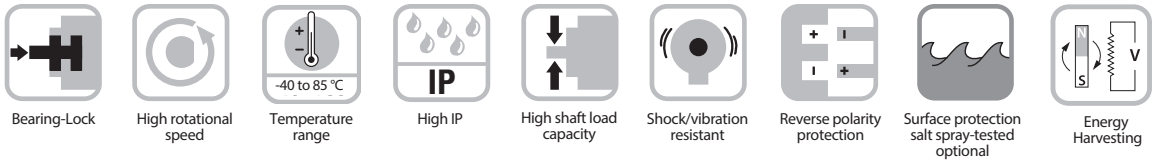
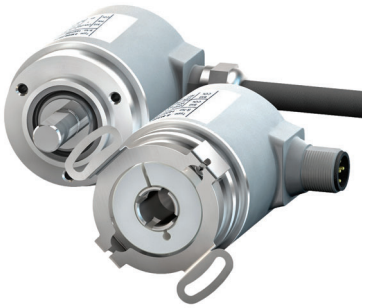
## Absolute, Multiturn Type RM-99 (Shaft) / RM-100 (Blind Hollow Shaft) SSI




Bearing-Lock | High rotational speed | Temperature range | High IP | High shaft load capacity | Shock/vibration resistant | Reverse polarity protection | Surface protection salt spray-tested optional | Energy Harvesting

### Reliable

- Sturdy bearing construction in Bearing-Lock design for resistance against vibration and installation errors.
- Without gear and without battery, thanks to the Energy Harvesting technology



Absolute

### Insensitive

- Reduced number of components ensures magnetic insensitivity.
- IP67 protection and wide temperature range –40 °C to +85 °C.

### Application Oriented

- Absolute accuracy ±1 °.
- Repeat accuracy ±0.2 °.
- Short control cycles, clock frequency with SSI up to 2 MHz.
- Max. resolution 38 bit (14 bit ST + 24 bit MT).

### Mechanical Characteristics:

| | |
|---|---|
| Max. speed: | |
| Shaft or blind hollow shaft version: | 6000 RPM |
| Without shaft seal (IP65): | 3000 RPM (continous) |
| Shaft or blind hollow shaft version: | 4000 RPM |
| With shaft seal (IP 67): | 2000 RPM (continous) |
| Starting torque (68 °F \| 20 °C): | |
| Without shaft seal (IP65): | < 1.0 oz - in (0.007 Nm) |
| With shaft seal (IP67): | < 1.4 oz - in (0.01 Nm) |
| Shaft load capacity: | |
| Radial: | 9 lbs (40 N) |
| Axial: | 4.5 lbs (20 N) |
| Weight: | approx. 0.44 lbs (0.2 kg) |
| Protection acc. to EN 60529: | IP65/IP67 |
| Working temperature: | –40 to +185 °F (–40 to +85 °C) |
| Materials: | |
| Shaft / Hollow shaft: | stainless steel |
| Flange: | aluminum |
| Housing: | zinc die-cast |
| Cable: | PUR |
| Shock resistance acc. to EN 60068-2-27: | 250 g (2,500 m/s²), 6 ms |
| Vibration resistance acc. to EN 60068-2-6: | 30 g (300 m/s²), 10 - 2,000 Hz |

## Absolute, Multiturn Type RM-99 (Shaft) / RM-100 (Blind Hollow Shaft) SSI

### General Electrical Characteristics:

| | |
|---|---|
| Power supply | 10 - 30 VDC |
| Current consumption (no load): | max. 40 mA, |
| Reverse polarity protection at power supply (+V): | yes |
| Short-circuit protected outputs: | yes[1)] |
| e1 compliant acc. to (pending): | EU guideline 2009/19/EC (acc. to EN 55025, ISO 11452 and ISO 7637) |
| UL approval: | file E356899 |
| CE compliant acc. to: | EMC guideline 2014/30/EU RoHS guideline 2011/65/EU |

[1)] = short circuit protection to **0**V or to output when power supply correctly applied.

### Interface Characteristics SSI:

| | |
|---|---|
| Output driver: | RS485 transceiver type |
| Permissible load / channel: | max. +/– 30 mA |
| Signal high: | typ 3.8 V |
| Signal level low with $I_{Load}$ = 20 mA: | typ 1.3 V |
| Resolution singleturn: | 10 - 14 bit |
| Absolute accuracy [2)]: | ±1 ° |
| Repeat accuracy: | ±0.2 ° |
| Number of revolutions (multiturn): | max. 24 bit |
| Code: | binary or gray |
| SSI clock rate: | 50 kHz - 2 MHz |
| Data refresh rate: | 2 ms |
| Monoflop time: | ≤ 15 µs |

Note: If the clock cycle starts within the monoflop time a second data transfer begins with the same data. If the clock cycle starts after the monoflop time the cycle begins with the new values. The update rate is dependent on the clock speed, data length and monoflop time.

[2)] = over the entire tempetature range.

### SET Input:

| | |
|---|---|
| Input characteristics: | active HIGH |
| Input type: | comparator |
| Signal level high: | min. 60% of +V (supply voltage), max: +V |
| Signal level low: | max. 30% of +V (supply voltage) |
| Input current: | < 0.5 mA |
| Min. pulse duration (SET): | 10 ms |
| Input delay: | 1 ms |
| New position data readable after: | 1 ms |
| Internal processing time: | 200 ms |

The encoder can be set to zero at any position by means of a HIGH signal on the SET input. Other preset values can be factory-programmed. The SET in put has a signal processing time of approx. 1 ms, after which the new position data can be read via SSI or BiSS. Once the SET function has been triggered, the encoder requires an internal processing time of typ. 200 ms; during this time the power supply must not be switched off.

The SET function should be carried out while the encoder is at rest.

If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.

### DIR Input:

Direction input: A HIGH signal switches the direction of rotation from the default cw to ccw. This inverted function can also be factory-programmed. If this input is not used, it should be connected to 0 V (Encoder ground GND)in order to avoid interferences.

| | |
|---|---|
| Response time (DIR input) | 1ms |

### Power-On Delay:

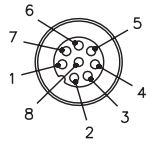
After Power-ON the device requires a time of approx. 150 ms before valid data can be read.

Hot plugging of the encoder should be avoided.

### Wiring Diagrams:

| Connection Type: | GND (0 V) | V+ | +Clock | –Clock | +Data | – Data | SET | DIR | PE |
|---|---|---|---|---|---|---|---|---|---|
| Cable: | WH | BN | GN | YE | GY | PK | BU | RD | Shield |
| M12 pin: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | PH |

**Male Encoder View**




M12 Eurofast Pinout

Mating Cordset:
E-RKC 8T-264-*

* Length in meters.

## Absolute, Multiturn Type RM-99 (Shaft) / RM-100 (Blind Hollow Shaft) SSI

### Part Number Key: RM-99 Shaft Version

| A | B | C | | D | E1 | E2 | | F |
|---|---|---|---|---|---|---|---|---|
| RM-99S | 6 | C | - | 3C | 10S | 12M | - | H1181 |

| A | Type |
|---|---|
| RM-99S | Ø 39 mm, Shaft w/ Flat, IP67 Shaft Seal |
| RM-99T | Ø 39 mm, Shaft w/ Flat, IP65 Shaft Seal |

| B | Shaft (Ø x L) |
|---|---|
| 6 | Ø 6 mm x 12.5 mm |
| 8 | Ø 8 mm x 15 mm |
| 10 | Ø 10 mm x 20 mm |
| A0 | Ø 1/4" x 1/2" |

| C | Flange |
|---|---|
| C | Ø 36 mm Clamping Flange |
| S | Ø 36 mm Servo Flange |

| D | Voltage Supply and Output Type |
|---|---|
| 3C | 10 - 30 VDC, SSI (Gray Code) |
| 5C | 10 - 30 VDC, SSI (Binary Code) |

| E1 | Resolution (singleturn) |
|---|---|
| 10S | 10 bit |
| 12S | 12 bit |
| 13S | 13 bit |
| 14S | 14 bit |

| E2 | Resolution (multiturn) |
|---|---|
| 12M | 12 bit |
| 16M | 16 bit |
| 20M | 20 bit |
| 24M | 24 bit |

| F | Type of Connection |
|---|---|
| H1181 | Radial 8-pin M12 Eurofast Connector |
| H1481 | Axial 8-pin M12 Eurofast Connector |
| C1M | Radial Cable (1m PUR) |
| CA1M | Axial Cable (1m PUR) |

### Part Number Key: RM-100 Blind Hollow Shaft Version

| A | B | C | | D | E1 | E2 | | F |
|---|---|---|---|---|---|---|---|---|
| RM-100B | 6 | E | - | 3C | 10S | 12M | - | H1181 |

| A | Type |
|---|---|
| RM-100B | Ø 39 mm, Blind Hollow Shaft, IP67 Shaft Seal |
| RM-100C | Ø 39 mm, Blind Hollow Shaft, IP65 Shaft Seal |

| B | Bore (18.5 mm insertion depth) |
|---|---|
| 6 | Ø 6 mm |
| 8 | Ø 8 mm |
| 10 | Ø 10 mm |
| A0 | Ø 1/4" |

| C | Flange |
|---|---|
| E | Ø 46 mm Flange w/ Slotted Flex Mount |
| T | Flange w/ Long Torque Stop |

| D | Voltage Supply and Output Type |
|---|---|
| 3C | 10 - 30 VDC, SSI (Gray Code) |
| 5C | 10 - 30 VDC, SSI (Binary Code) |

| E1 | Resolution (singleturn) |
|---|---|
| 10S | 10 bit |
| 12S | 12 bit |
| 13S | 13 bit |
| 14S | 14 bit |

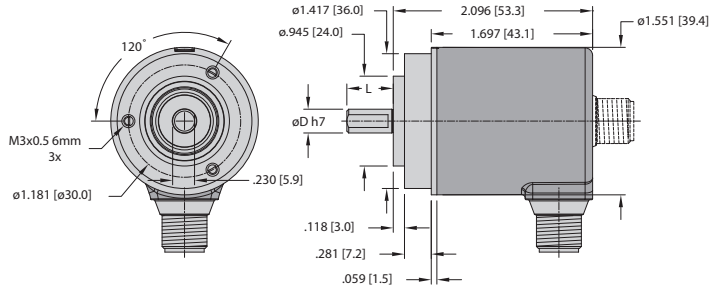
| E2 | Resolution (multiturn) |
|---|---|
| 12M | 12 bit |
| 16M | 16 bit |
| 20M | 20 bit |
| 24M | 24 bit |

| F | Type of Connection |
|---|---|
| H1181 | Radial 8-pin M12 Eurofast Connector |
| H1481 | Axial 8-pin M12 Eurofast Connector |
| C1M | Radial Cable (1m PUR) |
| CA1M | Axial Cable (1m PUR) |

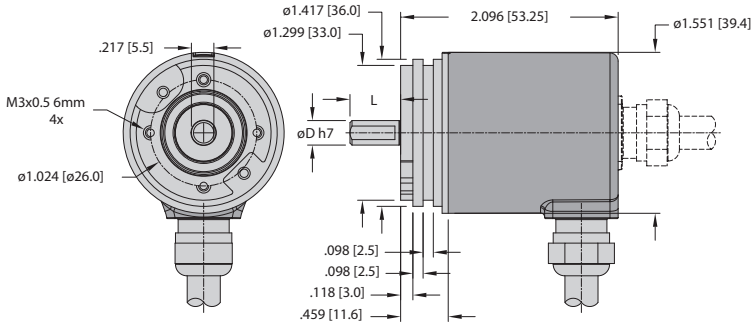
## Absolute, Multiturn Type RM-99 (Shaft) / RM-100 (Blind Hollow Shaft) SSI

### Dimensions: RM-99 Shaft Version

**RM-99 Flange C**
**Connection H1181 & H1481**

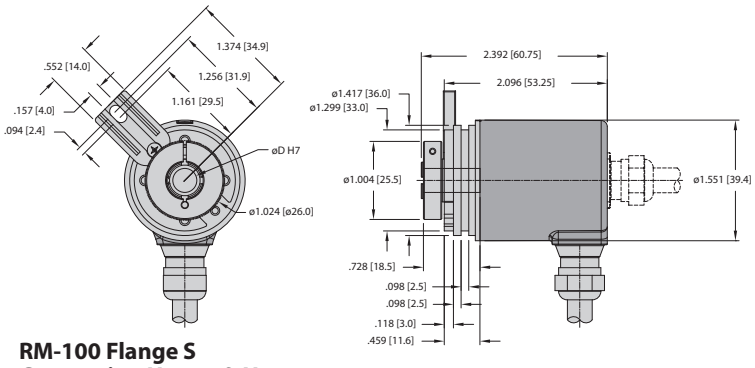



**RM-99 Flange S**
**Connection C1M & CA1M**

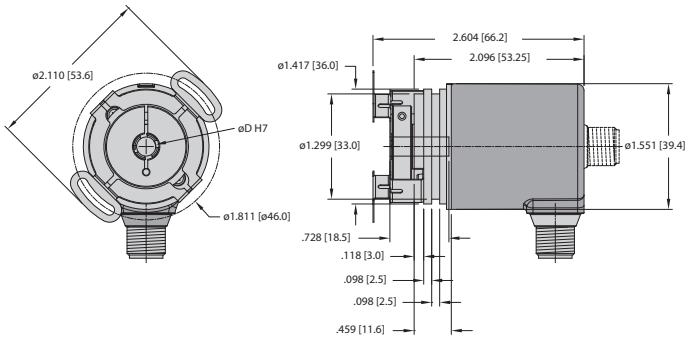



### Dimensions: RM-100 Blind Hollow Shaft Version

**RM-100 Flange T**
**Connection C1M & CA1M**




**RM-100 Flange S**
**Connection H1181 & H1481**




**Mounting Advice:**
The flanges and shafts of the encoder and drive should not be rigidly coupled together at the same time. We recommend the use of suitable couplings (see page G1, Accessories).