**GENERAL DESCRIPTION**

The Model 7558 (Strain Gage Input Meter) offers many features and performance capabilities to suit a wide range of industrial applications. The 4½ digit meter employs advanced technology for stable, drift free readout, while incorporating features that provide flexibility now and in the future with Plug-in option cards. The plug-in card options allow the opportunity to configure the meter for present applications, while providing easy upgrades for future needs.

The Strain Gage meter has two bipolar mV input ranges: 24 mV DC or 240 mV DC. The internal bridge excitation is selectable for 5 VDC or 10 VDC. The excitation output is based on a reference, ensuring accurate and drift-free readouts. A 16 point scaling feature compensates for square-law devices and other non-linear process characteristics.

The meter provides a Max and Min reading memory with programmable capture time. The capture time is used to prevent detection of false max and min readings which may occur during burst testing or unusual process events. The signal totalizer (integrator) can be used to compute a time-input product. This can be used to provide a readout of totalized flow, calculate service intervals of motors and pumps, etc. The totalizer can also accumulate batch weighing operations (batch weight).

The meter has four setpoint outputs, implemented on Plug-in cards. The Plug-in cards provide dual FORM-C relays (5 A), quad FORM-A relays (3 A) or either sinking or sourcing quad open collector logic outputs. The setpoint alarms can be configured in modes to suit a variety of control and alarm requirements.

- High and low absolute, high and low deviation and band acting
- Balanced or unbalanced hysteresis
- On and off delay timers
- Auto reset or latching modes
- Reverse phase output and/or panel indicator
- Selection of alternate list of setpoint values

Plug-in cards also facilitate bus communications. These include RS232, RS485 and MODBUS (Consult factory for other bus formats). Readout values and setpoint alarm values can be controlled via bus commands. Additionally, the meter has features that allow a remote computer to directly control the outputs of the meter. This is useful during commissioning phases and diagnostic use. With a communication card installed, set-up software allows configuration from a PC. The configuration data can be saved to a file for later recall.

A linear DC output signal is available as a Plug-in card. The card provides either 20 mA or 10 V signals. The output can be scaled independent of the input range.

The features of the linear output card are:
- Output tracks either input, totalizer, max or min readings
- Programmable output update times

Once the meter has been initially configured, the parameter list may be locked out from further modification in its entirety, or only the setpoint values can be made accessible.

The meter has been specifically designed for harsh industrial environments. With NEMA 4X/IP65 sealed bezel and extensive testing of noise effects to CE requirements, the meter provides a tough yet reliable application solution.
**SPECIFICATIONS**

1. **DISPLAY**: 5 digit, 0.56" (14.2 mm) red LED, (-19999 to 99999)
2. **POWER**
   - AC Versions
     - AC Power: 85 to 250 VAC, 50/60 Hz, 15 VA
     - Isolation: 2300 Vrms for 1 min. to all inputs and outputs.
   - DC Versions
     - DC Power: 11 to 36 VDC, 11 W
       (Derate operating temperature to 40 °C if operating <15 VDC and three plug-in cards are installed)
     - AC Power: 24 VAC, 10%, 50/60 Hz, 15 VA
     - Isolation: 500 Vrms for 1 min. to all inputs and outputs (50 V working).
3. **ANNUNCIATORS**
   - MAX - max readout selected
   - MIN - min. readout selected
   - TOT - totalizer readout selected, flashes when total overflows
   - SP1 - setpoint alarm 1 is active
   - SP2 - setpoint alarm 2 is active
   - SP3 - setpoint alarm 3 is active
   - SP4 - setpoint alarm 4 is active
   - Units Label - software controlled units label backlight
4. **KEYPAD**: 3 programmable multi-function keys, 5 keys total
5. **A/D CONVERTER**: 16 bit resolution
6. **UPDATE RATES**
   - A/D conversion rate: 20/readings sec
   - Step response: 200 msec. max. to within 99% of final readout value
     (digital filter and internal zero correction disabled)**
   - 700 msec. max. (digital filter disabled, internal zero correction enabled)**
   - Display update rate: 1 to 20 updates/sec
   - Setpoint output on/off delay time: 0.0 to 3275.0 sec
   - Analog output update rate: 0.0 to 10.0 sec
   - Max./Min. capture delay time: 0.0 to 3275.0 sec
7. **DISPLAY MESSAGES**
   - "OLOL" - Appears when measurement exceeds + signal range.
   - "ULUL" - Appears when measurement exceeds - signal range
   - "......" - Appears when display values exceed + display range.
   - "..." - Appears when display values exceed - display range.
8. **CONNECTIO TYPE**: 4-wire bridge (differential)
   - 2-wire (single-ended)
9. **COMMON MODE RANGE**
   - (w.r.t. input common): 0 to +5 VDC
   - Rejection: 80 db (DC to 120 Hz)
10. **SENSOR INPUTS**:

<table>
<thead>
<tr>
<th>Input Range</th>
<th>Accuracy* (18 to 28°C)</th>
<th>Accuracy* (0 to 50°C)</th>
<th>Impedance</th>
<th>Max Continuous Overload</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 mVDC</td>
<td>0.02% of reading +3 V</td>
<td>0.07% of reading +4 V</td>
<td>100 Mohm</td>
<td>30 V</td>
<td>1 V</td>
</tr>
<tr>
<td>240 mVDC</td>
<td>0.02% of reading +30 V</td>
<td>0.07% of reading +40 V</td>
<td>100 Mohm</td>
<td>30 V</td>
<td>10 V</td>
</tr>
</tbody>
</table>

* After 20 minute warm-up. Accuracy is specified in two ways: Accuracy over an 18 to 28°C and 10 to 75% RH environment; and accuracy over a 0 to 50°C and 0 to 85%RH (non-condensing environment). Accuracy over the 0 to 50°C range includes the temperature coefficient effect of the meter.

** The meter periodically (every 12 seconds) imposes a 500 msec delay to compensate for internal zero drift. If the delay affects applications where step response is critical, it can be defeated. Set the display update to 20/sec to disable. In this case, add a zero error of 0.2% FS to the 24 mV input range over the 0 to 50°C span.

*** Nominal resolution. The internal resolution is the input divided by 65535.

11. **BRIDGE EXCITATION**:
   - Jumper Selectable: 5 VDC @ 65 mA max., 2%
   - 10 VDC @ 125 mA max., 2%
   - Temperature coefficient (ratio metric): 20 ppm/°C max.
12. **LOW FREQUENCY NOISE REJECTION**:
   - Normal Mode: > 60 dB @ 50 or 60 Hz ±1%, digital filter off
   - Common Mode: >100 dB, DC to 120 Hz (w.r.t. earth)

13. **USER INPUTS (Logic Level)**
   - Three software defined user inputs, jumper selectable for sink/source logic
   - Max. Continuous Input: 30 VDC

<table>
<thead>
<tr>
<th>INPUT STATE</th>
<th>SINKING INPUTS</th>
<th>SOURCING INPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>$V_n &lt; 0.7$ VDC</td>
<td>$V_n &gt; 2.5$ VDC</td>
</tr>
<tr>
<td>Inactive</td>
<td>$V_n &gt; 2.5$ VDC</td>
<td>$V_n &lt; 0.7$ VDC</td>
</tr>
</tbody>
</table>

Isolation To Sensor Input Common: Not isolated
Response Time: 50 msec. max.
Logic State: Jumper selectable for sink/source logic.

14. **TOTALIZER**:
   - Time Base: second, minute, hour, or day
   - Time Accuracy: 0.01% typical
   - Decimal Point: 0 to 0.0000
   - Scale Factor: 0.001 to 65.000
   - Low Signal Cut-out: -19.999 to 99.999
   - Total: 9 digits, display alternates between high order and low order readouts
15. **CUSTOM LINEARIZATION**:
   - Data Point Pairs: Selectable from 2 to 16
   - Display Range: -19.999 to 99.999
   - Decimal Point: 0 to 0.0000
16. **SERIAL COMMUNICATIONS**
   - Field installable option card (RS232 or RS485)
   - Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
   - Working Voltage: 50 V
   - Not Isolated from all other commons.
   - Data: 7/8 bits
   - Baud: 300 to 19200
   - Parity: no, odd or even
   - Bus Address: selectable 0 to 99, Max. 32 meters per line (RS485)
   - Transmit Delay: Selectable for 2 to 50 msec or 50 to 100 msec (RS485)
17. **MODBUS CARD**
   - Type: RS485; RTU and ASCH MODBUS modes
   - Isolation to Sensor & User Input Commons: 500 Vrms for 1 min.
   - Not isolated from all other commons.
   - Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400.
   - Format: 7/8 bits, odd, even and no parity.
   - Transmit Delay: Programmable
18. **ANALOG OUTPUT**:
   - Field installable option card
   - Types: 0 to 20 mA, 4 to 20 mA or 0 to 10 VDC
   - Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
   - Working Voltage: 50 V
   - Not Isolated from all other commons.
   - Accuracy: 0.17% of FS (18 to 28°C): 0.4% of FS (0 to 50°C)
   - Resolution: 1/3500
   - Compliance: 10 VDC: 10 K load min.
   - 20 mA: 500 load max.
19. **SETPOINT OUTPUT**:
   - Four types of field installable option cards

**Dual Relay Card**
- Type: Two FORM-C relays
- Isolation To Sensor & User Input Commons: 2000 Vrms for 1 min.
- Working Voltage: 240 Vrms
- Contact Rating:
  - One Relay Energized: 5 amps @ 120/240 VAC or 28 VDC (resistive load), 1/8 HP @120 VAC, inductive load
  - Total current with both relays energized not to exceed 5 amps
  - Life expectancy: 100K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads

**Quad Relay Card**
- Type: Four FORM-A relays
- Isolation To Sensor & User Input Commons: 2300 Vrms for 1 min.
- Working Voltage: 250 Vrms
- Contact Rating:
  - One Relay Energized: 3 amps @ 250 VAC or 30 VDC (resistive load), 1/10 HP @120 VAC, inductive load
  - Total current with all four relays energized not to exceed 4 amps
  - Life Expectancy: 100K cycles min. at full load rating. External RC snubber extends relay life for operation with inductive loads
Quad Sinking Open Collector:
- Type: Four isolated sinking NPN transistors.
- Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
- Working Voltage: 50 V
- Not Isolated from all other commons.
- Rating: 100 mA max @ \( V_{\text{SAT}} = 0.7 \) V max. \( V_{\text{MAX}} = 30 \) V

Quad Sourcing Open Collector:
- Type: Four isolated sourcing PNP transistors.
- Isolation To Sensor & User Input Commons: 500 Vrms for 1 min.
- Working Voltage: 50 V
- Not Isolated from all other commons.
- Rating: Internal supply: 24 VDC ± 10%, 30 mA max. total all four outputs
- External supply: 30 VDC max., 100 mA max. each output

20. MEMORY: Nonvolatile \( \text{E}^2\text{PROM} \) retains all programmable parameters and display values.

21. CERTIFICATIONS AND COMPLIANCES:
- UL Recognized Component, File #E179259
  - Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.
  - SAFETY: EN 61010-1, IEC 1010-1
  - Safety requirements for electrical equipment for measurement, control, and laboratory use, Part I.

ELECTROMAGNETIC COMPATIBILITY
Immunity to EN 50082-2
- Electrostatic discharge: EN 61000-4-2 Level 3; 8 Kv air
- Electromagnetic RF fields: EN 61000-4-3 Level 3; 10 V/m
  - 80 MHz - 1 GHz
- Fast transients (burst): EN 61000-4-4 Level 4; 2 Kv I/O
  - Level 3; 2 Kv power
- RF conducted interference: EN 61000-4-6 Level 3; 10 V/rms
  - 150 KHz - 80 MHz
- Simulation of cordless telephones: ENV 50204 Level 3; 10 V/m
  - 900 MHz ± 5 MHz
  - 200 Hz, 50% duty cycle
- Emissions to EN 50081-2
  - RF interference: EN 55011 Enclosure class A
  - Power mains class A

Notes:
- 1. Self-recoverable loss of performance during EMI disturbance at 10 V/m:
  - Measurement error exceeds unit specifications
  - For operation without loss of performance:
    - Mount unit in a metal enclosure (Buckeye SM7013-0 or equivalent)
    - Route power and I/O cables in metal conduit connected to earth ground.

22. ENVIRONMENTAL CONDITIONS:
- Operating Temperature Range: 0 to 50°C (0 to 45°C with all three plug-in cards installed)
- Storage Temperature Range: -40 to 60°C
- Operating and Storage Humidity: 0 to 85% max. non-condensing
- Altitude: Up to 2000 meters

23. CONNECTIONS:
- High compression cage-clamp terminal block
- Wire Strip Length: 0.35" (9 mm)
- Wire Gauge Capacity: One 14 AWG solid or Two 18 AWG

24. CONSTRUCTION:
- This unit is rated for NEMA 4X/IP65 indoor use. IP20
  - Touch safe. Installation Category II, Pollution Degree 2

25. WEIGHT: 10.4 oz. (295 g)

ORDERING INFORMATION

7558 - X X X

Basic Meter with Analog Output

Communications
- 0 = None
- 1 = RS232 / Software
- 2 = RS485 / Software
- 3 = DeviceNet / Software
- 4 = ModBus

Relays
- 0 = None
- 1 = Dual Relays

Operating Power
- 0 = DC Power
- 1 = AC Power
The 7558 series meters can be fitted with up to three optional plug-in cards. However, only one card from each function type can be installed at a time. The function types include Setpoint Alarms, Communications, and Analog Output. The cards can be installed initially or at a later date. Each optional plug-in card is shipped with installation and programming instructions.

**SETPOINT ALARMS PLUG-IN CARDS**

The 7558 series has four setpoint alarm output plug-in cards. Only one of these cards can be installed at a time. (Logic state of the outputs can be reversed in the programming.) These plug-in cards include:
- Dual relay, FORM-C, Normally open & closed
- Quad relay, FORM-A, Normally open only
- Isolated quad sinking NPN open collector
- Isolated quad sourcing PNP open collector

**SERIAL RS485 PLUG-IN CARD**

An RS485 communication port can be installed with the serial RS485 plug-in card. The RS485 option allows the connection of up to 32 meters or other devices (such as a printer, PLC, HMI, or a host computer) on a single pair of wires not longer than 4,000 feet. The address number of each meter on the line can be programmed from 0-99. Data from the meter(s) can be interrogated or changed and alarm outputs can be reset by sending the proper command string. The function keys and user inputs can be programmed to send data to a printer or other device via serial communications.

**SERIAL RS232 PLUG-IN CARD**

An RS232 communication port can be installed with the serial RS232 plug-in card. The RS232 is intended to allow only 2 devices, not more than 50 feet apart, to communicate to each other (such as a printer, PLC, HMI, or host computer). Data from the meter(s) can be interrogated or changed and alarm outputs can be reset by sending the proper command string. The function keys and user inputs can be programmed to send data to a printer or device via serial communication.

**MODBUS PLUG-IN CARD**

A MODBUS communication port can be installed with the MODBUS plug-in card. The MODBUS card uses standard MODBUS protocol, which allows the integration of devices of different types and manufacturers within a common communication framework.

**ANALOG OUTPUT PLUG-IN CARD**

Either a 0(4)-20 mA or 0-10 V retransmitted linear DC output is available from the analog output plug-in card. The programmable output low and high scaling can be based on the input max, min, or total display value. Reverse acting output is possible by reversing the scaling point positions.

**UNITS LABEL KIT**

Each meter has a units indicator with backlighting that can be customized using the Units Label Kit. The backlight is controlled in the programming.

**PC SOFTWARE (SFPAX)**

The SFPAX is a Windows based program that allows configuration of the 7558 meter from a PC. Using SFPAX makes it easier to program the 7558 meter and allows saving the 7558 program in a PC file for future use. On-line help is available within the software. A 7558 serial plug-in card is required to program the meter using the software.

---

1.0 **INSTALLING THE METER**

**Installation**

The 7558 meets NEMA 4X/IP65 requirements for indoor use when properly installed. The unit is intended to be mounted into an enclosed panel. Prepare the panel cutout to the dimensions shown. Remove the panel latch and cardboard sleeve from the unit and discard the cardboard sleeve. Slide the panel gasket over the rear of the unit to the back of the bezel. The unit should be installed fully assembled. Insert the unit into the panel cutout.

While holding the unit in place, push the panel latch over the rear of the unit so that the tabs of the panel latch engage in the slots on the case. The panel latch should be engaged in the farthest forward slot possible. To achieve a proper seal, tighten the latch screws evenly until the unit is snug in the panel (Torque to approximately 7 in-lbs [79N-cm]). Do not over-tighten the screws.

**Installation Environment**

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents. Continuous exposure to direct sunlight may accelerate the aging process of the bezel.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.
2.0 SETTING THE JUMPERS

The meter has three jumpers that must be set prior to applying power. The three jumpers are Bridge Excitation, Input Range, and User Input Logic. The Jumper Selections Figure is an enlargement of the jumper area shown below.

To access the jumpers, remove the meter base from the meter case by firmly squeezing and pulling back on the side rear finger tabs. This should lower the latch below the case slot (which is located just in front of the finger tabs). It is recommended to release the latch on one side, then start the other side latch.

![Jumper Selections Figure](image_url)

**FRONT DISPLAY**

- **Main Circuit Board**
- **Bridge Location**
- **User Input Location**

**REAR TERMINALS**

**3.0 WIRING THE METER**

**WIRING OVERVIEW**

Electrical connections are made via screw-clamp terminals located on the back of the meter. All conductors should conform to the meter’s voltage and current ratings. All cabling should conform to appropriate standards of good installation, local codes and regulations. It is recommended that power supplied to the meter (DC or AC) be protected by a fuse or circuit breaker.

When wiring the meter, compare the numbers embossed on the back of the meter case against those shown in wiring drawings for proper wire position. Strip the wire, leaving approximately 0.3” (7.5 mm) bare lead exposed (stranded wires should be tinned with solder). Insert the lead under the correct screw-clamp terminal and tighten until the wire is secure. (Pull wire to verify tightness.) Each terminal can accept up to one #14 AWG (2.55 mm) wire, two #18 AWG (1.02 mm), or four #20 AWG (0.61 mm).

**EMC INSTALLATION GUIDELINES**

Although this meter is designed with a high degree of immunity to Electro-Magnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into the unit may be different for various installations. The unit becomes more immune to EMI with fewer I/O connections. Cable length, routing and shield termination are very important and can mean the difference between a successful or a troublesome installation.

Listed below are some EMC guidelines for successful installation in an industrial environment:

1. The meter should be mounted in a metal enclosure, which is properly connected to protective earth.
2. Use shielded (screened) cables for all Signal and Control inputs. The shield (screen) pigtail connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness:
   a. Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
   b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
3. Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run in metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter.
4. Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
5. In extremely high EMI environments, the use of external EMI suppression devices, such as ferrite suppression cores, is effective. Install them on Signal and Control cables as close to the unit as possible. Loop the cable through the core several times or use multiple cores on each cable for additional protection. Install line filters on the power input cable to the unit to suppress power line interference. Install them near the power entry point of the enclosure. The following EMI suppression devices (or equivalent) are recommended:
   - Ferrite Suppression Cores for signal and control cables:
     - Fair-Rite # 0443167251 (RLC #FCOR0000)
     - TDK # ZCAT3053-1330A
     - Steward #28B2029-0A0
     - Corcom #1VR3
   - Line Filters for input power cables:
     - Schaffner # FN610-13/07 (RLC #LFIL0000)
     - Schaffner # FN670-1.8/07
     - Corcom #1VR3
   - Note: Reference manufacturer’s instructions when installing a line filter.
6. Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.
7. Switching of inductive loads produces high EMI. Use of snubbers across inductive loads suppresses EMI. Snubber: RLC#SNUB0000.

**Bridge Excitation**

One jumper is used to select bridge excitation to allow use of the higher sensitivity 24 mV input range. Use the 5 V excitation with high output (3 mV/V) bridges. The 5 V excitation also reduces bridge power compared to 10 V excitation.

A maximum of four 350 ohm load cells can be driven by the internal bridge excitation voltage.

**Input Range**

One jumper is used to select input range. The value selected in programming must match the jumper setting. Select a range that is high enough to accommodate the bridge output to avoid overload.

**User Input Logic Jumper**

One jumper is used for the logic state of all three user inputs. If the user inputs are not used, it is not necessary to check or move this jumper.

**JUMPER SELECTIONS**

The ✗ indicates factory setting.

<table>
<thead>
<tr>
<th>BRIDGE EXCITATION</th>
<th>INPUT RANGE</th>
<th>USER INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V</td>
<td>±240mV</td>
<td>SINK</td>
</tr>
<tr>
<td>10V</td>
<td>±240mV</td>
<td>SOURCE</td>
</tr>
</tbody>
</table>

**REAR TERMINALS**
3.1 POWER WIRING

AC Power
Terminal 1: VAC
Terminal 2: VAC

3.2 INPUT SIGNAL WIRING

Before connecting signal wires, the Input Range Jumper should be verified for proper position.

3.3 USER INPUT WIRING

Before connecting the wires, the User Input Logic Jumper should be verified for proper position. If User Inputs are not used, then skip this section. Only the appropriate User Input terminal has to be wired.

**Sinking Logic**
Terminals 8-10 Connect external switching device between appropriate User Input terminal and User Comm.

In this logic, the user inputs of the meter are internally pulled up to +5 V with 22 K resistance. The input is active when it is pulled low (<0.7 V).

**Sourcing Logic**
Terminals 8-10: + VDC through external switching device
Terminal 7: -VDC through external switching device

In this logic, the user inputs of the meter are internally pulled down with 22 K resistance. The input is active when a voltage greater than 2.5 VDC is applied.

3.4 SETPOINT (ALARMS) WIRING
3.5 SERIAL COMMUNICATION WIRING
3.6 ANALOG OUTPUT WIRING

See appropriate plug-in card bulletin for details.

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**DEADLOAD COMPENSATION**

In some cases, the combined deadload and liveload output may exceed the range of the 24 mV input. To use this range, the output of the bridge can be offset a small amount by applying a fixed resistor across one arm of the bridge. This shifts the electrical output of the bridge downward to within the operating range of the meter. A 100 K ohm fixed resistor shifts the bridge output approximately -10 mV (350 ohm bridge, 10 V excitation).

Connect the resistor between +SIG and -SIG. Use a metal film resistor with a low temperature coefficient of resistance.

**BRIDGE COMPLETION RESISTORS**

For single strain gage applications, bridge completion resistors must be employed externally to the meter. Only use metal film resistors with a low temperature coefficient of resistance.

Load cells and pressure transducers are normally implemented as full resistance bridges and do not require bridge completion resistors.
4.0 REVIEWING THE FRONT BUTTONS AND DISPLAY

FRONT PANEL

Display Readout Legends*

Custom Units Overlay

Setpoint Alarm Annunciators

MAX MIN TOT

SP1 SP2 SP3 SP4

8.8.8.8.8 Lb.*

KEY

DSP Index display through max/min/total/input readings
PAR Access parameter list
F1 Function key 1; hold for 3 seconds for Second Function 1**
F2 Function key 2; hold for 3 seconds for Second Function 2**
RST Reset (function key)**

PROGRAMMING MODE ENTRY (PAR KEY)
The Display Mode is the normal operating mode of the meter. The Programming Mode is entered by pressing the PAR key. If it is not accessible, then it is locked by either a security code or hardware lock.

PARAMETER MODULE ENTRY (ARROW & PAR KEYS)
The Programming Menu is organized into modules. These modules group together parameters which are related in function. The display alternates between $Pr_a$ and the current parameter module. The arrow keys (F1 and F2) are used to select the desired parameter module. The displayed module is entered by pressing the PAR key.

PARAMETER MENU MOVEMENT (PAR KEY)
Each parameter module has a separate module menu (which is shown at the start of each parameter module discussion). The PAR key is pressed to advance to a particular parameter without changing the programming of preceding parameters. After completing a module, the display will return to $Pr_a$. Programming may continue by accessing additional parameter modules.

SELECTION/VALUE ENTRY (ARROW & PAR KEYS)
In the parameter module, the display will alternate between the current parameter and the selections/values for that parameter. The arrow keys (F1 and F2) are used to move through the selections/values for that parameter. By pressing the PAR key, the displayed selection is stored and activated. This will also advance the meter to the next parameter.

PROGRAMMING MODE EXIT (DSP KEY or at $Pr_a$ NO PAR KEY)
The Programming Mode is exited by pressing the DSP key (from anywhere in the Programming Mode) or the PAR key (with $Pr_a$ NO displayed). This will commit any stored parameter changes to memory and return the meter to the Display Mode. If a parameter was just changed, the PAR key should be pressed to store the change before pressing the DSP key.

5.0 PROGRAMMING THE METER

OVERVIEW

PROGRAMMING MENU

PROGRAMMING TIPS
It is recommended to start with Parameter Module 1. If lost or confused while programming, press the DSP key and start over. When programming is complete, it is recommended to record the parameter programming on the Parameter User Chart and lock-out parameter programming with a user input or lock-out code.

FACTORY SETTINGS
Factory Settings may be completely restored in Parameter Module 9. This is a good starting point when experiencing programming problems. Some parameters can be left at their Factory Settings without affecting basic start-up. These parameters are identified throughout the Module explanations. Try the Factory Settings for these parameters unless a specific selection or value is known.

ALTERNATING SELECTION DISPLAY
In the explanation of the parameter modules, the following dual display with arrows will appear. It is to illustrate the display alternating between the parameter on top, and the parameter’s factory setting on the bottom. In most cases, selections and values for the parameter will be listed on the right.
### 5.1 MODULE 1 - Signal Input Parameters (INP)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RANGE</td>
<td>Select the input range that corresponds to the external signal. This selection should be high enough to avoid input signal overload but low enough for the desired input resolution. This selection and the position of the Input Range Jumper must match.</td>
</tr>
<tr>
<td>DECPT</td>
<td>Select the decimal point location for the Input, MAX and MIN displays. (The TOT display decimal point is a separate parameter.) This selection also affects round and dSPx parameters and setpoint values.</td>
</tr>
<tr>
<td>FILTER</td>
<td>The input filter setting is a time constant expressed in tenths of a second. The filter settles to 99% of the final display value within approximately 3 time constants. This is an Adaptive Digital Filter which is designed to steady the Input Display reading. A value of '0' disables filtering.</td>
</tr>
<tr>
<td>BAND</td>
<td>The digital filter adapts to variations in the input signal. When the variation exceeds the input filter band value, the digital filter disengages. When the variation becomes less than the band value, the filter engages again. This allows for a stable readout, but permits the display to settle rapidly after a large process change. The value of the band is in display units, independent of the Display Decimal Point position. A band setting of '0' keeps the digital filter permanently engaged.</td>
</tr>
</tbody>
</table>

* Factory Setting can be used without affecting basic start-up.

#### INPUT RANGE
- 0.0000 ±24 mV
- 0.02 ±240 mV

#### DISPLAY DECIMAL POINT
- 0.00

#### FILTER SETTING*
- 0.00 to 250 seconds

#### FILTER BAND*
- 0 to 250 display units

#### SCALING POINTS*
- 2 to 16

**Linear - Scaling Points (2)**
- For linear processes, only 2 scaling points are necessary. It is recommended that the 2 scaling points be at opposite ends of the input signal being applied. The points do not have to be the signal limits. Display scaling will be linear between, and continue past, the entered points up to the limits of the Input Signal Jumper position. Each scaling point has a coordinate-pair of Input Value (INP) and an associated desired Display Value (dSP).

**Nonlinear - Scaling Points (Greater than 2)**
- For non-linear processes, up to 16 scaling points may be used to provide a piece-wise linear approximation. (The greater the number of scaling points used, the greater the conformity accuracy.) The Input Display will be linear between scaling points that are sequential in program order. Each scaling point has a coordinate-pair of Input Value (INP) and an associated desired Display Value (dSP). Data from tables or equations, or empirical data could be used to derive the required number of segments and data values for the coordinate pairs. In the SFPAX software, several linearization equations are available.

#### SCALING STYLE
- VELY key-in data
- RPLY apply signal

If Input Values and corresponding Display Values are known, the Key-in (VELY) scaling style can be used. This allows scaling without the presence of a live input signal. If Input Values have to be derived from the actual input signal source or simulator, the Apply (RPLY) scaling style must be used.

#### INPUT VALUE FOR SCALING POINT 1
- 0.0000 -19999 to 19999

For Key-in (VELY), enter the known first Input Value by using the arrow keys. (The Input Range selection sets up the decimal location for the Input Value). For Apply (RPLY), apply the input signal to the meter, adjust the signal source externally until the desired Input Value appears. In either method, press the PAR key to enter the value being displayed. The DSP key can be pressed without changing the previously stored INP 1 value in the RPLY style.

#### DISPLAY VALUE FOR SCALING POINT 1
- 0.0000 -19999 to 19999

Enter the first coordinating Display Value by using the arrow keys. This is the same for VELY and RPLY scaling styles. The decimal point follows the DECPT selection.

#### INPUT VALUE FOR SCALING POINT 2
- 20.000 -19999 to 19999

For Key-in (VELY), enter the known second Input Value by using the arrow keys. For Apply (RPLY), adjust the signal source externally until the next desired Input Value appears. (Follow the same procedure if using more than 2 scaling points.)
DISPLAY VALUE FOR SCALING POINT 2

Enter the second coordinating Display Value by using the arrow keys. This is the same for PES and RPLY scaling styles. (Follow the same procedure if using more than 2 scaling points.)

General Notes on Scaling
1. Input Values for scaling points should be confined to the limits of the Input Range Jumper position.
2. The same Input Value should not correspond to more than one Display Value. (Example: 20 mA cannot equal a display of 0 and 10.) This is referred to as readout jumps (vertical scaled segments).

3. The same Display Value can correspond to more than one Input Value. (Example: 0 mA and 20 mA can equal a display of 10.) This is referred to as readout dead zones (horizontal scaled segments).

4. For input levels beyond the first programmed Input Value, the meter extends the Display Value by calculating the slope from the first two coordinate pairs (INP 1 / DSP 1 & INP 2 / DSP 2). If INP 1 = 4 mA and DSP 1 = 0, then 0 mA would be some negative Display Value. This could be prevented by making INP 1 = 0 mA / DSP 1 = 0, INP 2 = 4 mA / DSP 2 = 0, with INP 3 = 20 mA / DSP 3 = the desired high Display Value. The calculations stop at the limits of the Input Range Jumper position.

5. For input levels beyond the last programmed Input Value, the meter extends the Display Value by calculating the slope from the last two sequential coordinate pairs. If three coordinate pair scaling points were entered, then the Display Value calculation would be between INP 2 / DSP 2 & INP 3 / DSP 3. The calculations stop at the limits of the Input Range Jumper position.

5.2 MODULE 2 - User Input and Front Panel Function Key Parameters (2FNC)

The three user inputs are individually programmable to perform specific meter control functions. While in the Display Mode or Program Mode, the function is executed the instant the user input transitions to the active state.

The front panel function keys are also individually programmable to perform specific meter control functions. While in the Display Mode, the primary function is executed the instant the key is pressed. Holding the function key for three seconds executes a secondary function. It is possible to program a secondary function without a primary function.

In most cases, if more than one user input and/or function key is programmed for the same function, the maintained (level trigger) actions will be performed while at least one of those user inputs or function keys are activated. The momentary (edge trigger) actions will be performed every time any of those user inputs or function keys transition to the active state.

Note: In the following explanations, not all selections are available for both user inputs and front panel function keys. Alternating displays are shown with each selection. Those selections showing both displays are available for both. If a display is not shown, it is not available for that selection.

USER INPUTS

FUNCTION KEYS

PARAMETER MENU

Note: The following displays are shown with each selection. Those selections showing both displays are available for both. If a display is not shown, it is not available for that selection.

2 - FNC
PAR

USr - 1

USr - 2

USr - 3

F 1

F 2

r Sk

Sc - F 1

Sc - F 2

Pre

The Zero Display provides a way to zero the input Display value at various input levels, causing future Display readings to be offset. When activated (momentary action), rSEflO flashes and the Display is set to zero. At the same time, the Display value (that was on the display before the Zero Display) is subtracted from the Display Offset Value and is automatically stored as the new Display Offset Value (OFFSt). If another Zero (tare) Display is performed, the display will again change to zero and the Display reading will shift accordingly.

RELATIVE/ABSOLUTE DISPLAY

This function switches the Input Display between Relative and Absolute. The Relative is a net value that includes the Display Offset Value. The Input Display will normally show the Relative unless switched by this function. Regardless of the display selected, all meter functions continue to operate based on relative values. The Absolute is a gross value (based on Module 1 DSP and INP entries) without the Display Offset Value. The Absolute display is selected as long as the user input is activated (maintained action) or at the transition of the function key (momentary action). When the user input is released, or the function key is pressed again, the input display switches back to Relative display. ABS (absolute) or rEL (relative) is momentarily displayed at transition to indicate which display is active.

HOLD DISPLAY

The display is held but all other meter functions continue as long as activated (maintained action).
HOLD ALL FUNCTIONS

The meter disables processing the input, holds the display, and locks the state of all outputs as long as activated (maintained action). The serial port continues data transfer.

SYNCHRONIZE METER READING

The meter suspends all functions as long as activated (maintained action). When the user input is released, the meter synchronizes the restart of the A/D with other processes or timing events.

STORE BATCH READING IN TOTALIZER

The Input Display value is one time added (batched) to the Totalizer at transition to activate (momentary action). The Totalizer retains a running sum of each batch operation until the Totalizer is reset. When this function is selected, the normal operation of the Totalizer is overridden.

SELECT TOTALIZER DISPLAY

The Totalizer display is selected as long as activated (maintained action). When the user input is released, the Input Display is returned. The Totalizer stops and holds its value. When the user input is released, the Totalizer stops and holds its value. This selection functions independent of the selected display.

RESET TOTALIZER

When activated (momentary action), rESEt flashes and the Totalizer resets to zero. The Totalizer then continues to operate as it is configured. This selection functions independent of the selected display.

RESET AND ENABLE TOTALIZER

When activated (momentary action), rESEt flashes and the Totalizer resets to zero. The Totalizer continues to operate while active (maintained action). When the user input is released, the Totalizer stops and holds its value. This selection functions independent of the selected display.

ENABLE TOTALIZER

The Totalizer continues to operate as long as activated (maintained action). When the user input is released, the Totalizer stops and holds its value. This selection functions independent of the selected display.

SELECT MAXIMUM DISPLAY

The Maximum display is selected as long as activated (maintained action). When the user input is released, the Input Display returns. The Totalizer continues to function independent of being displayed.

RESET MAXIMUM

When activated (momentary action), rESEt flashes and the Maximum reading is set to the present Input Display value. The Maximum continues from that value while active (maintained action). When the user input is released, Maximum detection stops and holds its value. This selection functions independent of the selected display.

RESET, SELECT, ENABLE MAXIMUM DISPLAY

When activated (momentary action), the Maximum value is set to the present Input Display value. Maximum continues from that value while active (maintained action). When the user input is released, Maximum detection stops and holds its value. This selection functions independent of the selected display. The DSP key overrides display activated by the user input but not the Maximum function.

SELECT MINIMUM DISPLAY

The Minimum display is selected as long as activated (maintained action). When the user input is released, the Input Display returns. The DSP key overrides the active user input. The Minimum continues to function independent of being displayed.

RESET MINIMUM

When activated (momentary action), rESEt flashes and the Minimum reading is set to the present Input Display value. The Minimum function then continues from that value. This selection functions independent of the selected display.

RESET, SELECT, ENABLE MINIMUM DISPLAY

When activated (momentary action), the Minimum value is set to the present Input Display value. Minimum continues from that value while active (maintained action). When the user input is released, Minimum detection stops and holds its value. This selection functions independent of the selected display. The DSP key overrides display activated by the user input display but not the Minimum function.

RESET MAXIMUM AND MINIMUM

When activated (momentary action), rESEt flashes and the Maximum and Minimum readings are set to the present Input Display value. The Maximum and Minimum function then continues from that value. This selection functions independent of the selected display.

SETPOINT SELECTIONS

The following selections are accessible only with the Setpoint plug-in card installed. Refer to the Setpoint Card Bulletin shipped with the Setpoint plug-in card for an explanation of their operation.

Setpoint Card Only

- Select main or alternate setpoints
- Reset Setpoint 1 (Alarm 1)
- Reset Setpoint 2 (Alarm 2)
- Reset Setpoint 3 (Alarm 3)
- Reset Setpoint 4 (Alarm 4)
- Reset Setpoint 3 & 4 (Alarm 3 & 4)
- Reset Setpoint 2, 3 & 4 (Alarm 2, 3 & 4)
- Reset Setpoint All (Alarm All)

PRINT REQUEST

The meter issues a block print through the serial port when activated. The data transmitted during a print request is programmed in Module 7. If the user input is still active after the transmission is complete (about 100 msec), an additional transmission occurs. As long as the user input is held active, continuous transmissions occur.
5.3 MODULE 3 - Display and Program Lock-out Parameters (3-LOC)

PARAMETER MENU

MAXIMUM DISPLAY LOCK-OUT*
MINIMUM DISPLAY LOCK-OUT*
TOTALIZER DISPLAY LOCK-OUT*

These displays can be programmed for LOC or rEd. When programmed for LOC, the display will not be shown when selected by the DSP key. It is suggested to lock-out the display if it is not needed. The associated function will continue to operate even if its display is locked-out.

SP-1 SP-2 SP-3 SP-4 SETPOINT ACCESS*

The setpoint displays can be programmed for LOC, rEd or Ent (See following table). Accessible only with the Setpoint plug-in card installed.

5.4 MODULE 4 - Secondary Function Parameters (4-SEC)

PARAMETER MENU

MAX CAPTURE DELAY TIME*
MIN CAPTURE DELAY TIME*
DISPLAY UPDATE RATE*

Auto-zero tracking operates when the readout remains within the tracking band for a period of time equal to the tracking delay time. When these conditions are met, the meter re-zeroes the readout. After the re-zero operation, the meter resets and continues to auto-zero track.

The auto-zero tracking band should be set large enough to track normal zero drift, but small enough to not interfere with small process inputs.

For filling operations, the fill rate must exceed the auto-zero tracking rate. Drift may be caused by changes in the transducers or electronics, or accumulation of material on weight systems.

Auto-zero tracking is disabled by setting the tracking band parameter to 0.

UNITS LABEL BACKLIGHT*

The Units Label Kit Accessory contains a sheet of custom unit overlays which can be installed in to the meter’s bezel display assembly. The backlight for these custom units is activated by this parameter.

DISPLAY OFFSET VALUE*

The Display Offset Value is the difference from the Absolute (gross) Display value to the Relative (net) Display value for the same input level. The meter will automatically update this Display Offset Value after each Zero Display. The Display Offset Value can be directly keyed-in to intentionally add or remove display offset. See Relative / Absolute Display and Zero Display explanations in Module 2.

* Factory Setting can be used without affecting basic start-up.
The Totalizer accumulates (integrates) the Input Display value using one of two modes. The first is using a time base. This can be used to provide an indication of total flow, usage or consumption over time. The second is through a user input or function key programmed for Batch (one time add on demand); where accumulation is based on a completed event. If the Totalizer is not needed, its display can be locked-out and this module can be skipped during programming.

**TOTALIZER DECIMAL POINT**

For most applications, this matches the Input Display Decimal Point (dECPt). If a different location is desired, refer to Totalizer Scale Factor.

**TOTALIZER TIME BASE**

For most applications, this matches the process rate the Input Display value represents. If the Totalizer is being accumulated through a user input programmed for Batch, then this parameter does not apply.

**TOTALIZER SCALE FACTOR**

For most applications, the Totalizer reflects the same decimal point location and engineering units as the Input Display. In these cases, the Totalizer Scale Factor can be used to scale the Totalizer to the desired engineering units. Common possibilities are:

1. Changing decimal point location (example tenths to whole)
2. Changing engineering units (example inches to yards)
3. Changing both decimal point location and engineering units.
4. Average over a controlled time frame.
Details on calculating the scale factor are shown later.

**TOTALIZER LOW CUT VALUE**

A low cut value disables Totalizer when the Input Display value falls below the value programmed.

**TOTALIZER POWER UP RESET**

The Totalizer can be reset to zero on each meter power-up by setting this parameter to reset.

* Factory Setting can be used without affecting basic start-up.

**TOTALIZER HIGH ORDER DISPLAY**

When the total exceeds 5 digits, the front panel annunciator TOT flashes. In this case, the meter continues to totalize up to a 9-digit value. The high order 4 digits and the low order 5 digits of the total are displayed alternately. The letter “h” denotes the high order display.

**TOTALIZER BATCHING**

The Totalizer Time Base and scale factor are overridden when a user input or function key is programmed for Batch (dECPt). In this mode, when the user input or function key is activated, the Input Display reading is one time added to the Totalizer (batch). The Totalizer retains a running sum of each batch operation until the Totalizer is reset. This is useful in weighting operations, when the value to be added is not based on time but after a filling event.

**TOTALIZER USING TIME BASE**

Totalizer accumulates as defined by:

\[ \text{Input Display} \times \frac{\text{Totalizer Time Base}}{10000} \times \text{Totalizer Scale Factor} \]

Example: Input reading is at a constant rate of 10.0 gallons per minute. The Totalizer Scale Factor is 1.000. With gallons per minute, the Totalizer Time Base is 3600. By placing these values in the equation, the Totalizer will accumulate every second as follows:

\[ 10.0 \times \frac{3600}{10000} \times 1.000 \]

This results in:

10.0 gallons accumulates each minute
60.0 gallons accumulates each hour

**TOTALIZER SCALE FACTOR CALCULATION EXAMPLES**

1. When changing the Totalizer Decimal Point (dECPt) location from the Input Display Decimal Point (dECPt), the required Totalizer Scale Factor is multiplied by a power of ten.

Example: Input (dECPt) -0.0

<table>
<thead>
<tr>
<th>Totalizer dECPt</th>
<th>Scale Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>10</td>
</tr>
<tr>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>0</td>
<td>0.01</td>
</tr>
<tr>
<td>100</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Example: Input (dECPt) -0.001

<table>
<thead>
<tr>
<th>Totalizer dECPt</th>
<th>Scale Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>1000</td>
</tr>
<tr>
<td>0.0</td>
<td>100</td>
</tr>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0.01</td>
<td>10</td>
</tr>
</tbody>
</table>

Note: The Totalizer display is round by tens or hundreds)

2. When changing the Totalizer engineering units, the Totalizer Scale Factor is the known conversion multiplier from Input Display units to Totalizer units. Example: If Input Display is feet and the Totalizer needs to be in yards, the conversion multiplier from feet to yards is 0.333. Enter 0.333 as the Totalizer scale factor.

3. When changing both the Totalizer engineering units and Totalizer Decimal Point, the two calculations are multiplied together. Example: Input Display – feet in tenths (0.0) with Totalizer – whole yards (0), the scale factor would be 0.033.

4. To obtain an average reading within a controlled time frame, the selected Totalizer Time Base is divided by the given time period expressed in the same timing units. Example: Average temperature per hour in 4 hour period, the scale factor would be 0.250. To achieve a controlled time frame, connect an external timer to a user input programmed for TOTAL. The timer will control the start (reset) and the stopping (hold) of the Totalizer.
5.6 MODULE 6 - Setpoint (Alarm) Parameters (6-Spt)

PARAMETER MENU

SPSEL - SELECT SETPOINT TO CONFIGURE

SP-1 SP-2 SP-3 SP-4

Act - SETPOINT ACTION

OFF dE-H1 dE-L0
Ab-H1 dE-L0 bAnD
Ab-L0 tLoL0
AU-H1 tHiH1
AU-L0 tHiL0

SP - SETPOINT VALUE

-19999 to 99999

HYS - SETPOINT HYSTERESIS

1 to 65535

5.7 MODULE 7 - Serial Communications Parameters (7-Srl)

PARAMETER MENU

bRd - BAUD RATE

300 4800
600 9600
1200 19200
2400

dAt - DATA BITS

7 8

PR - PARITY BIT

Odd NO

Addr - METER ADDRESS

0 to 99

Ab - ABBREVIATED PRINTING

NO YES

OP - PRINT OPTIONS

inp HILO tot

5.8 MODULE 8 - Analog Output Parameters (8-Out)

PARAMETER MENU

Ty - ANALOG TYPE

0-20 0-10
4-20

Rs - ANALOG ASSIGNMENT

inp LO

H1 tot

RL - ANALOG LOW SCALE VALUE

-19999 to 99999

RH - ANALOG HIGH SCALE VALUE

-19999 to 99999

ud - ANALOG UPDATE TIME

00 to 100 sec.
5.9 MODULE 9 - Factory Service Operations (9-FCE5)

PARAMETER MENU

CALIBRATION
The meter has been fully calibrated at the factory. Scaling to convert the input signal to a desired display value is performed in Module 1. If the meter appears to be indicating incorrectly or inaccurately, refer to Troubleshooting before attempting to calibrate the meter.

When recalibration is required (generally every 2 years), it should only be performed by qualified technicians using appropriate equipment. Calibration does not change any user programmed parameters. However, it may affect the accuracy of the input signal values previously stored using the Apply (RPLY) Scaling Style.

Calibration may be aborted by disconnecting power to the meter before exiting Module 9. In this case, the existing calibration settings remain in effect.

Note: Allow a 30 minute warm up period.
Warning: Calibration of this meter requires a signal source with an accuracy of 0.01% or better and an external meter with an accuracy of 0.005% or better.

Input Calibration
Before starting, connect -SIG (rear terminal 4) to COMM (rear Terminal 5). This allows a single ended signal to be used for calibration. Connect the calibration signal to +SIG (rear terminal 3) and -SIG (rear terminal 4). Verify the Input Range jumper is in the desired position. (Refer to product literature for jumper positions.) Perform the following procedure:

1. Press the arrow keys to display Code 48 and press PAR.
2. Choose the range to be calibrated by using the arrow keys and press PAR.
3. When the zero range limit appears on the display, apply 0 mV between +SIG and -SIG.
4. Press PAR and WWW will appear, wait for next prompt.
5. When the top range limit appears on the display, apply the corresponding +SIG and -SIG voltage (20 mV or 200 mV).
6. Press PAR and WWW will appear, on the display for about 10 seconds.
7. When NO appears, press PAR twice to exit programming.
8. Repeat the above procedure for each range to be calibrated or to recalibrate the same range. It is only necessary to calibrate the input ranges being used.
9. When all desired calibrations are completed, remove -SIG to COMM connection and external signal source.
10. Restore original configuration and jumper settings.

Analog Output Option Card Calibration
Before starting, verify that the precision voltmeter (voltage output) or current meter (current output) is connected and ready. Allow a 30 minute warm up period. Then perform the following procedure:
1. Use the arrow keys to display Code 48 and press PAR.
2. Use the arrow keys to choose DUT and press PAR.
3. Using the chart below, step through the five selections to be calibrated. At each prompt, use the 7558 arrow keys to adjust the external meter display to match the selection being calibrated. When the external reading matches, or if this range is not being calibrated, press PAR.
4. When NO appears remove the external meters and press PAR twice.

RESTORE FACTORY DEFAULTS
Use the arrow keys to display Code 66 and press PAR. The meter will display *ESR and then return to Code 50. Press DSP key to return to Display Mode. This will overwrite all user settings with the factory settings.

TROUBLESHOOTING

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>REMEDIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO DISPLAY</td>
<td>CHECK: Power level, power connections</td>
</tr>
<tr>
<td>PROGRAM LOCKED-OUT</td>
<td>CHECK: Active (lock-out) user input</td>
</tr>
<tr>
<td>ENTER: Security code requested</td>
<td></td>
</tr>
<tr>
<td>MAX, MIN, TOT LOCKED-OUT</td>
<td>CHECK: Module 3 programming</td>
</tr>
<tr>
<td>INCORRECT INPUT DISPLAY VALUE</td>
<td>CHECK: Module 1 programming, Input Range Jumper position, input connections, input signal level, Module 4 Display Offset is zero, DSP is on Input Display</td>
</tr>
<tr>
<td>PERFORM: Calibration (If the above does not correct the problem.)</td>
<td></td>
</tr>
<tr>
<td>&quot;OLOL&quot; in DISPLAY (SIGNAL LOW)</td>
<td>CHECK: Module 1 programming, Input Range Jumper position, input connections, input signal level</td>
</tr>
<tr>
<td>&quot;ULUL&quot; in DISPLAY (SIGNAL HIGH)</td>
<td>CHECK: Module 1 programming, Input Range Jumper position, input connections, input signal level</td>
</tr>
<tr>
<td>JITTERY DISPLAY</td>
<td>INCREASE: Module 1 filtering, rounding, input range</td>
</tr>
<tr>
<td>CHECK: Wiring is per EMC installation guidelines</td>
<td></td>
</tr>
<tr>
<td>MODULES or PARAMETERS NOT ACCESSIBLE</td>
<td>CHECK: Corresponding plug-in card installation</td>
</tr>
<tr>
<td>ERROR CODE (Err 1-4)</td>
<td>PRESS: RST Key (If unable to clear, contact the factory.)</td>
</tr>
</tbody>
</table>

For further assistance, contact technical support.
### User Input and Function Key Parameters

<table>
<thead>
<tr>
<th>DISPLAY</th>
<th>PARAMETER</th>
<th>FACTORY SETTING</th>
<th>USER SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>rANGE</td>
<td>INPUT RANGE</td>
<td>0.02u</td>
<td></td>
</tr>
<tr>
<td>dECPt</td>
<td>DISPLAY DECIMAL POINT</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>round</td>
<td>DISPLAY Rounding</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Filter</td>
<td>FILTER SETTING</td>
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<td></td>
</tr>
<tr>
<td>bAND</td>
<td>FILTER BAND</td>
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<td></td>
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<tr>
<td>PEs</td>
<td>SCALING POINTS</td>
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<td></td>
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<tr>
<td>SKEYE</td>
<td>SCALING STYLE</td>
<td>Key</td>
<td></td>
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<tr>
<td>inP 1</td>
<td>INPUT VALUE 1</td>
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<td></td>
</tr>
<tr>
<td>dSP 1</td>
<td>DISPLAY VALUE 1</td>
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<td></td>
</tr>
<tr>
<td>inP 2</td>
<td>INPUT VALUE 2</td>
<td>20.000</td>
<td></td>
</tr>
<tr>
<td>dSP 2</td>
<td>DISPLAY VALUE 2</td>
<td>10.000</td>
<td></td>
</tr>
<tr>
<td>inP 3</td>
<td>INPUT VALUE 3</td>
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<td></td>
</tr>
<tr>
<td>dSP 3</td>
<td>DISPLAY VALUE 3</td>
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<td></td>
</tr>
<tr>
<td>inP 4</td>
<td>INPUT VALUE 4</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>dSP 4</td>
<td>DISPLAY VALUE 4</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>inP 5</td>
<td>INPUT VALUE 5</td>
<td>0.000</td>
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</tr>
<tr>
<td>dSP 5</td>
<td>DISPLAY VALUE 5</td>
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</tr>
<tr>
<td>inP 6</td>
<td>INPUT VALUE 6</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>dSP 6</td>
<td>DISPLAY VALUE 6</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>inP 7</td>
<td>INPUT VALUE 7</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>dSP 7</td>
<td>DISPLAY VALUE 7</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>inP 8</td>
<td>INPUT VALUE 8</td>
<td>0.000</td>
<td></td>
</tr>
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<td>dSP 8</td>
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<td>inP 14</td>
<td>INPUT VALUE 14</td>
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<td>dSP 14</td>
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<td>inP 16</td>
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<td>dSP 16</td>
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### Totalizer (Integrator) Parameters

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<tr>
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<th>USER SETTING</th>
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<td>lBrSE</td>
<td>TOTALIZER TIME BASE</td>
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<td>ScFac</td>
<td>TOTALIZER SCALE FACTOR</td>
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<td>Locu</td>
<td>TOTALIZER LOW CUTOFF</td>
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### Serial Communication Parameters

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<td>dBtA</td>
<td>DATA BIT</td>
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<tr>
<td>PAry</td>
<td>PARITY BIT</td>
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<td>ABBREVIATED PRINTING</td>
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<td>INp</td>
<td>PRINT INPUT VALUE</td>
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<tr>
<td>pOt</td>
<td>PRINT TOTAL VALUE</td>
<td>Yes</td>
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<tr>
<td>HILO</td>
<td>PRINT MAX &amp; MIN VALUES</td>
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<tr>
<td>SPn</td>
<td>PRINT SETPOINT VALUES</td>
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### Analog Output Parameters

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<td>ASIN</td>
<td>ANALOG ASSIGNMENT</td>
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### Softkey (Alarm) Parameters

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<tr>
<td>SP-n</td>
<td>SETPOINT VALUE (main)</td>
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<tr>
<td>SP-n</td>
<td>SETPOINT VALUE (alternate)</td>
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<td>ON TIME DELAY</td>
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* Select alternate list to program these values.