

Series HTA36PM – multiturn/singleturn, programmable, analogue output, not redundant

Key features HTA36PM :

- Measuring range 10° to max. 72000° (200 shaft revolutions)
- Programmable by the user. Programmable are the sense of rotation (CW/CCW) and the effective electrical angle [°]
- Programmable up to 10.000 times
- Can also be used as a programmable singleturn rotary encoder
- Maximum rotation of the shaft in a voltage-free state without loss of the angle information +/-179°
- Factory programming (ex works): effective electrical angle of rotation 3600° (10 shaft revolutions), sense rotation CW
- Supply voltage: 9 to 30 VDC, 15 to 30 VDC
- Output signal: 4 to 20 mA, 0 to 5 V, 0 to 10 V

Electrical data HTA36PM – multiturn/singleturn, programmable, analogue output, not redundant

Effective electrical angle of rotation 1.)	0 to 10° - 0 to 72000° (max. 200 turns) Start point, endpoint and sense of rotation programmable by the customer. Ex works the angle is set to 3600°. For detecting absolute position >360° the sensor should not be turned more than ±179° without supply voltage.		
Independent linearity (best straight line) 1.)	±0.05% @ 3600°		
Absolute Linearity 1.)	±0.1% @ 3600°		
Output signal	0 to 5 V	0 to 10 V	4 to 20 mA
Resolution 1.)	12 Bit		
Update rate	3 ms		
Supply voltage	9 to 30 V	15 to 30 V	11 to 30 V
Power consumption (no load)	< 10 mA		< 14 mA
Output load	≥ 5 kOhm		≤ 500 Ohm
Insulation voltage 1.)	1000 VAC @ 50 Hz, 1 min		
Insulation resistance 1.)	2 MOhm @ 500 VDC, 1 min		
Max. number of programming cycles	10000		
MTTF (SN29500-2005-1)	224a		229a

1.) According IEC 60393

Signal output function (factory programming). Automatic function for inserting signal plateaus

The function represents the relationship between the zero degree marking on the rotary encoder housing in dependency to the 0° position of the shaft and the resulting output signal in the state of delivery, when turning the shaft clockwise (sense of rotation CW). The effective electrical angle of rotation is 3600° ex works. Before and after the linearly rising output signal for 3600° the HTA36PM integrates automatically signal plateaus for a rotation angle of each 180°.

The following example shows the output signal pattern when actuating the shaft in the delivery state for 11 revolutions clockwise (sense of rotation CW), starting at the 0° position:

1. 10 rotations of the shaft clockwise 0° to 3600°, linearly increasing output signal 0% to 100% FS
2. 1/2 rotation of the shaft 180° (3600° to 3780°) signal plateau 100% FS
3. 1/2 rotation of the shaft 180° (3780° to 3960°) signal plateau 0% FS

The drawing shows the signal-amplitude function for 0 to 10 V signal output



Programmable Multi-/Singleturn Encoders

HTA36PM

Order code HTA36PM – multiturn/singleturn, programmable, analogue output, not redundant

Description: User-programmable multiturn/singleturn rotary encoder. Programmable sense of rotation, effective electrical angle ex works: CW, 3600° (10 turns)	Selection: standard= black/bold , possible options= <i>grey/italic</i>						
Series HTA36PM	HTA36						
Shaft type: Solid shaft Hollow shaft with screw fixation <i>Option: with clamp fixation</i>		S H <i>HK</i>					
Shaft diameter, shaft length: Shaft diameter Ø 6 mm <i>Shaft diameter Ø 8 mm</i> <i>Shaft diameter Ø 6.35 mm</i> <i>User-defined shaft diameter [mm]</i> <i>Ø ≤8 mm in connection with option S</i> <i>Ø ≤10 mm in connection with option H or HK</i> <i>Ø ≤12 mm exclusively in connection with option H</i>			6 <i>8</i> <i>6,35</i> <i>X</i>				
Multiplication symbol [x]: For solid shaft (S) For Hollow shaft H or HK				x <i>-</i>			
Visible shaft length: Shaft length 16.5 mm for solid shaft (S) Shaft length for hollow shafts H or HK <i>User-defined shaft length for solid shaft S [mm]</i>				16,5 <i>-</i> <i>XX</i>			
Supply voltage / Output signal: VSUP=24 V (11 to 30 V) / OUT=4 to 20 mA VSUP=24 V (9 to 30 V) / OUT=0 to 5 V VSUP=24 V (15 to 30 V) / OUT=0 to 10 V					2442 2405 2410		
Shaft sealing: Without shaft sealing IP65 <i>With shaft sealing (IP67)</i>						<i>-</i> <i>D</i>	
Electrical connection, cable length, position: 1 m round cable, axial 1 m round cable, radial Plug M12, axial Connector M12, radial <i>Round cable, customer-specific cable length [X,XX m], axial</i> <i>Round cable, customer-specific cable length [X,XX m], radial</i>							PG PGR M12 M12R <i>PG X,XX</i> <i>PGR X,XX</i>

Order example HTA36PM S – solid shaft, multiturn/singleturn, programmable, analogue output, not redundant

Requirements:
Shaft Ø 6.00 mm, shaft length 16.5 mm, VSUP=24 V / OUT=0 to 5 V, sense of rotation ex works CW (programmable by customer), effective electrical angle ex works 3600° (programmable by the customer), no shaft sealing, round cable 1 m, cable outlet position axial (in dependency to the shaft)

Example for order code: HTA36PM S 6x16,5 2405 PG

Order example HTA36PM H – hollow shaft, multiturn/singleturn, programmable, analogue output, not redundant

Requirements:
Hollow shaft Ø 6.00 mm, fixation of the applications side shaft in the hollow shaft by means of grub screws, VSUP=24 V / OUT=4 to 20 mA, sense of rotation ex works CW (programmable by customer), effective electrical angle ex works 3600° (programmable by the customer), no shaft sealing, round cable 1 m, cable outlet position axial (in dependency to the shaft)

Example for order code: HTA36PM H 6 2442 PG

Order example HTA36PM programmer

Key features HTA36PM programmer "PRO":

- For programming of the sense of rotation (CCW/CW)
- For programming of the effective electrical angle of rotation [°]



Order number:

135945

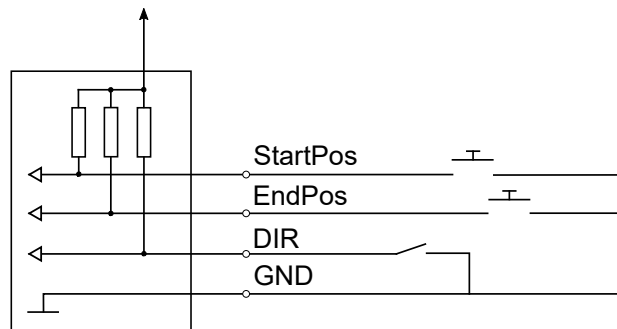
Order code:

Programmer Tool for series ETA25PM | HTAxxPM

Programming of HTA36PM – multiturn/singleturn, programmable, analogue output

The programming guide is available for download on the MEGATRON web page <https://www.megatron.de/>

To program the HTA36PM rotary encoder either the following circuit must be built, or the programmer must be ordered from MEGATRON.

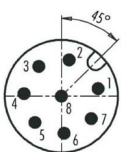


Cable and pin assignment HTA36PM – singleturn/multiturn, programmable, analogue output

Function:	Option PG(R):	Option M12(R)
GND	black	PIN 1
VSUP	red	PIN 2
OUT	brown	PIN 3
DIR	orange	PIN 4
START	yellow	PIN 5
END	green	PIN 6
-	-	PIN 7 n/c
-	-	PIN 8 n/c

Connector types M12 (R) HTA36PM – pin numbering

Type 2 (8 pole)



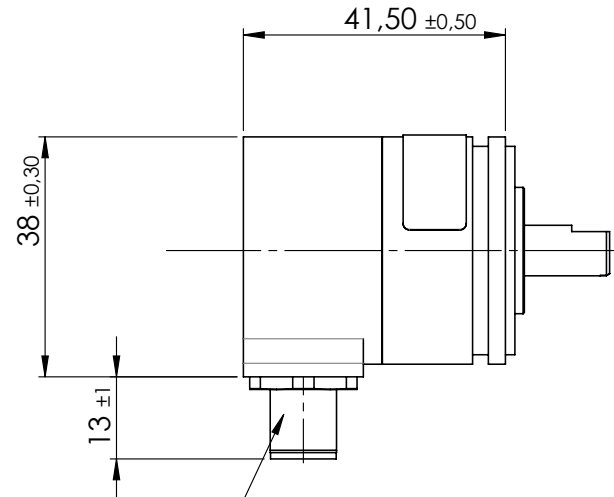
The orientation of the connector relative to the encoder housing is not defined and differs from one encoder to the next. When using angled connectors in combination with axial outlet, the orientation of the cable outlet is thus not defined.

If you need a defined orientation of the cable outlet, please choose our housings with radial cable outlet and use straight mating connectors.

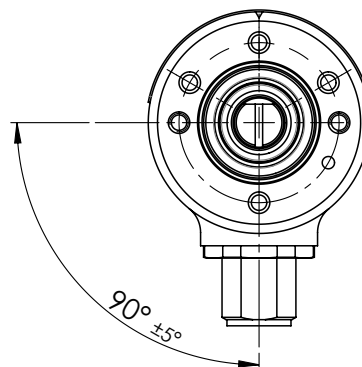
Drawings HTx36 S – solid shaft

HTx36 S (solid shaft), option M12R – M12 plug, radial orientation

Side view:



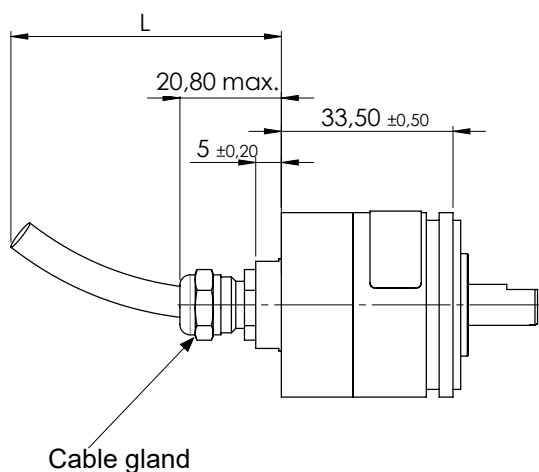
Front view:



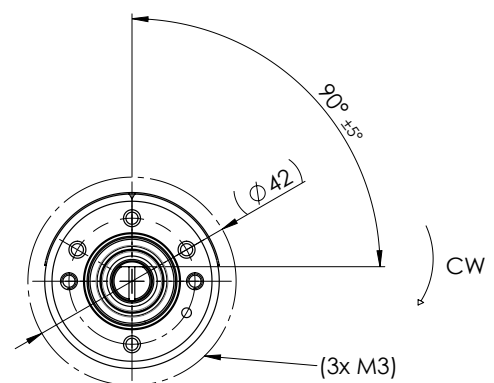
Binder male panel mount connector, range M12-A, 713 series or interoperable product

HTx36 S (solid shaft), option PG – cable gland, axial orientation incl. signal cable

Side view:



Front view:



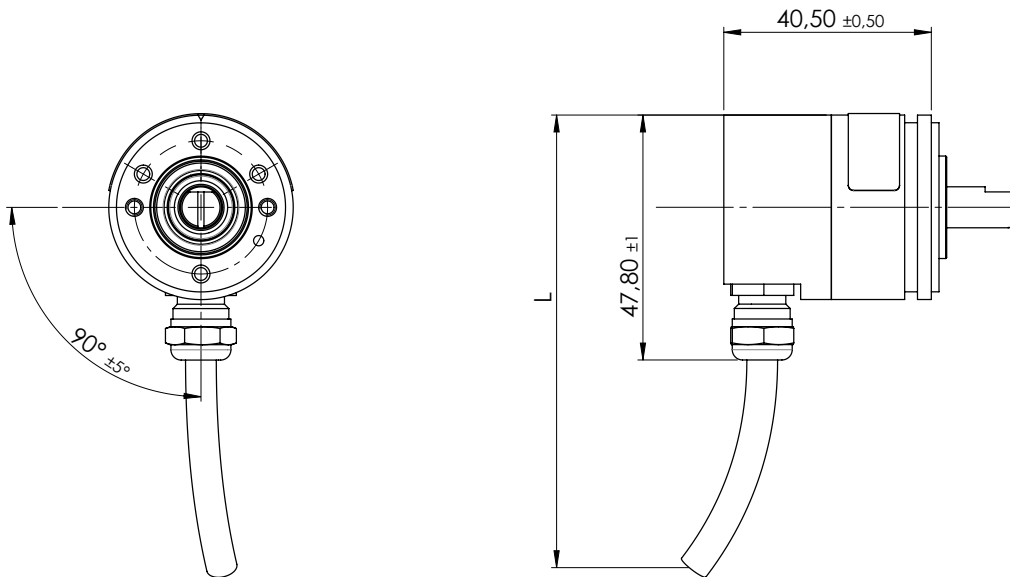
view shows 0° position

Drawings HTx36 S – solid shaft

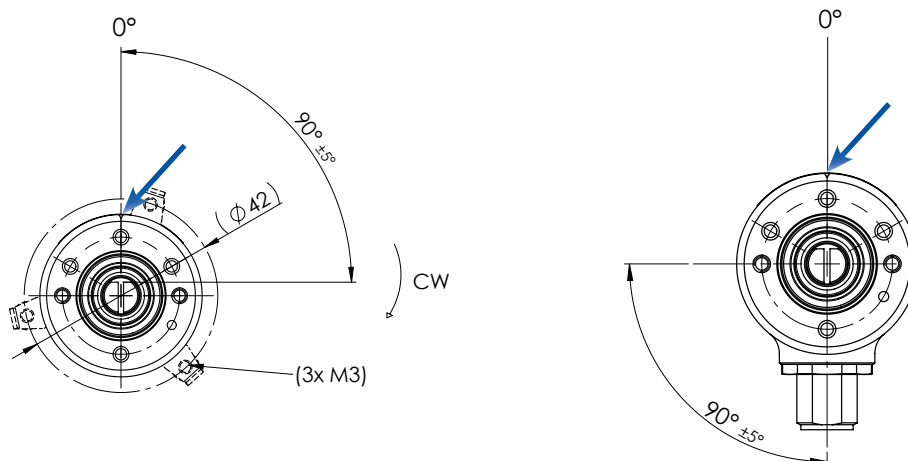
HTx36 S option PG R – cable gland, radial orientation incl. signal cable

Front view:

Side view:



Ex works zero degree reference point (*), sense of rotation:



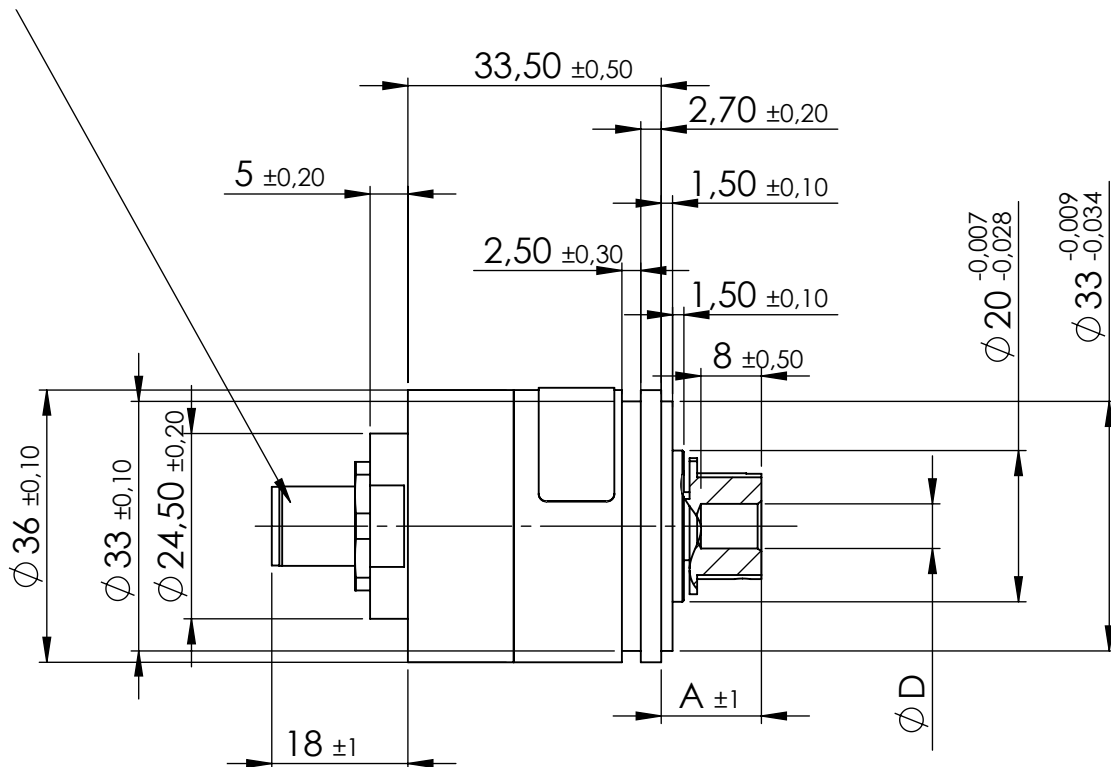
- (*) The drawings above shows the zero degree (0°) reference correlation for HTx36 S rotary encoders
- 0° position: If the shaft flattening is facing the groove marked with the red arrow (see drawing above), then the output signal is 0% full-scale.

Drawings HTx36 H – hollow shaft (screw fixation)

HTx36 H (hollow shaft, grub screw fixation), option M12 – M12 plug, axial orientation

Side view:

Binder male panel mount connector, range M12-A, 713 series or interoperable product

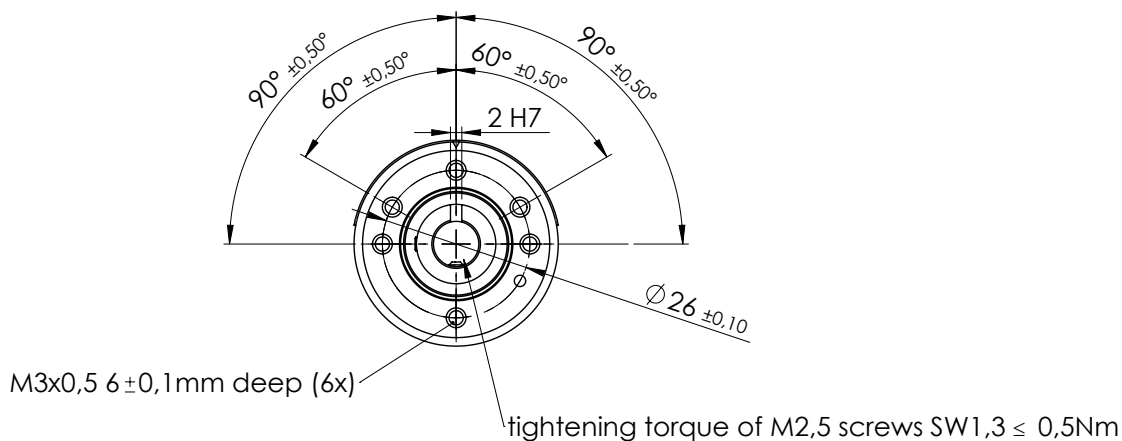


Front view:

View shows Product without Offset Bracket

Standard hollow shaft dimensions for HTx36 H with grub screw fixation

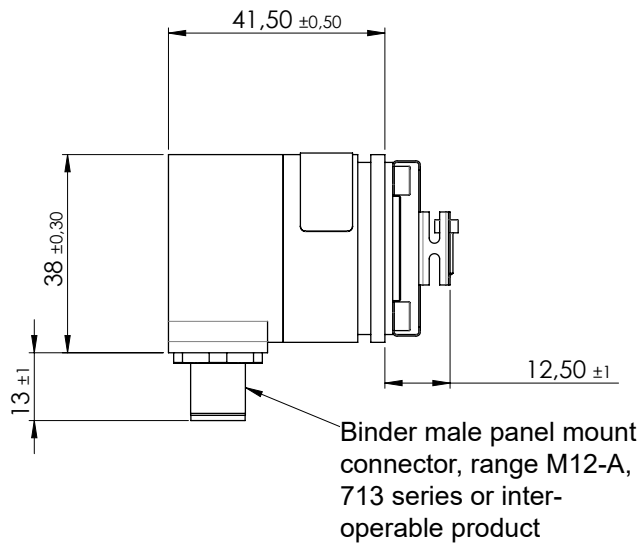
Hollow shaft length A	13.3 mm
Hollow shaft diameter D	6 mm 8 mm



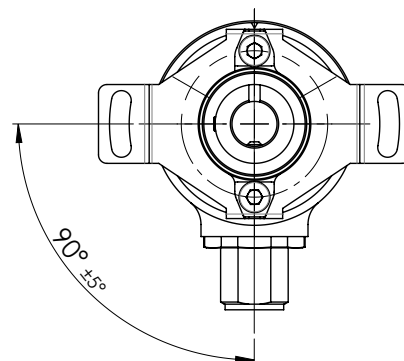
Drawings HTx36 H – hollow shaft (screw fixation)

HTx36 H (hollow shaft screw fixation), option M12R – M12 plug, radial orientation

Side view:

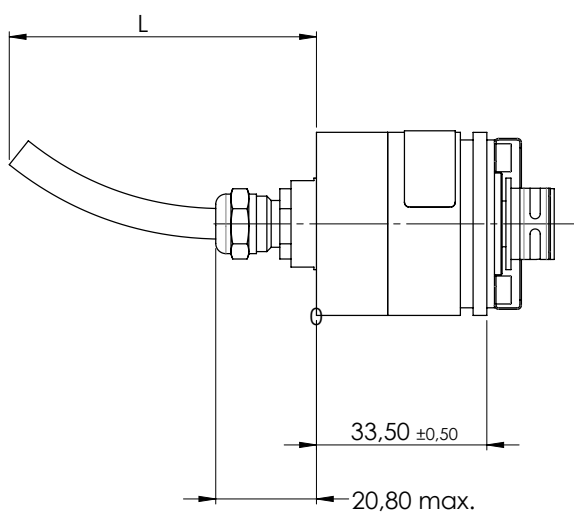


Front view:

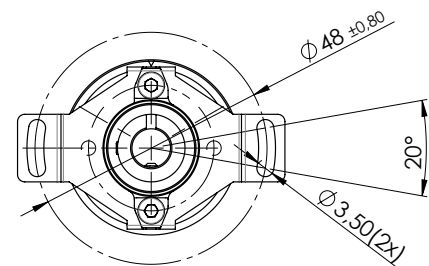


HTx36 H (hollow shaft, grub screw fixation), option PG – cable gland, axial orientation incl. signal cable

Side view:



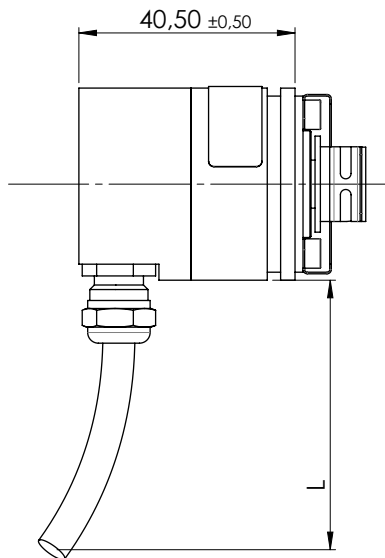
Front view:



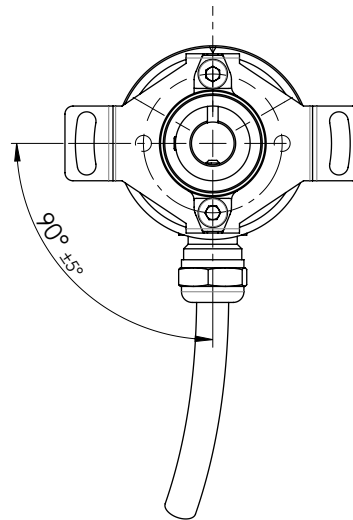
Drawings HTx36 H – hollow shaft (screw fixation)

HTx36 H (hollow shaft, grub screws fixation), option PG R – cable gland, radial orientation, incl. signal cable

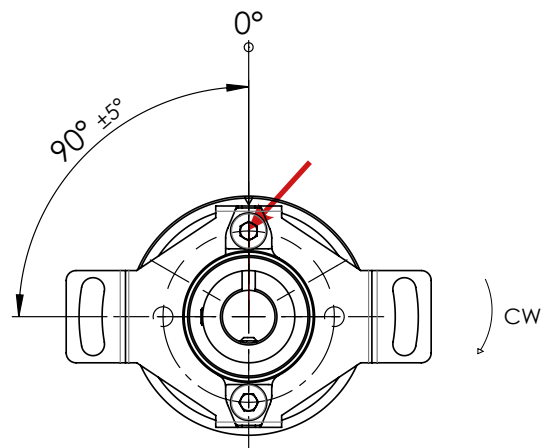
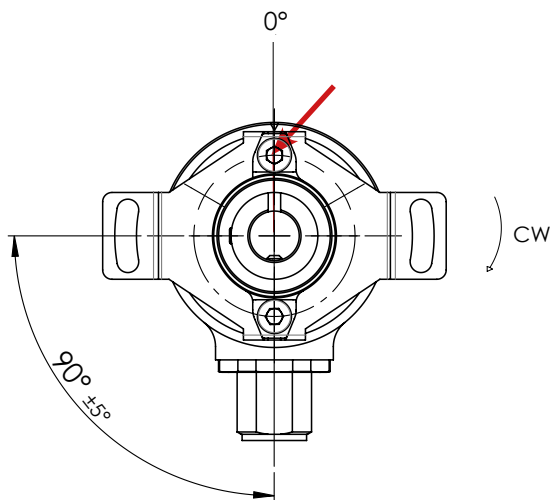
Side view:



Front view:



Ex works 0° position (*), sense of rotation:

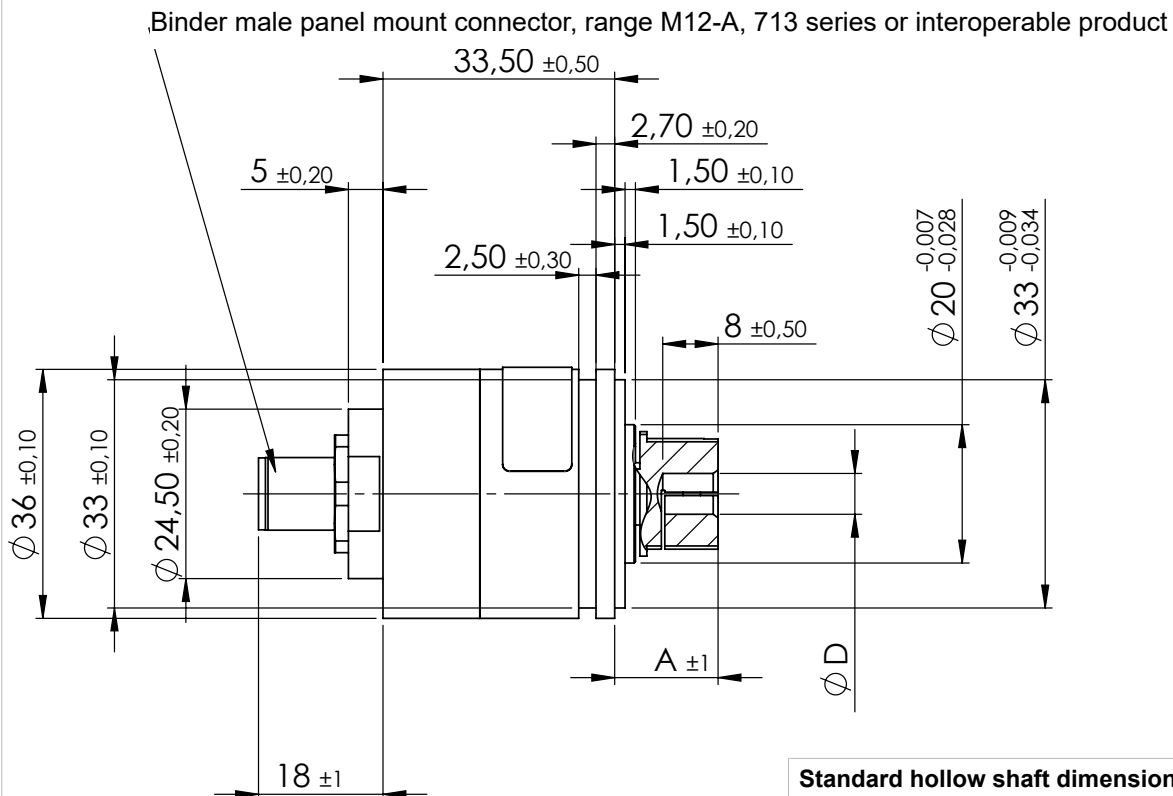


(*) The drawings above shows the zero degree (0°) reference
If the shaft slot is in a line with the groove in the encoder housing (groove is marked with a red arrow) then the output signal is 0% full-scale.

Drawings HTx36 HK – hollow shaft with clamp fixation

HTx36 HK (hollow shaft, clamp fixation), option M12 – M12 plug, axial orientation

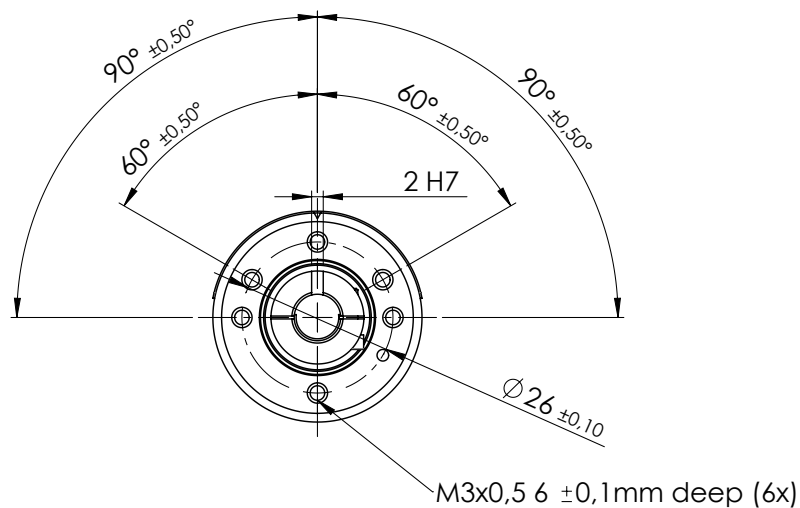
Side view:



Standard hollow shaft dimensions for HTx36 HK with clamp fixation

Hollow shaft length A	15 mm
Hollow shaft diameter D	6 mm 8 mm

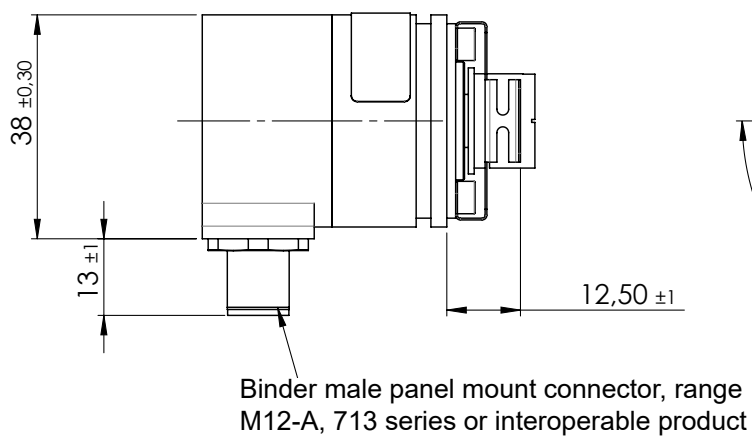
Front view:



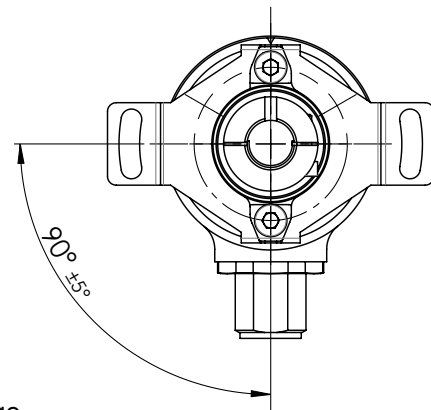
Drawings HTx36 HK – hollow shaft with clamp fixation

HTx36 HK hollow shaft, clamp fixation, option M12R – M12 plug, radial orientation

Side view:



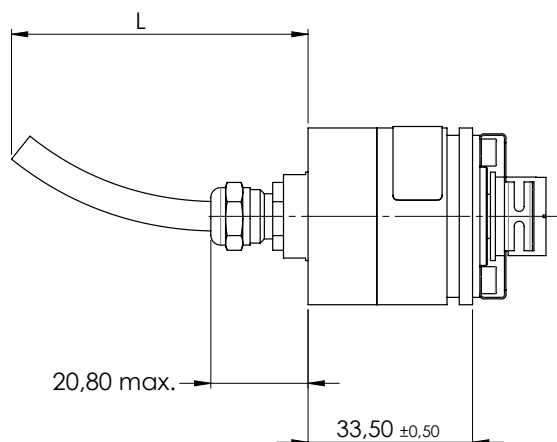
Front view:



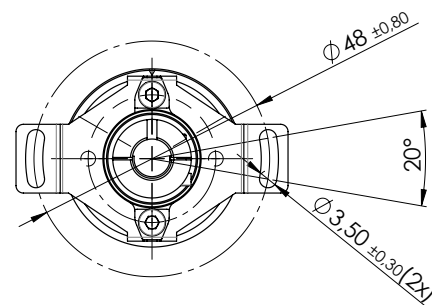
view shows connector orientation

HTx36 HK hollow shaft, clamp fixation, option PG – cable gland, axial orientation, incl. signal cable

Side view:



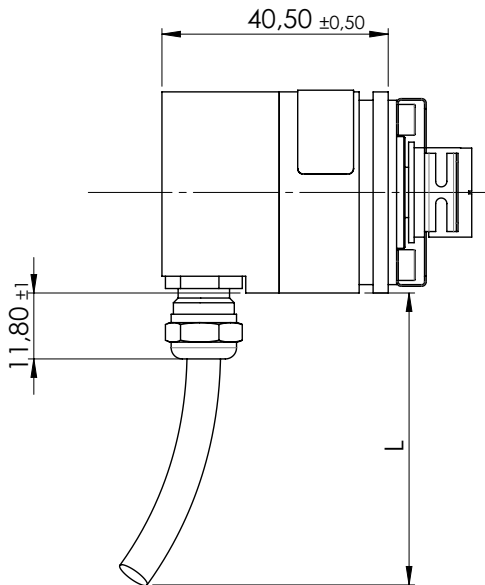
Front view:



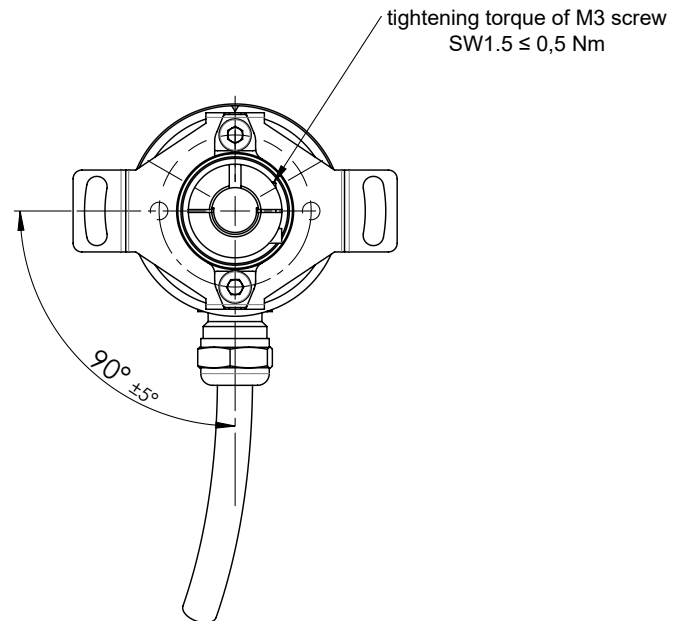
Drawings HTx36 HK – hollow shaft with clamp fixation

HTx36 HK with hollow shaft, clamp fixation), option PGR – cable gland, radial orientation, incl. signal cable

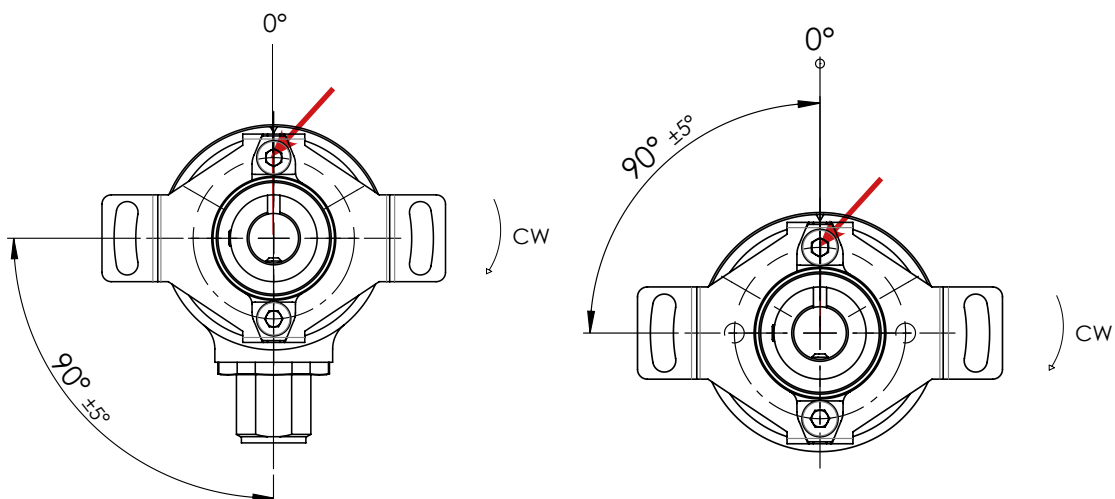
Side view:



Front view:



Ex works 0° position (*), sense of rotation:



(*) The drawings above shows the zero degree (0°) position

If the shaft slot is in a line with the groove in the encoder housing (groove is marked with a red arrow) then the output signal is 0% full-scale.

Drawings

Family HTx36

Cable specs for option PG(R) (round control cable)

Option	Standard cable length L	Number of single strands (depends on electronics)	Cable sheath Ø or width	Single strands cross section	Allowed tolerance (L)	Minimum bending radius
PG PGR	Standard 1000 mm	3		AWG26	-20 mm to +40 mm	10 x D Ø (D = cable sheath diameter Ø)
		6				
		8				
		10		AWG28		
		12				
Cables without cable shield						

(*) Tolerances according IPC Association

Cable length tolerances – custom lengths

Length L	Tolerance
≤ 0.3 m	+25 mm / -20 mm
> 0.3 m - 1.5 m	+40 mm / -20 mm
> 1.5 m - 3 m	+100 mm / -40 mm
> 3 m - 7.5 m	+150 mm / -60 mm

Wire harness length measured from sensor face including connector. Minimum cable length: 0.08 m (for round cable). Please contact us for lengths > 3 m regarding handling and packaging.

Definition der Nullposition

The following signal is output at the zero point:

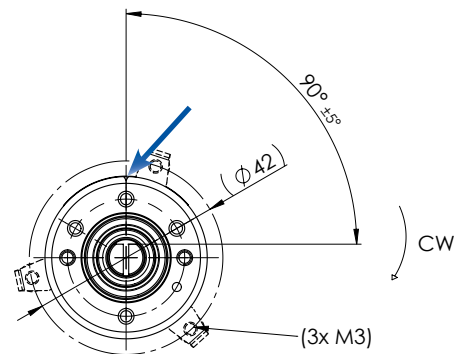
HTA36 (analogue outputs): Output signal 0% full scale (F.S.)

HTP36 (PWM output): Duty cycle 10% (10% duty cycle)

HTS36 (serial output): Output signal 0% full scale (F.S.)

HTI36 (Incremental output): Index signal output (Z)

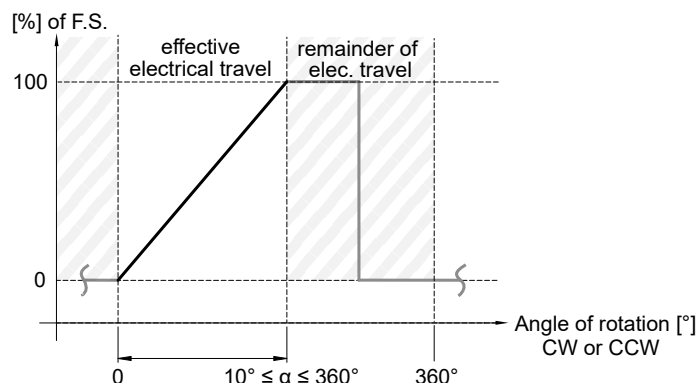
Position of the zero position is shown in the graphic below (see notch on housing)



Signaldefinition für benutzerdefinierte Drehwinkel

Benutzerdefinierte Winkel <360°

Bei der Programmierung des elektrischen Drehwinkels <360° wird der verbleibende nicht wirksame Drehbereich zu gleichen Teilen in High und Low aufgeteilt.



Mechanical and environmental data, miscellaneous – Family HTx36	
Shaft type	Solid shaft (HTx36 S) or hollow shaft (HTx36 H)
Mechanical angle of rotation 1.)	Endless
Lifetime (HTx36 S – solid shaft encoders) 2.)	@100 % of max. permissible radial shaft load >1.4x10E8 shaft revolutions @80 % of max. permissible radial shaft load >2x10E9 shaft revolution @20 % of max. permissible radial shaft load >1.7x10E10 shaft revolutions For option D (shaft sealing), the denseness is up to 1E6 shaft revolutions ensured
Bearing	2 pcs. groove ball bearings type 2RS
Max. operational speed (with shaft sealing)	12.000 rpm
Operational torque: (@ room temperature and 10 rev/min)	Solid shaft: ▪ Standard IP65: ≤ 0.3 Ncm ▪ With option D IP67: ≤ 2 Ncm Hollow shaft: ▪ Standard IP65: ≤ 0.5 Ncm ▪ With option D IP67: ≤ 2 Ncm
Operating temperature range	Option M12 (plug) ▪ -30 to +85°C Option PG (cable gland incl. cable) ▪ -30 to +85°C cable fixed ▪ -10 to +85°C cable in movement
Storage temperature range	-30 to +105 °C
Protection grade (IEC 60529) front side	From shaft side: ▪ Standard IP65 ▪ With option D IP67
Protection grade (IEC 60529) rear side	IP68 (cable ends excluded)
Vibration (DIN EN 60068-2-6)	±1.5 mm / 30 g / 10 to 2000 Hz / 16 frequency cycles (3x4 h)
Shock (DIN EN 60068-2-27)	100 g / 6 ms / half sine (3x6 shocks)
Housing diameter	Ø 36 mm
Housing depth	In dependency to the electrical connection position ▪ axial 33.5 mm ▪ radial 40.5 mm
Shaft diameter	Shaft diameter solid shaft: Standard: shaft diameter Ø 6 mm, Ø 8 mm Shaft diameter Ø 6.35 mm Option User-defined shaft diameter [mm] Ø ≤8 mm in connection with option S Ø ≤10 mm in connection with option H or HK Ø ≤12 mm exclusively in connection with option HK
Max. radial load (HTx36E S)	80 N (load point 80% in dependency to the visible standard shaft length)
Max. axial load	50 N (axial application of force onto the shaft end)
Mass (circa)	HTx36 with Plug M12(R) and: ▪ Solid shaft: axial 98 g, radial 90 g ▪ Hollow shaft: axial 102 g, radial 104 g HTx36 with cable gland and 1 m signal cable PG(R) and: ▪ Solid shaft: axial 133 g, radial 123 g ▪ Hollow shaft, axial 140 g, radial 133 g

1.) According IEC 60393

2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

Mechanical and Environmental Data

Family HTx36

Mechanical and environmental data, miscellaneous – Family HTx36

Connection type	Standard: - Cable gland stainless steel M12, axial, shielded round cable, 1 m, AWG26, PVC sheath, cable endings tinned Option: - Plug M12, axial or radial
Connection position	Axial or radial
Sensor mounting	Sensor mounting possibilities for solid shaft rotary encoders HTx36 S: - Via threaded holes integrated in the sensors head by use of stainless steel screws M3x0.5 - Via synchro flange with optional available servo mount fixing nails SFN1 incl. screws M3 x 0.5 from MEGATRON Sensor mounting for hollow shaft rotary encoders HTx36 H(K): - Using the ex work mounted torque bracket on the rotary encoder (spring plate) by means of 2 pcs of M3 screws
Fastening parts included in delivery	None - For fastening the rotary encoder by means of servo mount fixing nails SFN1 – available from MEGATRON as accessory - For options M12 (R), the M12 plug is not part of the scope of delivery. M12 plugs also incl. signal cable available as accessory from MEGATRON
Fastening torque per screw for fastening of the rotary encoder	≤ 0.6 Nm (M3 screw) For screw securing, the use of a medium-strength thread securing adhesive is recommended
Maximum tightening torque for grub screw for fixation of the shaft, only HTx36 H	≤ 0.5 Nm (wrench size M2.5 grub screw)
Maximum tightening torque for grub screw for fixation of the shaft, only HTx36 HK	≤ 0.5 Nm (wrench size M1.5 grub screw)
Material shaft	Stainless steel
Material housing	Aluminium
Material cable gland M12	Stainless steel

Immunity / Electrostatic Discharge

EN 61000-4-3 RF sine wave	Class A
EN 61000-4-6 Conducted sine wave	Class A
EN 61000-4-8 Power frequency magnetic fields	Class A
EN 61000-4-2 ESD	Class B