| DHM5 - DHK5 - DHO5

INCREMENTAL IO-LINK ENCODERS

Introduction

Built from a solid and reliable mechanical and electrical platform, this product series was built from the ground up for reliability and robustness. Electrical protection is built in to reduce "first installation" errors. Mechanically, the high precision sealed bearings mean long life, even in harsh conditions. And the product is tested and rated to perform from -40 to +85°C. This is the best all around encoder in a 58mm package for heavy duty industrial use.

Features

- Incremental encoder with IO-link programmable parameters
- IO-Link COM3 with minimal cycle time of 1ms
- Absolute position available via IO-link
- Easy programming with standard IO-Link tool
- Simple device replacement with Data Storage capability
- Universal Electronic Circuits from 4.75 to 30 Vdc
- Robust and excellent resistance to shock and vibration
- High protection level IP65, IP67 option with a sealing flange
- Operating temperature range from -40°C to 85°C
- Standard M12 connector available

Applications

- Factory automation
- Motor feedback
- Conveyors
- Automated warehousing
- General industrial system monitoring and feedback

SPECIFICATIONS

Mechanical

		DHM5	DHK5	DHO5
Material		**Cover**: Zinc Alloy **Body:** Aluminium **Shaft:** Stainless Steel		
Bearings		6000 Series	6803 Series	
Maximum Loads	**Axial**	50 N	20 N	
	Radial	100 N	50 N	
Shaft inertia		$2,5.10^{-6}$ kg.m^2 (10mm)	$2,9.10$-6 kg.m^2 (14mm)	$3,2.10$-6 kg.m^2 (14mm)
Torque		4.10^{-3} N.m	16.10-3 N.m	20.10^{-3} N.m
Permissible Max. Speed		12 000 min^{-1}	6 000 min^{-1}	
Continuous Max. Speed		10 000 min^{-1}	6 000 min^{-1}	
Encoder Weight (Approx.)		0,300 kg		
Theoretical Mechanical Lifetime 10^9 turns (F_{axial} / F_{radial})		30 N / 60 N : 26	20 N / 40 N : >36	

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Electrical

This encoder series offers an incremental encoder augmented by IO-Link configurability and diagnostics capabilities. There are two different implementations:

- Incremental encoder and IO-link on a dedicated wire (RGZ electronics)
- Incremental encoder with IO-link multiplexed on Z wire, in this case when working in a mode, the other one is disabled (RGY electronics)

Ver.	Mode	Output Signals	Operating Voltage	Supply current (no loads)	Current per channel pair	Short-circuit proof	Reverse polarity tolerant	Frequency Capability	Resolution	Temperature range
RGY RGZ	Incremental	programmable (HTL or TTL)	4,75V to 30V	< 75mA	< 40mA	Yes	Yes	Up to 1MHz	programmable (1 to 10kppr)	-40°C to +85°C
	IO-Link	IO-Link	18V to 30V					IO-link COM3 (230,4 kbits/s)	programmable (1 to 16bits)	

[1] RGY outputs are multiplexed, they are in incremental mode or IO-link mode (default startup mode is incremental)
[2] RGZ have Incremental and IO-link outputs working simultaneously

Environmental

Shocks (EN 60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
Vibrations (EN 60068-2-6)	≤ 200 m.s^{-2} (10…2 000Hz))
EMC	EN 61000-6-2, EN 61000-6-4
Isolation	1 000V eff
Operating Temperature	-40 ... + 85°C (encoder T°)
Storage Temperature	-40 ... + 85°C
Protection (EN 60529)	IP 65
Humidity	98% RH non-condensing at 20 °C

IO-LINK features

Process data
- Position : single turn 16 bits max
- Speed : calculated speed in rpm (signed)

Programmable Parameters
- Direction : clockwise or counter-clockwise, changes counting direction and speed sign.
- Set Zero Pulse command : Set the current position as the incremental zero pulse position. Set also the absolute position to zero.

For incremental mode :
- Incremental resolution : number of cycles per turn : from 1 to 10000
- Output voltage level : HTL or TTL
- Zero pulse width : 90°, 180° 270° or 360° (See figure for details)

Absolute parameters (in IO-Link mode) :
- Resolution per turn: 1 to 16 bits
- Speed window calculation : time between each speed data update.

Diagnostics
- Operating Hours : number of hours since factory reset
- Temperature : event triggers when temperature exceeds specifications
- Device Status : Access to the status of the encoder

Factory settings
- Output : HTL, incremental resolution 1024, direction : clockwise B before A, zero pulse : 90°, speed calculation window : 200ms, absolute resolution 16 bits

Table 1 : Z pulse width definition

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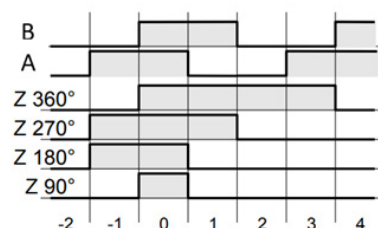
STANDARD CONNECTIONS

Electronics RGY : Incremental OR IO-link on Z (multiplexed)

	Mode	INC	GND	VCC	A	B	Z	A/	B/	Z/	Ground
		IO-link	L-	L+	NC	NC	IO-link	NC	NC	NC	NC
GM	M12 8 pins	1	2	3	4	5	6	7	8	shield
BF	M12 5 pins	3	1	2	5	4	-	-	-	shield
GP	PUR Cable 8 wires	WH	BU	GY	BN	RD	PK	GN	BK	shield
G3	PVC Cable 8 wires	WH	BN	GN	YE	GY	PK	BU	RD	shield

Electronics RGZ : Incremental AND IO-link (simultaneous)

		GND (L-)	VCC (L+)	A	B	Z	A/	B/	Z/	IO-link	Ground
I6	M23 12 pins CW	1	2	3	4	5	6	7	8	9	shield
IP	Cable PUR 9 wires	WH	BU	GY	BN	RD	PK	GN	BK	BN/GN	shield

DIMENSIONS

All dimensions are in millimeters.

DHM5_10 Connection I6R (Radial M23)

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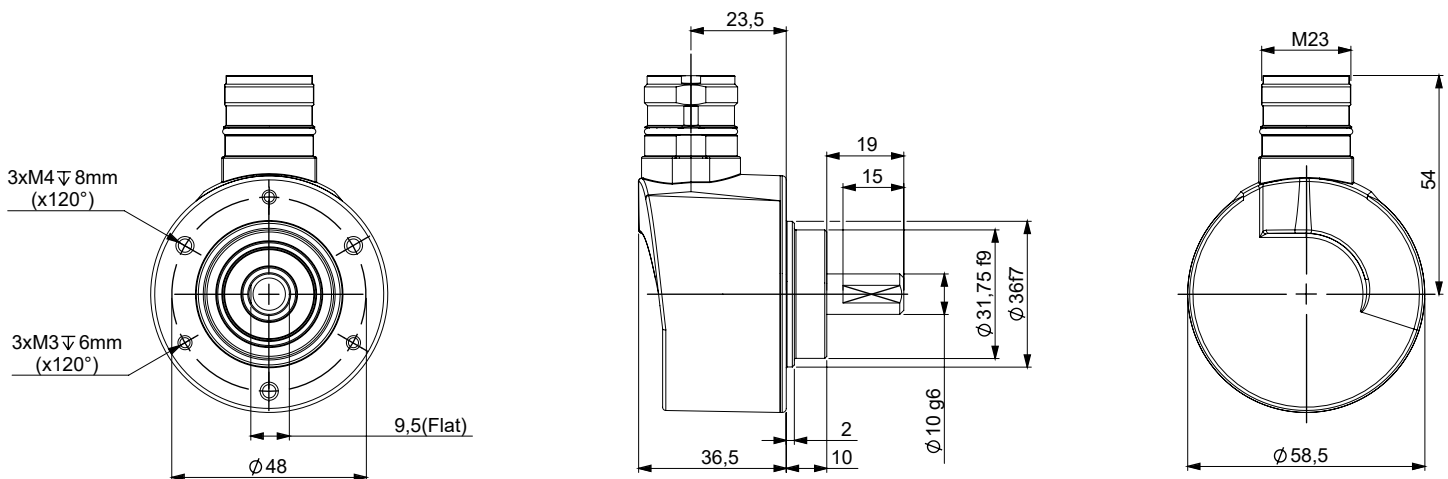
DHM5_06 Connection GMA (Axial M12)
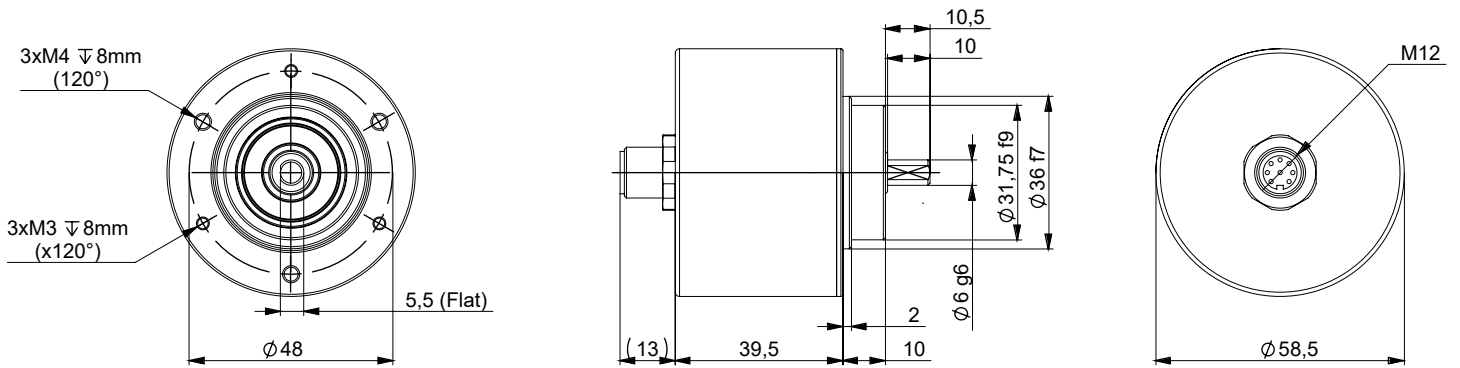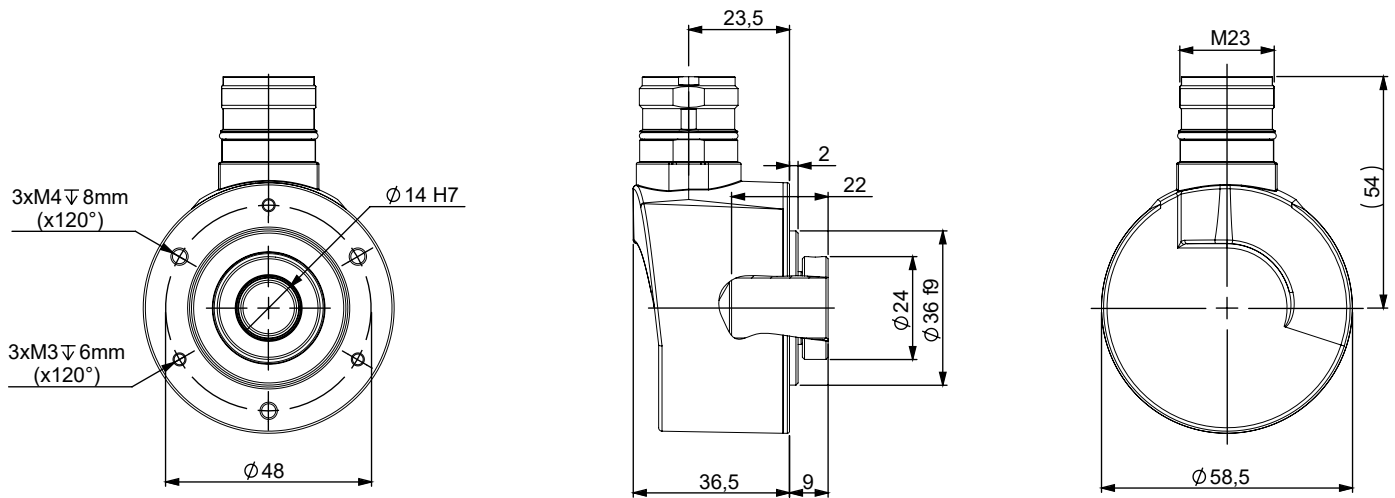
3xM4 ∇ 8mm
(120°)

3xM3 ∇ 8mm
(x120°)

5,5 (Flat)

∅48

10,5

10

∅31,75 f9

∅36 f7

∅6 g6

(13)   39,5

2

10

M12

∅58,5

DHK5_14 Connection I6R (Radial M23)

3xM4∇8mm
(x120°)

∅14 H7

3xM3∇6mm
(x120°)

∅48

23,5

2

22

∅24

∅36 f9

36,5   9

M23

(54)

∅58,5

DHO5_14 Standard clamping, Connection G3R (Radial Cable)

3xM4∇8mm
(x120°)

3xM3∇6mm
(x120°)

∅48

23,5

(∅6 ±1)

∅36 f9

2

2,5

40

(52)

∅14 H7

∅58,5

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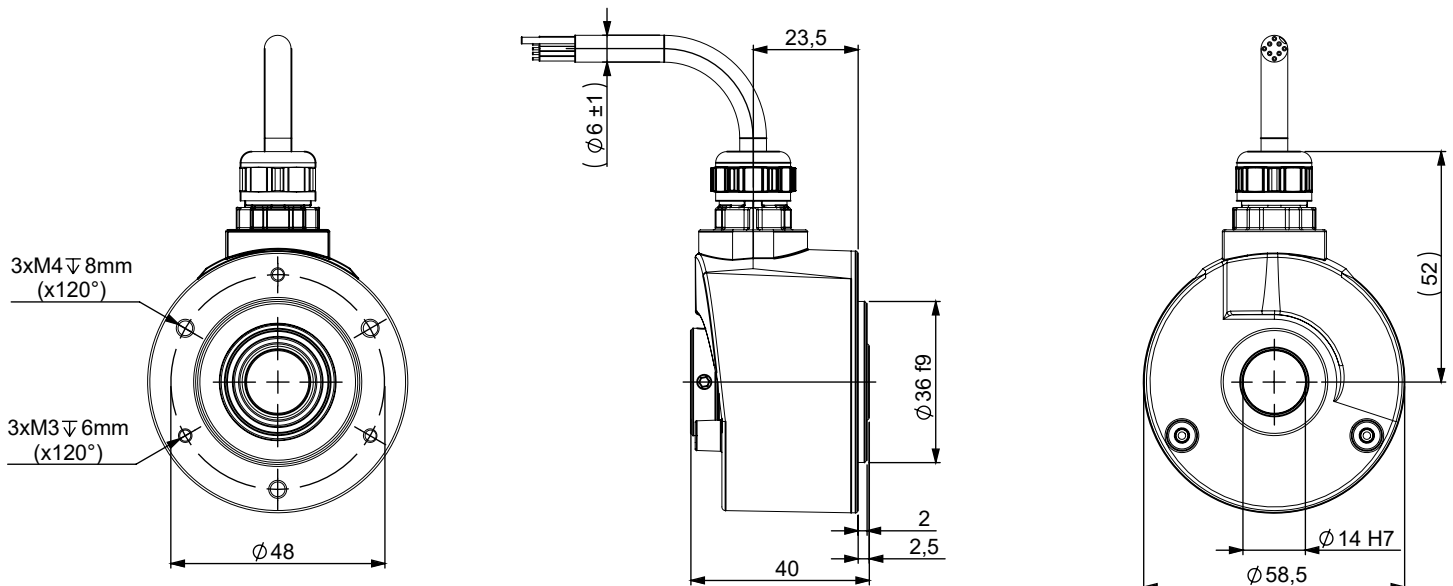
DHO5S14/OM/ Flange side clamping, Connection GMR (Radial M12)

3xM4 ⤓ 8mm (x120°)

Ø 14 H7

3xM3 ⤓ 6mm (x120°)

Ø 48

23,5

2

Ø 36 f9

40,5

36,5

9

M12x1

(55)

Ø 58,5
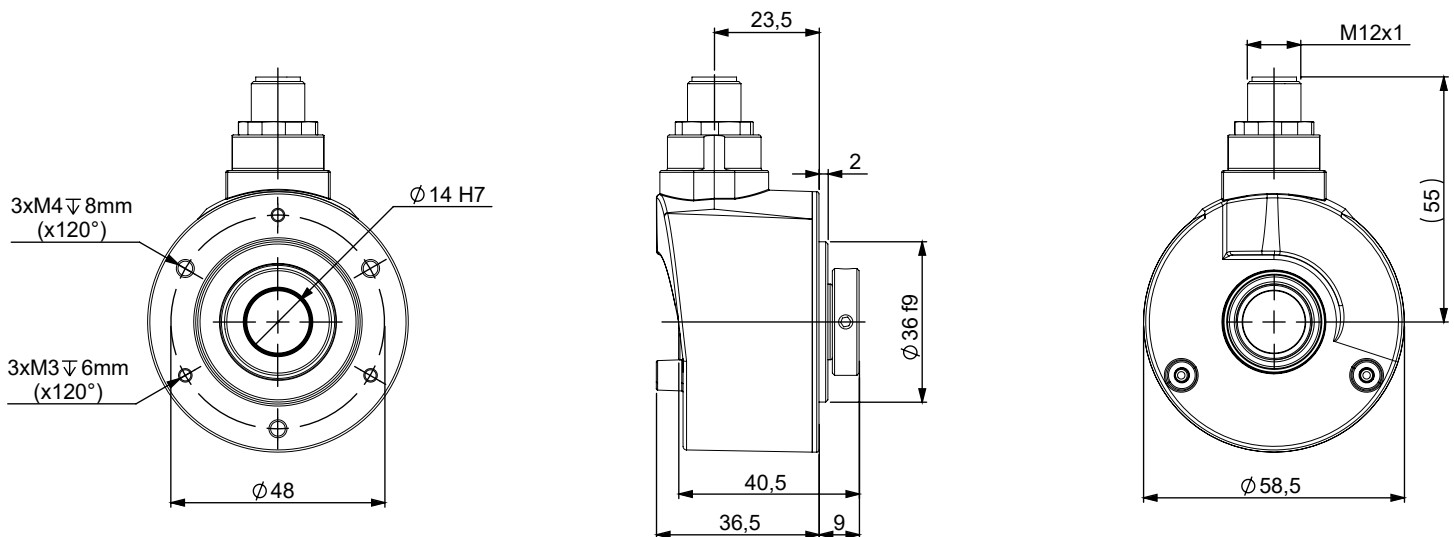
● CONNECTION DIMENSIONS

Radial
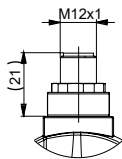
| M12 GMR, BFR | M23 I6R | Cable G3R, GPR, IPR |

M12x1

(21)

M23x1

20

Ø 19

(18)
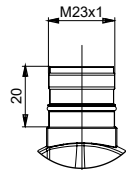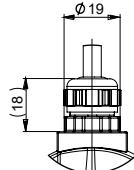
Axial
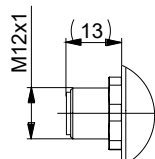
| M12 GMA, BFA | Cable IPA, G3A, GPA | M23 I6A |

M12x1

(13)

(18)

Ø 20

22

M23x1
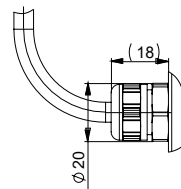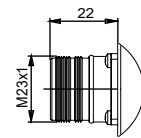
● FLANGE AND COUPLING INTERFACES

The flange or coupling configurations can be defined in the ordering options and they will be installed on encoder in factory.
All flange or coupling kits can also be ordered separately (see accessories section).

DHM5_06 Connection I6R (Radial M23), flange 9500/003 mounted on the body

3xM4 ⤓ 10mm (3x120°)

Ø 42

10,5

0,5

Ø 50 h9

Ø 53

Ø 58

3

4

10

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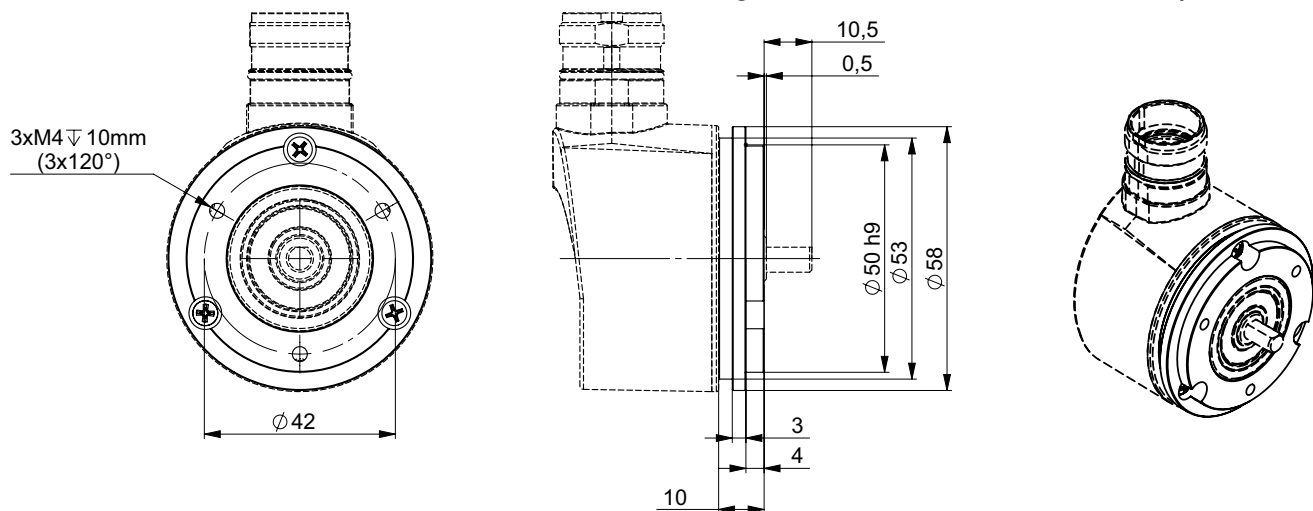
DHM5_10 Connection G3R (Radial cable), flange 9500/005 mounted on the body

4x ⌀5,5

☐52,4
☐63,5

3
10
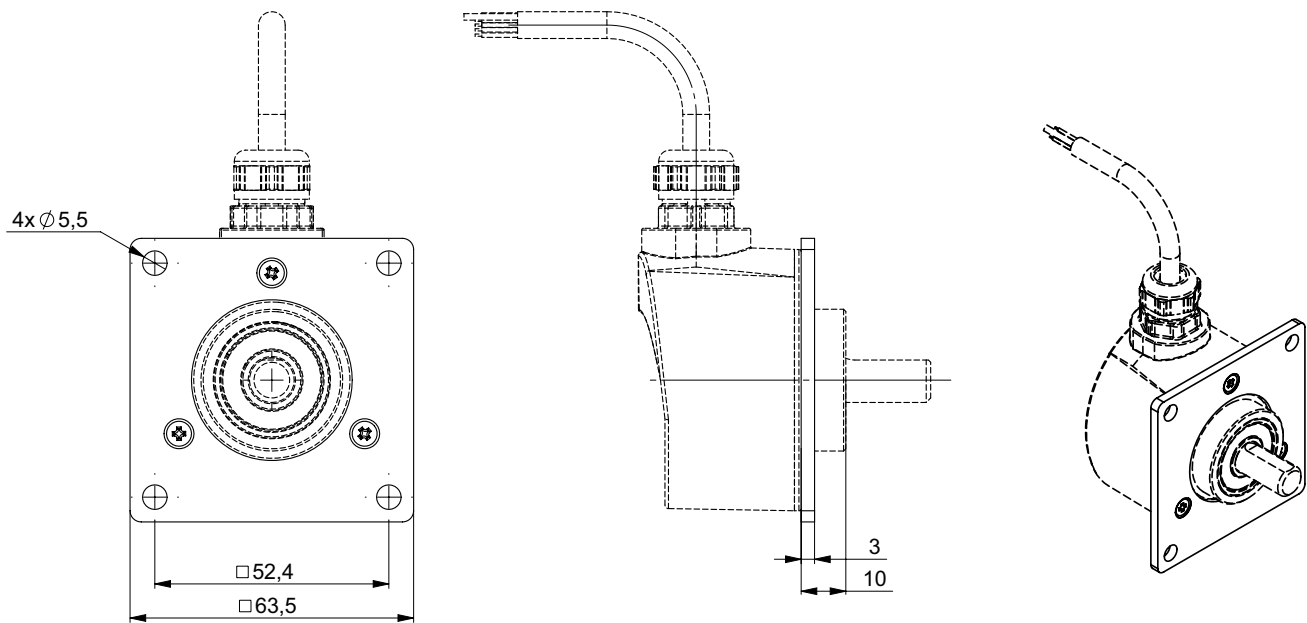
DHK5_14 Connection I6A (Axial M23), coupling 9445/016 mounted on the body

36°
18°
⌀3,2
R35
⌀64

1,5
23,5
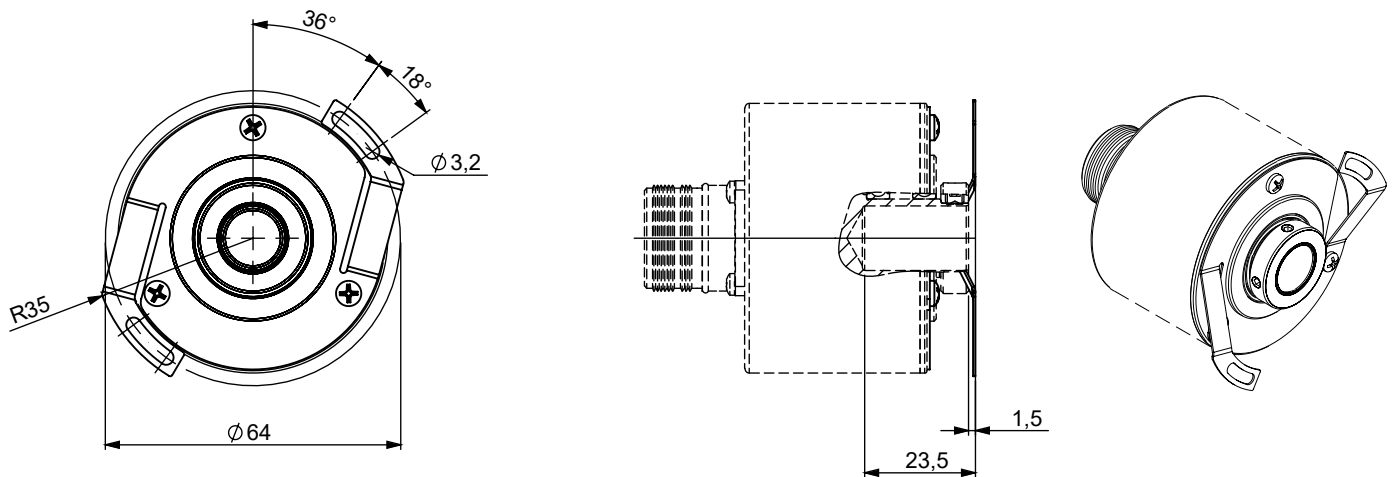
DHO5_14 Standard clamping, Connection G3R (Radial Cable), coupling 9445/012 mounted on the body

36°
18°
⌀3,2
R35
⌀64

31
40
5

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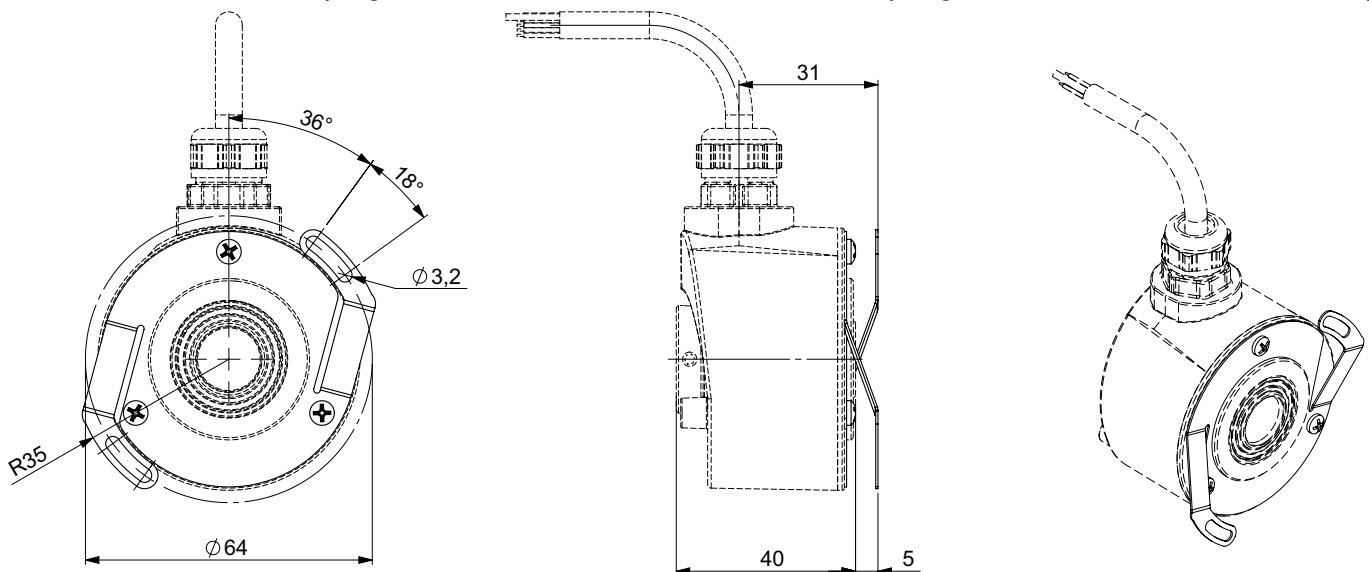
DHO5_14 Standard clamping, Connection G3R (Radial Cable), coupling 9445/015 mounted on the body
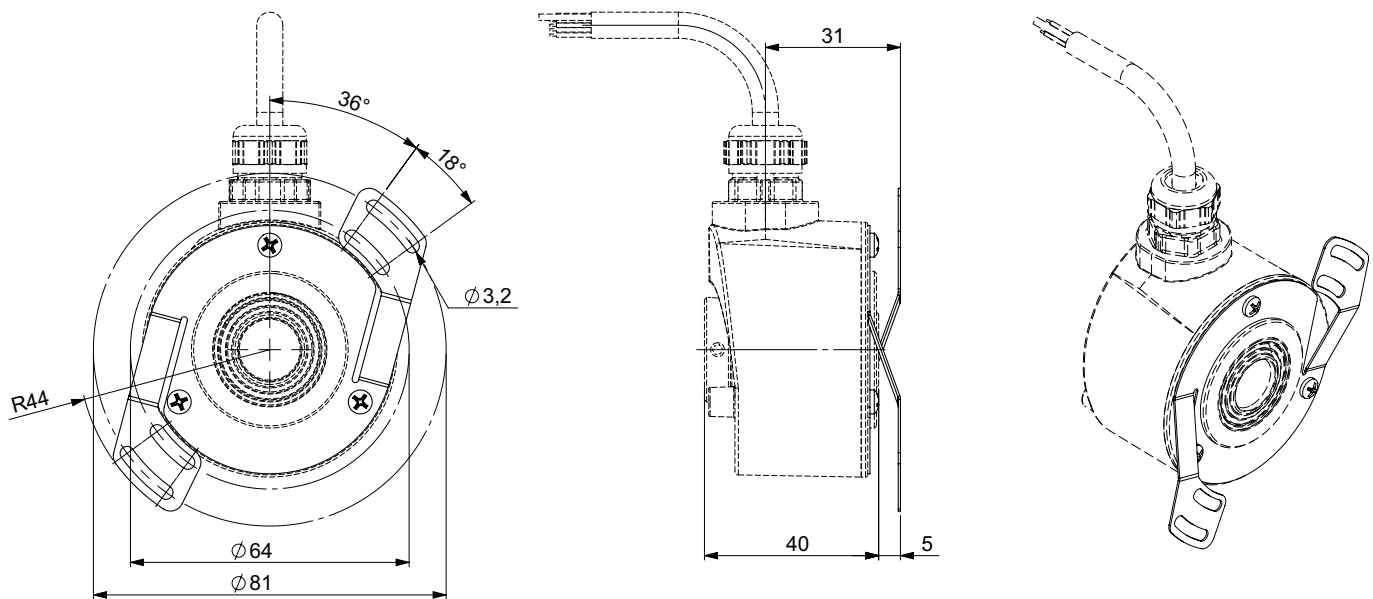
DHO5S14/OM/ Flange side clamping, Connection IPR (Radial M23)", coupling 9445/016 mounted on the body
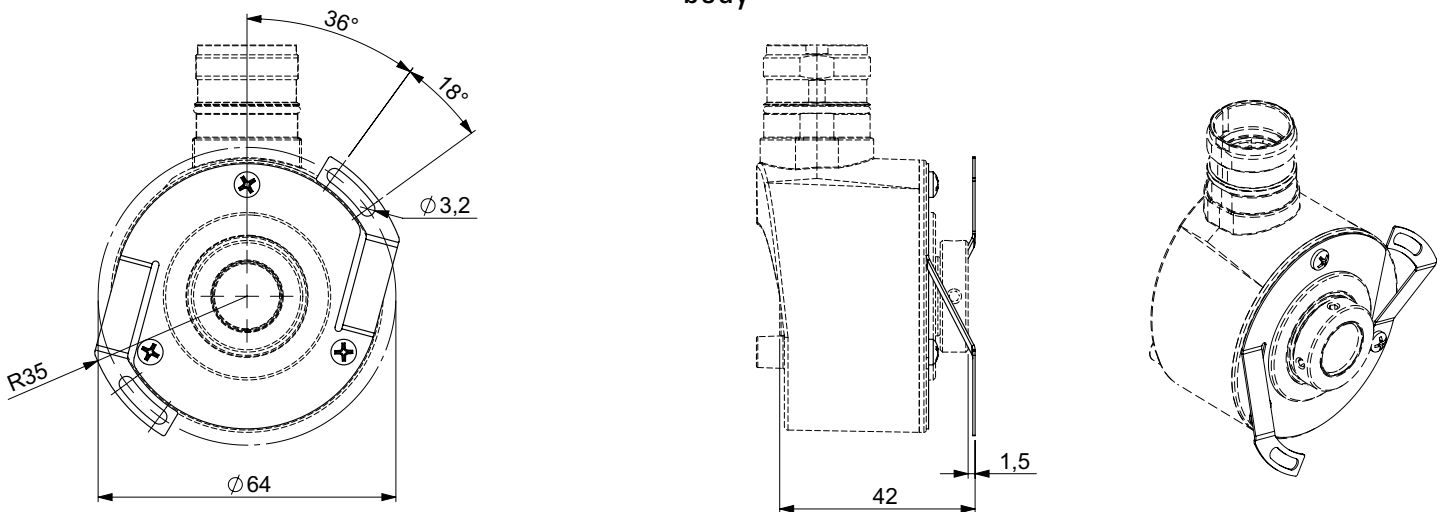
GENERAL NOTES

For an optimized installation meeting industrial standards, refer to the Instructions Manual.
The Instructions Manual provides the technical information (drawings, electrical data, etc...) for a proper integration.

AGENCY APPROVALS & CERTIFICATIONS

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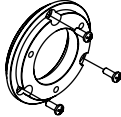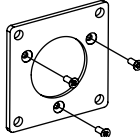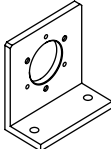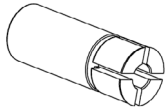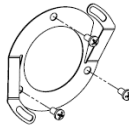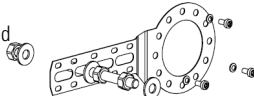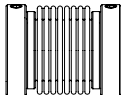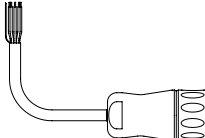
DHM5 _ 06 / / RGZ X // EPROG // I6 R // **03**

Family

DHM5: Solid Shaft Encoder
DHK5: Blind Shaft Encoder
DHO5: Hollow Shaft Encoder

Shaft Size

DHM5	DHK5 or DHO5:
06: 6 mm	**10:** 10 mm
09: 9.52 mm	**12:** 12 mm
10: 10 mm	**14:** 14 mm
08: 8mm (Option)	**15:** 15mm (Option)

Contact factory for other configurations

Mechanical Option

Blank: No option
OM: Flange side clamping

Voltage Output

RGY : 4,75-30V IO-link multiplexed on Z programmable output HTL/TTL
RGZ : 4,75-30V programmable output HTL/TTL and IO-link

Channels

X : programmable outputs

Cycles / Turn

EPROG: Full programmable 1-10kppr with programming tool (IO-Link master)

Output Termination

GM: M12 8 Pins
GP: PUR Cable - 8 Wires (not UL)
G3: PVC Cable - 8 Wires
BF : M12 5 pins
I6: M23 12 Pins CW
IP: PUR Cable - 9 wires

Output orientation

R: Radial (All configurations)
A: Axial (DHM5 and DHK5 only)

Cable Length

xxx: Cable Length (ex.: 020 = 2 Meters)
Maximum IO-link cable length is 20 meters
Blank: No Cable

Accesories

D0**:** DHO5 with aluminum reduction sleeve
D1**:** DHO5 with insulated reduction sleeve
D2**:** DHK5 with aluminum reduction sleeve
D2: 9445/012 DHO5 Stator coupling
D4: 9445/015 DHO5 Stator coupling
DK: 9445/016 DHK5 & DHO5.../OM/ Stator coupling
03: 9500/003 Synchro flange
05: 9500/005 Square flange

ACCESSORIES

Description	Part Number		
Synchro flange kit Hardware included	M9500/003 Other synchro flanges dimensions available on request		
Square flange kit Hardware included	M9500/005 Other square flanges dimensions available on request		
Mounting bracket Hardware included	M9202 (Compatible with all models)		
Reduction sleeve	Insulated (PEEK) DHO5 9431/I06 9431/I08 9431/I10 9431/I12	Non insulated (Aluminum) DHO5 DHK5 9431/A06 9431/K06 9431/A08 9431/K08 9431/A10 9431/K10 9431/A12 9431/K12	Bore size (H7) 6 mm 8 mm 10 mm 12 mm
Stator coupling kit Hardware included	P/N M9445/012 M9445/015 M9445/016	Recommended use/Compatibility DHO5 DHK5 & DHO5 DHK5 & DHO5 with /OM/ option	Fixing points 2 4 2
	Other stator coupling configurations available on request		
Tether arm kit Hardware included	M9445/047 (Compatible with DHK5 and DHO5 models)		
Bellows coupling	9403/xx-yy with: xx = 06 to 12 (side 1 bore diameter in mm) yy = 06 to 12 (side 2 bore diameter in mm) + Imperial sizes available: 6.35, 9.52, 12.7 (mm) Installation: Refer to Instruction Manual		
Standard Mating Connector 2m, 5m, 10m Mating Cable Assembly	Extension cords compatible with G6 connection option: RAL-020-001 = M23, PVC cable, 2m RAL-050-001 = M23, PVC cable, 5m RAL-100-001 = M23, PVC cable, 10m	Extension cords compatible with G8 connection option: RAL-020-xxx = M23, PUR cable, 2m RAL-050-xxx = M23, PUR cable, 5m RAL-100-xxx = M23, PUR cable, 10m	Extension cords compatible with GM connection option: 8230/366 = M12 overmolded, PUR cable, 2m 8230/370 = M12 overmolded, PUR cable, 5m 8230/368 = M12 overmolded, PUR cable, 10m
Standard programing cable (only for GMR) IO-Link USB master			

Made in France

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