACTIONS + - -
ANGLES + - -
3 PLACE DECIMALS + - -
2 PLACE DECIMALS + - -
MATERIAL
FINISH
NEXT ASSY. USED ON
APPLICATION
DATE
DR.
CH.
APP.
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Fairbanks Scales
St. Johnsbury, Vermont
CSA CERTIFICATION DRAWING FOR
LOW POWER WEIGHT INDICATOR
FOR USE IN HAZARDOUS LOCATIONS
SIZE C
DRAWING NO. 3-57481
SCALE NONE
SHEET 2 OF 3

REVISIONS

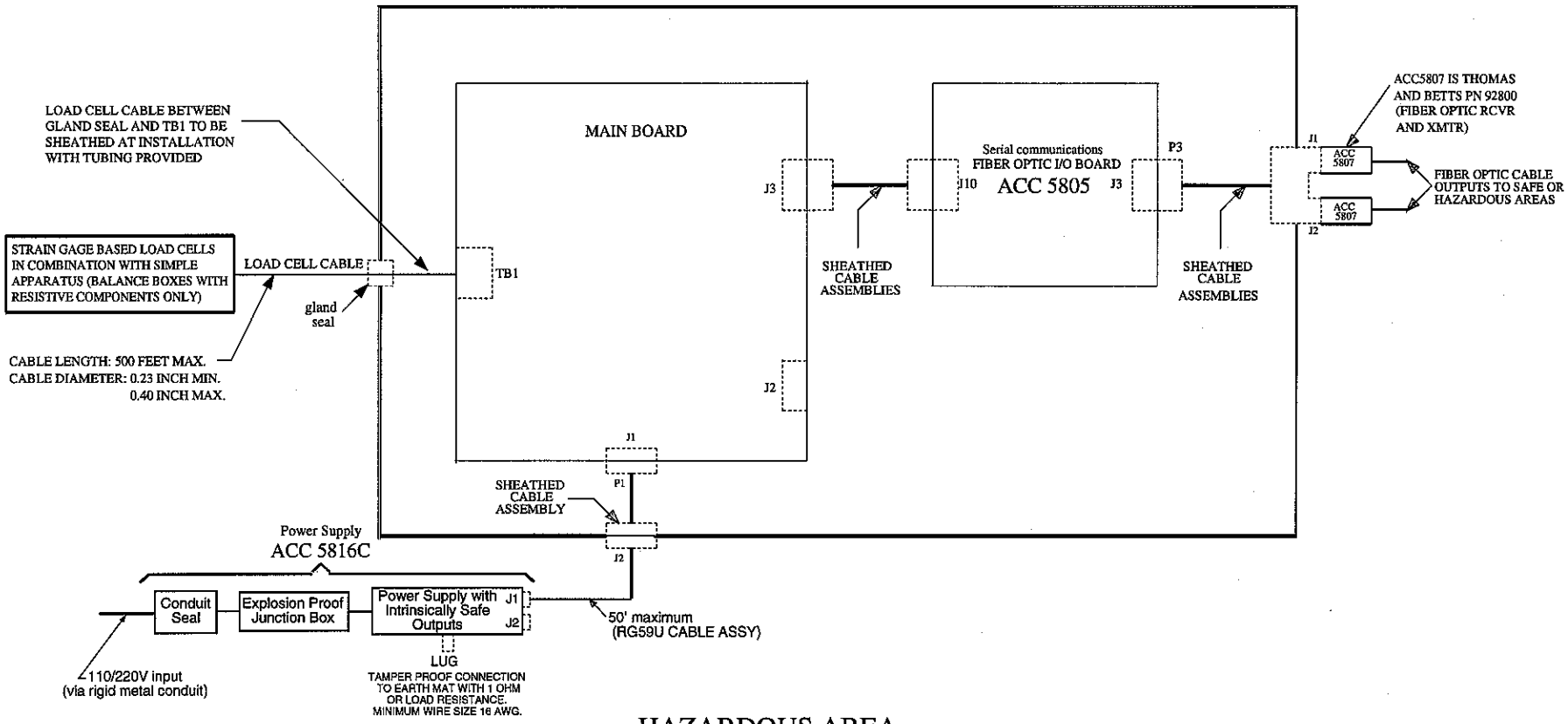
ZONE LTR	DESCRIPTION	DATE APPROVED
-	RELEASED	10-13-95 GDL / MPD

10-13-95

LOW POWER INSTRUMENT H90-3051Cx

H90-3051C1 - NO INPUT/OUTPUT ACCESSORIES

H90-3051C3 - ACCESSORY 5805



HAZARDOUS AREA

CLASS I, GROUPS C & D
CLASS II, GROUPS E, F & G
CLASS III

INSTALLATION NOTICE: ANY CABLING CONNECTED TO THE INSTRUMENT MUST HAVE SUFFICIENT SLACK TO ENABLE THE INSTRUMENT TO BE CALIBRATED AND PROPER OPERATION VERIFIED WHILE THE INSTRUMENT IS RESTING ON A CONVENIENT SURFACE SUCH AS A TABLE TOP, WORKBENCH OR FLOOR. SEE SJ4437 (ATTACHED TO INSTRUMENT).

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C57481-3

DR. CAD/GDL	DATE 9-5-95	Fairbanks Scales, St. Johnsbury, Vermont
CH. MPD		CSA CERTIFICATION DRAWING FOR LOW POWER WEIGHT INDICATOR FOR USE IN HAZARDOUS LOCATIONS
APP. MPD		SIZE C, DRAWING NO. 3-57481, SCALE, SHEET 3 of 3

SJ4321

FAIRBANKS
SCALES

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