

Low-Voltage Motors N-compact **Standardline** Operation with converter

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Operation with converter

Overview

Variable-speed drive systems for 400 V and 500 V

N-compact Standardline motors with SINAMICS G150 frequency converter



SINAMICS G150 converter cabinet units are designed for use in variable-speed drives in machine construction and plant engineering. They offer a low-cost drive solution which can be flexibly tailored from a wide spectrum of components and options to meet the requirements of individual customers.

A detailed description of the SINAMICS G150 converter series can be found in Catalog D 11 (Order No. E86060-K5511-A101-A3-7600), Part 3.

N-compact Standardline 1LA8 low-voltage motors and SINAMICS G150 frequency converters combine to make an ideally coordinated system for variable-speed drives specially tailored for operating pumps, fans and compressors (square-law characteristic):

- Power range 250 to 500 kW
- Supply voltages 400 V and 500 V, 50 Hz
- 4-pole motor
- Motor type IM B3

Benefits

Benefits to the customer:

- The complete system can be delivered within 4 weeks.
- Optimally coordinated drive system
- Economical drive solution
- Easy to customize

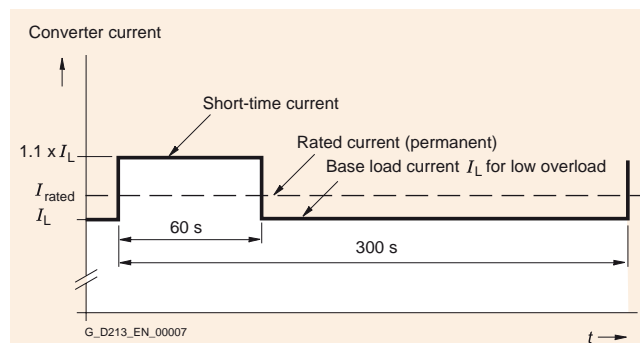
Configuration

With the motor - converter combination (selection and ordering data), the drive can be operated under both "low overload" and "high overload" on the basis of the motor drive power (for exceptions, see selection and ordering data, footnotes 3 to 5).

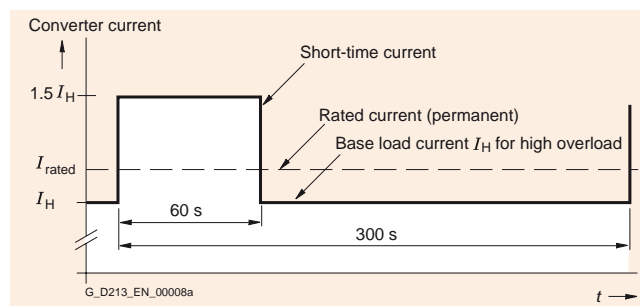
Note about "Low/high overload":

The rated output current of the converter equals the maximum permissible current for continuous operation (without overload).

If the converter must be capable of handling overload conditions such as breakaway torques or shock loads, a base load current determined according to the duty cycle must be applied to calculate the converter rating.



Low overload



High overload

The diagrams show the duty cycles for two different conditions, i.e. "low overload" and "high overload", with the resulting base load currents I_L and I_H .

"Low overload" is defined as a 300 s duty cycle in which the converter may operate at 110% of the base load current I_L for 60 s, or at 150% for 10 s (not illustrated).

"High overload" is defined as a 300 s duty cycle in which the converter may operate at 150% of the base load current I_H for 60 s, or at 160% for 10 s (not illustrated).

The converter may be operated under the appropriate overload conditions only if the base load current is not exceeded within the duty cycle either before or after the overload phase.

Technical specifications

Further information about general technical data and the design of the SINAMICS G150 converter series can be found in Catalog D 11 (Order No. E86060-K5511-A101-A3-7600) and in the electronic Catalog CA 01 on CD-ROM (Order No. E86060-D4001-A110-C5-7600).

Selection and Ordering Data

The following drive systems (motor + converter) are recommended for applications with square-law load torque.

| Drive power ¹⁾ kW | N-compact motor | | SINAMICS G150 converter variant A ²⁾ | |
|---------------------------------|--|--------------------|--|---------------------------|
| | Order No. + order codes for further options | Rated current A | Order No. for converter options Order No. with -Z + Order codes | Rated output current A |
| 3AC 400 V Δ, 50 Hz | | | | |
| 1500 rpm, 4-pole | | | | |
| 250 | 1LA8315-4PB80-Z + B20 | 430 | 6SL3710-1GE35-0AA0 | 490 |
| 315 | 1LA8317-4PB80-Z + B20 | 540 | 6SL3710-1GE36-1AA0 | 605 |
| 355 | 1LA8353-4PB80-Z + B20 | 610 | 6SL3710-1GE37-5AA0 | 745 |
| 400 | 1LA8355-4PB80-Z + B20 | 690 | 6SL3710-1GE37-5AA0 ³⁾ | 745 |
| 500 | 1LA8357-4PB80-Z + B20 | 850 | 6SL3710-1GE41-0AA0 | 985 |
| 3AC 500 V Δ, 50 Hz | | | | |
| 1500 rpm, 4-pole | | | | |
| 250 | 1LA8315-4PB50-Z + B20 | 340 | 6SL3710-1GF34-1AA0 | 410 |
| 315 | 1LA8317-4PB50-Z + B20 | 432 | 6SL3710-1GF34-7AA0 ⁴⁾ | 465 |
| 355 | 1LA8353-4PB50-Z + B20 | 488 | 6SL3710-1GF35-8AA0 | 575 |
| 400 | 1LA8355-4PB50-Z + B20 | 552 | 6SL3710-1GF37-4AA0 | 735 |
| 500 | 1LA8357-4PB50-Z + B20 | 680 | 6SL3710-1GF37-4AA0 ⁵⁾ | 735 |
| 3AC 690 V Y, 50 Hz | | | | |
| 1500 rpm, 4-pole | | | | |
| 250 | 1LA8315-4PB80-Z + B20 | 283 | SINAMICS S 150 converters for 690 V motors are not part of the Standardline program. For operating the listed 690 V motors on the SINAMICS converter, the converter has to be ordered with option L10 (du/dt filter). For Selection and Ordering Data, see Catalog D 11. | |
| 315 | 1LA8317-4PB80-Z + B20 | 360 | | |
| 355 | 1LA8353-4PB80-Z + B20 | 406 | | |
| 400 | 1LA8355-4PB80-Z + B20 | 460 | | |
| 500 | 1LA8357-4PB80-Z + B20 | 566 | | |

- Temperature class F, utilization in accordance with F. The drive output must be reduced by 10% for motors utilized in accordance with temperature class B.
- For information about SINAMICS G150 design variant A and "overload capability", refer to Catalog D 11, Part 3 and section "Configuration".
- Converter model 6SL3710-1GE38-4AA0 (840 A) must be selected when this drive is operated under high overload conditions!
- Converter model 6SL3710-1GF35-8AA0 (575 A) must be selected when this drive is operated under high overload conditions!
- Converter model 6SL3710-1GF38-1AA0 (810 A) must be selected when this drive is operated under high overload conditions!

Ordering example:

Low-voltage motor
N-compact Standardline basic version
3AC 400 V, 50 Hz, 1500 rpm, 4-pole, 355 kW
with motor option K45: Anti-condensation heating for 230 V

Matching converter
SINAMICS G150 variant A
with converter option K50: Sensor Module Cabinet-Mounted for motor speed acquisition

**1LA8353-4PB80-Z
+B20+K45**

**6SL3710-1GE37-5AA0-Z
+K50**

Options

| N-compact Standardline motor | | Relevant option with SINAMICS G150 | |
|--|------------|---|------------|
| Option description | Order code | Option description | Order code |
| Motor temperature sensing using built-in temperature sensor KTY 84-130 | A23 | Standard | - |
| Motor temperature sensing by means of 6 built-in PT100 G resistance thermometers | A61 | PT100 evaluation unit for 6 sensors, divided into two groups with factory setting, e.g. with motors, 3 PT100 for the stator windings and two for the motor bearings | L86 |
| Installation of 2 screw-in PT100 resistance thermometers in basic circuit for rolling-contact bearings | A72 | | |
| Built-on pulse encoder LL861 900 220 | H70 | Sensor Module Cabinet-Mounted for motor speed acquisition | K50 |
| Built-on pulse encoder HOG 10 D 1024 I For further options, see page 2/3. | H73 | | |

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Further converter options
(see Catalog D 11 for detailed descriptions):

| Option description | Order code |
|---|------------|
| Input side | |
| Line filter for use in the first environment to EN 61 800-3, category C2 (TN/TT supplies) | L00 |
| Main contactor for currents < 800 A | L13 |
| Without line reactor in power range P < 500 kW | L22 |
| Line reactor 2% may be required for P > 500 kW | L23 |
| EMC shield bus ¹⁾ (cable connection from below) | M70 |
| PE bus ¹⁾ (cable connection from below) | M75 |
| Output side | |
| EMC shield bus ¹⁾ (cable connection from below) | M70 |
| PE bus ¹⁾ (cable connection from below) | M75 |
| Motor protection and safety functions | |
| EMERGENCY STOP button in the cabinet door | L45 |
| EMERGENCY STOP category 0, 230 V AC or 24 V DC, uncontrolled stop | L57 |
| EMERGENCY STOP category 1, 230 V AC, controlled stop ²⁾ | L59 |
| EMERGENCY STOP category 1, 24 V DC, controlled stop ²⁾ | L60 |
| Thermistor protection unit with PTB approval (alarm) | L83 |
| Thermistor protection unit with PTB approval (switch-off) | L84 |
| Insulation monitoring | L87 |
| Additional shock protection | M60 |
| Increase in degree of protection | |
| IP21 degree of protection | M21 |
| IP23 degree of protection | M23 |
| IP54 degree of protection | M54 |
| Mechanical options | |
| Plinth, 100 mm high, RAL 7022 | M06 |
| Cable connection area, 200 mm high, RAL 7035 | M07 |
| Power supply connection from above | M13 |
| Motor connection from above | M78 |
| Top-mounted crane transport assembly for cabinets | M90 |
| Miscellaneous options | |
| Customer terminal block extension | G61 |
| Cabinet illumination with service socket | L50 |
| Anti-condensation heating for cabinet | L55 |
| 200 kW braking unit | L62 |
| Languages | |
| Documentation in English/French | D58 |
| Documentation in English/Spanish | D60 |
| Documentation in English/Italian | D80 |
| Rating plate and operator panel in English/French | T58 |
| Rating plate and operator panel in English/Spanish | T60 |
| Rating plate and operator panel in English/Italian | T80 |
| Options specific to chemical industry | |
| NAMUR terminal block | B00 |
| Protective separation for 24 V supply (PELV) | B02 |
| Separate output for external auxiliaries (uncontrolled) | B03 |

¹⁾ These options are listed for the input and output options, but are only required once.

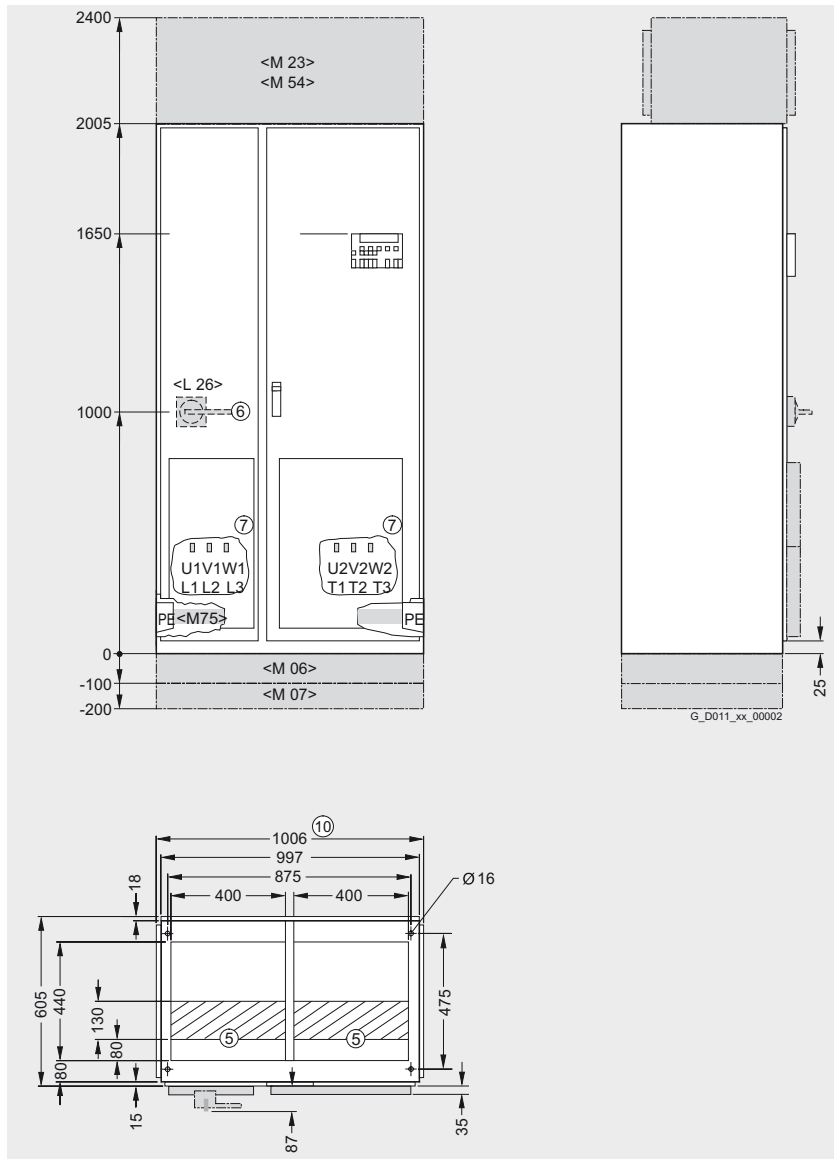
²⁾ The drive stop requirements must be taken into account with this option. Additional braking units may be needed.

Dimensional drawings

SINAMICS G150 Converter Cabinet Units - Variant A

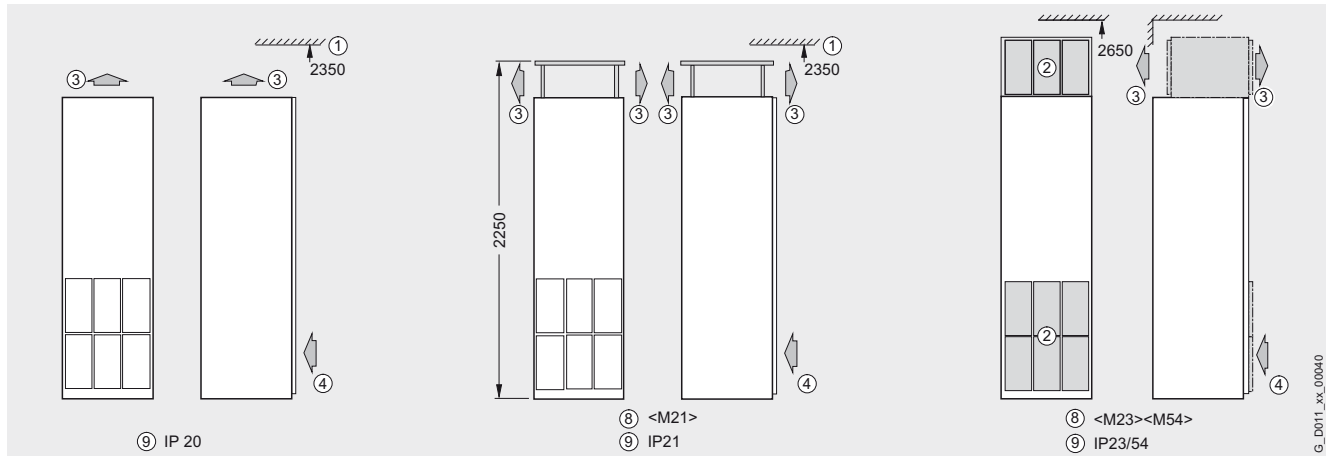
6SL3710-1GE35-0AA0

Mains supply and motor terminals at bottom of cabinet (see Catalog D 11 for further connection options)



- ① Minimum ceiling height for wall mounting
 - ② Ventilation grille
 - ③ Air outlet zone
 - ④ Air inlet zone
 - ⑤ Cables can enter from below within hatched area
 - ⑥ Main switch, can be secured by padlock
 - ⑦ Power connection
 - ⑧ Degrees of protection option
 - ⑨ Degrees of protection IP20
IP21 option <M21>
IP23 option <M23>
IP54 option <M54>
 - ⑩ Transport unit
- Options are shaded grey

Degrees of protection

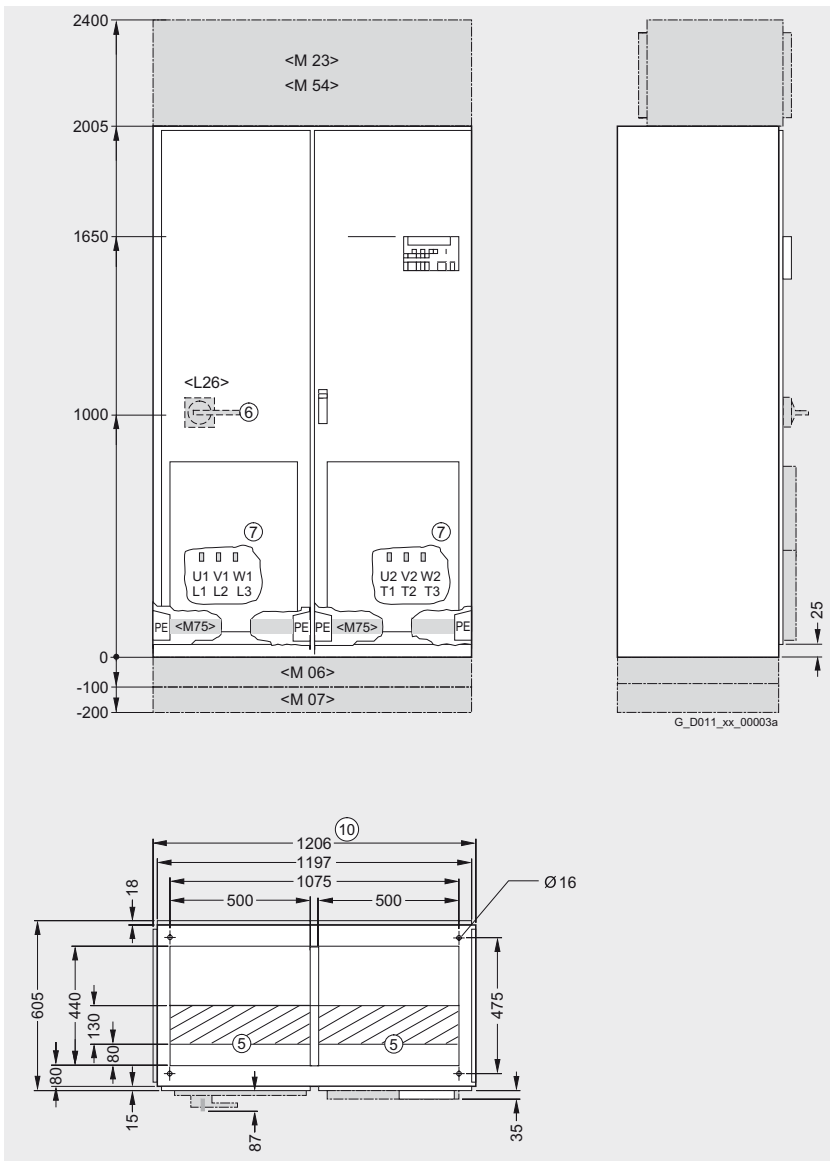


Low-Voltage Motors N-compact Standardline

Operation with converter

Dimensional drawings

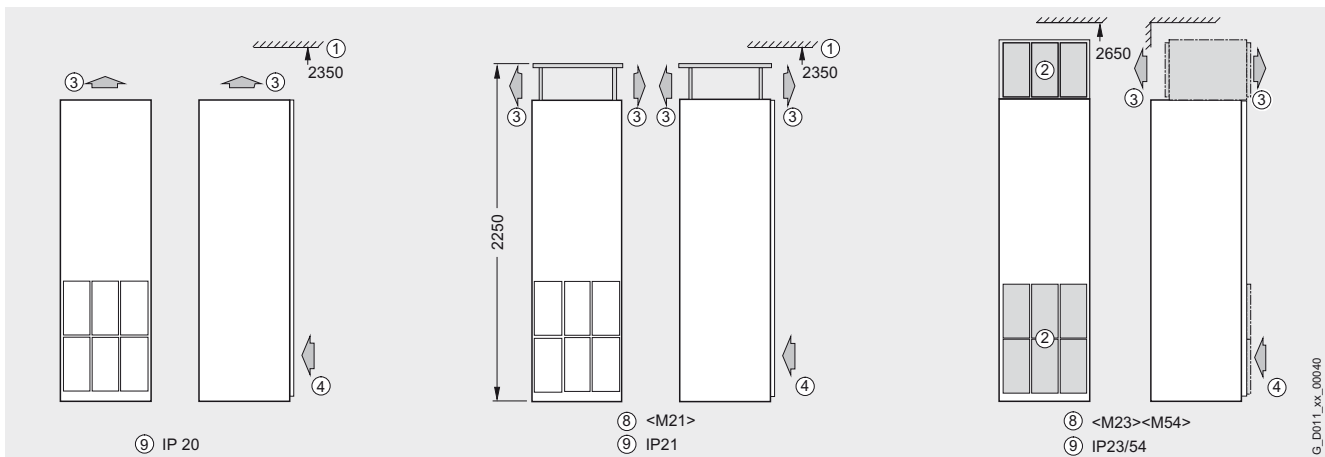
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6SL3710-1GF34-7AA0, 6SL3710-1GF35-8AA0



- ① Minimum ceiling height for wall mounting
 - ② Ventilation grille
 - ③ Air outlet zone
 - ④ Air inlet zone
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IP21 option <M21>
IP23 option <M23>
IP54 option <M54>
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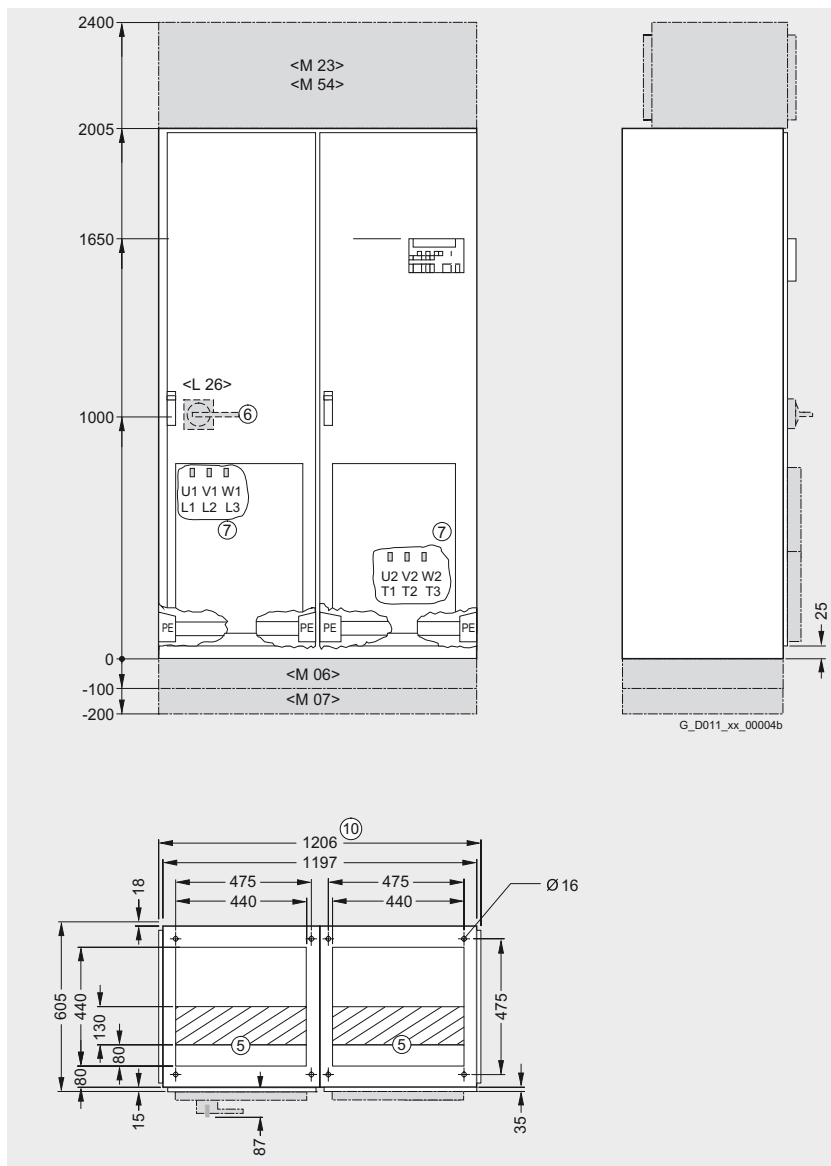
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Degrees of protection



Dimensional drawings

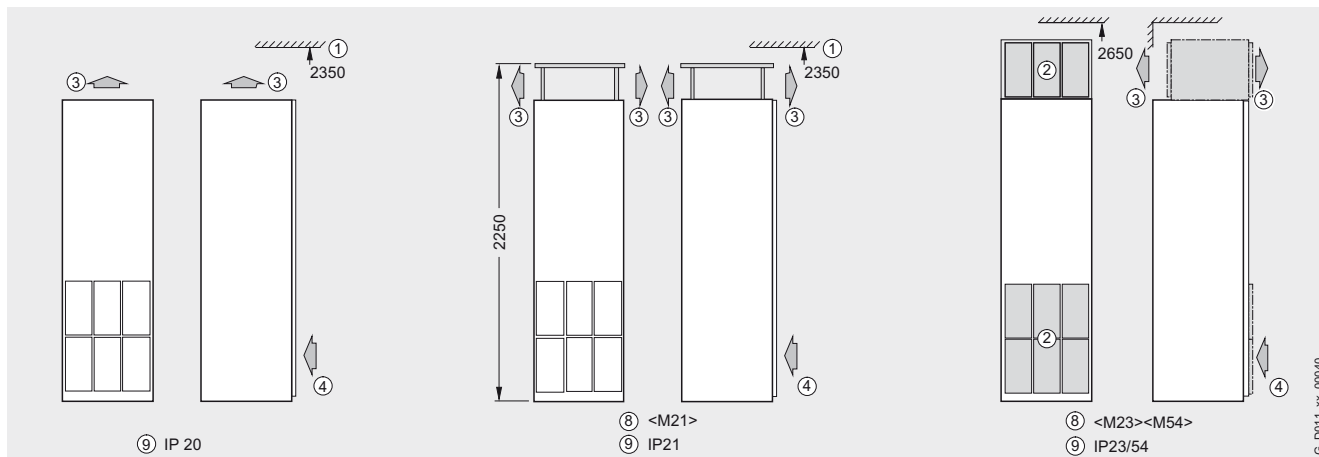
6SL3710-1GE37-5AA0, 6SL3710-1GE38-4AA0



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Degrees of protection

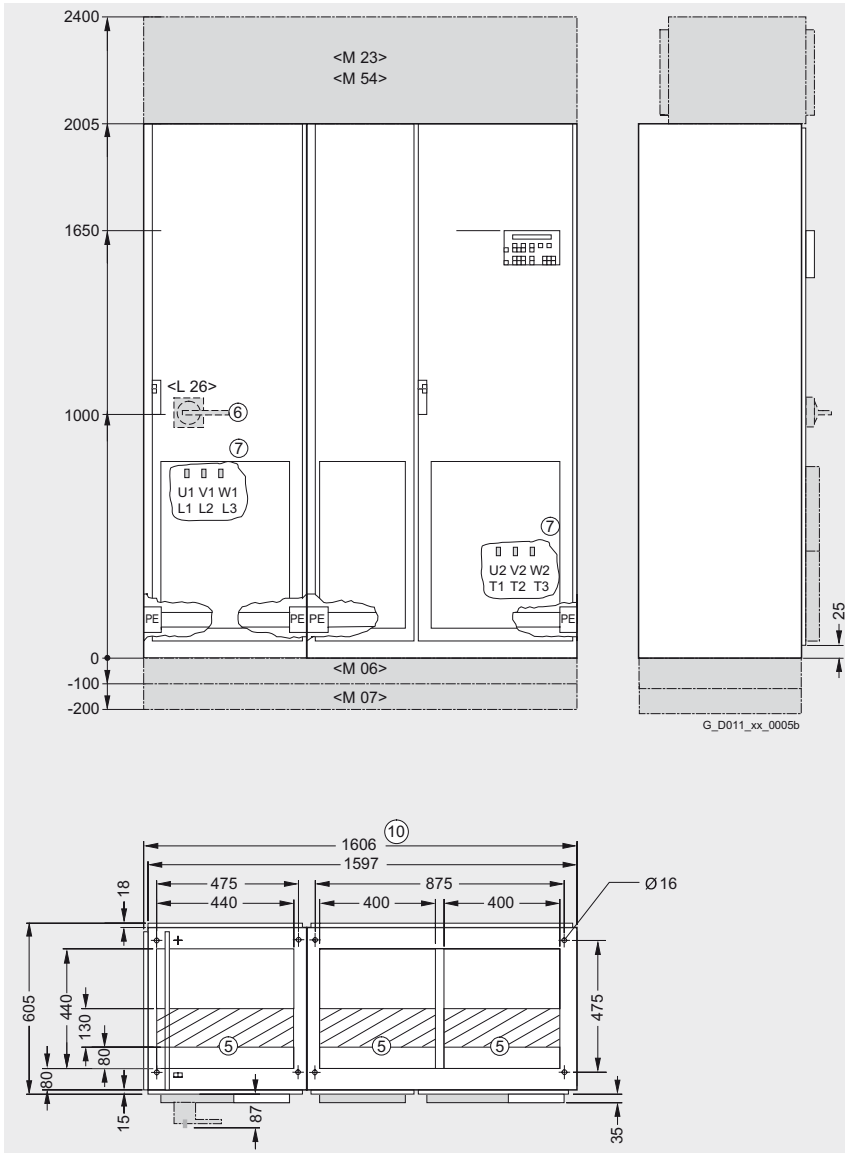


Low-Voltage Motors N-compact Standardline

Operation with converter

Dimensional drawings

6SL3710-1GE41-0AA0, 6SL3710-1GF37-4AA0,
6SL3710-1GF38-1AA0

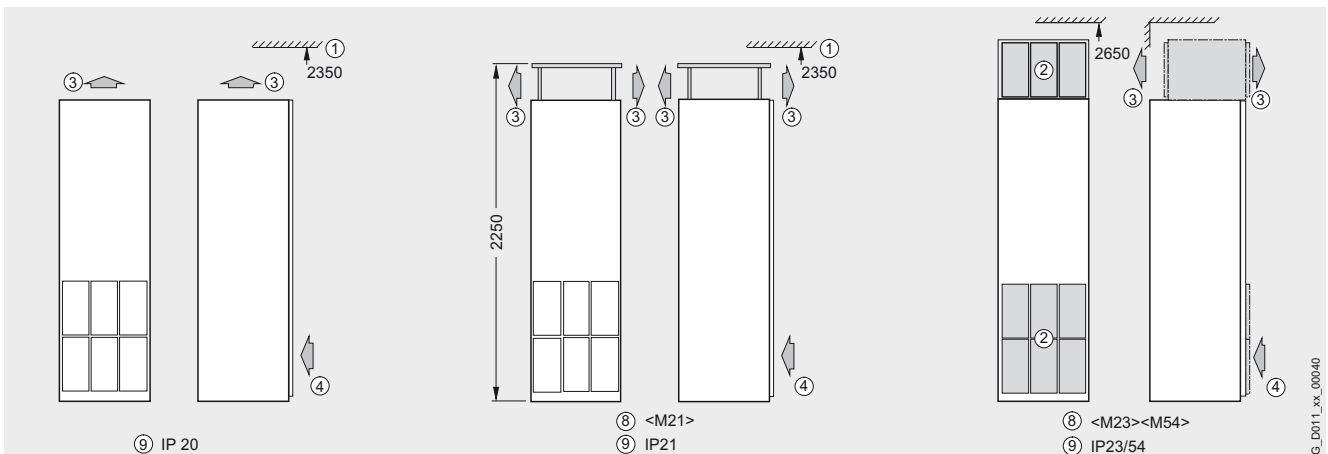


- ① Minimum ceiling height for wall mounting
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IP21 option <M21>
IP23 option <M23>
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⑩ Transport unit
Options are shaded grey

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Degrees of protection



G_D011_xx_00040

More information

Power cables

The following table shows the recommended or maximum possible cable connections on the power supply and motor sides.

| Drive power kW | Power supply connection (converter input) | | | | Motor connection (converter output) | | | | Motor connection box | | |
|--------------------------|---|--------------------|---------------------------------|--------------------------|-------------------------------------|--------------------|---------------------------------|-----|----------------------|----------------------|---|
| | Cable cross section (to DIN VDE) | | | | Cable cross section (to DIN VDE) | | | | Number of terminals | Contact screw thread | Max. diameter (sealing area connection box) |
| | Recommended | Max. cross section | Fixing screw M12 (no. of holes) | | Recommended | Max. cross section | Fixing screw M12 (no. of holes) | | | | |
| 400 V mm ² | 500 V mm ² | mm ² | | 400 V mm ² | 500 V mm ² | mm ² | | | | mm | |
| 250 | 2 x 120 | 2 x 95 | 4 x 240 | (2) | 2 x 120 | 2 x 95 | 2 x 240 | (2) | 6 | M12 | 41 ... 56.5 |
| 315 | 2 x 185 | 2 x 120 | 4 x 240 | (2) | 2 x 185 | 2 x 120 | 2 x 240 | (2) | 6 | M12 | 41 ... 56.5 |
| 355 | 2 x 240 | 2 x 150 | 4 x 240 | (2) | 2 x 240 | 2 x 150 | 4 x 240 | (2) | 6 | M16 | 56 ... 68.5 |
| 400 | 2 x 240 | 2 x 185 | 4 x 240 | (2) | 2 x 240 | 2 x 185 | 4 x 240 | (2) | 6 | M16 | 56 ... 68.5 |
| 500 | 3 x 185 | 2 x 240 | 8 x 240 | (4) | 3 x 185 | 2 x 240 | 6 x 240 | (3) | 12 | M16 | 56 ... 68.5 |

The cross section recommendations are based on the fuses specified in Part 3 "Accessories" of Catalog D11, and on single routing of 3-core copper cables at 40 °C ambient temperature.

If these conditions do not apply (cable routing, number of cables and ambient temperature), the planning guide for cable installation in Part 4 "Conductor cross sections and terminals" in Catalog D11 must be observed.

Low-Voltage Motors N-compact Standardline

Notes

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