

# Type SCA50

- **Shaft Encoder - ø 50 mm**
- **Shaft: ø 6 mm to ø 12 mm**
- **Resolution up to 12.500 ppr**
- **IP 65 (IP 67 option)**
- ***Formerly named 2R or 2R-3L***

## Electrical Specifications

| | |
|---|---|
| **Code:** | Incremental |
| **Resolution:** | 1 to 12.500 ppr (pulses per revolution) |
| **Supply Voltage:** | 4,5 Vdc min. to 30 Vdc max. (45 mA max. - no load) ** |
| **Output Voltage:** | Low: 500 mV max. at 10 mA<br>High: ($V_{in}$ – 0,6) at -10 mA<br>($V_{in}$ – 1,3) at -25 mA |
| **Output Current:** | 30 mA max. load per output channel ** |
| **Frequency Response:** | 300 kHz max. ** |
| **Output Format:** | Two channel (A, B) quadrature with Index (Z) and optional complementary (A-, B-, Z-) outputs |
| **Phase Sense:** | A leads B clockwise (CW) from the mounting end of the encoder |
| **Index:** | Gated with Channels A and B high |
| **Accuracy:** | +/- 0,8 arc-min. |
| **Outputs:** | ASIC Push pull and Differential<br>OL7272 Push-pull and Differential Line Driver<br>26C31 Differential Line Driver 5V output (with 5V input) |
| **Electrical Protection:** | Reverse polarity and output short circuit protected |
| **Noise Immunity:** | Tested to EN61000-6-2 : 2005 (industrial environments) Electromagnetic compatibility (EMC) and EN 61000-6-3 : 2007 (residential, commercial, and light-industrial environments) for Electromagnetic compatibility (EMC) |

**= It is recommended user not to combine max. Value for all 3 parameters

## Mechanical Specifications

| | |
|---|---|
| **Material:** | Housing: Aluminum<br>Cap: Electroplated Aluminum<br>Shaft: Stainless Steel |
| **Weight:** | Encoder: ~ 140 gr (4,94 oz)<br>Cable: 60 gr / meter (2,12 oz / meter) |
| **Bearing Life:** | > 1,9 x $10^{10}$ revolutions at rated load |
| **Shaft Speed:** | 12.000 rpm (max.) |
| **Starting Torque:** | < 0,01 Nm (1,42 oz-in) at 25° C |
| **Mass Moment of Inertia:** | 2,0 gcm² (2,83 x $10^{-5}$ oz-in-sec²) |
| **Shaft Loads:** | Axial: 20 N (4.5 lbs) max.<br>Radial: 20 N (4.5 lbs) max. |

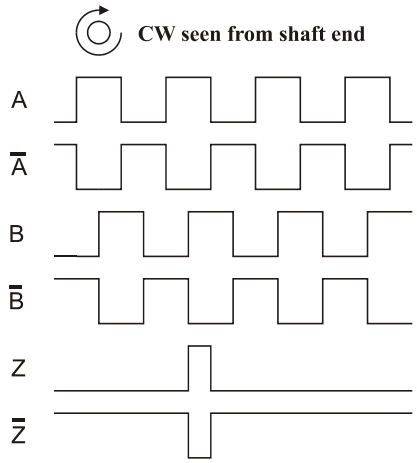
## Environmental Specifications

| | |
|---|---|
| **Operating Temp.:** | -40° to +85° C |
| **Storage Temp.:** | -40° to +85° C |
| **Shock:** | 100 G / 11 ms |
| **Vibration:** | 10-2000 Hz / 10 G |
| **Bump:** | 10 G / 16 ms (1000 x 3 axis) |
| **Humidity:** | 98 % RH without condensation |
| **Enclosure Rating:** | IP 65 / Nema 4 (approx.)<br>IP 67 / Nema 6 (approx.) option |

## Connection Options

| | |
|---|---|
| **Cable:** | 8 leads (0,14 mm², 26 AWG) - Differential<br>5 leads (0,14 mm², 26 AWG) - Standard<br>twisted pairs; shielded |
| **Connector:** | M12 5-pin - Standard<br>M12 8-pin - Differential<br>M23 9-pin - Standard<br>M23 12-pin - Differential |

## Output waveform




| | | |
|---|---|---|
| **Channel tolerance** | **180 e°** | **+/- 36 e°** |
| **Phase difference tolerance** | **90 e°** | **+/- 18 e°** |
| **Z channel tolerance** | **90 e°** | **+/- 18 e°** |

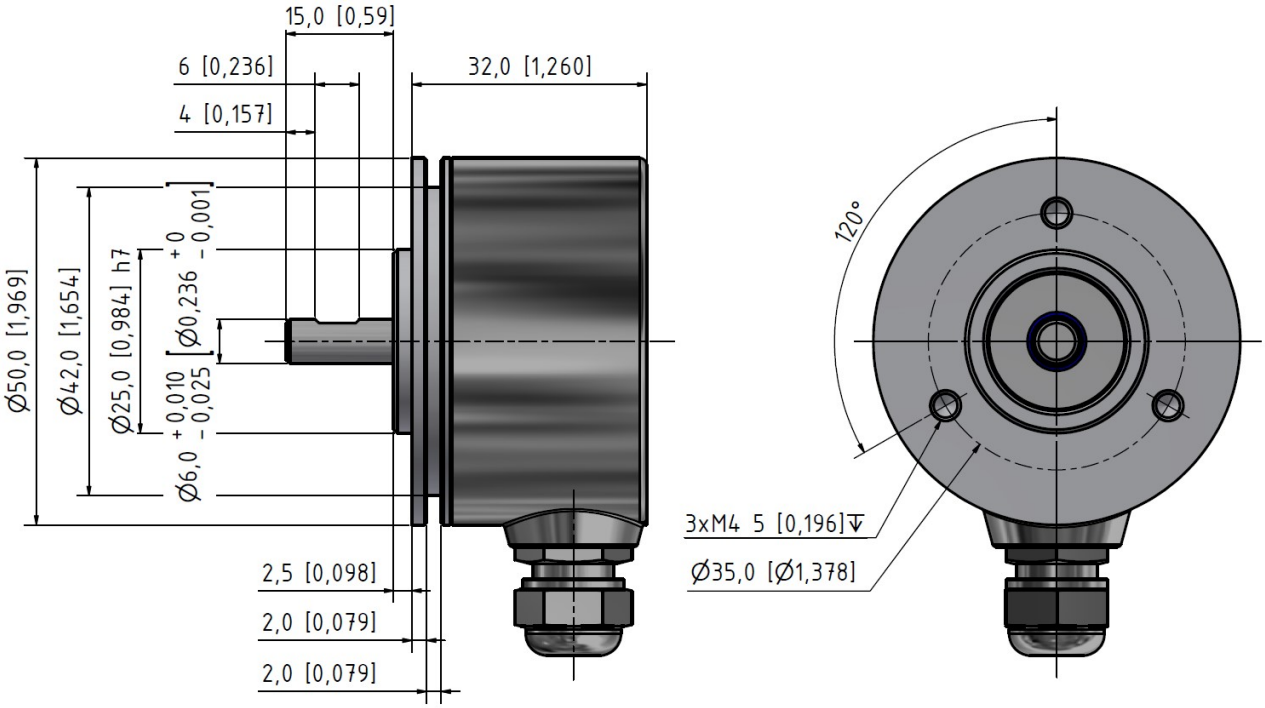
## Disk Resolutions (Pulses per revolution)

| | | | | |
|---|---|---|---|---|
| 1 | 32 | 125 | 720 | 3072 |
| 2 | 36 | 150 | 800 | 3600 |
| 5 | 40 | 180 | 1000 | 4000 |
| 6 | 45 | 200 | 1024 | 4096 |
| 7 | 47 | 250 | 1131 | 5000 |
| 8 | 50 | 256 | 1200 | 8192 |
| 10 | 60 | 300 | 1250 | 9000* |
| 12 | 64 | 360 | 1270 | 10000* |
| 15 | 70 | 400 | 1500 | 12500* |
| 16 | 75 | 455 | 2000 | |
| 18 | 80 | 500 | 2048 | |
| 20 | 90 | 512 | 2400 | |
| 25 | 100 | 600 | 2500 | |
| 30 | 120 | 635 | 3000 | |

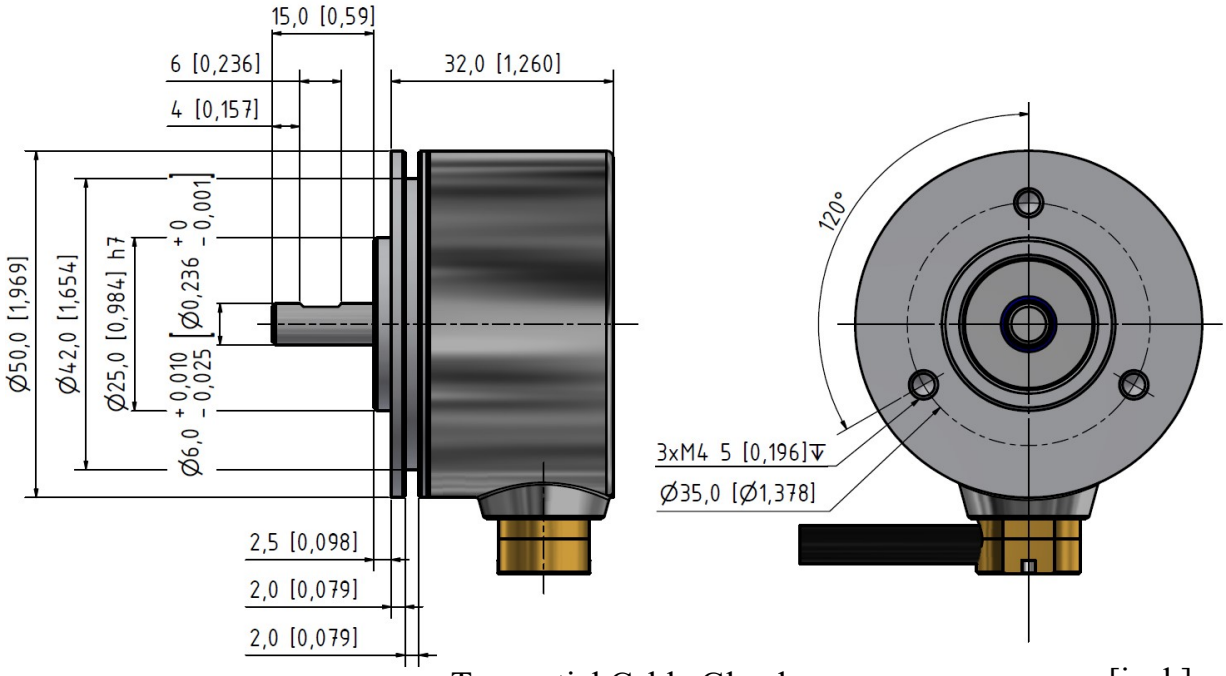
**Other options on request**
Pulses per revolution,
min. 1 – max. 12.500

* ***Operating temperature: -20° C to 50° C***

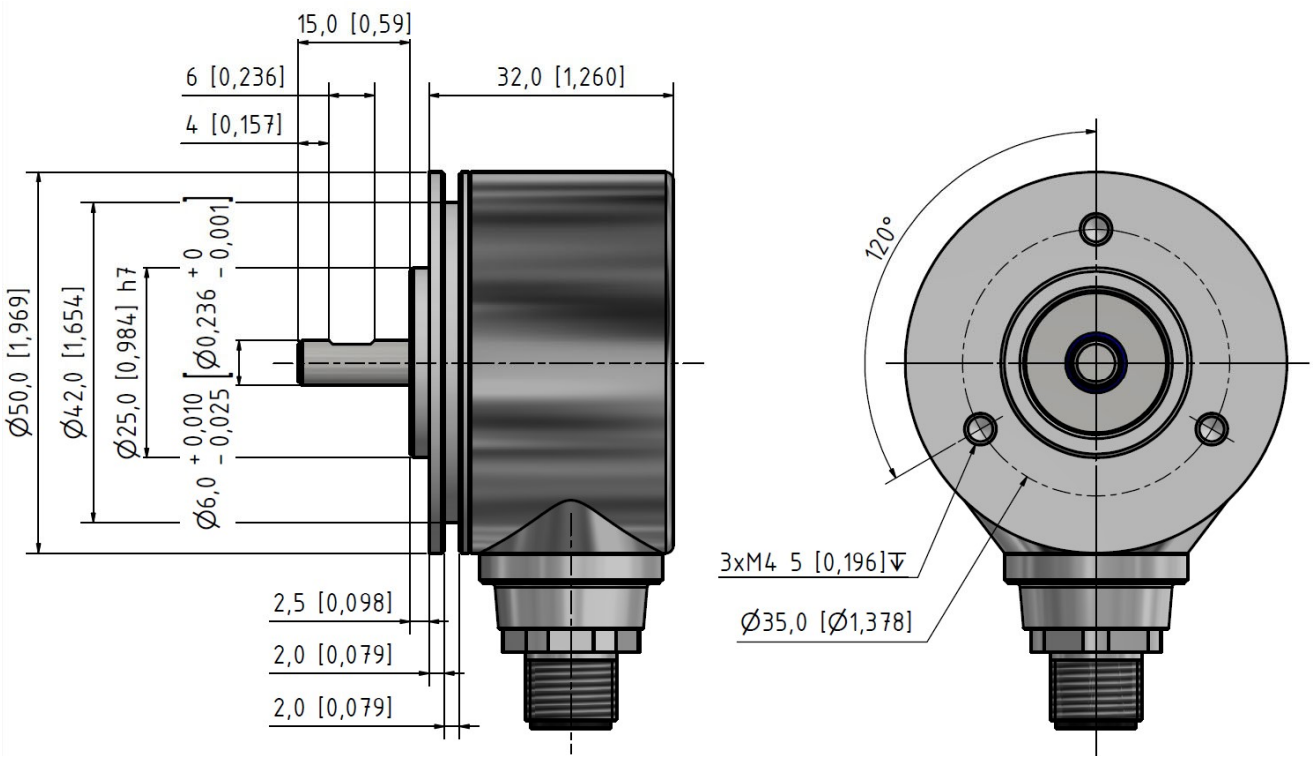
## Mechanical Dimensions



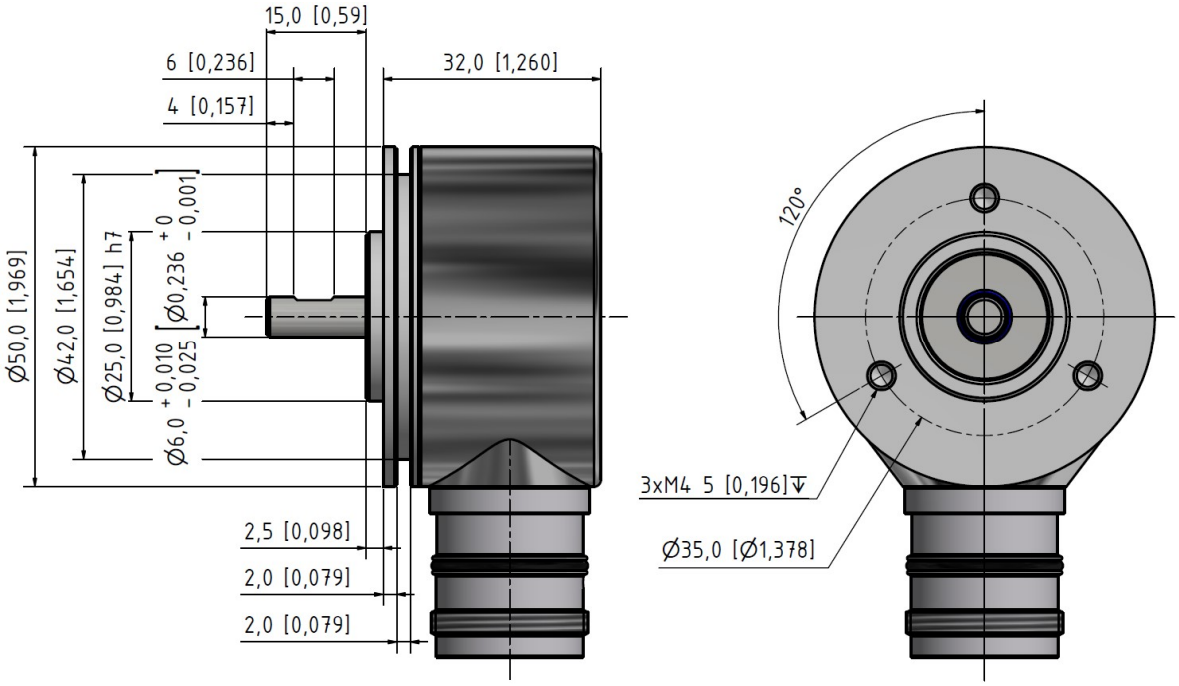

Standard Cable Gland (side or back outlet) mm [inch]




Tangential Cable Gland mm [inch]

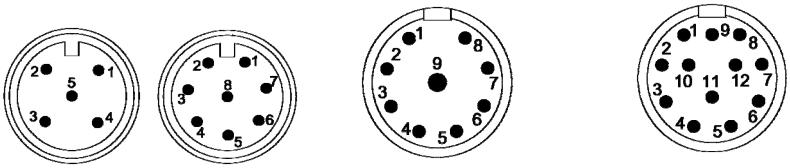



M12 Connector mm [inch]




M23 Connector mm [inch]

## Output Terminations



| | Standard Cable | |
|---|---|---|
| | Standard Output | Differential Output |
| Channel | Wire Color | |
| A | Pink | Pink |
| A - | *Gray** | Gray |
| B | Green | Green |
| B - | *Yellow** | Yellow |
| Z | White | White |
| Z - | *Brown** | Brown |
| Vsup | Red | Red |
| GND | Blue | Blue |

*GND = Circuit Ground*

** Internally connected as GND*

| | M12 5 - pin | M12 8 - pin | M23 9 - pin | M23 9 - pin | M23 12 - pin | M23 12 - pin |
|---|---|---|---|---|---|---|
| | Standard Output | Differential Output | Standard Output | Differential Output | Standard Output | Differential Output |
| Pin | Channel | Channel | Channel | Channel | Channel | Channel |
| 1 | Vsup | A | A | A | GND | B - |
| 2 | B | Vsup | B | B | *NC* | *NC* |
| 3 | GND | A - | Z | Z | Z | Z |
| 4 | A | B | GND | A - | GND | Z - |
| 5 | Z | B - | GND | B - | A | A |
| 6 | | Z | GND | Z - | GND | A - |
| 7 | | GND | Vsup | Vsup | *NC* | *NC* |
| 8 | | Z - | GND | GND | B | B |
| 9 | | | Shield | Shield | Shield | Shield |
| 10 | | | | | GND | GND |
| 11 | | | | | *NC* | *NC* |
| 12 | | | | | Vsup | Vsup |

*GND = Circuit Ground*

*Shield = Case Ground*

## Ordering Code

**Example: SCA50 – 1024 – D – 06 – 15 – 65 – 01 – S – 00**

| SCA50 | - | | - | | - | | - | | - | | - | | - | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 |

### 1. Pulses per revolution

**See table on page 2**

### 2. Output

Standard ..... **N**
Standard *(Open collector NPN)* ..... **NON**
Standard *(Open collector PNP)* ..... **NOP**
Differential ..... **D**
26C31 Line Driver *(5V IN/OUT)* **L**
26C31 Line Driver *(9-30V IN / 5V OUT)* **L**
OL 7272 Line Driver ..... **M**

### 3 & 4. Shaft diameter

| | 3. | | 4. |
|---|---|---|---|
| 6 mm x 15 mm | **06** | **x** | **15** |
| 6 mm x 20 mm | **06** | **x** | **20** |
| 6 mm x 30 mm | **06** | **x** | **30** |
| 8 mm x 15 mm | **08** | **x** | **15** |
| 10 mm x 15 mm | **10** | **x** | **15** |
| 10 mm x 27 mm | **10** | **x** | **27** |
| 10 mm x 40 mm | **10** | **x** | **40** |
| 12 mm x 15 mm | **12** | **x** | **15** |
| 1/4 in x 15 mm | **1/4** | **x** | **15** |
| 3/8 in x 15 mm | **3/8** | **x** | **15** |

### 5. IP Rating

IP 65 ..... **65**
IP 67 ..... **67**

### 6. Cable Length

Standard cable is 1m ..... **01**
Specify length ..... **XX**
No cable ..... **00**

### 7. Cable & Connector Takeout

Side radial ..... **S**
Back axial ..... **B***
Tangential ..... **T**
***Only encoders with cable**

### 8. Connector

M12 5-pin ..... **P5**
M12 8-pin ..... **P8**
M23 9-pin ..... **C9**
M23 12-pin ..... **C12**
No connector ..... **00**
**See Accessories for drawings**