DSCP55 Configuration Guide

Pt100, Ni100/Loop-Powered Converter

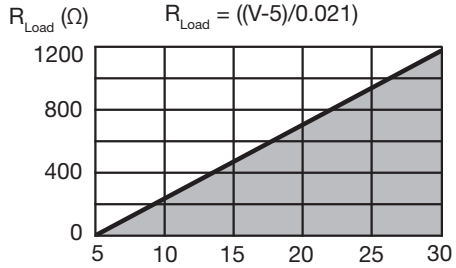
Description

Each DSCP55 RTD Loop-Powered Input Converter provides a single channel of RTD input which is amplified, linearized and converted to a high-level 4 to 20mA or 20 to 4mA output. Inputs may be connected by 2, 3, or 4 wires and measurement range may be configured by dip-switch.

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

Module	DSCP55
Input (selectable)	
Pt100 Probe EN 60751	Accepts 2-, 3-, or 4-wire RTDs Sensor current: 750µA Cable resistance: 25Ω (max) per wire Measurement range: –200°C to +650°C (settable) Span: 20°C (min)
Ni100 Probe	Accepts 2-, 3-, or 4-wire RTDs Sensor current: 750µA Cable resistance: 25Ω (max) per wire Measurement range: –60°C to +250°C (settable) Span: 20°C (min)
Accuracy	±0.1% (max)
Thermal Drift	<100ppm/°K
A/D Conversion	16-bit
Response Time, 90% Span (selectable)	<220ms (without filter), <620ms (with filter)
Isolation	No
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	4 to 20 or 20 to 4mA Load resistance: 1200Ω (max)
Current Output Maximum	30mA
Fault Output	102.5% or 105% of full-scale value in case of over-range
Hot Swapping	Yes
Loop Supply Voltage	5 to 30VDC
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	1.6 ounces (45g)

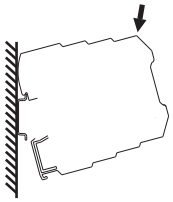
Load resistance vs. Minimum functioning voltage



Installation rules

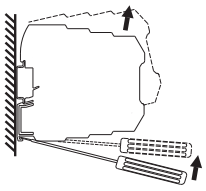
This module is designed for assembly on a DIN 46277 rail. Assembly in a vertical position is recommended to increase the module's ventilation. Be sure that no raceways or other objects that compromise aeration are positioned in the vicinity, and do not position the module above equipment that generates heat. We recommend positioning the module in the lower part of the control panel or container compartment.

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.

Factory dip-switch settings

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

RTD wiring	3 wires
50/60Hz line rejection	Enabled
Reversed output	Normal: 4 to 20mA
RTD type	Pt100
Measurement range start	0°C
Measurement full-scale	100°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.

RTD wiring		
SW1	1	
	●	2-/4-wire connection
		3-wire connection

50/60Hz rejection filter				
SW1	2		Response time 10-90%, 50Hz	Sampling time
	●	Enabled	<620ms	300ms
		Not enabled	<220ms	100ms

Reversed output		
SW1	3	
	●	Reversed: 20 to 4mA
		Normal: 4 to 20mA

RTD type		
SW1	4	
	●	Ni100
		Pt100

Not used		
SW1	5	Not used

Measurement range start				
SW1	6	7	8	°C
				0
	●			– 10
		●		– 20
	●	●		– 40
			●	– 50
	●		●	– 100
		●	●	– 150
	●	●	●	– 200

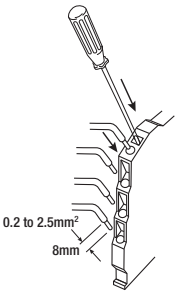
Measurement full scale																							
SW2	1	2	3	4	5	6	°C	SW2	1	2	3	4	5	6	°C	SW2	1	2	3	4	5	6	°C
							0			●	●		●		120				●	●		●	340
	●						5		●	●	●		●		130		●		●	●		●	350
		●					10					●	●		140			●	●	●		●	360
	●	●					15		●			●	●		150		●	●	●	●		●	370
			●				20			●		●	●		160						●	●	380
	●		●				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	20.4mA	21mA
4mA	3.6mA	<3.4mA

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.

Input

The module accepts input from a Pt100 (EN 60751) or Ni100 temperature probe 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

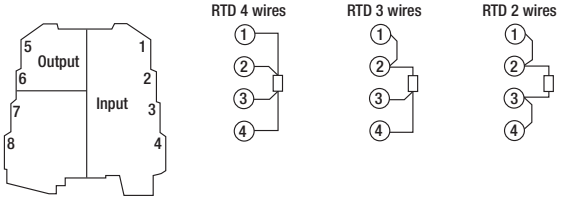
Use this connection for medium distances (>10m, <15m) between module and probe. The module compensates for the resistance added by the connection cables. However, the resistance values of all cables must be equal for the compensation to be correct because the module measures the resistance of only one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



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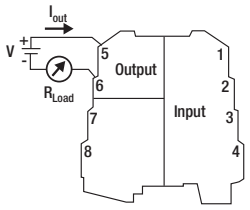
Output: Current loop connection

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



NOTE: To reduce power dissipation, load must be ≥250Ω.

LED indications on front of module

LED	Meaning
Rapid flashing, 3 pulses/sec	Internal fault
Slow flashing, 1 pulse/sec	Dip-switch setting error (full-scale and start range limits)
Steady light	RTD connection wire fault Measurement out of range, 3rd wire resistance out of range

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