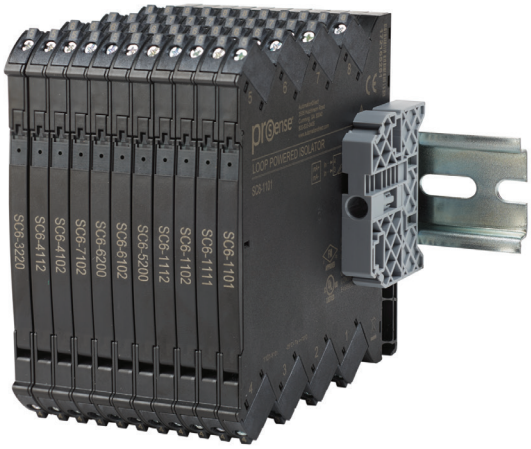
# ProSense SC6 Series Signal Conditioners User Manual




**This product manual covers the following part numbers:**

| | | | | | | |
|---|---|---|---|---|---|---|
| 0068060 | SC6-1100 | SC6-1110 | SC6-2200 | SC6-3220 | SC6-5200 | SC6-7102 |
| 0068061 | SC6-1101 | SC6-1111 | SC6-2220 | SC6-4102 | SC6-6102 | SC6-PCU1 |
| 0068062 | SC6-1102 | SC6-1112 | SC6-3200 | SC6-4112 | SC6-6200 | |

# ProSense SC6 Series Signal Conditioners User Manual

Please include the Manual Number and the Manual Issue, both shown below, when communicating with Technical Support regarding this publication.

**Manual Number:** ProSense SC6 Series Signal Conditioners Manual
**Issue:** 1st Edition
**Issue Date:** 06/18

| Publication History | | |
|---|---|---|
| **Issue** | **Date** | **Description of Changes** |
| 1st Edition | 06/18 | Original |

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# 1 - Warnings


General

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 installed, do not connect hazardous voltages to the device.


Caution

To avoid explosion and serious injury, modules having mechanical failures must not be used.

Modules are not repairable.

In applications where hazardous voltage is connected to in-/outputs of the device, sufficient spacing or isolation from wires, terminals and enclosure - to surroundings (incl. neighboring devices), must be ensured to maintain protection against electric shock.

Potential electrostatic charging hazard. To avoid the risk of explosion due to electrostatic charging of the enclosure, do not handle the units unless the area is known to be safe, or appropriate safety measures are taken to avoid electrostatic discharge.

# 2 - Symbol Identification

Triangle with an exclamation mark: Read the manual before installation and commissioning of the device in order to avoid incidents that could lead to personal injury or mechanical damage.

The CE mark indicates device is in compliance with the essential requirements of the directives.

# 3 - Safety Instructions

## 3.1 - Receipt and unpacking

Unpack the device without damaging it and check whether the device type corresponds to the one ordered. The packing should always follow the device until the unit has been permanently installed.

## 3.2 - Environment

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

## 3.3 - Installing

Only technicians who are familiar with the technical terms, warnings, and instructions in the manual and who are able to follow these should connect the device.

Should there be any doubt as to the correct handling of the device, please contact AutomationDirect.com.

Installation and connection of the device should comply with national legislation for installing of electric materials, e.g. 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 device is provided with field wiring terminals and shall be supplied from a Power Supply having double or reinforced insulation. A power switch should be readily accessible and close to the device. The power switch shall be marked as the disconnecting unit for the device.

The SC6 Series must be installed on a DIN rail that complies with EN 60715. Note: No mounting orientation restrictions.

**UL installation**

Use 60°C/75°C copper conducters only.
Wire size . . . . . .AWG 26-12

UL file number . . . . . .E498965

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.

The power supply unit must comply with NEC Class 2, as described by the National Electrical Code® (ANSI / NFPA 70).

**cFMus installation in Division 2 or Zone 2**

FM18US0045X . . . . . Cl I, Div. 2, Group A, B, C, D T4
or Cl I, Zone 2, AEx nA IIC T4

FM18CA0023X . . . . . Cl I, Div. 2, Group A, B, C, D T4
or Cl I, Zone 2, Ex nA IIC T4

In Class I, Division 2 or Zone 2 installations, the subject equipment shall be installed within a tool-secured enclosure which is capable of accepting one or more of Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70) or in Canada in the Canadian Electrical Code (C22.1).

The SC6 Series Isolators and Converters must be connected to limited output NEC Class 2 circuits, as outlined in the National Electrical Code® (ANSI / NFPA 70), only. If the devices are connected to a redundant power supply (two separate power supplies), both must meet this requirement.

When installed in outdoor or potentially wet locations the enclosure shall at a minimum meet the requirements of IP54.

**Warning:** Substitution of components may impair suitability for Zone 2 / Division 2.

**Warning:** To prevent ignition potential in an explosive atmosphere, disconnect power before servicing. Do not separate connectors while circuit is energized in a potentially explosive atmosphere.

**Warning:** Do not install or remove devices from a live power rail when an explosive gas mixture is present.

### 3.4 - Cleaning

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

## 4 - Supply Voltage Options

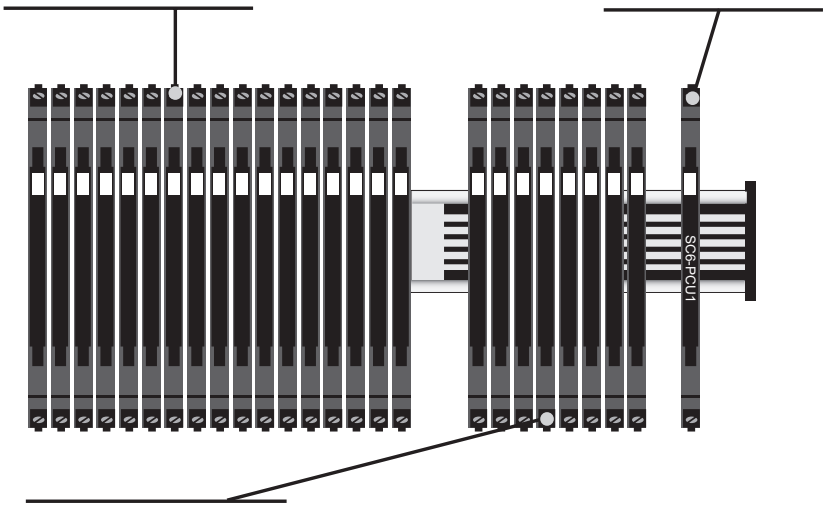
The technical specifications specify the maximum required power at nominal operating values, e.g. 24V supply voltage, 60°C ambient temperature, 600 Ω load, and 20mA output current.

**DIN rail solution - device daisy chain:**
The units can be supplied with 24VDC ±30% via direct wiring and a loop between the devices.

Protective fuse: 2.5 A.

**Power rail solution #2:**
The SC6-PCU1 power connector unit allows easy connection of a 24 VDC / 2.5 A source to the power rail.

Protective fuse: 2.5 A.



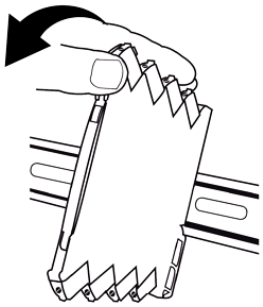

**Protective fuse: 0.4 A.**

**Power rail solution #1:**
Alternately, you can connect 24VDC to any one SC6 Series device with power rail connector which will then energize other units on the rail. The terminals can pass a current of 400mA maximum.

Note: SC6-1101, -1102, -1111, -1112, -4102, -4112, -6102, -7102 are not supplied via the DIN rail solution. Direct terminal wiring to each device is required for these models.

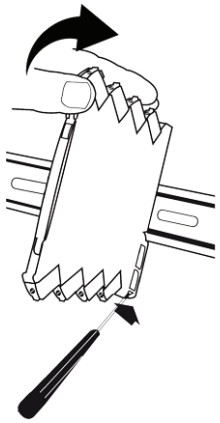
**External fuse characteristics:**
The 2.5 A fuse must break after not more than 120 seconds at 6.4 A.

## 5 - Installing and Uninstalling the SC6 Series



**Picture 1:**

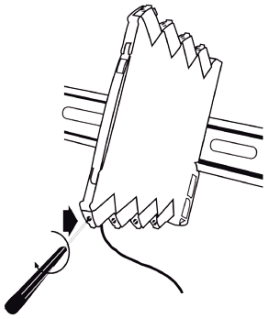
Installing on DIN rail / power rail.
Click the device onto the rail.



**Picture 2:**

Uninstalling from DIN rail / power rail.
First, remember to uninstall the connectors with hazardous voltages.
Detach the device from the DIN rail by lifting the bottom lock.

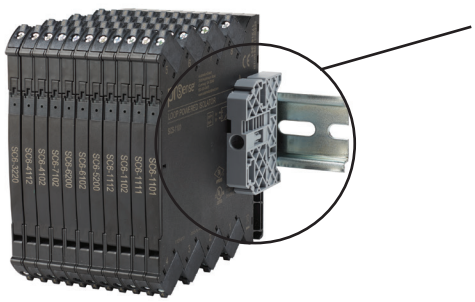
Note: Always use a screwdriver to uninstall units and avoid excessive force to prevent damaging the unit.



**Picture 3:**

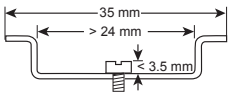
Wire size AWG 26-12 / 0.13 - 2.5 mm2 stranded wire.
Screw terminal torque 0.5 N·m.

## 6 - Installation on DIN rail / power rail




The devices in the SC6 Series can be installed on a DIN rail or on a power rail (only SC6-1100, -1110, -2200, -2220, -3200, -3220, -5200 and -6200). It is recommended that the modules be supported by end brackets (part number KN-EB7-10). Power supply units can be installed on the power rail according to customer requirements.

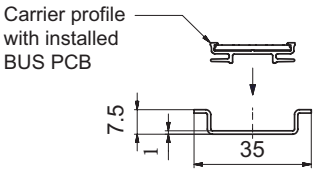
If you want to install a SC6 Series device with power rail connectors on a standard DIN rail, the head of the screws holding the 7.5 mm DIN rail shall be no more than 3.5 mm high in order to avoid short circuit between the power rail connectors on the SC6 Series device and the screws.



## 6.1 - In-Rail-Bus-Set Installation

**Step 1**

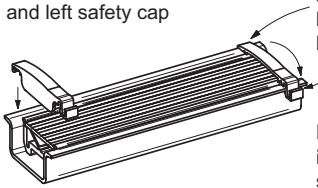
Put the BUS PCB into the carrier profile and then put the carrier profile into the DIN rail



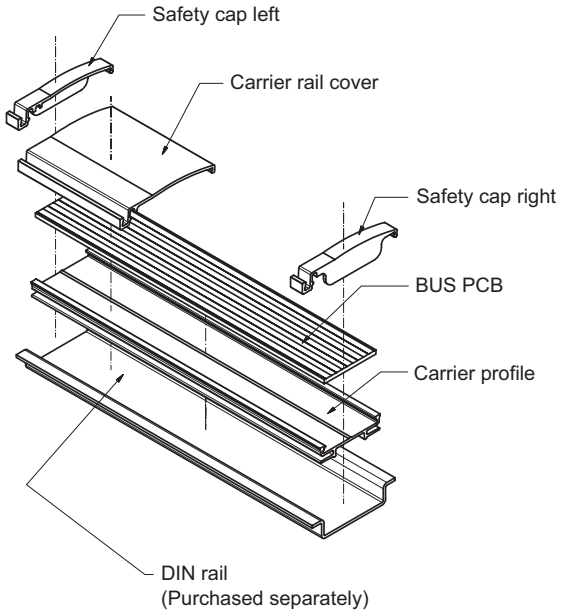

**Step 2**

Put on the right
and left safety cap

**Pay attention to the sequence:**
a) put the cap in from above
laid on the carrier profile
b) snap the cap on below

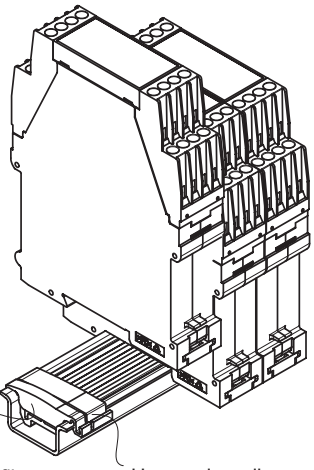


Dismantling
in reversed
sequence




**Step 3**

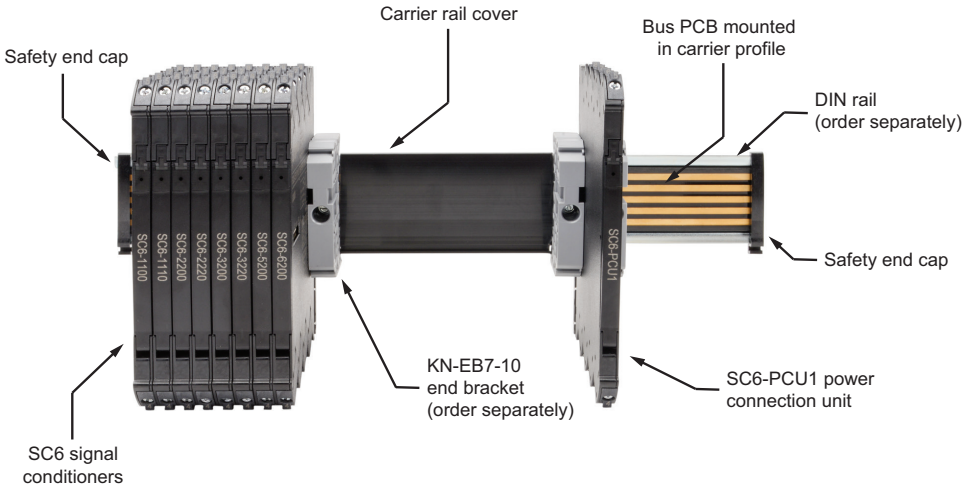
Snap the devices on
the In-Rail-Bus



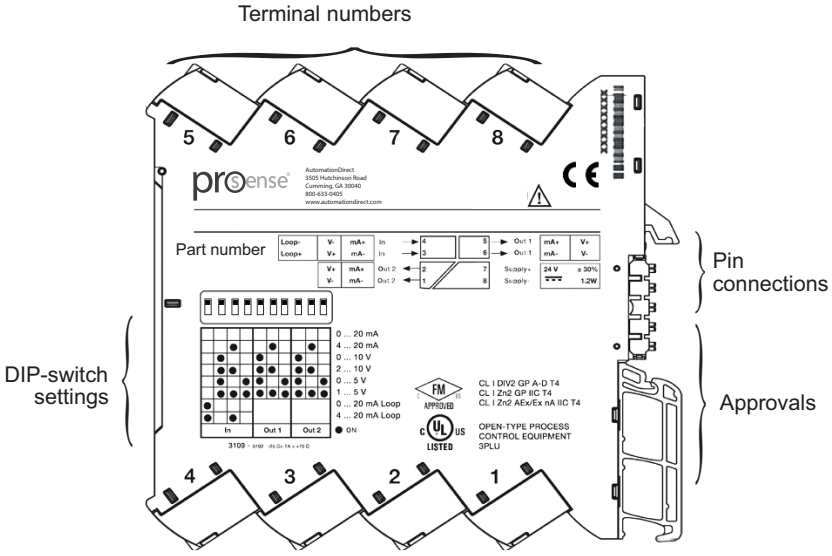
Safety cap on both
sides tight to the carrier profile
The safety cap fixes the carrier profile
in the DIN rail and protects the ends of
the BUS

Use carrier rail
cover provided to
protect exposed
sections of the BUS PCB

| *Part No.* | *In-Rail-Bus-Set / 250mm 0068060* | *In-Rail-Bus-Set / 500mm 0068061* | *In-Rail-Bus-Set / 750mm 0068062* |
|---|---|---|---|
| *Each Set Includes* | BUS-PCB 250mm | BUS-PCB 500mm | BUS-PCB 750mm |
| | Carrier profile 250mm | Carrier profile 500mm | Carrier profile 750mm |
| | Carrier rail cover 250mm | Carrier rail cover 500mm | Carrier rail cover 750mm |
| | Safety cap right | Safety cap right | Safety cap right |
| | Safety cap left | Safety cap left | Safety cap left |



## 7 - Side Label




## 8 - Common Technical Specifications

| SC6 Series Common Technical Specifications | | |
|---|---|---|
| ***Environmental Conditions*** | | |
| ***Operating Temperature*** | -25°C to +70°C (-13°F to +158°F) | |
| ***Storage Temperature*** | -40°C to +85°C (-40°F to +185°F) | |
| ***Calibration Temperature*** | +20°C to +28°C (+68 to +82.4°F) | |
| ***Relative Humidity*** | < 95% RH (non-cond.) | |
| ***Protection Degree*** | IP20* | |
| ***Mechanical Specifications*** | | |
| ***Dimensions (HxWxD)*** | 113 x 6.1 x 115 mm | |
| ***Weight Approx.*** | 70g | |
| ***DIN Rail Type*** | DIN EN 60715 - 35mm | |
| ***Wire Size*** | 0.13...2.5 mm2 / AWG 26...12 stranded wire | |
| ***Screw Terminal Torque*** | 0.5 N·m | |
| ***Vibration*** | 2 to 25 Hz | ± 1.6 mm |
| | 25 to 100 Hz | ± 4g |
| ***Observed Authority Requirements*** | EMC | 2014/30/EU |
| | LVD | 2014/35/EU |
| | RoHS 2 | 2011/65/EU |
| ***Approvals*** | cULus, Standard for Safety | UL 61010-1, File E498965 |
| | cFMus | FM18US0045X, FM18CA0023X |
| | Safe Isolation | EN 61140 |
| **** Installation in pollution degree 2 & overvoltage category II, No corrosive gases*** | | |

## 9 - 4-Wire, External Powered Analog Signal Input Modules - Technical Specifications

| 4- Wire, External Powered Analog Signal Input Modules - Technical Specifications | | | | | | |
|---|---|---|---|---|---|---|
| ***Part No.*** | ***SC6-1100*** | ***SC6-2200*** | ***SC6-1110*** | ***SC6-2220*** | ***SC6-3200*** | ***SC6-3220*** |
| ***Application*** | One channel | One channel | Signal splitter | Signal splitter | One channel | Signal splitter |
| ***DIP switch configurable*** | No | Yes | No | Yes | Yes | Yes |
| ***Supply voltage*** | 16.8 - 31.2 VDC (terminals or bus rail) | | | | | |
| ***Max. required power**** | 0.80 W | 1.20 W | 0.80 W | 1.20 W | 0.80 W | 1.20 W |
| ***Max. power dissipation***** | 0.60 W | 0.55 W | 0.48 W | 0.60 W | 0.43 W | 0.43 W |
| ***Isolation voltage, test*** | 2.5 kVAC | | | | | |
| ***Isolation voltage, working*** | 300VAC (reinforced) / 250VAC (Zone 2, Div. 2) | | | | | |
| ***Double isolation*** | Input / Output 1 / Output 2 / Supply | | | | | |
| ***Signal dynamics, input / output*** | Analog signal chain | | | | | |
| ***Signal / noise ratio*** | > 60dB | | | | | |
| ***Cut-off frequency (3 dB)*** | > 100Hz | | | | >100Hz or 10Hz (DIP switch selectable) | |
| ***Response time filter (0-90%, 100-10%)*** | < 7ms | | | | < 7ms or < 44ms (DIP switch selectable) | |
| ***Accuracy*** | < +/-0.05% of span | | | | | |
| ***Temperature coefficient*** | < +/-0.01% of span / °C | | | | | |
| ***EMC immunity influence*** | < +/-0.5% of span | | | | | |
| ***Extended EMC immunity:*** | | | | | | |
| ***NAMUR NE 21, A criterion, burst*** | < +/-1% of span | | | | | |
| ***Current input*** | | | | | | |
| ***Overall measurement range*** | 0-23 mA | | | | - 23mA to + 23mA | |
| ***Selectable measurement ranges*** | 0-20 mA, 4-20 mA | | | | +/- 10mA, +/- 20mA | |
| ***Input voltage drop*** | < 1.5 VDC | | | | < 1VDC | |
| ***Input resistance*** | 190Ω nominal @ 4mA<br>70Ω nominal @ 20mA | | | | 40Ω nominal | |
| ***Transmitter (Tx) auxiliary supply*** | None | > 17VDC / 20mA | None | > 17VDC / 20mA | None | |
| ***Voltage input*** | | | | | | |
| ***Overall measurement range*** | 0-10.25 VDC | | | | - 11.5 VDC to + 11.5 VDC | |
| ***Selectable measurement range*** | 0-10 VDC, 2-10 VDC, 0-5 VDC, 1-5 VDC | | | | +/-5 VDC, +/- 10 VDC | |
| ***Input resistance*** | ≥ 500 kohms | | | | ≥ 1 Mohms | |
| ***Current output*** | | | | | | |
| ***Overall signal range (span)*** | 0-23 mA | | | | | |
| ***Selectable signal ranges*** | 0-20 mA, 4-20 mA | | | | 0-20 mA, 4-20 mA or +/-10 mA, +/-20 mA | |
| ***Load*** | ≤ 600 ohms | | ≤ 300 ohms / channel | | ≤ 600 ohms | ≤ 300 ohms / channel |
| ***Load stability*** | < 0.002% of span / 100 ohms | | | | | < 0.02% of span / 100 ohms |
| ***Current limit*** | ≤ 28mA | | | | | |
| ***Voltage output*** | | | | | | |
| ***Overall signal range (span)*** | None | 0-10 VDC | None | 0-10 VDC | | |
| ***Selectable signal ranges*** | None | 0-10 VDC, 2-10 VDC, 0-5 VDC, 1-5 VDC | None | 0-10 VDC, 2-10 VDC, 0-5 VDC, 1-5 VDC | | |
| ***Load (minimum)*** | None | > 10 kohms | None | > 10 kohms | | |

***Max. required power is the maximum power needed at power supply terminals or rail connector.***
****Max. power dissipation is the maximum power dissipated at nominal operating values.***
*"of span" = of the seleted range*

## 10 - 2-Wire, Loop Powered Analog Signal Input Modules - Technical Specifications

| 2-Wire, Loop Powered Analog Signal Input Modules - Technical Specifications | | | | | | |
|---|---|---|---|---|---|---|
| ***Part No.*** | ***SC6-1101*** | ***SC6-1111*** | ***SC6-4102*** | ***SC6-4112*** | ***SC6-1102*** | ***SC6-1112*** |
| ***Application*** | One channel | Two channel | One channel | Two channel | One channel | Two channel |
| ***DIP switch configurable*** | No | No | No | No | No | No |
| ***Loop supply voltage*** | None (powered by input signal) | | 6-35 VDC | | | |
| ***Power dissipation*** | 30mW / channel | | 50mW / channel | | V terminal x I / channel | |
| ***Isolation voltage, test*** | 2.5 kVAC | | | | | |
| ***Isolation voltage, working*** | 300 VAC (reinforced) / 250 VAC (Zone 2, Div. 2) | | | | | |
| ***Double isolation*** | Input 1 / Input 2 / Output 1 / Output 2 | | | | | |
| ***Signal dynamics, input / output*** | Analog signal chain | | | | | |
| ***Signal / noise ratio*** | > 60dB | | | | | |
| ***Cut-off frequency (3 dB)*** | 100Hz | | | | | |
| ***Response time (0-90%, 100-10%)*** | < 5ms | | | | | |
| ***Accuracy*** | ≤ +/-10uA + 0.05% of max. value of span | | ≤ ± 8uA | | | |
| ***Temperature coefficient*** | ≤ ± 2uA / °C | | Vloop supply ≤ 24V: ± 0.48 uA/°C (>25°C); ± 1.68 uA/°C (< 25°C)<br>Vloop supply > 24V: ± 0.02 uA/°C x Vloop supply (> 25°C); +/-0.047 uA/degC x Vloop supply (<25°C) | | Vloop supply ≤ 24V: ± 0.48 uA/°C (> 25°C); ± 1.12 uA/°C (< 25°C)<br>Vloop supply >24V: ± 0.02 uA/°C x Vloop supply (> 25°C); ± 0.047 uA/°C x Vloop supply (< 25°C) | |
| ***EMC immunity influence*** | < ± 0.5% of span | | | | | |
| ***Extended EMC immunity:*** | | | | | | |
| ***NAMUR NE 21, A criterion, burst*** | < ± 1% of span | | | | | |
| ***Current input*** | | | | | | |
| ***Overall measurement range*** | 0-23 mA | | 3.5-23 mA | | | |
| ***Nominal measurement range*** | 0-20.5 mA<br>10uA start up current, typical | | 3.8-20.5 mA | | | |
| ***Signal conversion*** | 1:1 | | | | | |
| ***Input voltage drop*** | 1.35 + (0.02335*$R_{out}$ load) @ 23mA max.<br>$R_{out}$ load 600Ω: 15.36 V<br>$R_{out}$ load 250Ω: 7.19 V | | 2.5 VDC input to output | | ≤ 3VDC | |
| ***Input resistance*** | $R_{out}$ load @ 600Ω: 668Ω*<br>$R_{out}$ load @250Ω: 313Ω* | | Not applicable | | 130Ω nominal | |
| ***Transmitter (Tx) auxiliary supply*** | None | | 3.5-32.5 VDC<br>(Loop supply voltage - Input voltage drop) | | None | |
| ***Current output*** | | | | | | |
| ***Overall signal range (span)*** | 0-23 mA | | 3.5-23 mA | | | |
| ***Nominal signal range*** | 0-20.5 mA | | 3.8-20.5 mA | | | |
| ***Load*** | ≤ 600 ohms | | 900 ohms max at 24 Vloop supply<br>1450 ohms max at 35 Vloop supply<br>See derating chart above 60°C ambient | | 900 ohms max at 24 Vloop supply<br>1450 ohms max at 35 Vloop supply<br>See derating charts above 50°C ambient | |
| ***Load stability*** | <0.01% of span / 100 ohms | | N/A | | | |

***"of span" = 0-20 mA***

**** Because the input signal drives both the SC6 unit and the output signal loop, the input resistance changes with the output load. Calculate the input voltage drop using the formula shown and divide by the maximum current signal of 23mA to determine the Input resistance.***

## 11 - Temperature Input Modules - Technical Specifications

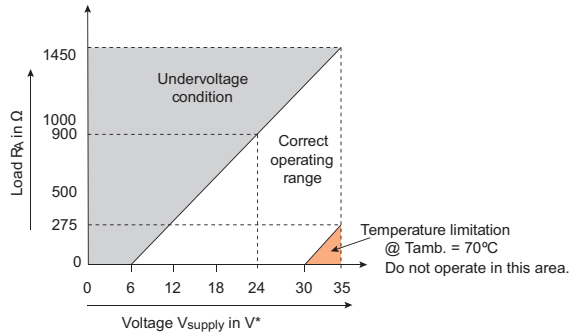
| Temperature Input Modules - Technical Specifications | | | | |
|---|---|---|---|---|
| ***Part No.*** | ***SC6-5200*** | ***SC6-6200*** | ***SC6-7102*** | ***SC6-6102*** |
| ***Application*** | One channel | One channel | One channel | One channel |
| ***DIP switch configurable*** | Yes | Yes | Yes | Yes |
| ***Supply voltage*** | 16.8 - 31.2 VDC (terminals or bus rail) | | 5.5 - 35 VDC | 3.3 - 35 VDC |
| ***Max. power dissipation*** | 0.7 W | 0.7 W | 0.8 W | 0.8 W |
| ***Isolation voltage, test*** | 2.5 kVAC | | | None |
| ***Isolation voltage, working*** | 300VAC (reinforced) / 250VAC (Zone 2, Div. 2) | | | None |
| ***Double isolation*** | Input / Output 1 / Supply | | | None |
| ***Signal dynamics, input / output*** | 23bit / 18bit | | | |
| ***Signal / noise ratio*** | > 60dB | | | |
| ***Response time (0-90%, 100-10%)*** | < 30ms or < 300ms, DIP switch selectable | | | |
| ***Accuracy*** | Basic: ≤ 0.5°C; General: ≤ ±0.05% of span | Basic: ≤ 0.1°C; General: ≤ ±0.05% of span | Basic: ≤ 0.1°C (Pt100), ≤ 0.5°C (TC); General: ≤ ±0.05% of span | Basic: ≤ 0.2°C; General: ≤ ±0.1% of span |
| ***Temperature coefficient*** | 0.1°C/°C (basic) or ≤ ±0.01% of span/°C | 0.02°C/°C (basic) or ≤ ±0.01% of span/°C | 0.1°C/°C (basic) or ≤ ±0.01% of span/°C | 0.02°C/°C (basic) or ≤ ±0.01% of span/°C |
| ***EMC immunity influence*** | < ±0.5% of span | | | |
| ***Extended EMC immunity:*** | | | | |
| ***NAMUR NE 21, A criterion, burst*** | < ±1% of span | | | |
| ***RTD (Pt100) input*** | | | | |
| ***Overall measurement range*** | N/A | -200 to 850°C (IEC 60751) | | |
| ***Min. measurement span*** | N/A | 10°C | | |
| ***Sensor current*** | N/A | < 150uA | | |
| ***Sensor cable resistance*** | N/A | < 50 ohms per wire | | |
| ***Effect of sensor cable resistance 3/4-wire*** | N/A | < 0.002 ohm/ohm | | |
| ***Sensor error detection*** | N/A | Yes, DIP switch selectable | | |
| ***Broken sensor*** | N/A | > 800 ohms | | |
| ***Shorted sensor*** | N/A | < 18 ohms | | |
| ***Thermocouple (TC) input*** | | | | |
| ***Overall mesasurement range, Type J*** | -100 to 1200°C (IEC60584-1) | N/A | -100 to 1200°C (IEC60584-1) | N/A |
| ***Overall mesasurement range, Type K*** | -180 to 1372°C (IEC60584-1) | N/A | -180 to 1372°C (IEC60584-1) | N/A |
| ***Selectable measurement range*** | See temperature range programming table | | | |
| ***Min. measurement span*** | 50°C | N/A | 50°C | N/A |
| ***Sensor cable resistance*** | < 5 kohm per wire | N/A | < 5 kohm per wire | N/A |
| ***External Pt100 CJC sensor accuracy*** | < ±0.15°C | N/A | < ±0.15°C | N/A |
| ***Internal CJC sensor accuracy*** | < ±2.5°C | N/A | <+/-2.5°C | N/A |
| ***Open thermocouple detection*** | Yes, DIP switch selectable | N/A | Yes, DIP switch selectable | N/A |
| ***External CJC error detection*** | Yes, DIP switch selectable | N/A | Yes, DIP switch selectable | N/A |
| ***Internal CJC error detection*** | Yes | N/A | Yes | N/A |
| ***Current output*** | | | | |
| ***Overall signal range (span)*** | 0 / 3.8-20.5 mA | | 3.8-20.5 mA | |
| ***Nominal signal range*** | 0 / 4-20 mA DIP switch selectable | | 4-20 mA or 20-4 mA, DIP switch selectable | |
| ***Load*** | ≤ 600 ohms | | Rload=(Vsupply-5.5) / 0.023 ohms | Rload=(Vsupply-3.3) / 0.023 ohms |
| ***Sensor error output*** | Downscale: 0 / 3.5 mA, Upscale: 23mA DIP switch selectable | | Downscale: 3.5 mA, Upscale: 23mA DIP switch selectable | |
| ***Voltage output*** | | | | |
| ***Overall signal range (span)*** | 0 / 0.875-5.125 V, 0 / 1.75-10.25 V | | N/A | |
| ***Nominal signal range*** | 0 / 1-5 V, 0 / 2-10 V DIP switch selectable | | N/A | |
| ***Load*** | ≥ 10 kohms | | N/A | |
| ***Sensor error output*** | Downscale: 0V, Upscale: 5.5 / 11V DIP switch selectable | | N/A | |
| ***Load stability*** | ≤ 0.01% of span / 100 ohms | | | |
| ***Updating time*** | 10ms | | | |

## 12 - Power Connector Module - Technical Specifications

| Power Connection Module - Technical Specifications | |
|---|---|
| ***Part No.*** | ***SC6-PCU1*** |
| ***Supply voltage*** | 16.8-31.2 VDC |
| ***Internal power dissipation*** | 0.25 W max. |
| ***Required external fuse*** | 2.5 A |

## 13 - Output Load Deratings

SC6-4102, -4112 Output Load Derating @ $T_{amb.}$ = 70°C:




SC6-4102, -4112 Output Load Derating @ $T_{amb.}$ = 60°C . . . No limiting issues within operating range

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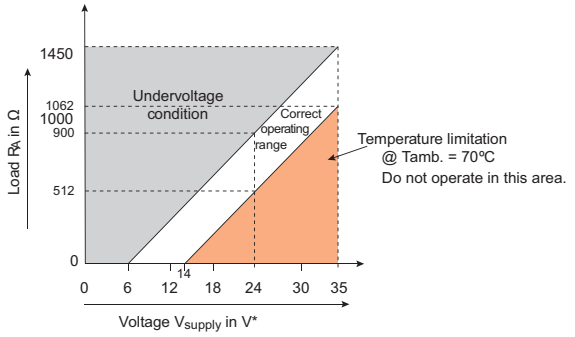
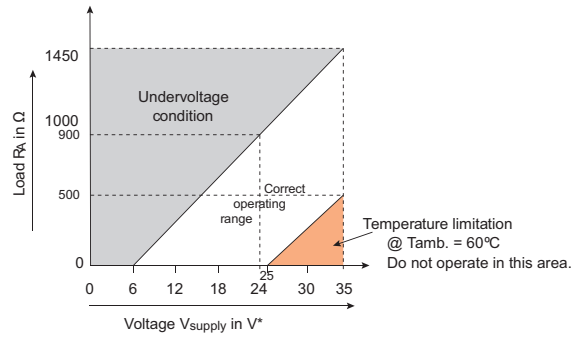
SC6-1102, -1112 Output Load Derating @ $T_{amb.}$ = 70°C:




SC6-1102, -1112 Output Load Derating @ $T_{amb.}$ = 60°C:




SC6-1102, -1112 Output Load Derating @ $T_{amb.}$ = 50°C . . . No limiting issues within operating range

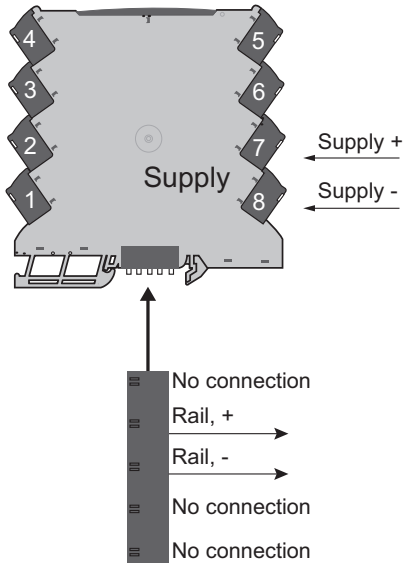
* $V_{supply}$: The supply voltage for the loop covering both the SC6 output terminal voltage and the voltage across the load resistor $R_A$.

$R_A$ = The input impedance in the PLC + the load in the loop (incl. the cable resistance).

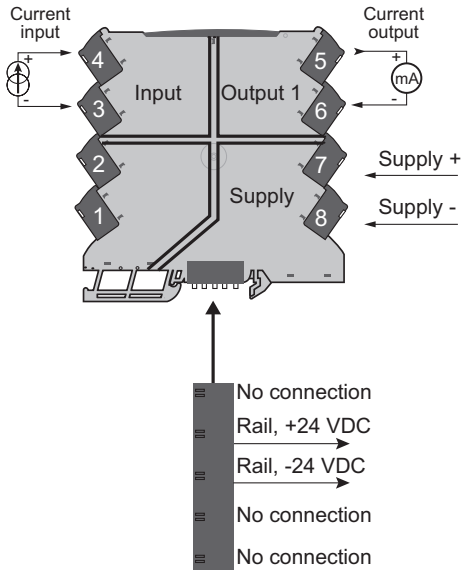
## 14 - Wiring Diagrams

***Note: The SC6 2-wire Transmitter Input is a current input which provides an excitation voltage to the input device, otherwise known as an active or sourcing input, while the SC6 Current Input requires the input device be provided with an external excitation voltage, otherwise known as a passive or sinking input.***

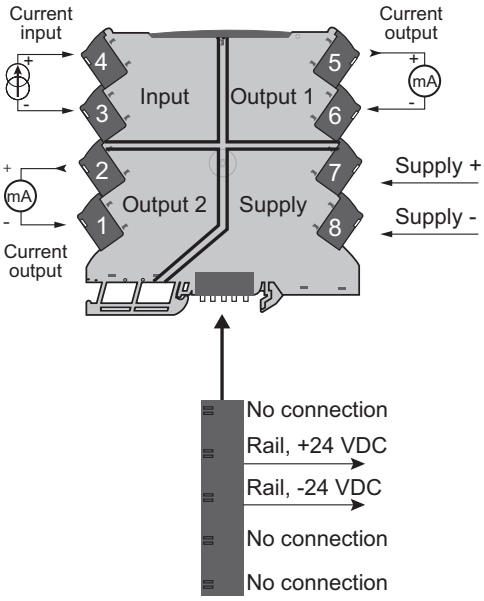
### SC6-PCU1



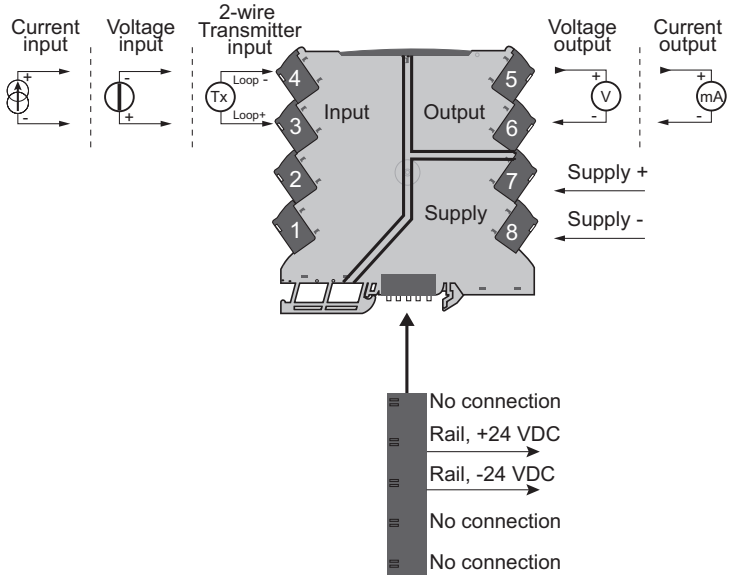

### SC6-1100



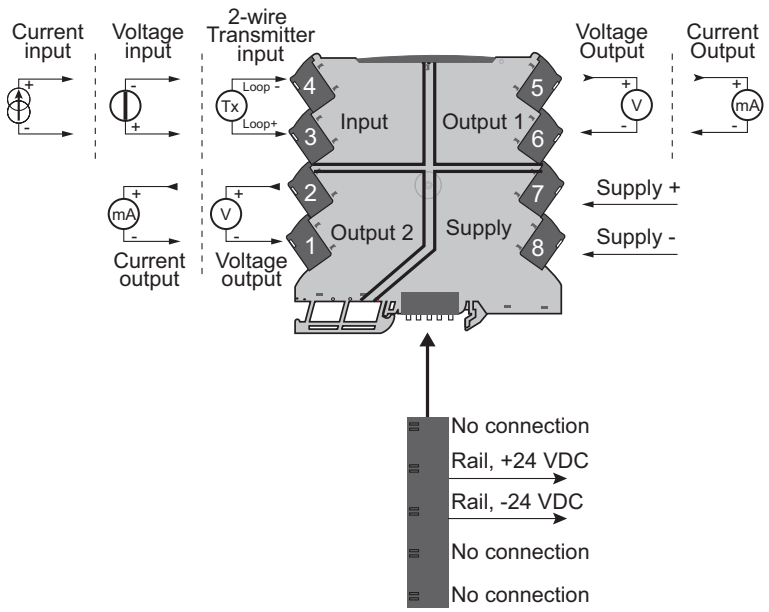

### SC6-1110



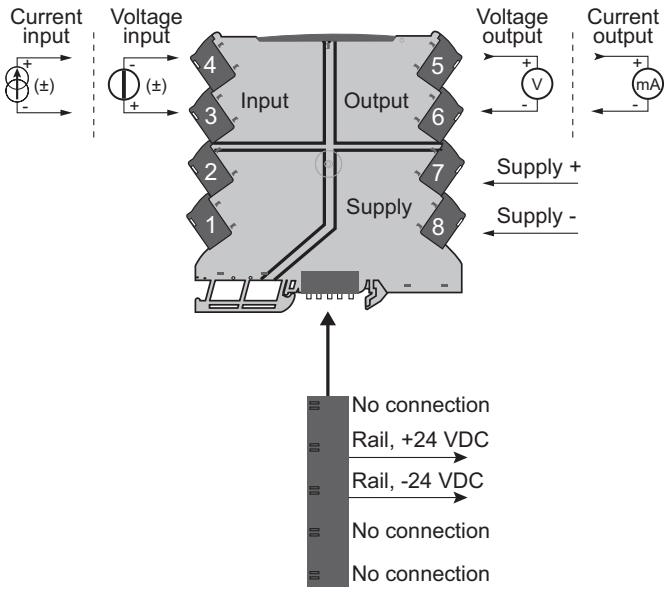

### SC6-2200



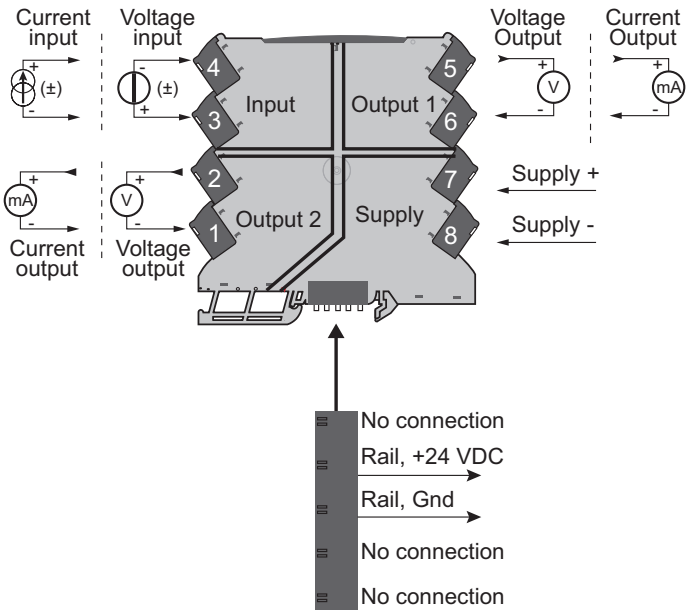
### SC6-2220



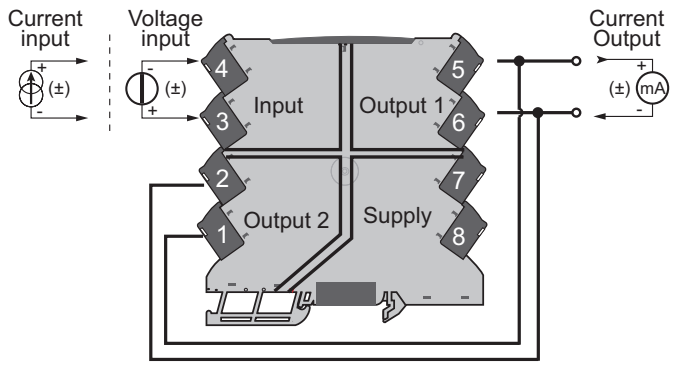

### SC6-3200



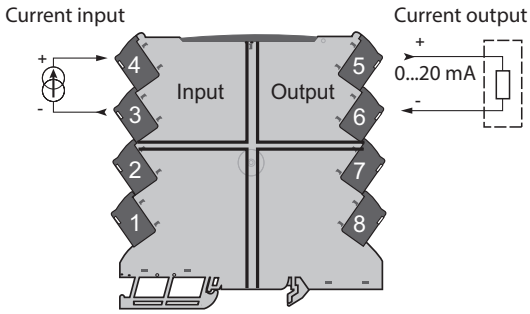

### SC6-3220



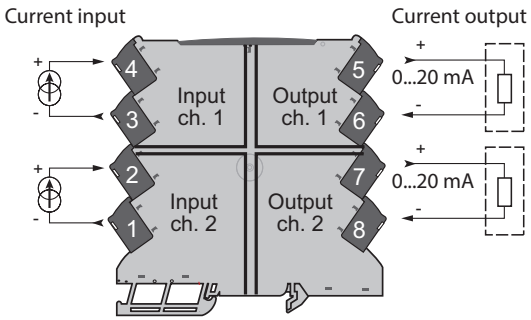

***Bipolar Input to bipolar output wiring set-up:***



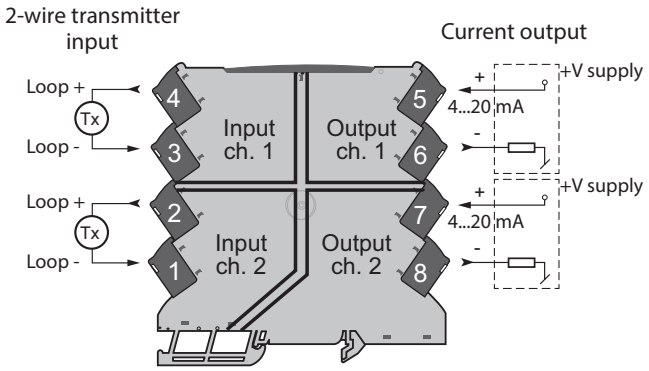

### SC6-1101



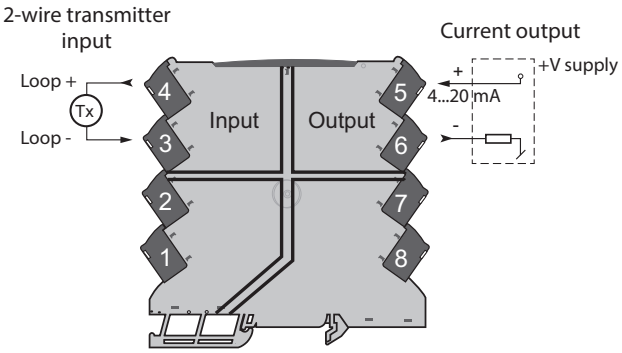
### SC6-1111



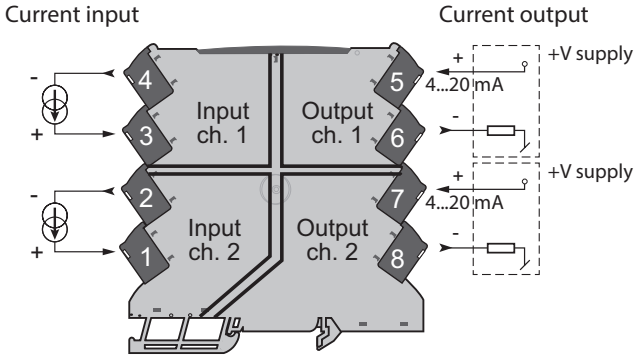

### SC6-4112



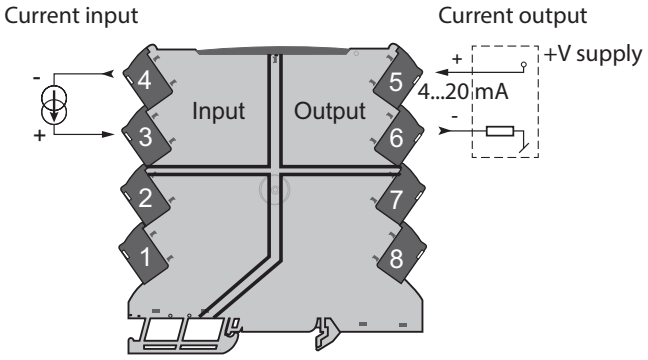

### SC6-4102



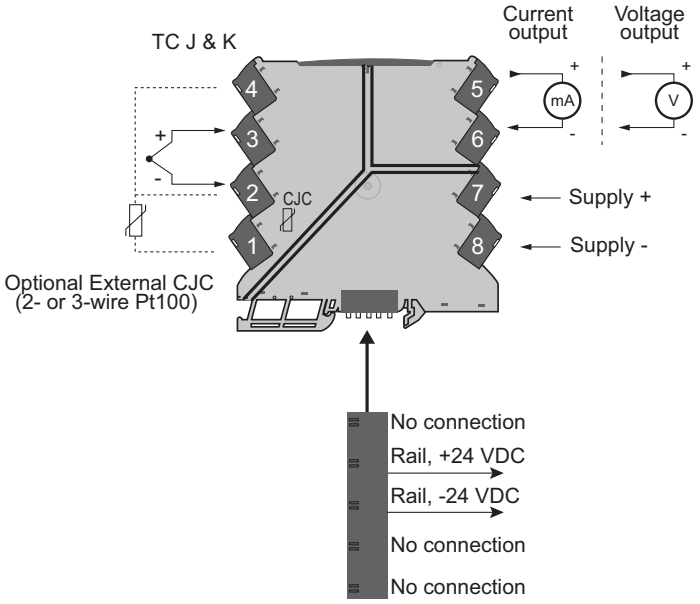

### SC6-1112



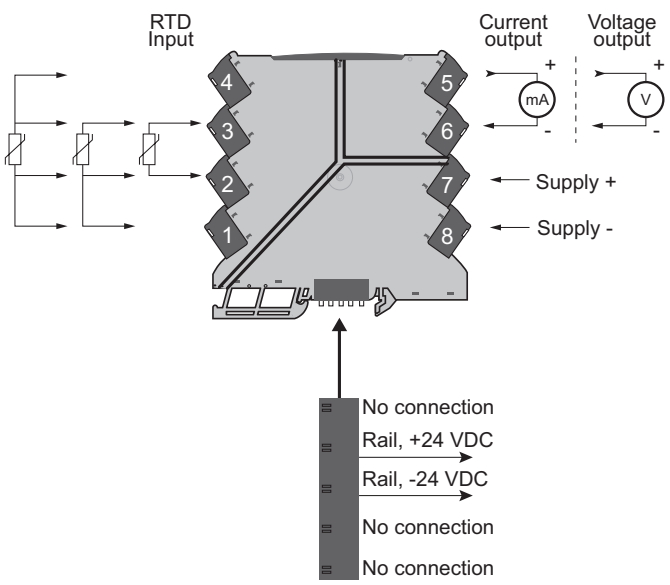

### SC6-1102



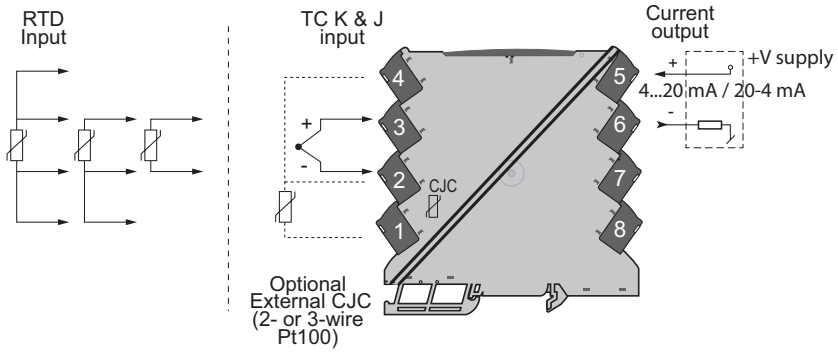
**SC6-5200**



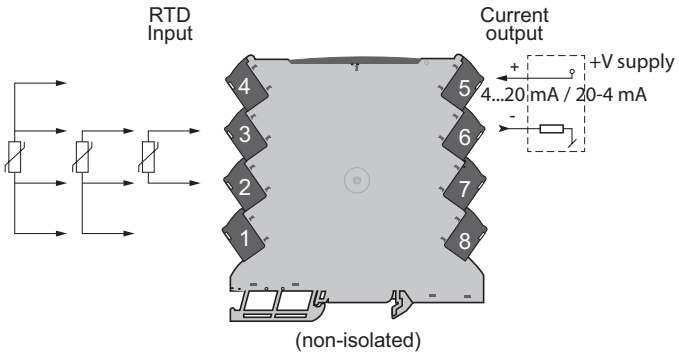

**SC6-6200**




**SC6-7102**




**SC6-6102**



## 15 - DIP Switch Settings

The part numbers listed below are configured with DIP switches which are located on the side of the module and can be adjusted with a small screw driver or other implement.

### SC6-2200

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | DIP Switch |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 0...20mA |
| | | ● | | | ● | | | | | 4...20mA |
| | ● | | | ● | | | | | | 0...10V |
| | ● | ● | | ● | ● | | | | | 2...10V |
| | ● | | ● | ● | | ● | | | | 0...5V |
| | ● | ● | ● | ● | ● | ● | | | | 1...5V |
| ● | | | | | | | | | | 0...20mA Loop |
| ● | | ● | | | | | | | | 4...20mA Loop |
| In | | | | Out | | | | | | ● = ON |

### SC6-2220

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | DIP Switch |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 0...20mA |
| | | ● | | | ● | | | ● | | 4...20mA |
| | ● | | | ● | | | ● | | | 0...10V |
| | ● | ● | | ● | ● | | ● | ● | | 2...10V |
| | ● | | ● | ● | | ● | | | ● | 0...5V |
| | ● | ● | ● | ● | ● | ● | ● | ● | ● | 1...5V |
| ● | | | | | | | | | | 0...20mA Loop |
| ● | | ● | | | | | | | | 4...20mA Loop |
| In | | | | Out1 | | | Out2 | | | ● = ON |

### SC6-3200

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | DIP Switch |
|---|---|---|---|---|---|---|---|---|---|---|
| On ● | | | | | | | | | | 0...20mA |
| Off | | | | | ● | | | | | 4...20mA |
| Filter | | | | | ● | | | | | 0...10V |
| | | | | | ● | ● | | | | 2...10V |
| | | | | | ● | | ● | | | 0...5V |
| | | | | | ● | ● | ● | | | 1...5V |
| | ● | ● | | | | | | | | -20...+20mA |
| | ● | ● | ● | | | | | | | -10...+10mA |
| | | | | | | | | | | -10...+10V |
| | | | ● | | | | | | | -5...+5V |
| | In | | | Out | | | | | | ● = ON |

### SC6-3220

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | DIP Switch |
|---|---|---|---|---|---|---|---|---|---|---|
| On ● | | | | | | | | | | 0...20mA |
| Off | | | | | | ● | | | ● | 4...20mA |
| Filter | | | | | ● | | | ● | | 0...10V |
| | | | | | ● | ● | | ● | ● | 2...10V |
| | | | | | ● | | ● | | ● | 0...5V |
| | | | | | ● | ● | ● | ● | ● | 1...5V |
| | ● | ● | | | | | ● | | ● | -20...+20mA |
| | ● | ● | ● | | | ● | ● | | ● | -10...+10mA |
| | | | | | | | | | | -10...+10V |
| | | | ● | | | | | | | -5...+5V |
| | In | | | Out 1 | | | Out 2 | | | ● = ON |

### SC6-5200

| Sensor S1 | 1 | 2 | 3 |
|---|---|---|---|
| TC J (Int. CJC) | | | ● |
| TC K (Int. CJC) | ● | | ● |
| TC J (Ext. CJC) | | ● | ● |
| TC K (Ext. CJC) | ● | ● | ● |

| Output S1 | 4 | 5 | 6 |
|---|---|---|---|
| 0...20 mA | | | |
| 4...20 mA | ● | | |
| 0...10 V | | | ● |
| 2...10 V | ● | | ● |
| 0...5 V | | ● | ● |
| 1...5 V | ● | ● | ● |

| Sensor Error Detection S1 | 7 |
|---|---|
| None | |
| Enable | ● |

| Output Error Level S1 | 8 |
|---|---|
| Downscale | |
| Upscale | ● |

| Noise Supp. S1 | 9 |
|---|---|
| 50 Hz | |
| 60 Hz | ● |

| Resp. T. S1 | 10 |
|---|---|
| < 30 ms | |
| 300 ms | ● |

● = ON

### SC6-6102

| Sensor S1 | 1 | 2 | 3 |
|---|---|---|---|
| Pt100, 2w | ● | | |
| Pt100, 3w | | ● | |
| Pt100, 4w | ● | ● | |

| Output S1 | 4 | 5 | 6 |
|---|---|---|---|
| 4...20 mA | ● | | |
| 20...4 mA | ● | ● | |

● = ON

| Sensor Error Detection S1 | 7 |
|---|---|
| None | |
| Enable | ● |

| Output Error Level S1 | 8 |
|---|---|
| Downscale | |
| Upscale | ● |

| Noise Supp. S1 | 9 |
|---|---|
| 50 Hz | |
| 60 Hz | ● |

| Resp. T. S1 | 10 |
|---|---|
| < 30 ms | |
| 300 ms | ● |

### SC6-6200

| Sensor S1 | 1 | 2 | 3 |
|---|---|---|---|
| Pt100, 2w | ● | | |
| Pt100, 3w | | ● | |
| Pt100, 4w | ● | ● | |

| Output S1 | 4 | 5 | 6 |
|---|---|---|---|
| 0...20 mA | | | |
| 4...20 mA | ● | | |
| 0...10 V | | | ● |
| 2...10 V | ● | | ● |
| 0...5 V | | ● | ● |
| 1...5 V | ● | ● | ● |

● = ON

| Sensor Error Detection S1 | 7 |
|---|---|
| None | |
| Enable | ● |

| Output Error Level S1 | 8 |
|---|---|
| Downscale | |
| Upscale | ● |

| Noise Supp. S1 | 9 |
|---|---|
| 50 Hz | |
| 60 Hz | ● |

| Resp. T. S1 | 10 |
|---|---|
| < 30 ms | |
| 300 ms | ● |

### SC6-7102

| Sensor S1 | 1 | 2 | 3 |
|---|---|---|---|
| Pt100, 2w | ● | | |
| Pt100, 3w | | ● | |
| Pt100, 4w | ● | ● | |
| TC J (Int. CJC) | | | ● |
| TC K (Int. CJC) | ● | | ● |
| TC J (Ext. CJC) | | ● | ● |
| TC K (Ext. CJC) | ● | ● | ● |

| Output S1 | 4 | 5 | 6 |
|---|---|---|---|
| 4...20 mA | ● | | |
| 20...4 mA | ● | ● | |

● = ON

| Sensor Error Detection S1 | 7 |
|---|---|
| None | |
| Enable | ● |

| Output Error Level S1 | 8 |
|---|---|
| Downscale | |
| Upscale | ● |

| Noise Supp. S1 | 9 |
|---|---|
| 50 Hz | |
| 60 Hz | ● |

| Resp. T. S1 | 10 |
|---|---|
| < 30 ms | |
| 300 ms | ● |

**SC6-5200, SC6-6200, SC6-6102, SC6-7102 Models:**

**Temperature Range Programming**

DIP S2 • = ON Temperature Range °C (°F)

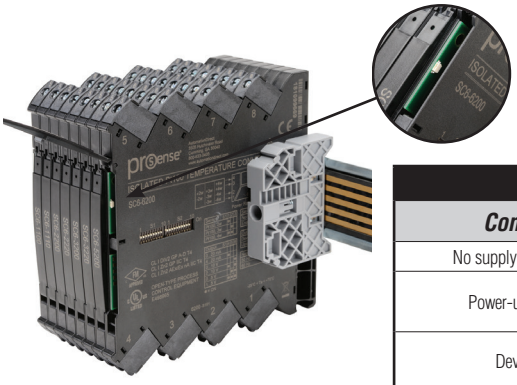
| Start Temp. | 1 | 2 | 3 | 4 | End Temp. | 5 | 6 | 7 | 8 | 9 | 10 | End Temp. | 5 | 6 | 7 | 8 | 9 | 10 | End Temp. | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -200°C (-328°F) | | | | | 0°C (32°F) | | | | | | | 105°C (221°F) | | • | | • | | • | 375°C (707°F) | • | | • | | • | |
| -180°C (-292°F) | | | | • | 5°C (41°F) | | | | | | • | 110°C (230°F) | | • | | • | • | | 400°C (752°F) | • | | • | | • | • |
| -150°C (-238°F) | | | • | | 10°C (50°F) | | | | | • | | 115°C (239°F) | | • | | • | • | • | 450°C (842°F) | • | | • | • | | |
| -100°C (-148°F) | | | • | • | 15°C (59°F) | | | | | • | • | 120°C (248°F) | | • | • | | | | 500°C (932°F) | • | | • | • | | • |
| -50°C (-58°F) | | • | | | 20°C (68°F) | | | | • | | | 125°C (257°F) | | • | • | | | • | 550°C (1022°F) | • | | • | • | • | |
| -25°C (-13°F) | | • | | • | 25°C (77°F) | | | | • | | • | 130°C (266°F) | | • | • | | • | | 600°C (1112°F) | • | | • | • | • | • |
| -10°C (14°F) | | • | • | | 30°C (86°F) | | | | • | • | | 135°C (275°F) | | • | • | | • | • | 650°C (1202°F) | • | • | | | | |
| -5°C (23°F) | | • | • | • | 35°C (95°F) | | | | • | • | • | 140°C (284°F) | | • | • | • | | | 700°C (1292°F) | • | • | | | | • |
| 0°C (32°F) | • | | | | 40°C (104°F) | | | • | | | | 145°C (293°F) | | • | • | • | | • | 750°C (1382°F) | • | • | | | • | |
| 5°C (41°F) | • | | | • | 45°C (113°F) | | | • | | | • | 150°C (302°F) | | • | • | • | • | | 800°C (1472°F) | • | • | | | • | • |
| 10°C (50°F) | • | | • | | 50°C (122°F) | | | • | | • | | 160°C (320°F) | | • | • | • | • | • | 850°C (1562°F) | • | • | | • | | |
| 20°C (68°F) | • | | • | • | 55°C (131°F) | | | • | | • | • | 170°C (338°F) | • | | | | | | 900°C (1652°F) | • | • | | • | | • |
| 25°C (77°F) | • | • | | | 60°C (140°F) | | | • | • | | | 180°C (356°F) | • | | | | | • | 950°C (1742°F) | • | • | | • | • | |
| 50°C (122°F) | • | • | | • | 65°C (149°F) | | | • | • | | • | 190°C (374°F) | • | | | | • | | 1000°C (1832°F) | • | • | | • | • | • |
| 100°C (212°F) | • | • | • | | 70°C (158°F) | | | • | • | • | | 200°C (392°F) | • | | | | • | • | 1050°C (1922°F) | • | • | • | | | |
| 200°C (392°F) | • | • | • | • | 75°C (167°F) | | | • | • | • | • | 225°C (437°F) | • | | | • | | | 1100°C (2012°F) | • | • | • | | | • |
| | | | | | 80°C (176°F) | | • | | | | | 250°C (482°F) | • | | | • | | • | 1150°C (2102°F) | • | • | • | | • | |

| Sens.Type | Temp. Range |
|---|---|
| Pt100 | -200°C (-328°F) to 850°C (1562°F) |
| TC J | -100°C (-148°F) to 1200°C (2192°F) |
| TC K | -180°C (-292°F) to 1372°C (2502°F) |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 85°C (185°F) | | • | | | | • | 275°C (527°F) | • | | | • | • | | 1200°C (2192°F) | • | • | • | | • | • |
| 90°C (194°F) | | • | | | • | | 300°C (572°F) | • | | | • | • | • | 1250°C (2282°F) | • | • | • | • | | |
| 95°C (203°F) | | • | | | • | • | 325°C (617°F) | • | | • | | | | 1300°C (2372°F) | • | • | • | • | | • |
| 100°C (212°F) | | • | | • | | | 350°C (662°F) | • | | • | | | • | 1350°C (2462°F) | • | • | • | • | • | |
| | | | | | | | | | | | | | | 1372°C (2502°F) | • | • | • | • | • | • |

Note: °F values are calculated equivalents for °C values

## 16 - LED Indication for Analog Input Modules (SC6-1100, -1110, -2200, -2220, -3200, -3220)



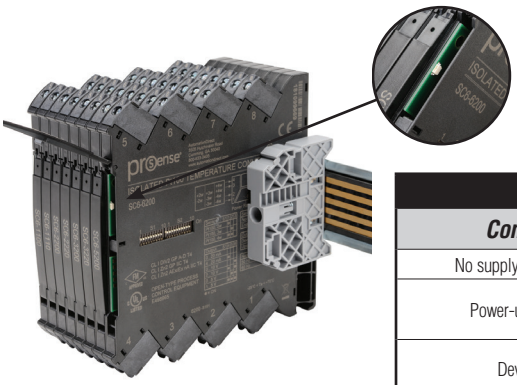
### LED Indication

The device is equipped with a green power LED in the front to indicate the operation status, see the table below:

**LED Indication for Analog Input Modules**

| *Condition* | *LED* | *Output and Loop Supply* | *Action Required* |
|---|---|---|---|
| No supply / device error | OFF | De-energized | Connect supply / replace device |
| Power-up or restart | 1 Flash (0.5 s OFF + 0.5 s ON) | De-energized | - |
| Device OK | Flashing 13Hz (15ms ON) | Energized | - |
| Incorrect DIP-switch setting | Flashing 1Hz (15ms ON) | De-energized | Correct setting and re-power device |
| Restarting due to: Supply error/hardware. RAM or program flow error | Flashing 1Hz (0.5 s ON) | De-energized | Adjust supply / replace device |

## 17 - LED Indication for Temperature Input Modules (SC6-5200, -6200)



### LED Indication

The device is equipped with a green power LED in the front to indicate the operation status, see the table below:

**LED Indication for Temperature Input Modules**

| *Condition* | *LED* | *Output and Loop Supply* | *Action Required* |
|---|---|---|---|
| No supply / device error | OFF | De-energized | Connect supply / replace device |
| Power-up or restart | 1 Flash (0.5 s OFF + 0.5 s ON) | De-energized | - |
| Device OK | Flashing 13Hz (15ms ON) | Energized | - |
| Incorrect DIP-switch setting | Flashing 1Hz (500ms ON) | De-energized | Correct setting and re-power device |
| Sensor error indication | Flashing 1Hz (15ms ON) | Up- or Downscale | Check sensor |