

Инкрементные энкодеры HSD37, HSD38, HSD25

Технические характеристики

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Incremental



NUMBER OF PULSES

- Single or Dual output
- ATEX Certification available for Intrinsically Safe application
- High Resolution Unbreakable Disk
- Industrial Duty Connector
- NEMA 4X, 6 / IP66, 67 Rated
- Nickel or Stainless Steel Housing available

HEAVY DUTY NorthStar™ CE

0001 / 0024 / 0035 / 0040 / 0050 / 0060 / 0100 / 0120 / 0192 / 0200 / 0240 / 0250 / 0256 / 0300 / 0360 / 0500 / 0512 / 0600 / 0625 / 0720 / 1000 / 1024 / 1200 / 1250 / 1440 / 2000 / 2048 / 2500 / 2540 / 3000 / 3600

GENERAL INFORMATION

HARSH-DUTY OPTICAL HUB SHAFT ENCODER

NorthStar's HSD25 Harsh-Duty Optical Hub Shaft Encoder accepts up to 0.75" diameter shafts and operates reliably from -40 to +100°C. The hard anodized finish encoder exceeds IP66/IP67 and NEMA 6 enclosure requirements.

This robust encoder is also available in Stainless Steel to meet NEMA 4x and 6P requirements and its sealed housing allows the Encoder to be operated when regulatory wash-down and high pressure steam or caustic chemicals are required. Utilization of an advanced Opto ASIC with innovative packaging techniques enables the encoder to operate in high shock and vibration environments.

The HSD25 is also available in an Intrinsically Safe version certified to ATEX EEx ia IIB T4 when used with the appropriate IS barrier.

APPLICATIONS

The HSD25 Harsh-Duty Optical Encoder features simple installation on motor or machine hub shafts. It is often mounted on the back of motors where encoder feedback is needed in harsh environment applications. Available housing options make it ideal use in corrosive environments that demand heavy washdown protection. ATEX certification is also available for intrinsically safe applications.

- Converting Machinery
- Material Handling
- Packaging Equipment
- Oil Field Exploration
- Processing Equipment

INDUSTRIES

Chemical, Food & Beverage, Oil & Gas, Paper, Steel and any other where a precise encoder is needed to operate in harsh environments.

TECHNICAL DATA
mechanical

Housing diameter	58.93 mm
Shaft diameter	$\frac{3}{8}$ " / 10 mm / 12.7 mm / $\frac{5}{8}$ " / $\frac{3}{4}$ " (Hubshaft)
Flange (Mounting of housing)	Tether
Mounting of shaft	Front clamping ring
Protection class shaft input (EN 60529)	NEMA 4X or NEMA 6 IP66 or IP67

Incremental

TECHNICAL DATA
mechanical (continued)

Protection class housing (EN 60529)	NEMA 4X or NEMA 6 IP66 or IP67
Bearing life	max. 5 x 10 ¹¹ revs.
Starting torque typ.	< 1.76 Ncm
Vibration resistance (DIN EN 60068-2-6)	200 m/s ² (5 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	500 m/s ² (11 sec)
Operating temperature	-40 °C ... +100 °C ATEX: -40 °C ... +80 °C
Material shaft	Stainless Steel
Material housing	Hard anodized Aluminum, Nickel, Stainless Steel
Weight	approx. 600 g
Connection	MS, radial M12 connector, radial Cable, radial

TECHNICAL DATA
electrical

Supply voltage	DC 5 - 26 V ATEX: DC 5 V ATEX: DC 7 - 26 V
Current w/o load typ.	50 mA
Code	Incremental, optical
Max. pulse frequency	125 kHz
Phasing	Incremental signals (A leads B): A leads B by 90° for ccw shaft rotation viewing the shaft clamp end of the encoder
Pulse shape	Square wave

ELECTRICAL CONNECTIONS
6, 7 & 10 Pin MS connector /
Cable

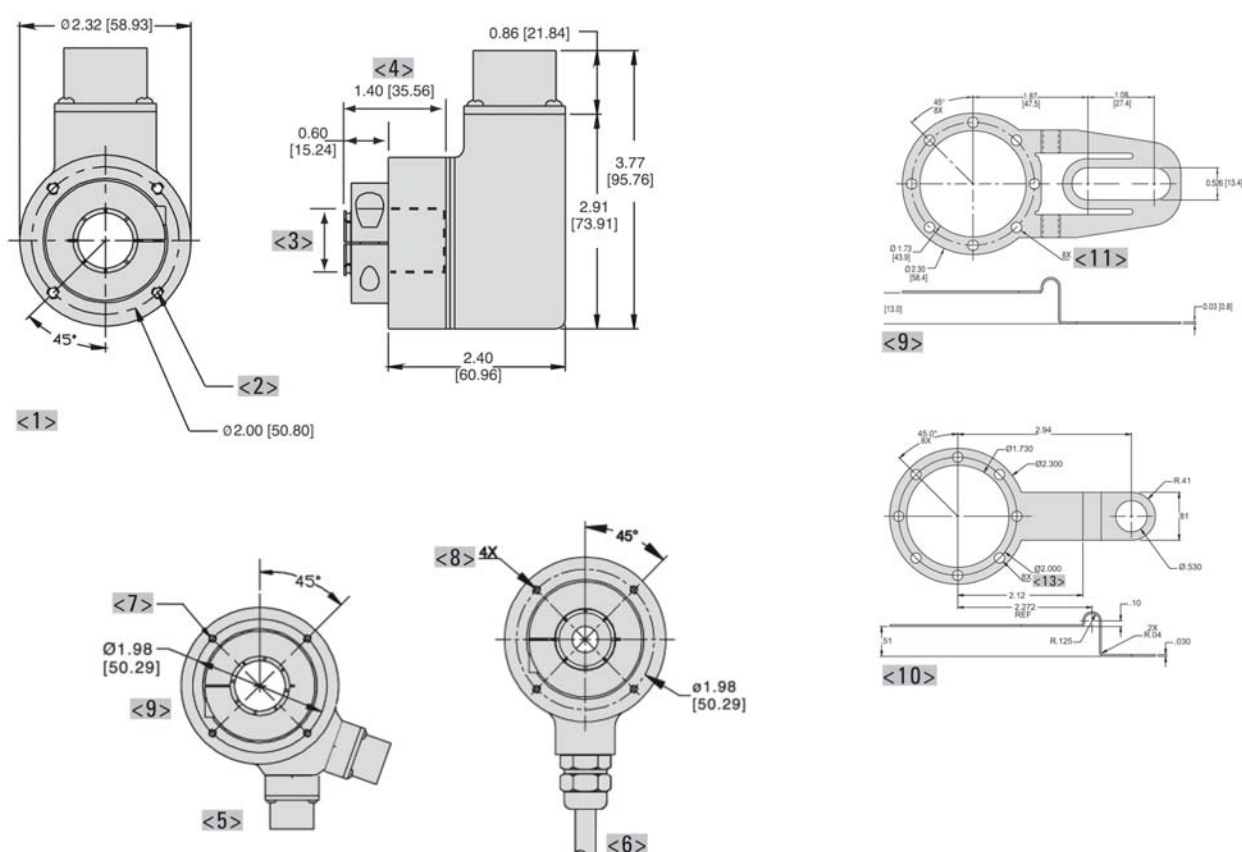
Encoder Function	Cable 6 Pin Single Ended		Cable 7 Pin Single Ended		Cable 7 Pin Dif Line Drv w/o Idx		Cable 10 Pin Dif Line Drv w/ Idx		Cable 12 Pin CCW		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Sig. A	E	brown	A	brown	A	brown	A	brown	5	brown	green
Sig. B	D	orange	B	orange	B	orange	B	orange	8	orange	blue
Sig. Z	C	yellow	C	yellow	--	--	C	yellow	3	yellow	orange
Power +V	B	red	D	red	D	red	D	red	12	red	red
Com	A	black	F	black	F	black	F	black	10	black	black
Case	--	--	G	green	G	green	G	green	9	--	white
N/C	F	--	E	--	--	--	E	--	7	--	--
Sig. $\bar{A}$	--	--	--	--	C	brown/white	H	brown/white	6	brown/white	violet
Sig. $\bar{B}$	--	--	--	--	E	orange/white	I	orange/white	1	orange/white	brown
Sig. $\bar{Z}$	--	--	--	--	--	--	J	yellow/white	4	yellow/white	yellow
0 Volt Sense	--	--	--	--	--	--	--	--	2	green	--
5 Volt Sense	--	--	--	--	--	--	--	--	11	black/white	--

ELECTRICAL CONNECTIONS

5 & 8 Pin M12 Accessory Cable

Encoder Function	Cable 5 Pin Single Ended		Cable 8 Pin Single Ended		Cable 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	black	1	brown	1	brown
Sig. B	2	white	4	orange	4	orange
Sig. Z	5	grey	6	yellow	6	yellow
Power +V	1	brown	2	red	2	red
Com	3	blue	7	black	7	black
Sig. $\bar{A}$					3	brown/white
Sig. $\bar{B}$					5	orange/white
Sig. $\bar{Z}$					8	yellow/white

DIMENSIONED DRAWINGS



- | | |
|--|---|
| <1> Standard Housing | <7> 4-40 x .25 deep 4 places - 90° apart |
| <2> 8-32 UNC x .28 deep on 2.000 bolt circl 4 places 90° apart | <8> 4-40 x .25 deep 90° apart |
| <3> Bore diameter | <9> Slotted Tether |
| <4> Hub shaft cavity maximum depth | <10> Single Point Tether |
| <5> Dual Redundant Outputs | <11> Ø 0.172 [43.7] ON Ø 2.00 [50.8] B.C. |
| <6> Cable Exit | |

Dimensions in inch [mm]

Incremental

ORDERING INFORMATION

Type ¹	Number of pulses	Shaft Ø	Output format ^{2,3}	Connection	Options	Special options
☐	☐	☐	☐	☐	☐	☐
HSD25 Heavy Duty ISD25 ATEX	1 ... 3600	0 6.0 mm 3 8.0 mm 4 9.25 mm (3/8") 5 10.00 mm 6 12.00 mm 7 12.7 mm (1/2") 8 5/8" 9 15.00 mm A 16.00 mm C 19.00 mm	0 bidirectional with index, 5-26 V push-pull 6 bidirectional, inverted with index, 5 V out (7272) 7 bidirectional, inverted with index, 5-26 V out (7272) A bidirectional with index 7-26 V in, 7-26 V out push pull (7272) C bidirectional with index, 5 V in, 5 V out push pull (7272) K bidirectional, inverted with index, 5 V in, 5 V out (7272) L bidirectional, inverted with index, 7-26 V in, 7-26 V out (7272) M bidirectional, inverted with index, 7-26 V in, 5 V out (7272)	1 7 pin connector 2 10 pin connector 6 7 pin connector plus mating connector 7 10 pin connector plus mating connector 8 12 pin connector plus mating connector A Cable 0,5 m C Cable 1 m D Cable 2 m E Cable 3 m L Cable 4 m J M12 connector, 8 pole K 0.45 m cable with in line 10 pin connector M M12 connector, 8 pole N M12 connector, 8 pole	0 No Options 1 Slotted Tether 2 Single point Tether 3 No tether, Dual isolated outputs 4 Slotted Tether, Dual isolated outputs 5 Single Point Tether, isolated Outputs	Blank None 01 Nickel Plated 02 Stainless Steel

¹ Type HSD25 is only available with Output format "0", "6" and "7"; Output formats "A", "C", "K", "L" and "M" are available with Type ISD25

² Output format "K", "L", "M", "6" and "7" are not available in the combination with Connection "1", "6", "H" respectively Option "3", "4" and "5"

³ Output format Open collector on request

Incremental



- Single or Dual Output
- Double-Sealed Housing
- ATEX Certification for Intrinsically Safe Applications
- High Resolution Unbreakable Disk
- Electrically and Thermally Isolated
- Industrial Duty Connector
- NEMA 4X, 6 / IP66, 67 Rated
- Rugged Cast-Aluminum Housing
- Stainless Steel Housing Available

HEAVY DUTY NorthStar™ CE

NUMBER OF PULSES

0015 / 0032 / 0100 / 0200 / 0240 / 0250 / 0500 / 0512 / 0600 / 1000 / 1024 / 1200 / 2000 / 2048 / 2500 / 4000 / 5000

GENERAL INFORMATION

EXTREME HEAVY DUTY HOLLOWSHAFT ENCODER

NorthStar's HSD37 Extreme Duty Industrial Hollowshaft Encoder accepts up to 1" diameter shafts and operates reliably from -40 to +100°C. Its Hard Anodized finish enclosure exceeds IP66/IP67 and NEMA 6 enclosure requirements.

This robust encoder features a double-sealed housing that allows application where regulatory washdown or caustic chemicals are present. Utilization of an advanced Opto ASIC with innovative packaging techniques enables the encoder to operate in high shock and vibration environments.

It is also available in an Intrinsically Safe version, certified to ATEX EEx ia IIB T4, when used with the appropriate IS Barrier.

APPLICATIONS

The HSD37 extreme duty encoder features simple installation on motor or machine shafts. It is often mounted on the back of motors where encoder feedback is needed in harsh environment applications. It is ideal for use in environments that demand heavy washdown protection.

- Converting Machinery
- Material Handling
- Packaging Equipment
- Processing Equipment

Industries

Chemical, Food & Beverage, Oil & Gas, Paper, Steel and any other where a precise encoder is needed to operate in harsh environments.

TECHNICAL DATA
mechanical

Housing diameter	95.25 mm
Shaft diameter	12 mm / 1/2" / 15 mm / 5/8" / 16 mm / 3/4" / 0.875" (Through hollow shaft)
Flange (Mounting of housing)	Tether
Mounting of shaft	Front clamping ring
Protection class shaft input (EN 60529)	NEMA 4X or NEMA 6 IP66 or IP67

Incremental

TECHNICAL DATA

mechanical (continued)

Protection class housing (EN 60529)	NEMA 4X or NEMA 6 IP66 or IP67
Shaft tolerance	31,75 mm
Bearing life	max. 5 x 10 ¹¹ revs.
Starting torque typ.	2.8 Ncm
Vibration resistance (DIN EN 60068-2-6)	200 m/s ² (5 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	500 m/s ² (11 msec)
Operating temperature	-40 °C ... +100 °C ATEX: -40 °C ... +80 °C
Material shaft	Aluminum
Material housing	Hard anodized Aluminum, Stainless Steel
Weight	approx. 1000 g
Connection	MS, radial Cable, radial with M12 connector

TECHNICAL DATA

electrical

Supply voltage	DC 5 - 26 V
Current w/o load typ.	50 mA
Code	Incremental, optical
Max. pulse frequency	125 kHz
Phasing	Incremental signals (A leads B): A leads B by 90° for ccw shaft rotation viewing the shaft clamp end of the encoder
Pulse shape	Square wave

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS connector / Cable

Encoder Function	Cable 6 Pin Single Ended		Cable 7 Pin Single Ended		Cable 7 Pin Dif Line Drv w/o Idx		Cable 10 Pin Dif Line Drv w/ Idx		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Sig. A	E	brown	A	brown	A	brown	A	brown	green
Sig. B	D	orange	B	orange	B	orange	B	orange	blue
Sig. Z	C	yellow	C	yellow	--	--	C	yellow	orange
Power +V	B	red	D	red	D	red	D	red	red
Com	A	black	F	black	F	black	F	black	black
Case	--	--	G	green	G	green	G	green	white
N/C	F	--	E	--	--	--	E	--	--
Sig. $\bar{A}$	--	--	--	--	C	brown/white	H	brown/white	violet
Sig. $\bar{B}$	--	--	--	--	E	orange/white	I	orange/white	brown
Sig. $\bar{Z}$	--	--	--	--	--	--	J	yellow/white	yellow

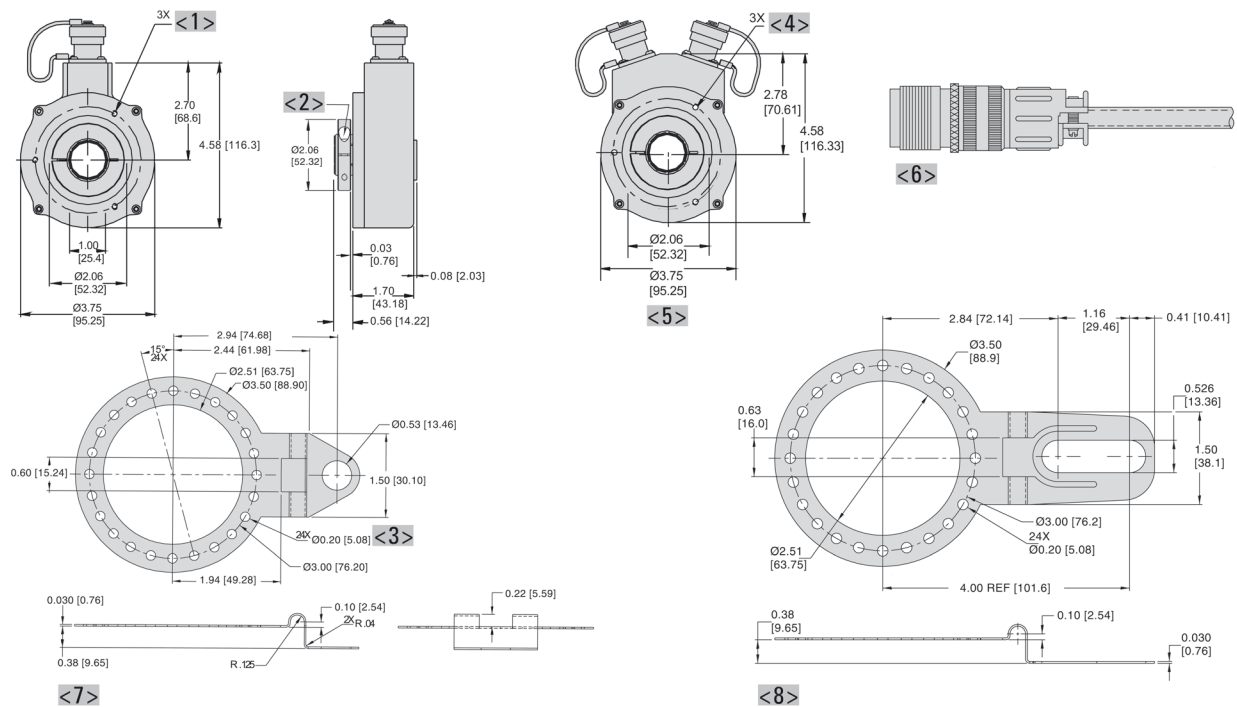
Heavy Duty Incremental

HSD 37

ELECTRICAL CONNECTIONS 5 & 8 Pin M12 Accessory Cable

Encoder Function	Cable 5 Pin Single Ended		Cable 8 Pin Single Ended		Cable 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	black	1	brown	1	brown
Sig. B	2	white	4	orange	4	orange
Sig. Z	5	grey	6	yellow	6	yellow
Power +V	1	brown	2	red	2	red
Com	3	blue	7	black	7	black
Sig. $\bar{A}$					3	brown/white
Sig. $\bar{B}$					5	orange/white
Sig. $\bar{Z}$					8	yellow/white

DIMENSIONED DRAWINGS



- <1> 10-32 UNF x .38 deep on a $\varnothing$ 3.000 bolt circle
- <2> 10-32 clamp screw
- <3> on 3.00 [76.20] bolt circle
- <4> 10-32 UNF x .38 deep on a $\varnothing$ 3.000 bolt circle

- <5> Redundant Version
- <6> Pigtail with MS Connector (K Option)
- <7> Single Point Tether
- <8> Slotted Tether

Dimensions in inch [mm]

Incremental

ORDERING INFORMATION

Type ¹	Number of pulses	Shaft Ø	Output format ^{2,3}	Connection	Options	Special options
☐	☐	☐	☐	☐	☐	☐
HSD37 Heavy Duty Hollow-shaft encoder ISD37 Atex Intrinsically Safe	15 ... 5000	0 6 mm 1 1/4" 2 5/16" 3 8 mm 4 3/8" 5 10 mm 6 12 mm 7 1/2" 8 5/8" 9 15 mm A 16 mm C 19 mm D 3/4" E 20 mm H 1" Non Isolated P 25 mm Non Isolated R 1" Isolated	0 Single Ended, 5-26 VDC push pull 6 Differential ABZ, 5-26 in, 5V out (7272) 7 Differential ABZ, 5-26 in, 5-26 out (7272) A Single Ended ABZ, 7-26V in, 7-26V out push-pull (7272) C Single Ended ABZ, 5V in, 5V out push-pull (7272) K Differential ABZ, 5V in, 5V out (7272) L Differential ABZ, 7-26 in, 7-26 out (7272) M Differential ABZ, 7-26 in, 5V out (7272)	0 6 pin connector 1 7 pin connector 2 10 pin connector 4 10 pin Bayonet connector 6 7 pin+mating connector 7 10 pin+mating connector 8 12 CW pin+mating connector 9 10 pin Bayonet+mating connector A 0.5 m (18") cable C 1 m (36") cable D 2 m (72") cable H 5 pin M12 connector J 8 pin M12 connector K 1.5 ft (18") cable w/ in line 10 pin connector M 5 ft (60") cable N 10 ft (120") cable T Terminal box w/ conduit entry	0 No options 1 Slotted Tether 2 Single point 4.5" C-face tether 3 Single point 8.5" C-face tether 4 Dual isolated Outputs, No tether 5 Dual isolated Outputs, Slotted Tether 6 Dual Isolated Outputs, 4.5" C-face tether 7 Dual isolated Outputs, 8.5" C-face Tether A Swivel Rod tether C Metric Swivel Rod tether D Dual Isolated Outputs, Swivel Rod Tether E Dual Isolated Outputs, Metric Swivel Rod Tether A 7pin+mating connector 7 10 pin+mating	Blank None 01 Nickel Plated 02 Stainless Steel

¹ Type HSD 37 only available with Output format "0", "6" und "7"

² Output format "6", "7", "K", "L" and "M" are not available with connector "1" and "6"

³ Output format Open Collector on request

Incremental



NUMBER OF PULSES

- Double-Sealed Housing
- High Resolution Unbreakable Disk
- Electrically and Thermally Isolated
- Industrial Duty Connector
- NEMA 4X, 6 / IP66 or IP67 Rated
- Rugged Cast-Aluminum Housing

HEAVY DUTY NorthStar™ C E

0015 / 0032 / 0100 / 0200 / 0240 / 0250 / 0500 / 0512 / 0600 / 1000 / 1024 / 1200 / 2000 / 2048 / 2500 / 4000 / 5000

GENERAL INFORMATION

EXTREME HEAVY DUTY HOLLOWSHAFT ENCODER

NorthStar's HSD38 Extreme Duty Industrial Hollowshaft Encoder accepts up to 1" (25,4 mm) diameter shafts and operates reliably from -40 to +100°C. Its Hard Anodized finish enclosure exceeds IP66/IP67 and NEMA 6 enclosure requirements.

This robust encoder features a double-sealed housing that allows application where regulatory washdown and high pressure steam or caustic chemicals are present. Utilization of an advanced Opto ASIC with innovative packaging techniques enables the encoder to operate in high shock and vibration environments.

APPLICATIONS

The HSD38 extreme duty encoder features simple installation on motor or machine shafts. It is often mounted on the back of motors where encoder feedback is needed in harsh environment applications. It is ideal for use in environments that demand heavy washdown protection.

- Converting Machinery
- Material Handling
- Packaging Equipment
- Processing Equipment

Industries

Chemical, Food & Beverage, Paper, Steel and any other where a precise encoder is needed to operate in harsh environments.

TECHNICAL DATA
mechanical

Housing diameter	96.52 mm
Shaft diameter	12 mm / 15 mm / 1/2" / 5/8" / 16 mm / 3/4" / 0.875" (Hubshaft)
Flange (Mounting of housing)	Tether
Mounting of shaft	Front clamping ring
Protection class shaft input (EN 60529)	NEMA 4X or NEMA 6 IP66 or IP67
Protection class housing (EN 60529)	NEMA 4X or NEMA 6 IP66 or IP67
Bearing life	max. 5 x 10 ¹¹ revs.
Starting torque typ.	< 2.8 Ncm
Vibration resistance (DIN EN 60068-2-6)	200 m/s ² (5 ... 2000 Hz)

Incremental

TECHNICAL DATA

mechanical (continued)

Shock resistance (DIN EN 60068-2-27)	500 m/s ² (11 msec)
Operating temperature	-40 °C ... +100 °C
Storage temperature	-40 °C ... +100 °C
Material shaft	Aluminum
Material housing	Hard anodized Aluminum
Weight	approx. 800 g
Connection	MS, radial Cable, radial with M12 connector

TECHNICAL DATA

electrical

Supply voltage	DC 5 - 26 V
Current w/o load typ.	50 mA
Code	Incremental, optical
Max. pulse frequency	125 kHz
Phasing	Incremental signals (A leads B): A leads B by 90° for ccw shaft rotation viewing the shaft clamp end of the encoder
Pulse shape	Square wave

ELECTRICAL CONNECTIONS

6, 7 & 10 Pin MS connector / Cable

Encoder Function	Cable 6 Pin Single Ended		Cable 7 Pin Single Ended		Cable 7 Pin Dif Line Drv w/o Idx		Cable 10 Pin Dif Line Drv w/ Idx		Cable Exit with Seal
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color	Wire Color
Sig. A	E	brown	A	brown	A	brown	A	brown	green
Sig. B	D	orange	B	orange	B	orange	B	orange	blue
Sig. Z	C	yellow	C	yellow	--	--	C	yellow	orange
Power +V	B	red	D	red	D	red	D	red	red
Com	A	black	F	black	F	black	F	black	black
Case	--	--	G	green	G	green	G	green	white
N/C	F	--	E	--	--	--	E	--	--
Sig. $\bar{A}$	--	--	--	--	C	brown/white	H	brown/white	violet
Sig. $\bar{B}$	--	--	--	--	E	orange/white	I	orange/white	brown
Sig. $\bar{Z}$	--	--	--	--	--	--	J	yellow/white	yellow

ELECTRICAL CONNECTIONS

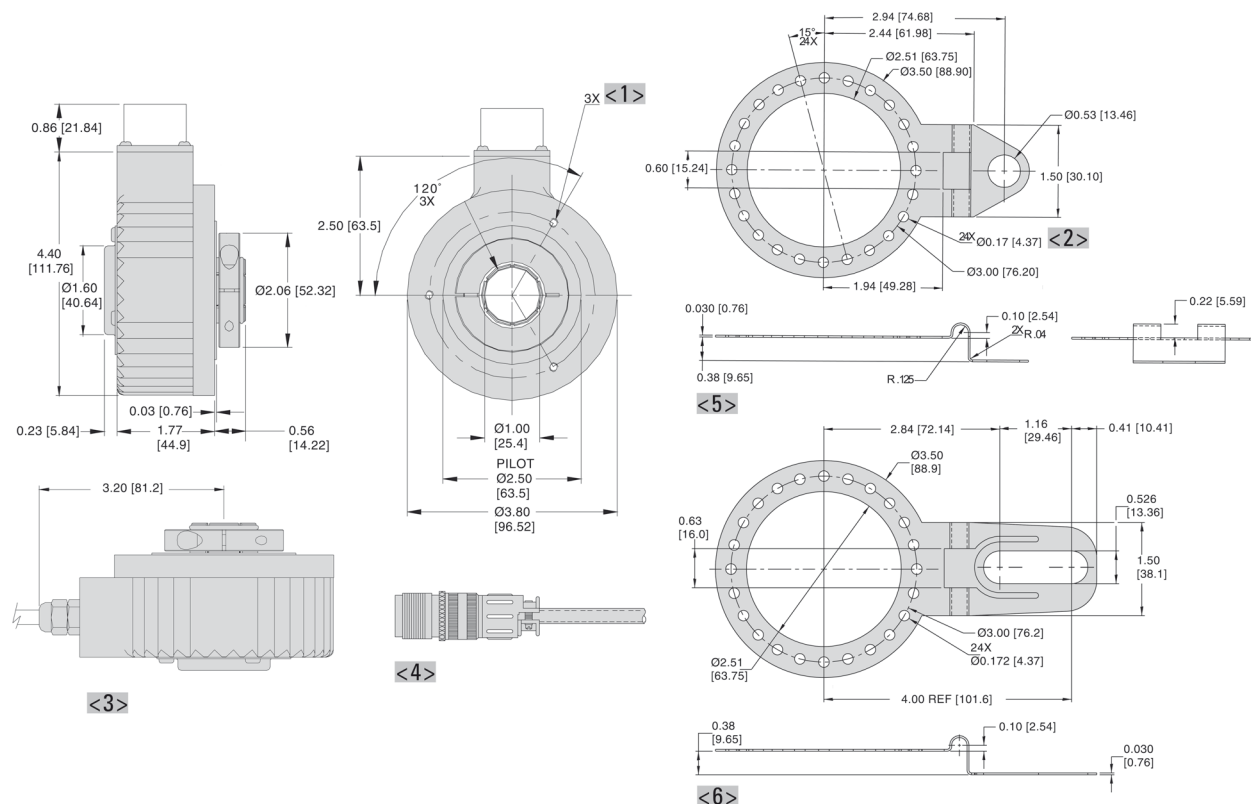
5 & 8 Pin M12 Accessory Cable

Encoder Function	Cable 5 Pin Single Ended		Cable 8 Pin Single Ended		Cable 8 Pin Differential	
	Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
Sig. A	4	black	1	brown	1	brown
Sig. B	2	white	4	orange	4	orange
Sig. Z	5	grey	6	yellow	6	yellow
Power +V	1	brown	2	red	2	red
Com	3	blue	7	black	7	black
Sig. $\bar{A}$					3	brown/white
Sig. $\bar{B}$					5	orange/white
Sig. $\bar{Z}$					8	yellow/white

Heavy Duty Incremental

HSD 38

DIMENSIONED DRAWINGS



- <1> 8-32 x .22 deep on 3.000 bolt circle
- <2> On 3.00 [76.20] bolt circle
- <3> Optional cable output

- <4> Pigtail with MS Connector (K Option)
- <5> Single Point Tether
- <6> Slotted Tether

Dimensions in inch [mm]

Heavy Duty Incremental

HSD 38

ORDERING INFORMATION

Type	Number of pulses	Shaft Ø	Output format ¹	Connection	Safety	Special options
☐	☐	☐	☐	☐	☐	☐
HSD38	15 ... 5000	6 12 mm 7 12.7 mm (1/2") 9 15 mm A 16 mm C 3/4"	22 bidirectional with index, 5-26 V push-pull out 43 birectional inverted with index, 5-26 V differential kine driver out (7272) 44 birectional inverted with index, 5-26 V in, 5 V differential line driver out (7272)	1 7 pin connector 2 10 pin connector 6 7 pin connector plus mating connector 7 10 pin connector plus mating connector A Cable 0,5 m G Cable, 0.3 m J M12 connector, 8 pole K 0.5 m cable with 10 pin in-line connector	0 Reserved for Future Options	0 Cast Aluminum Housing, Slotted Tether C Cast Aluminum Housing, Single-Point Tether Included (NEMA 4.5" C-face) 6 Cast Aluminum Housing, No Tether M Swivel-Rod tether with metric hardware

¹ Output format "44" is only available with connection "2", "7", "A", "G", "J" and "K"

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