

# DHM5 - DHK5 - DH05

## 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.



### SPECIFICATIONS

#### Mechanical

		DHM5	DHK5	DH05
<b>Material</b>		<b>Cover:</b> Zinc Alloy <b>Body:</b> Aluminium <b>Shaft:</b> Stainless Steel		
<b>Bearings</b>		6000 Series	6803 Series	
<b>Maximum Loads</b>	<b>Axial</b>	50 N	20 N	
	<b>Radial</b>	100 N	50 N	
<b>Shaft inertia</b>		2,5.10 <sup>-6</sup> kg.m <sup>2</sup> (10mm)	2,9.10-6 kg.m <sup>2</sup> (14mm)	3,2.10-6 kg.m <sup>2</sup> (14mm)
<b>Torque</b>		4.10 <sup>-3</sup> N.m	16.10-3 N.m	20.10 <sup>-3</sup> N.m
<b>Permissible Max. Speed</b>		12 000 min <sup>-1</sup>	6 000 min <sup>-1</sup>	
<b>Continuous Max. Speed</b>		10 000 min <sup>-1</sup>	6 000 min <sup>-1</sup>	
<b>Encoder Weight (Approx.)</b>		0,300 kg		
<b>Theoretical Mechanical Lifetime 10<sup>9</sup> turns</b> (F <sub>axial</sub> / F <sub>radial</sub> )		30 N / 60 N : 26	20 N / 40 N : >36	

### 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



## 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

<b>Shocks (EN 60068-2-27)</b>	≤ 500 m.s <sup>-2</sup> (during 6 ms)
<b>Vibrations (EN 60068-2-6)</b>	≤ 200 m.s <sup>-2</sup> (10...2 000Hz)
<b>EMC</b>	EN 61000-6-2, EN 61000-6-4
<b>Isolation</b>	1 000V eff
<b>Operating Temperature</b>	-40 ... + 85°C (encoder T°)
<b>Storage Temperature</b>	-40 ... + 85°C
<b>Protection (EN 60529)</b>	IP 65
<b>Humidity</b>	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.

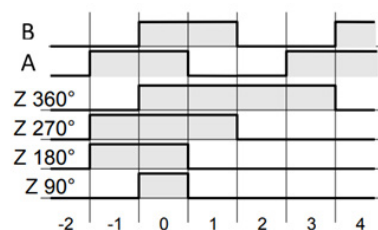
### Diagnostics

- 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**





# 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
<b>GM</b>	M12 8 pins		1	2	3	4	5	6	7	8	shield
<b>BF</b>	M12 5 pins		3	1	2	5	4	-	-	-	shield
<b>GP</b>	PUR Cable 8 wires		WH	BU	GY	BN	RD	PK	GN	BK	shield
<b>G3</b>	PVC Cable 8 wires		WH	BN	GN	YE	GY	PK	BU	RD	shield

## Electronics RGZ : Incremental AND IO-link (simultaneous)

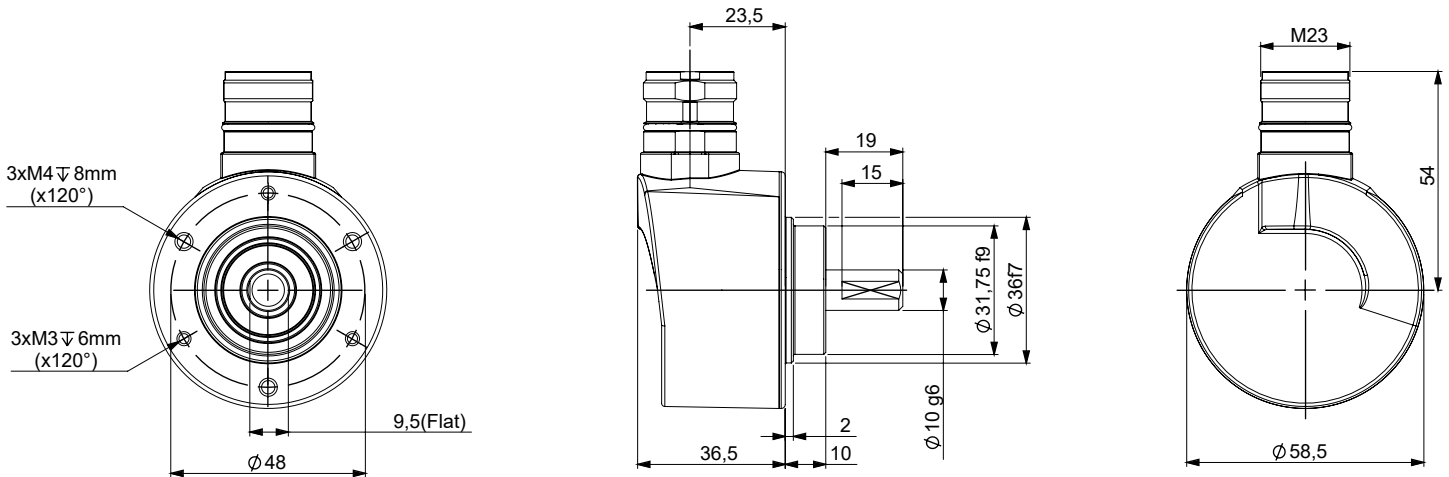
		GND (L-)	VCC (L+)	A	B	Z	A/	B/	Z/	IO-link	Ground
<b>I6</b>	M23 12 pins CW	1	2	3	4	5	6	7	8	9	shield
<b>IP</b>	Cable PUR 9 wires	WH	BU	GY	BN	RD	PK	GN	BK	BN/GN	shield



## DIMENSIONS

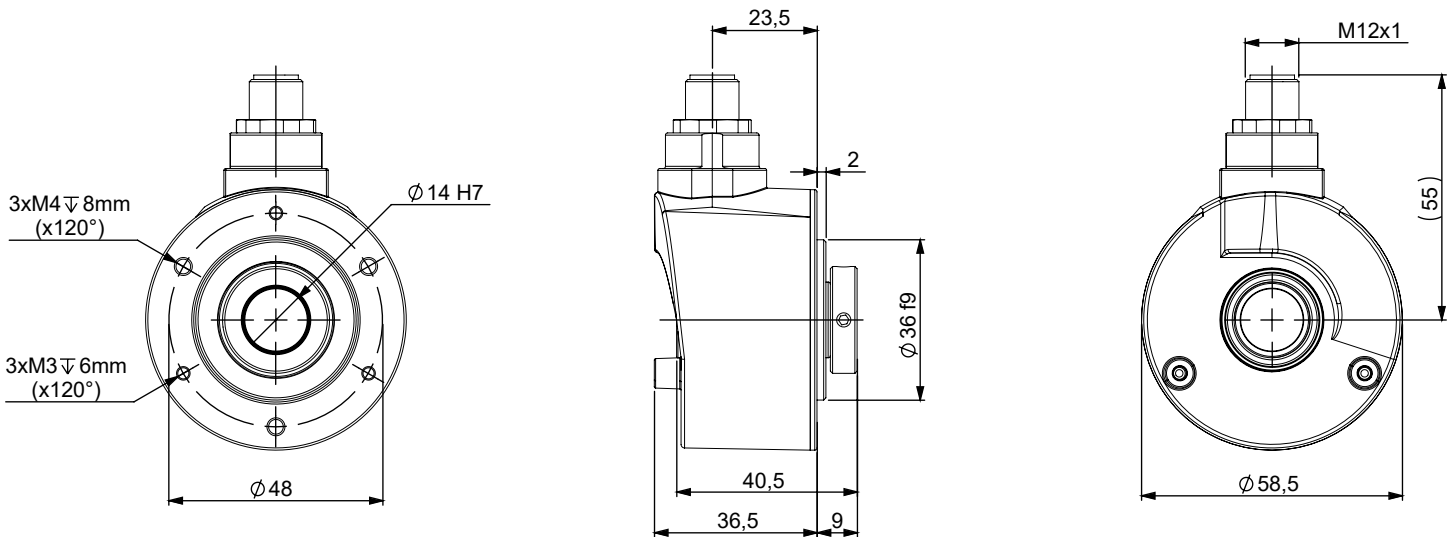
All dimensions are in millimeters.

### DHM5\_10 Connection I6R (Radial M23)





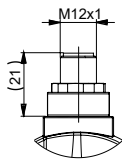
## DH05S14/OM/ Flange side clamping, Connection GMR (Radial M12)



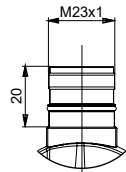
### CONNECTION DIMENSIONS

#### Radial

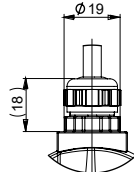
**M12  
GMR, BFR**



**M23  
I6R**

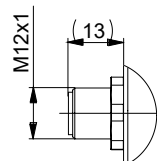


**Cable  
G3R, GPR, IPR**

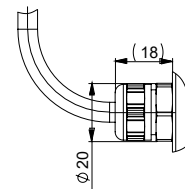


#### Axial

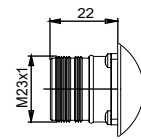
**M12  
GMA, BFA**



**Cable  
IPA, G3A, GPA**



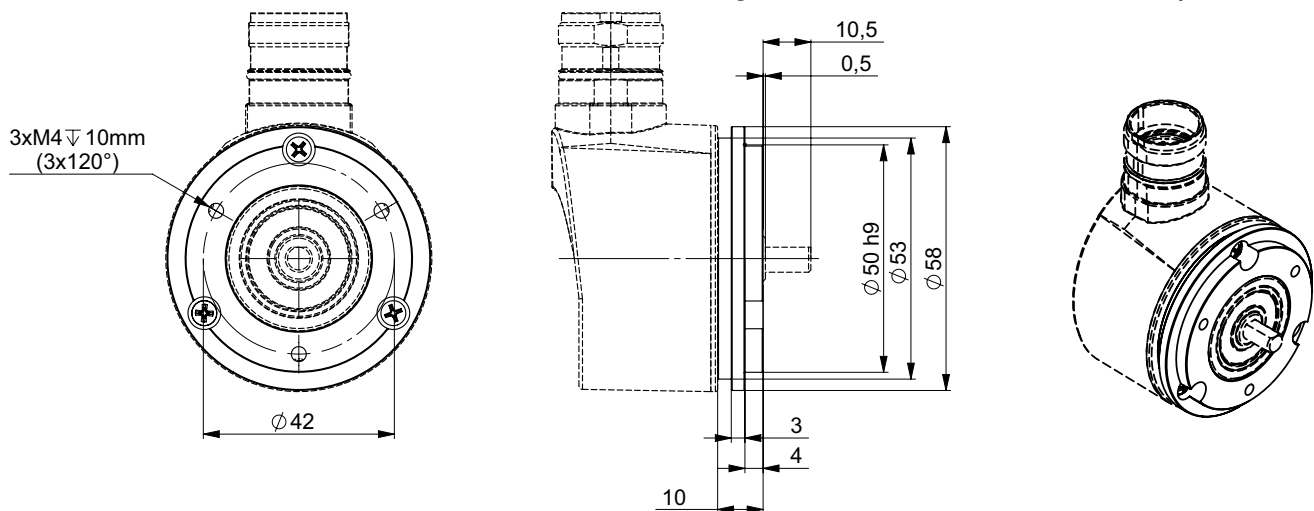
**M23  
I6A**



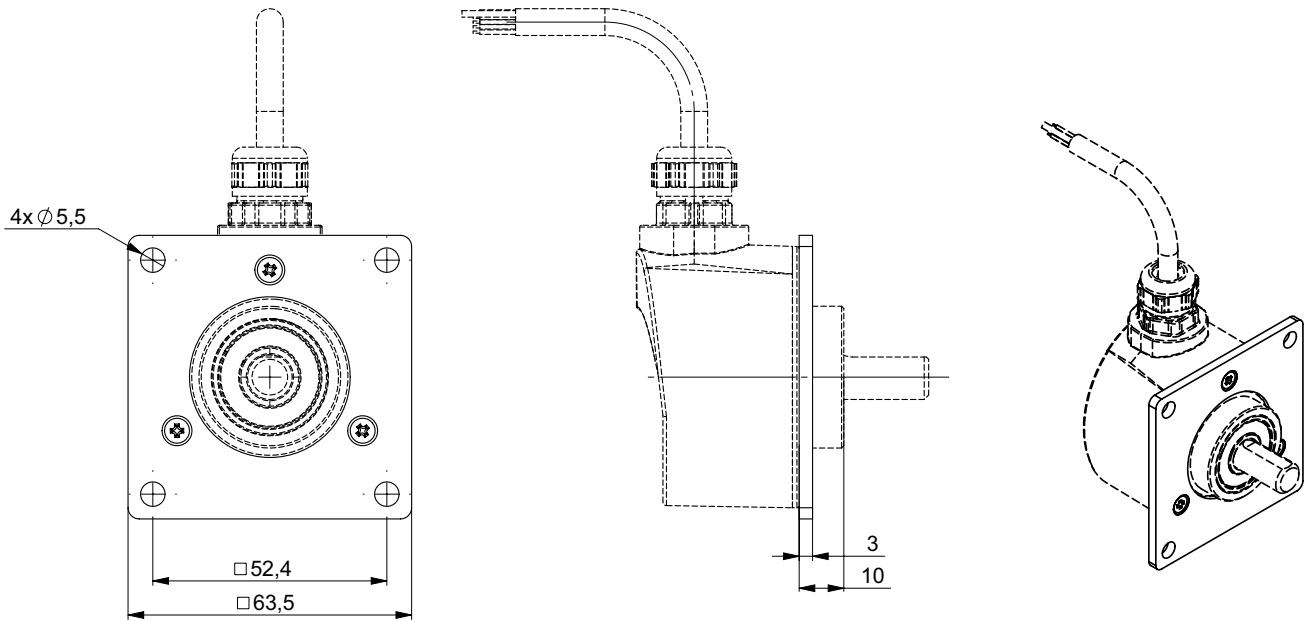
### FLANGE AND COUPLING INTERFACES

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).

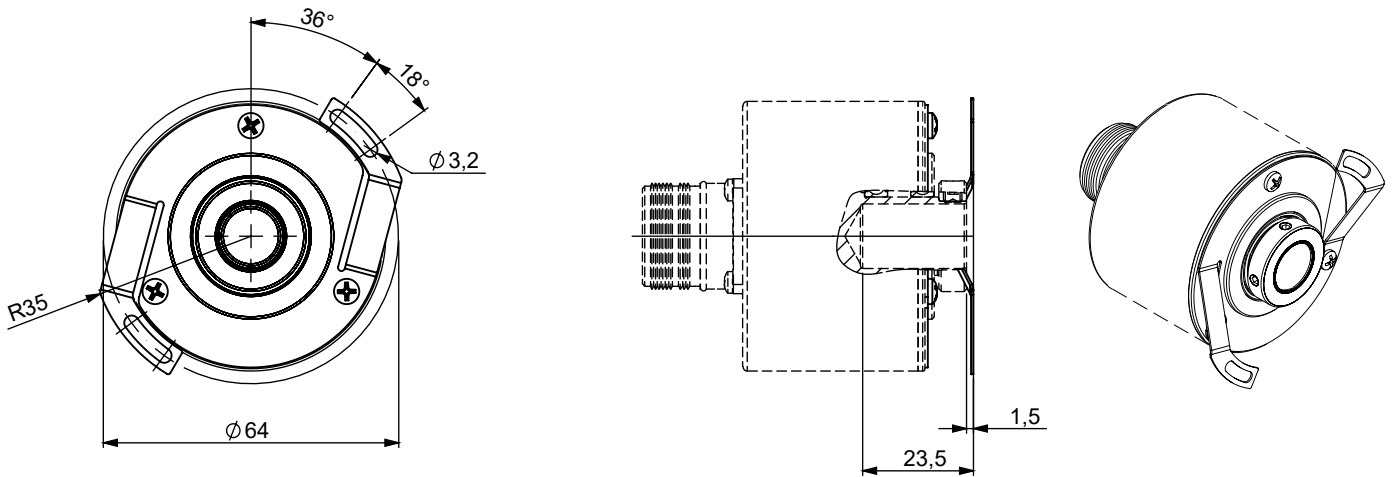
## DHM5\_06 Connection I6R (Radial M23), flange 9500/003 mounted on the body



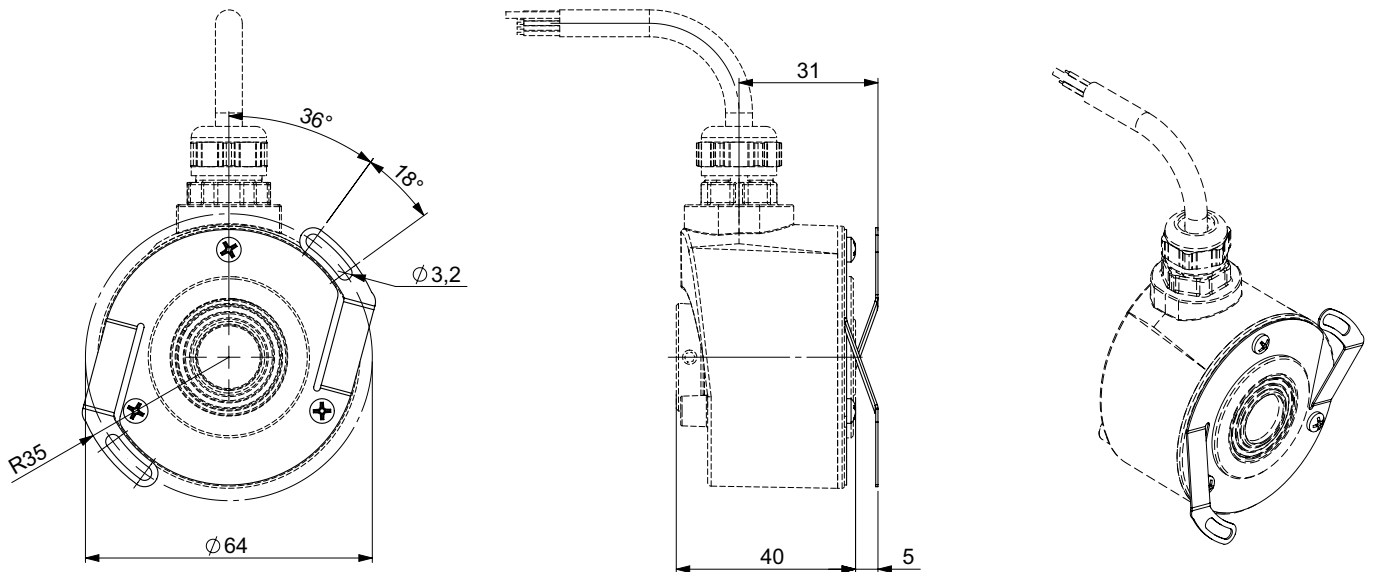
DHM5\_10 Connection G3R (Radial cable), flange 9500/005 mounted on the body



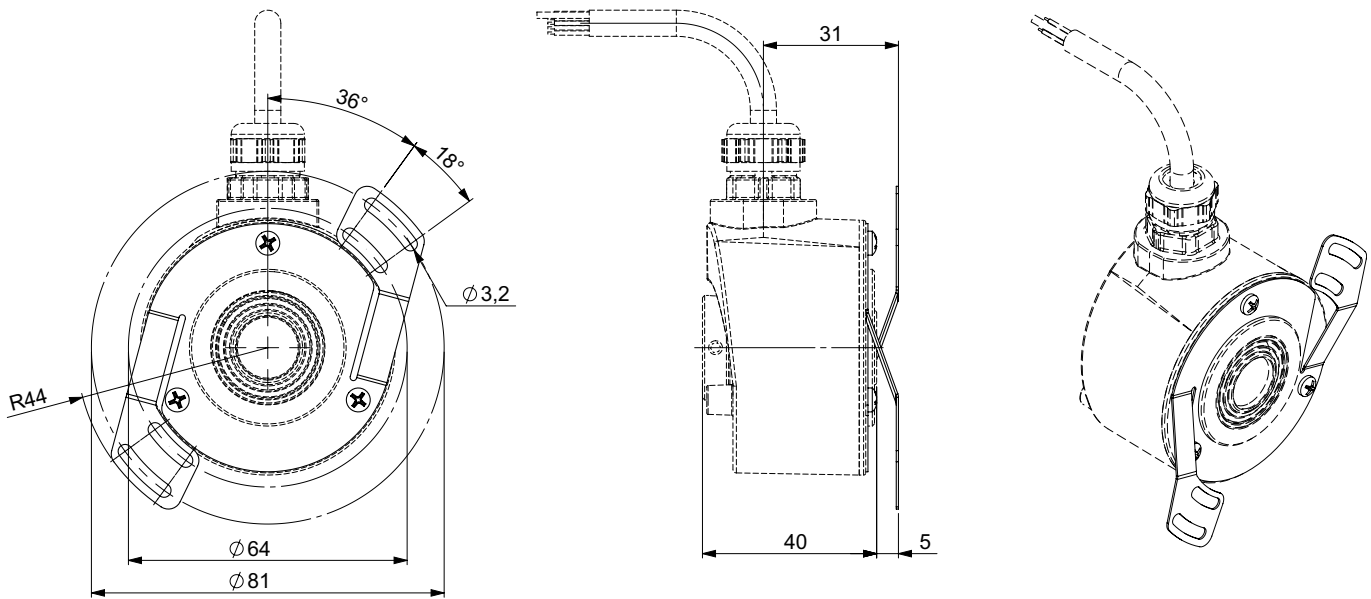
DHK5\_14 Connection I6A (Axial M23), coupling 9445/016 mounted on the body



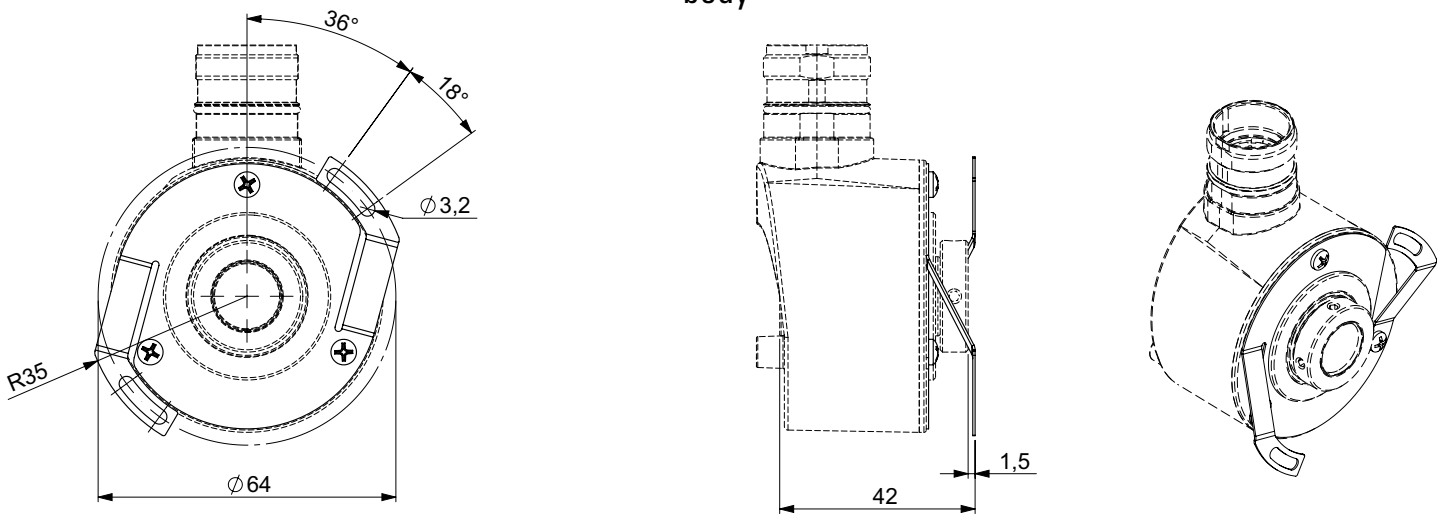
DH05\_14 Standard clamping, Connection G3R (Radial Cable), coupling 9445/012 mounted on the body



DH05\_14 Standard clamping, Connection G3R (Radial Cable), coupling 9445/015 mounted on the body



DH05S14/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**





# ORDERING OPTIONS

Example : DHM5\_06//RGZ9//EPROG//I6R//\*\*03\*\*

Family	DHM5	06	/	/	RGZ	X	//	EPROG	//	I6	R	//	**03**
<b>DHM5:</b> Solid Shaft Encoder <b>DHK5:</b> Blind Shaft Encoder <b>DH05:</b> Hollow Shaft Encoder													
<b>Shaft Size</b>													
<b>DHM5</b> 06: 6 mm 09: 9.52 mm 10: 10 mm 08: 8mm (Option)		<b>DHK5 or DH05:</b> 10: 10 mm 12: 12 mm 14: 14 mm 15: 15mm (Option)											
Contact factory for other configurations													
<b>Mechanical Option</b>													
<b>Blank:</b> No option <b>OM:</b> Flange side clamping													
<b>Voltage Output</b>													
<b>RGY :</b> 4,75-30V IO-link multiplexed on Z programmable output HTL/TTL <b>RGZ :</b> 4,75-30V programmable output HTL/TTL and IO-link													
<b>Channels</b>													
<b>X :</b> programmable outputs													
<b>Cycles / Turn</b>													
<b>EPROG:</b> Full programmable 1-10kppr with programming tool (IO-Link master)													
<b>Output Termination</b>													
<b>GM:</b> M12 8 Pins <b>GP:</b> PUR Cable - 8 Wires (not UL) <b>G3:</b> PVC Cable - 8 Wires <b>BF :</b> M12 5 pins <b>I6:</b> M23 12 Pins CW <b>IP:</b> PUR Cable - 9 wires													
<b>Output orientation</b>													
<b>R:</b> Radial (All configurations) <b>A:</b> Axial (DHM5 and DHK5 only)													
<b>Cable Length</b>													
<b>xxx:</b> Cable Length (ex.: 020 = 2 Meters) Maximum IO-link cable length is 20 meters <b>Blank:</b> No Cable													
<b>Accessories</b>													
<b>D0****:</b> DH05 with aluminum reduction sleeve <b>D1****:</b> DH05 with insulated reduction sleeve <b>D2****:</b> DHK5 with aluminum reduction sleeve <b>**D2**:</b> 9445/012 DH05 Stator coupling <b>**D4**:</b> 9445/015 DH05 Stator coupling <b>**DK**:</b> 9445/016 DHK5 & DH05.../OM/ Stator coupling <b>**03**:</b> 9500/003 Synchro flange <b>**05**:</b> 9500/005 Square flange													