ProSense® SCU Series Universal Signal Conditioners

SCU-3100, SCU-1400, SCU-1600 Signal Conditioners

Part No. SCU-1400 Shown

The Universal Signal Conditioners from AutomationDirect are extremely versatile providing the flexibility to convert, transmit, scale and isolate signals from a wide variety of process sensors and controller I/O. Scalable input signal types supported include mA, VDC, thermocouple with internal or optional external cold junction compensation, 2-, 3-, 4-wire RTDs, linear resistance or potentiometer signals. Numerous selectable input and output ranges, two-point field scalability, and configuration for direct or inverse acting signals will handle hundreds of applications. The SCU-3100 has two individually programmable relay outputs used for alarming and control functions. The output on the SCU-1400 is a range selectable mA or VDC analog signal while the SCU-1600 provides both selectable mA or VDC analog signal and two individually programmable relays. An integral excitation power supply output is available to power a 2-wire transmitter or a 3-wire potentiometer. The isolated universal supply voltage input eliminates the need for separate transformers or power supplies. Isolation is also provided between input and output.

The signal conditioners are easily configured with the SCU-PDM1 menu-structured LCD programming/display module (a computer running special calibration software is not required and there are no confusing DIP switches or jumpers to set). Automatic scrolling Help text identifies each menu item. The detachable programming/display module can store and transfer configuration parameters from one signal conditioner to another, minimizing set-up time in multiple unit applications. Programming is available in seven different languages and the programming/display module can be password protected to prevent unauthorized changes to the configuration. When not used for configuration, the programming/display module can remain on the signal conditioner to display the input signal value and engineering units, output signal, and relay status (if equipped). A process simulation function allows manual manipulation of the input signal to control the output signal for trouble-shooting and checkout.

Features

- Flexibility to accept mA, VDC, thermocouple, RTD, linear resistance or potentiometer signal types
- Selectable input and output ranges, two-point field scalability, and direct or reverse signal configuration to handle hundreds of applications
- SCU-3100: two individually programmable relay outputs.
- SCU-1400: selectable direct or reverse acting mA or VDC analog output signal.
- SCU-1600: selectable direct or reverse acting mA or VDC analog output signal and two programmable relay outputs.
- Universal supply voltage, 21.6 to 253 VAC or 19.2 to 300 VDC, polarity insensitive
- 3-way isolation between input, output, and power
- Auxiliary power supply output for 2-wire transmitters and 3-wire potentiometers
- Easy-to-use detachable LCD programming/display module SCU-PDM1 (Sold separately and required for programming)
- Transfer configuration settings from one signal conditioner to another with SCU-PDM1
- LEDs indicate operation and relay status (SCU-3100, SCU-1600) when display module is not installed
- Integral 35mm DIN rail mounting adapter
- Removable screw terminal blocks are keyed to ensure correct installation
- cULus, FM, and CE marked
- 5 year warranty

SCU-3100, SCU-1400, SCU-1600 Universal Signal Conditioners				
Part No.	***Description***	***Quantity***	***Weight (lbs)***	***Price***
SCU-3100	ProSense limit alarm, isolated, current, voltage, RTD, thermocouple or potentiometer input, °F or °C, relay output, 21.6-253 VAC/19.2-300 VDC operating voltage, 35mm DIN rail mount, removable screw terminal plugs.	1	0.32	
SCU-1400	ProSense signal conditioner, isolated, current, voltage, RTD, thermocouple or potentiometer input, °F or °C, current or voltage output, 21.6-253 VAC/19.2-300 VDC operating voltage, 35mm DIN rail mount, removable screw terminal plugs.	1	0.38	
SCU-1600	ProSense signal conditioner, isolated, current, voltage, RTD, thermocouple or potentiometer input, °F or °C, current, voltage, relay output, 21.6-253 VAC/19.2-300 VDC operating voltage, 35mm DIN rail mount, removable screw terminal plugs.	1	0.38	

SCU-3100, SCU-1400, SCU-1600 Signal Conditioners

SCU-3100, SCU-1400, SCU-1600 Universal Signal Conditioners Technical Specifications		
General Specifications		
Power	AC Power	21.6 to 253 VAC, 50/60 Hz
	DC Power	19.2 to 300 VDC
Consumption	≤ 2.0W (SCU-3100 & SCU-1400) ≤ 2.5W (SCU-1600)	
Fuse	400 mA slow blow / 250 VAC (not user replaceable)	
Auxiliary Power Supply Output	16-25 VDC, 20 mA max (Terminal 43 and 44)	
Isolation Voltage, Test / Operation	2.3 kVAC/250 VAC	
Configuration Interface	Programming/display module, SCU-PDM1 (sold separately)	
Signal/noise Ratio	Min. 60 dB (0 to 100 kHz)	
Response Time (0 to 90%, 100 to 10%)	Temperature input	≤ 1 sec
	mA / V input	≤ 400 ms
Calibration Temperature	20 to 28°C [68 to 82.4°F]	
Accuracy	The greater of the general and basic values (See Accuracy Table 1)	
Vibration	IEC 60068-2-6, UL 508/C22.2 No. 14 2 to 13.2 Hz...± 1mm 13.2 to 100Hz...± 0.7 g	
EMC Immunity	≤ ±0.5% of span	
Extended EMC Immunity: NAMUR NE 21, A criterion, burst	≤ ±1% of span	
Environmental Conditions	Operating Temperature	-20 to +60°C [-4 to 140°F]
	Storage Temperature	-20 to +85°C [-4 to 185°F]
	Operating and Storage Humidity	95% relative humidity (non-condensing)
Approvals	UL: E191072, UL 508/C22.2 No. 14 FM: FM19US0054X, 3600, 3611, 3819, ISA 61010-1, Class I, Div. 2, Group A-D, T5, Class I, Div. 2, Group IIC, T5 Zone 2 CE: EMC 2014/30/EU LVD 2014/35/EU RoHS2 2011/65/EU amended by 2015/863	
Construction	IP 20, case body is black high impact plastic. Pollution degree 1.	
Connections	Wire strip length	7.5mm [0.3 in]
	Wire gauge	26 - 14 AWG standard wire
	Torque	0.5 N-m [4.5 inch-lbs]
Weight	SCU-1400	145g [5.1 oz], 160 g [5.6 oz] with programming module
	SCU-1600	170g [5.9 oz], 185 g [6.5 oz] with programming module
	SCU-3100	170g [5.9 oz], 185 g [6.5 oz] with programming module
Dimensions (HxWxD)	109 x 23.5 x 104mm [4.3 x 0.93 x 4.1 in], 109 x 23.5 x 116mm [4.3 x 0.93 x 4.6 in] with programming module	

Accuracy Table 1		
General Values		
Input Type	***Absolute Accuracy***	***Temperature Coefficient***
All	≤ ± 0.1% of span	≤ ± 0.01% of span/°C [± 0.01% of span/°F]
Basic Values		
Input Type	***Basic Accuracy***	***Temperature Coefficient***
mA	≤ ± 4 µA	≤ ± 0.4 µA/°C [±0.22µA/°F]
Volt	≤ ± 20 µV	≤ ± 2 µV/°C [±1.1µV/°F]
Pt100	≤ ± 0.2°C [±0.36°F]	≤ ± 0.01°C/°C [±0.001°F/°F]
Linear resistance	≤ ± 0.1 Ω	≤ ± 0.01 Ω/°C [±0.0056Ω/°F]
Potentiometer	≤ ± 0.1 Ω	≤ ± 0.01 Ω/°C [±0.0056Ω/°F]
TC Type: E, J, K, L, N, T, U	≤ ± 1°C [±1.8°F]	≤ ± 0.05°C/°C [±0.05°F/°F]
TC Type: B, R, S, W3, W5, LR	≤ ± 2°C [3.6°F], TC Type B ≤ ± 4°C, 200...1820°C	≤ ± 0.2°C/°C [±0.2°F/°F], TC Type B ≤ ± 4°C, 200...1820°C

SCU-3100, SCU-1400, SCU-1600 Signal Conditioners

Input/Output Specifications

Inputs			
Current Input			
Programmable Ranges		0 to 20 and 4 to 20 mA DC	
Measurement Range		0 to 20 mA	
Input Resistance		Nom. 70 Ω	
Sensor Error Detection		4 to 20 loop break, ≤3.6mA; ≥21mA	
Voltage Input			
Programmable Ranges		0 to 1, 0.2 to 1, 0 to 5, 1 to 5, 0 to 10, and 2 to 10 VDC	
Measurement Range		0V to 12 VDC	
Input Resistance		Nom. 10 MΩ	
Thermocouple Inputs			
Thermocouple Type		B, E, J, K, L, N, R, S, T, U, W3, W5, and LR	
Cold Junction Compensation		Via internally mounted sensor: < ± 2.0°C [< ± 3.6°F] (+ 0.4°C * Δt), Δt = internal temperature - ambient temperature Via external sensor in connector SCU-CJC1: 20 to 28°C [68 to 82.4°F] ≤ ± 1°C [1.8°F] and -20 to 20°C / 8 to 70°C [-4 to 68°F / 82.4 to 158°F] ≤ ± 2°C [3.6°F]	
Sensor Error Detection		Sensor break, >750kOhm/(1.25V)	
Sensor Error Current		When detecting 2µA, otherwise 0 µA	
Type	***Min. value***	***Max. value***	***Standard***
B	0°C [+32°F]	+1820°C [+3308°F]	IEC 60584-1
E	-100°C [-148°F]	+1000°C [+1832°F]	IEC 60584-1
J	-100°C [-148°F]	+1200°C [+2192°F]	IEC 60584-1
K	-180°C [-292°F]	+1372°C [+2502°F]	IEC 60584-1
L	-200°C [-328°F]	+900°C [+1652°F]	DIN 43710
N	-180°C [-292°F]	+1300°C [+2372°F]	IEC 60584-1
R	-50°C [-58°F]	+1760°C [+3200°F]	IEC 60584-1
S	-50°C [-58°F]	+1760°C [+3200°F]	IEC 60584-1
T	-200°C [-328°F]	+400°C [+752°F]	IEC 60584-1
U	-200°C [-328°F]	+600°C [+1112°F]	DIN 43710
W3	0°C [+32°F]	+2300°C [+4172°F]	ASTM E988-90
W5	0°C [+32°F]	+2300°C [+4172°F]	ASTM E988-90
LR	-200°C [-328°F]	+800°C [+1472°F]	GOST 3044-84
RTD, Linear Resistance, Potentiometer Inputs			
RTD Types		Pt10, Pt20, Pt50, Pt100, Pt200, Pt250, Pt300, Pt400, Pt500, Pt1000, Ni50, Ni100, Ni120, Ni1000, Cu10, Cu20, Cu50, Cu100	
Cable Resistance per Wire		RTD, 50 Ω max	
Sensor Current		RTD, Nom. 0.2 mA	
Sensor Error Detection		Sensor break >15 kOhm Sensor short <15 Ohm (N/A for Cuxx, Pt10, Pt20, Pt50)	
Input type	***Min. value***	***Max. value***	***Standard***
Pt10 to Pt1000	-200°C [-328°F]	+850°C [+1562°F]	IEC60751
Ni50 to Ni1000	-60°C [-76°F]	+250°C [+482°F]	DIN 43760
Cu10 to Cu100	-200°C [-328°F]	-260°C [-436°F]	α = 0.00427
Linear Resistance	0 Ω	10kΩ	–
Potentiometer	10 Ω	100kΩ	–

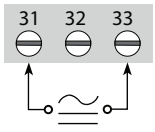
SCU-3100, SCU-1400, SCU-1600 Signal Conditioners

Outputs	
Analog Output - Current (SCU-1400 and SCU-1600)	
Signal Range	0 to 20 mA
Programmable Signal Range	0 to 20, 4 to 20, 20 to 0, and 20 to 4 mA
Load Resistance	800 Ω max, 20mA, 16 VDC
Load Stability	0.01% of span, 100 Ω load
Output state on sensor error detection	0 / 3.5 mA / 23 mA / none selectable
Output Limitation	For 4 to 20 and 20 to 4 mA signals: 3.8 to 20.5 mA
	For 0 to 20 and 20 to 0 mA signals: 0 to 20.5 mA
Current Limit	≤28 mA
Analog Output - Voltage (SCU-1400 and SCU-1600)	
Signal Range (Span)	0 to 10 VDC
Programmable Signal Ranges	0 to 1, 0.2 to 1, 0 to 10, 0 to 5, 1 to 5, 2 to 10, 1 to 0, 1 to 0.2, 5 to 0, 5 to 1, 10 to 0, and 10 to 2 V
Load	500k Ω min
Relay outputs (SCU-3100 and SCU-1600)	
Relay Functions	Setpoint, Window, Sensor Error, Latch, Power and Off
Hysteresis	0 to 100%
On and Off Delay	0 to 3600 sec
Relay state on sensor error detection	Break / Make / Hold selectable
Relay contact ratings	250 Vrms max; 2 A AC or 1 A DC max; 500 VA max

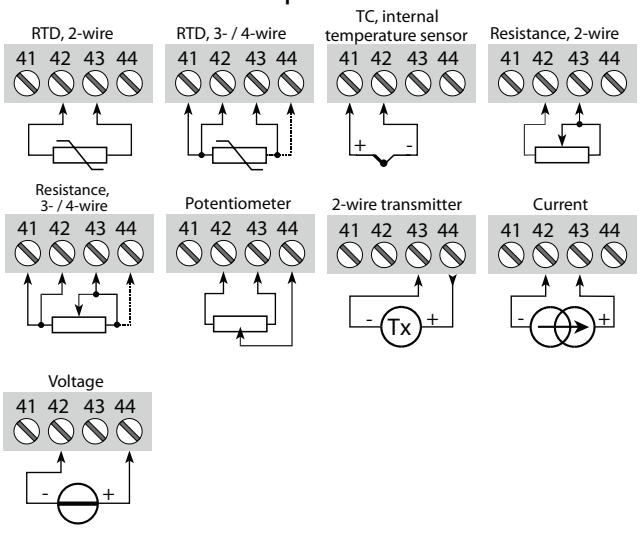
Wiring Diagrams

Models SCU-1400/1600/3100

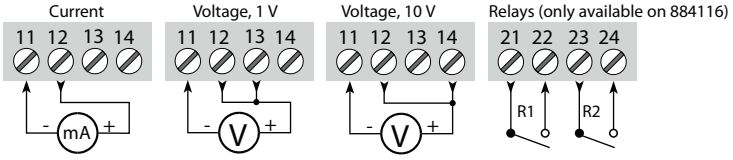
Supply:



Inputs:



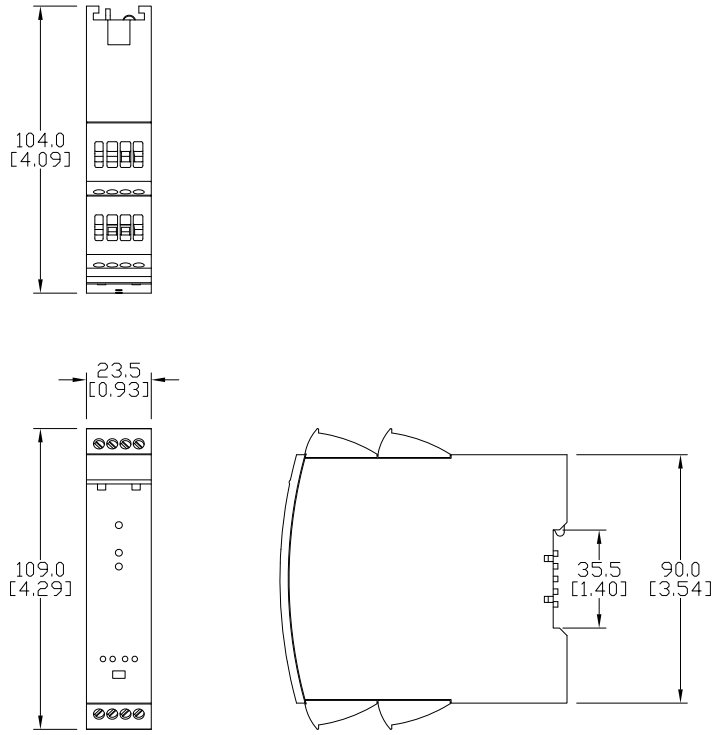
Outputs:



SCU-3100, SCU-1400, SCU-1600 Signal Conditioners

Dimensions

mm [inches]



See our website _____ for complete Engineering drawings.

SCU Series Signal Conditioner Accessories

Programming/Display Module SCU-PDM1

Application:

- The AutomationDirect SCU-PDM1 module easily connects to the front of the Universal Signal Conditioners and is used as a display and to enter or adjust the programming of the module.
- Can be moved from one module to another and download the configuration of the first transmitter to subsequent transmitters.
- Fixed display for visualization of process data and status.
- Required for programming all SCU Series Universal Signal Conditioner models.

Technical characteristics:

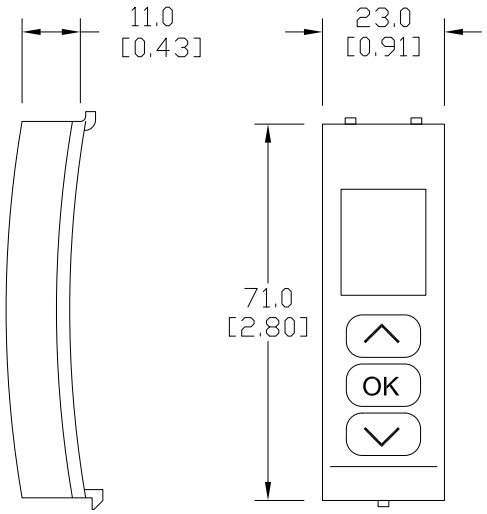
- LCD display with 4 lines; Line 1 (H = 5.57 mm, 0.22 in) shows input signal, line 2 (H = 3.33 mm, 0.13 in) shows units, line 3 (H = 3.33 mm, 0.13 in) shows analog output or user defined text and line 4 shows communication and relay status.
- Programming access can be blocked by assigning a password. The password is saved in the transmitter in order to ensure against unauthorized modifications to the configuration.
- Not capable of standalone or remote operation.
- For Use With: SCU-3100, SCU-1400, SCU-1600, SCU-8400, SCU-7900

Mounting/Installation:

- Snap SCU-PDM1 onto the front of the universal signal conditioners.
- Can be installed or removed whether the signal conditioner is powered or not.

Selectable Engineering Units

°C	hp	kW	mA	pH
°F	hPa	kWh	mbar	rpm
%	Hz	l	mils	s
A	in	l/h	min	S
bar	in/h	l/min	mm	t
cm	in/min	l/s	mm/s	t/h
ft	in/s	m	mol	uA
ft/h	ips	m/h	MPa	um
ft/min	K	m/min	mV	uS
ft/s	kA	m/s	MW	V
g	kg	m/s2	MWh	W
gal/h	kJ	m3	N	Wh
gal/min	kPa	m3/h	Ohm	yd
GW	kV	m3/min	Pa	



See our website _____ for complete Engineering drawings.

External Cold Junction Compensation Connector

Part No. SCU-CJC1

Installation:

- Remove terminal block included with SCU-1400, SCU-1600 or SCU-3100 signal conditioner and replace with SCU-CJC1.

SCU Series Signal Conditioner Accessories				
Part No.	***Description***		***Weight (lb)***	***Price***
SCU-PDM1	ProSense detachable programming/display module, for use with SCU series signal conditioners.	1	0.04	
SCU-CJC1	ProSense external cold junction compensation (CJC) connector, for use with SCU-3100, SCU-1400, SCU-1600 signal conditioners.	1	0.02	