INSTRUCTION MANUAL

SIL 3 Switch/Proximity Interface
DIN-Rail and Termination Board
Models D6034S, D6034D

technology for safety

Characteristics

General Description: The single and dual channel Switch/Proximity Detector Interface, D6034S and D6034D is a high integrity repeater, designed to interface contacts or proximity detectors (EN60947-5-6, NAMUR) and is suitable for applications requiring SIL 3 level (according to IEC 61508:2010 Ed. 2) in safety related systems for high risk industries.
Field loop integrity and status (line plus contact or proximitor) are continuously and directly monitored, in transparent mode, into the PLC, ESD, DCS using their existing input line, without requiring an additional channel for line fault detection.
PLC / DCS can detect the following conditions:

0.5 to 1.3 mA	Input open condition
2.0 to 6.0 mA	Input close condition
0 to 0.4 mA	Input fault condition (Line break)
6.5 to 8.0 mA	Input fault condition (Short circuit)

These are automatically detected for proximity switches inputs.
For contact inputs is necessary to install end of line resistors close to the contacts.
Mounting on standard DIN-Rail, with or without Power Bus, or on customized Termination Boards.

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

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 @ 24 V: 30 mA for 2 channels D6034D, 15 mA for 1 channel D6034S with short circuit input, typical.
Power dissipation: 0.72 W for 2 channels D6034D, 0.36 W for 1 channel D6034S with 24 V supply voltage and short circuit input, 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: ***Current levels:*** ≥ 0.1 mA to ≤ 8.0 mA
Input equivalent source: 8 V 1 KΩ typical (8 V no load, 8 mA short circuit).
Output: 0.1 to 8.0 mA in sink mode, V max. 30 V, current limited at ≈ 8 mA, repeats input current level.
Response time: 1 ms (0 to 100 % step change).
Output ripple: ≤ 20 mVrms.
Power dissipation: 0.4 W for 2 channels D6034D, 0.2 W for 1 channel D6034S short circuit input/output and 24 Vdc loop voltage, typical.
Performance: Ref. Conditions 24 V supply, 23 ± 1 °C ambient temperature.
Calibration accuracy: ≤ ± 0.25 % of full scale.
Linearity error: ≤ ± 0.25 % of full scale.
Supply voltage influence: ≤ ± 0.05 % of full scale for a min to max supply change.
Load influence: ≤ ± 0.05 % of full scale for a 0 to 100 % load resistance change.
Temperature influence: ≤ ± 0.03 % of full scale on zero and span for a 1 °C change.
Compatibility:
CE mark compliant, conforms to Directive: 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.
Storage: temperature limits – 45 to + 80 °C.
Approvals:
TÜV Certificate No. TUV IT 25 SIL 0635, SIL 2 / 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:
T35 DIN-Rail according to EN50022, with or without Power Bus or on customized Termination Board.
Weight: about 140 g D6034D, 115 g D6034S.
Connection: by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm^2.
Protection class: IP 20.
Dimensions: Width 12.5 mm, Depth 123 mm, Height 120 mm.

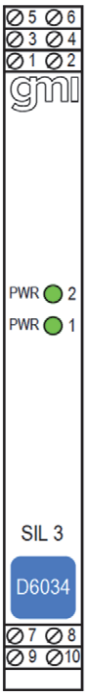
Ordering Information

Model:	D6034	
1 channel		S
2 channels		D

Power Bus and DIN-Rail accessories:

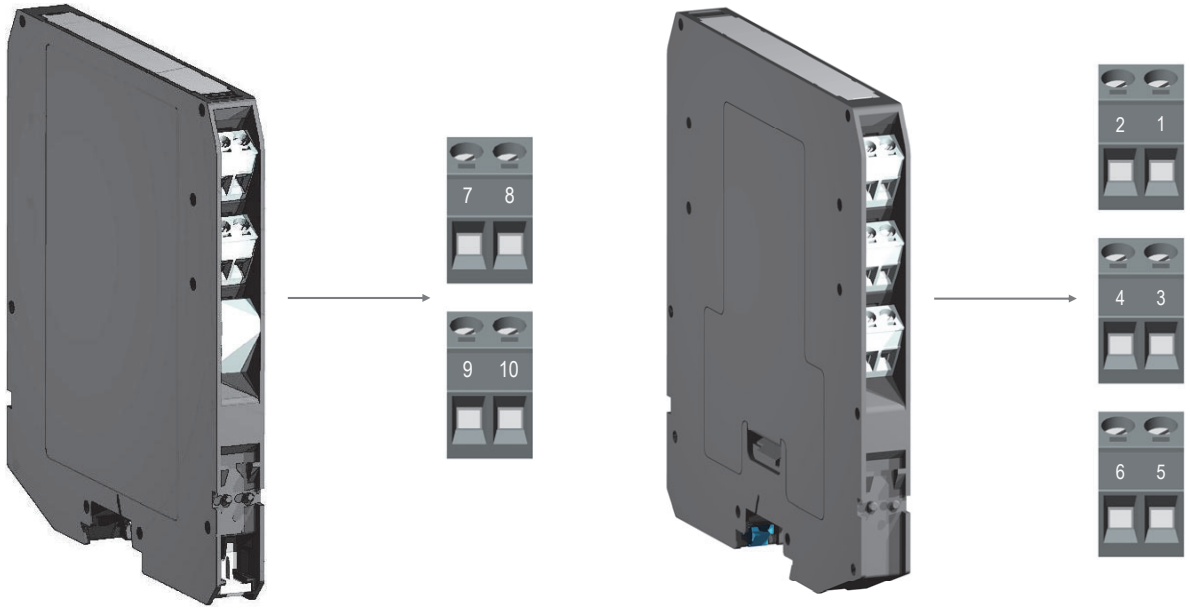
Connector JDFT049	Cover and fix MCHP196
Terminal block male MOR017	Terminal block female MOR022

Front Panel and Features



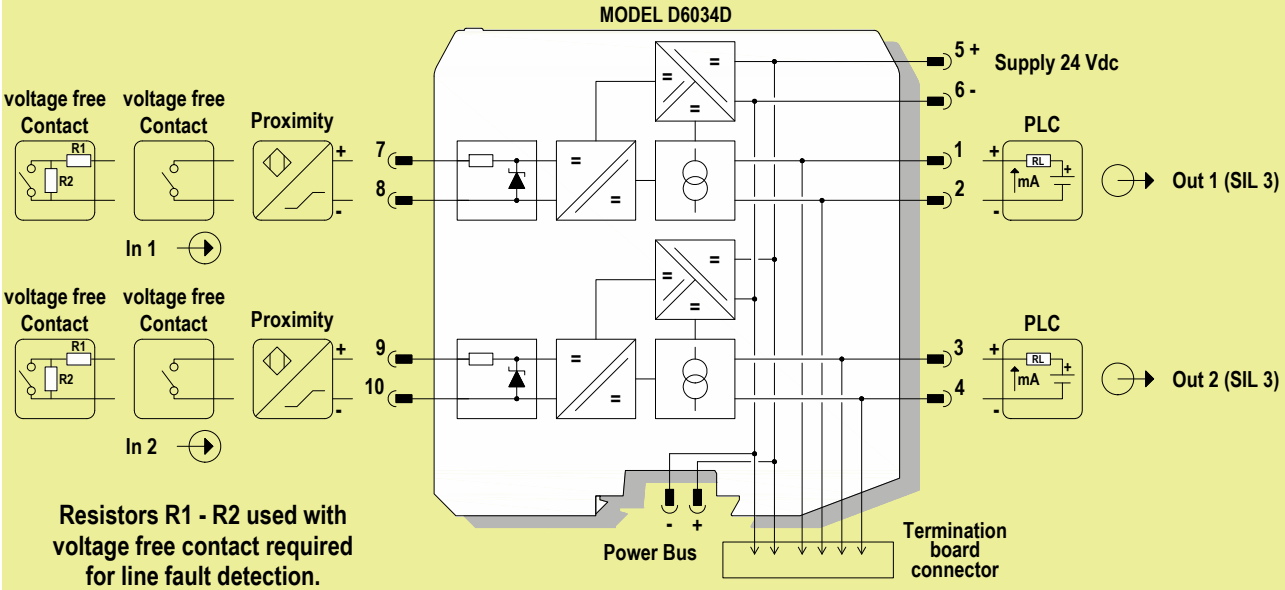
- SIL 3 according to IEC 61508:2010 Ed. 2 for Tproof = 1 / 10 yrs (≤10% / >10 % of total SIF).
- SIL 2 according to IEC 61508:2010 Ed. 2 for Tproof = 17 / 20 yrs (≤10% / >10 % of total SIF).
- PFDavg (1 year) 5.65 E-05, SFF 90.86 %.
- Systematic capability SIL 3
- 2 fully independent channels.
- Transparent mode operation.
- Field open and short circuit detection available to the PLC/DCS card.
- Input and Output short circuit proof
- High Accuracy.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.
- TÜV Certification.
- TÜV Functional Safety Certification.
- High Density, two channels per unit.
- Simplified installation using standard DIN-Rail and plug-in terminal blocks, with or without Power Bus, or customized Termination Boards.

Terminal block connections

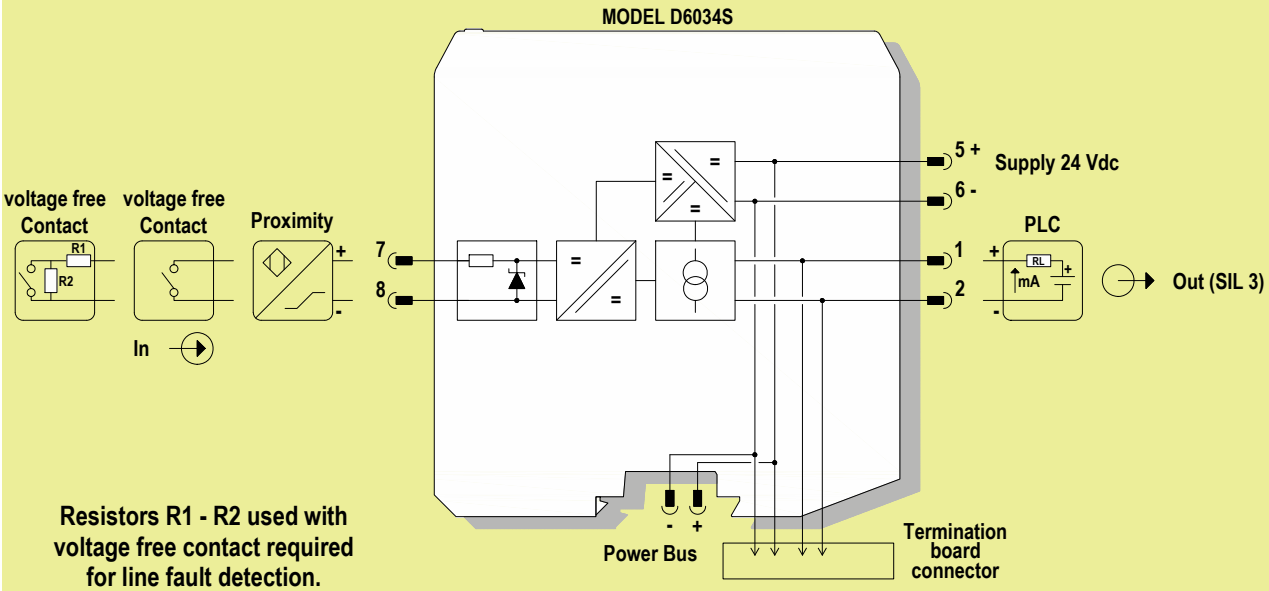


7	+ Input Ch 1 for Proximity or Voltage free Contact
8	- Input Ch 1 for Proximity or Voltage free Contact
9	+ Input Ch 2 for Proximity or Voltage free Contact
10	- Input Ch 2 for Proximity or Voltage free Contact

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



Resistors R1 - R2 used with voltage free contact required for line fault detection.



Resistors R1 - R2 used with voltage free contact required for line fault detection.

Warning

D6034 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

The single and dual channel Switch/Proximity Interface, D6034S and D6034D is a high integrity repeater, designed to interface contacts or proximity detectors (EN60947-5-6, NAMUR) and is suitable for applications requiring SIL 3 level (according to IEC 61508:2010 Ed. 2) in safety related systems for high risk industries.
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These are automatically detected for proximity switches inputs. A “POWER ON” green led for each channel lits when input power is present.

Note: use of voltage free electrical contacts with fault detection enabled (control equipment) requires, near the switch at the end of the line a R1=1 KΩ typical (470 Ω to 2 KΩ range) resistor in series and a R2=10 kΩ typical (5 KΩ to 15 KΩ range) resistor in parallel to the contacts in order to allow the fault detection circuit to distinguish between a condition of contact close/open and a line open/short circuit fault.

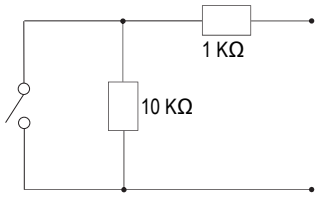
Installation

D6034 series are Switch/Proximity Detector Interface housed in a plastic enclosure suitable for installation on T35 DIN-Rail according to EN50022, with or without Power Bus or on customized Termination Board.
D6034 unit can be mounted with any orientation over the entire ambient temperature range.
Electrical connection of conductors up to 2.5 mm² 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.
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.
Identify the number of channels of the specific card (e.g. D6034S is a single channel model and D6034D is a dual channel model), the function and location of each connection terminal using the wiring diagram on the corresponding section, as an example:
Connect 24 Vdc power supply positive at terminal “5” and negative at terminal “6”.
For Model D6034S connect positive output of channel 1 at terminal “1” and negative output at “2”.
For Model D6034D in addition to channel 1 connections above, connect positive output of channel 2 at terminal “3” and negative output at “4”.
For Model D6034S, in case of Proximity or Voltage free Contact, connect the wires at terminal “7” for positive and “8” for negative.
For Model D6034D in addition to channel 1 connections above, connect terminal “9” for positive and “10” for negative on channel 2.

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 card modification must be avoided.
According to EN61010, D6034 series must be connected to SELV or SELV-E supplies.

End of Line Resistor for Contact

Use of voltage free electrical contacts with fault detection enabled (control equipment) requires, near the switch at the end of the line a 1 KΩ typical (470 Ω to 2 KΩ range) series connected resistor and a 10 KΩ typical (5 KΩ to 15 KΩ range) parallel connected resistor in order to allow the fault detection circuit to distinguish between a condition of contact close/open and a line open/short circuit fault.



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 output condition must be in accordance with condition of the corresponding input line. If possible close and open input lines one at time checking the corresponding reflected current output to be correct.