ProSense® SCU Series Universal Signal Conditioners

Part No. SCU-2501 Shown

SCU-2501, SCU-2502, SCU-2503 Signal Conditioners

The SCU-2501, SCU-2502, and SCU-2503 Universal Signal Conditioners from AutomationDirect are extremely versatile, providing the flexibility to convert, transmit, scale, and isolate frequency input signals from a wide variety of process sensors and controller I/O. The input accepts frequency signals up to 100 kHz from NPN, PNP, TTL, Tachometer, and NAMUR sensors. The SCU-2501 provides a range selectable unipolar or bipolar mA or VDC analog output and a programmable relay output. The outputs on the SCU-2502 are two programmable relays used for alarming and control functions. The SCU-2503 outputs provide a range selectable unipolar or bipolar mA or VDC analog signal and scalable frequency output up to 100 kHz. The SCU-2500 series also features the ability to establish a square root relationship between input and output, which is useful in flow measurement applications. An integral excitation power supply output is available to power various types of input sensors. The isolated universal supply voltage input eliminates the need for separate transformers or power supplies. Isolation is also provided between input and output.

The SCU-2500 series is easily configured with the SCU-PDM2 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, engineering units, and output signal. A process simulation function allows manual manipulation of the input signal to control the output signal for trouble-shooting and checkout.

Features

- Frequency input signals up to 100 kHz from NPN, PNP, TTL, Tachometer, and NAMUR sensors
- SCU-2501: range selectable unipolar or bipolar mA or VDC analog output and a programmable relay output
- SCU-2502: two individually programmable relay outputs
- SCU-2503: range selectable unipolar or bipolar mA or VDC analog signal and scalable frequency output up to 100 kHz
- Available square root function
- Buffered voltage output option to handle high current load devices
- 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 various types of input sensors
- Easy-to-use detachable LCD programming/display module SCU-PDM2 (Sold separately and required for programming)
- Transfer configuration settings from one signal conditioner to another with SCU-PDM2
- Integral 35mm DIN rail mounting adapter
- Removable screw terminal blocks are keyed to ensure correct installation
- cULus and CE marked
- 5 year warranty

SCU-2501, SCU-2502, SCU-2503 Universal Signal Conditioners

Part No.	Application	Isolation	Input	Output	Field Configurable	Operating Voltage	Mounting	Electrical Connection	Quantity	Weight (lbs)	Drawing Link	Price
SCU-2501	Signal conditioner	Yes	Frequency	Unipolar or bipolar current, (1) relay	Yes*	21.6-253 VAC/19.2-300 VDC	35mm DIN rail	Removable screw terminal plugs	1	0.46	PDF	$271.00
SCU-2502				(2) relays					1	0.48	PDF	$258.00
SCU-2503				Unipolar or bipolar current, voltage, frequency					1	0.44	PDF	$299.00

* Requires SCU-PDM2

SCU-2501, SCU-2502, SCU-2503
Universal Signal Conditioners

SCU-2501, SCU-2502, SCU-2503 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	≤ 2.6 W	
Max. Power Dissipation	≤ 2.1 W	
Fuse	400 mA slow blow / 250 VAC (not user replaceable)	
Auxiliary Power Supply Output	5-17 VDC, 20 mA max (Terminal 43 and 44)	
Isolation Voltage, Test / Operation	2.3 kVAC/250 VAC	
Configuration Interface	Programming/display module, SCU-PDM2 (sold separately) or SCU-PDM1 (discontinued and replaced by SCU-PDM2)	
Signal/noise Ratio	Min. 60 dB	
Response Time (0 to 90%, 100 to 10%)	Frequency input	< 30ms
Calibration Temperature	20 to 28°C [68 to 82.4°F]	
Accuracy	The greater of the general and basic values (See Accuracy Table)	
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 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	7.5 mm [0.3 in]
	Wire gauge	26 - 14 AWG standard wire
	Torque	0.5 N-m [4.5 inch-lbs]
Weight	SCU-2501	160g [5.6 oz], 175 g [6.2 oz] with programming module
	SCU-2502	165g [5.8 oz], 180 g [6.3 oz] with programming module
	SCU-2503	150g [5.3 oz], 165 g [5.8 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 116 or 131mm depending on which programming module, PDM1 or PDM2 [4.3 x 0.93 x 4.6 or 5.16 in] with programming module	

Accuracy Table			
Input			
Input Type	***Basic Accuracy***	***Absolute Accuracy***	***Temperature Coefficient***
Frequency	≤ 0.0002 Hz	≤ ±0.01% of input frequency	≤ ±0.0005% / °C
Output			
Current output	8 µA	≤ ±0.05% of span	≤ ±0.005% / 0.8 µA / °C
Voltage output	2 mV	≤ ±0.05% of span	≤ ±0.005% / 200 µV / °C
Frequency output	n.a.	≤ ±0.002% of output frequency +0.0004% of fmax.	≤ ±0.0005% / °C

SCU-2501, SCU-2502, SCU-2503
Universal Signal Conditioners
Input/Output Specifications

Inputs				
Model		**SCU-2501**	**SCU-2502**	**SCU-2503**
Frequency input	Frequency Range	0.001 Hz to 100 kHz		
	Time range, time function	10 µs to 999.9 s		
	Max. frequency, with input filter ON	75Hz		
	Min. pulse width with input filter ON	8ms		
	Min. pulse width with input filter OFF	4µs		
	Response time (0...90%, 100...10%)	< 30ms		
NAMUR input	Trig-level LOW	≤ 1.2 mA		
	Trig-level HIGH	≥ 2.1 mA		
	Input impedance	1 kΩ || < 220pF		
	Breakage detection	≤ 0.1 mA		
	Short-circuit detection	≥ 6.9 mA		
	Sensor supply - pin 44, fixed	8.3 V		
Tacho input	Trig-level LOW	≤ -50 mV		
	Trig-level HIGH	≥ +50 mV		
	Input impedance	100 kΩ || < 220 pF		
	Max. input voltage	80VAC pp		
	Sensor supply - pin 44, programmable	5...17 V / 23mA		
NPN / PNP input	Trig-level LOW	≤ 4.0 V		
	Trig-level HIGH	≥ 7.0 V		
	Input impedance	3.48 kΩ || < 220 pF		
	Trigger edge	NPN = Neg. edge, PNP = Pos. edge.		
	Sensor supply - pin 44, programmable	5...17 V / 23mA		
TTL input	Trig-level LOW	≤ 0.8 V		
	Trig-level HIGH	≥ 2.0 V		
	Input impedance	≥ 100 kΩ || < 220 pF		
	Sensor supply - pin 44, programmable	5...17 V / 23mA		
S0 input	Trig-level LOW	≤ 2.2 mA		
	Trig-level HIGH	≥ 9.0 mA		
	Input impedance	758 Ω || < 220 pF		
	Sensor supply - pin 44, fixed.	17V		
Special voltage input	User-programmable trig-levels	-0.05...6.50 V		
	*Hysteresis, min	50 mV		
	Input impedance, programmable:	High Z: ≥100 kΩ || < 220 pF Pull up/down; 3.48 kΩ || < 220 pF		
	Programmable sensor supply - pin 44	5...17 V / 23 mA		
	Max. input voltage	17V		
Special current input	User-programmable trig-levels.	0.0...10.0 mA		
	*Hysteresis, min	0.2 mA		
	Input impedance	1 kΩ || < 220 pF		
	Sensor supply - pin 44, programmable	5...17 V / 23 mA		
	Max. input current	17mA		

*** For low signal levels with input trigger level hysteresis below 100 mV / 0.1 mA it is recommended to use shielded cables with correct grounding, to avoid false triggering due to induced EMC.**

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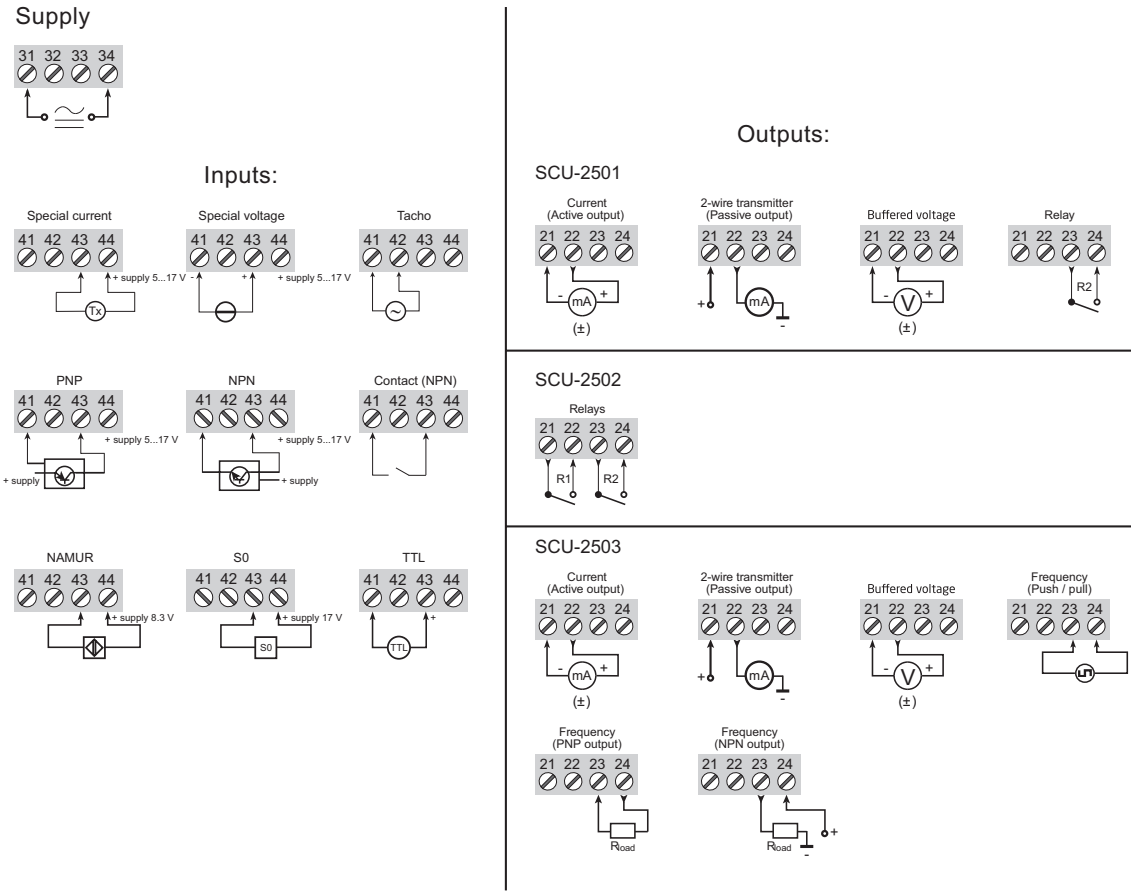
Input/Output Specifications Continued

Outputs			
Model	***SCU-2501***	***SCU-2502***	***SCU-2503***
Current output	0...20, 4...20, S4-20, ±10 mA, ±20 mA	----------	0...20, 4...20, S4-20, ±10 mA, ±20 mA
Load (max.), current output	≤ 600 Ω	----------	≤ 600 Ω
Current limit	≤ 28 mA	----------	≤ 28 mA
Voltage output	0…5, 1…5, 0...10, 2…10, ±5, ±10 VDC	----------	0…5, 1…5, 0...10, 2…10, ±5, ±10 VDC
Load (min.), voltage output	≥ 2 kΩ	----------	≥ 2 kΩ
Relay output	AC: 230Vrms 2A 500VA / DC: 24V 1A	2 x AC: 230Vrms 2A 500VA / DC: 24V 1A	----------
Frequency output	----------	----------	0.001 Hz...100kHz
PNP output	----------	----------	24VDC at 30mA max
NPN output	----------	----------	30VDC at 130mA max
Push-Pull output	----------	----------	5...24VDC

Wiring Diagrams

Models SCU-2501/2502/2503



SCU Series Universal Signal Conditioner Accessories

Programming/Display Module SCU-PDM2

Application:

- The AutomationDirect SCU-PDM2 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:

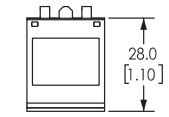
- LCD display with 4 lines; Line 1 (H = 5mm, 0.20 in) shows input signal, line 2 (H = 3.5 mm, 0.14 in) shows units, line 3 (H = 3.5 mm, 0.14 in) shows analog output or user defined text and line 4 shows communication and relay status.
- Programming access can be blocked by assigning a password. The password 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, SCU-2200, SCU-2501, SCU-2502, SCU-2503

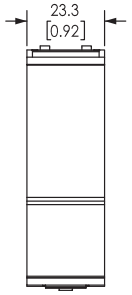
Mounting/Installation:

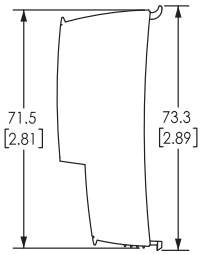
- Snap SCU-PDM2 onto the front of the universal signal conditioners.
- Can be installed or removed whether the signal conditioner is powered or not.

Selectable Engineering Units

°C	hP	kW	mA	pH	MHz
°F	hPa	kWh	mbar	rpm	P/m
%	Hz	l	mils	s	P/h
A	in	l/h	min	S	P/d
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	KHz	







See our website www.AutomationDirect.com 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-PDM2	ProSense detachable programming/display module, for use with SCU series signal conditioners.	1	0.04	$59.00
SCU-CJC1	ProSense external cold junction compensation (CJC) connector, for use with SCU-3100, SCU-1400, SCU-1600 signal conditioners.	1	0.02	$18.00