

ENCODER WITH A LARGE HOLLOW SHAFT FOR HARSH AMBIENT CONDITIONS



Product description

The high-resolution DGS34/DGS35 hollow shaft incremental encoder family is a reliable solution for extremely demanding encoder applications. With a large

hollow shaft diameter of up to 1 to 1/8" or 30 mm, they are very well suited for direct assembly on the motor shaft

At a glance

- Incremental encoder with 3.5" diameter
- Electrical interface
- 5 V TTL / RS422
- 8 ... 24 V TTL / RS422
- 8 ... 24 V, HTL/Push Pull
- 8 ... 24 V, Open Collector
- Blind hollow shaft for shaft diameters of 30 mm; 1", 1/2", 5/8", 3/4", 7/8"
- Cable outlet with length of 1 m, 1.5 m, 3 m, 5 m, 10 m
- Number of lines: 120 ... 16,384

Your benefits

- The high output frequency means that no mechanical reduction is required
- Hollow shaft design requires no couplings or mounting brackets
- Large selection of stator couplings available for almost every AC asynchronous motor



Additional information

Fields of application F-193
 Detailed technical data F-193
 Type code F-192
 Ordering information F-196
 Dimensional drawings F-197
 PIN assignment F-199
 Recommended accessories F-199

F

Fields of application

- Crane winches
- Stages and theater
- Steel industry
- Elevators
- Packaging industry

Detailed technical data

Performance

Pulses (Z) per revolution ^{1), 2)}	120 ... 16,384 ²⁾
Measurement step	90° electrical/pulses per revolution
Reference signal	
	Number 1
	Location 90° electrical, logically gated with A and B or 180° electrical, logically gated with B- (see electrical interface)
Error limits	45/Z°
Measurement step deviation	45/Z°

¹⁾ 3,000 rpm (2,200 rpm for 8,192 and 16,384 pulses per revolution).

²⁾ For a detailed list of pulses per revolution, see table "Pulses per revolution"

Mechanical data

Shaft diameter	
	DGS34 blind hollow shaft 1" DGS35 through hollow shaft 30 mm; other shaft diameters possible using collets, see Accessories
Shaft material	Brass
Flange material	Aluminum
Housing material	Aluminum
Mass ¹⁾	1.1 kg
Start up torque at 20 °C	9.0 Ncm
Operating torque at 20 °C	7.0 Ncm
Permissible shaft movement of the drive element, static/dynamic	0.5 mm / 0.1 mm radial 0.5 mm / 0.5 mm axial
Max. angular acceleration	1 x 10 ⁵ rad/s ²
Max. operating speed ²⁾	3,000 rpm
Rotor moment of inertia	490 gcm ²
Bearing lifetime	4.5 x 10 ⁹ revolutions

¹⁾ Relates to devices with cable outlet.

²⁾ 3,000 rpm (2,200 rpm for 8,192 and 16,384 pulses per revolution).

Electrical data

Electrical interfaces	4.5 ... 5.5 V, TTL/RS422, 3487, zero pulse width, 180° 8 ... 24 V, TTL/RS422, 3487, zero pulse width, 180° 8 ... 24 V, HTL/Push Pull, 7272, zero pulse width, 180° 8 ... 24 V, Open Collector, 7273, zero pulse width, 180° 4.5 ... 5.5 V, TTL/RS422, 3487, zero pulse width, 90° (only 10,000 and 16,384 pulses possible) 8 ... 24 V, TTL/RS422, 3487, zero pulse width, 90° (only 10,000 and 16,384 pulses possible) 8 ... 24 V, HTL/Push Pull, 7272, zero pulse width, 90° (only 10,000 and 16,384 pulses possible) 8 ... 24 V, Open Collector, 7273, zero pulse width, 90° (only 10,000 and 16,384 pulses possible)
Connection type	Cable, 11-wire, radial, 1.0 m Cable, 11-wire, radial, 1.5 m Cable, 11-wire, radial, 3.0 m Cable, 11-wire, radial, 5 m Cable, 11-wire, radial, 10 m (not possible with Open Collector outputs) MS male connector, 10-pin, radial

Maximum output frequency	≤300 kHz (1 to 8,192 pulses); ≤600 kHz (>8,192 pulses)
Load current	
4.5 V...5.5 V, TTL/RS422	40 mA
8 ... 24 V, TTL/RS422; 8 ... 24 V, HTL/Push Pull	40 mA
8 ... 24 V, Open Collector	20 mA
Operating current without load	
8 ... 24 V	100 mA
4.5 ... 5.5 V	120 mA
Reverse polarity protection	Yes
Short-circuit protection of the outputs	
4.5 V...5.5 V, TTL/RS422, 3487	No
8 V...24 V, TTL/RS422, 3487	No
8 ... 24 V, HTL/Push Pull, 7272	Yes
8 ... 24 V, Open Collector, 7273	Yes
4.5 V...5.5 V, TTL/RS422, 3487	No
8 V...24 V, TTL/RS422, 3487	No
8 ... 24 V, HTL/Push Pull, 7272	Yes
8 ... 24 V, Open Collector, 7273	Yes

Ambient data

EMC	EN 61000-6-2, 61000-6-3
Enclosure rating	
On the housing, male connector outlet ¹⁾	IP 66
On the housing, cable outlet	IP 66
Permissible relative humidity	95%, condensation of optical surfaces not permitted
Operating temperature range	-20 ... +70 °C
Storage temperature range	-30 ... +85 °C
Resistance	
To shocks	50 g/11 ms
To vibrations	20 g/ 5 ... 2,000 Hz

¹⁾ When mating connector is inserted.

Type code

Mechanical design

- 4** Blind hollow shaft ¹⁾
- 5** Through hollow shaft ¹⁾

Electrical interface

- 1** 4.5 ... 5.5 V, TTL/RS422, 3487 ²⁾, reference signal 180
- 2** 8 ... 24 V, 5 V, 3487 ²⁾, reference signal 90 ³⁾
- 3** 8 ... 24 V, 5 V, 3487 ²⁾, reference signal 180
- 4** 8 ... 24 V, 8/24 V, 7272 ²⁾, reference signal 90 ³⁾
- 5** 8 ... 24 V, 8/24 V, 7272 ²⁾, reference signal 180
- 8** 8 ... 24 V, Open Collector, 7273 ²⁾, reference signal 90 ³⁾
- 9** 8 ... 24 V, Open Collector, 7272 ²⁾, reference signal 180
- Y** 5 V, 5 V, 3487 ²⁾, reference signal 90 ³⁾

Mechanical design

- H** T1 stator coupling, shaft diameter Ø 1"
- J** Stator coupling via customer's own locating pin, shaft diameter Ø 1"
- K** T1 stator coupling, shaft diameter Ø 30 mm
- L** Stator coupling via customer's own locating pin, shaft diameter Ø 30 mm

Connection type

- 2** Cable, 11-wire, radial, 1 m
- K** Cable, 11-wire, radial, 1.5 m
- L** Cable, 11-wire, radial, 3 m
- M** Cable, 11-wire, radial, 5 m
- N** Cable, 11-wire, radial, 10 m (not in conjunction with the electrical interfaces 8 and 9)
- 4** MS male connector, 10-pin, radial

Pulses

Always 5 characters in clear text



¹⁾ Order collets for 7/8", 24 mm, 25 mm, 18 mm, 20 mm and 22 mm as an additional accessory, see "Recommended accessories" on page F-199.

²⁾ IC module.

³⁾ 10,000 and 16,384 pulses per revolution only available with 90° reference signal.

Pulses per revolution

Pulses per revolution	120	3,600
	360	4,096
	600	5,000
	1,024	8,192
	2000	10,000
	2,048	16,384
	2,500	

Ordering information

DGS34 blind hollow shaft

Electrical interface	Mechanical design	Connection type	Type	Part no.
4.5 ... 5.5 V, TTL/RS422, 3487, reference signal 180	Stator coupling via customer's own locating pin, shaft diameter Ø 30 mm	MS male connector, 10-pin, radial	DGS34-1L402048	7101744
8 ... 24 V, 8/24 V, 7272, reference signal 180	Stator coupling via customer's own locating pin, shaft diameter Ø 1"	MS male connector, 10-pin, radial	DGS34-5J404096	7102201
	Stator coupling via customer's own locating pin, shaft diameter Ø 30 mm	Cable, 12-wire, radial, 1.5 m	DGS34-5LK02048	7101764

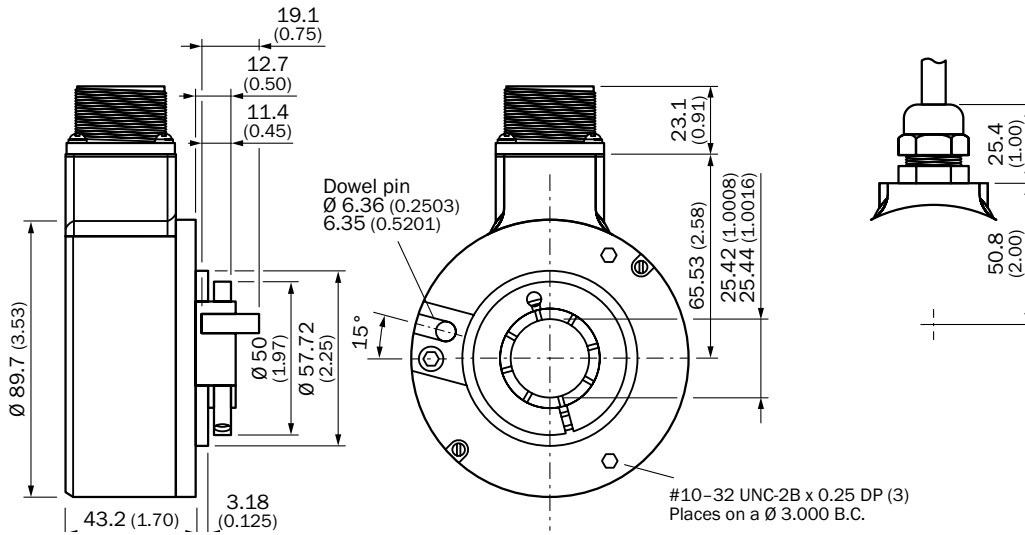
DGS35 through hollow shaft

Electrical interface	Mechanical design	Connection type	Type	Part no.	
4.5 ... 5.5 V, TTL/RS422, 3487, reference signal 180	Stator coupling via customer's own locating pin, shaft diameter Ø 1"	Cable, 12-wire, radial, 3 m	DGS35-1JL01024	7134504	
	T1 stator coupling, shaft diameter Ø 30 mm	MS male connector, 10-pin, radial	DGS35-1K402048	7130548	
		Cable, 12-wire, radial, 1.5 m	DGS35-1KK01024	1049552	
			DGS35-1KK02500	1055330	
	Stator coupling via customer's own locating pin, shaft diameter Ø 30 mm	MS male connector, 10-pin, radial	DGS35-1L401024	7101683	
			DGS35-1L402048	7101684	
		Cable, 12-wire, radial, 1.5 m	DGS35-1LK01024	7101698	
			DGS35-1LK02048	7101699	
	DGS35-1LK08192	7101701			
	8 ... 24 V, 5 V, 3487, reference signal 180	Stator coupling via customer's own locating pin, shaft diameter Ø 1"	MS male connector, 10-pin, radial	DGS35-3J401024	7126765
T1 stator coupling, shaft diameter Ø 30 mm		MS male connector, 10-pin, radial	DGS35-3K401024	1058110	
		Cable, 12-wire, radial, 1.5 m	DGS35-3K402048	1060264	
			DGS35-3KK01024	1057039	
Stator coupling via customer's own locating pin, shaft diameter Ø 30 mm		MS male connector, 10-pin, radial	DGS35-3K402048	1062810	
			DGS35-3L402048	1062795	
		Cable, 12-wire, radial, 1.5 m	DGS35-3LK02048	1062354	
			DGS35-3LL01024	1055112	
8 ... 24 V, 8/24 V, 7272, reference signal 180		T1 stator coupling, shaft diameter Ø 1"	Cable, 12-wire, radial, 1.5 m	DGS35-5HK00120	7130703
		T1 stator coupling, shaft diameter Ø 30 mm	MS male connector, 10-pin, radial	DGS35-5K401024	7134312
	DGS35-5K402048			1062811	
	DGS35-5K402500			7134638	
	DGS35-5K405000			7130624	
	Stator coupling via customer's own locating pin, shaft diameter Ø 30 mm	MS male connector, 10-pin, radial	Cable, 12-wire, radial, 1.5 m	DGS35-5KK01024	1058301
			DGS35-5L401024	7101688	
	Cable, 12-wire, radial, 1.5 m	DGS35-5LK04096	7101705		
		DGS35-5LK08192	7101706		

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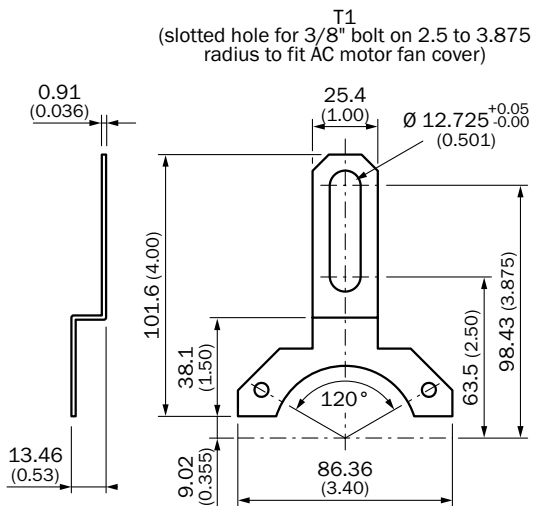
Dimensional drawings (dimensions in mm)

Through hollow shaft

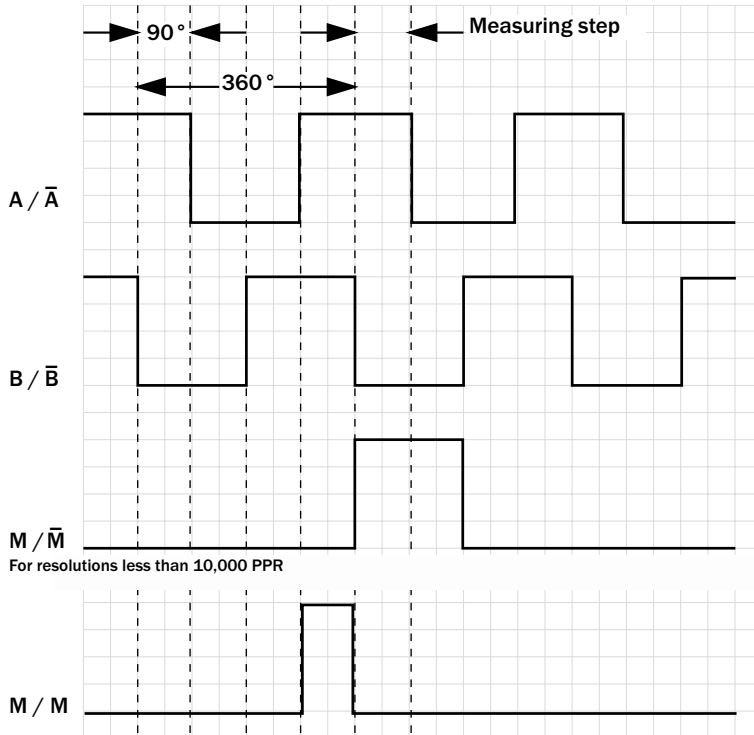


Hollow shaft	Shaft diameter	Min. shaft insertion depth
1/2"	12.67 mm / 12.7 mm	25.4 mm
5/8"	15.85 mm / 15.88 mm	25.4 mm
3/4"	19.02 mm / 19.05 mm	25.4 mm
7/8"	22.2 mm / 22.23 mm	25.4 mm
1.0"	25.37 mm / 25.4 mm	25.4 mm
1 1/8"	28.55 mm / 28.58 mm	45.47 mm
M30	29.96 mm / 29.98 mm	46 mm

Spring plate stator coupling



Signal outputs



For resolutions less than 10,000 PPR

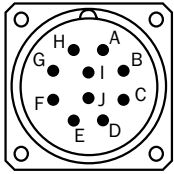
For resolutions greater than or equal to 10,000 PPR and push-pull driver option

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Electrical interfaces

Supply voltage
4.75 ... 5.25 V
8.0 ... 24.0 V
8.0 ... 24.0 V

PIN assignment

MS3102, 10-pin

PIN, 10-pin	Wire colors	Explanation
A	White	A
B	Pink	B
C	Violet	M
H	Brown	\bar{A}
I	Black	\bar{B}
J	Yellow	\bar{M}
D	Red	+V _s
F	Blue	GND
G	N/A	Housing grounding
N/A	N/A	Screen

Recommended accessories

Mounting systems

Shaft adaptation

Collets and clamping rings

Brief description	Shaft diameter	Type	Part no.
For T1 stator couplings with 1" hollow shaft diameters (mechanical interfaces H, J)	7/8"	SPZ-7E8-DD35-AD	7102158
For 30 mm stator couplings with 30 mm hollow shaft diameters (mechanical interfaces K, I)	24 mm	SPZ-024-MD35-AD	7130587
	25 mm	SPZ-025-MD35-AD	7130588
For T1 stator couplings with 1" hollow shaft diameters (mechanical interfaces H, J)	18 mm	SPZ-018-DD35-AD	7130585
	20 mm	SPZ-020-DD35-AD	7130529
	22 mm	SPZ-022-DD35-AD	7130586

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Connectivity

Plug connectors and cables

Brief description	Length of cable	Type	Part no.
Female cable connector, MS 3105, 10-pin, straight	-	DOS-MS10-G	7102129
Cable, MS 3105, 10-pin, straight, 11-wire, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm ² , with shielding, cable diameter 7.5 mm	1.5 m	DOL-MS10-G1M5MA2	7102130
	3.0 m	DOL-MS10-G03MMA2	7102131
	5.0 m	DOL-MS10-G05MMA2	7102132
	10.0 m	DOL-MS10-G10MMA2	7102133
	20.0 m	DOL-MS10-G20MMA2	7102134
	30.0 m	DOL-MS10-G30MMA2	7102135
Data cable by the meter 4 x 2 x 0.15 mm ² with shielding, Ø 5.6 mm	-	LTG-2308-MWENC	6027529
Data cable by the meter 4 x 2 x 0.25 mm ² + 2 x 0.5 mm ² + 1 x 0.14 mm ² with shielding, Ø 7.5 mm	-	LTG-2411-MW	6027530
Data cable by the meter 4 x 2 x 0.25 mm ² + 2 x 0.5 mm ² + 2 x 0.14 mm ² with shielding, suitable for drag chain, Ø 7.8 mm	-	LTG-2512-MW	6027531

→ For additional accessories, please see page K-668 onwards

F