

# proense® Universal Signal Conditioners

## Quick Start Guide

AUTOMATIONDIRECT

### Models:

**SCU-7900 - Universal AC Transmitter**  
**SCU-PDM1 or SCU-PDM2 - Display / Programming Module**

ProSense Universal AC Transmitter Signal Conditioner model SCU-7900 is a single input devices that accepts AC voltage or AC Current inputs and provides a selectable single 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.

3505 HUTCHINSON ROAD  
 CUMMING, GA 30040-5860



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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 any 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-7900..... E197592

The device is an Open Type Listed Process Control Equipment. To prevent injury resulting from accessibility 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.

## 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.....	≤ 1.8 W
Max. power dissipation.....	≤ 2.5 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
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
Dimensions (HxWxD) w/ SCU-PDM2.....	109 x 23.5 x 132 mm w/ SCU-PDM2
Protection degree .....	IP20
<b>Approvals</b>	
UL, Standard for Safety .....	UL 508/C22.2 No. 14
<b>Observed authority requirements:</b>	
EMC .....	2014/30/EU
LVD .....	2014/35/EU
RoHS 2.....	2011/65/EU

Model	SCU-7900
<b>Input</b>	
Current input ranges	0...0.5; 0...1; 0...2.5 & 0...5 Arms / 40...400 Hz
Current input resistance	Nom. < 0.07 Ω
Input voltage drop, nom.	Nom. < 0.35 V
Voltage input ranges	0...0.5, 0...1, 0...2.83, 0...5, 0...120, 0...230 & 0...300 Vrms / 40...400 Hz
Voltage input resistance	Nom. 3 MΩ    100 pF
<b>Output</b>	
Current output	0...20, 4...20, S4...20, ±10, ±20 mA
Load (max.), current output	≤ 800 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

Note: Additional specifications available at [www.AutomationDirect.com](http://www.AutomationDirect.com)

## Installation:

This installation guide for technical personnel covers the following products:

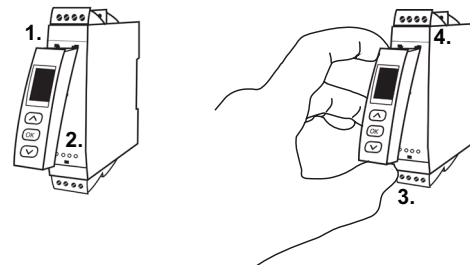
SCU-7900	SCU-PDM2
SCU-PDM1	

### 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.

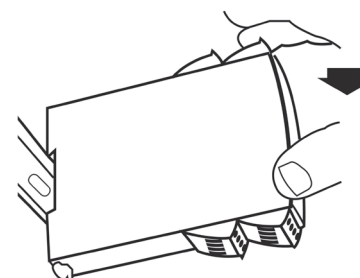
### Removing the SCU-PDM1 or SCU-PDM2:

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.



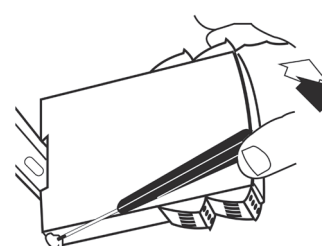
### Mounting on DIN rail:

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 mm<sup>2</sup> stranded wire. Screw terminal torque 0.5 Nm.

## Side Label

SCU-7900

SN: YYZZZZZZ

TAG: .

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 Cumming, GA 30040. 800-633-0405  
[www.automationdirect.com](http://www.automationdirect.com)

-20°C ≤ Ta ≤ +60°C

<p>41: input V</p> <p>42: input V(N) I(N)</p> <p>43: input I</p> <p>44: input I</p>	<p>31: supply 24-250VDC / 105-10mA</p> <p>32: supply</p> <p>33: supply 24-230VAC / 50-60Hz / 2.5W</p>	<p>11: output mA- mA+</p> <p>12: output V- V+</p> <p>13: output loop- loop+</p> <p>14: output</p>
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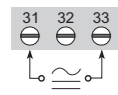
**Attention !**  
 Read Manual before installation / operation.  
 Lire manual avant installation / opération.

SCU-7900S101

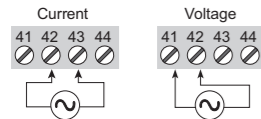
**UNIVERSAL AC TRANSMITTER SCU-7900**

## Wiring Diagrams

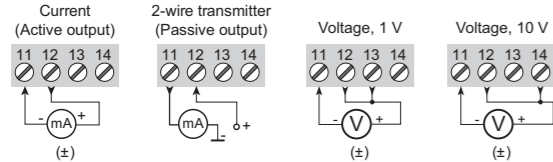
### Supply:



### Inputs:



### Outputs:



## 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 **▼** 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	DISP.LO = display range low
AD.ER = A/D converter error	DISP.HI = display range high
AO.ER = analog output supply error	VRMS = volts RMS
EF.ER = external flash error	ARMS = amps RMS
IF.ER = internal flash error	ANA.OUT = analog output
AO.ER = no load for current output (S4-20 mA only)	ORANGE = output range
NO.CO = connection error between SCU-7900 and SCU-PDM1 or SCU-PDM2	OUT.MOD = passive or active mode
CO.ER = invalid configuration	ILIM.LO = low output limit
IN.ER = error levels on input	ILIM.HI = high output limit
TY.ER = configuration in SCU-PDM1 or SCU-PDM2 doesn't match this product	OUT.ERR = output action on error
ADV.SET = advanced settings	RESP. = output response rate
IN.TYPE = input type	EN.PASS = enable password
V.RANGE = voltage range	NEW.PAS = new password
I.RANGE = current range	CAL.LO = calibrate input low to process value?
IN.LO = input low	CAL.HI = calibrate input high to process value?
IN.HI = input high	USE.CAL = Use process calibration value?
DEC.P = decimal place location	EN.SIM = enable simulated output
	O.FUN = analog output function
	O.FUNC = direct or inverted output mode

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

## Application Example - AC Current Transformer Input to Current Output

Monitoring an AC motor using a current transformer with a 50:5 ratio into a 4-20mA input on a PLC. The transformer will measure the current flow of 0 to 50 Amps. The current draw can be used to monitor motor condition and run state.

- In the configuration menu press **▲** or **▼** until CURR is displayed for IN.TYPE. Press **OK**.
  - Select input range. Press **▲** or **▼** until 0-5 is displayed for I.RANGE. Press **OK**.
  - Select input units. Press **▲** or **▼** until ARMS is displayed for UNIT. Press **OK**.
  - Select decimal point location. Press **▲** or **▼** until 111.1 is displayed for DEC.P. Press **OK**.
  - Set display value for minimum input. Press **▲** or **▼** until 0.0 is displayed for DISP.LO. Press **OK**.
  - Set display value for maximum input. Press **▲** or **▼** until 50.0 is displayed for DISP.HI. Press **OK**.
  - Select output mode. Press **▲** or **▼** until CURR is displayed for ANA.OUT. Press **OK**.
  - Select output range. Press **▲** or **▼** until 4-20 is displayed for ORANGE. Press **OK**.
  - Select active output. Press **▲** or **▼** until ACTI is displayed for OUT.MOD. Press **OK**.
  - Select no input limit. Press **▲** or **▼** until NO is displayed for ILIM.L. Press **OK**.
  - Select no input limit. Press **▲** or **▼** until NO is displayed for ILIM.H. Press **OK**.
  - Set analog output response time. Press **▲** or **▼** until 0.0 is displayed for RESP. Press **OK**.
  - Wait while the settings are stored and the unit switches to run mode.
- The SCU-7900 will provide the excitation voltage for the 4-20 mA output because it is set for active output. To use an external voltage source passive should be selected.

## Application Example - AC Voltage Input to Voltage Output

Monitor a 120 AC voltage  $\pm 5\%$  with  $\pm 8\%$  input level error monitoring to a 0-10 VDC output signal.

- In the configuration menu press **▲** or **▼** until VOLT is displayed for IN.TYPE. Press **OK**.
- Select input range. Press **▲** or **▼** until CUST is displayed for V.RANGE. Press **OK**.
- Select lower input range. Press **▲** or **▼** until 114.0 is displayed for IN.LO. Press **OK**.
- Select upper input range. Press **▲** or **▼** until 126 is displayed for IN.HI. Press **OK**.
- Select input units. Press **▲** or **▼** until VRMS is displayed for UNIT. Press **OK**.
- Select decimal point location. Press **▲** or **▼** until 111.1 is displayed for DEC.P. Press **OK**.
- Set display value for minimum input. Press **▲** or **▼** until 114.0 is displayed for DISP.LO. Press **OK**.
- Set display value for maximum input. Press **▲** or **▼** until 126.0 is displayed for DISP.HI. Press **OK**.
- Select output mode. Press **▲** or **▼** until VOLT is displayed for ANA.OUT. Press **OK**.

Application Example Continued above.

## Application Example - AC Voltage Input to Voltage Output - Cont'd

- Select output range. Press **▲** or **▼** until 0-10 is displayed for ORANGE. Press **OK**.
- Select the low input limit. Press **▲** or **▼** until YES is displayed for ILIM.L. Press **OK**.
- Set the low input limit. Press **▲** or **▼** until 110.4 is displayed for ILIM.L. Press **OK**.
- Select the error output state. Press **▲** or **▼** until UP is displayed for OUT.ERR. Press **OK**.
- Select the high input limit. Press **▲** or **▼** until YES is displayed for ILIM.H. Press **OK**.
- Set the high input limit. Press **▲** or **▼** until 129.6 is displayed for VRMS. Press **OK**.
- Select the error output state. Press **▲** or **▼** until UP is displayed for OUT.ERR. Press **OK**.
- Set analog output response time. Press **▲** or **▼** until 0.0 is displayed for RESP. Press **OK**.
- Wait while the settings are stored and the unit switches to run mode.

If the voltage falls to 110.4 or goes to 129.6 VAC the output will be 11.5 VDC and the back light and IN.ER text will blink on the display. The output voltage will reach a maximum of 10.25 VDC when going above the set range and will hold there until the error level is reached. See output limits and error indication tables from manual for more detail.

## Application Example - AC Voltage Custom Range to Bi-Polar Voltage Output

Convert a 0-240 AC voltage to a +/-5 VDC output signal. For example a voltage input of zero would correlate to an output of -5 VDC, 120 VAC would output zero volts, and 240 VAC input would have an output of +5 VDC.

- In the configuration menu press **▲** or **▼** until VOLT is displayed for IN.TYPE. Press **OK**.
- Select input range. Press **▲** or **▼** until CUST is displayed for V.RANGE. Press **OK**.
- Select lower input range. Press **▲** or **▼** until 0.000 is displayed for IN.LO. Press **OK**.
- Select upper input range. Press **▲** or **▼** until 240 is displayed for IN.HI. Press **OK**.
- Select input units. Press **▲** or **▼** until VRMS is displayed for UNIT. Press **OK**.
- Select decimal point location. Press **▲** or **▼** until 111.1 is displayed for DEC.P. Press **OK**.
- Set display value for minimum input. Press **▲** or **▼** until 0.0 is displayed for DISP.LO. Press **OK**.
- Set display value for maximum input. Press **▲** or **▼** until 240.0 is displayed for DISP.HI. Press **OK**.
- Select output mode. Press **▲** or **▼** until VOLT is displayed for ANA.OUT. Press **OK**.

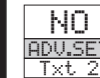
Application Example Continued above.

## Application Example - AC Voltage Custom Range to Bi-Polar Voltage Output - Cont'd

- Select output range. Press **▲** or **▼** until +/-5 is displayed for ORANGE. Press **OK**.
- Select no input limit. Press **▲** or **▼** until NO is displayed for ILIM.L. Press **OK**.
- Select no input limit. Press **▲** or **▼** until NO is displayed for ILIM.H. Press **OK**.
- Set analog output response time. Press **▲** or **▼** until 0.0 is displayed for RESP. Press **OK**.
- Wait while the settings are stored and the unit switches to run mode.

## Advanced Operations

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



The configuration of the SCU-7900 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 **▼** until MEM is displayed for SETUP. Press **OK**.
- To save the configuration into the SCU-PDM1 or SCU-PDM2. Press **▲** or **▼** until SAVE is displayed for MEMORY. Press **OK**.
- To load the configuration from the SCU-PDM1 or SCU-PDM2 into the SCU-7900. Press **▲** or **▼** 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 **▼** until PASS is displayed for SETUP. Press **OK**.
- To enable password protection. Press **▲** or **▼** until YES is displayed for EN.PASS. Press **OK**.
- To set a password. Press **▲** or **▼** 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