ProSense® Universal Signal Conditioners
Quick Start Guide

AUTOMATIONDIRECT

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CUMMING, GA 30040-5860

Models:
SCU-8400 - Universal Uni- / Bi-Polar Signal Transmitter
SCU-PDM1 or SCU-PDM2 - Display / Programming Module

ProSense Universal Uni- / Bi-Polar Transmitter Signal Conditioner model SCU-8400 is a single input device that accepts uni- / bi-polar milliampere or voltage or potentiometer inputs and provides a selectable single uni- / bi-polar analog output. It features a plastic slim-line housing, integral 35mm DIN rail mounting adapter, and removable screw terminals. The detachable SCU-PDM1 or SCU-PDM2 programming / display module (purchased separately) is required for unit configuration. The programming / display module may remain affixed for operational display of input and output values.

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⚠ WARNING ⚠

This device is designed for connection to hazardous electric voltages. Ignoring this warning can result in severe personal injury or mechanical damage. To avoid the risk of electric shock and fire, the safety instructions of this guide must be observed and the guidelines followed. The specifications must not be exceeded, and the device must only be applied as described in the following. Prior to the commissioning of the device, this installation guide must be examined carefully. Only qualified personnel (technicians) should install this device. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Until the device is mounted, do not connect hazardous voltages to the device. The following operations should only be carried out on a disconnected device and under ESD safe conditions: General mounting, connection and disconnection of wires.

Do not open the front plate of the device as this will cause damage to the connector for the display / programming front SCU-PDM1 or SCU-PDM2. This device contains no DIP-switches or jumpers. Units must be mounted on a DIN rail according to DIN 60715

SAFETY INSTRUCTIONS

Receipt and unpacking
Unpack the device without damaging it. The packing should always follow the device until it has been permanently mounted. Check at the receipt of the device to ensure the type corresponds to the one ordered.

Environment
Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation. All devices can be used for Measurement / Overvoltage Category II and Pollution Degree 2. The module is designed to operate safely at an altitude of 2000m or less.

Mounting
Mounting and connection of the device should comply with national legislation for mounting of electric materials, i.e. wire cross section, protective fuse, and location. Descriptions of input / output and supply connections are shown in this installation guide and on the side label. The following apply to hazardous
voltage-connected devices:
The max. protective fuse is 10A. A power switch shall be easily accessible and close to the device. The power switch shall be marked as the disconnecting unit for the device.

UL installation requirements
Use 60/75°C copper conductors only.
For use only in pollution degree 2 or better.
Max. ambient temperature ..... 60°C (140°F)
Wire size ..... AWG 26-14
UL file number, SCU-8400..... E197592

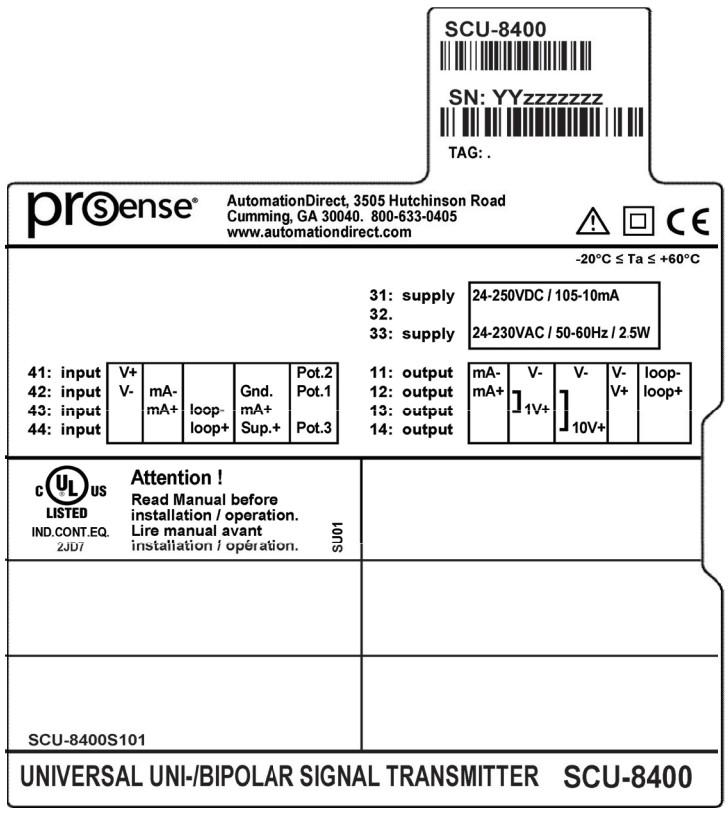
The device is an Open Type Listed Process Control Equipment. To prevent injury resulting from accessability to live parts the equipment must be installed in an enclosure.

Calibration and adjustment

During calibration and adjustment, the measuring and connection of external voltages must be carried out according to the specifications of this installation guide. The technician must use tools and instruments that are safe to use.

Cleaning
When disconnected, the device may be cleaned with a cloth moistened with distilled water.

Side Label



Technical Specifications

Operating temperature ..... -20°C to +60°C (-4°F to 140°F)
Storage temperature ..... -20°C to +85°C (-4°F to 185°F)
Supply voltage..... ..... 21.6...253 VAC or 19.2...300 VDC
Max. required power..... ≤ 2.5 W
Max. power dissipation..... ≤ 2.0 W
Fuse ..... 400mA SB / 250VAC
Isolation voltage, test / operation..... 2.3 kVAC / 250VAC (reinforced isolation)
EMC immunity influence..... < ±0.5% of span
Extended EMC immunity:
NAMUR NE 21, A criterion, burst..... < ±1% of span
Conducted emission..... Class A 150kHz - 10MHz
Relative humidity..... < 95% RH (non-cond.)
Dimensions (HxWxD) ..... 109 x 23.5 x 104 mm
Dimensions (HxWxD) w/ SCU-PDM1..... 109 x 23.5 x 116 mm or 109 x 23.5 x 132 mm w/ SCU-PDM2
Protection degree IP20

Approvals
UL, Standard for Safety ..... UL 508/C22.2 No. 14

Observed authority requirements:
EMC 2014/30/EU
LVD 2014/35/EU
RoHS 2..... 2011/65/EU

Model	*SCU-8400*
Input	
Current input ranges	0...1, 0...5, 1...5, 0...20, 4...20, ±1, ±5, ±10, ±20, ±50 mA, ±100 mA
Current input resistance	Nom. 20 Ω + PTC 10 Ω
Input voltage drop, nom.	0.6 V @ 20 mA
Voltage input ranges	0...0.1, 0...1, 0.2...1, 0...2.5, 0...5, 1...5, 0...10, 2...10, 0...100, 0...300, ±0.1, ±1, ±2.5, ±5, ±10, ±100, ±300 V
Voltage input resistance	> 2.5 V input: 3 MΩ nom. ≤ 2.5 V input: > 10 MΩ
Output	
Current output	0...5, 1...5, 0...10, 2...10, 0...20, 4...20, S4-20 mA, ±5, ±10, ±20 mA
Load (max.), current output	1000 Ω
Current limit	≤ 28 mA (unipolar) / ±28 mA (bipolar)
Voltage output	0/0.2...1, 0/1...5, 0/2...10, ±1, ±5, ±10 V
Load (min.), voltage output	≥ 500 kΩ
Buffered voltage output	0...1, 0.2...1, 0...2.5, 0...5, 1...5, 0...10, 2...10, 0...20, 4...20, ±1, ±2.5, ±5, ±10, ±20 V
Load (min.), buffered voltage output	> 2 kΩ
Current limit, buffered voltage output	< 50 mA

Note: Additional specifications available at www.AutomationDirect.com

Installation:

This installation guide for technical personnel covers the following products:

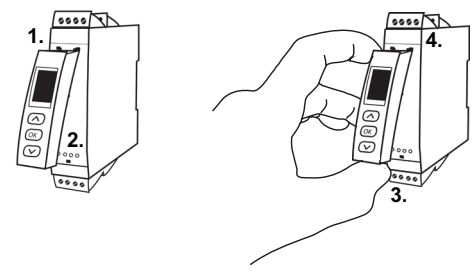
SCU-8400	SCU-PDM2
SCU-PDM1	

Mounting SCU-PDM1 or SCU-PDM2:

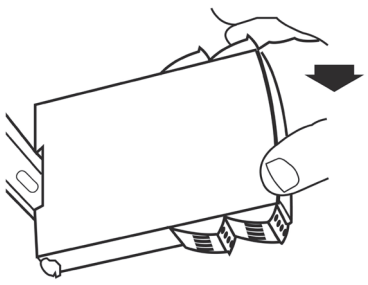
1. Insert the tabs of the SCU-PDM1 or SCU-PDM2 into the holes at the top of the device.
2. Swing the SCU-PDM1 or SCU-PDM2 down until it snaps into place.

Removing the SCU-PDM1 or SCU-PDM2:

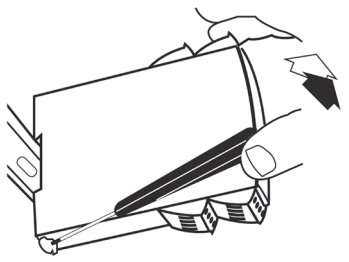
3. Push the release button on the bottom of the SCU-PDM1 or SCU-PDM2 and swing out and up.
4. With the SCU-PDM1 or SCU-PDM2 hinged up, remove it from the holes at the top of the device.



Mounting on DIN rail:
Place top notch of module onto DIN rail and then press lower portion onto DIN rail until it snaps in place.

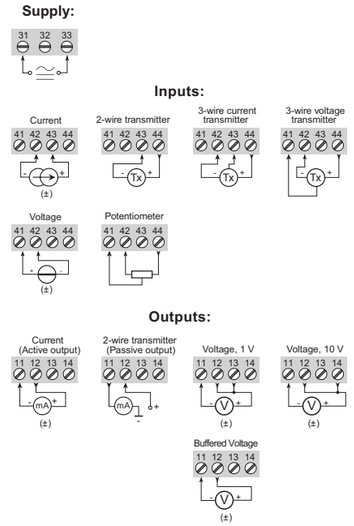


Removing from DIN rail:
Remember to remove the connectors with hazardous voltages. Detach the device from DIN rail by lifting the bottom lock.



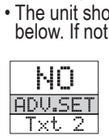
Wiring:
Max. wire size 1 x 2.5 mm2 stranded wire. Screw terminal torque 0.5 Nm.

Wiring Diagrams



Configuring a new unit

- Mount the unit on a 35mm DIN rail and connect supply, input and output wires to the appropriate terminals based on the connection diagrams in this Quick Start Guide.
- Snap the SCU-PDM1 or SCU-PDM2 Programming Module on the front of the unit.
- Power up the unit.
- The unit should display the configuration menu similar to the figure below. If not, press OK once.



- Press OK to begin configuration. Press ^ or v to scroll through options on each step. Press OK to confirm an option and move to the next step.
- Press and hold OK to step backwards through the configuration menu.

Abbreviations used on the SCU-PDM1 or SCU-PDM2 display

RA.ER = RAM error
AD.ER = A/D converter error
AO.ER = analog output supply error
EF.ER = external flash error
IF.ER = internal flash error
AO.ER = no load for current output (S4-20 mA only)
NO.CO = connection error between SCU-8400 and SCU-PDM1 or SCU-PDM2
CO.ER = invalid configuration
IN.ER = error levels on input
TY.ER = configuration in SCU-PDM1 or SCU-PDM2 doesn't match this product
ADV.SET = advanced settings
IN TYPE = input type
V.RANGE = voltage range
I.RANGE = current range
IN.LO = input low
IN.HI = input high
DEC.P = decimal place location
DISP.LO = display range low
DISP.HI = display range high
ANA.OUT = analog output
O.RANGE = output range
OUT.MOD = passive or active mode
OUT.LO = output low
OUT.HI = output high
ERR.L = output error low
ERR.H = output error high
OUT.ERR = output action on error
RESP. = output response rate
EN.PASS = enable password
NEW.PAS = new password
CAL.LO = calibrate input low to process value?
CAL.HI = calibrate input high to process value?
USE.CAL = Use process calibration values?
EN.SIM = enable simulated output
O.FUN = analog output function
O.FUNC = direct or inverted output mode
I.FUN = analog input function

Note: Help text for each abbreviation will scroll across the SCU-PDM1 or SCU-PDM2

Application Example - Bi-Polar ± 10VDC Input from DC Current Transducer to Current Output

Monitoring ±10 VDC output from a DC current transducer monitoring DC amperage and direction of flow into a 4-20mA input on a PLC.

- In the configuration menu press ^ or v until VOLT is displayed for IN.TYPE. Press OK.
- Select input range. Press ^ or v until ~10 is displayed for V.RANGE. Press OK.
- Select input units. Press ^ or v until A is displayed for UNIT. Press OK.
- Select decimal point location. Press ^ or v until 111.1 is displayed for DEC.P. Press OK.
- Set display value for minimum input. Press ^ or v until -100.0 is displayed for DISP.LO. Press OK.
- Set display value for maximum input. Press ^ or v until 100.0 is displayed for DISP.HI. Press OK.
- Select output mode. Press ^ or v until CURR is displayed for ANA.OUT. Press OK.
- Select active output. Press ^ or v until ACTI is displayed for OUT.MOD. Press OK.
- Select output range. Press ^ or v until 4-20 is displayed for O.RANGE. Press OK.
- Select no error limit. Press ^ or v until NO is displayed for ERR. LO. Press OK.
- Select no error limit. Press ^ or v until NO is displayed for ERR. HI. Press OK.
- Set analog output response time. Press ^ or v until 0.0 is displayed for RESP. Press OK.
- Wait while the settings are stored and the unit switches to run mode.

The SCU-8400 will provide a 12mA signal for zero flow conditions, 4ma at 100A negative flow, and 20mA at 100A positive flow.

Application Example - Potentiometer Input to Current Output

Convert a potentiometer position to a 0-100 percentage 4-20mA signal.

- Select input low. Press ^ or v until 100.0 is displayed for IN.HI. Press OK.
- Select input units. Press ^ or v until % is displayed for UNIT. Press OK.
- Select decimal point location. Press ^ or v until 111.1 is displayed for DEC.P. Press OK.
- Set display value for minimum input. Press ^ or v until 0.0 is displayed for DISP.LO. Press OK.
- Set display value for maximum input. Press ^ or v until 100.0 is displayed for DISP.HI. Press OK.
- Select output mode. Press ^ or v until CURR is displayed for ANA. OUT. Press OK.
- Select active output. Press ^ or v until ACTI is displayed for OUT. MOD. Press OK.
- Select output range. Press ^ or v until 4-20 is displayed for O.RANGE. Press OK.
- Select no error limit. Press ^ or v until NO is displayed for ERR. LO. Press OK.
- Select no error limit. Press ^ or v until NO is displayed for ERR.HI. Press OK.
- Set analog output response time. Press ^ or v until 0.0 is displayed for RESP. Press OK.
- Wait while the settings are stored and the unit switches to run mode.

The SCU-8400 will provide a 4mA signal when the potentiometer is turned to zero % and 20mA at 100 %.

Application Example - Bi-Polar Current Input to Bi-Polar Voltage Output

- **In the configuration menu press ^ or v until CURR is displayed for IN.TYPE. Press OK.**
- **Select input range. Press ^ or v until ~20 is displayed for I.RANGE. Press OK.**
- **Select input units. Press ^ or v until mA is displayed for UNIT. Press OK.**
- **Select decimal point location. Press ^ or v until 111.1 is displayed for DEC.P. Press OK.**
- **Set display low. Press ^ or v until -20.0 is displayed for DISP.LO. Press OK.**
- **Set display high. Press ^ or v until 20.0 is displayed for DISP.HI. Press OK.**
- **Select output mode. Press ^ or v until VOLT is displayed for ANA.OUT. Press OK.**
- **Select voltage output type. Press ^ or v until VBUF is displayed for O.TYPE. Press OK.**
- **Select output range. Press ^ or v until ~10 is displayed for O.RANGE. Press OK.**
- **Select low input error. Press ^ or v until YES is displayed for ERR.LO. Press OK.**
- **Set the low input limit. Press ^ or v until -21.0 is displayed for mA. Press OK.**
- **Select the error output state. Press ^ or v until DOWN is displayed for OUT.ERR. Press OK.**
- **Select high input error. Press ^ or v until YES is displayed for ERR.HI. Press OK.**
- **Set the high input limit. Press ^ or v until 21.0 is displayed for mA. Press OK.**
- **Select the error output state. Press ^ or v until UP is displayed for OUT.ERR. Press OK.**
- **Set analog output response time. Press ^ or v until 0.0 is displayed for RESP. Press OK.**
- **Wait while the settings are stored and the unit switches to run mode.**

The SCU-8400 will provide a -10 VDC signal for -20 mA input and a 10 VDC signal for a 20 mA signal. If a low input error occurs the output will drop to -11.5 VDC and if a high input error occurs the output will rise to 11.5 VDC. See output limits and error indication tables from manual for more detail.

Advanced Operations

Several useful functions are in the Advanced Settings Menu. To get to the Advanced Settings Menu, Press ^ or v until YES is displayed for the first screen of the configuration menu that looks like this:

The configuration of the SCU-8400 can be saved into the SCU-PDM1 or SCU-PDM2. The SCU-PDM1 or SCU-PDM2 can then be moved to another unit (must be the same part number) and the configuration loaded into the new unit.

- Enter Advanced Settings menu and then press ^ or v until MEM is displayed for SETUP. Press OK.
- *To save the configuration into the SCU-PDM1 or SCU-PDM2.* Press ^ or v until SAVE is displayed for MEMORY. Press OK.
- *To load the configuration from the SCU-PDM1 or SCU-PDM2 into the SCU-8400.* Press ^ or v until LOAD is displayed for MEMORY. Press OK.

Password Protection allows the user to create a 4-digit password (0000-9999) to prevent tampering with configuration settings if the SCU-PDM1 or SCU-PDM2 is left mounted to the front of the signal conditioner.

- Enter Advanced Settings menu and then press ^ or v until PASS is displayed for SETUP. Press OK.
- *To enable password protection.* Press ^ or v until YES is displayed for EN.PASS. Press OK.
- *To set a password.* Press ^ or v until the desired code is displayed for NEW.PAS. Press OK.

Additional Help and Support

- For product support, specifications, installation and troubleshooting, a Hardware User Manual can be downloaded from the On-line Documentation area of the ***AutomationDirect*** web site.
- For additional technical support and questions, call out Technical Support team @ 1-800-633-0405 or 770-844-4200

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