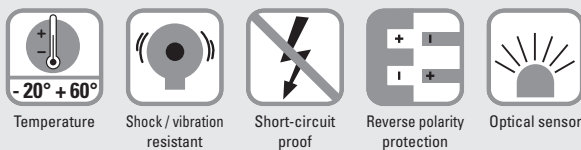


Absolute Encoders - Singleturn

Stainless steel encoder, optical **5876 (Hollow shaft)** **SSI, Parallel**



The singleturn encoder 5876 with SSI or parallel interface and optical sensor technology boasts a hollow shaft of up to 12 mm. It offers a maximum resolution of 14 bits, divided over 360°.



Safe

- A protection level of IP67 as well as the wide temperature range of -20°C to +80°C allow error-free operation even under the toughest working conditions
- The stainless-steel (1.4305) housing withstands even the most extreme external influences.

Adaptable

- Available with a choice of M12 connector or as cable version
- Gray, Binary or BCD code for parallel interface
- Wide range of possible applications thanks to numerous input options

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Order code **8.5876** . **XXXX** . **XXXX**
Shaft / Hollow shaft Type **a** **b** **c** **d** **e** **f**

- a** Flange
1 = flange with through hollow shaft
2 = flange with blind hollow shaft
- b** Hollow shaft
6 = ø 10 mm
8 = ø 12 mm
- c** Output circuit / Power supply
1 = SSI / 5 V DC
2 = SSI / 10 ... 30 V DC
3 = Parallel / 5 V DC
4 = Parallel / 10 ... 30 V DC
- d** Type of connection
1 = radial cable (1 m PVC cable) ¹⁾
2 = M12 connector radial, without mating connector ²⁾
- e** Code type and Division
see table 1 (at interface 3 and 4, Parallel)
see table 2 (at interface 1 and 2, SSI)
- f** Options
2 = SET and V/R
3³⁾ = SET and Latch
4³⁾ = V/R and Latch

optional on request
- Ex 2/22

| Division | 250 | 360 | 500 | 720 | 900 | 1000 | 1024 10 bit | 1250 | 1440 | 1800 | 2000 | 2500 | 2880 | 3600 | 4000 | 4096 12 bit | 5000 | 7200 | 8192 13 bit | 16384 14 bit |
|-------------------------------|-----|-----|-----|-----|-----|------|----------------|------|------|------|------|------|------|------|------|----------------|------|------|----------------|-----------------|
| Order code Gray / Gray-Excess | E02 | E03 | E05 | E07 | E09 | E01 | G10 | E12 | E14 | E18 | E20 | E25 | E28 | E36 | E40 | G12 | E50 | E72 | G13 | G14 |
| Order code Binary | B02 | B03 | B05 | B07 | B09 | B01 | B10 | BA2 | BA1 | B18 | B20 | B25 | B28 | B36 | B40 | B12 | B50 | B72 | B13 | B14 |
| Order code BCD | D02 | D03 | D05 | D07 | D09 | D01 | D10 | DA2 | DA1 | D18 | D20 | | | | | | | | | |

| Division | 1024 10 bit | 4096 12 bit | 8192 13 bit | 16384 14 bit |
|-------------------|----------------|----------------|----------------|-----------------|
| Order code Gray | G10 | G12 | G13 | G14 |
| Order code Binary | B10 | B12 | B13 | B14 |

1) In conjunction with parallel or SSI output
2) Only in conjunction with SSI output
3) Not with SSI interface

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| | | |
|---|----------------------------|----------------------|
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|---|----------------------------|----------------------|

| Mechanical characteristics | | | |
|--|---|---|-------------------------------------|
| Speed ¹⁾ | max. 6000 min ⁻¹ | Protection acc. to EN 60 529 | IP67 |
| Rotor moment of inertia | approx. 6 x 10 ⁻⁶ kgm ² | Working temperature range | -20°C ... +80°C ²⁾ |
| Starting torque | < 0.05 Nm | Material | shaft / housing stainless steel |
| Weight | approx. 0.6 kg | Shock resistance acc. EN 60068-2-27 | 2500 m/s ² , 6 ms |
| EX approval for hazardous areas | optional Zone 2 and 22 | Vibration resistance acc. EN 60068-2-6 | 100 m/s ² , 10...2000 Hz |

| Electrical characteristics | | | | | |
|---|--|---|--------------------------|-------------------------------|-----------------------------|
| Interface type | | Synchronous serial (SSI) | Synchronous serial (SSI) | Parallel | Parallel |
| Power supply (U _B) | | 5 V DC (± 5 %) | 10 ... 30 V DC | 5 V DC (± 5%) | 10 ... 30 V DC |
| Output driver | | RS485 | RS485 | Push-Pull | Push-Pull |
| Power consumption (no load) | typ. max. | 89 mA 138 mA | 89 mA 138 mA | 109 mA 169 mA | 109 mA 169 mA |
| Permissible load / channel | | max. +/- 20 mA | max. +/- 20 mA | max. +/- 10 mA | max. +/-10 mA |
| Update rate | | max. 15.000/s | max.15.000/s | 40.000/s | 40.000/s |
| SSI clock rate min./max. | | 100 kHz / 500 kHz | 100 kHz / 500 kHz | – | – |
| Signal level high | | typ. 3.8 V | typ. 3.8 V | min. 3.4 V | min. U _B - 2.8 V |
| Signal level low | (I _{Load} = 20 mA) (I _{Load} = 10 mA) (I _{Load} = 1 mA) | typ. 1.3 V – – | typ. 1.3 V – – | – max. 1.5 V max. 0.3 V | – max. 1.8 V – |
| Rising edge time t _r (without cable) | | max. 100 ns | max. 100 ns | max. 0.2 μs | max. 1 μs |
| Falling edge time t _f (without cable) | | max. 100 ns | max. 100 ns | max. 0.2 μs | max. 1 μs |
| Short circuit proof outputs ³⁾ | | yes | yes ⁴⁾ | yes | yes |
| Reverse connection of the supply voltage | | no | yes | no | yes |
| UL-certified | | File 224618 | | | |
| CE compliant acc. to | | EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3 | | | |
| RoHS compliant acc. to | | EU guideline 2002/95/EG | | | |

1) For continuous operation max. 1500 min⁻¹

2) 70°C cable version

3) If supply voltage U_B correctly applied

4) Only one channel allowed to be shorted-out:

at U_B = 5 V short circuit to channel, 0 V, or +U_B is permitted.

at U_B = 5 ... 30 V short circuit to channel or 0 V is permitted.

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| | | |
|---|----------------------------|----------------------|
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Control inputs

Switching levels of the control inputs

| | | |
|-----------------|--------|----------------|
| Supply voltage | 5 V DC | 10 ... 30 V DC |
| Switching level | low | ≤ 1.7 V |
| | high | ≥ 3.4 V |
| | | ≤ 4.5 V |
| | | ≥ 8.7 V |

Up/Down input to switch the counting direction

As a standard, absolute encoders deliver increasing code values when the shaft rotates clockwise (cw), when looking from the shaft side. When the shaft rotates counter-clockwise (ccw), the output delivers accordingly decreasing code values. The same applies to models with current interfaces. When the shaft rotates clockwise, the output delivers increasing current values, and decreasing values when it rotates counter-clockwise.

As long as the Up/Down input receives the corresponding signal (high), this feature is reversed. Clockwise rotation will deliver decreasing code/current values while counter-clockwise rotation will deliver increasing code/current values.

The response time is :

| | |
|-----------------------------------|--------|
| for 5 V DC supply voltage | 0.4 ms |
| for 10 ... 30 V DC supply voltage | 2 ms |

SET input

This input is used to reset (zero) the encoder. A control pulse (high) sent to this input allows the current position value to be saved as the new zero position in the encoder.

For models equipped with a current interface, the analogue output (4..20 mA) will be set accordingly to the value 4 mA.

Note : After applying power to the encoder and before activating the SET input, a count direction (cw or ccw) must be clearly defined on the Up/Down input!

The response time is :

| | |
|-----------------------------------|--------|
| for 5 V DC supply voltage | 0.4 ms |
| for 10 ... 30 V DC supply voltage | 2 ms |

LATCH input

This input is used to "freeze" the current position value. The position value will be statically available on the parallel output as long as this input remains active (high).

The response time is :

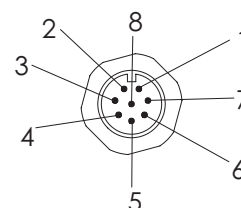
| | |
|-----------------------------------|--------|
| for 5 V DC supply voltage | 140 μs |
| for 10 ... 30 V DC supply voltage | 200 μs |

Terminal assignment SSI with M12 connector (8-pin) or cable version

| Signal | 0V | +U _B | +T | -T | +D | -D | ST | VR |
|--------------|----|-----------------|----|----|----|----|----|----|
| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Cable colour | WH | BN | GN | YE | GY | PK | BU | RD |

Top view of mating side, male contact base

M12 connector, 8 pin



Terminal assignment cable version Parallel interface up to max. 14 bit and max. 2 options:

| Signal | 0V | +U _B | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | ST/ VR | VR/ LH | 14 | ⏏ |
|--------------|----|-----------------|----|----|----|----|----|----|----|----|----------|----------|----------|----------|----------|----------|----------|----------|----|
| Cable colour | WH | BN | GN | YE | GY | PK | BU | RD | BK | VT | GY PK | RD BU | WH GN | BN GN | WH YE | YE BN | WH GY | GY BN | PH |

- T: Clock signal
- D: Data signal
- ST: Set input. The current position is set to zero
- VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning clockwise.

Isolate unused outputs before initial start-up.

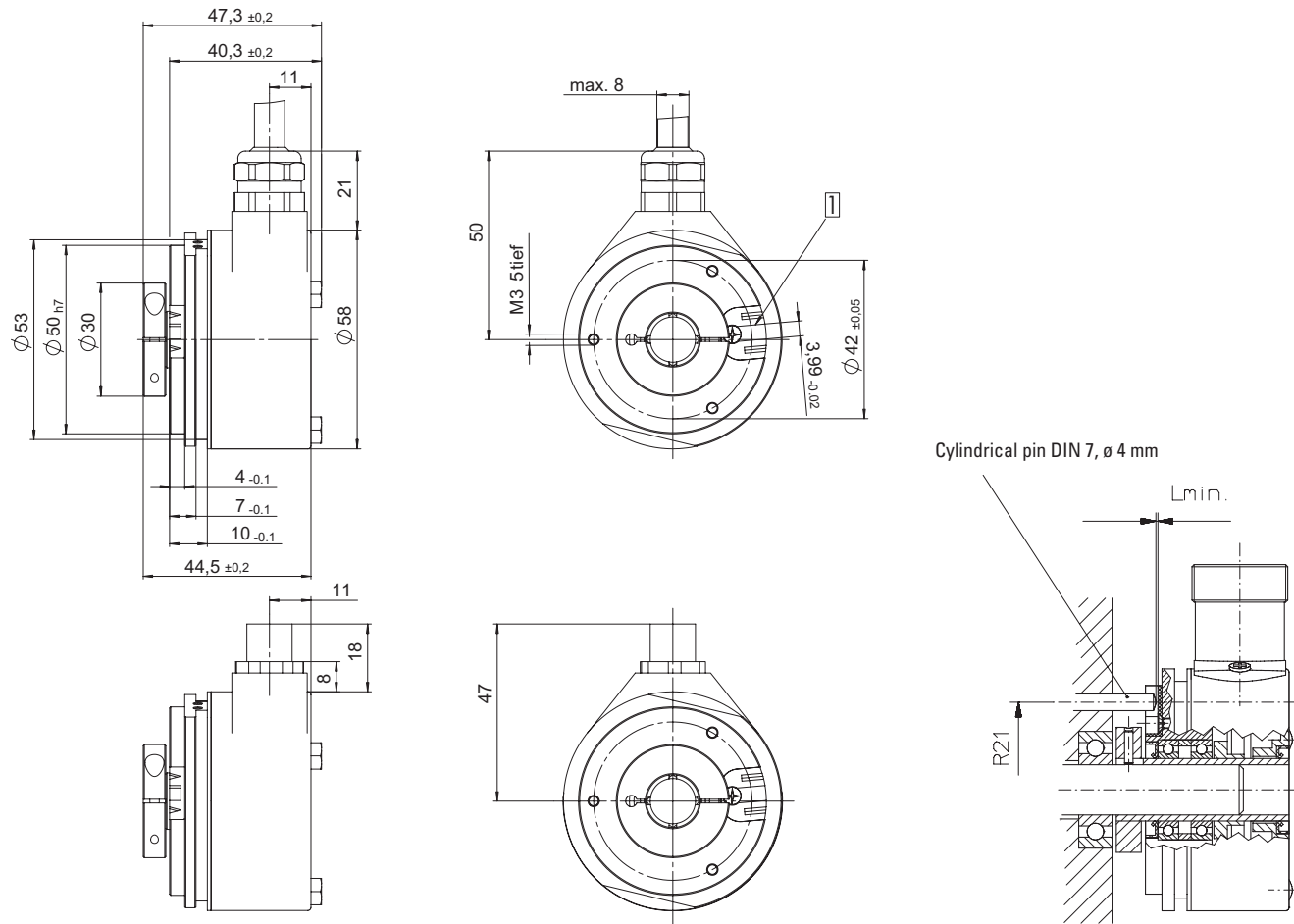
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5876 (Hollow shaft)

SSI, Parallel

Dimensions



1 Torque stop slot,
Recommendation: Cylindrical pin DIN7, ø 4 mm

Mounting advice

- 1) When mounting a hollow shaft encoder, we recommend using the torque stop pin or a stator coupling.
- 2) When mounting the encoder ensure that the dimension Lmin. is larger than the maximum axial play of the drive. Otherwise there is a danger that the device could mechanically seize up.