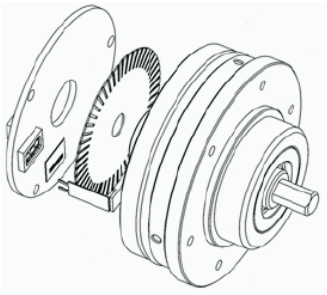
INCREMENTAL ENCODERS

DESCRIPTION

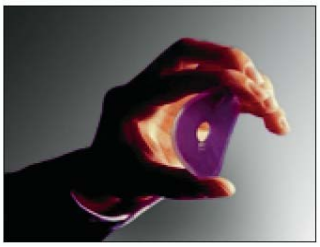


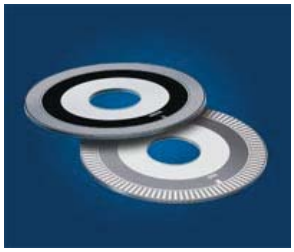
An industrial optical encoder is an angular position sensor:

- The optical disk with dark and clear radial lines is mounted on the rotating shaft of the encoder
- A source of light (light emitting diode - LED) is used. The light from the LED crosses the lines on the disk and creates an analogue signal in the receptor. BEI IDEACOD encoders use the differential reading method, helping to compensate the reduction of the amplitude of the signals due to wearing of the bearings and the optical components age
- This signal is electronically amplified then converted into a numeric signal which can be read by a subsequent electronic control system (PLC, display…)

The incremental encoders simply counts the number of pulses engraved on the disk, they can't memorize their position in case of power shut-down, it is necessary to find out the datum point at each new start of cycle.

Our POLYFASS® disks, mylar-mica composite, are unbreakable. The use of glass disk insures on the *DIGISINE*™ range a high stability level even in high resolutions.





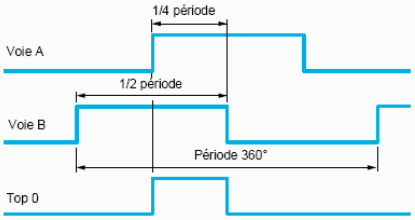
INCREMENTAL ENCODERS ELECTRICAL CARACTERISTICS (AND TACHO-ENCODERS)

A, A/, B, B/, 0, 0/ output signals

Channel B arrives before A in a clockwise direction seen from the shaft side for shafted encoders or bearing housing side for the hollow shaft encoders. The 90° electrical phase-shift between A and B signals determines the rotation direction:

- Clockwise, during the mounting front of A signal, B signal is 1
- Counter clockwise, during the mounting front of A signal, B signal is 0

Period	360° electrical	
''Top 0'' calibration	Gated A &t B	: code 9
	Gated A (1/2 period)	: code A
	On a the B period	: code N



The maximum frequency of the incremental signals delivered by an incremental encoder is 100kHz (300kHz in *DIGISINE*™ version)

F = N x R / 60	Example
F : incremental signal frequency	F = 12,8 kHz
N : rotation speed (rpm)	N = 3 000 rpm
R : resolution (pulses per revolution ppr)r	R = 256 ppr

Most PLCS/counters are equipped with quadrature inputs, which enable them to multiply by 2 or 4 the disk resolution. 10 000 measure steps can be generated with A and B signals of an encoder which has a resolution of 2500 pulses per turn

The resolution of the encoders must be chosen in respect of the precision needed for your application (positioning, speed, 360 pulses per revolution for a degree indication, etc). It is important to check these points.

- the maximum frequency of the outputs signal of the encoders (standard 100 kHz), the frequency is directly related to the resolution and the rotation speed of the shaft
- the maximum frequency which can be read by the subsequent circuitry

SIGNALS USE

1 channel A signals (eventually complemented with A\) are classically used for measuring speed, but without detection of the direction of rotation
2 channels, A and B (possibly complemented with A\ and B\) are used for measuring movements, lengths, angle without absolute position, the detection of the rotation sense is possible as A and B are electrically phase-shifted at 90°
3 channels A, B and 0 signals (complemented with A\, B\ and 0\), are used for the same applications, but with the possibility to control the number of counts with the 0 signal once per revolution. BEI IDEACOD has three different ways in which to gate the 0 channel: in the standard it is gated on A and B, gated on A or un-gated 0 signals are optional

INCREMENTAL ENCODERS – STANDARD RANGE

COMPACTIS™ - 40mm

- The most compact industrial encoder, available with 6mm solid or through shaft
- Adapted for light duty applications
- Encoder T°: –20 to +80°C
- IP52 (GZT4)
- IP54 (GHM4)
- Polyfass© unbreakable disk

DIGISINE™ - 58mm

- The European standard universal encoder
- Encoder T° : –30 to +100°C
- IP65 (IP67 with flange option)
- Glass disk technology insuring a high signals stability in high resolutions
- Available with programmable option

Range - 90mm

- Developed for extreme loads, shocks and vibrations
- Encoder T° –20 to +100°C (+80°C GHU9)
- IP67 DHM9 - IP65 GHU9
- Polyfass© unbreakable disk (GHU)
- Output available : connector, cable gland or terminal box (GHM9)
- *MAXCONTROLE® option* : self-monitoring intelligent encoder

MAXX™ - 200mm

- Developed for heavy industries, such as : steel, glass, cement mills, maritime oil rig…
- Encoder T° –20 to +80°C, cooling flange option
- IP65
- Polyfass© unbreakable disk
- Duplex version available, (double electronic & optical system)

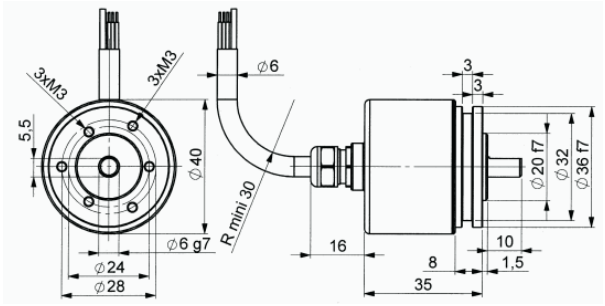
INCREMENTALS		Shaft	Electronic		Channel	Resolution	Connection
		**06** : 6mm **10** : 10mm **11** : 11mm **12** : 12mm **14** : 14mm **30** : 30mm	Power supply: **2** :5Vdc **9** : 5 to 24Vdc **5** : 11 to 30Vdc **R** : 4,75 to 30Vdc **P** : 5 to 30Vdc	Output: **G2** : 5Vdc, RS422 **G5** : push-pull **WT**: sine-cosine 1Vpp Programmable resolution : **P2** : 5Vdc, RS422 **P5** : push-pull	**9**: A, A/ B, B/ 0, 0/ 0 gated A&B	Number of pulses per turn	**GDA**: axial 8pins DIN **G6R**: radial 12 pins CW M23 connector **G8R**: radial 12 pins CCW M23 connector **G3R020**: radial 2m PVC cable **GPR020**: radial 2m PUR cable **GBR** : terminal box, radial cable gland output
	***COMPACTIS™*** **40mm** GHM4	Solid: 06	2G2 9G5 5G5		9	2500 max.	GDA G3R020 GPR020
	***COMPACTIS™*** **40mm** GZT4 – GHT4	Through: 06	2G2 9G5 5G5		9	2500 max.	G3R020 GPR020
	***DIGISINE™*** **58mm** DHM5	Solid : 06 10	RG2 PG5 2WT PP5 RP2		9	80 000 max.	G6R G8R G3R020 GPR020
	***DIGISINE™*** **58mm** DHO5 DHK5	Through: DHO5 : 14 Blind : DHK5 : 15	RG2 PG5 2WT PP5 RP2		9	80 000 max.	G6R G8R G3R020 GPR020
	***DIGISINE™*** **90mm** DHM9	Solid : 11 12	RG2 PG5 2WT PP5 RP2		9	80 000 max.	G6R G8R G3R020 GPR020 GBR
	***ROBUSTECH™*** **90mm** GHU9	Through : 30	2G2 5G2 5G5		9	10 000 max.	G6R G8R G3R020 GPR020
	***MAXX™*** **200mm** GHML	Solid : 14	2G2 5G2 5G5		9	10 000 max.	G6R G8R G3R020 GPR020
Reference example	GHU9_	30 //	5G2		9 //	1024 //	G6R

GHM4

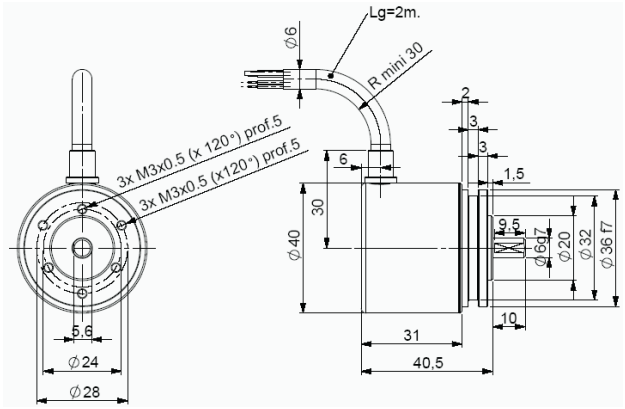
INCREMENTAL ENCODERS, GHM4 RANGE, *COMPACTIS™*

- With its 40mm size and a 6mm solid shaft, this encoder characterizes itself by its strength and robustness of the mechanical and opto-electronic components, it's the most compact truly industrial encoder with a solid shaft
- Coded discs in synthetic material are used: stable and unbreakable (Polyfass™, Mylar-Myca composite)
- Available resolution up to 2 500 counts per turn
- Universal electronics 5 to 24Vdc available
- Application fields : micro-robotics, printing machines, low power DC motors, shears…

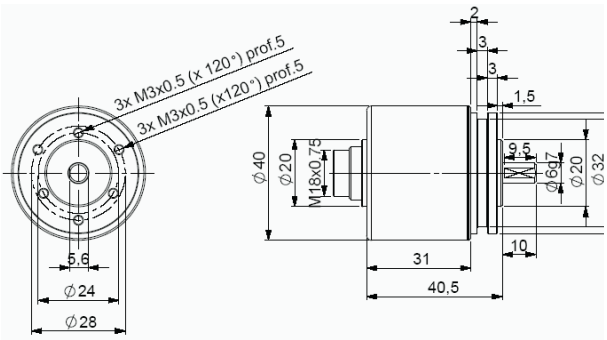
GHM4 connection G3A (axial cable)



GHM4 connection G3R (radial cable)



GHM4 connection G2A / GDA (axial DIN)



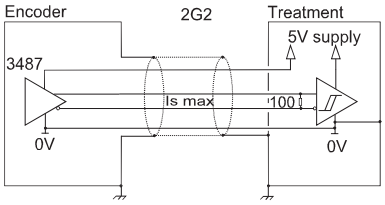
CHARACTERISTICS

Material	Shaft: stainless steel
	Cover: aluminium
	Body: aluminium
Bearings	688 serie
Maximum loads	Axial : 10 N
	Radial : 20 N
Shaft inertia	≤ $0{,}2.10^{-6}$ kg.m²
Torque	≤ 2.10^{-3} N.m
Permissible max. speed	12 000 min^{-1}
Continuous max. speed	9 000 min^{-1}
Encoder weight (approx.)	0,190 kg

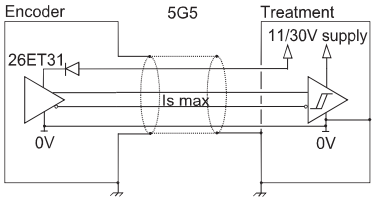
EMC	EN 50082-2 (1995)
	EN 50081-1 (1992)
Isolation	1 000 Veff
Operating temperature	- 20... + 80 °C (encoder T°)
Storage temperature	- 40... + 80 °C
Protection CEI60529 (1989)	IP 54
Shocks (EN60068-2-27)	≤ 300 $m.s^{-2}$ (during 11 ms)
Vibrations (EN60068-2-6)	≤ 100 $m.s^{-2}$ (10 … 500 Hz)
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
5 N / 10 N	263
10 N / 20 N	33

INCREMENTAL ENCODERS, GHM4 RANGE, *COMPACTIS™*

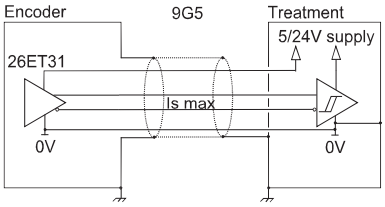
OUTPUT ELECTRONIC / POWER SUPPLY



2G2 electronic (100kHz)
Supply : 5Vdc ± 10%
Cons. without load : 100mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



5G5 electronic (100kHz)
Supply : 11 to 30Vdc
Cons. without load: 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1min (Is=20mA) : V_{oh} = Vcc-3Vdc



9G5 electronic(100kHz)
Supply : 5 to 24Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1min (Is=20mA) : V_{oh} = Vcc-3Vdc

Protection against short circuits of the electronics : 5G5 and 9G5
Protection against inversion of polarity for the electronics : 5G5

STANDARD CONNECTION

		-	+	A	B	0	A/	B/	0/	Ground
G3	PVC cable, 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	Blindage général
GD	DIN Connector 8 pinouts	1	2	3	4	5	6	7	8	Embase connectique
G2	DIN connector 5 pinouts	1	2	3	4	5	/	/	/	Embase connectique

ORDERING REFERENCE (Contact the factory for special versions, ex: special flanges, electronics, connections…)

	Shaft Ø	Available electronics		Output signals	Resolution	Connection	Connection orientation
		2G2, 5G5, 9G5				**GD** : DIN 8pins **G2** : DIN 5pins	**A** : axial
		Supply	Output stage				
GHM4	**06** : 6mm **L6**: 6mm 16mm length (option)	**2** : 5Vdc **5 :** 11 to 30Vdc **9** : 5 to 24Vdc	**G2** : 5Vdc RS422 **G5** : push-pull	**9**:A,A/,B,B/,0,0/ (0 gated A & B) **A**:A,A/,B,B/,0,0/ (0 gated A) **N**:A,A/,B,B/,0,0/ (0 ungated)	**2 500** max	**G3** : PVC cable 8 wires	Example : **R020**: radial cable 2m **A020**: axial cable 2m
Ex:GHM4	**06 //**	**5**	**G5**	**9 //**	**2 500//**	**G3**	**R020**

Available resolutions : *1 2 4 5 6 10 15 16 20 24 25 27 30 35 36 40 50 60 64 75 80 90 96 100 120 125 127 128 150 160 180 200 250 256 300 360 384 400 480 500 512 517 600 720 750 800 1000 1024 2500*

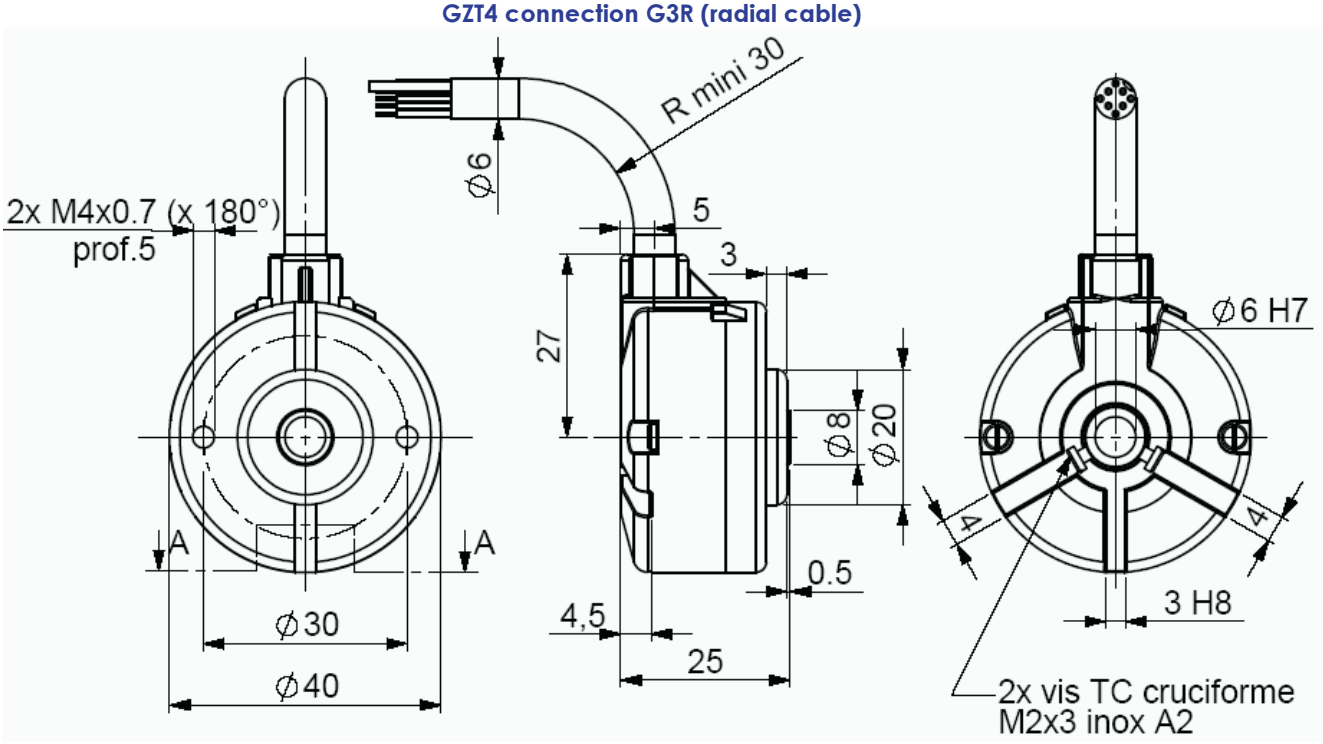
Made in FRANCE

GZT4

INCREMENTAL ENCODERS, GZT4 RANGE, *COMPACTIS™*

- With its 40mm size and a 6mm through shaft, this encoder characterizes itself by its strength and robustness of the mechanical and opto-electronic parts, it's the most compact truly industrial encoder with a through shaft
- Coded discs in synthetic material are used: stable and unbreakable (Polyfass™, Mylar-Myca composite)
- Available resolution up to 1 024 counts per turn (GHT4 option, up to 2 500 counts per turn)
- Universal electronics 5 to 24Vdc available
- Application fields : micro-robotics, printing machines, low power DC motors, shears…

GZT4 connection G3R (radial cable)

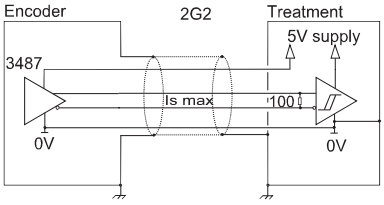


CHARACTERISTICS

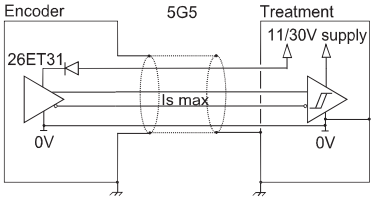
Material	Axe : aluminium
	Capot : zamac
	Embase : zamac
Bearings	688 serie
Maximum loads	Axial : 10 N
	Radial : 20 N
Shaft inertia	≤ 0,1.10^{-6} kg.m^2
Torque	≤ 2.10^{-3} N.m
Permissible max. speed	12 000 min^{-1}
Continuous max. speed	9 000 min^{-1}
Encoder weight (approx.)	0,240 kg

EMC	EN 50082-2 (1995)
	EN 50081-1 (1992)
Isolation	1 000 Veff
Operating temperature	- 20 ... + 80 °C (encoder T°)
Storage temperature	- 40 ... + 80 °C
Protection CEI60529 (1989)	IP 52
Shocks (EN60068-2-27)	≤ 300 m.s^{-2} (during 11 ms)
Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (10 ... 500 Hz)
Torque (shaft pressure screw)	Nominal :0,3N.m ; break : 0,5N.m
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
5 N / 10 N : 260	10 N / 20 N : 33

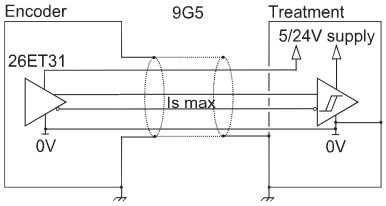
OUTPUT ELECTRONIC / POWER SUPPLY



2G2 electronic (100kHz)
Supply : 5Vdc ± 10%
Cons. without load : 100mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



5G5 electronic (100kHz)
Supply : 11 to 30Vdc
Cons. without load: 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1min (Is=20mA) : V_{oh} = Vcc-3Vdc



9G5 electronic(100kHz)
Supply : 5 to 24Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1min (Is=20mA) : V_{oh} = Vcc-3Vdc

Protection against short circuits of the electronics : 5G5 and 9G5
Protection against inversion of polarity for the electronics : 5G5

STANDARD CONNECTION

		-	+	A	B	0	A/	B/	0/	Ground
G3	PVC cable, 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	Connector body

ORDERING REFERENCE (Contact the factory for special versions , ex: special flanges, electronics, connections…)

	Shaft Ø	Available electronics		Output signals	Resolution	Connectique	Connection orientation
GZT4	**06** : 6mm **04**: 4mm (option) **6.35** : 6.35 mm (option)	**2G2, 5G5, 9G5** **Supply** **2** : 5Vdc **5 :** 11 to 30Vdc **9** : 5 to 24Vdc	**Output stage** **G2** : 5Vdc RS422 **G5** : push-pull	**9**:A,A/,B,B/,0,0/ (0 gated A & B) **A**:A,A/,B,B/,0,0/ (0 gated A) **N**:A,A/,B,B/,0,0/ (0 ungated)	**1 024** max Nota : **2500** with the GHT4	**G3 :** PVC cable 8 wires	Example : **R020**: radial cable 2m
Ex:GZT4	**06** //	**5**	**G5**	**9** //	**1 024** //	**G3**	**R020**

Available resolutions : *1 2 4 5 8 10 16 20 24 25 27 30 36 40 50 60 64 90 100 120 125 128 144 150 170 180 200 250 300 360 400 500 512 600 720 800 1000 1024*

Made in France

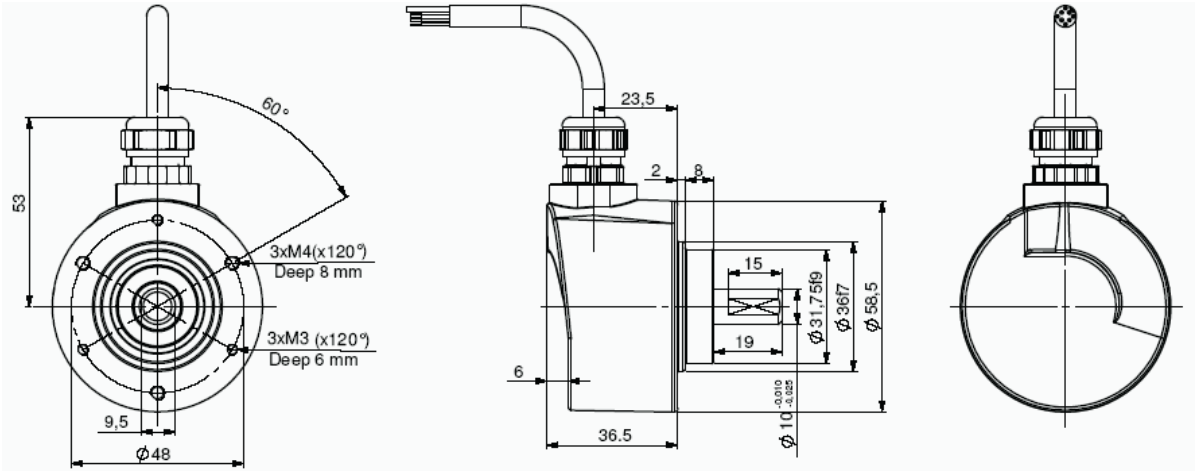
DHM5

FIXED RESOLUTION INCREMENTAL ENCODERS, DHM5 RANGE, 100°C, *DIGISINE*™

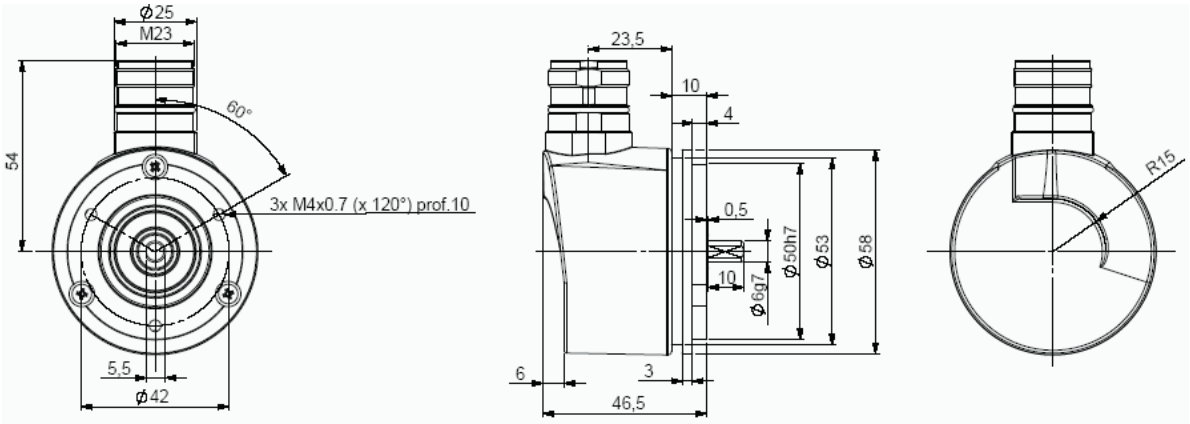
DIGISINE, universal encoders :

- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65, IP67 option with a sealing flange
- High resolutions available : up to 80 000 cpt
- Universal electronic circuits from 5 to 30 Vdc (option 5 to 36Vdc)
- High performances in temperature –30°C to 100°C (option –40°C)
- High performances in frequency of output signals : 300 kHz

DHM5_10 connection G3R (radial cable)



DHM5_06 connection G6R (radial M23), flange 9500/003* mounted on the body

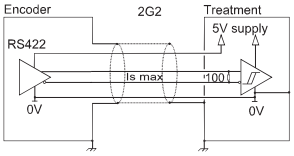


* Accessory to be ordered separately

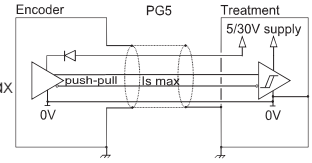
Material	Cover : zinc alloy	Shock (EN60068-2-27)	≤ 500m.s^{-2} (during 6 ms)
	Body : aluminium	Vibration (EN60068-2-6)	≤ 100m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 000 serie	Isolation	1 000 Veff
Maximum loads	Axial : 50 N	Encoder weight (approx.)	0,300 kg
	Radial : 100 N	Operating temperature	- 30 ... + 100 °C (encoder T°)
Shaft inertia	≤ 1.10^{-6} kg.m^2	Storage temperature	- 40 ... + 100 °C
Torque	≤ 4.10^{-3} N.m	Protection (EN 60529)	IP 65 (IP67 with flange option)
Permissible max. speed	12 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Continuous max. speed	9 000 min^{-1}	25 N / 50 N : 99	50 N / 100 N : 12

FIXED RESOLUTION INCREMENTAL ENCODERS, DHM5 RANGE, 100°C ,*DIGISINE™*

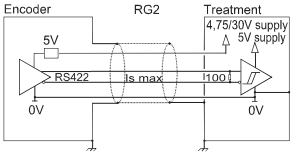
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



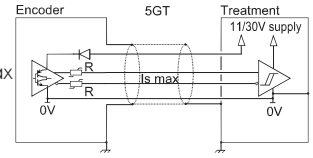
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic PG5 (100°C, 300kHz)
Supply : 5 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

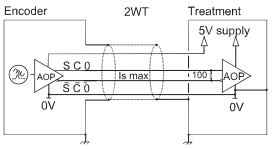


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic 5GT (70°C, 120kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 1,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

SINE WAVE OUTPUT SIGNALS



Electronic 2WT (100°C)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Output signals :
1Vpp (peak to peak)

ELECTRONIC PROTECTIONS

Protection against short circuits of the electronics: 2G2, RG2, PG5, 5GT and 2WT
Protection against reverse polarity for all the electronics except 2G2 and 2WT

Consult us for special electronics : programmable resolution, 5 to 36Vdc, 100mA per channel...

STANDARD CONNECTIONS

		-	+	A	B	0	A/	B/	0/	Ground
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	Connector Body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector Body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions, ex: electronics 5-36V, special flanges, connections...)

	Ø axe	Digital signals (Square wave)				Connection	Connection orientation
		Electronics : 2G2, PG5, RG2 , 5GT		Output signals	resolution		
		Supply	Output stage				
DHM5	**06** : 6mm **10** : 10mm **08** : 8mm (option)	**2** : 5Vdc **5** : 11 to 30Vdc **P** : 5 to 30Vdc **R** : 4.75 to 30Vdc	**G2** : driver 5Vdc RS422 **G5** : push-pull 5-30Vdc **GT** : transistorized push-pull 11-30Vdc	**9** : A,A/,B,B/,0,0/ (0 gated A & B)	**80 000** max	**G6**: M23 12 pins CW **G5** : M23 12 pins CW **G8** : M23 12 pins CCW **G1** : solenoid valve 4 pins **G2** : DIN 5 pins **GD**: DIN 8 pins	**R** : radial
		Sine-wave signals				**GP** : PUR cable 12 wires **G3** : PVC cable 8 wires	Example : **R020** : radial cable 2m
		2: 5Vdc	**WT**: sine 1Vpp	**9**: S,S/,C,C/,Z,Z/	**2 500** max		
Ex: DHM5 _	**10** //	**P**	**G5**	**9** //	**80 000** //	**GP**	**R020**

Available resolutions (100°C electronic) : *50 60 100 120 125 127 150 180 200 240 250 256 300 314 360 375 400 500 512 600 720 750 768 800 927 1000 1024 1200 1250 1280 1440 1500 1800 2000 2048 2400 2500 3000 3600 4000 4096 5000 6000 7200 8000 8192 10000*

Interpolated available resolutions (70°C electronic) : *1080 2560 2880 3072 4320 5120 7500 5760 9000 10240 10800 12000 12500 12288 14400 15000 16000 16384 18000 20000 20480 24000 25000 28800 30000 32000 32768 36000 40000 40960 43200 48000 49152 50000 57600 60000 64000 65536 80000*

Available resolutions sine-wave signals (100°C electronic) : *250 256 360 500 1024 2500*

Nota : The maximal resolution with the 5GT electronic is 5 000 pulses per turn (non available electronic with interpolation)

Made in France

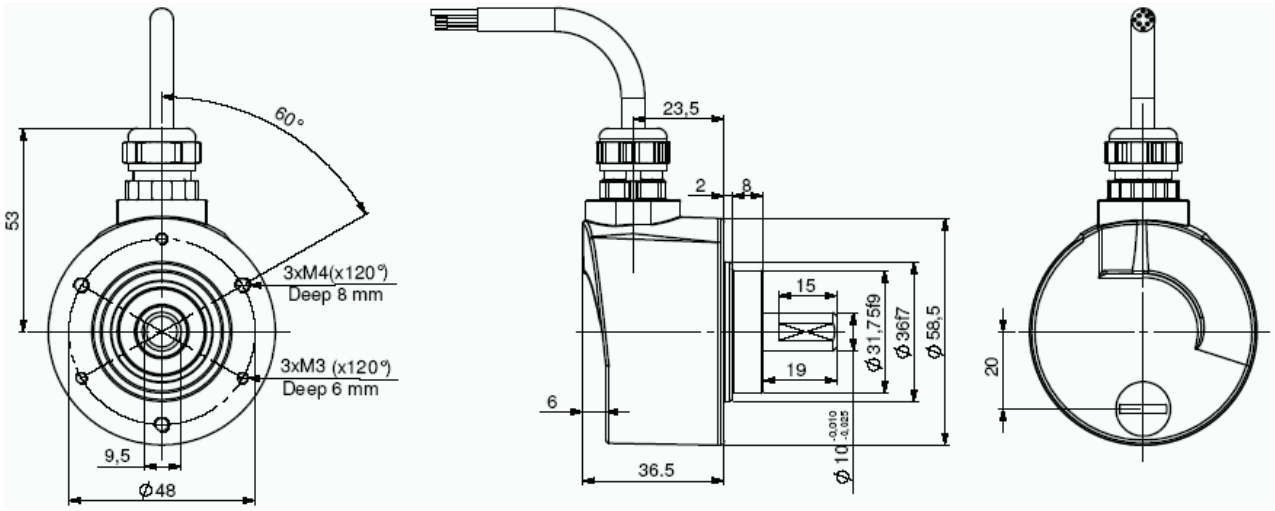
DHM5

PROGRAMMABLE INCREMENTAL ENCODERS, DHM5 RANGE, *DIGISINE*™

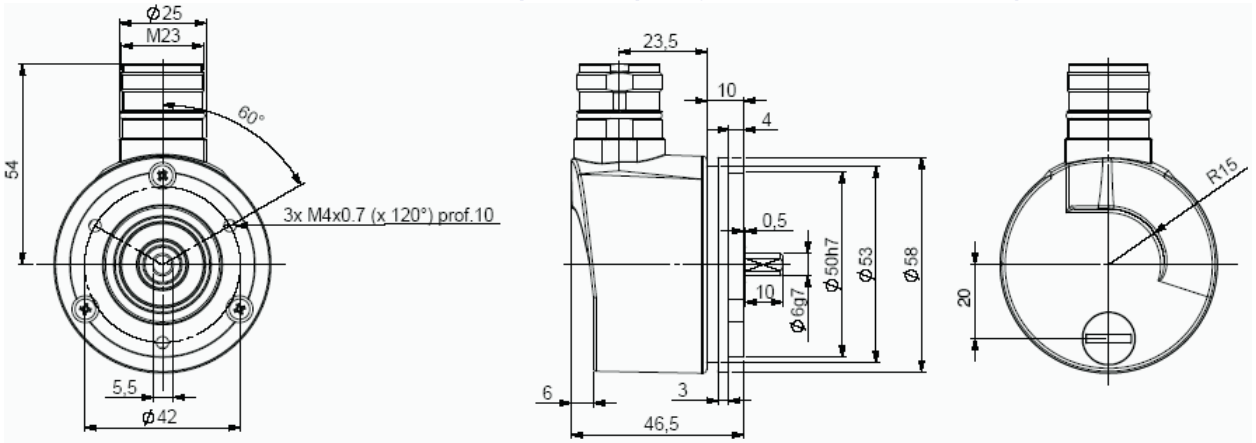
The programmable encoder : ***DIGISINE™,*** unique combination of performance and flexibility

- Easy programming without any specific software or hard-ware
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65, IP67 option with a sealing flange
- High resolutions available : up to 80 000 cpt
- Universal electronic circuits from 5 to 30 Vdc
- High performances in temperature –30°C to +70°C (option –40°C)
- High performances in frequency of output signals : 300 kHz

DHM5_10 connection G3R radial cable



DHM5_06 connection G6R (radial M23), flange 9500/003* mounted on body

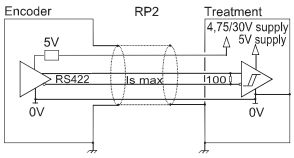


* Accessory to be ordered separately

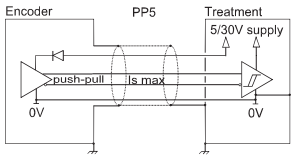
Material	Cover : zinc alloy	Shock (EN60068-2-27)	≤ 500m.s^{-2} (during 6 ms)
	Body : aluminium	Vibration (EN60068-2-6)	≤ 100m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 000 serie	Isolation	1 000 Veff
Maximum loads	Axial : 50 N	Encoder weight (approx.)	0,300 kg
	Radial : 100 N	Operating temperature	- 30 ... + 70 °C (encoder T°)
Shaft inertia	≤ 1.10^{-6} kg.m^2	Storage temperature	- 40 ... + 80 °C
Torque	≤ 4.10^{-3} N.m	Protection(EN 60529)	IP 65 (IP67 with flange option)
Permissible max. speed	12 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Continuous max. speed	9 000 min^{-1}	25 N / 50 N : 99	50 N / 100 N : 12

PROGRAMMABLE INCREMENTAL ENCODERS, DHM5 RANGE, *DIGISINE*™

DIGITAL OUTPUT SIGNALS (SQUARE WAVE)



RP2 electronic (300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel: 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



PP5 electronic (300kHz)
Supply: 5 to 30Vdc
Cons. without load : 75mA max
Current per channel: 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

Protection against short circuits and against reverse polarity for all the electronics

STANDARD CONNECTION

		-	+	A	B	0	A/	B/	0/	Ground
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	Connector body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions, ex: special electronics, flanges, connections...)

	Shaft Ø	Digital signals (Square wave)				Connection	Connection orientation
		Electronic : PP5, RP2		Output signals	Resolution		
		Supply	Output stage				
DHM5	**06** : 6mm **10** : 10mm **08**: 8mm (option)	**R** : 4.75 to 30Vdc **P** : 5 to 30Vdc	**P2** : driver 5Vdc RS422 **P5** : push-pull	**9** : A,A/,B,B/,0,0/ (0 gated A & B)	**5 000** max basic resolution	**G6**: M23 12 pins CW **G5** : M23 12 pins CW **G8** : M23 12 pins CCW **G1**: solenoid valve 4 pins **G2** : DIN 5 pins **GD**: DIN 8 pins	**R** : radial
						G3 : PVC cable 8 wires **GP** : PUR cable 12 wires	Example : **R020** : radial cable 2m
Ex: DHM5 _	**10** //	**P**	**P5**	**9** //	**5 000** //	**GP**	**R020**

AVAILABLE INTERPOLATED RESOLUTIONS

Easy multiplication of the basis resolution of the disk : 1, 2, 3, 4, 5, 8, 10, 12 and 16 times per dip-switch without specific software nor hardware

Interpolation factor	*Basis resolutions*										
	250	***256***	***360***	***500***	***1 024***	***2 500***	***3 000***	***3 600***	***4 000***	***4 096***	***5 000***
X 1	*250*	*256*	*360*	*500*	*1 024*	*2 500*	*3 000*	*3 600*	*4 000*	*4 096*	*5 000*
X 2	*500*	*512*	*720*	*1 000*	*2 048*	*5 000*	*6 000*	*7 200*	*8 000*	*8 192*	*10 000*
X 3	*750*	*768*	*1 080*	*1 500*	*3 072*	*7 500*	*9 000*	*10 800*	*12 000*	*12 288*	*15 000*
X 4	*1 000*	*1 024*	*1 440*	*2 000*	*4 096*	*10 000*	*12 000*	*14 400*	*16 000*	*16 384*	*20 000*
X 5	*1 250*	*1 280*	*1 800*	*2 500*	*5 120*	*12 500*	*15 000*	*18 000*	*20 000*	*20 480*	*25 000*
X 8	*2 000*	*2 048*	*2 880*	*4 000*	*8 192*	*20 000*	*24 000*	*28 800*	*32 000*	*32 768*	*40 000*
X 10	*2 500*	*2 560*	*3 600*	*5 000*	*10 240*	*25 000*	*30 000*	*36 000*	*40 000*	*40 960*	*50 000*
X 12	*3 000*	*3 072*	*4 320*	*6 000*	*12 288*	*30 000*	*36 000*	*43 200*	*48 000*	*49 152*	*60 000*
X 16	*4 000*	*4 096*	*5 760*	*8 000*	*16 384*	*40 000*	*48 000*	*57 600*	*64 000*	*65 536*	*80 000*

switchs position	
factor	CODE SWITCH 1 2 3 4
x 1	ON ■ ■ ■ ■
x 2	ON ■ ■ □ ■
x 3	ON ■ □ □ ■
x 4	ON □ □ □ ■
x 5	ON ■ □ □ ■
x 8	ON ■ □ □ ■
x 10	ON □ □ □ ■
x 12	ON ■ ■ ■ □
x 16	ON ■ □ □ □

Made in France

BEI IDEACOD

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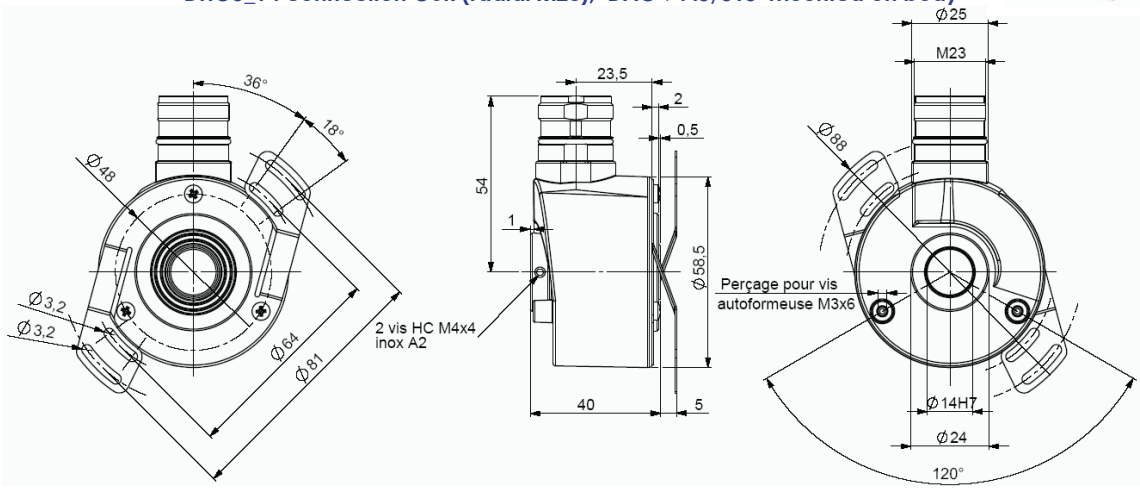
DHO5

FIXED RESOLUTION INCREMENTAL ENCODERS, DHO5 RANGE, 100°C, *DIGISINE*™

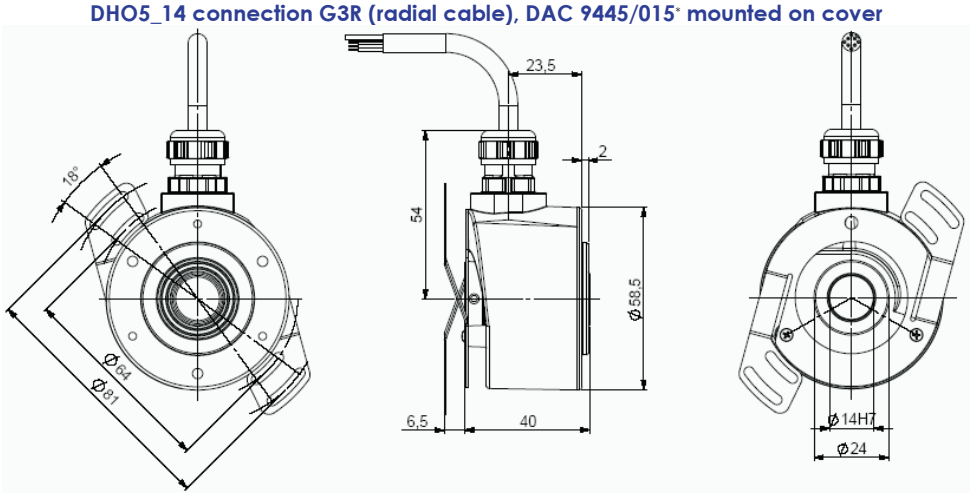
DIGISINE, universal encoders :

- Through hollow shaft version Ø14mm, with reduction hubs in aluminium of 6, 8, 10 and 12 mm
- Easy mounting for the hollow shafts thanks to DAC (Anti-Coupling Device)
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65
- High resolutions available : up to 80 000 cpt
- Universal electronic circuits from 5 to 30 Vdc
- High performances in temperature –30°C to 100°C (option –40°C)
- High performances in frequency of output signals : 300 kHz

DHO5_14 connection G6R (radial M23), DAC 9445/015* mounted on body



DHO5_14 connection G3R (radial cable), DAC 9445/015* mounted on cover



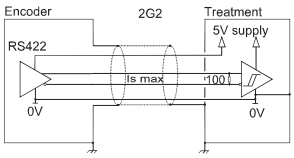
* Accessory to be ordered separately

Material	Cover : zinc alloy
	Body : aluminium
	Shaft : stainless steel
Bearings	6 803 serie
Maximum loads	Axial : 20 N
	Radial : 50 N
Shaft inertia	≤ 2,2.10^{-6} kg.m^2
Torque	≤ 6.10^{-3} N.m
Permissible max. speed	9 000 min^{-1}
Continuous max. speed	6 000 min^{-1}
Shaft seal	Viton

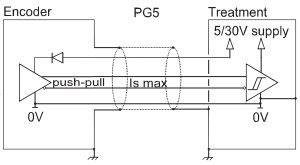
Shocks (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (55 … 2 000 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 V eff
Encoder weight (approx.)	0,300 kg
Operating temperature	- 30 ... + 100°C (encoder T°)
Storage temperature	- 40 ... + 100°C
Protection (EN 60529)	IP 65
Torque (ring pressure screw)	nominal: 1.5 N.m, break: 2.0 N.m
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
10N / 25N : 230	20N / 50N : 29

FIXED RESOLUTION INCREMENTAL ENCODERS, DHO5 RANGE, 100°C, *DIGISINE™*

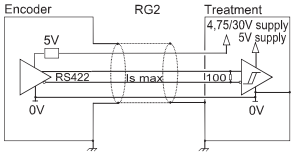
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



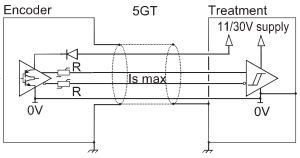
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic PG5 (100°C, 300kHz)
Supply : 5 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

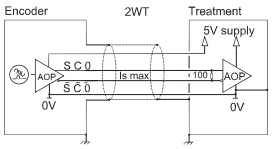


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic 5GT (70°C, 120kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 1,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

SINE WAVE OUTPUT SIGNALS



Electronic 2WT (100°C)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Output signals :
1Vpp (peak to peak)

ELECTRONIC PROTECTIONS

Protection against short circuits of the electronics: 2G2, RG2, PG5, 5GT and 2WT
Protection against reverse polarity for all the electronics except 2G2 and 2WT

Consult us for special electronics : programmable resolution, 100mA per channel...

STANDARD CONNECTIONS

		-	+	A	B	0	A/	B/	0/	Ground
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	Connector Body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector Body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions, ex: electronics, special flanges, connections...)

	Shaft Ø	Digital signals (Square wave)				Connection	Connection orientation
		Electronics : 2G2, PG5, RG2 , 5GT		Output signals	resolution		
		Supply	Output stage			**G6**: M23 12 pins CW **G5** : M23 12 pins CW **G8** : M23 12 pins CCW **G2** : DIN 5 pins **GD**: DIN 8 pins	**R** : radial
DHO5	**14** : 14mm reduction hubs available up to 6mm	**2** : 5Vdc **5** : 11 to 30Vdc **P** : 5 to 30Vdc **R** : 4.75 to 30Vdc	**G2** : driver 5Vdc RS422 **G5** : push-pull 5-30Vdc **GT** : transistorized push-pull 11-30Vdc	**9** : A,A/,B,B/,0,0/ (0 gated A & B)	**80 000** max		
		Sine-wave signals				**GP** : PUR cable 12 wires **G3** : PVC cable 8 wires	Example : **R020** : radial cable 2m
		2: 5Vdc	**WT**: sine 1Vpp	**9**: S,S/,C,C/,Z,Z/	**2 500** max		
Ex: DHO5 _	**14** //	**P**	**G5**	**9** //	**80 000** //	**GP**	**R020**

Available resolutions (100°C electronic) : *50 60 100 120 125 127 150 180 200 240 250 256 300 314 360 375 400 500 512 600 720 750 768 800 927 1000 1024 1200 1250 1280 1440 1500 1800 2000 2048 2400 2500 3000 3600 4000 4096 5000 6000 7200 8000 8192 10000*

Interpolated available resolutions (70°C electronic) : *1080 2560 2880 3072 4320 5120 7500 5760 9000 10240 10800 12000 12500 12288 14400 15000 16000 16384 18000 20000 20480 24000 25000 28800 30000 32000 32768 36000 40000 40960 43200 48000 49152 50000 57600 60000 64000 65536 80000*

Available resolutions sine-wave signals (100°C electronic) : *250 256 360 500 1024 2500*

Nota : The maximal resolution with the 5GT electronic is 5 000 pulses per turn (non available electronic with interpolation)

Made in France

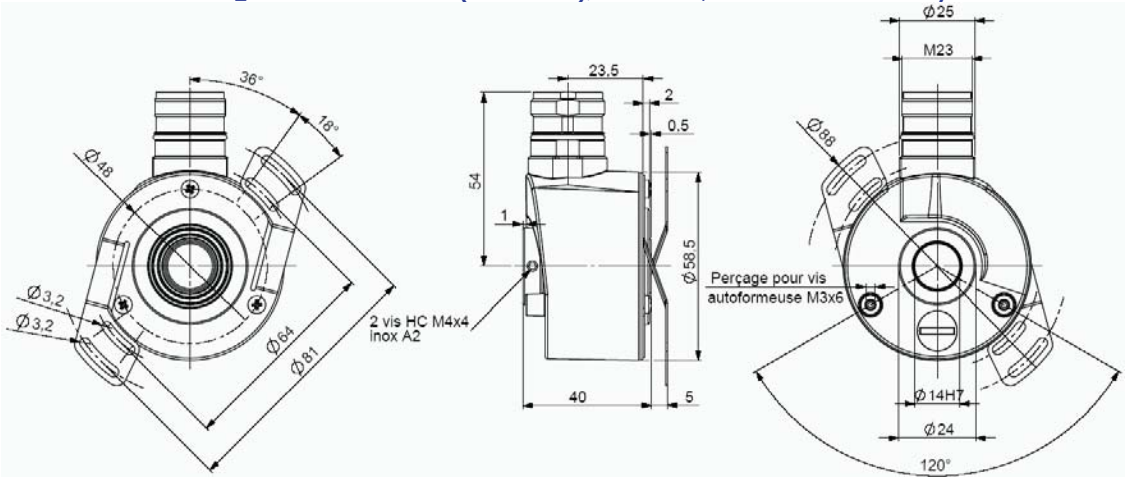
DHO5

PROGRAMMABLE INCREMENTAL ENCODERS, DHO5 RANGE, *DIGISINE*™

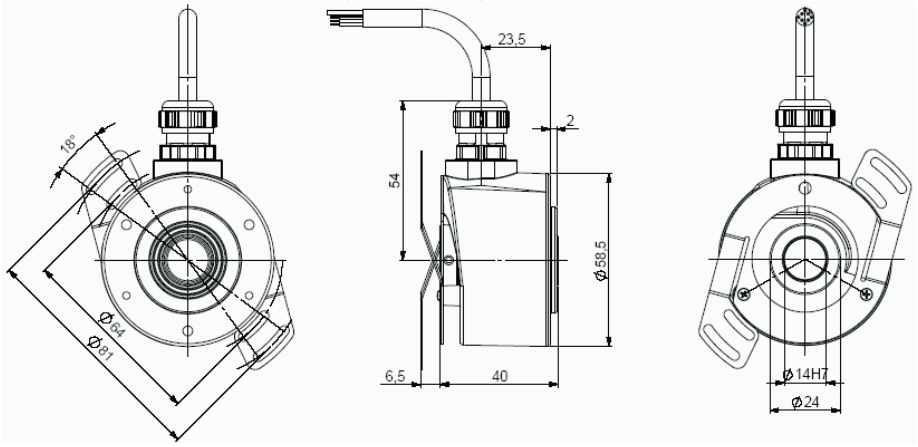
The programmable encoder : ***DIGISINE™,*** unique combination of performance and flexibility

- Easy programming without any specific software or hard-ware
- High resolutions available : up to 80 000 cpt
- Through hollow shaft version Ø14mm, with reduction hubs in aluminium of 6, 8, 10 and 12 mm
- Easy mounting for the hollow shafts thanks to DAC (Anti-Coupling Device)
- Robustness and excellent resistance to shocks / vibrations
- High protection level: standard IP65
- Universal electronic circuits from 5 to 30 Vdc
- High performances in temperature –30°C to +70°C (option –40°C)
- High performances in frequency of output signals : 300 kHz

DHO5_14 connection G6R (radial M23), DAC 9445/015* mounted on body



DHO5_14 connection G3R (radial cable), DAC 9445/015* mounted on cover

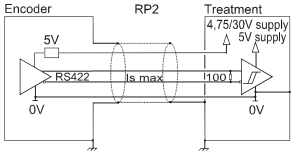


* Accessory to be ordered separately

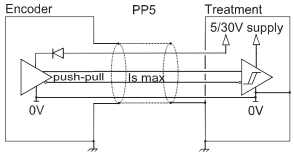
Material	Cover : zinc alloy	Shocks (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
	Body : aluminium	Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 803 serie	Isolation	1 000 V eff
Maximum loads	Axial : 20 N	Encoder weight (approx.)	0,300 kg
	Radial : 50 N	Operating temperature	- 30 ... + 70°C (encoder T°)
Shaft inertia	≤ 2,2.10^{-6} kg.m^2	Storage temperature	- 40 ... + 80°C
Torque	≤ 6.10^{-3} N.m	Protection (EN 60529)	IP 65
Permissible max. speed	9 000 min^{-1}	Torque (ring pressure screw)	nominal: 1.5 N.m, break: 2.0 N.m
Continuous max. speed	6 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shaft seal	Viton	10N / 25N : 230	20N / 50N : 29

PROGRAMMABLE INCREMENTAL ENCODERS, DHO5 RANGE, *DIGISINE*™

DIGITAL OUTPUT SIGNALS (SQUARE WAVE)



RP2 electronic (300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel: 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



PP5 electronic (300kHz)
Supply: 5 to 30Vdc
Cons. without load : 75mA max
Current per channel: 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

Protection against short circuits and against reverse polarity for all the electronics

STANDARD CONNECTION

		-	+	A	B	0	A/	B/	0/	Ground
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	Connector body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions, ex: special electronics, flanges, connections...)

	Shaft Ø	Digital signals (Square wave)				Connection	Connection orientation
		Electronic : PP5, RP2		Output signals	Resolution		
		Supply	Output stage				
DHO5	**14** : 14mm reduction hubs available up to 6mm	**R** : 4.75 to 30Vdc **P** : 5 to 30Vdc	**P2** : driver 5Vdc RS422 **P5** : push-pull	**9** : A,A/,B,B/,0,0/ (0 gated A & B)	**5 000** max basic resolution	**G6**: M23 12 pins CW **G5** : M23 12 pins CW **G8** : M23 12 pins CCW **G2** : DIN 5 pins **GD**: DIN 8 pins	**R** : radial
						G3 : PVC cable 8 wires **GP** : PUR cable 12 wires	Example : **R020** : radial cable 2m
Ex: DHO5 _	**14** //	**P**	**P5**	**9** //	**5 000** //	**GP**	**R020**

AVAILABLE INTERPOLATED RESOLUTIONS

Easy multiplication of the basis resolution of the disk : 1, 2, 3, 4, 5, 8, 10, 12 and 16 times per dip-switch without specific software nor hardware

Interpolation factor	*Basis resolution*										
	250	***256***	***360***	***500***	***1 024***	***2 500***	***3 000***	***3 600***	***4 000***	***4 096***	***5 000***
X 1	*250*	*256*	*360*	*500*	*1 024*	*2 500*	*3 000*	*3 600*	*4 000*	*4 096*	*5 000*
X 2	*500*	*512*	*720*	*1 000*	*2 048*	*5 000*	*6 000*	*7 200*	*8 000*	*8 192*	*10 000*
X 3	*750*	*768*	*1 080*	*1 500*	*3 072*	*7 500*	*9 000*	*10 800*	*12 000*	*12 288*	*15 000*
X 4	*1 000*	*1 024*	*1 440*	*2 000*	*4 096*	*10 000*	*12 000*	*14 400*	*16 000*	*16 384*	*20 000*
X 5	*1 250*	*1 280*	*1 800*	*2 500*	*5 120*	*12 500*	*15 000*	*18 000*	*20 000*	*20 480*	*25 000*
X 8	*2 000*	*2 048*	*2 880*	*4 000*	*8 192*	*20 000*	*24 000*	*28 800*	*32 000*	*32 768*	*40 000*
X 10	*2 500*	*2 560*	*3 600*	*5 000*	*10 240*	*25 000*	*30 000*	*36 000*	*40 000*	*40 960*	*50 000*
X 12	*3 000*	*3 072*	*4 320*	*6 000*	*12 288*	*30 000*	*36 000*	*43 200*	*48 000*	*49 152*	*60 000*
X 16	*4 000*	*4 096*	*5 760*	*8 000*	*16 384*	*40 000*	*48 000*	*57 600*	*64 000*	*65 536*	*80 000*

switchs position	
factor	CODE SWITCH 1 2 3 4
x 1	ON ■ □ □ □
x 2	ON ■ ■ □ □
x 3	ON ■ □ ■ □
x 4	ON □ ■ ■ □
x 5	ON ■ ■ ■ □
x 8	ON ■ □ □ ■
x 10	ON ■ ■ □ ■
x 12	ON ■ □ ■ ■
x 16	ON □ ■ ■ ■

Made in France

BEI IDEACOD

www.bei-ideacod.com

DHO5

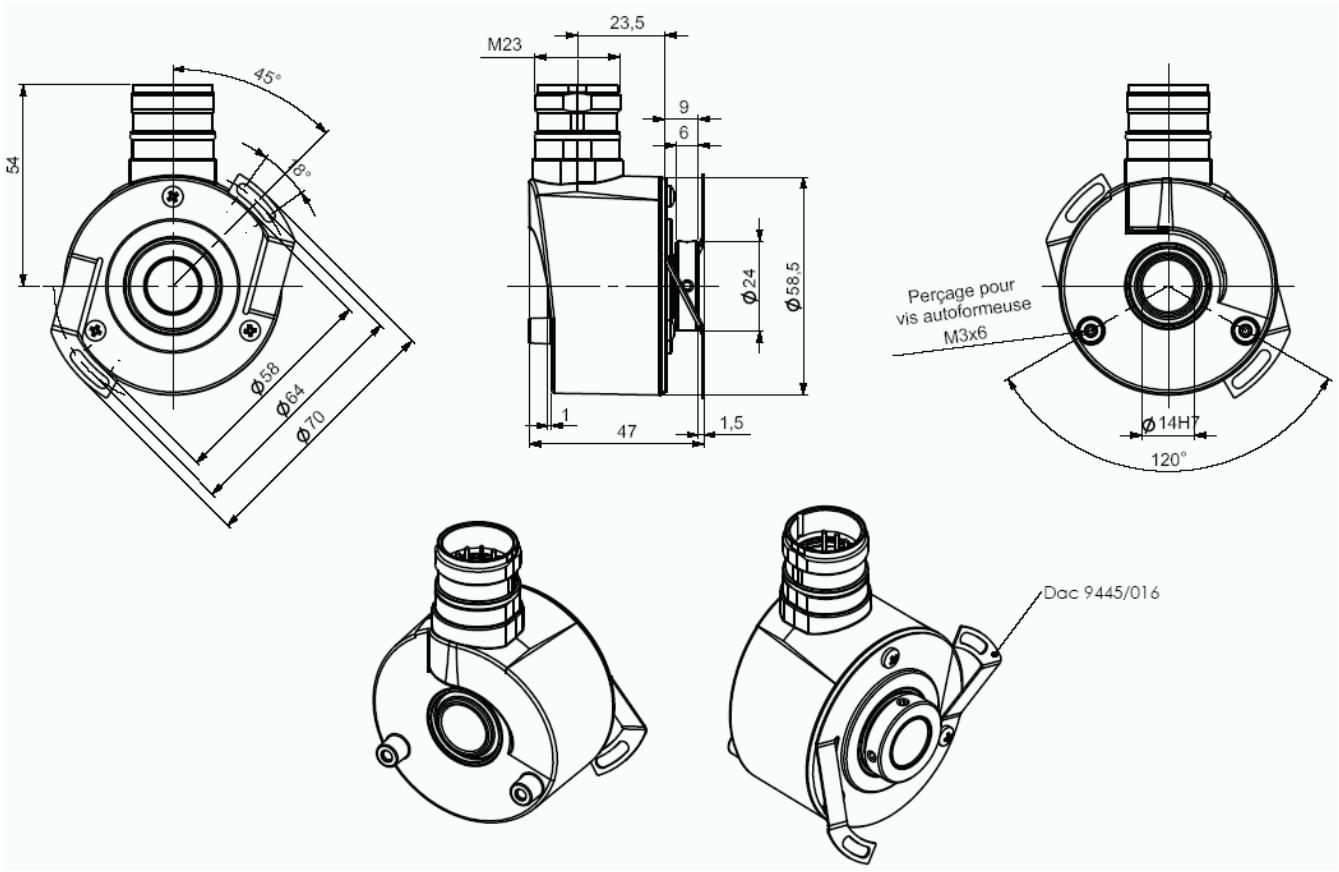
FIXED RESOLUTION INCREMENTAL ENCODERS, DHO5S14/OM RANGE, 100°C, *DIGISINE*™

THROUGH SHAFT ENCODER, TIGHTENING SHAFT RING AT THE LEVEL OF THE BODY SIDE

DIGISINE, universal encoders :

- Through hollow shaft version Ø14mm, with reduction hubs in aluminium of 6, 8, 10 and 12 mm
- Easy mounting for the hollow shafts thanks to DAC (Anti-Coupling Device)
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65
- High resolutions available : up to 80 000 cpt
- Universal electronic circuits from 5 to 30 Vdc
- High performances in temperature –30°C to 100°C (option –40°C)
- High performances in frequency of output signals : 300 kHz

DHO5S14/OM connection G6R (radial M23), DAC 9445/016* mounted on the body

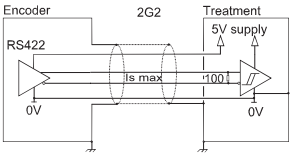


* Accessory to be ordered separately

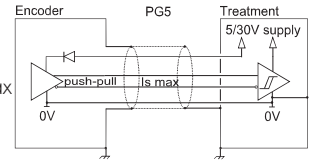
Material	Cover : zinc alloy	Shocks (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
	Body : aluminium	Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 803 serie	Isolation	1 000 V eff
Maximum loads	Axial : 20 N	Encoder weight (approx.)	0,300 kg
	Radial : 50 N	Operating temperature	- 30 ... + 100°C (encoder T°)
Shaft inertia	≤ 2,2.10^{-6} kg.m^2	Storage temperature	- 40 ... + 100°C
Torque	≤ 6.10^{-3} N.m	Protection (EN 60529)	IP 65
Permissible max. speed	9 000 min^{-1}	Torque (ring pressure screw)	nominal: 1.5 N.m, break: 2.0 N.m
Continuous max. speed	6 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shaft seal	Viton	10N / 25N : 230	20N / 50N : 29

FIXED RESOLUTION INCREMENTAL ENCODERS, DHO5S14/OM RANGE, 100°C, *DIGISINE™*

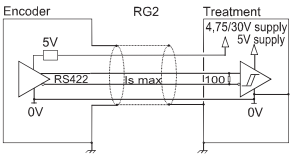
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



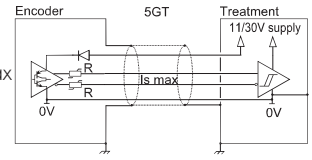
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic PG5 (100°C, 300kHz)
Supply : 5 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

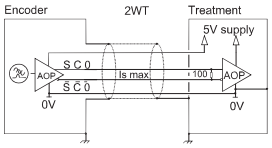


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic 5GT (70°C, 120kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 1,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

SINE WAVE OUTPUT SIGNALS



Electronic 2WT (100°C)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Output signals :
1Vpp (peak to peak)

ELECTRONIC PROTECTIONS

Protection against short circuits of the electronics: 2G2, RG2, PG5, 5GT and 2WT
Protection against reverse polarity for all the electronics except 2G2 and 2WT

Consult us for special electronics : programmable resolution, 100mA per channel...

STANDARD CONNECTIONS

		-	+	A	B	0	A/	B/	0/	Ground
G6	12 pins CW	1	2	3	4	5	6	7	8	Connector Body
G8	12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector Body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions, ex: electronics, special flanges, connections...)

	Shaft Ø	Ring	Digital signals (Square wave)				Connectique	Connection orientation
			Electronics : 2G2, PG5, RG2 , 5GT		Output signals	resolution		
			Supply	Output stage				
DHO5S	**14** : 14mm reduction hubs available up to 6mm	Ring at the level of the body side	**2**: 5Vdc **5**: 11 to 30Vdc **P**: 5 to 30Vdc **R**: 4.75 to 30Vdc	**G2** : driver 5Vdc RS422 **G5** : push-pull 5-30Vdc **GT** : transistorized push-pull 11-30Vdc	**9** : A,A/,B,B/,0,0/ (0 gated A & B)	**80 000** max	**G6**: M23 12 pins CW **G5** : M23 12 pins CW **G8** : M23 12 pins CCW **G2** : DIN 5 pins **GD**: DIN 8 pins	**R** : radial
			Sine-wave signals				**GP** : PUR cable 12 wires **G3** : PVC cable 8 wires	Example : **R020** : radial cable 2m
			2: 5Vdc	**WT**: sine 1Vpp	**9** : S,S/,C,C/,Z,Z/	**2 500** max		
Ex:DHO5S	**14**	**/ OM /**	**P**	**G5**	**9**	**// 80 000//**	**GP**	**R020**

Available resolutions (100°C electronic) : *50 60 100 120 125 127 150 180 200 240 250 256 300 314 360 375 400 500 512 600 720 750 768 800 927 1000 1024 1200 1250 1280 1440 1500 1800 2000 2048 2400 2500 3000 3600 4000 4096 5000 6000 7200 8000 8192 10000*

Interpolated available resolutions (70°C electronic) : *1080 2560 2880 3072 4320 5120 7500 5760 9000 10240 10800 12000 12500 12288 14400 15000 16000 16384 18000 20000 20480 24000 25000 28800 30000 32000 32768 36000 40000 40960 43200 48000 49152 50000 57600 60000 64000 65536 80000*

Available resolutions sine-wave signals (100°C electronic) : *250 256 360 500 1024 2500*

Nota : The maximal resolution with the 5GT electronic is 5 000 pulses per turn (non available electronic with interpolation)

Made in France

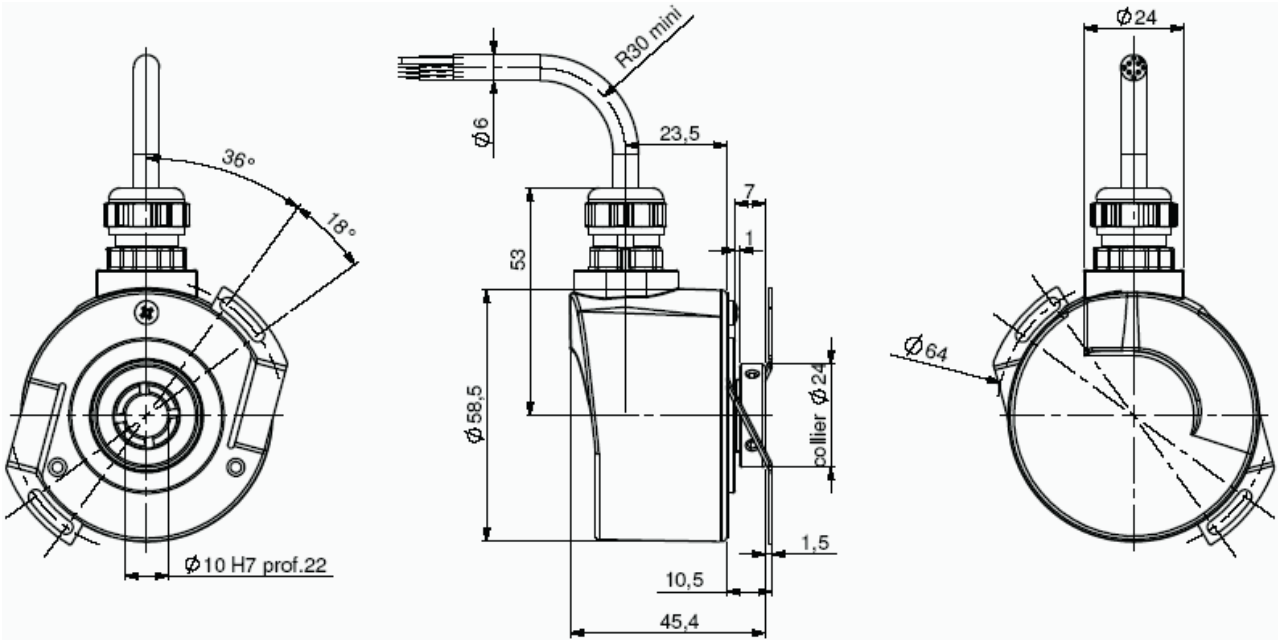
DHK5

FIXED RESOLUTION INCREMENTAL ENCODERS, DHK5 RANGE, 100°C, *DIGISINE*™

DIGISINE, universal encoders :

- Blind shaft version Ø14mm (6, 8, 10 and 12 mm also available)
- Easy mounting for the hollow shafts thanks to DAC (Anti-Coupling Device)
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65
- High resolutions available : up to 80 000 cpt
- Universal electronic circuits from 5 to 30 Vdc
- High performances in temperature –30°C to 100°C (option –40°C)
- High performances in frequency of output signals : 300 kHz

DHK5_10 connection G3R (radial cable), DAC 9445/016* mounted on the body



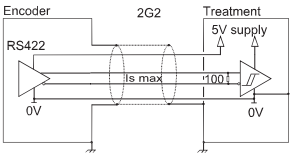
Minimum shaft depth : 12mm for optimal centring

* Accessory to be ordered separately

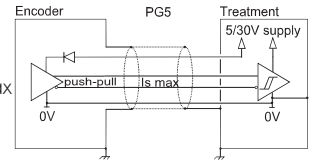
Material	Cover : zinc alloy	Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (55 … 2 000 Hz)
	Body : aluminium	EMC	EN 50081-1, EN 61000-6-2
	Shaft : stainless steel	Isolation	1 000 V eff
Bearings	6 803 serie	Encoder weight (approx.)	0,300 kg
Maximum loads	Axial : 20 N	Operating temperature	- 30 ... + 100°C (encoder T°)
	Radial : 50 N	Storage temperature	- 40 ... + 100°C
Shaft inertia	≤ 2,2.10^{-6} kg.m^2	Protection (EN 60529)	IP 65
Torque	≤ 6.10^{-3} N.m	Torque (ring pressure screw)	nominal: 1.5 N.m, break: 2.0 N.m
Permissible max. speed	9 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Continuous max. speed	6 000 min^{-1}	10N / 25N	230
Shocks (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)	20N / 50N	29

FIXED RESOLUTION INCREMENTAL ENCODERS, DHK5 RANGE, 100°C, *DIGISINE™*

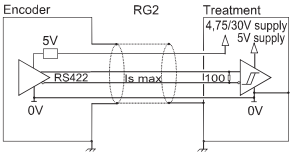
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



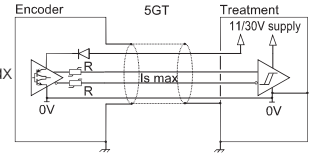
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic PG5 (100°C, 300kHz)
Supply : 5 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

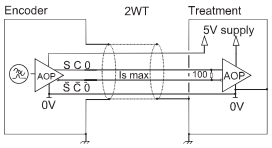


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic 5GT (70°C, 120kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 1,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

SINE WAVE OUTPUT SIGNALS



Electronic 2WT (100°C)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Output signals :
1Vpp (peak to peak)

ELECTRONIC PROTECTIONS

Protection against short circuits of the electronics: 2G2, RG2, PG5, 5GT and 2WT
Protection against reverse polarity for all the electronics except 2G2 and 2WT

Consult us for special electronics : programmable resolution, 100mA per channel...

STANDARD CONNECTIONS

		-	+	A	B	0	A/	B/	0/	Ground
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	Connector Body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector Body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions, ex: electronics, special flanges, connections...)

	Shaft Ø	Digital signals				Connection	Connection orientation
		Electronics : 2G2, PG5, RG2 , 5GT		Output signals	resolution		
		Supply	Output stage				
DHK5	**14** : 14mm reduction hubs available up to 6mm	**2** : 5Vdc **5** : 11 to 30Vdc **P** : 5 to 30Vdc **R** : 4.75 to 30Vdc	**G2** : driver 5Vdc RS422 **G5** : push-pull 5-30Vdc **GT** : transistorized push-pull 11-30Vdc	**9** : A,A/,B,B/,0,0/ (0 gated A & B)	**80 000** max	**G6**: M23 12 pins CW **G5** : M23 12 pins CW **G8** : M23 12 pins CCW **G2** : DIN 5 pins **GD**: DIN 8 pins	**R** : radial
		Sine-wave signals				**GP** : PUR cable 12 wires **G3** : PVC cable 8 wires	Example : **R020** : radial cable 2m
		2: 5Vdc	**WT**: sinus 1Vpp	**9**: S,S/,C,C/,Z,Z/	**2 500** max		
Ex: DHK5 _	**14 //**	**P**	**G5**	**9 //**	**80 000 //**	**GP**	**R020**

Available resolutions (100°C electronic) : *50 60 100 120 125 127 150 180 200 240 250 256 300 314 360 375 400 500 512 600 720 750 768 800 927 1000 1024 1200 1250 1280 1440 1500 1800 2000 2048 2400 2500 3000 3600 4000 4096 5000 6000 7200 8000 8192 10000*

Interpolated available resolutions (70°C electronic) : *1080 2560 2880 3072 4320 5120 7500 5760 9000 10240 10800 12000 12500 12288 14400 15000 16000 16384 18000 20000 20480 24000 25000 28800 30000 32000 32768 36000 40000 40960 43200 48000 49152 50000 57600 60000 64000 65536 80000*

Available resolutions sine-wave signals (100°C electronic) : *250 256 360 500 1024 2500*

Nota : The maximal resolution with the 5GT electronic is 5 000 pulses per turn (non available electronic with interpolation)

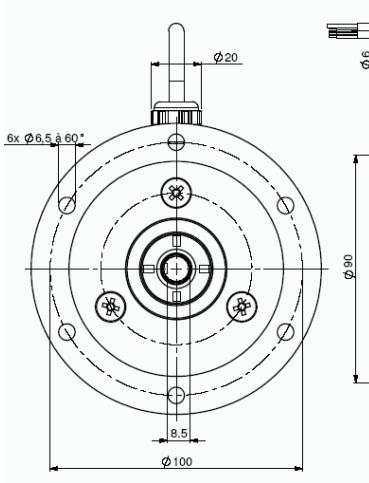
Made in France

DHM9

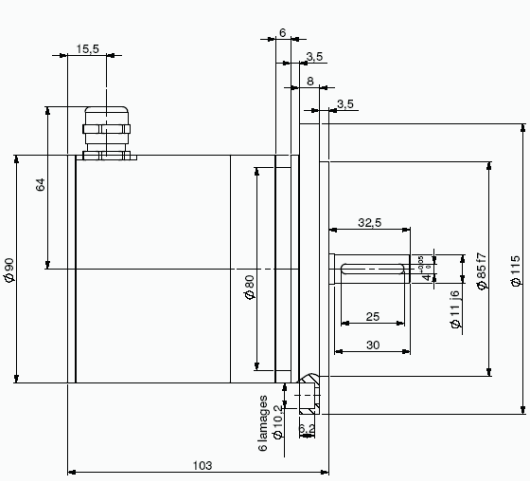
INCREMENTAL ENCODERS, DHM9 RANGE 100°C, *DIGISINE™*

- Especially designed for heavy-duty (steel, paper, wood – mills, cranes …) Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads
- High performances in temperature –30°C to 100°C (option –40°C)
- High protection level: IP 67 (cable), IP 66 (connector)
- Universal electronic circuits from 5 to 30 Vdc (option 5 to 36Vdc)
- High resolutions: up to 80 000 cpt (Programmable resolutions option)
- Connection with terminal box, cable or connector output
- Square or sine wave available
- Mechanical overspeed switch option
- 12mm solid shaft or 11mm with REO 115mm flange (Euroflange B10) for tacho-generator mounting

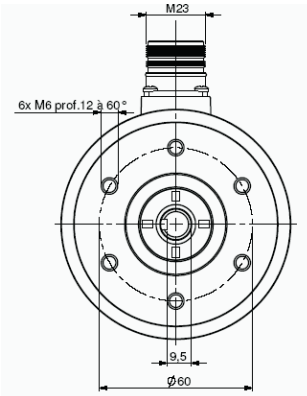
DHM9_11 connection G3R (radial cable)



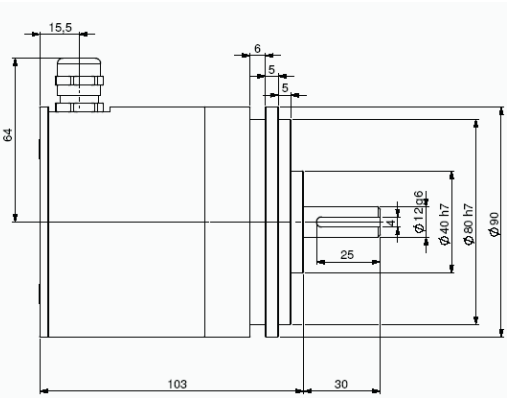
DHM9_11 connection GBR (terminal box)



DHM9_12 connection G6R (radial M23)



DHM9_12 connection GBR (terminal box)



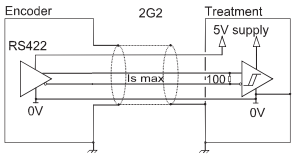
Material (cable or connector version), Stainless steel option	Cover : zinc alloy
	Body : aluminium
Material (terminal box version), Stainless steel option	Cover: treated alu.
	Body: aluminium
Shaft material	Stainless steel
Bearings	6001 serie
Maximum loads	Axial : 100 N
	Radial : 200 N
Shaft inertia	≤ 15.10^{-6} kg.m²
Torque	≤ 10.10^{-3} N.m
Permissible max. speed	9 000 min^{-1}
Continuous max. speed	6 000 min^{-1}
Shaft seal	Viton double lips

Shocks (EN60068-2-27)	≤ 500 $m.s^{-2}$ (during 6ms)
Vibrations (EN60068-2-6)	≤ 200 $m.s^{-2}$ (10 … 1 000 Hz)
EMC	EN 61000-6-4, EN 61000-6-2
Isolation	1 000 V eff
Encoder weight (approx.) Cable or connector version	1,100kg zinc alloy cover, alu. body
	2,600kg stainless steel cover & body
Encoder weight (approx.) Terminal box version	1,300kg aluminium cover & body
	2,800kg stainless steel cover & body
Operating temperature	- 30 ... + 100 °C (encoder T°)
Storage temperature	- 40 ... + 100 °C
Protection(EN 60529)	IP 67 (cable), IP 66 (connector)

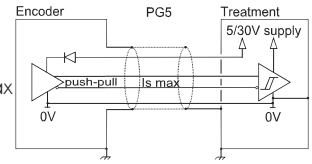
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})		
20 N / 30 N : 360	50 N / 100 N : 18	100 N / 200 N: 2,2

INCREMENTAL ENCODERS, DHM9 RANGE 100°C, *DIGISINE™*

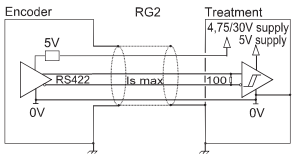
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



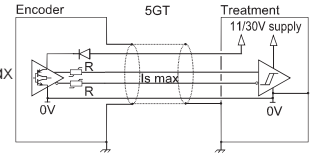
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic PG5 (100°C, 300kHz)
Supply : 5 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

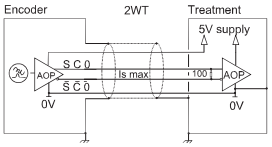


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



Electronic 5GT (70°C, 120kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 1,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

SINE WAVE OUTPUT SIGNALS



Electronic 2WT (100°C)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Output signals :
1Vpp (peak to peak)

ELECTRONIC PROTECTIONS

Protection against short circuits of the electronics: 2G2, RG2, PG5, 5GT and 2WT
Protection against reverse polarity for all the electronics except 2G2 and 2WT

Consult us for special electronics : programmable resolution, 5 to 36Vdc, 100mA per channel...

STANDARD CONNECTIONS

		-	+	A	B	0	A/	B/	0/	Ground
GB	Terminal box	1	2	3	4	5	6	7	8	On cable gland
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	Connector Body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector Body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions, ex: electronics 5-36V, special flanges, connections...)

	Shaft Ø	Digital signals (Square wave)				Connection	Connection orientation
		Electronics : 2G2, PG5, RG2 , 5GT		Output signals	resolution		
		Supply	Output stage				
DHM9 **DBM9** Stainless steel body **DXM9** Stainless steel cover and body	**11**:11mm **12** : 12mm	**2** : 5Vdc **5** : 11 to 30Vdc **P** : 5 to 30Vdc **R** : 4.75 to 30Vdc	**G2** : driver 5Vdc RS422 **G5** : push-pull 5-30Vdc **GT** : transistorized push-pull 11-30Vdc	**9** : A,A/,B,B/,0,0/ (0 gated A & B)	**80 000** max	**G6**: M23 12 pins CW **G5** : M23 12 pins CW **G8** : M23 12 pins CCW **GB** : terminal box	**R** : radial **A** : axial
		Sine-wave signals				**GP** : PUR cable 12 wires **G3** : PVC cable 8 wires	Example : **R020** : radial cable 2m **A020**: axial cable 2m
		2: 5Vdc	**WT**: sine 1Vpp	**9**: S,S/,C,C/,Z,Z/	**2 500** max		
Ex: DHM9 _	**12** //	**P**	**G5**	**9** //	**80 000**//	**GP**	**R020**

Available resolutions (100°C electronic) : *50 60 100 120 125 127 150 180 200 240 250 256 300 314 360 375 400 500 512 600 720 750 768 800 927 1000 1024 1200 1250 1280 1440 1500 1800 2000 2048 2400 2500 3000 3600 4000 4096 5000 6000 7200 8000 8192 10000*

Interpolated available resolutions (70°C electronic) : *1080 2560 2880 3072 4320 5120 7500 5760 9000 10240 10800 12000 12500 12288 14400 15000 16000 16384 18000 20000 20480 24000 25000 28800 30000 32000 32768 36000 40000 40960 43200 48000 49152 50000 57600 60000 64000 65536 80000*

Available resolutions sine-wave signals (100°C electronic) : *250 256 360 500 1024 2500*

Nota : The maximal resolution with the 5GT electronic is 5 000 pulses per turn (non available electronic with interpolation)

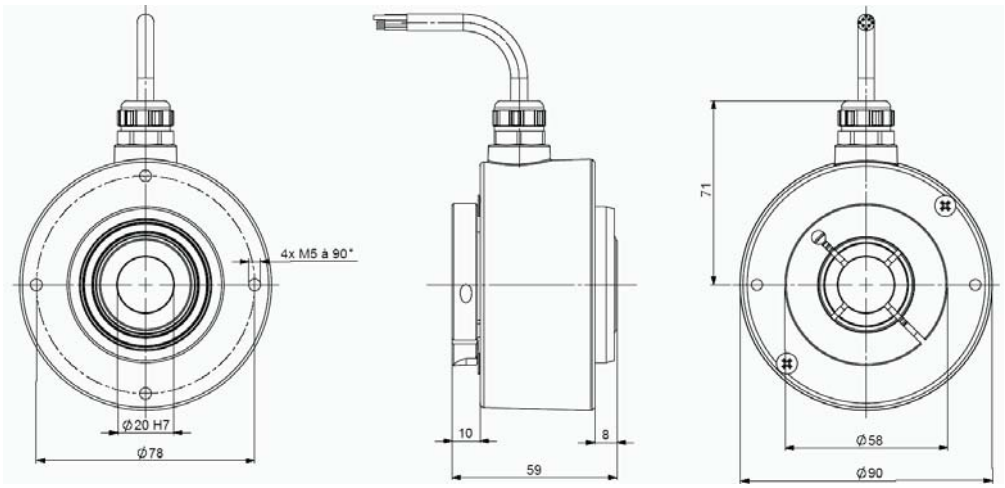
Made in France

GHU9

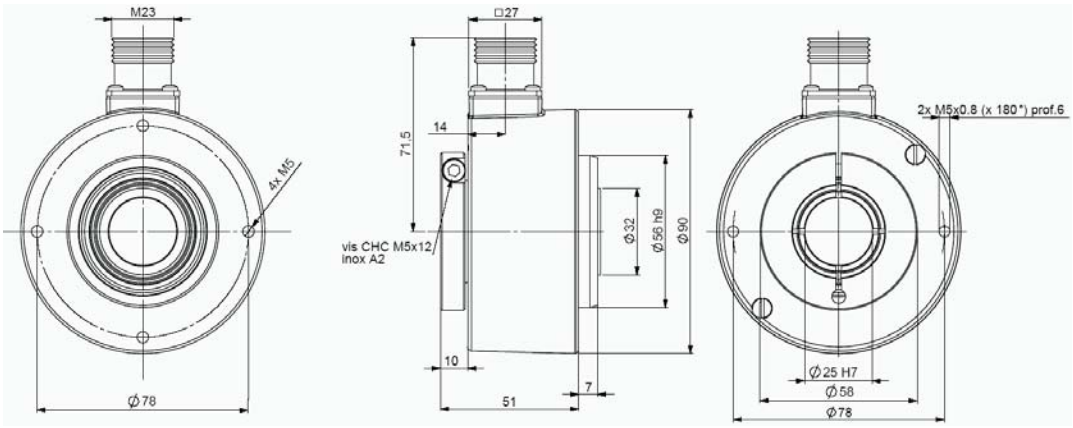
INCREMENTAL ENCODERS, GHU9 RANGE, *ROBUSTECH™*

- Especially designed for heavy-duty (steel, paper, wood – mills, cranes…), compact and robust conception, its connection can be done with industrial connector or shield cable
- Various standard and specials electronics: push-pull 11-30V (HTL) & 5VRS422 (TTL); for long, high capacity cables: push-pull 11-30V transistorised
- Hollow shaft of up to 30mm, adaptation of the bore size with composite hub for thermal and electric insulation (aluminium hubs in option)
- Digital incremental signals, option - analogue output signals (Tachoencoders , optotachos)
- Self-monitoring MaxControl (optional) : detection of shocks, vibrations, temperatures
- Double/triple mounting in combinations of incremental, absolute, analogue signals, mechanical over-speed switch

GHU9_20 connection G3R (radial cable output), with reduction hub 9418/I20 mounted in the shaft



GHU9_25 connection G6R (radial M23), with reduction hub 9418/I25 mounted in the shaft



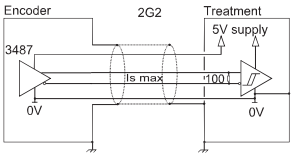
Material Stainless steel option	Cover : zinc alloy
	Body : aluminium
Shaft	Inox
Bearings	6807 serie
Maximum loads	Axial : 50 N
	Radial : 80 N
Shaft inertia moment	≤ 55.10^{-6} kg.m^2
Torque	≤ 25.10^{-3} N.m
Permissible max. speed	6 000 min^{-1}
Continuous max. speed	3 600 min^{-1}
Shaft seal	Viton
Shocks (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)

Vibration (EN60068-2-6)	≤ 200 m.s^{-2} (10 … 1 000 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 Veff
Encoder weight (approx.)	0,700kg zinc alloy cover, alu body
	1,000kg zinc alloy cover, stainless steel body
	1,200kg stainless steel cover and body
Operating temperature	- 20 ... + 80 °C (Encoder T°)
Storage temperature	- 40 ... + 80 °C
Protection (EN 60529)	IP 65
Torque (ring screw)	nominal: 3N.m, break: 4N.m
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
25 N / 40 N: 140	50 N / 80 N : 17

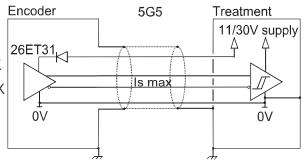
GHU9

INCREMENTAL ENCODERS, GHU9 RANGE, *ROBUSTECH™*

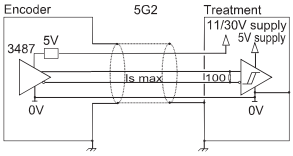
OUTPUT ELECTRONIC / SUPPLY



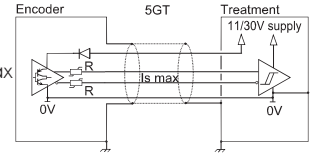
2G2 electronic (100kHz)
Supply : 5Vdc ± 10%
Cons. without load : 100mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



5G5 electronic (100kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-3Vdc



5G2 electronic (100kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



5GT electronic, optional (100kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

Electronics 5GT is designed for long and high capacity cables (contact our factory)

Available in option :
- 3G3 electronic, supply between 15 and 30Vdc, push-pull output regulated 12Vdc
- 5GH electronic permits to 'drive different inputs (plc + display for example)

Protection against short circuits the electronics: 5G5, 5GT, 3G3
Protection against inversion of polarity for all the electronics except 2G2

Option ''Max control'' : the encoder gives on real time its physical environment parameters: shocks and vibrations, too high or too low temperature, too low or too high supply, quality of the output signals : upon request..

STANDARD CONNECTION

		-	+	A	B	0	A/	B/	0/	Ground
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	connector body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	connector body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU bleu	RD red	general shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions ex: overspeed switch, electronics, special flanges, connections ...)

	Shaft Ø	Available electronic		Output signal	Resolution	Connection	Connection orientation
GHU9 Cover : zinc Body alu **GBU9** Cover : zinc Body: stainless steel **GXU9** Cover and body: stainless steel	**30**: 30mm Nota: reduction hubs available **32**: 32mm option consult us	**2G2, 5G2, 5G5, 5GT, 5GH, 3G3**		**9** : A,A/,B,B/,0,0/ (0, A&B gated) **A** : A,A/,B,B/,0,0/ (0, A gated) **N** : A,A/,B,B/,0,0/ (0 ungated)	**10 000** max	**G6**: M23 12 pins CW **G5**: M23 12 pins CCW **G8**: M23 12 pins CCW	**R** : radial
		Supply	**Output stages**			**G3** : PVC cable 8 wires **GP** : PUR cable 12 wires	Example: **R020**: axial 2m cable
		2 : 5Vdc **5** : 11 to 30Vdc **3** : 15 to 30Vdc	**G2** : driver 5Vdc RS422 **G3** : driver 12Vdc **G5** : push-pull **GT** : push-pull 11-30Vdc transistorised **GH** : push-pull 11-30Vdc 150 mA				
Ex: GHU9 _	**30** //	**5**	**G5**	**9** //	**5 000** //	**GP**	**R050**

Available resolutions : *1 2 3 4 5 6 7 8 9 10 12 13 14 15 16 19 20 21 24 25 26 28 29 30 32 35 36 39 40 43 45 46 48 50 54 56 58 60 62 63 64 66 67 70 72 74 75 76 80 84 86 88 89 90 91 94 96 100 107 110 120 122 123 125 127 128 130 132 135 138 140 147 150 157 159 160 168 169 170 172 175 180 188 191 196 200 201 205 220 222 225 234 240 241 242 245 246 248 250 254 255 256 258 259 267 268 275 283 285 295 300 305 314 315 318 320 330 340 350 360 367 375 378 380 381 388 390 397 400 405 410 424 425 438 443 450 471 480 489 495 500 505 512 515 534 540 550 565 580 600 623 625 628 630 632 635 650 660 700 720 746 750 752 754 800 810 840 860 880 891 900 942 990 1000 1024 1080 1100 1131 1200 1225 1250 1260 1280 1290 1400 1414 1440 1500 1536 1570 1600 1620 1630 1750 1800 1885 2000 2048 2250 2400 2500 2640 3000 3456 3600 3680 3750 4000 4096 4500 4900 5000 7200 9000 10000*

Made en FRANCE

BEI IDEACOD

www.bei-ideacod.com

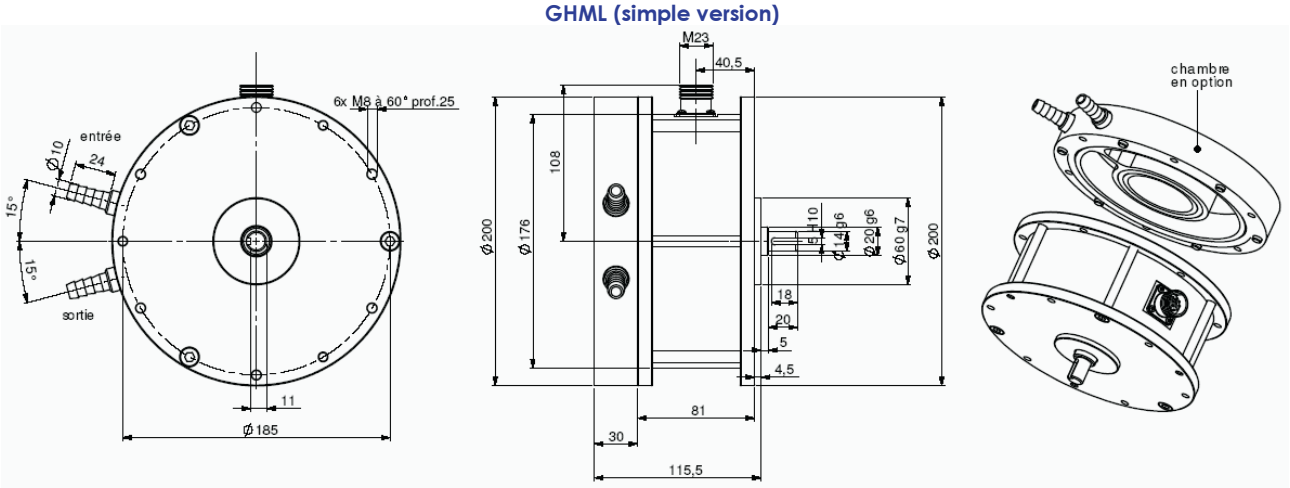
GHML

INCREMENTAL ENCODERS, GHML RANGE, MAXX™

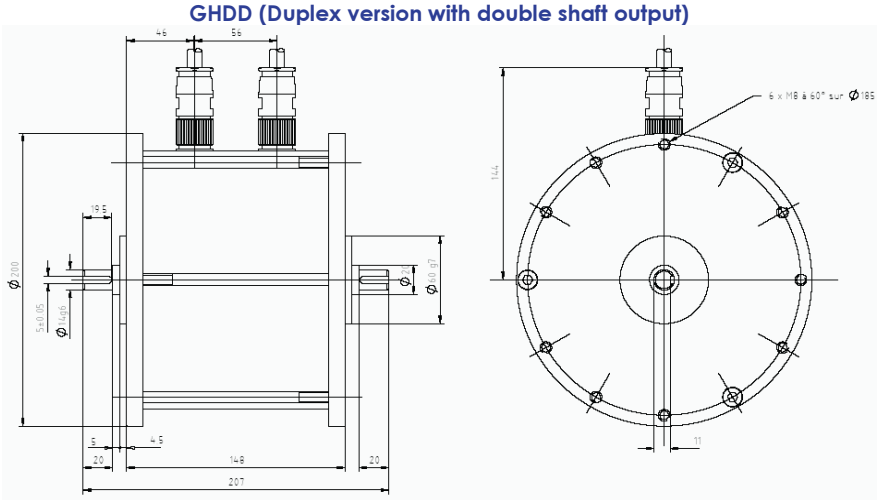
- With 200mm diameter, especially for heavy duty, extreme resistance to shocks/vibrations and to axial and radial charges
- Stainless steel body, treated against corrosion
- Digital incremental output, analog output in option (tacho-encoder, optotacho)
- Water cooling flange as option
- Max control function as option : shock detection, vibration, temperatures
- Double shaft output as option
- Duplex version with 2 opto-electronics redundant system

Application fields : glass, steel, cement- mills, platform marine, locks…

GHML (simple version)



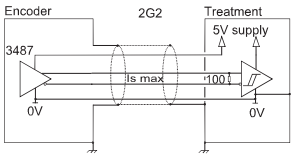
GHDD (Duplex version with double shaft output)



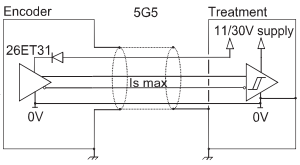
Material	Cover : steel	Continuous max. speed	3 600 min^{-1}
	Body: steel	Shocks (EN60068-2-27)	≤ 500 $m.s^{-2}$ (during 6ms)
	Shaft : stanless steel	Vibrations (EN60068-2-6)	≤ 200 $m.s^{-2}$ (10 … 1 000 Hz)
Bearings	6004 serie	EMC	EN 50081-1, EN 61000-6-2
Maximum loads	Axial : 200 N	Isolation	1 000 V eff
	Radial : 200 N	Encoder weight (approx.)	Simple version : 10kg
Shaft inertia moment	Simple:50.10^{-6} $kg.m^2$		Duplex version: 15kg
	Duplex : 200.10^{-6} $kg.m^2$	Operating temperature	- 20... + 80 °C (encoder T°)
Torque	≤ 30.10^{-3} N.m	Storage temperature	- 40... + 80 °C
Permissible max. speed	6 000 min^{-1}	Protection(EN 60529)	IP 65

INCREMENTAL ENCODERS, GHML RANGE, *MAXX™*

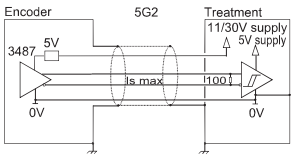
OUTPUT ELECTRONIC / SUPPLY



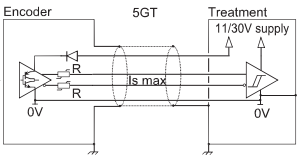
2G2 electronic (100kHz)
Supply : 5Vdc ± 10%
Cons. without load : 100mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



5G5 electronic (100kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-3Vdc



5G2 electronic (100kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



5GT electronic, optional (100kHz)
Supply : 11 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-2,5Vdc

Electronics 5GT is designed for long and high capacity cables (contact our factory)

Available in option :
- 3G3 electronic, supply between 15 and 30Vdc, push-pull output regulated 12Vdc
- 5GH electronic permits to 'drive different inputs (plc + display for example)

Protection against short circuits the electronics: 5G5, 5GT, 3G3
Protection against inversion of polarity for all the electronics except 2G2

Option ''Max control'' : the encoder gives on real time its physical environment parameters: shocks and vibrations, too high or too low temperature, too low or too high supply, quality of the output signals : upon request..

STANDARD CONNECTION

		-	+	A	B	0	A/	B/	0/	Ground
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	connector body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	connector body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU bleu	RD red	general shielding
GP	PUR cable 12 wires 8230/050	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

ORDERING REFERENCE (Contact the factory for special versions ex: electronics, special flanges, connections ...)

	Shaft Ø	Available electronic		Output signal	Resolution	Connection	Connection orientation
		2G2, 5G2, 5G5, 5GT, 5GH, 3G3					
		Supply	Output stages				
GHML **GHDL** **GHMD** **GHDD**	**14** :14mm	**2** : 5Vdc **5** : 11 to 30Vdc **3** : 15 to 30Vdc	**G2** : driver 5Vdc RS422 **G3** : driver 12Vdc **G5** : push-pull **GT** : push-pull 11-30Vdc transistorised **GH** : push-pull 11-30Vdc 150 mA	**9** : A,A/,B,B/,0,0/ (0, A&B gated) **A** : A,A/,B,B/,0,0/ (0, A gated) **N** : A,A/,B,B/,0,0/ (0 ungated)	**10 000** max	**G6**: M23 12 pins CW **G5**: M23 12 pins CCW **G8**: M23 12 pins CCW	**R** : radial
						G3 : PVC cable 8 wires **GP** : PUR cable 12 wires	Example : **R020** : radial cable 2m
Ex: GHML _	**14** //	**5**	**G5**	**9** //	**5 000** //	**GP**	**R020**

GHML : simple shaft output, standard
GHDL : double shaft output, standard
GHMD : simple shaft output, duplex
GHDD : double shaft output, duplex

In duplex version, 2 outputs (independent electronic/optronic) ensure a redundant security of the product

Available resolutions : *1 2 3 4 5 6 7 8 9 10 12 13 14 15 16 19 20 21 24 25 26 28 29 30 32 35 36 39 40 43 45 46 48 50 54 56 58 60 62 63 64 66 67 70 72 74 75 76 80 84 86 88 89 90 91 94 96 100 107 110 120 122 123 125 127 128 130 132 135 138 140 147 150 157 159 160 168 169 170 172 175 180 188 191 196 200 201 205 220 222 225 234 240 241 242 245 246 248 250 254 255 256 258 259 267 268 275 283 285 295 300 305 314 315 318 320 330 340 350 360 367 375 378 380 381 388 390 397 400 405 410 424 425 438 443 450 471 480 489 495 500 505 512 515 534 540 550 565 580 600 623 625 628 630 632 635 650 660 700 720 746 750 752 754 800 810 840 860 880 891 900 942 990 1000 1024 1080 1100 1131 1200 1225 1250 1260 1280 1290 1400 1414 1440 1500 1536 1570 1600 1620 1630 1750 1800 1885 2000 2048 2250 2400 2500 2640 3000 3456 3600 3680 3750 4000 4096 4500 4900 5000 7200 9000 10000*

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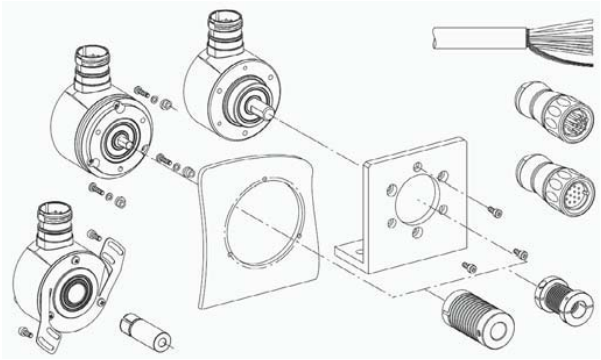
STANDARD MECHANICAL ACCESSORIES

Encoder type	Coupling DAC	Flange or Square flange		Reduction hubs
GHM406	9403/ x - x	/	/	/
GZT406	MKITDAC 9445/ 006	/	/	/
DHM506 CHM506 PHM506	9403/ x - x	M9500/003 & M9500/014	M9202	/
DHM510 CHM510 PHM510	9403/ x - x	M9500/003 & M9500/014	M9202	/
DHO514 CHO514 PHO514	M9445/015	/	/	9431/A y
DHO5S14/OM	M9445/016	/	/	9431/A y
DHK5	M9445/016	/	/	/
MHM510	9403/ x - x	/	M9202	/
MHK515	9445/017[1)]	/	/	9432/ z
DHM911 CHM911 SHM9/PHM911	9401/ x – x or 9403/ x - x	M9500/007[1)]	/	/
DHM912 CHM912 SHM9/PHM912	9401/ x – x or 9403/ x - x	M9500/007 or M9500/015	M9302	/
GHU930 CHU930 PHU930	MKITDAC 9445/009	/	/	9418/I w
SHU930	MKITDAC 9445/009	/	/	9419/ I w

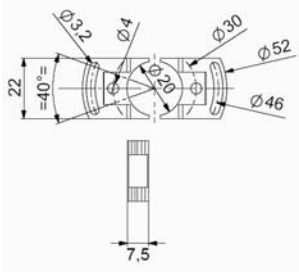


Available standard shaft diameter	
x	06 08 10 12 14
y	06 08 10 12
z	06 08 10 12 14
w	10 12 14 16 18 20 25

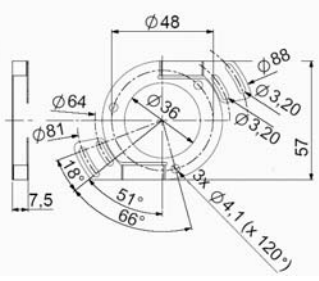
[1)] the flange / the DAC is already mounted on the encoder

DAC : Device Anti-Coupling for through / blind hollow shaft encoder

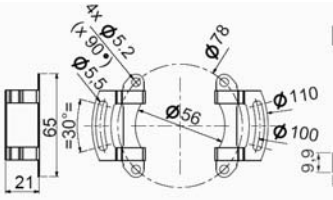
Ref : **9445/006**



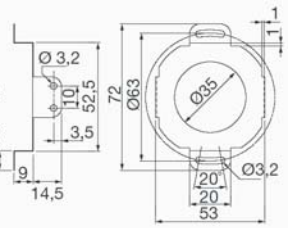
Ref : **9445/015**



Ref : **9445/009**

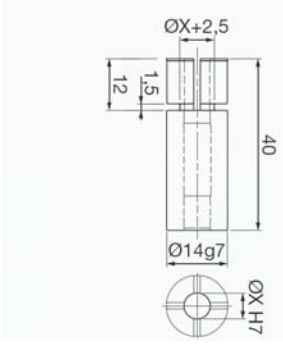


Ref : **9445/017**

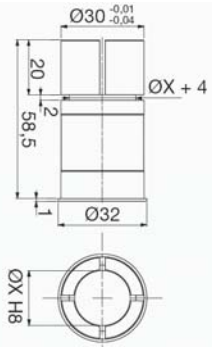


Reduction hub : available for through / blind hollow shaft encoder

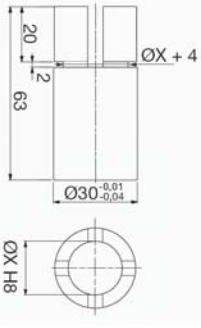
Ref : **9431/A**



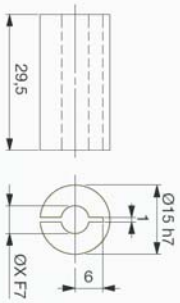
Ref: **9418/I**



Ref: **9419/A**



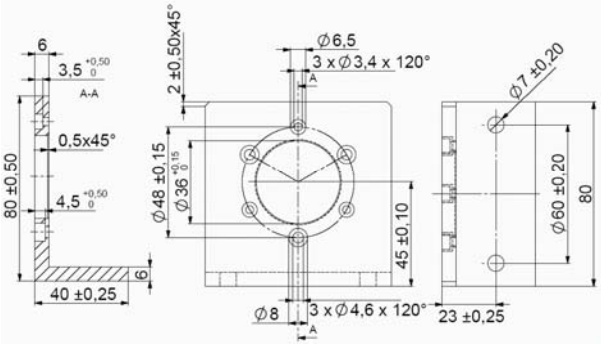
Ref: **9432**



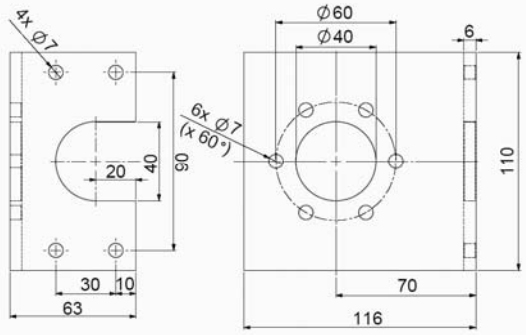
STANDARD MECHANICAL ACCESSORIES

Square flange for solid shaft encoder

Ref : **9202**

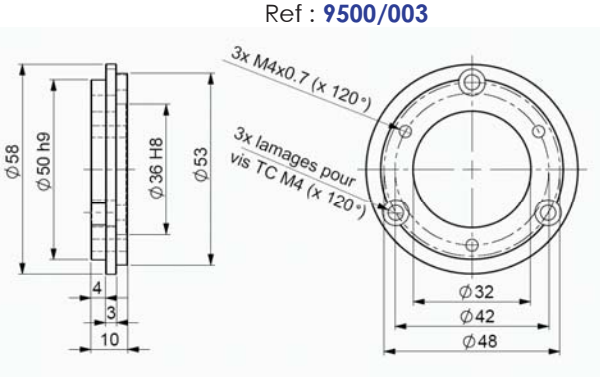


Ref : **9302**

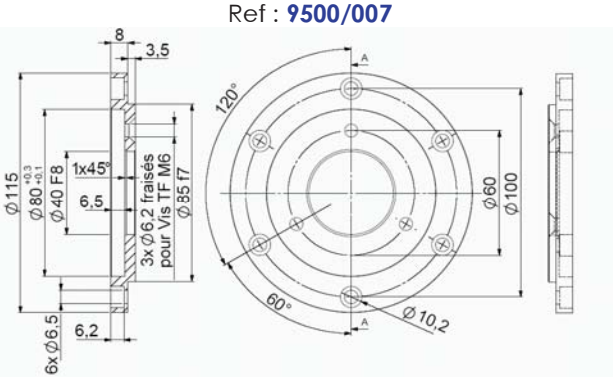


Flange for solid shaft encoder

Ref : **9500/003**

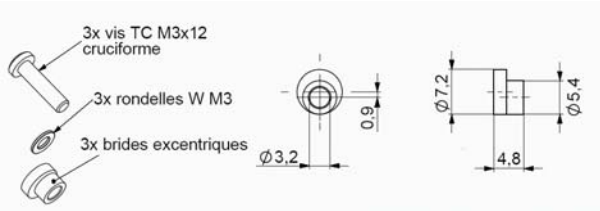


Ref : **9500/007**

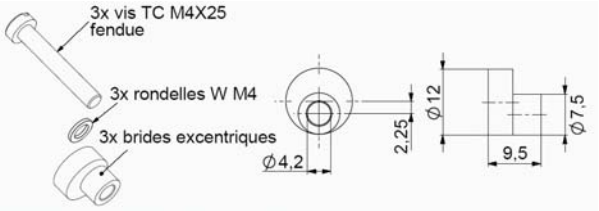


Mounting screws for synchro mounting

Ref : **9500/014**

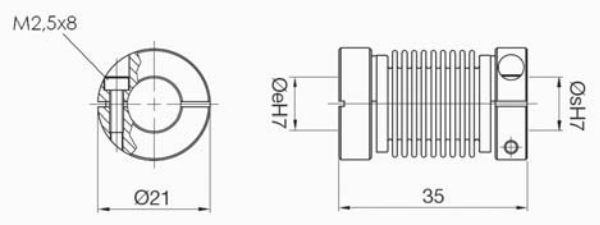


Ref : **9500/015**



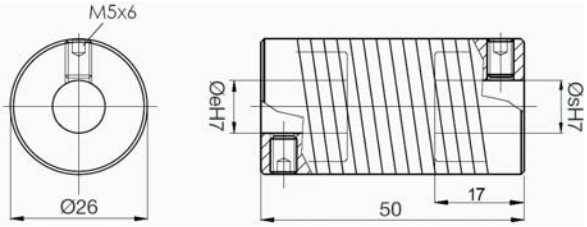
Couplings for solid shaft encoders

Ref : **9403**



Bellow coupling

Ref : **9401**



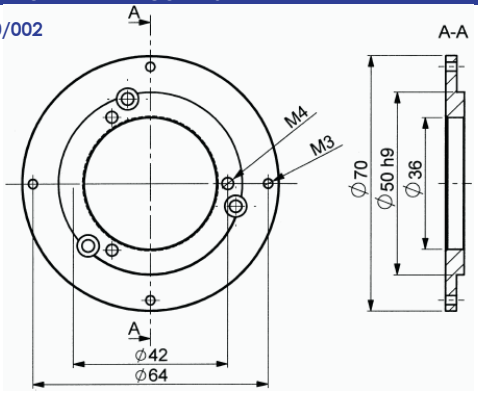
Spring coupling

COMPLEMENTARY MECHANICAL ACCESSORIES - FLANGES

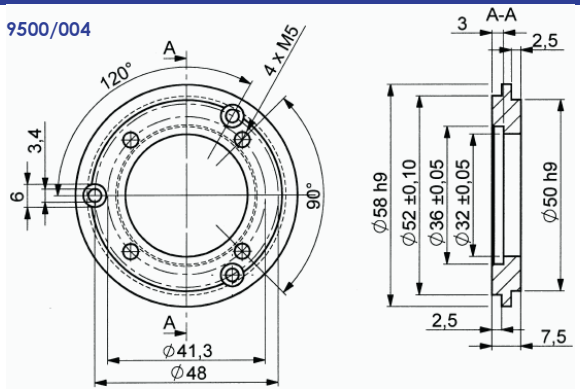
Large choice of adaptation flange – mounting system for all standard encoders

FLANGE FOR 58mm ENCODERS

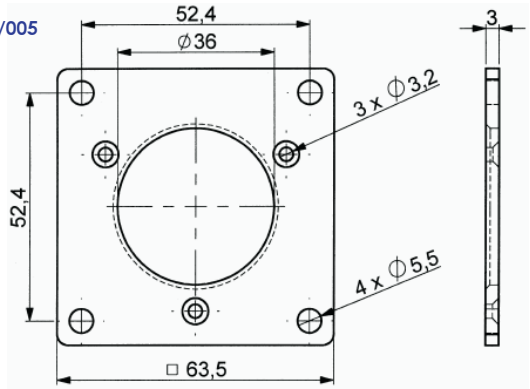
9500/002



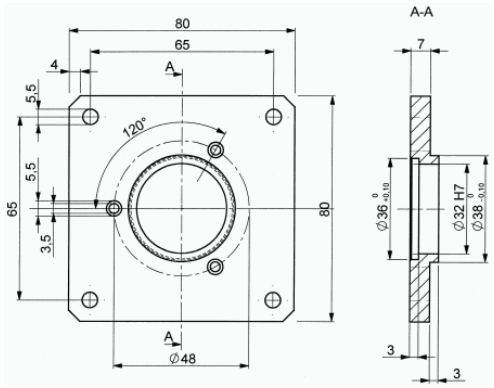
9500/004



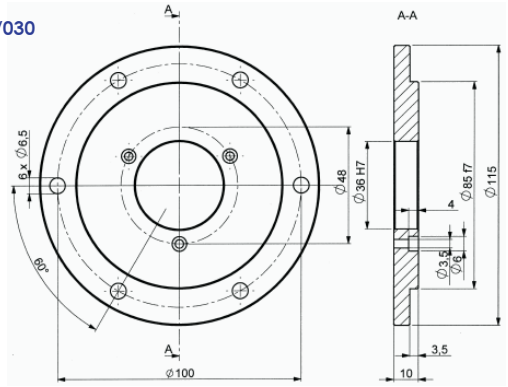
9500/005



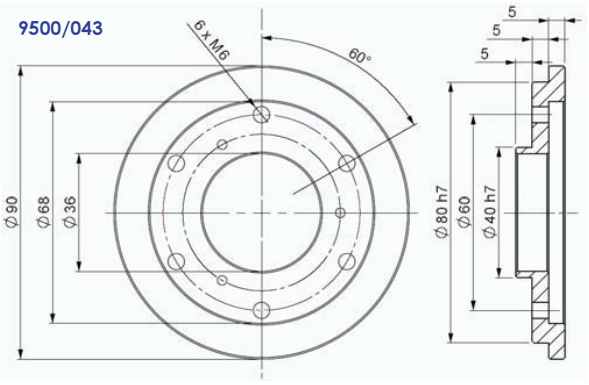
9500/006



9500/030

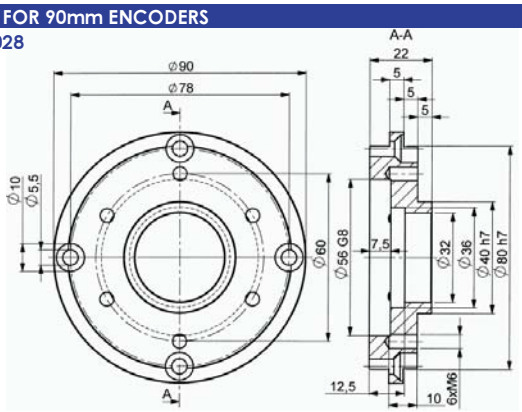


9500/043

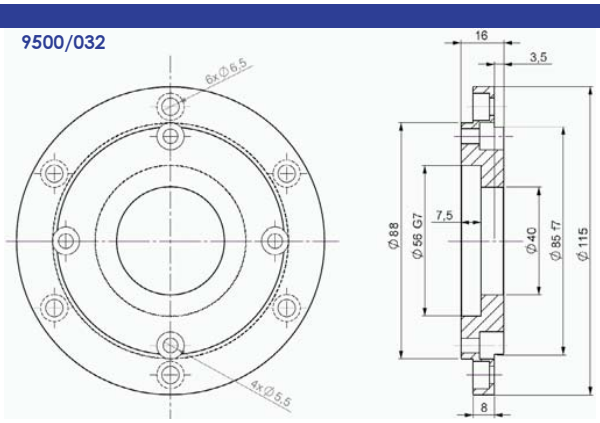


FLANGE FOR 90mm ENCODERS

9500/028



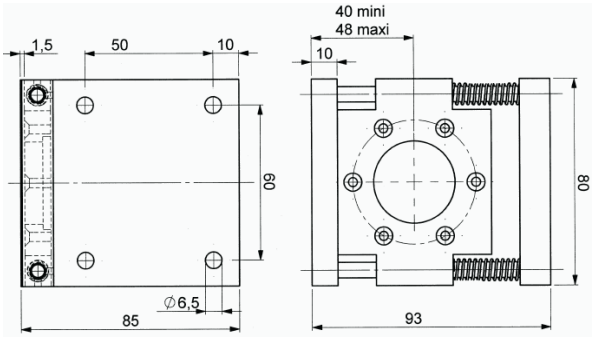
9500/032



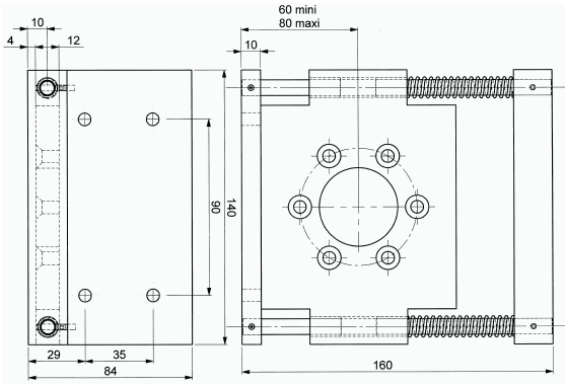
COMPLEMENTARY MECHANICAL ACCESSORIES

Ajustable spring brackets

9212 : For 58mm encoder, 36mm centering



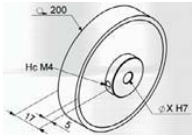
9213 : For 90mm encoder



Measuring whells

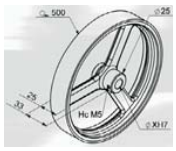
200mm circumference, 6 to 10mm shaft

9108	Polyurethane plastic
9109	Knobbled rubber
9110	Knurled aluminium



500mm circumference, 8 to 12mm shaft

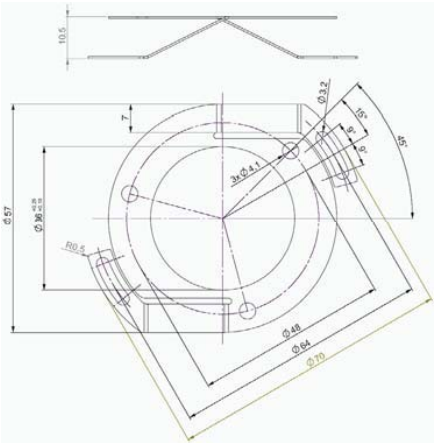
9101	Polyurethane plastic
9102	Knobbled rubber
9103	Knurled aluminium



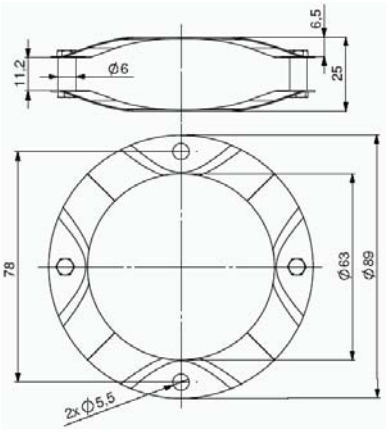
Pinions / racks also available for linear measure : consult us

Anti-rotation system

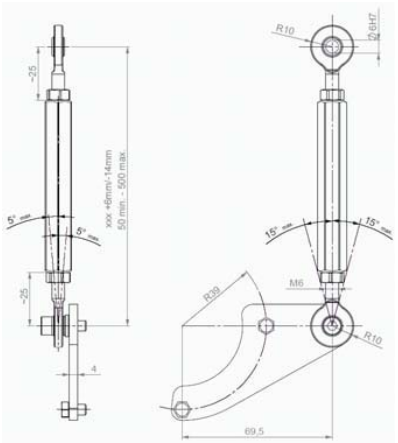
9445/016
For DHK / DHO5SOM



9445/004 MEFLEX
For Duplex mounting

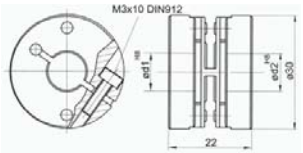


M9230 torque arm system
For 90mm encoder

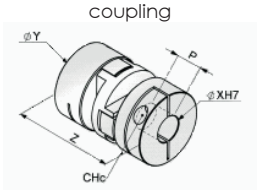


Specific coupling

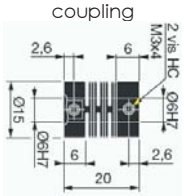
9400 : flexible washer coupling



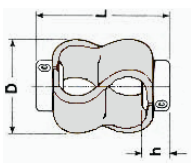
9410 : ''OLDHAM'' coupling



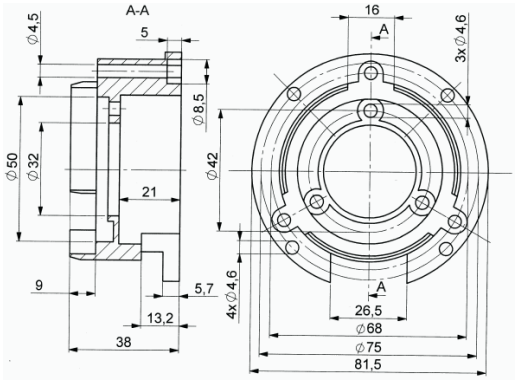
9417 : plastic coupling



Paguflex : high flexibility Plastic coupling



Fixing bell, ref : 9616



STANDARD CONNECTOR – EXTENSION CABLE

Connection	Female counter connector	Connector cable gland		Extension cable of 2m ...-020 Extension cable of 5m ...-050
		min	max	
BA	9416/073	6	8	Consult us
BB	E8213/011	4	9	Consult us
C (3pins)	CB3	3	6	RCB3-1M (1m)
C (8pins)	CB8	3	6	RCB8-1M (1m)
C1	9416/025	5	13.5	Consult us
C6	9416/076	5	10	9416/076 - 8230/070 - S6 -020
C8	9416/055	8	9	9416/055 - 8230/070 - S8 -020
CP	9416/006P	7	10	9416/006P- 8230/004 - CP -020
G1	9412/F	5.5	8	9412/F - 8230/020 - G1 -020
G2	9414/F5	3	6	9414/F5 - 8230/020 - G2 -020
G6	9416/076	5	10	9416/076 - 8230/020 - G6 -020
G8	9416/055	8	9	9416/055 - 8230/050 - G8 -020
GD	9414/F8	3	6	9414/F8 - 8230/020 - GD -020
N6	9416/076	5	10	9416/076 - 8230/050 - N6 -020
P6 POSI+™	9416/011	8	10	9416/011 - 8230/132A - P6 -020
S3	E 8212/053	4	9	8212/053 - 8230/119 - S3 -020
S6	9416/076	5	10	9416/076 - 8230/070 - S6 -020
S6 POSI+™	9416/076	5	10	9416/076 - 8230/165 - S6 -020
S8	9416/055	8	9	9416/055 - 8230/070 - S8 -020
V6	9416/076	5	10	9416/076 - 8230/050 - N6 -020
B3 (female)	9416/010A (male)	7	10	Consult us

Ex : The extension cable 9416/076-8230/020-G6-020 is composed of : 2m of cable 8230/020, at its end, the connector 9416/076 is welded, flying leads at the other end

Cable	Type	Cable diameter	Caracteristics
8230/004	16 wires, PVC	7.5	16 x 0.14mm²
8230/020	8 wires, PVC	5.8	6 x 0.14mm² + 2 x 0.22mm²
8230/050	12 wires, PUR	6.4	4 x (2 x 0.15mm²) + 4 x 0.25mm²
8230/070	8 wires, PUR	8.5	3 x (2 x 0.14mm²) + 2 x 0.5mm²
8230/132A	16 wires, PVC	9.5	16 x 0.22mm²
8230/119	36 wires, PVC	9.9	36 x 0.14mm²
8230/165	8 wires, PUR	8.5	2 x 0.5mm² + 3 x (2 x 0.14mm²)

Female connector	Male counter-connector	Male counter-connector cable gland		Example of prewired extension cable
		min	max	
CB3	9414/M3/P	3	6	Consult us
CB8	9414/M8/P	3	6	Consult us
9414/F5	9414/M5/P	3	6	9414/F5 - 8230/020 - G2 -020 -9414/M5/P
9414/F8	9414/M8/P	3	6	9414/F8 - 8230/020 - GD -020 -9414/M8/P
9416/006P	9416/012	6.35	13.5	9416/006P- 8230/020 - GD -020 -9416/012
9416/011	9416/013	3	7	9416/011P- 8230/165 - S6 -020 -9416/013
9416/055	9416/083	3.5	10.5	9416/055 - 8230/050 - G8 -020 -9416/083
9416/073	9416/072	6	8	Consult us
9416/076	9416/010A	7	10	9416/076 - 8230/020 - G6 -020 -9416/010A
E8213/011	E8213/008	3	7.5	Consult us
E8212/053	E8212/062	4	9	E8213/053- 8230/119 - S9 -020 -E8212/062

The extension cable 9416/055-8230/050-G8-020-9416/083 is composed of 2m of cable 8230/050, at one end the connector 9416/055 is welded, at the other end the connector 9416/083 is welded

9416/076

9416/010A

9416/055

9416/083

9416/F5

9416/M5/P

9412/F

E8212/053

E8212/008

9416/073

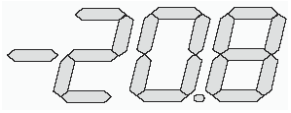
PRODUCT RANGE FOR AUTOMATION AND MOVEMENT CONTROL

In addition to our range of incremental and absolute industrial encoders, we market a large choice of electrical an electronic accessories, contact us ! We will offer you the right device for your application, ex :

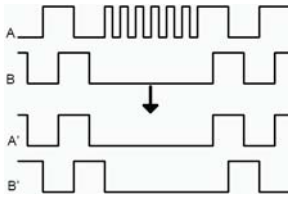
- Digital displays for incremental and absolute encoder: measure and display of angular positions, linear movement, positioning systems, cut to length, rotary and linear speed, etc...

- Signal processing devices : multi-channel amplifiers, D/A converters, etc...

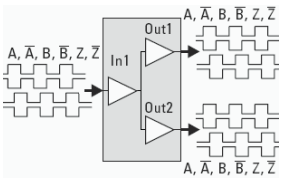
- A large choice of cables, connectors, counter connector, extension cables cut to length...



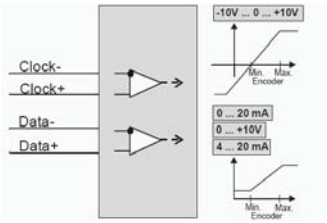
Multi-function indicators
- for all types of encoders (incremental, SSI, parallel, analog…)
- adjustable scaling factor
- analog output, relay…



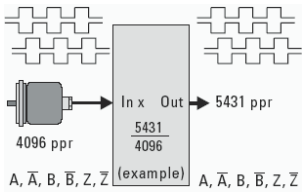
Anti-dither module
- 24Vdc power supply
- universal impulse input TTL/RS422 or HTL
- output level TTL/RS422 or HTL can be selected
- for start/stop or high vibrations application



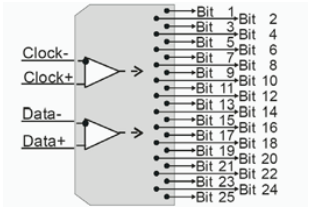
Changeover switch, distributor and splitter for encoder signals
- 5-30Vdc power supply
- input levels optional TTL/RS422 or HTL
- output levels individually adjustable to TTL/RS422 or HTL (10/30V)
- also available for SSI encoders



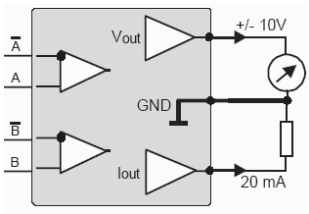
Converter SSI → analog
- 18-30Vdc power supply
- suitable for use with SSI encoders
- analog outputs proportional to the encoder position
- also available for incremental encoders



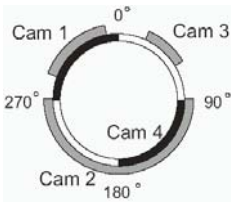
Universal level converter, frequency division/multiplication, direction detection…
- 18-30Vdc power supply
- universal impulse inputs TTL/RS422 or HTL
- programmable quadrature frequency divider for error free division of the inputs signals



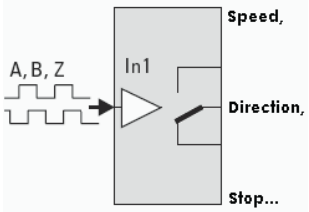
Deserialisation interface
- 18-30Vdc power supply
- SSI input
- Gray , binary, BCD output, HTL lor TTL level



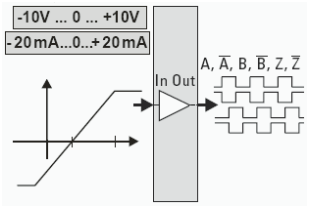
Signal converter frequency → analog/RS232
- 18 – 30Vdc power supply
- universal impulse input TTL/RS422 (A, A/, B, B/) or HTL (A/B or only A)
- wide input range : 1Hz to 500kHz
- bipolar output +/-10Vdc and 0-20mA or 4-20mA



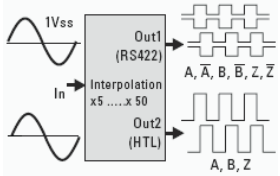
Cam controller
- 24Vdc power supply
- for incremental and absolute SSI encoders
- from 8 to 24 cams output



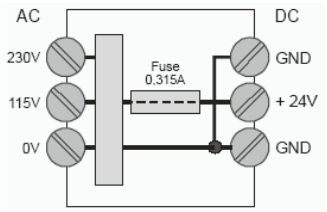
Monitor for speed, direction of rotation and standstill
- 115/230Vac or 18/30Vdc power supply
- impulse input A & B type TTL or HTL
- wide range of input frequency



Signal converter analog → frequency/RS232
- 12-30Vdc power supply
- analog input –10…+10Vdc / 0/4-20mA
- frequency output HTL and RS422 up to 500kHz
- programmable 0 index



Sine/cosine interpolator for 1Vpp encoder
- 18 – 30Vdc power supply
- incremental signal channel RS422 and HTL level
- adjustable interpolation rate from X5 to x50



24Vdc power supply
- input : 115 / 230VAC +/- 15%, 7,5VA, 50-60 Hz
- output : 24VDC / 300mA (-15%)
- protection against short-circuits

MAX CONTRÔLE OPTION FOR INCREMENTAL ENCODERS

SELF MONITORING FOR GENERATION OF INTELLIGENT INDUSTRIAL ENCODERS

The function of self monitoring ''Max control'' makes it possible for the encoder to deliver real time information regarding its physical environment and operating conditions. If the limits of the controlled parameters are overrun, maintenance could be made to avoid production break-downs. Recommended in 24/7, non-stop work where interruptions of lines cause important financial losses.

The main parameters analysed are those which may deteriorate the signal of the encoder :

- shocks and vibrations may generate the mechanical destruction of the encoder
- temperature level : too low or too high
- level of the power supply (too low or too high)
- the quality of the output signal

This information is delivered on three bits, the error codes are presented as follows :

E2	E1	E0	Defect / parameter
0	0	0	Not in operation
0	0	1	Shock > 30 g
0	1	0	High temperature > 75 °C
0	1	1	Low temperature < -20 °C
1	0	0	Power supply > maximum value of the electronic stage
1	0	1	Power supply < minimum value of the electronic stage
1	1	0	Codes disk error
1	1	1	No failure

Available connection output with this option :

- G6A or G6R (with connector)
- G3A or G3R (with cable 12 wires)

The ''Max Control'' function is available with the following encoders : GHM9 – GHU9 – GHT9 - GHML

The selection of the Max Control option is determined in the ordering code when selecting the electronics, consult us

Available electronics with ''MAX CONTROL'' option: 3G3, 5G2, 5G5 et 2G2 (2G2 without voltage detection)

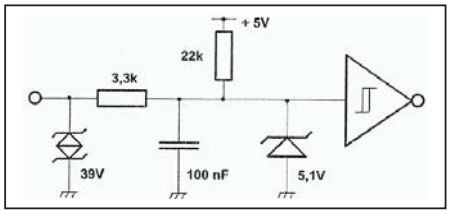
NB :

- the high voltage error is delivered for values from 33.5Vdc to 35Vdc
- the low voltage error is delivered for values from 8Vdc to 11Vdc
- the disk code error can be used up to 71kHz frequency answer.

		-	+	A	B	0	A/	B/	0/	RAZ	E0	E1	E2
G6	9416 12 pin connector	1	2	3	4	5	6	7	8	9	10	11	12
G3	12 wires cable	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	BK blackr	VT violet	BN-GN Brown-green	WH-BN white-brown

RAZ ''alarm'' output circuit

If the device has no ''reset to 0'' RAZ, the alarm signal is continuously delivered. If the device has an electric ''reset to 0'', apply an impulse of minimum 1 second to the ground



CUSTOMIZED PRODUCTS : OUR SPECIALTY

If you haven't found the right product in our standard catalogue, never mind, send us your specifications, we will be able to propose you the solution which will answer best to your needs :

- single manufacture possibility on the base of a standard encoder
- complete customized product for small batches

Below a ''check list'' which can help you to define the different points of your project

DESCRIPTION OF THE APPLICATION OR THE PROJECT		(X)
Application: The encoder will be mounted on:	Incremental	
	Tacho-encoder	
	Singleturn	
	Multiturn	

MECHANICAL SPECIFICATIONS	
Dimension : diameter / total length	
Shaft : syze / type / material	
Body : Fixation / Centering / Material	
Cover : material appearance	
Ingress protection IP	
Rotation speed / acceleration / torque	
Axial / radial load	
T°C of use : min / nominal / max	
Shocks / vibrations	
Other	

ELECTRICAL AND OPTICAL SPECIFICATIONS	
Power supply nominal / max	
Protection (power supply / output)	
Maximal consumption	
Electronic (incremental, ex: RS422, open collector)	
Frequency min / nominal / max (incremental)	
Current consumption (mA, incremental)	
Number of period (ppr, incremental encoder)	
Number of channels (incremental encoder, ex:A,A/,B,B/,0,0/)	
Commutation channels (brushless engine, nbre of pole)	
Number of points per turn (singleturn and multiturn)	
Number of turns (multiturn)	
Code (absolute encoder, ex : Gray, binary...)	
Transmission type (absolute encoder, ex : serial, CAN...)	
Speed data output (tacho-encoder, ex : 4-20mA, serial...)	
Needed accuracy	
Other	

WIRING - CONNECTION	
Connection : type / orientation / Lg.(cable)	
Wiring : fct / colour / pinout n°	
Other	

APPLICABLE STANDARDS	
Standard (ex : ATEX)	
Other	

PROJECT DATAS			
Potential (qty/year - month)		Target price	
Prototypes (qty)		Prototype target price	

Do not hesitate to send us mechanical, electrical drawings, software...