10 Other options and design types

10.1 Output options

10.1.1 Foot-mounted motors

Type designation

/\FI
SEW motor with IEC/EN feet and A-side endshield.
- IEC 60072-1: 1991
- EN 50347: 2003

Description

The /\FI foot-mounted motor is a motor design with shaft ends and feet pursuant to IEC 60072-1 / EN 50347.

The shaft and foot dimensions for the 2-, 4- and 6-pole motors with standard efficiency (DRS..) and high efficiency (DRE..) are designed according to the motor power.

For the 2-, 4- and 6-pole DRP.. motors, the foot dimensions comply with EN 50437 wherever possible.

The feet on the DRM.. torque motors and the asynchronous DRL.. servomotors are constructed in line with the DRS.. motor.

According to EN 50347, each power rating is assigned the corresponding shaft height. Some DRS.. motors allow for the implementation of a higher power rating in a smaller size (e.g. DRS100LC4 with 4 kW).

If an application requires a non-EN compliant shaft height, the motor can be equipped with another foot height instead.

EN 50437 includes the entire foot geometry in a single designation:
- Shaft height (H)
- Distances between the foot holes (A and B)
- Distance from the foot holes to the shaft shoulder (C)
- Diameter of the foot holes (K)

Example

<table>
<thead>
<tr>
<th>Designation pursuant to EN 50347</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>160M</td>
<td>H = 160 mm</td>
</tr>
<tr>
<td></td>
<td>A = 254 mm (transverse to the shaft)</td>
</tr>
<tr>
<td></td>
<td>B = 210 mm (parallel to the shaft)</td>
</tr>
<tr>
<td></td>
<td>C = 108 mm</td>
</tr>
<tr>
<td></td>
<td>K = 14.5 mm</td>
</tr>
</tbody>
</table>

SEW-EURODRIVE indicates the foot designation and the dimensions of the shaft end in summary form on the nameplate. All the foot dimensions are detailed in the order confirmation documents.
Type designation

/F.A, /F.B

SEW motor with universal foot variant.

Description

The feet, which can be bolted to the motor that has been ordered, are included separately when delivering the universal foot-mounted motor. They are not assembled prior to delivery, as is the case for standard /FI foot-mounted motors. The customer is responsible for mounting the feet. A foot-mounted motor can be designed with a customized terminal box position (0°, 180°, 270°). This is beneficial for spare part management, as a universal motor can simply be used to manufacture a motor with a specific terminal box position.

The universal foot version allows for the following designs thanks to the universally mountable feet:

- Flange-mounted motor
- Foot-mounted motor with fixed foot position
- Foot-mounted motor with variable foot position without feet (stator prepared to mount feet)
- Foot-mounted motor with variable foot position with feet
10.1.2 Flange-mounted motors

Four designs are available for selection for flange-mounted motors:
- IEC/EN flange-mounted motors with bore: /FF
- IEC/EN flange-mounted motors with threads: /FT
- NEMA flange-mounted motors with inch threads: /FC
- Flange-mounted motor with different dimensions to IEC/EN: /FL

Type designation

/FF
SEW motor with IEC/EN flange with through bores.
- IEC 60072-1: 1991
- EN 50347: 2003

Description

The flange-mounted motor in the /FF design is the design with the through bores in the flange. It is similar to the IEC IM B5 basic flange design.

The flange dimensions for 2-, 4- and 6-pole motors with Standard Efficiency (DRS..), High Efficiency (DRE..) or Premium Efficiency (DRP..) are based on the power rating according to EN 50347.

EN 50437 includes the entire flange geometry in a single designation:
- Hole circle diameter (FF)
- Centering diameter (Z)
- Outer diameter (D)
- Bore diameter (S)
- Number of bores (K)

Example

<table>
<thead>
<tr>
<th>Designation pursuant to EN 50347</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF265</td>
<td>FF = 265 mm</td>
</tr>
<tr>
<td></td>
<td>Z = 230 mm</td>
</tr>
<tr>
<td></td>
<td>D = 300 mm</td>
</tr>
<tr>
<td></td>
<td>S = 14.5 mm</td>
</tr>
<tr>
<td></td>
<td>K = 4</td>
</tr>
</tbody>
</table>

SEW-EURODRIVE indicates the flange designation and the dimension of the outer diameter as well as the dimensions of the shaft end in summary form on the nameplate. All the flange dimensions are detailed in the order confirmation documents.
Other options and design types

Output options

Type designation

/FT
SEW motor with IEC/EN flange with metric threads.
- IEC 60072-1: 1991
- EN 50347: 2003

Description

The flange-mounted motor in the /FF design is the design with the threads in the flange. It is similar to the IEC IM B14 basic flange design.

The flange dimensions for 2-, 4- and 6-pole motors with Standard Efficiency (DRS..), High Efficiency (DRE..) or Premium Efficiency (DRP..) are based on the power rating according to EN 50347.

EN 50437 includes the entire flange geometry in a single designation:
- Hole circle diameter (FT)
- Centering diameter (Z)
- Outer diameter (D)
- Thread dimensions (M)
- Number of bores (K)

Example

<table>
<thead>
<tr>
<th>Designation pursuant to EN 50347</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT115</td>
<td>FT = 115 mm</td>
</tr>
<tr>
<td></td>
<td>Z = 95 mm</td>
</tr>
<tr>
<td></td>
<td>D = 140 mm</td>
</tr>
<tr>
<td></td>
<td>M = 8 mm</td>
</tr>
<tr>
<td></td>
<td>K = 4</td>
</tr>
</tbody>
</table>

SEW-EURODRIVE indicates the flange designation and the dimension of the outer diameter as well as the dimensions of the shaft end in summary form on the nameplate. The flange dimensions are detailed in the order confirmation documents.
Type designation

/FC
SEW motor with NEMA-C-Face flange with inch dimensions and threads.
- NEMA MG1

Description

The flange-mounted motor in the /FC design is the design with the inch dimensions and threads in the flange. It is similar to the IM B14 flange form, but is called C-Face pursuant to the NEMA-MG1.

The flange dimensions for 2-, 4- and 6-pole motors with Standard Efficiency (DRS..), High Efficiency (DRE..) or Premium Efficiency (DRP..) are based on the power rating according to the US NEMA MG1 standard.

C-Face dimensions:
- Hole circle diameter (M)
- Centering diameter (N)
- Outer diameter (P)
- Thread dimensions (S)
- Number of bores (K)

Example

<table>
<thead>
<tr>
<th>SEW designation</th>
<th>Dimensions</th>
<th>For motor size</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC 5.875&quot;</td>
<td>M = 5.875&quot;</td>
<td>DR. 71, DR. 80 and DR.90</td>
</tr>
<tr>
<td></td>
<td>N = 4.5&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P = 6.5&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S = 3/8&quot;-16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>K = 4</td>
<td></td>
</tr>
<tr>
<td>FC 7.25&quot;</td>
<td>M = 7.25&quot;</td>
<td>DR.90 and DR.100</td>
</tr>
<tr>
<td></td>
<td>N = 8.5&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P = 8.875&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S = 1/2&quot;-13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>K = 4</td>
<td></td>
</tr>
</tbody>
</table>

Note: 1" = 25.4 mm

SEW-EURODRIVE indicates the flange designation and the dimension of the outer diameter as well as the dimensions of the shaft end on the nameplate. The flange dimensions are detailed in the order confirmation documents.
Other options and design types

Output options

Type designation

/FL
SEW motor with flanges with through bores or threads that differ from IEC/EN.
- IEC 60072-1: 1991
- EN 50347: 2003

Description

The flange-mounted motor in the /FL design is the design with flange dimensions that
deviate from IEC/EN, with through bores or threads in the flange. It is similar to the
IEC IM B5 or IM B14 basic flange design.

The flange dimensions for 2-, 4- and 6-pole motors with Standard Efficiency (DRS..),
High Efficiency (DRE..) or Premium Efficiency (DRP..) are based on the power rating
that deviate from EN 50347.

EN 50437 includes the entire flange geometry in a single designation:
- Hole circle diameter (FL)
- Centering diameter (Z)
- Outer diameter (D)
- Diameter of the bores (S) or thread dimensions (M)
- Number of bores (K)

Example

<table>
<thead>
<tr>
<th>SEW designation</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL265</td>
<td>FL = 265 mm</td>
</tr>
<tr>
<td></td>
<td>Z = 230 mm</td>
</tr>
<tr>
<td></td>
<td>D = 300 mm</td>
</tr>
<tr>
<td></td>
<td>S = 14.5 mm or K = 14.5 mm</td>
</tr>
<tr>
<td></td>
<td>K = 4</td>
</tr>
</tbody>
</table>

SEW-EURODRIVE indicates the flange designation and the dimension of the outer di-
ameter as well as the dimensions of the shaft end in summary form on the nameplate.
The flange dimensions are detailed in the order confirmation documents.
10.1.3 Integral motors for the SEW gear unit series

Type designation

/FG
SEW motors for mounting to gear units.

Description

The /FG flange-mounted motor design is used for mounting the motor onto the SEW gear unit for the DR.. series. The flange dimensions are implemented according to the SEW work standards for gear unit mounting.

Based on EN 50347, the gear unit mounting flange is also identified with the hole circle and diameter information.

- Hole circle diameter (FG)
- Outer diameter (D)

Example

<table>
<thead>
<tr>
<th>SEW designation</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG100 DFG100</td>
<td>FG = 100 mm</td>
</tr>
<tr>
<td></td>
<td>D = 120 mm</td>
</tr>
</tbody>
</table>

The shaft end is manufactured as a pinion shaft end in line with the motor power. This means that the DRS.., DRE.. and DRP.. motors, the DRM.. torque motors and the DRL.. servomotors can have different pinion shaft ends for a motor size and length.

Motors sold separately and prepared for mounting to a gear unit are assigned the designation /FG in the product type and catalog designation. This designation is eliminated if the motor is delivered together with the gear unit (as conventional gearmotor).
10.1.4 Foot- and flange-mounted motors

Three designs are available for foot- and flange-mounted motors.

- IEC/EN foot-/flange-mounted motor with bores: FE
- IEC/EN foot-/flange-mounted motor with threads: FY
- Integral motor with flange and foot: FM

**Type designation**

/FE
SEW motor with IEC/EN flange with through bores and feet.

- IEC 60072-1: 1991
- EN 50347: 2003

**Description**

The foot- and flange-mounted motor in the /FE design is the foot-mounted motor design with the through bores in the flange. It is similar to the IEC IM B35 basic flange design.

The shaft and foot dimensions for the 2, 4 and 6 pole motors with standard efficiency (DRS..) and high efficiency (DRE..) are designed according to the motor power. For the 2-, 4- and 6-pole DRP.. motors, wherever possible.

According to EN 50347, each power rating is assigned the corresponding shaft height. Some DRS.. motors allow for implementing a higher power rating in a smaller size (e.g. DRS100LC4 with 4 kW).

The flange dimensions for 2-, 4- and 6-pole motors with Standard Efficiency (DRS..), High Efficiency (DRE..) or Premium Efficiency (DRP..) are based on the power rating according to EN 50347.

EN 50437 includes the entire foot geometry in a single designation:

- Shaft height (H)
- Distances between the foot holes (A and B)
- Distance from the foot holes to the shaft shoulder (C)
- Diameter of the foot holes (K)
### Example

<table>
<thead>
<tr>
<th>Designation pursuant to EN 50347</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>160M</td>
<td>H = 160 mm</td>
</tr>
<tr>
<td></td>
<td>A = 254 mm (transverse to the shaft)</td>
</tr>
<tr>
<td></td>
<td>B = 210 mm (parallel to the shaft)</td>
</tr>
<tr>
<td></td>
<td>C = 108 mm</td>
</tr>
<tr>
<td></td>
<td>K = 14.5 mm</td>
</tr>
</tbody>
</table>

EN 50437 also includes the entire flange geometry in a single designation:

- Hole circle diameter (FF)
- Centering diameter (Z)
- Outer diameter (D)
- Bore diameter (S)
- Number of bores (K)

<table>
<thead>
<tr>
<th>Designation pursuant to EN 50347</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF265</td>
<td>FF = 265 mm</td>
</tr>
<tr>
<td></td>
<td>Z = 230 mm</td>
</tr>
<tr>
<td></td>
<td>D = 300 mm</td>
</tr>
<tr>
<td></td>
<td>S = 14.5 mm</td>
</tr>
<tr>
<td></td>
<td>K = 4</td>
</tr>
</tbody>
</table>

SEW-EURODRIVE indicates the summarized foot designation, the flange designation and the dimension of the outer diameter as well as the dimensions of the shaft end in summary form on the nameplate. The foot and flange dimensions are detailed in the order confirmation documents.
Other options and design types
Output options

Type designation

/FY
SEW motor with IEC/EN flange with threads and feet.

- IEC 60072-1: 1999
- EN 50347: 2003

Description

The foot- and flange-mounted motor in the /FY design is the foot-mounted motor design with the through bores in the flange. It is similar to the IEC IM B34 basic flange design.

The shaft and foot dimensions for the 2, 4 and 6 pole motors with standard efficiency (DRS..) and high efficiency (DRE..) are designed according to the motor power. For the 2-, 4- and 6-pole DRP.. motors, wherever possible.

According to EN 50347, each power rating is assigned the corresponding shaft height. Some DRS.. motors allow for implementing a higher power rating in a smaller size (e.g. DRS100LC4 with 4 kW).

The flange dimensions for 2-, 4- and 6-pole motors with Standard Efficiency (DRS..), High Efficiency (DRE..) or Premium Efficiency (DRP..) are based on the power rating according to EN 50347.

EN 50437 includes the entire foot geometry in a single designation:

- Shaft height (H)
- Distances between the foot holes (A and B)
- Distance from the foot holes to the shaft shoulder (C)
- Diameter of the foot holes (K)

Example

<table>
<thead>
<tr>
<th>Designation pursuant to EN 50347</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>160M</td>
<td>H = 160 mm</td>
</tr>
<tr>
<td></td>
<td>A = 254 mm (transverse to the shaft)</td>
</tr>
<tr>
<td></td>
<td>B = 210 mm (parallel to the shaft)</td>
</tr>
<tr>
<td></td>
<td>C = 108 mm</td>
</tr>
<tr>
<td></td>
<td>K = 14.5 mm</td>
</tr>
</tbody>
</table>

EN 50437 includes the entire flange geometry in a single designation:

- Hole circle diameter (FT)
- Centering diameter (Z)
- Outer diameter (D)
- Thread dimensions (M)
- Number of bores (K)
Other options and design types

Output options

<table>
<thead>
<tr>
<th>Designation pursuant to EN 50347</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT115</td>
<td>FT = 115 mm</td>
</tr>
<tr>
<td></td>
<td>Z = 95 mm</td>
</tr>
<tr>
<td></td>
<td>D = 140 mm</td>
</tr>
<tr>
<td></td>
<td>M = 8 mm</td>
</tr>
<tr>
<td></td>
<td>K = 4</td>
</tr>
</tbody>
</table>

SEW-EURODRIVE indicates the summarized foot designation, the flange designation and the dimension of the outer diameter as well as the dimensions of the shaft end in summary form on the nameplate. The foot and flange dimensions are detailed in the order confirmation documents.
Other options and design types

Output options

Type designation

/\FM

SEW motor for mounting to gear units and feet.

Description

The combined foot-mounted and integral motor in the /FM design is the foot-mounted motor design with an oil-tight flange for mounting to the SEW gear units.

The foot dimensions for the 2-, 4- and 6-pole motors with standard efficiency (DRS..) and high efficiency (DRE..) are designed according to the motor power. For the 2-, 4- and 6-pole DRP.. motors, wherever possible.

The feet on the DRM.. torque motors and the DRL.. servomotors are constructed in line with the DRS.. motor.

The flange dimensions are implemented according to the SEW work standards for gear unit mounting.

The shaft end is manufactured as a pinion shaft end in line with the motor power. This means that the DRS.., DRE.. and DRP.. motors, the DRM.. torque motors and the DRL.. servomotors can have different pinion shaft ends for a motor size and length.

EN 50437 includes the entire foot geometry in a single designation:

- Shaft height (H)
- Distances between the foot holes (A and B)
- Distance from the foot holes to the shaft shoulder (C)
- Diameter of the foot holes (K)

Example

<table>
<thead>
<tr>
<th>Designation pursuant to EN 50347</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>160M</td>
<td>H = 160 mm</td>
</tr>
<tr>
<td></td>
<td>A = 254 mm (transverse to the shaft)</td>
</tr>
<tr>
<td></td>
<td>B = 210 mm (parallel to the shaft)</td>
</tr>
<tr>
<td></td>
<td>C = 108 mm</td>
</tr>
<tr>
<td></td>
<td>K = 14.5 mm</td>
</tr>
</tbody>
</table>

Based on EN 50347, the gear unit mounting flange is also identified with the hole circle and diameter information.

- Hole circle diameter (FG)
- Outer diameter (D)

<table>
<thead>
<tr>
<th>SEW designation</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FG250 D300</td>
<td>FG = 250 mm</td>
</tr>
<tr>
<td></td>
<td>D = 300 mm</td>
</tr>
</tbody>
</table>

Motors sold separately with feet and prepared for mounting to a gear unit are assigned the designation /FM in the product type and catalog designation. The /FM designation is also added, if the motor with feet is delivered completely assembled with the gear units as a conventional gearmotor.
SEW-EURODRIVE only indicates the summarized foot designation, the gear unit flange designation and the dimensions of the outer diameter as well as the dimensions of the outer diameter and the dimensions of the pinion shaft end in summary form on the nameplate for the integral motor for the gear unit.

The foot and flange dimensions are detailed in the order confirmation documents. The above information is not indicated on the nameplate and the order documents if the gearmotor is delivered fully assembled.
10.2 First shaft end

10.2.1 Key and keyway

Type designation

None

Description

The foot-mounted stand-alone motors and/or flange-mounted stand-alone motors are manufactured in series with a keyway and key pursuant to IEC 60072-1: 1991 and delivered with a full key pursuant to DIN 6885 Sheet 1 (ISO 773) Form A.

The shaft balancing takes place pursuant to the standards using a half key in accordance with DIN 6885 Sheet 3.

The sizes and dimensions can be found in the relevant dimension sheets in the "DR.. motors/brakemotors dimension sheets" (→ 203) chapter.

Drive selection

If the motor is to be used to replace an old motor, the motor’s rotor can also be balanced with a full key based on the information provided by the customer. This is identified with a "V" on the shaft end face.

10.2.2 Special-order shaft end

Type designation

None

Description

SEW-EURODRIVE can also deliver shaft ends of the foot-mounted stand-alone motors and/or flange-mounted stand-alone motors that differ from the series design:

• with a smooth shaft without keyway
• with a half key
• with other key forms
• with two keys
• with special lengths
• and special dimensions

Please contact SEW-EURODRIVE if required. Sketches of how the shafts are to be constructed are also helpful to explain your requirements.

Drive selection

The permitted overhung and axial loads and the dimensions of the special shaft end are documented separately.
10.3 Second shaft end

The motors are also available with a B-side shaft end. This second shaft end is constructed with a traditional keyway, in derogation of IEC 60072-1: 1991, and key pursuant to DIN 6885 Sheet 1 Form A (ISO 773) and delivered with a full key (Form A).

However, the shaft balancing takes place pursuant to the standards with a half key in accordance with DIN 6885 Sheet 3.

The sizes and dimensions can be found in the relevant dimension sheets in the "DR.. motors/brakemotors dimension sheets" (→ 2203) chapter.

The designs depend on the motor size and length and not the power or the number of poles.

These are supplied in series
- with a cover for motors/brakemotors DR.71 to DR.132,
- without a cover for motors/brakemotors DR.160 to DR.315, as the diameter of the second shaft end is so large that damage during transport is unlikely.

A cover can be ordered for these sizes.

10.3.1 Second shaft end - standard

Type designation

/2W

Description

The standard design of the second shaft end is generally smaller than described in EN 50347 for each number of poles and power.

SEW-EURODRIVE has decided to take this path in order to meet the demand for combination with different brake sizes.

The DR. 71 to DR. 315 motor sizes can be delivered with the second shaft end in a standard design.

The possible dimensions can be found in the following Tables (→ 470) or Dimension Sheets (→ 2203).

Drive selection

- For permitted combinations see the "Second shaft end" (→ 154) chapter.
- For permitted loads see the "Overhung and axial loads" (→ 156) chapter.

10.3.2 Second shaft end - reinforced

Type designation

/2W

Description

The reinforced design of the second shaft end was developed as an alternative. This design considers the maximum possible dimension of the second shaft end and can only be combined with one brake size.

The DR. 71 to DR. 225 motor sizes can optionally be delivered with the stronger second shaft end.
The possible dimensions can be found in the following Tables (→ 2470) or Dimension Sheets (→ 2203).

**Drive selection**

- For permitted combinations see the "Second shaft end" (→ 2154) chapter.
- For permitted loads see the "Overhung and axial loads" (→ 2156) chapter.

**Assignment tables**

Key:

<table>
<thead>
<tr>
<th>Type</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>*</td>
</tr>
<tr>
<td>Reinforced option</td>
<td>x</td>
</tr>
<tr>
<td>Not possible</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions of the 2W</th>
<th>DR.71S</th>
<th>DR.71M</th>
<th>DR.80S</th>
<th>DR.80M</th>
<th>DR.90L</th>
<th>DR.100M</th>
<th>DR.100L/LC</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 × 23</td>
<td>*</td>
<td>*</td>
<td>x</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>14 × 30</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>19 × 40</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions of the 2W</th>
<th>DR.112M</th>
<th>DR.132S</th>
<th>DR.132M/MC</th>
<th>DR.160S</th>
<th>DR.160M/MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 × 40</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>24 × 50</td>
<td>x</td>
<td>x</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>28 × 60</td>
<td>–</td>
<td>–</td>
<td>x</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>38 × 80</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions of the 2W</th>
<th>DR.180S</th>
<th>DR.180M</th>
<th>DR.180L/LC</th>
<th>DR.200L</th>
<th>DR.225S</th>
<th>DR.225M/MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 × 80</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>42 × 110</td>
<td>x</td>
<td>x</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>48 × 110</td>
<td>–</td>
<td>–</td>
<td>x</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>55 × 110</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions of the 2W</th>
<th>DR.250M</th>
<th>DR.280S</th>
<th>DR.280M</th>
<th>DR.315K</th>
<th>DR.315S</th>
<th>DR.315M</th>
<th>DR.315M</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 × 110</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>70 × 140</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>
10.4 Oil seals

10.4.1 Nitride butadiene (NBR) oil seals

Type designation
None

Description
SEW-EURODRIVE uses nitride butadiene (NBR) oil seals in the series motors and gearmotors.
In accordance with DIN ISO 1629: 1995, the material NBR is part of the rubber group with the designation "R".

Drive selection
NBR oil seals are installed in motors with a standard temperature range of -20 °C to +40 °C, but are also in use for temperatures of -40 °C.

10.4.2 Fluorocarbon rubber (FKM) oil seals

Type designation
None

Description
SEW-EURODRIVE uses fluorocarbon rubber (FKM) oil seals in the 2-pole DR.. motor series as well as the 4-pole DRL.. motors and gearmotors.
FKM oil seals are also an option for use with all motor types.
In accordance with DIN ISO 1629: 1995, the material FK is part of the rubber group with the designation "M".

Drive selection
FKM oil seals can be used down to a temperature of -25 °C.
For gearmotors, the lubricant has an influence on whether fluorocarbon rubber (FKM) oil seals are permitted.

10.5 Backstop

10.5.1 Backstop

The mechanical backstop can be used in order to prevent the rotor from running backwards on motors that have been switched off.

Type designation
/RS

Description
A backstop is used to block or exclude a direction of rotation of the motor. The blocking direction is defined as looking onto the fan guard.
Other options and design types

Backstop

Blocking direction specification:
CW: Clockwise
CCW: Counter Clockwise

The backstop is installed instead of the brake.
The locking torque reaches at least 2 times the motor's maximum torque, with the exception of the DRS132MC4, which only reaches 160%.

Similar to the installation principle of the brake (integrated or premounted on a friction disk), the backstop can also be installed in different ways:

The following figure shows the structure of the backstop RS.

1. Brake endshield
2. RS housing
3. Sprag ring

INFORMATION

When installing a motor on a gear unit, please note the direction of rotation of the output shaft and the number of stages. Specify the direction of rotation for the motor or gearmotor when placing your order.

The backstop is designed for motors in grid operation. Please contact SEW-EURODRIVE when operating a motor with backstop on an inverter.

Do not startup the motor in the blocking direction. Note the correct phase angle when connecting the motor.

For inspection purposes, you can operate the backstop once with half the motor voltage in the blocking direction:

Please note: Specify the direction of rotation for the motor or gearmotor when placing your order.
The dimensions of the DR.71 – 132 motors with installed backstop/RS can be found in the special dimension sheets (→ 308). The Brakemotor (/BE) (→ 203) dimension sheets apply for sizes DR. 160 – 315.

<table>
<thead>
<tr>
<th>Motor sizes</th>
<th>Rated locking torque</th>
<th>Lift-off speed of clamping parts</th>
<th>Maximum speed</th>
<th>Ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>71</td>
<td>95</td>
<td>890</td>
<td>5000</td>
<td>-40 °C to +60 °C</td>
</tr>
<tr>
<td>80</td>
<td>130</td>
<td>860</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 / 100</td>
<td>370</td>
<td>750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>112 / 132</td>
<td>490</td>
<td>730</td>
<td>4500</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>700</td>
<td>700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>1400</td>
<td>610</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 / 225</td>
<td>2500</td>
<td>400</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>250 / 280</td>
<td>2600</td>
<td>400</td>
<td>2600</td>
<td></td>
</tr>
<tr>
<td>315</td>
<td>6300</td>
<td>320</td>
<td>2500</td>
<td></td>
</tr>
</tbody>
</table>

**Drive selection**

- The RS backstop operates maintenance-free above the lift-off speed.
- Please consult SEW-EURODRIVE for operation below lift-off speed.
- The /RS backstop is not available for torque motors DRM, as these motors cannot achieve the lift-off speed.
10.6 Bearing options

10.6.1 Current-insulated rolling bearings

Type designation
/NIB

Description
The same size B-side bearings are also available in a current-insulated design for motor sizes DR.250, DR.280 and DR.315. The current insulation is achieved by an insulated bearing surface.

Drive selection
SEW-EURODRIVE recommends using these bearings when operating the motor on a frequency inverter.

10.6.2 Lubrication device

Type designation
/NS

Description
The installation of the relubrication device is optional for motor sizes 250, 280 and 315. The A- and B-side bearings are relubricated with grease via the externally accessible grease nipples in Form A pursuant to DIN 71412.

The following greases are used on-site, depending on the ambient temperature. The greases can also be purchased separately from SEW-EURODRIVE in 400 g packaging units.

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>Manufacturer</th>
<th>Type</th>
<th>DIN designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20 °C to +80 °C</td>
<td>Esso</td>
<td>Polyrex EM</td>
<td>K2P-20</td>
</tr>
<tr>
<td>-40 °C to +60 °C</td>
<td>SKF</td>
<td>GXN</td>
<td>K2N-40</td>
</tr>
</tbody>
</table>

The relubrication intervals must be individually adapted to the application. The motor generally has to be inspected and the used grease removed after 6 to 8 relubrications.

Drive selection
The relubrication device is recommended for motor sizes 250, 280 and 315 for the following uses:
- Motors in vertical mounting position
- for permanent speeds over 1800 1/min
- for an ambient temperature of over 60 °C.
10.6.3 Reinforced A-side bearings

Type designation

/ERF

Description

Reinforced A-side bearings are also available for motor sizes DR.250, DR.280 and DR.315. The /ERF option can only be delivered together with relubrication device /NS.

For gearmotors, the reinforced A-side bearings are only required for a few gear ratios. These gear ratios are marked in the speed-performance overview. The /ERF and /NS options are included in the price.

Drive selection

The use of the /ERF option is identified after determining the necessary axial and overhung application loads. Please note the drive selection in the "Bearing types used" (→ 147) chapter.
10.7 Condensation drain hole

10.7.1 Number of bores depending on the mounting position

Type designation

/DH

Description

Motor standard IEC 60034-5 only defines the mounting positions in vertical or horizontal levels, please also see the "AC motor mounting positions" (→ 290) chapter.

SEW-EURODRIVE also provides inclined and moving mounting positions. These are identified based on the descriptions in the "Mounting positions" (→ 144) chapter.

The number of condensation drain holes required is determined by the relevant mounting position.

The condensation drain holes are closed with an element on delivery and must be opened regularly in order to drain any condensation. The intervals depend on the application and the environment and must be specified individually.

The bores are not always precisely positioned at 0°, 90°, 180° or 270°. They may differ by a few degrees due to the mechanical design of the flange.

Horizontal mounting position

The motors receive two bores, one each on the A- and B-side, at the lowest points of the motor, normally placed in the flanges and motor covers, see the arrows in the diagram.

IM B5 example:

![Diagram showing condensation drain hole positions for horizontal mounting]
**Vertical mounting position**

The motors receive one bore, either on the A- or B-side, at the lowest point of the motor, normally placed in the flange or the motor cover, see the arrows in the diagram.

IM V3 example:

![Diagram of Vertical mounting position](image1)

**Inclined mounting positions**

The motors receive one or two bore(s), either on the A- and/or B-side, at the lowest point of the motor, normally placed in the flanges or the motor covers, see the arrows in the diagram.

B5/V3/45° example:

![Diagram of Inclined mounting positions](image2)
**Inclined mounting positions: IM B5 situation**

In the IM B5 mounting position, there is the special feature that the movement around the motor axis does not result in a new mounting position designation. As a result, SEW-EURODRIVE has combined this with a familiar feature for the mounting position.

The angle of rotation around the motor axis is defined as follows based on the position of the terminal box:

- clockwise (CW)
- counter-clockwise (CCW)

Example: IM B5 with terminal box position 0 (R) is installed with a 30° offset in the clockwise direction.

Information when ordering B5/CCW/30°:
**Moving mounting position**

The motors receive two or four bores, one or two each on the A- and B-side, at the lowest points of the motor in the end positions, normally placed in the flanges and motor covers, see the arrows in the diagram.

B35/B65/0-90° example:

![Diagram](9007208057312395)

**Moving mounting position: IM B5 situation**

In the IM B5 mounting position, there is the special feature that the movement around the motor axis does not result in a new mounting position designation. As a result, SEW-EURODRIVE has combined this with a familiar feature for the mounting position.

The angle of rotation around the motor axis is defined as follows based on the position of the terminal box:

- clockwise (CW)
- counter-clockwise (CCW)

Example: IM B5 with terminal box position 0 (R) is installed with a 30° offset in the clockwise direction.

Information when ordering B5/CCW/0-70°:
Drive selection

The necessity of fitting the motor with condensation drain holes must be identified based on the following criteria:

- The humidity in the ambient air (condensation drain holes are recommended for a relative humidity > 95%).
- The frequency with which the motor is turned on and off, the heating and the cooling of the motor, the suction of humid ambient air, the risk of penetration of external water.
10.7.2 Fan guard

Type designation

None

Description

If there is the risk that liquid could remain in the fan guard, such as in the event of inclined or moving mounting positions with the fan guard underneath, waste water bores in the fan guard can be used to ensure drainage.

Inclined mounting position

The motors receive a bore at the lowest point of the fan guard, see the arrow in the following diagram.
B5/V3/45° example:

![Inclined mounting position diagram]

Moving mounting position

The motors receive a bore at the lowest points of the fan guard in the end positions, see the arrows in the following diagram.
B5/V3/45-135° example:

![Moving mounting position diagram]

Drive selection

Please quote the mounting position specification in your order.
10.7.3 Dependency on corrosion protection

Type designation

None

Description

SEW-EURODRIVE assumes an increased water penetration in the event of the optional selection of the /DH condensation drain hole. As a result, SEW-EURODRIVE recommends also ordering the corrosion protection (KS) and the surface protection (OS1). A higher surface protection may be selected as an option.

Drive selection

The recommendation with KS and OS1 must be taken into account when ordering the /DH option.
10.8 Degree of protection

10.8.1 Degree of protection IP54 and higher

Type designation

None

Description

The basic degree of protection for motors is IP54, please also refer to the "Degrees of protection pursuant to EN 60034 (IEC 60034-5)" (→ 139) chapter.

The motor is also available with the following degrees of protection:

- IP6x: Increased dust protection: IP6
- IPx5 / IPx6: Increased water protection: IP56 or IP66

The basic brake option is also designed in IP54 and can be supplied in the following degrees of protection:

- IP65 with increased dust protection
- IP56 or IP66 with increased water protection. Additional measures are taken for this option.

The /DUB brake monitoring option can be designed in degree of protection IP54 or IP55. Even higher degrees of protection are structurally impossible.

The degrees of protection for other options and designs are indicated in the relevant descriptions.

Drive selection

The relevant degree of protection must be carefully selected, as otherwise there is the risk of damage to the motor.
10.8.2 Special degree of protection IP46

Type designation

None

Description

If the penetration of water into the motor cannot be ruled out, a drive solution with the following criteria can be provided:

- Degree of protection IP56
- Combination with epoxy casting resin
  - for the stator winding
  and
  - the terminal box opening at the stator
  and
- permanently open /DH condensation drain holes
- KS corrosion protection
  and
- surface protection, at least OS1.

This IP46 design is possible for motors without brakes in sizes 71 – 132 for all number of poles without further add-ons.

Drive selection

Please contact SEW-EURODRIVE if required.
10.9 Ventilation options

10.9.1 Additional flywheel mass

Type designation

IZ

Description

The motor can optionally be equipped with additional flywheel mass Z, the flywheel fan, to achieve a smoother startup and braking behavior of line-operated motors. The fan gives the motor an additional mass moment of inertia J_Z. The flywheel fan is replaced with the standard fan, the outer motor dimensions remain the same.

It can be installed on motor sizes DR.71 – DR.160 with and without a brake.

The flywheel fan is used instead of the PVC or aluminum fan. It increases the mass moment of inertia of the rotor so that the motor responds smoother to acceleration or braking torques.

The technical data for the 4-pole motor is displayed in the table below. A combination with all other number of poles is also possible.

Drive selection

Note the following points:

• Note the additional flywheel mass inertia when determining the permitted switching frequency. Multiply the permitted no-load starting frequency Z_0 by the factor 0.8 or use a forced cooling fan.

• Set the total mass moment of inertia on the motor side J_\text{ges} = J_\text{Mot} + J_Z - J_{PA}.

• Take the additional weight into account during fitting.

• Counter-current braking and running against a stop are no longer permitted.

• Not available in vibration grade "B".

Additional flywheel mass inertia:

<table>
<thead>
<tr>
<th>For motor</th>
<th>J_Z 10^4 kgm^2</th>
<th>J_PA 10^4 kgm^2</th>
<th>J_Mot 10^4 kgm^2</th>
<th>J_Mot + J_Z - J_{PA} 10^4 kgm^2</th>
<th>Increase in inertia %</th>
<th>Mass m_Z kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR.71S4</td>
<td>21.3</td>
<td>0.34</td>
<td>4.9</td>
<td>25.9</td>
<td>529</td>
<td>1.3</td>
</tr>
<tr>
<td>DR.71M4</td>
<td>7.1</td>
<td>28.1</td>
<td>14.9</td>
<td>51.8</td>
<td>348</td>
<td>1.8</td>
</tr>
<tr>
<td>DR.80S4</td>
<td>37.9</td>
<td>0.97</td>
<td>21.5</td>
<td>58.4</td>
<td>272</td>
<td></td>
</tr>
<tr>
<td>DR.80M4</td>
<td>100</td>
<td>1.32</td>
<td>35.5</td>
<td>134</td>
<td>377</td>
<td>3.4</td>
</tr>
<tr>
<td>DR.90M4</td>
<td>43.5</td>
<td>1425</td>
<td>56</td>
<td>191</td>
<td>341</td>
<td>3.5</td>
</tr>
<tr>
<td>DR.90L4</td>
<td>135</td>
<td>218</td>
<td>68</td>
<td>218</td>
<td>321</td>
<td>3.8</td>
</tr>
<tr>
<td>DR.100L4</td>
<td>150</td>
<td>240</td>
<td>90</td>
<td>240</td>
<td>267</td>
<td></td>
</tr>
<tr>
<td>DR.112M4</td>
<td>200</td>
<td>146</td>
<td>340</td>
<td>233</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>DR.132S4</td>
<td>190</td>
<td>384</td>
<td>255</td>
<td>549</td>
<td>215</td>
<td>6.4</td>
</tr>
<tr>
<td>DR.132M4</td>
<td>300</td>
<td>634</td>
<td>340</td>
<td>186</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DR.132MC4</td>
<td>340</td>
<td>864</td>
<td>370</td>
<td>234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DR.160S4</td>
<td>500</td>
<td>5.97</td>
<td>450</td>
<td>944</td>
<td>210</td>
<td>7.3</td>
</tr>
<tr>
<td>DR.160M4</td>
<td>529</td>
<td>1084</td>
<td>590</td>
<td>184</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DR.160MC4</td>
<td>590</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10.9.2 Aluminum fan

Type designation

/AL

Description

The aluminum fan is used instead of the PVC fan if the expected ambient temperature exceeds +60 °C or drops below -20 °C.

The fan's permitted temperature range is -40 °C to +100 °C.

It can be installed on motor sizes DR.71 – 315 with and without a brake.

Due to the air volume required for cooling, different aluminum fan sizes can be used for some sizes and number of poles. The assignment can be found in the following table.

Drive selection

Please note the following:

• Note the aluminum fan inertia when determining the permitted switching frequency.

• The switching frequency $Z_0$ does not need to be reduced.

Aluminum fan inertia:

<table>
<thead>
<tr>
<th>Motor</th>
<th>$J_{AL}$</th>
<th>$J_{PA}$</th>
<th>$J_{IM}$</th>
<th>$J_{IM} + J_{AL} - J_{PA}$</th>
<th>Increase in inertia</th>
<th>Mass $m_{AL}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRS71S2, ..S4</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRS71S4/2, ..S8/2</td>
<td></td>
<td></td>
<td>8.1</td>
<td>10.45</td>
<td>129 %</td>
<td></td>
</tr>
<tr>
<td>DRS71S6, DRS71S8/4</td>
<td></td>
<td></td>
<td>7.1</td>
<td>9.45</td>
<td>133 %</td>
<td></td>
</tr>
<tr>
<td>DR.71M2, ..M4</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRS71M4/2, ..M8/2</td>
<td></td>
<td></td>
<td>11.7</td>
<td>14.05</td>
<td>120 %</td>
<td></td>
</tr>
<tr>
<td>DR.71M6</td>
<td>4.31</td>
<td>0.97</td>
<td>14.9</td>
<td>18.24</td>
<td>122 %</td>
<td>0.22</td>
</tr>
<tr>
<td>DRS71M8/4</td>
<td></td>
<td></td>
<td>21.4</td>
<td>24.74</td>
<td>116 %</td>
<td></td>
</tr>
<tr>
<td>DRS80S2, ..S4</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRS80S8/2</td>
<td></td>
<td></td>
<td>8.1</td>
<td>10.45</td>
<td>129 %</td>
<td></td>
</tr>
<tr>
<td>DRS80M2, ..M4</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRS80M8/4, ..M8/2</td>
<td></td>
<td></td>
<td>21.4</td>
<td>24.74</td>
<td>116 %</td>
<td></td>
</tr>
<tr>
<td>DRS80M8/4</td>
<td></td>
<td></td>
<td>21.4</td>
<td>24.74</td>
<td>116 %</td>
<td></td>
</tr>
<tr>
<td>DRS90S2, ..S4</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRS90S8/2</td>
<td></td>
<td></td>
<td>8.1</td>
<td>10.45</td>
<td>129 %</td>
<td></td>
</tr>
<tr>
<td>DRS90M2, ..M4</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRS90M8/4, ..M8/2</td>
<td></td>
<td></td>
<td>21.4</td>
<td>24.74</td>
<td>116 %</td>
<td></td>
</tr>
<tr>
<td>DRS90M8/4</td>
<td></td>
<td></td>
<td>21.4</td>
<td>24.74</td>
<td>116 %</td>
<td></td>
</tr>
<tr>
<td>DRS90L2, ..L4</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRS90L8/2, ..L8/4</td>
<td></td>
<td></td>
<td>8.1</td>
<td>10.45</td>
<td>129 %</td>
<td></td>
</tr>
<tr>
<td>DRE132S4</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRE132S8/4</td>
<td></td>
<td></td>
<td>8.1</td>
<td>10.45</td>
<td>129 %</td>
<td></td>
</tr>
<tr>
<td>DRE132M2</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
<tr>
<td>DRE132M4/2</td>
<td></td>
<td></td>
<td>8.1</td>
<td>10.45</td>
<td>129 %</td>
<td></td>
</tr>
<tr>
<td>DRE132MC2</td>
<td>2.69</td>
<td>0.34</td>
<td>4.9</td>
<td>7.25</td>
<td>148 %</td>
<td>0.18</td>
</tr>
</tbody>
</table>
### Other options and design types

#### Ventilation options

<table>
<thead>
<tr>
<th>For motor</th>
<th>$J_{AL}$ $10^4$ kgm²</th>
<th>$J_{PA}$ $10^4$ kgm²</th>
<th>$J_{Mot} + J_{AL} - J_{PA}$ $10^4$ kgm²</th>
<th>Increase in inertia %</th>
<th>Mass $m_{AL}$ kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR.112M6</td>
<td>16.17</td>
<td>5.55</td>
<td>145</td>
<td>155.6</td>
<td>107 %</td>
</tr>
<tr>
<td>DRS112M4</td>
<td></td>
<td></td>
<td>146</td>
<td>156.6</td>
<td>107 %</td>
</tr>
<tr>
<td>DRS112M8/2, ..M8/4</td>
<td></td>
<td></td>
<td>188</td>
<td>198.6</td>
<td>106 %</td>
</tr>
<tr>
<td>DR.123M6</td>
<td>190</td>
<td>200.6</td>
<td>250</td>
<td>260.6</td>
<td>104 %</td>
</tr>
<tr>
<td>DRS132M8/2, ..M8/4</td>
<td></td>
<td></td>
<td>253</td>
<td>263.6</td>
<td>104 %</td>
</tr>
<tr>
<td>DR.123MC6</td>
<td>337</td>
<td>347.6</td>
<td>340</td>
<td>350.6</td>
<td>103 %</td>
</tr>
<tr>
<td>DR.132MC4</td>
<td></td>
<td></td>
<td>340</td>
<td>350.6</td>
<td>103 %</td>
</tr>
<tr>
<td>DR.160S4</td>
<td>61.2</td>
<td>5.97</td>
<td>370</td>
<td>425.2</td>
<td>115 %</td>
</tr>
<tr>
<td>DRS160S6</td>
<td></td>
<td></td>
<td>520</td>
<td>575.2</td>
<td>111 %</td>
</tr>
<tr>
<td>DR.160M4</td>
<td>633</td>
<td>688.2</td>
<td>633</td>
<td>688.2</td>
<td>109 %</td>
</tr>
<tr>
<td>DRS160M8/2, ..M8/4</td>
<td></td>
<td></td>
<td>593</td>
<td>648.2</td>
<td>109 %</td>
</tr>
<tr>
<td>DR.160MC4</td>
<td>1110</td>
<td>1165</td>
<td>1110</td>
<td>1165</td>
<td>105 %</td>
</tr>
<tr>
<td>DRS160MC4</td>
<td></td>
<td></td>
<td>1300</td>
<td>1355</td>
<td>104 %</td>
</tr>
<tr>
<td>DR.180S4</td>
<td>65.7</td>
<td>16.27</td>
<td>1680</td>
<td>1735</td>
<td>103 %</td>
</tr>
<tr>
<td>DRS180S8/4</td>
<td></td>
<td></td>
<td>1680</td>
<td>1735</td>
<td>103 %</td>
</tr>
<tr>
<td>DR.180M4</td>
<td>895</td>
<td>944.4</td>
<td>895</td>
<td>944.4</td>
<td>106 %</td>
</tr>
<tr>
<td>DRS180M8/4</td>
<td></td>
<td></td>
<td>1110</td>
<td>1159</td>
<td>104 %</td>
</tr>
<tr>
<td>DR.180L4</td>
<td>1300</td>
<td>1349</td>
<td>1300</td>
<td>1349</td>
<td>104 %</td>
</tr>
<tr>
<td>DR.180LC4</td>
<td>1680</td>
<td>1729</td>
<td>1680</td>
<td>1729</td>
<td>103 %</td>
</tr>
<tr>
<td>DRS180MC4</td>
<td>157</td>
<td>16.85</td>
<td>2360</td>
<td>2500</td>
<td>106 %</td>
</tr>
<tr>
<td>DRS180S8/4</td>
<td></td>
<td></td>
<td>2930</td>
<td>3070</td>
<td>105 %</td>
</tr>
<tr>
<td>DR.200L4</td>
<td>3430</td>
<td>3570</td>
<td>3430</td>
<td>3570</td>
<td>104 %</td>
</tr>
<tr>
<td>DRS200L8/4</td>
<td></td>
<td></td>
<td>369</td>
<td>4682</td>
<td>108 %</td>
</tr>
<tr>
<td>DR.225S4</td>
<td>6200</td>
<td>6552</td>
<td>6200</td>
<td>6552</td>
<td>106 %</td>
</tr>
<tr>
<td>DRS225S8/4</td>
<td></td>
<td></td>
<td>8870</td>
<td>9222</td>
<td>104 %</td>
</tr>
<tr>
<td>DR.225M4</td>
<td></td>
<td></td>
<td>8770</td>
<td>9222</td>
<td>104 %</td>
</tr>
<tr>
<td>DRS225MC4</td>
<td></td>
<td></td>
<td>4330</td>
<td>4682</td>
<td>108 %</td>
</tr>
<tr>
<td>DR.250M4</td>
<td>8870</td>
<td>9222</td>
<td>8870</td>
<td>9222</td>
<td>104 %</td>
</tr>
<tr>
<td>DRS250MC4</td>
<td>6200</td>
<td>6552</td>
<td>6200</td>
<td>6552</td>
<td>106 %</td>
</tr>
<tr>
<td>DR.280M4</td>
<td>454</td>
<td>117</td>
<td>454</td>
<td>9307</td>
<td>104 %</td>
</tr>
<tr>
<td>DRS280MC4</td>
<td>370</td>
<td>86.47</td>
<td>18400</td>
<td>18684</td>
<td>102 %</td>
</tr>
<tr>
<td>DR.315K4</td>
<td>22500</td>
<td>22784</td>
<td>22500</td>
<td>22784</td>
<td>101 %</td>
</tr>
<tr>
<td>DR.315S4</td>
<td>27900</td>
<td>28184</td>
<td>27900</td>
<td>28184</td>
<td>101 %</td>
</tr>
<tr>
<td>DR.315MC4</td>
<td>31900</td>
<td>32184</td>
<td>31900</td>
<td>32184</td>
<td>101 %</td>
</tr>
</tbody>
</table>

The bigger the motor size, the lower the influence of the aluminum fan.
10.9.3 Built-in encoder

Type designation

/E17.

Description

The magnet ring in the fan of the built-in encoder increases the mass moment of inertia.

It can be installed on motor sizes DR.71 – 225 with and without a brake.

The technical data for the 4-pole motor is displayed in the table below. A combination with all other number of poles is also possible.

Drive selection

Please note the following:

- Note the inertia of the magnet ring fan when determining the permitted switching frequency.
- The switching frequency $Z_0$ does not need to be reduced.

<table>
<thead>
<tr>
<th>For motor</th>
<th>$J_{E17}$</th>
<th>$J_{PA}$</th>
<th>$J_{Mot}$</th>
<th>$J_{Max} + J_{E17} - J_{PA}$</th>
<th>Increase in inertia</th>
<th>Mass $m_{E17}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10^{-4} kNm²</td>
<td>10^{-4} kNm²</td>
<td>10^{-4} kNm²</td>
<td>10^{-4} kNm²</td>
<td>%</td>
<td>kg</td>
</tr>
<tr>
<td>DR.71S4</td>
<td>2.8</td>
<td>0.3</td>
<td>4.9</td>
<td>7.2</td>
<td>147</td>
<td>0.17</td>
</tr>
<tr>
<td>DR.71M4</td>
<td>3.4</td>
<td>1.0</td>
<td>14.9</td>
<td>17.2</td>
<td>115</td>
<td>0.21</td>
</tr>
<tr>
<td>DR.80S4</td>
<td>11.7</td>
<td>1.3</td>
<td>35.5</td>
<td>45.6</td>
<td>128</td>
<td>0.43</td>
</tr>
<tr>
<td>DR.80M4</td>
<td>16.1</td>
<td>1.3</td>
<td>146</td>
<td>160</td>
<td>111</td>
<td>0.51</td>
</tr>
</tbody>
</table>
10.10 Fan guard options

10.10.1 Canopy

Type designation

/C

Description

If a vertical motor design with upright fan guard is used, there is the risk that parts will penetrate through the fan grille into the ventilation area. This can be protected as follows:

- by structural measures in the system or the machine
- or
- by using a canopy.

The canopy can be retrofitted to the fan guard.

It can be installed on motor sizes DR.71 – 315 with and without a brake.

Drive selection

For additional lengths due to the protection canopy, refer to the Motor dimension sheets (→ 199).
10 Other options and design types

Fan guard options

10.10.2 Air filter

Type designation

/LF

Description

In an environment with high amounts of dust or suspended particles, the air circulation required to cool the motor blows these particles around. In unfavorable conditions, this leads to the constant increase in particle deposits between the cooling fins, which can no longer be blown away by the cooling air flow.

In the worst case, the space between the cooling fins is completely filled and the motor is no longer cooled, resulting in the thermal risk that it may be destroyed.

In these operating conditions, an air filter can be used to prevent this effect. Conversely, the filtered particles must continuously be removed from the filter, as otherwise ventilation can no longer take place.

As a result, the air filter is fastened to the inner guard by a short external guard using a single bolt.

Drive selection

The additional lengths and the space for removing the fixing guard must be considered as part of the selection process, please refer to the "Air filter" (→ 152) chapter.

No maintenance intervals can be specified due to the individuality of each drive and the environment where it is installed.

10.10.3 Reduction of the noise level

Type designation

/LN

Description

Low-noise fan guards are available for motor and brakemotor sizes DR.71 – 132, either as an option or as part of the design.

The noise is reduced by 5 – 8 dB(A).

These guards are not available for encoder mounting and for forced cooling fans.

The low-noise fan guard is part of the series production of the following motors:

- 2-pole motors in the sizes mentioned above
- MOVIMOT® combinations in delta connection type
- some reduction ratios for gear sizes K19 / K29.

Drive selection

Replacing a standard fan guard with a low noise design does not affect the drive selection.
10.10.4 Axially separable fan guard for brakemotors

Type designation

None

Description

Wear parts must be inspected and maintained on a cyclical basis for brakemotors. The information in the dimension sheets refers to the sufficient extra space in the axial direction in order to remove the brake fan guard.

If this space is not structurally possible in the system or machine, the axially separable fan guard is an option that still allows the brake to be inspected.

![Axially separable fan guard for brakemotors](8806554891)

This special fan guard design is available for brakemotor sizes DR. 71 – DR. 225, as well as in combination with the option of a second shaft end.

Drive design

Instead of the axial space to remove the brakemotor fan guard, enough radial space is now required around the fan guard in order to open the guard, see the "Axially separable fan guard on the brakemotor" (→ 150) chapter.
10.10.5 Non-ventilated motors

SEW-EURODRIVE provides two alternatives for non-ventilated motors:
- Option /U: non-ventilated without fan
- Option /OL: non-ventilated closed B-side

**Type designation**

/U or /OL

**Description**

/U design:
The improvements described in the "Air filter" (→ 490) chapter can also be achieved by not installing a fan.
The lack of cooling means that the rated power in the sizes up to DR.225 has to be reduced to about 50% of the ventilated operation.
The required power reduction is higher for sizes DR.250 and above.
In general, this means that the motor has to be two to three sizes larger for the same power output.

/OL design:
An alternative to the non-ventilated motor (without fan) is the motor design for which the fan guard is not installed. The rotor is reduced to the extent that the B-side end-shield can be implemented as a closed design.
Once again, the motor only has a rated power of about 50% of the ventilated operation for sizes up to DR.225.
The required power reduction is also higher for sizes DR.250 and above.

**Drive selection**

/U design:
This design is possible for sizes DR.71 – DR.280. Please contact SEW-EURODRIVE to find out the exact size for the required power.

/OL design:
This design is possible for sizes DR.71 – DR.280. Please contact SEW-EURODRIVE to find out the exact size for the required power.
10.11 Motor protection

10.11.1 Motor protection

Types

SEW-EURODRIVE provides four fundamental types of thermal motor protection for the motors:

- Temperature sensor /TF
- Temperature switch /TH
- Temperature sensor /KY
- Temperature sensor /PT

Drive selection

Information on the design can be found in the "General project planning information" (→ 277) chapter.

More information can be found in the "Thermal characteristics" (→ 2129) chapter.

Take the information of that chapter into account for your selection.

Trigger temperatures

Thermal motor protection is realized by TF temperature sensors or TH bimetallic switches built into the end winding of the motors. To make the motor protection as reliable as possible, the trigger temperature is slightly lower than the limit value of the thermal classification. Temperature sensor TF and bimetallic switch TH are available with the following trigger temperatures:

<table>
<thead>
<tr>
<th>Thermal class</th>
<th>Nominal response temperature /TF</th>
<th>Rated switching temperature /TH</th>
</tr>
</thead>
<tbody>
<tr>
<td>155 (F)</td>
<td>150 °C</td>
<td>150 °C</td>
</tr>
<tr>
<td>180 (H)</td>
<td>170 °C</td>
<td>170 °C</td>
</tr>
</tbody>
</table>
10.11.2 TF temperature sensor

Type designation

/TF

Description

Thermal motor protection prevents the motor from overheating and causing irreparable damage. The TF is a triple PTC thermistor. One TF is installed in every motor phase and then connected in series.

A PTC thermistor is a resistance whose resistance value rises significantly from a nominal response value as the temperature rises. Please refer to the following characteristic curve.

The temperature sensor /TF can be designed as follows:

• in thermal class 155 (F)
• in thermal class 180 (H)
• in a double version
  – for warning in 130 (B) and for disconnection in 155 (H),
  – for warning in 155 (F) and for disconnection in 180 (H).

Please contact us if you are considering the double /TF design.

Notes on the selection

The positive temperature coefficient (PTC) temperature sensors comply with DIN 44082.

Resistance measurement (measuring instrument with V ≤ 2.5 V or < 1 mA):

• Standard measured values: 20 – 500 Ω
• Hot resistance: > 4000 Ω

When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. If the temperature reaches an excessive level, the thermal protection function must be brought into effect immediately.

INFORMATION

The temperature sensor /TF may not be subjected to voltages > 30 V.
The below figure shows the characteristic curve of a TF with reference to the nominal response temperature (referred to as $T_{NF}$).

10.11.3 TH temperature switch

Type designation

/TH

Description

Thermal motor protection prevents the motor from overheating and causing irreparable damage. The TH is a triple bimetallic switch. One TH is installed in every motor phase and then connected in series.

A bimetallic switch is a switching element with contact, which opens the contact when the switching temperature is reached. The motor can then be shutdown using a controller. When the motor cools down, it does not immediately switch back to the rated switching temperature (NST) but only switches once it is approx. 40 K below the rated switching temperature (reset temperature RST), see the following characteristic curve.

The time it takes for the reset temperature to be reached is in the high double-digit minute range.

The /TH can be designed as follows:

- in thermal class 155 (F)
- in thermal class 180 (H)
- in a double version
  - for warning in 130 (B) and for disconnection in 155 (H)
  - for warning in 155 (F) and for disconnection in 180 (H),

Please contact us if you are considering the double /TH design.
Notes on the selection

The thermostats are connected in series and open when the permitted winding temperature is exceeded. They can be connected in the drive monitoring loop.

<table>
<thead>
<tr>
<th>Type</th>
<th>AC values</th>
<th>DC values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage in V</td>
<td>250</td>
<td>60</td>
</tr>
<tr>
<td>Current in A (cosφ = 1.0)</td>
<td>2.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Current in A (cosφ = 0.6)</td>
<td>1.6</td>
<td>–</td>
</tr>
</tbody>
</table>

Switching condition of a bimetallic switch "NC contact":

10.11.4 KY temperature sensor

Type designation

/KY

Description

Thermal motor protection prevents the motor from overheating and causing irreparable damage. The temperature sensor only provides indirect protection, as only one sensor value is determined, which first has to be analyzed.

The /KY consists of a KTY84-130 semiconductor sensor, which has been installed in one of the three motor windings. This also means that the /KY is not a replacement for the motor protection with /TF or /TH.

The inverter and the KY sensor value can only take on the function of motor protection when it is used in combination with an inverter containing the thermal motor model.

The /KY constantly changes its resistance value and provides an accurate reflection of the current temperature in the end turns, please refer to the following characteristic curve. The /KY has no reference to a thermal class and can be installed in addition to the /TF or /TH.
Notes on the selection

The KTY84-130 temperature sensor continuously detects the motor temperature.

<table>
<thead>
<tr>
<th>Type</th>
<th>KTY84-130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection</td>
<td>red conductor = +</td>
</tr>
<tr>
<td></td>
<td>blue conductor = -</td>
</tr>
<tr>
<td>Total resistance at 20 – 25° C</td>
<td>540 Ω &lt; R &lt; 640 Ω</td>
</tr>
<tr>
<td>Test current</td>
<td>&lt; 3 mA</td>
</tr>
</tbody>
</table>

INFORMATION

The poles of the temperature sensor /KY must be connected correctly, otherwise an incorrect measurement result will be issued.

Typical characteristic curve of a KTY:

![Typical characteristic curve of a KTY](image)

10.11.5 PT temperature sensor

Type designation

/PT

Description

Thermal motor protection prevents the motor from overheating and causing irreparable damage. The temperature sensor only provides indirect protection, as only one sensor value is determined, which first has to be analyzed.

The /PT design consists of a platinum sensor or three PT100 platinum sensors, which are installed in one of the three or in all three motor windings. For the design with three PT100, the sensors are already connected in series in the end turns.

Unlike the KTY semiconductor sensor, the platinum sensor has an almost linear characteristic curve and is more accurate. The inverter /PT option can take on the function of motor protection when it is used in combination with an inverter containing the thermal motor model.
The /PT resistance value displays linear changes and provides an accurate reflection of the current temperature in the end turns, please refer to the following characteristic curve. The /PT has no reference to a thermal class and can be installed in addition to the /TF or /TH.

Notes on the selection

The PT100 temperature sensor continuously detects the motor temperature. One or three PT100 sensors are used depending on the requirements.

<table>
<thead>
<tr>
<th>Type</th>
<th>1 × PT100</th>
<th>3 × PT100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection</td>
<td>Red/white</td>
<td></td>
</tr>
<tr>
<td>Total resistance at 20 – 25 °C</td>
<td>107 Ω &lt; R &lt; 110 Ω</td>
<td>321 Ω &lt; R &lt; 330 Ω</td>
</tr>
<tr>
<td>Test current</td>
<td>&lt; 3 mA</td>
<td></td>
</tr>
</tbody>
</table>

**INFORMATION**

The temperature sensor /PT is unipolar, so interchanging the incoming cables does not change the measurement result.

Characteristic curve of a PT100:
10.12 Insulation

10.12.1 Reinforced insulation

Type designation
/RI

Description
SEW-EURODRIVE recommends to use reinforced insulation for motors operated on frequency inverters at voltages > 500 V.

Notes on the selection
Permitted pulse voltages can be found in the "DR.. AC motors with inverters from other manufacturers" (→ 198).

10.12.2 Reinforced winding insulation with increased resistance against partial discharge

Type designation
/RI2

Description
For motors operated on frequency inverters at voltages > 690 V, or if DC link voltages rise to over 724 V, SEW-EURODRIVE recommends to use reinforced insulation with increased resistance against partial discharge.

This option is available for DRS.., DRE.. and DRP.. motor sizes 112M – 315L.

Notes on the selection
Permitted pulse voltages can be found in the "DR.. AC motors with inverters from other manufacturers" (→ 198).
10.13 Anti-condensation heating

10.13.1 Anti-condensation heating

Type designation

None

Description

The motors can be equipped with anti-condensation heating if required.

The recommended or prescribed use of anti-condensation heating depends on the ambient temperature.

- Ambient temperature below 0 °C: the use of anti-condensation heating is recommended.
- Ambient temperature below -20 °C, with expected condensation: the use of anti-condensation heating is mandatory.

The anti-condensation heating must be activated for temperatures below -20 °C as long as the motor is switched off.

The anti-condensation heating connection voltage is 230 V.

The following differences arise depending on the motor size:

- The heating capacity is between 28 W and 150 W.
- The strip heaters are either only installed around the end turn/turns on the A-side or on the A- and B-side.

They are connected to an auxiliary terminal strip in the terminal box. The connections are marked as H1 and H2.

Notes on the selection

Please contact SEW-EURODRIVE if you require other connection voltages.
10.14 Winding protection

10.14.1 Humidity and acid protection

Type designation

None

Description

Humidity and acid protection is another measure used to protect the motor. This option allows the motors to be used in warm and humid environments or in atmospheres that contain solvents.

Further information is available in the “Humidity and acid protection and tropicalization” (→ [58]) chapter.

Available for all motor sizes DR.71 – 315.

Notes on the selection

Please contact SEW-EURODRIVE if required.

10.14.2 Tropicalization

Type designation

None

Description

Tropicalization is another measure used to protect the motor. This option allows the motors to be used in warm and humid or tropical environments.

Further information is available in the “Humidity and acid protection and tropicalization” (→ [58]) chapter.

Available for all motor sizes DR.71 – 315.

Notes on the selection

Please contact SEW-EURODRIVE if required.
Other options and design types
Pole-changing motors

10.15 Pole-changing motors

10.15.1 8/4-, 4/2-, 8/2-pole DRS.. motors

Type designation

8/4, 4/2, 8/2

Description

Instead of a design with a single speed, SEW-EURODRIVE offers two different types of multi-speed motors in three different pole number combinations.

- Dahlander windings
  The 4/2-pole and 8/4-pole DRS.. motors are available with a Dahlander winding. The characteristic feature of this winding is that all winding phases are constantly in use. Rotating fields with a ratio of 2:1 are created only as a result of connecting the different parts of the winding.

- Separate winding
  8/2-pole DRS.. motors are available with a separate winding. The characteristic feature of this winding is that two windings are built into the motor, but only one of them can be connected to the supply system. This means it is possible to combine rotating fields with a range of ratios. SEW-EURODRIVE only uses a 4:1 ratio.

Drive selection

The drive selection for multi-speed motors takes place after careful calculation. SEW-EURODRIVE is happy to perform the calculation and the drive selection for you if required.
10.16 Forced cooling fan

10.16.1 Forced cooling fan

Type designation

\( /V \)

Description

The motors and brakemotors can be equipped with a forced cooling fan \( /V \) option if required. A forced cooling fan is usually not required for motors operated off the power supply in continuous duty.

SEW-EURODRIVE recommends a forced cooling fan for the following applications:

- Mains-operated drives with high starting frequency
- Mains-operated drives with additional flywheel mass \( Z \) (flywheel fan)
- Inverter drives with a setting range \( \geq 1:20 \)
- Inverter drives that have to produce the rated torque at low speeds or even at standstill.

The forced cooling fan is installed in order to ensure motor cooling independent of the motor speed. This means the motor can permanently deliver the full nominal torque at low speeds without the risk that the motor will overheat.

With forced cooling, the PVC fan installed as standard on the motor shaft is removed. The sheet metal hood of the forced cooling fan changes from a cylindrical shape to the typical octagonal shape. The length of the forced cooling fan guard varies depending on the motor options, such as brake or encoder. This also applies to the punched grooves, for example in the case of manual brake release or incoming cable to the encoder.

The cooling effect for forced air cooling is at least equivalent with self-ventilation.

The following figure shows a typical speed-torque characteristic for a dynamic inverter drive, for example with MOVIDRIVE\textsuperscript{®} MDX61B with encoder feedback option (DEH11B) in the CFC operating mode.

A forced cooling fan must be used if the load torque in the \( 0 - n_{\text{base}} \) is above curve 1. Without a forced cooling fan, there is a thermal overload in the motor and it could be destroyed.

\[
\begin{align*}
M &= \text{Rated torque of the motor} \\
M_{\text{max}} &= \text{Maximum torque of the motor} \\
n_{\text{base}} &= \text{Rated speed (transition speed) of the motor}
\end{align*}
\]

1 = With self-cooling
2 = With forced cooling
3 = Maximum torque
Notes on the selection

The possible connection voltage data is displayed in the "Forced cooling fan voltage" (→ 124) chapter.

Further technical data is displayed in the following tables.

The forced cooling fan \( \mathcal{V} \) can be combined with all encoders described in the "Encoders" (→ 431) chapter.

Please take into account that the potential additional length of the overall drive.

### 10.16.2 Technical data for DR.71 – 132../\mathcal{V} (50 Hz)

<table>
<thead>
<tr>
<th>Forced cooling fan</th>
<th>( \mathcal{V} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>For motor size</td>
<td>71</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
</tr>
<tr>
<td>Current consumption</td>
<td>( A_{AC} )</td>
</tr>
<tr>
<td></td>
<td>( A )</td>
</tr>
<tr>
<td></td>
<td>( \Delta )</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>W</td>
</tr>
<tr>
<td>Air discharge rate</td>
<td>m³/h</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>°C</td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Terminal board in the forced cooling fan's terminal box with 6 M4 bolts. Connection 1~ with enclosed CB running capacitor</td>
</tr>
<tr>
<td>Max. cable cross-section</td>
<td>mm²</td>
</tr>
<tr>
<td>Thread for cable gland</td>
<td></td>
</tr>
<tr>
<td>Additional weight</td>
<td>kg</td>
</tr>
<tr>
<td>Certificates</td>
<td>CSA, UR</td>
</tr>
</tbody>
</table>

### 10.16.3 Technical data DR.71 – 132../\mathcal{V} (24 V DC)

<table>
<thead>
<tr>
<th>Forced cooling fan</th>
<th>( \mathcal{V} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>For motor size</td>
<td>71</td>
</tr>
<tr>
<td>Voltage</td>
<td>V( _{DC} )</td>
</tr>
<tr>
<td>Current consumption</td>
<td>( A_{DC} )</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>W</td>
</tr>
<tr>
<td>Air discharge rate</td>
<td>m³/h</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>°C</td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Terminal strip in terminal box of forced cooling fan</td>
</tr>
<tr>
<td>Max. cable cross section</td>
<td>mm²</td>
</tr>
<tr>
<td>Thread for cable gland</td>
<td></td>
</tr>
<tr>
<td>Additional weight</td>
<td>kg</td>
</tr>
<tr>
<td>Certificates</td>
<td>CSA, UR</td>
</tr>
</tbody>
</table>
### 10.16.4 Technical data DR.160 – 315../V (50 Hz)

<table>
<thead>
<tr>
<th>Forced cooling fan</th>
<th>/V</th>
</tr>
</thead>
<tbody>
<tr>
<td>For motor size</td>
<td>160</td>
</tr>
<tr>
<td>Frequency</td>
<td>Hz</td>
</tr>
<tr>
<td>Current consumption</td>
<td>A&lt;sub&gt;ac&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>Δ</td>
</tr>
<tr>
<td></td>
<td>Δ</td>
</tr>
<tr>
<td>Maximum power consumption</td>
<td>W</td>
</tr>
<tr>
<td>Air discharge rate</td>
<td>m³/h</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>°C</td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td></td>
</tr>
<tr>
<td>Max. cable cross section</td>
<td>mm²</td>
</tr>
<tr>
<td>Thread for cable gland</td>
<td></td>
</tr>
<tr>
<td>Additional weight</td>
<td>kg</td>
</tr>
<tr>
<td>Certificates</td>
<td></td>
</tr>
<tr>
<td>Identification according to VO327/2011</td>
<td></td>
</tr>
</tbody>
</table>

¹) At voltages > 500 V, the temperature range -20°C to +40°C applies for size DR.180
10.17 Terminal box

10.17.1 Cable gland

Type designation

None

Designation

The terminal boxes of the motors are supplied as standard with a sufficient number of threads in the terminal box wall so that the appropriate supply cables and be connected and the cable glands affixed.

Depending on the country and electrical regulations, the terminal boxes feature different thread types as standard or as a customer option.

The following table shows an excerpt from these regulations:

<table>
<thead>
<tr>
<th>Type</th>
<th>Metric thread</th>
<th>Conical inch thread</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC</td>
<td>Standard</td>
<td>Optional</td>
</tr>
<tr>
<td>USA, Canada</td>
<td>Optional</td>
<td>Standard</td>
</tr>
<tr>
<td>Global motor</td>
<td>Standard</td>
<td>Optional</td>
</tr>
<tr>
<td>Brazil</td>
<td>Standard</td>
<td>Optional</td>
</tr>
<tr>
<td>South Korea</td>
<td>Standard</td>
<td>Optional</td>
</tr>
<tr>
<td>Japan</td>
<td>Standard</td>
<td>Optional</td>
</tr>
</tbody>
</table>

The individual standard designs of the terminal boxes for motors and brakemotors are shown in the dimension sheets (→ 203).

The standard terminal boxes for motors and brakemotors of the sizes DR.71 – 180 are made from aluminum. In the case of DR.200 – 315, the terminal boxes are made from gray cast iron.

Any options or versions that are connected in the terminal box require a larger terminal box. It is therefore possible that the terminal box otherwise available in these cases is supplied in gray cast iron as standard.

SEW-EURODRIVE supplies its terminal boxes without cable glands as standard. The threads in the terminal box are sealed with plugs upon delivery. In normal ambient temperatures, these are made from plastic, while metal plugs are used for temperatures below -20°C or in excess of +80°C.

Notes on configuration

If you would like SEW-EURODRIVE to deliver the drive with fitted cable glands, please specify the manufacturer, type, and positioning of the cable glands with your order.
10.17.2 Larger terminal box

Type designation
None

Description
For sizes DR.71 – 180, an optional terminal box made from gray cast iron is also available.

Any options that are connected in the terminal box require a larger terminal box. It is therefore possible that the terminal box otherwise available in these cases is supplied in gray cast iron as standard.

The terminal box for sizes DR.315K4 and DR.315S4 is supplied as a weight-optimized option. The larger and heavier terminal box for sizes DR.315M4 and DR.315L4 can also be supplied for the smaller DR.315 models.

Notes on configuration
The terminal boxes made from gray cast iron for sizes DR.71 – 180 have different dimensions to those specified in the chapter "Dimension sheets" (→ 203). When ordering and in the case of restricted installation space, please request the terminal box dimensions separately.

If the larger terminal box for sizes DR.315K/S is required, we ask that you provide the relevant specifications with your order.

10.17.3 Connection pieces

Type designation
None

Description
Larger, gray cast iron terminal boxes with a connection piece are also available as an option for sizes DR.160 – 225.

The connection piece can be removed from the terminal box to enable the initial fitting of the supply cables. This greatly facilitates the connection process, particularly when installing in restricted spaces.

The connection pieces are available with the following threads:

<table>
<thead>
<tr>
<th>Thread</th>
<th>DR.160</th>
<th>DR.180</th>
<th>DR.200</th>
<th>DR.225</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 × M40 × 1.5 + 2 × M16 × 1.5</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2 × M50 × 1.5 + 2 × M16 × 1.5</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>2 × M63 × 1.5 + 2 × M16 × 1.5</td>
<td>–</td>
<td>–</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>1 × 1¼&quot;-11.5 + 2 × ½&quot;-14</td>
<td>•</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2 × 1½&quot;-11.5 + 1 × ½&quot;-14</td>
<td>•</td>
<td>–</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>2 × 1½&quot;-11.5 + 2 × ½&quot;-14</td>
<td>–</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
Notes on configuration

The gray cast iron terminal boxes with connection pieces for DR.160 – 225 have different dimensions to those specified in the chapter "Dimension sheets for motors/brakemotors with gray cast iron terminal boxes" (→ 309).

Please specify the required thread size for the cable glands with your order. In the case of restricted installation space, please request the terminal box dimensions separately.
10.18 Integrated plug connector

10.18.1 Complete plug connector

Type designation

/IS

Description

This 12-pin plug connector is characterized by the following criteria:
• It replaces the terminal board
• It is fully integrated in the terminal box
• It is a development of SEW-EURODRIVE

The star or delta connection is realized with a variable terminal link. The variable terminal link is included in the delivery. It features the necessary jumpers for star connection on the one side and the three jumpers for the delta connection on the other side. This variable terminal link is included in the scope of delivery.

The /IS option is available for motors of sizes 71 – 132.

The delivery comprises the IS female and male connectors. The connection of the winding and optional connections of the brake and auxiliary devices are performed on the male connector in the factory.

Notes on configuration

The 12 contacts of the IS plug connector are generally used as follows:
• 6 contacts for motor winding
• 4 contacts for brake connection
• 2 contacts for auxiliary devices (e.g., thermal motor protection)

In conjunction with the variable terminal link, core cross sections of max. 2.5 mm².

Without the variable terminal link, the connectable cross section increases to 4 mm².

The maximum current per contact is 16 A at a maximum ambient temperature of +40°C.

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>IS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug connector for motor size</td>
<td>DR. 71 – 132</td>
<td></td>
</tr>
<tr>
<td>Number of contacts</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>
Other options and design types

Integrated plug connector

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>IS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grounding (PE)</td>
<td></td>
<td>2 additional contacts</td>
</tr>
<tr>
<td>Connection to contacts</td>
<td></td>
<td>Screw connection</td>
</tr>
<tr>
<td>Contact type</td>
<td></td>
<td>Blade/bushing</td>
</tr>
<tr>
<td>Maximum voltage (IEC)</td>
<td>$V_{AC}$</td>
<td>690</td>
</tr>
<tr>
<td>Maximum voltage (CSA)</td>
<td>$V_{AC}$</td>
<td>600</td>
</tr>
<tr>
<td>Maximum contact load</td>
<td>$A_{AC}$</td>
<td>16</td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
<td>Corresponding to motor degree of protection IP54, optional IP55, IP56, IP65, IP66</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>°C</td>
<td>-40 to +40</td>
</tr>
<tr>
<td>Certification</td>
<td></td>
<td>UL certification provided in conjunction with motor</td>
</tr>
</tbody>
</table>

The position of the cable entry can be decided by the customer during startup and does not have to specified in the order. The item is always delivered with position "normal".

10.18.2 Motor-side plug connector

Type designation

/ISU

Description

In the case of the /ISU option, only the motor-side part of the /IS plug connector is supplied. All other properties correspond to those of the /IS plug connector.

The /ISU connector is used when the IS female connector is supplied with a prefabricated cable.

This option is available for motors of sizes 71 – 132.

The delivery comprises the IS lower section mounted on the motor side and a cover. The connection of the winding and optional connections of the brake and auxiliary devices are performed on the male connector in the factory.

Notes on configuration

The position of the cable entry is decided by the customer during startup according to the prefabricated cable.
10.18.3 Replacement of DT/DV motors with DR.. motors with /ISU plug connectors in size 1

Type designation

/ISU

Description

In the case of the /ISU option, only the motor-side part of the /IS plug connector is supplied. All other properties correspond to those of the /IS plug connector.

This option is available for motors of sizes 71 – 90.

The delivery comprises the size 1 IS lower section mounted on the motor side and a cover of the corresponding size. The connection of the winding and optional connections of the brake and auxiliary devices is performed on the male connector in the factory.

Notes on configuration

The position of the cable entry was defined during the original installation and can generally be retained.
10.19 Installed plug connectors

The installed plug connector is based on two Harting systems: Han 10 and Han Modular in various configurations.
- HAN® 10 ES
- HAN® 10 E
- HAN® Modular in four different configurations.

The mating connectors are not included in the scope of delivery of SEW-EURODRIVE.

10.19.1 HAN® 10ES / 10E

Type designation

/AS.., /AC.., or /IV

Description

These mounted plug connectors are based on Harting systems. The following series are used:
- HAN® 10 ES: contacts with cage clamp, SEW designation: /AS..
- HAN® 10 E: contacts with crimp connection, SEW designation: /AC..

The extensive possibilities for mounting a plug connector on the side of the terminal box are offered in the following variations:
- Single clip longitudinal closure (third character in SEW designation with "E")
- Twin clip transverse closure (third character in SEW designation with "B")

Due to the increasing use of AC motors on frequency inverters, the built-on housing is supplied in EMC design.

The built-on housing of the plug connector is not a separate component, but part of the terminal box.
### Notes on configuration

The 10 contacts of the HAN® 10ES / 10E are used in the most diverse assignment configurations.

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>/ASB.</th>
<th>/ACB.</th>
<th>/ASE.</th>
<th>/ACE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug connector for motor size</td>
<td>DR. 71 – 132</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closure type of mating connector</td>
<td>Twin clip transverse closure</td>
<td></td>
<td></td>
<td>Single clip longitudinal closure</td>
<td></td>
</tr>
<tr>
<td>Basic connector system</td>
<td>Harting: HAN®</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EMC housing 10B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aluminum terminal box</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor-side connector view</td>
<td><img src="image" alt="Diagram" /></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of contacts</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding (PE)</td>
<td>Via two housing pins on insulator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection to contacts</td>
<td>/AC.. = crimp contacts (HAN® 10E)</td>
<td></td>
<td></td>
<td>AS..= cage clamps (HAN® 10ES)</td>
<td></td>
</tr>
<tr>
<td>Contact type</td>
<td>Pin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(bushing in mating connector)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum voltage (IEC)</td>
<td>$V_{AC}$</td>
<td>500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum voltage (CSA)</td>
<td>$V_{AC}$</td>
<td>600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum contact load</td>
<td>$A_{AC}$</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>Corresponding to motor degree of protection IP54, optional IP55, IP65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>°C</td>
<td>-40 to +40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>UL approval has been granted for the plug connectors. They are certified according to UL1977 in the product category ECBT2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SEW-EURODRIVE provides details of the components and data for the plug connector in the order confirmation.

The mating connector is not included in the scope of delivery of SEW-EURODRIVE.
Other options and design types

Installed plug connectors

10.19.2 HAN® Modular

Type designation

/AM.., /AB.., /AD.., /AK.., or /IV

Description

These mounted plug connectors are based on Harting systems. The following series are used:

- HAN® Modular 2 E modules: SEW-EURODRIVE designation: /AM..
- HAN® Modular 1 C and 1 E module: SEW designation: /AB..
- HAN® Modular 2 C and 1 E module: SEW designation: /AD..
- HAN® Modular 1 C and 1 E module: SEW designation: /AK..

The extensive possibilities for mounting a plug connector on the side of the terminal box are offered in the following variations:

- Single clip longitudinal closure (third character in SEW designation with "E")
- Twin clip transverse closure (third character in SEW designation with "B")

If a designation in the DT/DV modular motor system was used with an "X" as the third or fourth character, these versions are now specified with a /IV in the product type and catalog designation.

Due to the increasing use of AC motors on frequency inverters, the built-on housing is supplied in EMC design.

The built-on housing of the plug connector is not a separate component, but part of the terminal box.
Notes on configuration

Depending on the module assembly, up to 12 contacts are used in the most diverse assignment configurations.

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>/AMB. /AME.</th>
<th>/ABB. /ABE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure type of mating connector</td>
<td>AMB: double locking latch</td>
<td>ABB: double locking latch</td>
<td>AME: single locking latch</td>
</tr>
<tr>
<td>Basic connector system</td>
<td>Harting: HAN®</td>
<td>EMC housing 10B</td>
<td>DR71 – 132: aluminum terminal box</td>
</tr>
<tr>
<td>Motor-side connector view</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of contacts</td>
<td>2 × 6</td>
<td>1 × 3 + 1 × 6</td>
<td></td>
</tr>
<tr>
<td>Module type at positions a, b, and c</td>
<td>a: E module</td>
<td>a: C module</td>
<td>b: empty module</td>
</tr>
<tr>
<td>Grounding (PE)</td>
<td>Via two housing pins on articulated frame</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection to contacts</td>
<td>Crimp contacts (HAN® Modular)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact type</td>
<td>Pin (bushing in mating connector)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum voltage (IEC)</td>
<td>V&lt;sub&gt;AC&lt;/sub&gt; 500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum voltage (CSA)</td>
<td>V&lt;sub&gt;AC&lt;/sub&gt; 600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum contact load</td>
<td>A&lt;sub&gt;AC&lt;/sub&gt; 12 × 16</td>
<td>3 × 36</td>
<td>6 × 16</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>Corresponding to motor degree of protection IP54, optional IP55, IP65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>UL approval has been granted for the plug connectors. They are certified according to UL1977 in the product category ECBT2.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Mechanically mountable up to size 225; the nominal current of the motor is decisive

SEW-EURODRIVE provides details of the components and data for the plug connector in the order confirmation documents.
Depending on the module assembly, up to 12 contacts are used in the most diverse assignment configurations.

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>/ADB2</th>
<th>/ADE2</th>
<th>/AKB.</th>
<th>/AKE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug connector for motor size</td>
<td>DR. 71 – 132</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DR.160 – 225</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closure type of mating connector</td>
<td>ADB2: double locking latch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ADE2: single locking latch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic connector system</td>
<td>Harting: HAN®</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EMC housing 10B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DR71 – 132: aluminum terminal box</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DR160 – 225: gray cast iron terminal box</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor-side connector view</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of contacts</td>
<td>2 × 3 + 1 × 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module type at positions a, b, and c</td>
<td>a: C module</td>
<td></td>
<td>a: C module</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b: C module l</td>
<td></td>
<td>b: empty module</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c: E module</td>
<td></td>
<td>c: E module</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding (PE)</td>
<td>Via two housing pins on articulated frame</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection to contacts</td>
<td>Crimp contacts (HAN® Modular)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact type</td>
<td>Pin (bushing in mating connector)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum voltage (IEC)</td>
<td>$V_{AC}$</td>
<td>500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum voltage (CSA)</td>
<td>$V_{AC}$</td>
<td>600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum contact load</td>
<td>$A_{AC}$</td>
<td>6 × 36</td>
<td>3 × 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 × 16</td>
<td>6 × 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>Corresponding to motor degree of protection IP54, optional IP55, IP65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>UL approval has been granted for the plug connectors. They are certified according to UL1977 in the product category ECBT2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Mechanically mountable up to size 225; the nominal current of the motor is decisive.

SEW-EURODRIVE provides details of the components and data for the plug connector in the order confirmation documents.

The mating connector is not included in the scope of delivery of SEW-EURODRIVE.
10.19.3 Contact rating at ambient temperatures over 40°C

Description

Reduced current values apply to temperatures higher than the 40°C specified in the tables. The following figure shows the permitted contact load depending on the ambient temperature.

The drive selection only supports a gradation of 20°C.

Notes on configuration
10 Other options and design types

/KCC or /KC1 cage clamp

10.20 /KCC or /KC1 cage clamp

With these options, the traditional means of connecting to the bolts of the terminal board is replaced by a terminal strip with cage clamp connections.

10.20.1 6 or 10 /KCC terminal strips

Type designation

/KCC

Description

This option comprises an extension from 6 to 10 terminals, in each case with an additional grounding terminal (PE).

The star or delta connection is implemented in the middle of the terminal strip as follows:

- Using one jumper for the star connection
  or
- Using three jumpers for the delta connection

The four jumpers are included in the scope of delivery.

In a brakemotor, four additional terminal strips can be used as an option for connecting the brake.

Notes on configuration

The winding is always connected to the first six terminal strips.

Two alternatives exist for the connection of the optional brake:

- Separate connection in the terminal box via screw terminals for the brake voltage supply on the rectifier or the screw terminal when using the rectifiers in the control cabinet.
- Four additional terminal strips for the brake voltage supply and the optional feedback of the DC-side disconnection to the control cabinet.

When using the rectifiers in the control cabinet, only three of the four terminals are used for the connection.

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>KCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage clamp for motor size</td>
<td></td>
<td>DR. 71 – 132</td>
</tr>
<tr>
<td>Number of terminals</td>
<td></td>
<td>6 for motor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 or 10 for brakemotor</td>
</tr>
<tr>
<td>Grounding (PE)</td>
<td></td>
<td>1 additional terminal</td>
</tr>
<tr>
<td>Connection to terminals</td>
<td></td>
<td>Cage clamp</td>
</tr>
<tr>
<td>Maximum core cross section</td>
<td></td>
<td>Rigid conductors: 4 mm²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexible conductors: 4 mm²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>With conductor end sleeve: 2.5 mm²</td>
</tr>
<tr>
<td>Maximum voltage (IEC)</td>
<td>$V_{AC}$</td>
<td>720</td>
</tr>
<tr>
<td>Maximum voltage (CSA)</td>
<td>$V_{AC}$</td>
<td>600</td>
</tr>
<tr>
<td>Maximum contact load (IEC)</td>
<td>$A_{AC}$</td>
<td>28</td>
</tr>
</tbody>
</table>
The auxiliary terminals – e.g., for thermal motor protection – are generally connected separately via screw terminals and not via the terminal strip.

10.20.2 /KCC contact rating at ambient temperatures over 40°C

**Description**

Reduced current values apply to temperatures higher than the 40°C specified in the tables. The following figure shows the permitted contact load depending on the ambient temperature.
10 Other options and design types
/KCC or /KC1 cage clamp

10.20.3 /KC1 compact wiring space

Type designation
/KC1

Description
The connection of the terminal box for the /KC1 option differs from that of the standard motor or brakemotor terminal box.

A non-modifiable terminal strip replaces the terminal board and, instead of a terminal box lower part and cover, a high cover with three threads for cable glands is screwed directly onto the terminal box shoulder on the stator. This helps to achieve the low height.

VDI guideline 3643 contains a profile for electrified monorail systems, the C1 profile. The motor size DR.71 complies with this profile.

The DR.80 motor also meets this guideline with the /KC1 option in terminal box positions R (0°), L (180°), and T (270°), for all cable entry directions (X, 1, 2, 3).

The /KC1 option is compatible with motors DR.71 – 132.

Drive selection

The terminal strip consists of the following:

- Three dual-chamber terminals for connecting the motor winding and the three incoming cables.
- Three single-chamber terminals for connecting the brake. The rectifier for the brake must be fitted externally.
- Two single-chamber terminals for connecting an auxiliary device – e.g., a /TF or a /TH, or the anti-condensation heating etc.
- A grounding terminal (PE).

The maximum cross section that can be connected is 2.5 mm² per terminal. There are no star or delta bridges.

The following three cable entries are integrated in the high cover of the KC1:

- M20 × 1.5
- M16 × 1.5
- M12 × 1.5

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>KC1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage clamp for motor size</td>
<td>DR. 71 – 132</td>
<td>C1 profile with DR.71 – 80</td>
</tr>
<tr>
<td>Number of terminals</td>
<td>8 for motor/brakemotor</td>
<td></td>
</tr>
<tr>
<td>Grounding (PE)</td>
<td>1 additional terminal</td>
<td></td>
</tr>
<tr>
<td>Connection to terminals</td>
<td>Cage clamp</td>
<td></td>
</tr>
<tr>
<td>Maximum core cross section</td>
<td>Rigid conductors: 2.5 mm²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flexible conductors: 2.5 mm²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With conductor end sleeve: 1.5 mm²</td>
<td></td>
</tr>
<tr>
<td>Maximum voltage (IEC)</td>
<td>$V_{AC}$</td>
<td>500</td>
</tr>
<tr>
<td>Maximum voltage (CSA)</td>
<td>$V_{AC}$</td>
<td>600</td>
</tr>
</tbody>
</table>
Other options and design types

Other industrial plug connectors

<table>
<thead>
<tr>
<th>Type</th>
<th>Unit</th>
<th>KC1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum contact load (IEC)</td>
<td>A_{AC}</td>
<td>24</td>
</tr>
<tr>
<td>Maximum contact load (CSA)</td>
<td>A_{AC}</td>
<td>5</td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

The motor with the /KC1 option is supplied with factory-fitted wiring. Unless specified otherwise by the customer, a star connection is provided for 2-, 4-, and 6-pole motors of the type DRS.., DRE.., and DRP.. with connection type R13.

The customer can change this to a delta connection by altering the assignment of the three dual-chambers.

The terminal strip is approved by CSA (Canada) for a maximum of 5 amps.

10.20.4 /KC1 contact rating at ambient temperatures over 40°C

Description

Reduced current values apply to temperatures higher than the 40°C specified in the tables. The following figure shows the permitted contact load depending on the ambient temperature.

![Graph showing contact load at different ambient temperatures](image)

10.21 Other industrial plug connectors

If the connection is to be established via other plug connectors, please supply SEW-EURODRIVE with the manufacturer and type of the desired plug connectors.
10.22 Brake monitoring

10.22.1 Brake monitoring

Type designation

/DUB

Description

The DUB (Diagnostic Unit Brake) is a diagnostic unit used for reliable monitoring of the brake function and brake lining wear.

A microswitch serves as the core element of the /DUB diagnostic unit.

One microswitch is used for

- Function monitoring
  or
- Wear monitoring

Two microswitches are used for

- Function and wear monitoring

The /DUB option is available for brake BE2 on DR.90 up to BE122 on DR.315.
Notes on configuration

The technical data of the microswitch is listed in the following table.

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Unit</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$V_{AC}$</td>
<td>Max. 250</td>
</tr>
<tr>
<td></td>
<td>$V_{AC}$</td>
<td>24&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>$V_{DC}$</td>
<td></td>
</tr>
<tr>
<td>Rated switching capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$A_{AC}$</td>
<td>6.0 (at 250 V)</td>
</tr>
<tr>
<td></td>
<td>$A_{AC}$</td>
<td>0.1 (at 24 V)</td>
</tr>
<tr>
<td></td>
<td>$A_{DC}$</td>
<td></td>
</tr>
<tr>
<td>Mechanical service life in number of cycles</td>
<td></td>
<td>50 million</td>
</tr>
<tr>
<td>Control element material</td>
<td></td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Housing material</td>
<td></td>
<td>PA6T/X with fiberglass reinforcement</td>
</tr>
<tr>
<td>Snap switch mechanism</td>
<td></td>
<td>Self-reengaging, flexible tongue made of beryllium-copper with self-cleaning contacts</td>
</tr>
<tr>
<td>Tripping force</td>
<td>N</td>
<td>3.5</td>
</tr>
<tr>
<td>Differential movement</td>
<td>mm</td>
<td>0.1</td>
</tr>
<tr>
<td>Temperature range</td>
<td>°C</td>
<td>-40 to +80</td>
</tr>
<tr>
<td>Protection class</td>
<td></td>
<td>II</td>
</tr>
<tr>
<td>Can be mounted to</td>
<td></td>
<td>DR.90..BE2 – DR.315..BE122</td>
</tr>
<tr>
<td>Connection</td>
<td></td>
<td>Screw contacts in terminal box</td>
</tr>
</tbody>
</table>

1) When a voltage > 24 V DC is connected, the gold layer is destroyed, as a result of which operation with 24 V DC is no longer permitted.

- Note that for the function monitoring of the brake, no stop category is met in terms of the functional safety covered by standard EN 13849.
- The signal can be evaluated by a frequency inverter or higher-level controller.
- If the microswitch was operated with an AC voltage, operation with a 24 V DC voltage is then no longer permitted.
10.22.2 Function monitoring

Type designation

/DUB

Description

The function monitoring system signals whether the brake releases properly. This is done via the NO function of the contact in the microswitch.

Drive selection

Block diagram:

Function monitoring

[1] Brake

[2] MP321-1MS micro-switch

External vibration stress is not permitted since this can raise the occurrence of apparent error messages on the part of the microswitch.
10.22.3 Wear monitoring

Type designation

/DUB

Description

The wear monitoring system signals when the brake has reached a specified wear limit. However, the brake remains functional. This is done via the NC function of the contact in the microswitch.

Drive selection

Block diagram:

Wear monitoring

[1] Brake

[2] MP321-1MS micro-switch

External vibration stress is not permitted since this can raise the occurrence of apparent error messages on the part of the microswitch.
10.22.4 Function and wear monitoring

Type designation

/DUB

Description

Two microswitches are used in parallel.

- The function monitoring system signals whether the brake releases properly. This is done via the NO function of the contact in the first microswitch.
- The wear monitoring system signals when the brake has reached a specified wear limit. However, the brake remains functional. This is done via the NC function of the contact in the second microswitch.

Drive selection

Block diagram:

Function monitoring + wear monitoring

[1] Brake
[2] MP321-1MS microswitch
[3] Function monitoring

External vibration stress is not permitted since this can raise the occurrence of apparent error messages on the part of the microswitches.
10.23  Vibration monitoring

10.23.1  SPM measuring nipple

Type designation

None

Description

The bores for accommodating the SPM vibration transducers are available as an option for the motor sizes DR.160 to 315.

The A-side and B-side bores feature metrical threads (M8) in the flanges or covers and are closed with a closing plug. The closing plug is greased for easy disassembly.

Usually, the vibration transducers are aligned to the terminal box. They can be supplied by SEW-EURODRIVE with the order. They are supplied loose with the drive.

Usually, the 24 mm nipple is used on the A-side, while the 78 mm nipple is used for the fan guard on the B-side.

Notes on configuration

The vibration transducer is not included in the scope of delivery of SEW-EURODRIVE.
10.24 WPU smooth pole-change unit

Normal multi-speed motors cannot switch from high to low speed without jerks unless special measures are taken. To limit the regenerative braking torque which arises, the voltage is either reduced to a lower value at the moment of the changeover by chokes, a transformer or dropping resistors, or the changeover is only 2-phase. All specified measures involve additional installation effort and switchgear. A time relay, which is set empirically, causes the voltage to return to normal conditions.

The WPU smooth pole-change unit operates purely electronically.

10.24.1 Function

The changeover command blocks a phase of the line voltage by means of a triac, thereby reducing the shift-in torque to about one third. The third phase is switched back on with optimum current as soon as the synchronous speed of the low-speed winding is reached.

The following figure shows the WPU smooth pole-change unit.

![WPU smooth pole-change unit](image)

10.24.2 Advantages of WPU

- Load independent and wear-free
- No energy loss and thus high efficiency
- Unrestricted starting and nominal torque and unrestricted motor starting frequency
- Minimal wiring
- Suitable for any multi-speed standard motor
10.24.3 Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>WPU 1001</th>
<th>WPU 1003</th>
<th>WPU 1010</th>
<th>WPU 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>8257426</td>
<td>8257434</td>
<td>8257442</td>
<td>8257450</td>
</tr>
<tr>
<td>For multi-speed motors with nominal current $I_N$ at low speeds in S1 continuous duty</td>
<td>0.2 – 1 $A_{AC}$</td>
<td>1 – 3 $A_{AC}$</td>
<td>3 – 10 $A_{AC}$</td>
<td>10 – 30 $A_{AC}$</td>
</tr>
<tr>
<td>For multi-speed motors with nominal current $I_N$ at low speeds in S3 intermittent duty 40/60% cdf</td>
<td>0.2 – 1 $A_{AC}$</td>
<td>1 – 5 $A_{AC}$</td>
<td>3 – 15 $A_{AC}$</td>
<td>10 – 50 $A_{AC}$</td>
</tr>
<tr>
<td>Rated supply voltage $U_{line}$</td>
<td>2 × 150 – 500 $V_{AC}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line frequency $f_{line}$</td>
<td>50/60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal current in S1 continuous duty $I_N$</td>
<td>1 $A_{AC}$</td>
<td>3 $A_{AC}$</td>
<td>10 $A_{AC}$</td>
<td>30 $A_{AC}$</td>
</tr>
<tr>
<td>Ambient temperature $\theta_{amb}$</td>
<td>-15 to +45°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>0.3 kg</td>
<td>0.3 kg</td>
<td>0.6 kg</td>
<td>1.5 kg</td>
</tr>
<tr>
<td>Mechanical design</td>
<td>DIN rail housing with screw connections</td>
<td>Control cabinet back panel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10.24.4 Dimension sheets for WPU smooth pole-change unit

WPU 1001, 1003, 1010

1) Heat sink only for WPU 1010
Other options and design types

WPU smooth pole-change unit

WPU 2030

Catalog – AC Motors DR.71 - 315, DT56, DR63

10

530

Catalog – AC Motors DR.71 - 315, DT56, DR63