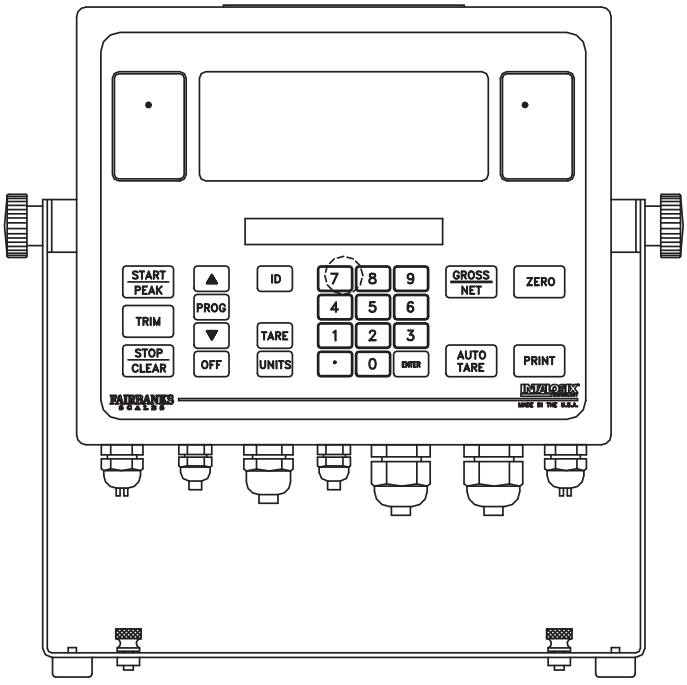
Operator Manual

2800 Series

INTRINSICALLY SAFE INSTRUMENT WITH INTALOGIX™ TECHNOLOGY

Model 2800



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Revision 7 10/07

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Amendment Record

2800 SERIES

Intrinsically Safe Instrument with Intalogix™ Technology

DOCUMENT 50647

Manufactured by Fairbanks Scales Inc.
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Kansas City, Missouri 64106

Created	09/01	New Product
Issue #1	09/01	New Product
Issue #2	11/01	Updated specifications
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Issue #4	08/02	Updated specifications for 4-20mA
Issue #5	01/03	Updated drawings, note, and caution graphics.
Issue #6	11/06	Updated specifications for 4-20mA.
Revision 7	10/07	Updated format, images, and technical specifications.

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Section 1: General Information

DESCRIPTION

The model 2800 series is an *Intrinsically Safe* instrument utilizing **Intalogix™ Technology**. It is **Factory Mutual Approved** for direct use in *hazardous environments* as shown in the FM Approved Control Drawings.

The 2800 series instrument eliminates the need for explosion proof enclosures or purging systems. Enclosed in a **stainless steel, NEMA 4X enclosure**, the instrument is able to withstand both *wash-down* and *corrosive environments*.

Major features of the Instrument include **push-button programming** and **calibration**, with data storage in ***nonvolatile ROM*** for **100% memory retention**.

The 2800 series instrument features a large **1.25 inch high LCD weight display** with an additional alphanumeric status display. The 2800 can be tilted up or down to accommodate different lighting conditions. *Microprocessor controlled design* allows the instrument to be rapidly programmed at installation to meet the specific requirements of the application.

The obtainable accuracy **meets Handbook 44 requirements**, and the instrument is approved for commercial application *up to 10,000 divisions*. A maximum of 30,000 divisions can be achieved for non-commercial applications.

This ultra low power instrument can *interface to analog load cells* through an Intalogix™ intrinsically safe controller or can be connected directly to analog load cells using an available optional accessory.

The instrument provides **fiber optic interfaces** from the hazardous area to the optional accessories located in a safe area. The optional accessories provide communications to various types of peripherals devices in selectable formats for **RS232, RS485,** and **20mA data outputs**. Other available options include analog interfaces through *programmable setpoints and 4-20 ma analog outputs*. The instrument may be powered by a battery or a continuous power accessory .

SPECIFICATIONS

Model: 2800 Series

Instrument Approvals	• **NTEP: CoC 01-009** • CWM: Pending
FM Approvals	• Class I, II, and III • Division 1 • Groups A, B, C, D, E, F, and G * *For more detailed information, see* **FM Control Drawing 21943.** *See* **Appendix II.**
Physical Dimensions	Approximately **13"W x 9"H x 3"D**
Material	**Stainless Steel**
Enclosure Rating	• NEMA 4X • IP65
Capacities	Service programmable up to 999,950 lb, kg, oz, g, tons, lb-oz, or gallons
Division Sizes	• Service programmable for **.0002 to 50** • Fixed at **one (1) oz**. in the **lb/oz mode**
Resolution	• Commercial - Up to 10,000 divisions maximum • Noncommercial - Up to 30,000 divisions maximum
Sensitivity	• **1µv/d (microvolt/division)**
Load Cells	Up to 16 - 350 or 1000 ohm impedance
Load Cell Cable Length/Wire Gauge	• 75' maximum • 20 AWG maximum
Display	**Weight Display** — **1.25" height** — 7 segment LCD **Status Display** — **.38" x 3.73" Alphanumeric LCD** — 16 characters - .38" x .191" character size
Zero Range	Service programmable - Disabled, 2, or 100%
Auto-Zero-Tracking	Service programmable - Disabled, .5, 1, or 3 divisions
Motion Detection	Service programmable - Disabled, .5, 1, or 3 divisions
Digital Filter	Service programmable from disabled up to heavy
Display Update Rate	Service programmable settings from .1 to .8 seconds.□□
Environment	**Handbook 44 Compliance Tested Operating Environment** — Temp -10°C to + 40°C (+14°F to + 104°F) **Storage** — Temp -40°C to + 60°C (-40°F to + 140°F)
Chemical Resistance	**Resistant to all petroleum derivatives and salts**

ACCESSORIES

Accessory 2802 Intrinsically Safe Controller

Product Number 22119

- Each controller allows **up to four (4) load cells** to be interconnected
- Communicates to the Model 2800 Series Instrument using Intalogix ™ Technology
- Enclosure: **NEMA 4X, Stainless steel**

Accessory 2825 Safe Area Power Supply

Product Number 18448

- This accessory will provide continuous power to the Model 2800 Instrument.
- The Accessory 2830 cannot be used with this accessory, as this accessory is installed in a non-hazardous, safe area only.
- *Refer to Control Drawing 21943 in Appendix II.*
- Enclosure: **NEMA 4, Fiberglass**
- Output: **7vdc**

Accessory 2830 Battery

Product Number 20615

- Supplies battery power to the Model 2800 Series Instrument.
- It must be recharged in a non-hazardous, safe area using **Accessory 2840 or 2841 only.**
- The Accessory 2830 is the only battery approved to be used with the Model 2800 Series Instruments for all applications.
- ***Do NOT use Accessory 2830 in conjunction with Accessory 2825.***
- Refer to Control Drawing 21943 in Appendix II.
- Specifications: **6vdc, 10aH, Sealed Lead Acid**
- FM Approvals: Class I, II, and III; Division 1; Groups A, B, C, D, E, F, and G

C A U T I O N

Battery surface gets *very HOT* during recharging!

ACCESSORIES, CONTINUED

- Battery Charging: Charging time is **16 hours** for a fully discharged battery.
  - The battery requires recharging when the **Recharge** display appears.
  - The battery may be **recharged 100 - 500 times** dependent on depth of discharge.
  - The following tables are nominal recharge intervals using various quantities of load cells and different accessories.
  - Recharge intervals may vary depending upon usage.

Table 1 – Recharge intervals using **Accessory 2802**

No. of Cells	Recharging Hours	
	350 ohm Load Cells	1000 ohm Load Cells
16	6	20
12	20	40
8	45	70
4	100	133

Table 2 – Recharge intervals using **Accessory 2880**

No. of Cells	Recharging Hours	
	350 ohm Load Cells	1000 ohm Load Cells
16	85	133
14	90	150
12	95	172
10	100	184
8	117	199
6	133	219
4	175	247
3	194	266
1	269	320

NOTE: *For proper battery disposal, please refer to the* **Material Safety Data Sheets** *in* **Appendix III.**

ACCESSORIES, CONTINUED

Accessory 2840 Battery Charger 110-120VAC for Accessory 2830

Product Number 21199

- The Safe Area Smart Recharger is for use with the Battery Accessory 2830 only.
  - This accessory is intended for non-hazardous, safe areas only.
  - The charger will fully charge a completely discharged 2830 battery ***within 16 hours.***
  - A charged battery can be left on the charger without any resulting damage to either the charger or battery pack.
- When a discharged Accessory 2830 Battery is first connected to a charger, the status L.E.D. on the charger blinks at a rapid rate such that it may appear to be continuously lit (**Caution: Hot!**).
- As the Accessory 2830 Battery Pack charges, the blinking rate decreases and at the end of charging the battery pack, the blinking rate decreases to roughly once per second or less.
- Input Voltage: **120 VAC, 60 Hz.**
  - Charger to be plugged into a standard outlet.
- Battery Output Voltage: **7.0vdc +/- 0.2vdc** at the end of charge with the battery connected.
- Output leads: **18 AWG**, approximately **6' in length.**
- Status L.E.D.: Brightness sufficient to discern the charge status under general office environment lighting.
- **Charging Time:16 hours maximum** for undamaged chargeable (electrolyte not depleted) battery with initial unloaded output voltage of 5.0vdc.
- Operating Temperature Range: 0ºC to +38ºC (**+32ºF to +100ºF**)

C A U T I O N

Battery surface gets *very HOT* during recharging!

ACCESSORIES, CONTINUED

Accessory 2841 Battery Charger 230VAC for Accessory 2830

Product Number 21740

- This unit is equipped with a **European style 230 VAC plug.**
- The Safe Area Battery Smart Recharger is for use with the battery accessory 2830 only.
  - This accessory is intended for ***non-hazardous, safe areas only.***
- The charger fully charges a completely discharged 2830 Battery **within 16 hours.**
  - A charged battery can be left on the charger without any resulting damage to either the charger or battery pack.
- When a discharged Accessory 2830 Battery is first connected to a charger, the status L.E.D. on the charger will blink at a rapid rate such that it may appear to be continuously lit (Caution: Hot).
- As the Accessory 2830 Battery Pack charges, the blinking rate decreases and at the end of charging the battery pack, the blinking rate decreases to roughly once per second or less.
- Input Voltage: **230 VAC, 50 Hz**
  - Charger to be plugged into a **standard European outlet.**
- Battery Output Voltage: **7.0VDC +/- 0.2VDC** at the end of charge with the battery connected.
- Output leads: **18 AWG**, approximately **6' in length.**
- Status L.E.D.: Brightness sufficient to discern the charge status under general office environment lighting.
- Charging Time: **16 hours maximum** for undamaged chargeable (electrolyte not depleted) battery with initial unloaded output voltage of 5.0vdc.
- Operating Temperature Range: 0°C to +38°C (**+32°F to +100°F**)

Accessory 2850 Safe Area Relay Setpoint Interface

Product Number 20570

- The setpoint accessory is service programmable for up to **eight (8) setpoints.**
- These setpoints may be configured to one of five different modes of operation.
- Enclosure: **NEMA 4. Fiberglass**

ACCESSORIES, CONTINUED

Accessory 2860 Safe Area Data Converter

Product Number 20523

- This accessory is service programmable and configurable for **RS232, RS485**, or **20mA data outputs.**
- This accessory can also be configured to provide a 4-20 ma analog output.
- Enclosure: **NEMA 4; Fiberglass**
- **4 -20 ma Specifications: 16 bit resolution** (+/- .01 integral linearity)

C A U T I O N

The 4-20ma accessory is a passive device!
The power is to be supplied by others, and *MUST BE* a *DEDICATED* and an *ISOLATED* power supply.

- Current loop voltage compliance: **7vdc minimum to 40vdc maximum** (typical voltage = 24vdc)
- Full scale settling time: **8msecs**
- Output impedance: **25 meg**
- Alarm current: **3.5 to 24 mA** (underload/overload conditions)
  - Offset @ 25 degrees C; +/- .1% of full scale
- Offset drift: +/- 25ppm of full scale per degree C
- Total output error: 20mA @ 25 degrees C: +/- .2% of full scale max
- Total output drift: +/- 50ppm of full scale per degree C-max

Accessory 2875 Intrinsically Safe Interconnection Cable

Product Number 21737

- This is the only approved cable for interconnecting the Accessory 2802, and for connecting to the Model 2800 to the Accessory 2850.
- Specifications: **2 pair - 16AWG; 0.48" O.D.**

ACCESSORIES, CONTINUED

Accessory 2880 Analog Cell Input

Product Number 19797

- This accessory allows for **direct interface to a analog load cell(s).**
- This accessory is complete, and is supplied with mounting hardware and an EPROM.

Accessory 2900 Splice Box

Product Number 20310

- Enclosure: **NEMA 4X; Stainless steel**

Accessory 2910 Splice Box Kit w/cables

Product Number 20199

- Enclosure: **NEMA 4X; Stainless steel**

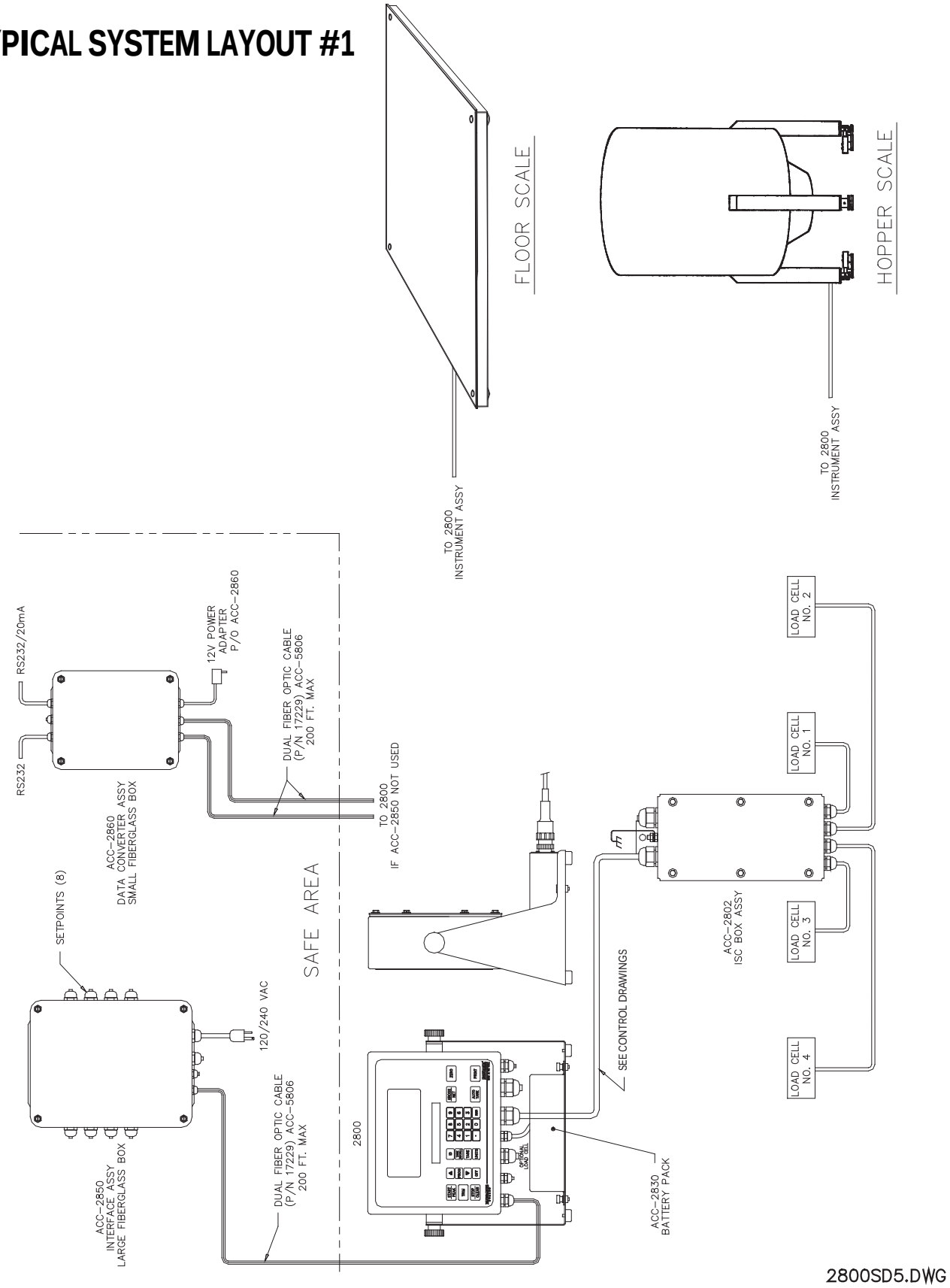
Accessory 5806 Fiber Optic cable

Product Number 17229

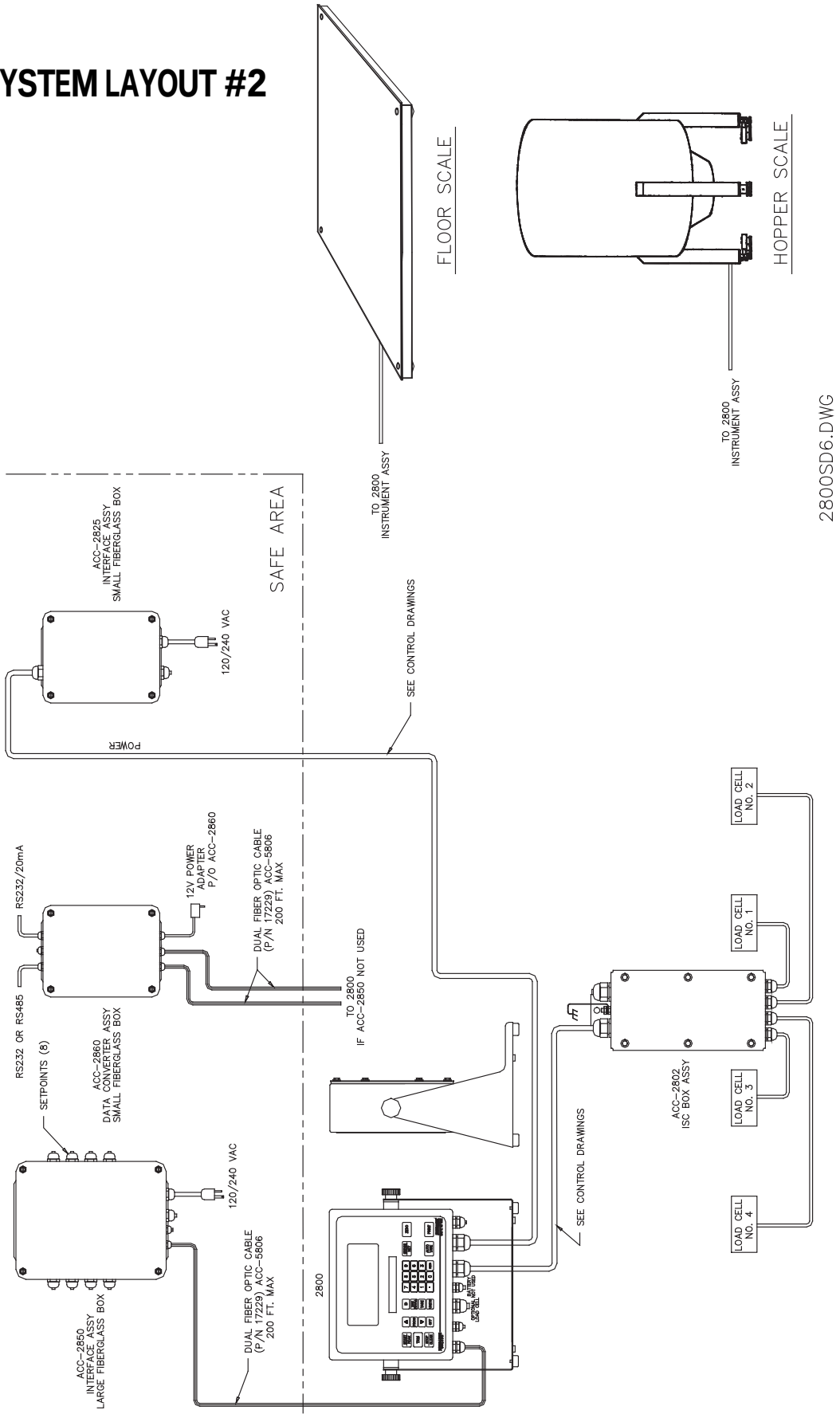
- This accessory allows a direct connection of the Model 2800 Series Instrument.

It is located in the hazardous area to the Accessories 2850 and 2860, in the **non-hazardous, safe area** for I/O operation.

TYPICAL SYSTEM LAYOUT #1



TYPICAL SYSTEM LAYOUT #2



Section 2: OPERATION

CUSTOMER/ OWNER RESPONSIBILITIES

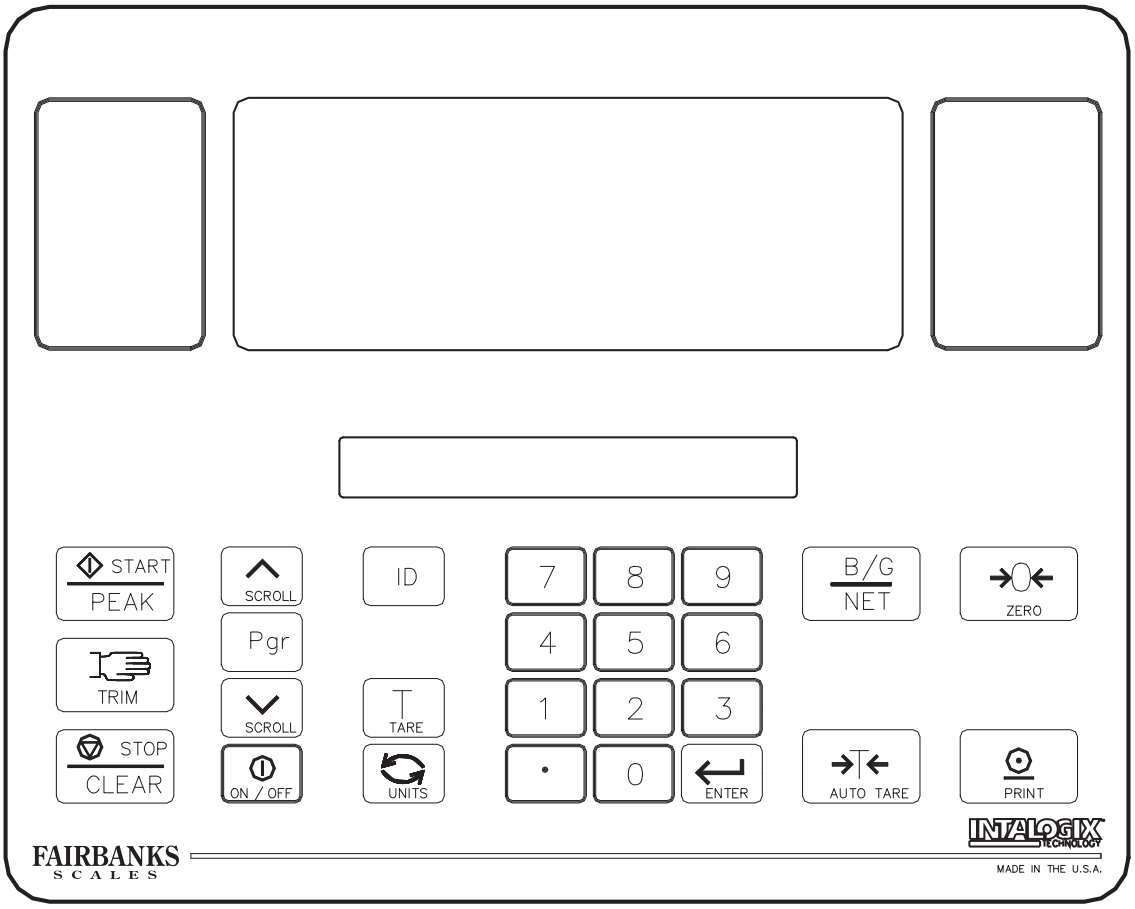
It is the customer/ owners' responsibility to maintain, the platform, instrument, and peripheral accessories in good order, and to protect the equipment from accidental or malicious damage. The installation shall be in accord with the manufacturer's instructions and with the National Electric Code (ANSI-NFPA 70). Refer to ANSI/ ISA-RP12.6, Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations for guidance on the installation of intrinsically safe apparatus and systems. Do not break the seals on the instrument or attempt any internal adjustments. Absolutely no physical, electrical, or program modifications other than the 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 and etc.) are allowed. No service, repairs, or adjustments, other than those outlined in this manual, may be performed by untrained service personnel.

SAFETY

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

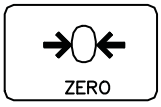
- Never load the scale platform beyond its rated capacity.
  - *Refer to the rating on the serial number plate to be certain.*
- Ensure that any structure which supports the platform is capable of withstanding the weight of the platform plus its rated capacity load.
- Do not load the scale platform if there is any evidence of damage to the platform or supporting structure.
- 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.

FRONT PANEL KEY FUNCTIONS



The function of the front panel keys varies 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.

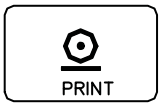
ZERO KEY



When in the Gross mode, this key sets the **Gross Weight** to Zero.

- If motion exists, the **ZERO** command will not be executed.
- If the weight on the platform exceeds the zero limit, and the **ZERO** key is pressed, the Zero command will not be executed.

PRINT KEY



Used to transmit weight data to an external device.

GROSS/NET KEY



Toggles between the Gross and Net Weight modes.

- It is also used to exit programming.

FRONT PANEL KEY FUNCTIONS, CONTINUED

AUTO TARE



In the Gross or Net mode, this key sets Tare Memory equal to the Gross Weight on the platform.

- The instrument displays "**0**" weight and enters the Net Weigh mode.
- The NET Legend displays.
- Auto Tare only operates if the Gross Weight is positive.

ID KEY



Enters numeric ID for printer or computer printout.

- A maximum of six digits is available, 0 thru 999999.

TARE KEY



Displays the currently entered **Tare Value**.

UNITS KEY



Toggles the displayed weight between the units selected in the **Configuration Program** (i.e. lb to kg or kg to lb.)

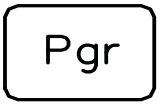
SCROLL KEYS





Moves through the Programming Menu Tree in an **UPWARD** or **DOWNWARD** direction.

PROGRAM KEY



Enters into the instrument's Programming mode.

ON/OFF KEY



- Turns instrument **ON** or **OFF.**
- If the **Sleep Function** is selected, this key either disables or enables the **Sleep** mode.

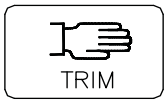
FRONT PANEL KEY FUNCTIONS, CONTINUED

START/PEAK KEY



- Initiates a Setpoint Operation.
- Also enables **Peak Net Tracking (PNT)**.

TRIM KEY



- Overrides the Setpoint Cycle.
- Adds weight in touch-controlled increments.

STOP/CLEAR



- Terminates a Setpoint Cycle.
- Resets the memory of the Peak Net Capture to a null value until a new Peak Net Weight is captured.

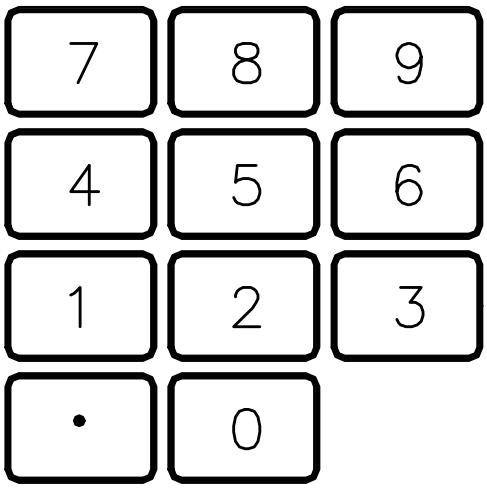
Enter



- Inputs commands to the Setpoint Operation.

NUMERIC KEYS (0 THRU 9)

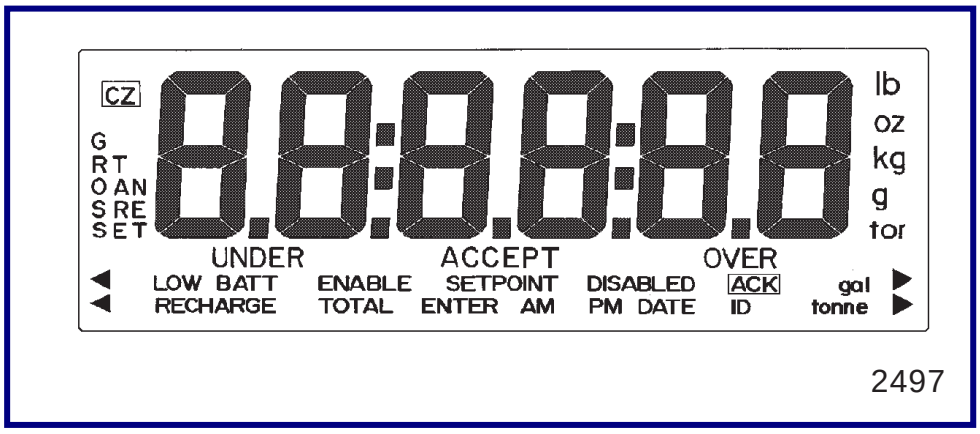
Used for numeric entries, such as Tare, ID, Setpoint Values, etc.



LCD DISPLAY

Displays weight on the load receiver and applicable prompts.

FRONT PANEL KEY FUNCTIONS, CONTINUED



LEGENDS

- Several different legends display on the LED screen.
- While most are self explanatory, the following items are defined.

CZ (**C**enter of **Z**ero).

RECHARGE

- Battery power is low and will require recharging soon.
- The RECHARGE legend displays when the input voltage from the Battery Accessory 2830 falls below a threshold of approximately 5.4VDC when using Accessory 2802, or 5.32VDC when using Accessory 2880.

LoBAtt

Battery requires immediate recharging.

The **RECHARGE** legend disappears and the instrument automatically shuts down and displays **LoBAtt** when the voltage from the battery falls below the following:

- **5.3VDC** when using Accessory **2802**
- **5.12VDC** with Accessory **2880.**

Instrument Weighing Functions

Three terms which describe the distribution of an object's weight are GROSS WEIGHT, TARE WEIGHT, and NET WEIGHT.

TARE WEIGHT

Tare weight is the weight of the incidental materials.

NET WEIGHT

Net weight is the weight of the primary materials.

GROSS WEIGHT

Gross weight is the total weight of a weighment.

- This includes any primary and incidental materials comprising the total weighment.

TARE WEIGHT VALUE + NET WEIGHT VALUE = GROSS WEIGHT

EXAMPLE

A can of house paint is an object to be weighed. The can is the incidental material used to hold the primary material, paint, and the label is incidental material used to identify the paint. All the incidental materials summed together comprise the Tare weight. All the primary materials weights summed together comprise the Net weight; in this case pigment, base, and solvent. The object is made up of incidental materials, can and label, and primary material, paint. Summed together, the complete object is the Gross weight.

Instrument Weighing Functions, Continued

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

GROSS = NET + TARE

TARE = GROSS – NET

NET = GROSS – TARE

NET = GROSS - TARE is particularly important because it is what a scale uses to compute net weights in the NET WEIGHING mode.

Gross Weight is a function of the total weight on the platform from the zero reference.

Tare Weight ***is always an operator defined value.***

Gross Weighing

1. Press the B/G NET key to select **Gross** as indicated by the legend.

2. With the platform empty, press the →0← ZERO key.
   - The display indicates **ZERO**.
   - The Center-of-Zero (**CZ**) legend appears.
3. Place the object to be weighed on the scale platform.
   - The weight of the object displays.
   - 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 weighed by pressing the →0← ZERO key.
   - The instrument will assign what ever weight happens to be on the platform a zero weight value.
   - Starting with an empty platform is not required.
   - The key sets the display to "**0**", regardless of what is on the platform.
   - Weighing in the **Gross** mode consists of pressing the →0← ZERO key and placing a weight on the platform.
   - The display shows the Gross Weight of the object.
   - The instrument understands Gross Weight as the total weight placed on the platform after the →0← ZERO key is pressed.

Tare Weights

Tare weight is operator-defined. There are two methods to input a tare weight value.

Keypad Tare Entry

Assign the tare weight value using the numeric keypad, then press the ↵ ENTER key. The instrument will change to the Net Weighing mode, and display the Gross Weight less the Keypad Tare weight entry.

Tare Weights, Continued

Auto Tare Entry

Place the item(s) that will comprise the Tare weight onto the scale and press the key. The instrument will Change to the Net Weighing mode, and display the Gross Weight less the Auto-tare weight entry. The tare weight value remains unaltered in the instruments memory until the following occurs.

1. Power is removed.
2. The key is pressed.
3. A new tare weight is entered via the keypad.
4. The **Program Menu** is accessed.
   - If the value of the tare weight entered using the keypad does not correspond with an exact division size, the number is first truncated to the correct decimal location, and then rounded to the nearest division size.
   - For example, for a division size of 0.1, an entered tare of 2.19 is truncated to 2.1. It is 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.
5. Correct entry errors by inputting "0's" until a single "0" is displayed
6. Press the ENTER key.

Net Weighing Using AUTO TARE

1. Press the ZERO key. The display will read "0" and the GROSS Legend will be displayed.
2. Place the empty container on the platform.
3. Press the AUTO TARE key.
   - The scale displays "0" and the NET legend is also displayed. The weight of the container on the scale will be entered in to the instruments memory as a TARE weight value.
4. Place the material to be weighed in the container. The display will show the weight of the material that is in the container. This is the NET weight value.

NOTE: *Net weighing of pre-packaged containers can be accomplished by first placing an empty container that is the same weight as the product container on the platform, and pushing* AUTO TARE *before beginning weighing operations.*

Tare Weights, Continued

Batching Using AUTO TARE

1. Select the **GROSS mode** and place the empty container on the platform.
   - the **TARE Weight** of the container is displayed.
2. Push the →0← ZERO key.
3. Fill the container with the first item until the desired weight is achieved. Instrument display indicates the net weight of the first item (in the **GROSS mode**).
4. Push the →T← AUTO TARE key to reset the display to zero.
   - The instrument display indicates zero net weight.
5. Place the next item into the container until the desired weight is reached.
6. Repeat Steps 4 and 5 until all items have been put into the container.
7. Switch to the **GROSS mode** and read the total NET weight of the batch.
8. Repeat Steps 1 through 7 for other batches.

Follow these steps to clear the operation.

1. Select the **GROSS mode**.
2. Remove all materials from the platform.
3. Push the →0← ZERO key to zero the display.
4. Push the →T← AUTO TARE key to reset the tare memory.
5. Select the **GROSS mode.**

ENTERING ID Numbers

1. Place the instrument into the Weighing mode.
2. Press the ID key.
   - The current ID number or id none will be displayed.
3. Use the numeric keypad to assign an ID number.
   - A maximum of six digits, 0 through 999999.

Tare Weights, Continued

4. Press the ENTER key to save the displayed ID number and to return the instrument to the Weighing mode.
   - The ID number is printed as part of each print cycle if selected in the **IO Output Programming.**

Peak Hold Function

The **PEAK HOLD** (**P hoLd**) function is used to determine, display, and print the largest Net weight data achieved during a weighing cycle. A weigh cycle ends when the Print command is given, or when the peak Net weight is manually cleared by the **CLEAR** key. **PEAK HOLD** tracks only Net weight, and operates independently of the display. The peak weight can either be a positive or a negative number, determined by the absolute weight value. This means that if a positive peak is displayed, a negative weight value of greater absolute value could update the peak information in the same cycle.

If the **P hoLd** option is activated in the **IO Menu**, then pressing the **START** key enables this function

- It allows the viewing of the current peak net weight.

Pressing **ENTER** returns the display to the **Weighing mode**.

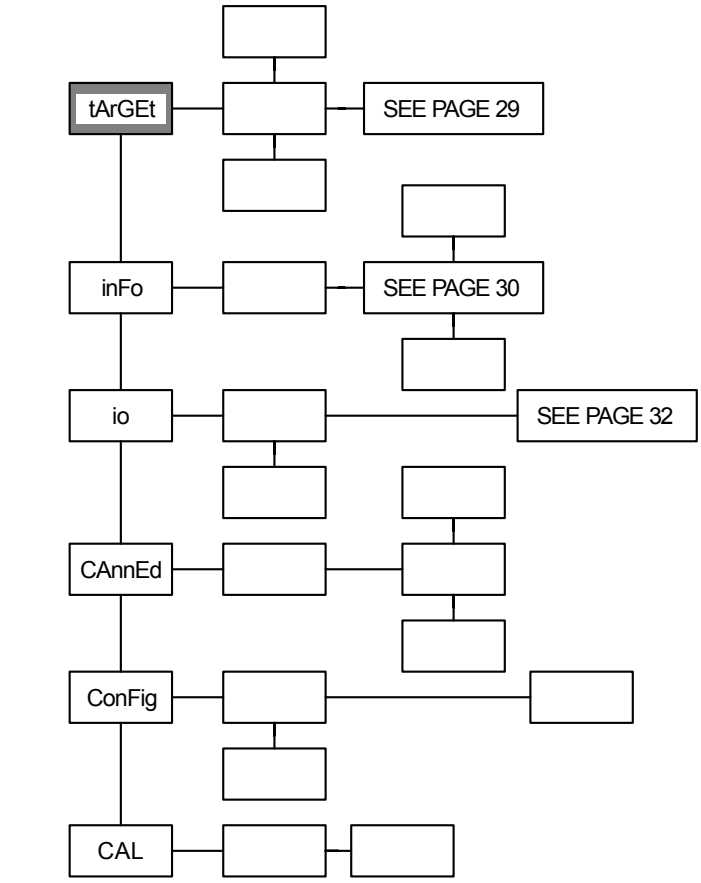
- The **P hoLd** feature works in the **Gross** or **Net Weighing modes**.

1. Place a container on the scale.
2. Press the **AUTOTARE** key, or enter in a known **TARE Weight.**
3. Press the **START/PEAK** key to view the current **Peak Net Weight.**
4. Press the **ENTER** key to enable the feature and return to the **Weighing mode.**
5. Perform the desired number of weighment'.
   - At any time, the current **Peak Net Weight** can be viewed by pressing the **START/PEAK** key.
   - Press the **ENTER** key to return the **Weighing mode**.
6. If a printer is enabled, pressing the **PRINT** key will have the **Peak Net Weight** transmitted with the printed data.
   - A print command ends the "**Peak hoLd" Weighing Cycle**.
7. Press the **STOP/CLEAR** key to reset the current **Peak Weight**, and press the **START/PEAK** key followed by the **ENTER** key to enable the feature.

Section 3: Programming

MENU NAVIGATION

The instrument must be programmed before it can be used. The program is arranged in a menu tree format. Once the Programming mode is entered, menu's may be accessed in any order by following the flow charts on the following pages.



The graphic model shows the **Main Menu Tree** options and several levels of sub-menu options. On the following pages, menu's are displayed graphically starting with a specific main menu option, its sub-menu's, and ending with the data within each that can be selected and saved. Each graphic shows lines as the paths to follow while navigating the menu.

MENU NAVIGATION, CONTINUED

Keys Used for Navigation

The **SCROLL** keys are used to navigate through menu options or data in an **UPWARD** or **DOWNWARD** direction. Continually pressing either **SCROLL** key cycles through the available options.

The **ENTER** key accepts and/or stores the displayed option or data entry. Press **ENTER** at a menu option to access the sub-menu's and data contained in that option. In the following flow charts, Enter is expressed as a lateral navigation key.

The **B/G NET** key exits most programming menu's returning to the previous menu. Continually pressing the **B/G NET** key exits programming and returns to the Weight Screen. In the following flow charts, **B/G NET** is expressed as a lateral navigation key.

Main Menu Descriptions

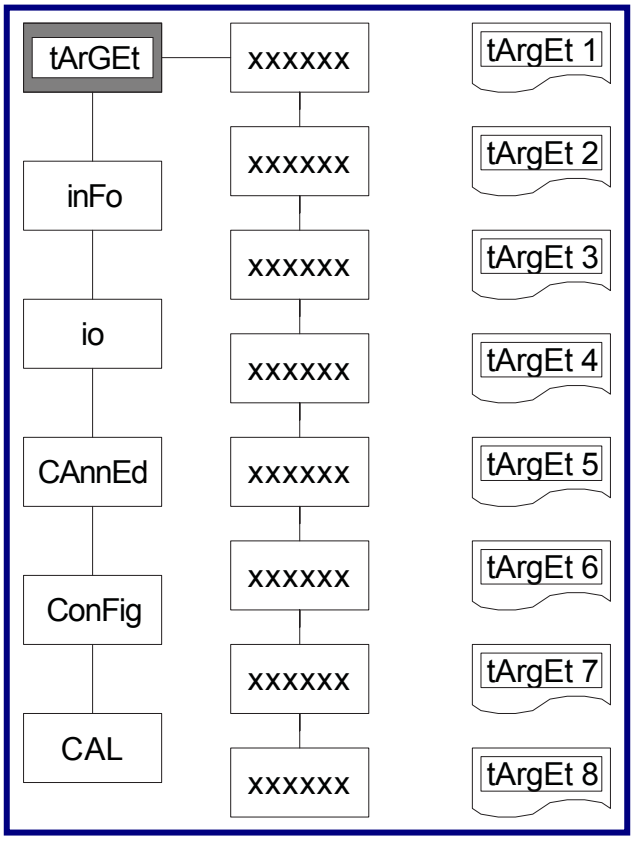
Menu Item	Description
tArgEt	• Conditional statement that appears if the setpoints are active. • No password is required. • Allows the operator to set target weights as defined by Setpoint mode. • *See page 28 further details.*
info	• No password is needed. • Displays instrument data. • Prints Audit Reports. • *See page 29 for further details.*
io	• **"U" Code** is required,. • Sets the time and date. • Programs all I/O Ports for printers and other accessory devices. • *See page 31 for further details.*
U CodE (User Code)	Used by an operator to access the IO Menu.
CAnnEd	Not operator accessible.
ConFig	Not operator accessible.
CAL	Not operator accessible.

tArgEt MENU Description

This area is for the numeric entry of target weights by the operator.

- No sub menu selections are available.
- Note that the **Status Display** shows the current setpoint being programmed.

1. Use the **SCROLL** keys to select the setpoint to be programmed.
2. Key in the desired target weight using the numeric keypad including the decimal point, if applicable.
3. Press the **ENTER** key.
4. When all applicable setpoints have been programmed, press the **B/G NET** key.
   - The **STORE** displays.



5a. If the **ENTER** key is pressed, the display will indicate **STORED** momentarily and then **TARGET**. Pressing **B/G NET** again will exit to the weigh screen.

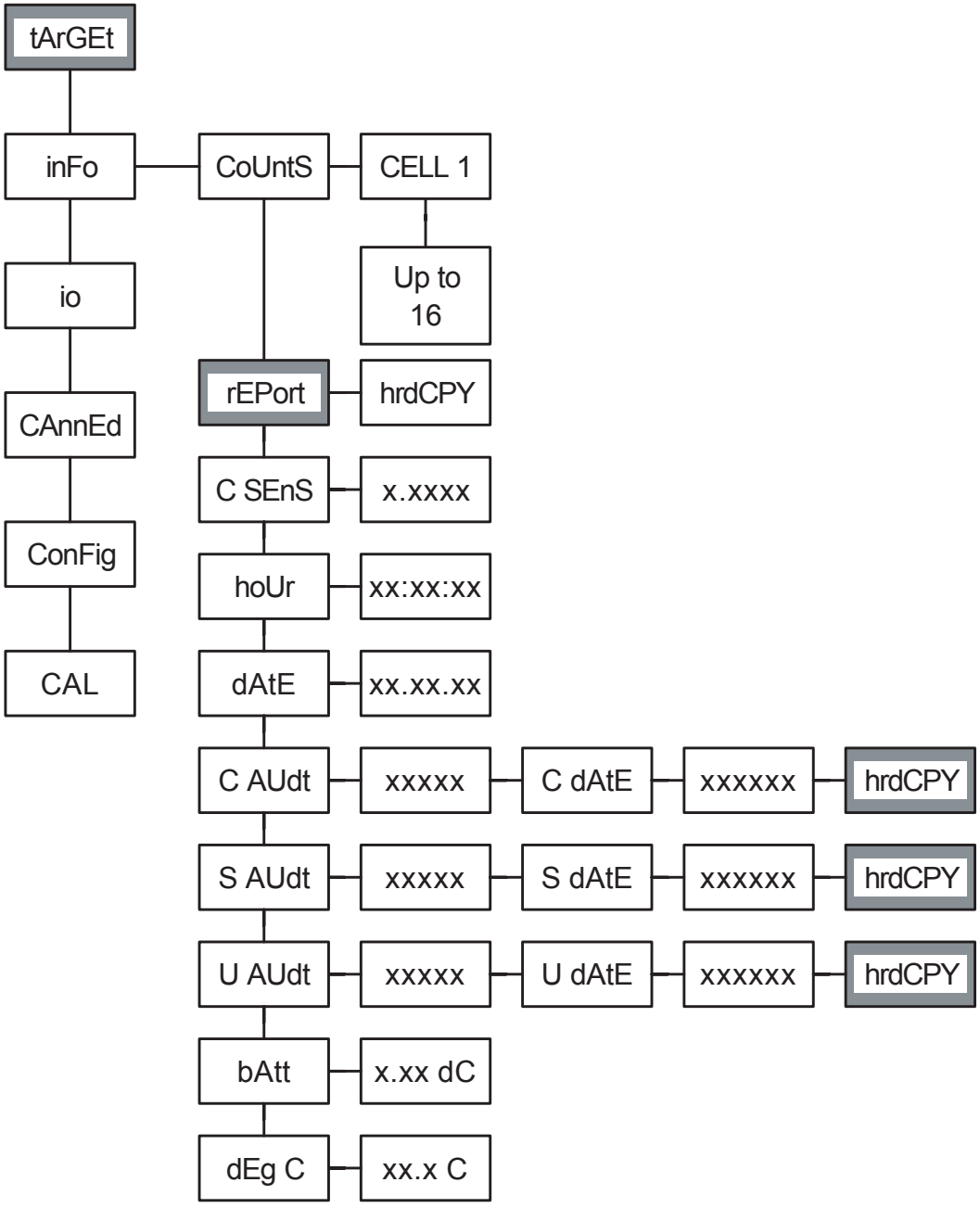
5b. If the **SCROLL** key is depressed, it will toggle between **STORE** and **CANCEL**.

- The **CANCEL** prompt gives the operator the option of exiting without saving changes.

6. Select **CANCEL** and press the **ENTER** key, the display will show **TARGET**.
7. Pressing the **B/G NET** key will exit to the weigh screen.

inFo Menu Description

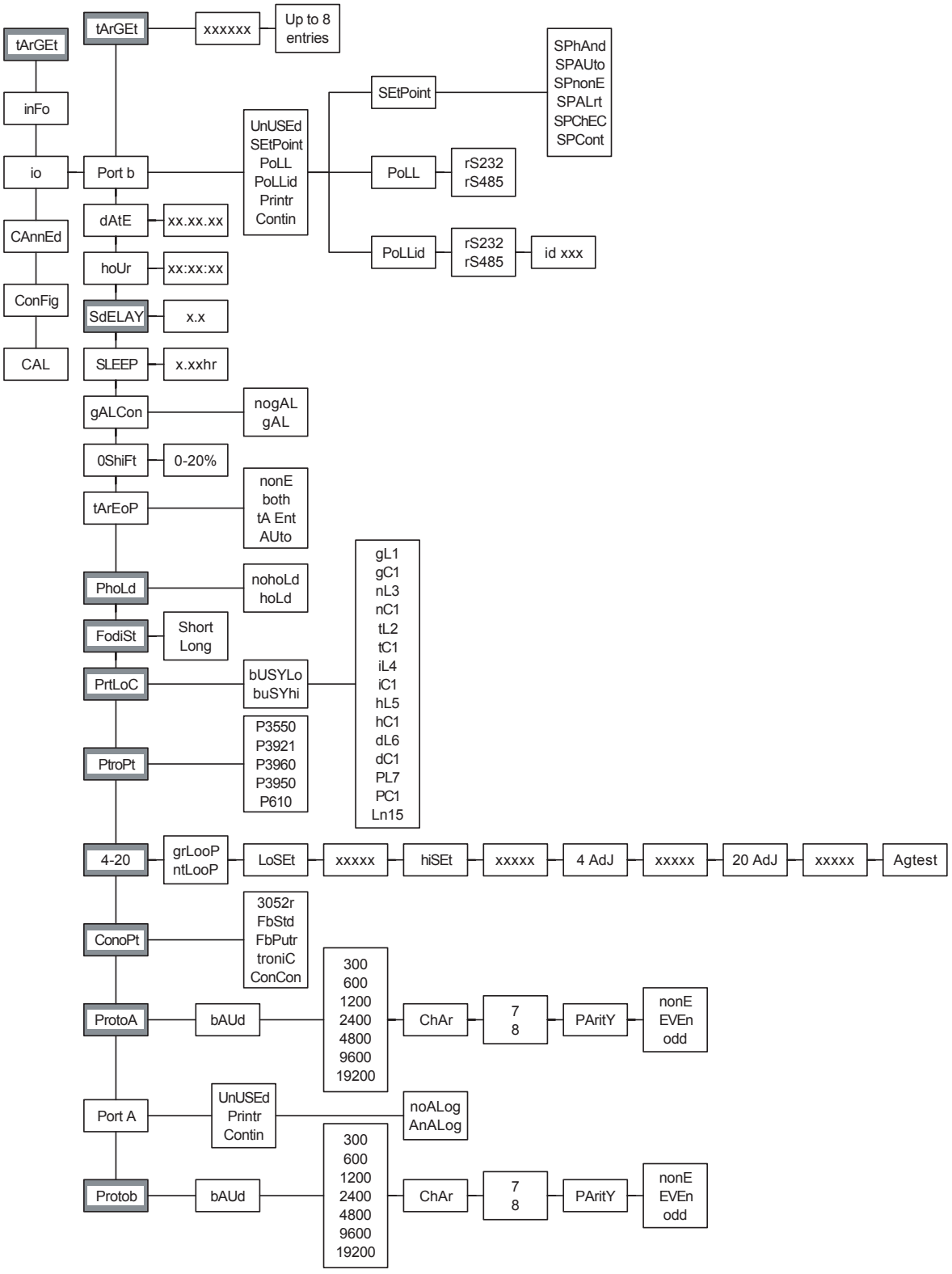
The info menu is user accessible ***without a security code.*** This menu may be checked by **Weights & Measures** to view the **S Audt**, **U Audt**, or **C Audt** entries, or the operator, service technician for diagnostic and informational purposes. This menu contains the following menu selections.



Main Menu Descriptions

Menu Item	Description
CoUntS	• Formatted **CELL X**, where x represents the load cell currently being displayed, the load cells are selectable using the SCROLL key. • The small display shows two numeric values. — The first value is the Initial Deadload or Zero Counts. — The second is the Current Liveload Count(s).
dEg C	• Formatted **XX.X°C.** • Displays the current internal temperature of the instrument in Centigrade.
bAtt	• Displays **XX.XdC.** • The current battery voltage.
U Audt	User Audit.
S Audt	Service Audit.
C Audt	Calibration Audit.
dAtE	• Displays **MM.DD.YY.** • The current system date.
hoUr	• Displays **HH.MM.SS.** • The current system time. • For viewing purposes only. • *Refer to the* **IO Section** *for programming.*
C SEnS	• mV/V of cell(s) currently selected. • All cells may be viewed using the **SCROLL** key.
rEPort hrdCPY	• For printing a configuration report to an installed printer. • A conditional statement appearing only when a printer is installed on **IO Ports A** or **B.**

I/O Menu


tArGEt
inFo
io
CAnnEd
ConFig
CAL
tArGEt
xxxxxx
Up to 8 entries
Port b
UnUSEd
SEtPoint
PoLL
PoLLid
Printr
Contin
SEtPoint
SPhAnd
SPAUto
SPnonE
SPALrt
SPChEC
SPCont
PoLL
rS232
rS485
PoLLid
rS232
rS485
id xxx
dAtE
xx.xx.xx
hoUr
xx:xx:xx
SdELAY
x.x
SLEEP
x.xxhr
gALCon
nogAL
gAL
0ShiFt
0-20%
tArEoP
nonE
both
tA Ent
AUto
PhoLd
nohoLd
hoLd
FodiSt
Short
Long
PrtLoC
bUSYLo
buSYhi
PtroPt
P3550
P3921
P3960
P3950
P610
gL1
gC1
nL3
nC1
tL2
tC1
iL4
iC1
hL5
hC1
dL6
dC1
PL7
PC1
Ln15
4-20
grLooP
ntLooP
LoSEt
xxxxx
hiSEt
xxxxx
4 AdJ
xxxxx
20 AdJ
xxxxx
Agtest
ConoPt
3052r
FbStd
FbPutr
troniC
ConCon
ProtoA
bAUd
300
600
1200
2400
4800
9600
19200
ChAr
7
8
PAritY
nonE
EVEn
odd
Port A
UnUSEd
Printr
Contin
noALog
AnALog
Protob
bAUd
300
600
1200
2400
4800
9600
19200
ChAr
7
8
PAritY
nonE
EVEn
odd

I/O Menu Descriptions

The IO (Input/Output) Menu sets up communications for sending data to devices, such as computers, printers, or remote displays. It also contains a menu for setting the time & date.

Menu Item	Description
Port b	Programs Setpoint modes, remote displays, printer, and computer outputs.
dAtE	Adjusts the date.

Steps for Setting the Date

1. With **dAtE** displayed, press the **ENTER** key.
   - The present date in memory displays with a small legend date flashing .
2. Using the numeric keypad, enter the current date.
   - Use the **MM/DD/YY** (month/day/year) format.
3. Press **ENTER**.
   - Once complete, the display returns to the **dAtE**.

Menu Item	Description
hour	Adjusts the time.

Steps for Setting the Time

- With **hoUr** displayed, press the **ENTER** key.
- The present time in memory displays with a small legend time flashing.
- Using the numeric keypad, enter the current date.
- Use the **HH/MM/SS (**hour/minute/second) format.
- When entering the time of 08:35am for example, press the numeric keys **0, 8, 3, 5**, followed by the **AUTOTARE** key.
- The time 08:35A.
- The **AUTOTARE** key is used to enter an **A** for AM.
- The **PRINT** key is used to enter **P** for PM.
- For military time (24 hour format), enter the current time using the numeric keypad and press the **ENTER** key.

I/O Menu Descriptions, Continued

Menu Item	Description
SdELAY	Activates the **Sleep Delay mode** in minutes and/or seconds *between* ingredients in a batch file of selected setpoints if the **Auto Batch mode** is on.
SLEEP	The **Sleep Delay** adjusts the length of time the instrument is inactive before going to sleep. – **0.00 hr** or **X.XX hr** (hrs & min) is displayed. – Use the **SCROLL** keys to adjust as required. – A setting of **0.00** hr disables the **Sleep Function**.

NOTE: *The* **Sleep mode** *will not activate if* **Recharge** *displays. The* **Sleep mode** *will also not occur when in the* **SPAUto** *or* **SPhAnd** *modes* ***if relays are energized.***

Menu Item	Description
gALCon	**Weight-to-Gallons** Conversion Option. When **Gallon** is selected, the **UNITS** key toggles the display from weight unit to gallon units.

EXAMPLE

4. In the **Gross Weigh mode**, note the displayed amount.
5. Press the **Units** key to toggle to the **Gallons** (**Gal**) display.
   – The number of gallons displays.
6. Press the **TARE** key to adjust the number of gallons.
   – The amount displays (**Gallons Factor**).
7. Press any numeric key.
   – A **U-CODE** window displays.
8. Enter the code using the numeric keypad.
9. Press **ENTER**.
   – The current date flashes in the display.
   – "**Entering Gallons**" also displays.

I/O Menu Descriptions, Continued

10. Press **ENTER** again.
    - The current gallon per weight displays.
11. Clear the display by pressing the numeric **ZERO** key until it is blank.
12. Key in the correct number of gallons.
13. Press **ENTER**.
    - The amount of gallons displays.
14. Press the **UNITS** key to toggle from weight to Gallons and confirm the correct weight to gallons ratio.

NOTE: *The* **Tare mode** *is unavailable in* **Gallon Conversion mode***.*

Menu Item	Description
0ShiFt	Sets the **Capacity Percentage** of the **Positive Weight Shift** on the scale. – Zeros the scale before an error code (i.e. Ic error) displays in the small window display. – Press the **ZERO** key a second time zeros the scale and continues its weighing.
tArEoP	Tare options include **AUto** (Using the **Auto Tare** key).
tA Ent	Using the numeric keypad, enter a known Tare Weight.
P hoLd	**Peak Weight** options are **Hold** and **No-Hold**. – If enabled, this holds the highest recorded **NET Weight Reading.** – Not used while in the Setpoint mode.
FodiSt	If a Device Output is selected, there are two fiber optic distance options. – **0-99 ft. = Short** – **100+ ft. = Long**
PrtLoC	Formats all available printer locations, if a ticket printer is selected in either port. *The following prompts apply when formatting the printer.*

I/O Menu Descriptions, Continued

NOTE: *The references to* **Line** *are as seen from the top of page down, and the* **Column** *is equal to one character space width.*

Prompt	Comment	Choices
bUSYh	Busy Line	bUSYhi, bUSYLo
gL 1	Gross Line	
gC 1	Gross Column	
nL 3	Net Line	
nC 1	Net Column	
tL 2	Tare Line	
tC 1	Tare Column	
iL 4	ID Line	
iC 1	ID Column	
hL 5	Hour (Time) Line	
hC 1	Hour (Time) Column	
6	Date Line	
dC 1	Date Column	
PL 7	'Peak' Line (if enabled)	
PC 1	'Peak' Column (if enabled)	
Ln 15	Length (Total Lines Printed)	
no Leg	Legend/No Legend	no LEg, grtAnt

EXAMPLE

Using the basic format below, to place time and date on the same line requires the following settings.

- **hL5**
- **hC1**
- **dL5**
- **C15**

NOTE: Peak Net Weight *must be printed to a* **GTN format.**

I/O Menu Descriptions, Continued

Menu Item	Description
PtroPt	Selects the printer type. — Options include **P3550, P3921, P3960, P3950, P610, P3921.**
4-20	Sets the **4-20 Analog Output.**

NOTE: *The* **4-20mA Output** *is enabled by selecting* **AnALog** *in* **Port A.**

C A U T I O N

The 4-20ma accessory is a passive device!
The power is to be supplied by others, and *MUST BE* a *DEDICATED* and an *ISOLATED* power supply.

Menu Item	Description
4-20	— **grLooP:** Tracks the **GROSS Weight.** — **ntLooP**: Tracks the **NET Weight.**

PROM Version 6.2+ Notes

- The 4-20mA output remains locked on the last reading at the time the "**PGR**" was pressed.
- An **Overload (OL**) condition produces a reading of **24mA.**
- An **Underload (UL**) condition produces a reading of **3.5mA.**
- While in the **Sleep mode**, the 4-20mA produces a reading of 3.5mA, and it is not tracked until the instrument is re-activated.

I/O Menu Descriptions, Continued

<table>
<tr><th>Prompt</th><th>Comment(s)</th></tr>
<tr><td>LoSEt</td><td>• Sets the weight value associated with 4mA.
• Usually "0".
1. At the LoSEt prompt, press ENTER.
2. Use the numeric keypad to enter desired weight value.
3. Press ENTER.</td></tr>
<tr><td>hiSEt</td><td>• Associated weight value of 20MA.
• Usually the capacity of the scale.
1. Press ENTER at the hiSEt prompt.
2. Use the numeric keypad to enter the desired weight value.
3. Press ENTER.</td></tr>
<tr><td>4 AdJ</td><td>Press ENTER to display a current number representing the 4mA Output.
— See note on key functions.</td></tr>
<tr><td>20 AdJ</td><td>Press ENTER to display a current number representing the 20mA Output.
— See note on key functions.</td></tr>
<tr><td>AgtESt</td><td>• LP4 - TO - LP22.
• Press ENTER to perform an analog test.
• 4mA thru 22mA will be output momentarily in 2mA steps.
When adjusting either 4mA or 20mA, the following numeric keys increase or decrease the reference value in the fashion that follows.
<table>
<tr><th colspan="2">Increased by:</th><th></th><th colspan="2">Decreased by:</th></tr>
<tr><td>9</td><td>10,000</td><td></td><td>4</td><td>10,000</td></tr>
<tr><td>8</td><td>1,000</td><td></td><td>3</td><td>1,000</td></tr>
<tr><td>7</td><td>100</td><td></td><td>2</td><td>100</td></tr>
<tr><td>6</td><td>10</td><td></td><td>1</td><td>10</td></tr>
<tr><td>5</td><td>1</td><td></td><td>0</td><td>1</td></tr>
</table></td></tr>
<tr><td>ConoPt</td><td>Used for Continuous Output.
Choices include the following:
• 3052r • FbStd • FbPUtr • troniC • ConCon</td></tr>
<tr><td>ProtoA</td><td>Protocol setting for Port A choices include selections for the following:
• bAUd 9600, 600, 1200, 2400, and 4800
• ChAr 8 and 7
• PAritY nonE, odd, and EVEn</td></tr>
</table>

I/O Menu Descriptions, Continued

Prompt	Comment(s)
Port A	Port A has available selections of the following: • **UnUSEd - no outputs** • **Printr - printer output** • **Cont in - continuous output**
noALog, AnALog	Used to turn on or off the 4 - 20MA output. • **noALog = Off** • **AnALog = On**
Protob	Protocol setting for Port A choices include the following: • **bAUd 9600, 600, 1200, 2400, and 4800** • **ChAr 8 and 7** • **PAritY nonE, odd, and EVEn**
tArgEt	Conditional, if setpoints are selected in Port B. 1. Press **ENTER** to adjust the Setpoint Target Weight Menu. – The large display shows the Current Target Weight Value associated with the Target Number, as shown in the small display. – The **SCROLL** key toggles through available Setpoint Relays (Targets). 2. Enter a new Target Weight Value with the numeric keypad. 3. Press **ENTER** to accept the new weight value and advance to the next available target.
Port b	Port b can be configured for the following: • **UnUSEd - no outputs** • *** SEtPnt - Setpoint modes** • *** Poll or Poll id - computer output** • **Printr – printer** • **Contin - continuous output**
*** Poll ***	• Used for Demand Output to a computer. • When the instrument receives an upper-case **"W"** followed by a **carriage return** (**"W", "Cr"**) from the PC, a data stream transmits. • *See **Appendix VII** for ASCII Chart.*
*** Poll id ***	• Use this demand mode when a specific instrument ID is required. • Setup by entering the required ID's decimal equivalent. • *See **Appendix VII** for ASCII Chart.*

I/O Menu Descriptions, Continued

EXAMPLE

The required ID is **3** (decimal equivalent is **51**).

1. Press the **ID** key.
   - Either **idnonE** or **the current ID** shows in the large display.
2. Using the numeric keypad, enter **51**.
3. Press **ENTER**.
   - When the PC sends **ID 3**, then a upper case **W** followed by a **C** carriage return (**3, W, Cr**), the instrument with that ID responds with a data transmission.

SEtPoint

The operation of Setpoint requires that accessories **5806 (Fiber Optic Cable)** and **2850 (Safe Area Relay Box)** be installed. There are five modes of setpoint operation that may be selected from during the installation and programming by your local Fairbanks Service Center or Authorized Factory trained Distributor.

SEtPoint Modes

Prompt	Choice(s)
SPCont	• Continuous operation of setpoints, **ON** at entered target weight. • *MUST* press **START** to begin function.
SPChEC	• Check weighing, such as **UNDER/ACCEPT/OVER**, with setpoint Relays 1 and 2 active for alarms.
SPALrt	• Setpoint **Relay 8 is active**, used as both **LOW** and **HIGH** alarms in **Solo mode**. • Or **Relays 4** and **8** if in **Paired mode**.
SPAUto	• Automatic batching, a range of materials can be added one at a time to complete a batch. • **SPAUto** *will not function* when in the **Gallons mode.** • When configuring **SdELAY**, to perform the delay in minutes and seconds ***between*** ingredients, the setting is located in the main **I/O Menu.**
SPHAnd	This operation requires a manual **START** at each setpoint.

I/O Menu Descriptions, Continued

TARGET MENU

Prompt	Choice(s)
tArgEt	• Used for programming weight values associated with setpoint-relays. • **Target 1 = relay 1** and **Target 2 = relay 2**, through rest of programmed setpoints. • The number of targets will vary depending on number selected during initial setup. Modifications should be performed with caution. • The **Setpoint mode** determines the target function, and targets should be programmed accordingly.

SETPOINT MODE

Target Assignment

Prompt	Choice(s)
SPCont	• **Target 1 thru X** (where X is the total number of setpoints) are the programmed number of setpoint relays. • Single-value relays that energize when their assigned weight value is reached or exceeded. • These relays, as a group, are manually controlled by the **START** and **STOP** front panel keys. • No **Autoprint** available in this mode.
SPChEC	• In the **Check Weigh** mode, Target 1 is the **UNDER** range setpoint-Relay 1. • It is on-active if the weight is equal to or below its assigned weight value. • Target 2 is the **OVER** range setpoint-Relay 2. • It is **Active** when the weight is equal to or above its assigned weight value. • The **ACCEPT** range is the weight between **UNDER** and **OVER**. • It is selected to operate either the **Gross** or **Net** modes.

NOTE:

- *The legends for* **UNDER, ACCEPT***, and* **OVER** *show on the large display when its associated weight value is active.*
- *There is not a relay output for the* **ACCEPT** *range.*
- *When using the* **SPCont** *or* **SPChEC** *modes the relays respond to the absolute value displayed (***+/-***) in the* **Gross** *mode and to the positive value displayed in the* **Net** *mode.*

I/O Menu Descriptions, Continued

Prompt	Choice(s)
SPALrt	• Used for **ALARM** purposes. • In the **Solo mode** only Relay 8 is used, for both the LOW and HIGH alarm. • In the paired mode, Relays 4 and 8 are used. • The setpoint-relay will be active when the **GROSS** weight is equal to or below the programmed **LOW ALARM** weight value or equal to or above the programmed **HIGH ALARM** weight value.

The following applies to either of the **Setpoint Batch modes**, whenever the weight on the scale is below or above the **Alert Value**, and the **Alert** *is enabled*. The alert relay(s) toggle **On/Off** when the following occurs.

- The front panel keys are pressed.
- The instrument comes out of its Sleep mode.

The **SPALrt** targets are only programmable in the **IO Port B Menu.**

- The **SPALrt** may be used with all other setpoint modes except whenever **four (4)** paired setpoints are programmed.
- If **SPALrt** is enables in conjunction with any other setpoint option, the indicator prompts for **Alarm low wgt,** causing an **Alarm high wgt**.
- **Alarm IO** *must be set to a value other than* **zero.**

I/O Menu Descriptions, Continued

Prompt	Choice(s)
SPAUto	A Batching mode, allowing the operator to press the **START** key once to add multiple materials automatically – It allows **SOLO** (single setpoint-relay) or **PAIRED** (dual setpoint-relays) setpoint(s). – In the **SOLO mode. Targets 1 thru X** represent the required weight of each individual material. – In the **PAIRED mode**, **Targets 1 thru 4** represent the Bulk or Fast-Fill Relays – Targets 5 through 8 are the slow or target. – Note the association of paired setpoints-relay: • **1-5** • **2-6** • **3-7** • **4-8** Always program the **Bulk-Fast Fill Setpoint-Relays** to a lesser weight value than the complete material weight value – Configure the Target-Slow Fill Setpoint-Relays assigned to the complete material weight value. – When using multiple materials, set the **SdELAY** (timer for start of next material relays) in the **IO Menu**. – If a printer has been selected, an auto print occurs when target value is reached. – **SPAUto** is not available in the gallons mode. **SPAUto EXAMPLE** Below is an example of a simple, two (2) material batch with **PAIRED** relays.

FUNCTION	TARGET NUMBER
Material 1 bulk - fast fill relay (1)	1
Material 2 bulk - fast fill relay (2	2
Not used	3
Not used	4
Material 1 target - slow fill relay (5)	5
Material 2 target - slow fill relay (6)	6

I/O Menu Descriptions, Continued

<table>
<tr><th>Prompt</th><th>Choice(s)</th></tr>
<tr><td>SPhAnd</td><td>The Manual mode of a batching process.
— Each separate material is operator-selected by using the SCROLL key, and then pressing START.
— This sequence must be continued until the batch is complete.
— If a printer is selected, an auto print occurs when target value is reached.
— Further detailed programming includes the following in order to define this modes operation.
• Gross (groSS) • Net (nEt) • Single relays (SoLo)
• Dual relays (PAirEd) • Upweighing (UP)
• Downweighing (not UP)
— SPhAnd is not available in the Gallons mode.</td></tr>
<tr><td>SPhAnd SPALrt</td><td>• Used for ALARM purposes.
• Only setpoint-relay (8) is used for both the LOW and HIGH alarms.
• The setpoint-relay actives when the GROSS weight is equal to or below the programmed LOW ALARM weight value, or equal to or above the programmed HIGH ALARM weight value.
Set the LAST to the following value, if Paired is selected:
<table><tr><th>PAIRED</th><th>LAST</th></tr><tr><td>1</td><td>5</td></tr><tr><td>2</td><td>6</td></tr><tr><td>3</td><td>7</td></tr><tr><td>4</td><td>8</td></tr></table>Relays (4) and (8) are conditional on selection of the SPALrt feature.</td></tr>
<tr><td>EXITING MENUS</td><td>When exiting the TARGET or IO menus, either store or canceling the changes.
— When prompted to STORE, press ENTER to save the changes.
— The display momentarily reads “STORED”, and then returns to the root menu prompt.
— With STORE displayed, press the SCROLL key to select the CANCEL option
— Press ENTER and no changes are saved.</td></tr>
</table>

Section 4: Security

SECURITY CODES

Prompt	Choice(s)
UCodE	**User Code** • Provides access for the operator /supervisor to the user programmable options. ***USE CAUTION*** *when making changes to the system.*

Follow these steps to create or change a **UCodE.**

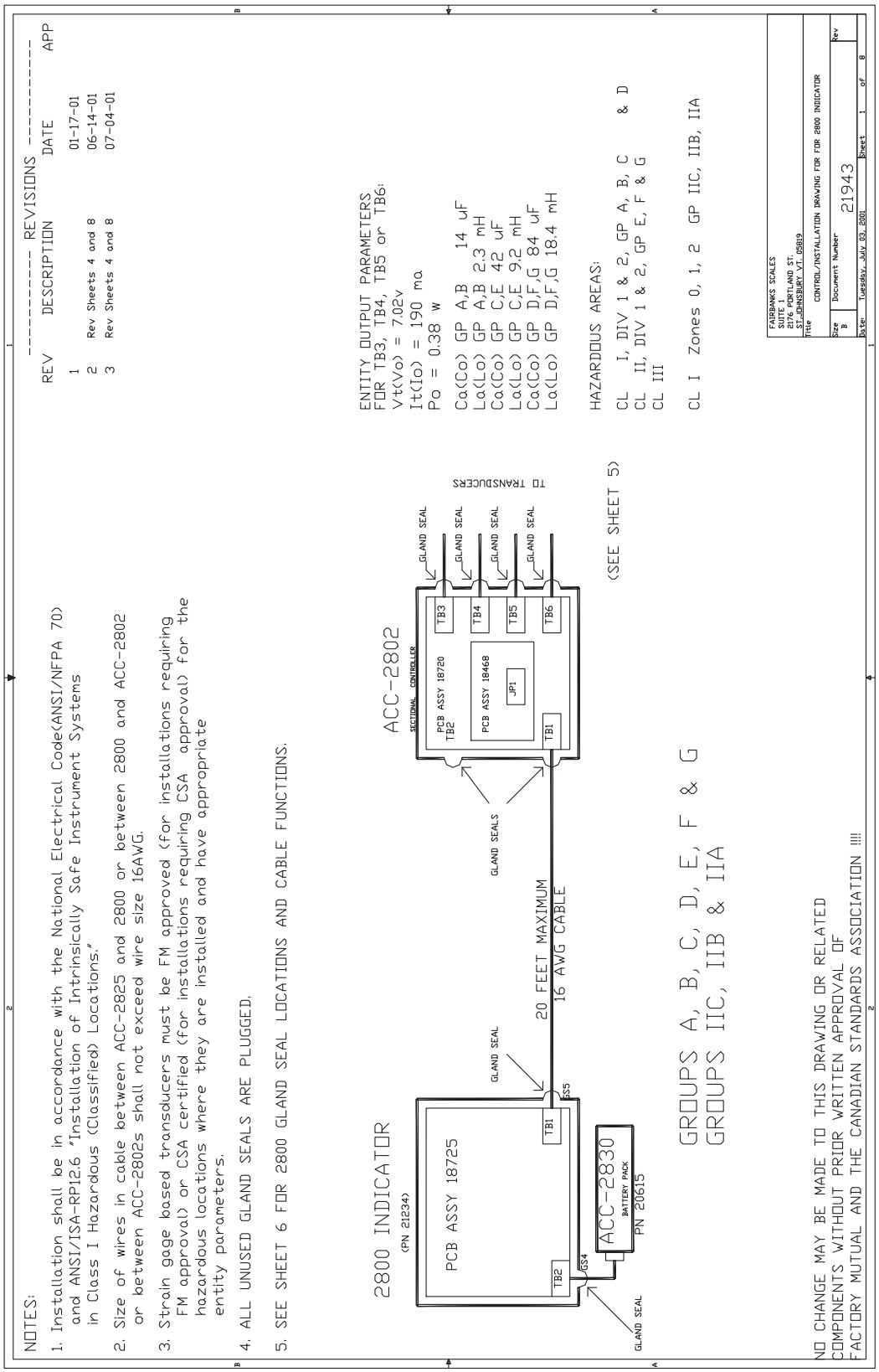
DISPLAYED PROMPTS	REQUIRED ACTIONS
UCodE	1. Press the **PRINTS** key.
P	2. Press the **UNITS** key.
PU	3. Press the **Pgr** key.
PUC	4. Press the **ID** key.
PUCi	5. Pres the hidden key (between) **ID** and **TARE**.
PUCin	6. Press the **ID** key.
PUCini	7. Press the **ENTER** key.
noSEAL	8. Use the **SCROLL** key to choose either **noSEAL.** (noncommercial) or **SEAL** (commercial) set, depending on the local jurisdiction. 9. Press the **ENTER** key.
nUPASS	10. Using the numeric keypad, enter the **new user code**. 11. Press the **ENTER** key.
CLrFin	12. Use the **SCROLL** key to choose either **CLrFin** (password needed upon menu re-entry) and **CLrPon** (password needed after power-up).
XX.XX.XX	13. **Current date.** If correct, proceed by pressing the **ENTER** key, or enter correct date using the numeric keypad.

Follow the standard exiting procedures as noted in the **Menu Navigation** section of this manual.

Appendix I: Troubleshooting/Error Codes

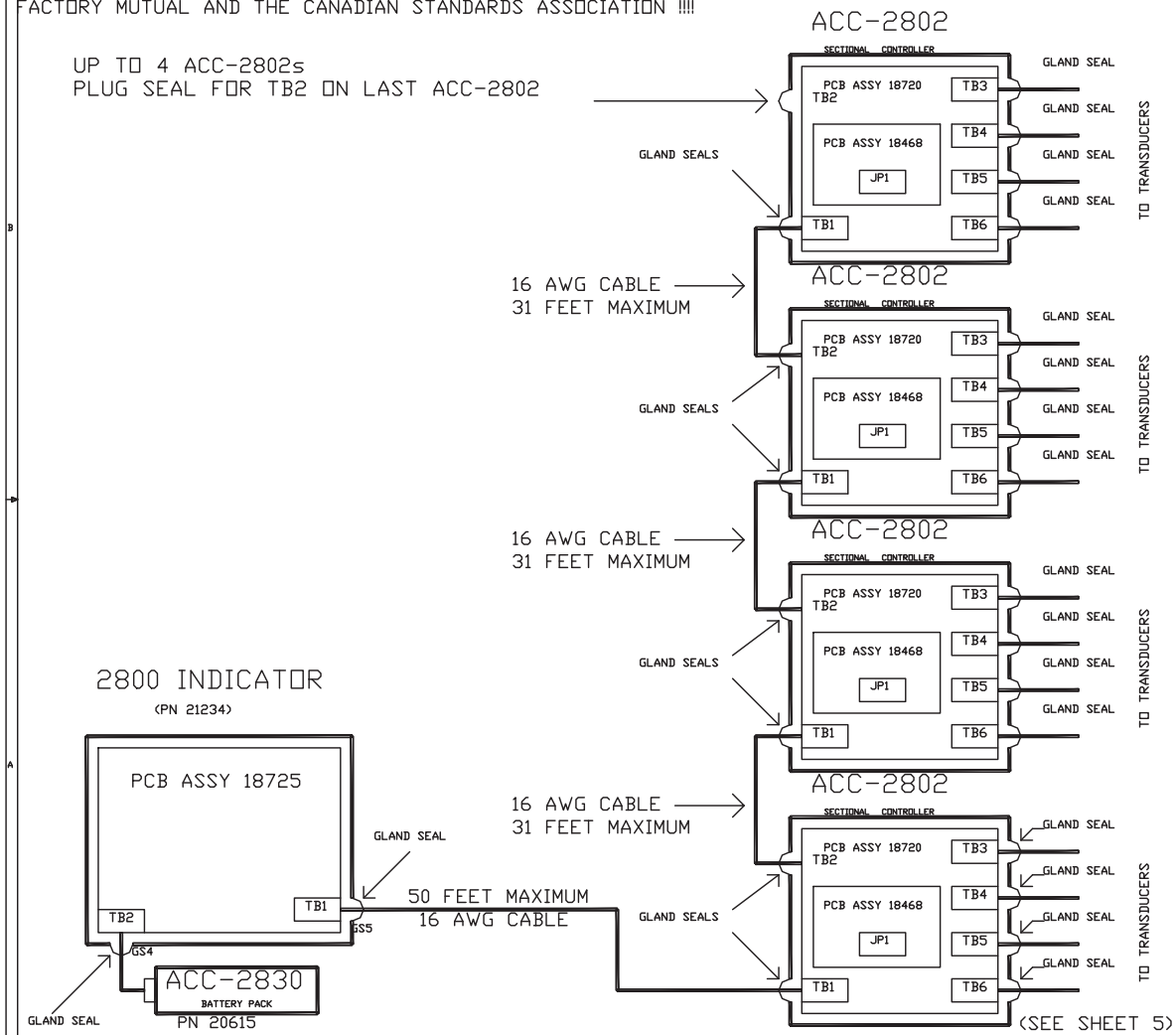
FAULT	CAUSE	SOLUTION
-UL-- LOADCELL FAILURE	Scale restricted. Debris under scale. Scale behind **0**. Load Cell failure.	Correct the bind or restriction. Remove debris under the scale/cells. Replace items removed from the scale. ***Call Fairbanks service.***
--oL-- LOADCELL FAILURE	Overloaded Scale. Load Cell failure.	Remove weight from the scale. ***Call Fairbanks service.***
RECHARGE	Battery voltage low between **5.4** to **5.32VDC**.	Recharge the battery.
LoBAtt	Battery voltage low, between **5.3** to **5.12VDC**	Recharge the battery *IMMEDIATELY.*
err 069	Programming input error.	Recycle the power to instrument.
likely lc error	**0shift** out of range Load Cell Failure.	Remove weight from the scale. Re-zero the scale. ***Call Fairbanks service.***

Appendix II: FM Control Drawings



NO CHANGE MAY BE MADE TO THIS DRAWING OR RELATED COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL OF FACTORY MUTUAL AND THE CANADIAN STANDARDS ASSOCIATION !!!!

REVISIONS			
REV	DESCRIPTION	DATE	APP
1		01-17-01	



GROUPS C, D, E, F & G
GROUPS IIB & IIA

ENTITY OUTPUT PARAMETERS
FOR TB3, TB4, TB5 or TB6:
Vt(Vo) = 7.02v
It(Io) = 190 ma
Po = 0.38 w

Ca(Co) GP C,E 42 uF
La(Lo) GP C,E 9.2 mH
Ca(Co) GP D,F,G 84 uF
La(Lo) GP D,F,G 18.4 mH

HAZARDOUS AREAS:

CL I, DIV 1 & 2, GP C & D
CL II, DIV 1 & 2, GP E, F & G
CL III

CL I Zones 0, 1, 2 GP IIB & IIA

FAIRBANKS SCALES
SUITE 1
2176 PORTLAND ST.
ST.JOHNSBURY VT. 05819

Title: CONTROL/INSTALLATION DRAWING FOR FOR 2800 INDICATOR

Size: B | Document Number: 21943 | Rev:

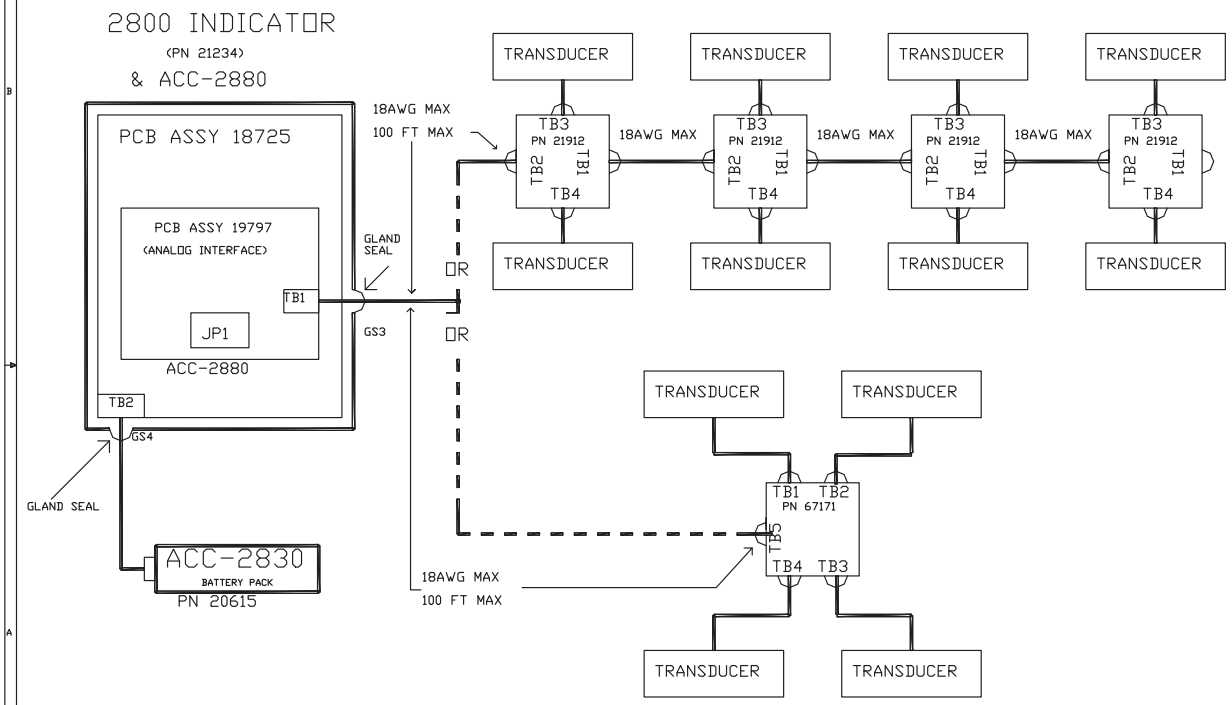
Date: Tuesday, July 03, 2001 | Sheet 2 of 8

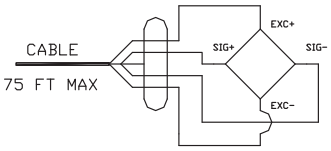
NOTES:

1. ALL UNUSED GLAND SEALS ARE PLUGGED.
2. MAXIMUM TRANSDUCER CABLE LENGTH/WIRE GAGE 75 FT/20AWG.
3. TWO TRANSDUCERS MAY PARALLELED REDUCING THE NUMBER OF PN 21912 BY HALF.

---------- REVISIONS ----------

REV	DESCRIPTION	DATE	APP
1		01-17-01	
2	22075 changed to 21912	06-14-01	
3	Added Sum Jct Box 67171	07-04-01	





TYPICAL TRANSDUCER

ENTITY OUTPUT PARAMETERS
FOR TB1 ACC-2880:
Vt(Vo) = 7.02v
It(Io) = 250 ma
Po = 0.88 w

Ca(Co) GP A,B 14 uF
La(Lo) GP A,B 2.3 mH
Ca(Co) GP C,E 42 uF
La(Lo) GP C,E 9.2 mH
Ca(Co) GP D,F,G 84 uF
La(Lo) GP D,F,G 18.4 mH

HAZARDOUS AREAS:

CL I, DIV 1 & 2, GP A, B, C & D
CL II, DIV 1 & 2, GP E, F & G
CL III

CL I Zones 0, 1, 2 GP IIC, IIB, IIA

GROUPS A, B, C, D, E, F & G
GROUPS IIC, IIB & IIA

NO CHANGE MAY BE MADE TO THIS DRAWING OR RELATED COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL OF FACTORY MUTUAL AND THE CANADIAN STANDARDS ASSOCIATION !!!!

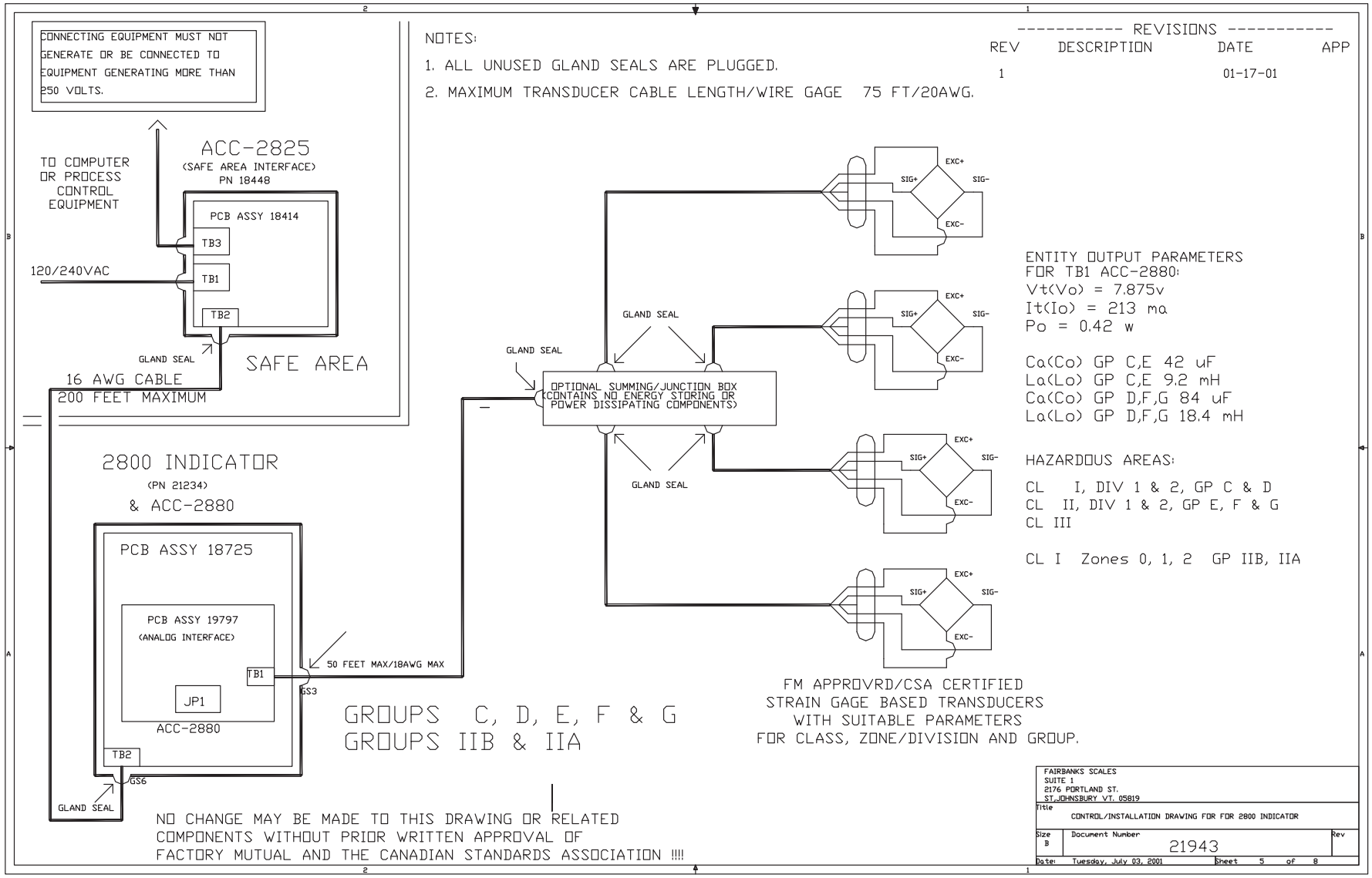
FM APPROVED/CSA CERTIFIED
STRAIN GAGE BASED TRANSDUCERS
WITH SUITABLE PARAMETERS
FOR CLASS, ZONE/DIVISION AND GROUP.

FAIRBANKS SCALES
SUITE 1
2176 PORTLAND ST.
ST.JOHNSBURY VT. 05819

Title: CONTROL/INSTALLATION DRAWING FOR FOR 2800 INDICATOR

Size	Document Number	Rev
B	21943	

Date: Tuesday, July 03, 2001 Sheet 4 of 8


CONNECTING EQUIPMENT MUST NOT GENERATE OR BE CONNECTED TO EQUIPMENT GENERATING MORE THAN 250 VOLTS.
NOTES:
1. ALL UNUSED GLAND SEALS ARE PLUGGED.
2. MAXIMUM TRANSDUCER CABLE LENGTH/WIRE GAGE 75 FT/20AWG.
REVISIONS
REV DESCRIPTION DATE APP
1 01-17-01
TO COMPUTER OR PROCESS CONTROL EQUIPMENT
ACC-2825
(SAFE AREA INTERFACE)
PN 18448
PCB ASSY 18414
TB3
TB1
TB2
120/240VAC
GLAND SEAL
SAFE AREA
16 AWG CABLE
200 FEET MAXIMUM
2800 INDICATOR
(PN 21234)
& ACC-2880
PCB ASSY 18725
PCB ASSY 19797
(ANALOG INTERFACE)
JP1
ACC-2880
TB1
TB2
GS3
GS6
GLAND SEAL
50 FEET MAX/18AWG MAX
GLAND SEAL
GLAND SEAL
OPTIONAL SUMMING/JUNCTION BOX
(CONTAINS NO ENERGY STORING OR POWER DISSIPATING COMPONENTS)
GLAND SEAL
EXC+
SIG+
SIG-
EXC-
ENTITY OUTPUT PARAMETERS
FOR TB1 ACC-2880:
Vt(Vo) = 7.875v
It(Io) = 213 ma
Po = 0.42 w
Ca(Co) GP C,E 42 uF
La(Lo) GP C,E 9.2 mH
Ca(Co) GP D,F,G 84 uF
La(Lo) GP D,F,G 18.4 mH
HAZARDOUS AREAS:
CL I, DIV 1 & 2, GP C & D
CL II, DIV 1 & 2, GP E, F & G
CL III
CL I Zones 0, 1, 2 GP IIB, IIA
GROUPS C, D, E, F & G
GROUPS IIB & IIA
FM APPROVRD/CSA CERTIFIED
STRAIN GAGE BASED TRANSDUCERS
WITH SUITABLE PARAMETERS
FOR CLASS, ZONE/DIVISION AND GROUP.
NO CHANGE MAY BE MADE TO THIS DRAWING OR RELATED
COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL OF
FACTORY MUTUAL AND THE CANADIAN STANDARDS ASSOCIATION !!!!
FAIRBANKS SCALES
SUITE 1
2176 PORTLAND ST.
ST.JOHNSBURY VT. 05819
Title
CONTROL/INSTALLATION DRAWING FOR FOR 2800 INDICATOR
Size B
Document Number
21943
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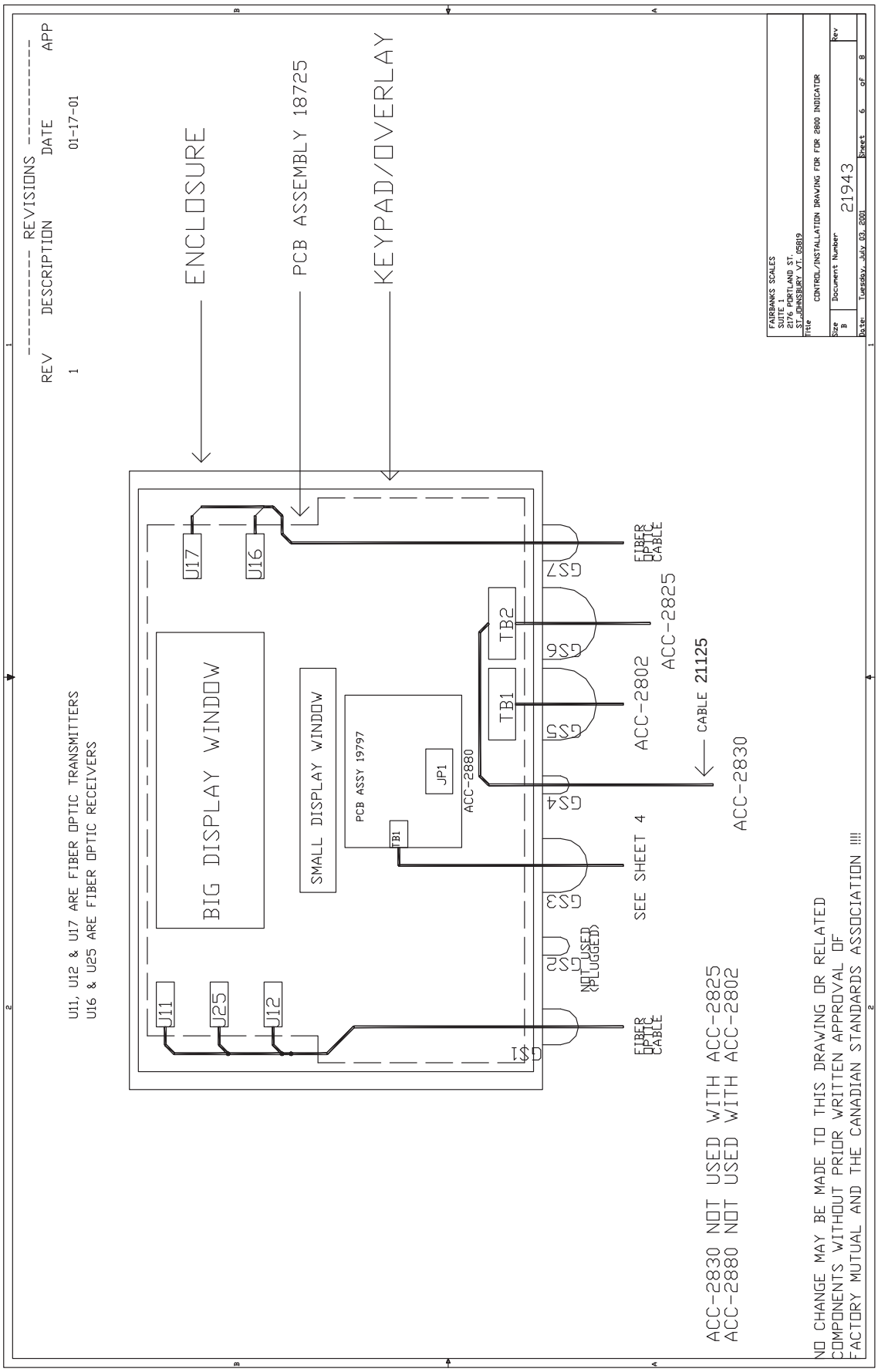
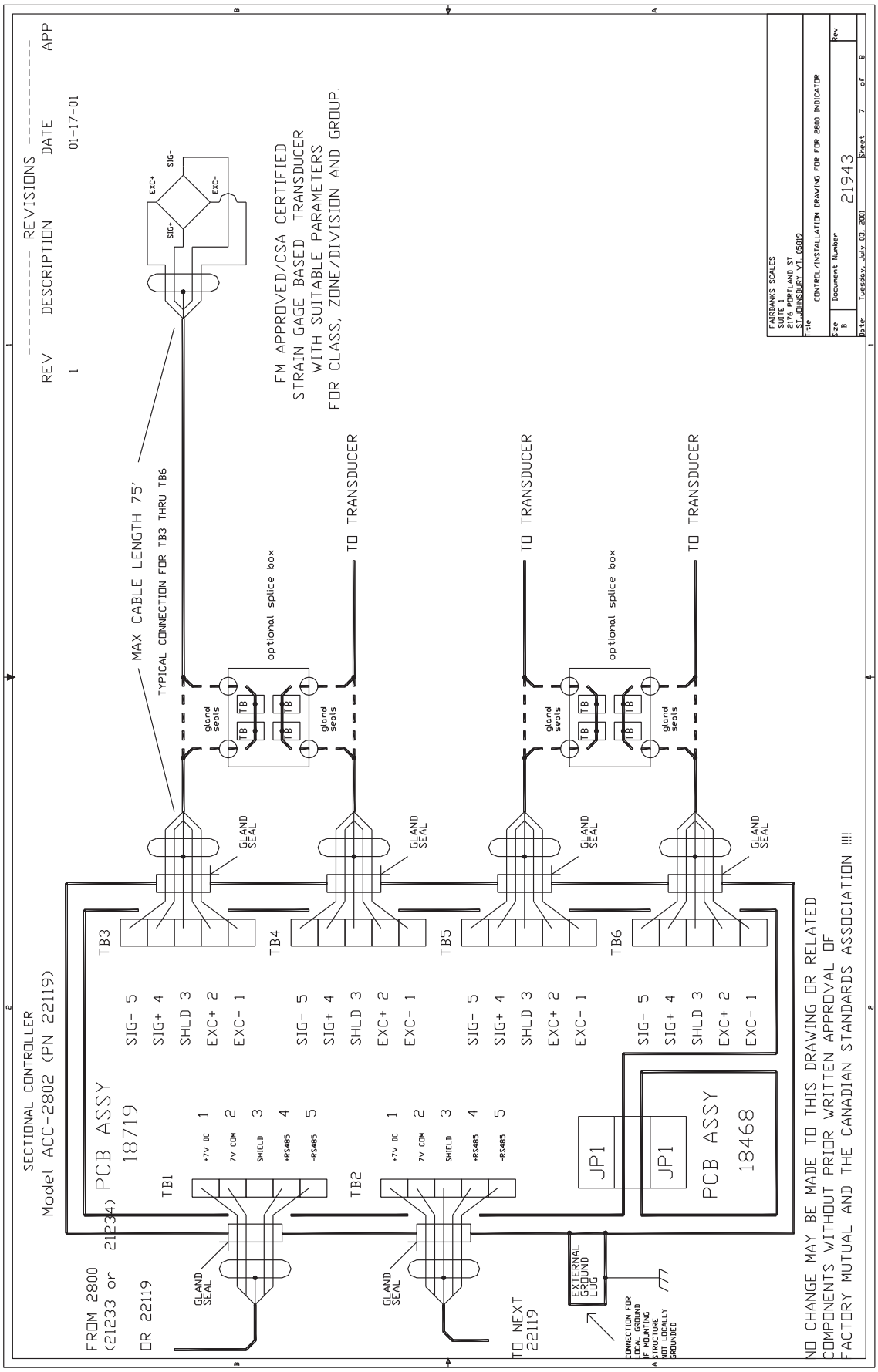
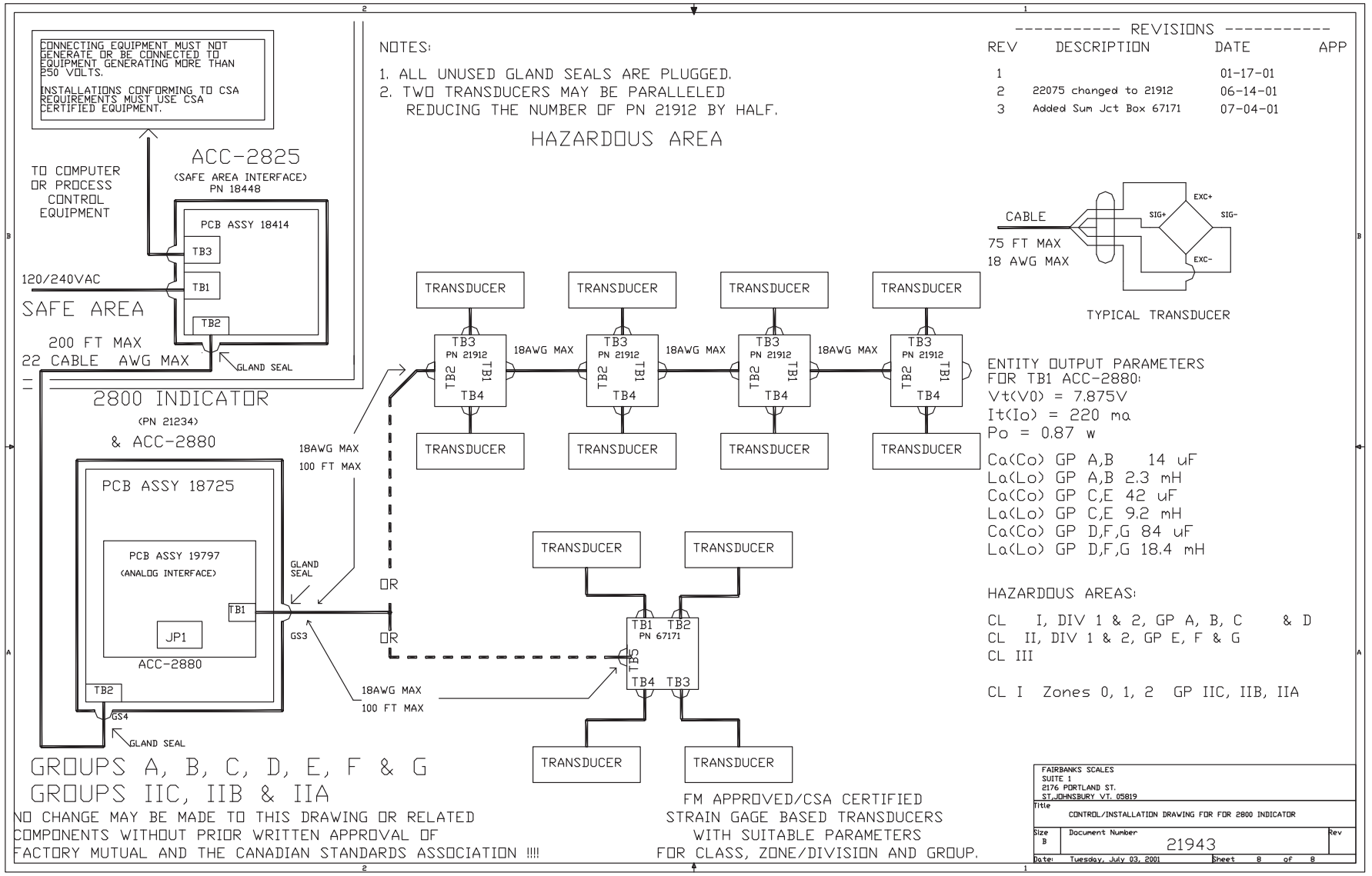
Date: Tuesday, July 03, 2001
Sheet 5 of 8


REVISIONS
REV DESCRIPTION DATE APP
1 01-17-01
ENCLOSURE
PCB ASSEMBLY 18725
KEYPAD/OVERLAY
U11, U12 & U17 ARE FIBER OPTIC TRANSMITTERS
U16 & U25 ARE FIBER OPTIC RECEIVERS
U17
U16
U11
U25
U12
BIG DISPLAY WINDOW
SMALL DISPLAY WINDOW
PCB ASSY 19797
JP1
TB1
ACC-2880
TB2
TB1
GS7
GS6
GS5
GS4
GS3
GS2
GS1
FIBER OPTIC CABLE
ACC-2825
ACC-2802
CABLE 21125
ACC-2830
SEE SHEET 4
NOT USED (UNPLUGGED)
FIBER OPTIC CABLE
ACC-2830 NOT USED WITH ACC-2825
ACC-2880 NOT USED WITH ACC-2802
NO CHANGE MAY BE MADE TO THIS DRAWING OR RELATED
COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL OF
FACTORY MUTUAL AND THE CANADIAN STANDARDS ASSOCIATION !!!!
FAIRBANKS SCALES
SUITE 1
2176 PORTLAND ST.
ST JOHNSBURY VT. 05819
Title CONTROL/INSTALLATION DRAWING FOR FDR 2880 INDICATOR
Size B
Document Number 21943
Rev
Date Tuesday, July 03, 2001
Sheet 6 of 8


---------- REVISIONS ----------
REV DESCRIPTION DATE APP
1 01-17-01
FM APPROVED/CSA CERTIFIED
STRAIN GAGE BASED TRANSDUCER
WITH SUITABLE PARAMETERS
FOR CLASS, ZONE/DIVISION AND GROUP.
SECTIONAL CONTROLLER
Model ACC-2802 (PN 22119)
MAX CABLE LENGTH 75'
TYPICAL CONNECTION FOR TB3 THRU TB6
EXC+
SIG+
SIG-
EXC-
optional splice box
gland seals
TB
TO TRANSDUCER
GLAND SEAL
TB3
TB4
TB5
TB6
SIG- 5
SIG+ 4
SHLD 3
EXC+ 2
EXC- 1
TB1
TB2
+7V DC 1
7V COM 2
SHIELD 3
+RS485 4
-RS485 5
JP1
PCB ASSY
18719
PCB ASSY
18468
FROM 2800 (21233 or 21234) OR 22119
TO NEXT 22119
GLAND SEAL
EXTERNAL GROUND LUG
CONNECTION FOR LOCAL GROUND IF MOUNTING SURFACE IS NOT LOCALLY GROUNDED
NO CHANGE MAY BE MADE TO THIS DRAWING OR RELATED COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL OF FACTORY MUTUAL AND THE CANADIAN STANDARDS ASSOCIATION !!!!
FAIRBANKS SCALES
SUITE 1
2176 PORTLAND ST.
ST.JOHNSBURY VT 05819
Title CONTROL/INSTALLATION DRAWING FOR FDR 2800 INDICATOR
Size B
Document Number 21943
Rev
Date Tuesday, July 03, 2001
Sheet 7 of 8


CONNECTING EQUIPMENT MUST NOT GENERATE OR BE CONNECTED TO EQUIPMENT GENERATING MORE THAN 250 VOLTS.
INSTALLATIONS CONFORMING TO CSA REQUIREMENTS MUST USE CSA CERTIFIED EQUIPMENT.
TO COMPUTER OR PROCESS CONTROL EQUIPMENT
ACC-2825
(SAFE AREA INTERFACE)
PN 18448
PCB ASSY 18414
TB3
TB1
TB2
120/240VAC
SAFE AREA
200 FT MAX
22 CABLE AWG MAX
GLAND SEAL
2800 INDICATOR
(PN 21234)
& ACC-2880
PCB ASSY 18725
PCB ASSY 19797
(ANALOG INTERFACE)
JP1
ACC-2880
TB2
GS4
GLAND SEAL
18AWG MAX
100 FT MAX
GLAND SEAL
GS3
OR
OR
18AWG MAX
100 FT MAX
NOTES:
1. ALL UNUSED GLAND SEALS ARE PLUGGED.
2. TWO TRANSDUCERS MAY BE PARALLELED
REDUCING THE NUMBER OF PN 21912 BY HALF.
HAZARDOUS AREA
TRANSDUCER
TB3
PN 21912
TB1
TB2
TB4
18AWG MAX
TB1 TB2
PN 67171
TB3
TB4
CABLE
75 FT MAX
18 AWG MAX
EXC+
SIG+
SIG-
EXC-
TYPICAL TRANSDUCER
ENTITY OUTPUT PARAMETERS
FOR TB1 ACC-2880:
Vt(V0) = 7.875V
It(Io) = 220 ma
Po = 0.87 w
Ca(Co) GP A,B 14 uF
La(Lo) GP A,B 2.3 mH
Ca(Co) GP C,E 42 uF
La(Lo) GP C,E 9.2 mH
Ca(Co) GP D,F,G 84 uF
La(Lo) GP D,F,G 18.4 mH
HAZARDOUS AREAS:
CL I, DIV 1 & 2, GP A, B, C & D
CL II, DIV 1 & 2, GP E, F & G
CL III
CL I Zones 0, 1, 2 GP IIC, IIB, IIA
GROUPS A, B, C, D, E, F & G
GROUPS IIC, IIB & IIA
NO CHANGE MAY BE MADE TO THIS DRAWING OR RELATED COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL OF FACTORY MUTUAL AND THE CANADIAN STANDARDS ASSOCIATION !!!!
FM APPROVED/CSA CERTIFIED
STRAIN GAGE BASED TRANSDUCERS
WITH SUITABLE PARAMETERS
FOR CLASS, ZONE/DIVISION AND GROUP.
REVISIONS
REV DESCRIPTION DATE APP
1 01-17-01
2 22075 changed to 21912 06-14-01
3 Added Sum Jct Box 67171 07-04-01
FAIRBANKS SCALES
SUITE 1
2176 PORTLAND ST.
ST.JOHNSBURY VT. 05819
Title
CONTROL/INSTALLATION DRAWING FOR FOR 2800 INDICATOR
Size B
Document Number
21943
Rev
Date: Tuesday, July 03, 2001
Sheet 8 of 8

Appendix III: Material Safety Data Sheets

Material Safety Data Sheet
May be used to comply with
OSHA's Hazard Communication Standard.
29 CFR 1910.1200 Standard must be
consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 12 18-0072

Identity (As Used on Label and List)
CAREFREE or HE Rechargeable Battery

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that

Section I

Manufacturer's Name	Emergency Telephone Number
Eagle-Picher Industries, Inc.	417-776-2256 800-424-9300 (CHEMTREC)
Address (Number, Street, City State, and Zip Code)	Telephone Number for Information
P.O. Box 130	417-776-2256
14212 Bethel Road	Date Prepared
Seneca, MO 64865	1-Apr-99
	Signature of Preparer (optional)

Section II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity, Common Name(s))		OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Lead	CAS #7439-92-1	0.050 mg/m^3	0.15 mg/m^3		50%
Lead Oxides	CAS #1314-41-6 - 1317-36-8	0.050 mg/m^3	0.15 mg/m^3		25%
38% Sulfuric Acid, 1.28 s.g.	CAS #7664-93-9	1.0 mg/m^3	1.0 mg/m^3		18%

GROUND SHIPMENTS: NOT REGULATED PER 49 CFR 173.159 (d)

AIR SHIPMENTS: Not Regulated Per IATA, Special Provisions 4.4, A67

OCEAN SHIPMENTS: Not Regulated

THIS PRODUCT IS AN ARTICLE UNDER OSHA

Section III - Physical/Chemical Characteristics

Boiling Point	N/A	Specific Gravity (H_2O=1)	N/A
Vapor Pressure (mm Hg.)	N/A	Melting Point	N/A
Vapor Density (Air=1)	N/A	Evaporation Rate (Butyl Acetate=1)	N/A

Solubility in Water
N/A

Appearance in Odor
N/A

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Direct Flame to Battery Case	UL-94HB, 94V-O on FR UNITS	N/A	N/A

Extinguishing Media
Water, Foam, Dry

Special Fire Fighting Procedures
N/A

Unusual Fire and Explosion Hazards
Keep lighted cigarettes, sparks and flames away. Explosion can result from improper charging and ignition of charging gases. Explosion can result if charged in gas tight enclosures.

(Reproduce Locally)

OSHA 174, Sept. 1985

Section V - Reactivity Data

Stability			Conditions to Avoid
	Unstable		
	Stable	XX	

Incompatibility (Materials to Avoid)

Solvents may dissolve battery case material.

Hazardous Decomposition or Byproducts

Severe overcharge and overheating may cause sulfur oxide fumes.

Hazardous Polymerization			Conditions to Avoid
	May Occur		
	Will Not Occur	XX	

Section VI - Health Hazard Data

Routes(s) of Entry	Inhalation?	Skin?	Ingestion?
Eyes	Yes	Yes	Yes

Health Hazards (Acute and Chronic)

Severe burns and eye damage from sulfuric acid electrolyte.

Illness from sulfur oxide fumes

Contains lead which is known to cause birth defects or other reproductive harm.

Carcinogenicity	NTP?	IARC Monographs?	OSHA Regulated?
NA	No	No	No

Signs and Symptoms of Exposure

Irritation and Acid Burns

Pungent odor and respiratory irritation

Medical Conditions

Generally Aggravated by Exposure

N/A

Emergency and First Aid Procedures

For sulfur oxide fumes, disconnect batteries, evacuate and ventilate.

External, flush areas contaminated by sulfuric acid electrolyte with water.

Internal, drink large quantities of water or milk, followed by milk of magnesia, beaten eggs, or vegetable oil

Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

Avoid contact with sulfuric acid electrolyte from battery. Flush with water.

Neutralize with solution of baking soda in water.

Waste Disposal Method

Unlawful to dispose in landfill. Do not incinerate, puncture, disassemble or mutilate

Dispose with automotive battery scrap in accordance with local and federal regulations.

Precautions to be taken in Handling and Storing

Batteries with released electrolyte shall be sealed in polyethylene bags.

Keep batteries away from children

Other Precautions

Do not crack battery cases. Do not overcharge. Do not short circuit battery terminals.

Keep lighted cigarettes, sparks and flames away from charging batteries.

Section VIII - Control Measures

Respiratory Protection (Specific Type)

N/A

Ventilation	Local Exhaust	Specific
	Mechanical (General)	Other: Natural convection

Protective Gloves	Eye Protection
Use rubber gloves if case is cracked	Recommended

Other Protective Clothing or Equipment

N/A

Work/Hygienic Practices

N/A

Appendix IV: Port A or B Continuous Output Data Streams

Format: Fairbanks Computer (FbPutr)

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Data String	STX	A	B	C	x	x	x	x	x	x	t	t	t	t	t	t	CR

x = Displayed weight; Gross or Net
t = Tare Weight
A = Status Word A
B = Status Word B
C = Status Word C

- Leading zeros are suppressed

The following tables define the value of **Status Word A, B**, and **C**:

STATUS WORD A

Bit No.	Decimal Point or Zero Location						
	X0	X	0.x	0.0x	0.00x	0.000x	0.0000x
0	1	0	1	0	1	0	1
1	0	1	1	0	0	1	1
2	0	0	0	1	1	1	1

DIVISION SIZE

Bit No.	Count by 1	Count by 2	Count by 5	
3	1	0	1	
4	0	1	1	
5		Always Logic 1		
6		Always Logic 0		
7		Parity Bit		

Format: Fairbanks Computer (FbPutr), Continued

Status Word B

Bit No.	Description				
0		Gross = 0		Net = 1	
1		Positive = 0		Negative = 1	
2		In Range = 0		Overcapacity = 1	
3		No Motion = 0		Motion = 1	
4		Lb = 0		Kg = 1	
5		Always Logic = 1			
6		Normal = 0		Power-up = 1	
7		Parity Bit			

Status Word C

Bit No.	Description				
0		Always Logic 0			
1		Always Logic 0			
2		Always Logic 0			
3		Normal = 0		Print Switch Pushed in = 1	
4		Always Logic 0			
5		Always Logic 0			
6		Normal = 0		Keyboard Tare = 1	
7		Parity Pit			

Format : Fairbanks Standard (FbStd)

Character	1	2	3	4	5	6	7	8	9	10
Data String	STX	4	y	x	x	x	x	x	x	ETX

x = weight
y = Second digit of a id code i.e. 4y where y= 0, 1, 3, or 4.
40 = Gross lb, oz, lb-oz, ton, or gallons
41 = Net lb, oz, lb-oz, or ton
43 = Gross kg or grams
44 = Net kg, grams, or gallons

- Underload condition data stops transmitting.
- Overload condition data is transmitted as the id followed by dashes.
- Leading zeros are suppressed.

Format : Consolidated Controls (ConCon)

Character	1	2	3	4	5	6	7	8	9	10
Data String	STX	x	x	x	x	x	x	U	E	CR

x = Displayed weight; Gross or Net
U = Units selected
- **L** = pounds
- **K** = kilograms
- **O** = ounces
- **G** = grams
- **T** = tons or gallons

E = Error flag
- **M** = motion
- **O** = underload or overload
- **Space** = no errors

- Leading zeros are suppressed.
- In a Underload or Overload condition the weight data is suppressed.

Format: Weightronix (tronix)

Character	1	2	3	4	5	6	7	8	9	10	11	12	13
Data String	L	L	x	x	x	x	x	x	sp	U	U	CR	LF

*Variable data string length using gallon units

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Data String	L	L	x	x	x	x	x	x	sp	U	U	U*	CR	LF

*Variable length using lb/oz units

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Data String	L	L	x	x	x	x	x	x	sp	U	U	U*	U*	U*	CR	LF

L = legend

spG = Gross
0N = Net
x = weight
sp = space

U = Units selected

U* = Units selected; these are optional characters which will appear based upon the units displayed. The data string length will vary if these units are selected.
lb = pounds
kg = kilograms
oz = ounces
g = grams
tn = tons
gal* = gallons
lb/oz* = pounds-ounces

- Leading zeros are suppressed.
- In a Underload or Overload condition the weight data and legends are suppressed.
- The first character for a gross data string is a space.

Appendix V: Port B Demand Output Data Streams

Format : Computer Polled (Poll)

Character	1	2	3	4	5	6	7	8	9	10	11	12	13
Data String	sp	x	x	x	x	x	x	sp	U	U	sp	L	L

x = weight
sp = space
U = Units selected
- **LB** = pounds
- **KG** = kilograms
- **OZ** = ounces
- **GM** = grams
- **TN** = tons
- **GM** = gallons
- **LB** = pounds-ounces

L = legend
- **GR** = Gross
- **NT** = Net

- Leading zeros are suppressed.
- In a Motion condition, the legend will change to lower case.
- In a underload or overload condition, the unit will transmit

  a --uL-- or a --oL—
- Polling request is a capital W followed by a carriage return.

Format: Computer Polled with Id (Pollid)

Character	1	2	3	4	5	6	7	8	9	10	11	12	13
Data String	sp	x	x	x	x	x	x	sp	U	U	sp	L	L

x = weight
sp = space
U = Units selected
- **LB** = pounds
- **KG** = kilograms
- **OZ** = ounces
- **GM** = grams

TN = tons
GM = gallons
- **LB** = pounds-ounces
- **L** = legend
- **GR** = Gross
- **NT** = Net

- Leading zeros are suppressed.
- In a Motion condition, the legend will change to lower case.
- In a underload or overload condition, the unit will transmit a **--uL-- or a --oL--.**
- Polling request is a **ID**, capital **W**, and followed by a **carriage return**. i.e. **4W(CR)**

Appendix VI: Accessory 2860 Communication Wiring

Port A

From TB3 in the Acc 2860	3550	3950	610	3960	3921	PC DB25	PC DB8
Pin 1 RXA/CTS	20	4	4	2	20	2	3
Pin 2 TXA	3	3	3	3	3	3	2
Pin 3							
Pin 4 GND	7	7	7	7	7	7	5
Pin 5							

From TB6 in the Acc 2860	RMT 140xA
Pin 1 20 *	1
Pin 2 20	5
Pin 3 (+)12V **	Jumper Pins
Pin 5 AI (+) ***	2 to 6
Pin 6 AI (–) ***	

From TB1 in the Acc 2860
Pin 1 485
Pin 2 485
Pin 3 GND

* A **22 AWG ground** wire must be connected from the remote to Acc 2860.

** Do not use the **+12V** as a source for **20mA** current loop or **4-20mA** or any other device.

*** **AI = Analog Interface.** The 4-20MA connections are made at this location.

C A U T I O N

The 4-20ma accessory is a passive device!
The power is to be supplied by others, and *MUST BE* a *DEDICATED* and an *ISOLATED* power supply.

Port B

From TB2 in the Acc 2860	3550	3950	610	3960	3921	PC DB25	PC DB8
Pin 1 RXA/CTS	20	4	4	2	20	2	3
Pin 2 TXA	3	3	3	3	3	3	2
Pin 3							
Pin 4 GND	7	7	7	7	7	7	5
Pin 5							

From TB5 in the Acc 2860	RMT 140xA
Pin 1 (+)12V *	For future usage.
Pin 2 ENI	
Pin 3 PCO	
Pin 4 PCI	
Pin 5 GND	

**Do not use the +12V as a source for 20 MA current loop or 4-20mA or any other device.*

Printer Cables

- Acc 1295 (15597) used on 3550 and 3921 printers.
- Acc 1296 (15598) used on 610 and 3950 printers.
- Acc 1297 (15599) used on 3960 printers.

Appendix VII: ASCII Codes

HEX	DEC	CHAR
00	000	NUL
01	001	SOH
02	002	STX
03	003	ETX
04	004	EOT
05	005	ENQ
06	006	AKC
07	007	BEL
08	008	BS
09	009	HT
0A	010	LF
0B	011	VT
0C	012	FF
0D	013	CR
0E	014	S0
0F	015	S1
10	016	DLE
11	017	DC1
12	018	DC2
13	019	DC3
14	020	DC4
15	021	NAK
16	022	SYN
17	023	ETB
18	024	CAN
19	025	EM
1A	026	SUB
1B	027	ESC
1C	028	FS
1D	029	GS
1E	030	RS
1F	031	US
20	032	Space
21	033	!
22	034	“
23	035	#
24	036	$
25	037	%
26	038	&
27	039	‘
28	040	(
29	041	)
2A	042	*
2B	043	+
2C	044	,
2D	045	_
2E	046	.
2F	047	/
30	048	0
31	049	1
32	050	2
33	051	3
34	052	4
35	053	5
36	054	6
37	055	7
38	056	8
39	057	9
3A	058	:
3B	059	;
3C	060	<
3D	061	=
3E	062	>
3F	063	?
40	064	@
41	065	A
42	066	B
43	067	C
44	068	D
45	069	E
46	070	F
47	071	G
48	072	H
49	073	I
4A	074	J
4B	075	K
4C	076	L
4D	077	M
4E	078	N
4F	079	O
50	080	P
51	081	Q
52	082	R
53	083	S
54	084	T
55	085	U
56	086	V
57	087	W
58	088	X
59	089	Y
5A	090	Z
5B	091	[
5C	092	\
5D	093	]
5E	094	^
5F	095	-
60	096	`
61	097	a
~ 62	098	b
63	099	c
64	100	d
65	101	e
66	102	f
67	103	g
68	104	h
69	105	I
6A	106	j
6B	107	k
6C	108	l
6D	109	m
6E	110	n
6F	111	o
70	112	p
71	113	q
72	114	r
73	115	s
74	116	t
75	117	u
76	118	v
77	119	w
78	120	x
79	121	y
7A	122	z
7B	123	{
7C	124	|
7D	125	}
7E	126	~
7F	127	Delete



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