Model 122 Pulse Input Rate/Totalizer
Instruction Manual

- Pulse, Open Collector, NPN, PNP, TTL, Switch Contact, Sine Wave (Coil), Square Wave Inputs
- Gate Function for Rate Display of Slow Pulse Rates
- NEMA 4X, IP65 Front
- Large Dual-Line 6-Digit Display, 0.60" & 0.46"
- Isolated 24 VDC Transmitter Power Supply
- Programmable Displays & Function Keys
- Sunlight Readable Display Models
- Rate Displayed as Units per Second, Minute, Hour, or Day
- Total, Grand Total or Non-Resettable Grand Total
- 9-Digit Totalizer with Total Overflow Feature
- K-Factor Calibration or Scale with up to 32-Point Linearization
- Isolated 4-20 mA Output for Rate/Total/Grand Total
- USB, RS-232 & RS-485 Serial Communication Options
- Modbus® RTU Communication Protocol Standard
- Free USB Programming Software & Cable

Max Machinery Inc
33A Healdsburg Ave
Healdsburg CA 95448 USA
Tel (707) 433-2662
www.maxmachinery.com

Disclaimer

The information contained in this document is subject to change without notice. Max Machinery makes no representations or warranties with respect to the contents hereof; and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

<table>
<tr><td>⚠

CAUTION: *Read complete instructions prior to installation and operation of the meter.*</td><td>⚡

WARNING: *Risk of electric shock or personal injury.*</td></tr>
</table>

⚡

WARNING:

This product is not recommended for life support applications or applications where malfunctioning could result in personal injury or property loss. Anyone using this product for such applications does so at his/her own risk. Max Machinery Incorporated shall not be held liable for damages resulting from such improper use.

Limited Warranty

Max Machinery Incorporated warrants this product against defects in material or workmanship for the specified period under "Specifications" from the date of shipment from the factory. Max Machinery's liability under this limited warranty shall not exceed the purchase value, repair, or replacement of the defective unit.

Registered Trademarks

All trademarks mentioned in this document are the property of their respective owners.

www.maxmachinery.com

Table of Contents

Table of Figures

INTRODUCTION

The Model 122 is a multipurpose, easy to use pulse rate/totalizer ideal for flow rate, total, and control applications. It accepts pulse (e.g. ±40 mV to ±8 V), square wave (0-5 V, 0-12 V, or 0-24 V), open collector, NPN, PNP, TTL or switch contact signals. Three of the front panel buttons can be custom-programmed for specific operation. The basic model includes an isolated 24 VDC transmitter power supply that can be used to power the input transmitter or other devices.

ORDERING INFORMATION

Model Number	Reorder Number
PD6300-6R3-MM	122-200-000

SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

General

DISPLAY	Upper display: 0.6" (15 mm) high, red LEDs Lower display: 0.46" (12 mm) high, red LEDs 6 digits: each (-99999 to 999999), with lead zero blanking.
DISPLAY INTENSITY	Eight user selectable intensity levels
DISPLAY UPDATE RATE	Rate: 10 per second; up to 1 per 100 seconds (and is a function of Low Gate setting) Total: 10 per second (fixed)
OVERRANGE	Display flashes 999999
DISPLAY ASSIGNMENT	The Upper and Lower displays may be assigned to rate, total, grand total, alternate rate & total, max/min, units (lower display only), set points, Modbus input, & more.
PROGRAMMING METHODS	Four front panel buttons, digital inputs, PC via MeterView Pro software, or Modbus registers.
RECALIBRATION	All ranges are calibrated at the factory to read frequency in Hz. No recalibration required.
MAX/MIN DISPLAY	Max/min readings reached by the process are stored until reset by the user or until power to the meter is cycled.
PASSWORD	Three programmable passwords restrict modification of programmed settings and two prevent resetting the totals. Pass 1: Allows use of function keys and digital inputs Pass 2: Allows use of function keys, digital inputs and editing set/reset points Pass 3: Restricts all programming, function keys, and digital inputs. Total: Prevents resetting the total manually Gtotal: Prevents resetting the grand total manually
NON-VOLATILE MEMORY	All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
POWER OPTIONS	85-265 VAC 50/60 Hz, 90-265 VDC, 20 W max
FUSE	Required external fuse: UL Recognized, 5 A max, slow blow; up to 6 meters may share one 5 A fuse
ISOLATED TRANSMITTER POWER SUPPLY	Terminals P+ & P-: 24 VDC $\pm$ 10% selectable for 24, 10, or 5 VDC supply (internal jumper J4). 85-265 VAC models rated @ 200 mA max.
ISOLATION	4 kV input/output-to-power line 500 V input-to-output or output-to-P+ supply

OVERVOLTAGE CATEGORY	Installation Overvoltage Category II: Local level with smaller transient overvoltages than Installation Overvoltage Category III.
ENVIRONMENTAL	Operating temperature range: -40 to 65°C Storage temperature range: -40 to 85°C Relative humidity: 0 to 90% non-condensing
CONNECTIONS	Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial communication adapters.
ENCLOSURE	1/8 DIN, high impact plastic, UL 94V-0, color: black
MOUNTING	1/8 DIN panel cutout required: 3.622" x 1.772" (92 mm x 45 mm) Two panel mounting bracket assemblies are provided.
TIGHTENING TORQUE	Screw terminal connectors: 5 lb-in (0.56 Nm)
OVERALL DIMENSIONS	4.68" x 2.45" x 5.64" (119 mm x 62 mm x 143 mm) (W x H x D)
WEIGHT	9.5 oz (269 g)
WARRANTY	3 years parts & labor

Rate Input

INPUTS	Field selectable: Pulse or square wave 0-5 V, 0-12 V, or 0-24 V @ 30 kHz; TTL; open collector 4.7 kΩ pull-up to 5 V @ 30 kHz; NPN or PNP transistor, switch contact 4.7 kΩ pull-up to 5 V @ 40 Hz; Modbus PV (Slave)
LOW VOLTAGE MAG PICKUP (Isolated)	Sensitivity: 40 mVp-p to 8Vp-p
MINIMUM INPUT FREQUENCY	0.001 Hz Minimum frequency is dependent on high gate setting.
MAXIMUM INPUT FREQUENCY	30,000 Hz (10,000 for low voltage mag pickup)
INPUT IMPEDANCE	Pulse input: Greater than 300 kΩ @ 1 kHz. Open collector/switch input: 4.7 kΩ pull-up to 5 V.
ACCURACY	±0.03% of calibrated span ±1 count
TEMPERATURE DRIFT	Rate display is not affected by changes in temperature.
MULTI-POINT LINEARIZATION	2 to 32 points

LOW-FLOW CUTOFF	0-999999 (0 disables cutoff function)
DECIMAL POINT	Up to five decimal places or none: *d.ddddd*, *d.dddd*, *d.ddd*, *d.dd*, *d.d*, or *dddddd*
CALIBRATION	May be calibrated using K-factor, internal calibration, or by applying an external calibration signal.
K-FACTOR	Field programmable K-factor converts input pulses to rate in engineering units. May be programmed from 0.00001 to 999,999 pulses/unit.
CALIBRATION RANGE	Input 1 signal may be set anywhere in the range of the meter; input 2 signal may be set anywhere above or below input 1 setting. Minimum input span between any two inputs is 10 Hz. An error message will appear if the input 1 and input 2 signals are too close together.
FILTER	Programmable contact de-bounce filter: 40 to 999 Hz maximum input frequency allowed with low speed filter.
TIME BASE	Second, minute, hour, or day
GATE	Low gate: 0.1-99.9 seconds High gate: 2.0-999.9 seconds
F4 DIGITAL INPUT CONTACTS	3.3 VDC on contact. Connect normally open contacts across F4 to COM.
F4 DIGITAL INPUT LOGIC LEVELS	Logic High: 3 to 5 VDC Logic Low: 0 to 1.25 VDC

Rate/Totalizer

DISPLAY ASSIGNMENT	The Upper and Lower displays may be assigned to rate, total, grand total, alternate rate/total, alternate rate/grand total, set points, alternate rate/units, alternate total/units, alternate grand total/units, display Hi, display Lo, display Hi/Lo, display Modbus, display units (lower display) and display Off (lower display).
RATE DISPLAY INDICATION	-99999 to 999999, lead zero blanking. "R" LED illuminates while displaying rate or frequency.
TOTAL DISPLAY & TOTAL OVERFLOW	0 to 999,999; automatic lead zero blanking. "T" LED is illuminated while displaying total or grand total. Up to 999,999,999 with total-overflow feature. "oF" is displayed to the left of total overflow and ▲ LED is illuminated.
ALTERNATING DISPLAY	Either display may be programmed to alternate between rate and total or rate and grand total every 10 seconds.
TOTAL DECIMAL POINT	Up to five decimal places or none: *d.ddddd*, *d.dddd*, *d.ddd*, *d.dd*, *d.d*, or *dddddd* Total decimal point is independent of rate decimal point.

TOTALIZER	Calculates total based on rate and field programmable multiplier to display total in engineering units. Time base must be selected according to the time units in which the rate is displayed.
TOTALIZER ROLLOVER	Totalizer rolls over when display exceeds 999,999,999. Relay status reflects display.
TOTAL OVERFLOW OVERRIDE	Program total reset for automatic with 0.1 second delay and set point 1 for 999,999
TOTALIZER PRESETS	Up to eight, user selectable under setup menu. Any set point can be assigned to total and may be programmed anywhere in the range of the meter for total alarm indication.
PROGRAMM-ABLE DELAY ON RELEASE	0.1 and 999.9 seconds; applied to the first relay assigned to total or grand total. If the meter is programmed to reset total to zero automatically when the preset is reached, then a delay will occur before the total is reset.
TOTAL RESET	Via front panel button, external contact closure on digital inputs, automatically via user selectable preset value and time delay, or through serial communications.
TOTAL RESET PASSWORD	Total and grand total passwords may be entered to prevent resetting the total or grand total from the front panel.
NON-RESETTABLE TOTAL	The grand total can be programmed as a non-resettable total by entering the password "050873". ⚠ **Caution!** *Once the Grand Total has been programmed as "non-resettable" the feature __cannot__ be disabled.*

Isolated 4-20 mA Transmitter Output

OUTPUT SOURCE	Rate/process, total, grand total, max, min, set points 1-8, Modbus input or manual control mode
SCALING RANGE	1.000 to 23.000 mA for any display range.
CALIBRATION	Factory calibrated: 0.0 to 1000.0 = 4-20 mA output
ANALOG OUT PROGRAMMING	23.000 mA maximum for all parameters: Overrange, underrange, max, min, and break
ACCURACY	± 0.1% FS ± 0.004 mA
TEMPERATURE DRIFT	0.4 µA/°C max from 0 to 65°C ambient, 0.8 µA/°C max from -40 to 0°C ambient *Note: Analog output drift is separate from input drift.*

ISOLATED TRANSMITTER POWER SUPPLY	Terminals I+ & R: 24 VDC $\pm$ 10%. May be used to power the 4-20 mA output or other devices. Refer to Figure 6 on page 16 and Figure 15 on page 18. All models rated @ 40 mA max.
EXTERNAL LOOP POWER SUPPLY	35 VDC maximum

OUTPUT LOOP RESISTANCE	Power supply	Minimum	Maximum
	24 VDC	10 Ω	700 Ω
	35 VDC (external)	100 Ω	1200 Ω

Modbus® RTU Serial Communications

SLAVE ID	1 – 247 (Meter address)
BAUD RATE	300 - 19,200 bps
TRANSMIT TIME DELAY	Programmable between 0 and 199 ms
DATA	8 bit (1 start bit, 1 or 2 stop bits)
PARITY	Even, Odd, or None with 1 or 2 stop bits
BYTE-TO-BYTE TIMEOUT	0.01 – 2.54 second
TURN AROUND DELAY	Less than 2 ms (fixed)

Note: Refer to the Modbus Register Tables located at www.maxmachinery.com for details.

MeterView Pro Software

SYSTEM REQUIREMENTS	Microsoft® Windows® XP/Vista/7/8/10
COMMUNICATIONS	USB 2.0 (Standard USB A to Micro USB B)
CONFIGURATION	Configure meters one at a time

COMPLIANCE INFORMATION

Safety

UL & c-UL LISTED	USA & Canada UL 508 Industrial Control Equipment
UL FILE NUMBER	E160849
FRONT PANEL	UL Type 4X, NEMA 4X, IP65; panel gasket provided
LOW VOLTAGE DIRECTIVE	EN 61010-1:2010 Safety requirements for measurement, control, and laboratory use

Electromagnetic Compatibility

EMISSIONS	EN 55022:2010 Class A ITE emissions requirements
Radiated Emissions	Class A
AC Mains Conducted Emissions	Class A
IMMUNITY	EN 61326-1:2013 Measurement, control, and laboratory equipment EN 61000-6-2:2005 EMC heavy industrial generic immunity standard
RFI - Amplitude Modulated	80 -1000 MHz 10 V/m 80% AM (1 kHz) 1.4 - 2.0 GHz 3 V/m 80% AM (1 kHz) 2.0 - 2.7 GHz 1 V/m 80% AM (1 kHz)
Electrical Fast Transients	±2kV AC mains, ±1kV other
Electrostatic Discharge	±4kV contact, ±8kV air
RFI - Conducted	10V, 0.15-80 MHz, 1kHz 80% AM
AC Surge	±2kV Common, ±1kV Differential
Surge	1KV (CM)
Power-Frequency Magnetic Field	30 A/m 70%V for 0.5 period
Voltage Dips	40%V for 5 & 50 periods 70%V for 25 periods
Voltage Interruptions	<5%V for 250 periods

Note:

> *Testing was conducted on Model 122 meters installed through the covers of grounded metal enclosures with cable shields grounded at the point of entry representing installations designed to optimize EMC performance.*

Declaration of Conformity available at www.maxmachinery.com

SAFETY INFORMATION

CAUTION: *Read complete instructions prior to installation and operation of the meter.*

WARNING: *Risk of electric shock or personal injury.*

Warning!   *Hazardous voltages exist within enclosure. Installation and service should be performed only by trained service personnel.*

INSTALLATION

There is no need to remove the meter from its case to complete the installation, wiring, and setup of the meter for most applications. Instructions are provided for changing the transmitter power supply to output 5 or 10 VDC instead of 24 VDC, see page 15.

Unpacking

Remove the meter from box. Inspect the packaging and contents for damage. Report damages, if any, to the carrier.

If any part is missing or the meter malfunctions, please contact your supplier or the factory for assistance.

Panel Mounting Instructions

- Prepare a standard 1/8 DIN panel cutout – 3.622" x 1.772" (92 mm x 45 mm). Refer to Figure 1 for more details.

- Clearance: allow at least 6.0" (152 mm) behind the panel for wiring.

- Panel thickness: 0.04" - 0.25" (1.0 mm - 6.4 mm).
  Recommended minimum panel thickness to maintain Type 4X rating: 0.06" (1.5 mm) steel panel, 0.16" (4.1 mm) plastic panel.

- Remove the two mounting brackets provided with the meter (back-off the two screws so that there is ¼" (6.4 mm) or less through the bracket. Slide the bracket toward the front of the case and remove).

- Insert meter into the panel cutout.

- Install mounting brackets and tighten the screws against the panel. To achieve a proper seal, tighten the mounting bracket screws evenly until meter is snug to the panel along its short side. DO NOT OVER TIGHTEN, as the rear of the panel may be damaged.
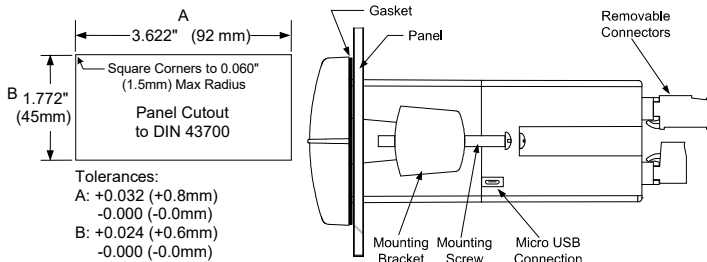
Figure 1: 1/8 DIN Panel Cutout and Mounting

Mounting Dimensions
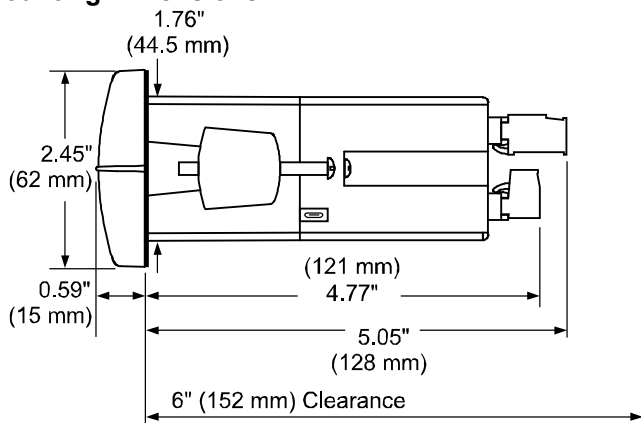
Figure 2: Meter Dimensions - Side View
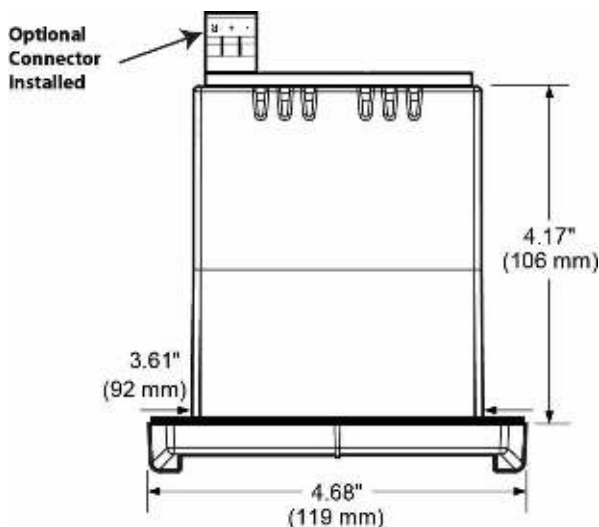
Figure 3: Meter Dimensions - Top View

Transmitter Supply Voltage Selection (P+, P-)

All meters are shipped from the factory configured to provide 24 VDC power for the transmitter or sensor.

If the transmitter requires 5 or 10 VDC excitation, the internal jumper J4 must be configured accordingly.

To access the voltage selection jumper:

1. Remove all the connectors.
2. Unscrew the back cover.
3. Slide the back cover about 1 inch.
4. Configure the J4 jumper, located behind the input signal connector, for the desired excitation voltage as shown.
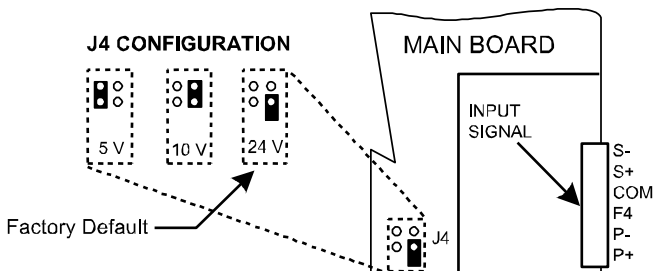
Figure 4: Transmitter Supply Voltage Selection

Connections

All connections are made to removable screw terminal connectors located at the rear of the meter.

⚠ **Caution!**	*Use copper wire with 60°C or 60/75°C insulation for all line voltage connections. Observe all safety regulations. Electrical wiring should be performed in accordance with all applicable national, state, and local codes to prevent damage to the meter and ensure personnel safety.*

Connectors Labeling

The connectors' label, affixed to the meter, shows the location of all connectors available with requested configuration.

⚠ **Warning!**	***The RJ45 M-LINK connector is for factory use only. Do not connect standard RJ45 cable, otherwise damage will occur to the equipment and the meter.***
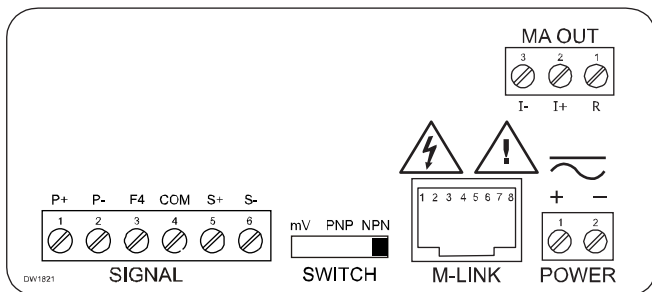
Figure 5: Connector Labeling for Model 122

Power Connections

Power connections are made to a two-terminal connector labeled POWER on Figure 5. The meter will operate regardless of DC polarity connection. The + and - symbols are only a suggested wiring convention.

Required External Fuse:
5 A max, 250 V Slow Blow
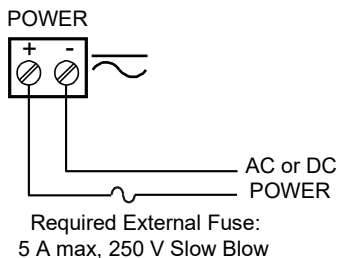
Figure 6: Power Connections

Signal Connections

Signal connections are made to a six-terminal connector labeled SIGNAL on Figure 5. The COM (common) terminal is the return for the input signals.

Setup and programming is performed through the front panel buttons.
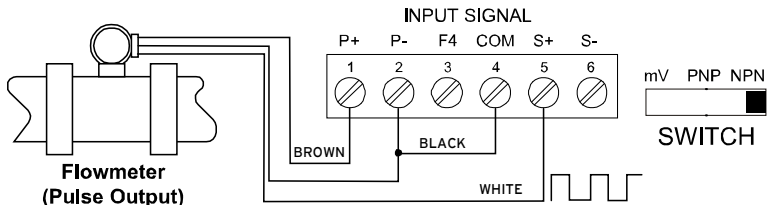
Figure 7: Flowmeter Powered by Internal Power Supply

F4 Digital Input Connections

A digital input, F4, is standard on the meter. This digital input connected with a normally open closure across F4 and COM, or with an active low signal applied to F4.
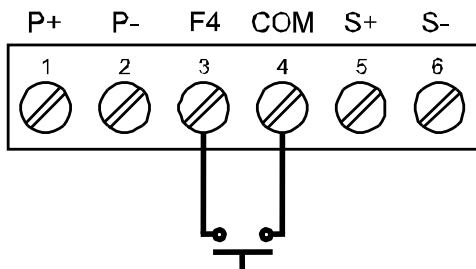
Figure 8. F4 Digital Input Connections

4-20 mA Output Connections

Connections for the 4-20 mA transmitter output are made to the connector terminals labeled MA OUT. The 4-20 mA output may be powered internally or from an external power supply.
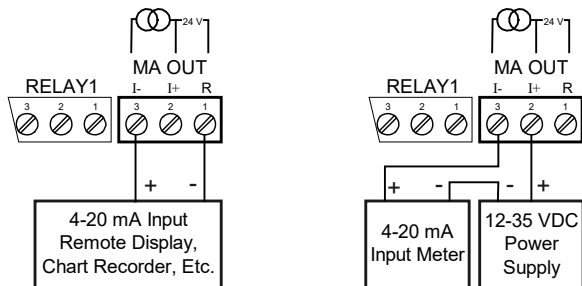
Figure 9: 4-20 mA Output Connections

Analog Output Transmitter Power Supply

The internal 24 VDC power supply powering the analog output may be used to power other devices, if the analog output is not used. The I+ terminal is the +24 V and the R terminal is the return.

SETUP AND PROGRAMMING

- The meter has been factory calibrated to read input frequency in Hz (pulses/sec). The calibration equipment is certified to NIST standards.

- Use the *K-Factor* menu to match the rate/totalizer with a flowmeter's k-factor (pulse/unit of measure).

- Or use the *Scale* menu to scale the pulse input (pulse/sec) without a signal source.

- Or use *Cal* menu to calibrate the rate/totalizer using a signal source.

Overview

There are two switches, located to the right of the input connector, which must be configured according to the input level and type. Jumper J4 located inside the meter, behind the input signal connector, is used to select the excitation voltage (24 V*, 10 V or 5 V) which is supplied to the P+ and P- wiring terminals.

Setup and programming is done through the front panel buttons.

After power and input signal connections have been completed and verified, apply power to the meter.

*Default setting

MeterView Pro Software

The meter can also be programmed using the PC-based MeterView Pro software included with the meter. This software can be installed on any Microsoft® Windows® (2000/XP/Vista/7/8/10) computer by connecting the meter's onboard USB. The meter is powered by the USB connection, so there is no need to wire anything prior to programming the meter, though USB is intended only for meter configuration.

MeterView Pro Installation

1. Connect one end of the provided USB cable to the meter and the other end to the computer. The computer will automatically install the driver software it needs to talk to the meter.
   Only one meter may be connected at a time. Attaching multiple meters will cause a conflict with the meter software.
   Disconnect other meters before performing these steps.
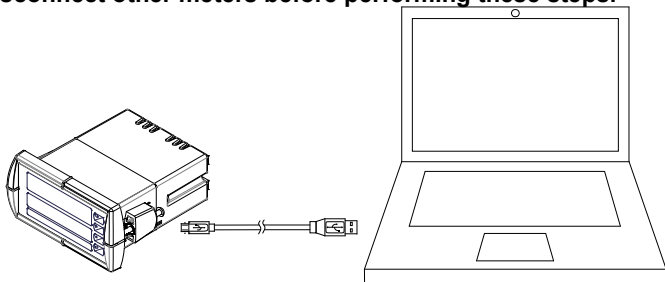
2. Once the driver is installed, an AutoPlay dialog should appear for the drive "MAINSTAL." Click "Open folder to view files."
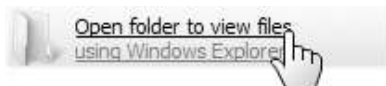
   If the computer does not display an AutoPlay dialog for the drive "MAINSTAL," you should open *My Computer* and double-click on the drive labeled "MAINSTAL."
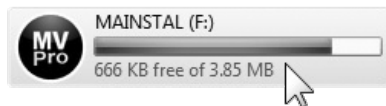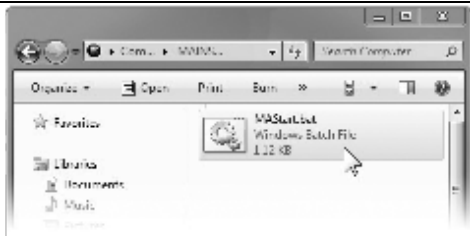
3. Double-click on the file named "MAStart." The program will open a few windows and install two programs on your computer.
Simply follow the onscreen instructions until you see one of the dialogs below. If you receive a "User Account Control" warning, click "Yes."
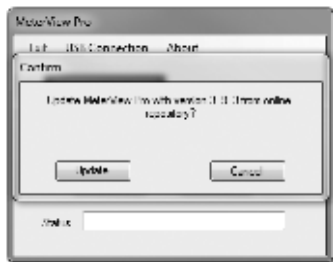
4. If there is an update available, click the "Update" button to install the new version. Otherwise, click "Configure" to begin programming your meter.

Note: If you decide to update your MeterView Pro software, once the installation has completed, you will be asked if you want to update the setup files located on the meter itself. This way, you will always have the most current version on the meter for future installs.

⚠️ **Warning!**	*Do not unplug the meter while the new installation files are being written to it. The meter will display* uwrite *during the process and you will receive an onscreen notification once the process is complete.*

Data logging for one meter at a time is available with MeterView Pro software. More advanced data acquisition may be accomplished by using any Modbus RTU compliant software. Additional information regarding configuration and monitoring of the meter using MeterView Pro software is available online.

Front Panel Buttons and Status LED Indicators

Button Symbol	Description
Menu button (MENU)	**Menu**
Right arrow/F1 button	**Right arrow/F1**
Up arrow/F2 button	**Up arrow/F2**
Enter/F3 button	**Enter/F3**
Note: *F4 is a digital input.*	

LED	Status
1-4	Alarm 1 – 4 indicator
R	Rate indicator
T	Total indicator
G T	Grand Total indicator
▲	Total overflow indicator
M	Manual control relays &/or analog output

- Press the Menu button to enter or exit the Programming Mode at any time.
- Press the Right arrow button to move to the next digit during digit or decimal point programming.
- Press or hold the Up arrow button to scroll through the menus, decimal point, or press or hold to increment the value of a digit.
- Press the Enter button to access a menu or to accept a setting.
- Press and hold the Menu button for three seconds to access the *Advanced Features* of the meter.

Display Functions and Messages

The meter displays various functions and messages during setup,
programming, and operation. The following table shows the main menu
functions and messages in the order they appear in the menu.

Display	Parameter	Action/Setting Description
SEtuP	*Setup*	Enter *Setup* menu
InPut	*Input*	Enter *Input* selection menu
totAL	*Total*	Enable or disable totalizer features
un itS	*Units*	Select the display units/tags
rAtE	*Rate*	Select the display units for rate
totAL	*Total*	Select the display units for total
GtotAL	*Grand Total*	Select the display units for grand total
dEc Pt	*Decimal point*	Set decimal point for rate, total, grand total
ProG	*Program*	Enter the *Program* menu
InCAL	*Input Calibration*	Enter the *Input Calibration* menu
FActor	*K-factor Scaling*	Programs unit to convert input pulse to rate in engineering units
SCALE	*Scale*	Enter the *Scale* menu
CAL	*Calibrate*	Enter the *Calibrate* menu
InP 1	*Input 1*	Calibrate input 1 signal or program input 1 value
d iS 1	*Display 1*	Program display 1 value
InP 2	*Input 2*	Calibrate input 2 signal or program input 2 value (up to 32 points)
d iS 2	*Display 2*	Program display 2 value (up to 32 points)
Error	*Error*	Error, calibration not successful, check signal or programmed value
t tb	*Total time base*	Program total time base
t CF	*Total conversion factor*	Program total conversion factor
t rSt	*Total reset*	Program total reset mode: auto or manual
Gt tb	*Grand total time base*	Program grand total time base
Gt CF	*Grand total conversion factor*	Program grand total conversion factor
Gt rSt	*Grand total reset*	Program grand total reset mode: auto or manual
Auto	*Automatic*	Press Enter to set automatic total reset

Display	Parameter	Action/Setting Description
t dLY	*Time delay*	Program time delay for total auto reset
m An	*Manual*	Press Enter to reset total manually
dSPLAY	*Display*	Enter the *Display* menu
L inE 1	*Upper display*	Press Enter to assign the Upper display parameter (default: PV or rate)
L inE 2	*Lower display*	Press Enter to assign the lower display parameter (default: total)
d- intY	*Display intensity*	Set display intensity level from 1 to 8
Aout	*Analog output*	Enter the *Analog output* scaling menu
d iS 1	*Display 1*	Program display 1 value
Out 1	*Output 1*	Program output 1 value (e.g. 4.000 mA)
d iS 2	*Display 2*	Program display 2 value
Out 2	*Output 2*	Program output 2 value (e.g. 20.000 mA)
rESEt	*Reset*	Press Enter to access the *Reset* menu
rSt H i	*Reset high*	Press Enter to reset max display
rSt Lo	*Reset low*	Press Enter to reset min display
rSt HL	*Reset high & low*	Press Enter to reset max & min displays
rSt t	*Reset total*	Press Enter to reset total
rSt Gt	*Reset grand total*	Press Enter to reset grand total
ContrL	*Control*	Enter *Control* menu
Auto	*Automatic*	Press Enter to set meter for automatic operation
m An	*Manual*	Press Enter to manually control relays or analog output operation
PASS	*Password*	Enter the *Password* menu
PASS 1*	*Password 1**	Set or enter Password 1* (*1, 2, or 3)
totAL	*Total password*	Set or enter password for manual reset
GtotAL	*Grand total password*	Set or enter password for manual reset
nonrSt	*Non-resettable*	Non-resettable grand total set after entering "050873" for Gtotal password
unLoc	*Unlocked*	Program password to lock meter
Locd	*Locked*	Enter password to unlock meter
999999	*Flashing display*	Overrange condition

Main Menu

The main menu consists of the most commonly used functions: *Reset, Control, Setup*, and *Password*.

- Press Menu button to enter Programming Mode then press the Up arrow button to scroll through the main menu.
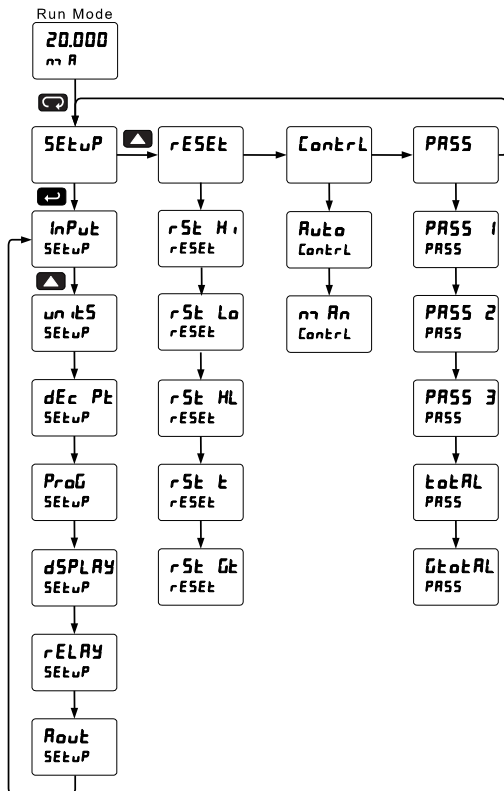
- Press Menu at any time to exit and return to Run Mode. Changes made to settings prior to pressing Enter are not saved.
- Changes to the settings are saved to memory only after pressing Enter.
- The display moves to the next menu every time a setting is accepted by pressing Enter.

Setting Numeric Values

The numeric values are set using the Right and Up arrow buttons. Press Right arrow to select next digit and Up arrow to increment digit value.

The digit being changed is displayed brighter than the rest.

Press and hold up arrow to auto-increment the display value.

Press the Enter button, at any time, to accept a setting or Menu button to exit without saving changes.
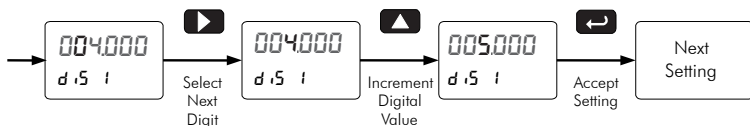
Setting up the Rate/Totalizer Meter (5EtuP)

The *Setup* menu is used to select:

1. Enable or disable totalizer features
2. Units for Rate, Total, and Grand Total
3. Decimal point position
4. Input Calibration
5. Display parameter and intensity
6. Relay (Alarm) operation
7. 4-20 mA analog output scaling

Press the Enter button to access any menu or press Up arrow button to scroll through choices. Press the Menu button to exit at any time.
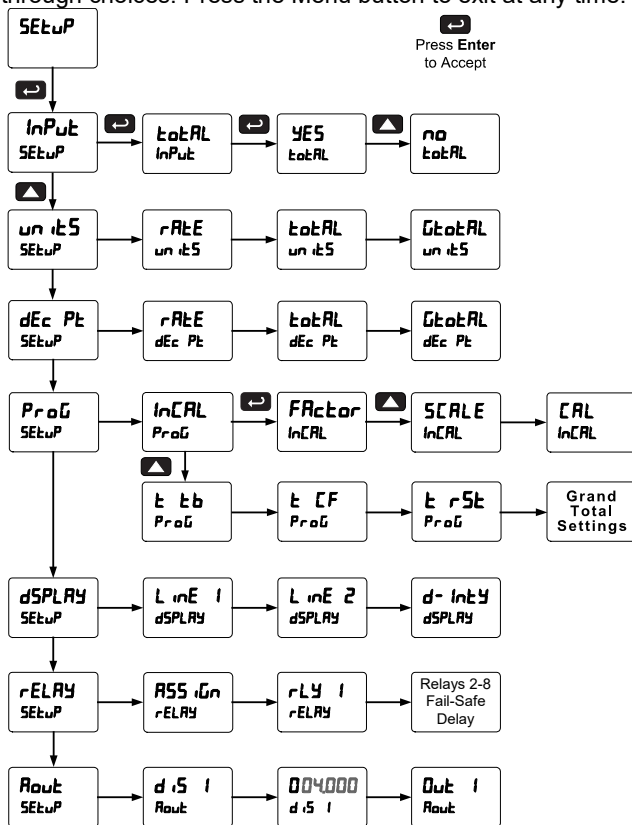
Setting the Input Signal (*InPut*)

There is a switch, located to the right of the input connector, which must be configured according to the input level and type. Jumper J4 located inside the meter, behind the input signal connector, is used to select the excitation voltage (24 V*, 10 V or 5 V) which is supplied to the P+ and P- wiring terminals.

*Default setting

Enter the Input menu to enable or disable the totalizer features.

Setting the Totalizer Features (*totAL*)

Enable or disable the totalizer features by selecting "*YES*" or "*no*" after the input type has been set up. If the totalizer features are disabled, most totalizer features and functions are hidden from the menus.

Note: The totalizer continues working in the background.

Setting the Input Units or Custom Tags (un it5)

Enter the input unit or custom tag that will be displayed if alternating rate, total, or grand total and units is selected in the un it5 menu, or d un it is selected as the lower display parameter. See the flow chart on page 38 to access the display menu to show the unit or tag on the lower display. The engineering units or custom legends can be set using the following 7-segment character set:

Display	Character		Display	Character
0	0		H	K
1	1		L	L
2	2		m	m
3	3		n	n
4	4		O	O
5	5		o	o
6	6		P	P
7	7		q	q
8	8		r	r
9	9		S	S
A	A		t	t
b	b		u	u
C	C		V	V
c	c		u w	w
d	d		H	X
E	E		Y	Y
F	F		Z	Z
G	G		-	-
g	g		/	/
H	H		]	]
h	h		[	[
I	I		=	=
i	i		!	Degree(<)
J	J			Space

Notes:

The letters "m" and "w" use two 7-segment LEDs each; when selected the characters to the right are shifted one position.

Press and hold up arrow to auto-scroll the characters in the display.

Setting the Decimal Point (*dEc Pt*)

The decimal point may be set with up to five decimal places or with no decimal point at all. The rate, total, and grand total decimal points are independent.

Pressing the right arrow moves the decimal point one place to the right until no decimal point is displayed, then it moves to the leftmost position.

Pressing the up arrow moves the decimal point to the left.

Programming the Rate/Totalizer (*ProG*)

It is **very important** that one reads the following information before programming the meter:

- The meter has been factory calibrated to read input frequency in Hz (pulses/sec). The calibration equipment is certified to NIST standards.

- Use the *K-Factor* menu to match the rate/totalizer with a flowmeter's k-factor (pulse/unit of measure).

- Or use the *Scale* menu to scale the pulse input (pulse/sec) without a signal source.

- Or use *Cal* menu to calibrate the rate/totalizer using a signal source.

The *Program* menu contains the following menus:

1. K-Factor calibration
2. Scale without a signal source
3. Calibrate with a calibrated signal source
4. Total time base & conversion factor
5. Grand total time base & conversion factor
6. Total reset mode for total & grand total

Note: The Scale, Calibrate, and K-Factor functions are exclusive of each other. The meter uses the last function programmed. Only one of these methods can be employed at a time. The Scale and Calibrate functions can use up to 32 points (default is 2). The number of points should be set in the Advanced Features menu under the Multi-Point Linearization (Linear) *menu selection prior to scaling and calibration of the meter, see page 46 for details.*

The pulse inputs may be calibrated or scaled to any display value within the range of the meter.

`ProG` →	`InCAL` `ProG` →	`t tb` `ProG`

Grand Total Settings ←	`t rSt` `ProG` ←	`t CF` `ProG`
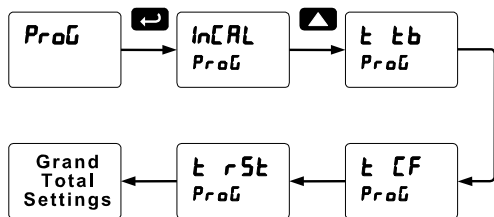
Additional parameters, not needed for most applications, are programmed in the *Advanced Features* menu; see *Advanced Features Menu*, page 43.

K-Factor Calibration (`FActor`)

The meter may be calibrated using the *K-Factor* function. Most flowmeter manufacturers provide this information with the device. Enter the *K-Factor* (Factor) menu and select the decimal point with highest resolution possible and program the k-factor value (*i.e.* pulses/gal). The meter will automatically calculate the flow rate using the k-factor and the time base selected.

`FActor` `ProG` →	`ddd.ddd` `FActor` →	`d.ddddd` `FActor` →	`1.89256` `FActor`

Multi-Point Calibration & Scaling

The meter is set up at the factory for 2-point linear calibration. The number of points for multi-point calibration/scaling is set up in the *Advanced Features* menu. Up to 32 linearization points may be selected. See page 46 for details.

Scaling the Meter (SCALE)

The pulse inputs can be scaled to display the process variable in engineering units.

A signal source is not needed to scale the meter; simply program the inputs and corresponding display values.
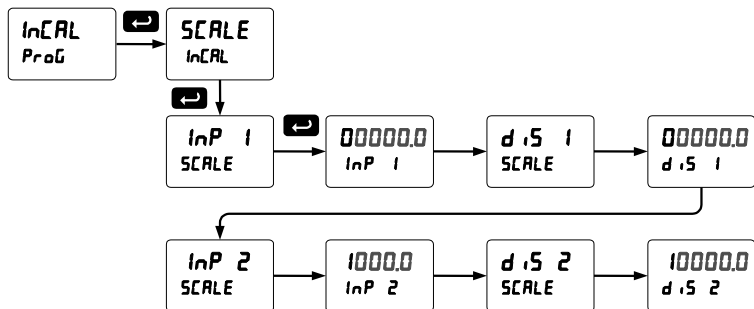
For instructions on how to program numeric values see *Setting Numeric Values*, page 26.

Error Message (*Error*)

An error message indicates that the calibration or scaling process was not successful. After the error message is displayed, the meter reverts to input 2 during calibration or scaling, allowing the appropriate input signal to be applied or programmed.

The error message might be caused by any of the following conditions:

1. Input signal is not connected to the proper terminals or it is connected backwards.
2. Minimum input span requirements not maintained.
3. Input 1 signal inadvertently applied to calibrate input 2.

Minimum Input Span

The minimum allowed input span is 1.0 Hz, which is the minimum difference between input 1 and input 2 signals required to complete the calibration or scaling of the meter.

Gate Function (*GAtE*)

The gate function is used for displaying slow pulse rates. Using the programmable gate, the meter is able to display pulse rates as slow as 1 pulse every 999.9 seconds (0.001 Hz). The gate function can also be used to obtain a steady display reading with a fluctuating input signal.

The gate function (*GAtE*) is the first option in the Advanced Features menu. There are two settings for the *GAtE*, low gate (*Lo G*) and high gate (*Hi G*).

Low Gate (*Lo G*)

For most applications, low gate setting should be left at 1.0 second. Increase low gate setting to obtain a steadier rate display. The rate display will update in accordance with the low gate setting, for example if low gate is set at 10.0, the display will update every 10 seconds; changes in rate between updates will not be reflected until next display update.

High Gate (*Hi G*)

Set the high gate value to correspond to the highest expected pulse period (lowest pulse rate). For instance if the meter must display a rate when there is 1 pulse coming into the meter every 10 seconds, set the high gate to 11.0 seconds. When the signal is removed from the meter, the display will show the last reading for 11 seconds; then it will read zero.

Gate Settings

Slow Pulse Rate		
Low Gate* (sec)	High Gate (sec)	Min Freq** (Hz)
1.0	2.0	0.5000
1.0	10.0	0.1000
1.0	20.0	0.0500
1.0	100.0	0.0100
1.0	200.0	0.0050
1.0	400.0	0.0025
1.0	800.0	0.0012
1.0	999.9	0.0010
*The low gate setting corresponds to the display update rate and is used to stabilize the display reading with a fluctuating signal.		
**The minimum frequency is dependent on high gate setting.		

Contact De-Bounce Filter (F ᵢLtEr)

The filter function (F ᵢLtEr) can be used for applications where the meter is set up to count pulses generated by switch contacts. The filter value can be set anywhere between 2 and 50, the higher the value, the greater the filtering.

The filter function (F ᵢLtEr) is the second option in the Advanced Features menu. There are two settings, H ᵢ SPd (high speed) and Lo SPd (low speed), press **ENTER** when Lo SPd is displayed to enable the filter function. Program the filter value, so that there are no extra counts when a contact closure is completed.

Filter Settings

Contact De-Bounce Filter		
Filter Setting	Speed Setting	Max Freq (Hz)
2	Lo SPd	999
4	Lo SPd	499
8	Lo SPd	249
16	Lo SPd	124
32	Lo SPd	62
40	Lo SPd	50
50	Lo SPd	40
N/A	Hi SPd	30,000

Time Base, Total Conversion Factor & Total Reset

The time base, total conversion factor, and total reset menus are located in the *Program* menu.

The total and grand total have their own independent settings. This means that one can be displaying the value in gallons while the other displays in million gallons, liters, m^3, etc.
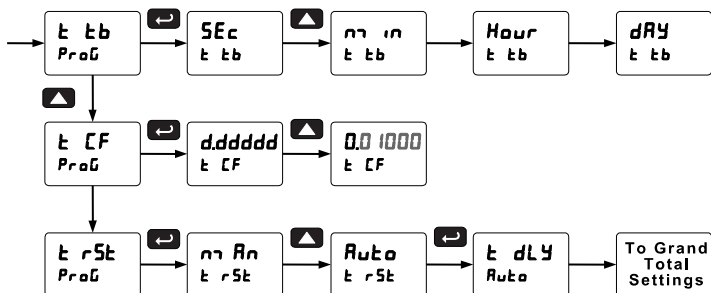
Time Base

The time base is the amount of time over which the rate parameter should accrue. For example, if the rate was ten and the time base was in minutes, then the total would increase by ten every one minute.

Total & Grand Total Conversion Factor

The total & grand total conversion factor is the amount by which the rate is multiplied before it is added to the total or grand total. For Example, if the rate was ten per second and the total conversion factor was 100, the total would increase by 1000 every second. This is useful, for instance, if you want to show rate in gallons and total in thousands of gallons.

Total & Grand Total Reset

The totals can be programmed for manual or automatic reset. In the automatic reset mode, a programmable time delay is available to reset the total or grand total after the assigned preset is reached.

Non-Resettable Totalizer

The total and grand total can be password-protected to prevent unauthorized resets. The grand total can be programmed as a non-resettable total, see page 41 for details.

Calibrating the Meter with External Source (CRL)

> To scale the meter without a signal
> source, refer to K-Factor Calibration
> (FRctor) on page 31 or Scaling the
> Meter (SCALE) on page 32

The meter can be calibrated to display the process variable in engineering units by applying the appropriate input signal and following the calibration procedure.

The use of a calibrated signal source is strongly recommended to calibrate the meter.
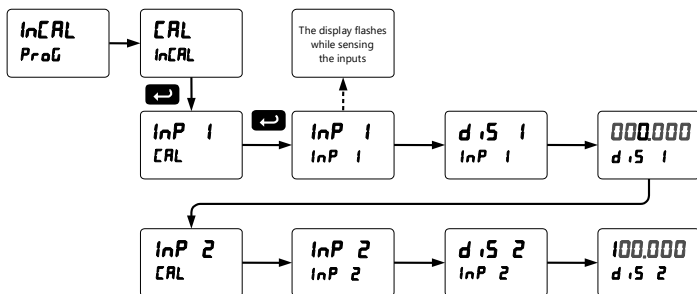
> *There is no need to warm up the meter before
> performing the calibration procedure.*

Setting the Display Parameter & Intensity (d5PLAY)

The upper display (L ᵢnE ᵢ) can be programmed to display:

1. Rate value
2. Total or grand total
3. Relay set points
4. Max & min values
5. Modbus input
6. Display rate and units
7. Rate and total
8. Rate and grand total
9. Total and units
10. Grand total and units

The lower display (L ᵢnE 2) can be programmed to display:

1. Rate value
2. Total or grand total
3. Relay set points
4. Max & min values
5. Engineering units or custom legends
6. Modbus input
7. Off (no display)
8. Display rate and units
9. Rate and total
10. Rate and grand total
11. Total and units
12. Grand total and units

Display Intensity: The meter has eight display intensity levels to give the best performance under various lighting conditions. Select intensity 8 for outdoor applications. The default display intensity setting is 8.

Display Setup Menu

dSPLAY SEtuP	**L inE 1** dSPLAY	**L inE 2** dSPLAY	**d- intY** dSPLAY

```
dSPLAY      L inE 1  ↑→   L inE 2  →→→→→→→→→→   d- intY
SEtuP   ↵   dSPLAY        dSPLAY                dSPLAY
            ↓                                   ↓
        d rAtE           d Gt-u    ←            Int 1
        L inE 1          L inE 2               d- intY
            ↓                ↓                   ↓
        d tot            d tot    d H i         Int 2
        L inE 1          L inE 2  L inE 2      d- intY
            ↓                ↓        ↓           ≈
        d Gtot           d Gtot   d Lo
        L inE 1          L inE 2  L inE 2
            ↓                ↓        ↓
d Gt-u  d r-t            d r-t    d HL           Int 8
L inE 1 L inE 1          L inE 2  L inE 2       d- intY
   ↓        ↓                ↓        ↓
d H i   d r-Gt           d r-Gt   n¬ buS
L inE 1 L inE 1          L inE 2  L inE 2
   ↓        ↓                ↓        ↓
d Lo    dSEt 1  Select   dSEt 1   d oFF
L inE 1 L inE 1 Set      L inE 2  L inE 2
   ↓            Points       ↓        ↓
d HL    d r-u   1-8      d r-u    d un it
L inE 1 L inE 1          L inE 2  L inE 2
   ↓        ↓                ↓        ↓
n¬ buS  dtot-u           dtot-u   d rAtE
L inE 1 L inE 1          L inE 2  L inE 2
```

After setting up the input and the display, press the Menu button to exit programming and skip the rest of the setup menu. Press the Menu button again and the Up arrow to reach the *Program* menu and complete the scaling or calibration of the meter.

Front Panel LEDs (rELAY)

The LEDs on the front panel provide status indication for the following:

| LED	Status
1	Alarm 1
2	Alarm 2
3	Alarm 3
4	Alarm 4

The meter is supplied with four alarm points that include front panel LEDs to indicate alarm conditions. This standard feature is particularly useful for alarm applications that require visual-only indication. The LEDs are controlled by the set and reset points programmed by the user. When the display reaches a set point for a high or low alarm, the corresponding alarm LED will turn on. When the display returns to the reset point the LED will go off. The front panel LEDs respond differently for latching and non-latching relays.

Scaling the 4-20 mA Analog Output (Aout)

The 4-20 mA analog output can be scaled to provide a 4-20 mA signal for any display range selected.

No equipment is needed to scale the analog output; simply program the display values to the corresponding mA output signal.

The *Analog Output* menu is used to program the 4-20 mA output based on display values.
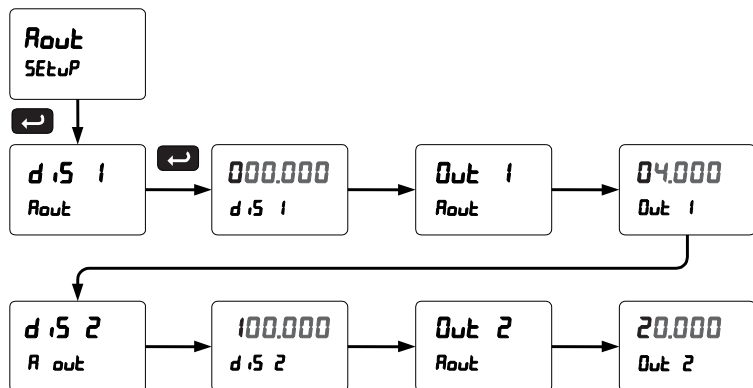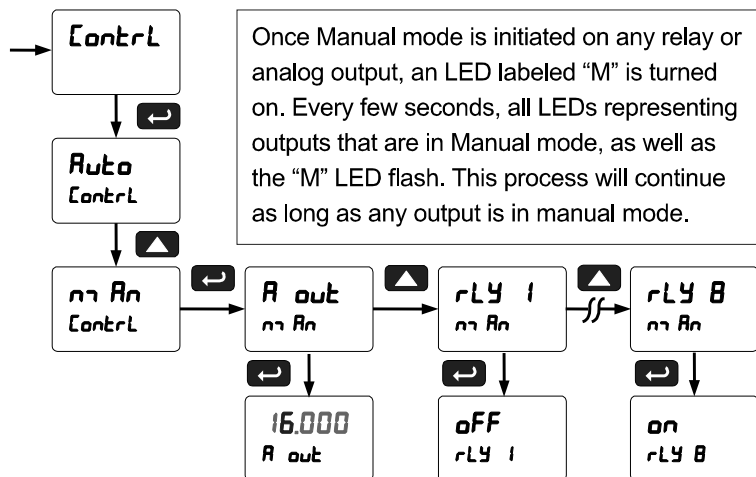

For instructions on how to program numeric values see *Setting Numeric Values*, page 26.

Reset Menu (rESEt)

The *Reset* menu is used to reset the totals, maximum or minimum reading (peak or valley) reached by the process; both may be reset at the same time by selecting "reset high & low" (rSt HL).

Control Menu (Contrl)

The *Control* menu is used to control the 4-20 mA analog output and the relays manually, ignoring the input. Each relay and analog output can be programmed independently for manual control. Selecting automatic control sets all relays and the analog output for automatic operation.

Once Manual mode is initiated on any relay or analog output, an LED labeled "M" is turned on. Every few seconds, all LEDs representing outputs that are in Manual mode, as well as the "M" LED flash. This process will continue as long as any output is in manual mode.

Setting up the Password (PASS)

The *Password* menu is used for programming three levels of security to prevent unauthorized changes to the programmed parameter settings and to program the non-resettable totalizer.

Pass 1: Allows use of function keys and digital inputs
Pass 2: Allows use of function keys, digital inputs and editing set/reset points
Pass 3: Restricts all programming, function keys, and digital inputs.
Total: Prevents resetting the total manually
Gtotal: Prevents resetting the grand total manually

Protecting or Locking the Meter

Enter the *Password* menu and program a six-digit password.

For instructions on how to program numeric values see *Setting Numeric Values*, page 26.

```
 ┌─────────┐      ┌─────────┐      ┌─────────┐      ┌─────────┐
 │ PASS 1  │ ⏎ →  │ 000000  │ ▲ →  │ 600000  │ ⏎ →  │ Locd    │
 │ PASS    │      │ PASS 1  │      │ PASS 1  │      │ PASS 1  │
 └─────────┘      └─────────┘      └─────────┘      └─────────┘
      │ ▲                                                │
 ┌─────────┐                                        ┌─────────┐
 │ PASS 2  │                                        │ Run Mode│
 │ PASS    │                                        └─────────┘
 └─────────┘
      │
 ┌─────────┐      ┌─────────┐      ┌─────────┐
 │ PASS 3  │  →   │ totAL   │  →   │ GtotAL  │
 │ PASS    │      │ PASS    │      │ PASS    │
 └─────────┘      └─────────┘      └─────────┘
```
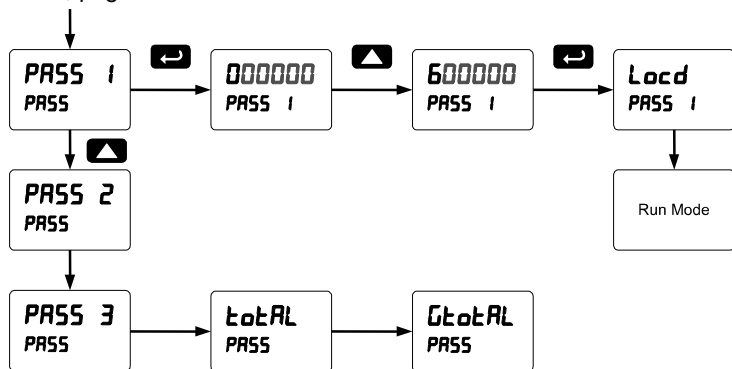
Record the password for future reference. If appropriate, it may be recorded in the space provided.

Model:	
Serial Number:	
Password 1:	__ __ __ __ __ __
Password 2:	__ __ __ __ __ __
Password 3:	__ __ __ __ __ __
Total	__ __ __ __ __ __
GTotal	__ __ __ __ __ __

Total Reset Password & Non-Resettable Total

The total and the grand total can be password-protected to prevent unauthorized total resets.

The grand total can be programmed as a non-resettable total by entering the password "050873".

⚠ **Caution!**	*Once the Grand Total has been programmed as "non-resettable" the feature **cannot** be disabled.*

Making Changes to a Password Protected Meter

If the meter is password protected, the meter will display the message *Locd* (*Locked*) when the Menu button is pressed. Press the Enter button while the message is being displayed and enter the correct password to gain access the menu. After exiting the programming mode, the meter returns to its password protected condition.

Disabling Password Protection

To disable the password protection, access the *Password* menu and enter the correct password twice, as shown below. The meter is now unprotected until a new password is entered.
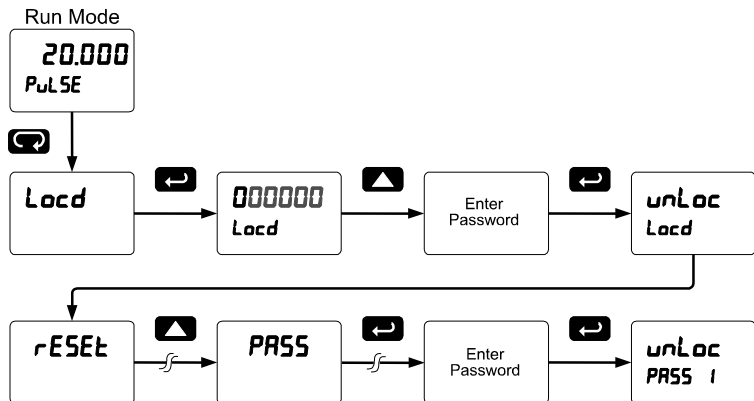
If the correct six-digit password is entered, the meter displays the message *unLoc* (unlocked) and the protection is disabled until a new password is programmed.

If the password entered is incorrect, the meter displays the message *Locd* (Locked) for about two seconds, and then it returns to Run Mode. To try again, press Enter while the *Locked* message is displayed.
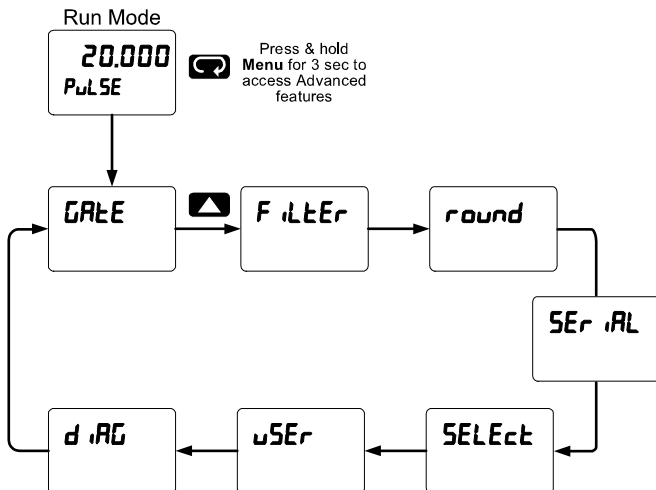

Did you forget the password?
The password may be disabled by entering a master password once. If you are authorized to make changes, enter the master password 508655 to unlock the meter.

Advanced Features Menu

To simplify the setup process, functions not needed for most applications are located in the *Advanced Features* menu.

Press and hold the Menu button for three seconds to access the Advanced Features of the meter.

Run Mode

20.000
PuLSE

Press & hold
Menu for 3 sec to
access Advanced
features

GAtE   FiLtEr   round

SEriAL

diAG   uSEr   SELEct

Advanced Features Menu & Display Messages

The following table shows the functions and messages of the *Advanced Features* menu in the order they appear in the menu.

Display	Parameter	Action/Setting
GATE	*Gate*	Enter Gate function menu
Lo G	*Low gate*	Program Low gate value
H i G	*High gate*	Program High gate value
F iLtEr	*Filter*	Enter the Filter menu
Lo SPd	*Low speed*	Set the contact de-bounce filter value
H i SPd	*High speed*	Select high speed filter
round	*Round*	Set the rounding value for display variables
SEr iAL	*Serial*	Set serial communication parameters
SLAUE id	*Slave ID*	Set slave ID or meter address
bAud	*Baud rate*	Select baud rate
tr dLY	*Transmit delay*	Set transmit delay for serial communication
PAr itY	*Parity*	Select parity Even, Odd, or None with 1 or 2 stop bits
t-bYt	*Time byte*	Set byte-to-byte timeout
SELEct	*Select*	Enter the Select menu (function, cutoff, out)
Functn	*Signal input conditioning*	Select linear only, other functions are not applicable to pulse input
L inEAr	*Linear*	Set meter for linear function and select number of linearization points
no PtS	*Number of points*	Set meter for 2 to 32-point linearization
CutoFF	*Cutoff*	Set low-flow cutoff
Count	*Count*	Set the totals to count up or down from a set value
tot C	*Total count*	Set the total to count up to or down from the programmed total value
Gtot C	*Grand total count*	Set the grand total to count up or down from from the programmed grand total value

44

| Display	Parameter	Action/Setting
RoutPr	*Analog output programming*	Program analog output parameters
SourcE	*Source*	Select source for the 4-20 mA output
O-rAnG	*Overrange*	Program mA output for display overrange
u-rAnG	*Underrange*	Program mA output for display underrange
n�7 AH	*Maximum*	Program maximum mA output allowed
n�7 in	*Minimum*	Program minimum mA output allowed
CAL ib	*Calibrate*	Calibrate 4-20 mA output (internal reference source used for scaling the output)
4 n�7 A	*4 mA output*	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
20 n�7 A	*20 mA output*	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
uSEr	*User I/O*	Assign function keys and digital I/O
F 1	*F1 function key*	Assign F1 function key
F2	*F2 function key*	Assign F2 function key
F3	*F3 function key*	Assign F3 function key
F4	*F4 function*	Assign F4 function (digital input)
d1 1	*Digital input 1*	*For factory use only
dO 1	*Digital output 1*	*For factory use only
d iAG	*Diagnostics*	Display parameter settings
LEd t	*LED test*	Test all LEDs
InFo	*Information*	Display software and S/N information
ErASE	*Erase*	Erase MeterView Pro software stored in meter's memory

Rounding Feature (round)

The rounding feature is used to give the user a steadier display with fluctuating signals. Rounding is used in addition to the filter function.

Rounding causes the display to round to the nearest value according to the rounding selected. This setting affects the last two digits, regardless of decimal point position.

Select Menu (SELEct)

The *Select* menu is used to select the signal input conditioner applied to the input (linear), low-flow cutoff, and analog output programming. The multi-point linearization is part of the linear function selection.
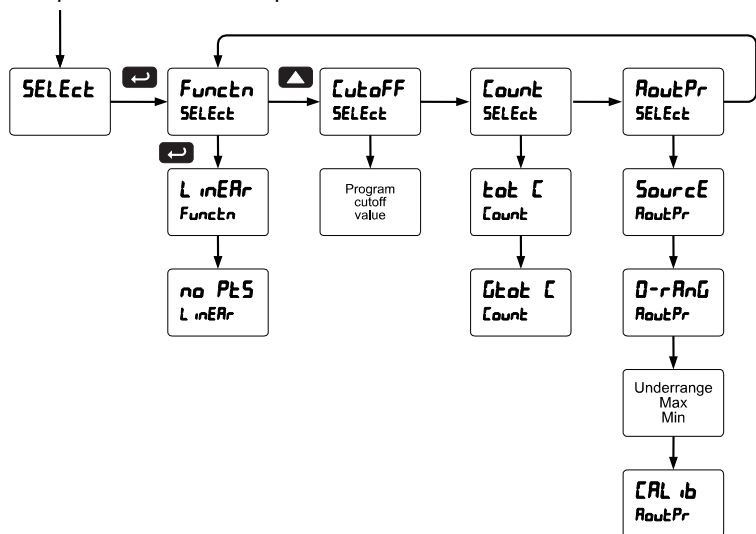

Signal Input Conditioning (Functn)

The *Function* menu is used to select the signal input conditioner applied to the input: linear, where the multi-point linearization is part of the linear function selection.

Meters are set up at the factory for linear function with 2-point linearization. The linear function provides a display that is linear with respect to the input signal.

Multi-Point Linearization (Linear)

Meters are set up at the factory for linear function with 2-point linearization. Up to 32 linearization points can be selected under the linear function. The multi-point linearization can be used to linearize the display for non-linear signals.
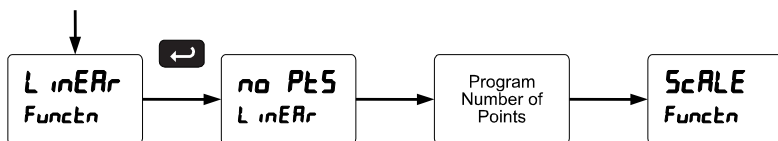
Low-Flow Cutoff (CutoFF)

The low-flow cutoff feature allows the meter to be programmed so that the often-unsteady output from a differential pressure transmitter, at low flow rates, always displays zero on the meter.

The cutoff value may be programmed from 0 to 999999. The meter will display zero below the cutoff value. Programming the cutoff value to zero disables the cutoff feature.

Analog Output Programming (RoutPr)

The *Analog Output Programming* menu is used to program the behavior of the 4-20 mA output. The following parameters and functions are programmed in this menu:

1. Source: Source for generating the 4-20 mA output (e.g. PV)
2. Overrange: Analog output value with display in overrange condition
3. Underrange: Analog output value with display in underrange condition
4. Max: Maximum analog output value allowed regardless of input
5. Min: Minimum analog output value allowed regardless of input
6. Calibrate: Calibrate the internal 4-20 mA source reference used to scale the 4-20 mA output

Analog Output Source

The source for generating the 4-20 mA output may be assigned to the rate/process variable, total, grand total, maximum or minimum value reached by the rate/process, one of the set points, or the Modbus PV input.
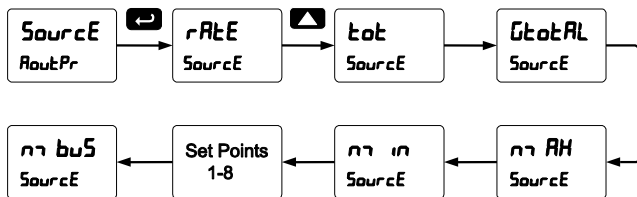

Analog Output Calibration

To perform the analog output calibration it's recommended to use a milliamp meter with a resolution of at least 0.1 µA to measure the output current. The values saved internally during this procedure are used for scaling the 4-20 mA output in the *Setup* menu.

Programmable Function Keys User Menu (uSEr)

The *User* menu allows the user to assign the front panel function keys F1, F2, F3, F4 (digital input) and up to eight digital inputs to access most of the menus or to activate functions immediately (e.g. Reset max & min). Up to eight digital outputs can be assigned to a number of actions and functions executed by the meter (e.g. Alarms, relay acknowledgement, etc.).
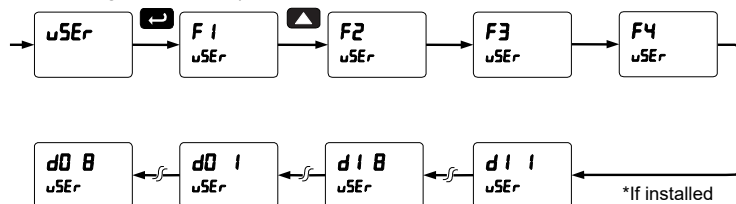
Function Keys & Digital I/O Available Settings

Display	Description	Display	Description
rSt HL	Reset max & min	rESEt	Reset menu
rELAY	Relay menu	rSt t	Reset total
SEt 1	Set point 1 - 8	rSt Gt	Reset grand total
rLY d	Disable relay	rSt Hi	Reset max
rLY E	Enable relay	rSt Lo	Reset min
O HoLd	Relays & output hold	dSPLAY	Display menu
d HoLd	Display hold	L inE 1	Upper display menu
Ln1 Hi	Max on Upper display	L inE 2	Lower display menu
Ln1 Lo	Min on Upper display	m Enu	Menu button
Ln1 HL	Max/min Upper display	r iGht	Right arrow button
Ln2 Hi	Max on Lower display	uP	Up arrow button
Ln2 Lo	Min on Lower display	EntEr	Enter button
Ln2 HL	Max/min Lower display	ALm 1	Alarm 1 – 8
Ln2 Gt	Lower display grand total	F on 1	Force on relay 1
ContrL	Control Menu	F on 2	Force on relay 2
d iSAbL	Disable function key	F on 3	Force on relay 3
AcH	Acknowledge relays	F on 4	Force on relay 4

METER OPERATION

The meter accepts pulses (e.g. ±40mV to ± 8V), square wave (0-5, 0-12V, or 0-24V), open collector NPN, PNP, TTL, or switch contact signals and displays these signals in engineering units from -99999 to 999999.

The dual-line display can be customized by the user to operate in such a way as to satisfy a specific application. Typically the upper display is used for the process variable; while the lower display is used for engineering units, custom legend, total, grand total, or set point indication.

The meter can be set up to display the pulse input on the upper display and the Modbus input on the lower display. The relays and analog output can be programmed to operate from the Modbus PV input.

Front Panel Buttons Operation

Button Symbol	Description
MENU	Press to enter or exit Programming Mode, view settings, or exit max/min readings
F1	Press to reset max/min readings or other parameter/function assigned through the *User* menu
F2	Press to display max/min readings or other parameter/function assigned through the *User* menu
F3	Press to acknowledge relays or other parameters/function assigned through the *User* menu

Function Keys Operation

During operation, the programmable function keys operate according to the way they have been programmed in the *Advanced Features – User* menu.

The table above shows the factory default settings for F1, F2, and F3.

F4 Operation

A digital input, F4, is standard on the meter. This digital input is programmed identically to function keys F1, F2, and F3. The input is triggered with a contact closure to COM, or with an active low signal. During operation, F4 operates according to the way is has been programmed in the *Advanced Features – User* menu.

Maximum/Minimum Readings

The max & min readings (peak & valley) reached by the process can be displayed either continuously or momentarily:

1. Display briefly by assigning to the F1-F3 function keys, F4 (digital input) or to the digital inputs in the *User* menu.
2. Display continuously by assigning either display to max/min through the *Display* menu.

Any of the F1-F3 function keys (buttons), F4 (digital input), and the digital inputs can be programmed to reset the max & min readings. The meters are set at the factory to display the max reading by pressing the Up arrow/F2 button and to use the Right arrow/F1 button to access the *Reset* menu.

To display max reading using function key with factory defaults:

1. Press Up arrow/F2 button to display maximum reading since the last reset/power-up.
2. To reset max/min press Right arrow/F1 button to access the Reset menu. The max & min displays are reset to actual values.
3. Press Menu to exit max/min display reading.

To display max/min readings continuously:

Assign either display to Max (d H ι), Min (d Lo), or toggle between Max and Min (d HL) every 10 seconds.
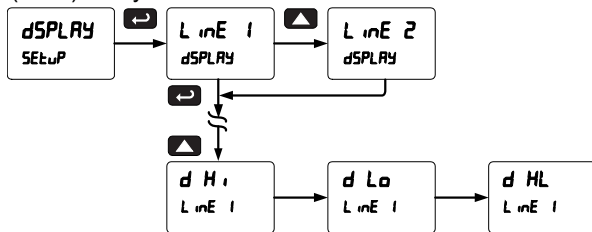
TROUBLESHOOTING

The rugged design and the user-friendly interface of the meter should make it unusual for the installer or operator to refer to this section of the manual. However, due to the many features and functions of the meter, it's possible that the setup of the meter does not agree with what an operator expects to see.

If the meter is not working as expected, refer to the *Diagnostics* menu and recommendations below.

Diagnostics Menu (d ıRɓ)

The *Diagnostics* menu is located in the *Advanced Features* menu, to access *Diagnostics* menu see *Advanced Features Menu*, page 43.

This menu allows the user to test the functionality of all the meter LEDs, check the meter's software and version information, and erase the MeterView Pro software installation files from the meter. Press the Enter button to view the settings and the Menu button to exit at any time.

For a description of the diagnostic messages, *see* Advanced Features Menu & Display Messages on page 44.

Determining Software Version

To determine the software version of a meter:
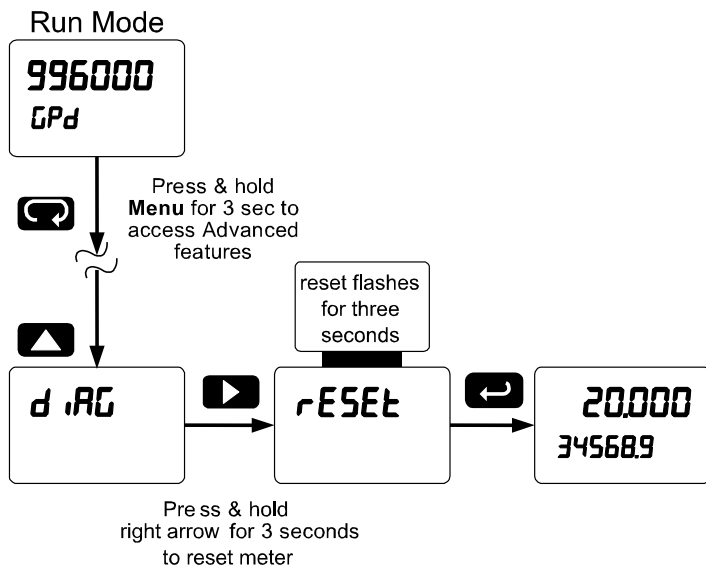
1. Go to the *Diagnostics* menu (d ıRɓ) and press Enter button.
2. Press Up arrow button and scroll to Information menu (ınFo).
3. Press Enter to access the software number (5Ft) and version (UEr) information. Write down the information as it is displayed. Continue pressing Enter until all the information is displayed.
4. The meter returns to Run Mode after displaying all the settings.

Reset Meter to Factory Defaults

When the parameters have been changed in a way that is difficult to determine what's happening, it might be better to start the setup process from the factory defaults.

Instructions to load factory defaults:

1. Enter the *Advanced Features* menu. See *Advanced Features Menu*, page 43.
2. Press Up arrow to go to *Diagnostics* menu
3. Press and hold Right arrow for three seconds, press Enter when display flashes ｒＥＳＥｔ.
    Note: If Enter is not pressed within three seconds, the display returns to the *Diagnostics* menu.
4. The meter goes through an initialization sequence (similar as on power-up), and loads the factory default settings.

Run Mode

996000
GPd

Press & hold
Menu for 3 sec to
access Advanced
features

reset flashes
for three
seconds

d iAG   rESEt   20.000
                                  34568.9

Press & hold
right arrow for 3 seconds
to reset meter

Factory Defaults & User Settings

The following table shows the factory setting for most of the programmable parameters on the meter. Next to the factory setting, the user may record the new setting for the particular application.

Model: _____   S/N: _____   Date: _____

Parameter	Display	Default Setting	User Setting
Input type	InPut	Pulse	
Total	YES	Total enabled	
Units	un itS	Rate / total / gr. total pulse / pulse / pulse	
Filter	F iLtEr	Hi Spd	
K-factor	FActor	1.000	
Function	Functn	Linear	
Number of points	no PtS	2	
Input 1	InP 1	00000.0	
Display 1	d iS 1	00000.0	
Input 2	InP 2	10000.0	
Display 2	d iS 2	10000.0	
Decimal point	dddddd	1 place	
Cutoff value	CutoFF	0.000 (disabled)	
Display assignment	dSPLAY		
Upper display	L inE 1	Rate/Process	
Lower display	L inE 2	Total value	
Display intensity	d- IntY	8	
Total time base	t tb	Second	
Total conversion factor	t CF	1.000	
Total reset	t rSt	Manual	
Grand total time base	Gt tb	Second	
Grand total conversion factor	Gt CF	1.000	
Grand total reset	Gt rSt	Manual	
Display 1 analog out	d iS 1	0.0	
Output 1 value	Out 1	4.000 mA	

Parameter	Display	Default Setting	User Setting
Display 2 analog out	d 5 2	1000.0	
Output 2 value	Out 2	20.000 mA	
Source analog output	SourcE	Rate/process	
Overrange output	O-rAnG	21.000 mA	
Underrange output	u-rAnG	3.000 mA	
Maximum output	m AH	23.000 mA	
Minimum output	m in	1.000 mA	
Slave ID (Address)	SLAUE id	247	
Baud rate	bAud	9600	
Transmit delay	tr dLY	50 ms	
Parity	PAr itY	Even	
Byte-to-byte timeout	t-bYt	010 (0.1 sec)	
F1 function key	F1	Reset max & min	
F2 function key	F2	Upper display: Max (Hi)	
F3 function key	F3	Acknowledge relays	
F4 function	F4	Acknowledge relays	
Digital input 1	d1 1	Menu	
Digital input 2	d1 2	Right arrow	
Digital input 3	d1 3	Up arrow	
Digital input 4	d1 4	Enter	
Digital output 1	dO 1	Alarm 1	
Digital output 2	dO 2	Alarm 2	
Digital output 3	dO 3	Alarm 3	
Digital output 4	dO 4	Alarm 4	
Password 1	PASS 1	000000 (unlocked)	
Password 2	PASS 2	000000 (unlocked)	
Password 3	PASS 3	000000 (unlocked)	
Total password	totAL	000000 (unlocked)	
Grand total password	GtotAL	000000 (unlocked)	

Troubleshooting Tips

Symptom	Check/Action
No display at all	Check power at power connector
Not able to change setup or programming, $Locd$ is displayed	Meter is password-protected, enter correct six-digit password to unlock
Meter displays error message during calibration ($Error$)	Check: 1. Signal connections 2. Minimum input span requirements

Meter displays
    999999
    -99999
	Check:
	1. Input selected in *Setup* menu
	2. Corresponding signal at Signal connector

Display is unstable	Check: 1. Input signal stability and value 2. Display scaling vs. input signal 3. Filter and gate values
Display response is too slow	Check filter and gate values
Display reading is not accurate	Check: Scaling or calibration
Display does not respond to input changes, reading a fixed number	Check: Display assignment, it might be displaying max, min, or set point.
Display alternates between 1. H and a number 2. Lo and a number	Press Menu to exit max/min display readings.
Flashing relay status LEDs	Relays in manual control mode or relay interlock switches opened.
Meter not communicating with application programs	Check: 1. Serial adapter and cable 2. Serial settings 3. Meter Slave ID and baud rate
If the display locks up or the meter does not respond at all	Cycle the power to reboot the microprocessor.
Other symptoms not described above	Call Technical Support for assistance.

Note: Certain sequences of events can cause unexpected results. To solve these issues, it is best to start fresh from factory defaults and map changes ahead of time, rather than at random.

Contact Max Machinery

For Technical Support

Call: (707) 433-2662

or go to: **www.maxmachinery.com**