

# DHM5 - DHK5 - DH05

## 58MM SOLID - BLIND - HOLLOW SHAFT INCREMENTAL 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°C to +100°C for operation in extreme environments. This is the best all around encoder in a 58mm package for heavy duty industrial use.



### Features

DH\_5 Rotary Incremental Encoder :

- Robustness and excellent resistance to shocks / vibrations
- High Protection Level IP65, IP67 Option with a Sealing Flange
- High Resolutions Available: Up to 500 000 ppr
- Universal Electronic Circuits from 4.75 to 30 Vdc
- High Performance in Temperatures -40°C to 100°C
- High bandwidth: Up to 1MHz

### Applications

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

## SPECIFICATIONS

### Mechanical

		DHM5	DHK5	DH05
<b>Material</b>		<b>Cover:</b> Zinc Alloy <b>Body:</b> Aluminum <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 <sup>-6</sup> kg.m <sup>2</sup> (14mm)	3,2.10 <sup>-6</sup> kg.m <sup>2</sup> (14mm)
<b>Torque</b>		4.10 <sup>-3</sup> N.m	16.10 <sup>-3</sup> 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	

## Electrical

Ver.	Output Signals	Operating Voltage +V	Supply Current (no loads)	Current per Channel Pair	Short Circuit Proof	Reverse Polarity Tolerant	Frequency Capability	Resolutions category <sup>(1)</sup>	Operating Temperature Range <sup>(2)(3)</sup>
RG5	HTL	4,75-30V	<75mA	<40mA	Yes	Yes	Up to 1MHz	Standard	-40°C ... +100°C
								Low	
								High	
RGX	HTL/TTL selectable	4,75-30V	<75mA	<40mA	HTL: refer RG5 TTL: refer RG2	Yes	Up to 1MHz	Full Programmable	-40°C ... +100°C
								Multiplier programmable	-40°C ... +80°C
5GT	HTL + CTP	11-30V	<75mA	<40mA	Yes	Yes	Up to 300kHz	Standard	-40°C ... +80°C
RG2	TTL	4,75-30V	<75mA	<40mA	Yes (Except to +V)	Yes	Up to 1MHz	Standard	-40°C ... +100°C
								Low	-40°C ... +80°C
								High	-40°C ... +80°C
2G2	TTL	5V ± 5%	<75mA	<40mA	Yes	Yes	Up to 1MHz	Standard	-40°C ... +100°C
								Low	-40°C ... +80°C
								High	-40°C ... +80°C
2WT	1Vpp	5V ± 5%	<75mA	<8mA	Yes	Yes	Up to 300kHz	Sine wave	-40°C ... +100°C
RWT	1Vpp	4,75-30V	<75mA	<8mA	Yes (Except to +V)	Yes	Up to 300kHz	Sine wave	-40°C ... +100°C

<sup>(1)</sup> See resolutions section for details.

<sup>(2)</sup> Surface encoder temperature

<sup>(3)</sup> UL Listed: -20°C +80°C. Device must be supplied by a Class 2, LPS or SELV limited energy source 250mA.

## 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>	See Electrical table above
<b>Storage Temperature</b>	-40°C ... +100°C
<b>Protection (EN 60529)</b>	IP 65
<b>Humidity</b>	98% RH non-condensing at 20 °C



# STANDARD CONNECTIONS

		-	+	A or S	B or C	Z	A/ or S/	B/ or C/	Z/	Ground
<b>GM</b>	M12 - 8 Pins	1	2	3	4	5	6	7	8	Connector Body
<b>G6</b>	M23 - 12 Pins CW	1	2	3	4	5	6	7	8	Connector Body
<b>G8</b>	M23 - 12 Pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector Body
<b>U3</b>	PVC Cable - 8 Wires	WH (White)	BN (Brown)	GN (Green)	YE (Yellow)	GY (Grey)	PK (Pink)	BU (Blue)	RD (Red)	General Shielding
<b>GC</b>	PUR Cable - 8 Wires	BK (Black)	RD (Red)	GN (Green)	BN (Brown)	VT (Violet)	YE (Yellow)	OG (Orange)	BU (Blue)	General Shielding
<b>G3</b>	PVC Cable - 8 Wires (not UL)	WH (White)	BN (Brown)	GN (Green)	YE (Yellow)	GY (Grey)	PK (Pink)	BU (Blue)	RD (Red)	General Shielding
<b>GP</b>	PUR Cable - 12 Wires (not UL)	WH (White) + WH/GN (White/Green)	BU (Blue) + BN/GN (Brown/Green)	GY (Grey)	BN (Brown)	RD (Red)	PK (Pink)	GN (Green)	BK (Black)	General Shielding
<b>TE</b>	Silicone Cable <sup>(3)</sup> - 8 Wires (Not UL)	WH (White)	BN (Brown)	GN (Green)	YE (Yellow)	GY (Grey)	PK (Pink)	BU (Blue)	RD (Red)	General Shielding

<sup>(3)</sup> Advised cable for mobile application, in extreme temperature from -40°C to +100°C



# RESOLUTIONS

### Standard resolutions:

1000, 1024, 1800, 2000, 2048, 2500, 3600, 4000, 4096, 5000, 7200, 10000

### Low resolutions<sup>(4)</sup>: (not found in the Standard resolutions range):

Any resolution within the 1-2500ppr range.

### High resolutions: (not found in the Standard resolutions range)

All multipliers of 1000, 1024, 1800, 2500 from 1 to 200.

### Programmable resolutions <sup>(4)</sup> (RGX electronics):

- Full programmable (EPROG):  
from 1 to 10kppr with direction and standard index tracks configuration

- Full programmable (XPROG):  
from 1 to 10kppr with direction and alternate index tracks configuration

- Multiplier programmable (1000, 1024, 1800, 2500 native):  
Programmability of the native resolution multiplier from 1 to 200 with direction and all index tracks configurations possibilities

All those versions can be configured with one of the following programming tool P/N (ordered separately):

EAP-001 (for encoder with "GM" connection), EAP-002 (for encoder with "G6" connection), EAP-003 (for encoder with "G8" connection).

Programming procedure available in Instruction Manual.

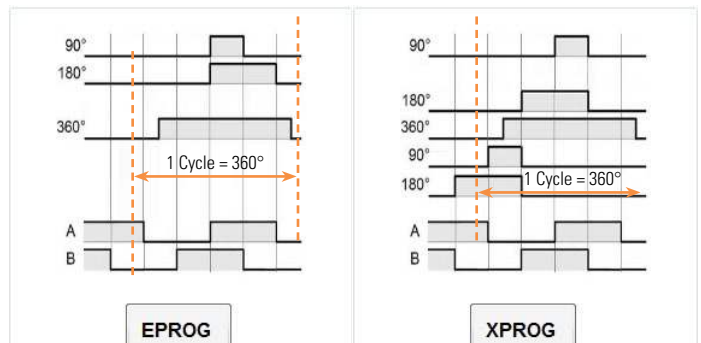
### Sine wave resolutions:

360, 500, 512, 600, 1000, 1024, 1800, 2500

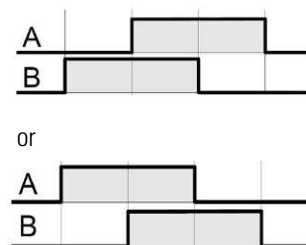
<sup>(4)</sup> Signal tolerances available in Instructions Manual

<sup>(5)</sup> Signals are shown for CW rotation when viewed from the face side of the encoder

### Index track gating possibilities<sup>(5)</sup>



### Directions Possibilities<sup>(5)</sup>

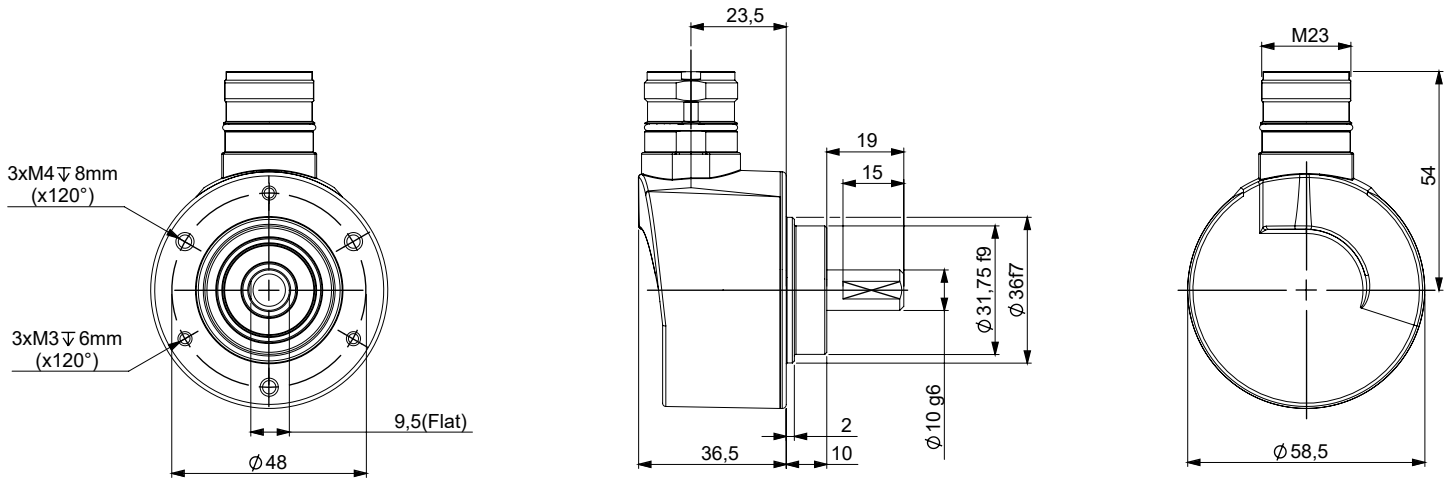




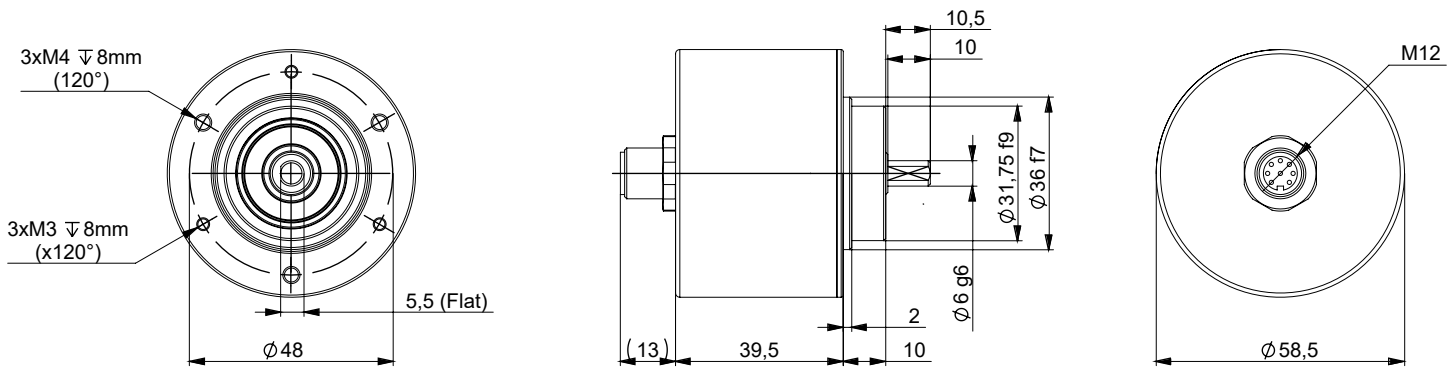
# DIMENSIONS

All dimensions are in millimeters.

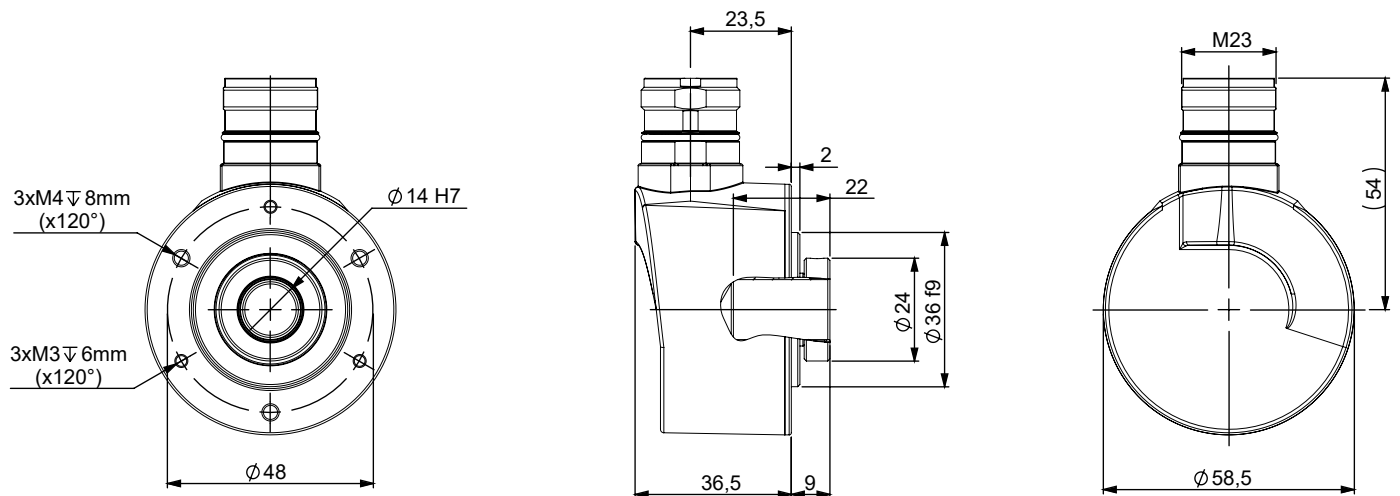
## DHM5\_10 Connection G6R (Radial M23)



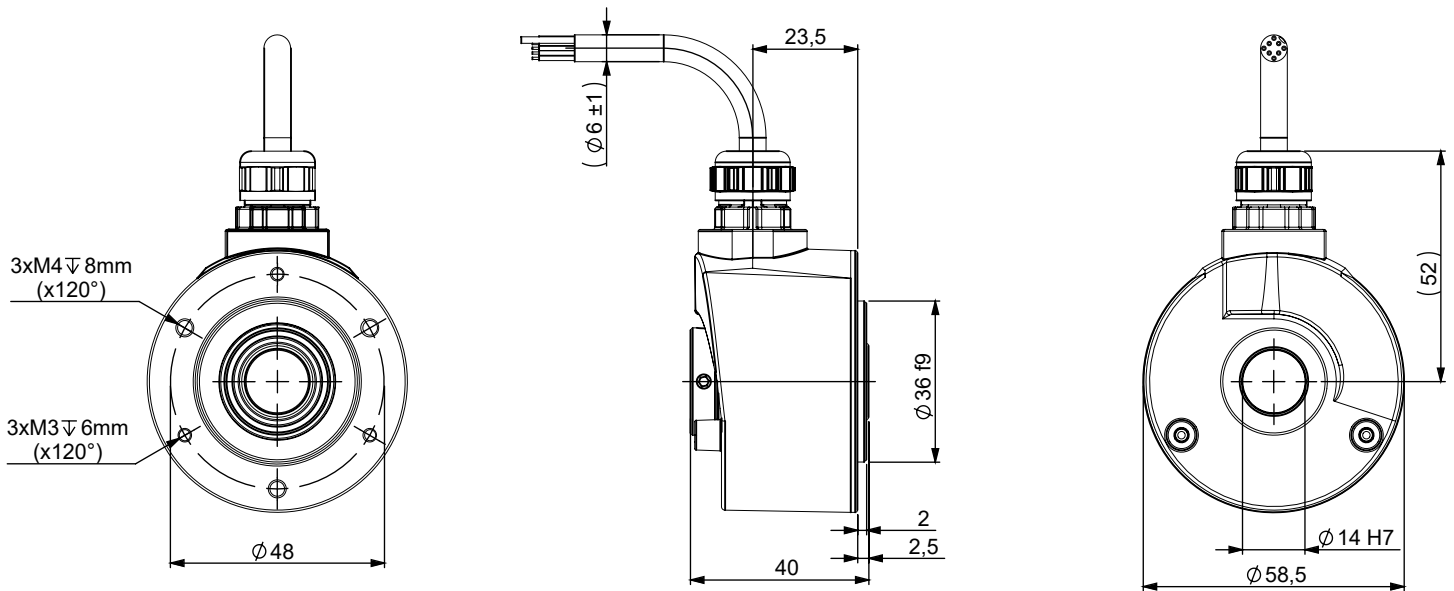
## DHM5\_06 Connection GMA (Axial M12)



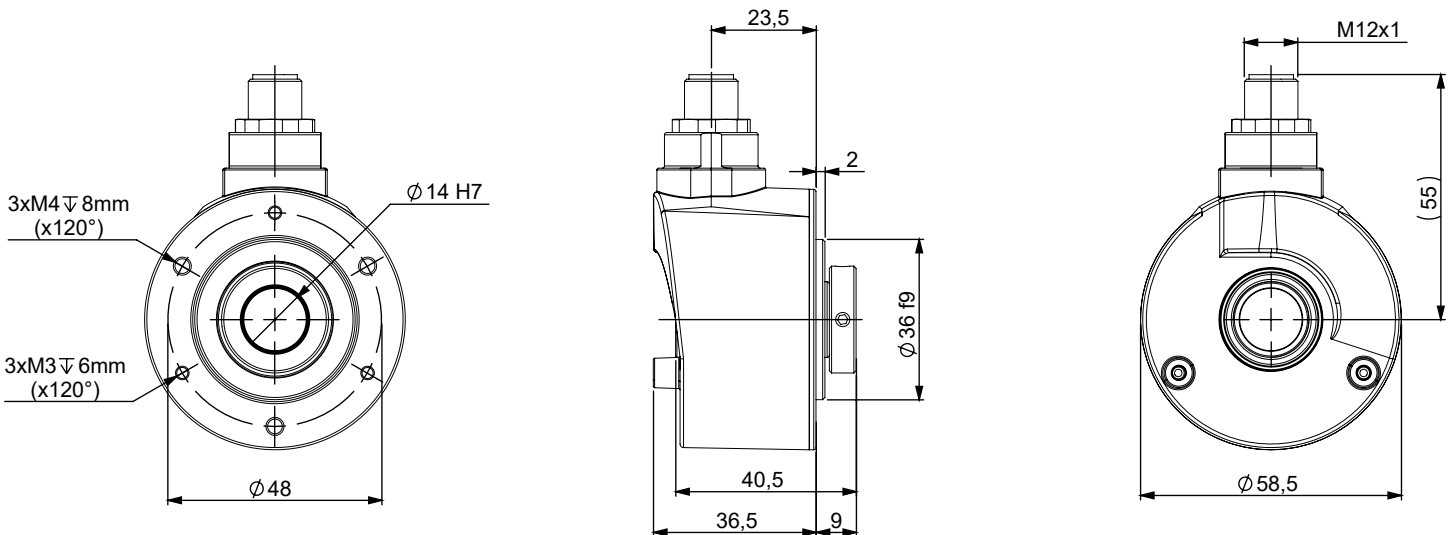
## DHK5\_14 Connection G6R (Radial M23)



## DH05\_14 Standard clamping, Connection G3R (Radial Cable)

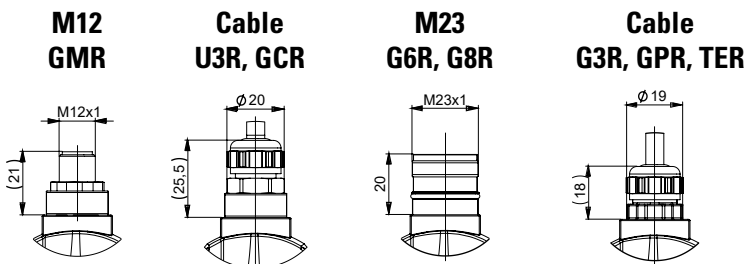


## DH05S14/OM/ Flange side clamping, Connection GMR (Radial M12)

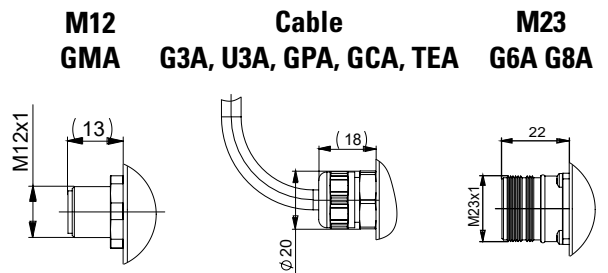


## CONNECTION DIMENSIONS

### Radial



### Axial

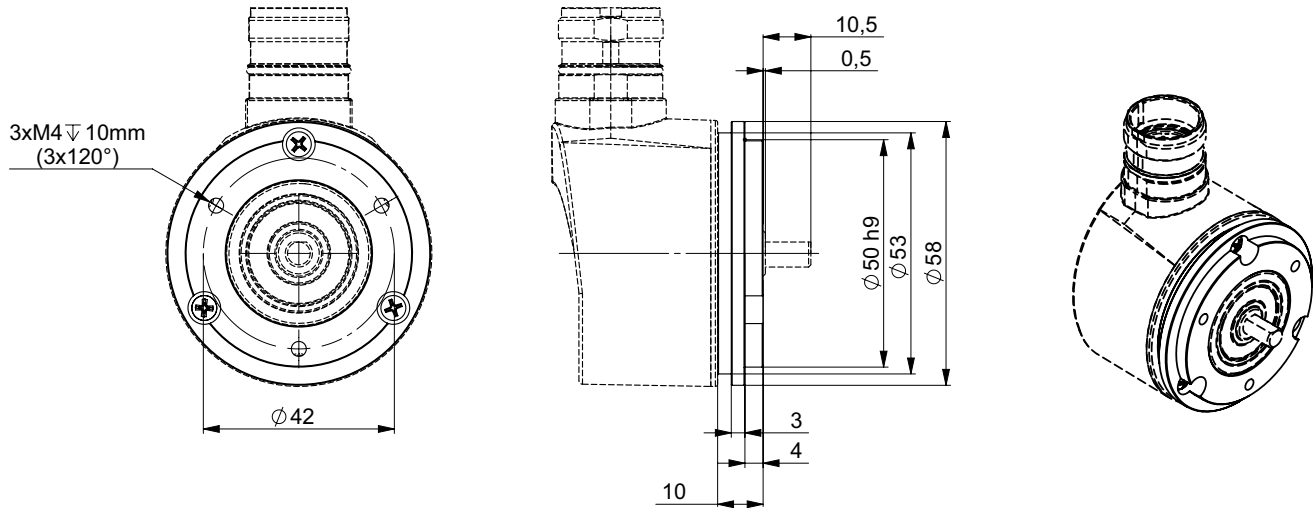




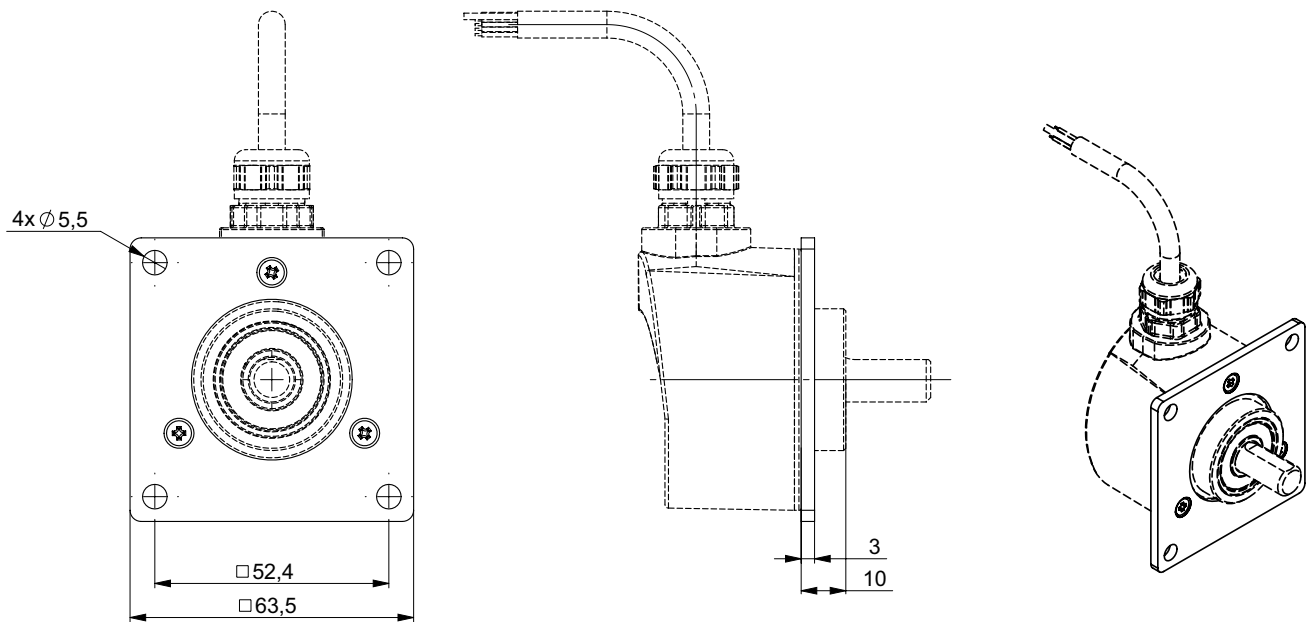
## FLANGE AND COUPLING INTERFACES

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

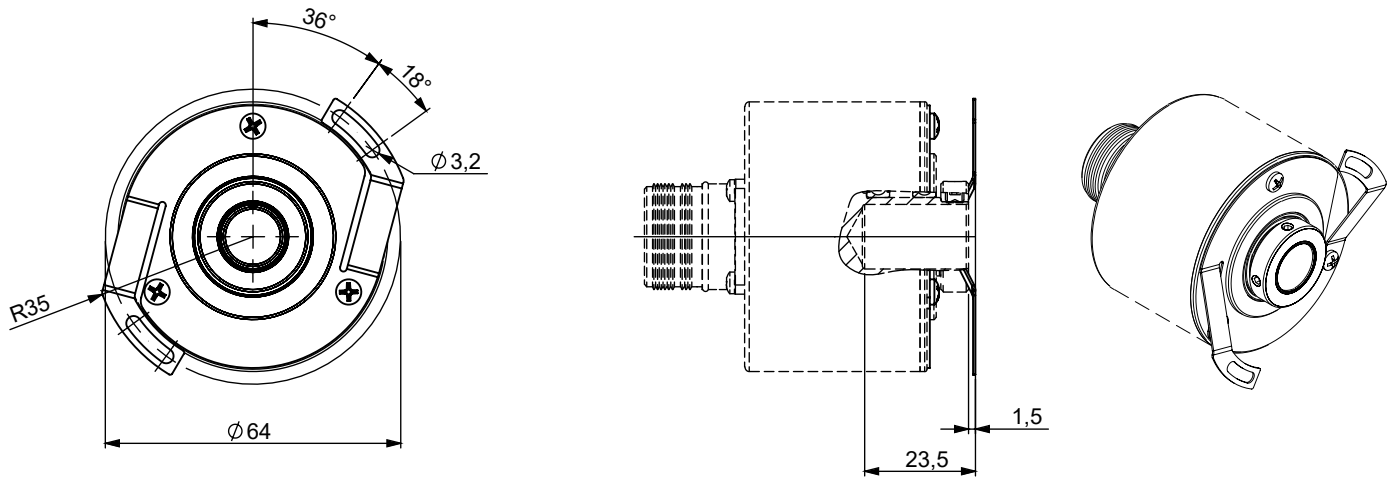
### DHM5\_06 Connection G6R (Radial M23), flange 9500/003 mounted on the body



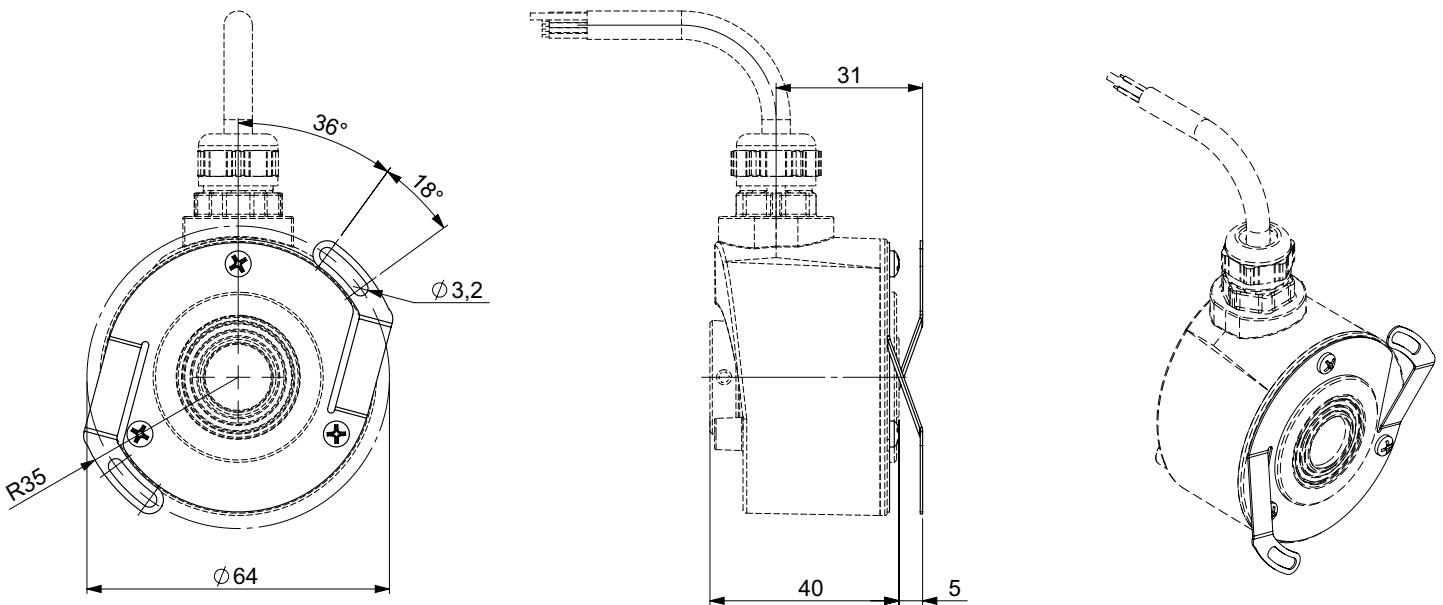
### DHM5\_10 Connection G3R (Radial cable), flange 9500/005 mounted on the body



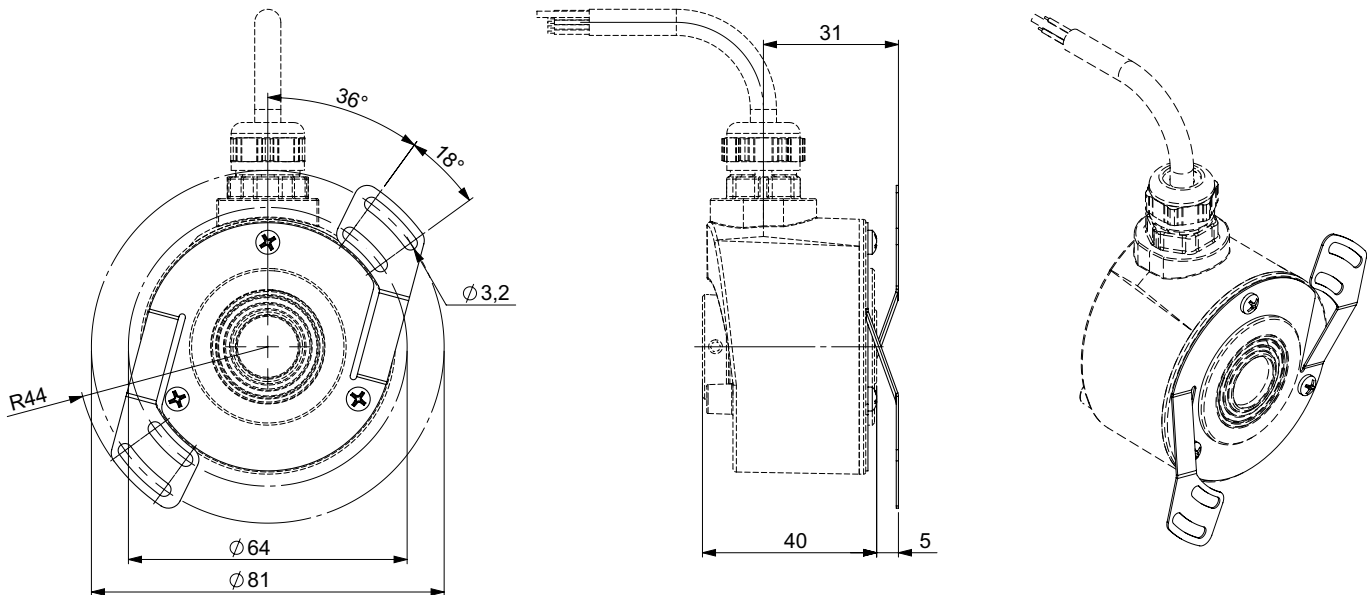
DHK5\_14 Connection G6A (Axial M23), coupling 9445/016 mounted on the body



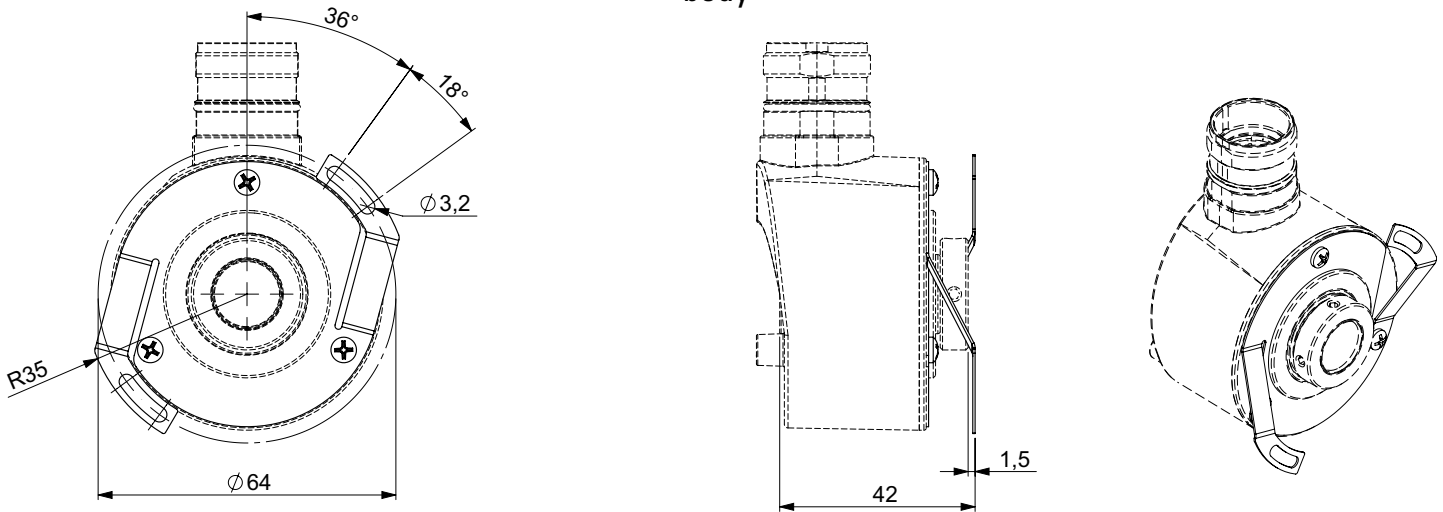
DH05\_14 Standard clamping, Connection G3R (Radial Cable), coupling 9445/012 mounted on the body



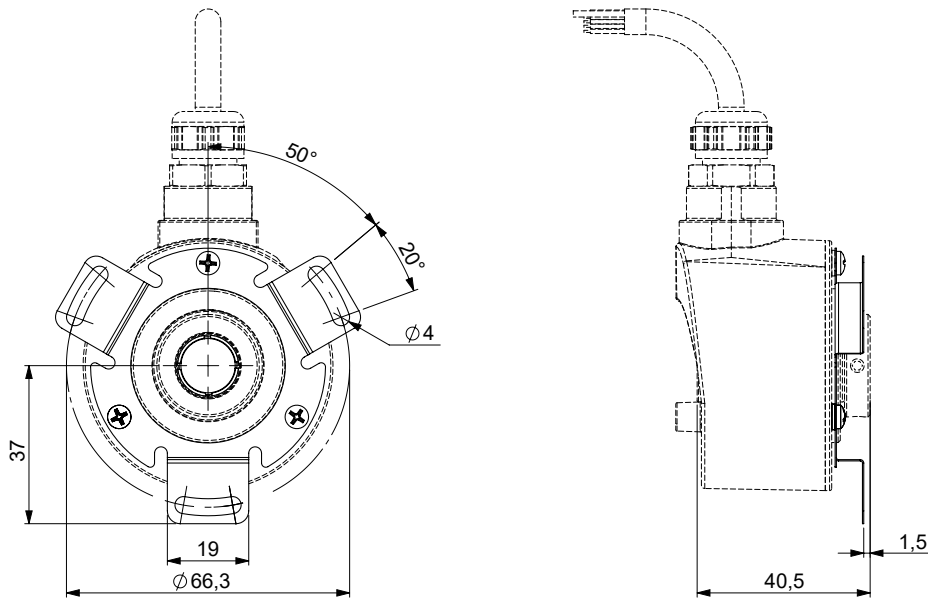
DH05\_14 Standard clamping, Connection G3R (Radial Cable), coupling 9445/015 mounted on the body



DH05S14/OM/ Flange side clamping, Connection G6R (Radial M23)", coupling 9445/016 mounted on the body



DH0514 Flange side clamping, Connection U3R (Radial cable), coupling 9445/068 mounted on the body



Note: 9445/068 coupling is available for replacing the previous HS22 model.

**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**



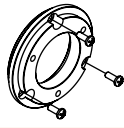
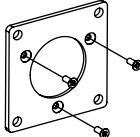
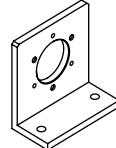
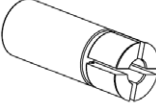
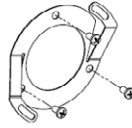
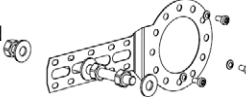
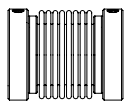
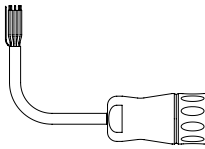




# ORDERING OPTIONS

Example : DHM5\_06//RG59//01024//G3R020//\*\*03\*\*

Family	DHM5	06	/	/	RG5	9	//	01024	//	G3	R	020	//	**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>RG5:</b> 4.75-30V HTL <b>RGX:</b> 4.75-30V Programmable <b>5GT:</b> 11-30V HTL+CTP <b>RG2:</b> 4.75-30V TTL <b>2G2:</b> 5V TTL <b>2WT:</b> 5V Analog 1Vpp <b>RWT:</b> 4.75-30V Analog 1Vpp														
<b>Channels</b>														
<b>9:</b> Digital electronics AA/ BB/ ZZ/ B before A, CW viewed from flange side Z gated A&B <b>N:</b> Analog electronics SS/ CC/ ZZ/ C before S, CW viewed from flange side Z ungated <b>X:</b> Programmable Electronics (RGX) Contact factory for other configurations														
<b>Cycles / Turn</b>														
Contact factory for other configurations														
<b>(Enter Cycles)</b> Standard/Low/High resolutions and Multiplier programmable. See available resolutions in "Resolutions" section. <b>EPROG:</b> Full programmable 1-10kppr (standard index tracks configurations). <b>XPROG:</b> Full programmable 1-10kppr (alternate index tracks configurations).														
<b>Output Termination</b>														
<b>G3:</b> PVC Cable <b>GC:</b> PUR Cable <b>GP:</b> PUR Cable (not UL) <b>TE:</b> Silicone Cable (not UL) <b>GM:</b> M12 <b>G6:</b> M23 12 Pins CW <b>G8:</b> M23 12 Pins CCW														
<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) <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 <b>**D9**:</b> 9445/069 DH05 Stator coupling (for replacing previous HS22 model).													

Description	Part Number		
<b>Synchro flange kit</b> Hardware included 	M9500/003 Other synchro flanges dimensions available on request		
<b>Square flange kit</b> Hardware included 	M9500/005 Other square flanges dimensions available on request		
<b>Mounting bracket</b> Hardware included 	M9202 (Compatible with all models)		
<b>Reduction sleeve</b> 	Insulated (PEEK) DH05 9431/106 9431/108 9431/110 9431/112	Non insulated (Aluminum) DH05    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
<b>Stator coupling kit</b> Hardware included 	P/N M9445/012 M9445/015 M9445/016 M9445/068	Recommended use/Compatibility DH05 DHK5 & DH05 DHK5 & DH05 with /OM/ option DHK5 & DH05 retrofit for HS22	Fixing points 2 4 2 3
Other stator coupling configurations available on request			
<b>Tether arm kit</b> Hardware included 	M9445/047 (Compatible with DHK5 and DH05 models)		
<b>Bellow coupling</b> 	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		
<b>Standard Mating Connector</b> 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-020-012 = M23, PUR cable, 2m RAL-050-020 = M23, PUR cable, 5m RAL-100-028 = M23, PUR cable, 10m	Extension cords compatible with GM connection option: 8230/369 = M12 overmolded, PUR cable, 2m 8230/370 = M12 overmolded, PUR cable, 5m 8230/371 = M12 overmolded, PUR cable, 10m

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