Absolute, Multiturn Type RM -101 (Shaft) / RM-102 (Blind Holllow Shaft)   CANopen

Bearing-Lock	High rotational speed	−40 to 85 °C Temperature range	IP 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

c(UL)us

(RoHS)

CANopen

e1 pending
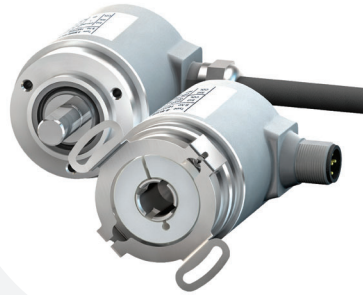
Up-To-The-Minute Fieldbus Performance
- LSS services for configuration of the node address and baud rate.
- Variable PDO mapping in the memory.
- Universal scaling function.
- Configuration management (bootloader).

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

Absolute Encoders

Mechanical Characteristics:

Max. speed:	
Shaft or blind hollow shaft version: Without shaft seal (IP65):	6000 RPM 3000 RPM (continuous)
Shaft or blind hollow shaft version: With shaft seal (IP67):	4000 RPM 2000 RPM (continuous)
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:	9.0 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 range:	−40 to +185 °F (−40 to +85 °C)
Materials:	
Shaft / Hollow shaft:	stainless steel
Flange:	aluminium
Housing:	zinc die-cast
Cable:	PVC
Shock resistance acc. to EN 60068-2-27:	250 g (2,500 m/s^2), 6 ms
Vibration resistance acc. to EN 60068-2-6:	30 g (300 m/s^2), 10 - 2,000 Hz

Rotary Position Technology
Absolute Encoders, Multiturn

General Electrical Characteristics:

Sensor:

Power supply:	10 - 30 VDC
Current consumption (no load):	max. 30 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

Interface Characteristics CANopen:

Resolution singleturn:	1 - 16384 (14 bit), (scalable default: 8192 (13 bit)
Absolute accuracy[2]:	±1 °
Repeat accuracy:	±0.2 °
Number of revolutions (multiturn):	max. 16.777.216 (24 bit) scalable only via the total resolution
Total resolution:	1…274,877,906,944 (38 bit), scalable default: 33,554,432 (25 bit)
Code:	binary
Interface:	CAN high-speed acc. to ISO 11898, Basic- and Full-CAN, CAN specification 2.0 B
Protocol:	CANopen profile DS406 V4.0 with manufacturer-specific add-ons, LSS-Service, bootloader
Power-ON time:	< 1200 ms
SDO timeout:	< 1000 ms
Baud rate:	10 - 1000 k bit/s software configurable
Node address:	1 - 127 software configurable
Termination:	software configurable
LSS protocol:	CIA LSS protocol DS305, global command support for node address and baud rate, selective commands via attributes of the identity object
Bootloader:	configuration management CIA DS 302-3

[1] = short circuit protected to 0V or to output when power supply correctly applied.
[2] = over the entire temperature range.

General Information about CANopen

The CANopen encoders support the latest CANopen communication profile according to DS301 V4.02 . In addition, device-specific profiles like the encoder profile DS406 V3.2, DS305 (LSS) and DS302 (Bootloader) are available.

The following operating modes may be selected: Polled Mode, Cyclic Mode, Sync Mode. Moreover, scale factors, preset values, limit switch values and many other additional parameters can be programmed via the CANbus. When switching the device on, all parameters, which have been saved on a flash memory to protect them against power failure, are loaded again.

The following output values may be combined in a freely variable way as PDO(PDO mapping): **position**, **speed, acceleration** as well as the **status of the working area.**

The encoders are available with a connector or a cable connection.

The device address and baud rate can be set/ modified by means of the software.

The two-color LED located on the back indicates the operating or fault status of the CAN-bus, as well as the status of the internal diagnostics.

CANbus connection

The CANopen encoders are equipped with a bus trunk line in various lengths or a M12 connector and can be terminated in the device.

The devices do not have an integrated T-coupler nor are they looped internally and must therefore only be used as end devices.

LSS layer setting services DS305 V2.0
- Global support of node-ID and baud rate.
- Selective protocol via identity object (1018h).

CANopen Communication Profile DS301 V4.2
Among others, the following functionality is integrated (Class C2 functionality):
- NMT Slave
- Heartbeat Protocol
- Identity Object
- Error Behavior Object
- Variable PDO Mapping self-start programmable (Power on to operational), 3 Sending PDO's.
- Node address, baud rate and CANbus / programmable termination.

CANopen encoder profile DS406 V4.0
The following parameters can be programmed:
- Event mode, start optional.
- 1 work area with upper and lower limit and the corresponding output states variable PDO mapping for position, speed, work area status, error and acceleration.
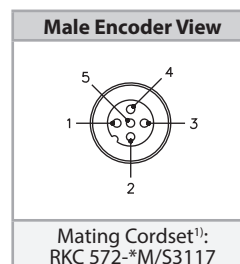- Extended failure management for position sensing.

- User interface with visual display of bus and failure status 1 LED two colors.
- Customer-specific protocol.
- "Watchdog controlled" device.

Bootloader functionality DS302-3
Configuration Management:
- Program download
- Program start
- Program erase

Wiring Diagram:

Male Encoder View

Mating Cordset[1]:
RKC 572-*M/S3117

* Length in meters.
[1] See Connectivity section H for corresponding cable color code.

Standard Wiring:

Connection Type:	+V	Common (0 V)	CAN GND	CAN High	CAN Low
Cable:	BN	WH	GY	GN	YE
M12 Eurofast :	2	3	1	4	5

Absolute, Multiturn Type RM -101 (Shaft) / RM-102 (Blind Holllow Shaft) CANopen

Part Number Key: RM-101 Shaft Version

A	B	C		D		E
RM-101S	6	C	-	9D38D	-	H1151

A	Type
RM-101S	Ø 39 mm, Shaft w/ Flat, IP67 Shaft Seal
RM-101T	Ø 39 mm, Shaft w/ Flat, IP65 Shaft Seal

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

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

D	Voltage Supply and Output Type
9D38B	10 - 30 VDC, CANopen DS 406 V4.0

E	Type of Connection
H1151	Radial 5-pin M12 Eurofast Connector
H1451	Axial 5-pin M12 Eurofast Connector
C1M	Radial Cable (1 m PVC)
CA1M	Radial Cable (1 m PVC)

Part Number Key: RM-102 Blind Hollow Shaft Version

A	B	C		D		E
RM-102B	6	E	-	9D38D	-	H1151

A	Type
RM-102B	Ø 39 mm, Blind Hollow Shaft, IP67 Shaft Seal
RM-102C	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
9D38B	10 - 30 VDC, CANopen DS 406 V4.0

E	Type of Connection
H1151	Radial 5-pin M12 Eurofast Connector
H1451	Axial 5-pin M12 Eurofast Connector
C1M	Radial Cable (1 m PVC)
CA1M	Radial Cable (1 m PVC)

Absolute Encoders

Rotary Position Technology
Absolute Encoders, Multiturn

Dimensions: RM-101 Shaft Version

RM-101 Flange C
Connection H1151 & H1451

ø1.417 [36.0]
ø.945 [24.0]
2.096 [53.3]
1.697 [43.1]
ø1.551 [39.4]
120°
L
øD h7
M3x0.5 6mm 3x
ø1.181 [ø30.0]
.230 [5.9]
.118 [3.0]
.281 [7.2]
.059 [1.5]
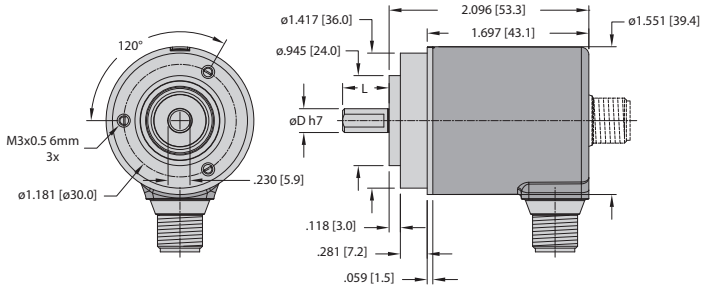
RM-101 Flange S
Connection C1M & CA1M

ø1.417 [36.0]
ø1.299 [33.0]
2.096 [53.25]
ø1.551 [39.4]
.217 [5.5]
L
øD h7
M3x0.5 6mm 4x
ø1.024 [ø26.0]
.098 [2.5]
.098 [2.5]
.118 [3.0]
.459 [11.6]
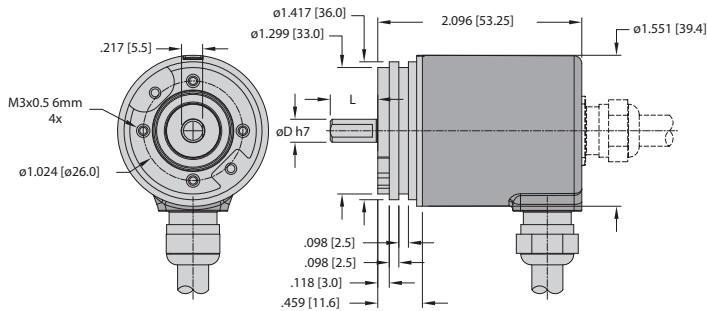
Dimensions: RM-102 Blind Hollow Shaft Version

RM-102 Flange T
Connection C1M & CA1M

1.374 [34.9]
1.256 [31.9]
1.161 [29.5]
.552 [14.0]
.157 [4.0]
.094 [2.4]
øD H7
ø1.024 [ø26.0]
2.392 [60.75]
2.096 [53.25]
ø1.417 [36.0]
ø1.299 [33.0]
ø1.004 [25.5]
ø1.551 [39.4]
.728 [18.5]
.098 [2.5]
.098 [2.5]
.118 [3.0]
.459 [11.6]
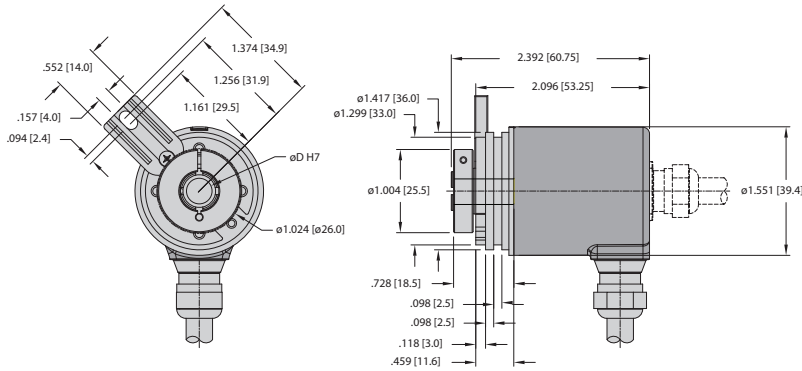
RM-102 Flange E
Connection H1151 & H1451

ø2.110 [53.6]
øD H7
ø1.811 [ø46.0]
2.604 [66.2]
2.096 [53.25]
ø1.417 [36.0]
ø1.299 [33.0]
ø1.551 [39.4]
.728 [18.5]
.118 [3.0]
.098 [2.5]
.098 [2.5]
.459 [11.6]
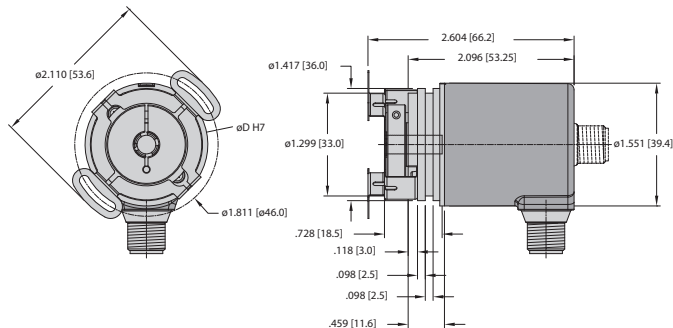
Mounting Advice:
The flanges and shafts of the encoder and drive should not be rigidly coupled together at the same time. We recommend the use of suitable couplings (see page G1, Accessories).