DSCP61 Configuration Guide

Pt100-to-DC Current/Voltage Converter

Description

Each DSCP61 RTD Pt100 Converter provides a single channel of RTD input which is amplified, linearized and converted to a high-level current or voltage output. Inputs may be connected by 2, 3, or 4 wires and measurement range may be configured by dip-switch to cover a range of –150°C to +650°C. Power can be applied directly to the converter's terminals or through a DIN rail mounted bus connector accessory, eliminating the need to wire power to each individual converter.

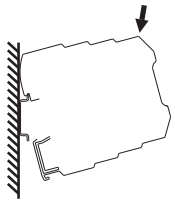
Specifications Typical at T_A=+25°C and +24VDC power

Module	DSCP61
Input (selectable)	
Pt100 Probe EN 60751	Accepts 2-, 3-, or 4-wire RTDs Sensor current: <900µA Cable resistance: 20Ω per wire (max) Measurement range: –150°C to +650°C (settable) Span: 50°C (min) Input voltage: 32VDC (max)
Accuracy	±0.1% (max)
Thermal Drift	<100ppm/°K
A/D Conversion	14-bit
Processing	Floating point 32-bit
Response Time, 90% Span (selectable)	<50ms (without filter), <200ms (with filter)
Isolation	1500Vrms (1 minute), 3-Way
Dip-Switch Configuration	Sets input and output ranges, sensor type, filter and faults
Status Indicators (LED)	Internal fault, configuration error, connection fault
Output (selectable)	
Current	0 to 20, 4 to 20, 20 to 0 or 20 to 4mA Load resistance: 500Ω (max)
Current Output Maximum	25mA
Fault Output	102.5% or 105% of full-scale value in case of over-range
Voltage	0 to 5, 1 to 5, 0 to 10 or 10 to 0VDC Load resistance: 2kΩ (min)
Power Supply	19.2 to 30VDC
Power Consumption	500mW (21mA at 24VDC)
Hot Swapping	Yes
Environmental	
Operating Temp. Range	–20°C to +65°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 90%, Noncondensing
IP Protection	IP20
Emissions	EN61000-6-4
Immunity	EN61000-6-2
Mechanical Dimensions (w x h x d)	0.24" x 3.67" x 4.04" (6.2mm x 93.1mm x 102.5mm)
Housing	Terminal housing for mounting on 35mm DIN 46277
Connections	Spring cage clamp
Weight	1.8 ounces (50g)

Installation rules

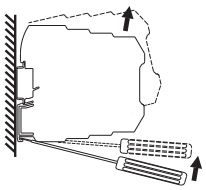
This module is designed for assembly on a DIN 46277 rail. Assembly in a vertical position is recommended to increase the module's ventilation. Be sure that no raceways or other objects that compromise aeration are positioned in the vicinity, and do not position the module above equipment that generates heat. We recommend positioning the module in the lower part of the control panel or container compartment. We also recommend rail-type assembly using the Power Bus connector, which eliminates the need to connect the power supply to each module.

Inserting module in DIN rail



1. Attach module in upper part of rail.
2. Press module downward.

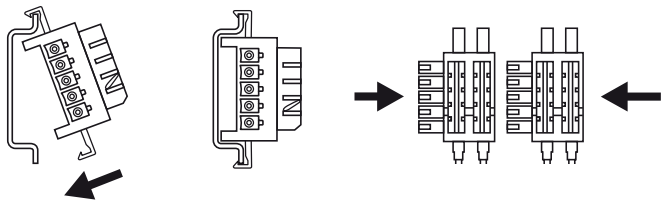
Extracting module from DIN rail



1. Apply leverage using a screwdriver (as shown in figure).
2. Rotate module upward.

Using the Power-Bus connector

Each expandable Power-Bus connector allows insertion of two modules. Insert Power-Bus connectors into the DIN rail by attaching to upper side of rail and rotating downward.



NOTE:
The Power-Bus must be inserted with protruding terminals on the left (as shown in figure above); otherwise the modules are turned upside down.

Never connect power supply directly to the bus connector on the DIN rail. Never tap power from the bus connector either directly or by using module terminals.

Factory dip-switch settings

The module leaves the factory with all dip-switches in the OFF position. The default configuration is as follows:

Pt100 wiring	3 wires
Input filter	Enabled
Output signal	4 to 20mA
Measurement range start	0°C
Measurement full-scale	0°C
Output signal in case of open input	Toward the top of the output range
Input over-range	Output signal is limited to +5% of max (or –5% of min) with input over-ranged

This configuration is valid only with all dip-switches in the OFF position. If even one dip-switch is not in the OFF position, all parameters must be set as indicated in the following tables.

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NOTE:
The indication ● means the dip-switch is set in the ON position.
No indication means the dip-switch is set in the OFF position.

Pt100 wiring		
SW1	1	
	●	2-/4-wire
		3-wire

Input filter				
SW1	2		10-90% response, 50Hz	10-90% response, 60Hz
	●	Not enabled	<200ms	<200ms
		Enabled	<50ms	<50ms

Output signal				
SW1	3	4	5	
				4 to 20mA
	●			0 to 20mA
		●		20 to 4mA
	●	●		20 to 0mA
			●	0 to 10VDC
		●	●	10 to 0VDC
	●	●	●	0 to 5VDC
	●		●	1 to 5VDC

Measurement range start				
SW1	6	7	8	°C
				0
	●			–10
		●		–20
	●	●		–30
			●	–40
	●		●	–50
		●	●	–100
	●	●	●	–150

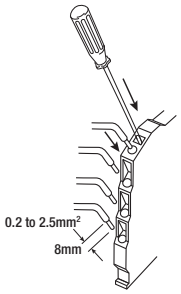
Measurement full scale																									
SW2	1	2	3	4	5	6	°C	SW2	1	2	3	4	5	6	°C	SW2	1	2	3	4	5	6	°C
							0			●	●		●		120				●	●		●	340
	●						5		●	●	●		●		130		●		●	●		●	350
		●					10					●	●		140			●	●	●		●	360
	●	●					15		●			●	●		150		●	●	●	●		●	370
			●				20			●		●	●		160						●	●	380
	●		●				25		●	●		●	●		170		●				●	●	390
		●	●				30				●	●	●		180			●			●	●	400
	●	●	●				35		●		●	●	●		190		●	●			●	●	410
				●			40			●	●	●	●		200				●		●	●	420
	●			●			45		●	●	●	●	●		210		●		●		●	●	430
		●		●			50							●	220			●	●		●	●	440
	●	●		●			55		●					●	230		●	●	●		●	●	450
			●	●			60			●				●	240					●	●	●	480
	●		●	●			65		●	●				●	250		●			●	●	●	500
		●	●	●			70				●			●	260			●		●	●	●	520
	●	●	●	●			75		●		●			●	270		●	●		●	●	●	550
					●		80			●	●			●	280				●	●	●	●	580
	●				●		85		●	●	●			●	290		●		●	●	●	●	600
		●			●		90					●		●	300			●	●	●	●	●	620
	●	●			●		95		●			●		●	310		●	●	●	●	●	●	650
			●		●		100			●		●		●	320								
	●		●		●		110		●	●		●		●	330								

Output signal in case of open input		
SW2	7	
	●	ON: Toward the bottom of the output range
		OFF: Toward the top of the output range

Over-range / Under-range Options (See table below for corresponding values)		
SW2	8	
	●	ON: Output signal is limited to ±2.5% of full-scale setting with input over- / under-ranged
		OFF: Output signal is limited to ±5% of full-scale setting with input over- / under-ranged

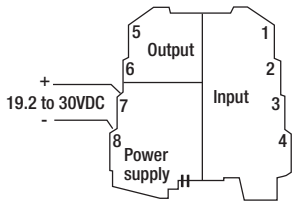
Nominal output value	Over- / Under-range limited to ±2.5% of full-scale setting	Over- / Under-range limited to ±5% of full-scale setting
20mA	20.5mA	21mA
4mA	3.5mA	3mA
0mA	0mA	0mA
10VDC	10.25VDC	10.5VDC
5VDC	5.125VDC	5.25VDC
1VDC	0.875VDC	0.75VDC
0VDC	0VDC	0VDC

Electrical connections



The module is designed for spring cage clamp electrical connections.
1. Strip cables by 0.8mm.
2. Insert screwdriver in the square hole and press until the cable lock spring opens.
3. Insert cable in the round hole.
4. Remove screwdriver and ensure cable is tightly fastened in the terminal.

Power supply



There are three ways to power the DSCP6x series of signal converters.

1. Connect the 24VDC power supply directly to terminals 7 (+) and 8 (-) of each module.

2. Connect power to one signal converter and use the expandable Power-Bus connector to distribute power to a maximum of 16 adjacent modules. The bus can be supplied from any of the modules, but the total current consumption of the bus must be less than 400mA. Higher consumption values can damage the module. An appropriately sized fuse must be connected in series with the power supply.

3. Use the DSCP70 Power Supply Connection Module and the expandable Power-Bus connector to distribute power to a maximum of 75 modules. The DSCP70 is designed to protect the modules connected via bus against overvoltage loads. The bus connector can be provided with power using the DSCP70 module if the total consumption of the bus is less than 1.5A. Higher consumption values can damage both the module and the bus. An appropriately sized fuse must be connected in series with the power supply.

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Input
The module accepts input from a Pt100 temperature probe (EN 60751) with 2-, 3-, or 4-wire connection.

The use of shielded cables is recommended for the electronic connections.

2-wire connection
Use this connection for short distances (<10m) between module and probe, remembering that it adds an error to the measurement equivalent to the resistance added by the connection cables.

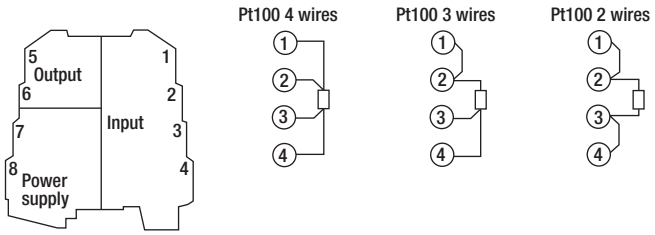
Set dip-switch SW1-1 in the ON position (2 / 4 wires) with bridges between terminals 1 and 2 and terminals 3 and 4.

3-wire connection
Use this connection for medium distances (>10m, <15m) between module and probe. The module compensates for the resistance added by the connection cables. However, the resistance values of all cables must be equal for the compensation to be correct because the module measures the resistance of only one cable and assumes the resistance value of the others is the same.

Set dip-switch SW1-1 in the OFF position (3 wires) with a bridge between terminals 3 and 4.

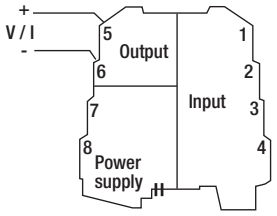
4-wire connection
Use this connection for long distances (>15m) between module and probe. It provides the maximum precision because the module measures the resistance of the sensor independently of the resistance of the connection cables.

Set dip-switch SW1-1 in the ON position (2 / 4 wires).



NOTE: The module measures the value of the Pt100 by using pulsed excitation current to reduce module power consumption. For this reason, some electronic calibrators may not be able to generate the correct simulated signal.

Output: Voltage / Current connections
The use of shielded cables is recommended for the electronic connections.



NOTE: To reduce power dissipation, load must be ≥250Ω for current output option.

LED indications on front of module

LED	Meaning
Rapid flashing, 3 pulses/sec	Internal fault
Slow flashing, 1 pulse/sec	Dip-switch setting error
Steady light	Pt100 connection wire fault 3rd wire resistance out of range

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