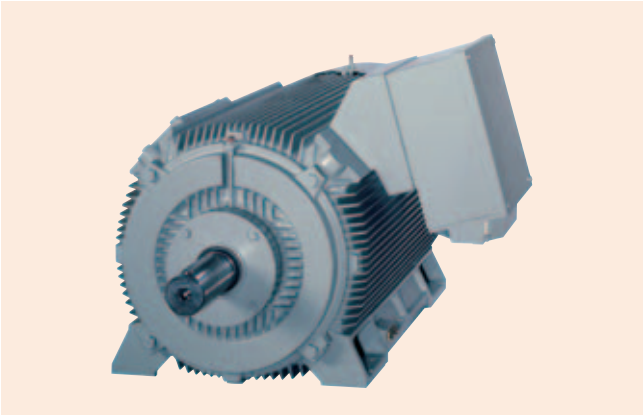
Low-Voltage Motors
N-compact Standardline
Operation on supply system

2

Operation on supply system

Overview



The N-compact series sets the modern worldwide standard for large three-phase low-voltage motors. Many details of the motors' design make them durable and so robust that they are always capable of withstanding extreme stresses.

In terms of technical design, the N-compact Standardline series is identical to the familiar 1LA8 N-compact motors which are described in Catalog M 11 (Order No. E86060-K1711-A101-A3-7600).

Standardline is intentionally designed to focus the N-compact series on meeting the requirements of drives for pumps, fans and compressors:

- Power range 250 to 500 kW
- Supply voltages 400 V, 500 V and 690 V at a frequency of 50 Hz
- 4-pole
- Type of construction IM B3

Benefits

Standardization has made it possible to further optimize order handling and production processes.

Benefits to the customer:

- Significant reduction in delivery time to only 4 weeks
- Attractive price
- State-of-the-art technology and quality which is already in use worldwide

Technical specifications

Further information about general technical data and the design and construction of the N-compact motor series can be found in Catalog M 11 (Order No. E86060-K1711-A101-A3-7600) and in the electronic Catalog CA 01 on CD-ROM (Order No. E86060-D4001-A110-C3-7600).

Selection and Ordering Data

Type IM B3, degree of protection IP55, temperature class F, utilization in accordance with temperature class B

Rated power	Order No. + order codes for further options	Operating values at rated output						Starting torque	Starting current	Stalling torque	Torque class	Moment of inertia J
		Rated speed	Efficiency η with 4/4 load	Efficiency η with 3/4 load	Power factor cos φ	Rated current at 400 V	Rated torque	with direct starting as multiple of rated torque				
kW		rpm	%	%		A	Nm				CL	kgm²
3AC 400 V, 50 Hz												
1500 rpm, 4-pole												
250	**1LA8315-4AB▪0-Z + B20**	1488	96.0	96.0	0.88	425	1600	1.9	6.5	2.8	13	3.6
315	**1LA8317-4AB▪0-Z + B20**	1488	96.3	96.3	0.88	540	2020	2.0	6.8	2.8	13	4.4
355	**1LA8353-4AB▪0-Z + B20**	1488	96.3	96.3	0.87	610	2280	2.1	6.5	2.6	13	6.1
400	**1LA8355-4AB▪0-Z + B20**	1488	96.4	96.4	0.87	690	2570	2.1	6.5	2.6	13	6.8
500	**1LA8357-4AB▪0-Z + B20**	1488	96.8	96.8	0.88	850	3210	2.1	6.5	2.4	13	8.5

Voltage distinctive number:

400 V△/690 VY — 6

500 V△ — 5

Ordering example:

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

1LA8353-4AB60-Z
+B20+K45

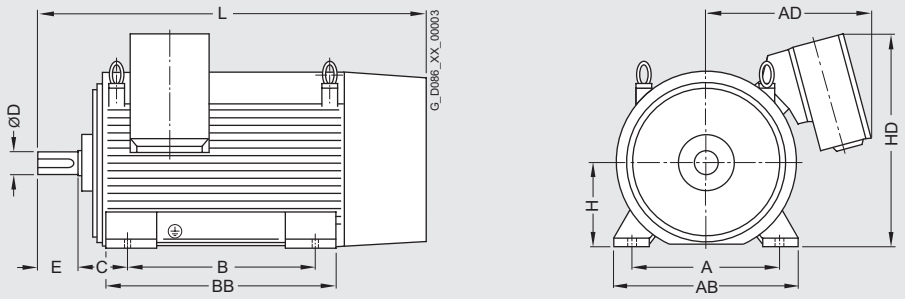
Options

Option description	Order code	Comment
Standardline design	**B20**	Always state
Motor temperature sensing by KTY 84-130 temperature sensor	**A23**	
Motor temperature sensing by 6 PT100 resistance thermometers	**A61**	
2 screw-in PT100 resistance thermometers in basic circuit for rolling-contact bearings	**A72**	
Terminal box on RHS (view onto DE)	**K09**	Standard
Terminal box on LHS (view onto DE)	**K10**	
Anti-condensation heating for 230 V	**K45**	
Auxiliary terminal box 1XB3 020	**L97**	
Auxiliary terminal box 1XB9 013	**L98**	
Next larger terminal box 1XB1 621	**M58**	The next larger size of terminal box is recommended when cables with cross sections >185 mm^2 are installed for motors with shaft height 315.
Standard paint finish in other colors	**Y53**	Plain text required

Dimensional drawings

Design:

Type IM B3, rolling-contact bearing, degree of protection IP55, cooling method IC 441



Type	Weight	A	AB	AD	B	BB	C	H	HD	L	D	E
	approx. kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4-pole												
1LA8315-4AB.0	1300	560	680	570	630	780	180	315	825	1410	85	170
1LA8317-4AB.0	1500	560	680	570	630	780	180	315	825	1410	85	170
1LA8353-4AB.0	1900	630	780	710	800	980	200	355	905	1635	95	170
1LA8355-4AB.0	2000	630	780	710	800	980	200	355	905	1635	95	170
1LA8357-4AB.0	2200	630	780	840	800	980	200	355	945	1635	95	170

For further information see Catalog M 11
(Order No. E86060-K1711-A101-A3-7600).

Operation on supply system

More information

Power cables

As specified in the table below, parallel feeders are required to connect the motors (see also Catalog M 11 “Technical information”, “Connection, switching, and terminal boxes”):

	1LA8 . . .				
Voltage	**315**	**317**	**353**	**355**	**357**
400 V	•	•	•	•	•
500 V			•	•	

Low-Voltage Motors
N-compact Standardline
Operation with converter

3

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-A2-7600), 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

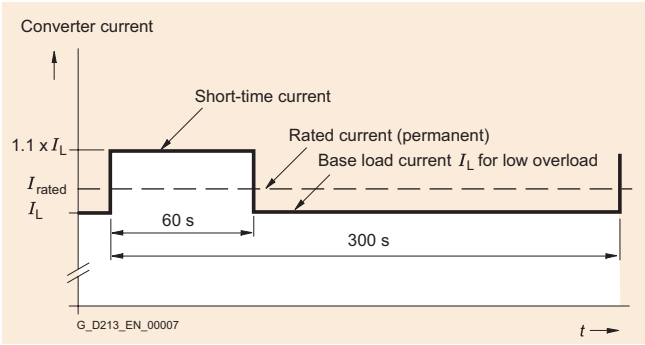
Configuration

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 4 to 6).

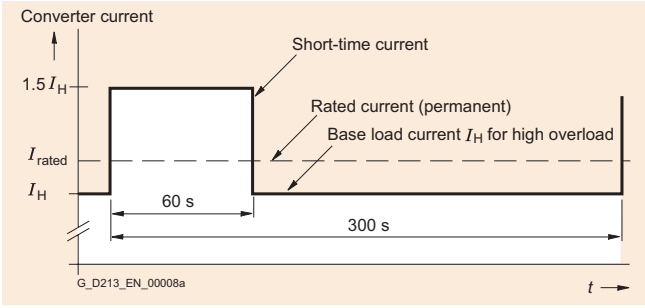
Note about “Low/high overload”:

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-A2-7600) and in the electronic Catalog CA 01 on CD-ROM (Order No. E86060-D4001-A110-C3-7600).

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 Order No. + order codes for further options	Rated current A	SINAMICS G150 converter variant A [2] Order No. for converter options Order No. with -Z + Order codes	Rated output current A
3AC 400 V, 50 Hz				
1500 rpm, 4-pole				
250	**1LA8315-4PB80-Z + B20**	425	**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, 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	**6SL3710-1GF35-4AA0**	735
500	**1LA8357-4PB50-Z + B20**	680	**6SL3710-1GF37-4AA0** [5]	735

1) 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.

2) For information about SINAMICS G150 design variant A and "overload capability", refer to Catalog D 11, Part 3 and section "Configuration".

3) Converter model 6SL3710-1GE38-4AA0 (840 A) must be selected when this drive is operated under high overload conditions!

4) Converter model 6SL3710-1GF35-8AA0 (575 A) must be selected when this drive is operated under high overload conditions!

5) 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	**H73**		
Terminal box on RHS (view onto DE)	**K09**		
Terminal box on LHS (view onto DE)	**K10**		
Anti-condensation heating for 230 V	**K45**		
Auxiliary terminal box 1XB3 020	**L97**		
Auxiliary terminal box 1XB9 013	**L98**		
Next larger terminal box 1XB1 621 (the next larger size of terminal box is recommended when cables with cross sections >185 mm^2 are installed for motors with shaft height 315)	**M58**		
Standard paint finish in other colors (plain text required)	**Y53**		

Operation with converter

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.

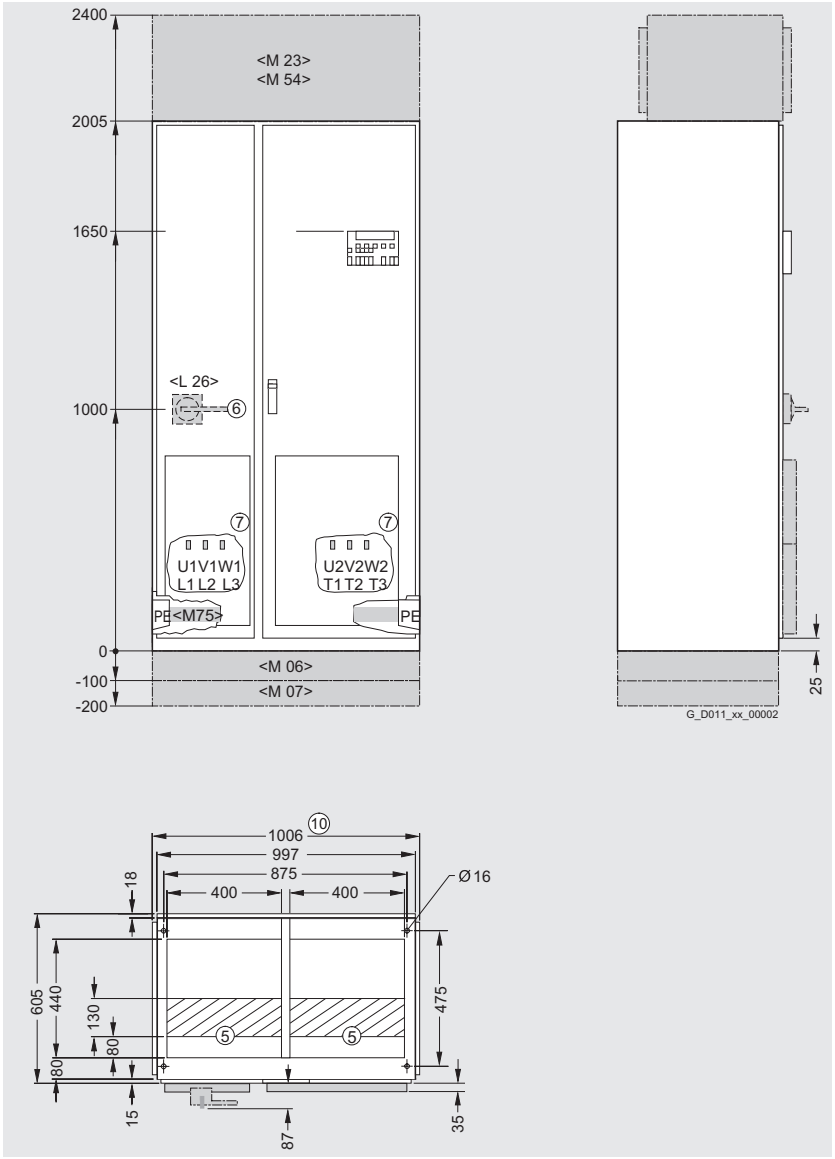
2) The drive stop requirements must be taken into account with this option. Additional braking units may be needed.

Dimensional drawings

SINAMICS G150 Converter Cabinet Units - Variant A

6SL3710-1GE35-0AA0

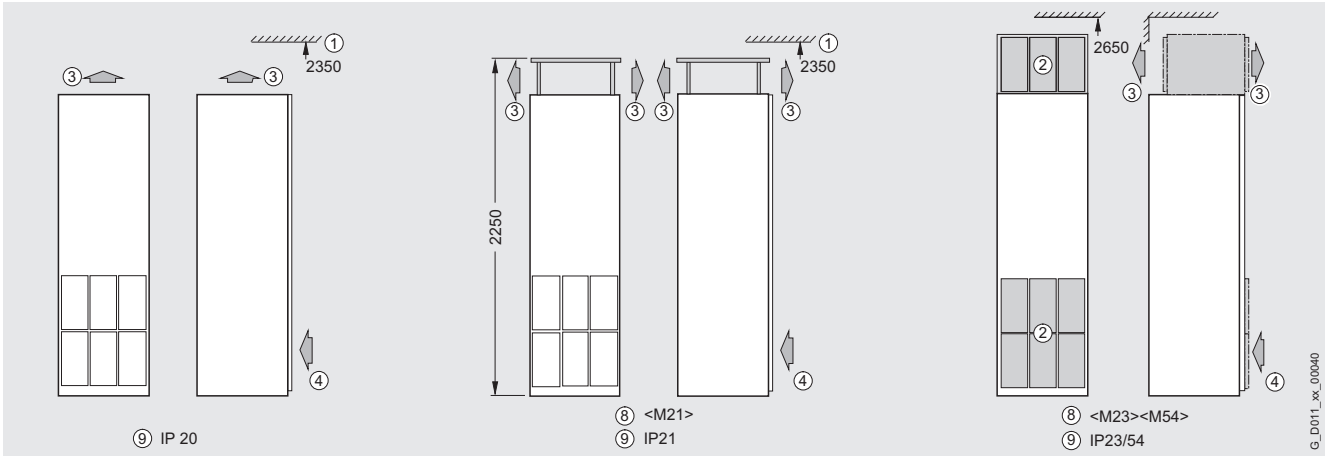
Mains supply and motor terminals at bottom of cabinet
(see Catalog D 11 for further connection options)



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

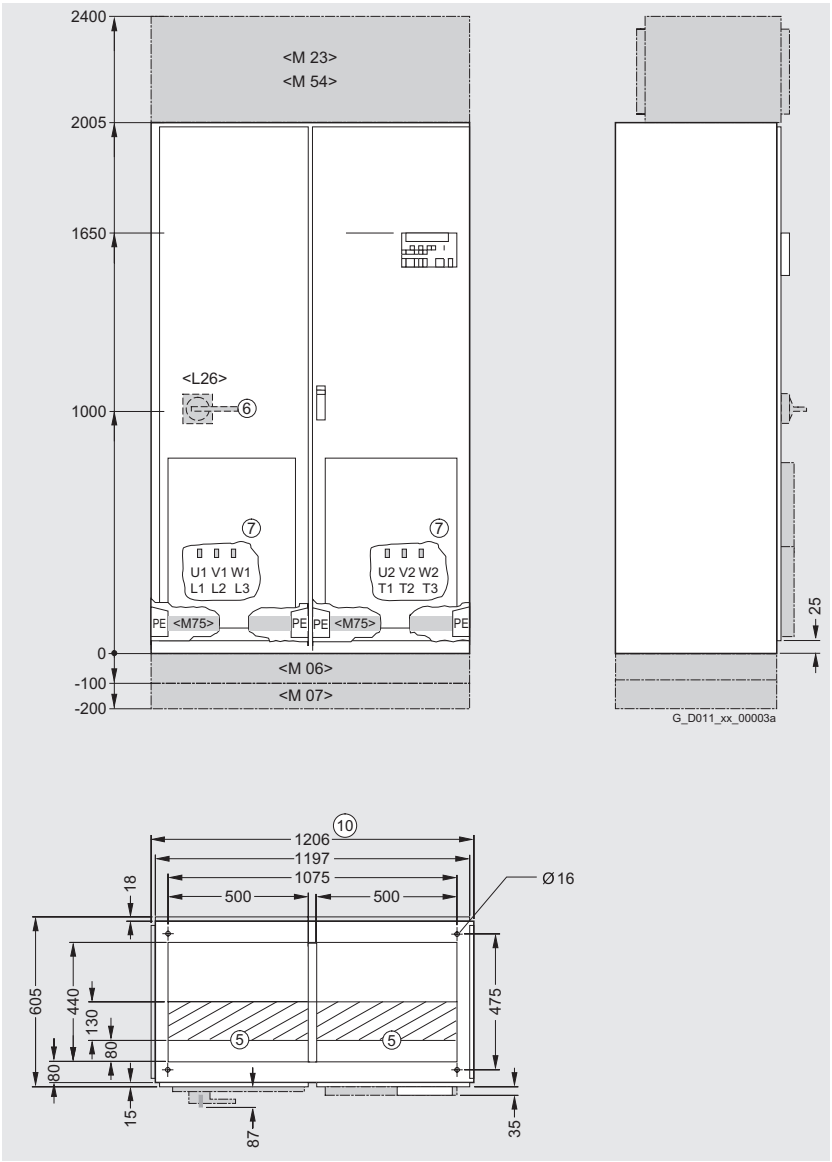
Degrees of protection



Operation with converter

Dimensional drawings

6SL3710-1GE36-1AA0, 6SL3710-1GF34-1AA0, 6SL3710-1GF34-7AA0, 6SL3710-1GF35-8AA0



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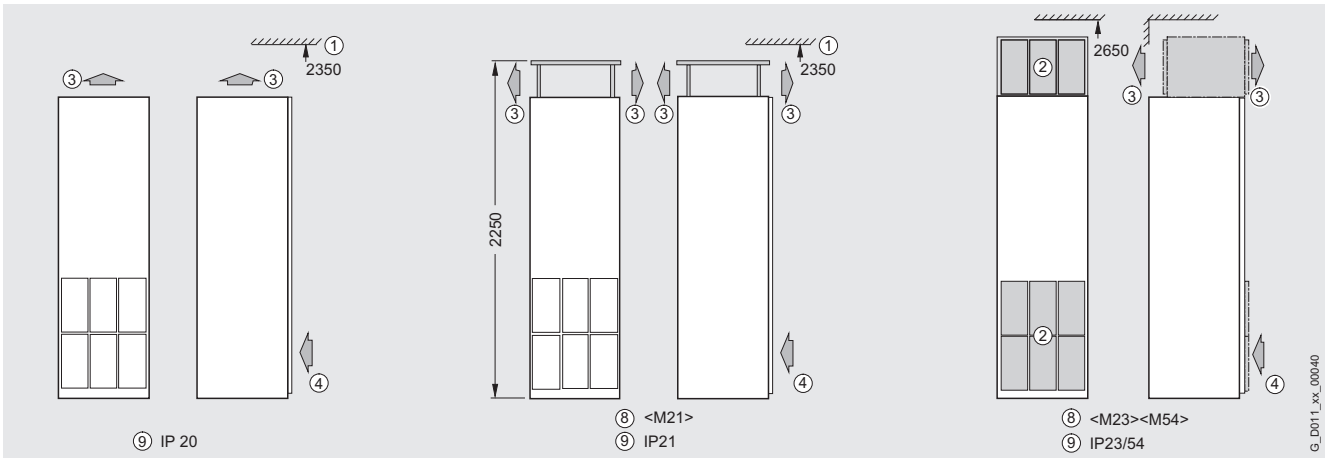
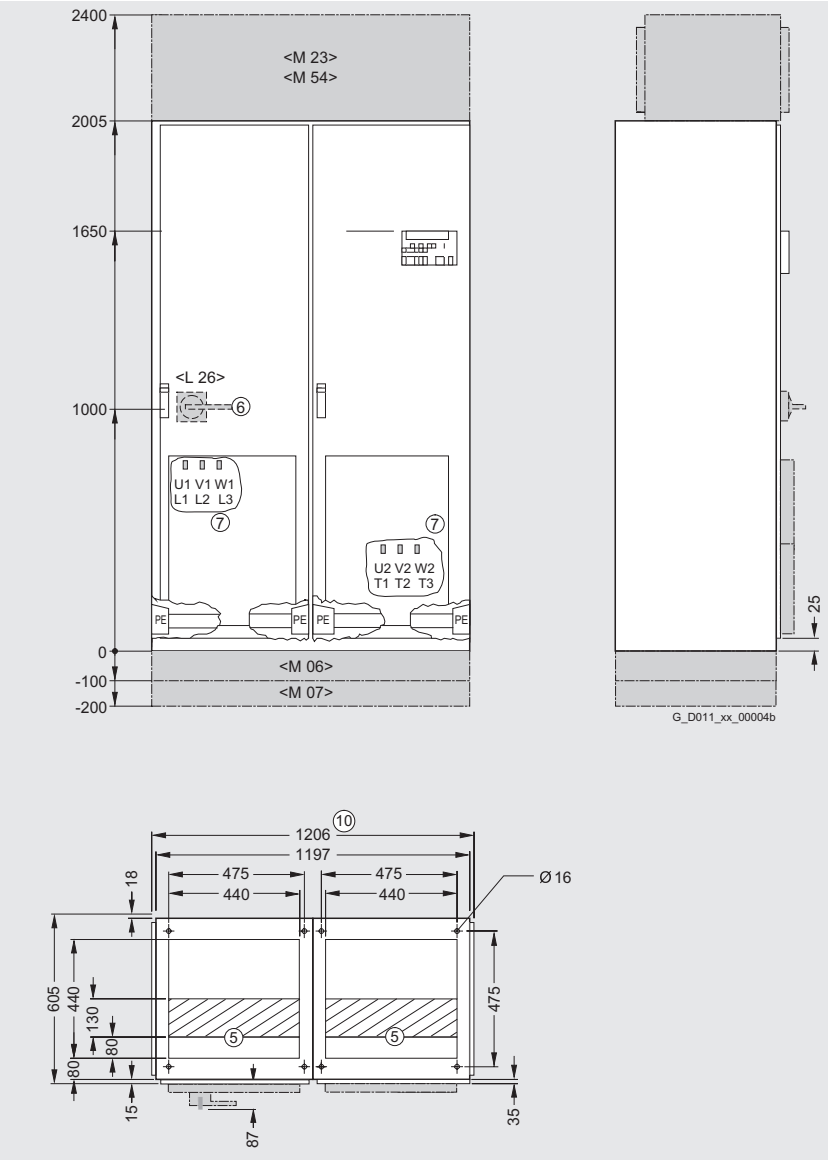


Dimensional drawings

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



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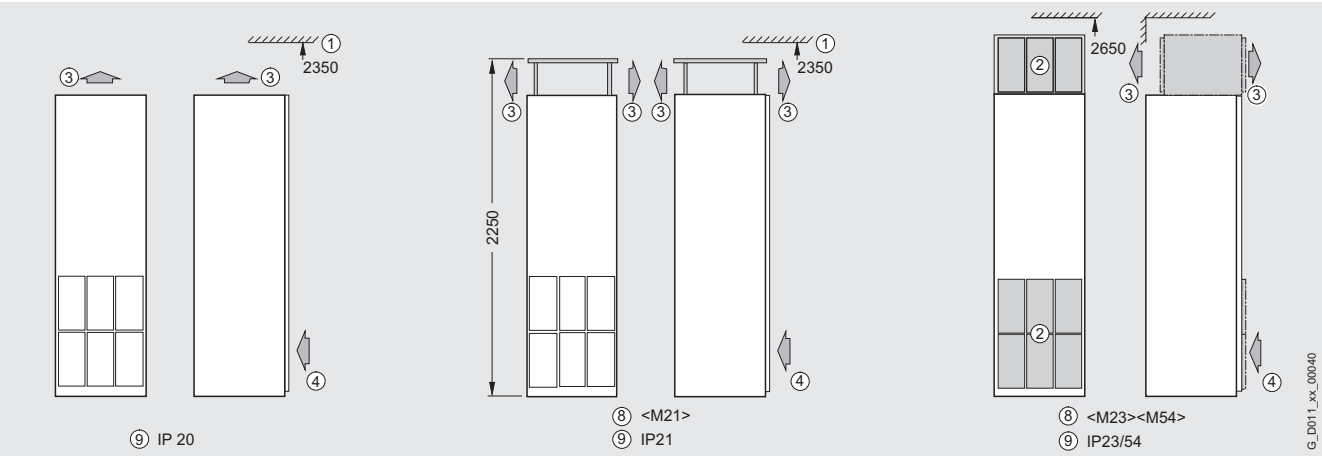
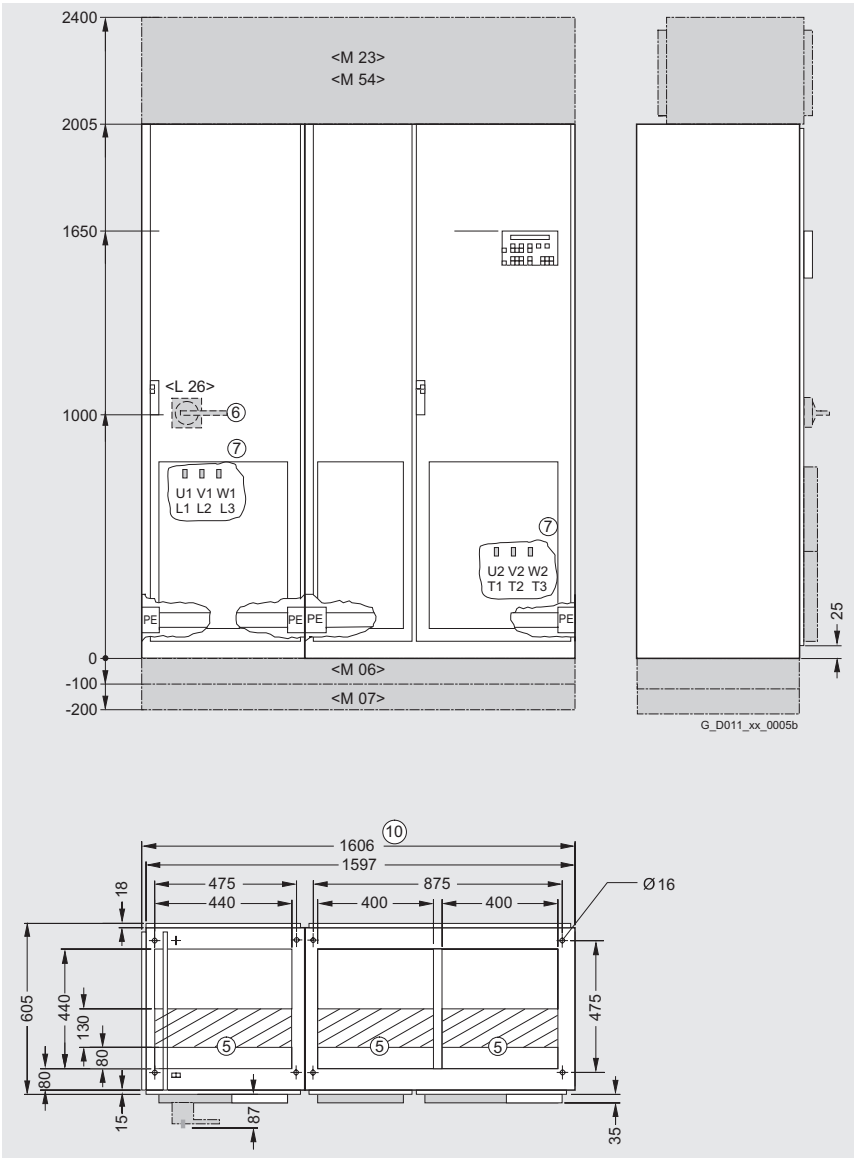


Operation with converter

Dimensional drawings

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



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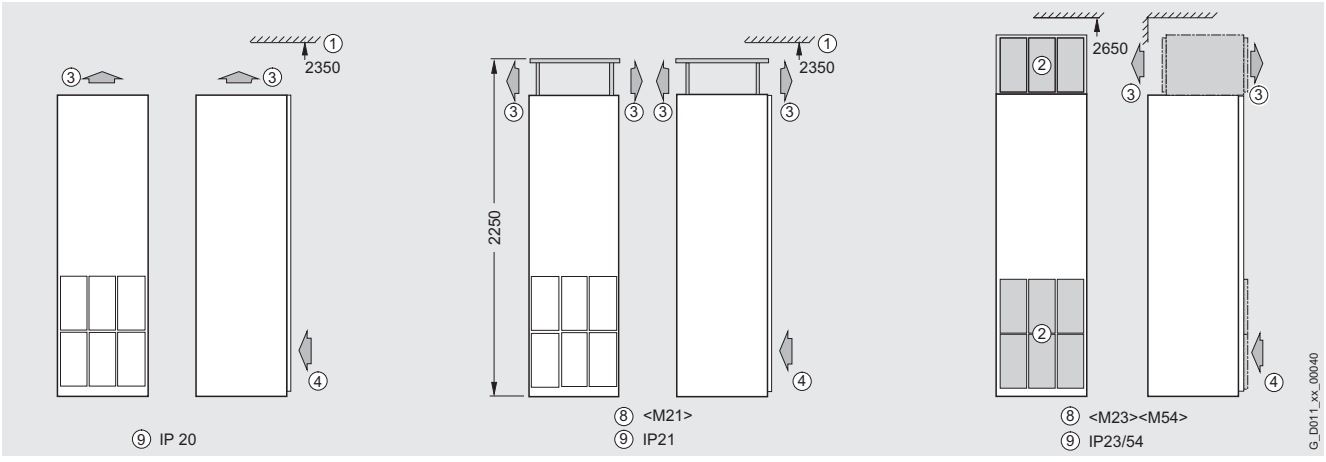
Degrees of protection



More information

Power cables

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

Drive power	Power supply connection (converter input)				Motor connection (converter output)						
	Cable cross section (to DIN VDE)				Cable cross section (to DIN VDE)				Motor terminal box		
	Recommended		Max. cross section	Fixing screw M12 (no. of holes)	Recommended		Max. cross section	Fixing screw M12 (no. of holes)	Number of terminals	Contact screw thread	Max. diameter (sealing area terminal box)
	400 V	500 V			400 V	500 V					
kW	mm^2	mm^2	mm^2		mm^2	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	40 ... 48
315	2 x 185	2 x 120	4 x 240	(2)	2 x 185	2 x 120	2 x 240	(2)	6	M12	40 ... 48
355	2 x 240	2 x 150	4 x 240	(2)	2 x 240	2 x 150	4 x 240	(2)	6	M16	41 ... 56
400	2 x 240	2 x 185	4 x 240	(2)	2 x 240	2 x 185	4 x 240	(2)	6	M16	41 ... 56
500	3 x 185	2 x 240	8 x 240	(4)	3 x 185	2 x 240	6 x 240	(3)	12	M16	40 ... 75 [1])

1) two-section plate.

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.