Supplementary Sheet for the Motor Module Swap for Booksize C/D-Type Modules with Adapter Cable

1. Use of the adapter cable

The Motor Modules to be replaced have a different system to connect motor cables than the C/D-type modules. To connect existing motor cables that use the old connection system (see article 5) to the C-/D-Type Motor Modules, the specified adapter cables should be used. The required adapter cable is specified in the following table:

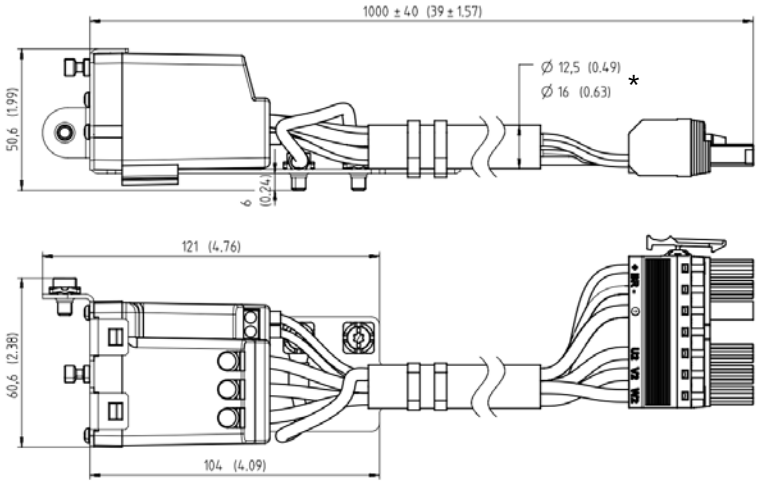
Width	Designation	Motor Modules Booksize old	Motor Modules C/D-type	Adapter cable	Cross-section
50 mm	Single Motor Module 3 A	6SL3120-1TE13-0AAx	6SL3120-1TE13-0ADx	1x 6SL3162-2ME0**1**-0ACx	2.5 mm²
50 mm	Single Motor Module 5 A	6SL3120-1TE15-0AAx	6SL3120-1TE15-0ADx	1x 6SL3162-2ME0**1**-0ACx	2.5 mm²
50 mm	Single Motor Module 9 A	6SL3120-1TE21-0AAx	6SL3120-1TE21-0ADx	1x 6SL3162-2ME0**1**-0ACx	2.5 mm²
50 mm	Single Motor Module 18 A	6SL3120-1TE21-8AAx	6SL3120-1TE21-8ADx	1x 6SL3162-2ME0**1**-0ACx	2.5 mm²
50 mm	Double Motor Module 3 A	6SL3120-2TE13-0AAx	6SL3120-2TE13-0ADx	2x 6SL3162-2ME0**1**-0ACx	2.5 mm²
50 mm	Double Motor Module 5 A	6SL3120-2TE15-0AAx	6SL3120-2TE15-0ADx	2x 6SL3162-2ME0**1**-0ACx	2.5 mm²
50 mm	Double Motor Module 9 A	6SL3120-2TE21-0AAx	6SL3120-2TE21-0ADx	2x 6SL3162-2ME0**1**-0ACx	2.5 mm²
100 mm	Double Motor Module 18 A	6SL3120-2TE21-8AAx	6SL3120-2TE21-8ACx	2x 6SL3162-2ME0**1**-0ACx	2.5 mm²
100 mm	Single Motor Module 30 A	6SL3120-1TE23-0AAx	6SL3120-1TE23-0ACx	1x 6SL3162-2ME0**2**-0ACx	6 mm²

The adapter cables are designed and permitted exclusively for operation with the specified Motor Modules.

The following adapter cable versions are available:

Article No.	Description	Cable cross section	Max. current at 40 °C (55 °C)	Ø cable max.	Bending radius, min.
6SL3162-2ME0**1**-0AC0	Adapter cable for motor connection 2.5 mm²	4 x 2.5 mm² + 2 x 1.5 mm²	18 A (10.8 A)	12.5 mm (0.49 in)	60 mm (2.36 in)
6SL3162-2ME0**2**-0AC0	Adapter cable for motor connection 6 mm²	4 x 6 mm² + 2 x 1.5 mm²	30 A (18 A)	16 mm (0.63 in)	80 mm (3.15 in)
Operation	Surrounding air 0…40 °C without derating, >40 °C to +55 °C: linear reduction of the current by 2.67 % pro °C				
Notice	The adapter cables are suitable for use on a circuit capable of delivering not more than 100 kArms symmetrical amperes, 480 V AC maximum and used with the above specified Motor Modules, S120 Booksize Line Modules and protected by overcurrent protection devices specified for the Line Modules.				

Dimension drawing of the adapter cable in mm (inch)



The adapter cable is 1 m (39.37 in) long. This allows you to stow the adapter cable flexibly according to the spatial conditions in the control cabinet.

As an alternative to using the adapter cable, the existing motor cable can be upgraded to the new connection technology. To do this, approximately 15 cm (5.91 in) of the existing motor cable must additionally be available.

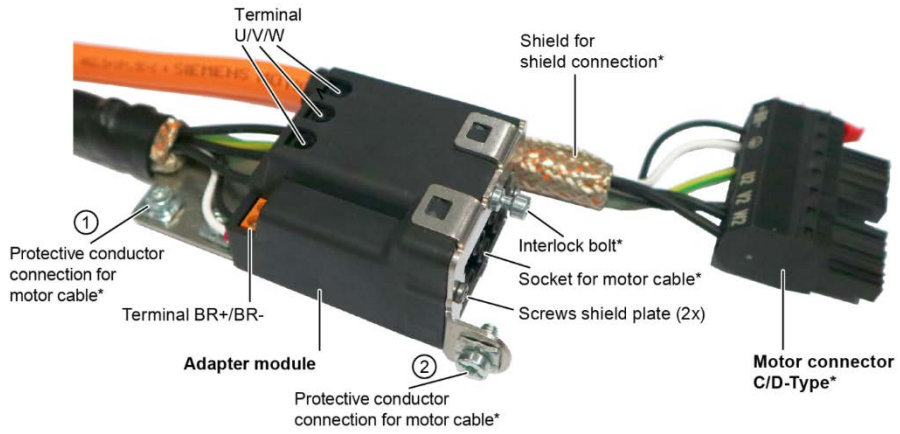
The following options are possible:

Alternative 1:
Use of the motor connector of the adapter cable (see Section 7).

Alternative 2:
Use of separate motor connectors that are available for order (see Section 8).

*** Cable diameter:**
Ø 12.5 mm (0.49 in) at 2.5 mm²
Ø 16 mm (0.63 in) at 6 mm²

Description of the customer interfaces and naming of the individual parts of the adapter cable



*** Interfaces for the user**

Torques:

PE connection: 3 Nm (26.55 lbf in)
Interlock bolt: 1.8 Nm (15.93 lbf in)
Terminal U/V/W: 1.2–1.5 Nm (10.62–13.28 lbf in)
Terminal BR+ / BR-: 0.4–0.5 Nm (3.54–4.43 lbf in)
Screws shield plate: 0.5 Nm (4.43 lbf in)

Notice:

If the motor cable's protective conductor is not long enough to reach the connection point ①, use the alternative connection point ②.

Scan the QR code for further documentation for your module

... or follow the link: https://support.industry.siemens.com/cs/document/109771800

2. Safety instructions

⚠ **Please also refer to the safety instructions in the equipment manual SINAMICS S120 "Booksize Power Units"**

⚠ WARNING

Danger to life due to live parts and other energy sources

Death or serious injury can result when live parts are touched.

- Only work on electrical devices when you are qualified for this job.
- Always observe the country-specific safety rules.

Generally, six steps apply when establishing safety:

1. Prepare for shutdown and notify all those who will be affected by the procedure.
2. Disconnect the machine from the supply.
   - Switch off the machine.
   - Wait until the discharge time specified on the warning labels has elapsed.
   - Check that it really is in a no-voltage condition, from phase conductor to phase conductor and phase conductor to protective conductor.
   - Check whether the existing auxiliary supply circuits are de-energized.
   - Ensure that the motors cannot move.
3. Identify all other dangerous energy sources, e.g. compressed air, hydraulic systems, or water.
4. Isolate or neutralize all hazardous energy sources by closing switches, grounding or shortcircuiting or closing valves, for example.
5. Secure the energy sources against switching on again.
6. Ensure that the correct machine is completely interlocked.

After you have completed the work, restore the operational readiness in the inverse sequence.

Electric shock due to a high DC link voltage

As long as the Line Module is connected to the line supply, the DC link is charged with a high voltage, and as a consequence, also the Motor Module. A hazardous voltage can be present independent of the status of the LED "DC LINK". Contact with live parts (at a voltage) can result in death or serious injury.

- Isolate the Line Module from the line supply during installation or maintenance work, e.g. via the line contactor or main switch.
- Observe the warning information on the component.

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⚠ WARNING

Electric shock due to unconnected cable shields

Hazardous touch voltages can occur through capacitive cross-coupling due to unconnected cable shields.

- As a minimum, connect cable shields and the conductors of power cables that are not used (e.g. brake cores) at one end at the grounded housing potential.

⚠ WARNING

Electric shock due to missing DC link side covers

There is a danger of an electric shock through contact when the side covers of the DC link are missing.

- Mount the side covers on the first and last component in the drive line-up.

You can order missing side covers (article number: 6SL3162-5AA00-0AA0).

⚠ WARNING

Electric shock when the protective cover of the DC link is open

Contact with live parts can result in death or serious injury.

- Only operate the components with closed protective cover.

⚠ WARNING

Electric shock when opening plug connections in operation

When opening plug connections in operation, arcs can result in severe injury or death.

- Only open plug connections when the equipment is in a no-voltage state, unless it has been explicitly stated that they can be opened in operation.

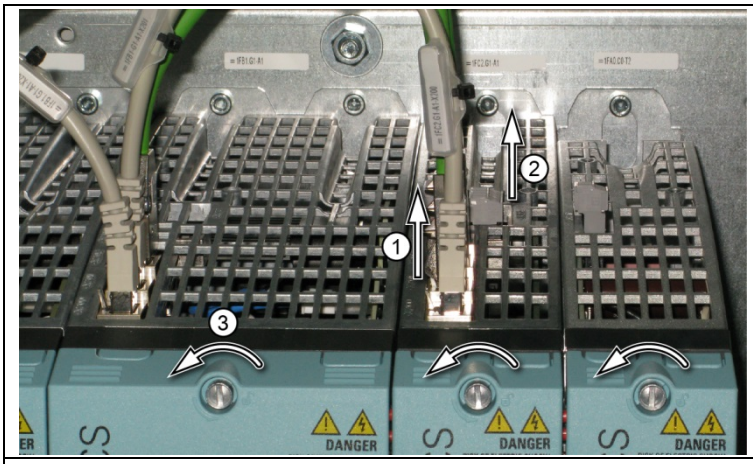
⚠ WARNING

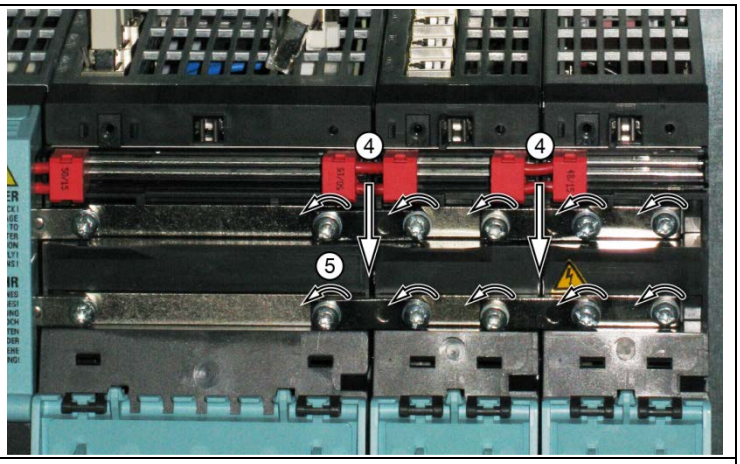
Fire if overheating occurs because of insufficient ventilation clearances

Inadequate ventilation clearances can cause overheating of components with subsequent fire and smoke. This can cause severe injury or even death. This can also result in increased downtime and reduced service lives for devices/systems.

- Ensure compliance with the specified minimum clearance as ventilation clearance for the respective component.

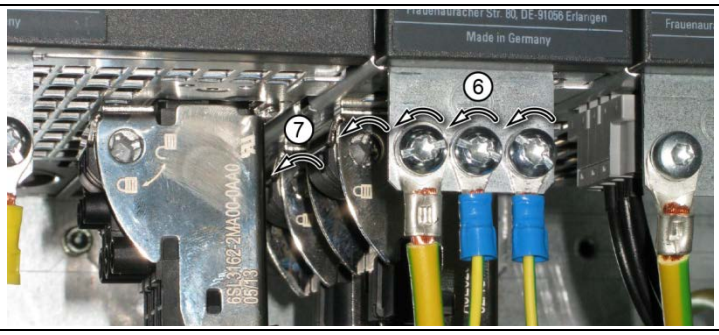
3. Disassembly of a Motor Module

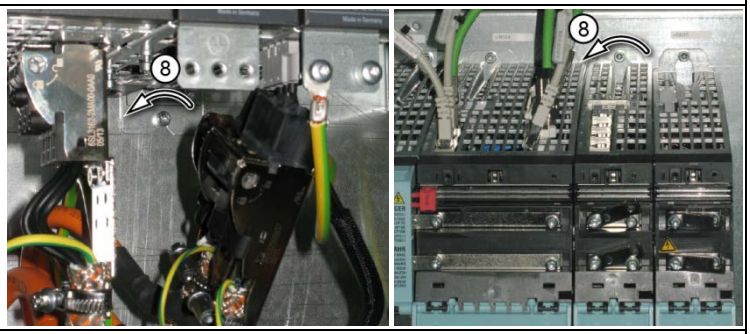




1. Unplug the DRIVE-CLiQ cables (X200-X203) ① and terminal X21/X22 ② from the Motor Module. Before unplugging, ensure that the cables are marked in such a way that it is possible to assign them to the interfaces.
2. Open the protective cover and that of the adjacent modules ③.

3. Remove the 24 V jumper plugs ④.
4. Loosen the screws of the DC link brackets ⑤ and fold the brackets to the right.

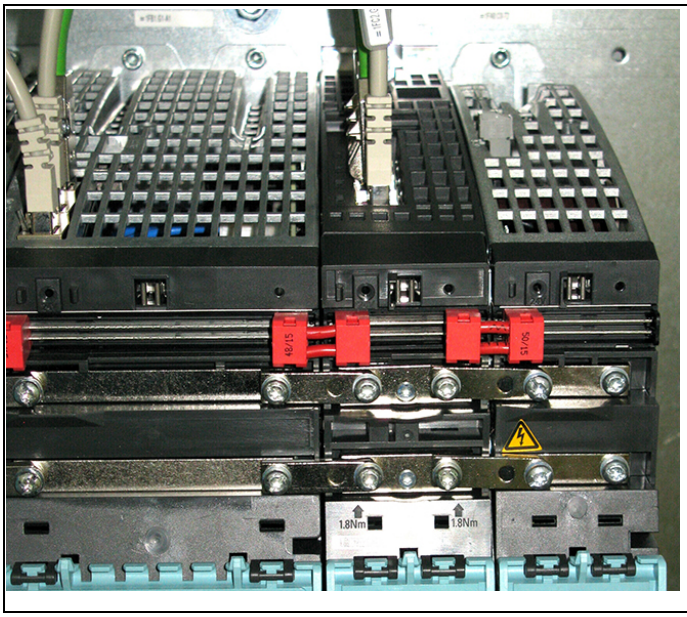




5. Unscrew and remove the screws of the protective conductors ⑥.
6. Open the locking mechanisms of the motor connectors ⑦, which are designed as a screw type or a locking mechanism, depending on the type used. Remove the motor connecting cables from the Motor Module.

7. When all connections have been disconnected, loosen the fastening screws of the Motor Module on the top and bottom ⑧ and lift the Motor Module out of the assembly.

4. Installation of the new Motor Module and connecting the adapter cable

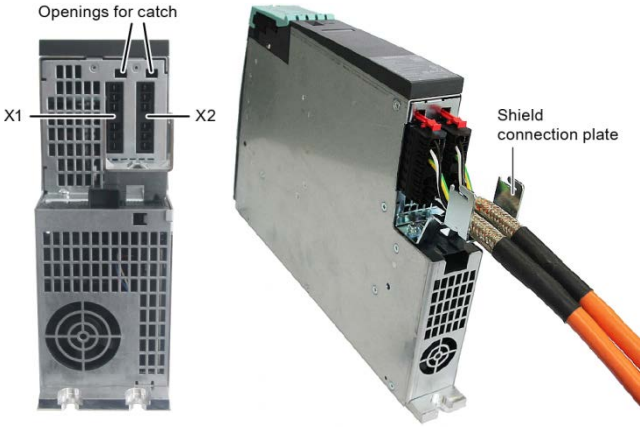




Installation of the new Motor Module:

1. Hang the new Motor Module on the fastening screws on the rear panel of the control cabinet (torque for screw size M6: 6 Nm / 53.10 lbf in).
2. Reconnect the DC link busbars to the adjacent components. To do this, swivel the DC link brackets back in and tighten all DC link screws (torque: 1.8 Nm / 15.93 lbf in).
3. **Only where necessary**, remove the DC link side covers ① on the protective cover.
4. Connect the 24 V rails of the components by connecting the 24 V jumper plugs and close the protective covers. Ensure that they are firmly latched in place.
5. Insert the DRIVE-CLiQ cables (X200-X203) and terminal X21/X22 into the corresponding sockets and ensure the assignment is correct.
6. Screw the protective conductor ② for the Motor Module onto the protective conductor connection provided for this purpose (torque: 3 Nm / 26.55 lbf in).

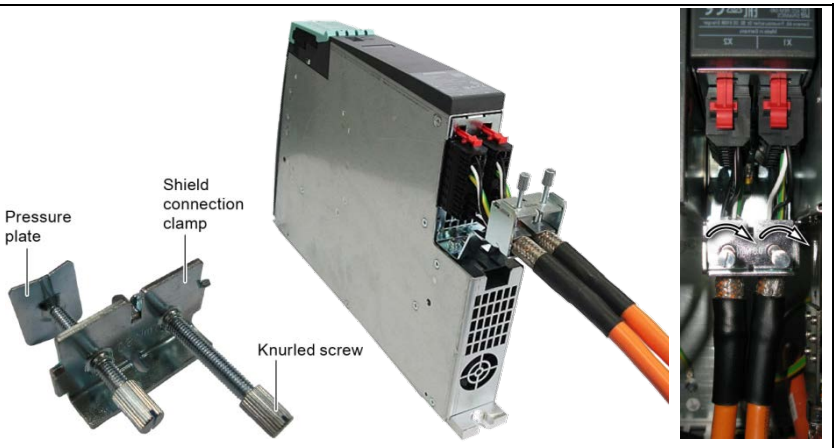
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Connecting the adapter cable to the Motor Module:

Plug the motor connector into socket X1 for Single Motor Modules and into sockets X1 and X2 for Double Motor Modules.
The motor connector has a catch which snaps into the opening provided on the Motor Module.

Note: The catch mechanism does not provide strain relief for the cables connected to the Motor Module.



Shield connection:

The power cable shield is attached to the shield connection plate of the Motor Module by means of the shield connection clamp supplied in the terminal kit of the module.

1. Route the power cables through the shield connection plate.
2. Hook the shield connection clamp into the shield connection plate.
3. Clamp the power cables securely in position by tightening the pressure plates of the shield connection clamps using the knurled screws (torque: 0.8 Nm / 7.08 lbf in). For a Double Motor Module, tighten the first motor cable again to the specified torque after you have securely fixed the second motor cable.

5. Connecting the motor cable with the adapter cable



The following connectors can be connected to the existing motor cables:

Type 1: with crimp contacts and screw-type lock
Type 2: with crimp contacts and locking mechanism
Type 3: with screw-type connections and screw-type lock
Type 4: with screw-type connections and locking mechanism (6SL3162-2MA00-0AAx)

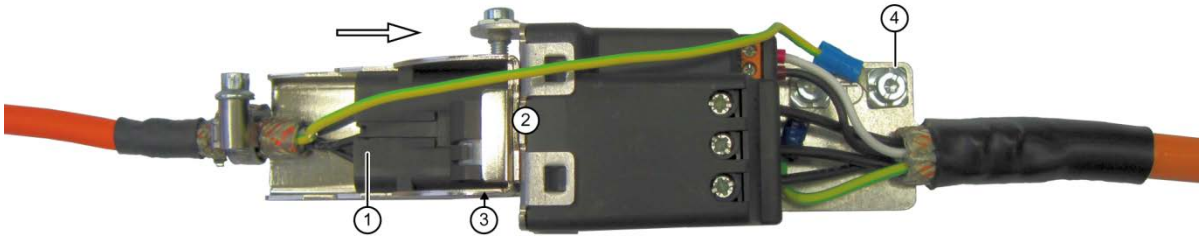
All of these variants are suitable for connecting to the adapter cable.

For models with a screw-type lock (types 1 and 3), the locking bolt must be unscrewed from the adapter.

For connectors from third-party manufacturers, no guarantee of safety and function can be assumed.



Unscrewed locking bolt
Tool: Torx T20



Example:

Connecting a motor cable with an adapter cable

1. Plug the connector of the existing motor cable ① into the socket of the adapter cable ②. Depending on the design, secure the motor connector by tightening the locking screw or by actuating the locking mechanism ③.
2. Screw on the protective conductor of the motor cable to the shield plate of the adapter ④. Use the available screw to do this. Use a 1 x 5.5 slotted screwdriver or a Torx T20 screwdriver (torque: 3 Nm / 26.55 lbf in). The protective conductor can, if necessary, be fastened to the motor connector or the adapter using a cable tie.

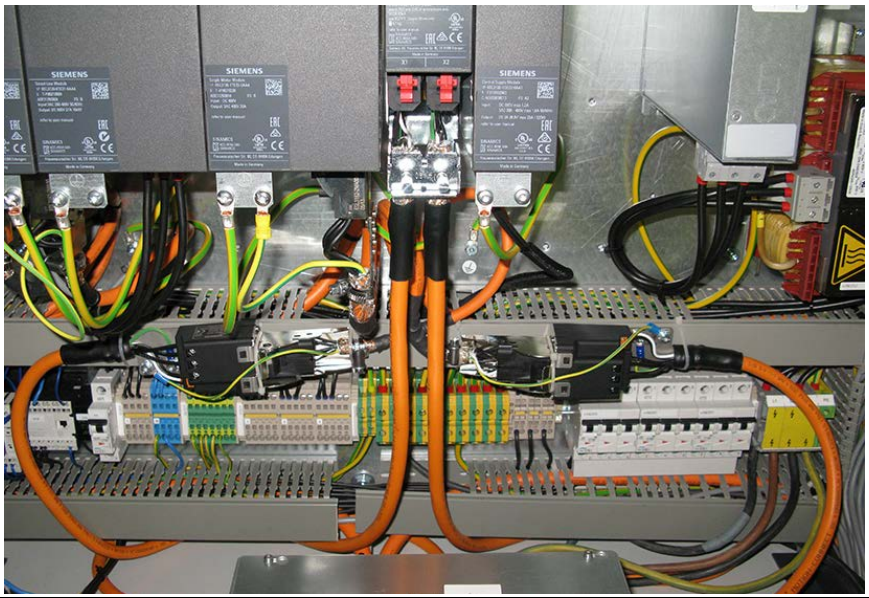
6. Routing the adapter cable in the control cabinet

After all of the electrical connections have been established, the adapter cable can be stowed in the control cabinet. The preferred locations for stowing are the floor of the control cabinet and cable racks. Also, any additional free location can be used, where the adapter cable can be secured (e.g. using cable ties). The adapter module can be stowed in any position.

Observe the following boundary conditions when routing the cable:

- The environmental conditions specified in the equipment manual apply.
- When routing the cables, local heat sources must be considered (e.g. chokes, braking resistors, heat sinks or hot air from devices and cable bundles with a high level of self-heating).
  Therefore, keep a distance of at least 20 cm (7.87 in).
- Do not cover any ventilation openings of devices with the adapter cable or adapter module.
- The minimum bending radius of the cable is 6 cm (2.36 in) for the 2.5 mm² cable and 8 cm (3.15 in) for the 6 mm² cable.
- For EMC reasons, a minimum distance to signal and 24 V cables of 20 cm (7.87 in) is recommended.

Example of an installation in the control cabinet:



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7. Alternative 1: Use of the motor connector of the adapter cable for converting the existing motor cable



Detaching the pre-assembled power cable from the motor connector:

To loosen the conductors, the terminals must be opened. To remove, insert a slot-head screwdriver (0.6 x 3.5 mm) into the opening provided above the terminal location and withdraw the conductor from the motor connector.

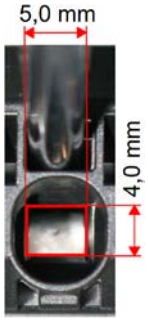
Note: Screwdrivers with an insulated shaft are not suitable because it will not be possible to insert them deep enough into the terminal.

Connectable conductor cross-sections:

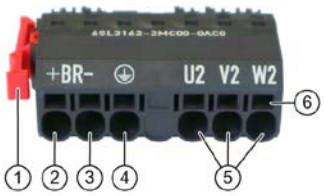
	1.5 mm²	2.5 mm²	4 mm²	6 mm²	10 mm²
	AWG 16	AWG 14	AWG 12	AWG 10	AWG 8
	✓	✓	✓	✓	✓
	✓	✓	✓	✓	

Note:
When crimped, conductor end sleeves must not exceed the maximum dimensions of 4.0 x 5.0 mm (0.11 x 0.20 in), as otherwise individual conductors will not be able to be inserted.
For ferrule crimping, we recommend using the following tools from the Weidmüller company:

Conductor Ø	Crimping tool
1.5 mm² - 6 mm²:	Type PZ 6/5, Art. No.: 9011460000
6 mm² - 10 mm²:	Type PZ 16, Art. No.: 9012600000



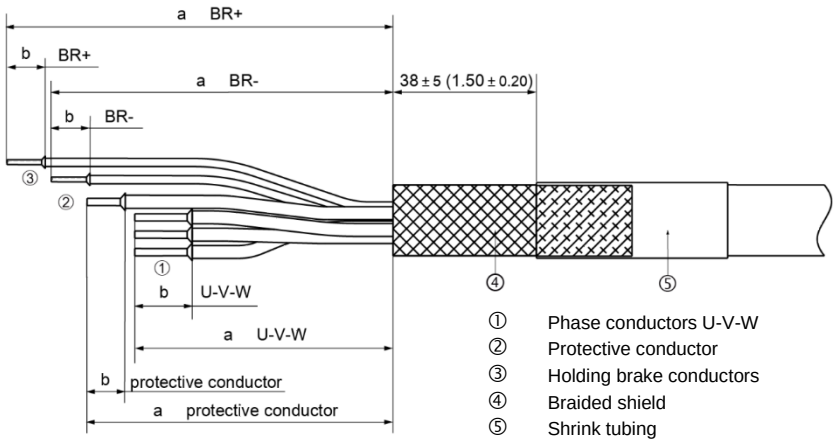
Dimensions of the terminal opening



① Catch
② Holding brake connection BR+
③ Holding brake connection BR-
④ Motor protective conductor connection (PE)
⑤ Phase contacts U2, V2, W2
⑥ Opening to release the spring

Assembling the motor cable:

1. Remove 85 mm (3.35 in) of the cable sheath.
2. Fold back the braided shield. If you are using a motor cable with brake conductors, then the braided shield of the brake conductors must be unbraided. Fold back unbraided shield onto the outer shield.
3. Fix the braided shield. Preferably, use shrink tubing with hot melt adhesive.
4. Shorten the individual conductors corresponding to the adjacent drawing and the table below.
5. Remove 12 mm (0.47 in) of the insulation from each conductor (15 mm / 0.59 in with a conductor cross-section of 10 mm²).
6. Use wire end sleeves according to DIN 46228 with the appropriate cross-section.

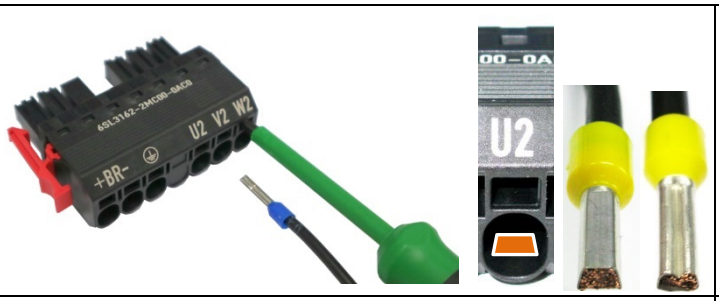


① Phase conductors U-V-W
② Protective conductor
③ Holding brake conductors
④ Braided shield
⑤ Shrink tubing

Conductor and stripped insulation lengths as a function of the conductor cross-section, data in mm (inch)

	1.5 mm² (AWG 16)		2.5 / 4 / 6 mm² (AWG 14 / AWG 12 / AWG 10)		10 mm² (AWG 8)	
	a	b	a	b	a	b
U / V / W	55 +2/-3 (2.17 +0.08/-0.12)	12 ±0.5 (0.47 ±0.02)	55 +2/-3 (2.17 +0.08/-0.12)	12 ±0.5 (0.47 ±0.02)	55 +2/-3 (2.17 +0.08/-0.12)	15 ±0.5 (0.59 ±0.02)
PE	64 +2/-3 (2.52 +0.08/-0.12)	12 ±0.5 (0.47 ±0.02)	62 +2/-3 (2.44 +0.08/-0.12)	12 ±0.5 (0.47 ±0.02)	62 +2/-3 (2.44 +0.08/-0.12)	15 ±0.5 (0.59 ±0.02)
BR-	73 ±5 (2.87 ±0.20)	12 ±0.5 (0.47 ±0.02)	73 ±5 (2.87 ±0.20)	12 ±0.5 (0.47 ±0.02)	73 ±5 (2.87 ±0.20)	12 ±0.5 (0.47 ±0.02)
BR+	79 ±5 (3.11 ±0.20)	12 ±0.5 (0.47 ±0.02)	79 ±5 (3.11 ±0.20)	12 ±0.5 (0.47 ±0.02)	79 ±5 (3.11 ±0.20)	12 ±0.5 (0.47 ±0.02)

Connecting the motor cable:



Open the terminal using a slotted screwdriver (0.6 x 3.5 mm). To insert an individual conductor, slide the wire end sleeve to the stop in the terminal. Pull out the screwdriver to close the terminal again.

Note:
Wire end sleeves with rectangular or trapezoidal crimping must be inserted in the terminal as displayed above.
When pulling out the screwdriver, ensure that the conductors remain completely inserted in the terminal.



Start with phase conductors W2, V2, and U2. Gently pull on the conductors to ensure that they are securely engaged in the terminals before you continue with the PE and the brake conductors in the same way.



Assembled push-in connector. When assembling conductors with a cross-section of more than 4 mm² (AWG 12), it may help to simultaneously open terminals U2, V2, and W2 with an appropriate tool.

Note: The connection of wires to the terminals must be done properly to ensure:

- Sufficient spacings between uninsulated live parts incl. ground
- Protection against being touched
- Safe fixture of wires

8. Alternative 2: Motor connectors available separately



6SL3162-2MA00-0AC0
Connector with screw terminals



6SL3162-2MB00-0AC0
Connector with push-in connection and actuators

The instructions for assembling the motor cables are enclosed with the motor connectors.

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