Features

- 1-channel signal conditioner
- 24 V DC supply
- Input for 2- or 3-wire sensors
- Input frequency 10 mHz ... 50 kHz
- Relay contact output
- Start-up override and restart inhibit
- Configurable by DIP switches and software
- Connection via screw terminals

Function

This signal conditioner provides the galvanic isolation between field circuits and control circuits.

The device monitors the overspeed condition and the underspeed condition of a digital signal.

The device has an input for the following digital signals:
- Mechanical contacts
- 2-wire sensors (NAMUR, SN, DC, S0)
- 3-wire sensors (NPN, PNP)
- AC sources (magnetic sensors)
- custom-specific setting

The input is reverse polarity protected and short-circuit proofed.

The connected sensors can also be supplied externally.

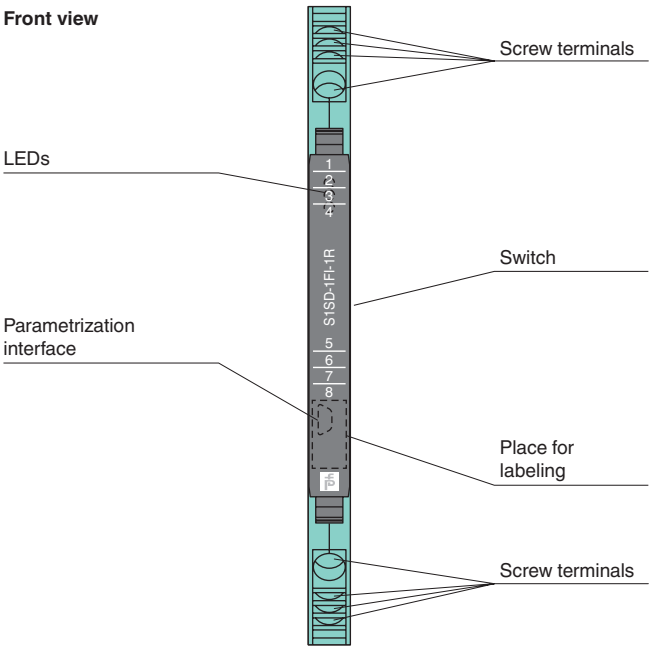
The device compares the input frequency with a user-specified reference frequency. An overspeed condition or an underspeed condition is signaled via the relay contact outputs.

A fault is indicated by a red LED and output by Power Bus.

The device is easily configured by the use of DIP switches or software.

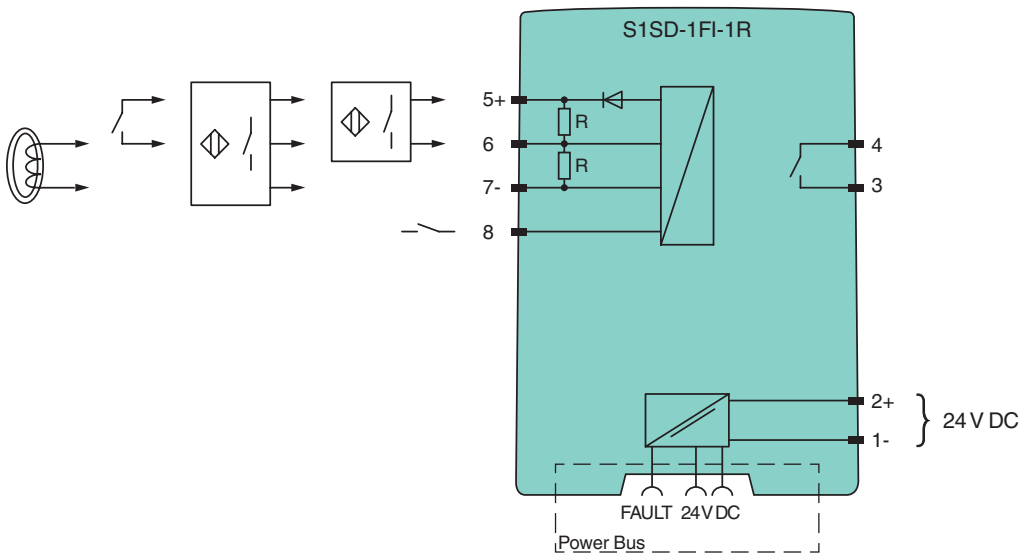
The device can be powered via terminals or Power Bus.

Assembly



CE

Connection



Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml

General specifications		
Signal type		Digital Input
Supply		
Connection		Power Bus or terminals 1-, 2+
Rated voltage	U_r	16.8 ... 31.2 V DC
Power dissipation		0.6 W
Power consumption		1.1 W
Input		
NAMUR sensor		
Type		2-wire
Connection		terminals 5+, 6
Signal		acc. to EN 60947-5-6 (NAMUR)
Sensor supply		8 V
Open-circuit		< 0.1 mA
Switching point		1.2 ... 2.1 mA
Short-circuit		> 6 mA
Input impedance		1 kΩ
Mechanical contact		
Type		2-wire
Connection		terminals 5+, 6
Sensor supply		15 V
External supply		16.8 ... 31.2 V DC
Switching point		8 ... 10 V / 1.2 ... 2.1 mA
Frequency		0 ... 50 Hz , debounce filter
Input impedance		4 kΩ
SN sensor		
Type		2-wire
Connection		terminals 5+, 6
Sensor supply		8 V
Open-circuit		< 0.1 mA
Switching point		1.2 ... 2.1 mA
Short-circuit		> 6 mA
Input impedance		1 kΩ
2-wire DC sensor		
Type		2-wire
Connection		terminals 5+, 6
Signal		acc. to EN 60947-5-2
Sensor supply		16 V / 25 mA , short-circuit protected
External supply		16.8 ... 31.2 V DC
Switching point		4 ... 6 V
Input impedance		1 kΩ
S0 sensor		
Type		2-wire
Connection		terminals 5+, 6
Signal		acc. to EN 62053-31 , Type B
Sensor supply		15 V
Switching point		0.15 ... 2 mA
Input impedance		4 kΩ
NPN sensor		
Type		3-wire
Connection		terminals 5+, 6, 7-
Signal		acc. to EN 60947-5-2
Sensor supply		16 V / 25 mA , short-circuit protected
External supply		16.8 ... 31.2 V DC
Switching point		3 ... 5 V
Input impedance		4 kΩ
PNP sensor		
Type		3-wire
Connection		terminals 5+, 6, 7-
Signal		acc. to EN 60947-5-2
Sensor supply		16 V / 25 mA , short-circuit protected
External supply		16.8 ... 31.2 V DC
Switching point		8 ... 10 V
Input impedance		4 kΩ

Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml

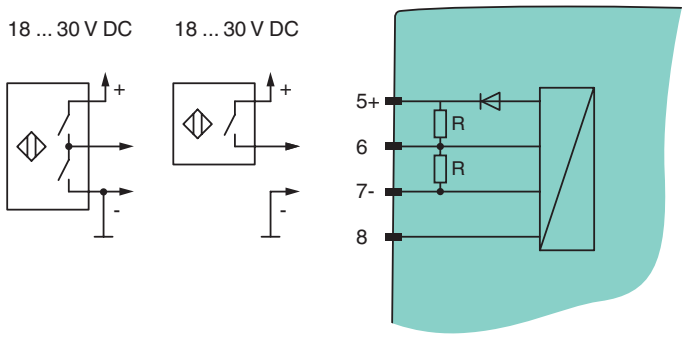
AC source	
Connection	terminals 6, 7-
Signal	max. ± 30 V
Switching point	150 ... 400 mV
Input impedance	4 kΩ
Function input	
Connection	terminal 8
Open loop voltage	7.5 V
Input impedance	approx. 50 kΩ
Function 1	activation start-up override
Switching point	< 3 V , edge triggered
Adjustment range	1 ... 6500 s
Function 2	reset restart inhibit
Switching point	> 12 V , edge triggered
Output	
Connection	terminals 3, 4:
Output	signal, relay
Contact loading	253 V AC/2 A/cos ϕ > 0.7; 126.5 V AC/4 A/cos ϕ > 0.7; 30 V DC/2 A resistive load
Minimum switch current	2 mA / 24 V DC
Energized/De-energized delay	≤ 20 ms / ≤ 20 ms
Mechanical life	10^7 switching cycles
Transfer characteristics	
Measuring time	≤ 100 ms
Deviation	0.1 % of measured value
Influence of ambient temperature	< 100 ppm/K of the measured value
Frequency range	0.01 ... 50000 Hz
Galvanic isolation	
Output/power supply	safe electrical isolation by reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff} test voltage 3 kV, 50 Hz, 1 min
Input/Other circuits	safe electrical isolation by reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff} test voltage 3 kV, 50 Hz, 1 min
Directive conformity	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1:2013 (industrial locations)
Low voltage	
Directive 2014/35/EU	EN 61010-1:2010
Conformity	
Degree of protection	IEC 60529:2001
Protection against electrical shock	EN 61010-1:2010
Ambient conditions	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Damaging gas	designed for operation in environmental conditions acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	screw terminals
Core cross-section	0.5 ... 2.5 mm^2 , 20 ... 14 AWG
Degree of protection	IP20
Mass	approx. 60 g
Dimensions	6.2 x 97 x 107 mm (0.24 x 3.82 x 4.21 inch) , housing type S1
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
General information	
Supplementary information	Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.
Accessories	
Optional accessories	power feed module S1SD-2PF adapter with USB interface S-ADP-USB Power Bus POWERBUS-SETL5.*** Power Bus POWERBUS-SETH5.*** cover for DIN mounting rail POWERBUS-COV.250 end cap POWERBUS-CAP splitter VAZ-CHAIN-BU/BN70MM/1,0-25

Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml

Connection

External Supply

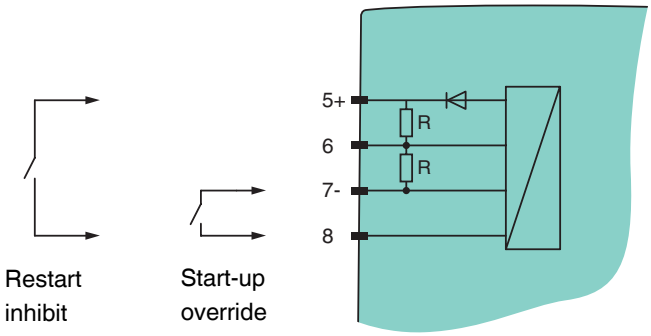
For mechanical contacts, 2-wire DC sensors and 3-wire sensors



Function input

The function input has two functions: resetting the restart inhibit and starting the start?up override.

Connect each function as shown in the diagram. Be aware that the functions can never be used at the same time. The input is edge triggered. The signal must be present for a minimum of 100 ms.



Start-up Override

The start?up override affects the trip mode MIN alarm. If the relay is in the active operating mode, it remains de-energized during the bridging delay. If the relay is in the passive operating mode, it is inevitably energized during the bridging delay. When the start?up override is bridged, the start?up override is activated once when the device is started. Do not use the restart inhibit function with a bridged input.

Restart inhibit

The restart inhibit is used to prevent the momentary exceedance of a switch point or faults from not being noticed by operating personnel. Faults can be caused by a lead breakage, lead short circuit, or insufficient supply voltage.

If the restart inhibit is active, the new status is retained after an output has been switched until one of the following events occurs.

- The device is restarted
- There is a reset signal on terminals 8 and 5

If one of these events occurs, the output is reset. The status is retained only in the following exceptional cases:

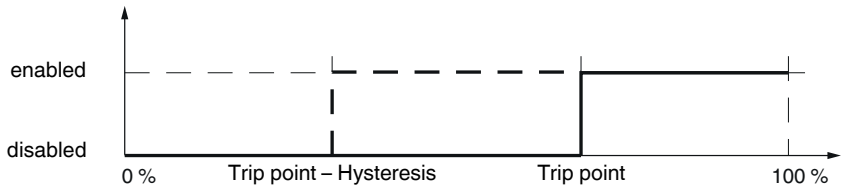
- The switch point continues to be exceeded.
- The fault continues to be present.

If you have chosen the restart inhibit for an output with a trip mode MIN alarm, the restart inhibit is inevitably triggered when the device starts, as the device starts with a measured value of 0. This means a MIN alarm is triggered immediately. Without the start?up override, the output would then be blocked by the restart inhibit.

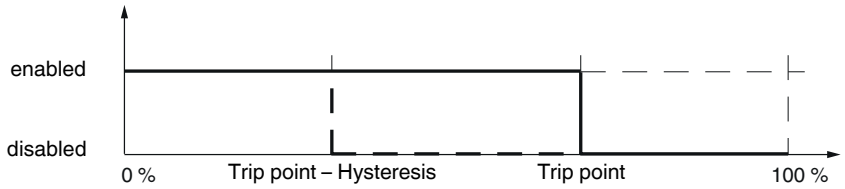
Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml

Modes of operation

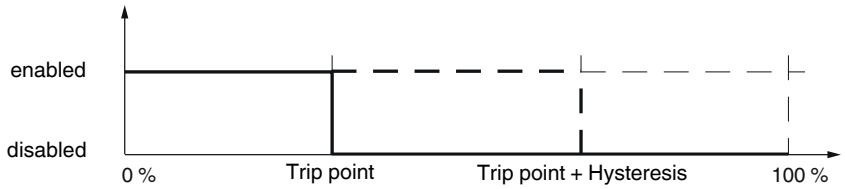
Trip mode MAX alarm, mode of operation active



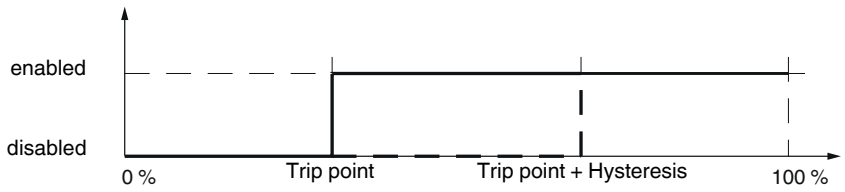
Trip mode MAX alarm, mode of operation passive



Trip mode MIN alarm, mode of operation active



Trip mode MIN alarm, mode of operation passive



Status Displays

The following status displays are provided on the front of the device.

LED	Display	Meaning
Red/yellow LED	Flashing yellow	Indicates input pulses
	Flashing red	Line fault, incorrect setting
	Red on	Device is in startup phase/device fault or insufficient power supply
	Flashing red briefly	Restart inhibit is active
Green LED	On	Power supply OK
	Off	Insufficient power supply, device not functioning
Yellow LED	On	Relay energized
	Off	Relay de-energized

Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml

Configuration

Configuration using DIP switches

Use the DIP switches to configure the device. Via the DIP switches you can select only a limited number of sensors. A wider range of sensors you can select via software configuration. The following options are available:

DIP switches (X = ON)	S1		
	1	2	3
PC setting			
NAMUR/SN sensor	X		
Mechanical contact		X	
2-wire DC sensor	X	X	
NPN sensor			X
PNP sensor	X		X
S0 sensor		X	X
AC source (magnetic sensor)	X	X	X

DIP switches (X = ON)	S1						
	4	5	6	7	8	9	10
Trip mode MIN alarm							
Trip mode MAX alarm	X						
Mode of operation active							
Mode of operation passive		X					
Hysteresis 1 %							
Hysteresis 5 %			X				
Hysteresis 10 %				X			
Hysteresis 25 %			X	X			
Start-up override 10 s							
Start-up override 120 s					X		
Filter disabled							
Filter enabled						X	
Restart inhibit disabled							
Restart inhibit enabled							X

Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml

DIP switches (X = ON)	S2						
	1	2	3	4	5	6	7
1 Hz							
2 Hz	X						
3 Hz		X					
4 Hz	X	X					
5 Hz			X				
6 Hz	X		X				
7 Hz		X	X				
8 Hz	X	X	X				
9 Hz				X			
10 Hz	X			X			
11 Hz		X		X			
12 Hz	X	X		X			
13 Hz			X	X			
14 Hz	X		X	X			
15 Hz		X	X	X			
16 Hz	X	X	X	X			
17 Hz					X		
18 Hz	X				X		
19 Hz		X			X		
20 Hz	X	X			X		
21 Hz			X		X		
22 Hz	X		X		X		
23 Hz		X	X		X		
24 Hz	X	X	X		X		
25 Hz				X	X		
26 Hz	X			X	X		
27 Hz		X		X	X		
28 Hz	X	X		X	X		
29 Hz			X	X	X		
30 Hz	X		X	X	X		
31 Hz		X	X	X	X		
32 Hz	X	X	X	X	X		
33 Hz						X	
34 Hz	X					X	
35 Hz		X				X	
36 Hz	X	X				X	
37 Hz			X			X	
38 Hz	X		X			X	
39 Hz		X	X			X	
40 Hz	X	X	X			X	
41 Hz				X		X	
42 Hz	X			X		X	
43 Hz		X		X		X	
44 Hz	X	X		X		X	
45 Hz			X	X		X	
46 Hz	X		X	X		X	
47 Hz		X	X	X		X	
48 Hz	X	X	X	X		X	
49 Hz					X	X	
50 Hz	X				X	X	
51 Hz		X			X	X	
52 Hz	X	X			X	X	
53 Hz			X		X	X	
54 Hz	X		X		X	X	
55 Hz		X	X		X	X	
56 Hz	X	X	X		X	X	
57 Hz				X	X	X	
58 Hz	X			X	X	X	
59 Hz		X		X	X	X	
60 Hz	X	X		X	X	X	
61 Hz			X	X	X	X	
62 Hz	X		X	X	X	X	

Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml

DIP switches (X = ON)	S2						
	1	2	3	4	5	6	7
63 Hz		X	X	X	X	X	
64 Hz	X	X	X	X	X	X	
65 Hz							X
66 Hz	X						X
67 Hz		X					X
68 Hz	X	X					X
69 Hz			X				X
70 Hz	X		X				X
71 Hz		X	X				X
72 Hz	X	X	X				X
73 Hz				X			X
74 Hz	X			X			X
75 Hz		X		X			X
76 Hz	X	X		X			X
77 Hz			X	X			X
78 Hz	X		X	X			X
79 Hz		X	X	X			X
80 Hz	X	X	X	X			X
81 Hz					X		X
82 Hz	X				X		X
83 Hz		X			X		X
84 Hz	X	X			X		X
85 Hz			X		X		X
86 Hz	X		X		X		X
87 Hz		X	X		X		X
88 Hz	X	X	X		X		X
89 Hz				X	X		X
90 Hz	X			X	X		X
91 Hz		X		X	X		X
92 Hz	X	X		X	X		X
93 Hz			X	X	X		X
94 Hz	X		X	X	X		X
95 Hz		X	X	X	X		X
96 Hz	X	X	X	X	X		X
97 Hz						X	X
98 Hz	X					X	X
99 Hz		X				X	X

DIP switches (X = ON)	S2		
	8	9	10
x 0.01	X		
x 0.1		X	
x 1	X	X	
x 10			
x 100			X
x 1000	X		X

Configuration using software

Use software to configure the device. Configuration must be permitted by setting the DIP switches. See table.

The device is equipped with a programming socket on the front. A corresponding adapter is available as an accessory. This adapter can be used to configure the device. The software is available to download from www.pepperl-fuchs.com.

The following options are available:

- You can choose from a wider range of sensor types.
- You can adjust the start value and end value in smaller increments.

Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml

Factory Settings

In the delivery state the DIP switches on the device side are in the OFF position. This setting corresponds to the "PC setting" option. The following values are preset with this setting.

Function	Setting
Sensor	NAMUR/SN sensor
Trip mode	MIN alarm
Mode of operation	active
Trip point	10 Hz
Hysteresis	1 %
Filter	disabled
Start-up override	10 s
Restart inhibit	disabled

Release date 2017-02-27 10:34 Date of issue 2017-02-27 286050_eng.xml