

Incremental encoders

Insulated hollow shaft $\varnothing 0.5...1$ inch

Resolution 1...8192 pulses programmable

HS35P - Programmable



HS35P with insulated hollow shaft

Features

- Rugged design up to IP 67 protection
- Shock resistant up to 200 g's
- Insulating insert to prevent high shaft currents from damaging bearings
- Wide range voltage supply 4.75...30 VDC
- Precision ≤ 60 arc-seconds for improved closed loop control
- Fully PC programmable from 1...8192 counts per turn

Technical data - electrical ratings

Voltage supply	4.75...30 VDC
Reverse polarity protection	Yes
Consumption w/o load	≤ 50 mA (24 VDC) ≤ 180 mA (5 VDC) + output load, 250 mA (max.)
Resolution (steps/turn)	1...8192
Accuracy	≤ 60 arc-seconds
Sensing method	Optical
Output frequency	≤ 300 kHz (TTL) ≤ 160 kHz (HTL) ≤ 160 kHz (OC)
Output signals	A, B, Z A, B, Z + complement, $\frac{1}{2}$ cycle index gated with negative B channel
Output circuit	Linedriver (TTL, 7272) Vout = 5 V, short-circuit proof Push-pull (HTL, 7272) Vout = Vin, short-circuit proof Open Collector (OC, 7273) Vout = Vin, short-circuit proof
Programmable parameters	Output resolution in increments of one (can be different for A and B) Output signal level (TTL or HTL) Zero pulse width and position Rotational direction CW/CCW
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-4
Approvals	UL approval / file no. E240061, ROHS compliant EU guideline 2002/95/EG, CE compliant

Technical data - mechanical design

Housing	$\varnothing 3.15''$ ($\varnothing 80$ mm)
Shaft	$\varnothing 0.5...1''$ ($\varnothing 12.7...25.4$ mm) hollow shaft with insulated insert
Bore runout	0.0016" (0.04 mm) TIR max.
Allowable misalignment	0.004" (0.1016 mm) radial TIR (end of shaft) 0.01" (0.254 mm) axial
Protection DIN EN 60529	IP 54, IP 65, IP 67
Operating speed	≤ 5000 rpm IP 54 ≤ 3000 rpm IP 65 ≤ 2000 rpm IP 67
Bearing	52100 SAE high carbon steel (ABEC 5)
Starting torque	≤ 3 in-oz (77 °F, IP 65) ≤ 0.02 Nm (25 °C, IP 65)
Rotor moment of inertia	2.3 oz-in ² (420 gcm ²)
Service life	Bearing: typ. 13 billion rev. (89000 h/2500 rpm)
Materials	Housing: aluminium, powder-coated Shaft: stainless steel
Operating temperature	-40...+212 °F (-40...+100 °C)
Relative humidity	98 % non-condensing
Resistance	DIN EN 60068-2-6 Vibration 20 g, 55-2000 Hz DIN EN 60068-2-27 Shock 200 g, 6 ms
Connection	MIL-connector, 7-pin MIL-connector, 10-pin Cable (AWG26 wire)
Weight approx.	16 oz., 450 g

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Part number

HS35P

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Mounting kit

- T1 Tether arm T1, fixed length, for bolt 3/8"
- T2 Tether arm T2, fixed length, for bolt 1/2"
- T3 Tether arm T3, adjustable length, for bolt 1/4"
- T4 Tether arm T4, adjustable length, for bolt 5/16"
- T5 Tether arm T5, adjustable length, for bolt 3/8"

Protection

- IP54 IP 54
- IP65 IP 65
- IP67 IP 67 (not at operating temperature E, dust cap included)

Hollow shaft

- 100 Hollow shaft $\varnothing 1.000''$ ($\varnothing 25.4$ mm)
- 087 Hollow shaft $\varnothing 0.875''$ ($\varnothing 22.23$ mm)
- 075 Hollow shaft $\varnothing 0.750''$ ($\varnothing 19.05$ mm)
- 062 Hollow shaft $\varnothing 0.625''$ ($\varnothing 15.88$ mm)
- 050 Hollow shaft $\varnothing 0.500''$ ($\varnothing 12.7$ mm)

Operating temperature

- E -40...+212 °F (-40...+100 °C)
- S -40...+185 °F (-40...+85 °C)

Connection

- D31SR7 MIL-connector MS3102E-16S-1P, 7-pin (at ABZ)
- D31SR10 MIL-connector MS3102E-18-1P, 10-pin (at ABZC)
- CR12 Cable gland with cable and wire end sleeves L=12" (305 mm)
- CR18 Cable gland with cable and wire end sleeves L=18" (457 mm)
- CR24 Cable gland with cable and wire end sleeves L=24" (610 mm)

Output signals

- ABZ A, B, Z
- ABZC A, B, Z + complements

Voltage supply / signals

- PT Linedriver (TTL): $V_{in} = 4.75...30$ VDC, $V_{out} = 5$ V (7272), programmable (factory setting)
- PH Push pull (HTL): $V_{in} = 4.75...30$ VDC, $V_{out} = V_{in}$ (7272), programmable
- OC Open Collector (OC) $V_{in} = 4.75...30$ VDC, $V_{out} = V_{in}$ (7273), not programmable (external pull-up resistor required)

Pulses programmable

0001...8192 ppr programmable (1024 ppr factory setting)

Subject to modification in technic and design. Errors and omissions excepted.

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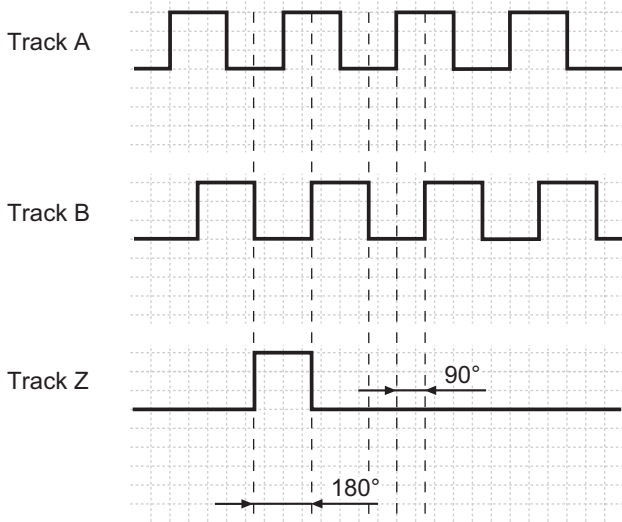
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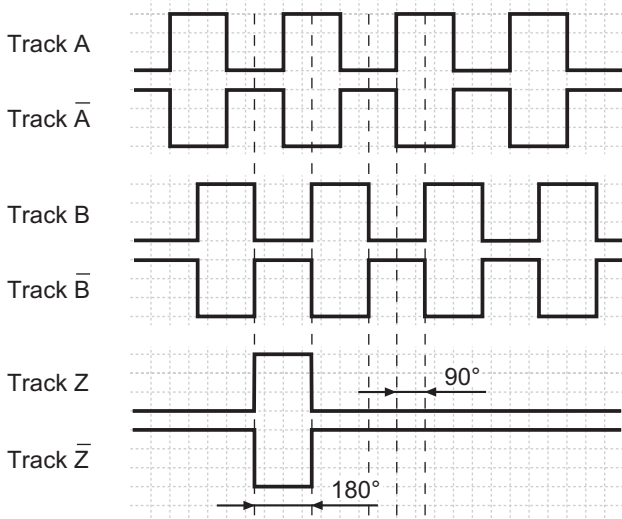
Output signals

Clockwise rotation when looking at the mounting side.

ABZ-Output signals



ABZC-Output signals



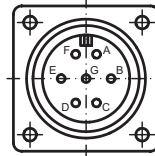
Trigger level

Outputs	Linedriver (TTL, ET7272)
Output level High	≥ 2.4 V
Output level Low	≤ 0.5 V
Load	≤ 40 mA
Outputs	Push pull (HTL, ET7272)
Output level High	$\geq U_B - 3$ V
Output level Low	≤ 1.5 V
Load	≤ 40 mA

Terminal assignment

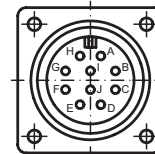
D31SR7: MIL-connector MS3102E-16S-1P, 7-pin

Connector	Assignment
Pin A	Track A
Pin B	Track B
Pin C	Track Z
Pin D	+Vs
Pin E	-
Pin F	0 V
Pin G	Housing



D31SR10: MIL-connector MS3102E-18-1P, 10-pin

Connector	Assignment
Pin A	Track A
Pin B	Track B
Pin C	Track Z
Pin D	+Vs
Pin E	-
Pin F	0 V
Pin G	Housing
Pin H	Track A complement
Pin I	Track B complement
Pin J	Track Z complement



Cable gland (AWG26 wire)

Core colour	Assignment
green	Track A
grey	Track B
pink	Track Z
red	+Vs
blue	0 V
transparent	Shield/Housing
brown	Track A complement
black	Track B complement
white	Track Z complement

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Accessories

Connectors and cables

514736	NAC 25E 7-pin Mil Spec Mating Connector
45706-0100	CNAC 25E 7-pin Mil Spec Mating Connector + cable L = 10 feet (3.05 m)
45706-0200	CNAC 25E 7-pin Mil Spec Mating Connector + cable L = 20 feet (6.10 m)
45706-0300	CNAC 25E 7-pin Mil Spec Mating Connector + cable L = 30 feet (9.15 m)
514737	NAC 29H 10-pin Mil Spec Mating Connector
45705-0100	CNAC 29H 10-pin Mil Spec Mating Connector + cable L = 10 feet (3.05 m)
45705-0200	CNAC 29H 10-pin Mil Spec Mating Connector + cable L = 20 feet (6.10 m)
45705-0300	CNAC 29H 10-pin Mil Spec Mating Connector + cable L = 30 feet (9.15 m)

Accessories

Mounting accessories

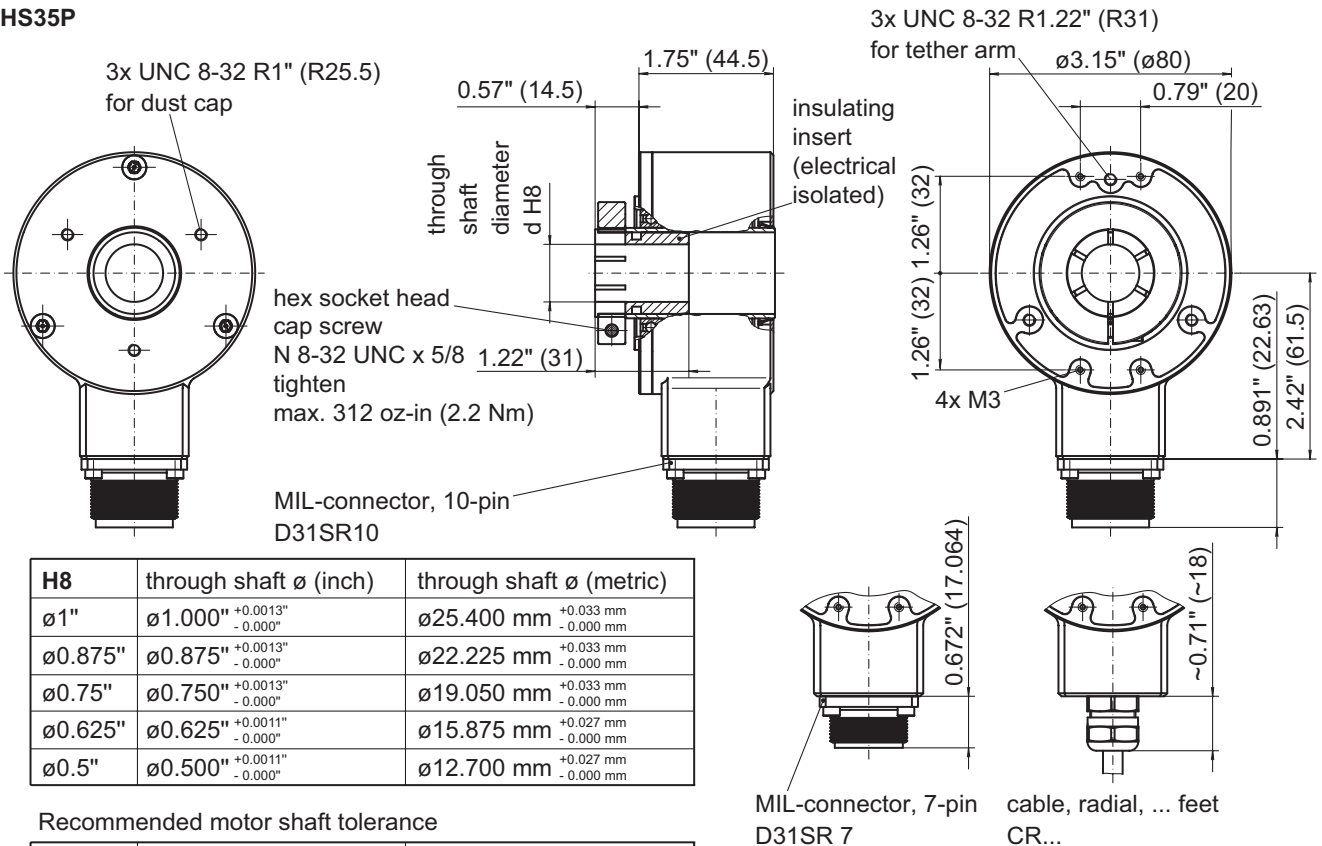
44972	Tether arm T1, fixed length, for bolt 3/8" with plastic clip and screws
44973	Tether arm T2, fixed length, for bolt 1/2" with plastic clip and screws
44974	Tether arm T3, adjustable length, for bolt 1/4" with plastic clip and screws
44998	Tether arm T4, adjustable length, for bolt 5/16" with plastic clip and screws
44999	Tether arm T5, adjustable length, for bolt 3/8" with plastic clip and screws
44986	Dust cap, including gasket and screws

Programming accessories

45622	Programmer kit and PC software
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Dimensions

HS35P



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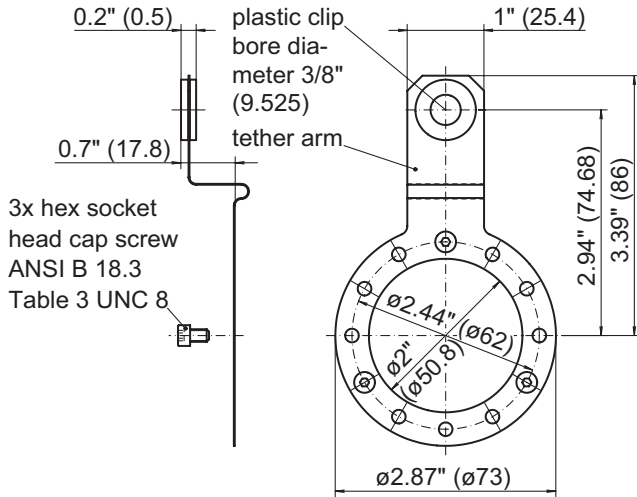
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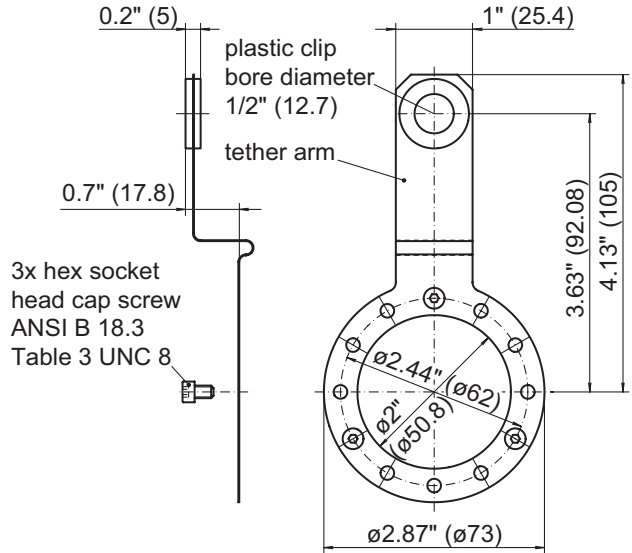
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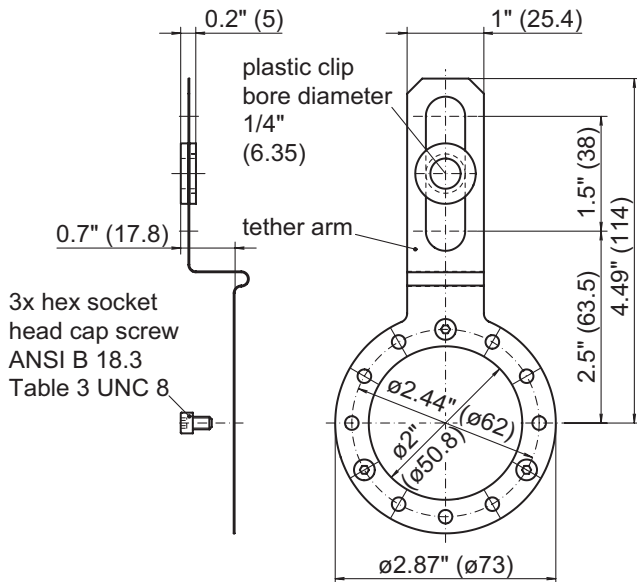
Tether arm T1



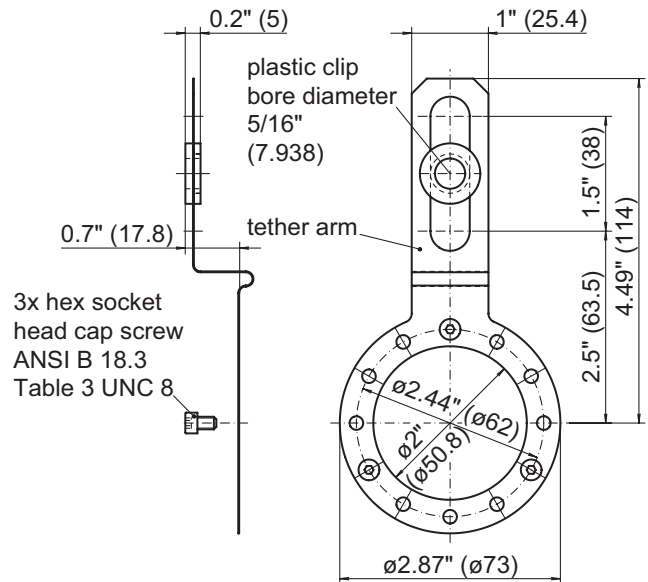
Tether arm T2



Tether arm T3



Tether arm T4



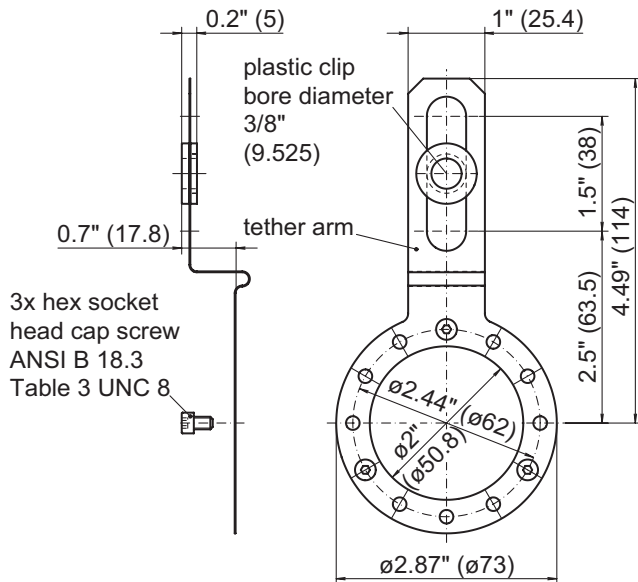
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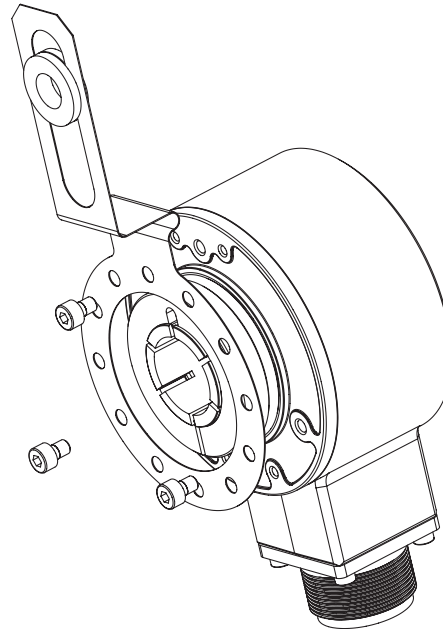
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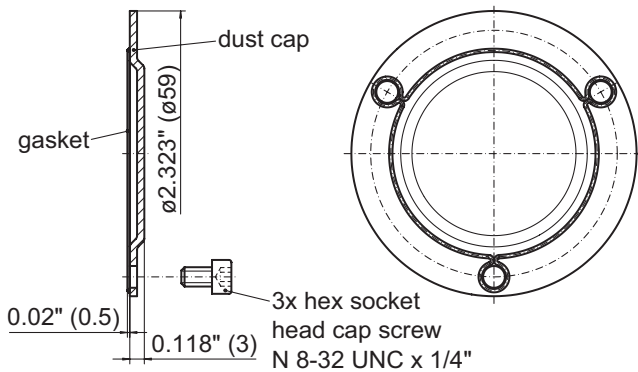
Tether arm T5



Example fitting tether arm on HS35P



Dust cap (required for IP 67 protection)



Example fitting dust cap on HS35P

