Incremental Encoder
Absolute Encoder

Measuring
Driving
Controlling

1965–2015
50 Jahre
MEYLE®

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Incremental Encoders

Version	Incremental magnetic encoder shaft	Incremental encoder shaft	Incremental encoder hollow shaft	Incremental encoder shaft and hollow shaft
Type series	DINMS24	BINS24	BINB24	AINS40/AINS40Z AINH40Z
Electrical characteristics				
Output	RS 422/Push-pull	Push-pull	Push-pull	RS 422/Push-pull
Supply voltage (VDC)	5 or 5 ... 30	5 ... 24 or 8 ... 30	5 ... 24 or 8 ... 30	5 or 11 ... 30 or 5 ... 24
Mechanical characteristics				
Shaft Ø (mm)	6	4/5/6	4/6	6
housing diameter (mm)	24	24	24	40
max. speed (min^{-1})	12000	12000	12000	12000
max. shaft load radial/axial (N)	80/50	10/20		20/10
max. working temp. (°C)	–40 ... +80	–20 ... +85	–20 ... +85	–20 ... +80
Protection to	IP 65/IP 67	IP 64	IP 64	IP 52
Type of connection	cable, connector	cable	cable	cable
max. resolution	1024	1080	1024	1024
highlights or product differentations	miniature version	miniature version	miniature hollow shaft version	standard hollow shaft version
page	22	23	25	27/28




Incremental Encoders

Version	Incremental encoder shaft	Incremental encoder hollow shaft	Incremental encoder shaft and hollow shaft	Incremental encoder shaft
Type series	EINS40	EINH50	FINS58/FINH58	AINS58
Electrical characteristics				
Output	RS 422/Push-pull	RS 422/Push-pull	RS 422/Push-pull/sine wave	RS 422/Push-pull
Supply voltage (VDC)	5 or 5 ... 26	5 or 5 ... 30	5 or 5 ... 30 or 4,75 ... 30	5 or 4, 75 ... 30
Mechanical characteristics				
Shaft Ø (mm)	6	6/8/10/12/14/15	6/10 or 6/8/10/12/14	6/10
housing diameter (mm)	40	50	58	58
max. speed (min^{-1})	6000	10000	9000/12000	8000
max. shaft load radial/axial (N)	20/30	100/80	100/50	38/40
max. working temp. (°C)	–20 ... +70	–20 ... +85	–30 ... +100	–20 ... +70
Protection to	IP 62	IP 65/IP 67	IP 65/IP 67	IP 65
Type of connection	cable	cable, connector	cable, connector	cable, connector
max. resolution	1024	5000	80000 (interpolatet)	2499
highlights or product differentations	standard version	standard version	standard version Option: programmable sine wave output	economical version Option: up to +100 °C
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SELECTION GUIDE

Incremental Encoders

Version	Incremental encoder shaft	Incremental encoder hollow shaft	Incremental encoder hollow shaft	Incremental encoder shaft
Type series	EINS58	CINH76	EINH80	AINS90/AINS90S
Electrical characteristics				
Output	RS 422/Push-pull	RS 422/Push-pull	RS 422/Push-pull	RS 422/Push-pull
Supply voltage (VDC)	5 or 5 ... 30	5 or 10 ... 30	5 or 10 ... 30	5 or 11 ... 30
Mechanical characteristics				
Shaft Ø (mm)	6/8/10	15 ... 42	38/40/42/44	11/12
housing diameter (mm)	58	76	81	90
max. speed (min^{-1})	10000	6000	6000	6000
max. shaft load radial/axial (N)	240/140			200/100
max. working temp. (°C)	–20 ... +85	–25 ... +100	–25 ... +100	–20 ... +80
Protection to	IP 65	IP 40/IP 64	IP 54/IP 64	IP 65
Type of connection	cable	cable	cable	cable, connector
max. resolution	25000	10000	4096	10000
highlights or product differentations		large hollow shaft diameter	large hollow shaft diameter	heavy duty high resolution
page	38	40	42	44

Incremental Encoders

Version	Incremental encoder shaft	Incremental encoder hollow shaft	Incremental encoder hollow shaft	Incremental encoder hollow shaft
Type series	EINS90	AINH90/AINH90S	EINH90	AINH100
Electrical characteristics				
Output	RS 422/Push-pull	RS 422/Push-pull	RS 422/Push-pull	RS 422A/Push-pull
Supply voltage (VDC)	5 or 11 ... 26	5 or 11 ... 30	5 or 5 ... 26	4.75 ... 30
Mechanical characteristics				
Shaft Ø (mm)	11/12	12/20/25/30/32	30	26/38/44
housing diameter (mm)	90	90	90	100
max. speed (min^{-1})	6000	4500	3500	4000
max. shaft load radial/axial (N)	30/30		30/30	80/60
max. working temp. (°C)	–20 ... +85	–20 ... +80	–20 ... +85	–20 ... +70
Protection to	IP 54/IP 64	IP 65	IP 62	IP 54
Type of connection	cable	cable, connector	cable	cable, connector
max. resolution	6000	10000	4096	25000
highlights or product differentations	heavy duty high resolution	heavy duty hollow shaft	heavy duty large hollow shaft diameter	heavy duty hollow shaft
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SELECTION GUIDE

Incremental Encoders
Overspeed switches




Version	Incremental encoder hollow shaft	Incremental encoder hollow shaft	Incremental encoder hollow shaft	Overspeed Switch with encoder
Type series	DINH100	EINH100	DINH145	AOSS90
Electrical characteristics				
Output	RS 422/Push-pull	RS 422A/Push-pull	RS 422/Push-pull	NO, NC
Supply voltage (VDC)	4,75 ... 5,5 or 10 ... 30	5 or 5 ... 30	4,75 ... 5,5 or 10 ... 30	240 VAC / 6 A
Mechanical characteristics				
Shaft Ø (mm)	25 ... 45	26/28/30/32/38/40/42	48 ... 72	11, 12
housing diameter (mm)	100	100	145	90
max. speed (min^{-1})	3500	10000	800	9000
max. shaft load radial/axial (N)	200/100	240/140	200/100	200/100
max. working temp. (°C)	–10 ... +70	–20 ... +85	–10 ... +70	–30 ... +130
Protection to	IP 54	IP 65	IP 54	IP 66
Type of connection	cable, connector	cable	cable, connector	connector, terminal box
max. resolution	4096	10000	2500	4000
highlights or product differentations	heavy duty large hollow shaft diameter	heavy duty hollow shaft	heavy duty large hollow shaft diameter	heavy duty centrifugal overspeed switch; multiple mounting possibilities with incremental and absolute encoders
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Overspeed switches
Linear Encoders




Version	Overspeed switch/ Rotation Speed monitor	Connector belt monitor with overspeed switch	Draw Wire	Magnetic linear encoder system
Type series	6KB44110/AL-Ni	6KB4111	CDxx	KLME01
Electrical characteristics				
Output	2 Relay contacts r/l	2 Relay contacts r/l	see section	PPL/TTL/RS422
Supply voltage (VDC)	Internally generated	Internally generated		10 ... 30
Mechanical characteristics				
Shaft Ø (mm)	Pin adapter	Pin adapter		
housing diameter (mm)	120	120		
max. speed (min^{-1})	6000	6000		
max. shaft load radial/axial (N)				
max. working temp. (°C)	–25 ... +70	–25 ... +70		–25 ... +85
Protection to	IP 65	IP 65		IP 67
Type of connection	M 20 cable gland	M 20 cable gland		cable
max. resolution				5/10/25/62.5 µm
highlights or product differentations	Electrojnic overspeed switch, Speed range adjustable from 60–6000 rpm	heavy duty conveyor belt speed monitor	incremental or absolute encoder	measuring length up to 100 mm High resolution up to 0.001 mm
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SELECTION GUIDE

Linear Encoders
Absolute Encoders




Version	Magnetic linear encoder profile system	Sealed magnetic measuring scale	Absolute magnetic encoder, singleturn, multiturn, shaft and blind shaft	Absolute encoder, single-turn and multiturn shaft, hollow and blind shaft
Type series	KLME02	KMLE03	DAMxx37/58	CAxx37
Electrical characteristics				
Output	PPL/TTL/RS422	PPL/TTL/RS422	SSI/CANopen	SSI/BiSS option SinCos
Supply voltage (VDC)	10 ... 30	10 ... 30	5 or 10 ... 30	5 or 7 ... 30
Mechanical characteristics				
Shaft Ø (mm)			6, 8, 10, 12, 14	6 or 8
housing diameter (mm)			37/58	37,5
max. speed (min^{-1})			12000/8000	12000
max. shaft load radial/axial (N)			80/50 or 125 (220)/120	
max. working temp. (°C)				
Protection to	–25 ... +85	–25 ... +85	–40 ... +80	–25 ... +100/–15 ... +120
Type of connection	IP 67	IP 67	IP 67	IP 64/IP 40
max. resolution	cable	cable	cable, connector	cable, PCB connector
highlights or product differentations	5/10/25/62.5 µm measuring length up to 100 mm High resolution up to 0.001 mm	5/10/25/62.5 µm measuring length up to 100 mm High resolution up to 0.001 mm	14/40 bit compact and heavy duty industrial absolut magnetic encoder	29/31 Bits miniature version high temperature
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Absolute Encoders



Version	Absolute encoder, singleturn and multiturn shaft and blind shaft	Absolute encode multiturn shaft and hollow shaft
Type series	CAxx58	FAxx90
Electrical characteristics		
Output	SSI/BiSS/Parallel/Profibus DP/Device Net/ CANopen/Interbus	SSI/Profibus/CANopen
Supply voltage (VDC)	5 or 10 ... 30	Parallel on request 11 ... 30
Mechanical characteristics		
Shaft Ø (mm)	6/10 or 10/12	11/12 or 12/20/25/30
housing diameter (mm)	58	90
max. speed (min^{-1})	12000	9000/6000
max. shaft load radial/axial (N)	60/40	200/100
max. working temp. (°C)	–40 ... +100	–20 ... +90
Protection to	IP 64/IP 67	IP 65/IP 67
Type of connection	cable, connector	cable, connector
max. resolution	29 Bit	29 Bit
highlights or product differentations	High temperature	heavy duty large hollow shaft diameter
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- Specifications are subject to change without notice.
- Due to RoHS EU directive 2002/95/EC, housings will be changed to lead free colours without further notice. For actual RoHS status please consult factory

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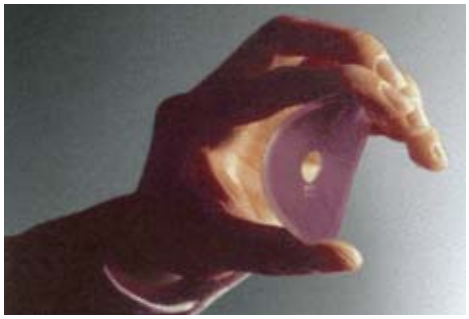
GENERAL/OVERVIEW
Introduction

Description



The optical rotary encoder is an angular position sensor. It is made source of light, light emitting diode (or LED), a receptor and a disk rotating in between. The optical disk with dark and clear radial lines is mounted on the rotating shaft of the encoder. Most of the disks used by Meyle are Polyfass (Mylar-Mica composite) and are unbreakable (see photo). The light from the LED crosses the lines on the disk and creates an analogical signal in the receptor, which is later amplified and could be converted in either square-wave or sine-cosine signals. All Meyle encoders use the differential reading, helping to compensate the reduction of the amplitude of the signals due to higher temperature, age, wearing of the bearings, etc.

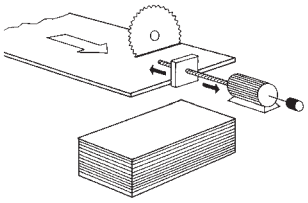
Incremental encoders simply count the number of pulses engraved on the disk and in case of power shut-down, it is necessary to find out the origin at every new start.

Single-turn absolute encoders determine their position at all times using a single code in a given single revotution, even if there is no reference measurement.

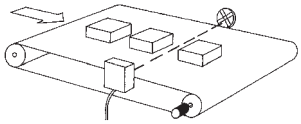
Multi-turn absolute encoders provide in addition a reading of the position within the revolution and is capable of counting the number of turns made.

Applications

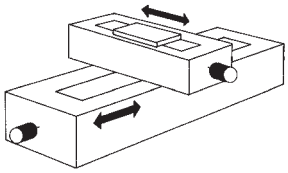
Stop dog positioning



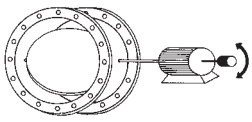
Workpiece lengthmeasurement system with opto electric and encoder



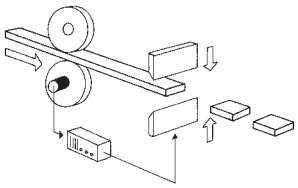
Crosstable positioning



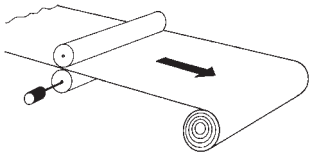
Valve position control



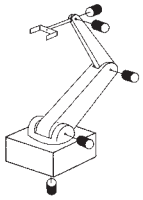
Length dimension with measuring wheel



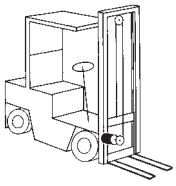
Lengthmeasuring of textile or paper rolls



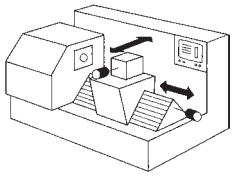
Roboter axis control



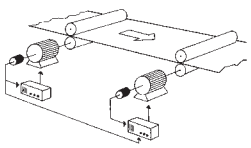
Fork hight measuring at fork trucks



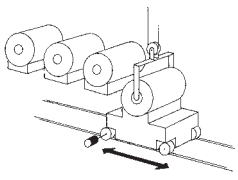
Positioning at CNC-tooling-machines



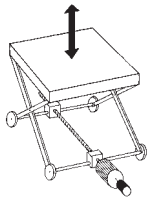
Tensile stress control



Control of transport vehicles



Adjustment of lift platforms



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GENERAL/OVERVIEW
General

Conformity:

All Meyle encoders fully comply with the CE-regulations and are intensively tested in our EMC laboratories. They conform to CE requirements according to EN 50082-2, EN 50081-2 and EN 55011 class B.

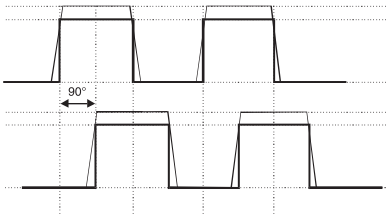
High quality of signals:

All encoders from Meyle, are equipped with ageing and temperature compensation to ensure a long term and stable signal also after many years of operation.

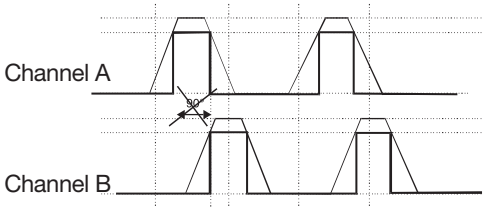
Ageing compensation:

Each LED source will inevitably lose it's power over a period of time. As a result, the output signal degrades. The phase shift between channel A and B of 90° becomes less and less. The direction of rotation may no longer be detected. Properly by the control, a special electronic circuit, which is built in the specific ASIC prevents this effect.

Signals of a new encoder or encoders with ageing compensation:



Signals of an older encoder without ageing compensation:



Benefit: The ageing compensation circuit ensures the same signal, even after many years of operating time. The down time of machines will be reduced dramatically and the reliability is increased.

Temperature compensation:

This specialised circuit ensures that the quality of the signal will stay on the same high level over the whole working temperature range.

Benefit:
The positioning accuracy of a machine will not be affected by temperature changes.

Environmental conditions:

A significant influence on the lifetime of the encoder is set by the environment in which the encoder is operating, e.g.:

- The ambient temperature
- The expected shaft load
- The possible grade of dust/dirt and humidity/liquids

The support design and the use of high quality components makes our encoders suitable for applications in **rough conditions.**
Many references such as from Bosch, Siemens, Bombardier and other customers proof these high requirements.

Temperature:
Definition according to DIN standards 32 878

Working temperature:
Is defined as the environmental temperature, in which the encoder will produce the signals defined in the data sheets.

Operating temperature:
Is defined as the environmental temperature which the encoder can withstand without getting damaged.

GENERAL/OVERVIEW
General

Dirt/dust and humidity/water:

The IP classification according to EN 60529 describes how the encoder is protected against particles and water. It is described as an abbreviation "IP" followed by two numbers.

The first digit defines the size of the particles. The higher the number the smaller the particles.

The second digit defines the resistance against water. The higher the number, the higher the water pressure can be.

Our encoders have a protection up to IP 67.

These two tables summarise the most used IP ratings:

Protection against particles (first digit):

0	not protected
1	protected against particles 50 mm and larger
2	protected against particles 12,5 mm and larger
3	protected against particles 2,5 mm and larger
4	protected against particles 1,0 mm and larger
5	protected against dust
6	dust proof

Protection against water (second digit)

0	not protected
1	protected against vertically falling drops of water
2	protected against falling drops of water up to 15° from vertical
3	protected against water sprayed up to 60° from vertical
4	protected against water sprayed from all directions, limited ingress permitted
5	protected against low pressure jets from all directions, limited ingress permitted
6	protected against strong jets of water, e.g. for use on ship decks, limited ingress permitted
7	protection against the affects of immersion between 15 cm and 1 m
8	protected against long periods of immersion under pressure

Designation of colours
to DIN standard 757

abbreviation	colour
BK	black
BN	brown
RD	red
OG	orange
YE	yellow
GN	green
BU	blue
VT	violet
GY	grey
WH	white
PK	pink
GD	gold
TQ	turquoise
SR	silver

Shaft Load:

Due to misalignment and other mechanical influences from outside, the shaft of the encoder is exposed to a number of different loads. This has a direct impact on the lifetime of the ball bearings and also on the electrical signal itself. If there is an overload there will be an early wear and in the worst case it will lead to a failure of the unit and to a destruction of the optical system inside.

For shaft encoders the maximal radial and axial load should not be exceeded. It is highly recommended to use a coupling between the encoder shaft and the drive shaft, see also the accessories and the mounting suggestions.

In the technical data sheets of the encoders, typical values for the radial and axial load at the shaft end are listed. This is based on the lifetime of the ball bearing, the speed, the mechanical load and the temperature.

To easily find the lifetime for the specific application the following diagrams can be used. All of the diagrams are based on the following parameters:

- 60° C environmental temperature
- The axial load is always half the load compared to the radial load

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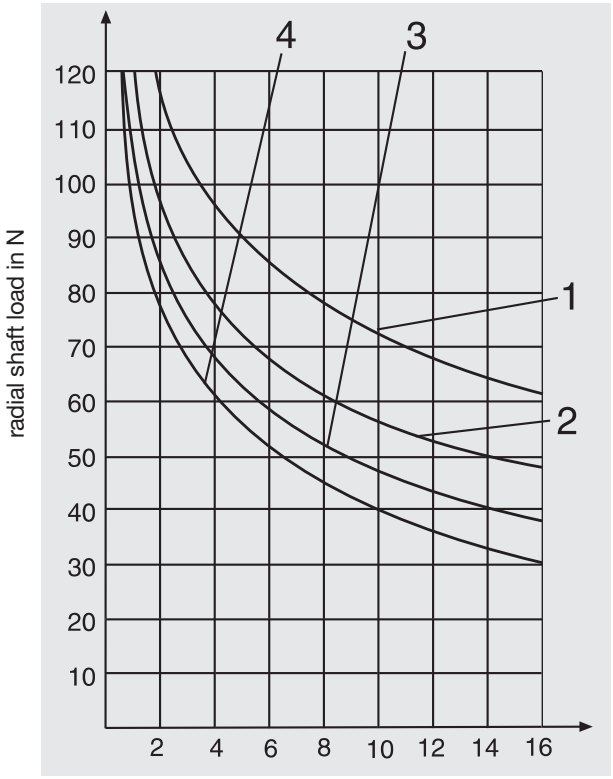
GENERAL/OVERVIEW

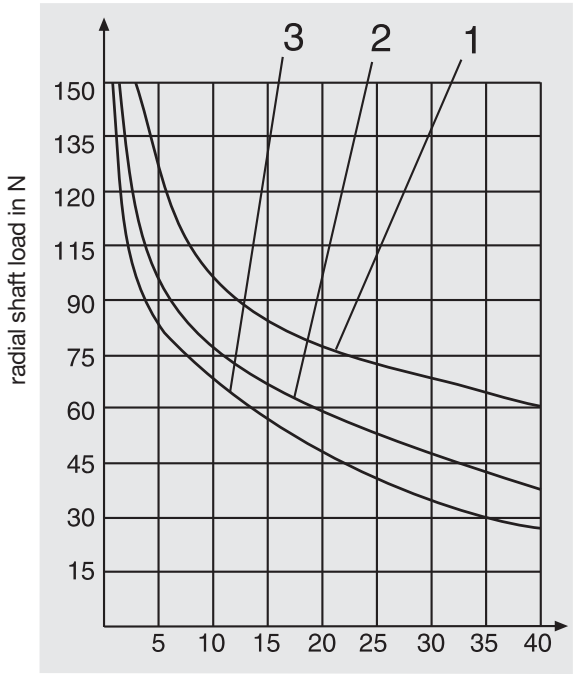
General

Type series 58 mm diameter



1 n = 3000 min^{-1}
2 n = 6000 min^{-1}
3 n = 9000 min^{-1}
4 n = 12000 min^{-1}

Type series 90 mm diameter



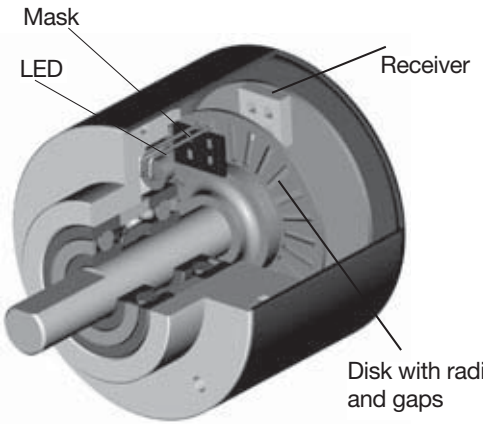
1 n = 2000 min^{-1}
2 n = 4000 min^{-1}
3 n = 6000 min^{-1}

Incremental encoder

Assembly and function:

Meyle encoders operate on an electro-optical scanning principle.

A disk with a radial grating of lines and gaps rotates between a light source (mostly a LED) and a receiver which produces a sine wave signal proportional to the light received.



Processing of the signals:

The sine wave signals are processed further in an electronic circuitry, usually a specific ASIC. This is necessary because most controllers controls (like e.g. counters) require digital signals with a certain voltage level. For that the signals are pre-processed in the encoder. The pre-processed signals are transmitted by the output circuit depending on the application.

Selecting an incremental encoder:

When selecting the encoder, following parameters should be considered in addition to the topic mentioned on page 8–10.

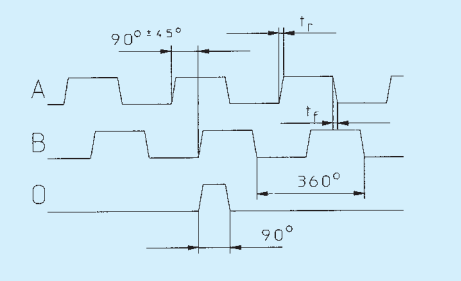
Number of channels:

Encoders with one output channel

Encoders with one output channel are used where no direction sensing is needed, e.g. speed control or length measuring.

Encoders with two output channels

Applications, where the direction of a rotation should be sensed, e.g. positioning, require encoders with two channels A and B being shifted 90° out of phase. By detecting the phase shift, the direction can be located.



- Shaft turning clockwise, top-view of shaft
- Inverted signals available
- 0-pulse is linked to AND with channel A and B

t_r = rise time
t_f = fall time

Encoders with three output channels

In addition to the two channels A and B there is a zero signal available, that appears once per turn. This can be used e.g. as a reference signal during the first revolution after power up.

Multiplication of pulses:

The resolution of a two channel encoder can be multiplied by two or four using a special edge detecting. An encoder with physically 5000 pulses per revolution can generate 20000 pulses per revolution using this technique

Inverted signals:

When used in environments, with a lot of electrical noise and/or if very long cable distances are required, we recommend to use encoders with inverted (complementary) signals. These signals are always available with output circuits of the RS 422 type and sine wave outputs. Meyle also offers them for push-pull outputs.

Resolution:

Example: An encoder is equipped with a measuring wheel. Every revolution corresponds to a distance of 200 mm (circumference). The accuracy should be 0,1 mm. What is the required resolution (ppr)?

Given: Circumference of the measuring wheel: U = 200 [mm]

Accuracy of the system: G = 0,1 [mm]

Wanted: Resolution of the encoder: A = ? [pulses/resolution]

$$\text{resolution} = \frac{\text{Circumference}}{\text{Accuracy}} = \frac{U}{G}$$

The required resolution would be 2000 ppr (pulses per revolution).

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Pulse frequency:

The required pulse frequency can be calculated. This is based on the number of pulses per turn (ppr) and the speed (rpm). The max. pulse frequency is listed for each encoder. Usually it is 300 kHz. Meyle also offers high resolution encoders with a pulse frequency of up to 800 kHz.

Example

of how to calculate the required pulse frequency ^{f}max:

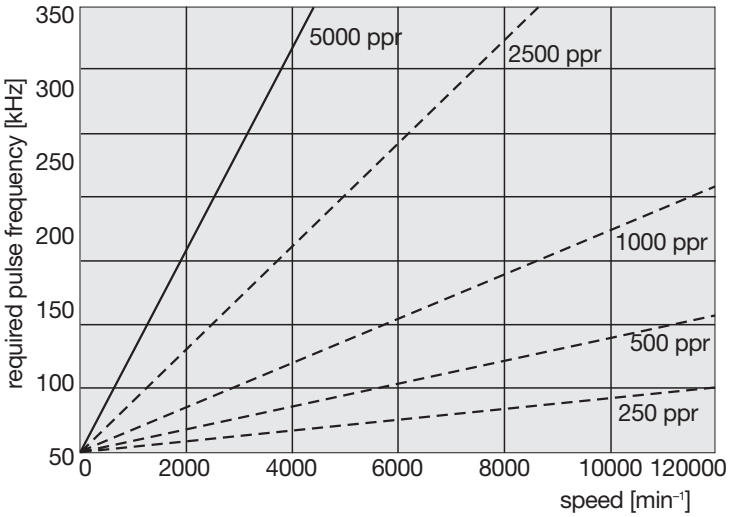
Given: Speed n= 3000 min^{-1}

Resolution of the encoder
R = 1000 ppr

$$^{f}\text{max} = \frac{n \times R}{60}$$

The required pulse frequency is 50 kHz. Now you can compare this result with the data of the encoder you would like to choose.

This diagram can be used for the most common resolutions as a quick guide:



Outputs and voltage supplies (overview):

Meyle offers a wide range of possible outputs and voltage supplies for any application.

Output	Inverted signals	Voltage supply
RS 422	Yes	5 V DC
RS 422	Yes	10 ... 30 V DC or 5 ... 30 V DC
Push Pull output	No	10 ... 30 V DC or 5 ... 30 V DC
Push Pull output	Yes	10 ... 30 V DC or 5 ... 30 V DC
Sine wave voltage output	Yes	5 V DC
Sine wave voltage output	Yes	10 ... 30 VDC

If the encoder is used in an environment with strong electrical noise and long cables we highly recommend the use of inverted signals.

Sensor outputs:

The sensor outputs are used if the distance from the encoder to the control unit is very long and the voltage supply at the encoder could drop due to this long distance.
The input impedance of the sensor inputs (Controller) is very high, and the voltage drop on the sensor output line is almost zero. Due to this it is possible to detect the actual supply voltage of the encoder (e.g. 4,2 V instead of 5 V). Based on this information the controller will increase the voltage supply to e.g. 5,8 V.

GENERAL/OVERVIEW
General

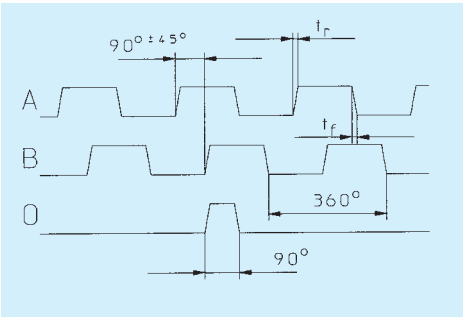
Digital outputs:

The sine wave signal from the optical system is first digitised to have square wave signals available.

- Shaft turning clockwise, top view of shaft
- Inverted signals are available
- 0-pulse is linked to AND with channel A and B

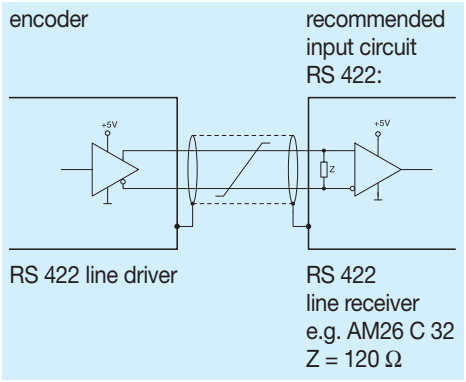
To transmit the signals there are two possible outputs available. RS 422 (TTL compatible) or push-pull (covers PNP or NPN). For choosing the suitable output for the application the following points have to be considered:

- The corresponding unit / controller the encoder will be connected to



- The distance from the encoder to the receiver unit
- The sensitivity against electrical noise or other interferences.

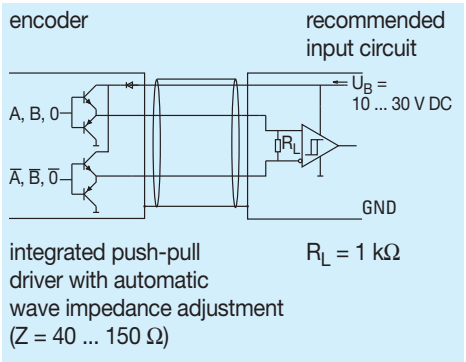
Output circuit and recommended input circuit RS 422:



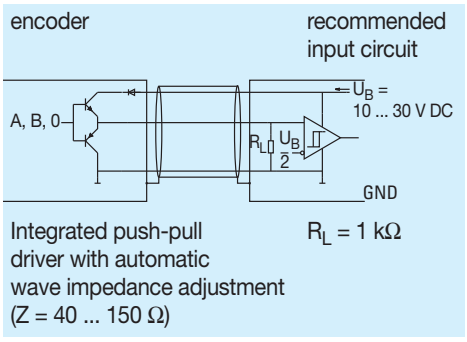
Push-pull:

Push-pull outputs are suitable for count interface cards, electronic counters or PLC inputs.

Output circuit and recommended input circuit push-pull with inverted signals:



Output circuit and recommended input circuit push-pull without inverted signals:



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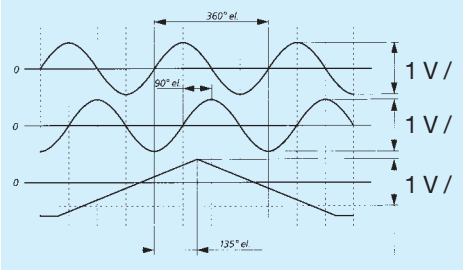
GENERAL/OVERVIEW
General

Sine wave outputs:

The sine wave signals are available as voltage signals. They can be further processed and can be multiplied by a factor of usually 10, 20, 50, 100, 400, 500, 1000 res. binary factors (512, 1024). Due to the interpolation of the two signals, which are 90° out of phase, a very high resolution can be achieved. This makes these kind of signals specially useful for applications where very high resolutions are required. Further they are very suitable for digital drives with a very slow and precise movement, e.g. for grinding machines or lifts and elevators.



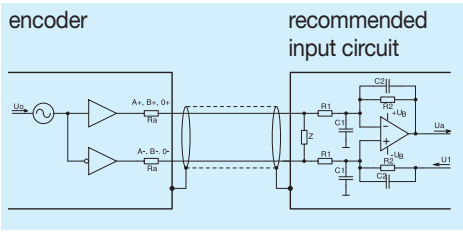
- Shaft turning clockwise, top view of shaft
- 0-pulse is generated once per turn

Output circuit and recommended input circuit for sine wave voltage signals:

R_a = 10 Ω
C_1 = 150 pF
C_2 = 10 pF
R_1 = 10 kΩ
R_2 = 33 kΩ
U_0 = 2,5 V ±0,5 V

Z = 120 Ω
$U_1 = U_0$

OPV: z.B. MC33074



Cable length:

Depending on the output circuit and the electrical noise the following cable lengths are recommended:

Output circuit	max. cable length	Encoder connected to e.g.
Push-pull without inverted signals	100 m	counter/PLC
Push-pull with inverted signals	250 m	PLC/IPC[1])
RS 422 with inverted signals	up to 1000 m (> 50 m depending on frequency)	PLC/IPC[1])
Voltage sinus with inverted signals	50 m	PLC/IPC[1])

1)IPC = industrial PC

Annotations:

- Depending on the application the recommended cable length can be shorter, especially in areas with strong electrical noise.
- Always use shielded cables
- The core diameter of the signal cores should be ∅ 0,14 mm²
- The core diameter of the voltage supply cores should be large enough depending on the cable length, that the voltage supply of the encoder is high enough and the signals do not go below the minimum levels!

We strictly recommend the use of the cable types written down in the accessories.

Selecting an Absolute encoder

Design and function:

Absolute encoders have a disk with a digital coding on concentric tracks. This code is read by a Opto-Asic. A unique bit pattern is assigned to each position.

The advantage is, that after power failure true position verification is available as soon as power is up again, even if the shaft was moved during the dead state.

Advantage:

No reference drives after starting-up are necessary as with incremental systems. Safety is increased and the time taken for reference drives is saved.

Selecting an absolute encoder:

When selecting the right absolute encoder the following parameters should be considered in addition to the recomendations on page 8–10.

- Supply voltage
- Type of code
- Interface (SSI, parallel, fieldbus, 4 ... 20 mA)

Versions:

Singleturn encoders:

Depending on the number of divisions they genrate up to 131072 (17 Bit) unique per turn. This corresponds to an angular resolution of 0,0028°. After one revolution the process re-starts.

Singleturn encoders can be used in applications where revolution is sufficient, e.g. measurement of angles, robotic.

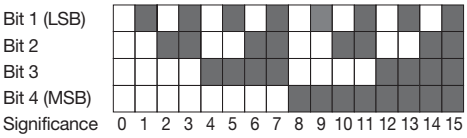
Multiturn encoders:

They are available with up to 131072 (17 Bit) definite angular positions per revolution and in addition 4096 (12 Bit) definite revolutions. This corresponds to 70 billion definite positions.

Multiturn encoders can be used for positioning applications e.g. automatic storage, retiered systems, lift elevators, cranes, machine tool, etc.

Code types:

Binary Code:



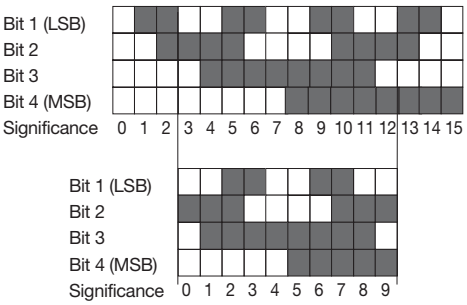
The binary code can be processed very easily by computer systems. When using optical read-out, errors may occure, because the change from one bit to another on the different concentric tracks (LSB, LSB+1...) is not exactly synchronized. Due to this, without any correction of the code, the position information could be wrong.

Gray Code:

The Gray Code is a single-step code. This indicates, that from one position to the next only 1 bit is changed. The reliability of the code detection is increased, which leads to a high position-reliability.

The gray code is used to opticaly read out the position for all absolute encoders

Symmetrically cut Gray Code (Gray-Excess):

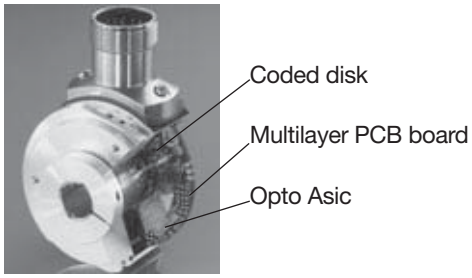


The extraction of a defined part of the gray code leads to the gray-excess code. This code enables the generation of non binary based divisions, e.g. 360, 720, 1000, 1440.

Reversion of the Gray Code:

The code values increase when the shaft is turning clockwise. If the most significant bit (MSB) is inverted, the code values decrease when the shaft is turning clockwise

Optical disk in Gray code



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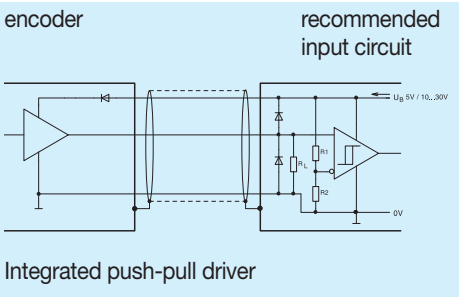
Outputs

To transfer the position data to a controller, different interfaces are available.

Parallel output:

This type of transfer is very fast. All bits of a position are transferred simultaneously each via a separate line.

Output circuit and recommended input circuit parallel interface:

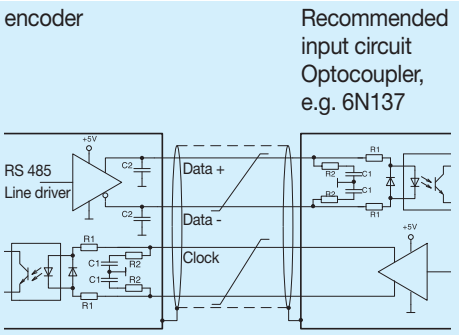


Integrated push-pull driver

Synchronous Serial Interface (SSI):
SSI

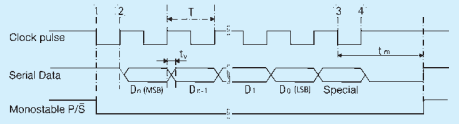
Compared to the parallel interface, the SSI interface needs less components and the EMC-characteristics are much better. In addition less cores are needed for transmission and the possible cable length is much longer.

Output circuit and recommended input circuit of the SSI-Interface:



R_1, R_2 = 100 Ω
C_1 = 1 nF

Synchronous-serial Transfer (SSI):



T = clock pulse period
t_m = storage time of monostable element
t_m ranging from 10 µs to 30 µs
t_v = 100 ns

The number of clock pulses necessary for data transfer is independent of the resolution of the absolute shaft encoder.

The clock signal can be interrupted at any point, or continued in ring-register mode for repeated polling.

With the first shift of the clock signal from low to high ② the most significant bit (MSB) of the angular data is applied to the shaft encoder's serial output.

With each succeeding rising edge, the next less significant bit is shifted to the data output.

After transmission of the least significant bit (LSB) the Alarm bit or other special bits are transferred, depending on configuration.

Then the data line switches to low ③ until the time t_m has passed.

A further transfer of data cannot be started until the data line switches to high ④ again. If the clock pulse sequence is not interrupted at point ③, the ring-register mode is activated automatically. This means that the data stored at the first clock pulse transition ① are returned to the serial input si via the terminal so. As long as the clock pulse is not interrupted at ③, the data can be read out as often as wanted (multiple transfer).

Cable length:

Depending on the desired output circuit, we recommend following cable lengths:

Interface and output circuit	max. cable length	Connected to
Parallel CMOS/TTL	2 m	PLC/IPC[1])
Parallel push-pull	100 m	PLC/IPC[1])
SSI	up to 1200 m	PLC/IPC[1])
RS 422 /RS 485	(> 50 m depending on frequency)	

[1])IPC = Industrial PC

Notes:

- Depending on the application the max. allowed cable length can be shorter, especially in areas with strong electrical noise.
- Always use shielded cables
- The core diameter of the signal cores should be Ø 0,14 mm^2
- The core diameter of the voltage supply cores should be large enough depending on the cable length, that the voltage supply of the encoder is high enough and the signals do not go below the minimum levels!

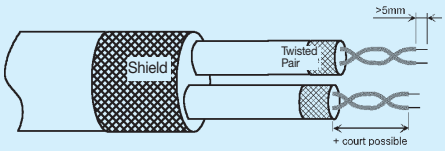
We strictly recommend the use of the cable types written down in the accessories.

Connection – precautions

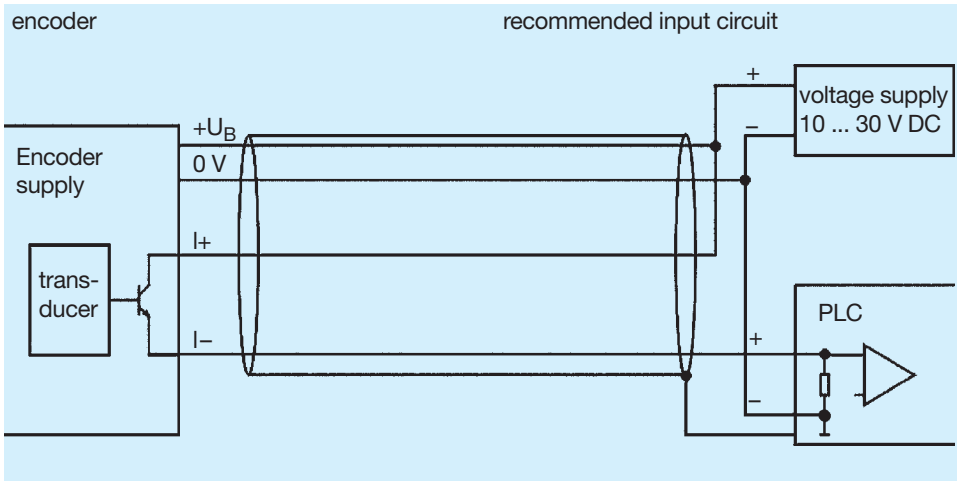
For the connection of the shield braids, refer to the logic control documentation. In all cases, for grounding, the braids must be covered through 360°. All unused conductors must be connected to the same potential at both ends.

Keep the encoder connection cables as far away from the power cables as possible and avoid running them in parallel. Finally, for the same regulated power supply, only connect encoders drawing the current that the power supply can deliver. Group the signals of the same type by pair, CLK+ with CLK-, DATA+ with DATA-.

SSI Transmission



Type of connection and recommended input circuit



BiSS Sensor Communication Bi-directional and fully-digital

BISS

BiSS is a fully-digital and bi-directional sensor interface. It defines communication between one master and several slaves (sensors) in industrial control systems. BiSS manifests a new standard in technology and is available license-free (GPL). Due to its high performance, it constitutes an efficient alternative to the standard combination of data interface and analog sine/cosine incremental output.

BiSS only needs a total of 6 lines (4 data, 2 power), does not require any hardware for analog signals (cable(s)/drive interpolation electronics) – and so helps to reduce system costs.

Bus Networking:
Up to 8 sensors can be connected to a bus-master. Wiring and control cost is considerably reduced for multi axe applications.

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GENERAL/OVERVIEW

General

Bus systems:

The use of a network of sensor-actuator bus systems has essential advantages:

- Reduced expenditure concerning connection: All members are linked by one cable.
- Wide range diagnostics and programming possibility of the units.

In the following please find the available bus systems:

CAN:

- CAN fullfils the real time demands of the automobile industries (ABS, Airbag, Motormanagement)
- Multi-Master system
- The message text (speed, position...) itself is marked by an identifier through the whole network, instead of indexing the nodes.
- Check for importance of message
- Accept or ignore ® network wide broadcasting
- high allocation on the network
- Monitoring (high reliability)
- Bus Specification according to CAN High Speed ISO/DIN 11898 for transmission rates of up to 1 Mbaud.

Introduction

The Meyle CANopen encoder is an absolute encoder. The version described sends its current position to another station via the "CAN-bus" transmission medium (physically: screened and twisted two-wire line).

The serial bus system CAN (Controller Area Network), which had been originally developed for automotive uses, is gaining ground in industrial automation technology. The system is multimaster compatible, i.e. several CAN- stations are able to request the bus at the same time. The data transfer is regulated by the message's priority. The message with the highest priority (determined by the identifier) will be received immediately. Within the CAN system, there are message identifiers but no transport addresses. The message which is being sent can be received by all stations at the same time (broadcast). By means of a special filter method, the station only accepts the relevant messages which is of importance for this station. The identifier transmitted with the message is the basis for the decision as to whether the message will be accepted or not.

The bus coupler is standardised according to the international standard ISO-DIS 11898 (CAN High Speed) and allows data to be transferred at a maximum rate of 1 MBit/s. The most significant feature of the CAN-protocol is its high level of transmission reliability (Hamming distance = 6). The CAN-Controller Intel 82527 used in the encoder is basic as well as full-CAN compatible and supports the CAN-specification 2.0 part B (standard protocol with 11-bit- identifier as well as extended protocol with 29-bit identifier).

Field of application

In applications, where the position of a drive or of other parts of a machine has to be recorded and signalled to the control system, the encoder can carry out this function. The encoder can resolve, for instance, positioning tasks by sending the check-back signal concerning the present drive position via the CAN bus to the positioning unit.

The CANopen Profile

CANopen allows for:

- synchronisation of the devices,
- auto-configuration of the network,
- comfortable access to all device parameters.
- simultaneous data input and output.
- cyclical and event-controlled process data processing,

CANopen uses four communication objects (COB) with different features:

- Process Data Objects (PDO) for real-time data
- Service Data Objects (SDO) for the transfer of parameters and programs
- Network Management (NMT, Life-Guarding)
- predefined objects (for synchronisation, time stamp, emergency message)

All device parameters are stored in an object directory. The object directory contains the description, data type and structure of the parameters as well as their addresses (index).

The directory consists of three parts:

- communication
- profile parameters,
- device profile parameters and manufacturer specific parameters.

Existing Profiles

The following device profiles already exist:

- CiA Draft Standard Proposal 401 for Input/Output Modules
- CiA Draft Standard Proposal 402 for Drives and Motion Control
- CiA Work Item 403 for Human-Machine Interfaces
- CiA Work Draft 404 for Closed-Loop Controllers and Transformers
- CiA Work Item 405 for IEC-1131 Interfaces
- CiA Draft Standard Proposal 406 for Encoders
- CiA Work Item 407 for Public Transport
- CiA Work Item 408 for Fork-Lifts

The encoder device profile (CIA DSP 406)

This profile describes a standardised and binding, but manufacturer-independent definition of the interface for encoders. The profile not only defines which CANopen functions are to be used, but also how they are to be used. This standard allows an open and manufacturer-independent bus system. The device profile consists of two object categories

- the standard category C1 describes all the basic functions the shaft encoder must contain
- the extended category C2 contains a variety of additional functions which either have to be supported by category C2 shaft encoders (mandatory) or which are optional. Category C2 devices thus contain all C1 and C2 mandatory functions as well as, depending on the manufacturer, further optional functions. In addition, an addressable area is defined in the profile, to which, depending on the manufacturer, different functions can be assigned.

DATA Transmission

In CANopen, the data is transferred by means of two different communication types (COB = Communication Object) with different features:

- Process Data Objects (PDO)
- Service Data Objects (SDO)

The priority of the message objects is determined by the COB identifier.

The process data objects (PDO) serve the highly dynamic exchange of real-time data (e.g. position of the shaft encoder) with a maximum length of 8 Byte.

This data is transferred with high priority (low COB identifier). PDOs are broadcast messages and put their information simultaneously at the disposal of all desired receivers. The service data objects (SDO) form the communication channel for the transfer of device parameters (e.g. programming of the shaft encoder's resolution). Since these parameters are transferred acyclically (e.g. only once when starting up the network), the SDO objects have a low priority (high COB identifier).

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GENERAL/OVERVIEW

General

Profibus: General Information

The basic functions of the PROFIBUS DP are only described in extracts in here. For additional information, please refer to the standards on PROFIBUS DP, i.e. DIN 19245-3 and EN 50170 respectively.

Introduction

The Meyle Profibus encoders are absolute encoders. The version described sends its current position to another station via the transmission medium "PROFIBUS DP" (physically: screened and twisted pair line). The Profibus encoder supports all class 1 and 2 functions listed in the encoder profile.

PROFIBUS-DP is standardised and binding, but manufacturer-independent definition for a variety of applications in the field of production, process and automation. The requirements of openness and independence from the manufacturer are stipulated in the European standard EN 50 170.

PROFIBUS-DP permits the communication of devices produced by different manufacturers without any particular adaptations of the interfaces. PROFIBUS DP is a special standard version for a quick data exchange within the field level which has been optimised in terms of speed and low connection costs. Central with local field devices like drives, valves, or encoders. The data exchange between these devices is predominantly cyclical. The communication functions required for this exchange are determined by the functions of the PROFIBUS DP according to the EN 50 170 European standard.

Field of application

In systems, where the position of a drive or of any other part of a machine has to be recorded and transmitted to the control system, the encoder is doing this function. The encoder can resolve, for instance, positioning tasks by sending the feedback signal concerning the present drive position via the PROFIBUS DP to the positioning unit.

Basic function of the Profibus DP

The central control system (master) cyclically reads out the input information from the slaves and transmits the output information to the slaves. For this purpose, the bus cycle time has to be shorter than the program cycle time of the central control system (e.g. SPC, or IPC), which amounts to approx. 10 ms for several applications. Beside the cyclical user data transfer, the PROFIBUS DP version also disposes of powerful functions for diagnosis and initial operation procedures. The data traffic is controlled by watchdog functions on both the slave and the master side. In the following the basic functions of the PROFIBUS DP are summarised in short.

PROFIBUS DP Basic Functions

Transmission technology:

- RS-485 twisted pair line
- Baud rates ranging from 9.6 kbit/s up to 12 Mbit/s

Bus access:

- Monomaster or multimaster systems possible
- Token passing procedure between the masters and master-slave procedures for slaves
- Master and slave devices, max. of 126 stations at a single bus

Communication:

- Point-to-point (user data communication) or multicas (control commands)
- Cyclical master-slave user data communication and acyclical master-master data transfer

Operating state:

- Operate: cyclical transfer of input and output data
- Stop: only master-master data transfer is possible
- Clear: The input data are read, the output data remain in the safe status
- Synchronisation: Control commands enable a synchronisation of the input and output data
- Sync mode: Output data are being synchronised

Functionality:

- Address assignment for the DP slaves via the bus
- Cyclical user data transfer between DP master and DP slave(s)
- Configuration of the DP master (DPM1) via the bus
- Single DP slaves are dynamically activated or deactivated
- Control of the DP slave's configuration.
- Powerful diagnostic functions, 3 stepped diagnostic message levels.
- Maximum of 246 byte input and output data per DP slave possible
- Synchronisation of in- and/ or output

Protection functions:

- Access protection of the DP slaves' input/ output
- All messages are transferred with a hamming distance of HD=4
- Response control at the DP slaves
- Monitoring of the user data communication with adjustable control timer at the master

Device types:

- DP master class 2 (DPM2), e.g. programming/ project planning devices
- DP master class 1 (DPM1), e.g. central automation devices like SPC, PC
- DP slave e. g. devices with binary or analogue input/output, drives, valves

Diagnostic function

The extensive diagnostic functions of PROFIBUS DP allow a quick localisation of possible errors. The diagnostic messages are transmitted by means of the bus and are joined together at the master.

System Performance

To ensure a high level of exchangeability between the devices, the system performance of PROFIBUS DP has also been standardised. It is mainly determined by the operational status of the DPM1. The DPM1 can either be controlled locally or via the bus by the project planning device. The following three main states are available:

Operate

The DPM1 has entered the data transfer phase. In case of a cyclical data traffic, the input is read by the DP slaves while the output is transferred to the DP slaves. After an error has occurred during the data transfer phase of the DPM1, like for example, the failure of a DP slave, the response of the system is determined by the operating parameter "Auto Clear". If this parameter has been set to true, the DPM1 will set the output of all the respective DP slaves to the safe status, as soon as a DP slave is no longer available for user data communication. Afterwards, the DPM1 changes to the clear status. If this parameter is = false, the DPM1 remains, even if an error occurs, in the operate status, and the user can determine the response of the system at his own decision.

Stop

There is no data traffic between DPM1 and the DP slaves.

Clear

The DPM1 reads the input information of the DP slaves and maintains the safe status of the DP slaves' output.

Cyclical data transfer between DPM1 and the DP SLAVES

The data traffic between the DPM1 and the respective DP slaves is automatically handled by the DPM1 in a fixed, recurring order. When configuring the bus system, the user assigns a DP slave to the DPM1. In addition

the slaves are in- or excluded from the user data communication. The data traffic between the DPM1 and the DP slaves is subdivided in three phases: parameterisation, configuration, and data transfer.

Before including a DP slave in the data transfer phase, the DPM1 checks during the parameterisation and configuration phase, whether the planned set configuration corresponds to the actual configuration of the device. For this check, the device type, the information on the format and the length as well as the number of input and output lines have to be correct. Due to this check it is ensured that the parameterisation is reliable and correct at the end. In addition to the user communication, which is automatically executed by the DPM1, the user can request the new parameterisation data to be sent to the DP slaves.

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Magnetic Linear Incremental Encoder System MyLin

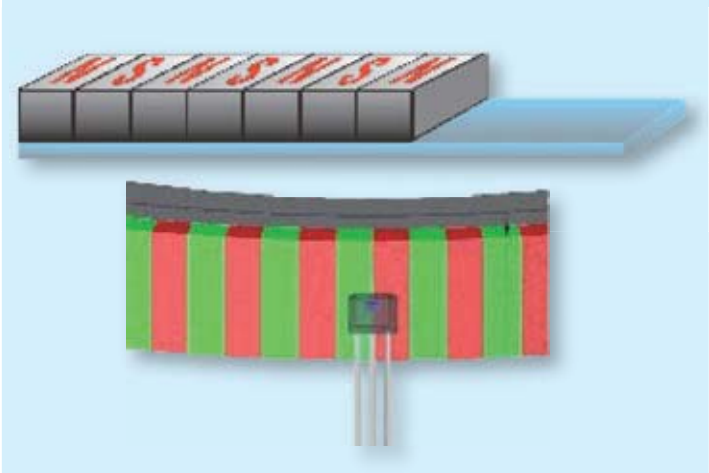
KMLIxx

The purpose of linear encoder systems is to measure the displacement on industrial an automation systems. It is an incremental measuring system, which consists of a sensing head and a magnetic encode tape.

The tape has alternating magnetic north-south poles with a gap up to 2.5 mm.

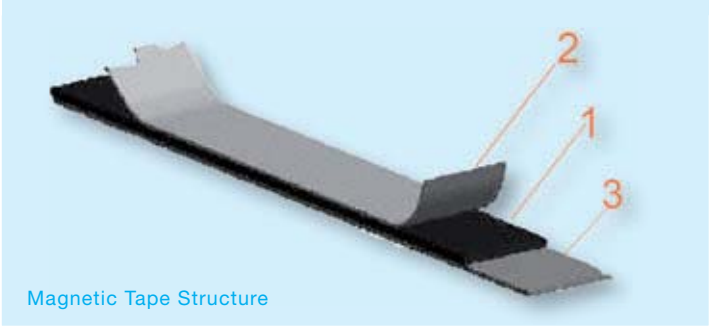
The sensor head is moved along the magnetic tape and produces an output signal equivalent to an incremental encoder or linear scale with a resolution up to 1 µm.

A distance up to 2.5 mm (approx. 50 % of the pole width) between sensor head and magnetic tape is allowed.



This system is highly immune to contermination of oils, dust, etc. and his ideal for use is harsh, dusty industrial environments.

The highly rugged, flexible magnetic tape can be applied to a tool very easy.
1. magnetic tape
2. magnetised steel cover tape
3. carrier tape



Magnetic Tape Structure

KLME01 Magnetic Linear Encoder System
is an incremental system for linear length measurement without contact an consists of the sensor head and the magnetic tape.

KLME02 Magnetic Linear Encoder Profile System
is an incremental system for linear length measurement without contact and consists of an unguided sensor head and the magnetic tape in a profile system. This system guarantees mechanical stability.

KLME03 Magnetic Linear Encoder Scale System
is an incremental system for linear length measurement without contact.

The scanning unit is guided within the housing along the scale, it forms a compact unit.
The system is protected by an aluminum extruded profile with elastic sealing lips.

INCREMENTAL ENCODER MAGNETIC

DINMS 24

- small housing diameter
- usable in harsh conditions
- IP 65, optional IP 67
- High shaft load radial 80 N, axial 50 N

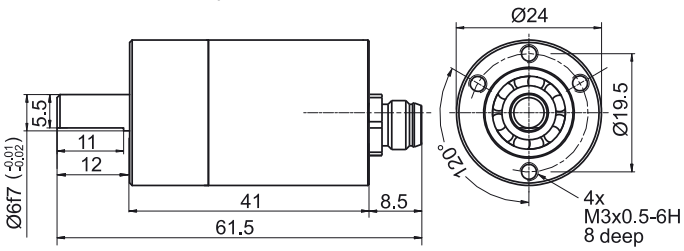
Electrical Specifications

Supply Voltage	4.75-5.5 VDC or 5-30 VDC
Current Consumption	40 mA (max.)
Output Circuit	Push-Pull: 1-128, 256, 512, 1024 ppr
	RS 422: 16, 32, 64 ppr
Impulse Frequency	200 kHz (max.) (HTL ≤ 1024 ppr)
	20 kHz (max.) (TTL ≤ 64 ppr)
Output signals	A, $\overline{A}$, B, $\overline{B}$, 0, $\overline{0}$
Load	max. 30 mA / channel

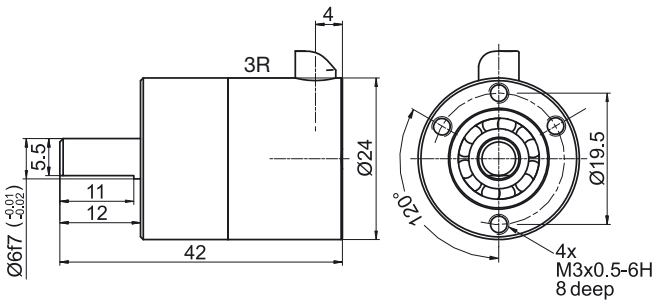
Mechanical Specifications

Cover	Aluminium		
Body	Aluminium		
Shaft	Stainless steel		
Protection	IP 65	optional	IP 67
Speed (max.)	12000 rpm		3500 rpm
Load (max.)	radial 80 N		radial 45 N
	axial 50 N		axial 30 N
Torque	approx. 0.2 Ncm		approx. 1.2 Ncm
Temperature	-40 °C . . . +80 °C		
Weight	approx. 50 g		

Sensor connector 7A, 6-pin



Cable connection 3R with 2 m cable



ORDERING CODE

DINMS 24

Shaft Ø
06 = 6 mm

Output Circuit
A5 = Push Pull
4.75 to 30 VDC
A2 = Line Driver
4.5 to 5.5 VDC
RS 422

Output Signals
9 = A+B+0+Compliments

Connection
3R = shielded cable, 2m, radial output
7A = 6 pin connector, axial output

Resolution
1024 max. (A5)
64 max. (A2)

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INCREMENTAL ENCODER MyInc

BINS24

- Low price at high performance
- IP 64
- Wide temperature range (-20 ... +85 °C)
- Housing is resistant against environmental influences due to chromium plated surface
- Sturdy cable output with multiple clamping
- Temperature compensation
- Broad input voltage range (5 ... 24 V or 8 ... 30 V)
- Highly flexible cable with stands constant flexing from 0 °C ... 70 °C
- Low power consumption despite high scanning rate
- Reverse connection protected and short-circuit proof

Mechanical characteristics:

Speed:	max. 12 000 min^{-1}
Rotor moment of inertia:	appr. 0,1 x 10-6 kgm^2
Starting torque:	< 0,001 Nm
Radial load capacity of shaft:	10 N
Axial load capacity of shaft:.	20 N
Weight:	appr. 0,06 kg
Protection acc. to EN 60529:	IP 64
Working temperature:	–20° C ... +85 °C
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27:	1000 m/s^2, 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	100 m/s^2, 55 ... 2000 Hz

Pulse rates available at short notice:

10, 25, 36, 50, 60, 100, 125, 180, 200, 250, 360, 500, 512, 1000, 1024, 1080

Electrical characteristics:

Output circuit:	Push-pull	Push-pull
Supply voltage:	5 ... 24 V DC	8 ... 30 V DC
Power consumption (no load):	max. 50 mA	max. 50 mA
Permissible load/channel:	max. 50 mA	max. 50 mA
Pulse frequency:	max. 160 kHz	max. 160 kHz
Signal level high:	min. U_B = –2,5 V	min. U_B = –3 V
Signal level low:	max. 0,5 V	max. 2,5 V
Rise time t_r:	max. 1 µs	max. 1 µs
Fall time t_f:	max. 1 µs	max. 1 µs
Short circuit proof outputs: DIN-IEC 68-2-27:	yes	yes
Conforms to CE requirements acc. to EN 50082-2, EN 50081-2 and EN 55011 Class B		

Applications:

- Pick and place machines
- Handling machines for electronic components
- Quality testing machines
- Medical machines
- Mail opening and mail stuffing machines
- Check weighers
- Labeling machines
- Mole machines (camera control)

INCREMENTAL ENCODER MyInc

BINS24

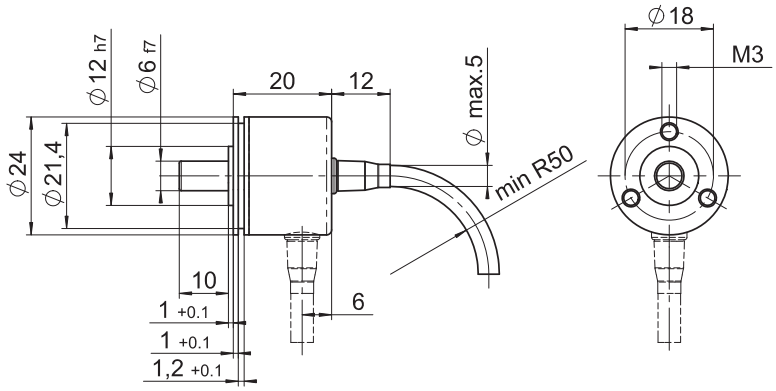
Terminal assignment

Signal:	0V	+UB	$\bar{A}$	A	$\bar{B}$	B	0	$\bar{O}$	
Colour:	WH	BN	GN	YE	GY	PK	BU	RD	
without inverted signal:	WH	BN	GN		YE		GY		

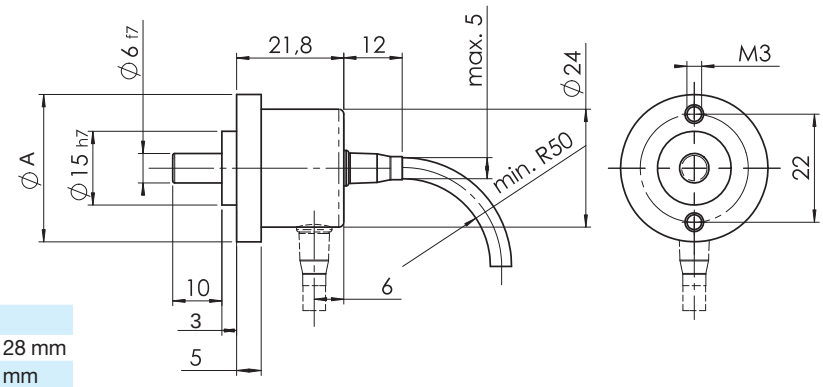
Insulate unused outputs before initial startup.

Dimensions:

Flange type 1
(Ø 24 mm)



Flange type 2
(Ø 30 mm)
Flange type 3
(Ø 28 mm)



Flange type	2	3
A	ø 30 mm	ø 28 mm
B	3 mm	2 mm

Mounting advice:

Do not connect encoder and drive rigidly to one another at shafts and flanges! Always use couplings to prevent shaft overload (see chapter accessories).

ORDERING CODE

BINS24

Flange

1 = Ø 24 mm

2 = Ø 30 mm

3 = Ø 28 mm

Shaft Ø

1 = Ø 4 mm x 10 mm

2 = Ø 6 mm x 10 mm

3 = Ø 5 mm x 10 mm with flattening

Output and voltage supply

A1 = Push-pull (with inverted signals) 5 ... 24 V DC supply voltage

A5 = Push-pull (with inverted signals) 8 ... 30 V supply voltage

Connection

3A = Cable axial (2 m PVC-cable)

3R = Cable radial (2 m PVC-cable)

Resolution

1080 max.

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INCREMENTAL ENCODER MyInc

BINB24

- Low price at high performance
- IP 64
- Wide temperature range (-20 ... +85 °C)
- Housing is resistant against environmental influences due to chromium plated surface
- Sturdy cable output with multiple clamping
- Temperature compensation
- Broad input voltage range (5 ... 24 V or 8 ... 30 V)
- Highly flexible cable with stands constant flexing at 0 °C ... 70 °C
- Low power consumption despite high scanning rate
- Reverse connection protected and short-circuit proof

Mechanical characteristics:

Speed:	max. 12000 min^{-1}
Rotor moment of inertia:	appr. 0,1 x 10^{-6} kgm^2
Starting torque:	< 0,001 Nm
Weight:	appr. 0,06 kg
Protection acc. to EN 60 529:	IP 64
Working temperature:	–20 °C ... +85 °C
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27:	1000 m/s^2, 6 ms
Vibration resistance acc. to IEC 68-2-6:	100 m/s^2, 55 ... 2000 Hz

Pulse rates available at short notice:

10, 25, 36, 50, 60, 100, 125, 180, 200, 250, 360, 500, 512, 1000, 1024

Other pulse rates on request

Electrical characteristics:

Output circuit:	Push-pull	Push-pull
Supply voltage:	5 ... 24 V DC	8 ... 30 V DC
Power consumption (no load):	max. 50 mA	max. 50 mA
Permissible load/channel:	max. 50 mA	max. 50 mA
Pulse frequency:	max. 160 kHz	max. 160 kHz
Signal level high:	min. U_B = –2,5 V	min. U_B = –3 V
Signal level low:	max. 0,5 V	max. 2,5 V
Rise time t_r:	max. 1 µs	max. 1 µs
Fall time t_f:	max. 1 µs	max. 1 µs
Short circuit proof outputs:	yes	yes
Conforms to CE requirements acc. to EN 50082-2, EN 50081-2 and EN 55011 Class B		

Applications:

- Pick and place machines
- Handling machines for electronic components
- Quality testing machines
- Medical machines
- Mail opening and mail stuffing machines
- Check weighers
- Labeling machines
- Mole machines (camera control)

INCREMENTAL ENCODER MyInc

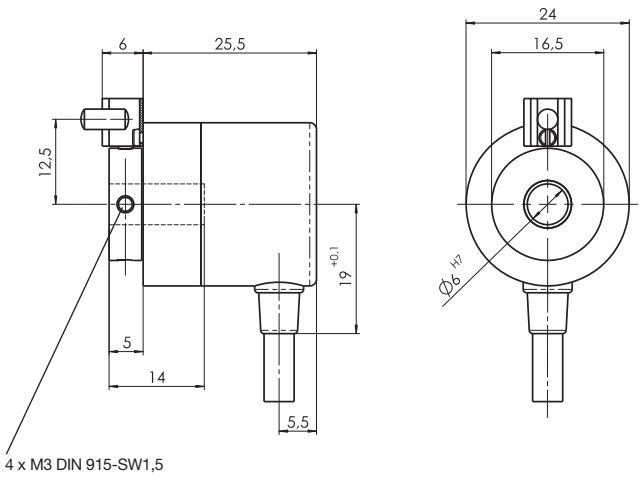
BINB24

Terminal assignment

Signal:	0V	$+U_B$	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{O}$	
Colour:	WH	BN	GN	YE	GY	PK	BU	RD	
without inverted signal:	WH	BN	GN		YE		GY		

Insulate unused outputs before initial startup.

Dimensions



Mounting advice:

Do not connect encoder and drive rigidly to one another at shafts and flanges! Always use couplings to prevent shaft overload (see chapter accessories).

ORDERING CODE

BINB24

Flange

1 = Ø 24 mm

Shaft Ø

1 = Ø 4 mm Blind shaft

2 = Ø 6 mm Blind shaft

Output and voltage supply

A1 = Push-pull (with inverted signals) 5 ... 24 V DC supply voltage

A5 = Push-pull (with inverted signals) 8 ... 30 V supply voltage

Connection

3A = Cable axial (2 m PVC-cable)

3R = Cable radial (2 m PVC-cable)

Resolution

1024 max.

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INCREMENTAL ENCODER MyInc

AINS40
AINS40Z

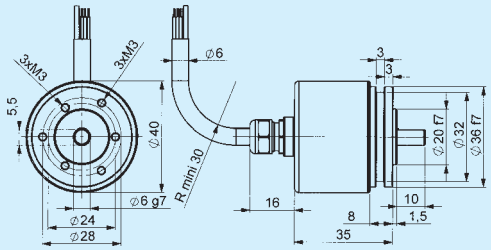
AINS40/AINS40Z
- Up to 10.000 steps in 2500 cpt
- Applications: micro-robotics, printing…

SPECIFICATIONS

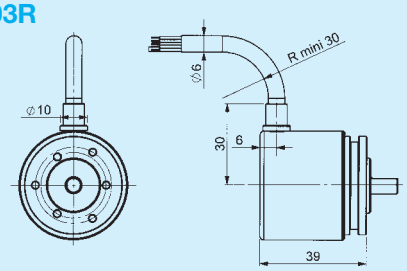
	AINS40	AINS40Z		
• COVER	Aluminium	Zinc alloy	• MAX. SPEED	12 000 min^{-1}
• BODY	Aluminium	Zinc alloy	• RADIAL SHAFT LOADING	20 N
• SHAFT	Stainless steel	Stainless steel	• AXIAL SHAFT LOADING	10 N
• TORQUE	0,2 Ncm	0,2 Ncm	• INERTIA	10 gcm^2
• WEIGHT	110 g	100 g	• PROTECTION	IP 54

DIMENSIONS

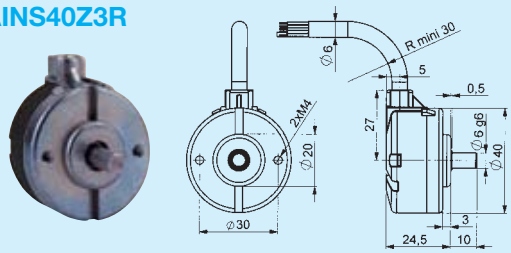
AINS403A



AINS403R



AINS40Z3R



ORDERING CODE

AINS40
AINS40Z

Shaft Ø
06 = 6 mm

Output circuit
2 = 5 V RS422
5 = 11-30 V Driver
9 = 5-24 V Driver

Output signals
9= A, $\overline{A}$, B, $\overline{B}$, 0, $\overline{0}$
7= A, $\overline{A}$, B, $\overline{B}$
5= A, $\overline{A}$
A= Index gated on A
N= Index ungated

Connection
AINS40 :
3A = shielded cable, axial output
3R = shielded cable, radial output

AINS40Z :
3R = shielded cable, radial output

Resolution
AINS40 : 2500 max
AINS40Z : 1024 max

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INCREMENTAL ENCODER MyInc

EINS40

- Miniature Size Ø 38 mm
- IP 62 Protection
- 5 to 26 Volts, RS 422 Compatible
- <100 kHz Maximum Frequency
- Resolutions up to 1024 cpt

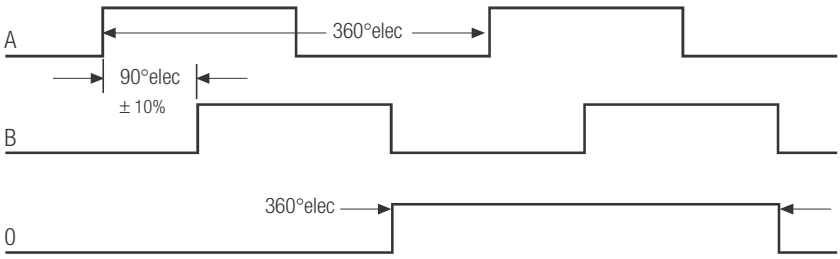
Electrical Specifications

Supply Voltage	5-26 VDC, 5 VDC
Current Consumption	<60 mA (24 VDC)
Output Circuit	Push-Pull, RS 422A (line driver)
Impulse Frequency	<100 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)

Mechanical Specifications

Cover	Aluminium
Body	Aluminium
Shaft	Stainless steel
Speed	6000 RPM (max.)
Torque	< 0.025 Nm
Loading	Axial 30 N, Radial 20 N
Protection	IP 62
Temperature	-20 °C . . . +70 °C
Weight	160 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

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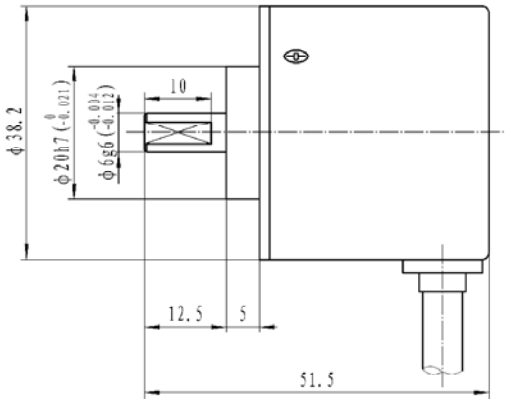
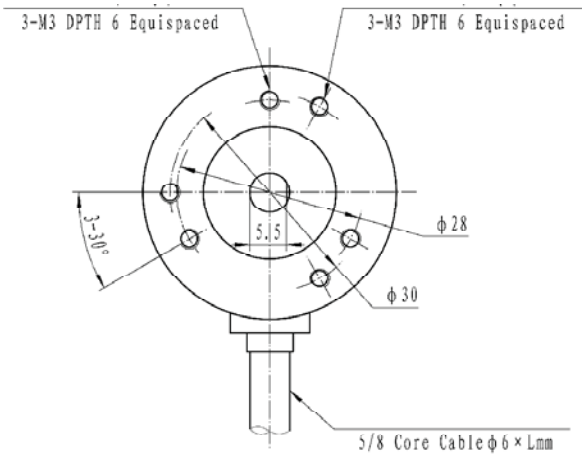
EINS40





Connections

Function	Cable Colours, 3A, 3R
0 Volt	black
+ Volt	red
A	green
B	white
0	yellow
$\overline{A}$	brown (only output A2)
$\overline{B}$	grey (only output A2)
$\overline{0}$	orange (only output A2)

ORDERING CODE

EINS40

Shaft Ø

06 = 6 mm

Output Circuit

A5 = Push Pull 5 to 26 VDC

A2 = Line Driver 5 VDC, RS 422

Output Signals

9 = A+B+0

Connection

3A = shielded cable, 2 m, axial output

3R = shielded cable, 2 m, radial output

Resolution

30, 50, 60, 100, 120, 127, 200, 250, 256, 300, 360, 400, 500, 512, 600, 720, 800, 900, 960, 1000, 1024

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INCREMENTAL ENCODER MyInc

AINH40Z

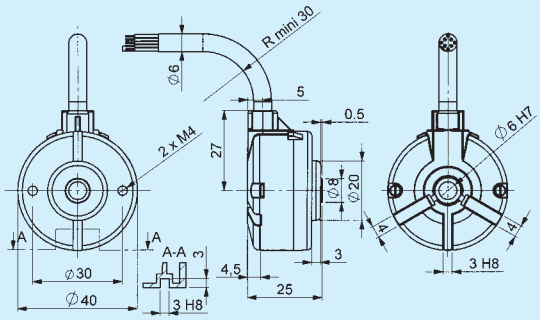
- Easy mounting by flexible anti-rotation blade
- Applications: micro-robotics, DC motors shears…

SPECIFICATIONS

• COVER	Zinc alloy	• MAX. SPEED	12 000 min^{-1}
• BODY	Zinc alloy	• RADIAL SHAFT LOADING	20 N
• SHAFT	Aluminium	• AXIAL SHAFT LOADING	10 N
• TORQUE	0.25 Ncm	• INERTIA	5 gcm^2
• WEIGHT	100 g	• PROTECTION	IP 52

DIMENSIONS

3R



ORDERING CODE

AINH40Z

Shaft Ø
06 = 6 mm

Output circuit
2 = 5 V RS422
5 = 11-30 V Driver
9 = 5-24 V Driver

Output signals
9= A, $\overline{A}$, B, $\overline{B}$, 0, $\overline{0}$
7= A, $\overline{A}$, B, $\overline{B}$
5= A, $\overline{A}$
A= Index gated on A
N= Index ungated

Connection
3R = shielded cable, radial output

Resolution
1024 max

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INCREMENTAL ENCODER MyInc

EINH50

- Industry Standard Size Ø 50 mm
- IP 65 Protection, Option IP67
- 5 to 30 Volts, RS 422 Compatible
- <300 kHz Maximum Frequency
- Resolutions up to 5000 cpt

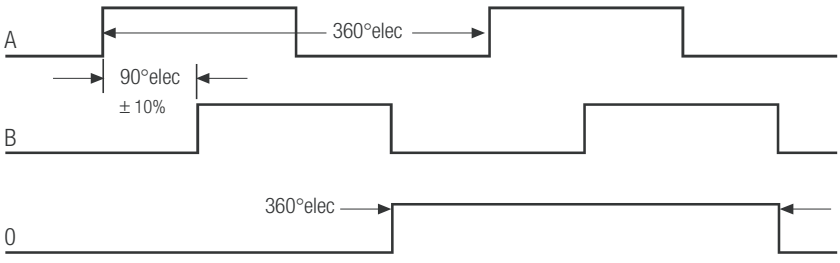
Electrical Specifications

Supply Voltage	5-30 VDC, 5 VDC
Current Consumption	<60 mA (24 VDC)
Output Circuit	Push-Pull, RS 422A (line driver)
Impulse Frequency	<300 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)
Short Circuit Protection	100 %

Mechanical Specifications

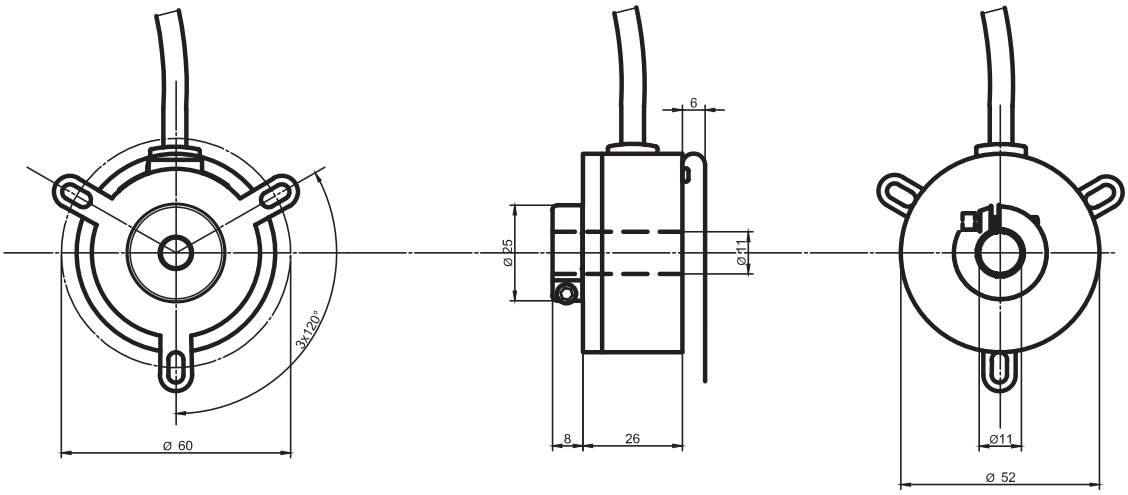
Cover	Aluminium
Body	Aluminium
Shaft	Stainless steel
Speed	10000 RPM (max.)
Torque	< 0.025 Nm
Loading	Axial 80 N, Radial 100 N
Protection	IP 65, Option IP 67
Temperature	-20 °C . . . +85 °C
Weight	240 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

EINH50



Connections

Function	Cable Colours, 3R
0 Volt	brown
+ Volt	white
A	green
B	yellow
0	grey
$\overline{A}$	red
$\overline{B}$	pink
$\overline{0}$	blue

ORDERING CODE

EINH50

Shaft Ø

06 = 6 mm
08 = 8 mm
10 = 10 mm
12 = 12 mm
14 = 14 mm
15 = 15 mm

Output Circuit

A5 = Push Pull
5 to 30 VDC

A2 = Line Driver 5 VDC,
RS 422

A9 = 5–30 VDC
Line Driver 5 VDC,
RS422

Output Signals

9 = A+B+0+Compliments

Connection

3R = shielded cable, 2 m,
radial output

Resolution

750, 900, 1000, 1024, 1250, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 4000, 4096, 5000

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INCREMENTAL ENCODER MyInc

FINS58
FINH58

- Shaft (FINS) and hollow shaft (FINH) encoder with the same modular concept
- Shaft diameters Ø 6 and Ø 10 mm for shafted encoders
- Hollow shaft Ø 14 mm, aluminium reduction hubs of Ø 6, Ø 10 and Ø 12 mm
- Robustness, excellent shock and vibrationresistance
- Easily achievable high degree of protection IP 67 with special sealing flange for shafted versions
- High resolutions available up to 80000 cpt in 3 channels with complements
- Available output signals: square wave, square wave programmable and sine wave
- Simple programmable resolution through dipswitch, no software, no hardware required
- Universal electronic circuits from 4.75 Vdc to 30 VDC
- High operating temperature performance: -30 °C up to 100 °C (encoder temperature)
- High frequency response performance of the output signals: 300 kHz (push-pull & RS422)
- Glass disks in standard, available with unbreakable disks in Polyfas (Composite Mylar-Mica) in option for resolutions <2500 cpt and temperature <80 °C

Replacment for GHM5, GHT5, GHK5, GHO5.

SPECIFICATIONS

	FINS58	FINH58
• COVER	Zinc-aluminium alloy	Zinc-aluminium alloy
• BODY	Aluminium	Aluminium
• SHAFT/HOLLOW SHAFT	Stainless steel	Stainless steel
• TORQUE	0,4 Ncm	0,6 Ncm
• WEIGHT	300 g	300 g
• MAX. SPEED	12 000 min^{-1}	9 000 min^{-1}
• RADIAL SHAFT LOADING	100 N	100 N with DAC
• AXIAL SHAFT LOADING	50 N	50 N with DAC
• INERTIA	10 gcm^2	22 gcm^2
• PROTECTION	IP 65	IP 65

MECHANICAL FEATURES

Shock resistance: < 1000 $m.s^{-2}$ for 6 ms (EN60068-2-27)

Vibrations resistance: < 100 $m.s^{-2}$ from 50 to 2000 Hz
– Standard IP 65, IP 67 available with a special flange for the shaft encoders of Ø 10 mm
– Perfect sealing of the connectors (moulded in the encoder cover)

Max. Acceleration: 1.105 $rad.s^{-2}$

Lifetime of the bearings: 12 x 10^9 turns

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INCREMENTAL ENCODER MyInc

FINS58
FINH58

SQUARE-WAVE OUTPUT SIGNAL ENCODERS

Operating temperature: from –30 °C to 100 °C (encoder body)

AVAILABLE ELECTRONICS

	A5*	A7
Supply voltage	5–30 VDC, 75 mA max.	4.75–30 VDC, 75 mA max.
Output signals	4.5–30 VDC, push-pull 50 mA	5 VDC RS422, 40 mA
Frequency response	300 kHz	300 kHz
	AT	A2
Supply voltage	10–30 VDC, 75 mA max.	5 VDC±10 %, 75 mA max.
Output signals	10–30 VDC, push-pull 20 mA	5 VDC RS422, 40 mA
Frequency response	120 kHz	300 kHz

Protection against short circuits and reverse polarity in all electronics, except for A2, against short circuits only. Note: *A5 is compatible RS422 if encoder is supplied with 5 VDC –0/+10 %

Signals A, A\, B, B\, 0,0\ :

Channel B (mounting front) arrives before A clock-wise seen from the body side of the encoders (not cover side). The shift between each fronts is given by the formula a >135/F (a in time in µs, F, frequency in kHz). Ex. a > 0,45 µs at F=300 kHz.

Available resolutions (100 °C electronic): 5 10 20 25 30 50 60 100 120 125 127 150 180 200 240 250 256 300 314 360 375 400 500 512 600 720 750 762 768 800 927 1000 1024 1200 1250 1280 1440 1500 1800 2000 2048 2400 2500 3000 3600 4000 4096 5000 6000 7200 8000 8192 10000.

Interpolated availabel 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 72000 80000.

PROGRAMMABLE ENCODERS: SQUARE-WAVE OUTPUT SIGNALS

Operating temperature: from -30 °C to 70 °C (encoder body)

AVAILABLE ELECTRONICS

	D5*	D7
Supply voltage	5–30 VDC, 75 mA max.	4.75–30 VDC, 75 mA max.
Output signals	4.5–30 VDC, push-pull 50 mA	5 VDC RS422, 40 mA
Frequency response	300 kHz	300 kHz

Protection against short circuits and reverse polarity for all electronics (except for A2, against short circuits only). Note: *D5 is compatible RS422 if encoder is supplied with 5 VDC –0/+10 %
Easy multiplication of the basic resolutions with a dipswitch, no hardware, nor specific software required. Interpolation factor: x1, x2, x3, x4, x5, x8, x10, x12, x16. For ex., with a basic resolution of 2500 cpt, the following resolutions could be programmed : 2500 5000 7500 10000 12500 20000 25000 30000 40000 cpt.

Available basic resolutions:

– for shaft encoders FINS58: 250, 256, 360, 500, 1024, 2500, 3000, 3600, 4000, 4096, 5000, 6000 cpt
– for hollow shaft encoders FINH58: 250, 256, 360, 500, 1024, 2500, 3000, 3600, 4000, 4096, 5000, 6000 cpt
Max resolution 80000 cpt with basic resolution of 5000 cpt.

SINE-WAVE OUTPUT SIGNALS

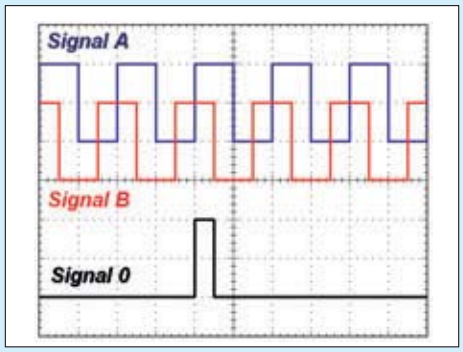
Electronics S1: supply voltage 5 VDC±10 %, 75 mA (without load), output circuits sine-wave output signals 1 VDC peak to peak. Protection against short circuits.
Operating temperature (encoder body): from -30 °C to 100 °C.

Signals S, S\, C, C\, 0, 0\ :

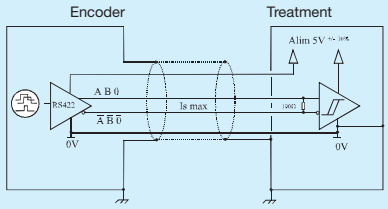
Channel C (cosine)arrives before channel S (sine) clockwise seen from the shaft side (for the shaft encoders) body side for the hollow shaft encoders: The secondary harmonics are 50 dB lower than first harmonics

Available basic resolutions:

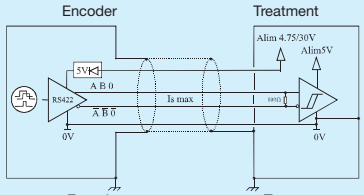
– for shaft encoders FINS58: 250, 256, 360, 500, 1024, 2500 cpt
– for hollow shaft encoders FINH58: 256, 360, 500, 1024, 2500 cpt



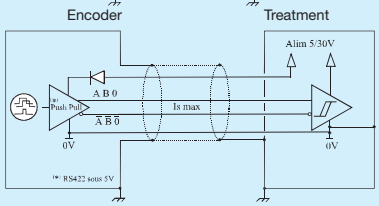
A2



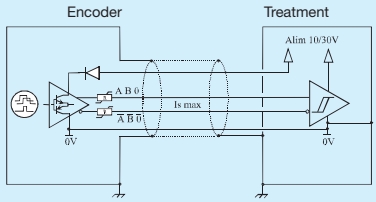
A7



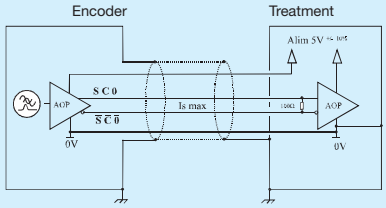
A5



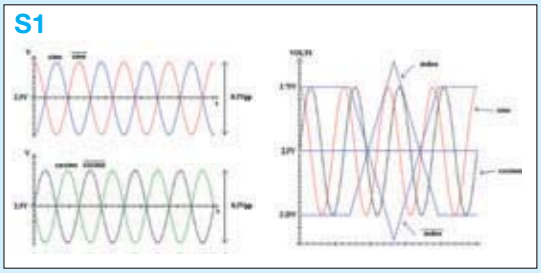
AT



S1



S1



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INCREMENTAL ENCODER MyInc

FINS58
FINH58

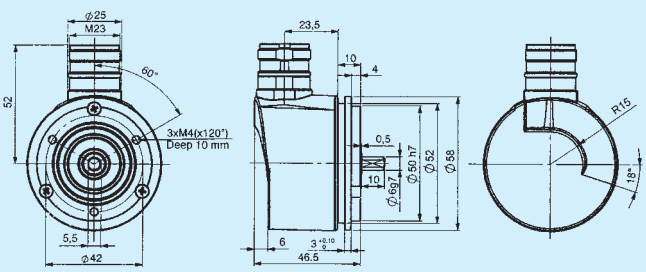
Terminal assignment

Signal:	OV	$+U_B$	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	Shield
12 pin plug cw (6R) Pin:	1	2	3	6	4	7	5	8	connector body
12 pin plug cw (8R) Pin:	10 + 11	2 + 12	8	1	5	6	3	4	connector body
Cable colour:	WH	BN	GN	PK	YE	BU	GY	RD	general shielding

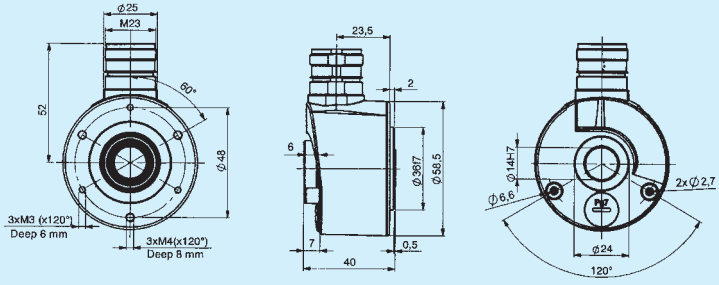
DIMENSIONS

FINS58 S6

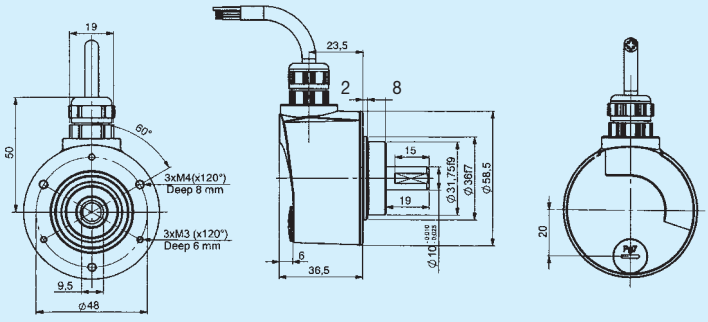
(FINS58 06 incl. flange 9500/003)



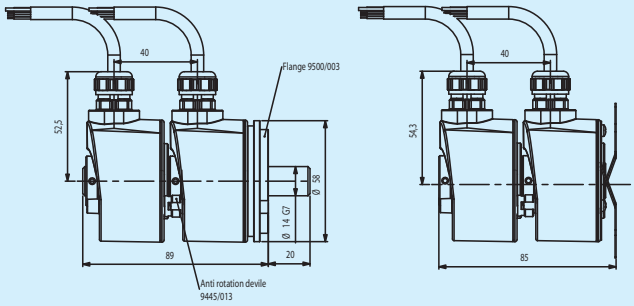
FINH58 14



FINS58 10



FINx58 Double mounting



ORDERING CODE

	Shaft Ø	Output circuit (p. 36)	Output signals	Connection	Resolution
FINS58 shaft	06 = 6 mm 10 = 10 mm S6 = 06 mm S0 = 10 mm	**Square-wave signals:** A5 = driver push-pull 5–30 VDC A7 = 4,75-30 VDC RS422 A2 = driver 5 VDC RS422 AT = driver push-pull 10 to 30 VDC transistorized **Programmable:** D5 = 5-30 VDC driver push-pull D2 = driver 5 VDC RS422 D7 = 4,75-30 VDC RS422 **Sine-wave signals:** S1 = Sine-wave 1 V pp (peak to peak)	9= A, $\overline{A}$, B, $\overline{B}$, 0, $\overline{0}$	3R = cable gland + 2 m cable 6R = M23 12 pins clock-wise standard 8R = M23 12 pins counter clock-wise standard	standard encoder 80000 max. programmable 6000 max. basic sine-wave 2500 max.
FINH58 hollow shaft	6 = 6 mm (with hub) 8 = 8 mm (with hub) 10 = 10 mm (with hub) 12 = 12 mm (with hub) 14 = 14 mm				

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INCREMENTAL ENCODER MyInc

AINS58

- Industry Standard Size Ø 58 mm
- IP 65 Protection
- 4.75 to 30 Volts, RS 422 Compatible
- 300 kHz Maximum Frequency
- Resolutions up to 2499 cpt
- Economical version

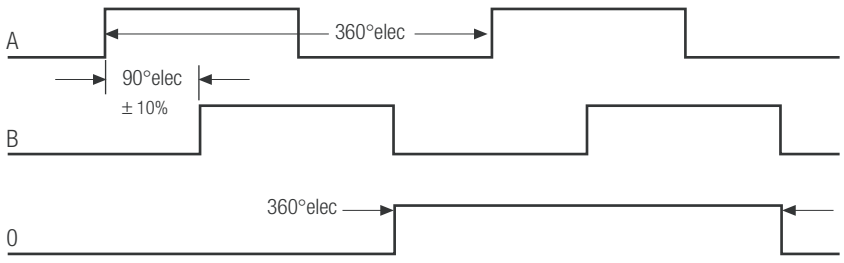
Electrical Specifications

Supply Voltage	4.75-30 VDC
Current Consumption	40 mA (max.)
Output Circuit	Push-Pull, RS 422A
Impulse Frequency	300 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)
Short Circuit Protection	100 %

Mechanical Specifications

Cover	Aluminium
Body	Aluminium
Shaft	Stainless steel
Speed	8000 RPM (max.)
Torque	> 0.05 Nm
Loading	Axial 40 N, Radial 30 N
Protection	IP 65
Temperature	-20 °C . . . +70 °C
	+100° C optional
Weight	320 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

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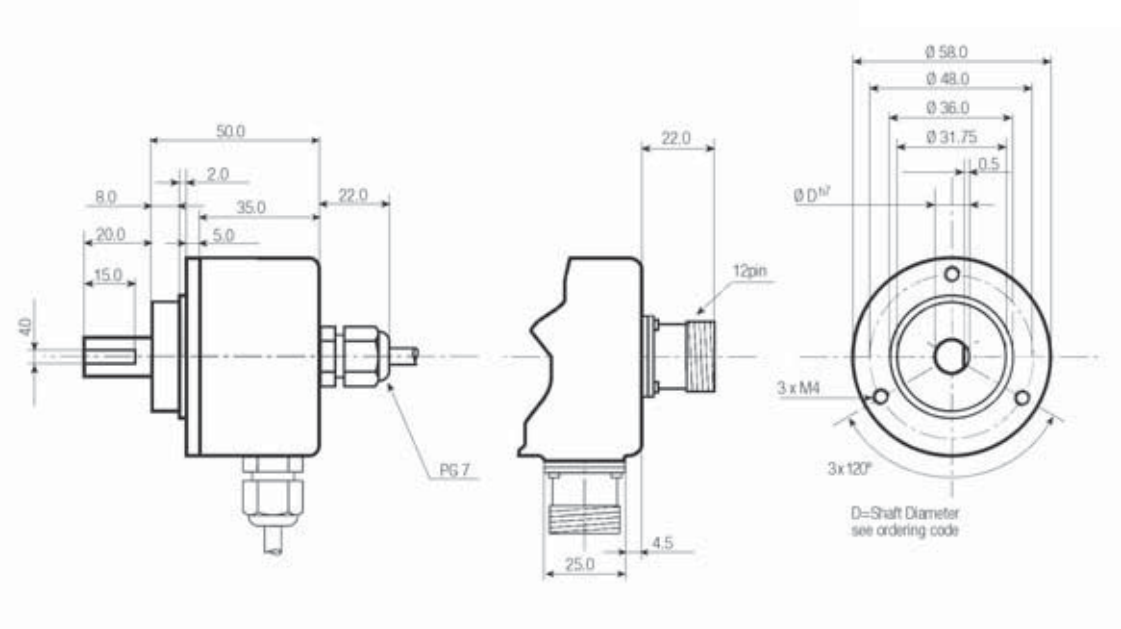
INCREMENTAL ENCODER MyInc

AINS58



Connections

Function	Cable Colours, 3A, 3R	12 Pin Connector, 6A, 6R	7 Pin Connector, 7A, 7R	10 Pin Connector, 10A, 10R
0 Volt	white	1	F	F
+ Volt	brown	2	D	D
A	green	3	A	A
B	yellow	4	B	B
0	grey	5	C	C
$\overline{A}$	pink	6	G	H
$\overline{B}$	blue	7	E	I
$\overline{0}$	red	8		

ORDERING CODE

AINS58

Shaft Ø

06 = 6 mm
08 = 8 mm
10 = 10 mm
04 = 1/4“
09 = 3/8“

Output Circuit

A5 = Push Pull
4.75 to 30 VDC
A2 = Line Driver 5 VDC,
RS 422
A9 = 8–30 VDC
Line Driver 5 VDC,
RS422

Output Signals

9 = A+B+0+Compliments

Connection

3A = shielded cable, 2 m, axial output
3R = shielded cable, 2 m, radial output
6A = 12 pin connector, axial output, cw
6R = 12 pin connector, radial output, cw
7A = 7 pin connector, axial output
7R = 7 pin connector, radial output
10A = 10 pin connector, axial output
10R = 10 pin connector, radial output

Resolution

2499 max.

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INCREMENTAL ENCODER MyInc

EINS58

- Industry Standard Size Ø 58 mm
- IP 65 Protection, Option IP67
- 5 to 30 Volts, RS 422 Compatible
- <300 kHz Maximum Frequency
- Resolutions up to 25000 cpt

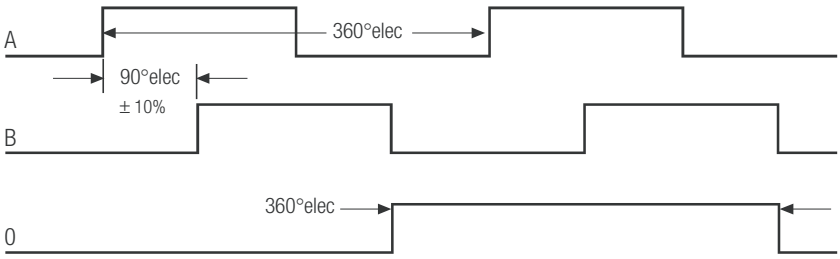
Electrical Specifications

Supply Voltage	5-30 VDC, 5 VDC
Current Consumption	<60 mA (24 VDC)
Output Circuit	Push-Pull, RS 422A (line driver)
Impulse Frequency	<300 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)
Short Circuit Protection	100 %

Mechanical Specifications

Cover	Aluminium
Body	Aluminium
Shaft	Stainless steel
Speed	10000 RPM (max.)
Torque	< 0.025 Nm
Loading	Axial 140 N, Radial 240 N
Protection	IP 65, Option IP 67
Temperature	-20 °C . . . +85 °C
Weight	330 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

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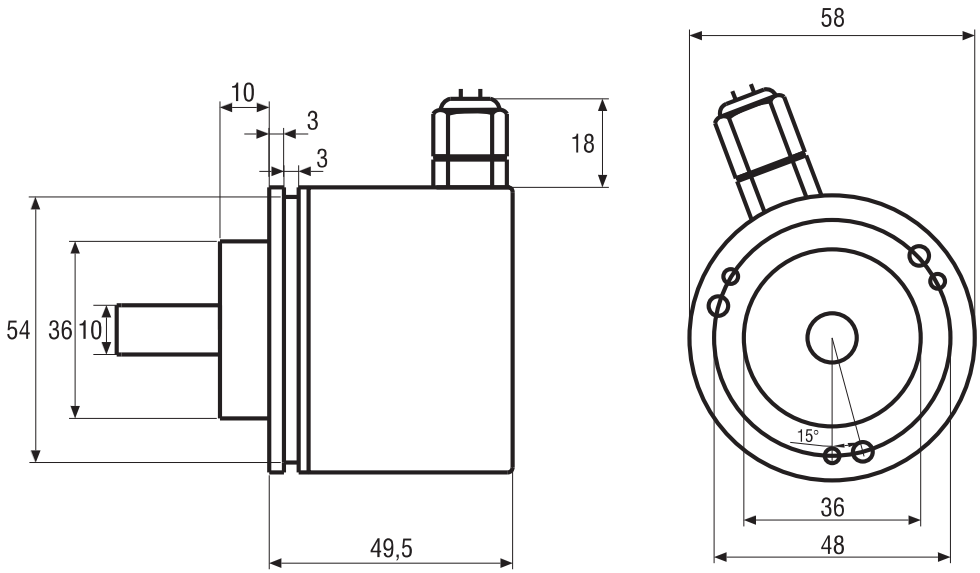
EINS58



Connections

Function	Cable Colours, 3A, 3R
0 Volt	brown
+ Volt	white
A	green
B	yellow
0	grey
$\overline{A}$	red
$\overline{B}$	pink
$\overline{0}$	blue

ORDERING CODE

EINS58

Shaft Ø

06 = 6 mm

08 = 8 mm

10 = 10 mm

Output Circuit

A5 = Push Pull
5 to 30 VDC

A2 = Line Driver 5 VDC,
RS 422

A9 = 5–30 VDC
Line Driver 5 VDC,
RS422

Output Signals

9 = A+B+0+Compliments

Connection

3A = shielded cable, 2 m,
axial output

3R = shielded cable, 2 m,
radial output

Resolution

1 to 128, 25, 50, 100, 200, 250, 250, 300, 360, 400, 500, 512, 600, 720, 800, 900, 1000, 1024, 1250, 1440, 2000, 2048, 2500, 3000, 3600, 4000, 4096, 5000, 6000, 10000, 12500, 16384, 20000, 25000

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INCREMENTAL ENCODER MyInc

CINH76

- Through shaft with up to diameter 42 mm
- Short overall length with an outside diameter of only 76 mm
- Easy installation by means of clamping ring
- Operating temperature up to 100 °C
- Application e.g.:
  - motors
  - printing machines
  - lifts

Mechanical characteristics:

Speed:	at 70 °C and IP 64: 3600 RPM for Ø 15...25 at 70 °C and IP 64: 1800 RPM for Ø > 25...42 at 70 °C and IP 40: 6000 RPM for Ø 15...42 at 100 °C always: 1800 RPM for Ø 15...42
Rotor moment of inertia:	1,4 ... 42 x 10^{-6} kgm^2
Starting torque:	0,03 ... 0,10 Nm
Weight:	320–580 g
Protection acc. to EN 60 529:	IP 40 (option IP 64)
Working temperature:	–25 °C ... +100 °C
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27:	1000 m/s^2 (6 ms)
Vibration resistance acc. to IEC 68-2-6:	100 m/s^2 (10 ... 2000 Hz)

Available resolutions:

50, 100, 250, 300, 500, 600, 900, 1000, 1024, 1500, 2048, 2500, 3072, 4096, 5000, 9000, 10000

Electrical characteristics:

Output circuit:	RS 422	Push-pull
Supply voltage:	5 VDC (± 10 %)	10 ... 30 VDC
Power consumption (no load) with inverted signals:	60 mA	60 mA
Permissible load/channel:	30 mA	30 mA
Pulse frequency:	max. 300 kHz	max. 200 kHz
Signal level high:	min. 2,5 V	min. U_B-3 V
Signal level low:	max. 0,5 V	max. 2 V
Short circuit proof outputs:[1)]	no	yes
Reverse connection protection at UB:	no	yes

Terminal assignment

Signal:	0V	0V Sensor	+U_B	+U_B Sensor	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	Shield[1)]
Cable colour:	WH/GN	VT	BN/GN	BU	BN	GN	GY	PK	RD	BK	

[1)] connected to housing

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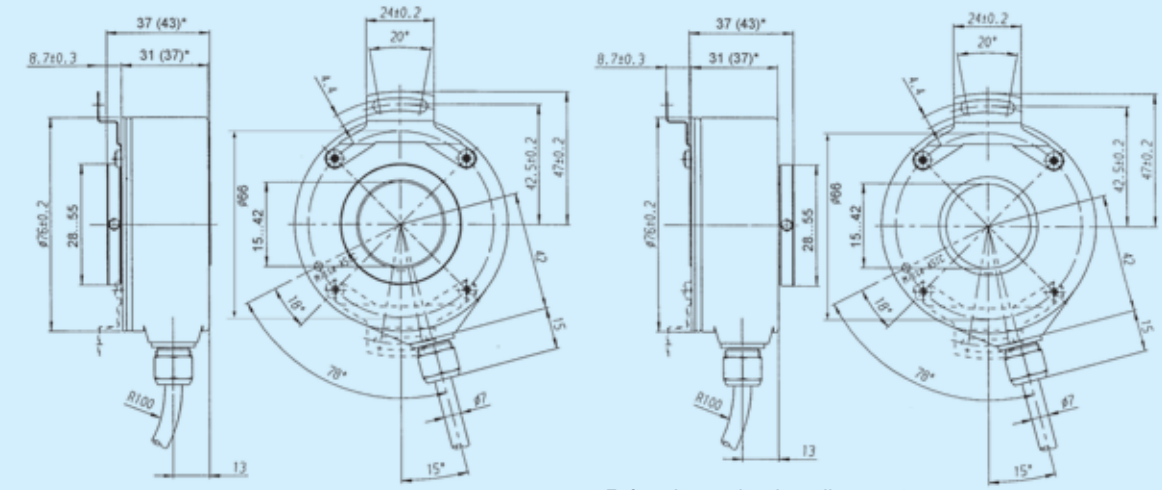
INCREMENTAL ENCODER MyInc

CINH76

Dimensioned drawing

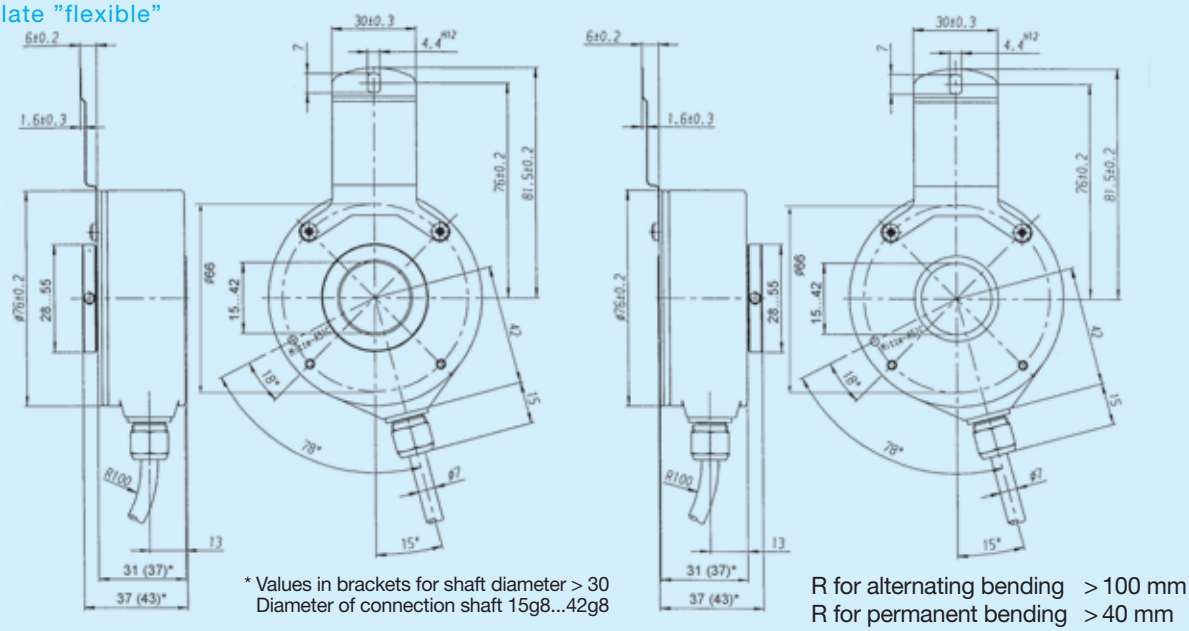
with spring plate "rigid"



* Values in brackets for shaft diameter > 30
Diameter of connection shaft 15g8...42g8

R for alternating bending > 100 mm
R for permanent bending > 40 mm

with spring plate "flexible"



* Values in brackets for shaft diameter > 30
Diameter of connection shaft 15g8...42g8

R for alternating bending > 100 mm
R for permanent bending > 40 mm

ORDERING CODE

CINH76	Mounting synchro flange with	Shaft diameter[1]	Output circuit and supply voltage	Protection class	Spring plate	Connection	Resolution
	D = Front clamping ring H = Rear clamping ring	15 ... 42 in mm	A5 = Push-pull (with inverted signal) 10 ... 30 V supply voltage A7 = RS422 (with inverted signal) + Alarm, 5 V supply voltage	0 = IP 40 4 = IP 64	O = without A = flexible N = rigid	3R = TPE-cable radial	10000 max.

[1] Available with front clamping ring and IP 40: 15, 20, 24, 25, 27, 28, 30, 38, 40, 42, 50
Available with front clamping ring and IP 64: 15, 16, 18, 20, 24, 25, 27, 28, 30, 32, 38, 40, 42
Available with rear clamping ring and IP 40: 25, 28, 30, 32, 38, 40, 42
Available with rear clamping ring and IP 64: 20, 25, 30, 32, 38, 40, 42

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INCREMENTAL ENCODER MyInc

EINH80

- Industry Standard Size Ø 80 mm
- IP 65 Protection, Option IP67
- 5 to 30 Volts, RS 422 Compatible
- <300 kHz Maximum Frequency
- Resolutions up to 8192 cpt

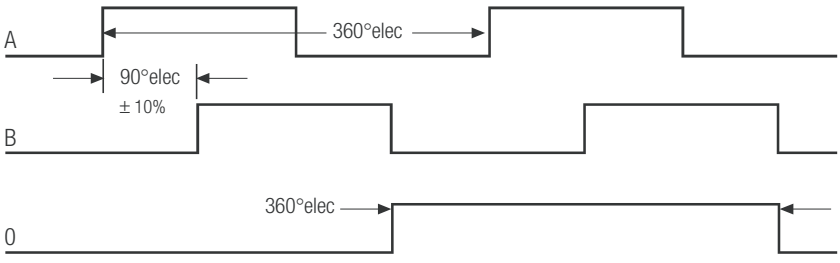
Electrical Specifications

Supply Voltage	5-30 VDC, 5 VDC
Current Consumption	<60 mA (24 VDC)
Output Circuit	Push-Pull, RS 422A (line driver)
Impulse Frequency	<300 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)
Short Circuit Protection	100 %

Mechanical Specifications

Cover	Aluminium
Body	Aluminium
Shaft	Stainless steel
Speed	10000 RPM (max.)
Torque	< 0.025 Nm (IP 67)
Loading	Axial 140 N, Radial 240 N
Protection	IP 65, Option IP 67
Temperature	-20 °C . . . +85 °C
Weight	500 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

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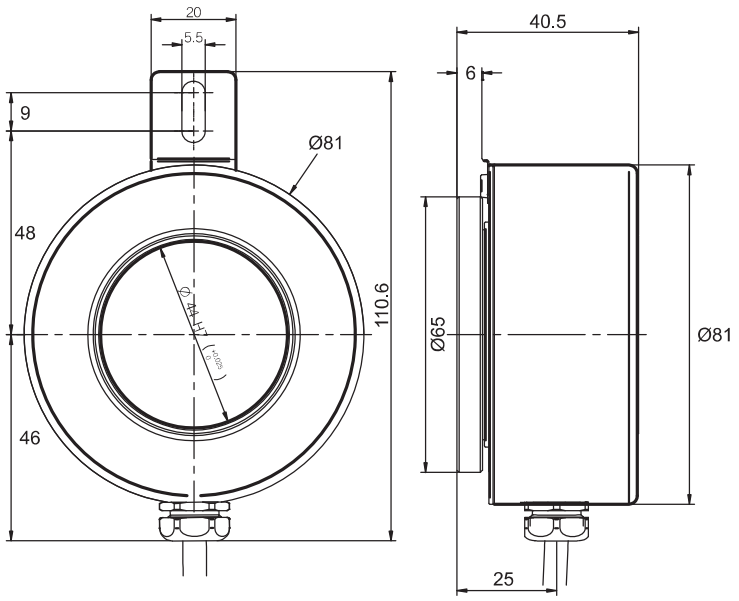
EINH80



Connections

Function	Cable Colours, 3R
0 Volt	brown
+ Volt	white
A	green
B	yellow
0	grey
$\overline{A}$	red
$\overline{B}$	pink
$\overline{0}$	blue

ORDERING CODE

EINH80

Shaft Ø

38 = 38 mm
40 = 40 mm
42 = 42 mm
44 = 44 mm

Output Circuit

A5 = Push Pull
4.75 to 30 VDC

A2 = Line Driver 5 VDC,
RS 422

A9 = 8–30 VDC
Line Driver 5 VDC,
RS422

Output Signals

9 = A+B+0+Compliments

Connection

3R = shielded cable, 2 m,
radial output

Resolution

1024, 2000, 2048, 4000,
4096, 8000, 8192

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INCREMENTAL ENCODER MyInc

AINS90
AINS90S

- Heavy duty standard encoder
- Ø 90 mm synchro flange or Ø 115 mm tachoflange
- Applications: steel and paper mills, food industry, windmills

SPECIFICATIONS

	AINS90	AINS90S
• COVER	Zinc alloy	Zinc alloy
• BODY	Aluminium	Stainless steel
• WEIGHT	1.3 kg	3 kg
• SHAFT	Stainless steel	
• TORQUE	1 Ncm	
• TEMPERATURE	-20 °C ... +85 °C	

• MAX. SPEED	6 000 min^{-1}
• RADIAL SHAFT LOADING	200 N
• AXIAL SHAFT LOADING	100 N
• INERTIA	150 gcm^2
• PROTECTION	IP 66

AINS9011

AINS9012

Terminal assignment

Signal:	OV	$+U_B$	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	Shield
12 pin plug cw (6R) Pin:	1	2	3	6	4	7	5	8	connector body
12 pin plug cw (8R) Pin:	10 + 11	2 + 12	8	1	5	6	3	4	connector body
Cable colour:	WH	BN	GN	PK	YE	BU	GY	RD	general shielding

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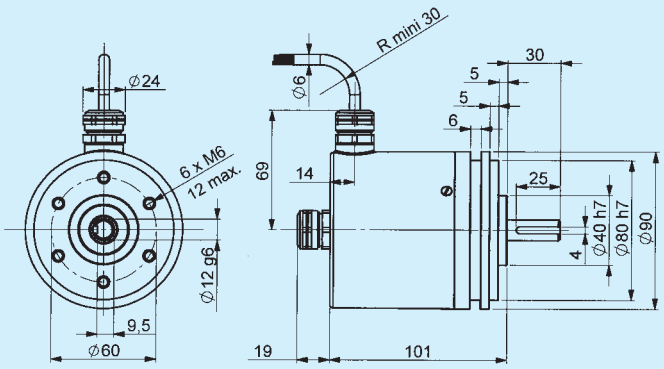
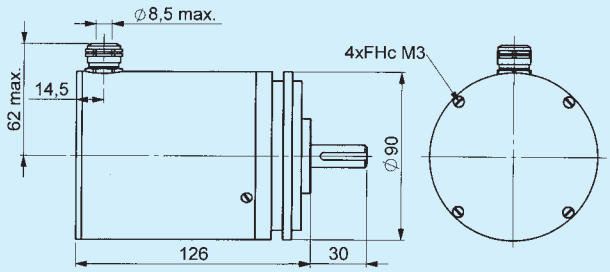
AINS90
AINS90S

DIMENSIONS

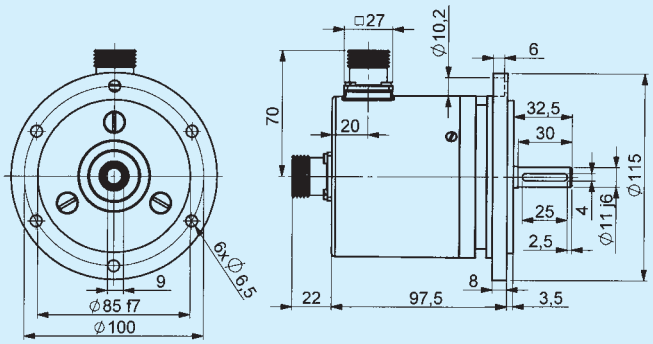
AINS912
3A, 3R



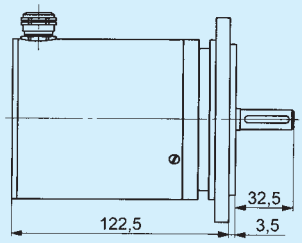
AINS912
with terminal box (BR)



AINS911
5A, 5R, 6A, 6R, 8A, 8R



AINS911
with terminal box (BR)



ORDERING CODE

AINS90
AINS90S

Shaft Ø

11 = 11 mm
12 = 12 mm
C1 = 11 mm
Shaft length : 22,5 mm
C2 = 12 mm
Shaft length : 25 mm

Output circuit

2 = 5 V RS422
3 = 15-30 V Driver 12 V
5 = 11-30 V Driver
8 = 11-30 V RS422
T = 11-30 V Transistor
H = 11-30 V 150 mA

Output signals

9= A, $\overline{A}$, B, $\overline{B}$, 0, $\overline{0}$
7= A, $\overline{A}$, B, $\overline{B}$
5= A, $\overline{A}$
A= Index gated on A
N= Index ungated

Connection

3A = shielded cable, axial output
3R = shielded cable, radial output
5A = 12 pin connector, axial output, cw
5R = 12 pin connector, radial output, cw
6A = 12 pin connector, axial output, cw
6R = 12 pin connector, radial output, cw
8A = 12 pin connector, axial output, ccw
8R = 12 pin connector, radial output, ccw

Resolution

10000 max.

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INCREMENTAL ENCODER MyInc

EINS90

- Industry Standard Size Ø 90 mm
- IP 54 Protection, Option IP64
- 5 to 26 Volts, RS 422 Compatible
- <100 kHz Maximum Frequency
- Resolutions up to 6000 cpt

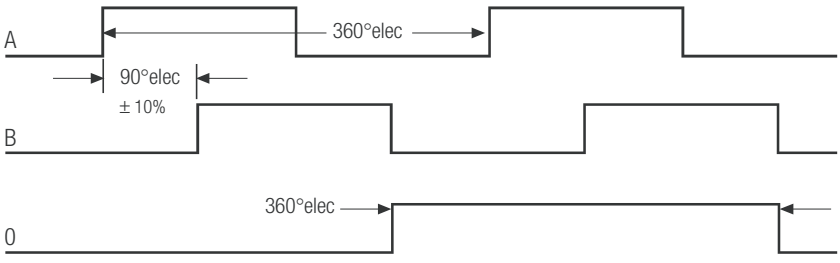
Electrical Specifications

Supply Voltage	5-26 VDC, 5 VDC
Current Consumption	<60 mA (24 VDC)
Output Circuit	Push-Pull, RS 422A (line driver)
Impulse Frequency	<100 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)

Mechanical Specifications

Cover	Aluminium
Body	Aluminium
Shaft	Stainless steel
Speed	6000 RPM (max.)
Torque	< 0.025 Nm
Loading	Axial 30 N, Radial 30 N
Protection	IP 54, Option IP 64
Temperature	-20 °C . . . +85 °C
Weight	1500 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

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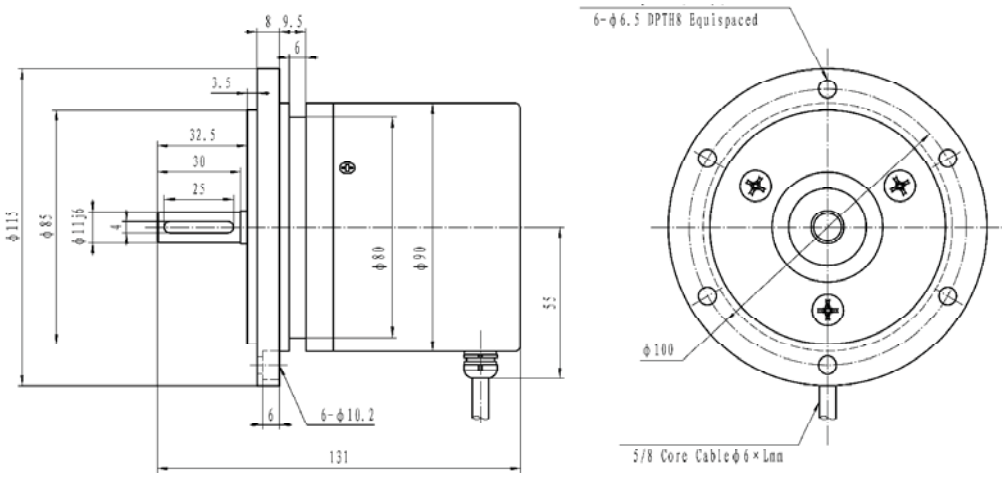
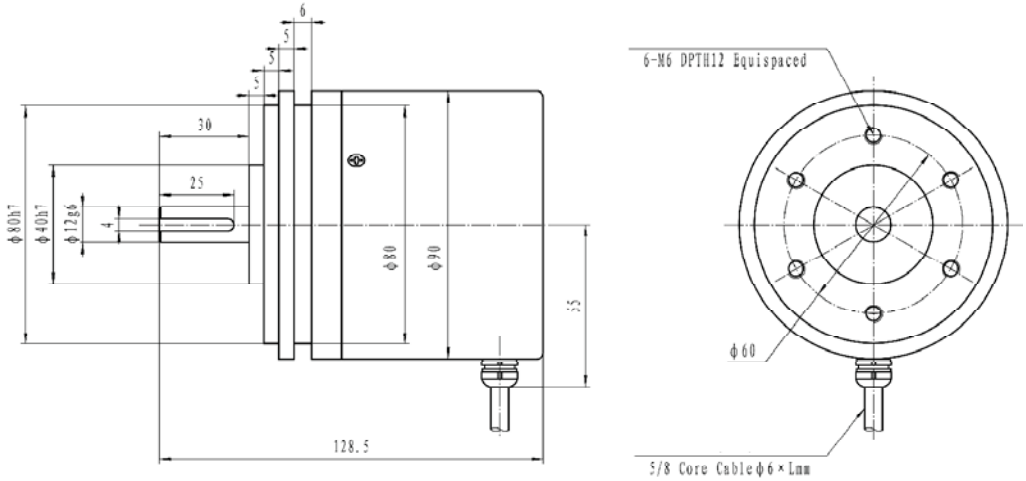
INCREMENTAL ENCODER MyInc

EINS90

EINS9011



EINS9012



Connections

Function	Cable Colours, 3A, 3R
0 Volt	black
+ Volt	red
A	green
B	white
0	yellow
$\overline{A}$	brown (only output A2)
$\overline{B}$	grey (only output A2)
$\overline{0}$	orange (only output A2)

ORDERING CODE

EINS90

Shaft Ø

11 = 11 mm

12 = 12 mm

Output Circuit

A5 = Push Pull 5 to 26 VDC

A2 = Line Driver 5 VDC, RS 422

Output Signals

9 = A+B+0

Connection

3A = shielded cable, 2 m, axial output

3R = shielded cable, 2 m, radial output

Resolution

100, 120, 200, 300, 360, 400, 500, 550, 600, 720, 800, 900, 960, 1000, 1024, 1200, 1440, 1500, 1600, 1800, 2000, 2048, 2400, 2500, 3000, 3600, 4000, 4096, 5000, 6000

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INCREMENTAL ENCODER MyInc

AINH90
AINH90S

- Heavy duty hollow shaft encoder.
- Adaptation of the diameter by reduction hubs in aluminium or in composite RDP (thermal and electrical insulation).
- Possibility of double or triple mounting with incremental, absolute or tachoencoders.

SPECIFICATIONS

	AINH90	AINH90S
• COVER	Zinc alloy	Stainless steel
• BODY	Aluminium	Stainless steel
• SHAFT	Stainless steel	Stainless steel
• TORQUE	2.5 Ncm	2.5 Ncm
• INERTIA	500 gcm²	500 gcm²
• AXIAL SHAFT LOADING	50 N	50 N
• RADIAL SHAFT LOADING	80 N	80 N
• MAX. SPEED	4 500 min⁻¹	4 500 min⁻¹
• PROTECTION	IP 65	IP 65
• TEMPERATURE	-20 °C ... +85 °C	-20 °C ... +85 °C
• WEIGHT	850 g	1 800 g

AINH90

Terminal assignment

Signal:	OV	$+U_B$	A	$\overline{A}$	B	$\overline{B}$	0	$\overline{0}$	Shield
12 pin plug cw (6R) Pin:	1	2	3	6	4	7	5	8	connector body
12 pin plug cw (8R) Pin:	10 + 11	2 + 12	8	1	5	6	3	4	connector body
Cable colour:	WH	BN	GN	PK	YE	BU	GY	RD	general shielding

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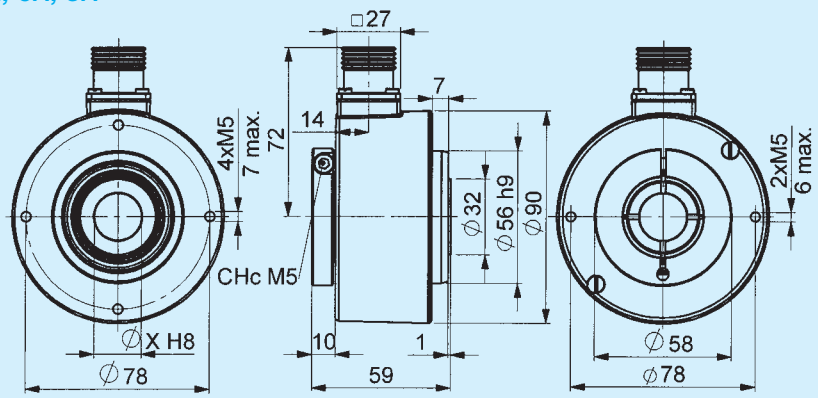
AINH90
AINH90S

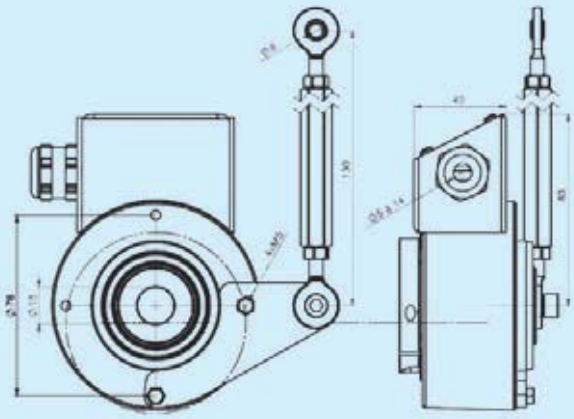
DIMENSIONS

AINH90

5R, 6R, 8R

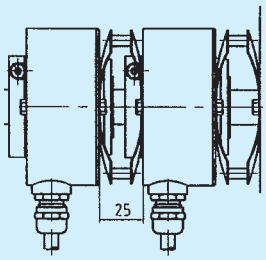


AINH90 . . . BR + DAC9320



On request: Double mounting

2 x AINH90 . . . 3R + DAC9445/004



ORDERING CODE

AINH90
AINH90S

Shaft Ø

with hub
12 = 12 mm
20 = 20 mm
25 = 25 mm

without hub
30 = 30 mm
32 = 32 mm

Output circuit

2 = 5 V RS422
3 = 15-30 V Driver 12 V
5 = 11-30 V Driver
8 = 11-30 V RS422
T = 11-30 V Transistor
H = 11-30 V, 150 mA

Output signals

9= $\overline{A}$, A, $\overline{B}$, B, $\overline{0}$, 0
7= $\overline{A}$, A, $\overline{B}$, B
5= $\overline{A}$, A
A= Index gated on A
N= Index ungated

Connection

3R = shielded cable, radial output
8R = 12 pin connector, radial output, ccw
6R = 12 pin connector, radial output, cw
5R = 12 pin connector, radial output, cw
BR = terminal box, radial

Resolution

10000 max.

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INCREMENTAL ENCODER MyInc

EINH90

- Industry Standard Size Ø 90 mm
- IP 62 Protection
- 5 to 26 Volts, RS 422 Compatible
- <100 kHz Maximum Frequency
- Resolutions up to 4096 cpt

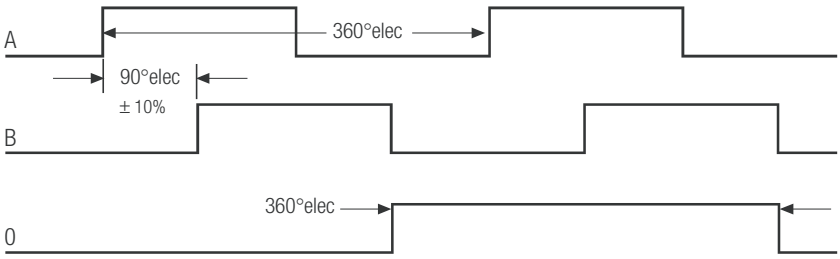
Electrical Specifications

Supply Voltage	5-26 VDC, 5 VDC
Current Consumption	<60 mA (24 VDC)
Output Circuit	Push-Pull, RS 422A (line driver)
Impulse Frequency	<100 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)

Mechanical Specifications

Cover	Aluminium
Body	Aluminium
Shaft	Stainless steel
Speed	6000 RPM (max.)
Torque	< 0.025 Nm
Loading	Axial 20 N, Radial 20 N
Protection	IP 62
Temperature	-20 °C . . . +85 °C
Weight	700 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

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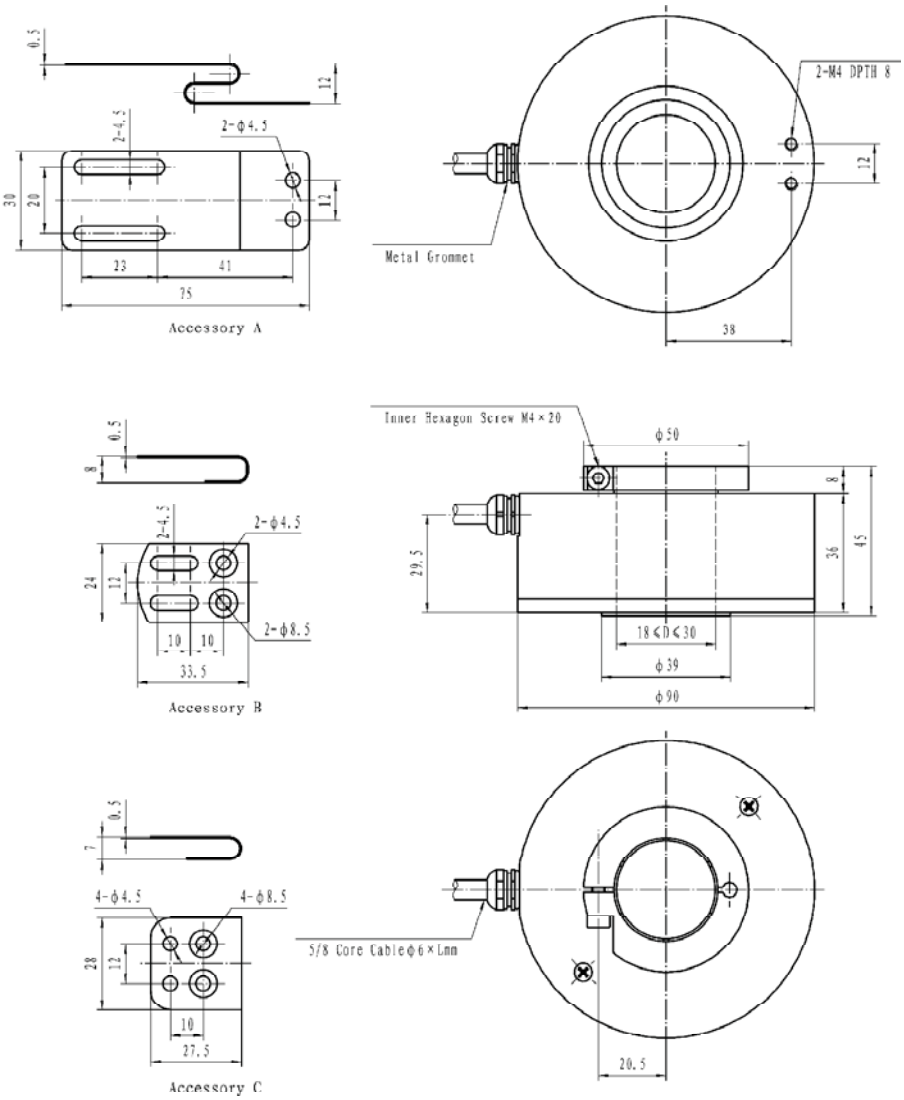
EINH90



Connections

Function	Cable Colours, 3A, 3R
0 Volt	black
+ Volt	red
A	green
B	white
0	yellow
$\overline{A}$	brown (only output A2)
$\overline{B}$	grey (only output A2)
$\overline{0}$	orange (only output A2)

ORDERING CODE

EINH90

Shaft Ø	Output Circuit	Output Signals	Connection	Resolution
30 = 30 mm	A5 = Push Pull 5 to 26 VDC A2 = Line Driver 5 VDC, RS 422	9 = A+B+0	3A = shielded cable, 2 m, axial output 3R = shielded cable, 2 m, radial output	100, 300, 500, 512, 600, 1000, 1024, 2000, 2500, 3000, 4096

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INCREMENTAL HOLLOW SHAFT ENCODER AINH100

- Heavy duty hollow shaft encoder
- Hollow shaft 40-65 mm
- 25000 PPR Maximum
- 4.75 to 30 Volts, RS 422 Compatible
- 300 kHz Maximum Frequency
- Possibility of double or triple mounting with incremental, absolute or tacho encoders
- Short circuit protection

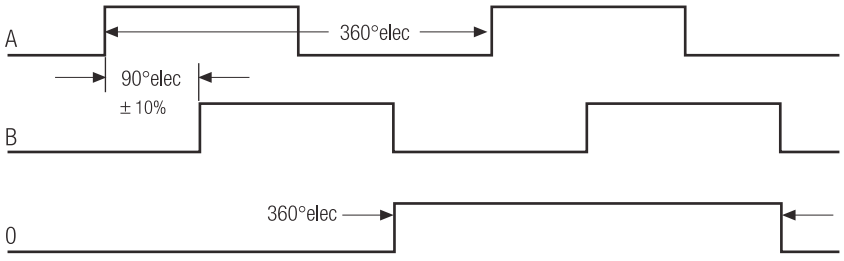
Electrical Specifications

Supply Voltage	4.75-30 V DC
Current Consumption	40 mA (max.)
Output Circuit	Push-Pull, RS 422A
Impulse Frequency	300 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)

Mechanical Specifications

Cover	Aluminium
Body	Aluminium
Hollow shaft	Stainless steel
Speed	4000 RPM (max.)
Torque	> 0.2 Nm
Loading	Axial 60 N, Radial 80 N
Protection	IP 54
Temperature	-20° . . . +70° C +100° C Optional
Weight	570 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

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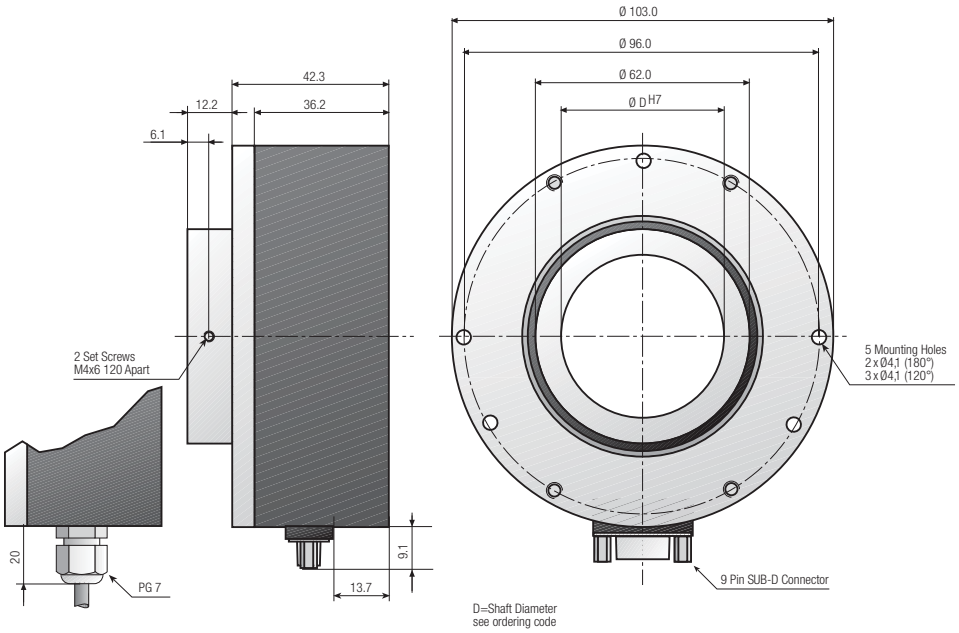
INCREMENTAL HOLLOW SHAFT ENCODER AINH100



Connections

Function	Cable Colour Code	9 Pin Connector	12 Pin Connector
0 Volt	white	1	1
+ Volt	brown	2	2
A	green	3	3
B	yellow	4	4
0	grey	5	5
$\overline{A}$	pink	6	6
$\overline{B}$	blue	7	7
$\overline{0}$	red	8	8

ORDERING CODE

AINH 100

Shaft Size D

26 = 26 mm
38 = 38 mm
44 = 44 mm

Output Circuit

A7 = Push Pull
4.75 to 30 VDC
A2 = Line Driver 5 V DC,
RS 422

Output Signals

9 = A+B+0
+Compliments

Connection

3R = shielded cable, 2 m,
radial output

6R = 12 pin connector,
radial output, cw

9R = 9 pin Sub D connector,
radial output

Resolution

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INCREMENTAL ENCODER MyInc

DINH100

- Rugged and extremely thin hollow shaft encoder for extension on power motors
- Hollow shaft Ø max. 45 mm
- Easy mounting
- Meets protection class IP 54

Applications:
Power motors and three phase current motors with frequency transformation, system construction, crane systems

Mechanical characteristics:

Speed:	max. 3500 min-1
Starting torque:	1,5 Ncm
Radial load capacity of shaft*:	200 N
Axial load capacity of shaft:*:	100 N
Weight:	720 g
Protection acc. to EN 60 529:	IP 54
Working temperature:	–10 °C ... +70 °C
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27:	1000 m/s^2 (6 ms)
Vibration resistance acc. to IEC 68-2-6:	50 m/s^2 (10 ... 2000 Hz)

Available resolution:

1000, 1024, 2048, 2500, 4096

Electrical characteristics:

Output circuit:	RS 422	Push-pull
Supply voltage:	4,75 ... 5,5 VDC	10 ... 30 VDC
Power consumption (no load) without inverted signal:	–	–
Power consumption (no load) with inverted signals:	max. 70 mA	max. 70 mA
Permissible load:	max. 40 mA	max. 40 mA
Pulse frequency:	max. 200 kHz	max. 200 kHz
Signal level high at 20 mA:	min. 2,5 V	min. U_B-2,5 V
Signal level low at 20 mA:	max. 1,2 V	max. 2,5 V
Short circuit proof outputs:	no	yes

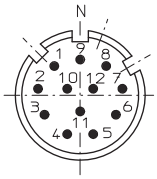
Terminal assignment

Signal:	0V	+U_B	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	Shield
12 pin plug Pin	10	12	5	6	8	1	3	4	PH[1)]
Cable colour:	WH	BN	GN	RD	YE	BL	GY	PK	

[1)]PH = Shield is attached to connector housing

Top view of mating side, male contact base:

12 pin plug



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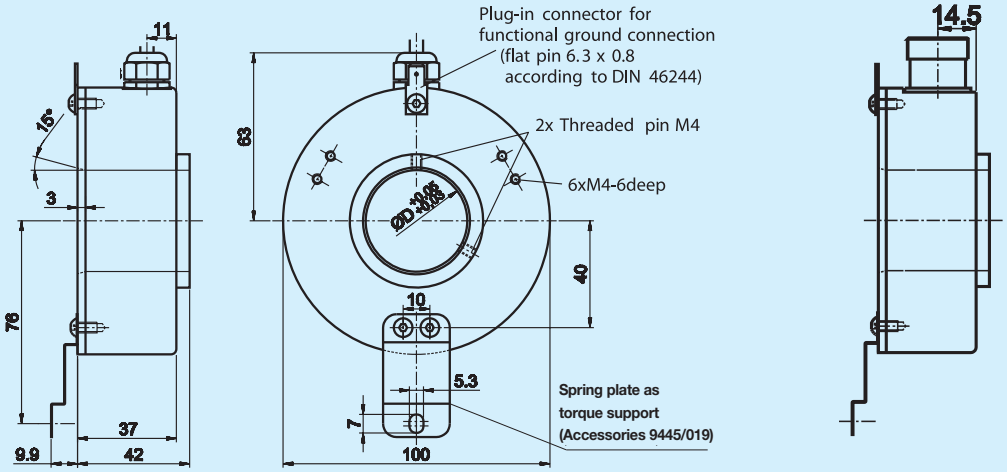
DINH100

Dimensions

Connector, 12-pin.



ORDERING CODE

DINH100

Shaft Ø

25 = 25 mm
28 = 28 mm
30 = 30 mm
32 = 32 mm
38 = 38 mm
40 = 40 mm
42 = 42 mm
45 = 45 mm
Other diameters on request.

Output circuit and supply voltage

A5 = Push-pull (with inverted signal) 10 ... 30 V supply voltage
A2 = RS422 (with inverted signal) 5 V supply voltage

Output signals

9 = $\overline{A}$, A, $\overline{B}$, B, $\overline{0}$, 0
7 = $\overline{A}$, A, $\overline{B}$, B
5 = $\overline{A}$, A

Connection

Cable
3R = shielded cable radial output
8R = 12 pin connector, radial output, ccw

Resolution

1000
1024
2048
2500
4096
Other PPRs on request.

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INCREMENTAL ENCODER MyInc

EINH100

- Industry Standard Size Ø 100 mm
- IP 65 Protection, Option IP67
- 5 to 30 Volts, RS 422 Compatible
- <300 kHz Maximum Frequency
- Resolutions up to 10000 cpt

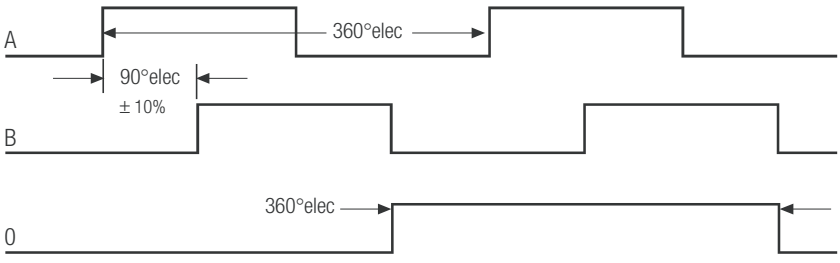
Electrical Specifications

Supply Voltage	5-30 VDC, 5 VDC
Current Consumption	<60 mA (24 VDC)
Output Circuit	Push-Pull, RS 422A (line driver)
Impulse Frequency	<300 kHz (max.)
Logic Level (high)	Vcc - 0.7 Volt
Logic Level (low)	0.25 Volt (max.)
Short Circuit Protection	100 %

Mechanical Specifications

Cover	Aluminium
Body	Aluminium
Shaft	Stainless steel
Speed	10000 RPM (max.)
Torque	< 0.025 Nm (IP 67)
Loading	Axial 140 N, Radial 240 N
Protection	IP 65, Option IP 67
Temperature	-20 °C . . . +85 °C
Weight	900 g

Output Signals



A Leads B in the CW Direction (facing shaft)
Complimentary channel also available

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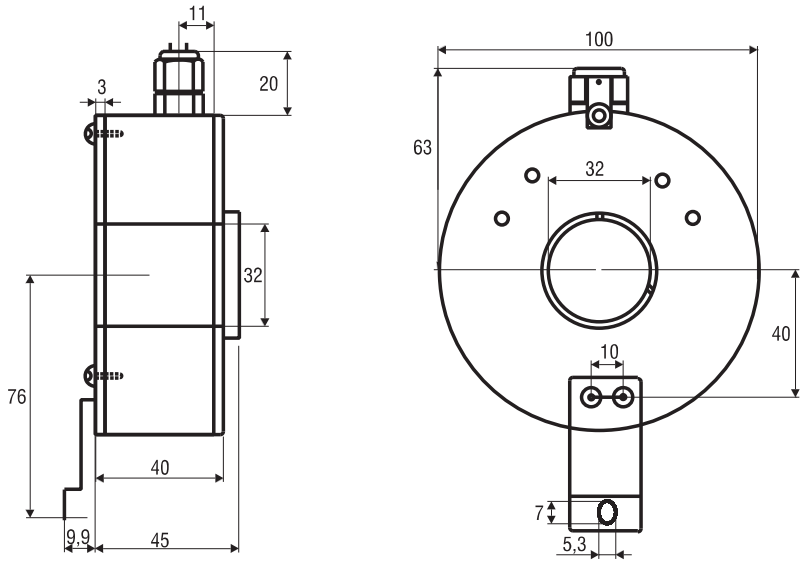
EINH100



Connections

Function	Cable Colours, 3R
0 Volt	brown
+ Volt	white
A	green
B	yellow
0	grey
$\overline{A}$	red
$\overline{B}$	pink
$\overline{0}$	blue

ORDERING CODE

EINH100

Shaft Ø

26 = 26 mm
28 = 28 mm
30 = 30 mm
32 = 32 mm
38 = 38 mm
40 = 40 mm
42 = 42 mm

Output Circuit

A5 = Push Pull
4.75 to 30 VDC

A2 = Line Driver 5 VDC,
RS 422

A9 = 8–30 VDC
Line Driver 5 VDC,
RS422

Output Signals

9 = A+B+0+Compliments

Connection

3R = shielded cable, 2 m,
radial output

Resolution

1024, 2000, 2048, 2500, 4000, 4096, 5000, 8000, 8192, 10000

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INCREMENTAL ENCODER MyInc

DINH145

- Hollow shaft encoder for direct istallation on large electric motors
- Maximum mechanical and electrical safety
- Highly interference-resistant when used with frequency converters
- Meets protection class IP 54
- Hollow shaft Ø max. 72 mm

Mechanical characteristics:

Speed:	max. 800 min-1
Starting torque:	1,5 Ncm
Radial load capacity of shaft*:	200 N
Axial load capacity of shaft:*:	100 N
Weight:	1700 ... 2500 g
Protection acc. to EN 60 529:	IP 54
Working temperature:	–10 °C ... +70 °C
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27:	1000 m/s^2 (6 ms)
Vibration resistance acc. to IEC 68-2-6:	50 m/s^2 (10 ... 2000 Hz)

Available resolution:

1024, 2500

Electrical characteristics:

Output circuit:	RS 422	Push-pull
Supply voltage:	4,75 ... 5,5 VDC	10 ... 30 VDC
Power consumption (no load) without inverted signal:	–	–
Power consumption (no load) with inverted signals:	max. 70 mA	max. 70 mA
Permissible load:	max. 40 mA	max. 40 mA
Pulse frequency:	max. 200 kHz	max. 200 kHz
Signal level high at 20 mA:	min. 2,5 V	min. U_B-2,5 V
Signal level low at 20 mA:	max. 1,2 V	max. 2,5 V
Short circuit proof outputs:	no	yes

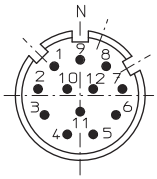
Terminal assignment

Signal:	0V	+U_B	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	Shield
12 pin plug Pin	10	12	5	6	8	1	3	4	PH[1)]
Cable colour:	WH	BN	GN	RD	YE	BL	GY	PK	

[1)]PH = Shield is attached to connector housing

Top view of mating side, male contact base:

12 pin plug



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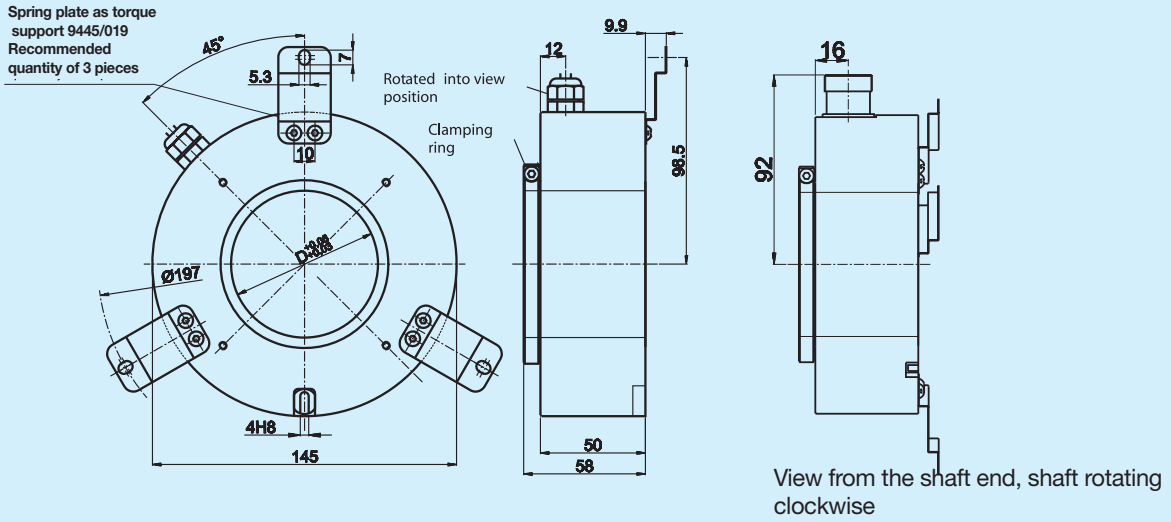
INCREMENTAL ENCODER MyInc

DINH145

Dimensions

Connector, 12-pin.



View from the shaft end, shaft rotating clockwise

ORDERING CODE

DINH145

Shaft Ø

48 = 48 mm

55 = 55 mm

65 = 65 mm

72 = 72 mm

Other diameters on request.

Output circuit and supply voltage

A5 = Push-pull (with inverted signal) 10 ... 30 V supply voltage

A2 = RS422 (with inverted signal) + Alarm, 5 V supply voltage

Output signals

9 = $\overline{A}$, A, $\overline{B}$, B, $\overline{0}$, 0

Connection

Cable

3R = shielded cable radial output

8R = 12 pin connector, radial output, ccw

Resolution

1024

2500

Other PPRs on request.

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OVERSPEED SWITCH

AOSS90

- Heavy duty centrifugal overspeed switch
- Switching speed from 800 to 4000 rpm
- Multiple mounting possibility with Axxx90 and FAxH90 encoders
- No external power supply required
- IP 66 Protection
- Temperature range form -30 to +130 °C
- Connector and terminal box version
- Applications: steel and paper mills, crane and wood industry, etc.

AOSS9011

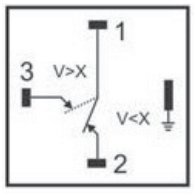
AOSS9012 + AINS9012
Double mounting

Specifications

	connector/cable version	terminal box version
Cover	zinc alloy	treated aluminium
Body	aluminium	aluminium
Shaft	stainless steel	stainless steel
Speed	continuous 6000 min^{-1} short term 9000 min^{-1} maximum 1,5 · n_s	continuous 6000 min^{-1} short term 9000 min^{-1} maximum 1,5 · n_s
Torque	≤ 10 · 10^{-3} Nm	≤ 10 · 10^{-3} Nm
Loading	Axial 100 N, Radial 200 N	Axial 100 N, Radial 200 N
Protection	IP 66	IP 66
Temperature	-30 °C . . . +130 °C	-30 °C . . . +130 °C
Weight	1.1 kg	1.3 kg
Switching speed	800 . . . 4000 min^{-1}	800 . . . 4000 min^{-1}
Principle	centrifugal	centrifugal
Contact type	NO, NC	NO, NC
Max. current	6 A/240 VAC	6 A/240 VAC
Max. switching sequrence	4/min.	4/min.
Switching accuray	-5 . . . +8 % of n_s	-5 . . . +8 % of n_s
tolerance	appr. 3 % between cw and ccw	
Speed hysteresis	40 % below n_s	40 % below n_s

n_s = switching speed (factory calibrated)

Terminal assignment



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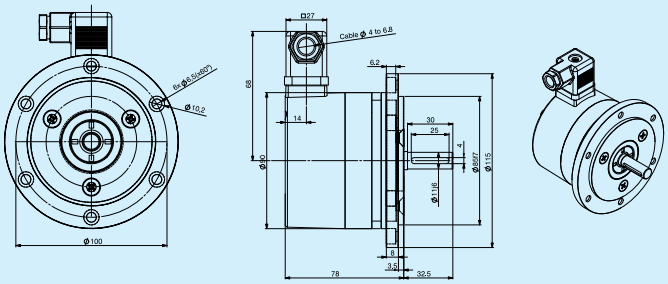
OVERSPEED SWITCH

AOSS90

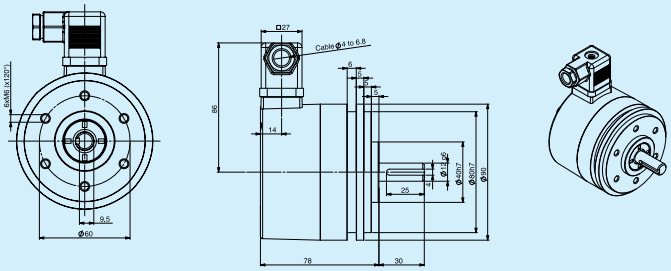
Dimensioned drawing

Overspeed switches

AOSS9011

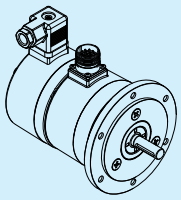


AOSS9012

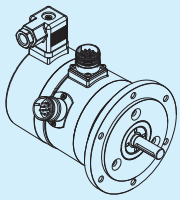


Overspeed switch - encoder combinations

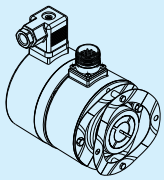
AOSS90 + AINS90xx



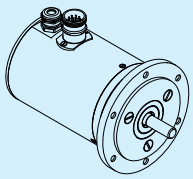
AOSS90 + AINS90xx
with 2 incremental outputs



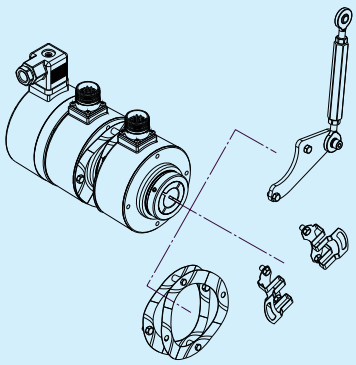
AOSS90 + AINH90xx
with meflex coupling



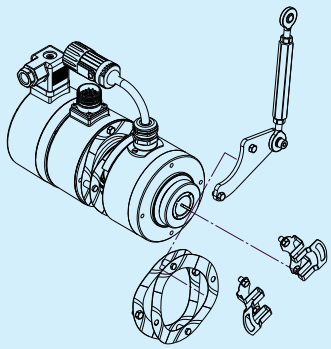
AOSS90 + AINS90xx
in 1 housing



AOSS90 + AINH90xx + AINH90xx
with 2 incremental outputs



AOSS90 + AINH90xx + FAxH90
with 1 incremental + 1 absolute/
bus output



ORDERING CODE

AOSS90

Shaft-Ø

11 = 11 mm
12 = 12 mm
CE = Combination
with encoder

Connection

1R = 4pin solenaid
valve connector
BR = terminal box

Resolution

800
1000
1200
1500
1800
3000
4000
Other switching speeds
on request

Odering code example for overspeed switch-encoder combination

AOSS90CE1R1500 + AINS9011596R1024

Technical specifications of encoders, refer to related incremental or absolute encoder data sheets

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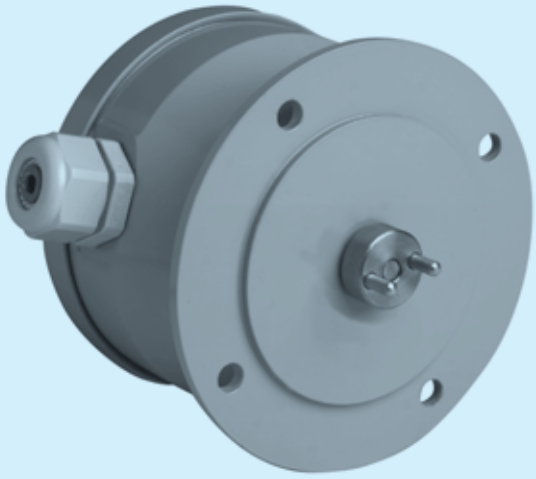
ROTATION SPEED MONITOR 6KB 4110/AL-Ni

- Robust speed monitor
- Switching speed range 60 to 6000 rpm
- Adjustable by code swittches
- Seperate relays for left and right turning
- No external power supply required
- Hysteresis 30 to 60 rpm



Function Principle

When the shaft is turned a stepper motor induces the supply power for the signal processing circuits and the signal voltages for determination of revolution and direction.

When the speed selected by the code switches is reached relay 1 switches at left turning and relay 2 switches at right turning.

Electrical Data:

Supply voltage:	Internally generated
Nominal speed range:	60 to 6.000 r.p.m. (1 to 100 r.p.s.)
Relay contacts:	2 change over, for left and right turning
Switching performance:	max. 400 V AC, 5 A, 1250 VA max. 240 V DC, 5 A, 150 W (resistive load)

Mechanical Data:

Adaptation:	Pin adapter with plugged elastic clutch
Cable entry:	M 20 cable gland for cable ø 7 to 12 mm
Housing material:	Glass fibre reinforced plastic; oil, grease and acid resistant
Housing dimensions:	According to fig. 1
Flange diameter:	120 mm
Shaft bearing:	2 ball bearings
Environmental temperature:	Operating -25 °...+70 °C Storage -40 °...+80 °C Transport -40 °...+80 °C
Enclosure:	IP 65

Testing and Qualification of the Item:

Humidity:		DIN IEC 68-2-30		
		Lower temp.	+25 °C	97 % rel. hum.
		Upper temp.	+55 °C	93 % rel. hum.
		Test duration	6 days	
Vibration:		DIN EN 60 068 -2 -6		
		Frequency	10 – 150 Hz	
		Amplitude	0,35 mm	
		Resp. acceleration	5 g (20 Cycles per axis)	
Shock loads:		DIN EN 60 068 -2 -27		
		Shocktype	semi-sine	
		Amplitude	30 g	
		Duration	18 ms	
		Shocks per orientation	3	
Long term shock loads:		DIN EN 60 068 -2 -29		
		Shocktype	semi-sine	
		Amplitude	25 g	
		Duration	6 ms	
		Shocks per orientation	1000	
Isolation:		DIN / VDE 0435 Part 303		
		Check value	2 kV AC	
Susceptibility:	Conducted susc.	DIN / EN 50141	10 V	
	Radiated susc.	DIN ENV 50140	10 V/m	
	Electrostatic discharge	DIN EN 61 000-4-8		
			Contact	4 kV
			Air gap	8 kV
	Burst:	DIN EN 61 000-4-4	2 kV	
	Surge:	DIN EN 61 000-4-5		
			asymmetrical	4 kV
			symmetrical	2 kV
Emission:	Radiated emission:	DIN EN 55 022	Line B	

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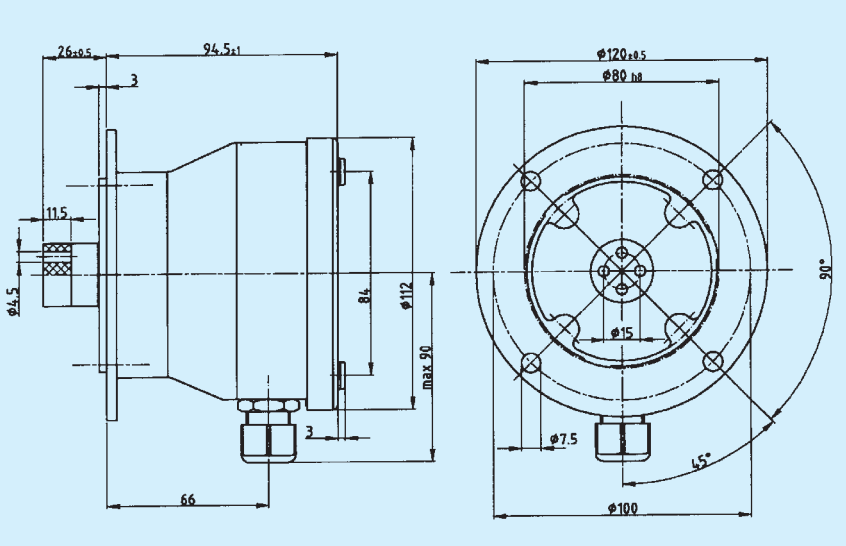
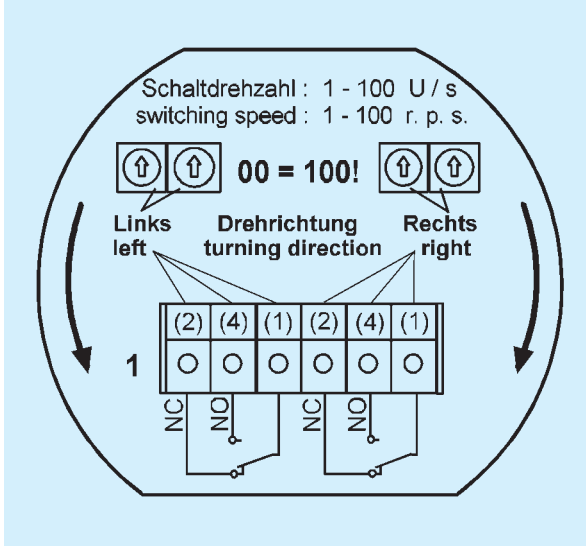
ROTATION SPEED MONITOR 6KB 4110/AL-Ni

Dimensioned drawing



Terminal assignment



Code Switch setting

Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm
*1 0 : 1	1	60	2 : 1	21	1260	4 : 1	41	2460	6 : 1	61	3660	8 : 1	81	4860
0 : 2	2	120	2 : 2	22	1320	4 : 2	42	2520	6 : 2	62	3720	8 : 2	82	4920
0 : 3	3	180	2 : 3	23	1380	4 : 3	43	2580	6 : 3	63	3780	8 : 3	83	4980
0 : 4	4	240	2 : 4	24	1440	4 : 4	44	2640	6 : 4	64	3840	8 : 4	84	5040
0 : 5	5	300	2 : 5	25	1500	4 : 5	45	2700	6 : 5	65	3900	8 : 5	85	5100
0 : 6	6	360	2 : 6	26	1560	4 : 6	46	2760	6 : 6	66	3960	8 : 6	86	5160
0 : 7	7	420	2 : 7	27	1620	4 : 7	47	2820	6 : 7	67	4020	8 : 7	87	5220
0 : 8	8	480	2 : 8	28	1680	4 : 8	48	2880	6 : 8	68	4080	8 : 8	88	5280
0 : 9	9	540	2 : 9	29	1740	4 : 9	49	2940	6 : 9	69	4140	8 : 9	89	5340
1 : 0	10	600	3 : 0	30	1800	5 : 0	50	3000	7 : 0	70	4200	9 : 0	90	5400
1 : 1	11	660	3 : 1	31	1860	5 : 1	51	3060	7 : 1	71	4260	9 : 1	91	5460
1 : 2	12	720	3 : 2	32	1920	5 : 2	52	3120	7 : 2	72	4320	9 : 2	92	5520
1 : 3	13	780	3 : 3	33	1980	5 : 3	53	3180	7 : 3	73	4380	9 : 3	93	5580
1 : 4	14	840	3 : 4	34	2040	5 : 4	54	3240	7 : 4	74	4440	9 : 4	94	5640
1 : 5	15	900	3 : 5	35	2100	5 : 5	55	3300	7 : 5	75	4500	9 : 5	95	5700
1 : 6	16	960	3 : 6	36	2160	5 : 6	56	3360	7 : 6	76	4560	9 : 6	96	5760
1 : 7	17	1020	3 : 7	37	2220	5 : 7	57	3420	7 : 7	77	4620	9 : 7	97	5820
1 : 8	18	1080	3 : 8	38	2280	5 : 8	58	3480	7 : 8	78	4680	9 : 8	98	5880
1 : 9	19	1140	3 : 9	39	2340	5 : 9	59	3540	7 : 9	79	4740	9 : 9	99	5940
2 : 0	20	1200	4 : 0	40	2400	6 : 0	60	3600	8 : 0	80	4800	0 : 0	100	6000

*1 not 6KB 4110/AL-Ni-M

ORDERING CODE

	Speed range	Relay type	Ident-No.
6KB 4110/AL-Ni	60–6000 rmp	bistable	SI 100
6KB 4110/AL-Ni-M	120–6000 rpm	monostable	SI 101

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CONVEYOR BELT MONITOR

6KB 4111

- Robust speed monitor
- Switching speed range 60 to 6000 rpm
- Adjustable by code switches
- Seperate relays for left and right turning
- No external power supply required
- Hysteresis 30 to 60 rpm

Function Principle

When the shaft is turned a stepper motor induces the supply power for the signal processing circuits and the signal voltages for determination of revolution and direction.

When the speed selected by the code switches is reached relay 1 switches at left turning and relay 2 switches at right turning.

Electrical Data:

Supply voltage:	Internally generated
Nominal speed range:	60 to 6.000 r.p.m. (1 to 100 r.p.s.)
Relay contacts:	2 change over, for left and right turning
Switching performance:	max. 400 V AC, 5 A, 1250 VA max. 240 V DC, 5 A, 150 W (resistive load)

Mechanical Data:

Adaptation:	Pin adapter with plugged elastic clutch
Cable entry:	M 20 cable gland for cable ø 7 to 12 mm
Housing material:	Glass fibre reinforced plastic; oil, grease and acid resistant
Housing dimensions:	According to fig. 1
Flange diameter:	120 mm
Shaft bearing:	2 ball bearings
Environmental temperature:	Operating -25 °...+70 °C Storage -40 °...+80 °C Transport -40 °...+80 °C
Enclosure:	IP 65

Testing and Qualification of the Item:

Humidity:		DIN IEC 68-2-30		
		Lower temp.	+25 °C	97 % rel. hum.
		Upper temp.	+55 °C	93 % rel. hum.
		Test duration	6 days	
Vibration:		DIN EN 60 068 -2 -6		
		Frequency	10 – 150 Hz	
		Amplitude	0,35 mm	
		Resp. acceleration	5 g (20 Cycles per axis)	
Shock loads:		DIN EN 60 068 -2 -27		
		Shocktype	semi-sine	
		Amplitude	30 g	
		Duration	18 ms	
		Shocks per orientation	3	
Long term shock loads:		DIN EN 60 068 -2 -29		
		Shocktype	semi-sine	
		Amplitude	25 g	
		Duration	6 ms	
		Shocks per orientation	1000	
Isolation:		DIN / VDE 0435 Part 303		
		Check value	2 kV AC	
Susceptibility:	Conducted susc.	DIN / EN 50141	10 V	
	Radiated susc.	DIN ENV 50140	10 V/m	
	Electrostatic discharge	DIN EN 61 000-4-8		
			Contact	4 kV
			Air gap	8 kV
	Burst:	DIN EN 61 000-4-4	2 kV	
	Surge:	DIN EN 61 000-4-5		
			asymmetrical	4 kV
			symmetrical	2 kV
Emission:	Radiated emission:	DIN EN 55 022	Line B	

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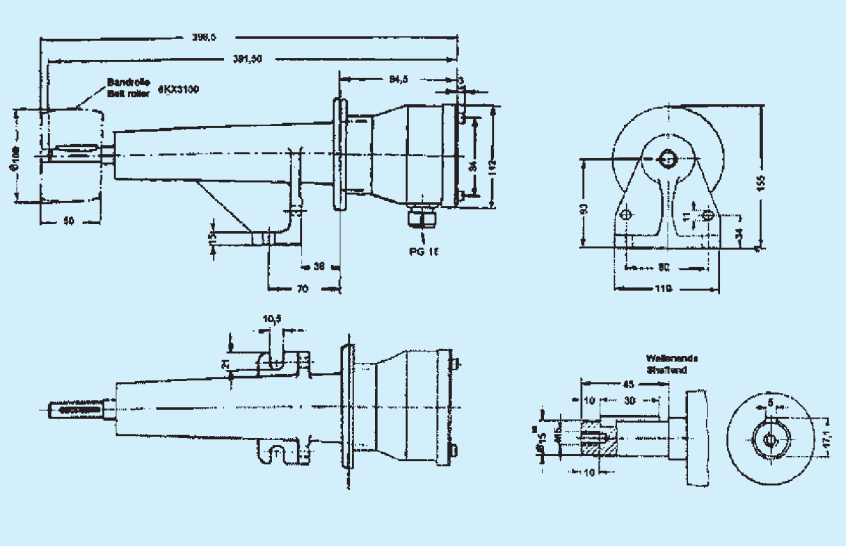
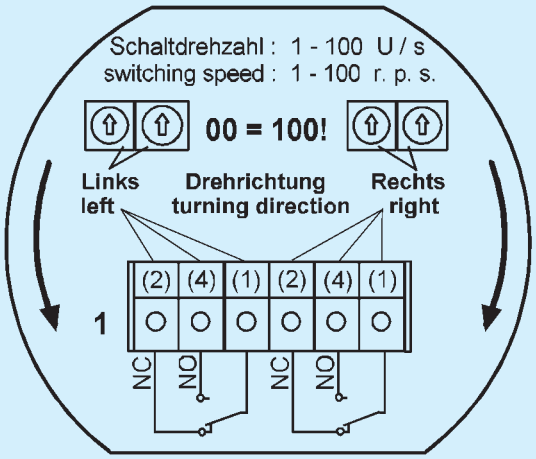
CONVEYOR BELT MONITOR

6KB 4111

Dimensioned drawing



Terminal assignment



Code Switch setting

Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm	Pos.	rps	rpm
0 : 1	1	60	2 : 1	21	1260	4 : 1	41	2460	6 : 1	61	3660	8 : 1	81	4860
0 : 2	2	120	2 : 2	22	1320	4 : 2	42	2520	6 : 2	62	3720	8 : 2	82	4920
0 : 3	3	180	2 : 3	23	1380	4 : 3	43	2580	6 : 3	63	3780	8 : 3	83	4980
0 : 4	4	240	2 : 4	24	1440	4 : 4	44	2640	6 : 4	64	3840	8 : 4	84	5040
0 : 5	5	300	2 : 5	25	1500	4 : 5	45	2700	6 : 5	65	3900	8 : 5	85	5100
0 : 6	6	360	2 : 6	26	1560	4 : 6	46	2760	6 : 6	66	3960	8 : 6	86	5160
0 : 7	7	420	2 : 7	27	1620	4 : 7	47	2820	6 : 7	67	4020	8 : 7	87	5220
0 : 8	8	480	2 : 8	28	1680	4 : 8	48	2880	6 : 8	68	4080	8 : 8	88	5280
0 : 9	9	540	2 : 9	29	1740	4 : 9	49	2940	6 : 9	69	4140	8 : 9	89	5340
1 : 0	10	600	3 : 0	30	1800	5 : 0	50	3000	7 : 0	70	4200	9 : 0	90	5400
1 : 1	11	660	3 : 1	31	1860	5 : 1	51	3060	7 : 1	71	4260	9 : 1	91	5460
1 : 2	12	720	3 : 2	32	1920	5 : 2	52	3120	7 : 2	72	4320	9 : 2	92	5520
1 : 3	13	780	3 : 3	33	1980	5 : 3	53	3180	7 : 3	73	4380	9 : 3	93	5580
1 : 4	14	840	3 : 4	34	2040	5 : 4	54	3240	7 : 4	74	4440	9 : 4	94	5640
1 : 5	15	900	3 : 5	35	2100	5 : 5	55	3300	7 : 5	75	4500	9 : 5	95	5700
1 : 6	16	960	3 : 6	36	2160	5 : 6	56	3360	7 : 6	76	4560	9 : 6	96	5760
1 : 7	17	1020	3 : 7	37	2220	5 : 7	57	3420	7 : 7	77	4620	9 : 7	97	5820
1 : 8	18	1080	3 : 8	38	2280	5 : 8	58	3480	7 : 8	78	4680	9 : 8	98	5880
1 : 9	19	1140	3 : 9	39	2340	5 : 9	59	3540	7 : 9	79	4740	9 : 9	99	5940
2 : 0	20	1200	4 : 0	40	2400	6 : 0	60	3600	8 : 0	80	4800	0 : 0	100	6000

ORDERING CODE

	Speed range	Relay type	Ident-No.
6KB 4111	60 – 6000 rmp	bistable	SI 099
accessory: 6KX 3100	pressure roller		SI 101

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- The Draw wire Sensor makes it possible to measure to position or control systems of linear displacement.

!

SPECIFICATIONS

The sensor with cable does not require precise linear guidance. It is especially adapted to the severe industrial environments: iron and steel industry, transcribing, industry of wood (sawmills, joineries), etc...

Principle of operation

A **cable of measurement** out of steel inoxidable, of great flexibility coated with a film polyamide, is rolled up and been held on a drum of precision.
An **optical encoder**, interdependent of the drum of technology incremental, absolute, analog or potentiomètrique

Our range of Draw Wire

DRAW WIRE	RANGE max. (mm)	Perimeter (mm)	Cable (mm)
CD50	1200	100	0,4 mm
CD60	1500	152,4 or 150	0,9 mm
CD80	2500	200 or 204,8	0,6; 0,9
CD80 MEC	2500	200 or 204,8	0,6; 0,9
CD115	3500	300	0,9
CD115 MEC	3500	300	0,9
CD150	5000	409,6	0,9
CD150 MEC	5000	409,6	0,9
CD230	8000	667,9	0,9
CD230-MEC	8000	667,9	0,9

The modules in version MEC (Mechanical) can be provided separately of the encoder.
Note: Flange ref. 9500/003 built-in on each draw wire

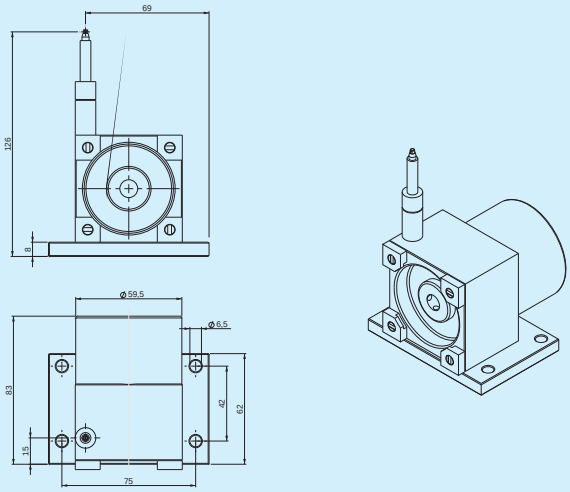
Ref. CD50

Ref. CD60

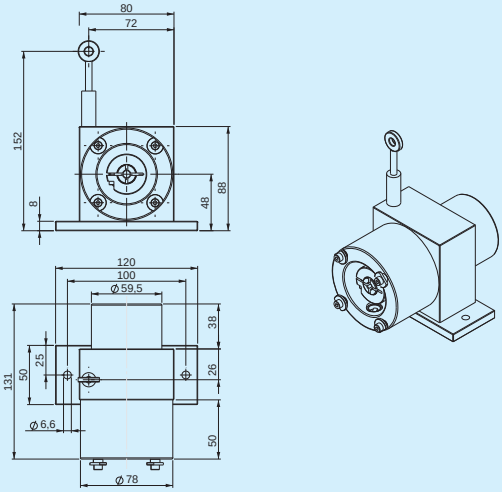
Ref. CD80

DIMENSIONS

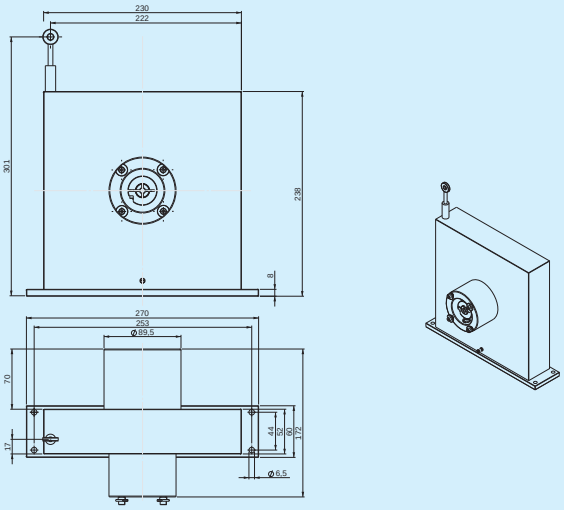
CD60



CD80



CD230



ORDERING CODE

CD

Serial number	Range	Incremental	Absolute
50	1200 mm	IN/40/CD5	/
60	1500 mm	FINS5810	ASS5810
80	2500 mm	FINS5810	ASS5810
80-MEC	2500 mm	FINS5806	ASS5806
115	3500 mm	FINS5810	ASS5810
115-MEC	3500 mm	FINS5806	ASS5806
150	5000 mm	FINS5810	ASS5810
150-MEC	5000 mm	FINS5806	ASS5806
230	8000 mm	FINS5810	ASS5810
230-MEC	8000 mm	FINS5806	ASS5806

Resolution

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Magnetic Linear Encoder System MyLin

KMLIxx

KMLE01 Magnetic Linear Encoder System:

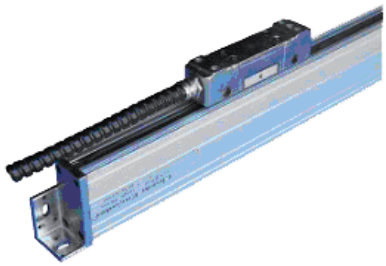
- High resolution up to 0.001 mm resolution
- Sturdy metal case
- Best technology in small dimensions
- Shielded metal enclosure
- Easy mounting by gluing
- Contact-less and vear free system
- High resistance to vibrations and shocks
- Protection class IP67
- Resistant to humidity
- High accuracy
- Reliability reading transducer
- Measuring lengths of up to 100 m
- Connection cable up to 50 m
- Signal processing as standard with encoders

KMLE02 Magnetic Linear Encoder Profile System:

- High resolution up to 0.001 mm
- Tape in flat and rugged aluminium profile
- Stainless steel cover protect
- Best technology in small dimensions
- Shielded metal enclosure
- Easy mounting
- Contact-less and vear free system
- High resistance to vibrations and shocks
- Protection class IP67
- Resistant to humidity
- High accuracy
- Reliability reading transducer
- Measuring lengths of up to 100 m
- Connection cable up to 20 m

KMLE03 Sealed Magnetic Measuring Scale in Guidance Profile and Guided Sensor Head:

- Incremental Encoder output A,B
- Contact-less and vear free system
- Robust shielded metal enclosure
- Protection class IP67
- Resistant to dirt, humidity and dust
- Compact design
- Requires no cleaning or Maintenance
- High tolerance to shock and vibration
- Measuring lengths of up to 100 m



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Magnetic Linear Incremental Encoder System MyLin

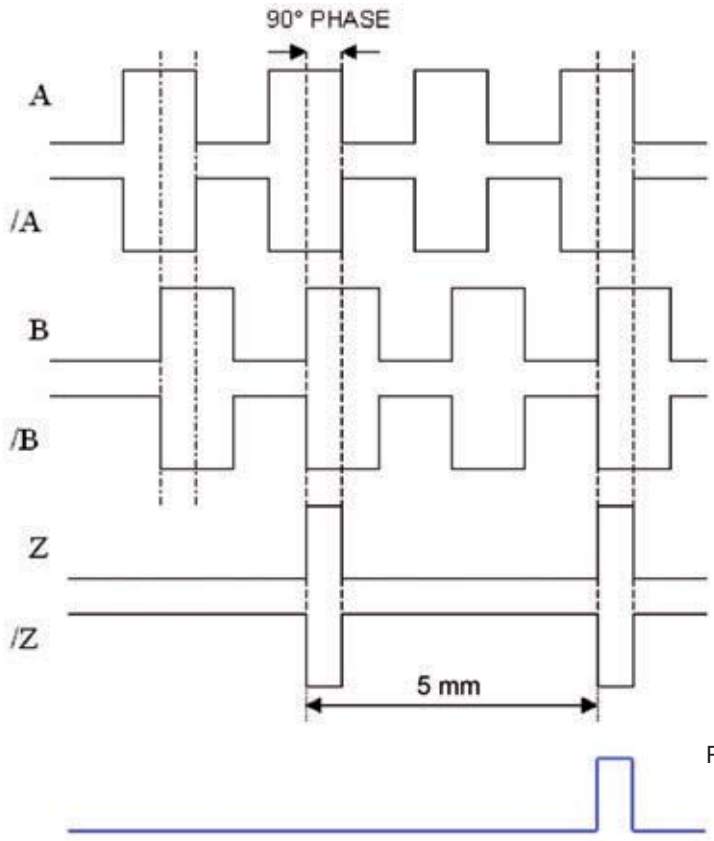
KMLIxx

Specification Sensor Head:

Electrical Data:

Resolution	5 µm , 10 µm , 25 µm and 62,5 µm or on request
Output Circuit	Push-Pull or TTL RS 422 Line Driver
Output Signals	A, /A, B, /B, Z, /Z
Current consumption	40 mA per channel (max)
Supply voltage	10...30 VDC ± % 20 or 5 VDC ± % 5
Housing Material	Aluminium
Connections	Up to 100 m cable length on request
Gap between tape and sensor	Up to 2.5 mm (Depend on pole pitch)
Travel Velocity	3 m/s
Magnetic Tape Type	B5 nitrile rubber temperature magnetic tape
Measure Accuracy	± 1 Increment
Repetability	± 1 Increment
Operating temperature range	-25...+85°
Protection Class	IP67

Output Signals:



Every 5 mm
Z index Pulse

Optional “Z” Signal
ONE Z
REFERENCE SIGNAL
(for eyamle on the
Startpoint)

Terminal assignment:

Signal:	0V	+U_B	A	~~A~~	B	~~B~~	0	~~0~~	Shield
9 pin plug Pin:	4	3	1	5	6	2	8	7	9
Cable Colour:	BK	RD	YE	BU	GN	WH	PK	GY	Shield

Specifications Magnetic Tape:

Environmental conditions:

Operating temperature	-40 °C to +120 °C
Storage temperature	-40 °C to +120 °C
Water Protection	CrNi 17 7 stainless steel carrier nitrile rubber high temperature magnetic tape

Mechanical properties:

Width	10 mm
Thickness	1,2 mm
Length	Up to 100 m
Number of tracks	1
Pole pitch	1 mm, 2 mm, 5 mm
Absolute pole patern possible	yes
Accuracy	±0.04 mm/m up to 50 m length
Linear expansion coefficient	(11 ±1) x 10-6 / K

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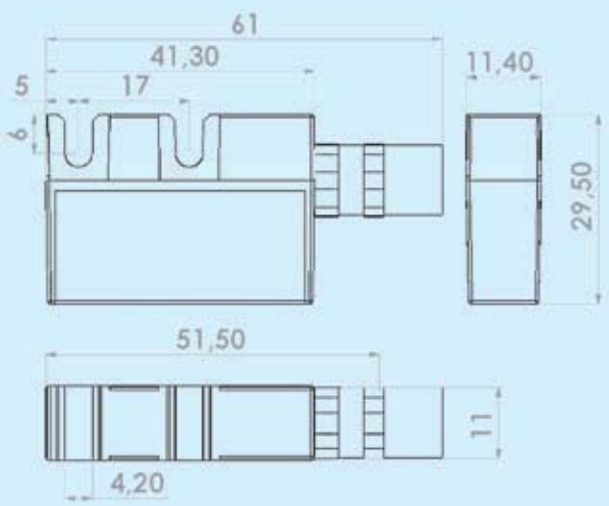
Magnetic Linear Incremental Encoder System MyLin

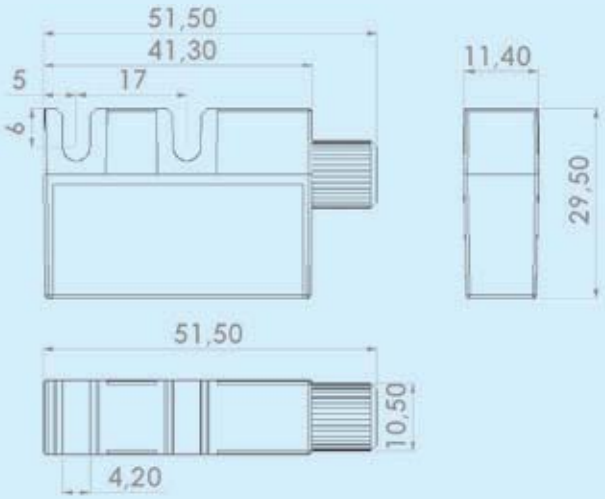
KMLIxx

Dimensioned drawing

Sensor Head KMLI01, KMLI02

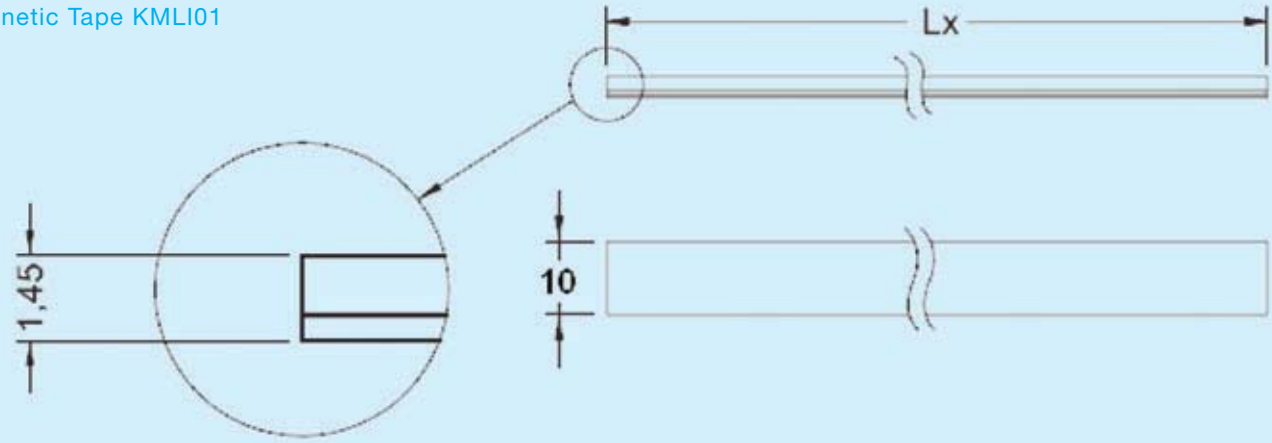


WITH SPIRAL CABLE GLAND

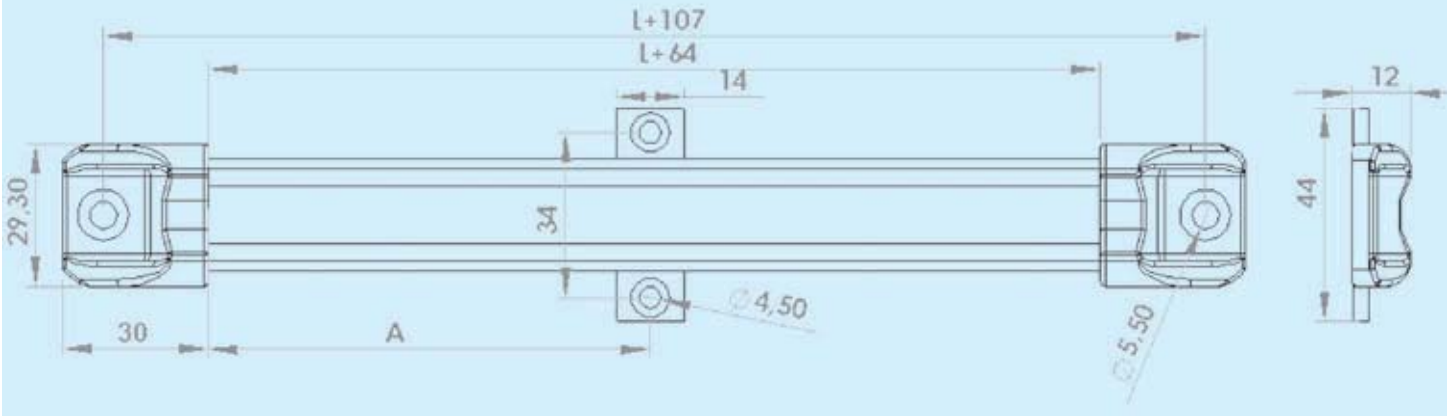


WITH CABLE GLAND

Magnetic Tape KMLI01



Profile KMLI02



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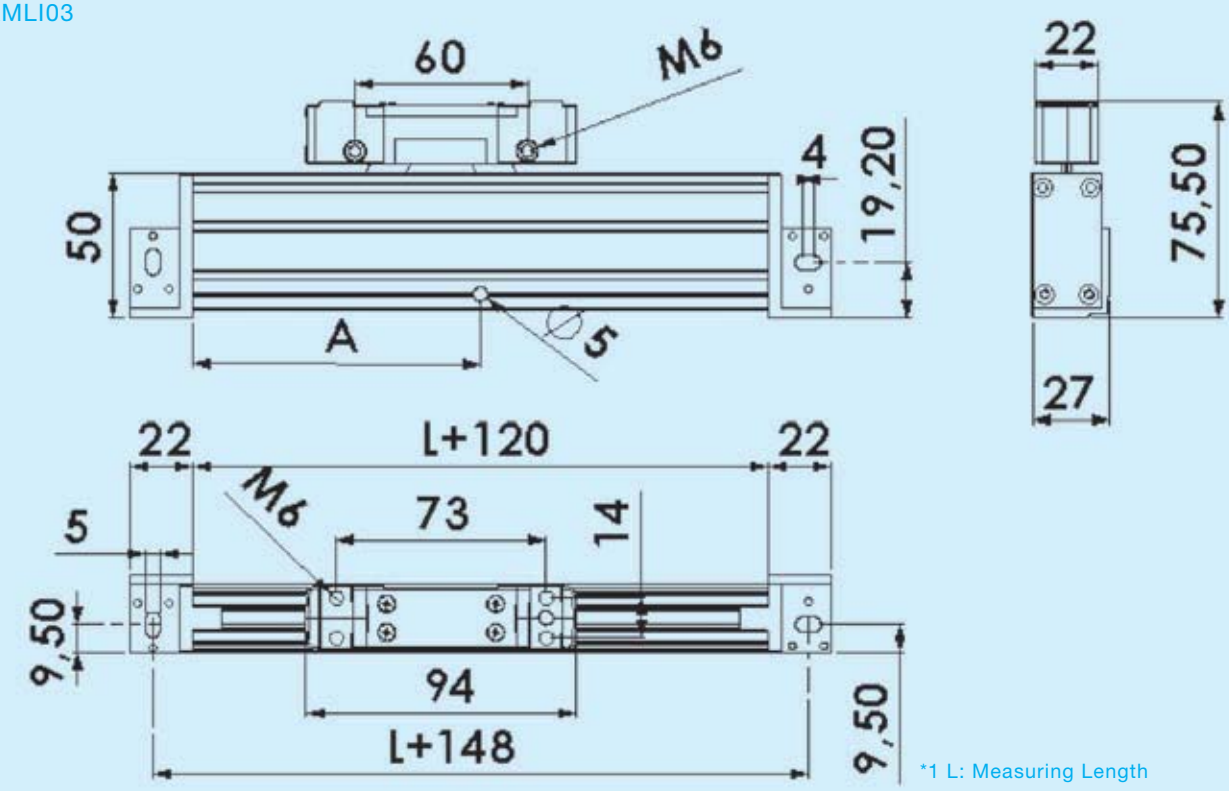
Magnetic Linear Incremental Encoder System MyLin

KMLIxx

Scale KMLI03



*1 L: Measuring Length

Availiable Length KMLI03

Measuring Length (mm)																		
100	120	150	170	200	220	250	270	300	320	350	370	400	420	450	470	500	520	550	570
Measuring Length (mm)																		
600	650	700	750	800	850	900	950	1000	1100	1200	1300	1400	1500	1600	1700	1800	2000	3000	4000

* For over the 2000 mm strokes plaese inquire us.

ORDERING CODE

KMLI01
KMLI02
KLMI03

Resolution

05 = 5 µm
10 = 10 µm
25 = 25 µm
62 = 62,5 µm

Supply Voltage and Output

PPL : 24 VDC ± % 20 Power Supply
: 24 VDC Push-Pull Output

TTL : 5 VDC ± % 5 Power Supply
: 5 VDC TTL RS422 Line Driver Output

Option : 24 VDC ± % 20 Power Supply
: 5 VDC TTL RS422 Line Driver

Output signals

2 = A, B
3 = A, B, Z
4 = A, /A, B, /B
6 = A, /A, B, /B, Z, /Z

Z-Signal: Standart = every 5 mm
* Optional = One Z reference signal (for example on Startpoint)

Cable Lenght

5 M = 5 M
10 M = 10 M

* optional = between 5 M to 50 M

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ABSOLUTE ENCODER MAGNETIC DAMxx37/58

- Absolute magnetic single- and multiturn encoders with SSI, CANopen, RS485, SAEJ1959 outputs *1
- Shaft and hollow shaft versions with 36 mm and 58 mm diameter
- Resistant diecast housing and protection up to IP 67
- Stainless steel shaft
- Single-/multiturn (14 bit/40 bit)
- 2-colour diagnostics LED
- High shaft load up to 220 N radial
  120 N axial (shaft encoder)
- Compact and heavy-duty industrial types
- Shaft Ø 6 or 10 mm
- Blind shaft Ø 6, 8, 10, 12, 14 mm
- Interface:
  SSI
  CANopen
  SAE J 1939
  RS485
- no battery, no gear (MT)

*1 Profibus on request

Electrical Data:

	SSI		CANopen	
Supply voltage:	5 V, -5 %/+10 % or 10–30 V		10–30V	
Power consumption:	max. 80 mA		max. 50 mA	
Singleturn resolution:	14 Bits		14 Bits	
Multiturn resolution:	up to 40 bit		up to 40 bits	
Interface:	Clock input:	via opto-coupler	Protocol:	CANopen
	Clock frequency: up to 2 MHz on request	100 kHz up to 500 kHz		- Communication Profile CiA 301 - Device Profile for encoder CiA 406 V3.2 class C2
	Data output:	RS485/ RS422 compatible		
	Output code:	gray or binary		
	SSI output:	Angular-/position value	Node number:	0 up to 127 (default 127)
	Parity bit:	optional (even/odd)	Baud rate:	10 kBaud up to 1 MBaud with automatic bit rate detection
	Error bit:	optional		
	Turn on time:	< 1.5 s		
	Positive direction of counting (View on shaft):	DIR = GND ➡ cw DIR = +Ub ➡ ccw	The standard settings as well as any customization in the software can be changed via LSS (CiA 305) and the SDO protocol, e.g. PDOs, Scaleing, Heartbeat, Node-ID, Baud rate etc.	
	Set to zero:	Preset = apply +Ub for 2s	**Programmable CAN transmission modes** • **Sychronous mode:** when a synchronisation telegram (SYNC) is received from another bus node, PDOs are transmitted independently • **Asynchronous mode:** a PDO message is triggered by an internal event, (e.g. change of measured valued, internal timer, etc.)	
Connection	Cable or flange connector axial oder radial		connector 5 pin axial or radial	

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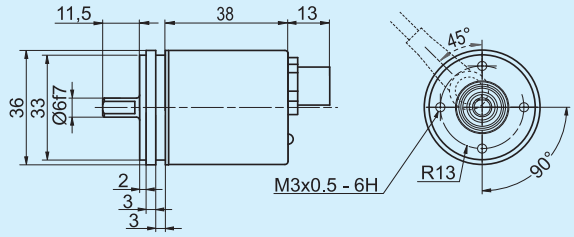
ABSOLUTE ENCODER MAGNETIC DAMxx37/58

Mechanical Data:

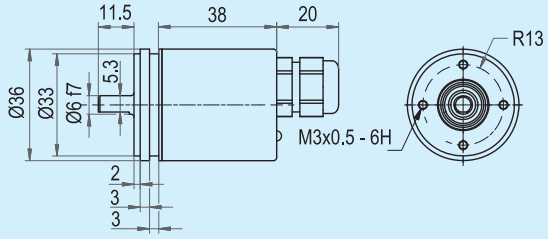
	SSI	CANopen
Housing diameter	37 mm or 58 mm	37 mm or 58 mm
Protection, shaft input	IP 65	IP 65
IP Protection class, housing	IP 67	IP 67
Flange types	Synchro-flange, clamping flange, blind shaft	Synchro-flange, clamping flange, blind shaft
Shaft diameter	Solid shaft 6 mm, 10 mm blind shaft 6, 8, 10, 12, 14 mm	Solid shaft 6 mm, 10 mm blind shaft 6, 8, 10, 12, 14 mm
Max. speed	DAMxx37: 12.000 min^{-1} DAMxx58: 8.000 min^{-1}	DAMxx37: 12.000 min^{-1} DAMxx58: 8.000 min^{-1}
Starting Torque	≤ 1 Ncm	≤ 1 Ncm
Max. Shaftload	DAMxx37: axial 50 N radial 80 N DAMxx58: axial 120 N radial 125/220 N	DAMxx37: axial 50 N radial 80 N DAMxx58: axial 120 N radial 125/220 N
Shock resistance DIN EN 60068-2-27	1.000 m/s^2 (6 ms)	1.000 m/s^2 (6 ms)
Vibration resistance DIN EN 60068-2-6	50 m/m^2 (10 ...2.000 Hz)	50 m/m^2 (10 ...2.000 Hz)
Working temperature	-40 ... +80 °C	-40 ... +80 °C
Storage temperature	-40 ... +100 °C	-40 ... +100 °C

Dimensioned drawing

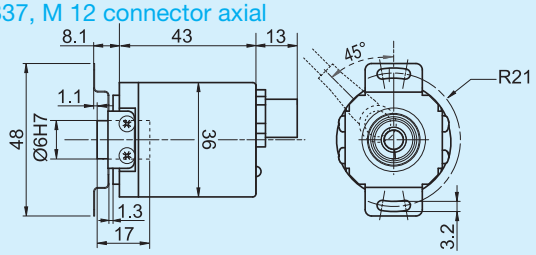
DAMxS37, M 12 connector axial



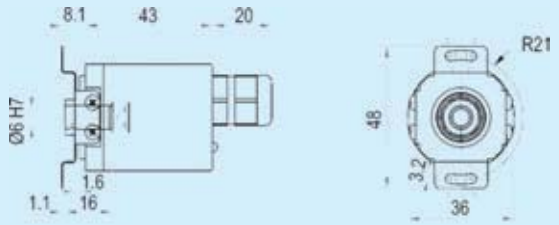
DAMxS37, cable axial



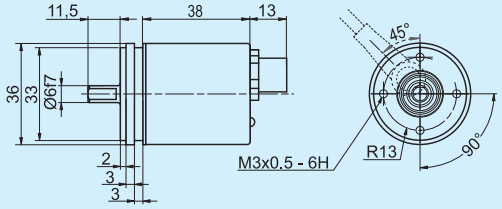
DAMxB37, M 12 connector axial



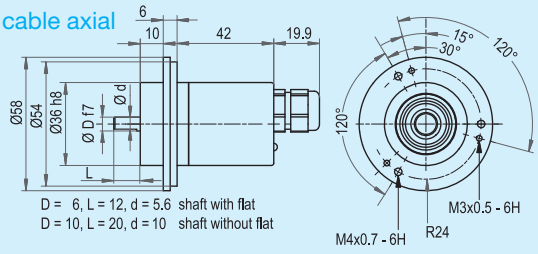
DAMxB37, cable axial



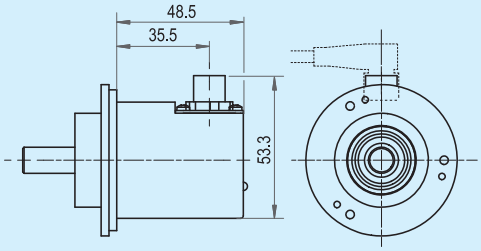
Synchro flange
DAMxS58, M 12 connector axial



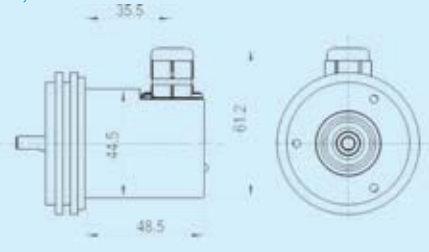
Clamping flange
DAMxS58, cable axial



DAMxS58, M 12 connector radial



DAMxS58, cable radial



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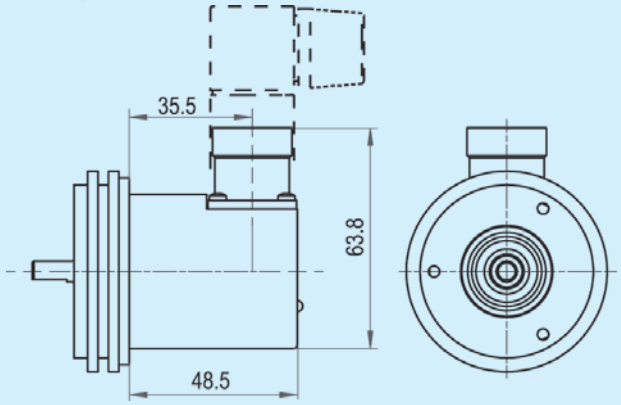
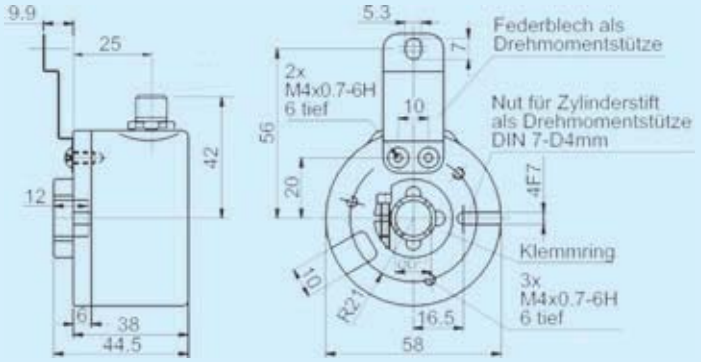
ABSOLUTE ENCODER MAGNETIC DAMxx37/58

Dimensioned drawing

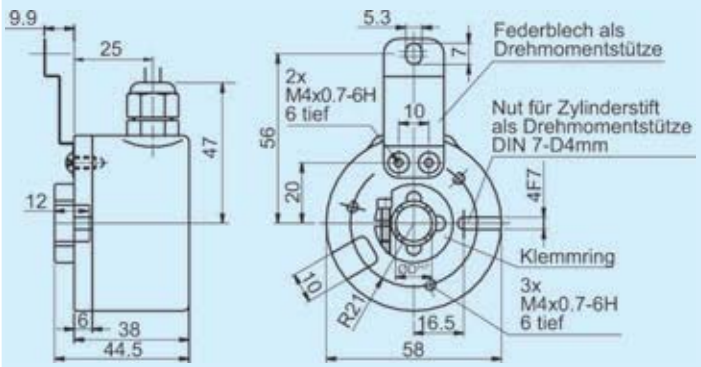
Synchro flange
DAMxS58, M 23 connector radial



Blind shaft
DAMxB58, M 12 connector radial



Blind shaft
DAMxB58, cable radial



S S I

Terminal assignment

for supply voltage A or E and type of connection A, B or H

Signal:	GND	+V	+C	-C	+D	-D	Preset	DIR	PE
Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD	Shield
M 23 - 12 pin:	12	11	2	1	3	4	9	8	PH

for supply voltage A or E and type of connection 7 or 8

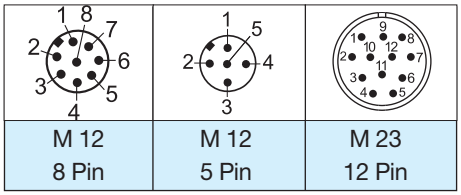
Signal:	GND	+V	+C	-C	+D	-D	Preset	DIR	Shield/PE
M12 - 8 pin:	1	2	3	4	5	6	7	8	PH

+V: Encoder Power Supply +VDC
GND: Encoder Power Supply Ground (0 V)
+C, -C: Clock signal
+D, -D: Data signal
Preset: Set to zerso if active for 2 sec.
DIR: Direction input: If this is active, output values are decreasing when shaft is turned clockwise.
PE: Protective earth
PH: Plug housing (shield)

C A N o p e n

Terminal assignment

Signal:	CAN Ground	CAN_Low (-)	CAN_High (+)	0 Volt power supply	+UB power supply
M 12 - 5 pin:	1	5	4	3	2



M 12 8 Pin	M 12 5 Pin	M 23 12 Pin

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ABSOLUTE ENCODER MAGNETIC DAMxx37/58

ORDERING CODE SSI

DAMSS37
Absolute singleturn shaft encoder

DAMMS37
Absolute multiturn shaft encoder

DAMSB37
Absolute singleturn blind shaft encoder

DAMMB37
Absolute multiturn blind shaft encoder

Resolution

0010 = 10 Bit ST
0011 = 11 Bit ST
0012 = 12 Bit ST
0013 = 13 Bit ST
0014 = 14 Bit ST
1210 = 12 Bit MT + 10 Bit ST
1211 = 12 Bit MT + 11 Bit ST
1212 = 12 Bit MT + 12 Bit ST
1213 = 12 Bit MT + 13 Bit ST

other resolutions on request

Supply voltage

A = 5 VDC
E = 10–30 VDC

Flange, Protection

S7 = Synchro, IP 67 housing, IP 65 shaft

Shaft-Ø

06 = 6 mm shaft/ blind shaft

Interface

SB = SSI Binary
SG = SSI Gray

Connection

A = cable axial, 2 m, IP 65 only
7 = M 12, 8 pol. axial

ORDERING CODE SSI

DAMSS58
Absolute singleturn shaft encoder

DAMMS58
Absolute multiturn shaft encoder

DAMSB58
Absolute singleturn blind shaft encoder

DAMMB58
Absolute multiturn blind shaft encoder

Resolution

0010 = 10 Bit ST
0011 = 11 BiT ST
0012 = 12 Bit ST
0013 = 13 Bit ST
0014 = 14 Bit ST
1210 = 12 Bit MT + 10 Bit ST
1211 = 12 Bit MT + 11 Bit ST
1212 = 12 Bit MT + 12 Bit ST
1213 = 12 Bit MT + 13 Bit ST
1214 = 12 Bit MT + 14 Bit ST

other resolutions on request

Supply voltage

A = 5 VDC
E = 10–30 VDC

Flange, Protection

S7 = Synchro, IP 67 housing, IP 65 shaft
K7 = Clamping, IP 67 housing, IP 65 shaft
H7 = Torque stop, IP 67 housing, IP 65 shaft

Shaft-Ø

06 = 6 mm shaft (S7 only)
08 = 8 mm blind shaft
10 = 10 mm shaft/ blind shaft
12 = 12 mm blind shaft
14 = 14 mm blind shaft

Interface

SB = SSI Binary
SG = SSI Gray

Connection

A = cable axial, 2 m, IP 65 only
B = cable radial, 2 m, IP 65 only
H = Conin 12 pol. radial ccw
7 = M 12, 8 pol. axial
8 = M 12, 8 pol. radial

ORDERING CODE CANopen

DAMSS37
Absolute singleturn shaft encoder

DAMMS37
Absolute multiturn shaft encoder

DAMSB37
Absolute singleturn blind shaft encoder

DAMMB37
Absolute multiturn blind shaft encoder

Resolution

0012 = 12 Bit ST
1812 = 18 Bit MT + 12 Bit ST
4012 = 40 Bit MT + 12 Bit ST

other resolutions on request

Supply voltage

E = 10–30 VDC

Flange, Protection

S7 = Synchro, IP 67 housing, IP 65 shaft

Shaft-Ø

06 = 6 mm shaft/ blind shaft

Interface

CO = CANopen Profile DS406 V 3.2

Connection

11 = M 12, 5 pol. axial

ORDERING CODE CANopen

DAMSS58
Absolute singleturn shaft encoder

DAMMS58
Absolute multiturn shaft encoder

DAMSB58
Absolute singleturn blind shaft encoder

DAMMB58
Absolute multiturn blind shaft encoder

Resolution

0012 = 12 Bit ST
1812 = 18 Bit MT + 12 Bit ST
4012 = 40 Bit MT + 12 Bit ST

other resolutions on request

Supply voltage

E = 10–30 VDC

Flange, Protection

S7 = Synchro, IP 67 housing, IP 65 shaft
K7 = Clamping, IP 67 housing, IP 65 shaft
H7 = Torque stop, IP 67 housing, IP 65 shaft

Shaft-Ø

06 = 6 mm shaft, (S7 only)
08 = 8 mm blind shaft
10 = 10 mm shaft/ blind shaft
12 = 12 mm blind shaft
14 = 14 mm blind shaft

Interface

CO = CANopen Profile DS406 V 3.2

Connection

11 = M 12, 5 pol. axial
12 = M 12, 5 pol. radial

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ABSOLUTE ENCODER MyAbs

CAxx37

- Housing Ø 37,5 mm shaft (CAxS37) and hollow/blind shaft (CAxH37) absolute encoder
- CAxS37: up to 17 bit single turn and 12 bit multiturn, + 100 °C operating temperature, 6 mm shaft Ø
- CAxH37: up to 19 bit single turn and 12 bit multiturn, + 120 °C operating temperature, 8 mm through hollow shaft
- SSI or BiSS interface
- Sinewave 1 Vpp
- Bandwidth 500 kHz

Electrical Data:

	Shaft (CAxS37)	Hollow/blind shaft (CAxH37)
Supply voltage	DC 5 V, –5 %/+10 % or DC 7–30 V	DC 5 V, –5 %/+10 % or DC 7–30 V
Intrinsic current consumption ST/MT	50 mA/100 mA	50 mA/100 mA
Interface	Standard SSI or BiSS	Standard SSI or BiSS
Lines/Drivers	Clock and data / RS422	Clock and data / RS422
Output code	Gray or Binary	Gray
Singleturn resolution	12–17 Bit depending on version	12–19 Bit depending on version
Multiturn resolution	12 Bit	12 Bit
Incremental signals, optional	Sine – Cosine 1 Vpp	Sine – Cosine 1 Vpp
Number of increments	2048	2048
3 dB limiting frequency	500 kHz	500 kHz
Absolute accuracy	± 35″	± 35″
Repeatability	± 7″	± 7″
Connection	Cable axial or radial	Cable radial, PCB connector, 12-pole
Alarm output	Alarm Bit (SSI option), Warning Bit and alarm Bit (BiSS)	Alarm Bit (SSI option), Warning Bit and alarm Bit (BiSS)

Mechanical Data:

	Shaft (CAxS37)	Hollow/blind shaft (CAxH37)
Housing diameter	37,5 mm	37,5 mm
Protection, shaft input	IP 64	IP 40
IP Protection class, housing	IP 64	IP 40
Flage types	pilot flange	spring tether
Shaft diameter	6 mm	8 mm
Max. speed	Continuous 10 000 $^{min-1}$ Short-term 12 000 $^{min-1}$	Continuous 10 000 $^{min-1}$ Short-term 12 000 $^{min-1}$
Starting Torque	0,01 Nm	0,01 Nm
Moment of inertia, rotor	2,5 x 10^{-6} kgm^2	2,5 x 10^{-6} kgm^2
Tolerance axial		± 0,5 mm
Tolerance radial		± 0,05 mm
Shock resistance IEC 68-2-27	1000 m/s^2 (6 ms)	1000 m/s^2 (6 ms)
Vibration resistance IEC 68-2-6	100 m/s^2 (10–2000 Hz)	100 m/s^2 (10–2000 Hz)
Working temperature	–40...+100 °C	–40...+120 °C
Storage temperature	–15...+85 °C (due to packaging)	–15...+85 °C (due to packaging)
Weight, approx. (ST/MT)	80 g/130 g	80 g/130 g

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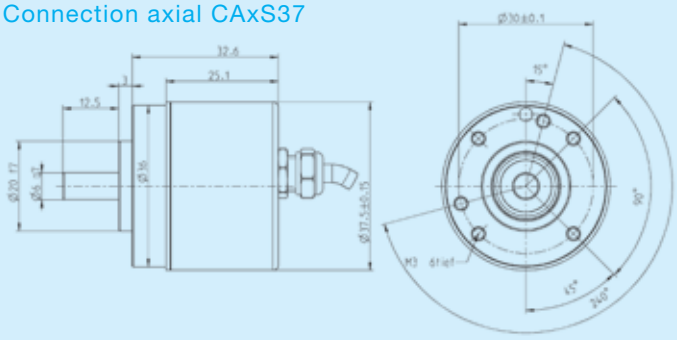
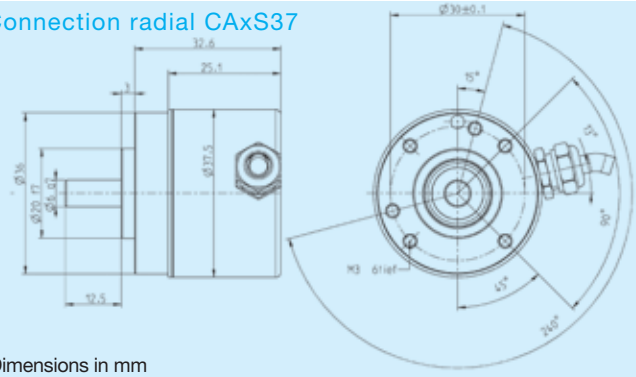
Dimensioned drawing

Connection axial CAxS37



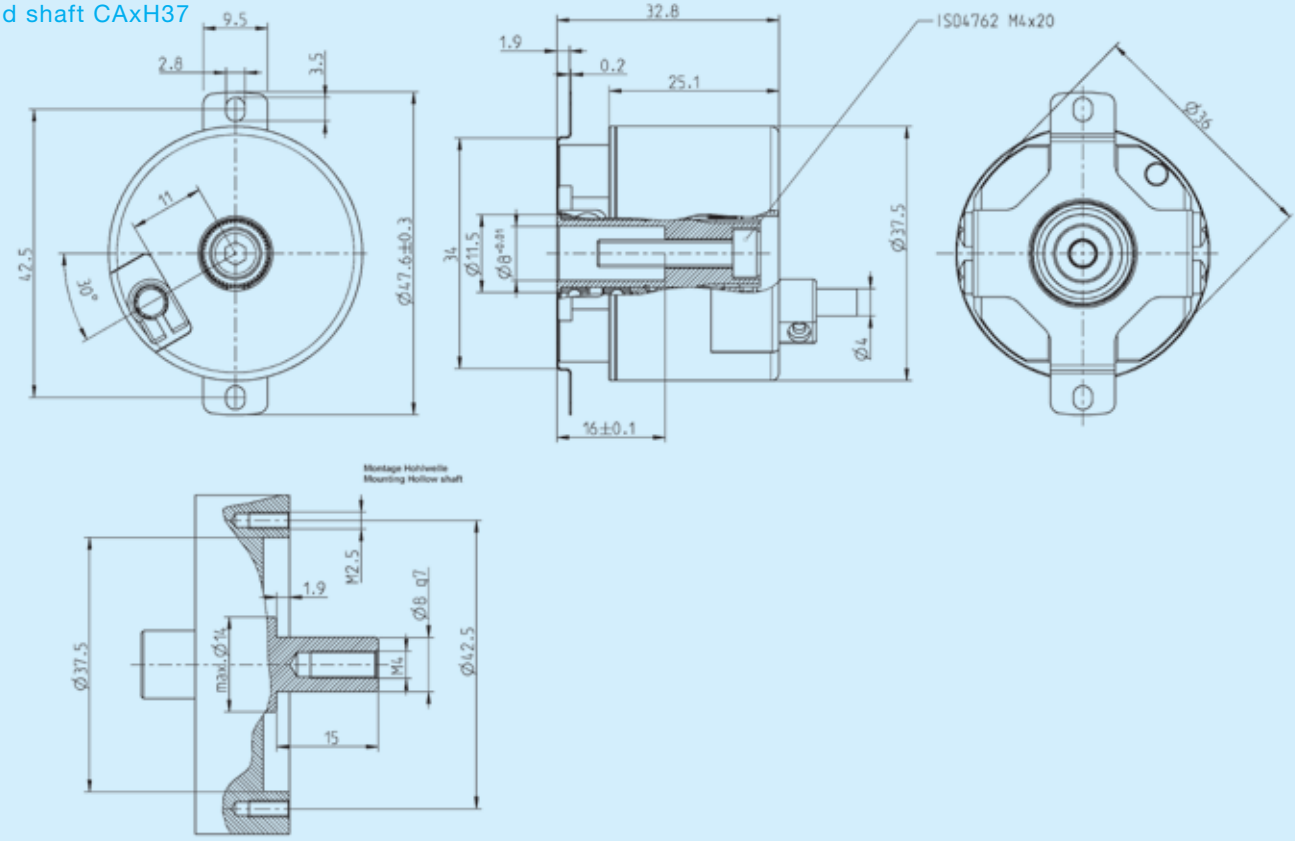
Dimensions in mm

Connection radial CAxS37

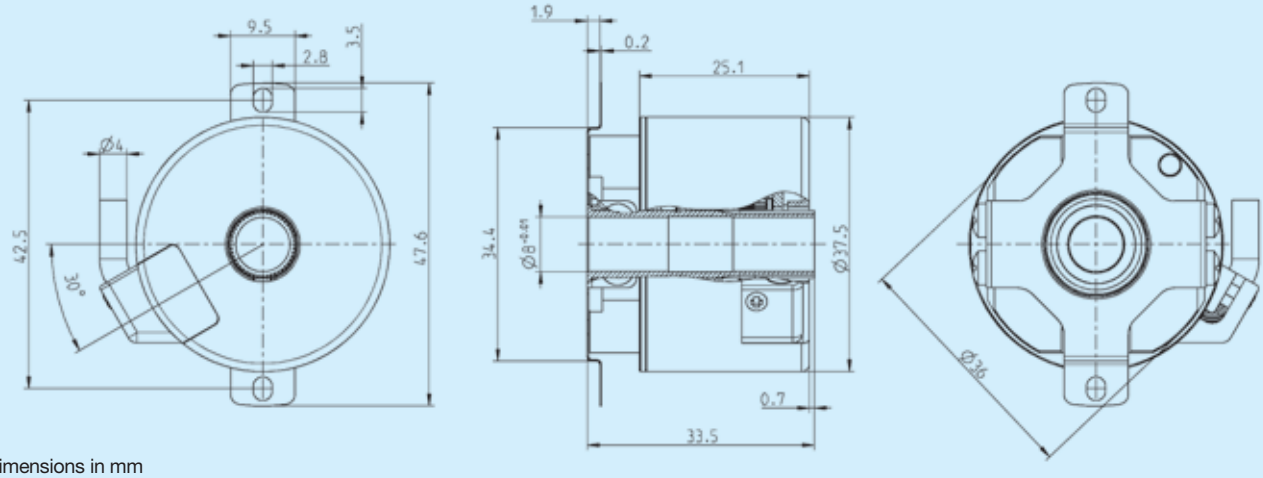


Dimensions in mm

Blind shaft CAxH37



Through hollow shaft CAxH37



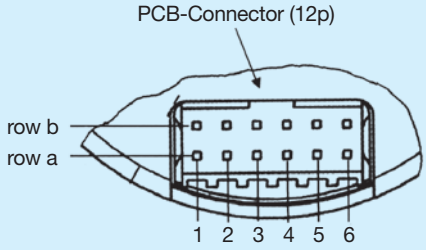
Dimensions in mm

Pin assignment CAxS37

Signal	Cable color
DC 5/7–30 V (U_B)	white
0 V (U_N)	brown
Clock	yellow
$\overline{\text{Clock}}$	green
Data	pink
$\overline{\text{Data}}$	grey
A	white/green[1]
$\overline{\text{A}}$	brown/green[1]
B	red/blue[1]
$\overline{\text{B}}$	grey/pink[1]
DC 5 V Sensor	violet[1]
0 V Sensor	black[1]

[1] only with „SC“

Pin assignment CAxH37



Signals	Pin	Cable color
$\overline{\text{Data}}$	1a	grey
A +	2a	red
0 V Sensor	3a	black
B +	4a	red/blue
$\overline{\text{Clock}}$	5a	green
5 V Sensor	6a	violett
DC 5 V/7–30 V	1b	white
Clock	2b	yellow
B -	3b	grey/pink
0 V (U_N)	4b	brown
A -	5b	blue
Data	6b	pink

ORDERING CODE CAxS37

CASS37
Absolute singleturn shaft encoder

CAMS37
Absolute multiturn shaft encoder

Resolution
0012 = 12 Bit ST
0013 = 13 Bit ST
0014 = 14 Bit ST
0017 = 17 Bit ST
1213 = 12 Bit MT + 13 Bit ST
1217 = 12 Bit MT + 17 Bit ST BiSS

Supply voltage
A = 5 V DC
E = 7–30 VDC

Flange, Protection
K4 = Clamping, IP 64

Shaft-Ø
06 = 6 mm shaft

Interface
SC = SSI Gray + SinCos 1Vpp
SB = SSI Binary
SG = SSI Gray
BB = BiSS

Connection
A = cable axial
B = cable radial

ORDERING CODE CAxH37

CASH37
Absolute singleturn shaft encoder

CAMH37
Absolute multiturn hollow shaft encoder

Resolution
0012 = 12 Bit ST
0013 = 13 Bit ST
0014 = 14 Bit ST
0017 = 17 Bit ST
0019 = 19 Bit ST (BiSS)
1213 = 12 Bit MT + 13 Bit ST
1217 = 12 Bit MT + 17 Bit ST
1219 = 12 Bit MT + 19 Bit ST (BiSS)

Supply voltage
A = 5 V DC
E = 7–30 VDC

Flange, Protection
H0 = Spring tether, IP 40, through hollow shaft
B0 = Spring tether, IP 40, blind shaft

Shaft-Ø
08 = 8 mm hollow/blind shaft

Interface
SC = SSI Gray + SinCos 1Vpp
BB = BiSS

Connection
B = cable radial
C = PCB-Connector 12-pole

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ABSOLUTE ENCODER MyAbs

CAxx58

- Compact design: 50 mm length for singleturn or multiturn versions
- Startup and operating aids: Diagnostics LED, preset key with optical feedback, status message
- Interfaces: Standard SSI, extended SSI mode, parallel interface or BiSS
- Sine/cosine signals available for dynamic control loops
- Max. 29 Bit

Fieldbus Versions

- Overall length: 63 mm (singleturn), 73 mm (multiturn) including bus cover
- Availability of all common field bus interfaces
- The complete bus-specific electronics is accommodated in the bus cover
- Versions: Profibus DP, DeviceNet, CAN, CANopen and Interbus

Electrical Data:	SSI, BiSS	Parallel	Profibus/DeviceNet other Bus Interfaces on request
Supply voltage	5 V, –5 %/+10 % or 10–30 V	10–30 V	10–30 V
Intrinsic current consumption ST/MT	50 mA/100 mA	200 mA/300 mA	220 mA/250 mA
Interface	Standard SSI or BiSS	Parallel	Profibus-DP, Encoder Profile CAN Highspeed acc. ISO/DIS 11898, CAN Spec. 2.0 B, protocol based on encoder profile draft DeviceNet
Lines/Drivers	Clock and data/RS422		
Output code	Binary Gray;	Binary, Gray, Gray Excess	Binary
Singleturn resolution	10–17 Bits depending on version; max: 13 Bit in SSI-MT Gray Excess: 360, 720 steps	10–14 Bit depending on version 12 Bit in MT version Gray Excess: 360, 720 steps	10–14 Bit depending on version
Multiturn resolution	12 Bit	12 Bit	12 Bit
Incremental signals, optional	Sine – cosine 1 Vpp		
Number of increments	2,048		
3 dB limiting frequency	500 kHz		
Absolute accuracy	± 35″		
Repeatability	± 7″		
Connection	Cable or flange-connector (Conin, axial or radial)	Cable or flange-connector (Conin 17-pole), axial or radial, Sub-D 37-pin	Bus cover with T-manifold
Parameterization	Resolution, code type, sense of rotation, warning, alarm		According to Class 2: Resolution, Preset, Direction 9,6 kBaud–12 MBaud
Linearity		± 1/2 LSB	
Output current		30 mA per Bit, short circuit proof	
Alarm output	Alarm Bit (SSI option), warning Bit and alarm Bit (BiSS)	NPN o.c. max. 5 mA	
Control input	Direction	Latch, Direction, Tristate	
Reset Key	Latch via parameterization		
Status LED	Green = ok.; Red = Alarm		
Integrated Special functions			Speed, Acceleration, Operating Time

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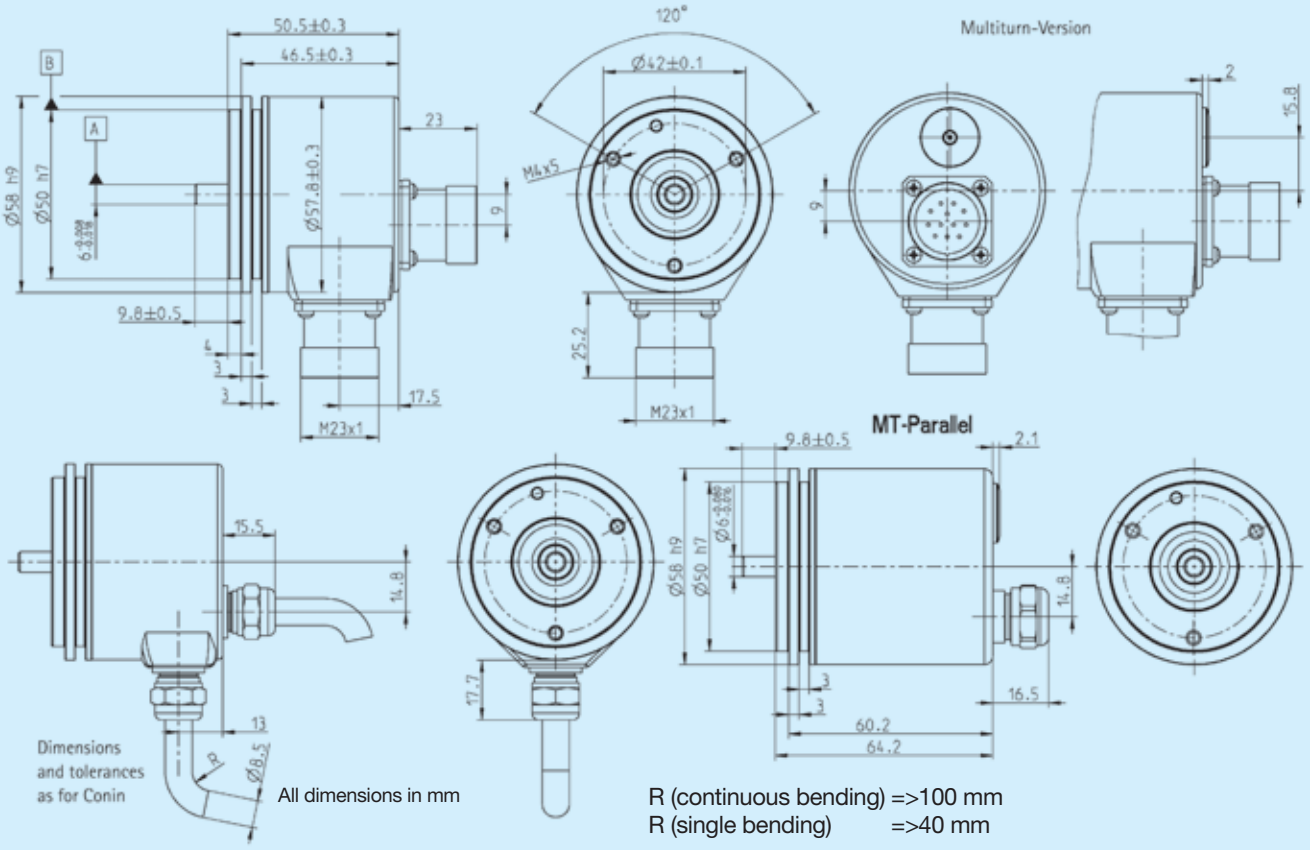
ABSOLUTE ENCODER MyAbs

CAxx58

Mechanical Data:	SSI, BiSS	Parallel	Profibus
Housing diameter	58 mm	58 mm	58 mm
Protection, shaft input	IP 64 or IP 67	IP 64 or IP 67	IP 64 or IP 67
IP Protection class, housing	IP 67	IP 67	IP 67
Flange types	Synchro-flange, clamping flange, spring tether	Synchro-flange, clamping flange, spring tether	Synchro-flange, clamping flange, spring tether
Shaft diameter	Solid shaft 6 mm, 10 mm; Hub shaft 10 mm, 12 mm	Solid shaft 6 mm, 10 mm; Hub shaft 10 mm, 12 mm	Solid shaft 6 mm, 10 mm; Hub shaft 10 mm, 12 mm
Max. speed	Continuous operation 10,000 min^{-1} short-term 12,000 min^{-1}	Continuous operation 10,000 min^{-1} short-term 12,000 min^{-1}	Continuous operation 10,000 min^{-1} short-term 12,000 min^{-1}
Starting Torque	≤ 0,01 Nm	≤ 0,01 Nm	≤ 0,01 Nm
Moment of inertia, rotor	3.8 x 10^{-6} kgm^2	3.8 x 10^{-6} kgm^2	3.8 x 10^{-6} kgm^2
Tolerance axial (blind shaft)	± 1.5 mm	± 1.5 mm	± 1.5 mm
Tolerance radial (blind shaft)	± 0.2 mm	± 0.2 mm	± 0.2 mm
Absolute max. shaft load	axial 40 N radial 60 N	axial 40 N radial 60 N	axial 40 N radial 60 N
Shock resistance DIN EN 60068-2-27	1,000 m/s^2 (6 ms)	1,000 m/s^2 (6 ms)	1,000 m/s^2 (6 ms)
Vibration resistance DIN EN 60068-2-6	100 m/s^2 (10 ... 2,000 Hz)	100 m/s^2 (10 ... 2,000 Hz)	100 m/s^2 (10 ... 2,000 Hz)
Working temperature	–40...+100 °C	–40...+100 °C	–40 °C... +85 °C
Storage temperature	–40...+85 °C (due to packaging)	–40...+85 °C (due to packaging)	–40...+85 °C (due to packaging)
Weight, approx. (ST/MT)	260 g/310 g	350 g/400 g	350 g/400 g

Dimensioned drawing

Synchro Flange



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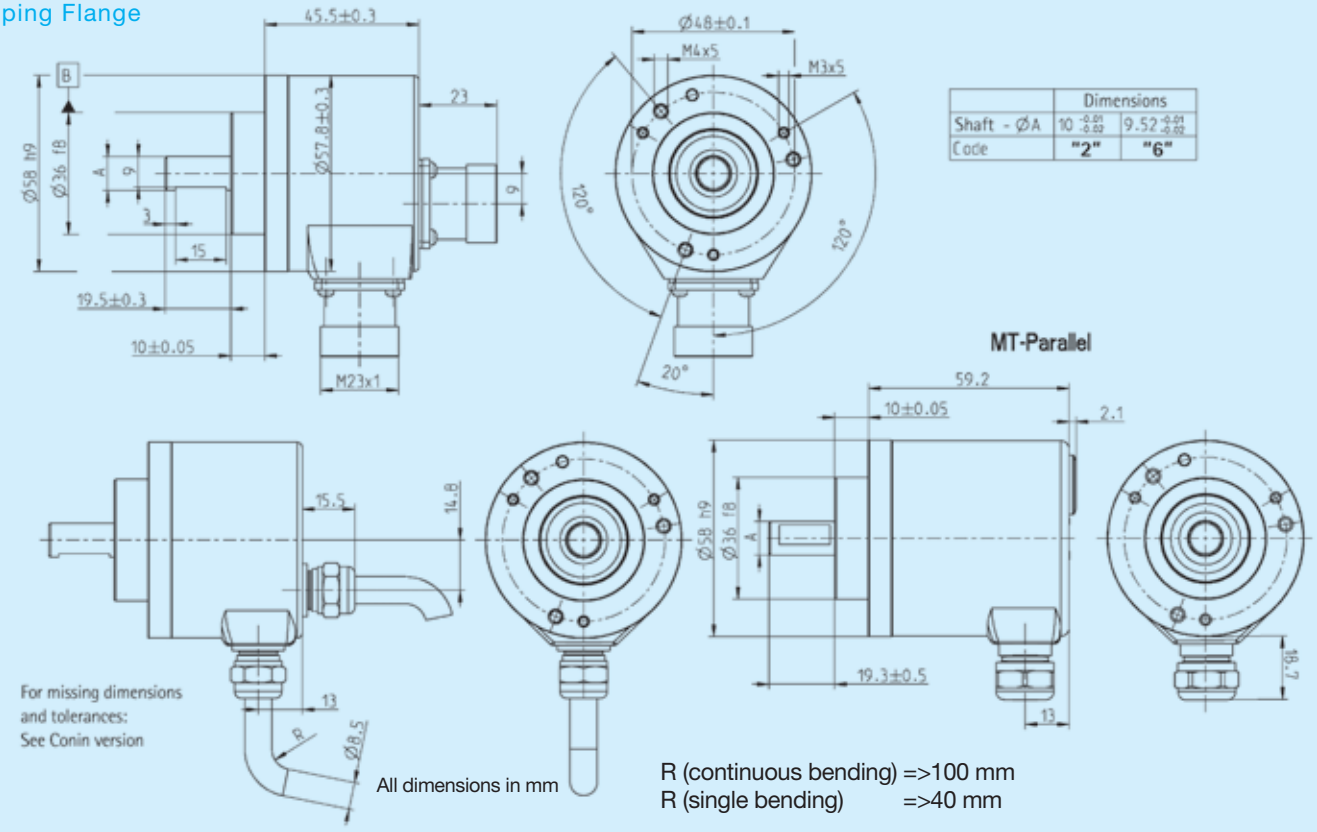
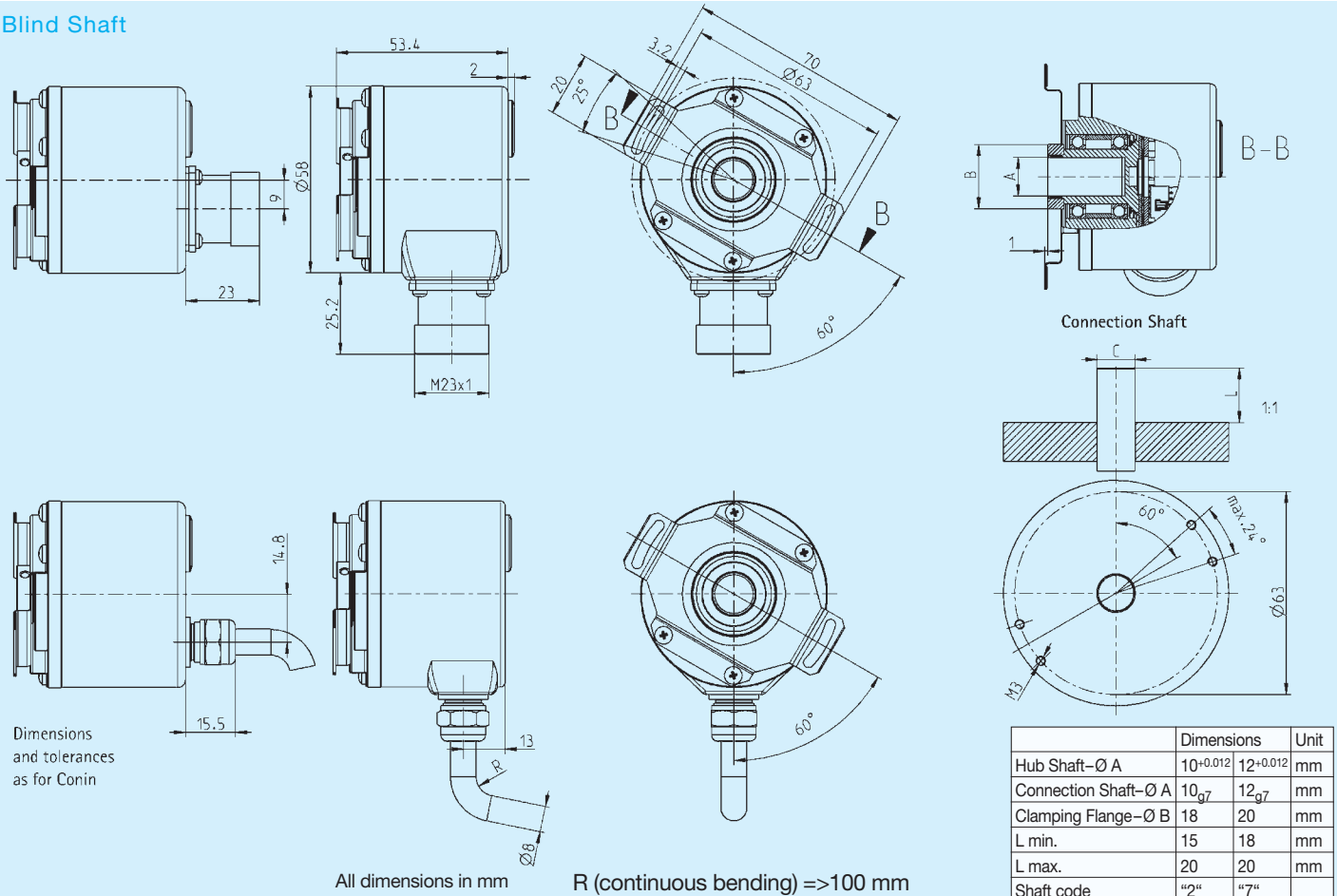
Dimensioned drawing

Clamping Flange



	Dimensions	
Shaft - ØA	10 $^{-0.01}_{-0.02}$	9.52 $^{-0.01}_{-0.02}$
Code	"2"	"6"

Blind Shaft



	Dimensions		Unit
Hub Shaft–Ø A	$10^{+0.012}$	$12^{+0.012}$	mm
Connection Shaft–Ø A	10_{g7}	12_{g7}	mm
Clamping Flange–Ø B	18	20	mm
L min.	15	18	mm
L max.	20	20	mm
Shaft code	"2"	"7"	

L = Depth of insertion of connection shaft in encoder

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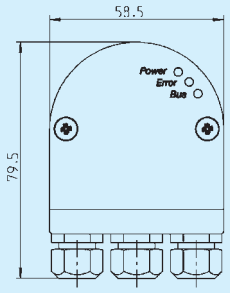
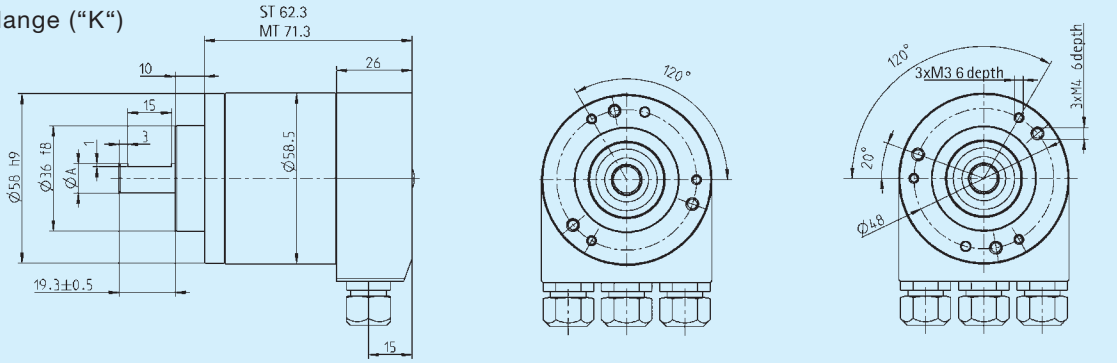
Bus Covers

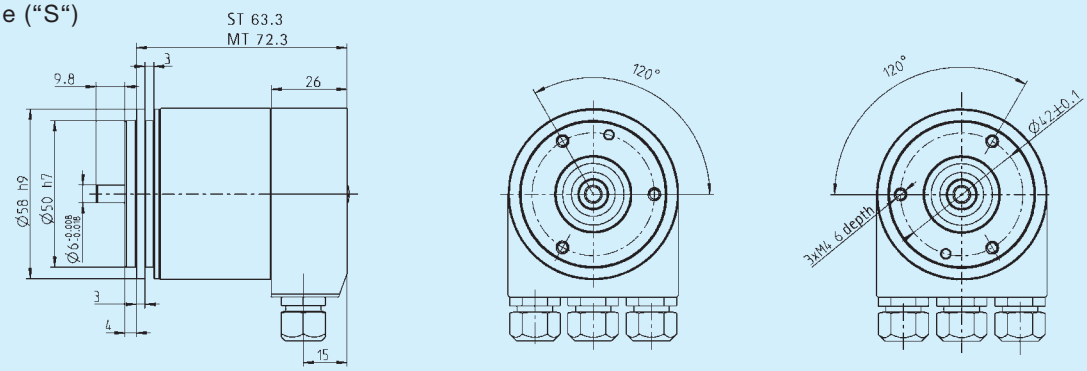
Bus Covers Connection “Z“



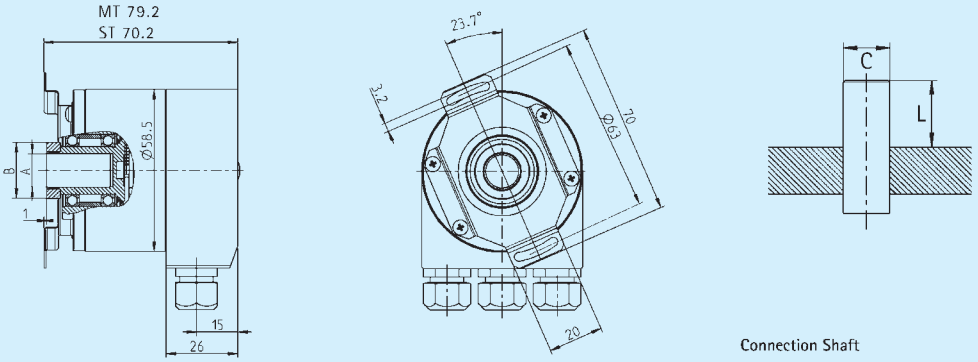
Clamping Flange (“K“)



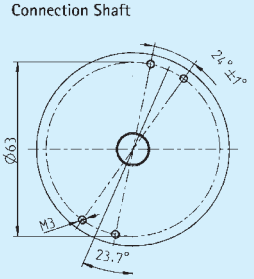
Synchro Flange (“S“)



Hub Shaft (“F“)



Dimensions



	Dimensions		Unit
Hub Shaft–Ø A	$10^{+0.012}$	$12^{+0.012}$	mm
Connection Shaft–Ø A	10_{g7}	12_{g7}	mm
Clamping Flange–Ø B	18	20	mm
L min.	15	18	mm
L max.	20	20	mm
Shaft code	“2“	“7“	

L = Depth of insertion of connection shaft in encoder

ST=Singleturn
MT=Multiturn

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ABSOLUTE ENCODER MyAbs

CAxx58

SSI, BiSS

Terminal assignment

for supply voltage A or E

Signal:	GND	+V	+C	-C	+D	-D	D GND	-DIR	N/C	N/C	N/C	N/C	
Cable colour:	BN	WH	YE	GN	PK	GY	BK	BU	–	–	–	–	
M23 PIN out:	1	8	3	11	2	10	12	5	4	6	7	9	

for supply voltage A or E

Signal:	GND	+V	+C	-C	+D	-D	-DIR	N/C	
M12 PIN out:	2	1	6	4	5	8	7	3	

+V: Encoder Power Supply +VDC
GND: Encoder Power Supply Ground (0V)
+C, -C: Clock signal
+D, -D: Data signal
D GND: Data ground
-DIR: Direction input: If this input is active, output values are increasing when shaft is turned cw.

Parallel

Terminal assignment

for supply voltage E, singleturn 9 Bit/360 ppr

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	-TRI	-LAT[1)]	-DIR	GND	+V	-ALM	N/C	N/C
Cable colour:	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN	–	–
Conin 17pol.:	1	2	3	4	5	6	7	8	9	12	13	14	15	16	17	10	11

[1)] binary only

for supply voltage E, singleturn 10 Bit/720 ppr

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	-TRI	-LAT[1)]	-DIR	GND	+V	-ALM	N/C
Cable colour:	VT	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN	–
Conin 17pol.:	1	2	3	4	5	6	7	8	9	10	12	13	14	15	16	17	11

[1)] binary only

for supply voltage E, singleturn 12 Bit

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	-TRI	-LAT[1)]	-DIR	GND	+V	-ALM
Cable colour:	BN/GY	RD/BU	VT	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN
Conin 17pol.:	1	2	3	4	5	6	7	8	9	10	11	12	–	13	14	15	16	17

[1)] binary only

for supply voltage E, singleturn 13 Bit

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	-TRI	-LAT[1)]	-DIR	GND	+V	-ALM
Cable colour:	BN/YE	BN/GY	RD/BU	VT	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN
Conin 17pol.:	13	12	11	10	9	8	7	6	5	4	3	2	1	–	17[1)]	14	15	16	17[2)]

[1)] binary only [2)] gray only

for supply voltage E, singleturn 14 Bit

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	-TRI	-LAT[1)]	-DIR	GND	+V	-ALM
Cable colour:	GY/PK	BN/YE	BN/GY	RD/BU	VT	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN
Conin 17pol.:	14	13	12	11	10	9	8	7	6	5	4	3	2	1	–	17[1)]	–	15	16	17[2)]

[1)] binary only [2)] gray only

for supply voltage E, multiturn 12-12 Bit

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
Cable colour:	BN	GN	YE	GY	PK	VT	GY/PK	RD/BU	WH/GN	BN/GN	WH/YE	YE/BN
Sub-D 37pol.	2	21	3	22	4	23	5	24	6	25	7	26
Signal:	M0	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
Cable colour:	WH/GY	GY/BN	WH/PK	PK/BN	WH/BU	BN/BU	WH/RD	BN/RD	WH/BK	BN/BK	GY/GN	YE/GY
Sub-D 37pol.	8	27	9	28	14	33	15	34	16	35	17	36
Signal:	-ALM	-DIR	-LAT	TRI	+V	+V	GND	GND				
Cable colour:	PK/GN	YE/PK	GN/BU	YE/BU	RD	WH	BU	BK				
Sub-D 37pol.	18	10	30	12	13	31	1	20				

+V: Encoder Power Supply +VDC
GND: Encoder Power Supply Ground (0V)
-TRI: Tristate input: if this input is active, outputs are active
TRI: Tristate input: if this input is active, outputs at high impedance (Tristate mode)
-LAT: Latch input: if this input is active, encoder data continuesly changing at output
-DIR: Direction input: if this input is active, output values are increasing when shaft is turned cw
S0, S1, ...: Data bits for resolution per turn
M0, M1, ...: Data bits for number of turns
-ALM: Alarm output: NPN open collector

Profibus DP

Terminal assignment

Bus terminal cover with terminal box (type of connection Z)

Signal:	BUS IN				BUS OUT			
	B	A	0 V	+V	0 V	+V	B	A
Terminal:	5	6	2	1	4	3	7	8

Shield must be connected to the cable gland (with the contact surface as large as possible)

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ABSOLUTE ENCODER MyAbs

CAxx58

ORDERING CODE SSI

CASS58
Absolute singleturn shaft encoder

CAMS58
Absolute multiturn shaft encoder

CASB58
Absolute singleturn blind shaft encoder

CAMB58
Absolute multiturn blind shaft encoder

Resolution

0010 = 10 Bit ST
0012 = 12 Bit ST
0013 = 13 Bit ST
0014 = 14 Bit ST
0017 = 17 Bit ST
1212 = 12 Bit MT + 12 Bit ST
1213 = 12 Bit MT + 13 Bit ST

Supply voltage

A = 5 V
E = 10–30 V

Flange, Protection, Shaft-Ø

S41 = Synchro, IP 64, 6 mm
S71 = Synchro, IP 67, 6 mm
K42 = Clamping, IP 64, 10 mm
K72 = Clamping, IP 67, 10 mm
F42 = Spring tether, IP 64, 10 mm Blind shaft
F47 = Spring tether, IP 64, 12 mm Blind shaft

Interface

SB = SSI Binary
SG = SSI Gray

Connection

A = cable axial
B = cable radial
C = Conin 12 pol. axial cw
D = Conin 12 pol. radial cw
G = Conin 12 pol. axial ccw
H = Conin 12 pol. radial ccw
7 = M12, 8 pol. axial
8 = M12, 8 pol. radial

ORDERING CODE BiSS

CASS58
Absolute singleturn shaft encoder

CAMS58
Absolute multiturn shaft encoder

CASB58
Absolute singleturn blind shaft encoder

CAMB58
Absolute multiturn blind shaft encoder

Resolution

0010 = 10 Bit ST
0012 = 12 Bit ST
0013 = 13 Bit ST
0014 = 14 Bit ST
0017 = 17 Bit ST
0360 = 360 increments ST
0720 = 720 increments ST
1212 = 12 Bit MT + 12 Bit ST
1213 = 12 Bit MT + 13 Bit ST
1214 = 12 Bit MT + 14 Bit ST
1217 = 12 Bit MT + 17 Bit ST

Supply voltage

A = 5 V
E = 10–30 V

Flange, Protection, Shaft-Ø

S41 = Synchro, IP 64, 6 mm
S71 = Synchro, IP 67, 6 mm
K42 = Clamping, IP 64, 10 mm
K72 = Clamping, IP 67, 10 mm
F42 = Spring tether, IP 64, 10 mm Blind shaft
F47 = Spring tether, IP 64, 12 mm Blind shaft

Interface

BI = BiSS (Digital)
BC = BiSS (+SinCos 1VPP)

Connection

A = cable axial
B = cable radial
C = Conin 12 pol. axial cw
D = Conin 12 pol. radial cw
G = Conin 12 pol. axial ccw
H = Conin 12 pol. radial ccw
7 = M12, 8 pol. axial
8 = M12, 8 pol. radial

ORDERING CODE PARALLEL INTERFACE

CASS58
Absolute singleturn shaft encoder

CAMS58
Absolute multiturn shaft encoder

CASB58
Absolute singleturn blind shaft encoder

CAMB58
Absolute multiturn blind shaft encoder

Resolution

0010 = 10 Bit ST
0012 = 12 Bit ST
0013 = 13 Bit ST
0014 = 14 Bit ST
0360 = 360 increments ST
0720 = 720 increments ST
1212 = 12 Bit MT + 12 Bit ST

Supply voltage

E = 10–30 V

Flange, Protection, Shaft-Ø

S41 = Synchro, IP 64, 6 mm
S71 = Synchro, IP 67, 6 mm
K42 = Clamping, IP 64, 10 mm
K72 = Clamping, IP 67, 10 mm
F42 = Spring tether, IP 64, 10 mm Blind shaft
F47 = Spring tether, IP 64, 12 mm Blind shaft

Interface

PB = Parallel Binary
PG = Parallel Gray

Connection

A = cable axial (ST, MT)
B = cable radial (ST, MT)
U = Conin 17 pol. axial ccw (ST)
V = Conin 17 pol. radial ccw (ST)
W = Conin 17 pol. axial cw (ST)
Y = Conin 17 pol. radial cw (ST)
A-A1-F = 0,1 m cable axial + 37 pol. Sub-D (MT)
B-A1-F = 0,1 m cable radial + 37 pol. Sub-D (MT)

ORDERING CODE PROFIBUS–DP/DEVICENET

CASS58
Absolute singleturn shaft encoder

CAMS58
Absolute multiturn shaft encoder

CASB58
Absolute singleturn blind shaft encoder

CAMB58
Absolute multiturn blind shaft encoder

Resolution

0010 = 10 Bit ST
0012 = 12 Bit ST
0013 = 13 Bit ST
0014 = 14 Bit ST
1212 = 12 Bit MT + 12 Bit ST
1213 = 12 Bit MT + 13 Bit ST
1214 = 12 Bit MT + 14 Bit ST

Supply voltage

E = 10–30 V

Flange, Protection, Shaft-Ø

S41 = Synchro, IP 64, 6 mm
S71 = Synchro, IP 67, 6 mm
K42 = Clamping, IP 64, 10 mm
K72 = Clamping, IP 67, 10 mm
F42 = Spring tether, IP 64, 10 mm Blind shaft
F47 = Spring tether, IP 64, 12 mm Blind shaft

Interface

DP = Profibus DP
VD = DeviceNet

Connection

Profibus:
Z = Bus cover 3x cable gland
DeviceNet:
Z = Bus cover 2 x cable gland

Note: Bus Connections radial/axial via connector and cable, optional on request.

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FAxx90

- Heavy duty absolute single- and multiturn encoders with SSI, Profibus, CANopen outputs. Parallel output for most versions on request
- Shaft and hollow shaft versions with Ø 90 mm
- Applications:
  -Steel industry
  -Paper industry
  -Cranes
- Shaft Ø 11 or 12 mm
- Through hollow shaft Ø 12, 20, 25, 30 mm (others on request) (Profibus blind shaft only)
- Easy mounting of the hollow shaft version. The encoder is mounted directly on the drive shaft without coupling

SSI

CANopen

PROFI® PROCESS FIELD BUS

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ABSOLUTE ENCODER MyAbs

FAxx90

Electrical Data:		SSI[1)]	Profibus (MT)	CANopen (MT)
Supply voltage		5–30 VDC	5–30 VDC	5–30 VDC
Intrinsic current consumption (without load)		100 mA max.	24 VDC: max. 170 mA	24 VDC: max. 120 mA
Interface		Standard SSI	Specification according DPVO, Class 2, encoder profile 3.062	CAN high speed according ISO 11898, Bacic and full CAN CAN specification DS301 V4.02
Protocol				CAN open profile DS406 V3.1
Lines/Drivers		RS422		
Output code		SSI: Binary or Gray	Binary	Binary
Singleturn resolution		13 Bit	13 Bit	13 Bit
Multiturn resolution		12 Bit	16 Bit	16 Bit
Incremental signals		optional		
Number of increments		2048		
Clock frequency	ST	100 kHz–1 MHz		
	MT	100 kHz–500 kHz		
Connection		Cable or flange-connector	Terminal box	Cable or flange-connector
Parameterization			According to Profibus profile	According to CANopen profile
Control input		Direction, Reset		

Mechanical Data:		SSI[1)]	Profibus (MT)	CANopen (MT)
Housing diameter		90 mm	90 mm	90 mm
Protection		FAxS90: IP 65 FAxH90: IP 65	FAMS90: IP 65 FAMH90: IP 65	FAMS90: IP 65 FAMH90: IP 65
Flange types		Synchro-flange Spring tether	Synchro-flange Spring tether	Synchro-flange Spring tether
Shaft diameter		Solid shaft: 11, 12 mm Hollow shaft: 12, 20, 25, 30 mm	Solid shaft: 11, 12 mm Hollow shaft: 12, 20, 25, 30 mm	Solid shaft: 11, 12 mm Hollow shaft: 12, 20, 25, 30 mm
Max. speed at 70 °C		FAxS90: continuous 6000 min^{-1} short-term 6000 min^{-1} FAxH90: continuous 3600 min^{-1} short-term 6000 min^{-1}	FAMS90: continuous 6000 min^{-1} short-term 6000 min^{-1} FAMH90: continuous 3600 min^{-1} short-term 6000 min^{-1}	FAMS90: continuous 6000 min^{-1} short-term 6000 min^{-1} FAMH90: continuous 3600 min^{-1} short-term 6000 min^{-1}
Starting Torque		< 0,025 Nm	< 0,025 Nm	< 0,025 Nm
Moment of inertia, rotor		15 ... 55 x 10^{-6} kgm^2	15 ... 55 x 10^{-6} kgm^2	15 ... 55 x 10^{-6} kgm^2
Absolute max. shaft load		FAxS90: axial 100 N, radial 200 N FAxH90: axial 50 N, radial 80 N	FAxS90: axial 100 N, radial 200 N FAxH90: axial 50 N, radial 80 N	FAxS90: axial 100 N, radial 200 N FAxH90: axial 50 N, radial 80 N
Shock resistance IEC 68-2-27		500 m/s^2 (6 ms)	500 m/s^2 (6 ms)	500 m/s^2 (6 ms)
Vibration resistance IEC 68-2-6	ST	200 m/s^2 (10 ... 1000 Hz)	100 m/s^2 (10 ... 500 Hz)	100 m/s^2 (10 ... 500 Hz)
	MT	100 m/s^2 (10 ... 2000 Hz)		
Working temperature	ST	–20 ... +90 °C	–10 ... +80 °C	–10 ... +80 °C
	MT	–20 ... +80 °C		
Weight, approx. (ST/MT)		FAxS90: 1100 g/1600 g FAxH90: 700 g/700 g	FAMS90: 1800 g FAMH90: 1200 g	FAMS90: 1600 g FAMH90: 700 g

[1)] Parallel output on request

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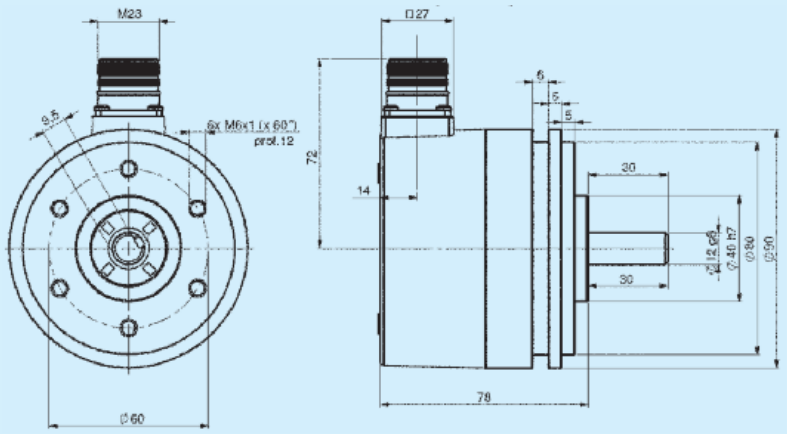
ABSOLUTE SHAFT ENCODER

FAxS90

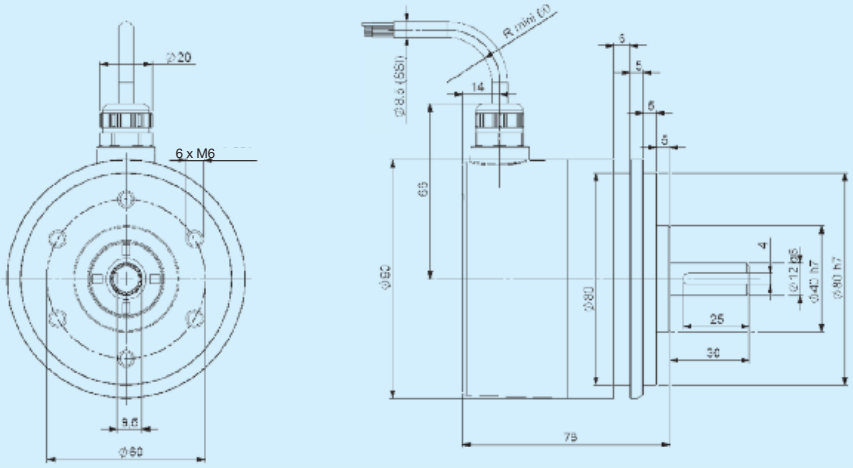
SINGLETURN, SSI

Dimensioned drawing

Synchro flange
(Drawing with M23 connector)



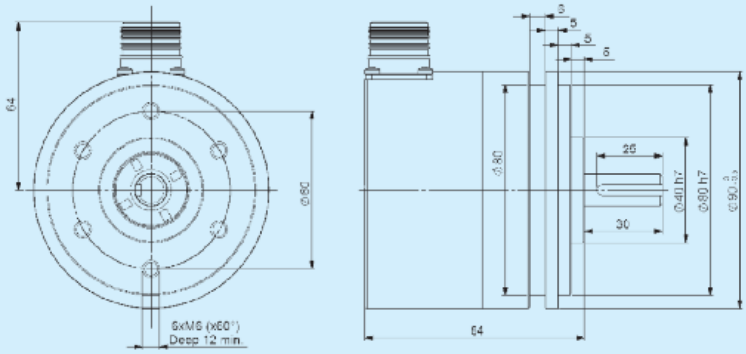
Synchro flange
(Drawing with cable version)



MULTITURN, SSI

Dimensioned drawing

Synchro flange
(Drawing with M23 connector)



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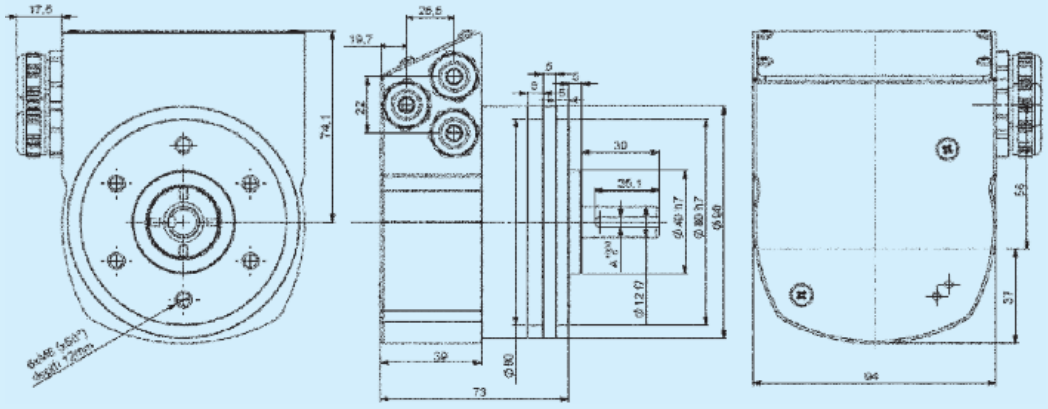
ABSOLUTE SHAFT ENCODER

FAMS90

MULTITURN, PROFIBUS DP

Dimensioned drawing

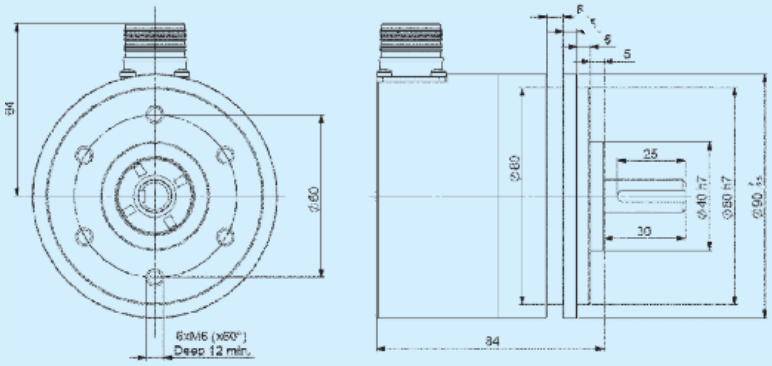
Synchro flange
(Drawing with terminal box)



MULTITURN, CANopen

Dimensioned drawing

Synchro flange
(Drawing with M23 connector)



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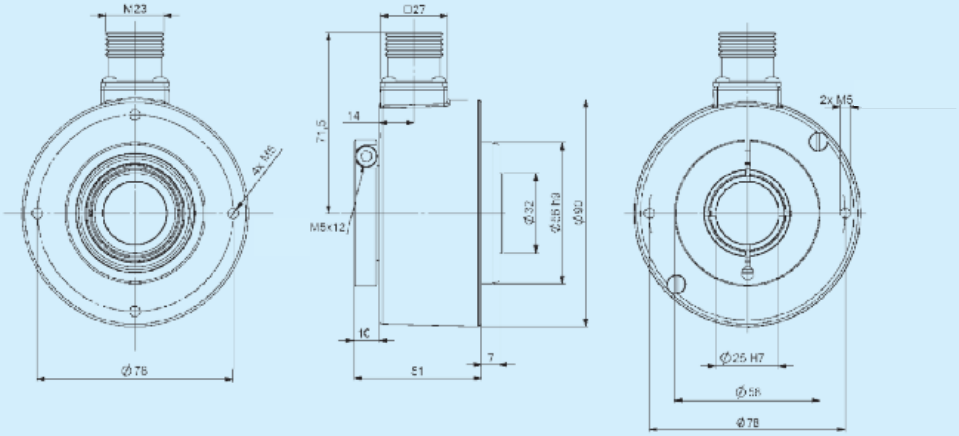
ABSOLUTE HOLLOW SHAFT ENCODER

FAxH90

SINGLETURN, SSI

Dimensioned drawing

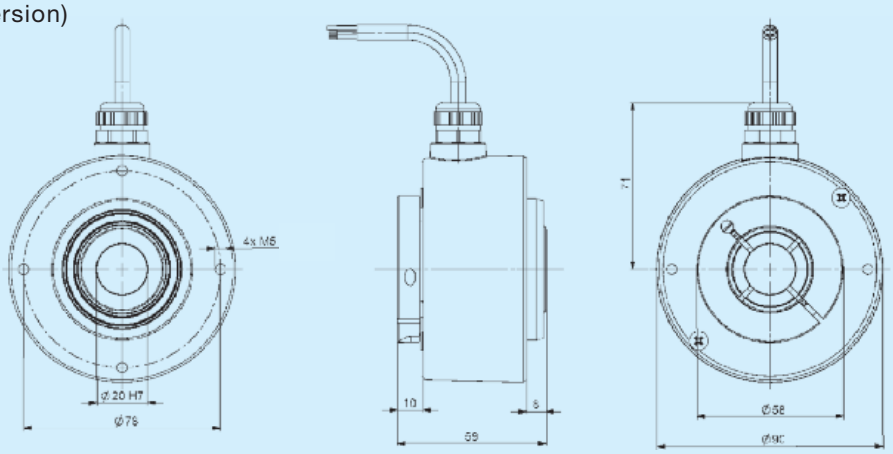
Hollow shaft
(Drawing with M23 connector)



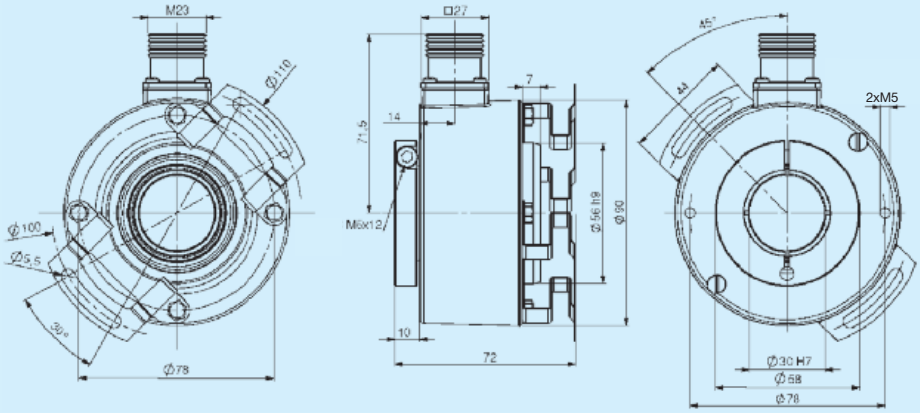
MULTITURN, SSI

Dimensioned drawing

Hollow shaft
(Drawing with cable version)



Hollow shaft
(Drawing with M23 connector and Anti-rotation device 9445/009)



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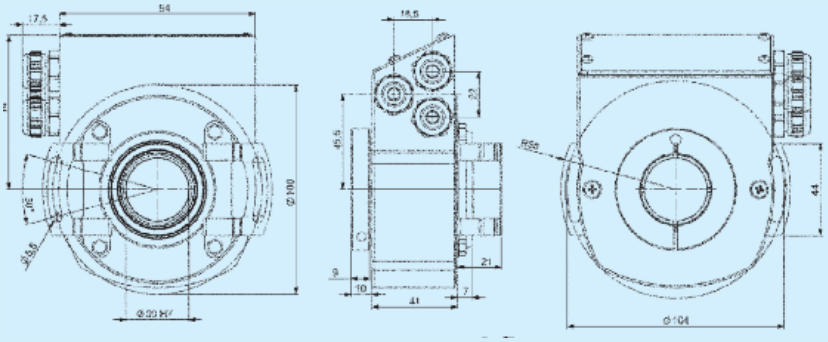
ABSOLUTE HOLLOW SHAFT ENCODER

FAMH90

MULTITURN, PROFIBUS DP

Dimensioned drawing

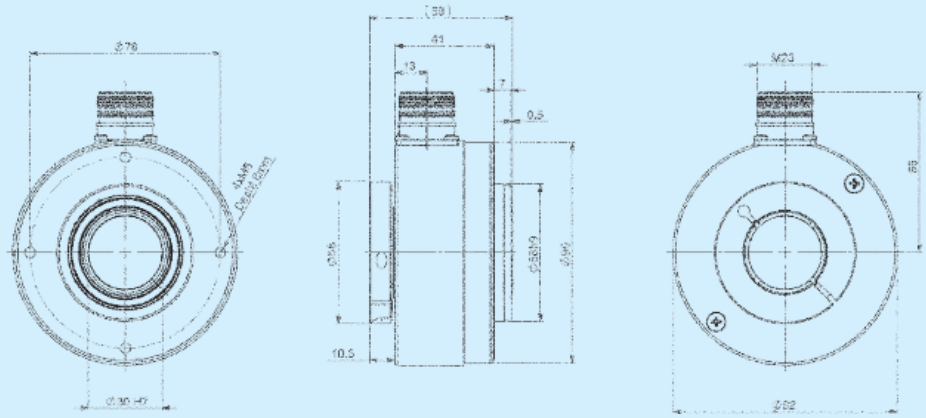
Hollow shaft
(Drawing with terminal box)



MULTITURN, CANopen

Dimensioned drawing

Hollow shaft
(Drawing with M23 connector)



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SSI

Terminal assignment

Signal:	GND	+V	+C	-C	+D	-D	RES	DIR
Cable colour:	WH/GN	BN/GN	GN	BN	GY	PK	BU	WH
M23 PIN out cw:	2	1	3	7	4	6	5	9
M23 PIN out ccw:	1	8	3	11	2	10	6	5

+V: Encoder Power Supply +VDC
GND: Encoder Power Supply Ground (0V)
+C, -C: Clock signal
+D, -D: Data signal
DIR: Direction input: If this input is active, output values are decreasing when shaft is turned clockwise.
RES: Reset to zero

Profibus DP

Terminal assignment

Signal:	A	B	+V	0V
Terminal	A	B	+	-

CANopen

Terminal assignment

Signal:	CAN Ground	CAN_Low (-)	CAN_High (+)	GND power supply	+V power supply	N/C
M23 PIN out cw	3	2	7	10	12	4, 5, 6, 8, 9, 11

Note: CAN Ground (PIN 3) and GND power supply (PIN 10) are connected internally

FAxx90

ORDERING CODE SSI[1)]

	Resolution	Supply voltage	Flange, Protection	Shaft-Ø	Interface	Connection
FASS90 Absolute singleturn shaft encoder FAMS90 Absolute multiturn shaft encoder FASH90 Absolute singleturn hollow shaft encoder FAMH90 Absolute multiturn hollow shaft encoder	0010 = 10 Bit ST 0011 = 11 BIT ST 0012 = 12 Bit ST 0013 = 13 Bit ST 1210 = 12 Bit MT + 10 Bit ST 1211 = 12 Bit MT + 11 Bit ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST	E = 5-30 VDC	S5 = Synchro, IP 65 (shaft) C5 = Hollow shaft, IP 65	11 = 11 mm shaft, flange Ø 115 mm 12 = 12 mm shaft/hollow shaft (with hub) 20 = 20 mm hollow shaft (with hub) 25 = 25 mm hollow shaft (with hub) 30 = 30 mm hollow shaft	SB = SSI Binary SG = SSI Gray	A = cable axial, 1 m PVC B = cable radial, 1 m PVC D = Conin 12pol. radial cw H = Conin 12 pol. radial ccw

[1)] Parallel output on request

ORDERING CODE Profibus DP

	Resolution	Supply voltage	Flange, Protection	Shaft-Ø	Interface	Connection
FAMS90 Absolute multiturn shaft encoder FAMH90 Absolute multiturn hollow shaft encoder	1210 = 12 Bit MT + 10 Bit ST 1211 = 12 Bit MT + 11 Bit ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST 1610 = 16 Bit MT + 10 Bit ST 1611 = 16 Bit MT + 11 Bit ST 1612 = 16 Bit MT + 12 Bit ST 1613 = 16 Bit MT + 13 Bit ST	E = 11–30 V	S5 = Synchro, IP 65 (shaft) C5 = Hollow shaft, IP 65	11 = 11 mm shaft, flange Ø 115 mm 12 = 12 mm shaft/hollow shaft (with hub) 20 = 20 mm hollow shaft (with hub) 25 = 25 mm hollow shaft (with hub) 30 = 30 mm hollow shaft	DP = Profibus DP Class 2 Profile 3.062	BR = Terminal box

ORDERING CODE CANopen

	Resolution	Supply voltage	Flange, Protection	Shaft-Ø	Interface	Connection
FAMS90 Absolute multiturn shaft encoder FAMH90 Absolute multiturn hollow shaft encoder	1210 = 12 Bit MT + 10 Bit ST 1211 = 12 Bit MT + 11 Bit ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST 1610 = 16 Bit MT + 10 Bit ST 1611 = 16 Bit MT + 11 Bit ST 1612 = 16 Bit MT + 12 Bit ST 1613 = 16 Bit MT + 13 Bit ST	E = 11–30 V	S5 = Synchro, IP 65 (shaft) C5 = Hollow shaft, IP 65	11 = 11 mm shaft, flange Ø 115 mm 12 = 12 mm shaft/hollow shaft (with hub) 20 = 20 mm hollow shaft (with hub) 25 = 25 mm hollow shaft (with hub) 30 = 30 mm hollow shaft	CO = CANopen Profile DS406 V.3.1	D = Conin 12 pol. radial cw H = Conin 12 pol. radial ccw

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MOUNTING ACCESSORIES

Anti-rotation devices for all
type of hollow-shaft and
through hollow shaft encoders

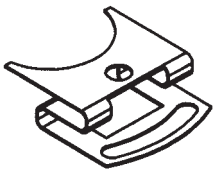
DAC

MEFLEX

Anti-rotation devices
For hollow shaft encoder without torque stop slot

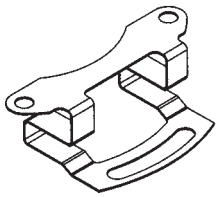
Ref. 9445/006

Ø 40 mm



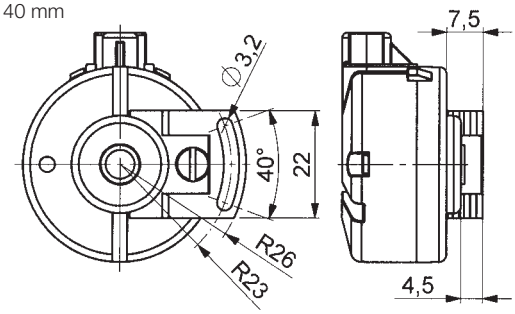
Ref. 9445/009

Ø 90 mm



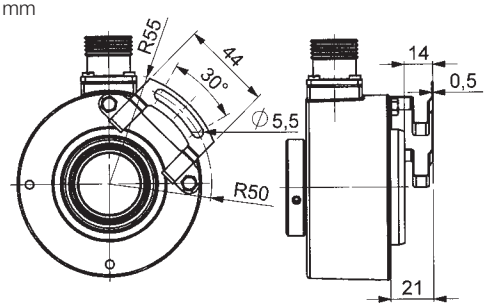
Ref. 9445/006

Ø 40 mm



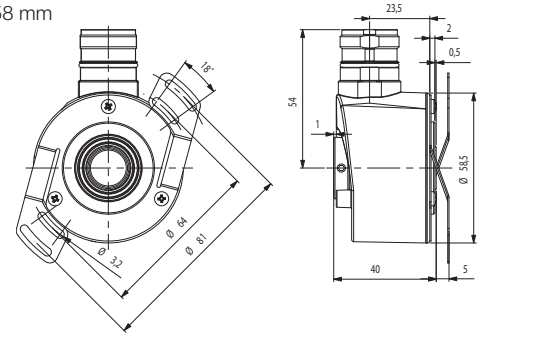
Ref. 9445/009

Ø 90 mm



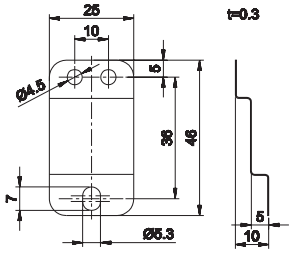
Ref. 9445/015

Ø 58 mm



Ref. 9445/019

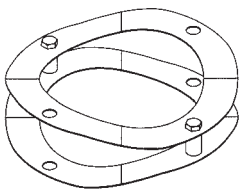
Ø 100 mm und 145 mm



Anti-rotation devices
For hollow shaft encoder without torque stop slot

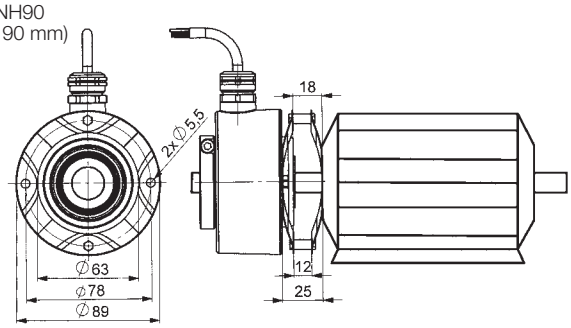
Ref. 9445/004

Ø 90 mm



Ref. 9445/004

AINH90
(Ø 90 mm)



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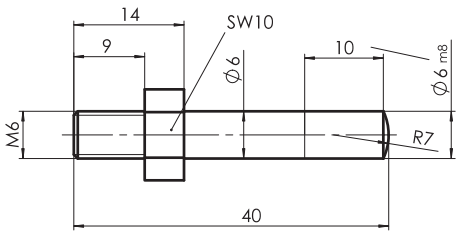
MOUNTING ACCESSORIES

Anti-rotation devices
For large hollow shaft encoder with torque stop slot

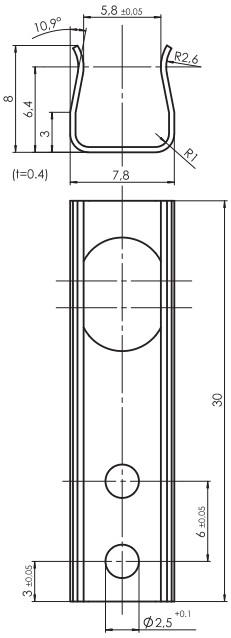
Ref. 9475/005

Complete set, consisting of:

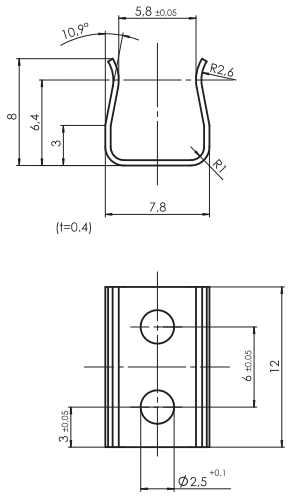
1 x cylindric pin
long with thread



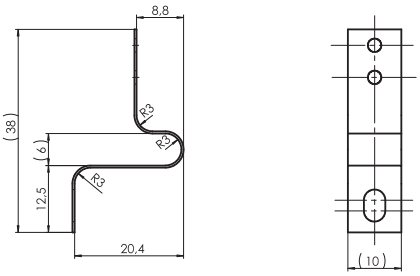
1 x spring long



1 x spring short



bracket



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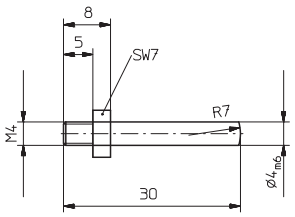
MOUNTING ACCESSORIES

Anti-rotation devices
For hollow shaft encoder Ø 58 mm with torque stop slot

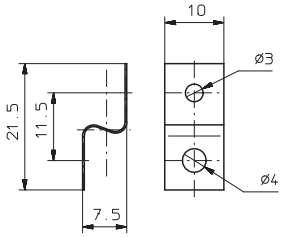
Ref. 9475/001

Complete set, consisting of:

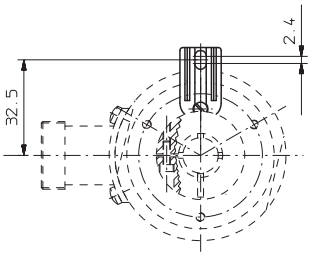
1 x cylindric pin
with thread



1 x mounting bracket
incl. screw M3x5



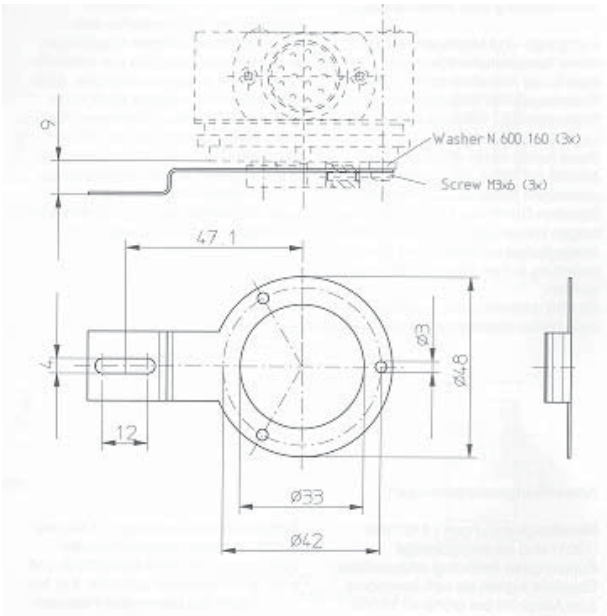
1 x long torque
support slot



Flexible mounting braket for hollow shaft encoders Ø 58 mm, screwhole circuit Ø 42 mm

Ref. 9475/010

Delivery includes:
1 x flexible mounting sheet
3 x washer
3 x screw M3x6

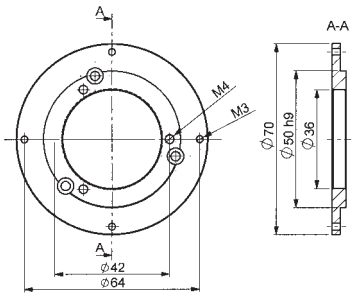


MOUNTING ACCESSORIES

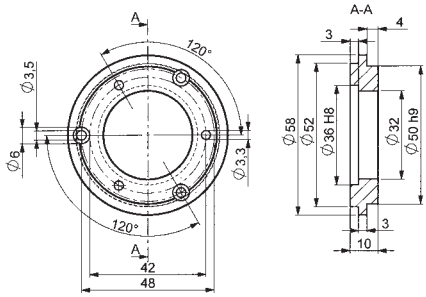
Large choice of mountings
for all encoder standards

Mountings for Ø 58 mm encoders

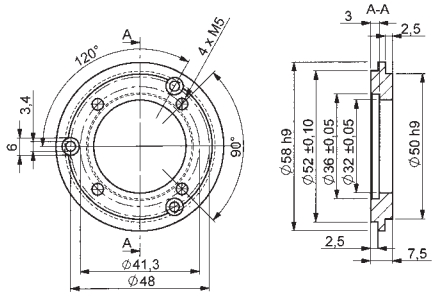
Ref. 9500/002 Aluminium



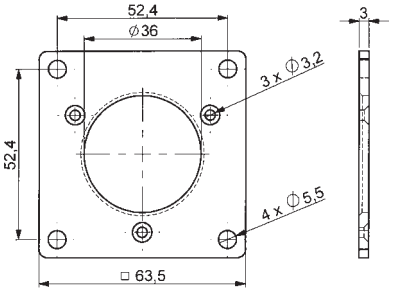
Ref. 9500/003 Aluminium



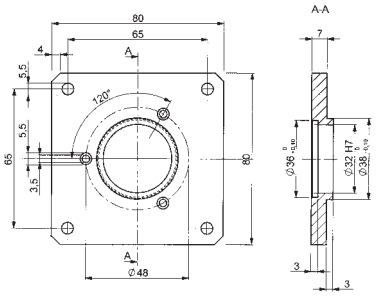
Ref. 9500/004 Aluminium



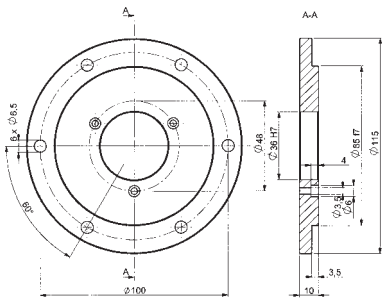
Ref. 9500/005 Aluminium



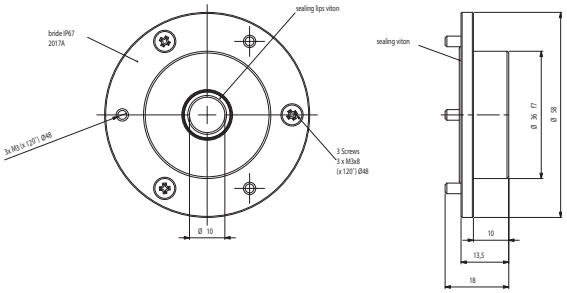
Ref. 9500/006 Aluminium



Ref. 9500/030 Aluminium



Ref. 9500/049 Sealing flange IP 67



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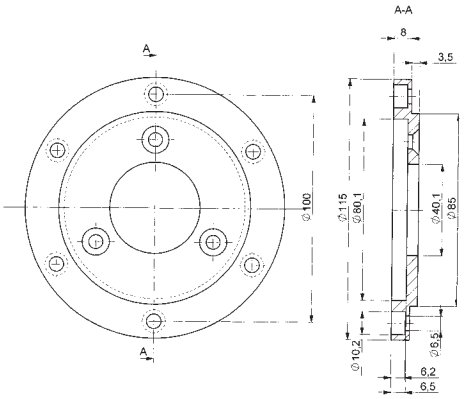
MOUNTING ACCESSORIES

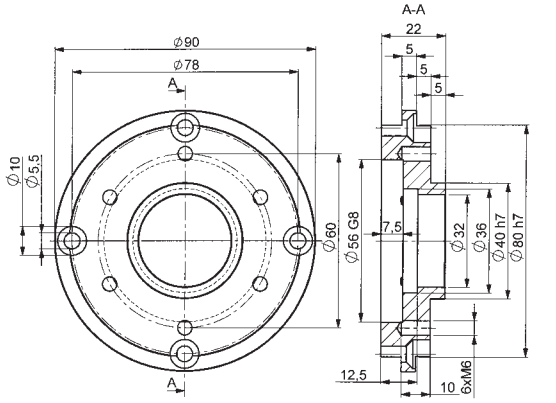
Large choice of mountings for
all encoder standards

Mountings for Ø 90 mm encoders

Ref. 9500/007 Aluminium

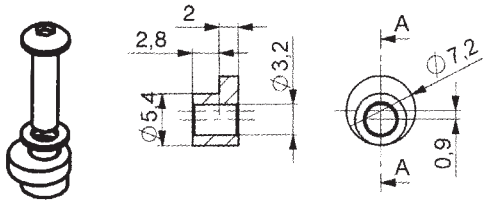


Ref. 9500/028 Aluminium

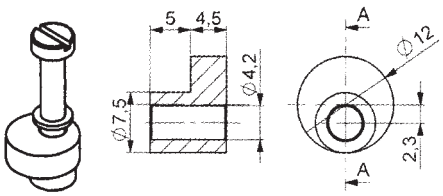


Excentric mounting

Ref. 9500/014 Nickel-coated brass



Ref. 9500/015 Stainless steel



COUPLING

Large choice of couplings
with adaptation for all types
of encoders

Ref. 9400

Flexible washer coupling

(mm)	Ø X1 H7	Ø X2 H7
9400/12-12	12	12
9400/10-10	10	10
9400/06-06	6	6
9400/06-10	6	10
9400/06-12	6	12
9400/10-12	10	12
9400/08-08	8	8
9400/08-06	8	6
9400/08-10	8	10
9400/08-12	8	12

Possibilities for boring between 6 and 12 mm

Ref. 9401

Spring coupling

(mm)	Ø X1 H7	Ø X2 H7
9401/12-12	12	12
9401/10-10	10	10
9401/06-06	6	6
9401/06-10	6	10
9401/06-12	6	12
9401/10-12	10	12
9401/08-08	8	8
9401/08-06	8	6
9401/08-10	8	10
9401/08-12	8	12
9401/12-14	12	14
9401/14-14	14	14

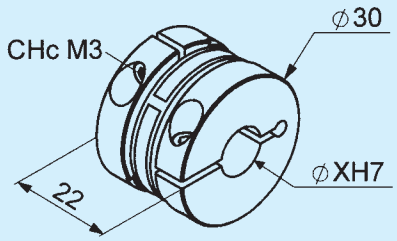
Possibilities for boring between 6 and 14 mm

Ref. 9402

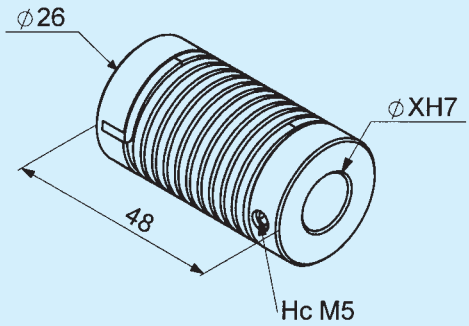
Small spring coupling

(mm)	Ø X1 H7	Ø X2 H7
9402/10-10	10	10
9402/06-06	6	6

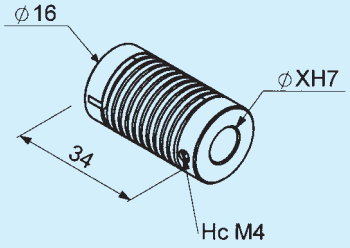
Réf. 9400



Réf. 9401



Réf. 9402



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Ref. 9403

Precision bellow coupling without insulation

	Ø X1 H7	Ø X2 H7
9403/10-10	10	10
9403/06-06	6	6
9403/06-10	6	10

Possibilities for boring between 4 and 10 mm

Ref. 9404

Precision bellow coupling

(mm)	Ø X1 H7	Ø X2 H7
9404/12-12	12	12
9404/10-10	10	10
9404/06-06	6	6
9404/06-10	6	10
9404/06-12	6	12
9404/10-12	10	12
9404/08-08	8	8
9404/08-06	8	6
9404/08-10	8	10
9404/08-12	8	12

Possibilities for boring between 6 and 14 mm

Ref. 9410

«OLDHAM» coupling

(mm)	Ø X1 H7	Ø X2 H7	Ø Y	Z	P
9410/C06-06	6	6	25.4	28.4	8.6
9410/C06-10	6	10	25.4	28.4	8.6
9410/C10-10	10	10	25.4	28.4	8.6
9410/A06-06	6	6	33.3	48	13
9410/A06-10	6	10	33.3	48	13
9410/A08-08	8	8	33.3	48	13
9410/A08-12	8	12	33.3	48	13
9410/A10-10	10	10	33.3	48	13
9410/A12-12	12	12	33.3	48	13
9410/B10-10	10	10	41.3	50.8	16.7
9410/B12-12	12	12	41.3	50.8	16.7

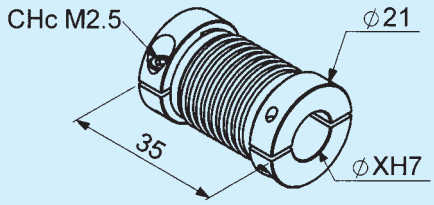
Possible borings from 6 to 14 mm (except for 9410/C de 4 à 10)

Ref. 9417

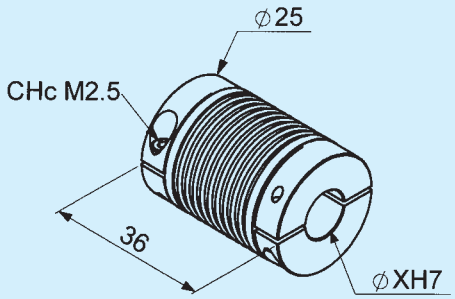
Plastic coupling

(mm)	Ø X1 H7	Ø X2 H7
9417/06-06	6	6

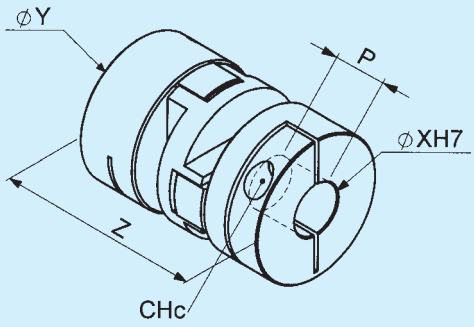
Réf. 9403



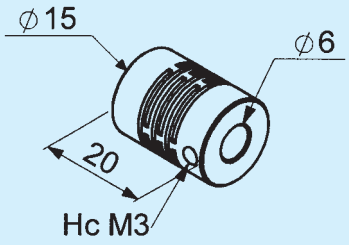
Réf. 9404



Réf. 9410



Réf. 9417



CONNECTION ACCESSORIES

Large choice of sockets and
other connection accessories
for all encoder standards

SOCKETS

Type 1 - Ref. 9412/F

Female socket 4 pins (CNOMO)

Type 2 - Ref. 9414_F5

Female socket DIN 5 pins

Type 5, 6 & H - Ref. 9416/...

Female sockets M23 clockwise

	12 pins	16 pins	Note
Ref.	9416/004	9416/006	Shield not linked to connector
Ref.	9416/004P	9416/006P	Shield linked to connector (EMI)

Type 8 – Ref. 9416/...

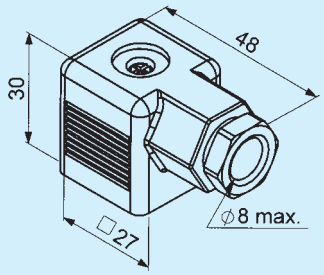
Female sockets M23 counter-clockwise

	12 pins	16 pins	Note
Ref.	9416/014	9416/037	Shield not linked to connector
Ref.	9416/055	9416/060	Shield linked to connector (EMI)

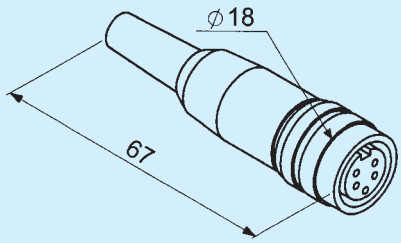
Type 9 – Ref. 8213/011 + Ref. 8212/065

Female sockets DB9 + cover

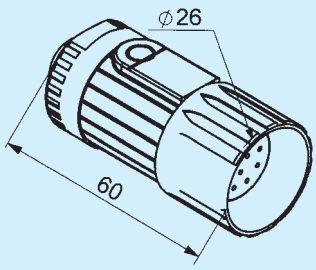
Ref. 9412



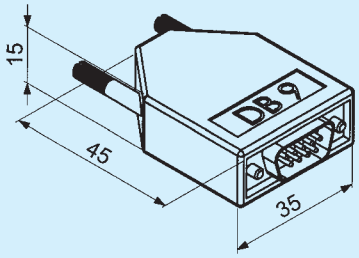
Ref. 9414



Ref. 9416



Ref. 8213



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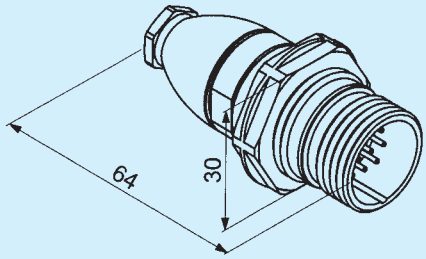
EXTENSION CABLE

Type M23 – Ref. 9416/013

Extension M23 clockwise

Ref. 9416/013

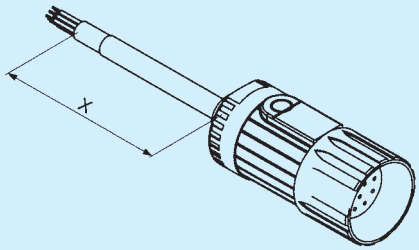


Type M23 – Ref. EJ/9416-004B/ xxx*

Extension cable M23 female clockwise

**xxx = length*

Ref. EJ/9416



MEASURING ACCESSORIES

Mesuring wheels
Pinion-Rack
Slave-bearing modules

Measuring wheel, circumference 200 mm

Ref.	Ø X H7 (mm)	Coating
9108/06	6	Polyurethan
9108/08	8	
9108/10	10	
9109/06	6	knobbled rubber
9109/08	8	
9109/10	10	
9110/06	6	Knurled aluminium

Mainly for Ø 58 mm encoders

Measuring wheel, circumference 500 mm

Ref.	Ø X H7 (mm)	Coating
9101/08	8	Polyurethan
9101/10	10	
9101/12	12	
9102/08	8	knobbled rubber
9102/10	10	
9102/12	12	
9103/12	12	Knurled aluminium

Mainly for Ø 90 and 102 mm encoders

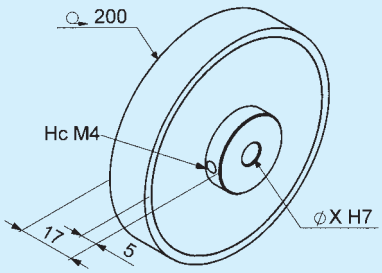
Racks

Ref.	Y (mm)	Module
9514 / 002	1000	1,591
9514 / 003	2000	1,591

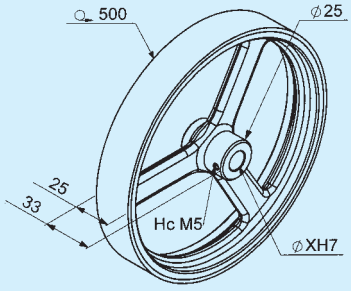
Pinions

Ref.	Ø X H7 (mm)	Nbr of teeth	Module
9215 / 002	8	20	1,591
9215 / 004	10	20	1,591
9215 / 005	12	20	1,591

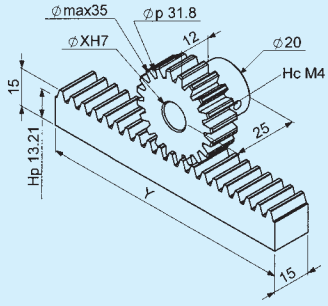
Ref. 9108/9109/9110
Aluminium



Ref. 9101/9102/9103
Aluminium



Ref. 9212/9215
Steel C 45



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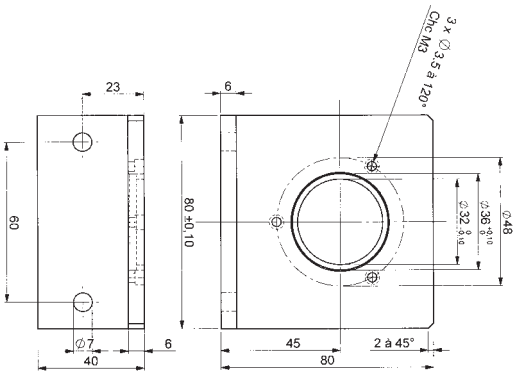
MOUNTING ACCESSORIES

Aluminium mounting brackets
Aluminium spring: adjustable
compensating brackets
for linear measuring

Mounting brackets

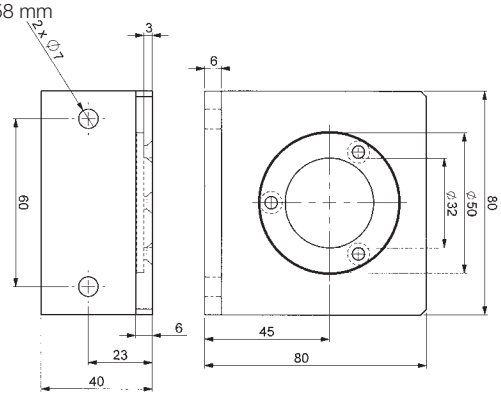
Ref. 9202

Ø 58 mm



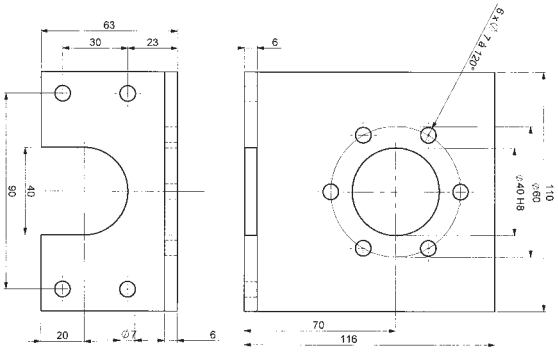
Ref. 9204

Ø 58 mm



Ref. 9302

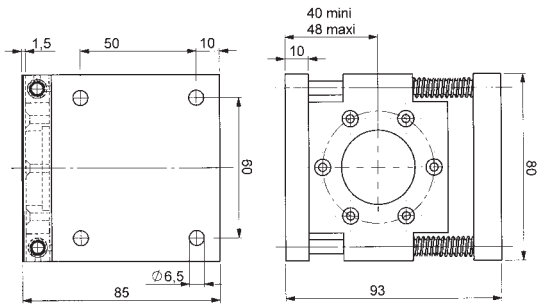
Ø 90 mm



Adjustable spring brackets

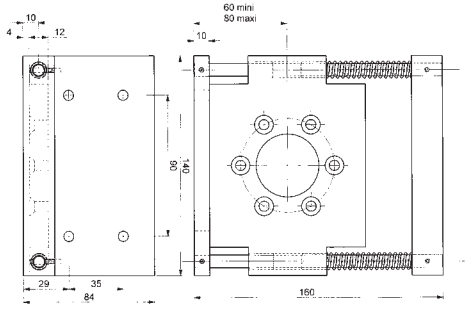
Ref. 9212

Ø 58 mm



Ref. 9213

Ø 90 mm



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INSTALLATION INSTRUCTIONS

If possible, mount the encoder shaft horizontal of facing downward, with the cable glands or the connector facing downward.

Solid shaft:

1: Mount encoder to a rigid bracket
2: Mount a flexible coupling (loose assembly) to the encoder shaft
3: Align carefully encoder and driving shaft
4: Tighten all screws

Hollow or through-in shaft:

1: Mount in a rigid assembly the driving shaft into the encoder hollow or through shaft
2: Mount the flexible anti-rotation device onto the frame – tighten the assembly
3: Respect the encoder-frame mounting distance of the flexible anti-rotation device.

Example:

A 30 mm hollow shaft, (g6) can only be used on a motor shaft of 30 mm, unless you add on the shaft one of our accessories, reduction hub.

PROTECTION DEGREE

(explanation on the figures)

1st figure	
Protection against the penetration of solid bodies. According to IEC, NFC, DIN	
0	Non protected.
1	Protection against solid bodies of more than 50 mm.
2	Protection against solid bodies of more than 12 mm.
3	Protection against solid bodies of more than 2,5 mm.
4	Protection against solid bodies of more than 1 mm.
5	Protected against dust.
6	Completely protected against dust.

2nd figure	
Protection against the penetration of liquids According to IEC, NFC, DIN	
0	Non protected.
1	Protected against vertical fall of water spot
2	Protected against vertical fall of water spot (max inclination 15°)
3	Protected against water in „rain“
4	Protected against water projection
5	Protected against water nozzle
6	Protected against sea waves
7	Protected in immersion

INFORMATION ON THE STANDARDS

CENELEC: Organisation that certifies encoders with intrinsic security and those which can be mounted where explosive atmosphere can be found.

INTRINSIC SECURITY: Encoders with intrinsic security can be installed where explosive atmosphere can be found without special conditioning or wiring. These encoders mounted with intrinsic security barriers limit the power supply and the tension allowed in risky atmospheres.

EUROPEAN UNION: The European Union defines the electrical standards against electromagnetic constraint. Since January 1st, 1996, all the electronic devices in Europe have to respect the CE standard. Our encoders have been tested according to the „heavy industry“ standards, this certification have been obtoined from an agreed organism.

CONNECTING CAUTIONS

Never leave wires unconnected! Never connect output together! Never connect idle outputs to a potential! Connect idle differential outputs with a resistor so as to draw a current of approximately 10 mA!

SWITCH ON AND POWER SUPPLY

Warning! Never connect or disconnect a powered encoder!

At the first switch-on: check on the corresponding pins of the unconnected encoder the correct 5 V or 24 V supplying voltage with the correct polarity. The encoder supply line must be protected against excessive voltage and current.

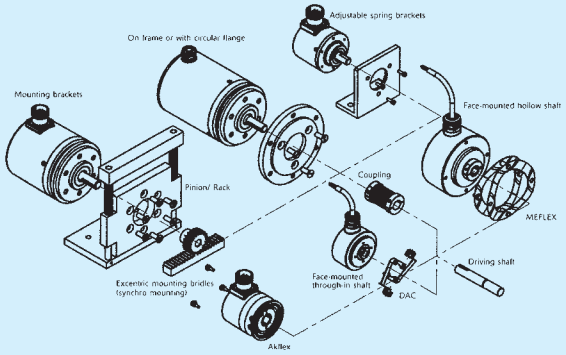
Voltage supply cautions: use a stabilised power supply dedicated to the encoder. The encoder must be powered through the PLC cabinet (e.g stabilised supply switch). To avoid destruction or slow deterioration do not exceed the voltage limits specified on the labels (ondulation included).

The wiring in the PLC cabinet must be as short as possible.

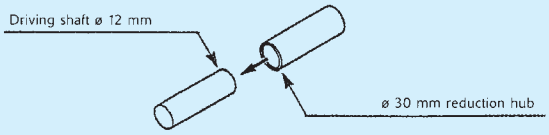
Use connexion boxes with metallic protection.

Never connect the encoder in the 220 V (or 125 V) electric network.

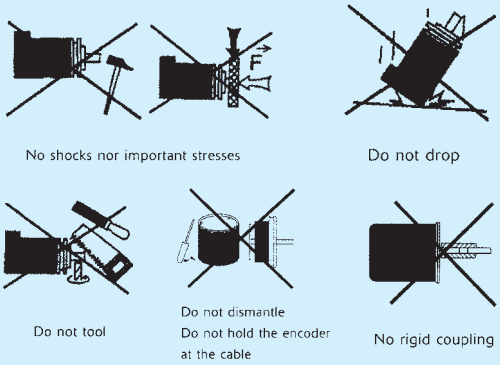
Installation instructions



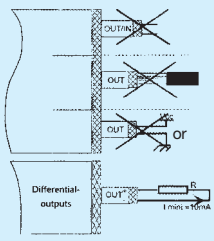
Example



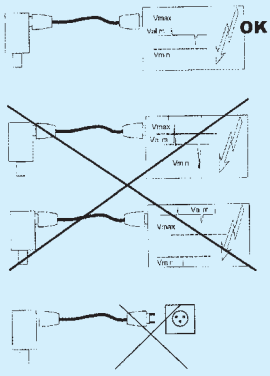
Caution!



Connecting cautions



Switch on and power supply



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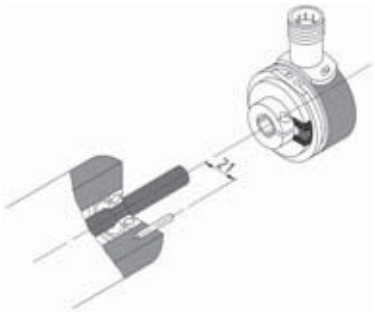
INSTALLATION INSTRUCTIONS

Mounting examples for hollow shaft encoders:

Mounting of a hollow shaft encoder with torque stop and pin (easiest and fastest mounting). Standard hollow shaft encoders are equipped with the torque stop.

Application:

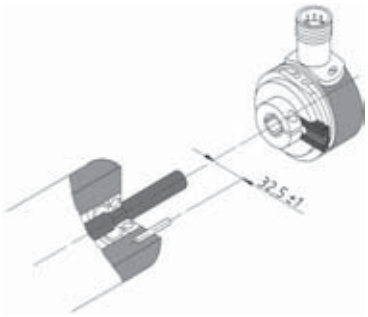
If axial play is less than 0.5 mm. Resolution up to 2500 ppr (If no pulse doubling is used)



Mounting of a hollow shaft encoder with extended torque stop and long pin.

Application:

Specially recommended, if there is a large axial play. Due to the bigger mounting radius of the pin, the resolution can be higher (up to 3600 ppr, if no pulse doubling is used)

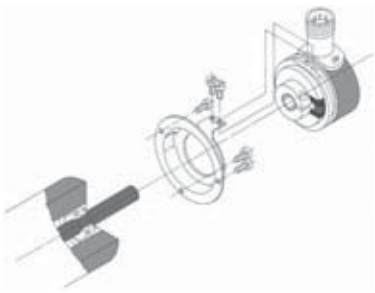


Mounting of a hollow shaft encoder with a stator coupling

Application:

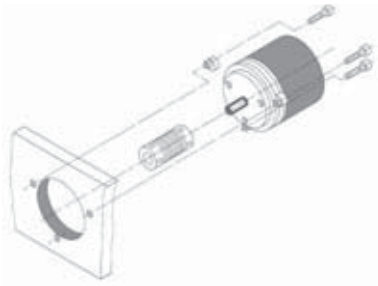
For higher resolution or if no pin can be used, due to mechanical restrictions.

No restrictions to resolution

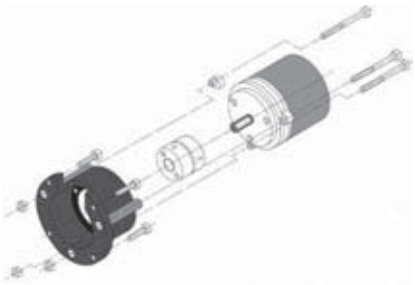


Mounting examples for shaft encoders with synchronous flange:

Mounting with fastening eccentrics and coupling (to reduce shaft overload)



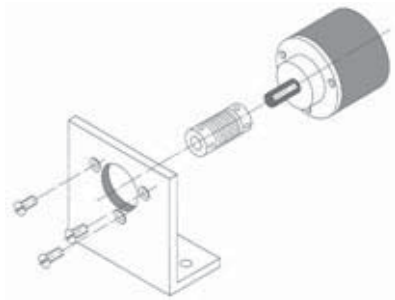
Mounting with assembly bell, fastening eccentrics and coupling (to prevent shaft overload and to insulate the encoder thermally and electrically)



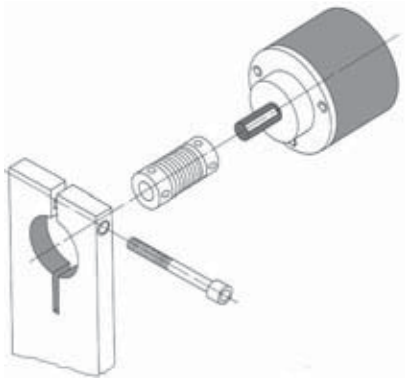
INSTALLATION INSTRUCTIONS

Mounting examples for shaft encoders with clamping flange:

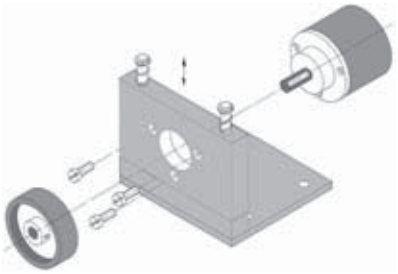
Mounting with an angular bracket and coupling (to reduce shaft overload)



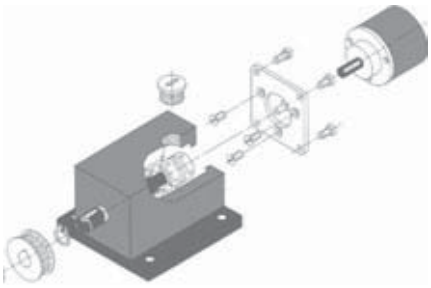
Mounting with a commonly used clamping device and coupling (to reduce shaft overload)



Mounting an encoder, using a displacement measuring device and a measuring wheel, e.g. for length measuring of foils, fabries, metal sheets etc. The displacement measuring device ensures a constant slight pressure for a safe and precise measurement and also prevents overload to the encoder ball bearing.



Mounting with a bearing box, if shaft load is very high, e.g. belt-drives etc.



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MEYLE incremental and absolute encoders

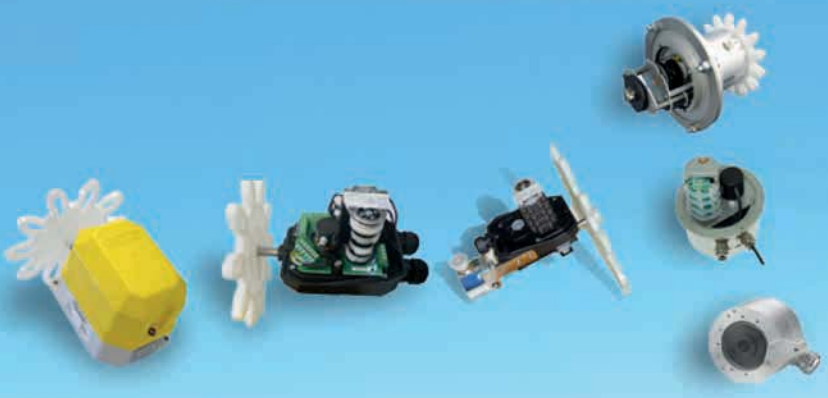
Comprehensive range of incremental, absolute and bus encoders as solid shafts and hollow shaft versions. Heavy duty encoders, draw wire sensors, linear encoders and speed monitors.

MEYLE heavy duty encoder

Encoder overspeed switch combinations, redundant encoders, encoders with large hollow shafts, robust encoders for conveyors and steel works.

MEYLE rotary gear limit switches for wind power, crane and machine applications

Rotary gear limit switches for exact positioning and end-position detection by cam controller and optional built-in encoder. Customer specific solutions for integration in machines and equipment.



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MEYLE safety switches for conveyor belts and machine protection

Pull rope emergency switches, lever limit switches, safety switches, belt alignment switches, off-track belt switches, speed monitors, material flow switches and interlock bypass switches for use in harsh environments.

MEYLE pressure, level & flow sensors

Pressure switches for industrial use and pressure transducers with thin film technology for ambitious, long-term measurements. Float switches with one or more switching points up to 3 m length. Magnetic level indicators for top or side tank assembly.

MEYLE arc detection systems

Arc detection systems for use in medium voltage switchgears for industrial plant and personal safety protection. Applications in energy distribution, power plants, mining, oil & gas, wind power and marine industries.

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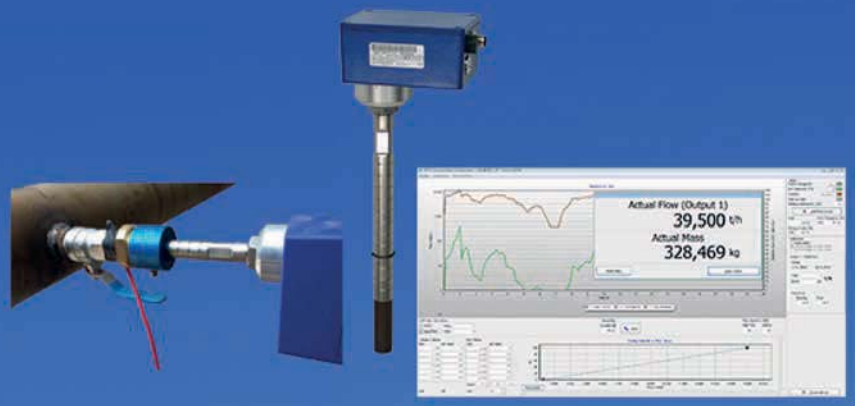
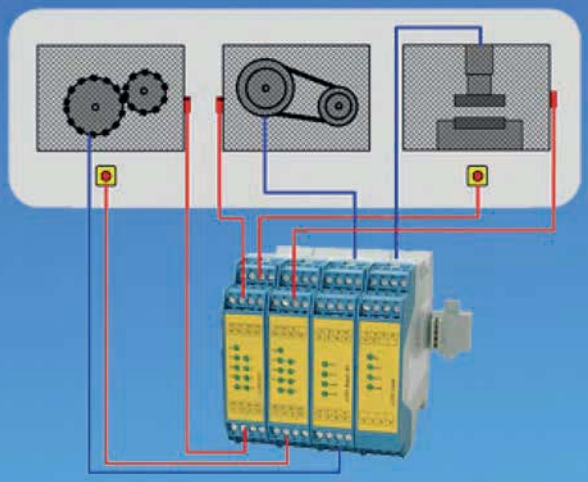
MEYLE solid flow transducers for mass flow measurement

The microwave transducer measures the flow of moving particles in pipes, operating maintenance free and without contact to the product. Simple installation in existing pipes and easy software calibration.



MEYLE safety modules and safety controls

Systems, components and concepts for safety applications up to safety category 4 and PL e / SIL 3 in accordance with the safety standards EN ISO 13849-1, IEC 62061 of the EC Machinery Directive.



MEYLE systems and components for wind power applications

Encoders for pitch control, rotary gear limit switches for yaw control and pitch adjustment, wind sensors, personal safety equipment, industrial ethernet networking of wind farms, system integration and engineering for applications in wind power industry.

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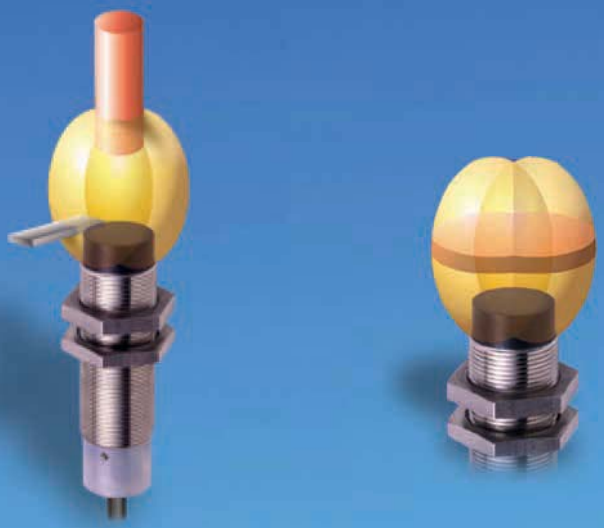
MEYLE stepping motors and brushless DC motors

Stepping motors with high torque at low speeds in different sizes and power ranges with high step angle accuracy. Electronically commutated (EC) brushless DC motors for machine applications.

MEYLE MyProx programmable proximity sensors

Programmable inductive proximity sensors with unique sensor functions and adjustable sensing range. Raises application problemes by target detection, background metal rejection, band detection and tech-in function, e.g. for applications with high vibration.



MEYLE engineering – System integration and engineering company

Long expertise and experience in the areas of planning, engineering and commissioning of solutions for industrial procedures and processes.

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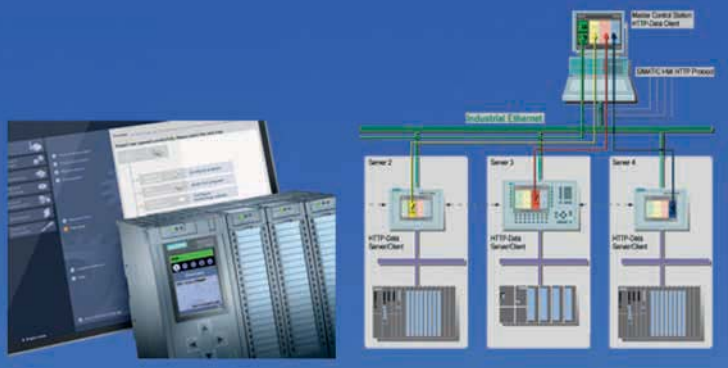
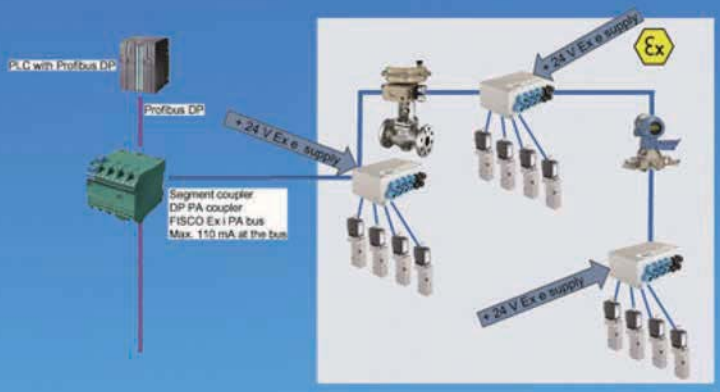
MEYLE engineering – System integrator and solution provider

Automation and process control from a single source as a solution provider for PLC technology, drive technology and process automation.



MEYLE engineering – Process automation in EX-area

Concepts and systems for Profibus PA Automation according to FISCO-Field-bus Intrinsically Safe Concept.



MEYLE outsourcing products

Acquisition of the tools, manufacturing equipment and customer relations for outsourcing and after market products. Production and quality assurance, as well as ensuring the delivery of compatible versions for ongoing demands, spare parts and for new applications worldwide.

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