Incremental, Absolute and Analog Encoders

Catalogue

a company of Schneider Electric

BEI IDEACOD

www.bei-ideacod.com

BEI IDEACOD DIFFERENTIATION – IDEAL ENCODER

An encoder is an intelligent mix of mechanical, optical and electronic components. Thirty years of experience has enabled us to excel in each of these fields. Each field has been mastered by all of our departments, from development to conception.

BEI IDEACOD distinguishes itself by its flexible approach and ability to react to customers needs, with us no limit exists; we shall always try to supply you the product offering the best solution to your specifications. If the product does not exist within our standard range, although very broad, we shall design a product especially for you; our company thrives on taking up challenges of this order.

We have the encoder you require, even if we have to design it for you

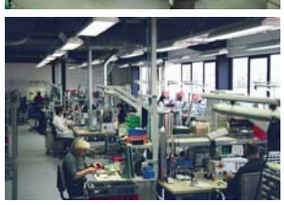
Our R&D department, production and engineering departments work with you until the completion of your project and will guarantee you permanent technical support

We are able to offer you
- an modified product on the base of a standard encoder
- a customized product : fulfilling your specifications










MECHANICAL SKILLS

Encoder material : For example, all our range can be offered in stainless steel or stainless aluminium

Modified mechanics, body and cover : Precision prototypes units, small and medium size (stainless steel, steel, aluminium, brass). Units that will match themselves exactly to your mechanical configuration or to your dimensional constraints

Solid shaft encoder : required shaft diameter, and the complementary realization of an ideal square flange / mounting flange associated to a flexible coupling according to the application needs

Through or blind shaft encoder : required shaft diameter, including flexible anti rotational device, designed to maintain the encoder and compensate shaft run outs, torque arm or tether block and dowel pin system

Specific shaft encoder : for example with integrated coupling, transmission with homocentric coupling AKFLEX© (patented / high flexibility system). Or modular, without bearings for specific applications

Send us your subset: we can integrate our encoder into your subset and return you the complete assembly with the guarantee of an optimal mounting

OPTICAL SKILLS

Resolution Our optical laboratory can manufacture disks corresponding to your demand, unbreakable disc POLYFASS © (Mylar-Mica composite) having excellent stability and planarity

On simple request any resolution can be drawn on a master

ELECTRONIC SKILLS

Electronic board : Our electronic laboratory is able to develop new electronic cards integrating the required specifications: electronics interface, data transmission, improved protection …

Software : The internal hardware development of our electronic cards is completed by associated software, example: internal memory programming, specific CAN fieldbus development

Soldering method : Our SMC (Surface Mounted Components) positioning machine allows us the manufacture of electronic cards, in smaller quantity

Connection / Cable assemblies: On the whole range of our encoder products a wide selection of electrical connections are possible.

SERVICE QUALITY

All our services present a high quality level validated by the ISO 9001 certification renewed each year since 1998
- Our technical support is at your disposal to guide you through your application: 3D drawings, wiring drawings, assembly diagrams, after-sales service, phone diagnosis, etc. …
- Experienced Sales networks with a high degree of technical knowledge are available for on site visits
- Speed delivery - logistic assistance – stock rationalization

Our customer commitment is our priority – a mission of trust


DET NORSKE VERITAS
CERTIFICATION FRANCE
CERTIFICAT SYSTEME QUALITE

BEI IDEACOD

	Resolution max	Encoder (mm)	Shaft (mm)	Solid	Through	Blind		
Incremental							Incremental encoders	10
	2500	40	6	•			GHM4	12
	2500	40	6		•		GZT4	14
	80 000	58	6 - 10	•			DHM5 100°C	16
	80 000	58	6 - 10	•			DHM5 programmable	18
	80 000	58	14		•		DHO5 100°C	20
	80 000	58	14		•		DHO5 programmable	22
	80 000	58	14		•		DHO5 body side tightening ring	24
	80 000	58	14			•	DHK5	26
	80 000	90	11 - 12	•			DHM9	28
	10 000	90	30		•		GHU9	30
	10 000	200	14	•			GHML	32

	Resolution max	Encoder (mm)	Shaft (mm)	Solid	Through	Blind		
Tacho							Tacho encoder	34
	10 000	90	11 – 12	•			NHM9	36
	10 000	90	30		•		NHU9	38

	Resolution max	Encoder (mm)	Shaft (mm)	Solid	Through	Blind		
Singleturn							Absolute singleturn encoder	40
	20 bits	58	6 – 10	•			CHM5 SSI	42
	15 bits	58	6 – 10	•			CHM5 Parallel	44
	20 bits	58	14		•		CHO5 SSI	46
	15 bits	58	14		•		CHO5 Parallel	48
	13 bits	90	12	•			CHM9 SSI	50
	13 bits	90	12	•			CHM9 Parallel	52
	13 bits	90	30		•		CHU9 SSI	54
	13 bits	90	30		•		CHU9 Parallel	56

	Resolution max	Encoder (mm)	Shaft (mm)	Solid	Through	Blind		
Multiturn							Absolute multiturn encoders	58
	25 bits	/	/				EAA deserialisation cable	60
	25 bits	58	6 – 10	•			PHM5 SSI	62
	25 bits	58	6 – 10	•			PHM5 SSI programmable	64
	25 bits	58	14		•		PHO5 SSI	66
	25 bits	58	14		•		PHO5 programmable	68
	25 bits	90	12	•			PHM9 SSI	70
	25 bits	90	12	•			PHM9 SSI programmable	72
	25 bits	90	30		•		PHU9 SSI	74
	25 bits	90	30		•		PHU9 SSI programmable	76
	30 bits	58	10	•			MHM5 Profibus	78
	30 bits	58	10	•			MHM5 CANopen	80
	30 bits	58	10	•			MHM5 DeviceNet	82
	30 bits	58	15			•	MHK5 Profibus	84
	30 bits	58	15			•	MHK5 CANopen	86
	30 bits	58	15			•	MHK5 DeviceNet	88
	29 bits	90	12	•			SHM9 Profibus	90
	29 bits	90	12	•			SHM9 CANopen	92
	29 bits	90	12	•			SHM9 DeviceNet	94
	29 bits	90	30		•		SHU9 Profibus	96
	29 bits	90	30		•		SHU9 CANopen	98
	29 bits	90	30		•		SHU9 DeviceNet	100

	Resolution max	Encoder (mm)	Shaft (mm)	Solid	Through	Blind		
ATEX							ATEX encoder	102
	/	/	/				EMDR1 IS barrier	104
	80 000	58	6 – 10	•			IHM5 incremental	106
	80 000	58	14		•		IHO5 incremental	108
	10 000	116	12	•			GAMX incremental	110
	10 000	108	30		•		GAUX incremental	112
	13 bits	116	12	•			CAMX Parallel	115
	25 bits	108	30		•		SAUX SSI	116

THE COMPANY

For more than 25 years, BEI IDEACOD has contributed to the achievement of its customer's projects by being a real specialist in the field of industrial encoders.

The encoders manufactured by BEI IDEACOD are used in a full range of industrial applications (steel industry, textile, packaging machines, handling, glass, robotics….) and work in all types of hazardous environments – corrosive atmospheres, electromagnetic interferences.

The culture of service of BEI IDEACOD aims to find the perfect solution to your requirements:

- Optimization of your applications in terms of performance and cost
- Reliability of your facilities with our products developed for hazardous environments
- Facility of integration with your environment with different possibilities of electronics, mechanics and interfaces.

BEI IDEACOD adapts its products with a large range of standard and specific encoders to the requirements of your market and the application you have chosen.
The commercial and technical teams of BEI IDEACOD are involved in developing these specific solutions for you.

Common to all of our products: high level of quality, confirmed by the certification ISO 9001:2000 certification, in conformity with the European Standard RoHS 2002/95/CE and the homologation ATEX of our products and processes.

Our production tool enables us to answer to your requirements within the shortest lead times.

Our international distribution aims to extend our expertise in the world for total satisfaction of our customers.

THE PRODUCTS

BEI IDEACOD encoders convert any position, movement, speed or acceleration into digital information which can be read by a machine controller or a PLC.

They are available in various types of assembly configuration:
- solid shaft
- blind shaft
- hollow shaft

They transform physical values in electrical signals through the opto-electronic reading of a coded disk.

The code is either relative, incremental through generation of pulses or absolute made through generation of codes.

The tacho-encoders and optotachos provide an analogue output, proportional to the frequency of disk reading and to the rotational speed of the encoder shaft.

Programmable encoders ***DIGISINE™*** and ***POSI+™*** offer programming of the different signals given by the encoder.

The ATEX range of ***BEI IDEACOD*** provides solutions for explosive environments in all of our encoder technologies (incremental, absolute, tachos encoders), with intrinsically safe and explosion proof encoders.

The various possible combinations of resolutions, optical disks, communication interfaces, output connections, shaft diameters and couplings qualify ***BEI IDEACOD*** as one of the broadest encoders range on the market.

INCREMENTAL		Shaft	Electronic	Resolution	Connection
	***COMPACTIS™*** **40mm** **GHM4 – GZT4**	Solid 6 mm Through 6mm	. 4,5 – 5,5V supply, out : 5V RS422 - TTL . 11-30 V push-pull . 5-24V push-pull	2500 ppr max.	. PVC cable . 5 or 8 pins DIN connector
	***DIGISINE™*** **58mm** **DHM5 – DHO5**	Solid 6 to 10mm Through 14 mm	. 4,5 – 5,5V supply, out: 5V RS422 - TTL . 4,75-30V supply, out: 5V RS422 - TTL . push-pull 5-30V . push-pull 11-30 V transistorised . sine-cosine 1V peak to peak	80 000 ppr max. Option : programmable resolution	. PVC cable . PUR cable . M23 12 pins . M12 4 to 8 pins . Solenoid valve 4 pins . 5 to 8 pins DIN connector
	**90mm** **DHM9 – GHU9**	Solid 11 - 12 mm Through 30 mm	. 4,5 – 5,5V supply, out: 5V RS422 - TTL . 11-30V supply, out: 5V RS422 - TTL . push-pull 11-30Vdc / 5-30Vdc . push-pull 11-30 V, transistorised . 15-30V supply , out 12 V regulated . push-pull 11-30V, 150 mA/channel . tacho-encoder option	10 000 ppr max. DHM9: . max. 80 000 ppr . programmable option	. Terminal box . PVC cable . PUR cable . M23 12 pins

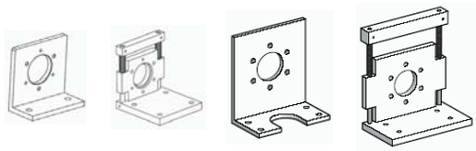
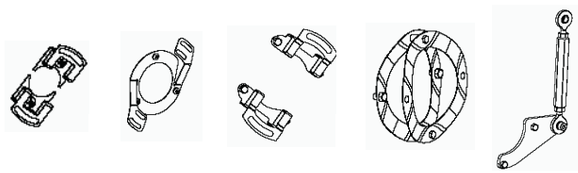
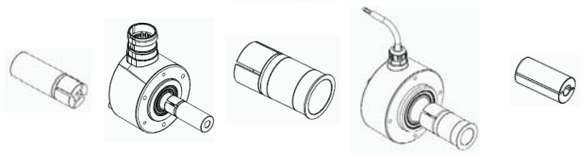
SINGLETURNS		Shaft	Interfaces	Codes	Resolution	Connection
	**58mm** **CHM5 – CHO5**	Solid 6 to 10mm Through 14 mm	. Parallel : Driver push-pull . SSI . BISS	Binary Gray	Max. 20 bits (SSI) Max. 15 bits (parallel)	. M23 12 broches . PUR cable . PVC cable . M23 16 pins . M23 17 pins
	**90mm** **CHM9 – CHU9**	Solid 11 - 12 mm Through 30 mm	. Parallel : Driver 5V . Parallel : Driver push-pull . SSI . Profibus . CANopen . DeviceNet	Binary Gray	Max. 13 bits (SSI) Max. 14 bits (parallel)	. M23 12 pins . PUR cable . PVC cable . M23 16 pins . M23 17 pins

MULTITURNS		Shaft	Interfaces	Codes	Resolution	Connection
	***POSI+™*** **58mm** **PHM5 – PHO5**	Solid 6 to 10mm Through 14 mm	. SSI	Gray Binary	13 bits max. x 16 bits max. programmable option	. M23 12 pins . PUR cable
	**58mm** **MHM5 - MHK5**	Solid 6 to 10mm Blind 15 mm	. Profibus DP . CANopen . DeviceNet	Binary	16 x 14 bits max. standard : 13 x 12 bits	. 3 cable gland outputs
	**90mm** **PHM9 – PHU9** **SHM9 – SHU9**	Solid 11 - 12 mm Through 30 mm	. SSI . Profibus DP . CANopen . DeviceNet . Parallel	Gray Binary	13 bits max. x 16 bits max. programmable option (25bits max. in SSI, //)	. Cable . M23 12 pins (SSI) . Cable + DB9 (CanOpen) . Cable + MiniC (Dnet) . Cable + DB37 (parallel)
	**Deserialisation cable** **EAA**	Allows the connection of a SSI encoder on PLC parallel inputs The parallel outputs of the DB37 are push-pull				

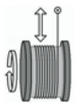
ATEX : Intrinsically safe encoder		Shaft	Electronic	Resolution	Connection
	***INTRATEX™*** **58mm** **IHM5 – IHO5**	Solid 6 to 10mm Through 14mm	. 5V RS422 . push-pull 8-12 V	80 000 points max. Option : prgrammable resolution	. PVC cable . PUR cable . M23 12 pins
	Intrinsically safe barrier for 5V RS422 encoder, integrated 5Vdc power supply for the encoder			Power supply of the barrier: 12 to 24Vdc	5V output: Ref : 924-60004-002 Push-pull output: Ref : 924-60004-003 NPN OC output: Ref : 924-60004-004

ATEX : Explosion proof encoder		Shaft	Electronic	Resolution	Connection
	**GAMX - GAUX**	Solid 12 mm Through 30mm	Incremental encoder type Absolute encoder type	Incremental version : 10 000 points max. Absolute version : 13 bits max. x 16 bits max.	. PVC cable . PUR cable

MOUNTING ACCESSORIES

Mounting flange	
Square flange	
Device Anti-Coupling	
Couplings	
Reduction hubs	

DRAW WIRE



Range
Maximum total range of the mechanical system (mm)

CD050	1 200
CD060	1 500
CD080-MEC	2 500
CD115-MEC	3 500
CD150-MEC	6 000
CDS1210-MEC	8 000
CDS1210-MEC	10 000
CDS1210-MEC	12 000
CDS1820-MEC	15 000
CDS1820-MEC	20 000
CDS1820-MEC	25 000
CDS1820-MEC	30 000
CDS1820-MEC	35 000
CDS1820-MEC	40 000
CDS1820-MEC	50 000

HEAVY DUTY MECHANICAL SYSTEMS- HIGH LOAD COUPLING DEVICE (for high axial and radial load)

Compatible flange with 58mm encoder

MPAL 10

Compatible flange with 90mm encoder

MPAL 11/12

MAXX™ mechanic

DUPLEX OR TRIPLE MOUNTING

Duplex/triple mounting for 58mm encoder

Solid shaft version 6 to 14 mm

Through 14mm

Duplex/triple mounting for 90mm encoder

Solid shaft version 11 - 12 mm standard

Through shaft version 30mm

ENCODER WITH MECHANICAL OVERSPEED

Shaft	Overspeed	Resolution
Available in or 90mm range	Solid 11 – 12 mm Blind 20mm	800-4 000 rpm	The overspeed function on our ***ROBUSTECH™***, range, sturdy mechanical safety module without external power supply

CONNECTION ACCESSORIES

Large choice of connector – extension cable

ELECTRICAL – ELECTRONICAL ACCESSORIES

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

ENCODER APPLICATIONS

Two types of optical encoders exist: '**INCREMENTAL** and **ABSOLUTE**

The **INCREMENTAL ENCODER** generates pulses which allow
- the direct reading of the generated signal frequency (speed automation)
- the increase a value in a process calculation working step by step (position automation)

The **ABSOLUTE ENCODER** concept has been developed to lessen the impact of these constraints which can be generated by an incremental encoder:
- every power down causes a loss in the position of the moving body. It is necessary to proceed to a datum point. This resetting time can be costly for some applications
- when not using the complementary channels : an interference signal can be counted like an incremental signal
- a non-counting period can induce a positioning error which can be only corrected with the reading of the 'top 0''
- Impossibility to stall the ''top 0'' in the case of a swinging type movement, which never achieves a complete rotation

1) 40mm encoder range

Thanks to their oversized bearings, the ***COMPACTIS***™ 40mm encoders are one of the most compact the industrial encoders on the market, they are used where the space envelope is minimal, ex : printer, jacks, robotics, small floodgates, medical applications, camera automation etc.
At only 100 g they are very lightweight, which permits use in applications with strong shocks and vibration characteristics, such as pneumatic machines, high acceleration...

2) 58mm encoder range

The standard European encoder has multiple applications: robotics, packing, textile, machine tool, pump... With a 14mm through shaft, it is the standard for motor applications (motorization at variable speed, result of many years of experience in drive systems)

For applications requiring high resolutions, for example machine tool / SMC components positioning, the sinusoidal signals of our ***DIGISINE***™ encoders can be interpolated by a subsequent electronics. Our ***POSI+***™ absolute encoders are also available with high resolutions, radar positioning is an example application.

Our standard 58mm encoders have been developed to answer to the need of our distributors, this range has a programmable option:

- ***DIGISINE***™ : the programming the resolution has made with simple dip-switches, these allow a internal interpolation (from x2 to x16) of the basic resolution of the optical disk
- ***POSI+***™ : simple programming with the help of a direct link to one of the serial PC port

This flexibility allows the reduction of stock levels (limited number of references) which helps in the delivery of encoders in emergency breakdown situations.

3) 90mm encoder range

Strong experience of over thirty years in heavy-duty industry, our 90mm range answers the most severe tests and finds applications in the most challenging environments: wind mills, iron and steel industry, rolling mill, glass industry, wood industry, AC or DC power engines, climatic engines, cranes, travelling crane...

Our 90mm range is available with the ***MAX CONTRÔLE***™ self monitoring function, it makes it possible for the encoder to deliver real time information on 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 continuous work schedules where interruptions of production lines cause critical financial losses, for example casting in the iron and steel industry, paper mill, etc...

4) Mechanics

All of our encoder ranges are available with stainless steel or stainless aluminium body and cover: for food processing industry or in salt water environments such as in marine applications

It is also possible to prevent water ingress: cleaning machines with high pressure water or continuous liquid projection

With the ***MAXX***™ mechanics, adapted for very severe environments, our encoders can be mounted, for example, on dam or lock systems. Furthermore with this mechanical arrangement, a cooling system can be added so they can be installed in the vicinity of extreme temperatures: melting glass, smelting iron etc.

In some applications, double / triple resolutions or different types of signals (incremental and absolute) can be necessary: redundant signals to ensure continuous working, needs of commutation channels, two different subsequent electronics, etc... all ***BEI IDEACOD*** ranges have been developed to make it possible for a simple mounting of two or even three hollow shaft encoders on a same shaft

The overspeed function on the ***ROBUSTECH***™ range, is a sturdy mechanical security module without external power supply (radial commutation centrifugal switch without permanent contact), it allows the acquisition of excessive speed data: ideally useful for handling applications, lifting apparatus, crane, rolling cranes, etc...

Standard accessories are available for all of the encoder range, but if you need a specific mechanical mounting, we are able to manufacture it especially for you

5) Linear applications

Less costly and more simple to implement than ball screws or pinion/rack systems, a draw wire allows an elegant solution for position and linear speed measurement, ideal for many applications : wood or steel cutting machines, rolling cranes, wagon hoists, scenic application (ex : theatre scenery), positioning machines, control system for bench test (car / train), elevator…

BEI IDEACOD also proposes an adjustable sprung square flange with a measuring wheel which allows simply measurement of the position or the speed of a conveyor belt, etc

6) Fieldbus

BEI IDEACOD encoders communicate with the main field buses: Profibus DP, Interbus S, CanOpen and Device Net

CAN was developed as a standardized embedded network with highly flexible configuration capabilities. CANopen was designed for motion-oriented machine control networks, such as handling systems: wagon hoists, cranes, rolling cranes

By now it is used in many various applications: off-road vehicles, maritime electronics, public transportation (bus, train, platform..), medical equipment (seat or bed, X ray machine..), building automation (lift, elevator, etc…)

Profibus is especially used in industrial automation process / automated lines - production lines

- packaging : deep drawing – filling – sealing - punching – labelling - palletizing robot
- automotive : pressing suction conveyor – rotary table – vertical repositioning unit – surface preparation – two axis gantry tire mounting - board conveyor
- food and beverage : palletizing – bottle washing machine – aseptic transportation – filling – closing - labelling
- forestry : alignment – milling – facing - edge cleaning – flying saw- palletizing

7) Electronics / connection

The choice of our electronic options is very wide: besides our 5-30Vdc push-pull and 5V RS422 universal electronics, BEI IDEACOD offers solutions for long cable lengths (ex: long production lines) or high capacity (µF) cable or also special electronics for unstable power supply (ex : trains / car embarked material) a special version working from 5 to 36Vdc

Our electronic department are also able to develop special communication protocols (ex: specific CAN, synchronous or asynchronous serial transmissions) or to propose a compatible interface with your existing electronics

To ensure equipment works continuously, purpose built incremental encoders with redundant signals have been developed; these encoders are perfectly adapted for applications with tough demands

To simplify and secure the connection of our encoders on your subsequent control electronics, ***BEI IDEACOD*** can propose you any type of connector

8) ATEX

It is an regulation to install ATEX compliant components in any zone with explosion risks, be containing potentially explosive dangerous materials: gases, vapours and dusts

This includes industries such as:

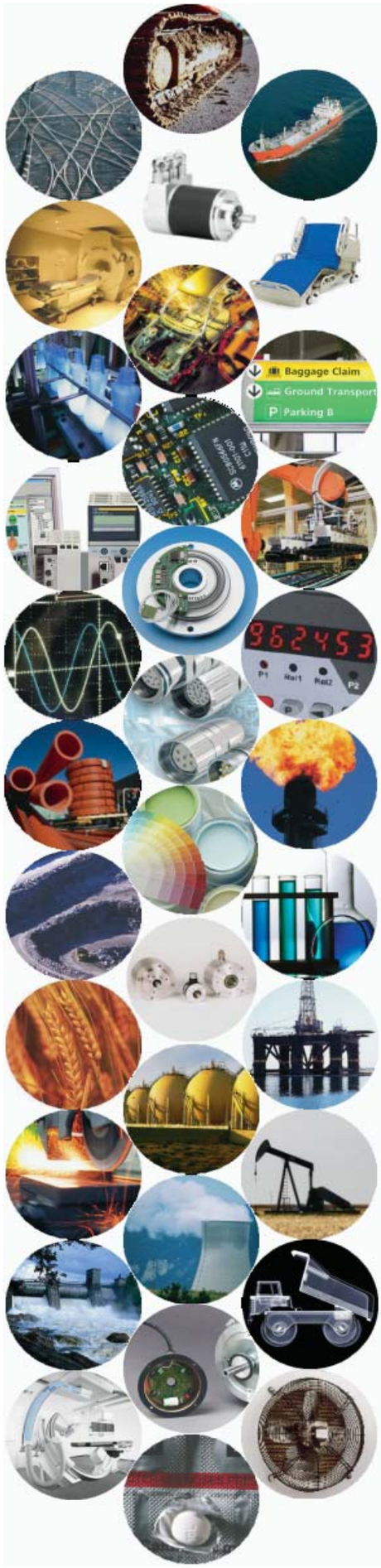
- Distillation- alcohol production, industrial cleaner manufacture - mixture / filling or distribution of flammable liquids - cooking, drying of varnish, painting, glues …
- Workshops where wood or similar combustible materials are used, wood mills, paper mills, cardboard, charcoal, warehouse / storehouses of coal, coke …
- Gas meter and gas tank, manufacturing, use, stocking of combustible material, car park place settings - repair shop of power engines - machines …
- Vegetable substances grinding-, fruits and vegetables desensitisation - vegetable oil extraction - sugar refinery, - silos and cereal stocking installation, grains, foodstuffs with flammable dusts…
- Paint and textile printing, manufacturing workshop, vegetable fibres treatment - tanning workshops…
- Plastics material, transformation of polymers …

9) CUSTOM

Our speciality: the customised encoder - ideal for your application. You are in development phase / you are looking for the integration of a precision rotary sensor on your system, whatever your specifications / your constraints (Mechanical interface / specific electronics, extra flat, extreme temperature, high IP, high speed of rotation, etc.), we know how to offer you an ideal solution, we can develop it for you and manufacture the prototype answering best to your needs, accompanied with 3D drawings, wiring plans, assembly cautions etc.…

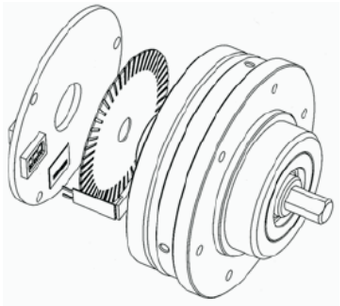
We can also provide you with the assembly of a complete subset to be equipped, this guarantees you an optimal assembly which can be easily integrated into your manufacturing process

Then discover the extent of our range and test our innovation spirit, we are sure that your demand will be satisfied!



INCREMENTAL ENCODERS

DESCRIPTION

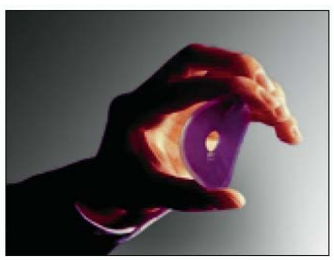


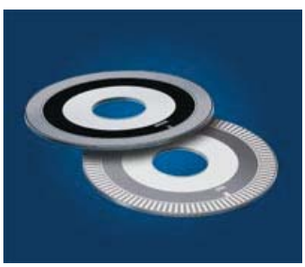
An industrial optical encoder is an angular position sensor:

- 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.





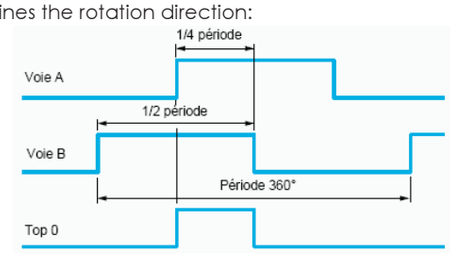
INCREMENTAL ENCODERS ELECTRICAL CARACTERISTICS (AND TACHO-ENCODERS)

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)

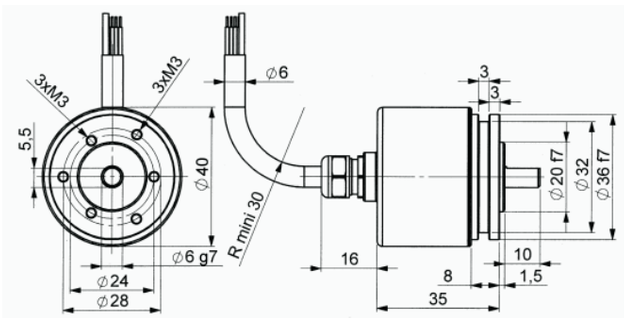
INCREMENTALS		Shaft	Electronic		Channel	Resolution	Connection
		**06** : 6mm **10** : 10mm **11** : 11mm **12** : 12mm **14** : 14mm **30** : 30mm	Power supply: **2** :5Vdc **9** : 5 to 24Vdc **5** : 11 to 30Vdc **R** : 4,75 to 30Vdc **P** : 5 to 30Vdc	Output: **G2** : 5Vdc, RS422 **G5** : push-pull **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

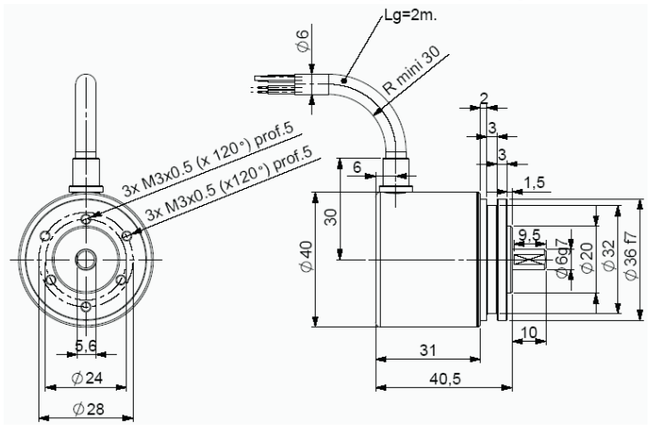
INCREMENTAL ENCODERS, GHM4 RANGE, *COMPACTIS™*

- 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…

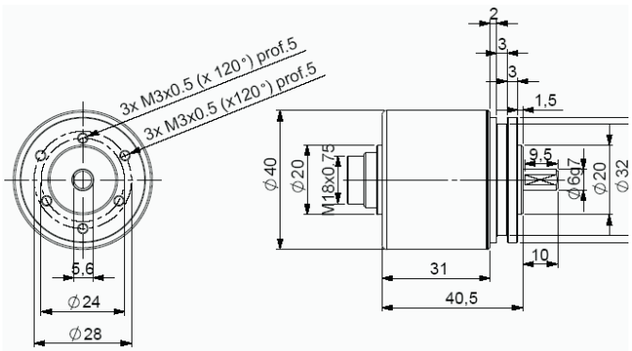
GHM4 connection G3A (axial cable)



GHM4 connection G3R (radial cable)



GHM4 connection G2A / GDA (axial DIN)



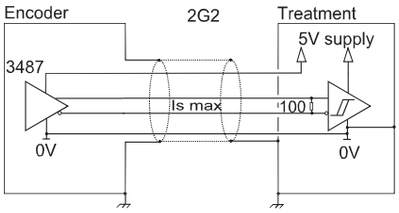
CHARACTERISTICS

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.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.)	0,190 kg

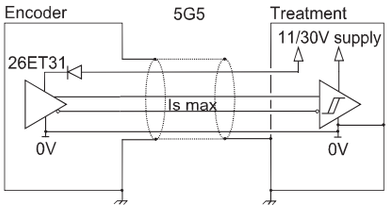
EMC	EN 50082-2 (1995)
	EN 50081-1 (1992)
Isolation	1 000 Veff
Operating temperature	- 20... + 80 °C (encoder T°)
Storage temperature	- 40... + 80 °C
Protection CEI60529 (1989)	IP 54
Shocks (EN60068-2-27)	≤ 300 m.s^{-2} (during 11 ms)
Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (10 … 500 Hz)
Theoretical mechanical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

INCREMENTAL ENCODERS, GHM4 RANGE, *COMPACTIS™*

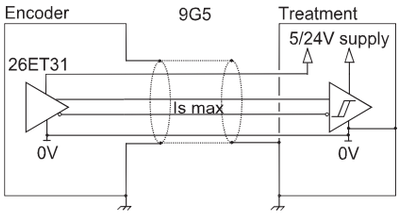
OUTPUT ELECTRONIC / POWER SUPPLY



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
GHM4	**06** : 6mm **L6**: 6mm 16mm length (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)	**2 500** max	**GD** : DIN 8pins **G2** : DIN 5pins **G3** : PVC cable 8 wires	**A** : axial 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*

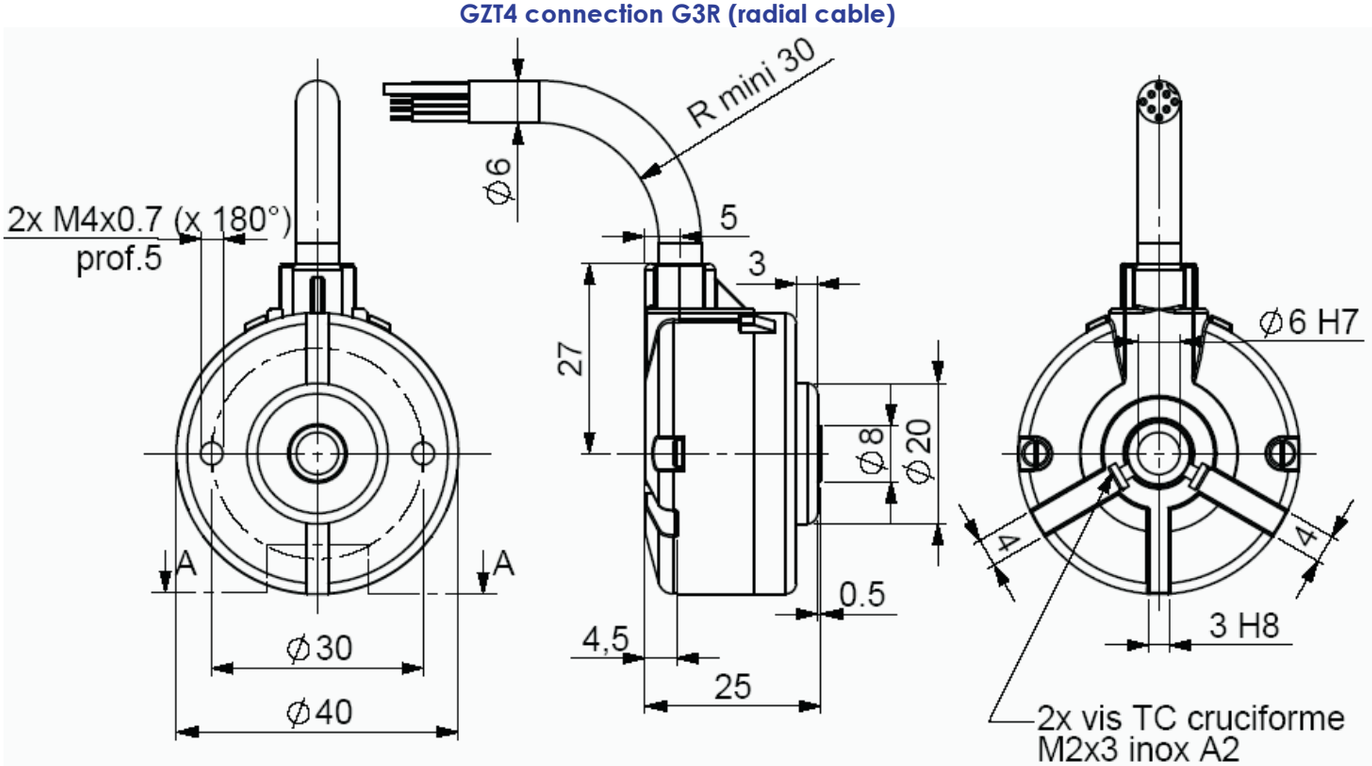
Made in FRANCE

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)



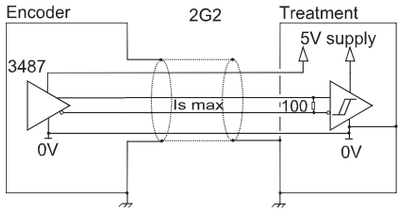
CHARACTERISTICS

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

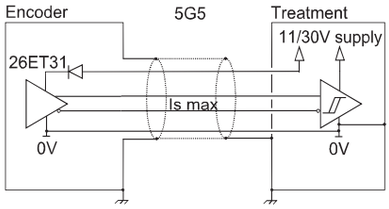
EMC	EN 50082-2 (1995)
	EN 50081-1 (1992)
Isolation	1 000 Veff
Operating temperature	- 20 ... + 80 °C (encoder T°)
Storage temperature	- 40 ... + 80 °C
Protection CEI60529 (1989)	IP 52
Shocks (EN60068-2-27)	≤ 300 m.s^{-2} (during 11 ms)
Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (10 ... 500 Hz)
Torque (shaft 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

INCREMENTAL ENCODERS, GZT4 RANGE, *COMPACTIS*™

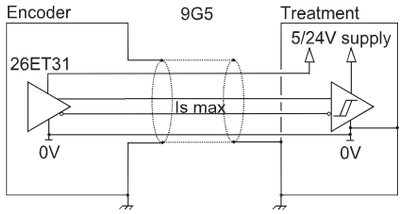
OUTPUT ELECTRONIC / POWER SUPPLY



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	Connector body

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

	Shaft ∅	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

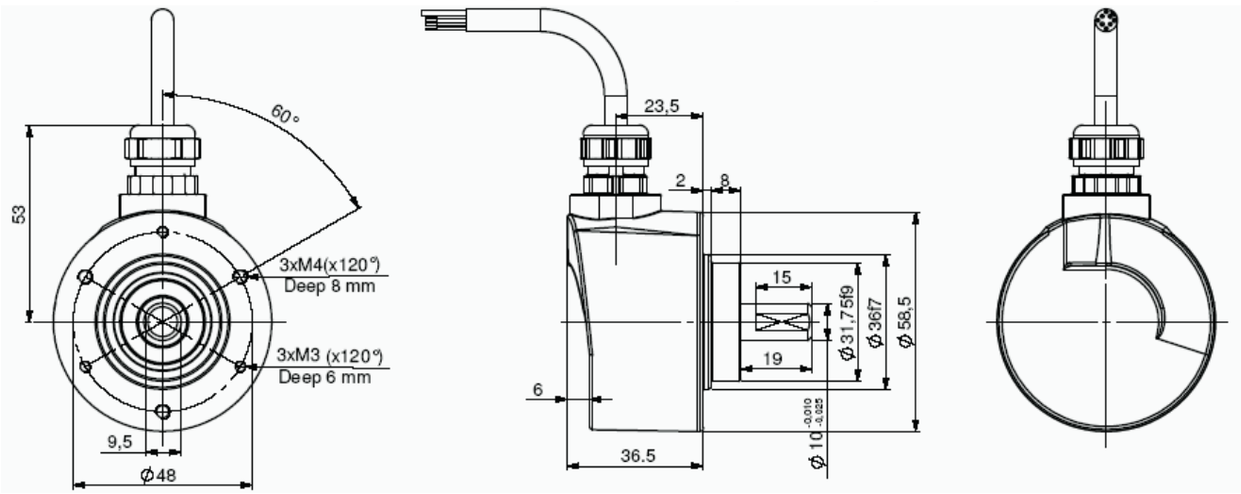
DHM5

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

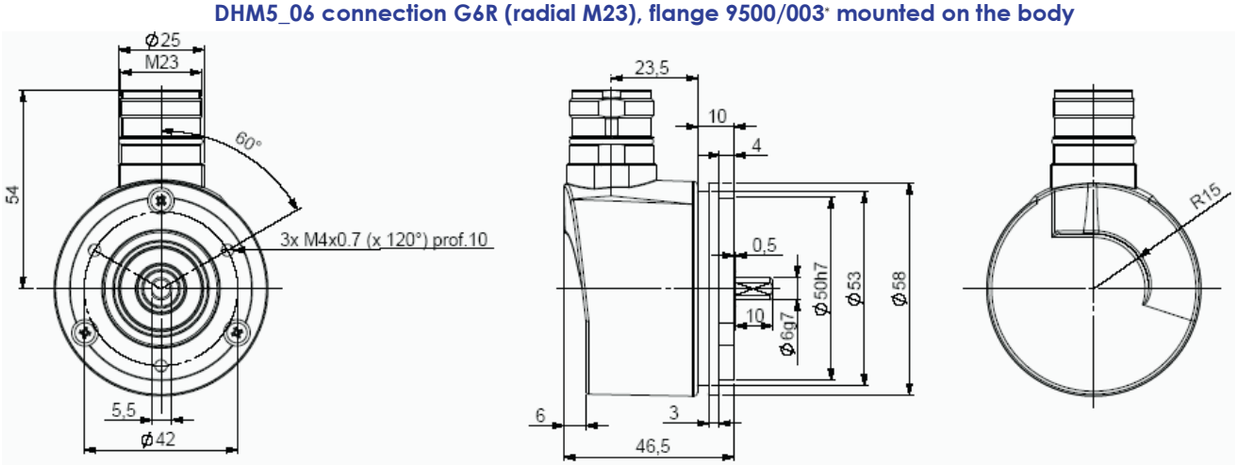
DIGISINE, universal encoders :

- 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

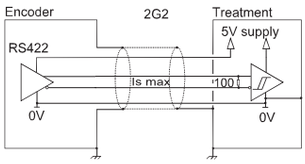


* Accessory to be ordered separately

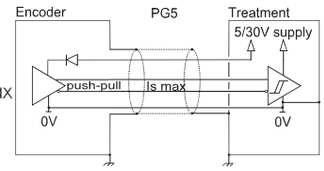
Material	Cover : zinc alloy	Shock (EN60068-2-27)	≤ 500m.s^{-2} (during 6 ms)
	Body : aluminium	Vibration (EN60068-2-6)	≤ 100m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 000 serie	Isolation	1 000 Veff
Maximum loads	Axial : 50 N	Encoder weight (approx.)	0,300 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*™

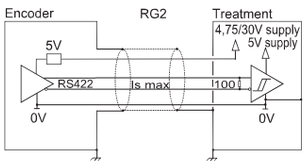
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



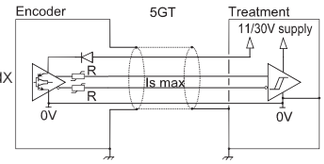
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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

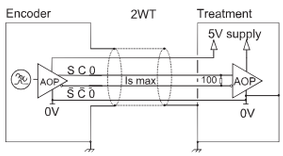


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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			**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
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	**GP** : PUR cable 12 wires **G3** : PVC cable 8 wires	Example : **R020** : radial cable 2m
		Sine-wave signals					
		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

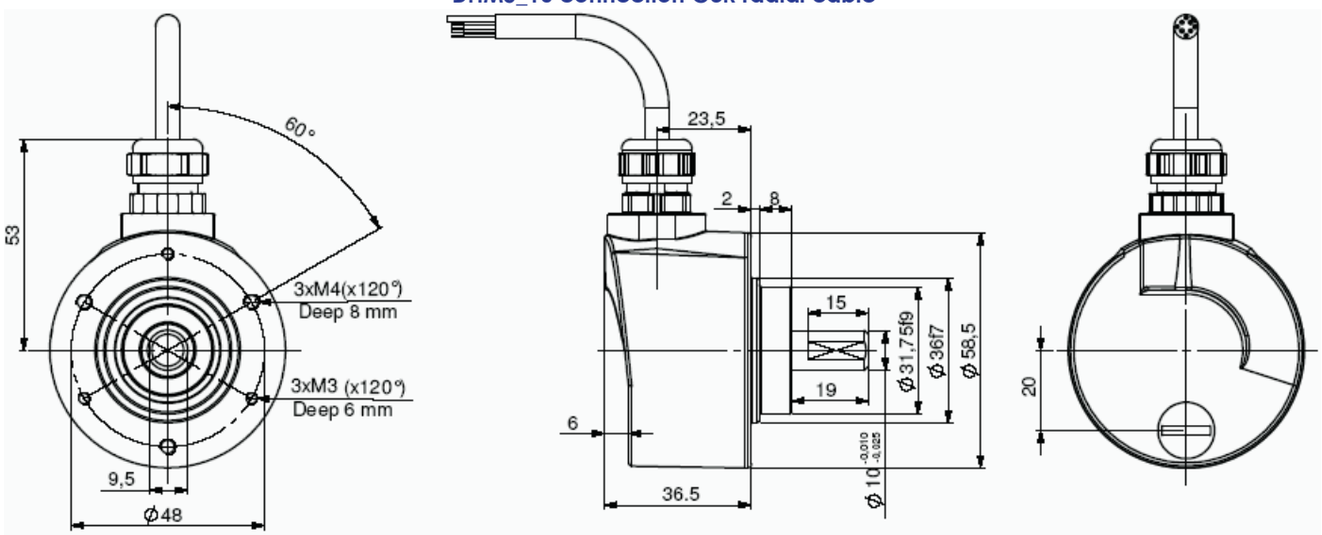
DHM5

PROGRAMMABLE INCREMENTAL ENCODERS, DHM5 RANGE, *DIGISINE*™

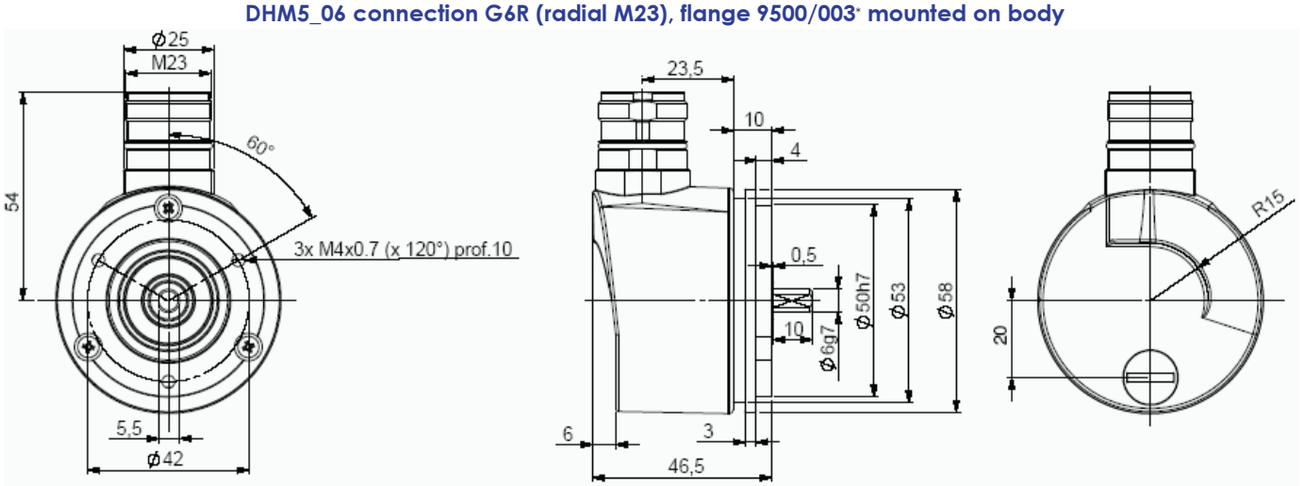
The programmable encoder : ***DIGISINE™,*** unique combination of performance and flexibility

- 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

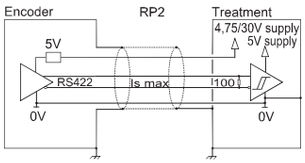


* Accessory to be ordered separately

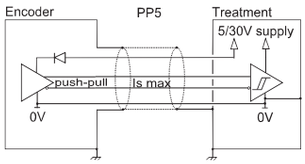
Material	Cover : zinc alloy	Shock (EN60068-2-27)	≤ 500m.s^{-2} (during 6 ms)
	Body : aluminium	Vibration (EN60068-2-6)	≤ 100m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 000 serie	Isolation	1 000 Veff
Maximum loads	Axial : 50 N	Encoder weight (approx.)	0,300 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

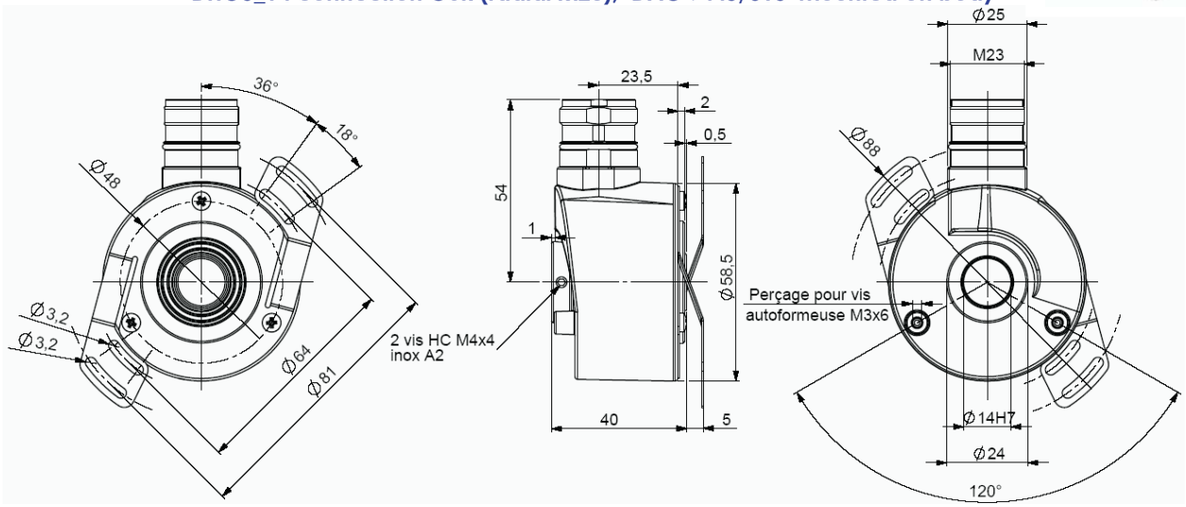
DHO5

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

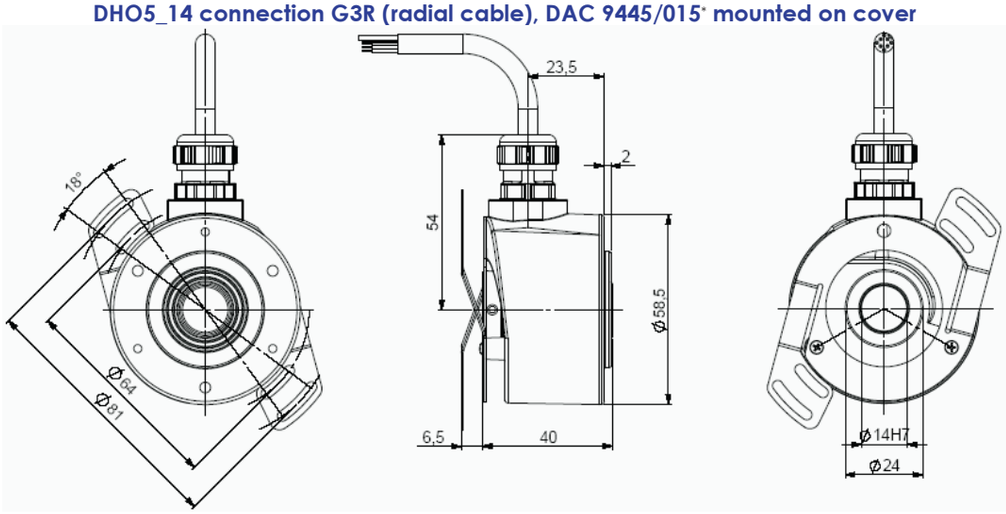
DIGISINE, universal encoders :

- 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

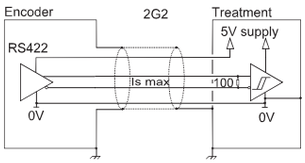


* Accessory to be ordered separately

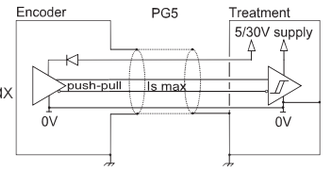
Material	Cover : zinc alloy	Shocks (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
	Body : aluminium	Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 803 serie	Isolation	1 000 V eff
Maximum loads	Axial : 20 N	Encoder weight (approx.)	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, DHO5 RANGE, 100°C, *DIGISINE™*

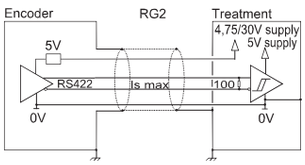
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



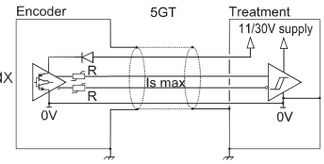
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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

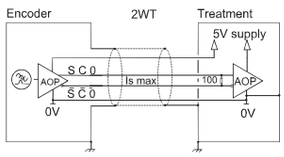


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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				
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	**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: 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

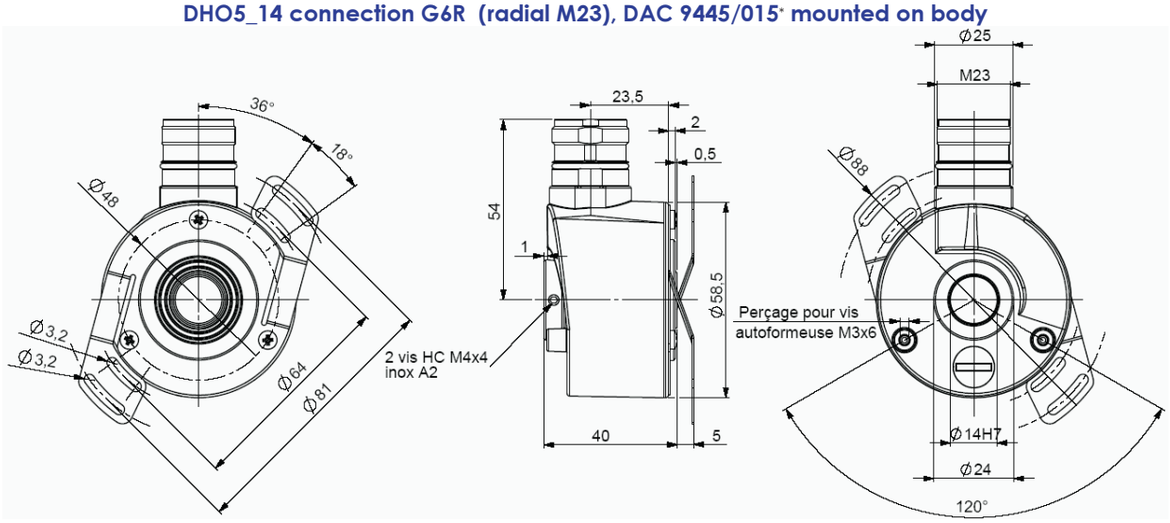
DHO5

PROGRAMMABLE INCREMENTAL ENCODERS, DHO5 RANGE, *DIGISINE*™

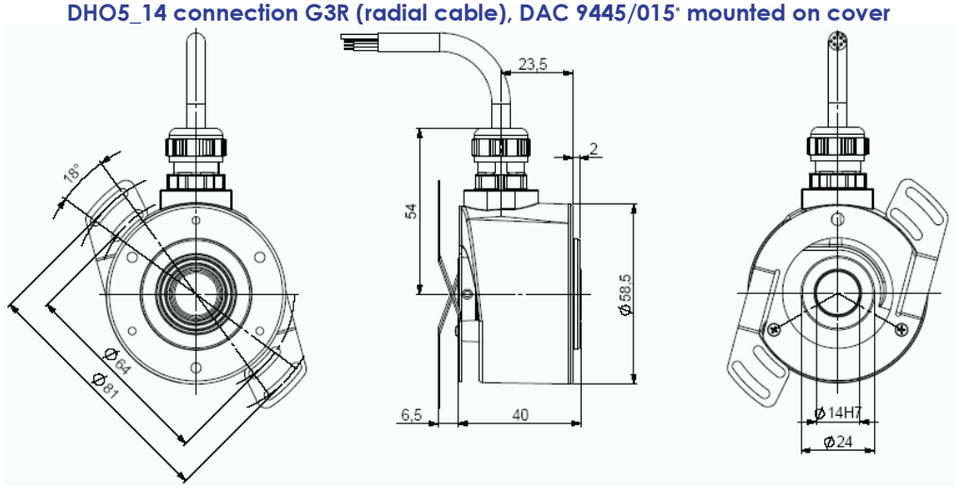
The programmable encoder : ***DIGISINE™,*** unique combination of performance and flexibility

- 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



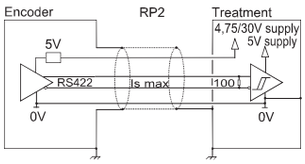
* Accessory to be ordered separately

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

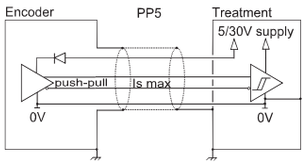
PROGRAMMABLE INCREMENTAL ENCODERS, DHO5 RANGE, *DIGISINE*™

CE

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

DHO5

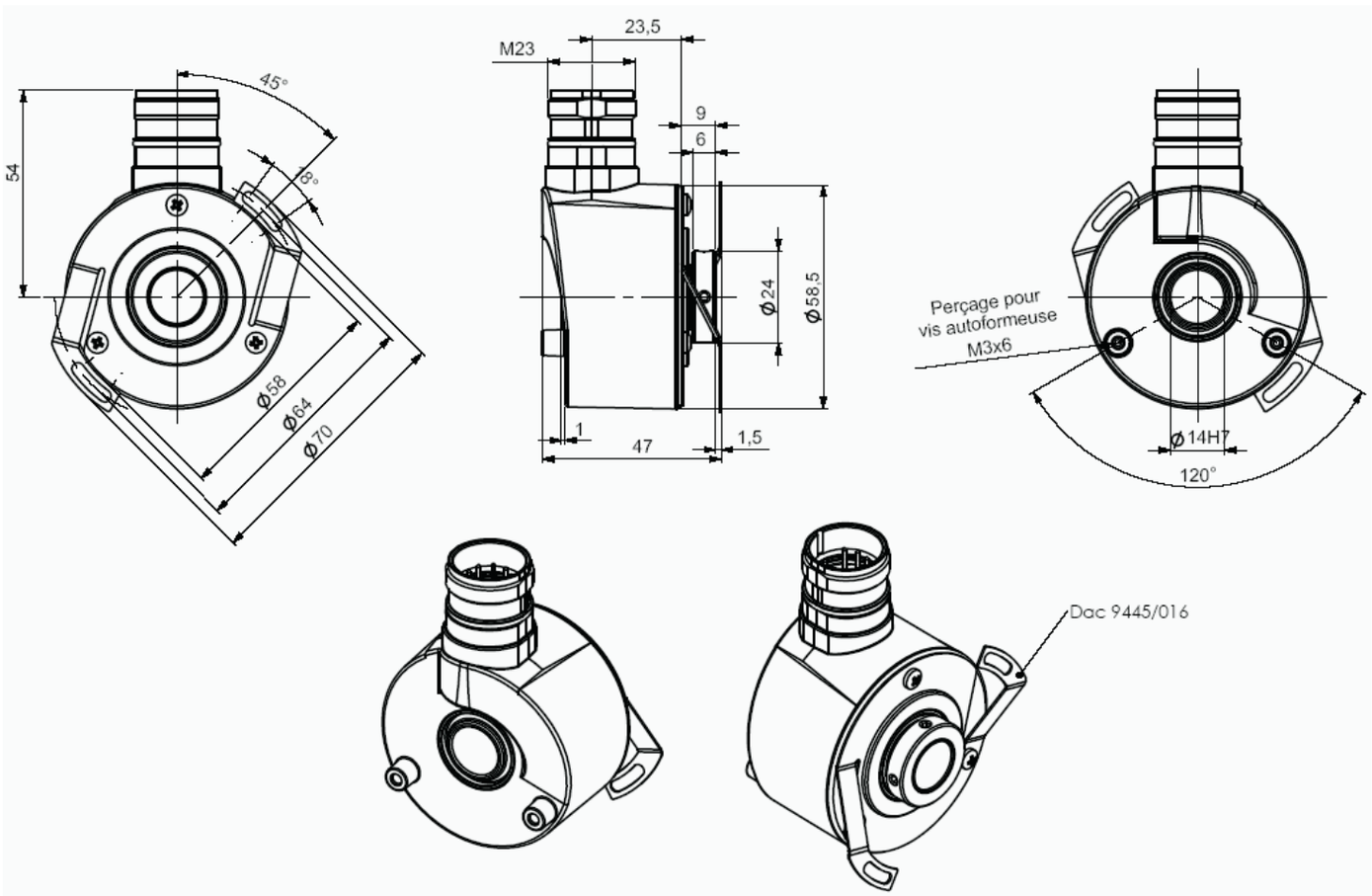
FIXED RESOLUTION INCREMENTAL ENCODERS, DHO5S14/OM RANGE, 100°C, *DIGISINE*™

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

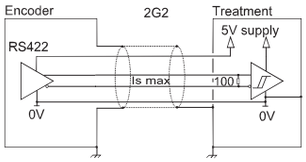


* Accessory to be ordered separately

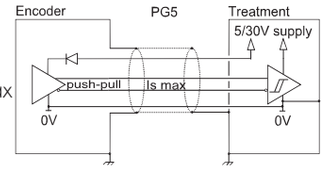
Material	Cover : zinc alloy	Shocks (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
	Body : aluminium	Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 803 serie	Isolation	1 000 V eff
Maximum loads	Axial : 20 N	Encoder weight (approx.)	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™*

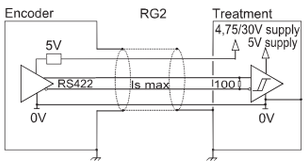
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



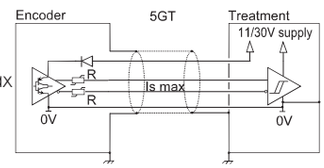
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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

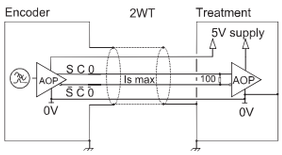


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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			**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
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		
			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

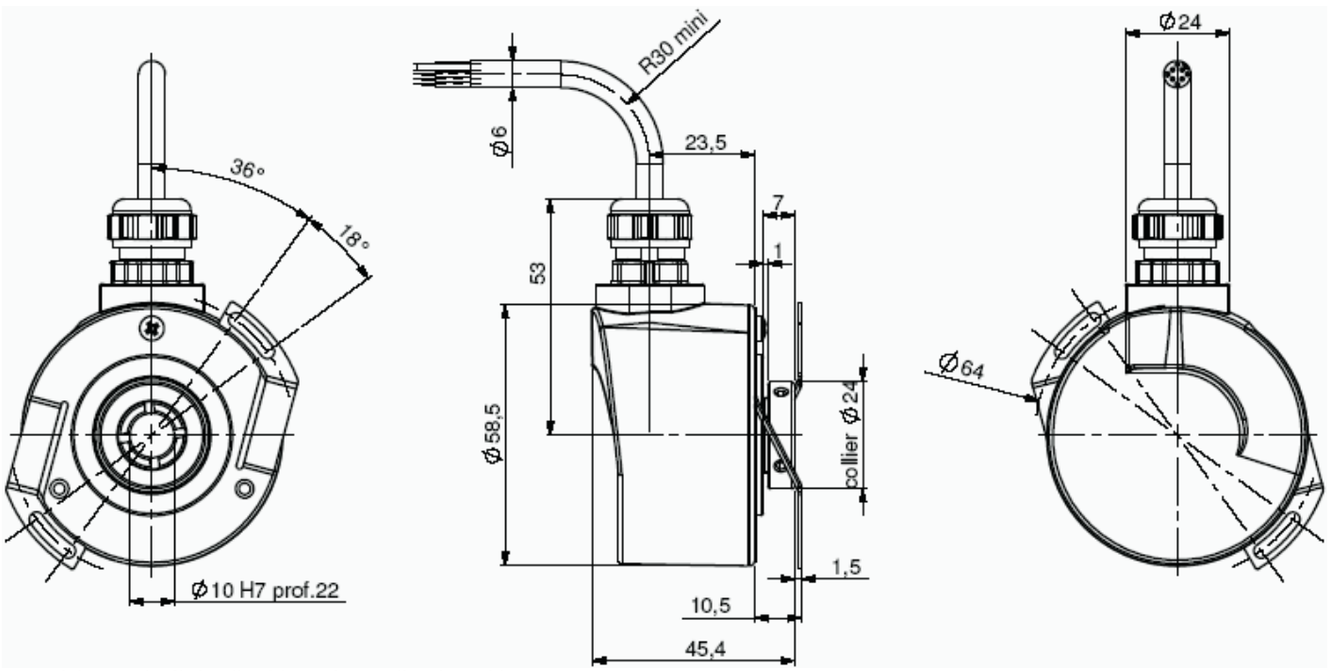
DHK5

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



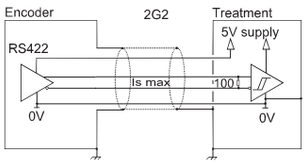
Minimum shaft depth : 12mm for optimal centring

* Accessory to be ordered separately

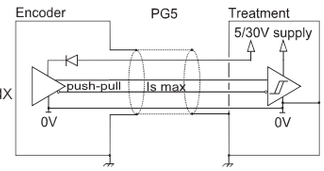
Material	Cover : zinc alloy	Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (55 … 2 000 Hz)
	Body : aluminium	EMC	EN 50081-1, EN 61000-6-2
	Shaft : stainless steel	Isolation	1 000 V eff
Bearings	6 803 serie	Encoder weight (approx.)	0,300 kg
Maximum loads	Axial : 20 N	Operating temperature	- 30 ... + 100°C (encoder 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™*

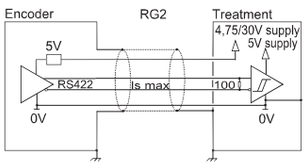
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



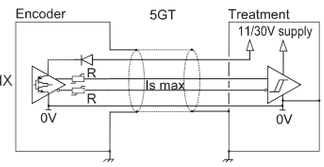
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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

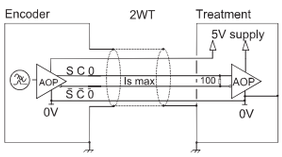


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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)

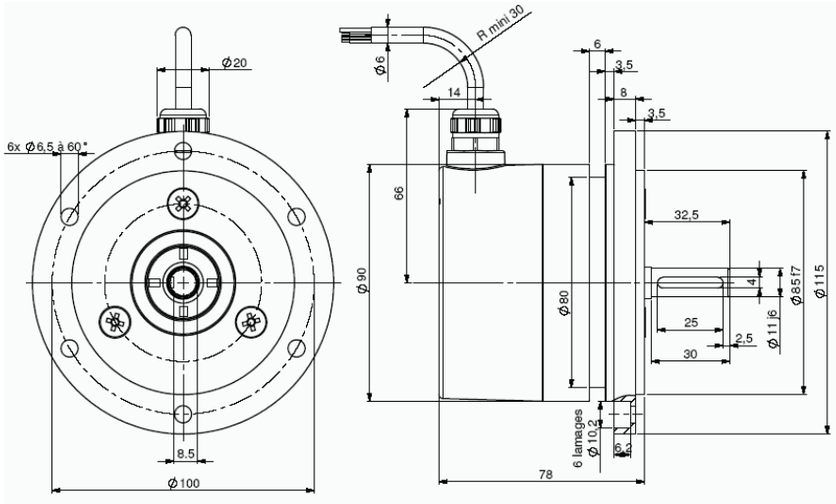
Made in France

DHM9

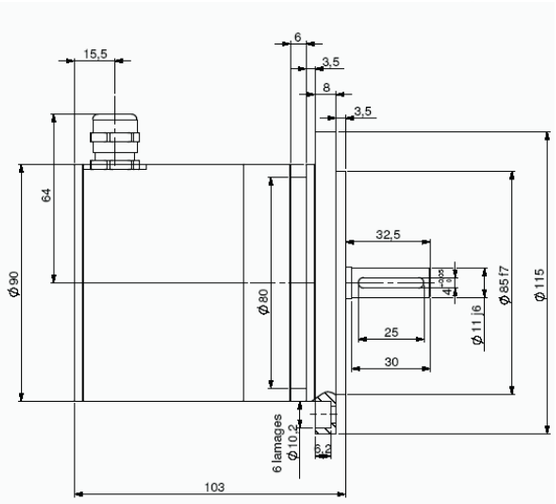
INCREMENTAL ENCODERS, DHM9 RANGE 100°C, *DIGISINE™*

- 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

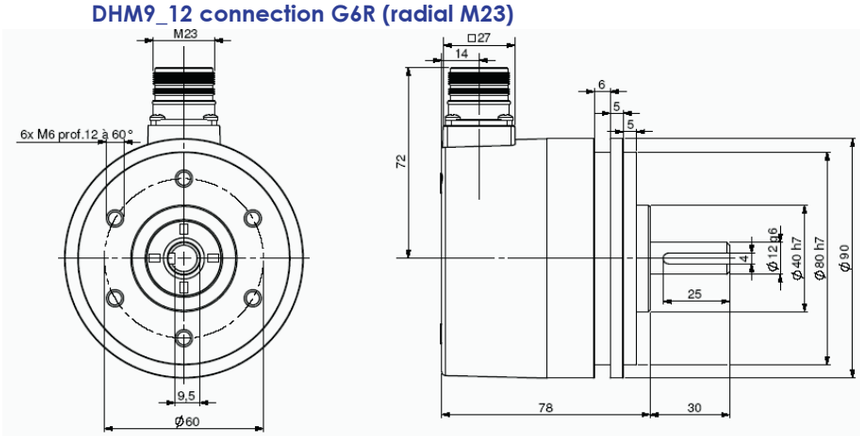
DHM9_11 connection G3R (radial cable)



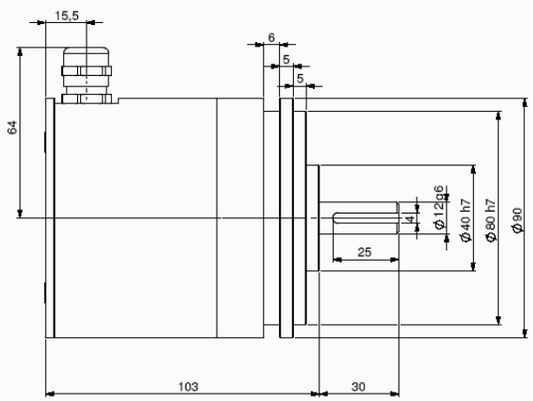
DHM9_11 connection GBR (terminal box)



DHM9_12 connection G6R (radial M23)



DHM9_12 connection GBR (terminal box)



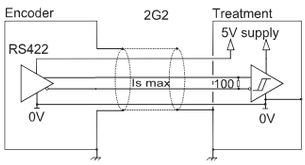
Material (cable or connector version), Stainless steel option	Cover : zinc alloy
	Body : aluminium
Material (terminal box version), Stainless steel option	Cover: treated alu.
	Body: aluminium
Shaft material	Stainless steel
Bearings	6001 serie
Maximum loads	Axial : 100 N
	Radial : 200 N
Shaft inertia	≤ 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)

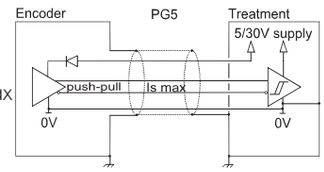
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})		
20 N / 30 N : 360	50 N / 100 N : 18	100 N / 200 N: 2,2

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

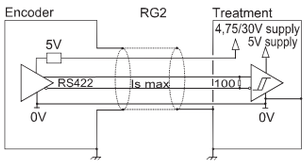
DIGITAL OUTPUT SIGNALS (SQUARE WAVE SIGNALS)



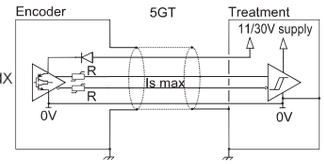
Electronic 2G2 (100°C,300kHz)
Supply : 5Vdc ± 10%
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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

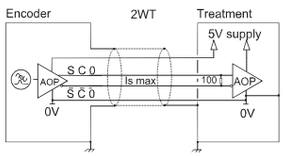


Electronic RG2 (100°C,300kHz)
Supply : 4,75 to 30Vdc
Cons. without load : 75mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 4Vdc



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						**G6**: M23 12 pins CW	
						G5 : M23 12 pins CW	**R** : radial
DBM9 Stainless steel body	**11**:11mm	**2** : 5Vdc	**G2** : driver 5Vdc RS422	**9** : A,A/,B,B/,0,0/ (0 gated A & B)	**80 000** max	**G8** : M23 12 pins CCW	**A** : axial
		5 : 11 to 30Vdc	**G5** : push-pull 5-30Vdc			**GB** : terminal box	
DXM9 Stainless steel cover and body	**12** : 12mm	**P** : 5 to 30Vdc	**GT** : transistorized push-pull 11-30Vdc			**GP** : PUR cable 12 wires	Example : **R020** : radial cable 2m
		R : 4.75 to 30Vdc				**G3** : PVC cable 8 wires	**A020**: axial cable 2m
		Sine-wave signals					
		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)

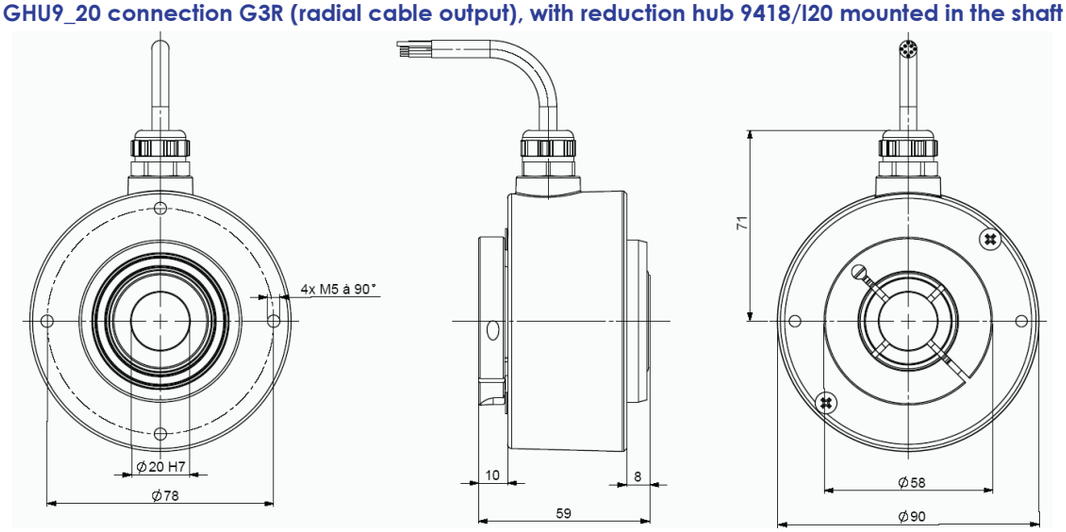
Made in France

GHU9

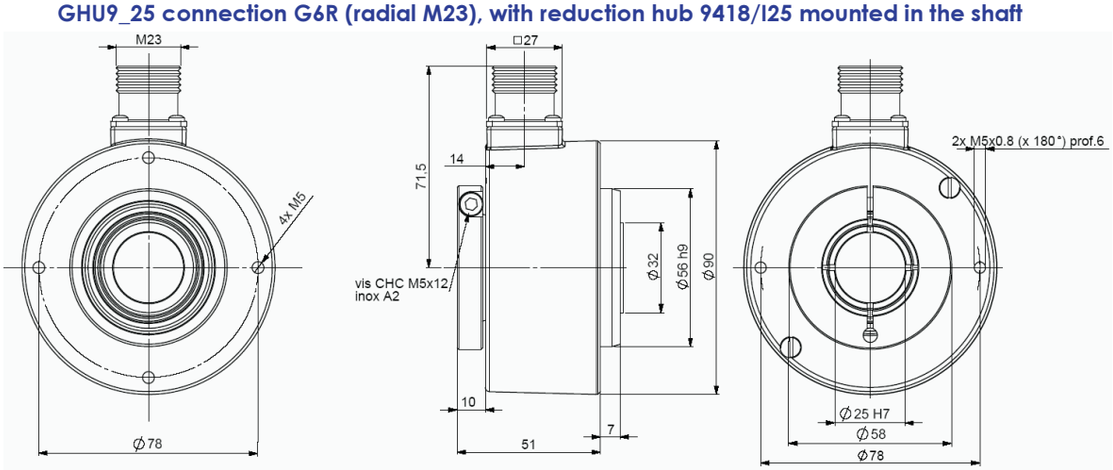
INCREMENTAL ENCODERS, GHU9 RANGE, *ROBUSTECH™*

- 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

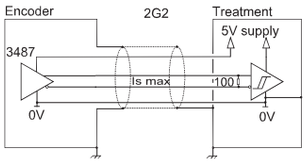


Material Stainless steel option	Cover : zinc alloy
	Body : aluminium
Shaft	Inox
Bearings	6807 serie
Maximum loads	Axial : 50 N
	Radial : 80 N
Shaft inertia moment	≤ 55.10^{-6} kg.m²
Torque	≤ 25.10^{-3} N.m
Permissible max. speed	6 000 min^{-1}
Continuous max. speed	3 600 min^{-1}
Shaft seal	Viton
Shocks (EN60068-2-27)	≤ 500 $m.s^{-2}$ (during 6 ms)

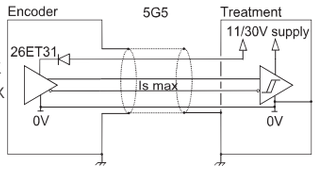
Vibration (EN60068-2-6)	≤ 200 $m.s^{-2}$ (10 … 1 000 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 Veff
Encoder weight (approx.)	0,700kg zinc alloy cover, alu body
	1,000kg zinc alloy cover, stainless steel body
	1,200kg stainless steel cover and body
Operating temperature	- 20 ... + 80 °C (Encoder 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

INCREMENTAL ENCODERS, GHU9 RANGE, *ROBUSTECH™*

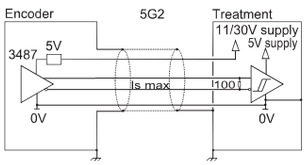
OUTPUT ELECTRONIC / SUPPLY



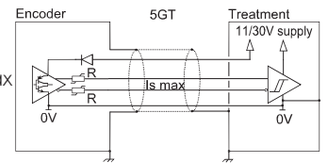
2G2 electronic (100kHz)
Supply : 5Vdc ± 10%
Cons. without load : 100mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



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**				
		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			**G3** : PVC cable 8 wires **GP** : PUR cable 12 wires	Example: **R020**: axial 2m cable
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

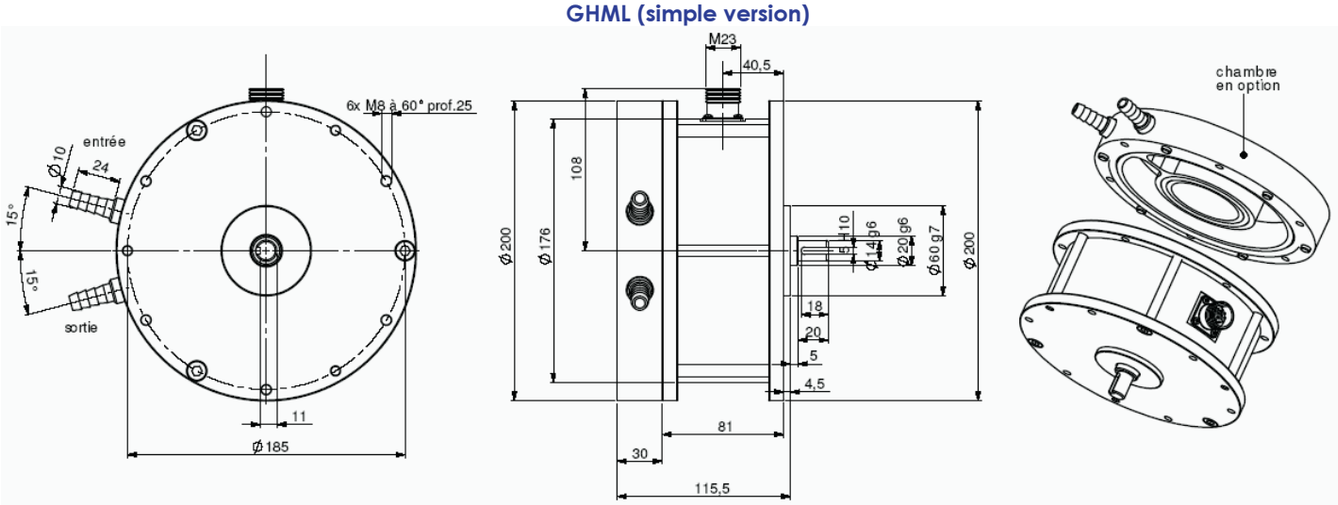
GHML

INCREMENTAL ENCODERS, GHML RANGE, *MAXX™*

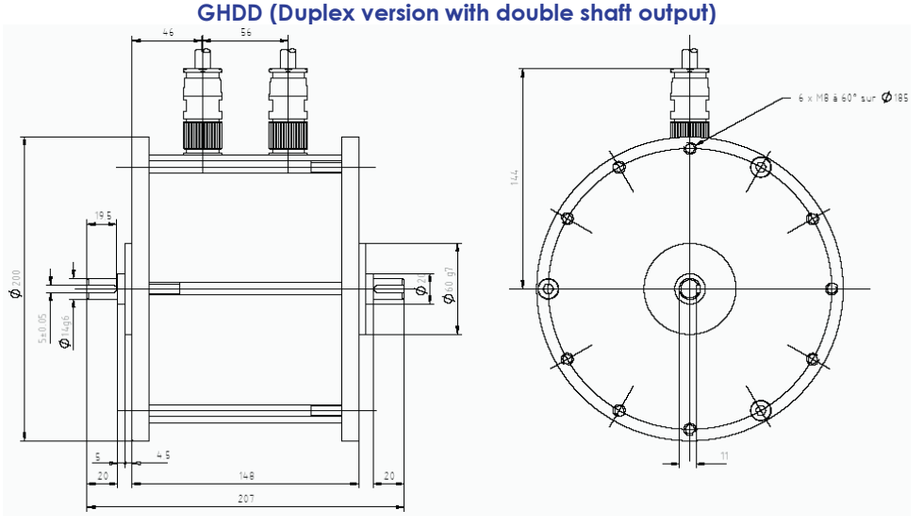
- With 200mm diameter, especially for heavy duty, extreme resistance to shocks/vibrations and to axial and radial charges
- Stainless steel body, treated against corrosion
- Digital incremental output, analog output in option (tacho-encoder, optotacho)
- Water cooling flange as option
- Max control function 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)



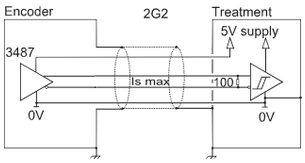
GHDD (Duplex version with double shaft output)



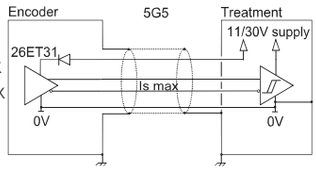
Material	Cover : steel	Continuous max. speed	3 600 min^{-1}
	Body: steel	Shocks (EN60068-2-27)	≤ 500 $m.s^{-2}$ (during 6ms)
	Shaft : stanless steel	Vibrations (EN60068-2-6)	≤ 200 $m.s^{-2}$ (10 … 1 000 Hz)
Bearings	6004 serie	EMC	EN 50081-1, EN 61000-6-2
Maximum loads	Axial : 200 N	Isolation	1 000 V 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™*

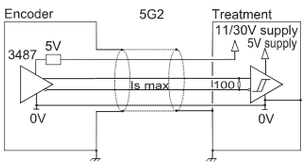
OUTPUT ELECTRONIC / SUPPLY



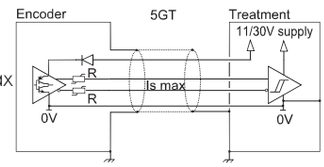
2G2 electronic (100kHz)
Supply : 5Vdc ± 10%
Cons. without load : 100mA max
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



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		**2** : 5Vdc	**G2** : driver 5Vdc RS422	**9** : A,A/,B,B/,0,0/ (0, A&B gated)		**G6**: M23 12 pins CW	
GHDL	**14** :14mm	**5** : 11 to 30Vdc	**G3** : driver 12Vdc		**10 000** max	**G5**: M23 12 pins CCW	**R** : radial
GHMD			**G5** : push-pull	**A** : A,A/,B,B/,0,0/ (0, A gated)		**G8**: M23 12 pins CCW	
GHDD		**3** : 15 to 30Vdc	**GT** : push-pull 11-30Vdc transistorised	**N** : A,A/,B,B/,0,0/ (0 ungated)		**G3** : PVC cable 8 wires	Example :
			GH : push-pull 11-30Vdc 150 mA			**GP** : PUR cable 12 wires	**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*

Made en FRANCE

TACHO-ENCODER – OPTOTACHO

Functionning principle

The tacho-encoders and the opto-tachos use the non contact optoelectronic reading system of the incremental encoders The pulses provided by the optical reading are protected against electromagnetic perturbation. The analogue output is get from the conversion of the readed disk frequency into a proportional voltage or a current

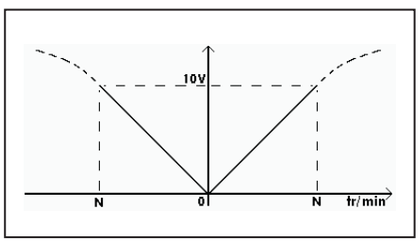
The tacho-encoders provide :
- the incremental signals of an incremental encoder
- linear analogue signal proportional to the rotation speed of the encoder shaft

The Opto-tacho provide only the analogue signal

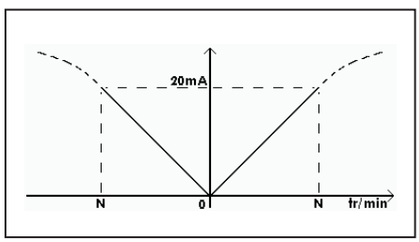
Signal specifications

The opto-electronic reading principle insures an exceptional life time without any maintenance. The voltage output can for example be used to send the speed information to a display near the engine. For applications with electrical disturbances, the current output allows an optimum functioning per current loop

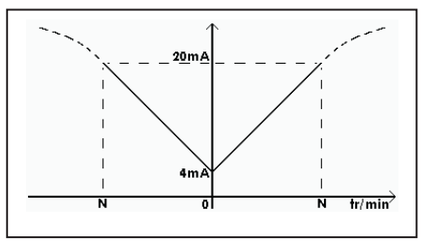
Voltage output : 0 to 10 Vdc



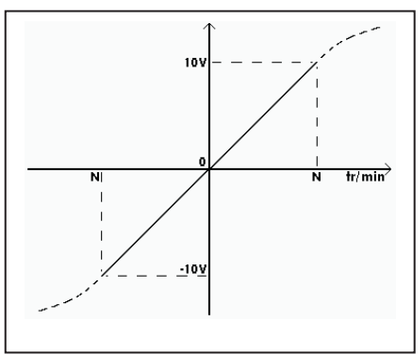
Current output : 0 to 20 mA



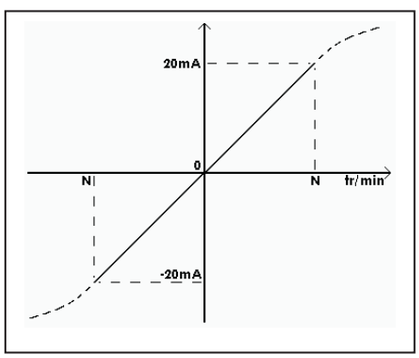
Current output : 4 to 20 mA



On 2 quadrants : voltage output



Currenty output



Standard calibration : in counter clockwise rotation the analogue output is positive

N calibrated (in RPM) can be choosen between 10 rpm and the maximal rotation speed which can be reached by the encoder (cf mechanical characteristics of the encoder)

Analogue signal characteristics

Frequency range at maximal speed	< 5 kHz	> 5 kHz
Linearity	0,1 %	0,05 %
Response time 10 % to 90 %	50 ms	30 ms

Comment :
• The minimum frequency must over than 800 Hz for the 10V or 20mA speed signal; this must be taken in account when choosing the resolution or the calibrated rotation speed. Frequency (Hz) = Resolution x rpm / 60
• Check the maximum frequency that can be reached by the incremental signal (100kHz standard, 200kHz option)

For very long length of cable or slow rotation speed, it is advised to use an incremental encoder associated with a subsequent electronic (at the level of the PLC for example) frequency/voltage or frequency/current (frequency signal are less sensible to the external electromagnetic perturbations

TACHO-ENCODER – OPTOTACHO – STANDARD RANGE

Range - 90mm / 200mm

An engine, either thermical or electrical, is defined per its nominal rotation speed, most of the time RPM are used. Measuring this speed allows to optimize the engine speed rate: underspeed measure, overload detection or overspeed (race detection or transmission break, for example), reduction of the noise level, overheating, etc...

On of the first speed rotary sensor in the industrial field was the tachogenerator – an electric motor used like a generator. The delivered analogue signal is proportional to the rotation speed. These devices have some disadvantages : the necessity to do regular maintenance of the brush - collector combination, the spark risk which is coming from this combination bans the use of tacho generator in explosive atmosphere and finally, the delivered voltage is wavy, this limits the precision of the system

BEI IDEACOD proposes solutions without any contacts based on the incremental encoder technology. The analogue signal is get with the transformation of the signal frequency into proportional voltage or current. The pulses which comes from the optical reading insures a total immunity to perturbations and allows a use on the hardest applications. Moreover the opto-electronic reading principle insures an exceptional life time without any maintenance

OPTO-TACHO		Shaft	Electronic		Speed	Connection
		**11** : 11mm **12** : 12mm **14** : 14mm **30** : 30mm	Power supply: **2** :5Vdc **3** : 15 to 30Vdc	Output: **V1** : 0...20 mA **V2** : 4...20 mA **V3** : -20mA ...+20mA **Vm** : 0...10Vdc **Vp** : -10V...+10Vdc	Example : **D10** : 10 rpm **C20** : 200 rpm **M30** : 3000 rpm	**V6R**: radial 12 pins CW M23 connector **V3R020**: radial 2m PUR cable **VBR** : terminal box, radial cable gland output
	**90mm** NHM9	Solid : 11 12	3V1, 3V2, 3V3, 3Vm, 3Vp 2V1, 2V2, 2V3, 2Vm, 2Vp		M60 max.	V6R V3R020 VBR
	**90mm** NHU9	Through : 30	3V1, 3V2, 3V3, 3Vm, 3Vp 2V1, 2V2, 2V3, 2Vm, 2Vp		M36 max.	V6R V3R020
	**200mm** NHML	Solid : 14	3V1, 3V2, 3V3, 3Vm, 3Vp 2V1, 2V2, 2V3, 2Vm, 2Vp		M36 max.	V3R V6R
Reference example	NHM9_	11 //	3V2 //		M36 //	VBR

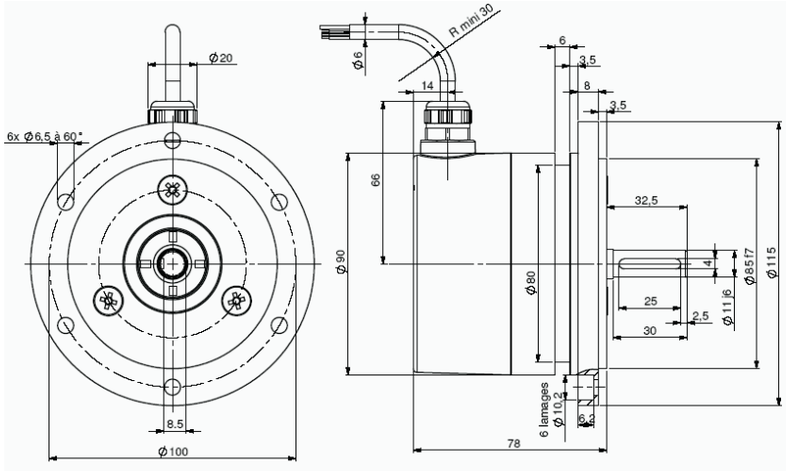
TACHO-ENCODER		Shaft	Electronic		Out	Pulses	Speed	Connection
		**11** : 11mm **12** : 12mm **14** : 14mm **30** : 30mm	Supply: **2** : 5Vdc **3** : 15-30Vdc	**Na**: 0...10Vdc + RS422 **Nc**: 0...10Vdc + push-pull **Nd**: 0...20mA + RS422 **Nf**: 0...20mA + push-pull **Ng**: 4...20mA + RS422 **Ni**: 4...20mA + push-pull **Nj**: –10Vdc... +10Vdc + RS422 **Nl**: –10Vdc... +10Vdc + push-pull **Nm**: - 20mA...+20mA + RS422 **No**: - 20mA...+20mA + push-pull	**9** : A, A/ B, B/ 0, 0/ 0 gated A&B	Number of pulses per turn	Example : **D10** : 10 rpm **C20** : 200 rpm **M30** : 3000 rpm	**N6R**: radial 12 pins CW M23 connector **N3R020**: radial 2m PUR cable **NBR** : terminal box, radial cable gland output
	**90mm** NHM9	Solid : 11 12	2Na, 2Nd, 2Ng, 2Nm 3Nc, 3Nf , 3Ni, 2Nj, 3Nl, 3No		9	10000 max	M60 max.	N6R N3R020 NBR
	**90mm** NHU9	Through : 30	2Na, 2Nd, 2Ng, 2Nm 3Nc, 3Nf , 3Ni, 2Nj, 3Nl, 3No		9	10000 max	M36 max.	N6R N3R020
	**200mm** NHML	Solid : 14	2Na, 2Nd, 2Ng, 2Nm 3Nc, 3Nf , 3Ni, 2Nj, 3Nl, 3No		9	10000 max.	M36 max.	N3R N6R
Reference example	NHM9_	11 //	3Ni		9 //	1024	M36 //	NBR

NHM9

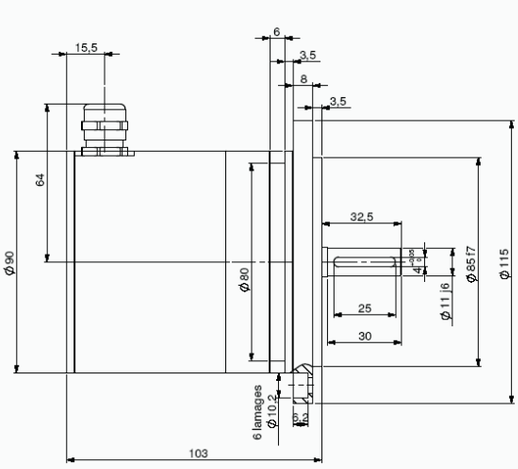
TACHO-ENCODER, NHM9 RANGE

- 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
- Connection with terminal box with LED option, cable or connector output
- Digital incremental signals and analogue output signals (proportional to the speed)
- Mechanical overspeed switch option
- 12mm solid shaft or 11mm with REO 115mm flange (Euroflange B10) for tacho-generator mounting

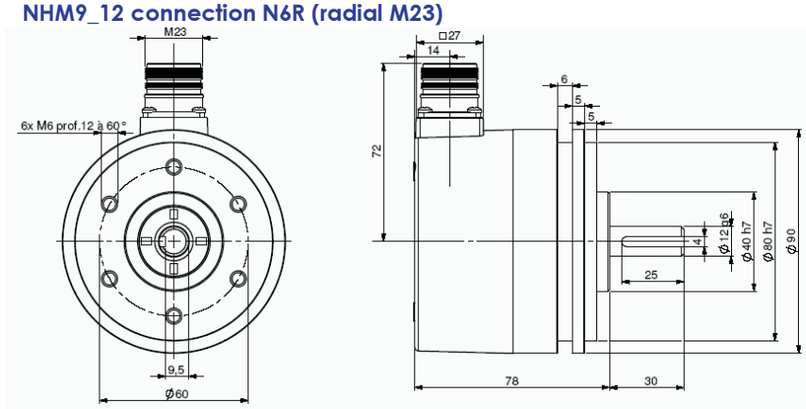
NHM9_11 connection N3R (radial cable)



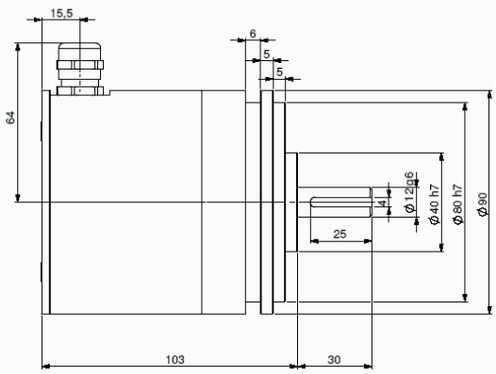
NHM9_11 connection NBR (terminal box)



NHM9_12 connection N6R (radial M23)



NHM9_12 connection NBR (terminal box)



Material (connector or cable output version) Stainless steel option	Cover : zinc alloy
	Body: aluminium
Material (terminal box version) Stainless steel option	Cover: aluminium
	Body: aluminium
Axe	Stainless steel
Bearings	6001
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)

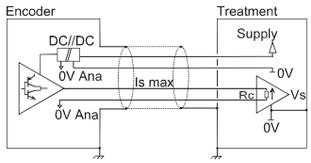
Vibrations (EN60068-2-6)	≤ 200 $m.s^{-2}$ (10 … 1 000 Hz)
EMC	EN 50081-1, EN 61000-6-2
Tension d'isolement	1 000 Veff
Encoder weight (approx.) Connector or cable version	1,100kg zinc alloy cover, alu body
	2,400kg zinc alloy cover, stainless steel body
	2,600kg stainless steel cover and body
Encoder weight (approx.) Terminal box version	1,300kg alu cover, alu body
	2,600kg alu cover, stainless steel body
	2,800kg stainless steel cover and body
Operating temperature	- 20 ... + 80 °C (encoder T°)
Storage temperature	- 40 ... + 80 °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

TACHO-ENCODER, NHM9 RANGE

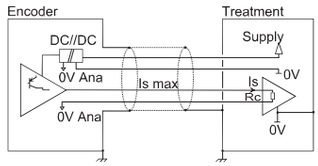
ANALOGUE OUTPUT CIRCUITS / POWER SUPPLY

2Na : power supply 5 Vdc – driver 0...10 Vdc
3Nc : power supply 15-30 Vdc – driver 0...10 Vdc
2Nj : power supply 5 Vdc – driver – 10 Vdc ... + 10 Vdc
3Nl : power supply 15-30 Vdc – driver – 10 Vdc ... + 10 Vdc



Rc min	1 kOhms
Rc advised	1,5 kOhms
Rc max	/

2Nd : power supply 5 Vdc – driver 0...20 mA
2Ng : power supply 5 Vdc – driver 4...20 mA
2Nm : power supply 5 Vdc – driver –20 mA ... + 20 mA
3Nf : power supply 15-30 Vdc – driver 0...20 mA
3Ni : power supply 15-30 Vdc – driver 4...20 mA
3No : power supply 15-30 Vdc – driver –20 mA ... + 20 mA

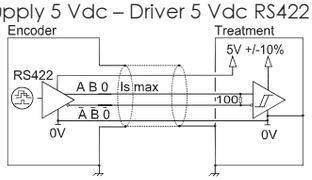


Rc min	25 Ohms
Rc advised	150 Ohms
Rc max	500 Ohms

Note : Current loop output also available
Both versions, voltage and current output are protected against inversion of polarity and excess voltage up to 33Vdc

DIGITAL OUTPUT CIRCUIT / SUPPLY

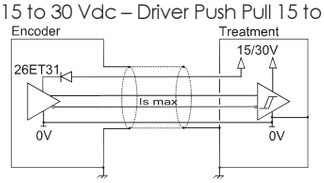
Electronic type 2Na, 2Nd, 2Ng, 2Nj and 2Nm :
Power supply 5 Vdc – Driver 5 Vdc RS422 (100kHz)



Supply : 5Vdc ± 10%
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc

Note : regulated 12Vdc output also available

Electronic type 3Nc, 3Nf, 3Ni, Nl and No :
Power supply 15 to 30 Vdc – Driver Push Pull 15 to 30 Vdc (100kHz)



Supply 15 to 30 Vdc
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-3Vdc

The products are equipped with a total galvanic isolation (1kV) between the analogue output circuits and the rest of the electronic
Consumption without load: 250mA, protection against short circuits for the electronic type 3Nc, 3Nf, 3Ni, Nl and No

STANDARD CONNECTIONS

		-	+	A	B	0	A/	B/	0/	0V ana	OUT ana	Ground
NB	Terminal box	1	2	3	4	5	6	7	8	9	10	Cable gland
N6	M23 – 12pins CW	1	2	3	4	5	6	7	8	9	10	Connector body
N3	PUR cable	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	WH-GN white-green	BN-GN brown-green	General shield

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

	Shaft Ø	Available electronic		Channel	Resolution	Speed	Connection	Orientation
		2Na,2Nd,2Ng,3Nc,3Nf and 3Ni						
		Supply	Output stage					
NHM9 **NBM9** stainless steel body **NXM9** stainless steel body and cover	**11** : 11mm **12** : 12mm **C1 :** 11mm Length 20mm **C2 :** 12mm Length 25mm	**2**: 5Vdc **3** : 15 to 30Vdc	**Na**:0..10Vdc+RS422 **Nc**:0..10Vdc+push-pull **Nd**:0..20mA+RS422 **Nf**:0..20mA+push-pull **Ng**:4..20mA+RS422 **Ni**:4..20mA+push-pull	**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	example : **D10** : 10rpm **C20** : 200rpm **M30** : 3000rpm	**N6** : M23 12 pinouts CW **NB** : terminal box **N3** : PUR cable 12 wires	**R** : radial **A** : axial example: **R020**:radial cable 2m **A020**:axial cable 2m
Ex: NHM9 _	**11** //	**3**	**Nc**	**9** //	**5000**	**M30** //	**NB**	**R**

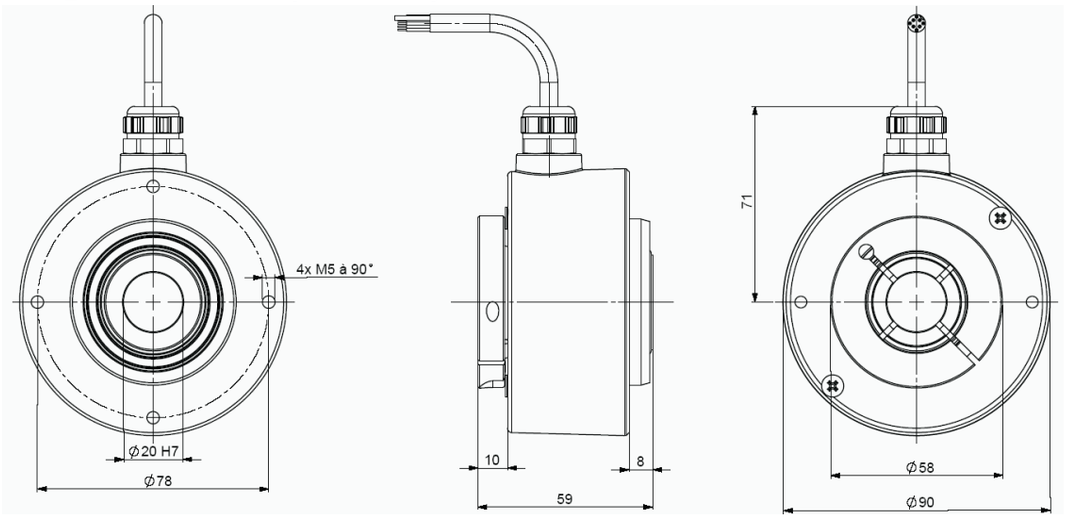
Made in FRANCE

NHU9

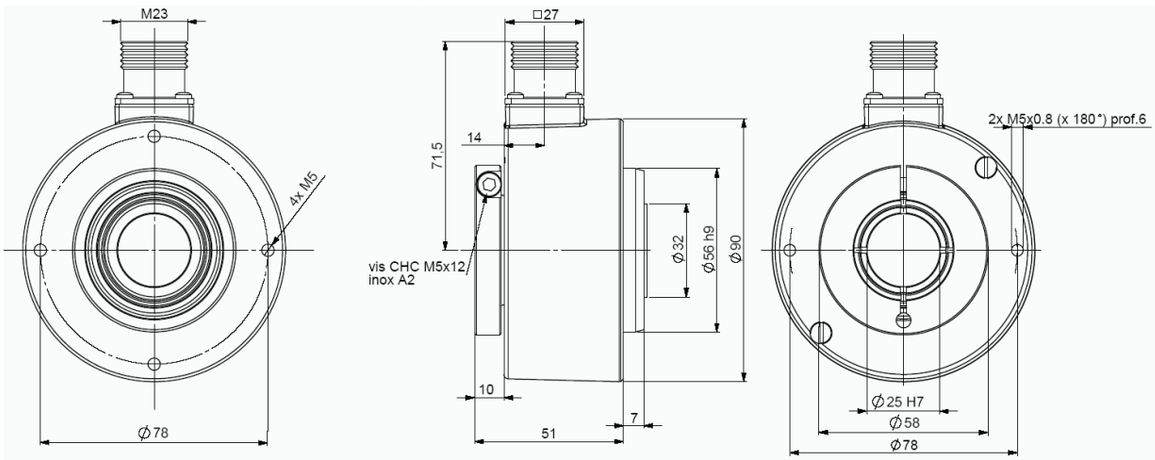
TACHO-ENCODER, NHU9 RANGE

- 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
- 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 and analogue output signals (proportional to the speed)
- Mechanical overspeed switch option
- Double/triple mounting in combinations of incremental, absolute, analogue signals

NHU9_20 connection N3R (radial cable), with reduction hub 9418/I20 mounted in the 30mm shaft



GHU9_25 connection G6R (radial M23), with reduction hub 9418/I25 mounted in the 30mm shaft



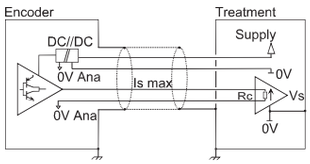
Material Stainless steel option	Cover : zinc alloy
	Body : aluminium
Shaft	Stainless steel
Bearings	6807 serie
Maximal loads	Axial : 50 N
	Radial : 80 N
Shaft inertia moment	≤ 55.10^{-6} kg.m²
Torque	≤ 25.10^{-3} N.m
Permissible max. speed	6 000 min^{-1}
Continuous max. speed	3 600 min^{-1}
Shaft seal	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

TACHO-ENCODER, NHU9 RANGE

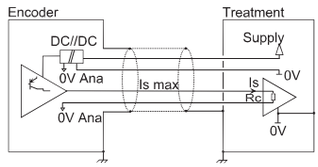
ANALOGUE OUTPUT CIRCUITS / POWER SUPPLY

2Na : power supply 5 Vdc – driver 0…10 Vdc
3Nc : power supply 15-30 Vdc – driver 0…10 Vdc
2Nj : power supply 5 Vdc – driver – 10 Vdc … + 10 Vdc
3Nl : power supply 15-30 Vdc – driver – 10 Vdc … + 10 Vdc



Rc min	1 kOhms
Rc advised	1,5 kOhms
Rc max	/

2Nd : power supply 5 Vdc – driver 0…20 mA
2Ng : power supply 5 Vdc – driver 4…20 mA
2Nm : power supply 5 Vdc – driver –20 mA … + 20 mA
3Nf : power supply 15-30 Vdc – driver 0…20 mA
3Ni : power supply 15-30 Vdc – driver 4…20 mA
3No : power supply 15-30 Vdc – driver –20 mA … + 20 mA

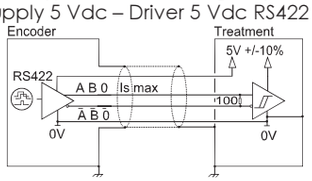


Rc min	25 Ohms
Rc advised	150 Ohms
Rc max	500 Ohms

Note : Current loop output also available
Both versions, voltage and current output are protected against inversion of polarity and excess voltage up to 33Vdc

DIGITAL OUTPUT CIRCUIT / SUPPLY

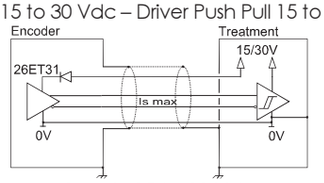
Electronic type 2Na, 2Nd, 2Ng, 2Nj and 2Nm :
Power supply 5 Vdc – Driver 5 Vdc RS422 (100kHz)



Supply : 5Vdc ± 10%
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc

Nota : regulated 12Vdc output also available

Electronic type 3Nc, 3Nf, 3Ni, Nl and No :
Power supply 15 to 30 Vdc – Driver Push Pull 15 to 30 Vdc (100kHz)



Supply 15 to 30 Vdc
Current per channel : 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-3Vdc

The products are equipped with a total galvanic isolation (1kV) between the analogue output circuits and the rest of the electronic
Consumption without load: 250mA, protection against short circuits for the electronic type 3Nc, 3Nf, 3Ni, Nl and No

STANDARD CONNECTIONS

		-	+	A	B	0	A/	B/	0/	0V ana	OUT ana	Ground
NB	Terminal box	1	2	3	4	5	6	7	8	9	10	Cable gland
N6	M23 – 12pins CW	1	2	3	4	5	6	7	8	9	10	Connector body
N3	PUR cable	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	WH-GN white-green	BN-GN brown-green	General shield

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

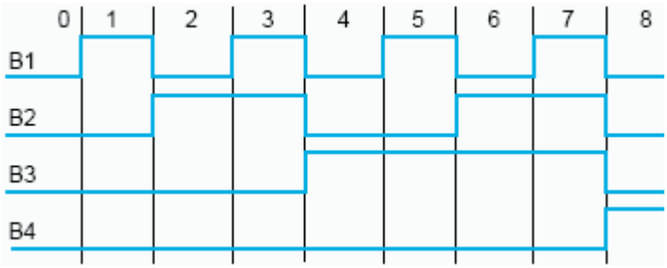
	Shaft Ø	Available electronic		Channel	Resolution	Speed	Connection	Orientation
GHU9 Cover : zinc Body alu **GBU9** Cover : zinc Body: stainless steel **GXU9** Cover and body: stainless steel	**30** : 30mm reduction hub available from 10 to 28mm	**2Na, 2Nd, 2Ng, 3Nc, 3Nf and 3Ni**		**9** : A,A/,B,B/,0,0/ (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	example : **D10** : 10rpm **C20** : 200rpm **M30** : 3000rpm	**N6** : M23 12 pinouts CW	**R** : radial
		Supply	**Output stage**					
		2: 5Vdc **3** : 15 to 30Vdc	**Na**:0..10Vdc+RS422 **Nc**:0..10Vdc+push-pull **Nd**:0..20mA+RS422 **Nf**:0..20mA+push-pull **Ng**:4..20mA+RS422 **Ni**:4..20mA+push-pull				**N3** : PUR cable 12 wires	example: **R020**:radial cable 2m
Ex: NHU9 _	**30 //**	**3**	**Nc**	**9 //**	**5000**	**M30//**	**N6**	**R050**

Made in FRANCE

SINGLETURN ABSOLUTE ENCODERS

Absolute encoders can determine their physical position at any given moment by using a unique code within the same revolution, even without a reference index. This unique code is given with the individually reading of concentric optical tracks, thanks to an LED and a receiving system of photosensitive cells. These tracks are coded in GRAY which presents the advantage to change its state on only on a single track (one bit) at each step, and so ensures a reading without any error

Binary code



GRAY coded disk

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2^4	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
2^3	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0
2^2	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1
2^1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
2^0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1

An absolute encoder disk is made up with "N" concentric tracks divided into equal segments alternatively opaque and transparent. Each track is associated to one optical receiver

The interior track is made up of an opaque half and a transparent half. The reading of this track, the Most Significant Bit (MSB), makes it possible to determine in which half-revolution the shaft is oriented

The following track is divided into 4 quarters alternatively opaque and transparent. The reading of this track combined with the preceding one makes it possible to determine in which quarter of turn the shaft is located. The following tracks make it possible to determine in which eighth of turn, sixteenth of turn, etc...

The external track corresponding to the Least Significant Bit (LSB) gives the final precision. It is made up of 2n points corresponding to the resolution of the encoder. Thus for each angular shaft position, the disk information provides a code, which can be convert ed into either a binary code or Gray code

The same coded values are repeated at the end of a complete revolution of the shaft encoder. An absolute encoder permanently delivers a code which is the image of the real position of the moving body being controlled. At the first switching on even after a power down, the encoder will deliver directly its exploitable information to the subsequent electronic

Standard code type

In function of the subsequent electronic needs, the GRAY code can be converted in other codes thanks to internal transcoder

Binary code, is used predominantly by computer or PLCs, binary code is obtained by the transcription of the GRAY code

The Excess code is coded in decimal GRAY, each decade is represented by a GRAY code. The Excess code is a GRAY code presenting an even decimal value. It is constructed with the truncation of a power of 2 code, and permits standard resolutions of 360, 400, 720, 800, etc...

GRAY code

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2^4	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
2^3	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0
2^2	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
2^0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

	0	1	2	3	4	5	6	7	8	9
2^3	0	0	1	1	0	0	1	1	0	0
2^2	1	1	1	0	0	0	0	1	1	1
2^1	0	1	1	1	1	1	1	1	1	0
2^0	0	0	0	0	0	1	1	1	1	1

Excess GRAY code

SINGLETURN ABSOLUTE ENCODERS – STANDARD RANGE

Range - 58mm

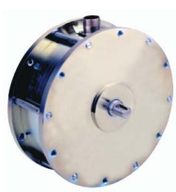
- European standards universal SSI an parallel encoder
- Encoder T° : –20 à +90°C (+100°C option)
- IP65 (IP67 with flange option)
- 5 to 30Vdc universal power supply
- High resolution possibility (20bits)

Range - 90mm

- Developed for extreme loads, shocks and vibrations
- 12mm solid shaft or 11mm with 115mm flange available 115 mm or with a 30mm through shaft
- Encoder T° : –20 to +90°C
- IP65 CHU9
- IP67 CHM9

Range - 200mm

- Developed for heavy industries, such as : steel, glass, cement mills, maritime oil rig…
- Encoder T° –20 to +90°C, cooling flange option
- IP65
- Duplex version available, (double electronic & optical system)

SINGLETURN		Shaft	Electronic		Code	Resolution	Connection
		**06** : 6mm **10** : 10mm **11** : 11mm **12** : 12mm **14** : 14mm **30** : 30mm	Supply: **2** : 5Vdc **5** : 11-30Vdc **P** : 5-30Vdc	Output: **CD** : driver 5Vdc **C5** : driver push-pull **CS** : SSI without parity CB : BiSS interface	**B** : Binary **G** : Gray	In powers of 2	**C6R / S6R** : radial 12 pins CW M23 connector **C8R / S8R** : radial 12 pins CCW M23 connector **C7R020** : 2m PUR radial cable **CPR** : radial 16 pins CW M23 connector (13 bits encoder) **C1R** : radial 17 pins CW M23 connector (14 bits encoders) **C3R– S5R020** : 2m radial cable
	**58mm** CHM5	Solid : 6 10	PCS PCB		B G	Standard : 13 Max : 20	S6R S8R S5R020
			PC5			15 max	CPR C1R C3R020
	**58mm** CHO5	Through : 14	PCS PCB		B G	Standard: 13 Max: 20	S6R S8R S5R020
			PC5			15 max	CPR C1R C3R020
	**90mm** CHM9	Solid : 11 12	5CS		B G	13 max	C6R C8R C7R020
			2CD 5C5			14 max	CPR C1R C3R020
	**90mm** CHU9	Through: 30	5CS		B G	13 max	C6R C8R C7R020
			2CD 5C5			14 max	CPR C1R C3R020
	**200mm** CHML	Solid : 14	5CS		B G	13 max	C6R C8R C7R020
			2CD 5C5			14 max	CPR C1R C3R020
Reference example	CHM9_	12 //	5CS		G //	13 //	C6R

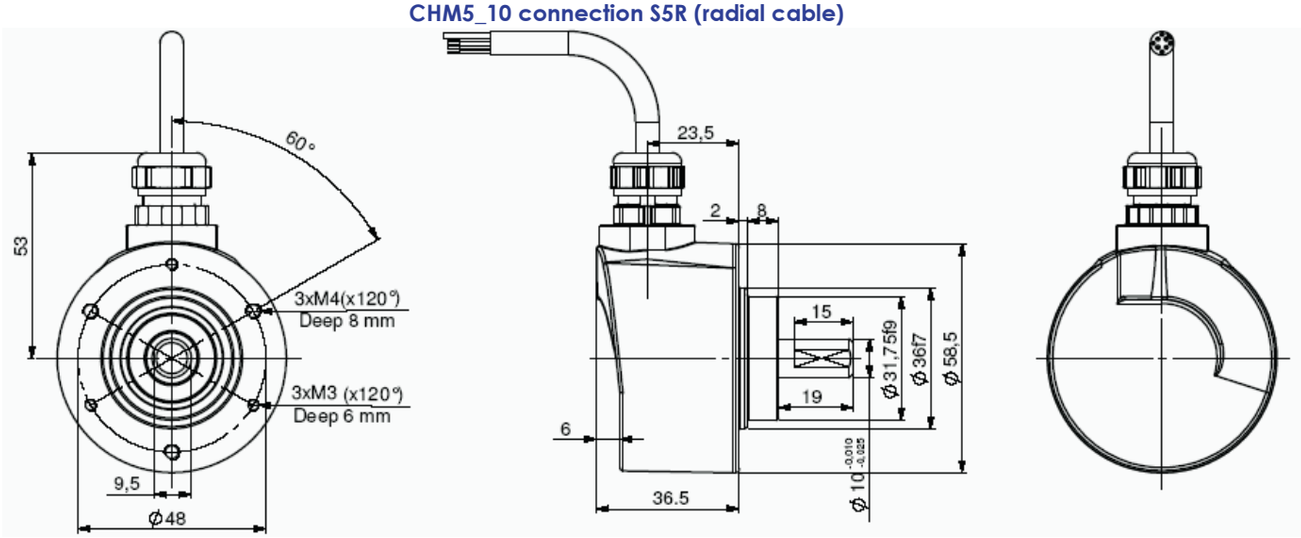
CHM5

SSI ABSOLUTE SINGLE TURN ENCODERS, CHM5 RANGE

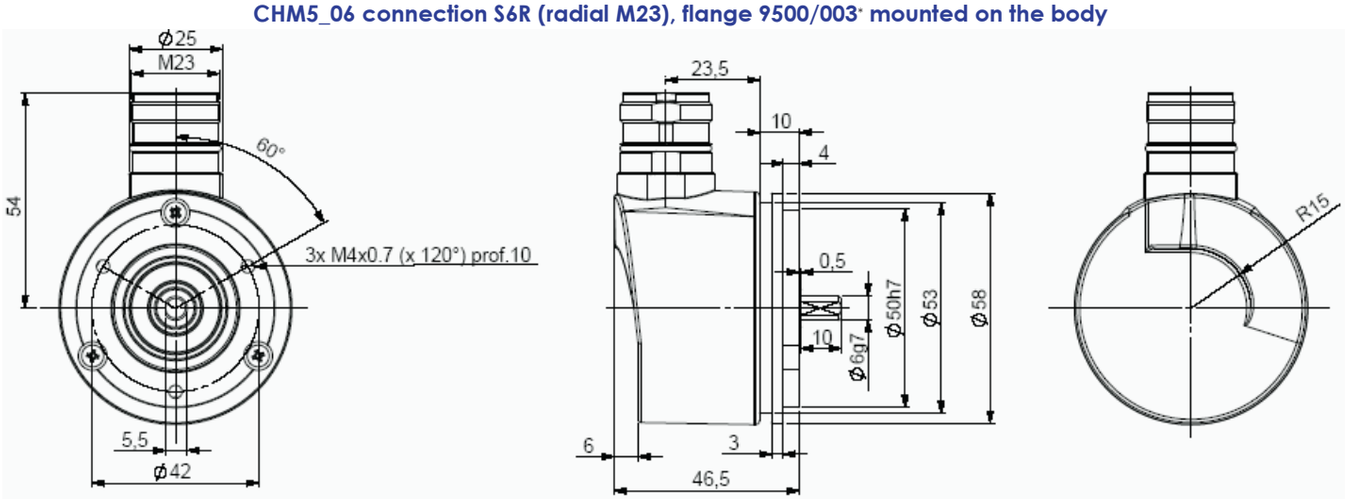
CHM5, the new generation of SSI absolute single turn encoders :

- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65, IP67 option with a sealing flange
- High resolutions possibility: up to 20 bits (Gray or binary)
- Universal power supply from 5 to 30 Vdc
- High performances in temperature –20°C to 90°C (option –40°C to 100°C)
- Standard DIRECTION and RESET input
- Digital or sine incremental outputs option

CHM5_10 connection S5R (radial cable)



CHM5_06 connection S6R (radial M23), flange 9500/003* mounted on the body



* Accessories 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} (10 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 61000-6-4, 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	- 20 … + 90 °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

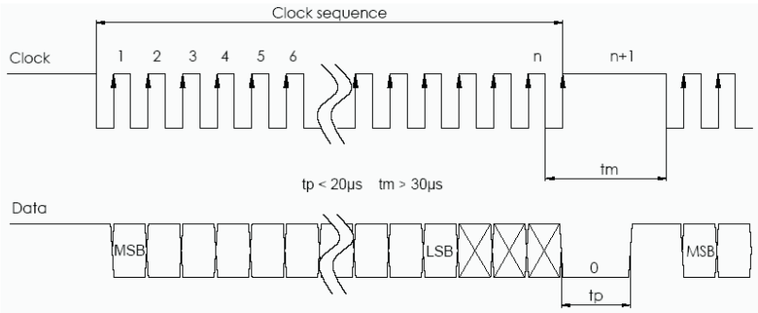
SSI ABSOLUTE SINGLE TURN ENCODERS, CHM5 RANGE

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per optocoupler
Output signal DATA	line - driver RS422
Power supply	5 – 30Vdc
Introduction	< 200ms
Consumption without load	Max. 100mA

Clock frequency CLK	• 100kHz to 1MHz for 13 bits encoder • 100kH – F_{max} = 10^6 / (resolution in bits –10) for encoder >13bits, ex : F_{max}=166kHz for 16 bits encoder
Interrogation frame	n=13 bits for 13 bits resolution n=21bits for >13bits resolution

SSI TRANSMISSION



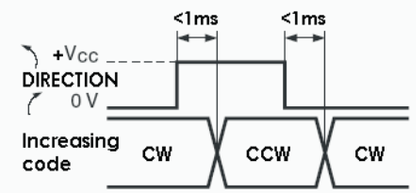
Transmission	Transmission up to 400m at 100kHz in function of the cable characteristics
Câble	High security of transmission by using shielded cable and twisted pairs

* Consult us for length > 100m

CONNECTIQUE STANDARD SSI

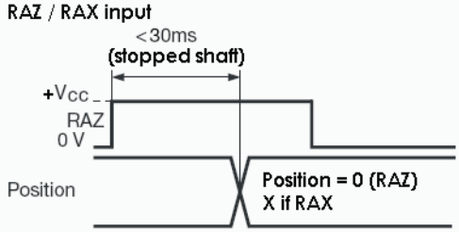
Type	+ Vcc	0 V	Clk+	Data+	RAZ	Data-	Clk-	DIRECTION
S6	1	2	3	4	5	6	7	9
S5	BN/GN Brown/Green	WH/GN White/Green	GN Green	GY Grey	BU Blue	PK Pink	BN Brown	WH White
S8	8	1	3	2	6	10	11	5

DIRECTION input



	min	max	Increasing
Level "0"	0 V	0,3x(+Vcc)	CW
Level "1"	0,7x(+Vcc)	+Vcc	CCW
I direction	< 5mA		

RAZ / RAX input



	min	max
Level "0"	0 V	0,3x(+Vcc)
Level "1"	0,7x(+Vcc)	+Vcc
I raz/rax	< 5mA	

Nota : Do not connect other pinouts, connect DIRECTION and RAZ to a potential (RAZ at 0V if not used)

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

	Shaft Ø	Supply	Output stage	Code	Resolution	Connection	Orientation
CHM5	**10** : 10mm **06** : 6mm	**P** : 5 to 30Vdc	**CS** : SSI without parity **CP** : SSI even parity **CI** : SSI odd parity	**B**: Binary **G** : Gray	Max: **20** bits, power of 2 **13**: 13 bits to **13**: 13 bits **20** bits: consult us	**S6** : M23 12pins CW for SSI transmission **S8**: M23 12pins CCW for SSI transmission	**R** : radial
						S5 : SSI cable, cable gland output	Example : **R020** : radial cable of 2m
CHM5 _	**10** //	**P**	**CS**	**G** //	**13** //	**S6**	**R**

Monitoring function available as option:
- of the code coherence
- of the LED internal regulated current loop
- of temperature range with 2 limits

Consult us

Input / output available as option:
- RAX input (reset to a value X, manufacture setting)
- ERROR output for monitoring functions
- Sine & Cosine outputs without index, 2048ppr (option: 4096 ppr)
- A & B incremental outputs without index, 2048ppr (option: 4096 ppr)

Made in FRANCE

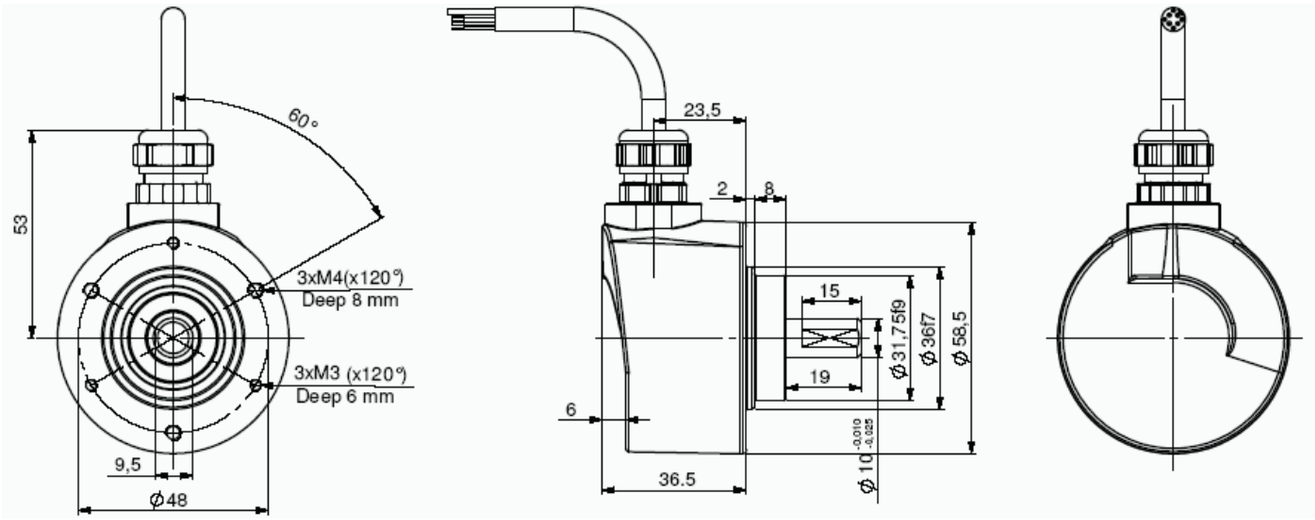
CHM5

PARALLEL SINGLE TURN ABSOLUTE ENCODER, CHM5 RANGE

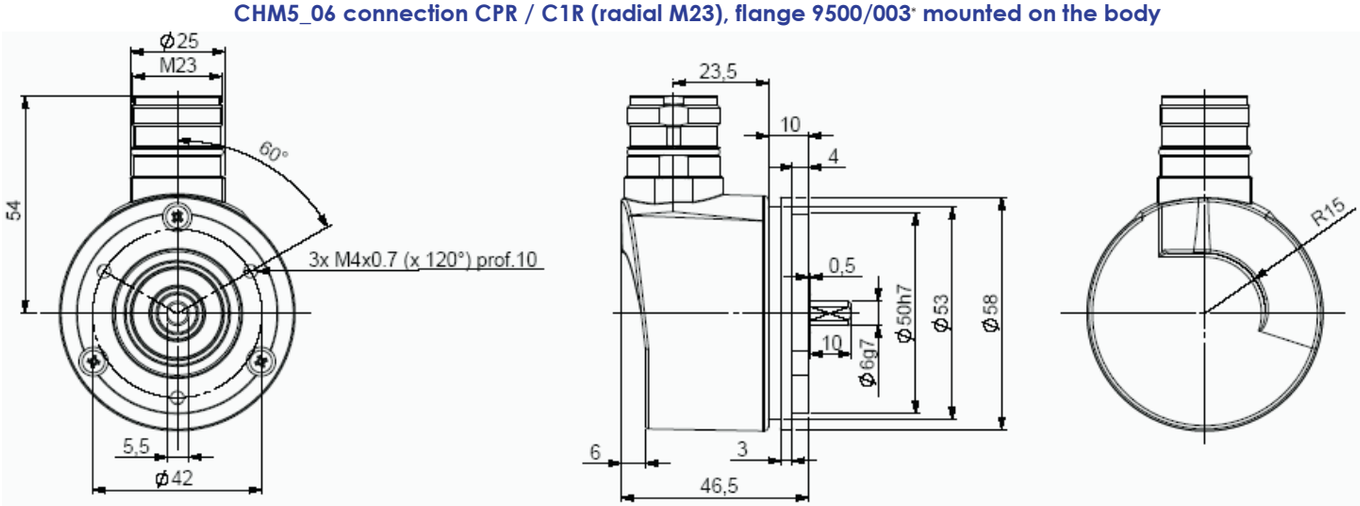
CHM5, the new generation of parallel absolute single turn encoders :

- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65, IP67 option with a sealing flange
- High resolutions possibility: up to 15 bits (Gray or binary)
- Universal electronic circuits from 5 to 30 Vdc
- High performances in temperature –20°C to 90°C (option –40°C to 100°C)
- Standard DIRECTION entry, LATCH option

CHM5_10 connection C3R (radial cable)



CHM5_06 connection CPR / C1R (radial M23), flange 9500/003* 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} (10 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 61000-6-4, 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	- 20 … + 90 °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

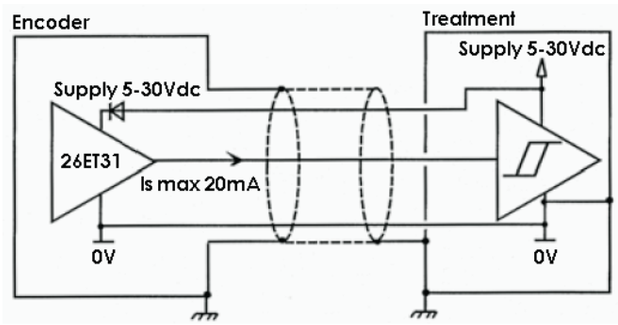
PARALLEL SINGLE TURN ABSOLUTE ENCODER, CHM5 RANGE

CONNECTION

	color	13 bits + DIRECTION CP or C3	14 bits + DIRECTION C1
1	white WH	0V	0V
2	brown BN	+Vcc	+Vcc
3	green GN	D0	D0
4	yellow YE	D1	D1
5	grey GY	D2	D2
6	pink PK	D3	D3
7	blue BU	D4	D4
8	red RD	D5	D5
9	black BK	D6	D6
10	violet VT	D7	D7
11	white/brown WH/BN	D8	D8
12	white/green WH/GN	D9	D9
13	white/yellow WH/YE	D10	D10
14	white/grey WH/GY	D11	D11
15	white/pink WH/PK	D12	D12
16	white/blue WH/BU	DIRECTION	D13
17	White/red WH/RD	/	DIRECTION

Example, 10 bits encoder : only MSB will be supplied (D3 to D12)

ELECTRONIC



Power supply : 5 to 30Vdc
Consumption without load : 100mA max
Current output per channel : Is=20mA max
Level ''0'' (Is=20mA) max : V_{ol} = 0,5Vdc
Level ''1'' (Is=20mA) min : V_{oh} = Vcc-2,5Vdc

Protection against short circuits and inversion of polarity

DIRECTION

CW increasing code: DIRECTION pin to +Vcc
CCW increasing code : DIRECTION pin to 0Vdc

LATCH (option)

Active data on the outputs : LATCH pin to 0V
Frozen data on the outputs: LATCH pin to +Vcc

Consult us for the connection of an encoder with this option

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

	Shaft Ø	Supply	Output stage	Code	Resolution	Connection	Orientation
CHM5	**10** : 10mm **06** : 6mm	**P** : 5 to 30Vdc	**C5** : push pull 5 to 30Vdc	**B**: Binary **G** : Gray	Power of 2: **1**: 1 bit to **14**: 14 bits Max: **15** bits Consult us	**CP** : M23 16 pins 13 bits + direction **C1** : M23 17 pins 14 bits + direction	**R** : radial
						C3 : cable gland + 16 wires cable	Example : **R020** : radial cable 2m
CHM5 _	**10** //	**P**	**C5**	**G** //	**13** //	**C3**	**R020**

Monitoring function available as option :
- of the code coherence
- of the LED internal regulated current loop
- of temperature range with 2 limits

Consult us

Entry / output available as option:
- LATCH entry
- ERROR output for monitoring functions

Made in FRANCE

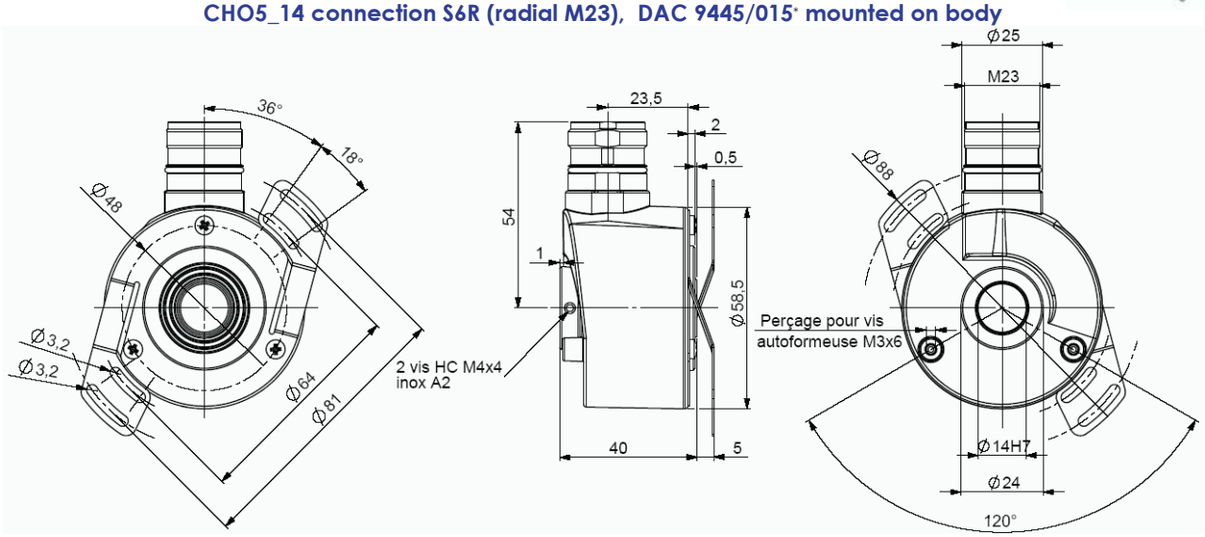
CHO5

SSI ABSOLUTE SINGLE TURN ENCODERS, CHO5 RANGE

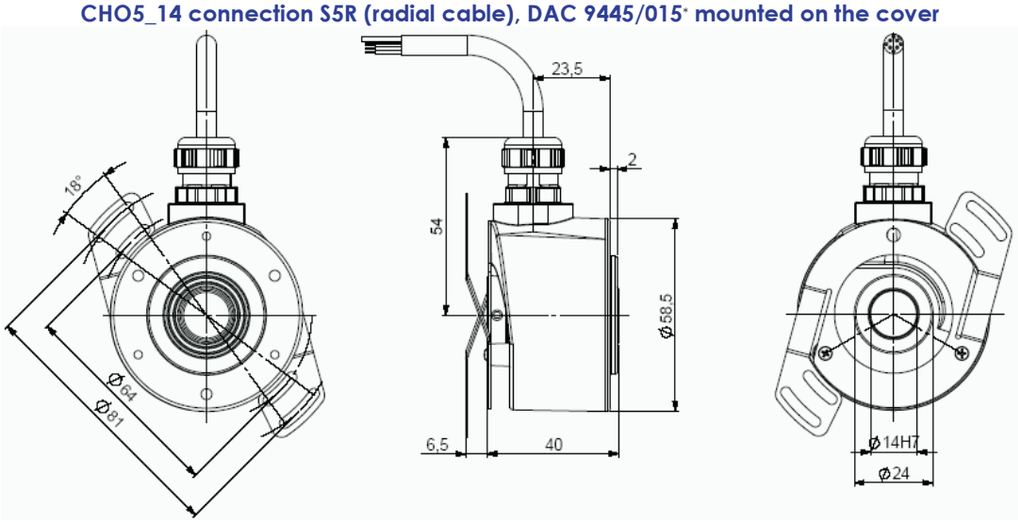
CHO5, the new generation of SSI absolute single turn encoders :

- Through hollow shaft version Ø14mm, with reduction hubs in aluminium of 6, 8, 10 and 12 mm
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65
- High resolutions possibility, up to 20 bits (Gray or binary)
- Universal power supply from 5 to 30 Vdc
- High performances in temperature –20°C to 90°C (option –40°C to 100°C)
- Standard DIRECTION and RESET input
- Numeric or sine incremental outputs option

CHO5_14 connection S6R (radial M23), DAC 9445/015* mounted on body



CHO5_14 connection S5R (radial cable), DAC 9445/015* mounted on the 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} (10 … 2 000 Hz)
EMC	EN 61000-6-4, EN 61000-6-2
Isolation	1 000 V eff
Encoder weight (approx.)	0,270 kg
Operating temperature	- 20 … + 90°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

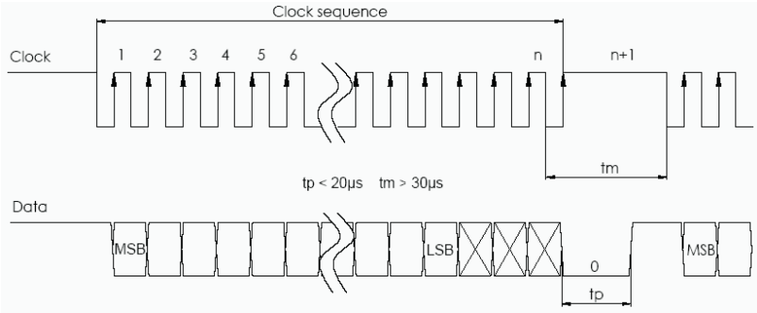
SSI ABSOLUTE SINGLE TURN ENCODERS, CHO5 RANGE

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per optocoupler
Output signal DATA	line - driver RS422
Power supply	5 – 30Vdc
Introduction	< 200ms
Consumption without load	Max. 100mA

Clock frequency CLK	• 100kHz to 1MHz for 13 bits encoder • 100kH – $F_{max} = 10^6$ / (resolution in bits –10) for encoder >13bits, ex : F_{max}=166kHz for 16 bits encoder
Interrogation frame	n=13 bits for 13 bits resolution n=21bits for >13bits resolution

SSI TRANSMISSION



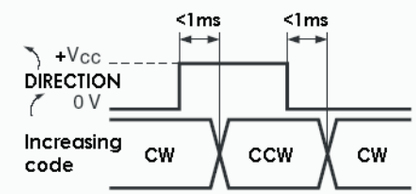
Transmission	Transmission up to 400m at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded cable and twisted pairs

* Consult us for length > 100m

CONNECTIQUE STANDARD SSI

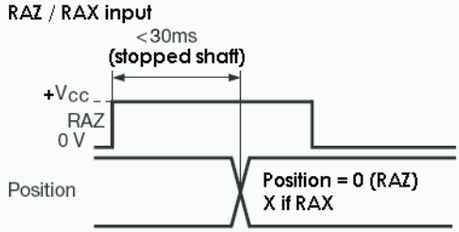
Type	+ Vcc	0 V	Clk+	Data+	RAZ	Data-	Clk-	DIRECTION
S6	1	2	3	4	5	6	7	9
S5	BN/GN Brown/Green	WH/GN White/Green	GN Green	GY Grey	BU Blue	PK Pink	BN Brown	WH White
S8	8	1	3	2	6	10	11	5

DIRECTION input



	min	max	Increasing
Level "0"	0 V	0,3x(+Vcc)	CW
Level "1"	0,7x(+Vcc)	+Vcc	CCW
I direction	< 5mA		

RAZ / RAX input



	min	max
Level "0"	0 V	0,3x(+Vcc)
Level "1"	0,7x(+Vcc)	+Vcc
I raz/rax	< 5mA	

Nota : Do not connect other pinouts, connect DIRECTION and RAZ to a potential (RAZ at 0V if not used)

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

	Shaft Ø	Supply	Output stage	Code	Resolution	Connection	Orientation
CHO5	**14** : 14mm Shaft reduction hubs available up to 6mm	**P** : 5 to 30Vdc	**CS :** SSI without parity **CP :** SSI even parity **CI :** SSI odd parity	**B:** Binary **G :** Gray	Max: **20** bits, power of 2 **13:** 13 bits to **13:** 13 bits **20** bits: consult us	**S6** : M23 12pins CW for SSI transmission **S8:** M23 12pins CCW for SSI transmission	**R** : radial
						S5 : SSI cable, cable gland output	Example : **R020** : radial cable of 2m
CHO5 _	**10** //	**P**	**CS**	**G** //	**13** //	**S6**	**R**

Monitoring function available as option :
- of the code coherence
- of the LED internal regulated current loop
- of temperature range with 2 limits

Consult us

Entry / output available as option:
- RAX input (reset to a value X, manufacture setting)
- ERROR output for monitoring functions
- Sine & Cosine outputs without index, 2048ppr (option: 4096 ppr)
- A & B incremental outputs without index, 2048ppr (option: 4096 ppr)

Made in FRANCE

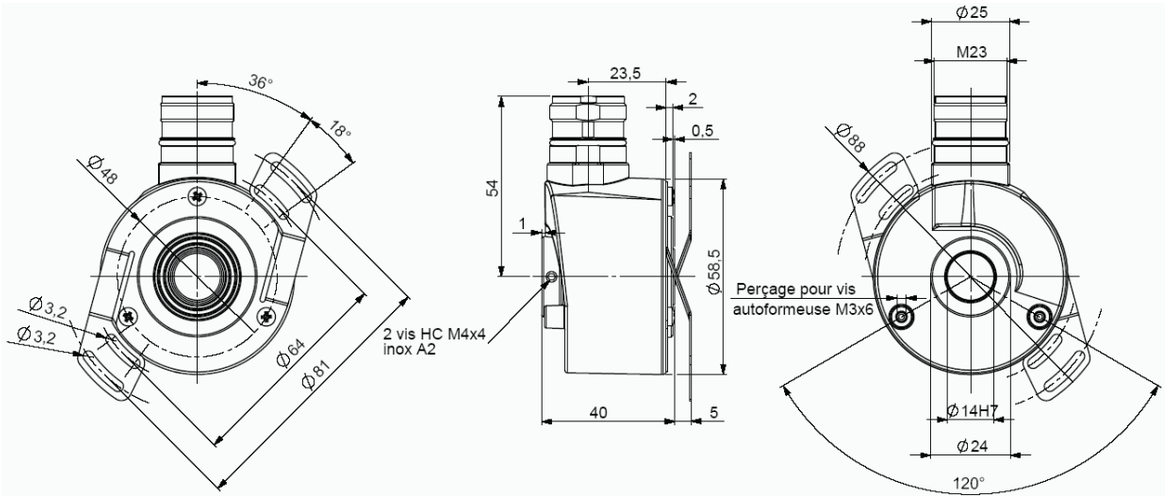
CHO5

PARALLEL SINGLE TURN ABSOLUTE ENCODER, CHO5 RANGE

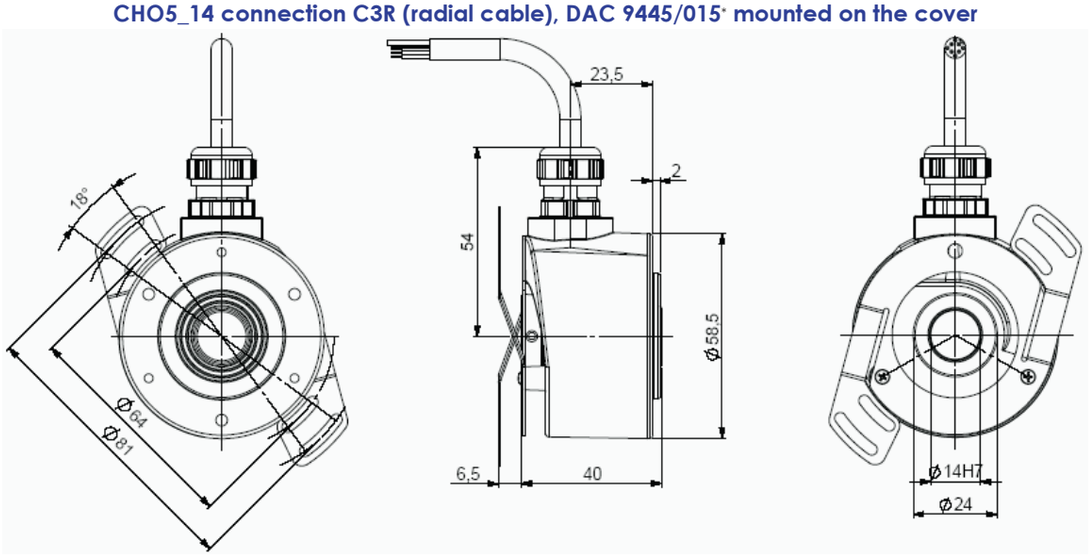
CHO5, the new generation of parallel absolute single turn encoders :

- Through hollow shaft version Ø14mm, with reduction hubs in aluminium of 6, 8, 10 and 12 mm
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65
- High resolutions possibility, up to 15 bits (Gray or binary)
- Universal electronic circuits from 5 to 30 Vdc
- High performances in temperature –20°C to 90°C (option –40°C to 100°C)
- Standard DIRECTION entry, LATCH option

CHO5_14 connection CPR / C1R (radial M23), DAC 9445/015* mounted on the body



CHO5_14 connection C3R (radial cable), DAC 9445/015* mounted on the 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} (10 … 2 000 Hz)
EMC	EN 61000-6-4, EN 61000-6-2
Isolation	1 000 V eff
Encoder weight (approx.)	0,270 kg
Operating temperature	- 20 … + 90°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

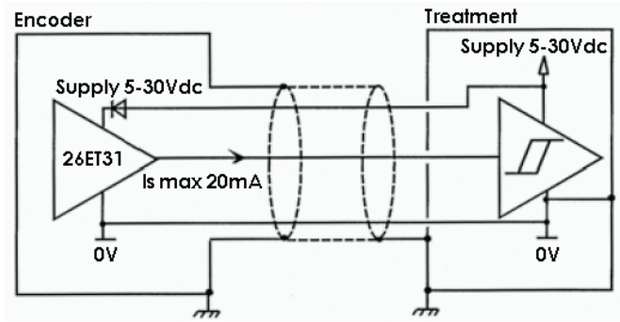
PARALLEL SINGLE TURN ABSOLUTE ENCODER, CHO5 RANGE

CONNECTION

	color	13 bits + DIRECTION CP or C3	14 bits + DIRECTION C1
1	white WH	0V	0V
2	brown BN	+Vcc	+Vcc
3	green GN	D0	D0
4	yellow YE	D1	D1
5	grey GY	D2	D2
6	pink PK	D3	D3
7	blue BU	D4	D4
8	red RD	D5	D5
9	black BK	D6	D6
10	violet VT	D7	D7
11	white/brown WH/BN	D8	D8
12	white/green WH/GN	D9	D9
13	white/yellow WH/YE	D10	D10
14	white/grey WH/GY	D11	D11
15	white/pink WH/PK	D12	D12
16	white/blue WH/BU	DIRECTION	D13
17	White/red WH/RD	/	DIRECTION

Example, 10 bits encoder : only MSB will be supplied (D3 to D12)

ELECTRONIC



Power supply : 5 to 30Vdc
Consumption without load : 100mA max
Current output per channel : Is=20mA max
Level ''0'' (Is=20mA) max : V_{ol} = 0,5Vdc
Level ''1'' (Is=20mA) min : V_{oh} = Vcc-2,5Vdc

Protection against short circuits and inversion of polarity

DIRECTION

CW increasing code: DIRECTION pin to +Vcc
CCW increasing code : DIRECTION pin to 0Vdc

LATCH (option)

Active data on the outputs : LATCH pin to 0V
Frozen data on the outputs: LATCH pin to +Vcc

Consult us for the connection of an encoder with this option

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

	Shaft Ø	Supply	Output stage	Code	Resolution	Connection	Orientation
CHO5	**14** : 14mm Shaft reduction hubs available up to 6mm	**P** : 5 to 30Vdc	**C5** : push pull 5 to 30Vdc	**B**: Binary **G** : Gray	Power of 2: **1**: 1 bit to **14**: 14 bits Max: **15** bits Consult us	**CP** : M23 16 pins 13 bits + direction **C1** : M23 17 pins 14 bits + direction	**R** : radial
						C3 : cable gland + 16 wires cable	Example : **R020** : radial cable 2m
CHO5 _	**14** //	**P**	**C5**	**G** //	**13** //	**C3**	**R020**

Monitoring function available as option :
- of the code coherence
- of the LED internal regulated current loop
- of temperature range with 2 limits

Consult us

Entry / output available as option:
- LATCH entry
- ERROR output for monitoring functions

Made in FRANCE

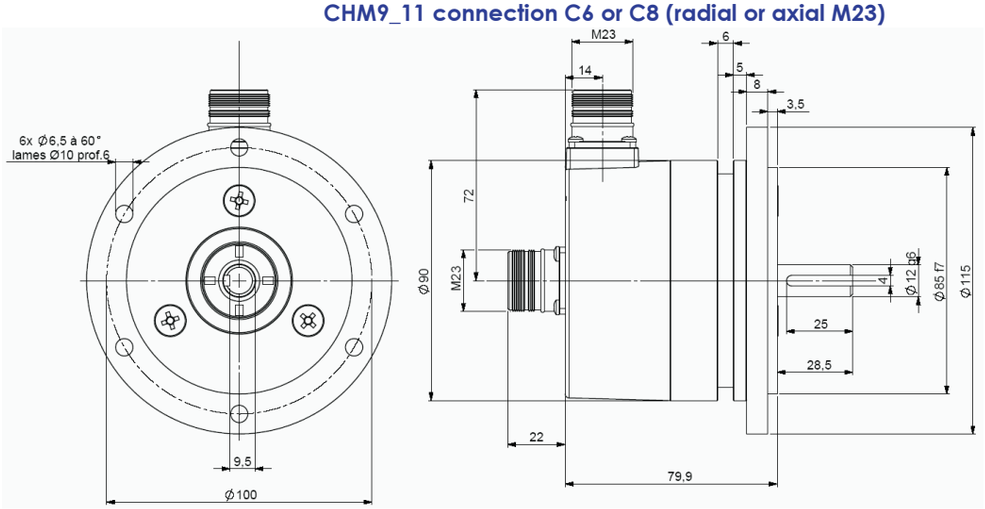
CHM9

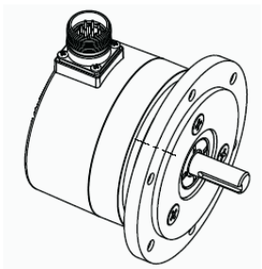
SSI ABSOLUTE SINGLETURN ENCODERS, CHM9 RANGE

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

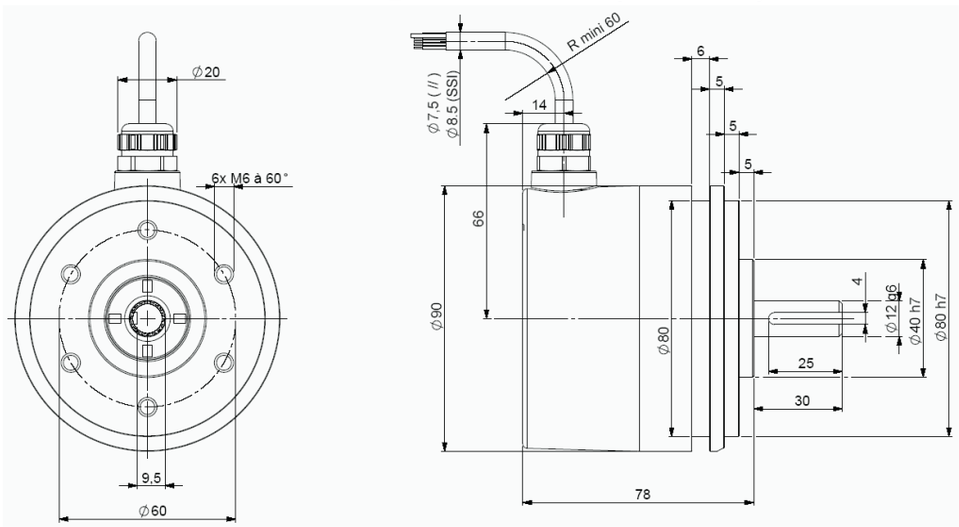
Also available in parallel output and fieldbus interface : CanOpen, DeviceNet, Profibus

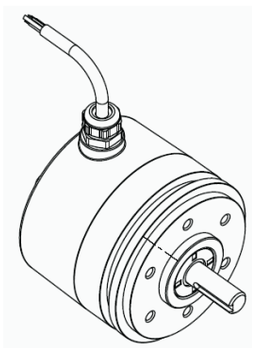
CHM9_11 connection C6 or C8 (radial or axial M23)





CHM9_12 connection C7R (radial cable)





Material Stainless steel option	Cover : zinc alloy
	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 50081-1, EN 61000-6-2
Isolation	1 000 Veff
Encoder weight (approx)	1,100kg zinc alloy cover, alu body
	2,400kg zinc alloy cover, stainless steel body
	2,600kg stainless steel cover and body
Operating temperature	- 20 ... + 90 °C (encoder T°)
Storage temperature	- 30 ... + 95°C
Protection(EN 60529)	IP 67 (cable), IP 66 (connector)

Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})

20 N / 30 N	50 N / 100 N	100 N / 200 N
360	18	2,2

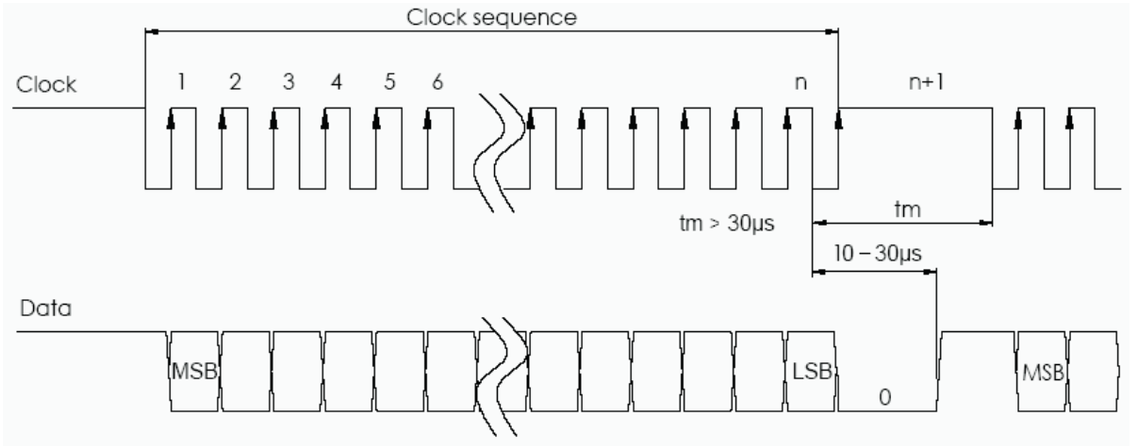
SSI ABSOLUTE SINGLETURN ENCODERS, CHM9 RANGE

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupleur
Output signal DATA	line - driver RS422
Clock frequency CLK	100kHz – 1MHz
Precision	+ ½ LSB (13 bits)

Power supply	11 – 30Vdc
Introduction	< 1 s
Consumption without load	100mA max

SSI TRANSMISSION (n=13 bits)



Transmission	Transmission up to 400m at 100kHz in function of cable characteristics
Cable	High security of transmission by using shielded and twisted pair cable

* Consult us for length > 100m

STANDARD SSI CONNECTION

Type	Vcc	Gnd	Clk+	Data+	Data-	Clk-	DIRECTION
C6	1	2	3	4	6	7	9
C7	BN brown	WH white	GN green	GY grey	PK pink	YE yellow	RD red
C8	8	1	3	2	10	11	5

DIRECTION:
- CW increasing code: DIRECTION to 0V
- CCW increasing code : DIRECTION to +Vcc

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections...)

	Shaft Ø	Supply	Output stage	Code	Resolution	Connection	Connection orientation
CHM9 Cover : zinc Body : alu **CBM9** Cover : zinc Body : stainless steel **CXM9** Stainless steel cover & body	**11** : 11mm **12** : 12mm	**5** : 11 to 30Vdc	**CS :** SSI without parity **CP :** SSI even parity **CI :** SSI odd parity	**B**: Binary **G** : Gray	**13** : 13bits	**C6** : M23 12 pins CW for SSI **C8:** M23 12 pins CCW for SSI	**R** : radial **A** : axial
						C7 : PE + SSI cable	Example : **R020** : radial 2m cable **A020** : axial 5m cable
CHM9 _	**12** //	**5**	**CS**	**G** //	**13** //	**C7**	**R020**

Made in FRANCE

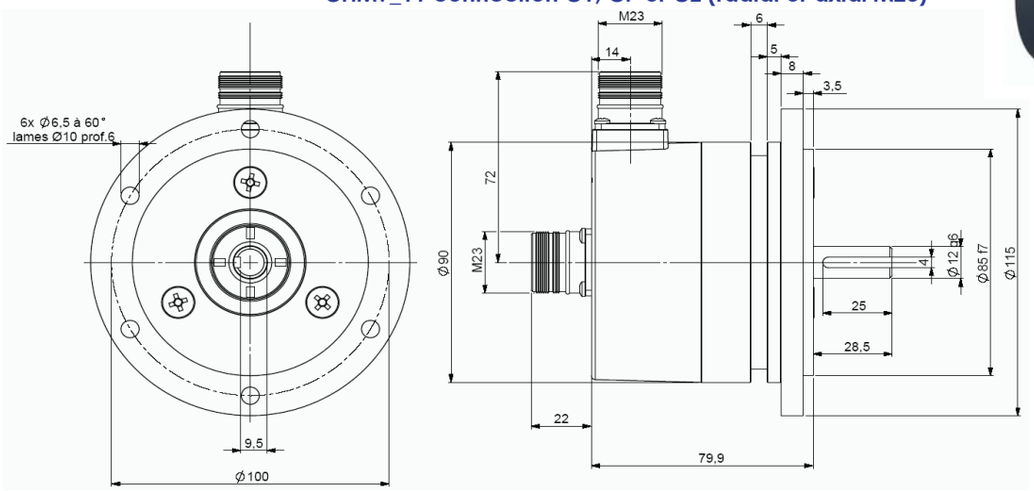
CHM9

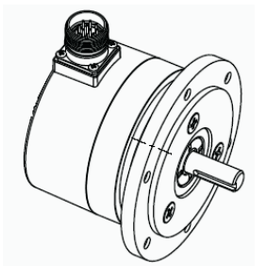
PARALLEL SINGLE TURN ABSOLUTE ENCODERS, CHM9 RANGE

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

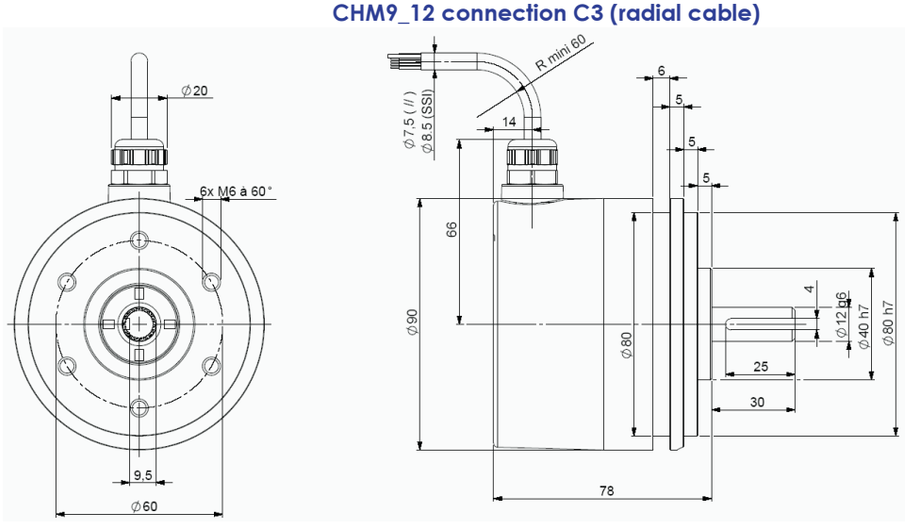
Also available in SSI serial interface and fielbus interfaces : CanOpen, DeviceNet, Profibus

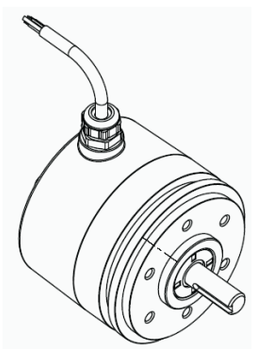
CHM9_11 connection C1, CP or CZ (radial or axial M23)





CHM9_12 connection C3 (radial cable)





CHARACTERISTICS

Material Stainless steel option	Cover : zinc alloy
	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 50081-1, EN 61000-6-2
Isolation	1 000 Veff
Encoder weight (approx)	1,100kg zinc alloy cover, alu body
	2,400kg zinc alloy cover, stainless steel body
	2,600kg stainless steel cover and body
Operating temperature	- 20 ... + 90 °C (encoder T°)
Storage temperature	- 30 ... + 95°C
Protection(EN 60529)	IP 67 (cable), IP 66 (connector)

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

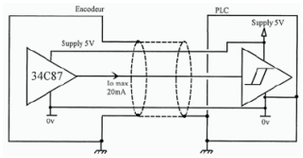
PARALLEL SINGLE TURN ABSOLUTE ENCODERS, CHM9 RANGE

PARALLEL OUTPUTS CONNECTION

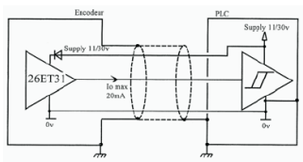
		13 bits + DIRECTION CP or C3	14 bits + DIRECTION C1	13 bits + DIRECTION + RAZ CZ
1	white WH	-	-	-
2	brown BN	+	+	+
3	green GN	D0	D0	D0
4	yellow YE	D1	D1	D1
5	grey GY	D2	D2	D2
6	pink PK	D3	D3	D3
7	blue BU	D4	D4	D4
8	red RD	D5	D5	D5
9	black BK	D6	D6	D6
10	violet VT	D7	D7	D7
11	white/brown WH/BN	D8	D8	D8
12	white/green WH/GN	D9	D9	D9
13	white/yellow WH/YE	D10	D10	D10
14	white/grey WH/GY	D11	D11	D11
15	white/pink WH/PK	D12	D12	D12
16	white/blue WH/BU	DIRECTION	D13	RAZ
17	white/red WH/RD	NC	DIRECTION	DIRECTION

Protection against inversion of polarity for the electronics 5CN and 5C5
Protection against short circuits for the electronic 5C5
Example 10 bits encoder : only most significant bits (D3 to D12) would be available

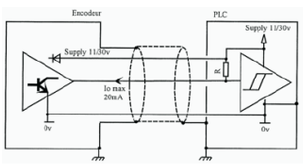
OUTPUT STAGE / SUPPLY - PARALLEL OUTPUT



Electronic 2CD
Supply : 5Vdc ± 10%
Cons. without load : 80mA max
Current per channel : Is = 20mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA): V_{oh} = 2,5Vdc



Electronic 5C5
Supply : 11 to 30Vdc
Cons. without load : 100mA max
Current per channel : Is = 20mA max
0 max (Is=20mA): V_{ol} = 0,5Vdc
1 min (Is=20mA): V_{oh} = Vcc-3Vdc



Electronic 5CN
Supply : 11 to 30Vdc
Cons. without load : 100mA max
Current per channel : Is = 20mA max
0 max (Is=20mA): V_{ol} = 1,25Vdc

RAZ to be used with non turning shaft :
For an electrical reset / with push button (option) : give an impulse to the +Vcc during 1s minimum

DIRECTION
CW code : pin DIRECTION at +Vcc
CCW code : pin DIRECTION at 0V

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections...)

	Shaft Ø	Parallel output : 2CD, 5C5, 5CN, 2ED, 5E5		Code	Resolution	Connection	Connection orientation
CHM9 Cover : zinc Body : alu **CBM9** Cover : zinc Body : stainless steel **CXM9** Stainless steel cover & body	**11** : 11mm **12** : 12mm	**2**: 5Vdc **5**: 11 – 30Vdc	**CD**: driver 5Vdc **C5**: Push-Pull 11-30Vdc **CN**: NPNCO 11-30Vdc	**B** : binary **G** : Gray	**14** **13** ... **1**	**CP** : M23 16 pins CW 13 bits + DIRECTION **C1** : M23 17 pins CW 14bits + DIRECTION **C3** : cable 16 fils	Ex connector : **A** : axial **R** : radial Ex cable : **A020** : cable 2m axial **R020** : cable 5m radial
			With electrical RAZ : **ED**: driver 5Vdc **E5**: push-pull 11-30Vdc			**CZ** : M23 17 pins hor. 13bits + DIRECTION + RAZ	
Ex: CHM9 _	**12 //**	**5 C5**		**G //**	**13 //**	**C3**	**R020**

14 bits : only available in GRAY code and electronics 5C5 and 2CD

Made in FRANCE

CHU9

SSI ABSOLUTE SINGLE TURN ENCODERS, CHU9 RANGE

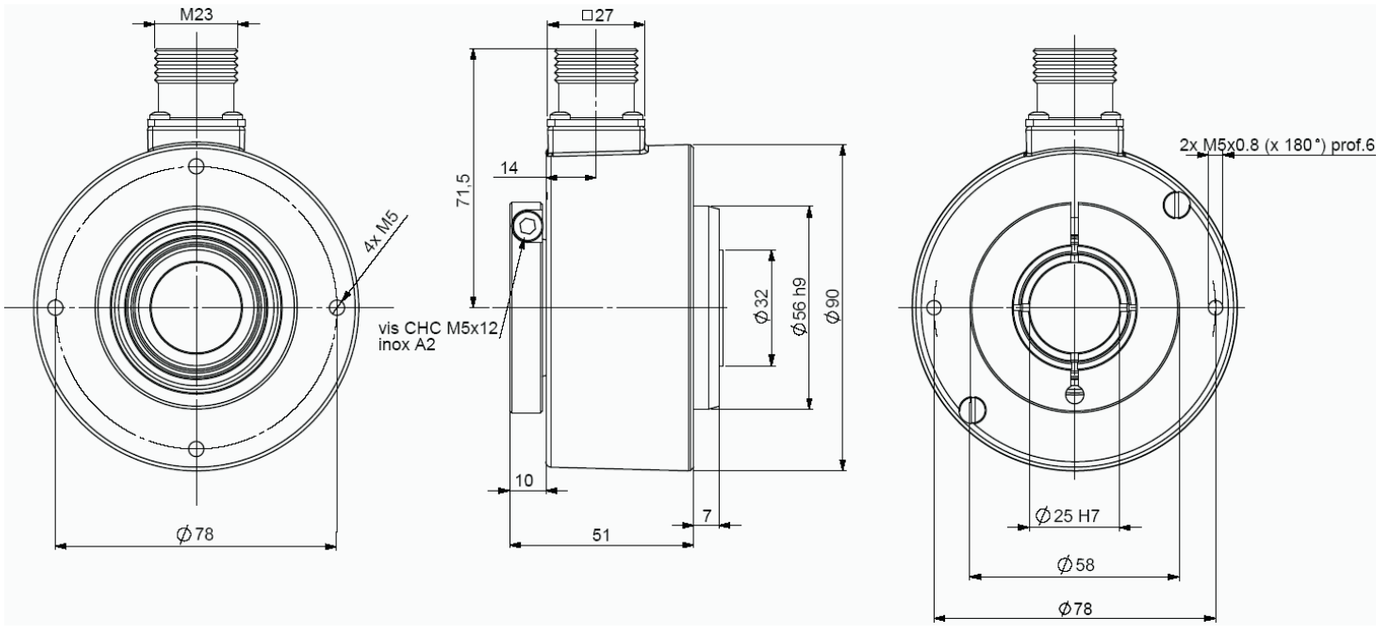
Especially designed for heavy-duty (steel, paper, wood – mills, cranes …) Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads

Hollow shaft of up to 30mm, adaptation of the bore size with composite hub for thermal and electric insulation (aluminium hubs in option)

Double/triple mounting in combinations of incremental, absolute, analogue signals

Also available in parallel output and fieldbus interface : CanOpen, DeviceNet, Profibus

CHU9_25 connection C6R (radial M23), with reduction hub 9418/I25 (25mm) mounted on the shaft



CHARACTERISTICS

Material Stainless steel option	Cover : zinc alloy	Vibrations (EN60068.2.6)	≤ 200m.s^{-2} (10 … 1 000Hz)
	Body : aluminium	EMC	EN 50081-1, EN 61000-6-2
Shaft	Inox	Isolation	1 000 Veff
Bearings	6807 serie	Encoder weight (approx.)	0,700kg zinc alloy cover, alu body
Maximum loads	Axial : 50 N		1,000kg zinc alloy cover, stainless steel body
	Radial : 80 N		1,200kg stainless steel cover and body
Shaft inertia	≤ 55.10^{-6} kg.m^2	Operating temperature	- 20 ... + 90 °C (encoder T°)
Torque	≤ 25.10^{-3} N.m	Storage temperature	- 30 ... + 95 °C
Permissible max. speed	6 000 min^{-1}	Protection(EN 60529)	IP 65
Continuous max. speed	3 600 min^{-1}	Torque (ring screw)	nominal: 3N.m, break: 4N.m
Shaft seal	Viton	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shocks (EN60068.2.27)	≤ 500 m.s^{-2} (during 6 ms)	25 N / 40 N : 140	50 N / 80 N : 17

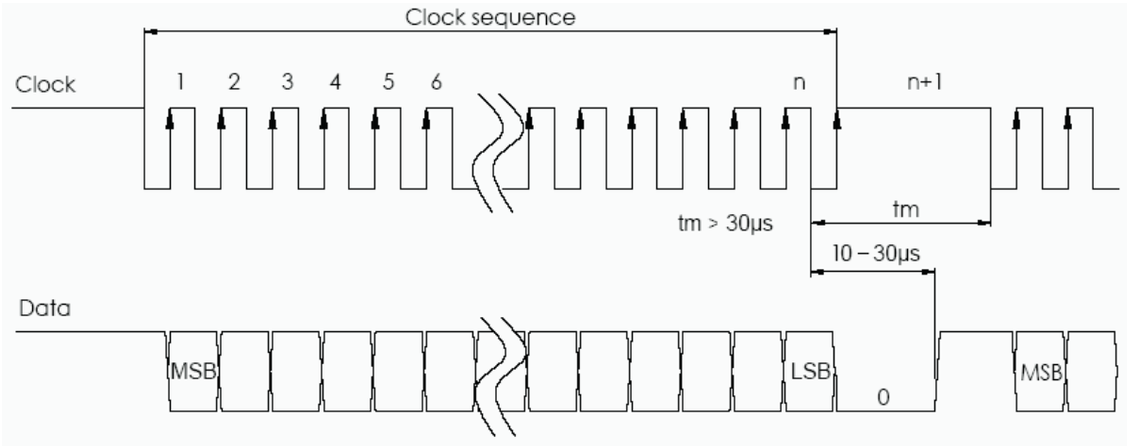
SSI ABSOLUTE SINGLE TURN ENCODERS, CHU9 RANGE

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupleur
Output signal DATA	line - driver RS422
Clock frequency CLK	100kHz – 1MHz
Precision	+ ½ LSB (13 bits)

Power supply	11 – 30Vdc
Introduction	< 1 s
Consumption without load	100mA max

SSI TRANSMISSION (n=13 bits)



Transmission	Transmission up to 400m at 100kHz in function of cable characteristics
Cable	High security of transmission by using shielded, twisted pair cable

* Consult us for length > 100m

STANDARD SSI CONNECTION

Type	Vcc	Gnd	Clk+	Data+	Data-	Clk-	DIRECTION
C6	1	2	3	4	6	7	9
C7	BN brown	WH white	GN green	GY grey	PK pink	YE yellow	RD red
C8	8	1	3	2	10	11	5

DIRECTION :
- CW increasing code: DIRECTION to 0V
- CCW increasing code : DIRECTION to +Vcc

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections...)

	Ø shaft	Supply	Output stage	Code	Resolution	Connection	Connection orientation
CHU9 Cover : zinc Body : alu **CBU9** Cover : zinc Body : stainless steel **CXU9** Stainless steel cover & body	**30**:30mm Reduction hubs available	**5** : 11 to 30Vdc	**CS :** SSI without parity **CP :** SSI even parity **CI :** SSI odd parity	**B**: binary **G** : Gray	**13** : 13bits	**C6** : M23 12 pins CW for SSI **C8:** M23 12 pins CCW for SSI	**R** : radial
						C7 : PE + cable SSI cable	Example : **R020** : 2m radial cable **R020** : 2m radial cable
CHU9 _	**30** //	**5**	**CS**	**G** //	**13** //	**C7**	**R020**

Made in FRANCE

CHU9

PARALLEL SINGLE TURN ABSOLUTE ENCODERS, CHU9 RANGE

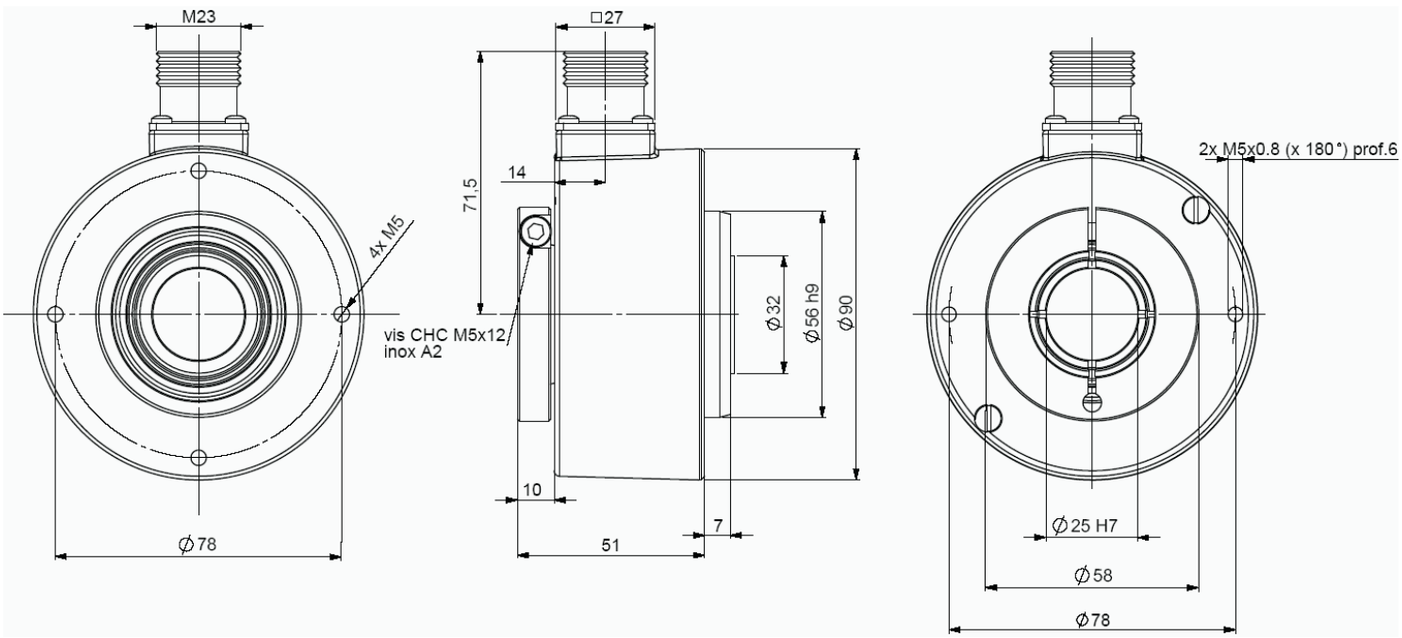
Especially designed for heavy-duty (steel, paper, wood – mills, cranes …) Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads

Hollow shaft of up to 30mm, adaptation of the bore size with composite hub for thermal and electric insulation (aluminium hubs in option)

Double/triple mounting in combinations of incremental, absolute, analogue signals

Also available in SSI serial interface and fieldbus interface : CanOpen, DeviceNet, Profibus

CHU9_25 connection CPR (radial M23), with reduction hub 9418/I25 (25mm) mounted on the shaft



CHARACTERISTICS

Material Stainless steel option	Cover : zinc alloy	Vibrations (EN60068.2.6)	≤ 200m.s^{-2} (10 … 1 000Hz)
	Body : aluminium	EMC	EN 50081-1, EN 61000-6-2
Shaft	Inox	Isolation	1 000 Veff
Bearings	6807 serie	Encoder weight (approx.)	0,700kg zinc alloy cover, alu body
Maximum loads	Axial : 50 N		1,000kg zinc alloy cover, stainless steel body
	Radial : 80 N		1,200kg stainless steel cover and body
Shaft inertia	≤ 55.10^{-6} kg.m^2	Operating temperature	- 20 ... + 90 °C (encoder T°)
Torque	≤ 25.10^{-3} N.m	Storage temperature	- 30 ... + 95 °C
Permissible max. speed	6 000 min^{-1}	Protection(EN 60529)	IP 65
Continuous max. speed	3 600 min^{-1}	Torque (ring screw)	nominal: 3N.m, break: 4N.m
Shaft seal	Viton	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shocks (EN60068.2.27)	≤ 500 m.s^{-2} (during 6 ms)	25 N / 40 N: 140	50 N / 80 N : 17

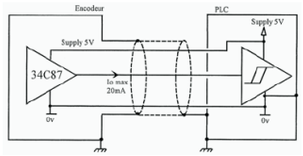
PARALLEL SINGLE TURN ABSOLUTE ENCODERS, CHU9 RANGE

PARALLEL OUTPUTS CONNECTION

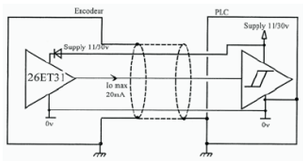
		13 bits + DIRECTION CP or C3	14 bits + DIRECTION C1	13 bits + DIRECTION + RAZ CZ
1	white WH	-	-	-
2	brown BN	+	+	+
3	green GN	D0	D0	D0
4	yellow YE	D1	D1	D1
5	grey GY	D2	D2	D2
6	pink PK	D3	D3	D3
7	blue BU	D4	D4	D4
8	red RD	D5	D5	D5
9	black BK	D6	D6	D6
10	violet VT	D7	D7	D7
11	white/brown WH/BN	D8	D8	D8
12	white/green WH/GN	D9	D9	D9
13	white/yellow WH/YE	D10	D10	D10
14	white/grey WH/GY	D11	D11	D11
15	white/pink WH/PK	D12	D12	D12
16	white/blue WH/BU	DIRECTION	D13	RAZ
17	white/red WH/RD	NC	DIRECTION	DIRECTION

Protection against inversion of polarity for the electronics 5CN and 5C5
Protection against short circuits for the electronic 5C5
Example 10 bits encoder : only most significant bits (D3 to D12) would be available

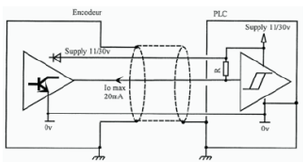
OUTPUT STAGE / SUPPLY - PARALLEL OUTPUT



Electronic 2CD
Supply : 5Vdc ± 10%
Cons. without load : 80mA max
Current per channel : Is = 20mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA): V_{oh} = 2,5Vdc



Electronic 5C5
Supply : 11 to 30Vdc
Cons. without load : 100mA max
Current per channel : Is = 20mA max
0 max (Is=20mA): V_{ol} = 0,5Vdc
1 min (Is=20mA): V_{oh} = Vcc-3Vdc



Electronic 5CN
Supply : 11 to 30Vdc
Cons. without load : 100mA max
Current per channel : Is = 20mA max
0 max (Is=20mA): V_{ol} = 1,25Vdc

RAZ to be used with non turning shaft :
For an electrical reset / with push button (option) : give an impulse to the +Vcc during 1s minimum

DIRECTION
CW code : pin DIRECTION at +Vcc
CCW code : pin DIRECTION at 0V

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections...)

	Ø shaft	Parallel output : 2CD, 5C5, 5CN, 2ED, 5E5		Code	Resolution	Connection	Connection orientation
CHU9 Cover : zinc Body : alu **CBU9** Cover : zinc Body : stainless steel **CXU9** Stainless steel cover & body	**30** :30mm Reduction hubs available	**2**: 5Vdc **5**: 11 – 30Vdc	**CD**: driver 5Vdc **C5**: Push-Pull 11-30Vdc **CN**: NPNCO 11-30Vdc	**B** : binary **G** : Gray	**14** **13** ... **1**	**CP** : M23 16 pins CW 13 bits + DIRECTION **C1** : M23 17 pins CW 14bits + DIRECTION **C3** : 16 wires cable	Connector : **R** : radial
			With electrical RAZ: **ED**: driver 5Vdc **E5**: push-pull 11-30Vdc			**CZ** : M23 17 pins CW 13bits + DIRECTION + RAZ	Ex cable : **R020** : 2m radial cable
Ex: CHU9 _	**30** //	**5**	**C5**	**G** //	**13** //	**C3**	**R020**

14 bits : only available in GRAY code and electronics 5C5 and 2CD

Made in FRANCE

MULTITURN ABSOLUTE ENCODERS

Absolute encoders determine at any moment of their position due to a unique code within one revolution, even without a reference index. This unique code is given with the individual reading of concentric optical tracks, thanks to an LED emitting and a receiving system. These tracks are coded in GRAY which presents the advantage of changing its state only once per single track (one bit) for each step, and so ensures a reading without error

GRAY coded disk example

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2^4	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
2^3	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0
2^2	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1
2^1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
2^0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1

Mechanical version

The multi-turn absolute encoder, in addition to the reading of the position in the revolution, permits to count the number of revolutions which have been carried out. This counting is classically realized with the help of mechanical gears associated with one or more other coded discs (turn counting up to 16384 turns - 14 bits)

All electronic version

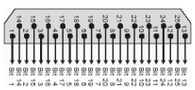
BEI IDEACOD has also developed a patented "all electronic" version based upon special sensors and dedicated electronics capable of counting the number of turns, both in normal operating mode and when the encoder is de-energized (turn counting up to 65536 - 16 bits). The reliability and the life duration of these method is now particularly high.

STANDARD INTERFACES

SSI

SSI involves synchronous transmission with data returned to the requesting unit which is controlled by the clock pulse. It only requires 4 signal wires, 2 for the clock (CLK + and CLK -) and 2 for the data (DATA + and DATA -) to which must be added two wires for the power supply. The clock signals are generated by the requester (logic controller, PC, display, etc.). The data signals are generated by the encoder. At the end of a data transfer, the line is held at 0 for 10 to 30 µs, then further interrogation is possible. To transmit the end of data bits, it requires N+1 clock periods. Transmission of parity calls for two supplementary clock periods. An absolute multi-turn encoder of 24 bits with parity requires 27 clock periods and 25 clock periods without parity

PARALLEL



The deserialisation extension cable allows the connection of a SSI encoder to parallel PLC input. The parallel outputs are push-pull types on a SUBD37 connector

PROFIBUS

Profibus is mainly used to automate industrial process / production lines, examples : automotive, chemical, food and beverage, logistics, safety or motion control... Devices connected to Profibus are 'smart', they deliver information about their 'health' and about the quality of the measured value. PROFIBUS is an international, open, nonproprietary fieldbus standard which is defined in the international standards.

CANOPEN

CANopen was developed as a standard embedded network with highly flexible configuration capabilities. CANopen was designed for motion-oriented machine control networks, such as handling systems. By now it is used in many various fields, such as medical equipment, off-road vehicles, maritime electronics, public transportation, building automation, etc... Standardized profiles (device, interface and application profiles) developed by CiA members simplify the system designer job of integrating a CANopen network system. CANopen is flexible and open enough to enable manufacturer-specific functionality in devices, which can be added to the generic functionality described in the profiles. It provides standardized communication objects for real-time data (Process Data Objects, PDO), configuration data (Service Data Objects, SDO), and special functions as well as network management data

DEVICENET

DeviceNet is manly used in industrial applications, in particular in factory automation. It's a standard communication link to connect industrial devices (such as encoders, but as well photoelectric sensors, bar code readers, variable frequency drive, panel displays) to a network that eliminates expensive hard wiring. The direct connectivity provides improved communication between devices as well as important device-level diagnostics

MULTITURN ABSOLUTE ENCODERS – STANDARD RANGE

CE

POSI+™ - 58mm

- European standards universal SSI encoder
- Encoder T°: –20 to +85°C
- IP65 (IP67 with flange option)
- Universal power supply 5 to 30Vdc
- Programmable version available
- Position + incremental channels / limit switches

Range – 90mm

- Developed for extreme loads, shocks and vibrations
- 12mm solid shaft or 11mm with 115mm flange available 115 mm or with a 30mm through shaft
- Encoder T°: –20 à +75°C (+85°C option)
- IP65 SHU9
- IP67 PHM9 / SHM9

Range – 58mm – Field bus

- European standard field bus encoder
- Encoder T°: –40 to +85°C
- IP64 (IP66 with sealing shaft option)
- Resolution up to 16 bits per turn and 14 bits for the number of turns
- Two diagnostic LED on the connection cap allow to check simply the encoder functioning
- Available in stock, they can be delivered in 24hours

MULTITURN	Shaft	Electronic		Code	Resolution	Connection
	**06** : 6mm **10** : 10mm **12** : 12mm **15** : 15mm **30** : 30mm	Power supply : **5** : 11-30Vdc **P** : 5-30Vdc	Sortie : **SS** : SSI without parity **BG** : Profibus **BB** : CANopen **BA** : DeviceNet Programmable: **PX**: SSI programmable	**B** : Binary **G** : Gray	Standard: **13B12D5** 13 bits: resolution 12 bits:nbr of turn **13B16** 13 bits: resolution 16 bits:nbr of turn	**S6R** : radial 12 pins CW M23 connector **S8R** : radial 12 pins CCW M23 connector **S7R020** : radial 2m PUR cable **B4R010** : radial 1m cable **BBR010** : radial 1m cable, DB9 CANopen welded at the end **BAR010** : radial 1m cable , MiniC DeviceNet welded at the end **P6R** : radial 12 pins CW M23 connector (programmable encoder)

MULTITURNS ABSOLUT ENCODER – ALL ELECTRONIC VERSION

	***POSI+™*** **58mm** PHM5	Solid : 6 10	PSS	B G	13B12D5	S6R, S8R
			PPX	G	13B12D5	P6R
	***POSI+™*** **58mm** PHO5	Through : 14	PSS	B G	13B12D5	S6R, S8R
			PPX	G	13B12D5	P6R
	**90mm** PHM9 - SHM9	Solid : 12	PSS	B, G	13B12D5	S6R, S8R
			5BG	B	13B16	B4R010
			5BB	B	13B16	BBR010
			5BA	B	13B16	BAR010
	**90mm** PHU9 - SHU9	Through: 30	PSS	B, G	13B12D5	S6R, S8R
			5BG	B	13B16	B4R010
			5BB	B	13B16	BBR010
			5BA	B	13B16	BAR010
Reference example	PHM5_	10 //	PSS	G //	13B12D5 //	S6R
	Deserialisation cable Ref : **EAA-005**	The deserialisation cable allows the connection of a synchronous serial encoder on PLC parallel inputs The parallel outputs are push-pull type on a SUBD37 connector				

MULTITURN ABSOLUTE ENCODERS – MECHANICAL VERSIONS

	**58mm** MHM5	Solid: 10	Profibus , connection cap , ref : MHM510 - PROF - 001 CANopen , connection cap , ref : MHM510 - CANO- 001 DeviceNet , connection cap , ref : MHM510 - DNET - 001	Standard encoder : 13 bits per revolution, 12bits for the number of turns
	**58mm** MHK5	Blind : 15	Profibus , connection cap , ref : MHK515 - PROF - 001 CANopen , connection cap , ref : MHK515 - CANO- 001 DeviceNet , connection cap , ref : MHK515 - DNET - 001	Standard encoder : 13 bits per revolution, 12bits for the number of turns
Reference example	MHM510 – PROF - 001			

EAA-005

DESERIALISATION CABLE, SSI -> PARALLEL OUTPUTS

The deserialisation cable allows the connection of an SSI serial interface encoder to a PLC with parallel inputs

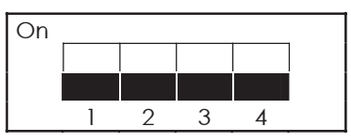
The reduced number of wires in the encoder connecting cable allows the customer to mount the card near the controller at a lower cost than an equivalent parallel encoder

Parallel outputs are push-pull type

Power supply	11 to 30 Vdc
Introduction	< 1 s
Encoder output	RS422 Level (SSI standards)
Encoder input	RS422 Level (Clock)
Parallel outputs	Push-pull, protection against short circuits
Transmission frequency	260kHz (switch 3 on OFF), 100kHz (switch 3 on ON)
Interrogation period	250µs (switch 3 on OFF), 390µs (switch 3 on ON)
Transmission	25 bits encoder without parity With or without transcoding Gray >> Binary, Binary >> Gray
Operating temperature	0 à 50°C

The different possible configurations are switch-programmable directly in the DB37. We would recommend to set all switches to 'Off', and then to configure the encoder using the following table:

Default configuration:



Gray parallel output	1 : OFF
Binary parallel output	1 : ON

Gray code encoder	2 : OFF
Binary code encoder	2 : ON

260kHz frequency	3 : OFF
100kHz frequency	3 : ON

Push-Pull, replacement PNP (inverse NPN)	4 : OFF
Push-Pull, replacement NPN (inverse PNP)	4 : ON*

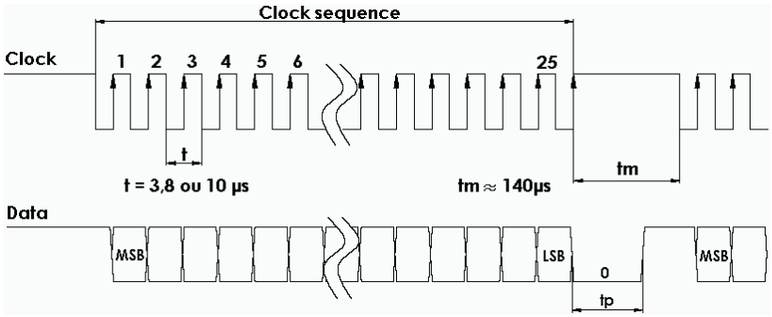
* The switch 4 on ON inverse the bits

The switch configuration is taken in account when the deserialisation cable is power on

EAA-005

DESERIALISATION CABLE, SSI -> PARALLEL OUTPUTS,

SSI TRANSMISSION



STANDARD SSI CONNECTION: 12 pinouts female M23 connector

Type	Vcc	Gnd	Clk+	Data+	RAZ / RAX	Data-	Clk-	DIRECTION
S6	1	2	3	4	5	6	7	9

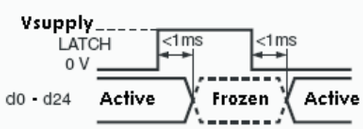
Pinouts 8, 10, 11 et 12 : reserved, do not connect

PARALLEL CONNECTION: 37 pinouts male SUBD connector

1	Bit 0 output	20	Bit 19 output
2	Bit 1 output	21	Bit 20 output
3	Bit 2 output	22	Bit 21 output
4	Bit 3 output	23	Bit 22 output
5	Bit 4 output	24	Bit 23 output
6	Bit 5 output	25	Bit 24 output
7	Bit 6 output	26	Reserved
8	Bit 7 output	27	RAZ / RAX
9	Bit 8 output	28	SELECT
10	Bit 9 output	29	LATCH
11	Bit 10 output	30	DIRECTION
12	Bit 11 output	31	Reserved
13	Bit 12 output	32	Reserved
14	Bit 13 output	33	Reserved
15	Bit 14 output	34	Reserved
16	Bit 15 output	35	Reserved
17	Bit 16 output	36	+ 11 to 30Vdc
18	Bit 17 output	37	0 Vdc
19	Bit 18 output	Reserved :	Do not connect

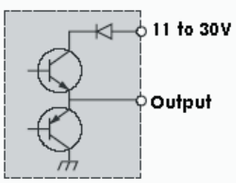
Electronic

Latch input



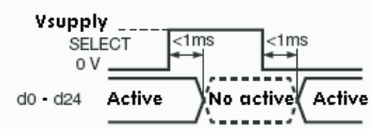
	min	max
"0" level	0V	0,3 x Vsupply
"1" level	0,7 x Vsupply	Vsupply
I LATCH	< 5mA	

PUSH - PULL
Power supply: 11 to 30Vdc
Max. ondulation: 500mV
Protection against inversion of polarity
Cons. without load: 50mA max.
(typically 30mA at 24V)



Max. current: 20mA
"0" level: 1,5V max.
"1" level: Vsupply - 2,5V
Protection against short circuits

SELECT input



	min	max
"0" level	0V	0,3 x Vsupply
"1" level	0,7 x Vsupply	Vsupply
I SELECT	< 5mA	

SELECT and LATCH inputs must be connected to the 0Vdc(do not leave unconnected)

Nota : Pinouts 27 and 30 of the SUBD37 connector are respectively directly connected to the pinouts 5 and 9 of the M23 connector

ORDERING REFERENCE: EAA-005 (1m cable, weight : 230g)

Nota : extension cable for SSI encoder available on simple request

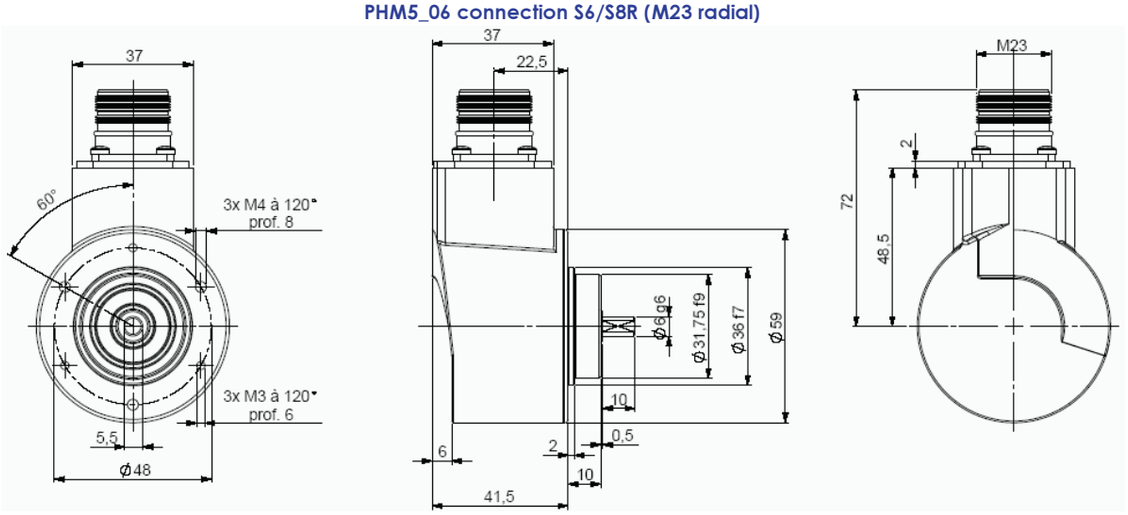
Made in FRANCE

PHM5

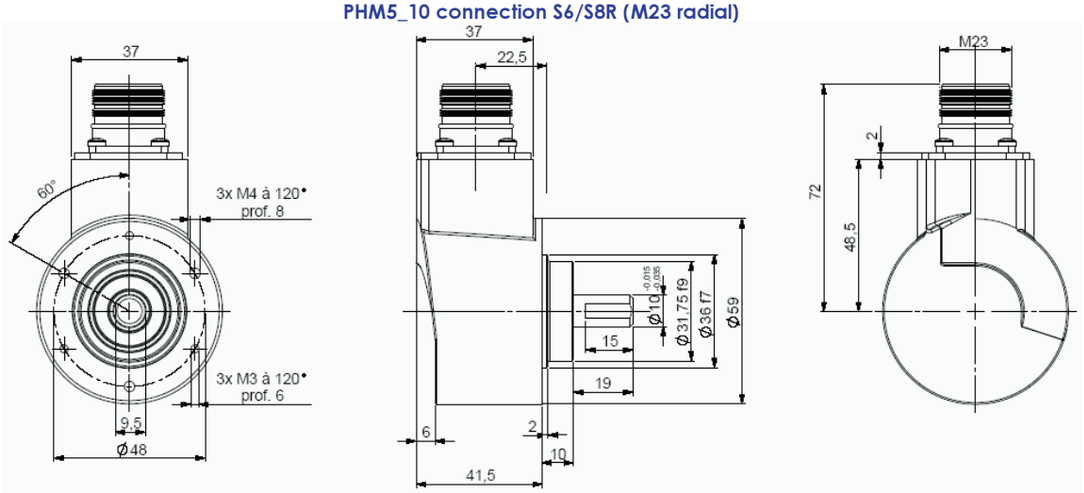
ABSOLUTE MULTITURN ENCODER, PHM5 RANGE, *POSI+™*

- Solid shaft Ø 6 and Ø 10 mm
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65, IP67 option with a sealing flange
- High performances in temperature –20°C to +85°C
- Isolated SSI interface, clock from 100 to 500 kHz
- Universal electronic circuits from 5 to 30Vdc
- Protection against short-circuits and inversion of polarity
- High resolutions available: 8192 (13 bits) per turn
- Turn counting up to 65 536 (16 bits)
- 2 inputs : DIRECTION and RAZ
- Available with incremental channels – 2048 points – 5 to 30 Vdc
- Option: push-button on the cover for a encoder reset to a value X

PHM5_06 connection S6/S8R (M23 radial)



PHM5_10 connection S6/S8R (M23 radial)



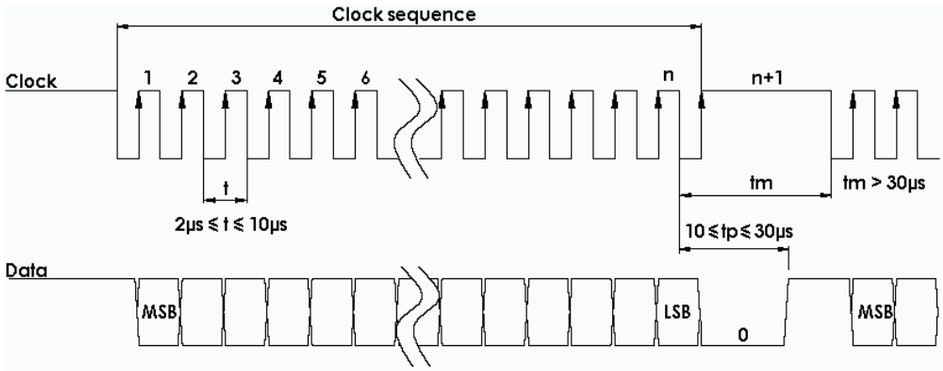
Material	Cover : treated steel	Shock (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
	Body: aluminium	Vibration (EN60068-2-6)	≤ 100 m.s^{-2} (10… 2 000 Hz)
	Shaft : stainless steel	EMC	EN 61000-6-4, EN 61000-6-2
Bearings	6 000 serie	Isolation	100V (1 min.)
Maximum load	Axial : 50 N	Weight (connector)	0,520 kg
	Radial : 100 N	Operating temperature	- 20 ... + 85 °C (encoder T°)
Shaft inertia	≤ 1.10^{-6} kg.m^2	Storage temperature	- 20 ... + 85 °C
Torque	≤ 4.10^{-3} N.m	Protection(EN 60529)	IP 65 (IP67 with flange option)
Permissible max. speed	6 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Continuous max. speed	6 000 min^{-1}	25 N / 50 N : 99	50 N / 100 N : 12

ABSOLUTE MULTITURN ENCODER, PHM5 RANGE, *POSI+™*

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupleur	Power supply	5 – 30Vdc
Output signal DATA	line - driver selon RS422	Introduction	< 1 s
Clock frequency CLK	100kHz – 500kHz	Cons. without load	< 100mA (typically 50-60mA at 24Vdc)
Precision	± ½ LSB (13 bits)	Position refresh	< 200µs

SSI TRANSMISSION



Transmission	Transmission up to 400m* at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded cable and twisted pairs

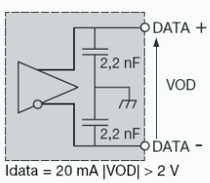
*Consult us for length > 100m

SSI CONNECTION (TYPE S6 : BEI IDEACOD STANDARD)

Type	Vcc	Gnd	Clk+	Data+	RAZ	Data-	Clk-	DIRECTION
S6	1	2	3	4	5	6	7	9
S8	8	1	3	2	6	10	11	5

Nota : Do not connect other pinouts, connect DIRECTION and RAZ to a potential (RAZ at 0V if not used)

Data output RS422

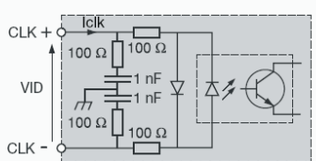


Idata = 20 mA |VOD| > 2 V

Protection against short circuits

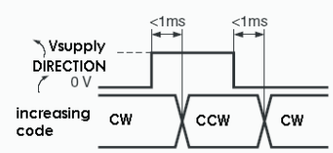
Isolated Clk input

Power supply: 5 to 30 V
Max ond. : 500mV for 11 to 30Vdc power supply
Protection against inversion of polarity
Cons. without load: 100mA max.



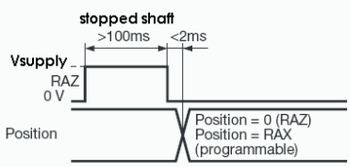
|VID| maxi : 5 V
|Iclk| maxi : 15 mA

DIRECTION input



	min	max	increasing
Level "0"	0V	0,3xVsupply	CW
Level "1"	0,7xVsupply	Vsupply	CCW
I direction		< 5mA	

RAZ / RAX input



	min	max
Level "0"	0 V	0,3xVsupply
Level "1"	0,7xVsupply	Vsupply
I RAZ/RAX	< 5mA	

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

	Shaft Ø	Supply	Output stage	Code	Resolution			Connection	Orientation
					13 B12 D5				
					Resolution	Nb of turn	Nb data		
PHM5	**10** : 10mm **06** : 6mm	**P** : 5 to 30Vdc	**SS** : SSI without parity	**B**: binary **G**: Gray	**13:** 13 bits	**B12:** 12 bits	**D5:** 25 bits	**S6** : M23 12pins CW for SSI transmission **S8:** M23 12pins CCW for SSI transmission	**R** : radiale
PHM5 _	**10** //	**P**	**SS**	**G** //	**13**	**B12**	**D5** //	**S6**	**R**

Made in France

PHM5

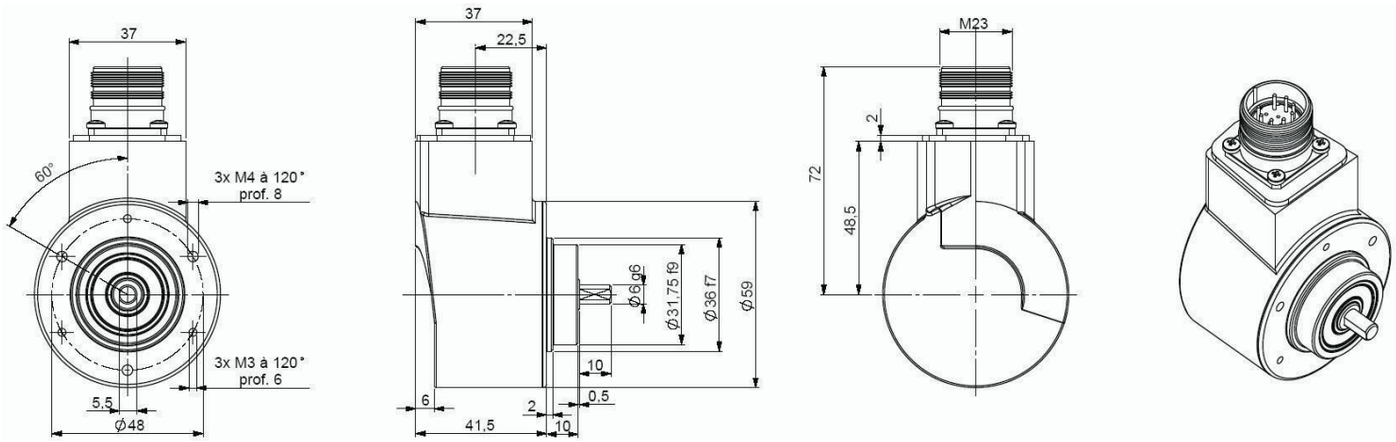
PROGRAMMABLE MULTITURN ABSOLUTE ENCODER, PHM5 RANGE, *POSI+™*

- Solid shaft Ø 6 and Ø 10 mm
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP65, IP67 option with a sealing flange
- High performances in temperature –20°C to +85°C
- Isolated SSI interface, clock from 100 to 500 kHz
- Universal electronic circuits from 5 to 30Vdc
- Protection against short-circuits and inversion of polarity
- High resolutions available: 8192 (13 bits) per turn
- Turn counting up to 65 536 (16 bits)
- 2 inputs : DIRECTION and RAZ
- Type choice of the wished limit value : position, rotation speed, temperature
- Diagnostic functions: temperature, rotation speed, position, input/output level
- Programmation of the encoder with a serial transmission RS232 directly with the serial PC connection: resolution, number of turn, output code, parity, SSI frame bit number, reset value, functions of the 2 outputs : (OUT 1 and OUT 2): limit switch, incremental channels

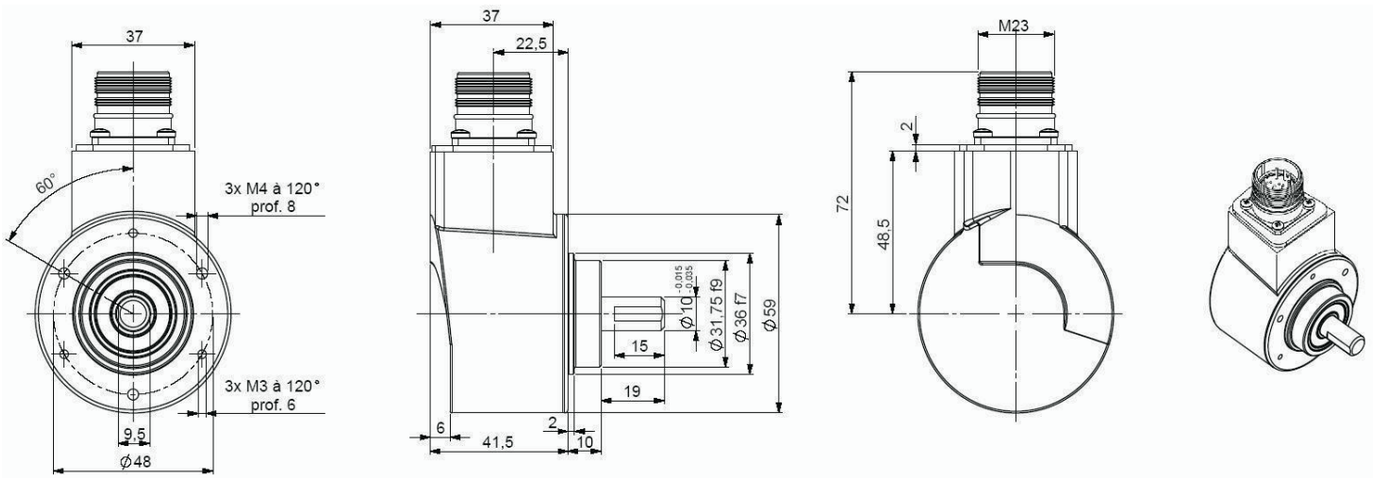
SYNCHRON SERIELLES INTERFACE

RS232

PHM5_06 connection P6R (M23 radial)



PHM5_10 connection P6R (M23 radial)



Material	Cover : treated steel
	Body: aluminium
	Shaft : stainless steel
Bearings	6 000 serie
Maximum load	Axial : 50 N
	Radial : 100 N
Shaft inertia	≤ 1.10^{-6} kg.m²
Torque	≤ 4.10^{-3} N.m
Permissible max. speed	6 000 min^{-1}
Continuous max. speed	6 000 min^{-1}

Shock (EN60068-2-27)	≤ 500 $m.s^{-2}$ (during 6 ms)
Vibration (EN60068-2-6)	≤ 100 $m.s^{-2}$ (10… 2 000 Hz)
EMC	EN 61000-6-4, EN 61000-6-2
Isolation	100V (1 min.)
Weight (connector)	0,520 kg
Operating temperature	- 20 ... + 85 °C (encoder T°)
Storage temperature	- 20 ... + 85 °C
Protection(EN 60529)	IP 65 (IP67 with flange option)
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
25 N / 50 N : 99	50 N / 100 N : 12

PROGRAMMABLE MULTITURN ABSOLUTE ENCODER, PHM5 RANGE, *POSI+*™

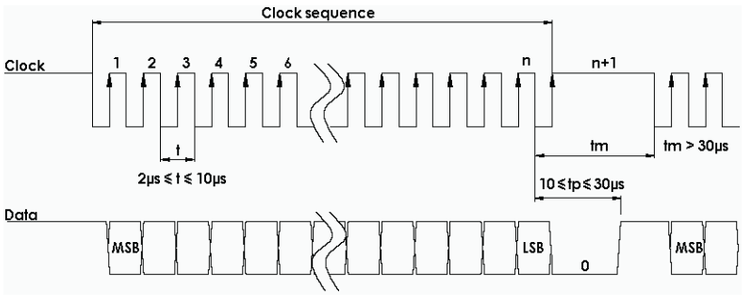
In order to optimize the installation times of SSI encoders, BEI IDEACOD has developed a friendly software package, easy to use, with which is possible to program your encoder under WINDOWS in only 2 minutes. With a simple connection to the serial connector of your PC, you can :
- configure : the number of steps per revolution, the number of turns, the code type, SSI frame bit number, the parity, reset value
- read : type of selected encoder, the serial number of the encoder, the position of the encoder, the temperature, the speed of rotation, the level of the input/output
- save the chosen configuration, load saved configurations
- function of the outputs and limit value : position, speed of rotation, temperature, incremental channels 2048 ppr

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupleur
Output signal DATA	line - driver RS422
Clock frequency CLK	100kHz – 500kHz
Precision	± ½ LSB (13 bits)

Power supply	5 – 30Vdc
Introduction	< 1 s
Cons. without load	< 100mA (typically 60-70mA at 24Vdc)
Position refresh	< 200µs

SSI TRANSMISSION



Transmission	Transmission up to 400m* at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded cable and twisted pairs

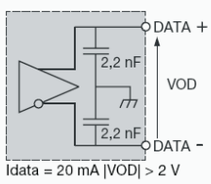
* consult us for length > 100m

SSI CONNECTION

Type	Vcc	Gnd	Clk+	Data+	RAZ	Data-	Clk-	DIR.	OUT1	OUT2	TXD Encoder RXD RS232	RXD Encoder TXD RS232
P6	1	2	3	4	5	6	7	9	10	11	8	12

The pinouts TXD and RXD are used for the encoder programming
Connect the entry DIRECTION and RAZ to a potential (RAZ to the 0V if not used)

Data output RS422

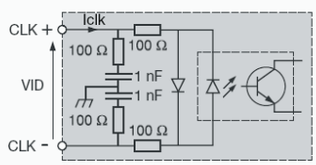


Idata = 20 mA |VOD| > 2 V

Protection against short circuits

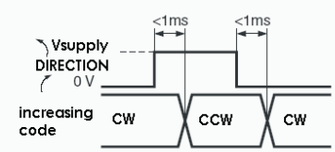
Isolated Clk input

Power supply: 5 to 30 V
Max ond. : 500mV for 11 to 30Vdc power supply
Protection against inversion of polarity
Cons. without load: 100mA max.



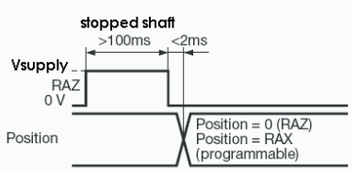
|VID| maxi : 5 V
|Iclk| maxi : 15 mA

DIRECTION input



	min	max	increasing
Level "0"	0V	0,3xVsupply	CW
Level "1"	0,7xVsupply	Vsupply	CCW
I direction	< 5mA		

RAZ / RAX input



	min	max
Level "0"	0 V	0,3xVsupply
Level "1"	0,7xVsupply	Vsupply
I RAZ/RAX	< 5mA	

Output : - Max current: 20m A
- Level "0" max : 0.5V, Level "1" min : Vsupply-2,5V
- Limit switch time answer : < 400µs
- Incremental channels : 100kHz max

Programmation cable : PC RS232
- Supply : 230Vac / 12Vdc
- Cable SubD9 (serial PC) / M23 12 pins (encoder)

Reference : PRO-020S001

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

	Shaft Ø	Supply	Output stage	Code	Resolution			Connection	Orientation
					13 B12 D5				
PHM5_	**06**:6mm **10**:10mm	**P** : 5 to 30Vdc	**PX** : SSI programmable Nota : without parity by default	**G** : Gray default	**Resolution** **13:** 13 bits default	**Nb of turn** **B12:** 12 bits default	**Nb data** **D5:** 25 bits default	**P6:** M23 12pins CW for SSI transmission	**R** : radial
PHM5 _	**10 //**	**P**	**PX**	**G //**	**13**	**B12**	**D5 //**	**P6**	**R**

SOFTWARE / CONFIGURATION MANUAL: consult us

Encoder available in stock, manufacture setting: 8192pts/turn, 4096 turns (25bits) - Gray

Made in FRANCE

BEI IDEACOD

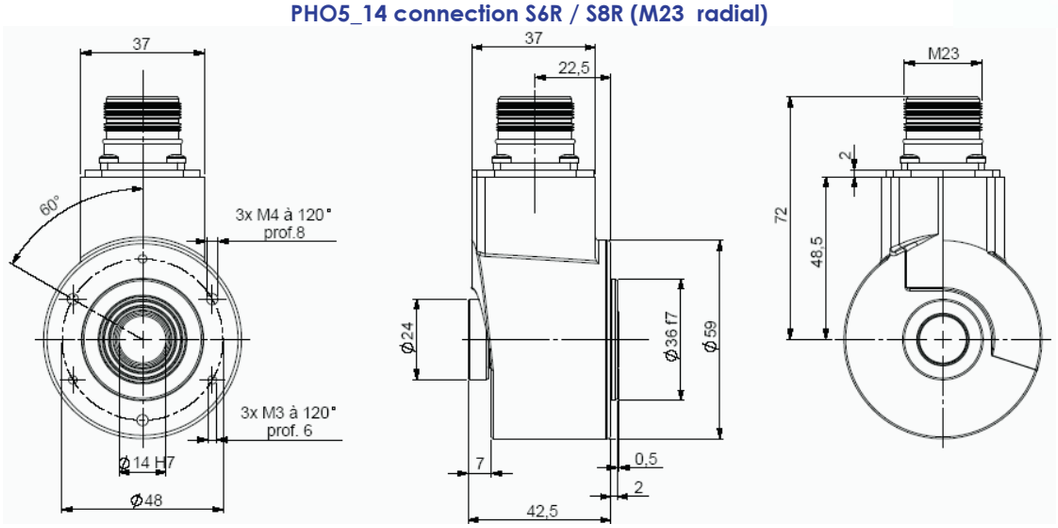
www.bei-ideacod.com

PHO5

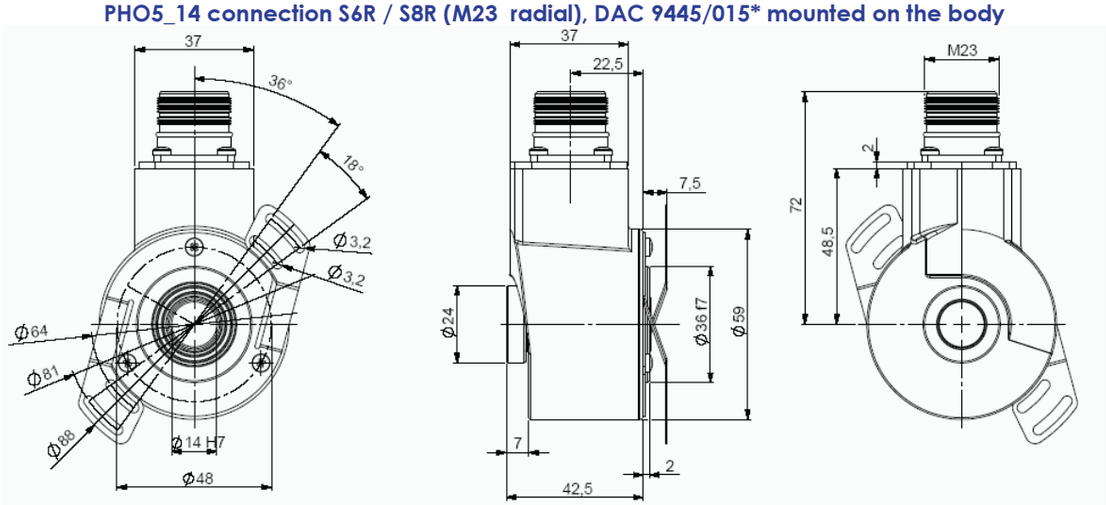
ABSOLUTE MULTITURN ENCODER, PHM5 RANGE, *POSI+™*

- Extra-flat encoder, through shaft Ø 14 mm, reduction hubs available: 6, 8, 10, 12mm
- Robustness and excellent resistance to shocks / vibrations
- High performances in temperature –20°C to +85°C
- Isolated SSI interface, clock from 100 to 500 kHz
- Universal electronic circuits from 5 to 30Vdc
- Protection against short-circuits and inversion of polarity
- High resolutions available: 8192 (13 bits) per turn
- Turn counting up to 65 536 (16 bits)
- 2 inputs : DIRECTION and RAZ
- Available with incremental channels – 2048 points – 5 to 30 Vdc

PHO5_14 connection S6R / S8R (M23 radial)



PHO5_14 connection S6R / S8R (M23 radial), DAC 9445/015* mounted on the body



* Accessories to be ordered separately

Material	Cover : treated steel	Shock (EN60068-2-27)	≤ 500m.s^{-2} (during 6 ms)
	Body: aluminium	Vibration (EN60068-2-6)	≤ 100m.s^{-2} (10 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 61000-6-4, EN 61000-6-2
Bearings	6 803 serie	Isolation	100V (1 min)
Maximum load	Axial : 20 N	Weight	0,480 kg
	Radial : 50 N	Operating temperature	- 20 ... + 85 °C (encoder T°)
Shaft inertia	≤ 2,2.10^{-6} kg.m^2	Storage temperature	- 20 ... + 85 °C
Torque	≤ 6.10^{-3} N.m	Protection(EN 60529)	IP 65
Permissible max. speed	6 000 min^{-1}	Torque (ring pressure screw)	nominal: 1.5N.m, break: 2.0N.m
Continuous max. speed	6 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shaft seal	Viton	10 N / 25 N : 185	20 N / 50 N : 24

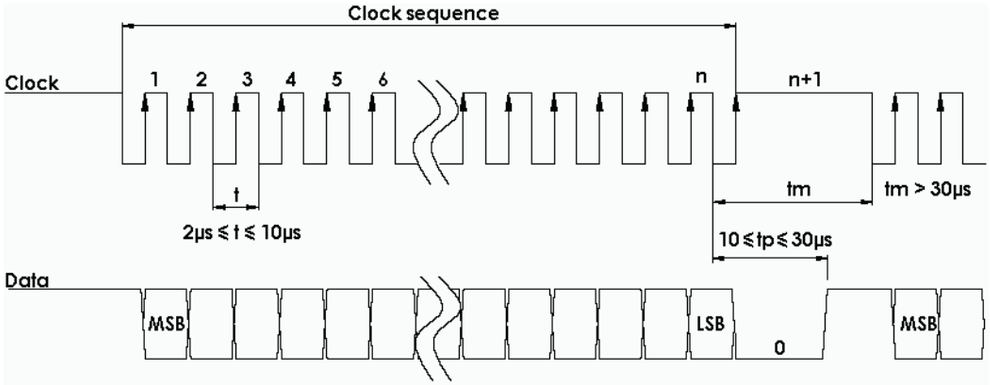
ABSOLUTE MULTITURN ENCODER, PHO5 RANGE, *POSI+™*

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupler
Output signal DATA	line - driver RS422
Clock frequency CLK	100kHz – 500kHz
Precision	± ½ LSB (13 bits)

Power supply	5 – 30Vdc
Introduction	< 1 s
Cons. Without load	< 100mA (typically 50-60mA at 24Vdc)
Position refresh	< 200µs

SSI TRANSMISSION



Transmission	Transmission up to 400m* at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded twisted pair cable

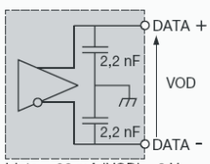
Consult us for length > 100m

SSI CONNECTION (TYPE S6 : BEI IDEACOD STANDARD)

Type	Vcc	Gnd	Clk+	Data+	RAZ	Data-	Clk-	DIRECTION
S6	1	2	3	4	5	6	7	9
S8	8	1	3	2	6	10	11	5

Note : Do not connect other pinouts, connect DIRECTION and RAZ to a potential (RAZ at 0V if not used)

Data output RS422

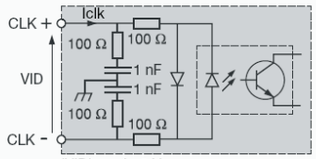


Idata = 20 mA |VOD| > 2 V

Protection against short circuits

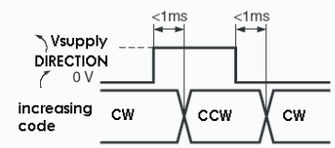
Isolated Clk input

Power supply: 5 to 30 V
Max ond. : 500mV for 11 to 30Vdc power supply
Protection against inversion of polarity
Cons. without load: 100mA max.



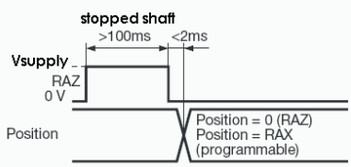
|VID| maxi : 5 V
|Iclk| maxi : 15 mA

DIRECTION input



	min	max	increasing
Level "0"	0V	0,3xVsupply	CW
Level "1"	0,7xVsupply	Vsupply	CCW
I direction		< 5mA	

RAZ / RAX input



	min	max
Level "0"	0 V	0,3xVsupply
Level "1"	0,7xVsupply	Vsupply
I RAZ/RAX	< 5mA	

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

	Shaft Ø	Supply	Output stage	Code	Resolution			Connection	Orientation
					13 B12 D5				
					Resolution	Nb of turn	Nb data		
PHO5	**14** : 14mm Nota: reduction hubs available	**P** : 5 to 30Vdc	**SS** : SSI without parity	**B**: binary **G**: Gray	**13:** 13 bits	**B12:** 12 bits	**D5:** 25 bits	**S6** : M23 12pins CW for SSI transmission **S8:** M23 12pins CCW for SSI transmission	**R** : radiale
PHO5 _	**14** //	**P**	**SS**	**G** //	**13**	**B12**	**D5** //	**S6**	**R**

Made in FRANCE

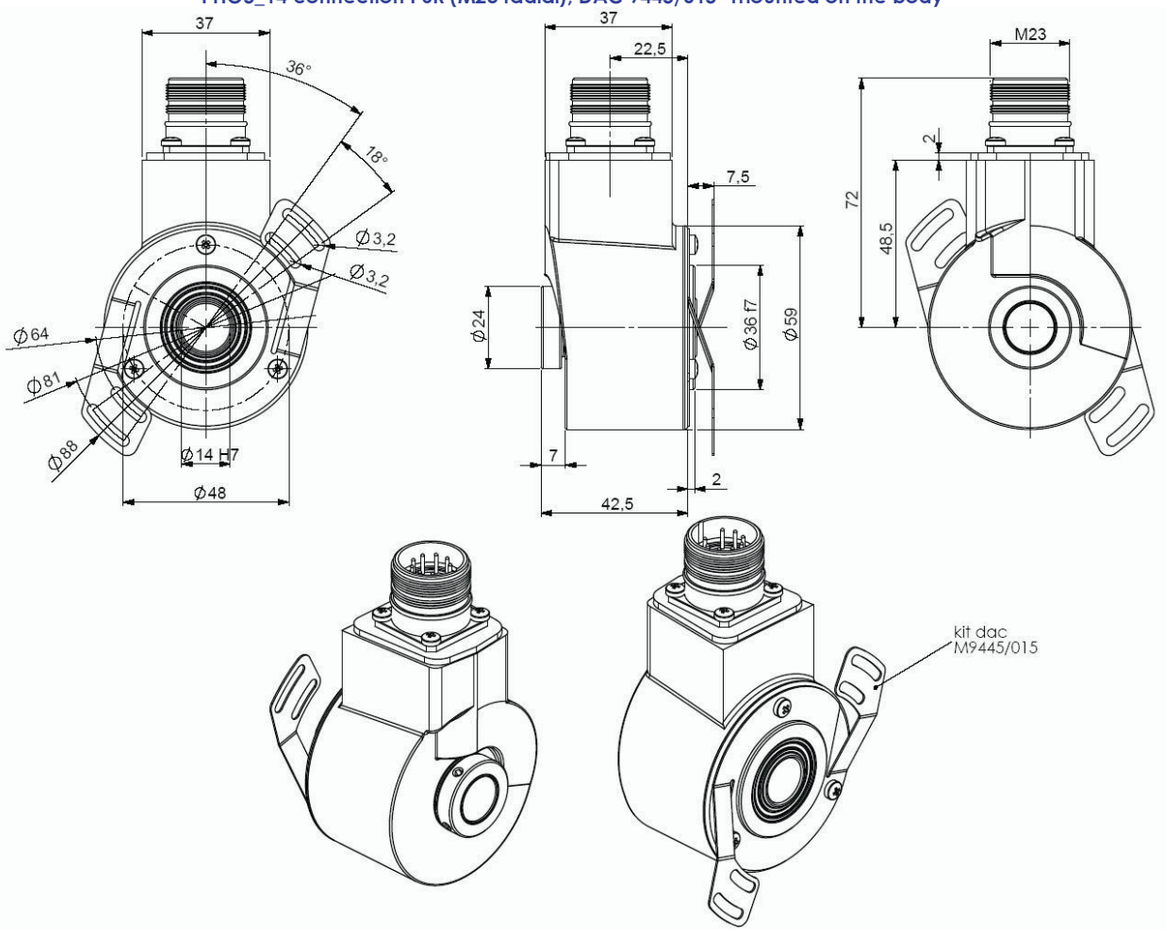
PHO5

PROGRAMMABLE MULTITURN ABSOLUTE ENCODER, PHO5 SERIE, *POSI+™*

- Extra flat encoder, through shaft Ø 14 mm, reduction hubs available: 6, 8, 10, 12mm
- Robustness and excellent resistance to shocks / vibrations
- High performances in temperature –20°C to +85°C
- Isolated SSI interface, clock from 100 to 500 kHz
- Universal electronic circuits from 5 to 30Vdc
- Protection against short-circuits and inversion of polarity
- High resolutions available: 8192 (13 bits) per turn
- Turn counting up to 65 536 (16 bits)
- 2 inputs : DIRECTION and RAZ
- Type choice of the wished limit value : position, rotation speed, temperature
- Diagnostic functions: temperature, rotation speed, position, input/output level
- Programming of the encoder with a serial transmission RS232 directly with the serial PC connection: resolution, number of turn, output code, parity, SSI frame bit number, reset value, functions of the 2 outputs : (OUT 1 and OUT 2): limit switch, incremental channels

RS232

PHO5_14 connection P6R (M23 radial), DAC 9445/015* mounted on the body



* accessories to be ordered separately

Material	Cover : treated steel	Shock (EN60068-2-27)	≤ 500m.s^{-2} (during 6 ms)
	Body: aluminium	Vibration (EN60068-2-6)	≤ 100m.s^{-2} (10 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 61000-6-4, EN 61000-6-2
Bearings	6 803 serie	Isolation	100V (1 min)
Maximum loads	Axial : 20 N	Weight	0,480 kg
	Radial : 50 N	Operating temperature	- 20 ... + 85 °C (encoder T°)
Shaft inertia	≤ 2,2.10^{-6} kg.m^2	Storage temperature	- 20 ... + 85 °C
Torque	≤ 6.10^{-3} N.m	Protection(EN 60529)	IP 65
Permissible max. speed	6 000 min^{-1}	Torque (ring pressure screw)	nominal: 1.5N.m, break: 2.0N.m
Continuous max. speed	6 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shaft seal	Viton	10 N / 25 N : 185	20 N / 50 N : 24

PROGRAMMABLE MULTITURN ABSOLUTE ENCODER, PHO5 SERIE, *POSI+™*

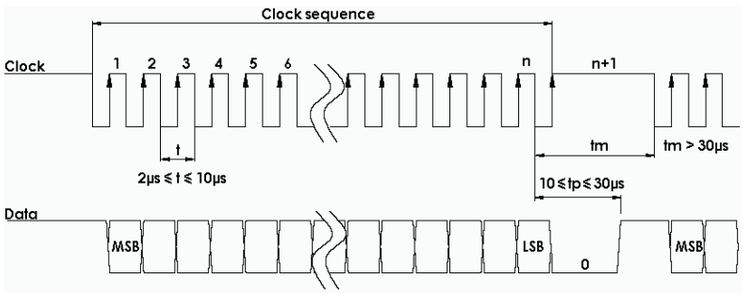
In order to optimize the installation times of SSI encoders, BEI IDEACOD has developed a friendly software, easy to use, with which it's possible to program your encoder under WINDOWS in only 2 minutes. With a simple connection to the serial connector of your PC, you can :
- configure : the number of points per revolution, the number of turns, the code type, SSI frame bit number, the parity, reset value
- read : type of selected encoder, the serial number of the encoder, the position of the encoder, the temperature, the speed of rotation, the level of the input/output
- save the chosen configuration, load saved configurations
- function of the outputs and limit value: position, speed of rotation, temperature, incremental channels 2048 ppr

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupler
Output signal DATA	line - driver RS422
Clock frequency CLK	100kHz – 500kHz
Precision	± ½ LSB (13 bits)

Power supply	5 – 30Vdc
Introduction	< 1 s
Cons. without load	< 100mA (typically 60-70mA at 24Vdc)
Position refresh	< 200µs

SSI TRANSMISSION



Transmission	Transmission up to 400m* at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded cable and twisted pairs

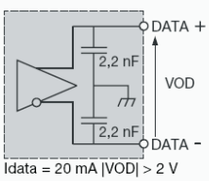
* consult us for length > 100m

SSI CONNECTION

Type	Vcc	Gnd	Clk+	Data+	RAZ	Data-	Clk-	DIR.	OUT1	OUT2	TXD Encoder RXD RS232	RXD Encoder TXD RS232
P6	1	2	3	4	5	6	7	9	10	11	8	12

The pinouts TXD and RXD are used for the encoder programming
Connect the entry DIRECTION and RAZ to a potential (RAZ to the 0V if not used)

Data output RS422

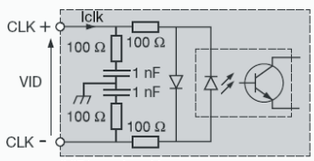


Idata = 20 mA |VOD| > 2 V

Protection against short circuits

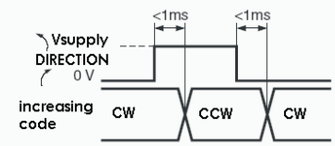
Isolated Clk input

Power supply: 5 to 30 V
Max ond. : 500mV for 11 to 30Vdc power supply
Protection against inversion of polarity
Cons. without load: 100mA max.



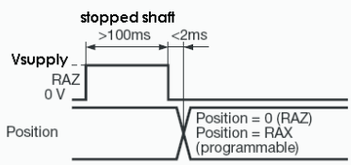
|VID| maxi : 5 V
|Iclk| maxi : 15 mA

DIRECTION input



	min	max	increasing
Level "0"	0V	0,3xVsupply	CW
Level "1"	0,7xVsupply	Vsupply	CCW
I direction	< 5mA		

RAZ / RAX input



	min	max
Level "0"	0 V	0,3xVsupply
Level "1"	0,7xVsupply	Vsupply
I RAZ/RAX	< 5mA	

Output : - Max current: 20m A
- Level "0" max : 0.5V, Level "1" min : Vsupply-2,5V
- Limit switch time answer : < 400µs
- Incremental channels : 100kHz max

Programmation cable : PC RS232
- Supply : 230Vac / 12Vdc
- Cable SubD9 (serial PC) / M23 12 pins (encoder)

Reference: PRO-020S001

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

	Shaft Ø	Supply	Output stage	Code	Resolution			Connection	Orientation
					13 B12 D5				
PHO5_	**14**:14mm	**P** : 5 to 30Vdc	**PX** : SSI programmable Nota : without parity by default	**G** : Gray default	**Resolution**	**Nb of turn**	**Nb data**	**P6**: M23 12pins CW for SSI transmission	**R** : radial
					13: 13 bits default	**B12:** 12 bits default	**D5:** 25 bits default		
PHO5 _	**14 //**	**P**	**PX**	**G //**	**13**	**B12**	**D5 //**	**P6**	**R**

SOFTWARE / CONFIGURATION MANUAL: consult us

Encoder available in stock, manufacture setting: 8192pts/turn, 4096 turns (25bits) - Gray

Made in FRANCE

BEI IDEACOD

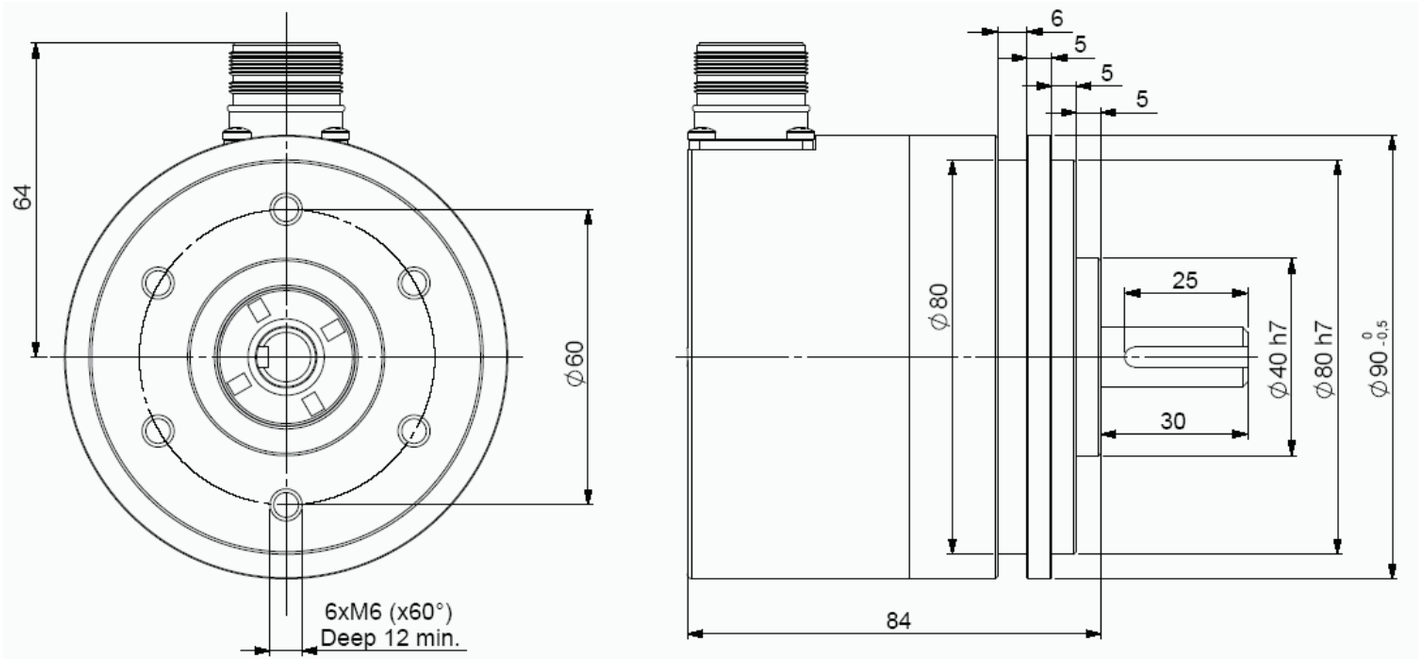
www.bei-ideacod.com

PHM9

SSI ABSOLUTE MULTITURN ENCODER, PHM9 RANGE

- Heavy Duty version, Ø 30mm through shaft, reduction hubs available
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP66
- High performances in temperature –20°C to +85°C
- Isolated SSI interface, clock from 100 to 500 kHz
- Universal electronic circuits from 5 to 30Vdc
- Protection against short-circuits and inversion of polarity
- High resolutions available: 8192 (13 bits) per turn
- Turn counting up to 65 536 (16 bits)
- 2 inputs : DIRECTION and RAZ
- Available with incremental channels – 2048 points – 5 to 30 Vdc
- Option: push-button on the cover for a encoder reset to a value X

PHM9_12 connection S6/S8R (radial M23)



CARACTERISTIQUES

Material	Cover : zinc alloy
	Body: aluminium
Shaft	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	6 000 min^{-1}
Continuous max. speed	6 000 min^{-1}
Shaft seal	Viton double lips

Shocks (EN60068.2.27)	≤ 500m.s^{-2} (during 6 ms)
Vibrations (EN60068.2.6)	≤ 100m.s^{-2} (10 ... 2 000 Hz)
EMC	EN 61000-6-4, EN 61000-6-2
Isolation	100V (1 min.)
Encoder weight (approx.)	1,600 kg
Operating temperature	- 20 ... + 85 °C (encoder T°)
Storage temperature	- 20 ... + 85 °C
Protection(EN 60529)	IP 66

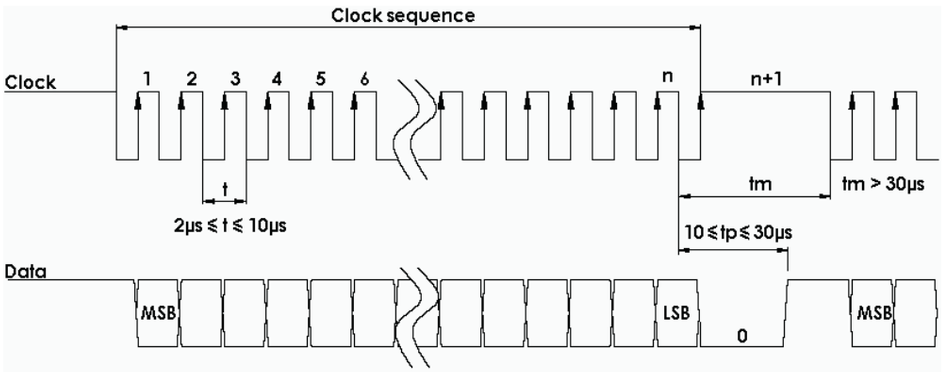
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})		
20 N / 30 N	50 N / 100 N	100 N / 200 N
360	18	2,2

SSI ABSOLUTE MULTITURN ENCODER, PHM9 RANGE

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupleur	Power supply	5 – 30Vdc
Output signal DATA	line - driver selon RS422	Introduction	< 1 s
Clock frequency CLK	100kHz – 500kHz	Cons. without load	< 100mA (typically 50-60mA at 24Vdc)
Precision	± ½ LSB (13 bits)	Position refresh	< 200µs

SSI TRANSMISSION



Transmission	Transmission up to 400m* at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded cable and twisted pairs

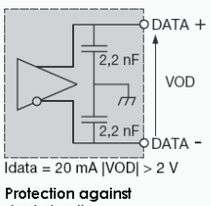
*Consult us for length > 100m

SSI CONNECTION (TYPE S6 : BEI IDEACOD STANDARD)

Type	Vcc	Gnd	Clk+	Data+	RAZ	Data-	Clk-	DIRECTION
S6	1	2	3	4	5	6	7	9
S8	8	1	3	2	6	10	11	5

Note : Do not connect other pinouts, connect DIRECTION and RAZ to a potential (RAZ at 0V if not used)

Data output RS422

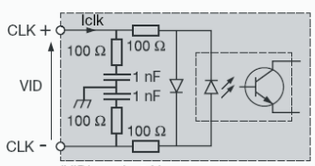


Idata = 20 mA |VOD| > 2 V

Protection against short circuits

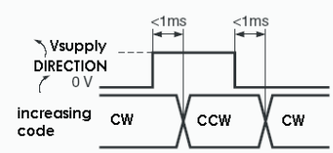
Isolated Clk input

Power supply: 5 to 30 V
Max ond. : 500mV for 11 to 30Vdc power supply
Protection against inversion of polarity
Cons. without load: 100mA max.



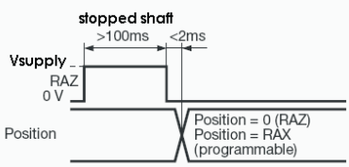
|VID| maxi : 5 V
|Iclk| maxi : 15 mA

DIRECTION input



	min	max	increasing
Level "0"	0V	0,3xVsupply	CW
Level "1"	0,7xVsupply	Vsupply	CCW
I direction	< 5mA		

RAZ / RAX input



	min	max
Level "0"	0 V	0,3xVsupply
Level "1"	0,7xVsupply	Vsupply
I RAZ/RAX	< 5mA	

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

	Shaft Ø	Supply	Output stage	Code	Resolution			Connection	Orientation
					13 B12 D5				
					Resolution	Nb of turn	Nb data		
PHM9	**11** : 11mm **12** : 12mm	**P** : 5 to 30Vdc	**SS** : SSI without parity	**B**: binary **G**: Gray	**13:** 13 bits	**B12:** 12 bits	**D5:** 25 bits	**S6** : M23 12pins CW for SSI transmission **S8:** M23 12pins CCW for SSI transmission	**R** : radiale
PHM9 _	**12** //	**P**	**SS**	**G** //	**13**	**B12**	**D5** //	**S6**	**R**

Made in France

PHM9

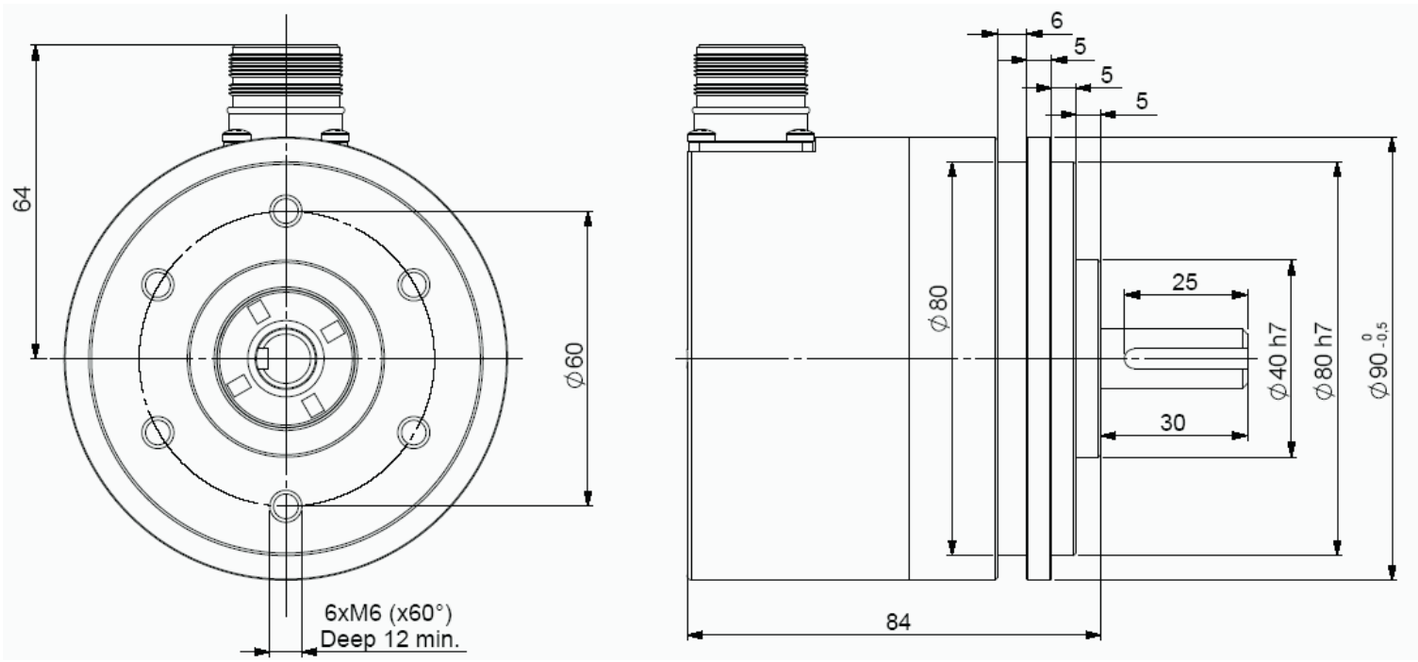
SSI PROGRAMMABLE MULTITURN ABSOLUTE ENCODER, PHM9 RANGE

- Heavy Duty version, Ø 11 or 12 mm shaft diameter
- Robustness and excellent resistance to shocks / vibrations
- High protection level IP66
- High performances in temperature –20°C to +85°C
- Isolated SSI interface, clock from 100 to 500 kHz
- Universal electronic circuits from 5 to 30Vdc
- Protection against short-circuits and inversion of polarity
- High resolutions available: 8192 (13 bits) per turn
- Turn counting up to 65 536 (16 bits)
- 2 inputs : DIRECTION and RAZ
- Type choice of the desired limit value : position, rotation speed, temperature
- Diagnostic functions: temperature, rotation speed, position, input/output level
- Programming of the encoder with a serial transmission RS232 directly with the serial PC connection: resolution, number of turn, output code, parity, SSI frame bit number, reset value, functions of the 2 outputs : (OUT 1 and OUT 2): limit switch, incremental channels

SYNCHRON SERIELLES INTERFACE

RS232

PHM9_12 connection P6R (radial M23)



CHARACTERISTICS

Material	Cover : zinc alloy
	Body: aluminium
Shaft	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	6 000 min^{-1}
Continuous max. speed	6 000 min^{-1}
Shaft seal	Viton double lips

Shocks (EN60068.2.27)	≤ 500m.s^{-2} (during 6 ms)
Vibrations (EN60068.2.6)	≤ 100m.s^{-2} (10 ... 2 000 Hz)
EMC	EN 61000-6-4, EN 61000-6-2
Isolation	100V (1 min.)
Encoder weight (approx.)	1,600 kg
Operating temperature	- 20 ... + 85 °C (encoder T°)
Storage temperature	- 20 ... + 85 °C
Protection(EN 60529)	IP 66

Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})

20 N / 30 N	50 N / 100 N	100 N / 200 N
360	18	2,2

SSI PROGRAMMABLE MULTITURN ABSOLUTE ENCODER, PHM9 RANGE

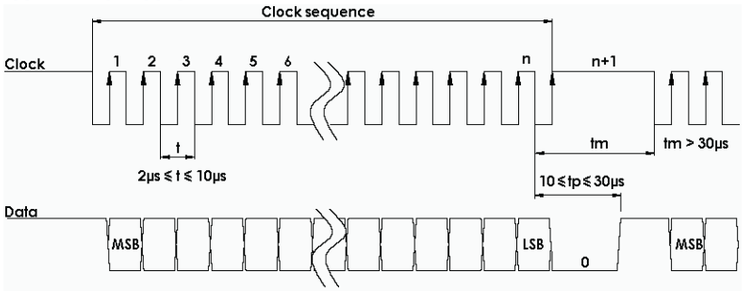
In order to optimize the installation times of SSI encoders, BEI IDEACOD has developed a friendly software package, easy to use, with which it's possible to program your encoder under WINDOWS in only 2 minutes. With a simple connection to the serial connector of your PC, you can :
- configure : the number of points per revolution, the number of turns, the code type, SSI frame bit number, the parity, reset value
- read : type of selected encoder, the serial number of the encoder, the position of the encoder, the temperature, the speed of rotation, the level of the input/output
- save the chosen configuration, load saved configurations
- function of the outputs and limit value : position, speed of rotation, temperature, incremental channels 2048 ppr

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupler
Output signal DATA	line - driver RS422
Clock frequency CLK	100kHz – 500kHz
Precision	± ½ LSB (13 bits)

Power supply	5 – 30Vdc
Introduction	< 1 s
Cons. without load	< 100mA (typically 60-70mA at 24Vdc)
Position refresh	< 200µs

SSI TRANSMISSION



Transmission	Transmission up to 400m* at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded cable and twisted pairs

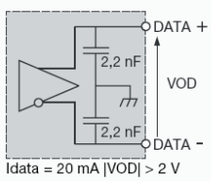
* consult us for length > 100m

SSI CONNECTION

Type	Vcc	Gnd	Clk+	Data+	RAZ	Data-	Clk-	DIR.	OUT1	OUT2	TXD Encoder RXD RS232	RXD Encodeur TXD RS232
P6	1	2	3	4	5	6	7	9	10	11	8	12

The pinouts TXD and RXD entries used for the encoder programming
Connect the entry DIRECTION and RAZ to a potential (RAZ to the 0V if not used)

Data output RS422

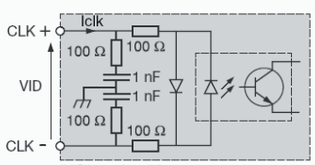


Idata = 20 mA |VOD| > 2 V

Protection against short circuits

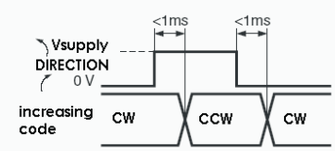
Isolated Clk input

Power supply: 5 to 30 V
Max ond. : 500mV for 11 to 30Vdc power supply
Protection against inversion of polarity
Cons. without load: 100mA max.



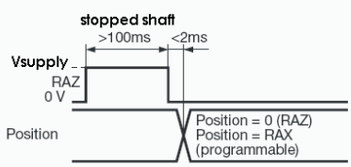
|VID| maxi : 5 V
|Iclk| maxi : 15 mA

DIRECTION input



	min	max	increasing
Level "0"	0V	0,3xVsupply	CW
Level "1"	0,7xVsupply	Vsupply	CCW
I direction	< 5mA		

RAZ / RAX input



	min	max
Level "0"	0 V	0,3xVsupply
Level "1"	0,7xVsupply	Vsupply
I RAZ/RAX	< 5mA	

Output : - Max current: 20m A
- Level "0" max : 0.5V, Level "1" min : Vsupply-2,5V
- Limit switch time answer : < 400µs
- Incremental channels : 100kHz max

Programmation cable : PC RS232
- Supply : 230Vac / 12Vdc
- Cable SubD9 (serial PC) / M23 12 pins (encoder)

Reference : PRO-020S001

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

	Shaft Ø	Supply	Output stage	Code	Resolution			Connection	Orientation
					13 B12 D5				
PHM9_	**11**:11mm **12**:12mm	**P** : 5 to 30Vdc	**PX** : SSI programmable Nota : without parity by default	**G** : Gray default	**Resolution** **13:** 13 bits default	**Nb of turn** **B12:** 12 bits default	**Nb data** **D5:** 25 bits default	**P6:** M23 12pins CW for SSI transmission	**R** : radial
PHM9 _	**10 //**	**P**	**PX**	**G //**	**13**	**B12**	**D5 //**	**P6**	**R**

SOFTWARE / CONFIGURATION MANUAL: consult us

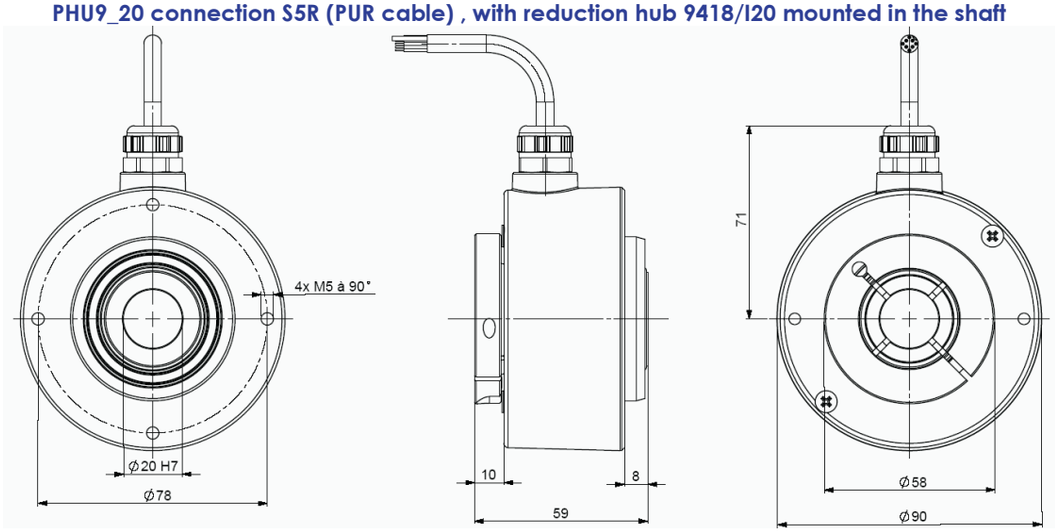
Made in FRANCE

PHU9

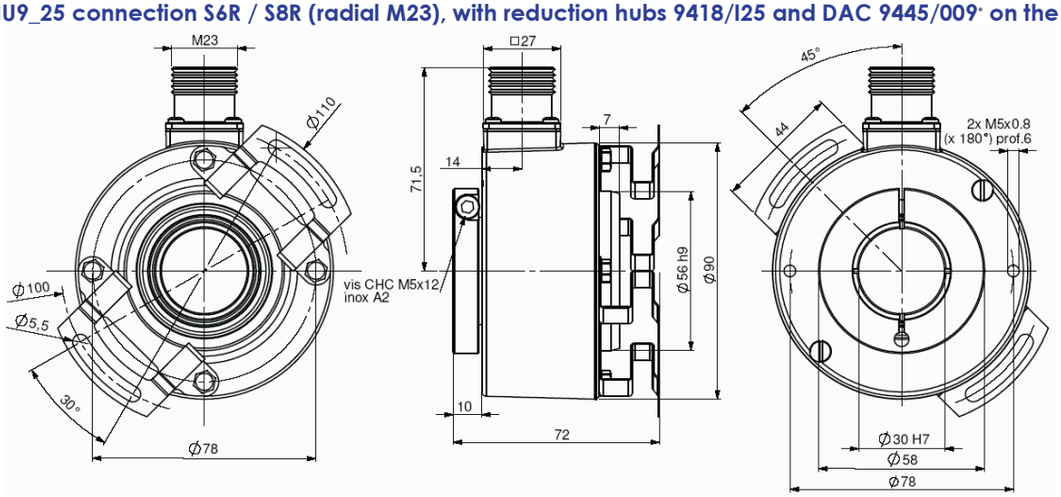
SSI ABSOLUTE MULTITURN ENCODER, PHU9 RANGE

- Version Heavy-Duty, axe traversant Ø 30mm, bagues de réduction d'axe disponibles
- Robustness and excellent resistance to shocks / vibrations
- High performances in temperature –20°C to +85°C
- Isolated SSI interface, clock from 100 to 500 kHz
- Universal electronic circuits from 5 to 30Vdc
- Protection against short-circuits and inversion of polarity
- High resolutions available: 8192 (13 bits) per turn
- Turn counting up to 65 536 (16 bits)
- 2 inputs : DIRECTION and RAZ
- Available with incremental channels – 2048 points – 5 to 30 Vdc

PHU9_20 connection S5R (PUR cable) , with reduction hub 9418/I20 mounted in the shaft



PHU9_25 connection S6R / S8R (radial M23), with reduction hubs 9418/I25 and DAC 9445/009* on the body



* Accessory to be ordered separately

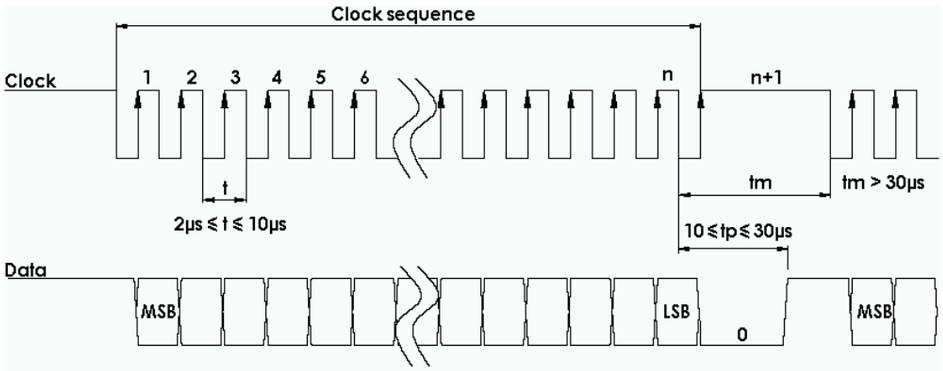
Material	Cover : zinc alloy	Shocks (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
	Body : aluminium	Vibrations (EN60068-2-6)	≤ 100 m.s^{-2} (10 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 61000-6-4, EN 61000-6-2
Bearings	6 807 serial	Isolation	100V (1 min)
Maximum loads	Axial : 50 N	Encoder weight (approx)	0,700 kg
	Radial : 80 N	Operating temperature	- 20... + 85 °C (encoder T°)
Shaft inertia	≤ 55.10^{-6} kg.m^2	Storage temperature	- 20... + 85 °C
Torque	≤ 25.10^{-3} N.m	Protection(EN 60529)	IP 65
Permissible max. speed	6 000 min^{-1}	Torque (ring pressure screw)	nominal: 3N.m, break: 4N.m
Continuous max. speed	3 600 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shaft seal	Viton	25 N / 40 N : 140	50 N / 80 N : 17

PRELIMINARY - SSI ABSOLUTE MULTITURN ENCODER, PHU9 RANGE

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupler	Power supply	5 – 30Vdc
Output signal DATA	line - driver RS422	Introduction	< 1 s
Clock frequency CLK	100kHz – 500kHz	Cons. without load	< 100mA (typically 50-60mA at 24Vdc)
Precision	± ½ LSB (13 bits)	Position refresh	< 200µs

SSI TRANSMISSION



Transmission	Transmission up to 400m* at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded cable and twisted pairs

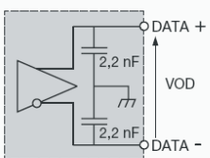
*Consult us for length > 100m

SSI CONNECTION (TYPE S6 : BEI IDEACOD STANDARD)

Type	Vcc	Gnd	Clk+	Data+	RAZ	Data-	Clk-	DIRECTION
S6	1	2	3	4	5	6	7	9
S8	8	1	3	2	6	10	11	5

Note : Do not connect other pinouts, connect DIRECTION and RAZ to a potential (RAZ at 0V if not used)

Data output RS422

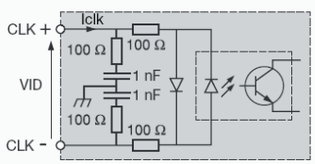


Idata = 20 mA |VOD| > 2 V

Protection against short circuits

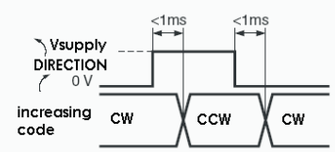
Isolated Clk input

Power supply: 5 to 30 V
Max ond. : 500mV for 11 to 30Vdc power supply
Protection against inversion of polarity
Cons. without load: 100mA max.



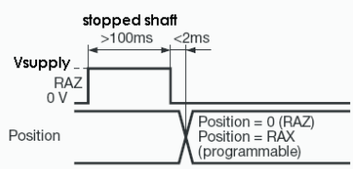
|VID| maxi : 5 V
|Iclk| maxi : 15 mA

DIRECTION input



	min	max	increasing
Level "0"	0V	0,3xVsupply	CW
Level "1"	0,7xVsupply	Vsupply	CCW
I direction	< 5mA		

RAZ / RAX input



	min	max
Level "0"	0 V	0,3xVsupply
Level "1"	0,7xVsupply	Vsupply
I RAZ/RAX	< 5mA	

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

	Shaft Ø	Supply	Output stage	Code	Resolution			Connection	Orientation
					13 B12 D5				
					Resolution	Nb of turn	Nb data		
PHU9	**30** : 30mm Reduction hub available	**P** : 5 to 30Vdc	**SS** : SSI sans parité	**B**: binary **G**: Gray	**13:** 13 bits	**B12:** 12 bits	**D5:** 25 bits	**S6**: M23 12 broches sens horaire **S8** : M23 12 broches sens anti-horaire **S5R** : câble PUR	**R** : radial Example: **R020**: radial cable 2m
PHU9 _	**30** //	**P**	**SS**	**G** //	**13**	**B12**	**D5** //	**S6**	**R**

Made in France

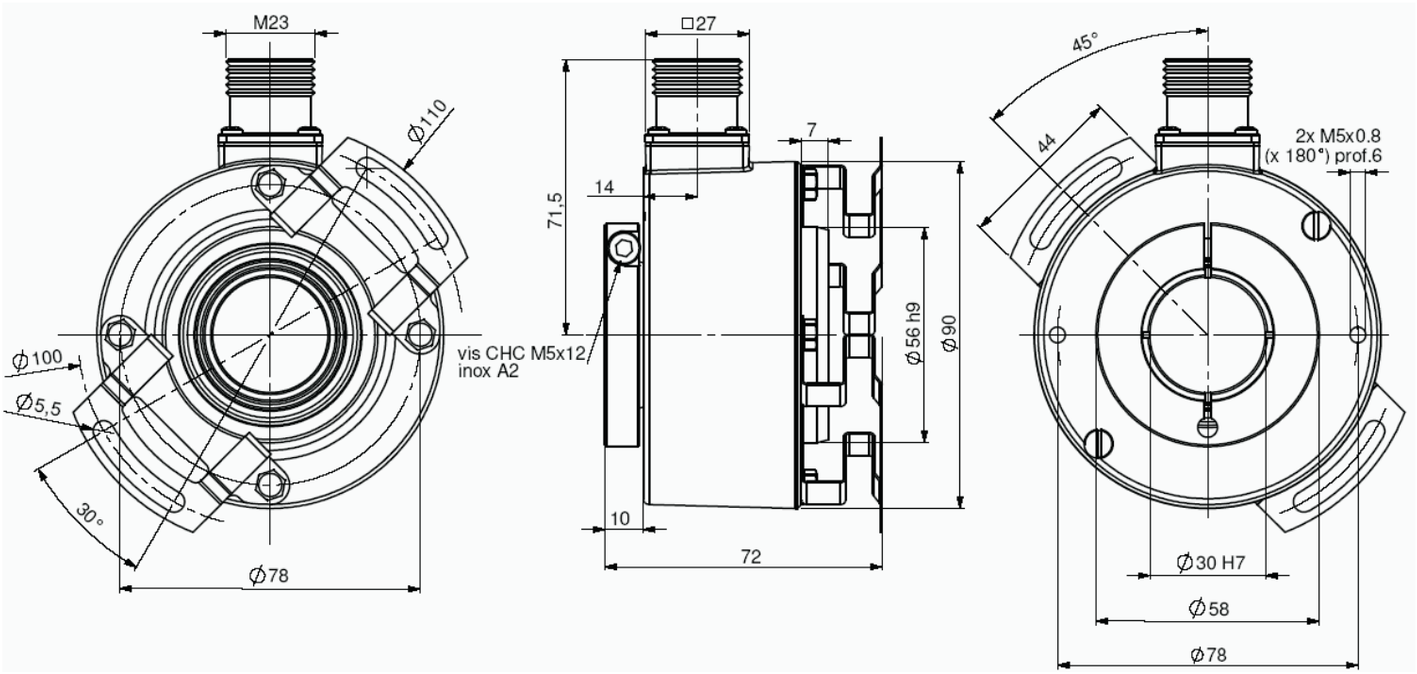
PHU9

SSI PROGRAMMABLE MULTITURN ABSOLUTE ENCODER, PHU9 RANGE

- Heavy duty version, Ø 30mm through shaft, reduction hubs available
- Robustness and excellent resistance to shocks / vibrations
- High performances in temperature –20°C to +85°C
- Isolated SSI interface, clock from 100 to 500 kHz
- Universal electronic circuits from 5 to 30Vdc
- Protection against short-circuits and inversion of polarity
- High resolutions available: 8192 (13 bits) per turn
- Turn counting up to 65 536 (16 bits)
- 2 inputs : DIRECTION and RAZ
- Type choice of the desired limit value : position, rotation speed, temperature
- Diagnostic functions: temperature, rotation speed, position, input/output level
- Programming of the encoder with a serial transmission RS232 directly with the serial PC connection: resolution, number of turn, output code, parity, SSI frame bit number, reset value, functions of the 2 outputs : (OUT 1 and OUT 2): limit switch, incremental channels

RS232

PHU9_30 connection P6R (radial M23), DAC9445/009* mounted on body



* Accessory to be ordered separately

CHARACTERISTICS

Material	Cover : zinc alloy	Shocks (EN60068-2-27)	≤ 500 $m.s^{-2}$ (during 6 ms)
	Body : aluminium	Vibrations (EN60068-2-6)	≤ 100 $m.s^{-2}$ (10 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 61000-6-4, EN 61000-6-2
Bearings	6 807 serie	Isolation	100V (1 min)
Maximal loads	Axial : 50 N	Encoder weight (approx)	0,700 kg
	Radial : 80 N	Operating temperature	- 20... + 85 °C (encoder T°)
Shaft inertia	≤ 55.10^{-6} $kg.m^2$	Storage temperature	- 20... + 85 °C
Torque	≤ 25.10^{-3} N.m	Protection(EN 60529)	IP 65
Permissible max. speed	6 000 min^{-1}	Torque (ring screw)	nominal: 3N.m, break: 4N.m
Continuous max. speed	3 600 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shaft seal	Viton	25 N / 40 N : 140	50 N / 80 N : 17

PHU9

PRELIMINARY - SSI PROGRAMMABLE MULTITURN ABSOLUTE ENCODER, PHU9 RANGE CE

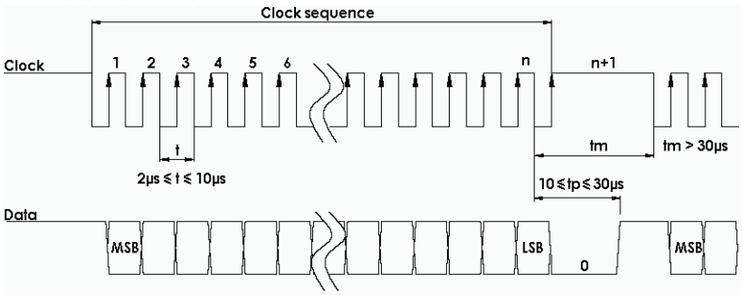
In order to optimize the installation times of SSI encoders, BEI IDEACOD has developed a friendly software, easy to use, with which it's possible to program your encoder under WINDOWS in only 2 minutes. With a simple connection to the serial connector of your PC, you can :
- configure : the number of points per revolution, the number of turns, the code type, SSI frame bit number, the parity, reset value
- read : type of selected encoder, the serial number of the encoder, the position of the encoder, the temperature, the speed of rotation, the level of the input/output
- save the chosen configuration, load saved configurations
- function of the outputs and limit value : position, speed of rotation, temperature, incremental channels 2048 ppr

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupleur
Output signal DATA	line - driver RS422
Clock frequency CLK	100kHz – 500kHz
Precision	± ½ LSB (13 bits)

Power supply	5 – 30Vdc
Introduction	< 1 s
Cons. without load	< 100mA (typically 60-70mA at 24Vdc)
Position refresh	< 200µs

SSI TRANSMISSION



Transmission	Transmission up to 400m* at 100kHz in function of the cable characteristics
Cable	High security of transmission by using shielded cable and twisted pairs

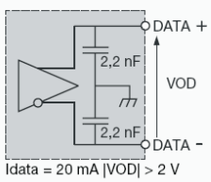
* consult us for length > 100m

SSI CONNECTION

Type	Vcc	Gnd	Clk+	Data+	RAZ	Data-	Clk-	DIR.	OUT1	OUT2	TXD Encoder RXD RS232	RXD Encodeur TXD RS232
P6	1	2	3	4	5	6	7	9	10	11	8	12

The pinouts TXD and RXD entries used for the encoder programming
Connect the entry DIRECTION and RAZ to a potential (RAZ to the 0V if not used)

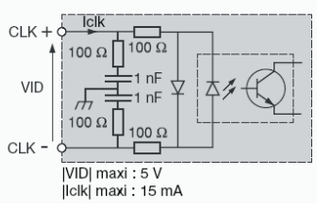
Data output RS422



Protection against short circuits

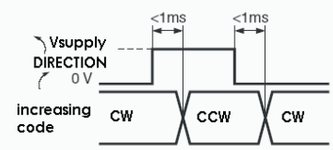
Isolated Clk input

Power supply: 5 to 30 V
Max ond. : 500mV for 11 to 30Vdc power supply
Protection against inversion of polarity
Cons. without load: 100mA max.



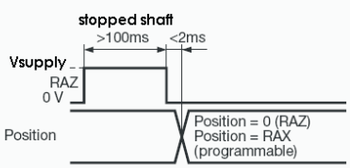
|VID| maxi : 5 V
|Iclk| maxi : 15 mA

DIRECTION input



	min	max	increasing
Level "0"	0V	0,3xVsupply	CW
Level "1"	0,7xVsupply	Vsupply	CCW
I direction	< 5mA		

RAZ / RAX input



	min	max
Level "0"	0 V	0,3xVsupply
Level "1"	0,7xVsupply	Vsupply
I RAZ/RAX	< 5mA	

Output : - Max current: 20m A
- Level "0" max : 0.5V, Level "1" min : Vsupply-2,5V
- Limit switch time answer : < 400µs
- Incremental channels : 100kHz max

Programmation cable : PC RS232
- Supply : 230Vac / 12Vdc
- Cable SubD9 (serial PC) / M23 12 pins (encoder)

Reference : PRO-020S001

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

	Shaft Ø	Supply	Output stage	Code	Resolution			Connection	Orientation
					13 B12 D5				
					Resolution	Nb of turn	Nb data		
PHU9_	**30**:30mm reduction hubs available	**P** : 5 to 30Vdc	**PX** : SSI programmable Nota : without parity by default	**G** : Gray default	**13:** 13 bits default	**B12:** 12 bits default	**D5:** 25 bits default	**P6:** M23 12pins CW for SSI transmission	**R** : radial
PHU9_	**30 //**	**P**	**PX**	**G //**	**13**	**B12**	**D5 //**	**P6**	**R**

SOFTWARE / CONFIGURATION MANUAL: consult us

Made in FRANCE

BEI IDEACOD

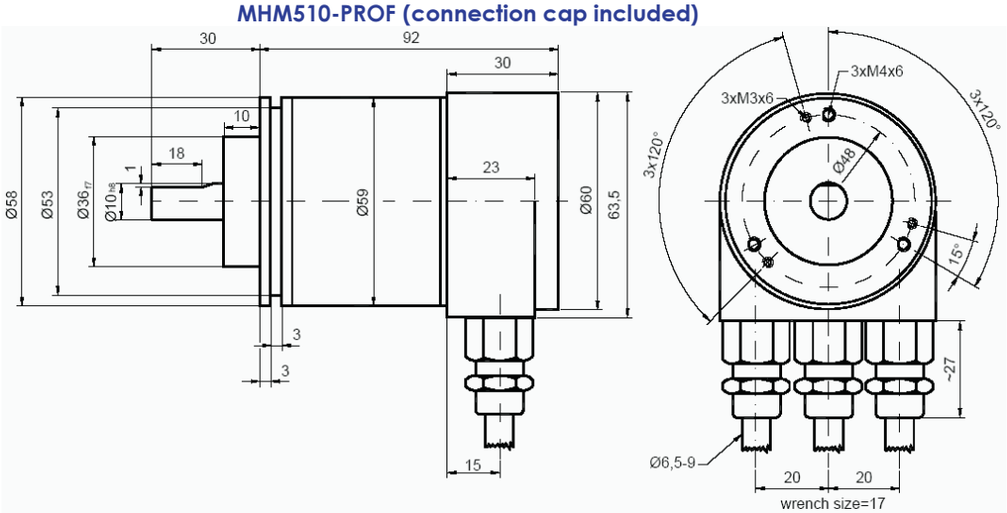
www.bei-ideacod.com

MHM5

PROFIBUS ABSOLUTE MULTI-TURN ENCODER, MHM510-PROF RANGE

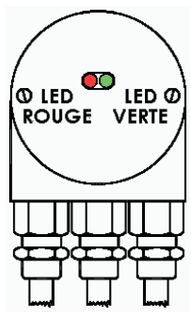
- MHM10-PROF, standard encoder Ø58mm with Profibus interface:
- Robust and compact conception
- Solid shaft version Ø 10 mm (06 mm available upon request)
- Precision ball bearings with sealing flange
- High temperatures performances –40°C … +85°C
- Code disc made of unbreakable and durable plastic
- Mechanical memorisation of the number of turns by gears
- Resolution : 13 bits = 8192 steps/turn (max 16 bits)
- Number of turns : 12 bits = 4096 turns (max 14 bits)
- Polarity inversion and short circuit protection
- Highly integrated circuit in SMD-technology

MHM510-PROF (connection cap included)



Red LED	Green LED	Status / possible cause
Dark	Dark	No power supply
Bright	Bright	Encoder is ready for operation but it has not received any configuration data after power on. Possible causes: address setting incorrect, Bus lines not connected correctly
Bright	Flashing	Parameter or configuration error. The encoder receives configuration or parameter da incorrect length or inconsistent data Possible cause: parameter value "total measuring range" too high
Flashing	Bright	The encoder is ready for operation but not addressed by the master (e.g. incorrect address in configuration).
Bright	Dark	Encoder has not received any data for a longer period (about 40 sec.) Possible cause: bus line has been interrupted
Dark	Bright	Normal operation in data exchange mode
Dark	Flashing	Commissioning mode

Led status at the front of the connection cap



MECHANICAL DATA

Material	Cover : aluminum
	Body : aluminum
	Shaft: stainless steel
Max. shaft loading	Axial : 40 N
	Radial : 110 N
Shaft Inertia	≤ 30 g.cm²
Torque	≤ 3 N.cm
RPM (continuous operation))	6 000 rpm
Shock (EN 60068-2-27))	≤ 100 g (halfsinus, 6 ms)
Shock (EN 60028-2-29)	≤ 10 g (half-sinus, 16ms)

Vibrations (EN 60068-2-6)	≤ 10 g (10Hz… 1 000Hz)
Weight	600 g
Operating temperature	- 40 … + 85°C
Storage temperature	- 40 ... + 85°C
Humidity	98 % sans condensation
Protection class (EN 60529)	IP65: cover
	IP64: shaft

Lifetime in 10^8 revolutions with F_a / F_r (axial/radial)		
40 N / 60 N	40 N / 80 N	40 N / 110 N
25	10	4

PROFIBUS ABSOLUTE MULTI-TURN ENCODER, MHM510-PROF RANGE

ELECTRICAL DATA

Interface	ISO 11898
Transmission rate	Max 1 MBauds
Device addressing	by rotary switches
Power supply	10 – 30Vdc
Current consumption	max 100mA (24Vdc)

Power consumption	max 2,5W
Step Frequency LSB	800 kHz
Accuracy	+ ½ LSB
EMC	EN 61000-6-4 EN 61000-6-2
Electrical lifetime	> 10^5 h

PROGRAMMABLE PARAMETERS

The Profibus-DP interface supports CLASS 1 and CLASS 2 functionality according to the encoder profile . In addition to these functions the GSD-file supports further features, for example software limit switches. Further more, the following encoder parameters can be programmed directly via the Profibus-DP network without any extra device

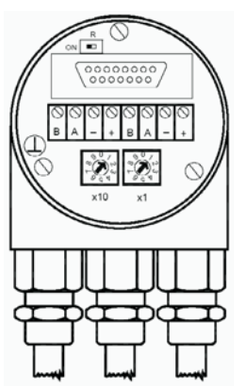
Counting Direction	This parameter counting direction defines whether the output code increases or decreases when the shaft rotates clockwise.
Resolution (positions per turns)	The parameter 'resolution per revolution' is used to program the desired number of steps per revolution. Each value between 1 and the physical resolution per revolution can be programmed
Total Resolution "Max-RANGE"	This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total physical resolution of the absolute rotary encoder
Reset (RAX)	The preset value is the desired position value, which should be reached at a certain physical position of the axis. The position value is set to the desired process value by the parameter preset
Velocity	The implemented software can additionally deliver the current velocity. This value is transmitted in binary code, 16 Bit, in addition to the process value It is possible to choose between four different units: steps per 10 ms, per 100 ms, per 1000 ms and revolutions per minute
Software limit switches function	Two software limit switches can be set. If the position value falls below the lower or exceeds the higher limit switch, a status bit in the process value is set
Teach-in (Online parameterization)	A special mode is available for commissioning phase of the device. This makes it possible to change parameters while the encoder is in data exchange mode

INTERFACE

The rotary encoder is connected by two or three cables, depending on whether the power supply is integrated into the bus cable or connected separately. If the power supply is integrated into the bus cable one of the cable glands can be fitted with a plug. The cable glands are suitable for cable diameters from 6.5 up to 9 mm

The Profibus-DP device address is set by user-friendly rotary switches in the connection cap. Allowed addresses are between 1 and 99, each can only be used once. The connection cap can easily be opened for installation by removing the two cap screws

Termination resistors are integrated in the connection cap. These must be switched on if the encoder is connected at the end or the beginning of the bus



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

MHM5	DP	B1	B	12	13	C	10	0	0CC
Absolute multi turn encoder	Profibus	Version	Code : Binary	Number of turns 2^{12} (4 096)	Resolution (pos./turn) 2^{13} (8 192)	Clamp Flange	Shat diameter : 10mm	Without mechanical option	Connection Cap

Ordering code : MHM510-PROF-001 = MHM5 – DP B1 B – 12 13 - C10 0 - 0CC

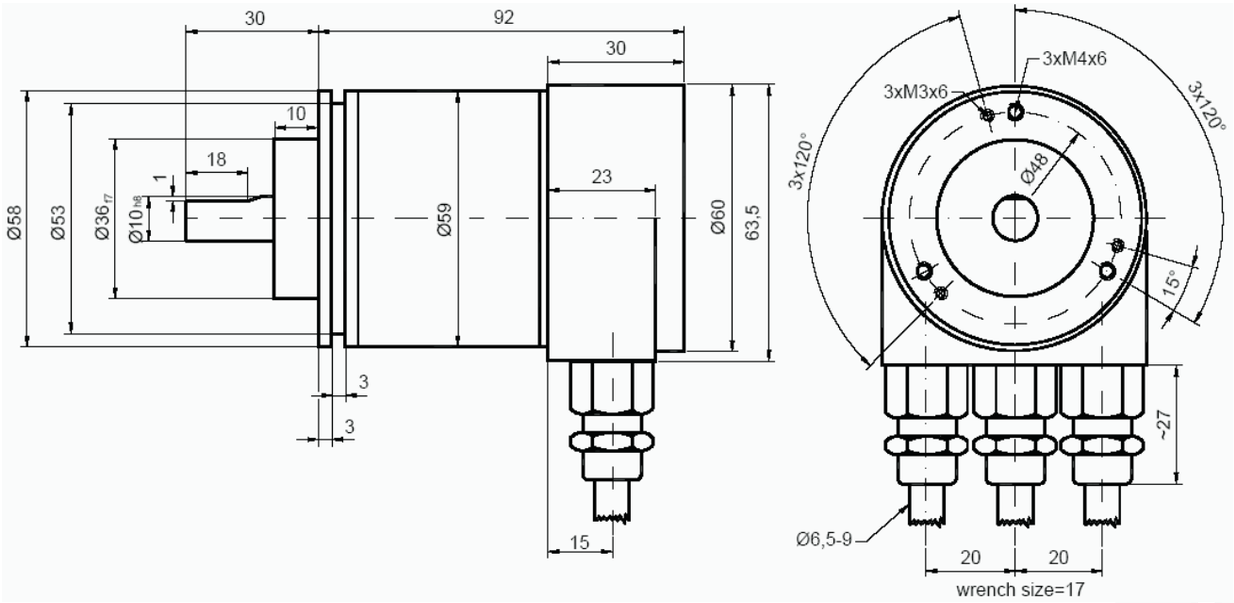
MHM5

CANOPEN ABSOLUTE MULTI-TURN ENCODER, MHM510-CANO RANGE

- MHM510-CANO, standard encoder Ø58mm with CANopen interface:
- Robust and compact design
- Solid shaft version Ø 10 mm (06 mm available upon request)
- Precision ball bearings with sealing flange
- High temperatures performances –40°C … +85°C
- Code disc made of unbreakable and durable plastic
- Mechanical memorisation of the number of turns by gears
- Resolution : 13 bits = 8192 steps/turn (max 16 bits)
- Number of turns : 12 bits = 4096 turns (max 14 bits)
- Polarity inversion and short circuit protection
- Highly integrated circuit in SMD-technology

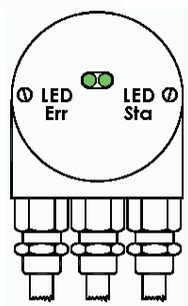
CANopen

MHM510-CANO (connection cap included)



Status indication with two LED's in the connection cap

Err - Green LED	*Sta - Green LED*	*Meaning*
off	off	No power supply
off	on	Encoder is ready, Boot Up message not sent (no further device on network, wrong baud rate) or encoder in prepared status
flashing	on	Boot Up message sent, device configuration is possible
on	on	Normal operation mode, Encoder in Operational Status



MECHANICAL DATA

Material Stainless steel option	Cover : aluminum
	Body : aluminum
	Shaft: stainless steel
Max. shaft loading	Axial : 40 N
	Radial : 110 N
Shaft Inertia	≤ 30 g.cm²
Torque	≤ 3 N.cm
RPM (continuous operation))	6 000 rpm
Shock (EN 60068-2-27))	≤ 100 g (halfsinus, 6 ms)
Shock (EN 60028-2-29)	≤ 10 g (half-sinus, 16ms)

Vibrations (EN 60068-2-6)	≤ 10 g (10Hz… 1 000Hz)
Weight	600 g
Operating temperature	- 40 … + 85°C
Storage temperature	- 40 ... + 85°C
Humidity	98 % without condensation
Protection class (EN 60529)	IP 65: body
	IP 64: shaft

Lifetime in 10^8 revolutions with F_a / F_r (axial / radial)		
40 N / 60 N	40 N / 80 N	40 N / 110 N
25	10	4

CANOPEN ABSOLUTE MULTI-TURN ENCODER, MHM510-CANO RANGE

CE

ELECTRICAL DATA

Interface	ISO 11898
Transmission rate	Max 1 MBauds
Device addressing	by rotary switches
Power supply	10 – 30Vdc
Current consumption	max 100mA (24Vdc)

Power consumption	max 2,5W
Step Frequency LSB	800 kHz
Accuracy	+ ½ LSB
EMC	EN 61000-6-4 EN 61000-6-2
Electrical lifetime	> 10^5 h

TRANSMISSION MODES

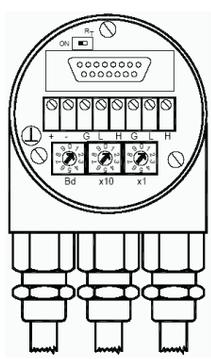
POLLED Mode	By a remote-transmission-request telegram the connected host calls for the current process value. The absolute rotary encoder reads the current position value, calculates eventually set-parameters and sends back the obtained process value by the same identifier
CYCLIC Mode	The absolute rotary encoder transmits cyclically - without being called by the host - the current process value. The cycle time can be programmed in milliseconds for values between 1 ms and 65536 ms
SYNC Mode	After receiving a sync telegram by the host, the absolute rotary encoder answers with the current process value. If more than one node number (encoder) shall answer after receiving a sync telegram, the answer telegrams of the nodes will be received by the host in order of their node numbers. The programming of an offset-time is not necessary. If a node should not answer after each sync telegram on the CAN network, the parameter sync counter can be programmed to skip a certain number of sync telegrams before answering again

PROGRAMMABLE PARAMETERS

Operating Parameters	This parameter determines the counting direction, in which the output code increases or decreases. As an important operating parameter the code sequence (complement) can be programmed
Resolution per turn	Value between 1 and 8192 can be programmed
Total resolution ''Max range''	This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total resolution of the absolute rotary encoder.
Preset Value	The preset value is the desired position value, which should be reached at a certain physical position of the axis
Limit Switch, Min. and Max	Two position values can be programmed as limit switches. By reaching these values one bit of the 32 bit process value is set to high level
Cam	One free programmable cam can be set in the total measuring range

INSTALLATION

The rotary encoder is connected by two or three cables depending on whether the power supply is integrated into the bus cable or connected separately. If the power supply is integrated into the bus cable, one of the cable glands can be fitted
with a plug. The cable glands are suitable for cable diameters from 5.5 up to 9 mm



CONFIGURATION

The setting of the node number is achieved by 2 turn-switches in the connection cap. Possible addresses lie between 0 and 89 whereby every address can only be used once. Inside the encoder the defined address is increased by one. The connection cap can easily be opened for installation by removing the two cap screws
A termination resistor is integrated in the connection cap. The resistor must be switched on if the encoder is connected at the end or at the beginning of the bus

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

MHM5	C2	B1	B	12	13	C	10	0	0CC
Absolute multi turn encoder	CANopen	Version	Code : Binary	Number of turns 2^{12} (4 096)	Resolution : 2^{13} (8 192)	Clamp flange	Shaft diameter : 10mm	Without mechanical option	Connection Cap

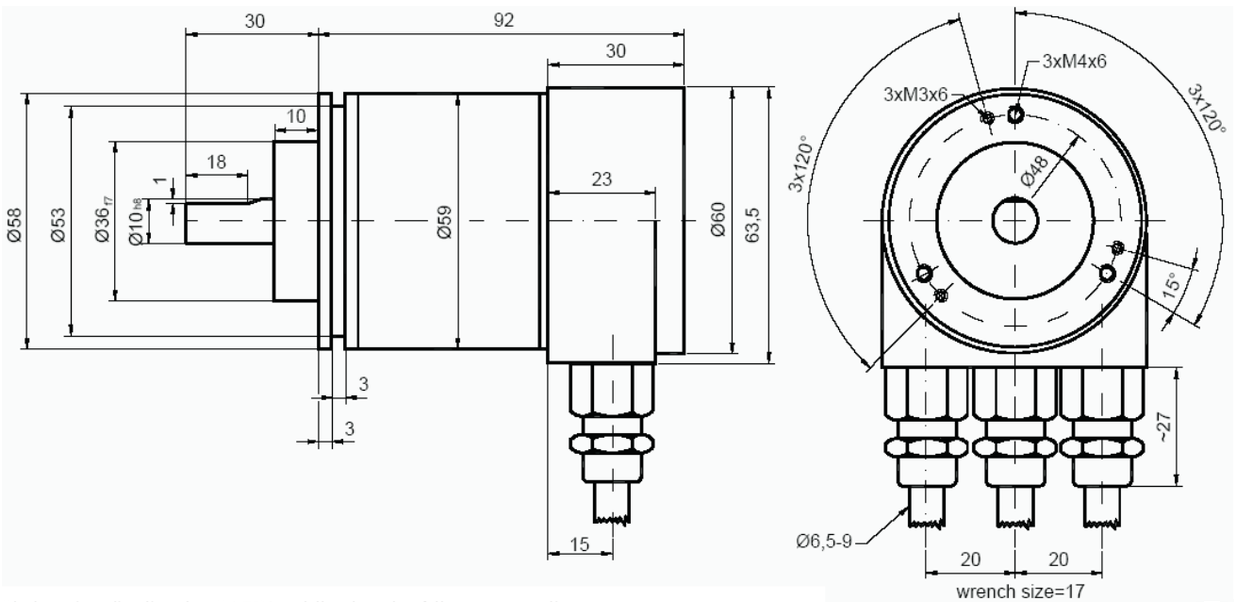
Ordering code: MHM510-CANO-001 = MHM5 - C2 B1 B – 12 13 - C10 0 - 0CC

MHM5

DEVICE NET ABSOLUTE MULTI-TURN ENCODER, MHM510-DNET RANGE

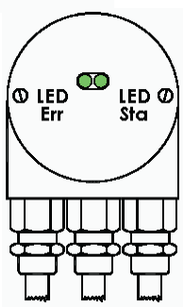
- MHM510-DEVICE NET, standard encoder Ø58mm with DeviceNet interface:
- Robust and compact design
- Solid shaft version Ø 10 mm (06 mm available upon request)
- Precision ball bearings with sealing flange
- High temperatures performances –40°C … +85°C
- Code disc made of unbreakable and durable plastic
- Mechanical memorisation of the number of turns by gears
- Resolution : 13 bits = 8192 steps/turn (max 16 bits)
- Number of turns : 12 bits = 4096 turns (max 14 bits)
- Polarity inversion and short circuit protection
- Highly integrated circuit in SMD-technology

MHM510-DNET (connection cap included)



Status visualization by 2 LED's at the back of the connection cap

Err - Green LED	*Sta - Green LED*	*Meaning*
off	off	No power supply
off	on	Encoder is ready, Boot Up message not sent (no further device on network, wrong baud rate) or encoder in prepared status
flashing	on	Boot Up message sent, device configuration is possible
on	on	Normal operation mode, Encoder in Operational Status



MECHANICAL DATA

Material	Cover : aluminum
	Body : aluminum
	Shaft: stainless steel
Max. shaft loading	Axial : 40 N
	Radial : 110 N
Shaft Inertia	≤ 30 g.cm²
Torque	≤ 3 N.cm
RPM (continuous operation))	6 000 tr/min
Shock (EN 60068-2-27))	≤ 100 g (halfsinus, 6 ms)
Shock (EN 60028-2-29)	≤ 10 g (half-sinus, 16ms)

Vibrations (EN 60068-2-6)	≤ 10 g (10Hz… 1 000Hz)
Weight	600 g
Operating temperature	- 40 … + 85°C
Storage temperature	- 40 ... + 85°C
Humidity	98 % without condensation
Protection class (EN 60529)	IP65: cover
	IP64: flange

Lifetime in 10^8 revolutions with F_a / F_r (axial / radial)		
40 N / 60 N	40 N / 80 N	40 N / 110 N
25	10	4

DEVICE NET ABSOLUTE MULTI-TURN ENCODER, MHM510-DNET RANGE

CE

ELECTRICAL DATA

Interface	Transceiver according ISO/DIS 11898
Transmission rate	Max 500KBauds
Device addressing	By rotary switches
Power Supply	10 – 30Vdc
Current consumption	max. 100mA (24Vdc)

Power consumption	max 2,5W
Step frequency LSB	800 kHz
Accuracy of division	+ ½ LSB
EMC	EN 61000-6-4 EN 61000-6-2
Electrical lifetime	> 10^5 h

TRANSMISSION MODE

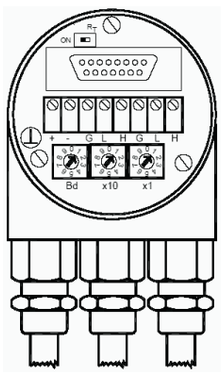
Polled Mode	By a telegram the connected host calls for the current process value. The absolute rotary encoder reads the current position value, calculates eventually set-parameters and sends back the obtained process value by the same identifier
Change of State	The absolute rotary encoder transmits the actual process value. The process value is transmitted when the position changes. This is useful to reduce the bus activity
CYCLIC Mode	The absolute rotary encoder transmits the actual process value event controlled by an internal timer. This is also useful to reduce the bus activity

PROGRAMMABLES PARAMETRES

Operating Parameters	As operating parameters the code sequence (complement) can be programmed. This parameter determines the counting direction, in which the output code increases or decreases
Resolution (pos./turn)	The parameter resolution per revolution is used to program the desired number of steps per revolution. Value between 1 and 8 192 can be programmed
Total Resolution "Max-RANGE"	This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total resolution of the absolute rotary encoder. If the encoder is used in a continuous measuring application, certain rules for the setting of this parameter must be followed. These rules are outlined in the manual
Preset Value	The preset value is the desired position value, which should be reached at a certain physical position of the axis. The position value is set to the desired process value by the parameter pre-set

INSTALLATION

The rotary encoder is connected by three cables. The power supply is achieved with a two-wire connection cable through one PG 9. Each one of the twisted-pair and shielded bus lines are guided in and out through two PG 9 on the right side (as seen on clamps)



CONFIGURATION

The setting of the node number is achieved by 2 turn-switches in the connection cap. Possible addresses lie between 0 and 63 whereby every address can only be used once. 2 LEDs on the backside of the connection cap show the operating status of the encoder

There is a resistor provided in the connection cap, which must be used as a line termination on the last device

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

MHM5	D2	B1	B	12	13	C	10	0	0CC
Absolute multi turn encoder	DEVICE NET	Version	Code : Binary	Number of turns 2^{12} (4 096)	Resolution : 2^{13} (8 192)	Clamp flange	Shaft diameter : 10mm	Without mechanical option	Connection Cap

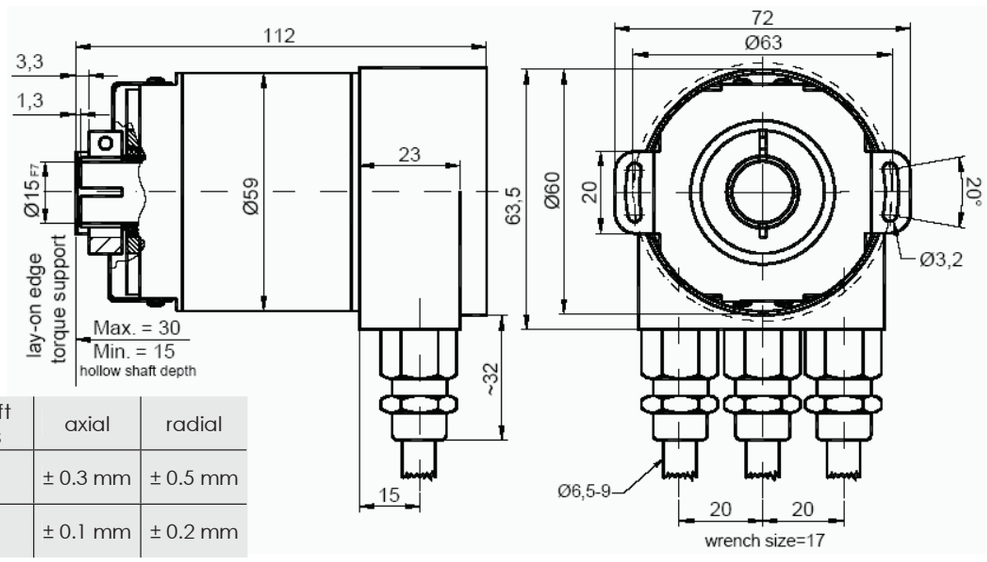
Ordering code: MHM510-DNET-001 = MHM5 - D2 B1 B – 12 13 - C10 0 - 0CC

MHK5

PROFIBUS ABSOLUTE MULTI-TURN ENCODER, MHK515-PROF RANGE

- MHK15-PROF, standard encoder Ø58mm with Profibus interface:
- Robust and compact conception
- Solid shaft version Ø 10 mm (06 mm available upon request)
- Precision ball bearings with sealing joint
- High temperatures performances –40°C … +85°C
- Code disc made of unbreakable and durable plastic
- Mechanical memorization of the number of turns by gears
- Resolution : 13 bits = 8192 steps/turn (max 16 bits)
- Number of turns : 12 bits = 4096 turns (max 14 bits)
- Polarity inversion and short circuit protection
- Highly integrated circuit in SMD-technology

MHK515-PROF (connection cap included)

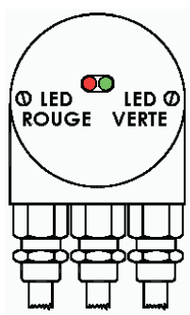


Allowed shaft movements	axial	radial
static	± 0.3 mm	± 0.5 mm
dynamic	± 0.1 mm	± 0.2 mm

Shaft diameter can be reduced at 12mm, 10mm or 8mm by reduction ring (by inserting them into the hollow shaft)

Red LED	Green LED	Status / possible cause
Dark	Dark	No power supply
Bright	Bright	Encoder is ready for operation but it has not received any configuration data after power on. Possible causes: address setting incorrect, Bus lines not connected correctly
Bright	Flashing	Parameter or configuration error. The encoder receives configuration or parameter da incorrect length or inconsistent data Possible cause: parameter value "total measuring range" too high
Flashing	Bright	The encoder is ready for operation but not addressed by the master (e.g. incorrect address in configuration).
Bright	Dark	Encoder has not received any data for a longer period (about 40 sec.) Possible cause: bus line has been interrupted
Dark	Bright	Normal operation in data exchange mode
Dark	Flashing	Commissioning mode

Led status at the front of the connection cap



MECHANICAL DATA

Material (option stainless steel)	Cover : aluminum	Shocks (EN 60068-2-27)	≤ 100 g (half sine, 6 ms)
	Body : aluminium	Perm. shocks(EN 60028-2-29)	≤ 10 g (half sine, 16ms)
	Shaft: Stainless steel	Vibration (EN 60068-2-6)	≤ 10 g (10Hz… 1 000Hz)
Max. shaft loading	Axial : 40 N	Weight (Aluminium Version)	600 g
	Radial : 110 N	Operating temperature	- 40 … + 85°C
Shaft Inertia	≤ 30 g.cm²	Storage temperature	- 40 ... + 85°C
Torque	≤ 3 N.cm	Humidity	98 % without condensation
Speed (continuous)	6 000 RPM	Protection (EN 60529)	Cover: IP65, Shaft: IP64

PROFIBUS ABSOLUTE MULTI-TURN ENCODER, MHK515-PROF RANGE

ELECTRICAL DATA

Interface	ISO 11898
Transmission rate	Max 1 MBauds
Device addressing	by rotary switches
Power supply	10 – 30Vdc
Current consumption	max 100mA (24Vdc)

Power consumption	max 2,5W
Step Frequency LSB	800 kHz
Accuracy	+ ½ LSB
EMC	EN 61000-6-4 EN 61000-6-2
Electrical lifetime	> 10^5 h

PROGRAMMABLE PARAMETERS

The Profibus-DP interface supports CLASS 1 and CLASS 2 functionality according to the encoder profile . In addition to these functions the GSD-file supports further features, for example software limit switches. Further more, the following encoder parameters can be programmed directly via the Profibus-DP network without any extra device

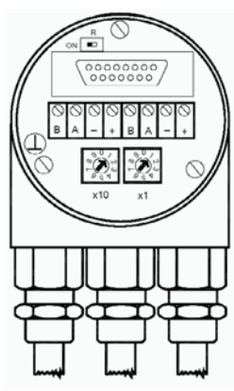
Counting Direction	This parameter counting direction defines whether the output code increases or decreases when the shaft rotates clockwise.
Resolution (positions per turns)	The parameter 'resolution per revolution' is used to program the desired number of steps per revolution. Each value between 1 and the physical resolution per revolution can be programmed
Total Resolution "Max-RANGE"	This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total physical resolution of the absolute rotary encoder
Reset (RAX)	The preset value is the desired position value, which should be reached at a certain physical position of the axis. The position value is set to the desired process value by the parameter preset
Velocity	The implemented software can additionally deliver the current velocity. This value is transmitted in binary code, 16 Bit, in addition to the process value It is possible to choose between four different units: steps per 10 ms, per 100 ms, per 1000 ms and revolutions per minute
Software limit switches function	Two software limit switches can be set. If the position value falls below the lower or exceeds the higher limit switch, a status bit in the process value is set
Teach-in (Online parameterization)	A special mode is available for commissioning phase of the device. This makes it possible to change parameters while the encoder is in data exchange mode

INTERFACE

The rotary encoder is connected by two or three cables, depending on whether the power supply is integrated into the bus cable or connected separately. If the power supply is integrated into the bus cable one of the cable glands can be fitted with a plug. The cable glands are suitable for cable diameters from 6.5 up to 9 mm

The Profibus-DP device address is set by user-friendly rotary switches in the connection cap. Allowed addresses are between 1 and 99, each can only be used once. The connection cap can easily be opened for installation by removing the two cap screws

Termination resistors are integrated in the connection cap. These must be switched on if the encoder is connected at the end or the beginning of the bus



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

MHK5	DP	B1	B	12	13	B	15	0	0CC
Absolute multi turn encoder	Profibus	Version	Code : Binary	Number of turns 2^{12} (4 096)	Resolution (pos./turn) 2^{13} (8 192)	Clamp Flange	Shat diameter : 15mm	Without mechanical option	Connection Cap

Ordering code : MHK515-PROF-001 = MHK5 - DP B1 B - 12 13 - B 15 0 - 0CC

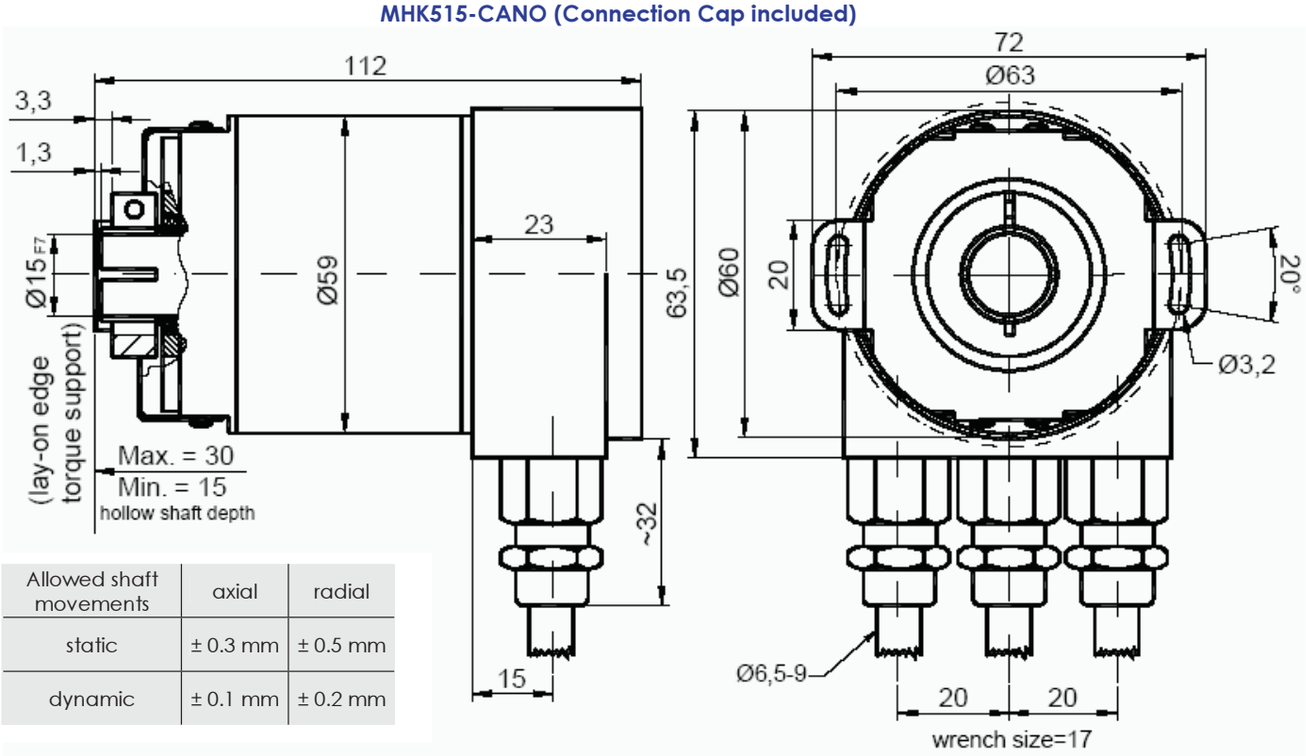
MHK5

CANOPEN ABSOLUTE MULTI-TURN ENCODER, MHK515-CANO RANGE

MHK515-CANO, standard encoder Ø58mm with CANopen interface:

- Robust and compact conception
- Blind shaft version Ø 15 mm (reduction hubs available)
- Precision ball bearings with sealing flange
- High temperatures performances –40°C … +85°C
- Code disc made of unbreakable and durable plastic
- Mechanical memorisation of the number of turns by gears
- Resolution : 13 bits=8192 steps/turn (max 16 bits)
- Number of turns : 12 bits=4096 turns (max 14 bits)
- Polarity inversion and short circuit protection
- Highly integrated circuit in SMD-technology

MHK515-CANO (Connection Cap included)

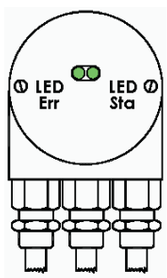


Allowed shaft movements	axial	radial
static	± 0.3 mm	± 0.5 mm
dynamic	± 0.1 mm	± 0.2 mm

Shaft diameter can be reduced to 12mm, 10mm or 8mm by reduction ring (by inserting them into the hollow shaft)

Status indication with two LED's in the connection cap

Err - Green LED	*Sta - Green LED*	*Meaning*
off	off	No power supply
off	on	Encoder is ready, Boot Up message not sent (no further device on network, wrong baud rate) or encoder in prepared status
flashing	on	Boot Up message sent, device configuration is possible
on	on	Normal operation mode, Encoder in Operational Status



MECHANICAL DATA

Material (Stainless steel option)	Cover : aluminum	Shock (EN 60068-2-27)	≤ 100 g (half sine, 6 ms)
	Body : aluminium	Shock (EN 60028-2-29)	≤ 10 g (half sine, 16ms)
	Shaft: Stainless steel	Vibration (EN 60068-2-6)	≤ 10 g (10Hz… 1 000Hz)
Max. shaft loading	Axial : 40 N	Weight (Aluminium Version)	600 g
	Radial : 110 N	Operating temperature	- 40 … + 85°C
Shaft Inertia	≤ 30 g.cm²	Storage temperature	- 40 ... + 85°C
Torque	≤ 3 N.cm	Humidity	98 % without condensation
Speed (continuous)	6 000 RPM	Protection (EN 60529)	Cover: IP65, Shaft: IP64

CANOPEN ABSOLUTE MULTI-TURN ENCODER, MHK515-CANO RANGE

CE

ELECTRICAL DATA

Interface	ISO 11898
Transmission rate	Max 1 MBauds
Device addressing	by rotary switches
Power supply	10 – 30Vdc
Current consumption	max 100mA (24Vdc)

Power consumption	max 2,5W
Step Frequency LSB	800 kHz
Accuracy	+ ½ LSB
EMC	EN 61000-6-4 EN 61000-6-2
Electrical lifetime	> 10^5 h

TRANSMISSION MODES

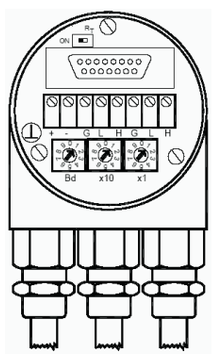
POLLED Mode	By a remote-transmission-request telegram the connected host calls for the current process value. The absolute rotary encoder reads the current position value, calculates eventually set-parameters and sends back the obtained process value by the same identifier
CYCLIC Mode	The absolute rotary encoder transmits cyclically - without being called by the host - the current process value. The cycle time can be programmed in milliseconds for values between 1 ms and 65536 ms
SYNC Mode	After receiving a sync telegram by the host, the absolute rotary encoder answers with the current process value. If more than one node number (encoder) shall answer after receiving a sync telegram, the answer telegrams of the nodes will be received by the host in order of their node numbers. The programming of an offset-time is not necessary. If a node should not answer after each sync telegram on the CAN network, the parameter sync counter can be programmed to skip a certain number of sync telegrams before answering again

PROGRAMMABLE PARAMETERS

Operating Parameters	This parameter determines the counting direction, in which the output code increases or decreases. As an important operating parameter the code sequence (complement) can be programmed
Resolution per turn	Value between 1 and 8192 can be programmed
Total resolution ''Max range''	This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total resolution of the absolute rotary encoder.
Preset Value	The preset value is the desired position value, which should be reached at a certain physical position of the axis
Limit Switch, Min. and Max	Two position values can be programmed as limit switches. By reaching these values one bit of the 32 bit process value is set to high level
Cam	One free programmable cam can be set in the total measuring range

INSTALLATION

The rotary encoder is connected by two or three cables depending on whether the power supply is integrated into the bus cable or connected separately. If the power supply is integrated into the bus cable, one of the cable glands can be fitted
with a plug. The cable glands are suitable for cable diameters from 5.5 up to 9 mm



CONFIGURATION

The setting of the node number is achieved by 2 turn-switches in the connection cap. Possible addresses lie between 0 and 89 whereby every address can only be used once. Inside the encoder the defined address is increased by one. The connection cap can easily be opened for installation by removing the two cap screws
A termination resistor is integrated in the connection cap. The resistor must be switched on if the encoder is connected at the end or at the beginning of the bus

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

MHK5	C2	B1	B	12	13	B	15	0	0CC
Absolute multi turn encoder	CAN Open	Version	Code : Binary	Number of turns 2^{12} (4 096)	Resolution (steps/turn) : 2^{13} (8 192)	Blind Shaft	Shaft diameter (reduction ring available upon request)	Without mechanical options	Connection Cap output

Ordering code : MHK515-CANO-001 = MHK5 - C2 B1 B- 12 13 - B 15 0 - 0CC

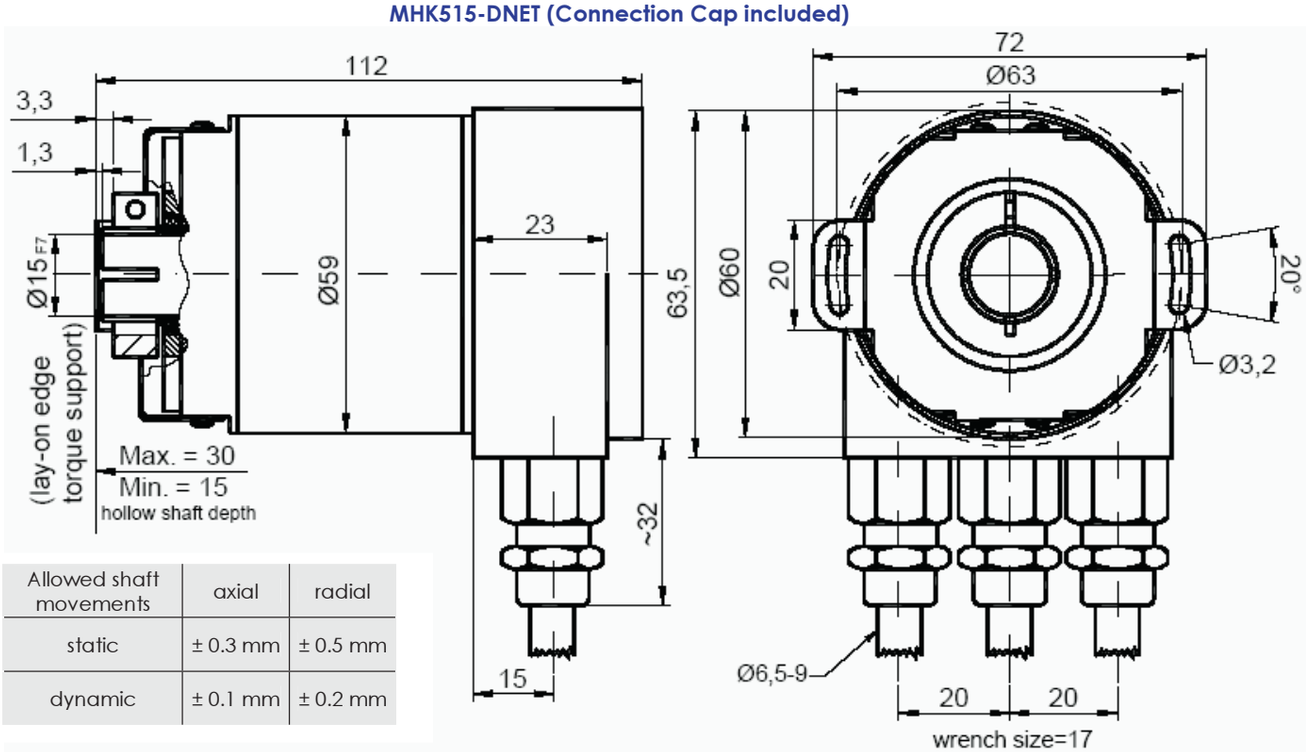
MHK5

DEVICE NET ABSOLUTE MULTI-TURN ENCODER, MHK515-DNET RANGE

MHK515-DNET, standard encoder Ø58mm with DeviceNet interface:

- Robust and compact conception
- Blind shaft version Ø 15 mm (reduction ring available)
- Precision ball bearings with sealing flange
- High temperatures performances –40°C … +85°C
- Code disc made of unbreakable and durable plastic
- Mechanical memorisation of the number of turns by gears
- Resolution : 13 bits=8192 steps/turn (max 16 bits)
- Number of turns : 12 bits=4096 turns (max 14 bits)
- Polarity inversion and short circuit protection
- Highly integrated circuit in SMD-technology

MHK515-DNET (Connection Cap included)

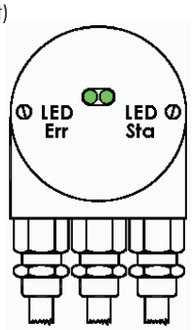


Allowed shaft movements	axial	radial
static	± 0.3 mm	± 0.5 mm
dynamic	± 0.1 mm	± 0.2 mm

Shaft diameter can be reduced at 12mm, 10mm or 8mm by reduction ring (by slipping them into the hollow shaft)

Status indication with two LED's in the connection cap

Err - Green LED	*Sta - Green LED*	*Meaning*
off	off	No power supply
off	on	Encoder is ready, Boot Up message not sent (no further device on network, wrong baud rate) or encoder in prepared status
flashing	on	Boot Up message sent, device configuration is possible
on	on	Normal operation mode, Encoder in Operational Status



MECHANICAL DATA

Material (option stainless steel)	Cover : aluminum	Shocks (EN 60068-2-27)	≤ 100 g (half sine, 6 ms)
	Body : aluminium	Perm. shocks(EN 60028-2-29)	≤ 10 g (half sine, 16ms)
	Shaft: Stainless steel	Vibration (EN 60068-2-6)	≤ 10 g (10Hz… 1 000Hz)
Max. shaft loading	Axial : 40 N	Weight (Aluminium Version)	600 g
	Radial : 110 N	Operating temperature	- 40 … + 85°C
Shaft Inertia	≤ 30 g.cm²	Storage temperature	- 40 ... + 85°C
Torque	≤ 3 N.cm	Humidity	98 % without condensation
Speed (continuous)	6 000 RPM	Protection (EN 60529)	Cover: IP65, Shaft: IP64

DEVICE NET ABSOLUTE MULTI-TURN ENCODER, MHK515-DNET RANGE

ELECTRICAL DATA

Interface	Transceiver according ISO/DIS 11898
Transmission rate	Max 500KBauds
Device addressing	By rotary switches
Power Supply	10 – 30Vdc
Current consumption	max. 100mA (24Vdc)

Power consumption	max 2,5W
Step frequency LSB	800 kHz
Accuracy of division	+ ½ LSB
EMC	EN 61000-6-4 EN 61000-6-2
Electrical lifetime	> 10^5 h

TRANSMISSION MODE

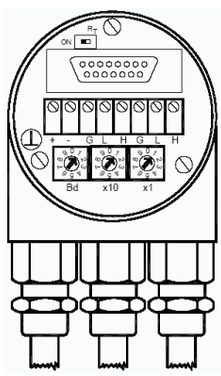
Polled Mode	By a telegram the connected host calls for the current process value. The absolute rotary encoder reads the current position value, calculates eventually set-parameters and sends back the obtained process value by the same identifier
Change of State	The absolute rotary encoder transmits the actual process value. The process value is transmitted when the position changes. This is useful to reduce the bus activity
CYCLIC Mode	The absolute rotary encoder transmits the actual process value event controlled by an internal timer. This is also useful to reduce the bus activity

PROGRAMMABLES PARAMETRES

Operating Parameters	As operating parameters the code sequence (complement) can be programmed. This parameter determines the counting direction, in which the output code increases or decreases
Resolution (pos./turn)	The parameter resolution per revolution is used to program the desired number of steps per revolution. Value between 1 and 8 192 can be programmed
Total Resolution "Max-RANGE"	This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total resolution of the absolute rotary encoder. If the encoder is used in a continuous measuring application, certain rules for the setting of this parameter must be followed. These rules are outlined in the manual
Preset Value	The preset value is the desired position value, which should be reached at a certain physical position of the axis. The position value is set to the desired process value by the parameter pre-set

INSTALLATION

The rotary encoder is connected by three cables. The power supply is achieved with a two-wire connection cable through one PG 9. Each one of the twisted-pair and shielded bus lines are guided in and out through two PG 9 on the right side (as seen on clamps)



CONFIGURATION

The setting of the node number is achieved by 2 turn-switches in the connection cap. Possible addresses lie between 0 and 63 whereby every address can only be used once. 2 LEDs on the backside of the connection cap show the operating status of the encoder

There is a resistor provided in the connection cap, which must be used as a line termination on the last device

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

MHK5	D2	B1	B	12	13	B	15	0	0CC
Absolute multi turn encoder	DEVICE NET	Version	Code : Binary	Number of turns 2^{12} (4 096)	Resolution (steps/turn) : 2^{13} (8 192)	Blind Shaft	Shaft diameter (reduction ring available upon request)	Without mechanical options	Connection Cap output

Ordering code: MHK515-DNET-001 = MHK5 - D2 B1 B – 12 13 - B15 0 - 0CC

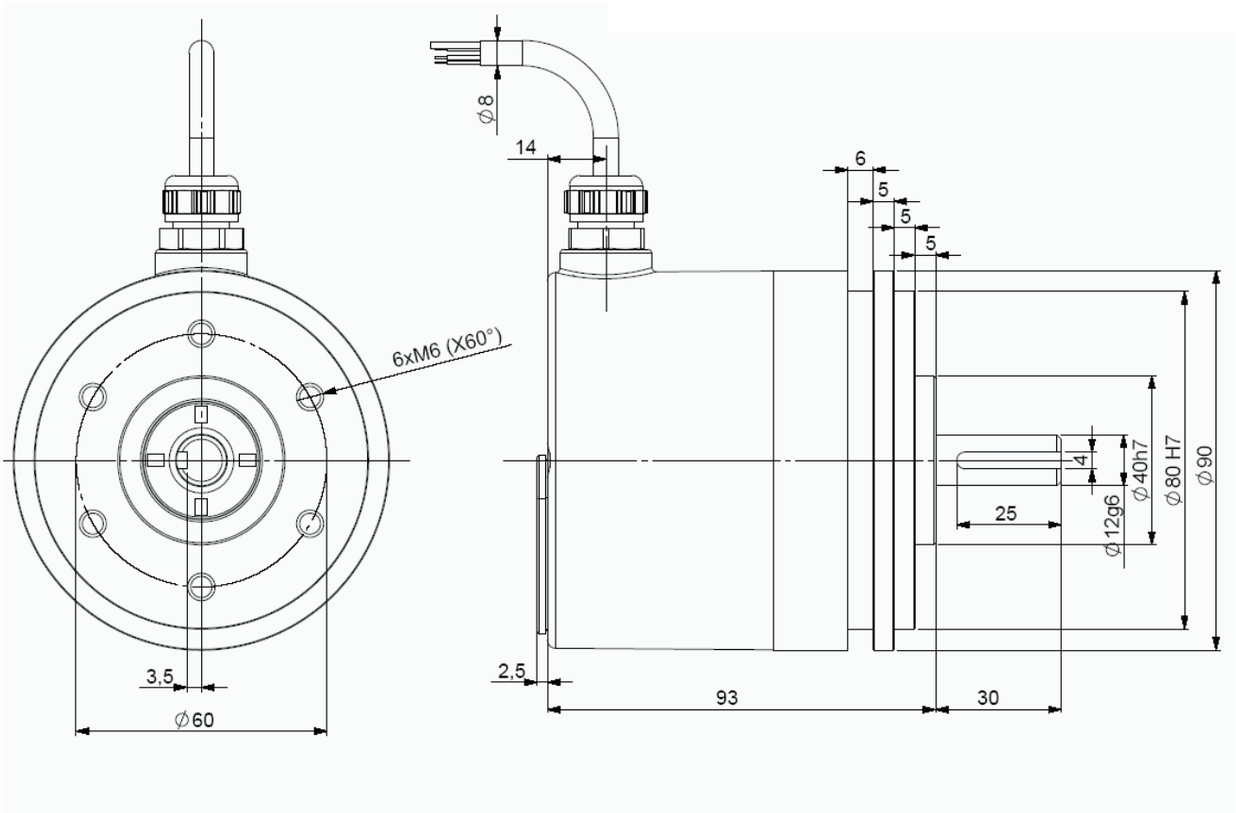
SHM9

PROFIBUS ABSOLUTE MULTITURN ENCODERS, SHM9 RANGE

Especially designed for Heavy Duty Industry (steel, paper, wood – mills, cranes…). Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads

Solid shaft output,IP67

Also available in SSI and fieldbus interfaces : CanOpen and DeviceNet



Material Stainless steel option	Cover : zinc alloy
	Body: aluminium
Shaft	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	6 000 min^{-1}
Continuous max speed	6 000 min^{-1}
Shaft seal	Viton
Shocks (EN60068-2-27)	≤ 300 $m.s^{-2}$ (during 6 ms)

Vibration (EN60068-2-6)	≤ 100 $m.s^{-2}$ (10 ... 500 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 V eff
Encoder weight (approx.)	1,100kg zinc cover, alu body
	2,400kg zinc cover, stainless steel body
	2,600kg stainless steel cover and body
Operating temperature	- 10... + 70 °C (encoder T°)
Storage temperature	- 10... + 70 °C
Protection(EN 60529)	IP 67 (cable)

Theoretical electrical lifetime 10^9 turns (F_{axial} / F_{radial})

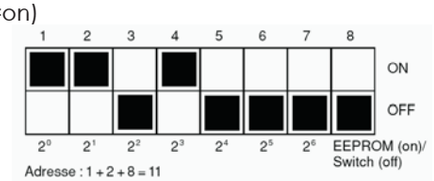
20 N / 30 N	50 N / 100 N	100 N / 200 N
360	18	2,2

PROFIBUS ABSOLUS MULTITOURS PROFIBUS, SHM9 RANGE

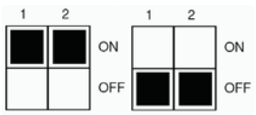
CE

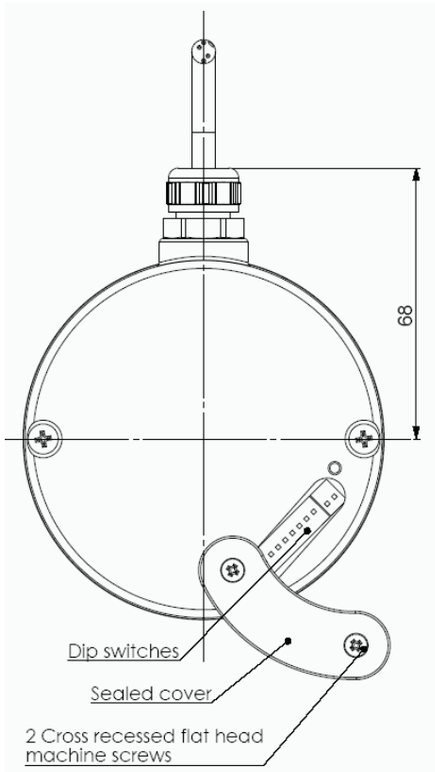
General

Transmission frequency: from 9.6Kbaud to 12Mbaud
Electronic interface: RS 485 opto-isolated
Address : permits the addressing of each encoder i(32 master stations or slaves stations per segment without repeater, 127 maximum with repeater)
The 8 switch permits to chose the addressing per deep switch (8=off) or per program(8=on)



Independence adaptation : is activated per the dip switch (1 and 2 = on) in the terminal box or on the encoder





Programmable parameters

Direction : Permits the definition of the counting direction of the encoder (CW or CCW) following its mechanical position
Resolution : the number or points per turn can be between 0 and 8192
Global resolution (MAX RANGE) : Total number of codes of the encoder (2 to 536 870 912)
Reset : defines the value of its actual position

PROFIBUS CONNECTION

B3 : cable + connector M23 12 pins				
A	B	Vcc	GNd	Reserved
2	4	7	8	1, 3, 5, 6, 9, 10, 11, 12

B4 : cable			
A	B	Vcc	Gnd
GN / green	YE / yellow	BR / brown	WH / white

Reserved: do not connect

Note : Refer to the bus standards for the maximal derivation length

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections…)

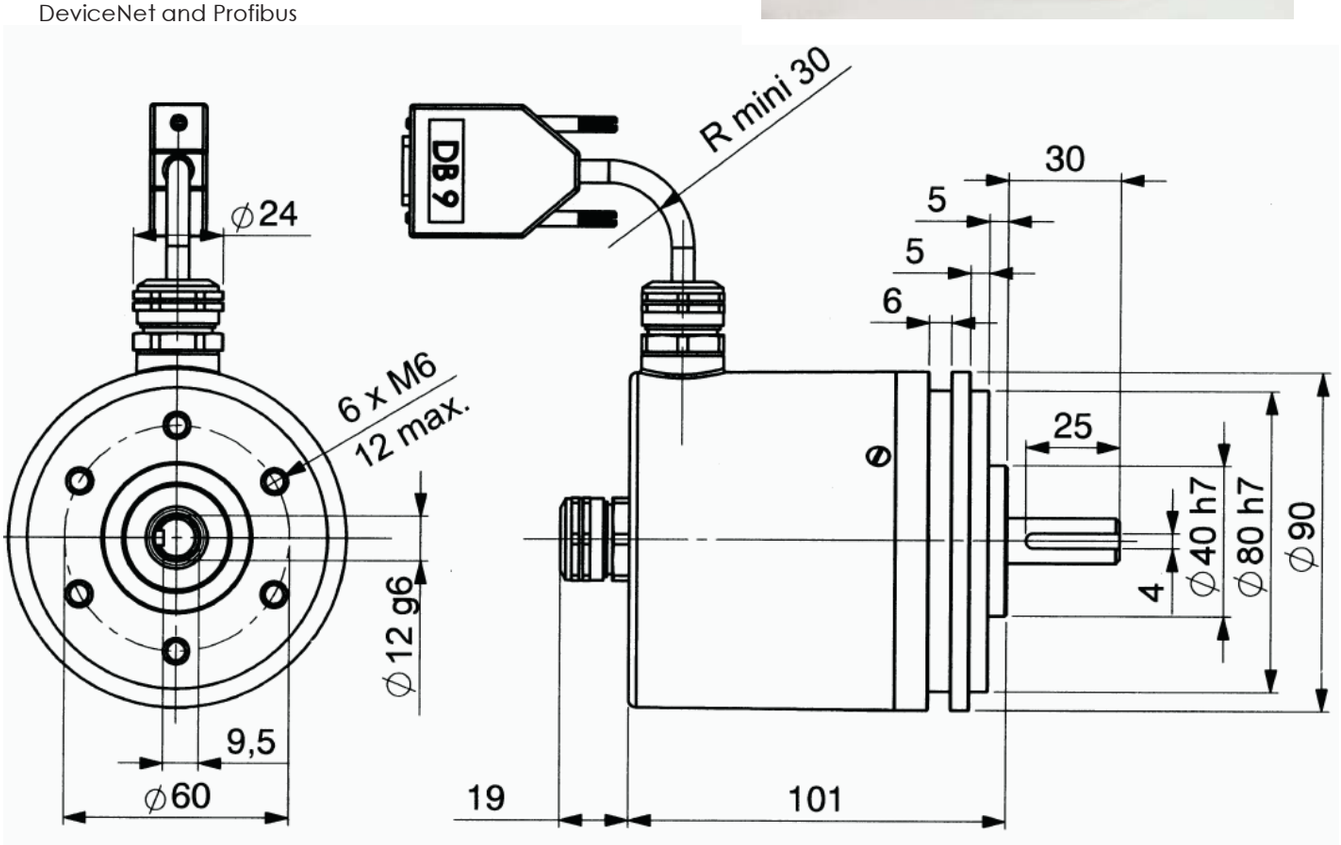
	Shaft Ø	Supply	Output stage	Code	Resolution	Number of turns	Connection	Connection orientation
SHM9 Zinc cover Alu body **SBM9** Zinc cover Stainless steel body **SXM9** Stainless steel cover & body	**11**:11mms **12**:12mms	**5** : 11 to 30Vdc	**BG :** Profibus	**B:** Binary	**13 :** 8192 points per turn (2^{13})	**B16** : 65 536 turns (2^{16})	**B3 :** Cable gland + cable + M23 12 pins **B4 :** Cable gland + 4 wires cable	Example : **R010** : radial cable 1m
SHM9 _	**12** //	**5**	**BG**	**B** //	**13**	**B16** //	**B4**	**R010**

SHM9

CANOPEN ABSOLUTE MULTITURN ENCODERS, SHM9 RANGE

Especially designed for Heavy Duty Industry (steel, paper, wood – mills, cranes...). Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads
They conform to the ISO 11 898 and meet the specifications of the DS201 to 207 v1.1, DS301 v3.0, DS Proposal 406 v1.0 and the CAN2.A (CiA)

Also available in parallel, SSI and fieldbus interfaces : DeviceNet and Profibus



CHARACTERISTICS

Material Stainless steel option	Cover : zinc alloy
	Body: aluminium
Shaft	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	6 000 min^{-1}
Continuous max speed	6 000 min^{-1}
Shaft seal	Viton
Shocs (EN60068-2-27)	≤ 300 $m.s^{-2}$ (during 6 ms)

Vibration (EN60068-2-6)	≤ 100 $m.s^{-2}$ (10 ... 500 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 V eff
Encoder weight (approx.)	1,100kg zinc cover, alu body
	2,400kg zinc cover, stainless steel body
	2,600kg stainless steel cover and body
Operating temperature	- 10... + 70 °C (encoder T°)
Storage temperature	- 10... + 70 °C
Protection(EN 60529)	IP 67 (cable)

Theoretical electrical lifetime 10^9 turns (F_{axial} / F_{radial})

20 N / 30 N	50 N / 100 N	100 N / 200 N
360	18	2,2

CANOPEN ABSOLUTE MULTITURN ENCODERS, SHM9 RANGE

CE

CANopen

Programmable parameters

Resolution: defines the resolution per revolution (0 to 8 192)
Global resolution (MAX RANGE) : total amount of codes for the encoder (2 to 536 870 911)
Transmission speed: programmable from 10kBaud (1000m) to 1 Mbaud (40 m) ; value per default: 20 Kbaud
Address: defines the software address of the encoder on the bus (1 to 127, value by default: id = 1)
Direction : defines the direction of count of the encoder
2 programmable markers a high marker and a low marker
Reset : defines the value of its preset position (non turning shaft)

Communication modes

3 modes are available to interrogate the encoder :
POLLING mode: the encoder transmits the position on the demand of the master. This mode permits the programming and the interrogation of the parameters of the encoder as well as its position
CYCLIC mode: the encoder transmits its position in an asynchronous manner. The frequency of the transmission is defined by the programmable cyclic timer register from 0 to 65 535 ms
SYNCHRO mode: the encoder transmits its position on a synchronous demand by the master

CANOPEN CONNECTION

1	2	3	4	5	6	7	8	9
DEFAUT	CAN LOW	CAN GND	N.C.	N.C.	0V	CAN HIGH	N.C.	11/30Vdc

DEFAULT : an impulse resets the encoder at the speed : 20kBaud, address=1, Clock-wise, Multiturn - 13bits resolution

Note : Refer to the bus standards for the maximal derivation length

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections…)

	Shaft Ø	Supply	Output stage	Code	Resolution	Number of turns	Connection	Connection orientation
SHM9 Zinc cover Alu body **SBM9** Zinc cover Stainless steel body **SXM9** Stainless steel cover & body	**11**:11mm **12**:12mm	**5** : 11 to 30Vdc	**BB** : CANopen	**B**: Binary	**13** : 8192 points per turn (2^{13})	**B16** : 65 536 turns (2^{16})	**BB:** PUR cable output + DB9	Example : **R010** : radial cable of 1m **A010** : axial cable of 1m
SHM9 _	**12** //	**5**	**BB**	**B** //	**13**	**B16** //	**BB**	**R010**

Made in FRANCE

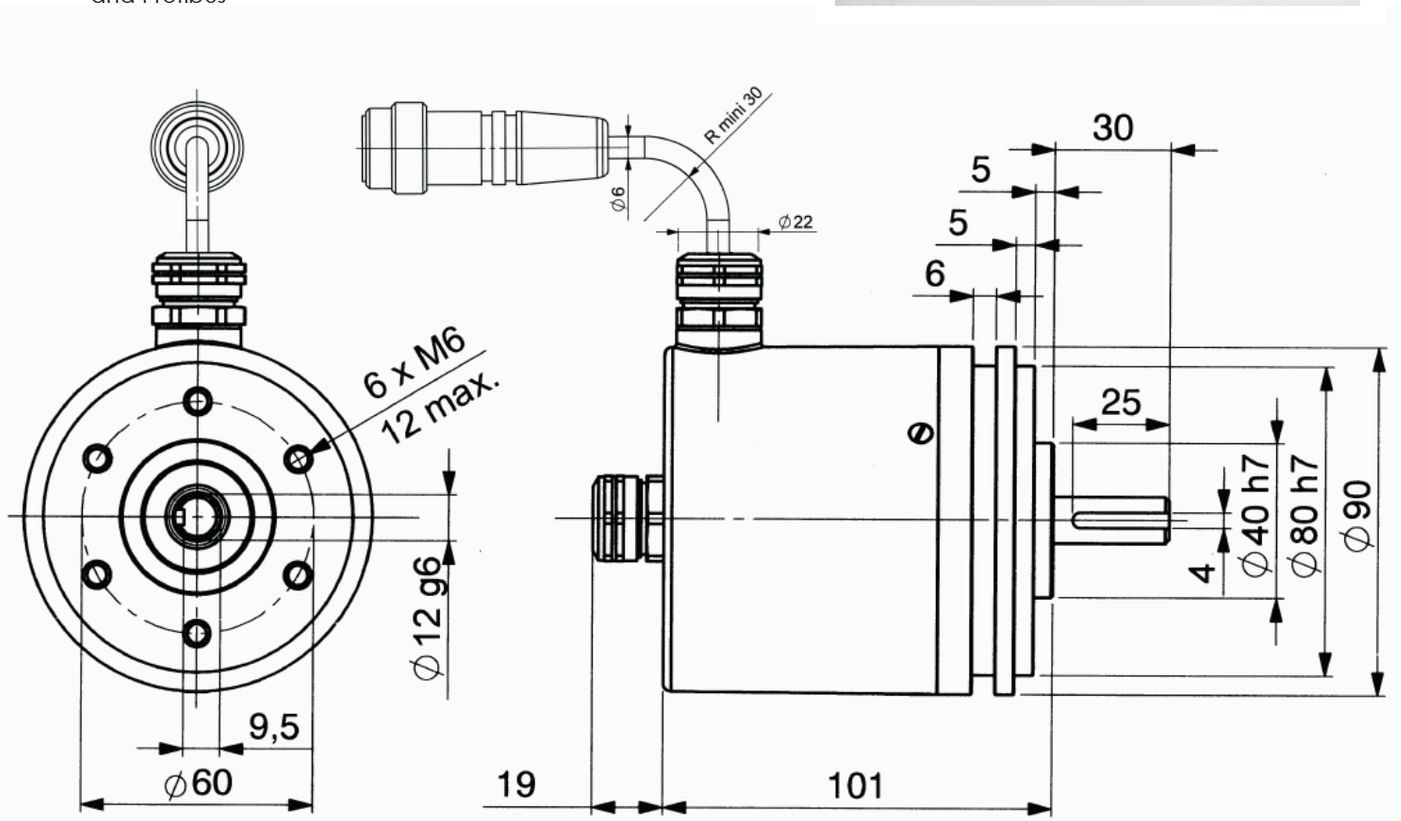
BEI IDEACOD
www.bei-ideacod.com

SHM9

DEVICENET ABSOLUTE MULTITURN ENCODERS, SHM9 RANGE

Especially designed for Heavy Duty Industry (steel, paper, wood – mills, cranes…). Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads
They conform to the ISO 11 898 and meet the V2.0 specifications of the ODVA

Also available in parallel, SSI and fieldbus interfaces : CanOpen and Profibus



CHARACTERISTICS

Material Stainless steel option	Cover : zinc alloy
	Body: aluminium
Shaft	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	6 000 min^{-1}
Continuous max speed	6 000 min^{-1}
Shaft seal	Viton
Shocs (EN60068-2-27)	≤ 300 $m.s^{-2}$ (during 6 ms)

Vibration (EN60068-2-6)	≤ 100 $m.s^{-2}$ (10 ... 500 Hz)	
EMC	EN 50081-1, EN 61000-6-2	
Isolation	1 000 V eff	
Encoder weight (approx.)	1,100kg zinc cover, alu body	
	2,400kg zinc cover, stainless steel body	
	2,600kg stainless steel cover and body	
Operating temperature	- 10... + 70 °C (encoder T°)	
Storage temperature	- 10... + 70 °C	
Protection (EN 60529)	IP 67 (cable)	
Theoretical electrical lifetime 10^9 turns (F_{axial} / F_{radial})		
20 N / 30 N	50 N / 100 N	100 N / 200 N
360	18	2,2

DEVICENET ABSOLUTE MULTITURN ENCODERS, SHM9 RANGE

CE

Programmable Parameters

Resolution could be 13, 10, 2 and 0 bits
Reset to a value (X) : puts the code of the present position to 0 (immobile shaft)
Transmission speed: configurable at 125 kBaud (default value), 250 kBaud, 500 kBaud
Address: defines the position of the encoder on the bus 1 to 63, default value: id = 63

The Communication Modes: The interrogation of the encoders could be done according to the following 4 modes :

CYCLIC Mode: the encoder transmits its position at the start of a programmed timer via the bus (with no answer). With an answer, the master must send an acknowledgement of the position of each frame
BIT STROBE Mode: A general request from the master (broadcast) makes it possible to interrogate max. 64 devices simultaneously
EXPLICIT Mode: This mode makes it possible to program and interrogate the parameters of the encoder, as well as its position
POLLING Mode: the encoder answers upon request of the master

The user manual and the ESD file are delivered with the encoder

CONNECTIQUE DEVICENET

1	2	3	4	5
DRAIN	24V	GND	CAN HIGH	CAN LOW

Note : Refer to the bus standards for the maximal derivation length

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections…)

	Shaft Ø	Supply	Output stage	Code	Resolution	Number of turns	Connection	Connection orientation
SHM9 Zinc cover Alu body **SBM9** Zinc cover Stainless steel body **SXM9** Stainless steel cover & body	**11** : 11mm **12** : 12mm	**5** : 11 to 30Vdc	**BA** : DeviceNet	**B**: Binary	**13** : 8192 points per turn (2^{13})	**B16** : 65 536 turns (2^{16})	**BA:** Cable gland + 1m cable + miniC 5 pins connector	Example : **R010** : radial cable de 1m
SHM9 _	**12** //	**5**	**BA**	**B** //	**13**	**B16** //	**BA**	**R010**

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SHU9

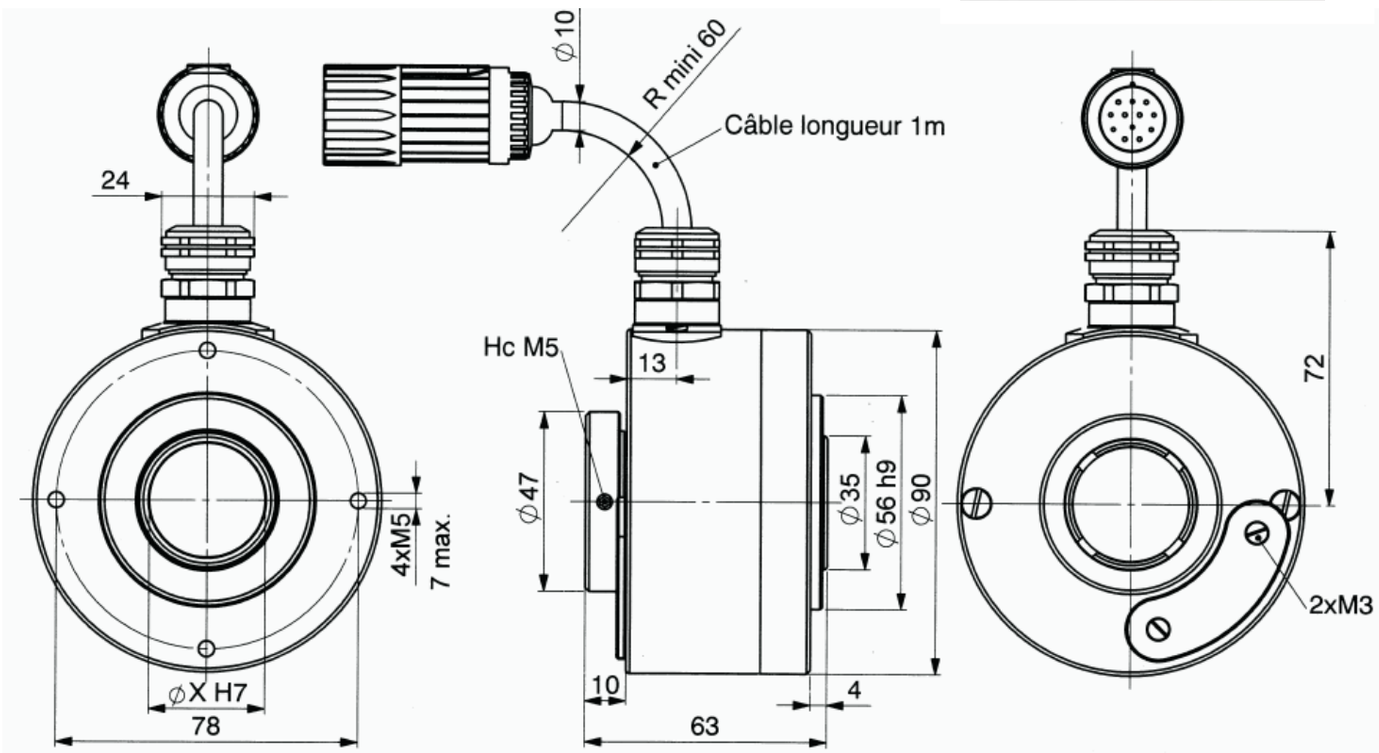
PROFIBUS ABSOLUTE MULTITURN ENCODERS, SHU9 RANGE

Especially designed for Heavy Duty Industry (steel, paper, wood – mills, cranes…). Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads

Adaptation with reduction hubs in aluminium or in PEEK composite

Possibility of double or triple mounting in associating incremental, absolute and tachometric functions

Also available in SSI and fieldbus interfaces : CanOpen and DeviceNet



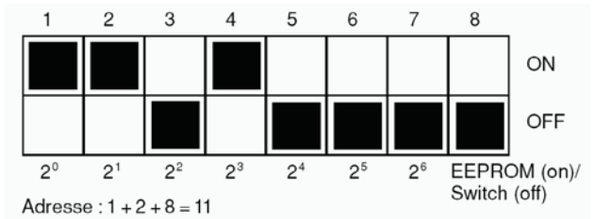
Material	Cover : zinc alloy
(Stainless steel option)	Body: aluminium
Shaft	Stainless steel
Bearings	6807 serie
Maximum loads	Axial : 50 N
	Radial : 80 N
Shaft inertia	≤ 56.10^{-6} kg.m^2
Torque	≤ 25.10^{-3} N.m
Permissible max. speed	6 000 min^{-1}
Continuous max speed	3 600 min^{-1}
Shaft seal	P.T.F.E
Shocks (EN60068-2-27)	≤ 300 m.s^{-2} (during 6 ms)

Vibration (EN60068-2-6)	≤ 100 m.s^{-2} (10 ... 500 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 V eff
Encoder weight (approx.)	0,900kg zinc alloy cover, alu body
	1,100kg zinc alloy cover, stainless steel body
	1,200kg stainless steel body & cover
Operating temperature	- 10... + 70 °C (encoder T°)
Storage temperature	- 10... + 70 °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

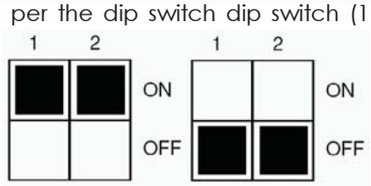
PROFIBUS ABSOLUTE MULTITURN ENCODERS, SHU9 RANGE

General

Transmission frequency: from 9.6Kbaud to 12Mbaud
Electronic interface: RS 485 opto-isolated
Address : permits the addressing of each encoder in an installation (32 master stations or slaves stations per segment without repeater, 127 maximum with repeater)
The 8 switch permits to chose the addressing per deep switch (8=off) or per program (8=on)



Impendency adaptation : is activated per the dip switch dip switch (1 and 2 = on) in the terminal box or on the encoder



Programmable parameters

Direction: Permits the definition of the counting sense of the encoder (CW or CCW) following its mechanical position
Resolution: the number or points per turn can be between 0 and 8192
Global resolution (MAX RANGE) : Total number of codes of the encoder (2 to 536 870 912)
Reset: defines the value of its actual position

PROFIBUS CONNECTION

B3 : cable + connector M23 12 pins				
A	B	Vcc	GNd	Reserved
2	4	7	8	1, 3, 5, 6, 9, 10, 11, 12

B4 : cable			
A	B	Vcc	Gnd
GN / green	YE / yellow	BR / brown	WH / white

Reserved: do not connect

Note : Refer to the bus standards for the maximal derivation length

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections…)

	Shaft Ø	Supply	Output stage	Code	Resolution	Number of turns	Connection	Connection orientation
SHU9 : Zinc cover Alu body **SBU9 :** Zinc cover Stainless steel body **SXU9 :** Stainless steel cover & body	**30**:30mm Shaft reduction hubs available from 10 to 28mm	**5** : 11 to 30Vdc	**BG :** Profibus	**B**: Binary	**13 :** 8192 points per turn (2^{13})	**B16** : 65 536 turns (2^{16})	**B3 :** Cable gland + cable + M23 12 pins **B4 :** Cable gland + 4 wires cable	Example : **R010** : radial cable 1m
SHU9 _	**30** //	**5**	**BG**	**B** //	**13**	**B16** //	**B4**	**R010**

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SHU9

CANOPEN ABSOLUTE MULTITURN ENCODERS, SHU9 RANGE

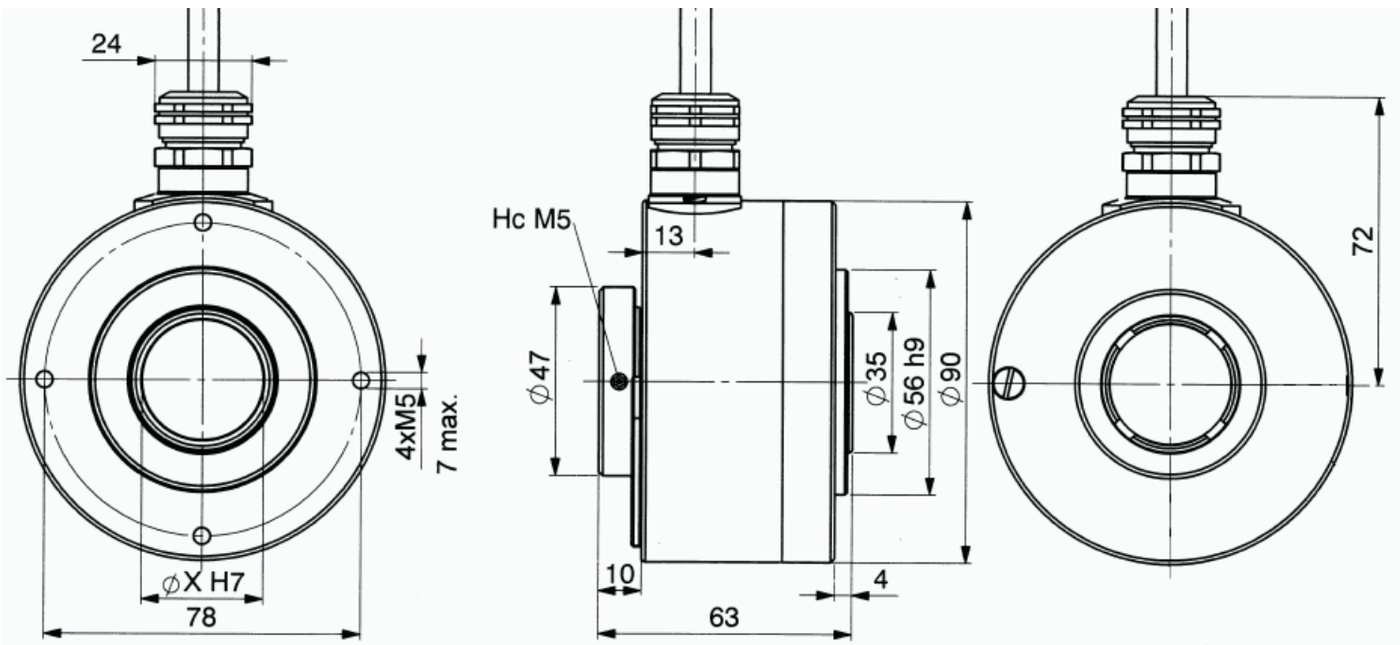
Especially designed for Heavy Duty Industry (steel, paper, wood – mills, cranes…). Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads

Adaptation with reduction hubs in aluminium or in PEEK composite

Possibility of double or triple mounting in associating incremental, absolute and tachometric functions

Also available in parallel, SSI and fieldbus interfaces : DeviceNet and Profibus

SHU9_30 connection BBR (radial cable)



Material (Stainless steel option)	Cover : zinc alloy	Vibration (EN60068-2-6)	≤ 100 m.s^{-2} (10 ... 500 Hz)
	Body: aluminium	EMC	EN 50081-1, EN 61000-6-2
Shaft	Stainless steel	Isolation	1 000 V eff
Bearings	6807 serie	Encoder weight (approx.)	0,900kg zinc alloy cover, alu body
Maximum loads	Axial : 50 N		1,100kg zinc alloy cover, stainless steel body
	Radial : 80 N		1,200kg stainless steel body & cover
Shaft inertia	≤ 56.10^{-6} kg.m^2	Operating temperature	- 10... + 70 °C (encoder T°)
Torque	≤ 25.10^{-3} N.m	Storage temperature	- 10... + 70 °C
Permissible max. speed	6 000 min^{-1}	Protection (EN 60529)	IP 65
Continuous max speed	3 600 min^{-1}	Torque (ring screw)	nominal: 3N.m, break: 4N.m
Shaft seal	P.T.F.E	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
Shocks (EN60068-2-27)	≤ 300 m.s^{-2} (during 6 ms)	25 N / 40 N: 140	50 N / 80 N : 17

CANOPEN ABSOLUTE MULTITURN ENCODERS, SHU9 RANGE

CE

CANopen

Programmable parameters

Resolution: defines the resolution per revolution (0 to 8 192)
Global resolution (MAX RANGE) : total amount of codes for the encoder (2 to 536 870 911)
Transmission speed : programmable from 10kBaud (1000m) to 1 Mbaud (40 m) ; value per default: 20 Kbaud
Address: define the software address of the encoder on the bus (1 to 127, value by default: id = 1)
Direction: define the direction of count of the encoder
2 programmable markers a high marker and a low marker
Reset : defines the value of its preset position (non turning shaft)

Communication modes

3 modes are available to interrogate the encoder :
POLLING mode: the encoder transmits the position on the demand of the master. This mode permits the programming and the interrogation of the parameters of the encoder as well as its position
CYCLIC mode: the encoder transmits its position in an asynchronous manner. The frequency of the transmission is defined by the programmable cyclical timer register from 0 to 65 535 ms
SYNCHRO mode: the encoder transmits its position on a synchronous demand by the master

CANOPEN CONNECTION

1	2	3	4	5	6	7	8	9
DEFAUT	CAN LOW	CAN GND	N.C.	N.C.	0V	CAN HIGH	N.C.	11/30Vdc

DEFAULT : an impulse reset the encoder at the speed : 20kBaud, adress=1, Clock-wise, Multiturn - 13bits resolution

Note : Refer to the bus standards for the maximal derivation length

ORDERING CODE (Special versions upon request, for ex. special flanges/electronics/connections…)

	Shaft Ø	Supply	Output stage	Code	Resolution	Number of turns	Connection	Connection orientation
SHU9 : Zinc cover Alu body **SBU9 :** Zinc cover Stainless steel body **SXU9 :** Stainless steel cover & body	**30**:30mm Shaft reduction hubs available from 10 to 28mm	**5** : 11 to 30Vdc	**BB :** CANopen	**B:** Binary	**13 :** 8192 points per turn (2^{13})	**B16 :** 65 536 turns (2^{16})	**BB:** PUR CanOpen cable output + DB9	**R010 :** radial cable de 1m
SHU9 _	**30 //**	**5**	**BB**	**B //**	**13**	**B16 //**	**BB**	**R010**

Made in FRANCE

SHU9

DEVICENET ABSOLUTE MULTITURN ENCODERS, SHU9 RANGE

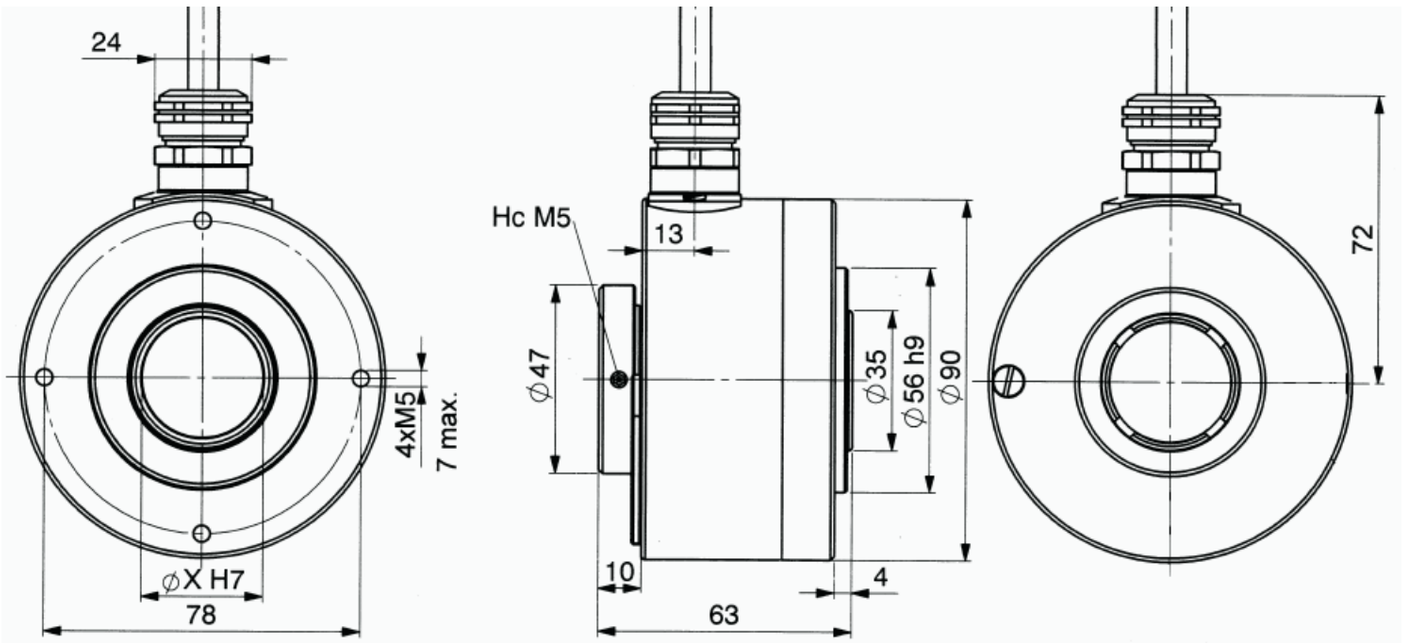
Especially designed for Heavy Duty Industry (steel, paper, wood – mills, cranes…). Compact and robust conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads

Adaptation with reduction hubs in aluminium or in PEEK composite

Possibility of double or triple mounting in associating incremental, absolute and tachymetric functions

Also available in parallel, SSI and fieldbus interfaces : CanOpen and Profibus

SHU9_30 connection BAR (radial cable)



Material (Stainless steel option)	Cover : zinc alloy
	Body: aluminium
Shaft	Stainless steel
Bearings	6807 serie
Maximum loads	Axial : 50 N
	Radial : 80 N
Shaft inertia	≤ 56.10^{-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	P.T.F.E
Shocks (EN60068-2-27)	≤ 300 m.s^{-2} (during 6 ms)

Vibration (EN60068-2-6)	≤ 100 m.s^{-2} (10 ... 500 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 V eff
Encoder weight (approx.)	0,900kg zinc alloy cover, alu body
	1,100kg zinc alloy cover, stainless steel body
	1,200kg stainless steel body & cover
Operating temperature	- 10... + 70 °C (encoder T°)
Storage temperature	- 10... + 70 °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

DEVICENET ABSOLUTE MULTITURN ENCODERS, SHU9 RANGE

CE

Programmable Parameters

Resolution could be 13, 10, 2 and 0 bits
Reset to a value (X) : puts the code of the present position to 0 (immobile shaft)
Transmission speed: configurable at 125 kBaud (default value), 250 kBaud, 500 kBaud
Address: defines the position of the encoder on the bus 1 to 63, default value: id = 63

The Communication Modes: The interrogation of the encoders could be done according to the following 4 modes :

CYCLIC Mode: the encoder transmits its position at the start of a programmed timer via the bus (with no answer). With an answer, the master must send an acknowledgement of the position of each frame
BIT STROBE Mode: A general request from the master (broadcast) makes it possible to interrogate max. 64 devices simultaneously
EXPLICIT Mode: This mode makes it possible to program and interrogate the parameters of the encoder, as well as its position
POLLING Mode: the encoder answers upon request of the master

The user manual and the ESD file are delivered with the encoder

DEVICENET CONNECTION

1	2	3	4	5
DRAIN	24V	GND	CAN HIGH	CAN LOW

Note : Refer to the bus standards for the maximal derivation length

ORDERING CODE (Special versions upon request, for ex. over-speed switches, special flanges/electronics/connections…)

	Shaft Ø	Supply	Output stage	Code	Resolution	Number of turns	Connection	Connection orientation
SHU9 : Zinc cover Alu body **SBU9 :** Zinc cover Stainless steel body **SXU9 :** Stainless steel cover & body	**30:**30mm Shaft reduction hubs available from 10 to 28mm	**5** : 11 to 30Vdc	**BA :** DeviceNet	**B:** Binary	**13 :** 8192 points per turn (2^{13})	**B16 :** 65 536 turns (2^{16})	**BA:** Cable gland + 1m cable + miniC 5 pins connector	Example : **R010 :** radial cable de 1m
SHU9 _	**30 // 5**		**BA**	**B //**	**13**	**B16 //**	**BA**	**R010**

Made in FRANCE

ATEX CERTIFIED ENCODERS

EXPLOSION PROOF ENCODERS

BEI IDEACOD has developed the largest range of explosion-proof encoders in conformity with the ATEX directive. Available in solid of 12 mm and hollow shaft of max. 30 mm, they are EEx dIIcT6 marked (T5 and T4 also available) for environment category 2 zone 1 (gas) and 21 (dust)

The hollow shaft encoders allows easy mounting on high torque motors, typically used in heavy-duty applications

The incremental range is available with several electronics: 5V RS422, push-pull 11-30V, 11-30V power supply with a RS422 regulated output, and also a transistorized push-pull 11-30V electronic which can drive long length of cables

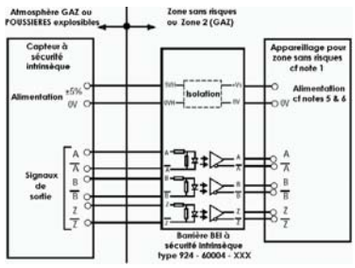
The absolute range is unique on the market with the multiturn encoders SSI and field bus : CANopen and DeviceNet. The absolute range propose also single turn encoders with parallel, SSI, CANopen and DeviceNet interfaces

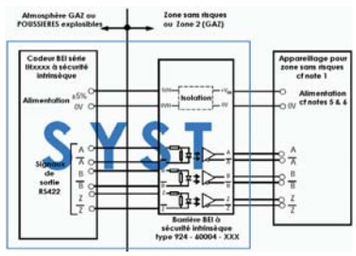
With a resolution up to 10000 ppr for the incremental encoders, with an analogue output, with 13bits for the singleturn absolute encoders and up to 29 bits for the multiturn encoders, all these ranges can be mounted on a large panel of applications moreover all our explosion-proof range is available with stainless steel or marine aluminium body

INCRINSICALLY SAVE ENCODER FOR SURFACE INDUSTRY (GROUP II)

BEI IDEACOD launches INTRATEX™: intrinsically safe incremental encoders. Based on DIGISINE™ technology, they are certified ATEX Ex II 1G/D, EEx ia IIC/B T4 for use in explosive atmospheres (gas and dust, zone 0 and 20). A complete intrinsic safety system with encoders, barriers (galvanically isolated or Zener) and cable assembly is proposed. With outer diameter of 58 mm, INTRATEX™ are available in shafted and hollow-shaft version

2 standard electronics operating with existing barriers are available: one push-pull with supply 8 to 12V; one line driver RS422 with supply 4.5-6V. Protection against shorts-circuit is systematic, protection against reverse polarity is available for the push-pull 8-12V. With the programmable option, the basic resolution of the encoder can be multiplied up to 16x with dip switches (access via the cover). The standard frequency response could reach 300kHz





INTRINSICALLY SAFE ENCODER FOR FIREDAMPS MINES (GROUP I)

Intrinsically safe system for firedamps mines also available, system composed of an intrinsically safe loop power supply: a galvanically isolated barrier, DEMKO 03 ATEX 0313867 X certified, and a certified LCIE 04 ATEX 6109X/01 stainless steel body encoder

INTRINSICALLY SAFE ENCODER FOR ZONE 22

ATEX encoder specially designed for explosive dust atmosphere in category 3 ZONE 22 : Ex II 3 D IP65 T135°C , use without intrinsically safe barrier, consult us

The below table helps you to select a certified ATEX encoder in conformity with the 94/9/CE directive in function of the application

d: suitable explosion-proof encoder ia: suitable intrinsically safe encoder			Explosion proof encoder	Intrinsically safe encoder/system
Firedamps mine	I M1 / (M1) SYST EEx ia I T135°C		Non certified	ia
Surface industry CENELEC group	II A (propan)		d	ia
	IIB (ethylen)		d	ia
	IIC (Hydrogen- Acetylen)		d	ia
Category	Category 1 Continuous presence	0 (gas)	Non certified	Category
		20 (dust)	Non certified	
	Category 2 Intermittent presence	1 (gas)	d	
		21 (dust)	d	
	Category 3 Occasional presence	2 (gas)	d	
		22 (dust)	d	
Maximal authorized temperature in case of failure	T6 – explosion proof standard		d (80°C)	Non certified
	T5 – explosion proof option		d (95°C)	Non certified
	T4 – intrinsically safe standard, explosion proof option		d (110°C)	ia (135°C)
Ambiant temperature	-30°C (ia) / -20°C (d) to +40°C		d (T6 standard)	ia
	-30°C (ia) / -20°C (d) to +55°C		d (T5 option)	ia
	-30°C (ia) / -20°C (d) to +70°C		d (T4 option)	ia

STANDARDS ATEX CERTIFIED ENCODERS

CE

INTRINSICALLY SAFE ENCODERS, EX II 1G/D, EEx ia IIC/B T4, Category 1, zone 0 (gas) and 20 (dust)

INCREMENTAL EEx ia IIC/B T4		Shaft : **06** : 6mm **10** : 10mm **12** : 12mm **14** : 14mm	Supply: **2** :4,5-6Vdc **I** : 8 to 12Vdc	Output: **G2** : 5Vdc, RS422 **G5** : push-pull	**9:** A, A/ B, B/ 0, 0/ 0 (A&B)	Number of points per turn	**G6R:** M23 12 pins CW **G8R:** M23 12pins CCW **G3R020:** 2m PVC radial cable **GPR020:** 2m PUR radial cable
	*INTRATEX™* 58mm - IHM5	Solid : 06, 10	2G2 IG5		9	80 000 max.	G6R, G8R G3R020, GPR020
	*INTRATEX™* 58mm - IHO5	Through : 14	2G2 IG5		9	80 000 max.	G6R, G8R G3R020, GPR020
	Intrinsically safe barrier for encoder with a 2G2 electronic, integrated 5Vdc power supply for the encoder			Barrier power supply: Vcc : 12 - 24Vdc		Out : 5V	Ref : 924-60004-002
						Out :Push-pull=Vcc	Ref : 924-60004-003
						Out:NPN CO	Ref : 924-60004-004

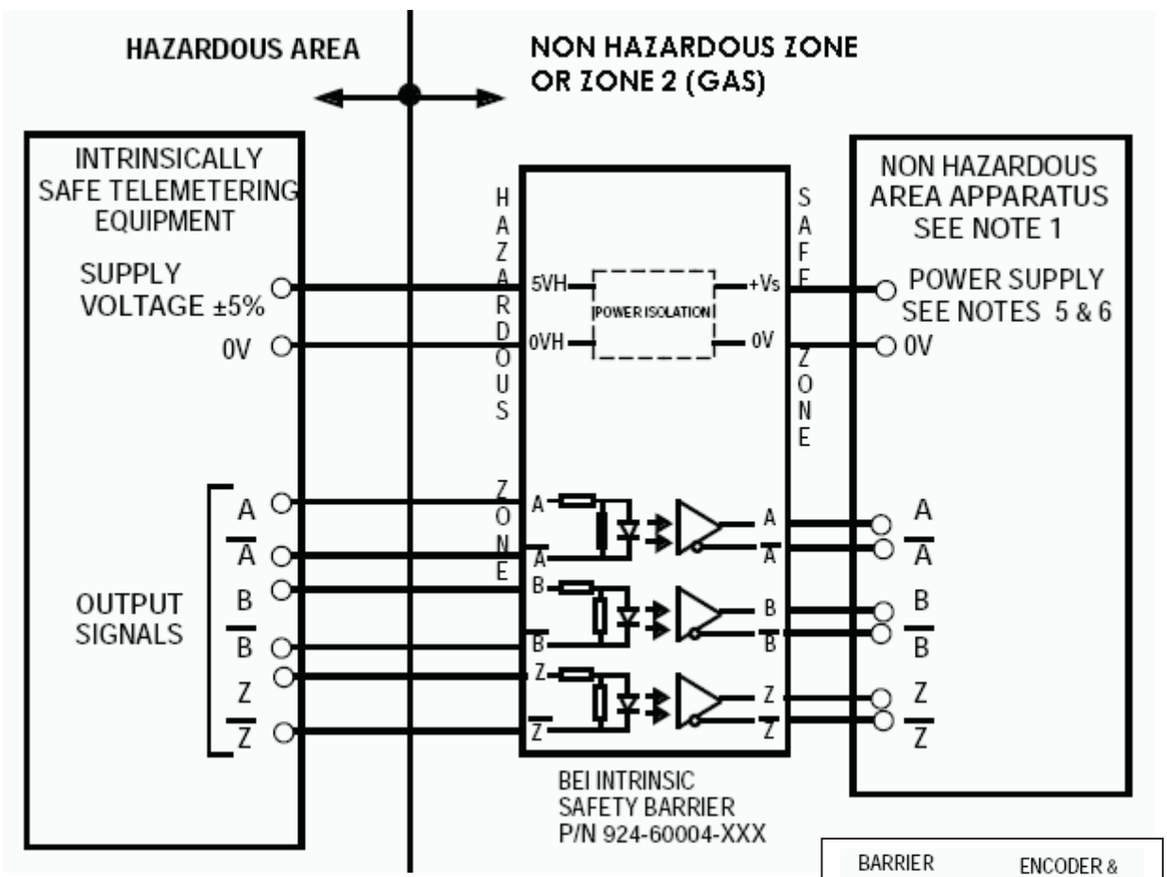
EXPLOSION PROOF ENCODERS II 2 G/D, EEx d IIC T6, Category 2, zone 1 (gas) and 21 (dust)

INCREMENTAL EEx d IIC T6		Shaft : **12** : 12mm **30** : 30mm	Supply: **2** : 5Vdc **5** : 11 - 30Vdc	Output: **G2** : 5Vdc, RS422 **G5** : push-pull	**9:** A, A/ B, B/ 0, 0/ 0 (A&B)	Number of points per revolution	**G3A030:** 3m PVC axial cable **GPR030:** 3m PUR radial cable **G3A030:** 3m PVC axial cable **GPR030:** 3m PUR radial cable
	116mm-GAMX	Solid : 12	2G2, 5G2, 5G5		9	10 000 max.	G3A030 GPA030
	109mm-GAUX	Through : 30	2G2, 5G2, 5G5		9	10 000 max.	G3R030 GPR030
SINGLETURN EEx d IIC T6		Shaft : **12** : 12mm **30** : 30mm	Supply **5** : 11-30Vdc	Output **CN:** driver NPN CO **C5:** driver push-pull **CS:** SSI without parity	**B** : Binary **G** : Gray	Resolution	T3A030 : 3m PVC radial cable C7R030 : 3m PUR radial cable
	116mm-CAMX	Solid : 12	5CN 5C5		B, G	13 bits max	T3A030
	109mm-CAUX	Through: 30	5CS		B, G	13 bits max	C7R030
MULTITURN EEx d IIC T6		Shaft : **30** : 30mm	Supply : **5** : 11-30Vdc	Output : **SS** : SSI without parity **BB** : CANopen **BA** : DeviceNet	**B** : Binary **G** : Gray	**13B12D5** 13 bits: resolution 12 bits:nbr of turn **13B16** 13 bits: resolution 16 bits:nbr of turn	**S7R030** :3m PUR radial cable **B2R030** : 3m radial cable **B1R030** : 3m radial cable
	109mm-SAUX	Through : 30	5SS		B, G	13B12D5	S7R030
			5BB		B	13B16	B2R030
			5BA		B	13B16	B1R030
OPTOTACHO EEx d IIC T6		**Shaft** : **12** : 12mm	Supply: **2** :5Vdc **3** : 15 - 30Vdc	Output: **V1** : 0...20 mA **V2** : 4...20 mA **V3** : -20mA ...+20mA **Vm** : 0...10Vdc **Vp** : -10V...+10Vdc	Example **D10** : 10 rpm **C20** : 200 rpm **M30** : 3000 rpm		**TAA030:** 3m PVC axial cable
	116mm, NAMX	Solid : 12	3V1, 3V2, 3V3, 3Vm,3Vp 2V1, 2V2, 2V3, 2Vm, 2Vp		M60 max.		**TAA030**
TACHO-ENCODER EEx d IIC T6		Shaft : **12** : 12mm	Supply: **2** : 5Vdc **3** : 15-30Vdc	**Na:** 0...10Vdc + RS422 **Nc:** 0...10Vdc + push-pull **Nd:** 0...20mA + RS422 **Nf :** 0...20mA + push-pull **Ng:** 4...20mA + RS422 **Ni:** 4...20mA + push-pull **Nj:** –10Vdc...+10Vdc + RS422 **Nl:** –10Vdc...+10Vdc + push-pull **Nm:** - 20mA...+20mA + RS422 **No:** - 20mA...+20mA + push-pull	**9:** A, A/ B, B/ 0, 0/ 0 (A&B)	Number of pulses per turn	Example **D10** : 10 rpm **C20** : 200 rpm **M30** : 3000 rpm	**T8A030:** 3m PVC axial cable
	116mm, NAMX	Solid : 12	2Na, 2Nd, 2Ng, 2Nm 3Nc, 3Nf , 3Ni, 2Nj, 3Nl, 3No		9	10000 max	M60 max.	N6R N3R020

EMDR1IS

INTRINSIC SAFETY BARRIER, EMDR1 RANGE, *INTRATEX*™

This galvanically Isolated Electronic Module is the perfect complement to our Intrinsically Safe Encoders. Together with our cable assemblies they constitute a completely engineered solution to operation in Zone 0 or 20 Group II Hazardous Environments. This single barrier provides both power and signal isolation for an incremental encoder with a differential quadrature outputs and an index. This all all-in-one approach saves the cost and inconvenience of buying separate power and signal barriers as required by other systems. This barrier is galvanically isolated and saves the additional cost of maintaining a high integrity earth ground. With differential line driver outputs, this barrier can be used to carry signals up to 150m with a bandwidth of up to 250kHz



BARRIER PARAMETERS		ENCODER & CABLE PARAMETERS
Voc (Uo)	≤	V MAX
Isc (Io)	≤	I MAX
Ca (Co)	≥	Ci + C cable
La (Lo)	≥	Li + L cable

Note : This system diagram is for general information only.

Installation must be consistent with BEI Installation Drawing 924-08067-001

EMDR1IS

INTRINSIC SAFETY BARRIER, EMDR1 RANGE, *INTRATEX™*

INTRINSIC SAFETY BARRIER SPECIFICATIONS							
POWER SUPPLY / OUPUT TYPE							
Part Number:	Barrier Supply Vs ± 5%	Output logic to Non-Hazardous Area Apparatus					
924-60004-002	12 – 24 Vdc	V out = 5Vdc		Line Driver 100 mA Source / Sink			
924-60004-003	12 – 24 Vdc	Vout = Vin (Nominal)		Line Driver 100 mA Source / Sink			
924-60004-004	12 – 24 Vdc	Open collector		NPN 80 mA Source / Sink			
BARRIER PARAMETERS							
Voltage Supply	Voc (Uo) Isc (Io)	Zone 0 Group IIA		Zone 0 Group IIB		Zone 0 Group IIC	
+ 5 Vdc ± 5%	8.9V 345mA	Ca (Co) 590 µF	La (Io) 2.0 mH	CA (Co) 43 µF	La (Io) 0.75 mH	Ca (Co) 5.6 µF	La (Io) 0.4 mH

ORDERING REFERENCE

EM	DR1	IS	5	RTB	-
Type : **EM** = Electronic Module, DIN Rail Mount	**Package Style:** **DR1** = 114.5 mm H 99 mm D 22.5 mm W	**Function:** **IS** = Intrinsically safe	**Output voltage encoder:** **5** = 5Vdc	**Output termination :** **RTB** = Removable Terminal	**Supply Voltage / Output** **24V/V**, 24 Vdc max, Vout = Vin **24V/5,** 24Vdc max, Vout = 5Vdc **24V/OC,** 24dc max, Vout = Open collector
Ex: EM	**DR1**	**IS**	**5**	**RTB**	**24V / V**

NOTES :

1. NON-HAZARDOUS AREA APPARATUS THAT IS UNSPECIFIED EXCEPT THAT IT MUST NOT BE SUPPLIED FROM NOR CONTAIN UNDER NORMAL OR ABNORMAL CONDITIONS A SOURCE OF POTENTIAL WITH RESPECT TO EARTH IN EXCESS OF 250V R.M.S. OR 250 V.D.C.
2. INTRINSICALLY SAFE ENCODERS: HAZARDOUS AREA APPARATUS THAT IS CERTIFIED TO THE APPROPRIATE ZONE AND GROUP BY THE CERTIFICATION BODY OF THE COUNTRY OF USE
3. THE ELECTRICAL CIRCUITS IN THE HAZARDOUS AREA MUST BE CAPABLE OF SURVIVING A VOLTAGE WITHSTAND TEST OF 500V R.M.S. TO EARTH OR FRAME OF THE APPARATUS
4. THE INSTALLATION MUST COMPLY WITH THE REGULATIONS OF THE COUNTRY OF USE
5. THE POWER SOURCE MUST BE CONSISTENT WITH PART NUMBER AND OUTPUT TYPE SPECIFIED IN TABLE 3. VOLTAGES GREATER THAN 5% OF THE NOMINAL BARRIER SUPPLY VOLTAGE MAY DAMAGE THE BARRIER
6. FUSES IN THE BARRIERS MAY RUPTURE IF INPUT VOLTAGE EXCEEDS MAX SUPPLY VOLTAGE (Vs) IN TABLE 3
7. HAZARDOUS AREA CABLE CAPACITANCE (C cable) AND INDUCTANCE (I cable) ARE CALCULATED BY MULTIPLYING THE CABLE LENGTH (IN FEET) BY THE NUMBER OF CONDUCTORS BY 60 pF / FT. AND 0.2 uH / FT. RESPECTIVELY. CABLE CAPACITANCE (C cable) AND INDUCTANCE (I cable) VALUES PLUS Ci AND Li MUST NOT EXCEED VALUES OF Ca (Co) AND La (Lo) DETERMINED BY BARRIER MANUFACTURER
8. THIS DESIGN IS CERTIFIED BY EX / DEMKO. NO CHANGES ARE ALLOWED WITHOUT APPROVAL FROM EX / DEMKO OR EQUIVALENT CERTIFYING BODY
9. **WARNING**: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. REPAIRS TO BE PERFORMED BY BEI IDEACOD ONLY
10. ASSOCIATED APPARATUS AND APPAREILLAGE CONNEXE

AVERTISSEMENT: THE SUBSTITUTION OF COMPONENTS CAN COMPROMISE THE INTRINSICALLY SAFE SYSTEM

IHM5

ATEX INCREMENTAL ENCODERS, IHM5 RANGE

Intrinsically safe encoders, specially designed for explosive GAS or DUST atmospheres

For chemical applications (painting, solvent, fragrances and rubber), textile, food processing, wood, petrochemical...

EC type examination certificate

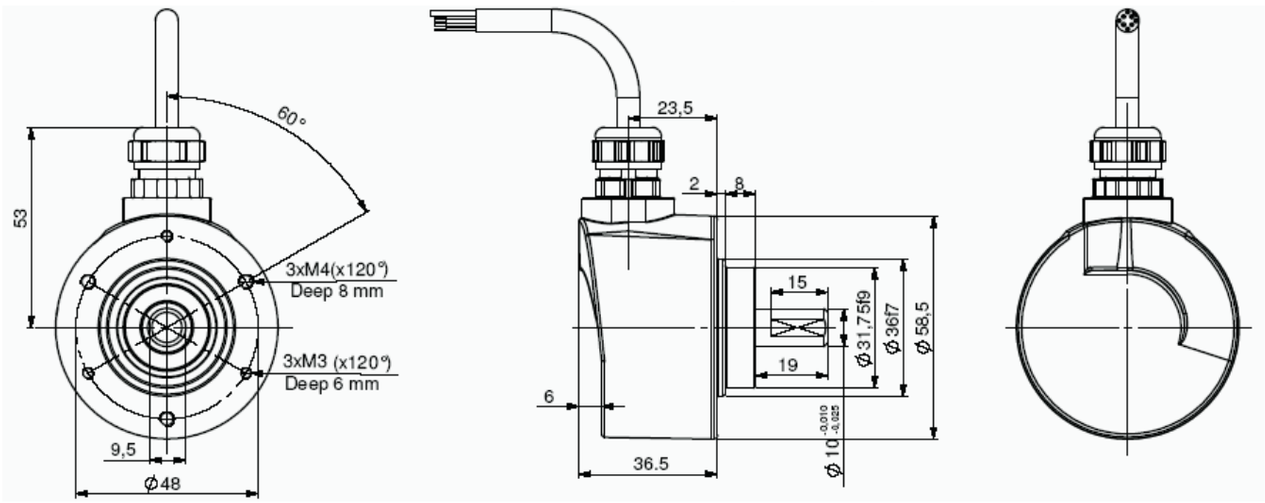
Download from our website www.bei-ideacod.com

LCIE 04 ATEX 6109 X

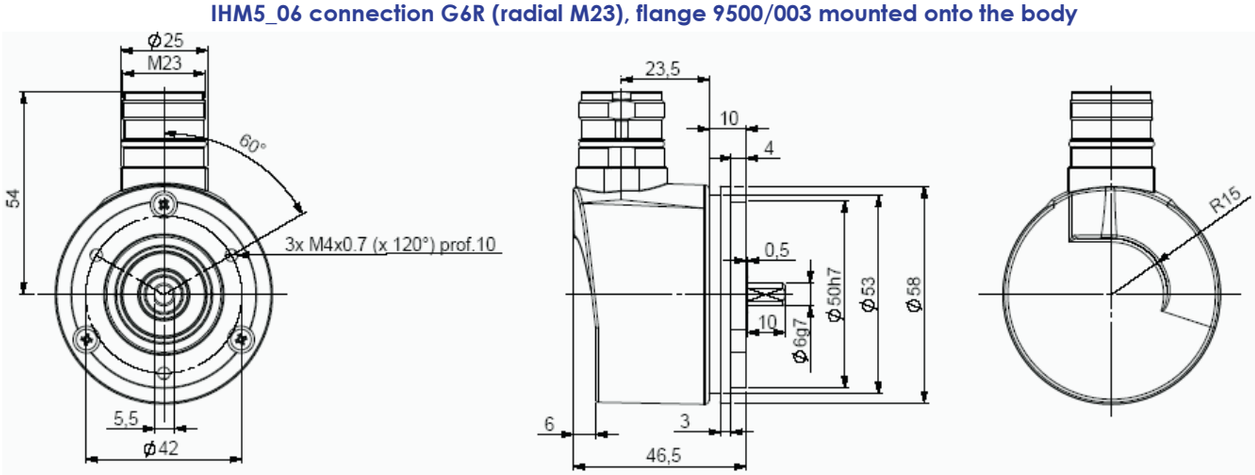
CE 0081

II 1 G/D EEx ia IIC/B T4 Ex iaD 20 T135°C

IHM5_10 connection G3R (radial cable)



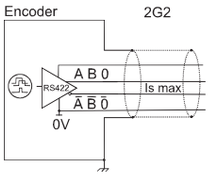
IHM5_06 connection G6R (radial M23), flange 9500/003 mounted onto the body



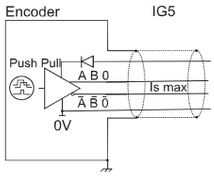
Material	Cover : zinc alloy	Shock (EN60068-2-27)	≤ 500m.s^{-2} (during 6 ms)
	Body : aluminium	Vibration (EN60068-2-6)	≤ 100m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	EMC	EN 50081-1, EN 61000-6-2
Bearings	6 000 serie	Isolation	1 000 Veff
Maximum loads	Axial : 50 N	Weight (connector)	0,3 kg
	Radial : 100 N	Operating temperature	- 30 ... + 70 °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

ATEX INCREMENTAL ENCODERS, IHM5 RANGE

OUTPUT ELECTRONIC / SUPPLY - DIGITAL SIGNALS (SQUARE WAVE SIGNALS)



Electronic 2G2
Supply : 4.5 to 6Vdc Consumption : 75mA
Intern capacity: 1.3µF, intern inductance: 0mH
II 1 G/D EEx ia IIC T4, Ex iaD 20 T135°C
RS422, 40 mA, TTL 20mA, F_{max}=300kHz
Barrier to be used for supply:
Ui<10V, Li<750mA, Pi<1.875W
Barrier to be used for each output:
Ui<10V, Li<200mA, Pi<0.5W



Electronic IG5
Supply : 8 to 12Vdc Consumption : 75mA
Intern capacity: 1.3µF, intern inductance: 0mH
II 1 G/D EEx ia IIC T4, Ex iaD 20 T135°C
Push Pull 50mA, F_{max}=300kHz
Barrier to be used for supply:
Ui<16V, Li<750mA, Pi<3W
Barrier to be used for each output:
Ui<16V, Li<150mA, Pi<0.6W

Protection against short circuits and inversion of polarity (except 2G2)

STANDARD CONNECTION

		-	+	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

	Shaft Ø	Digital Signal (square)				Connection	Orientation
		Electronic : 2G2, IG5		Signals	Resolution		
		Supply	Output stage				
IHM5 Cover : Zinc alloy Body : Aluminium	**06** :6mm **10** : 10mm	**2** : 5Vdc **I** : 8 to 12Vdc	**G2** : driver 5Vdc RS422 **G5** : push-pull	**9** : A,A/,B,B/,0,0/ (0 gated A&B)	**80 000** max	**G6** : M23 12pins CW **G5** : M23 12pins CW **G8** : M23 12 pins CCW **G1** : solenoid valve 4pins **G2** : 5 pin DIN **GD** : 8 pin DIN	**R** : radial
						G3 : PVC cable 8 wires **GP** : PUR cable 12 wires	Example : **R020**: radial cable 2m
Ex: IHM5 _	**10** //	**I**	**G5**	**9** //	**50 000**//	**GP**	**R050**

Available resolutions (2G2 and IG5)*: 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*

Interpolated available resolutions (2G2 only)*: 1080 2560 2880 3072 4320 5120 5760 6000 7200 7500 8000 8192 9000 10000 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 72000 80000*

NEVER CONNECT/DISCONNECT OR OPEN THE ENCODER WITH POWER ON OR IN DUST ENVIRONMENTS
RESPECT THE MOUNTING TOLERANCES AND THE MECHANICAL RESTRICTIONS IN ORDER TO REMAIN IN LINE WITH THE MAXIMUM SURFACE TEMPERATURE VALUE ALLOWED BY THE CLASS T4 REQUIREMENTS

LCIE 04 ATEX 6109 X: CE certification of Type for the encoder :
Operating Temperature : **-30°C to +70°C**
The components of the device are intrinsically safe: they can be used in explosive atmospheres. The supply and output circuits can only be connected to associated devices which are intrinsically safe and that are certified by type [ia] or [ib]. These devices must have electrical parameters that have a compatible supply with the above mentioned electronics

LCIE 04 ATEX 6155 X: CE certification of Type for the encoder's system (encoder associated with a BEI barrier):
Operating temperature: barrier: **-20°C to +40°C, encoder: -30°C to +70°C**
System classification: **Eex ia IIC T4 Ex iaD 20 T135°C**. The interconnecting cables have to be sufficiently protected against damage and have to be separated from the non intrinsically safe circuits. They are described in the norm EN50020 paragraph 6.3, with the following characteristics C=100pF/m and L=1.2µH/m, or with cables with other C and L values, With respect to the maximum authorized values:

Gases : **Ca=3.9µF** and **L=0.4 mH**
Dust : **Ca=38.7µF** and **L=0.8mH**

Made in FRANCE

IHO5

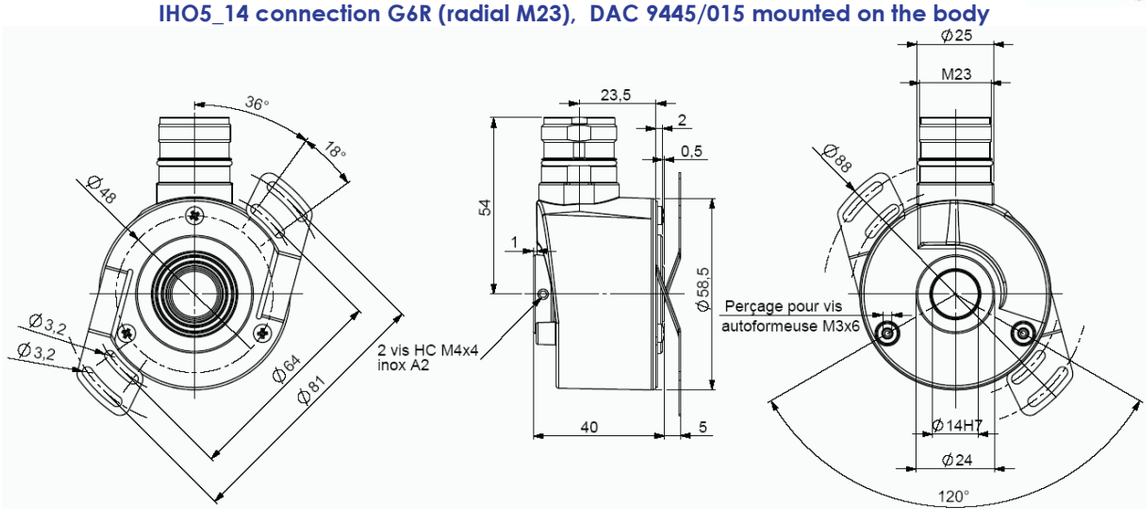
ATEX INCREMENTAL ENCODERS, IHO5 RANGE

Intrinsically safe encoders, specially designed for explosive GAZ or DUST atmospheres

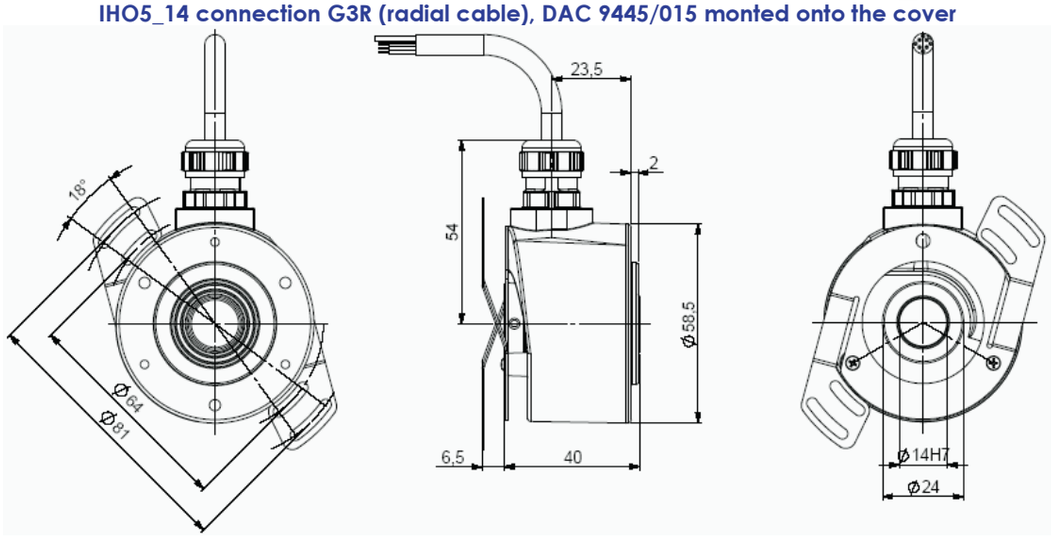
For chemical applications (painting, solvent, fragrances and rubber), textile, food processing, wood, petrochemical...

EC type examination certificate
Download from our website www.bei-ideacod.com
LCIE 04 ATEX 6109 X
CE 0081
II 1 G/D EEx ia IIC/B T4 Ex iaD 20 T135°C

IHO5_14 connection G6R (radial M23), DAC 9445/015 mounted on the body



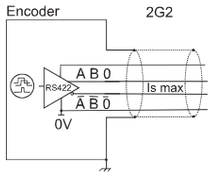
IHO5_14 connection G3R (radial cable), DAC 9445/015 monted onto the cover



Material	Cover : zinc alloy	Shock (EN60068-2-27)	≤ 500 m.s^{-2} (during 6 ms)
	Body : aluminium	Vibration (EN60068-2-6)	≤ 100 m.s^{-2} (55 … 2 000 Hz)
	Shaft : stainless steel	CEM	EN 50081-1, EN 61000-6-2
Bearings	6 803 serie	Isolation	1 000 V
Maximum load	Axial : 20 N	Weight (connector)	0,3 kg
	Radial : 50 N	Operating temperature	- 30 ... + 70°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	6 000 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

ATEX INCREMENTAL ENCODERS, IHO5 RANGE

OUTPUT ELECTRONIC / SUPPLY - DIGITAL SIGNALS (SQUARE WAVE SIGNALS)

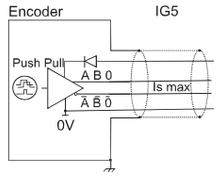


Electronic 2G2

Supply : 4.5 to 6Vdc Consumption : 75mA
Intern capacity: 1.3µF, intern inductance: 0mH
II 1 G/D EEx ia IIC T4, Ex iaD 20 T135°C
RS422, 40 mA, TTL 20mA, F_{max}=300kHz

Barrier to be used for supply:
Ui<10V, Li<750mA, Pi<1.875W

Barrier to be used for each output:
Ui<10V, Li<200mA, Pi<0.5W



Electronic IG5

Supply : 8 to 12Vdc Consumption : 75mA
Intern capacity: 1.3µF, intern inductance: 0mH
II 1 G/D EEx ia IIC T4, Ex iaD 20 T135°C
Push Pull 50mA, F_{max}=300kHz

Barrier to be used for supply:
Ui<16V, Li<750mA, Pi<3W

Barrier to be used for each output:
Ui<16V, Li<150mA, Pi<0.6W

Protection against short circuits (for both electronics) and polarity inversions (except for 2G2)

STANDARD CONNEXION

		-	+	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

	Shaft Ø	Digital signals (square)				Connection	Orientation
		Electronic : 2G2, IG5		Signals	Resolution		
		Supply	Output stage				
IHO5 Cover : Zinc alloy Body : Aluminium	**14** : 14mm Reduction hubs available	**2**: 5Vdc **I**: 8-12Vdc	**G2** : driver RS422 **G5** : driver push-pull	**9** : A,A/,B,B/,0,0/ (0 gated A&B)	**80 000** max	**G6 :** M23 12pins CW **G5** : M23 12pins CW **G8** : M23 12 pins CCW **G1** : solenoid valve 4pins **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: IHO5 _	**14 //**	**2**	**G2**	**9 //**	**10 000 //**	**GP**	**R050**

***Available resolutions (2G2 and IG5)**: 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*

***Interpolated available resolutions (2G2 only)**: 1080 2560 2880 3072 4320 5120 5760 6000 7200 7500 8000 8192 9000 10000 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 72000 80000*

NEVER CONNECT/DISCONNECT OR OPEN THE ENCODER UNDER POWER SUPPLY IN DUST ENVIRONMENTS.
RESPECT THE MOUNTING AND THE MECHANICAL RESTRICTIONS IN ORDER TO REMAIN IN LINE WITH THE MAXIMAL SURFACE TEMPERATURE VALUE ALLOWED BY THE CLASS T4 REQUIREMENTS

LCIE 04 ATEX 6109 X : CE certification of Type for the encoder :
Operating temperature : **-30°C to +70°C**
The components of the device are intrinsically safe : they can be used in explosive atmospheres. The supply and outpu circuits can only be connected to associated devices which are intrinsically safe and that are certified by type (ia) or (ib). These devices must have electrical parameters that have a compatible supply with the above mentioned eletronics

LCIE 04 ATEX 6155 X : CE certification of Type for the encoder's system (encoder in association with a BEI barrier) :
Operating temperature : **barrier -20°C to +40°C and encoder -30°C to +70°C**
System classification : **EEx ia IIC T4 Ex iaD 20 T135°C**
The interconnecting cables have to be sufficiently protected against damage and have to be separated from the non intrinsically safe circuits. They are described in the norm EN50020 paragraph 6.3, with the following characteristics C=100pF/m and L=1.2µH/m, or with cables with other C and L values, with respect to the maximum authorized :
Gases : **Ca=3.9µF** and **L=0.4mH**
Dust : **Ca=38.7µF** and **L=0.8mH**

Made in FRANCE

GAMX

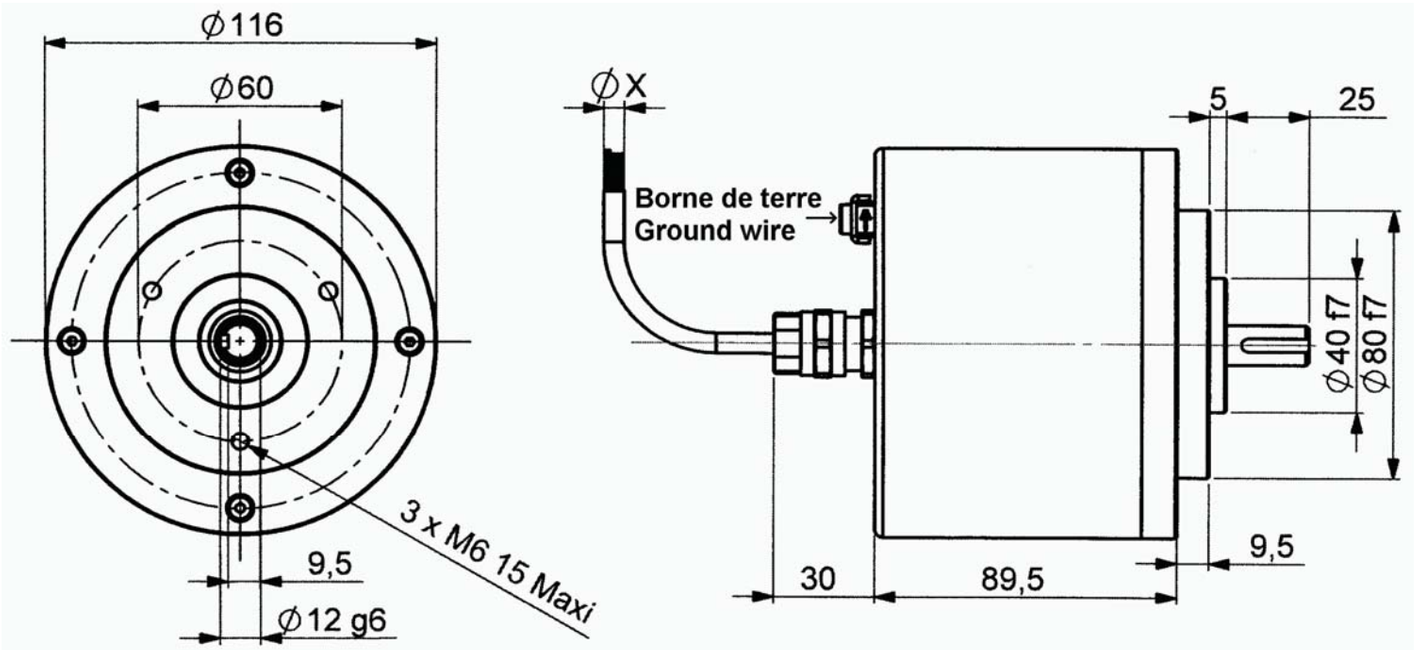
ATEX INCREMENTAL ENCODERS, GAMX RANGE

ATEX certified Explosion-proof encoders according to Directive 94/9/CE

Explosion-proof rotary encoders for hazardous environments gas & dust
Robust design for heavy-duty applications
Application fields: explosive atmospheres except for firedamp mines

EC type examination certificate
Download from our website www.bei-ideacod.com
LCIE 03 ATEX 6235
CE0081
II 2 G/D
EEx d IIC T6
IP6X, T=80°C for D

GAMX_12 connection G3A (axial cable)



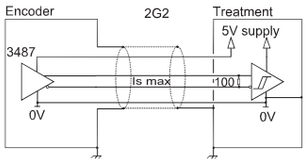
CHARACTERISTIC

Material Stainless steel option	Cover : aluminium	Shock (EN60068-2-27)	≤ 500 m.s^{-2} (during 6ms)	
	Body: aluminium	Vibration (EN60068-2-6)	≤ 200 m.s^{-2} (10 … 1 000 Hz)	
Shaft	Stainless steel	CEM	EN 50081-1, EN 61000-6-2	
Bearings	6001 serie	Isolation	1 000 V eff	
Maximum load	Axial : 50 N	Weight	3,5kg aluminium body and cover	
	Radial : 100 N		7,2kg stainless steel body and cover	
Shaft inertia	≤ 16.10^{-6} kg.m^2	Operating temperature	- 20... + 40 °C (encoder T°)	
Torque	≤ 15.10^{-3} N.m	Storage temperature	- 40... + 80 °C	
Permissible max.speed	9 000 min^{-1}	Protection(EN 60529)	IP 65	
Continuous max. speed	6 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})		
Shaft seal	Viton	20 N / 30 N : 360	50 N / 100 N : 18	100 N / 200 N : 2,2

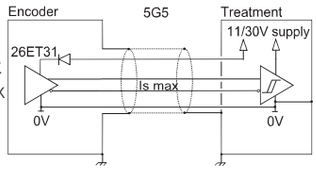
GAMX

ATEX INCREMENTAL ENCODERS, GAMX RANGE

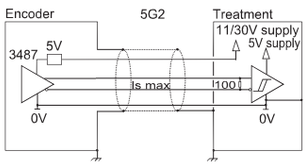
OUTPUT ELECTRONIC / SUPPLY



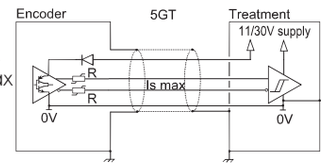
2G2 electronic (100kHz)
Supply : 5Vdc ± 10%
Cons. without load : 100mA max
Intensity per channel: 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



5G5 electronic (100kHz)
Supply: 11 to 30Vdc
Cons. without load : 75mA max
Intensity 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
Intensity per channel: 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



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

5GT electronic helps to drive very long cables (contact our factory)

Available :
3G3 electronic, supply between 15 and 30Vdc, push-pull output regulated 12Vdc

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

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	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

	Shaft Ø	Available electronic		Output signals	Resolution	Connection	Connection orientation
		2G2, 5G2, 5G5, 5GT, 3G3					
		Supply	Output stage				
GAMX Aluminium cover & body **GEMX** Stainless steel cover & body	**12** : 12mm	**2:** 5Vdc **5:** 11 to 30Vdc **3:** 15 to 30Vdc	**G2** : driver 5Vdc RS422 **G3** : driver 12Vdc **G5** : push-pull 11-30Vdc **GT** : push-pull 11-30Vdc transistorized	**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)	**10 000** max	**G3** : PVC cable 8 wires **GP** : PUR cable 12 wires	Example : **A030** : axial cable 3m
Ex: GAMX _	**12** //	**5**	**G5**	**9** //	**5 000** //	**GP**	**A030**

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*

ASSEMBLY CAUTION

NEVER OPEN THE ENCODER

NEVER CONNECT/DISCONNECT UNDER POWER SUPPLY/IN PRESENCE OF DUSTS ATMOSPHERE

The customer obliges to take up and to use our products, according to our specifications and to the manners of the profession. Our company would not be responsible for any defect resulting from a defective or erroneous assembly. From a use superior to the standard, or in abnormal conditions. The breakdowns resultant of shocks, bad electric supply, put in low capacity or overcapacity of the product, the environment of bad conditions (humidity, projection, dust, etc) cannot be imputed to us. The converter doesn't require any maintenance. Any encoder presenting a dysfunction will have to be the object of immediate return for control in our facilities. The encoder mustn't be open in any case (cable gland and/or cover)
An earth situated on the cover must be linked with the ground of the installation

Made in FRANCE

BEI IDEACOD

www.bei-ideacod.com

GAUX

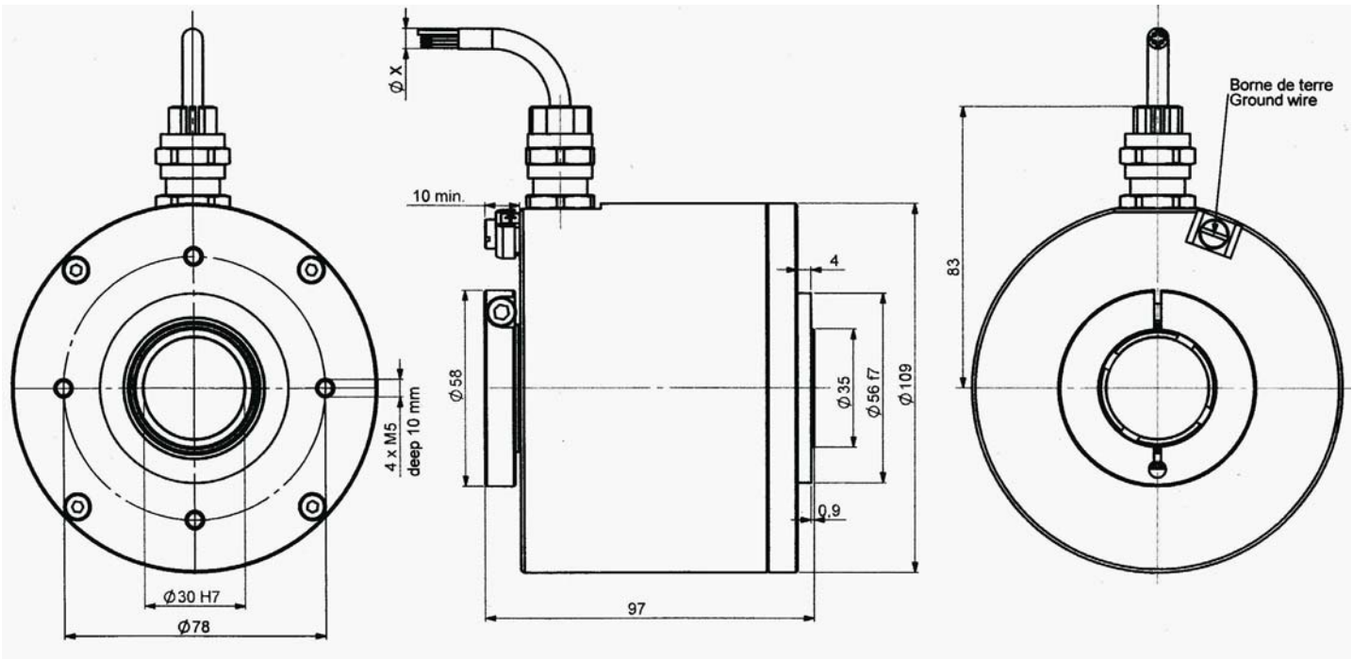
ATEX INCREMENTAL ENCODERS, GAUX RANGE

ATEX certified Explosion-proof encoders according to Directive 94/9/CE

Explosion-proof rotary encoders for hazardous environments gas & dust
Robust design for heavy-duty applications
Hollow through shaft up to 30mm
Application fields: explosive atmospheres except for firedamp mines

EC type examination certificate
Download from our website www.bei-ideacod.com
LCIE 03 ATEX 6407
CE0081
II 2 G/D
EEx d IIC T6
IP6X, T=80°C for D

GAUX_30 connection G3R (radial cable)



CHARACTERISTIC

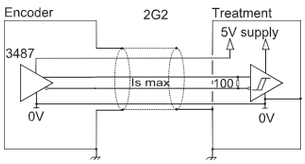
Material Stainless steel option	Cover: aluminium Body: aluminium
Shaft	Stainless steel
Bearings	6807 serie
Maximum load	Axial : 50 N Radial : 80 N
Shaft Inertia	≤ 50.10^{-6} kg.m^2
Torque	≤ 25.10^{-3} N.m
Permissible max. speed	4 500 min^{-1}
Continuous max speed	3 000 min^{-1}
Shaft seal	Viton

Shock (EN60068-2-27)	≤ 300 m.s^{-2} (during 6 ms)
Vibration (EN60068-2-6)	≤ 100 m.s^{-2} (10 ... 500 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 V eff
Weight	2kg aluminium body & cover 5kg stainless steel body & cover
Operating temperature	- 20... + 40 °C (encoder T°)
Storage temperature	- 20... + 80 °C
Protection(EN 60529)	IP 65
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
25 N / 40 N : 140	50 N / 80 N : 17

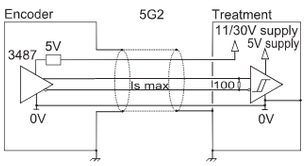
GAUX

ATEX INCREMENTAL ENCODERS, GAUX RANGE

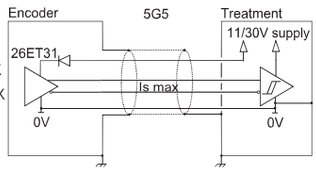
OUTPUT ELECTRONIC / SUPPLY



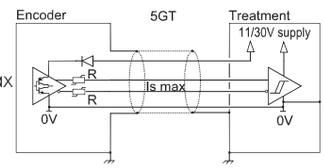
2G2 electronic (100kHz)
Supply : 5Vdc ± 10%
Cons. without load : 100mA max
Intensity per channel: 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = 2,5Vdc



5G2 electronic (100kHz)
Supply: 11 to 30Vdc
Cons. without load : 75mA max
Intensity 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
Intensity per channel: 40mA max
0 max (Is=20mA) : V_{ol} = 0,5Vdc
1 min (Is=20mA) : V_{oh} = Vcc-3Vdc



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

5GT electronic helps to drive very long cables (contact our factory)
Available :
3G3 electronic, supply between 15 and 30Vdc, push-pull output regulated 12Vdc

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

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	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

	Shaft Ø	Available electronic		Output signals	Resolution	Connection	Connection orientation
		2G2, 5G2, 5G5, 5GT					
		Supply	Output stage				
GAUX Aluminium cover & body **GEUX** Stainless steel cover & body	**30** : 30mm	**2** : 5Vdc **5 :** 11 to 30Vdc	**G2** : driver 5Vdc RS422 **G5** : push-pull 11-30Vdc **GT** : push-pull 11-30Vdc transistorized	**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)	**10 000** max	**G3** : PVC cable 8 wires **GP** : PUR cable 12 wires	Example : **R030** : radial cable 3m
Ex: GAUX _	**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*

ASSEMBLY CAUTION

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An earth situated on the cover must be linked with the ground of the installation

Made in FRANCE

CAMX

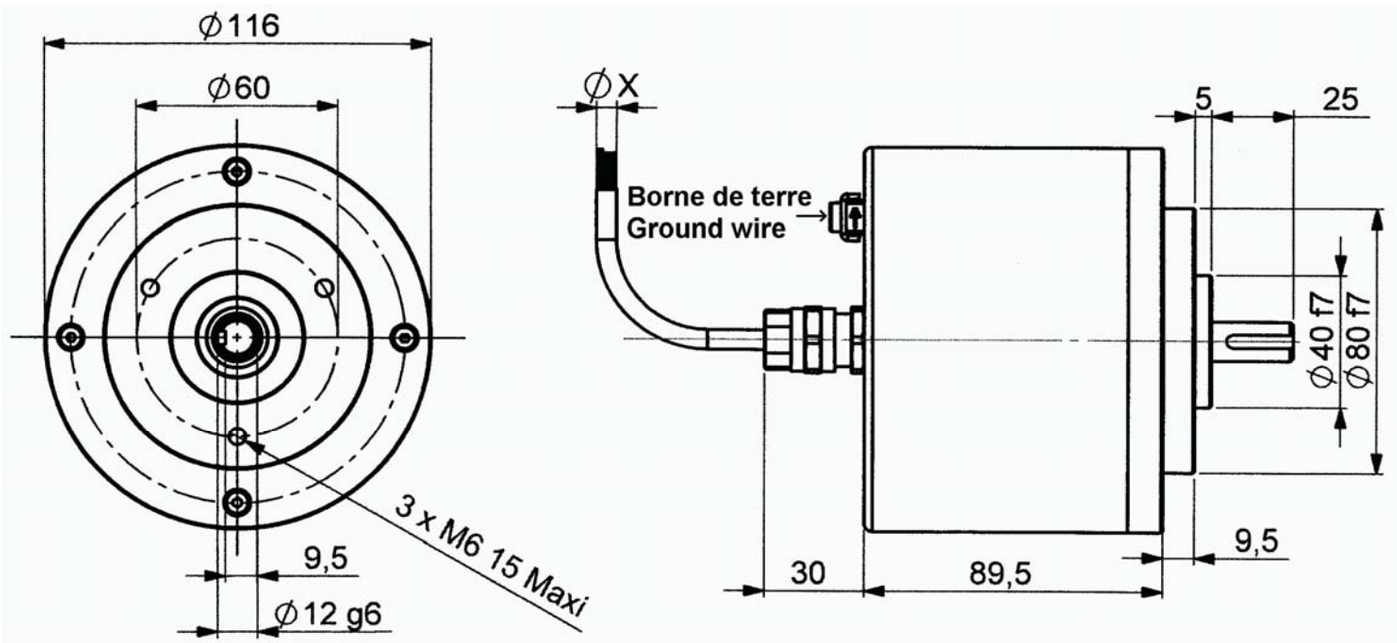
ATEX ABSOLUTE SINGLE TURN PARALLEL ENCODER, CAMX RANGE

ATEX certified Explosion-proof encoders according to Directive 94/9/CE

Explosion-proof rotary encoders for hazardous environments gas & dust
Robust design for heavy-duty applications
Application fields: explosive atmospheres except for firedamp mines

EC type examination certificate
Download from our website www.bei-ideacod.com
LCIE 03 ATEX 6235
CE0081
II 2 G/D
EEx d IIC T6
IP6X, T=80°C for D

CAMX_12 T3A connection (axial cable gland)



CHARACTERISTIC

Material Stainless steel option	Cover : aluminium	Shock (EN60068-2-27)	≤ 500 m.s^{-2} (during 6ms)	
	Body: aluminium	Vibration (EN60068-2-6)	≤ 200 m.s^{-2} (10 … 1 000 Hz)	
Shaft	Stainless steel	CEM	EN 50081-1, EN 61000-6-2	
Bearings	6001 serie	Isolation	1 000 V eff	
Maxiamum load	Axial : 50 N	Weight	3,5kg aluminium body and cover	
	Radial : 100 N		7,2kg stainless steel body and cover	
Shaft inertia	≤ 16.10^{-6} kg.m^2	Operating temperature	- 20... + 40 °C (encoder T°)	
Torque	≤ 15.10^{-3} N.m	Storage temperature	- 40... + 85 °C	
Permissible max.speed	9 000 min^{-1}	Protection(EN 60529)	IP 65	
Continuous max. speed	6 000 min^{-1}	Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})		
Shaft seal	Viton	20 N / 30 N : 360	50 N / 100 N : 18	100 N / 200 N : 2,2

ATEX ABSOLUTE SINGLE TURN PARALLEL ENCODER, CAMX RANGE

RACCORDEMENT

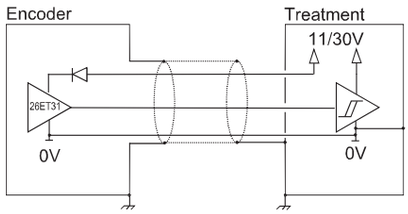
2^0	GN green
2^1	YE yellow
2^2	GY grey
2^3	OG orange
2^4	BU blue
2^5	RD red
2^6	BK black
2^7	VT violet
2^8	WH/BN white/brown
2^9	WH/GN white/green
2^{10}	WH/YE white/yellow
2^{11}	WH/BK white/black
2^{12}	WH/OG white/orange

-	WH white
+	BN brown
Ground/body	General shield

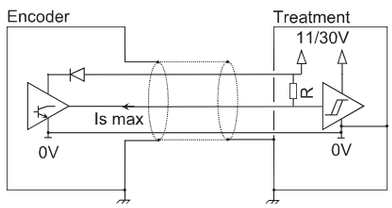
DIRECTION	WH/RD blanc/rouge

POWER SUPPLY/ OUTPUT STAGES

5C5 electronic : Push-pull 11/30Vdc
Power supply : 11 to 30Vdc
Consumption without load : 100mA max
Intensity per channel : Is = 20mA max
0 max (Is=20mA): V_{ol} = 0,5Vdc
1 min (Is=20mA): V_{oh} = Vcc-3Vdc
Protection against short circuits
Protection against inversion of polarity



5CN electronic : NPN CO 11 to 30Vdc
Power supply: 11 to 30Vdc
Consumption without load : 100mA max
Intensity per channel : Is = 20mA max
0 max (Is=20mA): V_{ol} = 1,25Vdc
Protection against inversion of polarity



10 bits encoder example : only MSB (D3 to D12) will be connected

DIRECTION entry :
- Code direction CW : connect White/Red with Brown
- Code direction CCW : connect White/Red with White

ORDERING CODE

	Shaft Ø	Parallel output : 5C5, 5CN		Code	Resolution	Connection	Orientation connection
CAMX (aluminium) **CEMX** (stainless steel)	**12** :12mm	**5**: 11 – 30Vdc	**C5**: Push-Pull 11-30Vdc **CN**: NPNCO 11-30Vdc	**B** : binaire **G** : Gray	**13** … **1**	**T3** : cable gland + PVC cable	Ex. cable : **A030** : cable 3m axial
Ex: CEMX _	**12 //**	**5**	**C5**	**G //**	**13 //**	**T3**	**A030**

ASSEMBLY CAUTION

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An earth situated on the cover must be linked with the ground of the installation

Made in FRANCE

SAUX

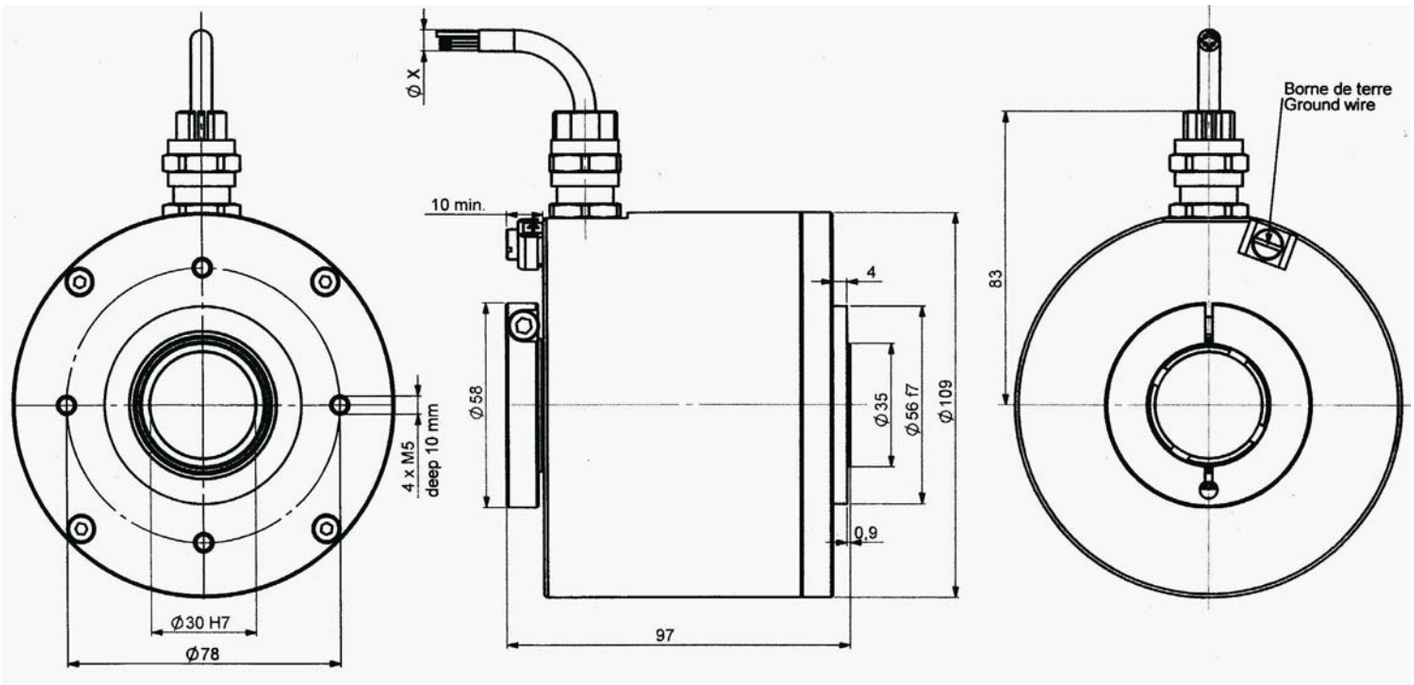
ATEX ABSOLUTE SSI MULTI TURN ENCODER, SAUX RANGE

ATEX certified Explosion-proof encoders according to Directive 94/9/CE

Explosion-proof rotary encoders for hazardous environments gas & dust
Robust design for heavy-duty applications
Hollow through shaft up to 30mm
Application fields: explosive atmospheres except for firedamp mines

EC type examination certificate
Download from our website www.bei-ideacod.com
LCIE 03 ATEX 6407
CE0081
II 2 G/D
EEx d IIC T6
IP6X, T=80°C for D

SAUX_30 connection S7R (radial cable)



CHARACTERISTIC

Material Stainless steel option	Cover: aluminium
	Body: aluminium
Shaft	Stainless steel
Bearings	6807 serie
Maximum load	Axial : 50 N
	Radial : 80 N
Shaft Inertia	≤ 50.10^{-6} kg.m²
Torque	≤ 25.10^{-3} N.m
Permissible max. speed	4 500 min^{-1}
Continuous max speed	3 000 min^{-1}
Shaft seal	Viton

Shock (EN60068-2-27)	≤ 300 $m.s^{-2}$ (during 6 ms)
Vibration (EN60068-2-6)	≤ 100 $m.s^{-2}$ (10 ... 500 Hz)
EMC	EN 50081-1, EN 61000-6-2
Isolation	1 000 V eff
Weight	2kg aluminium body & cover
	5kg stainless steel body & cover
Operating temperature	- 10... + 40 °C (encoder T°)
Storage temperature	- 10... + 70 °C
Protection(EN 60529)	IP 65
Theoretical mechanical lifetime 10^9 turns (F_{axial} / F_{radial})	
25 N / 40 N : 140	50 N / 80 N : 17

SAUX

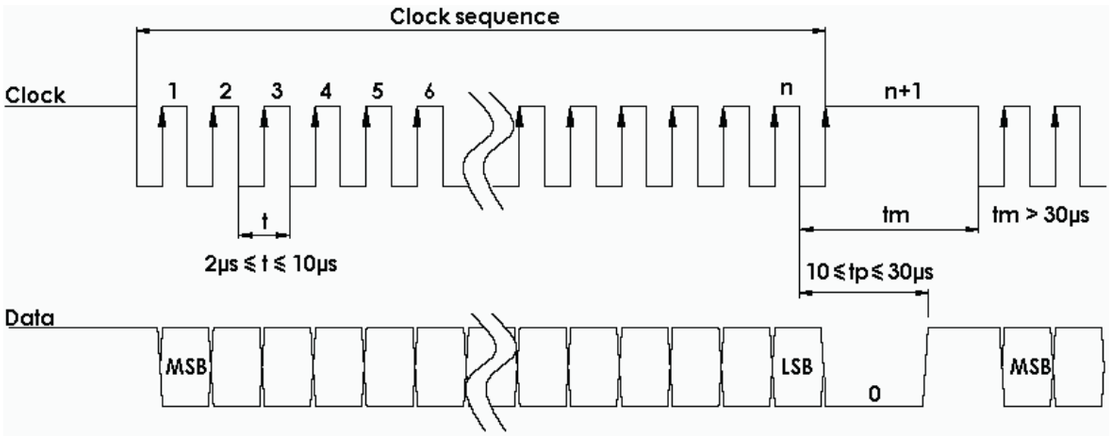
ATEX ABSOLUTE SSI MULTI TURN ENCODER, SAUX RANGE

ELECTRICAL CHARACTERISTIC

Input signal clock CLK	per opto-coupleur
Output signal DATA	line - driver RS422
Clock frequency CLK	100kHz – 500kHz
Precision	+ ½ LSB (13 bits)

Power supply	11 – 30Vdc
Introduction	< 4 s
Consumption without load	< 100mA

SSI TRANSMISSION



Transmission	Transmission up to 400m at 100kHz in function of cable characteristics*
Cable	High security of transmission by using shielded cable and twisted pairs

* Consult us for length > 100m

SSI STANDARD CONNECTION

Type	Vcc	Gnd	Clk+	Data+	Data-	Clk-	DIRECTION	Raz
S7	BN brown	WH white	GN green	GY grey	PK pink	YE yellow	RD red	BU blue

DIRECTION entry :
- Increasing code CW : pin DIRECTION to 0V
- Increasing code CCW : pin DIRECTION to +Vcc

RAZ entry (non turning shaft)
Apply an impulse to +Vcc for at least 1s

ORDERING CODE

	Shaft Ø	Supply	Output stage	Code	Resolution Number of turns	Connection	Connection Orientation
SEUX (stainless steel) **SAUX** (aluminium)	**30**:30 mm	**5** : 11-30Vdc	**SS :** SSI without parity **SP :** SSI with even parity **SI :** SSI with odd parity	**B**: Binary **G** : Gray	**13B12D5** : Resolution : 13 bits Number of turns : 12 bits D5: 25bits frame	**S7**: cable gland + cable	Example : **R020** : radial cable 3m
SEUX _	**30** //	**5**	**SS**	**G** //	**13 B12 D5** //	**S7**	**R030**

ASSEMBLY CAUTION

NEVER OPEN THE ENCODER

NEVER CONNECT/DISCONNECT UNDER POWER SUPPLY/IN PRESENCE OF DUSTS ATMOSPHERE

The customer obliges to take up and to use our products, according to our specifications and to the manners of the profession. Our company would not be responsible for any defect resulting from a defective or erroneous assembly. From a use superior to the standard, or in abnormal conditions. The breakdowns resultant of shocks, bad electric supply, put in low capacity or overcapacity of the product, the environment of bad conditions (humidity, projection, dust, etc) cannot be imputed to us. The converter doesn't require any maintenance. Any encoder presenting a dysfunction will have to be the object of immediate return for control in our facilities. The encoder mustn't be open in any case (cable gland and/or cover)
An earth situated on the cover must be linked with the ground of the installation

Made in FRANCE

DRAW WIRE – LINEAR MEASURING SYSTEM

The draw wire offers a simple and cost-effective solution to measure linear speed and position (relative or absolute). Made up with a neighbouring coil drum onto which the cable winds / unwinds, it converts the cables linear movement into rotary movement which can be measured by the sensor : incremental, absolute or analogue encoder

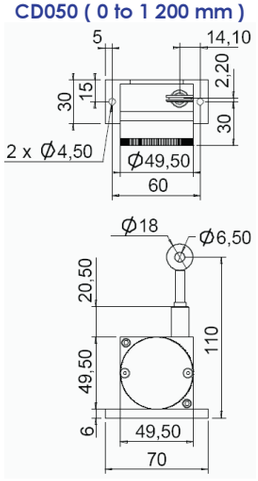
The use of an incremental encoder allows it to measure the winding / unwinding speed and the relative position of the application. The resolution choice of the incremental encoder allows the user to obtain the desired number of pulses per millimetre, ie : with a 300mm circumference drum and an 3000ppr incremental encoder, the resolution will be 10 pulses per millimetre

The use of an absolute multiturn encoder provides one precise code for each linear position

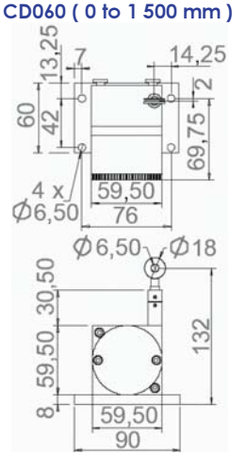
BEI IDEACOD offers draw wires up to 50m with

- Incremental or/and absolute encoder (with parallel, SSI, Profibus, CANopen, DeviceNet)
- Analogue sensor ; potentiometer or process output ; 4 to 20 mA, 0 to 10V or 0 to 20mA (absolute position measure)

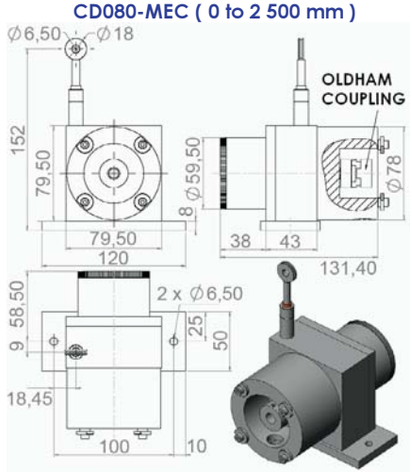
CD050 (0 to 1 200 mm)



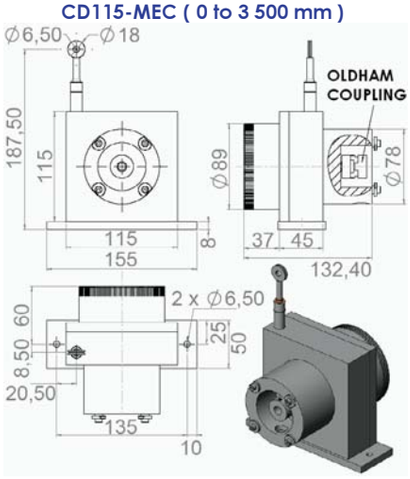
CD060 (0 to 1 500 mm)



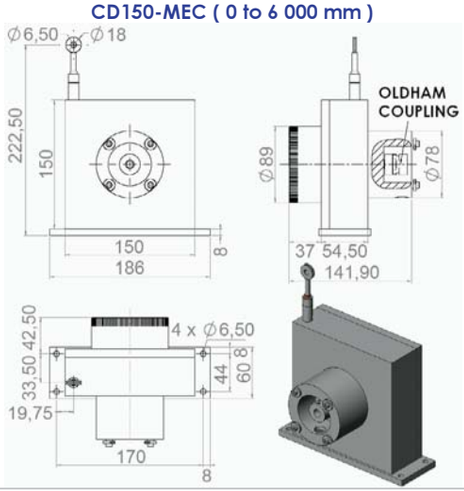
CD080-MEC (0 to 2 500 mm)



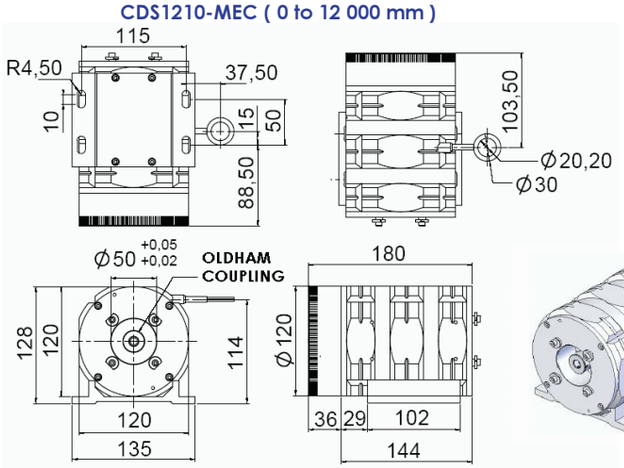
CD115-MEC (0 to 3 500 mm)



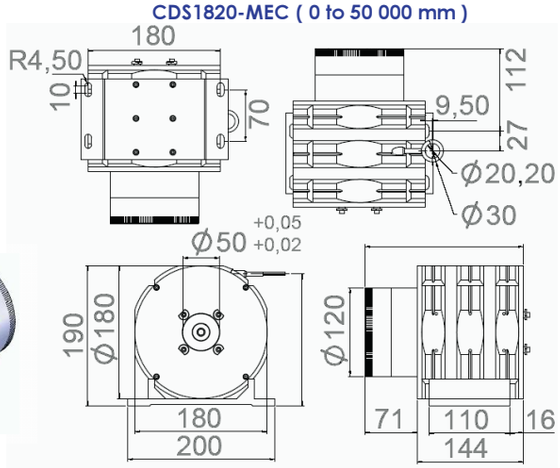
CD150-MEC (0 to 6 000 mm)



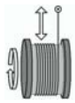
CDS1210-MEC (0 to 12 000 mm)



CDS1820-MEC (0 to 50 000 mm)



DRAW WIRE – LINEAR MEASURING SYSTEM – STANDARD RANGE

DRAW WIRE	Total range	Drum Circumference	Flange	Linearity
	Maximum total range of the mechanical system (mm)	mm/turn	**L005** (standard) = ±0.05% full scale **L001** (option) = ±0.01% full scale	**OP-10** Adaptation flange for 58mm encoder Encoder shaft :10mm
 **CD050**	1 200	100	L005 or L001	Only with GHM4_L6
CD060	1 500	152,4	L005 or L001	Only with 10mm encoder
CD080-MEC	2 500 (2 000 ana. version)	204,8	L005 or L001	OP-10
CD115-MEC	3 500 (3 000 ana. version)	300 (317,6 ana. version)	L005 or L001	OP-10
CD150-MEC	6 000 (4 000 ana. version)	409,6	L005 or L001	OP-10
CDS1210-MEC	8 000	300	L005 or L001	OP-10
CDS1210-MEC	10 000	300	L005 or L001	OP-10
CDS1210-MEC	12 000	300	L005 or L001	OP-10
CDS1820-MEC	15 000	500	L005 or L001	OP-10
CDS1820-MEC	20 000	500	L005 or L001	OP-10
CDS1820-MEC	25 000	500	L005 or L001	OP-10
CDS1820-MEC	30 000	500	L005 or L001	OP-10
CDS1820-MEC	35 000	500	L005 or L001	OP-10
CDS1820-MEC	40 000	500	L005 or L001	OP-10
CDS1820-MEC	50 000	500	L005 or L001	OP-10
Reference example	CDS1820-MEC	20 000	500	L005	OP-10

Ex. incremental encoder : : CDS1210 – MEC – 8000 – 300- L005 - OP - 10 + DHM5_10 // PP5 9 // 00250 // G6R
Ex. absolute encoder : CDS1820 – MEC – 35000– 500- L005 + PHM5_06 // PPS G // 13B12D5 // P6R // **03**

Note : Possibility to mount a 6mm encoder with a Servo flange (ref : 9500/003) without option ''OP-10''

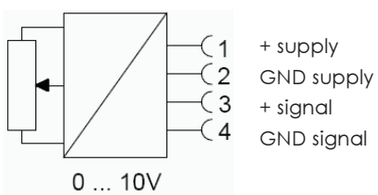
ANALOGUE OUTPUT DRAW WIRE

Series	Total range	Measurement origin (mm)	Full scale end (mm)	Output	Linearity	Output
CD	mm (corresponds to the chosen series)	**x**: in mm	**y**: in mm	**U010**: 0/10 V **I420**: 4/20 mA (2 wires) I020 : 0/20mA (2 wires) Ex. potentiometer: **R01K**: 1KΩ **R500**: 500 Ω...	Standard : **L15** : ±0.15% Option : **L10** : ±0.10%	**C** : DIN type R version: 3 pins U/I version: 8 pins
Reference example	CD080	2 000	0	1800	I420	L15	C

Analogue output 0…10V (U010)

CB8 connector
Seen from soldered side DIN45326

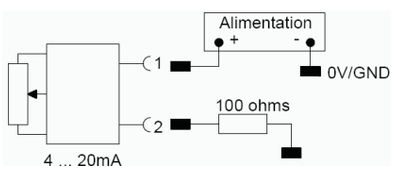
With 8 pinouts connector DIN45326
Pinout 1: + supply (red)
Pinout 2: GND supply (blue)
Pinout 3: + signal (green)
Pinout 4: GND signal (yellow)



Analogue output 4…20mA (I420) or 0…20mA (I020)

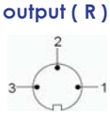
CB8 connector
Seen from soldered side DIN45326

With 8 pinouts connector DIN 45326
Pinout 1: + (red)
Pinout 2: GND (blue)



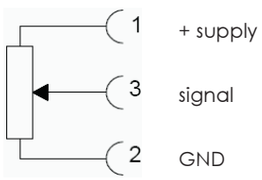
Subsequent electronic load

Potentiometer output (R)



CB3 connector
Seen from the soldered side DIN41524

With 3 pinouts connector DIN 41524
Pinout 1: + Supply (red)
Pinout 2: GND (blue)
Pinout 3: Signal (green)

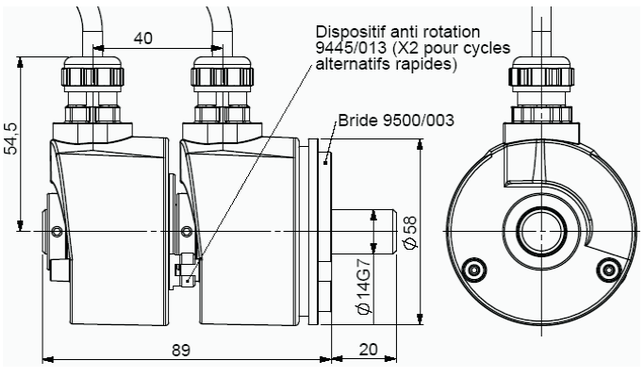


MODULAR MECHANIC ASSEMBLING

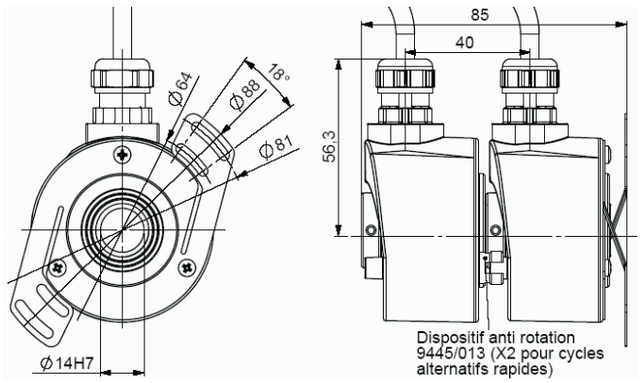
DUPLEX MOUNTING

In some applications, two or three different resolutions or signals (incremental or absolute) can be required: redundancy signals to guarantee continuous operation of costly equipment, distribution of the signals to two controllers; use of incremental and absolute signals; commutation channels needed, etc.
The assembly of two or even three encoders on the same shaft appears as elegant and inexpensive solution. All of the **BEI IDEACOD** encoder range has been developped to easily cope with this type of mounting : in through shaft version for a direct installation on the turning shaft or on an added solid shaft on which 2 or 3 encoders can be mounted

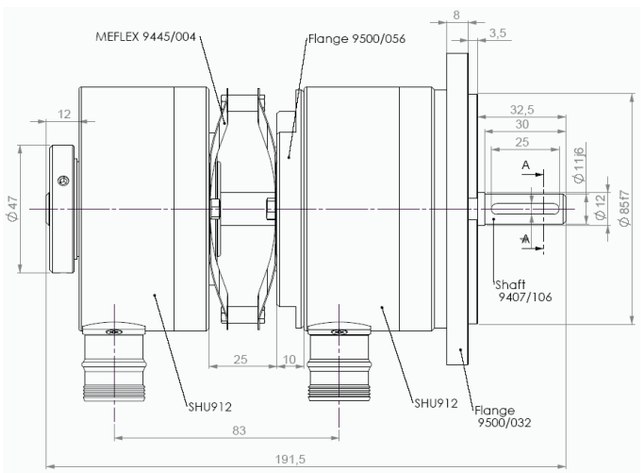
Duplex mounting of 2 *DIGISINE*™
DHO5, 58mm, in solid shaft



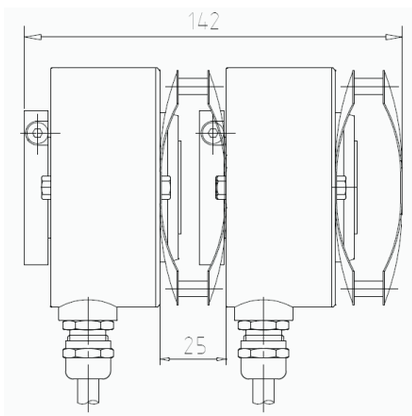
Duplex mounting of 2 *DIGISINE*™
DHO5, 58mm, in through shaft



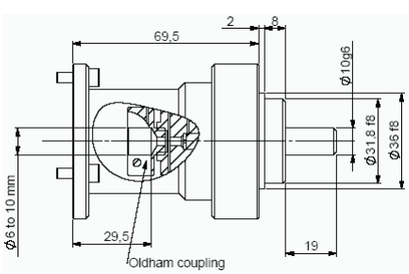
Duplex mounting of 2 *ROBUSTECH*™
SHU9, 90mm, in solid shaft



Duplex mounting of 2 *ROBUSTECH*™
GHU, 90mm, in through shaft

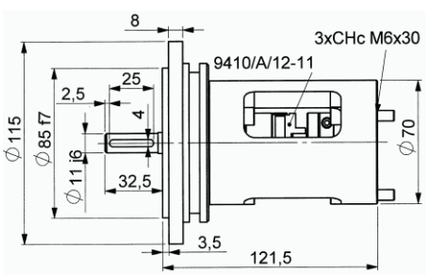


HIGH LOAD COUPLING DEVICE : Go between stage system in case of high radial / axial load on the shaft



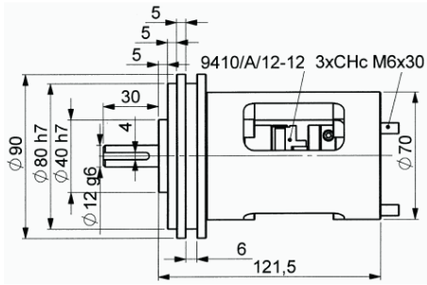
Compatible flange with 58mm encoder

Ref: **MPAL58**



Compatible flange with 90mm encoder 11mm shaft

Ref: **MPAL11**



Compatible flange with 90mm encoder 12mm shaft

Ref: **MPAL12**

Also in our mechanics accessory range : specific flange, fixing bells, pinions, racks, measuring wheels, ajustable spring brackets, consult us !

MODULAR MECHANIC ASSEMBLING

OVERSPEED FUNCTION WITH CENTRIFUGAL SWITCH

The overspeed switch function on the ***ROBUSTECH™*** range – a sturdy mechanical security module without external power supply:

- radial commutation centrifugal switch without permanent contact
- high quality mechanics and reliability
- excellent repeatability
- secure system, works without power supply
- modular mounting possibility
- commutation speed : standard calibration range between 800 and 4 000 rpm (rotation per minute)

Especially designed for heavy duty industry (steel and paper mills, lumber, cranes, engine etc...). Sturdy compact conception. Excellent resistance to shocks/vibrations and to extreme axial/radial loads
- 12mm or 11mm solid shaft with 115mm REO (Euroflange B10) for tacho-generator type mounting
- up to 20mm for the blind shaft (reduction hubs available)

example of triple mounting with blind shaft

example of double mounting solid shaft

The compact assembly proposed by BEI IDEACOD, allows the combination of overspeed switch and encoder presenting a particularly interesting cost / performances relation

CENTRIFUGAL SWITCH CHARACTERISTICS

Material	Cover : zinc alloy	Weight	1,10kg
	Body: aluminium	Operating temperature	-30 … +130°C
Max. speed	1,50 . n_s	Protection (EN 60529)	IP 67 (mounted)

Characteristics given for a horizontal mounting. Application example : motor race detection

Switching speed	800 … 4 000 rpm	Max current	6 A / 240 Vac
Principle	centrifugal	Contact material	silver-cadmium
Mechanical life-time	500 000 cycles	Maximum breaking sequence	4/min
Contact type	Opened or closed	Breaking accuracy	min^{-1} - 5% … +8%

AVAILABLE COMBINATION (Consult us for special version: ex: flange / connection / specific speed...)

Available combination
- incremental encoder + overspeed switch
- tacho-encoder + overspeed switch
- absolute encoder + overspeed switch
- incremental encoder + opto-tacho + overspeed switch
- overspeed switch + overspeed switch …

Standard speeds (rpm) : 1 000, 1 200, 1 500, 1 800, 3 000 (consult us for other speed)

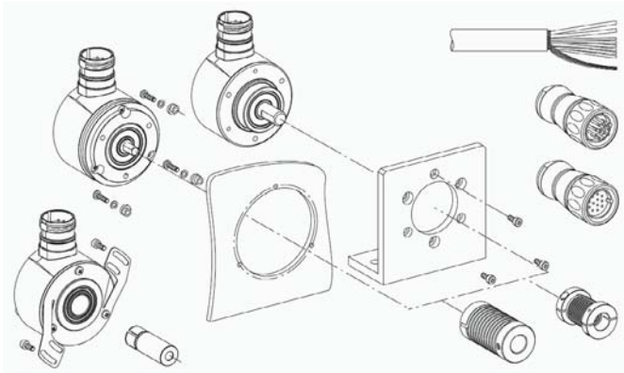
Reference: consult us

Note : The switch commutation speed is calibrated in our factory, no correction and no later modification is possible

Made in France

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

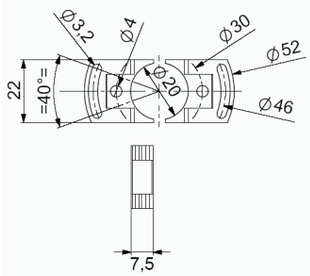


Available standard shaft diameter	
x	06 08 10 12 14
y	06 08 10 12
z	06 08 10 12 14
w	10 12 14 16 18 20 25

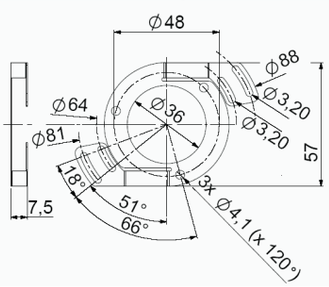
[1)] the flange / the DAC is already mounted on the encoder

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

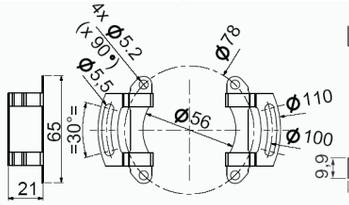
Ref : **9445/006**



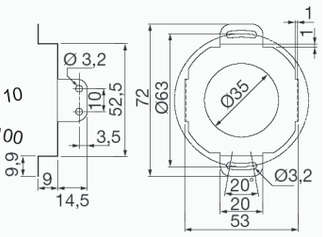
Ref : **9445/015**



Ref : **9445/009**

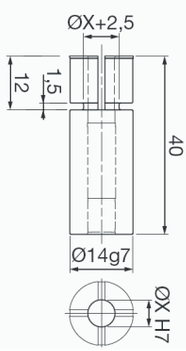


Ref : **9445/017**

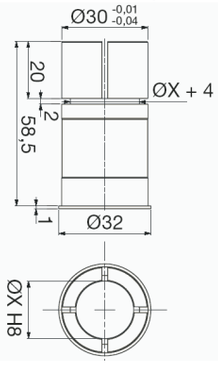


Reduction hub : available for through / blind hollow shaft encoder

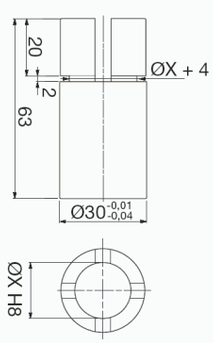
Ref : **9431/A**



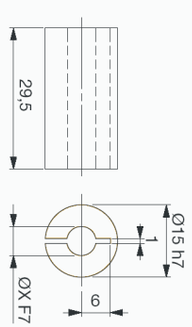
Ref: **9418/I**



Ref: **9419/A**



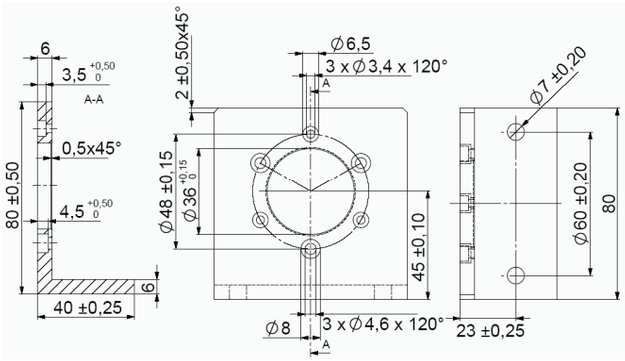
Ref: **9432**



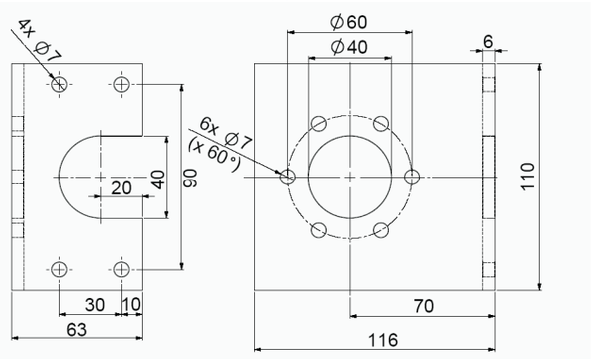
STANDARD MECHANICAL ACCESSORIES

Square flange for solid shaft encoder

Ref : **9202**

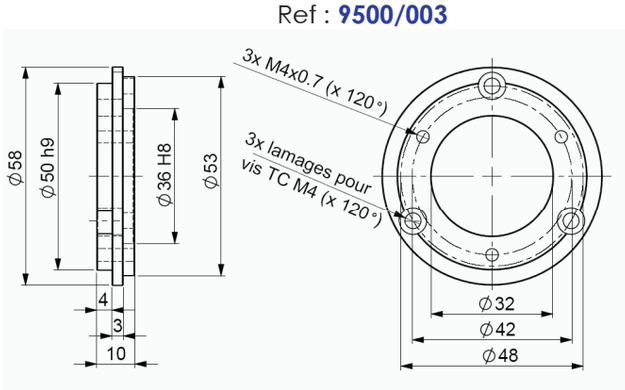


Ref : **9302**

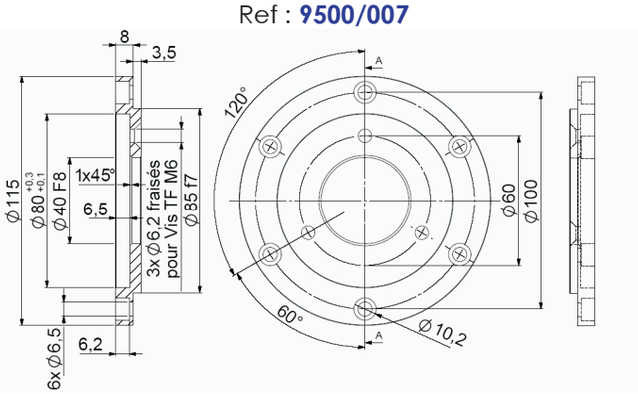


Flange for solid shaft encoder

Ref : **9500/003**

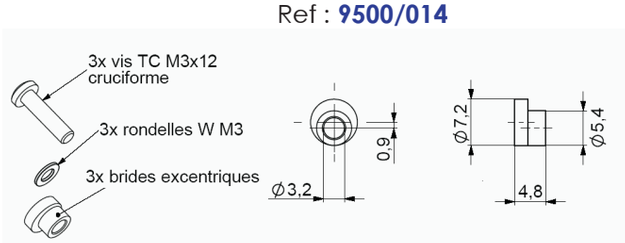


Ref : **9500/007**

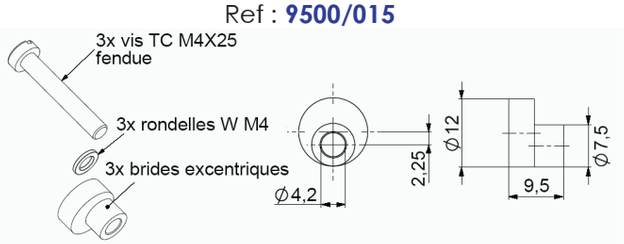


Mounting screws for synchro mounting

Ref : **9500/014**

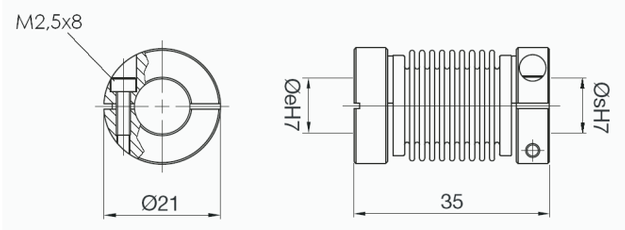


Ref : **9500/015**



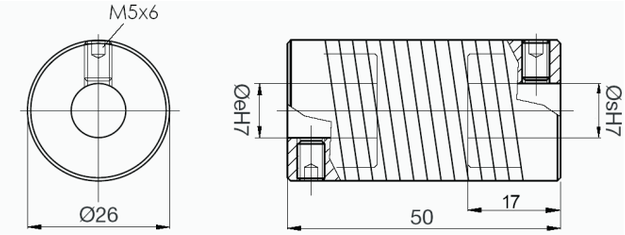
Couplings for solid shaft encoders

Ref : **9403**



Bellow coupling

Ref : **9401**



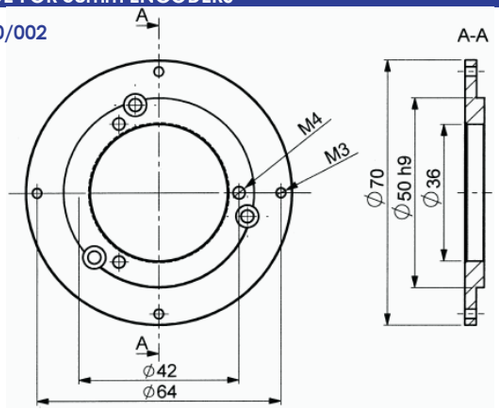
Spring coupling

COMPLEMENTARY MECHANICAL ACCESSORIES - FLANGES

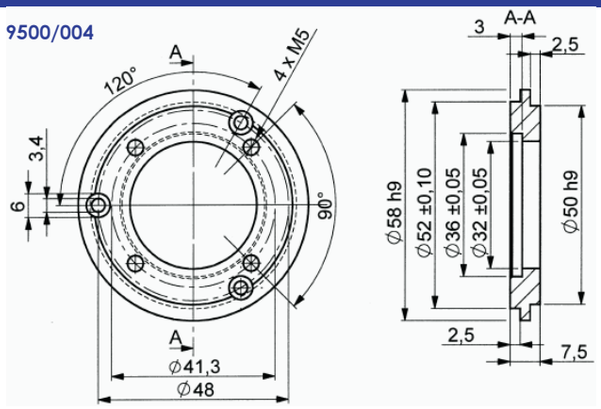
Large choice of adaptation flange – mounting system for all standard encoders

FLANGE FOR 58mm ENCODERS

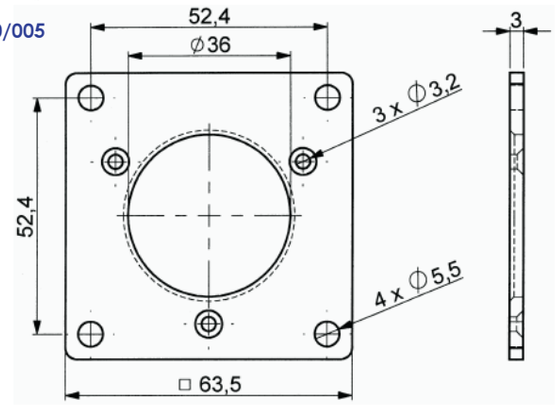
9500/002



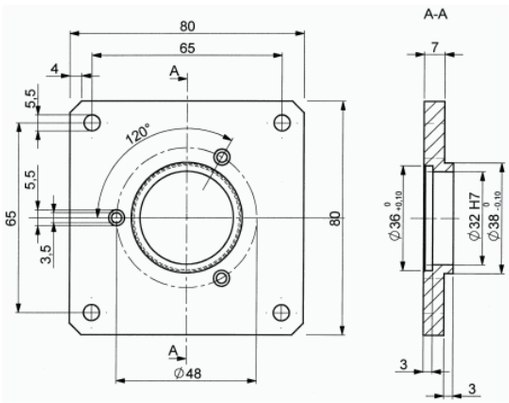
9500/004



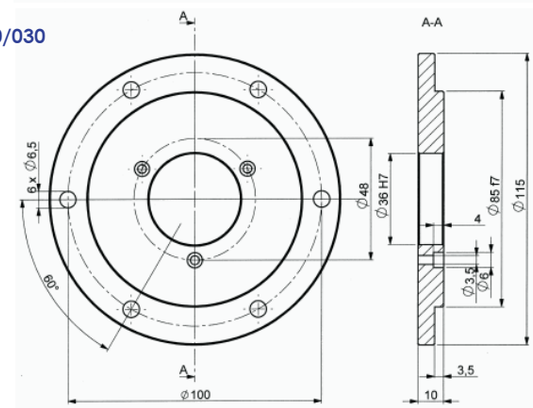
9500/005



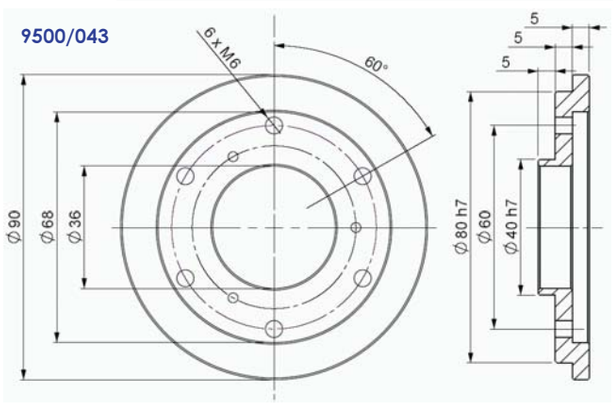
9500/006



9500/030

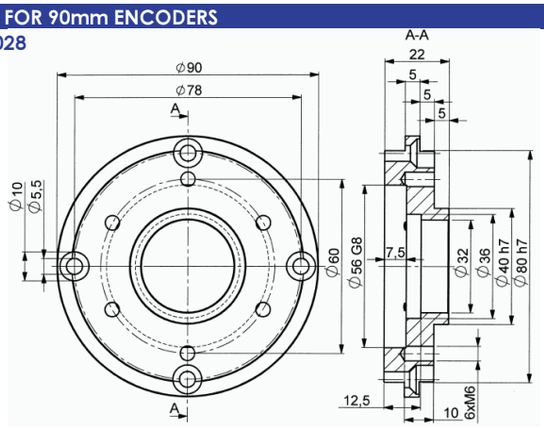


9500/043

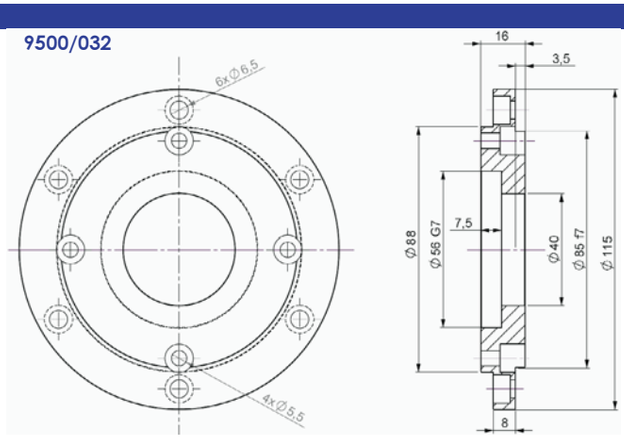


FLANGE FOR 90mm ENCODERS

9500/028



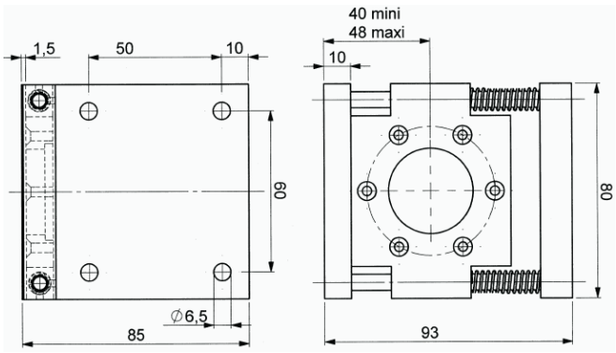
9500/032



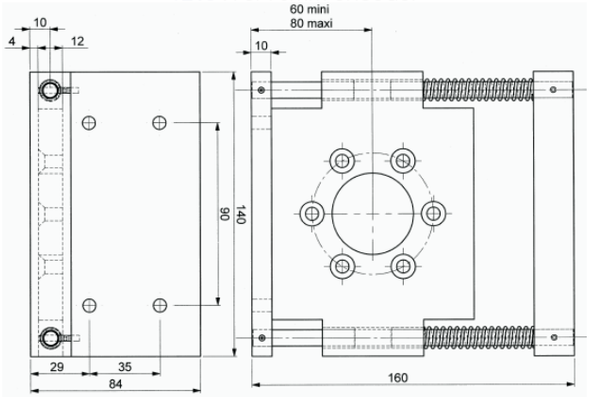
COMPLEMENTARY MECHANICAL ACCESSORIES

Ajustable spring brackets

9212 : For 58mm encoder, 36mm centering



9213 : For 90mm encoder



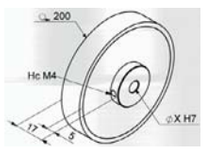
Measuring whells

200mm circumference, 6 to 10mm shaft

9108 Polyurethane plastic

9109 Knobbled rubber

9110 Knurled aluminium



500mm circumference, 8 to 12mm shaft

9101 Polyurethane plastic

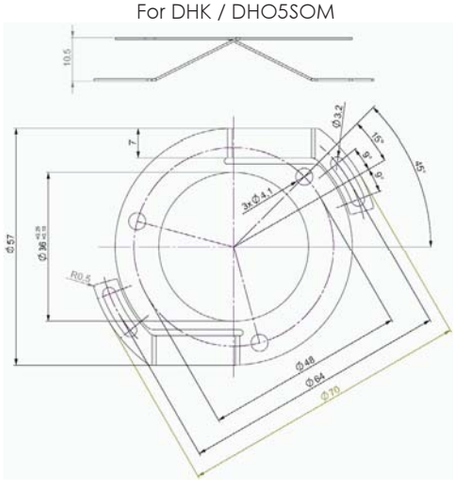
9102 Knobbled rubber

9103 Knurled aluminium

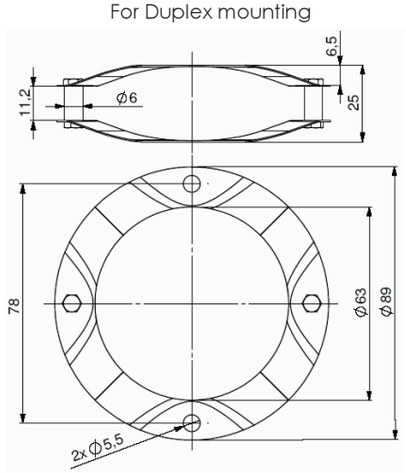
Pinions / racks also available for linear measure : consult us

Anti-rotation system

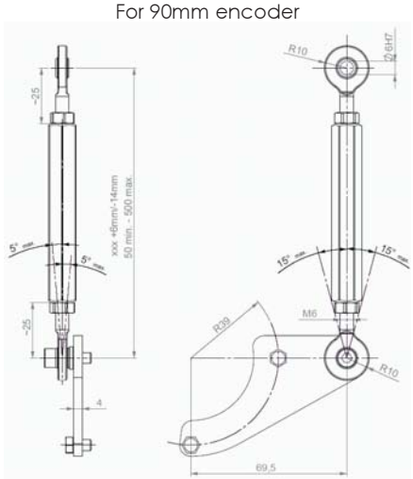
9445/016
For DHK / DHO5SOM



9445/004 MEFLEX
For Duplex mounting

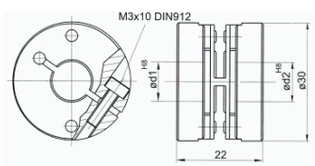


M9230 torque arm system
For 90mm encoder

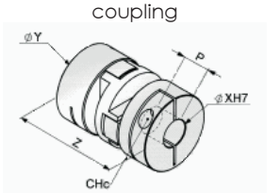


Specific coupling

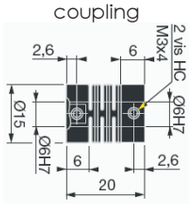
9400 : flexible washer coupling



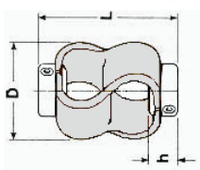
9410 : ''OLDHAM'' coupling



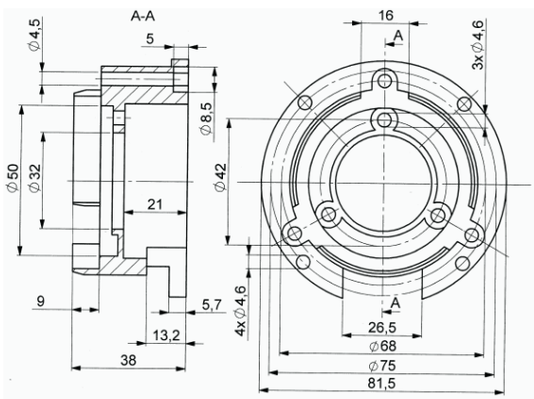
9417 : plastic coupling



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

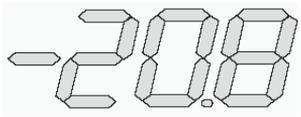
PRODUCT RANGE FOR AUTOMATION AND MOVEMENT CONTROL

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 :

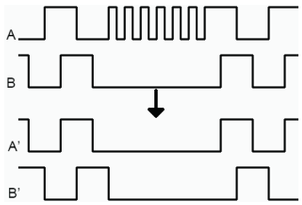
- Digital displays for incremental and absolute encoder: measure and display of angular positions, linear movement, positioning systems, cut to length, rotary and linear speed, etc...

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

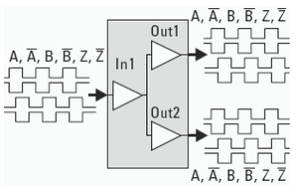
- A large choice of cables, connectors, counter connector, extension cables cut to length...



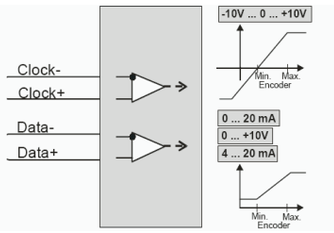
Multi-function indicators
- for all types of encoders (incremental, SSI, parallel, analog…)
- adjustable scaling factor
- analog output, relay…



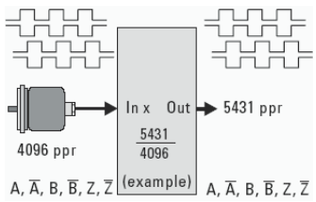
Anti-dither module
- 24Vdc power supply
- universal impulse input TTL/RS422 or HTL
- output level TTL/RS422 or HTL can be selected
- for start/stop or high vibrations application



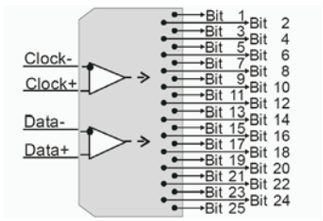
Changeover switch, distributor and splitter for encoder signals
- 5-30Vdc power supply
- input levels optional TTL/RS422 or HTL
- output levels individually adjustable to TTL/RS422 or HTL (10/30V)
- also available for SSI encoders



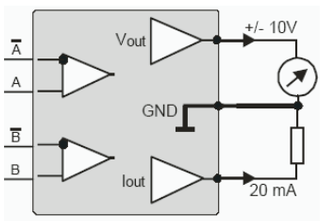
Converter SSI → analog
- 18-30Vdc power supply
- suitable for use with SSI encoders
- analog outputs proportional to the encoder position
- also available for incremental encoders



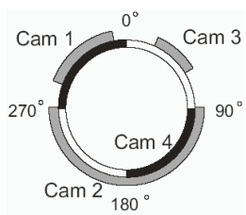
Universal level converter, frequency division/multiplication, direction detection…
- 18-30Vdc power supply
- universal impulse inputs TTL/RS422 or HTL
- programmable quadrature frequency divider for error free division of the inputs signals



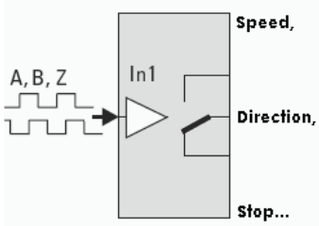
Deserialisation interface
- 18-30Vdc power supply
- SSI input
- Gray , binary, BCD output, HTL lor TTL level



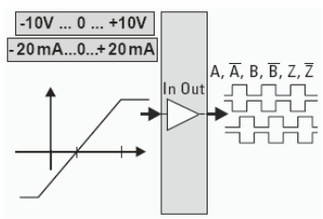
Signal converter frequency → analog/RS232
- 18 – 30Vdc power supply
- universal impulse input TTL/RS422 (A, A/, B, B/) or HTL (A/B or only A)
- wide input range : 1Hz to 500kHz
- bipolar output +/-10Vdc and 0-20mA or 4-20mA



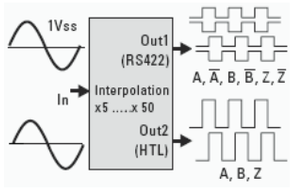
Cam controller
- 24Vdc power supply
- for incremental and absolute SSI encoders
- from 8 to 24 cams output



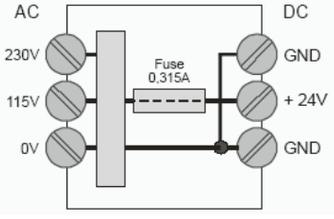
Monitor for speed, direction of rotation and standstill
- 115/230Vac or 18/30Vdc power supply
- impulse input A & B type TTL or HTL
- wide range of input frequency



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

PRO-020S001 – CONFIGURATION CABLE FOR *POSI+*™

The **PRO-020S001** extension cable permits to connect simply your programmable ***POSI+***™ encoder to you PC, it is composed of:

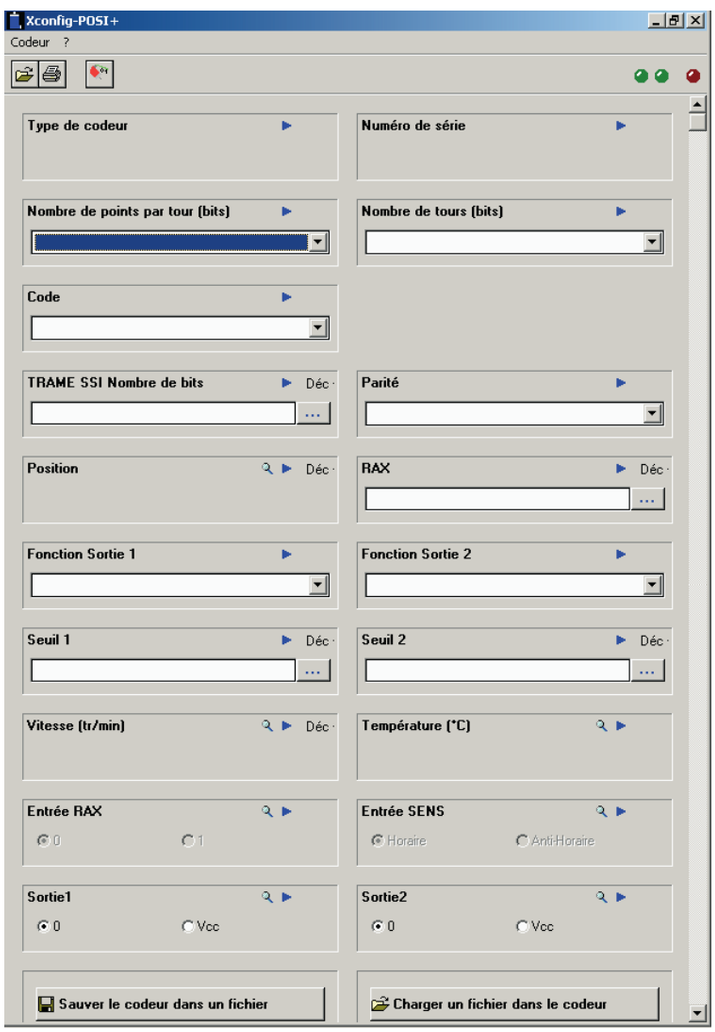
- A power supply to be plugged into the mains (230Vac/12Vdc), this powers the encoder
- At one side: a M23 12 pins connector to be screwed on the programmable encoder (PHM5, PHO5, PHM9 or PHU9)
- AT the other side a SUBD9 female connector to be plugged on a serial port of your PC

Ordering reference : **PRO-020S001**

Note / connecting cautions :
The connection / disconnection of the connectors have to be done only after having disconnect the mains power (230Vac/12Vdc)

The programming software is downloadable from our web site :

www.bei-ideacod.com



In order to optimize the installation times of SSI encoders, BEI IDEACOD has developed a user friendly software package, easy to use, with which it's possible to program your encoder in WINDOWS in only 2 minutes. With a simple connection to the serial connector of your PC, you can :

- configure : the number of points per revolution, the number of turns, the code type, SSI frame bit number, the parity, reset value

- read : type of selected encoder, the serial number of the encoder, the position of the encoder, the temperature, the speed of rotation, the level of the input/output

- save the chosen configuration, load saved configurations

- function of the outputs and limit value : position, speed of rotation, temperature, incremental channels 2048 ppr

Made in FRANCE

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)

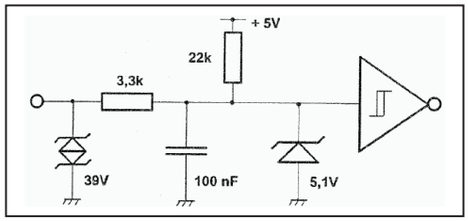
NB :

- 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…

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