



DFV60A-22PM65536

DFV60

MEASURING WHEEL ENCODERS

SICK
Sensor Intelligence.



Ordering information

| Type | part no. |
|------------------|----------|
| DFV60A-22PM65536 | 1051337 |

Other models and accessories → www.sick.com/DFV60

Illustration may differ



Detailed technical data

Features

| | |
|-----------------------|--|
| Items supplied | DFV60 spring arm (part number: 2056155) not included with delivery |
|-----------------------|--|

Safety-related parameters

| | |
|--|--|
| MTTF_D (mean time to dangerous failure) | 300 years (EN ISO 13849-1) ¹⁾ |
|--|--|

¹⁾ This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40°C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

Performance

| | |
|---|---|
| Pulses per revolution | 65,536 |
| Resolution in pulses/mm | 218.45 Pulses/mm ¹⁾ |
| Measuring increment (resolution in mm/pulse) | 0.005 mm/pulse ²⁾ |
| Measuring step deviation | ± 0.002° ³⁾ |
| Error limits | ± 4 mm/m, subject to measuring wheel (measuring wheel surface + measuring surface + ambient conditions) |
| Initialization time | 30 ms |

¹⁾ Calculation example: Pulses per revolution / measuring wheel circumference = 16,384 pulses per revolution / 200 mm = 81.92 pulses/mm.

²⁾ Calculation example: Circumference of wheel / pulses per revolution = 200 mm / 16384 pulses per revolution = 0,012mm/pulse.

³⁾ Value refers to the mounted encoder.

Interfaces

| | |
|---------------------------------------|-------------|
| Communication interface | Incremental |
| Communication Interface detail | TTL / HTL |
| Programmable/configurable | ✓ |

Electronics

| | |
|------------------------|-------------------------------|
| Connection type | Cable, 8-wire, universal, 5 m |
|------------------------|-------------------------------|

| | |
|--|---|
| Power consumption max. without load | ≤ 30 mA |
| Supply voltage | 4.5 V ... 32 V |
| Load current max. | 30 mA |
| Maximum output frequency | 820 kHz |
| Reference signal, number | 1 |
| Reference signal, position | 90°, electric, logically gated with A and B |
| Reverse polarity protection | ✓ |
| Short-circuit protection of the outputs | ✓ |

Mechanics

| | |
|--|--|
| Measuring wheel circumference | 300 mm |
| Measuring wheel surface | O-ring NBR70 ¹⁾ |
| Mass | + 500 g |
| Encoder material | |
| Shaft | Stainless steel |
| Flange | Aluminum |
| Housing | Aluminum |
| Cable | PUR |
| Spring arm mechanism material | |
| Spring element | Not contained in the scope of delivery of the system |
| | Aluminum |
| Start up torque | 0.8 Ncm (at 20 °C) |
| Operating torque | 0.6 Ncm (at 20 °C) |
| Operating speed | 1,500 min ⁻¹ |
| Maximum operating speed | 3,000 min ⁻¹ ²⁾ |
| Bearing lifetime | 3 x 10 ⁹ revolutions |
| Maximum travel/deflection of spring arm | 40 mm |
| Max. permissible working area for the spring (continuous operation) | ± 10 mm |
| Recommended spring deflection | 20 mm ... 40 mm |
| Mounting position relative to the measuring object | Preferably from above, from below possible |

¹⁾ The surface of a measuring wheel is subject to wear. This depends on contact pressure, acceleration behavior in the application, traversing speed, measurement surface, mechanical alignment of the measuring wheel, temperature, and ambient conditions. We recommend you regularly check the condition of the measuring wheel and replace as required.

²⁾ Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

Ambient data

| | |
|--------------------------------------|--|
| EMC | According to EN 61000-6-2 and EN 61000-6-4 |
| Enclosure rating | IP65 |
| Permissible relative humidity | 90 % (Condensation not permitted) |
| Operating temperature range | -20 °C ... +100 °C |
| Storage temperature range | -40 °C ... +100 °C, without package |
| Resistance to shocks | 70 g, 6 ms (EN 60068-2-27) |
| Resistance to vibration | 30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6) |

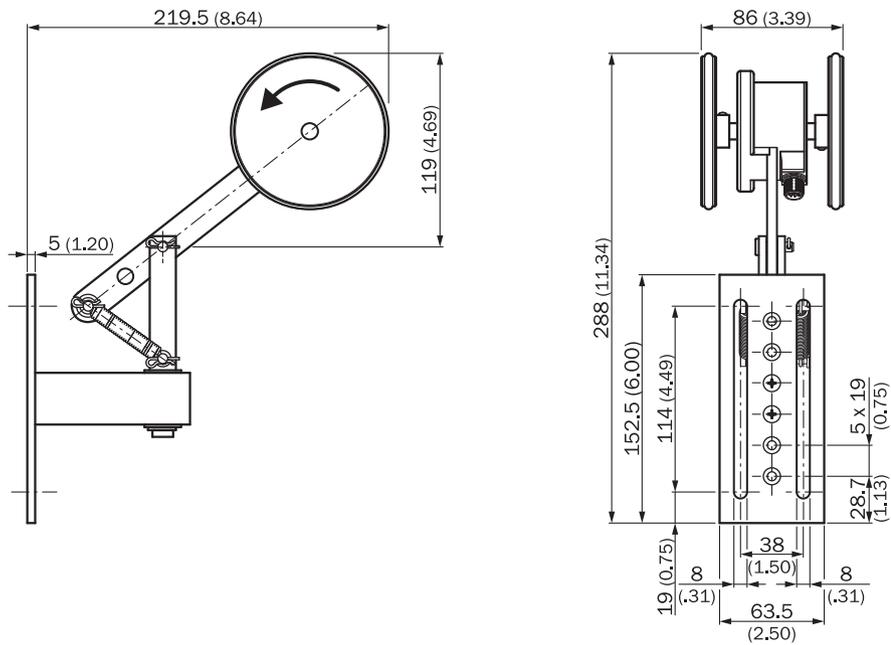
Certificates

| | |
|--|---|
| EU declaration of conformity | ✓ |
| UK declaration of conformity | ✓ |
| ACMA declaration of conformity | ✓ |
| Moroccan declaration of conformity | ✓ |
| China RoHS | ✓ |
| Information according to Art. 3 of Data Act (Regulation EU 2023/2854) | ✓ |

Classifications

| | |
|-----------------------|----------|
| ECLASS 5.0 | 27270501 |
| ECLASS 5.1.4 | 27270501 |
| ECLASS 6.0 | 27270590 |
| ECLASS 6.2 | 27270590 |
| ECLASS 7.0 | 27270501 |
| ECLASS 8.0 | 27270501 |
| ECLASS 8.1 | 27270501 |
| ECLASS 9.0 | 27270501 |
| ECLASS 10.0 | 27270790 |
| ECLASS 11.0 | 27270707 |
| ECLASS 12.0 | 27270504 |
| ETIM 5.0 | EC001486 |
| ETIM 6.0 | EC001486 |
| ETIM 7.0 | EC001486 |
| ETIM 8.0 | EC001486 |
| UNSPSC 16.0901 | 41112113 |

Dimensional drawing DFV60 spring arm (part number: 2056155) not included with delivery

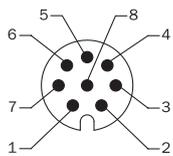


Dimensions in mm (inch)

Anschlussbelegung

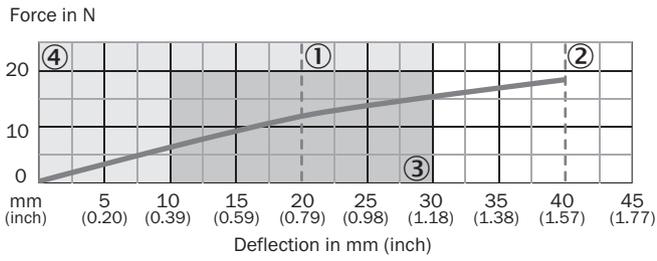
Cable 8-core

View to the connector M12 fitted to the encoder body



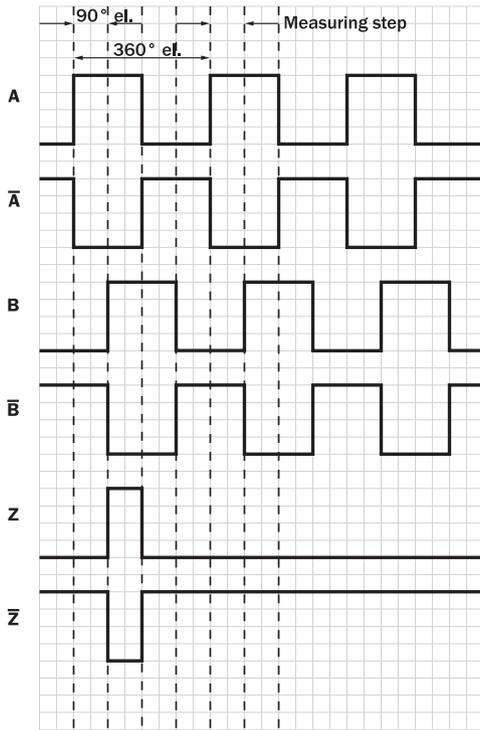
| PIN, 8-pin, connector M12 | Color of wires for encoders with cable outlet | Signal TTL, HTL | Explanation |
|---------------------------|---|-----------------|---|
| 1 | Brown | \bar{A} | Signal line |
| 2 | White | A | Signal line |
| 3 | Black | \bar{B} | Signal line |
| 4 | Pink | B | Signal line |
| 5 | Yellow | \bar{Z} | Signal line |
| 6 | Lilac | Z | Signal line |
| 7 | Blue | GND | Ground connection of the encoder |
| 8 | Red | +U _s | Supply voltage (potential free to housing) |
| Screen | Screen | Screen | Screen connected to encoder housing. On the control side connected to earth. |

Diagrams Dual wheel, spring tension, yoke mount



- ① recommended pre-tension (20 mm)
- ② maximum deflection (40 mm)
- ③ recommended deflection range (10 – 30 mm)
- ④ permissible working area (0 – 30 mm)

Diagrams



Recommended accessories

Other models and accessories → www.sick.com/DFV60

| | Brief description | Type | part no. |
|---|---|------------------|----------|
| measuring wheels and measuring wheel mechanics | | | |
|  | <ul style="list-style-type: none"> • Product segment: Measuring wheels and measuring wheel mechanics • Product: Measuring wheels • Description: Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm | BEF-MR010030R | 2049278 |
| | <ul style="list-style-type: none"> • Product segment: Measuring wheels and measuring wheel mechanics • Product: Measuring wheel mechanics • Description: O-ring for measuring wheels (circumference 300 mm) • Items supplied: 2x O-ring | BEF-OR-083-050 | 2064076 |
| Mounting systems | | | |
|  | <ul style="list-style-type: none"> • Description: Spring arm / mounting arm for DFV60 | DFV60 spring arm | 2056155 |

| | Brief description | Type | part no. |
|---|--|------------------|----------|
| connectors and cables | | | |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, JST, 8-pin, straight • Connection type head B: Flying leads • Signal type: Incremental, SSI • Items supplied: JST including sealing • Cable: 0.5 m, 8-wire, PUR, halogen-free • Description: Incremental, shielded, SSI | DOL-0J08-G0M5AA3 | 2046873 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, JST, 8-pin, straight • Connection type head B: Flying leads • Signal type: Incremental • Items supplied: JST including sealing • Cable: 1.5 m, 8-wire, PUR, halogen-free • Description: Incremental, shielded | DOL-0J08-G1M5AA3 | 2046874 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, JST, 8-pin, straight • Connection type head B: Flying leads • Signal type: SSI, Incremental • Items supplied: JST including sealing • Cable: 1.5 m, 8-wire, PUR, halogen-free • Description: SSI, shielded, Incremental | DOL-0J08-G1M5AA6 | 2048590 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, JST, 8-pin, straight • Connection type head B: Flying leads • Signal type: Incremental, SSI • Items supplied: JST including sealing • Cable: 10 m, 8-wire, PUR, halogen-free • Description: Incremental, shielded, SSI | DOL-0J08-G10MAA3 | 2046877 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, JST, 8-pin, straight • Connection type head B: Flying leads • Signal type: SSI, Incremental • Items supplied: JST including sealing • Cable: 3 m, 8-wire, PUR, halogen-free • Description: SSI, shielded, Incremental | DOL-0J08-G3M0AA6 | 2048591 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, M12, 8-pin, straight • Connection type head B: Flying leads • Signal type: Incremental, SSI • Cable: 2 m, 8-wire, PUR, halogen-free • Description: Incremental, shielded, SSI • Connection systems: Flying leads • Application: Drag chain operation, Zones with oils and lubricants | DOL-1208-G02MAC1 | 6032866 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, M12, 8-pin, straight • Connection type head B: Flying leads • Signal type: Incremental, SSI • Cable: 5 m, 8-wire, PUR, halogen-free • Description: Incremental, shielded, SSI • Connection systems: Flying leads • Application: Drag chain operation, Zones with oils and lubricants | DOL-1208-G05MAC1 | 6032867 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, M12, 8-pin, straight • Connection type head B: Flying leads • Signal type: Incremental, SSI • Cable: 10 m, 8-wire, PUR, halogen-free • Description: Incremental, shielded, SSI • Connection systems: Flying leads • Application: Drag chain operation, Zones with oils and lubricants | DOL-1208-G10MAC1 | 6032868 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, M12, 8-pin, straight • Connection type head B: Flying leads • Signal type: Incremental, SSI • Cable: 20 m, 8-wire, PUR, halogen-free • Description: Incremental, shielded, SSI • Connection systems: Flying leads • Application: Drag chain operation, Zones with oils and lubricants | DOL-1208-G20MAC1 | 6032869 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, M12, 8-pin, straight • Connection type head B: Flying leads • Signal type: Incremental, SSI • Cable: 25 m, 8-wire, PUR, halogen-free • Description: Incremental, shielded, SSI • Connection systems: Flying leads • Application: Drag chain operation, Zones with oils and lubricants | DOL-1208-G25MAC1 | 6067859 |
|  | <ul style="list-style-type: none"> • Connection type head A: Female connector, M23, 12-pin, straight • Connection type head B: Flying leads • Signal type: Incremental | DOL-2312-G02MLA3 | 2030682 |

| | Brief description | Type | part no. |
|---|--|------------------|----------|
| | <ul style="list-style-type: none"> Cable: 2 m, 11-wire, PUR Description: Incremental, shielded Application: Zones with oils and lubricants | | |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 3 m, 12-wire, PUR, halogen-free Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G03MMA3 | 2029213 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 5 m, 12-wire, PUR, halogen-free Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G05MMA3 | 2029214 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 7 m, 11-wire, PUR Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G07MLA3 | 2030685 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 1.5 m, 12-wire, PUR, halogen-free Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G1M5MA3 | 2029212 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 10 m, 11-wire, PUR Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G10MLA3 | 2030688 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 10 m, 12-wire, PUR, halogen-free Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G10MMA3 | 2029215 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 15 m, 11-wire, PUR Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G15MLA3 | 2030692 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 20 m, 11-wire, PUR Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G20MLA3 | 2030695 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 20 m, 12-wire, PUR, halogen-free Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G20MMA3 | 2029216 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 25 m, 11-wire, PUR Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G25MLA3 | 2030699 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 30 m, 11-wire, PUR Description: Incremental, shielded | DOL-2312-G30MLA3 | 2030702 |

| | Brief description | Type | part no. |
|---|--|------------------|----------|
|  | <ul style="list-style-type: none"> Application: Zones with oils and lubricants Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 30 m, 12-wire, PUR, halogen-free Description: Incremental, shielded Application: Zones with oils and lubricants | DOL-2312-G30MMA3 | 2029217 |
|  | <ul style="list-style-type: none"> Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental, HIPERFACE® Items supplied: By the meter Cable: 8-wire, PUR, halogen-free Description: SSI, shielded, Incremental, HIPERFACE® | LTG-2308-MWENC | 6027529 |
|  | <ul style="list-style-type: none"> Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental Items supplied: By the meter Cable: 11-wire, PUR Description: SSI, shielded, Incremental | LTG-2411-MW | 6027530 |
|  | <ul style="list-style-type: none"> Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental Items supplied: By the meter Cable: 12-wire, PUR, halogen-free Description: SSI, shielded, Incremental | LTG-2512-MW | 6027531 |
|  | <ul style="list-style-type: none"> Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, TTL, HTL, Incremental Items supplied: By the meter Cable: 12-wire, UV and saltwater-resistant, PUR, halogen-free Description: SSI, shielded, TTL, HTL, Incremental | LTG-2612-MW | 6028516 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, terminal box, 8-pin, straight Connection type head B: Male connector, D-Sub, 9-pin, straight Signal type: SSI + incremental Cable: 0.5 m, 4-wire, PVC Description: SSI + incremental, shielded Note: Programming adapter cable for programming tool PGT-10-Pro and PGT-08-S | DSL-0D08-G0M5AC3 | 2061739 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M12, 8-pin, straight Connection type head B: Male connector, D-Sub, 9-pin, straight Signal type: Incremental Cable: 0.5 m, 8-wire Description: Incremental, shielded Note: Programming adapter cable for programming tool PGT-10-Pro and PGT-08-S | DSL-2D08-G0M5AC3 | 2046579 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Male connector, D-Sub, 9-pin, straight Signal type: Incremental Cable: 0.5 m, 8-wire Description: Incremental, shielded Note: Programming adapter cable for programming tool PGT-10-Pro and PGT-08-S | DSL-3D08-G0M5AC3 | 2046580 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M12, 8-pin, straight, A-coded Signal type: Incremental, SSI Cable: CAT5, CAT5e Description: Incremental, shielded, SSI Connection systems: IDC quick connection Permitted cross-section: 0.14 mm² ... 0.34 mm² | DOS-1208-GA01 | 6045001 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shielded, SSI, Incremental Connection systems: Solder connection | DOS-2312-G | 6027538 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shielded, SSI, Incremental Connection systems: Solder connection | DOS-2312-G02 | 2077057 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, angled, A-coded Signal type: HIPERFACE®, SSI, Incremental Description: HIPERFACE®, shielded, SSI, Incremental | DOS-2312-W01 | 2072580 |

| | Brief description | Type | part no. |
|---|---|------------------|----------|
|  | <ul style="list-style-type: none"> Connection systems: Solder connection Connection type head A: Male connector, M12, 8-pin, straight, A-coded Signal type: Incremental Cable: CAT5, CAT5e Description: Incremental, shielded Connection systems: IDC quick connection Permitted cross-section: 0.14 mm² ... 0.34 mm² | STE-1208-GA01 | 6044892 |
|  | <ul style="list-style-type: none"> Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental, RS-422 Description: HIPERFACE[®], shielded, SSI, Incremental, RS-422 Connection systems: Solder connection | STE-2312-G | 6027537 |
|  | <ul style="list-style-type: none"> Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], shielded, SSI, Incremental Connection systems: Solder connection | STE-2312-GX | 6028548 |
|  | <ul style="list-style-type: none"> Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], shielded, SSI, Incremental Connection systems: Solder connection | STE-2312-G01 | 2077273 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, JST, 8-pin, straight Connection type head B: Male connector, M23, 12-pin, straight Signal type: Incremental Cable: 0.35 m, 8-wire, PUR, halogen-free Description: Incremental, shielded | STL-2312-GM35AA3 | 2061621 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, JST, 8-pin, straight Connection type head B: Male connector, M23, 12-pin, straight Signal type: Incremental Cable: 1 m, 8-wire, PUR, halogen-free Description: Incremental, shielded | STL-2312-G01MAA3 | 2061622 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, JST, 8-pin, straight Connection type head B: Male connector, M23, 12-pin, straight Signal type: Incremental Cable: 2 m, 8-wire, PUR, halogen-free Description: Incremental, shielded | STL-2312-G02MAA3 | 2061504 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 9-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], shielded, SSI, Incremental Connection systems: Solder connection | DOS-2309-G | 6028533 |
| programming devices | | | |
|  | <ul style="list-style-type: none"> Product segment: Programming devices Product family: PGT-08-S Description: USB programming unit, for programmable SICK encoders AFS60, AFM60, DFS60, VFS60, DFV60 and wire draw encoders with programmable encoders. Not compatible with the portable SOPAS ET versions. | PGT-08-S | 1036616 |
|  | <ul style="list-style-type: none"> Product segment: Programming devices Product family: PGT-10 Pro Description: Programming unit display for programmable SICK DFS60, DFV60, AFS/AFM60, AHS/AHM36 encoders, and wire draw encoder with DFS60, AFS/AFM60 and AHS/AHM36. Compact dimensions, low weight, and intuitive operation. Items supplied: 1 x PGT-10-Pro stand-alone programming tool, 4 x alkaline type batteries, 1.5 V Mignon (AA) | PGT-10-Pro | 1072254 |

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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