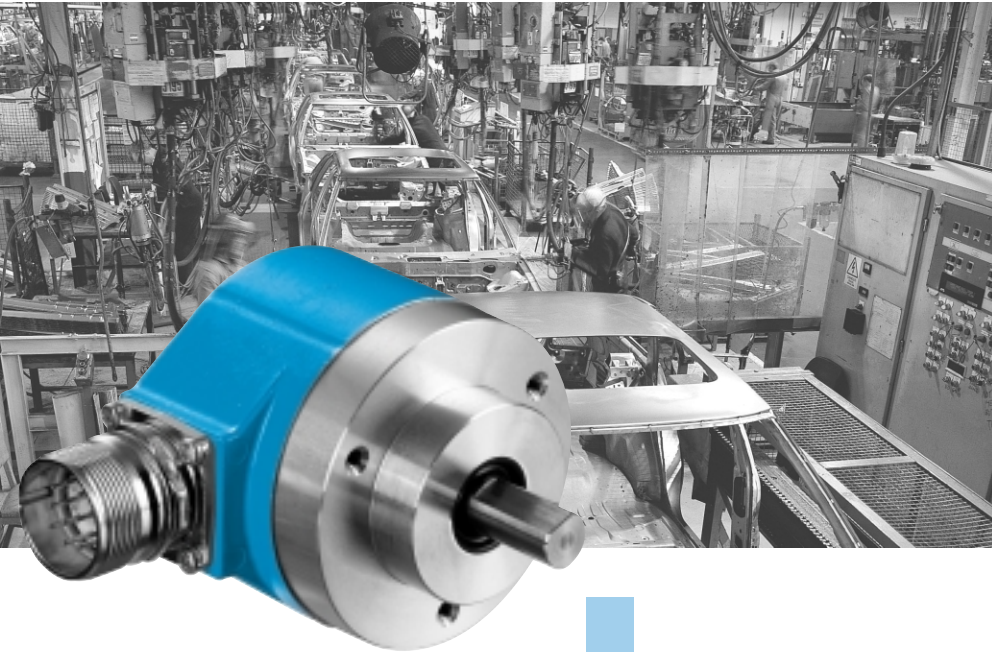


DGS 60, DGS 65 and DGS 66: Incremental Encoders for rough environmental conditions




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

| | |
|---|--|
|  | <p>Number of lines 100 to 10,000</p> |
| <p>Incremental Encoder</p> | |

Incremental encoders in the DGS 60, DGS 65 and DGS 66 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.

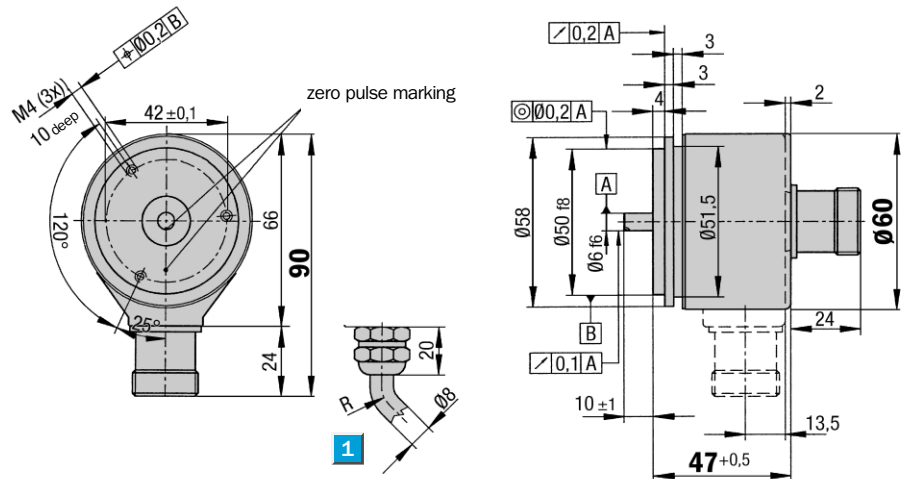
Resolutions up to 10,000 lines are available.

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

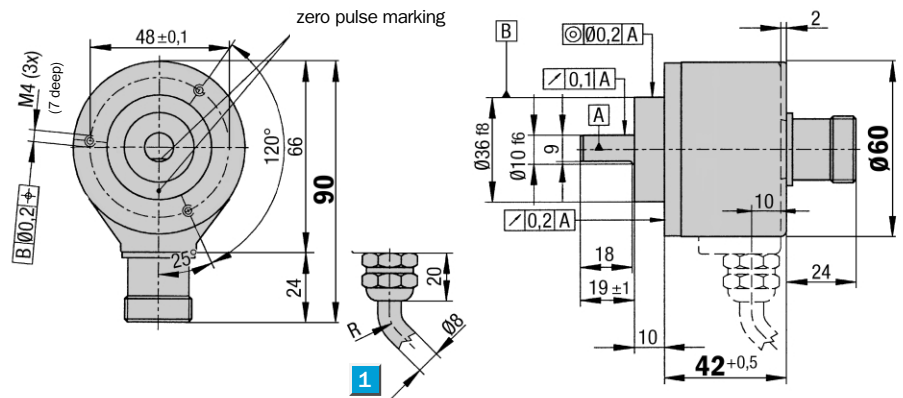
Dimensional drawing servo flange



1 R = bending radius min. 40 mm

General tolerances according to DIN ISO 2768-mk

Dimensional drawing face mount flange

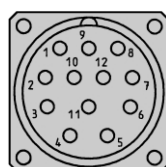


1 R = bending radius min. 40 mm

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 | | DGS 60 | | Flange type | | | | | | | | | |
|--|--|--------|---------|-------------|--|--|--|--|--|--|--|--|--|
| | | servo | face m. | | | | | | | | | | |
| Solid shaft | 10 mm | | | | | | | | | | | | |
| | 6 mm | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | |
| 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 ⁷⁾ | | | | | | | | | | | | | |
| Housing side | IP 67 | | | | | | | | | | | | |
| Flange side | 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⁾ 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

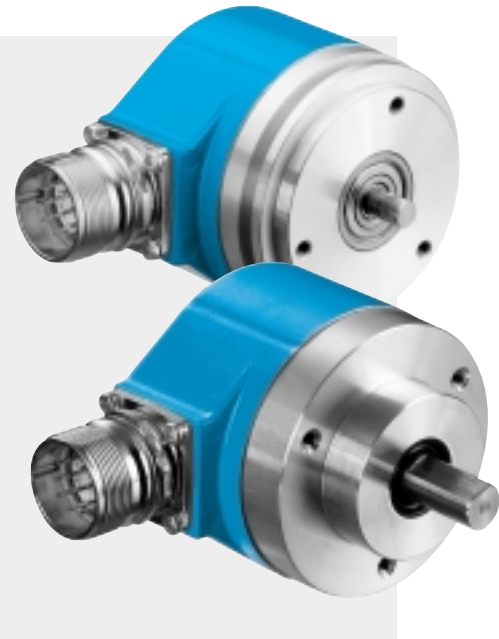
⁷⁾ With mating connector fitted

Order information see page 5

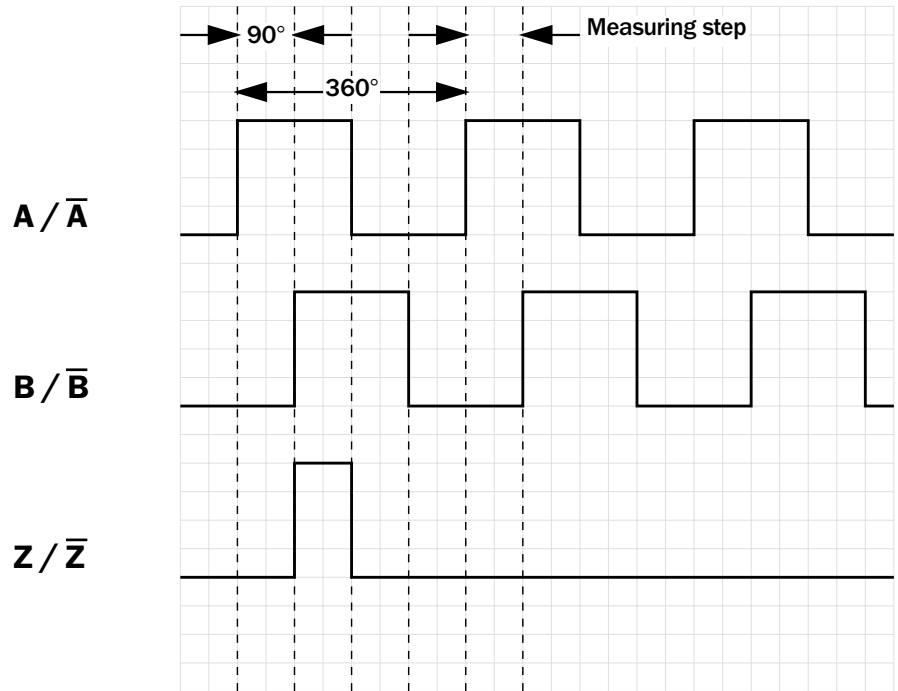
 **Number of lines**
100 to 10,000

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

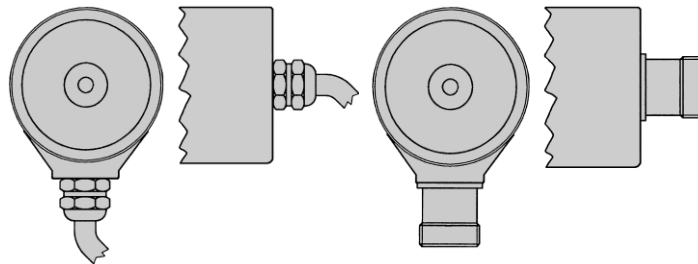


Electrical interfaces

| | | | |
|--------------------|--------------|--------------|-----------------|
| 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 DGS 60, 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 ¹⁾ |
| 00125 | 00256 | 00512 | 00750 | 01200 | 02048 | 04096 | 08000 ¹⁾ |
| 00150 | 00300 | 00570 | 00800 | 01250 | 02500 | 04500 | 08192 ¹⁾ |
| 00160 | 00314 | 00600 | 00900 | 01500 | 03000 | 05000 | 09000 ¹⁾ |
| 00180 | 00360 | 00625 | 01000 | 01800 | 03600 | 06000 ¹⁾ | 10000 ¹⁾ |
| 00200 | 00400 | 00700 | | | | | |

¹⁾ Only possible with interface 4 ... 6 V, TTL (RS 422) = A

Order example: Incremental Encoder DGS 60

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 | - | | | | | | | | |

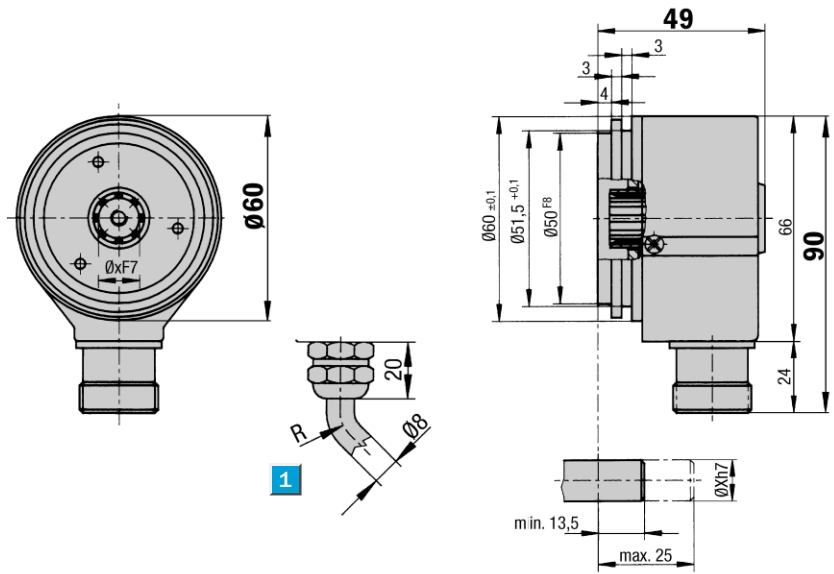
Number of lines
100 to 10,000

Incremental Encoder

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



Dimensional drawing blind hollow shaft

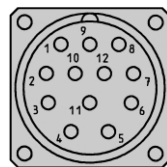


1 R = bending radius min. 40 mm

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 |

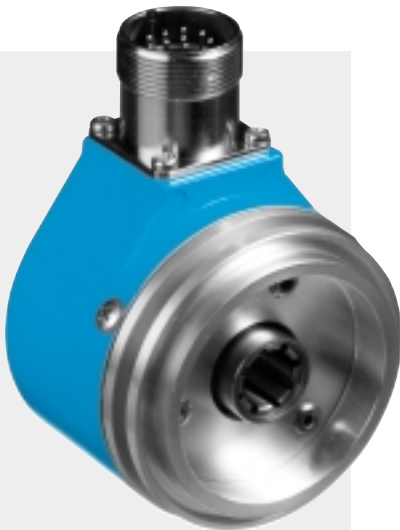
| Technical Data | | DGS 65 | Flange type | | | | | | | | | | | |
|--|--|-------------------|-------------|--|--|--|--|--|--|--|--|--|--|--|
| | | | blind | | | | | | | | | | | |
| Hollow shaft diameter | 6, 8, 10 and 12 mm | | | | | | | | | | | | | |
| Number of lines (Z) per revolution | 00100 to 10,000, 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 ⁶⁾ | | | | | | | | | | | | | | |
| Housing side | IP 65 | | | | | | | | | | | | | |
| Flange side | 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 outlet²⁾ Condensation not permitted³⁾ To DIN EN 61000-6-2 and DIN EN 61000-6-3⁴⁾ To DIN EN 60068-2-27⁵⁾ To DIN EN 60068-2-6⁶⁾ With mating connector fitted

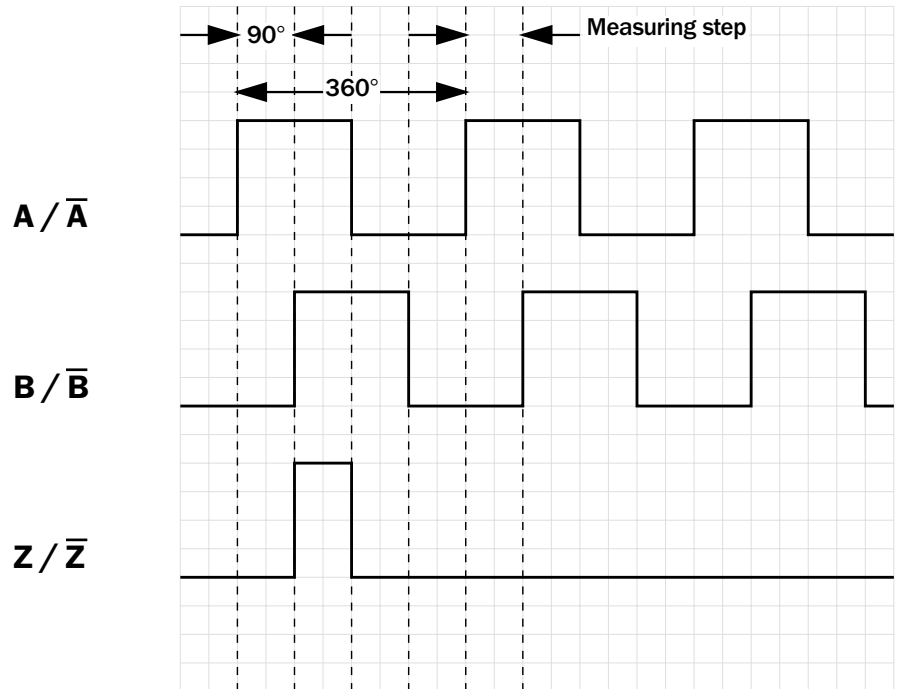
 **Number of lines**
100 to 10,000

Incremental Encoder

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



Incremental pulse diagram

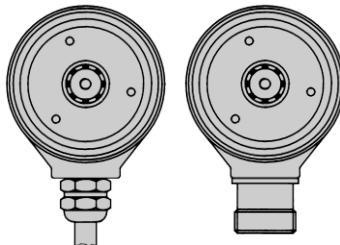


Electrical interfaces

| | | | |
|--------------------|--------------|--------------|-----------------|
| 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 DGS 65, 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 | | 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⁾ Collets for 6, 8, 10 and 12 mm as accessories, separate order item (see below).

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 ... 6V, TTL (RS 422) = A

Order example: Incremental Encoder DGS 65

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 DGS 65 Encoder with blind hollow shaft

| Type | Part no. | Shaft diameter |
|----------------|-----------|----------------|
| SPZ-006-DD65-A | 2 029 181 | 6 mm |
| SPZ-008-DD65-A | 2 029 182 | 8 mm |
| SPZ-010-DD65-A | 2 029 183 | 10 mm |
| SPZ-011-DD65-A | 2 019 043 | 11 mm |
| SPZ-012-DD65-A | 2 029 184 | 12 mm |

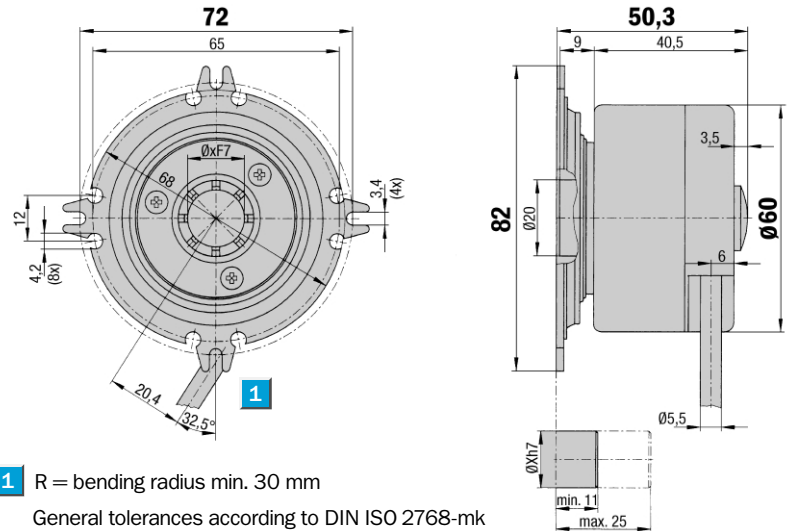
Number of lines
100 to 10,000

Incremental Encoder

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

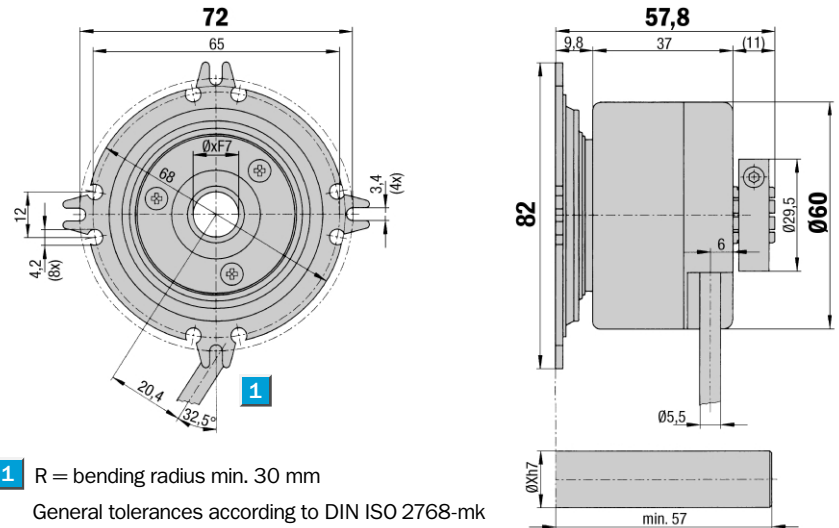


Dimensional drawing blind hollow shaft



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 | | DGS 66 | Flange type | | | | | | | |
|---|--|------------------------------------|-------------|---------|--|--|--|--|--|--|
| | | | blind | through | | | | | | |
| Hollow shaft diameter | 6, 8, 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 ⁴⁾ | 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 ⁴⁾ | | 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 | | | | | | | | |

⁴⁾ Condensation not permitted

³⁾ To DIN EN 60068-2-27

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

⁴⁾ To DIN EN 60068-2-6

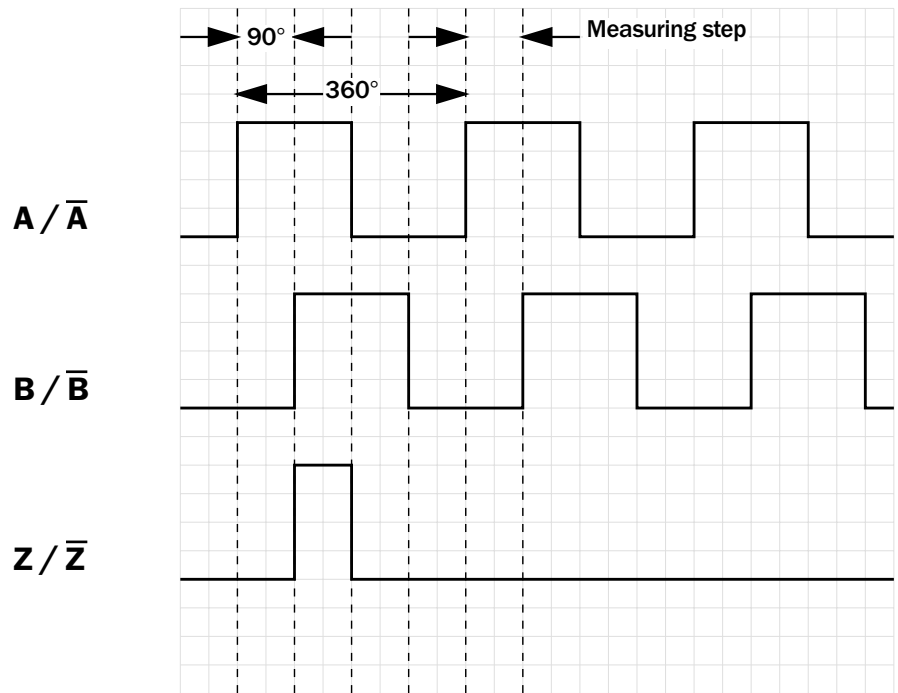
 **Number of lines**
100 to 10,000

Incremental Encoder

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



Incremental pulse diagram

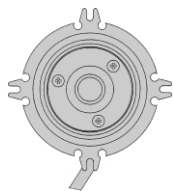


Electrical interfaces

| | | | |
|--------------------|--------------|--------------|-----------------|
| 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



CE

Accessories

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

Order information

Incremental Encoder DGS 66, 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 | | |

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 DGS 66

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 DGS 66 Encoder with blind hollow shaft

| Type | Part no. | Shaft diameter |
|----------------|-----------|----------------|
| SPZ-006-DD66-A | 2 029 185 | 6 mm |
| SPZ-008-DD66-A | 2 029 186 | 8 mm |
| SPZ-010-DD66-A | 2 029 187 | 10 mm |
| SPZ-012-DD66-A | 2 029 188 | 12 mm |
| SPZ-1E2-DD66-A | 2 029 189 | 1/2" |
| SPZ-014-DD66-A | 2 029 190 | 14 mm |
| SPZ-015-DD66-A | 2 029 191 | 15 mm |

Dimensional drawings and order information

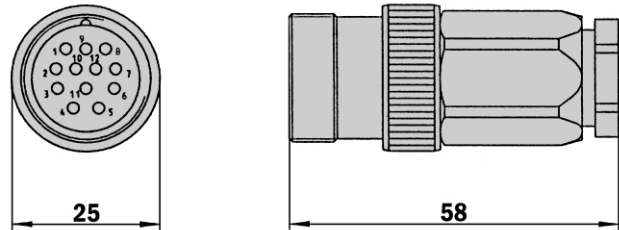
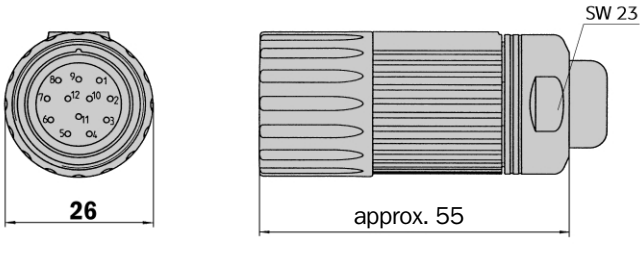
Screw-in system M23, 12 pin

Cable onnector M23 female, 12 pin, straight, screened

| Type | Part no. | Contacts |
|------------|-----------|----------|
| DOS-2312-G | 6 027 538 | 12 |

Cable onnector M23 male, 12 pin, straight, screened

| Type | Part no. | Contacts |
|------------|-----------|----------|
| STE-2312-G | 6 027 537 | 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 | 2 029 212 | 12 | 1.5 m |
| DOL-2312-G03MMA3 | 2 029 213 | 12 | 3.0 m |
| DOL-2312-G05MMA3 | 2 029 214 | 12 | 5.0 m |
| DOL-2312-G10MMA3 | 2 029 215 | 12 | 10.0 m |
| DOL-2312-G20MMA3 | 2 029 216 | 12 | 20.0 m |
| DOL-2312-G30MMA3 | 2 029 217 | 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 | 6 027 529 | 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 | 6 027 530 | 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 | 6 027 531 | 12 | |
| LTG-2612-MW | 6 028 516 | 12 | UV and salt water resistant |

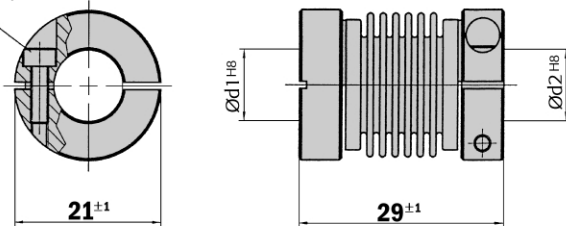
Dimensional drawings and order information

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

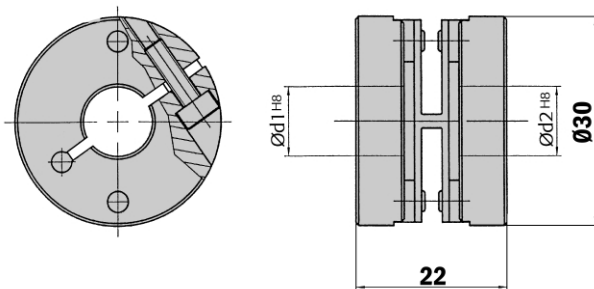
| Type | Part no. | Shaft diameter |
|------------|-----------|-----------------|
| KUP-0606-B | 5 312 981 | 6 mm ... 6 mm |
| KUP-0610-B | 5 312 982 | 6 mm ... 10 mm |
| KUP-1010-B | 5 312 983 | 10 mm ... 10 mm |
| KUP-1012-B | 5 312 984 | 10 mm ... 12 mm |

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 | 5 312 985 | 6 mm ... 10 mm |
| KUP-1010-F | 5 312 986 | 10 mm ... 10 mm |



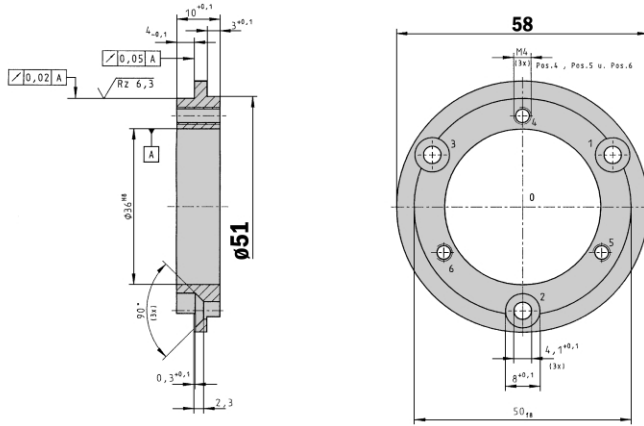
General tolerances according to DIN ISO 2768-mk

Dimensional drawings and order information

Mechanical Adaptors

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

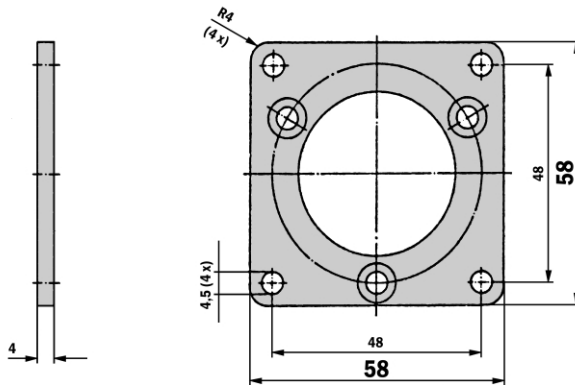
| Type | Part no. | Adaption |
|----------------|-----------|-----------------------|
| BEF-FA-036-050 | 2 029 160 | To 50 mm servo flange |



General tolerances according to DIN ISO 2768-mk

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

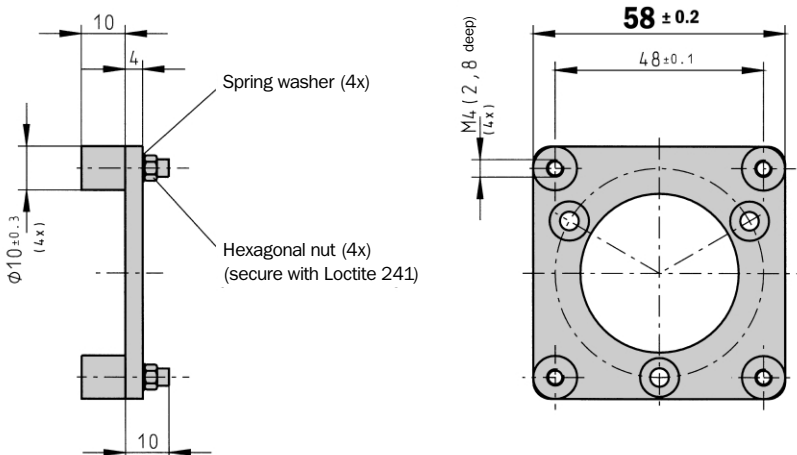
| Type | Part no. | Adaption |
|-------------------|-----------|--------------------------------|
| BEF-FA-036-060REC | 2 029 162 | To 60 mm square mounting plate |



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 | 2 029 163 | To 60 mm square mounting plate with shock absorbers |



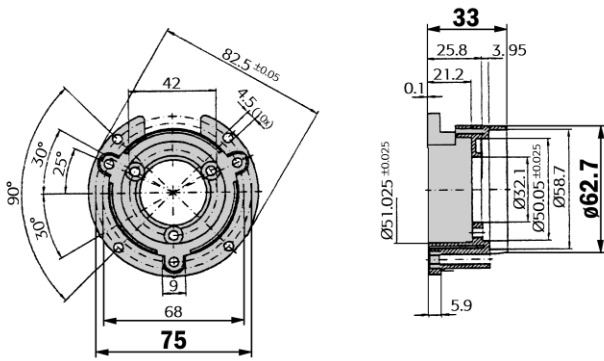
General tolerances according to DIN ISO 2768-mk

Dimensional drawings and order information

Mechanical Adaptors

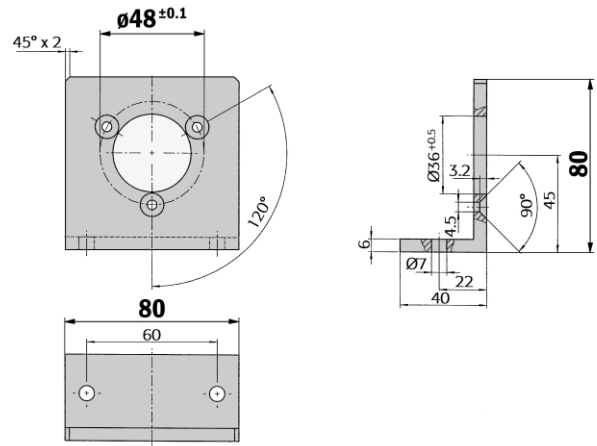
Mounting bell incl. fixing set for encoder with servo flange

| Type | Part no. | Flange spigot |
|-----------|-----------|----------------|
| BEF-MG-50 | 5 312 987 | Diameter 50 mm |



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

| Type | Part no. | Flange spigot |
|-----------|-----------|----------------|
| BEF-WF-36 | 2 029 164 | Diameter 36 mm |

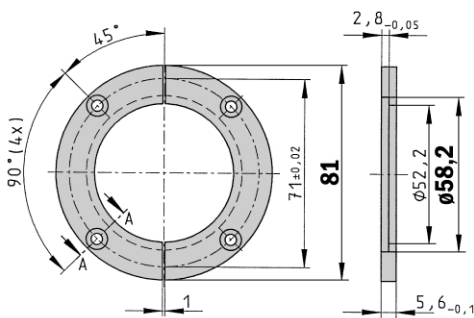


General tolerances according to DIN ISO 2768-mk

General tolerances according to DIN ISO 2768-mk

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

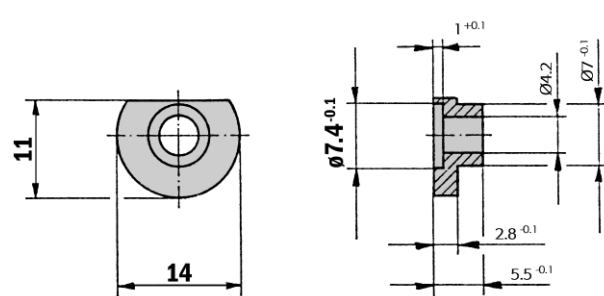
| Type | Part no. |
|--------------|-----------|
| BEF-WG-SF050 | 2 029 165 |



General tolerances according to DIN ISO 2768-mk

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

| Type | Part no. |
|-----------|-----------|
| BEF-WK-SF | 2 029 166 |



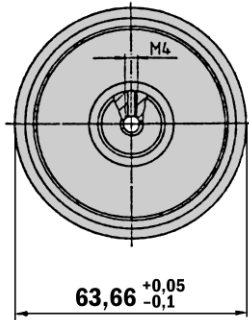
General tolerances according to DIN ISO 2768-mk

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

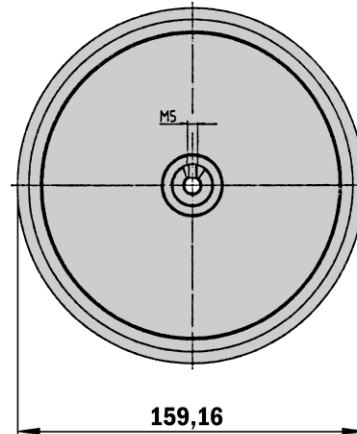
| Type | Part no. | Circumference |
|---------------|-----------|---------------|
| BEF-MR-010020 | 5 312 988 | 0.2 m |



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 |
|---------------|-----------|---------------|
| BEF-MR-010050 | 5 312 989 | 0.5 m |



General tolerances according to DIN ISO 2768-mk

Collets

Collets for DGS 65 blind hollow shaft encoder

| Type | Part no. | Shaft diameter |
|----------------|-----------|----------------|
| SPZ-006-DD65-A | 2 029 181 | 6 mm |
| SPZ-008-DD65-A | 2 029 182 | 8 mm |
| SPZ-010-DD65-A | 2 029 183 | 10 mm |
| SPZ-011-DD65-A | 2 019 043 | 11 mm |
| SPZ-012-DD65-A | 2 029 184 | 12 mm |

Collets for DGS 66 through hollow shaft encoder

| Type | Part no. | Shaft diameter |
|----------------|-----------|----------------|
| SPZ-006-DD66-A | 2 029 185 | 6 mm |
| SPZ-008-DD66-A | 2 029 186 | 8 mm |
| SPZ-010-DD66-A | 2 029 187 | 10 mm |
| SPZ-012-DD66-A | 2 029 188 | 12 mm |
| SPZ-1E2-DD66-A | 2 029 189 | 1/2" |
| SPZ-014-DD66-A | 2 029 190 | 14 mm |
| SPZ-015-DD66-A | 2 029 191 | 15 mm |

Contact:

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 vzdinfo@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

Italia

Phone +39 011 797965
E-Mail stegmann@stegmann.it

Japan

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

Korea

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

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

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

USA

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

More representatives and agencies
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