

Standard Industrial Types Incremental



Incremental encoders are sensors capable of generating signals in response to rotary movement. In conjunction with mechanical conversion devices, such as rack-and-pinions, measuring wheels or spindles, incremental shaft encoders can also be used to measure linear movement. The shaft encoder generates a signal for each incremental change in position.

With the optical transformation, a line-coded disc made of metal, plastic or glass and positioned on a rotary bearing interrupts the infra red light ray emitted by gallium arsenid sender diode. The number of lines determines the resolution, i.e. the measuring points within a revolution. The interruptions of the light ray are sensed by the receptor element and electronically processed. The information is then made available as a rectangular signal at the encoder output.

Examples for typical applications of incremental encoders:

- Door closing devices for trains
- Desktop robots
- Lens grinding machines
- Plotters
- Testing machines
for optical waveguides
- Scattering machines
- Tampon printing machines
- Ultrasonic welding
- Screwing machines
- Labelling machines
- x/y indication
- Analysis devices
- Drilling machines
- Mixing machines

Incremental

Solid Shaft



- Miniature encoder for industrial use
- Low current consumption
- High noise interference immunity
- Cable lengths of up to 100 m
- Suitable for high pulse frequencies
- High protection class
- Applications: CNC machines, manipulators, motors, medical technology, textile machines



NUMBER OF PULSES

5 / 10 / 20 / 25 / 30 / 50 / 60 / 100 / 120 / 200 / 250 / 256 / 288 / 300 / 360 / 400 / **500** / **512** / 600 / 720 / 900 / **1000** / 1024 / 1250 / 1500

Other number of pulses on request

Preferably available versions are printed in bold type.

TECHNICAL DATA
mechanical

Housing diameter	30 mm
Shaft diameter	5 mm (Solid shaft)
Flange (Mounting of housing)	Synchro flange, Pilot flange
Protection class shaft input (EN 60529)	IP64
Protection class housing (EN 60529)	IP64
Shaft load axial / radial	5 N / 10 N
Max. speed	max. 10 000 rpm
Torque	≤ 0.2 Ncm
Moment of inertia	approx. 0.8 gcm ²
Vibration resistance (DIN EN 60068-2-6)	100 m/s ² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	1000 m/s ² (6 ms)
Operating temperature	-10 °C ... +70 °C
Storage temperature	-25 °C ... +85 °C
Material housing	Aluminum
Weight	approx. 60 g
Connection	Cable, axial or radial M16 (Binder), axial

TECHNICAL DATA
electrical

General design	as per DIN VDE 0160, protection class III, contamination level 2, overvoltage class II
Supply voltage	RS422 + Alarm (R), RS422 + Sense (T): DC 5 V ±10 % Push-pull (K): ± 10% DC 5 V or DC 10 - 30 V
Max. current w/o load	40 mA (DC 5 V), 60 mA (DC 10 V), 30 mA (DC 24 V)
Max. pulse frequency	RS422: 300 kHz Push-pull: 200 kHz
Standard output versions ^{1,2}	RS422 + Alarm (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , $\overline{\text{Alarm}}$ RS422 + Sense (T): A, B, N, \bar{A} , \bar{B} , \bar{N} , Sense Push-pull (K): A, B, N, $\overline{\text{Alarm}}$
Pulse width error	± max. 25° electrical
Number of pulses	5 ... 1500

Incremental

Solid Shaft

TECHNICAL DATA electrical (continued)

Alarm output	NPN-O.C., max. 5 mA
Pulse shape	Square wave
Pulse duty factor	1:1

¹ With push-pull (K): pole protection

² Output description and technical data see chapter "Technical basics"

ELECTRICAL CONNECTIONS Cable

Description (push-pull)	Description (RS422)	Lead Ø mm ²	Colour
DC 10 - 30 V	DC 5 V	0.5	red
	Sense V _{CC}	0.14	yellow/red
Channel A	Channel A	0.14	white
	Channel \bar{A}	0.14	white/brown
Channel B	Channel B	0.14	green
	Channel \bar{B}	0.14	green/brown
Channel N	Channel N	0.14	yellow
	Channel \bar{N}	0.14	yellow/brown
GND	GND	0.5	black
$\overline{\text{Alarm}}$	$\overline{\text{Alarm/Sense GND}}$ ¹	0.14	yellow/black
screen ²	screen ²		screen ²

¹ depending on ordering code

² connected with encoder housing

ELECTRICAL CONNECTIONS M16 connector (Binder), 6 pole

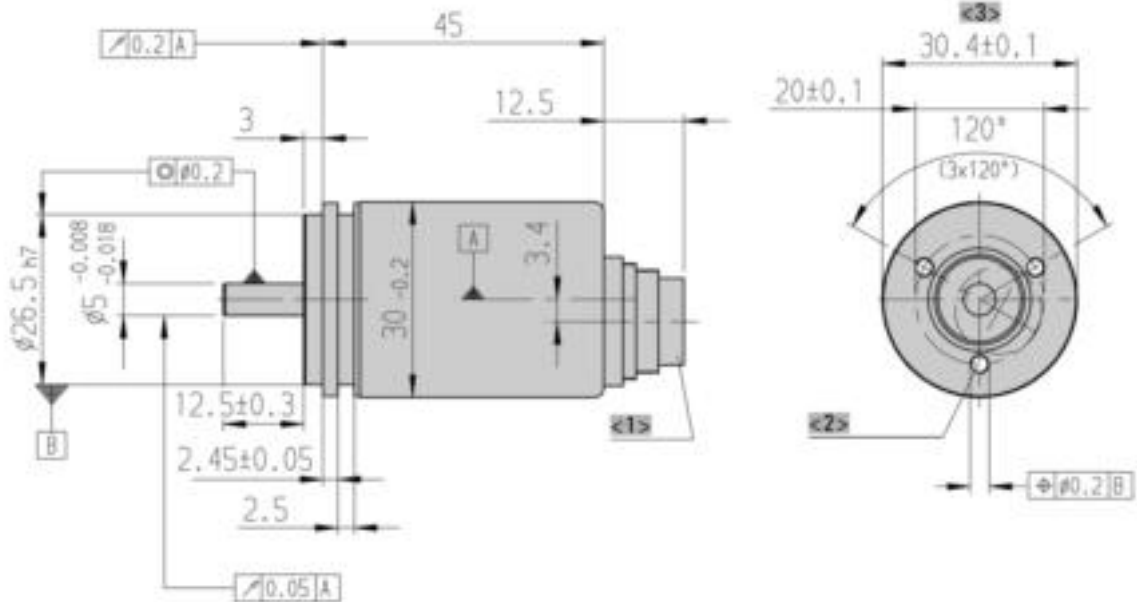
Description (push-pull)	Pin
DC 10 - 30 V	1
Channel A	2
Channel N	3
Channel B	4
$\overline{\text{Alarm}}$	5
GND	6

Standard Industrial Types Incremental

RI 30
Solid Shaft

DIMENSIONED DRAWINGS (continued)

Synchro flange, M16 (Binder)

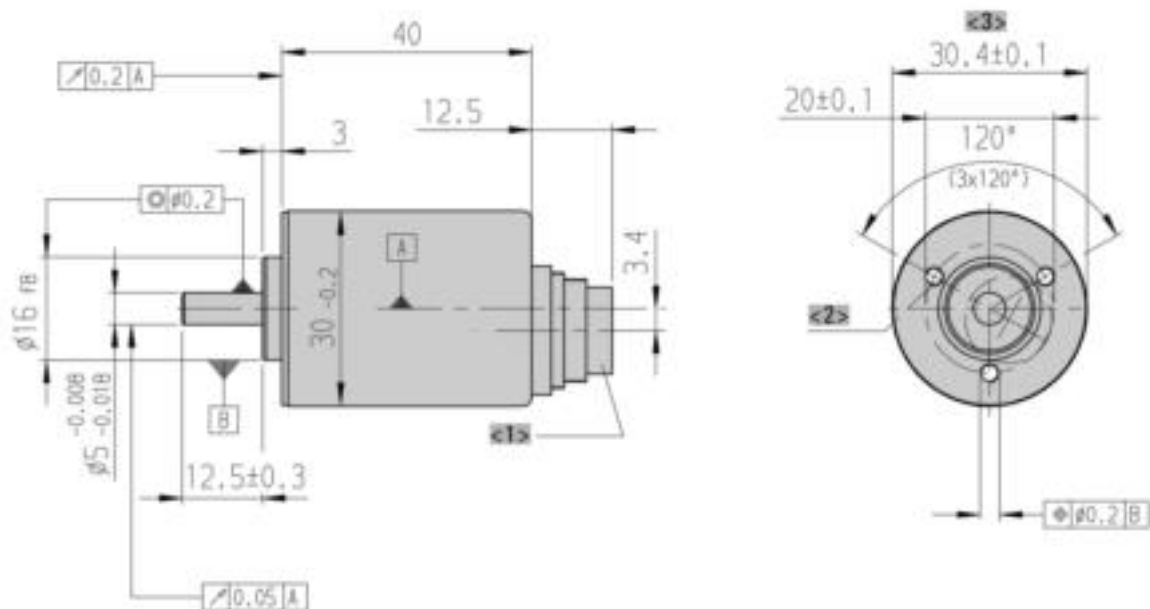


- <1> 6 pole (pins)
- <2> mounting thread M3x5

<3> Housing

Dimensions in mm

Pilot flange, M16 (Binder)



- <1> 6 pole (pins)
- <2> mounting thread M3x5

<3> Housing

Dimensions in mm

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ¹	Flange, Protection, Shaft	Output ²	Connection ³
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RI30-0	5 ... 1500	A DC 5 V E DC 10 - 30 V	S.34 Synchro, IP64, 5 mm R.34 Pilot, IP64, 5 mm	R RS422 +Alarm T RS422 +Sense K Push-pull	A Cable, axial B Cable, radial E-I M23 connector (Conin) at 1 m TPE cable, cw E-D M23 connector (Conin) at 1 m TPE cable, ccw N M16 connector (Binder), 6 pole, axial

¹ DC 10 - 30 V only with push-pull

² Output code "K": short-circuit-proof

³ For Output Code "N" (M16): only push-pull

ORDERING INFORMATION

Selection of cable length

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

see chapter "Accessories", starting page 322

Incremental

Solid Shaft



NUMBER OF PULSES

- Miniature industry standard encoder for high numbers of pulses
- High reliability
- Applications: CNC axles, machine tools, robots, special purpose machines, high-speed winding machines



5 / 10 / 20 / 25 / 28 / 32 / 50 / 60 / 72 / 100 / 128 / 144 / 200 / 250 / 256 / 288 / 300 / 360 / 400 / 500 / 512 / 600 / 720 / 900 / 1000 / 1024 / 1250 / 1500 / 2000 / 2048 / 2500 / 3000 / 3600
Other number of pulses on request

TECHNICAL DATA mechanical

Housing diameter	36 mm
Shaft diameter	6 mm / 6.35 mm (Solid shaft)
Flange (Mounting of housing)	Synchro flange, Pilot flange
Protection class shaft input (EN 60529)	IP64
Protection class housing (EN 60529)	IP64
Shaft load axial / radial	5 N / 10 N
Max. speed	max. 10 000 rpm
Torque	≤ 0.3 Ncm
Moment of inertia	approx. 2.8 gcm ²
Vibration resistance (DIN EN 60068-2-6)	100 m/s ² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	1000 m/s ² (6 ms)
Operating temperature	-10 °C ... +70 °C
Storage temperature	-25 °C ... +85 °C
Material housing	Aluminum
Weight	approx. 80 g
Connection	Cable, axial or radial M16 (Binder), axial or radial

TECHNICAL DATA electrical

General design	as per DIN VDE 0160, protection class III, contamination level 2, overvoltage class II
Supply voltage ¹	RS422 + Alarm (R), RS422 + Sense (T): DC 5 V ±10 % Push-pull (K), Push-pull antivalent (I): DC 10-30 V
Max. current w/o load	40 mA (DC 5 V), 60 mA (DC 10 V), 30 mA (DC 24 V)
Max. pulse frequency	RS422: 300 kHz Push-pull: 200 kHz
Standard output versions ²	RS422 + Sense (T): A, B, N, \bar{A} , \bar{B} , \bar{N} , Sense RS422 + Alarm (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , Alarm Push-pull (K): A, B, N, \bar{A} Alarm Push-pull complementary (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , \bar{A} Alarm
Pulse width error	± max. 25° electrical
Number of pulses	5 ... 3600
Alarm output	NPN-O.C., max. 5 mA

Incremental

Solid Shaft

TECHNICAL DATA
electrical (continued)

Pulse shape	Square wave
Pulse duty factor	1:1

¹ With push-pull (K) and push-pull complementary (I): pole protection

² Output description and technical data see chapter "Technical basics"

ELECTRICAL CONNECTIONS
Cable PVC

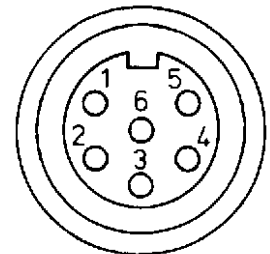
Cable PVC (A, B)		Output		
Colour	Lead mm ²	RS422 (R, T)	push-pull (K)	push-pull complementary (I)
red	0.5	DC 5 V	DC 10 - 30 V	DC 10 - 30 V
yellow/red	0.14	Sense V _{CC}		Sense V _{CC}
white	0.14	Channel A	Channel A	Channel A
white/brown	0.14	Channel \bar{A}		Channel \bar{A}
green	0.14	Channel B	Channel B	Channel B
green/brown	0.14	Channel \bar{B}		Channel \bar{B}
yellow	0.14	Channel N	Channel N	Channel N
yellow/brown	0.14	Channel \bar{N}		Channel \bar{N}
black	0.5	GND	GND	GND
yellow/black	0.14	Alarm/Sense GND ¹	Alarm	Alarm
screen ²		screen ²	screen ²	screen ²

¹ depending on ordering code

² connected with encoder housing

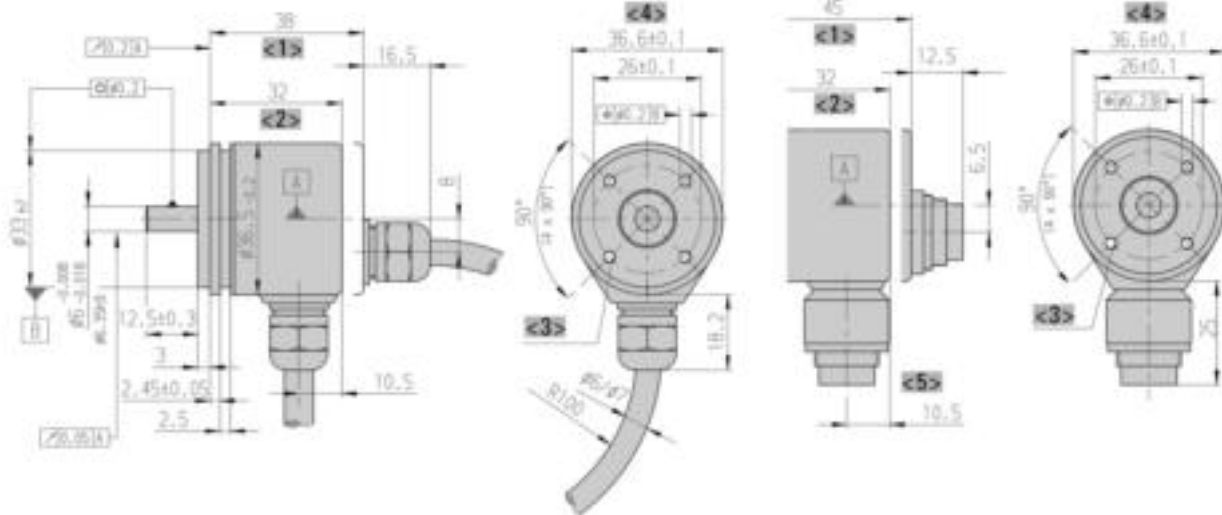
ELECTRICAL CONNECTIONS
M16 connector (Binder), 6 pole

Description (push-pull)	Pin
DC 10 - 30 V	1
Channel A	2
Channel N	3
Channel B	4
Alarm	5
GND	6



DIMENSIONED DRAWINGS

Synchro flange

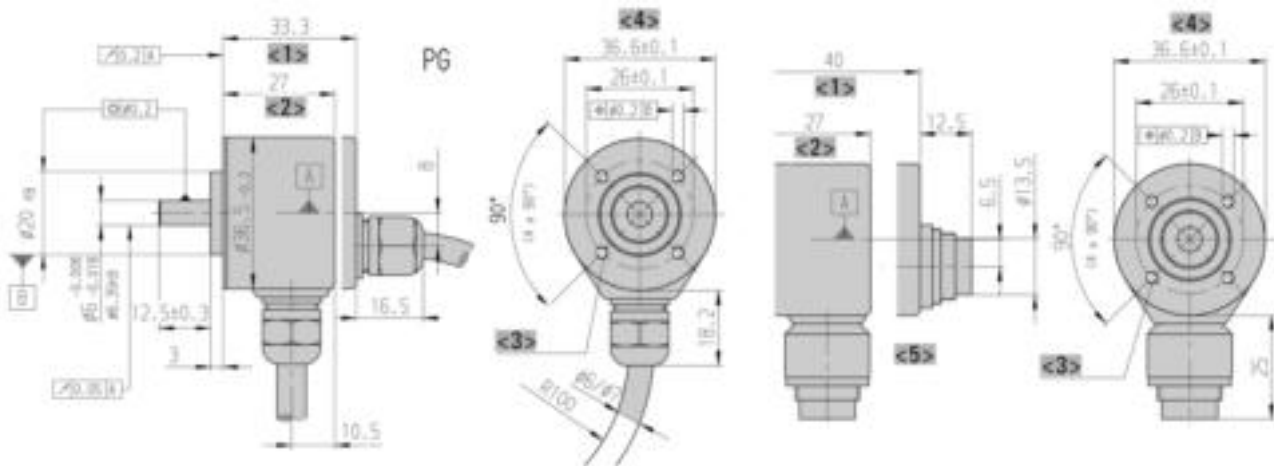


- <1> axial
- <2> radial
- <3> mounting thread M3x5
- <4> Housing
- <5> 6 pole (pins)

Cable bending radius R for flexible installation ≥ 100 mm
 Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

Pilot flange



- <1> axial
- <2> radial
- <3> mounting thread M3x5
- <4> Housing
- <5> 6 pole (pins)

Cable bending radius R for flexible installation ≥ 100 mm
 Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ¹	Flange, Protection, Shaft	Output ²	Connection ³
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RI36-0	5 ... 3600	A DC 5 V E DC 10 - 30 V	S.31 Synchro, IP64, 6 mm S.35 Synchro, IP64, 6,35 mm R.31 Pilot, IP64, 6 mm R.35 Pilot, IP64, 6,35 mm	R RS422 +Alarm T RS422 +Sense K Push-pull I Push-pull complementary	A Cable, axial B Cable, radial E-I M23 connector (Conin) at 1 m TPE cable, cw E-D M23 connector (Conin) at 1 m TPE cable, ccw J M16 connector (Binder), 6 pole, radial N M16 connector (Binder), 6 pole, axial

¹ DC 10 - 30 V only with output push-pull (K) and push-pull complementary (I)

² Output code "K" and "I": short-circuit-proof

³ For Output Code "N" und "J" (M16): only push-pull

ORDERING INFORMATION

Selection of cable length

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

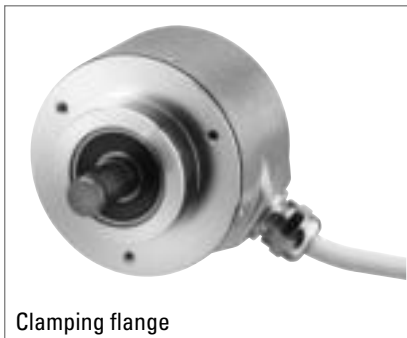
see chapter "Accessories", starting page 322

Incremental

Solid Shaft



Synchro flange



Clamping flange

- Universal industry standard encoder
- Up to 40 000 steps with 10 000 pulses
- High signal accuracy
- Protection class up to IP67
- Flexible due to many flange and configuration variants
- Suitable for high shock ratings
- Applications: machine tools, CNC axles, packing machines, motors/ drives, injection moulding machines, sawing machines, textile machines
- For EX version, see RX 70-I
- Operating temperature up to 100 °C (RI 58-T)



NUMBER OF PULSES

RI 58-0

1 / 2 / 3 / 4 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 60 / 64 / 70 / 72 / 80 / **100** / 125 / 128 / 144 / 150 / 180 / 200 / 230 / **250** / 256 / 300 / 314 / 350 / 360 / 375 / 400 / 460 / 480 / **500** / 512 / 600 / 625 / 635 / 720 / 750 / 900 / **1000** / **1024** / 1200 / **1250** / 1500 / 1600 / 1800 / 2000 / 2048 / **2500** / 3000 / 3480 / **3600** / 3750 / 3968 / 4000 / **4096** / 4800 / **5000** / 5400 / 6000 / 7200 / 7680 / 8000 / 8192 / 9000 / 10000

Other number of pulses on request

Preferably available versions are printed in bold type.

RI 58-T

4 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 60 / 64 / 70 / 72 / 80 / **100** / 125 / 128 / 144 / 150 / 180 / 200 / 230 / **250** / 256 / 300 / 314 / 350 / 360 / 375 / 400 / 460 / 480 / **500** / 512 / 600 / 625 / 635 / 720 / 750 / 900 / **1000** / **1024** / 1200 / **1250** / 1500 / 1600 / 1800 / 2000 / 2048 / **2500**

Other number of pulses on request

Preferably available versions are printed in bold type.

TECHNICAL DATA
mechanical

Housing diameter	58 mm
Shaft diameter	6 mm / 6.35 mm / 7 mm / 9.52 mm / 10 mm / 12 mm (Solid shaft)
Flange (Mounting of housing)	Synchro flange, Clamping flange, Square flange, Synchro clamping flange
Protection class shaft input (EN 60529)	IP64 or IP67
Protection class housing (EN 60529)	IP65 or IP67
Shaft load axial / radial	Ø 6 mm / 6,35 mm: 20 N / 40 N Ø 7 ... 10 mm: 40 N / 60 N Ø 12 mm: 60 N / 80 N
Max. speed	max. 10 000 rpm
Torque	≤ 0.5 Ncm ≤ 1 Ncm (IP67)
Moment of inertia	approx. 14 gcm ² (Synchro flange) approx. 20 gcm ² (Clamping flange)

Incremental
Solid Shaft
**TECHNICAL DATA
mechanical (continued)**

Vibration resistance (DIN EN 60068-2-6)	100 m/s ² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	1000 m/s ² (6 ms)
Operating temperature	RI 58-O: -10 °C ... +70 °C RI 58-T: -25 °C ... +100 °C
Storage temperature	RI 58-O: -25 °C ... +85 °C RI 58-T: -25 °C ... +100 °C
Material housing	Aluminum
Weight	approx. 360 g
Connection	PVC cable, axial or radial M23 connector (Conin), axial or radial TPE cable, axial or radial M16 (Binder), axial or radial MS, axial oder radial

**TECHNICAL DATA
electrical**

General design	as per DIN VDE 0160, protection class III, contamination level 2, overvoltage class II
Supply voltage ¹	RS422 + Sense (T): DC 5 V ±10 % RS422 + Alarm (R): ± 10% DC 5 V or DC 10 - 30 V Push-pull (K), Push-pull antivalent (I): DC 10-30 V
Max. current w/o load	40 mA (DC 5 V), 60 mA (DC 10 V), 30 mA (DC 24 V)
Max. pulse frequency	RS422: 300 kHz Push-pull: 200 kHz
Standard output versions ²	RS422 + Alarm (R): A, B, N, \overline{A} , \overline{B} , \overline{N} , \overline{Alarm} RS422 + Sense (T): A, B, N, \overline{A} , \overline{B} , \overline{N} , Sense Push-pull (K): A, B, N, \overline{Alarm} Push-pull complementary (I): A, B, N, \overline{A} , \overline{B} , \overline{N} , \overline{Alarm}
Pulse width error	± max. 25° electrical
Number of pulses	1 ... 10 000
Alarm output	NPN-O.C., max. 5 mA
Pulse shape	Square wave
Pulse duty factor	1:1

¹ Pole protection with supply voltage DC 10 - 30 V

² Output description and technical data see chapter "Technical basics"

Incremental

Solid Shaft

ELECTRICAL CONNECTIONS
Cable PVC

Cable PVC (A, B) Colour	Output		
	RS422 (R, T)	push-pull (K)	push-pull complementary (I)
red	DC 5 / 10 - 30 V	DC 10 - 30 V	DC 10 - 30 V
yellow/red	Sense V _{cc}		Sense V _{cc}
white	Channel A	Channel A	Channel A
white/brown	Channel \bar{A}		Channel \bar{A}
green	Channel B	Channel B	Channel B
green/brown	Channel \bar{B}		Channel \bar{B}
yellow	Channel N	Channel N	Channel N
yellow/brown	Channel \bar{N}		Channel \bar{N}
black	GND	GND	GND
yellow/black	$\bar{\text{Alarm}}$ /Sense GND ¹	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$
screen ²	screen ²	screen ²	screen ²

¹ depending on ordering code

² connected with encoder housing

ELECTRICAL CONNECTIONS
Cable TPE

Cable TPE (E, F) Colour	Output		
	RS422 (R, T)	push-pull (K)	push-pull complementary (I)
brown/green	DC 5 / 10 - 30 V	DC 10 - 30 V	DC 10 - 30 V
blue	Sense V _{cc}		Sense V _{cc}
brown	Channel A	Channel A	Channel A
green	Channel \bar{A}		Channel \bar{A}
grey	Channel B	Channel B	Channel B
pink	Channel \bar{B}		Channel \bar{B}
red	Channel N	Channel N	Channel N
black	Channel \bar{N}		Channel \bar{N}
white/green	GND	GND	GND
violet (white) ¹	$\bar{\text{Alarm}}$ /Sense GND ²	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$
screen ³	screen ³	screen ³	screen ³

¹ white with RS422 + Sense (T)

² depending on ordering code

³ connected with encoder housing

Incremental

Solid Shaft

ELECTRICAL CONNECTIONS
M23 connector (Conin), 12 pole

Pin	RS422 + Sense (T)	RS422 + Alarm (R)	push-pull (K)	push-pull complementary (I)
1	Channel \bar{B}	Channel \bar{B}	N.C.	Channel \bar{B}
2	Sense V_{CC}	Sense V_{CC}	N.C.	Sense V_{CC}
3	Channel N	Channel N	Channel N	Channel N
4	Channel \bar{N}	Channel \bar{N}	N.C.	Channel \bar{N}
5	Channel A	Channel A	Channel A	Channel A
6	Channel \bar{A}	Channel \bar{A}	N.C.	Channel \bar{A}
7	N.C.	$\bar{A}larm$	$\bar{A}larm$	$\bar{A}larm$
8	Channel B	Channel B	Channel B	Channel B
9	N.C. ¹	N.C. ¹	N.C. ¹	N.C. ¹
10	GND	GND	GND	GND
11	Sense GND	N.C.	N.C.	N.C.
12	DC 5 V	DC 10 - 30 V	DC 10 - 30 V	DC 10 - 30 V

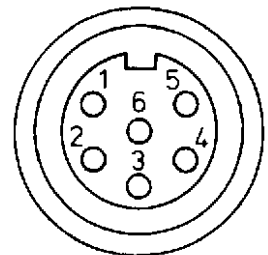
¹ screen for cable with CONIN connector

ELECTRICAL CONNECTIONS
MS connector, 10 pole

Pin	Description RS422 / Euro-pinout (Connection codes O and K)	push-pull	push-pull complementary
1/A	Channel A	Channel A	Channel A
2/B	Channel B	Channel B	Channel B
3/C	Channel N	Channel N	Channel N
4/D	DC 5/10 - 30 V	DC 10 - 30 V	DC 10 - 30 V
5/E	$\bar{A}larm$	$\bar{A}larm$	$\bar{A}larm$
6/F	GND	GND	GND
7/G	Channel \bar{A}	screen	Channel \bar{A}
8/H	Channel \bar{B}	N.C.	Channel \bar{B}
9/I	Channel \bar{N}	N.C.	Channel \bar{N}
10/J	screen	screen	screen

ELECTRICAL CONNECTIONS
M16 connector (Binder), 6 pole

Description (push-pull)	Pin
DC 10 - 30 V	1
Channel A	2
Channel N	3
Channel B	4
$\bar{A}larm$	5
GND	6

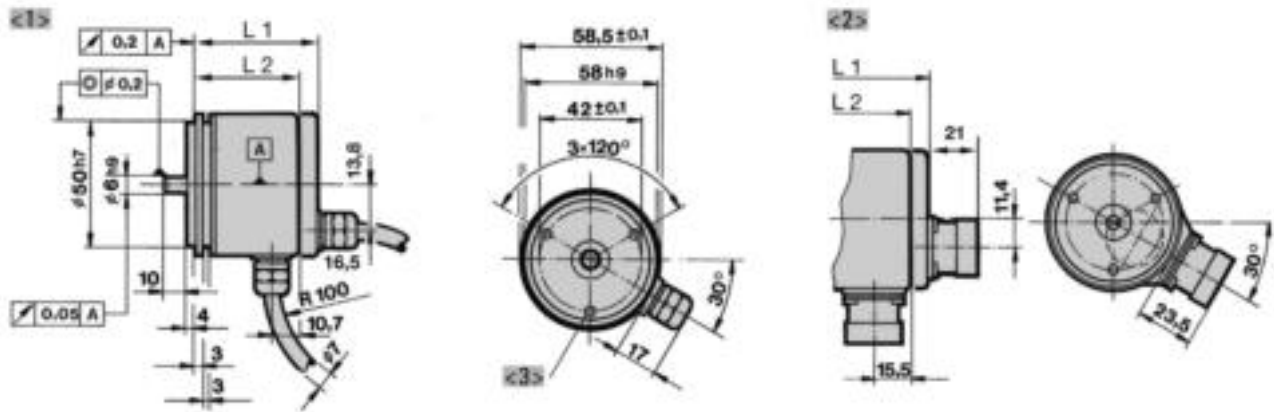


Standard Industrial Types **RI 58-0 / RI 58-T**

Incremental **Solid Shaft**

DIMENSIONED DRAWINGS

Synchro flange, 58 mm

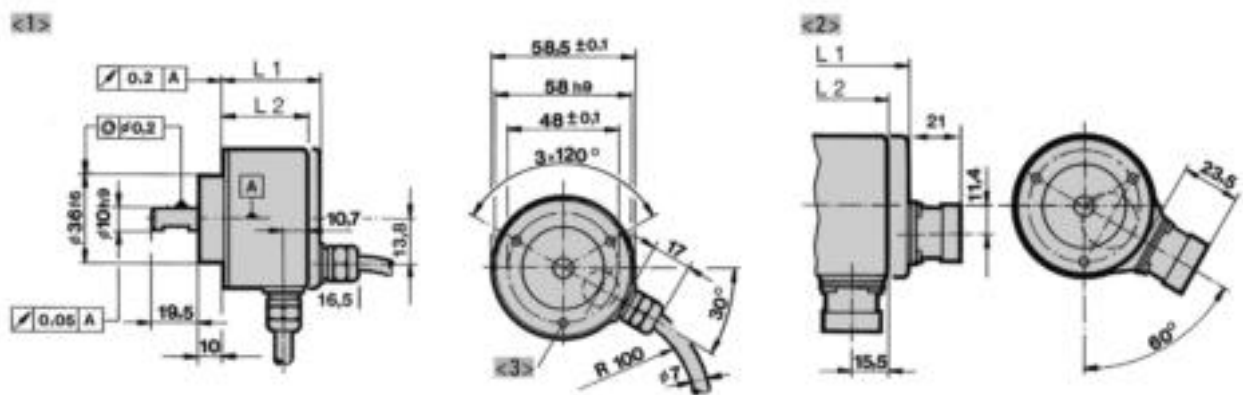


- <1> Connection cable, axial/radial
- <2> M23, 12 pole, axial/ radial
- <3> mounting thread M4x5

Cable bending radius R for flexible installation ≥ 100 mm
 Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

Clamping flange, 58 mm



- <1> Connection cable, axial/radial
- <2> M23, 12 pole, axial/ radial
- <3> mounting thread M3x5 (Option M4x5)

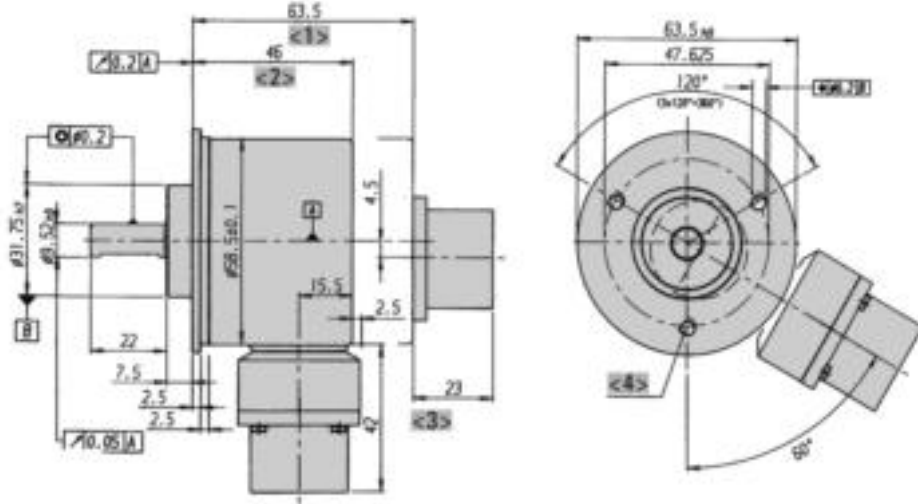
Cable bending radius R for flexible installation ≥ 100 mm
 Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

Standard Industrial Types RI 58-0 / RI 58-T Incremental Solid Shaft

DIMENSIONED DRAWINGS (continued)

Synchro clamping flange, 63,5 mm (2,5")

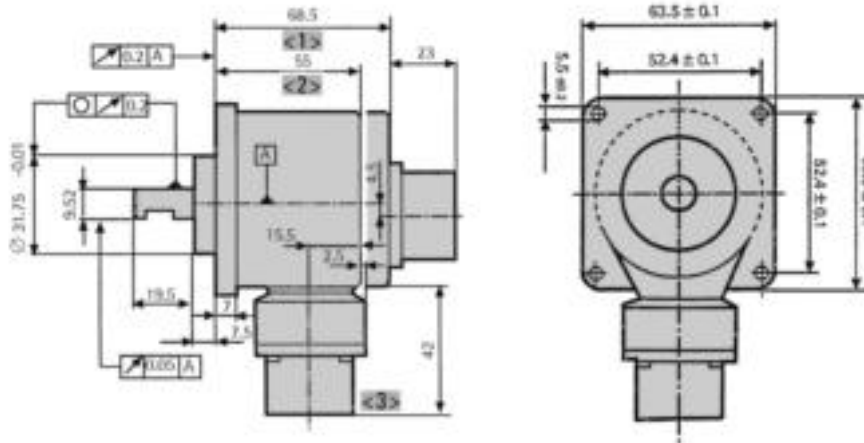


<1> axial
<2> radial

<3> MS 6 - 10 pole
<4> Screw thread 10-32 UNF

Dimensions in mm

Square flange, 63,5 mm x 63,5 mm (2,5" x 2,5')



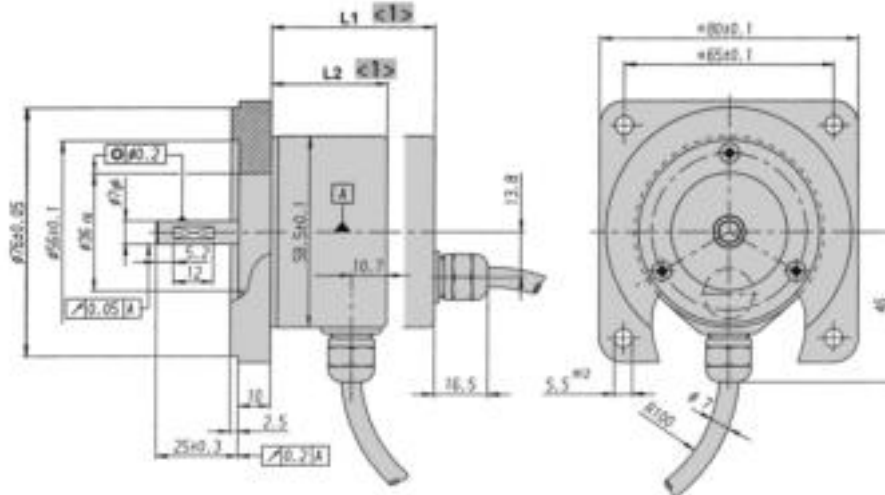
<1> axial
<2> radial

<3> MS 6 - 10 pole

Dimensions in mm

DIMENSIONED DRAWINGS (continued)

Square flange 80 x 80 mm



<1> L1, L2 see clamping flange
Cable bending radius R for flexible installation ≥ 100 mm

Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

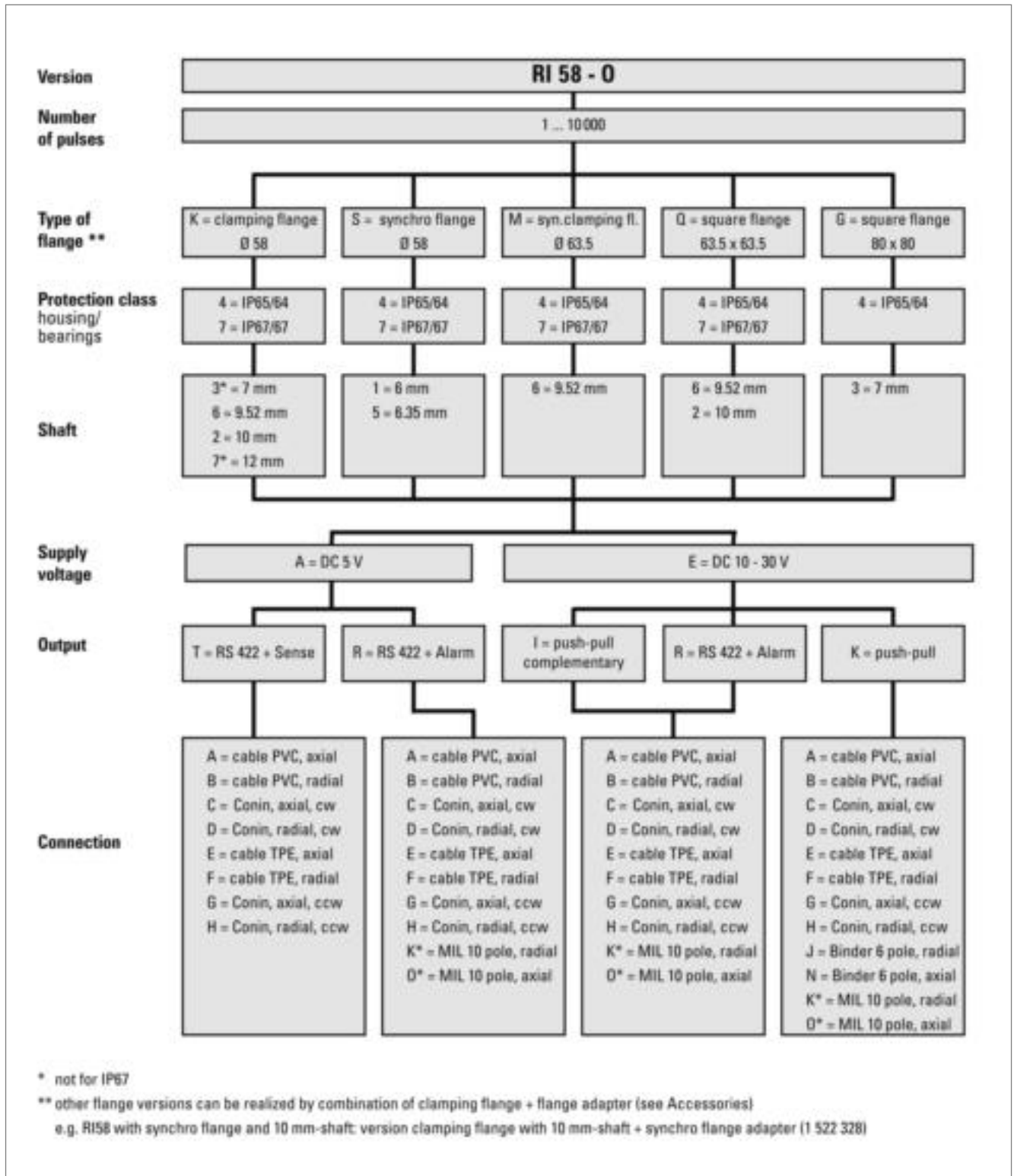
DIMENSIONS

Typ	Connection	Output	axial L1 mm	radial L2 mm
Synchro flange, 58 mm	cable	R (with U _B = DC 5 V), T, K, I	51.5	41.5
		R (with U _B = DC 10 - 30 V)	56	56
	connector	R (with U _B = DC 5 V), T, K, I	57.5	51.5
		R (with U _B = DC 10 - 30 V)	57.5	56
Clamping flange, 58 mm / Square flange, 80x80 mm	cable	R (with U _B = DC 5 V), T, K, I	45.5	35.5
		R (with U _B = DC 10 - 30 V)	50	50
	connector	R (with U _B = DC 5 V), T, K, I	51.5	45.5
		R (with U _B = DC 10 - 30 V)	51.5	50

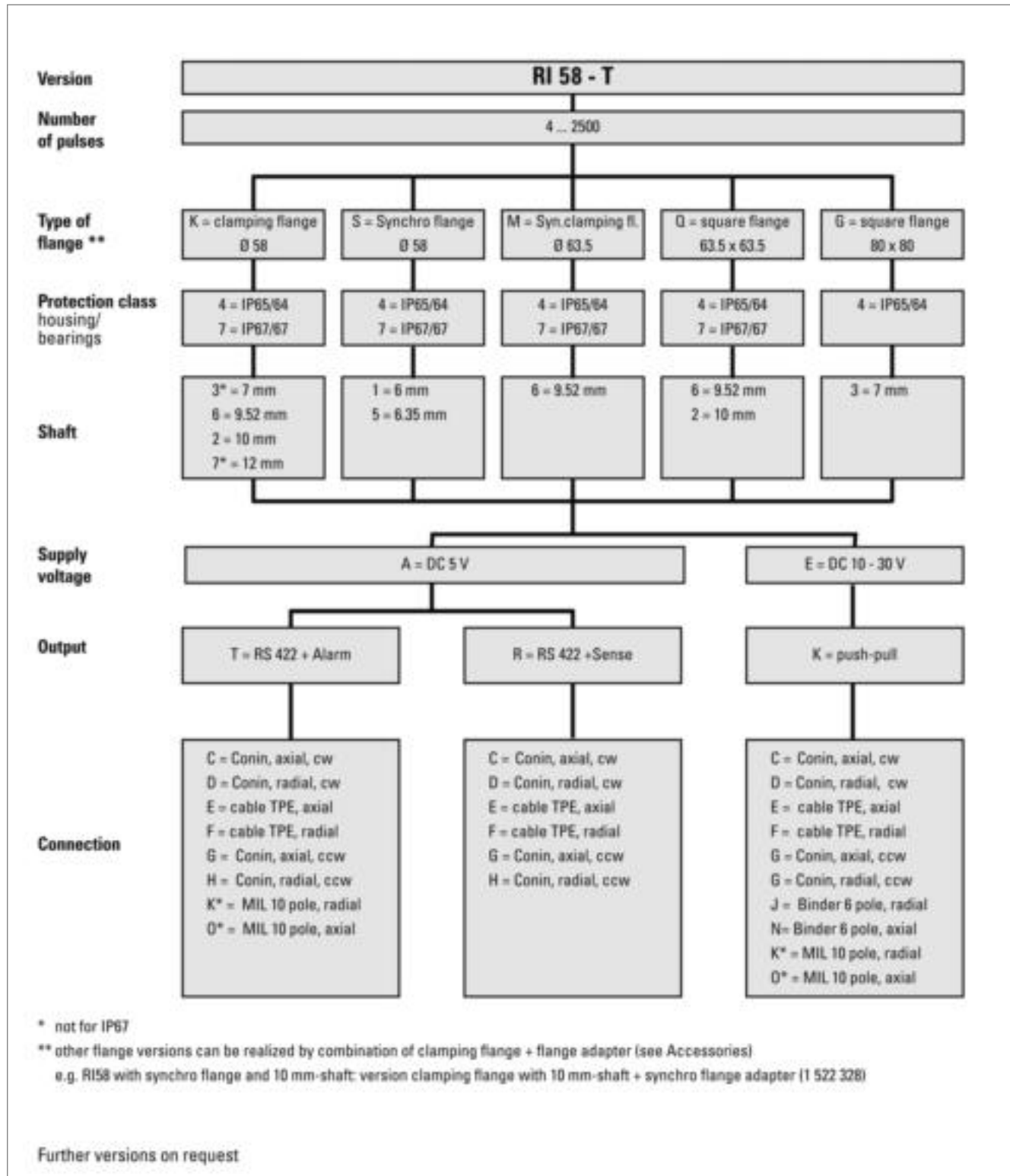
Standard Industrial Types RI 58-O / RI 58-T

Incremental Solid Shaft

STANDARD VERSIONS



STANDARD VERSIONS (100 °C max. operating temperature)



Standard Industrial Types **RI 58-O / RI 58-T**

Incremental **Solid Shaft**

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ¹	Flange, Protection, Shaft ^{2,3}	Output ⁴	Connection ^{5,6}
□	□	□	□	□	□
RI58-O RI58-T	RI 58-O: 1 ... 10000 RI 58-T: 4 ... 2500	A DC 5 V E DC 10 - 30 V	S.41 Synchro, IP64, 6 mm S.45 Synchro, IP64, 6.35 mm S.71 Synchro, IP67, 6 mm S.75 Synchro, IP67, 6.35 mm K.42 Clamping, IP64, 10 mm K.47 Clamping, IP64, 12 mm K.43 Clamping, IP64, 7 mm K.46 Clamping, IP64, 9.52 mm K.72 Clamping, IP67, 10 mm K.76 Clamping, IP67, 9.52 mm M.46 Syn.clamping, IP64, 9.52 mm M.76 Syn.clamping, IP67, 9.52 mm O.46 Square, IP64, 9.52 mm O.42 Square, IP64, 10 mm O.76 Square, IP67, 9.52 mm O.72 Square, IP67, 10 mm G.73 Square 80x80, IP67, 7 mm	R RS422 +Alarm T RS422 +Sense K Push-pull I Push-pull complementary	A PVC cable, axial B PVC cable, radial E TPE cable, axial F TPE cable, radial C M23 connector (Conin), 12 pole, axial, cw D M23 connector (Conin), 12 pole, radial, cw G M23 connector (Conin), 12 pole, axial, ccw H M23 connector (Conin), 12 pole, radial, ccw J M16 connector (Binder), 6 pole, radial N M16 connector (Binder), 6 pole, axial O MS connector, 10 pole (Insert arrangement 18-1), axial K MS connector, 10 pole (Insert arrangement 18-1), radial

¹ DC 10 - 30 V only with push-pull

² other flange versions can be realized by combination of clamping flange + flange adapter (see Accessories), e.g. RI58 with synchro flange and 10 mm-shaft: version clamping flange with 10 mm-shaft + synchro flange adapter (1 522 328)

³ Output code "K" and "I": short-circuit-proof

⁴ Connection code "O", "K": according to MIL-C-5015 (only RI 58-O)

⁵ IP67 on cover with connector only if IP67 mating connector mounted properly.

⁶ Connection code "O", "K": according to MIL-C-5016 (only RI 58-T)

ORDERING INFORMATION

Selection of cable length

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

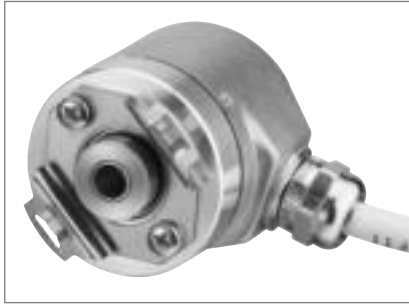
Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

see chapter "Accessories", starting page 322

Incremental

Hollow Shaft



NUMBER OF PULSES

- Miniature industry encoder for high number of pulses
- Short mounting length
- Easy mounting procedure
- Applications: motors, machine tools, robots, automated SMD equipment



5 / 10 / 20 / 25 / 50 / 60 / 100 / 200 / 250 / 300 / 360 / 500 / 600 / 720 / 1000 / 1024 / 1250 / 1500 / 2000 / 2048 / 2500 / 3000 / 3600

Other number of pulses on request

TECHNICAL DATA mechanical

Housing diameter	36 mm
Shaft diameter	4 mm / 6 mm / 8 mm / 10 mm (Hubshaft)
Flange (Mounting of housing)	Tether
Mounting of shaft	Front clamping ring
Protection class shaft input (EN 60529)	IP64
Protection class housing (EN 60529)	IP64
Axial endplay of mounting shaft (hubshaft)	± 0.5 mm
Radial runout of mating shaft (hubshaft)	± 0.15 mm
Max. speed	max. 10 000 rpm
Torque	≤ 1 Ncm
Moment of inertia	approx. 3 gcm ²
Vibration resistance (DIN EN 60068-2-6)	100 m/s ² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	1000 m/s ² (6 ms)
Operating temperature	-10 °C ... +70 °C
Storage temperature	-25 °C ... +85 °C
Material housing	Aluminum
Weight	approx. 80 g
Connection	Cable, axial or radial

TECHNICAL DATA electrical

General design	as per DIN EN 61010-1, protection class III, contamination level 2, overvoltage class II
Supply voltage ¹	RS422 + Alarm (R), RS422 + Sense (T): DC 5 V ±10 % Push-pull (K), Push-pull antivalent (I): DC 10-30 V
Max. current w/o load	40 mA (DC 5 V), 60 mA (DC 10 V), 30 mA (DC 24 V)
Max. pulse frequency	RS422: 300 kHz Push-pull: 200 kHz
Standard output versions ²	RS422 + Sense (T): A, B, N, \bar{A} , \bar{B} , \bar{N} , Sense RS422 + Alarm (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , Alarm Push-pull (K): A, B, N, Alarm Push-pull complementary (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , Alarm

Incremental

Hollow Shaft

TECHNICAL DATA
electrical (continued)

Pulse width error	± max. 25° electrical
Number of pulses	5 ... 3600
Alarm output	NPN-O.C., max. 5 mA
Pulse shape	Square wave
Pulse duty factor	1:1

¹ With push-pull (K) and push-pull complementary (I): pole protection

² Output description and technical data see chapter "Technical basics"

ELECTRICAL CONNECTIONS
Cable PVC

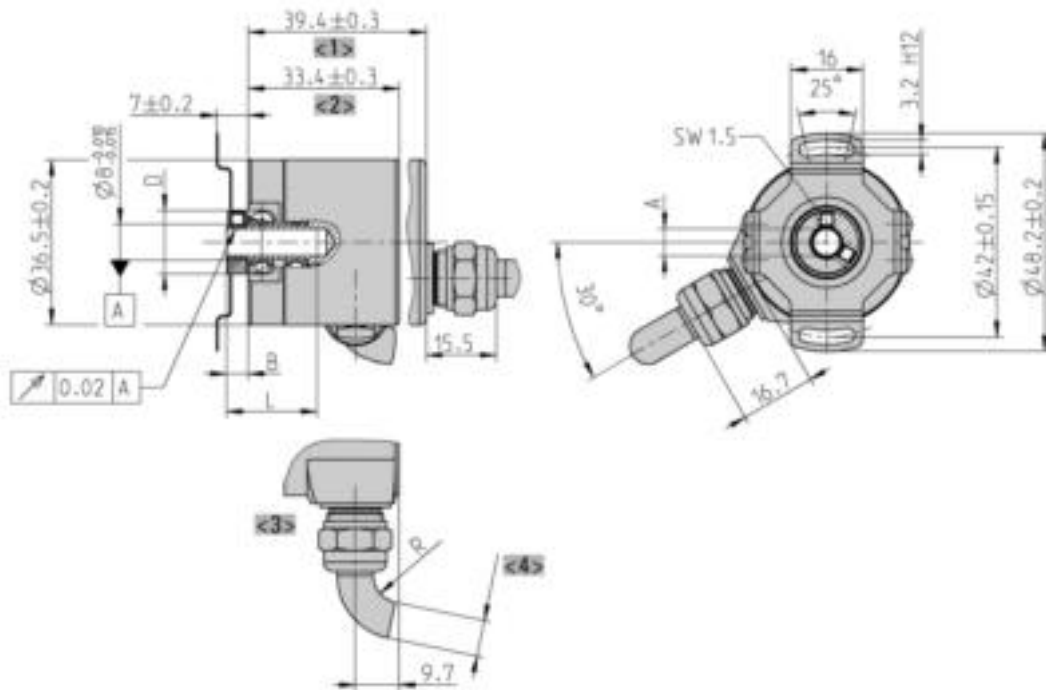
Cable PVC (A, B)		Output		
Colour	Litze mm ²	RS422 (R, T)	push-pull (K)	push-pull complementary (I)
red	0.5	DC 5 V	DC 10 - 30 V	DC 10 - 30 V
yellow/red	0.14	Sense V _{CC}		Sense V _{CC}
white	0.14	Channel A	Channel A	Channel A
white/brown	0.14	Channel \bar{A}		Channel \bar{A}
green	0.14	Channel B	Channel B	Channel B
green/brown	0.14	Channel \bar{B}		Channel \bar{B}
yellow	0.14	Channel N	Channel N	Channel N
yellow/brown	0.14	Channel \bar{N}		Channel \bar{N}
black	0.5	GND	GND	GND
yellow/black	0.14	$\bar{\text{Alarm}}$ /Sense GND ¹	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$
screen ²		screen ²	screen ²	screen ²

¹ depending on ordering code

² connected with encoder housing

DIMENSIONED DRAWINGS

Torque support "J"



Dim.	Hollow shaft ϕ				Unit
A	4 $+0.01$	6 $+0.01$	8 $+0.01$	10 $+0.01$	mm
A*	4 $g7$	10 $g7$	8 $g7$	10 $g7$	mm
B	4.8 ± 0.2	4.8 ± 0.2	4.8 ± 0.2	4.8 ± 0.2	mm
D	12	14	16	18	mm
L _{min}	6	9	12	15	mm
L _{max}	20	20	20	20	mm

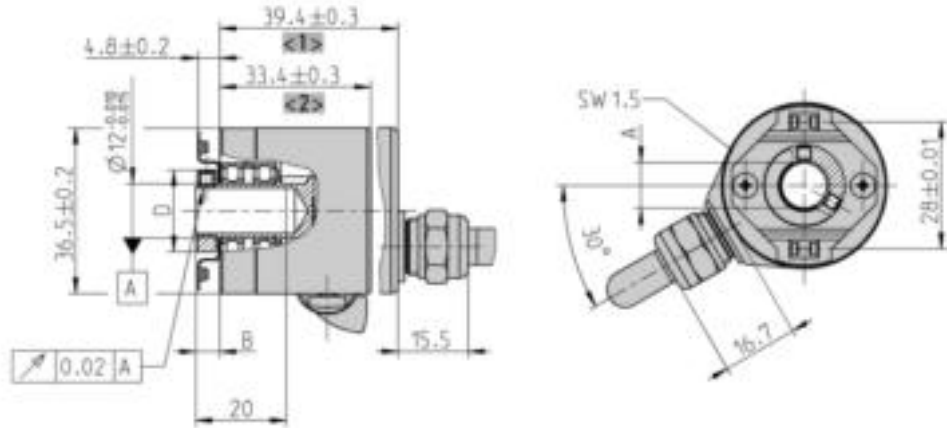
A* = diameter of connection shaft
 B = space between housing and shaft
 D = diameter clamping ring
 L = length of connection shaft

$\langle 1 \rangle$ axial
 $\langle 2 \rangle$ radial
 $\langle 3 \rangle$ Cable radial
 $\langle 4 \rangle$ $\phi 6$ or $\phi 8$
 Cable bending radius R for flexible installation ≥ 100 mm
 Cable bending radius R for fixed installation ≥ 40 mm
 Tightening torque of set screw: 15 Ncm

Dimensions in mm

DIMENSIONED DRAWINGS (continued)

Torque support "F"



Dim.	Hollow shaft Ø				Unit
A	4 +0.01	6 +0.01	8 +0.01	10 +0.01	mm
A*	4 _{g7}	10 _{g7}	8 _{g7}	10 _{g7}	mm
B	4.8 ± 0.2	4.8 ± 0.2	4.8 ± 0.2	4.8 ± 0.2	mm
D	12	14	16	18	mm
L _{min}	6	9	12	15	mm
L _{max}	20	20	20	20	mm

A* = diameter of connection shaft
 B = space between housing and shaft
 D = diameter clamping ring
 L = length of connection shaft

<1> axial

<2> radial

Cable bending radius R for flexible installation ≥ 100 mm

Cable bending radius R for fixed installation ≥ 40 mm

Tightening torque of set screw: 15 Ncm

The hubshaft with tether (F) as torque support must be fixed by a cylindrical pin (2.4 mm Ø) at the machine side.

Dimensions in mm

Incremental

Hollow Shaft

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ¹	Flange, Protection, Shaft ^{3,4}	Output ²	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RI36-H	5 ... 3600	A DC 5 V E DC 10 - 30 V	F.30 Spring tether "F" with clamping ring front, IP64, 4 mm F.31 Spring tether "F" with clamping ring front, IP64, 6 mm F.3C Spring tether "F" with clamping ring front, IP64, 8 mm F.32 Spring tether "F" with clamping ring front, IP64, 10 mm J.30 Spring tether "J" with clamping ring front, IP64, 4 mm J.31 Spring tether "J" with clamping ring front, IP64, 6 mm J.3C Spring tether "J" with clamping ring front, IP64, 8 mm J.32 Spring tether "J" with clamping ring front, IP64, 10 mm	R RS422 +Alarm T RS422 +Sense K Push-pull I Push-pull complementary	A Cable, axial B Cable, radial E-I M23 connector (Conin) at 1 m TPE cable, cw E-D M23 connector (Conin) at 1 m TPE cable, ccw

¹ DC 10 - 30 V only with push-pull

² Output code "K" and "I": short-circuit-proof

³ Fixing of hubshaft with tether by cylindrical pin

⁴ Fixing of hubshaft with tether by oblong hole

ORDERING INFORMATION

Selection of cable length

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

see chapter "Accessories", starting page 322

Incremental

Hollow Shaft



NUMBER OF PULSES

- Through hollow shaft
- High accuracy by means of integrated flexible coupling
- Safe shaft mounting
- Applications: textile machines, motors, drives, copiers



1 / 2 / 3 / 4 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 60 / 64 / 70 / 72 / 80 / **100** / 125 / 128 / 144 / 150 / 180 / 200 / **250** / 256 / 300 / 314 / 350 / 360 / 375 / 400 / 460 / 480 / **500** / 512 / 600 / 625 / 720 / 900 / **1000** / **1024** / **1250** / 1500 / 1600 / 1800 / 2000 / 2048 / **2500** / 3000 / 3480 / **3600** / 4000 / **4096** / **5000**

Other number of pulses on request

Preferably available versions are printed in bold type.

TECHNICAL DATA
mechanical

Housing diameter	58 mm
Shaft diameter	10 mm / 12 mm (Hubshaft)
Flange (Mounting of housing)	Synchro flange
Protection class shaft input (EN 60529)	IP64
Protection class housing (EN 60529)	IP64
	Ø 10 mm, tolerance g8 (-0.005 ... -0.027 mm), Ø 12 mm, tolerance g8 (-0.006 ... -0.033 mm)
Axial endplay of mounting shaft (hubshaft)	± 0.4 mm
Parallel endplay of mounting shaft	0.4 mm
Angular endplay of mounting shaft	1 °
Max. speed	max. 3000 rpm
Torque	≤ 2 Ncm
Moment of inertia	approx. 65 gcm ² (10 mm shaft) approx. 95 gcm ² (12 mm shaft)
Vibration resistance (DIN EN 60068-2-6)	10 g = 100 m/s ² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	100 g = 1000 m/s ² (6 ms)
Operating temperature	-10 °C ... +70 °C
Storage temperature	-25 °C ... +85 °C
Material housing	Aluminum
Weight	approx. 210 g
Connection	Cable, radial

TECHNICAL DATA
electrical

General design	as per DIN VDE 0160, protection class III, contamination level 2, overvoltage class II
Supply voltage ¹	RS422 + Sense (T): DC 5 V ±10 % RS422 + Alarm (R): ± 10% DC 5 V or DC 10 - 30 V Push-pull (K), Push-pull antivalent (I): DC 10-30 V

Incremental

Hollow Shaft

TECHNICAL DATA
electrical (continued)

Max. current w/o load	40 mA (DC 5 V), 60 mA (DC 10 V), 30 mA (DC 24 V)
Max. pulse frequency	RS422: 300 kHz Push-pull: 200 kHz
Standard output versions ²	RS422 + Alarm (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , $\overline{\text{Alarm}}$ RS422 + Sense (T): A, B, N, \bar{A} , \bar{B} , \bar{N} , Sense Push-pull (K): A, B, N, $\overline{\text{Alarm}}$ Push-pull complementary (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , $\overline{\text{Alarm}}$
Pulse width error	± max. 25° electrical
Number of pulses	1 ... 5000
Pulse shape	Square wave
Pulse duty factor	1:1

¹ Pole protection with supply voltage DC 10 - 30 V

² Output description and technical data see chapter "Technical basics"

ELECTRICAL CONNECTIONS
Cable PVC

Connecting cable Colour	Lead Ø	Output RS422 T and R	push-pull K and I
red	0.5 mm ²	DC 5/10 - 30 V	DC 10 - 30 V
red/yellow	0.14 mm ²	Sense VCC	Sense VCC
white	0.14 mm ²	Channel A	Channel A
white	0.14 mm ²	Channel \bar{A}	Channel \bar{A} ¹
green/brown	0.14 mm ²	Channel B	Channel B
green/brown	0.14 mm ²	Channel \bar{B}	Channel \bar{B} ¹
yellow	0.14 mm ²	Channel N	Channel N
yellow/brown	0.14 mm ²	Channel \bar{N}	Channel \bar{N} ¹
black	0.5 mm ²	GND	GND
black/yellow	0.14 mm ²	$\overline{\text{Alarm}}$ /Sense GND ²	$\overline{\text{Alarm}}$
screen ³		screen ³	screen ³

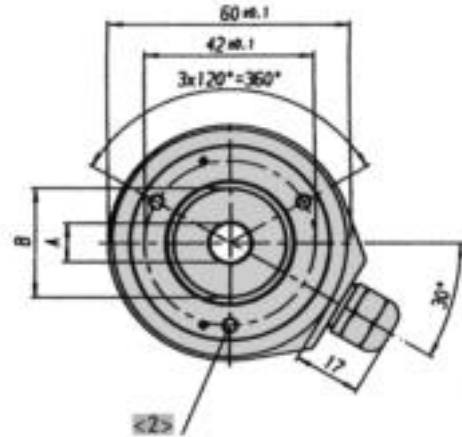
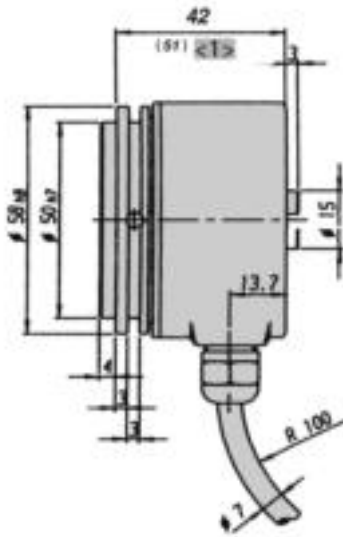
¹ only push-pull complementary (I)

² depending on ordering code

³ connected with encoder housing

DIMENSIONED DRAWINGS

Synchro flange



Required dimension of mounting shaft (g8)	Hollow shaft Ø (A)	B	Unit
-0.005 ... -0.027	10 *	28	mm
-0.006 ... -0.033	12 *	33	mm
* Tolerance H7 = 0 ... +0.018 mm			

<1> value in brackets with version DC 10 - 30 V, RS422

<2> mounting thread M4x5

Cable bending radius R for flexible installation ≥ 100 mm

Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ^{1,2}	Flange, Protection, Shaft	Output	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RI58-H	1 ... 5000	A DC 5 V E DC 10 - 30 V	S.42 Synchro, IP64, 10 mm S.47 Synchro, IP64, 12 mm	R RS422 +Alarm T RS422 +Sense K Push-pull I Push-pull complementary	B PVC cable, radial

¹ DC 5 V: only with output "T", "R" available

² DC 10 - 30 V: only with output "K", "I", "R" available

Incremental**Hollow Shaft****ORDERING INFORMATION****Selection of cable length**

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

see chapter "Accessories", starting page 322

Standard Industrial Types RI 58-D / RI 58TD

Incremental

Hollow Shaft



Clamping shaft



Blind shaft

- Direct mounting without coupling
- Flexible hollow shaft design up to diameter 14 mm
- Through hollow shaft or as end shaft (blind shaft)
- Easy installation by means of clamping shaft or blind shaft
- Short overall length of 33 mm
- Fixing of flange by means of a stator coupling or set screw
- Various shaft versions
- Applications: actuators, motors
- Operating temperature up to 100 °C (RI 58TD)



NUMBER OF PULSES

RI 58-D

1 / 2 / 3 / 4 / 5 / 10 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 60 / 64 / 70 / 72 / 80 / **100** / 125 / 128 / 144 / 150 / 180 / 200 / **250** / 256 / 300 / 314 / 350 / 360 / 375 / 400 / 460 / 480 / **500** / 512 / 600 / 625 / 720 / 900 / **1000** / **1024** / **1250** / 1500 / 1600 / 1800 / 2000 / 2048 / **2500** / 3000 / 3480 / **3600** / 4000 / **4096** / **5000**

Other number of pulses on request

Preferably available versions are printed in bold type.

RI 58TD

4 / 5 / 10 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 60 / 64 / 70 / 72 / 80 / **100** / 125 / 128 / 144 / 150 / 180 / 200 / **250** / 256 / 300 / 314 / 350 / 360 / 375 / 400 / 460 / 480 / **500** / 512 / 600 / 625 / 720 / 900 / **1000** / **1024** / **1250** / 1500 / 1600 / 1800 / 2000 / 2048 / **2500**

Other number of pulses on request

Preferably available versions are printed in bold type.

TECHNICAL DATA mechanical

Housing diameter	58 mm
Shaft diameter ¹	10 mm / 12 mm (Through hollow shaft) 10 mm / 12 mm / 14 mm (Hubshaft)
Flange (Mounting of housing)	Synchro flange
Mounting of shaft	RI 58-D: Front clamping ring, Center bolt RI 58TD: Front clamping ring, Rear clamping ring, Center bolt
Protection class shaft input (EN 60529)	IP64
Protection class housing (EN 60529)	Through hollow shaft - D: IP64 Hubshaft - E,F: IP65
Shaft tolerance	Ø 10 mm, tolerance g8 (-0.005 ... -0.027 mm), Ø 12/ 14 mm, tolerance g8 (-0.006 ... -0.033 mm)
Max. speed	Hub shaft - E,F: max. 6000 rpm Through hollow shaft - D: max. 4000 rpm

Standard Industrial Types RI 58-D / RI 58TD

Incremental

Hollow Shaft

TECHNICAL DATA mechanical (continued)

Torque	≤ 1 Ncm (Hub shaft - E,F) ≤ 2 Ncm (Through hollow shaft - D)
Moment of inertia	approx. 35 gcm ² (Hub shaft with clamping ring front - F) approx. 20 gcm ² (Hub shaft, mounting with set screw - E) approx. 60 gcm ² (Through hollow shaft with clamping ring front - D)
Vibration resistance (DIN EN 60068-2-6)	10 g = 100 m/s ² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	100 g = 1000 m/s ² (6 ms)
Operating temperature	RI 58-D: -10 °C ... +70 °C RI 58TD: -25 °C ... +100 °C
Storage temperature	-25 °C ... +85 °C
Material housing	Aluminum
Weight	approx. 170 g with hubshaft (E,F), approx. 190 g with through hollow shaft (D)
Connection ²	Cable, axial or radial M23 connector (Conin), radial

¹ Other shaft diameters on request

² Standard cable length: 1.5 m cable, other cable length on request (only RI 58TD)

TECHNICAL DATA electrical

General design	as per DIN VDE 0160, protection class III, contamination level 2, overvoltage class II
Supply voltage ¹	RS422 + Sense (T): DC 5 V ±10 % RS422 + Alarm (R): ± 10% DC 5 V or DC 10 - 30 V Push-pull (K), Push-pull antivalent (I): DC 10-30 V
Max. current w/o load	40 mA (DC 5 V), 60 mA (DC 10 V), 30 mA (DC 24 V)
Max. pulse frequency	RS422: 300 kHz Push-pull: 200 kHz
Standard output versions ²	RS422 + Alarm (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , \overline{Alarm} RS422 + Sense (T): A, B, N, \bar{A} , \bar{B} , \bar{N} , Sense Push-pull (K): A, B, N, \overline{Alarm} Push-pull complementary (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , \overline{Alarm}
Pulse width error	± max. 25° electrical
Number of pulses	1 ... 5000
Alarm output	NPN-O.C., max. 5 mA
Pulse shape	Square wave
Pulse duty factor	1:1

¹ With push-pull (K): pole protection

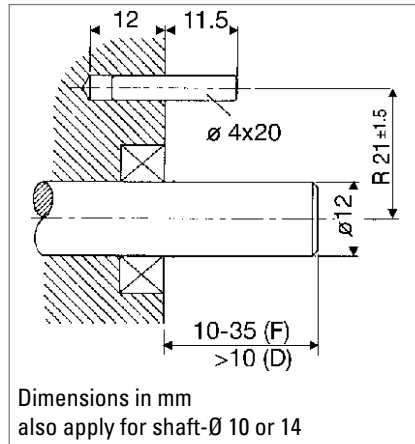
² Output description and technical data see chapter "Technical basics"

Incremental

Hollow Shaft

MOUNTING NECESSITIES

In order to be able to compensate an axial and radial misalignment of the shaft, the encoder flange must not be fixed rigidly. Fix the flanges by means of a stator coupling (e.g. hubshaft with tether) as torque support (see "Accessories") or by means of a cylindrical pin:



Mounting = D, F (Clamping ring)

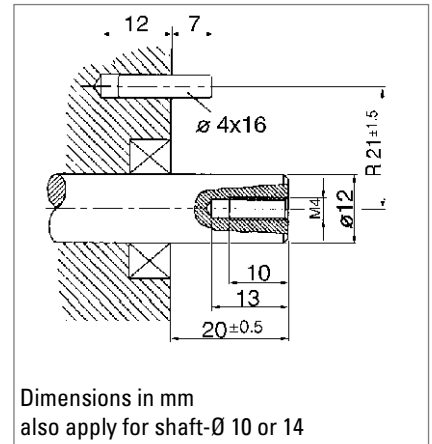
Preparation of the machine flange ¹

(all mounting versions):

In the machine flange a straight pin must be installed (diameter 4x16 resp. 4x20, DIN 6325).

This pin is required as a torque support.

¹ Or as an option: stator coupling as torque support



Mounting = E (mounting with center screw)

Preparation of the drive shaft

(only in mounting = E):

The drive shaft must be provided with a threaded bore M 4 x 10:

This bore accepts the fastening screw of the shaft encoder.

ELECTRICAL CONNECTIONS

Cable PVC

Cable PVC Colour	Output circuit			
	RS422 + Sense (T)	RS422 + Alarm (R)	push-pull (K)	push-pull complementary (I)
white	Channel A	Channel A	Channel A	Channel A
white/brown	Channel \bar{A}	Channel \bar{A}		Channel \bar{A}
green	Channel B	Channel B	Channel B	Channel B
green/brown	Channel \bar{B}	Channel \bar{B}		Channel \bar{B}
yellow	Channel N	Channel N	Channel N	Channel N
yellow/brown	Channel \bar{N}	Channel \bar{N}		Channel \bar{N}
yellow/black	Sense GND	$\bar{A}larm$	$\bar{A}larm$	$\bar{A}larm$
yellow/red	Sense V_{CC}	Sense V_{CC}		Sense V_{CC}
red	DC 5 V	DC 5 / 10 - 30 V	DC 10 - 30 V	DC 10 - 30 V
black	GND	GND	GND	GND
Cable screen ¹	Cable screen ¹	Cable screen ¹	Cable screen ¹	Cable screen ¹

¹ connected with encoder housing

Incremental

Hollow Shaft

ELECTRICAL CONNECTIONS Cable TPE

Cable TPE Colour	Output circuit			
	RS422 + Sense (T)	RS422 + Alarm (R)	push-pull (K)	push-pull complementary (I)
brown	Channel A	Channel A	Channel A	Channel A
green	Channel \bar{A}	Channel \bar{A}		Channel \bar{A}
grey	Channel B	Channel B	Channel B	Channel B
pink	Channel \bar{B}	Channel \bar{B}		Channel \bar{B}
red	Channel N	Channel N	Channel N	Channel N
black	Channel \bar{N}	Channel \bar{N}		Channel \bar{N}
violet (white) ¹	Sense GND	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$
blue	Sense V _{CC}	Sense V _{CC}		Sense V _{CC}
brown/green	DC 5 V	DC 5 / 10 - 30 V	DC 10 - 30 V	DC 10 - 30 V
white/green	GND	GND	GND	GND
Cable screen ²	Cable screen ²	Cable screen ²	Cable screen ²	Cable screen ²

¹ white with RS422 + Sense (T)

² connected with encoder housing

ELECTRICAL CONNECTIONS M23 connector (Conin), 12 pole

Pin	RS422 + Sense (T)	RS422 + Alarm (R)	push-pull (K)	push-pull complementary (I)
1	Channel \bar{B}	Channel \bar{B}	N.C.	Channel \bar{B}
2	Sense V _{CC}	Sense V _{CC}	N.C.	Sense V _{CC}
3	Channel N	Channel N	Channel N	Channel N
4	Channel \bar{N}	Channel \bar{N}	N.C.	Channel \bar{N}
5	Channel A	Channel A	Channel A	Channel A
6	Channel \bar{A}	Channel \bar{A}	N.C.	Channel \bar{A}
7	N.C.	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$
8	Channel B	Channel B	Channel B	Channel B
9	N.C. ¹	N.C. ¹	N.C. ¹	N.C. ¹
10	GND	GND	GND	GND
11	Sense GND	N.C.	N.C.	N.C.
12	DC 5 V	DC 5/10 - 30 V	DC 10 - 30 V	DC 10 - 30 V

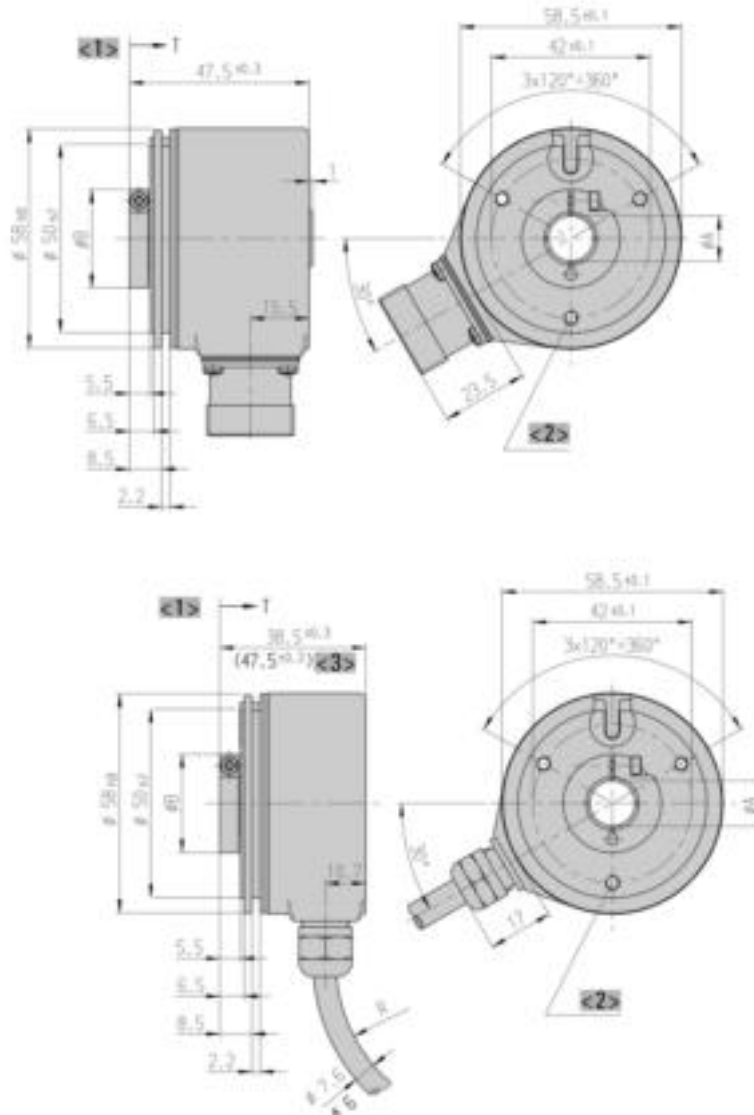
¹ screen for cable with CONIN connector

Standard Industrial Types RI 58-D / RI 58TD

Incremental Hollow Shaft

DIMENSIONED DRAWINGS

Mounting F: Hubshaft with clamping ring front



Dim.	Hollow shaft Ø			Unit
A	10 ^{H7}	12 ^{H7}	14 ^{H7}	mm
A*	10 ^{g8}	12 ^{g8}	14 ^{g8}	mm
B	26	28	30	mm
T	33.5	33.5	22.5	mm

A* = diameter of connection shaft

- <1> View turned 60°
 - <2> mounting thread M4x5
 - <3> value in brackets with version DC 10 - 30 V, RS422
- Cable bending radius R for flexible installation ≥ 100 mm
 Cable bending radius R for fixed installation ≥ 40 mm

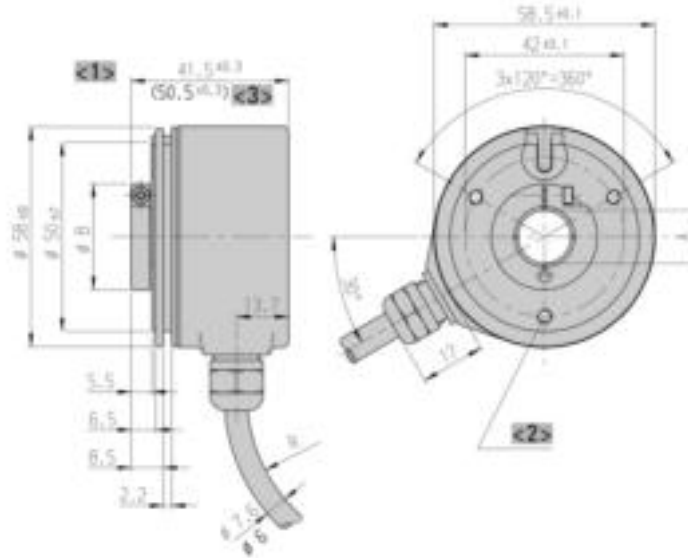
Dimensions in mm

Standard Industrial Types RI 58-D / RI 58TD

Incremental Hollow Shaft

DIMENSIONED DRAWINGS (continued)

Mounting D: Through hollow shaft with clamping ring front



Dim.	Hollow shaft \varnothing		Unit
A	10 ^{H7}	12 ^{H7}	mm
A*	10 ^{g8}	12 ^{g8}	mm
B	26	28	mm

A* = diameter of connection shaft

<1> View turned 60°

<2> mounting thread M4x5

<3> value in brackets with version DC 10 - 30 V, RS422

Cable bending radius R for flexible installation ≥ 100 mm

Cable bending radius R for fixed installation ≥ 40 mm

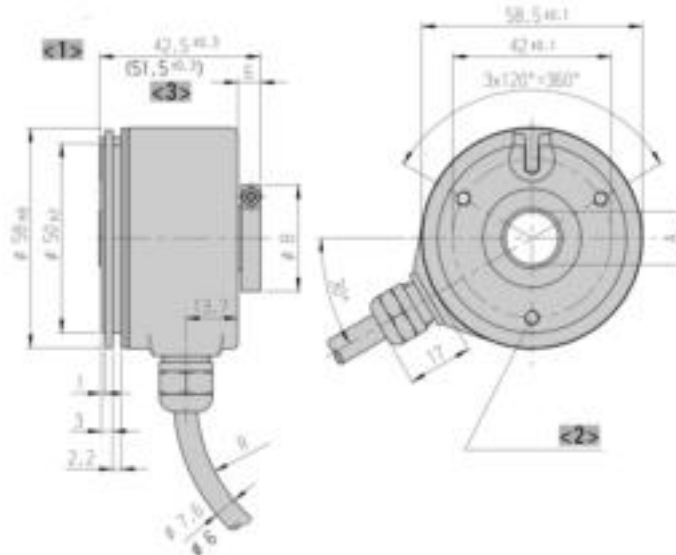
Dimensions in mm

Standard Industrial Types RI 58-D / RI 58TD

Incremental Hollow Shaft

DIMENSIONED DRAWINGS (continued)

Mounting H optional: Through hollow shaft with clamping ring rear on request



Dim.	Hollow shaft Ø		Unit
A	10 ^{H7}	12 ^{H7}	mm
A*	10 ^{g8}	12 ^{g8}	mm
B	26	28	mm
A* = diameter of connection shaft			

<1> View turned 60°

<2> mounting thread M4x5

<3> value in brackets with version DC 10 - 30 V, RS422

Cable bending radius R for flexible installation ≥ 100 mm

Cable bending radius R for fixed installation ≥ 40 mm

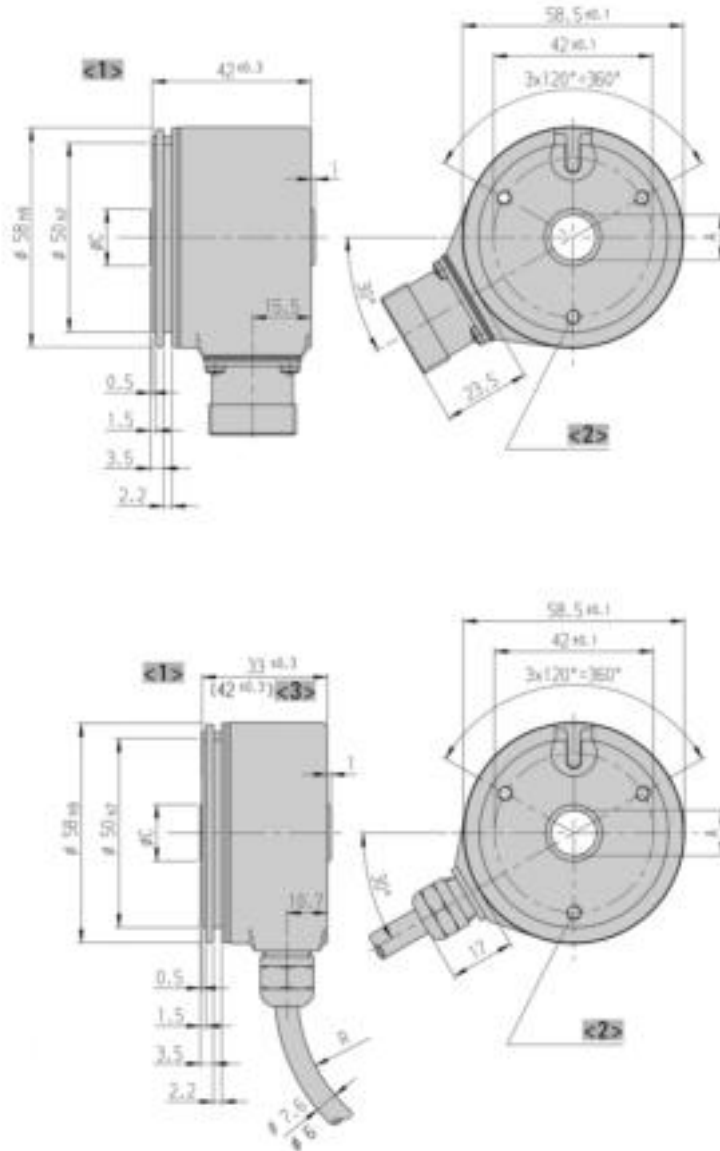
Dimensions in mm

Standard Industrial Types RI 58-D / RI 58TD

Incremental Hollow Shaft

DIMENSIONED DRAWINGS (continued)

Mounting E: Hubshaft, mounting with center screw



Dim.	Hollow shaft Ø			Unit
A	10 ^{H7}	12 ^{H7}	14 ^{H7}	mm
A*	10 ^{g8}	12 ^{g8}	14 ^{g8}	mm
C	15	15	17	mm
T	18±0.5	18±0.5	18±0.5	mm

A* = diameter of connection shaft
T = length of custom shaft in encoder

<1> View turned 60°
 <2> mounting thread M4x5
 <3> value in brackets with version DC 10 - 30 V, RS422
 Cable bending radius R for flexible installation ≥ 100 mm
 Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

Standard Industrial Types **RI 58-D / RI 58TD**

Incremental Hollow Shaft

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ^{1,2}	Flange, Protection, Shaft ^{3,4,5}	Output	Connection
□	□	□	□	□	□
RI58-D RI58TD	1 ... 5000	A DC 5 V E DC 10 - 30 V	D.32 Through hollow shaft with clamping ring front, IP64, 10 mm D.37 Through hollow shaft with clamping ring front, IP64, 12 mm E.42 Hubshaft, mounting with set screw, IP64, 10 mm E.47 Hubshaft, mounting with set screw, IP64, 12 mm E.49 Hubshaft, mounting with set screw, IP64, 14 mm F.42 Spring tether, IP64, hubshaft 10 mm, mounting with clamping ring front F.47 Spring tether, IP64, hubshaft 12 mm, mounting with clamping ring front F.49 Spring tether, IP64, hubshaft 14 mm, mounting with clamping ring front	R RS422 +Alarm T RS422 +Sense K Push-pull I Push-pull complementary	B PVC cable, radial F TPE cable, radial D M23 connector (Conin), 12 pole, radial, cw H M23 connector (Conin), 12 pole, radial, ccw

¹ DC 5 V: only with output "T", "R" available

² DC 10 - 30 V: only with output "K", "I", "R" available

³ Mounting (flange) code "D" only with connection code "B", "F" (cable)

⁴ Mounting (flange) code "E", "F" only with connection code "D", "H" (M23 connector)

⁵ IP67 on cover with connector only if IP67 mating connector mounted properly.

ORDERING INFORMATION

Selection of cable length

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

see chapter "Accessories", starting page 322

Standard Industrial Types RI 58-G / RI 58TG

Incremental

Hollow Shaft



- Direct mounting without coupling
- Through hollow shaft Ø 14 mm and 15 mm
- Easy installation by means of clamping ring
- Fixing of flange by means of a stator coupling or set screw
- Applications: actuators, motors



NUMBER OF PULSES	RI 58-G	50 / 360 / 500 / 1000 / 1024 / 2000 / 2048 / 2500 / 3600 / 4096 / 5000
NUMBER OF PULSES	RI 58TG	50 / 360 / 500 / 1000 / 1024 / 2000 / 2048 / 2500

TECHNICAL DATA mechanical

Housing diameter	58 mm
Shaft diameter	14 mm / 15 mm (Through hollow shaft)
Flange (Mounting of housing)	Synchro flange
Mounting of shaft	Front clamping ring, Rear clamping ring
Protection class shaft input (EN 60529)	IP64
Protection class housing (EN 60529)	IP64
Shaft tolerance	Ø 14/ 15 mm, tolerance g8
Max. speed	max. 4000 rpm
Torque	≤ 2 Ncm
Moment of inertia	approx. 60 gcm ²
Vibration resistance (DIN EN 60068-2-6)	10 g = 100 m/s ² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	100 g = 1000 m/s ² (6 ms)
Operating temperature	RI 58-G: -10 °C ... +70 °C RI 58TG: -10 °C ... +100 °C
Storage temperature	-25 °C ... +85 °C
Material housing	Aluminum
Weight	approx. 210 g
Connection	Cable, radial

TECHNICAL DATA electrical

General design	as per DIN VDE 0160, protection class III, contamination level 2, overvoltage class II
Supply voltage ¹	RS422 + Sense (T): DC 5 V ±10 % RS422 + Alarm (R): ± 10% DC 5 V or DC 10 - 30 V Push-pull (K), Push-pull antivalent (I): DC 10-30 V
Max. current w/o load	40 mA (DC 5 V), 60 mA (DC 10 V), 30 mA (DC 24 V)
Max. pulse frequency	RS422: 300 kHz Push-pull: 200 kHz
Standard output versions ²	RS422 + Alarm (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , $\overline{\text{Alarm}}$ RS422 + Sense (T): A, B, N, \bar{A} , \bar{B} , \bar{N} , Sense Push-pull (K): A, B, N, $\overline{\text{Alarm}}$ Push-pull complementary (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , $\overline{\text{Alarm}}$

Incremental

Hollow Shaft

TECHNICAL DATA electrical (continued)

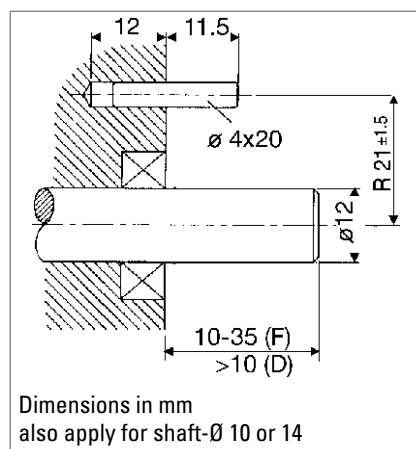
Pulse width error	± max. 25° electrical
Number of pulses	50 ... 2500
Alarm output	NPN-O.C., max. 5 mA
Pulse shape	Square wave
Pulse duty factor	1:1

¹ With push-pull (K): pole protection

² Output description and technical data see chapter "Technical basics"

MOUNTING NECESSITIES

In order to be able to compensate an axial and radial misalignment of the shaft, the encoder flange must not be fixed rigidly. Fix the flanges by means of a stator coupling (e.g. hubshaft with tether) as torque support (see "Accessories") or by means of a cylindrical pin:



Mounting = D, F (Clamping ring)

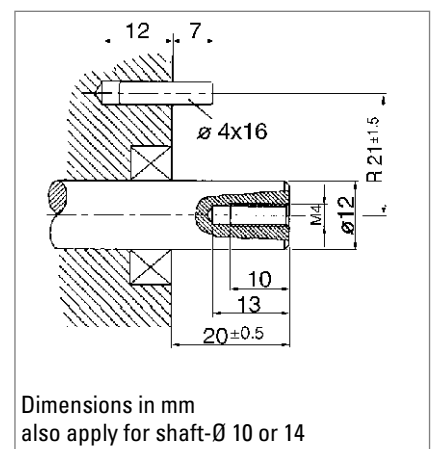
Preparation of the machine flange ¹

(all mounting versions):

In the machine flange a straight pin must be installed (diameter 4x16 resp. 4x20, DIN 6325).

This pin is required as a torque support.

¹ Or as an option: stator coupling as torque support



Mounting = E (mounting with center screw)

Preparation of the drive shaft

(only in mounting = E):

The drive shaft must be provided with a threaded bore M 4 x10:

This bore accepts the fastening screw of the shaft encoder.

Incremental

Hollow Shaft

ELECTRICAL CONNECTIONS

Cable PVC

Cable PVC Colour	Output circuit			
	RS422 + Sense (T)	RS422 + Alarm (R)	push-pull (K)	push-pull complementary (I)
white	Channel A	Channel A	Channel A	Channel A
white/brown	Channel \bar{A}	Channel \bar{A}		Channel \bar{A}
green	Channel B	Channel B	Channel B	Channel B
green/brown	Channel \bar{B}	Channel \bar{B}		Channel \bar{B}
yellow	Channel N	Channel N	Channel N	Channel N
yellow/brown	Channel \bar{N}	Channel \bar{N}		Channel \bar{N}
yellow/black	Sense GND	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$
yellow/red	Sense V _{CC}	Sense V _{CC}		Sense V _{CC}
red	DC 5 V	DC 5 / 10 - 30 V	DC 10 - 30 V	DC 10 - 30 V
black	GND	GND	GND	GND
Cable screen ¹	Cable screen ¹	Cable screen ¹	Cable screen ¹	Cable screen ¹

¹ connected with encoder housing

ELECTRICAL CONNECTIONS

Cable TPE

Cable TPE Colour	Output circuit			
	RS422 + Sense (T)	RS422 + Alarm (R)	push-pull (K)	push-pull complementary (I)
brown	Channel A	Channel A	Channel A	Channel A
green	Channel \bar{A}	Channel \bar{A}		Channel \bar{A}
grey	Channel B	Channel B	Channel B	Channel B
pink	Channel \bar{B}	Channel \bar{B}		Channel \bar{B}
red	Channel N	Channel N	Channel N	Channel N
black	Channel \bar{N}	Channel \bar{N}		Channel \bar{N}
violet (white) ¹	Sense GND	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$	$\bar{\text{Alarm}}$
blue	Sense V _{CC}	Sense V _{CC}		Sense V _{CC}
brown/green	DC 5 V	DC 5 / 10 - 30 V	DC 10 - 30 V	DC 10 - 30 V
white/green	GND	GND	GND	GND
Cable screen ²	Cable screen ²	Cable screen ²	Cable screen ²	Cable screen ²

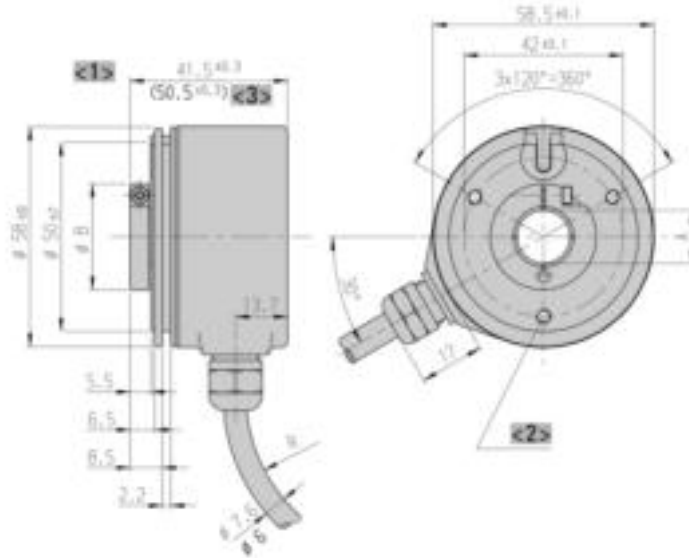
¹ white with RS422 + Sense (T)

² connected with encoder housing

Standard Industrial Types RI 58-G / RI 58TG Incremental Hollow Shaft

DIMENSIONED DRAWINGS

Mounting D: Through hollow shaft with clamping ring front



Dim.	Hollow shaft Ø		Unit
A	14 ^{H7}	15 ^{H7}	mm
A*	14 ^{g8}	15 ^{g8}	mm
B	30	30	mm

A* = diameter of connection shaft

- <1> View turned 60°
 - <2> mounting thread M4x5
 - <3> value in brackets with version DC 10 - 30 V, RS422
- Cable bending radius R for flexible installation ≥ 100 mm
Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

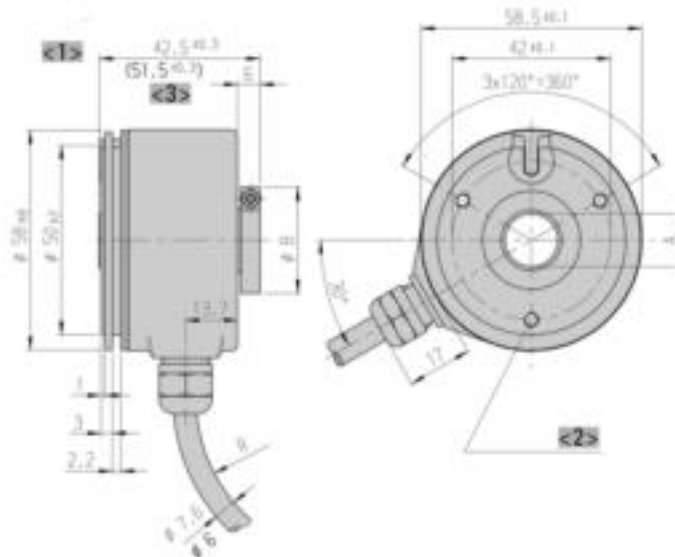
Standard Industrial Types RI 58-G / RI 58TG

Incremental

Hollow Shaft

DIMENSIONED DRAWINGS (continued)

Mounting H optional: Through hollow shaft with clamping ring rear on request



Dim.	Hollow shaft Ø		Unit
A	14 ^{H7}	15 ^{H7}	mm
A*	14 ^{g8}	15 ^{g8}	mm
B	30	30	mm

A* = diameter of connection shaft

<1> View turned 60°

<2> mounting thread M4x5

<3> value in brackets with version DC 10 - 30 V, RS422

Cable bending radius R for flexible installation ≥ 100 mm

Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ^{1,2}	Flange, Protection, Shaft ³	Output	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RI58-G RI58TG	RI 58-G: 50 ... 2500 RI 58TG: 50 ... 5000	A DC 5 V E DC 10 - 30 V	D.39 Through hollow shaft with clamping ring front, IP64, 14 mm D.3D Through hollow shaft with clamping ring front, IP64, 15 mm H.39 Through hollow shaft with clamping ring rear, IP64, 14 mm H.3D Through hollow shaft with clamping ring rear, IP64, 15 mm	R RS422 +Alarm (RI 58-G) T RS422 +Sense K Push-pull I Push-pull complementary R RS422 +Alarm +Sense (RI 58TG)	B PVC cable, radial F TPE cable, radial D M23 connector (Conin), 12 pole, radial, cw (RI 58-G) H M23 connector (Conin), 12 pole, radial, ccw (RI 58-G)

¹ DC 5 V: only with output "T", "R" available

² DC 10 - 30 V: only with output "K", "I", "R" available

³ IP67 on cover with connector only if IP67 mating connector mounted properly.

Incremental**Hollow Shaft****ORDERING INFORMATION**
Selection of cable length

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

Incremental

Hollow Shaft



NUMBER OF PULSES

- Incremental hollow shaft encoder
- Up to 10 000 ppr
- Through hollow shaft and hubshaft up to 12 mm (14 mm optional)
- Optimized stator coupling
- Applications: Feedback for asynchronous motors, industrial applications



1 / 2 / 3 / 4 / 10 / 20 / 25 / 30 / 40 / 45 / 50 / 60 / 64 / 70 / 72 / 80 / **100** / 125 / 128 / 144 / 150 / 180 / 200 / **250** / 256 / 300 / 314 / 350 / 360 / 375 / 400 / 460 / 480 / **500** / 512 / 600 / 625 / 720 / 900 / **1000** / **1024** / **1250** / 1500 / 1600 / 1800 / 2000 / 2048 / 2500 / 3000 / 3480 / **3600** / 4000 / **4096** / **5000** / **7854** / **10000**

Preferably available versions are printed in bold type.

TECHNICAL DATA mechanical

Housing diameter	58 mm
Shaft diameter	6 mm / 10 mm / 12 mm (Hubshaft) 6 mm / 10 mm / 12 mm (Through hollow shaft)
Flange (Mounting of housing)	Tether
Mounting of shaft	Set screw, Front clamping ring, Rear clamping ring, Clamping ring with set screw
Protection class shaft input (EN 60529)	IP64
Protection class housing (EN 60529)	Through hollow shaft - D: IP64 Hubshaft - F: IP67
Axial endplay of mounting shaft (hubshaft)	± 1.5 mm
Radial runout of mating shaft (hubshaft)	± 0.2 mm
Max. speed	Hub shaft: max. 4000 rpm Through hollow shaft: max. 6000 rpm
Vibration resistance (DIN EN 60068-2-6)	100 m/s ²
Shock resistance (DIN EN 60068-2-27)	1000 m/s ²
Operating temperature	-10 °C ... +70 °C
Storage temperature	-25 °C ... +85 °C
Material shaft	Stainless Steel
Material housing	Aluminum
Weight	approx. 180 g
Connection	Cable, radial M23 connector (Conin), 12 pole, radial

TECHNICAL DATA electrical

General design	as per DIN VDE 0160, protection class III, contamination level 2, overvoltage class II
Supply voltage ¹	RS422 + Sense (T): DC 5 V ±10 % RS422 + Alarm (R): ± 10% DC 5 V or DC 10 - 30 V Push-pull (K), Push-pull antivalent (I): DC 10-30 V
Max. current w/o load	40 mA (DC 5 V), 60 mA (DC 10 V), 30 mA (DC 24 V)

Incremental

Hollow Shaft

TECHNICAL DATA electrical (continued)

Standard output versions ^{2,3}	RS422 + Alarm (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , \bar{Alarm} RS422 + Sense (T): A, B, N, \bar{A} , \bar{B} , \bar{N} , Sense Push-pull (K): A, B, N, \bar{Alarm} Push-pull complementary (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , \bar{Alarm}
Number of pulses	1 ... 10 000

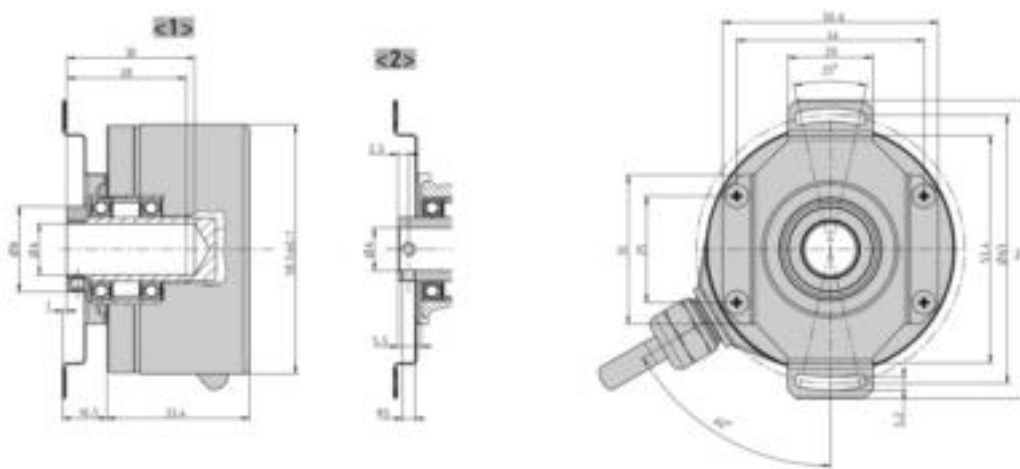
¹ Pole protection with supply voltage DC 10 - 30 V

² Output code "K" and "I": short-circuit-proof

³ Output description and technical data see chapter "Technical basics"

DIMENSIONED DRAWINGS

Hubshaft



Dim.	Hollow shaft \emptyset		Unit
A	10 ^{-0.002/+0.008}	12 ^{-0.002/+0.008}	mm
A*	10 _{g7}	12 _{g7}	mm
B		20	mm
L _{min}	15.5	17.5	mm
L _{max}	28	28	mm
A* = diameter of connection shaft			
L = length of connection shaft			

<1> $\emptyset A > 10$ mm

<2> $\emptyset A \leq 10$ mm

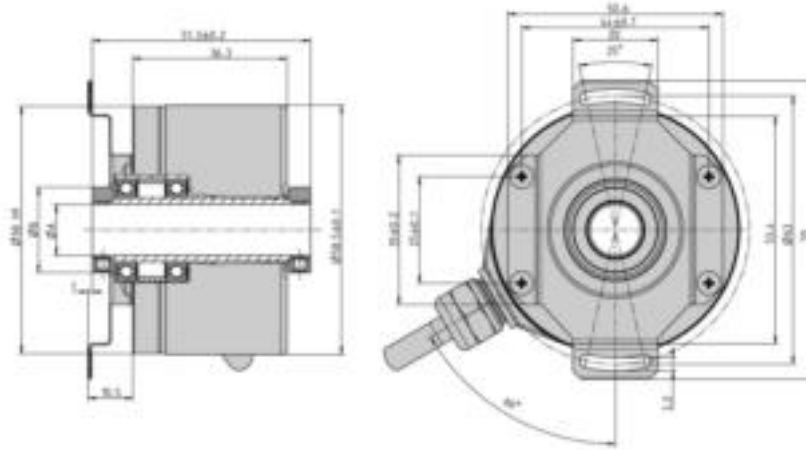
Cable bending radius R for flexible installation ≥ 100 mm

Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

DIMENSIONED DRAWINGS (continued)

Through hollow shaft



Dim.	Hollow shaft Ø		Unit
A	10 ^{+0.012}	12 ^{+0.012}	mm
A*	10 _{g7}	12 _{g7}	mm
B	18	20	mm

A* = diameter of connection shaft

Cable bending radius R for flexible installation ≥ 100 mm
 Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ^{1,2}	Flange, Protection, Shaft ⁴	Output	Connection ³
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RI58-F	1 ... 10000	A DC 5 V E DC 10 - 30 V	B.32 Spring tether, IP64, through hollow shaft, 10 mm, mounting with clamping ring front and rear B.37 Spring tether, IP64, through hollow shaft, 12 mm, mounting with clamping ring front and rear F.41 Spring tether, IP64, hubshaft 6 mm, mounting with set screw F.42 Spring tether, IP64, hubshaft 10 mm, mounting with set screw F.47 Spring tether, IP64, hubshaft 12 mm, mounting with ring with clamping set screw	R RS422 +Alarm T RS422 +Sense K HTL I HTL complementary	B PVC cable, radial F TPE cable, radial D M23 connector (Conin), 12 pole, radial, cw H M23 connector (Conin), 12 pole, radial, ccw

¹ DC 5 V only with output T, R, K

² DC 10 - 30 V only with output K, I

³ Connection code "D", "H" (M23 connector) only with hubshaft

⁴ IP67 on cover with connector only if IP67 mating connector mounted properly.

Incremental**Hollow Shaft****ORDERING INFORMATION**
Selection of cable length

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

see chapter "Accessories", starting page 322

Incremental

Hollow Shaft



NUMBER OF PULSES

- Through hollow shaft \varnothing 15 bis 42 mm
- Outside diameter only 76 mm
- Easy installation by means of clamping ring front or rear
- Operating temperature up to 100 °C
- Applications: motors, printing machines, lifts



50 / 100 / 128 / 250 / 256 / 300 / 314 / 360 / 500 / 600 / 720 / 900 / 1000 / 1024 / 1250 / 1500 / 2048 / 2500 / 3072 / 4096 / 5000 / 9000 / 10000

Other number of pulses on request

TECHNICAL DATA
mechanical

Housing diameter	76 mm
Shaft diameter	15 mm / 16 mm / 18 mm / 20 mm / 24 mm / 25 mm / 27 mm / 28 mm / 30 mm / 32 mm / 38 mm / 40 mm (Hub shaft)
Flange (Mounting of housing)	Tether
Mounting of shaft	Front clamping ring, Rear clamping ring
Protection class shaft input (EN 60529)	IP40 or IP64
Protection class housing (EN 60529)	IP50 (IP65 optional)
Minimum length of mounting shaft clamping ring front	32 mm with \varnothing 15 ... 30, 35 mm with \varnothing >30 ... 42
Minimum length of mounting shaft clamping ring rear	corresponding to total length of encoder
Axial endplay of mounting shaft (hubshaft)	With stator coupling A (flexible): \pm 2 mm With 1x stator coupling (torsionally rigid): \pm 0.5 mm With 2x stator coupling (torsionally rigid): \pm 0.3 mm
Radial runout of mating shaft (hubshaft)	With stator coupling A (flexible): \pm 0.15 mm With 1x stator coupling (torsionally rigid): \pm 0.3 mm With 2x stator coupling (torsionally rigid): \pm 0.2 mm
Max. speed	for \varnothing 15 ... 25 mm at 70 °C and IP64: max. 3600 rpm for \varnothing >25 ... 42 mm bei 70 °C and IP64: max. 1800 rpm for \varnothing 15 ... 42 mm at 70 °C and IP40: max. 6000 rpm for \varnothing 15 ... 42 mm at 100 °C always: max. 1800 rpm
Torque	3 ... 10 Ncm (depending on version)
Moment of inertia	approx. 140 ... 420 gcm ² (depending on version)
Vibration resistance (DIN EN 60068-2-6)	10 g = 100 m/s ² (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	100 g = 1000 m/s ² (6 ms)
Operating temperature	-25 °C ... +100 °C
Storage temperature	-25 °C ... +100 °C
Material housing	Aluminum
Weight	approx. 320 ... 580 g (depending on version)
Connection	Cable, radial

TECHNICAL DATA
electrical

General design	as per DIN EN 61010-1, protection class III, contamination level 2, overvoltage class II
----------------	--

Incremental

Hollow Shaft

TECHNICAL DATA electrical (continued)

Supply voltage ¹	RS422 + Sense (T): DC 5 V ±10 % RS422 + Alarm (R): ± 10% DC 5 V or DC 10 - 30 V Push-pull (K), Push-pull antivalent (I): DC 10-30 V
Max. current w/o load	60 mA (DC 5 V), 60 mA (DC 10 V), 35 mA (DC 24 V)
Max. pulse frequency	RS422: 300 kHz Push-pull: 200 kHz
Standard output versions ²	RS422 + Alarm (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , \overline{Alarm} RS422 + Sense (T): A, B, N, \bar{A} , \bar{B} , \bar{N} , Sense Push-pull (K): A, B, N, \overline{Alarm} Push-pull complementary (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , \overline{Alarm}
Pulse width error	± max. 25° electrical
Number of pulses	1 ... 10 000
Alarm output	NPN-O.C., max. 5 mA
Pulse shape	Square wave
Pulse duty factor	1:1

¹ Pole protection with supply voltage DC 10 - 30 V

² Output description and technical data see chapter "Technical basics"

SHAFT CONNECTION

Shaft fixing is done through a clamping ring either on the flange or cap side. As a rule, flange side clamping is better for smaller motors as the available shaft stub is correspondingly shorter.

On the other hand, cap side clamping is easier when there is sufficient shaft length available.

MOUNTING NECESSITIES

In order to compensate for axial and radial shaft eccentricity as well as any angle offset, the encoder flange must not be rigidly mounted. Please mount the flange with a flexible stator coupling (e.g. hubshaft with tether) as torque support

There are two flexible mounting plates:

- A flexible hubshaft with tether (A) for higher levels of play and lower requirements for accuracy.
- A rigid hubshaft with tether (N) for reduced play and rigid connection with reduced swing angle. This is suitable in the case of higher accuracy and dynamics requirements.

ELECTRICAL CONNECTIONS Cable TPE

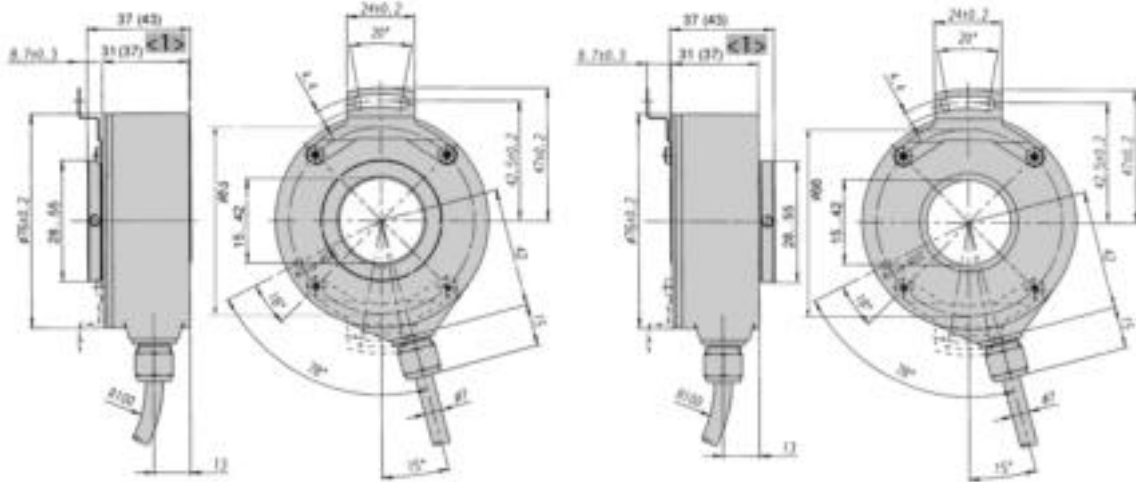
Colour (TPE)	Output circuit			
	RS422 + Sense (T)	RS422 + Alarm (R)	push-pull (K)	push-pull complementary (I)
brown	Channel A	Channel A	Channel A	Channel A
green	Channel \bar{A}		Channel \bar{A}	Channel \bar{A}
grey	Channel B	Channel B	Channel B	Channel B
pink	Channel \bar{B}	Channel \bar{B}		Channel \bar{B}
red	Channel N	Channel N	Channel N	Channel N
black	Channel \bar{N}	Channel \bar{N}		Channel \bar{N}
violet (white) ¹	Sense GND	\overline{Alarm}	\overline{Alarm}	\overline{Alarm}
blue	Sense V _{CC}	Sense V _{CC}		Sense V _{CC}
brown/green	DC 5 V	DC 5/10 - 30 V	DC 10 - 30 V	DC 10 - 30 V
white/green	GND	GND	GND	GND
Cable screen ²	Cable screen ²	Cable screen ²	Cable screen ²	Cable screen ²

¹ white for version Sense (T)

² connected with encoder housing

DIMENSIONED DRAWINGS

With hubshaft with tether "rigid"

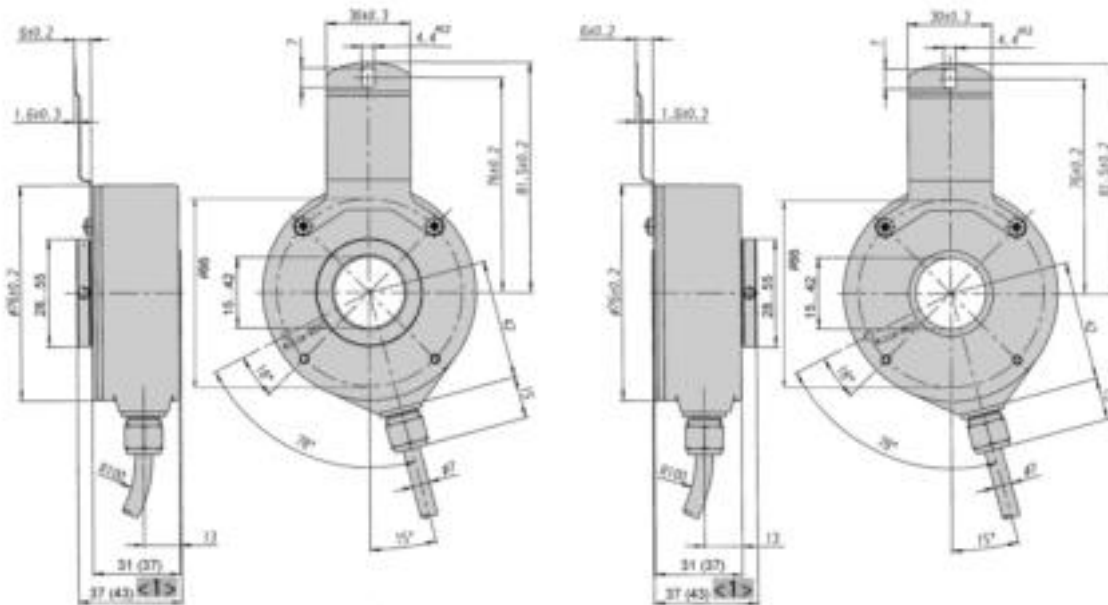


<1> Values in brackets for shaft diameter > 30, diameter of connection shaft 15⁹⁸ ... 42⁹⁸

Cable bending radius R for flexible installation ≥ 100 mm
Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

With hubshaft with tether "flexible"



<1> Values in brackets for shaft diameter > 30, diameter of connection shaft 15⁹⁸ ... 42⁹⁸

Cable bending radius R for flexible installation ≥ 100 mm
Cable bending radius R for fixed installation ≥ 40 mm

Dimensions in mm

ORDERING INFORMATION

Type	Number of pulses	Supply voltage ^{1,2}	Shaft	Protection	Spring tether	Shaft Ø ^{3,4,5,6}	Output	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RI76TD	1 ... 10000	A DC 5 V E DC 10 - 30 V	D Clamping shaft with clamping ring front H Clamping shaft with clamping ring rear	1 IP40 4 IP64	O Without A Flexible N Rigid	15 ... 42 15 ... 42 mm 50 ... 99 50 ... 99 Zoll 50 = 5/8" 51 = 1 5/8" 52 = 3/4"	R RS422 +Alarm T RS422 +Sense K Push-pull I Push-pull complementary	F TPE cable, radial

¹ DC 5 V: only with output "T", "R" available

² DC 10 - 30 V: only with output "K", "I", "R" available

³ Available with front clamping ring and IP40: **15, 20, 24, 25, 27, 28, 30, 38, 40, 42, 50** (5/8"), **51** (1 5/8")

⁴ Available with front clamping ring and IP64: **15, 16, 18, 20, 24, 25, 27, 28, 30, 32, 38, 40, 42, 50** (5/8"), **51** (1 5/8"), **52** (3/4")

⁵ Available with rear clamping ring and IP40: **25, 28, 30, 32, 38, 40, 42**

⁶ Available with rear clamping ring and IP64: **20, 25, 30, 32, 38, 40, 42**

Preferably available versions are printed in bold type.

Others: please request delivery time

ORDERING INFORMATION

Selection of cable length

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

see chapter "Accessories", starting page 322

Incremental

Hollow Shaft



- Incremental
- 30 - 45 mm hollow shaft
- Rugged mechanical design
- Unbreakable disc
- Integrated diagnostic system
- Wide voltage range DC 5 - 30 V
- Isolated shaft



NUMBER OF PULSES

1024 / 2048 / 2500 / 4096 / 5000 / 10000
Other number of pulses on request

GENERAL INFORMATION

The central element of the RI80-E is the latest Hengstler OptoAsic technology, which offers the following key benefits:

- Highest EMC immunity
- Outstanding reliability by reduced number of components and integrated diagnostics system
- Aging compensation by integrated LED light regulation
- Integrated monitoring of pollution, disk damage, LED lifetime, temperature

A robust and generously dimensioned mechanical design ensures long maintenance free operation.

The RI80-E is ideally suited for applications like:

- Geared Elevators
- Asynchronous Motors
- Industrial Machinery

TECHNICAL DATA
mechanical

Housing diameter	100 mm
Shaft diameter	30 mm / 45 mm (Through hollow shaft)
Flange (Mounting of housing)	Tether
Mounting of shaft	Keyway, Set screw
Protection class shaft input (EN 60529)	IP50 or IP64
Protection class housing (EN 60529)	IP50 or IP64
Axial endplay of mounting shaft (hubshaft)	± 0.5 mm
Radial runout of mating shaft (hubshaft)	± 0.05 mm
Max. speed	IP50: max. 3600 rpm IP64: max. 1500 rpm
Operating temperature	-25 °C ... +85 °C
Storage temperature	-40 °C ... +70 °C
Material shaft	Aluminum, ceramic coating
Material housing	Aluminum / glass fiber-reinforced plastic
Weight	670 g
Connection	Sub-D connector Cable, radial

Incremental

Hollow Shaft

TECHNICAL DATA electrical

General design	as per DIN EN 61010-1, protection class III, contamination level 2, overvoltage class II
Supply voltage ¹	DC 5 V ±10 % or DC 5 - 30 V
Max. current w/o load	60 mA (DC 5 V), 60 mA (DC 10 V), 35 mA (DC 24 V)
Max. pulse frequency	RS422: 600 kHz Push-pull: 200 kHz
Standard output versions ²	RS422 (R): A, B, N, \bar{A} , \bar{B} , \bar{N} , $\overline{\text{Alarm}}$, Sense Push-pull (K): A, B, N, $\overline{\text{Alarm}}$ Push-pull complementary (I): A, B, N, \bar{A} , \bar{B} , \bar{N} , $\overline{\text{Alarm}}$
Pulse width error	± max. 25° electrical
Number of pulses	1024, 2048, 2500, 4096, 5000, 10 000, (other number of pulses on request)
Alarm output	NPN-O.C., max. 5 mA
Pulse shape	Square wave
Pulse duty factor	1:1

¹ Pole protection with supply voltage DC 5 - 30 V

² Output description and technical data see chapter "Technical basics"

ELECTRICAL CONNECTIONS Cable TPE

Color	RS422 + Alarm + Sense (R)	Push-pull (K)	Push-pull Complement. (I)
brown	Channel A	Channel A	Channel A
green	Channel \bar{A}		Channel \bar{A}
gray	Channel B	Channel B	Channel B
pink	Channel \bar{B}		Channel \bar{B}
red	Channel N	Channel N	Channel N
black	Channel \bar{N}		Channel \bar{N}
violet	$\overline{\text{Alarm}}$	$\overline{\text{Alarm}}$	$\overline{\text{Alarm}}$
white	Sense GND		Sense GND
blue	Sense V _{cc}		Sense V _{cc}
brown/green	DC 5 - 30 V	DC 5 - 30 V	DC 5 - 30 V
white/green	GND	GND	GND
screen ¹	screen ¹	screen ¹	screen ¹

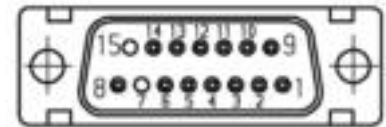
¹ connected with encoder housing

Incremental

Hollow Shaft

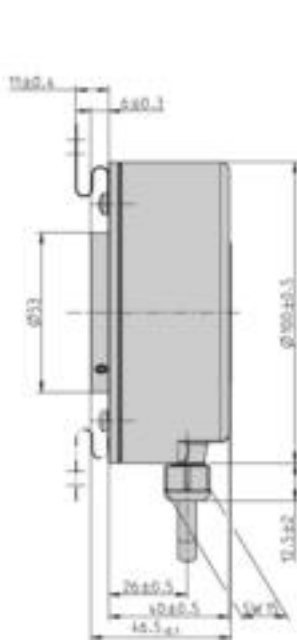
ELECTRICAL CONNECTIONS
Sub-D connector, 15 pole/ 9 pole

Pin	Signal 15 pole	Signal 9 pole
1	\bar{B}	GND
2	B	+Ub
3	\bar{A}	A
4	A	B
5	GND	N
6	+Ub	\bar{A}
7	n.c.	\bar{B}
8	screen	\bar{N}
9	\bar{N}	
10	N	
11	n.c.	
12	n.c.	
13	n.c.	
14	n.c.	
15	n.c.	

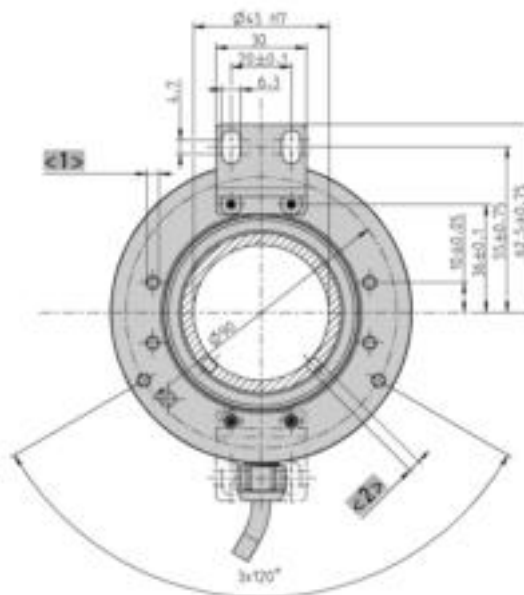


DIMENSIONED DRAWINGS

Set screw



<1> M4 (depth 6)

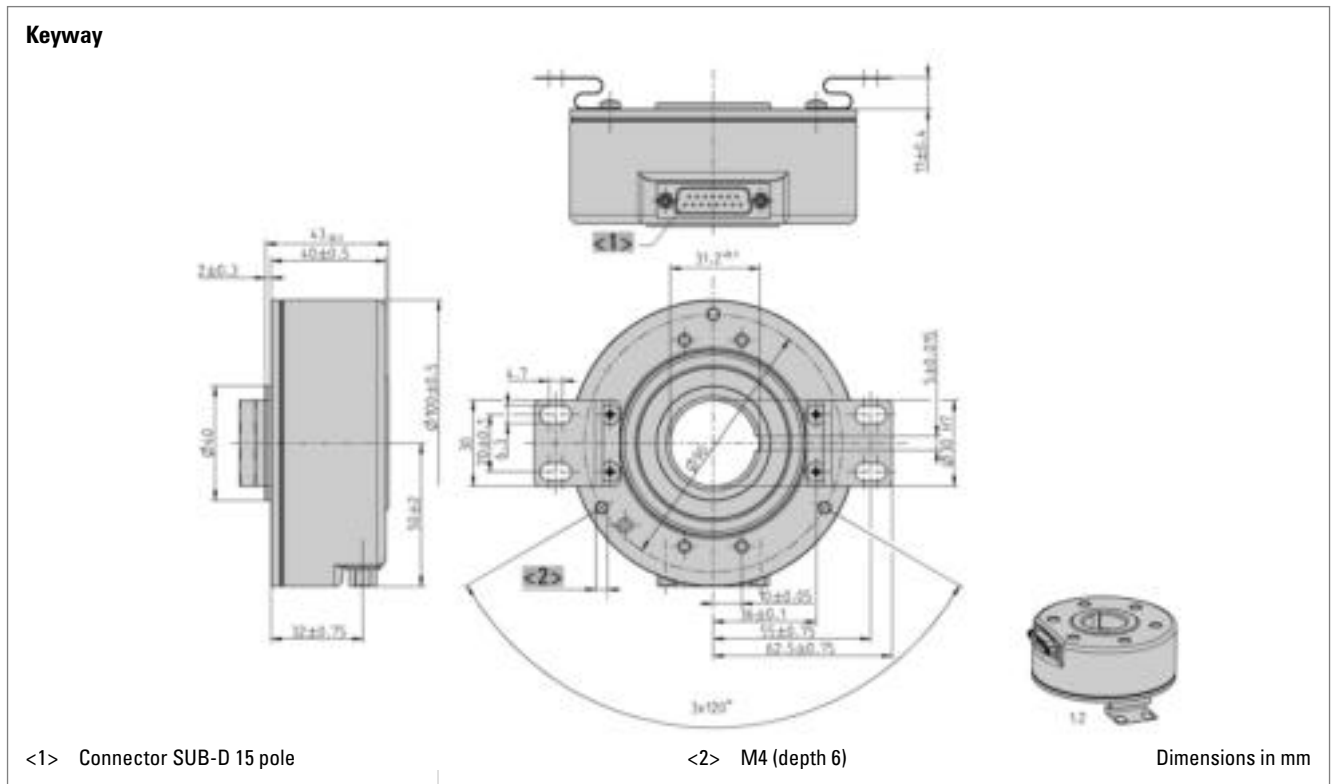


<2> M4 (2 x 90°)



Dimensions in mm

DIMENSIONED DRAWINGS (continued)



ORDERING INFORMATION

Type	Number of pulses ²	Supply voltage	Spring tether	Protection	Shaft	Output ¹	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RI80-E	1024 2048 2500 4096 10000 5000	A DC 5 V B DC 5 - 30 V	O Without tether A Spring tether single B Spring tether double C RI76 compatible (A)	0 IP40 1 IP50 4 IP64	G30 Set screw / 30 mm G38 Set screw / 38 mm G40 Set screw / 40 mm G45 Set screw / 45 mm K30 Keyway / 30 mm 1" isolated on request	R RS422 +Alarm +Sense K HTL I HTL complementary	F TPE cable, radial E-I M23 connector (Conin) at 1 m TPE cable, cw E-D M23 connector (Conin) at 1 m TPE cable, ccw 3 Sub-D connector, 9 pole 4 Sub-D connector, 15 pole

¹ Output code "K" and "I": Driver type DL, see < www.ichaus.de >

² Other number of pulses on request

Incremental**Hollow Shaft****ORDERING INFORMATION****Selection of cable length**

Versions with cable outlet (connection A, B, E or F) are available with various lengths of cable. To order your desired cable length, please add the respective code to the end of your ordering code. Further cable lengths on request.

Code	Cable length
without code	1.5 m
-D0	3 m
-F0	5 m
-K0	10 m
-P0	15 m
-U0	20 m
-V0	25 m

ACCESSORIES

see chapter "Accessories", starting page 322