

# INSTRUCTION MANUAL

SIL 3 2-wire Active HART<sup>®</sup> Tx Current Repeater  
DIN-Rail and Termination Board,  
Models D6016SS, D6016SK, D6016DS, D6016DK



### General Description:

The Current Repeater D6016 module is a high integrity analog input interface suitable for applications requiring SIL 3 level (according to IEC 61508:2010 Ed.2) in safety related systems for high risk industries.

It repeats a 2-wire active 4-20 mA current signal input floating circuit to drive a load.

The module allows bi-directional communication signals, for HART® devices.

Mounting on standard DIN-Rail, with or without Power Bus, or on customized Termination Boards.

D6016SS: Single channel, source output. D6016SK: Single channel, sink output. D6016DS: Double channel, source output. D6016DK: Double channel, sink output.

## Technical Data

### Supply:

24 Vdc nom (18 to 30 Vdc) reverse polarity protected.

**Current consumption:** 33 mA (D6016SS), 20 mA (D6016SK), 57 mA (D6016DS), 31 mA (D6016DK) @ 24 Vdc with 20 mA output, typical.

**Power dissipation:** 0.90 W (D6016SS), 1.00 W (D6016SK), 1.50 W (D6016DS), 1.80 W (D6016DK) @ 24 Vdc with 20 mA output on 250 Ω load and 24 Vdc output supply for sink models, typical.

### Isolation (Test Voltage):

In/Out 2.5 kV; In/Supply 2.5 kV; In/In 500 V; Out/Supply 500 V; Out/Out 500 V.

### Input:

4 to 20 mA (separately powered input, voltage drop  $\leq 7$  V), reading range 0 to 22 mA.

**HART Impedance:** 225 Ω, typical.

### Output:

4 to 20 mA.

**Sink out voltage range:** 2 to 30 V.

**Load range:** 0 to 500 Ω, with conventional Tx input 250 Ω nom (160 to 500 Ω), with smart Tx input.

**Current limitation:** 24 mA (up to 450 Ω load)  $\leq$  max current  $\leq$  26 mA.

**Response time:** 20 ms (10 to 90 % step change).

### Performance:

**Ref. Conditions:** 24 V supply, 250 Ω load,  $23 \pm 1$  °C ambient temperature.

**Calibration accuracy:**  $\leq \pm 20$  μA.


**Linearity accuracy:**  $\leq \pm 20$  μA.

**Supply voltage influence:**  $\leq \pm 4$  μA for a min to max supply change.

**Load influence:**  $\leq \pm 4$  μA for a 0 to 100 % load resistance change.

**Temperature influence:**  $\leq \pm 2$  μA/°C.

### Compatibility:

 CE mark compliant, conforms to Directives: 2014/30/EU EMC, 2014/35/EU LVD, 2011/65/EU RoHS.

### Environmental conditions:

**Operating:** temperature limits - 40 to + 70 °C, relative humidity 95 %, up to 55 °C.

**Max altitude:** 2000 m a.s.l.

**Storage:** temperature limits - 45 to + 80 °C.

### Approvals:

SIL 3 conforms to IEC61508:2010 Ed. 2.

### Mounting:

EN/IEC60715 TH 35 DIN-Rail, with or without Power Bus or on customized Termination Board.

**Weight:** about 135 g (D6016DS and D6016DK), 115 g (D6016SS and D6016SK).

**Connection:** by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm<sup>2</sup> (13 AWG).

**Protection class:** IP 20.

**Dimensions:** Width 12.5 mm, Depth 123 mm, Height 120 mm.

## Ordering Information

Model:	D6016
1 channel source output	SS
1 channel sink output	SK
2 channels source outputs	DS
2 channels sink outputs	DK

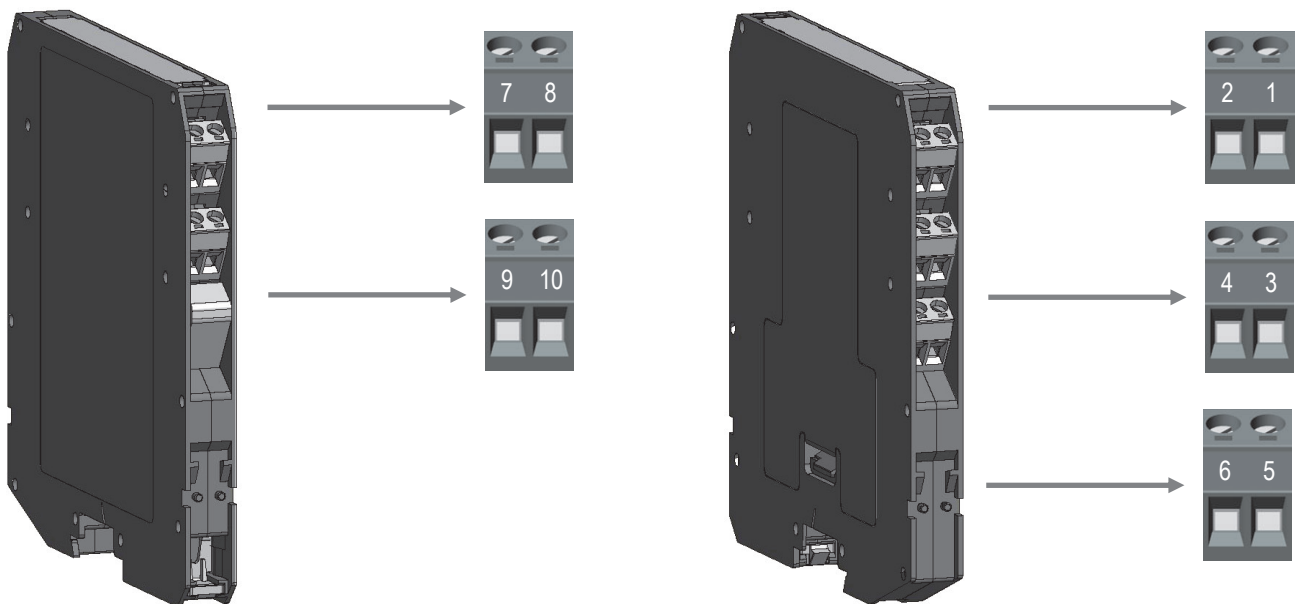
Power Bus and DIN-Rail accessories:  
 Bus Connector JDFT049      Bus Mounting Kit OPT5096

## Front Panel and Features



- 4-20 mA Input Signal Active.
- 4-20 mA Output Signal Source-Sink.
- HART® compatible.
- Input and Output short circuit proof.
- High Accuracy.
- High Density, two channels per unit.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety systems.
- Simplified installation using standard DIN-Rail and plug-in terminal blocks, with or without Power Bus, or customized Termination Boards.

## Terminal block connections



**7** + Input Ch 1 for External Powered Transmitters

**8** - Input Ch 1 for External Powered Transmitters

**9** + Input Ch 2 for External Powered Transmitters

**10** - Input Ch 2 for External Powered Transmitters

**11** -

**12** -

**1** + Output Ch 1

**2** - Output Ch 1

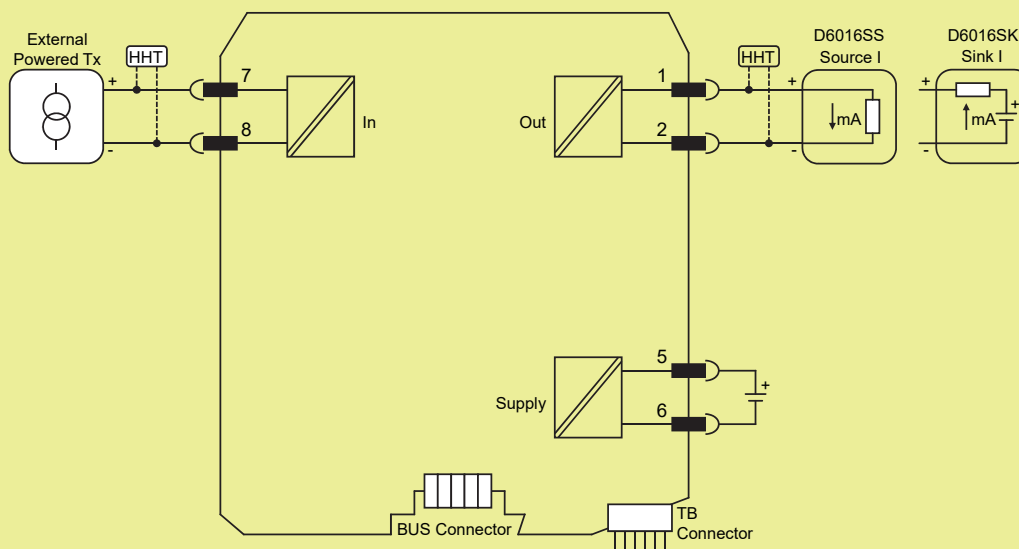
**3** + Output Ch 2

**4** - Output Ch 2

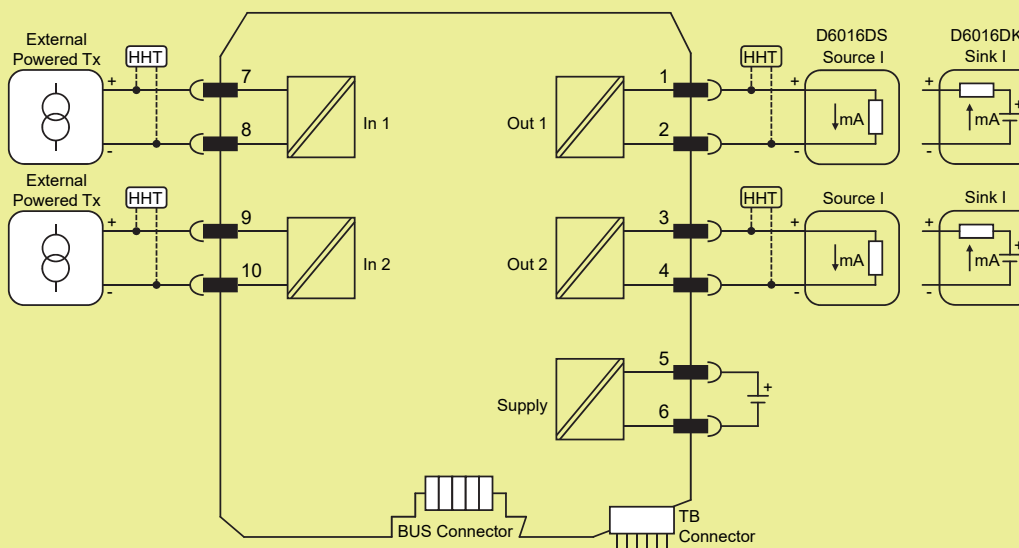
**5** + Power Supply 24 Vdc

**6** - Power Supply 24 Vdc

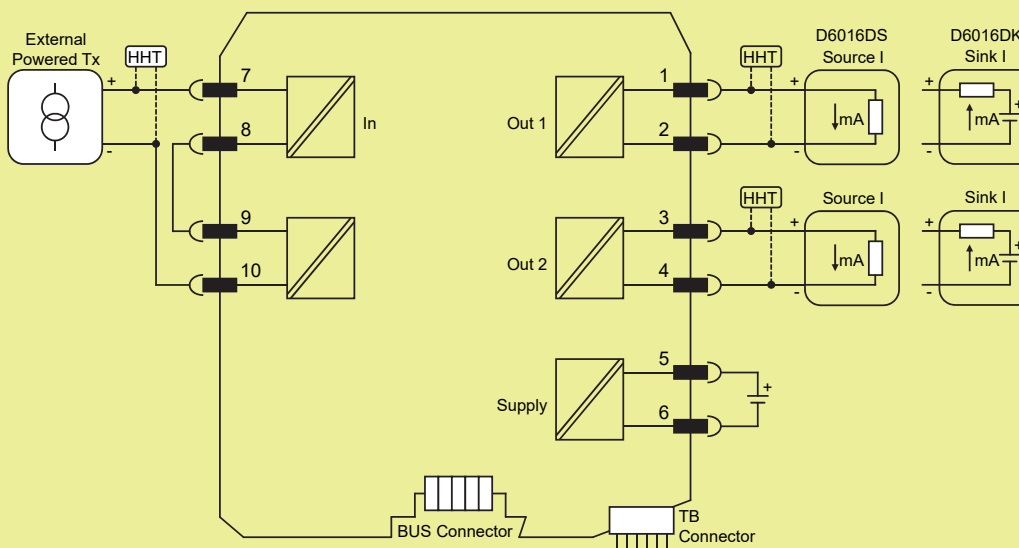
D6016S\*



D6016D\*



D6016D\* Duplicator



## Warning

D6016 series must be installed, operated and maintained only by qualified personnel, in accordance to the relevant national/international installation standards. Failure to properly installation or use of the equipment may risk to damage the unit or severe personal injury. The unit cannot be repaired by the end user and must be returned to the manufacturer or his authorized representative. Any unauthorized modification must be avoided.

## Operation

D6016 repeats an externally powered 4-wire 4-20 mA current signal input floating circuit to drive a load. The module allows bi-directional communication signals, for HART® devices. A "POWER ON" green led for each channel lits when input power is present.

## Installation

D6016 series are Repeater power supply HART® compatible housed in a plastic enclosure suitable for installation on EN/IEC60715 TH 35 DIN-Rail, with or without Power Bus or on customized Termination Board. D6016 series can be mounted with any orientation over the entire ambient temperature range. Electrical connections are accommodated by polarized plug-in removable screw terminal blocks which can be plugged in/out into a powered unit without suffering or causing any damage. Connect only one individual conductor per each clamping point, use conductors up to 2.5 mm<sup>2</sup> (13 AWG) and a torque value of 0.5-0.6 Nm. Use only cables that are suitable for a temperature of at least 85°C. The wiring cables have to be proportionate in base to the current and the length of the cable. On the section "Function Diagram" and enclosure side a block diagram identifies all connections. The enclosure provides, according to EN60529, an IP20 minimum degree of protection (or similar to NEMA Standard 250 type 1). The equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1. The end user is responsible to ensure that the operating temperature of the module is not exceeded in the end use application. Units must be protected against dirt, dust, extreme mechanical (e.g. vibration, impact and shock) and thermal stress, and casual contacts. If enclosure needs to be cleaned use only a cloth lightly moistened by a mixture of detergent in water. Any penetration of cleaning liquid must be avoided to prevent damage to the unit. Any unauthorized modification must be avoided. D6016 series must be connected to SELV or PELV supplies. All circuits connected to D6016 series must comply with the overvoltage category II (or better) according to EN/IEC60664-1.

## Start-up

Before powering the unit check that all wires are properly connected, particularly supply conductors and their polarity, input and output wires. Check conductors for exposed wires that could touch each other causing dangerous unwanted shorts. Turn on power, the "power on" green leds must be lit, for 2 wires transmitter connection output signal should be corresponding to the input from the transmitter. If possible change the transmitter output and check the corresponding output.