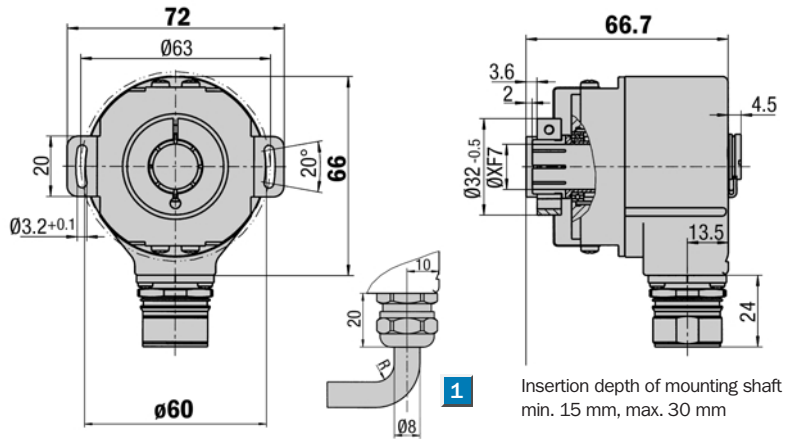


Number of lines
1 up to 8,192

Incremental Encoder

- Connector or cable outlet
- Protection class up to IP 66
- Electrical interfaces
TTL and HTL
- Zero-Pulse-Teach via
pressing a button
- DRS 61: number of lines and
zero pulse width can be freely
programmed by the customer

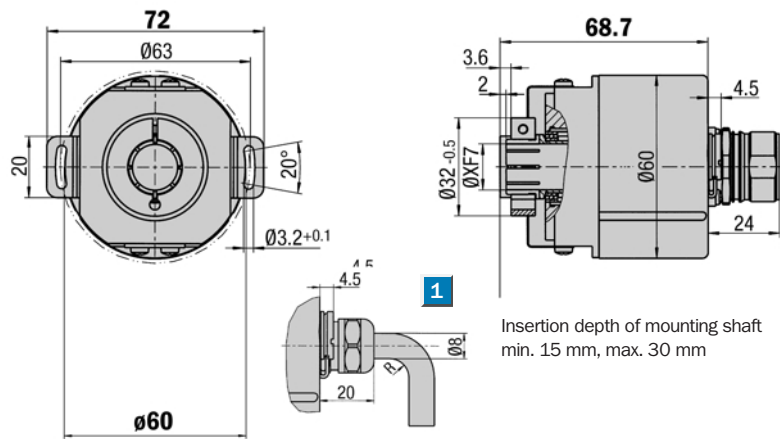
Dimensional drawing blind hollow shaft radial



1 R = bending radius min. 40 mm

General tolerances according to DIN ISO 2768-mk

Dimensional drawing blind hollow shaft axial

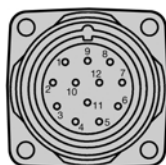


1 R = bending radius min. 40 mm

General tolerances according to DIN ISO 2768-mk

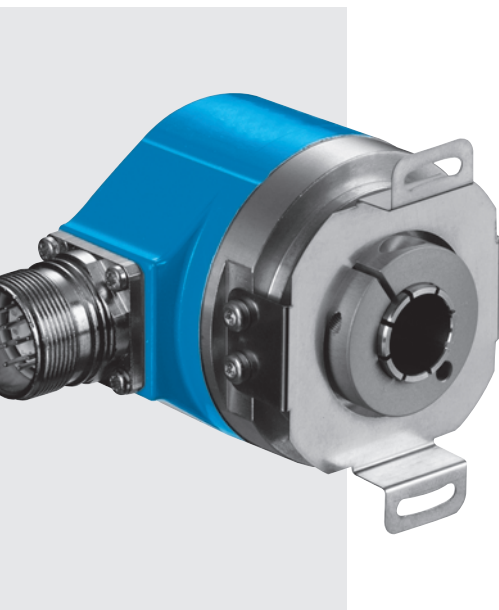
PIN and wire allocation/cable 11 core

PIN	Signal	Wire colour (Cable outlet)	Explanation
1	\bar{B}	black	Signal line
2	Sense +	grey	Connected internally to U_s
3	Z	lilac	Signal line
4	\bar{Z}	yellow	Signal line
5	A	white	Signal line
6	\bar{A}	brown	Signal line
7	N. C.	orange	Not connected
8	B	pink	Signal line
9	Screen		Housing potential
10	GND	blue	Zero volt connected to the encoder
11	Sense -	green	Connected internally to GND
12	U_s	red	Supply voltage ¹⁾



View of the connector M23 fitted to the encoder body

¹⁾ Potential free to housing
 N. C. =
 Not connected



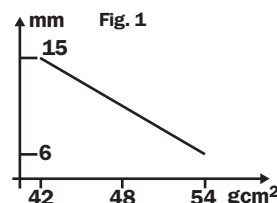
Accessories

- Connection systems
- Mounting systems
- Collets
- Programming Tool

Technical Data acc. to DIN 32878		DRS 60/DRS 61 blind hollow shaft		Flange type					
		blind							
Hollow shaft diameter	6, 8, 10, 12, 15 mm, 1/4", 3/8", 1/2"								
Number of lines per revolution	00001 up to 08192, see order info								
Electrical Interface	TTL/RS 422, 6-channel								
	HTL/push-pull, 6-channel								
Mass ⁴⁾	Approx. 0.3 kg								
Moment of inertia of the rotor	See Fig. 1								
Measuring step	90°/number of lines								
Reference signal									
Number	1								
Position ²⁾	90° or 180°								
Error limits									
binary number of lines	0.035°								
non-binary number of lines	0.046°								
Measuring step deviation									
binary number of lines	0.005°								
non-binary number of lines	0.016°								
Max. output frequency									
TTL	820 kHz								
HTL	200 kHz								
Operating torque max.	3,000 min ⁻¹								
Max. angular acceleration	5 x 10 ⁵ rad/s ²								
Operating torque	Typ. 0.4 Ncm								
Start up torque	Typ. 0.6 Ncm								
Permissible movement of the drive element									
radial static/dynamic movement	± 0.3/± 0.1 mm								
axial static/dynamic movement	± 0.5/± 0.2 mm								
Bearing lifetime	3.6 x 10 ⁹ revolutions								
Working temperature range	- 20 ... + 85 °C								
Storage temperature range	- 40 ... + 100 °C								
Permissible relative humidity ³⁾	90 %								
EMC ⁴⁾									
Resistance									
to shocks ⁶⁾	50/11 g/ms								
to vibration ⁶⁾	20/10 ... 2000 g/Hz								
Protection class IEC 60529									
Connector outlet ⁷⁾	IP 65								
Cable outlet	IP 66								
Operating voltage range									
Load current TTL/RS 422, 4.5 ... 5.5 V	Max. 20 mA								
TTL/RS 422, 10 ... 32 V	Max. 20 mA								
HTL/push-pull, 10 ... 32 V	Max. 60 mA								
No-load operating current									
at 10 ... 32 V	Typ. 100 mA								
at 5 V	Typ. 120 mA								
Operation of zero-set ⁸⁾	≥ 100 ms								
Initialisation time after power on	40 ms								

¹⁾ Concerning encoder with connector
²⁾ Electrical, logically linked to A and B
³⁾ Condensation of the optical scanning not permitted

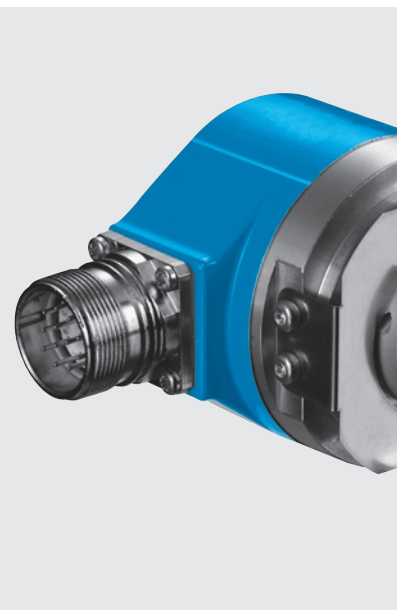
⁴⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3
⁵⁾ To DIN EN 60068-2-27
⁶⁾ To DIN EN 60068-2-6
⁷⁾ With mating connector fitted
⁸⁾ Only with shaft stationary



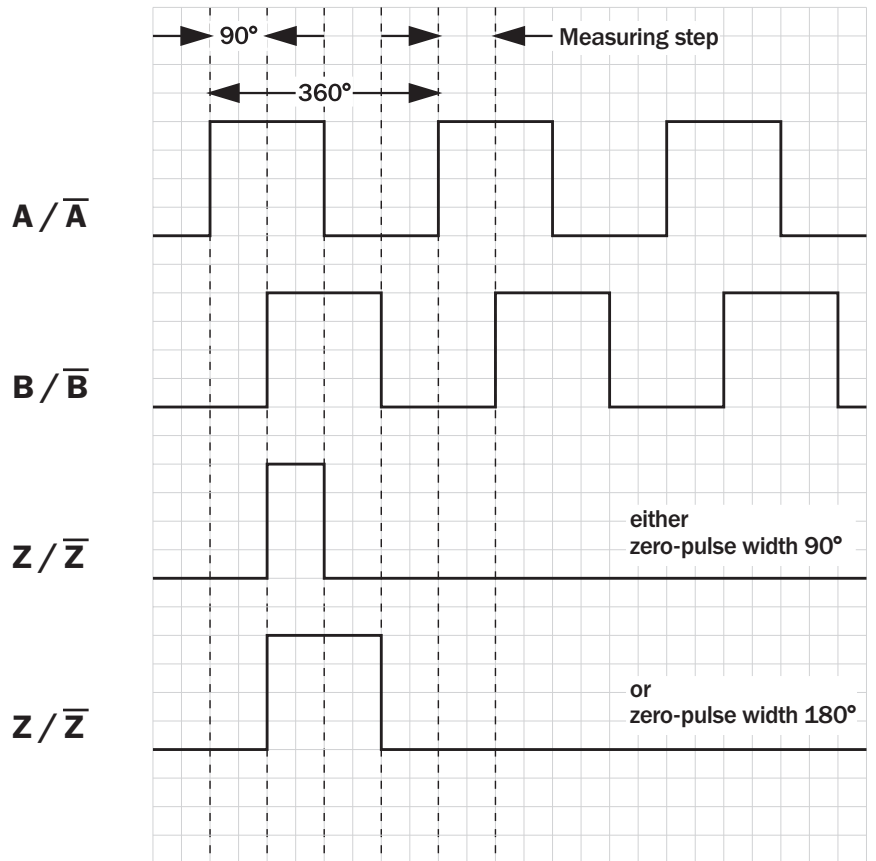
Number of lines
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Incremental Encoder

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Incremental pulse diagram

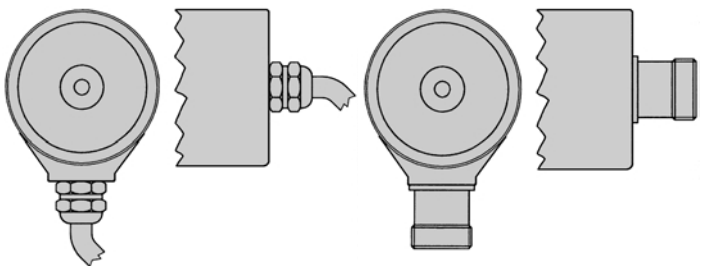


Electrical interface

Supply voltage	4.5 ... 5.5 V	10 ... 32 V	10 ... 32 V
Interfaces/drivers	TTL (RS 422)	TTL (RS 422)	HTL (push-pull)

Connection type

- Cable radial
 Cable axial
 Connector radial
 Connector axial



Accessories

Connection systems
Mounting systems
Collets
Programming Tool



Order information

Incremental Encoder DRS 60, blind hollow shaft

Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
D	R	S	6	0	-		A						

Electrical interface	
4.5 ... 5.5 V, TTL/RS 422 Zero-pulse width 90°	= A
4.5 ... 5.5 V, TTL/RS 422 Zero-pulse width 180°	= B
10 ... 32 V, TTL/RS 422 Zero-pulse width 90°	= C
10 ... 32 V, TTL/RS 422 Zero-pulse width 180°	= D
10 ... 32 V, HTL/push-pull Zero-pulse width 90°	= E
10 ... 32 V, HTL/push-pull Zero-pulse width 180°	= F

Mechanical interface	
Blind hollow shaft ¹⁾	= A

¹⁾ Collets for 6, 8, 10, 12 mm and 1/4", 3/8" and 1/2" as accessories, separate order item (see below). For 15 mm shaft diameter, collet is not needed.

Connection type	
Connector M23, 12 pin, radial	= A
Connector M23, 12 pin, axial	= B
Cable 11 core, radial 1.5 m	= K
Cable 11 core, radial 3 m	= L
Cable 11 core, radial 5 m	= M
Cable 11 core, radial 10 m	= N
Cable 11 core, axial 1.5 m	= R
Cable 11 core, axial 3 m	= S
Cable 11 core, axial 5 m	= T
Cable 11 core, axial 10 m	= U

Number of lines	
Each number of lines from 00001 up to 08192 possible.	
Always 5 characters in clear text.	

Order example Incremental Encoder DRS 60

4.5 ... 5.5 V, TTL/RS 422 zero-pulse width 90°; blind hollow shaft; connector M23, 12 pin, radial; number of lines: 360

Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
D	R	S	6	0	-	A	A	A	0	0	3	6	0



Incremental-Encoder DRS 61 blind hollow shaft (number of lines and zero pulse width can be freely programmed by the customer)

Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
D	R	S	6	1	-		A		0	8	1	9	2

Electrical interface	
4.5 ... 5.5 V, TTL/RS 422	= A
10 ... 32 V, TTL/RS 422	= C
10 ... 32 V, HTL/push-pull	= E

Mechanical interface	
Blind hollow shaft ¹⁾	= A

¹⁾ Collets for 6, 8, 10, 12 mm and 1/4", 3/8" and 1/2" as accessories, separate order item (see below). For 15 mm shaft diameter, collet is not needed.

Connection type	
Connector M23, 12 pin, radial	= A
Connector M23, 12 pin, axial	= B
Cable 11 core, radial 1.5 m	= K
Cable 11 core, axial 1.5 m	= R

Number of lines	
Factory-programmed to 8,192.	

Order example Incremental Encoder DRS 61

4.5 ... 5.5 Volt, TTL/RS 422; blind hollow shaft; connector M23, 12 pin, radial; number of lines: 8,192 (factory-programmed)

Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
D	R	S	6	1	-	A	A	A	0	8	1	9	2

Blind hollow shaft collets

Type	Part no.	Shaft diameter
SPZ-006-AD-A	2 029 174	6 mm
SPZ-1E4-AD-A	2 029 175	1/4"
SPZ-008-AD-A	2 029 176	8 mm
SPZ-3E8-AD-A	2 029 177	3/8"
SPZ-010-AD-A	2 029 178	10 mm
SPZ-012-AD-A	2 029 179	12 mm
SPZ-1E2-AD-A	2 029 180	1/2"