DSCP65 Configuration Guide

DC Low Voltage Converter

Description

Each DSCP65 Low Voltage Converter provides a single channel of low voltage input which is converted to a current or voltage output. It is designed for industrial standard voltage or current signals. Input/output range, filter, fault indication, and other functions may be configured by dip-switch. 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

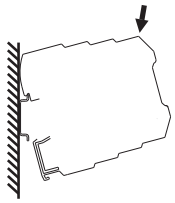
Typical at T_A=+25°C and +24VDC power

Module	DSCP65
Input (selectable)	
Voltage (Terminals 3 and 4)	25, 50, 60, 75, 80, or 100mV (input R = 50kΩ)
Voltage (Terminals 2 and 4)	120, 150, 200, 250, 300, 400, or 500mV (input R = 250kΩ)
Voltage (Terminals 1 and 4)	1000 or 2000mV (input R = 1MΩ)
Maximum Input Voltage	±50VDC
Accuracy	±0.1% (max)
Thermal Drift	<120ppm/°K
A/D Conversion	14-bit
Processing	Floating point 32-bit
Response Time, 90% Span (selectable)	<23ms (without filter), <51ms (with filter)
CMRR	>160dB
Isolation	1500Vrms (1 minute), 3-Way
Dip-Switch Configuration	Sets input and output ranges, 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 2 to 10VDC Load resistance: 2kΩ (min)
Voltage Output Maximum	12.5VDC
Power Supply	19.2 to 30VDC
Power Consumption	<600mW (22mA 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	1.6 ounces (46g)

Installation rules

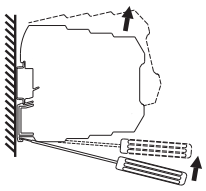
This module is designed for assembly on a DIN 46277 rail. Assembly in a vertical position is recommended to increase the module's ventilation. Be sure that no raceways or other objects that compromise aeration are positioned in the vicinity, and do not position the module above equipment that generates 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.

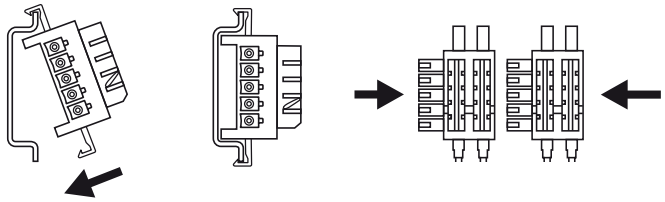
Extracting module from DIN rail



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

Using the CB-Power-Bus

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.

Shunt release detection

A shunt disconnection detection function can be activated by the dip-switch settings. It applies to the most sensitive inputs, which lead to terminals M2 and M3. When this function is enabled, shunt release is detected as a positive saturation of the input and interpreted as a fault.

The event is signaled visually by rapid flashing of the LED (see "LED indications on front of module" section) and the output is taken to fault condition (to the value of the set over-range, see "Over-/Under-range" section). Use of this function slightly degrades accuracy.

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Factory dip-switch settings

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

Input signal	0 to 60mV
Bipolar input	Not enabled
50/60Hz line rejection	50Hz
Input filter	Not enabled
Shunt detection	Not enabled
Output signal	4 to 20mA
Input over-range	Output signal is limited to +2.5% of max (or –2.5% 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.

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.

Input signal and scale details

SW1				Measure F.S.	Physical F.S.	Terminal +	SW1				Measure F.S.	Physical F.S.	Terminal +
1	2	3	4	mV	mV	Toward M4	1	2	3	4	mV	mV	Toward M4
				60mV	±100mV	M3				●	150mV	±250mV	M2
●				25mV	±50mV	M3	●			●	200mV	±250mV	M2
	●			50mV	±50mV	M3		●		●	250mV	±250mV	M2
●	●			60mV	±100mV	M3	●	●		●	300mV	±500mV	M2
		●		75mV	±100mV	M3			●	●	400mV	±500mV	M2
●		●		80mV	±100mV	M3	●		●	●	500mV	±500mV	M2
	●	●		100mV	±100mV	M3		●	●	●	1000mV	±1000mV	M1
●	●	●		120mV	±250mV	M2	●	●	●	●	2000mV	±2000mV	M1

The physical full scale is shown to evaluate the error and the transmission resolution, in addition to the acceptability of the input and, therefore, the useful margin before a fault is signaled.

Unipolar or bipolar input

SW1	5	
	●	Bipolar
		Unipolar

50/60Hz line rejection

SW1	6	
	●	60Hz
		50Hz

Input filter

SW1	7		10-90% response, 50Hz	10-90% response, 60Hz
	●	Enabled	max 55ms	max 51ms
		Not enabled	max 25ms	max 23ms

Shunt detection

SW1	8	
	●	Enabled
		Not enabled

If enabled, an injection of current less than 3µA is allowed, which can degrade the module's precision.

Output signal

SW2	1	2	3	
				0 to 20mA
	●			4 to 20mA
		●		20 to 0mA *
	●	●		20 to 4mA *
			●	0 to 10VDC
			●	0 to 5VDC
	●	●	●	1 to 5VDC
	●	●	●	2 to 10VDC

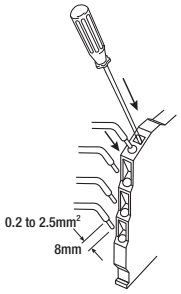
* These are inverted output scales, for which the fault is represented by the lower extreme.

Over-range / Under-range Options
(See table below for corresponding values)

SW2	4	
	●	ON: Output signal is limited to ±5% of full-scale setting with input over- / under-ranged
		OFF: Output signal is limited to ±2.5% 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
2VDC	1.75VDC	1.5VDC
0VDC	0VDC	0VDC

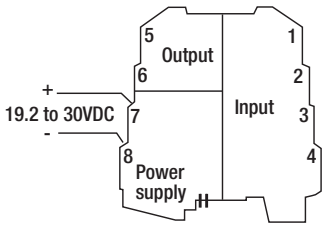
Electrical connections



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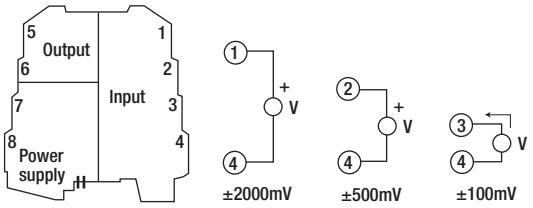
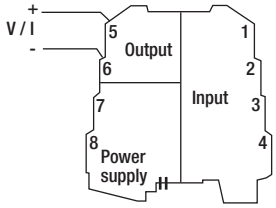
Input
The use of shielded cables is recommended for the electronic connections.

Terminal details (switch selectable for unipolar or bipolar input)
Terminal 1: Voltage input ranges (mVDC): 1000, 2000
Terminal 2: Voltage input ranges (mVDC): 120, 150, 200, 250, 300, 400, 500
Terminal 3: Voltage input ranges (mVDC): 25, 50, 60, 75, 80, 100
Terminal 4: Return



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 (red)	Meaning
Rapid flashing	Internal fault
Slow flashing	Function for detecting the disconnection of the shunt required for an input capacity, for which it is not available (M1)
Steady light	Output limiting in progress

Behavior due to fault or defect
Any defect causing the LED to flash rapidly takes the output into fault condition, i.e., to the over-range value (2.5% or 5% according to the setting of the dip-switches). For direct scales, the output takes on the over-range value corresponding to the maximum value; for the inverse scales (20 to 0mA, 20 to 4mA) it takes on the value corresponding to the minimum value. If slow flashing occurs, the output remains on zero. The acceptability of the input is determined by the physical full scale for the selected scale.

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