

## EIL580P-SQ

Solid shaft with square flange

1...65536 pulses per revolution programmable (interpolated system)

### Overview

- Size  $\varnothing 58$  mm
- Precise optical sensing (interpolated)
- Output signal level programmable (TTL or HTL)
- Square flange 2.5" (63.5 mm)
- Connection axial, radial or tangential
- Pulses per revolution 1...65536, programmable
- High protection up to IP 67
- High resistance to shock and vibrations



### Technical data

#### Technical data - electrical ratings

|                             |                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Voltage supply              | 4.75...30 VDC                                                                                                         |
| Reverse polarity protection | Yes                                                                                                                   |
| Short-circuit proof         | Yes                                                                                                                   |
| Consumption w/o load        | $\leq 70$ mA                                                                                                          |
| Initializing time           | $\leq 30$ ms after power on                                                                                           |
| Pulses per revolution       | 1 ... 65536                                                                                                           |
| Duty cycle                  | 45...55 % typical at 1024, 2048 ppr (further see table Duty cycle)                                                    |
| Reference signal            | Zero pulse 90° or 180°                                                                                                |
| Sensing method              | Optical                                                                                                               |
| Output frequency            | $\leq 300$ kHz (TTL)<br>$\leq 160$ kHz (HTL)                                                                          |
| Output signals              | A+, B+, R+, A-, B-, R-                                                                                                |
| Output stages               | TTL/RS422<br>HTL/push-pull                                                                                            |
| Programmable parameters     | Output level TTL/HTL<br>Pulse number 1...65536<br>Zero pulse width 90°/180°<br>Zero pulse position<br>Signal sequence |
| Interference immunity       | DIN EN 61000-6-2                                                                                                      |
| Emitted interference        | DIN EN 61000-6-3                                                                                                      |
| Approval                    | UL 508 / CSA 22.2                                                                                                     |

#### Technical data - mechanical design

|                       |                                                                                                                                        |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Size (flange)         | 2.5 x 2.5" (63.5 x 63.5 mm)                                                                                                            |
| Shaft type            | $\varnothing 10$ x 20 mm, solid shaft with flat<br>$\varnothing 3/8$ " x 4/5" ( $\varnothing 9.525$ x 20.32 mm), solid shaft with flat |
| Admitted shaft load   | $\leq 40$ N axial<br>$\leq 80$ N radial                                                                                                |
| Flange                | Square flange 2.5" (63.5 mm)                                                                                                           |
| Protection EN 60529   | IP 65 (without shaft seal)<br>IP 67 (with shaft seal)                                                                                  |
| Operating speed       | $\leq 6000$ rpm (+20 °C, IP 67)<br>$\leq 12000$ rpm (+20 °C, IP 65)                                                                    |
| Starting torque       | $\leq 0,015$ Nm (+20 °C, IP 65)<br>$\leq 0,02$ Nm (+20 °C, IP 67)                                                                      |
| Material              | Housing: aluminium die-cast<br>Flange: aluminium<br>Solid shaft: stainless steel                                                       |
| Operating temperature | -40...+100 °C                                                                                                                          |
| Relative humidity     | 90 % non-condensing                                                                                                                    |
| Resistance            | DIN EN 60068-2-6 Vibration 30 g, 10-2000 Hz<br>DIN EN 60068-2-27 Shock 300 g, 6 ms                                                     |
| Connection            | Flange connector M12, 8-pin<br>Flange connector M23, 12-pin<br>Cable                                                                   |
| Weight approx.        | 370 g                                                                                                                                  |

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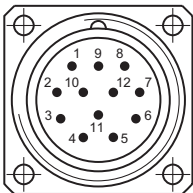
### Terminal assignment

#### Flange connector M23, 12-pin / cable

| Pin | Core color | Assignment          |
|-----|------------|---------------------|
| 1   | pink       | B-                  |
| 2   | —          | —                   |
| 3   | blue       | R+                  |
| 4   | red        | R-                  |
| 5   | green      | A+                  |
| 6   | yellow     | A-                  |
| 7   | —          | R-Set <sup>1)</sup> |
| 8   | grey       | B+                  |
| 9   | —          | —                   |
| 10  | white      | GND                 |
| 11  | —          | —                   |
| 12  | brown      | UB                  |

Screen: Connected to housing

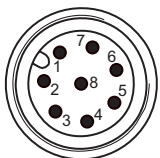
Cable data: PUR, [4x2x0,14 mm<sup>2</sup>], bending radius >45,8 mm, outer diameter 6.1 mm



<sup>1)</sup> The R-Set input is used to set the reference pulse (zero pulse) on the current shaft position.  
R-Set = UB ≥ 200 ms

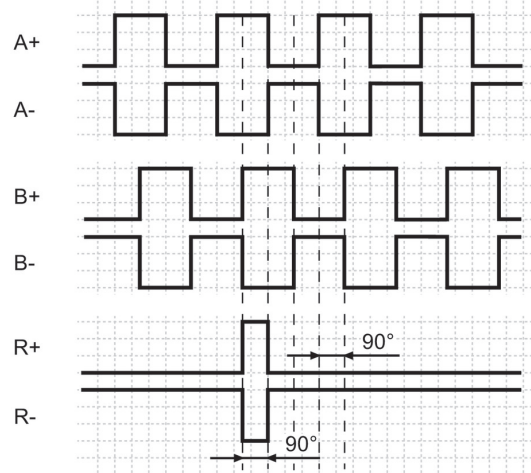
#### Flange connector M12, 8-pin

| Pin | Assignment |
|-----|------------|
| 1   | GND        |
| 2   | UB         |
| 3   | A+         |
| 4   | A-         |
| 5   | B+         |
| 6   | B-         |
| 7   | R+         |
| 8   | R-         |

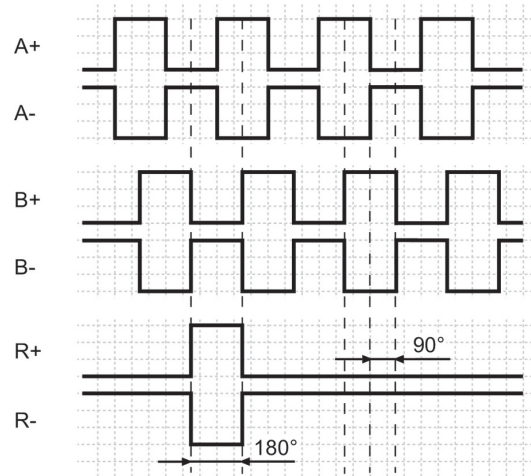


### Output signals

Zero pulse electrical 90° A&B high  
(Factory setting at clockwise rotation (CW)  
in view of the encoder flange)



Zero pulse electrical 180° B low  
(at clockwise rotation (CW)  
in view of the encoder flange)



### Trigger level

| Outputs           | TTL/RS422 |
|-------------------|-----------|
| Output level High | ≥2.5 V    |
| Output level Low  | ≤0.5 V    |
| Load              | ≤20 mA    |

| Outputs           | HTL/Push-pull |
|-------------------|---------------|
| Output level High | ≥UB -3 V      |
| Output level Low  | ≤1.5 V        |
| Load              | ≤20 mA        |

## EIL580P-SQ

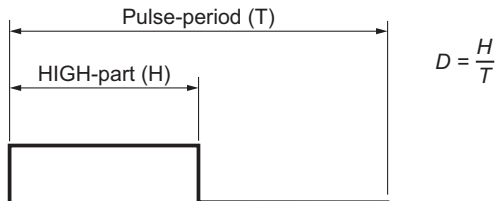
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### Duty cycle

The duty cycle (D) is defined as the time ratio between the HIGH pulse duration (H) and the pulse period (T).

System-induced and depending on the pulse number, the measured values may vary which has an impact on speed and position acquisition. Binary pulse numbers are recommended for speed feedback.



| Programmed pulse number | Scan ratio (D) (maximum)                               | Jitter (+/-) (maximum) |
|-------------------------|--------------------------------------------------------|------------------------|
| 1...1023                | 45...55 %                                              | 5%                     |
| 1024, 2048              | 45...55 %                                              | 5%                     |
| 1025...5000             | 40...60 %                                              | 10%                    |
| 8192, 16384             | 35...85 %                                              | 15%                    |
| 5001...10000            | 22...78 %                                              | 28%                    |
| 32768                   | 25...75 %                                              | 25%                    |
| 65536                   | 15...85 %                                              | 35%                    |
| all other               | Jitter[%]=(programmed pulse number -10000)*0,0007%+28% |                        |

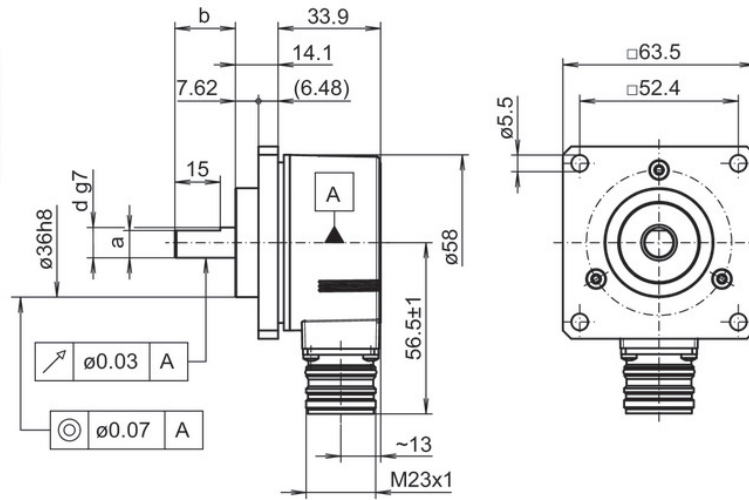
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Solid shaft with square flange

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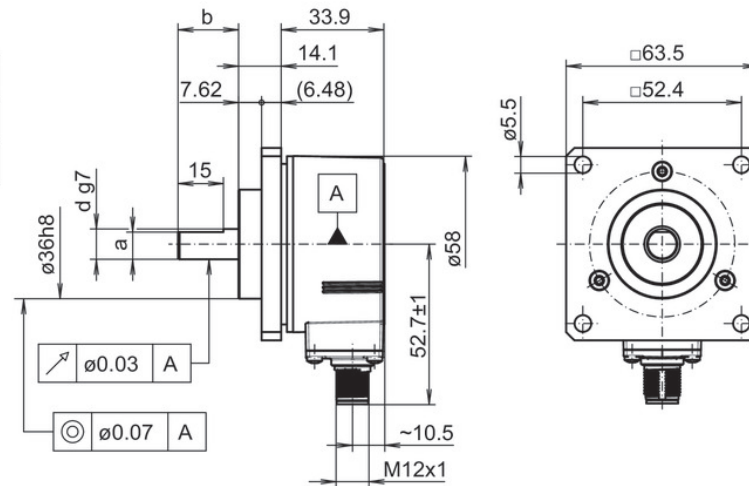
### Dimensions

| d g7   | a    | b     |
|--------|------|-------|
| ø9.525 | 8.64 | 20.32 |
| ø10    | 9.   | 20    |



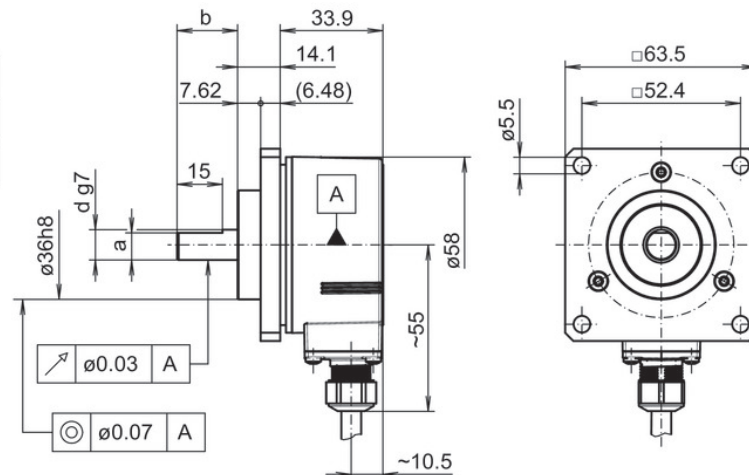
Square flange, flange connector M23, radial

| d g7   | a    | b     |
|--------|------|-------|
| ø9.525 | 8.64 | 20.32 |
| ø10    | 9.   | 20    |



Square flange, flange connector M12, radial

| d g7   | a    | b     |
|--------|------|-------|
| ø9.525 | 8.64 | 20.32 |
| ø10    | 9.   | 20    |



Square flange, cable radial

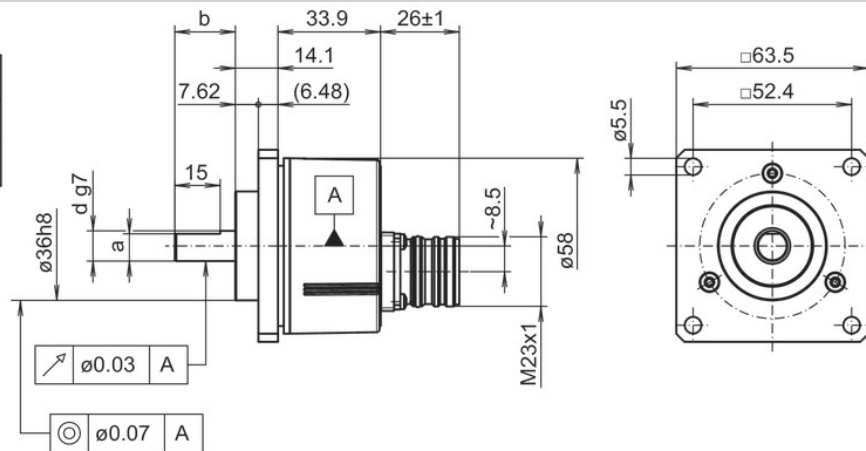
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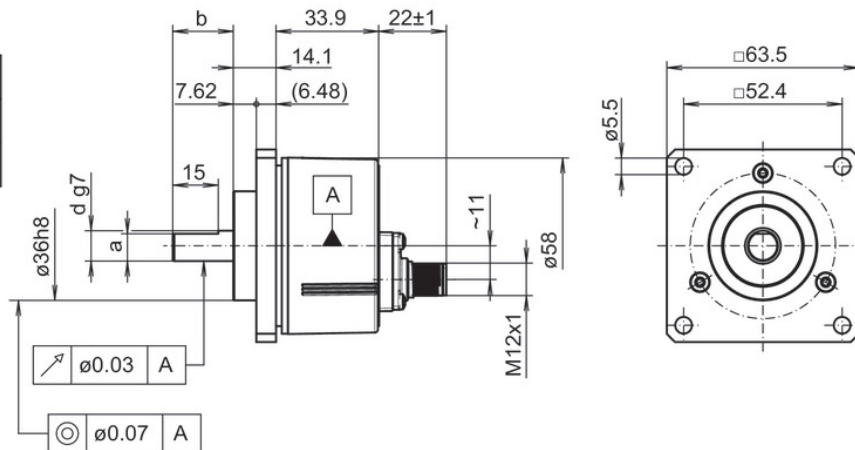
### Dimensions

| d g7   | a    | b     |
|--------|------|-------|
| ø9.525 | 8.64 | 20.32 |
| ø10    | 9.   | 20    |



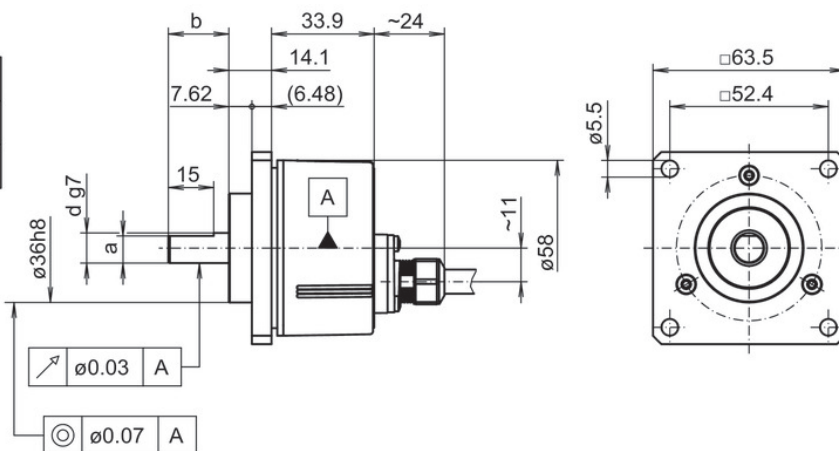
Square flange, flange connector M23, axial

| d g7   | a    | b     |
|--------|------|-------|
| ø9.525 | 8.64 | 20.32 |
| ø10    | 9.   | 20    |



Square flange, flange connector M12, axial

| d g7   | a    | b     |
|--------|------|-------|
| ø9.525 | 8.64 | 20.32 |
| ø10    | 9.   | 20    |



Square flange, cable axial

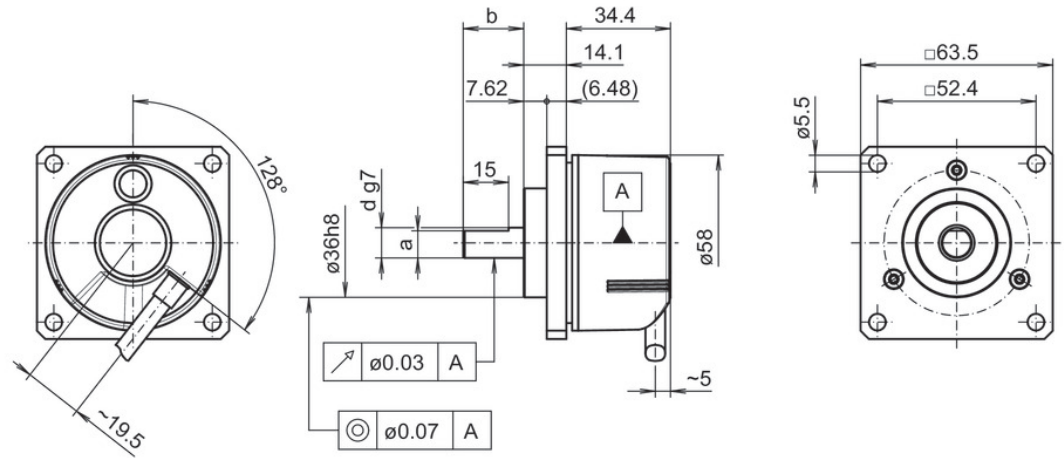
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### Dimensions

| d g7   | a    | b     |
|--------|------|-------|
| ø9.525 | 8.64 | 20.32 |
| ø10    | 9.   | 20    |



Square flange, cable tangential

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### Ordering reference

|                                                                                                                             | EIL580P | - | S | Q | ## | . | # | ## | # | . | 01024 | . | B |
|-----------------------------------------------------------------------------------------------------------------------------|---------|---|---|---|----|---|---|----|---|---|-------|---|---|
| <b>Product</b>                                                                                                              | EIL580P |   |   |   |    |   |   |    |   |   |       |   |   |
| <b>Shaft type</b>                                                                                                           |         |   |   |   |    |   |   |    |   |   |       |   |   |
| Solid shaft                                                                                                                 |         |   | S |   |    |   |   |    |   |   |       |   |   |
| <b>Flange (shaft)</b>                                                                                                       |         |   |   |   |    |   |   |    |   |   |       |   |   |
| Square flange 2.5 (63.5 mm),<br>centering collar Ø1.417 x 0.3 (Ø36 x 7.62 mm),<br>square mounting 4 x Ø5.5 / 52.4 x 52.4 mm |         |   |   | Q |    |   |   |    |   |   |       |   |   |
| <b>Shaft</b>                                                                                                                |         |   |   |   |    |   |   |    |   |   |       |   |   |
| Ø3/8" x 4/5" (Ø9.525 x 20.32 mm), with flat                                                                                 |         |   |   |   | U3 |   |   |    |   |   |       |   |   |
| Ø10 x 20 mm, with flat                                                                                                      |         |   |   |   | 10 |   |   |    |   |   |       |   |   |
| <b>Protection class</b>                                                                                                     |         |   |   |   |    |   |   |    |   |   |       |   |   |
| IP 65                                                                                                                       |         |   |   |   |    |   |   | 5  |   |   |       |   |   |
| IP 67                                                                                                                       |         |   |   |   |    |   |   | 7  |   |   |       |   |   |
| <b>Connection</b>                                                                                                           |         |   |   |   |    |   |   |    |   |   |       |   |   |
| Cable radial, 1 m                                                                                                           |         |   |   |   |    |   |   |    | R |   |       |   |   |
| Cable radial, 2 m                                                                                                           |         |   |   |   |    |   |   |    | L |   |       |   |   |
| Flange socket radial, M23, 12-pin, male contacts, CCW                                                                       |         |   |   |   |    |   |   |    | F |   |       |   |   |
| Flange socket radial, M12, 8-pin, male contacts, CCW                                                                        |         |   |   |   |    |   |   |    | B |   |       |   |   |
| Cable axial, 1 m                                                                                                            |         |   |   |   |    |   |   |    | T |   |       |   |   |
| Cable axial, 2 m                                                                                                            |         |   |   |   |    |   |   |    | U |   |       |   |   |
| Flange socket axial, M23, 12-pin, male contacts, CCW                                                                        |         |   |   |   |    |   |   |    | D |   |       |   |   |
| Flange socket axial, M12, 8-pin, male contacts, CCW                                                                         |         |   |   |   |    |   |   |    | A |   |       |   |   |
| Cable tangential, 1 m                                                                                                       |         |   |   |   |    |   |   |    | P |   |       |   |   |
| Cable tangential, 2 m                                                                                                       |         |   |   |   |    |   |   |    | Q |   |       |   |   |
| <b>Voltage supply / output</b>                                                                                              |         |   |   |   |    |   |   |    |   |   |       |   |   |
| 4,75...30 VDC, TTL/RS422 6 channel (Vout=5V)                                                                                |         |   |   |   |    |   |   |    | F |   |       |   |   |
| 4,75...30 VDC, HTL/push pull, 6 channel (Vout=Vin)                                                                          |         |   |   |   |    |   |   |    | Q |   |       |   |   |
| <b>Pulses programmable</b>                                                                                                  |         |   |   |   |    |   |   |    |   |   |       |   |   |
| 1...65536 programmable (factory setting: 1024)                                                                              |         |   |   |   |    |   |   |    |   |   | 01024 |   |   |
| <b>Operating temperature</b>                                                                                                |         |   |   |   |    |   |   |    |   |   |       |   |   |
| -40...+100 °C                                                                                                               |         |   |   |   |    |   |   |    |   |   |       |   | B |

(Factory setting: 1024 ppr, Vout = 5 VDC TTL, signal sequence A leading B (CW), zero pulse 90° A&amp;B high)

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### Accessories

#### Mounting accessories

|          |                                                          |
|----------|----------------------------------------------------------|
| 11065915 | Coupling CPS25 L=19 d1=04/d2=10                          |
| 11065918 | Coupling CPS25 L=19 d1=07/d2=10                          |
| 11065920 | Coupling CPS25 L=19 d1=08/d2=10                          |
| 11065921 | Coupling CPS25 L=19 d1=09/d2=10                          |
| 11065922 | Coupling CPS25 L=19 d1=10/d2=06                          |
| 11065923 | Coupling CPS25 L=19 d1=10/d2=10                          |
| 11065924 | Coupling CPS25 L=19 d1=10/d2=11                          |
| 11065925 | Coupling CPS25 L=19 d1=10/d2=12                          |
| 10141132 | Spring washer coupling D1=6 / D2=10 (Z 121.C01)          |
| 10141133 | Spring washer coupling D1=10 / D2=10 (Z 121.C03)         |
| 11034138 | Spring washer coupling D1=10 / D2=16 (Z 121.C04)         |
| 11034140 | Spring washer coupling D1=10 / D2=14 (Z 121.C06)         |
| 11034141 | Spring washer coupling D1=10 / D2=12 (Z 121.C07)         |
| 11050507 | Bellows coupling aluminium/stainless steel D1=06 / D2=10 |
| 11101781 | Double loops coupling D1=10 / D2=10                      |

#### Connectors and cables

|          |                                                                                           |
|----------|-------------------------------------------------------------------------------------------|
| 10127844 | Connection cable 2 m shielded with female connector M12, 8-pin, straight (ESG 34FH0200G)  |
| 10129332 | Connection cable 5 m shielded with female connector M12, 8-pin, straight (ESG 34FH0500G)  |
| 10129333 | Connection cable 10 m shielded with female connector M12, 8-pin, straight (ESG 34FH1000G) |
| 11053961 | Connection cable 2 m shielded with female connector M12, 8-pin, angled (ESW 33FH0200G)    |
| 11053962 | Connection cable 5 m shielded with female connector M12, 8-pin, angled (ESW 33FH0500G)    |
| 10170054 | Connection cable 10 m shielded with female connector M12, 8-pin, angled (ESW 33FH1000G)   |
| 11212849 | Female connector M23, 12-pin, CW, with cable 1 m - EIL580P                                |
| 11212870 | Female connector M23, 12-pin, CW, with cable 2 m - EIL580P                                |
| 11212871 | Female connector M23, 12-pin, CW, with cable 5 m - EIL580P                                |
| 11212872 | Female connector M23, 12-pin, CW, with cable 10 m - EIL580P                               |

#### Programming accessories

|          |                                                              |
|----------|--------------------------------------------------------------|
| 11120657 | Handheld Programming Tool Z-PA-EI-H                          |
| 11120547 | PC Programming Tool Z-PA-EI-P                                |
| 11119280 | Connection cable connector M12 / connector D-SUB, 0.2 m      |
| 11119720 | Connection cable connector M12 / connector D-SUB, 1 m        |
| 11119257 | Connection cable connector M23 (CW) / connector D-SUB, 0.2 m |
| 11119723 | Connection cable connector M23 (CW) / connector D-SUB, 1 m   |