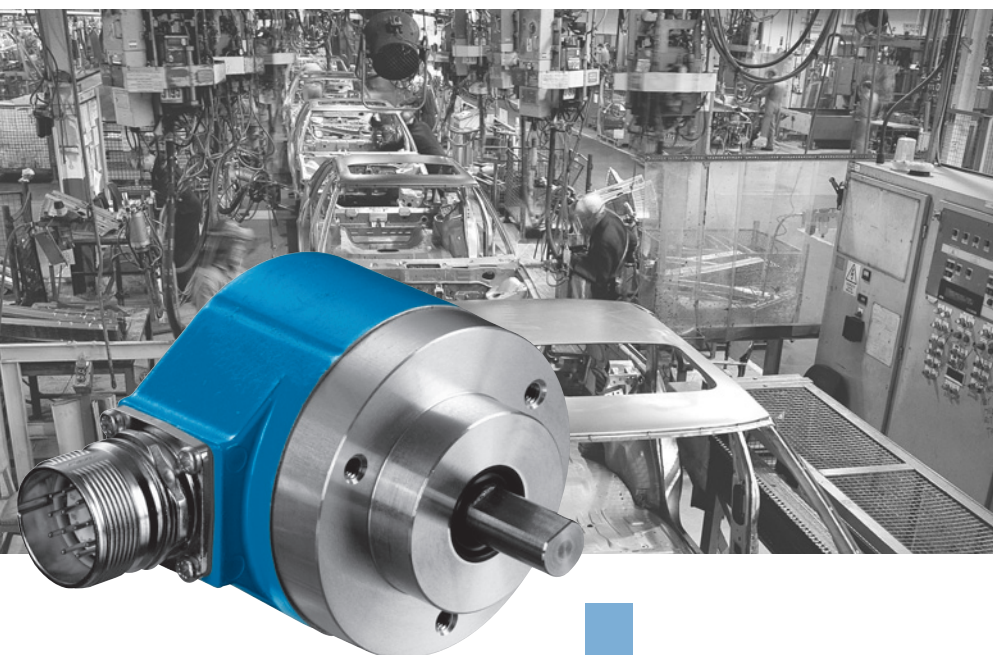



DGS60, DGS65 and DGS66: Incremental Encoders for rough environmental conditions



Select your individual encoder!
Possible product variants:
6 and 10 mm solid shafts with servo flange or face mount flange, through or blind hollow shafts with connector or cable outlet, TTL or HTL interface.

Thanks to this wide variety of products, there are numerous possible uses, for example in:

- machine tools
- textile machines
- woodworking machines
- packaging machines

| | |
|---|--|
|  | Number of lines 100 to 10,000 |
| Incremental Encoder | |

Incremental encoders in the DGS60, DGS65 and DGS66 series are in use world-wide under the toughest environmental conditions.

The rugged construction – up to IP 67 degree protection – and the individual adaptation of the design to the requirements of the user are the outstanding features of this series.

Resolutions up to 10,000 lines are available.

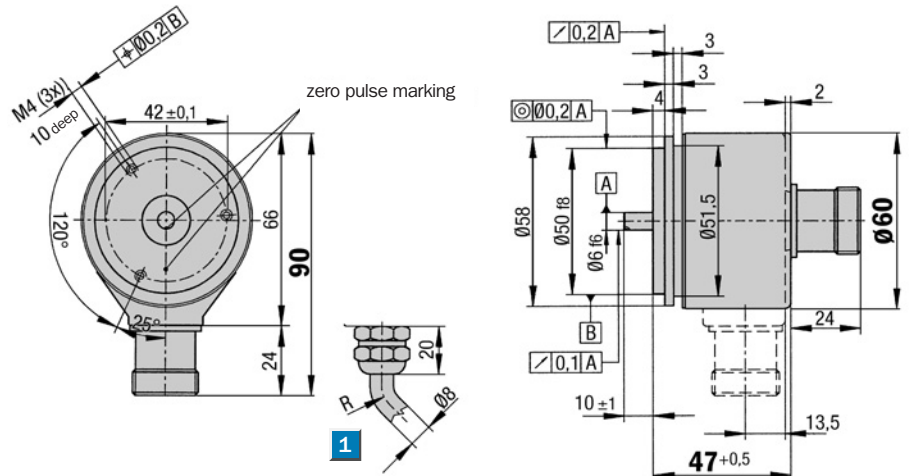


Number of lines
100 to 10,000

Incremental Encoder

- Servo or face mount flange
- Connector or cable outlet
- Protection class up to IP 67
- Electrical Interfaces
TTL and HTL

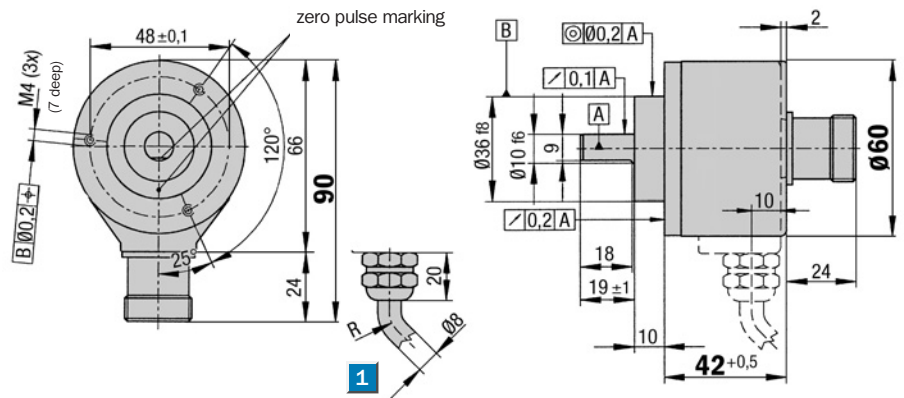
Dimensional drawing servo flange



1 R = bending radius min. 40 mm

General tolerances according to DIN ISO 2768-mk

Dimensional drawing face mount flange

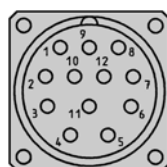


1 R = bending radius min. 40 mm

General tolerances according to DIN ISO 2768-mk

PIN and wire allocation/cable 11 core

| PIN | Signal HTL | Signal TTL | Core colour (cable outlet) | Explanation |
|-----|---------------|---------------|-------------------------------|--------------------------------|
| 1 | N. C. | \bar{B} | black | Signal line |
| 2 | N. C. | Sense + | grey | Connected internally to U_s |
| 3 | Z | Z | lilac | Signal line |
| 4 | N. C. | \bar{Z} | yellow | Signal line |
| 5 | A | A | white | Signal line |
| 6 | N. C. | \bar{A} | brown | Signal line |
| 7 | N. C. | N. C. | orange | N. C. |
| 8 | B | B | pink | Signal line |
| 9 | Screen | Screen | | Housing potential |
| 10 | GND | GND | blue | Ground connection |
| 11 | N. C. | Sense - | green | Connected internally to ground |
| 12 | U_s | U_s | red | Power supply 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

| Technical Data to DIN 32878 | | DGS60 | | Flange type | | | | | | | |
|--|--|-------|---------|-------------|--|--|--|--|--|--|--|
| | | servo | face m. | | | | | | | | |
| Solid shaft | 10 mm | | | | | | | | | | |
| | 6 mm | | | | | | | | | | |
| Number of lines (Z) per revolution | 00100 to 10,000, see order info | | | | | | | | | | |
| Electrical Interface | TTL/RS 422, 6-channel | | | | | | | | | | |
| | HTL/push-pull, 3-channel (A, B, Z) | | | | | | | | | | |
| Mass ⁴⁾ | Approx. 0.3 kg | | | | | | | | | | |
| Moment of inertia of the rotor | | | | | | | | | | | |
| Servo flange | 13 gcm ² | | | | | | | | | | |
| Face mount flange | 25 gcm ² | | | | | | | | | | |
| Measuring step | 90°/number of lines | | | | | | | | | | |
| Reference signal | | | | | | | | | | | |
| Number | 1 | | | | | | | | | | |
| Position | 90° electr. & logically interlocked with A+B | | | | | | | | | | |
| Error limits | | | | | | | | | | | |
| 100 ≤ Z < 1250 | 45/Z + 0.054° | | | | | | | | | | |
| 1250 < Z ≤ 10000 | 45/Z + 0.039° | | | | | | | | | | |
| Measuring step deviation | 45/Z ° | | | | | | | | | | |
| Max. output frequency | | | | | | | | | | | |
| TTL | 300 kHz (600 at > 5000 lines) | | | | | | | | | | |
| HTL | 200 kHz | | | | | | | | | | |
| Max. operating speed ²⁾ | | | | | | | | | | | |
| with shaft seal | 6,000 min ⁻¹ | | | | | | | | | | |
| without shaft seal | 10,000 min ⁻¹ | | | | | | | | | | |
| Max. angular acceleration | 5 x 10 ⁵ rad/s ² | | | | | | | | | | |
| Operating torque | | | | | | | | | | | |
| with shaft seal | 1 Ncm | | | | | | | | | | |
| without shaft seal | 0.1 Ncm | | | | | | | | | | |
| Start up torque | | | | | | | | | | | |
| with shaft seal | 1.5 Ncm | | | | | | | | | | |
| without shaft seal | 0.2 Ncm | | | | | | | | | | |
| Permissible shaft loading | | | | | | | | | | | |
| Servo flange radial/axial | 20 N/10 N | | | | | | | | | | |
| Face mount flange radial/axial | 40 N/20 N | | | | | | | | | | |
| Bearing lifetime | 3.6 x 10 ¹⁰ revolutions | | | | | | | | | | |
| Working temperature range | - 20 ... + 85 °C | | | | | | | | | | |
| Storage temperature range | - 30 ... + 85 °C | | | | | | | | | | |
| Permissible relative humidity ³⁾ | 90 % | | | | | | | | | | |
| EMC ⁴⁾ | | | | | | | | | | | |
| Resistance | | | | | | | | | | | |
| to shocks ⁵⁾ | 30/11 g/ms | | | | | | | | | | |
| to vibration ⁶⁾ | 20/10 ... 2000 g/Hz | | | | | | | | | | |
| Protection class acc. IEC 60529 | | | | | | | | | | | |
| Connector outlet ⁷⁾ | IP 67 | | | | | | | | | | |
| Cable outlet | IP 65 | | | | | | | | | | |
| Operating voltage range | | | | | | | | | | | |
| Load current TTL/RS 422, 4 ... 6 V | Max. 20 mA | | | | | | | | | | |
| TTL/RS 422, 10 ... 30 V | Max. 20 mA | | | | | | | | | | |
| HTL/push-pull, 10 ... 30 V | Max. 60 mA | | | | | | | | | | |
| Operating current range at no load | | | | | | | | | | | |
| at 24 V | 100 mA | | | | | | | | | | |
| at 5 V | 120 mA | | | | | | | | | | |

⁴⁾ For an encoder with connector outlet

³⁾ Condensation not permitted

⁵⁾ To DIN EN 60068-2-27

²⁾ At speeds > 6000 rpm the shaft seal must be removed

⁴⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁶⁾ To DIN EN 60068-2-6

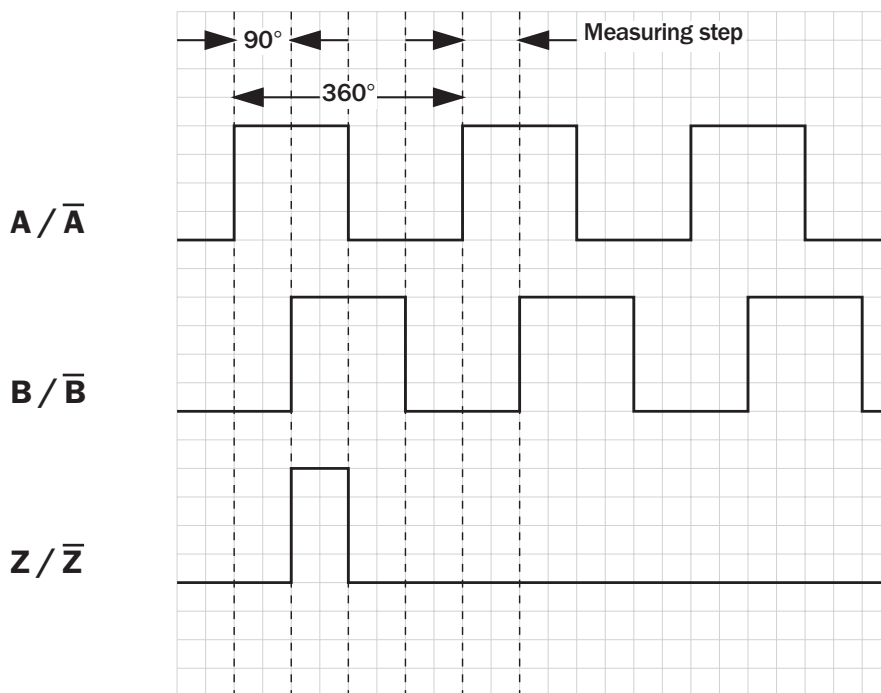
⁷⁾ With mating connector fitted

Number of lines
100 to 10,000

Incremental Encoder

- Servo or face mount flange
- Connector or cable outlet
- Protection class up to IP 67
- Electrical Interfaces
TTL and HTL

Incremental pulse diagram

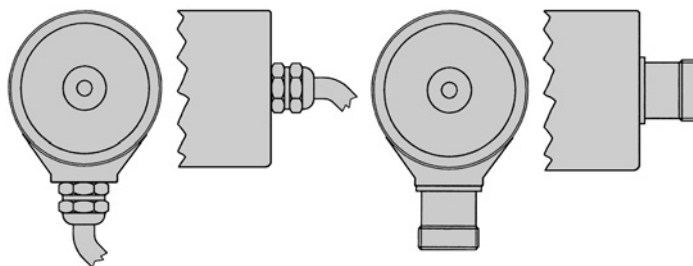


Electrical interfaces

| | | | |
|--------------------|--------------|--------------|-----------------|
| Supply voltage | 4 ... 6 V | 10 ... 30 V | 10 ... 30 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 |



Order information

Incremental Encoder DGS60, solid 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 | G | S | 6 | 0 | - | | | | | | | | |

| | | | |
|---|---|--|--|
| Electrical interface | Mechanical interface | Connection type | Number of lines |
| 4 ... 6 V, TTL (RS 422) = A | Servo flange, shaft 6 mm = 1 | Connector M23, 12 pin, radial = A | Always 5 characters in clear text 1 |
| 10 ... 30 V, TTL (RS 422) = C | Face mount flange, shaft 10 mm = 4 | Connector M23, 12 pin, axial = B | |
| 10 ... 30 V, HTL (push-pull) = G | | 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, axial 1.5 m = R | |
| | | Cable 11 core, axial 3 m = S | |
| | | Cable 11 core, axial 5 m = T | |

1 Number of lines (Z) per revolution

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 00100 | 00250 | 00500 | 00720 | 01024 | 02000 | 04000 | 07200 |
| 00125 | 00256 | 00512 | 00750 | 01200 | 02048 | 04096 | 08000 |
| 00150 | 00300 | 00570 | 00800 | 01250 | 02500 | 04500 | 08192 |
| 00160 | 00314 | 00600 | 00900 | 01500 | 03000 | 05000 | 09000 |
| 00180 | 00360 | 00625 | 01000 | 01800 | 03600 | 06000 | 10000 |
| 00200 | 00400 | 00700 | | | | | |

Order example: Incremental Encoder DGS60

4 ... 6 V, TTL; servo flange; 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 | G | S | 6 | 0 | - | A | 1 | A | 0 | 0 | 3 | 6 | 0 |

Please enter your individual encoder here

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|----------|----------|----------|
| 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 | G | S | 6 | 0 | - | | | | | | | | |

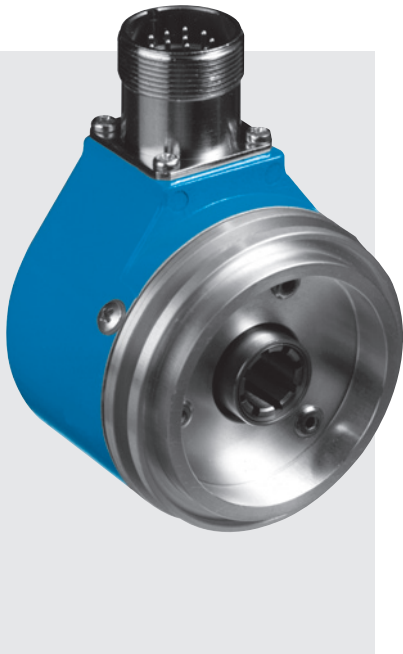
| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|----------|----------|----------|
| Point 1 | Point 2 | Point 3 | Point 4 | Point 5 | Point 6 | Point 7 | Point 8 | Point 9 | Point 10 | Point 11 | Point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

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|----------|----------|----------|
| 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 | G | S | 6 | 0 | - | | | | | | | | |

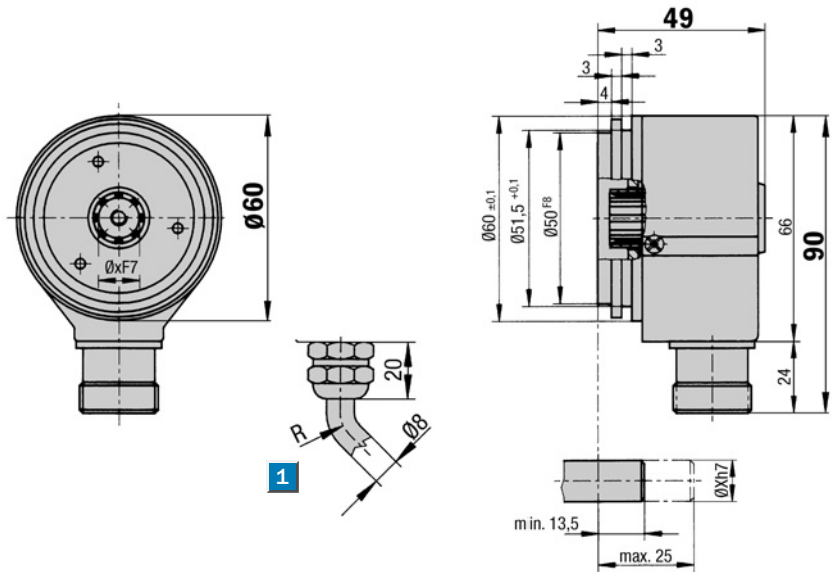
Number of lines
100 to 10,000

Incremental Encoder

- Collets for shaft diameter 6, 8, 10, 11, 12 mm and 3/8"
- Connector or cable outlet
- Electrical Interfaces
TTL and HTL



Dimensional drawing blind hollow shaft

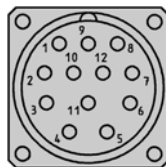


1 R = bending radius min. 40 mm

General tolerances according to DIN ISO 2768-mk

PIN and wire allocation/cable 11 core

| PIN | Signal HTL | Signal TTL | Core colour (cable outlet) | Explanation |
|-----|---------------|---------------|-------------------------------|--------------------------------|
| 1 | N. C. | \bar{B} | black | Signal line |
| 2 | N. C. | Sense + | grey | Connected internally to U_s |
| 3 | Z | Z | lilac | Signal line |
| 4 | N. C. | \bar{Z} | yellow | Signal line |
| 5 | A | A | white | Signal line |
| 6 | N. C. | \bar{A} | brown | Signal line |
| 7 | N. C. | N. C. | orange | N. C. |
| 8 | B | B | pink | Signal line |
| 9 | Screen | Screen | | Housing potential |
| 10 | GND | GND | blue | Ground connection |
| 11 | N. C. | Sense - | green | Connected internally to ground |
| 12 | U_s | U_s | red | Power supply 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



| Technical Data to DIN 32878 | | DGS65 | Flange type | | | | | | | | | | | |
|---|--|-------------------|-------------|--|--|--|--|--|--|--|--|--|--|--|
| | | | blind | | | | | | | | | | | |
| Hollow shaft diameter | 6, 8, 10, 11, 12 mm and 3/8" | | | | | | | | | | | | | |
| Number of lines (Z) per revolution | 00100 to 10,000, see order info | | | | | | | | | | | | | |
| Attention: number of lines > 5000 | Only with TTL 4...6 V | | | | | | | | | | | | | |
| Electrical Interface | TTL/RS 422, 6-channel | | | | | | | | | | | | | |
| | HTL/push-pull, 3-channel (A, B, Z) | | | | | | | | | | | | | |
| Mass ¹⁾ | Approx. 0.4 kg | | | | | | | | | | | | | |
| Moment of inertia of the rotor | 25 gcm ² | | | | | | | | | | | | | |
| Measuring step | 90°/number of lines | | | | | | | | | | | | | |
| Reference signal | | | | | | | | | | | | | | |
| Number | 1 | | | | | | | | | | | | | |
| Position | 90° electr. & logically interlocked with A+B | | | | | | | | | | | | | |
| Error limits | | | | | | | | | | | | | | |
| 100 ≤ Z < 1250 | 45/Z + 0.054° | | | | | | | | | | | | | |
| 1250 < Z ≤ 10000 | 45/Z + 0.039° | | | | | | | | | | | | | |
| Measuring step deviation | 45/Z ° | | | | | | | | | | | | | |
| Max. output frequency | | | | | | | | | | | | | | |
| TTL | 300 kHz (600 at > 5000 lines) | | | | | | | | | | | | | |
| HTL | 200 kHz | | | | | | | | | | | | | |
| Max. operating speed | 6,000 min ⁻¹ | | | | | | | | | | | | | |
| Max. angular acceleration | 5 x 10 ⁵ rad/s ² | | | | | | | | | | | | | |
| Operating torque | 0.1 Ncm | | | | | | | | | | | | | |
| Start up torque | 0.3 Ncm | | | | | | | | | | | | | |
| Permissible shaft movement | | | | | | | | | | | | | | |
| static | radial/axial | ± 0.5 mm/± 0.5 mm | | | | | | | | | | | | |
| dynamic | radial/axial | ± 0.1 mm/± 0.2 mm | | | | | | | | | | | | |
| Angular movement at right angles to the axis | | | | | | | | | | | | | | |
| static | 34 x 10 ⁻³ mm | | | | | | | | | | | | | |
| dynamic | 17 x 10 ⁻³ mm | | | | | | | | | | | | | |
| Bearing lifetime | 3.6 x 10 ¹⁰ revolutions | | | | | | | | | | | | | |
| Working temperature range | - 20 ... + 85 °C | | | | | | | | | | | | | |
| Storage temperature range | - 30 ... + 85 °C | | | | | | | | | | | | | |
| Permissible relative humidity ²⁾ | 90 % | | | | | | | | | | | | | |
| EMC ³⁾ | | | | | | | | | | | | | | |
| Resistance | | | | | | | | | | | | | | |
| to shocks ⁴⁾ | 30/11 g/ms | | | | | | | | | | | | | |
| to vibration ⁵⁾ | 20/10 ... 2000 g/Hz | | | | | | | | | | | | | |
| Protection class acc. IEC 60529 | | | | | | | | | | | | | | |
| Connector outlet ⁶⁾ | IP 65 | | | | | | | | | | | | | |
| Cable outlet | IP 66 | | | | | | | | | | | | | |
| Operating voltage range | | | | | | | | | | | | | | |
| Load current TTL/RS 422, 4 ... 6 V | Max. 20 mA | | | | | | | | | | | | | |
| | TTL/RS 422, 10 ... 30 V | Max. 20 mA | | | | | | | | | | | | |
| | HTL/push-pull, 10 ... 30 V | Max. 60 mA | | | | | | | | | | | | |
| Operating current range at no load | | | | | | | | | | | | | | |
| at 24 V | 100 mA | | | | | | | | | | | | | |
| at 5 V | 120 mA | | | | | | | | | | | | | |

¹⁾ For an encoder with connector outlet


²⁾ Condensation not permitted

³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3

⁴⁾ To DIN EN 60068-2-27

⁵⁾ To DIN EN 60068-2-6

⁶⁾ With mating connector fitted

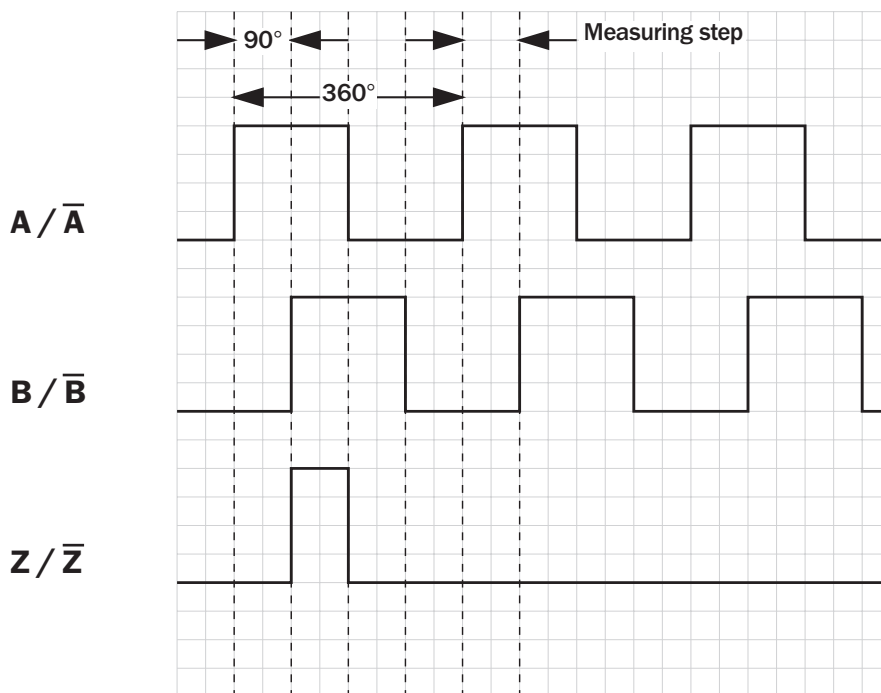
 **Number of lines**
100 to 10,000

Incremental Encoder

- Collets for shaft diameter 6, 8, 10, 11, 12 mm and 3/8"
- Connector or cable outlet
- Electrical Interfaces
TTL and HTL



Incremental pulse diagram

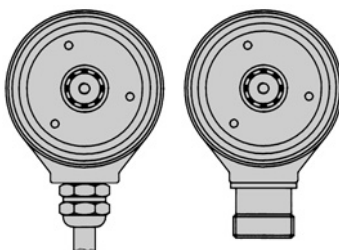


Electrical interfaces

| | | | |
|--------------------|--------------|--------------|-----------------|
| Supply voltage | 4 ... 6 V | 10 ... 30 V | 10 ... 30 V |
| Interfaces/drivers | TTL (RS 422) | TTL (RS 422) | HTL (push-pull) |

Connection type

- Cable radial Connector radial



Accessories

- Connection systems
- Mounting systems
- Collets



Order information

Incremental Encoder DGS65, 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 | G | S | 6 | 5 | - | | | | | | | | |

| | | | |
|---|---|--|--|
| Electrical interface | Mechanical interface | Connection type | Number of lines |
| 4 ... 6 V, TTL (RS 422) = A | Blind hollow shaft ¹⁾ = A | Connector M23, 12 pin, radial = A | Always 5 characters in clear text 1 |
| 10 ... 30 V, TTL (RS 422) = C | ¹⁾ Collets for 6, 8, 10, 11, 12 mm and 3/8" as accessories, separate order item (see below). | Cable 11 core, radial 1.5 m = K | |
| 10 ... 30 V, HTL (push-pull) = G | | Cable 11 core, radial 3 m = L | |
| | | Cable 11 core, radial 5 m = M | |

1 Number of lines (Z) per revolution

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|---------------------|
| 00100 | 00244 | 00336 | 00600 | 00785 | 01024 | 02000 | 04096 |
| 00125 | 00250 | 00360 | 00625 | 00800 | 01200 | 02048 | 05000 |
| 00150 | 00256 | 00400 | 00700 | 00900 | 01250 | 02500 | 07200 ²⁾ |
| 00160 | 00300 | 00500 | 00720 | 00938 | 01375 | 03000 | 08192 ²⁾ |
| 00180 | 00308 | 00512 | 00750 | 01000 | 01500 | 03600 | 10000 ²⁾ |
| 00200 | 00314 | 00570 | 00768 | 01005 | 01800 | 04000 | |

²⁾ Only possible with interface 4 ... 6 V, TTL (RS 422) = A

Order example: Incremental Encoder DGS65

4 ... 6 V, TTL; 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 | G | S | 6 | 5 | - | A | A | A | 0 | 0 | 3 | 6 | 0 |

Please enter your individual encoder here

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| 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 | G | S | 6 | 5 | - | | | | | | | | |

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| 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 | G | S | 6 | 5 | - | | | | | | | | |

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| 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 | G | S | 6 | 5 | - | | | | | | | | |

Collets for DGS65 Encoder with blind hollow shaft

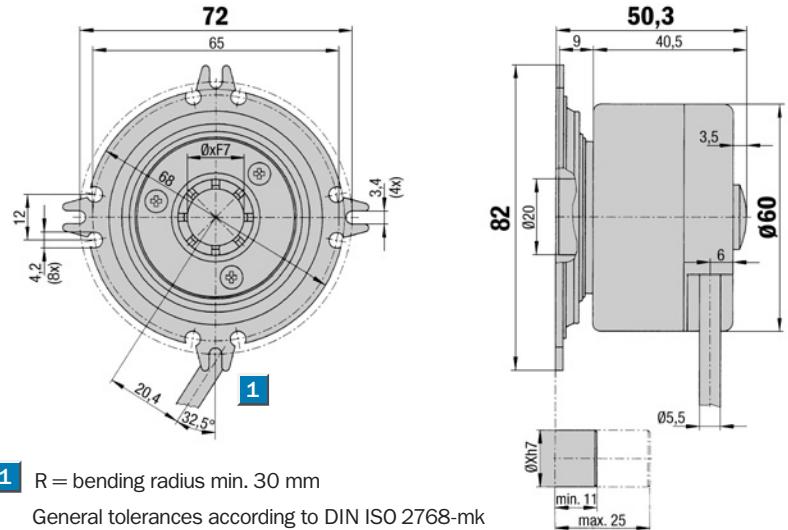
| Type | Part no. | Shaft diameter |
|----------------|----------|----------------|
| SPZ-006-DD65-A | 2029181 | 6 mm |
| SPZ-008-DD65-A | 2029182 | 8 mm |
| SPZ-010-DD65-A | 2029183 | 10 mm |
| SPZ-011-DD65-A | 2019043 | 11 mm |
| SPZ-012-DD65-A | 2029184 | 12 mm |
| SPZ-3E8-DD65-A | 2039227 | 3/8 " |

Number of lines
100 to 10,000

Incremental Encoder

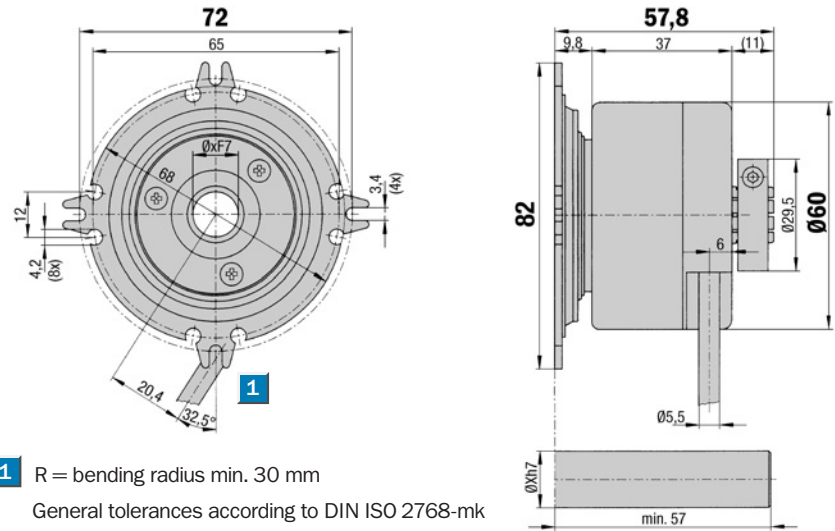
- 100 to 10,000 number of lines per revolution
- Electrical Interfaces TTL and HTL

Dimensional drawing blind hollow shaft



1 R = bending radius min. 30 mm
 General tolerances according to DIN ISO 2768-mk

Dimensional drawing through hollow shaft

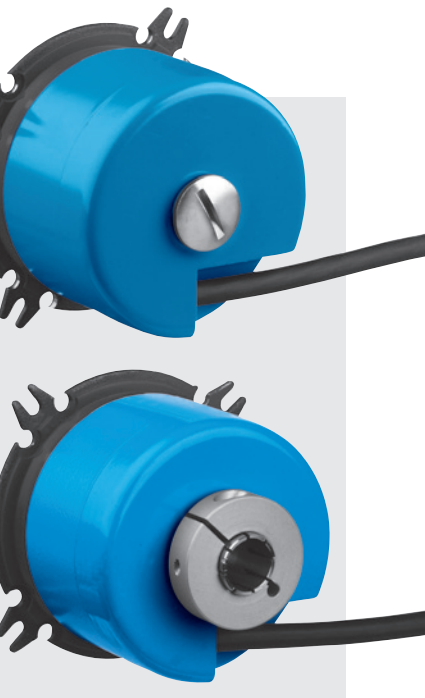


1 R = bending radius min. 30 mm
 General tolerances according to DIN ISO 2768-mk

PIN and wire allocation/cable 8 core (explanation see page 14)

| Core colour | Explanation | Core colour | Explanation |
|-------------|----------------------------|-------------|----------------------------|
| HTL | | TTL | |
| black | N. C. | black | \bar{B} |
| lilac | Z | lilac | Z |
| yellow | N. C. | yellow | \bar{Z} |
| white | A | white | A |
| brown | N. C. | brown | \bar{A} |
| pink | B | pink | B |
| Screen | Screen | Screen | Screen |
| blue | Ground connection | blue | Ground connection |
| red | Power supply ¹⁾ | red | Power supply ¹⁾ |

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




Accessories

| |
|--------------------|
| Connection systems |
| Mounting systems |
| Collets |

| Technical Data to DIN 32878 | | DGS66 | Flange type | | | | | | | |
|---|--|-------|-------------|---------|--|--|--|--|--|--|
| | | | blind | through | | | | | | |
| Hollow shaft diameter | 6, 8, 9, 10, 12, 14 and 15 mm, 1/2" | | | | | | | | | |
| | 6, 8, 10, 12, 14 mm, 3/8" and 1/2" | | | | | | | | | |
| Number of lines (Z) per revolution | 00100 to 10,000, see order info | | | | | | | | | |
| Attention: number of lines > 5000 | Only with TTL 4...6V | | | | | | | | | |
| Electrical Interface | TTL/RS 422, 6-channel | | | | | | | | | |
| | HTL/push-pull, 3-channel (A, B, Z) | | | | | | | | | |
| Mass ¹⁾ | Approx. 0.3 kg | | | | | | | | | |
| Moment of inertia of the rotor | 45 gcm ² | | | | | | | | | |
| Measuring step | 90°/number of lines | | | | | | | | | |
| Reference signal | | | | | | | | | | |
| Number | 1 | | | | | | | | | |
| Position | 90° electr. & logically interlocked with A+B | | | | | | | | | |
| Error limits | | | | | | | | | | |
| 100 ≤ Z < 1250 | 45/Z + 0.054° | | | | | | | | | |
| 1250 < Z ≤ 10000 | 45/Z + 0.039° | | | | | | | | | |
| Measuring step deviation | 45/Z ° | | | | | | | | | |
| Max. output frequency | | | | | | | | | | |
| TTL | 300 kHz (600 at > 5000 lines) | | | | | | | | | |
| HTL | 200 kHz | | | | | | | | | |
| Max. operating speed | 6,000 min ⁻¹ | | | | | | | | | |
| Max. angular acceleration | 5 x 10 ⁵ rad/s ² | | | | | | | | | |
| Operating torque | 0.2 Ncm | | | | | | | | | |
| Start up torque | 0.4 Ncm | | | | | | | | | |
| Permissible shaft movement | | | | | | | | | | |
| static radial/axial | ± 0.1 mm/± 2.0 mm | | | | | | | | | |
| dynamic radial/axial | ± 0.05 mm/± 0.2 mm | | | | | | | | | |
| Angular movement at right angles to the axis | | | | | | | | | | |
| static | 34 x 10 ⁻³ mm | | | | | | | | | |
| dynamic | 17 x 10 ⁻³ mm | | | | | | | | | |
| Bearing lifetime | 3.6 x 10 ¹⁰ revolutions | | | | | | | | | |
| Working temperature range | - 20 ... + 85 °C | | | | | | | | | |
| Storage temperature range | - 30 ... + 85 °C | | | | | | | | | |
| Permissible relative humidity ¹⁾ | 90 % | | | | | | | | | |
| EMC ²⁾ | | | | | | | | | | |
| Resistance | | | | | | | | | | |
| to shocks ³⁾ | 30/11 g/ms | | | | | | | | | |
| to vibration ⁴⁾ | 20/10 ... 2000 g/Hz | | | | | | | | | |
| Protection class acc. IEC 60529 | | | | | | | | | | |
| Cable outlet | IP 65 | | | | | | | | | |
| Operating voltage range | | | | | | | | | | |
| Load current TTL/RS 422, 4 ... 6 V | Max. 20 mA | | | | | | | | | |
| TTL/RS 422, 10 ... 30 V | Max. 20 mA | | | | | | | | | |
| HTL/push-pull, 10 ... 30 V | Max. 60 mA | | | | | | | | | |
| Operating current range at no load | | | | | | | | | | |
| at 24 V | 100 mA | | | | | | | | | |
| at 5 V | 120 mA | | | | | | | | | |

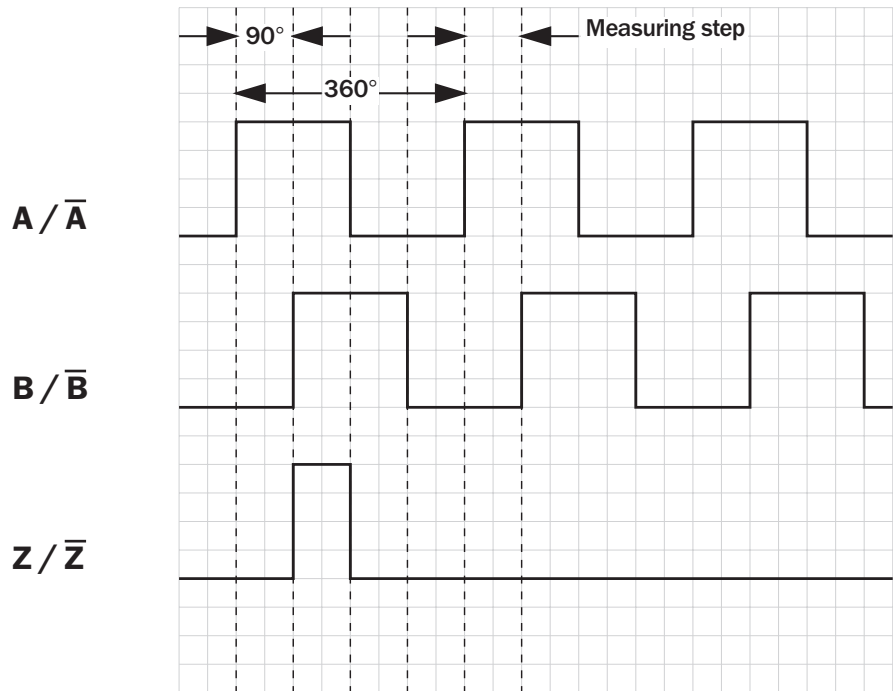
¹⁾ Condensation not permitted³⁾ To DIN EN 60068-2-27²⁾ To DIN EN 61000-6-2
and DIN EN 61000-6-3⁴⁾ To DIN EN 60068-2-6

 **Number of lines**
100 to 10,000

Incremental Encoder

- 100 to 10,000 number of lines per revolution
- Electrical Interfaces
TTL and HTL

Incremental pulse diagram

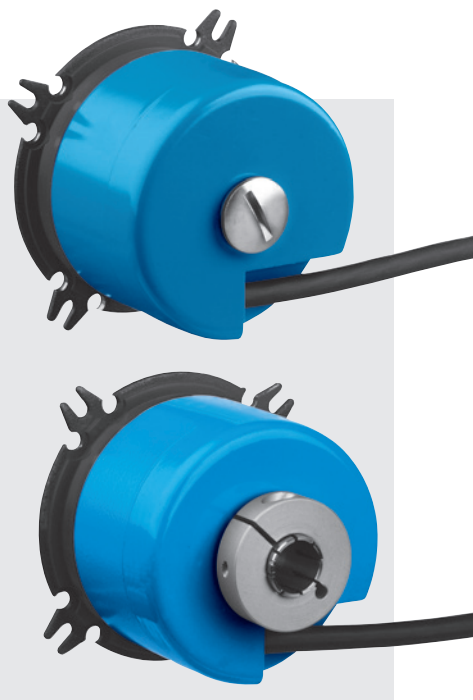
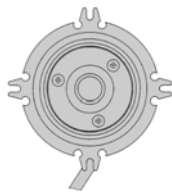


Electrical interfaces

| | | | |
|--------------------|--------------|--------------|-----------------|
| Supply voltage | 4 ... 6 V | 10 ... 30 V | 10 ... 30 V |
| Interfaces/drivers | TTL (RS 422) | TTL (RS 422) | HTL (push-pull) |

Connection type

Cable radial



Accessories

- Connection systems
- Mounting systems
- Collets

Order information

Incremental Encoder DGS66, blind/through 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 | G | S | 6 | 6 | – | | | | | | | | |

| | | | |
|---|---|---------------------------------------|--|
| Electrical interface | Mechanical interface | Connection type | Number of lines |
| 4 ... 6 V, TTL (RS 422) = A | Blind hollow shaft ¹⁾ = A | Cable 8 core, radial 1.5 m = K | Always 5 characters in clear text 1 |
| 10 ... 30 V, TTL (RS 422) = C | | Cable 8 core, radial 3 m = L | |
| 10 ... 30 V, HTL (push-pull) = G | Through hollow shaft 6 mm = M | Cable 8 core, radial 5 m = M | |
| | Through hollow shaft 8 mm = P | | |
| | Through hollow shaft 3/8" = R | | |
| | Through hollow shaft 10 mm = S | | |
| | Through hollow shaft 12 mm = T | | |
| | Through hollow shaft 1/2" = U | | |
| | Through hollow shaft 14 mm = V | | |

¹⁾ Collets for 6, 8, 10, 12, 14, 15 mm and 1/2" as accessories, separate order item (see below).

1 Number of lines (Z) per revolution with electrical interface 4 ... 6 V, TTL (RS 422) = A

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 00100 | 00360 | 00720 | 01250 | 02500 | 04000 | 05000 | 08192 |
| 00200 | 00500 | 01000 | 02000 | 03600 | 04096 | 07200 | 10000 |
| 00250 | 00512 | 01024 | 02048 | | | | |

1 Number of lines (Z) per revolution with the electrical interfaces 10 ... 30 V, TTL (RS 422) = C and 10 ... 30 V, HTL (push-pull) = G

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|--|
| 00100 | 00360 | 00515 | 01024 | 02000 | 02500 | 04096 | |
| 00250 | 00500 | 01000 | 01250 | 02048 | 03600 | 05000 | |

Order example Incremental Encoder DGS66

4 ... 6 V, TTL; blind hollow shaft; cable 8 core 1.5 m, 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 | G | S | 6 | 6 | – | A | A | K | 0 | 0 | 3 | 6 | 0 |

Please enter your individual encoder here

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| 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 | G | S | 6 | 6 | – | | | | | | | | |

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| 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 | G | S | 6 | 6 | – | | | | | | | | |

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| 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 | G | S | 6 | 6 | – | | | | | | | | |

Collets for DGS66 Encoder with blind hollow shaft

| Type | Part no. | Shaft diameter |
|----------------|----------|----------------|
| SPZ-006-DD66-A | 2029185 | 6 mm |
| SPZ-008-DD66-A | 2029186 | 8 mm |
| SPZ-009-DD66-A | 2040980 | 9 mm |
| SPZ-010-DD66-A | 2029187 | 10 mm |
| SPZ-012-DD66-A | 2029188 | 12 mm |
| SPZ-1E2-DD66-A | 2029189 | 1/2 " |
| SPZ-014-DD66-A | 2029190 | 14 mm |
| SPZ-015-DD66-A | 2029191 | 15 mm |

Dimensional drawings and order information

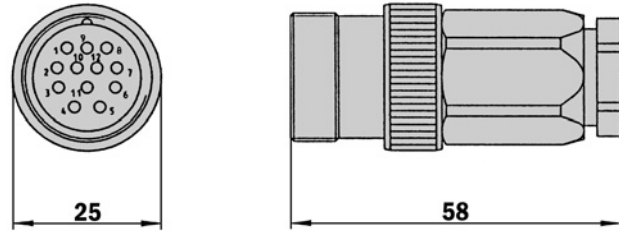
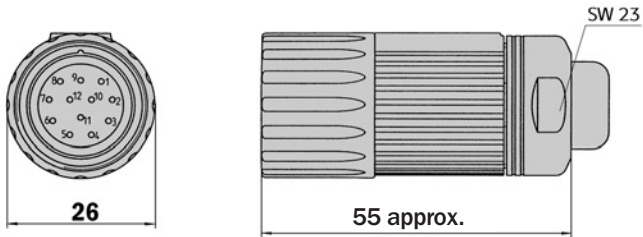
Screw-in system M23, 12 pin

Cable onnector M23 female, 12 pin, straight, screened

| Type | Part no. | Contacts |
|------------|----------|----------|
| DOS-2312-G | 6027538 | 12 |

Cable onnector M23 male, 12 pin, straight, screened

| Type | Part no. | Contacts |
|------------|----------|----------|
| STE-2312-G | 6027537 | 12 |



Connector M23 female, 12 pin, straight, cable 12 core, 4 x 2 x 0.25 + 2 x 0.5 + 2 x 0.14 mm² with screening, capable of being dragged, cable diameter 7.8 mm

| Type | Part no. | Contacts | Cable length |
|------------------|----------|----------|--------------|
| DOL-2312-G1M5MA3 | 2029212 | 12 | 1.5 m |
| DOL-2312-G03MMA3 | 2029213 | 12 | 3.0 m |
| DOL-2312-G05MMA3 | 2029214 | 12 | 5.0 m |
| DOL-2312-G10MMA3 | 2029215 | 12 | 10.0 m |
| DOL-2312-G20MMA3 | 2029216 | 12 | 20.0 m |
| DOL-2312-G30MMA3 | 2029217 | 12 | 30.0 m |

Cable 8 core, per meter, 4 x 2 x 0.15 mm² with screening, cable diameter 5.6 mm

| Type | Part no. | Cores |
|----------------|----------|-------|
| LTG-2308-MWENC | 6027529 | 8 |

Cable 11 core, per meter, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm² with screening, cable diameter 7.5 mm

| Type | Part no. | Cores |
|-------------|----------|-------|
| LTG-2411-MW | 6027530 | 11 |

Cable 12 core, per meter, 4 x 2 x 0.25 + 2 x 0.5 + 2 x 0.14 mm² with screening, capable of being dragged, cable diameter 7.8 mm

| Type | Part no. | Cores | Explanation |
|-------------|----------|-------|-----------------------------|
| LTG-2512-MW | 6027531 | 12 | |
| LTG-2612-MW | 6028516 | 12 | Salt water and UV resistant |

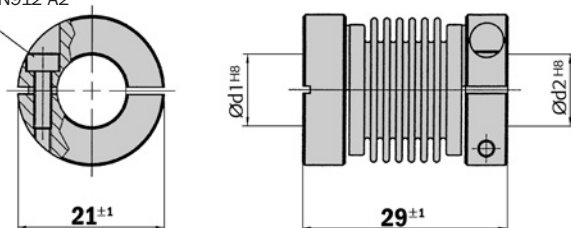
Dimensional drawings and order information

Couplings

Bellows coupling, max. shaft offset radial ± 0.3 mm, axial 0.4 mm, angle ± 4 degrees, torsion spring stiffness 120 Nm/rad, bellows of stainless steel, hubs of aluminium

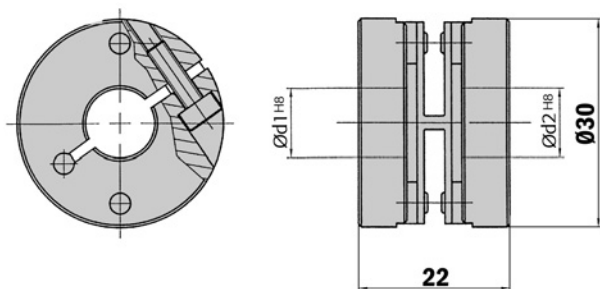
| Type | Part no. | Shaft diameter |
|------------|----------|-----------------|
| KUP-0606-B | 5312981 | 6 mm ... 6 mm |
| KUP-0610-B | 5312982 | 6 mm ... 10 mm |
| KUP-1010-B | 5312983 | 10 mm ... 10 mm |
| KUP-1012-B | 5312984 | 10 mm ... 12 mm |

Cheese-head screw
M2,5x8 DIN912 A2



Spring-disc coupling, max. shaft offset radial ± 0.3 mm, axial 0.4 mm, angle ± 2.5 degrees, torsion spring stiffness 50 Nm/rad, flange of stainless steel, spring-discs of glass-fibre-reinforced plastic

| Type | Part no. | Shaft diameter |
|------------|----------|-----------------|
| KUP-0610-F | 5312985 | 6 mm ... 10 mm |
| KUP-1010-F | 5312986 | 10 mm ... 10 mm |



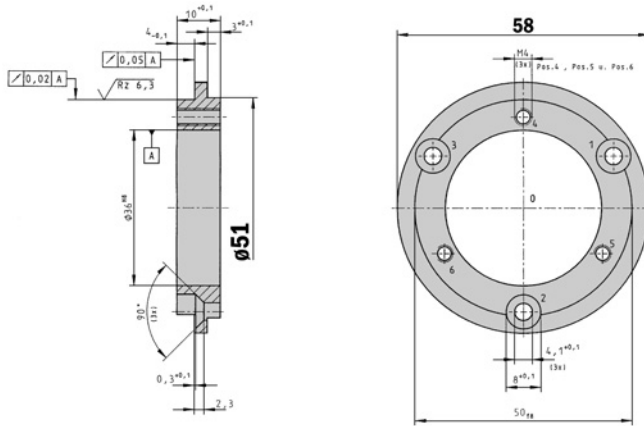
General tolerances according to DIN ISO 2768-mk

Dimensional drawings and order information

Mechanical Adaptors

Adaptor flange of aluminium for face mount flange, spigot 36 mm

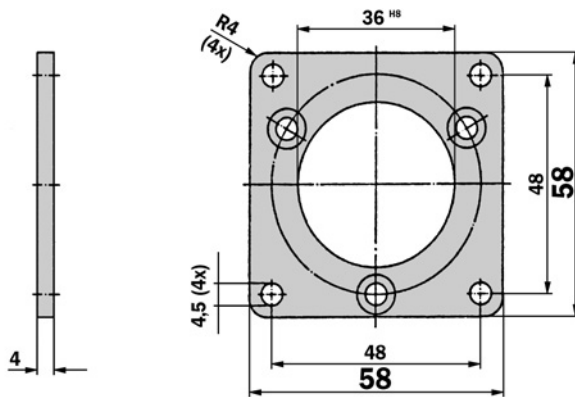
| Type | Part no. | Adaption |
|----------------|----------|-----------------------|
| BEF-FA-036-050 | 2029160 | To 50 mm servo flange |



General tolerances according to DIN ISO 2768-mk

Adaptor flange of aluminium for face mount flange, spigot 36 mm

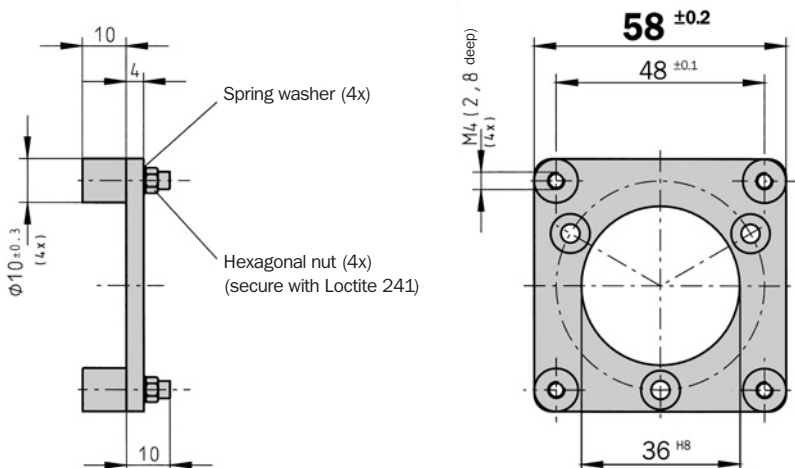
| Type | Part no. | Adaption |
|-------------------|----------|--------------------------------|
| BEF-FA-036-060REC | 2029162 | To 60 mm square mounting plate |



General tolerances according to DIN ISO 2768-mk

Adaptor flange of aluminium for face mount flange, spigot 36 mm

| Type | Part no. | Adaption |
|-------------------|----------|---|
| BEF-FA-036-060RSA | 2029163 | To 60 mm square mounting plate with shock absorbers |



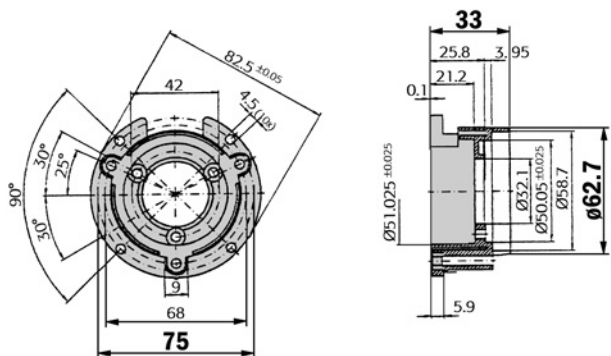
General tolerances according to DIN ISO 2768-mk

Dimensional drawings and order information

Mechanical Adaptors

Mounting bell incl. fixing set for encoder with servo flange

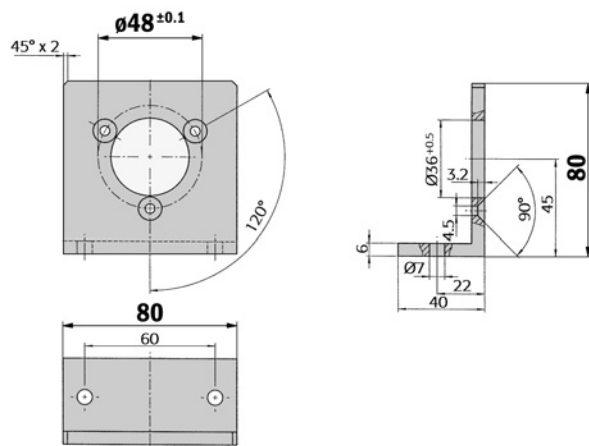
| Type | Part no. | Flange spigot |
|-----------|----------|----------------|
| BEF-MG-50 | 5312987 | Diameter 50 mm |



General tolerances according to DIN ISO 2768-mk

Mounting angle incl. fixing set for encoder with face mount flange

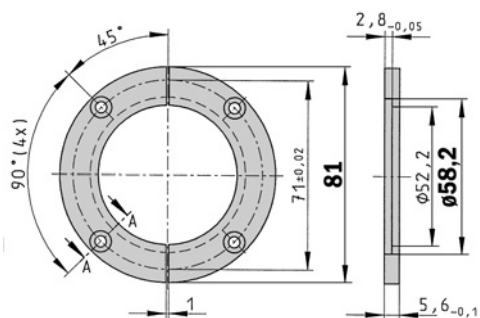
| Type | Part no. | Flange spigot |
|-----------|----------|----------------|
| BEF-WF-36 | 2029164 | Diameter 36 mm |



General tolerances according to DIN ISO 2768-mk

Servo clamps half ring, Set (comprises 2 pieces) for servo flanges with spigot diameter 50 mm

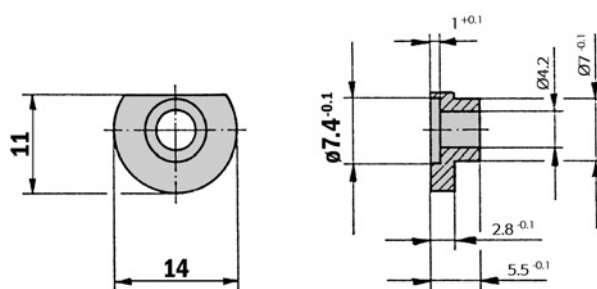
| Type | Part no. |
|--------------|----------|
| BEF-WG-SF050 | 2029165 |



General tolerances according to DIN ISO 2768-mk

Servo clamps small, Set (comprises 3 pieces) for servo flanges

| Type | Part no. |
|-----------|----------|
| BEF-WK-SF | 2029166 |



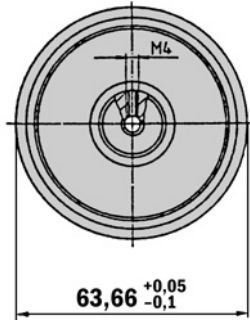
General tolerances according to DIN ISO 2768-mk

Dimensional drawings and order information

Mechanical Adaptors

Measuring wheel for encoder shafts with diameter 10 mm, type material plastic (Hytrel), wheel material plastic with aluminium hub

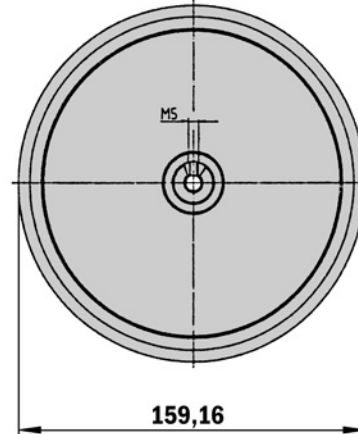
| Type | Part no. | Circumference | Surface |
|----------------|----------|---------------|---------|
| BEF-MR-010020 | 5312988 | 0.2 m | smooth |
| BEF-MR-010020G | 5318678 | 0.2 m | knurled |



General tolerances according to DIN ISO 2768-mk

Measuring wheel for encoder shafts with diameter 10 mm, type material plastic (Hytrel), wheel material plastic with aluminium hub

| Type | Part no. | Circumference | Surface |
|---------------|----------|---------------|---------|
| BEF-MR-010050 | 5312989 | 0.5 m | smooth |



General tolerances according to DIN ISO 2768-mk

Collets

Collets for DGS65 blind hollow shaft encoder

| Type | Part no. | Shaft diameter |
|----------------|----------|-----------------|
| SPZ-006-DD65-A | 2029181 | 6 mm |
| SPZ-008-DD65-A | 2029182 | 8 mm |
| SPZ-010-DD65-A | 2029183 | 10 mm |
| SPZ-011-DD65-A | 2019043 | 11 mm |
| SPZ-012-DD65-A | 2029184 | 12 mm |
| SPZ-3E8-DD65-A | 2039227 | $\frac{3}{8}$ " |

Collets for DGS66 Encoder with blind hollow shaft

| Type | Part no. | Shaft diameter |
|----------------|----------|-----------------|
| SPZ-006-DD66-A | 2029185 | 6 mm |
| SPZ-008-DD66-A | 2029186 | 8 mm |
| SPZ-009-DD66-A | 2040980 | 9 mm |
| SPZ-010-DD66-A | 2029187 | 10 mm |
| SPZ-012-DD66-A | 2029188 | 12 mm |
| SPZ-1E2-DD66-A | 2029189 | $\frac{1}{2}$ " |
| SPZ-014-DD66-A | 2029190 | 14 mm |
| SPZ-015-DD66-A | 2029191 | 15 mm |

Australia

Phone +61 3 9497 4100
1800 33 48 02 – tollfree
E-Mail sales@sick.com.au

Belgium/Luxembourg

Phone +32 (0)2 466 55 66
E-Mail info@sick.be

Brasil

Phone +55 11 5091-4900
E-Mail sac@sick.com.br

Ceská Republika

Phone +420 2 57 91 18 50
E-Mail sick@sick.cz

China

Phone +852-2763 6966
E-Mail ghk@sick.com.hk

Danmark

Phone +45 45 82 64 00
E-Mail sick@sick.dk

Deutschland

Phone +49 (0)2 11 53 01-250
E-Mail info@sick.de

España

Phone +34 93 480 31 00
E-Mail info@sick.es

France

Phone +33 1 64 62 35 00
E-Mail info@sick.fr

Great Britain

Phone +44 (0)1727 831121
E-Mail info@sick.co.uk

India

Phone +91-22-2822 7084
E-Mail info@sick-india.com

Italia

Phone +39 011 79 79 65
E-Mail info@sick.it

Japan

Phone +81 (0)3 3358 1341
E-Mail support@sick.jp

Nederlands

Phone +31 (0)30 229 25 44
E-Mail info@sick.nl

Norge

Phone +47 67 81 50 00
E-Mail austefjord@sick.no

Österreich

Phone +43 (0)22 36 62 28 8-0
E-Mail office@sick.at

Polska

Phone +48 22 837 40 50
E-Mail info@sick.pl

Republic of Korea

Phone +82-2 786 6321/4
E-Mail kang@sickkorea.net

Republika Slovenija

Phone +386 (0)1-47 69 990
E-Mail office@sick.si

Russia

Phone +7 495 775 05 34
E-Mail denis.kesaev@
sickautomation.ru

Schweiz

Phone +41 41 619 29 39
E-Mail contact@sick.ch

Singapore

Phone +65 6744 3732
E-Mail admin@sicksgp.com.sg

Suomi

Phone +358-9-25 15 800
E-Mail sick@sick.fi

Sverige

Phone +46 8 680 64 50
E-Mail info@sick.se

Taiwan

Phone +886 2 2365-6292
E-Mail sickgrc@ms6.hinet.net

Türkiye

Phone +90 216 587 74 00
E-Mail info@sick.com.tr

USA

Phone +1 937-454-1956
E-Mail sales@stegmann.com

More representatives and agencies
in all major industrial nations at
www.sick.com

