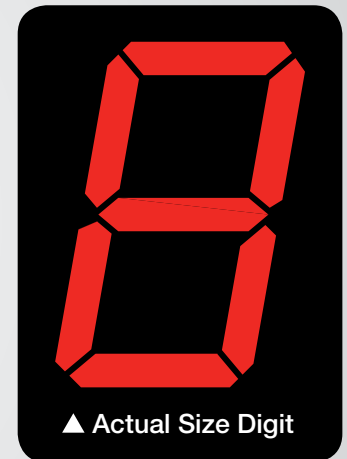


# PD2-6400

Helios High Voltage & Current Meter



**HELIOS**



**HIGH VOLTAGE & CURRENT**

- Large Display NEMA 4X, IP65 Wall Mounted Meter
- (1) High Voltage and (1) High Current Input
- Multiplication for Apparent Power Calculation
- 0-300 VAC or VDC Voltage Input
- 0-5 AAC or ADC Current Input
- Large Dual-Line 6-Digit Display, 1.8" (46 mm) Digits Readable up to 100 Feet (30 Meters) Away
- Four (4) Relays with Interlocking Capability + Isolated 4-20 mA Output Option
- Free PC-Based MeterView Pro USB Programming Software
- Super Bright Display
- Operating Temperature Range: -40 to 65°C (-40 to 150°F)
- UL & C-UL Listed. E160849; 508 Industrial Control Equipment
- Input Power Options Include 85-265 VAC or 12-24 VDC
- Programmable Display, Function Keys & Digital Inputs
- Onboard RS-485 Serial Communications
- Modbus RTU Communication Protocol Standard
- Split Core AC Current Transformers Up to 1000 A AC Available
- Control Station Accessory Available For Remote Operation of Helios

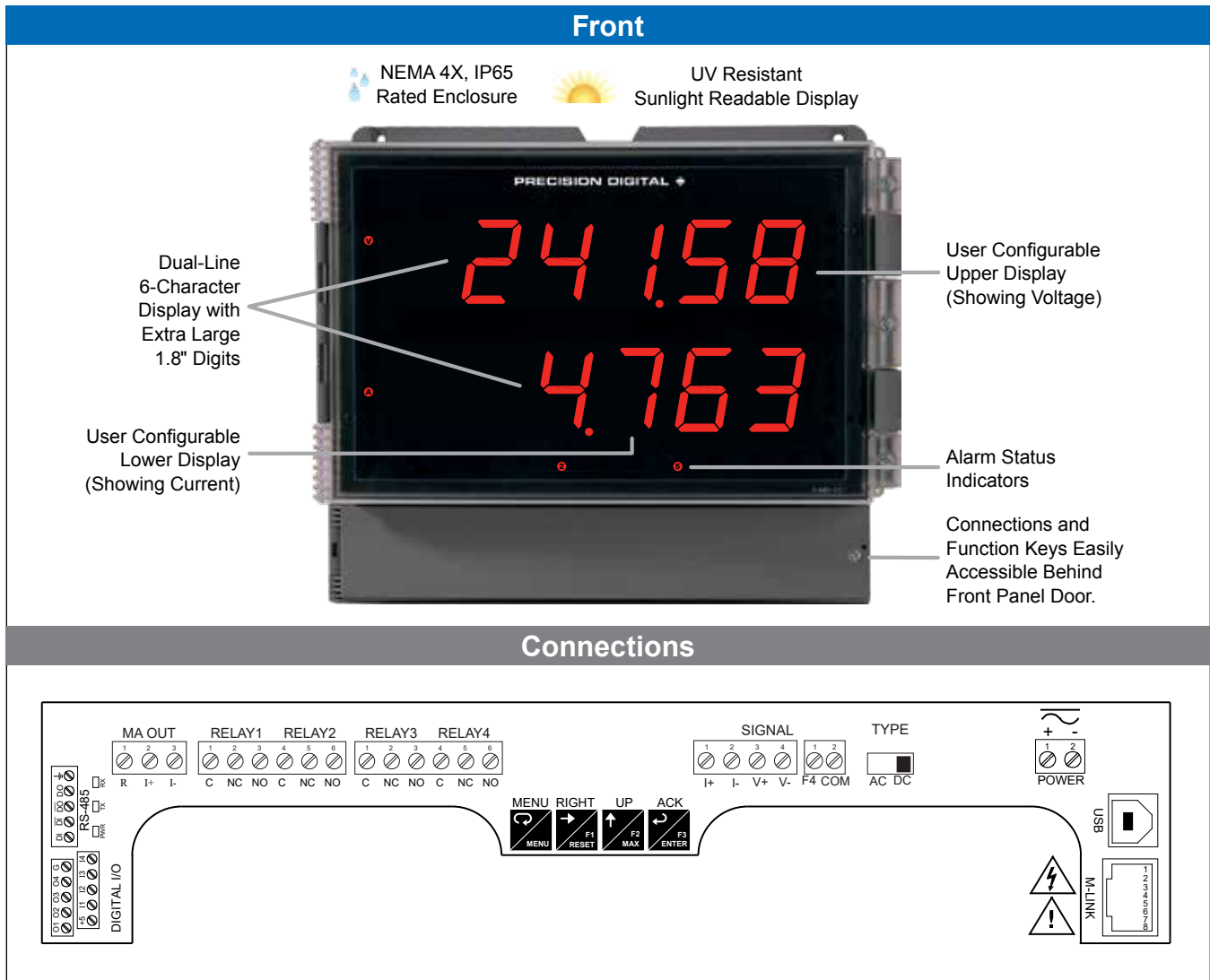


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# PD2-6400 Helios High Voltage & Current Meter

## OVERVIEW



## The Only Large Display High Voltage & Current Meter You Will Ever Need

The Helios large display high voltage and current meter boasts specifications, features and functionality that make it the only large display high voltage and current meter you will ever need. The big, bright 6-digit dual-line LED display that can be seen from 100 feet even in bright sunlight is the first thing you will notice about the Helios. The dual-line display can be used to display voltage in the range of 0-300 VAC or VDC on one line and 0-5 AAC or ADC on the other line. In addition, a math channel P calculates apparent power as the product of the voltage and current inputs.

The enclosure is rated NEMA 4X which means you can install the Helios indoors and outdoors, exposed to moisture, dust and other adverse conditions. Other key features include four

relays and 4-20 mA output option, function keys, and Modbus RTU serial communications. Finally, all these features and capabilities can easily be programmed with free MeterView Pro PC-based software.

Precision Digital also offers several accessories for the Helios to enhance the user experience:

- AC current transformers that can step down a higher current to 0-5 AAC that can be read directly by the PD2-6400
- Control Stations for remote programming and other functions

## ADVANCED DISPLAY FEATURES

### Dual-Line Makes All the Difference

The upper display can be programmed to indicate PV, maximum (peak), minimum (valley), alternating maximum/minimum, one of eight alarm set points, or Modbus input. The lower display can be configured to display engineering units, set points, user defined messages, or simply turned off.

The Helios's dual-line display makes all the difference both when programming the instrument and when using it in the field. When programming the instrument, the dual line display prompts for the needed information and also helps you keep track of where you are in the setup process. When using the instrument, the dual line display provides more information such as displaying the input in two different scales like height and volume for a level application. We call this the Dual-Scale feature.

### Programming Assistance

The Helios's dual-line display makes programming the instrument much easier because the lower line prompts for the needed information and also helps you keep track of where you are in the setup process.



The Helios is prompting for the value for Input 2 and displaying the default value of 5.00 A. The "5" in 5.00 is brighter than the rest of the digits indicating that it is the number that will be changed by the Up and Right arrows.



The Helios is now prompting for what the user wants Display 2 to be; that is the value that corresponds to 95.00 A. In this case Display 2 is currently set to 95.00.

### Superluminous Sunlight Readable Display

The Helios's 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.

### Rounding Feature for Even Steadier Display

The rounding feature is used to give the user a steadier display with fluctuating signals. It causes the display to round to the nearest value according to the rounding value selected (1, 2, 5, 10, 20, 50, or 100). For example, with a rounding value of 10, and an input of 12346, the display would indicate 12350.

### Display Voltage and Current Individually or at Same Time

The Helios PD2-6400 can accept both a voltage and a current input. These can be displayed as one or the other as illustrated in the first set of screen shots below or both at the same time as illustrated by the second set of screen shots.



Value & Volts

Value & Amps



Alternating Input Value and Units

MeterView Pro can be used to scale the voltage and the current inputs on the Helios PD2-6400 meter.



### Toggle Between Reading & Units with Tag and Calculating Apparent Power

The Helios below is programmed so the upper line toggles between the reading and units, and the lower line displays a tag. A math channel P calculates apparent power as the product of the voltage and current inputs shown in the bottom two images.



Upper line toggles between 241.58 and Volts and the lower line displays Gen 1



Upper line toggles between 1150.6 and Apparent Power and the lower line displays Gen 1

# PD2-6400 Helios High Voltage & Current Meter

## QUICK & EASY SCALE & PROGRAMMING METHODS

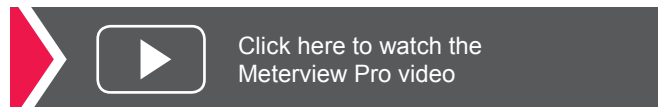
The Helios can be programmed either via the front panel push buttons or free, PC-based MeterView Pro software. MeterView Pro is resident on the Helios and is accessed by a provided USB cable, so it is by far the easiest way to program the Helios. The Helios can be calibrated either by applying a known signal or scaled by entering a desired value with the front panel buttons or MeterView Pro software. Most customers will use the scaling method because it is simpler and does not require a calibrated signal source. Selecting the input to be current or voltage is done with the front panel buttons or MeterView Pro software. Once programming is completed it can be locked with a password.

### Free PC-Based MeterView Pro USB Programming Software & Cable



The Helios comes preloaded with free MeterView Pro programming software that connects and installs directly to your PC with a standard USB cable, also provided free with each instrument. This eliminates the need to insert CDs, install drivers, or download software from the internet. When you connect your Helios to your PC, MeterView Pro is downloaded to your PC, the software automatically selects the model you are programming, and you're ready to start programming immediately. Further simplifying the programming process, the

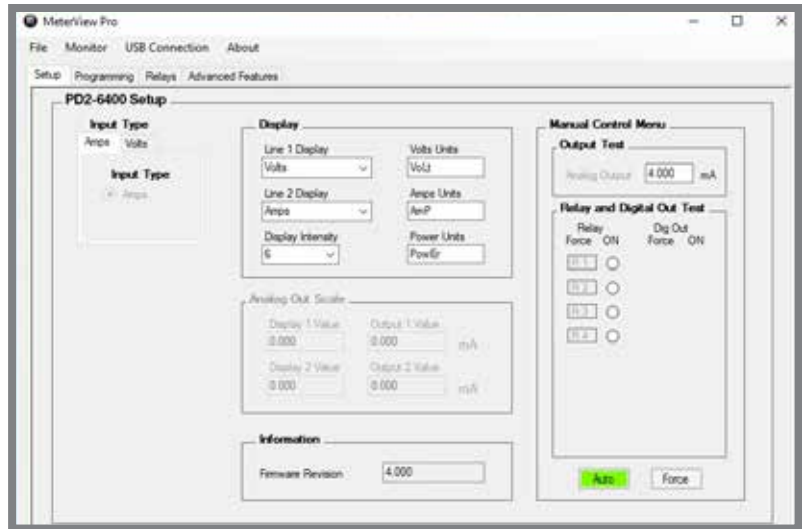
Helios can be powered from the USB port, so no need to apply external power while programming your meter. In addition to programming, the software will also allow you to monitor, and datalog a Helios using your PC. You can also generate and save programming files for later use.



# PD2-6400 Helios High Voltage & Current Meter

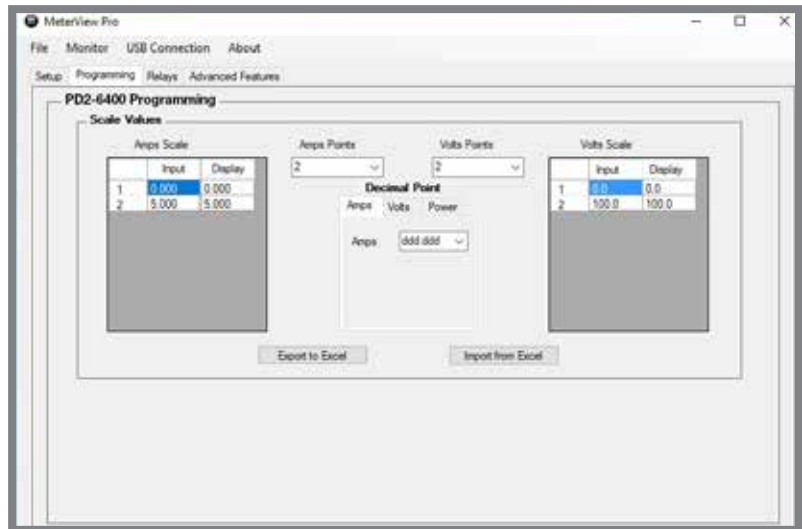
## Setup Screen

- Select Voltage or Current Input
- Activate Dual-Scale (Level) Function
- Select Decimal Point
- Set Line 1 Display Parameters
- Set Line 2 Display Parameters
- Set Analog Output Values
- Enable Manual Control
- Test Relays & Digital Outputs



## Programming Screen

- Set Scale Values
- Set the Number of Points (up to 32)
- Import from Excel
- Export to Excel



## Relays Screen

- Greatly Simplifies Programming a Variety of Relay Features
- Set Relay Action
- Set Sampling Time
- Set Set & Reset Points
- Set On/Off Time Delays
- Set Fail Safe Operation
- Set Input Break Relay Action



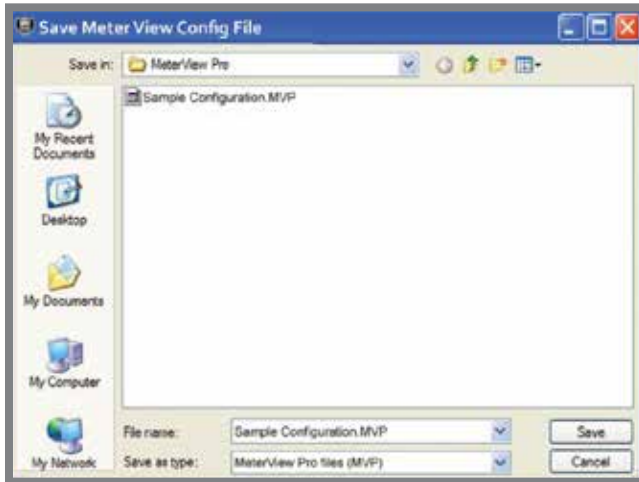
## Save/Open Configuration

At the bottom of most MeterView screens are two tabs:

1. **Get Meter Data:** This reads the programming of the meter that is currently connected to the PC.
2. **Send Meter Data:** Clicking this button, sends current MeterView programming to the meter.



The configuration file can be sent, or retrieved, from the directory of your choice. This makes it very easy to program multiple meters with the same programming. It is also a great backup utility as well.



## Specifications

### System Requirements:

Microsoft® Windows® XP/Vista/7/8/10

### Communications:

Onboard USB (firmware version 4.0 or higher),  
RS-232 Adapter or RS-485 Adapter

### Meter Address: 1 - 247

### Reports:

- Data logging: Save as CSV file format
- Configuration: Save as PDC file format or print configuration

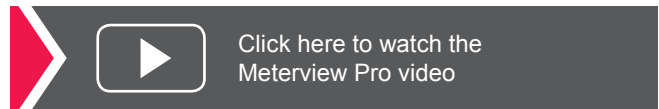
### Baud Rate: 300 - 19,200 bps

### Configuration: One meter at a time

### Protocol:

Modbus RTU (requires Helios firmware version 4.0 or higher)

*\*Note: Windows® 32/64-bit operating systems*



## Password Protection

The Password menu is used for programming three levels of security to prevent unauthorized changes to the programmed parameter 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

## 4-20 mA OUTPUT & RELAYS

### 4-20 mA Analog Output

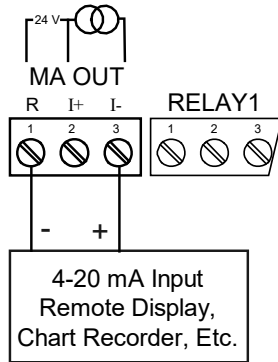
The isolated analog output can be configured to represent the process variable (PV), maximum (peak) value, minimum (valley) value, the value for any of the eight relay set points, or Modbus input. While the output is nominally 4-20 mA, the signal will accurately accommodate under- and over-ranges from 1 to 23 mA.

The 4-20 mA output can be reversed scaled such that 4 mA represents the high value and 20 mA represents the low value. For instance, a 4-20 mA output signal could be generated as the meter went from 100.0 to 0.0.

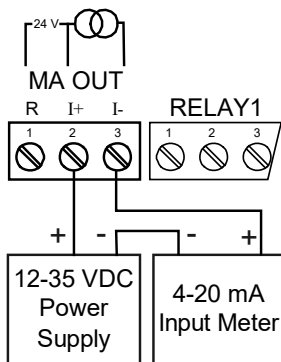
For applications where the input was linearized by the Helios, the 4-20 mA output will represent that linearized value.

### Connections

The Helios can provide 40 mA at 24 VDC to power the 4-20 mA output signal or an external power supply can be used:



4-20 mA Output Powered by PD2-6400



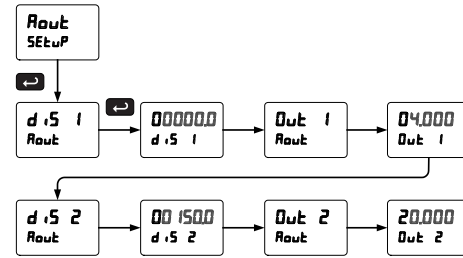
4-20 mA Output Powered by External Power Supply

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.

The 4-20 mA output can either be programmed using the front panel push buttons or free MeterView Pro software.

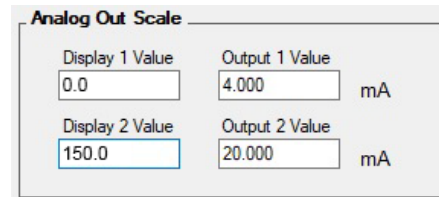
### Front Panel Push Button Programming

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.

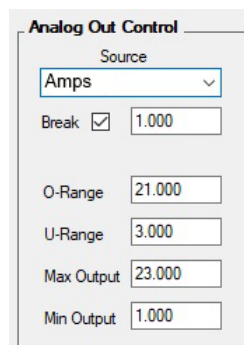
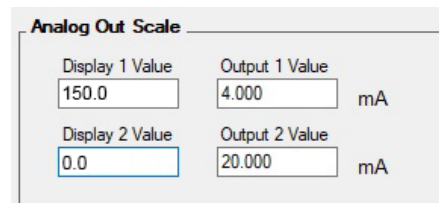


### MeterView Pro Software Programming

When a meter is programmed as shown below, the output will be 4.00 mA when the display reads 0 and the output will be 20.00 mA when the display reads 150.0.



The meter can be set up for reverse scaling as shown below: the output will be 4.00 mA when the display reads 150.0 and the output will be 20.00 mA when the display reads 0.



**Source:** Source for generating the 4-20 mA output (e.g. Amps)

**Overrange:** Analog output value with display in overrange condition

**Underrange:** Analog output value with display in underrange condition

**Break:** Analog output value when current input break is detected

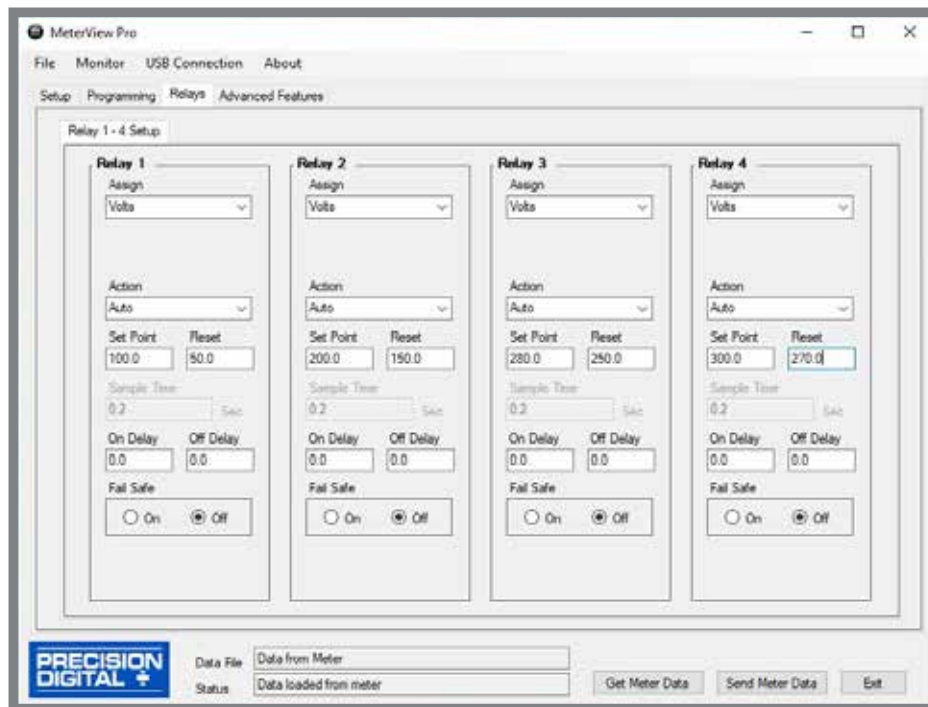
**Max:** Maximum analog output value allowed regardless of input

**Min:** Minimum analog output value allowed regardless of input



## Relays for Alarm & Control Applications

Adding relays to the Helios meter turns it into a sophisticated alarm device as well as a powerful, yet simple, alternative to a more complicated PLC system for control applications. The Helios can be equipped with four 3 A Form C (SPDT) internal relays. Relays are highly user-configurable as the following screen shot from MeterView Pro indicates:



\*Values are intended to show programming choices. They are not intended to represent an actual application.

### Setting Set and Reset Points (HI / LO Alarms)

All relays are independent of each other and may be programmed as high or low alarms with user desired set and reset points. Setting a set point above a reset point results in a high alarm and setting a set point below a reset point results in a low alarm. Alarms have 0 – 100% deadband and set and reset points may be set anywhere in the range of the meter.

### Resetting the Relays (Action in MV Pro)

All relays are independent of each other and may be programmed to reset (*Action* in MV Pro) in the following ways:

- **Automatic:** Alarm will reset automatically once the alarm condition has cleared.
- **Automatic/Manual:** Alarm will reset automatically once the alarm condition has cleared but can also be reset at any time with a switch wired across terminals F4 and Common\*.
- **Latching:** Alarm must be reset manually and can be done so at any time with a switch wired across terminals F4 and Common\*.
- **Latching with Reset after Cleared:** Alarm must be reset manually and can only be done so after the alarm condition has cleared with a switch wired across terminals F4 and Common\*.

\* Or via one of the four digital inputs

### Time Delay (On and Off)

In many applications it is desirable to wait before turning off or on a relay – such as waiting for a process to settle before taking action. Each relay on the Helios can be programmed with independent on and off time delays of 0 to 999.9 seconds to achieve this.

### Relays Auto Initialization

When power is applied to the meter, the front panel LEDs and alarm relays will reflect the state of the input to the meter.

### Signal Loss or Current Input Break Relay Operation

When the meter detects a break in the current input, the relay will go to one of the following selected actions:

1. Turn On (Go to alarm condition)
2. Turn Off (Go to non-alarm condition)
3. Ignore (Processed as a low signal condition)

### User Selectable Fail-Safe Operation

All relays are independent of each other and may be programmed for user selectable fail-safe operation. With the fail-safe feature activated, the relays will transfer to the alarm state on power loss to the meter.

## Front Panel LEDs

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.

## 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 (1-8) flash every 10 seconds indicating that the meter is in manual control mode.

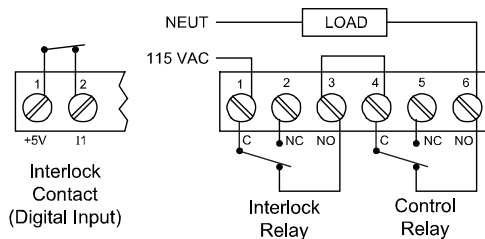


## Sampling Function (PV Triggered Timed Relay)

The sampling function allows the operator to set a relay as 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).

## 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.



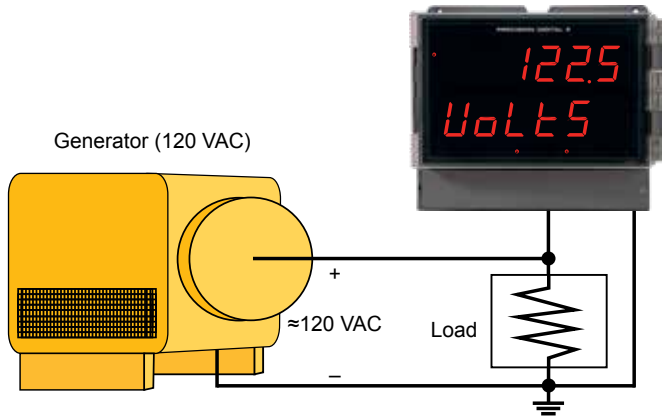
## Switching Inductive Loads

The use of suppressors (snubbers) is strongly recommended when switching inductive loads to prevent disrupting the microprocessor's operation. The suppressors also prolong the life of the relay contacts. Precision Digital offers the PDX6901 Snubber with 0.01 $\mu$ F/470 $\Omega$  flexible leads.

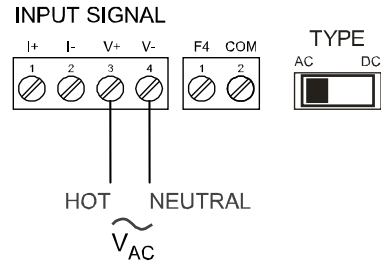
## APPLICATION EXAMPLES

The PD2-6400 Helios can be used to display application data for voltage, current, or both. Each Channel, Voltage or Current, can be scaled independently. The following examples show just a few of the PD2-6400's application capabilities using generators and transformers. Each example is followed by a wiring diagram that shows proper switch position for the meter.

### Voltage Measurement for a Generator Driving a Load

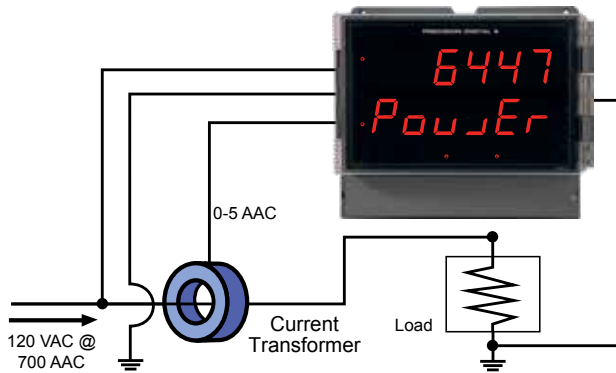


Voltage Input Application Example

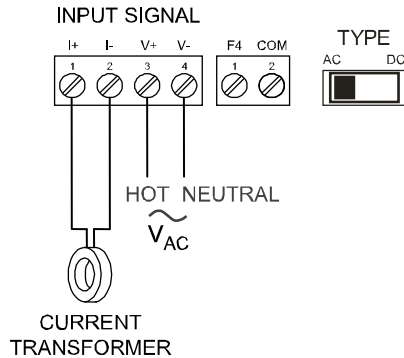


Voltage Input Wiring Example with AC Switch Selected

### Apparent Power Measurement Using a Current Transformer

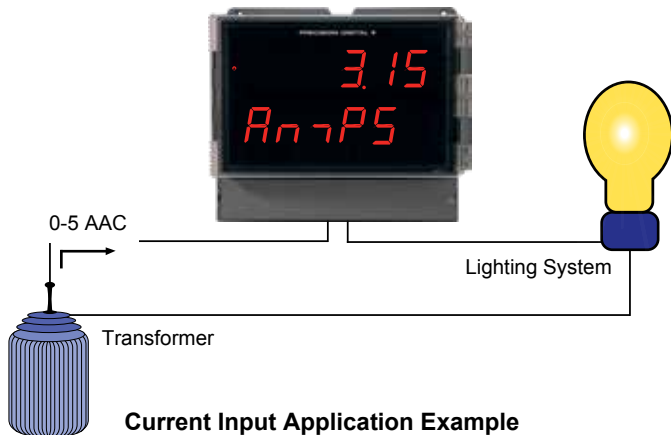


Voltage/Current Input Application Example

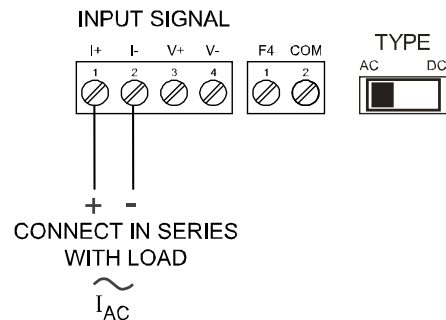


Voltage/Current Input Wiring Example with AC Switch Selected

### Current Measurement for a Lighting System



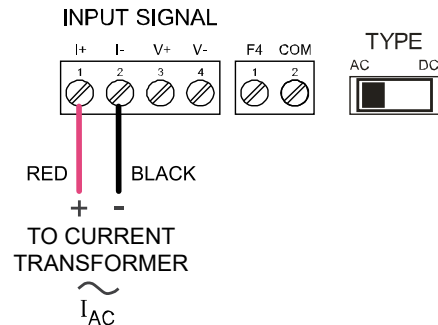
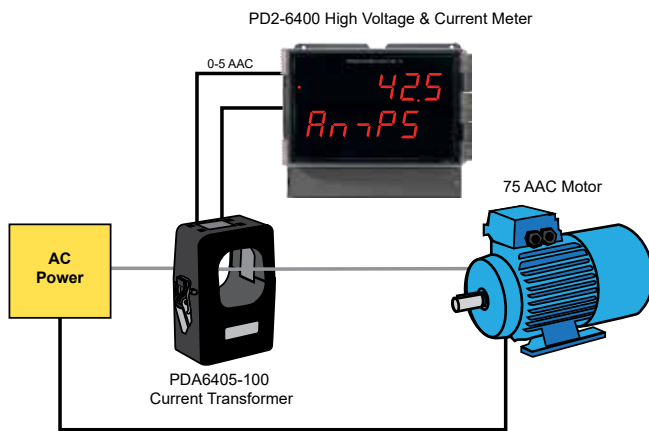
Current Input Application Example



Current Input Wiring Example with AC Switch Selected

# PD2-6400 Helios High Voltage & Current Meter

## Converting High AC Current with the PDA6405 Split Core AC Current Transformer



Measuring Current with PDA6405-100 Current Transformer and PD2-6400 large display high voltage & current meter.

PD2-6400 Connections from PDA6405 Current Transformer with AC Switch Selected.

## PDA6405 Split Core AC Current Transducer



Precision Digital offers a line of split core AC current transformers that convert the high AC current flowing through a cable or wire to a 0-5 AAC output that can be displayed on a PD6400. The PDA6420 works with a PD6400 because it puts out a 4-20 mA signal. They are available in ranges of 100, 200, 400, 600, and 1000 AAC. These nonintrusive devices feature split core convenience for easy installation and are a cost effective solution for monitoring load or proof of operation. The PDA6420 current transformers are ideal for monitoring current loads on pumps, driving fans and blowers, and sensing the status of heating coils and lighting.

### Specifications:

**Current Range:** 100A, 200A, 400A, 600A, and 1000A (based on model)  
**Output:** 0-5 A  
**Accuracy:** +/- 1%  
**Burden:** 2VA  
**Insulation Voltage:** CAT IV 250 or CAT III 600VAC  
**Maximum Primary Voltage:** 5000 VAC (Insulated Conductor)  
**Phase Angle:** Less than 2 degrees at 50% of rated current  
**Frequency Range:** 50/60 Hz  
**Operating Temperature:** -40 to 55°C  
**Humidity:** 0-95% RH non-condensing, Indoor use only  
**Pollution Degree:** 2  
**Leads:** 18AWG 1.0 m cable  
**UL File Number:** UL recognized for US and Canada (E341727)

## DIGITAL COMMUNICATIONS

### Modbus® RTU Serial Communications

With onboard RS-485 serial communication, the PD2-6400 can communicate with any Modbus *master* device using the popular Modbus communications protocol that is included in every Helios. In addition to the typical Modbus capabilities of reading PVs and writing set points, below are some examples of other things that can be done with the meter's Modbus communications:


- Send a 6-character message to the lower display upon an event
- Convert a digital value to a 4-20 mA signal
- Remote user control (i.e. change set points, acknowledge alarms)
- Input a Modbus digital PV (in place of analog input)
- Remote override of any, or all, relays and analog outputs



Modbus PV Input



Remote Message

 [Click here for more information on the Helios's Modbus capabilities](#)

### Additional Communication Modules

In addition to RS-485 communications which is a standard feature, the Helios is available with serial communications modules for RS-232 and USB.



**PDA7485-I**

RS-232 to  
RS-422/485

Isolated Converter



**PDA8485-I**

USB to  
RS-422/485

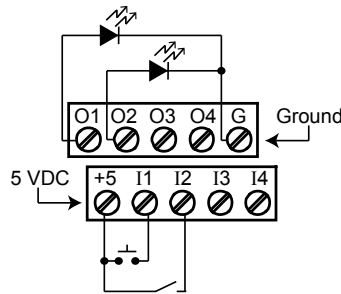
Isolated Converter

 For more info on serial converters click here.

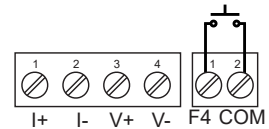
\*All adapters and connectors supplied with appropriate cables.

## ON-BOARD DIGITAL INPUTS AND OUTPUTS

The PD2-6400 includes five (5) digital inputs and four (4) digital outputs standard. Since the Helios is a large display meter it is often mounted in areas where it is not convenient to access the programming buttons. The digital inputs can be set up to mimic the four programming buttons on the Helios meter, thus making it possible to mount remote buttons for programming in a more convenient location. In addition, the digital inputs can also be used to reset the total, operate the tare feature, reset the tare, and more. The digital outputs can be used to drive alarming devices or as a means to communicate alarm conditions with a PLC.



4 Digital Inputs  
& 4 Digital Outputs



F4 Terminal for  
Digital Input

See page 17 for more details on what can be done with the digital inputs and outputs.

# PD2-6400 Helios High Voltage & Current Meter

## PHYSICAL FEATURES

The most striking physical feature of the Helios meter is its dual-line 6-digit display with 1.8" high super-bright LEDs. These allow the display to be read from up to 100 feet away, even in bright sunlight.

The Helios is designed for ease-of-use in industrial applications where it will be exposed to wet, dusty, hot, cold and other adverse conditions. The Helios is housed in a rugged NEMA 4X enclosure, can operate over a wide temperature range, includes removable screw terminal connectors, and is UL Listed for electrical safety. All of these features are backed by a 3-year warranty.

### Super-Bright 1.8" High LED Display

The Helios features super-bright 1.8" high LEDs; three times the height of standard digital panel meters.



### Type 4X / NEMA 4X Front Panel

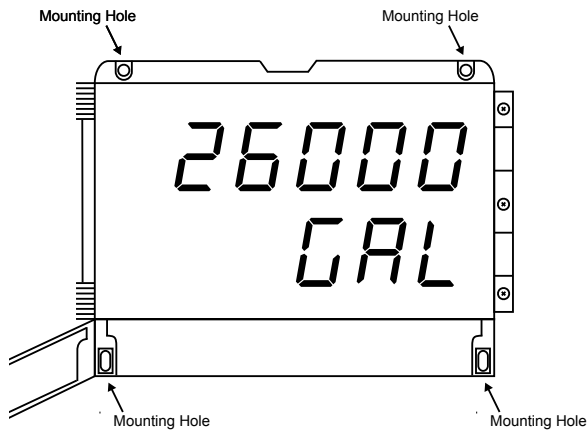
Not only does the Helios's front panel UL Type 4X approval indicate it is waterproof, but it also indicates it is rugged. Part of the UL Type 4X test is to drop a 2 inch solid stainless steel ball from 8 feet on top of the meter's cover.



# PD2-6400 Helios High Voltage & Current Meter

## Integral Holes for Wall Mounting

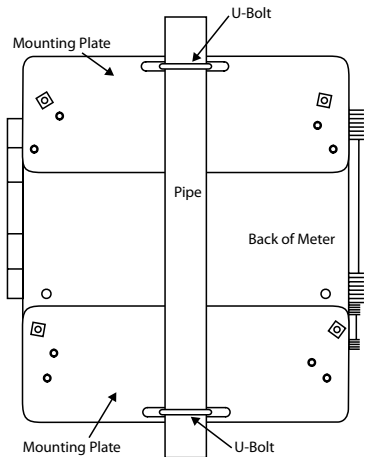
The Helios's back panel includes four holes for convenient wall mounting.



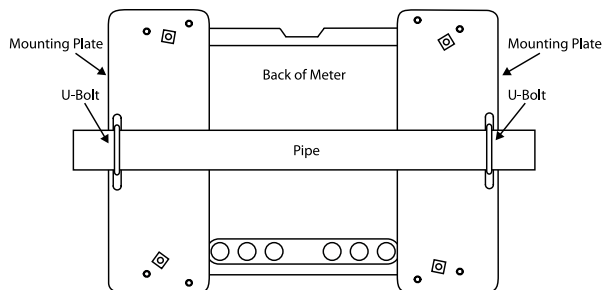
Integral Holes Locations

## 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 PD2-6400 manual for instructions.



Vertical Pipe Mounting



Horizontal Pipe Mounting

## USB Port for Easy Connection to MeterView Pro Free Software



## Wide Operating Temperature Range

The Helios can operate from  $-40$  to  $65^{\circ}\text{C}$  ( $-40$  to  $150^{\circ}\text{F}$ ) meaning it can be installed in a wide variety of indoor and outdoor industrial applications. And over this range the Helios will drift no more than  $0.005\%$  of calibrated span/ $^{\circ}\text{C}$  max from  $0$  to  $65^{\circ}\text{C}$  ambient and  $0.01\%$  of calibrated span/ $^{\circ}\text{C}$  max from  $-40$  to  $0^{\circ}\text{C}$  ambient.

## Removable Screw Terminal Connectors

Industrial applications require screw terminal connections for easy field wiring and the Helios goes one step further in convenience by making them removable also.

## UL Listing for Electrical Safety

**UL & C-UL Listed:** USA & Canada

UL 508 Industrial Control Equipment

**UL File Number:** E160849

**Front Panel:** UL Type 4X, NEMA 4X, IP65

**Low Voltage Directive:**

EN 61010-1:2010. Safety requirements for measurement, control, and laboratory use.

## OPERATIONAL FEATURES

### Function Keys, F4 Terminal, Digital Inputs

There are two ways the user can interact with the Helios to perform a variety of useful functions:

#### 1. Three Buttons Under the Front Cover

The default settings for the function keys are:



Reset Max/Min Reading



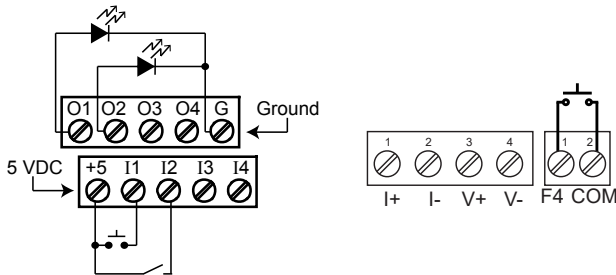
Display Max/Min Reading



Acknowledge Relays

#### 2. Built-in Digital Inputs/Outputs

The Helios comes with five digital inputs and four digital outputs. The digital inputs can operate with the interlock relays feature, force relays on from a signal from a PLC or relay on other equipment, and much more. The digital inputs can also be used to mimic the programming buttons, which are located behind a door and generally not accessible during operation. The digital outputs can be used to send signals to PLCs and other devices.

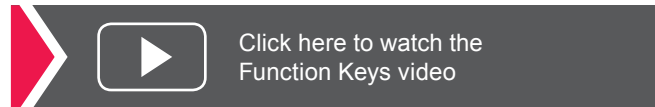
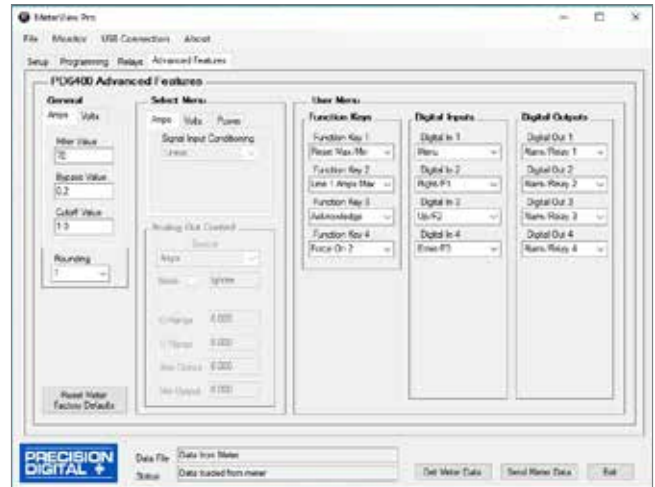


4 Digital Inputs & 4 Digital Outputs

F4 Terminal for Digital Input

### Remote Operation of Front Panel Buttons

The Helios's programming buttons are located behind a door and generally not accessible during operation. Digital inputs are provided that can be wired to remote buttons to operate the programming buttons in a convenient location. MeterView Pro provides an easy way to do this programming:

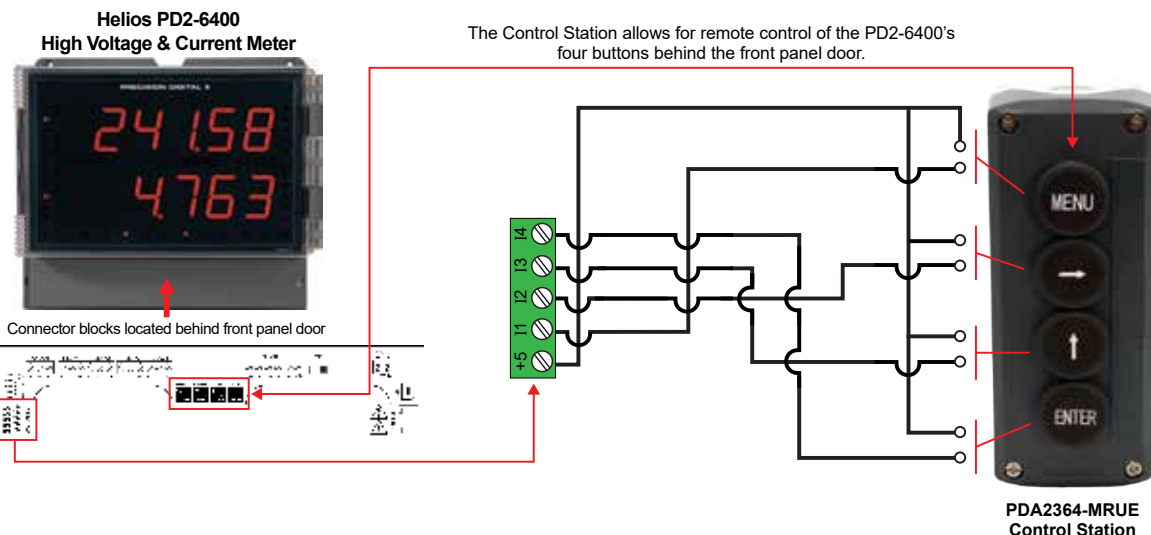


### Max / Min Display

Max/Min (or Peak/Valley) is standard on the Helios PD2-6400. Either display can be configured to show either maximum or minimum excursion since last reset. The displays can also be configured to toggle between Max and Min values. Both values can be simply reset from the front panel.

### Remote Operation Using PDA2364-MRUE Control Station

The PD2-6400's four internal programming and operations buttons can be remotely controlled by using the PDA2364-MRUE 4-button control station accessory as shown in the diagram below.





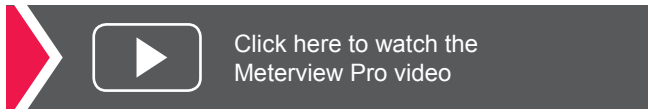
# PD2-6400 Helios High Voltage & Current Meter

## MeterView Pro Monitoring & Datalogging Software

Not only does free MeterView Pro software greatly simplify setup and programming of the Helios, it can also be used to monitor and datalog your process.

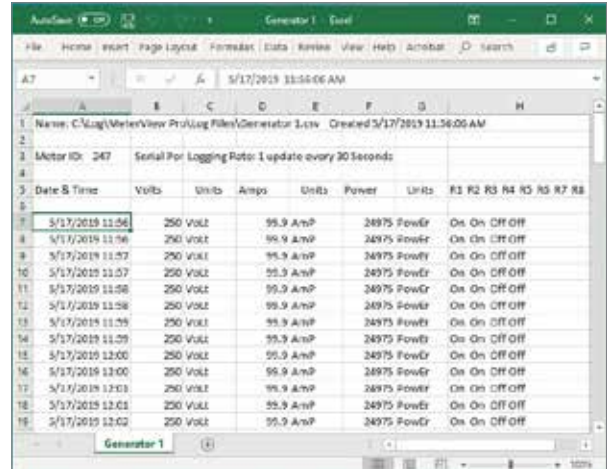


- Custom Tags: i.e. Power
- Custom Units: i.e. Amps, Volts
- Alarm Status Indicators



## Datalog Report

Collected data logger information can be sent to a CSV file for importing into a spreadsheet program. Below is an example of one such file. Of course, once within the spreadsheet, much can be done to customize the data.



## Relay Control

Relays can be controlled from MeterView Pro for testing purposes. This is commonly done to determine whether the relays are functioning properly. In the *Setup* window, under *Relay and Digital Out Test* you have the option of selecting the relays you want in an ON state or OFF state and also whether you want to leave the relays in manual control or to return them to automatic operation.

## Plastic Control Stations For The Helios PD6400

The PDA2360 series of plastic control stations provide a convenient way to remotely control devices such as Precision Digital's Helios PD2-6400. The PDA2364-MRUE four-position control station mimics the Helios's four buttons behind the front panel door: Menu, Right Arrow, Up Arrow, and Enter. The PDA2360-E is an emergency stop button and the PDA2361-A is used to acknowledge an alarm.



- Complete Pre-Assembled Stations
- Normally Open (NO) Spring Return Plastic Bezel Pushbuttons
- Trigger Action Turn to Release Pushbutton (PDA2360-E only)
- IP65 / NEMA 4, 4X and 13 Rated
- Four-Position Control Station for Remote Operation of Helios Buttons
- Wall Mountable

PDA2360 Series Control Stations	
Model	Description
PDA2360-E	Emergency Stop Button
PDA2361-A	1 Black Ack Button
PDA2364-MRUE	4 Black Buttons: Menu, Right, Up, Enter

## Function Key, Digital Inputs, & Digital Outputs Descriptions

The following table describes the actions that Helios function keys and digital inputs can be programmed to perform. The table also describes how the digital outputs can be used to remotely monitor the Helios's alarm relay states, or the states of a variety of actions and functions executed by the meter.

Display	Description	Item
rSt H1	Reset the stored maximum display value	FK, DI, DO
rSt Lo	Reset the stored minimum display value	FK, DI, DO
rSt HL	Reset the stored maximum & minimum display values	FK, DI, DO
rELAY	Directly access the relay menu	FK, DI
SEt 1*	Directly access the set point menu for relay 1 (*through 8)	FK, DI
rLY d	Disable all relays until a button assigned to enable relays (rLY E) is pressed	FK, DI
rLY E	Enable all relays to function as they have been programmed	FK, DI
0 Hold	Hold current relay states and analog output as they are until a button assigned to enable relays (rLY E) is pressed	FK, DI
d Hold	Hold the current display value, relay states, and analog output momentarily while the function key or digital input is active. The process value will continue to be calculated in the background.	FK, DI
Ln1 H1	Display maximum display value on line 1	FK, DI
Ln1 Lo	Display minimum display value on line 1	FK, DI
Ln1 HL	Display maximum & minimum display values on line 1	FK, DI

Display	Description	Item
Ln2 H1	Display maximum display value on line 2	FK, DI
Ln2 Lo	Display minimum display value on line 2	FK, DI
Ln2 HL	Display maximum & minimum display values on line 2	FK, DI
F On 1*	Force relay 1 (*through 4) into the on state. This is used in conjunction with a digital input expansion module to achieve interlock functionality.	FK, DI
Control	Directly access the control menu	FK, DI
d ISAbL	Disable the selected function key or digital I/O	FK, DI
AcK	Acknowledge all active relays that are in a manual operation mode such as auto-manual or latching	FK, DI, DO
rESEt	Directly access the reset menu	FK, DI
mEnu	Mimic the menu button functionality (digital inputs only)	DI
rIGHt	Mimic the right arrow/F1 button functionality (digital inputs only)	DI
uP	Mimic the up arrow/F2 button functionality (digital inputs only)	DI
EntEr	Mimic the enter/F3 button functionality (digital inputs only)	DI
ALm 1*	Provide indication when alarm 1 (*through 8) has been triggered (digital outputs only)	DO

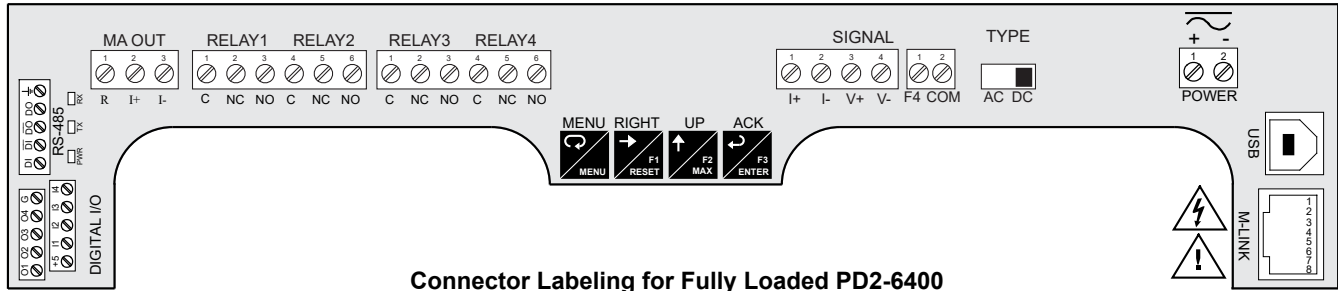
FK: Function Keys    DI: Digital Inputs    DO: Digital Outputs



Watch video about the programmable function keys, digital inputs, and all the capabilities these features offer on the PROVU Series.

# PD2-6400 Helios High Voltage & Current Meter

## CONNECTIONS

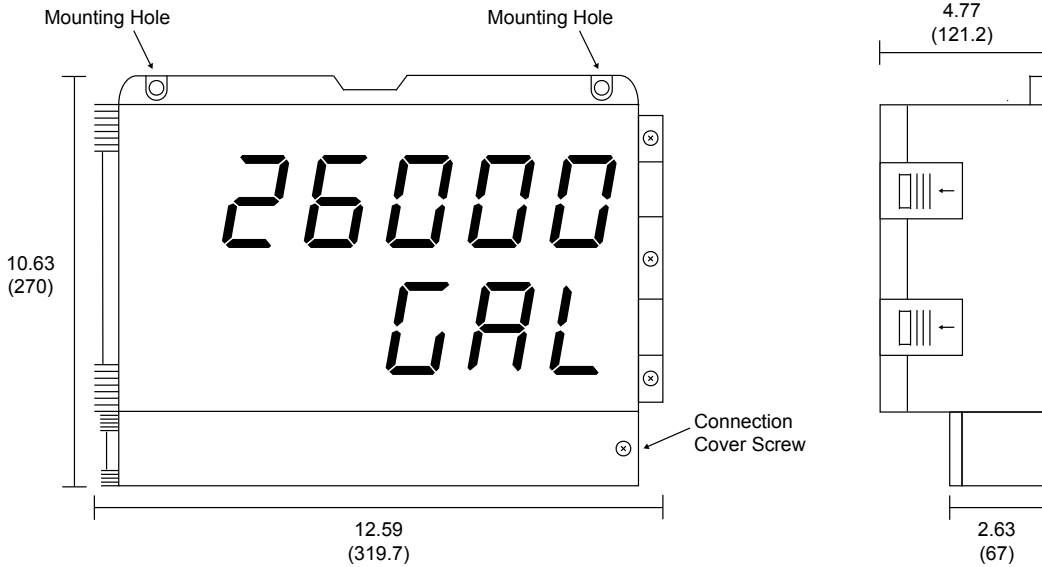


Connector Labeling for Fully Loaded PD2-6400

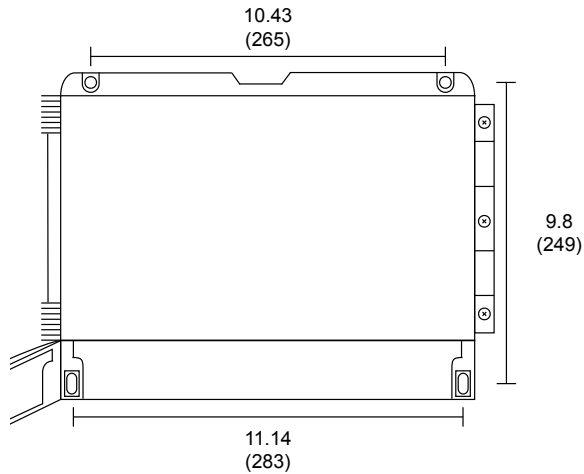
## DIMENSIONS

Units: Inches (mm)

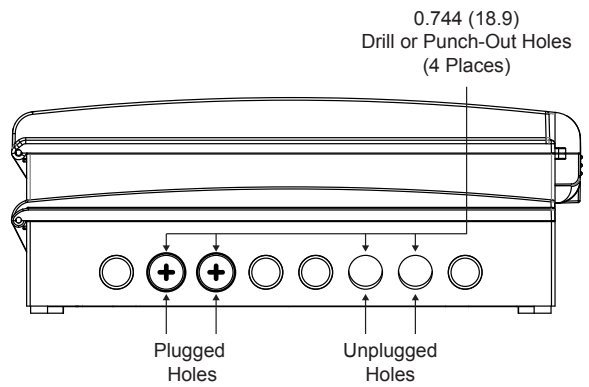
### Front and Side View



### Wall Mounting Holes Location



### Conduit Holes Location



Bottom View



Download free 3-D CAD files of these instruments to simplify your drawings!

[predig.com/documentation-cad](http://predig.com/documentation-cad)

# Complete Product Line of Displays and Controllers IN ALL SHAPES, SIZES & LOCATIONS



Big, Bright Displays  
For Indoor or Outdoor  
in Bright Sunlight



Large Dual-Line  
6-Digit Display



24 VDC  
Transmitter  
Power Supply



MeterView® Pro USB  
Programming Software



Universal 85-265  
VAC or 12-24 VDC  
Input Power  
Options



4-20 mA, 0-10 V,  
Thermocouple, RTD,  
Strain Gauge, High  
Voltage, & Modbus Inputs



Up To Four  
3 A Form C  
Relays (SPDT)



FM APPROVED SP Ex CE IECEx

## EXPLOSION-PROOF ProtEX-MAX Series

- NEMA 4X, IP68 Rated Enclosure
- SafeTouch® Through-Glass Buttons
- Operating Temperature of -40 to 65°C
- Worldwide Approvals

## LARGE DISPLAYS Helios Series

- 1.8" Digits Readable From 100 Feet
- NEMA 4X, IP65 Rated Enclosure
- Operating Temperature of -40 to 65°C
- Now UL and C-UL Approved!

## PANEL METERS ProVu Series

- NEMA 4X, IP65 Rated Front
- Programmable Function Keys
- UL, C-UL, and CE Approvals
- 1/8 DIN Size

Go to [PREDIG.COM](http://PREDIG.COM) for details on ProVu, ProtEX-MAX and Helios Series Meters

# PD2-6400 Helios High Voltage & Current Meter

## SPECIFICATIONS

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

### General

**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)

**Overrange:** Display flashes 999999

**Underrange:** Display flashes -99999

**Display Assignment:** Displays lines 1 & 2 may be assigned to process values for Channels A (Ch-A, current), V (Ch-V, voltage), or P (Ch-P, apparent power); toggle between (Ch-A & Ch-V, Ch-A & Ch-P, Ch-V & Ch-P, and Ch-A, Ch-V, & Ch-P); relay set points; max and/or min values for CH-A, Ch-V, or Ch-P; CH-A and units; Ch-V and units; Ch-P and units; or Modbus input. The lower display may also be set to show engineering units or be off, with no display.

**Noise filter:** Programmable from 2 to 199 (0 will disable filter)

**Filter Bypass:** Programmable from 0.1 to 99.9% of calibrated span

**Recalibration:** All ranges are calibrated at the factory. Recalibration is recommended at least every 12 months.

**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

**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 or 12-24 VDC  $\pm$  10%, 15 W max. Powered over USB for configuration only.

**Fuse:** Required external fuse: UL Recognized, 5 A max, slow blow; up to 6 meters may share one 5 A fuse.

**Normal Mode Rejection:** Greater than 60 dB at 50/60 Hz

**Isolation:** 500 V AC/DC potential allowed between voltage and current input channels. Channels isolated by 3 M $\Omega$  impedance 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 150°F (-40 to 65°C)

*Storage temperature range:* -40 to 185°F (-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 mounting meter to wall.

**Pipe Mounting:** Optional pipe mounting kit (PDA6260) allows for pipe mounting. Sold separately. See manual for mounting 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:** Microsoft® Windows® XP/Vista/7/8/10

**Power:** USB Port

### Voltage and Current Inputs

**High Voltage Input:** One high voltage input (Channel V) 0-300 VDC or VAC; Switch Selectable, Modbus PV (Slave)

**High Current Input:** One high current input (Channel A) 0-5 AAC or ADC; Switch Selectable, Modbus PV (Slave)

**Channels:** Channel A, Channel V, Channel P (Math Channel for Apparent Power)

**AC/DC Selection:** Switch selectable for AC or DC inputs. Channels A and V share AC/DC selection.

**Apparent Power Math:** Apparent power P calculated as  $P = A * V$

**Programmable Constants:** Constant C (Adder): -99.999 to 999.999, default: 0.000. Constant F (Factor): 0.001 to 999.999, default: 1.000.

**Accuracy:** ADC: 0.03% Full Scale  $\pm$ 1 count,

AAC: 0.1% Full Scale  $\pm$ 1 count,

VDC: 0.05% Full Scale  $\pm$ 1 count,

VAC: 0.15% Full Scale  $\pm$ 1 count, square root & programmable exponent accuracy range: 10-100% of calibrated span

**Temperature Drift:** 0.005% of calibrated span/°C max from -40 to 65°C ambient

**Signal Input Conditioning:** Linear, square root, programmable exponent, or round horizontal tank volume calculation.

**Multi-Point Linearization:** 2 to 32 points for Channel A and V

**Low-Flow Cutoff:** 0-999999 (0 disables cutoff function). Independent for Channel A and V.

**Decimal Point:** Up to five decimal places or none:

*d.ddddd, d.ddddd, d.ddd, d.dd, d.d, or ddddd*

**Calibration Range:**

Input Channel	Input Range	Minimum Span Input 1 & Input 2
A	+/- 0-5 ADC/0-5 AAC	+/- 0.005 ADC/0.010 AAC
V	+/- 0-300 VDC/0-300 VAC	+/- 0.1 VDC/0.3

*Note: An error message will appear if the input 1 and input 2 signals are too close together.*

**Input Impedance:** Voltage Input: greater than 3 M $\Omega$ .

Current Input: 0.01  $\Omega$ .

**Input Overload:** Voltage input protected up to 500 VDC Current input protected up to 10 A by a 10A/300V fast acting non-resettable fuse. Fuse is NOT resettable after a fault; unit must be factory reconditioned.

**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

# PD2-6400 Helios High Voltage & Current Meter

## Relays

**Rating:** 2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP ( $\approx 50$  W) @ 125/250 VAC for inductive loads

**Noise Suppression:** Noise suppression is recommended for each relay contact switching inductive loads.

**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 (turn 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:** 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).

## RS485 Serial Communications Terminal

**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)

## Modbus® RTU Serial Communications

**Meter Address/Slave ID:** 1 - 247

**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 seconds

**Turn Around Delay:** Less than 2 ms (fixed)

*Note: Refer to the Helios Register Tables located at [www.predig.com](http://www.predig.com) for details.*

## Isolated 4-20 mA Transmitter Output

**Output Source:** Process channel A, V, or P, max or min for channel A, V, or highest or lowest max or min of A and V, 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: 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

**Accuracy:**  $\pm 0.1\%$  of span  $\pm 0.004$  mA

**Temperature Drift:** 0.4  $\mu\text{A}/^\circ\text{C}$  max from 0 to 65 $^\circ\text{C}$  ambient, 0.8  $\mu\text{A}/^\circ\text{C}$  max from -40 to 0 $^\circ\text{C}$  ambient

*Note: Analog output drift is separate from input drift.*

**Isolated Transmitter Power Supply:** Terminals I+ & R: 24 VDC  $\pm 10\%$ . 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 $\Omega$	700 $\Omega$
35 VDC (external)	100 $\Omega$	1200 $\Omega$

## MeterView Pro Programming Software

**System Requirements:**

Microsoft® Windows® XP/Vista/7/8/10

**Communications:**

Onboard USB (firmware version 4.0 or higher), RS-232 Adapter or RS-485 Adapter

**Meter Address:** 1 - 247

**Reports:**

- Data logging: Save as CSV file format
- Configuration: Save as PDC file format or print configuration

**Baud Rate:** 300 - 19,200 bps

**Configuration:** One meter at a time

**Protocol:**

Modbus RTU (requires ProVu firmware version 4.0 or higher)

*\*Note: Windows® 32/64-bit operating systems*

# PD2-6400 Helios High Voltage & Current Meter

## ORDERING INFORMATION

PD2-6400 • Standard Models		
85-265 VAC Model	12-24 VDC Model	Options Installed
PD2-6400-6H0	PD2-6400-7H0	No Options
PD2-6400-6H7	PD2-6400-7H7	4 Relays & 4-20 mA Output

Note: 24 V Transmitter power supply standard on all models.

Accessories	
Model	Description
PDA1024-01	24 VDC Transmitter Power Supply
PDA1002	6" DIN Rail Mounting Kit
PDA6260	Pipe Mounting Kit
PDA7485-I	RS-232 to RS-422/485 Isolated Converter
PDA8485-I	USB to RS-422/485 Isolated Converter
PDAPLUG2	Plastic Conduit Plug
PDX6901	Suppressor (snubber): 0.01 $\mu$ F/470 $\Omega$ , 250 VAC

### Your Local Distributor is:



46, Jalan SS 22/21, Damansara Jaya,  
47400 Petaling Jaya,  
Selangor Darul Ehsan, Malaysia.

Email: [nog@nog.com.my](mailto:nog@nog.com.my)

Web access: <http://www.nog.com.my>

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### WARNING

Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



AC Current Transformers	
Model	Description
PDA6405-100	100 AAC Current Transformer with 0-5 AAC Output
PDA6405-200	200 AAC Current Transformer with 0-5 AAC Output
PDA6405-400	400 AAC Current Transformer with 0-5 AAC Output
PDA6405-600	600 AAC Current Transformer with 0-5 AAC Output
PDA6405-1000	1000 AAC Current Transformer with 0-5 AAC Output



PDA2360 Series Control Stations	
Model	Description
PDA2360-E	Emergency Stop Button
PDA2361-A	1 Black Ack Button
PDA2364-MRUE	4 Black Buttons: Menu, Right, Up, Enter

LDS2-6400\_D 05/19