

# DRSP-I DRSP-I-DC 4-20 mA Isolated Signal Splitters

M-5244/0818

Model	Module Power
DRSP-I	85-265 VAC, 50/60 Hz or 60-300 VDC
DRSP-I-DC	9-30 VDC or 10-32 VAC

## Description

The DRSP-I series accepts a 4-20 mA current input and provides two optically isolated 4-20 mA current outputs that are linearly related to the input. Typical applications include isolation, output splitting, output device separation, and redundancy (i.e. to prevent failure of the entire loop if one device fails), or a combination of these.

Full 4-way isolation makes this module useful for ground loop elimination, common mode signal rejection, or noise pickup reduction.

## Sink/Source I/O

Standard is a 15 VDC loop excitation supply for the input and a 20 VDC loop excitation supply for each output. These power supplies can be selectively wired for sinking or sourcing allowing use with any combination of powered or unpowered milliamp I/O devices.

## I/O Status LEDs

A green input LED and two red output LEDs vary in intensity with changes in the process input and output signals. These provide a quick visual picture of your process loop at all times.

## Output Test

An output test button provides a fixed output (independent of the input) when held depressed. The test output level is potentiometer adjustable from 0 to 100% of output span.

Terminals are provided to operate the test functions remotely for each channel. This also allows use as a remote manual override to provide a temporary fixed output.



# OMEGA™ User's Guide

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WARRANTY

MADE IN  
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## DC Input Range

Factory ranged, please specify

Voltage: 0-10 mVDC to 0-100 VDC

Bipolar voltage:  $\pm 50$  mVDC to  $\pm 10$  VDC

Current: 0-1 mADC to 0-50 mADC, 4-20 mADC

## Input Impedance and Burden

Voltage: 200 k $\Omega$  minimum

Current: 50  $\Omega$  typical

Voltage burden: 1.25 VDC max. at 20 mA current input

## Input Loop Power Supply

15 VDC  $\pm 10\%$ , regulated, 25 mADC

May be selectively wired for sinking or sourcing mA input

## LoopTracker

Variable brightness LEDs indicate I/O loop level and status

One for input, one for each output

## Channel 1 and Channel 2 DC Output Ranges

Factory configured, please specify for each output channel

Voltage: 0-1 VDC to 0-10 VDC, 10 mA max  
up to 20 VDC with M19, M29, M39

Bipolar voltage:  $\pm 1$  VDC to  $\pm 10$  VDC

Current: 0-1 mADC to 0-20 mADC, 4-20 mADC  
20 V compliance, 1000  $\Omega$  at 20 mA

## Output Calibration

Multi-turn zero and span potentiometers for each output channel  $\pm 15\%$  of span adjustment range typical

## Output Loop Power Supplies

20 VDC nominal, regulated, 25 mADC for each output channel  
May be selectively wired for sinking or sourcing mA output

## Output Test/Override

Front momentary buttons or external contact closures for each channel to set output test levels.

Each output test level potentiometer adjustable 0-100% of span

## Output Ripple and Noise

Less than 10 mVRMS

## Linearity

Better than  $\pm 0.1\%$  of span

## Ambient Temperature Range and Stability

$-10^\circ\text{C}$  to  $+60^\circ\text{C}$  operating ambient

Better than  $\pm 0.04\%$  of span per  $^\circ\text{C}$  stability

## Response Time

70 milliseconds typical

Fast response time option DF, 10 milliseconds typical

## Isolation

Full 4-way, 1200 VRMS minimum

## Housing and Connectors

IP 40, requires installation in panel or enclosure

For use in Pollution Degree 2 Environment

Mount vertically to a 35 mm DIN rail

Eight 4-terminal removable connectors, 14 AWG max wire size

## Power

85-265 VAC, 50/60 Hz or 60-300 VDC, 6 W maximum

D versions: 9-30 VDC or 10-32 VAC 50/60 Hz, 6 W maximum



**WARNING:** This product can expose you to chemicals including nickel, which are known to the State of California to cause cancer or birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

### Electrical Connections

**WARNING!** All wiring must be performed by a qualified electrician or instrumentation engineer. See wiring diagrams.

Avoid shock hazards! Turn signal input, output, and power off before connecting or disconnecting wiring.

The DRSP-I is factory configured for one 4-20 mA input and two 4-20 mA outputs as indicated on the serial number label.

To maintain full isolation, avoid combining power supplies in common with inputs, outputs, or unit power.

The power supplies are fuse protected and the unit may be returned for fuse replacement.

### Signal Input Terminals

Polarity must be observed when connecting the signal inputs.

The DRSP-I may be wired for a sinking or sourcing input.

Determine if your input device provides power to the current loop or if the loop must be powered by the DRSP-I. Typical voltage may be 9-24 VDC at your device's terminals if it provides power to the loop.

Type of Input Device	- Terminal	+ Terminal
Transmitter with mA (current) output that provides power to the current loop. Typically a 3 or 4-wire device.	17 (-)	19 (+)
Transmitter with mA (current) output that is unpowered. Typically a 2-wire device. DRSP-I module provides loop power.	19 (-)	18 (+15 V)

### Signal Output Terminals

Polarity must be observed when connecting the signal outputs.

The two DRSP-I output channels may be individually wired for a sinking or sourcing output as needed.

For each channel determine if your output device provides power to the current loop or if the loop must be powered by the DRSP-I. Typical voltage may be 9-24 VDC at your device's terminals if it provides power to the loop.

The wiring diagram illustrates typical wiring examples. Each channel may be wired as needed.

If the output does not function, check wiring and polarity for both inputs and outputs.

Type of Device for Output Channel 1	- Terminal	+ Terminal
Measuring/recording device accepts a mA (current) input and the input is unpowered or passive. DRSP-I provides the loop power.	3 (-)	4 (+20 V)
Measuring or recording device accepts a mA (current) input and provides power to the current loop.	2 (-)	3 (+)

Type of Device for Output Channel 2	- Terminal	+ Terminal
Measuring/recording device accepts a mA (current) input and the input is unpowered or passive. DRSP-I provides the loop power.	7 (-)	8 (+20 V)
Measuring or recording device accepts a mA (current) input and provides power to the current loop.	6 (-)	7 (+)

### Module Power Terminals

Check white model/serial number label for module operating voltage to make sure it matches available power.

Connect power last. When using DC power, either polarity is acceptable, but for consistency with similar products, positive (+) can be wired to terminal 13 and negative (-) can be wired to terminal 16.

### Current Sinking Outputs

Typical of some PLCs that have current sourcing inputs.

### Current Sinking Outputs with Separate Power Supplies

Typical of a system using loop powered displays with external loop supplies.

### Current Sourcing Outputs

DRSP-I provides power to each loop. Typical of a system or PLC using current sinking inputs.

### External Contacts For Test Function

Closing the contact provides the same function as pressing the Test button for each channel. May be used as a manual override.

Output LEDs: Variable brightness red LED indicates output level for each channel

Test Cal.: Output test level adjustment

Test: Push to test output. Sets each output to level determined by Test Cal. potentiometer.

Span: Output span calibration for each channel

Input LED: Variable brightness green LED indicates input level

Zero: Output zero calibration for each channel

### Current Sourcing Input

DRSP-I provides power to input loop. Typical when using a passive or unpowered transmitter or sensor.

### Current Sinking Input

Typical of a system using a transmitter that is externally powered and provides power to the loop.

### Current Sinking Input with Separate Power Supply

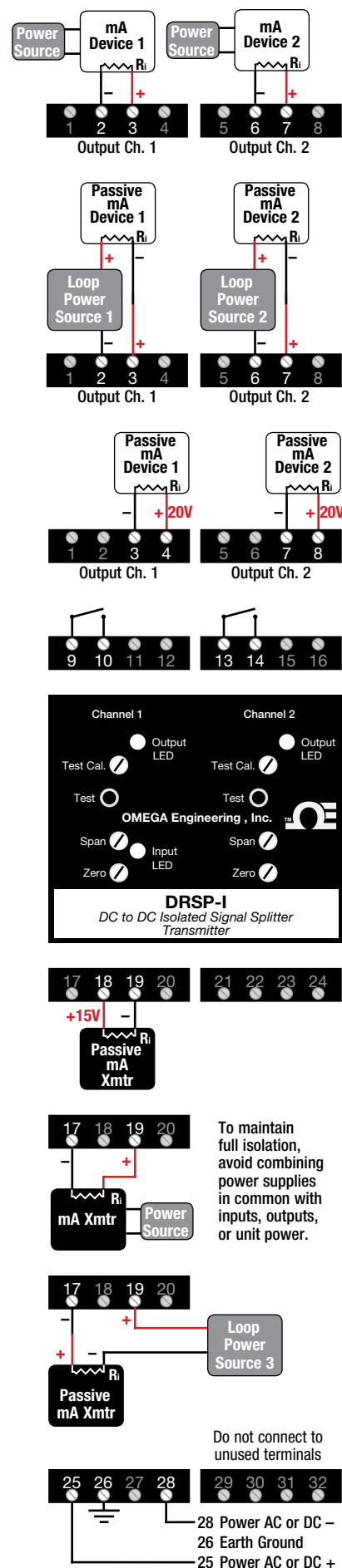
Typical of a system using a passive transmitter that uses a loop power supply to power to the loop.

### Module Power

DRSP-I: 685-265 VAC, 50/60 Hz or 60-300 VDC

DRSP-I-DC: 9-30 VDC or 10-32 VAC 50/60 Hz

Power wiring: Cu 60/75°C conductors 14 AWG max.



### Mounting to a DIN Rail

Install module vertically on a 35 mm DIN rail in a protective enclosure away from heat sources.

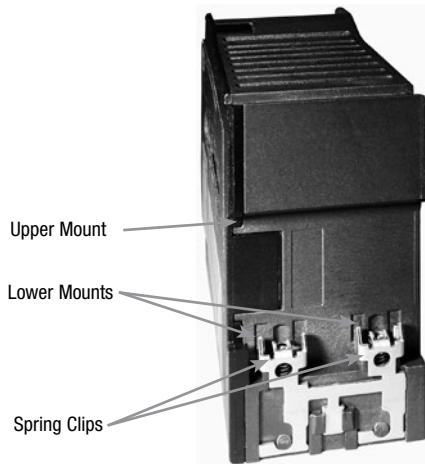
Do not block air flow. Allow 1" (25 mm) above and below housing vents for air circulation.

Avoid shock hazards! Turn signal input, output, and power off before installing or removing module.

1. Tilt front of module downward and position the lower mounts and spring clips against the bottom edge of DIN rail.
2. Push front of module upward until upper mount snaps into place.

### Removal

1. Push up on bottom back of module.
2. Tilt front of module downward to release upper mount from top edge of DIN rail.
3. The module can now be removed from the DIN rail.



### Calibration

Front-mounted Zero and Span potentiometers for each channel can be used to compensate for load and lead variations.

1. Apply power to the module and allow a minimum 30 minute warm up time.
2. Using an accurate calibration source, provide an input to the module equal to the minimum input required for the application.
3. Using an accurate measurement device for the output, adjust the Zero potentiometer for the exact minimum output desired. The Zero control should only be adjusted when the input signal is at its minimum. This will produce the corresponding minimum output signal. The Zero control will provide adjustment for the 4 mA or low end of the signal.
4. Set the input at maximum, and then adjust the Span pot for the exact maximum output desired. The Span control should only be adjusted when the input signal is at its maximum. This will produce the corresponding maximum output signal. The Span control will provide adjustment for the 20 mA or high end of the signal.
5. Repeat adjustments for maximum accuracy.
6. Repeat adjustments for second channel.

### Output Test Function

When the Test button is depressed it will drive the output with a known good signal that can be used as a diagnostic aid during initial start-up or troubleshooting. When released, the output will return to normal.

The Test Cal. potentiometer is factory set to approximately 50% output. It can be adjusted to set the test output from 0 to 100% of the output span.

Press and hold the Test button and adjust the Test Cal. potentiometer for the desired output level.

The output test function for each channel may be externally wired for remote test operation or a manual override. See wiring diagram.

### Operation

The DRSP-I accepts a 4-20 mA current input and provides two optically isolated 4-20 mA current outputs that are linearly related to the input.

The green input LED provides a visual indication that a signal is being sensed by the input circuitry of the module. It also indicates the input signal strength by changing in intensity as the process changes from minimum to maximum.

If the LED fails to illuminate, or fails to change in intensity as the process changes, check the module power or signal input wiring.

The two red output LEDs provide a visual indication that the output signals are functioning. They become brighter as the input and each corresponding output change from minimum to maximum.

The red LED will only light if the output loop current path is complete. Failure to illuminate or a failure to change in intensity as the process changes may indicate a problem with the module power or signal output wiring.

Note that it may be difficult to see the LEDs under bright lighting conditions and low I/O levels.



Wire terminal  
torque  
0.5 to 0.6 Nm or  
4.4 to 5.3 in-lbs

## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

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2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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