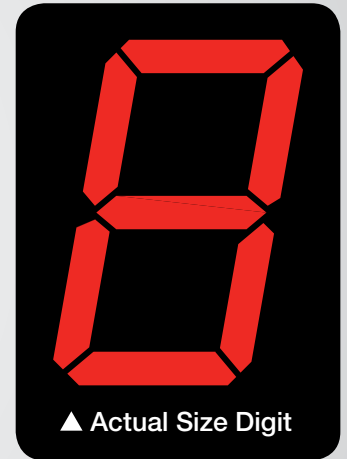# PD2-6080/PD2-6081
Helios Super Snooper Modbus® Scanners

PD2-6080

HELIOS

▲ Actual Size Digit

- Large 1.80" Digits
- Dual-Line 6-Digit Display
- Readable from up to 100 Feet (30 Meters) Away
- Superluminous Sunlight Readable Display
- NEMA 4X, IP65 Rated Field Mountable Enclosure
- Operating Temperature Range of -40 to 65°C (-40 to 150°F)
- Modbus® RTU Master, Slave, or Snooper Mode
- Poll and Display up to 16 Process Variables
- Addition, Difference, Average, Multiplication, Division, Min, Max, Weighted Average, Ratio, Concentration, & More
- Universal 85-265 VAC, or 12-24 VDC Input Power Models
- 2 or 4 Relays + Isolated 4-20 mA Output Options
- Onboard USB & RS-485 Serial Communication Options
- Program the Meter from a PC with onboard USB and ScanView
- UL & C-UL Approved

PRECISION DIGITAL CORPORATION

PRECISION DIGITAL ÷

www.predig.com

PD2-6080/PD2-6081 Helios Super Snooper Modbus® Scanners

NEMA 4X, IP65
Rated Enclosure

UV Resistant
Sunlight Readable Display

Extra-Large
1.8" Digits

User Configurable
Display Showing
Feet & Inches to
nearest 8th or 16th
of an inch

Dual-Line
6-Character
Display

User Configurable
Display (Showing
Custom Tag)

Alarm Status
Indicators

Connections and
Function Keys Easily
Accessible Behind
Front Panel Door.

▲ *PD2-6081 Feet & Inches Display Shown*

TAKE ADVANTAGE OF YOUR MODBUS ENABLED TRANSMITTERS

The Helios PD2-6080/81 Super Snooper Modbus Scanners are multi-purpose, easy-to-use scanners that can be programmed as Modbus RTU Masters, Slaves, or Snoopers. They are capable of scanning up to 16 process variables (PVs) from your exisiting multivariable transmitters, which make them ideal for multiple tank level monitoring and control. You can display multiple variables including level, interface level, density, temperature, and more. Plus, they combine two independently programmed analog inputs with powerful math functions. Various math functions that may be applied to the inputs and PVs include addition, difference, average, multiplication, division, ratio, and more.

KEY FEATURES

Modbus RTU Serial Communications

The Helios PD2-6080/81 can be programmed to be used as a Modbus RTU Master, Slave, or Snooper.

As a Master, the Helios PD2-6080/81 reads up to 16 slave devices, scales the data from each, and displays each on an alternating display.

In Snooper Mode, the PD2-6080/81 is able to to read any of the variables being polled by the master by listening to the bus traffic. It picks up specific register or registers being polled by a master device from a specific slave device and processes the data being read. No other device on the Modbus network needs to be reprogrammed for the Snooper Mode PD2-6080/81 to display data polled by the Modbus master.

As a Slave, the PD2-6080/81 is controlled by a master device. The data sent to it by the master is scaled, displayed, and used to operate the internal relays and 4-20 mA output.

Superluminous Sunlight Readable Display

The Helios' standard SunBright display features extraordinarily bright LEDs. It is perfect for applications where the meter is in direct sunlight or in applications where visibility may be impaired by smoke, fog, dust, or distance.

Precise, Accurate, and More Informative

The Helios' large 1.8" display provides a highly accurate and precise dual line, 6-digit view of the process measurement. Its 24-bit A/D is accurate to ±0.03% of calibrated span ±1 count.

Programmable Function Keys

The user can assign the function keys F1, F2, and F3, the digital input F4, and up to four additional digital inputs to access most of the menus or to activate functions immediately (e.g. reset max & min). F4 is a digital input on the signal input connector. Up to four digital outputs can be assigned to a number of actions and functions executed by the meter (e.g. Alarms, relay acknowledgement, etc.).
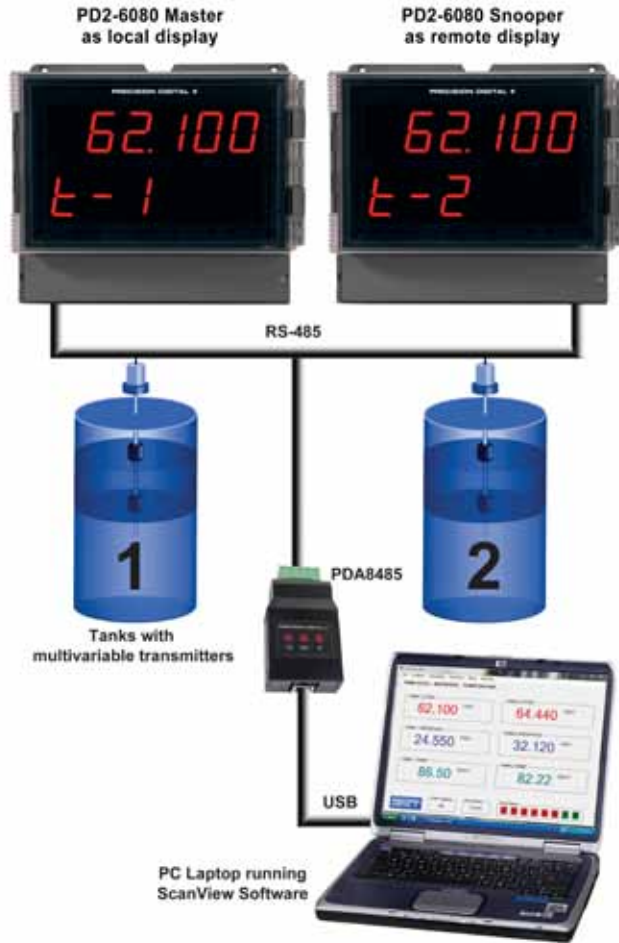
Custom Tag and Units for Each PV

Each process variable has an independently programmable tag and unit name. The tag must display on the line opposite the PV or alternate with the PV during scanning. The unit may be configured to display similarly. The tag and unit may be programmed as any six-digit alphanumeric value.

Automatic or Manual Scanning

The scanner may automatically or manually cycle through the PVs. The scanner can be programmed to display each PV for 1 to 99.9 seconds. The NEXT and PREV buttons can be used to manually scan to the next or previous PV display. The SCAN button will pause and resume automatic scanning.

PD2-6080/PD2-6081 Helios Super Snooper Modbus® Scanners

Typical Modbus Application Example

Alternating Tag and Units on the Bottom Display for Each PV

Displaying Two PVs

Customizable Displays

The Helios has two red LED displays, one Upper display and one Lower display both at 1.8" high. Each display is a full 6 digits (-99999 to 999999). The display assignment is programmable, allowing for various one line or two line PV configurations.

Modbus Application Capabilities

The PD6080 & PD6081 scanners can communicate with any Modbus device using the ever-popular Modbus communications protocol. Take advantage of the Modbus capabilities in the level and flow transmitters you already have by using Master Mode to read more data, more accurately. Possible applications include:

• Use Master Mode to scan the top level, interface level, and temperature from Modbus multivariable level transmitters.

• Use Master Mode to display the flow rate, tag, and units, for multiple Modbus-enabled flow meters.

• Use Snooper Mode to add a tank side indicator at eye-level for a Modbus level transmitter being polled by a master in the control room.

• Use Snooper Mode to add additional remote displays to a network with a Modbus scanner acting as the master, and display the data at all operator locations.

• Use Slave Mode to display data sent to the scanner by a Modbus master in the control room.

These are just a few capabilities of using the PD6080 & PD6081 Modbus Scanners in a Modbus process network.

Powerful Math Functions

The PD2-6080/81 uses up to 16 process variables in a variety of powerful math functions designed for process applications. Programmable Adder (P) and Factor (F) constants allow each formula to be customized as needed for a specific application. The Math Channels (C1-C4) may be displayed in many useful combinations. Most math functions may be applied to all PVs: for example, it is possible to add up to 16 PVs and calculate the total volume of all the tanks in a field. The Math2 function allows for further calculations on the results of other math channels (e.g. C4= C2/C1).

Name	Function	Setting
Addition	C1=(PV1+PV2+P)*F	Sum
Difference	C1=(PV1-PV2+P)*F	diF
Absolute Difference	C1=((Abs(PV1- PV2)+P)*F	diFAbS
Average	C1=(((PV1+PV2)/2)+P)*F	AUG
Multiplication	C1=((PV1*PV2)+P)*F	multi
Division	C1=((PV1/PV2)+P)*F	diUidE
Maximum PV	Maximum value of all selected PVs	Hi-PU
Minimum PV	Minimum value of all selected PVs	Lo-PU
Draw	C1=((PV1/PV2)-1)*F	drAw
Weighted Average	C1=((PV2-PV1)*F)+PV1	wi AUG
Ratio	C1=(PV1/PV2)*F	rAtio
Concentration	C1=(PV1/(PV1+PV2))*F	ConcEn
Resultant Math Channel	Math on all other math channels	mAth2
Addition	C3=(C1+C2+P)*F	Sum
Difference	C4=(C1-C2+P)*F	diF
Absolute Difference	C3=((Abs(C1- C2)+P)*F	diFAbS
Average	C4=(((C1+C2)/2)+P)*F	AUG
Multiplication	C3=((C1*C2)+P)*F	multi
Division	C4=((C1/C2)+P)*F	diUidE

Note: The F constant can be any value from 0.00001 to 999999. If the value is less than 1, it will have the same effect as a divider. For example, the average could also be derived by using (A+B)*F, where F = 0.500.

Three Tier Password Protection

The Helios PD2-6080/81 offers 3 levels of password protection:
- Level 1 protection allows the operator use of only the 3 pre-configured function keys without a password.
- Level 2 protection allows the operator use of only the function keys and the ability to change set points without a password.
- Level 3 protection restricts the operator from using the function keys and all meter configuration menus without a password.

Advanced Linearization Capability

The Helios PD2-6080/81 includes a 32-point linearizer for PV1 & PV2 (all other PVs utilize two-point linearization). In non-linear level applications (i.e. some pumping or lift stations), it can easily compensate for submerged equipment or plumbing that displace usable volume. In addition to the 32-point linearization, the Helios can perform a square root or programmable exponent function on one or both analog inputs, Modbus inputs, any or all enabled PVs, or automatically calculate level in round horizontal tanks by inputting the length and height of the tank. Each input's linearization is performed independently prior to the input value being used in any math function.

On-Board Digital Input

The PD2-6080/81 includes a digital input as a standard feature. This digital input can operate with the interlock relays feature, force relays on from a signal from a PLC or relay on other equipment, acknowledge alarms, and much more. This is ideal for installations where the meter is inaccessible behind a cover, or where an additional function key is needed for customized operation.
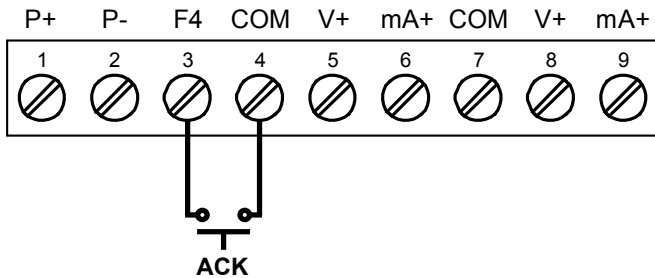
Dual Analog Input Scanning

The PD2-6080/81 has two process input channels (A & B) capable of accepting current (0-20, 4-20 mA) and voltage (±10, 0-5, 1-5, 0-10 VDC). Each input is programmed separately, with independent input type selection and scaling. These inputs may be displayed individually as part of the customizable dual-line display, or used with a wide range of math functions. Each input has a custom unit or tag that may be displayed. A 24 V transmitter power supply is standard and may be used to power the inputs.

Each analog input enabled counts toward the available 16 PVs that may be scanned. The scanner could be configured to scan a maximum of 14 Modbus PVs, 4 math channels, and both analog inputs.
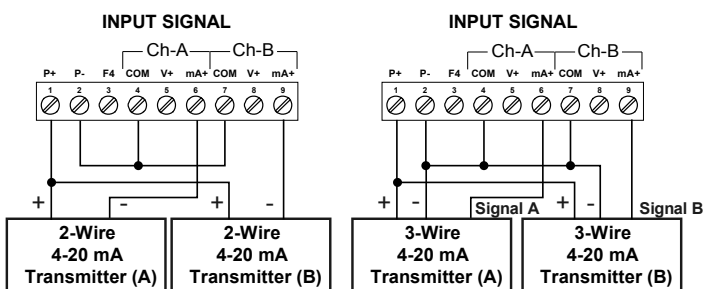
DIGITAL COMMUNICATIONS

Free USB Programming Software (ScanView)

The Helios comes with free programming software that connects to your PC with a standard USB cable that is provided with each instrument. A new and very useful feature of this software is that it is resident on the Helios meter and installed directly into your PC. This eliminates the need to install drivers or download software from the internet. Just connect the Helios to your PC (the Helios even gets its power from the PC so you don't have to provide external power!) and within minutes you will be programming it with the free software.

ScanView Software
### For Helios Modbus Scanners

FEATURES
- Use in Modbus master, slave, or snooper mode
- Scan up to 16 Modbus process variables
- Monitor critical process information
- Manage relays and analog outputs
- Independent scaling, tag, and unit for each PV
- Data log all PVs to a PC

MOUNTING OPTIONS

Pipe Mounting Kit

The meter can also be mounted to a pipe using the optional pipe mounting kit (PDA6260). This kit includes two mounting plates, two U-bolts, and the necessary nuts and bolts. *See PD2-6080/81 manual for instructions.*

Vertical Pipe Mounting

Horizontal Pipe Mounting
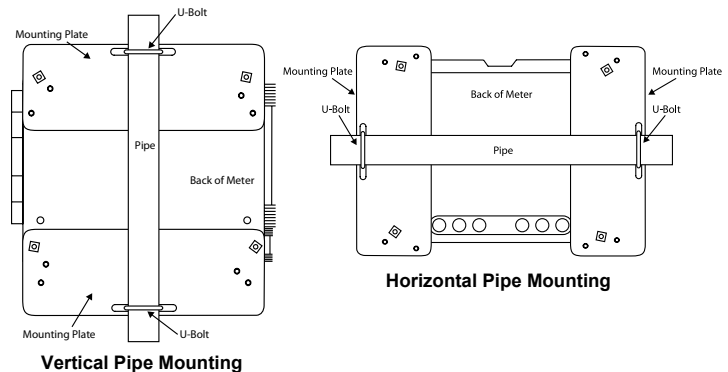
Wall Mounting

The meter can be mounted to any wall using the four provided mounting holes. Note that the bottom mounting holes are located behind the front door panel. *See PD2-6080/81 manual for instructions.*

OUTPUTS

Each output of the PD2-6080/81 may be assigned to any single analog input, Modbus PV, or math PV. The output will reflect the state of that assigned variable at all times during scanning.

Relay Outputs

The Helios has up to four 3 A Form C relays (SPDT) with multiple power loss fail-safe options. Relays can be configured for proper protective action upon input loop break. Relay ON and OFF delay times are user adjustable. Up to four front panel indicators show alarm and/or relay state. All relays can be configured for 0-100% deadband.

Relay Operation/Configuration

There are powerful relay functions that can be configured in the Helios PD2-6080/81, including:

- Automatic reset only (non-latching)
- Automatic + manual reset at any time (non-latching)
- Latching (manual reset only)
- Latching with clear (manual reset only after alarm condition has cleared)
- Pump alternation control (automatic reset only)
- Sampling (activated for a user-specified time)
- User selectable fail-safe operation
- Relay action for loss (break) of 4-20 mA input signal
- Time delay (on and off), independent for each relay
- Manual control mode
- Interlock relay mode

Analog Output

The isolated analog retransmission signal scales for any 4 mA and 20 mA display value. While the output is nominally 4-20 mA, the signal will accurately accommodate under- and over-ranges from 1 to 23 mA.

Manual Output Control

Take control of any output with this feature. All relays can be forced ON or OFF, and the 4-20 mA output signal can be set to any value within its range. When the relays and 4-20 mA output are controlled manually, an LED labeled "M" is turned on and the associated Alarm LEDs (1-4) flash every 10 seconds indicating that the meter is in manual control mode.

Isolated Transmitter Power Supply

A powerful 24 V @ 200 mA power supply is a standard feature on the Helios PD2-6080/81. It can be configured for 5, 10, or 24 V (default) by means of a simple internal jumper (see manual). An additional power supply (24 V @ 40 mA) is standard with the 4-20 mA output option.

Sampling Function (PV Triggered Timed Relay)

The sampling function allows the operator to set a set point for a "sampling" relay. When the PV reaches that set point, it will close that relay's contacts for a preset period of time (0.1 to 5999.9 seconds). An example of its use may be for beer/ale fermentation. When the batch reaches a certain pH, the relay contacts would close and alert someone or automatically take a sample of the batch. This function can be used whenever a timed relay output closure is required when the PV reaches a certain set point.

Interlock Relay(s)

This function allows a process to use one or more very low voltage input signals or simple switch contacts to control the state of one or more internal "interlock" relays. A violation (i.e. loss of input, open switch, or open circuit) forces one or more N/O interlock relay contacts to open. One input can be used in series with a number of interlock switches, or up to four inputs can be required to force-on one (or more) internal interlock relays. Please see *Safety Interlock on the ProVu Series* whitepaper on our website for more information. Requires use of on-board digital I/O.
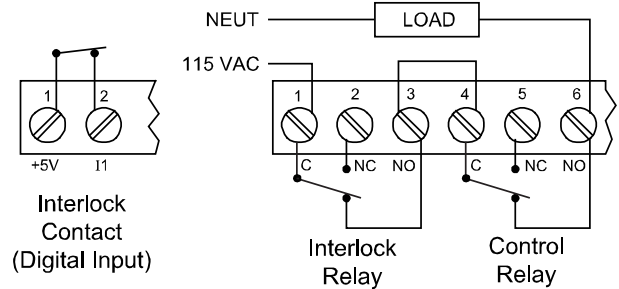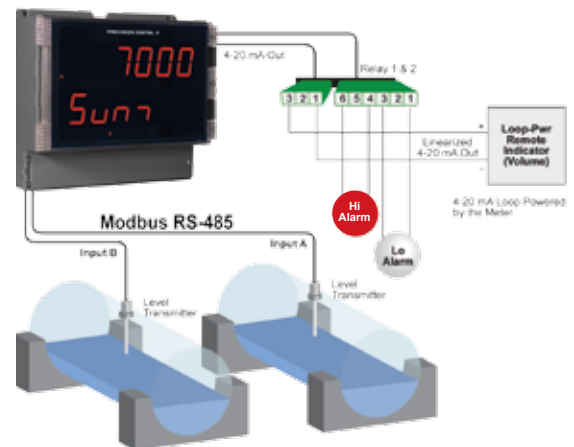

SIGNAL INPUT CONDITIONING

Non-linear input signals (i.e. weirs & flumes, differential pressure, etc.) can be linearized with the Helios's simple to use built-in signal input conditioning, such as: square-root extractor, exponential linearizer, round horizontal tank linearizer, or the Helios' powerful general purpose 32-point linearizer (32 point for PV1 & PV2 only - all other PVs use two linearization points).

Weir Flow Calculated Using Exponential Signal Input Conditioning

Round Horizontal Tank Signal Input Conditioning

SPECIFICATIONS

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

General

Input/Output: Modbus RTU over RS-485, Two analog inputs (4-20 mA, ±10 V)
Display: Two lines with 1.8" (46 mm) high digits, red LEDs; 6 digits per line (-99999 to 999999), with lead zero blanking
Display Intensity: Eight user selectable intensity levels
Display Update Rate: 5/second (200 ms) seconds. Slave: Dependent on master device (e.g. PLC)
Overrange: Display flashes 999999
Underrange: Display flashes -99999
Programming Methods: Four programming buttons, digital inputs, PC and MeterView Pro software, or Modbus registers.
Max/Min Display: Max/min readings reached by the process are stored until reset by the user or until power to the meter is turned off.
Password: Three programmable passwords restrict modification of programmed settings.
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.
Power Options: 85-265 VAC 50/60 Hz, 90-265 VDC, 20 W max or 12-24 VDC ± 10%, 15 W max. Powered over USB for configuration only.
Isolated Transmitter Power Supply: Terminals P+ & P-: 24 VDC ± 10%. 12-24 VDC powered models selectable for 24, 10, or 5 VDC supply (internal P+/P- switch).
85-265 VAC models rated @ 200 mA max, 12-24 VDC powered models rated @ 100 mA max, @ 50 mA max for 5 or 10 VDC supply.
Non-Volatile Memory: All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
Fuse: Required external fuse: UL Recognized, 5 A max, slow blow; up to 6 meters may share one 5 A fuse.
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 and integrated screw terminal blocks accept 12 to 22 AWG wire.
Enclosure: UL Type 4X, IP65 rated. Polycarbonate & glass blended plastic case, color: gray. Includes four PG11 through-hole conduit openings, with two factory installed PG11, IP68, black nylon threaded hole plugs with backing nuts.
Wall Mounting: Four (4) mounting holes provided for screwing meter into wall. *See PD2-6080/81 manual for instructions.*
Pipe Mounting: Optional pipe mounting kit (PDA6260) allows for pipe mounting. Sold separately. *See PD2-6080/81 manual for instructions.*
Tightening Torque: *Removable Screw Terminals:* 5 lb-in (0.56 Nm)
Digital I/O and RS485 Terminals: 2.2 lb-in (0.25 Nm)
Overall Dimensions: 10.63" x 12.59" x 4.77" (270 mm x 319.7 mm x 121.2 mm) (W x H x D)
Weight: 6.10 lbs (2.76 kg)
UL File Number: UL & C-UL Listed. E160849; 508 Industrial Control Equipment.
Warranty: 3 years parts & labor
USB Connection: Compatibility: USB 2.0 Standard, Compliant
Connector Type: Micro-B receptacle
Cable: USB A Male to Micro-B Cable
Driver: Windows 98/SE, ME, 2000, Server 2003/2008, XP 32/64-Bit, Vista 32/64-Bit, Windows 7 32/64-Bit, Windows 10 32/64-Bit
Power: USB Port

Operating Modes

Master: Processes data read from Modbus RTU slave devices. It polls up to 16 process variables from 1 to 16 slave devices. The Master is capable of scanning the selected PVs, scaling the data, triggering relays, performing math operations, and driving the analog outputs.
Snooper: Listens to the Modbus traffic and picks up a specific register or registers being polled by a master device from a specific slave device and processes the data being read. The Snooper mode handles the data the same way as the Master.
Slave: Processes data sent to it from a Modbus RTU master device.
Note: The relays and the 4-20 mA outputs are functional in all modes.

Master & Snooper Settings

PV Number: PV1–PV16 Enable or disable the process variables to be polled by the Master.
Slave Id: Assign the slave ID or address (1-247, 256-259 for mA or volts inputs) containing the process variables to be displayed by the selected PV.
Function Code: Select which Modbus function code (03, 04, or 65) to use in reading the slave device.
Register Number: 5 digit: 30001-39999, 40001-49999, or 1-65, 536; 6 digit: 300001-365536 or 400001-465536 (Function Code 65 N/A here) Specifies which register(s) to read in the slave device. Range is dependent on Function Code selection (65, 04, or 03) and digits selection (5 or 6).
Data Type: Select the data format that the slave device uses. Select between Short integer (2 byte), Long integer (4 byte), or floating point (4 byte), Signed or Unsigned (integer only) and byte order: 1234, 4321, 2143, or 3412 (big-endian vs. little-endian, or swapped).
Poll Time: 1.0 to 99.9 sec. Time between read-commands (Master mode).
Slave Response Timeout: *0.0 to 99.9 seconds:* Time allowed for the slave to respond before the scanner generates a communication break condition. The master polls the slave 3 times before starting the response timeout timer.
Slave/Snooper mode: Time the scanner will wait for new data before going into break condition.
Slave mode: Programming 0 disables the timeout; the last value received will be displayed indefinitely.
Communication Break: Displays "brERH" after the Master has polled the slave device 3 times and the response timeout has elapsed. The Snooper and Slave modes go into break condition after no new data is received within the response timeout window. Relays can be programmed to go on, off, or ignore the break condition. The analog outputs can be setup to generate a fixed mA current when a break condition is detected.

PV Settings

Tag & Units: 6-character, independent tag and units for each PV and math channel
PV Format: PD6080 default: Decimal format; PD6081 default: FT & IN, 1/8th or 1/16th; decimal format may be selected for display line 2 indication.
Display Decimal Point:
Up to five decimal places or none: *d.ddddd*, *dd.dddd*, *ddd.ddd*, *dddd.dd*, *ddddd.d*, or *dddddd*
Float Decimal Point:
Select the number of decimals to use for the floating point data expected from the slave or master device (this is independent from the display decimal point selection).
PV & Math Scaling: All PVs and math channels may be scaled to represent the input data in any engineering unit. *Example:* Level transmitter = 999.999 inches; to display in Ft-In-1/16th scale input 2 to display 83 Ft – 4 In – 0/16th.

Display Settings

Scan Mode: *Automatic:* 1.0 to 99.9 sec, *Manual:* Front panel or digital inputs, *Go on alarm:* Continues scanning after an alarm is detected, *Stop on alarm:* Goes to the alarmed PV and stops scanning; press Scan to resume scanning.
Display Scan Rate: *Master/Snooper:* 1 PV/second to 1 PV every 99.9 seconds, *Slave:* Dependent on master device (e.g. PLC)
Note: The display scan rate is independent of the poll time.
Display Assignment: Display line 1 may be assigned to PV (process values), Ch C (math channel), PV & units, tag & PV, tag-PV-units, C & units, tag-C-unit, Set point 1 8, max/min PV, max/min C.
Display line 2 may be assigned to all of the above, tag, tag & units, or off.
The tag and units are displayed alternately for 2 sec max, when selected.
Different tags & PVs may be selected to display on line 1 and line 2 at the same time.

Isolated 4-20 mA Transmitter Output

Output Source: Process Variable 1-16, math channels C1-C4, set points 1-4, or manual control mode
Scaling Range: 1.000 to 23.000 mA for any display range
Calibration: Factory calibrated: 4.000 to 20.000 = 4-20 mA output
Analog Output Programming: 23.000 mA maximum for all parameters: Overrange, underrange, max, min, and break
Communications Break: Programmable mA output when a slave device does not reply within the response timeout
Accuracy: ± 0.1% of span ± 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
Isolated Transmitter Power Supply: Terminals I+ & R: 24 VDC ± 10%. Isolated from the input at >500 V. May be used to power the 4-20 mA output or other devices. 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

Dual Process Input

Two Inputs: Two analog inputs, each separately field selectable:
0-20 mA, 4-20 mA; ±10 V (0-5, 1-5, 0-10 V)
PV Analog Channel ID: *Ch-A mA:* Assign PV to ID 256 or Ch-A volt: 257; *Ch-B mA:* Assign PV to ID 258 or Ch-B volt: 259
Accuracy: ±0.03% of calibrated span ±1 count, square root & programmable exponent accuracy range: 10-100% of calibrated span
Temperature Drift: 0.005% of calibrated span/±C max from 0 to 65°C ambient, 0.01% of calibrated span/°C max from -40 to 0°C ambient
Signal Input Conditioning: Linear, square root, programmable exponent, or round horizontal tank volume calculation
Multi-Point Linearization: 2 to 32 points for PV1 and PV2
Programmable Exponent: 1.0001 to 2.9999
Low-Flow Cutoff: 0-999999 (0 disables cutoff function) for PV1 and PV2
Calibration Range:

Input Range	Minimum Span Input 1 & Input 2
10 Ω	700 Ω
100 Ω	1200 Ω

An error message will appear if the input 1 & input 2 signals are too close together.

Input Impedence: *Voltage ranges:* greater than 500 kΩ
Current ranges: 50 - 100 Ω (depending on resettable fuse impedance)
Input Overload: Current input protected by resettable fuse, 30 VDC max. Fuse resets automatically after fault is removed.

Serial Communications

Compatibility: EIA-485
Connectors: Removable screw terminal connector
Max Distance: 3,937′ (1,200 m) max
Status Indication: Separate LEDs for Power (P), Transmit (TX), and Receive (RX)
Scanner Id: 1 – 247 (Scanner Modbus address)
Baud Rate: 300 – 19,200 bps
Transmit Time Delay: Programmable 0 to 4999 ms
This is the time the scanner will wait for a slave to respond before sending another request on the bus. This value should be greater than 100 ms to avoid collisions on the bus.
Data: 8 bits (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® Scanner Modbus Register Tables located at
www.predig.com.

Math Functions

Name	Math Operation (Examples) (P = Adder, F = Factor)	Setting
Addition	(PV1+PV2+P)*F	5um
Difference	(PV1-PV2+P)*F	d iF
Absolute Difference	((Abs(PV1- PV2)+P)*F	d iFRb5
Average	(((PV1+PV2)/2)+P)*F	RUG
Multiplication	((PV1*PV2)+P)*F	muLt i
Division	((PV1/PV2)+P)*F	d iU idE
Maximum PV	Maximum value of all selected PVs	H i-PU
Minimum PV	Minimum value of all selected PVs	Lo-PU
Draw	((PV1/PV2)-1)*F	drRuJ
Weighted Average	((PV2-PV1)*F)+PV1	uJ RUG
Ratio	(PV1/PV2)*F	rRt io
Concentration	(PV1/(PV1+PV2))*F	ConcEn
Math 2	Math on all other math channels	mRth2

Relays

Rating: 4 SPDT (Form C) internal rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP (≈ 50 W) @ 125/250 VAC for inductive loads
Noise Suppression: Noise suppression is recommended for each relay contact switching inductive loads. *See PD2-6080/81 manual for details.*
Electrical Noise Suppression: A suppressor (snubber) should be connected to each relay contact switching inductive loads to prevent disruption to the microprocessor's operation. Recommended suppressor value: 0.01 µF/470 Ω, 250 VAC (PDX6901).
Deadband: 0-100% of span, user programmable
High or Low Alarm: User may program any alarm for high or low trip point. Unused alarm LEDs and relays may be disabled (turned off).
Relay Operation: Automatic (non-latching) and/or manual reset
Latching (requires manual acknowledge) with/without clear
Pump alternation control (2 to 4 relays)
Sampling (based on time)
Off (disable unused relays and enable Interlock feature)
Manual on/off control mode
Relay Reset: User selectable buttons, digital inputs, or PC.
1. Automatic reset only (non-latching), when input passes the reset point.
2. Automatic + manual reset at any time (non-latching).
3. Manual reset only, at any time (latching).
4. Manual reset only after alarm condition has cleared (latching).
Note: Button behind front panel or digital input may be assigned to acknowledge relays programmed for manual reset.
Time Delay: 0 to 999.9 seconds, on & off relay time delays; Programmable and independent for each relay.
Fail-Safe Operation: Programmable and independent for each relay.
Note: Relay coil is energized in non-alarm condition. In case of power failure, relay will go to alarm state.
Auto Initialization: When power is applied to the meter, relays will reflect the state of the input to the meter.

Digital Input & Output Terminal

Channels: 4 digital inputs & 4 digital outputs
Digital Input Logic High: 3 to 5 VDC
Digital Input Logic Low: 0 to 1.25 VDC
Digital Output Logic High: 3.1 to 3.3 VDC
Digital Output Logic Low: 0 to 0.4 VDC
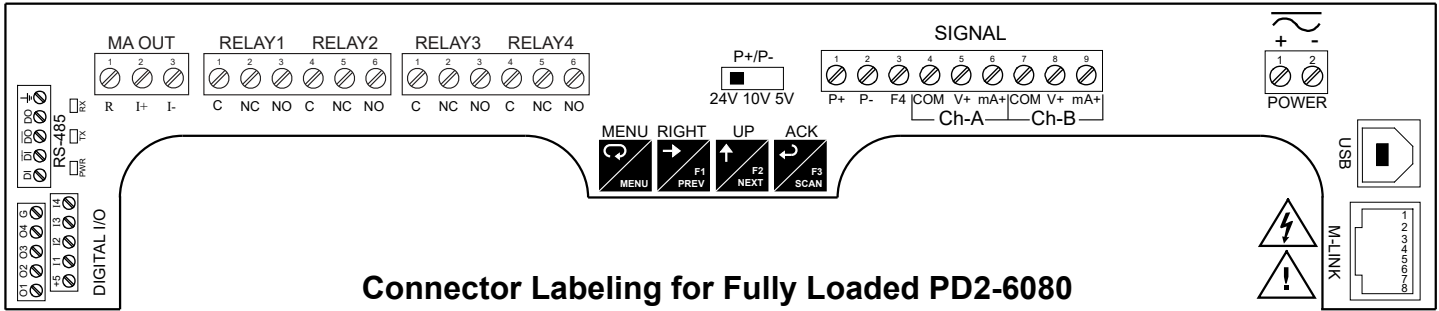**Source Current:** 10 mA maximum output current
Sink Current: 1.5 mA minimum input current
+5 V Terminal: To be used as pull-up for digital inputs only. Connect normally open pushbuttons across +5 V & DI 1-4.
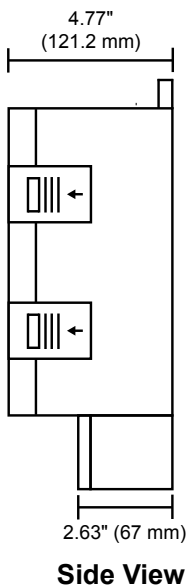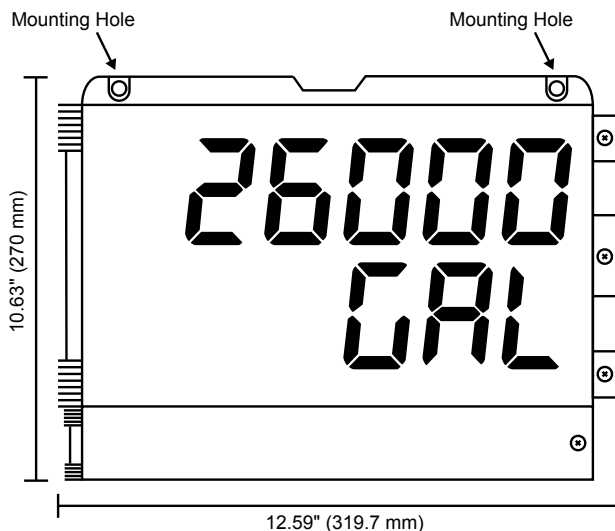***WARNING! DO NOT use +5 V terminal to power external devices.***

CONNECTIONS

Connector Labeling for Fully Loaded PD2-6080

DIMENSIONS

10.63" (270 mm)

12.59" (319.7 mm)

Front View

4.77" (121.2 mm)

2.63" (67 mm)

Side View

ORDERING INFORMATION

Helios PD2-6080 Decimal Modbus Scanner Models		
85-265 VAC Model	**12-24 VDC Model**	**Options Installed**
PD2-6080-6H0	PD2-6080-7H0	No Options
PD2-6080-6H7	PD2-6080-7H7	4 Relays & 4-20 mA Output
Note: 24 V Transmitter power supply standard on all models.		

Helios PD2-6081 Feet & Inches Modbus Scanner Models		
85-265 VAC Model	**12-24 VDC Model**	**Options Installed**
PD2-6081-6H0	PD2-6081-7H0	No Options
PD2-6081-6H7	PD2-6081-7H7	4 Relays & 4-20 mA Output
Note: 24 V Transmitter power supply standard on all models.		

Accessories	
Model	**Description**
PDA6260	Pipe Mounting Kit
PDA7485-I	RS-232 to RS-422/485 Isolated Converter
PDA7485-N	RS-232 to RS-422/485 Non-Isolated Converter
PDA8485-I	USB to RS-422/485 Isolated Converter
PDA8485-N	USB to RS-422/485 Non-Isolated Converter
PDAPLUG2	Plastic Conduit Plug
PDX6901	Suppressor (snubber): 0.01 µF/470 Ω, 250 VAC

Your Local Distributor is:

LDS2-6080_C   08/18

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