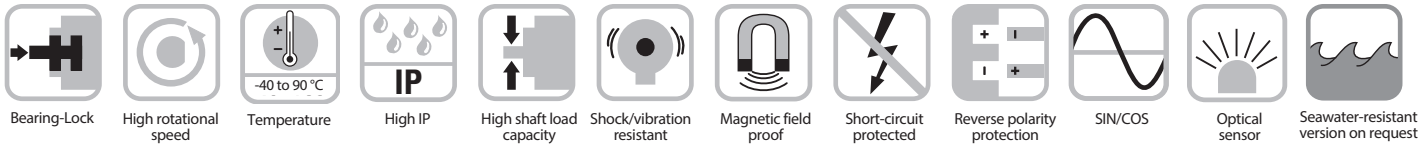
Absolute, Multiturn Type RM-46 (Shaft) / RM-50 (Blind / Hollow Shaft) SSI/BiSS-C



Bearing-Lock | High rotational speed | Temperature | High IP | High shaft load capacity | Shock/vibration resistant | Magnetic field proof | Short-circuit protected | Reverse polarity protection | SIN/COS | Optical sensor | Seawater-resistant version on request

Reliable

- **Increased ability to withstand vibration and installation errors.** Sturdy Bearing-Lock design structure **eliminates machine downtime and repairs.**
- **Fewer components and connection points increase the operational reliability:** Turck OptoASIC technology with highest integration density (Chip-on-Board).
- Die cast housing and protection up to IP67: **Remains sealed even when subjected to harsh everyday use.**
- Wide temperature range of -40 to +194 °F (-40 to +90 °C).
- **Easy diagnosis in case of fault condition.** Status indication by means of LED, sensor, voltage and temperature monitoring.

Absolute

Fast

- **High accuracy:** Update rate of the whole position value above 100 kHz for a max. jitter of 1 µs (real-time).
- **High productivity due to very short regulation cycles:** Clock rate with SSI up to 2 MHz, with BiSS-C up to 10 MHz.
- **High-resolution feedback system achievable in real-time:** SinCos incremental outputs.

Versatile

- **Connections for every application:** Tangential cable.
- **Open interfaces ensure flexibility and independence:** SSI or BiSS-C with Sine-Cosine-Option incremental track RS422.
- Multiple mounting brackets for easy installation.
- **Compact design.**
- **Fast and easy start-up on site:** Preset and reversal of rotation direction by control inputs.
- **Direct mounting on standard diameter shafts up to 10 mm** through hollow shaft up to 8 mm.

Mechanical Characteristics:

Max. speed, shaft or blind hollow shaft version without shaft sealing (IP65):	12,000 RPM, continuous operation 10,000 RPM
Max. speed, shaft version (IP67) or blind hollow shaft (IP65) with shaft sealing:	10,000 RPM, continuous operation 8,000 RPM
Starting torque without shaft sealing:	< 1 oz-in (< 0.007 Nm)
Starting torque with shaft sealing:	< 1.4 oz-in (< 0.01 Nm)
Radial load capacity of shaft:	9 lbs (40 N)
Axial load capacity of shaft:	4.5 lbs (20 N)
Weight:	approx. 0.44 lbs (0.2 kg)

Protection acc. to EN 60 529:	Housing: IP67, Shaft: IP65, opt. IP67
Working temperature:	-40 to +194 °F (-40 to +90 °C)
Materials:	Shaft/Hollow shaft: stainless steel, Flange: aluminum, Housing: die cast zinc, Cable: PUR
Shock resistance acc. to DIN-IEC 68-2-27:	> 250 g (> 2,500 m/s²), 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	> 10 g (>100 m/s²), 55-2,000 Hz

General Electrical Characteristics:

Supply voltage:	5 VDC ±5% or 10-30 VDC
Current consumption (without output load):	5 VDC: max. 60 mA, 10-30 VDC: max. 30 mA
Reverse polarity protection at power supply (+V):	Yes
RoHS compliant acc. to EU guideline 2011/65/EU	
UL approval:	file E356899

Output driver:	RS485 transceiver type
Permissible load/channel:	max. ± 30 mA
Signal level high:	typ. 3.8 V
Signal level low at I_{load} = 20 mA:	typ. 1.3 V
Short-circuit protected:	yes [1]

Interface Characteristics SSi:

Singleturn resolution:	10-17 bit
Number of revolutions:	Max. 24 bit
Code:	binary or gray
SSI clock rate:	≤ 14 bit: 50 kHz-2 MHz / ≥ 15 bit: 50 kHz-125 kHz
Monoflop time:	≤ 15 µs

Date refresh rate:	Up to 14 bits, ≤1 µs Up to 15-17 bits, 4 µs
Status and Parity bit:	Optional on request

Note: If clock starts cycling within monoflop time, a second data transfer starts with the same data. If clock starts cycling after monoflop time, the data transfer starts with updated values. Max. update rate is dependent on clock speed, data length and monoflop time.

[1] Short-circuit to 0 V or to output, one channel at a time, supply voltage correctly applied

Absolute, Multiturn Type RM-46 (Shaft) / RM-50 (Blind / Hollow Shaft) SSI/BiSS-C

Interface Characteristics BiSS-C:

Singleturn resolution:	10-17 bit
Number or revolutions:	Max. 24 bit
Code:	Binary
Clock rate:	up to 10 MHz
Max. update rate:	< 10 µs, depending on clock speed and data length
Data refresh rate:	≤ 1 µs

Note: Bidirectional, programmable parameters are: resolution, code, direction, alarms and warnings; Multicycle data output (e.g., for temperature); CRC data verification

Incremental Output (A/B). 2048 PPR:

	Sin/Cos	RS422 Compatible
Max. -3dB frequency:	400 kHz	400 kHz
Signal level:	1 Vpp (±20%)	High: min. 2.5 V Low: max. 0.5 V
Short-circuit proof:	yes [1)]	yes [1)]

[1)] Short-circuit to 0 V or to output, one channel at a time, supply voltage correctly applied

Status Output and LED:

Output driver:	open collector, internal pull up resistor 22 kOhm
Permissible load:	Max. 20 mA
Signal level high:	+V
Signal level low:	< 1 V
Active at:	Low

The optional LED (red) and the status output serve to display various alarm or error messages. In normal operation, the LED is OFF and the status output is HIGH (open-collector with int. pull-up 22 k).

If the LED is ON (status output LOW) this indicates: Sensor error, singleturn or multiturn (soiling, glass breakage etc.); LED error, failure or aging; Over temperature; Under voltage.
In the SSI mode, the fault indication can only be reset by switching off the power-supply to the device.

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 may be set to zero at any position by means of a HIGH signal on the SET input or by pressing the optional SET key. Other preset values may be factory programmed. The SET input has a signal delay time of approximately 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approximately 200 ms before the new position data can be read. During this time the LED is ON and the status output is at LOW.

Response time (DIR input)	1 ms

DIR Input:

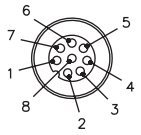
A HIGH signal switches the direction of rotation from the default CW to CCW. This inverted function can also be factory-programmed. If DIR is changed when the device is already switched on, then this will be interpreted as an error. The LED will come ON and the status output will switch to LOW.

Power-On Delay:

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

Wiring Diagrams:

Male Encoder View



M12 Eurofast Pinout

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

* Length in meters.

Standard Wiring:

Output Circuit *C and *F (SSI or BiSS-C, SET, DIR, Status) (Connection CT*M)

Connection Type:	Common (0 V)	+V	+Clock	-Clock	+Data	-Data	SET	DIR	Status	PE
Cable:	WH	BN	GN	YE	GY	PK	BU	RD	VT	Shield

Output Circuit *C and *F (SSI or BiSS-C, SET, DIR) (Connection CT1M-RSS8T)

Connection Type:	GND	+V	+Clock	-Clock	+Data	-Data	SET	DIR	Shield/PE
M12 Eurofast:	1	2	3	4	5	6	7	8	PH

Output Circuit *E and *G (SSI or BiSS-C, SET, DIR, 2048 Sin/Cos) (Connection CT*M)

Connection Type:	GND	+V	+Clock	-Clock	+Data	-Data	SET	DIR	A	A inv	B	B inv	PE
Cable:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY/PK	RD/BU	Shield

Output Circuit *H (SSI or BiSS-C, SET, DIR, Voltage Sense Outputs) (Connection CT*M)

Connection Type:	GND	+V	+Clock	-Clock	+Data	-Data	SET	DIR	0 V sens	+V sens	PE
Cable:	WH	BN	GN	YE	GY	PK	BU	RD	VT	RD/BU	Shield

Output Circuit *J (SSI or BiSS-C, SET, DIR, 2048 Sin/Cos, Voltage Sense Outputs) (Connection CT*M)

Connection Type:	GND	+V	+Clock	-Clock	+Data	-Data	0 V sens	+V sens	A	A inv	B	B inv	PE
Cable:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY/PK	RD/BU	Shield

Output Circuit *K and *L (SSI or BiSS-C, SET, DIR, 2048 Sin/Cos) (Connection CT*M)

Connection Type:	GND	+V	+Clock	-Clock	+Data	-Data	A	A inv	B	B inv	PE
Cable:	WH	BN	GN	YE	GY	PK	BK	VT	GY/PK	RD/BU	Shield

Absolute, Multiturn Type RM-46 (Shaft) / RM-50 (Blind / Hollow Shaft) SSI/BiSS-C

Part Number Key: RM-46 Shaft Version

A	B	C		D	E1	E2		F
RM-46S	6	C	-	5F	10S	12M	-	CT1M

A	Type
RM-46S	Ø 39 mm, Shaft, IP67 Shaft Seal
RM-46T	Ø 39 mm, Shaft, 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 12.5 mm
A1	Ø 3/8" x 5/8"

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

E1	Resolution (Singleturn)
10S	10-bit
12S	12-bit
13S	13-bit
14S	14-bit
17S	17-bit

E2	Resolution (Multiturn)
12M	12-bit
16M	16-bit
24M	24-bit

F	Type of Connection
CT1M	Tangential Cable (1 m PUR)
CT5M	Tangential Cable (5 m PUR)
CT1M-RSS8T	Tangential Cable w/ 1m M12 Eurofast Connector*

* Only Available with Output Type *C and *F

D	Voltage Supply and Output Type			
	SSI (B)	SSI (G)	BiSS-C	Features
5 V	5F	3F	DF	
	5E	3E	DE	2048 PPR SinCos
	5H	3H	DH	Voltage Monitoring
	5J	3J	DJ	2048 PPR SinCos Plus Voltage Monitoring
	5K	3K	DK	2048 PPR Incr., RS422 (TTL-Compatible)
10-30 V	5C	3C	DC	
	5G	3G	DG	2048 PPR SinCos
	5L	3L	DL	2048 PPR Incr., RS422

(B) = Binary, (G) = Gray

Accessories:

- See page H1, Connectivity, for cables and connectors
- See page G1, Accessories, for mounting attachments and couplings

Absolute, Multiturn Type RM-46 (Shaft) / RM-50 (Blind / Hollow Shaft) SSI/BiSS-C

Part Number Key: RM-50 Hollow Shaft Version

A	B	C		D	E1	E2		F
RM-50B	6	E	-	5F	10S	12M	-	CT1M

A	Type
RM-50B	Ø 39 mm, Blind Hollow Shaft, IP65 Shaft Seal [1]
RM-50H	Ø 39 mm, Hollow Shaft, IP65 Shaft Seal

[1] Only Available with Bore '10'

B	Bore
6	Ø 6 mm
8	Ø 8 mm
10	Ø 10 mm
A0	Ø 1/4"

C	Flange
E	Ø 36 mm Flange w/ Slotted Flex Mount
T	Ø 36 mm Flange w/ Long Torque Stop
T1	Ø 36 mm Flange w/ Short Torque Stop

E1	Resolution (Singleturn)
10S	10-bit
12S	12-bit
13S	13-bit
14S	14-bit
17S	17-bit

E2	Resolution (Multiturn)
12M	12-bit
16M	16-bit
24M	24-bit

F	Type of Connection
CT1M	Tangential Cable (1 m PUR)
CT5M	Tangential Cable (5 m PUR)
CT1M-RSS8T	Tangential Cable w/ 1 m M12 Eurofast Connector*

* Only Available with Output Type *C and *F

D	Voltage Supply and Output Type			
	SSI (B)	SSI (G)	BiSS-C	Features
5 V	5F	3F	DF	
	5E	3E	DE	2048 PPR SinCos
	5H	3H	DH	Voltage Monitoring
	5J	3J	DJ	2048 PPR SinCos Plus Voltage Monitoring
	5K	3K	DK	2048 PPR Incr., RS422 (TTL-Compatible)
10-30 V	5C	3C	DC	
	5G	3G	DG	2048 PPR SinCos
	5L	3L	DL	2048 PPR Incr., RS422

(B) = Binary, (G) = Gray

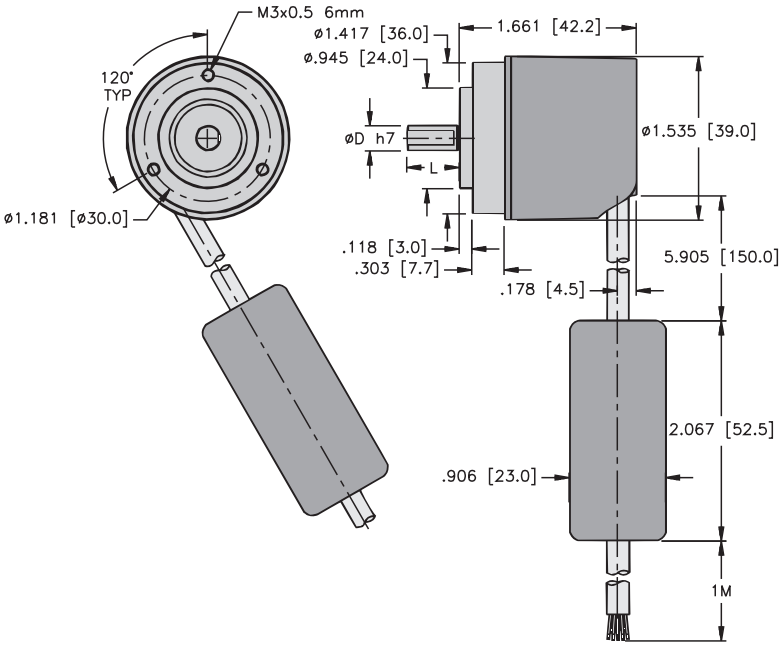
Accessories:

- See page H1, Connectivity, for cables and connectors
- See page G1, Accessories, for mounting attachments and couplings

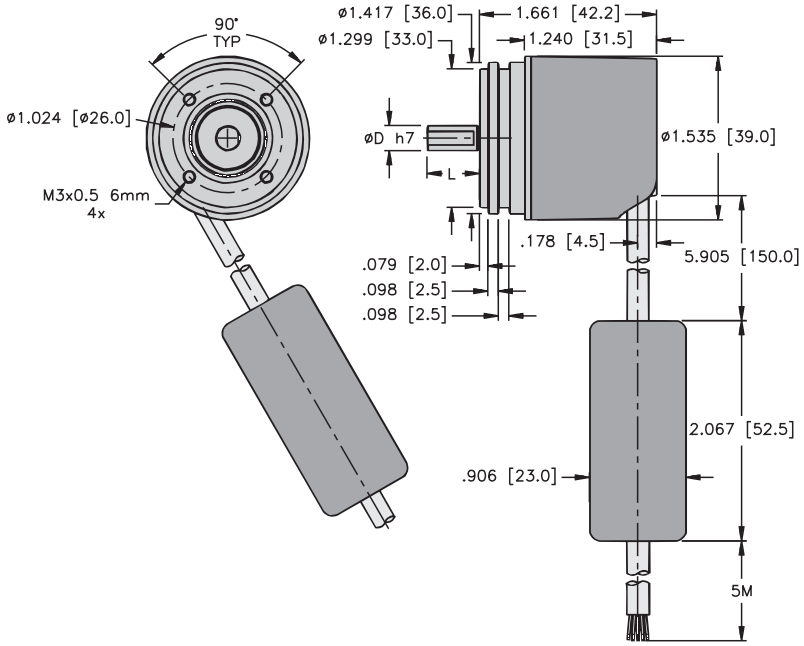
Absolute, Multiturn Type RM-46 (Shaft) / RM-50 (Blind / Hollow Shaft) SSI/BiSS-C

Dimensions: RM-46 Shaft Version

RM-46 Flange C
Connection CT1M



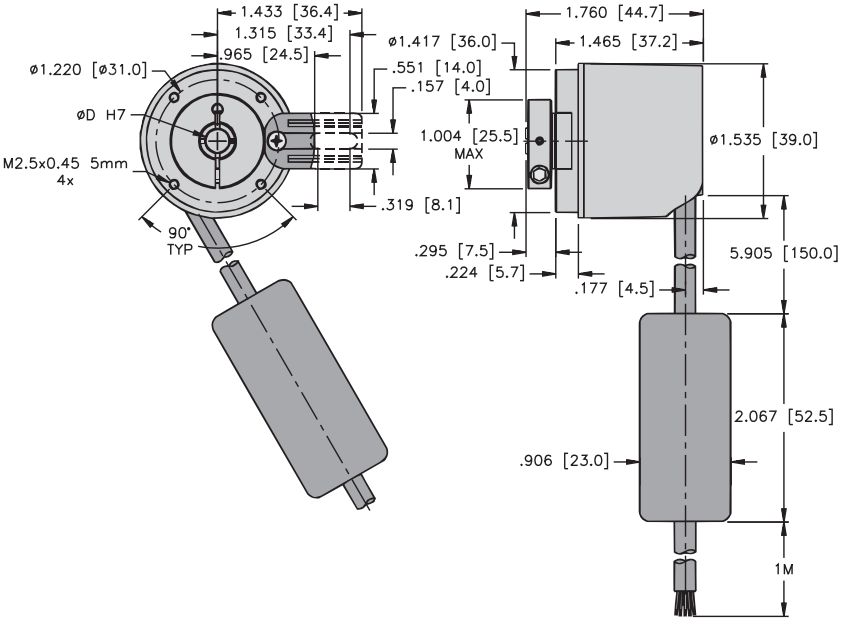
RM-46 Flange S
Connection CT5M



Absolute, Multiturn Type RM-46 (Shaft) / RM-50 (Blind / Hollow Shaft) SSI/BiSS-C

Dimensions: RM-50 Hollow Shaft Version

RM-50 Flange T&T1
Connection CT1M



RM-50 Flange E (Blind Hollow Shaft)
Connection CT1M-RSC8T