

AKD[®]/S700

Accessories Guide

North American Edition



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Original Document



Keep all manuals as a product component during the life span of the product.
Pass all manuals to future users/owners of the product.

KOLLMORGEN[®]

Because Motion Matters[™]

Record of Document Revisions

| Revision | Remarks |
|----------------|--|
| Rev A, 12/2009 | Original version |
| Rev B, 08/2012 | Updated revision |
| Rev C, 09/2012 | Minor updates to formatting. |
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| Rev E, 05/2013 | Notes added on 300V and 600V Value line cable routing standards. Chapter on capacitor modules added. |
| Rev F, 09/2013 | Pinout drawings added for linear motor adapters. Section added for Kollmorgen Ethernet cables. |
| Rev G, 12/2014 | Regen resistor model support changed. |
| Rev H, 12/2015 | Filter order information clarified. |

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Current patents:

US Patent 5,646,496 (used in control card R/D and 1 Vp-p feedback interface)

US Patent 5,162,798 (used in control card R/D)

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Technical changes which improve the performance of the device may be made without prior notice.

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2 General

2.1 About this Manual

This manual describes accessories for the AKD and S700 drives and contains essential technical data. This manual is only valid in conjunction with the manuals for the AKD drive and applicable motor in your application.

The manuals for AKD and S700 drives are included on the disk shipped with the drives and on the Kollmorgen website (www.kollmorgen.com). These documents are available in PDF format in multiple languages (system requirements: Windows, internet browser, and Acrobat Reader). In all pdf versions, the table of contents and index entries are active bookmarks. Page/chapter numbers in the text with cross references are active links to the target material.

2.2 Symbols

| Symbol | Meaning |
|--|---|
|  DANGER | Indicates a hazardous situation which, if not avoided, will result in death or serious injury. |
|  WARNING | Indicates a hazardous situation which, if not avoided, could result in death or serious injury. |
|  CAUTION | Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. |
| NOTICE | This is not a safety symbol. Indicates situations which, if not avoided, could result in property damage. |
| NOTE | This is not a safety symbol. This symbol indicates important notes. |

2.3 General Safety Instructions

CAUTION

- This manual is only valid in conjunction with the manuals for the drive and motor in your application.
- You must read the installation manual for the drive and motor in your application and observe the safety instructions in this manual before beginning mounting/installation work.
- Improper or incorrect cable assembly, mounting, or wiring can result in damage to property and equipment or personnel injury. The following requirements for specialist personnel apply:

Transport: only by personnel with knowledge of handling electrostatically sensitive components.

Unpacking: only by electrically qualified personnel.

Cable assembly: only by electrically qualified personnel.

Installation: only by electrically qualified personnel.




Commissioning: only by qualified personnel with extensive knowledge of electrical engineering /drive technology.

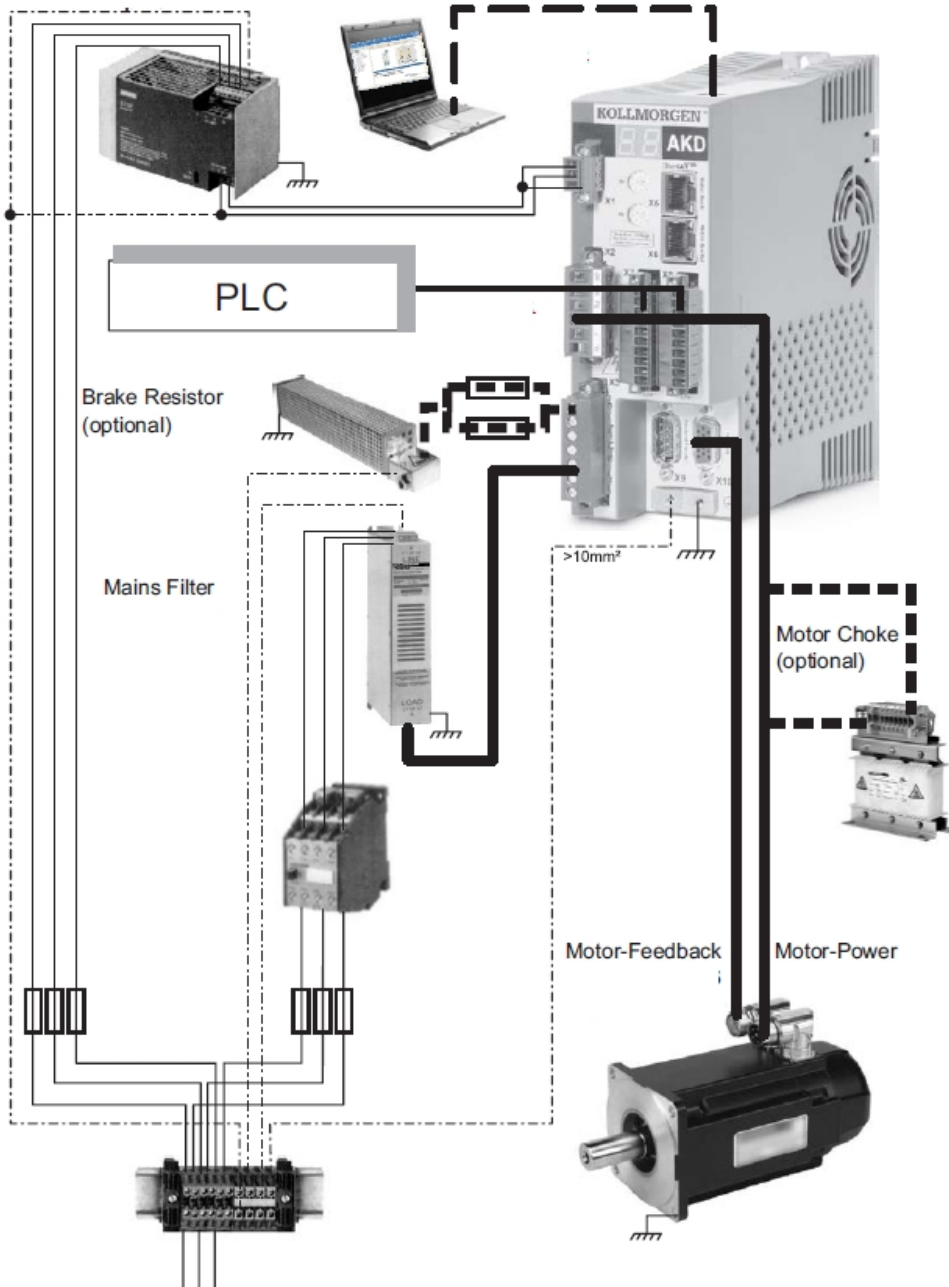
- Observe the specific safety instructions for each product group.
- The maximum cable lengths that are given must not be exceeded, otherwise the drive and motors may not function properly.
- Kollmorgen is not liable for faults or damage to the connected equipment caused by cables that have been configured by customers.

3 Digital Drive Systems

The systems shown are possible scenarios for setting up a digital drive system with relevant components.

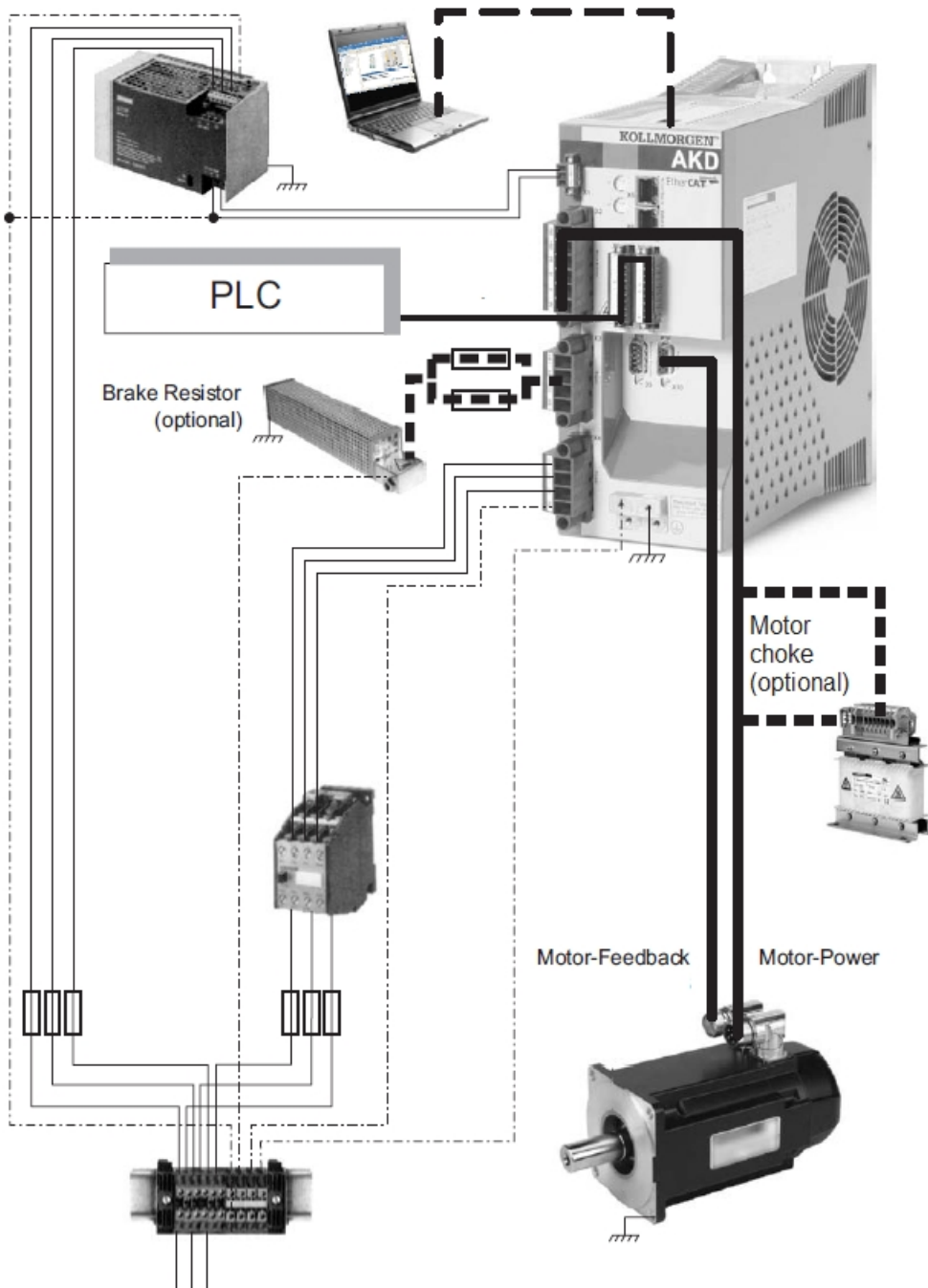
3.1 Drive System with AKD-P00306 to 02406

- Shielded Cable 
- Electrical Ground 
- Optional Devices 



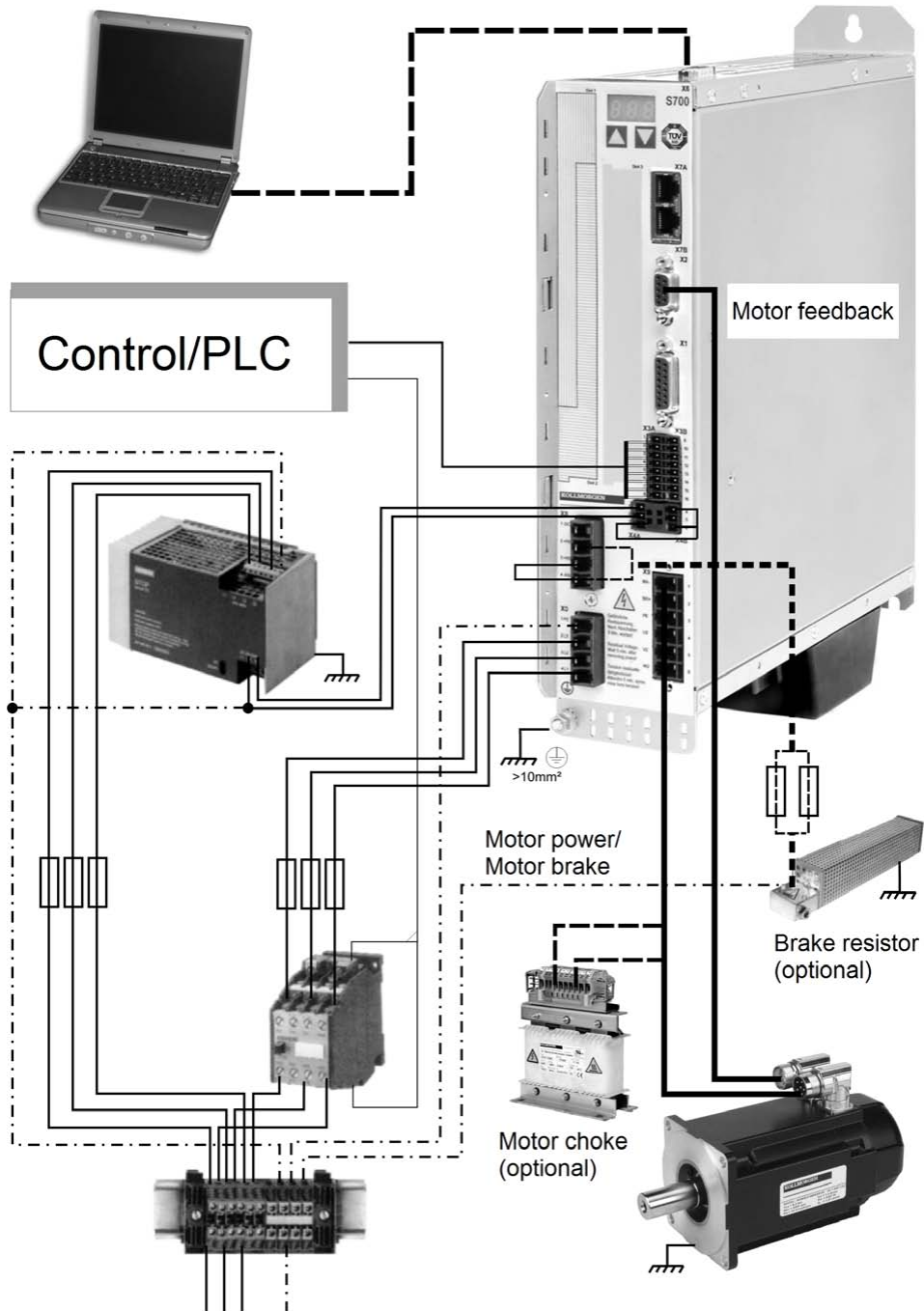
3.2 Drive System with AKD-P00307 to 02407

Shielded Cable ————
 Electrical Ground - - - - -
 Optional Devices - - - - -



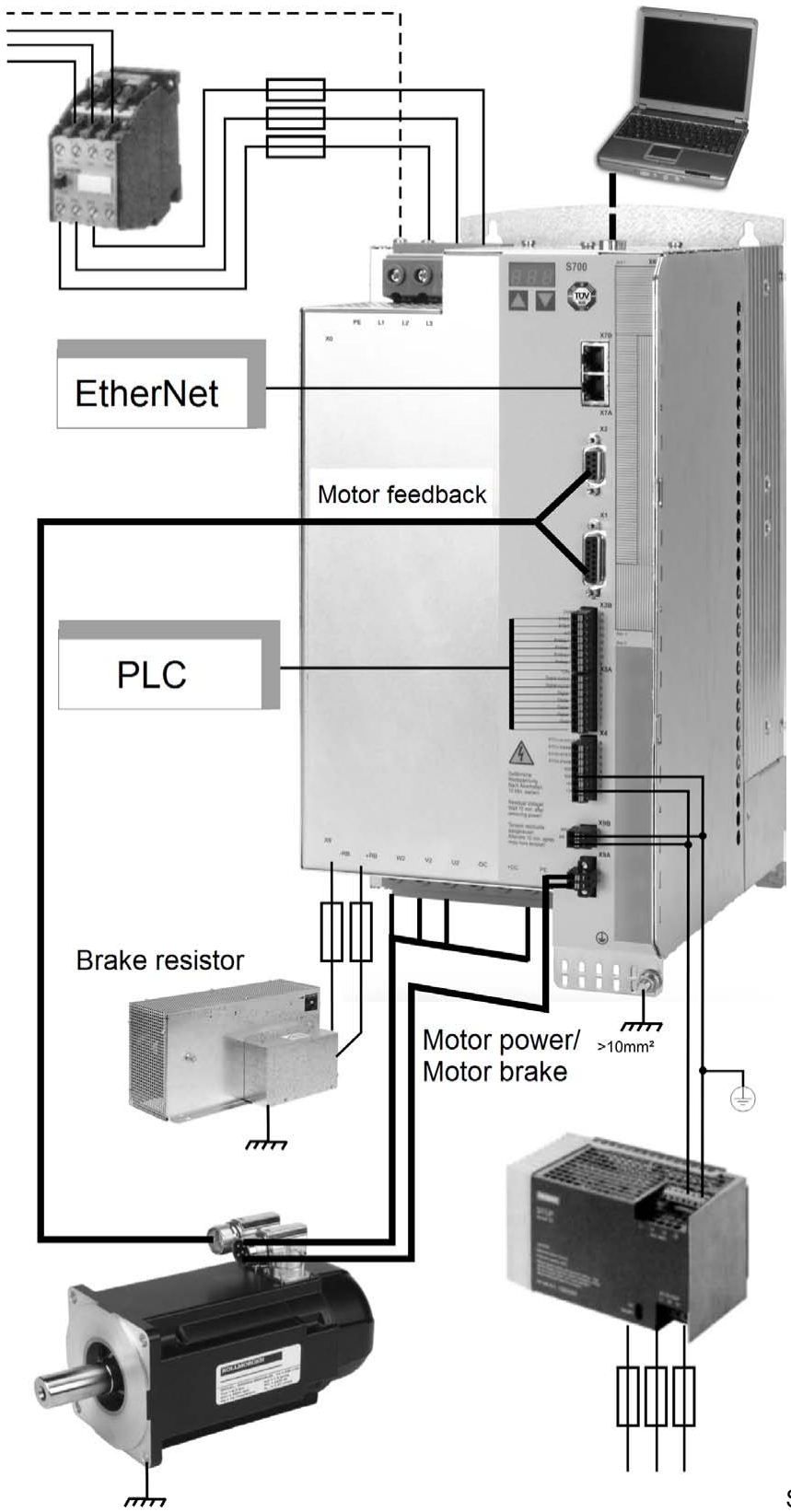
3.3 Drive System with S701 to 724

- Shielded Cable
- Electrical Ground
- Optional Devices



3.4 Drive System with S748 to S772

Shielded Cable ————
 Electrical Ground - - - - -
 Optional Devices - - - - -



S

4 Mechanical Tools

4.1 Safety instructions

⚠ CAUTION

This manual is only valid in conjunction with the instruction manual for the drive and motor you are using in your application.

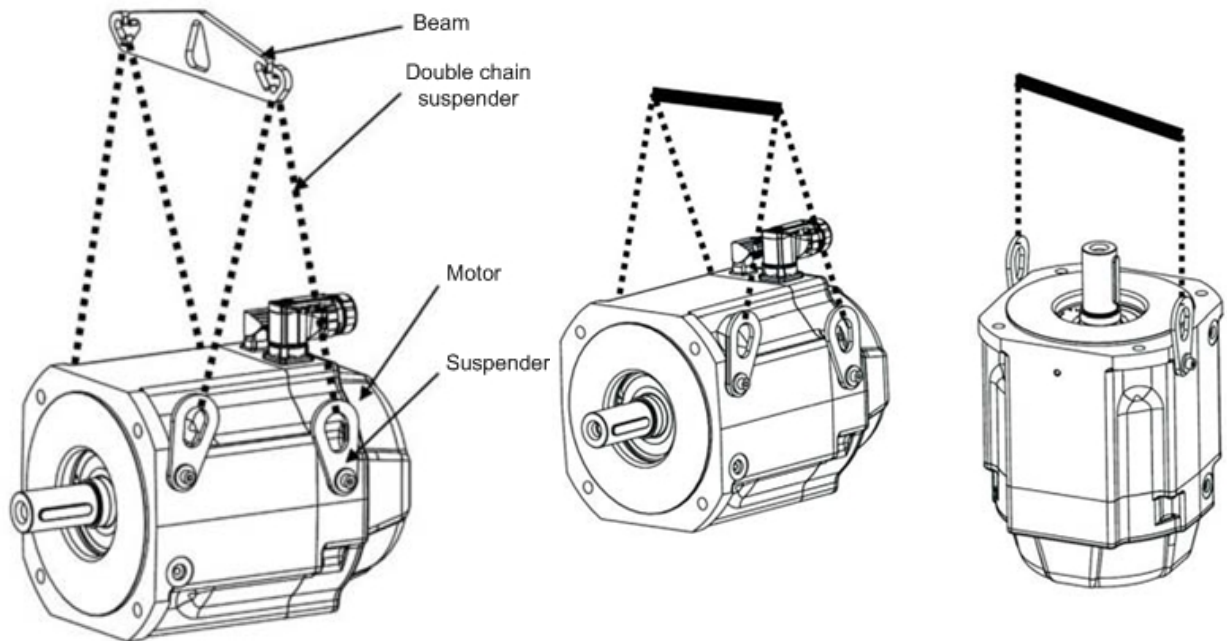
4.1.1 Suspension Unit for AKM8 motors

⚠ CAUTION

You must read the instruction manual for the suspension unit ZPMZ 120/292. Observe and follow the safety instructions for this item.

The Suspension Unit ZPMZ 120/292 is designed for suspending motors only, without attached units such as gearboxes, and clutches. The suspension unit is designed for a maximum motor weight of 120 kg and maximum nominal span of the extreme suspension hooks of 292 mm.

The suspension unit consists of a beam (suspended off the crane hook) and two double-run chain suspenders. The motor may be suspended on two or four runs of the chain suspender.



The suspenders (number depends on the motor type) are delivered with the motor.

| Technical Data | Value |
|------------------|---------|
| Lifting capacity | 120 kg |
| Nominal span | 292 mm |
| Lug width | 44.7 mm |
| Lug height | 51 mm |
| Weight | 0.83 kg |

| Technical Data | Value |
|---------------------------|---------|
| Number of cycles per year | 20,000 |
| Average load | 60 % |
| Order code | FA00092 |

4.2 Mounting clamps for side mounting of S701-712 and S724

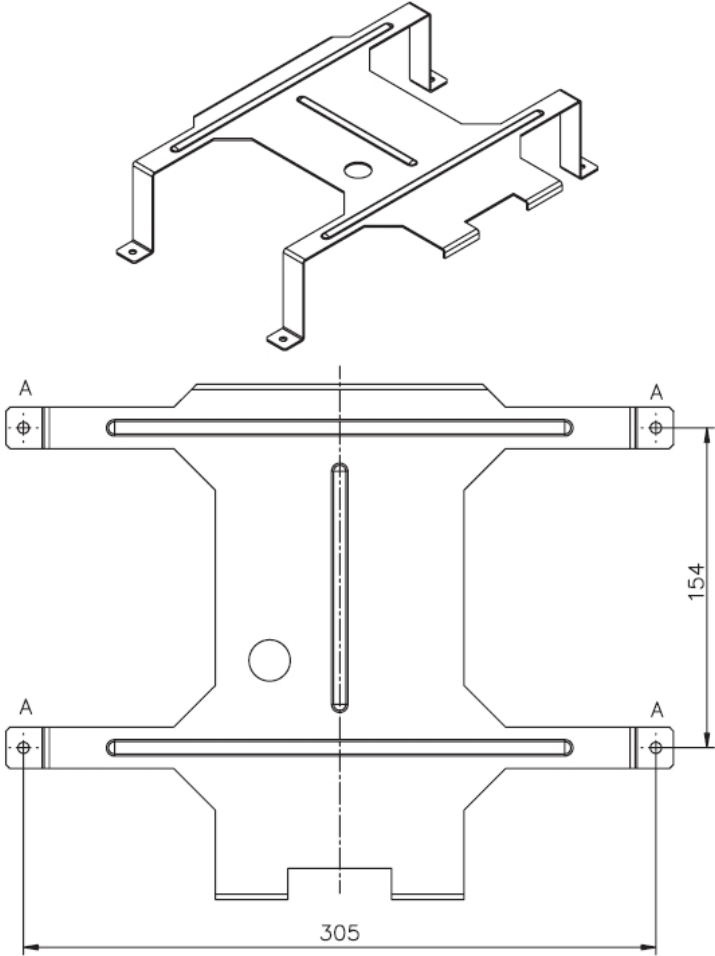


You can mount S700 drives to side walls or doors of switchgear cabinets using an additional mounting clamp. The S701-712 drives requires a 70 mm clamp and the S724 requires a 100 mm clamp.

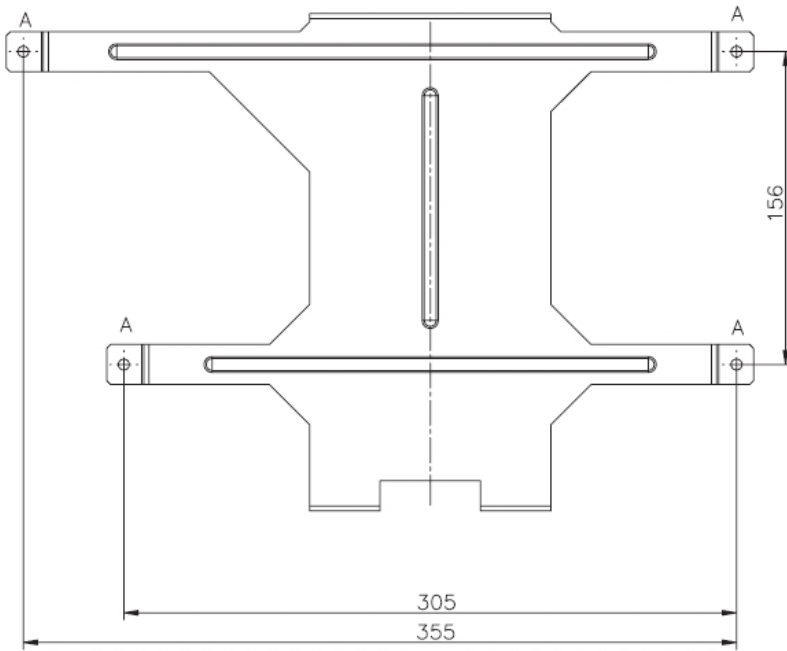
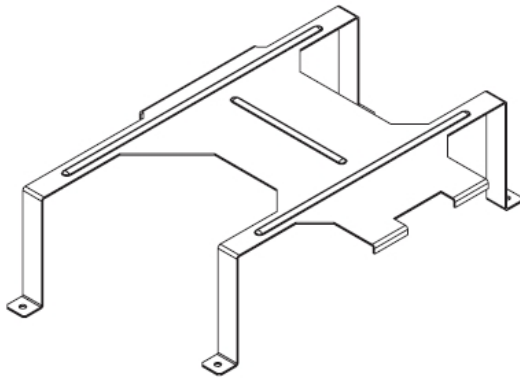
Technical Data for Clamps

| Technical Data | 70 mm clamp | 100 mm clamp |
|----------------|-------------|--------------|
| Mounting holes | 5.5 mm | 5.5 |
| Height | 322 mm | 370 |
| Width | 72 mm | 102 |
| Depth | 248 mm | 248 |
| Weight | 0.13 kg | 0.14 |
| Order code | DE-201402 | DE-201403 |

4.2.1 Clamp for S701-712, 70mm

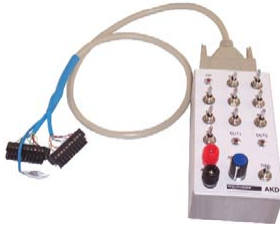


4.2.2 Clamp for S724, 100mm



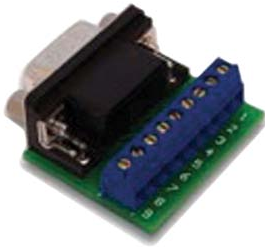
5 Input, Output, and Feedback Accessories

5.1 AKD Control Box, AKD-CONTROLBOX-A



The AKD control box is a test instrument that allows you to control all digital and analog inputs on the drive and to monitor the digital and analog outputs.

5.2 X9 Screw Terminal Adapter, AKD-X9ADPT



The AKD X9 screw terminal adapter plugs into the X9 port for testing of the X9 port connection. This item is not used with S700 drives.

5.3 Linear Motor Adapter

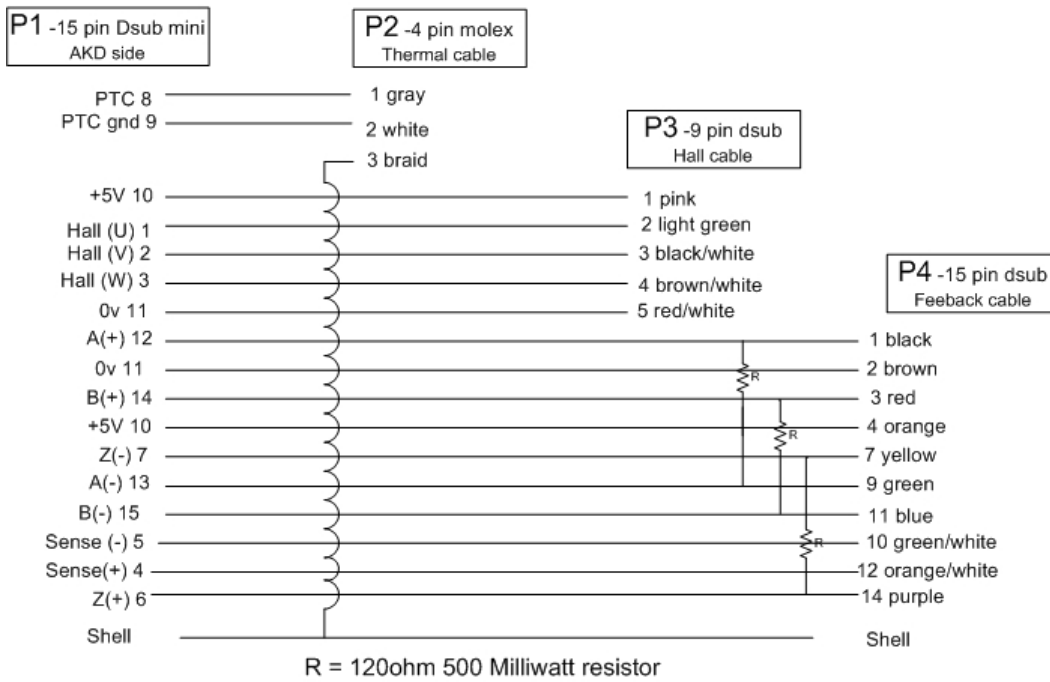


Linear motor adapters are used to combine feedback, Hall, and thermal sensors. They have connectors for standard Kollmorgen DDL connections. The linear feedback device is customer supplied, and two different adapter models are available for common linear feedback types. This item is not used with S700 drives.

| Item | Linear Feedback Type |
|-----------|----------------------|
| ACI-AKD-A | Heidenhain |
| ACI-AKD-B | Renishaw |

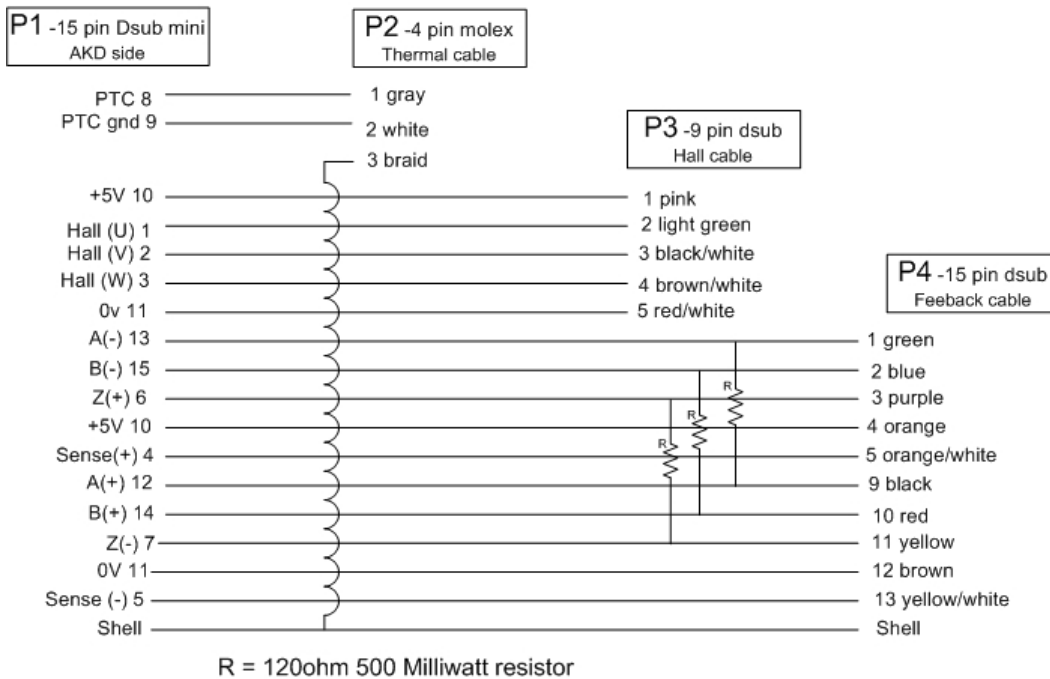
5.3.1 ACI-AKD-A Pinout Drawing

ACI-AKD-A (Heidenhain type)



5.3.2 ACI-AKD-B Pinout Drawing

ACI-AKD-B (Renishaw Sine/Cos type)



6 Shielding Accessories

6.1 Safety instructions

⚠ CAUTION

- You must read the instructions manual for the drive/motor you are using in your application and observe the safety instructions they contain before beginning mounting/installation work.
- This manual is only valid in conjunction with the instruction manuals for the drive and motor you are using in your application.

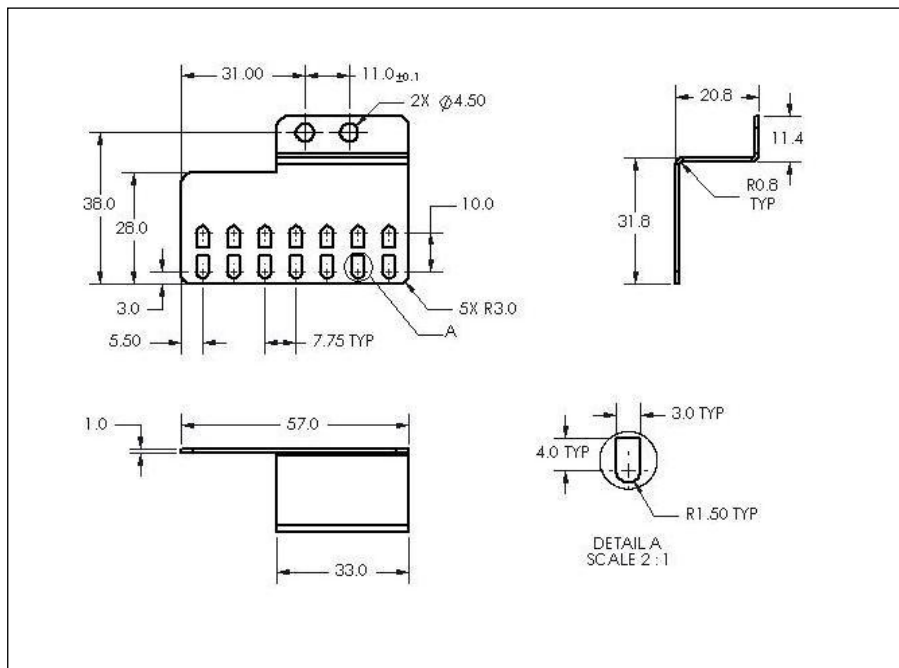
6.2 Shield Plates

Shield plates can be attached to drives to assist in grounding and routing cabling.



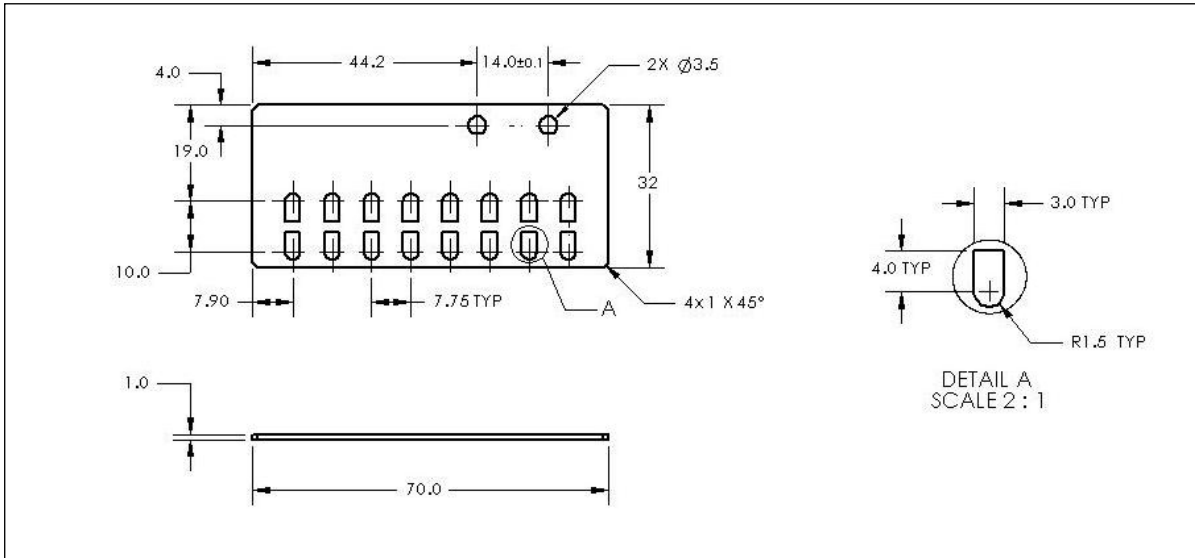
6.2.1 AKD-z-zzz06 shield plate

This shield plate is not included with AKD-z-zzz06, but can be ordered separately (Item 153-230000-01).



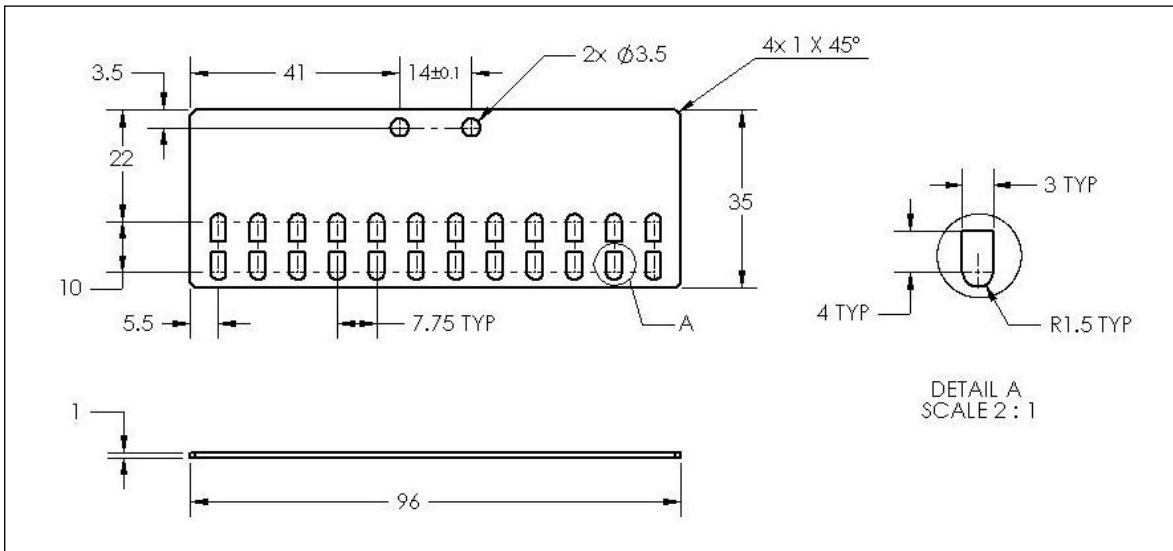
6.2.2 AKD-z-00307, AKD-z-00607, and AKD-z-01207 shield plate

This shield plate (Item number 153-254001-00) is included for use with AKD-z-00307, AKD-z-00607, and AKD-z-01207 drives.



6.2.3 AKD-z-02407 shield plate

This shield plate (Item 153-255000-02) is included for use with the AKD-z-02407 drive.



6.3 AKD and S701 to S724 Shield Clamps (purchased separately)



S701 to 724 and AKD drives feature slots on the front panel for connecting additional shield clamps.

Recommended shield clamp:

| Manufacturer | Item | Tension range |
|-----------------|------|---------------|
| Phoenix Contact | SK14 | 6-13 mm |

6.4 S748 to S772 Shield Clamps (purchased separately)



The shroud supplied with S748 to S772 drives features slots for the connection of additional shield clamps. The clamps are included with the drive.

Recommend shield clamps:

| Manufacturer | Item | Tension range |
|------------------|----------------------|---------------|
| OBO (Bettermann) | BBS-Schelle Typ 2056 | 16-22 mm |
| OBO (Bettermann) | BBS-Schelle Typ 2056 | 28-34 mm |

6.5 External Shielding Busbar (purchased separately)

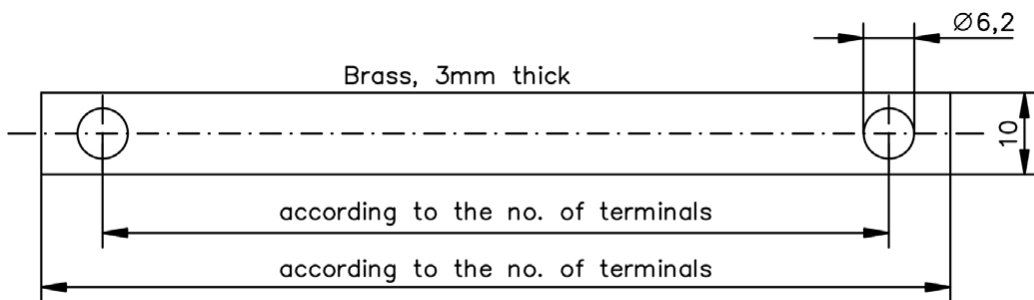


In special cases, the cable shields can be routed to an additional busbar via shield clamps. The following shield clamp is recommended:

| Manufacturer | Item | Tension range |
|--------------|------|---------------|
| Weidmüller | KLBÜ | 6-13 mm |

A possible scenario for setting up a busbar for the above shield clamps is described below.

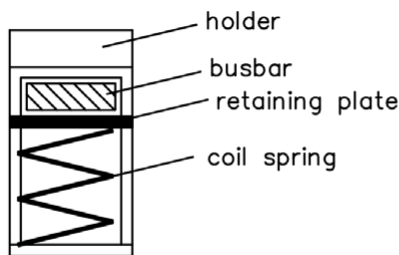
- Cut a busbar of the required length from a brass rail (cross-section 10 x 3 mm) and drill holes in it as indicated. All shield clamps required must fit between the drill holes.



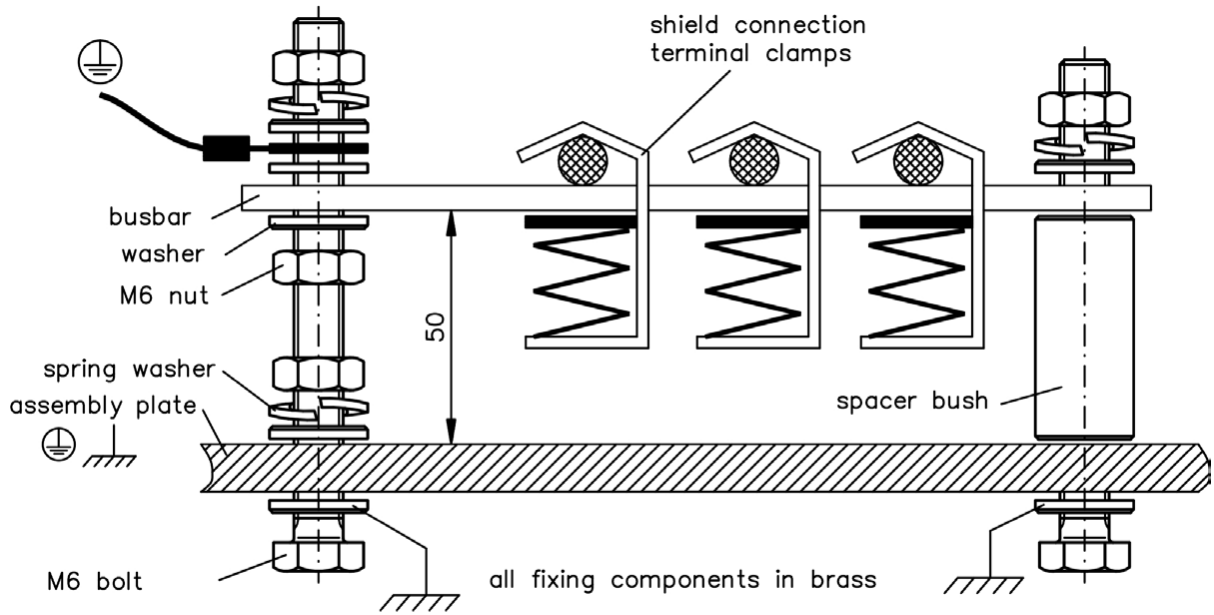
- Squeeze together the coil spring and the supporting plate and push the busbar through the opening in the holder.

CAUTION

Risk of injury is present due to the spring force of the coil spring. Use pincers.



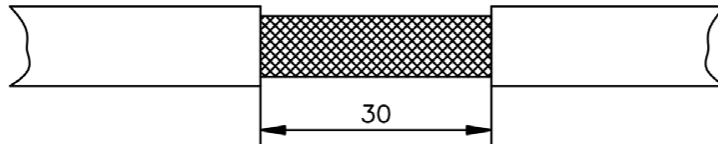
- Mount the busbar with the shield clamps fitted on the assembly plate. Use either metal spacer bushes or screws with nuts and accessories to maintain a spacing of 50 mm. Earth the busbar using a single conductor with a cross-section of at least 2.5 mm².



- Strip the external cable sheath to a length of approx. 30 mm, taking care not to damage the braided shield. Push the shield clamp up and route the cable to it via the busbar.

NOTICE

Make sure good contact exists between the shield clamp and the braided shield.



7 Mains Chokes

In special cases, if mains voltage is more than 3% asymmetrical, then the S748/772 drives must be used with a mains choke. Without this choke, an unfavorable combination of mains impedance and DC bus capacitance can result in an unloaded DC bus voltage of up to 800 V.

To reduce EMC, the chokes should be mounted isolated from the cabinet. Single conductors can be used for wiring; shielded cables are not required.

The purpose of mains choke is as follows:

- Prevents overloading of the semiconductors in the event of a rapid current rise during commutation.
- Prevents voltage dips in the mains voltage caused by commutation.
- Reduces current ripple in the DC link, which increases the service life of the DC link capacitors.

NOTICE

Several drives can be connected to one mains choke; the rated current of the mains choke must be greater than or at least equal to the total current of the connected drives.

7.1 Safety instructions

⚠ WARNING

Power terminals can conduct hazardous voltage up to 10 minutes after the mains voltage has been disconnected. Before starting work on power terminals, check that the phase-to-earth and phase-to-phase voltages have de-energised.

⚠ WARNING

Due to the high earth leakage currents induced by the system, you should observe the requirements of EN 61800-5-1 (which is fixed installation, $\geq 10 \text{ mm}^2$ or double protective earth) when carrying out mounting and installation work.

⚠ CAUTION

You must read the instruction manuals for the drive/motor you are using in your application and observe the safety instructions they contain before starting mounting/installation work.

⚠ CAUTION

This manual is only valid in conjunction with the instruction manuals for the drive and motor you are using in your application.

NOTICE

A connection diagram appears in the drive instruction manual.

7.2 Type assignment

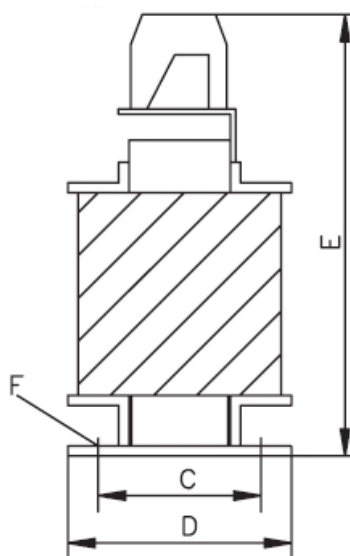
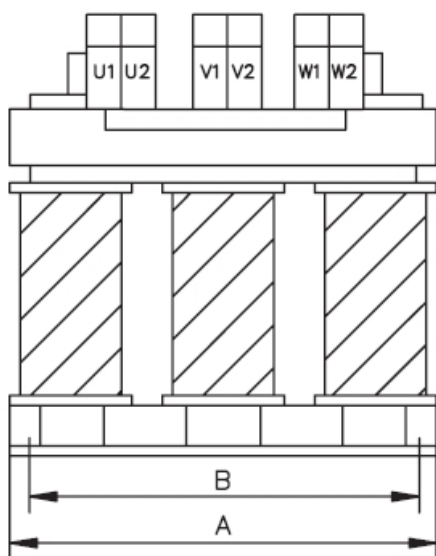
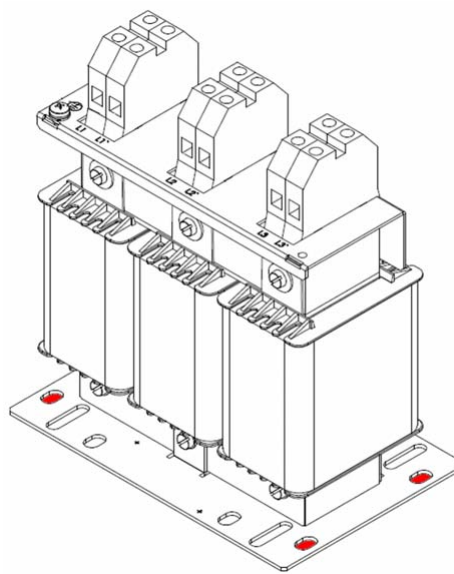
| Drive | Mains Choke |
|---|--------------|
| S748 (with asymmetrical mains >3% only) | 2% uk |
| S772 (with asymmetrical mains >3% only) | 2% uk |
| S701 to 724 | Not required |

7.3 Order codes

| Item | | uk | Order codes | Comments |
|-------------------------|-----------------|----|-------------|--|
| Mains choke 3L0,2-50-2 | (0.24 mH, 50A) | 2% | DE-201476 | Can be used for S748/772 in case of asymmetric mains |
| Mains choke 3L0, 2-75-2 | (0.20 mH, 75 A) | 2% | DE-201477 | Can be used for S748/772 in case of asymmetric mains |

7.4 Mains choke 3L

Mains choke 3L is shown in the photograph and drawings below.



Technical Data

| Type | Inductivity [mH] | Nominal Current [A] | uk [%] | A [mm] | B [mm] | C [mm] | D [mm] | E [mm] | F [mm] | Terminals [mm ²] | Weight [kg] |
|---------------|------------------|---------------------|--------|--------|--------|--------|--------|--------|--------|------------------------------|-------------|
| 3L 0, 24-50-2 | 0.24 | 50 | 2 | 152.5 | 114.3 | 88.9 | 101.5 | 163 | 6.5 | 10 | 5.9 |

| Type | Inductivity [mH] | Nominal Current [A] | uk [%] | A [mm] | B [mm] | C [mm] | D [mm] | E [mm] | F [mm] | Terminals [mm ²] | Weight [kg] |
|--------------|------------------|---------------------|--------|--------|--------|--------|--------|--------|--------|------------------------------|-------------|
| 3L 0, 2-75-2 | 0.20 | 75 | 2 | 185 | 170 | 77 | 122 | 220 | 8x12 | 35 | 9.9 |

8 Mains Filters

AKD-P00306 to 02406 drives require an external mains filter. All other drives feature built-in mains filters (see the relevant instruction manual).

NOTE

Filters are not available for order from Kollmorgen in North America. Schaffner part numbers are provided below. Schaffner filters are available from electrical component distributors, or directly from Schaffner.

In order for the mains filters to function properly, the permissible throughput rating of the mains filters must not be exceeded even on peak loading of the drives with I_{peak} :

Maximum available throughput rating of the mains filter (F):

$$P_{max F} = \sqrt{3} \cdot U_N \cdot I_{NF}$$

Maximum power consumption of the drive:

$$P_{max V} = g \cdot \sqrt{3} \cdot U_N \cdot \sum_i I_{peakVi}$$

Maximum power consumption of the motors (M):

$$P_{max M} = g \cdot \sum_i k_{Ei} \cdot \frac{n_i}{1000} \cdot I_{peakVi} \cdot \sqrt{\frac{3}{2}}$$

The rated current I_{NF} of the mains filter in a system with i axes must be:

$$I_{NF} \leq 2 \cdot \sum_i I_{NVi}$$

(total of twice the rated currents of the amplifiers) and, more precisely,

$$I_{NF} \leq \frac{P_{max M}}{\sqrt{3} \cdot U_N}$$

(typical maximum single value of the amplifier peak currents)

In many cases, you can use the next smallest filter in the event of a low coincidence factor g or low load.

8.1 Safety instructions

⚠ CAUTION

You must read the instructions manual for the drive/motor you are using in your application and observe the safety instructions they contain before commencing mounting/installation work. This manual is only valid in conjunction with the instructions manual for the drive and motor you are using in your application.

⚠ WARNING

Power terminals are capable of conducting hazardous voltage up to 10 minutes after the mains voltage has been disconnected. Before starting work on power terminals, check that the phase-to-earth and phase-to-phase voltages have de-energized.

⚠ WARNING

Due to the high earth leakage currents induced by the system, you should observe the requirements of EN 61800-5-1 (e.g. fixed installation, $\geq 10 \text{ mm}^2$ or double protective earth) when carrying out mounting and installation work. A connection diagram appears in the drive installation manual.

8.2 Type assignment

| Drive | Mains filter |
|-----------------------------------|--------------------------------------|
| AKD-P00306 to 02406 (120 to 240V) | FN-type Shaffner filters recommended |
| AKD-P00307 to 02407 (240 to 480V) | Not required |
| S700 | Not required |

8.3 Order codes

Filters are not available for order from Kollmorgen North America. Schaffner part numbers are provided below. Schaffner filters are available from electrical component distributors, or directly from Schaffner.

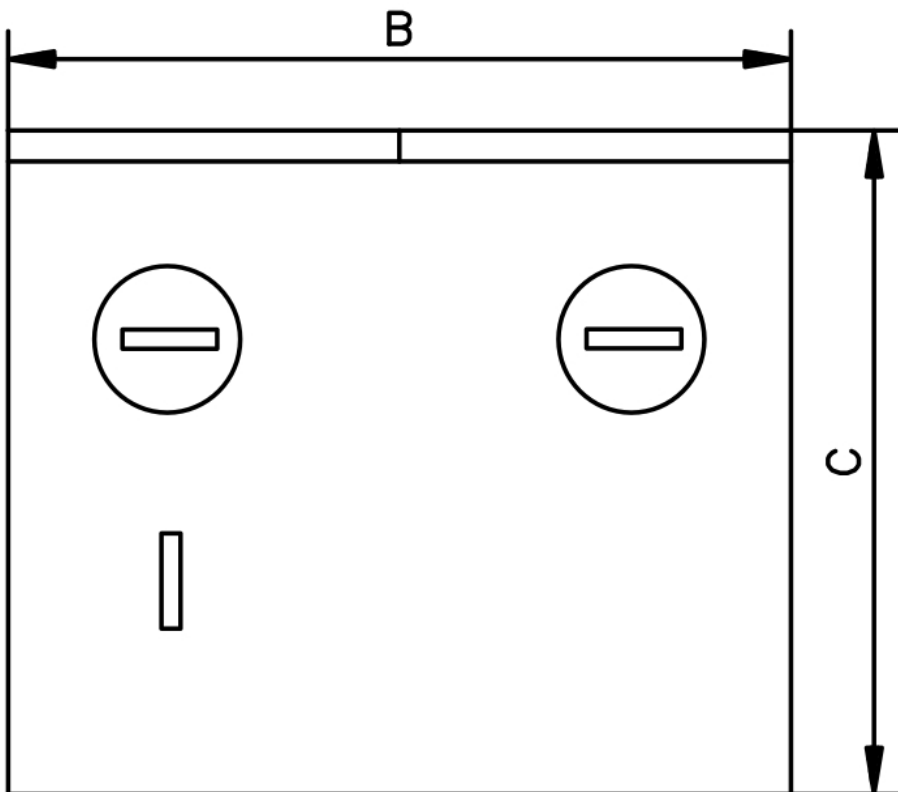
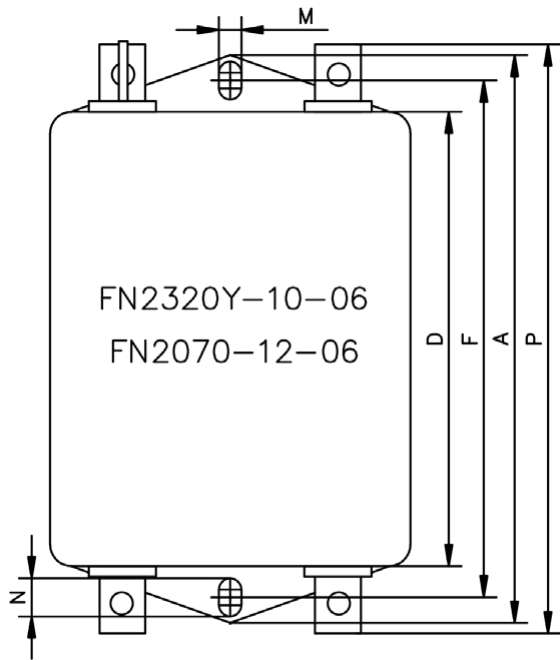
| Drive | Schaffner Filter | Description |
|-------------|------------------|--|
| AKD-x-00306 | FN2320Y-10-06 | Mains Filter - single phase, 230 V AC, CE*, UL |
| AKD-x-00606 | FN2320Y-10-06 | Mains Filter - single phase, 230 V AC, CE*, UL |
| AKD-x-01206 | FN2070-12-06 | Mains Filter - single phase, 230 V AC, CE*, UL |
| AKD-x-00306 | FN3258-7-45 | Mains Filter - three phases, 480 V AC, CE*, UL |
| AKD-x-00606 | FN3258-16-45 | Mains Filter - three phases, 480 V AC, CE*, UL |
| AKD-x-01206 | FN3258-16-45 | Mains Filter - three phases, 480 V AC, CE*, UL |
| AKD-x-02406 | FN3258-30-47 | Mains Filter - three phases, 480 V AC, CE*, UL |

* No EC directive matches mains filters. You can use these filters in Europe, because they are manufactured according to harmonized standards concerning creeping and voltage distances.

8.4 Mains filters FN2320Y-10-06 and FN2070-12-06



Observe the safety instructions.
For single-phase operation only.



Technical Data

| Type | Nominal Current [A]* | A [mm] | B [mm] | C [mm] | D [mm] | F [mm] | M [mm] | N [mm] | P [mm] | Weight [kg] | Connection |
|---------------|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------------|------------|
| FN2320Y-10-06 | 10 | 85 | 49 | 40.3 | 54 | 75 | 5.3 | 6.3 | 87 | 0.29 | Fast-on |
| FN2070-12-06 | 12 | 156 | 57.5 | 45.4 | 130.5 | 143 | 5.3 | 6 | 156 | 0.73 | Fast-on |

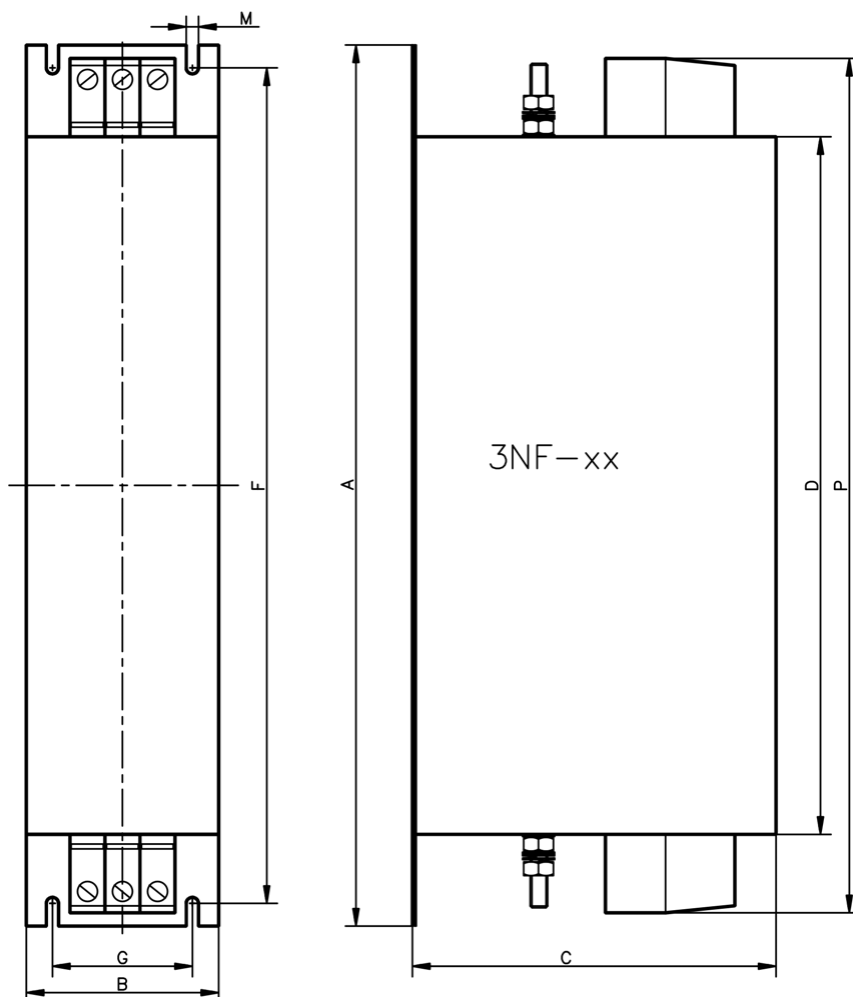
* at 40°C environment temperature

8.5 Mains filters FN3258-7-45, FN3258-16-45, and FN3258-30-47



Observe the safety instructions.

For three-phase operation only.



Technical Data

| Type | Nom- inal Cur- rent* | A [m- m] | B [m- m] | C [m- m] | D [m- m] | F [m- m] | G [m- m] | M [m- m] | P [m- m] | Weigh- t [kg] | Ter- minals | PE Bolt |
|-------------------|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|--------------------------------------|-------------------|
| FN325- 8-7-45 | 7 A | 190 | 40 | 70 | 160 | 180 | 20 | 4.5 | 180 | 0.5 | 4 mm ² , 0.7 to 0.8 Nm | M5, 2.2N- m |
| FN325- 8-16-45 | 16 A | 250 | 45 | 70 | 220 | 235 | 25 | 5.4 | 240 | 0.8 | | |
| FN325- 8-30-47 | 30 A | 270 | 50 | 85 | 240 | 255 | 30 | 5.4 | 260 | 1.2 | | |

* at 50°C environment temperature

9 Capacitor Modules

KCM modules (KOLLMORGEN Capacitor Modules) absorb energy generated by the motor when it is operating in generator mode. Normally, this energy is dissipated as waste via brake resistors. KCM modules, however, feed the energy they have stored back into the DC Bus link as and when it is required.

| | |
|--------------|---|
| KCM-S | Saves energy: The energy stored in the capacitor module during regenerative braking is available the next time acceleration happens. The module's inception voltage is calculated automatically during the first load cycles. |
| KCM-P | Power in spite of power failure: If the power supply fails, the module provides the drive with the stored energy that is required to bring the drive to a standstill in a controlled manner (this only applies to the power supply voltage; battery-back the 24 V supply separately). |
| KCM-E | Expansion module for both applications. Expansion modules are available in two capacitance classes. |

9.1 Important Notes

⚠ DANGER

DC Bus link terminals in servo systems carry high DC voltage of up to 900 V. Touching the terminals while they are carrying voltage is extremely dangerous. Switch off (disconnect) the line voltage. You must only work on the connections when the system is disconnected.

It can take over an hour for the modules to self-discharge. Check the state of charge with a measuring device that is suitable for a DC voltage of up to 1,000 V. When measuring a voltage of over 60 V between the DC+/DC- terminals or to ground, discharge the modules as described in the KCM Instructions Manual.

NOTICE

You must read the instructions manual for the drive / servomotor you are using in your application and observe the safety instructions they contain before commencing mounting/installation work.

Wiring diagram and more important notes concerning wiring can be found in the KCM instructions manual and in the instructions manual of the used drive.

9.2 Order codes

| Type/Order Code | Remarks |
|-----------------|------------------------------|
| KCM-S200-0000 | Energy Saving Module, 1.6 kW |
| KCM-P200-0000 | Power Module, 2 kW |
| KCM-E200-0000 | Expansion Module 2 kW |
| KCM-E400-0000 | Expansion Module 4 kW |

9.3 Technical Data

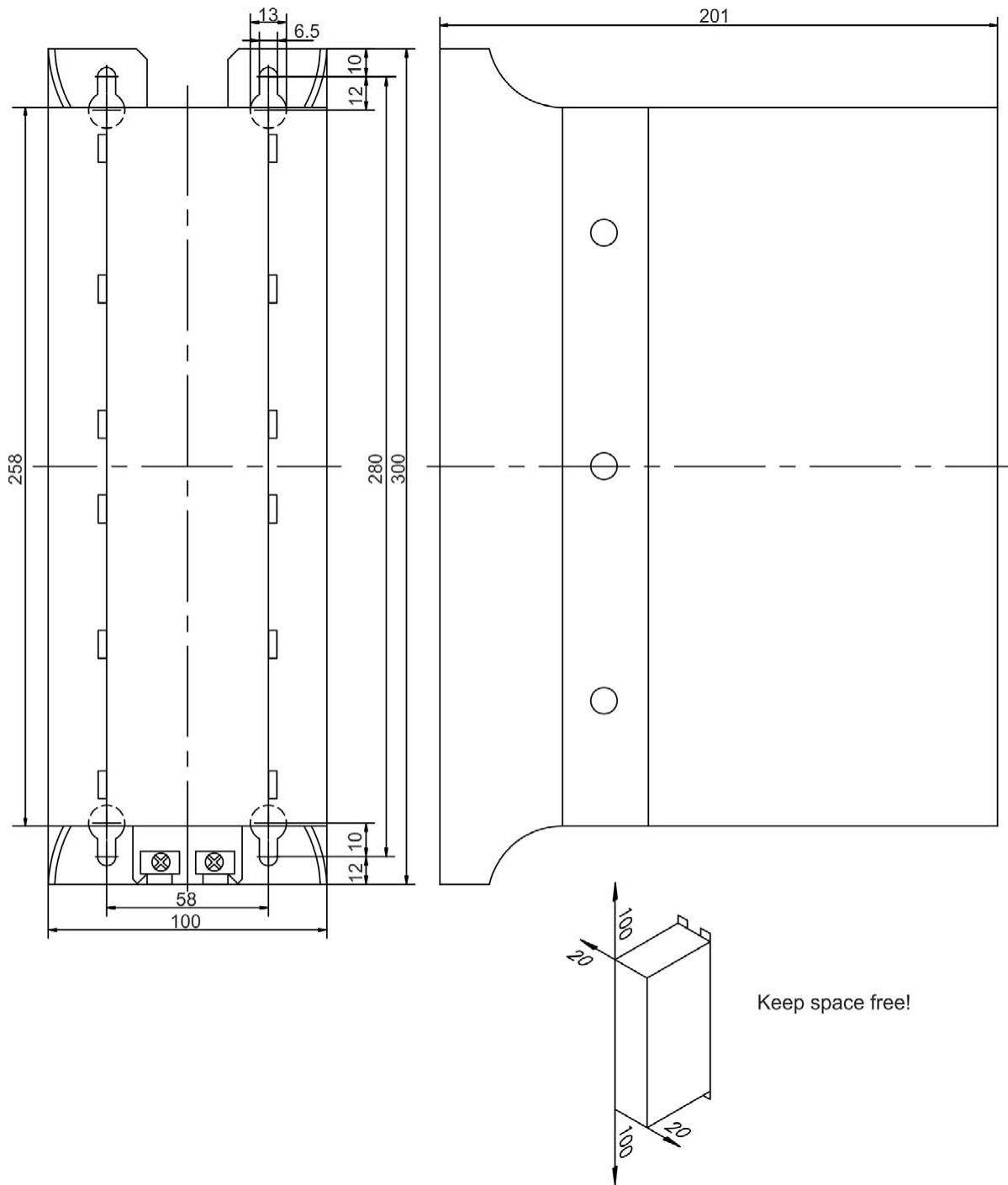
| Type | Storage Capacity [Ws] | Rated supply voltage [V=] | Peak supply voltage [V=] | Power [kW] | Protection Class | Inception voltage [V=] | Weight' [kg] |
|----------|-----------------------|---------------------------|---------------------------|------------|------------------|------------------------|--------------|
| KCM-S200 | 1600 | max 850 VDC | max 950 VDC (30s in 6min) | 18 | IP20 | calculated | 6,9 |
| KCM-P200 | 2000 | | | | | 470 VDC | 6,9 |
| KCM-E200 | 2000 | | | | | - | 4,1 |
| KCM-E400 | 4000 | | | | | - | 6,2 |

9.4 External regen resistor BAFP(U)



Observe the instructions in chapter "Important Notes " (→ p. 30) and in the instruction manual of the drive.

Permissible assembly type: Vertical, ground connections at the bottom. Other assembly positions are not permitted. Observe the required free space to next device. Ensure there is unobstructed convection for cooling purposes.



10 Brake/Regeneration Resistors

During braking with the aid of the motor, energy is fed back into the drive. This energy is dissipated as heat in the regeneration resistor (referred to as a brake resistor when used with an S700 drive). The regen resistor is switched on by the brake circuit. Different resistance values must be used depending on the drive. All regen resistors meet the requirements of CE directives and are UL-registered. Regen resistor requirements for Kollmorgen servo systems can be calculated using the Motioneering sizing and selection tool available here:

http://www.kollmorgen.com/website/com/eng/support/design_tools/motioneering.php.

10.1 Safety Instructions

⚠ CAUTION

- You must read the instruction manuals for the drive and motor that you are using in your application and observe the safety instructions they contain before starting mounting/installation work.
- This manual is only valid in conjunction with the instruction manuals for the drive and motor you are using in your application.
- Danger of burn. Mount only in switchgear cabinets, observe installation clearances, provide the requisite conditions for unobstructed convection for cooling. As Regen resistors can heat up to temperatures in excess of 250°C, use temperature-resistant components in the vicinity of the resistor.
- Observe allowed mounting positions (see dimension drawings). The connection terminals must never be in the updraft area of hot air.
- In case of insufficient cooling or false mounting the resistor or the surrounding devices could be overheated or damaged.
- A connection diagram appears in the drive's instructions manual.

NOTICE

For best results, the following conditions must be provided for regen resistors:

- Unobstructed cooling air
- Unobstructed diversion of warmed air
- Rated data with maximum ambient temperature 40°C, in case of ambient temperature higher than 40°C, power must be reduced by 4% per 10K temperature rise.

10.2 Type assignment

| Drive | Regen resistor | Resistance/Ohm |
|-------------|-----------------------|----------------|
| AKD-x00306 | BAFP(U)/BAR(U)/BAS(U) | 33 |
| AKD-x00606 | BAFP(U)/BAR(U)/BAS(U) | 33 |
| AKD-x01206 | BAFP(U)/BAR(U)/BAS(U) | 15 |
| AKD-x02406 | BAR(U)/BAS(U) | 15 |
| AKD-x00307 | BAR(U)/BAS(U) | 33 |
| AKD-x00607 | BAR(U)/BAS(U) | 33 |
| AKD-x01207 | BAR(U)/BAS(U) | 33 |
| AKD-x02407 | BAR(U)/BAS(U) | 23 |
| S701 to 712 | BAR(U) | 33 |
| S724 | BAR(U)/BAS(U) | 23 |
| S748 | BAS(U) | 15 |
| S772 | BAS(U) | 10 |

10.3 Order codes

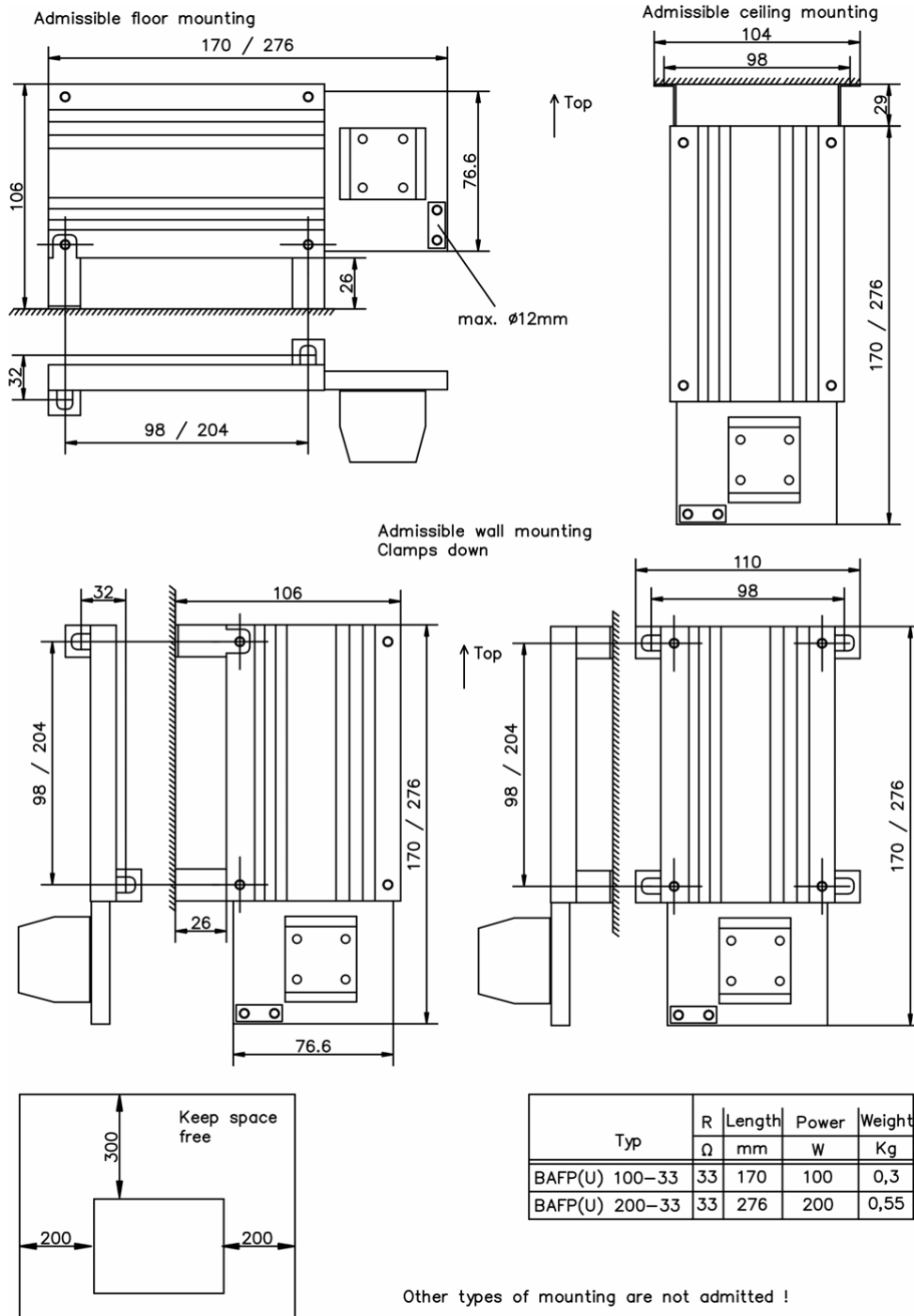
| Description | Drive | Resistance [Ω] | Rated Power [W] | Max. Power [W] | Order code |
|-------------------------------|--|------------------|-----------------|----------------|-------------|
| Regen resistor BAS(U) 2000-10 | S772 | 10 | 2000 | 3200 | BAS-2000-10 |
| Regen resistor BAS(U) 3000-10 | | 10 | 3000 | 4800 | BAS-3000-10 |
| Regen resistor BAS(U) 6000-10 | | 10 | 6000 | 9600 | BAS-6000-10 |
| Regen resistor BAR(U) 500-15 | AKD-x01206AKD-x02406, S748 | 15 | 500 | 800 | BAR-500-15 |
| Regen resistor BAR(U) 1000-15 | | 15 | 1000 | 1600 | BAR-1000-15 |
| Regen resistor BAS(U) 2000-15 | | 15 | 2000 | 3200 | BAS-2000-15 |
| Regen resistor BAS(U) 3000-15 | | 15 | 3000 | 4800 | BAS-3000-15 |
| Regen resistor BAS(U) 6000-15 | | 15 | 6000 | 9600 | BAS-6000-15 |
| Regen resistor BAR(U) 600-23 | AKD-P02407, S724 | 23 | 600 | 960 | BAR-600-23 |
| Regen resistor BAR(U) 1000-23 | | 23 | 1000 | 1600 | BAR-1000-23 |
| Regen resistor BAS(U) 2000-23 | | 23 | 2000 | 3200 | BAS-2000-23 |
| Regen resistor BAS(U) 3000-23 | | 23 | 3000 | 4800 | BAS-3000-23 |
| Regen resistor BAS(U) 4000-23 | | 23 | 4000 | 6400 | BAS-4000-23 |
| Regen resistor BAFP(U) 100-33 | AKD-x00306 to x00606, AKD-x00307 to x01207 S701 to 712 | 33 | 100 | 160 | BAFP-100-33 |
| Regen resistor BAFP(U) 200-33 | | 33 | 200 | 320 | BAFP-200-33 |
| Regen resistor BAR(U) 250-33 | | 33 | 250 | 400 | BAR-250-33 |
| Regen resistor BAR(U) 500-33 | | 33 | 500 | 800 | BAR-500-33 |
| Regen resistor BAR(U) 1500-33 | | 33 | 1500 | 2400 | BAR-1500-33 |
| Regen resistor BAS(U) 3000-33 | | 33 | 3000 | 4800 | BAS-3000-33 |

10.4 External regen resistor BAFP(U)



Protection class: IP40

- Surface temperature can exceed 250°C.
- Make sure that the necessary space is kept clear.
- Do not mount on combustible surfaces.

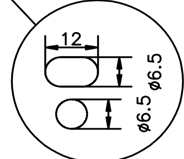
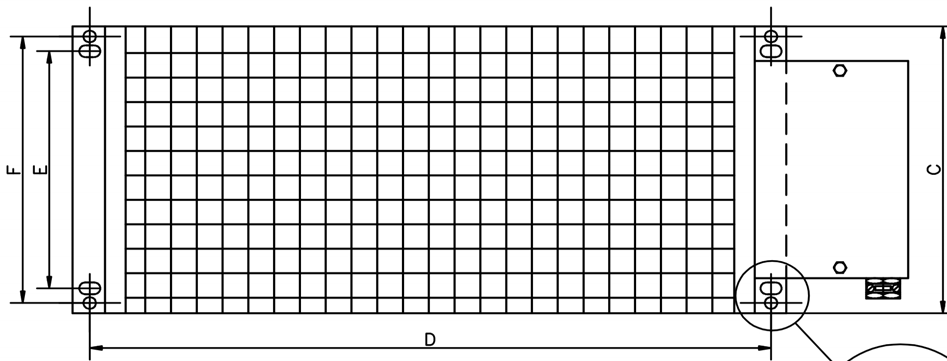
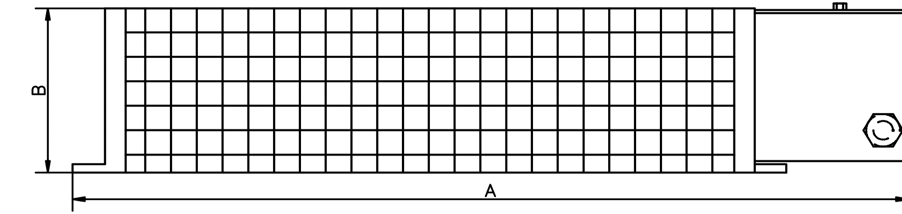


10.5 External regen resistor BAR(U)

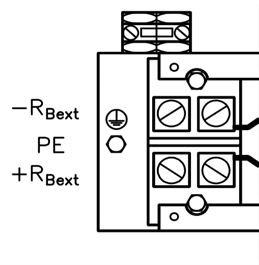


Protection class: IP20

- Surface temperature can exceed 250°C.
- Make sure that the necessary space is kept clear.
- Do not mount on combustible surfaces.

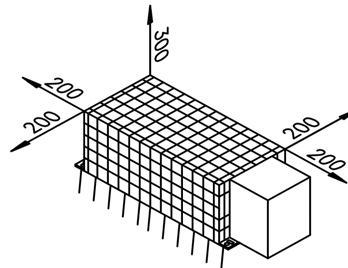


| Type | R | Power | A | B | C | D | E | F | weight |
|-------------|----|-------|-----|-----|-----|-----|----|-----|--------|
| | Ω | W | mm | mm | mm | mm | mm | mm | |
| BAR(U) 500 | 15 | 500 | 549 | 120 | 92 | 430 | 64 | 80 | 3 |
| BAR(U) 1000 | 15 | 1000 | 749 | 120 | 92 | 630 | 64 | 80 | 4 |
| BAR(U) 600 | 23 | 600 | 549 | 120 | 92 | 430 | 64 | 80 | 3 |
| BAR(U) 1000 | 23 | 1000 | 749 | 120 | 92 | 630 | 64 | 80 | 4 |
| BAR(U) 250 | 33 | 250 | 349 | 120 | 92 | 230 | 64 | 80 | 2 |
| BAR(U) 500 | 33 | 500 | 549 | 120 | 92 | 430 | 64 | 80 | 3 |
| BAR(U) 1500 | 33 | 1500 | 649 | 120 | 185 | 530 | - | 150 | 5,8 |
| BAR(U) 300 | 66 | 300 | 349 | 120 | 92 | 226 | 64 | 80 | 1,5 |
| BAR(U) 600 | 66 | 600 | 549 | 120 | 92 | 426 | 64 | 80 | 2,3 |
| BAR(U) 1000 | 66 | 1000 | 749 | 120 | 92 | 626 | 64 | 80 | 3,4 |
| BAR(U) 300 | 91 | 300 | 349 | 120 | 92 | 226 | 64 | 80 | 1,5 |
| BAR(U) 600 | 91 | 600 | 549 | 120 | 92 | 426 | 64 | 80 | 2,3 |
| BAR(U) 1000 | 91 | 1000 | 749 | 120 | 92 | 626 | 64 | 80 | 3,4 |

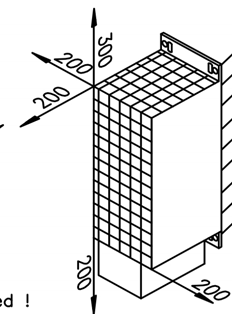


±10%, Temperaturdrift ca. 1%
Kalt ca. +8%, 320°C ca. -7%

Admissible floor mounting



Admissible wall mounting
Clamps down



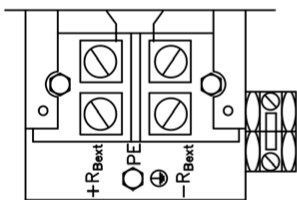
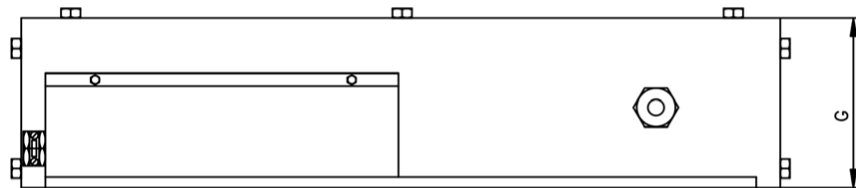
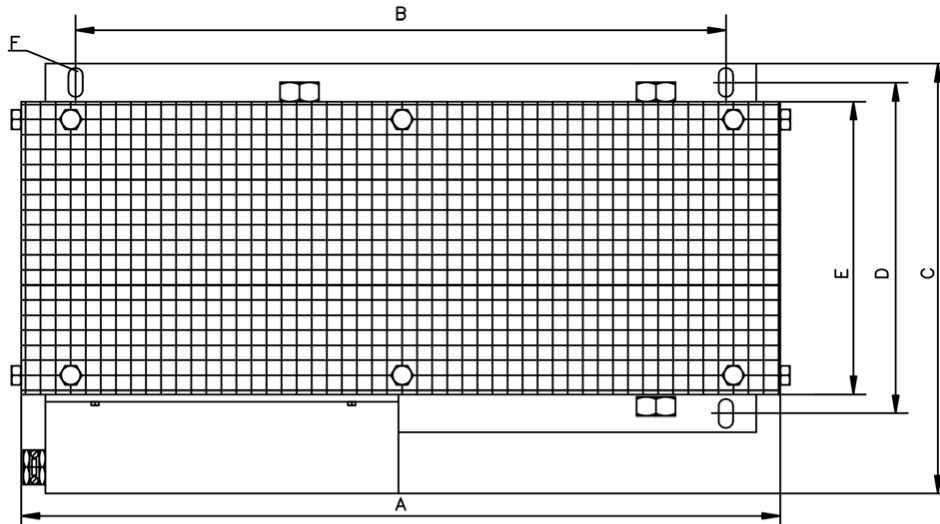
Other types of mounting are not admitted !

10.6 External regen resistor BAS(U)



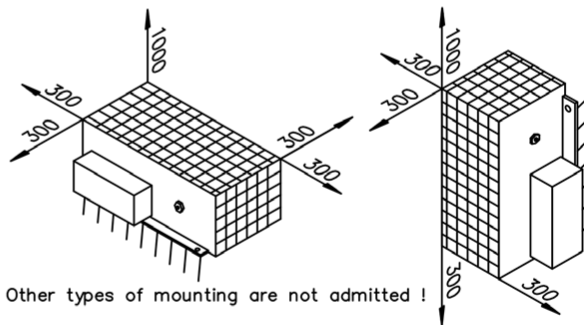
Protection class: IP20

- Surface temperature can exceed 250°C.
- Make sure that the necessary space is kept clear.
- Do not mount on combustible surfaces.



Admissible floor mounting

Admissible wall mounting
Clamps down



±10%, Temperaturdrift ca. 1%
Kalt ca. +8%, 320°C ca. -7%

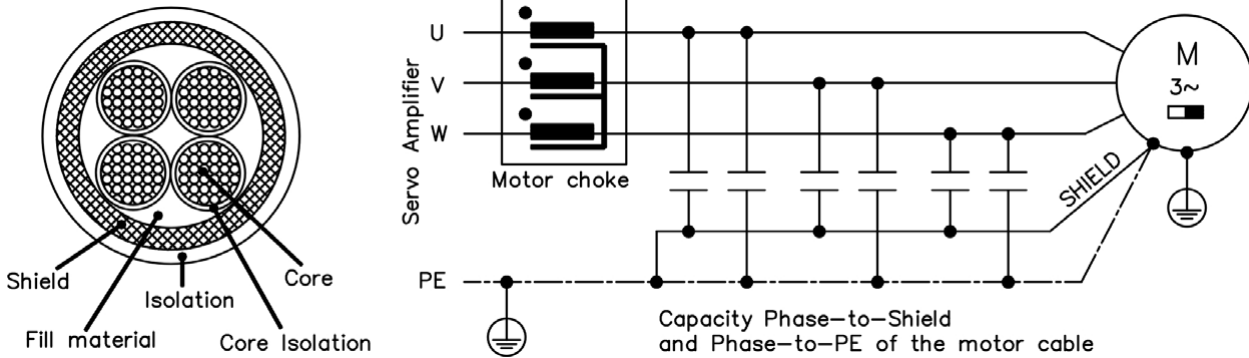
Other types of mounting are not admitted !

| | R | Rated power W | A | B | C | D | E | F | G | weight Kg |
|---------------|----|------------------|-----|-----|-----|-----|-----|-------|-----|--------------|
| | Ω | | mm | mm | mm | mm | mm | mm | mm | |
| BAS(U)2000-10 | 10 | 2000 | 490 | 380 | 255 | 170 | 150 | ∅10,5 | 260 | 7 |
| BAS(U)3000-10 | 10 | 3000 | 490 | 380 | 355 | 270 | 250 | ∅10,5 | 260 | 8 |
| BAS(U)6000-10 | 10 | 6000 | 490 | 380 | 455 | 370 | 350 | ∅10,5 | 260 | 11 |
| BAS(U)2000-15 | 15 | 2000 | 490 | 380 | 255 | 170 | 150 | ∅10,5 | 260 | 7 |
| BAS(U)3000-15 | 15 | 3000 | 490 | 380 | 355 | 270 | 250 | ∅10,5 | 260 | 8 |
| BAS(U)6000-15 | 15 | 6000 | 490 | 380 | 455 | 370 | 350 | ∅10,5 | 260 | 11 |
| BAS(U)2000-23 | 23 | 2000 | 490 | 380 | 255 | 170 | 150 | ∅10,5 | 260 | 7 |
| BAS(U)3000-23 | 23 | 3000 | 490 | 380 | 355 | 270 | 250 | ∅10,5 | 260 | 8 |
| BAS(U)4000-23 | 23 | 4000 | 490 | 380 | 355 | 270 | 250 | ∅10,5 | 260 | 9 |
| BAS(U)3000-33 | 33 | 3000 | 490 | 380 | 355 | 270 | 250 | ∅10,5 | 260 | 8 |

11 Motor Chokes

11.1 Shielded motor cables

For electromagnetic compatibility, the motor must be supplied with power using a shielded cable. The structure of a cable with 100% shielding and the capacity equivalent circuit diagram (to earth) are shown below.



Why use motor chokes?

- To compensate for high capacitive charge/discharge currents typical of shielded motor cables approximately 25 m and longer.
- To reduce current alternation noise in the motor.
- To reduce current ripple in the motor.

The digital drives' high switching frequencies and steep switching edges give rise to the transfer of capacitive currents to the shield by the three phases (U, V, W). These currents flow from the shield to earth. Depending on the cable length and cable capacity (determined by design), this can lead to the generation of shield currents with peak values of up to 20 A.

These shield currents place a load on the drives and motor and, on large systems, lead to shifts in potential which can damage other components. This effect is evident in particular on systems with multiple amplifiers operating in parallel on the same mains filter. The motor chokes slow down the rate of rise of the motor current (reduce edge steepness), thereby reducing the current transferred to the shield.

Why is the cross-section of the motor cable important?

Motor cables longer than 50 m with a small cross-section (such as 4 x 1.0 mm²) and therefore a higher equivalent resistance are able to reduce the oscillation tendency of the LCR oscillating circuit (amplifier/choke/cable/motor). This cross-section can also be advantageous for cable lengths shorter than 50 m if the cable capacity and motor inductance are very high. However, the current loading of the cable must always be within the limits specified by EN 60204.

11.2 Safety Instructions

⚠ CAUTION

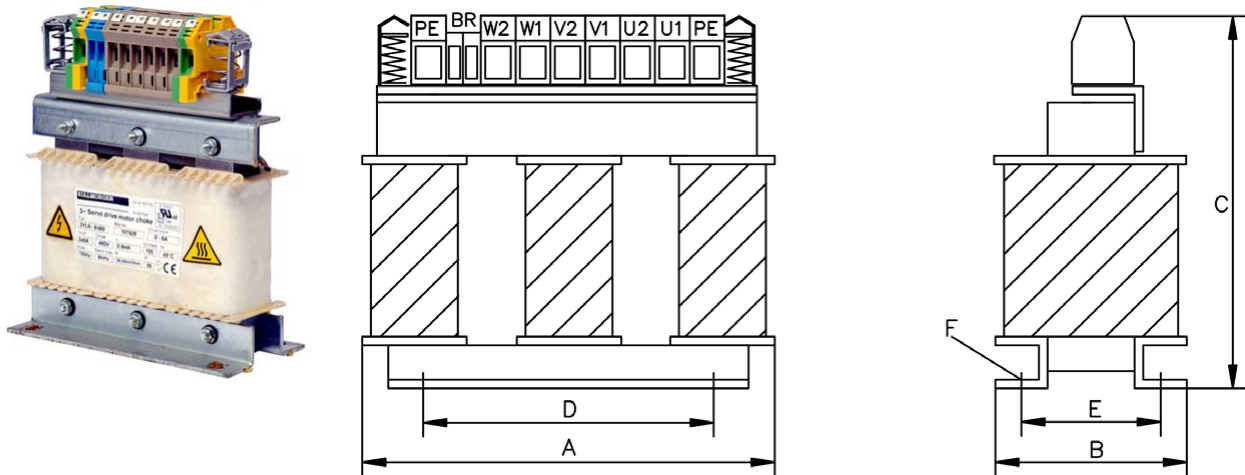
- Before starting mounting/installation work, you must read and observe the instruction manuals and the safety instructions that they contain for the drive and motor that you are using in your application.
- This manual is only valid in conjunction with the instruction manuals for the drive and motor you are using in your application.
- Mount the motor choke on a conductive earthed assembly plate in the switchgear cabinet.
- The choke can become hot during operation (rising to temperatures in excess of 80°C). Therefore, you should make sure that the choke is mounted a sufficient distance away from neighboring components.
- Provide the requisite conditions for unobstructed convection to cool the choke.
- A connection diagram appears in the drive instructions manual.
- If the motor cable is longer than 25m, then the motor choke is wired into the cable close to the amplifier. When laying the motor cable, allow about 400 mm for the connection to the choke.

11.3 Type assignment

| Drive* | Motor choke | Approvals | Condition |
|------------------------|-------------|--------------|-------------------|
| AKD-P003x to AKD-P006x | 3YLN-06 | CE, UL | Motor cable > 25m |
| AKD-P012x | 3YLN-14 | CE, UL | Motor cable > 25m |
| AKD-P024x | 3YLN-24 | CE, UL | Motor cable > 25m |
| S701 to 724 | 3YLN-xx | CE, UL | Motor cable > 25m |
| S748/772 | | Not required | |

*AKD part numbers indicate continuous current rating (-003 is 3 A, -012 is 12 A, etc.).

11.4 Motor choke 3YLN-xx



Technical Data

| Rated Data | Symbol | Units | 3YLN-06 | 3YLN-14 | 3YLN-20 | 3YLN-24 |
|---------------------------------------|-------------------|-----------------|-----------|----------|---------|---------|
| Rated current | I _{0rms} | A | 6 | 14 | 20 | 24 |
| Rated voltage | U _{nom} | V | 480 | | | |
| Rated frequency | f _{nom} | Hz | | 0 to 150 | | |
| Max. frequency | f _{max} | kHz | 8 | | | |
| Inductivity | L | μH | 900 | 900 | 450 | 450 |
| Power loss | P | W | 12 | 19.4 | 22.3 | 23.2 |
| Protection class | - | - | IP00 | | | |
| Temperature class | - | - | F | | | |
| Operation class | - | - | S1 | | | |
| Weight | G | kg | 4.5 | 10 | 10 | 10 |
| Cable diameter (Shield clamp) | - | mm | 4 to 13.5 | | | |
| Wiring cross section max. (Terminals) | - | mm ² | 10 | 16 | 16 | 16 |
| Width | A | mm | 155 | 190 | 190 | 190 |
| Depth | B | mm | 90 | 125 | 125 | 125 |
| Height | C | mm | 195 | 230 | 230 | 230 |
| Mounting hole distance | D | mm | 130 | 170 | 170 | 170 |
| Mounting hole distance | E | mm | 56.5 | 78 | 78 | 78 |
| Mounting screws | F | - | 4xM6 | 4xM6 | 4xM6 | 4xM6 |

12 Cables

12.1 PC connection

The AKD drive is connected to a PC or to a switch/hub by a standard net cable with RJ45 connectors.

The S700 drive series is connected to a PC using a serial RS232-SubD9 cable.

12.2 Kollmorgen Ethernet Cables

PUR jacketed CAT5e cables, pre-terminated with RJ45 connectors.

| Article | Description | Order code |
|----------------|--|---------------|
| Ethernet cable | 0.17 meter pre-terminated patch cable | ENCP-0017-000 |
| Ethernet cable | 0.26 meter pre-terminated patch cable | ENCP-0026-000 |
| Ethernet cable | 0.50 meter pre-terminated patch cable | ENCP-0050-000 |
| Ethernet cable | 1 meter pre-terminated patch cable | ENCP-0100-000 |
| Ethernet cable | 2 meter pre-terminated patch cable | ENCP-0200-000 |
| Ethernet cable | 3 meter pre-terminated patch cable | ENCP-0300-000 |
| Ethernet cable | 4 meter pre-terminated patch cable | ENCP-0400-000 |
| Ethernet cable | 5 meter pre-terminated patch cable | ENCP-0500-000 |
| Ethernet cable | 10 meter pre-terminated patch cable | ENCP-1000-000 |
| Ethernet cable | Unterminated cable per 10 meter increment (min 30 meters) | ENCU-xxxx-000 |
| Ethernet cable | Connector kit for ENCU-xxxx-000 unterminated cable (one termination per kit) | ENCU-KIT-000 |

Technical Data:

| ENCP-xxxx-xxx (Kollmorgen Ethernet Cables) | |
|--|---|
| Cross-section | 4 x 2 x AWG26/7 ... 4 x 2 x 0.128 mm ² |
| Cable sheath material | PUR |
| Color | Green (RAL 6018) |
| Line configuration | SF/UTP |
| Diameter | sheath: typ. 5.9 mm ± 0.2 mm |
| Bending radius | > 5 x diameter |
| Category/class | CAT5e, class D |
| Operating/installation temperature | -40... +75 °C/-10 ... +60 °C |
| Insertion cycles | min. 750 |

12.3 CANopen Bus Cables for AKD



Configured CANopen bus cables are available for AKD. See CANopen Bus Cable Specifications (→ p. 46) for specifications.

| Item | Length | AKD Order Code |
|-------------------|--------|-------------------|
| CANopen bus cable | 0.15 m | P-AKD-CAN-RJ-0-15 |
| CANopen bus cable | 0.5 m | P-AKD-CAN-RJ-0-50 |
| CANopen bus cable | 3.0 m | P-AKD-CAN-RJ-3-00 |

The CANopen bus termination plug is required for bus termination of the last AKD drive connected to the CANopen bus. To connect an AKD drive to a CANopen device with a SubD9 connector, use the CAN RJ12-SubD9.

| Item | AKD Order Code |
|------------------------------|-------------------|
| CANopen bus termination plug | P-AKD-CAN-TERM |
| CAN RJ12-SubD9 adapter | P-AKD-CAN-9d-0-15 |

According to ISO 11898, you should use a bus cable with a characteristic impedance of 120 Ω. The usable cable length depends on the transmission rate. The values that have been measured can be taken as a guide, but they should not be interpreted as limits.

Cable length, depending on the transmission rate:

| | | | |
|-------------------------|------|-----|-----|
| Transmission rate/kbps: | 1000 | 500 | 250 |
| Maximum cable length/m: | 20 | 70 | 115 |

12.4 Motor Power and Feedback Cables

These cables differ in how they are connected to the drive, due to the varying requirements for minimum code distances, different shielding concepts depending on rated voltage, and current load. The following pre-assembled, ready-to-use cables meet the requirements of relevant CE and UL standards. See Motor Power Cable Specifications (→ p. 49) and Motor Feedback Cable Specifications (→ p. 53) for engineering details on all cables.



Value Line Cables



Flex Line Cables



S700 Cables

Power Cables

| Cable Rating* | Value Line | OD ¹ (mm) | Value Line w/ Brake | OD ¹ (mm) | Flex Line | OD ¹ (mm) | Flex Line w/ Brake | OD ¹ (mm) |
|---------------|---------------|----------------------|---------------------|----------------------|-----------------|----------------------|--------------------|----------------------|
| 3/6 A | VP-507BEAN-XX | 9.4 | VP-508CFAN-XX | 10.9 | CP-507CCAN-XX-X | 12.7 | CP-507CDAN-XX-X | 14.5 |
| 12 A | VP-507BEAN-XX | 10.3 | VP-508CFAN-XX | 10.9 | CP-507CCAN-XX-X | 12.7 | CP-507CDAN-XX-X | 14.5 |

| Cable Rating* | Value Line | OD ¹ (mm) | Value Line w/ Brake | OD ¹ (mm) | Flex Line | OD ¹ (mm) | Flex Line w/ Brake | OD ¹ (mm) |
|---------------|---------------|----------------------|---------------------|----------------------|-----------------|----------------------|--------------------|----------------------|
| 20 A | VP-508DEAN-XX | 11.7 | VP-508DFAN-XX | 12.9 | CP-508DCAN-XX-X | 14.5 | CP-508DDAN-XX-X | 16.6 |
| 24A | Not Available | N/A | Not Available | N/A | CP-508EBDN-XX-X | 18.3 | CP-508EBDN-XX-X | 18.3 |

*Continuous current

¹Outside diameter

Feedback Cables

| Feedback Type | Value Line | OD (mm) | Flex Line | OD (mm) |
|----------------------|---------------|---------|-----------------|---------|
| SFD | VF-DA474N-XX | 6.7 | CF-DA0374N-XX-X | 7.5 |
| EnDat 2.1/BiSS | VF-SB4474N-XX | 9.7 | CF-SB7374N-XX-X | 11.2 |
| Resolver | VF-RA2474N-XX | 9.7 | CF-RA2574N-XX-X | 9.5 |
| Incremental/comcoder | Not available | N/A | CF-CB7374N-XX-X | 11.2 |

12.4.1 Order Codes for S700 Motor Power Cables

12.4.1.1 S701-712 Order Codes

With shield clamp for amplifier's end, motor connector size 1 (up to 22A):

| Article | Order Code |
|--------------------------------|------------|
| Motor cable 5m (4x1) | DE-107473 |
| Motor cable 10m (4x1) | DE-107474 |
| Motor cable 15m (4x1) | DE-107475 |
| Motor cable 20m (4x1) | DE-107476 |
| Motor cable 25m (4x1) | DE-107477 |
| Motor cable 5m (4x1+(2x0.75)) | DE-107479 |
| Motor cable 10m (4x1+(2x0.75)) | DE-107480 |
| Motor cable 15m (4x1+(2x0.75)) | DE-107481 |
| Motor cable 20m (4x1+(2x0.75)) | DE-107482 |
| Motor cable 25m (4x1+(2x0.75)) | DE-107483 |

With shield plate at amplifier's end, motor connector size 1 (up to 22A):

| Article | Order Code |
|----------------------------------|------------|
| Motor cable 5m (4x1.5) | DE-200456 |
| Motor cable 10m (4x1.5) | DE-200457 |
| Motor cable 15m (4x1.5) | DE-200458 |
| Motor cable 20m (4x1.5) | DE-200459 |
| Motor cable 25m (4x1.5) | DE-200460 |
| Motor cable 5m (4x1.5+(2x0.75)) | DE-200462 |
| Motor cable 10m (4x1.5+(2x0.75)) | DE-200463 |
| Motor cable 15m (4x1.5+(2x0.75)) | DE-200464 |
| Motor cable 20m (4x1.5+(2x0.75)) | DE-200465 |

| Article | Order Code |
|----------------------------------|------------|
| Motor cable 25m (4x1.5+(2x0.75)) | DE-200466 |
| Motor cable 5m (4x2.5) | DE-200468 |
| Motor cable 10m (4x2.5) | DE-200469 |
| Motor cable 15m (4x2.5) | DE-200470 |
| Motor cable 20m (4x2.5) | DE-200471 |
| Motor cable 25m (4x2.5) | DE-200472 |
| Motor cable 5m (4x2.5+(2x1)) | DE-200474 |
| Motor cable 10m (4x2.5+(2x1)) | DE-200475 |
| Motor cable 15m (4x2.5+(2x1)) | DE-200476 |
| Motor cable 20m (4x2.5+(2x1)) | DE-200477 |
| Motor cable 25m (4x2.5+(2x1)) | DE-200478 |
| Motor cable 5m (4x4) | DE-200618 |
| Motor cable 10m (4x4) | DE-200619 |
| Motor cable 15m (4x4) | DE-200620 |
| Motor cable 20m (4x4) | DE-200621 |
| Motor cable 25m (4x4) | DE-200622 |
| Motor cable 5m (4x4+(2x1)) | DE-200623 |
| Motor cable 5m (4x4+(2x1)) | DE-200624 |
| Motor cable 5m (4x4+(2x1)) | DE-200625 |
| Motor cable 5m (4x4+(2x1)) | DE-200626 |
| Motor cable 5m (4x4+(2x1)) | DE-200627 |

12.4.1.2 S724 Order Codes

With shield plate at amplifier's end, motor connector size 1.5

| Article | Order Code |
|-----------------------------|------------|
| Motor cable 5m (4x6) | DE-201579 |
| Motor cable 10m (4x6) | DE-201580 |
| Motor cable 15m (4x6) | DE-201581 |
| Motor cable 20m (4x6) | DE-201582 |
| Motor cable 25m (4x6) | DE-201583 |
| Motor cable 5m (4x6+(2x1)) | DE-201584 |
| Motor cable 10m (4x6+(2x1)) | DE-201585 |
| Motor cable 15m (4x6+(2x1)) | DE-201586 |
| Motor cable 20m (4x6+(2x1)) | DE-201587 |
| Motor cable 25m (4x6+(2x1)) | DE-201588 |

12.4.1.3 S748 Order Codes

With shield plate at amplifier's end, motor connector size 1.5

| Article | Order Code |
|-----------------------|------------|
| Motor cable 5m (4x10) | DE-201589 |

| Article | Order Code |
|------------------------------|------------|
| Motor cable 10m (4x10) | DE-201590 |
| Motor cable 15m (4x10) | DE-201591 |
| Motor cable 20m (4x10) | DE-201592 |
| Motor cable 25m (4x10) | DE-201593 |
| Motor cable 5m (4x10+(2x1)) | DE-201594 |
| Motor cable 10m (4x10+(2x1)) | DE-201595 |
| Motor cable 15m (4x10+(2x1)) | DE-201596 |
| Motor cable 20m (4x10+(2x1)) | DE-201597 |
| Motor cable 25m (4x10+(2x1)) | DE-201598 |

12.4.2 Preparing Motor Cables (Motor End)

12.4.2.1 Motor Series AKM2...8, 6SMx7, DBL2...6, DBK

Please note that different conductor cross-sections are required for different motors, and that for motors with a holding brake the brake signals are also attached through this connector.

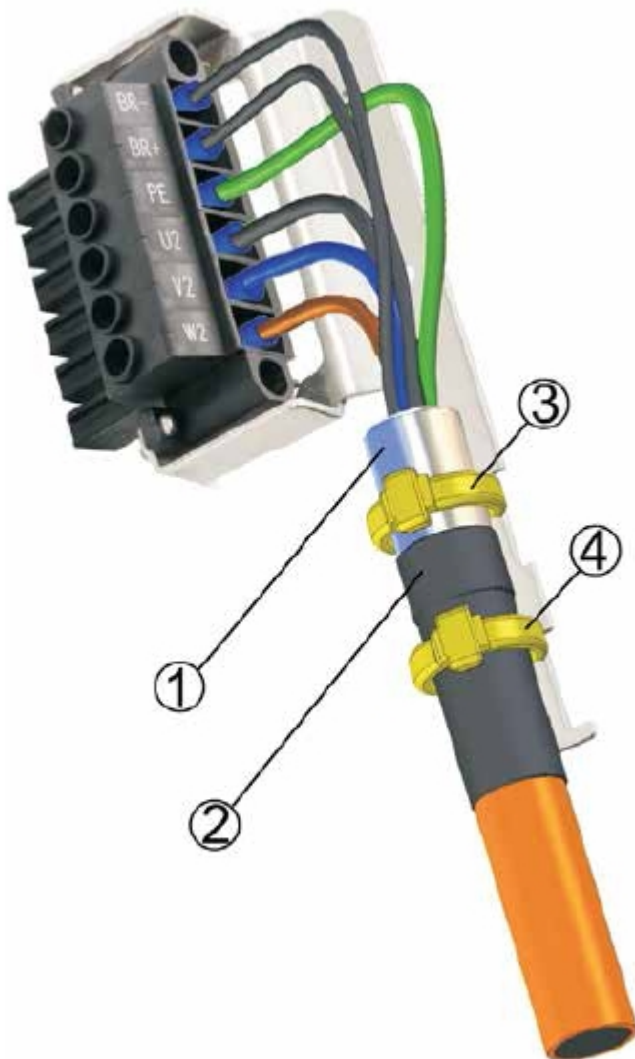
Connections: The view is as seen from the contact side of the connector:

| Standard (size 1), wire max 4mm ² | | | | |
|--|----------|--------|-----|--------|
| | Pin | Signal | Pin | Signal |
| | 1 | U2 | A | + Br |
| | 4 | V2 | B | - Br |
| | 3 | W2 | C | n.c. |
| | ⏚ (2) | PE | D | n.c. |

| Option H (size 1.5), wire max. 10mm ² | | | | |
|--|-----|--------|-----|--------|
| | Pin | Signal | Pin | Signal |
| | U | U2 | + | + Br |
| | V | V2 | - | - Br |
| | W | W2 | 1 | n.c. |
| | ⏚ | PE | 2 | n.c. |

12.4.3 Preparing Cables for Drive (S701 to S724)

The motor is connected to the S701...724 by a Power Combicon connector (see p.71). You can obtain the connector kit from us (connector, housing, shield plate, rubber bushes, installation material) with the ordercode DE-200453. Please take note that the connector can accept a maximum conductor cross-section of 6mm².



Strip the external cable sheath to a length of approx. 120 mm, **taking care not to damage the braided shield**. Push the braided shield (1) back over the cable and secure with a rubber sleeve (2) or shrink sleeve.

Shorten all the wires apart from the protective earth (PE) wire (green/yellow) by about 20 mm so that the PE wire is now the longest wire. Strip all wires and fit wire end ferrules.

Secure the braided shield of the cable to the shroud with a cable tie or a hose clamp (3) and use a second tie (4) to fasten the cable over the rubber sleeve.

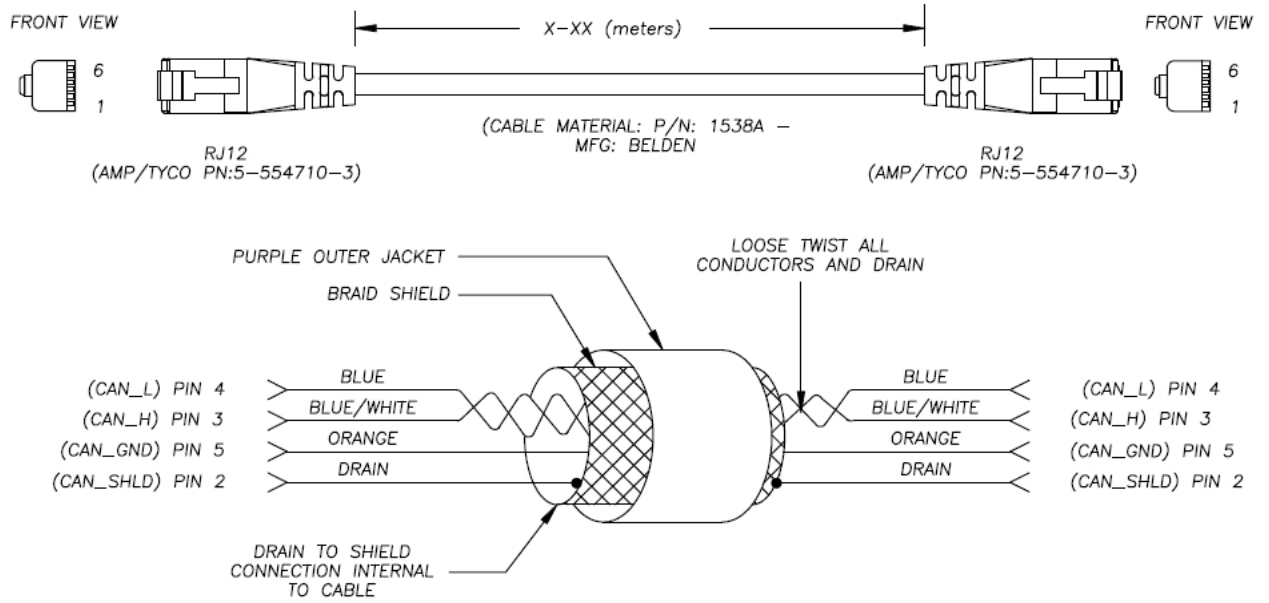
Wire the connector as shown in the connection diagram. Plug in the connector to the socket on the front of the S701...724.

Screw the connector in place. This ensures that there is conductive contact over a large surface area between the braided shield and the front panel.

12.5 CANopen Bus Cable Specifications

All cables supplied with AKD and S700 drives are RoHS compliant.

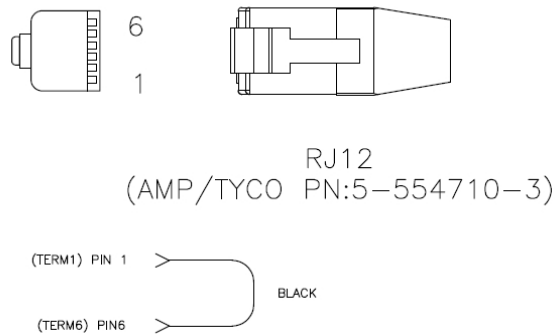
12.5.1 CANopen Cable P-AKD-CAN-RJ-z-zz



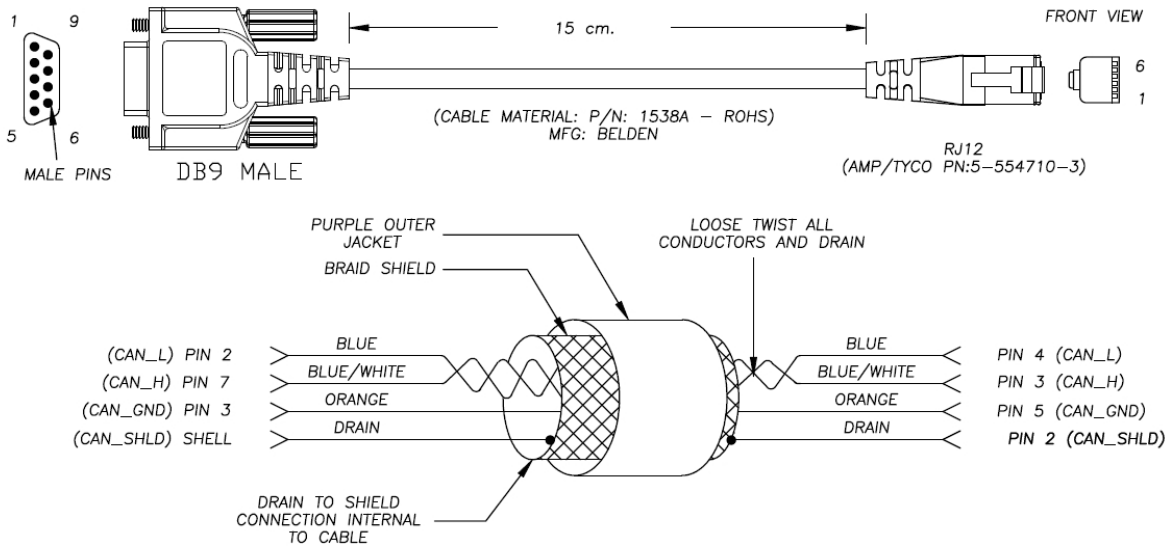
| Cable Specifications | |
|----------------------|-----------------|
| Outside diameter | 6.7 mm ± 0.2 mm |
| RoHS Compliant | Yes |
| Length: | |
| PAKD-CANRJ-0-15 | 0.15 m |
| PAKD-CANRJ-0-30 | 0.3 m |
| PAKD-CANRJ-1-00 | 1 m |
| PAKD-CANRJ-3-00 | 3 m |

12.5.2 CANopen Cable P-AKD-CAN-TERM

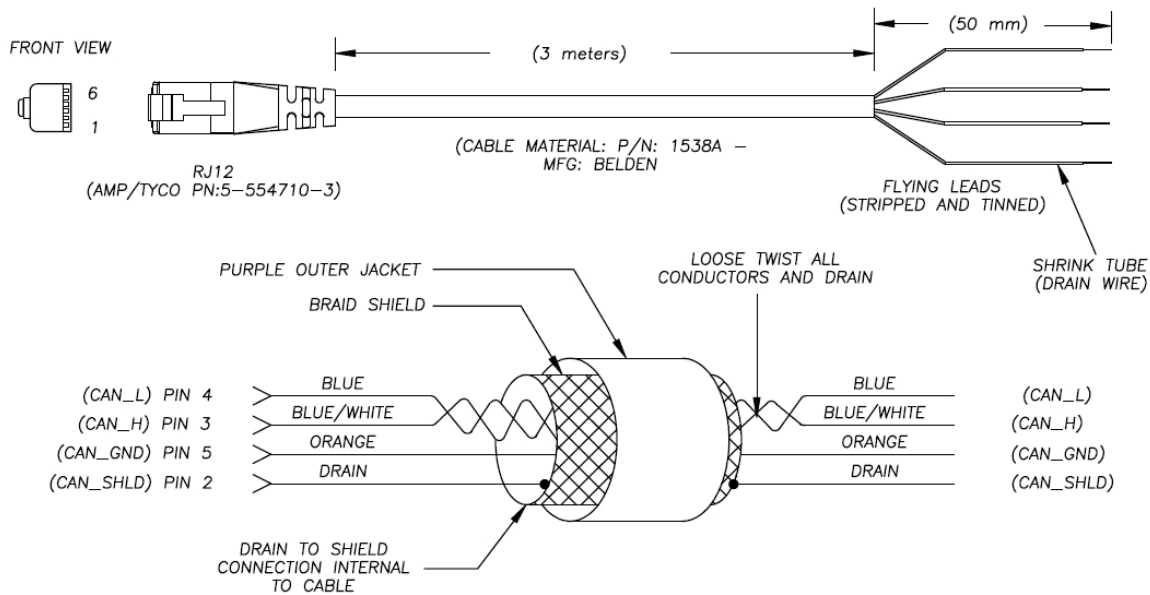
FRONT VIEW



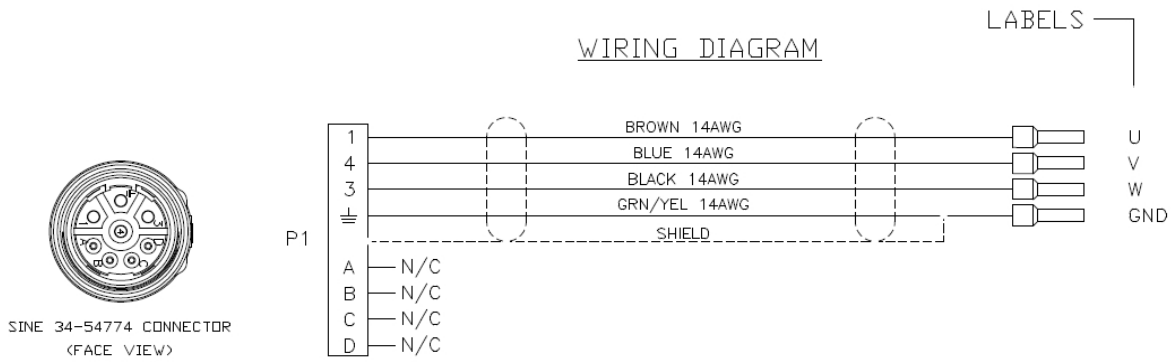
12.5.3 CANopen Cable PAKD-CAN-9D-0-15



12.5.4 CANopen Cable PAKD-CAN-FL-3-00



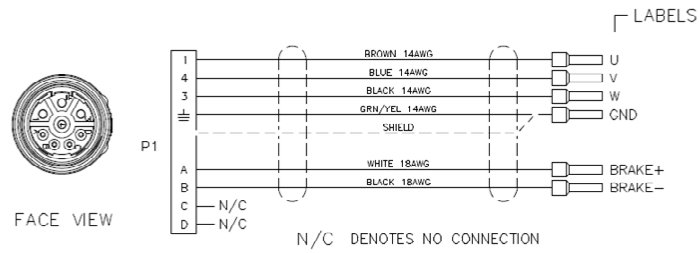
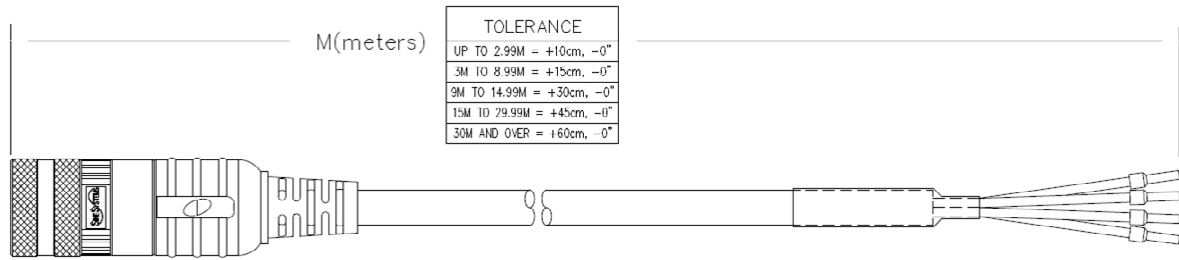
12.6.3 AKD 12 A Power Cable, VP-508CEAN-zz



N/C DENOTES NO CONNECTION

| Cable Specifications | |
|-----------------------|--|
| Cable jacket material | TPE |
| Outside diameter | 10.25 mm ± 0.30 mm |
| Bend radius | 102.5 mm |
| Static flex rating | Not rated |
| Dynamic flex rating | Not rated |
| Temperature rating | 105 C |
| Voltage rating | 600 V (see Cable Routing Standards) |
| RoHS Compliant | Yes |
| Assembly Weight: | |
| VP-508CEAN-01 | 0.247 kg |
| VP-508CEAN-03 | 0.521 kg |
| VP-508CEAN-06 | 0.942 kg |
| VP-508CEAN-09 | 1.363 kg |
| VP-508CEAN-12 | 1.784 kg |

12.6.4 AKD 12 A Power Cable with Brake, VP-508CFAN-zz



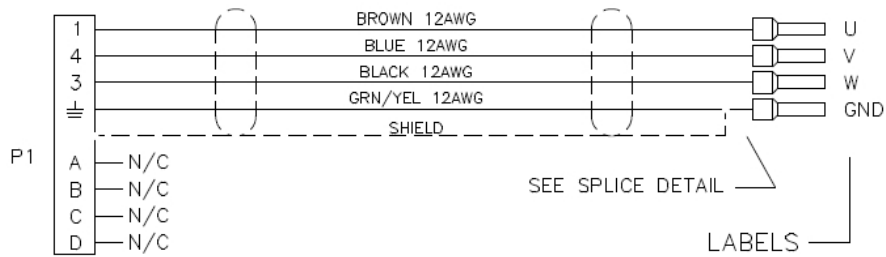
| Cable Specifications | |
|-----------------------|--|
| Cable jacket material | TPE |
| Outside diameter | 10.90 mm ± 0.30 mm |
| Bend radius | 109 mm |
| Static flex rating | Not rated |
| Dynamic flex rating | Not rated |
| Temperature rating | 105 C |
| Voltage rating | 600 V (see Cable Routing Standards) |
| RoHS Compliant | Yes |
| AWM Style | UL20328 |
| Assembly Weight: | |
| VP-508CFAN-01-0 | 0.256 kg |
| VP-508CFAN-03-0 | 0.767 kg |
| VP-508CFAN-06-0 | 1.534 kg |
| VP-508CFAN-09-0 | 2.301 kg |
| VP-508CFAN-12-0 | 3.068 kg |

12.6.5 AKD 24 A Power Cable with Brake, VP-508DEAN-zz

WIRING DIAGRAM



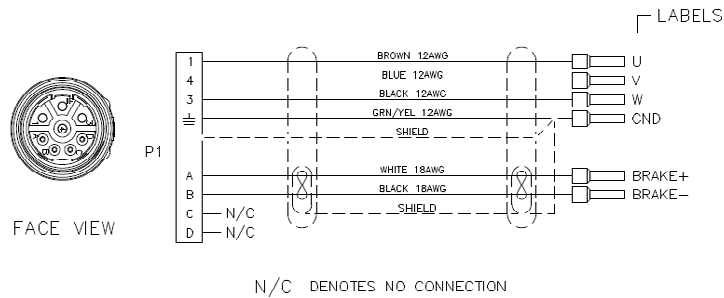
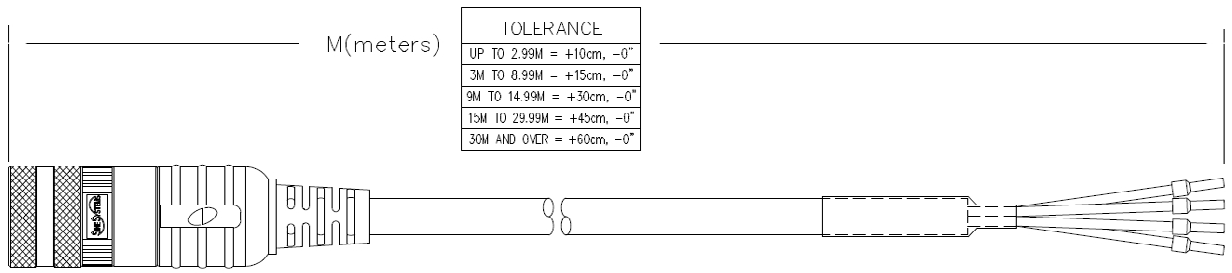
FACE VIEW



N/C DENOTES NO CONNECTION

| Cable Specifications | |
|-----------------------|--|
| Cable jacket material | TPE |
| Outside diameter | 11.70 mm ± 0.30 mm |
| Bend radius | 117 mm |
| Static flex rating | Not rated |
| Dynamic flex rating | Not rated |
| Temperature rating | 105 C |
| Voltage rating | 600 V (see Cable Routing Standards) |
| RoHS Compliant | Yes |
| Assembly Weight: | |
| VP-508DEAN-01-0 | 0.292 kg |
| VP-508DEAN-03-0 | 0.874 kg |
| VP-508DEAN-06-0 | 1.750 kg |
| VP-508DEAN-09-0 | 2.622 kg |
| VP-508DEAN-12-0 | 3.496 kg |

12.6.6 AKD 24 A Power Cable with Brake, VP-508DFAN-zz



| Cable Specifications | |
|-----------------------|--|
| Cable jacket material | TPE |
| Outside diameter | 12.90 mm ± 0.20 mm |
| Bend radius | 129 mm |
| Static flex rating | Not rated |
| Dynamic flex rating | Not rated |
| Temperature rating | 105 C |
| Voltage rating | 600 V (see Cable Routing Standards) |
| RoHS Compliant | Yes |
| AWM Style | UL20328 |
| Assembly Weight: | |
| VP-508DFAN-01-0 | 0.328 kg |
| VP-508DFAN-03-0 | 0.983 kg |
| VP-508DFAN-06-0 | 1.966 kg |
| VP-508DFAN-09-0 | 2.949 kg |
| VP-508DFAN-12-0 | 3.932 kg |

12.7 Motor Feedback Cable Specifications

All cables supplied with AKD and S700 drives are RoHS compliant.

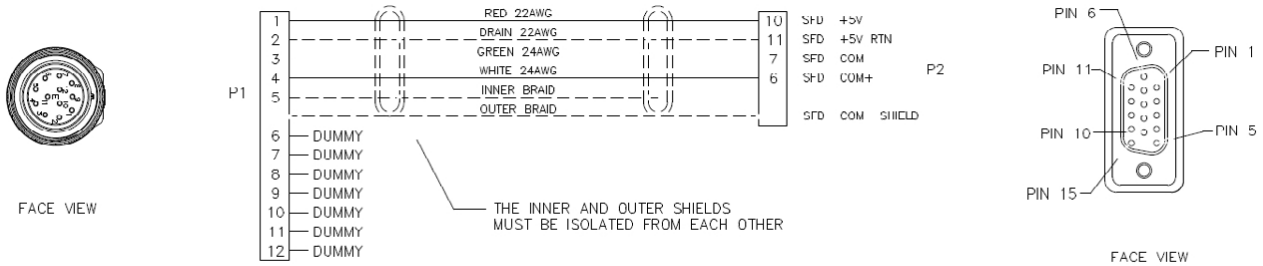
12.7.1 Cable Routing Standards

UL 508C and UL 508A indicate that wires, when routed together, shall be rated for the highest voltage involved in all of the circuits. This means that value line feedback cables which are 300V rated are not appro-

appropriate when routed directly next to motor power cables that carry more voltage than 300V. They should be physically separated. Performance line cables are recommended when this is a concern.

The NFPA 70 (NEC) article 300.3(C)(1) says that for circuits that are 600V or less, conductors of ac and dc circuits shall be permitted to occupy the same equipment wiring enclosure, cable, or raceway. All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure, cable, or raceway.

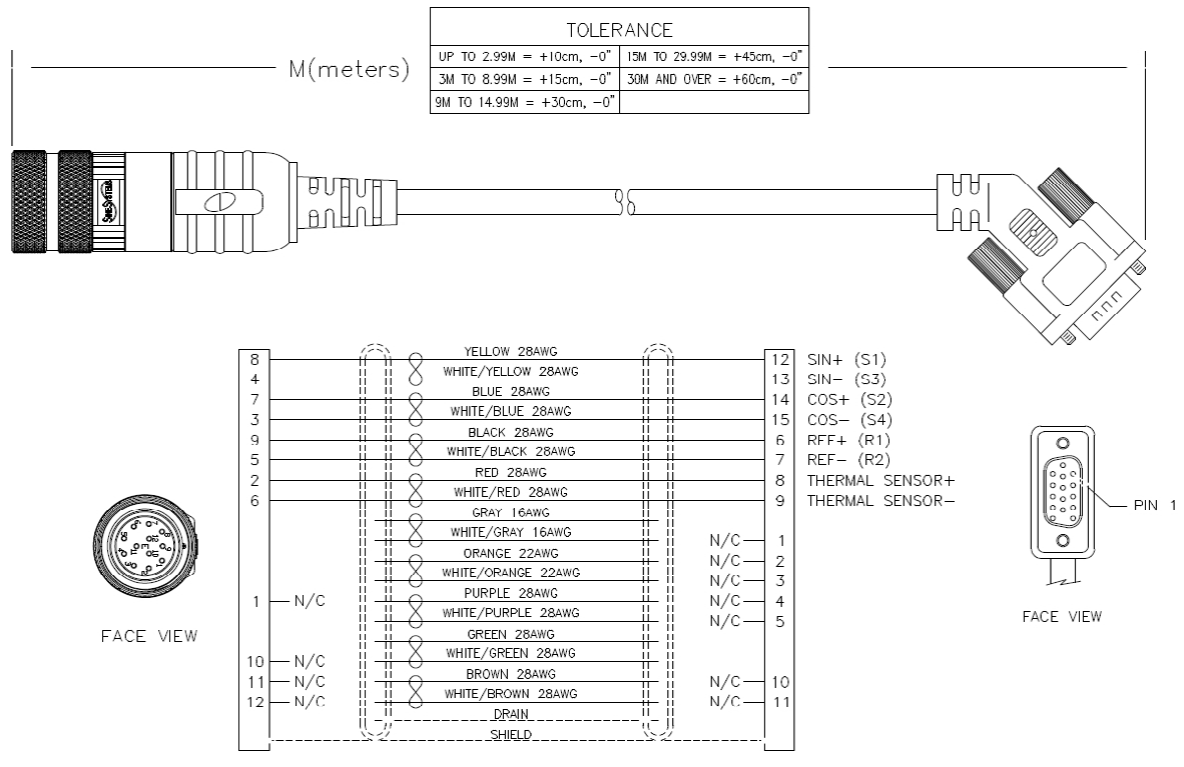
12.7.2 Motor Feedback Cable, VF-DA0-474N-zz



N/C DENOTES NO CONNECTION

| Cable Specifications | |
|-----------------------|--|
| Cable jacket material | TPE |
| Outside diameter | 6.7 mm ± 0.2 mm |
| Bend radius | 67 mm |
| Static flex rating | Not rated |
| Dynamic flex rating | Not rated |
| Temperature rating | 105 C |
| Voltage rating | 300 V (see Cable Routing Standards) |
| RoHS Compliant | Yes |
| Assembly Weight: | |
| VF-DA0-474N-01 | 0.211 kg |
| VF-DA0-474N-03 | 0.357 kg |
| VF-DA0-474N-06 | 0.568 kg |
| VF-DA0-474N-09 | 0.779 kg |
| VF-DA0-474N-12 | 0.99 kg |

12.7.3 Feedback Resolver Cable, VF-RA2474N-zz



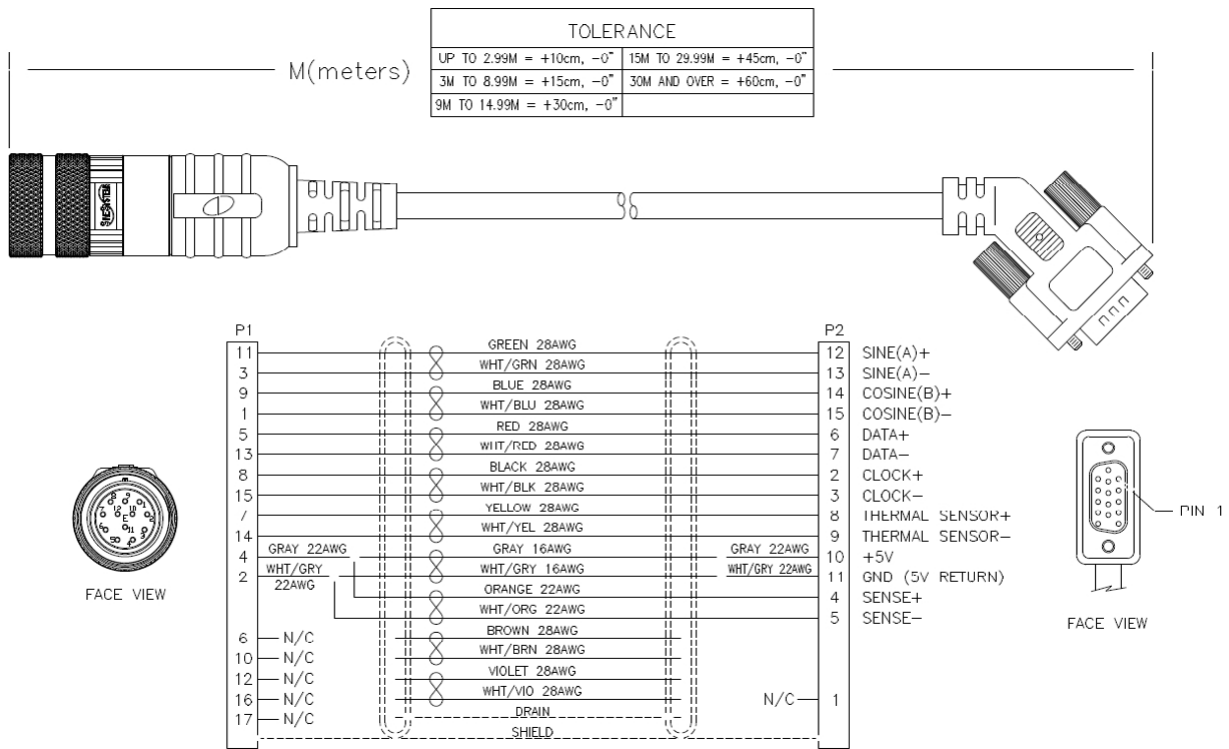
 TWISTED PAIR

N/C DENOTES NO CONNECTION

CONNECTOR BACKSHELL SHIELDED 360° (BOTH ENDS)

| Cable Specifications | |
|-----------------------|--|
| Cable jacket material | TPE |
| Outside diameter | 9.65 mm ± 0.35 mm |
| Bend radius | 96.5 mm |
| Static flex rating | Not rated |
| Dynamic flex rating | Not rated |
| Temperature rating | 105 C |
| Voltage rating | 300 V (see Cable Routing Standards) |
| AWM Style | UL20327 |
| RoHS Compliant | Yes |
| Assembly Weight: | |
| VF-RA2474N-01-0 | 0.273 kg |
| VF-RA2474N-03-0 | 0.551 kg |
| VF-RA2474N-06-0 | 0.968 kg |
| VF-RA2474N-09-0 | 1.385 kg |
| VF-RA2474N-12-0 | 1.793 kg |

12.7.4 Sine Encoder Feedback Cable, VF-SB4474N-zz



∞ = TWISTED PAIR

N/C DENOTES NO CONNECTION

CONNECTOR BACKSHELL SHIELDED 360° (BOTH ENDS)

| Cable Specifications | |
|-----------------------|--|
| Cable jacket material | TPE |
| Outside diameter | 9.65 mm ± 0.35 mm |
| Bend radius | 96.5 mm |
| Static flex rating | Not rated |
| Dynamic flex rating | Not rated |
| Temperature rating | 105 C |
| Voltage rating | 300 V (see Cable Routing Standards) |
| AWM Style | UL20327 |
| RoHS Compliant | Yes |
| Assembly Weight: | |
| VF-SB4474N-01-0 | 0.269 kg |
| VF-SB4474N-03-0 | 0.547 kg |
| VF-SB4474N-06-0 | 0.974 kg |

| Cable Specifications | |
|----------------------|----------|
| VF-SB4474N-09-0 | 1.386 kg |
| VF-SB4474N-12-0 | 1.798 kg |

12.7.5 Resolver Cables for S700/AKD



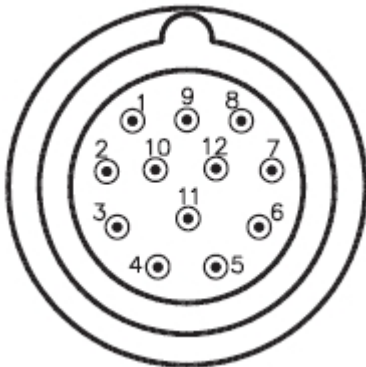
All the motors in our range feature the same 12-pin connector for the resolver connection. This connector is also used for the connections from the motor's thermal protection contact to the servo amplifier. The servo amplifiers have a Sub-D female connector for the connection of a resolver and the thermal protection contact. The cable shield is connected to the servo amplifier via the connector housing.

12.7.5.1 Resolver Cable Order Codes

| Article | S700 | | AKD | |
|-----------------------------|--------|------------|--------|-------------------|
| | Length | Order Code | Length | Order Code |
| Resolver Cable (4x(2x0.25)) | 5m | DE-84972 | 1m | CFR0A1-002-001-00 |
| Resolver Cable (4x(2x0.25)) | 10m | DE-84973 | 3m | CFR0A1-002-003-00 |
| Resolver Cable (4x(2x0.25)) | 50m | DE-84974 | 6m | CFR0A1-002-006-00 |
| Resolver Cable (4x(2x0.25)) | 20m | DE-84975 | 12m | CFR0A1-002-012-00 |
| Resolver Cable (4x(2x0.25)) | 30m | DE-87655 | 24m | CFR0A1-002-024-00 |

12.7.5.2 Preparing Resolver Cables

For cable lengths up to 100m use a shielded and sheathed cable, with cores as twisted pairs (suggestion acc. to DIN 47100). Please consult our customer support for cables longer than 100m.



View: solder side of the motor connector.

| S700 Pin | AKD X10 High Density Pin | Pair No. | Core Color acc. to IEC 60757 | Motor End Pin | Function 6SM, DBL/DBK, AKM |
|----------|--------------------------|----------|------------------------------|---------------|----------------------------|
| - | | - | - | 1 | n.c. |
| 2 | 8 | 4 | BU | 2 | Thermal Protection |
| 3 | 15 | 2 | YE | 3 | S4 Cosine+ |
| 4 | 13 | 3 | PK | 4 | S3 Sine- |
| 5 | 7 | 1 | BN | 5 | R2 Reference+ |
| 6 | 9 | 4 | RD | 6 | Thermal Protection |
| 7 | 14 | 2 | GN | 7 | S2 Cosine- |
| 8 | 12 | 3 | GY | 8 | S1 Sine+ |
| 9 | 6 | 1 | WH | 9 | R1 Reference- |

12.7.6 Encoder Cables for S700/AKD



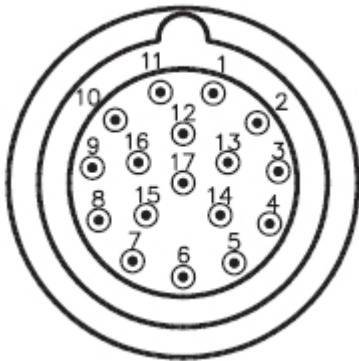
All the motors in our range feature the same 17-pin connector for the encoder connection (EnDat, HIPERFACE, BiSS etc.). This connector is also used for the connections from the motor's thermal protection contact to the servo amplifier. The servo amplifiers have a Sub-D female connector for the connection of the encoder and the thermal protection contact. The cable shield is connected to the servo amplifier via the connector housing.

12.7.6.1 Encoder Cable Order Codes

| Article | S700 | | AKD | |
|----------------------------|--------|------------|--------|-------------------|
| | Length | Order Code | Length | Order Code |
| Encoder Cable (7x(2x0.25)) | 5m | DE-90287 | 1m | CFE0A1-002-001-00 |
| Encoder Cable (7x(2x0.25)) | 10m | DE-91019 | 3m | CFE0A1-002-003-00 |
| Encoder Cable (7x(2x0.25)) | 15m | DE-91811 | 6m | CFE0A1-002-006-00 |
| Encoder Cable (7x(2x0.25)) | 20m | DE-91807 | 12m | CFE0A1-002-012-00 |
| Encoder Cable (7x(2x0.25)) | 30m | DE-92205 | 24m | CFE0A1-002-024-00 |

12.7.6.2 Preparing Encoder Cables

Up to a cable length of 50m, use a shielded and sheathed cable with cores in twisted pairs (suggestion acc. to DIN 47100). Please consult our customer support for cables longer than 50m.



View: solder side of the motor connector.

| S700 | Pin: Amplifier End | | Pair | Core Color acc. to IEC 60757 | Pin: Motor End Encoder ECN/EQN/SRS/SRM |
|------|--------------------|-----------|------|------------------------------|--|
| | AKD EnDat BiSS | Hiperface | | | |
| 1 | 15 | 12 | 1 | WH | 1 |
| 2 | 11 | 11 | 6 | RD/BU | 2 |
| 3 | 13 | 14 | 2 | GN | 3 |
| 4 | 10 | 10 | 6 | GY/PK | 4 |
| 5 | 6 | 6 | 3 | GY | 5 |
| 6 | - | - | - | - | - |
| 7 | 9 | 9 | 7 | BN/GN | 7 |

| S700 | Pin: Amplifier End | | Pair | Core Color acc. to IEC 60757 | Pin: Motor End |
|------|--------------------|-----------|------|------------------------------|-----------------|
| | AKD | | | | |
| | EnDat BiSS | Hiperface | | | ECN/EQN/SRS/SRM |
| 8 | 2 | - | 4 | BU | 8 |
| 9 | 14 | 13 | 1 | BN | 9 |
| 10 | 5 | 5-4 | 5 | VT | 10 |
| 11 | 12 | 15 | 2 | YE | 11 |
| 12 | 4 | 4-5 | 5 | BK | 12 |
| 13 | 7 | 7 | 3 | PK | 13 |
| 14 | 8 | 8 | 7 | WH/GN | 14 |
| 15 | 3 | - | 4 | RD | 15 |

12.7.7 ComCoder Cables for S700/AKD



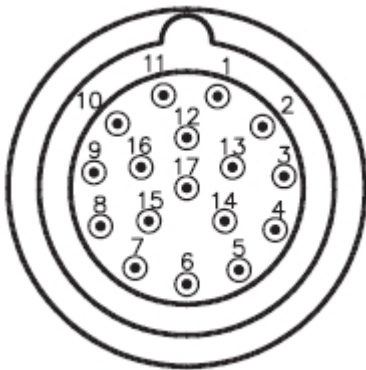
All the motors in our range feature the same 17-pin connector for the ComCoder connection. This connector is also used for the connections from the motor's thermal protection contact to the servo amplifier. The servo amplifiers have a Sub-D female connector for the connection of the ComCoder and the thermal protection contact. The cable shield is connected to the servo amplifier via the connector housing.

12.7.7.1 ComCoder Cable Order Codes

| Article | S700 | | AKD | |
|-----------------------------|--------|------------|--------|-------------------|
| | Length | Order Code | Length | Order Code |
| ComCoder Cable (8x(2x0.25)) | 5m | DE-107915 | 1m | CFC0A1-002-001-00 |
| ComCoder Cable (8x(2x0.25)) | 10m | DE-107916 | 3m | CFC0A1-002-003-00 |
| ComCoder Cable (8x(2x0.25)) | 15m | DE-107917 | 6m | CFC0A1-002-006-00 |
| ComCoder Cable (8x(2x0.25)) | 20m | DE-107918 | 12m | CFC0A1-002-012-00 |
| ComCoder Cable (8x(2x0.25)) | 30m | DE-107919 | 24m | CFC0A1-002-024-00 |

12.7.7.2 Preparing Comcoder Cable

Up to a cable length of 25m, use a shielded and sheathed cable with cores in twisted pairs (suggestion acc. to DIN 47100). Please consult our customer support for cables longer than 25m.



View: Solder side of the motor connector.

| Pin Amplifier End S700 | Pin AKD X10 High Density | Pair | Core color to IEC 60757 | Pin: Motor End |
|------------------------|--------------------------|------|-------------------------|----------------|
| 1 | 14 | 1 | WH | 1 |
| 2 | 11 | 6 | RD/BU | 7 |
| 3 | 12 | 2 | GN | 3 |
| 4 | 10 | 6 | GY/PK | 10 |
| 5 | 6 | 3 | GY | 5 |
| 6 | 1 | 4 | RD | 15 |
| 7 | 9 | 7 | BN/GN | 8 |
| 8 | 2 | 4 | BU | 16 |

| Pin Amplifier End S700 | Pin AKD X10 High Density | Pair | Core color to IEC 60757 | Pin: Motor End |
|------------------------|--------------------------|------|-------------------------|----------------|
| 9 | 15 | 1 | BN | 2 |
| 10 | 5 | 5 | VT | 7 |
| 11 | 13 | 2 | YE | 4 |
| 12 | 4 | 5 | BK | 10 |
| 13 | 7 | 3 | PK | 6 |
| 14 | 8 | 7 | WH/GN | 9 |
| 15 | 3 | 8 | WH/YE | 17 |

About KOLLMORGEN

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.



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