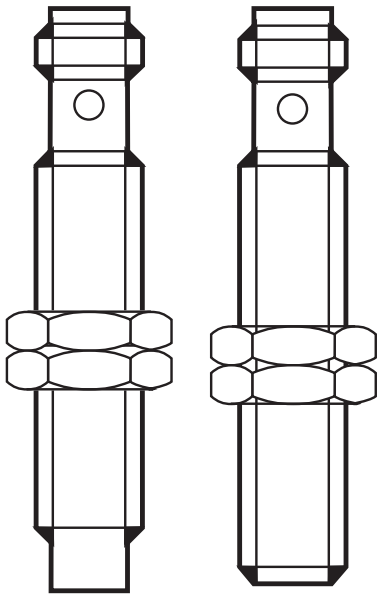
CE

Installation instructions
Compact speed monitor M12
DC design, IO-Link, with connector
DI5027
DI5028

UK



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1 Preliminary note

This document applies to devices of the type "compact speed monitor" (art. no.: DI5027 and DI5028).

This document is intended for specialists. These specialists are people who are qualified by their training and their experience to see risks and to avoid possible hazards that may be caused during operation, installation or maintenance of the device.

Read this document before use to familiarise yourself with operating conditions, installation and operation. Keep this document during the entire duration of use of the device.

⚠ WARNING

Adhere to the warning notes and safety instructions (→ 2 Safety instructions).

1.1 Symbols and warnings used

▶ Instructions

→ Cross-reference

Information
Supplementary note.

Important note
Non-compliance may result in malfunction or interference.

⚠ WARNING

Warning of serious personal injury.
Death or serious irreversible injuries may result.

2 Safety instructions

A qualified electrician must connect the unit. Observe the national and international regulations for the installation of electrical equipment.

3 Functions and features

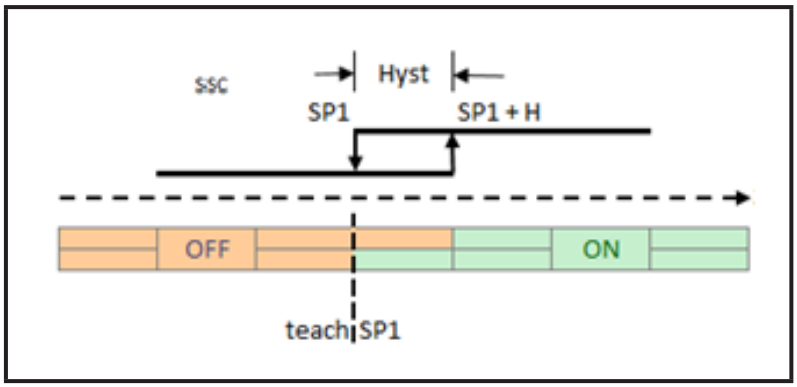
The inductive compact speed monitor with IO-Link determines the frequency [pulses/min] with which the sensor is damped without contact. The device compares the measured value with the switching thresholds and switches the outputs according to the configuration. The device can be operated in the IO-Link mode or in the SIO mode (switching output).

4 Function diagrams

4.1 Single point mode

Normally open (switch point logic = 1)

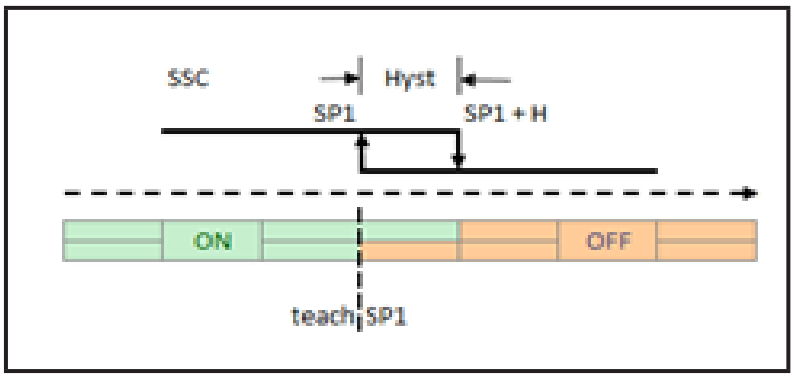
SP1: switch-off point
SP1+hyst: switch-on point



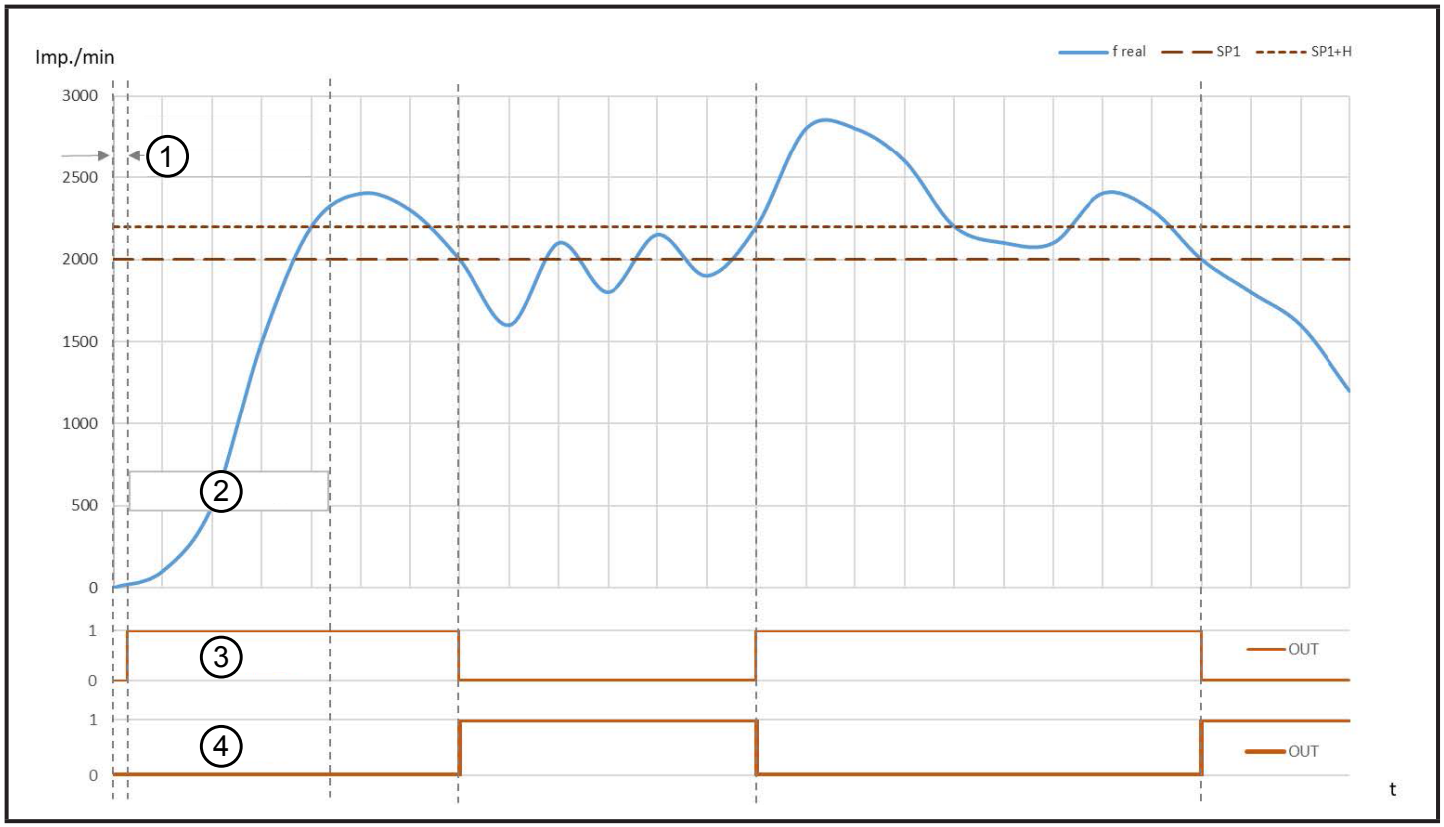
The "open" output status indicates that a set rotational speed has not been reached.

Normally closed (switch point logic = 0)

SP1: switch-on point
SP1+hyst: switch-off point



The "closed" output status indicates that a set rotational speed has not been reached.

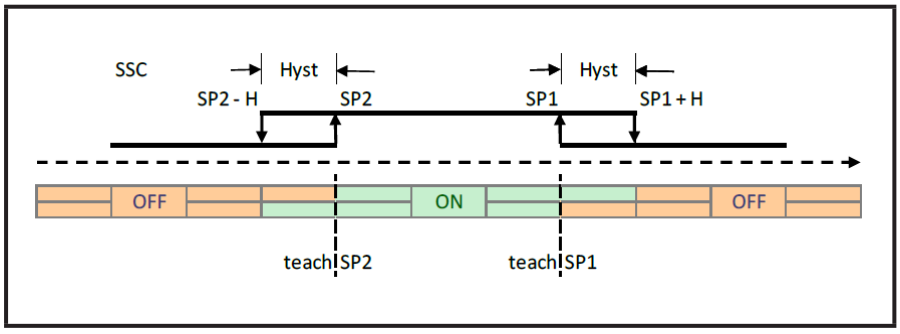


1: Power-on delay time
2: Start-up delay
3: Normally open
4: Normally closed

4.2 Window mode

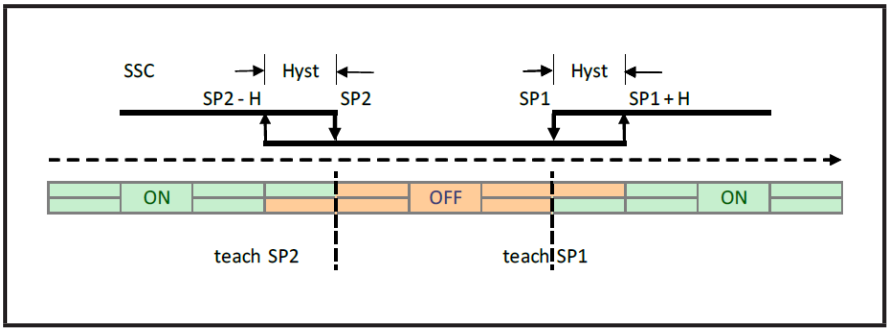
Normally open (switch point logic = 1)

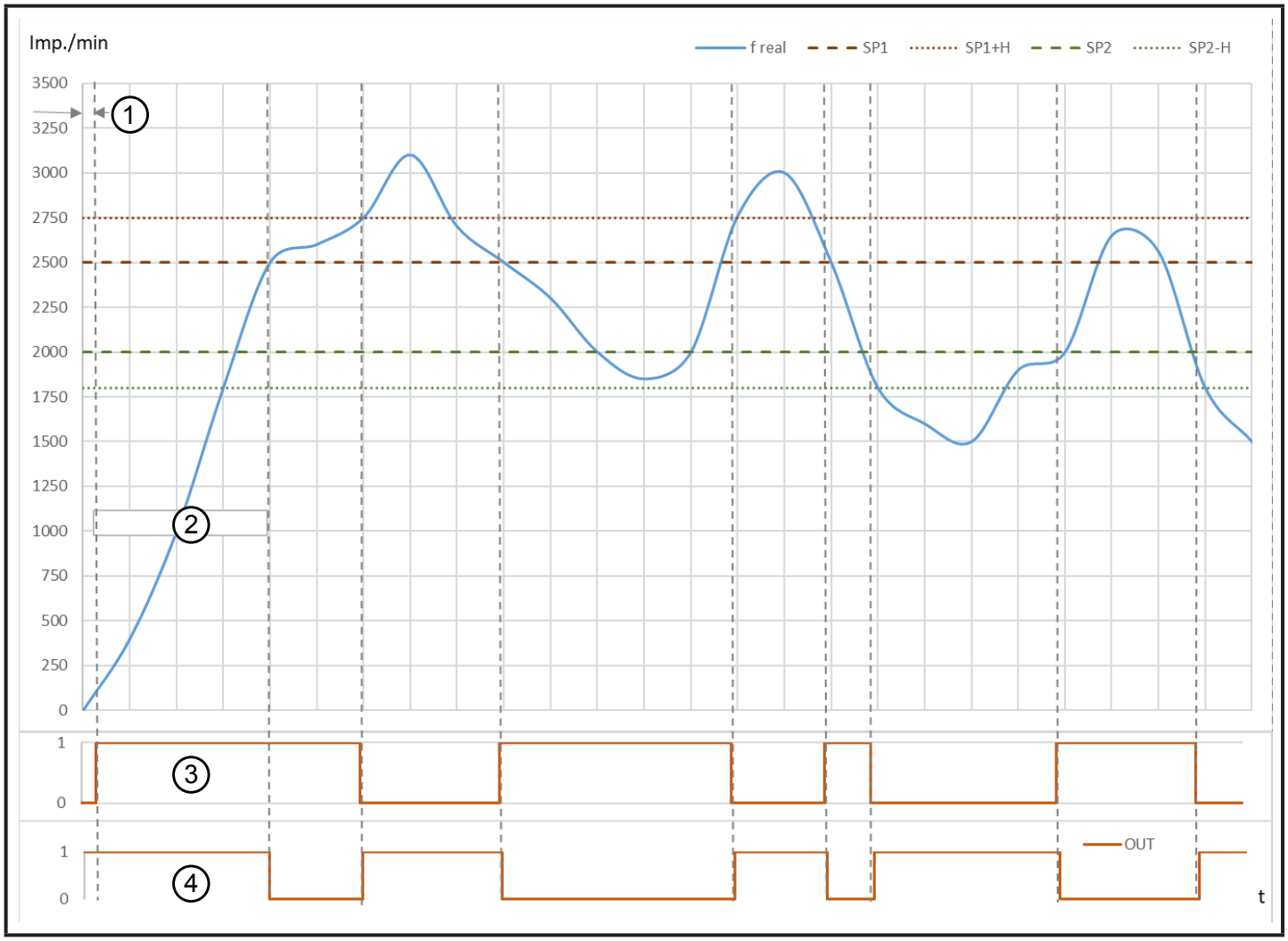
SP1: switch-on point window
SP1+hyst: switch-off point
SP2: switch-on point window
SP2 hyst: switch-off point



Normally closed (switch point logic = 0)

SP1: switch-off point window
SP1+hyst: switch-on point
SP2: switch-off point window
SP2 hyst: switch-on point





1: Power-on delay time
2: Start-up delay
3: NO
4: NC

5 SIO mode

The yellow LEDs indicate the switching status of the sensor.

5.1 Switching function normally open

Transistor output	LED yellow	
Switched (conducting)	On	Rotational speed > SP + Hy and during the start-up delay
Not switched (non conducting)	Off	Rotational speed < SP

SP = switch point
Hy = hysteresis

5.2 Switching function normally closed

Transistor output	LED yellow	
Not switched (non conducting)	Off	Rotational speed > SP + Hy and during the start-up delay
Switched (conducting)	On	Rotational speed < SP

SP = switch point
Hy = hysteresis

6 IO-Link mode

IO-Link allows the configuration of internal parameters such as start-up delay and switching behaviour (normally closed/normally open) as well as reading the current measured values. Furthermore IO-Link protects against signal faults and measured value losses as well as tampering with the device.

You will find the IODDs necessary for the configuration of an IO-Link device and detailed information about parameter setting tools and process data structure, diagnostic information and parameter addresses at www.ifm.com/gb/io-link.

6.1 LED display

Status	LED status
In the measuring range	yellow (permanently on)
Outside the measuring range (UL)	yellow (flashing) 2 Hz mark-to-space ratio 1:1
Outside the measuring range (OL)	yellow (flashing) 2 Hz mark-to-space ratio 1:1
After power-on in the IO-Link mode => "NO DATA“ (PDV = +32764) If no process data value is measured or max. 120 s	yellow (flashing) 2 Hz mark-to-space ratio 1:1

6.2 Setting parameters via IO-Link

Parameter	Description	Setting range
Application Specific Tag	Application Specific Tag	max. 32 bytes default = ***
P-n	Output polarity for the switching outputs	PNP / NPN default = PNP
SSC1 Param SP1	Setpoint 1	5...24000 pulses/min default = 5 pulses/min
SSC1 Param SP2	Setpoint 2	3...21600 pulses/min default = 3 pulses/min
SSC1 Config Logic	Setpoint logic / State for target detected	NO / NC default = NO
SSC1 Config Mode	Setpoint mode	single point / window / two-point mode default = single point mode
SSC1 Config Hyst	Setpoint hysteresis	10%
SSC1 switch-on delay	Switching signal channel 1, Switch-On delay	0...60000 ms (100 ms steps) default = 0 ms
SSC1 switch-off delay	Switching signal channel 1, Switch-Off delay,	0...60000 ms (100 ms steps) default = 0 ms

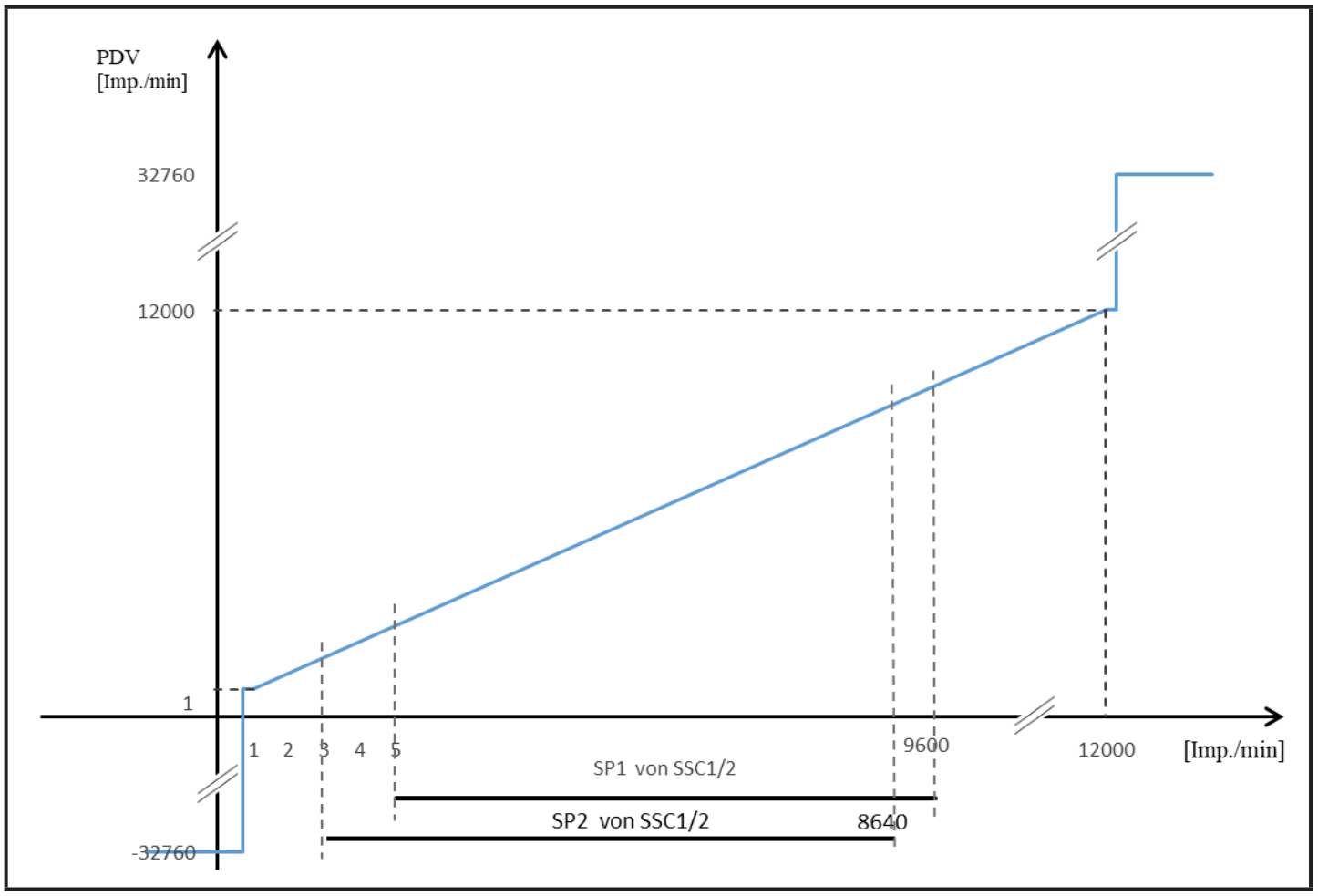
SSC2 Param SP1	Setpoint 1	5...24000 pulses/min default = 5 pulses/min
SSC2 Param SP2	Setpoint 2	3...21600 pulses/min default = 3 pulses/min
SSC2 Config Logic	Setpoint logic / State for target detected	NO / NC default = NO
SSC2 Config Mode	Setpoint mode	single point / window / two-point mode default = single point mode
SSC2 Config Hyst	Setpoint hysteresis	10%
SSC2 Switch-On delay	Switching signal channel 2, Switch-On delay	0...60000 ms (100 ms steps) default = 0 ms
SSC2 Switch-Off delay	Switching signal channel 2, Switch-Off delay	0...60000 ms (100 ms steps) default = 0 ms
PrSC	Prescaler, indicates the number of targets to calculate current revolution	1...99 default = 1
TI Select	Teach selection	SSC1 / SSC2 default = SSC1
Teach SP1	Teach switch-point 1	-
Teach SP2	Teach switch-point 2	-
Teach offset*	Sets an offset between setpoint and current process data value	1...200% default = 80%
Restore Factory Settings	Reset to factory settings	-
Delay Startup	Delay Startup	0...30000 ms (100 ms steps) default = 15 ms

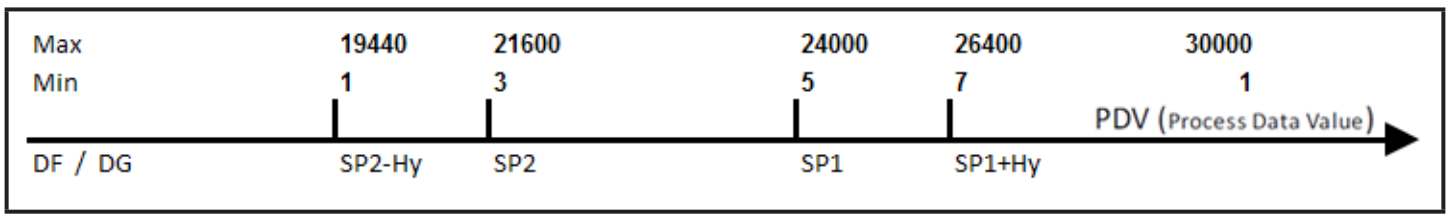
*Teach offset = defines the switch point depending on the teach process data value.

6.2.1 Setting range and conditions for parameter setting

To properly set the device parameters the value line below has to be observed.

It gives important information about the setting range and the resulting conditions.





Conditions:

5 ≤ SP1 ≤ 24000
3 ≤ SP2 ≤ 21600
Hy = 10%
2 ≤ Hy abs.
SP2 ≤ SP1-10% with SP1-SP2 ≥ 2 1/min

6.2.2 Start-up delay

The start-up delay suppresses an error signal as long as the machine is in the process of starting and has not yet reached its minimum speed. After application of the operating voltage the start-up delay is active only once.

If the plant is started and stopped frequently, linking the drive and speed monitor power supplies ensures that the start-up delay is effective each time the machine is switched on (→ 4 Function diagrams).

6.2.3 Background compensation

With this function a possible predamping of the sensor can be suppressed. Predamping can occur during installation of the device, for example. Background compensation of the device adjusts the sensing range so that the sensor goes into an undamped state and it can detect the object again.

During background compensation there must not be any object in the desired detection range.

6.2.4 Teach offset

This parameter allows setting of an offset between the taught process value and the resulting switching value.

Example: Teach offset = 80 % / NO
If a teach process is carried out while a motor is running at a nominal rpm of 3600 pulses/min, the switching point is set to 2880 pulses/min. In the event of underspeed (<2880 pulses/min) the output switches off.

6.2.5 Prescaler

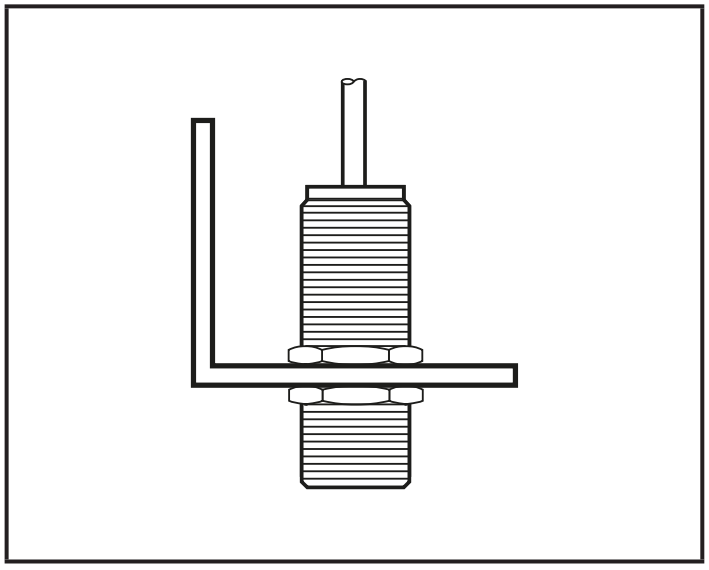
The prescaler is a divider to calculate the actual rpm as process data value (PDV) in an application with several cams on an axis.

The measurement limit is reduced by this divider.

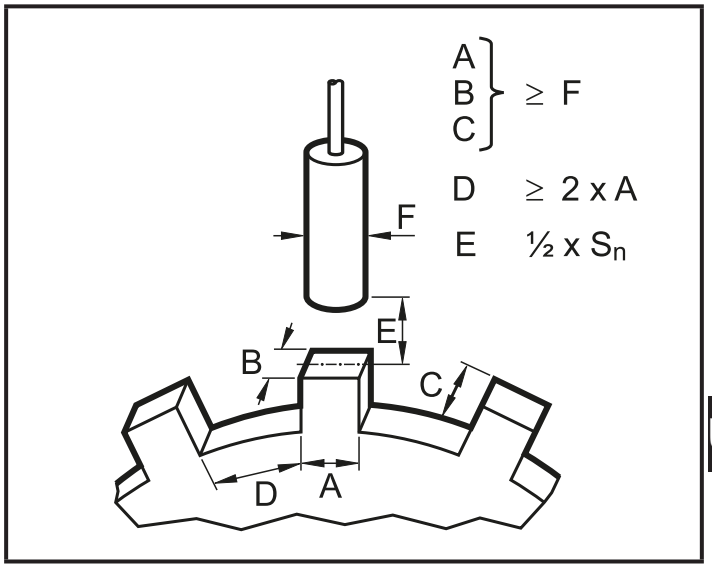
6.3 Diagnostics and events

Code	Name	Type	Description
20480 d / 50 00 h	Device hardware fault	Error	Device Exchange
35856 d / 8C 10 h	Process variable range over-run	Warning	Process data uncertain. Note: This event will not be transmitted via IO-Link Event mechanism. it is only available by reading index 37 (DetailedDeviceStatus) or 545 (BitCoded_ActiveEvents):
35888 d / 8C 30 h	Process variable range under-run	Warning	Process data uncertain. Note: This event will not be transmitted via IO-Link Event mechanism. it is only available by reading index 37 (DetailedDeviceStatus) or 545 (BitCoded_ActiveEvents):
36350 d / 8D FE h	Test Event 1	Warning	Event appears by setting index 2 to value 240, Event disappears by setting index 2 to value 241
36351 d / 8D FF h	Test Event 2	Warning	Event appears by setting index 2 to value 242, Event disappears by setting index 2 to value 243

7 Installation



Mounting principle

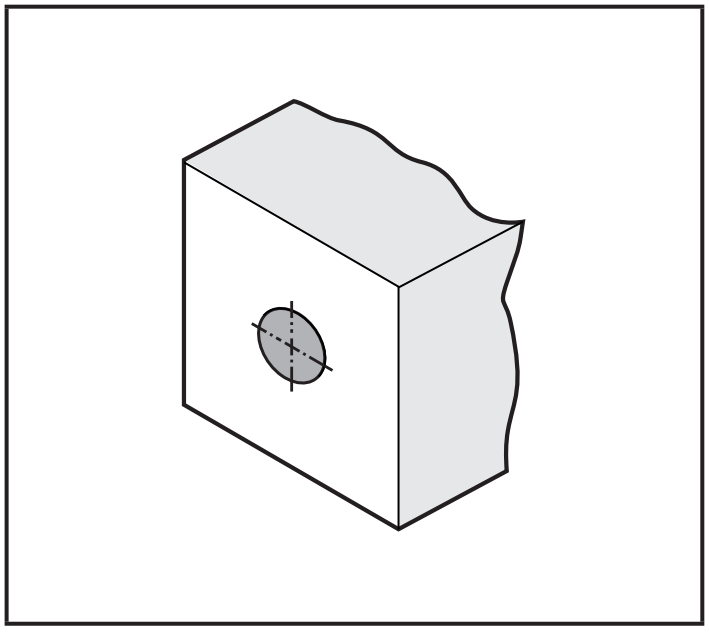


Mounting specifications

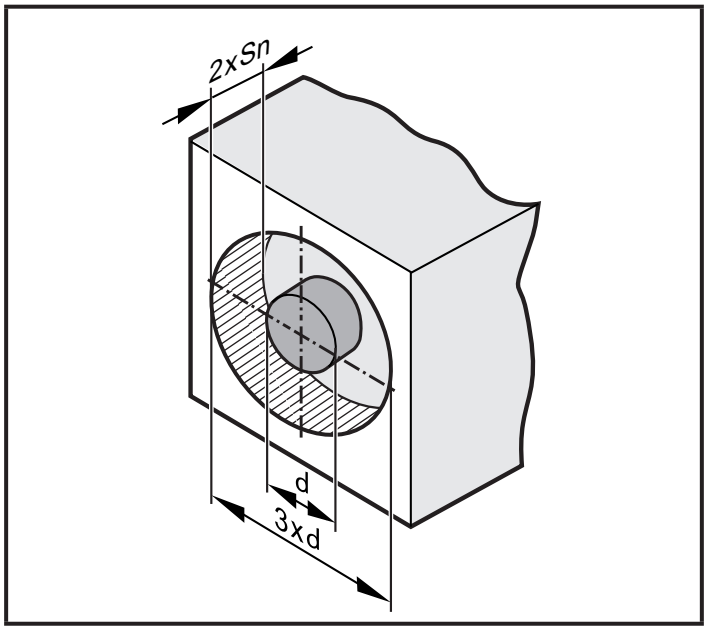
- ▶ Fix the device using a bracket and secure it by means of the nuts provided so that it cannot work loose.
- ▶ Adhere to the above mounting specifications to ensure a correct function.

7.1 Tips on flush and non-flush mounting in metal

Installation instructions cylindrical design

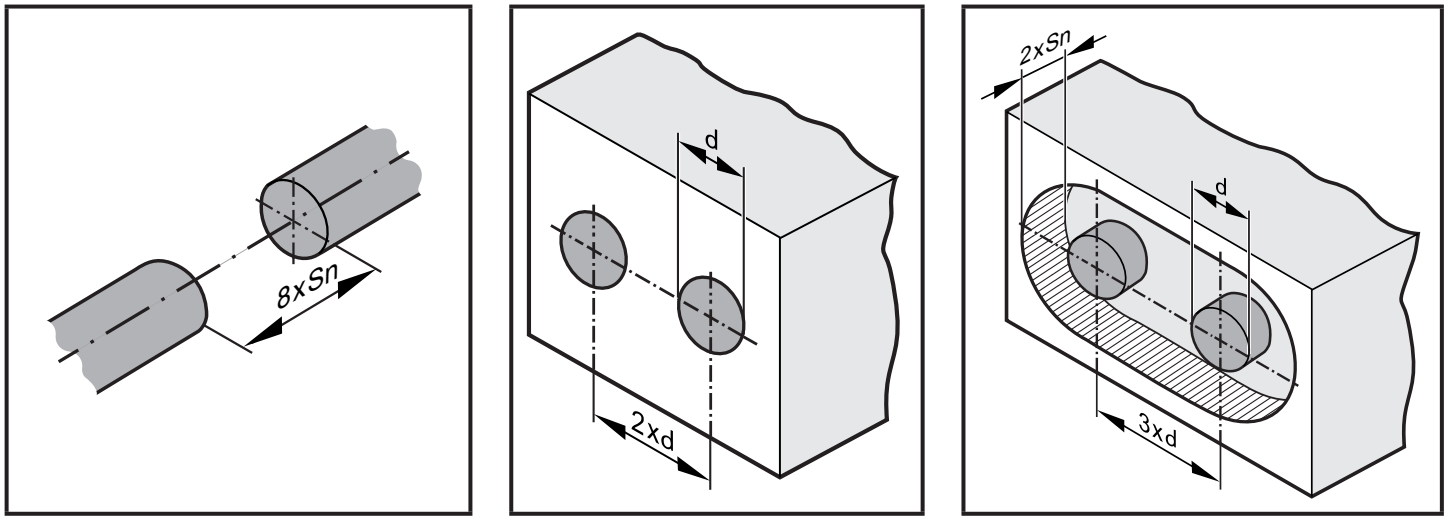


flush



non flush

Minimum clearance for installing units of the same type (side-by-side installation). Applies to cylindrical and rectangular sensors.



flush non flush

Side-by-side installation only possible with different oscillator frequencies.

8 Electrical connection

▶ Disconnect power.
▶ Connect the device according to the wiring diagram.

8.1 Wiring

DI5027, DI5028	
SIO: 4	Switching output PNP/NPN programmable via IO-Link
IO-Link: 4	IO-Link communication
Factory setting	PNP / normally open

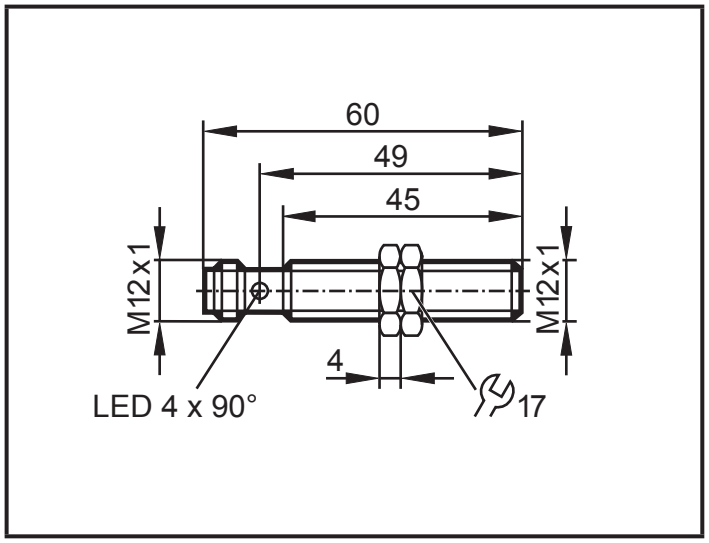
9 Operation

The operation is maintenance-free.

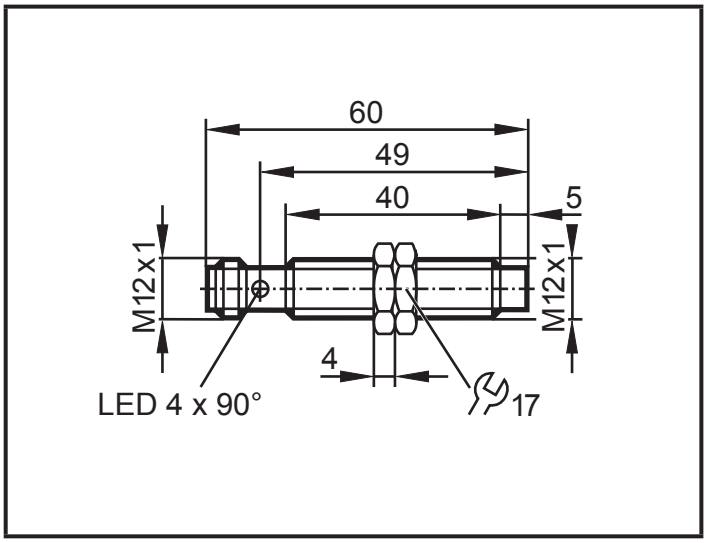
Ensure the following for a correct function:

- ▶ Keep the sensing face and the clear space free of metal deposits and foreign bodies.
- ▶ Do not operate units with high field intensity (e.g. mobile phones) at close range to the speed monitor.

10 Scale drawing



DI5027



DI5028

Dimensions [mm]

Data sheets and EC declarations of conformity can be found at: www.ifm.com