D6017

SIL3 3/4-Wire HART® Transmitter Power Supply

Models D6017SS, D6017SK

INSTRUCTION MANUAL

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1. CHARACTERISTICS

General Description:
The Repeater Power Supply D6017 module is a high integrity analog input interface suitable for applications requiring SIL 3 level in safety related systems for high risk industries. It provides a fully floating dc supply for energizing 3 & 4 wires 4-20 mA transmitters, and repeats the current in floating circuit to drive a load.
The circuit allows bi-directional communication signals, for HART® devices.
D6017SS: Single channel, source output.
D6017SK: Single channel, sink output.

Functional Safety Management Certification:
G.M. International is certified by TUV to conform to IEC61508:2010 part 1 clauses 5-6 for safety related systems up to and included SIL3.

2. TECHNICAL DATA

Supply:

24 Vdc nom (18 to 30 Vdc) reverse polarity protected, ripple within voltage limits ≤ 5 Vpp, 2 A time lag fuse internally protected.
Current consumption: 270 mA (D6017SS), 255 mA (D6017SK with 24 V sink out voltage), @ 24 Vdc with 200 mA field supply and 20 mA output signal on 250 Ω, typical.
Power dissipation: 1.75 W (D6017SS), 1.9 W (D6017SK with 24 V sink out voltage), @ 24 Vdc with 200 mA field supply and 20 mA output signal on 250 Ω, typical.

Isolation (test voltage):

Supply/In 500 V; Supply/Out 500 V; In/Out 500 V; Field Supply/In 500 V; Field Supply/Out 500 V; Field Supply/Supply 500 V.

Input:

4 to 20 mA (voltage drop ≤ 6 V), reading range 0 to 24 mA.
Transmitter line voltage: 24 V nominal, 23 V minimum @ 200 mA.
Current rating: 200 mA (resettable fuse protected), with linear derating down to 150 mA, from 50 to 70°C.
HART impedance: 225 Ω, typical.

Output:

Current range: 4 to 20 mA, limited at 25 mA.
Sink out voltage range: 2 to 30 V.
Conventional Tx load: 0 to 550 Ω.
Smart Tx load: 250 Ω nom (150 to 500 Ω).
Response time: 10 ms (10 to 90 % step change).
Output ripple: ≤ 20 mVrms on 250 Ω communication load on 0.5 to 2.5 kHz band.
Frequency response: 0.5 to 2.5 kHz bidirectional within 3 dB (HART protocol).

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Performance:

Ref. Conditions: 24 V supply, 250 Ω output load, 23 ± 1 °C ambient temperature.
Calibration accuracy: ≤ ± 20 µA.
Linearity accuracy: ≤ ± 20 µA.
Supply voltage influence: ≤ ± 4 µA for a min to max supply change.
Load influence: ≤ ± 4 µA for a 0 to 100 % load resistance change.
Temp. influence: ≤ ± 2 µA/°C.

Compatibility:

CE mark compliant, conforms to Directives:
2014/34/EU ATEX, 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.

Safety Description:

ATEX: II 3G Ex ec IIC T4 Gc
IECEx: Ex ec IIC T4 Gc
UL: NI / I / 2 / ABCD / T4
C-UL: NI / I / 2 / ABCD / T4
CCC: Ex ec IIC T4 Gc
Approvals:
ATEX conforms to EN60079-0, EN60079-7.
IECEx conforms to IEC60079-0, IEC60079-7.
UL & C-UL E222308 conforms to UL 61010-1 and UL 121201 for UL and CAN/CSA C22.2 No.61010-1-12 and CSA C22.2 No. 213 for C-UL.
CCC n. 2024322310005795 conforms to GB/T 3836.1, GB/T 3834.3.
TUV Certificate No. TUV IT 25 SIL 0634 SIL 3 conforms to IEC61508:2010 Ed. 2.
SIL 3 Functional Safety TÜV Certificate conforms to IEC61508:2010 Ed.2, for Management of Functional Safety.

Mounting:

EN/IEC60715 TH 35 DIN-Rail, with or without Power Bus or on customized Termination Board.
Weight: about 155 g.
Connection: by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm² (13 AWG).
Location: installation in Safe Area/Non Hazardous Locations or Zone 2, Group IIC T4 or Class I, Division 2, Group A,B,C,D, T4.
Protection class: IP 20.
Dimensions: Width 12.5 mm, Depth 123 mm, Height 120 mm.

3. ORDERING INFORMATION

3.1 Ordering codes

D6017SS: 1 channel source output

D6017SK: 1 channel sink output

3.2 Accessories

Bus Connector JDFT049, Bus Mounting Kit OPT5096.

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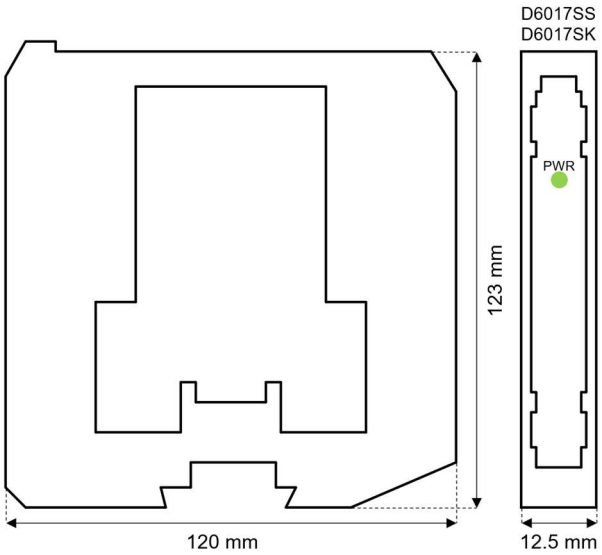
4. OVERALL DIMENSIONS



5. TERMINAL BLOCK CONNECTIONS

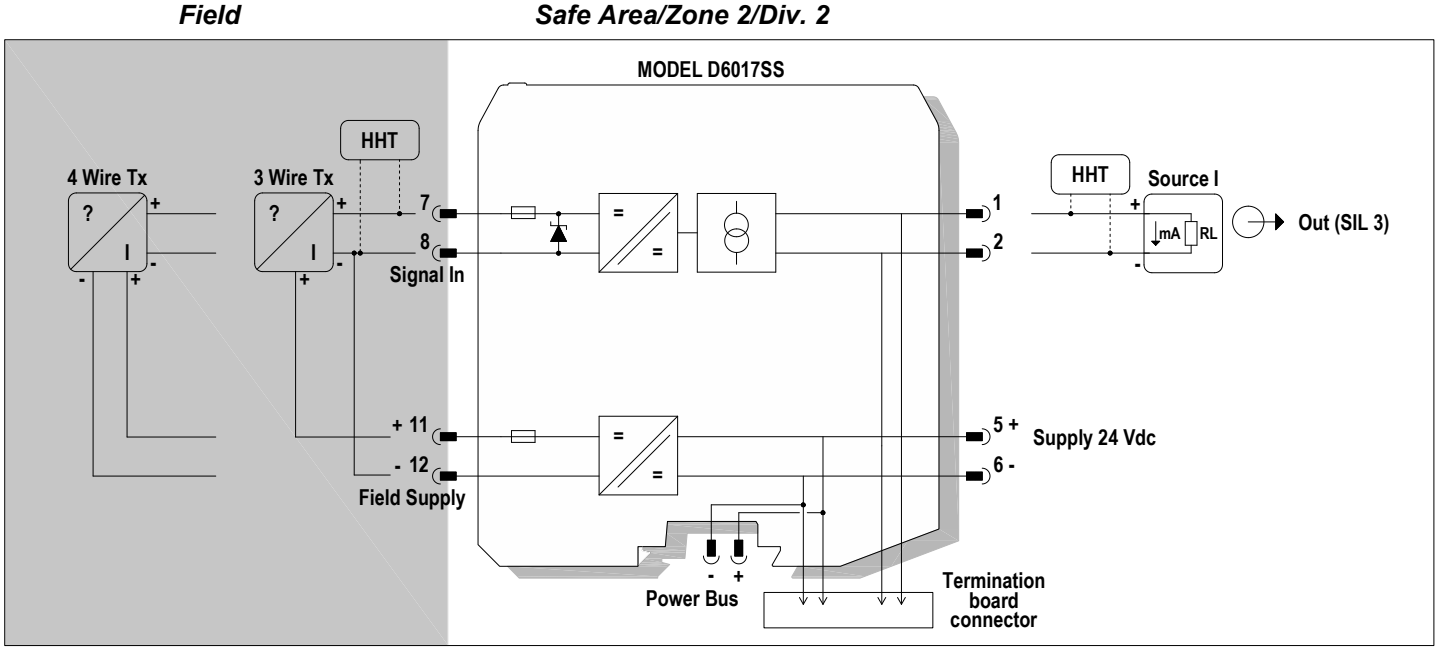
5.1 Field Side

7: + Input Ch 1 for 3/4 wires Transmitters
8: - Input Ch 1 for 3/4 wires Transmitters
11: + Field Supply 24 Vdc
12: - Field Supply 24 Vdc

5.2 System Side

1: + Output Ch 1
2: - Output Ch 1
5: + Power Supply 24 Vdc
6: - Power Supply 24 Vdc

6. FUNCTION DIAGRAM



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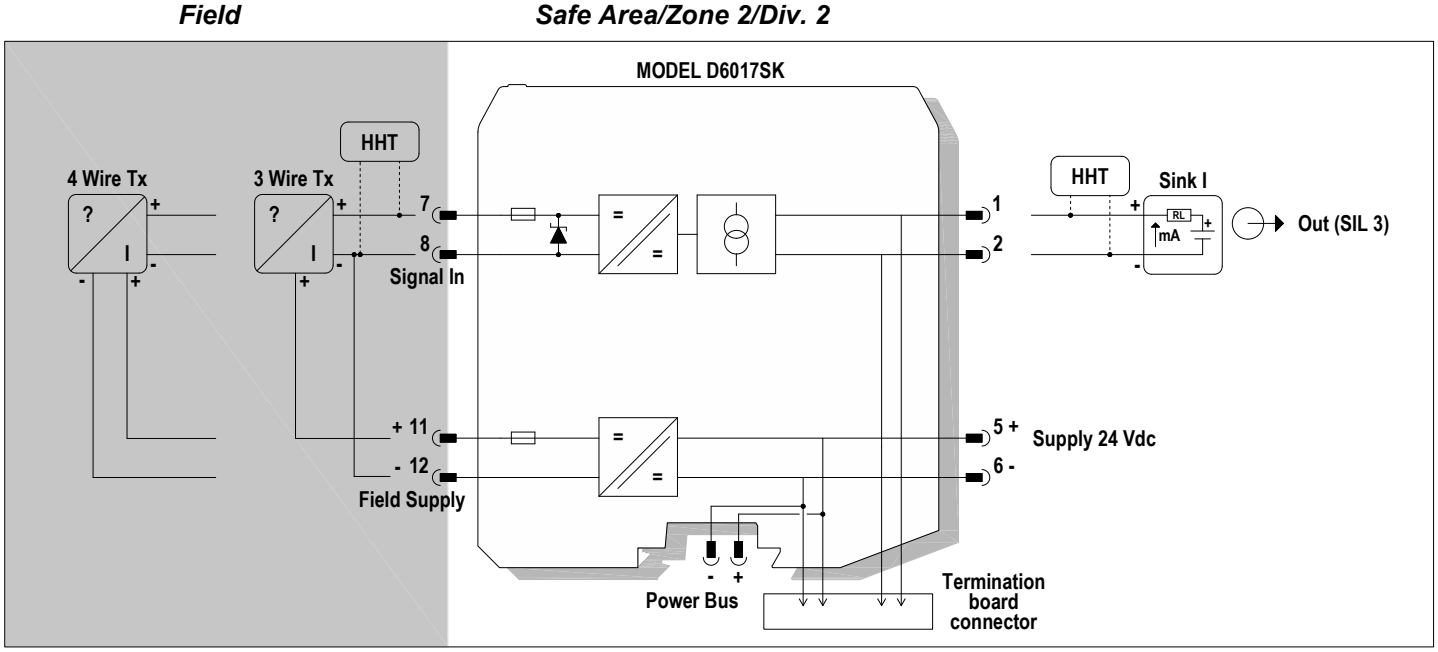

7. WARNING

D6017 series are electrical apparatus installed into standard EN/IEC60715 TH 35 DIN-Rail or customized Termination Boards located in Safe Area or Zone 2, Group IIC, Temperature T4 or Class I, Division 2, Group A, B, C, D, T4 Hazardous Area within the specified operating temperature limits Tamb -40 to +70 °C.
D6017 series must be installed, operated and maintained only by qualified personnel, in accordance to the relevant national/international installation standards (e.g. IEC/EN60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines)), following the established installation rules.
De-energize power source (turn off power supply voltage) before plug or unplug the terminal blocks when installed in Hazardous Area or unless area is known to be nonhazardous.

Warning: substitution of components may impair suitability for Zone 2/Division 2. Avertissement: la substitution des composants peut nuire à l'aptitude à la Zone 2/Div. 2.
Explosion Hazard: to prevent ignition of flammable atmospheres, disconnect power before servicing or unless area is known to be nonhazardous. Danger d'Explosion: pour éviter l'inflammation d'atmosphères inflammables, débrancher l'alimentation avant l'entretien ou à moins que région est connue pour être non dangereuse.

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.

8. OPERATION

D6017 provides fully floating DC supply for energizing 3/4 wires 4-20 mA transmitters and repeats the current to a 4-20 mA floating output signal to drive a load.

The circuit allows bi-directional communication signal for smart transmitters, a "POWER ON" green led for each channel lits when input power is present.

9. INSTALLATION

D6017 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. D6017 series can be mounted with any orientation over the entire ambient temperature range.
Electrical connection 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 **(for Zone 2 installations check the area to be nonhazardous before servicing).** Connect only one individual conductor per each clamping point, use conductors up to 2.5 mm^2 (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.

Installation and wiring must be in accordance to the relevant national or international installation standards (e.g. IEC/EN60079-14 Electrical apparatus for explosive gas atmospheres Part 14: Electrical installations in hazardous areas

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(other than mines)), make sure that conductors are well isolated from each other and do not produce any unintentional connection.

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. When installed in EU Zone 2, the unit shall be installed in an enclosure that provides a minimum ingress protection of IP54 in accordance with IEC 60079-0. When installed in a Class I, Zone 2 Hazardous Location, the unit shall be mounted in a supplemental AEx or Ex enclosure that provides a degree of protection not less than IP54 in accordance with UL/CSA 60079-0. When installed in a Class I, Division 2 Hazardous Location, the unit shall be mounted in a supplemental enclosure that provides a degree of protection not less than IP54. The enclosure must have a door or cover accessible only by the use of a tool. 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.

Electrostatic Hazard: to avoid electrostatic hazard, the enclosure of D6017 must be cleaned only with a damp or antistatic cloth.

Any penetration of cleaning liquid must be avoided to prevent damage to the unit.
Any unauthorized modification must be avoided.
D6017 series must be connected to SELV or PELV supplies.
All circuits connected to D6017 series must comply with the overvoltage category II (or better) according to EN/IEC60664-1.

10. START-UP

Before powering the unit check that all wires are properly connected, particularly 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, output signal should be corresponding to the input from the transmitter and field supply must be ≥ 23 V. If possible change the transmitter output and check the corresponding output.

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