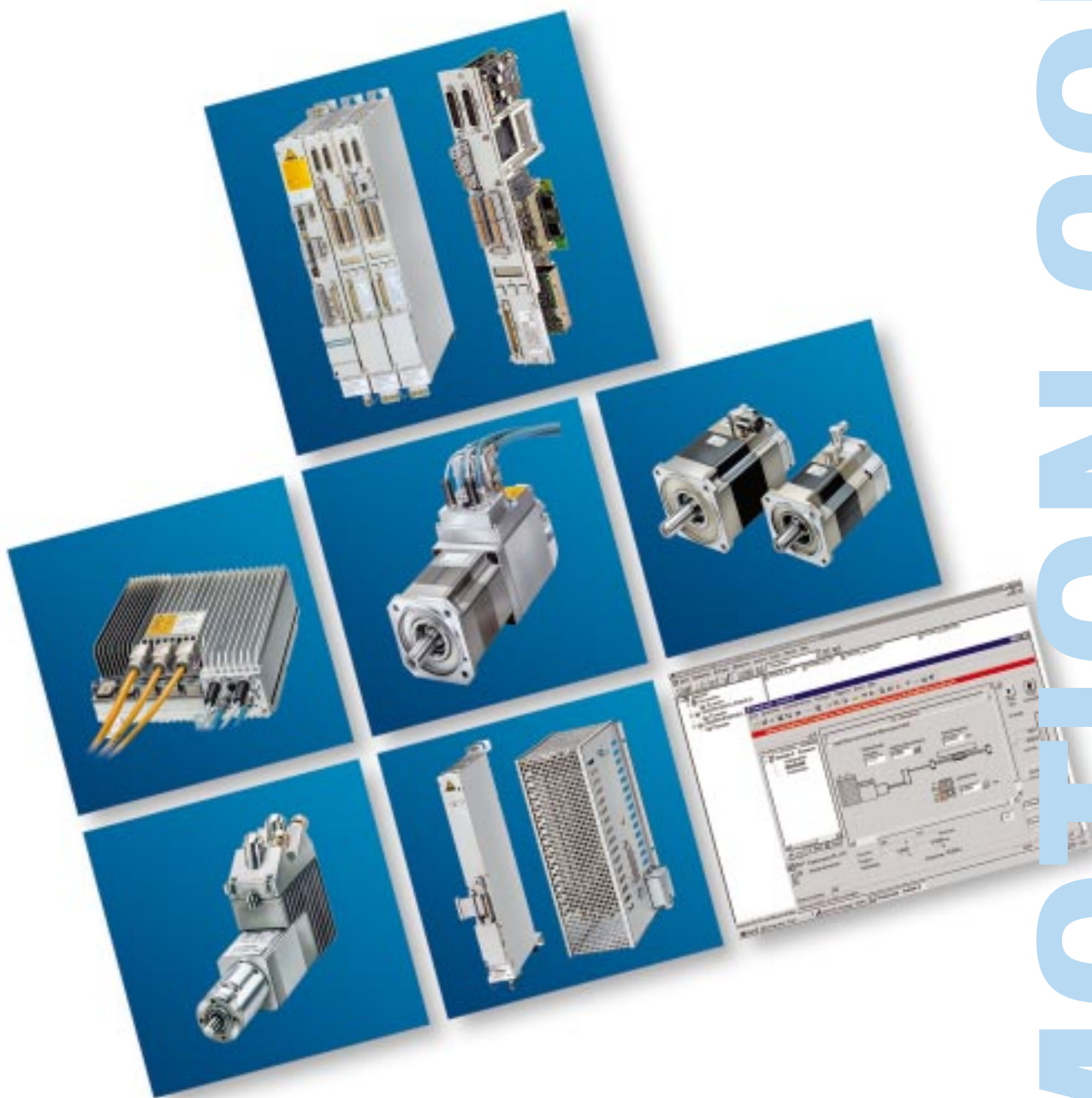


WANTION CONTROL

SIMODRIVE 611 universal and POSMO

Catalog DA 65.4 · 2002



Related catalogs:

SIMOVERT MASTERDRIVES VC 2.2 kW to 2300 kW

DA 65.10

Order No.:

German: E86060-K5165-A101-A2

English: E86060-K5165-A101-A2-7600



SIMOVERT MASTERDRIVES MC 0.55 kW to 250 kW

DA 65.11

Order No.:

German: E86060-K5165-A111-A2

English: E86060-K5165-A111-A2-7600



Low-Voltage Motors for Variable-Speed Drives

DA 65.3

Order No.:

German: E86060-K5165-A301-A1

English: E86060-K5165-A301-A1-7600



SIMODRIVE 611 universal and POSMO

DA 65.4

Order No.:

German: E86060-K5165-A401-A1

English: E86060-K5165-A401-A1-7600



Automation Systems for Machine Tools

NC 60

Order No.:

German: E86060-K4460-A101-A8

English: E86060-K4460-A101-A8-7600



Cables, Connectors & System Components

NC Z

for SINUMERIK, SIMODRIVE and
SIMOVERT MASTERDRIVES

Order No.:

German: E86060-K4490-A001-A9

English: E86060-K4490-A101-A8-7600



Automation and Drives

CA 01

Order No.:

German: E86060-D4001-A100-B5

English: E86060-D4001-A110-B5-7600



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SIEMENS

SIMODRIVE 611 universal and POSMO

Central and
Distributed
Drive Systems
0.075 kW to 120 kW

Catalog DA 65.4 · 2002

The products and systems
described in this catalog are
sold under application of a
quality management system
certified by DQS.
The DQS Certificate is
recognized in all EQ Net countries.



Management system



DQS-certified acc. to
DIN EN ISO 9001 Reg. No. 1258-05
DIN EN ISO 14001 Reg. No. 81342-01

Overview

1

Technical data

2

Selection and ordering data

3

AC motors

4

Business services and documentation

5

Planning guide

6

Dimension drawings

7

Appendix

A

Important:

The technical data are intended for general information.

Please observe the operating instructions and the references indicated on the products for installation, operation and maintenance.

® COMBIMASTER, MICROMASTER, MOTION-CONNECT, SIMATIC, SIMATIC HMI, SIMODRIVE, SIMODRIVE POSMO, SIMOREG, SIMOVERT, SINUMERIK, SITOP, SITRAIN, STEP and USS are Siemens registered trademarks.

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- The technical data, selection and ordering data (order numbers), accessories and availability are subject to alteration.
- All dimensions in this catalog are stated in mm.

SIMODRIVE

611 universal and POSMO

Overview

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- 1/2 SIMODRIVE for central and distributed drive systems
- 1/3 System data
- 1/4 Application
- 1/7 Optimized integration of the drives in the world of automation
- 1/8 Guidelines for SIMODRIVE 611 universal
- 1/10 Guidelines for SIMODRIVE POSMO
- 1/12 SIMODRIVE 611 universal selection guidelines
- 1/14 SIMODRIVE POSMO CD/CA selection guidelines
- 1/16 SIMODRIVE POSMO SI selection guidelines
- 1/17 SIMODRIVE POSMO A selection guidelines

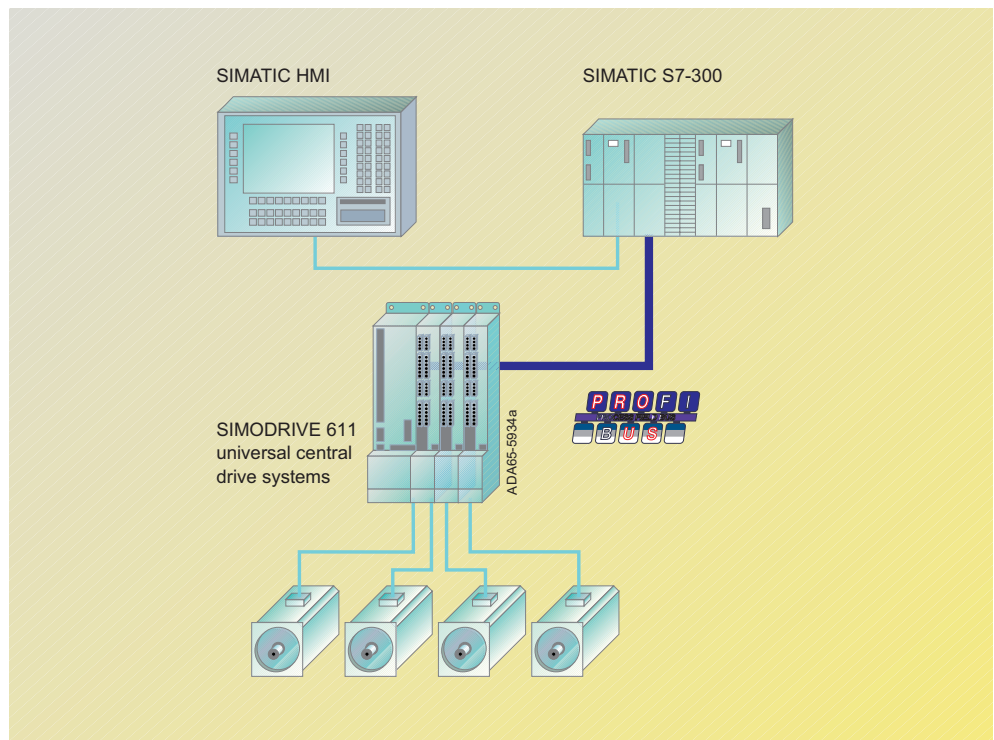
SIMODRIVE 611 universal and POSMO

Overview

SIMODRIVE for central and distributed drive systems

Central drive systems

Central drive systems offer a wide performance range based on modular design. All components of the SIMODRIVE® 611 modular system, such as mains supply and power modules can be used. The SIMODRIVE 611 universal regulated control plug-in unit provides you with a simple digital drive for all motor types and for various encoder systems. SIMODRIVE 611 universal offers integrated positioning functions and numerous communications interfaces for flexible integration in higher-level control systems. The two-axis modules support space-saving module configurations.



SIMATIC solution: Application of SIMODRIVE 611 universal with FM 357-2

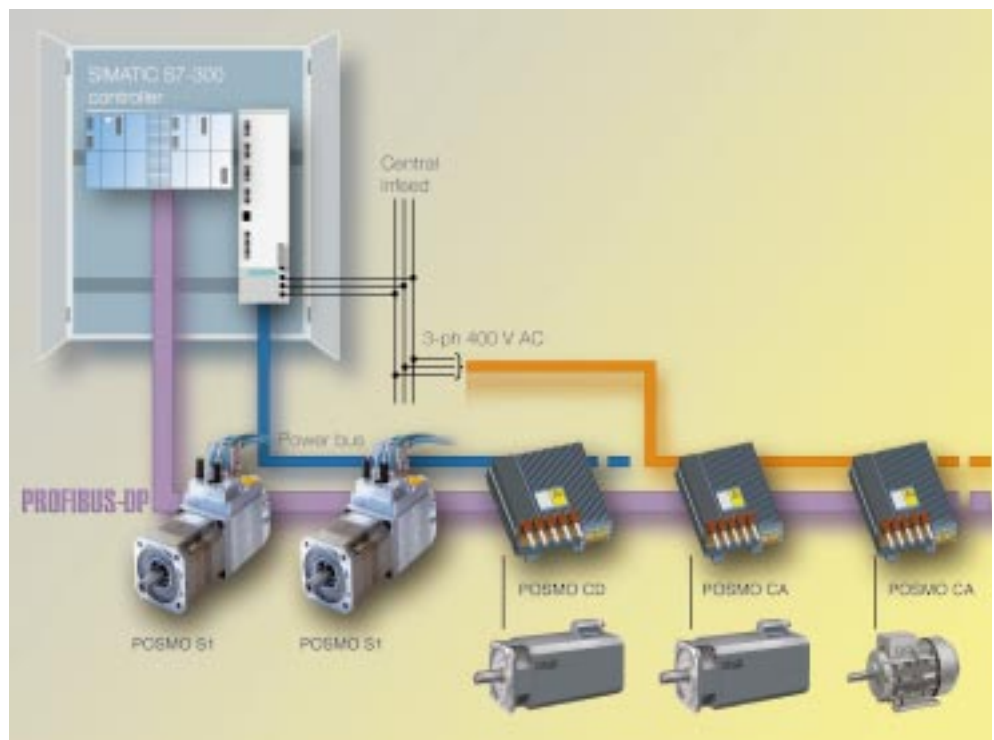
Distributed drive systems

With distributed drives, the drive technology is relocated at the machine. The advantages of this technology lie in the system configuration and installation technique: The control cabinet costs are reduced, mounting at the machine is simplified by the use of complete self-contained units and the installation costs are reduced by simplified cable routing.

The benefits of distributed drive configurations are most apparent in the case of large scale machines and installations.

The following versions are available:

- SIMODRIVE POSMO® CD/CA: The converter system for mounting at the motor that makes Motion Control tasks possible
- SIMODRIVE POSMO SI: The servo drive that is also capable of interpolating motion tasks
- SIMODRIVE POSMO A: The intelligent positioning motor.



Distributed drive solution: Application with SIMODRIVE POSMO SI and CD/CA

SIMODRIVE 611 universal and POSMO

Overview

System data

Comparison between SIMODRIVE 611 universal and SIMODRIVE POSMO

	Central drive systems	Distributed drive systems			
	SIMODRIVE 611 universal	SIMODRIVE POSMO CD	SIMODRIVE POSMO CA	SIMODRIVE POSMO SI	SIMODRIVE POSMO A
Infeed					
Direct system connection	–	–	3 AC 400 V – 480 V	–	–
Open-loop infeed	5 kW to 28 kW	5 kW to 28 kW	–	5 kW to 28 kW	Converter DC 48 V, 25 A
Closed-loop infeed	16 kW to 120 kW	16 kW to 120 kW	–	16 kW to 120 kW	SITOP DC 24/48 V 10 A, 20 A, 30 A, 40 A
Rated power range					
	1.1 kW to 120 kW	5 kW; 10 kW	5 kW	1.8 kW to 5.7 kW	75 W; 300 W
Rated current range – Power modules for motor power inverter					
Applications with synchronous servo motors	3 A to 140 A	9 A to 18 A	9 A	Servo drive with integrated power section	Positioning drive with integrated power section
Applications with induction servo motors with motor encoders	24 A to 200 A	9 A to 18 A	9 A	–	–
Induction motor application closed-loop without motor encoder	3 A to 200 A	9 A to 18 A	9 A	–	–
Motor types					
Synchronous servo motors	1FK6/1FT6	1FK6/1FT6	1FK6/1FT6	1FK6 with single absolute encoder integrated	DC 24/48 V – brushless servo motor integrated
Induction servo motors	1PH	1PH	1PH	–	–
Linear motors	1FN	1FN	1FN	–	–

The functionality of SIMODRIVE 611 universal and POSMO CD/CA, SI is identical. SIMODRIVE 611 universal central drive systems can be expanded using SIMODRIVE POSMO CD/CA, SI

distributed drive systems. The infeed components and accessories (e.g. filters) of SIMODRIVE 611 universal can also be used for SIMODRIVE POSMO CD and SI.

1

SIMODRIVE 611 universal and POSMO

Overview

Applications

Central drive systems with SIMODRIVE 611 universal

With a proven hardware platform, the new SIMODRIVE 611 universal has been designed to handle a wide range of applications in the mechanical engineering industry. It can be used to control various motor types, such as synchronous servo, asynchronous servo, standard induction or linear motors. Its compact, multi-axis design is well suited for many industries – i.e. printing, packaging, textile, wood and glass.

SIMODRIVE 611 universal is supplied for line voltages of 3-phase 380 V to 480 V AC, 50/60 Hz and is available from 1.1 kW to 120 kW. The modules have a standard design of 480 mm high by 288 mm deep and depending on the power range, the width increases in units of 50 mm.

Some of the main features of the SIMODRIVE 611 universal:

- Configurable for speed/torque control and positioning control
- Suitable for synchronous and induction motors
- Compact design with single-axis and two-axis modules
- Communication with PROFIBUS
- All data in the package is located on a traversable memory submodule.

In addition to classical drive functions such as torque and speed control with output frequencies up to 1400 Hz, SIMODRIVE 611 universal offers integral positioning functions.

Up to 64 independent traversing blocks can be stored to perform either absolute or relative position moves allowing it to be characterized by:

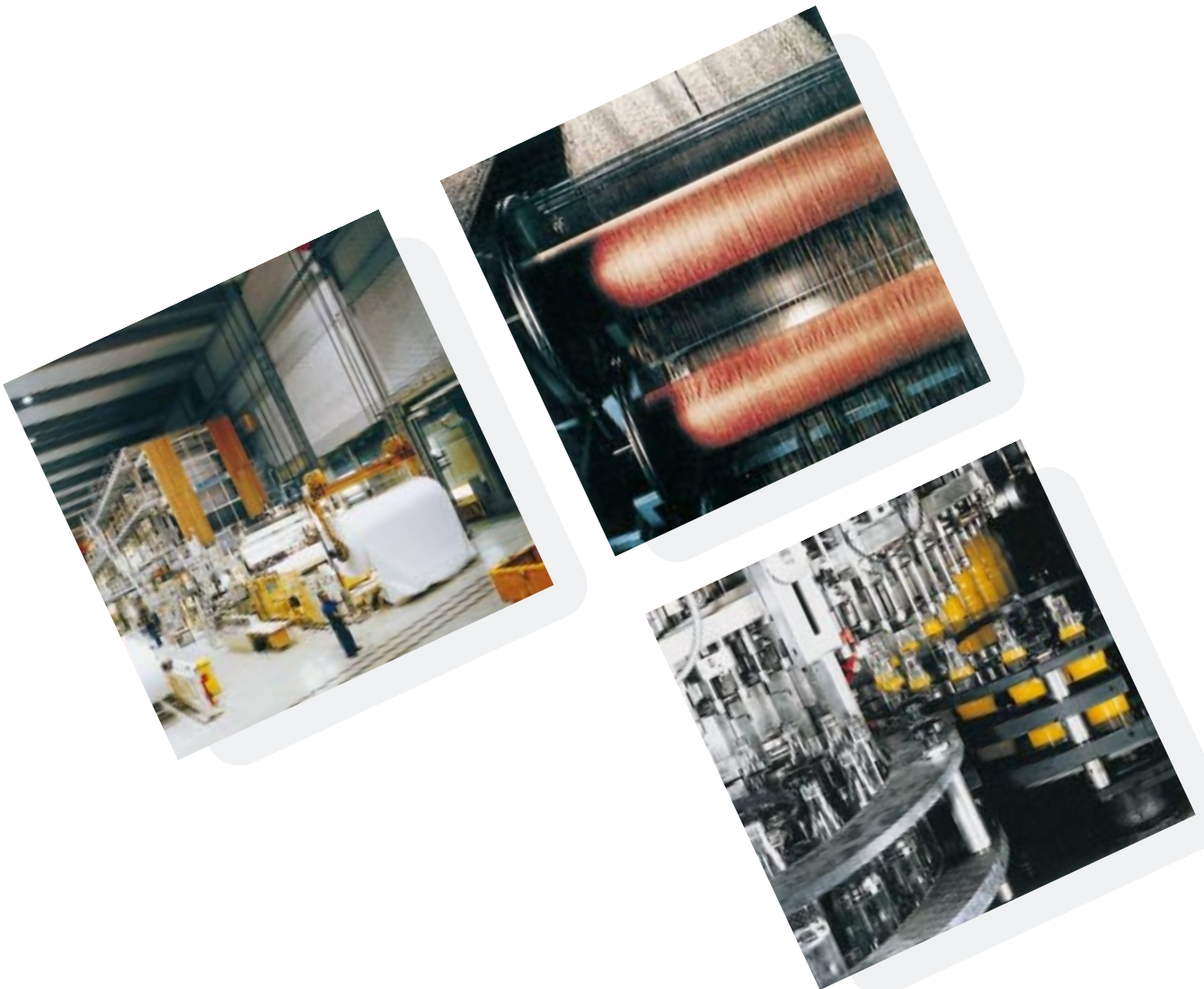
- Extremely high dynamic performance
- Flexible positioning
- High field weakening range
- Ease of use.

The range is rounded off by a complete spectrum of system components and accessories.

Customer-specific, integral solutions (automation – converters – motors) are available for the most varied of applications in all industrial sectors.

For the SIMODRIVE 611 universal, an easy to use Windows based graphical programming and diagnostic tool is available. Known as SIMOCOM U, this tool has been specially developed to make start up of the drive system effortless.

Siemens' worldwide service and the company's sales network enable all our customers to obtain direct access to expert advice and project planning as well as training and service.



SIMODRIVE 611 universal and POSMO

Overview

Applications

SIMODRIVE POSMO A

SIMODRIVE POSMO A is an intelligent positioning motor as a distributed station on PROFIBUS-DP.

Main features:

- Power section and complete motion control in the motor
- Link via communications bus and power bus
- PROFIBUS-DP standard slave

Typical applications:

- Positioning of formats or stops
- Re-setting of process variables, e.g. via motor valves

Areas of application:

- All sectors of mechanical engineering
- Transfer lines
- Medical technology, e.g. traversal of examination tables or x-ray equipment.

Typical applications:

- High-performance servo applications such as continuous-path control with an accuracy of up to 1 μm , synchronous operation with a high dynamic response.
- Feed axes on machine tools.

SIMODRIVE POSMO SI

SIMODRIVE POSMO SI is a distributed servo drive system which is a direct station on PROFIBUS-DP.

Main features:

- Complete functional unit integrated into the motor.
- Motion Control can be stored in the unit in the form of a program.
- Communication via PROFIBUS-DP, supply from the power bus.

Typical applications:

- Servo axes in handling devices
- Independent positioning axes in machines
- Auxiliary axes in machine tools

The SIMODRIVE POSMO SI servo drive system is a fully functional mechatronic unit that is ideally suited to a wide range of applications in mechanical engineering.

The SIMODRIVE POSMO series, with its consistent distributed design concept, opens up a new level in automation and can be used throughout the mechanical engineering sector, particularly in the fields of packaging, presses, wood, glass, printing, plastics, textiles and machine tools.

SIMODRIVE POSMO CD/CA

SIMODRIVE POSMO CD/CA is the distributed converter system for mounting at the motor.

Main features:

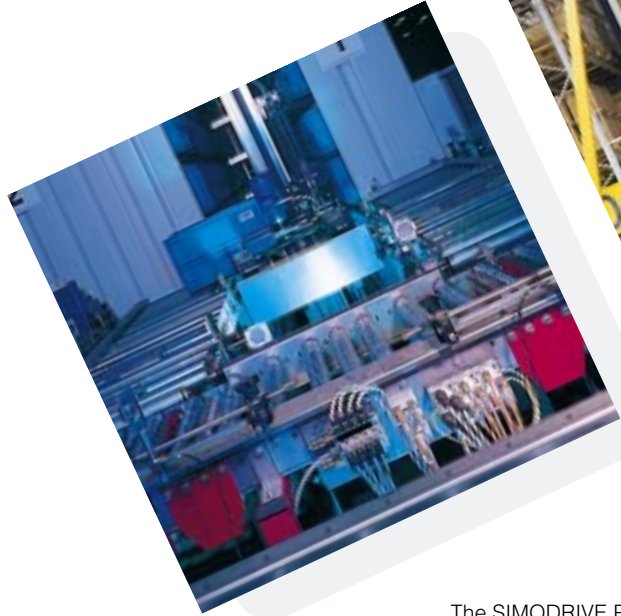
- Complete functional unit to the IP 65 degree of protection, suitable for installation close to the motor.
- The motor-independent construction supports the flexible use of different or special motor types, such as servo motors in different designs, induction motors and linear motors.
- Motion Control can be stored in the unit in the form of a program.
- Communication via PROFIBUS-DP, supply from the power bus.

Distributed drive systems with SIMODRIVE POSMO

Installation at the machine or integrated in the motor: For distributed solutions, the servo drives of the SIMODRIVE POSMO series designed to a high degree of protection take drive technology out of the control cabinet and put it right on the machine.

Flexibility in machine design, low wiring overheads, rapid installation and start-up, short re-tooling times, easy maintenance and high availability are obvious advantages for the OEM and machine operator when using SIMODRIVE POSMO drives.

This significantly reduces system costs and project engineering and installation times.



SIMODRIVE 611 universal and POSMO

Overview

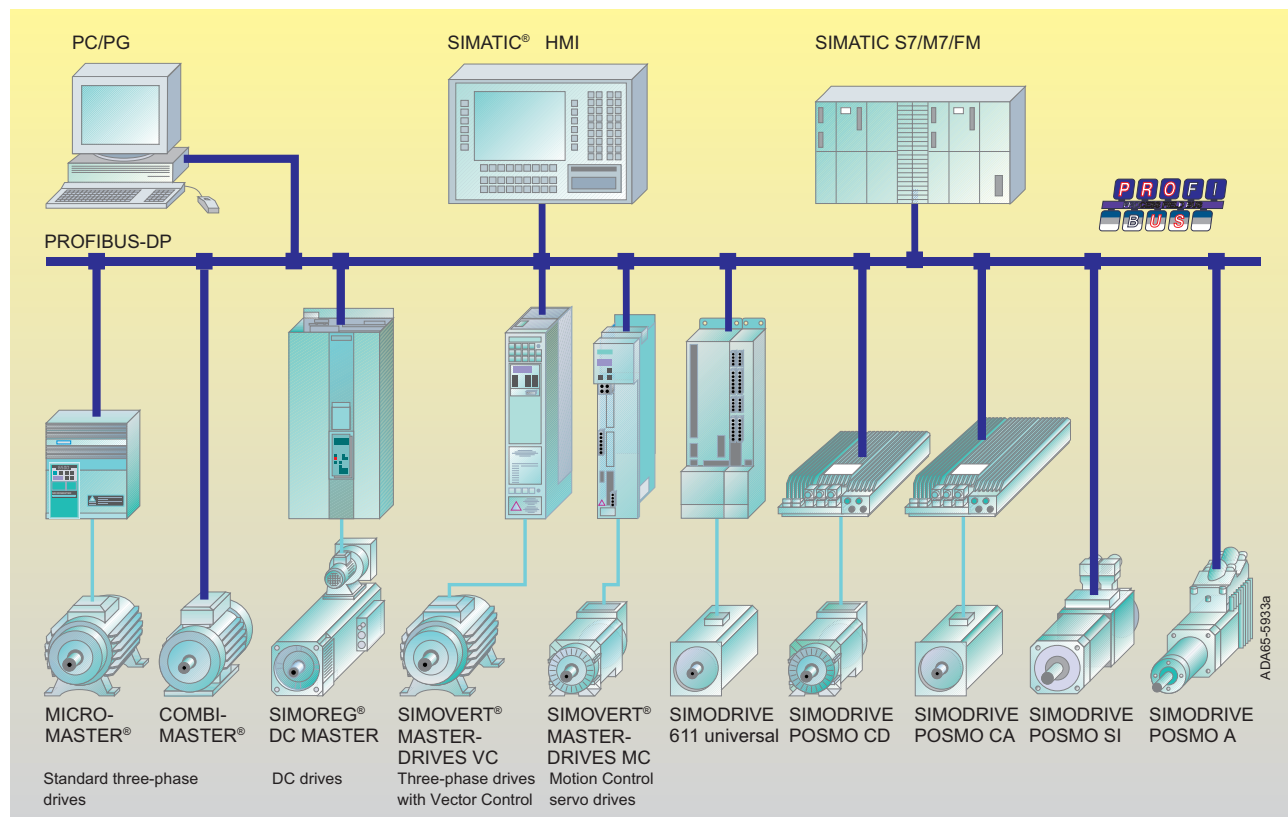
Optimized integration of the drives
in the world of automation

TOTALLY INTEGRATED AUTOMATION®

Low engineering costs, high productivity and low life-cycle costs – these are today's requirements for efficient manufacturing. TOTALLY INTEGRATED AUTOMATION (T.I.A.) is the answer.

T.I.A. impresses customers on the one hand with its threefold uniformity in project engineering/programming, data management and communication. T.I.A. offers on the other hand, a modular system that contains all the

components required for a modern automation solution. It therefore provides a single, totally integrated system basis: From the field level containing the drives right through to the system management level.



SIMODRIVE 611 universal and POSMO

Overview

Optimized integration of the drives
in the world of automation

Drive ES – and drives can be seamlessly integrated into the SIMATIC® world.

Drive ES (Engineering System) is a completely new software package: An engineering system that finally gives you all the data pertaining to your drives in a uniform format. For uniform data management, uniform project engineering and uniform communication via PROFIBUS. This makes your life much easier, because there is nothing like it for easy, problem-free, time-saving and economical integration of drive systems into the SIMATIC world.

Drive ES allows you to implement Totally Integrated Automation for your SIMODRIVE drives. Drive ES is easy to use: The software runs under the desktop of the SIMATIC Manager in use throughout the world. The supplementary program Drive ES SIMATIC offers additional advantages.

PROFIBUS-DP – Control bus and drive bus in one

PROFIBUS-DP is a multi-vendor, open fieldbus standard with a wide field of application in manufacturing and process automation. Multi-vendor capability and openness is guaranteed by the EN 50170 and EN 50254 international standards.

PROFIBUS-DP is suitable for high-speed, time-critical applications as well as for complex communications tasks. PROFIBUS-DP is the most frequently used communications profile. It is optimized for speed, efficiency and low connection costs and is specially designed for communication between automation systems and distributed I/O.

The new functionality for synchronous operation (regulated control and synchronization of drives over the bus) and direct communication (between drives and the I/O) means that a special drive bus is no longer necessary.

For full automation of your machine, you only need one bus: PROFIBUS-DP. The following functions can be implemented with PROFIBUS-DP:

- Unregulated control
- Operator control and visualization
- Actuators, sensors
- Motion Control functions
- Engineering, diagnostics and Teleservice.

The benefits of PROFIBUS-DP for total automation of the machine are clear:

Less hardware, less wiring, less installation, lower engineering costs, fewer mistakes with fast commissioning and minimal training costs.

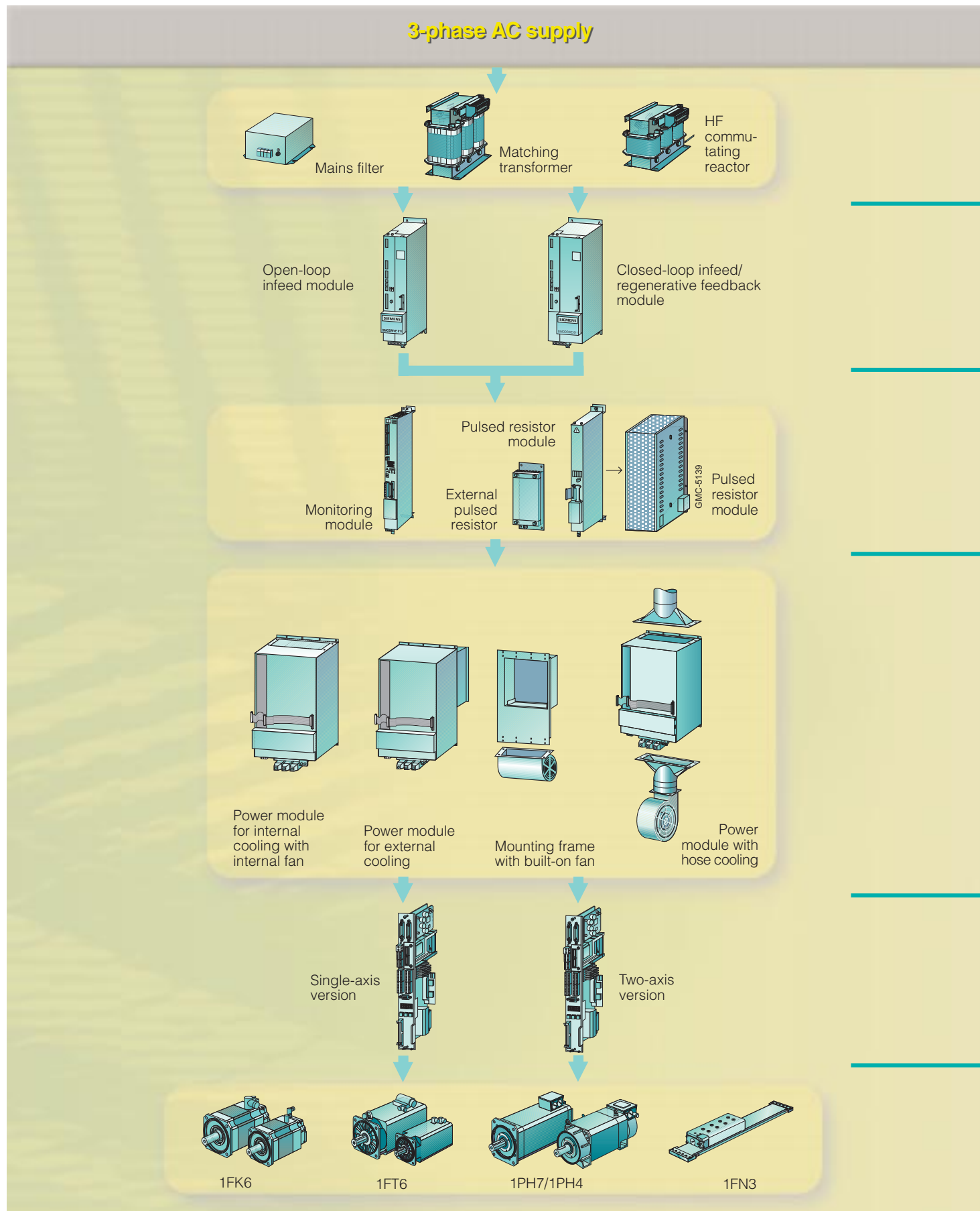
1

SIMODRIVE 611 universal and POSMO

Overview

Guidelines for SIMODRIVE 611 universal

1



SIMODRIVE 611 universal and POSMO

Overview

Guidelines for SIMODRIVE 611 universal

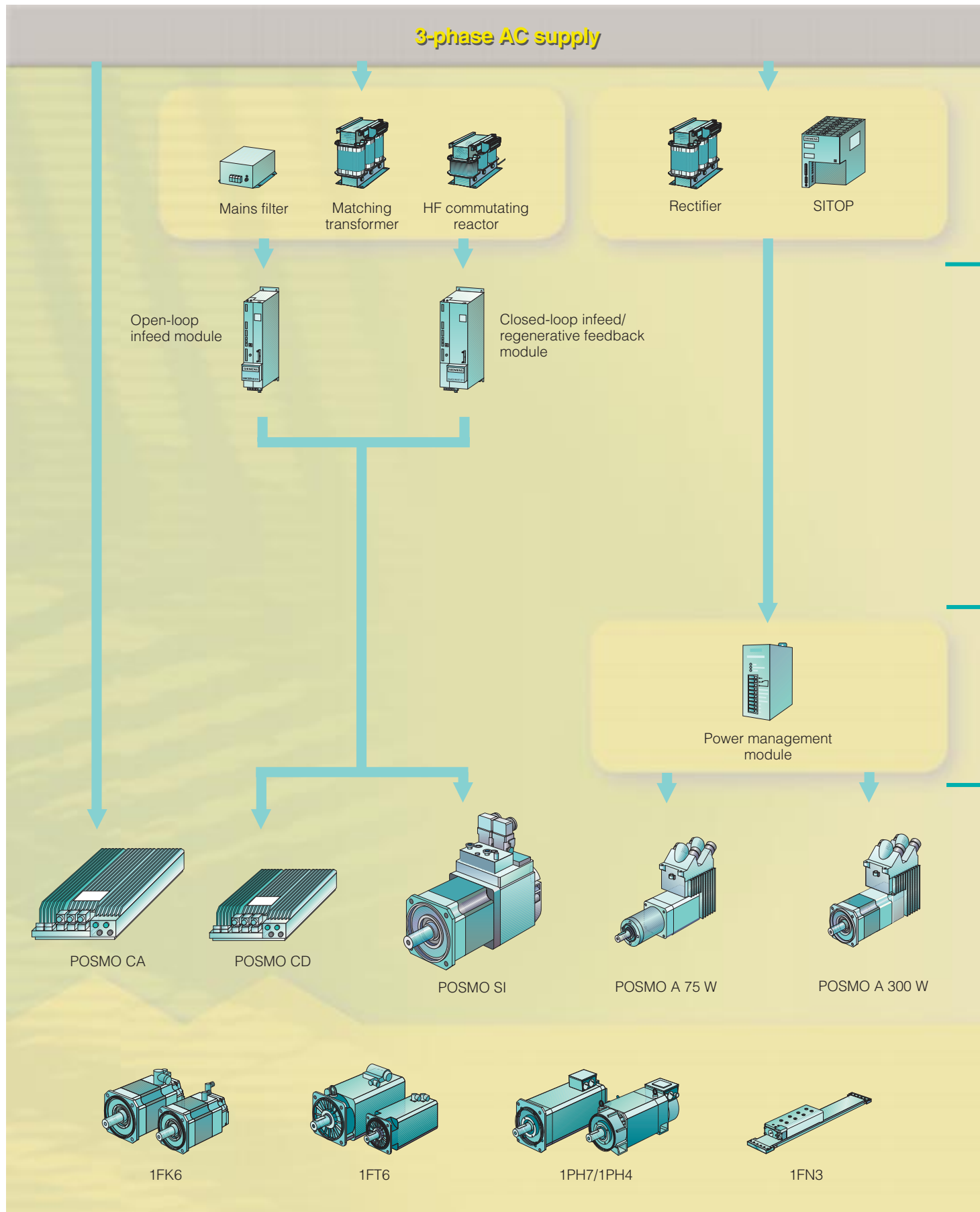
	Technical data Page	Selection and ordering data Page	Engineering information Page	Dimension drawings Page
Line-side components				
Mains filter package	–	3/10	6/19	–
HF commutation reactors	2/7	3/10	6/18	7/5
Mains filters	2/7	3/10	6/19	7/5
Overvoltage limiter module	2/7	3/5	6/20, 6/39	–
Voltage matching transformer	2/3	3/9	–	7/6
Infeed modules				
Infeed module, infeed/regenerative feedback modules	2/5	3/2	6/20, 6/21, 6/32 – 6/37	7/2, 7/3, 7/8, 7/11
System components				
Monitoring module	2/7	3/5	6/36, 6/37	7/2
Pulsed resistor module	2/7	3/5	6/22, 6/23, 6/25	7/3
Capacitor module	2/8	3/6	6/24	–
Power modules				
Power modules	2/6	3/3	6/22, 6/29 – 6/31, 6/38	7/2
Power modules internally cooled	2/6	3/3	6/22, 6/27	7/2, 7/8
Power modules externally cooled	2/6	3/3	6/27	7/3, 7/11 – 7/15
Power modules hose cooled	–	3/3	6/28	7/4, 7/9, 7/10
Electronic options				
Regulated control plug-in units	–	3/4	6/40 – 6/48	–
Interconnecting components				
Power and encoder cables	Part 4, Appendix (fold-out page)	3/11, 3/12, 6/47, 6/48, Part 4	6/47, 6/48	–
Motors				
1FK6 synchronous servo motors	2/14, 4/20, 4/21	4/20, 4/21	4/19	7/28, 7/29
1FT6 synchronous servo motors	2/14, 4/4 – 4/17	4/4 – 4/17	4/3	7/22 – 7/27
1PH7 induction servo motors	2/16, 4/38 – 4/40	4/38 – 4/40	4/37	7/31 – 7/34, 7/36, 7/37
1PH4 induction servo motors	2/16, 4/41, 4/42	4/42	4/41	7/35 – 7/37
1FN3 linear motors	2/15, 4/31 – 4/34	4/34 – 4/36	4/31	7/30

SIMODRIVE 611 universal and POSMO

Overview

Guidelines for SIMODRIVE POSMO

1



SIMODRIVE 611 universal and POSMO

Overview

Guidelines for SIMODRIVE POSMO

	Technical data Page	Selection and ordering data Page	Engineering information Page	Dimension drawings Page
Line-side components				
Rectifier unit	2/12	3/21	6/87	–
Mains filter	2/7	3/10	6/19	7/5
Commutating reactor	2/7	3/10	6/18	7/5
SITOP power supply	–	3/20	6/86	–
Matching transformer	2/3	3/9	–	7/6
Infeed modules				
Infeed modules, infeed/regenerative feedback modules	2/5	3/2	6/20	7/2, 7/3, 7/8, 7/11
System components				
Power Management Module	2/11	3/20	6/88	–
Pulsed resistor module	–	3/5	6/22	–
External pulsed resistor	2/7	3/5	6/22	7/3
SIMODRIVE POSMO				
POSMO CA	2/9	3/13	6/60 – 6/83	7/18
POSMO CD	2/9	3/13	6/60 – 6/83	7/18
POSMO SI	2/9	3/14	6/60 – 6/83	7/19
POSMO A 75 W	2/10	3/18	6/84 – 6/93	7/20
POSMO A 300 W	2/10	3/18	6/84 – 6/93	7/21
Motors				
1FK6 synchronous servo motors	2/14, 4/20, 4/21	4/20, 4/21	4/19	7/28, 7/29
1FT6 synchronous servo motors	2/14, 4/4 – 4/17	4/4 – 4/17	4/3	7/22 – 7/27
1PH7 induction servo motors	2/16, 4/38 – 4/40	4/38 – 4/40	4/37	7/31 – 7/34, 7/36, 7/37
1PH4 induction servo motors	2/16, 4/41, 4/42	4/42	4/41	7/35 – 7/37
1FN3 linear motors	2/15, 4/31 – 4/34	4/34 – 4/36	4/31	7/30

SIMODRIVE 611 universal and POSMO

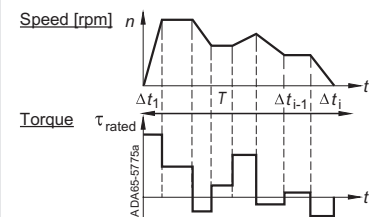
Overview

SIMODRIVE 611 universal selection guidelines

Basic details

Note:

The speed curves and the load torque curve must be known in order to select the correct drive.



Step 1

Determining the degree of protection of the motor:

IP 23; IP 55; IP 64; IP 65; IP 67

See Part 4

Step 2

Determining the mains voltage/motor voltage:

380 to 400 V; 460 to 480 V

Step 3

Determining the construction type of the motor:

IM B 3 (foot mounted); IM B 5 (flange mounted); IM B 35 (foot/flange mounted)

See Part 4

Step 4

Determining the maximum torque τ_{max} from the load torque curve

Step 5

Determining the mean (rms) torque τ_{rms}

See Part 6

Step 6

Determining the motor type required:

1FK6; 1FT6; 1PH7; 1PH4; 1FN3

See Part 4

Step 7

Selection of the motor that meets the following criteria:

Synchronous servo motor:

$n_{max} \leq n_n$
 $\tau_{rms} \leq \tau_{rated}$
 The load points (n_i , τ_i) must lie below $\tau_{max, perm.}$ or below the voltage limit curve.

Induction servo motor:

$n_{max} \leq n_{rated}$; $\tau_{max} < 2 \times \tau_{rated}$
 $\tau_{rms} \leq \tau_{rated}$
 The load points (n_i , τ_i) must lie at least 30 % below the stalling torque curve.

Step 8

Determining the encoder system required:

Rotary pulse encoder (only induction servo motors); resolver; encoder; absolute encoder

See Part 4

Step 9

Complete motor order number with all the necessary options:

1FK6; 1FT6; 1PH7; 1PH4; 1FN3

See Part 4

Motor order number:

1FK6 □□□-□□□□-□□□□
1FT6 □□□-□□□□-□□□□
1PH7 □□□-□□□□-□□□□
1PH4 □□□-□□□□-**Z** + Short codes
1FN3 □□□-□□□□-□□□□

Step 10

Determining the length and cross-section of the pre-assembled power cable or determining the coupling required for customer installation:

See Part 3

Power cable order number:

Step 11



SIMODRIVE 611 universal and POSMO

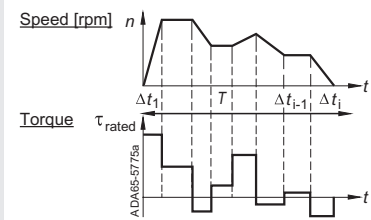
Overview

SIMODRIVE POSMO CD/CA selection guidelines

Basic details

Note:

The speed curves and the load torque curve must be known in order to select the correct drive.



Step 1

Determining the degree of protection of the motor:

IP 23; IP 55; IP 64; IP 65; IP 67

See Part 4

Step 2

Determining the mains voltage/motor voltage:

380 to 400 V; 460 to 480 V

Step 3

Determining the construction type of the motor:

IM B 3 (foot mounted); IM B 5 (flange mounted); IM B 35 (foot/flange mounted)

See Part 4

Step 4

Determining the maximum torque $\tau_{\max}$ from the load torque curve

Step 5

Determining the mean (rms) torque τ_{rms}

See Part 6

Step 6

Determining the motor type required:

Synchronous servo motors 1FK6; 1FT6
Synchronous linear motors 1FN3

See Pages 4/2 and 4/40

Induction servo motors 1PH7, (PH4)

Step 7

Selection of the motor that meets the following criteria:

Synchronous servo motor:

$$n_{\max} \leq n_n$$

$$\tau_{\text{rms}} \leq \tau_{\text{rated}}$$

The load points (n_i , τ_i) must lie below $\tau_{\max, \text{perm}}$ or below the voltage limit curve.

Induction servo motor:

$$n_{\max} \leq n_{\text{rated}}; \tau_{\max} < 2 \times \tau_{\text{rated}}$$

$$\tau_{\text{rms}} \leq \tau_{\text{rated}}$$

The load points (n_i , τ_i) must lie at least 30 % below the stalling torque curve.

Step 8

Determining the encoder system required:

- Incremental encoder with 1 V_{pp} sin/cos
- Absolute encoder (Multiturn)

See Part 4

Step 9

Complete motor order number with all the necessary options:

1FK6; 1FT6; 1PH7; 1PH4; 1FN3

See Part 4

Motor order number:

1FK6 □□-□□□□-□□□□

1FT6 □□-□□□□-□□□□

1PH7 □□-□□□□-□□□□

1PH4 □□-□□□□-**Z** + Short codes

1FN3 □□-□□□□-□□□□

Step 10

Selection of the pre-assembled power cable connected to the motor (length and cross-section)

See Part 3

Step 11

Step
11

Selection of the pre-assembled encoder cable:

See Part 3

Step
12

Selection of the SIMODRIVE POSMO:

POSMO CD 9 A
POSMO CD 18 A
POSMO CA 9 A

Order No.

6SN2 703-2AA 0□-0BA0
6SN2 703-2AA 0□-0CA0
6SN2 703-3AA□□-0BA0

Step
13

Repeat steps 1 to 12 for all other axes in the application

Step
14 *)

Calculate the DC link power $P_{DC \text{ link}}$

See Part 6

Step
15 *)

Selection of the infeed module in accordance with Step 14
Caution: Depending on the power cable, the maximum power per power line is 16 kW

See Part 3

Step
16 *)

Selection of the pre-assembled power cables

Step
17

Selection of the PROFIBUS cable
Selection of the cables for I/O signals

See Part 3

Step
18 *)

Are a pulsed resistor module and a braking resistor necessary?
(only when using open-loop infeed modules)

Step
19 *)

Are the following components necessary?
– HF commutating reactor
– Mains filter

*) Only for POSMO CD

SIMODRIVE 611 universal and POSMO

Overview

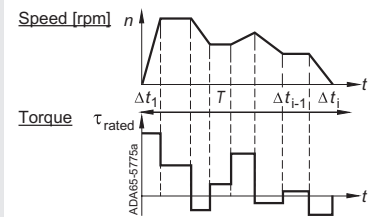
SIMODRIVE POSMO SI selection guidelines

1

Basic details

Note:

The speed curves and the load torque curve must be known in order to select the correct drive.



Step 1

Determining the degree of protection:

- IP 64 (fan IP 54)
- IP 65 and also DE flange IP 67 (fan IP 54)

Step 2

Construction type of the motor (flange mounted):

IM B 5, IM V 1, IM V 3

Step 3

Determining the maximum torque $\tau_{\max}$ from the load torque curve

Step 4

Determining the mean (rms) torque τ_{rms}

See Part 6

Step 5

Selection of the POSMO SI that meets the following criteria:

$n_{\max} \leq 3000 \text{ rpm}$
 $\tau_{\text{rms}} \leq \tau_{\text{rated}}$

The load points (n_i, τ_i) must lie below $\tau_{\max, \text{perm.}}$ or below the voltage limit curve.

Step 6

Encoder system:

- Absolute encoder (Multiturn)

See Part 2

Step 7

Selection of the pre-assembled power cable connected to the infeed module and to the next POSMO (length)

See Part 3

Step 8

Selection of the PROFIBUS cable Selection of the cables for I/O signals

See Part 3

Step 9

Repeat steps 1 to 8 for all other axes in the application

Step 10

Calculate the DC link power $P_{\text{DC link}}$

Step 11

Selection of the infeed module in accordance with Step 10

Caution: Depending on the power cable, the maximum power per power line is 16 kW

See Part 3

Step 12

Are a pulsed resistor module and a braking resistor necessary?

(only when using open-loop infeed modules)

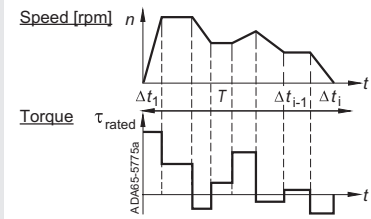
Step 13

Are the following components necessary?

- HF commutating reactor
- Mains filter

Basic details

Note:
The speed curves and the load torque curve must be known in order to select the correct drive.



Step 1

Determining the maximum torque $\tau_{\max}$ from the load torque curve

Step 2

Determining the mean (rms) torque τ_{rms}

See Part 6

Step 3

Selection of the POSMO A that meets the following criteria:

$$n_{\max} \leq 3000 \text{ rpm}$$

$$\tau_{\text{rms}} \leq \tau_{\text{rated}}$$

The load points (n_i, τ_i) must lie below $\tau_{\max, \text{perm.}}$ or below the voltage limit curve.

Step 4

Selection of the pre-assembled power cable connected to the infeed and to the next POSMO (length)

See Part 3

Step 5

Selection of the PROFIBUS cable
Selection of the cables for I/O signals

See Part 3

Step 6

Repeat steps 1 to 5 for all other axes in the application

Step 7

Calculate the DC link power $P_{\text{DC link}}$

Step 8

Selection of the 24/48 V DC power module in accordance with Step 7

See Part 3

Step 9

Is a power management module necessary?

SIMODRIVE 611 universal and POSMO

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SIMODRIVE sensor

Optoelectronic top-mounted rotary encoder

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Technical data

SIMODRIVE converter system

General technical data SIMODRIVE 611 universal

EU low-voltage directive 73/23/EEG and RL 93/68/EEG	EN 50 178
EU EMC directive 89/336/EEG	EMC product standard EN 61 800-3 for variable-speed drives (also EMC basic standard EN 55 011)
EU machine guideline 89/392/EEG	Safety category 3 according to Y54-1
Approvals	CUL
Pollution degree	Pollution degree 2 in accordance with EN 50 178 moisture condensation not permissible
Overvoltage category	Category III acc. to DIN VDE 0110, Part 2
Degree of protection	Acc. to EN 60 529 IP 20 ¹⁾
Shock protection (impact load)	Acceleration 49.05 m/s ² for 11 ms according to EN 60 068-2-27 (IEC 68, Part 2-27)
RI interference suppression • Standard • Options	Acc. to EN 61 800-3 No radio interference suppression Radio interference suppression filter for Class B1 or A1 acc. to EN 55 011
Vibration load • Acceleration	Acc. to DIN IEC 68-2-6 9.8 ms ⁻² acc. to EN 60 068-2-6 with constant deflection of 0.075 mm in the frequency range 10 Hz to 58 Hz
Humidity classification to DIN EN 60 721-3-3	Climate 3K5 Condensation and icing not permissible. Low air temperature 0 °C.
Cooling type	Forced air cooling with integral fan. Externally cooled by blower or by external duct.
Permissible ambient and coolant temperature • During operation • During storage and transport	0 °C to +40 °C ²⁾ –40 °C to +70 °C
Installation altitude	≤ 1000 m above sea level, no derating (see Part 6)
Permissible moisture conditions	Relative humidity ≤ 95 % during operation; moisture condensation is not permissible

1) Only applies for power modules when regulated control plug-in units are used.

2) With derating, up to +55 °C.

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE converter system

Matching transformers with separate windings for 60 Hz supply systems

Rated power	kVA	8.2	15.7	42.6	21	47	70	104	155
Allocation to the infeed module	kW	5 (OI)	10 (OI)	28 (OI)	16 (I/RF)	36 (I/RF)	55 (I/RF)	80 (I/RF)	120 (I/RF)
Output voltage	V	3 AC 400							
Frequency	Hz	60 ± 5 %							
Degree of protection		IP 00, IP 20 and IP 23 to DIN EN 60529 (IEC 60529)							
Humidity classification to DIN EN 60721-3-3		Cl. 3K5, condensation and icing excluded. Low air temperature 0 °C.							
Permissible ambient temperature									
• Operation	°C	–25 to +40, to +55 with derating							
• Storage/transport	°C	–25 to +80							
Power loss	W	350	670	1300	700	1380	2020	2600	3700
Weight, approx. ¹⁾	kg	51	81	196	111	196	302	424	576
Dimensions (L x W x H) ¹⁾ approx.	mm	360 x 268 x 320	410 x 262 x 370	416 x 267 x 420	416 x 209 x 420	416 x 267 x 420	540 x 303 x 585	660 x 325 x 665	660 x 371 x 665
Max. conductor cross-section, secondary side	mm ²	4	10	35	16	50	70	FL ²⁾	FL ²⁾

Input voltage 3 AC 575 V ±10%; 60 Hz ±5%

Rated input current	A	8.65	16.6	44.1	21.7	48.6	72.4	108	159
Max. conductor cross-section, primary side	mm ²	4	4	25	6	25	50	50	FL ²⁾

Input voltage 3 AC 480 V ±10%; 60 Hz ±5%

Rated input current	A	10.4	19.8	52.8	26.1	58.2	86.7	129	190
Max. conductor cross-section, primary side	mm ²	4	6	25	10	35	50	70	FL ²⁾

Input voltage 3 AC 240 V ±10%; 60 Hz ±5%

Rated input current	A	20.7	39.7	106	52.1	116	173	258	380
Max. conductor cross-section, primary side	mm ²	6	16	50	25	50	FL ²⁾	FL ²⁾	FL ²⁾

Matching transformers with an economy circuit

Rated power	kVA	21	46.5	70.3	104	155
Allocation to I/RF modules	kW	16 (I/RF)	36 (I/RF)	55 (I/RF)	80 (I/RF)	120 (I/RF)
Output voltage	V	3 AC 400				
Frequency	Hz	50 Hz –5 % to 60 Hz +5 %				
Degree of protection		IP 00 to DIN EN 60529 (IEC 60529)				
Humidity classification to DIN EN 60721-3-3		Cl. 3K5, condensation and icing excluded. Low air temperature 0 °C.				
Permissible ambient temperature						
• Operation	°C	–25 to +40, to +55 with derating				
• Storage/transport	°C	–25 to +80				

Input voltage 3 AC 480 V/440 V ±10%

Power loss	W	170	376	445	550	700
Max. conductor cross-section Primary side/secondary side	mm ²	16	50	70	FL ²⁾	FL ²⁾
Weight, approx.	kg	26	60	60	80	125
Dimensions (L x W x H) approx.	mm	270 x 192 x 250	370 x 244 x 330	370 x 254 x 340	420 x 265 x 370	480 x 260 x 440

Input voltage 3 AC 220 V ±10%

Power loss	W	412	644	790	1100	1340
Max. conductor cross-section Primary side/secondary side	mm ²	16/16	70/50	95/70	FL ²⁾	FL ²⁾
Weight, approx.	kg	60	120	135	220	300
Dimensions (W x H x D) approx.	mm	370 x 244 x 330	480 x 264 x 430	480 x 300 x 430	580 x 340 x 520	590 x 360 x 600

1) Only applicable for IP 50 degree of protection

2) FL = Flat-type terminal, drilled hole Ø 9 mm

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE converter system

Matching transformers with separate windings for 50/60 Hz supply systems

Rated power	kVA	8.2	15.7	42.6	21	47	70	104	155
Allocation to the infeed module	kW	5 (OI)	10 (OI)	28 (OI)	16 (I/RF)	36 (I/RF)	55 (I/RF)	80 (I/RF)	120 (I/RF)
Output voltage	V	3 AC 400							
Frequency	Hz	50 –5 % to 60 +5 %							
Degree of protection		IP 00, IP 20 and IP 23 to DIN EN 60529 (IEC 60529)							
Humidity classification to DIN EN 60721-3-3		Cl. 3K5, condensation and icing excluded. Low air temperature 0 °C.							
Permissible ambient temperature									
• Operation	°C	–25 to +40, to +55 with derating							
• Storage/transport	°C	–25 to +80							
Power loss	W	600	730	1300	750	1380	2100	2800	3700
Weight ²⁾ approx.	kg	51	81	96	111	160	425	440	576
Dimensions (L x W x H) ²⁾	mm	360 x 268 x 320	410 x 262 x 370	416 x 267 x 420	416 x 209 x 420	416 x 267 x 420	540 x 303 x 585	660 x 325 x 665	660 x 371 x 665
Max. conductor cross-section, secondary side	mm ²	4	10	35	16	50	70	FL ¹⁾	FL ¹⁾

Input voltage 3 AC 500 V ±10%; 50 Hz –5% to 60 Hz +5%

Rated input current	A	9.95	19	50.7	25.2	55.9	84.1	124	183
Max. conductor cross-section, primary side	mm ²	4	6	25	10	35	50	70	FL ¹⁾

Input voltage 3 AC 440 V ±10%; 50 Hz –5% to 60 Hz +5%

Rated input current	A	11.3	21.3	57.6	28.7	63.5	95.5	141	207
Max. conductor cross-section, primary side	mm ²	4	6	35	10	35	50	70	FL ¹⁾

Input voltage 3 AC 415 V ±10%; 50 Hz –5% to 60 Hz +5%

Rated input current	A	12	22.9	61	30.4	67.3	101	149	220
Max. conductor cross-section, primary side	mm ²	4	6	35	10	50	50	70	FL ¹⁾

Input voltage 3 AC 400 V ±10%; 50 Hz –5% to 60 Hz +5%

Rated input current	A	12.4	23.8	63.3	31.5	69.9	105	155	228
Max. conductor cross-section, primary side	mm ²	4	10	35	16	50	70	FL ¹⁾	FL ¹⁾

Input voltage 3 AC 220 V ±10%; 50 Hz –5% to 60 Hz +5%

Rated input current	A	22.6	43.3	115	57.3	127	191	281	415
Max. conductor cross-section, primary side	mm ²	6	25	50	35	70	FL ¹⁾	FL ¹⁾	FL ¹⁾

Input voltage 3 AC 200 V ±10%; 50 Hz –5% to 60 Hz +5%

Rated input current	A	24.9	47.6	127	63	140	210	309	456
Max. conductor cross-section, primary side	mm ²	10	25	70	35	70	FL ¹⁾	FL ¹⁾	FL ¹⁾

1) FL = Flat-type terminal, drilled hole Ø 9 mm

2) Only valid for IP 00 degree of protection

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE converter system

Infeed/regenerative feedback modules

Infeed		5	10	28	16	36	55	80	120
Rated power (S1)	kW								
Infeed power (S6 - 40)	kW	6.5	13	36	21	47	71	104	156
Peak infeed power	kW	10	25	50	35	70	91	131	175
Infeed type		Open-loop ¹⁾	Open-loop ¹⁾	Open-loop	Closed-loop	Closed-loop	Closed-loop	Closed-loop ²⁾	Closed-loop ²⁾
Mains regenerative feedback									
Continuous feedback power	kW	–	–	–	16	36	55	80	120
Peak feedback power	kW	–	–	–	35	70	91	131	175
Continuous/peak performance of integrated pulsed resistor	kW	0.2/10	0.3/25	– ¹⁰⁾	–	–	–	–	–
Supply data									
Voltage	V	3 AC 400 – 10% to 3 AC 480 +6% ²⁾ ⁸⁾							
Frequency	Hz	50 to 60 ± 10%							
Rated current	A	12.5	24	65	27	60.5	92.5	134	202
Current with undervoltage	A	14	26.7	72.3	30	67.3	103	149	224.5
Peak current (P , U_N)	A	25	60	116	59	117.5	153	220	294
Max. conductor cross-section	mm ²	6	16	50	16	50	95 or 2 x 35	95 or 2 x 35	150 or 2 x 50
Output voltage	V	490 to 680 +6%			600 / 625 / 680 ⁸⁾				
Module width	mm	50	100	200	100	200	300	300	300
Cooling type									
Internal cooling		Self-cooled	Universal cooling	Internal separate fan	Internal separate fan	Internal separate fan	Internal separate fan	Built-on fan ⁴⁾	Built-on fan ⁴⁾
External cooling		Self-cooled ¹⁾	Internal/external	Integrated separate fan	Integrated separate fan	Integrated separate fan	Fan box and built-on fan required ⁴⁾ ⁹⁾		
Hose cooling		–	–	–	–	–	Kit for hose cooling with fan		
Losses									
Internal cooling	W	270 ³⁾	450 ³⁾	250 ³⁾	320	585	745	1280 ⁴⁾	1950 ⁴⁾
External cooling	W	270 ³⁾ / –	119 / 331	90 / 160	50 / 270	50 / 535	115 / 630	190 / 1090	290 / 1660
Hose cooling internal/external	W	–	–	–	–	–	115 / 630	190 / 1090	290 / 1660
Utilization factor η ¹¹⁾		0.985	0.985	0.985	0.97	0.975	0.977	0.977	0.978
Weights									
Internal cooling	kg	6.5	9.5	15.5	10.5	15.5	26	26	29
External cooling ⁵⁾	kg	6.5	9.5	15.5	10.5	15.5	26	26	29
Hose cooling ⁶⁾	kg	–	–	–	–	–	26	26	29

1) Housing is suitable for drive systems with internal and external cooling.

2) The 80 kW/120 kW I/RF modules require an external control voltage for internal network protection. 2 AC 360 V to 457 V/45 Hz to 53 Hz: 2 AC 400 V to 510 V/57 Hz to 65 Hz.

3) Including the component of the internal pulsed resistor.

4) With built-on fan 6SN1162-0BA02-0AA1.

5) Without integrated components.

6) Without kit for hose cooling.

7) Data valid for use of the specified external fan and fan boxes.

8) For supply voltages of 3 AC 415 V or 480 V, the DC link voltage must be selected on the I/RF module via an internal coding switch.

9) The fan box is included in the scope of supply of the mounting bracket 6SN1162-0BA01-0EA0.

10) Max. connectable external pulsed resistor 2 x 1.5 kW/25 kW.

11) η = (output active power/input active power) to the module terminals

OI: Inductive losses at commutation reactor and device current supply, but without pulsed resistors

I/RF: Inductive losses at commutation reactor and device current supply for infeed and regenerative feedback mode

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE converter system

SIMODRIVE 611 universal single-axis power module

1FT6/1FK6/1FN3 motors

Rated current	A	3	5	9	18	28	42	56	70	100	140
Peak current	A	6	10	18	36	56	64	112	140	200	210
Power loss ⁴⁾											
• Total	W	35	50	90	190	300	460	645	730	1300	1910
• Internal	W	14	19	35	65	30	25	25	90	170	250
• External	W	21	31	55	125	270	435	620	640	1130	1660

1PH motors

Rated current	A	3 ¹⁾	5 ¹⁾	8 ¹⁾	24	30	45	60	85	120	200
Current at S6 - 40 %	A	3	5	10	32	40	60	80	110	150	250
Peak current	A	3	8	16	32	51	76	102	127	193	257
Power loss ⁴⁾											
• Total	W	30	40	74	260	320	460	685	850	1290	2170
• Internal	W	12	16	29	89	32	19	30	100	119	325
• External	W	18	24	45	171	288	441	655	750	1100	1845

General data for closed-loop infeed ³⁾

Module width	mm	50	50	50	50	100	150	150	300	300	300
Cooling type		Self	Self	Separate	Separate	Separate	Separate	Separate	Separate	Separate	Separate
Max. conductor cross-section	mm	6	6	6	6	16	50	50	95	95	150
Weight, approx.											
• Internal cooling	kg	6.5	6.5	6.5	7.5	9.5	13	13	26 ²⁾	21 ²⁾	24 ²⁾
• External cooling	kg	6.5	6.5	6.5	7.5	9.5	13	13	26 ²⁾	21 ²⁾	24 ²⁾
• Hose cooling	kg	–	–	–	–	–	–	–	13 ²⁾	21 ²⁾	24 ²⁾
Input voltage	V	600 / 625 / 680 DC									
Output voltage	V	3 AC 0 to 430									
Utilization factor η ⁵⁾		0.98									

SIMODRIVE 611 universal two-axis power module

1FT6/1FK6/1FN3 motors

Rated current per axis	A	3	5	9	18
Peak current per axis	A	6	10	18	36
Power loss					
• Total	W	70	100	180	380
• Internal	W	27	38	69	130
• External	W	43	62	111	250

1PH motors

Rated current per axis	A	3	5	8	24
Peak current per axis	A	3	8	16	32
Current S6 - 40 % per axis	A	3	5	10	32
Power loss					
• Total	W	76	118	226	538
• Internal	W	28	42	74	184
• External	W	48	76	152	354

General data for closed-loop infeed ³⁾

Module width	mm	50	50	50	100
Cooling type		Self	Separate	Separate	Separate
Max. conductor cross-section	mm	6	6	6	6
Weight, approx.					
• Internal cooling	kg	7	7	7	13.5
• External cooling	kg	7	7	7	13.5
Input voltage	V	600 / 625 / 680 DC			
Output voltage	V	3 AC 0 to 430			
Utilization factor η		0.98			

1) Only standard induction motors

2) Without externally mounted or hose cooling components

3) For open-loop infeed 490 V, see also Part 6 "Planning Guide"

4) Total: Power losses from the module
Internal: Power losses remaining in the control cabinet
External: Power losses directly routed to the outside

5) η = (output active power/input active power) to the module terminals

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE converter system

External pulsed resistor

		External pulsed resistor 0.3/25 kW	External pulsed resistor 1.5/25 kW	Internal pulsed resistor 0.3/25 kW	Internal pulsed resistor 0.2/10 kW
Pulsed resistor built-in for:		–	–	OI 10 kW Pulsed resistor module	OI 5 kW
Can be used with:		OI module, 28 kW	OI module, 28 kW	–	–
Can be used with:		–	Pulsed resistor module 6SN1 113-1AB0 □-0BA□	–	–
P_n	kW	0.3	1.5	0.3	0.2
P_{max}	kW	25	25	25	10
E_{max}	kWs	7.5	180	7.5	13.5
Degree of protection		IP 54	IP 20	See module	See module

HF commutating reactors, supply voltage 3 AC 400/480 V

	kW	28 (OI)	16 (I/RF)	36 (I/RF)	55 (I/RF)	80 (I/RF)	120 (I/RF)
Allocation to the infeed module							
Rated AC current	A	65	30	67	103	150	225
Power loss	W	70	170	250	350	450	590
Max. conductor cross-section, primary/secondary side	mm ²	50	16	50	70	FL ¹⁾	FL ¹⁾
Weight, approx.	kg	6	8.5	13	18	40	50
Dimensions (W x H x D) approx.	mm	190 x 200 x 100	330 x 145 x 150	330 x 230 x 150	330 x 280 x 150	380 x 250 x 170	380 x 290 x 170
Supply voltage	V	3 AC 400 – 10% to 3 AC 480 +6%					
Frequency	Hz	50/60 ± 10%					
Degree of protection		IP 00 to DIN EN 60529 (IEC 60529)					
Humidity classification to DIN EN 60721-3-3		Cl. 3K5, condensation and icing excluded. Low air temperature 0 °C.					
Permissible ambient temperature							
• Operation	°C	–25 to +40, to +55 with derating					
• Storage/transport	°C	–25 to +80					

Mains filter for I/RF and for OI modules

	kW	5 (OI)	10 (OI)	28 (OI)	16 (I/RF)	36 (I/RF)	55 (I/RF)	80 (I/RF)	120 (I/RF)
Allocation to the infeed module									
Rated AC current	A	16	25	65	30	67	103	150	225
Power loss	W	20	20	25	70	90	110	150	200
Max. conductor cross-section	mm ²	4	10	50	10	50	50	95	FL ¹⁾
Connection of equipotential bonding (PE)		M6, bolt	M6, bolt	M10, bolt	M5, bolt	M8, bolt	M8, bolt	M8, bolt	M10, bolt
Weight, approx.	kg	3.8	5.7	12.5	9	16	19	22	32
Dimensions (W x H x D) approx.	mm	156 x 193 x 81	156 x 281 x 91	171 x 261 x 141	130 x 480 x 149.5	130 x 480 x 244.5	130 x 480 x 279.5	200 x 480 x 279.5	300 x 480 x 279.5
Supply voltage	V	3 AC 400 ± 10% to 3 AC 415 ± 10% (TN system)							
Frequency	Hz	50/60 ± 10%							
Degree of protection		IP 20 to DIN EN 60529 (IEC 60529)							
Humidity classification to DIN EN 60721-3-3		Cl. 3K5, condensation and icing excluded. Low air temperature 0 °C.							
Permissible ambient temperature									
• Operation	°C	0 to +40, max. 55 at 0.6 x P_N of the OI or I/RF module							
• Storage/transport	°C	–25 to +70							
Installation altitude	m	800, 2000 above sea level with derating							
RI interference suppression		acc. to EN 55011, conducted interference Limit Class A with system design conforming to Planning Guide							

Overvoltage limiter module

Energy absorption max.	100 Joules
Weight, approx.	0.3 kg
Dimensions (W x H x D)	70 mm x 76 mm x 32.5 mm
Module depth max. when plugged in	325 mm

Monitoring module

Rated supply voltage	3 AC 400 V – 10% to 480 V +6% 50 Hz to 60 Hz ± 10% or 490 V to 680 V DC
Power loss	70 W
Cooling type	Self cooling
Weight, approx.	5 kg
Module width	50 mm

1) FL = Flat-type terminal, drilled hole Ø 9 mm

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE converter system

Capacitor modules

Module type		4.1 mF	20 mF
Voltage range U_{DC}	V	350 to 750	
Storage capacity $w = \frac{1}{2} \times C \times U^2$		UDC steady-state (example) 600 V → 738 Ws 680 V → 948 Ws	UDC steady-state (example) ¹⁾ 600 V → 3215 Ws 680 V → 4129 Ws
Temperature range		0 °C to +55 °C	
Weight, approx.	kg	7.5 kg	21.5 kg
Dimensions W x H x D	mm	100 x 480 x 211	300 x 480 x 211

2

1) Due to the internal precharging resistor, the voltage across the capacitors is only $0.94 \times U_{DC}$.

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE POSMO CD/CA

Type		SIMODRIVE POSMO CD		SIMODRIVE POSMO CA
Rated converter current I_N	A	9	18	9
Maximum converter current I_{max}	A	18	36	18
Rated converter power P_N	kW	5	10	5
Supply voltage		600 V DC	600 V DC	3 AC 400 V to 480 V
Weight, approx.	kg	10.0	15.0	15.0
Motors which can be connected		1FT6, 1FK6, 1FN3, 1PH7, 1PH4		
Degree of protection to IEC 60 034-5		IP 65		
Cooling		Natural convection		
Ambient temperature		0 °C to +45 °C (up to +55 °C with derating)		
Connectable motor measuring system		• Incremental sin/cos 1 V_{PP} • Absolute multi-turn with EnDat		
Direct measuring system		• Incremental sin/cos 1 V_{PP} • Absolute multi-turn with EnDat		
Connection system		• Power plug • PROFIBUS-DP with M20 screwed cable gland (copper conductor) • I/O signals with M12 connection system		
Communication		• PROFIBUS-DP up to 12 Mbit/s • 4 parameterizable I/O terminals (max. 3 inputs, max. 2 outputs)		

2

SIMODRIVE POSMO SI

Motor	Permanent-magnet brushless servo motor 1FK6				
Rated torque τ_n 100K	Nm	4.0	6.0	6.8	10.5
Static torque τ_0 100K	Nm	6	11	8	16
Rotor inertia J (without brake)	10 ⁻⁴ kgm ²	8.6	16.1	16.1	27.1
					57.2
Rated current I_N 100K	A	3.1	4.7	5.2	7.7
Motor phase current I_0 100K	A	4.3	7.9	5.8	10.4
Calculated power P_{calc} 100K	kW	1.9	3.5	2.5	5
					5.7
Weight (without brake)	kg	12.0 (12.5)	16.3 (16.8)	17.3 (17.8)	21.0 (22.5)
					23.9 (26.3)
Type		IM B5 (IM V1, IM V3)			
Degree of protection to IEC 60 034-5		IP 64 (fan IP 54)			
Cooling		Separate ventilation			
Ambient temperature		0 °C to +45 °C (up to +55 °C with derating)			
Rated voltage		600 V DC			
Rated speed		3000 rpm			
Connection system		• Power plug • PROFIBUS-DP with M20 screwed cable gland (copper conductor) • I/O signals with M12 connection system			
Communication		• Motion Control with PROFIBUS-DP up to 12 Mbit/s • 4 parameterizable I/O terminals (max. 3 inputs, max. 2 outputs)			
Rotary motion precision, coaxiality and linear motion acc. to DIN 42 955 (IEC 60 072-1)		Tolerance N (normal)			
Vibration strength acc. to EN 60 034-14 (IEC 60 034-14)		Level N (normal)			
Max. sound level to EN 21 680		• 6SN2 46x: 65 dB (A) • 6SN2 48x: 70 dB (A) • 6SN2 50x: 70 dB (A)			
Vibration and shock load in operation		• Vibration load in operation - Frequency range 2 to 9 Hz with constant displacement = 7 mm - Frequency range 9 to 200 Hz with constant acceleration = 2 g - Applicable standards: IEC 68-2-6, DIN EN 60 721 Part 3-0 and Part 3-3 Class 3M6 • Shock load in operation - Peak acceleration max. 25 g - Shock duration 6 ms - Applicable standards: DIN EN 60 721 Part 3-0 and Part 3-3 Class 3M6			
Vibration and shock load in transport		Applicable standards: DIN EN 60 721 Part 3-3 Class 2M2 Note: The information is valid for components packed for transport.			
Encoder system, built-in		Single absolute encoder, multiturn, 32 S/R and travel range 4096 R with EnDat			
Options		• Shaft end at drive end with fitted key and keyway, (half-key balancing) • Holding brake built-in • IP 65 degree of protection, also IP 67 for DE flange			

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE POSMO A

	75 W	300 W
Supply voltage	DC 24 V ± 20 % Rated power and voltage is reduced when the supply voltage falls below 24 V.	DC 48 V ± 20 % For supply voltages < 48 V: • Lower speed • Lower torque
Motor type	Permanent-magnet brushless servo motor (brushless DC: BLDC)	
Degree of protection (to IEC 60 034-5)	IP 54 IP 40 at the motor shaft and at the planetary gear unit shaft. The shaft must not run in an oil bath. If necessary, it should be greased.	IP 54, IP 65 optional
Cooling	Non-ventilated (natural convection)	
Overload • S3 – 25 %, 60 s • Overload monitoring	2 x rated torque for 15 s within 60 s I^2t limiting in the converter	60 s within 4 min
Position encoder (integrated)	Incremental, resolution 816 inc/rev	Incremental, 4096 inc/rev
Rated motor speed	3300 rpm (S1); 2000 rpm (S3)	3000 rpm (S1)
Rated motor torque	0.18 Nm (S1); 0.36 Nm (S3)	0.48 Nm (S1), 0.95 Nm (S3)
Rated motor current	4.5 A (S1); 9 A (S3)	5 A (S1), 10 A (S3 _{25%})
Motor efficiency	65 %	75 %
Motor moment of inertia	600 kgm ²	630 kgm ² (motor without a brake) 670 kgm ² (motor with a brake)
Permissible ambient temperature (acc. to DIN EN 60 721, Part 3-3, Class 3K5) • Operation • Extended operation • Transport and storage	0 °C to 45 °C 0 °C to 65 °C (with continuous current reduction) –40 °C to 70 °C (acc. to DIN EN 60 721, Parts 3-1 and 3-2, Classes 2K4 and 1K4)	
Installation altitude	1000 m above sea level 1500 m Derating factor 0.97 2000 m Derating factor 0.94 3000 m Derating factor 0.86 3500 m Derating factor 0.82 4000 m Derating factor 0.77	
Vibration load in operation (acc. to IEC 68-2-6, DIN EN 60 721, Parts 3-0 and 3-3, Class 3M6)	Frequency range 2 to 9 Hz for constant displacement = 7 mm Frequency range 9 to 200 Hz for constant acceleration = 20 m/s ²	
Shock load in operation (acc. to DIN EN 60 721 Parts 3-0 and 3-3, Class 3M6) • Maximum acceleration • Shock duration	150 ms ² 6 ms	
Vibration and shock load during transport	Acc. to DIN EN 60 721, Part 3-3, Class 2M2 (applicable to components in original packaging)	
Weights values in brackets are with brake	• without gearing: 3.1 kg • with 1-stage gearing: 3.5 kg • with 2-stage gearing: 3.7 kg • with 3-stage gearing: 3.9 kg • with worm gear: 3.5 kg	• without gearing: 3.9 kg (4.0 kg) • with 1-stage gearing: 5.1 kg (5.2 kg) • with 2-stage gearing: 5.4 kg (5.5 kg)

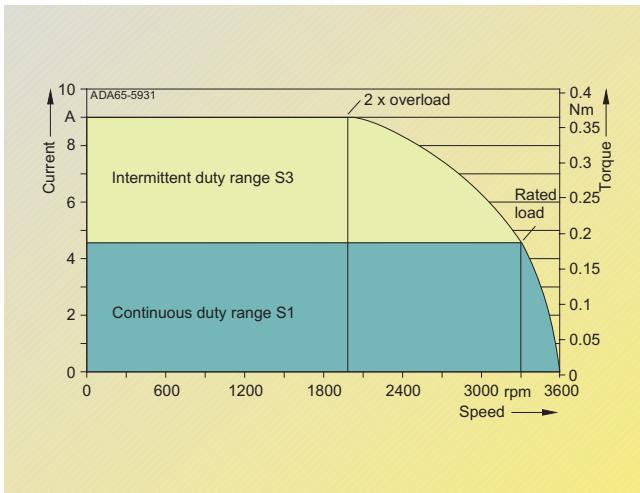
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SIMODRIVE 611 universal and POSMO

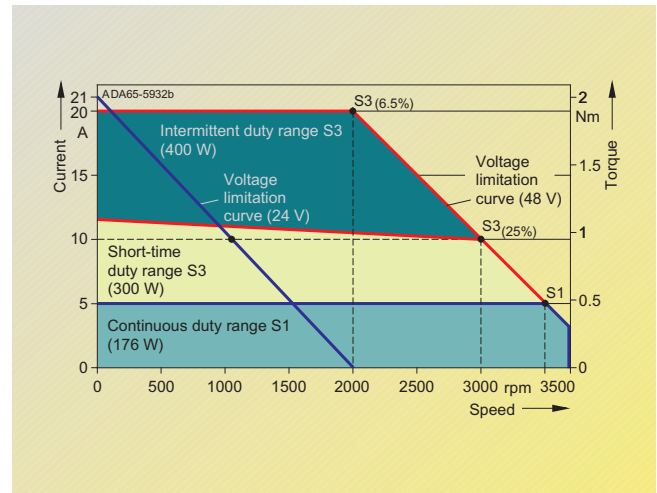
Technical data

SIMODRIVE POSMO A

Characteristic curves



Torque/speed characteristic for SIMODRIVE POSMO A 75 W



Torque/speed characteristic for SIMODRIVE POSMO A 300 W

Power Management Module (PMM)

for POSMO A type	75 W	300 W
Input voltage	DC 24 V	DC 48 V
Operational voltage range	DC 19.2 V to DC 28.8 V	DC 38.4 to 57.6 V
Continuous energy consumption	10 Ws	15 Ws
Peak energy consumption	50 Ws	
Max. permissible continuous current via PMM	28 A at +40 °C ambient temperature	
Overload monitoring	I^2t limit monitoring to protect the pulsed resistor	
Relay	Monostable with changeover contact	
Maximum relay switching voltage	DC 150 V / AC 125 V	
Maximum number of connectable positioning motors	The maximum permissible number of positioning motors that can be connected to a module is dependent on the load rating, the coincidence factor of the feedback and the feedback energy ¹⁾ .	
Operating temperature	0 °C to +55 °C	
Transport and storage temperature	-25 °C to +85 °C	
Degree of protection	IP 20 acc. to IEC 529	

1) The feedback energy is calculated for a drive as follows:

$$W = \frac{1}{2} \times J \times \omega^2$$

W : Braking energy [Ws = (kgm²/s²)]

J : Mass moment of inertia [kgm²]

ω : Angular frequency ($2 \times \pi \times n$)/60 [Hz] with n [rpm]

SIMODRIVE 611 universal and POSMO

Technical data

SIMODRIVE POSMO A

Rectifier for SIMODRIVE POSMO A 300 W

Input voltage	3 AC 480/400 V (+6%/–10%)
Frequency	50 to 60 Hz
Output voltage	48 V DC
Output current	25 A
Output capacitance	20,000 µF/100 V
Residual ripple	< 5%
Insulation class	T 40/B
Degree of protection	IP 00
Safety class	I
Applicable specifications	EN 61558; EN 61131-2; EN 50082-2 (interference immunity); EN 50081-1 (emitted interference); acc. to EN 61000-3-2/-3-3 suitable for connection to public supply systems and industrial networks
Installation conditions	
• Installation angle:	Upright
• Altitude up to:	1000 m above sea level
• Attachment:	M6 screw mounting on angle bracket
• Location:	Rooms with outdoor climate acc. to DIN 5001
• Ambient temperature:	–25 °C to +40 °C
• Storage temperature:	–25 °C to +60 °C

2

Degree of protection

For configuring machine-tool drives, the degrees of protection according to EN 60 034-5 and IEC 60 034-5 (e.g. IP 64) should only be used as a guide. The second digit of the number denoting the degree of protection indicates the degree of protection against penetration of water and the first digit indicates the degree of protection against the ingress of foreign bodies. In the case of machine tools and transfer lines, protection against water alone is insufficient due to the use of oily, creeping and/or corrosive coolants.

As a result of many years of experience, we use seals that exceed the IEC specifications by a large margin and that satisfy the demands placed on machine tools.

The adjacent table should be used to select the necessary degree of protection for servo motors.

Fluids	Gen. workshop environment	Water Gen. coolant (95 % H ₂ O, 5 % oil) oil	Creeping oil; petroleum; corrosive coolants
Penetration			
Dry	IP 64	–	–
Environment containing fluids	–	IP 64 ¹⁾	IP 67
Spray mist	–	IP 65	IP 67
Splatter	–	IP 65	IP 68
Jet	–	IP 67	IP 68
Surge, brief immersion; constant flooding	–	IP 67	IP 68

Type

Type	Designation
	IM B3
	IM V5
	IM V6

Type	Designation
	IM B5 IM B14
	IM V1 IM V18
	IM V3 IM V19

Type	Designation
	IM B35
	IM V15
	IM V36

SIMODRIVE 611 universal and POSMO

Technical data

Synchronous servo motors

1FT6 servo motors

Machine type	Three-phase servo motor (permanent-magnet synchronous motor)
Magnet material	SE magnet material
Insulation of stator winding ¹⁾ acc. to EN 60 034-1 (IEC 60 034-1)	Temperature class F for winding overheating of $\Delta T = 100$ K for an ambient temperature of +40 °C. For water cooling, max. upstream temperature +25 °C.
Design acc. to EN 60 034-7 (IEC 60 034-7)	IM B5 (IM V1, IM V3) IM B14 (IM V18, IM V19)
Degree of protection acc. to EN 60 034-5 (IEC 60 034-5)	IP 64 standard type, IP 65 core type IP 67 and IP 68 option
Cooling	Self cooling, separate cooling, water cooling
Temperature monitoring	Temperature sensor KTY 84 in the stator winding
Paint	Anthracite
2nd rating plate	supplied separately packed
Shaft end at the drive end acc. to DIN 748-3 (IEC 60 072-1)	smooth shaft with key
Rotary motion precision, coaxiality and linear motion acc. to DIN 42955 (IEC 60 072-1)	Tolerance N (normal)
Vibration strength acc. to EN 60 034-14 (IEC 60 034-14)	Level N (normal)

Max. sound level (EN 21 680)	1FT602 1FT603: 55 dB (A) 1FT604: 55 dB (A) 1FT606: 65 dB (A) 1FT608: 70 dB (A) 1FT610: 70 dB (A)
Shock load (DIN 40 046, T7)	1FT603: 100 g 1FT604: 100 g 1FT606: 50 g 1FT608: 30 g 1FT610: 20 g
Encoder system, built-in	• Incremental encoder sin/cos 1 V_{pp}, 2048 S/R • Resolver, multi-pole (pole number corresponds to pole number for motor) • Absolute encoder, multiturn 2048 S/R and travel range 4096 R with EnDat
Connection	Connector for signals and power
Options	• Shaft end at drive end with fitted key and keyway (half-key balancing) • Holding brake, built-in • IP 67, IP 68 degree of protection • Planetary gear unit, built on (precondition: smooth shaft)

For selection of the degree of protection and type of design, see Page 2/13. For selection and ordering data, see Part 4.

1FK6 servo motors

Machine type	Three-phase servo motor (permanent-magnet synchronous motor)
Magnet material	SE magnet material
Insulation of stator winding ¹⁾ acc. to EN 60 034-1 (IEC 60 034-1)	Temperature class F for winding overheating of $\Delta T = 100$ K for an ambient temperature of +40 °C.
Design acc. to EN 60 034-7 (IEC 60 034-7)	IM B5 (IM V1, IM V3)
Degree of protection acc. to EN 60 034-5 (IEC 60 034-5)	IP 64
Cooling	Self cooling
Temperature monitoring	Temperature sensor KTY 84 in the stator winding
Paint	No paint finish
Shaft end at the drive end acc. to DIN 748-3 (IEC 60 072-1)	smooth shaft with key
Rotary motion precision, coaxiality and linear motion acc. to DIN 42955 (IEC 60 072-1)	Tolerance N (normal)
Vibration strength acc. to EN 60 034-14 (IEC 60 034-14)	Level N (normal)
Max. sound level (EN 21 680)	1FK603: 55 dB (A) 1FK604: 55 dB (A) 1FK606: 65 dB (A) 1FK608: 70 dB (A) 1FK610: 70 dB (A)

Shock load (DIN 40 046, T7)	1FK603: 100 g 1FK604: 100 g 1FK606: 50 g 1FK608: 30 g 1FK610: 20 g
Encoder system, built-in	• Incremental encoder sin/cos 1 V_{pp}, 2048 S/R • Absolute encoder, multiturn 2048 S/R and travel range 4096 R with EnDat • Single absolute encoder, multiturn, 32 S/R and travel range 4096 R with EnDat • Resolver, multi-pole (pole number corresponds to pole number for motor)
Connection	Connector for signals and power, rotatable (270°)
2nd rating plate	glued to end shield
3rd rating plate	supplied separately packed
Options	• Shaft end at drive end with fitted key and keyway (half-key balancing) • Holding brake, built-in • IP 65 degree of protection, also IP 67 for DE flange • Planetary gear unit (precondition: smooth shaft)

For selection of the degree of protection and type of design, see Page 2/13.
For selection and ordering data, see Part 4.

1) Supply voltage of the SIMODRIVE converter system:

3 AC 400 V ±10 % (i.e. DC link voltage = 600 V)	3 AC 480 V +6 %, -10 % (i.e. DC link voltage = 680 V)
Utilization of the 1FT6/1FK6 motors up to $\Delta T = 100$ K	Utilization of the 1FT/1FK610 and 1FT613 motors up to $\Delta T = 100$ K
	Utilization of the 1FT/1FK603, 1FT/1FK604, 1FT/ 1FK606 and 1FT/1FK608 motors up to $\Delta T = 60$ K

1FN3 linear motors

	1FN3
Machine type	Three-phase linear motor (permanent-magnet synchronous motor)
Magnet material	SE magnet material
Insulation of stator winding acc. to EN (IEC) 60 032-1	Temperature class H for a winding temperature of +120 °C
Degree of protection acc. to EN 60 034-5 (IEC 60 034-5)	IP 65
Overload ratio ($F_{MAX} : F_N$) up to max.	2.75
Design possibilities	Different graduations thanks to modular construction
Secondary side cover	Uniform over all segments, interchangeable
Cooling type	Water cooling
Water cooler connections	1/8" inside thread on all primary and secondary coolers (using appropriate adapters)
Temperature effect on the surrounding construction for precision cooling, max.	+4 °C
Permissible coolant inlet temperature, max.	+35 °C (condensation must be prevented) > +35 °C with reduction of rated motor force
Temperature monitoring built in to primary winding	PTC thermistor KTY 84 temperature sensor
Connection type	Terminal box with cable gland Optional: Accessories for connector and cable connection
Recommended measuring systems	See "Measuring system overview"
2nd rating plate	supplied separately packed

For selection and ordering data, see Part 4.

Connector box

Degree of protection acc. to EN 60 529 (IEC 60 529)	IP 65
Permissible air humidity acc. to DIN 40 040	95 % (no condensation)
Weight, approx.	0.26 kg
Dimensions (W x H x D) (without sockets or without cable glands)	65 mm x 54 mm x 25 mm

For description, see Part 4.

SIMODRIVE 611 universal and POSMO

Technical data

Induction servo motors

1PH7 servo motors

Insulation of stator winding ¹⁾ acc. to EN 60 034-1 (IEC 60 034-1)	Temperature class F for a coolant temperature up to +40 °C
Fan supply voltage	3 AC 400 V/50 Hz/60 Hz; 3 AC 480 V/60 Hz
Motor encoder, built-in	Incremental encoder sin/cos 1 V _{pp} , 2048 S/R
Terminal box connection type • Motor • Fan • Motor encoder and PTC thermistor	Terminals in terminal box Terminals in terminal box 17-pole round socket (without mating connector)
Rating plates	1 unit supplied separately packed in terminal box
Permissible coolant temperature	-15 °C to + 40 °C
Temperature monitoring	PTC thermistor in stator winding
Sound level acc. to ISO 1680-1 (EN 21 680) (tolerance +3 dB)	from drive end to non-drive end (for 50 Hz supply) 1PH7 10.: 70 dB(A) 1PH7 13.: 70 dB(A) 1PH7 16.: 75 dB(A) ²⁾ 1PH7 18.: 78 dB(A) ³⁾ 1PH7 22.: 81 dB(A) ³⁾

Core type

Design ⁴⁾ acc. to EN 60 034-7 (IEC 60 034-7)	1PH7 10: IM B5 (IM V1, IM V3) 1PH7 13: IM B5 (IM V1, IM V3) 1PH7 16: IM B35 (IM V15, IM V36)
Terminal box arrangement (view onto drive end ⁵⁾)	Top, cable entry right
Bearing design at DE	Bearing for belt or coupling drive
Vibration strength acc. to EN 60 034-14 (IEC 60 034-14)	Level S
Shaft and flange precision acc. to DIN 42 955 (IEC 60 072-1)	Tolerance R (reduced)
Degree of protection acc. to EN 60 034-5 (IEC 60 034-5)	Motor IP 55, fan IP 54
Paint finish	No paint finish

For selection and ordering data, see Part 4.

1PH4 servo motors

Insulation of stator winding ¹⁾ acc. to EN 60 034-1 (IEC 60 034-1)	Temperature class F for a coolant temperature up to +25°C
Motor encoder, built-in	Incremental encoder sin/cos 1 V _{pp} , 2048 S/R
Design acc. to EN 60 034-7 (IEC 60 034-7)	IM B35, IM V15
Terminal box arrangement	top, rotatable 4 x 90°
Terminal box connection type • Motor • Motor encoder and PTC thermistor	Terminals in terminal box 17-pole round socket (without mating connector)
Bearing design at DE	Bearing for belt or coupling drive
Vibration strength acc. to EN 60 034-14 (IEC 60 034-14)	Level R (reduced)

Shaft and flange precision acc. to DIN 42 955 (IEC 60 072-1)	Tolerance N (normal)
Shaft end DE acc. to DIN 748	with key and keyway
Degree of protection acc. to EN 60 034-5 (IEC 60 034-5)	IP 65, at shaft outlet IP 55
Paint finish	Anthracite
Coolant temperature	Due to the formation of condensa- tion, we recommend an inlet temper- ature of approximately + 25 °C depending on the ambient condi- tions.
Temperature monitoring	2 PTC thermistors in the stator wind- ing, of which 1 x spare
Sound level acc. to ISO 1680-1 (EN 21680) (tolerance +3 dB)	1PH4 10: 69 dB (A) 1PH4 13: 69 dB (A) 1PH4 16: 71 dB (A)

For selection and ordering data, see Part 4.

1) Supply voltage of the SIMODRIVE converter system:

3 AC 400 V ±10 % (i.e. DC link voltage = 600 V)	3 AC 480 V +6 %, -10 % (i.e. DC link voltage = 680 V)
Operation of 1PH4 and 1PH7 motors are possible	Operation of 1PH4, 1PH7 10, 1PH7 13 and 1PH7 16 motors is possible. Option for 1PH7 18 and 1PH7 22 motors.

2) With a 60 Hz supply, a reduction in the sound level is possible on request.

3) With shaft heights of 180 and 225, a reduction in the sound level is possible on request.

4) For design, see Page 2/14.

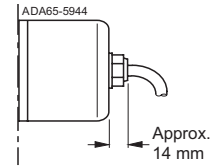
5) DE is the front of the motor with the shaft.
NDE is the rear of the motor.

Optoelectronic top-mounted rotary encoder

Design	Encoder with TTL (RS 422)	Encoder with sin/cos 1 V _{pp}	Encoder with HTL	Double-track encoder with TTL (RS 422)
Operational voltage at encoder	5 V DC ± 10% or 10 V to 30 V DC	5 V DC ± 10%	10 V to 30 V DC	5 V DC ± 5%
Cut-off frequency (–3 dB) (–6 dB)	–	≥ 180 kHz (typ.) ≥ 450 kHz (typ.)	–	–
Sampling frequency (max.)	300 kHz	–	300 kHz	Track 1: max. 160 kHz Track 2: max. 1 kHz
Current consumption without load (max.)	150 mA			150 mA per track
Signal level	TTL (RS 422)	Sine wave 1 V _{pp}	HTL $U_H ≥ 21 V$ at $I_H = 20 mA @ 24 V$ $U_L ≤ 2.8 V$ at $I_L = 20 mA @ 24 V$	TTL (RS 422)
Outputs protected against short-circuit to 0 V	Yes	Yes	Yes	Yes
Operating time (10% to 90%) (with 1 m cable and recommended input circuit)	Rise/fall time $t_r/t_f ≤ 50 ns$	–	Rise/fall time $t_r/t_f ≤ 200 ns$	Rise/fall time $t_r/t_f ≤ 100 ns$
Phase angle between signals A and B	90°	90° ± 10° el.	90°	90°
Min. edge spacing at: 1 MHz 300 kHz 160 kHz	– ≥ 0.45 μs –	– – –	– ≥ 0.45 μs –	≥ 0.125 μs (Track 2) – ≥ 0.8 μs (Track 1)
Lead length to downstream electronics ¹⁾ , max.	100 m	150 m	100 m	100 m (up to 500 kHz) 50 m (up to 1 MHz)
LED failure monitoring	Driver, high-resistance	–	Driver, high-resistance	–
Resolution, max.	5000 S/R	2500 S/R	2500 S/R	Track 1: 1024 S/R Track 2: 9000 S/R
Accuracy (in angle seconds)	± 18° mech. x 3600/increments			Track 1: ± 63 Track 2: ± 12
Electr. permissible speed	18 x 10 ⁶ rpm Increments	27 x 10 ⁶ rpm Increments (at –6 dB)	18 x 10 ⁶ rpm Increments	Track 1: 9000 rpm Track 2: 6500 rpm
Speed, mech., max.	12000 rpm			
Frictional torque	≤ 0.01 Nm (at 20 °C)			
Starting torque	≤ 0.01 Nm (at 20 °C)			
Shaft loading • n > 6000 rpm • n ≤ 6000 rpm	axial 10 N/radial 20 N on shaft end axial 40 N/radial 60 N on shaft end			– axial 10 N/radial 20 N on shaft end
Angular acceleration, max.	> 10 ⁵ rad/s ²			
Rotor moment of inertia	1.45 x 10 ^{–6} kg/m ²			20 x 10 ^{–6} kg/m ²
Vibration (55 to 2000 Hz) acc. to DIN IEC 68-2-6	≤ 100 m/s ²			
Shock (6 ms) acc. to DIN IEC 68-2-27	≤ 1000 m/s ²			
Maximum operating temperature	100 °C (U _p = 5 V ± 10%) 70 °C (U _p = 10 V to 30 V)	100 °C	85 °C (100 °C at U _p < 15 V)	70 °C
Minimum operating temperature	Flange outlet or fixed wiring: –40 °C Moving cable: –10 °C			–10 °C
Degree of protection acc. to DIN EN 60 529 (IEC 60529)	IP 67 at enclosure IP 64 at shaft output			
EMC	tested in accordance with the guidelines for electromagnetic compatibility 89/336/EEG and the specifications of the EMC guidelines (basic technical standards)			
Weight, approx.	0.25 kg			0.7 kg
CE mark	Yes			

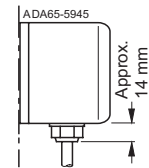
Connection types

Lead axial



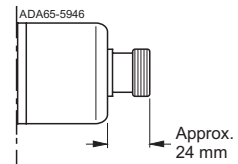
Cable length approx. 1 m

Lead radial

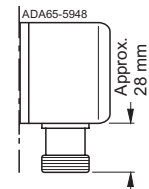


Cable length approx. 1 m

Flange outlet axial



Flange outlet radial



1) With recommended cable and input circuit of the downstream electronics, max. permissible cable length of the evaluating module.

SIMODRIVE 611 universal and POSMO

Technical data

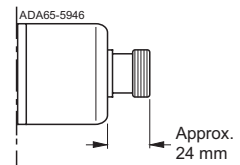
SIMODRIVE sensor

Optoelectronic externally mounted rotary encoder (continued)

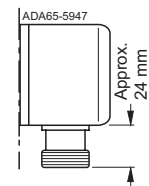
Type	Absolute encoder with serial synchronous interface SSI	Absolute encoder with PROFIBUS-DP (EN 50 170)
Operational voltage at encoder	10 V to 30 V DC	10 V to 30 V DC
Power consumption, approx.	180 mA multi-turn 120 mA single-turn	300 mA up to 100 mA (3.5 W)
Clock input	via optocoupler	
Data output	Line driver acc. to RS 485/RS 422	
Short-circuit strength	Short-term	
Transfer rate	100 kHz to 1 MHz	12 Mbit/s with PROFIBUS controller SPC 3 and Microcontroller 80C 165
LED for bus diagnostics	–	Yes (green/red)
Stepping rate LSB	max. 100 kHz valid code value	
Speed, mech., max.	12000 rpm for single-turn, 6000 rpm for multi-turn	
Lead length to downstream electronics ¹⁾ , max.	50 m up to 1 MHz clock 100 m up to 300 kHz clock 400 m up to 100 kHz clock	100 m up to 12 Mbit/s 200 m up to 1.5 Mbit/s 1200 m up to 93.75 kbit/s
Number of stations, max.	–	99
Connection	Flange outlet axial/radial	Terminal block, PG 9 (3 units) radial
Resolution	12-bit single-turn (4096 steps), 24-bit multi-turn (4096 x 4096 steps)	
Telegram length	13-bit single-turn, without parity 25-bit multi-turn, without parity	– –
Code type		
• Scanning	Gray	Gray
• Transfer	Gray	Binary
Parameterization capability		
• Resolution per revolution	–	any, 1 to 4096
• Resolution	–	any, 1 to 4096
• Preset	–	Yes
• Counting direction	Yes	Yes
• Velocity signal	–	Yes
• Limit switch	–	Yes, 2 units
• Clock synchronism and internode communication	–	Yes
Online parameterization	–	Yes
Bus loading, approx.	–	20 µs per encoder at 12 Mbit/s
Cycle time	–	500 µs
Accuracy	± ½ LSB	
EMC	tested to DIN EN 50 081 and EN 50 082	
Ball bearing service life	10 ⁴ h at 8000 rpm and +50 °C	
Frictional torque	≤ 1 Ncm	
Breakaway torque	≤ 1 Ncm	
Shaft loading		
• Synchronous flange axial/radial	15 N/25 N	
• Clamping flange axial/radial	20 N/110 N	
Angular acceleration, max.	10 ⁵ rad/s ²	
Moment of inertia		
• Synchronous flange, approx.	2 x 10 ⁻⁶ kg/m ²	
• Clamping flange, approx.	3 x 10 ⁻⁶ kg/m ²	
Vibration load	100 m/s ² (10 Hz to 2500 Hz) acc. to DIN IEC 68-2-6	
Shock load	1000 m/s ² (11 ms) acc. to DIN IEC 68-2-29	
Permissible ambient temperature		
• During storage and transport	–40 °C to +85 °C	–40 °C to +85 °C
• During operation	–30 °C to +70 °C without condensation	0 °C to +70 °C without condensation
Degree of protection acc. to DIN EN 60 529 (IEC 60 529)		
• without/with shaft input	IP 65/IP 64	
Weight		
• Single-turn/multi-turn, approx.	0.28 kg/0.4 kg	0.5 kg/0.7 kg
CE mark	Yes	Yes
PROFIBUS certificate	–	Yes
Supported profiles	–	Class 1, Class 2

Connection types Absolute encoder with SSI

Flange outlet axial



Flange outlet radial



Absolute encoder with PROFIBUS-DP

Terminal block with address selector switch and bus terminating resistor in a removable cover, with 3 x PG 9 radial for cable diameter 6.5 mm to 9 mm. The cover can be dismantled without interruption of the bus.

1) The max. permissible cable length for the connected modules must be observed.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

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SIMODRIVE converter system

- 3/2 Infeed modules
- 3/3 Power modules
- 3/4 SIMODRIVE 611 universal
Digital closed-loop control plug-in units
- 3/5 Overvoltage limiter module
monitoring module, pulsed resistor
module, blanking cover, warm air deflection
plate, external pulsed resistors,
- 3/6 Capacitor module, 2-tier configuration,
additional components
- 3/7 Mechanical components · External cooling
- 3/8 Mechanical components · Hose cooling,
fans for internal and external cooling, shield
terminal plate
- 3/9 Supply components · Matching transformers
- 3/10 Supply components · HF commutating
reactor, mains filter, mains filter package
- 3/11 Cables for SIMODRIVE 611 universal

SIMODRIVE POSMO CD/CA, SI

- 3/13 SIMODRIVE POSMO CD,
SIMODRIVE POSMO CA
- 3/14 SIMODRIVE POSMO SI
- 3/15 Cables

SIMODRIVE POSMO A positioning motor

- 3/18 SIMODRIVE POSMO A 75 W,
SIMODRIVE POSMO A 300 W
- 3/19 Cables and connectors, power cables
- 3/20 Power Management Module DC PMM
24 V/48 V, SITOP power
- 3/21 Rectifier unit

Software

- 3/22 Drive ES configuration program,
start-up and diagnostics software

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Infeed modules

Unregulated control with pulsed resistor	Regulated control with regenerative feedback	Peak infeed power	Rated current	Peak supply current	Infeed module	Power loss	Module width	For dimension drawing, see Part 7	Weight	Feedback power	Max. supply conductor cross-section
Rated DC link power (S1)	Rated DC link power (S1)				Order No.	With fan/without fan				Continuous/peak	U1, V1, W1
kW	kW	kW	A	A		W	mm	Page	kg	kW	mm ²
Internal cooling											
5 ⁴⁾	–	10	12.5	25	6SN11 46-1AB00-0BA1	–/270 ⁵⁾	50	7/2	6.5	0.2/10 ⁴⁾ ¹¹⁾	6
10 ⁴⁾	–	25	24	60	6SN11 45-1AA01-0AA1	–/450 ⁶⁾	100	7/2	9.5	0.3/25 ⁴⁾ ¹¹⁾	16
28	–	50	65	116	6SN11 45-1AA00-0CA0	–/250	200	7/2	15.5	– ¹⁰⁾	50
–	16	35	27	59	6SN11 45-1BA01-0BA1	–/320	100	7/2	10.5	16/35 ¹²⁾	16
–	36	70	60.5	117.5	6SN11 45-1BA02-0CA1	–/585	200	7/2	15.5	36/70 ¹²⁾	50
–	55	91	92.5	153	6SN11 45-1BA01-0DA1	–/745	300	7/2	26	55/91 ¹²⁾	95
–	80	131	134	220	6SN11 45-1BB00-0EA1	–/1280 ⁷⁾	300	7/2	26	80/131 ¹²⁾	95
–	120	175	202	294	6SN11 45-1BB00-0FA1	–/1950 ⁷⁾	300	7/2	26	120/175 ¹²⁾	150
External cooling⁴⁾											
5 ⁴⁾	–	10	12.5	25	6SN11 46-1AB00-0BA1 ¹³⁾	270/– ⁵⁾	50	7/3	6.5 ⁸⁾	0.2/10 ⁴⁾ ¹¹⁾	6
10 ⁴⁾	–	25	24	60	6SN11 45-1AA01-0AA1 ¹³⁾	119/331	100	7/3	9.5 ⁸⁾	0.3/25 ⁴⁾ ¹¹⁾	16
28	–	50	65	116	6SN11 46-1AB00-0CA0 ¹³⁾	90/160	200	7/3	15.5 ⁸⁾	– ¹⁰⁾	50
–	16	35	27	59	6SN11 46-1BB01-0BA1 ¹³⁾	50/270	100	7/3	10.5 ⁸⁾	16/35 ¹²⁾	16
–	36	70	60.5	117.5	6SN11 46-1BB02-0CA1 ¹³⁾	50/535	200	7/3	15.5 ⁸⁾	36/70 ¹²⁾	50
–	55	91	92.5	153	6SN11 46-1BB00-0DA1 ¹³⁾	115/630	300 ³⁾	7/3	26 ⁸⁾	55/91 ¹²⁾	95
–	80	131	134	220	6SN11 46-1BB00-0EA1 ¹³⁾	190/1090	300 ³⁾	7/3	26 ⁸⁾	80/131 ¹²⁾	95
–	120	175	202	294	6SN11 46-1BB00-0FA1 ¹³⁾	290/1660	300 ³⁾	7/3	29 ⁸⁾	120/175 ¹²⁾	150
Hose cooling											
–	55	91	92.5	153	6SN11 45-1BB00-0DA1	115/630 ²⁾	300 ³⁾	7/4	26 ⁹⁾	55/91 ¹²⁾	95
–	80	131	134	220	6SN11 45-1BB00-0EA1	190/1090 ²⁾	300 ³⁾	7/4	26 ⁹⁾	80/131 ¹²⁾	95
–	120	175	202	294	6SN11 45-1BB00-0FA1	290/1660 ²⁾	300 ³⁾	7/4	29 ⁹⁾	120/175 ¹²⁾	150

1) In the case of external cooling, the fan box is part of the scope of supply of the mounting frame for the 300 mm module width. The required 6SN 11 62-0BA02-0AA1 built-on fan must be ordered separately.

2) The mounting frame is not required if the cutouts required for the module cooling element are made in the cabinet wall in accordance with the Planning Guide. The above-mentioned mounting frame 6SN11 62-0BA04-0EA0 must be used for modules of 300 mm in width.

3) With internal cooling, a 6SN11 62-0BA02-0AA1 built-on fan is required for these 300 mm modules.

4) Housing is suitable for drive systems with internal and external cooling.

5) The 80 kW/120 kW I/RF modules require an external control voltage for internal network protection.
2 AC 360 to 457 /45 Hz to 53 Hz;
2 AC 400 V to 510 V /57 Hz to 65 Hz.

6) Including the component of the internal pulsed resistor.

7) 6SN11 62-0BA02-0AA1 built-on fan is required.

8) Without integrated components.

9) Without kit for hose cooling.

10) Max. connectable external pulsed resistor 2 x 1.5 kW/25 kW.

11) Power of integrated pulsed resistor

12) Mains feedback power.

13) Mounting frame is required for control cabinet, see mechanical components.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Power modules

Power modules for 1FT6/1FK6/1FN3 motors			1PH motors ⁴⁾			Power module	Module width	For di- mension drawing, see Part 7	Weight	Max. conductor cross- section for motor con- nection U2, V2, W2
Rated current	Peak current	Power loss ⁸⁾ total/internal/ external	Rated current	Peak current	Power loss ⁸⁾ total/internal/ external	Order No.	mm	Page	kg	mm ²
A	A	W	A	A	W					

Internal cooling ¹⁾

Single-axis version										
3	6	35/-/-	3	3	30/-/-	6SN11 23-1AA00-0HA1⁴⁾	50	7/2	6.5	6
5	10	50/-/-	5	8	40/-/-	6SN11 23-1AA00-0AA1⁴⁾	50	7/2	6.5	6
9	18	90/-/-	8	16	74/-/-	6SN11 23-1AA00-0BA1⁴⁾	50	7/2	6.5	6
18	36	190/-/-	24	32	260/-/-	6SN11 23-1AA00-0CA1	50	7/2	7.5	6
28	56	300/-/-	30	51	320/-/-	6SN11 23-1AA00-0DA1	100	7/2	9.5	16
42	64	460/-/-	45	76	460/-/-	6SN11 23-1AA00-0LA1	150	7/2	13	50
56	112	645/-/-	60	102	685/-/-	6SN11 23-1AA00-0EA1	150	7/2	13	50
70	140	730/-/-	85	127	850/-/-	6SN11 23-1AA01-0FA1	300	7/2	26 ⁶⁾	95
100	100	1300/-/-	120	193	1290/-/-	6SN11 23-1AA00-0JA1	300	7/2	21 ⁶⁾	95
140	210	1910/-/-	200	257	2170/-/-	6SN11 23-1AA00-0KA1	300	7/2	24 ⁶⁾	150
Two-axis version										
2 x 3	2 x 6	70/-/-	3	8	76/-/-	6SN11 23-1AB00-0HA1	50	7/2	7	6
2 x 5	2 x 10	100/-/-	5	8	118/-/-	6SN11 23-1AB00-0AA1	50	7/2	7	6
2 x 9	2 x 18	180/-/-	8	16	226/-/-	6SN11 23-1AB00-0BA1	50	7/2	7	6
2 x 18	2 x 36	380/-/-	24	32	538/-/-	6SN11 23-1AB00-0CA1	100	7/2	13.5	6

External cooling ²⁾

Single-axis version										
3	6	-/14/21	3	3	-/12/18	6SN11 24-1AA00-0HA1⁴⁾	50	7/3	6.5	6
5	10	-/19/31	5	8	-/16/24	6SN11 24-1AA00-0AA1⁴⁾	50	7/3	6.5	6
9	18	-/35/55	8	16	-/29/45	6SN11 24-1AA00-0BA1⁴⁾	50	7/3	6.5	6
18	36	-/65/125	24	32	-/89/171	6SN11 24-1AA00-0CA1	50	7/3	7.5	6
28	56	-/30/270	30	51	-/32/288	6SN11 24-1AA00-0DA1	100	7/3	9.5	16
42	64	-/25/435	45	76	-/19/441	6SN11 24-1AA00-0LA1	150	7/3	13	50
56	112	-/25/620	60	102	-/30/655	6SN11 24-1AA00-0EA1	150	7/3	13	50
70	140	-/90/640	85	127	-/100/750	6SN11 24-1AA01-0FA1	300	7/3	26 ⁶⁾	95
100	100	-/170/1130	120	193	-/190/1100	6SN11 24-1AA00-0JA1	300	7/3	21 ⁶⁾	95
140	210	-/250/1660	200	257	-/325/1845	6SN11 24-1AA00-0KA1	300	7/3	24	150
Two-axis version										
2 x 3	2 x 6	-/27/43	3	8	-/28/48	6SN11 24-1AB00-0HA1	50	7/3	7	6
2 x 5	2 x 10	-/38/62	5	8	-/42/76	6SN11 24-1AB00-0AA1	50	7/3	7	6
2 x 9	2 x 18	-/69/111	8	16	-/74/152	6SN11 24-1AB00-0BA1	50	7/3	7	6
2 x 18	2 x 36	-/130/250	24	32	-/184/354	6SN11 24-1AB00-0CA1	100	7/3	13.5	6

Hose cooling ³⁾

Single-axis version										
70	140	730/-/-	85	127	460/-/-	6SN11 23-1AA02-0FA1⁵⁾	300	7/4	13 ⁶⁾	95
100	100	1300/-/-	120	193	1230/-/-	6SN11 23-1AA00-0JA1	300	7/4	21 ⁶⁾	95
140	210	1910/-/-	200	254	2710/-/-	6SN11 23-1AA00-0KA1	300	7/4	24	150

1) Internal cooling

For power modules
6SN11 23-1AA00-0JA1 and ...-0KA1, a built-on
fan is required;
Order No.: 6SN11 62-0BA02-0AA1.

2) External cooling

For external cooling, the fan box is included in
the scope of supply of the mounting frame for
300 mm module widths. The corresponding
built-on fan must be ordered separately;
Order No.: 6SN11 62-0BA02-0AA1.

3) Hose cooling

For hose cooling, a kit for hose connection is
required for each module containing a fan, hose,
flanges and filter mats.

Order No. for **kit for hose cooling:**
6SN11 62-0BA03-0AA1.

4) Also for standard induction motors.

5) For hose cooling in 2-tier configuration (only for
55 kW I/RF modules and 85 A induction motors):
**Kit for hose connection for 2-tier configura-
tion; Order No.: 6SN11 62-0BA03-0CA1.**

6) Without mounting and hose cooling compo-
nents.

7) Mounting frame is required for control cabinet,
see mechanical components.

8) Total: Total power losses from the module
Internal: Power losses remaining
in the control cabinet.

External: Power losses directly
routed to the outside.

The data are applicable for the respective rated
cycle frequencies of the inverter.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

SIMODRIVE 611 universal digital regulated control plug-in units

Designation	Order No.	Weight, approx. kg
Regulated control plug-in unit with analog speed setpoint interface		
Single-axis version	Resolver, speed/torque setpoint	6SN11 18-0NJ00-0AA2
	Resolver, speed/torque setpoint, positioning	6SN11 18-1NJ00-0AA2
Two-axis version	Resolver, speed/torque setpoint	6SN11 18-0NK00-0AA2
	Resolver, speed/torque setpoint, positioning	6SN11 18-1NK00-0AA2
	sin/cos 1 V _{pp} /absolute encoder, speed/torque setpoint	6SN11 18-0NH00-0AA2
	sin/cos 1 V _{pp} /absolute encoder, speed/torque setpoint, positioning	6SN11 18-1NH00-0AA2
Option modules		
Terminal expansion for axis A	8 digital inputs/8 digital outputs, 24 V/ 500 mA (max.), electrically isolated, parameterizable	6SN11 14-0NA00-0AA0
PROFIBUS-DP	Standard slave for up to 2 axes cyclic and non-cyclic (V1) data exchange up to 12 Mbaud	6SN11 14-0NB00-0AA1
Motion Control with PROFIBUS-DP	Synchronous standard slave for up to 2 axes, cyclic and non-cyclic (V1) data exchange up to 12 Mbaud	6SN11 14-0NB01-0AA0

Important:

Shield terminal plates are necessary for attaching the shields of the encoder leads (see mechanical components).

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Overvoltage limiter module

Description	Order No.	Weight approx. kg	Dimensions W x H x D mm
Overvoltage limiter module For mains supply modules from 10 kW for SIMODRIVE 611	6SN11 11-0AB00-0AA0	0.3	70 x 76 x 32.5
Important: - With the overvoltage module, the infeed module has a maximum module depth of 325 mm (when plugged in). - For UL compliance, an overvoltage limiter module must be used. - In the 5 kW OI module an appropriate protective circuit is integrated as standard.			

Monitoring module

Description	Order No.	Power loss	Rated supply voltage	Weight approx. kg	Module width mm
Monitoring module Complete with all termination and connection elements. Suitable for internal and external cooling.	6SN11 12-1AC01-0AA1	70 W	3 AC 400 V –10% to 480 V +6% 50 Hz to 60 Hz ±10% or DC 490 V to 680 V	5	50

Pulsed resistor module

Description	Order No.	Power loss	Rated supply voltage	Continuous rating/ peak rating	Weight approx. kg	Module width mm
Pulsed resistor module Complete with all termination and connection elements	6SN11 13-1AB01-0BA1	Load-dependent 15 W to max. 315 W	DC 600 V/ 625 V/680 V	- With internal pulsed resistor 0.3 kW/25 kW - With external pulsed resistor 1.5 kW/25 kW	5	50

Blanking cover

Description	Order No.	Width mm
Blanking cover For fixing the module and for closing the prepared opening in the case of external cooling	6SN11 62-0BA04-0JA0	50

Warm air deflection plate

Description	Order No.	Important:
Warm air deflection plate	6SN11 62-0BA01-0AA0	Open-loop infeed modules are available for low ratings. These modules up to 10 kW contain the commutating reactors and a pulsed resistor that converts the braking energy of the drive modules into heat. With maximum utilization of the pulsed resistor (>200 W), a warm air deflection plate must be used to prevent overheating of the modules mounted above.

External pulsed resistors

Description	Order No.	Degree of protection	Weight approx. kg	Dimensions W x H x D mm
External pulsed resistor 1.5 kW/25 kW	6SN11 13-1AA00-0CA0	IP 20	5.6	193 x 410 x 240
0.3 kW/25 kW only for 28 kW I/RF module	6SN11 13-1AA00-0DA0	IP 54	3.4	83.5 x 280 x 54.5

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SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Capacitor module

Description	Order No.	Dimensions W x H x D mm
Capacitor module 4.1 mF	6SN11 12-1AB00-0BA0	100 x 480 x 211
Capacitor module 20 mF	6SN11 12-1AB00-0CA0	300 x 480 x 211

2-tier configuration

Description	Order No.
Adapter terminals for DC link connection (for 2-tier configuration)	• Pack of 2 double terminals 50 mm² for module widths of 50 mm to 200 mm • Pack of 2 double terminals 95 mm² for module widths of 300 mm
Device bus cable (for 2-tier configuration) with SIMODRIVE 611	Length: 1.5 m

Additional components

	Description	Order No.	Grid pattern mm
Shield contacting clip	The shield contacting clips for the electronics cables can be mounted on the threaded bushes on the power and infeed modules above the regulated control plug-in units.	6SN11 62-0FA00-0AA0	
	The plug-in terminals on the front panel of the modules can be coded by freely pluggable male coding elements on the pin side and corresponding female coding elements on the plug side (socket). The male and female coding elements are necessary only if the connectors are to be individually coded. The function of the plug-in terminals is not restricted if coding elements are not used.		
	Female coding elements for plug side (socket)	Quantity: 100 6FC9 348-7BA	5
	Male coding elements for pin side	Quantity: 100 6FC9 348-7BB	5

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SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Mechanical components · External cooling

Description	Size Infeed module	Size Power module 1FT6/1FK6/1FN3 motors	1PH motors	Infeed/power module	Mounting frame/ blanking cover	Width mm
					Order No.	
Mounting frame for cubicle mounting of an infeed module for external cooling	5 kW OI	–	–	6SN11 46-1AB00-0BA1	6SN11 62-0BA04-0JA0	–
	10 kW OI	–	–	6SN11 45-1AA01-0AA1	6SN11 62-0BA04-0HA1	–
	28 kW OI	–	–	6SN11 46-1AB00-0CA0	6SN11 62-0BA04-0DA1	–
	16 kW I/RF	–	–	6SN11 46-1BB01-0BA1	6SN11 62-0BA04-0BA1	–
	36 kW I/RF	–	–	6SN11 46-1BB02-0CA1	6SN11 62-0BA04-0DA1	–
	55 kW OI	–	–	6SN11 46-1BB00-0DA1	6SN11 62-0BA04-0EA0	–
	80 kW OI	–	–	6SN11 46-1BB00-0EA1	6SN11 62-0BA04-0EA0	–
	120 kW OI	–	–	6SN11 46-1BB00-0FA1	6SN11 62-0BA04-0EA0	–
Important: The mounting frame is not required if the cutouts required for the respective module are made in the cabinet wall in accordance with the Planning Guide. The above-mentioned mounting frame 6SN11 62-0BA04-0EA0 must be used for modules of 300 mm in width.						
Mounting frame for cubicle mounting of a power module for external cooling	–	3/ 6 A	3/ 3 A	6SN11 24-1AA00-0HA1	6SN11 62-0BA04-0AA1	–
	–	5/ 10 A	5/ 8 A	6SN11 24-1AA00-0AA1	6SN11 62-0BA04-0AA1	–
	–	9/ 18 A	8/ 16 A	6SN11 24-1AA00-0BA1	6SN11 62-0BA04-0AA1	–
	–	18/ 36 A	24/ 32 A	6SN11 24-1AA00-0CA1	6SN11 62-0BA04-0FA1	–
	–	28/ 56 A	30/ 51 A	6SN11 24-1AA00-0DA1	6SN11 62-0BA04-0BA1	–
	–	–	45/ 76 A	6SN11 24-1AA00-0LA1	6SN11 62-0BA04-0CA1	–
	–	56/112 A	60/102 A	6SN11 24-1AA00-0EA1	6SN11 62-0BA04-0CA1	–
	–	70/140 A	85/127 A	6SN11 24-1AA01-0FA1	6SN11 62-0BA04-0EA0	–
	–	–	120/193 A	6SN11 24-1AA00-0JA1	6SN11 62-0BA04-0EA0	–
	–	140/210 A	200/257 A	6SN11 24-1AA00-0KA1	6SN11 62-0BA04-0EA0	–
	–	2 x 3/ 6 A	3/ 8 A	6SN11 24-1AB00-0HA1	6SN11 62-0BA04-0AA1	–
	–	2 x 5/10 A	5/ 8 A	6SN11 24-1AB00-0AA1	6SN11 62-0BA04-0AA1	–
	–	2 x 9/18 A	8/ 16 A	6SN11 24-1AB00-0BA1	6SN11 62-0BA04-0AA1	–
	–	2 x 18/36 A	On request	6SN11 24-1AB00-0CA1	6SN11 62-0BA04-0GA1	–
Important: The mounting frame is not required if the cutouts required for the respective module are made in the cabinet wall in accordance with the SIMODRIVE 611 Planning Guide. A blanking plate (width 50 mm) can be supplied to cover the prepared opening; Order No.: 6SN11 62-0BA04-0JA0. The above-mentioned mounting frame must be used with modules that are 300 mm wide.						
Blanking plate for fixing the module and for closing the prepared opening in the case of external cooling	–	–	–	–	6SN11 62-0BA04-0JA0	50

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Mechanical components · Hose cooling

Description	Order No.	
Hose cooling packages Package 1 for single module consisting of: 2 x module connection flange 2000 mm hose 1 x cabinet connection flange 1 x radial fan with cabinet connection flange 3 AC 360 V to 457 V, 47.5 Hz to 62.5 Hz Connection current: 1 A to 1.2 A Package 2 for 2-tier configuration of 55 kW I/RF and 85 A PM consisting of: 4 x module connection flange 2000 mm hose 1 x cabinet connection flange 1 x radial fan as for package 1	6SN11 62-0BA03-0AA1 6SN11 62-0BA03-0CA1	Important: A 2-tier installation is permissible for the 55 kW I/RF module in combination with the 85 A power module. A hose connection assembly kit 6SN11 62-0BA03-0CA1 can be supplied for this purpose.

Mechanical components · Fans for internal and external cooling

Description	Order No.	Degree of protection	Supply voltage	Supply current
Built-on fan 	Radial blower for internal and external cooling 6SN11 62-0BA02-0AA1	IP 44	3 AC 360 V to 510 V, 45 Hz to 65 Hz	0.2 to 0.3 A
			Important: A built-on fan 6SN11 62-0BA02-0AA1 is required for several 300 mm modules for the internal cooling (see power and infeed modules in this chapter). In the case of external cooling, the fan box is part of the scope of supply of the mounting frame for the 300 mm module width. The required 6SN11 62-0BA02-0AA1 built-on fan must be ordered separately.	

Mechanical components · Shield terminal plate

Description	Order No.	Module width mm
Shield terminal plate 	For 5 kW OI module, monitoring module and pulsed resistor module 6SN11 62-0EB00-0AA0	50
	For 10 kW OI module 6SN11 62-0EB00-0BA0	100
	For 28 kW OI module, I/RF module and power modules with:	
	• Internal cooling	
	6SN11 62-0EA00-0AA0	50
	6SN11 62-0EA00-0BA0	100
	6SN11 62-0EA00-0CA0	150
	6SN11 62-0EA00-0JA0	200
	6SN11 62-0EA00-0DA0	300
	• External cooling	
	6SN11 62-0EB00-0AA0	50
	6SN11 62-0EB00-0BA0	100
	6SN11 62-0EB00-0CA0	150
	6SN11 62-0EB00-0JA0	200
	6SN11 62-0EB00-0DA0	300
	For modules with hose cooling or internal cooling with built-on fan 6SN11 62-0EA00-0KA0	300

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Supply components · Matching transformers

Rated power kW	Order No. for IP 00 degree of protection	Weight kg	Order No. for IP 23 degree of protection	Weight kg	Order No. for IP 20 degree of protection	Weight kg
Matching transformers with separate windings for 60 Hz supply systems						
Input voltage 3 AC 575/480 V $\pm 10\%$; 60 Hz $\pm 5\%$						
8.2	4AU36 95-0SB00-0CN2	51	4AU36 95-0SB02-0CN2	65	4AU36 95-0SB08-0CN2	65
15.7	4AU39 95-0SA30-0CN2	81	4AU39 95-0SA32-0CN2	95	4AU39 95-0SA38-0CN2	95
42.6	4BU47 95-0SC30-0C	196	4BU47 95-0SC32-0C	216	4BU47 95-0SC38-0C	216
21	4BU43 95-0SA70-0C	111	4BU43 95-0SA72-0C	131	4BU43 95-0SA78-0C	131
47	4BU47 95-0SC30-0C	196	4BU47 95-0SC32-0C	216	4BU47 95-0SC38-0C	216
70	4BU55 95-0SA40-0C	302	4BU55 95-0SA42-0C	364	4BU55 95-0SA48-0C	364
104	4BU58 95-0SA60-0C	424	4BU58 95-0SA62-0C	536	4BU58 95-0SA68-0C	536
155	4BU60 95-0SA60-0C	576	4BU60 95-0SA62-0C	688	4BU60 95-0SA68-0C	688
Input voltage 3 AC 240 V $\pm 10\%$; 60 Hz $\pm 5\%$						
8.2	4AU36 95-0SB20-0CN2	51	4AU36 95-0SB22-0CN2	65	4AU36 95-0SB28-0CN2	65
15.7	4AU39 95-0SA50-0CN2	81	4AU39 95-0SA52-0CN2	95	4AU39 95-0SA58-0CN2	95
42.6	4BU47 95-0SC50-0C	196	4BU47 95-0SC52-0C	216	4BU47 95-0SC58-0C	216
21	4BU43 95-0SB00-0C	111	4BU43 95-0SB02-0C	131	4BU43 95-0SB08-0C	131
47	4BU47 95-0SC50-0C	196	4BU47 95-0SC52-0C	216	4BU47 95-0SC58-0C	216
70	4BU55 95-0SA60-0C	302	4BU55 95-0SA62-0C	364	4BU55 95-0SA68-0C	364
104	4BU58 95-0SA80-0C	424	4BU58 95-0SA82-0C	536	4BU58 95-0SA88-0C	536
155	4BU60 95-0SA80-0C	576	4BU60 95-0SA82-0C	688	4BU60 95-0SA88-0C	688
Matching transformers with separate windings for 50/60 Hz supply systems						
Input voltage 3 AC 500 V $\pm 10\%$; 50 Hz -5% to 60 Hz $+5\%$						
8.2	4AU36 95-0SB00-0CN2	51	4AU36 95-0SB02-0CN2	65	4AU36 95-0SB08-0CN2	65
15.7	4AU39 95-0SA30-0CN2	81	4AU39 95-0SA32-0CN2	95	4AU39 95-0SA38-0CN2	95
42.6	4BU47 95-0SC30-0C	196	4BU47 95-0SC32-0C	216	4BU47 95-0SC38-0C	216
21	4BU43 95-0SA70-0C	111	4BU43 95-0SA72-0C	131	4BU43 95-0SA78-0C	131
47	4BU47 95-0SB30-0C	196	4BU47 95-0SB32-0C	216	4BU47 95-0SB38-0C	216
70	4BU55 95-0SA40-0C	302	4BU55 95-0SA42-0C	364	4BU55 95-0SA48-0C	364
104	4BU58 95-0SA60-0C	424	4BU58 95-0SA62-0C	536	4BU58 95-0SA68-0C	536
155	4BU60 95-0SA60-0C	576	4BU60 95-0SA62-0C	688	4BU60 95-0SA68-0C	688
Input voltage 3 AC 440/415/400 V $\pm 10\%$; 50 Hz -5% to 60 Hz $+5\%$						
8.2	4AU36 95-0SB10-0CN2	51	4AU36 95-0SB12-0CN2	65	4AU36 95-0SB18-0CN2	65
15.7	4AU39 95-0SA40-0CN2	81	4AU39 95-0SA42-0CN2	95	4AU39 95-0SA48-0CN2	95
42.6	4BU47 95-0SC40-0C	196	4BU47 95-0SC42-0C	216	4BU47 95-0SC48-0C	216
21	4BU43 95-0SA80-0C	111	4BU43 95-0SA82-0C	131	4BU43 95-0SA88-0C	131
47	4BU47 95-0SC40-0C	196	4BU47 95-0SC42-0C	216	4BU47 95-0SC48-0C	216
70	4BU55 95-0SA50-0C	302	4BU55 95-0SA52-0C	364	4BU55 95-0SA58-0C	364
104	4BU58 95-0SA70-0C	424	4BU58 95-0SA72-0C	536	4BU58 95-0SA78-0C	536
155	4BU60 95-0SA70-0C	576	4BU60 95-0SA72-0C	688	4BU60 95-0SA78-0C	688
Input voltage 3 AC 220 V $\pm 10\%$; 50 Hz -5% to 60 Hz $+5\%$						
8.2	4AU36 95-0SB20-0CN2	51	4AU36 95-0SB22-0CN2	65	4AU36 95-0SB28-0CN2	65
15.7	4AU39 95-0SA50-0CN2	81	4AU39 95-0SA52-0CN2	95	4AU39 95-0SA58-0CN2	95
42.6	4BU47 95-0SC50-0C	196	4BU47 95-0SC52-0C	216	4BU47 95-0SC58-0C	216
21	4BU43 95-0SB00-0C	111	4BU43 95-0SB02-0C	131	4BU43 95-0SB08-0C	131
47	4BU47 95-0SC50-0C	196	4BU47 95-0SC52-0C	216	4BU47 95-0SC58-0C	216
70	4BU55 95-0SA60-0C	302	4BU55 95-0SA62-0C	364	4BU55 95-0SA68-0C	364
104	4BU58 95-0SA80-0C	424	4BU58 95-0SA82-0C	536	4BU58 95-0SA88-0C	536
155	4BU60 95-0SA80-0C	576	4BU60 95-0SA82-0C	688	4BU60 95-0SA88-0C	688
Input voltage 3 AC 200 V $\pm 10\%$; 50 Hz -5% to 60 Hz $+5\%$						
8.2	4AU36 95-0SB20-0CN2	51	4AU36 95-0SB22-0CN2	65	4AU36 95-0SB28-0CN2	65
15.7	4AU39 95-0SA50-0CN2	81	4AU39 95-0SA52-0CN2	95	4AU39 95-0SA58-0CN2	95
42.6	4BU47 95-0SC50-0C	196	4BU47 95-0SC52-0C	216	4BU47 95-0SC58-0C	216
21	4BU43 95-0SA50-0C	111	4BU43 95-0SA52-0C	131	4BU43 95-0SA58-0C	131
47	4BU47 95-0SC50-0C	196	4BU47 95-0SC52-0C	216	4BU47 95-0SC58-0C	216
70	4BU55 95-0SA60-0C	302	4BU55 95-0SA62-0C	364	4BU55 95-0SA68-0C	364
104	4BU58 95-0SA80-0C	424	4BU58 95-0SA82-0C	536	4BU58 95-0SA88-0C	536
155	4BU60 95-0SA80-0C	576	4BU60 95-0SA82-0C	688	4BU60 95-0SA88-0C	688
Matching transformers with an economy circuit						
Input voltage 3 AC 480 V/440 V $\pm 10\%$						
21	6SN11 11-0AA0-0BB1	26				
46.5	6SN11 11-0AA0-0CB0	60				
70.3	6SN11 11-0AA0-0DB0	60				
104	6SN11 11-0AA0-0EB0	80				
155	6SN11 11-0AA0-0FB1	125				
Input voltage 1 AC 230 V $\pm 10\%$						
21	6SN11 11-0AA0-0BC0	60				
46.5	6SN11 11-0AA0-0CC0	120				
70.3	6SN11 11-0AA0-0DC0	135				
104	6SN11 11-0AA0-0EC0	220				
155	6SN11 11-0AA0-0FC0	300				

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Supply components · HF commutating reactor, supply voltage 3 AC 400/480 V

Assignment to the infeed module	Order No.	Rated AC current	Power loss	Max. conductor cross-section, primary/secondary side	Weight approx.	Dimensions (W x H x D) approx.
kW		A	W	mm ²	kg	mm
28 (OI)	6SN11 11-1AA00-0CA0	65	70	50)	6	204 x 200 x 100
16 (I/RF)	6SN11 11-0AA00-0BA1	30	170	16)	8.5	330 x 145 x 150
36 (I/RF)	6SN11 11-0AA00-0CA1	67	250	50)	13	330 x 230 x 150
55 (I/RF)	6SN11 11-0AA00-0DA1	103	350	70)	18	330 x 280 x 150
80 (I/RF)	6SN11 11-0AA00-1EA0	150	450	FL ¹⁾	40	380 x 250 x 170
120 (I/RF)	6SN11 11-0AA00-1FA0	225	590	FL ¹⁾	50	380 x 290 x 170

Supply components · Mains filters

Assignment to the infeed module	Order No.	Rated AC current	Power loss	Max. conductor cross-section, primary/secondary side	Connection of equipotential bonding (PE)	Weight approx.	Dimensions (W x H x D) approx.
kW		A	W	mm ²		kg	mm
5 (OI)	6SN11 11-0AA01-1BA0	16	20	4	M 6, bolt	3.8	156 x 193 x 81
10 (OI)	6SN11 11-0AA01-1AA0	25	20	10	M 6, bolt	5.7	156 x 281 x 91
28 (OI)	6SN11 11-0AA01-1CA0	65	25	50	M 10, bolt	12.5	171 x 261 x 141
16 (I/RF)	6SN11 11-0AA01-2BA0	30	70	10	M 5, bolt	9	130 x 480 x 149.5
36 (I/RF)	6SN11 11-0AA01-2CA0	67	90	50	M 8, bolt	16	130 x 480 x 244.5
55 (I/RF)	6SN11 11-0AA01-2DA0	103	110	50	M 8, bolt	19	130 x 480 x 279.5
80 (I/RF)	6SN11 11-0AA01-2EA0	150	150	95	M 8, bolt	22	200 x 480 x 279.5
120 (I/RF)	6SN11 11-0AA01-2FA0	225	200	FL ¹⁾	M 10, bolt	32	300 x 480 x 279.5

Supply components · Mains filter packages

We recommend ordering the mains filter packages for I/RF modules.

For adapting the mains filter packages to the mounting surface and to the fixing point

geometry of the previous filter modules, adapter sets are available. The installed depth will, in

this case, protrude between 20 mm and 30 mm beyond the front of the drive system.

Assignment to the I/RF module	Mains filter package	Adapter set
kW	Order No.	Order No.
16	6SN11 11-0AA01-2BB0	6SN11 62-0GA00-0BA0
36	6SN11 11-0AA01-2CB0	6SN11 62-0GA00-0CA0
55	6SN11 11-0AA01-2DB0	6SN11 62-0GA00-0DA0
80	6SN11 11-0AA01-2EB0	6SN11 62-0GA00-0EA0
120	6SN11 11-0AA01-2FB0	6SN11 62-0GA00-0EA0

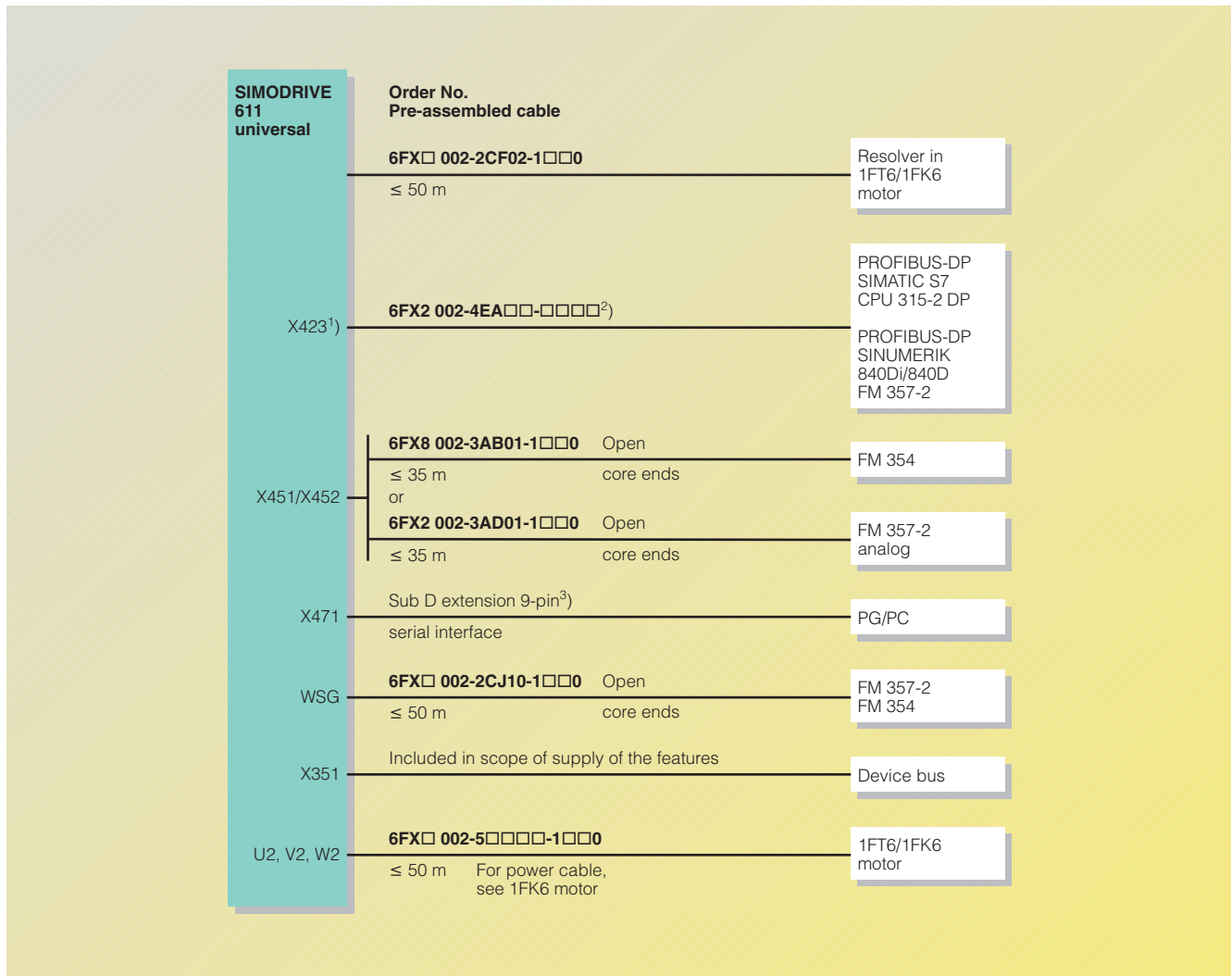
1) FL = Flat-type terminal, drilled hole Ø 9 mm.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Cables for SIMODRIVE 611 universal



Connection overview for SIMODRIVE 611 universal, resolver

Shield terminal plates are necessary for attaching the shields of the encoder leads.

Power and signal cables can be lengthened or assembled within the maximum permissible length. In such cases, the typical connections from Catalog NC Z must be selected.

When more than one additional intermediate connection is used in the signal cables, the max. permissible cable length is reduced by 2 m per cable connection.

1) PROFIBUS connector, e.g.:
Order No. 6FX2 003-0AA02

2) 6XV1 830-0EH10: not suitable for trailing
6XV1 830-3BH10: for trailing.

3) Generally available PC accessories.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE converter system

Cables for SIMODRIVE 611 universal (continued)

SIMODRIVE 611 universal		Order No. Pre-assembled cable	
X411/X412		6FX8 002-1AA14-1A□□0	Open
		≤ 5 m (1 m, 2 m, 5 m)	core ends
			Temperature sensor in 1FN motor ¹⁾
			Adapter cable ²⁾ 313 791..
			Direct linear absolute encoder EnDat LC 181
		6FX□ 002-2CH00-1□□□0	
		≤ 50 m	
			Rotary absolute encoder EnDat ROC 413/ROQ 425
		6FX□ 002-2CG00-1□□□0	
		≤ 50 m	
			Incremental encoder sin/cos 1 V _{pp} 6FX2 001-3...
		6FX□ 002-2EQ10-1□□□0	
		≤ 50 m	
			Absolute encoder/simple absolute encoder EnDat in 1FT6/1FK6 motor
			Adapter cable ²⁾ 310 128..
			Direct linear incremental encoder sin/cos 1 V _{pp} LS 186 (C)/LF 183 (C)/LB 381 (C) LS 468 (C)/LF 481 (C)
		6FX□ 002-2CA31-1□□□0	
		≤ 50 m	
			Motor encoder in 1PH motor or SIZAG 2
			Incremental encoder sin/cos 1 V _{pp} in 1FT6/1FK6 motor
X423		⁴⁾⁵⁾ 6XV1 830-□□H10	Cut to length
			PROFIBUS-DP SIMATIC S7 CPU 315-2 DP
		6FX2 002-4EA□□-□□□□ ⁴⁾	
			PROFIBUS-DP SINUMERIK 840Di/840D FM 357-2
		6FX2 002-4EA07-1□□□0	
X451/X452		6FX8 002-3AB01-1□□□0	Open
		≤ 35 m or	core ends
			FM 354
		6FX5 002-3AD01-1□□□0	Open
		≤ 35 m	core ends
			FM 357-2
X471		Sub D extension, 9-pin ³⁾	
		serial interface	PG/PC
X461/X462 WSG		⁶⁾ 6FX□ 002-2CJ10-1□□□0	
		≤ 50 m	
			SINUMERIK 802C FM 357-2 FM 354
X351		Included in scope of supply	
			Device bus
		6FX□ 002-5□□□□-1□□□0	
		≤ 50 m	
			For power cable, see 1FK6 motor
			1FK6 motor 1FT6 motor
		6FX7 00□-□□□□□-1□□□0	
		≤ 50 m	
			For power cable, see 1FN motor
			1FN motor
		6FX□ 008-...	
		≤ 50 m	
			For power cable, see 1PH/1FE1 motor
			1FK6 motor 1FT6 motor

Connection overview for SIMODRIVE 611 universal, absolute encoder/simple absolute encoder EnDat and incremental encoder sin/cos 1 V_{pp}

1) The temperature sensor must be connected by the customer. The leads for the temperature are routed in the power cable 6FX7 00□-5EA... for the 1FN motor.

2) Cable must be ordered from the manufacturer of the linear position encoder.

3) Generally available PC accessories.

4) PROFIBUS connector, e.g.: Order No. 6FX2 003-0AA02

5) 6XV1 830-0EH10: not suitable for trailing 6XV1 830-3BH10: for trailing.

SIMODRIVE 611 universal and POSMO

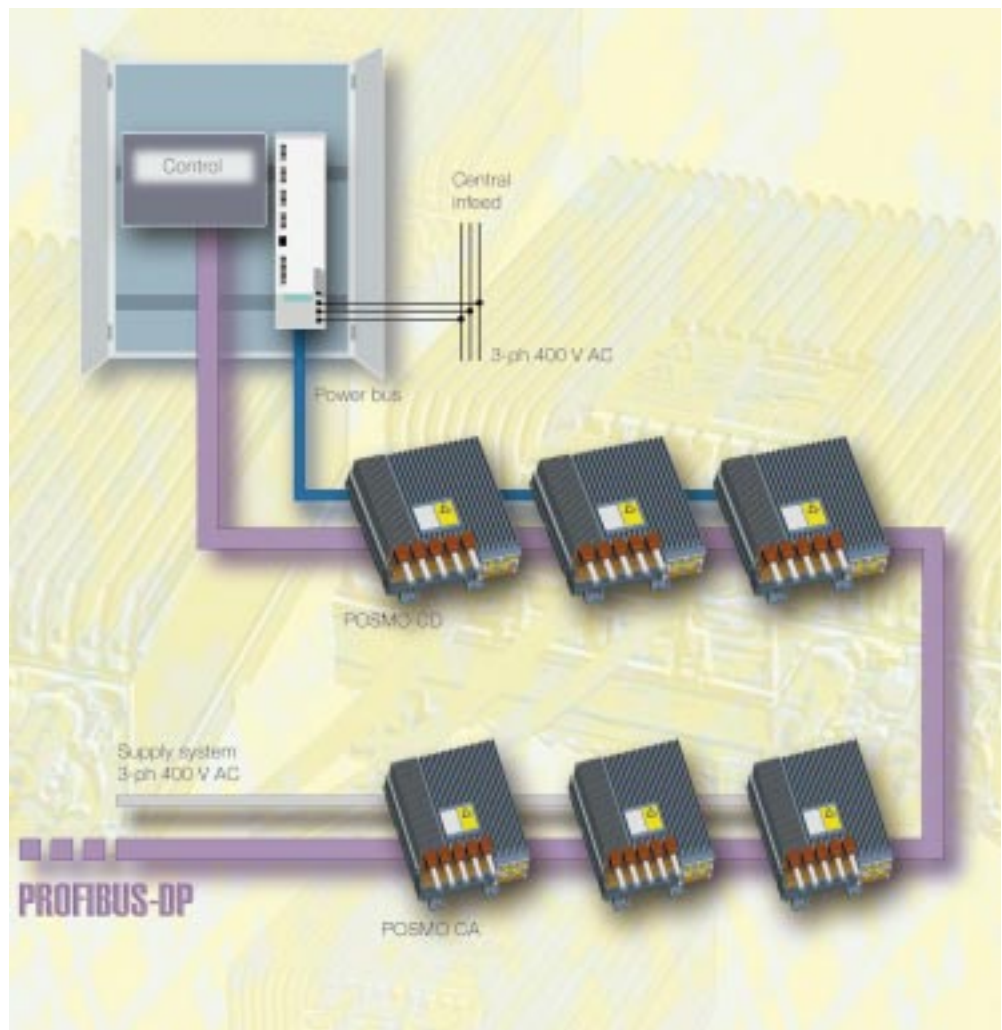
Selection and ordering data

SIMODRIVE POSMO CD/CA, SI

SIMODRIVE POSMO CD, SIMODRIVE POSMO CA

PROFIBUS-DP

PROFIBUS-DP supports the rapid transfer of data between SIMODRIVE POSMO CD/CA and the higher-level master, e.g. a SIMATIC S7. Using the synchronous version of PROFIBUS-DP (Motion Control), interpolatory operation of the SIMODRIVE POSMO CD/CA with a higher-level PLC is possible.



Distributed drive technology, configuration with SIMODRIVE POSMO CD/CA

Variants	Supply voltage	SIMODRIVE POSMO CD/CA Distributed converter Natural convection Order No.	Rated converter power P_N kW	Rated converter power I_N A	Maximum converter current I_{max} A	Weight approx. kg
SIMODRIVE POSMO CD	600 V DC	6SN2 703-2AA 0 □-0BA0 6SN2 703-2AA 0 □-0CA0	5 10	9 18	18 36	15 13
SIMODRIVE POSMO CA	3 AC 400 V to 480 V	6SN2 703-3AA □ □-0BA0	5	9	18	15

Connection

without EMC filter, TN/TT/IT systems	0
with EMC filter, TN systems	1
no additional measuring system	0
with additional measuring system	3

SIMODRIVE 611 universal and POSMO

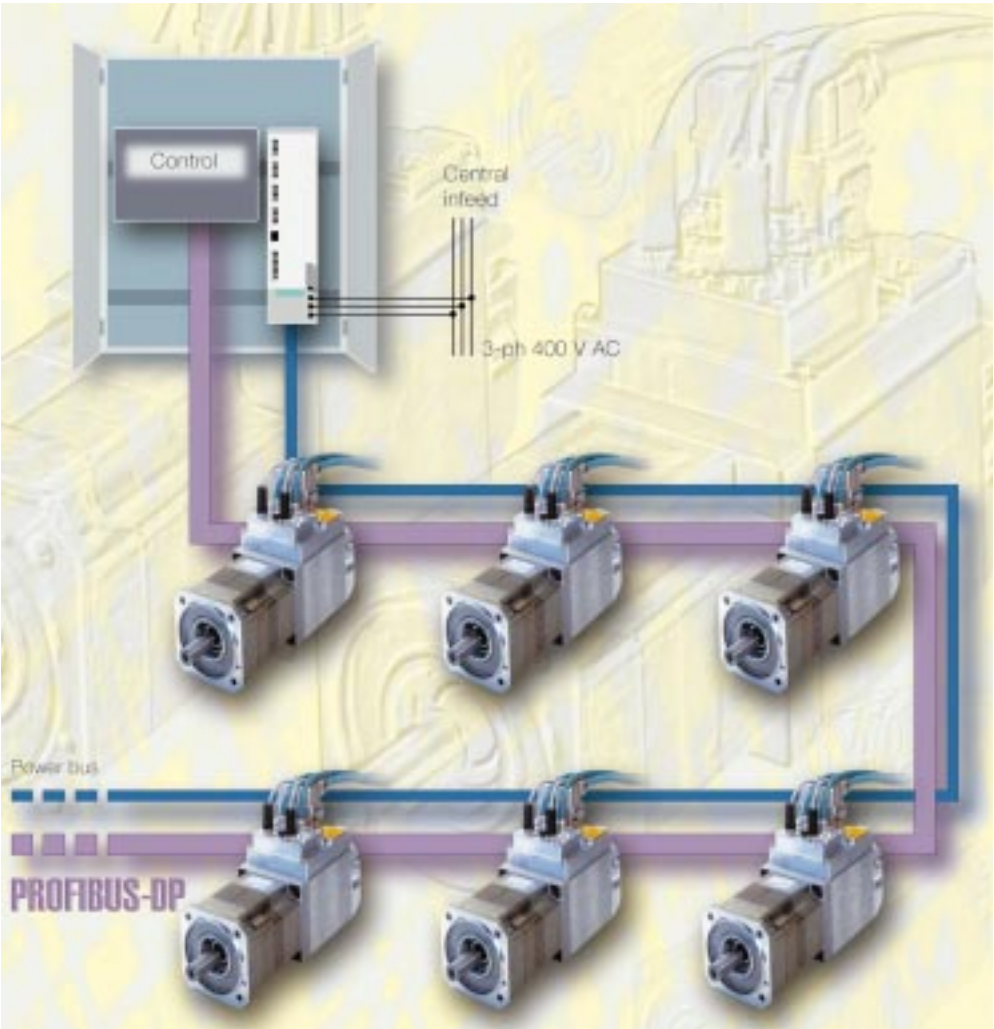
Selection and ordering data

SIMODRIVE POSMO CD/CA, SI

SIMODRIVE POSMO SI

PROFIBUS-DP

PROFIBUS-DP supports the rapid transfer of data between SIMODRIVE POSMO SI and the higher-level master, e.g. a SIMATIC S7. Using the synchronous version of PROFIBUS-DP (Motion Control), interpolatory operation of the SIMODRIVE POSMO SI with a higher-level PLC is possible.



Distributed drive technology, configuration with SIMODRIVE POSMO SI

Static torque τ_0 (100) for $\Delta T = 100$ K Nm	Rated torque τ_N (100) for $\Delta T = 100$ K Nm	Order No.	Motor phase current I_0 (100) for τ_0 (100) A	Rated current required I_N (100) for τ_N (100) A	Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$ P_{calc} (100) for τ_0 (100) kW	Rotor moment of inertia (without brake) J 10^{-4} kgm ²	Weight (without brake/ with brake) kg
6.0	4.0	6SN2 460-2BF00-0G □□	4.3	3.1	1.9	8.6	12.0/12.5
11.0	6.0	6SN2 463-2BF00-0G □□	7.9	4.7	3.5	16.1	16.3/16.8
8.0	6.8	6SN2 480-2BF00-0G □□	5.8	5.2	2.5	16.1	17.3/17.8
16.0	10.5	6SN2 483-2BF00-0G □□	10.4	7.7	5.0	27.1	21.0/22.5
18.0	12.0	6SN2 500-2BF00-0G □□	12.2	8.4	5.7	57.2	23.9/26.3

Shaft end	Tolerance	Holding brake	
with key and keyway	N	without	A
with key and keyway	N	with	B
smooth shaft	N	without	G
smooth shaft	N	with	H
Degree of protection			
IP 64			0
IP 65 and also DE flange IP 67			2

LP planetary gear units for SIMODRIVE POSMO SI

Order number with identification code **"Z"** and order code V40 or V41 for the built-on planetary gear unit assigned to the motor. Shaft end at drive end: smooth shaft (prerequisite for fitting on the LP gear unit).

6SN2 □□□□-0G□□- Z	
V□□	
▲	G Smooth shaft without holding brake
▲	H Smooth shaft with holding brake
4 0	Gear ratio $i = 5$
4 1	Gear ratio $i = 10$

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE POSMO CD/CA, SI

Cables

SIMODRIVE POSMO CD		Order No.	Pre-assembled cable	
SUPPLY IN (3+2-pole)	Female straight	6FX1 002 - 5DA55 - 1 □ □ 0	< 100 m ¹⁾	MS (mains supply) P600, M600
	Female angled	6FX1 002 - 5DA65 - 1 □ □ 0	< 100 m ¹⁾	
SUPPLY OUT (3+2-pole)	Male angled	6FX1 002 - 5DA15 - 1 □ □ 0	< 100 m ¹⁾ or	SIMODRIVE POSMO SI POSMO CD SUPPLY IN (3+2-pole)
	Male straight	6FX1 002 - 5DA25 - 1 □ □ 0	< 100 m ¹⁾ or	
	Male angled	6FX1 002 - 5DA35 - 1 □ □ 0	< 100 m ¹⁾	
	Male angled	6FX1 002 - 5DA02 - 1 □ □ 0	≤ 5 m or	
MOT POWER (4+2-pole)	Male angled	6FX1 002 - 5DA85 - 1 □ □ 0	≤ 5 m	1FT6/1FK motor
	Male angled	6FX1 002 - 5CA32 - 1 □ □ 0	≤ 5 m or	Terminal box connection 1PH motor
	Male angled	6FX1 002 - 5CA16 - 1 □ □ 0	≤ 5 m	
	Male angled	6FX1 002 - 5CA02 - 1 □ □ 0	≤ 5 m	
DIR MEASRG (17-pole)	Female angled	6FX1 002 - 2AA10 - 1 □ □ 0	≤ 15 m or	Incremental direct measuring system
	Female angled	6FX1 002 - 2AA30 - 1 □ □ 0	≤ 15 m or	Absolute direct measur- ing system (EnDat)
	Female angled	6FX1 002 - 2AA50 - 1 □ □ 0	≤ 15 m	Absolute direct measuring system (SSI)
MOT ENCODR (21-pole)	Female angled	6FX1 002 - 2AA60 - 1 □ □ 0	≤ 5 m or	Incremental motor measuring system
	Female angled	6FX1 002 - 2AA70 - 1 □ □ 0	≤ 5 m	Absolute motor measur- ing system (EnDat)
PROFIBUS-DP IN		6XV1 830 - □ □ H10 ²⁾	2-core cut to length	PROFIBUS-DP Master
PROFIBUS-DP OUT		6FX1 002 - 4EA00 - 1BA0	2-core with PG connection	SIMODRIVE POSMO SI POSMO CD POSMO CA
		10 m or 6XV1 830 - □ □ H10 ²⁾	2-core cut to length	
		or 6ES7 194 - 1LY00 - 0AA0	5-core not pre-assembled	

1) The total cable length in the DC link for all devices connected to an infeed must not exceed 100 m.

2) 6XV1 830-0EH10 not suitable for trailing, 6XV1 810-3EH10 for trailing.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE POSMO CD/CA, SI

Cables (continued)

		Order No. Pre-assembled cable	
SIMODRIVE POSMO CA	SUPPLY IN (4+2-pole)	Female angled 6FX1 002 - 5DA75 - □ □ □ 0	Supply system U1, V1, W1
	SUPPLY OUT (4+2-pole)	Male angled 6FX1 002 - 5DA45 - □ □ □ 0	Female angled SIMODRIVE POSMO CA SUPPLY IN (4+2-pole)
MOT POWER (4+2-pole)	Male angled	6FX1 002 - 5DA02 - 1 □ □ 0 ≤ 5 m (4 x 2.5 mm ² + 2 x 1.5 mm ²) and	Female straight, connector size 1
	Male angled	6FX1 002 - 5DA85 - 1 □ □ 0 ≤ 5 m (4 x 6 mm ² + 2 x 1.5 mm ²)	Female straight, connector size 1.5
	Male angled	6FX1 002 - 5EA12 - 1 □ □ 0 ≤ 5 m	Female straight
	Male angled	6FX1 002 - 5CA32 - 1 □ □ 0 ≤ 5 m (4 x 2.5 mm ² + 2 x 1.5 mm ²) or	Terminal box connection 1PH motor
	Male angled	6FX1 002 - 5CA16 - 1 □ □ 0 ≤ 5 m (4 x 6 mm ² + 2 x 1.5 mm ²)	
			1FT6/1FK motor
DIR MEASRG (17-pole)	Female angled	6FX1 002 - 2AA10 - 1 □ □ 0 ≤ 15 m or	Female straight Incremental direct measuring system
	Female angled	6FX1 002 - 2AA30 - 1 □ □ 0 ≤ 15 m or	Female straight Absolute direct measur- ing system (EnDat)
	Female angled	6FX1 002 - 2AA50 - 1 □ □ 0 ≤ 15 m	Female straight Absolute direct measuring system (SSI)
MOT ENCODR (21-pole)	Female angled	6FX1 002 - 2AA60 - 1 □ □ 0 ≤ 5 m or	Female straight Incremental motor measuring system
	Female angled	6FX1 002 - 2AA70 - 1 □ □ 0 ≤ 5 m	Female straight Absolute motor measur- ing system (EnDat)
PROFIBUS-DP IN		6XV1 830 - □ □ H10 ¹⁾ 2-core cut to length	PROFIBUS-DP Master
PROFIBUS-DP OUT		6FX1 002 - 4EA00 - 1BA0 2-core with PG connection	SIMODRIVE POSMO SI POSMO CD POSMO CA
		10 m or	
		6XV1 830 - □ □ H10 ¹⁾ 2-core cut to length	
		≤ 15 m or	
		6ES7 194 - 1LY00 - 0AA0 5-core not pre-assembled	
		≤ 5 m	

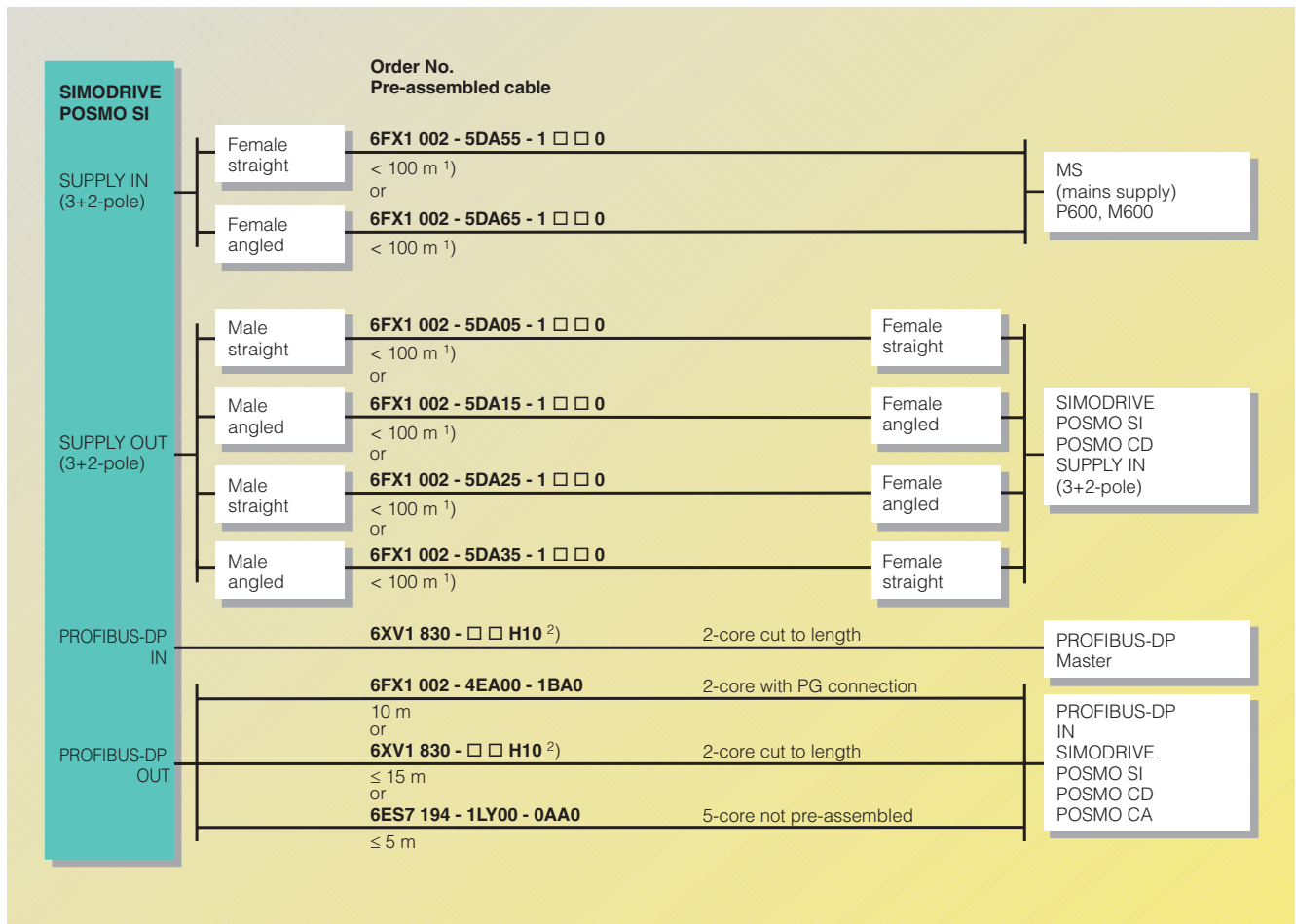
1) 6XV1 830-0EH10 not suitable for trailing,
6XV1 810-3EH10 for trailing.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE POSMO CD/CA, SI

Cables (continued)



Connection overview for SIMODRIVE POSMO SI or POSMO SI – POSMO SI/CD

1) The total cable length in the DC link for all devices connected to an infeed must not exceed 100 m.

2) 6XV1 830-0EH10 not suitable for trailing,
6XV1 810-3EH10 for trailing.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE POSMO A positioning motor

SIMODRIVE POSMO A 75 W

Order No.	Speed	Available torque at continuous operation	Gear unit type	Stage number	Ratio	Gear unit efficiency	Permissible continuous gear unit torque ¹⁾	Max. available overload torque ²⁾	Moment of inertia	Weight, approx.
	rpm	τ_{S1} Nm					$\tau_{perm. S1}$ Nm	$\tau_{S3 25\%}$ Nm	10^{-6} kgm^2	kg
6SN21 32-0AA11-1BA0	3300	0.18	–	–	–	–	–	0.36	60	3.1
6SN21 32-1BC11-1BA0	733	0.7	Planetary gear unit – Play 1°	1	4.5	0.85	1.2	1.4	60.9	3.5
6SN21 32-1BF11-1BA0	413	1.2		1	8	0.85	1.2	2.4	60.9	3.5
6SN21 32-1CK11-1BA0	163	2.6		2	20, 25	0.72	8.0	5.2	60.9	3.7
6SN21 32-1CR11-1BA0	92	4.7	Planetary gear unit – Play 1.5°	2	36	0.72	8.0	9.3	60.9	3.7
6SN21 32-1CU11-1BA0	66	6.5		2	50	0.72	8.0	13.0	60.9	3.7
6SN21 32-1DE11-1BA0	26	13.9		3	126, 56	0.61	24	27.8	60.9	3.9
6SN21 32-1DH11-1BA0	20	17.8	Worm gear	3	162	0.61	24	35.6	60.9	3.6
6SN21 32-5KD11-1BA0	660	0.6		1	5	0.70	2.0	1.3	61.5	3.5
6SN21 32-5KM11-1BA0	138	2.2		1	24	0.50	3.5	4.3	61.5	3.5
6SN21 32-5KW11-1BA0	44	3.4		1	75	0.25	4.0	6.8	61.5	3.5

SIMODRIVE POSMO A 300 W

Order No.	Speed	Available torque at continuous operation	Gear unit type	Stage number	Ratio	Gear unit efficiency	Permissible continuous gear unit torque ¹⁾	Max. available overload torque ³⁾	Moment of inertia	Weight, without (with) brake approx.
	rpm	τ_{S1} Nm					$\tau_{perm. S1}$ Nm	$\tau_{S3 25\%}$ Nm $\tau_{S3 6.3\%}$ Nm	10^{-6} kgm^2	kg
6SN21 55-□AA1 □-1BA0	3500	0.48	–	–	–	–	–	0.95 1.9	63 67	3.9 (4.0)
6SN21 55-2BD1 □-1BA0	875	1.7	Planetary gear unit – Play 0.25°	1	4	0.90	26	3.4 6.8	94 98	5.1 (5.2)
6SN21 55-2BF1 □-1BA0	500	3.0		1	7	0.90	26	6.0 12.0	92.1 96.9	5.1 (5.2)
6SN21 55-2CH1 □-1BA0	292	4.9	Planetary gear unit – Play 0.33°	2	12	0.85	36	9.7 19.4	95.4 99.4	5.4 (5.5)
6SN21 55-2CK1 □-1BA0	175	8.2		2	20	0.85	42	16.2 32.3	93.7 97.7	5.4 (5.5)
6SN21 55-2CM1 □-1BA0	100	14.3		2	35	0.85	44	28.3 44.0	92.4 96.4	5.4 (5.5)
6SN21 55-2CP1 □-1BA0	71	20.0		2	49	0.85	44	39.6 44.0	92.4 96.4	5.4 (5.5)

0	without holding brake
1	with holding brake
0	with key
1	smooth shaft

1) The specified values are continuous torque values. The gears can be briefly subjected to higher torques of up to twice the continuous torque value without being damaged. If this limit is exceeded, the gear unit can be damaged.

2) S_{3 25%} ON period 15 s, operation 1 min

3) S_{3 25%} ON period 60 s, operation 4 min
S_{3 6.3%} ON period 15s, operation 4 min

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE POSMO A positioning motor

Cables and connectors

Different types of PROFIBUS cables are available for various installation applications, e.g. trailing cables, robust cables etc. (for further details, see Part 2 or the Siemens catalog IK PI and the electronic catalog CA01). Generally the cables listed should be used. Due to double shielding, these cables are particularly suitable for industrial environments subject to electromagnetic interference. PROFIBUS FastConnect (FC) is a system for fast and easy assembly of PROFIBUS copper cables. The system comprises three compatible components:

- FastConnect bus cables for fast installation
- FastConnect stripping tool
- FastConnect bus connector for PROFIBUS.

Designation		Order No.
PROFIBUS FC Standard Cable	(Standard type) specially designed for rapid assembly, two-wire, shielded, sold by the meter; consignment 1000 m max., min. ordering quantity 20 m	6XV18 30-0EH10
	Preferred lengths	
	20 m	6XV18 30-0EN20
	50 m	6XV18 30-0EN50
	100 m	6XV18 30-0ET10
	200 m	6XV18 30-0ET20
	500 m	6XV18 30-0ET50
PROFIBUS FC Robust Cable	Two-wire, shielded, sold by the meter; consignment 1000 m max., min. ordering quantity 20 m	6XV18 30-0JH10
PROFIBUS FC Trailing Cable	Two-wire, shielded, sold by the meter; consignment 1000 m max., min. ordering quantity 20 m	6XV18 30-3EH10
PROFIBUS FastConnect	Stripping tool Preset stripping tool for rapid stripping of insulation from PROFIBUS Fast Connect bus cables	6GK19 05-6AA00
	Blade cassettes Spare blade cassettes for the PROFIBUS FastConnect stripping tool, 5 units	6GK19 05-6AB00
PROFIBUS FastConnect bus	RS 485 connector with 90° cable outlet With insulation piercing • Without PG interface • With PG interface ¹⁾	6ES79 72-0BA50-0XA0 6ES79 72-0BB50-0XA0
	RS 485 connector with 180° cable outlet	6GK15 00-0FC00

Power cable

The largest connectable conductor cross-section for POSMO A is 4 mm². The outer cable diameter must be between 8 mm and 12 mm for compliance with the IP 54 degree of protection.

It is recommended that the 6FX50 08-5FA00-1FA0 cable is used.

The current for the electronics is obtained from the supply cable. When the bus communication and position detection are required to remain active even when the load power supply is switched off, an optional power supply can be connected (24 V ±20%).

The supply cables are routed together with the PROFIBUS cable 6ES71 94-1LY00-0AA0 or 6ES71 94-1LY10-0AA0 (oil resistant).

Power cable	Load rating ²⁾	Cross-section	Outer diameter of cable D _{max}	Order No.	Weight	Length
	A	mm ²	mm		kg/m	m
Power cable	31	2 x 4 mm ²	10.7	6FX50 08-5FA00-1FA0	0.176	50
Power cable PVC casing	5	1 x 2 x 0.65 mm ² 3 x 1 x 0.75 mm ²	10	6ES71 94-1LY00-0AA0-Z	0.232	Sold by the meter
Power cable, oil-resistant PUR casing	5	1 x 2 x 0.65 mm ² 3 x 1 x 0.75 mm ²	10	6ES71 94-1LY10-0AA0-Z	0.232	Sold by the meter

1) Sub-D socket on rear of connector, permits piggy-back mounting of a second connector.

2) According to IEC 60 204-1 1997 reviewed in 1998, at 40 °C, installation condition C.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE POSMO A positioning motor

Power Management Module DC-PMM 24V/48 V

The DC PMM is installed between one or more positioning motors (POSMO A) and the load power supply. The Power Management Module provides feedback protection. The PMM detects when the positioning motor brakes and converts the energy fed back by the motor into heat by means of an internal pulsed resistor.

An integrated I^2t monitor protects the pulsed resistor from thermal overload and destruction. The relay contacts of the PMM are used as signaling and monitoring contacts for the operating states "Ready" and "Fault".

Description	Order No.
Power Management Module (DC-PMM/24 V)	9AL21 37-1AA00-1AA0
Power Management Module (DC-PMM/48 V)	9AL21 37-1BA00-1AA0



Power Management Module

3

SITOP power

The SITOP range of 24 V power supplies has been optimized for industrial applications and operates on the primary pulse principle. The precise regulation of the output voltage makes the device suitable even for connection to sensitive sensors.

DC/DC transformers with 600 V inputs have been specially developed for connection to converters with a DC link. The drive energy can be used to provide a continued supply to 24 V loads, even after a power failure; appropriate safety measures can therefore be implemented.

15 A and 40 A DC UPS modules with external battery backup are available to provide protection against extended power failures.

Technical characteristics

- Precise output voltage
- Low residual ripple
- Large input voltage range
- High utilization factor
- Easy assembly
- Integrated electronic short-circuit protection
- Safe electrical isolation (SELV acc. to EN 60 950)
- In accordance with national and international standards, e.g. EMC to EN 50 081-1/-2 and EN 50 082-1/-2; UL/cUL approvals
- No silicone release

Version	Input voltage $U_{e \text{ rated}}$	Order No.	Voltage range	Output voltage $U_{a \text{ rated}}$	Current $I_{a \text{ rated}}$
DC 24 V/5 A; 10 A; 20 A 1-phase c_{us}					
	AC 120 V/230 V	6EP13 33-2BA00	AC 93 V – 132 V/ AC 187 V – 264 V	DC 24 V $\pm 3 \%$	5 A
	AC 120 V/230 V	6EP13 34-2BA00	AC 93 V – 132 V/ AC 187 V – 264 V	DC 24 V $\pm 3 \%$	10 A
	AC 120 V/230 V	6EP13 36-2BA00	AC 93 V – 132 V/ AC 187 V – 264 V	DC 24 V $\pm 3 \%$	20 A

SIMODRIVE 611 universal and POSMO

Selection and ordering data

SIMODRIVE POSMO A positioning motor

SITOP power (continued)

Version	Input voltage $U_{e \text{ rated}}$	Order No.	Voltage range	Output voltage $U_{a \text{ rated}}$	Current $I_{a \text{ rated}}$
DC 24 V /10 A; 20 A; 30 A; 40 A 3-phase c[®]_{US}					
	3 AC 400 V – 500 V	6EP14 34-2BA00	3 AC 360 V – 550 V	DC 24 V ± 3 %	10 A
	3 AC 400 V – 500 V	6EP14 36-2BA00	3 AC 360 V – 550 V	DC 24 V ± 3 %	20 A
	3 AC 400 V – 500 V	6EP14 37-2BA00	3 AC 360 V – 550 V	DC 24 V ± 3 %	30 A
	3 AC 400 V – 500 V	6EP14 37-2BA10	3 AC 360 V – 550 V	DC 24 V ± 3 %	40 A



Rectifier unit



Input voltage 3 AC V	Frequency Hz	Output voltage DC V	Output current DC A	Order No.
480/400 +6 %/–10 %	50 – 60	48	25	4AV35 96-0EG30-0C

For technical data, see Part 2.

SIMODRIVE 611 universal and POSMO

Selection and ordering data

Software

Drive ES configuration program

Designation	Order No.	Type of delivery	Documentation
Drive ES software packages · Installation as an integrated option for STEP® 7, Version ≥ V 5.1 upwards			
Drive ES Basic V 5.1 ¹⁾ single-user licence	6SW17 00-5JA00-1AA0	CD-ROM, 1 unit	Five standard languages
Drive ES Basic Upgrade V 5.0 → V 5.1 single-user licence	6SW17 00-5JA00-1AA4	CD-ROM, 1 unit	Five standard languages
Drive ES Basic V 5.1 copy/company licence	6SW17 00-5JA00-1AA1	CD-ROM, 1 unit	Five standard languages
Drive ES SIMATIC V 5.1 single-user licence	6SW17 00-5JC00-1AA0	CD-ROM, 1 unit	Five standard languages
Drive ES SIMATIC Upgrade V 5.0 → V 5.1 single-user licence	6SW17 00-5JC00-1AA4	CD-ROM, 1 unit	Five standard languages
Drive ES SIMATIC V 5.1 copy/runtime licence	6SW17 00-5JC00-1AC0	Product certificate only (without software and documentation)	Five standard languages

Contents of the Drive ES SIMATIC package

- **Communication software "PROFIBUS-DP"** for
S7-300 with CPUs with integrated DP interface (DRVDPS7, POSMO module libraries)
S7-400 with CPUs with integrated DP interface or with CP443-5 (DRVDPS7, POSMO module libraries)
S7-300 with CP342-5 (DRVDPS7C module library)
- **Communication software "USS"® protocol** for
S7-200 with CPU 214/CPU 215/CPU 216 (DRVUSS2 driver program for STEP 7-Micro programming tool)
S7-300 with CP 340/341 and S7-400 with CP 441 (DRVUSS7 module library)
- **STEP 7 slave object manager**
for the easy configuration of drives as well as for non-cyclic PROFIBUS-DP communication with the drives,
supports the conversion of DVA_S7 to Drive ES projects (only for V 5.1 upwards)
- **SETUP program** for installing the software in the STEP/environment

Software update service

Drive ES Basic	6SW17 00-0JA00-0AB2
Drive ES SIMATIC	6SW17 00-0JC00-0AB2

Start-up and diagnostics software

Designation	Order No.	Type of delivery
SimoCom U/Toolbox for SIMODRIVE 611 universal and POSMO CD/CA, SI Parameterization, start-up and test tool	6SN11 53-0NX20-0AG0	CD-ROM in the five standard languages (current software version)
SimoCom A for SIMODRIVE POSMO A, SW 1.5.x and higher	–	Download from the Internet free of charge at: http://www.ad.siemens.de/mc/html_00/info/download
POSMO A Master for SIMODRIVE POSMO A	–	Download from the Internet free of charge at: http://www.ad.siemens.de/mc/html_00/info/download

1) Drive ES Basic can also be installed stand-alone without STEP 7
(see accompanying text for further details).

SIMODRIVE

611 universal and POSMO

AC Motors



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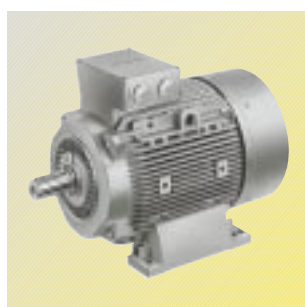
SIMODRIVE 611 universal and POSMO AC Motors

Overview

Versions, features	1FT6 synchronous servo motors	1FK6/1FK6 High Dynamic synchronous servo motors	1FN3 linear motors
Speed/velocity	1500 rpm to 6000 rpm	3000 rpm to 6000 rpm	58 m/min to 836 m/min
Static torque τ_0	0.4 Nm to 140 Nm	1.1 Nm to 36 Nm 1.3 Nm to 22 Nm (High Dynamic)	–
Force of feed F_N	–	–	200 N to 20700 N
Overload capability up to max.	$4 \times \tau_0$	$4 \times \tau_0$	$2.75 \times F_N$
Encoder system	- Incremental encoder sin/cos 1 V_{pp}, 2048 S/R - Absolute encoder, multiturn 2048 S/R and travel range 4096 R with EnDat - Single absolute encoder, multiturn, 32 S/R and travel range 4096 R with EnDat - Resolver, 2-pole or multi-pole (pole number corresponds to pole number for motor)		Linear (enclosed or open) - Incremental - Absolute
Sound pressure level (EN 21680)	55 dB(A) to 70 dB (A)	55 dB(A) to 70 dB (A)	–
Degree of protection EN 60034-7 (IEC 60034-7)	IP 64 to IP 68	IP 64, IP 65: also DE flange IP 67	IP 65
Cooling	Self-cooling separate ventilation water cooling	Self cooling	Water cooling
Insulation of stator winding EN 60034-1 (IEC 60034-1)	Temperature class F for winding overheating of $\Delta T = 100$ K for an ambient temperature of + 40 °C. For water cooling, max. upstream temperature + 25°C.		Temperature class H for a winding temperature of + 120°C Coolant + 20 °C to + 35 °C
Holding brake	Built-on (option)	Built-on (option)	–
Machine type	Permanent-magnet synchronous motor, 3-phase		
Paint finish	Anthracite	No paint finish	No paint finish
Built-on gear unit - Planetary gear unit - Cycloid gear unit - Harmonic drive	$i = 4$ to 50, graded $i = 6$ to 119, graded $i = 160$ to 50, graded	$i = 5$, $i = 10$	–

Versions, features	1PH7 induction servo motors	1PH4 induction servo motors
Range of control	with SIMODRIVE 611 universal and SIMODRIVE POSMO CD/CA $n > 1 : 500000$	with SIMODRIVE 611 universal and SIMODRIVE POSMO CD/CA $n > 1 : 500000$
Type	acc. to EN 60034-7 (IEC 60034-7): IM B3 (IM V5, IM V6) IM B5 (IM V1, IM V3, only possible for 1PH710 and 1PH 713) IM B35 (IM V15, IM V36)	acc. to EN 60034-7 (IEC 60034-7): IM B35 (IM V15)
Rated power P_N (S1)	3.7 kW to 100 kW	7.5 kW to 52 kW
Speed	up to 12000 rpm	up to 12000 rpm
Rated torque τ_N	23.6 Nm to 750 Nm	48 Nm to 331 Nm
Encoder system	Incremental encoder built-in: sin/cos 1 V_{pp} , 2048 S/R	Incremental encoder built-in: sin/cos 1 V_{pp} , 2048 S/R
Sound level (EN 21680 T.1 and T.2)	70 dB(A) to 81 dB(A) at 50 Hz mains frequency, Tolerance +3 dB	69 dB(A) to 71 dB(A), tolerance +3 dB
Degree of protection EN 60034-5 (IEC 60034-5)	IP 55, fan IP 54	IP 65, IP 55 at shaft outlet
Cooling	Separate ventilation	Water cooling
Insulation of stator winding EN 60034-1 (IEC 60034-1)	Temperature class F for a coolant temperature up to + 40 °C	Temperature class F for a coolant temperature up to + 25°C
Holding brake	–	Mounted on drive end (option)
Machine type	AC servo motor in induction technology with a squirrel cage rotor	AC servo motor in induction technology with a squirrel cage rotor
Paint finish	No paint finish	Anthracite
Built-on gear unit	Prepared (option)	

Standard Siemens induction motors



1LA6 standard induction motor

With SIMODRIVE POSMO CD/CA, you can also use the 1LA5/1LA6 induction motors.

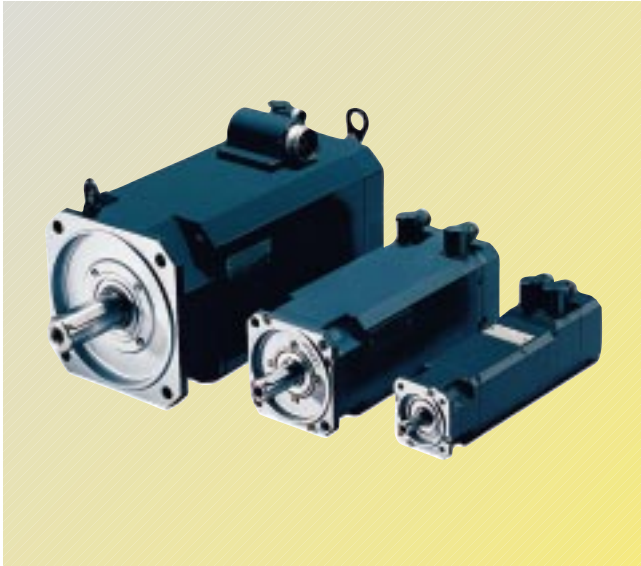
The drives can also be operated in V/f control mode in addition to the n control and M control modes.

It is important to note that the 1LA motors are already subject to field weakening 15 % below the rated speed.

For further details on motor selection, see Catalog M11.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors



Description

The 1FT6 servo motors offer:

- High rotational accuracy (sinusoidal current form)
- Short non-productive times due to high dynamic performance
- Power and signal connections for use in severely contaminated areas
- Easy installation as a result of reduced cabling requirements
- High resistance to lateral force

1FT6 AC servo motors are extremely compact permanent-field synchronous motors. 1FT6 motors with integrated encoders can be operated using the SIMODRIVE 611 universal and SIMODRIVE POSMO CD/CA converter systems. Those versions of 1FT6 motors with resolvers can be operated using the SIMODRIVE 611 universal and SIMODRIVE POSMO CD/CA converter system.

The fully digital control system of the SIMODRIVE 611 universal converter and the new encoder technology of the 1FT6 servo motors fulfill the highest

demands in terms of dynamic performance, speed setting range and rotational and positioning accuracy.

The motors are primarily designed for operation without external cooling and the heat is dissipated through the motor surface. The heat generated in the stator winding and stator core can be directly dissipated via the good thermal coupling to the motor enclosure. The concept of brushless, permanent-field synchronous motors shows its special merits here.

Applications

- Production machines with high requirements in terms of dynamic performance and precision
- Packaging machines
- Stacker cranes
- Conveyor systems
- Woodworking
- Manipulators
- Printing machines (wad and rotary machines)

For selection of the degree of protection and design, see Part 2.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Ordering and planning data

Rated speed	Static torque		Rated torque	1FT6 servo motor Self-cooling		No. of pole pairs	Weight (without brake)	Rotor moment of inertia (without brake)
n_N	τ_0 (60) for $\Delta T=60$ K	τ_0 (100) for $\Delta T=100$ K	τ_N (100) for $\Delta T=100$ K	Order No. Core type (Delivery time: 20 workdays)	Order No. Standard type (Delivery time: On request)			J
rpm	Nm	Nm	Nm				kg	10^{-4} kgm ²
1500	22.4	27	24.5	–	1FT6 102-8AB7 □-□ □ □ □	8	27.5	99
	42	50	41		1FT6 105-8AB7 □-□ □ □ □	8	39.5	168
	58	70	61		1FT6 108-8AB7 □-□ □ □ □	8	55.5	260
	62	75	62	–	1FT6 132-6AB7 1-□ □ □ □	6	85	430
	79	95	75		1FT6 134-6AB7 1-□ □ □ □	6	100	547
	95	115	88		1FT6 136-6AB7 1-□ □ □ □	6	117	664

Type:

IM B5	1
IM B14 ¹⁾ (not for 1FT613)	2

Orientation of connectors:

Transverse right	1
Transverse left	2
NDE axial (not for 1FT613)	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat 2)	E
Resolver multi-pole	S
Resolver 2-pole	T

Shaft end:

with key and keyway	N	without	A
with key and keyway	N	with	B
with key and keyway	R	without	D
with key and keyway	R	with	E
smooth shaft	N	without	G
smooth shaft	N	with	H
smooth shaft	R	without	K
smooth shaft	R	with	L

Vibration severity:

N	IP 64	0
N	IP 65	1
N	IP 67	2
N	IP 68	6
R	IP 64	3
R	IP 65	4
R	IP 67	5
R	IP 68	7

Degree of protection:

For selection of the degree of protection and design, see Part 2.

1) Same flange as on type IM B5, but with threaded inserts in the four fastening holes.

2) If the absolute encoder is used, the rated torque is reduced in the case of motors with:
 $n_N = 3000$ rpm by 5 %,
 $n_N = 4500$ rpm by 10 %,
 $n_N = 6000$ rpm by 15 %.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Motor phase current		Rated converter current required		Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$		Motor supply (brake) via power connector		Power cable, for trailing with overall shield
I_0 (60) for τ_0 (60) A	I_0 (100) for τ_0 (100) A	I_N (60) for τ_0 (60) A	I_N (100) for τ_0 (100) A	P_{calc} (60) for τ_0 (60) kW	P_{calc} (100) for τ_0 (100) kW	Power plug Size	Conductor cross-section, motor ⁴⁾ mm ²	Pre-assembled cable Order No.
7.3	8.4	9	9	3.5	4.2	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
13.8	17.2	18	18	6.5	7.9	1.5	4 × 2.5	6FX □ 002-5 □ A31-1 □ □ 0
18.3	22.1	18 ³⁾	28	9.1	11.0	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
18.5	23.0	18 ³⁾	28	9.7	11.8	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
12.0	29.0	28	28 ³⁾	12.4	14.9	1.5	4 × 6	6FX □ 002-5 □ A51-1 □ □ 0
28.0	34.0	28	56	14.9	18.1	1.5	4 × 10	6FX □ 002-5 □ A61-1 □ □ 0

Power cable design

MOTION-CONNECT 800 ⁵⁾	8		
MOTION-CONNECT 500 ⁵⁾	5		
without brake cable		C	
with brake cable (2 × 1.5 mm ²)		D	

Cable lengths: (examples)

5 m			A F
10 m			B A
15 m			B F
18 m			B J
25 m			C F

See page 4/18 for signal cables.
Power cables for SIMODRIVE
POSMO see Page 3/15.

Power and signal cables can be
lengthened or configured. In
such cases, the typical connec-
tions from Catalog NC Z must be
selected.

Cables are available in exact
meter lengths; they are not part
of the scope of supply for motors
and must be ordered separate-
ly. For the length codes, see
Appendix (fold-out page).

The current load capability of
the power cables complies with
IEC 60204-1 for installation type
C under continuous operating
conditions at an ambient air
temperature of +40 °C.

3) The specified power section does not permit
the motor to be utilized to the full winding tem-
perature rise of $\Delta T = 60$ K or 100 K.

4) Rated for I_{0rms} (100 K), ambient temperature
+40 °C, PVC insulated cable.

5) Technical data for the MOTION-CONNECT
series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Ordering and planning data (continued)

Rated speed	Static torque			Rated torque ¹⁾	1FT6 servo motor Self-cooling	No. of pole pairs	Weight (without brake)	Rotor moment of inertia (without brake)
n_N	τ_0 (60) for $\Delta T=60$ K	τ_0 (100) for $\Delta T=100$ K	τ_N (100) for $\Delta T=100$ K	Order No. Core type (Delivery time: 20 workdays)	Order No. Standard type (Delivery time: On request)		kg	10^{-4} kgm ²
rpm	Nm	Nm	Nm					
2000	3.3	4	3.7	—	1FT6 061-6AC7 □-□ □ □ □	6	8	6
	5	6	5.2		1FT6 062-6AC7 □-□ □ □ □	6	9.5	8.5
	7.9	9.5	8		1FT6 064-6AC7 □-□ □ □ □	6	12.5	13
	6.6	8	7.5	—	1FT6 081-8AC7 □-□ □ □ □	8	12.5	21
	10.8	13	11.4		1FT6 082-8AC7 □-□ □ □ □	8	15	30
	16.6	20	16.9		1FT6 084-8AC7 □-□ □ □ □	8	20.5	48
	22.4	27	22.5		1FT6 086-8AC7 □-□ □ □ □	8	25.5	66.5
	22.4	27	23	1FT6 102-1AC71 -□ □ □ 1	1FT6 102-8AC7 □-□ □ □ □	8	27.5	99
	42	50	38	1FT6 105-1AC71 -□ □ □ 1	1FT6 105-8AC7 □-□ □ □ □	8	39.5	168
	58	70	55		1FT6 108-8AC7 □-□ □ □ □	8	55.5	260
	62	75	55	—	1FT6 132-6AC7 1-□ □ □ □	6	85	430
	79	95	65		1FT6 134-6AC7 1-□ □ □ □	6	100	547
	95	115	74		1FT6 136-6AC7 1-□ □ □ □	6	117	664

Orientation of connectors:

Transverse right	1
Transverse left	2
NDE axial	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat ¹⁾	E

smooth shaft/rotational accuracy N:

without holding brake	G
with holding brake	H

Type:

IM B5	1
IM B14 ²⁾ (not for 1FT613)	2

Orientation of connectors:

Transverse right (not for 1FT606)	1
Transverse left (not for 1FT606)	2
NDE axial (not for 1FT613)	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat ¹⁾	E
Resolver multi-pole	S
Resolver 2-pole	T

Shaft end:

Rotational accuracy: Holding brake:

with key and keyway	N	without	A
with key and keyway	N	with	B
with key and keyway	R	without	D
with key and keyway	R	with	E
smooth shaft	N	without	G
smooth shaft	N	with	H
smooth shaft	R	without	K
smooth shaft	R	with	L

Vibration severity:

N	IP 64	0
N	IP 65	1
N	IP 67	2
N	IP 68	6
R	IP 64	3
R	IP 65	4
R	IP 67	5
R	IP 68	7

For selection of the degree of protection and design, see Part 2.

1) If the absolute encoder is used, the rated torque is reduced in the case of motors with:

n_N = 3000 rpm by 5 %,
 n_N = 4500 rpm by 10 %,
 n_N = 6000 rpm by 15 %.

2) Same flange as on type IM B5, but with threaded inserts in the four fastening holes.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Motor phase current		Rated converter current required		Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$		Motor supply (brake) via power connector		Power cable, for trailing with overall shield
I_0 (60) for τ_0 (60) A	I_0 (100) for τ_0 (100) A	I_N (60) for τ_0 (60) A	I_N (100) for τ_0 (100) A	P_{calc} (60) for τ_0 (60) kW	P_{calc} (100) for τ_0 (100) kW	Power plug Size	Conductor cross-section, motor ⁴⁾ mm ²	Pre-assembled cable Order No.
1.6	2	3	3	0.69	0.84	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
2.3	2.7	3	3	1.0	1.3	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
3.5	4.2	5	5	1.7	2.0	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
3.3	4.1	5	5	1.4	1.7	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
5.5	6.9	5 ³⁾	9	2.2	2.7	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
7.7	9.5	9	9 ³⁾	3.4	4.2	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
9.7	12.0	18	18	4.7	5.7	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
10.2	12.4	18	18	4.7	5.7	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
18.4	22.9	18 ³⁾	18	8.7	10.5	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
24	29	28	28 ³⁾	12.1	14.7	1.5	4 × 6	6FX □ 002-5 □ A51-1 □ □ 0
25	31	28	28 ³⁾	13.0	15.7	1.5	4 × 6	6FX □ 002-5 □ A51-1 □ □ 0
33	39	56	56	16.5	19.9	1.5	4 × 10	6FX □ 002-5 □ A61-1 □ □ 0
35	43	56	56	19.9	24.1	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0

Power cable design

MOTION-CONNECT 800 ⁵⁾

8

MOTION-CONNECT 500 ⁵⁾

5

without brake cable

C

with brake cable (2 × 1.5 mm²)

D

Cable lengths: (examples)

5 m

A F

10 m

B A

15 m

B F

18 m

B J

25 m

C F

See page 4/18 for signal cables.
Power cables for SIMODRIVE
POSMO see Page 3/15.

Power and signal cables can be
lengthened or configured. In
such cases, the typical connec-
tions from Catalog NC Z must be
selected.

Cables are available in exact
meter lengths; they are not part
of the scope of supply for motors
and must be ordered separate-
ly. For the length codes, see
Appendix (fold-out page).

The current load capability of
the power cables complies with
IEC 60204-1 for installation type
C under continuous operating
conditions at an ambient air
temperature of +40 °C.

3) The specified power section does not permit
the motor to be utilized to the full winding tem-
perature rise of $\Delta T = 60$ K or 100 K.

4) Rated for I_{rms} (100 K), ambient temperature
+40 °C, PVC insulated cable.

5) Technical data for the MOTION-CONNECT
series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Ordering and planning data (continued)

Rated speed	Static torque			Rated torque ¹⁾	1FT6 servo motor Self-cooling	No. of pole pairs	Weight (without brake)	Rotor moment of inertia (without brake)
n_N	τ_0 (60) for $\Delta T=60$ K	τ_0 (100) for $\Delta T=100$ K	τ_N (100) for $\Delta T=100$ K	Order No. Core type (Delivery time: 20 workdays)	Order No. Standard type (Delivery time: On request)		kg	10^{-4} kgm ²
rpm	Nm	Nm	Nm					
3000	2.15	2.6	2.15		1FT6 041-4AF7 1-□□□□	4	6.6	2.9
	4.2	5	4.3	1FT6 044-1AF71 -□□□1	1FT6 044-4AF7 1-□□□□	4	8.3	5.1
	3.3	4	3.5		1FT6 061-6AF7 □-□□□□	6	8	6
	5	6	4.7	1FT6 062-1AF71 -□□□1	1FT6 062-6AF7 □-□□□□	6	9.5	8.5
	7.9	9.5	7	1FT6 064-1AF71 -□□□1	1FT6 064-6AF7 □-□□□□	6	12.5	13
	6.6	8	6.9		1FT6 081-8AF7 □-□□□□	8	12.5	21
	10.8	13	10.3	1FT6 082-1AF71 -□□□1	1FT6 082-8AF7 □-□□□□	8	15	30
	16.6	20	14.7	1FT6 084-1AF71 -□□□1	1FT6 084-8AF7 □-□□□□	8	20.5	48
	22.4	27	18.5	1FT6 086-1AF71 -□□□1	1FT6 086-8AF7 □-□□□□	8	25.5	66.5
	22.4	27	19.5	–	1FT6 102-8AF7 □-□□□□	8	27.5	99
	42	50	31		1FT6 105-8AF7 □-□□□□	8	39.5	168
	62	75	36	–	1FT6 132-6AF7 1-□□□□	6	85	430

Orientation of connectors:

Transverse right (not for 1FT604, 1FT606)	1
Transverse left (not for 1FT604, 1FT606)	2
NDE axial	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat ¹⁾	E

smooth shaft/rotational accuracy N:

without holding brake	G
with holding brake	H

Type:

IM B5	1
IM B14 ²⁾ (not for 1FT604, 1FT613)	2

Orientation of connectors:

Transverse right (not for 1FT604, 1FT606)	1
Transverse left (not for 1FT604, 1FT606)	2
NDE axial (not for 1FT613)	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat ¹⁾	E
Resolver multi-pole	S
Resolver 2-pole	T

Shaft end:

with key and keyway	N	without	A
with key and keyway	N	with	B
with key and keyway	R	without	D
with key and keyway	R	with	E
smooth shaft	N	without	G
smooth shaft	N	with	H
smooth shaft	R	without	K
smooth shaft	R	with	L

Vibration severity:

N	IP 64	0
N	IP 65	1
N	IP 67	2
N	IP 68	6
R	IP 64	3
R	IP 65	4
R	IP 67	5
R	IP 68	7

For selection of the degree of protection and design, see Part 2.

1) If the absolute encoder is used, the rated torque is reduced in the case of motors with:

$n_N = 3000$ rpm by 5 %,
 $n_N = 4500$ rpm by 10 %,
 $n_N = 6000$ rpm by 15 %.

2) Same flange as on type IM B5, but with threaded inserts in the four fastening holes.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Motor phase current		Rated converter current required		Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$		Motor supply (brake) via power connector		Power cable, for trailing with overall shield
I_0 (60) for τ_0 (60) A	I_0 (100) for τ_0 (100) A	I_N (60) for τ_0 (60) A	I_N (100) for τ_0 (100) A	P_{calc} (60) for τ_0 (60) kW	P_{calc} (100) for τ_0 (100) kW	Power plug Size	Conductor cross-section, motor ⁴⁾ mm ²	Pre-assembled cable Order No.
1.55	1.8	3	3	0.68	0.79	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
2.5	3.0	3	3	1.3	1.6	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
2.25	2.75	3	3	1.0	1.3	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
3.4	4.0	3 ³⁾	5	1.6	1.9	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
5.0	6.1	5	9	2.5	3.0	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
4.9	6.0	5	9	2.1	2.5	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
8.2	10.2	9	18	3.3	4.1	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
11.3	14.0	18	18	5.1	6.3	1.5	4 × 2.5	6FX □ 002-5 □ A21-1 □ □ 0
14.1	17.5	18	18	7.0	8.5	1.5	4 × 2.5	6FX □ 002-5 □ A31-1 □ □ 0
14.2	17.2	18	18	7.0	8.5	1.5	4 × 2.5	6FX □ 002-5 □ A31-1 □ □ 0
28	34	28	28 ³⁾	13.0	15.7	1.5	4 × 6	6FX □ 002-5 □ A51-1 □ □ 0
37.0	46.0	56	56	19.5	23.6	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0

Power cable design

MOTION-CONNECT® 800 ⁵⁾

8

MOTION-CONNECT 500 ⁵⁾

5

without brake cable

C

with brake cable (2 × 1.5 mm²)

D

Cable lengths: (examples)

5 m

A F

10 m

B A

15 m

B F

18 m

B J

25 m

C F

See page 4/18 for signal cables.
Power cables for SIMODRIVE
POSMO see Page 3/15.

Power and signal cables can be
lengthened or configured. In
such cases, the typical connec-
tions from Catalog NC Z must be
selected.

Cables are available in exact
meter lengths; they are not part
of the scope of supply for motors
and must be ordered separate-
ly. For the length codes, see
Appendix (fold-out page).

The current load capability of
the power cables complies with
IEC 60204-1 for installation type
C under continuous operating
conditions at an ambient air
temperature of +40 °C.

3) The specified power section does not permit
the motor to be utilized to the full winding tem-
perature rise of $\Delta T = 60$ K or 100 K.

4) Rated for I_{rms} (100 K), ambient temperature
+40 °C, PVC insulated cable.

5) Technical data for the MOTION-CONNECT
series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Ordering and planning data (continued)

Rated speed	Static torque			1FT6 servo motor Self-cooling		No. of pole pairs	Weight (without brake)	Rotor moment of inertia (without brake)
n_N	τ_0 (60) for $\Delta T=60$ K	τ_0 (100) for $\Delta T=100$ K	τ_N (100) for $\Delta T=100$ K	Order No. Core type (Delivery time: 20 workdays)	Order No. Standard type (Delivery time: On request)			J
rpm	Nm	Nm	Nm				kg	10^{-4} kgm ²
4500	3.3	4	2.9		1FT6 061-6AH7 □-□ □ □ □	6	8	6
	5	6	3.6	1FT6 062-1AH71 -□ □ □ □ 1	1FT6 062-6AH7 □-□ □ □ □	6	9.5	8.5
	7.9	9.5	4.8	1FT6 064-1AH71 -□ □ □ □ 1	1FT6 064-6AH7 □-□ □ □ □	6	12.5	13
	6.6	8	5.8		1FT6 081-8AH7 □-□ □ □ □	8	12.5	21
	10.8	13	8.5		1FT6 082-8AH7 □-□ □ □ □	8	15	30
	16.6	20	10.5	1FT6 084-1AH71 -□ □ □ □ 1	1FT6 084-8AH7 □-□ □ □ □	8	20.5	48
	22.4	27	12	1FT6 086-1AH71 -□ □ □ □ 1	1FT6 086-8AH7 □-□ □ □ □	8	25.5	66.5
	22.4	27	12	–	1FT6 102-6AH7 □-□ □ □ □	8	27,5	99

Orientation of connectors:

Transverse right (not for 1FT606)	1
Transverse left (not for 1FT606)	2
NDE axial	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat 1)	E

smooth shaft/rotational accuracy N:

without holding brake	G
with holding brake	H

Type:

IM B5	1
IM B14 2)	2

Orientation of connectors:

Transverse right (not for 1FT606)	1
Transverse left (not for 1FT606)	2
NDE axial	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat 1)	E
Resolver multi-pole	S
Resolver 2-pole	T

Shaft end:

Rotational accuracy:

Holding brake:

with key and keyway	N	without	A
with key and keyway	N	with	B
with key and keyway	R	without	D
with key and keyway	R	with	E
smooth shaft	N	without	G
smooth shaft	N	with	H
smooth shaft	R	without	K
smooth shaft	R	with	L

Vibration severity:

Degree of protection:

N	IP 64	0
N	IP 65	1
N	IP 67	2
N	IP 68	6
R	IP 64	3
R	IP 65	4
R	IP 67	5
R	IP 68	7

For selection of the degree of protection and design, see Part 2.

1) If the absolute encoder is used, the rated torque is reduced in the case of motors with:

$n_N = 3000$ rpm by 5 %,
 $n_N = 4500$ rpm by 10 %,
 $n_N = 6000$ rpm by 15 %.

2) Same flange as on type IM B5, but with threaded inserts in the four fastening holes.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Motor phase current		Rated converter current required		Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$		Motor supply (brake) via power connector		Power cable, for trailing with overall shield
I_0 (60) for τ_0 (60) A	I_0 (100) for τ_0 (100) A	I_N (60) for τ_0 (60) A	I_N (100) for τ_0 (100) A	P_{calc} (60) for τ_0 (60) kW	P_{calc} (100) for τ_0 (100) kW	Power plug Size	Conductor cross-section, motor ⁴⁾ mm ²	Pre-assembled cable Order No.
3.4	4.1	5	5	1.6	1.9	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
4.8	5.6	5	9	2.4	2.8	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
7.5	9.1	9	9 ³⁾	3.7	4.5	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
7.4	9.0	9	9	3.1	3.8	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
12.1	15.0	18	18	4.9	6.1	1.5	4 × 2.5	6FX □ 002-5 □ A31-1 □ □ 0
17.5	21.6	18	18 ³⁾	7.6	9.4	1.5	4 × 4	6FX □ 002-5 □ A31-1 □ □ 0
20.4	25.3	18 ³⁾	28	10.6	12.7	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
20.5	24.8	18 ³⁾	28	10.6	12.7	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0

Power cable design

MOTION-CONNECT 800 ⁵⁾

MOTION-CONNECT 500 ⁵⁾

without brake cable

with brake cable (2 × 1.5 mm²)

Cable lengths: (examples)

5 m

10 m

15 m

18 m

25 m

A F

B A

B F

B J

C F

See page 4/18 for signal cables.
Power cables for SIMODRIVE
POSMO see Page 3/15.

Power and signal cables can be
lengthened or configured. In
such cases, the typical connec-
tions from Catalog NC Z must be
selected.

Cables are available in exact
meter lengths; they are not part
of the scope of supply for motors
and must be ordered separate-
ly. For the length codes, see
Appendix (fold-out page).

The current load capability of
the power cables complies with
IEC 60204-1 for installation type
C under continuous operating
conditions at an ambient air
temperature of +40 °C.

3) The specified power section does not permit
the motor to be utilized to the full winding tem-
perature rise of $\Delta T = 60$ K or 100 K.

4) Rated for I_{0rms} (100 K), ambient temperature
+40 °C, PVC insulated cable.

5) Technical data for the MOTION-CONNECT
series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Ordering and planning data (continued)

Rated speed	Static torque			1FT6 servo motor Self-cooling		No. of pole pairs	Weight (without brake)	Rotor moment of inertia (without brake)
n_N	τ_0 (60) for $\Delta T=60$ K	τ_0 (100) for $\Delta T=100$ K	τ_N (100) for $\Delta T=100$ K	Order No. Core type (Delivery time: 20 workdays)	Order No. Standard type (Delivery time: On request)		kg	J
rpm	Nm	Nm	Nm					10^{-4} kgm ²
6000	0.33	0.4	0.3	–	1FT6 021-6AK7 1-□□□□	6	1.2	0.21
	0.66	0.8	0.5	–	1FT6 024-6AK7 1-□□□□	6	2.1	0.34
	0.83	1.0	0.75	–	1FT6 031-4AK7 1-□□□□	4	3.1	0.65
	1.65	2.0	1.4	1FT6 034-1AK71 -□□□1	1FT6 034-4AK7 1-□□□□	4	4.4	1.1
	2.15	2.6	1.7	–	1FT6 041-4AK7 1-□□□□	4	6.6	2.9
	4.2	5.0	3.0	–	1FT6 044-4AK7 1-□□□□	4	8.3	5.1
	3.3	4.0	2.1	–	1FT6 061-6AK7 □-□□□□	6	8	6
	5.0	6.0	2.1	–	1FT6 062-6AK7 □-□□□□	6	9.5	8.5
	7.9	9.5	2.1	–	1FT6 064-6AK7 □-□□□□	6	12.5	13
	6.6	8.0	4.6	–	1FT6 081-8AK7 □-□□□□	8	12.5	21
	10.8	13.0	5.5	–	1FT6 082-8AK7 □-□□□□	8	15	60
	16.2	20.0	6.5	1FT6 084-1AK71 -□□□1	1FT6 084-8AK7 □-□□□□	8	20.5	48

Orientation of connectors:

NDE axial	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat ¹⁾	E

smooth shaft/rotational accuracy N:

without holding brake	G
with holding brake	H

Type:

IM B5	1
IM B14 ²⁾ (not for 1FT602, 1FT603, 1FT604)	2

Orientation of connectors:

Transverse right (not for 1FT603, 1FT604, 1FT606)	1
Transverse left (not for 1FT603, 1FT604, 1FT606)	2
NDE axial	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder (not for 1FT602) ¹⁾	E
Resolver multi-pole	S
Resolver 2-pole	T

Shaft end:

with key and keyway	N	without	A
with key and keyway	N	with	B
with key and keyway	R	without	D
with key and keyway	R	with	E
smooth shaft	N	without	G
smooth shaft	N	with	H
smooth shaft	R	without	K
smooth shaft	R	with	L

Vibration severity:

N	Degree of protection:	0
N ⁶⁾	IP 64	1
N	IP 65 ⁶⁾	2
N ⁶⁾	IP 67	6
R	IP 68 ⁶⁾	3
R ⁶⁾	IP 64	4
R	IP 65 ⁶⁾	5
R ⁶⁾	IP 67	7
R ⁶⁾	IP 68 ⁶⁾	

For selection of the degree of protection and design, see Part 2.

1) If the absolute encoder is used, the rated torque is reduced in the case of motors with:

$n_N = 3000$ rpm by 5 %,
 $n_N = 4500$ rpm by 10 %,
 $n_N = 6000$ rpm by 15 %.

2) Same flange as on type IM B5, but with threaded inserts in the four fastening holes.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Motor phase current		Rated converter current required		Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$		Motor supply (brake) via power connector		Power cable, for trailing with overall shield
I_0 (60) for τ_0 (60) A	I_0 (100) for τ_0 (100) A	I_N (60) for τ_0 (60) A	I_N (100) for τ_0 (100) A	P_{calc} (60) for τ_0 (60) kW	P_{calc} (100) for τ_0 (100) kW	Power plug Size	Conductor cross-section, motor ⁴⁾ mm ²	Pre-assembled cable Order No.
1.05	1.25	3	3	0.2	0.25	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
1.05	1.25	3	3	0.4	0.5	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
1.2	1.45	3	3	0.52	0.63	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
2.15	2.6	3	3	1.0	1.3	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
2.6	3.0	3	3	1.4	1.6	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
4.9	5.9	5	9	2.6	3.1	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
4.1	5.0	5	5	2.1	2.5	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
6.3	7.5	9	9	3.1	3.8	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
10.0	12.1	9 ³⁾	18	5.0	6.0	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
9.1	11.1	9 ³⁾	18	4.1	5.0	1.5	4 × 1.5	6FX □ 002-5 □ A21-1 □ □ 0
14.6	18.2	18	18 ³⁾	6.5	8.2	1.5	4 × 2.5	6FX □ 002-5 □ A41-1 □ □ 0
20.2	25.0	28	28	10.2	12.6	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0

Power cable design

MOTION-CONNECT 800 ⁵⁾

8

MOTION-CONNECT 500 ⁵⁾

5

without brake cable

C

with brake cable (2 × 1.5 mm²)

D

Cable lengths: (examples)

5 m

A F

10 m

B A

15 m

B F

18 m

B J

25 m

C F

See page 4/18 for signal cables.
Power cables for SIMODRIVE
POSMO see Page 3/15.

Power and signal cables can be
lengthened or configured. In
such cases, the typical connec-
tions from Catalog NC Z must be
selected.

Cables are available in exact
meter lengths; they are not part
of the scope of supply for motors
and must be ordered separate-
ly. For the length codes, see
Appendix (fold-out page).

The current load capability of
the power cables complies with
IEC 60204-1 for installation type
C under continuous operating
conditions at an ambient air
temperature of +40 °C.

3) The specified power section does not permit
the motor to be utilized to the full winding tem-
perature rise of $\Delta T = 60$ K or 100 K.

4) Rated for I_{0rms} (100 K), ambient temperature
+40 °C, PVC insulated cable.

5) Technical data for the MOTION-CONNECT
series can be obtained from the NC Z Catalog.

6) Not possible for 1FT6 02.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Ordering and planning data (continued)

Rated speed	Static torque			1FT6 servo motor Separate ventilation ²⁾		No. of pole pairs	Weight (without brake)	Rotor moment of inertia (without brake)
n_N	τ_0 (60) for $\Delta T=60$ K	τ_0 (100) for $\Delta T=100$ K	Rated torque ¹⁾ τ_N (100) for $\Delta T=100$ K	Order No. Core type (Delivery time: 20 workdays)	Order No. Standard type (Delivery time: On request)			J
rpm	Nm	Nm	Nm				kg	10 ⁻⁴ kgm ²
2000	54	65	56		1FT6 105-8SC7 □-□ □ □ □	8	45.5	168
	75	90	80		1FT6 108-8SC7 □-□ □ □ □	8	61.5	260
	91	110	98		1FT6 132-6SC7 1-□ □ □ □	6	91	430
	116	140	125		1FT6 134-6SC7 1-□ □ □ □	6	106	547
3000	21.6	26	22	–	1FT6 084-8SF7 □-□ □ □ □	8	25	48
	29	35	31		1FT6 086-8SF7 □-□ □ □ □	8	30	66.5
	54	65	50		1FT6 105-8SF7 □-□ □ □ □	8	45.5	168
4500	21.6	26	20	–	1FT6 084-8SH7 □-□ □ □ □	8	25	48
	29	35	27		1FT6 086-8SH7 □-□ □ □ □	8	30	66.5
6000	21.6	26	17	–	1FT6 084-8SK7 □-□ □ □ □	8	25	48
	29	35	22		1FT6 086-8SK7 □-□ □ □ □	8	30	66.5

Type:

IM B5	1
IM B14 ³⁾ (not for 1FT613)	2

Orientation of connectors:

Transverse right	1
Transverse left	2
NDE axial (for 1FT613, connector 12 mm higher)	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat ¹⁾	E
Resolver multi-pole	S
Resolver 2-pole	T

Shaft end:

Rotational accuracy:

Holding brake:

with key and keyway	N	without	A
with key and keyway	N	with	B
with key and keyway	R	without	D
with key and keyway	R	with	E
smooth shaft	N	without	G
smooth shaft	N	with	H
smooth shaft	R	without	K
smooth shaft	R	with	L

Vibration severity:

Degree of protection: ⁴⁾

N	IP 64	0
N	IP 65	1
R	IP 64	3
R	IP 65	4

For selection of the degree of protection and design, see Part 2.

1) If the absolute encoder is used, the rated torque is reduced in the case of motors with:
 $n_N = 3000$ rpm by 5 %,
 $n_N = 4500$ rpm by 10 %,
 $n_N = 6000$ rpm by 15 %.

2) Not suitable for conductive dust. Separate ventilation cannot be used in the presence of flammable, corrosive, electrically conductive or explosive dust.

3) Same flange as on type IM B5, but with threaded inserts in the four fastening holes.

4) The degree of protection refers to the motor; the built-on fan attains IP 54.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Motor phase current		Rated converter current required		Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$		Motor supply (brake) via power connector		Power cable, for trailing with overall shield
I_0 (60) for τ_0 (60) A	I_0 (100) for τ_0 (100) A	I_N (60) for τ_0 (60) A	I_N (100) for τ_0 (100) A	P_{calc} (60) for τ_0 (60) kW	P_{calc} (100) for τ_0 (100) kW	Power plug Size	Conductor cross-section, motor ⁶⁾ mm ²	Pre-assembled cable Order No.
26	32	28	28 ⁵⁾	10.5	13.2	1.5	4 × 6	6FX □ 002-5 □ A51-1 □ □ 0
34	41	56	56	15.9	18.8	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
41	51	56	56	19.1	23.0	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
52	62	56	70	24.3	29.3	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
15.6	19.3	18	18 ⁵⁾	6.9	8.2	1.5	4 × 2.5	6FX □ 002-5 □ A31-1 □ □ 0
20.7	26	28	28	9.3	11.0	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
36	45	56	56	15.7	19.8	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
22.7	28	28	28	10.4	12.3	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
32	39	56	56	13.9	16.5	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
29	36	28 ⁵⁾	56	13.8	16.3	1.5	4 × 10	6FX □ 002-5 □ A61-1 □ □ 0
37	45	56	56	18.5	22.0	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0

Power cable design

MOTION-CONNECT 800 ⁷⁾	8
MOTION-CONNECT 500 ⁷⁾	5
without brake cable	C
with brake cable (2 × 1.5 mm ²)	D

Cable lengths: (examples)

5 m	A F
10 m	B A
15 m	B F
18 m	B J
25 m	C F

See page 4/18 for signal cables.
Power cables for SIMODRIVE
POSMO see Page 3/15.

Power and signal cables can be
lengthened or configured. In
such cases, the typical connec-
tions from Catalog NC Z must be
selected.

Cables are available in exact
meter lengths; they are not part
of the scope of supply for motors
and must be ordered separate-
ly. For the length codes, see
Appendix (fold-out page).

The current load capability of
the power cables complies with
IEC 60204-1 for installation type
C under continuous operating
conditions at an ambient air
temperature of +40 °C.

5) The specified power section does not permit
the motor to be utilized to the full winding tem-
perature rise of $\Delta T = 60$ K or 100 K.

6) Rated for I_{0rms} (100 K), ambient temperature
+40 °C, PVC insulated cable.

7) Technical data for the MOTION-CONNECT
series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Ordering and planning data (continued)

Rated speed	Static torque			1FT6 servo motor Water cooling		No. of pole pairs	Weight (without brake)	Rotor moment of inertia (without brake)
n_N	τ_0 (60) for $\Delta T=60$ K	τ_0 (100) for $\Delta T=100$ K	τ_N (100) for $\Delta T=100$ K	Order No. Core type (Delivery time: 20 workdays)	Order No. Standard type (Delivery time: On request)		kg	10^{-4} kgm ²
rpm	Nm	Nm	Nm					
1500	98	119	116	–	1FT6 108-8WB7 □-□ □ □ □	8	61.5	260
2000	70	85	82	–	1FT6 105-8WC7 □-□ □ □ □	8	45.5	168
	98	119	115		1FT6 108-8WC7 □-□ □ □ □	8	61.5	260
3000	8.5	10.2	10.1	–	1FT6 062-6WF7 □-□ □ □ □	6	9.5	8.5
	13.4	16.2	16.1		1FT6 064-6WF7 □-□ □ □ □	6	12.5	13
	29	35	35	–	1FT6 084-8WF7 □-□ □ □ □	8	21	48
	39	47	46		1FT6 086-8WF7 □-□ □ □ □	8	26	66.5
	70	85	78		1FT6 105-8WF7 □-□ □ □ □	8	45.5	168
	98	119	109		1FT6 108-8WF7 □-□ □ □ □ ²⁾	8	61.5	260
4500	8.5	10.2	10	–	1FT6 062-6WH7 □-□ □ □ □	6	9.5	8.5
	13.4	16.2	16		1FT6 064-6WH7 □-□ □ □ □	6	12.5	13
	29	35	34.5	–	1FT6 084-8WH7 □-□ □ □ □	8	21	48
	39	47	45		1FT6 086-8WH7 □-□ □ □ □	8	26	66.5
6000	8.5	10.2	9.8	–	1FT6 062-6WK7 □-□ □ □ □	6	9.5	8.5
	13.4	16.2	15.8		1FT6 064-6WK7 □-□ □ □ □	6	12.5	13
	29	35	34	–	1FT6 084-8WK7 □-□ □ □ □	8	21	48
	39	47	44		1FT6 086-8WK7 □-□ □ □ □	8	26	66.5

Type:

IM B5	1
IM B14 ¹⁾	2

Orientation of connectors:

Transverse right	1
Transverse left	2
NDE axial	3
DE axial	4

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat	E
Resolver multi-pole	S
Resolver 2-pole	T

Shaft end:

Rotational accuracy:

Holding brake:

with key and keyway	N	without	A
with key and keyway	N	with	B
with key and keyway	R	without	D
with key and keyway	R	with	E
smooth shaft	N	without	G
smooth shaft	N	with	H
smooth shaft	R	without	K
smooth shaft	R	with	L

Vibration severity:

Degree of protection:

N	IP 64	0
N	IP 65	1
N	IP 67	2
N	IP 68	6
R	IP 64	3
R	IP 65	4
R	IP 67	5
R	IP 68	7

For selection of the degree of protection and design, see Part 2.

Notes on water cooling:

- Max. incoming temperature of cooling water: max. +25 °C
- Cooling water throughput: at least 5 l/min
- Pressure upstream of motor: $p_{\max} = 3$ bar

- Cooling water connection: G 3/8
- Coolant: H₂O (up to 25 % anti-corrosion agent; recommendation: Tyfocor)
- Loss of pressure between inlet and outlet < 0.1 bar

1) Same flange as on type IM B5, but with threaded inserts in the four fastening holes.

2) Only available in vibration severity N.

SIMODRIVE 611 universal and POSMO AC Motors

1FT6 synchronous servo motors

Motor phase current		Rated converter current required		Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$		Motor supply (brake) via power connector		Power cable, for trailing with overall shield
I_0 (60) for τ_0 (60) A	I_0 (100) for τ_0 (100) A	I_N (60) for τ_0 (60) A	I_N (100) for τ_0 (100) A	P_{calc} (60) for τ_0 (60) kW	P_{calc} (100) for τ_0 (100) kW	Power plug Size	Conductor cross-section, motor ⁴⁾ mm ²	Pre-assembled cable Order No.
34	41	56	56	15.4	18.7	3	4 × 10	6FX □ 002-5 □ A13-1 □ □ 0
47	58	56	56 ³⁾	14.7	17.8	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
45	54	56	56	20.5	24.9	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
5.8	6.8	9	9	2.67	3.2	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
8.5	10.4	9	18	4.21	5.1	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
21	26	28	28	9.1	11	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
28	35	28 ³⁾	56	12.2	14.8	1.5	4 × 10	6FX □ 002-5 □ A61-1 □ □ 0
67	83	70	140	22	26.7	3	4 × 25	6FX □ 002-5 DA33-1 □ □ 0
67	81	70	140	30.8	37.4	3	4 × 25	6FX □ 002-5 DA33-1 □ □ 0
8.2	9.5	9	18	4.0	4.81	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
12.8	15.5	18	18	6.31	7.63	1	4 × 2.5	6FX □ 002-5 □ A11-1 □ □ 0
31	38	28 ³⁾	56	13.7	16.5	1.5	4 × 10	6FX □ 002-5 □ A61-1 □ □ 0
43	53	56	56	18.4	22.1	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
10.7	12.8	18	18	5.31	6.41	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
17	20.6	18	28	8.42	10.18	1	4 × 2.5	6FX □ 002-5 □ A11-1 □ □ 0
40	49	56	56	18.2	22	3	4 × 16	6FX □ 002-5 □ A23-1 □ □ 0
49	61	56	70	24.5	29.5	3	4 × 25	6FX □ 002-5 DA33-1 □ □ 0

Power cable design

MOTION-CONNECT 800 ⁵⁾

MOTION-CONNECT 500 ⁵⁾

without brake cable

with brake cable

Cable lengths: (examples)

5 m

10 m

15 m

18 m

25 m

A F

B A

B F

B J

C F

See page 4/18 for signal cables.
Power cables for SIMODRIVE
POSMO see Page 3/15.

Power and signal cables can be
lengthened or configured. In
such cases, the typical connec-
tions from Catalog NC Z must be
selected.

Cables are available in exact
meter lengths; they are not part
of the scope of supply for motors
and must be ordered separate-
ly. For the length codes, see
Appendix (fold-out page).

The current load capability of
the power cables complies with
IEC 60204-1 for installation type
C under continuous operating
conditions at an ambient air
temperature of +40 °C.

3) The specified power section does not permit
the motor to be utilized to the full winding tem-
perature rise of $\Delta T = 60$ K or 100 K.

4) Rated for I_{0rms} (100 K), ambient temperature
+40 °C, PVC insulated cable.

5) Technical data for the MOTION-CONNECT
series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO

AC Motors

Signal lines for 1FT6 and 1FK6 motors

Description

Signal cables may be extended or configured as required. In such cases, the typical connections from Catalog NC Z must be selected.

Cables are available in exact meter lengths; they are not part of the scope of supply for motors and must be ordered separately. For the length codes, see Appendix (fold-out page).

Power cables for SIMODRIVE POSMO see Page 3/16.

Ordering data

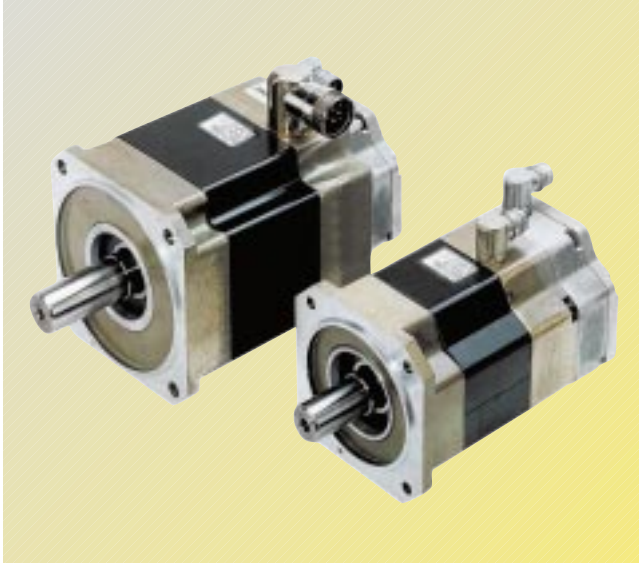
For 1FT6/1FK6 motors	Order No.
Pre-assembled cables with connectors	
Design of cable for:	
• Incremental encoder sin/cos 1 V _{pp} (Performance/Standard 2-control/SINUMERIK 810D) max. permissible length: 50 m	6FX □ 002-2CA31-1 □ □ 0
• Absolute encoder EnDat (Performance/Standard 2-control/SINUMERIK® 810D) max. permissible length: 50 m	6FX □ 002-2EQ10-1 □ □ 0
• Resolver max. permissible length: 50 m	6FX □ 002-2CF02-1 □ □ 0
MOTION-CONNECT 800 ¹⁾	8
MOTION-CONNECT 500 ¹⁾	5
Length: (examples)	
5 m	A F
10 m	B A
15 m	B F
18 m	B J
25 m	C F

¹⁾ Technical data for the MOTION-CONNECT series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO AC Motors

1FK6 synchronous servo motors

Description



The 1FK6 servo motors offer:

- Low space requirements due to compact dimensions
- Flexible machine design due to swivel connector orientation
- Easy installation as a result of reduced cabling requirements
- Shaft and flange compatibility with 1FT6 motors

1FK6 servo motors are permanent-field synchronous motors.

1FK6 motors with integrated encoders can be operated using the SIMODRIVE 611 universal and SIMODRIVE POSMO CD/CA converter systems. Those versions of 1FK6 motors with resolvers can be operated using the SIMODRIVE 611 universal and SIMODRIVE POSMO CD/CA converter system.

The motors are designed for operation without external cooling and the heat is dissipated through the motor surface. The heat generated in the stator winding and stator core

can be directly dissipated via the good thermal coupling to the motor enclosure. The concept of brushless, permanent-field synchronous motors shows its special merits here.

Applications

- Packaging machines
- Stacker cranes
- Conveyor systems
- Woodworking
- Manipulators

1FK6 High-Dynamic

The 1FK6 High-Dynamic AC servo motor has been specially developed for use in applications with requirements for high dynamic performance. These motors are characterized by a low moment of inertia and high dynamic performance.

Applications

- Packaging machines
- Textile machines
- Pick-and-place machines
- High-dynamic axes

SIMODRIVE 611 universal and POSMO AC Motors

1FK6 synchronous servo motors

Ordering and planning data

Rated speed	Static torque		Rated torque	1FK6 servo motor Self-cooling	Weight (without brake)	Rotor moment of inertia (without brake) <i>J</i>
n_N	τ_0 (60) for $\Delta T=60$ K	τ_0 (100) for $\Delta T=100$ K	τ_N (100) for $\Delta T=100$ K	Order No. Core type (Delivery time: 20 workdays)	kg	10^{-4} kgm ²
rpm	Nm	Nm	Nm			
3000	2.65	3.2	2.6	1FK6 042-6AF71- 1□ □ □	5	3.47
	5.0	6.0	4.0	1FK6 060-6AF71- 1□ □ □	9	8.6
	9.1	11	6	1FK6 063-6AF71- 1□ □ □	13.2	16.1
	6.6	8	6.8	1FK6 080-6AF71- 1□ □ □	12.5	16.1
	13.3	16	10.5	1FK6 083-6AF71- 1□ □ □	17	27.1
	15	18	12	1FK6 100-8AF71- 1□ □ □	21	58.8
	22.4	27	15.5	1FK6 101-8AF71- 1□ □ □	26	83.1
6000	30	36	16.5	1FK6 103-8AF71- 1□ □ □	30	107.4
	0.9	1.1	0.8	1FK6 032-6AK71- 1 S □ □	2.9	0.63
	1.3	1.6	0.8	1FK6 040-6AK71- 1□ □ □	3.7	1.87
1FK6 High-Dynamic						
3000	3.0	4.0	3.5	1FK6 044-7AF71- 1□ □ □	7.5	1.28
	4.9	6.4	5.4	1FK6 061-7AF71- 1□ □ □	10.1	3.4
	9.0	12	8.0	1FK6 064-7AF71- 1□ □ □	15.3	6.5
	10.5	13.5	7.5	1FK6 082-7AF71- 1□ □ □	17.2	14
	17	22	6.5	1FK6 085-7AF71- 1□ □ □	23.5	23
4500	2.5	3.1	2.6	1FK6 043-7AH71- 1□ □ □	6.7	1.01
	3.0	4.0	3.0	1FK6 044-7AH71- 1□ □ □	8.0	1.25
	4.9	6.4	4.3	1FK6 061-7AH71- 1□ □ □	10.1	3.4
	9.0	12	5.0	1FK6 064-7AH71- 1□ □ □	15.3	6.5
6000	1.0	1.3	0.9	1FK6 033-7AK71- 1□ □ □	3.15	0.27
	2.5	3.1	2.0	1FK6 043-7AK71- 1□ □ □	6.7	1.01

Encoder system:

Incremental encoder sin/cos 1 V _{pp}	A
Absolute encoder EnDat 1)	E
Single absolute encoder 1)	G
Resolver multi-pole	S
Resolver 2-pole	T

Shaft end:	Tolerance:	Holding brake:	
with key and keyway	N	without	A
with key and keyway	N	with	B
smooth shaft	N	without	G
smooth shaft	N	with	H

Degree of protection:

IP 64	0
IP 65 and also DE flange IP 67	2

For selection of the degree of protection and design, see Part 2.

1) If the absolute encoder is used, the rated torque is reduced by 10%.

SIMODRIVE 611 universal and POSMO AC Motors

1FK6 synchronous servo motors

Motor phase current		Rated converter current required		Calculated power $P_{calc} = \tau_0 \cdot n_N / 9550$		Motor supply (brake) via power connector		Power cable, for trailing with overall shield
I_0 (60) for τ_0 (60) A	I_0 (100) for τ_0 (100) A	I_N (60) for τ_0 (60) A	I_N (100) for τ_0 (100) A	P_{calc} (60) for τ_0 (60) kW	P_{calc} (100) for τ_0 (100) kW	Power plug Size	Conductor cross-section, motor ³⁾ mm ²	Pre-assembled cable Order No.
2.2	2.8	3	3	0.83	1	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
3.5	4.3	5	5	1.4	1.7	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
6.3	7.9	9	9	2.9	3.5	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
4.6	5.8	5	5 ²⁾	2.1	2.5	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
8.3	10.4	9	9 ²⁾	4.2	5	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
9.8	12.2	9 ²⁾	18	4.7	5.7	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
14.0	17.5	18	18	7	8.5	1.5	4 × 2.5	6FX □ 002-5 □ A31-1 □ □ 0
18.9	23.5	18 ²⁾	28	9.4	11.3	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
1.4	1.7	3	3	0.6	0.7	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
2.2	2.8	3	3	0.8	1	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
3.4	4.5	5	5	0.94	1.3	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
4.8	6.1	5	9	1.6	2	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
8.5	11.0	9	18	2.9	3.8	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
10.2	13.2	18	18	3.3	4.2	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
16.5	22.5	18	28	5.3	6.9	1.5	4 × 4	6FX □ 002-5 □ A41-1 □ □ 0
3.6	4.5	5	5	1.2	1.5	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
4.6	6.3	5	9	1.4	1.9	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
7.0	8.0	9	9	2.4	3	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
12.0	15.0	18	18	4.2	5.7	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
1.7	2.2	3	3	0.63	0.8	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0
4.8	6.4	5	9	1.6	2	1	4 × 1.5	6FX □ 002-5 □ A01-1 □ □ 0

Power cable design

MOTION-CONNECT 800 ⁴⁾

MOTION-CONNECT 500 ⁴⁾

without brake cable

with brake cable (2 × 1.5 mm²)

Lengths (examples)

5 m

10 m

15 m

18 m

25 m

A F

B A

B F

B J

C F

See page 4/18 for signal cables.
Power cables for SIMODRIVE
POSMO see Page 3/15.

Power and signal cables can be
lengthened or configured. In
such cases, the typical connec-
tions from Catalog NC Z must be
selected.

Cables are available in exact
meter lengths; they are not part
of the scope of supply for motors
and must be ordered separate-
ly. For the length codes, see
Appendix (fold-out page).

The current load capability of
the power cables complies with
IEC 60204-1 for installation type
C under continuous operating
conditions at an ambient air
temperature of +40 °C.

2) The specified power section does not permit
the motor to be utilized to the full winding tem-
perature rise of $\Delta T = 60$ K or 100 K.

3) Rated for I_{rms} (100 K), ambient temperature
+40 °C, PVC insulated cable.

5) Technical data for the MOTION-CONNECT
series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO AC Motors

Planetary gear units, SPG series (from alpha)
for 1FT6 synchronous servo motors

Description



1FT6 three-phase servo motor with built-on planetary gear unit

1FT6 AC servo motors can be combined with planetary gear units to form compact coaxial drive units. The gear units are flanged directly to the drive end of the motors.

When selecting the gear units, ensure that the permissible speed of the gear unit is not exceeded by the maximum speed of the motor. In the case of high operating frequencies, an allowance must be made for the withstand ratio f_2 (see Planning Guide). The frictional torque of the gear unit must always be taken into account in planning.

The gear units are only available in non-balanced design.

Technical features of the planetary gear units

- High efficiency (>94 %)
- Power transmission from the central sun gear via planetary gears
- No shaft deflections in the planetary gear set due to the symmetrical force distribution
- Very low moment of inertia and hence short acceleration times of the motors
- Drive end bearing for high lateral and axial loading due to pre-stressed tapered-roller bearing
- The enclosed gear units, filled with oil before leaving the factory, are attached to the shaft by means of an integral clamping hub. This requires a plain motor shaft extension with rotational accuracy tolerance N according to DIN 42955. The motor flange is fitted by means of adapter plates.
- Operation is possible in any mounting position.
- The gear units are filled with a high-grade synthetic gear oil of viscosity class ISO VG 220 in the factory. The quantity of oil is applicable to the IM B5 mounting position. The quantity of oil required is identical for all mounting positions in the case of the single-stage gear units of frame sizes SPG 060 to SPG 140. For frame sizes SPG 180 to SPG 240 and for all two-stage gear units, different quantities of oil are necessary for other mounting positions. In these cases, please specify the mounting position in the order.
- Output shaft of gear unit exactly coaxial with motor
- Oil seal on motor side included in the gear unit
- Small dimensions
- Low weight

Motors with built-on planetary gear units

The gear units assigned to the individual motors and gear ratios available for these motor/gear combinations are listed in the selection table *i* on the following pages. When making your selection, note the maximum permissible input speed of the gear unit which should be equal to the maximum motor speed.

The motor/gear combinations listed in the selection tables are mainly intended for use as positioning drives (S5). For applications involving continuous operation at high speed, please contact the gear unit manufacturer.

Follow the instructions in the Planning Guide when assigning gear units to the motor.

AC servo motors 1FT6 031 to 1FT6 136 can be supplied from the (Siemens) factory complete with built-on planetary gear unit.

For queries relating to the gear units please contact:

alpha getriebebau GmbH

Service Gewerbegebiet
Harthausen

Postal address:

PO Box 1163

D-97997 Igersheim

Walter-Wittenstein-Str. 1

D-97999 Igersheim

Tel.: +49(0)7931-493-0

Fax: +49(0)7931-493-200

Internet: [http://](http://www.alphagetriebe.de)

www.alphagetriebe.de

or

alpha gear drives

1440 Howard St.

Elk Grove Village, IL 60007

Tel.: +1(847)439-0700

Fax: +1(847)439-0755

SIMODRIVE 611 universal and POSMO AC Motors

Planetary gear units, SPG series (from alpha)
for 1FT6 synchronous servo motors

Selection table

Ordering data: **1FT6□□□-□A□7□-□□□□-Z**
V□□

Order No. of motor (standard type) with identification code **"-Z"** and
Order Code for built-on planetary gear unit

Servo motor Self-cooled	Planetary gear unit 1-stage Torque play ¹⁾ ≤ 4 arcmin	Gear unit weight, approx. kg	Available gear ratios $i =$				Max. perm. input speed	Max. perm. output torque	Max. perm. load on out- put shaft ²⁾	Moment of inertia gear unit	
			4	5	7	10	n_{G1}	τ_{G2}	F_r	J_G with $i = 4$	J_G with $i = 10$
Type	Type						rpm	Nm	N	10^{-4} kgm ²	10^{-4} kgm ²
1FT6 031	SPG 060-MF1	1.5	□	□	□	□	6000	40	2600	0.17	0.15
1FT6 034			□	□	□			(32 for $i = 10$)			
1FT6 034	SPG 075-MF1	2.8				□	6000	100	3800	0.57	0.4
1FT6 041			□	□	□	□		(80 for $i = 10$)		0.63	0.46
1FT6 044			□	□	□						
1FT6 044						□					
1FT6 044	SPG 100-MF1	6.2				□	4500	250	6000	2	1.3
1FT6 061			□	□	□	□		(200 for $i = 10$)		2.7	2
1FT6 062			□	□	□	□					
1FT6 064			□	□	□	□					
1FT6 081	SPG 140-MF1	11.5	□	□	□	□	4000	500	9000	8.4	6.2
1FT6 082			□	□	□	□		(400 for $i = 10$)			
1FT6 084			□	□	□	□					
1FT6 086			□	□	□						
1FT6 086	SPG 180-MF1	27				□	3500	1100	14000	30.6	17.4
1FT6 102			□	□	□	□		(880 for $i = 10$)		31.7	18.5
1FT6 105			□	□	□						
1FT6 108			□	□	□						
1FT6 105	SPG 210-MF1	53				□	2500	1900	18000	75.8	47.1
1FT6 108						□		(1520 for $i = 10$)			
1FT6 132			□	□	□						
1FT6 134			□	□	□						
1FT6 136	SPG 240-MF1	80	□	□	□		2200	2720	27000	146.3	83.1
1FT6 132						□					
1FT6 134						□					
1FT6 136						□					

Order code

- Gear shaft **with** key **V02 V03 V05 V09**
- Gear shaft **without** key **V22 V23 V25 V29**

1) With SPG 060 and SPG 075: ≤ 6 arcmin.

2) Guide values for the maximum permissible load on the midpoint of the output shaft at a speed $n_{G2} = 300$ rpm.

Axial load $F_a = 0.5 \cdot F_r$ with SPG 060 to SPG 180. $F_a = F_r$ with SPG 210 and SPG 240.

SIMODRIVE 611 universal and POSMO AC Motors

Planetary gear units, SPG series (from alpha)
for 1FT6 synchronous servo motors

Selection table

Ordering data: **1FT6□□□-□A□7□-□□□□-Z**
V□□

Order No. of motor (standard type) with identification code **"-Z"** and
Order Code for built-on planetary gear unit

Servo motor Self-cooled	Planetary gear unit 2-stage Torque play ¹⁾ ≤ 6 arcmin		Available gear ratios $i =$					Max. perm. input speed	Max. perm. output torque	Max. perm. load on out- put shaft ²⁾	Moment of inertia gear unit
Type	Type	Gear unit weight, approx. kg	16	20	28	40	50	n_{G1}	τ_{G2}	F_r	J_G with $i = 20$
								rpm	Nm	N	10 ⁻⁴ kgm ²
1FT6 031	SPG 075-MF2	3.1	☐	☐	☐	☐	☐	6000	100	3800	0.52
1FT6 034			☐	☐							
1FT6 034	SPG 100-MF2	7.1			☐	☐	☐	4500	250	6000	1.7
1FT6 041			☐	☐	☐	☐	1.8				
1FT6 044			☐	☐							
1FT6 061			☐	☐	☐		2.5				
1FT6 062			☐	☐							
1FT6 041	SPG 140-MF2	14.5					☐	4000	500	9000	4.4
1FT6 044					☐	☐	☐				
1FT6 061						☐	☐				5.1
1FT6 062					☐	☐					
1FT6 064			☐	☐							
1FT6 062	SPG 180-MF2	29					☐	4000	1100	14000	5.5
1FT6 064					☐	☐	☐				
1FT6 081			☐	☐	☐	☐	☐				8.2
1FT6 082			☐	☐	☐	☐					
1FT6 084			☐	☐							
1FT6 086			☐	☐							
1FT6 082	SPG 210-MF2	48					☐	3500	1900	18000	34.5
1FT6 084					☐	☐					
1FT6 086					☐						
1FT6 102			☐	☐	☐						35.6
1FT6 105			☐								
1FT6 084	SPG 240-MF2	70					☐	3500	3400	27000	43.1
1FT6 086						☐	☐				
1FT6 102						☐	☐				44.2
1FT6 105				☐	☐						
1FT6 108			☐	☐							

Order code

- Gear shaft **with** key **V12 V13 V15 V16 V17**
- Gear shaft **without** key **V32 V33 V35 V36 V37**

1) With SPG 060 and SPG 075: ≤ 8 arcmin.

2) Guide values for the maximum permissible load on the midpoint of the output shaft at a speed $n_{G2} = 300 \text{ rpm}$.

Axial load $F_a = 0.5 \cdot F_r$ with SPG 075 to SPG 180. $F_a = F_r$ with SPG 210 and SPG 240.

SIMODRIVE 611 universal and POSMO AC Motors

Planetary gear units, LP series (from alpha) for 1FK6 synchronous servo motors

Description



Planetary gear unit, LP Series

1FK6 and SIMODRIVE POSMO SI servo motors can easily be combined with planetary gear units of the LP series to form compact coaxial drive units. The gear units are flanged directly onto the drive end of the motors.

When selecting the gear units, ensure that the permissible speed of the gear unit is not exceeded by the maximum speed of the motor. In the case of high operating frequencies, an allowance must be made for the withstand ratio f_2 (see Planning Guide). The frictional torque of the gear unit must always be taken into account in planning.

The gear units are only available in non-balanced design and with fitted key.

Technical features of the planetary gear units

- High efficiency (>94 %)
- Power transmission from the central sun gear via planetary gears
- No shaft deflections in the planetary gear set due to the symmetrical force distribution
- The enclosed gear units, filled with grease before leaving the factory, are attached to the shaft by means of an integral clamping hub. This requires a plain motor shaft extension with rotational accuracy tolerance N according to DIN 42955. The motor flange is fitted by means of adapter plates.
- The gear units are suitable for all mounting positions.
- The gear units are filled with grease. They are lubricated and sealed for their complete service life (service life 20,000 h).
- The gear unit has a degree of protection of IP 64.
- Output shaft of gear unit exactly coaxial with motor
- Oil seal on motor side included in the gear unit
- Small dimensions
- Low weight

Motors with built-on planetary gear units

The gear units assigned to the individual motors and gear ratios available for these motor/gear combinations are listed in the selection table *i* on the following pages. When making your selection, note the maximum permissible input speed of the gear unit which should be equal to the maximum motor speed.

The motor/gear combinations listed in the selection tables are mainly intended for use as positioning drives (S5). Continuous operation (S1) is permissible at the rated speed and rated torque of the gear unit. The gear unit temperature must not exceed +90 °C. The rigidity specifications in the catalog of the company alpha refer to the rated torque of the gear. The rigidity decreases in the partial load range in accordance with the hysteresis characteristic.

Follow the instructions in the Planning Guide when assigning gear units to the motor.

AC servo motors 1FK6 032 to 1FK6 103 and SIMODRIVE POSMO SI can be supplied from the (Siemens) factory complete with built-on planetary gear unit.

For queries relating to the gear units please contact:

alpha getriebebau GmbH
Service Gewerbegebiet
Harthausen
Postal address:
PO Box 1163
D-97997 Igersheim
Walter-Wittenstein-Str. 1
D-97999 Igersheim
Tel.: +49(0)7931-493-0
Fax: +49(0)7931-493-200
Internet: <http://www.alphagetriebe.de>
or

alpha gear drives
1440 Howard St.
Elk Grove Village, IL 60007
Tel.: +1(847)439-0700
Fax: +1(847)439-0755

SIMODRIVE 611 universal and POSMO AC Motors

Planetary gear units, LP series (from alpha)
for 1FK6 synchronous servo motors

Selection table

Ordering data:

1FK6□□□-□A□71-1□□□-Z

V□□

G
H

Order No. of motor (standard type) with identification code "-Z" and

Order Code for built-on planetary gear unit

Shaft end on drive end: Smooth shaft
(prerequisite for mounting on the LP gear unit)

Servo motor Self-cooled	Planetary gear unit 1-stage Torque play ≤ 12 arcmin		Available gear ratios $i =$		Max. perm. input speed ¹⁾	Max. perm. output torque ¹⁾		Max. perm. load on output shaft ²⁾	Moment of inertia gear unit
Type	Type	Gear unit weight, approx. kg	5	10	n_{G1} rpm	τ_{G2} with $i = 5$ Nm	τ_{G2} with $i = 10$ Nm	F_r N	J_G with $i = 5/10$ 10^{-4} kgm^2
1FK6 032	LP 070-M01	1.9	☐	☐	6000	32	29	1450	0.28
1FK6 033			☐	☐					
1FK6 040	LP 090-M01	4.1	☐	☐	6000	80	72	2400	1.77
1FK6 042			☐	☐					
1FK6 043			☐	☐					
1FK6 044			☐	☐					
1FK6 060 ³⁾	LP 120-M01	9	☐	☐	4800	200	180	4600	5.42
1FK6 061			☐	☐					
1FK6 063 ³⁾			☐	☐					
1FK6 064			☐	☐					
1FK6 080 ³⁾	LP 155-M01	17.5	☐	☐	4800	400	320	7500	25.73
1FK6 083 ³⁾			☐	☐					
1FK6 100 ³⁾			☐						
1FK6 101			☐						
1FK6 103			☐						

Order code

- Gear shaft
with key

V40 V42

Continuous duty S1

Continuous operation is permissible at the rated speed and rated torque.

The gear unit temperature must not exceed + 90 °C.

Planetary gear unit 1-stage Torque play ≤ 12 arcmin	Rated speed	Max. perm. output torque ¹⁾	
Type	n_{N1} rpm	τ_{N2} with $i = 5$ Nm	τ_{N2} with $i = 10$ Nm
LP 070-M01	3700	16	15
LP 090-M01	3400	40	35
LP 120-M01	2600	100	90
LP 155-M01	2000	290	170

¹⁾ Values for S5 positioning mode.

²⁾ In relation to the midpoint of the output shaft.
at 100 rpm.

³⁾ Can also be ordered as SIMODRIVE POSMO SI
with this order code.

SIMODRIVE 611 universal and POSMO AC Motors

Cycloid gear units, Servo series (from Sumitomo)
for 1FT6 and 1FK6 synchronous servo motors

Description



Motor and cycloid gear unit

Ordering data

Technical information about the gear units in the servo series (permissible torques, radial loads, mounting dimensions, weights, etc.) is contained in CYCLO DRIVE leaflet number 37A from Sumitomo.

The gear units in the servo series are available exclusively from Sumitomo CYCLO DRIVE. Further information can be obtained from the gear unit manufacturer:

Sumitomo CYCLO DRIVE Europe GmbH

Cyclostr. 92
D-85229 Markt Indersdorf
Tel.: +49(0)8136-660
Fax: +49(0)8136-5771
Internet: <http://www.smcycuro.com>



The servo series of cycloid gear units are suitable for 1FT6 and 1FK6 motors. The single-stage gear units are available in four frame sizes with different gear ratios ranging from $i = 6$ to $i = 119$ (depending on the type of motor). Speeds ranging from 2000 rpm to 6000 rpm are available depending on the motor type.

- Gear unit types for 1FK6/1FT6 synchronous servo motors
 - Servo 100
 - Servo 4000

Technical features of the Servo series

- Torsional play ≤ 3 angular minutes
- Compact design
- Low weight due to aluminium enclosure
- High reliability due to overload capacity. Operational safety even in EMERGENCY-STOP situations
- Low maintenance requirement through permanent grease lubrication (20,000 h)
- Coaxial arrangement of motor and gear unit output shafts
- All sizes are suitable for any mounting position
- Easy mounting with only one low-play plug-type connection and a clamping element
- The two standard products permit
 - Short delivery times
 - Low prices
 - Low stock-holding and spare parts costs

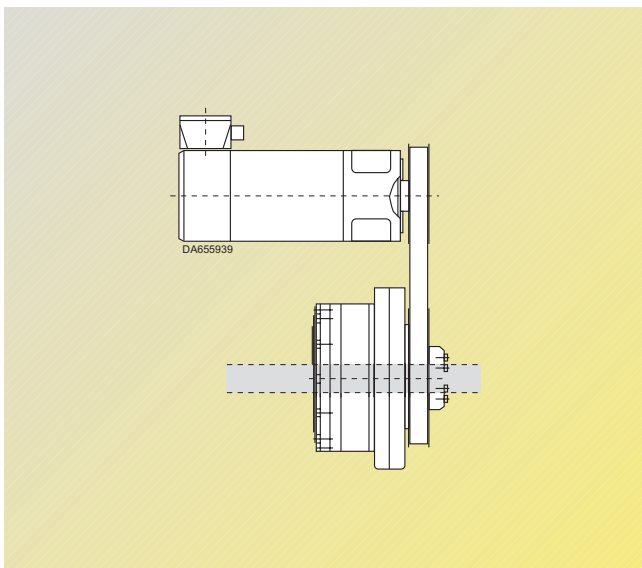
SIMODRIVE 611 universal and POSMO AC Motors

Harmonic Drive gear units HFUC (from Harmonic Drive) for 1FT6 and 1FK6 synchronous servo motors

Description



Motor with Harmonic Drive HFUC gear units



Servo motor with Harmonic Drive HFUS hollow shaft gear unit arranged in parallel

Extremely compact servo drives with high performance are obtained by adapting the 1FT6 and 1FK6 servo motors with the Harmonic Drive HFUC gear units. Single-stage gear reduction ratios ranging from $i = 50$ to $i = 160$ open up a broad array of applications in the automation technology sector. The 1FT6 and 1FK6 servo motors can be arranged either coaxially or in parallel to the Harmonic Drive HFUC gear units. The coaxial arrangement offers a very compact setup with a high reduction ratio.

The parallel motor/gear unit arrangement allows cables, coolant lines and laser beams to be passed through the hollow shaft that is part of the Harmonic Drive HFUS gear unit.

- Gear unit and drive variants
 - HFUC series
For coaxial attachment to 1FT6 and 1FK6 servo motors
 - HFUS series
Hollow shaft gear units for parallel attachment of the 1FT6 and 1FK6 servo motors

Technical features of the Harmonic Drive gear unit

- Freedom from play
- Single-stage reduction ratios from $i = 50$ to $i = 160$
- High positioning and repeat accuracy (< 1 angular minute)
- High power density
- Minimum installed space
- Low weight
- High-capacity cross roller output bearing
- No maintenance required (lubricate with grease)
- Efficiency approx. 75%

Applications

The servo drives comprising the 1FT6 or 1FK6 servo motors and the Harmonic Drive gear units are used primarily for positioning purposes in the following areas:

- Swivel axes on grinding, woodworking, plastics processing and glass working machines
- Industrial robots
 - Arm and wrist axes of jointed-arm robots
 - Swivel axes for Scara robots
- Measuring and test machinery

Ordering data

Technical data, drawings, CAD files and other information can be supplied by Harmonic Drive on request. Selection and design software can also be requested in the form of an electronic catalog on CD-ROM.

Motor flange and shaft tolerances in accordance with DIN 42955 are recommended for adapting 1FT6 and 1FK6 servo motors.

The gear units and the complete drive unit are available exclusively from Harmonic Drive.

Further information can be obtained from the gear unit manufacturer.

Harmonic Drive Antriebstechnik AG

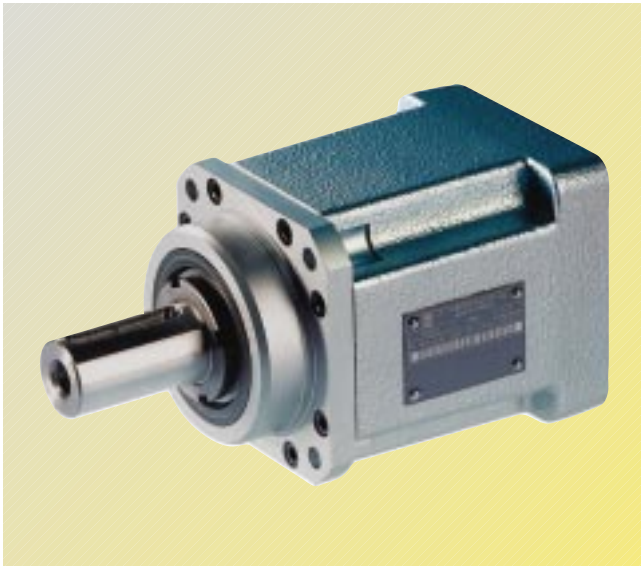
Hoenbergstr. 14
D-65555 Limburg
Tel.: +49(0)6431-5008-0
Fax: +49(0)6431-5008-18
Internet: <http://www.harmonicdrive.de>



SIMODRIVE 611 universal and POSMO AC Motors

Planetary gear units, ZF Servoplan (from ZF)
for 1FK6 synchronous servo motors

Description



Low-play planetary gear unit, ZF Servoplan series

Planetary gear units can easily be mounted onto 1FK6 servo motors. The motors are ordered with a plain shaft. The gear units are flanged directly to the drive end of the motors.

The motor shaft is inserted into the gear unit coupling and the four flange screws and the coupling screw are then simply tightened (please observe the tightening torques in the installation instructions).

When selecting the gear unit, ensure that the limit data for the motor does not exceed the limit data for the gear unit.

The 1FK6 motors should always be configured with τ_0 (60 K) characteristic curves (non-insulated configuration, ambient temperature +20 °C). A further reduction may be necessary for higher speeds and/or higher ambient temperatures. In the case of high operating frequencies, an allowance must be made for the withstand ratio (see Planning Guide). The frictional torque of the gear unit must always be taken into account in planning.

The gear units are balanced in accordance with DIN ISO 1940 to balancing quality G 6.3.

Technical features of the planetary gear units

- High efficiency (>95 % 1-stage, >92 % 2-stage)
- Power transmission from the central sun gear via planetary gears
- No shaft deflections in the planetary gear set due to the symmetrical force distribution
- Very low moment of inertia and hence short acceleration times of the motors
- Output shaft bearings dimensioned for high cantilever and axial loads using rugged rolling-contact bearings
- The enclosed gear units, filled with grease before leaving the factory, are attached to the shaft by means of an integral clamping hub. This requires a motor shaft extension in Version b with rotational accuracy tolerance N according to DIN 42955.
- The grease lubrication lasts for the entire service life, giving maintenance-free operation in all mounting positions
- Output shaft of gear unit exactly coaxial with motor
- The gear unit is sealed off from the motor
- Small dimensions
- Low weight
- The fully enclosed construction to the IP 65 degree of protection permits use even under harsh environmental conditions
- Low torsional play thanks to low-play helical gearing with ground gear pairs

Ordering data

Technical data for the ZF Servoplan gear units can be obtained direct from the manufacturer or via the Internet.

The drive units listed in the selection tables are mainly intended for use as positioning drives (S5). The motor/gear unit combination can be used for S1 operation at reduced rated output. For applications involving continuous operation at high speed, please contact the gear unit manufacturer.

The gear units and the complete drive unit are available exclusively from ZF Friedrichshafen. Further information can be obtained from the gear unit manufacturer.

ZF Maschinenantriebe GmbH

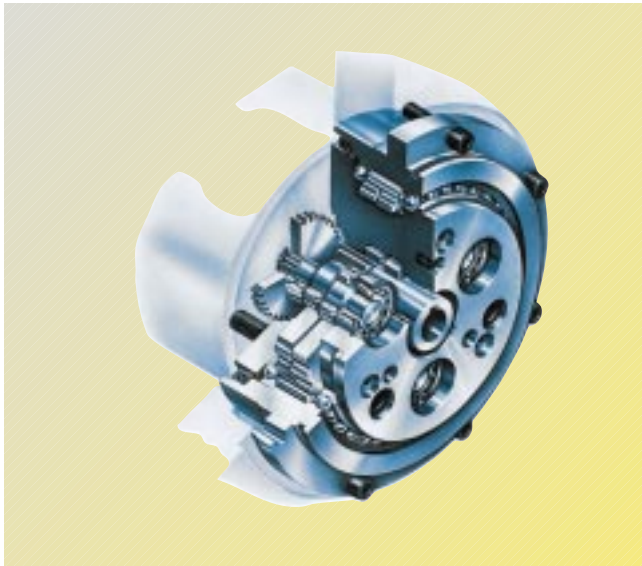
D-88038 Friedrichshafen
Tel.: +49(0)7541-77-0
Fax: +49(0)7541-77-908000

Internet: <http://www.zf-group.de/zf-n>

SIMODRIVE 611 universal and POSMO AC Motors

High-reduction precision gear units (from
Teijin Seiki) for 1FK6 synchronous servo motors

Description



Cross-section of RV-E gear unit

TEIJIN SEIKI has been offering its range of RV gear units to solve complex drive applications since 1986. RV gear units are used in cases where minimal torsional play, high rotational locking and stall stability and a compact construction are required with large reduction ratios. Consistent implementation of these requirements has resulted in TEIJIN SEIKI becoming the leading player in the world robotics market within a very short period of time.

Technical characteristics

- Hysteresis loss less than one angular minute
- Long service life and reliability
- High positioning accuracy
- Integrated output bearing reduces overall costs
- Patented two-stage reduction principle produces high level of dynamic performance and smooth operation
- Acceleration torques of 117 Nm to 17150 Nm
- Also available as hollow shaft version, d_i from 31 mm to 140 mm

Applications

- Robotics
- Medical engineering
- Communications technology (antennae drives)
- Packaging machines
- Indexing tables
- Handling and conveyor systems
- Aerospace industry
- Semiconductor production

Ordering data

Detailed information about the RV gear units can be obtained direct from the manufacturer or via the Internet. An interactive gear unit selection program is also available. This makes it possible to use the Internet to select the optimum gear unit on the basis of a cyclic load graph, the service life required and various other secondary criteria.

The gear units are available from TEIJIN SEIKI Europe. Further information can be obtained from the gear unit manufacturer.

TEIJIN SEIKI Europe GmbH

Klosterstraße 49
D-40211 Düsseldorf
Tel.: +49(0)211-17379-0
Fax: +49(0)211-364677
e-Mail: info@teijinseiki.de
Internet: <http://www.teijinseiki.de>

SIMODRIVE 611 universal and POSMO AC Motors

1FN3 linear motors

Description



1FN3 linear motors (primary sections)

The 1FN linear motors offer:

- Outstanding dynamic response and very high traversing velocity
- Excellent precision
- Easy assembly
- Non-wearing drive components due to contactless drive power transmission

In combination with the SIMODRIVE 611 universal and SIMODRIVE POSMO CD/CA converters, 1FN linear motors provide a linear drive system that is specially designed to meet mechanical engineering requirements.

The motors consist of a primary section and a secondary section with rare-earth magnets. The primary section has fixed dimensions, while the secondary section is made up of individual elements to suit the traversing range. Through parallel operation of the motors, the force of the feed can be scaled beyond the available spectrum.

Another important advantage of linear drive technology is that the effects of elasticity, play and friction as well as natural oscillation are virtually eliminated from the drive train. This results in a high dynamic response and high precision.

If suitable measuring systems are used and the temperature conditions are appropriate, the motors can be positioned in the nanometer range.

The simple mechanical construction without transmission elements such as leadscrew, coupling or belt, enhances the reliability and dynamic response of the drive components.

Heat loss occurs almost exclusively in the primary section and is dissipated via an integrated cooling system. The thermo-sandwich dual-circuit cooling system (optional for the 1FN3) permits both a thermal decoupling of the motor from the machine and also a low-cost cooling design.

The stainless metal encapsulation of the primary section provides the high mechanical rigidity and resistance to soiling required for use in mechanical engineering, as well as resistance to corrosive liquids. In addition, a large air gap makes minimal demands on the preparation of mounting surfaces. The mounting tolerances for the air gap are ± 0.3 mm.

Applications for 1FN3

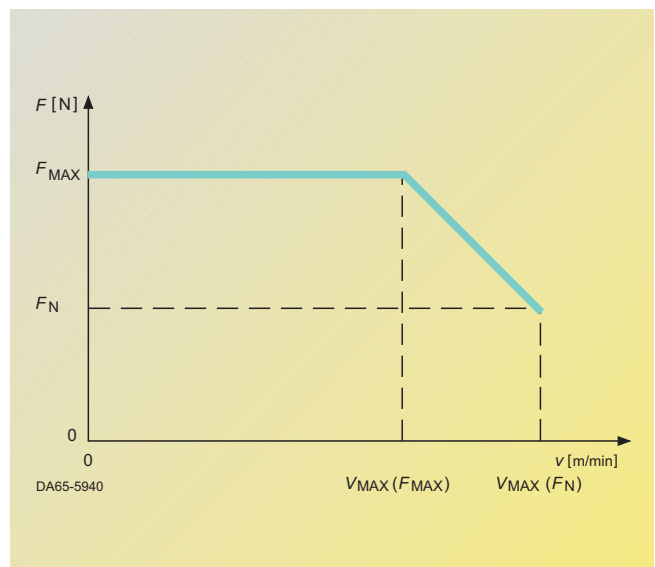
- High-dynamic and flexible mechanical engineering
- Laser machining
- Handling
- Pick & Place

An overload range is available for acceleration processes in the case of the 1FN linear motors. The maximum force F_{MAX} can only be fully utilized up to a maximum speed; above this speed, only the rated force F_N is available.

Construction variants

1FN linear motors are available as single-comb or double-comb motors.

- Single-comb motors
The single-comb version consists of a primary section with a standard winding that is mounted parallel to the associated secondary section.
- Double-comb motors
The secondary section of the double-comb version lies between two primary sections (each primary section with standard winding and complementary winding). The construction as a double-comb motor is particularly suitable for applications with movable secondary section and small traversing paths with extremely high accelerations (e.g. eccentric machining).



Speed/force of feed graph

SIMODRIVE 611 universal and POSMO AC Motors

1FN3 linear motors

Measuring system overview

Recommended linear measuring systems for 1FN linear motors		LC 181/LC 481 Absolute encoder EnDat encapsulated	LS 186 Incremental encoder sin/cos 1 V _{pp} encapsulated	LS 486 Incremental encoder sin/cos 1 V _{pp} encapsulated	Renishaw RG2 Incremental encoder sin/cos 1 V _{pp} open
Signal cycle	μm	16	20	20	20
Maximum permissible acceleration in measuring direction	m/s ²	50	100	50	300 ¹⁾
Maximum permissible traversing velocity	m/min	120	120	120	300
Maximum measuring length	mm	3040	3040	2040	50000
Output signal		EnDat/1 V _{pp}	1 V _{pp}	1 V _{pp}	1 V _{pp}

Connections

Connection of temperature sensors

A connection cable inside the control cabinet or a connector box for connection outside the control cabinet is required for connection of the temperature sensors in the linear motor to the SIMODRIVE 611 universal and SIMODRIVE POSMO CD/CA.

Connecting cable for 1FN3 linear motors

The connecting cable connects the temperature sensor cables Temp-F (temperature sensor) inside the power cable to the measuring system input on the SIMODRIVE regulated control module.

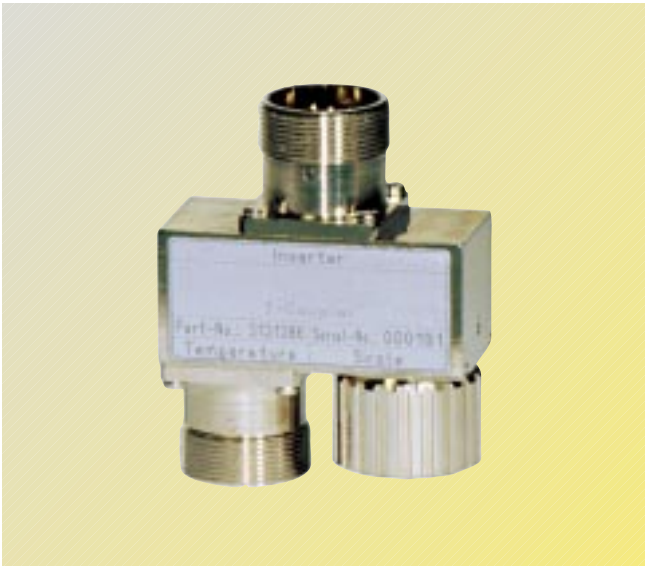
A protection module must be connected to the input of the regulated control module for protective separation. The connecting cable can be used irrespective of the measuring system in use. The possible connection types are power socket connectors or free cable ends (see motor table).

A further connecting cable links the temperature sensor cable Temp-S (temperature switch) inside the power cable to a secure electrically isolated 3RN1 thermistor motor protection unit which is connected to the PLC.

Connector box

A connector box is required for the connection of temperature sensors/switches outside the control cabinet.

The connector box is available in two versions, for incremental and absolute measuring systems respectively.



Connector box

Ordering data

Order No.
6FX8 002-1AA14-1A □ 0

Connecting cable

Pre-assembled	
Length 1 m	B
Length 3 m	D
Length 5 m	F

Ordering data

Order No.
1FN1 910-0AA □ 0-0AA0

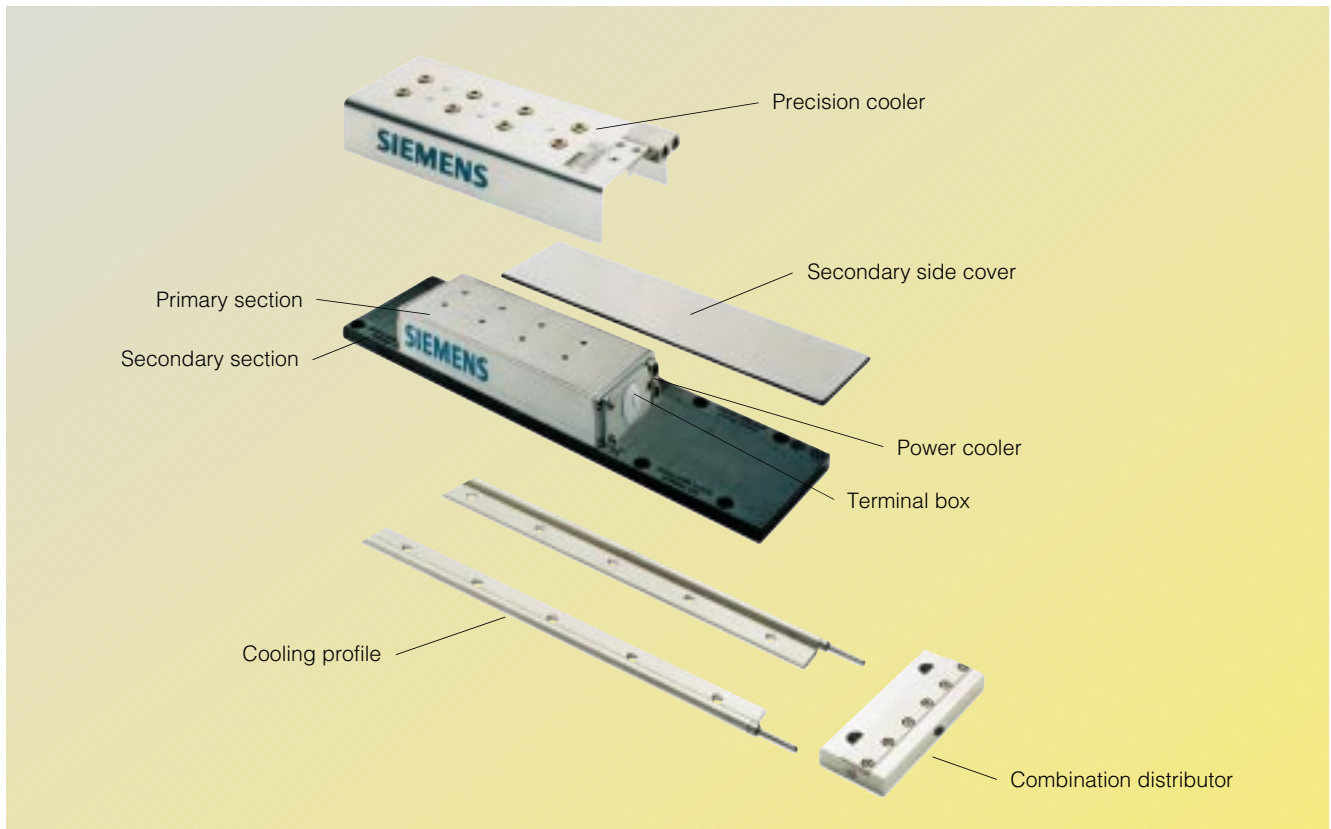
Connector box

for connection of	
Incremental encoder	0
Absolute encoder	1

1) Use depends on system environment

SIMODRIVE 611 universal and POSMO AC Motors

1FN3 linear motors



Hall-effect sensor box

A hall-effect sensor box is also necessary in the case of incremental measuring systems.



Hall-effect sensor box

Ordering data

Linear motor	Hall-effect sensor box	
	Mounting: Standard (opposite primary section connection side)	Mounting: Variants (on primary section connection side)
Type	Order No.	Order No.
1FN3 050-2W/-4W 1FN3 100-2W/-4W 1FN3 150-2W/-4W	1FN3 002-0PH0□-0AA0	1FN3 002-0PH0□-0AA0
1FN3 050-3W/-5W 1FN3 100-3W/-5W 1FN3 150-3W/-5W	1FN3 005-0PH0□-0AA0	1FN3 002-0PH0□-0AA0
1FN3 300-2W/-4W 1FN3 450-2W/-4W 1FN3 600-2W/-4W 1FN3 900-2W/-4W	1FN3 003-0PH0□-0AA0	1FN3 003-0PH0□-0AA0
1FN3 300-3W/-5W 1FN3 450-3W/-5W 1FN3 600-3W/-5W 1FN3 900-3W/-5W	1FN3 006-0PH0□-0AA0	1FN3 003-0PH0□-0AA0
Cable feeder, straight	0	0
Cable feeder, lateral	1	1

SIMODRIVE 611 universal and POSMO AC Motors

1FN3 linear motors

Ordering and planning data

Force of feed		Maximum velocity ¹⁾		1FN1 AC linear motor water-cooled		Weight ²⁾	
F_N ¹⁾	F_{MAX}	v_{MAX} at F_{MAX}	v_{MAX} at F_N	Primary section Order No.	Secondary section Order No.	Primary section	Secondary section
N	N	m/min	m/min			kg	kg
200	550	146	373	1FN3 050-2WC00-0AA 0	1FN3 050-4SA00-0AA0	2.4/ 2.9	0.4/0.5
200	490	138	222	1FN3 100-1WC00-0AA 1	1FN3 100-4SA00-0AA0	3.8/ 4.4	0.7/0.8
450	1100	131	297	1FN3 100-2WC00-0AA 1			
		237	497	1FN3 100-2WE00-0AA 1			
675	1650	120	277	1FN3 100-3WC00-0AA 1		5.4/ 6.2	0.7/0.8
		237	497	1FN3 100-3WE00-0AA 1			
900	2200	131	297	1FN3 100-4WC00-0AA 1		7.4/ 8.5	0.7/0.8
		237	497	1FN3 100-4WE00-0AA 1			
1125	2750	109	255	1FN3 100-5WC00-0AA 1		9.1/10.4	0.7/0.8
675	1650	126	282	1FN3 150-2WC00-0AA 1	1FN3 150-4SA00-0AA0	5.3/ 6.0	1.2/1.3
1015	2470	126	282	1FN3 150-3WC00-0AA 1		7.8/ 8.7	1.2/1.3
1350	3300	126	282	1FN3 150-4WC00-0AA 1		10.2/11.4	1.2/1.3
1690	4120	126	282	1FN3 150-5WE00-0AA 1		12.8/14.2	1.2/1.3
1225	3450	63	176	1FN3 300-2WB00-0AA 1	1FN3 300-4SA00-0AA0	11.4/12.4	2.4/2.6
		125	297	1FN3 300-2WC00-0AA 1			
		369	805	1FN3 300-2WG00-0AA 1			
1840	5170	125	297	1FN3 300-3WC00-0AA 1		17.0/18.4	2.4/2.6
		383	836	1FN3 300-3WG00-0AA 1			
2450	6900	63	176	1FN3 300-4WB00-0AA 1		22.2/24.0	2.4/2.6
		125	297	1FN3 300-4WC00-0AA 1			
1930	5180	120	275	1FN3 450-2WC00-0AA 1	1FN3 450-4SA00-0AA0	15.9/17.1	3.8/4.0
		240	519	1FN3 450-2WE00-0AA 1			
2895	7760	62	164	1FN3 450-3WB00-0AA 1		22.6/24.3	3.8/4.0
		90	217	1FN3 450-3WB50-0AA 1			
		120	275	1FN3 450-3WC00-0AA 1			
		240	519	1FN3 450-3WE00-0AA 1			
3860	10350	62	164	1FN3 450-4WB00-0AA 1		30.9/33.1	3.8/4.0
		90	217	1FN3 450-4WB50-0AA 1			
		120	275	1FN3 450-4WC00-0AA 1			
		240	519	1FN3 450-4WE00-0AA 1			
3915	10350	58	155	1FN3 600-3WB00-0AA 1	1FN3 600-4SA00-0AA0	31.5/33.4	4.6/5.0
		112	254	1FN3 600-3WC00-0AA 1			
5220	13800	58	155	1FN3 600-4WB00-0AA 1		40.8/43.3	4.6/5.0
		91	215	1FN3 600-4WB50-0AA 1			
		112	254	1FN3 600-4WC00-0AA 1			
4050	10350	65	160	1FN3 900-2WB00-0AA 1	1FN3 900-4SA00-0AA0	28.2/29.7	7.5/7.9
		115	253	1FN3 900-2WC00-0AA 1			
8100	20700	65	160	1FN3 900-4WB00-0AA 1		56.2/58.9	7.5/7.9
		88	203	1FN3 900-4WB50-0AA 1			
		115	253	1FN3 900-4WC00-0AA 1			
With a temperature monitoring circuit: Temp-S						0	
With two temperature monitoring circuits: Temp-S and Temp-F						1	

1) Speed values refer to a converter DC link voltage of 600 V DC.

2) Values for version with/without components for precision cooling of the primary and secondary section.

3) For water cooling.

4) For connection via terminal box, length < 1.5 m applies in the following:
4 × 16 mm² + 4 × 0.5 mm²;
Order No. 6FX7 008-1BC61-□□□□.

SIMODRIVE 611 universal and POSMO AC Motors

1FN3 linear motors

Motor phase current		Rated converter current required	Rated power loss	Calculated power Peak electrical power consumption	Motor supply via power connector	Power cable, for trailing with overall shield (increased velocity/ acceleration)
$I_N^{3)}$	I_{MAX}	I_N/I_{MAX}	$P_{VN}^{3)}$	P_{calc}	Motor conductor cross- section (IEC 60204-1C) mm ²	Sold by the meter
A	A	A	W	kW		Order No.
2.7	8.2	5/ 10	310	4.1	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
2.4	6.5	5/ 10	280	3.1	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
5.1	13.5	9/ 18	550	6.3	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
8.1	21.5	18/ 36	550	8.3	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
7.2	19.1	18/ 36	820	9.2	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
12.1	32.2	18/ 36	830	12.4	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
10.1	27.0	18/ 36	1100	12.6	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
16.1	43.0	28/ 56	1100	16.6	4 × 2.5 + 4 × 0.5	6FX7 008-1BC21-□ □ □ 0
11.0	29.5	18/ 36	1320	14.4	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
7.2	19.1	18/ 36	730	8.7	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
10.7	28.6	18/ 36	1100	13.0	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
14.3	38.2	28/ 56	1470	17.4	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
17.9	47.7	28/ 56	1830	21.7	4 × 2.5 + 4 × 0.5	6FX7 008-1BC21-□ □ □ 0
8.0	24.7	18/ 36	990	13.2	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
12.6	39.2	28/ 56	1000	16.8	4 × 1.5 + 4 × 0.5	6FX7 008-1BC11-□ □ □ 0
32.2	99.7	56/112	930	30.2	4 × 6 + 4 × 0.5	6FX7 008-1BC41-□ □ □ 0
19.0	58.7	56/112	1500	25.2	4 × 1.5 + 4 × 0.5	6FX7 008-1BC21-□ □ □ 0
50.0	154.9	140/210	1370	46.0	4 × 16 + 4 × 0.5	6FX7 008-1BC61-□ □ □ 0
16.0	49.4	28/ 56	1990	26.3	4 × 2.5 + 4 × 0.5	6FX7 008-1BC21-□ □ □ 0
25.3	78.3	56/112	1990	33.5	4 × 4 + 4 × 0.5	6FX7 008-1BC31-□ □ □ 0
18.8	55.3	28/ 56	1470	23.2	4 × 2.5 + 4 × 0.5	6FX7 008-1BC21-□ □ □ 0
33.8	99.7	56/112	1370	32.7	4 × 6 + 4 × 0.5	6FX7 008-1BC41-□ □ □ 0
17.9	52.7	28/ 56	2250	27.5	4 × 2.5 + 4 × 0.5	6FX7 008-1BC21-□ □ □ 0
22.8	67.3	56/112	2230	31.1	4 × 4 + 4 × 0.5	6FX7 008-1BC31-□ □ □ 0
28.1	83.0	56/112	2200	34.7	4 × 6 + 4 × 0.5	6FX7 008-1BC41-□ □ □ 0
50.7	149.6	140/210	2060	49.2	4 × 16 + 4 × 0.5	6FX7 008-1BC61-□ □ □ 0
23.8	70.3	56/112	3000	36.8	4 × 4 + 4 × 0.5	6FX7 008-1BC31-□ □ □ 0
30.4	89.8	56/112	2980	41.4	4 × 6 + 4 × 0.5	6FX7 008-1BC41-□ □ □ 0
37.5	110.6	56/112	2940	46.4	4 × 10 + 4 × 0.5	6FX7 008-1BC51-□ □ □ 0
67.6	199.5	140/210	2740	65.3	4 × 25 + 4 × 0.5 ⁴⁾	6FX7 008-1BC25-□ □ □ 0
23.2	67.3	56/112	3000	35.3	4 × 4 + 4 × 0.5	6FX7 008-1BC31-□ □ □ 0
35.2	102.4	56/112	2630	41.7	4 × 6 + 4 × 0.5	6FX7 008-1BC41-□ □ □ 0
30.9	89.8	56/112	4000	47.2	4 × 6 + 4 × 0.5	6FX7 008-1BC41-□ □ □ 0
40.8	118.5	70/140	3810	53.0	4 × 10 + 4 × 0.5	6FX7 008-1BC51-□ □ □ 0
46.9	136.5	70/140	3510	55.4	4 × 10 + 4 × 0.5	6FX7 008-1BC51-□ □ □ 0
24.7	69.5	56/112	2940	34.5	4 × 4 + 4 × 0.5	6FX7 008-1BC31-□ □ □ 0
36.7	103.3	56/112	2670	41.0	4 × 10 + 4 × 0.5	6FX7 008-1BC51-□ □ □ 0
49.4	138.9	70/140	5890	68.7	4 × 10 + 4 × 0.5	6FX7 008-1BC51-□ □ □ 0
60.6	170.3	140/210	5830	76.5	4 × 16 + 4 × 0.5	6FX7 008-1BC61-□ □ □ 0
73.5	206.5	140/210	5340	81.9	4 × 25 + 4 × 0.5 ⁴⁾	6FX7 008-1BC25-□ □ □ 0

Length: (examples)

50 m	1 F A
100 m	2 A A
200 m	3 A A

The current load capability of the power cables complies with IEC 60204-1 for installation type C, Table 5 under continuous op-

erating conditions at an ambient air temperature of +40 °C.

Power cables for SIMODRIVE POSMO see Page 3/15.

4

AC Motors

Ordering and planning data (continued)

Linear motors Type	Optional components			
	Precision cooler Order No.	Secondary section end pieces Order No.	Cooling profile ¹⁾ Order No.	Secondary side cover Order No.
1FN3 050-2W	1FN3 050-2PK00-0AA0	1FN3 050-0T□0□-0AA0	1FN3 002-0TK0□-1□□0	1FN3 050-□□□00-1□□0
1FN3 100-2W	1FN3 100-2PK00-0AA0	1FN3 100-0T□0□-0AA0	1FN3 002-0TK0□-1□□0	1FN3 100-□□□00-1□□0
1FN3 100-3W	1FN3 100-3PK00-0AA0			
1FN3 100-4W	1FN3 100-4PK00-0AA0			
1FN3 100-5W	1FN3 100-5PK00-0AA0			
1FN3 150-2W	1FN3 150-2PK00-0AA0	1FN3 150-0T□0□-0AA0	1FN3 002-0TK0□-1□□0	1FN3 150-□□□00-1□□0
1FN3 150-3W	1FN3 150-3PK00-0AA0			
1FN3 150-4W	1FN3 150-4PK00-0AA0			
1FN3 150-5W	1FN3 150-5PK00-0AA0			
1FN3 300-2W	1FN3 300-2PK00-0AA0	1FN3 300-0T□0□-0AA0	1FN3 003-0TK0□-1□□0	1FN3 300-□□□00-1□□0
1FN3 300-3W	1FN3 300-3PK00-0AA0			
1FN3 300-4W	1FN3 300-4PK00-0AA0			
1FN3 450-2W	1FN3 450-2PK00-0AA0	1FN3 450-0T□0□-0AA0	1FN3 003-0TK0□-1□□0	1FN3 450-□□□00-1□□0
1FN3 450-3W	1FN3 450-3PK00-0AA0			
1FN3 450-4W	1FN3 450-4PK00-0AA0			
1FN3 600-3W	1FN3 600-3PK00-0AA0	1FN3 600-0T□0□-0AA0	1FN3 004-0TK0□-1□□0	1FN3 600-□□□00-1□□0
1FN3 600-4W	1FN3 600-4PK00-0AA0			
1FN3 900-2W	1FN3 900-2PK00-0AA0	1FN3 900-0T□0□-0AA0	1FN3 005-0TK0□-1□□0	1FN3 900-□□□00-1□□0
1FN3 900-4W	1FN3 900-4PK00-0AA0			

Combination distributor

(for parallel water connection of all cooler profiles and holding down the cover)

Combination adapter

(for one-sided water connection and holding down the cover; use only in combination with combination end piece)

Combination end piece

(for water redirection and holding down the cover;
use only in combination with combination end piece)

Cover end piece

(holding down cover, without cooler profile)

Combination distributor, adapter, end piece for cooling profile with adapter nipple

Combination distributor, adapter, end piece for cooling profile with plug-in coupling 1

Equipped with hose sleeve nipple for direct hose connection

Pre-assembled with plug-in coupling for connection to combination distributors with plug-in coupling, adapters with plug-in coupling and end pieces with plug-in coupling

Cooling profile for frame sizes:

1FN3050 to 1FN3450 with hose sleeve nipple, right
1FN3600 to 1FN3900 with hose sleeve nipples on both sides

Cooling profile for frame sizes:

1FN3050 to 1FN3450 with hose sleeve nipple, left

Continuous secondary section cover over several secondary sections

Segmented secondary section cover over 3, 4 or 5 secondary sections

Examples:

Number of secondary sections	Order No. for secondary section cover
------------------------------	---------------------------------------

1	1FN3 ..0-0TB00-1AB0
---	---------------------

14 1FN3 ..0-0TB00-1BE0

16	1FN3 ..0-0TB00-1BGC
----	---------------------

24	1FN3 ..0-0TB00-1CE0
----	---------------------

1) Frame sizes

1FN3 050 to 1FN3 450:

2 pieces per secondary section track

1 FN3 600 to 1FN3 900:

3 pieces per secondary section track.

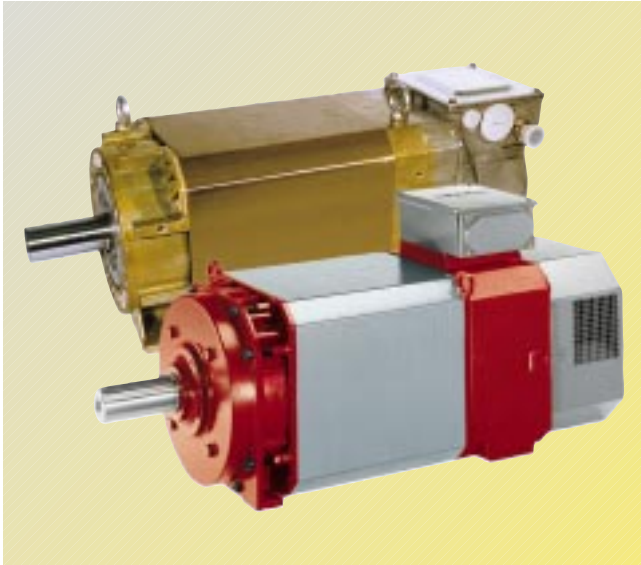
The maximum length of a single-section cooling profile that can be supplied is 3 m.
For the following frame sizes this corresponds to:

- 1FN3050 to 1FN3150 a maximum number of 24 secondary sections (AB to CE)
- 1FN3300 to 1FN3900 a maximum number of 16 secondary sections (AB to BG).

SIMODRIVE 611 universal and POSMO AC Motors

1PH7 induction servo motors

Description



1PH7 motor (AH 100 to AH 160 and AH 180/AH 225)

1PH7 air-cooled induction servo motors feature

- Short overall length of motor
- Minimized noise curve due to the integrated terminal box (AH 100 to AH 160)
- Maximum speeds up to 9000 rpm (option: 12000 rpm)
- Full rated torque constantly available even at standstill
- Optimum matching to the power levels SIMODRIVE 611

1PH7 motors are rugged and maintenance-free four-pole squirrel-cage induction motors. They have been designed specifically for use in conjunction with the SIMODRIVE 611 universal converter system.

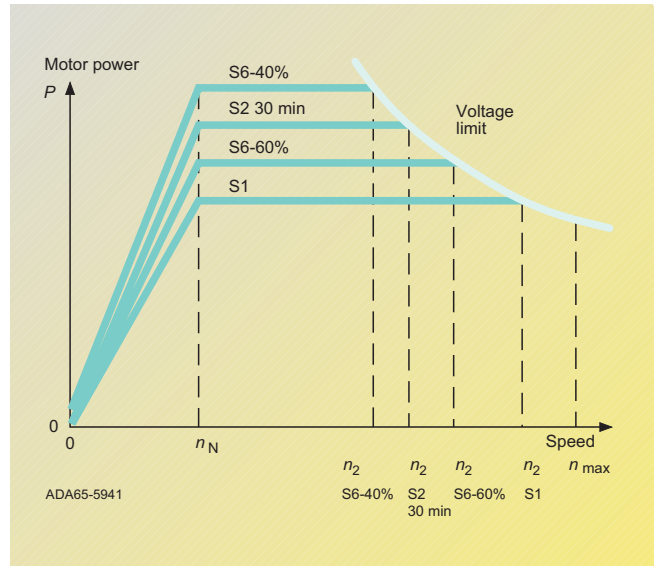
A fan for providing separate ventilation is mounted axially on the rear side of the motor. The normal direction of air flow is from the drive end to the non-drive end in order to keep the heat loss of the motor away from the machine tool.

The motors are equipped with a built-in encoder system for sensing the motor speed and indirect position. The encoder is capable of C-axis operation as standard, i.e. an additional encoder is not required for C-axis operation.

Applications

- Crane technology:
 - Lifting and traversing gear for stacker cranes
 - Hoisting gear, traversing gear, closing gear and trolley traversing gear
- Printing industry:
 - Single-motor drives for printing units
- Rubber, plastic, wire and glass:
 - Drives for extruders, calendars, rubber spray equipment, foil machines, flow equipment
 - Wire-drawing machines, cable handling machines, etc.
- General applications such as winch and winding drives.

Speed/power graph



Typical speed/power graph for three-phase motors ¹⁾

S1: Continuous duty

S6: Continuous duty with intermittent loading and a relative duty factor of 60 % (S6-60%) or 40 % (S6-40%) for a maximum cycle time of 10 minutes.

S2: Short-time operation with duty period of 30 min followed by standstill.

Motor Type	Rated speed n_N rpm	Achievable speed for rated power in duty type (acc. to IEC 60034-1)			
		n_2 ²⁾ S1 rpm	S6-60 % rpm	S6-40 % rpm	S2-30 min rpm
1PH7 101-.NF	1500	8200	7000	6000	6500
1PH7 103-.ND	1000	3750	3750	3100	3350
1PH7 103-.NF	1500	5000	4600	3900	4500
1PH7 103-.NG	2000	9000	7500	6400	6900
1PH7 105-.NF	1500	7900	6750	5750	6150
1PH7 107-.ND	1000	5800	4800	4100	4650
1PH7 107-.NF	1500	6500	6200	5250	5650
1PH7 107-.NG	2000	7000	7000	6900	7000
1PH7 131-.NF	1500	6700	5500	4500	5000
1PH7 133-.ND	1000	4700	3700	2800	3450
1PH7 133-.NF	1500	6800	5600	4500	5100
1PH7 133-.NG	2000	6500	6500	5900	6450
1PH7 135-.NF	1500	7500	6200	5200	5650
1PH7 137-.ND	1000	5400	4500	3600	4100
1PH7 137-.NF	1500	7000	7000	6200	6800
1PH7 137-.NG	2000	6000	6000	5800	6000
1PH7 163-.NB	500	2500	1900	1500	1730
1PH7 163-.ND	1000	5800	4800	4000	4400
1PH7 163-.NF	1500	5500	5500	5500	5500
1PH7 163-.NG	2000	3500	3500	3500	3500
1PH7 167-.NB	500	2100	1600	1250	1400
1PH7 167-.ND	1000	6250	5200	4300	4700
1PH7 167-.NF	1500	4500	4500	4500	4500
1PH7 167-.NG	2000	3250	3250	3250	3250
1PH7 184-.NT	500	4500	3800	3350	3350
1PH7 184-.ND	1000	5000	4400	3600	3600
1PH7 184-.NE	1250	5000	4680	4190	3600
1PH7 184-.NF	1500	5000	5000	5000	5000
1PH7 184-.NL	2500	5000	5000	5000	5000
1PH7 186-.NT	500	4800	4100	3580	4000
1PH7 186-.ND	1000	5000	4650	3850	3850
1PH7 186-.NE	1250	5000	4260	3780	3580
1PH7 224-.NC	700	3020	2570	2290	2170
1PH7 224-.ND	1000	4500	4500	4100	3730
1PH7 224-.NF	1500	4500	4330	4000	3890

¹⁾ See Planning Guide (see Part 5 for Order No.).

²⁾ Values taken from the speed/power graph with closed-loop infed. For open-loop infed, please follow the instructions in the Planning Guide.

SIMODRIVE 611 universal and POSMO

AC Motors

1PH7 induction servo motors

Ordering and planning data for shaft heights 100 to 160

Frame size <i>h</i> mm	Rated motor current for duty type (acc. to IEC 60034-1)				Three-phase induction servo motor 1PH7	
	P_N S1 kW	S6-60% kW	S6-40% kW	S2-30 min kW	Order No. Core type (Delivery time: 20 workdays)	Order No. Standard type (Delivery time: On request)
100	3.7	4.5	5.25	4.9		1PH7 101-2NF □ □ -0 □ □ □
	3.7	4.5	5.25	4.7		1PH7 103-2ND □ □ -0 □ □ □
	5.5	6.7	7.7	7		1PH7 103-2NF □ □ -0 □ □ □
	7	8.5	10	9.25	1PH7 103-2NG0 2 -0C □ 0	1PH7 103-2NG □ □ -0 □ □ □
	7	8.5	10	9.25		1PH7 105-2NF □ □ -0 □ □ □
	6.25	7.5	8.8	7.75		1PH7 107-2ND □ □ -0 □ □ □
	9	11	13	12	1PH7 107-2NF0 2 -0C □ 0	1PH7 107-2NF □ □ -0 □ □ □
	10.5	12.5	14.5	13.5		1PH7 107-2NG □ □ -0 □ □ □
132	11	13.5	16.5	15		1PH7 131-2NF □ □ -0 □ □ □
	12	15	18.5	16	1PH7 133-2ND0 2 -0C □ 0	1PH7 133-2ND □ □ -0 □ □ □
	15	18.5	23	20.5		1PH7 133-2NF □ □ -0 □ □ □
	20	25	30	27.5	1PH7 133-2NG0 2 -0C □ 0	1PH7 133-2NG □ □ -0 □ □ □
	18.5	23	28	25.5		1PH7 135-2NF □ □ -0 □ □ □
	17	20.5	25	22.5	1PH7 137-2ND0 2 -0C □ 0	1PH7 137-2ND □ □ -0 □ □ □
	22	27.5	33	30		1PH7 137-2NF □ □ -0 □ □ □
	28	35	43	39	1PH7 137-2NG0 2 -0C □ 0	1PH7 137-2NG □ □ -0 □ □ □
160	12	15	18	16.5		1PH7 163-2NB □ □ -0 □ □ □
	22	27	33	30	1PH7 163-2ND0 3 -0C □ 0	1PH7 163-2ND □ □ -0 □ □ □
	30	37	45	41	1PH7 163-2NF0 3 -0C □ 0	1PH7 163-2NF □ □ -0 □ □ □
	36	44	52	48		1PH7 163-2NG □ □ -0 □ □ □
	16	19.5	24	21.5		1PH7 167-2NB □ □ -0 □ □ □
	28	34.5	42	38		1PH7 167-2ND □ □ -0 □ □ □
	37	46	56	51	1PH7 167-2NF0 3 -0C □ 0	1PH7 167-2NF □ □ -0 □ □ □
	41	51	61	56		1PH7 167-2NG □ □ -0 □ □ □

Type 1)

IM B5 (IM V1, IM V3)	2
IM B35 (IM V15, IM V36)	3

Shaft ext. (drive end):	Balancing:	Direction of air flow (fan):	Air outlet dir.:	
Fitted key	Half-key	DE → NDE	axial	A
Smooth shaft	–	DE → NDE	axial	J

Terminal box/cable entry:

Top/right	0
Top/NDE	2
Top/left	3

Type 1)

IM B3 (IM V5, IM V6)	0
IM B5 (IM V1, IM V3) (not for 1PH7 16)	2
IM B35 (IM V15, IM V36)	3

Bearing design for:	Vibration severity:	Shaft and flange accuracy	
Coupling/belt drive	R	R	B
Coupling/belt drive	S	R	C
Coupling/belt drive	SR	R	D
Coupling/belt drive ²⁾ (increased speed)	SR	R	L

Shaft end (DE):	Balancing:	Direction of air flow (fan):	Air outlet dir.:	
Fitted key	Half-key	DE → NDE	axial	A
Fitted key	Half-key	NDE → DE	axial	B
Fitted key	Full-key	DE → NDE	axial	C
Fitted key	Full-key	NDE → DE	axial	D
smooth shaft	–	DE → NDE	axial	J
smooth shaft	–	NDE → DE	axial	K

Degree of protection:	Seal:	Paint:	
IP 55, fan IP 54	–	No paint finish	0
IP 55, fan IP 54	DE flange with shaft seal ²⁾	No paint finish	2

SIMODRIVE 611 universal and POSMO AC Motors

1PH7 induction servo motors

Rated speed n_N	Max. speed ³⁾		Rated torque τ_N	Moment of inertia J	Rated motor current for duty type (acc. to IEC 60034-1)				Weight approx. m
	n_{max}	$n_{max}^{4)}$			I_N S1 A	S6-60% A	S6-40% A	S2-30 min A	
rpm	rpm	rpm	Nm	kgm ²					kg
1500	9000	12000	23.6	0.017	10	11.5	12.5	12	40
1000	9000	12000	35.3	0.017	10	11.5	13	12	40
1500	9000	12000	35.0	0.017	13	16	18	16.5	40
2000	9000	12000	33.4	0.017	17.5	20.5	23.5	21.5	40
1500	9000	12000	44.6	0.029	17.5	21	23.5	22	63
1000	9000	12000	59.7	0.029	17.5	20.5	23	21	63
1500	9000	12000	57.3	0.029	23.5	27.5	31	29	63
2000	9000	12000	50.1	0.029	26	28.5	33	31	63
1500	8000	10000	70.0	0.076	24	29	34	31.5	90
1000	8000	10000	114.6	0.076	30	36	43	37.5	90
1500	8000	10000	95.5	0.076	34	41	49	43.5	90
2000	8000	10000	95.5	0.076	45	54	63	59	90
1500	8000	10000	117.8	0.109	42	50	58	54	130
1000	8000	10000	162.3	0.109	43	50	60	54	130
1500	8000	10000	140.1	0.109	57	68	79	73	130
2000	8000	10000	133.7	0.109	60	73	87	80	130
500	6500	8000	229.2	0.19	30	36	42	39	180
1000	6500	8000	210.1	0.19	55	65	77	71	180
1500	6500	8000	191.0	0.19	72	86	102	94	180
2000	6500	8000	171.9	0.19	85	100	114	107	180
500	6500	8000	305.6	0.23	37	44	53	48	228
1000	6500	8000	267.4	0.23	71	85	100	92	228
1500	6500	8000	235.5	0.23	82	97	115	104	228
2000	6500	8000	195.8	0.23	89	106	124	115	228



1PH7 motor (AH 100 to AH 160)

1) For "Prepared for ZF gear unit mounting", the following motor versions are necessary (for gear unit selection, see Page 4/48):

- Type IM B5 or IM B35
- Shaft with fitted key and full-key balancing

2) Only possible if oil spray/mist occasionally gets into the sealing ring. A sealing ring is not possible in the case of increased maximum speed.

3) For continuous duty (with 30% n_{max} , 60% $\frac{2}{3} n_{max}$, 10% standstill) for a duty cycle time of 10 min. For max. continuous speed and bearing replacement intervals, see the Planning Guide (for Order No. see Part 5).

4) Version for increased maximum speed, only in combination with vibration severity SR. The following options are not possible:

- Prepared for ZF gear unit mounting
- Shaft sealing ring

SIMODRIVE 611 universal and POSMO AC Motors

1PH7 induction servo motors

Ordering and planning data for shaft heights 180 to 225

Frame size	Rated motor current for duty type (acc. to IEC 60034-1)				1PH7 three-phase induction servo motor	Rated speed	Max. speed ¹⁾	Rated torque	Moment of inertia	Rated motor current for duty type (acc. to IEC 60034-1)				Weight approx. ²⁾	
<i>h</i>	<i>P_N</i>				Order No. (Delivery time: On request)	<i>n_N</i>	<i>n_{max}</i>	<i>τ_N</i>	<i>J</i>	<i>I_N</i>					
	S1	S6-60%	S6-40%	S2 30min						S1	S6-60%	S6-40%	S2 30 min	<i>m</i>	
mm	kW	kW	kW	kW		rpm	rpm	Nm	kgm ²	A	A	A	A	kg	
180	21.5	26.5	30.5	30	1PH7 184- □NT □ □-0 □ □ □	500	5000	410	0.5	76	90	103	102	390	
	39	48	58	58	1PH7 184- □ND □ □-0 □ □ □	1000	5000	372	0.5	90	106	126	126	390	
	40	50	56	66	1PH7 184- □NE □ □-0 □ □ □	1250	5000	305	0.5	85	100	110	128	390	
	51	68	81	81	1PH7 184- □NF □ □-0 □ □ □	1500	5000	325	0.5	120	149	174	174	390	
	78	97	115	115	1PH7 184- □NL □ □-0 □ □ □	2500	5000	298	0.5	172	204	237	237	390	
	29.6	36.5	43	38	1PH7 186- □NT □ □-0 □ □ □	500	5000	565	0.67	105	126	147	130	460	
	51	65	77	77	1PH7 186- □ND □ □-0 □ □ □	1000	5000	487	0.67	118	141	164	164	460	
	60	71	80	84	1PH7 186- □NE □ □-0 □ □ □	1250	5000	458	0.67	120	135	150	156	460	
	225	55	66	75	78	1PH7 224- □NC □ □-0 □ □ □	700	4500	750	1.48	117	135	149	155	650
		71	88	105	114	1PH7 224- □ND □ □-0 □ □ □	1000	4500	678	1.48	164	190	222	240	650
100		126	136	140	1PH7 224- □NF □ □-0 □ □ □	1500	4500	636	1.48	188	230	248	256	650	

Supply voltage³⁾ for the
SIMODRIVE 611 universal converter system:

3 AC 400 V ± 10%	2
3 AC 480 V +6%, -10%	3

Terminal box/cable entry:

Top/right	0
Top/DE	1
Top/NDE	2
Top/left	3

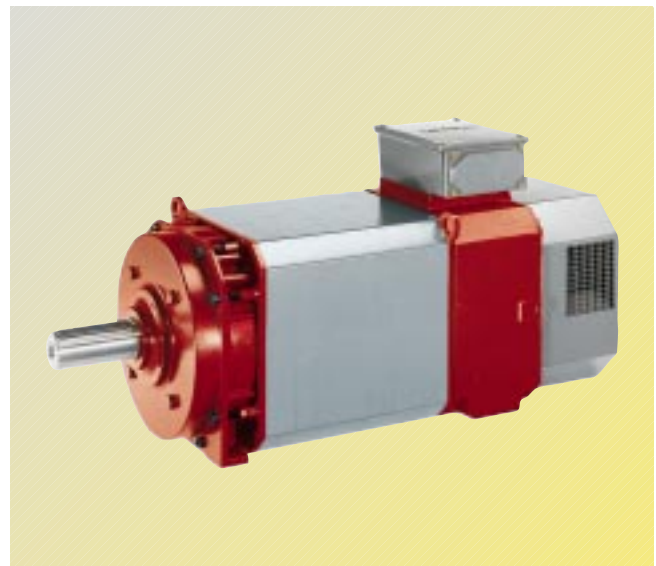
Type

IM B3	0
IM B3 (IM V5, IM V6) (lifting concept for vertical types)	1
IM B35	3
IM B35 (IM V15, IM V36) (lifting concept for vertical types)	5

Bearing design for:	Vibration severity:	Shaft and flange accuracy:	
Coupling drive	R	N	A
Coupling drive	R	R	B
Coupling drive	S	R	C
Coupling drive	SR	R	D
Belt drive	R	N	E
Belt drive	R	R	F
Belt drive (increased lateral force)	R	N	G
Belt drive (increased lateral force)	R	R	H
Coupling drive (increased speed)	S	R ⁴⁾	J

Shaft end (DE):	Balancing:	Direction of air flow (fan):	Air outlet dir.:	
Fitted key	Half-key	DE → NDE	Right	A
Fitted key	Half-key	NDE → DE	Axial	B
Fitted key	Full-key	DE → NDE	Right	C
Fitted key	Full-key	NDE → DE	Axial	D
smooth shaft	–	DE → NDE	Right	J
smooth shaft	–	NDE → DE	Axial	K

Degree of protection:	Seal: ⁵⁾ ⁶⁾	Paint:	
IP 55, fan IP 54	–	Primed	0
IP 55, fan IP 54	DE flange with Shaft seal	Primed	2



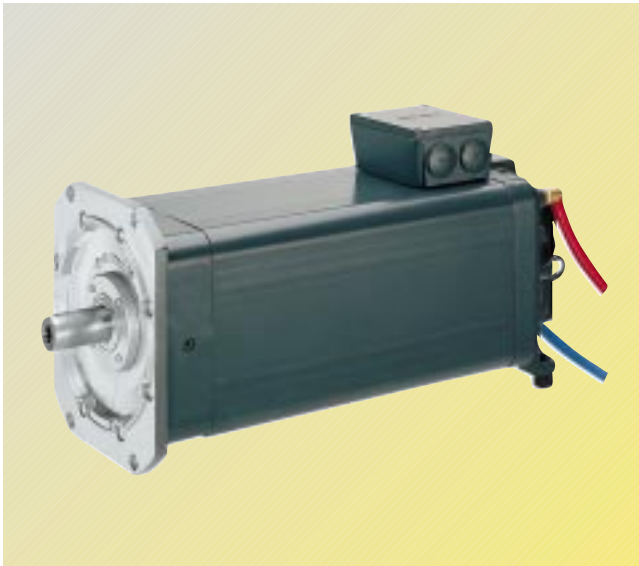
1PH7 motor (AH 180 to AH 225)

- For continuous duty (with 30% n_{max} , 60% n_{max} , 10% standstill) for a duty cycle time of 10 min. For max. continuous speed and bearing replacement intervals, see the Planning Guide (for Order No. see Part 5).
- The stated data are applicable to type IM B35. In type IM B3, the motor weighs 20 kg less.
- Fan supply voltage:
3 AC 400 V/50 Hz/60 Hz or
3 AC 480 V/60 Hz.
- Design for increased maximum speed
• $n_{max} = 7000$ rpm
for axle height 180
• $n_{max} = 5500$ rpm
for axle height 225
Option "Prepared for ZF gear unit mounting" not possible.
- For "Prepared for ZF gear unit mounting", the following motor versions are necessary (for gear unit selection, see Page 4/48):
• Type IM B35, IM V15 (not IM V36)
• Shaft with fitted key and full-key balancing
• Bearing design for coupling drive
• Vibration severity grade R
• Shaft and flange accuracy R
• ND flange with shaft sealing ring
- Only possible if oil spray/mist occasionally gets into the sealing ring. A sealing ring is not possible in the case of type IM B3 (IM V5, IM V6), version with increased cantilever forces or increased maximum speed.

SIMODRIVE 611 universal and POSMO AC Motors

1PH4 induction servo motors

Description



1PH4 motor

1PH4 water-cooled induction servo motors offer

- Small unit volume/ high power density
- Maximum speeds up to 9000 rpm (option: 12000 rpm)
- Full rated torque constantly available even at standstill
- Cooled flange to prevent thermal stressing of the mechanical power train
- Low noise level
- High degree of protection (IP 65, shaft gland IP 55)
- High rotational accuracy

The compact design of modern machine tools means that the heat losses from electrical drives can have an adverse effect on the accuracy of machining. The resulting demand for "cold" motors with a high power density has led to the development of the 1PH4 range of water-cooled AC induction servo motors.

Furthermore, a combination of high torque and small unit volume (low mass inertia) results in short acceleration and braking times.

This leads to a reduction in non-productive time.

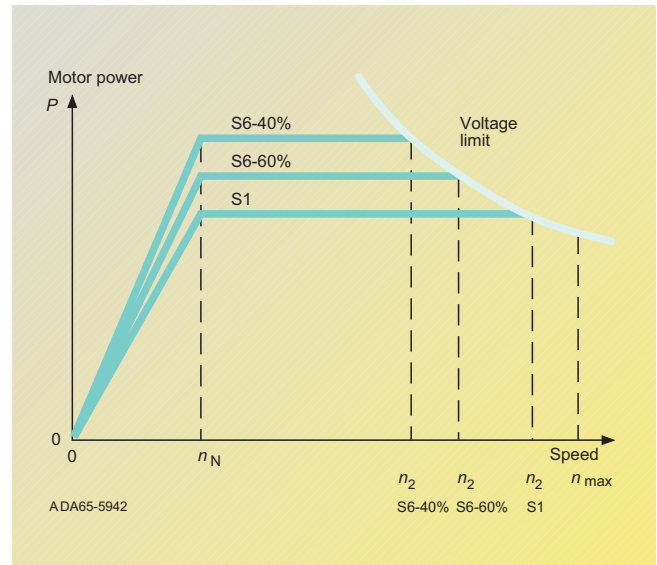
1PH4 motors are rugged four-pole squirrel-cage induction motors. They have been designed specifically for use in conjunction with the SIMODRIVE 611 universal converter system. This means that power losses and noise levels are reduced to a minimum. Due to the compact design of the motors, high maximum speeds can be achieved.

The motors are equipped with an encoder system for sensing the motor speed and indirect position. The encoder is capable of C-axis operation as standard, i.e. an additional encoder is not required for C-axis operation.

Field of application

- Wherever extreme ambient conditions, such as high temperature, dust, dirt or corrosive atmospheres do not permit air cooling.
- In processes in which heating of the atmosphere is not permitted.
- On special-purpose machines when coolant exists depending on the process.

Speed/power diagram



Typical speed/power graph for three-phase motors ¹⁾

S1: Continuous duty

S6: Continuous duty with intermittent loading and a relative duty factor of 60 % (S6-60 %) or 40 % (S6-40 %) for a maximum cycle time of 10 minutes.

Motor Type	Rated speed n_N rpm	Achievable speed for rated power for duty type (acc. to IEC 60034-1)		
		n_2 ²⁾ S1 rpm	S6-60 % rpm	S6-40 % rpm
1PH4 103	1500	8600	7500	6500
1PH4 105	1500	8800	7600	6500
1PH4 107	1500	8600	7400	6400
1PH4 133	1500	8000	7400	6000
1PH4 135	1500	7400	6200	5500
1PH4 137	1500	6800	5800	5000
1PH4 138	1500	7800	6600	5800
1PH4 163	1500	6300	5200	4500
1PH4 167	1500	5200	4400	3800
1PH4 168	1500	6300	5300	4600

¹⁾ See Planning Guide (see Part 5 for Order No.).

²⁾ Values taken from the speed/power graph with closed-loop infeed.

For open-loop infeed, please follow the instructions in the Planning Guide.

SIMODRIVE 611 universal and POSMO AC Motors

1PH4 induction servo motors

Ordering and planning data

Frame size <i>h</i>	Rated motor current for duty type (acc. to IEC 60034-1) <i>P_N</i>			1PH4 three-phase induction servo motor Rated speed <i>n_N</i> : 1500 rpm Type: IM B35 Order No. (Delivery time: On request)	Max. speed ²⁾ <i>n_{max}</i>	Max. speed L37 ¹⁾ ²⁾ <i>n_{max}</i>	Rated torque <i>T_N</i>	Moment of inertia <i>J</i>	Rated motor current for duty type (acc. to IEC 60034-1) <i>I_N</i>			Weight approx. <i>m</i>
mm	S1 kW	S6-60% kW	S6-40% kW		rpm	rpm	Nm	kgm ²	S1 A	S6-60% A	S6-40% A	kg
100	7.5	8.75	10	1PH4 103-4NF26	9000	12000	48	0.017	26	29	32	52
	11	12.75	14.75	1PH4 105-4NF26			70	0.024	38	42	47	67
	14	16.25	18.75	1PH4 107-4NF26			90	0.031	46	52	58	80
132	15	18	21	1PH4 133-4NF26	8000	10000	95	0.046	55	65	74	90
	22	26.5	31	1PH4 135-4NF26			140	0.071	73	86	99	112
	27	32.5	38	1PH4 137-4NF26			170	0.085	85	100	114	130
	30	36	42	1PH4 138-4NF26			190	0.097	102	119	136	150
160	37	45	52.5	1PH4 163-4NF26	6500	8000	235	0.17	107	125	142	175
	46	55	65	1PH4 167-4NF26			293	0.206	120	138	158	210
	52	62.5	73	1PH4 168-4NF26			331	0.22	148	173	197	240

Ordering notes:

When ordering options, an Order Code must be specified additionally for each design required.

Order No. **1PH4 1 □ □ -4NF26-Z**
Order code(s) □ □ □ + □ □ □ + . . .

Order Codes must not be repeated in plain text on the order form.

Options for standard types

	Order code
Bearing arrangement (viewed onto drive end) (standard = twin bearings)	K00
• Single bearing for coupling or planetary gear units or low to moderate cantilever forces	
Vibration severity acc. to EN 60034-14 (IEC 60 034-14) (standard = vibration severity grade R, twin bearing arrangement)	
• Grade S with twin bearing arrangement ³⁾	K05 ⁴⁾
• Grade S with single bearing arrangement ³⁾	K02 ⁴⁾
• Grade SR with single bearing arrangement ³⁾	K03 ⁴⁾
Shaft and flange precision acc. to DIN 42955 (IEC 60072-1) (standard = tolerance N)	
• Tolerance R	K04 ⁵⁾
Shaft extension (drive end): (standard = with keyway)	
• Without keyway (diameter and length: Standard)	K42
Shaft seal (drive end)	
• Rotary shaft seal, oil-tight	K18 ⁶⁾
Balancing (standard = full-key balancing)	
• Half-key balancing	L69
Gear unit ⁷⁾ ⁸⁾	
• Motor prepared for mounting ZF gear unit 2LG43... (type IM B35 or IM V15)	K00
Brake ⁸⁾	
• With holding brake mounted on DE	G46
Terminal box arrangement (viewed onto DE) (standard = top)	
• Side right ⁹⁾	K09
• Side left ⁹⁾	K10
Rotation of terminal box on its own axis	
• Through 90°, cable entry from drive end ⁹⁾	K83
• Through 90°, cable entry from non-drive end ⁹⁾	K84
• Through 180° ⁹⁾	K85
Speed ¹⁰⁾	
• With increased speed	L37
Other	
• Second rating plate separately packed	K31

1) "Increased speed" is the maximum when using the L37 option.

2) For continuous duty (with 30% *n_{max}*, 60% ^{2/3} *n_{max}*, 10% standstill) for a duty cycle time of 10 min.

3) Options mutually exclusive.

4) Automatically includes version K04.

5) Increased shaft accuracy.

6) Only possible if oil spray/mist occasionally gets into the sealing ring.

7) Vibration severity grades S and SR not possible with built-on gear unit. Use code K00 + G97 for former ZF gear unit 2LG42... (for choice of gear units see Page 4/48).

8) Options mutually exclusive.

9) Options mutually exclusive.

10) Version for increased maximum speed contains vibration severity SR. The following options are not possible:
• Prepared for ZF gear unit mounting
• Shaft sealing ring

SIMODRIVE 611 universal and POSMO AC Motors

2-gear gear units for
1PH7 and 1PH4 motors

Field of application



Sectional view of a planetary gear unit

Change-speed gear units increase the drive torque at low motor speeds and expand the band of constant power output available from the induction servo motor.

The performance features of the 2-speed gear units for AC induction motors are:

- Drive power up to 100 kW
- Constant power band at main spindle up to 1:24
- Bi-directional
- Motor frame sizes AH 100 to AH 225
- Types IM B35 and IM V15 (IM V36 on request)

Mounting the gear unit outside the headstock of the machine tool has the following advantages:

- Easy adaptation to the machine tool
- Low noise and no temperature fluctuations due to gearing inside the headstock
- Separate lubrication systems for the main spindle (grease) and the gear unit (oil)
- Gearing efficiency >95%
- Instead of V belts, the power output can also be transmitted from the gear drive output shaft by a spur gear pinion (available on request) or coaxially by means of a flexible coupling

Installation, mode of operation

The 2-speed gear units have a planetary design. The central sun gear distributes the power to several planet wheels which revolve around it. The outstanding advantage of this design is its compactness. The gear-changing device, a spined sleeve that moves axially, is of form-fit design.

Position 1:
Gear ratio $i/1 = 4$.

Position 2:
Gear ratio $i/2 = 1$.

The motor is flange-mounted onto the gear unit by means of a ring adapter. The AC motor must be suitably prepared for mounting.

At shaft heights of 160 mm and above, the type IM B35 V15 motor has to be supported free from distortion at the non-operating end.

Any cantilever forces imported into the gear unit have to be borne by the gear unit and transmitted to the machine base.

The motors for all 2K gear units must be full-key balanced with fitted key. Because the 2K 120, 2K 250 and 2K 300 gear units are enclosed, the motor flange is adequately sealed in the standard version.

Vertical mounting positions for the IM V15 and IM V36 require circulating oil lubrication of the gear units.

The standard version of the gear units up to and including the 2K 300 has a maximum torsional play of 30 angular minutes (measured at the gear unit output). The play is almost identical whatever the ratio. Various different special versions suitable for milling or machining work involving intermittent cutting are available on request:

- Reduced play with special features: max. 20'
- Reduced play for high performance: max. 15'

The drive unit (i.e. the motor and gear unit) is supplied with

vibration severity grade R according to EN 60034-14 (IEC 60 034-14). This is also the case when the motor is ordered with grade S.

The belt pulley ¹⁾ should be of the cup wheel type. For mounting the pulley, the output shaft on the gear unit has a flange with an external centering spigot and tapped holes. This ensures easy fitting and removal of the pulley.

Motors with built-on planetary gear units

The 1PH motors can also be supplied with flange-mounted planetary gear units. The motor gear unit is tested for correct functioning. The complete drive unit, i.e. the 1PH7 or 1PH4 motor with mounted ZF gear unit, can be directly ordered from Siemens:

Siemens AG

Industrial Projects and
Technical
Services

Contact:
Mr. Schneucker

Im Schiffelland 10
D-66386 St. Ingbert

Fax:
+49(0)6894-891-112

e-Mail:
karl-heinz.schneucker
@mhm6.siemens.de

The following details must be specified with the order:

Ordering example for 1PH4 motor:

Complete motor with gear unit
1PH4 133-4NF26-Z
K00
2LG4 315-3FD11

Ordering example for 1PH7 motor:

Complete motor with gear unit
1PH7 186-2NE03-0BC2
2LG4 260-1JD21

¹⁾Not included in scope of supply.

SIMODRIVE 611 universal and POSMO AC Motors

2-gear gear units for 1PH7 and 1PH4 motors

Gear unit data

Motor Size	Gear unit Type	Order No.	Permissible max. speed ²⁾	Permissible rated torque (S1 duty)			Permissible maximum torque (S6-60% duty)			Moment of inertia Gear unit		Gear unit weight approx. kg
			Input	Input	Output		Input	Output		Output	Output	
			n_{max} rpm	Nm	$i = 1$ Nm	$i = 4$ Nm	Nm	$i = 1$ Nm	$i = 4$ Nm	$i = 1$ J kg m ²	$i = 4$ J kg m ²	
100	2K 120	2LG4 312 - . . .	8000	120	120	480	140	140	560	0.0110	0.0114	30
132	2K 250	2LG4 315 - . . .	6300	250	250	1000	400	400	1600	0.0270	0.0570	62
160	2K 300	2LG4 320 - . . .	6300	300	300	1200	400	400	1600	0.0270	0.0570	70
180	2K 800	2LG4 250 - . . .	4000	800	800	3200	900	900	3600	0.1956	0.1766	110
	2K 801	2LG4 260 - . . .										
225	2K 802	2LG4 270 - . . .	On requ.									

For further binding technical data and planning instructions (such as on lubrication, temperature rise and typical applications), please refer to Catalog No. 4161 757 701d supplied by ZF (Zahnradfabrik Friedrichshafen). The ratings of the motor and gear unit are the governing factor in the design of the complete power unit (that is the AC motor and gear unit).

In the case of motor 1PH4 168 or 1PH7 167-2NB, for example, the rated torque must be reduced to 300 Nm. In the case of motors of frame size 132, it should be noted that with normal lubrication the speed of the 2K 250 gear unit is restricted to 6300 rpm.

The use of a gear unit permits the constant power band to be greatly increased.

Type for complete unit	Gear output shaft dimension D_2 (see Part 7) mm	2-speed gear unit (standard version) ¹⁾ Gear stage $i_1 = 4$ Order No.	ZF designa- tion
---------------------------	--	--	---------------------

For 1PH7 10. / 1PH4 10. motors

IM B5/B35/V1/V15	100	2LG4 312-3CC31	2K 120
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For 1PH7 13. / 1PH4 13. motors

IM B5/B35	118	2LG4 315-3FD11	2K 250
IM V1/V15	118	2LG4 315-3FC11	2K 250

For 1PH7 16. / 1PH4 16. motors

IM B35	130	2LG4 320-3JD11	2K 300
IM V15	130	2LG4 320-3JC11	2K 300

For 1PH7 184 motors

IM B35	180	2LG4 250-1JD11	2K 800
IM V15	180	2LG4 250-1JC11	2K 800

For 1PH7 186 motors

IM B35	180	2LG4 260-1JD21	2K 801
IM V15	180	2LG4 260-1JC21	2K 801

For further information about the gear units, please contact the manufacturer directly:

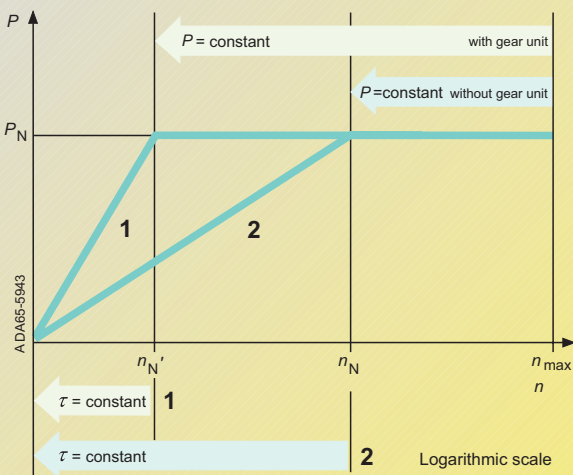
ZF Maschinenantriebe GmbH

D-88038 Friedrichshafen

Tel.:
+49(0)7541-77-0

Fax:
+49(0)7541-77-908000

Internet: <http://www.zf-group.de/zf-n>



Speed/power graph

Legend:

n_N	Rated speed
n_N'	Rated speed with 2-speed gear unit
n_{max}	Max. perm. speed
P_N	Rated power and constant power of the motor in the speed range from n_N to n_{max} or n_N' to n_{max}
τ	Torque

1) Special versions such as gear units with different play, or other ratios ($i = 3.17$ or $i = 5.5$) are available on request.

2) Higher drive speeds are allowed for gear ratios in some instances with oil-cooled gear units (see the ZF catalog).

SIMODRIVE 611 universal and POSMO AC Motors

Power cables for 1PH7 and 1PH4 motors

Selection and ordering data

Load rating up to max. I_{rated} A	Power cable without/with brake cable No. of cores Cross-section mm ²	Cable diameter		Power cable with overall shield Sold by the meter Order No.
		6FX8 D_{max} mm	6FX5 D_{max} mm	
15.2	4 × 1.5	10.4	10.1	6FX □ 008-1BB11-□ □ A0
	4 × 1.5 + 2 × 1.5	12.9	13.1	6FX □ 008-1BA11-□ □ A0
21	4 × 2.5	12.1	11.5	6FX □ 008-1BB21-□ □ A0
	4 × 2.5 + 2 × 1.5	14.2	14.2	6FX □ 008-1BA21-□ □ A0
28	4 × 4	13.2	13.3	6FX □ 008-1BB31-□ □ A0
	4 × 4 + 2 × 1.5	15.3	15.9	6FX □ 008-1BA31-□ □ A0
36	4 × 6	16	15.6	6FX □ 008-1BB41-□ □ A0
	4 × 6 + 2 × 1.5	17.8	16.9	6FX □ 008-1BA41-□ □ A0
50	4 × 10	19.4	20	6FX □ 008-1BB51-□ □ A0
	4 × 10 + 2 × 1.5	20.8	21.7	6FX □ 008-1BA51-□ □ A0
66	4 × 16	23.6	24.2	6FX □ 008-1BB61-□ □ A0
	4 × 16 + 2 × 1.5	24.7	24.2	6FX □ 008-1BA61-□ □ A0
84	4 × 25 + 2 × 1.5	27.9	29.4	6FX □ 008-1BA25-□ □ A0
104	4 × 35 + 2 × 1.5	32	32.6	6FX □ 008-1BA35-□ □ A0
123	4 × 50 + 2 × 1.5	35.8	38	6FX □ 008-1BA50-□ □ A0

- MOTION-CONNECT 800 ²⁾ **8**
- MOTION-CONNECT 500 ²⁾ **5**

Type of delivery:

10 m	Ring	(only for 25, 35, 50 mm ²)	1 B
50 m	Ring	(for deviations, see Table)	1 F
100 m	Ring	(for deviations, see Table)	2 A
200 m	Disposable drum	(not for cables 10 mm ² and larger)	3 A
500 m	Disposable drum	(not for cables 10 mm ² and larger)	6 A

Variations from the supplied form	-1FA0 (50 m)	-2AA0 (100 m)
6FX □ 008-1BA25-	Disposable drum	Disposable drum
6FX □ 008-1BA35-	Disposable drum	Disposable drum
6FX □ 008-1BA50-	Disposable drum	Disposable drum
6FX □ 008-1BA51-	–	Disposable drum
6FX □ 008-1BB51-	–	Disposable drum
6FX □ 008-1BA61-	–	Disposable drum
6FX □ 008-1BB61-	–	Disposable drum

8	• MOTION-CONNECT 800 ²⁾
5	• MOTION-CONNECT 500 ²⁾

The cross-sections 25 mm², 35 mm² and 50 mm² can also be ordered from 10 m to 49 m – in accordance with the length codes for pre-assembled cables – and in 10 m coils.

The current load capability of the power cables complies with IEC 60204-1 for installation type C under continuous operating conditions at an ambient air temperature of +40 °C.

Power cables for SIMODRIVE POSMO see Page 3/15.

1) Technical data for the MOTION-CONNECT series can be obtained from the NC Z Catalog.

SIMODRIVE 611 universal and POSMO AC Motors

Optoelectronic built-on rotary encoder SIMODRIVE sensor



Optoelectronic built-on rotary encoder

Applications, design

SIMODRIVE sensors are externally mounted opto-electronic encoders used to sense distances, angles of rotation or speeds in machines. They are used in combination with numerical controls, programmable controllers, drives and position displays, e.g.:

- SIMATIC; programmable controllers
- SIMODRIVE; drive systems

There are two types of measuring procedure: incremental and absolute. With incremental encoders, reference point approach must be performed on the machine after every Power Off, because the position is not usually stored in the control and movements of the machine during Power Off are not detected.

Absolute encoders, however, also detect these movements and supply the current position after Power On. Reference point approach is not necessary.

All encoders are available in the synchro-flange and clamping-flange designs. Encoders with a synchro-flange can be attached to the machine with 3 clamps. They can also be mounted using axial bolts. The encoder is driven via a plug-in coupling or a spring disk coupling. Belt pulleys can also be used.

The supply voltage of the encoder is 5 V DC or, alternatively, 10 V to 30 V DC. The 10 V to 30 V design permits longer cable lengths. Most control systems supply the voltage directly from the measuring circuit.

Mode of operation

Incremental encoders

These encoders supply a predetermined number of electrical pulses per revolution that represent the measurement of the traveled distance or angle.

Incremental encoders operate according to the principle of the opto-electronic scanning of ellipses using a backlighting technique. The light source is a light emitting diode (LED). The light/dark modulation that is generated by the rotating encoder shaft is acquired by photographic components. With suitable alignment of the line marking on the cam connected to the shaft and the stationary aperture, the photographic components supply two track signals A and B offset by 90° and a reference signal R. The encoder electronics amplifies these signals and converts them into different output levels.

The possible output levels are:

- RS 422 differential signals (TTL)
- Sine/cosine analog signals with Level 1 V_{pp}
- HTL (High Voltage Transistor Logic)

In the case of RS 422 encoders (TTL), the resolution of the edge evaluation can be quadrupled.

In order to obtain an even finer resolution, for encoders with sinusoidal signals, these are interpolated in the higher-level control. Encoders with an HTL interface (High Voltage Transistor Logic) are ideally suited to applications with counter modules.

Absolute encoder (single-turn/multi-turn)

Absolute encoders (shaft encoders) are designed in the same manner as incremental encoders with regard to the sensing principle but have more tracks. For 12 tracks, in the case of single-turn encoders, $2^{12} = 4096$ steps are encoded. A single-stepped code (Gray code) is used. This prevents any sampling errors.

After the machine is switched on, the position value is transferred immediately to the control. Reference point approach is not necessary. Data is transferred between the encoder and the control either via the Synchronous Serial Interface (SSI) or via PROFIBUS-DP.

There are advantages with SSI in time-critical applications. In installations with a large number of encoders, the advantage of PROFIBUS-DP is the reduced wiring overhead.

Encoders connected to PROFIBUS-DP can be parameterized.

Single-turn encoders subdivide a resolution (360° mechanical) into a specific number of steps, e.g. 4096. A unique code word is assigned to each position. After 360°, the position values are repeated.

Multi-turn encoders also detect the number of revolutions in addition to the absolute position within a revolution. Furthermore, additional rotary encoders that are coupled with the encoder shaft via gear stages are also scanned. If 12 additional tracks are evaluated, an additional $2^{12} = 4096$ rotations can be encoded.

SIMODRIVE 611 universal and POSMO AC Motors

Optoelectronic built-on rotary encoder
SIMODRIVE sensor

Selection and ordering data

Incremental encoder

Incremental encoders with RS 422 interface (TTL)		Order No.
<u>Synchro-flange and 5 V DC supply voltage</u>		
Connection:	• Flange outlet axial	6FX2 001 - 2G □ □ □
	• Flange outlet radial	6FX2 001 - 2E □ □ □
	• 1 m cable with axial connector	6FX2 001 - 2C □ □ □
	• 1 m cable with radial connector	6FX2 001 - 2A □ □ □
<u>Synchro-flange and 10 V – 30 V DC supply voltage</u>		
Connection:	• Flange outlet axial	6FX2 001 - 2H □ □ □
	• Flange outlet radial	6FX2 001 - 2F □ □ □
	• 1 m cable with axial connector	6FX2 001 - 2D □ □ □
	• 1 m cable with radial connector	6FX2 001 - 2B □ □ □
<u>Clamping-flange and 5 V DC supply voltage</u>		
Connection:	• Flange outlet axial	6FX2 001 - 2R □ □ □
	• Flange outlet radial	6FX2 001 - 2P □ □ □
	• 1 m cable with axial connector	6FX2 001 - 2M □ □ □
	• 1 m cable with radial connector	6FX2 001 - 2K □ □ □
<u>Clamping-flange and 10 V – 30 V DC supply voltage</u>		
Connection:	• Flange outlet axial	6FX2 001 - 2S □ □ □
	• Flange outlet radial	6FX2 001 - 2Q □ □ □
	• 1 m cable with axial connector	6FX2 001 - 2N □ □ □
	• 1 m cable with radial connector	6FX2 001 - 2L □ □ □
<u>Resolution</u>	500 S/R	A 5 0
	1000 S/R	B 0 0
	1024 S/R	B 0 2
	1250 S/R	B 2 5
	1500 S/R	B 5 0
	2000 S/R	C 0 0
	2048 S/R	C 0 4
	2500 S/R	C 5 0
	3600 S/R	D 6 0
	5000 S/R	F 0 0

Incremental encoder with analog signals sin/cos 1 V _{pp}		Order No.
<u>Synchro-flange and 5 V DC supply voltage</u>		
Connection:	• Flange outlet axial	6FX2 001 - 3G □ □ □
	• Flange outlet radial	6FX2 001 - 3E □ □ □
	• 1 m cable with axial connector	6FX2 001 - 3C □ □ □
	• 1 m cable with radial connector	6FX2 001 - 3A □ □ □
<u>Resolution</u>	1000 S/R	B 0 0
	1024 S/R	B 0 2
	2500 S/R	C 5 0

Incremental encoders with HTL interface		Order No.
<u>Synchro-flange and 10 V – 30 V DC supply voltage</u>		
Connection:	• Flange outlet axial	6FX2 001 - 4H □ □ □
	• Flange outlet radial	6FX2 001 - 4F □ □ □
	• 1 m cable with axial connector	6FX2 001 - 4D □ □ □
	• 1 m cable with radial connector	6FX2 001 - 4B □ □ □
<u>Clamping-flange and 10 V – 30 V DC supply voltage</u>		
Connection:	• Flange outlet axial	6FX2 001 - 4S □ □ □
	• Flange outlet radial	6FX2 001 - 4Q □ □ □
	• 1 m cable with axial connector	6FX2 001 - 4N □ □ □
	• 1 m cable with radial connector	6FX2 001 - 4L □ □ □
<u>Resolution</u>	100 S/R	A 1 0
	500 S/R	A 5 0
	1000 S/R	B 0 0
	2500 S/R	C 5 0

Double-track encoder

Double-track encoder with RS 422 interface (TTL)		Order No.
<u>Synchro-flange and 5 V DC supply voltage</u>		6FX2 001 - 2UK00
Connection:	• 1 m cable with axial connectors, 2-fold	
Resolution:	9000/1024 S/R	

Absolute encoder SSI

		Order No.
<u>Synchro-flange and 10 V – 30 V DC supply voltage</u>		
	• SSI with axial flange outlet	6FX2 001 - 5HS □ □
	• SSI with radial flange outlet	6FX2 001 - 5FS □ □
<u>Clamping-flange and 10 V – 30 V DC supply voltage</u>		
	• SSI with axial flange outlet	6FX2 001 - 5SS □ □
	• SSI with radial flange outlet	6FX2 001 - 5QS □ □
<u>Absolute encoder for PROFIBUS-DP</u>		
<u>Synchro-flange and 10 V – 30 V DC supply voltage</u>		
Connection:	• Radial	6FX2 001 - 5FP □ □
<u>Clamping-flange and 10 V – 30 V DC supply voltage</u>		
Connection:	• Radial	6FX2 001 - 5QP □ □
<u>Resolution</u>	Single-turn 4096 steps/revolution (12-bit)	1 2
	Multi-turn 4096 steps/revolution, 4096 revolutions (24-bit)	2 4

Documentation

User's Guide (German/English) for installation and parameterization of the PROFIBUS encoders

6SN1 197 - 0AB10 - 0YP1

4

SIMODRIVE 611 universal and POSMO AC Motors

Optoelectronic built-on rotary encoder
SIMODRIVE sensor

Mounting accessories



For the rotary encoders, clamps and couplings are available as mounting accessories.

Technical data

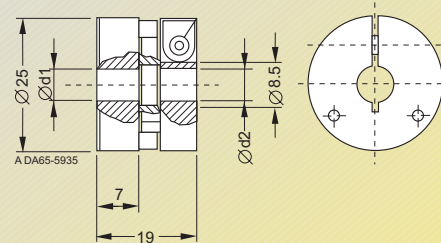
Design		Spring disk coupling	Plug-in coupling
Transmission torque	Max.	0.45 Nm	0.7 Nm
Shaft diameter		6 mm at both ends or $d_1 = 6 \text{ mm}$, $d_2 = 5 \text{ mm}$	6 mm at both ends or 10 mm at both ends
Center offset of the shafts	Max.	0.4 mm	0.5 mm
Axial offset		$\pm 0.4 \text{ mm}$	$\pm 0.5 \text{ mm}$
Angular displacement of the shafts	Max.	3°	1°
Spring-disk thickness		0.25 mm	–
Torsional rigidity		50 Nm/rad	31 Nm/rad
Lateral spring stiffness		18 N/mm	10 N/mm
Inertia		24 gcm ²	20 gcm ²
Weight	Approx.	16 g	20 g

Ordering data

	Order No.
Clamp (3 units required) for encoder with synchro-flange and double-track encoder	6FX2 001 - 7KP01
Spring disk coupling Shaft diameter: • 6 mm/6 mm • 6 mm/5 mm	6FX2 001 - 7KF10 6FX2 001 - 7KF06
Coupling, plug-in Shaft diameter: • 6 mm/ 6 mm • 10 mm/10 mm	6FX2 001 - 7KS06 6FX2 001 - 7KS10
Mating connector for the flange outlet or encoder plug ¹⁾ for cable diameters of 5.5 mm to 12 mm 12 socket contacts, crimp design	6FX2 003 - 0CE12

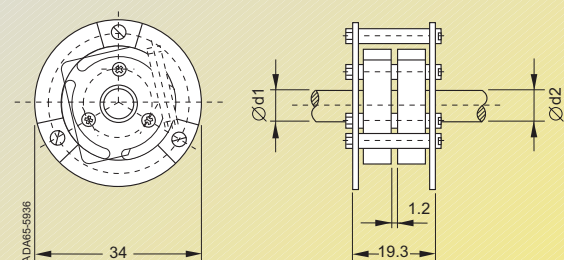
1) Packing 3 units.

Coupling, plug-in



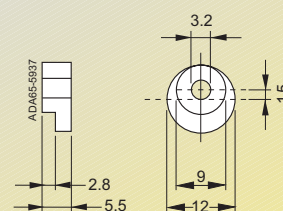
$d_1 = d_2 = 6 \text{ mm}$
or
 $d_1 = d_2 = 10 \text{ mm}$

Spring disk coupling

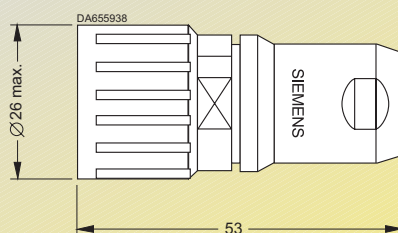


$d_1 = d_2 = 6 \text{ mm}$
or
 $d_1 = 5 \text{ mm}; d_2 = 6 \text{ mm}$

Clamp



Mating connector



SIMODRIVE 611 universal and POSMO AC Motors

Optoelectronic built-on rotary encoder
SIMODRIVE sensor

Diagnostics device

Description

The diagnostics unit is used to check encoder signals with an analog level of $\sin/\cos 1 V_{pp}$. Signals from built-in encoders with the above-mentioned level can be tested. The size of the signal amplitude, offset values and the assignment of the zero signal to the incremental signal can be measured.

The unit has a separate encoder power supply with monitoring. This allows the encoder system to be inspected without the need for additional external components such as converters and PLCs.

To connect built-in encoders to the diagnostics unit, the preassembled cables **6FX□002-2CA61-0...** or **-2CA31** or **-2CA51-0...** can be used.

Technical data

Supply voltage	230 V AC, 50/60 Hz
Inputs	Encoder signal connections
Outputs	
• Encoder power supply	5 V to 8 V DC per encoder type $I_{max} = 250 \text{ mA}$
• Analog outputs	Encoder signal A Encoder signal B Encoder signal R (= zero marker) Offset from encoder signal A or B
• Rectangular signal outputs	Encoder signal A and B Converted to rectangular and logically ANDed Encoder signal R (= zero marker) Converted to rectangular
Displays	LED "Measurement OK" LED "Encoder power supply"

Ordering data

	Order No.
Diagnostics device	6FX2 007 - 1AA00

SIMODRIVE 611 universal and POSMO

AC Motors

Notes

4

SIMODRIVE 611 universal and POSMO

Business Services and Documentation



Customer support and service

Automation & Drives customer support
Helpline for service and support
Online support
Field service
Spare parts and repairs
Technical support

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Training

Demonstration units

SIMODRIVE POSMO CD demonstration unit
SIMODRIVE POSMO SI demonstration unit
SIMODRIVE POSMO A demonstration unit
SIMODRIVE 611 universal demonstration unit
Start-up box

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5/5
5/5

Documentation

Manufacturer/service documentation
Electronic documentation

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SIMODRIVE 611 universal and POSMO

Business services and documentation

Customer support and service

Automation & Drives customer support



Whether you need a service specialist or a spare part, advice from a product expert or just an answer to a question: Contact the Service & Support Team – The team for your success.

Helpline for service and support



You need help and are not sure who to contact. We will ensure that you get assistance quickly.

The helplines guarantee that the right local specialist provides you with technical support. The helpline, for example in Germany, provides assistance 365 days a year round-the-clock in English and German.

Tel.: +49 (0)180 50 50 111

Online support



Our online support provides fast, effective assistance – round-the-clock, worldwide and in five different languages.

Online support offers a wide range of technical information:

- FAQs, tips and tricks, downloads, news
- Free manuals
- Helpful programs and software products – payment accepted with the SIMATIC Card

<http://www.siemens.de/automation/service&support>

Field service



Your plant is installed and you need help quickly on site. We have the specialists with the necessary expertise near you wherever you are in the world.

Our dense service network means that you will receive attention quickly and reliably.

In Germany, you can request an expert 365 days a year round-the-clock.

Tel.: 0180 50 50 444 ¹⁾

Naturally we also offer service contracts tailored to your individual needs. Please contact your local Siemens representative for further information.

Spare parts and repairs



Our worldwide network of regional spare parts warehouses and repair shops responds quickly and reliably with the latest in logistics.

In the event of queries concerning repairs or spare parts, please call the following number (in Germany):

Tel.: 0180 50 50 446 ¹⁾

Out of office hours and at the weekend, you can contact our emergency spare parts service under the following number.

Technical support



Technical support with using our products, systems and solutions in the field of automation and drives is available in

English and German. Capable, trained and experienced specialists also offer Teleservice and Video Conferencing for particularly difficult problems.

FreeContact – the route to technical support free of charge

- European and African time zones

Tel.: +49 (0)180 50 50 222
Fax: +49 (0)180 50 50 223
E-mail: techsupport@ad.siemens.de
Mo.-Fr.: 7:00 to 17:00 (CET)

- USA time zones

24h hotline toll-free:
+1 (0)800 241-4453

Tel.: +1 (0)770 740-3505
Fax: +1 (0)770 740-3396
E-mail: drives.support@sea.siemens.com
Mo.-Fr.: 8:00 to 20:00
(local time: Eastern Time)

- Asian/Australian time zones

Tel.: +65 (0)740-7000
Fax: +65 (0)740-7001
E-mail: drives.support@sae.siemens.com.sg
Mo.-Fr.: 8:30 to 17:30
(local time: Singapore)

¹⁾ Germany only, for local "Länder" telephone numbers visit:
<http://www.siemens.de/automation/service&support>

SIMODRIVE 611 universal and POSMO

Business services and documentation

Training

The efficient implementation of automation equipment depends on the knowledge and ability of specialists for optimized project engineering, programming, operation and maintenance.

The SITRAIN® training center for A&D has a worldwide presence and offers a consistent standard of training for your employees by qualified staff. Trained employees achieve problem-free, optimized automation solutions with motivation and initiative.

For SIMODRIVE 611 universal and POSMO CD/CA, SI and A in particular, Siemens offers the following standard courses. Special, customized courses with an individually tailored content can be performed at the customer site.

The training programme is shown in the Figure.

Brief description

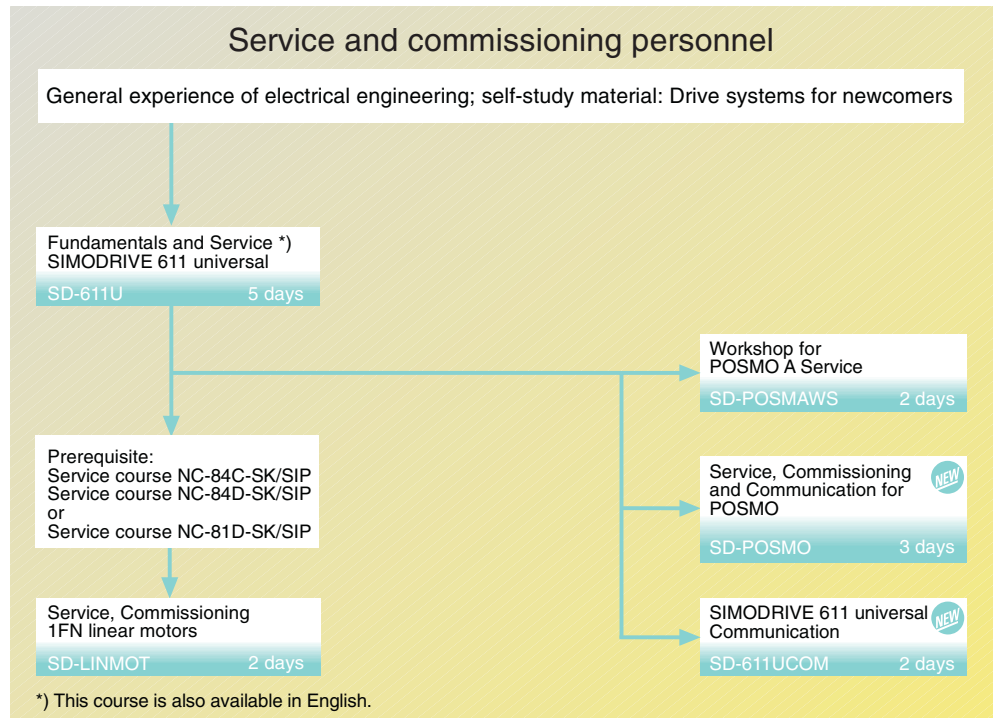
**SD-611U (5 days):
Fundamentals and service for
SIMODRIVE 611 universal**

Commissioning engineers and service personnel will gain the necessary technical knowledge for commissioning and optimizing the SIMODRIVE 611 universal drive system complete with digital regulated control and the possible motors. The fundamentals of drives will be explained for newcomers. In addition, practical training will be undertaken in positioning and PROFIBUS-DP interfacing.

Brief description

**SD-611UCOM (2 days):
Communication between
SIMODRIVE 611 universal and
SIMATIC S7**

The course is designed for project engineers, commissioning engineers and service personnel. The knowledge required for application, commissioning and servicing of the PROFIBUS-DP interface of SIMODRIVE 611 universal will be gained. The prerequisites are good SIMATIC S7 and SIMODRIVE 611 universal drive know-how.



SIMODRIVE 611 universal and POSMO training programme

Brief description

**SD-POSMO (3 days):
Service, commissioning and
communication**

This course is designed for service and commissioning engineers as well as for project engineers with responsibility for distributed drive technology. Commissioning, optimization, trouble-shooting and the software tools for POSMO CD/CA, SI and A are explained as well as practical training for linking the drives to SIMATIC S7 via PROFIBUS-DP.

The prerequisite is an understanding of **SIMATIC S7**.

Brief description

**SD-POSMAWS (2 days):
Service workshop for
POSMO A**

This course is designed for service and commissioning engineers who will be charged with implementing, commissioning and servicing the POSMO A. Practical training for communication of the drive with **SIMATIC S7** via PROFIBUS-DP and the commissioning tool is given.



For further information on **SITRAIN training**, see Catalog ITC, October 2000 or visit www.sitrain.com.

Contact person:
Any A&D Information and Training Center in the Regions and Siemens Regional Companies.

In Germany:

Training information line
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Siemens AG
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SIMODRIVE 611 universal and POSMO

Business services and documentation

Demonstration units

SIMODRIVE POSMO CD demonstration case

The SIMODRIVE POSMO CD demonstration case is stand-alone equipment; it is completely assembled and ready for connection to the 3 AC 400 V supply.

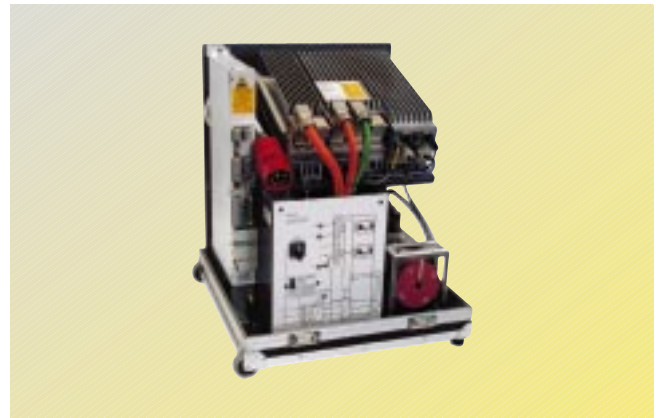
- Cargo rigid case
- Unregulated control infeed module
- RI suppression filter
- SIMODRIVE POSMO CD with PROFIBUS unit

- Servo motor with incremental encoder
- Operator panel with switching and display elements
- Transport trolley is supplied

Dimensions (W x H x D):
460 mm x 450 mm x 530 mm

Weight: approx. 50 kg

Order No.:
6SN2803-2AA00-0BA0



SIMODRIVE POSMO SI demonstration case

The SIMODRIVE POSMO SI demonstration case is stand-alone equipment; it is completely assembled and ready for connection to the 3 AC 400 V supply.

- Cargo rigid case
- Unregulated control infeed module
- RI suppression filter
- SIMODRIVE POSMO SI with PROFIBUS unit

- Operator panel with switching and display elements
- Transport trolley is supplied

Dimensions (W x H x D):
300 mm x 450 mm x 530 mm

Weight: approx. 32 kg

Order No.:
6SN2860-2BF00-0GA0



SIMODRIVE POSMO A demonstration case

Compact solution with all the necessary accessories as:

- Distributed station for PROFIBUS-DP as a single-axis unit for operation on a Notebook or programming device with the commissioning tool of SIMODRIVE POSMO A

or as

- Automation network with two SIMODRIVE POSMO A axes and a SIMATIC C7-626 DP as a master.

The demonstration case can be connected to a 230 V AC single-phase supply. The SIMODRIVE POSMO A units can be adapted for 110 V AC using the changeover switch on the SITOP power unit.

Demonstration case for SIMODRIVE POSMO A 1-axis system

- Dimensions (W x H x D):
500 mm x 400 mm x 180 mm
- Weight: 20 kg

Order No.:
6SN2832-0PG00-0AA0

Demonstration case for SIMODRIVE POSMO A 2-axis system

- Dimensions (W x H x D):
330 mm x 500 mm x 440 mm
- Weight: 32 kg

Order No.:
6SN2832-0CF00-0AA0



Demonstration case for SIMODRIVE 611 universal

- RIMOWA rigid case with rollers
- Unregulated control infeed module
- 2-axis regulated control plug-in unit and two 5 kW motors
- PROFIBUS-DP module and optional plug-in unit
Terminal expansion for axis A included
- Handheld terminal for setting digital and analog setpoints and actual-value sensing

The demonstration case can be connected to a 230 V AC single-phase supply. For connection to a 110 V AC supply, matching transformers are available.

Demonstration case for SIMODRIVE 611 universal 1-axis system

- Version with 1FK6 motors with resolver and PROFIBUS-DP optional plug-in unit

Order No.:
6SN1182-0TA00-2DP0

- Version with 1FK6 motors with resolver and optional plug-in unit for Motion Control with PROFIBUS-DP

Order No.:
6SN1182-0TA00-3DP0

- Version with 1FT6 motors with absolute encoders and PROFIBUS-DP optional plug-in unit

Order No.:
6SN1182-0EA00-2DP0

- Version with 1FT6 motors with absolute encoders and optional plug-in unit for Motion Control with PROFIBUS-DP

Order No.:
6SN1182-0EA00-3DP0



Start-up box

The start-up box is a support device for starting up SIMODRIVE 611 universal controllers.

The start-up box can be connected to the regulated control plug-in unit. An electronic circuit within the device is used to convert the 24 V DC auxiliary power supply value of the converter into an analog setpoint. The analog setpoint can be adjusted and is displayed via a 5-digit LCD.

Features of the start-up box

- Analog setting of setpoints:
 - Coarse and fine setting via two potentiometers in the ratio 1 : 10.
 - Polarity selector switch between normal and inverse setpoint polarity.
 - Potentiometer for analog offset value with autonomous ON/OFF switch.
 - ON/OFF switch for setting analog setpoints.
- The analog setpoint is completely decoupled and well-protected from polarity reversal within the operating voltage range.
- The analog output signal of the control terminal strip is wired to the 2 mm test sockets in the start-up box.
- Six OFF switches for digital enabling signals with green LED indicators.
- Four red LEDs for displaying digital output signals.



Technical data

Description	Value
Dimensions (L x W x H)	175 mm x 90 mm x 45 mm
Supply voltage	DC 24 V (via terminal – X101)
Voltage range, analog setpoint	0 V to 12.5 V/10 mA
Length of signal lines	1.3 m

Ordering data

Description	Order No.
Start-up box	9AK1014-1AA00

SIMODRIVE 611 universal and POSMO

Business services and documentation

Documentation

The documentation included in the scope of supply of the devices (infeed modules, power modules, plug-in units), system components and options is in two languages (English/German).

The documentation for SIMODRIVE is subdivided as follows:

- Manufacturer/service documentation
- Electronic documentation

Manufacturer/service documentation

This documentation is for the machine OEMs and service personnel who want to implement the "SIMODRIVE 611 universal" with standard three-phase induction motors in "Speed/torque setpoint" mode.

SIMODRIVE 611 universal Description of Functions

This documentation is for the machine OEMs and service personnel who want to implement the "SIMODRIVE 611 universal". This function description contains detailed information about the functionality of the "SIMODRIVE 611 universal" control.

SIMODRIVE 611 Planning Guide

These instructions support the project engineering of an application and contain detailed technical information for the "SIMODRIVE 611 universal".

User's Guide SIMODRIVE POSMO A distributed servo drive technology

This documentation is for the machine OEMs and service personnel who want to implement the "SIMODRIVE POSMO". This description contains detailed information about the functionality of the POSMOs.

Electronic documentation

DOC on CD

This CD contains the documentation for SINUMERIK and SIMODRIVE.

When documentation has been selected, various search functions can be used to find the relevant information.

Selection and ordering data

Documentation	Order No.
Electronic documentation	
DOC on CD	
• German	6FC5298-5CA00-0 AG2
• English	6FC5298-5CA00-0 BG2
Manufacturer/service documentation	
SIMODRIVE 611 universal Product Brief	6SN1197-0AB40-0 P2
SIMODRIVE 611 universal Description of Functions	6SN1197-0AB20-0 P3
Regulated control components for speed control and positioning	
SIMODRIVE 611 Planning Guide	6SN1197-0AA00-0 P5
Planning Guide for 1FT, 1PH, 1PQ motors	6SN1197-0AA20-0 P4
SIMODRIVE POSMO A User's Guide	6SN2197-0AA00-0 P2
User's Guide	6SN2197-0AA20-0 P0
SIMODRIVE POSMO SI, CD/CA distributed servo drive technology	
Language	
German	A
English	B
French	D
Italian	C
Spanish	E

SIMODRIVE

611 universal and POSMO

Planning guide



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	Unit design, power terminals and control terminals

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	Overview

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	System overview and requirements

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	C1 master "SIMODRIVE POSMO A PROFIBUS MASTER"

SIMODRIVE 611 universal and POSMO

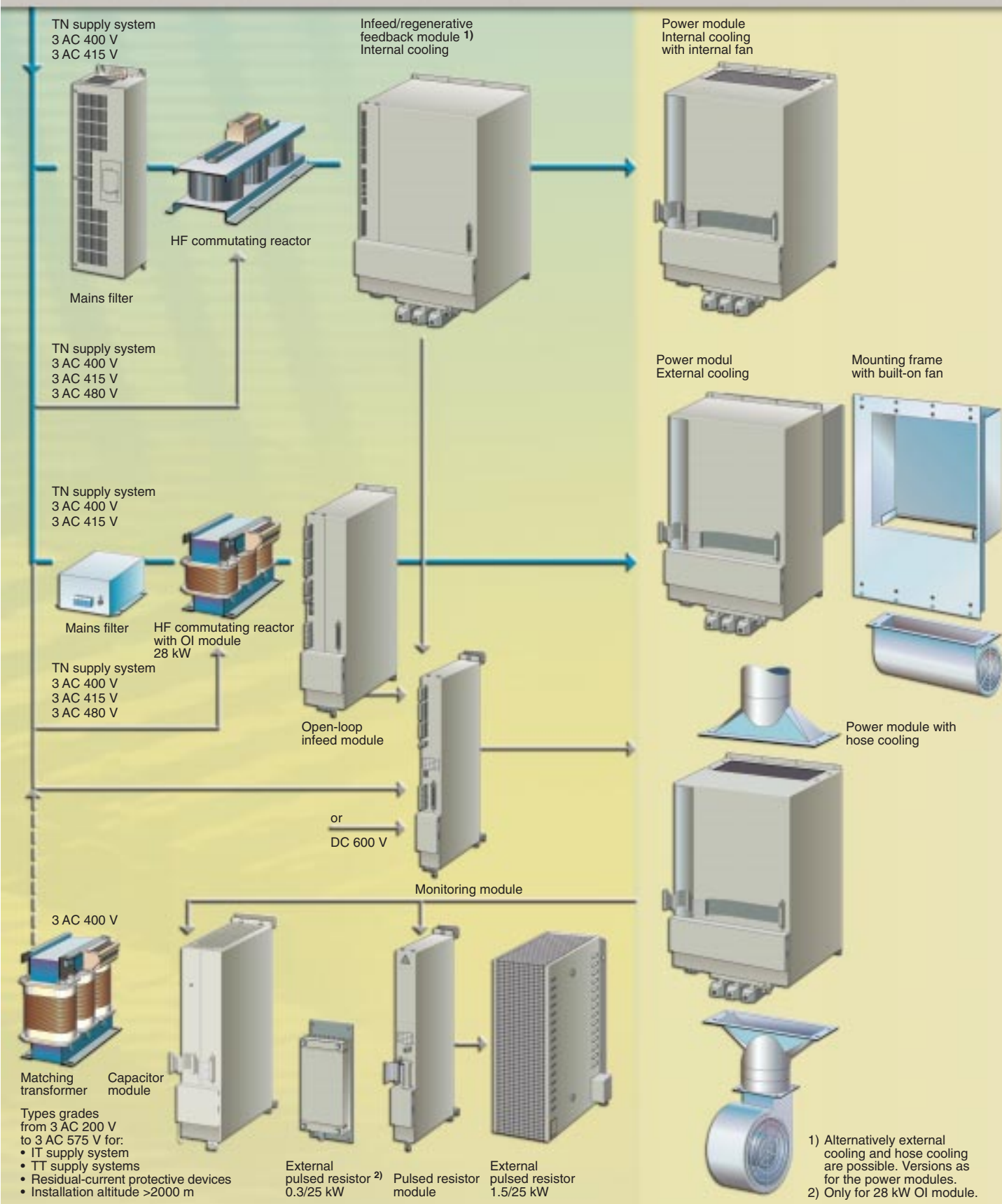
Planning guide

SIMODRIVE converter system Overview

Supply system interfaces

Infeed modules

Power modules



Regulated control plug-in unit with universal setpoint interface



- For 1FT6-/1FK6-/1FN-/1PH-/
1FE1 motors and induction motors
- One-axis version (only with resolver)
 - Two-axis version (resolver and motor encoder)
 - Standard: analog setpoint interface
 - Optional PROFIBUS
- SIMODRIVE 611 universal

Motors



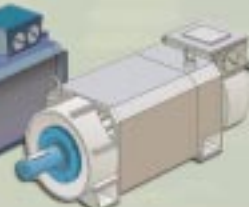
1FK6



Induction motor,
e.g. 1LA



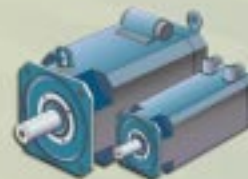
1PH4



1PH7



1FN3



1FT6

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Dimensioning of the power section and drive

Planning guide

The planning instructions are an excerpt from the SIMODRIVE 611 Planning Guide and from the SIMODRIVE 611 universal Description of Functions and are intended to provide support for dimensioning the system components. For further details, refer to the above-mentioned Planning Guide or Description of Functions.

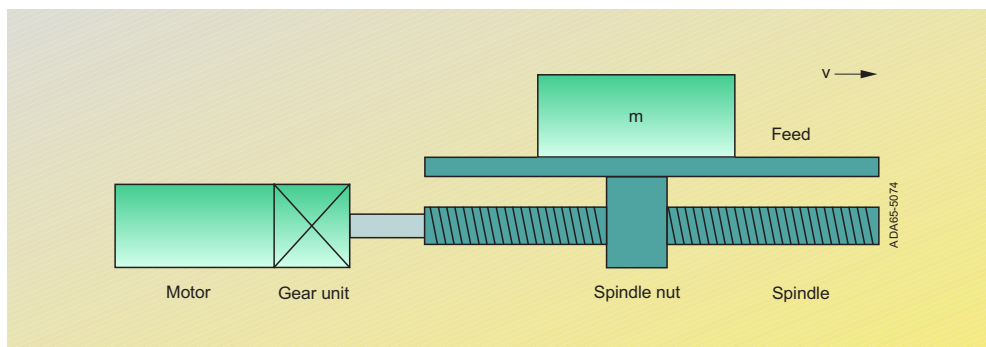
Motion Control

Servo drives are mostly cycle-type drives, i.e. drives which perform particular sequences of movement within a fixed cycle of motion. These movements can be linear or rotational. In addition, the motion sequence usually involves approaching a pre-defined position. All movements must be carried out in the shortest possible time. As a consequence, drives have to meet specific requirements. They must

- be dynamic, i.e. have short rise times and move to the desired position without overshoot
- have high overload capability, i.e. a high acceleration reserve
- and must have a large control range, i.e. a high resolution for exact positioning.

The planning notes below refer to servo drives with 1FK6/1FT6 synchronous servo motors with 1PH7/1PH4 asynchronous servo motors or 1FN3 linear motors. Synchronous servo motors are preferred where a compact motor volume, low rotor inertia and fast response levels are important. With induction servo motors, high maximum speeds are reached in the field-weakened speed range. They have a somewhat larger motor volume.

The drives can be operated individually as single-axis drives or together as multi-axis drives. For connecting the drives to a PLC via PROFIBUS, a supplementary board is necessary. Decentralized provision of positioning functions within the Motion Control system is possible with the software or the functions can be provided centrally using a higher level controller.



Typical spindle drive

A typical planning sequence

The basis for planning is the sketch and the description of how the machine functions.

1. Clarification of the type of drive, technical data and other boundary conditions such as technological functions and integration into an automation system
2. Specification of the motion curve
3. Calculation of the maximum load torque, selection of the gearbox
4. Selection of the motor
5. Cooling methods
6. Configuration of the drive module
7. Selection of the infeed module
8. Selection of the braking unit and the braking resistor
9. Selection of other components.

1. Clarification of the type of drive, technical data and other boundary conditions

The procedure for calculating the load torque depends on the type of drive. It may be a traction drive, a lifting drive or a turntable drive. In the case of linear motion, for example, power can be transmitted via a toothed belt, gear rack or a spindle. Normally a gearbox is also needed for adapting the motor speed and the motor torque to the load conditions.

For this calculation, the following technical data must be available:

- The moving masses
- The diameter of the drive wheel or the diameter and pitch of the spindle
- Details of the frictional losses
- Mechanical efficiency
- The travel distances
- The maximum speed
- The maximum acceleration and the maximum deceleration
- The cycle time
- Accuracy levels for positioning.

Further conditions are the integration into a system (PLC), the technology to be used (central or distributed) and the coupling between the drives (e.g. with PROFIBUS).

2. Specification of the motion curve

The motion curve - namely the v,t diagram when a linear drive is being used - is determined from the information relating to travel distances, speed, acceleration, deceleration and the cycle time. If multi-axis drives are used, the interdependence of the individual motion curves must be taken into account. The motion curve is also required for thermally dimensioning the motor and selecting the braking resistor. It should therefore represent the "worst-case scenario" for the task.

3. Calculation of the load speed and the maximum load torque, selection of the gearbox

Information on the mechanical actors involved is used to calculate the load speed and the maximum load torque. If the deceleration is equal to the acceleration, the load torque is at a maximum during the acceleration phase. For selecting the gear, there are various other variables in addition to the maximum load torque. These are

- Frame size
- Efficiency
- Torsional play
- Torsional rigidity
- Moment of inertia
- Noise.

Planetary gears are especially suitable for positioning tasks due to their low torsional play and high torsional strength. These gears also have a high power density, are highly efficient and produce a low amount of noise. When the gear transmission ratio is being selected,

it should be borne in mind that higher motor speeds generally entail smaller motors. This must, however, be checked for each individual case.

A higher gear transmission ratio has a favorable effect on positioning accuracy in relation to the encoder resolution. The angle of rotation α_G of the gear, the number of pulses z per rotation of the encoder, the drive-wheel diameter D or the spindle pitch h and the gear transmission ratio i give the positioning accuracy as follows:

$$\Delta S_{\text{Gear unit}} = \frac{D \cdot \pi}{360^\circ} \cdot \alpha_G$$

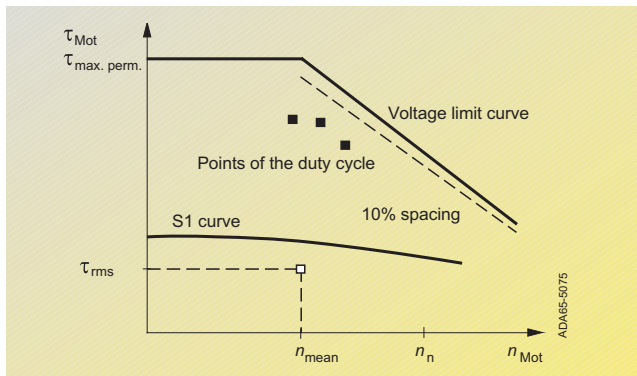
$$\Delta S_{\text{encoder}} = \frac{D \cdot \pi}{i \cdot z}$$

or with spindle drives

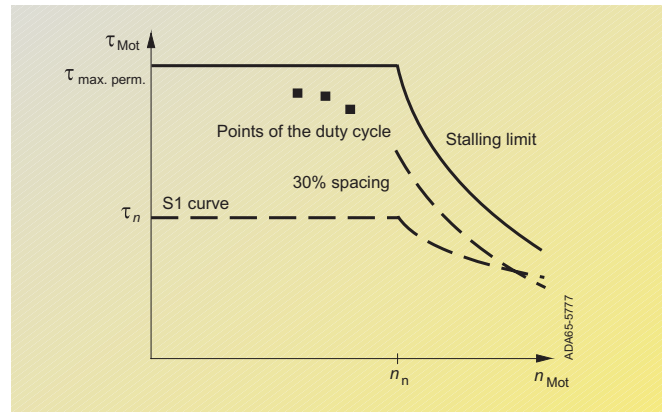
$$\Delta S_{\text{Gear unit}} = \frac{h}{i \cdot z} \text{ for spindle drives}$$

$$\Delta S_{\text{Total}} = \Delta S_{\text{Gear unit}} + \Delta S_{\text{encoder}} + \Delta S_{\text{mech}} \text{ (static)}$$

ΔS_{mech} is the inaccuracy of the mechanical system such as that due to expansion of the toothed belt.



Limit curves for 1FK6/1FT6 motors (synchronous servo motors)



Limit curves for 1PH7 motors (induction servo motors)

4. Selection of the motor

The motor is selected according to the following criteria:

- Observing the dynamic limits, i.e. all τ_n points of the duty cycle must be below the limit curve.
- The motor speed must be smaller than $n_{\text{max perm.}}$. With synchronous servo motors, the maximum motor speed must not be greater than the rated speed.
- Observing the thermal limits, i.e. with synchronous servo motors, the rms motor torque resulting from the duty cycle must be below the S1 curve. With induction servo motors, the rms value of the motor current within a duty cycle must be smaller than the rated current of the motor.

When synchronous servo motors are used, it must be borne in mind that the maximum permissible motor torque at high speeds is reduced by the voltage limit curve. In addition, a margin of about 10% from the voltage limit curve should be maintained as a protection against voltage fluctuations.

If induction servo motors are used, the permissible motor torque in the field weakening range is reduced by the stalling limit. Here a clearance of approximately 30% should be maintained.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Dimensioning of the power section and drive

Planning guide (continued)

In order to keep a check on the dynamic limits, the maximum motor torques must be calculated. In general, the maximum motor torque occurs during the acceleration phase. During acceleration, in addition to the maximum torque determined by the load, there is also the torque $\tau_{a \text{ Mot}}$ needed for accelerating the moment of inertia of the rotor. The following formula is therefore used to calculate the maximum motor torque:

$$\tau_{\text{Mot max}} = \tau_{a \text{ Mot}} + \tau_{\text{Load max}}$$

$\tau_{a \text{ Mot}}$ Accelerating torque for the motor rotor

$\tau_{\text{Load max}}$ The maximum load torque converted to the motor speed during the acceleration phase, including the contribution of the gearbox

with

$$\tau_{a \text{ Mot}} = J_{\text{Mot}} \cdot \alpha_{a \text{ Mot}}$$

$\alpha_{a \text{ Mot}}$ Angular acceleration of the motor

By experimenting, a motor can now be found which fulfills the condition for the maximum motor torque in the required speed range. The proportion of the acceleration torque for the motor rotor in relation to the maximum motor torque depends not only on the moment of inertia of the motor and the angular acceleration but also on the moment of inertia of the load, the gear transmission ratio and the static load torque.

A second point to be checked is whether the thermal limits are adhered to.

Synchronous servo motors

In order to calculate the rms torque, the motor torque must be determined in all parts of the motion curve. The following formula is used to calculate the rms torque and the mean motor speed:

$$\tau_{\text{rms}} = \sqrt{\frac{\sum \tau_{\text{Mot } i}^2 \cdot \Delta t_i}{T}}$$

$$n_{\text{mean}} = \frac{\sum \frac{n_{\text{Mot A}} + n_{\text{Mot E}}}{2} \cdot \Delta t_i}{T}$$

T Cycle time

$\tau_{\text{Mot } i}$ Motor torque in time segment Δt_i

$\frac{n_{\text{Mot A}} + n_{\text{Mot E}}}{2}$ Mean motor speed in time segment Δt_i (A: Initial value, E: Final value)

If the rms torque at the mean motor speed is below the S1 curve and the dynamic limits are being adhered to, the selected synchronous servo motor can be used.

Asynchronous servo motors

In order to calculate the rms motor current, the motor torque must first be determined in all parts of the motion curve. The motor current is therefore calculated as follows:

$$I_{\text{Mot}} = I_n \cdot \sqrt{\left(\frac{\tau_{\text{Mot}}}{\tau_n}\right)^2 \cdot \left(1 - \left(\frac{I_{\mu n}}{I_n}\right)^2\right) \cdot k_n^2 + \left(\frac{I_{\mu n}}{I_n}\right)^2 \cdot \frac{1}{k_n^2}}$$

I_n Rated current

$I_{\mu n}$ Rated magnetizing current

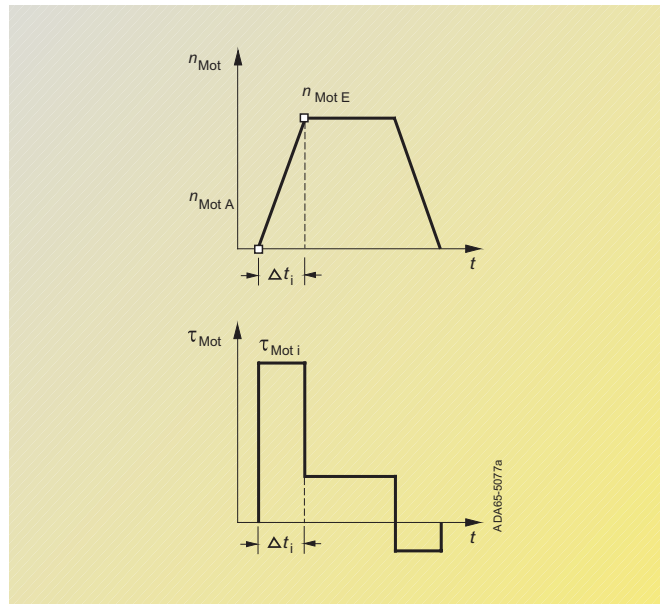
$k_n = 1$ In the constant flux range

$k_n = \frac{n}{n_n}$ In the field-weakening range

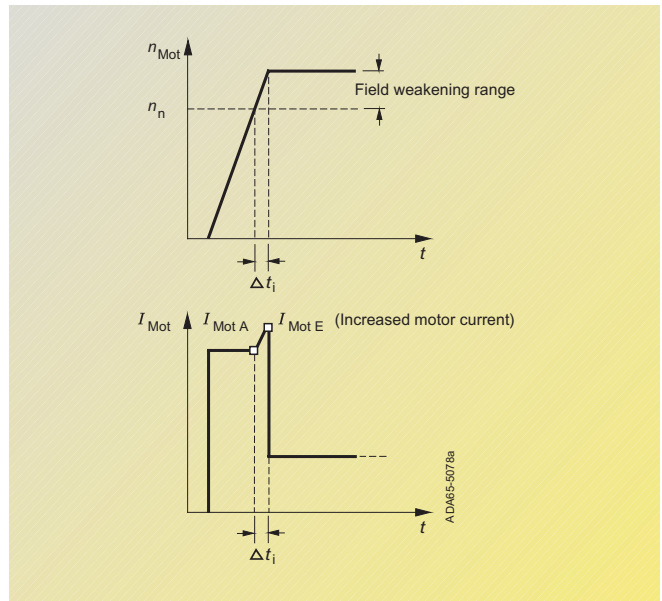
The following formula is used to calculate the rms value of the motor current:

$$I_{\text{rms}} = \sqrt{\frac{\sum \left(\frac{I_{\text{Mot A}} + I_{\text{Mot E}}}{2}\right)^2 \cdot \Delta t_i}{T}}$$

$\frac{I_{\text{Mot A}} + I_{\text{Mot E}}}{2}$ Mean motor current in time segment Δt_i (A: Initial value, E: Final value)



Example of motor speed and motor torque in a time segment Δt_i



Example of motor speed and motor current in a time segment Δt_i

If the dynamic limits are adhered to and the rms value of the motor current is smaller than the rated current for the motor, the selected induction motor can be used.

Which encoder is selected, depends on the requirements in each case.

Encoders provide high resolution and extremely true running at the lowest speeds. They are therefore especially suitable for highly accurate positioning tasks. Resolvers are rugged and inexpensive and provide good resolution.

5. Cooling methods

Different cooling methods are available for the infeed and power modules:

- Internal cooling
- External cooling
- Hose cooling

Internal cooling

In this standard solution, the power loss of the converter components from the electronic equipment and the power section is dissipated to the switching cabinet interior.

External cooling

Because the heat sinks of the modules pass through the mounting surface in the control cabinet, the power loss of the power section can be dissipated to an external ventilation circuit. Only the power loss of the electronic equipment remains in the control cabinet. The IP 54 degree of protection can be achieved at the "mechanical interface" which is the external heat sink.

Hose cooling

Hose cooling is designed for control cabinets that do not have a separate ventilation channel for the power sections. Flexible tubes are used to remove the heat arising from the power loss of the power sections from the cabinet. The IP 54 degree of protection can be achieved at the "mechanical interface" to the external air.

6. Configuration of the drive modules

The drive modules comprise the power module, regulated control plug-in unit, device bus cable and, in some cases, the option module.

Depending on the cooling method employed or the size of the power module, ventilation components have to be ordered additionally or provided by the user.

Regulated control plug-in units for one axis (with resolver evaluation) and two axes (with rotary encoder or sin/cos encoder evaluation) and power modules for one or two axes are available. Both analog setpoint specification and serial communication via PROFIBUS-DP are possible.

Considerations for the power module with induction motors

The drive module with induction motor regulated control allows the use of converter fed induction motors rated for a DC link voltage of 600 V. The maximum motor stator frequency is 1400 Hz for the SIMODRIVE 611 universal. With motor frequencies above 300 Hz or motor rated currents above 85 A, it may be necessary to provide a series inductor or to increase the converter operating frequency. Please note the rating guidelines in Part 7 of the Planning Guide.

To determine the motor current at a given motor torque, the following formula is used:

- For synchronous servo motors

$$I_{\text{Mot}} = \frac{\tau_{\text{Mot}}}{kTn}$$

kTn = Torque constant

In general, the highest motor current occurs during the acceleration phase. At high motor torques, the motor current may be greater than that calculated with kTn due to saturation effects. This must be taken into account when selecting the motor.

- For induction servo motors

The motor current is calculated as described in Step 4. Acceleration into the field-weakening range with a constant motor torque results in the maximum motor current in the field-weakening range at maximum speed.

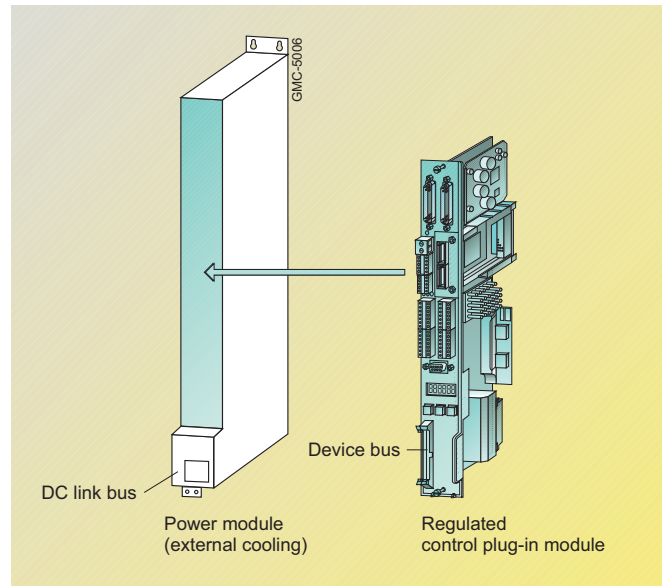
The arithmetic mean of the motor current is calculated as follows:

- For synchronous servo motors

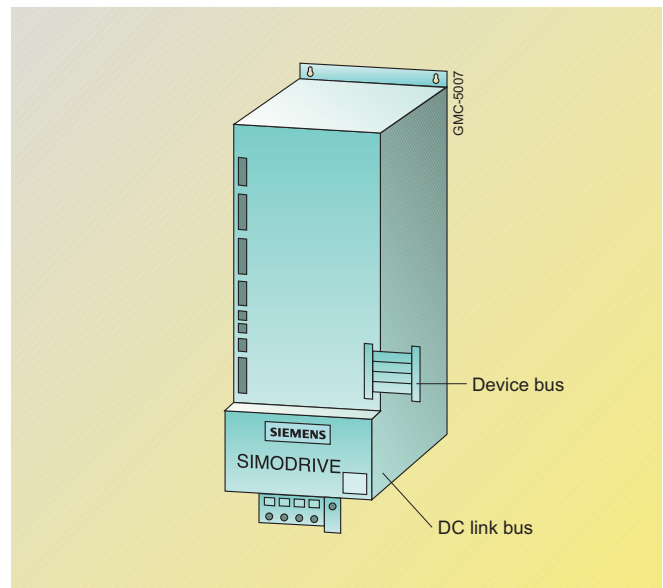
$$I_{\text{Mot mean}} = \frac{\sum |\tau_{\text{Mot } i}| \cdot \Delta t_i}{kTn \cdot T}$$

$\tau_{\text{Mot } i}$ Motor torque in time segment Δt_i

T Cycle time



Drive module



Infeed module

- For induction servo motors

$$I_{\text{Mot mean}} = \frac{\sum \frac{I_{\text{Mot A}} + I_{\text{Mot E}}}{2} \cdot \Delta t_i}{T}$$

$\frac{I_{\text{Mot A}} + I_{\text{Mot E}}}{2}$ Mean motor current in time segment Δt_i (A: Initial value, E: Final value)

7. Selection of the infeed module

The infeed module must always be located on the left as the first module. Power modules must be located next to the infeed module in descending order of rated current from left to right (highest rating on left, lowest on right). Infeed modules can only be used separately from each other, i.e. two infeed modules cannot be connected together.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Dimensioning of the power section and drive

Calculating the DC link power for the infeed module

Motor data for open-loop infeed (OI) modules and closed-loop infeed/regenerative feedback (I/RF) modules for AC 400/480 V

The rated data for induction motors depends on the rated motor voltage. The infeed module needs to provide the motor voltage, which corresponds to the motor data.

For the 1P. Series of Siemens High performance motors, please use the applicable data tables in Part 4.

For any other motor type, please note that the maximum output voltage to the motor varies in accordance with the combination of infeed module and supply voltage. The following table states the maximum output voltage to the motor.

Supply voltage	AC 400 V	AC 480 V
OI	AC 350 V	AC 415 V
I/RF	AC 385 V	AC 415 V

Infeed module: Selection and size optimization

When multi-axis drives are used, several power modules are supplied with power by an infeed module. When the infeed module is being selected, it must be determined whether it is able to supply enough peak and continuous power to the power module during a regular duty cycle. The criteria are as follows:

- The maximum DC link power must be less than the maximum permissible output power (see Part 3) of the infeed module. In the worst case, provided that the maximum power of each drive module occurs simultaneously, the infeed module must be dimensioned as follows:

$$P_{MS \max} > \sum P_{DC \text{ link pos max.}}$$

$$P_{DC \text{ link pos max.}} = \text{maximum motoring DC link power}$$

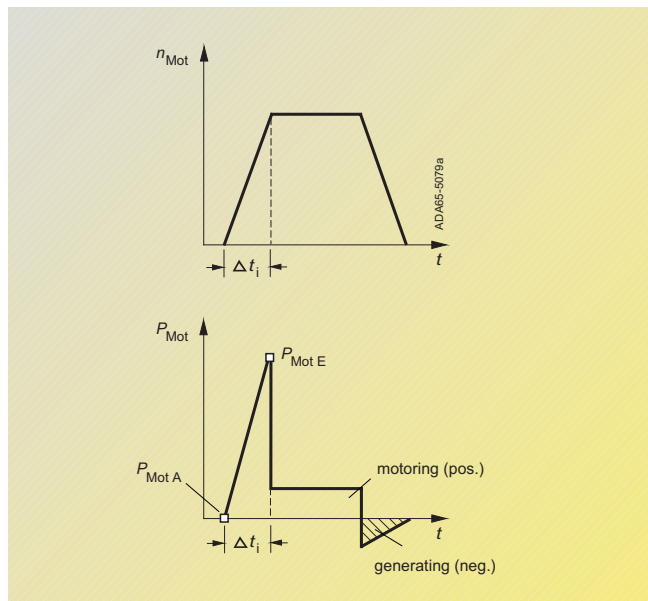
If this is not the case, the infeed module can be selected by determining the maximum power of all axes combined. This takes into consideration that the maximum power requirement of each axis does not occur simultaneously.

The DC link power (motoring) for each power module is calculated as follows:

$$P_{DC \text{ link pos}} = \frac{P_{DC \text{ link pos}}}{\eta_{\text{power module}} \cdot \eta_{\text{Mot}}}$$

The motor power is calculated according to the following equation:

$$P_{\text{Mot}} [\text{kW}] = \frac{\tau_{\text{Mot}} [\text{Nm}] \cdot n_{\text{Mot}} [\text{min}^{-1}]}{9550}$$



Example of motor speed and motor output in a time segment Δt_i

- After selecting an infeed module which is able to satisfy the maximum supply power demand of the drive axis, it must be checked whether the rated power of the infeed module is sufficient as well. For one or more axes, the rated power of the infeed module must fulfill the following condition:

$$P_{n \text{ pos MS}} > \frac{\sum \left(\frac{P_{\text{Mot pos rms}}}{\eta_{\text{power module}} \cdot \eta_{\text{Mot}}} \right)}{X}$$

$$X = 1.03 \text{ for } T \leq 10 \text{ s}$$

$$X = 0.90 \text{ for } 10 \text{ s} < T \leq 1 \text{ min}$$

$$X = 0.89 \text{ for } 1 \text{ min} < T \leq 10 \text{ min}$$

$$T = \text{Total cycle time}$$

$$P_{\text{Mot pos rms}} > \sqrt{\frac{\sum \left(\frac{P_{\text{Mot A}} + P_{\text{Mot E}}}{2} \right)^2 \cdot \Delta t_i}{T}}$$

$$P_{\text{Mot B}} = \text{Initial motor power in time segment } \Delta t_i$$

$$P_{\text{Mot E}} = \text{Final motor power in time segment } \Delta t_i$$

For open-loop OI infeed modules, only positive motor power has to be evaluated to determine the correctly dimensioned infeed module.

For closed-loop I/RF infeed modules, both positive (motoring) and negative (regenerating) power values must be separately evaluated.

The energy fed back to the DC link must not exceed the continuous and peak load capability of the I/RF infeed module. To determine the DC link peak and continuous power during regeneration (braking) the equations below are to be used.

$$P_{DC \text{ link regen}} = P_{\text{Mot neg}} \cdot \eta_{\text{power module}} \cdot \eta_{\text{mot}}$$

$$P_{n \text{ MS}} > \frac{\sum (P_{\text{Mot neg rms}} \cdot \eta_{\text{power module}} \cdot \eta_{\text{Mot}})}{X}$$

$$P_{\text{Mot neg}} = \text{max. power during braking}$$

Checking the 24 V DC power supply rating and braking calculations

In addition to the DC link power requirement, it is also necessary to check the 24 V DC power supply rating of the infeed module in order to determine whether or not a monitoring module (supplementary 24 V DC supply) is necessary.

The required power supply rating depends on the:

- Size of the infeed/regenerative feedback module
- Size of the drive modules
- Number of modules

The infeed or monitoring module offers a basic power supply rating for the electronics points (EP) and gating points (AP).

The power supply requirement of a drive grouping is calculated by summing all of the electronic points (EP) and gating points (AP) of a drive system. These values are listed in Table 1, Page 6/9.

If only one of these values is exceeded, an (additional) monitoring module must be provided.

The monitoring module must be mounted on the left upstream of the modules to be monitored.

DC link capacitance

Every infeed module has a maximum value which restricts expansion of the DC link capacitors. It must be ensured that the DC link capacitance of the various units in a drive system. Therefore all of the DC link capacitance of the various units in a drive system must be summed and compared to the available charging limit of the infeed module. The DC link capacitance of all available modules and accessories, including the charging limit of the infeed modules, is listed in Table 1, Page 6/9.

To check the 24 V DC power supply rating, Table 2 on Page 6/11 should be used. The frequency of precharging the DC link by the infeed module is given by the following formula:

Number of charging procedures within 8 min =

$$\frac{\text{Charging limit for infeed module } [\mu\text{F}]}{\sum \text{DC link capacitance for the engineered drive system } [\mu\text{F}]}$$

Only one infeed/regenerative feedback module or one open-loop infeed module is permitted per SIMODRIVE 611 universal system configuration.

8. Selection of the braking unit and braking resistor

For the OI non-regenerative infeed modules, the braking chopper is included along with the resistor for the 5 kW and 10 kW ratings. The available ratings for the pulsed resistors of the OI non-regenerative infeed modules are as follows:

- Infeed module 5 kW (with internal resistor) ¹⁾
200 W continuous rating
10 kW short-time rating for 120 ms once per 10 s cycle without previous load
- Infeed module 10 kW (with internal resistor) ¹⁾
300 W continuous rating
25 kW short-time rating for 120 ms once per 10 s cycle without previous load
- Infeed module 28 kW (external resistor needed)
max. 2 x 300 W continuous rating
max. 2 x 25 kW short-time rating for 120 ms once per 10 s cycle without previous load
max. 2 x 1.5 kW continuous rating
max. 2 x 25 kW short-time rating for 12 ms once per 10 s cycle without previous load

For the 28 kW OI module, the pulsed resistors must be ordered separately and installed externally.

With greater energy feedback values, a separate pulsed resistor module must be provided or the feedback power must be reduced by prolonging the braking time.

Subject to certain conditions, several pulsed resistor modules can be connected in parallel.

The maximum number of pulsed resistor modules depends on the DC link capacitance of the drive configuration implemented.

One pulsed resistor module can be installed for every full 500 μF of DC link regenerative capacitance.

Only the DC link capacitance of the coupled power modules or special modules need to be taken into consideration for those OI modules that already contain a pulsed resistor unit. If the pulsed resistor unit can be switched off, the internal DC capacitance can be included in determining the dimensions of the pulsed resistor module.

As regards the braking operation of the motors, check that the energy fed back to the DC link does not exceed the permissible peak load capability of the feedback converter.

Braking resistor selection

The selection of the braking resistor for one or more axes depends on the following criteria:

$$\begin{aligned} P_{\text{max br PW}} &\geq \sum (P_{\text{Mot br max}} \cdot \eta_{\text{Mot}} \cdot \eta_{\text{power module}}) \\ E_{\text{br max}} &\geq \frac{1}{2} \cdot \sum (P_{\text{Mot br max}} \cdot t_{\text{br}}) \\ P_{\text{n PW}} &\geq \sum (P_{\text{Mot br mean}} \cdot \eta_{\text{Mot}} \cdot \eta_{\text{power module}}) \\ P_{\text{Mot br mean}} &= \frac{\sum (P_{\text{Mot br A}} + P_{\text{Mot br E}}) \cdot \Delta t_i}{T} \\ E_{\text{br max}} &\quad \text{Maximum braking energy [Ws]} \\ T &\quad \text{Total cycle time} \end{aligned}$$

If several axes are braked simultaneously then the summation sign has to be used. In cases in which only one axis is operated at a time, only the highest value for the peak power, peak energy and continuous power have to be considered.

For regenerative infeed modules, it is possible to connect a pulsed resistor module and external braking resistor for emergency braking (i.e. in the event of a power failure).

9. Selection of other components

Transformers

It is possible to connect the drive converter directly to a grounded (TN) supply system for 3-phase AC 400 V, 415 V and 480 V. For other voltages or other supply systems, a transformer is required.

Commutating reactors

HF commutating reactors are required for all infeed modules with the exception of the 5 kW and 10 kW OI non-regenerative modules. The following table can be used as a guide for selecting the proper HF commutating reactor.

Supply voltage: 3 AC 400/480 V, 50/60 Hz

Module	HF commutating reactors		Order No.
OI	28/ 50 kW	28 kW	6SN11 11-1AA00-0CA0
I/RF	16/ 21 kW	16 kW	6SN11 11-0AA00-0BA1
	36/ 47 kW	36 kW	6SN11 11-0AA00-0CA1
	55/ 71 kW	55 kW	6SN11 11-0AA00-0DA1
	80/104 kW	80 kW	6SN11 11-0AA00-0EA1
	120/156 kW	120 kW	6SN11 11-0AA00-0FA0

The HF commutating reactor should be installed as near as possible to the mains infeed module.

HF noise suppression components (mains filters)

The mains filters are assigned to the mains infeed modules and limit the line-related emitted interference from the drive system. Together with the HF commutating reactor, the mains filter should also be installed near the mains infeed module with the filter always on the mains side. Because the connecting cables are subject to high interference levels, these cables must be laid with shielding. We recommend using mains filter products listed in Part 3.

¹⁾ External resistor connection is not possible.

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Additional components

Mains filter package

The mains filter and the HF commutating reactors are combined into one logistical unit in the form of a mains filter package.

Overvoltage limiter module (surge arrester)

The overvoltage limiter module limits the overvoltages that occur, for example, as the result of switching operations on inductive loads and on network matching transformers to values acceptable for the mains infeed modules above 10 kW.

The overvoltage limiter module is used for upstream transformers or networks that do not meet IEC requirements.

For UL compliance of the mains infeed module, the overvoltage limiter module must be used.

An appropriate protective circuit is integrated as standard in the 5 kW OI module.

Built-on fan

A built-on fan (6SN11 62-0BA02-0AA1) is required for the 80 kW and 120 kW infeed modules.

Shield terminal plates

Add-on shield terminal plates are available for the infeed and power modules. The plates also accommodate mounting points for terminals for the brake connection.

Option modules

An optional communication module is available to communicate via PROFIBUS-DP. This module also takes into account motion control with PROFIBUS-DP functions.

An optional terminal extension board is available to expand the I/O capability of the plug-in module (axis A only).

2-tier configuration

If space is limited, the SIMODRIVE 611 converter system modules can also be arranged on top of each other in two tiers.

The distance between the tiers must be not less than 200 mm. The location of the unit bus cable determines the maximum distance.

The modules with higher ratings and the infeed module must be located in the upper tier.

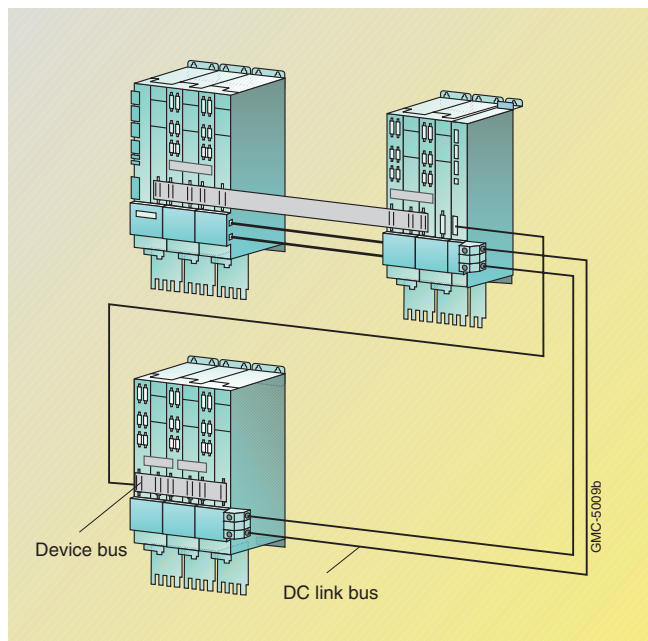
A connecting cable for the unit bus is required for two-tier configurations of the SIMODRIVE 611 converter system.

The DC link connection in two-tier configurations must be made with parallel cables (max. length 5 m). In the case of series-connected modules of 300 mm width, the copper conductor cross-section must be 70 mm² and for smaller modules it must be 50 mm². The cable must be laid short-circuit-proof and earth-fault proof. A bonding conductor of the same cross-section must also be laid and connected to the housings of both interconnected modules.

The maximum configuration of a drive grouping is limited by the capacity of the infeed module. Only one unit bus extension is permissible: either to the left, e.g. for a second tier; or to the right, e.g. to bypass a cubicle panel.

The device bus cable of a drive grouping to an infeed or monitoring module must not be longer than 2.1 m (from the infeed point). Two device bus junctions each a maximum length of 2.1 m from the junction point are possible at the infeed for the 2-tier configuration.

For 2-tier configurations, adapter terminals for the DC link are required along with a device bus extension cable.



2-tier configuration

Cables

The cable cross-section of the DC link connection depends on the actual configuration of the SIMODRIVE 611 converter system and must be dimensioned according to EN 60 204.

All power cables, including the mains lead, the connection between the I/RF module, the HF commutating reactor and the mains filter, and the motor leads must be laid with shielding and make contact over a large area.

The mounting surfaces for the mains infeed modules and drive modules and the commutating reactors and mains filters must be installed on mounting plates with low-resistance conducting surface (e.g. galvanized mounting plates).

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Table 1, Assessment factors

Module	EP and AP for the 24 V DC power supply rating						Limit for DC link μF	Capacitance	
	Provides	Requires	Provides	Requires	Provides	Requires		DC link μF	Braking utilization μF
SIMODRIVE power modules with the following plug-in units									
	Single-axis resolver 6SN11 18-□NJ00-0AA1		Two-axis resolver 6SN11 18-□NK00-0AA1		Two-axis sin/cos absolute encoder 1 V _{PP} 6SN11 18-□NH00-0AA1				
	↑ 0: Speed/torque setpoint, 1: Positioning and speed/torque setpoint								
Single-axis version									
6SN11 2□-1AA00-0HA1	0 0	EP 1.1 AP 1.7	0 0	EP 1.4 AP 2.0	0 0	EP 1.5 AP 2.0	0 0	75	75
6SN11 2□-1AA00-0AA1	0 0	EP 1.1 AP 1.7	0 0	EP 1.4 AP 2.0	0 0	EP 1.5 AP 2.0	0 0	75	75
6SN11 2□-1AA00-0BA1	0 0	EP 1.1 AP 1.7	0 0	EP 1.4 AP 2.0	0 0	EP 1.6 AP 2.0	0 0	110	110
6SN11 2□-1AA00-0CA1	0 0	EP 1.1 AP 1.7	0 0	EP 1.4 AP 2.0	0 0	EP 1.6 AP 2.0	0 0	330	330
6SN11 2□-1AA00-0DA1	0 0	EP 1.2 AP 1.7	0 0	EP 1.4 AP 2.0	0 0	EP 1.7 AP 2.0	0 0	495	495
6SN11 2□-1AA00-0LA1	0 0	EP 1.7 AP 1.8	0 0	EP 1.7 AP 2.1	0 0	EP 1.7 AP 2.1	0 0	495	495
6SN11 2□-1AA00-0EA1	0 0	EP 2.7 AP 1.8	0 0	EP 2.7 AP 2.1	0 0	EP 2.7 AP 2.1	0 0	990	990
6SN11 2□-1AA01-0FA1	0 0	EP 2.7 AP 1.9	0 0	EP 2.7 AP 2.1	0 0	EP 2.7 AP 2.1	0 0	2145	2145
6SN11 2□-1AA00-0JA1 ①	0 0	EP 1.3 AP 1.9	0 0	EP 1.5 AP 2.1	0 0	EP 1.7 AP 2.1	0 0	2145	2145
6SN11 2□-1AA00-0KA1 ①	0 0	EP 1.4 AP 1.9	0 0	EP 1.6 AP 2.1	0 0	EP 1.8 AP 2.1	0 0	4290	4290
6SN11 23-1AA02-0FA1 ①		EP 1.3 AP 1.9	0 0	EP 1.5 AP 2.1	0 0	EP 1.7 AP 2.1	0 0	2145	2145
Two-axis version									
6SN11 2□-1AB00-0HA1	0 0	EP 1.3 AP 2.1	0 0	EP 1.5 AP 2.4	0 0	EP 1.6 AP 2.4	0 0	150	150
6SN11 2□-1AB00-0AA1	0 0	EP 1.4 AP 2.1	0 0	EP 1.7 AP 2.4	0 0	EP 1.7 AP 2.4	0 0	150	150
6SN11 2□-1AB00-0BA1	0 0	EP 1.6 AP 2.1	0 0	EP 1.8 AP 2.4	0 0	EP 1.8 AP 2.4	0 0	220	220
6SN11 2□-1AB00-0CA1	0 0	EP 1.7 AP 2.1	0 0	EP 1.8 AP 2.4	0 0	EP 1.8 AP 2.4	0 0	660	660
	↑ 3: Internal cooling, 4: External cooling				① With built-on fan for hose cooling				
SIMODRIVE infeed modules									
OI 5 kW/10 kW 6SN11 4□-1AB00-0BA1	EP 3.5 AP 7	EP 0.3 AP –	EP 3.5 AP 7	EP 0.3 AP –	EP 3.5 AP 7	EP 0.3 AP –	1200	150	0
10 kW/25 kW 6SN11 4□-1AA01-0AA1	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	6000	440	0
28 kW/50 kW 6SN11 4□-1AA00-0CA0	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	20000	990	0
I/RF 16 kW/21 kW 6SN11 4□-1BA01-0BA1	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	6000	495	0
36 kW/47 kW 6SN11 4□-1BA02-0CA1	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	20000	990	0
55 kW/71 kW 6SN11 4□-1BA01-0DA1	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	EP 8 AP 17	EP 0.5 AP 0.5	20000	2145	0
80 kW/131 kW 6SN11 4□-1BB00-0EA1	EP 8 AP 17	EP 1 AP 0.75	EP 8 AP 17	EP 1 AP 0.75	EP 8 AP 17	EP 1 AP 0.75	20000	2145	0
120 kW/175 kW 6SN11 4□-1BB00-0FA1	EP 8 AP 17	EP 1 AP 0.75	EP 8 AP 17	EP 1 AP 0.75	EP 8 AP 17	EP 1 AP 0.75	20000	4290	0
Monitoring module 6SN11 12-1AC01-0AA1	EP 8 AP 17	EP 0 AP 0	EP 8 AP 17	EP 0 AP 0	EP 8 AP 17	EP 0 AP 0	0 0	1000	75
Pulsed resistor module 6SN11 13-1AB01-0BA1	0 0	EP 0.2 AP 0.1	0 0	EP 0.2 AP 0.1	0 0	EP 0.2 AP 0.1	0 0	75	75
	↑ 5 or 6, see Part 3								

Assessment factors of single modules for electronics points (EP) and gating points (AP) as well as permissible combinations of power modules and regulated control plug-in units (digital).

The details for the EP and AP assessment factors refer to the approved encoder cable lengths.

- PROFIBUS-DP
An additional 0.6 gating points must be taken into account when the option is used.

- Terminal module
No additional electronics points or gating points have to be taken into consideration in this case.

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Assessment and configuration sheet example

Module type	Electronics points			Gating points			DC link capacitance		
	Provides	Requires	Resultant	Provides	Requires	Resultant	Capacitance limit for infeed module (μF)	Capacitance used by DC link (μF)	Braking utilization (μF)
I/RF module 6SN11 45-1BB00-0FA1	8	1	$0 + 8 - 1 = 7$	17	0.75	16.25	20000	4290	0
Single-axis drive module 6SN11 23-1AA00-0EA1	0	2.7	$7 + 0 - 2.7 = 4.3$	0	2.1	14.15		990	990
Single-axis drive module 6SN11 23-1AA00-0EA1	0	2.7	1.6	0	2.1	12.05		990	990
Single-axis drive module 6SN11 23-1AA00-0EA1	0	2.7	-1.1	0	2.1	9.95		990	990
Note: Since the value of the resultant was negative, a monitoring module is required and must be physically located in this position. The current drive module and all subsequent modules must now be physically located to the right of the monitoring module.									
Note: When a monitoring module is used, the resultant calculation is continued with the value provided by the monitoring module. Any remaining resultant from above is ignored.									
Monitoring module 6SN11 12-1AC01-0AA1	8	0	8	17	0	17		1000	75
Single-axis drive module 6SN11 23-1AA00-0EA1	0	2.7	5.3	0	2.1	14.9		990	990
Single-axis drive module 6SN11 23-1AA00-0EA1	0	2.7	2.6	0	2.1	12.8		990	990
Pulsed resistor module 6SN11 13-1AB01-0BA1	0	0.2	2.4	0	0.1	12.7		75	75
Pulsed resistor module 6SN11 13-1AB01-0BA1	0	0.2	2.2	0	0.1	12.6		75	75
	Resultant electronic points ¹⁾ (must be > 0)		2.2	Resultant gating points ¹⁾ (must be > 0)		12.6	Σ DC link utilization < limit of infeed module		9400
	2.2 > 0 Therefore: OK			12.6 > 0 Therefore: OK			Σ Braking utilization ²⁾		4185

The required values can all be found in Table 1!

1) If resultant goes negative during calculation, a monitoring module must be added.

Start with the 8 electronic points and 17 gating points provided by the monitoring module.

2) Max. number of permissible braking resistors is equal to the integer value of Σ braking utilization/500 μF: Example 1) 1200 μF/500 μF = 2.4 = > max. 2

2) 1900 μF/500 μF = 3.8 = > max. 3

Resultant = Previous resultant + Provides - Requires

Actual physical configuration of drive system from left to right

Left

Right

Therefore: OK
no: $\frac{4185}{500} = 8.37$

Therefore: max.
4 braking resistors

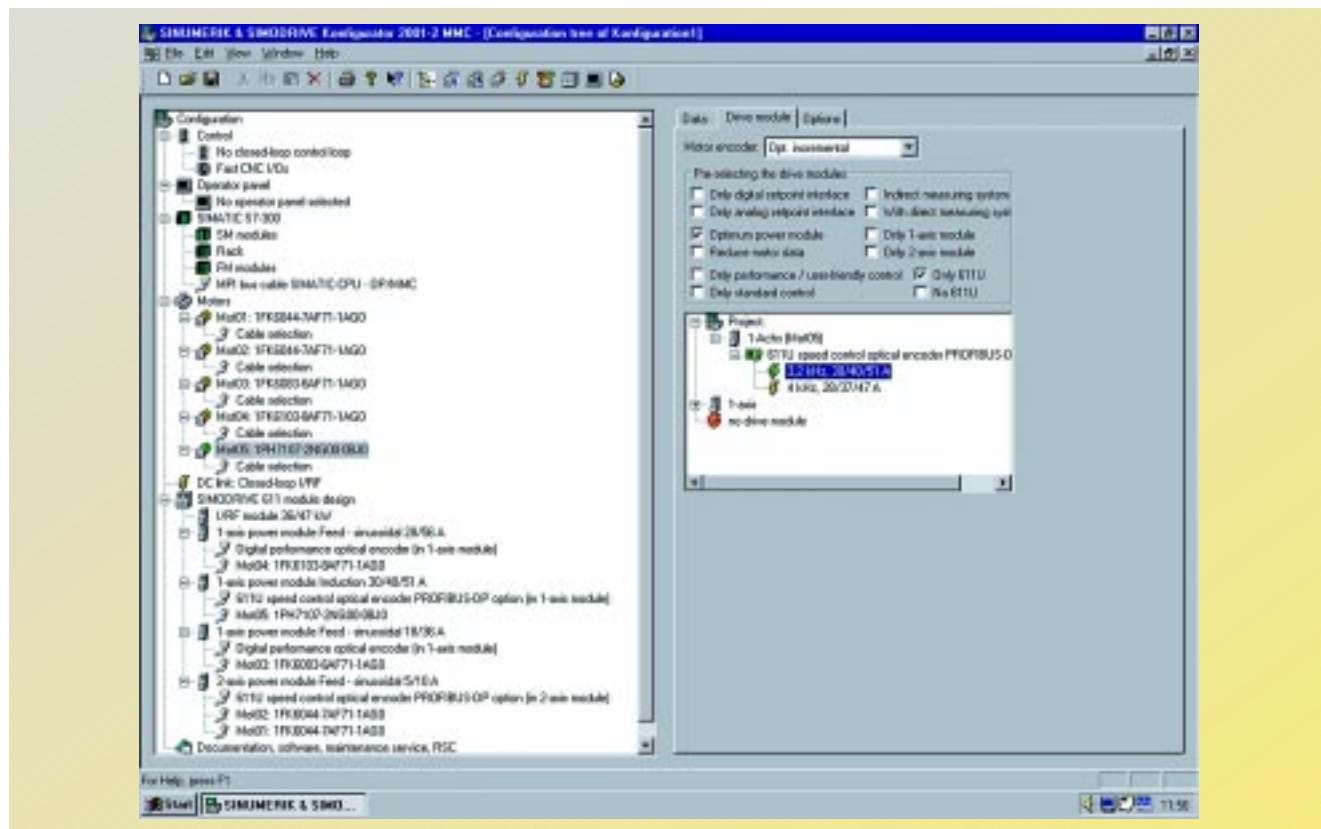
Module type	Electronics points			Gating points			DC link capacitance		
	Provides	Requires	Resultant	Provides	Requires	Resultant	Capacitance limit for infeed module (μ F)	Capacitance used by DC link (μ F)	Braking utilization (μ F)
	Resultant electronic points ¹⁾ (must be > 0)			Resultant gating points ¹⁾ (must be > 0)			Σ DC link utilization < Limit for infeed module		
							Σ Braking utilization ²⁾		

2) Max. number of permissible braking resistors is equal to the integer value of Σ braking utilization/500 μF : Example 1) $1200 \mu F/500 \mu F = 2.4 = > \max 2$
2) $1900 \mu F/500 \mu F = 3.8 = > \max 3$

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SIMODRIVE converter system
SINUMERIK & SIMODRIVE Configurator



Design

The SINUMERIK & SIMODRIVE Configurator (NC-SD) was developed for configuring the SINUMERIK controls and the SIMODRIVE drive systems.

The Configurator is used to consistently plan customized systems starting from the control complete with operator components through the drive system as far as the motor.

The main functions of the Configurator are:

- Selection of the control system and configuration of the possible control options
- Configuration of suitable operator components
- Configuration of SIMATIC components
- Configuration of the drive system comprising a converter and motor

• Design of the SINUMERIK and SIMODRIVE system

• Documentation and maintenance contracts for the individual components.

A particularly important task of the Configurator is to check that all components are compatible and admissible in terms of their interaction.

Motors can be selected via the order designation or using a motor magician (with reference to speed, torque or output). Further essential components such as cables are automatically assigned; the cable lengths can be specified to suit the application. Furthermore, individual motor options can be selected, such as brake, encoder, type of design, etc.

The appropriate power module for the motor is automatically selected. The power module can be matched, if preferred, by limiting the selected motor to the torque or speed actually required or by specifying the power section required. This also requires adaptation of the motor ratings data.

The regulated control board can also be selected for each motor depending on requirements. For example, a SIMODRIVE 611 universal regulated control module with speed or position control can be selected. Also terminals, PROFIBUS-DP and PROFIBUS-DP Motion Control are available as options for setpoint input.

Highlights:

- A simple menu structure supports rapid familiarization and easy navigation
- Variable module sequence
- Configuration of subsystems and complete installations
- Consistent project engineering of control, operator control, PLC, converter and motors
- Link to CA01
- The software for the NC SD Configurator is available
- on the CD-ROM for Catalog CA01,
- and on the Internet at <http://www.siemens.de/machine> under "Tools & Infos" and "Planning Tools".

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SIMODRIVE converter system Supply system types

General information

The SIMODRIVE 611 converter system is designed for a rated voltage of DC 600 V (± 300 V between the phase and the grounded neutral point).

This voltage must not be exceeded, otherwise the drive converter insulation system could be damaged which can result in inadmissably high touch voltages.

Important!

The drive converters can only be connected directly or via an auto-transformer to TN supply systems. For all other supply system types, an isolating transformer must be connected in series, whereby the star point of the secondary side must be grounded such that another TN supply system is created for the infeed.

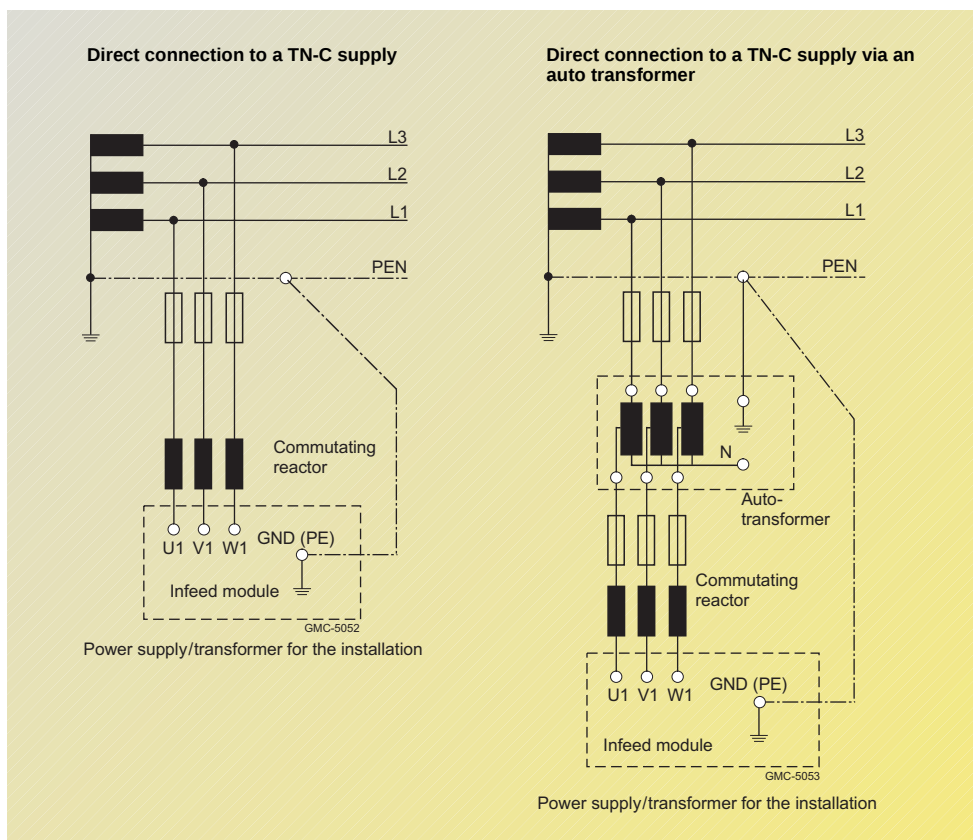
UL requirement for the maximum short-circuit current

Infeed units up to a rated output of:

- 37.3 kW may only be connected to supply systems with a maximum short-circuit current of 5 kA_{rms}, symmetrical, for a supply voltage of AC 480 V.

- 39 kW may only be connected to supply systems with a maximum short-circuit current of 10 kA_{rms}, symmetrical, for a supply voltage of AC 480 V.

Example for TN-C supply system



Connection to TN-C supply systems

Connection types

It is possible to connect the drive converter directly to a TN supply system for 3 AC 400 V, 3 AC 415 V and 3 AC 480 V¹⁾. For other voltage levels, it is possible to connect the drive converter through an auto-transformer.

Note

When using auto-transformers or isolating transformers upstream of infeed modules (module width ≥ 100 mm), an overvoltage limiting module or an external voltage limiting circuit must be used.

Description of TN-C supply, TN-S supply and TN-C-S supply

Symmetrical 4-conductor or 5-conductor three-phase supply system with grounded neutral point which can be loaded, with a protective conductor and neutral conductor connected to the neutral point – depending on the type of supply system and whether one or several phases are used.

For other types of supply system, the infeed module must be connected via an insulating transformer as shown in the examples on these pages.

¹⁾ Direct connection to 480 V is only possible in combination with the following power modules:

(Order No.: 6SN11 2□-1□□□-0□□1) and with I/RF modules, Order No.: 6SN11 4□-1□□□-0□□1.

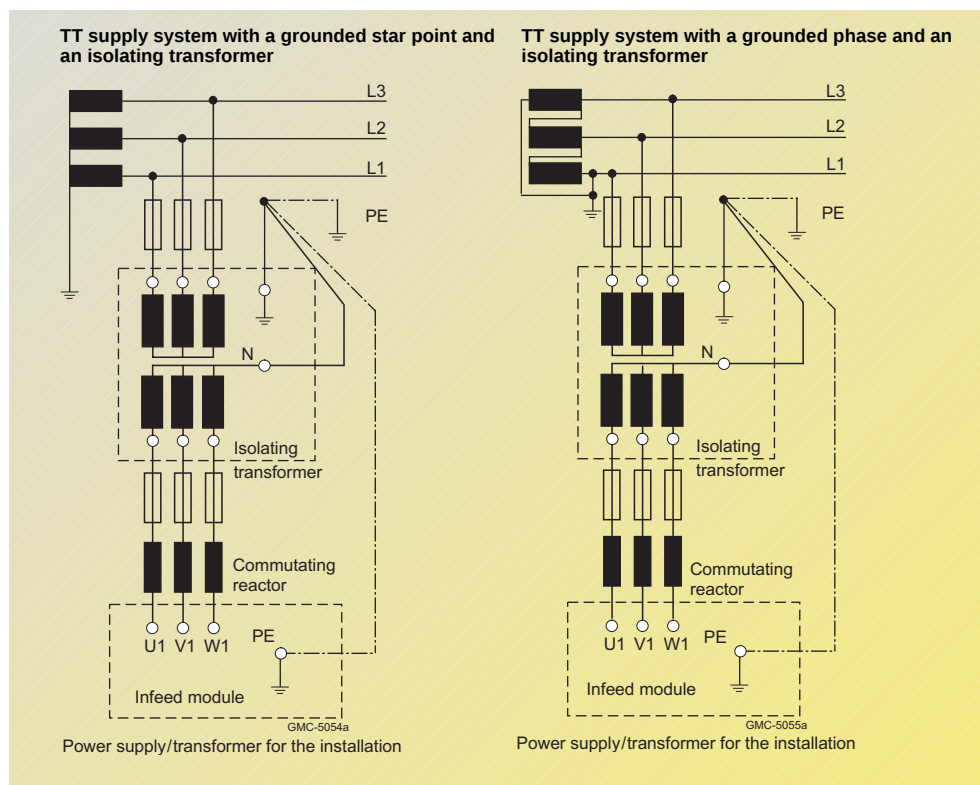
For motors with a shaft height < 100: For use up to temperature values of 60 K max. according to Part 4. Please follow the operating instructions for the motors.

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SIMODRIVE converter system Supply system types

Example for TT supply system

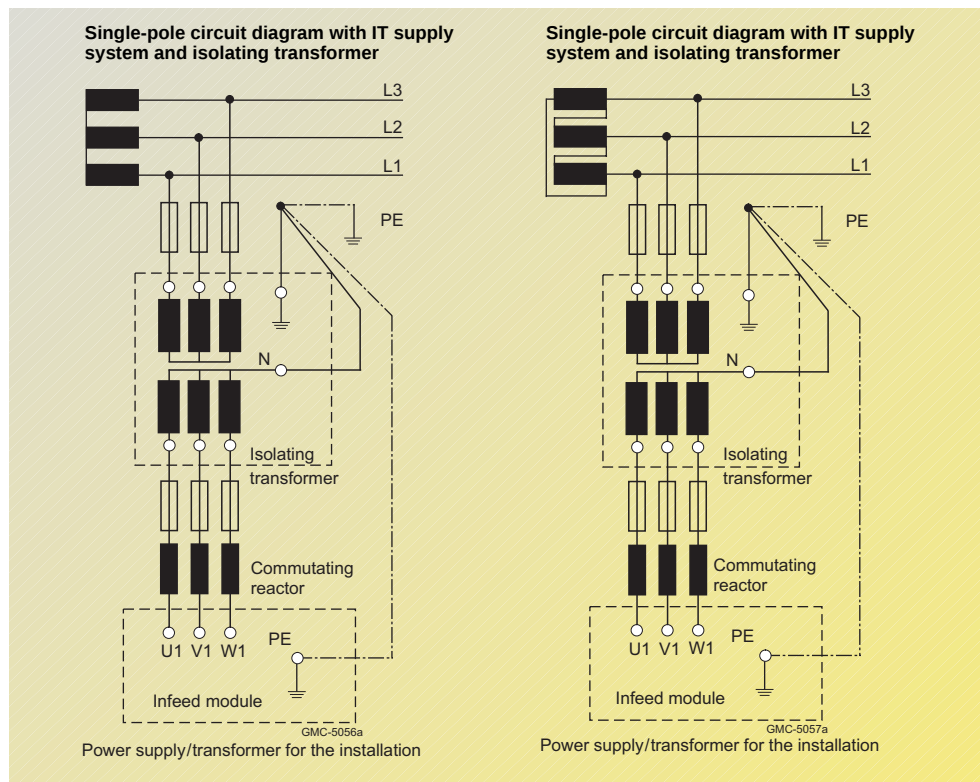


Connection to TT supply systems

Description of a TT supply

Symmetrical 3-conductor or 4-conductor three-phase supply system with a directly grounded point. The loads are, for example, connected to ground when they are not electrically connected with the directly grounded point of the supply system.

Example for IT supply system



Connection to IT supply systems

Description of an IT supply

Symmetrical 3-conductor or 4-conductor three-phase supply system without a directly grounded point. The loads are, for example, connected with ground connections.

Note

When using isolating transformers upstream of I/RF and OI infeed modules (module width ≥ 100 mm), an overvoltage limiting module or an external voltage limiting circuit must be used. For OI 5 kW, a voltage limiting circuit is included.

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SIMODRIVE converter system Electromagnetic compatibility (EMC)

Electromagnetic compatibility describes, according to the definition of the EMC guideline, the "ability of a device to function satisfactorily in an electromagnetic environment without itself causing electromagnetic interference which is unacceptable for other devices in this environment". In order to ensure compliance with the relevant EMC standards, the devices must demonstrate a sufficiently high immunity to interference, on the one hand, and interference emission must be limited to compatible values, on the other.

The **product standard EN 61800-3** relevant to "variable-speed drives" describes the requirements for domestic and industrial environments.

Immunity to interference

The devices satisfy the requirements of the EMC product standard EN 61800-3 for industrial environments and thus the lower values regarding interference to immunity required by the domestic environment.

Interference emission and radio-interference suppression

If converters are used in a domestic environment, conducted interference or radiated interference must not exceed the limit values of Class B1 in accordance with the European standard EN 55011.

A domestic environment refers in this context to an outgoing connection of a transformer to which private households are also connected.

The EMC guideline requires that an industrial system as a whole is electromagnetically compatible with its environment.

In the case of devices for use in industrial environments, no limit values are defined for emitted interference.

If the SIMODRIVE units are to comply with limit values, the following must be provided:

- Radio-interference suppression filters, including line commutating reactors for reducing conducted interference
- Shielded cables for motor supply lines and signal lines for reducing electromagnetically emitted interference
- Compliance with the installation guidelines

In systems with SIMODRIVE units and other components, e.g. contactors, switches, evaluation units, programmable controllers, etc., it must be ensured that no interference is emitted to the outside and also that the individual units do not cause mutual interference. In this respect, the measures described in the brochure "Design of Drives in Conformance with EMC Regulations" Order No.: 6SE7087-6CX87-8CE0 contained in the Planning Guide should be followed.

The most important of these measures are summarized here:

- The components of a system must be housed in a cabinet which acts like a Faraday cage.
- Signal lines and motor supply cables must be shielded. The shields must be grounded at both ends.
- Signal cables should be physically separated (at least 20 cm) from the power cables; isolation plates should be implemented if necessary.

Type of interference	Degree of immunity	Remarks
Discharge of static electricity (ESD)	up to 12 kV	
Burst	up to 4 kV	for power module
	up to 2 kV	for signal lines

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Line-side components

Mains supply interfaces for voltage matching

The SIMODRIVE 611 converter system is designed for direct operation on TN networks with rated voltages of 400 V, 415 V and 480 V 3-phase AC. Matching transformers tailor-made for the system are available for adapting the system for use with other network types, such as for operation on IT or TT networks. This wide range covers the mains voltages generally used in industrial regions worldwide.

The TN networks are characterized by a low resistance galvanic connection between the reference potentials to

ground of the power source and the protective conductor potential of the electrical equipment. If they are not satisfied, these connection conditions must be simulated by means of a transformer with separate windings whose secondary side star point is grounded on the protective conductor potential and connected to the protective conductor of the converter.

Within the pulsed transistor converter therefore, the voltage loading on the leakage paths between the power circuits fed by the mains potential and the

open-loop and regulated control circuits of the protective conductors complies with a rated voltage of 300 V in accordance with DIN EN 50178.

Upstream devices providing protection against hazardous leakage currents or for fire protection (such as residual-current protective devices) must be universal current sensitive in accordance with the requirements of DIN EN 50178. In the case of other residual-current protective devices, a transformer with sep-

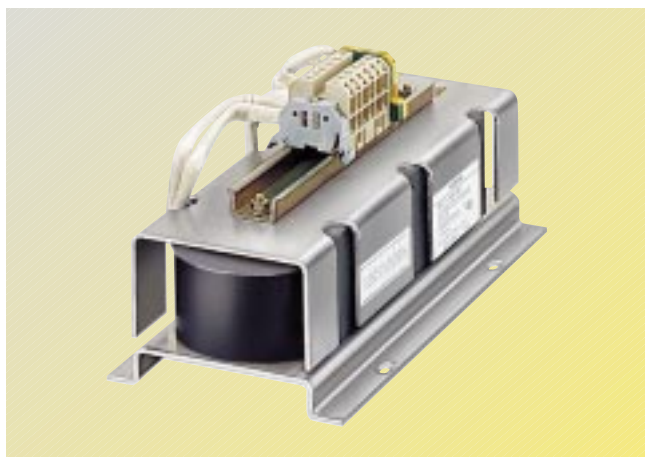
arate windings must be connected upstream of the converter for purposes of decoupling.

If mains filters are required and the rated mains voltage differs from the permissible supply voltage for the mains filters (400 V or 415 V 3-phase AC) one of the matching transformers shown below is also required.

Further detailed information:

- [Technical data in Part 2](#)
- [Selection and ordering data in Part 3.](#)

HF commutating reactor



HF commutating reactor

The matched HF commutating reactor in accordance with the selection table is required for connection of the open-loop 28 kW infeed modules and the closed-loop infeed/regenerative feedback modules to the supply system.

HF commutating reactors for
3 AC 400 V -10% to
3 AC 480 V $+6\%$ supplies;
50 Hz/60 Hz $\pm 10\%$.

To fulfill the requirements of the EMC guidelines, it is recommended that the mains filter packages are ordered.

Further detailed information:

- [Technical data in Part 2](#)
- [Selection and ordering data in Part 3](#)
- [Dimension drawings in Part 7.](#)

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Line-side components

Mains filter



Mains filter for 16 kW

The mains filters limit the conducted interference emitted from converter units to the permissible EMC values for industrial environments.

Provided that the installation is configured in accordance with the Planning Guide and the EMC guideline for SIMODRIVE, compliance with the limit values stipulated by the EU EMC Directive is ensured at the installation site.

Other functions of the mains filters in combination with the I/RF modules in sinusoidal current mode are:

- Provided the mains short-circuit rating is adequate, the low-frequency mains harmonic voltages remain within the limits set down by the VDEW requirements.
- Damping of resonance circuits (resonance circuits that are formed from the largely unknown mains impedances and impedances of the drive system).

- No impairment of the ripple control frequency ranges
- Designed for low leakage current. For the use of universal current sensitive residual-current protection devices with rated fault currents ≥ 300 mA.

A separate mains filter must be included in the supply cable in cases where there is a separate connection between the electronic power supply and the supply system (6-conductor connection).

When operating with rated mains voltages > 3 AC 415 V, a matching transformer must be connected in series with the mains filter.

Further detailed information:

- [Technical data in Part 2](#)
- [Selection and ordering data in Part 3](#)
- [Dimension drawings in Part 7.](#)

Mains filter package

Mains filter packages can be supplied for the I/RF modules. These mains filter packages comprise a mains filter and an HF commutating reactor,

each packed separately, then bound together to form a package. For technical specifications, see HF commutating reactor and mains filters.

Adapter sets are available to match the mains filter packages to the assembly surface and to the fixing points of the old filter modules. The mounted depth protrudes from the front of the

drive system by between 20 mm and 30 mm.

Further detailed information:

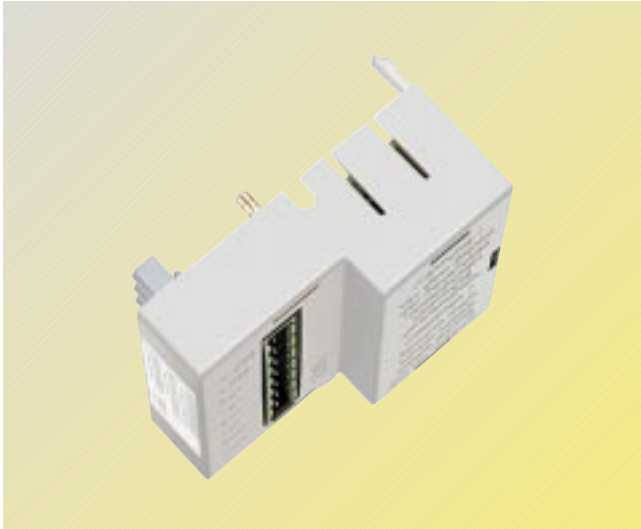
- [Selection and ordering data in Part 3](#)

SIMODRIVE 611 universal and POSMO

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SIMODRIVE converter system Line-side components

Overvoltage limiter module



Overvoltage limiter module

The overvoltage limiter module limits the overvoltages that occur, for example, as the result of switching operations on inductive loads and on network matching transformers to acceptable values. For mains infeed modules above 10 kW (width 100 mm), the overvoltage limiter module can be inserted at interface X181.

The overvoltage limiter module is used for upstream transformers or networks that do not meet IEC requirements.

For UL compliance of the mains infeed module, the overvoltage limiter module must be used.

An appropriate protective circuit is integrated as standard in the 5 kW OI module.

Further detailed information:
• **Technical data in Part 2**
• **Selection and ordering data in Part 3**

SIMODRIVE converter system Infeed modules

Infeed and infeed/regenerative feedback modules



Closed-loop 36 kW infeed/regenerative feedback module, int. cooling

The infeed modules are used to connect the drive system to the electricity supply system. The infeed modules are supplied with a mains voltage of 3 AC 400 V $\pm 10\%$, 50/60 Hz, 3 AC 415 V $\pm 10\%$, 50/60 Hz or 3 AC 480 V $+6\% - 10\%$, 50/60 Hz and form the direct voltage for the DC link. In addition, the electronics voltages (± 24 V, ± 15 V, $+5$ V etc.) are made available to the drive modules centrally by means of the device bus.

A transformer is required if the infeed modules are connected to a network that deviates from the TN form or a network without direct-current-sensitive residual-current devices. The HF commutating reactor is also required for the closed-loop infeed/regenerative feedback module.

An appropriate transformer for voltage matching is also required for supply voltages of 3 AC 200 V/220 V/240 V/440 V/500 V/575 V $\pm 10\%$, 50/60 Hz.

The required cooling components, such as separate fan and/or air baffles to carry air to the module heat sinks, are included in the scope of supply for modules with width ≤ 200 mm for both the internally cooled and externally cooled versions. Please observe the relevant instructions for the 300 mm modules. Shield terminal plates are available to meet EMC requirements for wiring with shielded power cables.

For UL compliance of the mains infeed module, the overvoltage limiter module must be used.

Infeed and infeed/regenerative feedback modules (continued)

Applications

- Machines that place high dynamic demands on the drives
- Frequent braking cycles and high braking energies
- Switching cabinet design optimized for low operating costs

When the regulated control infeed/regenerative feedback modules are used, it is possible to feed excess DC link energy generated, for example, when braking, back into the supply system. This results in optimization of the switching cabinet cooling and thus allows the operator to cut energy costs. The drive axes are supplied with a constant DC link voltage via the I/RF module.

The matching HF commutating reactor indicated in the selection table is required for connection to the mains power supply.

The associated mains filter package must be used for compliance with the EU EMC guideline.

Integrated functions

The functions integrated in the infeed modules and I/RF modules reduce the external wiring of the drive systems:

- The integrated line contactor can be activated using the input terminal (24 V).
- The external interlock input can be used to interrupt the energy supply of the contactor coil. This allows hardware contacts to be used for electrical isolation from the line contactor.
- Automatic DC link pre-charging on connection to the network.

The electronics power supply is maintained from the DC link energy to bring the coupled drive axis to a controlled stop in the event of a power failure. A pulsed resistor module is required to ensure that braking is also possible in this operating state.

- Central monitoring of the mains voltage, DC link voltage and electronic voltages $\pm 24 \text{ V}$, $\pm 15 \text{ V}$, $\pm 5 \text{ V}$.
- Coding switches can be used to select the various operating functions for the I/RF modules:
 - Regulated control with DC link voltage of 600 V or 625 V with sinusoidal current loading of the supply system with $\cos \varphi \geq 0.97$ (status as supplied). The power factor $\cos \varphi$ takes into account the sum of all the mains harmonic voltages.
 - Regulated control with DC link voltage of 600 V or 625 V with block current loading of the supply system.
 - Unregulated control with DC link voltage of 490 V (400 V in the case of 3-phase AC) with and without regenerative feedback to the system.
- Direct operation on 480 V AC 3-phase +6 % –10 % TN systems; 50/60 Hz with unregulated control DC link voltage of 680 V with regenerative feedback.

Further detailed information:

- **Technical data in Part 2**
- **Selection and ordering data in Part 3**
- **Dimension drawings in Part 7.**

Unregulated control infeed module OI without regenerative feedback



Open-loop 10 kW infeed module, internal/external cooling

Applications

- Machines with few or short braking cycles, low braking energy
- Operation on supplies from $SK_{\text{mains}}/P_{\text{nOI}} \geq 30$
 SK_{mains} Mains short-circuit power
 P_{nOI} rated power of OI module
- Drive systems with limited dynamic demands.

Open-loop infeed modules are available for low ratings. These infeed modules up to 10 kW contain the commutation reactors and a pulsed resistor that converts the braking energy of the drive modules into heat. With maximum utilization of the pulsed resistor (> 200 W), a warm air deflection plate must be used to prevent overheating of the modules mounted above.

For the 28 kW OI module, the pulsed resistors must be ordered separately and installed externally. The OI module contains the control for the pulsed resistors.

Further detailed information:

- **Technical data in Part 2**
- **Selection and ordering data in Part 3**
- **Dimension drawings in Part 7.**

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Power modules



Power module, internal cooling with internal fan, module width 100 mm

The power modules are designed to operate the following:

- 1FT6 and 1FK6 servo motors
- 1FN linear motors
- 1PH4 and 1PH7 motors
- Standard 1LA induction motors

A wide range of single-axis and two-axis power modules with three different cooling methods are available that are graded according to current rating.

Matching, pre-assembled power cables are available for connecting the motors.

Shield terminal plates are available to meet EMC requirements for wiring with shielded power cables.

The device bus cable is included in the scope of supply of the power module.

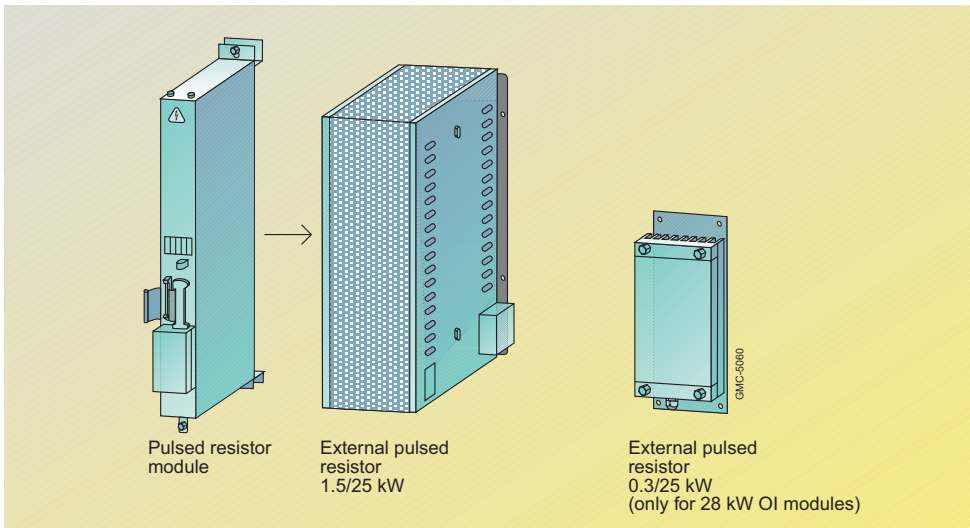
The drive bus cables for the digital system must be ordered separately.

Further detailed information:

- **Technical data in Part 2**
- **Selection and ordering data in Part 3**
- **Dimension drawings in Part 7.**

SIMODRIVE converter system System components

Pulsed resistor



Pulsed resistor module and external pulsed resistor

The pulsed resistor module can be used to cause rapid discharge of the DC link. Several pulsed resistor modules can be connected in parallel. Other possible applications are, for example, increasing the

pulsed resistor rating in conjunction with the open-loop infeed module or reducing the DC link voltage in the event of controlled braking after mains failure.

With maximum utilization of the pulsed resistor > 200 W, a warm air deflection plate must be used to prevent overheating of the modules mounted above.

External pulsed resistors

The external pulsed resistors can be used to transfer the heat loss to outside the control cabinet. The external pulsed resistors are always required for the 28 kW OI module.

Depending on the power requirement, the 0.3/25 kW and 1.5/25 kW pulsed resistors can be mixed in the 28 kW OI module. The protection function is parameterized via the connecting terminals.

It is not possible to connect the 0.3/25 kW external resistor to the pulsed resistor module. Shielded cables should be used for connections with pulsed resistors. In general, the instructions in the Planning Guide should be observed.

Further detailed information:

- **Technical data in Part 2**
- **Selection and ordering data in Part 3**
- **Dimension drawings in Part 7.**

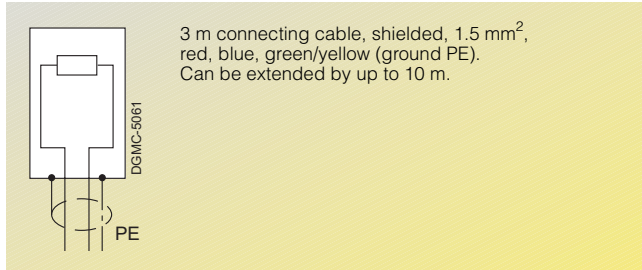
SIMODRIVE 611 universal and POSMO

Planning guide

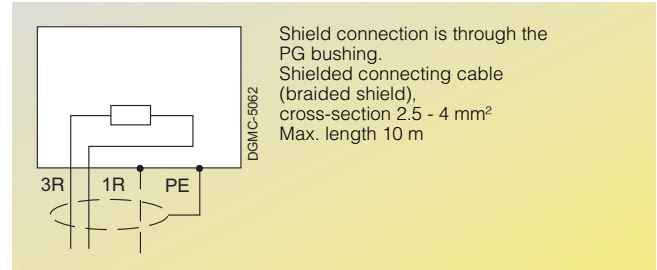
SIMODRIVE converter system
System components

Connection of the external pulsed resistor

This can be installed vertically or horizontally.



Connection of an external 0.3/25 kW pulsed resistor

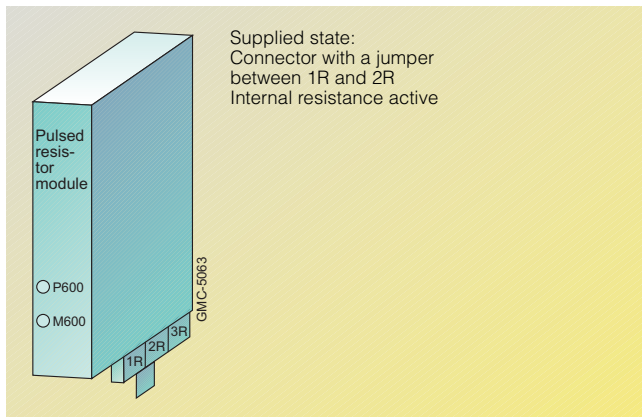


Connection of an external pulsed resistor, 1.5/25 kW

Note:

The unused cores of multi-core cables must generally be connected to protective earth (PE) at both ends.

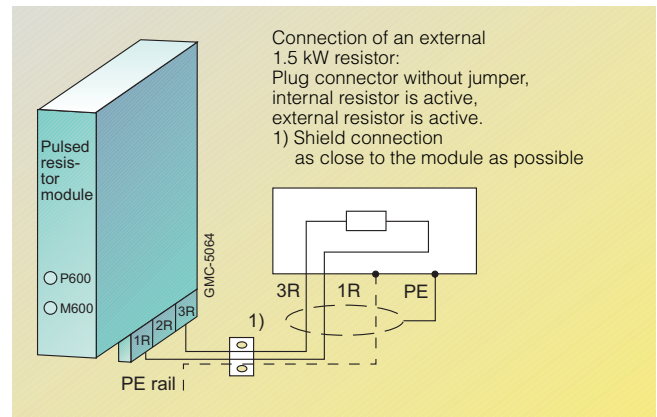
Circuit types for the pulsed resistor modules



Supplied state of the pulsed resistor module

Note:

Only one external 1.5/25 kW pulsed resistor is permitted to be connected to pulsed resistor modules.



Connection of an external pulsed resistor module, 1.5 kW

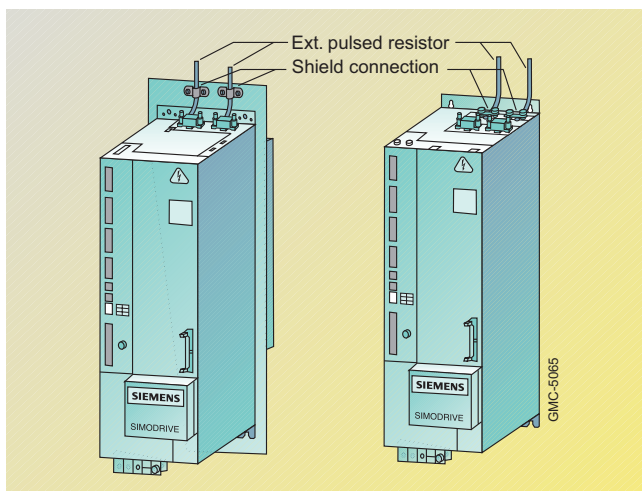
For the number of pulsed resistor modules that are connected to the same DC link: See the calculations for dimensioning the power modules and the drives.

$$N \leq C/500 \mu F$$

N Max. number of pulsed resistor modules (must always be rounded down)

C Capacitance of the DC link of the drive system in μF

Typical connections for external pulsed resistors to the 28 kW module



Connection of an external pulsed resistor with shield attachment

Pulsed resistor (PR)	Terminal strip TR1	Terminal strip TR2
0.3/25 kW	1R 2R 3R	1R 2R 3R
	PR 0,3 kW	PR 0,3 kW
2 x 0.3/25 kW = 0.6/50 kW	1R 2R 3R	1R 2R 3R
	PR 0,3 kW	PR 0,3 kW
1.5/25 kW	1R 2R 3R	1R 2R 3R
	PR 1,5 kW	PR 1,5 kW
2 x 1.5/25 kW = 3/50 kW	1R 2R 3R	1R 2R 3R
	PR 1,5 kW	PR 1,5 kW

Rules for connecting an external pulsed resistor to the 28 kW OI module

* Jumper for coding the thermal limit characteristic.

Note:

The 28 kW OI module does not contain a pulsed resistor. The brake chopper is however installed.

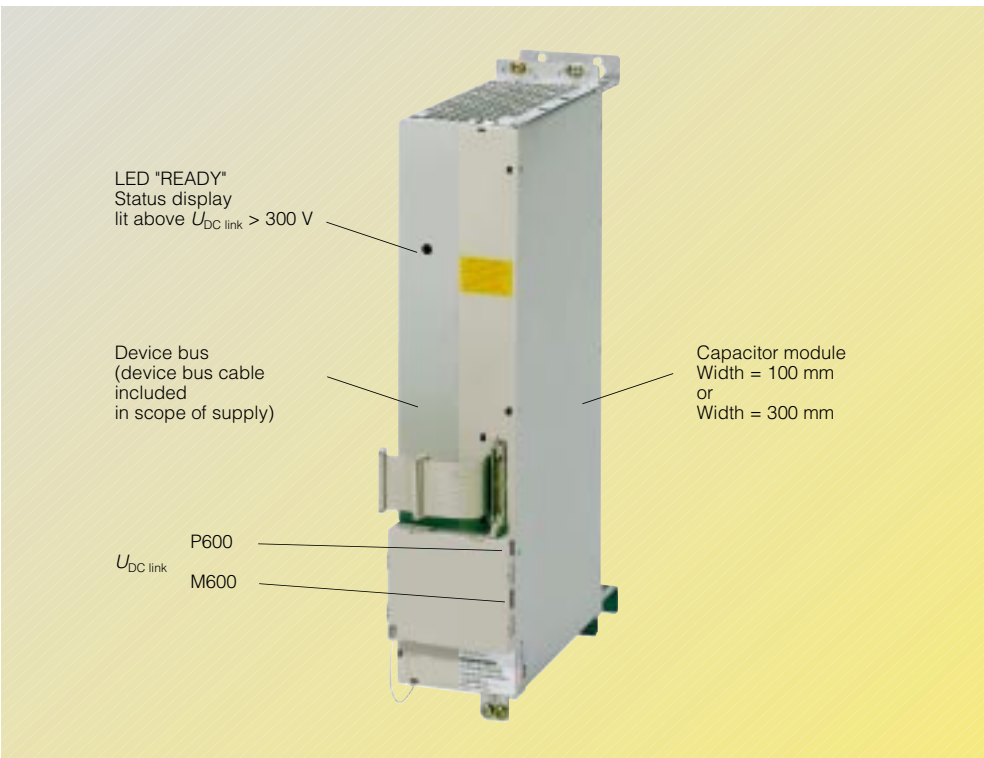
SIMODRIVE 611 universal and POSMO

Planning guide

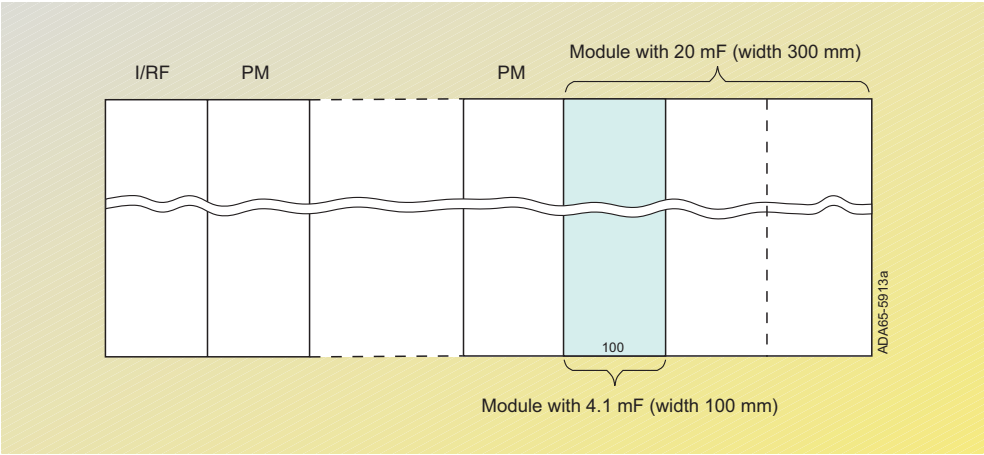
SIMODRIVE converter system

System components

Capacitor module with 4.1 mF or 20 mF



Capacitor module



Slot for the capacitor module

The capacitor modules are used to increase the capacitance of the DC link. This serves on the one hand to bridge temporary mains failures and on the other to store braking energy intermediately.

The following module types are available:

- Module with 4.1 mF that serves as a dynamic energy store
- Module with 20 mF that serves to bridge mains failures.

It is recommended that the capacitor module is installed at the right-hand end of the system. It is linked via the DC link bus module.

Depending on the type of mains supply used, several capacitor modules can be connected in parallel. For capacitor modules of 4.1 mF, the charging limit for the mains supply must not be exceeded in total.

Charging times, discharging times, discharge voltage

It must be ensured that the DC link is at zero potential before starting commissioning or service work. If a pulsed resistor exists in the system, after disconnecting terminal 48, a rapid discharge of the DC link can be performed via terminals X221:19 and 50 (jumpers) in order to reduce the discharge time.

For further details concerning project engineering, see the SIMODRIVE 611 Planning Guide and Catalog NC 60, Section "Engineering information".

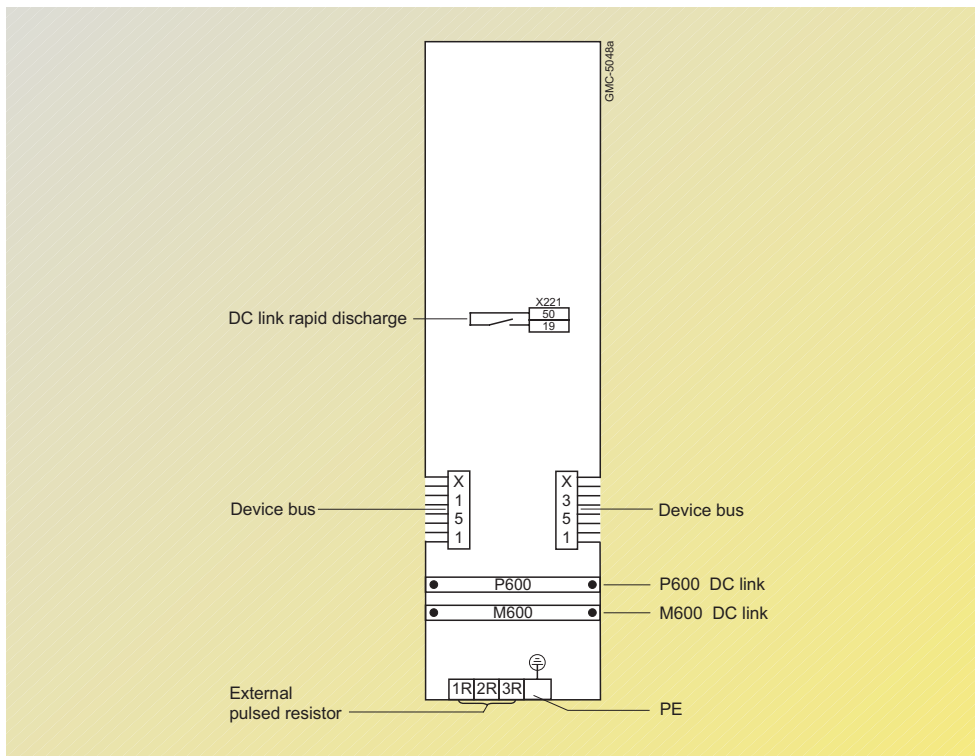
Maximum number of capacitor modules

Infeed unit	Connectable capacitor modules			
		without	1	≥ 2
OI 5 kW	None			
	Monitoring module			
OI 10 kW I/RF 16 kW	4.1 mF module	1	1	1
	20 mF module	3	1	0
OI 28 kW I/RF 36 to 120 kW	4.1 mF module	4	4	4
	20 mF module	3	1	0

Charging/discharging times, discharge voltage

Capacitor module	Charging time per module	Discharge time per module to 10 % of the DC link voltage at 750 V DC
4.1 mF	as for the power modules	approx. 24 min
20 mF	approx. 2 min	approx. 30 min

Pulsed resistor module – Power and control terminals



Terminal No.	Designation	Function	Type ¹⁾	Typ. Voltage/ limit values	Max. cross-section
	X151	Device bus	I/O	Various	Ribbon cable
19	X221	Enable voltage, reference potential	A	0 V	1.5 mm ²
50	X221	Control contact for rapid discharge	I	0 V	1.5 mm ²
GND		Protective conductor	I	0 V	Bolt
P 600		DC link	I/O	+300 V	Busbar
M 600		DC link	I/O	-300 V	Busbar
1 R 2 R 3 R	TR1 TR2 ²⁾	External resistance connection	I/O	300 V	6 mm ² /4mm ² ³⁾

1) I = Input; O = Output.

2) For 28 kW OI module only.

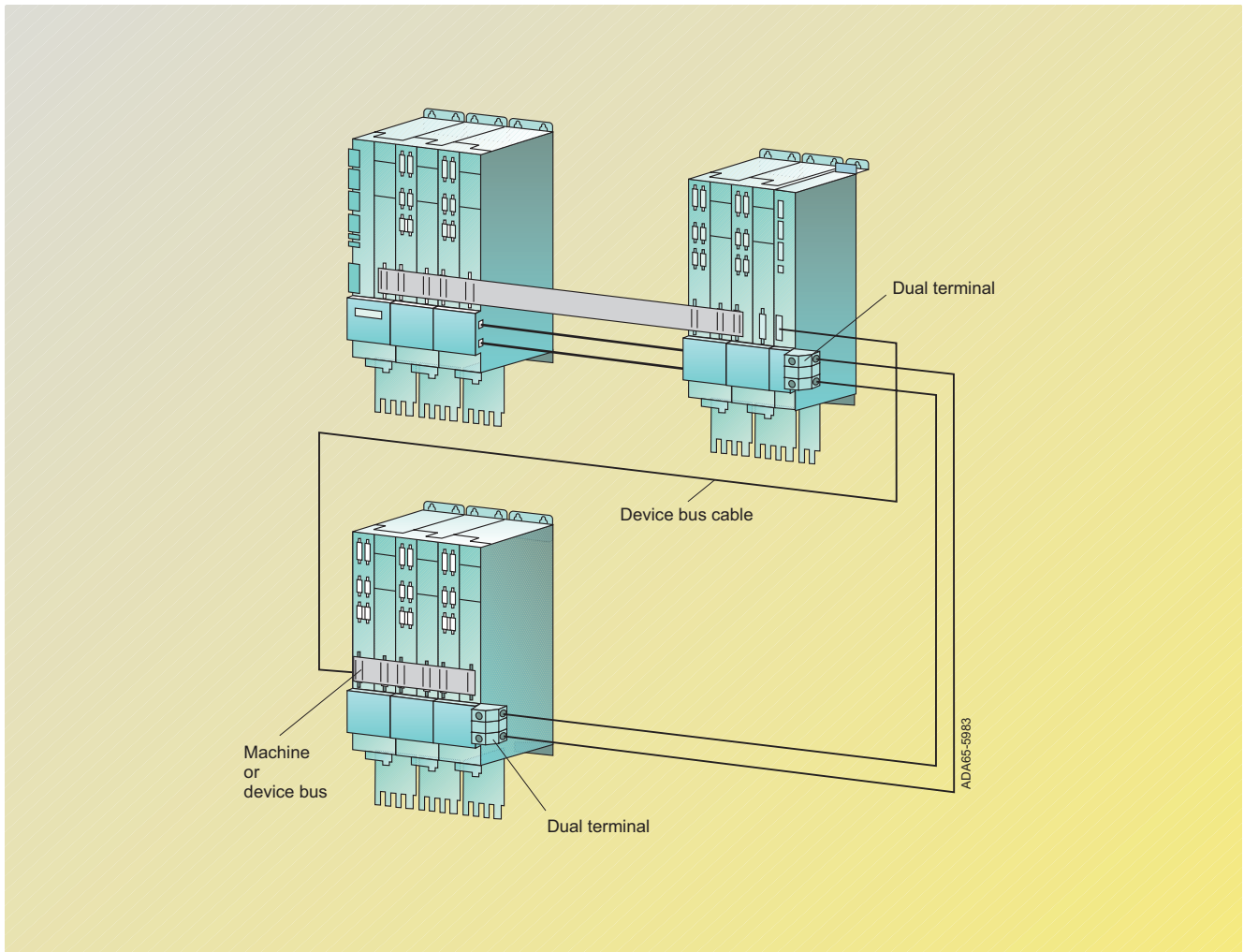
3) 6 mm² applies to cable lugs, 4 mm² for finely-stranded conductors without connecting sleeve.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system System components

2-tier configuration



6

1. The longest line of the device bus measured from the bus output of the infeed module must not exceed 2.1 m.

2. In the case of series-connected modules of 300 mm width, the cross-section of the copper conductor must be 70 mm² and for narrower modules 50 mm². The cable installation must be short-circuit-proof and earth-leakage-proof.

A bonding conductor of the same cross-section must also be laid and connected to the housings of both interconnected modules.

3. Extension of the device bus by 1.5 m.

Further detailed information:
• **Selection and ordering data in Part 3**

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Cooling systems

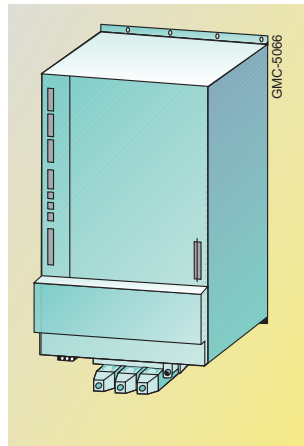
Internal cooling

In this standard solution, the power loss of the converter components from the electronic equipment and the power section is dissipated to the switching cabinet interior by means of natural cooling or separate ventilation.

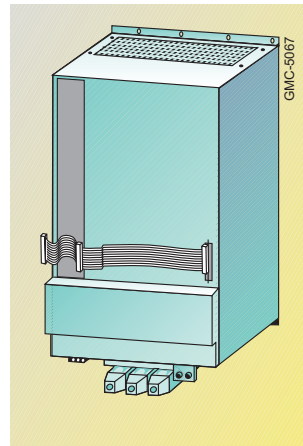
For the infeed/regenerative feedback modules of 80 kW and 120 kW and for the 300 mm wide power modules (with the exception of the 85 A power module), a built-on fan is required for internal cooling.

Further detailed information:

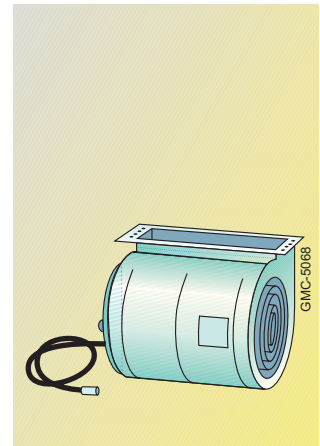
- Selection and ordering data in Part 3
- Dimension drawings in Part 7.



Infeed/regenerative feedback module
Internal cooling



Power module
Internal cooling with internal fan

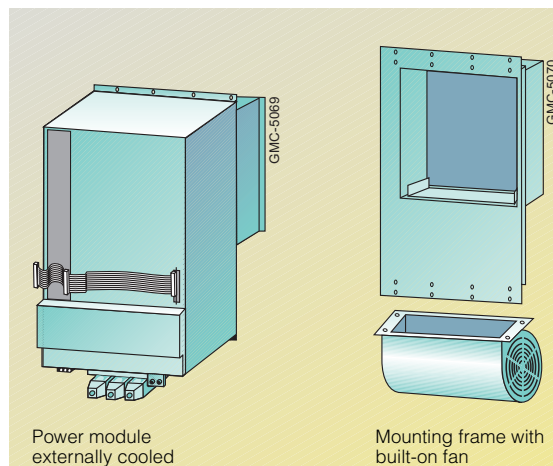


Built-on fan

External cooling

The power module heat sinks of the modules pass through the mounting surface in the control cabinet, so the power losses of the power section can be dissipated to an external separate ventilation circuit. Only the power loss of the electronic equipment remains in the control cabinet. The IP 54 degree of protection can be achieved at the "mechanical interface" which is the external heat sink.

- For the order numbers, see the infeed and power modules for external cooling in Part 3.
- When a monitoring module or a pulsed resistor module is used, a blanking cover can be ordered for mounting the module and for sealing the prepared opening.

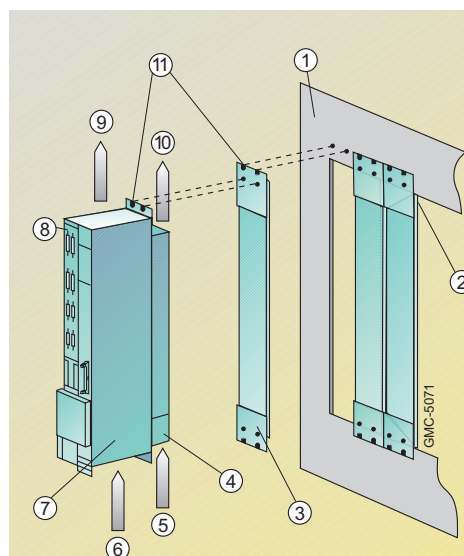


External cooling of the power module and mounting frame with built-on fan

For external cooling, the fan box is included in the scope of supply of the mounting frame for 300 mm module widths. The built-on fan required must be ordered separately.

Further detailed information:

- Selection and ordering data in Part 3
- Dimension drawings in Part 7.



- ① Control cabinet rear panel (untreated metal surface)
- ② Mounting frames sealed off from each other and from the rear panel of the control cabinet (e. g. with Terostat-91 available from Teroson). The sealant must be applied all around the edge in compliance with the IP 54 degree of protection.
- ③ Mounting frame
- ④ Fan box
- ⑤ Air inlet for heat sink, $T \leq 40^{\circ}\text{C}$
- ⑥ Air inlet for electronics, $T \leq 40^{\circ}\text{C}$
- ⑦ Power module with external cooling and heat sink seal
- ⑧ Regulated control
- ⑨ Air outlet for electronics
- ⑩ Air outlet for heat sink
- ⑪ M5 bolt

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system

Cooling systems

Hose cooling

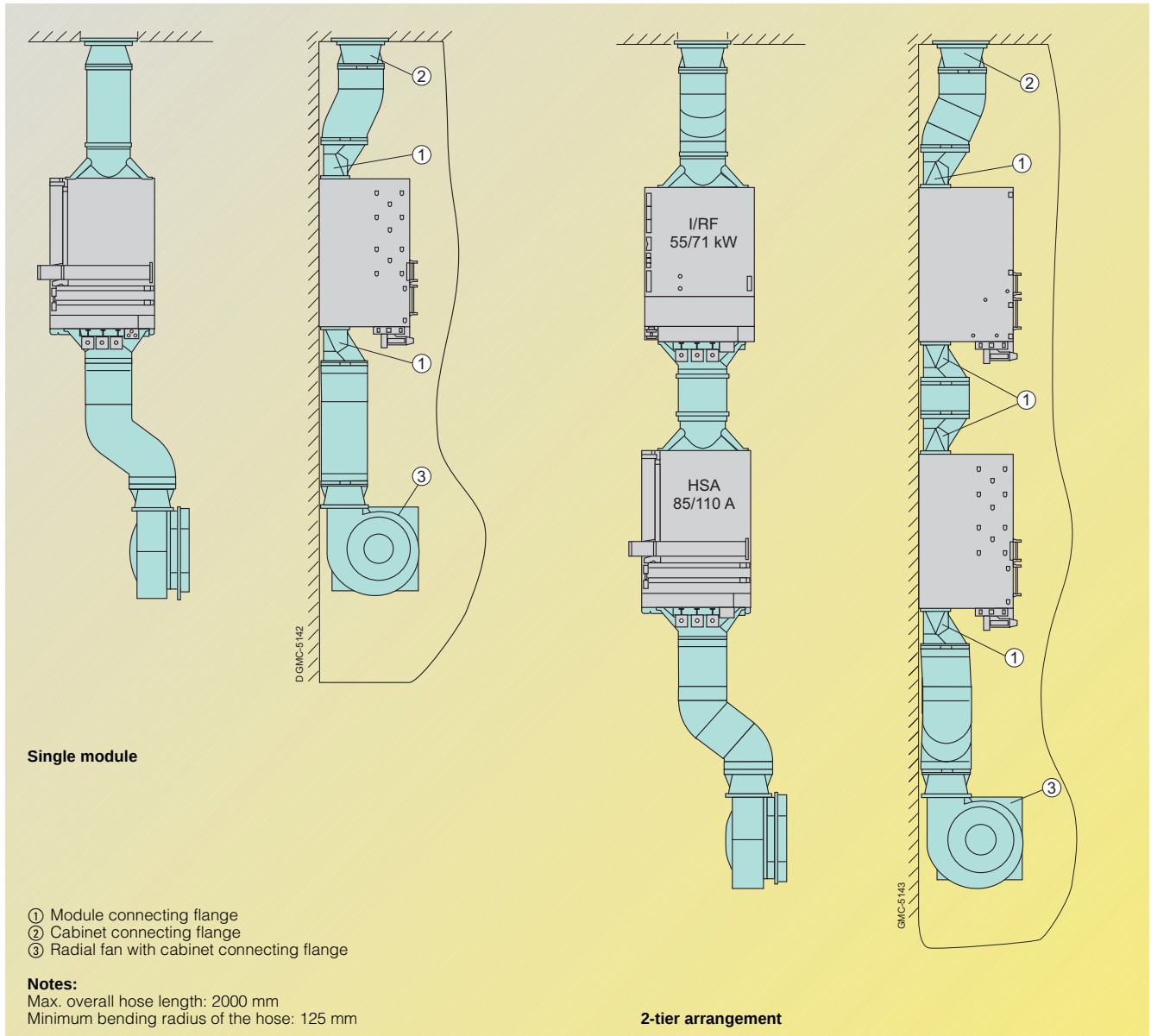
Hose cooling is designed for control cabinets that do not have a separate ventilation channel for the power sections.

Flexible tubes are used to remove the heat arising from the power loss of the power sections from the cabinet.

The IP 54 degree of protection can be achieved at the "mechanical interface".

Further detailed information:

- Selection and ordering data in Part 3
- Dimension drawings in Part 7.



Hose cooling for 300 mm modules without shield terminal plates

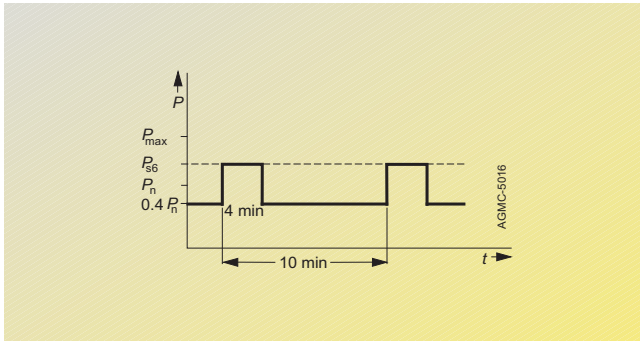
SIMODRIVE 611 universal and POSMO

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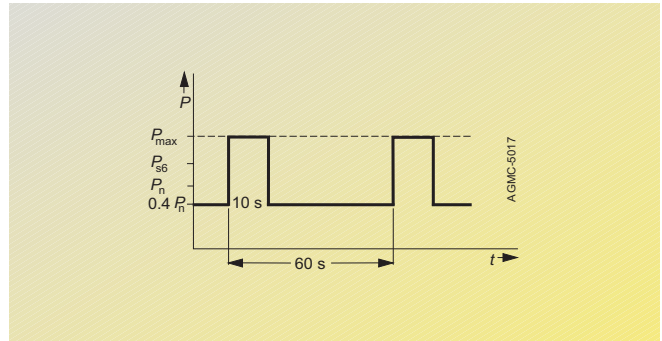
SIMODRIVE converter system
Dimensioning of the infeed module

Overload capability

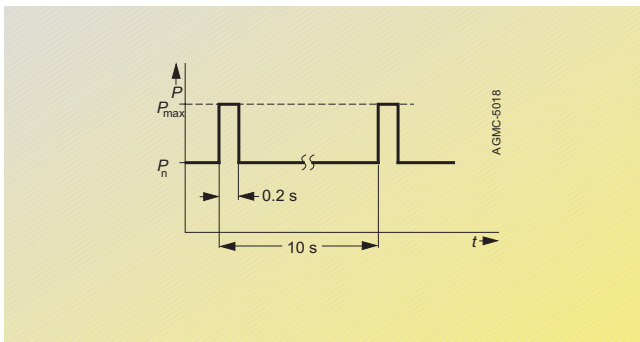
Rated load duty cycles for infeed modules



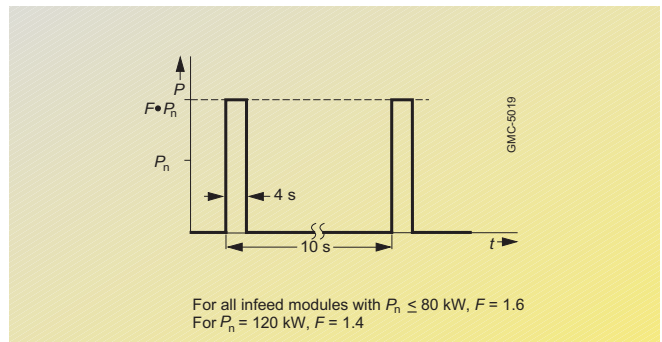
S6 duty cycle with pre-loading condition



Peak output duty cycle with pre-loading condition



Peak output duty cycle with pre-loading condition



Peak output duty cycle without pre-loading condition

The following rule-of-thumb applies:

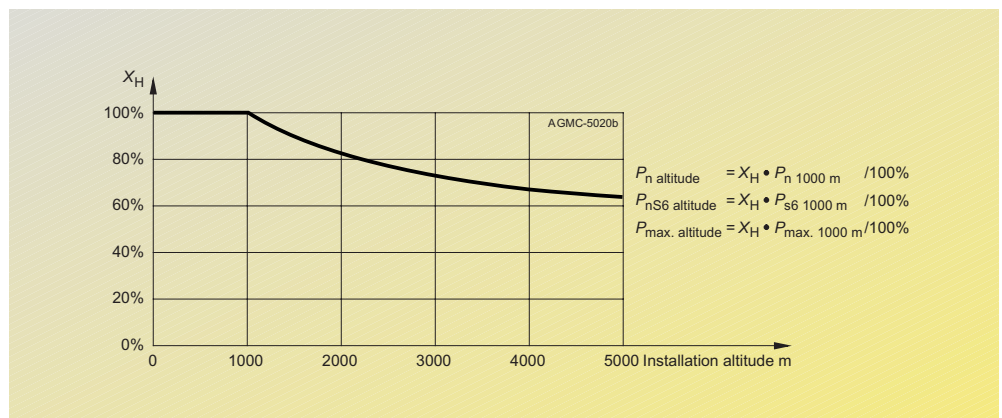
$X = 1.03$ for $T \leq 10$ s
 $X = 0.90$ for $10 \text{ s} < T \leq 1 \text{ min}$
 $X = 0.89$ for $1 \text{ min} < T \leq 10 \text{ min}$
 T = Total cycle time

$$P_{\text{Mot rms}} > \sqrt{\frac{\sum \left(\frac{P_{\text{Mot A}} + P_{\text{Mot E}}}{2} \right)^2 \cdot \Delta t_i}{T}}$$

$P_{\text{Mot B}}$ = Initial motor power in time increment Δt_i
 $P_{\text{Mot E}}$ = Final motor power in time increment Δt_i

Derating as a function of the installation altitude

All of the specified outputs are valid up to an installation altitude of 1000 m. For an installation altitude > 1000 m, the specified outputs should be reduced according to the diagrams. For installation altitudes > 2000 m, an isolating transformer must be used.



Example:
 Infeed module 16 kW
 Installation altitude 2000 m:
 from the diagram: $X_H = 83 \%$

Important: P_n , P_{s6} and P_{max} must be de-rated in the same way.

→ $P_{n \text{ altitude}} = X_H \cdot P_{n \text{ 1000 m}} / 100\% = 83\% \cdot 16 \text{ kW} / 100\% = 13.28 \text{ kW}$
 → $P_{n s6 \text{ altitude}} = X_H \cdot P_{n s6 \text{ 1000 m}} / 100\% = 83\% \cdot 21 \text{ kW} / 100\% = 17.43 \text{ kW}$
 → $P_{\text{max altitude}} = X_H \cdot P_{\text{max 1000 m}} / 100\% = 83\% \cdot 35 \text{ kW} / 100\% = 29.05 \text{ kW}$

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Dimensioning of the power module

Overload capability (continued)

The power modules can be overloaded for a short time up to $I_{\max}$. The duration of the overload is dependent on the operational state of the module. The necessary times are obtained from the overload diagrams.

Definition of the currents

The sinusoidal currents are rms values.

I_n continuous current

I_{S6} current for max. 4 min for S6 duty cycle

$I_{\max}$ peak current

Definition of the powers

$P_{V_{\text{tot}}}$ total module power loss

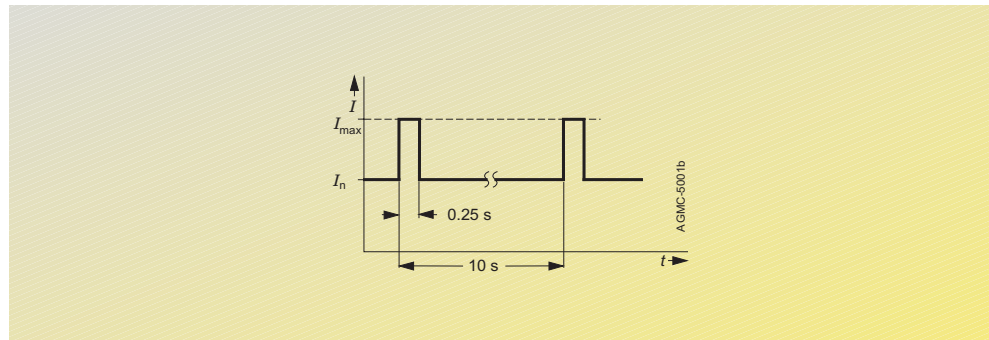
$P_{V_{\text{hose}}}$ power loss which can be dissipated through hose cooling

$P_{V_{\text{ext}}}$ power loss which can be dissipated through external cooling

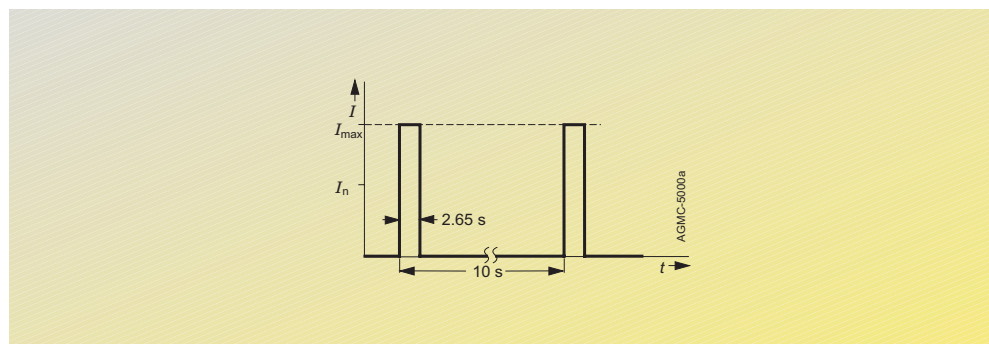
$P_{V_{\text{int}}}$ power loss which is not dissipated via hose or external cooling.

Rated load duty cycles

Typical of synchronous servo motors

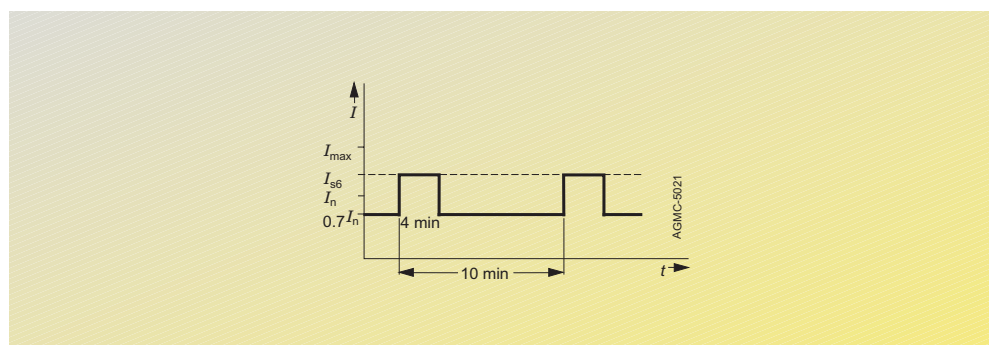


Peak current duty cycle with pre-loading condition

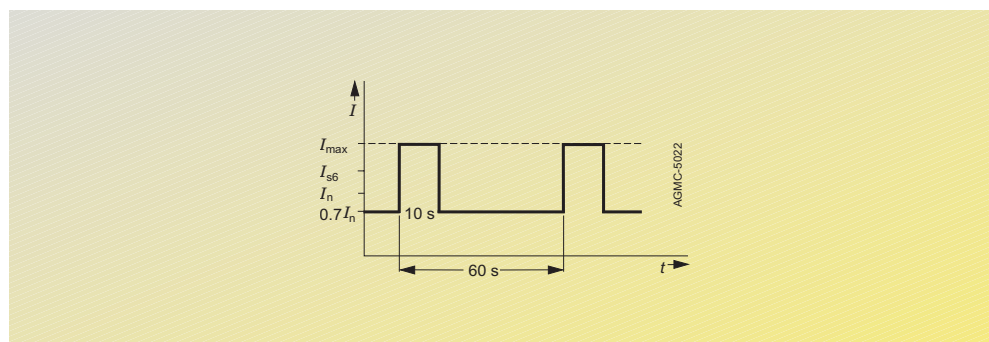


Peak current duty cycle without pre-loading condition

Typical of induction servo motors



S6 duty cycle with pre-loading condition



S6 peak current duty cycle with pre-loading condition

Current reduction curves

Current reduction dependent on the inverter clock frequency

X_1 = Current reduction factor, current reduction from the inverter clock frequency f_0 of the power transistors (see Technical Data).

$$X = 100\% - \frac{(100\% - X_1) \cdot (f_T - f_0)}{8 \text{ kHz} - f_0}$$

X = the reduction factor obtained

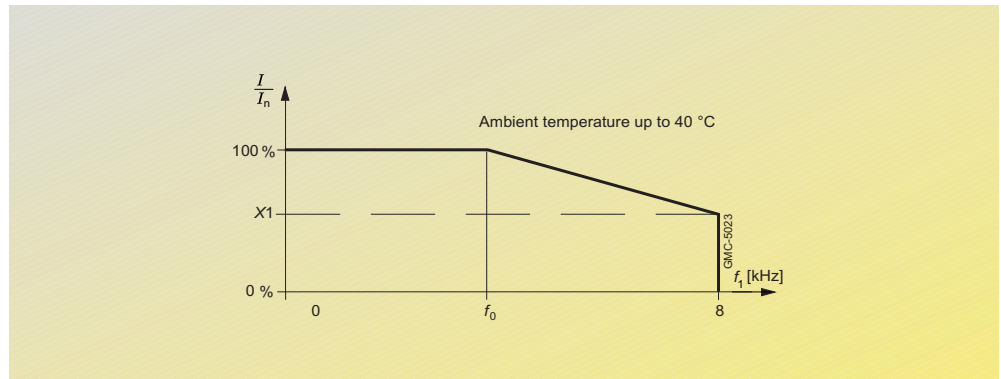
[in %] for I_n , I_{S6} , I_{max} .

f_T = selected inverter clock frequency

Important:

The currents I_n , I_{S6} and I_{max} must be reduced in the same way.

$$\begin{aligned} \rightarrow I_{nTT} &= X \cdot I_{n10}/100\% \\ \rightarrow I_{S6TT} &= X \cdot I_{S610}/100\% \\ \rightarrow I_{maxTT} &= X \cdot I_{max10}/100\% \end{aligned}$$



Current reduction factor X_1

Power module Order No.	I_n/I_{max} Induction motors	Pulse frequency f_0 in kHz	Current de-rating factors in % for induction motors	I_n/I_{max} Synchronous motors	Pulse frequency f_0 in kHz	Current de-rating factors in % for synchronous motors
6SN11 23-1AA00-0HA1	3/3 A	3.2	50	3/6 A	4	55
6SN11 23-1AA00-0AA1	5/8 A	3.2	50	5/10 A	4	55
6SN11 23-1AA00-0BA1	8/16 A	3.2	55	9/18 A	4	55
6SN11 23-1AA00-0CA1	24/32 A	3.2	40	18/36 A	4	40
6SN11 23-1AB00-0HA1	2 x 3/3 A	3.2	50	2 x 3/6 A	4	55
6SN11 23-1AB00-0AA1	2 x 5/8 A	3.2	50	2 x 5/10 A	4	55
6SN11 23-1AB00-0BA1	2 x 8/16 A	3.2	55	2 x 9/18 A	4	55
6SN11 23-1AB00-0CA1	2 x 24/32 A	3.2	40	2 x 18/36 A	4	40
6SN11 23-1AA00-0DA1	30/51 A	3.2	55	28/56 A	4	50
6SN11 23-1AA00-0LA1	46/76 A	3.2	55	42/64 A		55
6SN11 23-1AA00-0EA1	60/102 A	3.2	50	56/112 A	4	55
6SN11 23-1AA00-0FA1	85/127 A	3.2	55	70/140 A	4	55
6SN11 23-1AA00-0JA1	120/193 A	3.2	50	100/100 A		55
6SN11 23-1AA00-0KA1	200/257 A	3.2	50	140/210 A	4	50

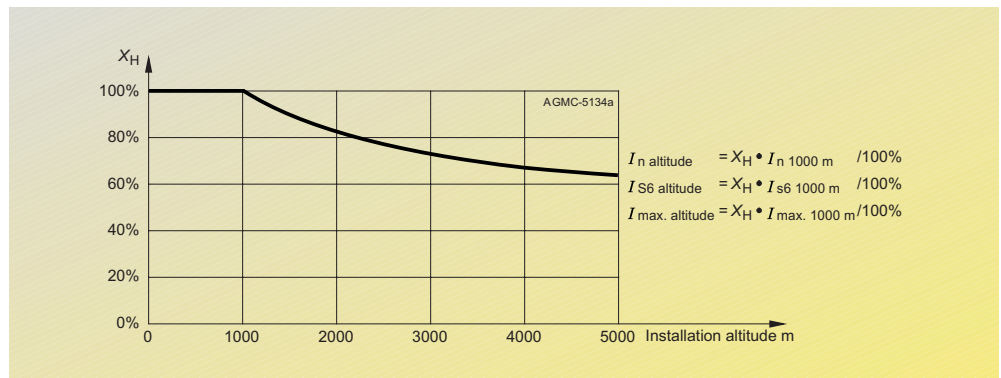
Current reduction as a function of the installation altitude

All of the specified load currents are valid up to an installation altitude of 1000 m. For installation altitudes > 1000 m, the load currents must be de-rated according to the diagram below.

Important:

The currents I_n , I_{S6} and I_{max} must be reduced in the same way.

$$\begin{aligned} \rightarrow I_{n \text{ altitude}} &= X_H \cdot I_{n 1000 m}/100\% \\ \rightarrow I_{S6 \text{ altitude}} &= X_H \cdot I_{S6 1000 m}/100\% \\ \rightarrow I_{max \text{ altitude}} &= X_H \cdot I_{max 1000 m}/100\% \end{aligned}$$



Further detailed information:

- Selection and ordering data in Part 3.

Example:

50 A power module: selected inverter clock frequency 6.3 kHz; installation altitude 2000 m.

$$X = 100\% - \frac{(100\% - 40\%) \cdot (6.3 \text{ kHz} - 3.2 \text{ kHz})}{8 \text{ kHz} - 3.2 \text{ kHz}} = 61.25\%; X_H = 83\%$$

$$\rightarrow I_{n 6.3 \text{ kHz}, 2000 \text{ m}} = (X \cdot I_{n10}/100\%) \cdot X_H/100\% = 12 \text{ A}$$

$$\rightarrow I_{S6 6.3 \text{ kHz}, 2000 \text{ m}} = (X \cdot I_{S610}/100\%) \cdot X_H/100\% = 16 \text{ A}$$

$$\rightarrow I_{max 6.3 \text{ kHz}, 2000 \text{ m}} = (X \cdot I_{max10}/100\%) \cdot X_H/100\% = 16 \text{ A}$$

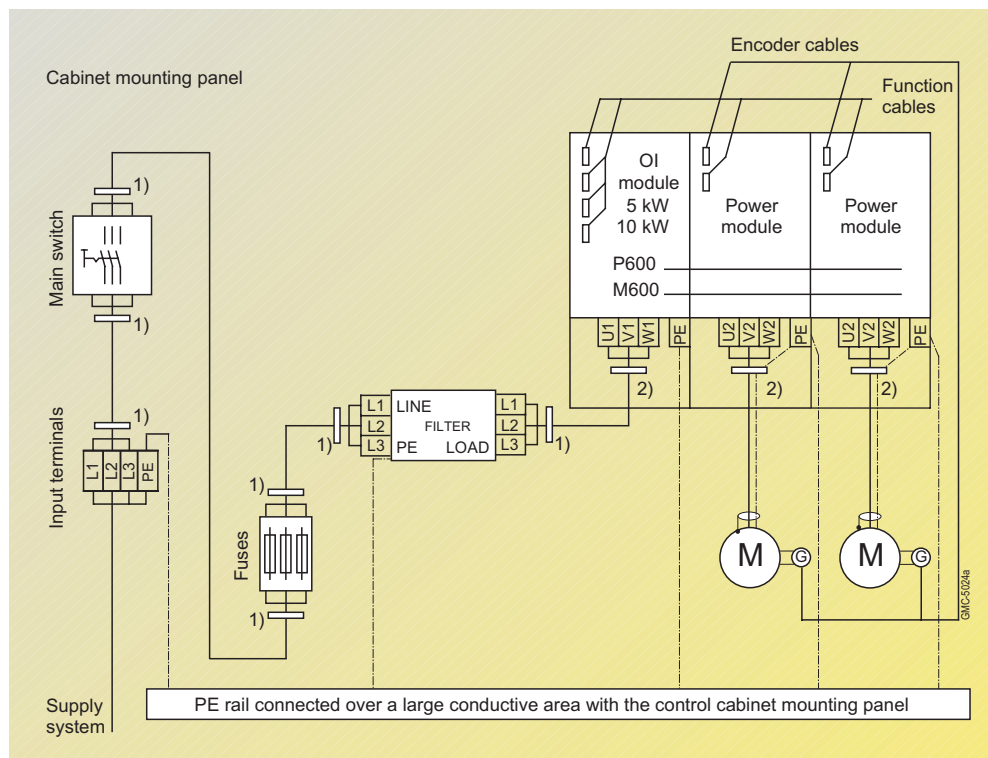
Permissible currents of the SIMODRIVE power modules for induction motors and drive applications (various S6 load duty cycles, defined for example as S6-25 % → 2.5 min/7.5 min).

SIMODRIVE 611 universal and POSMO

Planning guide

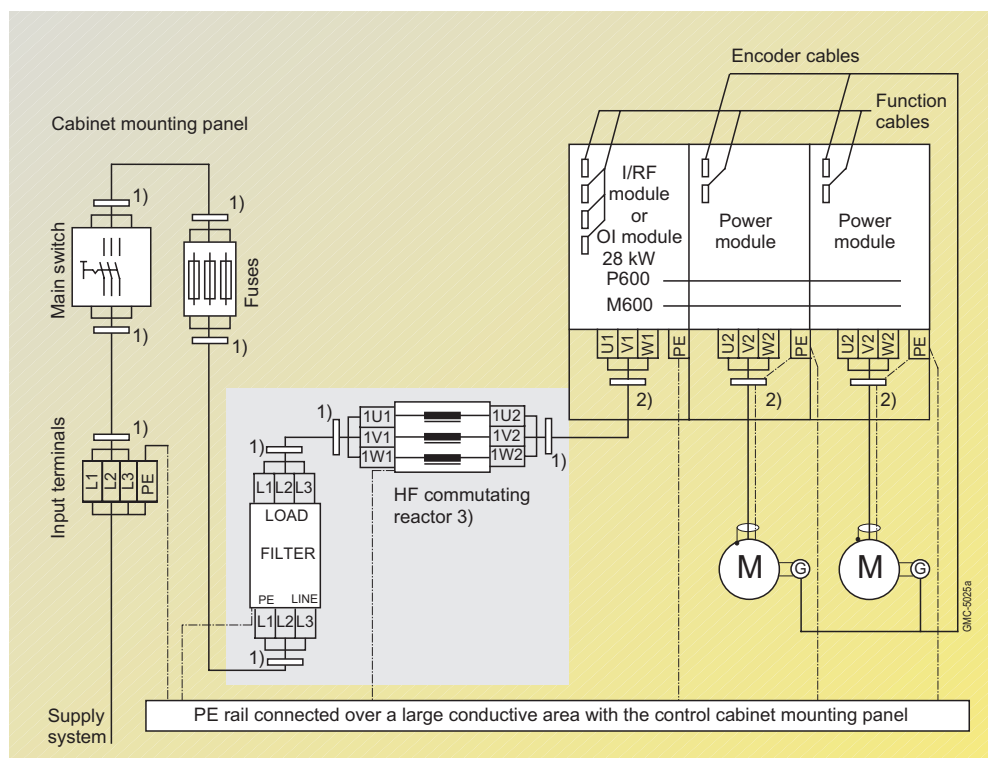
SIMODRIVE converter system Wiring configuration overview

OI modules with mains filter



Connection diagram for mains filters for 5 kW to 10 kW OI modules.

28 kW OI module and I/RF modules with mains filters



Connection diagram for mains filters for 16 kW to 120 kW I/RF modules. The connection diagram is also valid for OI 28 kW.

- 1) Shield connection, connected to the cabinet mounting unit over the largest possible surface area.
- 2) Shield connection to the module-specific connection plate.

- 3) For the permissible commutating reactors for I/RF module with sinusoidal operation, see Part 3. For permissible commutating reactor for 28 kW OI module, see Part 3.

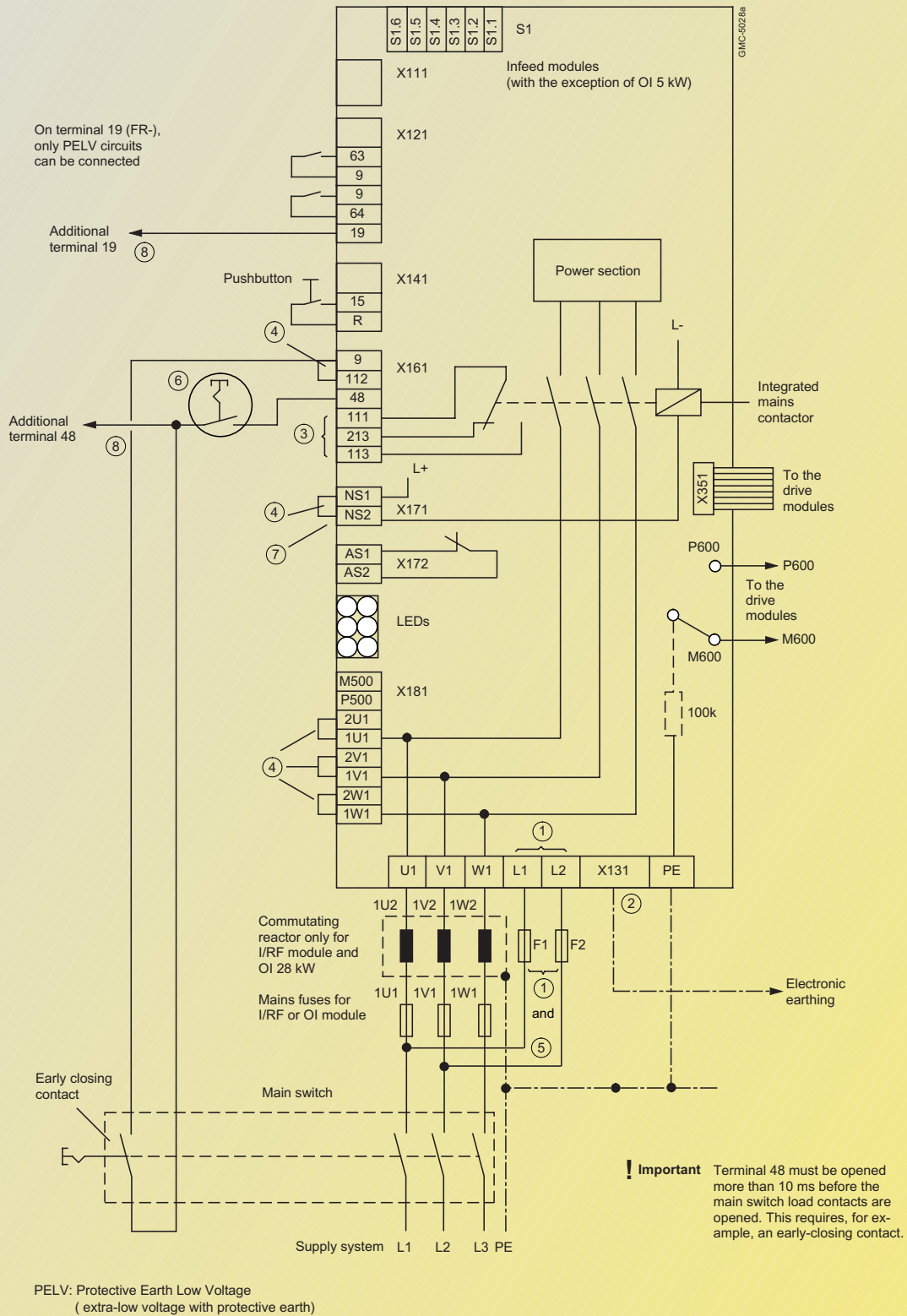
When routing cables in the cabinet, a clearance of > 100 mm must be maintained around the HF reactor.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system
Wiring configuration overview

Infeed module - Standard circuit connections



Legend on Page 6/34.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system Wiring configuration overview

Infeed module - Standard circuit connections (continued)

Legend for Figure on Page 6/33

- ① Terminals L1, L2 are only available for the 80/104 kW and 120/156 kW I/RF modules.

In this case, the rated fuse current $I_{n, \text{fuse}}$ must be $\geq 4 \text{ A}$, Version: gL

- ② For coupling to a numerical control, X131 must be connected with the NC reference potential. This cable is routed in parallel to the speed set-point cable.

- ③ Signaling contact of the internal line contactor

Terminals 111/113:
NO contact

Terminals 111/213:
NC contact

Terminals 111/213:
Positively driven to the load contacts, see Infeed Modules (MS).

- ④ Jumpers inserted in the equipment when supplied.

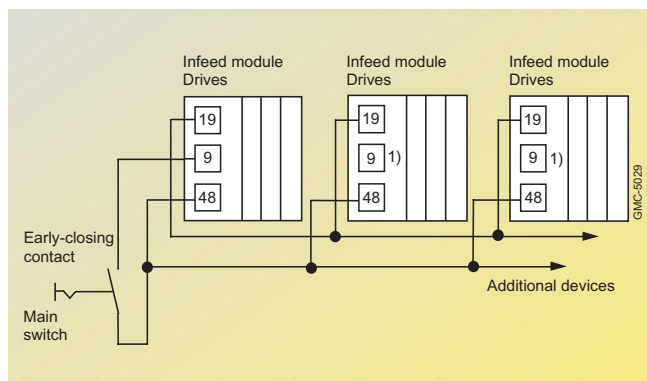
Caution

- ⑤ With the 80/104 kW or 120/156 kW I/RF modules, if the mains voltage on terminals L1 and L2 fails or fuses F1 and F2 trip, the pulses of the I/RF module are inhibited and the integral mains contactor opens. This is indicated by the supply failure LED, the Ready relay and via the signaling contacts of the contactor. In this case, before the built-in mains contactor is re-installed, terminal 48 must be disconnected from the supply and reconnected after $\geq 1 \text{ s}$ or the complete drive must be switched off and on again.

- ⑥ When an 80/104 kW module or a 120/156 kW I/RF module is used, the jumper connected between terminals 9 and 48 must be removed and (due to Point 5 above), a switch must be used. The switch is not necessary when the drive converter is switched off and on again via the main switch (power switch).

- ⑦ Max. cable length for 1.5 mm^2 cross-section: 50 m (2-conductor cable). This should be linearly decreased for lower cross-sections.

- ⑧ A maximum of 6 x 48 terminals may be connected in parallel to shut down up to 6 infeed (MS) modules using a leading contact of the main switch. Max. cable length for 1.5 mm^2 cross-section: 150 m (2-conductor cable). This should be linearly decreased for lower cross-sections.



Connection diagram

If more than 6 infeed (MS) modules are to be connected to a main switch, then an external 24 V supply must be provided. Current input at Terminal 48 = 35 mA; the minimum input voltage of Terminal 48 must be observed (13 V). Additional loads connected to the external 24 V power supply must be provided with an overvoltage limiting circuit (e.g. free-wheeling diode).

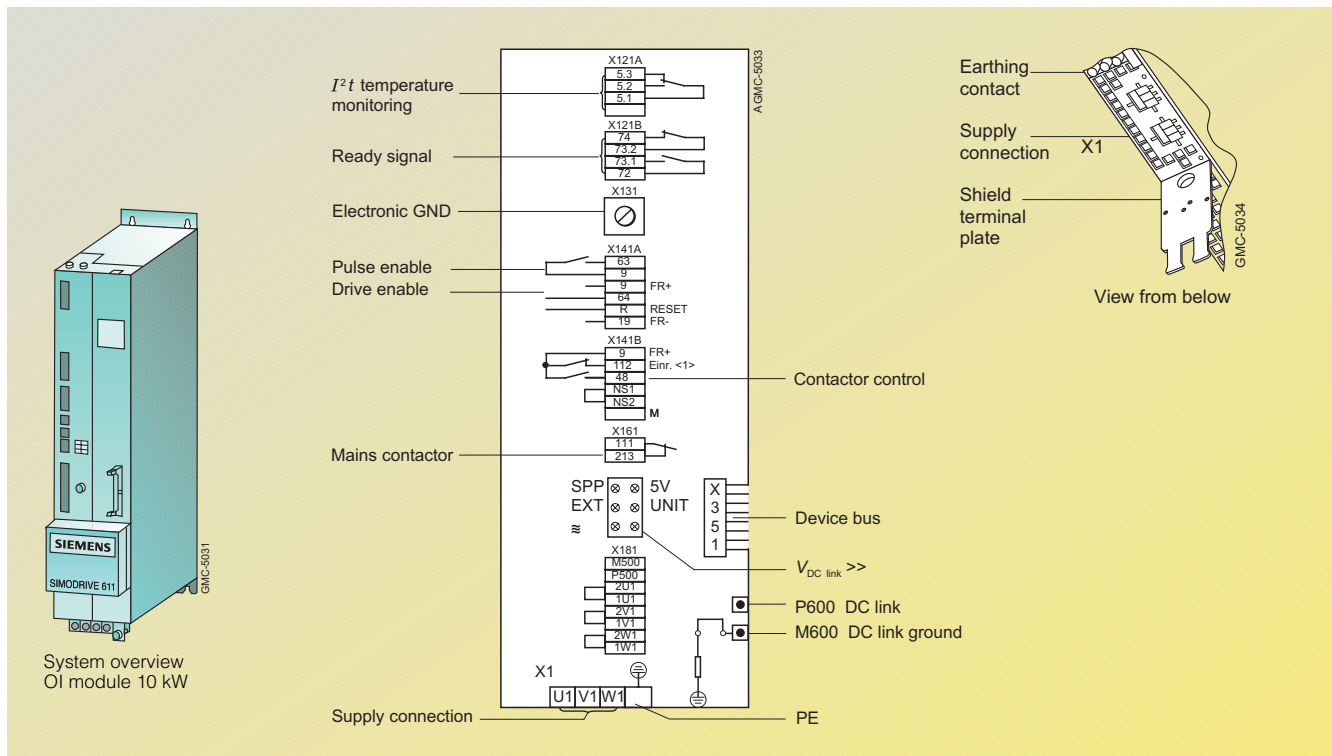
1) Terminal 9 is not permitted to be connected to terminal 48.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system
Unit design, power terminals and control terminals

OI module 5/10 kW



Termin. No.	Designation	Function	Type ¹⁾	Typ. voltage limit values	Max. cross-section ⁶⁾
U1 V1 W1	X1	Supply connection	I	3 AC 480 V	4 mm ² finely-stranded without connector sleeve, 6 mm ² with cable lug
GND (PE)	-	Protective conductor	I	0 V	M5 thread
	X131	Electronics GND	I	0 V	M4 thread
	X351	Device bus	I/O	Various	34-core ribbon cable
		Grounding bar ³⁾	I/O	-300 V	Busbar
P600 M600		DC link	I/O	+300 V -300 V	Busbar
M500	X181	DC link power supply	I	-300 V	1.5 mm ²
P500	X181	DC link power supply	I	+300 V	1.5 mm ²
1U1	X181	Output L1	O	3 AC 400 V	1.5 mm ²
2U1	X181	Input L1	I	3 AC 400 V	1.5 mm ²
1V1	X181	Output L2	O	3 AC 400 V	1.5 mm ²
2V1	X181	Input L2	I	3 AC 400 V	1.5 mm ²
1W1	X181	Output L3	O	3 AC 400 V	1.5 mm ²
2W1	X181	Input L3	I	3 AC 400 V	1.5 mm ²
5.3	X121A	Relay contact Group signal I^2t /Motor temp.	NC	DC 50 V/0.5 A/12 VA max DC 5 V/3 mA min	1.5 mm ²
5.2	X121A		NO		1.5 mm ²
5.1	X121A		I		1.5 mm ²
nc	X121A		I		1.5 mm ²
74	X121B	Relay signal Ready/Fault	NC	1 AC 250 V/DC 50 V/2 A max DC 5 V/3 mA min	1.5 mm ²
73.2	X121B		I		1.5 mm ²
73.1	X121B		I		1.5 mm ²
72	X121B		NO		1.5 mm ²
63 ²⁾	X141A	Pulse enable	I	+13 V...30 V/ $R_E = 1.5 \text{ k}\Omega$	1.5 mm ²
9 ²⁾ 4)	X141A	FR+	O	+24 V	1.5 mm ²
9 ²⁾ 4)	X141A	FR+	O	+24 V	1.5 mm ²
64 ²⁾	X141A	Drive enable	I	+13 V...30 V/ $R_E = 1.5 \text{ k}\Omega$	1.5 mm ²
R ⁵⁾	X141A	RESET	I	Terminal 19/ $R_E = 10 \text{ k}\Omega$	1.5 mm ²
19	X141A	FR-, reference ground enable voltage	O		1.5 mm ²
111	X161	Signaling contact Mains contactor	I	1 AC 250 V/DC 50 V/2 A DC 17 V/3 mA min	1.5 mm ²
213	X161		NC		1.5 mm ²
9 ²⁾ 4)	X141B	FR+	O	+24 V	1.5 mm ²
112	X141B	Setting-up/standard mode	I	+13 V...30 V/ $R_E = 1.5 \text{ k}\Omega$	1.5 mm ²
48	X141B	Contactor control	I	+13 V...30 V/ $R_E = 1.5 \text{ k}\Omega$	1.5 mm ²
NS1	X141B	Coil contact for mains, pre-charging contactor	O	+24 V	1.5 mm ²
NS2	X141B		I		1.5 mm ²
15	X141B		O		1.5 mm ²

Note:

For the 5 kW OI module, the DC link is pre-charged through two phases. If a DC link voltage is not established, in spite of the fact that all of the enable signals are present (there is no ready signal), it must be checked that all of the three phases are connected to terminals U1, V1, W1. Important: Terminals 7, 45, 44 and 10 are not available for the 5/10 kW OI module.

1) I = Input; O = Output;
NC = NC contact; NO = NO contact

2) Terminal 19 is the reference terminal (connected in the module via 10 k Ω to general reference ground X131). It is not permitted to connect Terminal 15 with PE or with Terminal 19, furthermore, no external voltage sources may be connected to Terminal 15. Terminal 19 may be connected to X131.

The terminal may only be used to enable the associated drive system.

3) The grounding bar is used to ground the DC link GND rail through 100 k Ω (it is recommended that this is inserted; if a high voltage test is to be performed in the system, the grounding bar should be opened).

4) Max. current load of Terminal 9 to 19 $\leq 1 \text{ A}$. Important: Terminals 7, 45, 44 and 10 are not available for the 5/10 kW OI module.

5) RESET = Resets the fault memory, edge triggered for the complete drive system (terminal "R" $\rightarrow$ Terminal 19 = RESET).

6) For UL certification: only use copper cables which are designed for an operating temperature of $\geq 60 \text{ }^\circ\text{C}$.

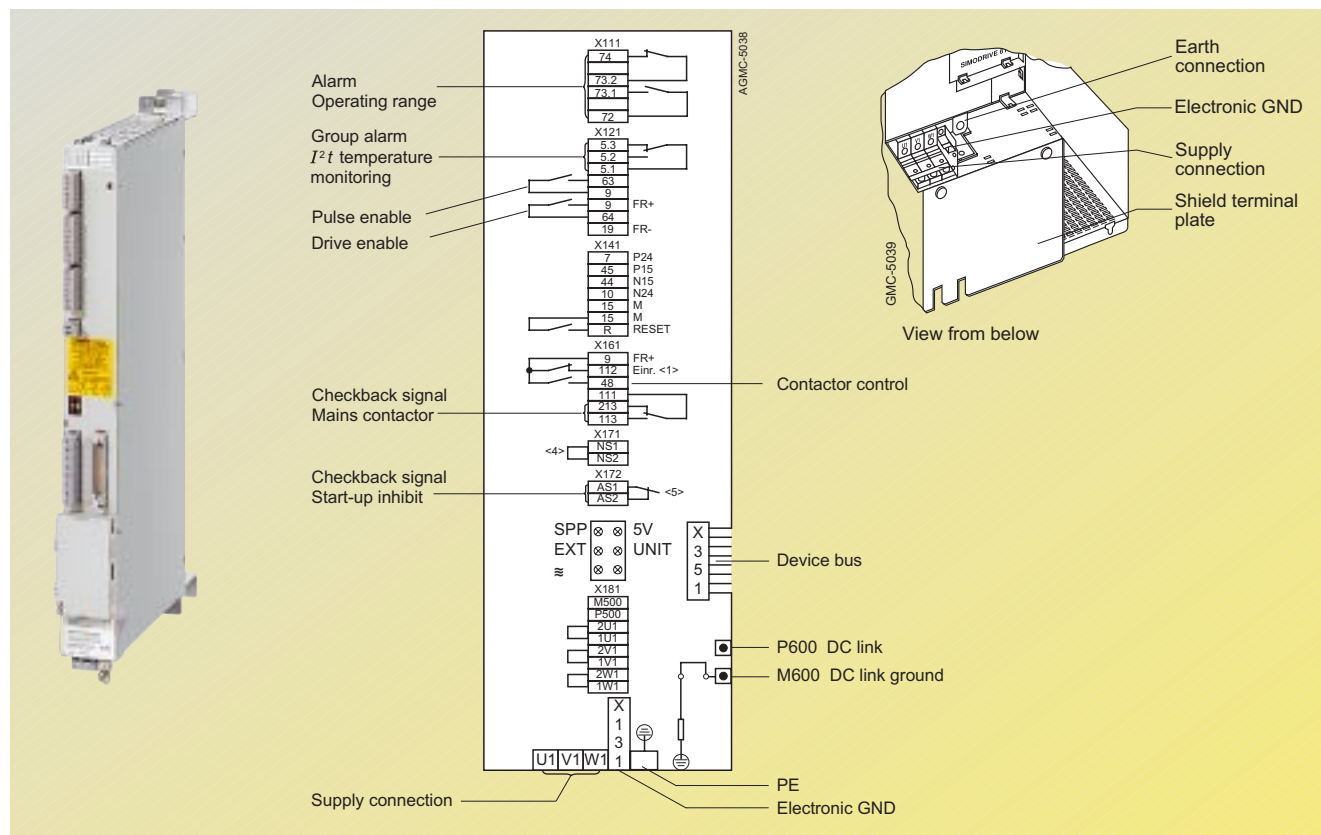
6

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system
Unit design, power terminals and control terminals

Infeed modules (OI and I/RF) except for OI 5/10 kW and monitoring module

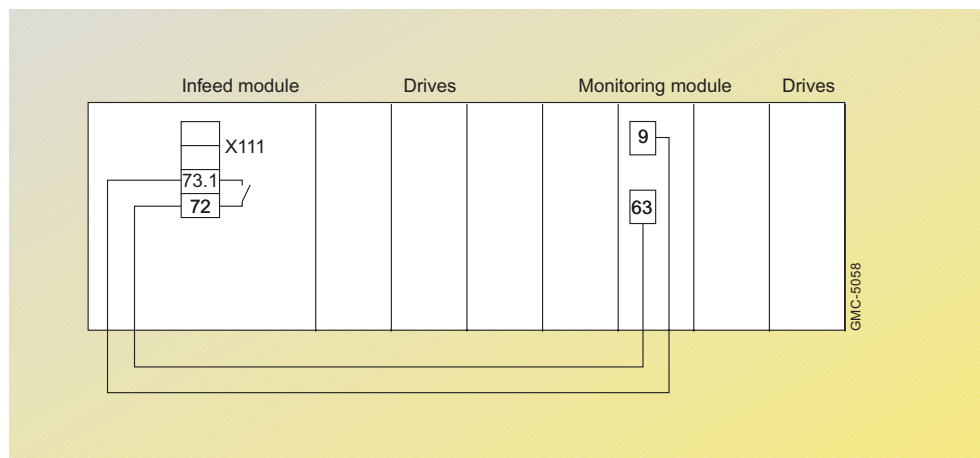


The monitoring module contains a complete electronics power supply and the central monitoring functions for a self-contained drive group. The power supply can be taken from either the 400 V to 480 V 3-phase AC supply or from the DC link voltage.

The monitoring module must be installed when a large number of drive modules in a drive group require more electronic power than the infeed module can supply.

The monitoring module allows drive modules located in several different cabinet panels or tiers to be formed into groups.

6



Connection diagram

If a monitoring module is integrated into the system, terminal 63 on the monitoring module must be connected via the Ready relay, terminals 72 to 73.1 (NO contact) of the mains supply module.

The Ready relay of the mains supply module must be set to Ready (S1.2 OFF position).

Depending on the requirements of the application with regard to the coastdown of axis groups, delayed or immediate switching off is necessary. For further details, see the Planning Guide for the SIMODRIVE 611 converter.

It is important to ensure that the axes downstream of the monitoring module can only traverse after the checkback signal "Precharging completed" has been output.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system
Unit design, power terminals and control terminals

Terminal No.	Designation	Function	Type ¹⁾	Typ. voltage limit values	Max. cross-section ²⁾	Terminals available in ³⁾
U1 V1 W1		Supply connection	I	3 AC 400 V 3 AC 415 V 3 AC 480 V	see Part 3	I/RF, OI
L1 L2		Contactor supply	I	2 AC 400 V, direct. from the supply L1, L2, L3	16 mm ² /10 mm ² 4) 16 mm ² /10 mm ² 4)	I/RF 80/104 kW, 120/156 kW
PE P600 M600		Protective conductor DC link DC link	I I/O I/O	0 V +300 V -300 V	Bolt Busbar Busbar	I/RF, OI, mon.
		Grounding bar ⁵⁾	I/O	-300 V	Busbar	I/RF, OI
P600 M600		DC link DC link	I/O I/O	+300 V -300 V	16 mm ² /10 mm ² 4) 16 mm ² /10 mm ² 4)	Monitor
1R, 2R, 3R	TR1, TR2 ⁷⁾	External resistance connection	I/O	300 V	6 mm ² /4 mm ² 4)	OI 28 kW
	X131	Electronics M	I/O	0 V	16 mm ² /10 mm ² 4)	I/RF, OI, mon.
	X151	Device bus	I/O	Various	Ribbon cable	I/RF, OI, mon.
M500	X181	DC link power supply	I	DC -300 V	1.5 mm ²	I/RF, OI, mon.
P500	X181	DC link power supply	I	DC +300 V	1.5 mm ²	
1U1	X181	Output L1	O	3 AC 400 V	1.5 mm ²	
2U1	X181	Input L1	I	3 AC 400 V	1.5 mm ²	
1V1	X181	Output L2	O	3 AC 400 V	1.5 mm ²	
2V1	X181	Input L2	I	3 AC 400 V	1.5 mm ²	
1W1	X181	Output L3	O	3 AC 400 V	1.5 mm ²	
2W1	X181	Input L3	I	3 AC 400 V	1.5 mm ²	
7	X141	P24	O	+20.4 to 28.8 V/50 mA	1.5 mm ²	I/RF, OI, mon.
45	X141	P15	O	+15 V/10 mA	1.5 mm ²	
44	X141	N15	O	-15 V/10 mA	1.5 mm ²	
10	X141	N24	O	-20.4 to 28.8 V/50 mA	1.5 mm ²	
15 ⁸⁾	X141	M	O	0 V	1.5 mm ²	
R ⁹⁾	X141	RESET	I	Term. 15/R _E = 10 kΩ	1.5 mm ²	
5.3	X121	Relay contact	NC	DC 50 V/0.5 A/12 VA max	1.5 mm ²	I/RF, OI, mon.
5.2	X121	Group signal	NO	DC 5 V/3 mA min	1.5 mm ²	
5.1	X121	I ² t/Motor temp.	I		1.5 mm ²	
63 ⁸⁾	X121	Pulse enable	I	+13 V to 30 V/R _E = 1.5 kΩ	1.5 mm ²	
9 ⁸⁾ 10)	X121	Enable voltage	O	+24 V	1.5 mm ²	
9 ⁸⁾ 10)	X121	Enable voltage	O	+24 V	1.5 mm ²	
64 ⁸⁾	X121	Drive enable	I	+13 V to 30 V/R _E = 1.5 kΩ	1.5 mm ²	
19	X121	Enable voltage, reference potential	I	0 V	1.5 mm ²	
74 nc	X111 X111	Relay contact	NC		1.5 mm ²	I/RF, OI, mon.
73.2	X111	signal	I	1 AC 250 V/DC 50 V/2 A max	1.5 mm ²	
73.1	X111	Ready to brake	I	DC 5 V/3 mA min	1.5 mm ²	
nc	X111				1.5 mm ²	
72	X111		NO		1.5 mm ²	
9 ⁸⁾ 10)	X161	Enable voltage	O	+24 V	1.5 mm ²	I/RF, OI, mon.
112 ⁸⁾	X161	Set-up mode/standard mode	I	+21 V to 30 V/R _E = 1.5 kΩ	1.5 mm ²	
48 ⁸⁾	X161	Contactor control	I	+13 V to 30 V/R _E = 1.5 kΩ	1.5 mm ²	I/RF, OI
111 ¹¹⁾	X161	Signaling contact	I	+30 V/1 A (111-113)	1.5 mm ²	
213 ¹¹⁾	X161	contact	NC	1 AC 250 V/DC 50 V/ 2 A max	1.5 mm ²	
113 ¹¹⁾	X161	Mains contactor	NO	DC 17 V/3 mA min	1.5 mm ²	
AS1	X172	Signaling contact	I	AC 250 V/1 A/DC 50 V/ 2 A max	1.5 mm ²	I/RF
AS2	X172	Start inhibit (Terminal 112)	NC	DC 5 V/10 mA min	1.5 mm ²	
NS1	X171	Coil contact for line and pre-charging	O	+24 V	1.5 mm ²	I/RF, OI
NS2	X171	contactor	I		1.5 mm ²	

1) I = Input; O = Output; NC = NC contact;
NO = NO contact; (for signal NO = High;
NC = Low).

2) For UL certification: only use copper cables
which are designed for an operating temperature
of $\geq 60^\circ\text{C}$.

3) I/RF = Infeed/regenerative feedback module;
OI = Open-loop infeed;
mon. = Monitoring module

4) The 1st number is valid for cable lugs. The
2nd number is valid for finely-stranded conduc-
tors without connector sleeve.

5) The grounding bar is used to ground the DC link
GND rail through 100 kΩ (it is recommended

that this is inserted; if a high voltage test is to be
performed in the system, the grounding bar
should be opened).

6) Max. permissible connected load $P_{\text{max}} \leq 43 \text{ kW}$,
max. permissible current load $I_{\text{max}} \leq 72 \text{ A}$.

7) For 28 kW OI module only.

8) Terminal 19 is the reference ground (connected
inside the module with 10 kΩ to the general refer-
ence ground X131/terminal 15). Terminal 15 must
not be connected to PE or to terminal 19, also no
external voltage sources should be connected to
terminal 15. Terminal 19 may be connected to
X131. The terminal may only be used to enable
the associated drive group.

9) RESET = Resets the fault memory, edge trig-
gered for the complete drive group (terminal "R"
→ Terminal 15 = RESET).

10) Maximum current load of terminal 9 with
respect to terminal 19: 0.5 A.

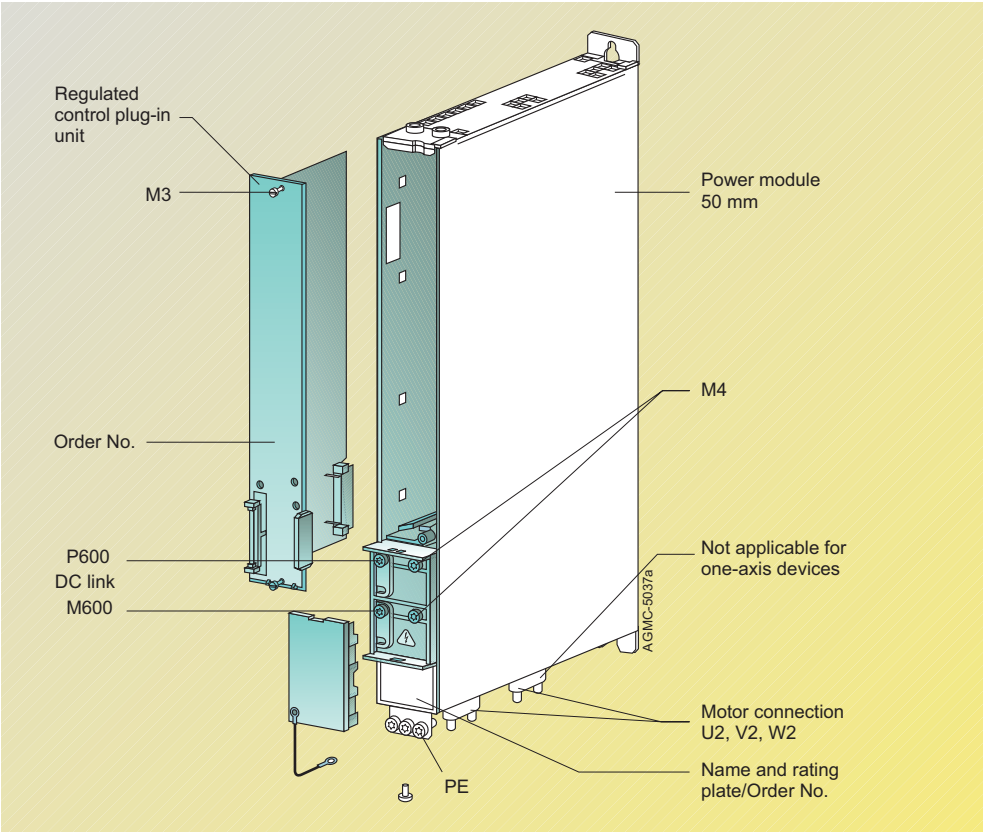
11) Terminals 111 to 213, positively-driven NC con-
tact (for I/RF 16 kW and OI 10 kW only from
Order No. 6SN11 4□-1□□01-0□□□).
Terminals 111 to 113 NO contacts, not posi-
tively driven.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system
Unit design, power terminals and control terminals

Power module (single-axis and two-axis)



50 mm power module

Terminal No.	Designation	Function	Type 1)	Typ. voltage/limit values	Mounting
Single-axis version					
U2 V2 W2	A1	Motor connection	A	3 AC 600 V	Max. cross-section see Part 3
PE	⊕	Protective conductor Protective conductor	I I	0 V 0 V	2 screws
P600 M600		DC link DC link	I/O I/O	+300 V -300 V	Busbar Busbar
Two-axis version					
U2 V2 W2	A1	Motor connection for axis 1	A	3 AC 600 V	Max. cross-section see Part 3
U2 V2 W2	A2	Motor connection for axis 2	A	3 AC 600 V	Max. cross-section see Part 3
PE (GND)		Protective conductor Protective conductor	I I	0 V 0 V	3 screws
P600 M600		DC link DC link	I/O I/O	+ 300 V - 300 V	Busbar Busbar

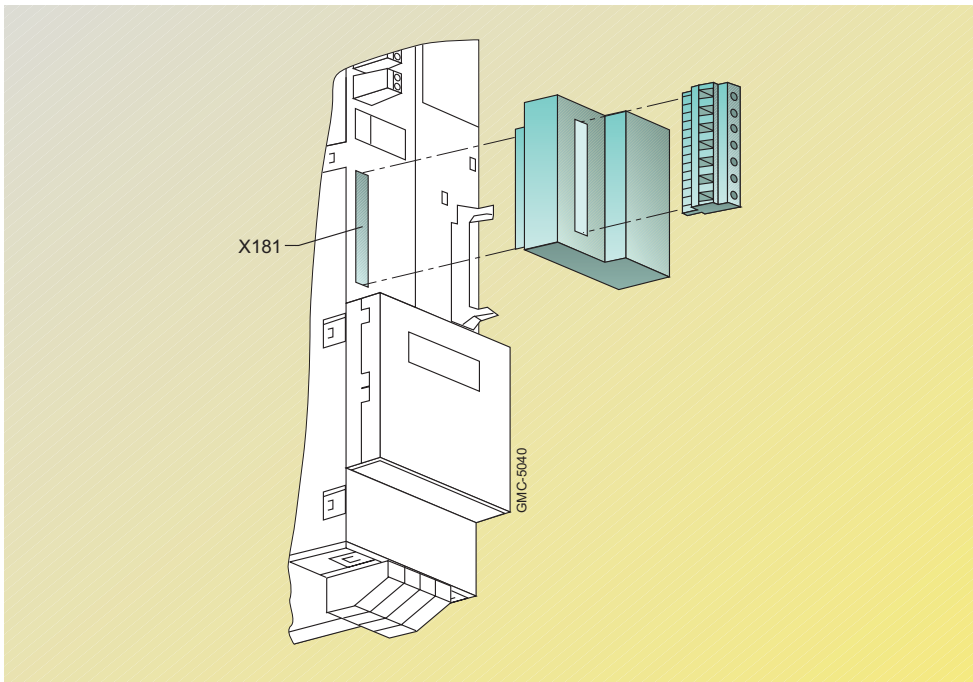
1) O = Output; I = Input

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE converter system
Unit design, power terminals and control terminals

SIMODRIVE 611 overvoltage limiter module (surge arrester)



Overvoltage limiter module

The overvoltage limiter module limits the overvoltages that occur, for example, as the result of switching operations on inductive loads and on network matching transformers to values acceptable for the infeed modules above 10 kW (width 100 mm). It is inserted at interface X181.

The overvoltage limiter module is used for upstream transformers or networks that do not meet IEC requirements. For UL compliance of the mains infeed module, the overvoltage limiter module must be used.

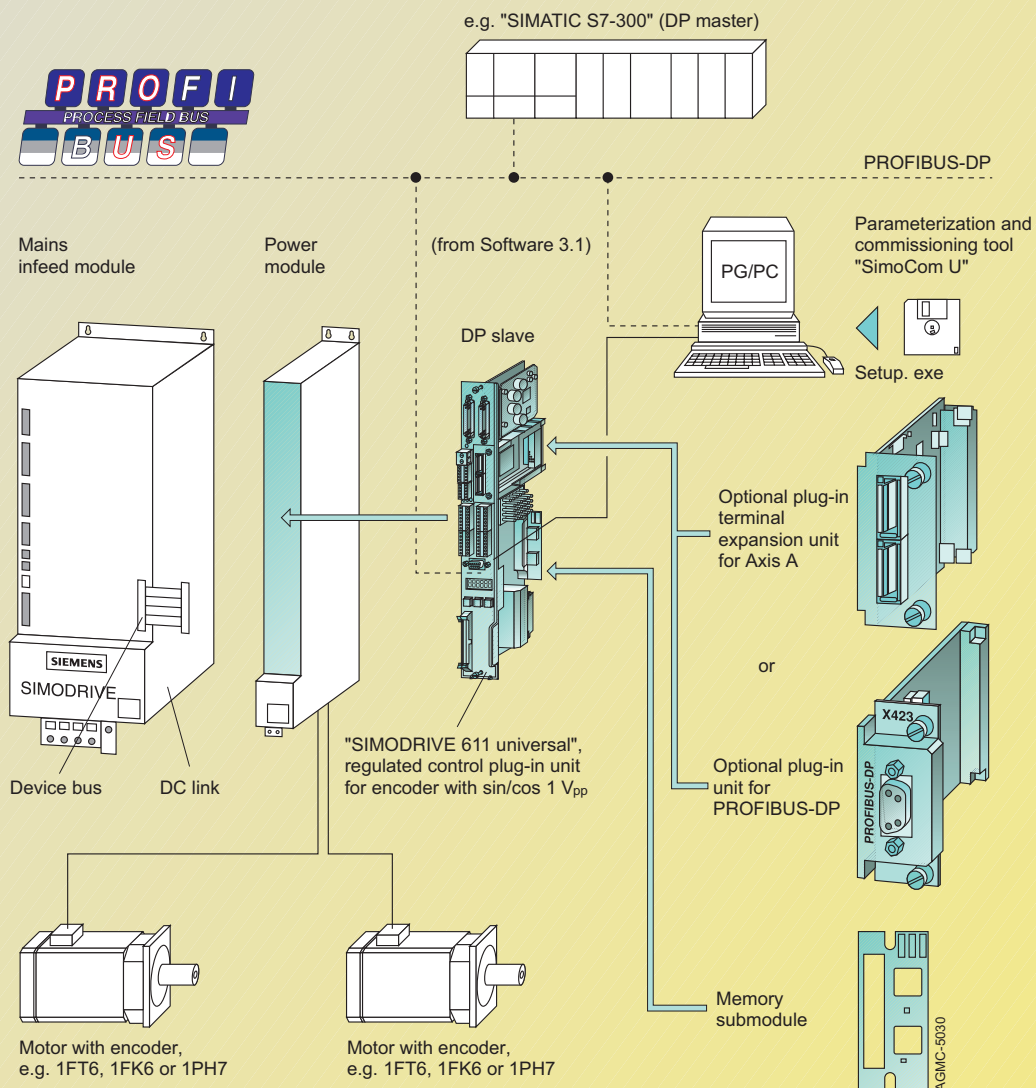
An appropriate protective circuit is integrated as standard in the 5 kW OI module.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE 611 universal
Unit design, power terminals and control terminals

System overview



System overview

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE 611 universal Unit design, power terminals and control terminals

SIMODRIVE 611 universal regulated control plug-in unit with analog setpoint interface or PROFIBUS-DP



SIMODRIVE 611 universal

SIMODRIVE 611 universal is a regulated control plug-in unit with analog speed setpoint interface and optional PROFIBUS-DP interface with or without positioning functions with motor frequencies up to 1400 Hz for:

- 1FT6, 1FK6 synchronous motors
- 1FN linear motors
- 1PH, 1LA induction motors with/without encoder

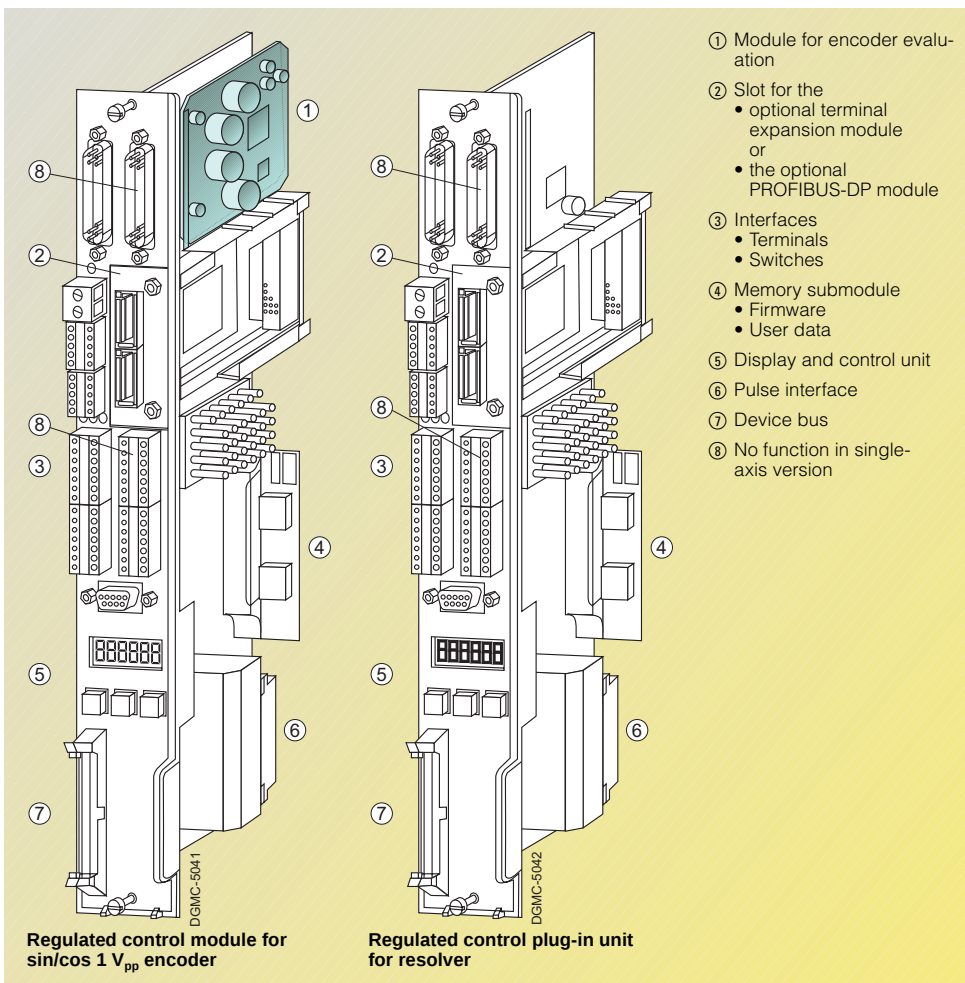
Both single-axis and two-axis regulated control plug-in units can be ordered with options. The two-axis versions can also be used in the single-axis power modules.

The following encoder evaluations are available for various regulated control plug-in units:

- Resolver
1 to 6 pairs of poles; up to 375 Hz operating frequency, internal pulse multiplication factor 4096 x No. of pole pairs
- Incremental encoder with sin/cos
1 V_{pp} signals, 0 to 65535 signals/revolution, max. 350 kHz, internal pulse multiplication factor 128 x signals/revolution
- Absolute encoder with EnDat interface, same as sin/cos
1 V_{pp} plus EnDat evaluation for position signal.

Variants: for regulated control plug-in units and options, see Ordering Data.

The drive can be commissioned either by means of a 7-segment display and keyboard on the front of the module or by means of the SimoCom U installation tool that executes on a PC under Windows NT/95/98.



Functions (for each axis, selection)

- 2 analog inputs/outputs
± 10 V
- 4 digital inputs/outputs, freely parameterizable
- Incremental shaft-angle encoder interface WSG, selectable:
 - Output:
Incremental simulation of the motor encoder by means of differential quadrant signals A, B, R acc. to RS 485, RS 422 (TTL).
For sin/cos 1 V_{pp} encoder:
Pulses 1:1
For resolver:
1024 pulses/pole pair
No. of pulses can be divided with resolver and absolute encoder with EnDat: 1:1, 1:2, 1:4, 1:8
- Input:
Incremental step setpoint X_{set} quadrant signals, Tracks A, B up to 2.5 MHz plus/direction signal up to 5 MHz forwards/backwards signal; up to 5 MHz

(continued on Page 6/42)

Regulated control plug-in unit for two-axis version

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE 611 universal Unit design, power terminals and control terminals

SIMODRIVE 611 universal regulated control plug-in unit with analog setpoint interface or PROFIBUS-DP (continued)

- For two-axis module, a direct, second measuring system for axis A can be connected via axis B (the module can then only be operated as a single-axis module).
 - Resolver, any No. of pole pairs
 - Incremental encoder $\sin/\cos 1 V_{pp}$, 0 to 8388607 pulses.
- Absolute encoder with EnDat interface
- RS 232/RS 485 interface (TTL) for connecting a PC/PG for commissioning using the SimoComU tool
- Four motor data blocks can be stored per axis, star/delta changeover possible
- Positioning absolute, relative, rotary axis, external block change, jerk limitation; block relaying with: CONTINUE WITH ON-THE-FLY, CONTINUE WITH STOP, GO TO, END, LIMIT STOP, LINKING.
- 64 data blocks per axis can be stored as parameters. They can be called up and edited by means of the Motion Control with PROFIBUS-DP option. The blocks of this axis can also be called up via the terminal expansion option for Axis A.

Start inhibit in the drive modules

Important

The functions "Safe standstill" and "Setup mode" are not safety functions in the context of Machinery Directive 89/392/EEC. They simply support the measures that must be implemented by the customer.

Using the start inhibit

The "start inhibit" function is provided in the SIMODRIVE 611 drive modules.

The start inhibit function prevents a synchronous or induction motor drive unexpectedly starting from standstill.

Electrical isolation is not provided by the start inhibit function and it does not provide protection against "electric shock".

The complete machine must always be electrically isolated from the supply system through the main switch if any work is to be carried out on the machine or system, such as maintenance, servicing or cleaning work (EN 60 204/5.3).

As a result of a hazard analysis/risk analysis which must be executed according to the Machinery Directive 89/392/EEC or EN 292; pr EN 954; and pr EN 1050, machine manufacturers must configure the safety circuit for the complete machine taking into account all of the integrated components for their machine types and versions of them. This also includes the electric drives.

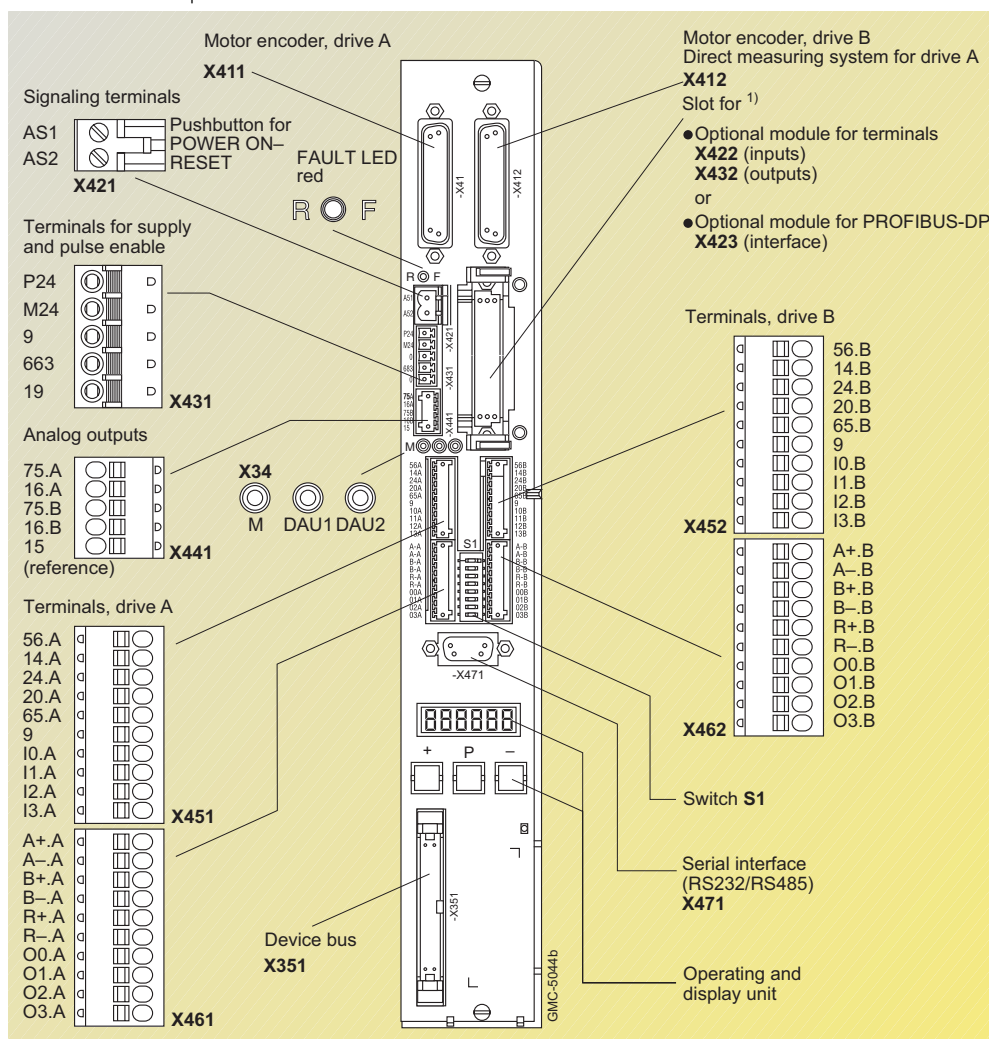
SIMODRIVE 611 universal regulated control plug-in unit

Control terminal strip

The control terminal strip is located on the front of the regulated control plug-in unit.

All the necessary functions for operating and monitoring SIMODRIVE 611 universal drives are accessible via the control terminal strip.

- Control commands, e.g. enable signals, ON/OFF, operating status, block selection, setpoint selection, duty types.
- Analog setpoint inputs, e.g. speed setpoint, torque setpoint
- Analog outputs of internally calculated quantities, e.g. motor current, speed, motor voltage, frequency
- Status messages, e.g. run, fault



Regulated control plug-in unit

1) Blanking cover removed, no optional board inserted.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE 611 universal Unit design, power terminals and control terminals

SIMODRIVE 611 universal regulated control plug-in units (continued)

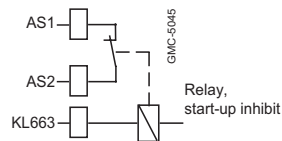
Board-specific terminals and interfaces

The board-specific terminals and interfaces are available for drive A and B.

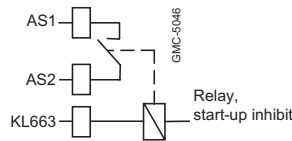
Terminal No.	Designation	Function	Type ¹⁾	Technical data
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Signaling terminal, start inhibit (X421)

AS1	X421	Signaling contact Start inhibit	NC	Connector type: 2-pin connector Max. conductor cross-section: 2.5 mm ²
AS2	X421	Checkback signal from terminal 663	NC	Contact: NC, floating Contact load: at 250 V AC max. 1 A at 30 V DC max. 2 A



Pulses not enabled (T663)
The control pulses for the power transistors are inhibited.



Pulses enabled (T663)
The control pulses for the power transistors are enabled.

Terminals for supply and pulse enable (X431)

X431			Connector type: 5-pin connector Max. conductor cross-section: 1.5 mm ²
P24	X431.1	External power supply for digital outputs (+24 V)	V Voltage tolerance (including ripple): 10 V to 30 V
M24	X431.2	Reference for the external supply	V The external supply is required for the following digital outputs: • 8 outputs for drive-specific terminals (X461, O0.A - O3.A/X462, O0.B - O3.B) • 8 outputs of the optional TERMINAL module (X432.O4 - O11) When dimensioning the external power supply, the total current of all of the digital outputs must be taken into account. Maximum total current: • For the control board (all 8 outputs): 2.4 A • For the optional TERMINAL module (all 8 outputs): 480 mA
9	X431.3	Enable voltage (+24 V)	V Reference: Terminal 19 Max. current (for the complete group): 500 mA Note: The enable voltage (Terminal 9) can be used to provide the enable signals (e.g. pulse enable) as 24 V auxiliary voltage.
663	X431.4	Pulse enable (+24 V)	I Voltage tolerance (including ripple): 21 V to 30 V Current input, typical: 25 mA at 24 V Note: The pulse enable acts simultaneously on drive A and drive B. When the pulse enable is withdrawn, the drives coast down unbraked.
19	X431.5	Reference (reference potential for all digital inputs)	V Note: If the enable signals are to be controlled from an external voltage and not from Terminal 9, the reference potential (ground) of the external source must be connected to this terminal.

Device bus (X351)

-	X351	Device bus	I/O	Ribbon cable: 34-pole Voltages: Various Signals: Various
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Test sockets (X34)

DAU1	X34	Test socket 1 ²⁾	MA	Test socket: Ø 2 mm
DAU2	X34	Test socket 2 ²⁾	MA	Resolution: 8-bit
M	X34	Reference potential	MA	Voltage range: 0 V to 5 V Maximum current: 3 mA

1) I = Input; V = Supply;
I/O = Input/Output;
MA = Analog measuring signal;
NC = NC contact

2) Freely parameterizable

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE 611 universal Unit design, power terminals and control terminals

SIMODRIVE 611 universal regulated control plug-in units (continued)

Drive-specific terminals

The drive-specific terminals are available for both drive A and drive B.

Terminal		Function		Type	Technical data
Drive A	Drive B				
No.	Designation	No.	Designation		

Encoder connection (X411, X412)

–	X411	–	–	Motor encoder connection, Drive A	I	Literature: SIMODRIVE 611 Planning Guide, Section "Indirect and direct position sensing" Encoder limit frequencies: - Encoder with sin/cos 1 V_{pp} 350 kHz - Resolver 375 Hz
–	–	–	X412	Motor encoder connection, Drive B Direct measuring system for Drive A	I	

Pin assignment of X411/X412 for encoders with sin/cos 1 V_{pp}

Connector type: 25-pin male Sub-D connector
Cable: see Part 4

Pin	Signal name
1	P_Encoder
2	M_Encoder
3	A
4	*A
5	Internal shield
6	B
7	*B
8	Internal shield
9	Spare
10	EnDat_CLK
11	Spare
12	*EnDat_CLK
13	+Temp

Pin	Signal name
14	5 V Sense
15	EnDat_DAT
16	0 V Sense
17	R
18	*R
19	C
20	*C
21	D
22	*D
23	*EnDat_DAT
24	Internal shield
25	–Temp
–	–

Pin assignment of X411/X412 for resolver

Connector type: 25-pin male Sub-D connector
Cable: see Part 4

Pin	Signal name
1	Spare
2	M_Encoder
3	SIN_PLUS
4	SIN_MINUS
5	Internal shield
6	COS_PLUS
7	COS_MINUS
8	Internal shield
9	Erregung_Pos
10	Spare
11	Erregung_Neg
12	Spare
13	Temp+

Pin	Signal name
14	Spare
15	Spare
16	Spare
17	Spare
18	Spare
19	Spare
20	Spare
21	Spare
22	Spare
23	Spare
24	Internal shield
25	Temp–
–	–

1) I = Input

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE 611 universal
Unit design, power terminals and control terminals

Drive-specific terminals

The drive-specific terminals are available for both drive A and drive B.

Terminal	Drive A	Drive B	Function	Type ¹⁾	Technical data
No.	Designation	No.	Designation		

Analog outputs (X441)

75.A	X441.1	–	–	Analog output 1 ²⁾	AA	Connector type:	5-pin connector
16.A	X441.2	–	–	Analog output 2 ²⁾	AA	Wiring:	See ³⁾
–	–	75.B	X441.3	Analog output 1 ²⁾	AA	Max. conductor cross-section for stranded or solid conductor	
–	–	16.B	X441.4	Analog output 2 ²⁾	AA	Voltage range:	0.5 mm ²
15	X441.5	15	X441.5	Reference (electronics GND)	–	Max. current:	–10 to +10 V
						Resolution:	3 mA
						Update:	8-bit
							in speed controller cycle
						Short-circuit proof	

Terminals for analog inputs and digital inputs/outputs (X451, X452)

X451		X452				Connector type:	10-pin connector
						Max. conductor cross-section for finely stranded and solid conductors:	0.5 mm ²
56.A	X451.1	56.B	X452.1	Analog input 1	AE	Differential input	
14.A	X451.2	14.B	X452.2	Reference potential 1	AE	Voltage range (limit values):	–12.5 V to +12.5 V
24.A	X451.3	24.B	X452.3	Analog input 2	AE	Input resistance:	100 kΩ
20.A	X451.4	20.B	X452.4	Reference potential 2	AE	Resolution:	14 bits (sign + 13 bits)
						Wiring:	Cable with braided shield, attached at both ends
65.A	X451.5	65.B	X452.5	Servo enable, drive-specific	E	Current input, typical:	6 mA to 24 V
						Level (including ripple)	
						High signal:	15 V to 30 V
						Low signal:	–3 V to 5 V
						Electrical isolation:	Reference is Terminal 19/ Terminal M24
9	X451.6	9	X452.6	Enable voltage (+24 V)	V	Reference:	Terminal 19
						Max. current (for complete group):	500 mA
						Note:	
						The enable voltage (Terminal 9) can be used to provide the enable signals (e.g. control enable).	
10.A	X451.7	10.B	X452.7	Digital input 0 ²⁾	DE	Voltage:	24 V
				High-speed input ³⁾		Current input, typical:	6 mA to 24 V
				e.g. for equivalent zero mark, external block change (SW 3.1 and higher)		Level (including ripple)	
						High signal:	15 V to 30 V
						Low signal:	–3 V to 5 V
						Electrical isolation:	Reference is Terminal 19/Terminal M24
11.A	X451.8	11.B	X452.8	Digital input 1 ²⁾	DE	Note:	
12.A	X451.9	12.B	X452.9	Digital input 2 ²⁾	DE	• Parameterization of the input terminals as well as the defaults are described in the SIMODRIVE 611 universal Description of Functions	
13.A	X451.10	13.B	X452.10	Digital input 3 ²⁾	DE	• An open-circuit input is interpreted as a "0" signal	

1) AO = Analog output; I = Input;
DI = Digital input; AI = Analog input;
V = Power supply

2) Freely parameterizable. All digital inputs are debounced using software techniques. This results in a delay of 1 to 2 interpolation cycles in signal recognition (P1010).

3) I0.x is hard-wired internally to the position sensing circuit and acts almost immediately.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE 611 universal Unit design, power terminals and control terminals

SIMODRIVE 611 universal regulated control plug-in units (continued)

Drive-specific terminals

The drive-specific terminals are available for both drive A and drive B.

Terminal No.	Designation	Drive B No.	Designation	Function	Type ¹⁾	Technical data
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Drive-specific terminals (X461, X462)

X461		X462				Connector type:	10-pin connector
						Max. conductor cross-section for stranded or solid conductor:	0.5 mm ²
A+.A	X461.1	A+.B	X462.1	Signal A+	I/O	Incremental shaft-angle encoder interface (WSG)	
A-.A	X461.2	A-.B	X462.2	Signal O-	I/O		
B+.A	X461.3	B+.B	X462.3	Signal B+	I/O	Wiring:	
B-.A	X461.4	B-.B	X462.4	Signal B-	I/O		
R+.A	X461.5	R+.B	X462.5	Signal R+	E/A		
R-.A	X461.6	R-.B	X462.6	Signal R-	I/O		

Note:

Nodes can be connected that comply with the RS485/RS422 standard. The WSG interface can be parameterized as an input or as an output.

- Input (SW 3.3 and higher) To supply incremental position setpoints
- Output To output incremental actual position values

O0.A	X461.7	O0.B	X462.7	Digital output 0 ²⁾	DA	Rated current per output:	500 mA
O1.A	X461.8	O1.B	X462.8	Digital output 1 ²⁾	DA	Max. current per output:	600 mA
O2.A	X461.9	O2.B	X462.9	Digital output 2 ²⁾	DA	Summation current, max. (valid for these 8 outputs):	2.4 A
O3.A	X461.10	O3.B	X462.10	Digital output 3 ²⁾	DA	Voltage drop, typical:	250 mV at 500 mA

Short-circuit proof

Note:

Parameterization of the output terminals and the SIMODRIVE 611 defaults are described in the Description of Functions.

Example:

When all 8 outputs are controlled simultaneously, the following applies:

Σ Current = 240 mA

→ OK

Σ Current = 2.8 A

→ Not OK, because the summation current is greater than 2.4 A.

Note:

- The power switched via these outputs is supplied from terminals P24/M24 (X431). This must be taken into account when dimensioning the external supply.
- The digital outputs only "function" when an external supply is available (+24 V, terminal P24/M24).

Terminal No.	Designation	Function	Type ¹⁾	Technical data
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Serial interface (X471)

-	X471	Serial interface for "SimoCom U"	I/O	Connector type: female Sub-D connector, 9-pole
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Note:

- Online mode via the RS232/RS485 serial interface

Pin assignment for serial interface X471

Connector type: 9-pin D socket connector

Contact	Signal designation	Contact	Signal designation
1	RS485 DATA+	6	Spare
2	RS232 T x D	7	RS232 CTS
3	RS232 R x D	8	RS232 RTS
4	Spare	9	RS485 DATA-
5	GND, 0 V	-	-

Note:

- The serial interface can be declared as an RS232 or as an RS485 interface by setting parameters appropriately.
- If it is parameterized as an RS485 interface, a terminating resistor can be connected/disconnected via Switch S1 on the front panel.

1) DO = Digital output;
I/O = Input/output

2) Freely parameterizable. The digital outputs are updated in the interpolation clock cycle (P1010). A hardware delay time of approx 200 μ s is added.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE 611 universal
Power and signal cables

Power module (single-axis or two-axis)

Order No.		
6FX□ 002-5□□□□-1□□□	≤ 50 m	For power cable, see Part 4
		1FK6 motor 1FT6 motor
6FX7 002-5E□□□□-1□□□	≤ 50 m	For power cable, see Part 4
		Motor 1FN3 up to 3 m/s ² others available on request
6FX□ 008-...	≤ 50 m	For power cable, see Part 4
		1PH motor

Regulated control plug-in unit for resolver

Two-axis for resolver

Order No. Pre-assembled cable		
6FX□ 002-2CF02-1□□□	≤ 50 m	Resolver
6XV1 830-□□H10²⁾	Sold by the meter	PROFIBUS-DP SIMATIC S7 CPU 315-2 DP
or		PROFIBUS-DP SINUMERIK 840Di/840D FM 357-2
6FX8 002-3AB01-1□□□	≤ 35 m	Open core ends
or		FM 354
6FX2 002-3AD01-1□□□	≤ 35 m	Open core ends
		FM 357-2 4 setpoints
6FX□ 002-2CJ10-1□□□	≤ 50 m	FM 357 FM 354
X471	Sub-D extension, 9-pole ⁴⁾	PG/PC
X351	Included in scope of supply	Device bus

1) PROFIBUS connector, e.g.:
Order No. 6FX2 003-0AA02

2) 6XV1 830-0EH10: not suitable for trailing
6XV1 830-3BH10: for trailing.

3) Incremental shaft encoder
4) PC accessories

SIMODRIVE 611 universal and POSMO

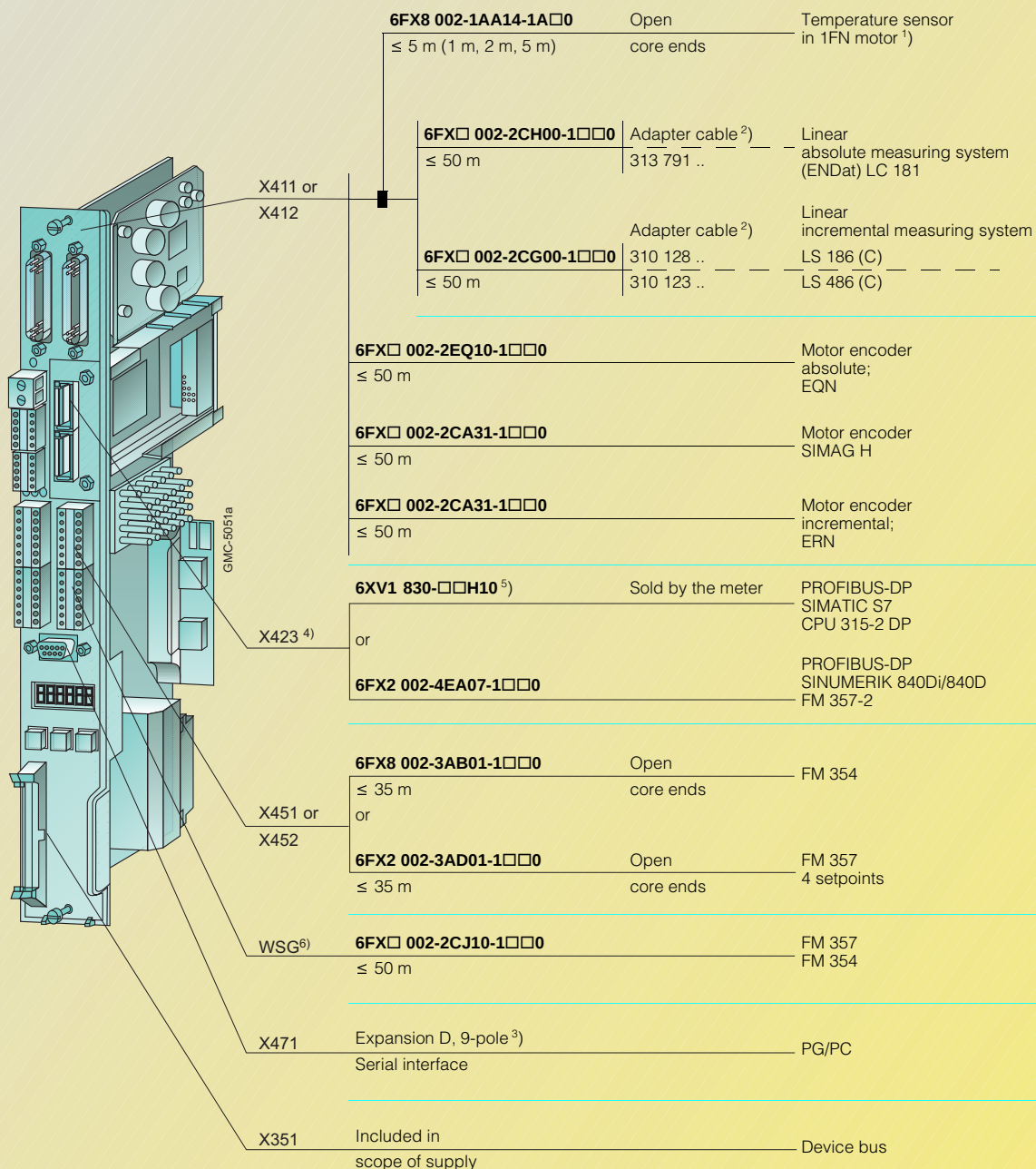
Planning guide

SIMODRIVE 611 universal Power and signal cables

Regulated control plug-in unit with sin/cos shaft encoder

Two-axis,
for shaft encoder with sin/cos 1 V_{pp}

Order No.
Pre-assembled cable



1) The temperature sensor must be connected by the customer. The cores for the temperature encoder are included in the power cable 6FX2 002-5E... for the 1FN motor.

2) The cable can be ordered from the manufacturer of the linear position encoder.

3) PC accessories

4) PROFIBUS connector, e.g.:
Order No. 6FX2 003-0AA02

5) 6XV1 830-0EH10: not suitable for trailing
6XV1 830-3BH10: for trailing.

6) Incremental shaft encoder

SIMODRIVE 611 universal and POSMO

Planning guide

Communication via PROFIBUS-DP for SIMODRIVE 611 universal and POSMO CD/CA, SI

The SIMODRIVE 611 universal and POSMO SI/CD/CA units are equipped with a PROFIBUS-DP

interface for communication with, for example, higher-level PLC systems, industrial PCs, etc.

General information

PROFIBUS-DP is an international, open fieldbus standard that is specified in the European fieldbus standard EN 50170 Part 2.

PROFIBUS-DP is optimized for high-speed, time-critical data transfer at the field level.

The fieldbus is implemented for the cyclic and non-cyclic exchange of data between a master and the slaves that are assigned to it.

Master and slaves

In the case of PROFIBUS, there are two categories of stations, masters and slaves.

- Master (active bus node)
A device set up as a master on the bus determines the data traffic on the bus and is therefore also known as an active bus node.

There are two classes of master:

- DP master Class 1 (DPMC1):
Masters of Class 1 exchange information with slaves in pre-specified message cycles.
Examples: SIMATIC S5, SIMATIC S7, etc.

- DP master Class 2 (DPMC2):
Devices of Class 2 are used for configuration, start-up, operator control and monitoring during normal operation of the bus.
Examples: Programming devices, HMI systems.

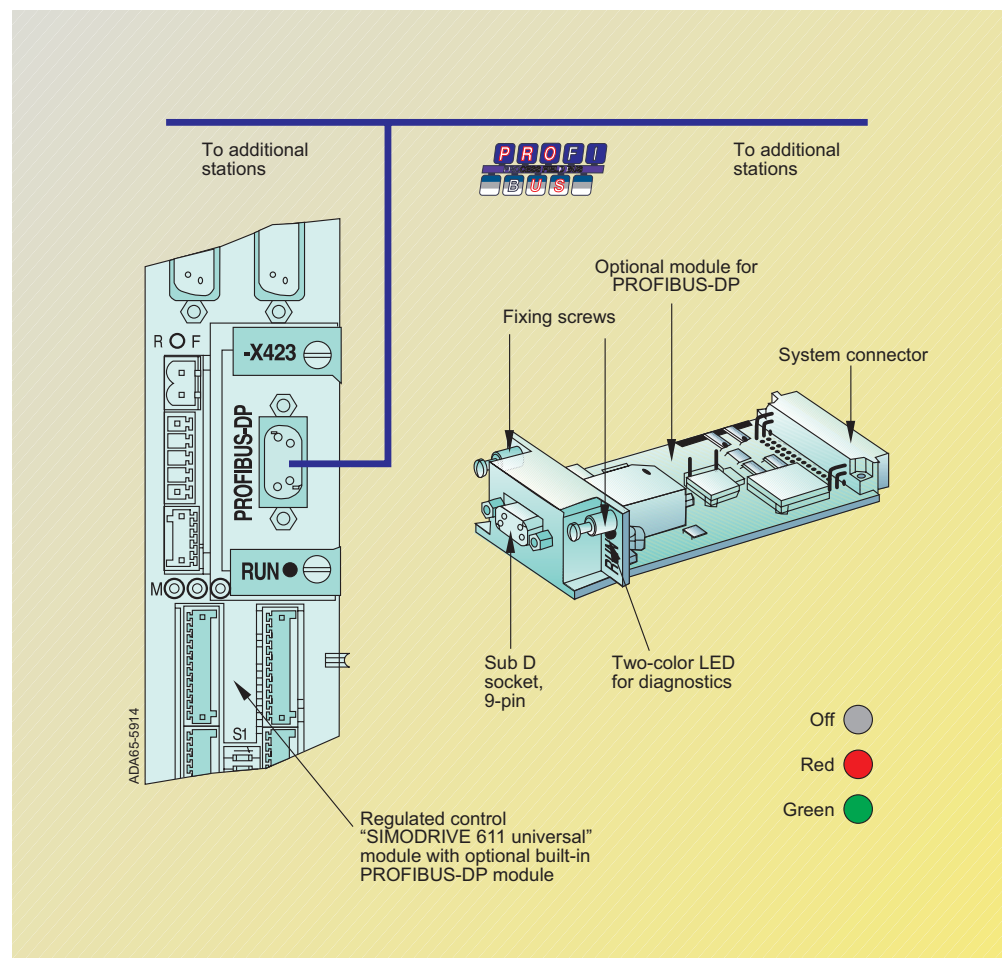
- Slaves (passive bus nodes)
These devices can only receive and acknowledge messages and, in response to a master request, send messages to the master.

SIMODRIVE 611 universal with PROFIBUS-DP option module

The "SIMODRIVE 611 universal" regulated control module with the PROFIBUS-DP option module is used for connecting drives to higher-level automation systems via PROFIBUS-DP.

"SIMODRIVE 611 universal" automatically detects the built-in PROFIBUS-DP option module on switch-on.

If an option module is used, the input/output functions can be selected via PROFIBUS-DP and setpoints can be preset.



SIMODRIVE 611 universal with PROFIBUS-DP option module

SIMODRIVE 611 universal and POSMO

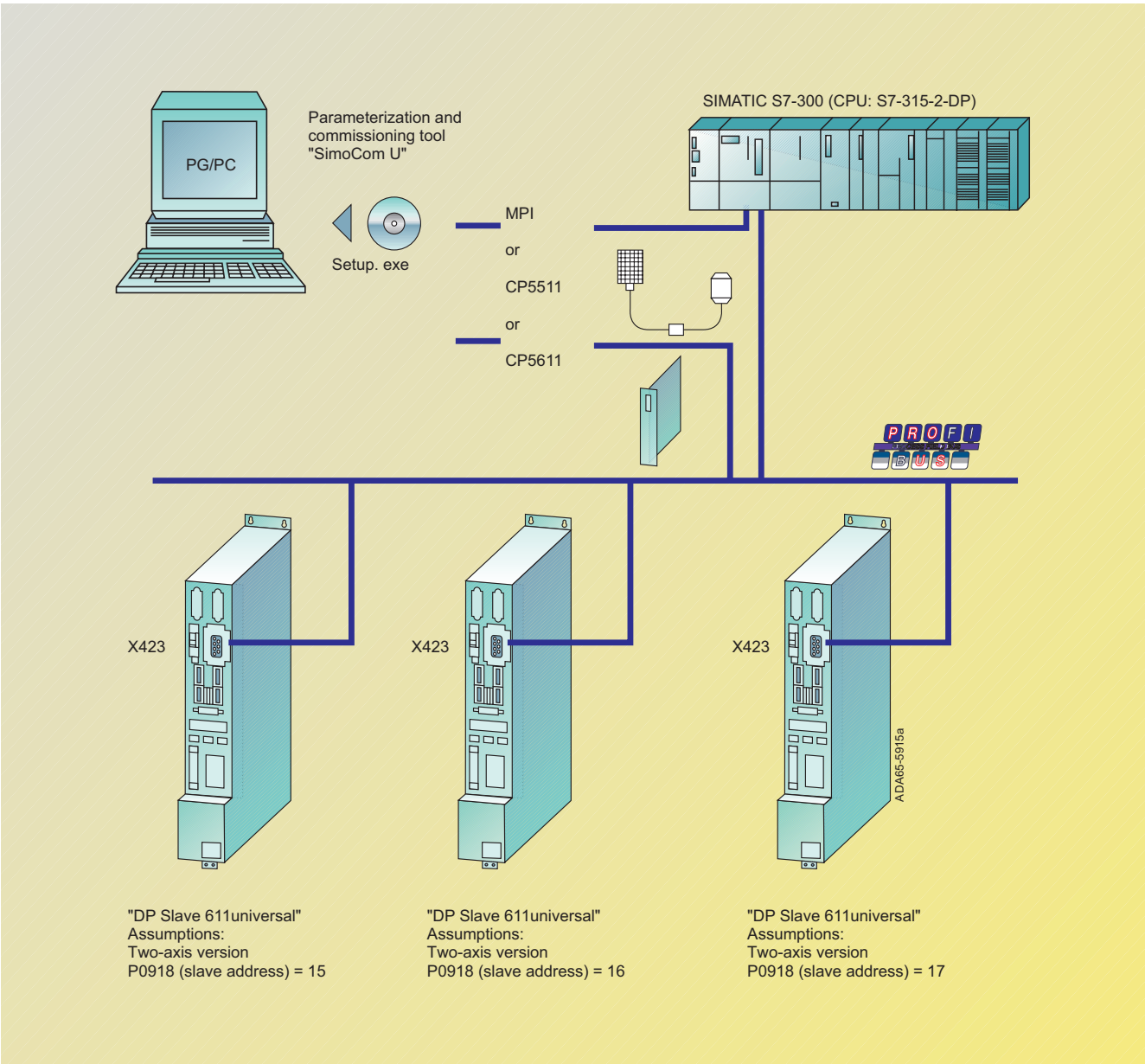
Planning guide

Communication via PROFIBUS-DP for
SIMODRIVE 611 universal and POSMO CD/CA, SI

SIMODRIVE 611 universal with PROFIBUS-DP option module (continued)

PROFIBUS-DP option modules		
Designation	Order No. (MLFB)	Characteristics
PROFIBUS-DP2	6SN1114-0NB00-0AA1	- PROFIBUS-ASIC DPC31 without PLL - For regulated control modules from software version 3.1, this module can be used in place of the PROFIBUS-DP1 option module
Characteristics common to PROFIBUS-DP2 and -DP3		- Requirements: - A regulated control module from software version 3.1 upwards is required - Cyclic data transfer (PKW section and PZD section) are possible - Module firmware update with SimoCom U is possible - Non-cyclic data transmission (DP/V1) - The function "SimoCom U via PROFIBUS" can be used
PROFIBUS-DP3	6SN1114-0NB01-0AA0	- PROFIBUS-ASIC DPC31 with PLL - The function "Motion Control with PROFIBUS-DP" (synchronous PROFIBUS mode) can be used

Integration of SIMODRIVE 611 universal with PROFIBUS-DP in the world of automation



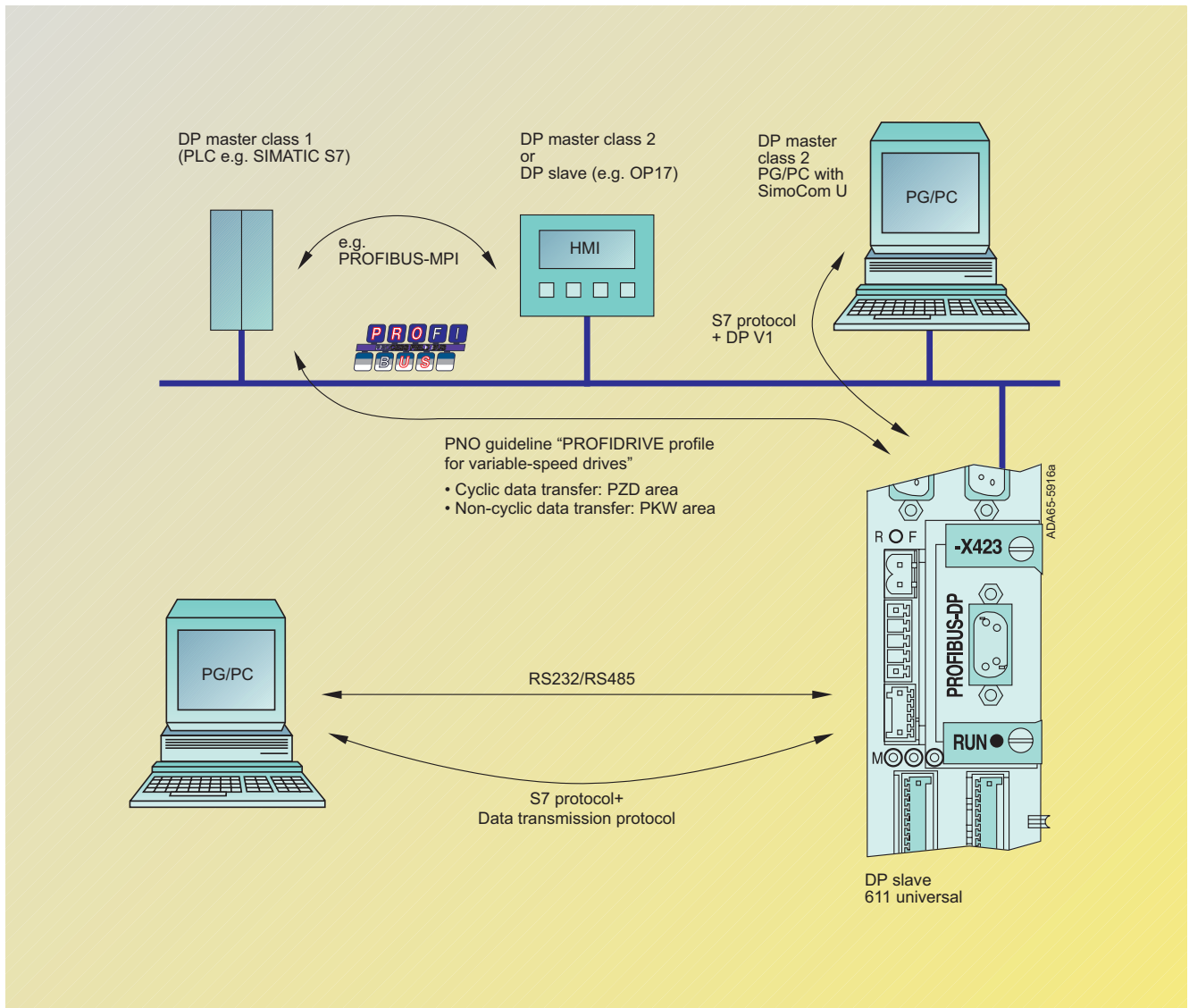
SimoCom U via PROFIBUS (example with 3 regulated control modules)

SIMODRIVE 611 universal and POSMO

Planning guide

Communication via PROFIBUS-DP for
SIMODRIVE 611 universal and POSMO CD/CA, SI

Protocols for DP slave 611 universal



Protocols for DP slave 611 universal

In accordance with the type of communication implemented, for "DP Slave 611 universal", the protocols shown in the diagram are used.

SIMODRIVE 611 universal and POSMO

Planning guide

Communication via PROFIBUS-DP for
SIMODRIVE 611 universal and POSMO CD/CA, SI

PROFIBUS-DP with SIMODRIVE POSMO CD/CA, SI

General information

The PROFIBUS unit is mounted on POSMO SI, POSMO CD or POSMO CA.

It must be disassembled for

- Connecting the PROFIBUS cable to X20
- Setting the PROFIBUS address
- Setting the terminating resistor on the last PROFIBUS station and
- Replacing the memory module.

The PROFIBUS cable is connected via the

- PG flange (with pre-assembled cables) **or**
- M20 screwed cable gland

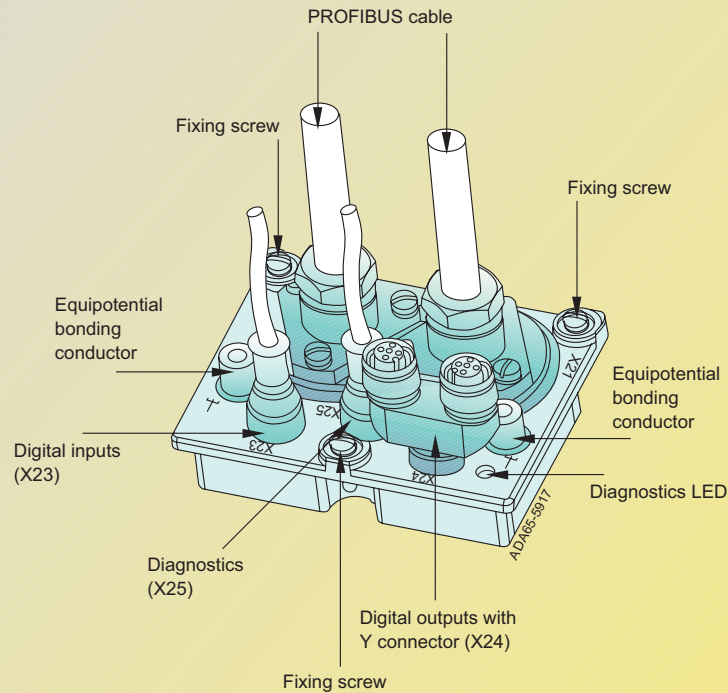
X20 screw-type terminal strip (rear side of PROFIBUS unit).

Note:

The M20 screwed cable gland and connectors X23 to X25 are supplied fitted with blanking covers.

To ensure that the IP 65 degree of protection is maintained, the blanking covers must only be removed for cases in which a signal lead is connected!

The connection of signal leads to the PROFIBUS unit is shown schematically in the Figure.



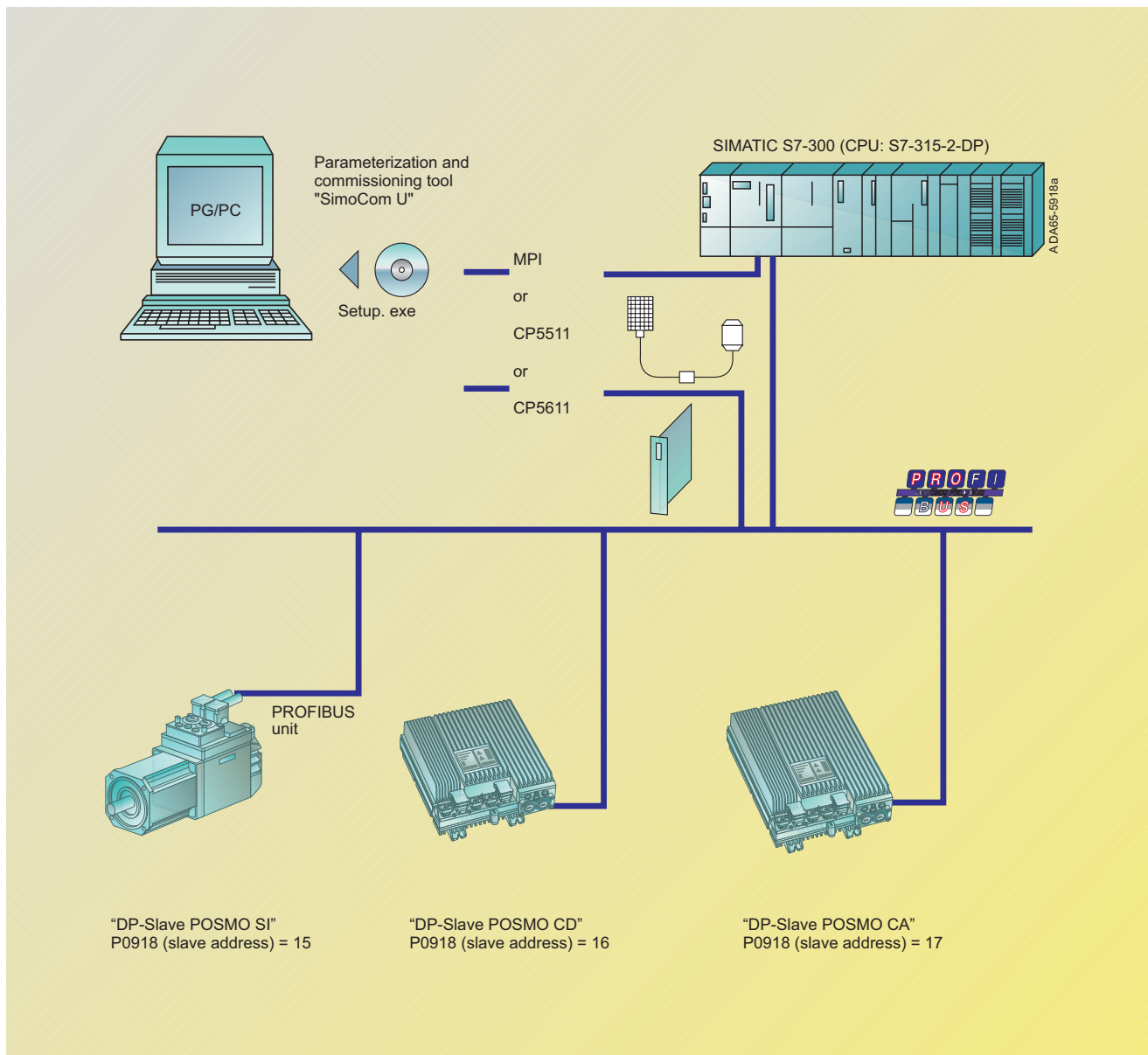
Signal lead assembly for PROFIBUS unit, e.g. with PG flange

SIMODRIVE 611 universal and POSMO

Planning guide

Communication via PROFIBUS-DP for
SIMODRIVE 611 universal and POSMO CD/CA, SI

Integration of SIMODRIVE POSMO CD/CA, SI



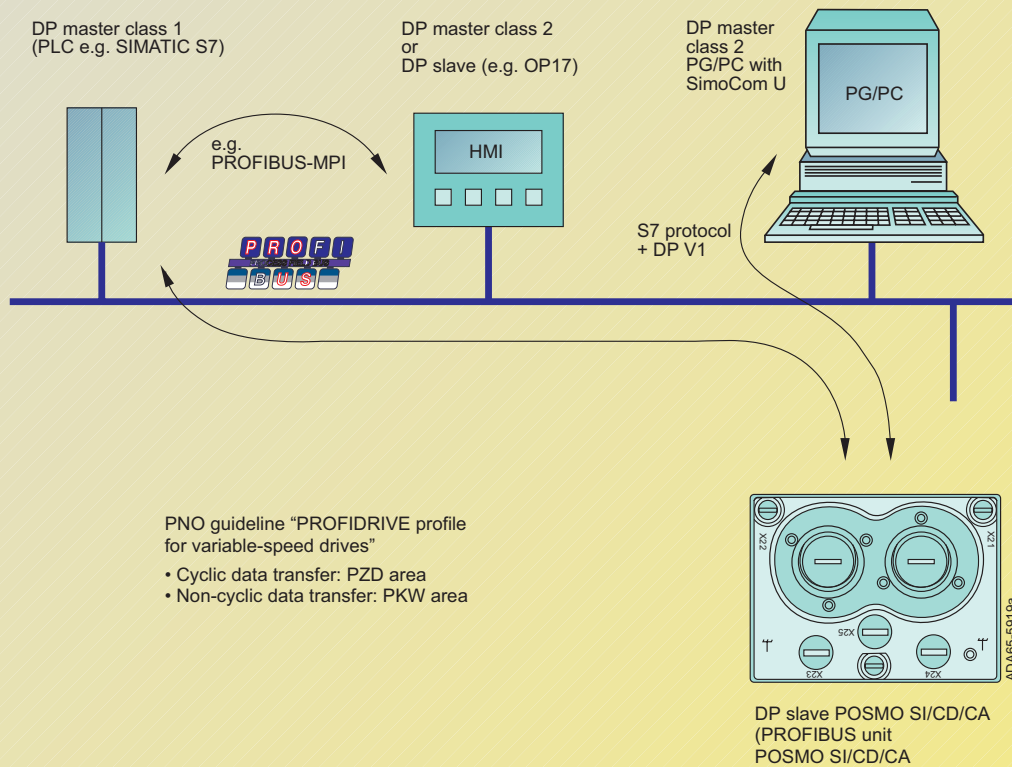
"SimoCom U" via PROFIBUS (example with 3 SIMODRIVE POSMO)

SIMODRIVE 611 universal and POSMO

Planning guide

Communication via PROFIBUS-DP for
SIMODRIVE 611 universal and POSMO CD/CA, SI

Protocols for DP slave POSMO CD/CA, SI



Protocols for DP slave POSMO CD/CA, SI

In accordance with the type of communication implemented, for "DP Slave POSMO CD/CA, SI", the protocols shown in the diagram are used.

SIMODRIVE 611 universal and POSMO

Planning guide

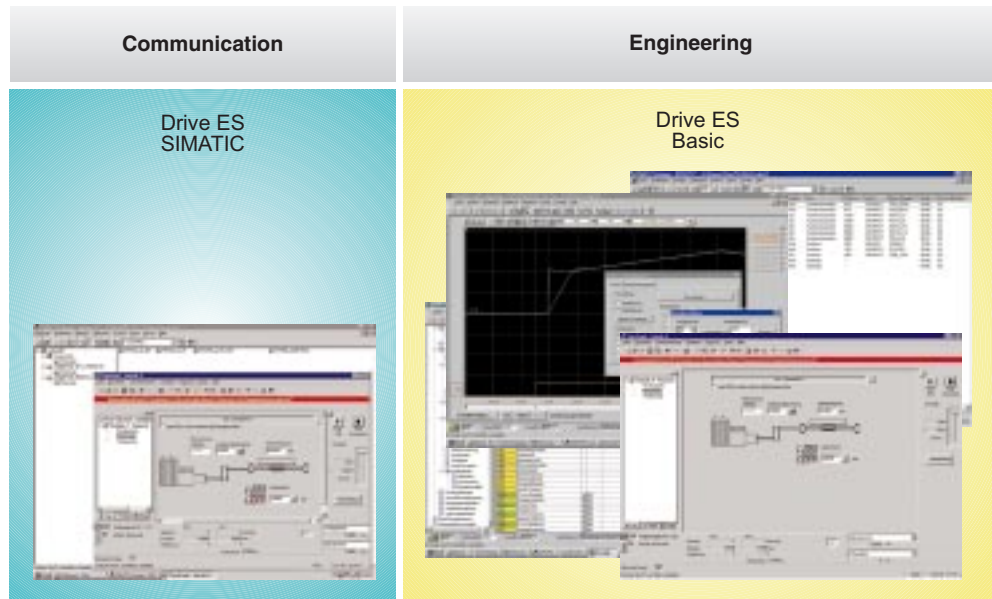
Communication via PROFIBUS-DP for
SIMODRIVE 611 universal and POSMO CD/CA, SI

Engineering package Drive ES

With Drive ES (Drive Engineering System), Motion Control drives of the SIMODRIVE 611 universal and POSMO series are fully integrated into the SIMATIC world of automation with regard to communication, project engineering and data storage.

Drive ES comprises the separately available software packages Drive ES Basic and Drive ES SIMATIC.

- Drive ES Basic is the basic software used for online and offline parameterization of all types of drive.
- Drive ES SIMATIC contains a SIMATIC module library, that calls SimoCom U/A from SIMATIC Manager and permits easy, reliable programming of the PROFIBUS-DP interface in the SIMATIC CPU for the drives. The prerequisite for Drive ES SIMATIC is that Step 7 has been installed.



Product structure of Drive ES

Drive ES Basic

- Drive ES is based on the user interface of the SIMATIC Manager.
- Drive parameters are also available in SIMATIC Manager (system-wide data storage).
- Drive ES ensures that parameters are uniquely assigned to a drive.
- A SIMATIC project complete with drive data can be archived.

- SIMATIC Teleservice (V 5.0 upwards) can be used.
- It communicates with the drive via PROFIBUS-DP.

Functions in SimoCom U/A

- Trace evaluation.
- Read out fault memory.
- Upread and download parameter sets (as a complete file or as a delta file with reference to the factory settings).

- Parameter sets can be assembled and processed as required.
- Guided start-up.
- Self-installation for speed controllers with FFT analysis (Fast Fourier Transformation).

Installation with STEP 7

Drive ES Basic can be installed as an option for STEP 7 (V $\geq$ 5.0) and is therefore homogeneously integrated into the SIMATIC environment.

Installation without STEP 7

Drive ES Basic can also be installed without STEP 7 in which case its own Drive Manager (similar to SIMATIC Manager) can be used.

Drive ES SIMATIC

- It provides function blocks and sample projects for the SIMATIC CPU that process the communication via PROFIBUS-DP with drives from Siemens.
- Communication only has to be parameterized not programmed.

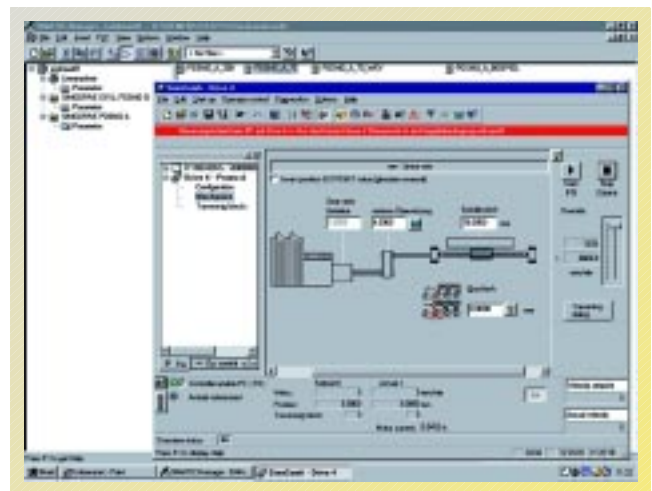
Features

- Modules of the STEP 7 type; symbolic addressing; function blocks complete with instance data; online Help.
- Can be used in any SIMATIC programming and configuring environment such as LAD, FBD, STL, SCL, CFC.

- New module structure: Separate modular functions for run-time optimized program development.

Building block structure

- Reading and writing of process data of a freely configurable length and consistency.
- Replacement of parameters cyclically and non-cyclically, communication monitoring, fault memory read out.
- Downloading parameters via the CPU in the drive.



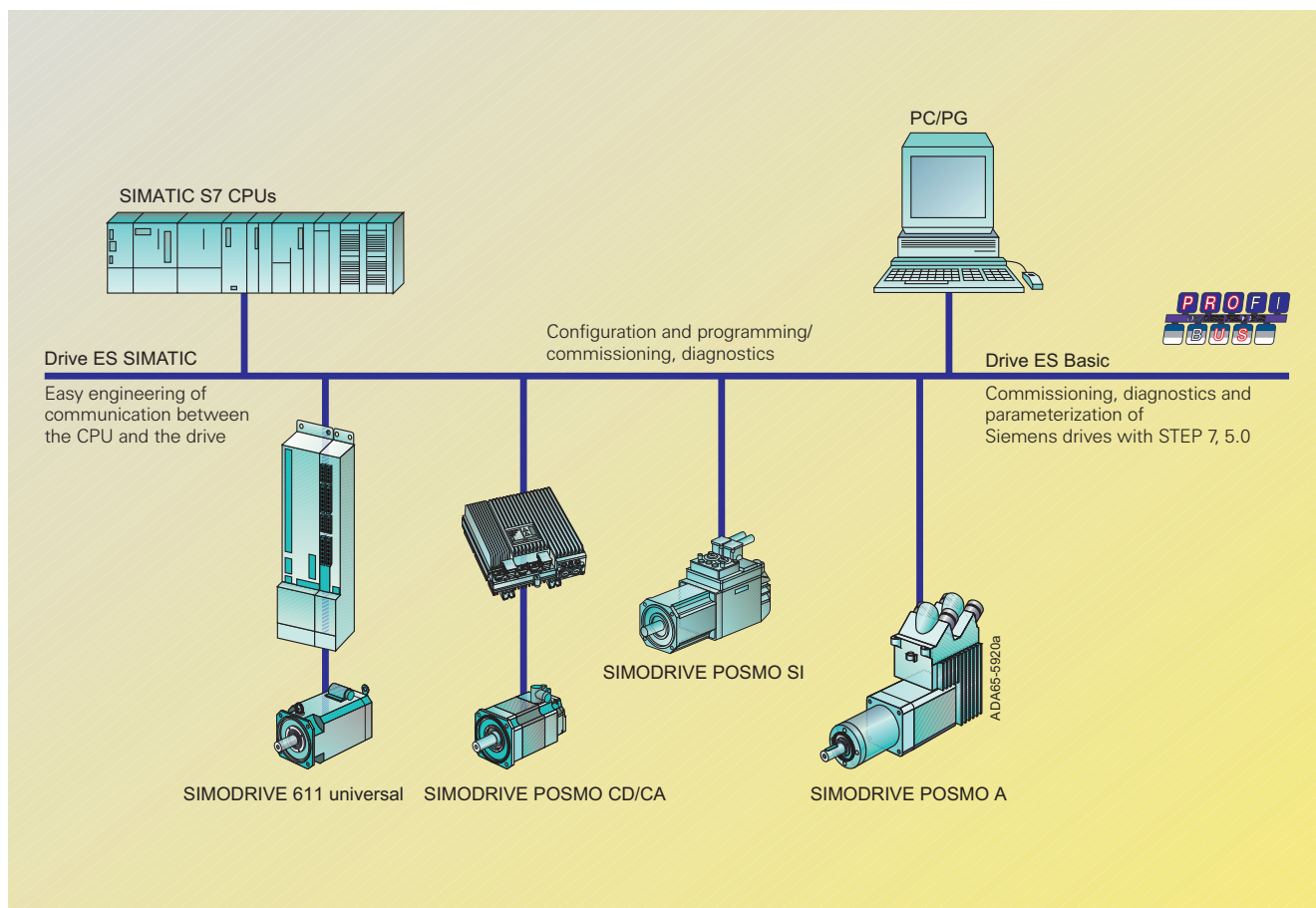
Integration of SIMODRIVE 611 universal and POSMO CD/CA, SI in the STEP 7 Manager.

SIMODRIVE 611 universal and POSMO

Planning guide

Communication via PROFIBUS-DP for
SIMODRIVE 611 universal and POSMO CD/CA, SI

Integration of drives in SIMATIC S7 with Drive ES



Integration of SIMODRIVE 611 universal and POSMO in SIMATIC S7 with Drive ES

SIMODRIVE 611 universal and POSMO

Planning guide

Communication via PROFIBUS-DP for SIMODRIVE 611 universal and POSMO CD/CA, SI

Engineering and process control of SIMODRIVE 611 universal and POSMO SI, CD/CA is particularly user-friendly with a SIMATIC S7 and Step 7 $\geq$ V 5.0.

The complete system can be engineered from the STEP 7 Manager when the Drive ES (Drive Engineering System) option software is installed on the same hardware platform (PC or PG). The S7 system bus PROFIBUS-DP is responsible for data communication (see Figure on Page 6/56).

The optional software Drive ES combines the previously separate steps of engineering (hardware configuration, parameterization, technology functions) and the control functions between SIMATIC S7 and SIMODRIVE 611 universal and POSMO SI, CD/CA in a single software tool.

Drive ES is fully integrated in STEP 7 Manager and comprises four packages with different functions.

Drive ES Basic supports user-friendly commissioning as well as service and diagnosis during operation of the system. The main advantage over SimoCom U/A stand-alone installations lies in the system-wide data management of drive and automation data of a project in STEP 7 Manager as well as utilization of the complete communications landscape of SIMATIC S7. This also comprises, for example, communication via different bus systems by means of ROUTING.

The communication between SIMATIC S7 and Siemens drives (e. g. SIMODRIVE 611 universal and POSMO SI, CD/CA) can then simply be parameterized thanks to ready-to-use CPU function blocks.

Software maintenance service Drive ES

A software update service can also be ordered for the Drive ES software. In this case, the user receives the most up-to-date software, service packs and complete versions automatically

for one year starting from the date of ordering.

The update service is offered for one year.

Six weeks before the year elapses, the customer and the Siemens contact person are informed in writing about the impending expiry. The update service can then be ordered for another year.

The update service can only be ordered if a complete version has been ordered.

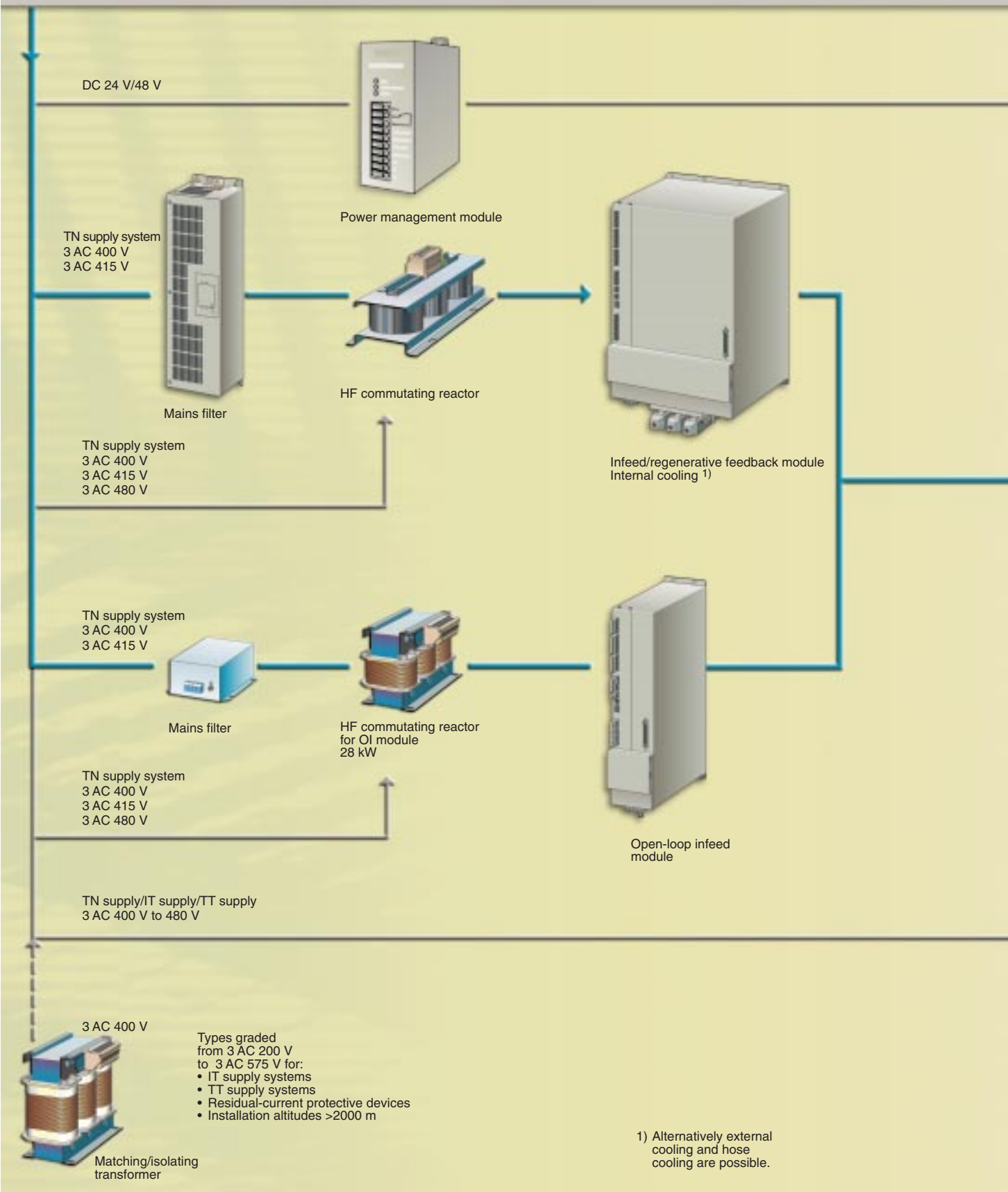
SIMODRIVE 611 universal and POSMO

Planning guide

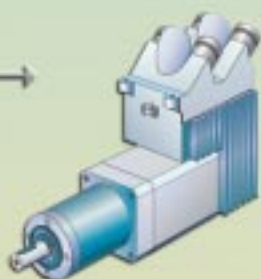
SIMODRIVE POSMO Overview

Supply system interfaces

Infeed modules



SIMODRIVE POSMO



POSMO A



POSMO SI



POSMO CD

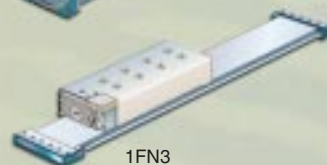


POSMO CA

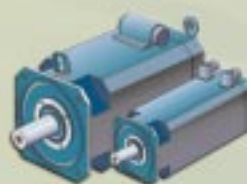
Motors



1FK6



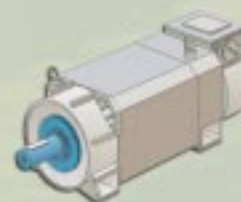
1FN3



1FT



Induction motor
e.g. 1LA



1PH7

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Overview

General information

The SIMODRIVE POSMO SI, POSMO CD and POSMO CA drives supplement the modular SIMODRIVE 611 design with decentralized variants that permit installation outside the control cabinet.

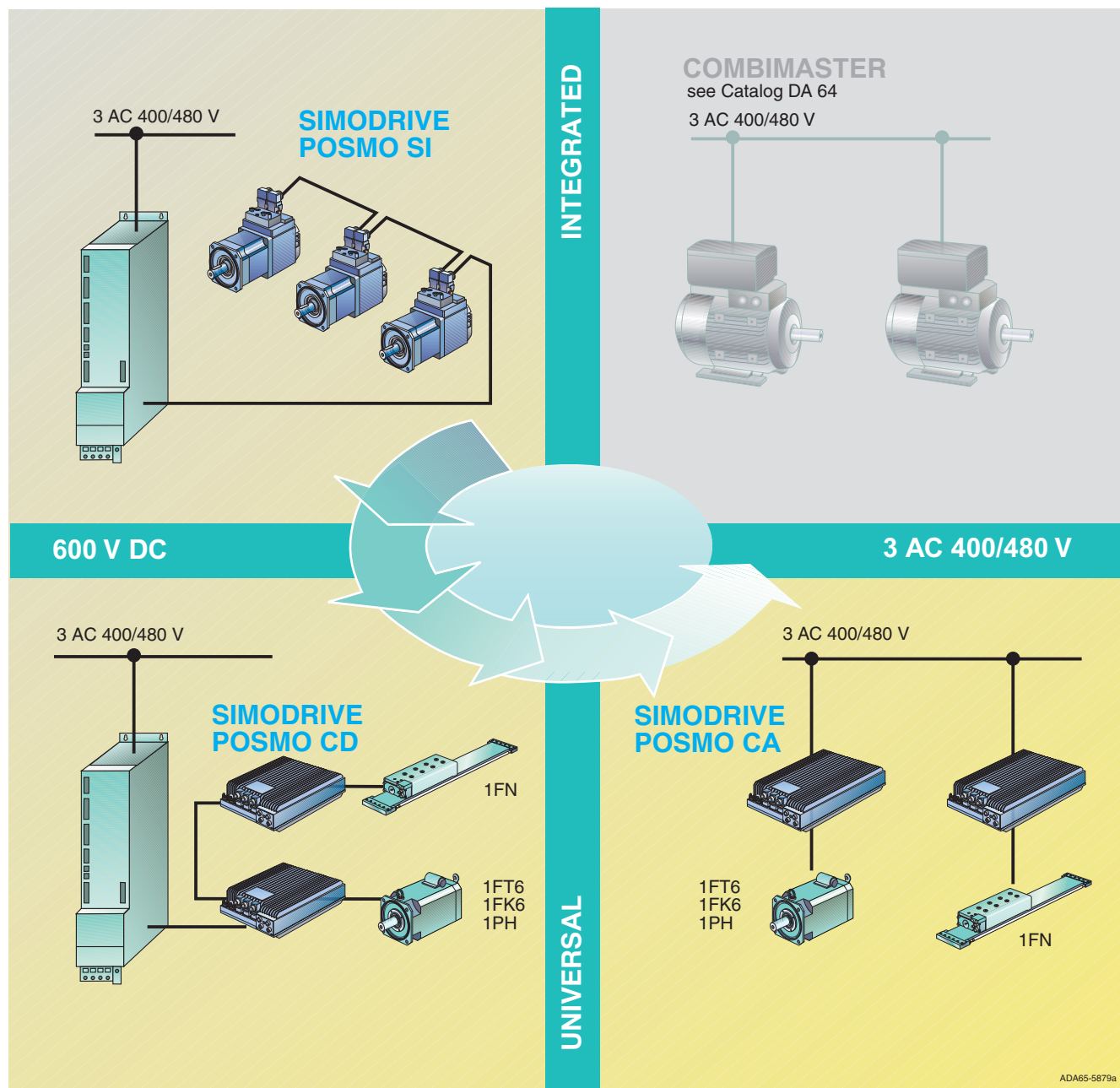
The same software is used for all three drives and is fully compatible with the SIMODRIVE 611 universal.

Communication takes place exclusively over PROFIBUS and the expanded standard Motion Control for PROFIBUS can also be used.

An overview of the SIMODRIVE POSMO drive system can be found in Part 3, Selection and Ordering Data.

The cables and connections are identical for all three drives.

The signal lines (encoder signals, bus communication) are not shown in the following diagram to ensure clarity.



ADA65-5879a

Product versions for distributed drive technology

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Applications

The SIMODRIVE POSMO SI, POSMO CD and POSMO CA drives are designed for flexible implementation in many application areas.

Distributed drives are used in all machines and systems in which a distributed configuration brings benefits for project engineering, commissioning, operation and servicing.

The advantages of distributed drive systems are:

- Reduced control cabinet overhead costs by locating the drives "on site".
- Fast machine installation due to mounting a complete drive unit.
- Low installation overhead thanks to linking via the communications bus and power bus.
- Easy commissioning and parameterization of all SIMODRIVE drives with the user-friendly commissioning tool "SimoCom U".
- Simple expansion of the number of axes without requiring any more space in the control cabinet.

SIMODRIVE POSMO SI for standard applications such as:

- Handling axes
- Positioning axes
- Auxiliary axes for machine tool and production machines

SIMODRIVE POSMO CD/CA for high-performance applications such as:

- Servo applications
- Main spindle applications

Characteristics of distributed drive technology

- Complete drive units with integrated power modules, regulated control modules, positioning control, program memory and, in the case of SIMODRIVE POSMO SI, an integrated motor.
- High degree of protection.
- High availability
 - Connectors that cannot be incorrectly plugged in
 - PROFIBUS connection with T functionality
 - Replaceable memory module for firmware/user data.
- Generation of the electronics power supply in the unit
 - No external power supply necessary (infeed possible as an option).
- Integrated brake activation.
- Positioning functionality with a programmable sequence of motions "on board".
- Operation on PROFIBUS with high-speed cyclic data transfer.

Parameterization

Parameters are set to integrate the drive and match it to the actual specification of the machine or system. For commissioning and servicing, the following possibilities are available:

- Parameterization and commissioning tool (SimoCom U under Windows 95/98 / NT).

Data storage

The unit is equipped with a removable memory module with a non-volatile data memory (EEPROM) for storing the following data:

- Firmware (system software)
- User data

Function overview

The functions are based on the functionality of SIMODRIVE 611 universal.

- Duty types
 - n set (speed/torque setpoint)
 - Speed control
 - Torque control
 - Torque reduction
 - Positioning
 - HW/SW limit switch
 - 64 traversing blocks (max.)
 - Position-related switching signals
 - Rotary axis with modulo compensation
 - Jerk limitation
 - External block change

- Commissioning
 - Parameterization and start-up tool SimoCom U
- Motor holding brake - sequence control
- Eight parameter blocks
- Monitoring functions
- Uniform I/O
 - Two digital inputs (freely parameterizable)
 - Two digital outputs (freely parameterizable)
 - Two analog measuring outputs
 - Terminal "Pulse enable" (KL IF)

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Overview (continued)

Distinguishing characteristics

The differences between SIMODRIVE POSMO SI, POSMO CD and POSMO CA are shown in the following table.

Characteristic	POSMO SI	POSMO CD	POSMO CA
Power infeed	From a centrally generated DC link (DC 600 V _{typ.})		From a three-phase mains supply voltage; integration of mains filter (optional), rectifier and pulsed resistor
Integration of power and regulated control electronics	In the motor		In a unit (distributed servo drive close to the motor)
Degree of protection	IP 64 (fan IP 54), optionally IP 65 with drive end IP 67	IP 65	
Cooling	Forced convection via integrated fan	Natural convection	
Cabling	Bus-type cabling of PROFIBUS and supply		
Power supply for electronics	Decentralized in the drive unit (external infeed is possible, if required)		
Terminal "Pulse enable" (KL IF)	via terminal to two additional cores in the power cable		
Ambient temperature	0 °C to 45 °C (to 55 °C with derating)		
Regulated control	SIMODRIVE 611 universal modified platform with removable memory module		
Inputs	2 digital inputs, of which one is a high-speed input		
Outputs	2 digital outputs		
Measuring outputs	2 analog measuring outputs for commissioning and diagnostics		
Indirect measuring system (motor measuring system)	Fixed Resolution 65,536 increments/revolution 4096 distinct revolutions	According to motor used (1 V _{pp} sin/cos signals; absolute encoder with EnDat)	
Direct measuring system	–	Optional (1 V _{pp} sin/cos signals; absolute encoder with EnDat)	
Connection system	Power, motor and measuring system connection with power socket connector, PROFIBUS with M20 screwed cable gland (copper conductor) I/O signals with M12 connection system		
Motors	1FK6 060–□□□□ 1FK6 063–□□□□ 1FK6 080–□□□□ 1FK6 083–□□□□ 1FK6 100–□□□□	1FT6; 1FK6; 1PH; 1FN according to power limit as specified in the documentation: Planning Guide for linear motors Planning Guide for three-phase induction motors	

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

SIMODRIVE POSMO CD/CA

Applications

SIMODRIVE POSMO CD (without mains infeed) and POSMO CA (with mains infeed) are complete converter and control units for a distributed servo drive system and are direct stations on PROFIBUS:

They are used to solve control and drive system tasks with stand-alone, modular function units "on site" at the machine.

This servo system can be installed virtually anywhere close to a motor thanks to its high degree of protection (IP 65).

Typical applications

- High-performance servo applications in packaging, textiles and wood-processing machines
- Feed axes on machine tools

Construction

- The SIMODRIVE POSMO CD/CA is a complete functional unit comprising:
 - Power section
 - Control electronics
 - Positioning control
 - Program memory.

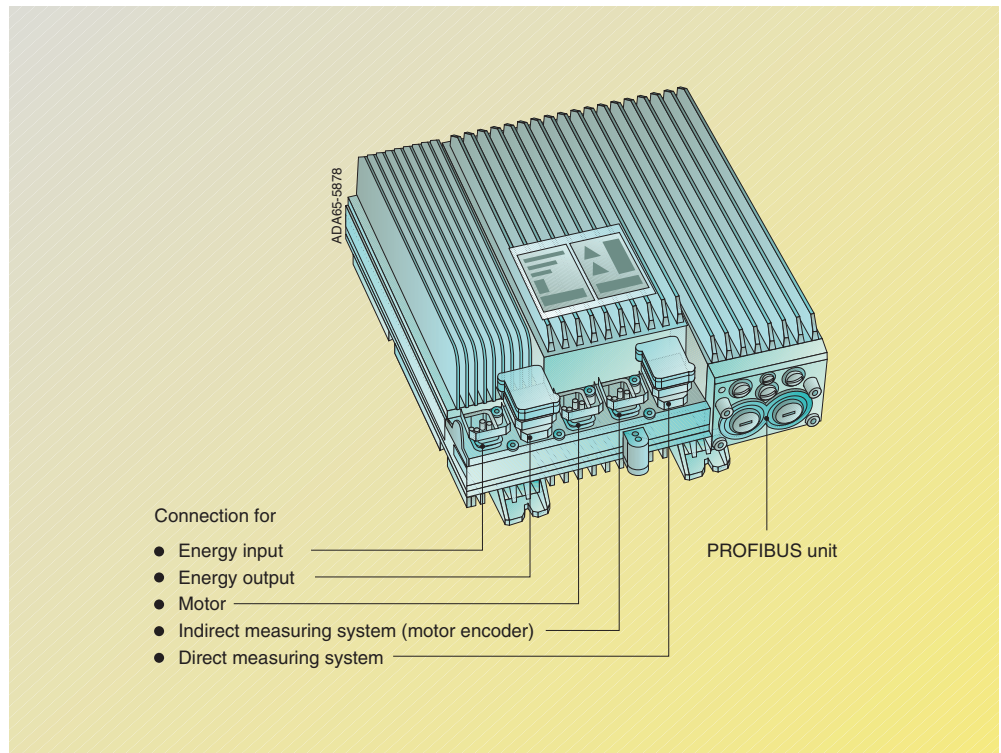
- Power infeed and loop through is implemented
 - With SIMODRIVE POSMO CD by means of a DC link connection that cannot be wrongly connected complete with safety interlocking
 - With SIMODRIVE POSMO CA by means of a mains connection that cannot be wrongly connected complete with safety interlocking.

- The motor is connected using a power socket connector that cannot be wrongly connected.
- Communication takes place via the "standard" PROFIBUS-DP or via Motion Control with PROFIBUS-DP (synchronous operation).

Signal connection is via a removable PROFIBUS unit using screwed cable glands and terminals.

When the PROFIBUS unit is removed, the bus connection (T functionality) to other stations remains intact.

- M12 plug-in technology is used to connect
 - Digital inputs/outputs
 - Diagnostic signals.



SIMODRIVE POSMO CD/CA (supplied from the factory)

- The measuring systems are connected to the position and speed sensing via connectors that cannot be wrongly connected which are of an identical design to the power socket connectors.

Mode of operation

Single-axis drive unit

The supply voltage connection is made via a 600 V DC mains infeed or directly via a 400 V to 480 V AC 3-phase supply (SIMODRIVE POSMO CA).

The 24 V DC electronics supply is generated decentralized in the unit. For diagnostic purposes, a 24 V DC electronics power supply can also be fed in externally.

Functional scope

- Sufficiently flexible to be connected to a wide variety of motor types (1FK6, 1FT6, 1FN3, 1PH)
- Operation as PROFIBUS-DP standard slave with high-speed cyclic data interchange with higher level master

- Interpolating sequence of motions with other nodes through a superior motion control system with PROFIBUS-DP
- Connections for high-resolution motor measuring system and direct measuring system
- Fast and easy commissioning of all PROFIBUS-DP drives via SimoCom U (under Windows 95/98/NT)

Highlights

- Flexibility due to the ability to install close to the motor, for various types of motor
- SIMODRIVE POSMO CA can be directly connected to the mains
- Reduced control cabinet overhead costs by locating the drives directly "on site" on the machine
- Fast machine installation due to mounting a complete drive unit
- Low installation overhead thanks to linking via the communications bus and power bus
- Direct linking of drive-related process signals via 4 terminals programmable as either inputs or outputs

- The pluggable terminal cover with integrated PROFIBUS-DP address switch makes it possible to disconnect a drive or drive ring (not applicable to the first and last station on the PROFIBUS-DP line) without interrupting communications
- Uniform easy-to-use connection system and pre-assembled cables
- High-speed diagnostics via
 - LEDs for fault/ready (on-site diagnostics)
 - PROFIBUS-DP and SimoCom U
- Fast module replacement (without the need to repeat setting up) thanks to memory card

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI

System overview and requirements

SIMODRIVE POSMO SI

Applications

SIMODRIVE POSMO SI is a single-axis servo drive for a distributed servo drive system which is a direct station on PROFIBUS-DP.

This servo drive system is a self-contained, fully functional mechatronic unit. It is used to solve control and drive system tasks with stand-alone, modular function units "on site" at the machine.

Typical applications

- Servo axes in handling devices
- Independent positioning axes in machines
- Auxiliary axes in machine tools

Construction

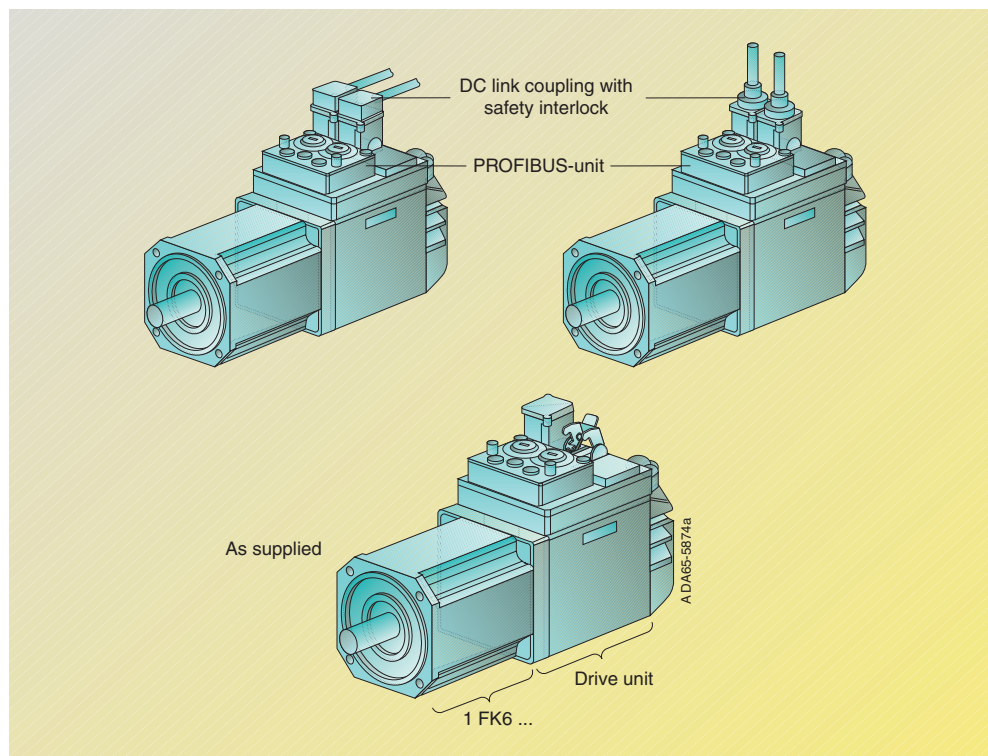
In the case of SIMODRIVE POSMO SI, power and information electronics are integrated in the motor.

Power is supplied via the DC link voltage ($600 V_{typ}$) that must be generated from an external mains supply.

- The SIMODRIVE POSMO SI is a complete functional unit comprising:
 - Power section
 - Control electronics
 - 1FK6 motor
 - Positioning control (optional)
 - Program control/program memory
- The $600 V_{typ}$ power connection is implemented with a DC link connection that cannot be wrongly connected.
- A second DC link connection that cannot be wrongly connected complete with safety interlocking is used for looping through the infeed to the next SIMODRIVE POSMO SI/CD.
- Communication takes place via the "standard" PROFIBUS-DP or via Motion Control with PROFIBUS-DP (synchronous operation).

Signal connection is via a removable SIMODRIVE PROFIBUS unit using screwed cable glands and terminals.

When the PROFIBUS unit is removed, the bus connection (T functionality) to other stations remains intact.



SIMODRIVE POSMO SI

- M12 plug-in technology is used to connect
 - Digital inputs/outputs
 - Diagnostic signals
- The electrical connection between the motor and drive unit is implemented using plug-in technology. This means that when servicing is necessary, the drive unit can simply be replaced.
- The PROFIBUS cable is connected at the plug-in PROFIBUS unit using terminals.

Mode of operation

Single-axis servo drive

The supply voltage connection is made via a 600 V DC mains infeed; the 24 V DC electronics power supply is generated decentralized in the unit. For diagnostic purposes, a 24 V DC electronics power supply can also be fed in externally.

Functional scope

- Positioning functionality with a freely programmable sequence of motions for one axis

- Operation as PROFIBUS-DP standard slave with high-speed cyclic data interchange with higher level master
- Interpolating sequence of motions with other nodes through a superior motion control system with PROFIBUS-DP
- Integrated absolute-value measuring system
- Fast commissioning of all PROFIBUS-DP drives via SimoCom U (under Windows 95/98/NT)

Highlights

- Reduced control cabinet overhead costs by locating the drives directly "on site" on the machine
- Fast machine installation due to mounting a complete drive unit
- Low installation overhead thanks to linking via the communications bus and power bus
- Direct linking of drive-related process signals via 4 terminals programmable as either inputs or outputs

- The pluggable terminal cover with integrated PROFIBUS-DP address switch makes it possible to disconnect a drive or drive ring not applicable to the first and last station on the PROFIBUS-DP line) without interrupting communications
- Uniform easy-to-use connection system and pre-assembled cables
- High-speed diagnostics via
 - LEDs for fault/ready (on-site diagnostics)
 - PROFIBUS-DP and SimoCom U
- Fast module replacement (without the need to repeat setting up) thanks to memory card

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Components for SIMODRIVE POSMO CD/CA, SI

The additional components required are listed in the adjacent table complete with their functions:

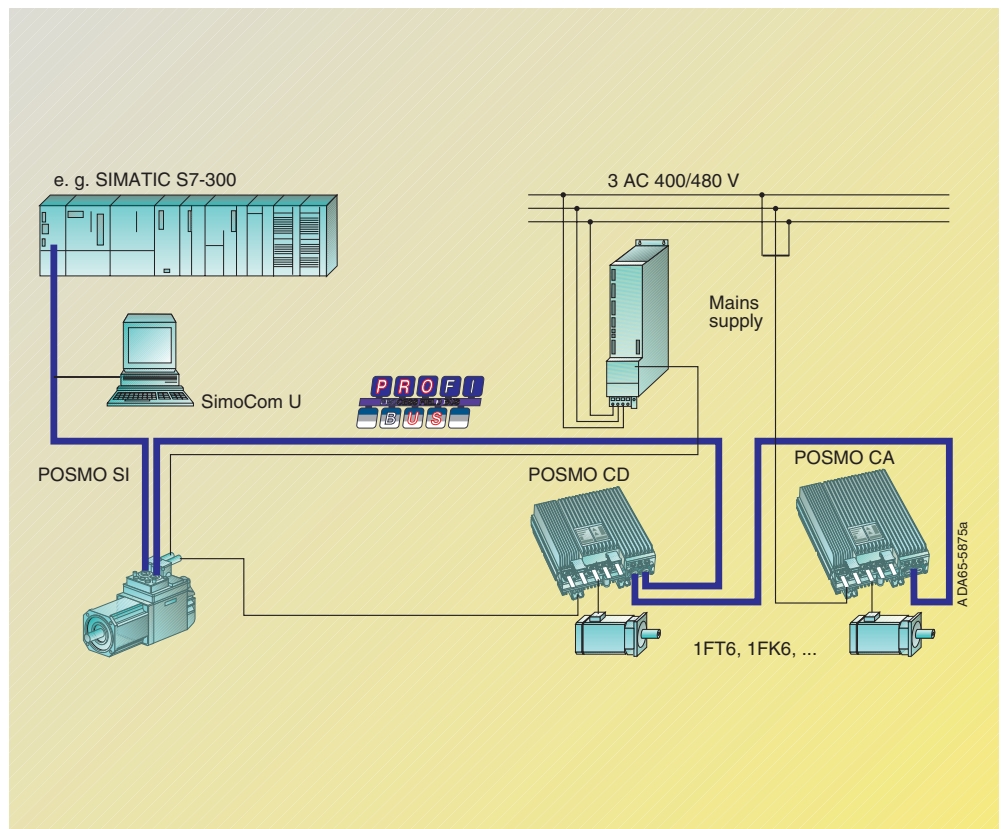
Components	Function
Control electronics (master) PROFIBUS-capability e. g. SIMATIC components	e. g. S7-300 DP Documentation: User's Guide – SIMODRIVE POSMO SI, CD/CA Distributed Servo Drive Technology
Mains supply module	With the following functions: • Interface from/to 3-phase supply • Provision of the DC link voltage
Connecting leads	see Part 3 Documentation: Catalog NC Z
Fuses	see Part 3
Terminals	Documentation: Catalog NS K
Parameterization and commissioning tool (SimoCom U) for PG/PC with PROFIBUS interface	This software executes under Windows 95/98/NT/2000 for parameterizing, commissioning and testing the SIMODRIVE POSMO SI or POSMO CD/CA drive systems via PROFIBUS-DP. This tool also supports, for example, the following functions: • Parameterization of SIMODRIVE POSMO SI/CD/CA • Traversal of axes • Optimization of adjustments • Firmware download • Series installation and start-up • Diagnostics (e. g. measuring function)

System integration of SIMODRIVE POSMO CD/CA, SI

System integration is possible with the following control systems:

- PLC solution (positioning application)
- SIMATIC multi-axis module FM 357-2 (interpolating axes and positioning axes).
- SINUMERIK 840Di (interpolating axes and positioning axes)
- SINUMERIK 840D (interpolating axes and positioning axes)

Examples for connection to control systems are shown in the following diagrams.



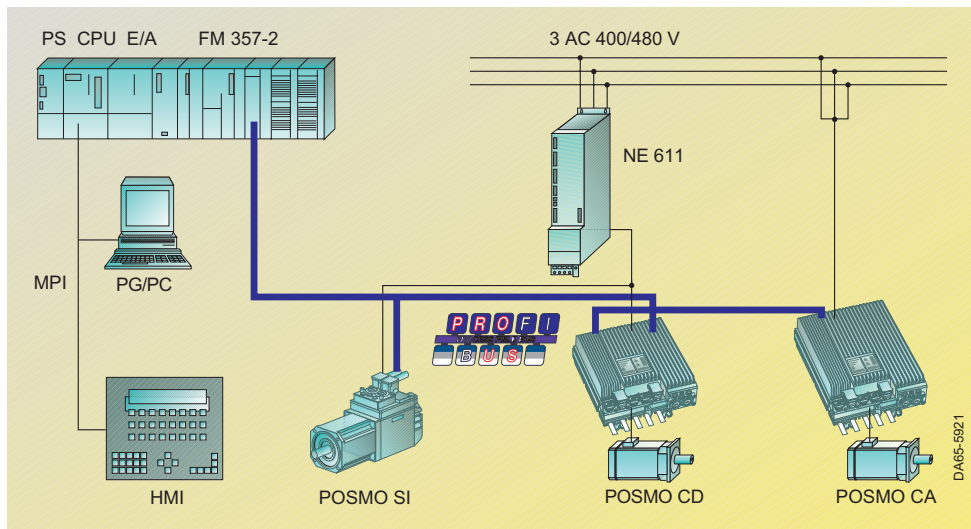
PLC solution as a master system

SIMODRIVE 611 universal and POSMO

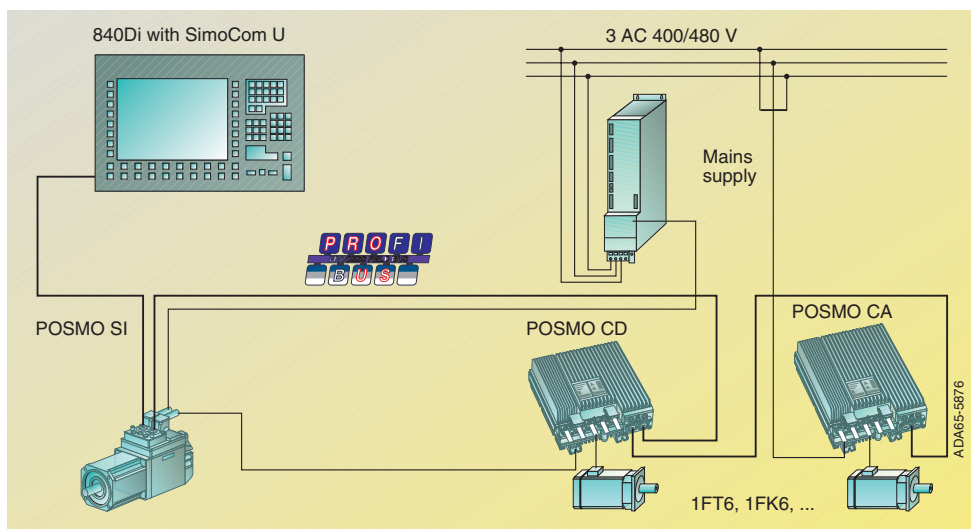
Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

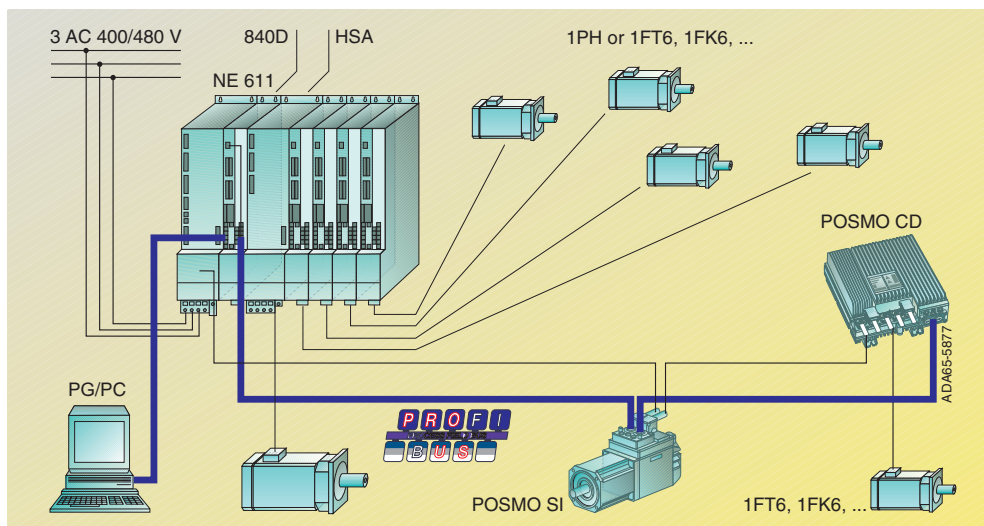
System integration of SIMODRIVE POSMO CD/CA, SI (continued)



SIMATIC with FM 357-2 as master system



SINUMERIK 840Di as master system



Mixed mode with SINUMERIK 840D (master) and SIMODRIVE 611D (NCU 573.2 only)

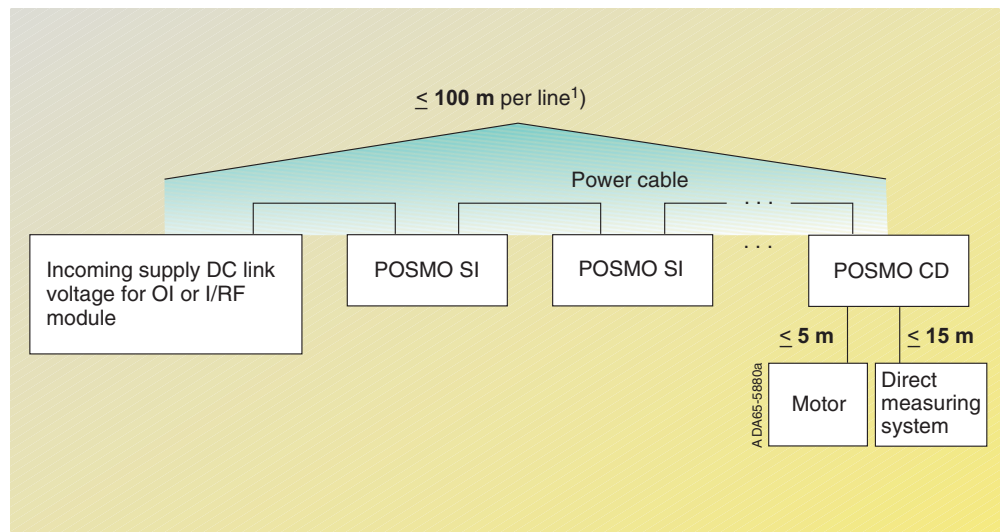
SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

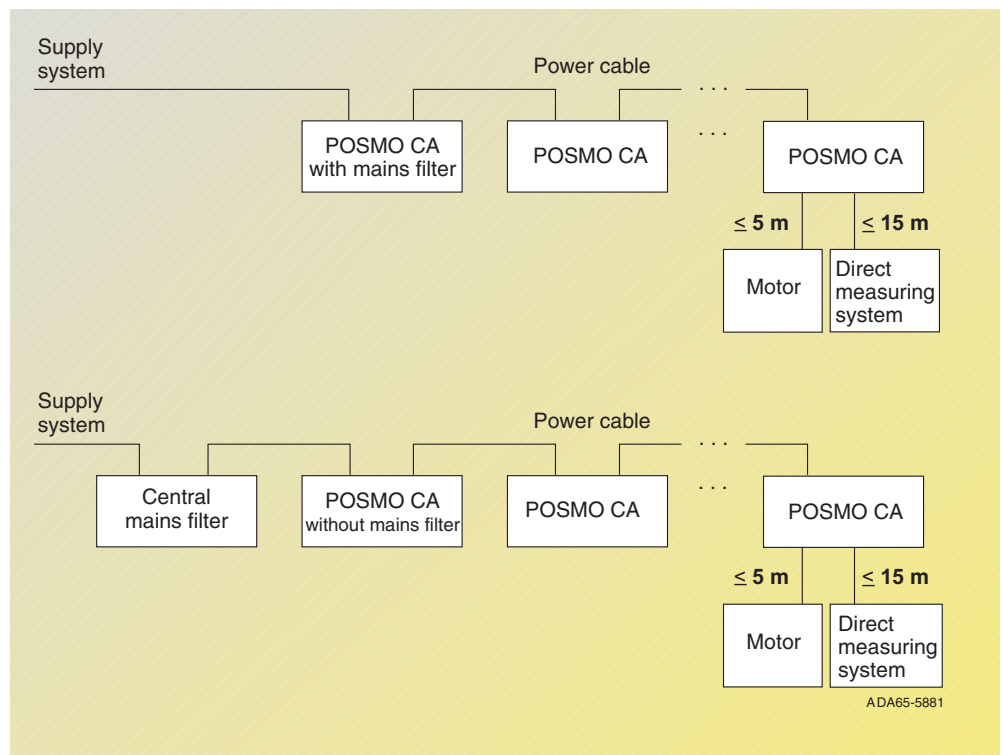
Cable lengths

SIMODRIVE POSMO SI/CD



Max. permissible cable lengths for SIMODRIVE POSMO SI/CD

SIMODRIVE POSMO CA



Max. permissible cable lengths for SIMODRIVE POSMO CA

Note:
Total cable length
(power cables, motor + DC
link) of all devices connected to
an infeed (SIMODRIVE 611 uni-
versal and POSMO) are not
permitted to exceed 350 m
(sinusoidal infeed) and 500 m
(square-wave infeed).

1) A line comprises all the POSMO SI/POSMO CD
units connected in series starting from the
infeed point.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI

System overview and requirements

Line power

SIMODRIVE POSMO SI/CD must be connected to the DC link voltage or SIMODRIVE POSMO CA must be connected to the supply system with a 6 mm² power cable.

This cable to the VDE standard can be loaded with up to 29 A up to 40 °C ambient temperature.

Note:
For ambient temperatures > 40 °C, the current carrying capacity of the power cable is reduced in accordance with EN 60204.

Max. line power for SIMODRIVE POSMO SI/CD

U_{mains} V	I/RF module	OI module	$P_{\text{S max}}$ kW
	$U_{\text{DC link}}$ V_{typ}	$U_{\text{DC link}}$ V	
400	600	–	17.40
	–	540	15.66
480	700 to 750	–	20.30 to 21.75
	–	648	18.80

The total power that can be connected per line in the case of SIMODRIVE POSMO SI/CD changes taking into account the coincidence factor (guide values for typical positioning applications), as shown in the following table.

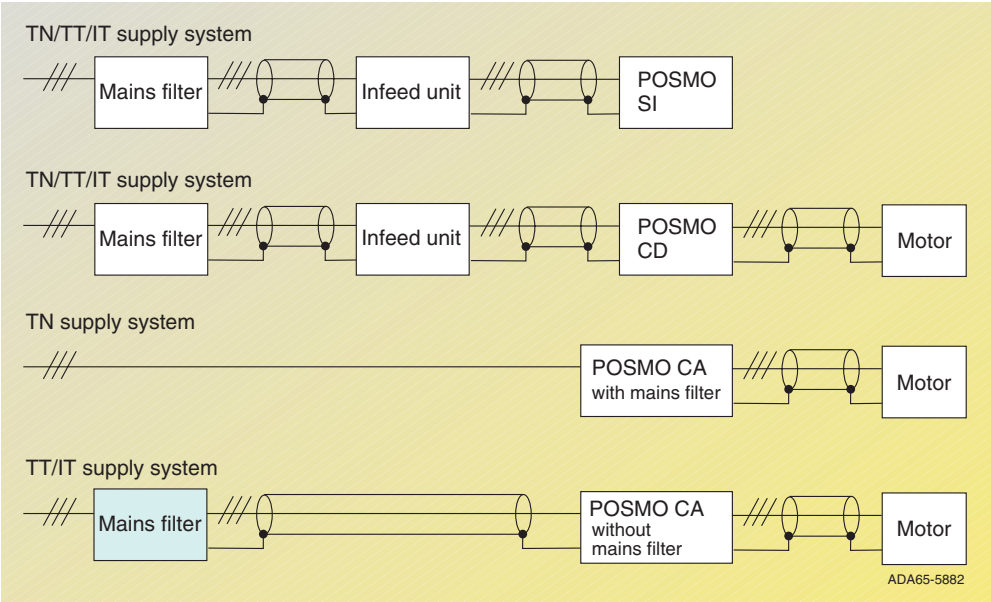
Number of axes	Coincidence factor
1	1
2	0.63
3	0.5
4	0.38
5	0.33
6	0.28

Max. line power for SIMODRIVE POSMO CA

U_{mains} V	$P_{\text{S max}}$ kVA
400	20.0
480	24.1

CE-compatible wiring

To ensure CE conformity in a machine/system, in addition to the signal lines, all the power cables connected downstream of the mains filter must be shielded. A schematic diagram is shown in Figure 6/98.



CE-compatible wiring

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Power infeed for SIMODRIVE POSMO SI, CD

General information

Requirements for the DC link voltage for SIMODRIVE POSMO SI/CD:

- Max. permissible DC link voltage 750 V DC
- Max. permissible DC link voltage 400 V DC
- Necessary DC link capacitance in the mains supply for supplies without DC link capacitance:
 - POSMO SI
≥ 180 μF per drive
 - POSMO CD 9A
≥ 180 μF per drive
 - POSMO CD 18A
≥ 360 μF per drive

Warning:

If the DC link voltage is connected to the mains supply module with the polarity reversed, the device can be damaged.

Recommended mains supply

To generate the DC link voltage for SIMODRIVE POSMO SI/CD, appropriate infeed modules can be selected from SIMODRIVE and SIMOVERT MASTERDRIVES. The tables contain recommended supply systems and the necessary DC link fuses. The DC link fuses must be connected externally by the customer.

UL-approved systems

When using SIMODRIVE POSMO SI or SIMODRIVE POSMO CD in UL-approved plants and systems, a UL approved varistor must be used in the supply circuit!

When the 5 kW SIMODRIVE OI module is used and with POSMO CA, an appropriate protection circuit is already integrated.

For SIMODRIVE mains supply modules from 10 kW upwards, the overvoltage limiting module with the order number 6SN1 111-0BA00-0AA0 can be used.

When the optional electronic supply infeed is used, in UL-approved systems, a UL-approved varistor with the corner values $V_N = 31 V_{DC}/I_{MAX} = 2000 A$ is required in the 24 V supply cable (e. g. SIOV-S20K25 from the company Epcos).

Overview of possible mains supplies						
Device	Type	Line fuse (recommended)	Supply system type	Supply voltage	Ext. varistor module	DC link fuse
SIMODRIVE 611	OI 5 kW	U_{mains} 415 V: 16 A D01; Neozed/B. No., 5SE2116	TN	3 AC 400 V – 10 %	No	No
			TT	3 AC 480 V + 6 %		
			IT			
	OI 10 kW	U_{mains} 500 V: 16 A DII; Diazed/B. No., 5SB261			Yes	No
		16 A Size 00; NH/B. No., 3NA3805				
		U_{mains} 415 V: 25 A D02; Neozed/B. No., 5SE2125				
SIMOVERT MASTERDRIVES Compact Plus	OI 28 kW	U_{mains} 500 V: 25 A DII; Diazed/B. No., 5SB281			Yes	HLS 32 A Size 0; NH B. No.; 3NE4101 ³⁾
		25 A Size 00; NH/B. No., 3NA3810				
	I/RF 16 kW	80 A				
	I/RF ≥ 36 kW	35 A				
	I/RF ≥ 36 kW	≥ 80 A				
SIMOVERT MASTERDRIVES Compact Plus	OI 15 kW	50 A	TN	3 AC 380 V – 15 %	No	
	OI ≥ 37 kW	100 A	TT	3 AC 480 V + 10 %		
			IT			
	OI 15 kW	50 A		3 AC 380 V – 15 % ¹⁾	No	
	OI ≥ 45 kW	100 A		3 AC 480 V + 10 %		
	I/RF 7.5 kW	See SIMODRIVE OI 10 kW				
SIMOVERT MASTERDRIVES Compact Plus	I/RF 15 kW	50 A				HLS 32 A Size 0; NH B. No.; 3NE4101 ³⁾
	OI ≥ 37 kW	100 A				

DC link voltage monitoring

The thresholds for DC link voltage monitoring are preset for a mains voltage of 400 V.

For 480 V supply systems, parameter P1171 must be set to 1.

Threshold	P1171 = 0 ²⁾	P1171 = 1
Threshold for DC link monitoring	$U_{mains} = 400 V$	$U_{mains} = 480 V$

Power supply conditions

For instructions on connecting to TN, TT and IT networks see Part 6, Supply System Types.

1) Only the NE can be connected to an IT/TT supply system; for UL, POSMO SI/CD requires line-side varistors due to air-gap and creepage distance.

2) Default value

3) Fuse holder NH3120.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Power infeed for SIMODRIVE POSMO CA

Mains infeed

Supplied from a three-phase mains voltage (3 AC 400/480 V).

SIMODRIVE POSMO CA is available in 2 versions

- With integrated mains filter for connection to TN networks or
- Without integrated mains filter for connection to TT and IT networks.

Note

Variant with mains filter:

The integrated mains filter in SIMODRIVE POSMO CA contains fault protection capacitors that are connected between protective earth. The effective capacitance of the three linked mains inputs with reference to earth is up to 270 nF.

The thresholds for pulsed resistor management is preset for a mains voltage of 400 V. For 480 V supply systems, the thresholds can be increased by adjusting parameter P1171.

Threshold	P1171 = 0 ¹⁾	P1171 = 1
Switch-on/switch-off threshold for pulsed resistor	$U_{\text{mains}} = 400 \text{ V}$	$U_{\text{mains}} = 480 \text{ V}$

Note

Variant without mains filter:

To connect the SIMODRIVE POSMO CA to TT and IT supply systems, shielded cables and an external central mains filter are necessary.

Rated voltage	DC test voltage
400 V AC	1900 V DC
480 V AC	2100 V DC

Line fuse

With SIMODRIVE POSMO CA 9A, the following line fuse must be inserted:

- U_{mains} 415 V: 16 A D01; Neozed/B. No.; 5SE2116
- U_{mains} 500 V: 16 A DII; Diazed/B. No.; 5SB261
- U_{mains} 500 V: 16 A Size 00; NH/B. No.; 3NA3805

Mains short-circuit power

Note

The mains short-circuit power must be larger than the power rating of the equipment operated on the line by a factor of approximately 30.

SIMODRIVE 611 universal and POSMO

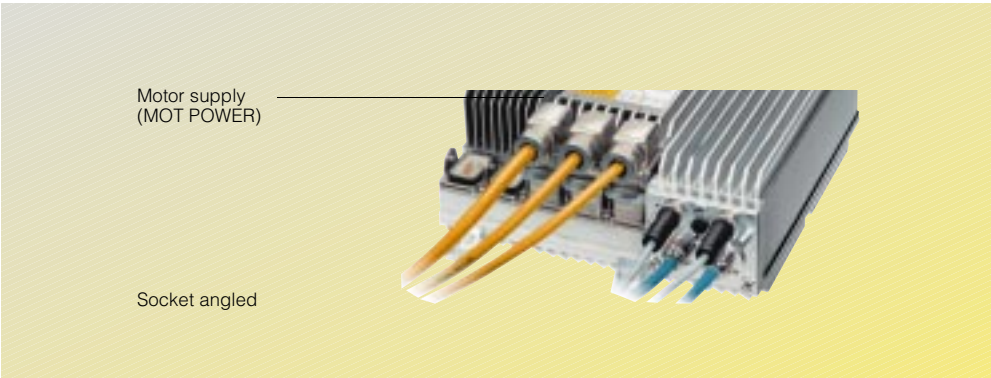
Planning guide

SIMODRIVE POSMO CD/CA, SI

System overview and requirements

Motor connection to SIMODRIVE POSMO CD/CA

The motor is connected via a power cable with a 6-pin connector (see adjacent Figure).



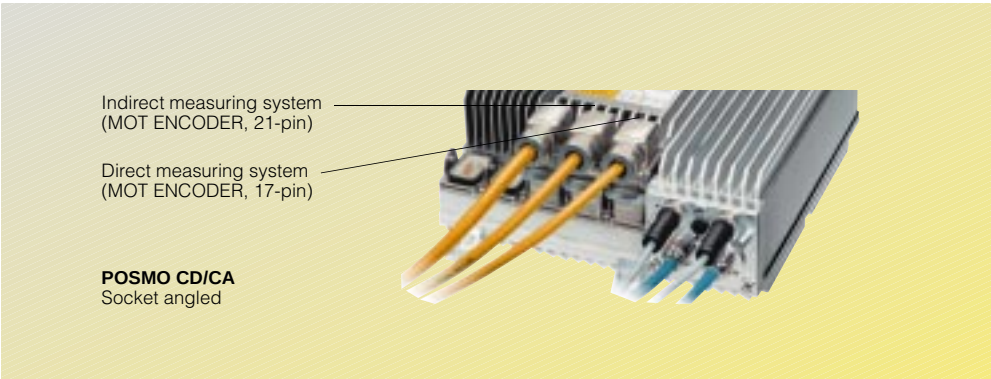
Connection of motor cable to SIMODRIVE POSMO CD/CA

Performance data:

Cross-section mm ²	Core identification	Color of conductor	Motor Name	Designation
4 x 6 mm², 2 x 1.5 mm²				
6	U/L1/C/L+	sw	Motor voltage	U
6	V/L2	sw	Motor voltage	V
6	W/L3/D/L-	sw	Motor voltage	W
6	None	gnge	PE conductor	⊕
1.5	None	sw	Brake + ¹⁾	1 (BRP)
1.5	None	ws	Brake - ¹⁾	2 (BRM)
4 x 2.5 mm², 2 x 1.5 mm²				
2.5	U	sw	Motor voltage	U
2.5	V	sw	Motor voltage	V
2.5	W	sw	Motor voltage	W
2.5	None	gnge	PE conductor	⊕
1.5	None	sw	Brake + ¹⁾	1 (BRP)
1.5	None	ws	Brake - ¹⁾	2 (BRM)

Measuring system connection for SIMODRIVE POSMO CD/CA

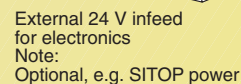
Connection of measuring
system
(SIMODRIVE POSMO
CD/CA only)



Connection of measuring system to SIMODRIVE POSMO CD/CA

1) When 1FN3 motors are used, instead of the brake, the motor PTCs are connected in series to sw (1) and ws (2).

**Power infeed,
e.g. SIMODRIVE 611
Mains supply module**



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SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Power terminal wiring for SIMODRIVE POSMO CD

Connector Designation	Function	Type ¹⁾	Technical data
SUPPLY IN	Power input		Pre-assembled cable for wiring (Order No.): • 6FX1002-5DA65-1□□□
C	DC link voltage P600	V	Permissible DC link voltage range
D	DC link voltage M600	V	400 V to 750 V DC
Note: A safe electrically isolated voltage 24 V (1P24) ±2 % is generated from the DC link voltage. The following are connected to this voltage: • Motor brake • Digital outputs • BERO supply DC link terminal: • to SIMODRIVE 611 • to SIMOVERT MASTERDRIVES			
Warning: The DC link connection is equipped with a safety interlock for protection against residual voltage; this must only be opened with a tool, e.g. a screwdriver, by qualified personal. The DC link connection must not be disconnected until 4 minutes after the power supply has been switched off!			
⊕	Ground PE	V	
–	Spare		
1	Terminal "Pulse enable" (KL IF)	I	Voltage tolerance (including ripple): 21 V to 30 V Current input typical: 1.4 mA at 24 V max.: 2.0 mA at 30 V
Note: The terminal "Pulse enable" acts on all axes operated on a line.			
2	Reference potential for KL IF (M24)	V	Connection conditions: • Standard case: – KL IF wiring (e.g. 24 V to 1; 0 V to 2) – Pulse enable via PROFIBUS control word • With the "Safe standstill" function (available soon) – KL IF is used as additional switch-off
SUPPLY OUT	Power output		Pre-assembled cable for wiring to additional POSMO SI (Order No.): • 6FX1002-5DA35-1□□□ to additional POSMO SI or POSMO CD: • 6FX1002-5DA25-1□□□
C	DC link voltage P600	V	The DC link voltage, PE conductor and "Pulse enable" terminal are wired to the next POSMO SI/CD
D	DC link voltage M600	V	
⊕	Ground PE	V	Important! In the last station, the blanking cover must remain on the SUPPLY OUT connector to safeguard the protection type!
–	Spare		
1	Terminal "Pulse enable" (KL IF)	O	
2	Reference potential for KL IF (M24)	V	
Warning: The DC link connection is equipped with a safety interlock for protection against residual voltage; this must only be opened with a tool, e.g. a screwdriver, by qualified personal. The DC link connection must not be disconnected until 4 minutes after the power supply has been switched off!			

1) I: Input; V: Supply; O: Output

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Motor connection wiring for SIMODRIVE POSMO CD

Connector Designation	Function	Type ²⁾	Technical data
MOT POWER ¹⁾	Motor output		Pre-assembled cable for wiring (Order No.):
U2	Motor voltage U	O	• 1FT6/1FK6 motor
V2	Motor voltage V	O	– 6FX1002-5DA01-1□□□
W2	Motor voltage W	O	– 6FX1002-5DA02-1□□□
⊕	Ground PE	V	– 6FX1002-5DA03-1□□□
1	Brake + (BRP) ³⁾	O	– 6FX1002-5DA85-1□□□
2	Brake – (BRM) ³⁾	O	• Linear motor 1FN
			– 6FX1002-5EA06-1□□□
			– 6FX1002-5EA12-1□□□
			– 6FX1002-5EA13-1□□□
			– 6FX1002-5EA21-1□□□
			• Terminal box connection for 1PH motor
			– 6FX1002-5CA16-1□□□
			– 6FX1002-5CA23-1□□□
			– 6FX1002-5CA31-1□□□
			– 6FX1002-5CA32-1□□□

1) Not for motors 1FN and 1PH (cables for 1FN have 4 signal cores and cables for 1PH have no brake cores).

2) V: Supply; O: Output

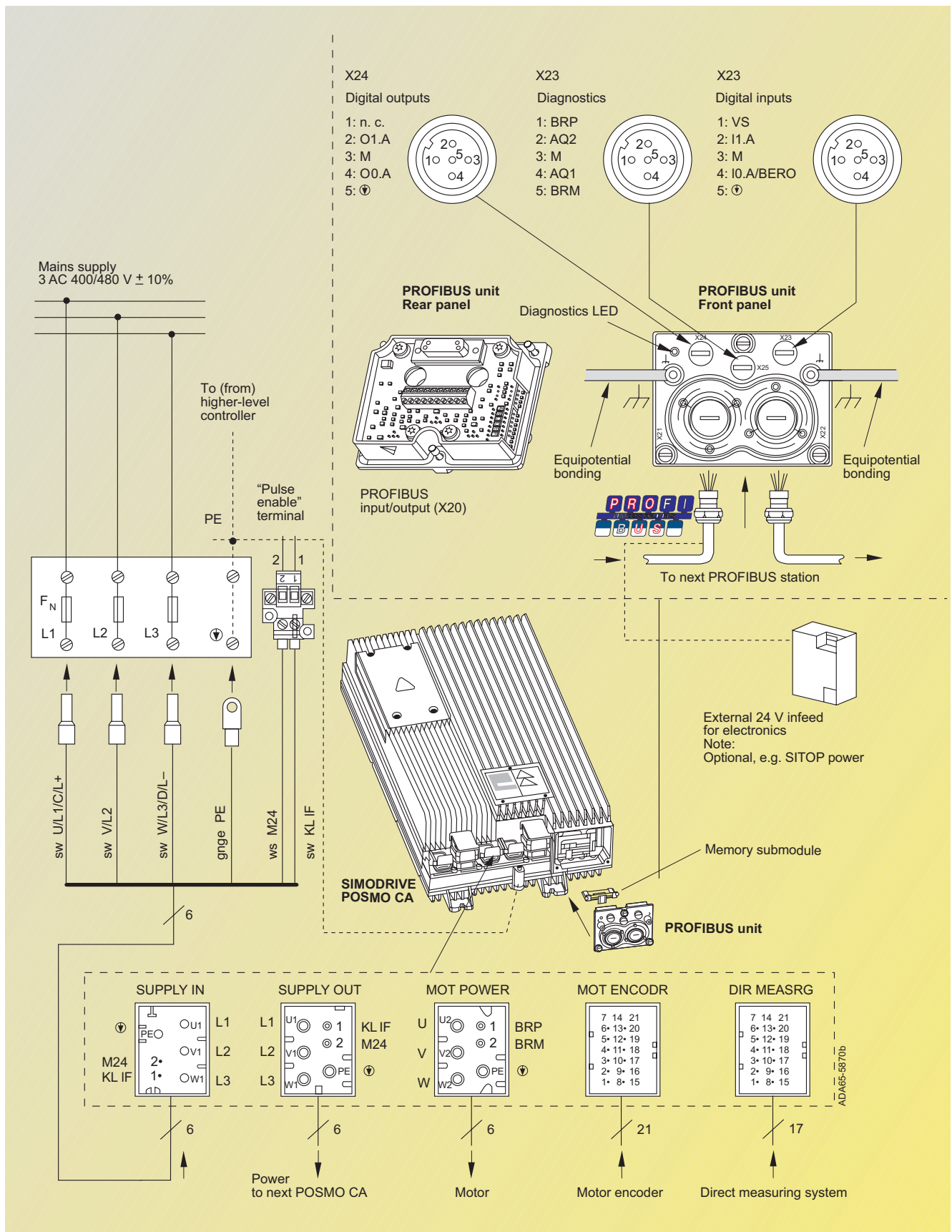
3) When 1FN3 motors are connected, instead of the brake, the motor PTCs are connected in series.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI
System overview and requirements

Connection overview for SIMODRIVE POSMO CA



Connection overview for SIMODRIVE POSMO CA

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI

System overview and requirements

Power terminal wiring for SIMODRIVE POSMO CA

Connector Designation	Function	Type ¹⁾	Technical data
SUPPLY IN	Power input		Pre-assembled cable for wiring (Order No.): • 6FX1002-5DA75-1□□□
L1	Supply voltage	V	Supply voltage: (3 AC 400/480 V) ± 10 %
L2	Supply voltage	V	
L3	Supply voltage	V	
⊕	Ground PE	V	Supply voltage: (3 AC 400/480 V) ± 10 %
1	Terminal "Pulse enable" (KL IF)	I	Voltage tolerance (including ripple): 21 V to 30 V Current input typical: 1.4 mA at 24 V max.: 2.0 mA at 30 V
			Note: The terminal "Pulse enable" acts on all axes operated on a line.
2	Reference potential for KL IF (M24)	V	Connection conditions: • Standard case: – KL IF wiring (e.g. 24 V to 1; 0 V to 2) – Pulse enable via PROFIBUS control word • With the "Safe standstill" function (available soon) – KL IF is used as additional switch-off
SUPPLY OUT	Power output		Pre-assembled cable for wiring to additional POSMO CA (Order No.): • 6FX1002-5DA45-1□□□
L1	Supply voltage	V	The supply voltage, PE conductor and "Pulse enable" terminal are wired to the next POSMO CA.
L2	Supply voltage	V	
L3	Supply voltage	V	
⊕	Ground PE	V	Important! In the last station, the blanking cover must remain on the SUPPLY OUT connector to safeguard the protection type!
–	Spare		
1	Terminal "Pulse enable" (KL IF)	O	
2	Reference potential for KL IF (M24)	V	
			Warning: The mains supply connection is equipped with a safety interlock for protection against residual voltage; this must only be opened with a tool, e.g. a screwdriver, by qualified personal. The mains supply connection must not be disconnected until 4 minutes after the power supply has been switched off!

SIMODRIVE 611 universal and POSMO

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SIMODRIVE POSMO CD/CA, SI
System overview and requirements

Motor connection wiring for SIMODRIVE POSMO CA

Connector Designation	Function	Type ²⁾	Technical data
MOT POWER ¹⁾	Motor output		Pre-assembled cable for wiring (Order No.):
U	Motor voltage U	O	• 1FT6/1FK6 motor
V	Motor voltage V	O	– 6FX1002-5DA01-1□□□
W	Motor voltage W	O	– 6FX1002-5DA02-1□□□
⊕	Ground PE	V	– 6FX1002-5DA03-1□□□
1	Brake + (BRP) ³⁾	O	– 6FX1002-5DA85-1□□□
2	Brake – (BRM) ³⁾	O	• Linear motor 1FN
			– 6FX1002-5EA06-1□□□
			– 6FX1002-5EA12-1□□□
			– 6FX1002-5EA13-1□□□
			– 6FX1002-5EA21-1□□□
			• Terminal box connection for 1PH motor
			– 6FX1002-5CA16-1□□□
			– 6FX1002-5CA23-1□□□
			– 6FX1002-5CA31-1□□□
			– 6FX1002-5CA32-1□□□

1) Not for motors 1FN and 1PH (cables for 1FN have 4 signal cores and cables for 1PH have no brake cores).

2) V: Supply; O: Output

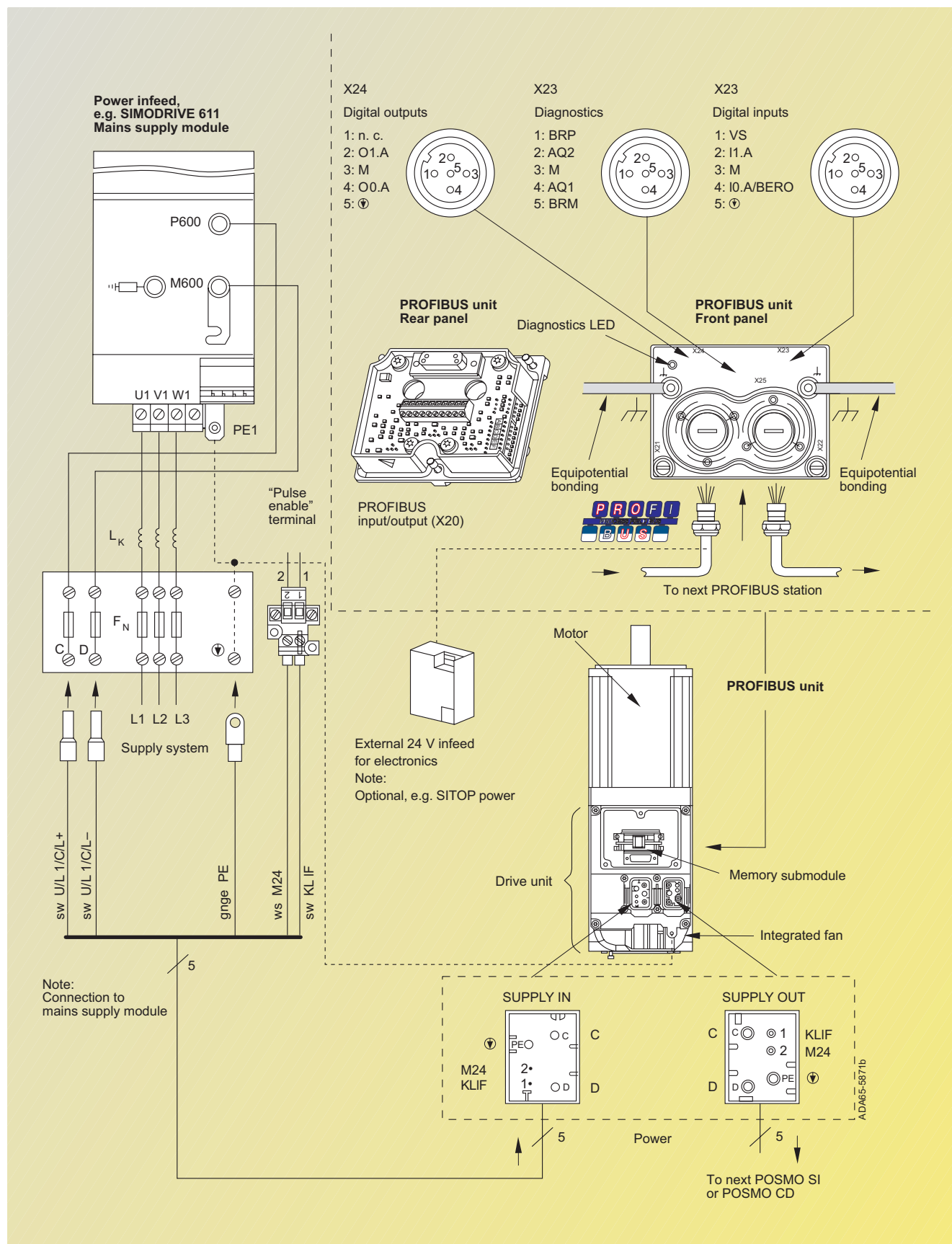
3) When 1FN3 motors are connected, instead of the brake, the motor PTCs are connected in series.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI
System overview and requirements

Connection overview for SIMODRIVE POSMO SI



Connection overview for SIMODRIVE POSMO SI

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Power terminal wiring for SIMODRIVE POSMO SI

Connector Designation	Function	Type ¹⁾	Technical data
SUPPLY IN	Power input		Pre-assembled cable for wiring (Order No.): • 6FX1002-5DA55-1□□□ or • 6FX1002-5DA65-1□□□
C	DC link voltage P600	V	Permissible DC link voltage range 400 V to 750 V DC
D	DC link voltage M600	V	
	Note: A safe electrically isolated voltage 24 V (1P24) ±2 % is generated from the DC link voltage. The following are connected to this voltage: • Motor brake • Digital outputs • BERO supply DC link terminal: • to SIMODRIVE 611 • to MASTERDRIVES Warning: The DC link connection is equipped with a safety interlock for protection against residual voltage; this must only be opened with a tool, e.g. a screwdriver, by qualified personal. The DC link connection must not be disconnected until 4 minutes after the power supply has been switched off!		
⊕	Ground PE	V	
–	Spare		
1	Terminal "Pulse enable" (KL IF)	I	Voltage tolerance (including ripple): 21 V to 30 V Current input typical: 1.4 mA at 24 V max.: 2.0 mA at 30 V Note: The terminal "Pulse enable" acts on all axes operated on a line.
2	Reference potential for KL IF (M24)	V	Connection conditions: • Standard case: – KL IF wiring (e.g. 24 V to 1; 0 V to 2) – Pulse enable via PROFIBUS control word • With the "Safe standstill" function (available soon) – KL IF is used as additional switch-off
SUPPLY OUT	Power output		Pre-assembled cable for wiring to additional POSMO SI (Order No.): • 6FX1002-5DA05-1□□□ or • 6FX1002-5DA35-1□□□ Pre-assembled cable for wiring to additional POSMO SI or POSMO CD (Order No.): • 6FX1002-5DA15-1□□□ or • 6FX1002-5DA25-1□□□
C	DC link voltage P600	V	The DC link voltage, PE conductor and "Pulse enable" terminal are wired to the next POSMO SI/CD
D	DC link voltage M600	V	
⊕	Ground PE	V	Important! In the last station, the blanking cover must remain on the SUPPLY OUT connector to safeguard the protection type!
–	Spare		
1	Terminal "Pulse enable" (KL IF)	O	
2	Reference potential for KL IF (M24)	V	
	Warning: The DC link connection is equipped with a safety interlock for protection against residual voltage; this must only be opened with a tool, e.g. a screwdriver, by qualified personal. The DC link connection must not be disconnected until 4 minutes after the power supply has been switched off!		

1) I: Input; V: Supply; O: Output

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Connection of the PROFIBUS unit

Design

Note

For SIMODRIVE POSMO SI, POSMO CD and POSMO CA, the same PROFIBUS unit is used!

- The PROFIBUS signals and I/O signals are connected to the PROFIBUS unit.
- PROFIBUS must either be connected via a metallic M20 cable gland with an integrated shield terminal (e. g. Pfirsch, Order No. 22051EP1108) or with a flange PG (available soon) to the X20 screw terminals. The flange PG enables pre-assembled cables to be used.
- If the communication has to remain operational even when the power supply is switched off, the necessary 24 V supply voltage can be fed in separately. For this purpose, a PROFIBUS cable with additional cores (SIMATIC ET200X accessories) must be used.
- Digital input signals must be connected to X23 and digital output signals must be connected to X24.
- Diagnostic signals are routed to connector X25.
- Connectors X23 to X25 are in M12 plug-in technology and are supplied fitted with covers.

T functionality

The PROFIBUS unit is designed such that when the PROFIBUS unit is removed, the PROFIBUS segment continues to function correctly.

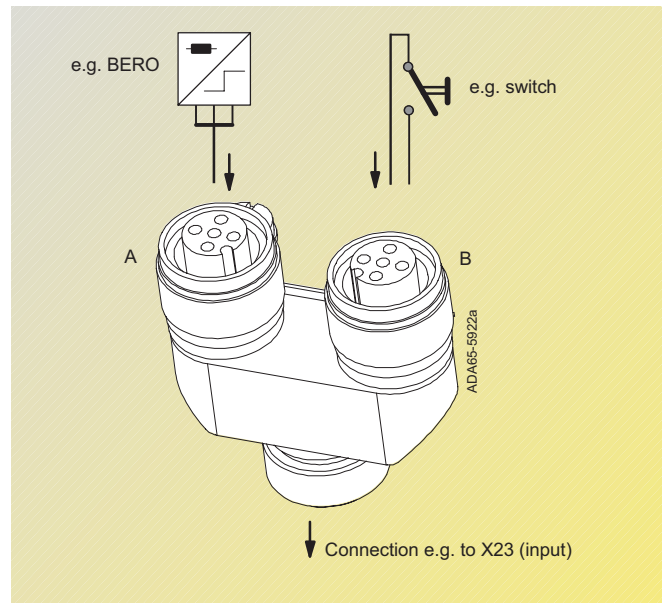
Important

The PROFIBUS unit is only permitted to be plugged in or removed when the power supply is disconnected!

Y connector

If input or output signals from or to different locations are routed to connector X23 or from connector X24, these signals can be distributed onto separate signal leads using a Y connector (for wiring, see Figure).

The Y connector is not a component part of the PROFIBUS unit. Order number: 6ES7194-1KA01-0XA0.



Y connector

PROFIBUS cabling

Important

The cable shield for each bus station must be connected to ground over as wide an area as possible (at the SIMODRIVE POSMO SI/CD/CA in the metallic M20 cable gland or flange PG).

Recommendation: Route the equipotential bonding in parallel with the PROFIBUS cable (cable cross-section 4 to 16 mm²). Two M5 threads are provided for this purpose on the PROFIBUS unit (see Figure on Page 6/83).

When using connector couplings for PROFIBUS, at higher data transfer rates (> 1.5 Mbaud), perfect functioning is no longer guaranteed (cable reflection).

Optional 24 V electronics supply

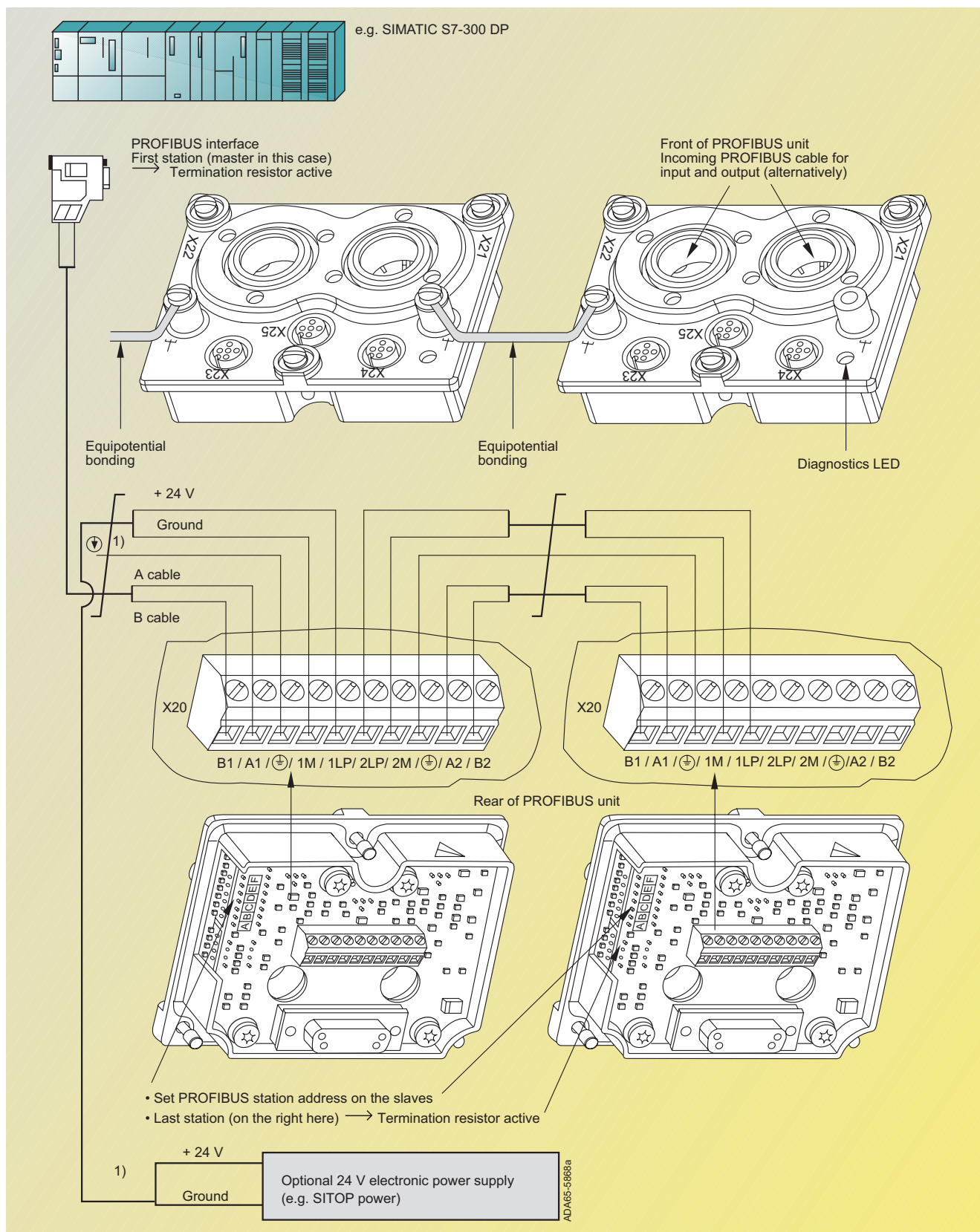
When the bus communication and position detection are required to remain active even when the load power supply is switched off, an optional power supply, e.g. SITOP power (24 V ± 20 %) can be connected. The supply cables are routed unshielded in the PROFIBUS cable.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI
System overview and requirements

Connection and wiring overview



Connection and wiring overview with PROFIBUS cable (example with additional electronics supply)

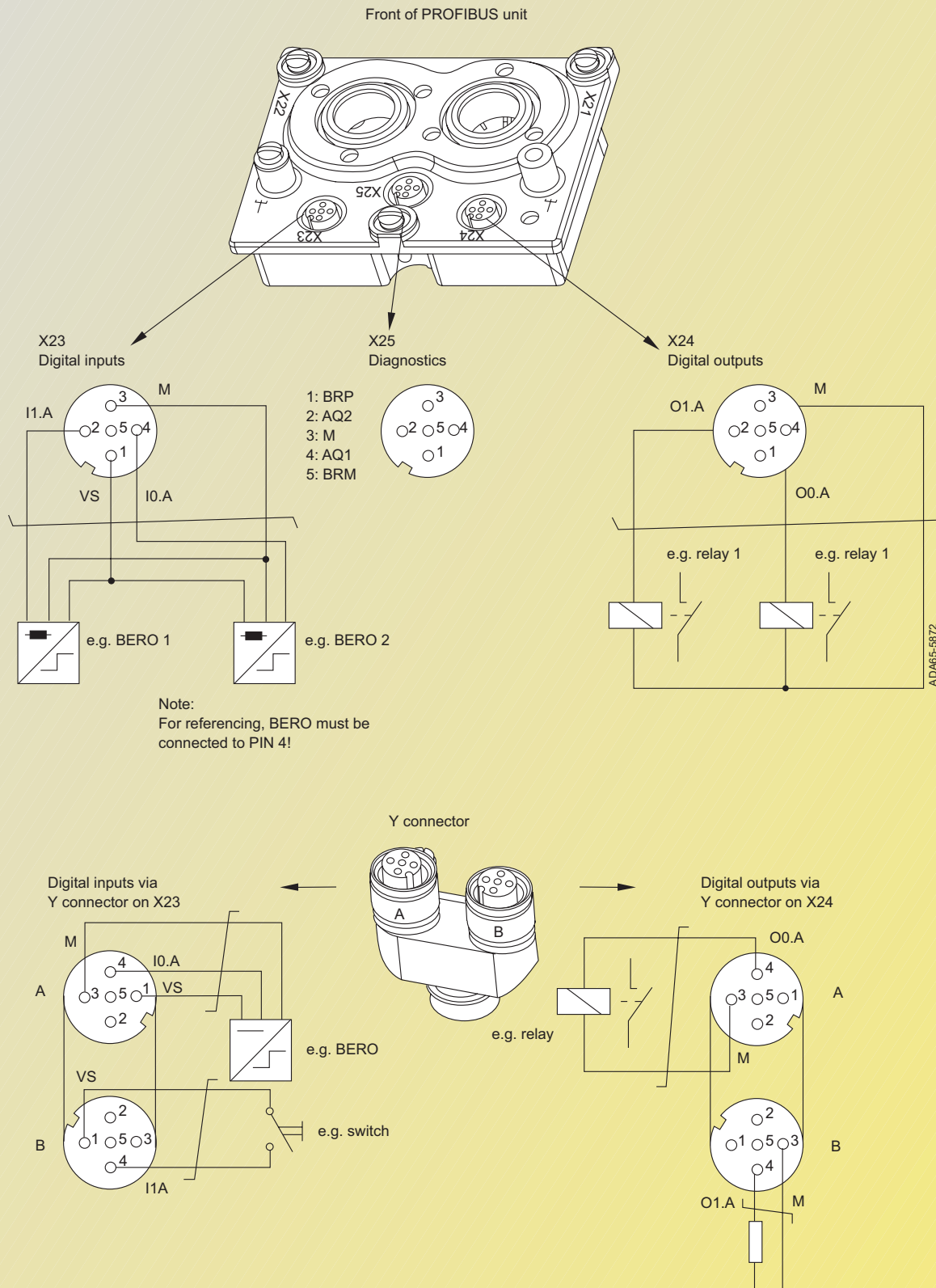
1) Externally combined into a 5-core PROFIBUS cable.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI
System overview and requirements

Connection and wiring overview (continued)



Connection and wiring overview for M12 connector (example)

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO CD/CA, SI System overview and requirements

Terminal assignment

Wiring of the PROFIBUS unit				
Terminal designation	Terminal No.	Function	Type ¹⁾	Technical data
PROFIBUS connection Cu PG (X20)				
X20		PROFIBUS input		Connector type: Screw terminal strip (X20)
B1		B-wire for PROFIBUS	I	Note: Cable, not pre-assembled, for wiring with an M20 screwed cable gland. In the last PROFIBUS station, the blanking cover must remain plugged in to safeguard the protection type!
A1		A-wire for PROFIBUS	I	
⊕		PE conductor	V	
1M		Ground 24 V input	V	
1LP		+ 24 V input	V	
		PROFIBUS output		
2LP		+ 24 V output	V	
2M		Ground 24 V output	V	
⊕		PE conductor	V	
A2		A-wire for PROFIBUS	O	
B2		B-wire for PROFIBUS	O	
Connection of digital inputs and supply (X23)				
	X23			Connector type: 5-pole M12 connector Signal line: 5-core of cross-section $\leq 0.75 \text{ mm}^2$
I0.A	X23.4	Digital input 1 ²⁾ High-speed input ³⁾ e. g. for BERO equivalent zero mark, external block change	DI	Voltage: 24 V Current input, typ.: 6 mA at 24 V Reference potential: X23.3 Level (including ripple) High signal: 15 V to 30 V Low signal: -3 V to 5 V Signal runtime for I0.A: typ. 500 μs
I1.A	X23.2	Digital input 2 ²⁾	DI	Note: An open-circuit input is interpreted as a "0" signal.
VS	X23.1	+ 24 V	V	Voltage range: 24 V $\pm 2 \%$ (short-circuit proof) Current load: max. 100 mA
M	X23.3	Ground 24 V input	V	Note: This voltage can be used to supply an external BERO.
⊕	X23.5	PE conductor	V	Not used
Connection of digital outputs and supply (X24)				
	X24			Connector type: 5-pole M12 connector Signal line: 5-core of cross-section $\leq 0.75 \text{ mm}^2$
O0.A	X24.4	Digital output 1	DO	Rated current per output: 100 mA short-circuit proof
O1.A	X24.2	Digital output 2	DO	Reference potential: X24.3
n.c.	X24.1	Not assigned		
M	X24.3	Ground 24 V	V	
⊕	X24.5	PE conductor	V	
Connection of diagnostics DAC and external brake activation (X25)				
	X25			Connector type: 5-pole M12 connector Signal line: 5-core of cross-section $\leq 0.75 \text{ mm}^2$
AQ1	X25.4	Diagnostic output 1 ⁴⁾ (test socket 1)	AO	Resolution: 8-bit Voltage range: 0 V to 5 V
AQ2	X25.2	Diagnostic output 2 ⁴⁾ (test socket 2)	AO	Maximum current: 3 mA No electrical isolation: Reference is X25.3
BRP	X25.1	Brake signal BRP	I	Note: The motor holding brake can be ventilated during servicing via an external 24 V power supply on BRP/BRM.
M	X25.3	Ground 24 V	V	
BRM	X25.5	Brake signal BRM	I	
				Voltage: 24 V $\pm 10 \%$ Current input: 1.3 A for 24 V (max) ⁵⁾

1) I: Input; DI: Digital input; DO: Digital output;
AO: Analog output; V: Supply.

2) Freely parameterizable
All digital inputs are debounced using software techniques. This results in a delay of interpolation cycles in signal recognition (P1010).

3) I0.A is hard-wired internally to the position sensing circuit and acts almost immediately.

4) Freely parameterizable
The digital inputs are updated in the interpolation clock cycle (P1010). A hardware delay time of approx 200 μs is added.

5) Dependent on the brake type.

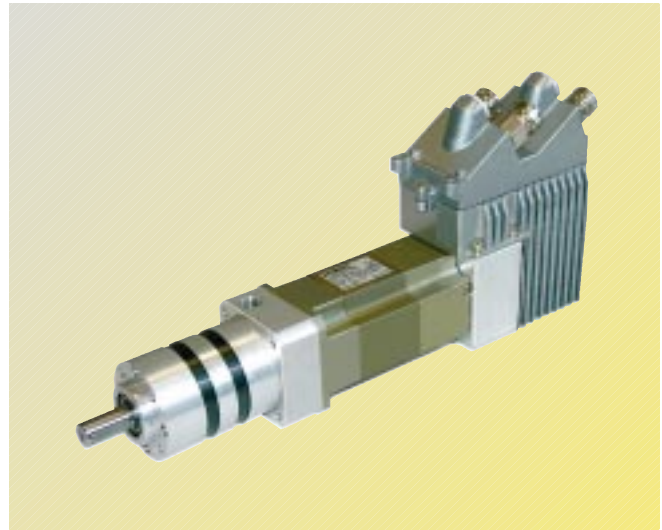
SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO A System overview and requirements



SIMODRIVE POSMO A 75 W



SIMODRIVE POSMO A 300 W with gear unit

Field of application

Intelligent positioning motor as a distributed station on PROFIBUS with the following features:

- Power module and complete drive control in the motor
- Link via communications bus and power bus

Typical applications:

- Positioning of formats or stops
- Re-setting of process variables (e.g. via motor valves)

Applications are found in machine tools and transfer lines and production machines in the sectors of packaging, wood processing, glass, printing and plastics as well as medical engineering, e.g. traversing of examination tables or X-ray equipment.

Additional features

- Linking via the communication bus and power bus results in simplification of the machine infrastructure.

- Simple communication interface for integration in any PROFIBUS environment. Uses only the simple PROFIBUS services.

- Two terminals (programmable as either inputs or outputs) for monitoring or controlling external drive-related signals, e.g. clamping and limit switches.

- Comfortable function blocks simplify configuring with STEP 7 in the SIMATIC world.

- Easy start-up with clear and user-friendly commissioning tool SimoCom A.

Design

Compact mounting of converter power module, motor control, position encoder, positioning control, program memory and communications interface to the motor.

The motor can be equipped with a modular gear unit with graduated planetary gearing or worm gearing.

- The removable terminal cover with integrated PROFIBUS address switch and terminating resistor makes it possible to disconnect a motor without interrupting the communication.

- All connections are made using standard cables.
- Local diagnostics via LED (fault/ready), plus two diagnostic socket connectors (parameterizable analog outputs).

Mode of operation

Single-axis positioning drive
The drive power is supplied by a 24 V/48 V DC supply voltage conventional in mechanical engineering. The entire range of traversing functions is provided via PROFIBUS, e.g.:

- **Travel to**
end position, with velocity and adjustable acceleration
- **Travel around**
one path and direction, with velocity and adjustable acceleration
- **Travel with**
controlled velocity and adjustable acceleration

- **Travel as soon as**
a time condition or logical condition is satisfied
- **Travel as long as**
a time condition or logical condition is satisfied
- **Travel and signal**
a previously defined byte combination from a particular position
- **Set actual value in-the-fly**
Re-synchronization of the actual value system (during axis motion) on a high-speed input

Additional functions:

- Jerk limitation
- Block change on-the-fly
- Actual value preset
- Travel to fixed stop
- Backlash compensation
- Software limit switch
- Brake management for optionally integrated holding brake (POSMO A 300) or potential external clamping.

PROFIBUS supports high-speed cyclic data exchange between the slave and the higher-level PROFIBUS master, e.g. a CPU of SIMATIC S7, a communications processor with communications capability, e.g. CP 5412, or a communications module, e.g. CP 342-5, but standard masters produced by other manufacturers can also be used.

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO A System overview and requirements

Drive system with SIMODRIVE POSMO A

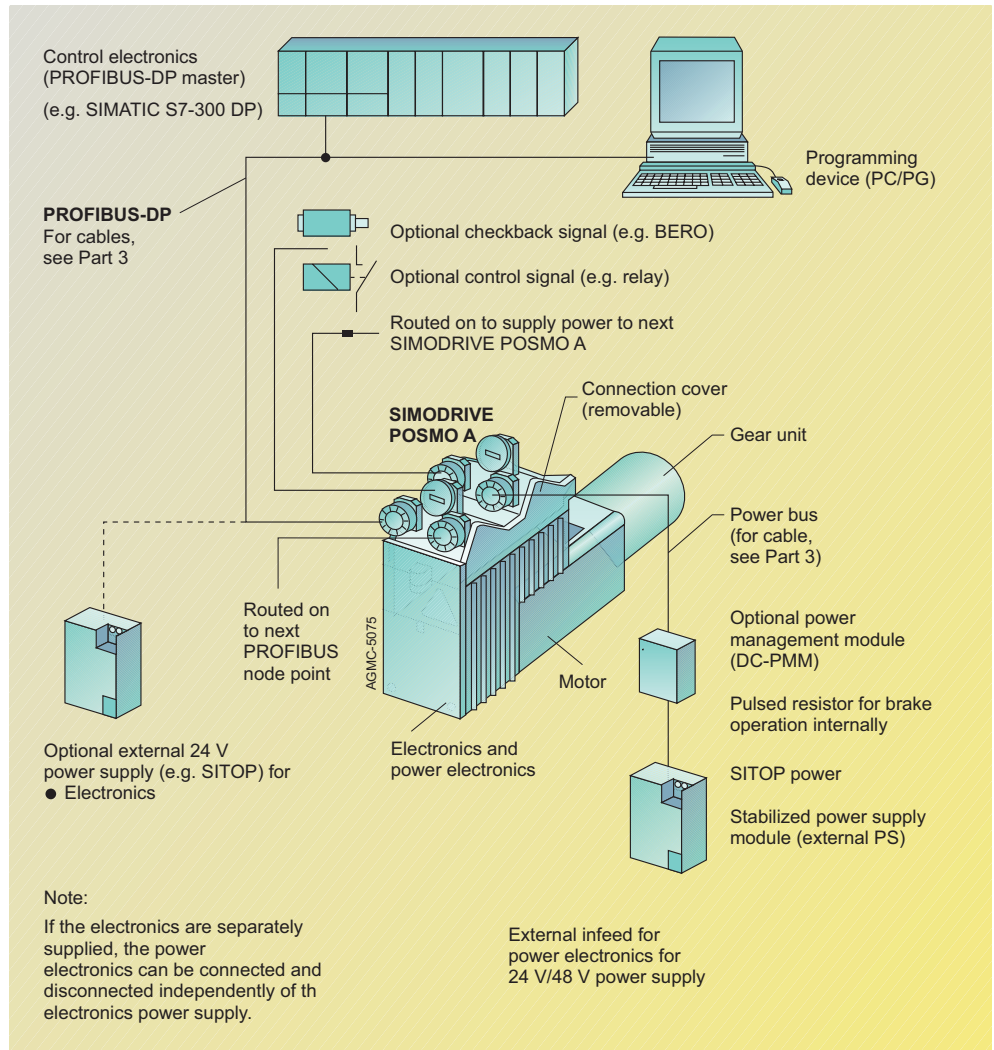
The following components are available together with the SIMODRIVE POSMO A positioning motor to build a complete drive system.

The following general requirements must be observed:

- The PROFIBUS-DP coupling is realized in conformance with the norm. A standard PROFIBUS cable can be used. In order to loop-in the optional electronics power supply, the same bus cable can be used as is used in the distributed ET 200X I/O station.

Note

- When using connector couplings for PROFIBUS, at higher data transfer rates (> 1.5 Mbaud), perfect functioning is no longer guaranteed (cable reflection).
- An external +24 V power supply unit must be provided (voltage range: 24 V $\pm$ 20 %) for POSMO A 75 W and 48 V $\pm$ 20 % for POSMO A 300 W. With POSMO A 300 W, operation is possible at 24 V DC with derating. This is, however, subject to the condition that the applied voltage is greater than 24 V when the integrated holding brake is used.
- The maximum cross-section for the 24/48 V load power supply is 4 mm². If the power supply used can supply more current than is permissible for the particular cable, appropriate fuses must be provided.
- A Power Management Module (PMM) can be optionally connected between the external load power supply and input terminals of SIMODRIVE POSMO A. The PMM is used to dissipate the regenerative feedback energy.
- If bus communications and position sensing are to remain active even with the load power supply switched off, an optional electronics power supply can be connected (24 V $\pm$ 20 %). The cable is routed in the ET 200X bus cable (distributed I/O system).



System overview

- A BERO can only be connected as a three-wire PNP type.
- All the power supplies must have "protective separation".
- When using SIMODRIVE POSMO A in UL-approved plants and systems, a UL approved varistor must be used in the 24 V supply cable; it must have the following characteristic data:

24 V:
 $U_N = \text{DC } 31 \text{ V}, I_{\text{max}} = 2000 \text{ A}$
e.g. SIOV-S20-K25 from EPCOS

48 V:
 $U_N = \text{DC } 65 \text{ V}, I_{\text{max}} = 6500 \text{ A}$
e.g. SIOV-S20-K50 from EPCOS

<http://www.epcos.com>.

When the Power Management Module (PMM) is used, a varistor is not necessary since it is part of the PMM.

SIMODRIVE 611 universal and POSMO

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SIMODRIVE POSMO A System overview and requirements

DC power supply (24 V, 48 V)

Power supply sizing

The load power supply must be engineered in accordance with the number of SIMODRIVE POSMO A positioning motors and the coincidence factor.

24 V supply (75 W motor)

For the technical specifications of the 24 V supply, see Chapter 3.

Recommendations for the 24 V power supply:

We recommend that a regulated SITOP power supply module is used for the 24 V load power supply.

5 A, 10 A, 20 A and 40 A modules are available.

48 V supply (300 W motor)

For the technical specifications of the 48 V supply, see Chapter 3.

First recommendation for the 48 V power supply:

We recommend that two regulated SITOP power supply modules connected in series (see Figure) are used for the 48 V load power supply.

5 A, 10 A, 20 A and 40 A modules are available.

Second recommendation for the 48 V power supply:

It is recommended that a rectifier unit is used to generate the 48 V power supply.

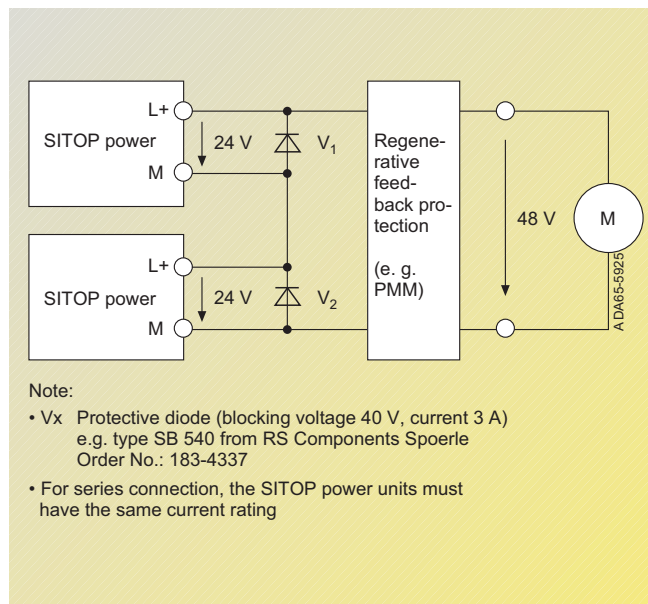
The rectifier unit is an unregulated DC supply with a safety transformer and varistor connection.

Coincidence factor

When several SIMODRIVE POSMO A devices are implemented but are not operated simultaneously, a lower rating load power supply can be used.

However a brief overload capability of the power supply must be guaranteed otherwise the electronics of the SIMODRIVE POSMO A would interpret voltage dips as an undervoltage condition and trip.

- Example 1:
3 SIMODRIVE POSMO A – 75 W
– Coincidence factor = 1
– Rated power, full speed
→ $3 \times 4.5 \text{ A} \times 1 = 13.5 \text{ A}$
→ SITOP power 20 A
- Example 2:
3 SIMODRIVE POSMO A – 75 W
– Coincidence factor = 0.7 (not all units are simultaneously operating)
– Rated power, full speed
→ $3 \times 4.5 \text{ A} \times 0.7 = 9.45 \text{ A}$
→ SITOP power 10 A
- Example 3:
3 SIMODRIVE POSMO A – 300 W
– Coincidence factor = 1
– Rated power, full speed
→ $3 \times 5.25 \text{ A} \times 1 = 15.75 \text{ A}$
→ SITOP power 20 A
- Example 4:
3 SIMODRIVE POSMO A – 300 W
– Coincidence factor = 0.5 (not all units are simultaneously operating)
– Rated power, full speed
→ $3 \times 5.25 \text{ A} \times 0.5 = 7.875 \text{ A}$
→ SITOP power 10 A
- Example 5:
4 SIMODRIVE POSMO A – 300 W
– Coincidence factor = 1
– Rated power, full speed
→ $4 \times 5.25 \text{ A} \times 1 = 21 \text{ A}$
→ 48 V transformer 4AV3596



Series connection of two SITOP power units to double the voltage

Regenerative feedback protection for motor braking

Regenerative feedback protection

If SIMODRIVE POSMO A is used in a plant or system with low mechanical friction, the electrical power regenerated when braking can increase the level of the load power supply.

In such cases, regenerative feedback protection must be used.

The type of regenerative feedback protection used depends on the following factors:

- Coincidence factor in the line
- Number of positioning motors operated on one line
- Efficiency of the existing mechanical system
- Existing friction
- The moments of inertia

Braking energy

The following typical braking energy per drive is generated under the specified conditions:

- Conditions
 - Braking from rated speed in S3 duty
 - Effective overall moment of inertia = 1 Motor moment of inertia
- Braking energy
 - 1.0 Ws for SIMODRIVE POSMO A – 75 W
 - 2.5 Ws for SIMODRIVE POSMO A – 300 W

The effective overall moment of inertia and the braking energy are related linearly, i.e. if the moment of inertia doubles, the braking energy is doubled when the motor brakes.

Rules for feedback protection

The following rules must be observed for regenerative feedback protection:

- If a switched load power supply is used (e.g. SITOP power), regenerative feedback protection is necessary.
- If the regenerative feedback power is not known, regenerative feedback protection must be used.
- If one power management module (PMM) is not sufficient for converting the braking energy, another supply line complete with an additional PMM is necessary.

Regenerative feedback protection for 24 V supply (75 W motor)

Depending on the type of power supply used, the following methods can be used for feedback protection during motor braking:

Unstabilized 24 V power supply (transformer, rectifier)

The type of regenerative feedback protection used depends on the following factors:

- Effective overall moment of inertia
- Coincidence factor
- Power supply used (output capacitance)

Stabilized 24 V power supply (SITOP power)

- Regenerative feedback protection with diode and capacitor

An example is shown in the Figure for which operation with up to 3 drives is possible under the following conditions:

- Effective overall moment of inertia = 1 Motor moment of inertia
- Coincidence factor = 1
- Braking from rated speed in S3 duty

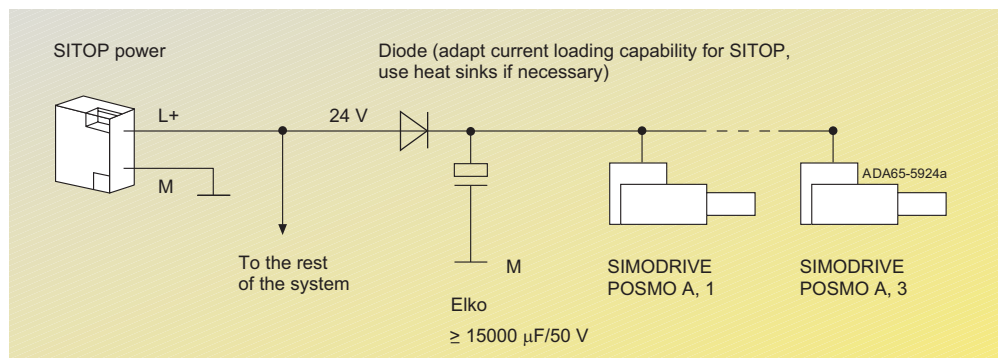
- Regenerative feedback protection with power management module DC 24 V (DC PMM/24 V)

1 DC PMM/24 V can accept a braking energy of 10 Ws.

Example:

- 3 motors each with a braking energy of = 1.0 Ws
- Maximum continuous current-carrying capacity = 28 A
- Coincidence factor = 1

→ A maximum of six POSMO A – 75 W can be operated on one DC PMM/24 V.



Example: Regenerative feedback protection with diode and capacitor

Regenerative feedback protection for 48 V supply (300 W motor)

Depending on the type of power supply used, the following methods can be used for feedback protection during motor braking:

Unstabilized 48 V power supply (transformer, rectifier)

The type of regenerative feedback protection used depends on the following factors:

- Effective overall moment of inertia
- Coincidence factor
- Power supply used (output capacitance)

Stabilized 48 V power supply (SITOP power)

- Regenerative feedback protection with diode and capacitor

An example is shown in the Figure for which operation with up to 3 drives is possible under the following conditions:

- Effective overall moment of inertia = 1 Motor moment of inertia
- Coincidence factor = 1
- Braking from rated speed in S3 duty

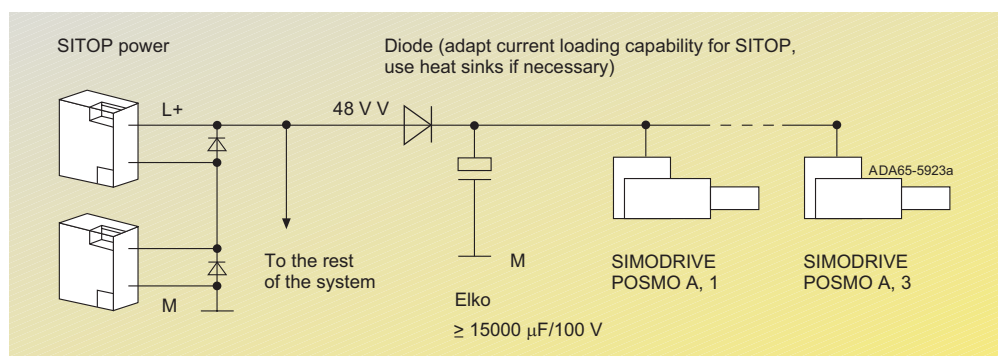
- Regenerative feedback protection with power management module DC 48 V (DC PMM/48 V)

1 DC PMM/48 V can accept a braking energy of 10 Ws.

Example:

- 3 motors each with a braking energy of = 4.5 Ws
- Maximum continuous current-carrying capacity = 28 A
- Coincidence factor = 1

→ A maximum of three POSMO A – 300 W can be operated on one DC PMM/48 V.



Example: Regenerative feedback protection with diode and capacitor

SIMODRIVE 611 universal and POSMO

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SIMODRIVE POSMO A System overview and requirements

Power Management Module (DC-PMM 24V/48 V)

If several axes are simultaneously braked in a system due to the operating situation, e.g. for EMERGENCY STOP, or if the axes are essentially traversed simultaneously, a Power Management Module can be used to dissipate the regenerative feedback power. The PMM is connected between the load power supply and the first SIMODRIVE POSMO A positioning motor.

Functions and features

- The regenerative feedback energy is dissipated using an integrated pulsed resistor with I^2t monitoring.
- Regenerative feedback protection
- Indicators
 - Ready
 - Fault
 - Regenerative feedback
- If the machine safety demands it:

Control circuit to control a relay for "start inhibit".

The maximum permissible number of positioning motors that can be connected to a module is dependent on the load rating, the coincidence factor of the feedback and the feedback energy.

The feedback energy is calculated for a drive as follows:

$$W = \frac{1}{2} \times J \times \omega^2$$

W : Braking energy
[Ws = (kgm²/s²)]

J : Inertia [kgm²]

ω : Angular frequency =
 $\frac{2 \times \pi \times n}{60} [\text{s}^{-1}]$



Power Management Module

SIMODRIVE 611 universal and POSMO

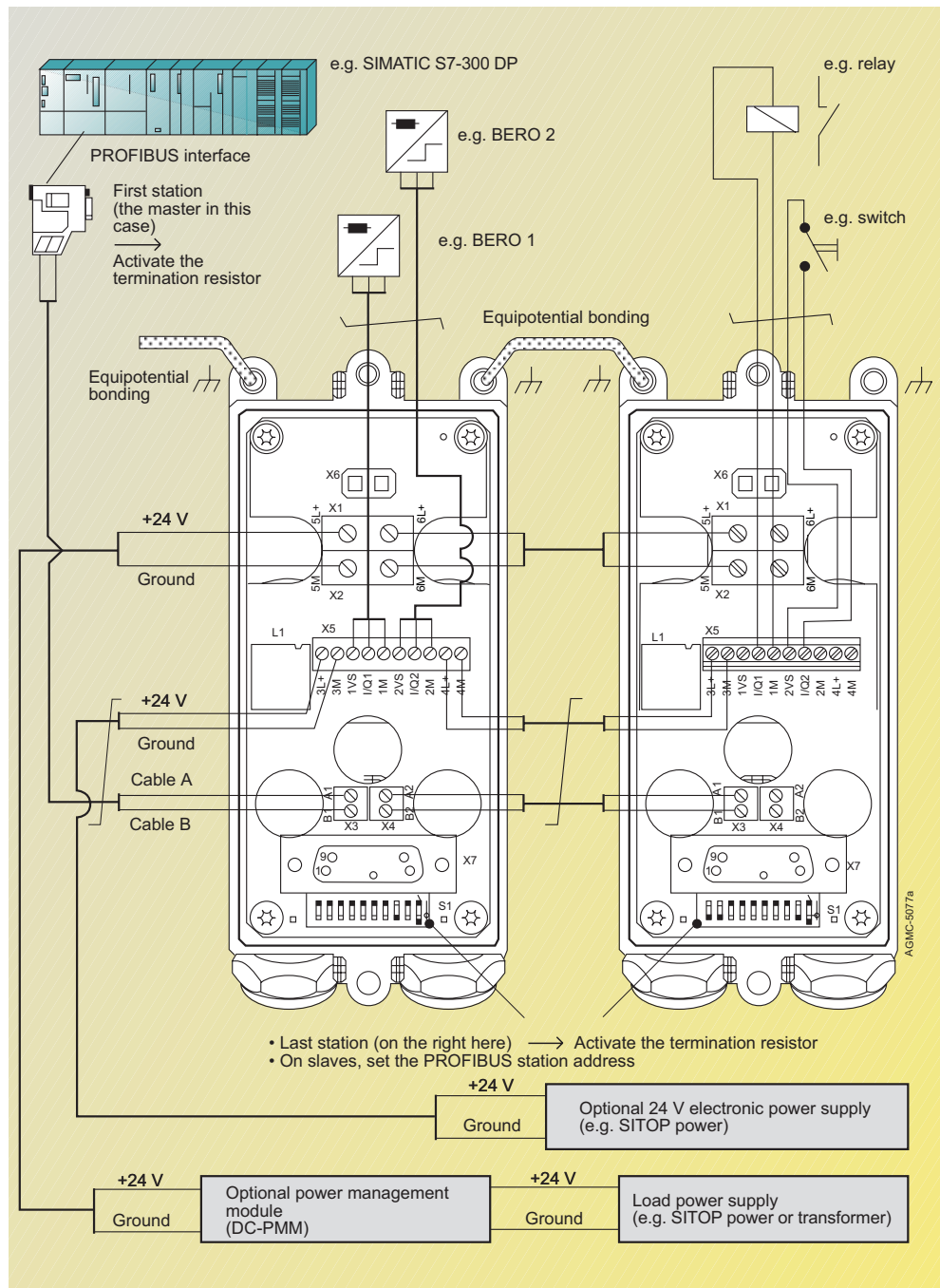
Planning guide

SIMODRIVE POSMO A System overview and requirements

Connection and wiring overview

The SIMODRIVE POSMO A is completely realized in the terminal cover. This design makes it especially quick and easy to replace a unit. The cover can be released from the old motor (2 screws) and attached to the new motor without having to remove the wiring.

All cables enter through PG glands.



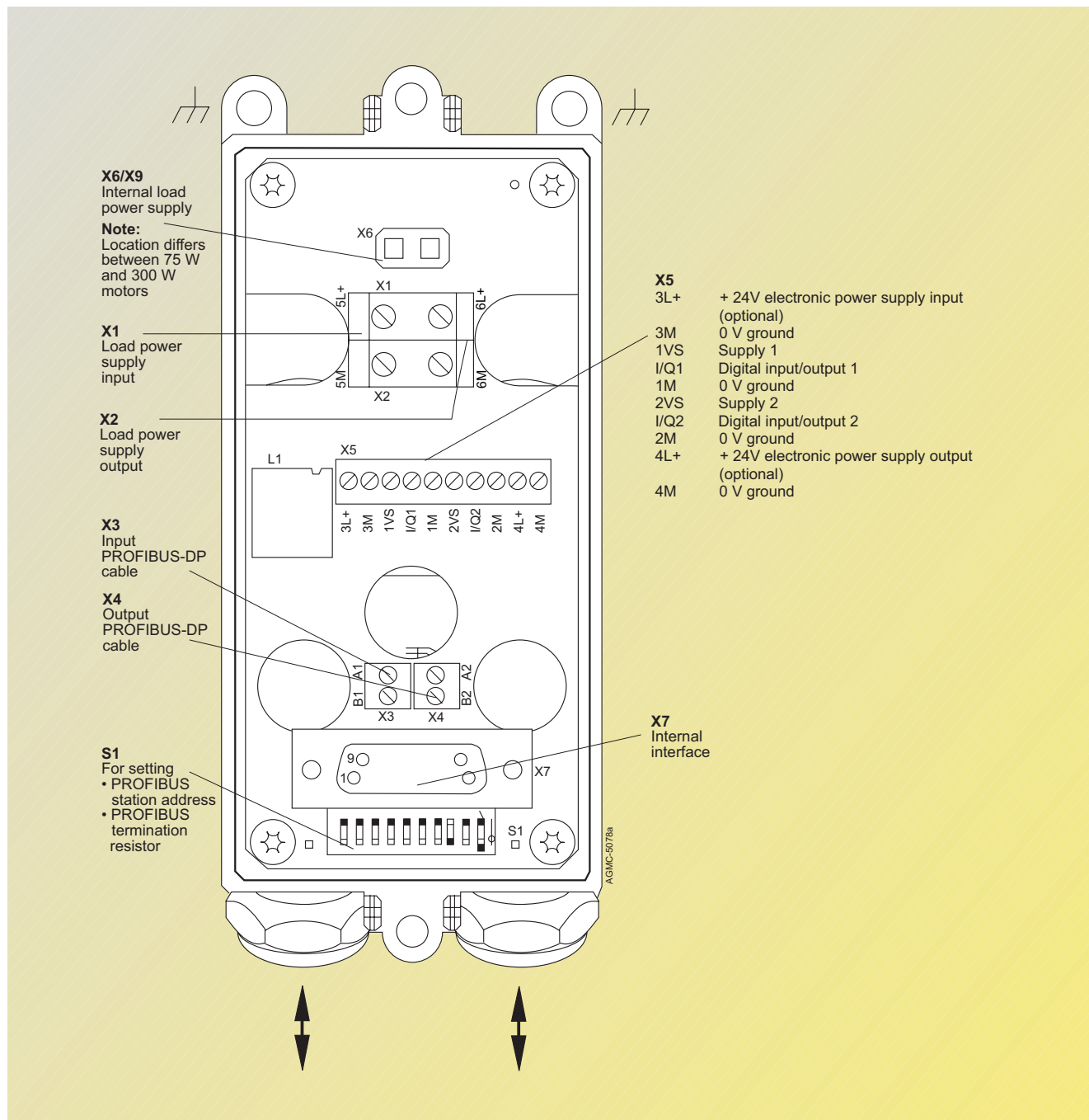
Connection and wiring overview (example with additional electronics supply)

SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO A System overview and requirements

Connection and wiring overview (continued)



Connections for SIMODRIVE POSMO A

SIMODRIVE 611 universal and POSMO

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SIMODRIVE POSMO A System overview and requirements

Interfaces, terminals and switch S1

No.	Designation	Function	Type ¹⁾	Technical data	Cross-section
X1	5L+	Load power supply	I	24 V for 75 W motor, 48 V for 300 W motor	Max. 4 mm ²
	6L+	+ 24 V / + 48 V input	O		
X2	5M	+ 24 V / + 48 V input	I	0 V	
	6M	Ground 24 V / 48 V input	O	0 V	
X3	A1	PROFIBUS-DP bus input	I	–	Max. 0.35 mm ²
	B1	A-wire input	I	–	
X4	A2	PROFIBUS-DP bus output	O	–	Max. 0.35 mm ²
	B2	B-wire output	O	–	
X5	3L+	Electronic supply (optional)	I	24 V ± 20%	Max. 0.75 mm ²
	3M	+24 V input	I	Current input: ≤ 250 mA	
		Ground 24 V input	I	The electronics can be supplied separately with 24 V via these terminals.	
				Advantage: When the load power supply is switched off, the electronics remain supplied and operational.	
	1VS	P24 output	O	•Output (KL Q1 and Q2):	
	I/Q1	Input/output terminal 1	I/O	– Maximum current/output: 100 mA	
	1M	M24 output	O	•Supply (KL VS):	
	2VS	P24 output	O	– Maximum current/terminal: 100 mA	
	I/Q2	Input/output terminal 2	I/O	•Input (KL I1 and I2):	
	2M	M24 output	O	– Current input: ≤ 15 mA – 24 V ± 20%	
				Typical connections for:	Max. 0.75 mm ²
				•BERO (3-wire PNP)	
				•External relay	
				•Logical I/Os (PLC)	
		Electronic supply (optional)			Max. 0.75 mm ²
	4L+	+ 24 V output	O	24 V ± 20%	
	4M	Ground 24 V output	O	The electronics of another unit can be supplied from these terminals.	

1) I: Input; O: Output

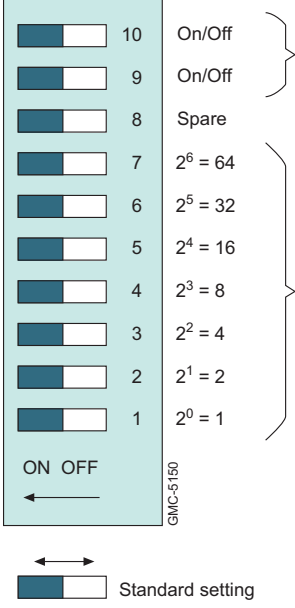
SIMODRIVE 611 universal and POSMO

Planning guide

SIMODRIVE POSMO A System overview and requirements

Interfaces, terminals and switch S1 (continued)

No.	Designation	Function	Type ¹⁾	Technical data	Cross-section
X6 X9	–	Internal load power supply	O	–	–
X7	–	Internal interface	I/O	Female Sub-D connector, 15-pole	–
		Equipotential bonding conductor (route in parallel with PROFIBUS cable)	I O	0 V 0 V	4 to 16 mm ²
S1	–	PROFIBUS station address	I	DIL switch, 10-pin	–



GMC-S150

PROFIBUS terminating resistor

Termination On/Off

Termination On/Off

PROFIBUS station address

Example:

	1	2
S7:	ON $\hat{=}$ 64	OFF $\hat{=}$ 0
S6:	ON $\hat{=}$ 32	ON $\hat{=}$ 32
S5:	ON $\hat{=}$ 16	ON $\hat{=}$ 0
S4:	OFF $\hat{=}$ 0	ON $\hat{=}$ 0
S3:	OFF $\hat{=}$ 0	ON $\hat{=}$ 4
S2:	OFF $\hat{=}$ 0	ON $\hat{=}$ 0
S1:	ON $\hat{=}$ 1	ON $\hat{=}$ 1
Total	113	37

Note:

- The valid address range is: 3 to 126
- For the first and last PROFIBUS station, the terminating resistor must be activated. Switches 9 and 10 must always be set to the same switch position.
- The set addresses are indicated in P918 (PROFIBUS station address).
- From software version 1.4 upwards:
When the positioning motor is switched on, if PROFIBUS station address 0 or 127 is recognized (all address switches are OFF or ON), the function "Jog mode without PROFIBUS and parameterization" is activated.

SIMODRIVE 611 universal and POSMO

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SIMODRIVE POSMO A Communication

PROFIBUS-DP overview

SIMODRIVE POSMO A is exclusively controlled and parameterized via PROFIBUS.

This means that communications must be established between the "DP master" and the "DP Slave POSMO A" to be commissioned.

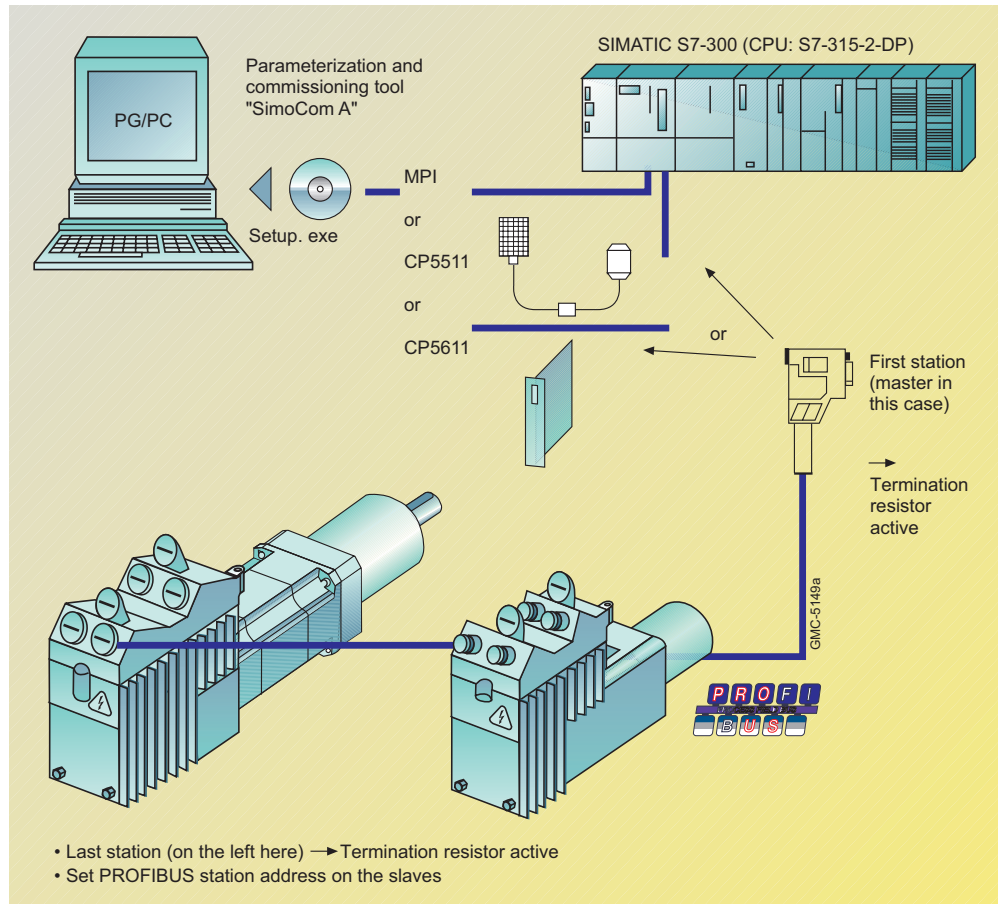
The communication possibilities:

- Start-up tool "SimoCom A" (Version 1.5.x and higher)
- Start-up tool "POSMO A Master"
- DP Master SIMATIC S5 or S7
- Third-party master

Stand-alone operation without PROFIBUS communication is possible. However, to parameterize the drive initially, access is required by means of one of the three communication possibilities listed above.

PROFIBUS devices have different performance characteristics. To enable all the master systems of the DP slave to be addressed correctly, the characteristic features of the slave are combined in a device master file (GSD). This file must be installed in the directory "GSD". The GSD file for the SIMODRIVE POSMO A, "SIEM8054.GSD", can be obtained from your local Siemens office (sales partner) or via the Internet: http://www.siemens.de/automation/csi_d/gsd

Data transfer between the master and slave uses the master/slave technique, whereby the drives are always the slaves. This allows extremely fast data transfer.



Example of online operation via PROFIBUS: "SimoCom A" ↔ 2 drives

POSMO A uses the PPO type 1 (Parameter Process Data Object) data structure as defined by the PROFIBUS organization.

PPO type 1 (PPO 1) is structured as follows:

- 4 words for the parameter area (PKW, parameter ID, value)

This message section is used to read and/or write parameters and to read out faults.

- 2 words for the process data area (PZD area)

SIMATIC S7 function blocks

To make it easier to control and parameterize a SIMODRIVE POSMO A positioning motor from the SIMATIC S7 program,

certain function blocks have been developed. This means that a drive, for instance,

can be parameterized without the need to know the PROFIBUS parameter formats and the task IDs.

The function blocks are available free of charge from your sales partner.

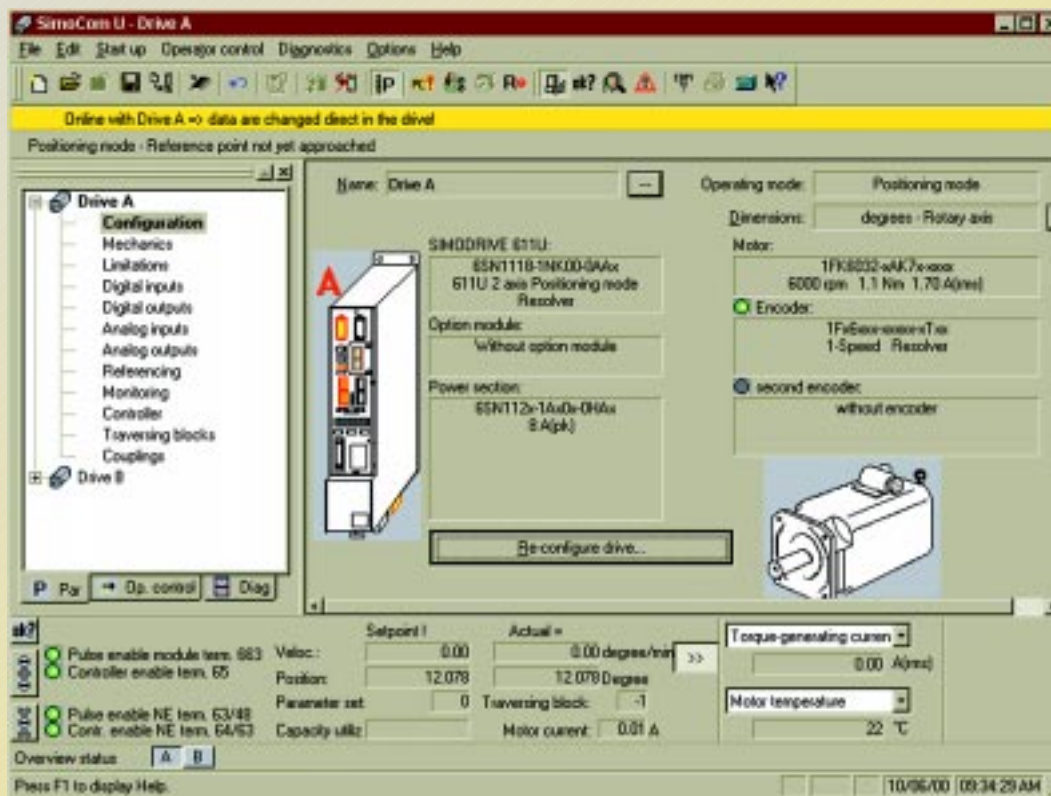
SIMODRIVE 611 universal and POSMO

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Tools

Start-up, parameterization and diagnostics with SimoCom U

SIMODRIVE 611 universal and POSMO CD/CA, SI are parameterized using the parameterization and commissioning tool SimoCom U.



Working window of SimoCom U

Features of SimoCom U

- Programming, selecting and starting traversing blocks
- Setting and monitoring all basic-unit parameters in tables which can be individually created
- Reading, writing, managing, printing and comparison of parameter sets
- Handling of process data (control commands, set-points)
- Diagnostics (faults, alarms, fault memory)
- Offline and online operation
- The drive can be operated from the PC
- Automatic speed controller self-optimization using FFT analysis
- Function generator/oscilloscope function "on board"
- Very simple handling
- The software can be downloaded from the Internet at http://www.siemens.de/automation/mc/html_00/info/download

PC configuration (hardware and software requirements)

- Windows 95, 98 or Windows NT (Windows 2000 and ME available soon)
- ≥ 32 Mbyte RAM
- Free hard-disk storage: 30 Mbytes
- Screen resolution: 800 x 600 or higher

For stand-alone operation:

- RS232 serial interface (for SIMODRIVE 611 universal only)

For use with SIMATIC S7/ PROFIBUS-DP:

- CP5511 or CP5611 communications processor

SIMODRIVE 611 universal and POSMO

Planning guide

Tools

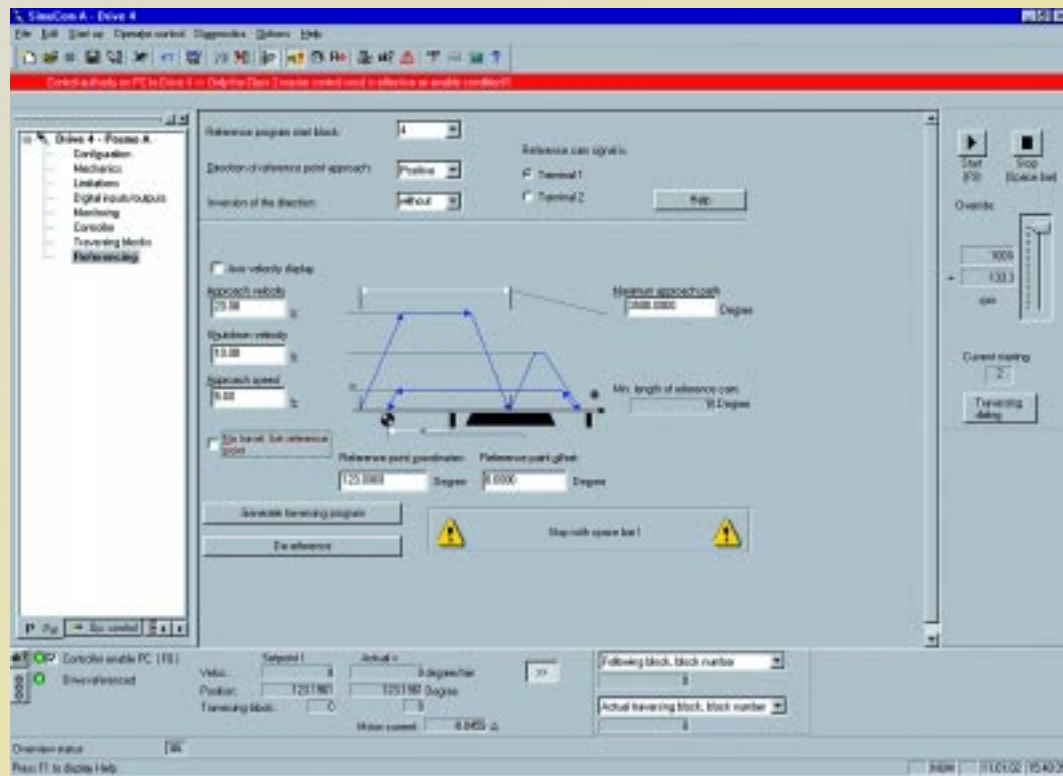
Parameterization and commissioning tool "SimoCom A" (Version 1.5 upwards)

From software version 1.5.x upwards, SIMODRIVE POSMO A 75 W and POSMO A 300 W can be operated, parameterized

and programmed using the commissioning tool "SimoCom A".

SimoCom A communicates with SIMODRIVE POSMO A via the

non-cyclic communication services of PROFIBUS-DP.



Working window of SimoCom A

Features of SimoCom A

- Programming, selecting and starting traversing blocks
- Control and operation of SIMODRIVE POSMO A for commissioning purposes
- Offline and online operation
- Setting and monitoring all basic parameters in tables which can be individually created

- Reading, writing, managing, printing and comparison of parameter sets
- Handling of process data (control commands, setpoints)
- Diagnostics (faults, alarms, fault memory)
- Very simple handling
- The software can be downloaded from the Internet at http://www.siemens.de/automation/mc/html_00/info/download

PC configuration (hardware and software requirements)

Software

- Windows 95, 98 or Windows NT (Windows 2000 and ME available soon)
- ≥ 32 Mbyte RAM
- Spare hard-disk storage 30 Mbytes

Hardware

- Screen resolution 800 x 600 or higher
- CP 5511 communications processor (PROFIBUS interfacing via PCMCIA card) or CP 5611 (PROFIBUS interfacing via short PCI card)

6

SIMODRIVE 611 universal and POSMO

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Tools

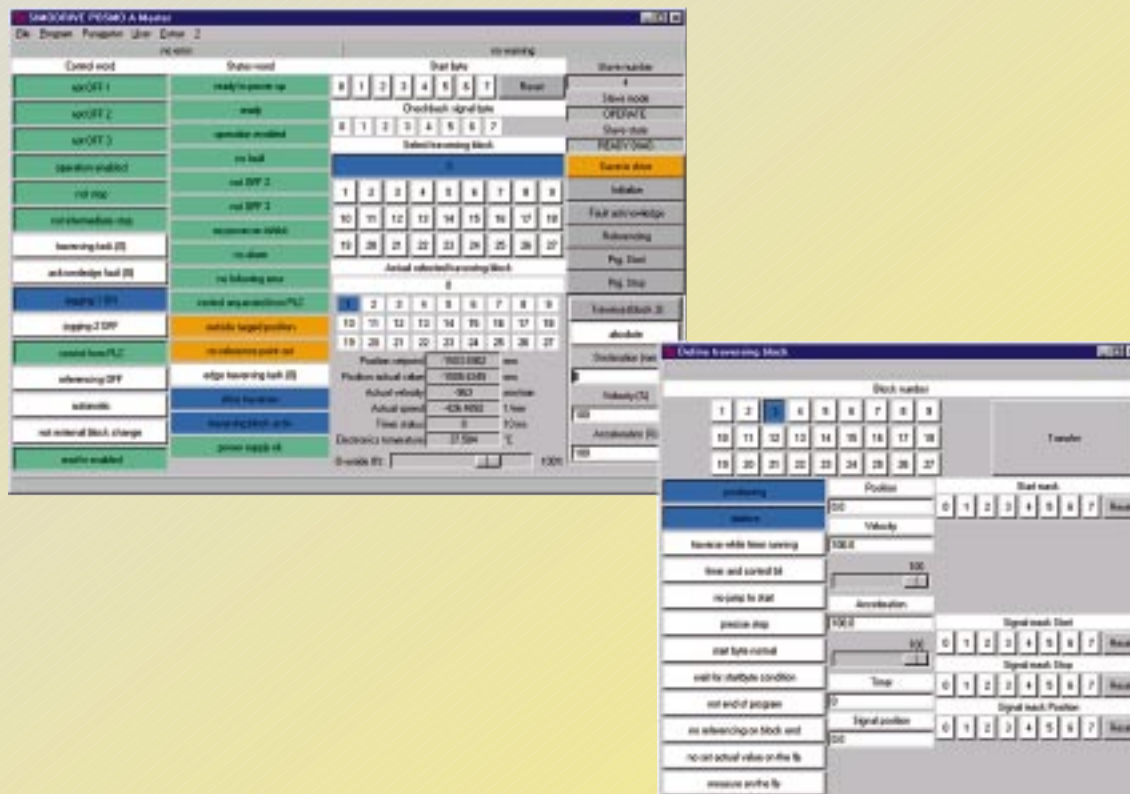
C1 master "SIMODRIVE POSMO A PROFIBUS MASTER"

SIMODRIVE POSMO A up to software version 1.4.x can be operated, parameterized and programmed with the IBS tool

"SIMODRIVE POSMO A PROFIBUS MASTER". The tool communicates exclusively by

means of the cyclic PROFIBUS-DP services a Class 1 master.

Communication is via the SIMATIC NET SOFTNET DP programming interface.



Working window of "SIMODRIVE POSMO A PROFIBUS MASTER"

Features

- Programming, selecting and starting traversing blocks
- Control and operation of SIMODRIVE POSMO A
- Setting and monitoring all basic parameters
- Reading, writing and managing parameter sets

- Handling of process data (control commands, setpoints)
- Diagnostics (faults, alarms)
- Very simple handling
- The software can be downloaded from the Internet at http://www.siemens.de/automation/mc/html_00/info/download

PC configuration (hardware and software requirements)

Software

- Windows 95, 98 or Windows NT
- ≥ 32 Mbyte RAM
- Spare hard-disk storage 10 Mbytes
- SIMATIC NET, SOFTNET-DP/Windows 98, NT 4.0/5.0 or higher

Hardware

- Screen resolution 800 x 600 or higher
- CP 5511 communications processor (PROFIBUS interfacing via PCMCIA card) or CP 5611 (PROFIBUS interfacing via short PCI card)

Dimension drawings



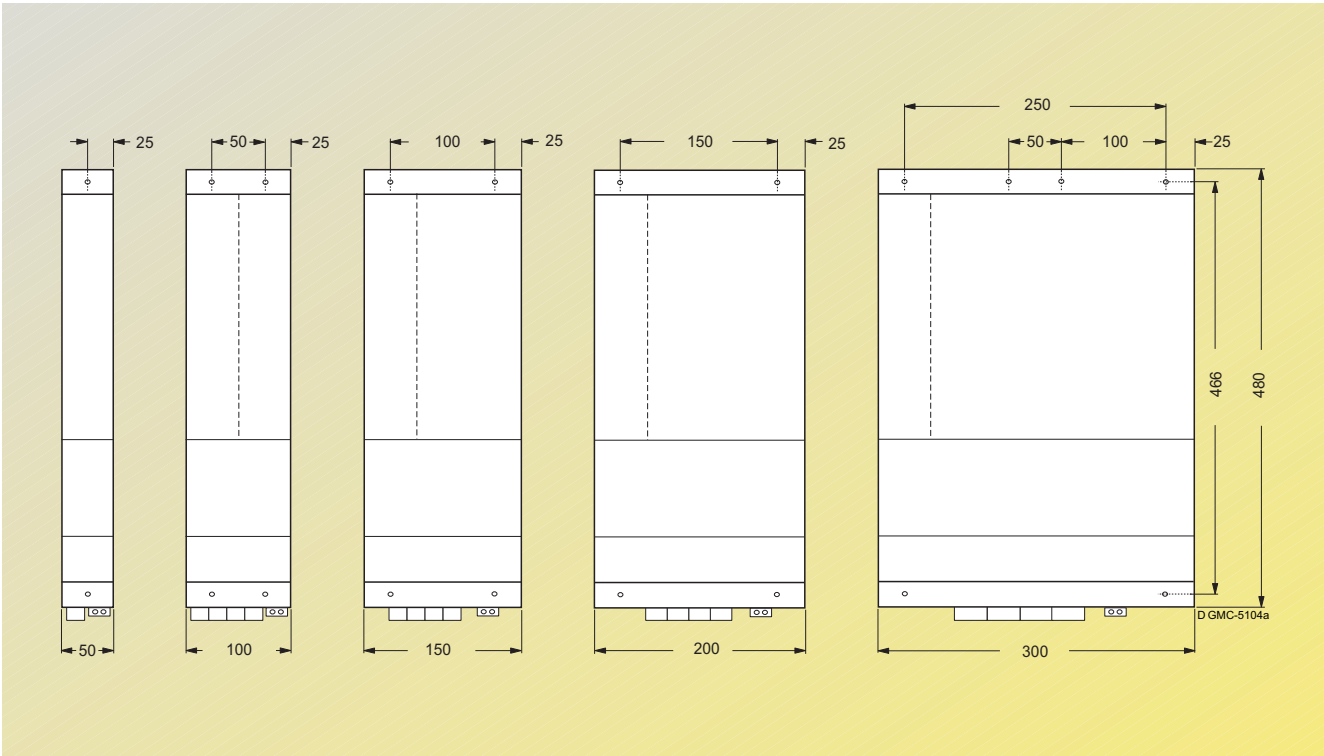
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SIMODRIVE 611 universal and POSMO

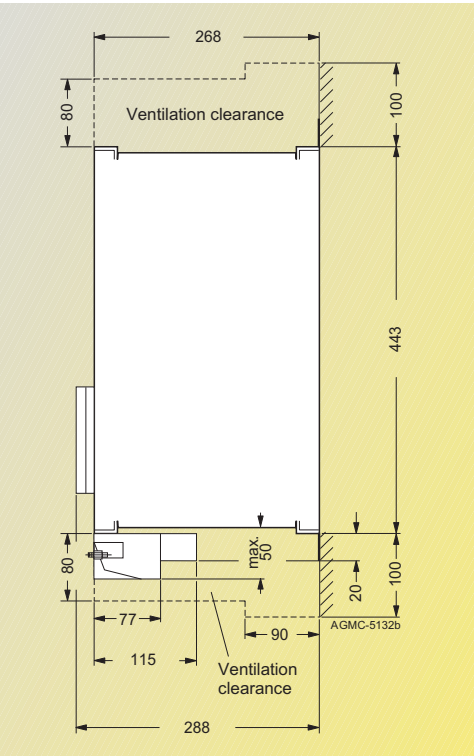
Dimension drawings

SIMODRIVE converter system
Overview drawings

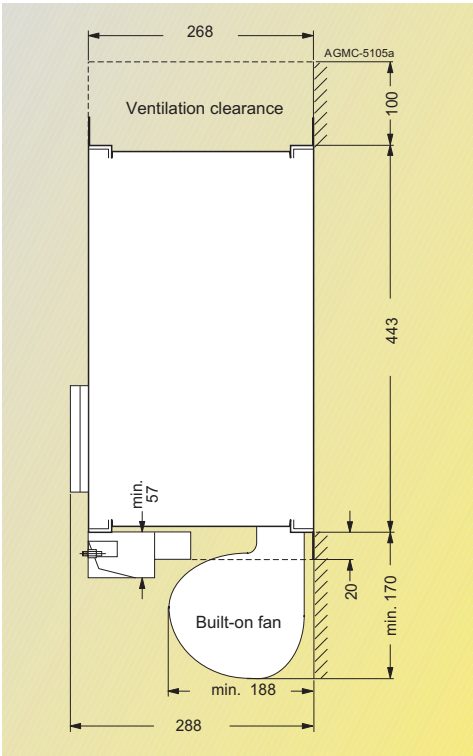
Infeed, power and monitoring modules



Front views
(without shield connection plate)



Side view (without shield connection plate)
internal cooling



Side view (without shield connection plate)
internal cooling with built-on fan

The shield connection plates increase the module height by the following dimensions:

Module width mm	Increase of the module height downwards from the lower edge of the connection lugs mm
50	100
100	100
150	180
200	180
300	180

The thermally conductive cover (for internal cooling only) increases the module heights by the following dimensions:

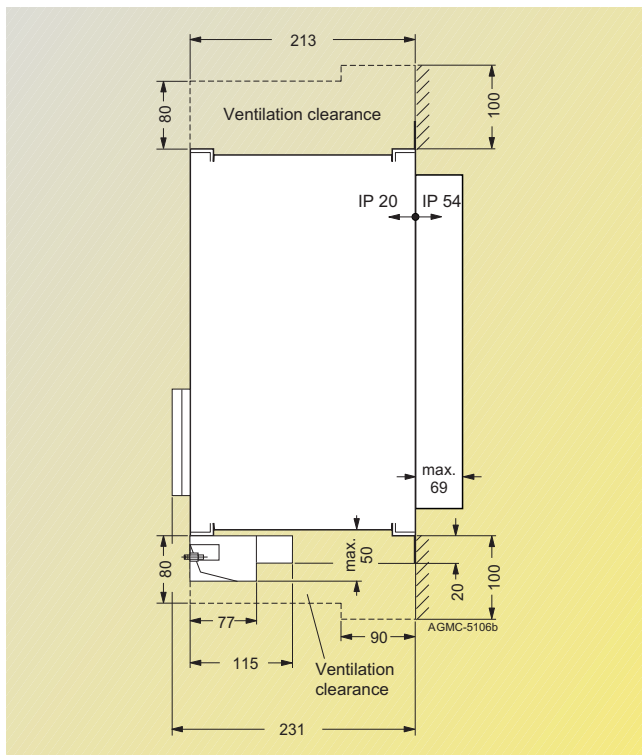
Module width mm	Increase of the module height upwards from the upper edge of the module casing mm
50	100
100	100

For further detailed dimensions, please see the Planning Guide.

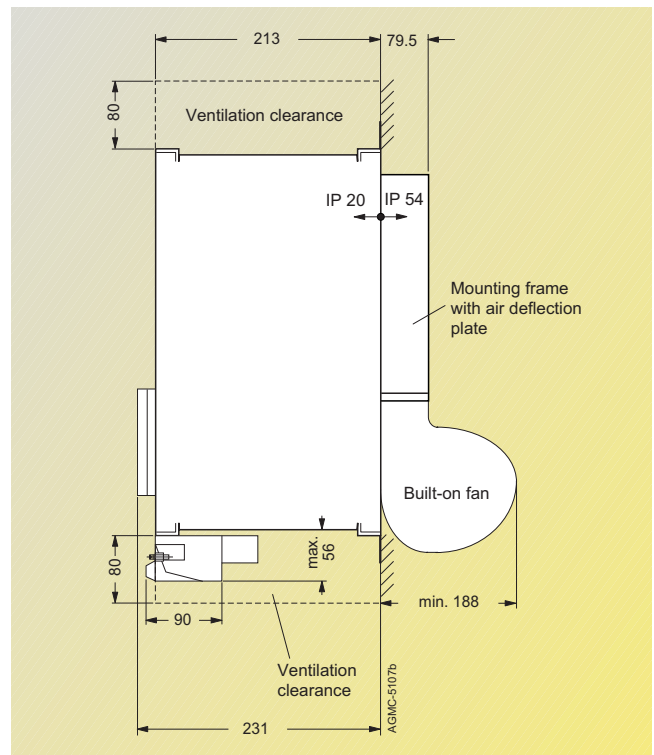
SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system
Overview drawings

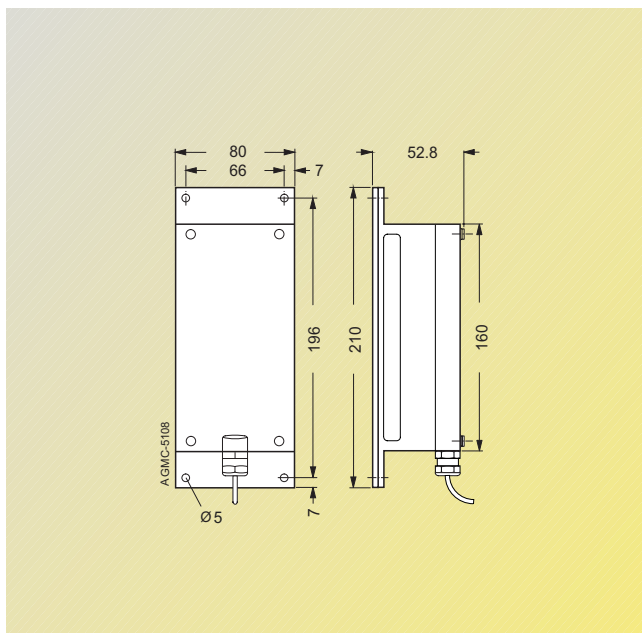


Side view (without shield connection plate)
external cooling
Module widths: 50 mm, 100 mm, 150 mm, 200 mm

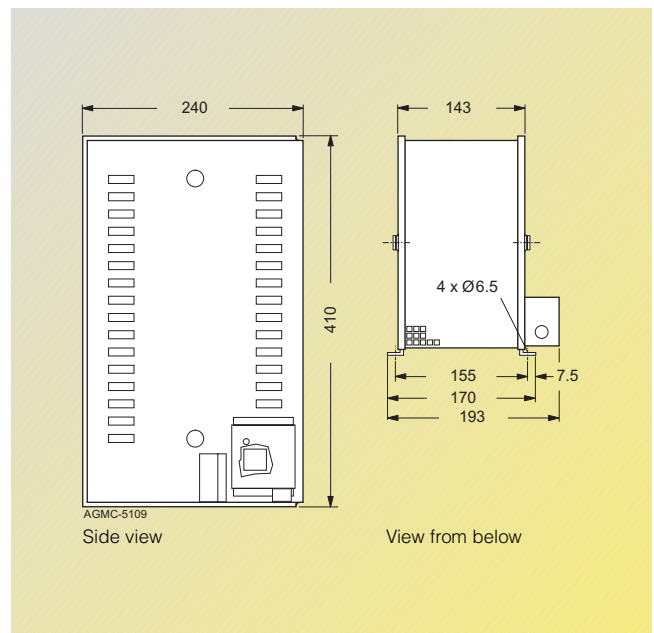


Side view (without shield connection plate)
external cooling
Module widths: 300 mm

External pulsed resistor



External pulsed resistor 0.3 kW/25 kW



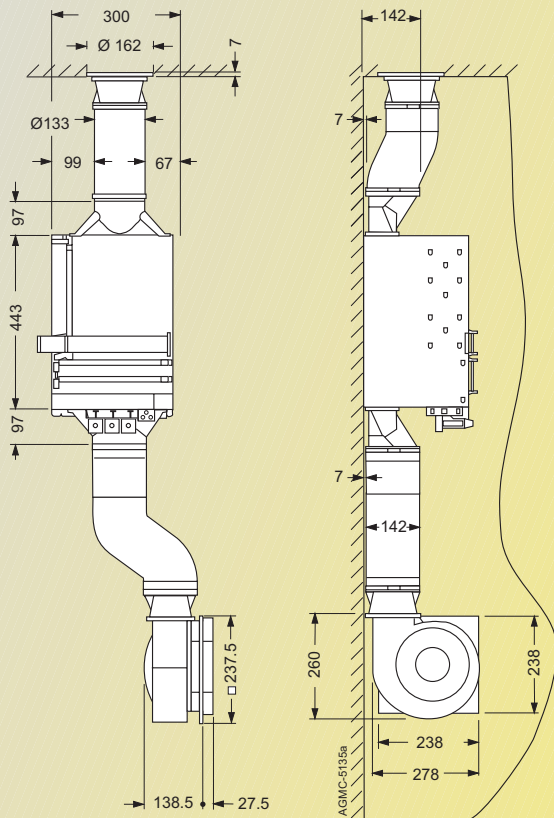
External pulsed resistor 1.5 kW/25 kW

SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system
Overview drawings

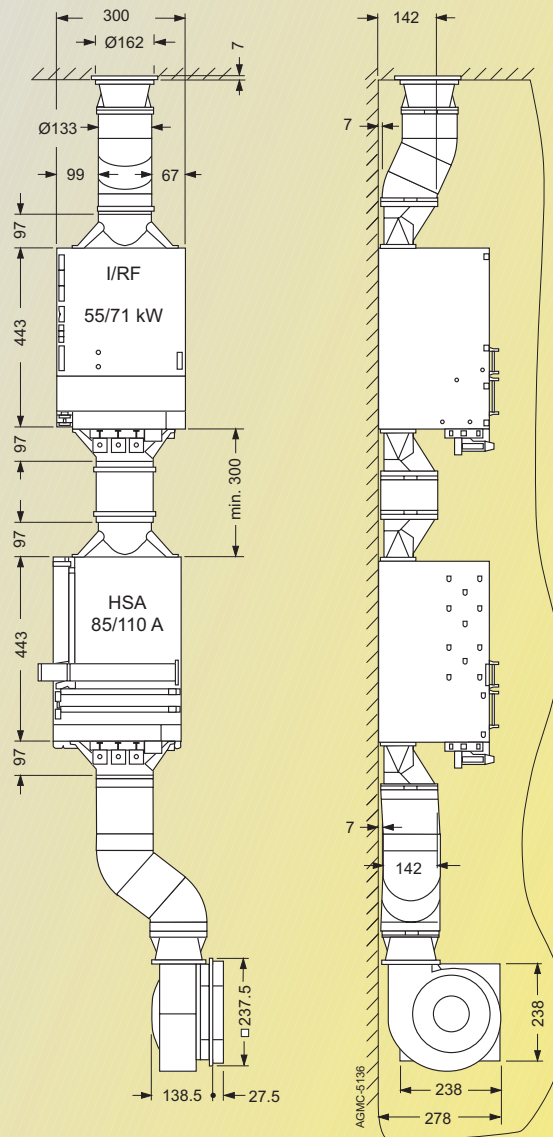
Hose cooling I/RF module and power module SIMODRIVE 611 universal, single-module and 2-tier configuration



Hose cooling for single module
for 300 mm modules without shield terminal plate

Note

Maximum overall length for hose: 2,000 mm,
Minimum bending radius for hose: 125 mm



Hose cooling for 2-tier configuration
for 300 mm modules without shield terminal plate

Note

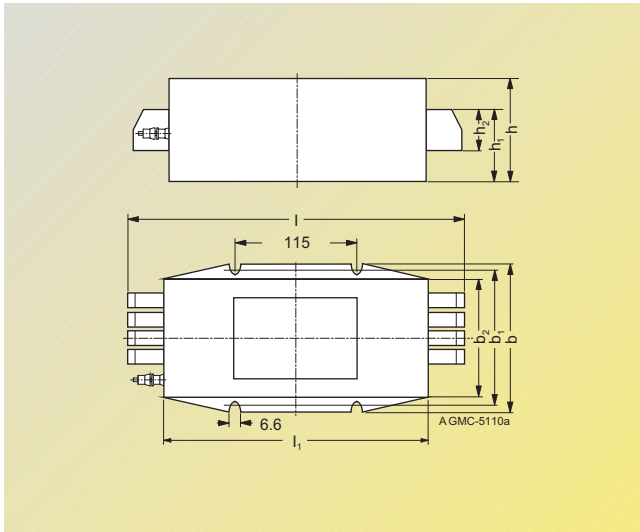
Maximum overall length for hose: 2,000 mm,
Minimum bending radius for hose: 125 mm

SIMODRIVE 611 universal and POSMO

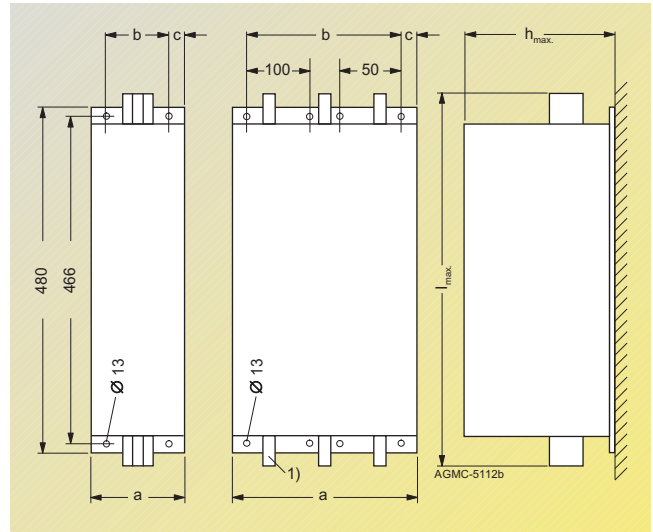
Dimension drawings

SIMODRIVE converter system
Detailed drawings

Mains filter

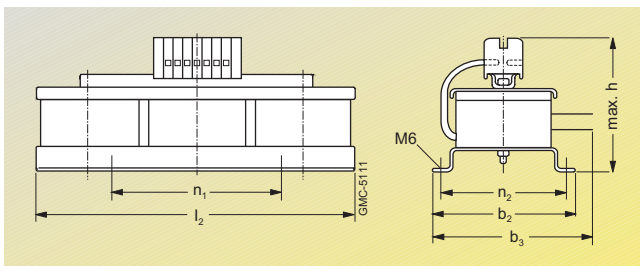


For Ol module kW	Dimensions b max.	b ₁	b ₂ max.	h max.	h ₁	h ₂	l max.	l ₁ max.
5	160	140	130	85	36	21	205	175
10	160	140	130	95	46	29	290	235
28	171	155	141	141	97	55	348	261

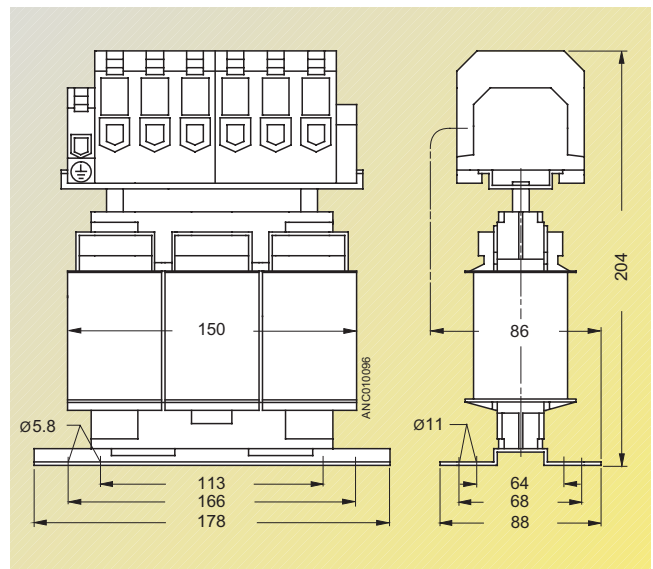


For I/RF module kW	Dimensions a	b	c	h max.	l max.
16	130	100	15	149.5	489
36	130	100	15	244.5	526
55	130	100	15	279.5	526
80	200	150	25	279.5	539
120	300	250	25	279.5	530

Commutating reactors



Rated infeed power kW	Order No.	Dimensions in mm						Screw-type terminals Max. mm ²
		b ₂	b ₃	h	l ₂	n ₁	n ₂	
16	6SN1111-0AA00-0BA1	150	–	145	330	175	136	16
36	6SN1111-0AA00-0CA1	150	–	230	330	175	136	50
55	6SN1111-0AA00-0DA1	150	–	280	330	175	136	70
80	6SN1111-0AA00-1EA0	170	225	200	380	325	156	²⁾
120	6SN1111-0AA00-1FA0	170	225	300	380	325	156	²⁾



Commutating reactor 28 kW

1) Flat-type terminal with drilled hole Ø 11 mm.

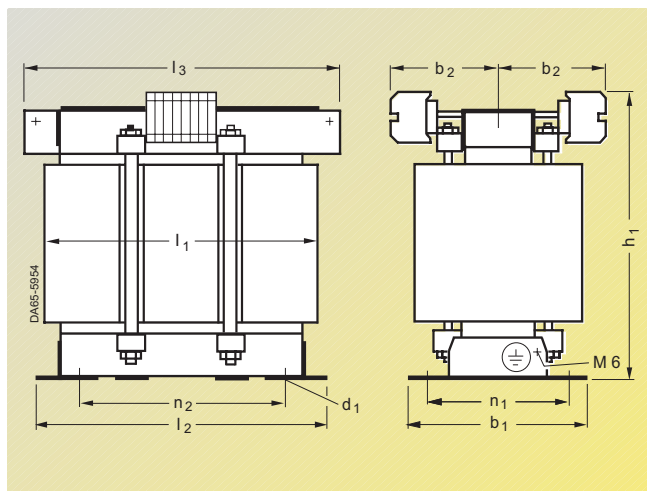
2) Flat-type terminal with drilled hole Ø 9 mm.

SIMODRIVE 611 universal and POSMO

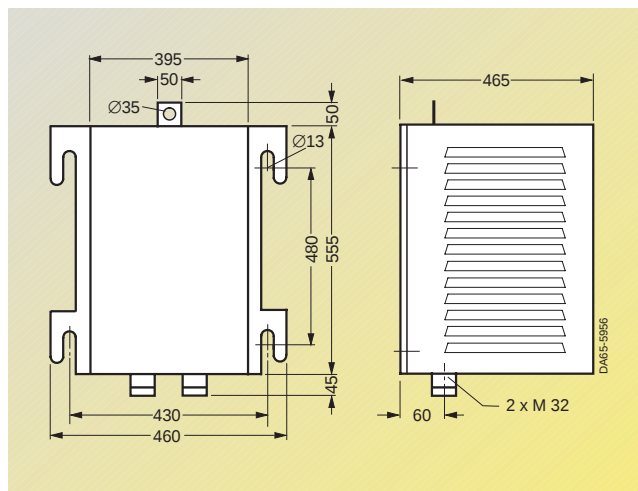
Dimension drawings

SIMODRIVE converter system
matching transformers, autotransformers

Three-phase matching transformers

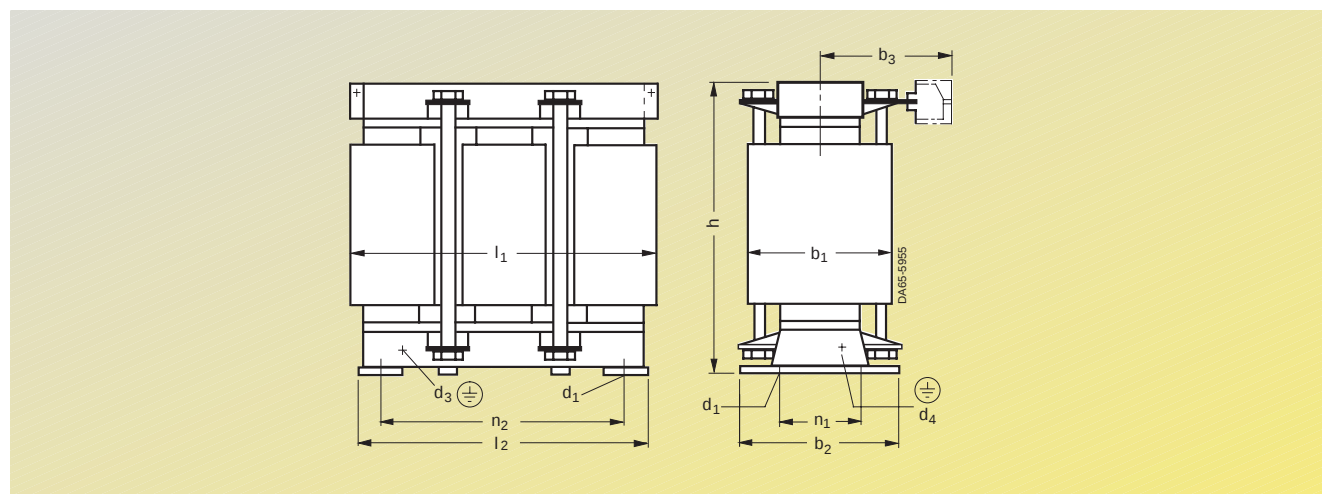


8.2 kVA to 15.7 kVA



Housing IP 20 and IP 23 for 4AU36/4AU39 type

Type	Rated power kVA	Designations acc. to DIN 41 302	b_1	b_2	d_1	h_1	l_1	l_2	l_3	n_1	n_2
4AU36	8; 10	3UI 180/75	169	134	10 x 18	320	360	314	360	138	264
4AU39	12.5; 16	3UI 210/70	174	131	12 x 18	370	420	366	410	141	316



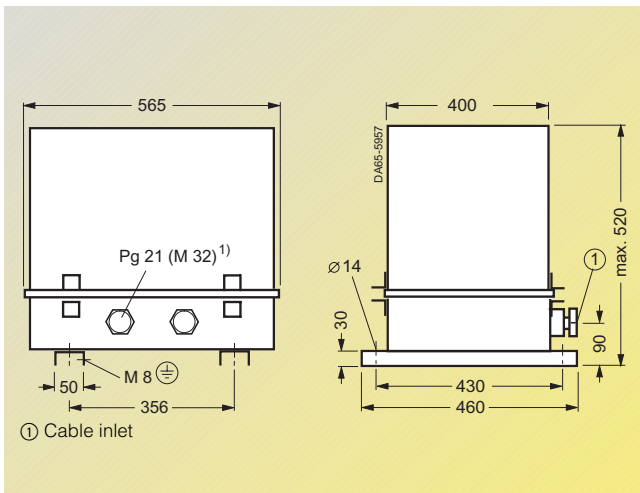
21 kVA to 155 kVA

Type	Rated power kVA	Type size based on DIN 41 302	b_1	b_2	b_3 for terminal size			d_1	d_3	d_4	h	l_1	l_2	n_1	n_2
					4	6; 16	35								
4BU43	18; 20; 22.5	3UI 240/80	194	194	112	120	132	15 x 22	–	M6	420	480	416	155	356
4BU47	31.5; 35.5; 40	3UI 240/137	251	251	141	149	161	15 x 22	–	M6	420	480	416	212	356
4BU55	80	3UIS 305/140	310	260	173	181	193	15	M12	–	585	630	540	213	470
4BU58	112; 125; 140	3UIS 370/150	330	290	180	188	200	15	M12	–	665	780	660	241	580
4BU60	180	3UIS 370/195	375	335	203	211	223	15	M12	–	665	780	660	286	580

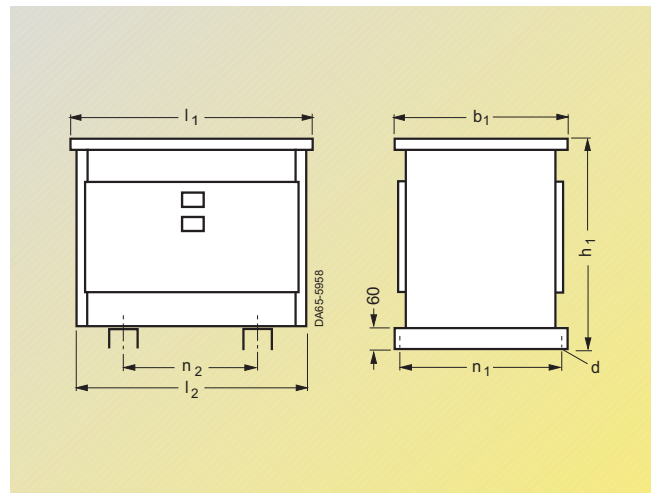
SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system
Matching transformers, autotransformers



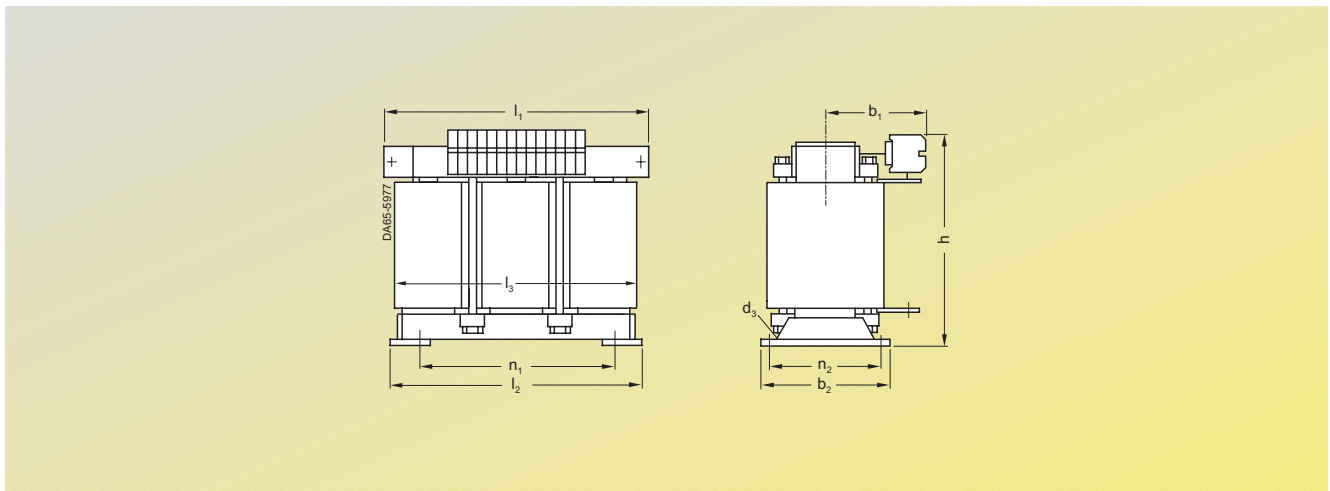
Housing IP 20 and IP 23 for 4BU43/4BU47 type



Housing IP 20 and IP 23 for 4BU55 to 4BU60 types

Type	b ₁	d	h ₁	l ₁	l ₂	n ₁	n ₂
4BU55	600	15	790	900	800	570	470
4BU58 to 4BU60	730	19	870	1220	1120	696	580

Autotransformers



Power kVA	Order No.	Dimensions								
		b ₁ max.	b ₂ max.	d ₃ max.	l ₁ max.	l ₂ max.	l ₃ max.	n ₁ max.	n ₂ max.	h max.
Rated input voltages 3 AC 480 V/440 V; 50 Hz/60 Hz										
21	6SN11 11-0AA0-1BB1	102	180	M8	270	220	270	200	101	250
46.5	6SN11 11-0AA0-0CB0	134	220	M8	370	314	360	264	138	330
70.3	6SN11 11-0AA0-0DB0	134	240	M8	370	314	360	264	138	340
104	6SN11 11-0AA0-0EB0	135 ²⁾	260	M10	420	366	420	316	141	370
155	6SN11 11-0AA0-0FB1	120 ²⁾	280	M12	480	416	480	356	155	440
Rated input voltages 3 AC 220 V/V; 50 Hz/60 Hz										
21	6SN11 11-0AA0-1BC0	134	220	M8	370	314	360	264	138	330
46.5	6SN11 11-0AA0-0CC0	136	255	M12	480	416	470	356	155	430
70.3	6SN11 11-0AA0-0DC0	150	300	M12	480	416	470	356	182	430
104	6SN11 11-0AA0-0EC0	175 ²⁾	325	M12	580	470	555	410	183	520
155	6SN11 11-0AA0-0FC0	178 ²⁾	360	M12	590	540	630	470	198	600

1) Acc. to DIN EN 50 262 (VDE 0619), step-by-step changeover takes place from the Pg molded-plastic screw gland to a metric cable gland.

2) Flat-type terminal with drilled hole Ø 9 mm.

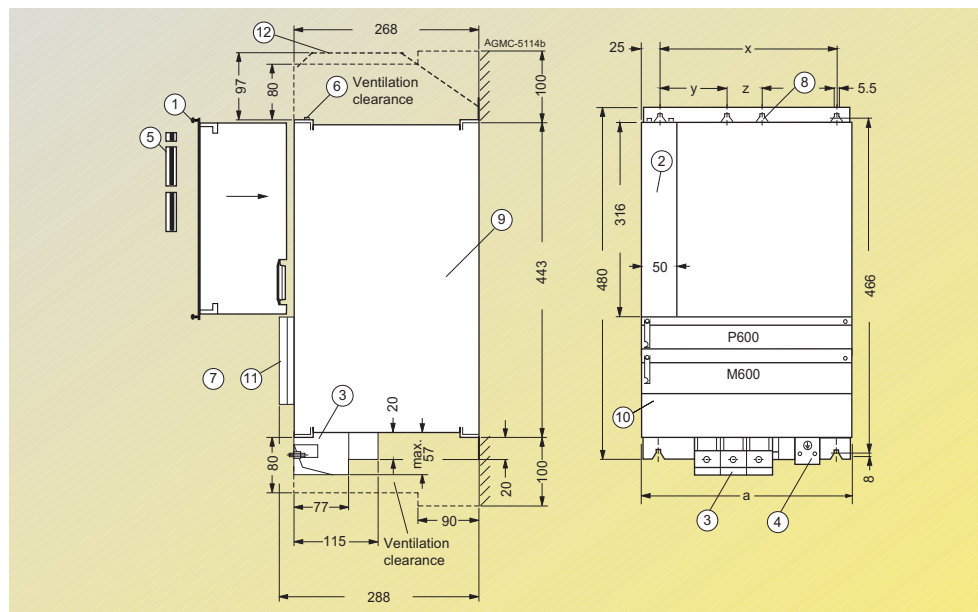
SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system

Detailed drawings

Modules 50 mm to 300 mm, internal cooling



- ① Regulated control plugged in and screwed down
Important! Screw fitting ensures contact of PE and shield for encoder and setpoint (can be omitted for modules with pulse interface)
- ② Terminal area
- ③ Terminal area U, V, W, X131
- ④ PE connection
- ⑤ Combicon terminals (plugged in on delivery)
- ⑥ Additional connection possibility for shield M 5 x 10 (encoder, setpoint)
- ⑦ Cover engaged
- ⑧ Drilled hole for M 5 or M 10 – 24 UNC-2A, 10 – 32 UNF-2A threads
- ⑨ Casing: Steel plate
DIN EN 10 143 FE P0 3G Z140 MB-0-1.5
- ⑩ Front panel: Plastic
- ⑪ Cover: Plastic
- ⑫ Warm air baffle (option for OI module)

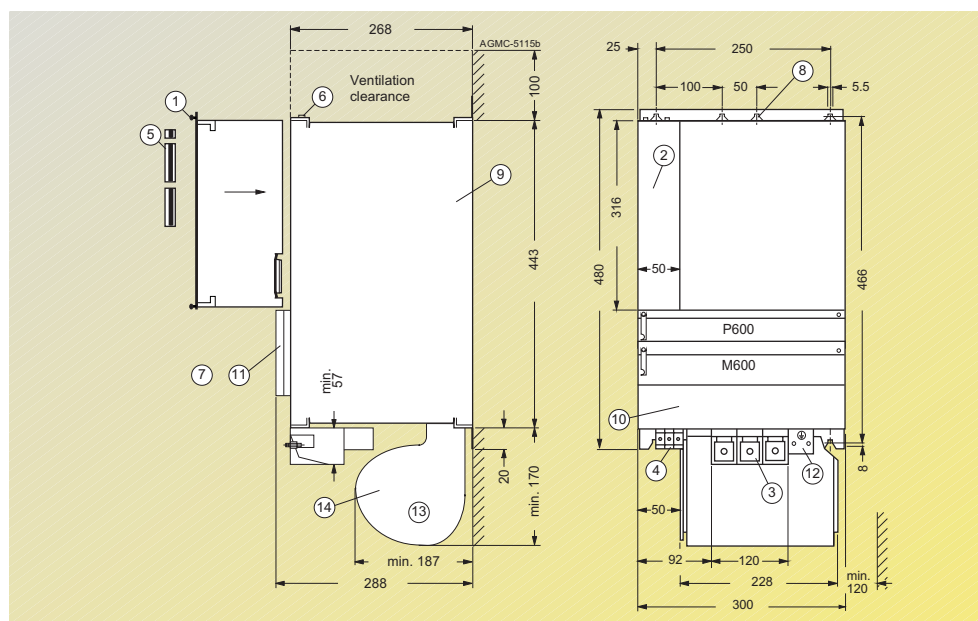
Tightening torques to be complied with when mounting modules

M 3 screws:	0.8 Nm
M 4 screws:	1.8 Nm
M 5 screws:	3.0 Nm
M 6 screws:	6.0 Nm
M 8 screws:	13 Nm

a	x	y	z	PE	Max. conductor cross-section U, V, W X131	
50	–	–	–	M5	4 or 6 mm ² 1) / M 3	16 mm ² / M 4
100	50	–	–	M5	10 or 16 mm ² 1) / M 4	16 mm ² / M 4
150	100	–	–	M6	50 mm ² / M 6	–
200	150	–	–	M6	50 mm ² / M 6	16 mm ² / M 4
300	250	100	50	M6	95 mm ² / M 8	16 mm ² / M 4

1) Only possible when pin terminals are used

Modules 300 mm, internal cooling with built-on fan



- ① Regulated control plugged in and screwed down
Important! Screw fitting ensures contact of PE and shield for encoder and setpoint (can be omitted for modules with pulse interface)
- ② Terminal area
- ③ Terminal area U, V, W
- ④ Terminal area L1, L2, X131
- ⑤ Combicon terminals (plugged in on delivery)
- ⑥ Additional connection possibility for shield M 5 x 10 (encoder, setpoint)
- ⑦ Cover engaged
- ⑧ Drilled hole for M 5 or M 10 – 24 UNC-2A, 10 – 32 UNF-2A threads
- ⑨ Casing: Steel plate
DIN EN 10 143 FE P0 3G Z140 MB-0-1.5
- ⑩ Front panel: Plastic
- ⑪ Cover: Plastic
- ⑫ PE connection (M 6)
- ⑬ Fan screw-mounted with M 6 x 16 screw
- ⑭ Fan weight: 4 kg

Tightening torques to be complied with when mounting modules

M 3 screws:	0.8 Nm
M 4 screws:	1.8 Nm
M 5 screws:	3.0 Nm
M 6 screws:	6.0 Nm
M 8 screws:	13 Nm
M 10 screws:	20 Nm

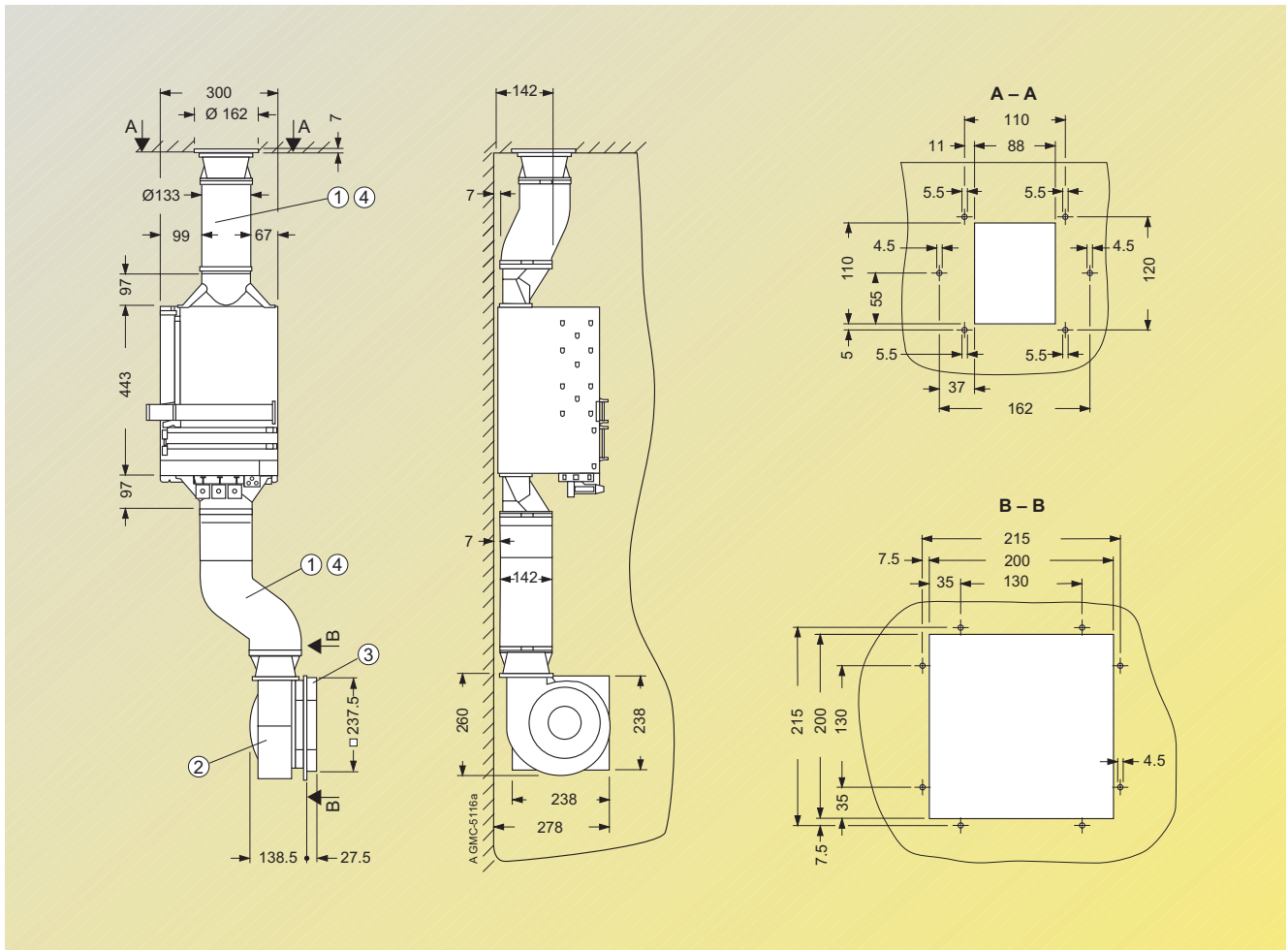
Module	Max. conductor cross-section U, V, W	L1, L2, X131
80/104 kW	95 mm ² / M 8	16 mm ² / M 4
120/156 kW	150 mm ² / M 10	16 mm ² / M 4
300 A	95 mm ² / M 8	–
400 A	150 mm ² / M 10	–

SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system
Detailed drawings

Hose cooling, single-module



- ① Maximum overall length for hose: 2 m
- ② Fan weight: 5 kg
- ③ Protection type for filter: IP 54
- ④ Minimum bending radius for hose: R = 125 mm

Tightening torques to be complied with when mounting modules

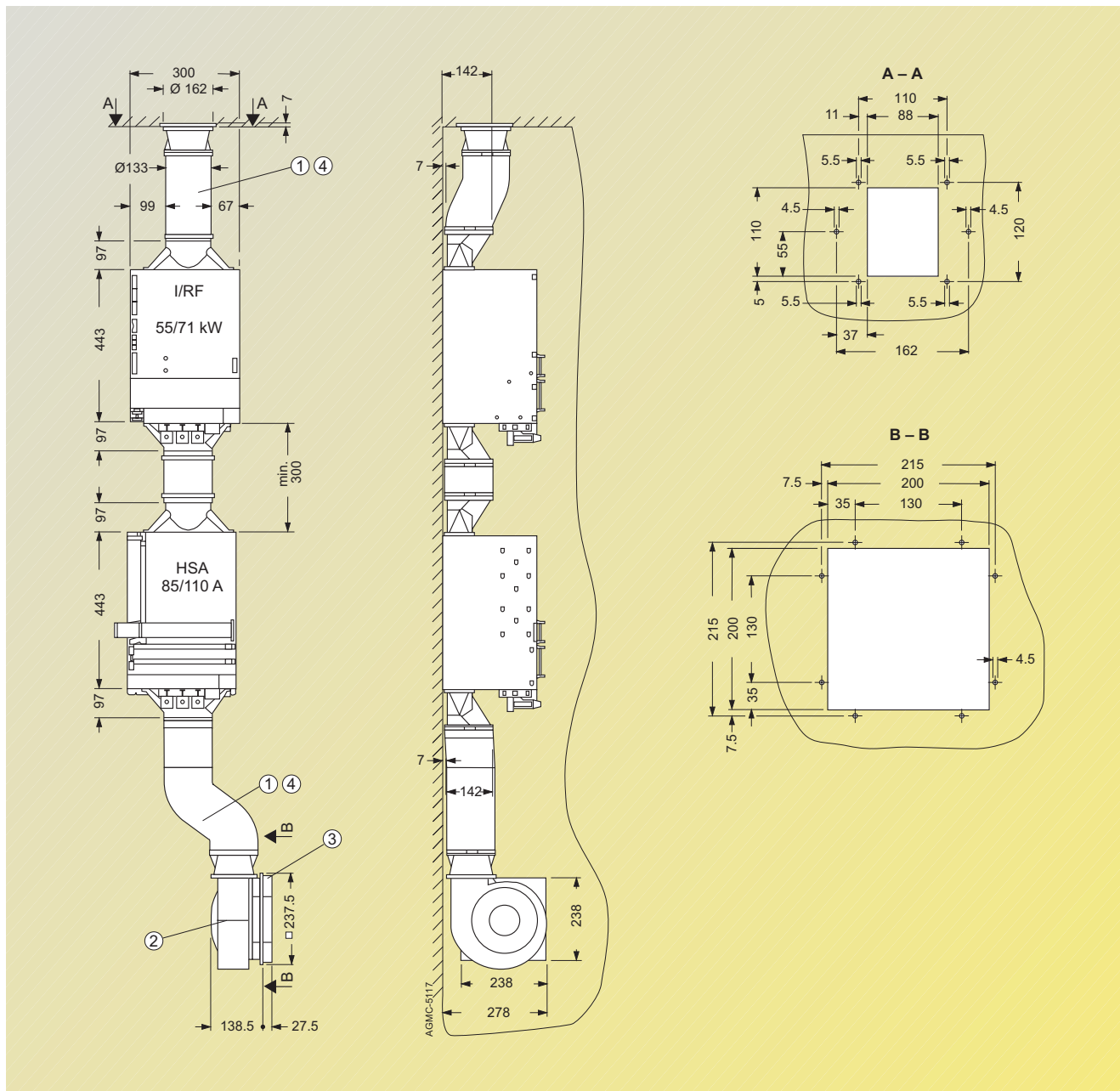
- M 3 screws: 0.8 Nm
- M 4 screws: 1.8 Nm
- M 5 screws: 3 Nm
- M 6 screws: 6 Nm

SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system
Detailed drawings

Hose cooling, 2-tier configuration



- ① Maximum overall length for hose: 2 m
- ② Fan weight: 5 kg
- ③ Protection type for filter: IP 54
- ④ Minimum bending radius for hose: $R = 125$ mm

Tightening torques to be complied with when mounting modules

- M 3 screws: 0.8 Nm
- M 4 screws: 1.8 Nm
- M 5 screws: 3 Nm
- M 6 screws: 6 Nm

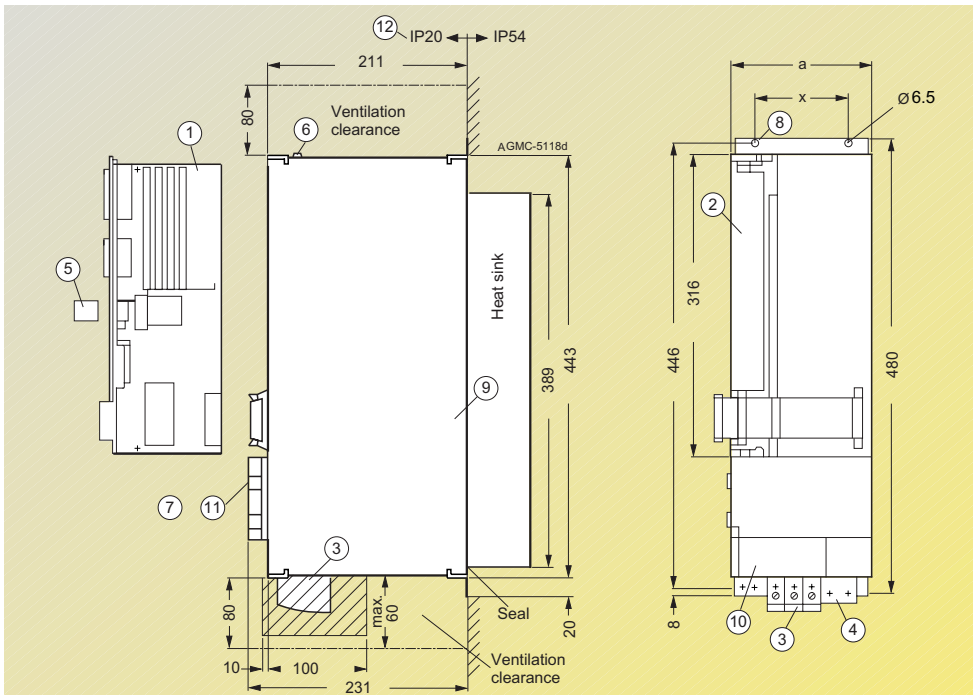
7

SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system Detailed drawings

Modules 50 mm to 200 mm, external cooling



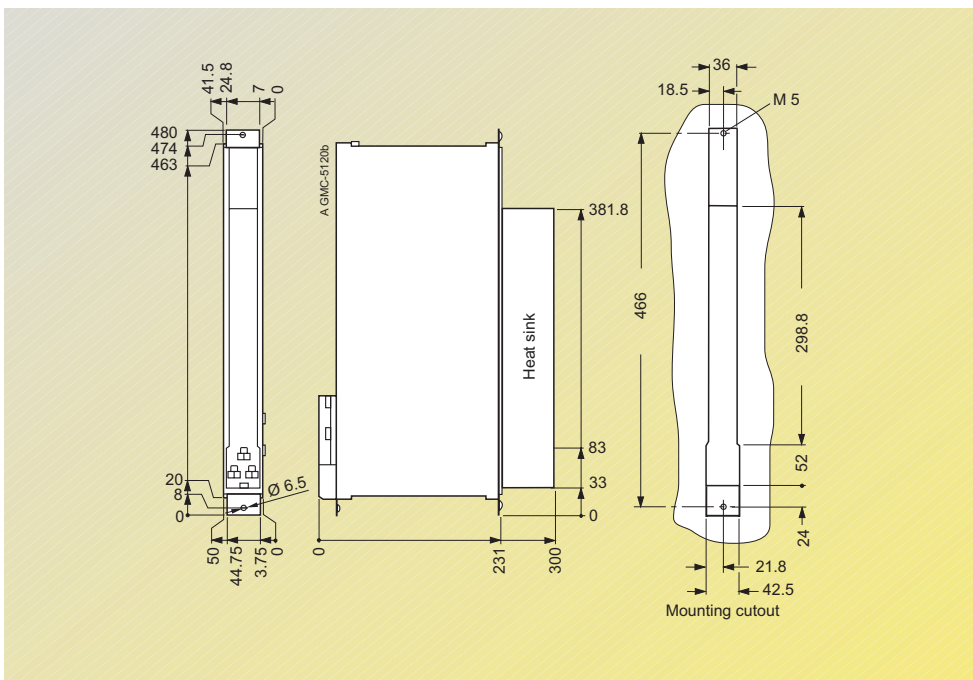
- ① Regulated control plugged in and screwed down
Important! Screw fitting ensures contact of PE and shield for encoder and setpoint (can be omitted for modules with pulse interface)
- ② Terminal area
- ③ Terminal area U, V, W, X131
- ④ PE connection
- ⑤ Combicon terminals (plugged in on delivery)
- ⑥ Additional connection possibility for shield M 5 x 10 (encoder, setpoint)
- ⑦ Cover engaged
- ⑧ Drilled hole for M 5 or M 10 – 24 UNC-2A, 10 – 32 UNF-2A threads
- ⑨ Casing: Steel plate
DIN EN 10 143 FE P0 3G Z140 MB-0-1.5
- ⑩ Front panel: Plastic
- ⑪ Cover: Plastic
- ⑫ For modules with pulse interface: IP 00

Tightening torques to be complied with when mounting modules
M 3 screws: 0.8 Nm
M 4 screws: 1.8 Nm
M 5 screws: 3.0 Nm

a	x	PE	Max. conductor cross-section U, V, W	X131
50	–	M 5	4 or 6 mm ² / M 3	16 mm ² / M 4
100	50	M 5	10 or 16 mm ² / M 4	16 mm ² / M 4
150	100	M 6	50 mm ² / M 6	–
200	150	M 6	50 mm ² / M 6	16 mm ² / M 4

1) Only possible when pin terminals are used

SIMODRIVE 611 universal power modules, 1-axis, 50 mm, external cooling



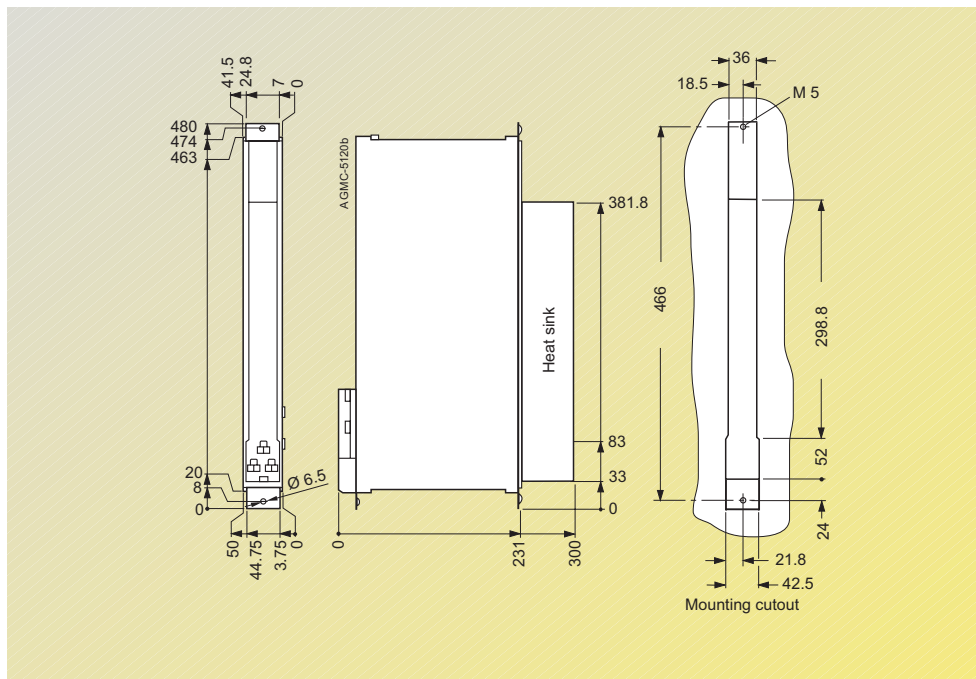
Tightening torques to be complied with when mounting modules
M 3 screws: 0.8 Nm
M 4 screws: 1.8 Nm
M 5 screws: 3.0 Nm
M 6 screws: 6.0 Nm

SIMODRIVE 611 universal and POSMO

Dimension drawings

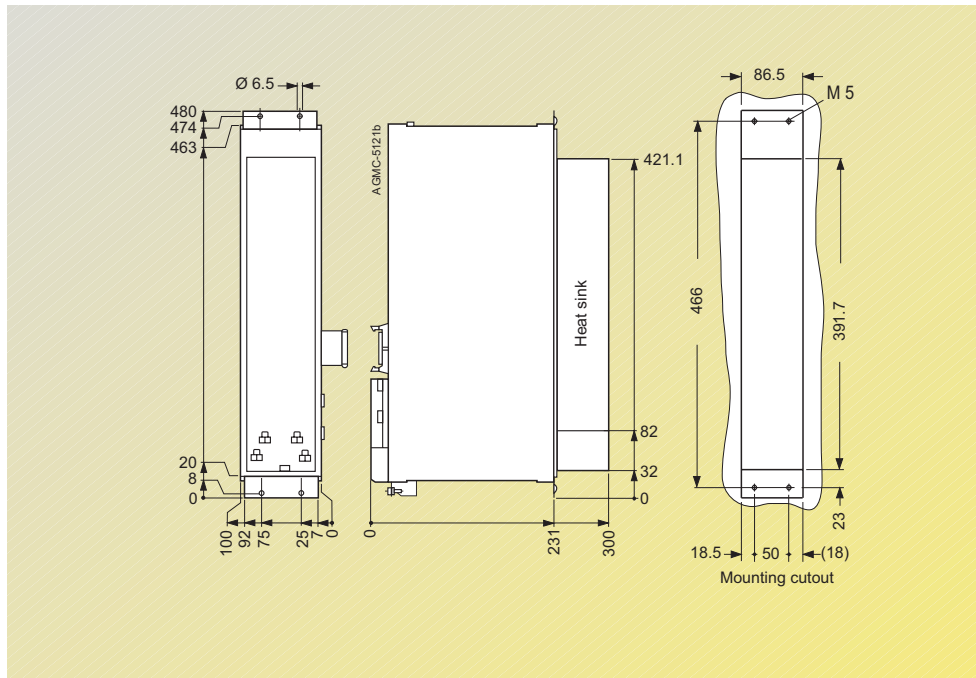
SIMODRIVE converter system
Detailed drawings

SIMODRIVE 611 universal power modules, 2-axis, 50 mm, external cooling



Tightening torques to be complied with when mounting modules
M 3 screws: 0.8 Nm
M 4 screws: 1.8 Nm
M 5 screws: 3.0 Nm
M 6 screws: 6.0 Nm

SIMODRIVE 611 universal power modules, 1-axis, 100 mm, external cooling



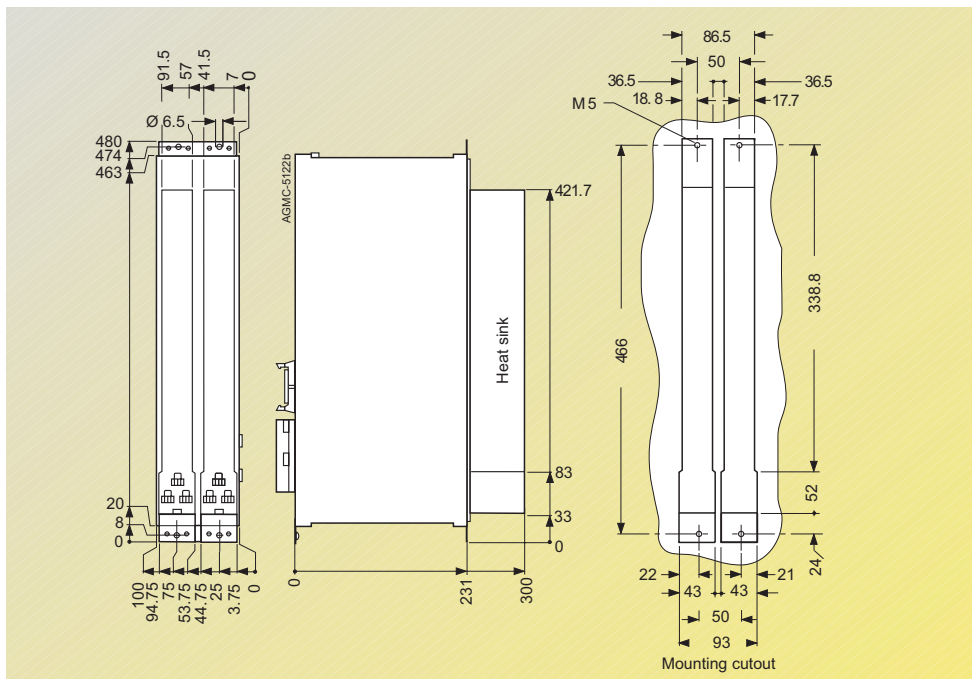
Tightening torques to be complied with when mounting modules
M 3 screws: 0.8 Nm
M 4 screws: 1.8 Nm
M 5 screws: 3.0 Nm
M 6 screws: 6.0 Nm

SIMODRIVE 611 universal and POSMO

Dimension drawings

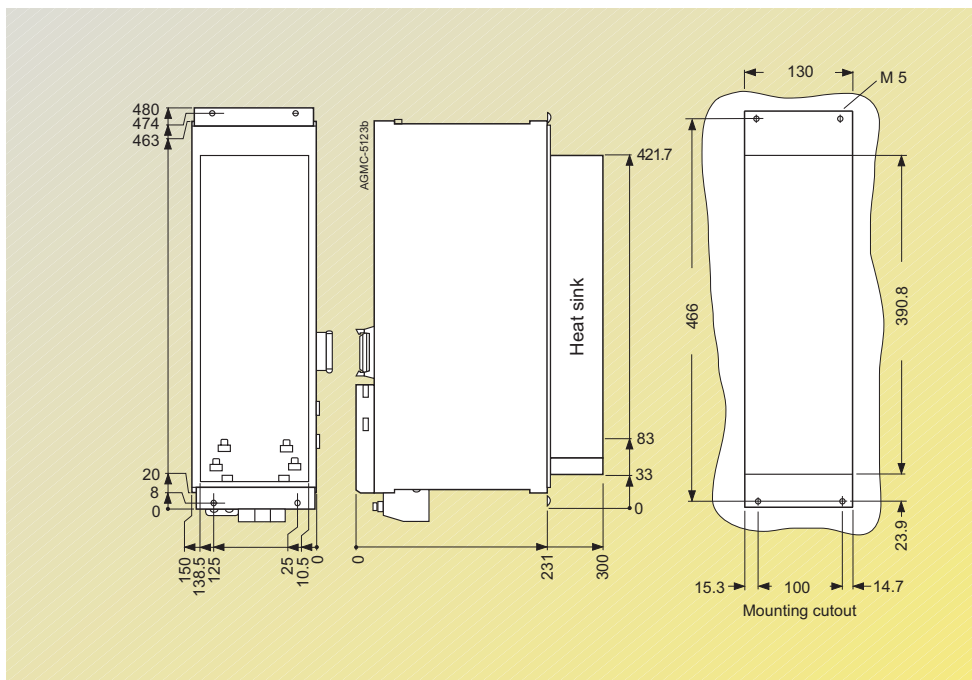
SIMODRIVE converter system
Detailed drawings

SIMODRIVE 611 universal power modules, 2-axis, 100 mm, external cooling



Tightening torques to be complied with when mounting modules
M 3 screws: 0.8 Nm
M 4 screws: 1.8 Nm
M 5 screws: 3.0 Nm
M 6 screws: 6.0 Nm

SIMODRIVE 611 universal power modules, 1-axis, 150 mm, external cooling



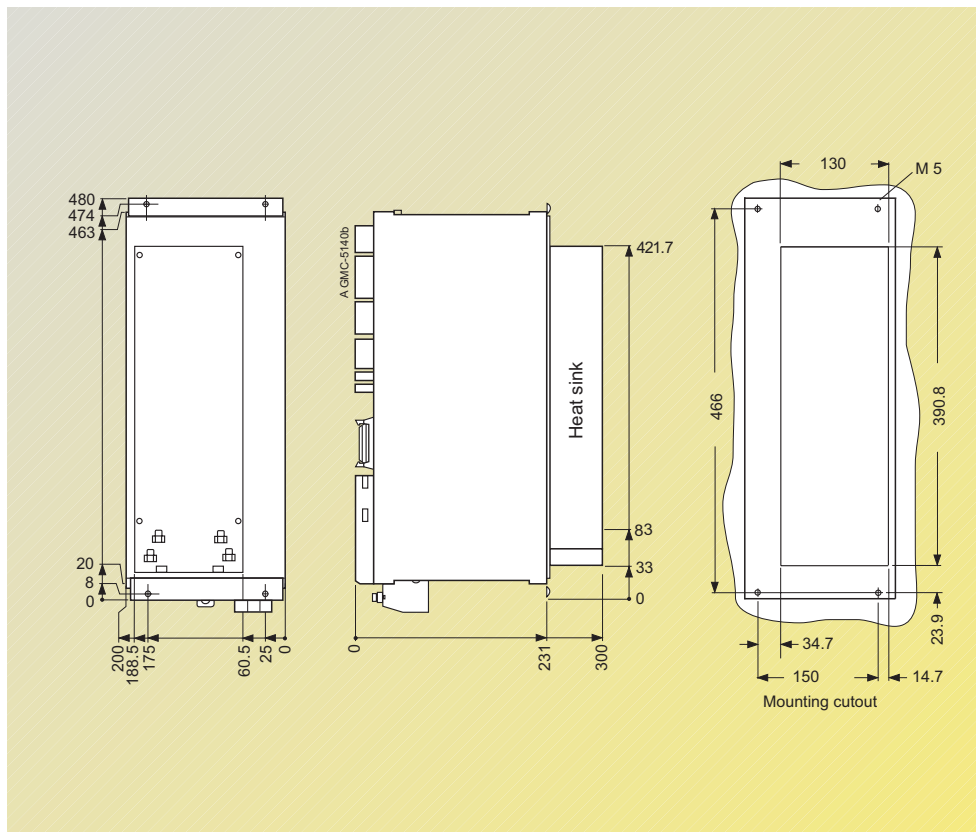
Tightening torques to be complied with when mounting modules
M 3 screws: 0.8 Nm
M 4 screws: 1.8 Nm
M 5 screws: 3.0 Nm
M 6 screws: 6.0 Nm

SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system
Detailed drawings

Infeed module, 1-axis, 200 mm, external cooling



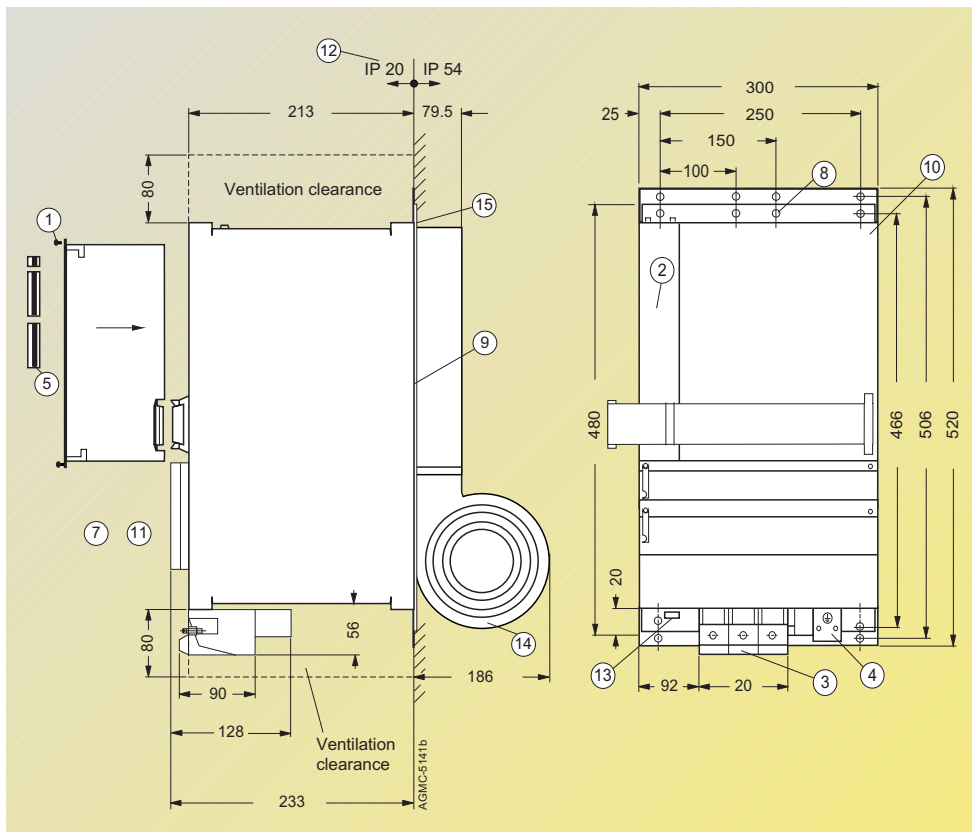
Tightening torques to be complied with when mounting modules
M 3 screws: 0.8 Nm
M 4 screws: 1.8 Nm
M 5 screws: 3.0 Nm
M 6 screws: 6.0 Nm

SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system
Detailed drawings

Infeed and power modules 1-axis, 300 mm, cooling with built-on fan



- ① Regulated control plugged in and screwed down
Important! Screw fitting ensures contact of PE and shield for encoder and setpoint (can be omitted for modules with pulse interface)
- ② Terminal area
- ③ Terminal area U, V, W
- ④ PE connection
- ⑤ Combicon terminals (plugged in on delivery)
- ⑥ Additional connection possibility for shield M 5 x 10 (encoder, setpoint)
- ⑦ Cover engaged
- ⑧ Drilled hole for M 5 or M 10 – 24 UNC-2A, 10 – 32 UNF-2A threads
- ⑨ Casing: Steel plate
DIN EN 10 143 FE P0 3G Z140 MB-0-1.5
- ⑩ Front panel: Plastic
- ⑪ Cover: Plastic
- ⑫ For modules with pulse interface: IP 00
- ⑬ Terminal area L1, L2, X131
- ⑭ Fan weight: 4 kg
- ⑮ Mounting frame 300 mm

Tightening torques to be complied with when mounting modules

M 3 screws:	0.8 Nm
M 4 screws:	1.8 Nm
M 5 screws:	3.0 Nm
M 6 screws:	6.0 Nm
M 8 screws:	13 Nm
M 10 screws:	20 Nm

Module	Max. conductor cross-section	
	U, V, W	L1, L2, X131
55 kW	95 mm ² / M 8	16 mm ² / M 4
80 kW	95 mm ² / M 8	16 mm ² / M 4
120 kW	150 mm ² / M 10	16 mm ² / M 4
200 A	95 mm ² / M 8	–
300 A	95 mm ² / M 8	–
400 A	150 mm ² / M 10	–

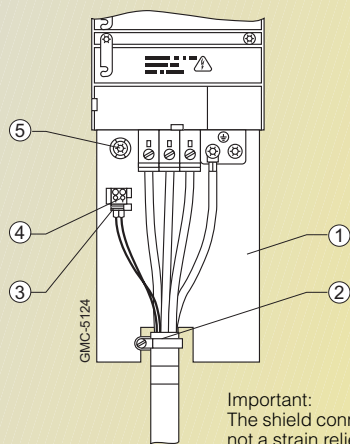
SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system

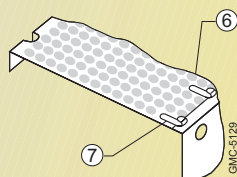
Detailed drawings

Electromagnetic compatibility – EMC

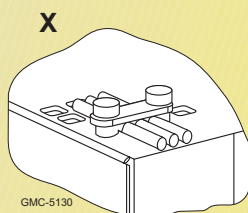
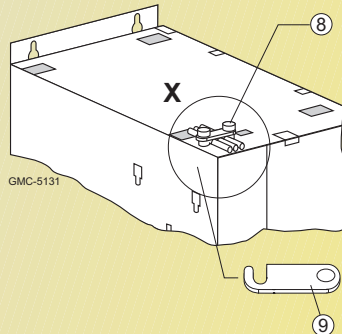


Assembly:

The shield plate engages in the module grille and is secured with screws.



Attachment point for cable shields
(e.g. control cable for function terminals)



- ① Shield plate
- ② Hose clip for shield
- ③ Plug connector for motor brake

Plug connector and hose clip are included in the scope of supply of the pre-assembled motor connection cables from Siemens:

Order No.
6FX2002-5DA□□-1□□□
6FX2002-5CA□□-1□□□
6FX4002-5DA□□-1□□□
6FX4002-5CA□□-1□□□

- ④ M 2.5 x 8 screw
- ⑤ M 5 screw for module attachment
- ⑥ Shield plate
- ⑦ Hook for engaging in grille
- ⑧ M 5 x 10
Important! Screws must not be overlength
- ⑨ Shield connecting rail
Order No.: 6SN11 62-0FA00-0AA0

The hose clips match the outside diameter of the cable shield. The details are given in the table below.

Conductor cross-section	Hose clip for shield
4 x 1.5 mm ²	Hose clip DIN 3017-AL-8-16 WI-I
4 x 1.5 mm ² + 2 x 1 mm ²	Hose clip DIN 3017-AL-8-16 WI-I
4 x 2.5 mm ²	Hose clip DIN 3017-AL-8-16 WI-I
4 x 2.5 mm ² + 2 x 1 mm ²	Hose clip DIN 3017-AL-12-20 WI-I
4 x 4 mm ²	Hose clip DIN 3017-AL-12-20 WI-I
4 x 4 mm ² + 2 x 1 mm ²	Hose clip DIN 3017-AL-12-20 WI-I
4 x 6 mm ²	Hose clip DIN 3017-AL-16-25 WI-I
4 x 6 mm ² + 2 x 1 mm ²	Hose clip DIN 3017-AL-16-25 WI-I
4 x 10 mm ²	Hose clip DIN 3017-AL-16-25 WI-I
4 x 10 mm ² + 2 x 1 mm ²	Hose clip DIN 3017-AL-16-25 WI-I
4 x 16 mm ²	Hose clip DIN 3017-AL-16-25 WI-I
4 x 16 mm ² + 2 x 1 mm ²	Hose clip DIN 3017-AL-16-25 WI-I
4 x 25 mm ² + 2 x 1.5 mm ²	Hose clip DIN 3017-AS-25-40 WI-I
4 x 35 mm ² + 2 x 1.5 mm ²	Hose clip DIN 3017-AS-25-40 WI-I
4 x 50 mm ² + 2 x 1.5 mm ²	Hose clip DIN 3017-AS-32-50 WI-I

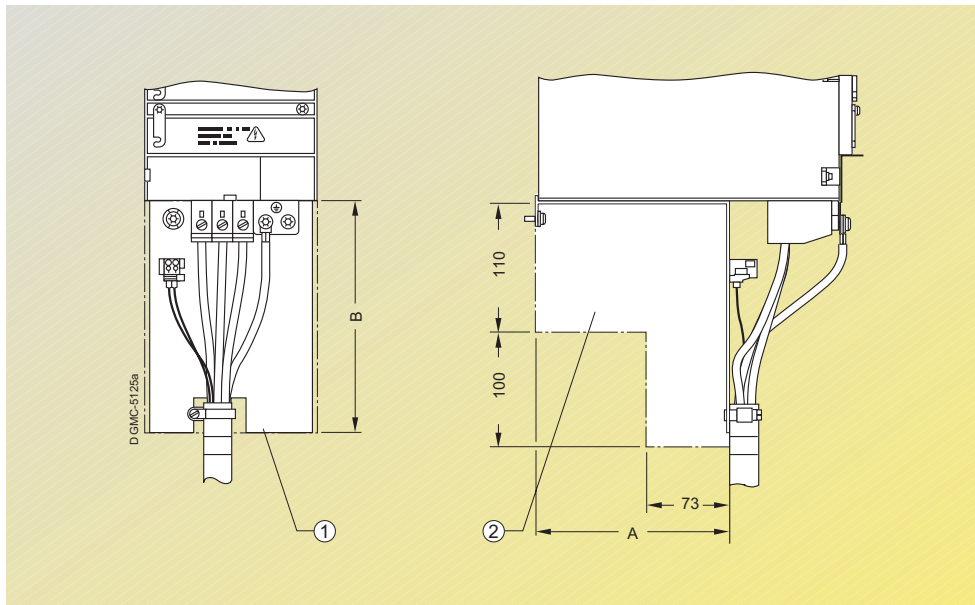
Tightening torques to be complied with when mounting modules

M 3 screws: 0.8 Nm
M 4 screws: 1.8 Nm
M 5 screws: 3.0 Nm
M 6 screws: 6.0 Nm

SIMODRIVE 611 universal and POSMO

Dimension drawings

SIMODRIVE converter system
Detailed drawings



- ① Shield plate
- ② Ventilation space

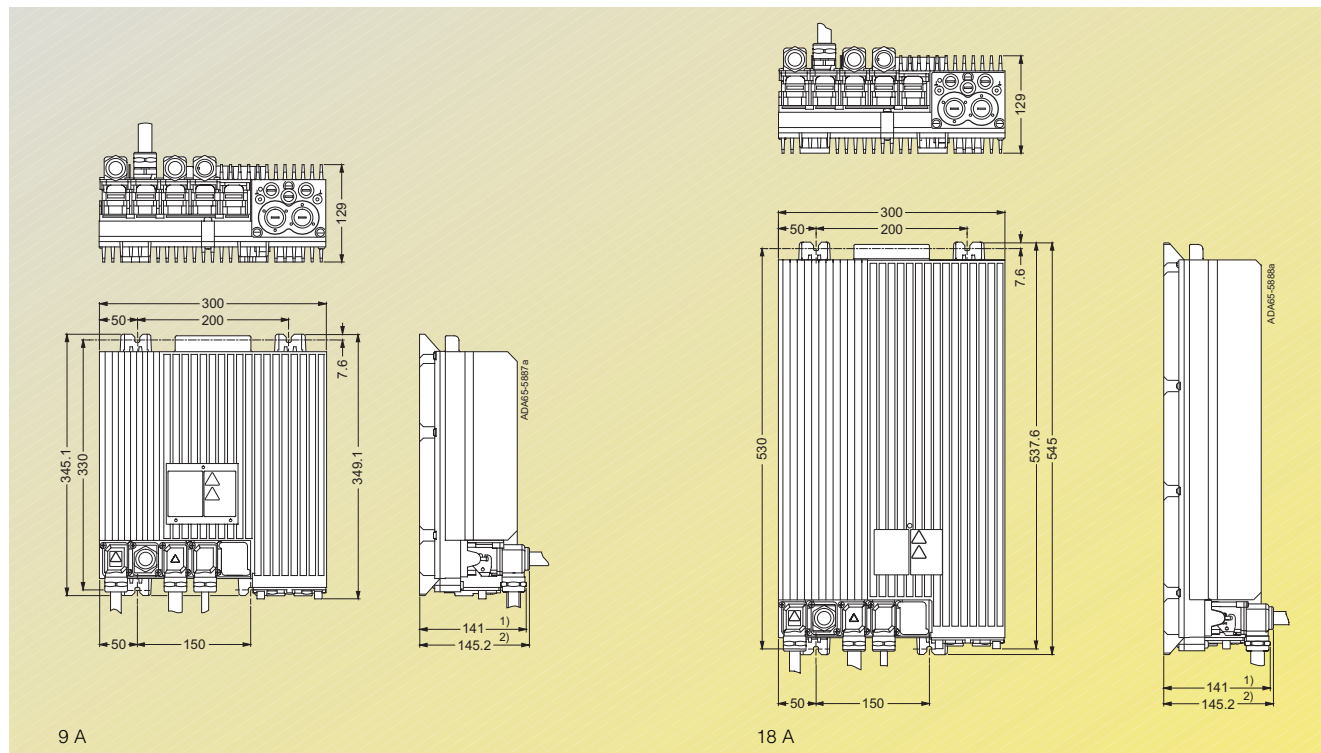
Module width	Shield plate dimensions A	B	Order No.
50	128	120	6SN11 62-0EA00-0AA0
	71	120	6SN11 62-0EB00-0AA0
100	177.8	120	6SN11 62-0EA00-0BA0
	111	120	6SN11 62-0EB00-0BA0
150	167.8	200	6SN11 62-0EA00-0CA0
	107.8	200	6SN11 62-0EB00-0CA0
200	167.8	200	6SN11 62-0EA00-0JA0
	107.8	200	6SN11 62-0EB00-0JA0
300	188.5	200	6SN11 62-0EA00-0DA0
	128.5	200	6SN11 62-0EB00-0DA0
	191.4	200	6SN11 62-0EA00-0KA0

SIMODRIVE 611 universal and POSMO

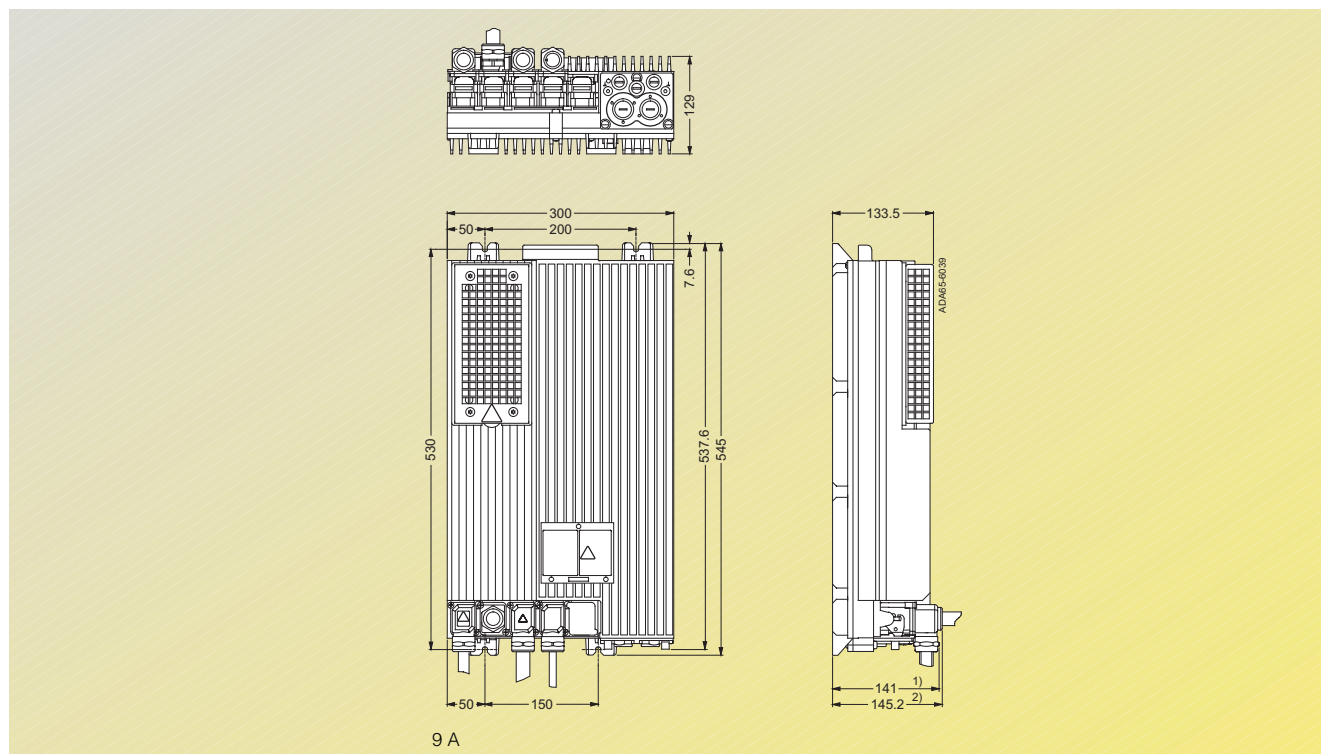
Dimension drawings

SIMODRIVE POSMO

SIMODRIVE POSMO CD



SIMODRIVE POSMO CA



SIMODRIVE 611 universal and POSMO

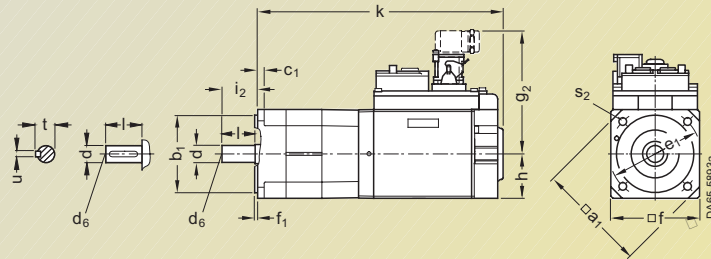
Dimension drawings

SIMODRIVE POSMO

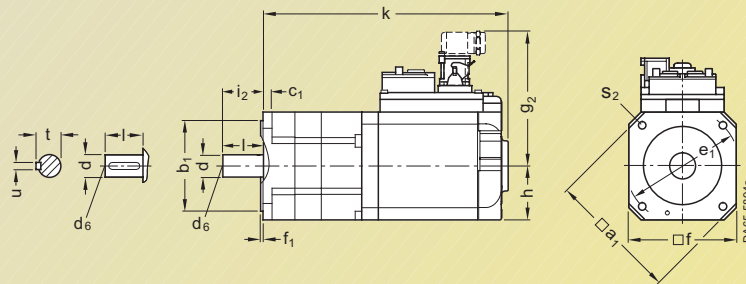
SIMODRIVE POSMO SI

Shaft design with
fitted key

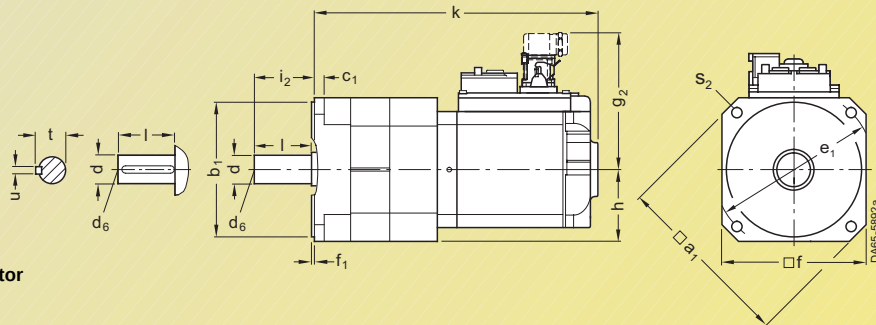
6SN2 46.
with 1FK6 06. motor



6SN2 48.
with 1FK6 08. motor



6SN2 500
with 1FK6 100 motor



For motor		Dimension designations acc. to										Encoder	Drive end				
Frame size	Type	DIN	a ₁	b ₁	c ₁	e ₁	f	f ₁	g ₂	h	i ₂	k	d	d ₆	l	t	u
		IEC	P	N	LA	M	AB	T	—	H	—	L	D	—	E	GA	F
63	1FK6 060		155	110	10	130	126	3.5	141	63	50	399	24	M8	50	27	8
	1FK6 063											449					
80	1FK6 080		186	130	13	165	155	3.5	154.5	77.5	58	415	32	M12	58	35	10
	1FK6 083											453					
100	1FK6 100		240	180	13	215	192	4	155	96	80	459	38	M12	80	41	10

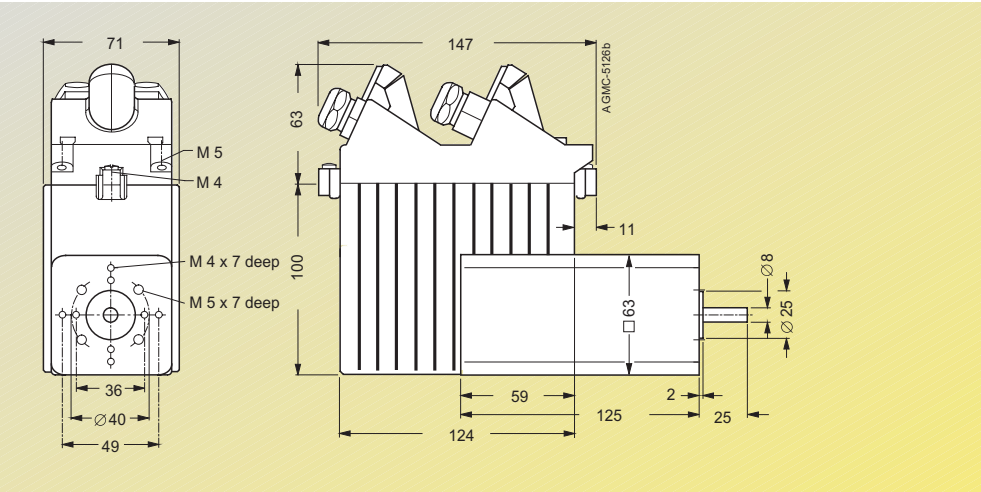
7

SIMODRIVE 611 universal and POSMO

Dimension drawings

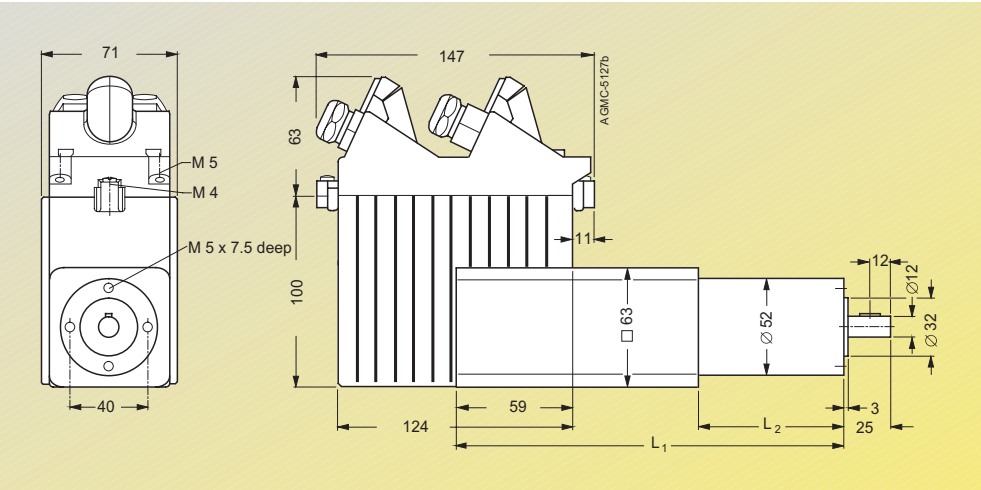
SIMODRIVE POSMO

SIMODRIVE POSMO A, 75 W without gear unit



Tightening torque
M 4: 1.8 Nm
M 5: 3.0 Nm

SIMODRIVE POSMO A, 75 W with planetary gear unit



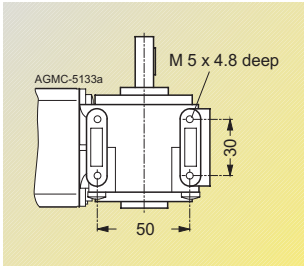
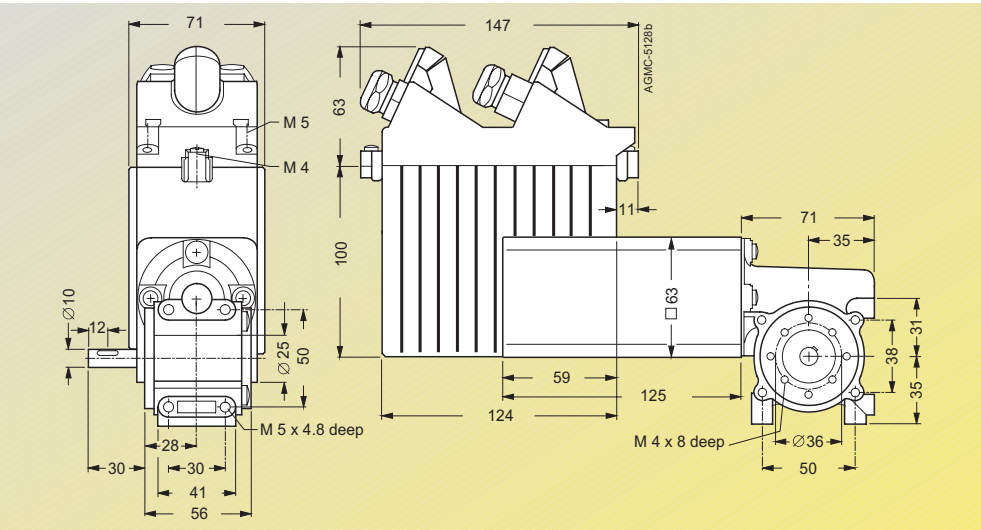
Tightening torque
M 4: 1.8 Nm
M 5: 3.0 Nm

Gear stages	Motor type	
	L ₁	L ₂
1	175	50
2	190.5	65.5
3	202.5	80.5

Reduction ratio
4.5:1/20.25:1/36:1/126.56:1/
162:1/8:1

Gear stages	Reduction ratio	
	i	
1	4.5; 8	
2	20.25; 36; 50	
3	126.56; 162	

SIMODRIVE POSMO A, 75 W with worm gear unit



Tightening torque
M 4: 1.8 Nm
M 5: 3.0 Nm

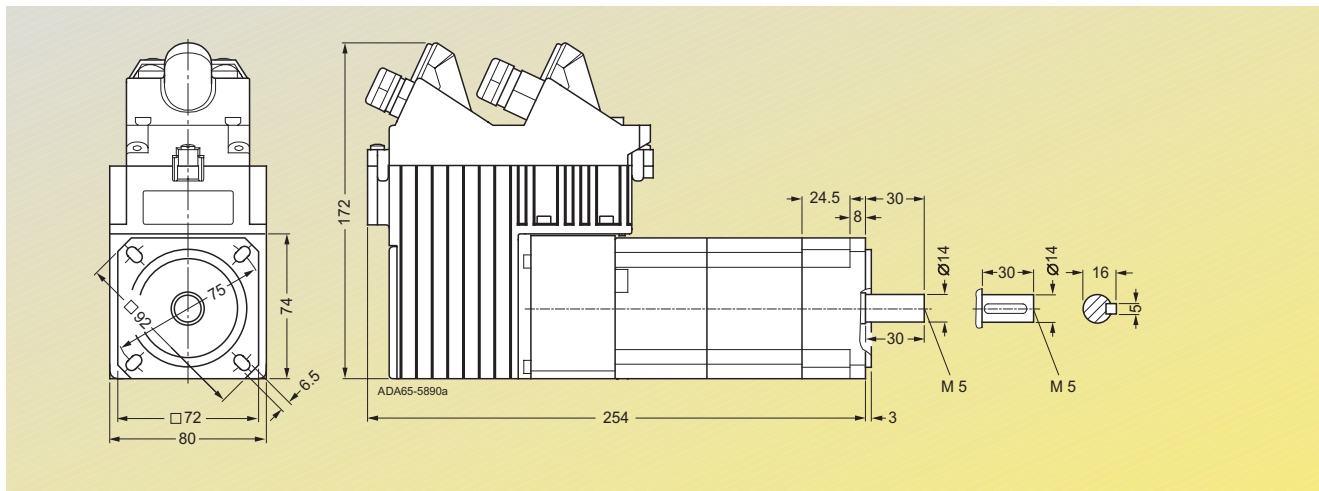
Reduction ratio
5:1/24:1/75:1

SIMODRIVE 611 universal and POSMO

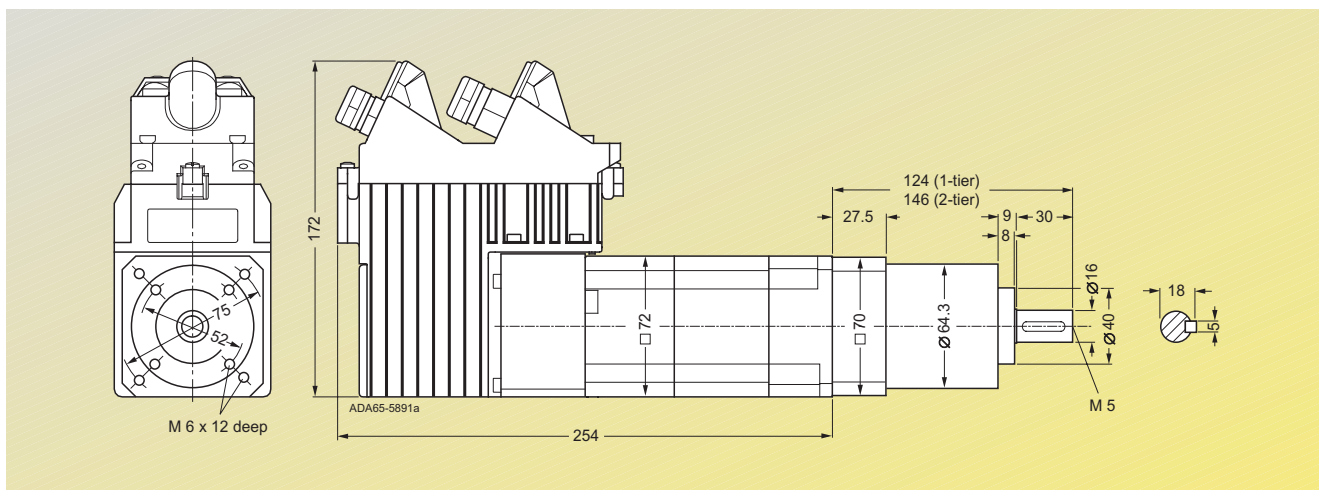
Dimension drawings

SIMODRIVE POSMO

SIMODRIVE POSMO A, 300 W without gear unit



SIMODRIVE POSMO A, 300 W with planetary gear unit



Gear stages	Reduction ratio i
1	4; 7
2	12; 20; 35; 49

SIMODRIVE 611 universal and POSMO

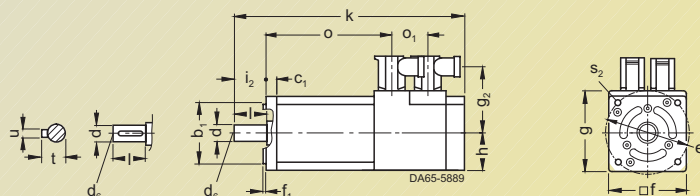
Dimension drawings

Synchronous servo motors

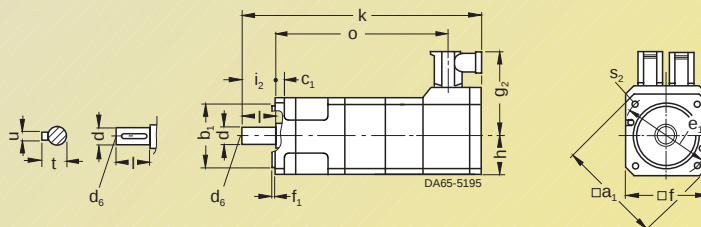
1FT6 servo motors, type IM B5, naturally cooled, with connector, with/without brake

Shaft design with
fitted key

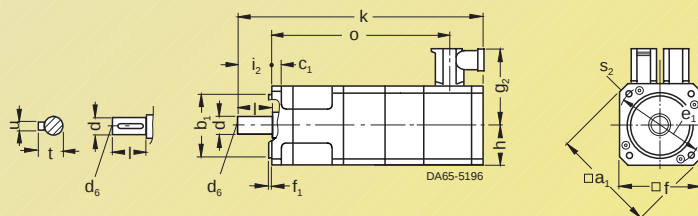
1FT6 02 .



1FT6 03 .



1FT6 04 .
1FT6 06 .



For motor		Dimension designations acc. to														Resolver without brake				with brake				Encoder without brake				with brake				Drive end				
Frame size	Type	DIN	a ₁	b ₁	c ₁	e ₁	f	f ₁	g ₂	h	i ₂	s ₂ ¹⁾	s ₂ ²⁾	o ₁	k	o	k	o	k	o	k	o	k	o	d	d ₆	l	t	u							
		IEC	P	N	LA	M	AB	T	—	H	—	S	S	—	L	—	L	—	L	—	L	—	L	—	D	—	E	GA	F							
28	1FT6 021	—		40	9.8	63	55	2.5	63	28	20	6	—	34.5	213	141	238	166	213	141	238	166	9	M3	20	10	3									
	1FT6 024														253	181	278	206	253	181	278	206														
36	1FT6 031		92	60	8	75	72	3	77	36	30	6	—	—	210	151	230	171	250	151	270	171	14	M5	30	16	5									
	1FT6 034														250	191	270	211	290	191	310	211														
48	1FT6 041		120	80	10	100	96	3	81	48	40	7	—	—	225	157	260	192	266	157	301	192	19	M6	40	21.5	6									
	1FT6 044														275	207	310	242	316	207	351	242														
63	1FT6 061		146	110	10	130	116	3.5	91	58	50	9	M8	—	248	172	278	202	278	172	308	202	24	M8	50	27	8									
	1FT6 062														273	197	303	227	303	197	333	227														
	1FT6 064														323	247	353	277	353	247	383	277														

1) IM B5.

2) IM B14.

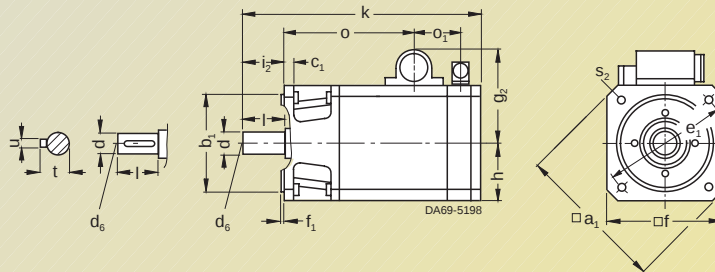
SIMODRIVE 611 universal and POSMO

Dimension drawings

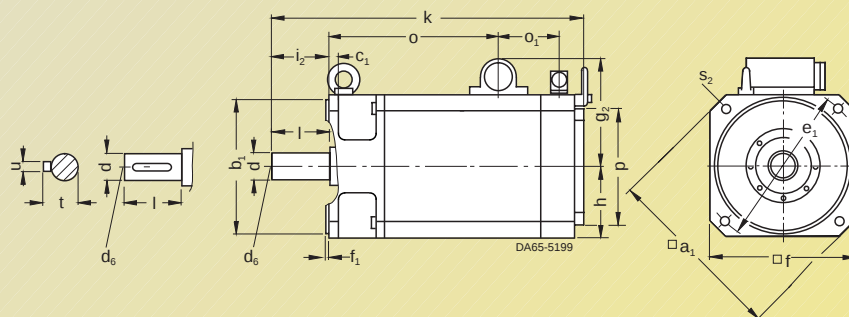
Synchronous servo motors

Shaft design with
fitted key

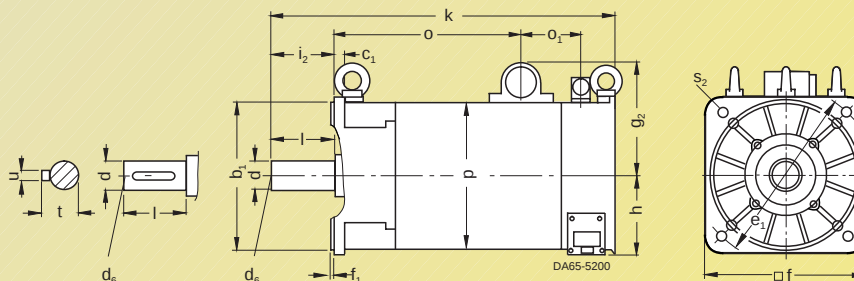
1FT6 08 .



1FT6 10 .



1FT6 13 .



For motor		Dimension designations acc. to														Resolver without brake				Encoder without brake				Drive end				
Frame size	Type	DIN	a ₁	b ₁	c ₁	e ₁	f	f ₁	g ₂	h	i ₂	p	s ₂ ¹⁾	s ₂ ²⁾	o ₁	k	o	k	o	k	o	k	o	d	d ₆	l	t	u
		IEC	P	N	LA	M	AB	T	–	H	–	HD	S	S	–	L	–	L	–	L	–	L	–	D	–	E	GA	F
80	1FT6 081		194	130	12	165	155	3.5	127.5	77.5	58	–	11	M10	76	279	113	306	140	279	113	306	140	32	M12	58	35	10
	1FT6 082															304	138	331	165	304	138	331	165					
	1FT6 084															354	188	400	234	354	188	400	234					
	1FT6 086															404	238	450	284	404	238	450	284					
100	1FT6 102		240	180	13	215	192	4	146	96	80	155	14	M12	76	375	186	421	232	375	186	421	232	38	M12	80	41	10
	1FT6 105															450	261	496	307	450	261	496	307					
	1FT6 108															550	361	596	407	550	361	596	407					
	1FT6 132		–	250	18	300	260	5	172.5	132	82	245	18	–	66	505	288	555	338	505	288	555	338	48	M16	82	51.5	14
132	1FT6 134															555	338	605	388	555	338	605	388					
	1FT6 136															605	388	655	438	605	388	655	438					

1) IM B5.

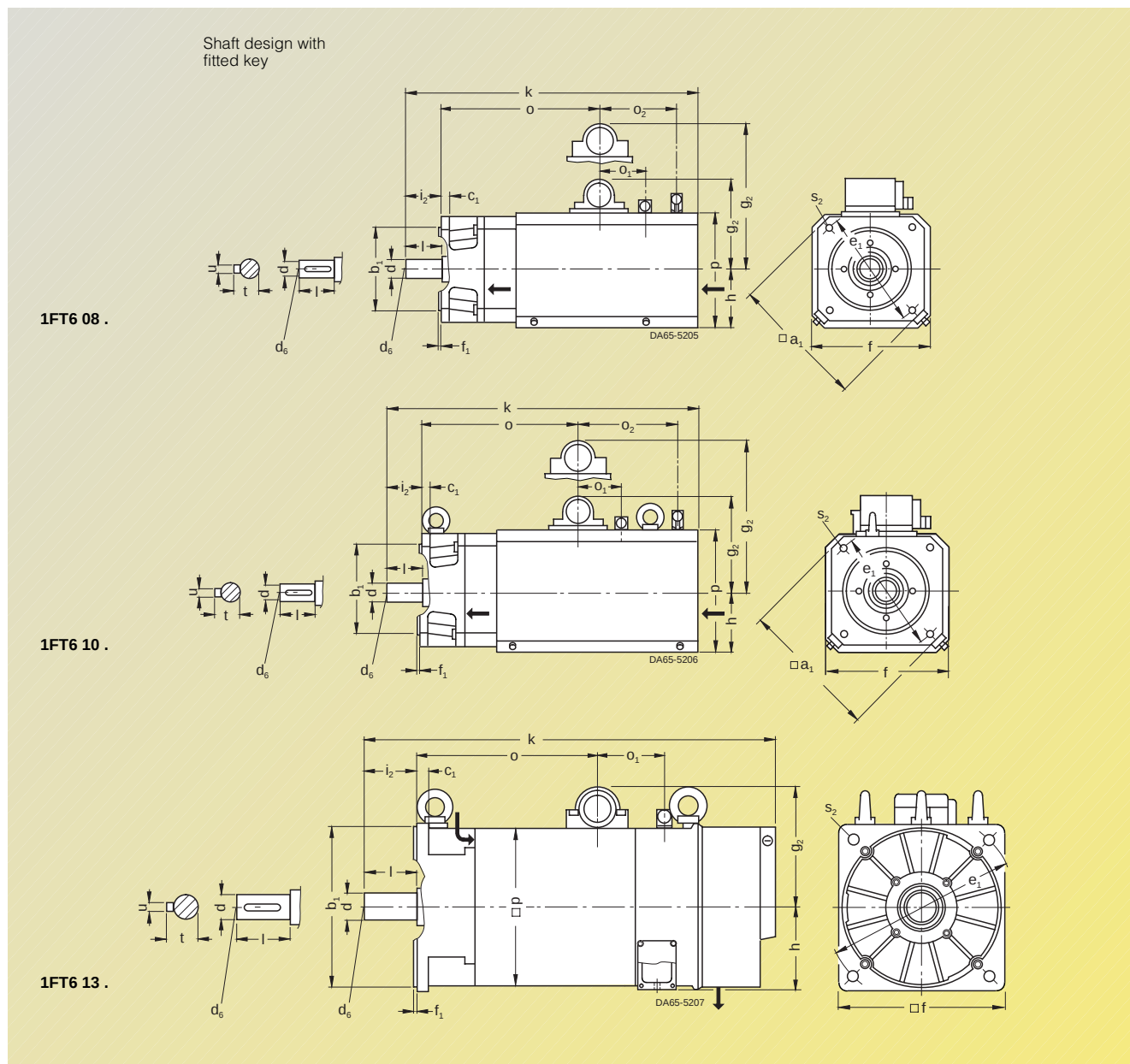
2) IM B14.

SIMODRIVE 611 universal and POSMO

Dimension drawings

Synchronous servo motors

1FT6 servo motors, type IM B5, separately ventilated, with connector with/without brake



For motor		Dimension designations acc. to							Connector									Resolver/encoder				Drive end				
									Size 1.5	Size 3								Without brake	with brake							
Frame size	Type	DIN	a ₁	b ₁	c ₁	e ₁	f	f ₁	g ₂	g ₂	h	i ₂	p	s ₂ ¹⁾	s ₂ ²⁾	o ₁	o ₂	k	o	k	o	d	d ₆	l	t	u
		IEC	P	N	LA	M	AB	T	–	–	H	–	HD	S	S				L	–	L	–	D	–	E	GA
80	1FT6 084		194	130	12	165	185	3.5	139.5	153.5	92.5	58	175	11	M10	76	169	457	188	503	234	32	M12	58	35	10
	1FT6 086																	507	238	553	284					
100	1FT6 105		240	180	13	215	221	4	158	172	110.5	80	212	14	M12	76.5	140	553	261	599	307	38	M12	80	41	10
	1FT6 108																	653	361	699	407					
132	1FT6 132	–	250	18	300	260	5	–	186.5	132	82	245	18	–	102	–	623	288	673	338	48	M16	82	51.5	14	
	1FT6 134																	673	338	723	388					

1) IM B5.

2) IM B14.

SIMODRIVE 611 universal and POSMO

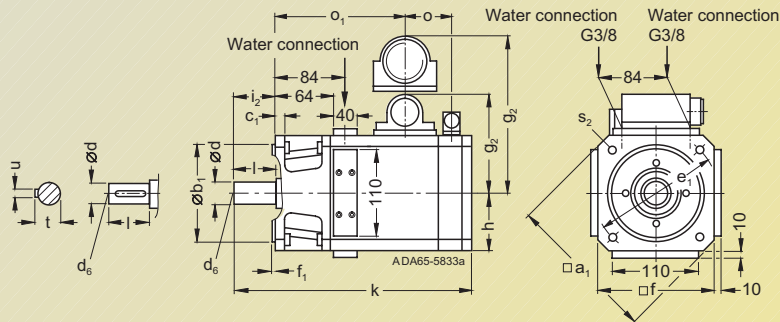
Dimension drawings

Synchronous servo motors

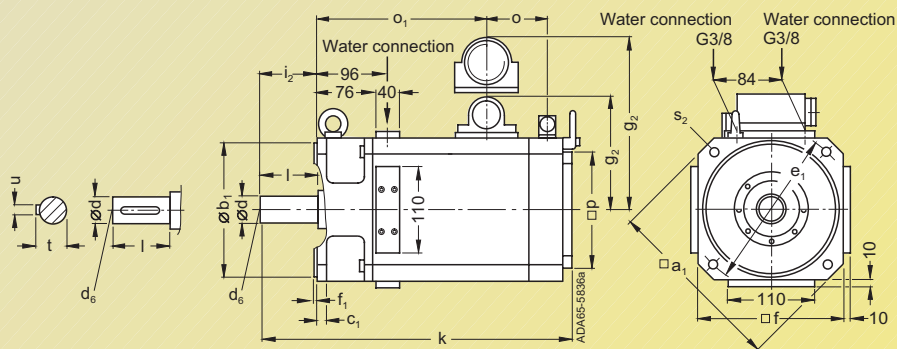
1FT6 servo motors, type IM B5, water-cooled, with connector with/without brake

Shaft design with
fitted key

1FT6 08 .



1FT6 10 .



For motor		Dimension designations acc. to							Connector								Resolver/encoder				Drive end				
									Size 1.5				Size 3				Without brake		with brake						
Frame size	Type	DIN IEC	a ₁ P	b ₁ N	c ₁ LA	e ₁ M	f AB	f ₁ T	g ₂ –	g ₂ –	h H	i ₂ –	p HD	s ₂ ¹⁾ S	s ₂ ²⁾ S	o ₁	k L	o –	k L	o –	d D	d ₆ –	l E	t GA	u F
80	1FT6 084		194	130	12	165	155	3.5	139.5	153.5	77.5	58	–	11	M10	76	354	188	400	234	32	M12	58	35	10
	1FT6 086																404	238	450	284					
100	1FT6 105		240	180	13	215	192	4	158	172	96	80	155	14	M12	76	450	261	496	307	38	M12	80	41	10
	1FT6 108																550	361	596	407					

1) IM B5.

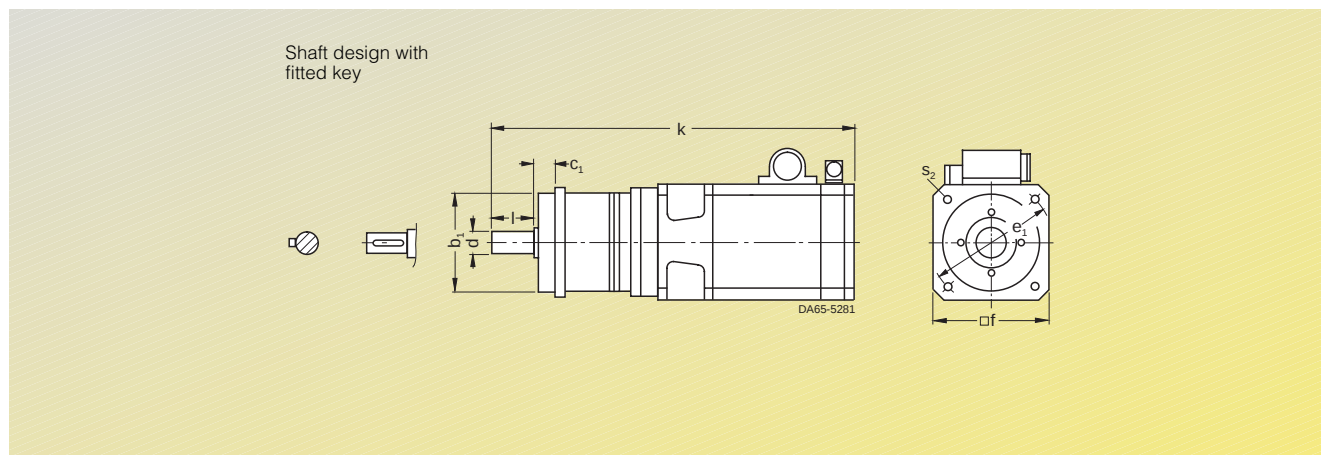
2) IM B14.

SIMODRIVE 611 universal and POSMO

Dimension drawings

Synchronous servo motors

1FT6 servo motors with planetary gearing (from alpha) SPG 1-stage, type IM B5, water-cooled with connector, with/without brake



For motor		With planetary gearing 1-stage	Dimension designations acc. to					without brake	with brake	Drive end		For motor dimensions, see drawings on Page 7/22-23
Frame size	Type	Type	DIN IEC	b ₁ N	c ₁ LA	e ₁ M	f AB	k ¹⁾ L	k ¹⁾ L	s ₂ S	d D	
36	1FT6 031	SPG 060-MF1		60	20	68	62	349	369	5.5	16	28
	1FT6 034	SPG 060-MF1						389	409			
		SPG 075-MF1		70		85	76	416	436	6.6	22	36
48	1FT6 041	SPG 075-MF1		70	20	85	76	384	419	6.6	22	36
	1FT6 044	SPG 075-MF1						434	469			
		SPG 100-MF1		90	30	120	101	480	515	9	32	58
63	1FT6 061	SPG 100-MF1		90	30	120	101	430	460	9	32	58
	1FT6 062	SPG 100-MF1						455	485			
	1FT6 064	SPG 100-MF1						505	535			
80	1FT6 081	SPG 140-MF1		130	30	165	141	477	505	11	40	82
	1FT6 082	SPG 140-MF1						503	530			
	1FT6 084	SPG 140-MF1						553	599			
	1FT6 086	SPG 140-MF1						603	649			
		SPG 180-MF1		160		215	182	643	689	13	55	82
100	1FT6 102	SPG 180-MF1		160	30	215	182	592	638	13	55	82
	1FT6 105	SPG 180-MF1						667	713			
		SPG 210-MF1		180	38	250	212	720	766	17	75	105
	1FT6 108	SPG 180-MF1		160	30	215	182	767	813	13	55	82
		SPG 210-MF1		180	38	250	212	820	866	17	75	105
132	1FT6 132	SPG 210-MF1		180	38	250	212	773	823	17	75	105
	1FT6 134	SPG 210-MF1						823	873			
	1FT6 136	SPG 210-MF1						873	923			
	1FT6 132	SPG 240-MF1		200	40	290	242	859	909	17	85	130
	1FT6 134	SPG 240-MF1						909	959			
	1FT6 136	SPG 240-MF1						959	1009			

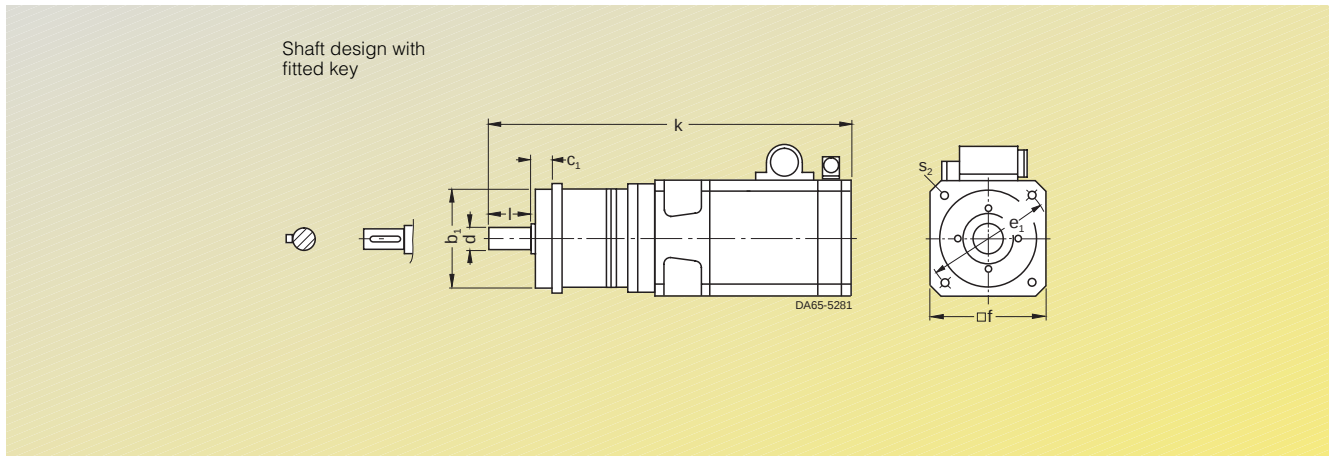
1) Motors with encoders.

SIMODRIVE 611 universal and POSMO

Dimension drawings

Synchronous servo motors

1FT6 servo motors with planetary gearing (from alpha) SPG 2-stage, type IM B5, naturally cooled with connector, with/without brake



For motor		With planetary gearing 2-stage	Dimension designations acc. to					without brake	with brake	Drive end		For motor dimensions, see drawings on Page 7/22-23	
Frame size	Type		Type	DIN IEC	b ₁ N	c ₁ LA	e ₁ M	f AB	k ¹⁾ L	k ¹⁾ L	s ₂ S		d D
36	1FT6 031	SPG 075-MF2		70	20	85	76	403	423	6.6	22	36	
	1FT6 034	SPG 075-MF2						443	463				
		SPG 100-MF2		90	30	120	101	495	515	9	32	58	
48	1FT6 041	SPG 100-MF2		90	30	120	101	463	498	9	32	58	
		SPG 140-MF2		130		165	141	525	560	11	40	82	
	1FT6 044	SPG 100-MF2		90		120	101	513	548	9	32	58	
		SPG 140-MF2		130		165	141	575	610	11	40	82	
63	1FT6 061	SPG 100-MF2		90	30	120	101	463	493	9	32	58	
		SPG 140-MF2		130		165	141	525	555	11	40	82	
	1FT6 062	SPG 100-MF2		90		120	101	488	518	9	32	58	
		SPG 140-MF2		130		165	141	550	580	11	40	82	
		SPG 180-MF2		160		215	182	569	599	13	55		
	1FT6 064	SPG 140-MF2		130		165	141	600	630	11	40		
		SPG 180-MF2		160		215	182	619	649	13	55		
80	1FT6 081	SPG 180-MF2		160	30	215	182	537	564	13	55	82	
	1FT6 082	SPG 180-MF2						562	589				
		SPG 210-MF2		180	38	250	212	643	670	17	75	105	
	1FT6 084	SPG 180-MF2		160	30	215	182	612	658	13	55	82	
		SPG 210-MF2		180	38	250	212	693	739	17	75	105	
		SPG 240-MF2		200	40	290	242	750	796		85	130	
	1FT6 086	SPG 180-MF2		160	30	215	182	662	708	13	55	82	
		SPG 210-MF2		180	38	250	212	743	789	17	75	105	
		SPG 240-MF2		200	40	290	242	800	846		85	130	
100	1FT6 102	SPG 210-MF2		180	38	250	212	692	738	17	75	105	
		SPG 240-MF2		200	40	290	242	749	795		85	130	
	1FT6 105	SPG 210-MF2		180	38	250	212	767	813		75	105	
		SPG 240-MF2		200	40	290	242	824	870		85	130	
	1FT6 108	SPG 240-MF2						924	970				

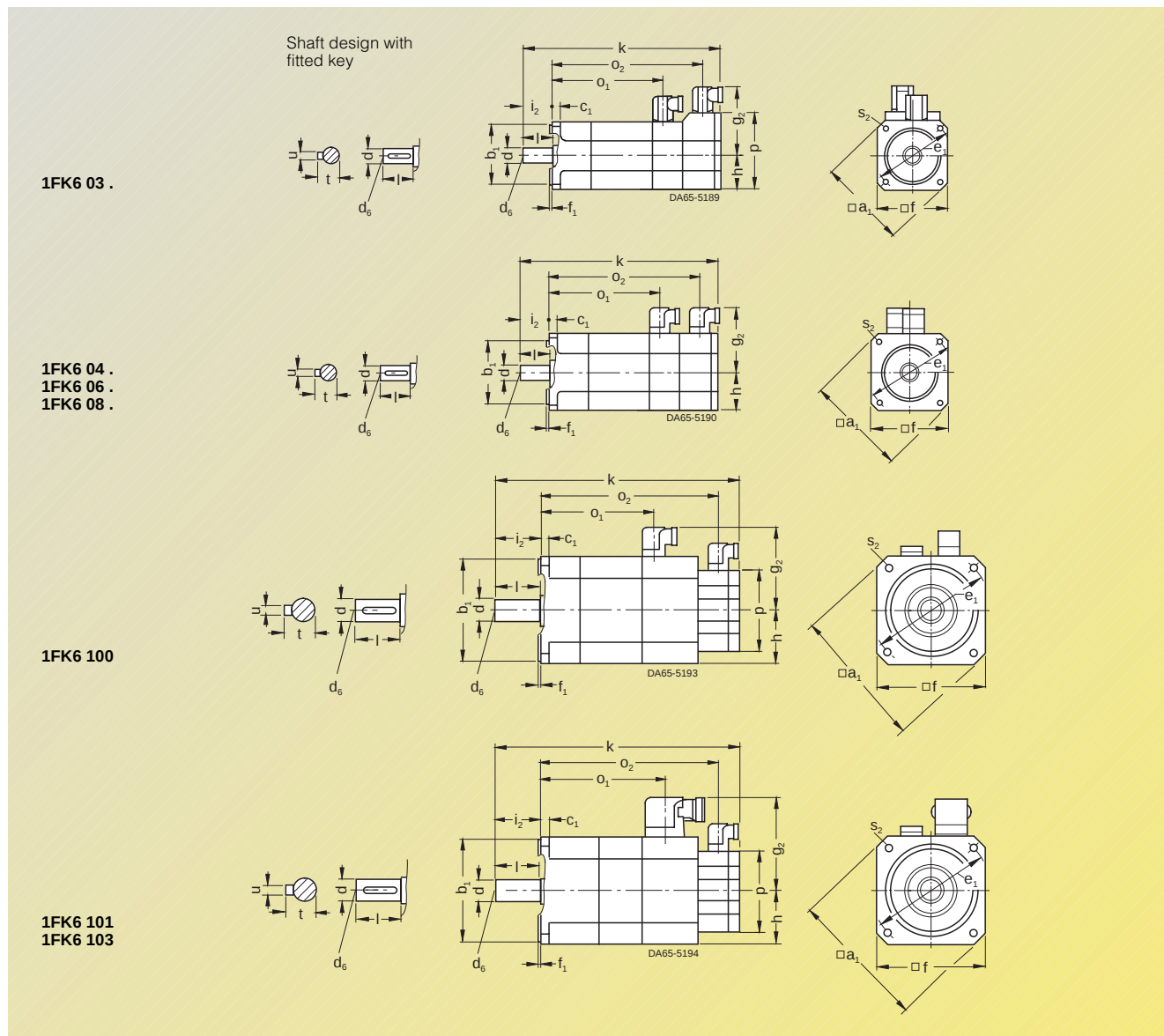
1) Motors with encoders.

SIMODRIVE 611 universal and POSMO

Dimension drawings

Synchronous servo motors

1FK6 servo motors, type IM B5, naturally cooled, with angled connector, with/without brake



Frame size	Type	High Dynamic	Dimension designations acc. to														Resolver				Encoder	Drive end				
		Without brake/with brake																								
		DIN IEC	a ₁ P	b ₁ N	c ₁ LA	e ₁ M	f AB	f ₁ T	g ₂ –	h H	i ₂ –	o ₁ –	o ₂ –	p HD	s ₂ S	k L	k L	d D	d ₆ –	l E	t GA	u F				
36	1FK6 032		92	60	8	75	72	3	79	36	30	95.5	154/154	78	6	209/209	–/–	14	M5	30	16	5				
	1FK6 033											114.5	164/164			219/219	241.5/241.5									
48	1FK6 040		120	80	10	100	96	3	85	48	40	83	134/157	–	7	200/223	243.5/266.5	19	M6	40	21.5	6				
	1FK6 042											115	166/189			232/255	275.5/298.5									
	1FK6 043											135	177/200			243/266	287.5/310.5									
	1FK6 044											161	202/225			268/291	312.5/335.5									
63	1FK6 060		155	110	10	130	126	3.5	100	63	50	104	170/188	–	9	250/268	288/306	24	M8	50	27	8				
	1FK6 061											123	166/184			246/264	284/302									
	1FK6 063											154	220/238			300/318	338/356									
	1FK6 064											187	230/248			310/328	348/366									
80	1FK6 080		186	130	13	165	155	3.5	114	77.5	58	97	165/207	–	11	253/295	300/342	32	M12	58	35	10				
	1FK6 082											142.5	186/228			274/316	321/363									
	1FK6 083											135	203/245			291/333	338/380									
	1FK6 085											192.5	236/278			324/366	371/413									
100	1FK6 100		240	180	13	215	192	4	132	96	80	113	188/188	155	14	298/298	345/345	38	M12	80	41	10				
	1FK6 101								150			148	214/214			324/324	371/371									
	1FK6 103											174	240/240			350/350	397/397									

SIMODRIVE 611 universal and POSMO

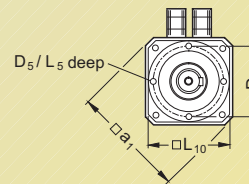
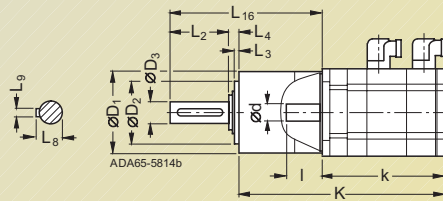
Dimension drawings

Synchronous servo motors

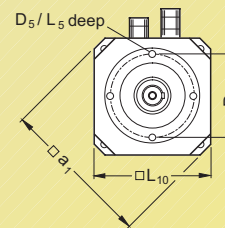
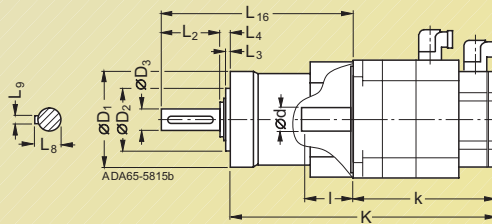
1FK6 servo motors with planetary gearing (from alpha) SPG 1-stage, type IM B5, naturally cooled, with/without brake

Shaft design with
fitted key

1FK6 032
1FK6 04 .
1FK6 06 .
1FK6 08 .



1FK6 10 .



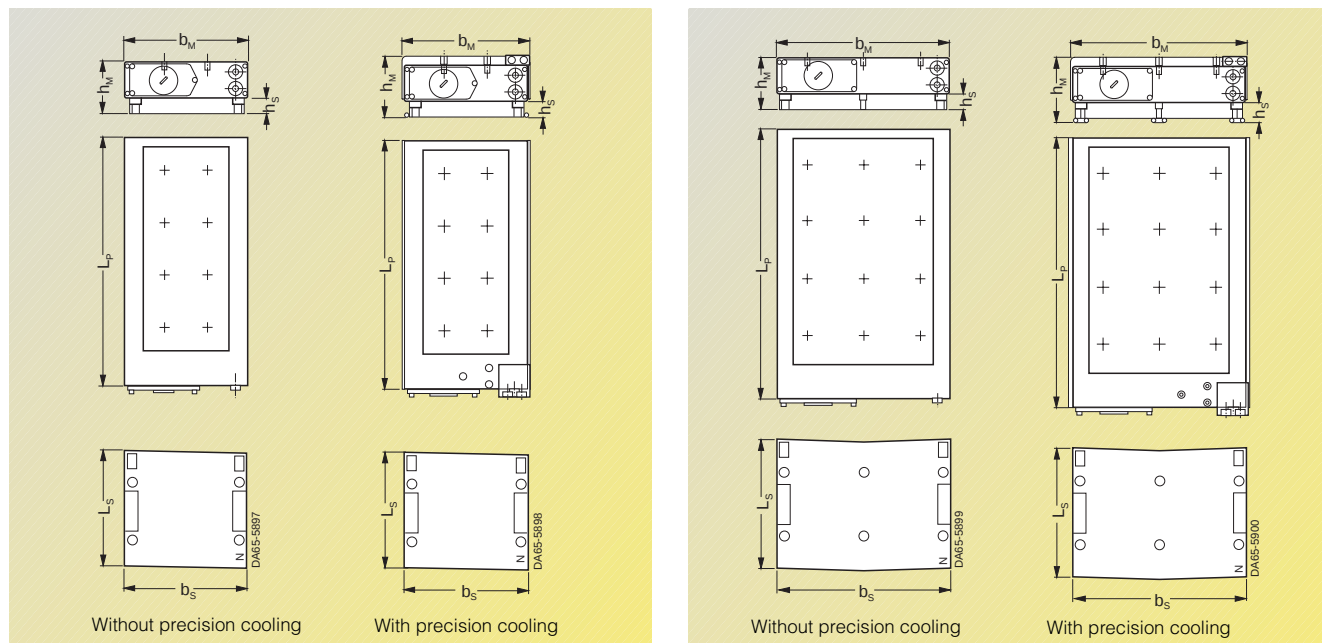
For motor		Dimension designations acc. to							Planetary gear unit														Re- solver	En- coder
Frame size	Type	Re- solver		En- coder		1-stage																		
		DIN	k	k	l	d	a ₁	Type	D ₁	D ₂	D ₃	D ₄	D ₅	L ₁₆	L ₂	L ₃	L ₄	L ₅	L ₈	L ₉	L ₁₀	K	K	
		IEC	L	L	E	D	P		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
36	1FK6 032		179	—	30	14	72	LP070-M01	70	52	16	62	M5	126	28	5	8	10	18	5	70	269	—	
48	1FK6 040		160	204	40	19	96	LP090-M01	90	68	22	80	M6	158	36	5	10	12	24.5	6	90	272	316	
	1FK6 042		192	236																	304	348		
63	1FK6 060		200	238	50	24	126	LP120-M01	120	90	32	108	M8	210	58	6	12	16	35	10	120	340	378	
	1FK6 063		250	288																	390	428		
80	1FK6 080		195	242	58	32	155	LP155-M01	155	120	40	140	M10	265	82	8	15	20	43	12	150	363	410	
	1FK6 083		233	280																	401	448		
100	1FK6 100		218	265	80	38	36	LP155-M01	155	120	40	140	M10	265	82	8	15	20	43	12	192	386	433	
	1FK6 101		244	291			54														412	459		
	1FK6 103		270	317																	438	485		

SIMODRIVE 611 universal and POSMO

Dimension drawings

Synchronous servo motors

Linear motors 1FN3 · Primary side



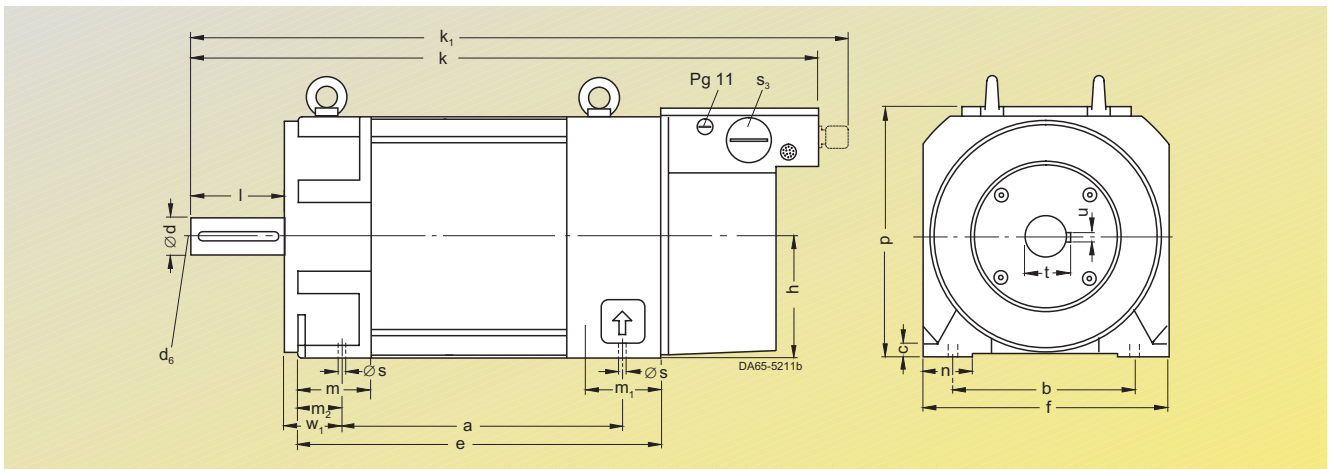
For motor	Without precision cooling		With precision cooling		Length of primary side	Secondary side	Without precision cooling		With precision cooling and cover		Length of secondary side
Type	b_M	h_M	b_M	h_M	L_P	Type	b_S	h_S	b_S	h_S	L_S
1FN3 050-2W	67	48.5	76	63.4	255	1FN3 050-4SA00-0AA0	58	11.8	75	14.8	120
1FN3 100-2W	96	48.5	105	63.4	255	1FN3 100-4SA00-0AA0	88	11.8	105	14.8	120
1FN3 100-3W	96	48.5	105	63.4	360						
1FN3 100-4W	96	48.5	105	63.4	465						
1FN3 100-5W	96	48.5	105	63.4	570						
1FN3 150-2W	126	50.5	135	65.4	255	1FN3 150-4SA00-0AA0	118	13.8	135	16.8	120
1FN3 150-3W	126	50.5	135	65.4	360						
1FN3 150-4W	126	50.5	135	65.4	465						
1FN3 150-5W	126	50.5	135	65.4	570						
1FN3 300-2W	141	64.1	151	79.0	382	1FN3 300-4SA00-0AA0	134	16.5	151	19.5	184
1FN3 300-3W	141	64.1	151	79.0	543						
1FN3 300-4W	141	64.1	151	79.0	704						
1FN3 450-2W	188	66.1	197	81.0	382	1FN3 450-4SA00-0AA0	180	18.5	197	21.5	184
1FN3 450-3W	188	66.1	197	81.0	543						
1FN3 450-4W	188	66.1	197	81.0	704						
1FN3 600-3W	248	64.1	257	86.0	543	1FN3 600-4SA00-0AA0	240	16.5	247	26.5	184
1FN3 600-4W	248	64.1	257	86.0	704						
1FN3 900-2W	342	66.1	351	88.0	382	1FN3 900-4SA00-0AA0	334	18.5	341	28.5	184
1FN3 900-4W	342	66.1	351	88.0	704						

SIMODRIVE 611 universal and POSMO

Dimension drawings

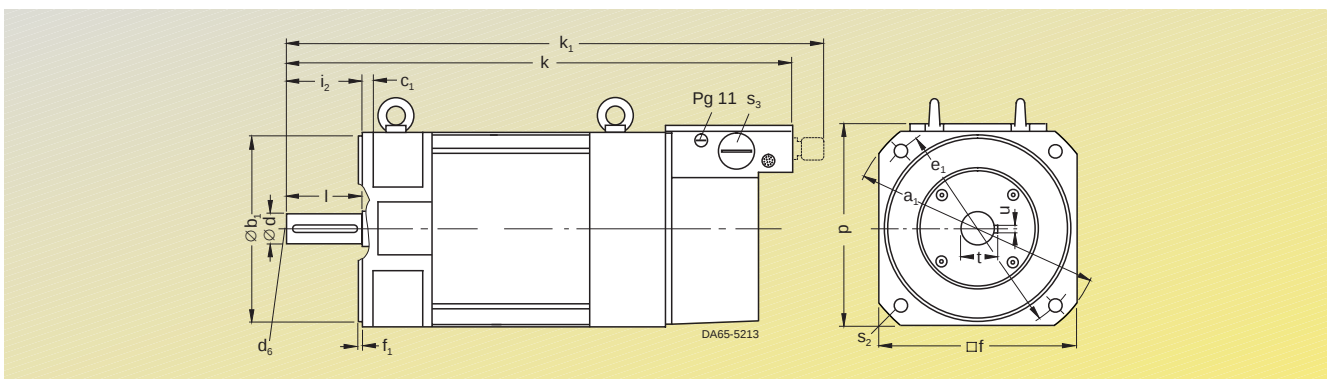
Induction servo motors

1PH7 servo motors, type IM B3, sizes 100 to 160



For motor		Dimension designations acc. to																Drive end					
Frame size	Type	DIN	a	b	c	e	f	h	k	k ₁	m	m ₁	m ₂	n	p	s	s ₃	w ₁	d	d ₆	l	t	u
		IEC	P	A	LA	M	AB	H	L	–	BA	–	–	AA	HD	K	–	C	D	–	E	GA	F
100	1PH7 101		202.5	160	11	263	196	100	491	514	52	64	27	39	220	12	Pg29	40	38	M12	80	41	10
	1PH7 103																						
	1PH7 105		297.5			358			586	609													
	1PH7 107																						
132	1PH7 131		265.5	216	14	341	260	132	648	671	63	75	33	52	275	12	Pg36	50	42	M16	110	45	12
	1PH7 133																						
	1PH7 135		350.5			426			733	756													
	1PH7 137																						
160	1PH7 163		346.5	254	17	438	314	160	750	773	78	81	42	62	330	14	Pg42	64	55	M20	110	59	16
	1PH7 167		406.5			498			810	833													

1PH7 servo motors, type IM B5, sizes 100 to 132



For motor		Dimension designations acc. to													Drive end				
Frame size	Type	DIN	a ₁	b ₁	c ₁	e ₁	f	f ₁	i ₂	k	k ₁	p	s ₂	s ₃	d	d ₆	l	t	u
		IEC	P	N	LA	M	AB	T	–	L	–	HD	S	–	D	–	E	GA	F
100	1PH7 101		250	180	10	215	196	4	80	491	514	218	14	Pg29	38	M12	80	41	10
	1PH7 103																		
	1PH7 105									586	609								
	1PH7 107																		
132	1PH7 131		350	250	16	300	260	5	110	648	671	273	18	Pg36	42	M16	110	45	12
	1PH7 133																		
	1PH7 135									733	756								
	1PH7 137																		

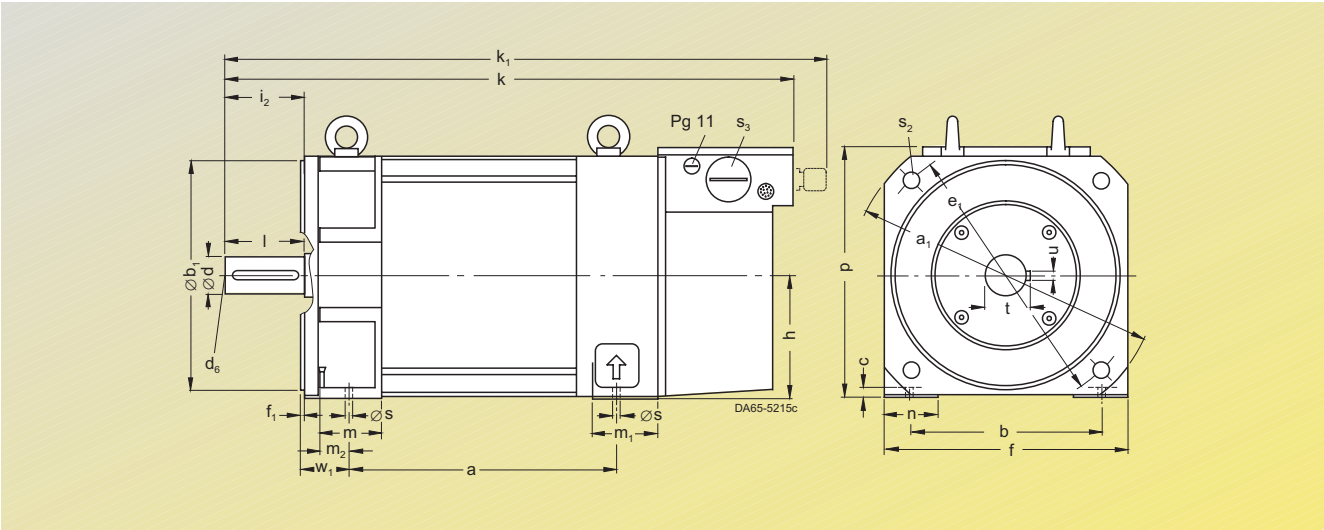
7

SIMODRIVE 611 universal and POSMO

Dimension drawings

Induction servo motors

1PH7 servo motors, type IM B35, sizes 100 to 160



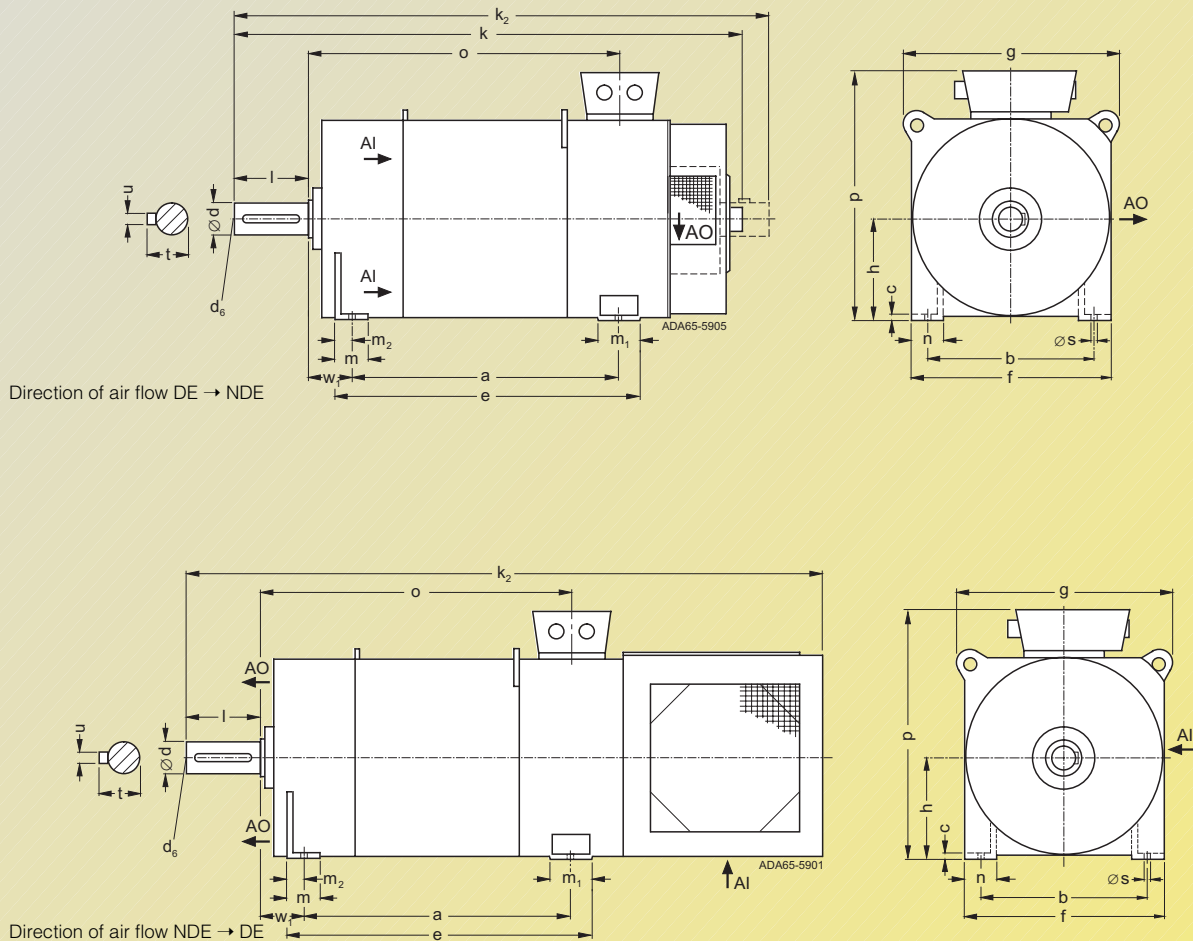
For motor		Dimension designations acc. to																				Drive end									
Frame size	Type	DIN	a	a ₁	b	b ₁	c	e ₁	f	f ₁	h	i ₂	k	k ₁	m	m ₁	m ₂	n	p	s	s ₂	s ₃	w ₁	d	d ₆	l	t	u			
		IEC	B	P	A	N	LA	M	AB	T	H	—	L	—	BA	—	—	AA	HD	K	S	—	C	D	—	E	GA	F			
100	1PH7 101		202.5	250	160	180	11	215	196	4	100	80	491	514	52	64	27	39	220	12	14	Pg29	40	38	M12	80	41	10			
	1PH7 103																														
	1PH7 105		297.5										586	609																	
	1PH7 107																														
132	1PH7 131		265.5	350	216	250	14	300	260	5	132	110	648	671	63	75	33	52	275	12	18	Pg36	50	42	M16	110	45	12			
	1PH7 133																														
	1PH7 135		350.5										733	756																	
	1PH7 137																														
160	1PH7 163		346.5	400	254	300	17	350	314	5	160	110	750	773	78	81	42	62	330	14	18	Pg42	64	55	M20	110	59	16			
	1PH7 167		406.5										810	833																	

SIMODRIVE 611 universal and POSMO

Dimension drawings

Induction servo motors

1PH7 servo motors, type IM B3, sizes 180 to 225



For motor		Dimension designations acc. to																			Drive end				
Frame size	Type	DIN	a	b	c	e	f	g	h	k	k ₁	k ₂	m	m ₁	m ₂	n	o	p ¹⁾	s	w ₁	d	d ₆	l	t	u
		IEC	B	A	LA	M	AB	AC	H	L	–	–	BA	–	–	AA	–	HD	K	C	D	–	E	GA	F
180	1PH7 184		430	279	14	510	360	395	180	960	–	1135	52	110	35	70	541	500	14.5	121	60	M20	140	64	18
	1PH7 186		520			600				1050		1225					631	560			65			99	
225	1PH7 224		445	356	18	540	450	495	225	–	1240	1235	60	110	40	85	629	680	18.5	149	75	M20	140	79.5	20

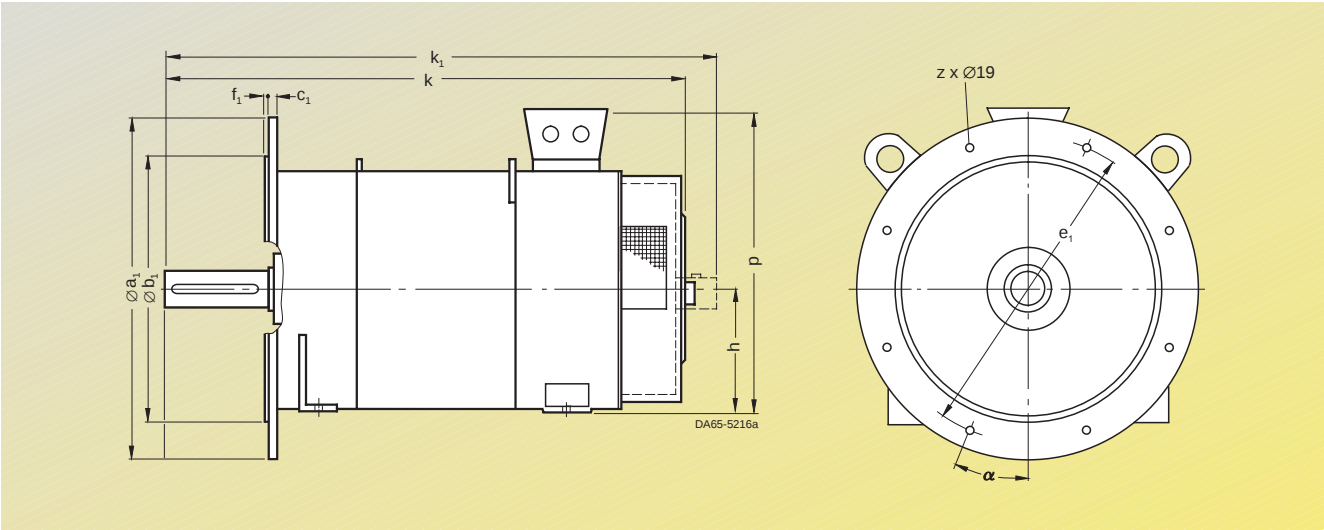
7

SIMODRIVE 611 universal and POSMO

Dimension drawings

Induction servo motors

1PH7 servo motors, type IM B35, sizes 180 to 225



For motor		Dimension designations acc. to										For the dimensions for mounting on feet and for the shaft and terminal box, see the dimension drawing for motors 1PH7 18 . and 1PH7 22 . of Size B3 on Page 7/33.	
Frame size	Type	DIN IEC	a ₁ P	b ₁ N	c ₁ LA	e ₁ M	f ₁ T	h H	k L	k ₁ –	p ¹⁾ HD	z	α
180	1PH7 184		400	300	15	350	5	180	960	–	500	4	45°
	1PH7 184		450	350	16	400			960		500	8	22.5°
	1PH7 186								1050		560		
225	1PH7 224		550	450	18	500	5	225	–	1240	680	8	22.5°

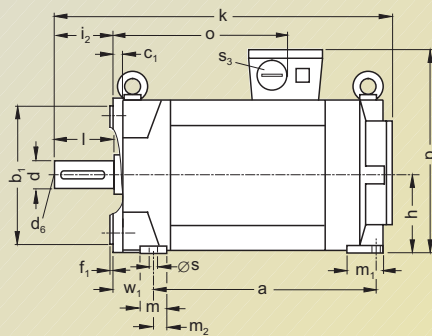
SIMODRIVE 611 universal and POSMO

Dimension drawings

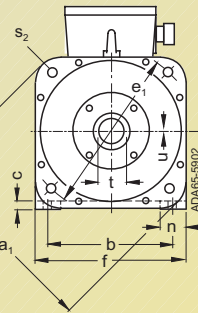
Induction servo motors

1PH4 servo motors, type IM B35, water-cooled

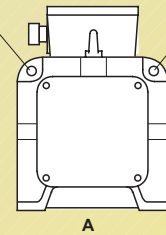
1PH4 10 .
1PH4 13 .



Water connection G 1/4
G 3/8 by 1PH4 13.

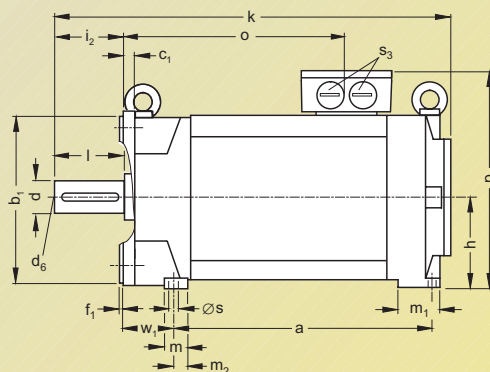


Water connection G 1/4
G 3/8 by 1PH4 13.

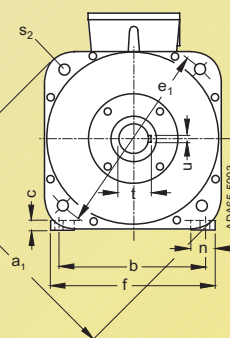


A

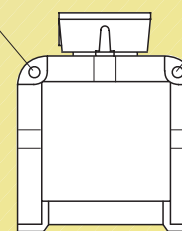
1PH4 16 .



Water connection G 1/2



Water connection G 1/2



A

For motor		Dimension designations acc. to																							Drive end					
Frame size	Type	DIN	a	a ₁	b	b ₁	c	c ₁	e ₁	f	f ₁	h	i ₂	k	m	m ₁	m ₂	n	o	p	s	s ₂	s ₃	w ₁	d	d ₆	l	t	u	
		IEC	B	P	A	N	LA	–	–	AB	T	H	–	–	BA	–	–	AA	–	HD	K	K	–	C	D	–	E	GA	F	
100	1PH4 103		349	250	160	180	11	12	215	190	4	100	80	496	35	60	24	40	245	259	12	14	Pg29	44	38	M12	80	41	10	
	1PH4 105		409											556					305											
	1PH4 107		474											621					245											
132	1PH4 133		377	350	216	250	14	16	300	246	5	132	110	568	36	85	25	46	264	334.5	12	18	Pg36	53	42	M16	110	45	12	
	1PH4 135		447											638					334											
	1PH4 137		497											688					384											
160	1PH4 163		508	400	254	300	17	18	350	290	5	160	110	701	42	77	29	52	407	388	14	18	Pg36	56	55	M20	110	59	16	
	1PH4 167		563											756					462											
	1PH4 168		608											801					507											

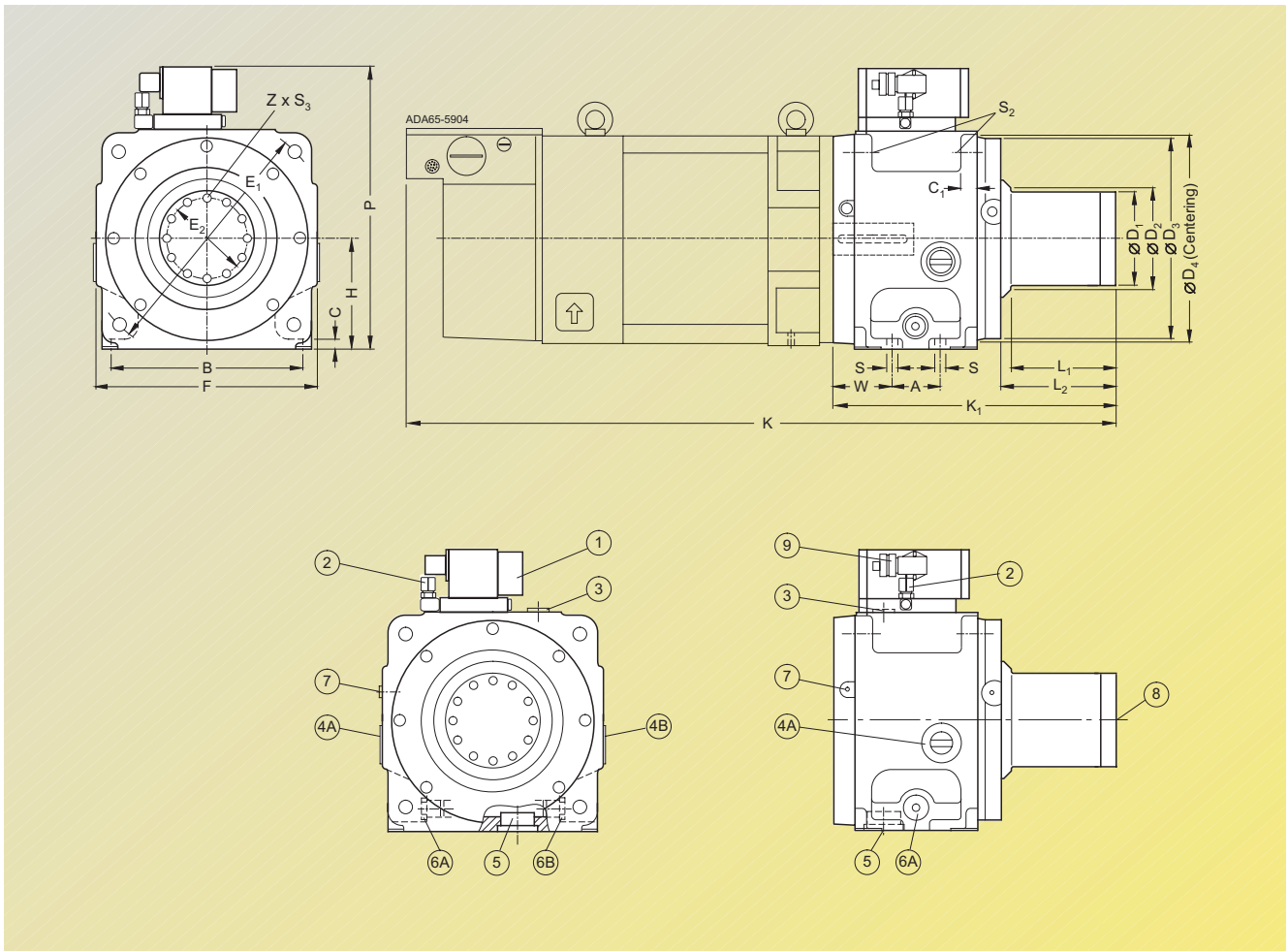
7

SIMODRIVE 611 universal and POSMO

Dimension drawings

Induction servo motors

Two-gear gear unit for 1PH7/1PH4 servo motors, type IM B35, water-cooled



- ① Switching unit (lifting solenoid 24 V DC, 5 A).
- ② Ventilation valve.
- ③ Oil filling bolt.
- ④A Oil level inspection window or oil return for counterclockwise rotation and greasing around the circumference.
- ④B Oil level inspection window or oil return for clockwise rotation and greasing around the circumference.
- ⑤ Oil drain bolt for type IM B35.
- ⑥A Oil inlet for clockwise rotation and greasing around the circumference.
- ⑥B Oil inlet for anticlockwise rotation and greasing around the circumference.
- ⑦ Oil inlet for type IM V15 (must be connected).
- ⑧ Oil inlet for type IM V36.
- ⑨ Connector, manufacture: Harting, type HAN 8 U.

SIMODRIVE 611 universal and POSMO

Dimension drawings

Induction servo motors

Motor		Gear unit																			Overall length motor/ gear unit
Size																					
	Type	A	B	C	C ₁	D ₁	D ₂	D ₃	D ₄	E ₁	E ₂	F	H	K ₁	P	S	S ₂	S ₃	Z	W	K
1PH7 induction servo motors																					
100	1PH7 101	55	184	12	18	100	100	188	190	215	80	208	108	298	301	14	14	M8	8	63	709
	1PH7 103																				709
	1PH7 105																				804
	1PH7 107																				804
132	1PH7 131	58	234	12	20	116	118	249	250	300	100	270	136	346.5	346	14	18	M12	12	71	885
	1PH7 133																				885
	1PH7 135																				970
	1PH7 137																				970
160	1PH7 163	58	290	17	20	140	118	249	250	350	100	326	164	346.5	402	14	18	M12	12	71	987
	1PH7 167																				1024
1PH4 induction servo motors																					
100	1PH4 103	55	184	12	18	100	100	188	190	215	80	208	108	298	301	14	14	M8	8	63	714
	1PH4 105																				774
	1PH4 107																				839
132	1PH4 133	58	234	12	20	116	118	249	250	300	100	270	136	346.5	346	14	18	M12	12	71	805
	1PH4 135																				875
	1PH4 137																				925
	1PH4 138																				960
160	1PH4 163	58	290	17	20	140	118	249	250	350	110	326	164	346.5	402	14	18	M12	12	71	938
	1PH4 167																				993
	1PH4 168																				1038

Dimensions for 1PH7 184, 1PH7 186 and 1PH7 224 on request.

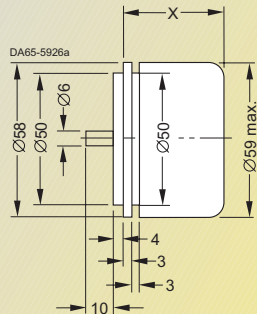
SIMODRIVE 611 universal and POSMO

Dimension drawings

Optoelectronic built-on rotary encoder
SIMODRIVE sensor

Incremental encoder, absolute encoder

Encoder with synchro-flange



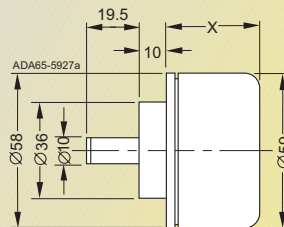
Dimensions of incremental encoder

Axial/radial cable:	x = 42±1
Flange outlet axial:	x = 48±1
Flange outlet radial:	x = 52±1

Dimensions of absolute encoder

Absolute encoder SSI	axial	radial
Single-turn:	x = 52	x = 58
Multi-turn:	x = 78	x = 78

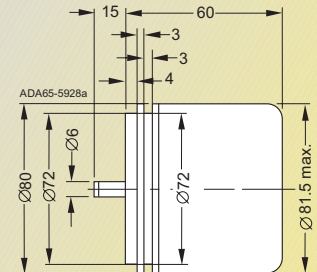
Encoder with clamping flange



Axial/radial cable:	x = 36±1
Flange outlet axial:	x = 42±1
Flange outlet radial:	x = 46±1

Absolute encoder SSI	axial	radial
Single-turn:	x = 52	x = 58
Multi-turn:	x = 78	x = 78

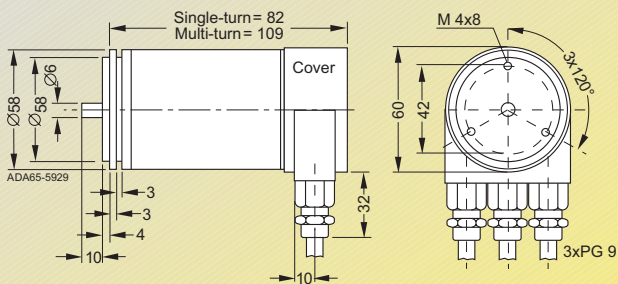
Double-track encoder with synchro-flange



Axial connection

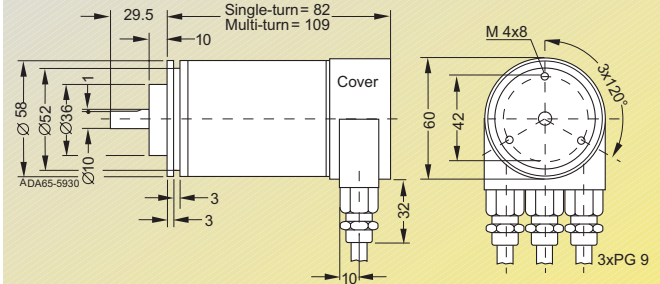
Absolute encoder with PROFIBUS-DP

Synchro-flange



Removable cover

Clamping flange



Removable cover

SIMODRIVE

611 universal and POSMO

Appendix

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SIMODRIVE 611 universal and POSMO

Appendix

Environment, resources and recycling

Siemens AG has committed itself to protecting the environment and conserving valuable natural resources. This applies both to production and to the products we sell.

As early as the development phase, the possible impact of future products and systems on the environment is taken into consideration. Our aim is to prevent environmental pollution or, at least, reduce it to a minimum and, in doing so, look beyond existing regulations and legislation.

Below are some of the most important environment-related aspects which are taken into account in the design of SIMODRIVE 611 universal and POSMO:

The use of dangerous substances (such as arsenic, asbestos, beryllium, cadmium, CFC, halogens and many more) is avoided as early as the development phase.

Connections have been designed so that they are easy to service and materials are selected carefully with preference being given to those which can be recycled or disposed of without problem.

Materials for manufacturing purposes are identified in accordance with their recyclability. This applies, in particular, to components which contain unavoidable, hazardous materials. These components are installed or mounted in such a way that they can be easily separated, thus facilitating disposal in an environmentally-friendly manner. Wherever possible, recycled components are used.

Environmentally-compatible packaging materials (pressed board and PE foils) are used for shipping and storage. If possible we pack our products in reusable packaging.

We have already made preparations to enable the converters to be disposed of after use in accordance with the regulations governing the disposal of electronic equipment (not yet in force).

This catalog is printed on Chlorine-free bleached paper.

All the Divisions of the A&D Group of Siemens AG are certified.

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Shanghai
Shenyang
Shenzhen
Suzhou
Tianjin
Wuhan
Wuxi
Xi'an
Xiaogan City
Zibo

Philippines

Siemens Inc.
Makati City
Pasig City
Cebu
Davao City

Qatar

Arabian Construction
Engineering Company
Doha

Saudi Arabia

Arabia Electric Ltd. (Equipment)
Jeddah
Al Khobar
Riyadh

Singapore

Siemens Advanced Engineering (Pte.) Ltd.
Singapore

Sri Lanka

Dimo Limited
Colombo

Syria

Siemens AG
Damascus Branch
Damascus

Taiwan

Siemens Ltd.
Taipei
Taichung
Kaohsiung
Taoyuan Hsien

Thailand

Siemens Limited
Bangkok
Rayong

Turkmenistan

Representative of Siemens AG
Aschabad

Uzbekistan

Representative of Siemens AG
Taschkent

United Arab Emirates

Siemens Resident Engineers
Dubai
Abu Dhabi

Vietnam

Siemens AG Representation
Hanoi
Ho Chi Minh City

Yemen

Tihama Tractors & Engineering Co. Ltd.
Sanaa
Aden

Australia

Siemens Ltd.
Melbourne
Adelaide
Bayswater
Brisbane
Gladesville
Milton
Pennant Hills
Perth
Silverwater
St. Leonards
Sydney

New Zealand

Siemens (NZ) Limited
Auckland
Wellington

SIMODRIVE 611 universal and POSMO

Appendix

Information and ordering on the Internet and on CD-ROM

A&D in the WWW



Detailed information about the product range to be used and the services that are available is essential at the planning and project engineering phases of plant automation projects. It is a fact that this information has to be as up-to-date as possible.

For this reason, the Siemens Group Automation and Drives (A&D) provides a comprehensive information service on the World Wide Web that makes it

easy for our customers to access all the necessary information.

You will find everything you need to know about products, systems and service contracts at:

<http://www.siemens.de/automation>

Product selection with the interactive catalogs



Providing comprehensive information and user-friendly interactive functions:

The interactive catalogs, CA 01 and ET 01, featuring over 80,000 products, provide a comprehensive overview of the Siemens Automation and Drives product spectrum.

You will find everything that you need to fulfill any task in the fields of automation, controlgear, electrical installation and drives. All the information is embedded in a user-interface that supports easy, intuitive operation.

When you have selected your products, you can submit your order by fax or via an online link at the press of a button.

You will find Information on the interactive catalogs on the Internet at:

<http://www.siemens.de/automation/ca01>

or on CD-ROM:

Automation and Drives, CA 01
Order No.:
E86060-D4001-A110-B5-7600

Electrical installation technology, ET 01
Order No.:
E86060-D8200-A107-A2-7600

Easy shopping with the Siemens Mall



The Siemens Mall is the virtual department store of Siemens AG on the Internet. You can access a gigantic product spectrum that is presented clearly and informatively in electronic catalogs.

Data transfer via EDIFACT allows the complete ordering process, from selection to ordering and order tracking, to take place online via the Internet.

Numerous functions are available to you which make the job easier.

Powerful search functions make it easy to find the required products and check their availability immediately. Individual customer discounts and quotations are available online as well as tracking and tracing of your order.

You will find the Siemens Mall on the Internet at:

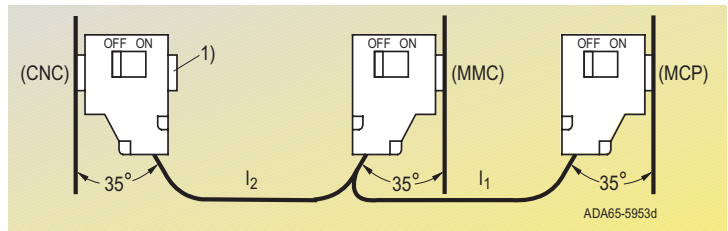
<http://www.siemens.de/automation/mall>

SIMODRIVE 611 universal and POSMO MOTION-CONNECT

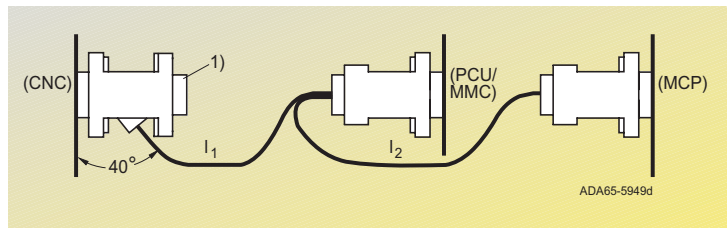
MPI cables

Ordering data

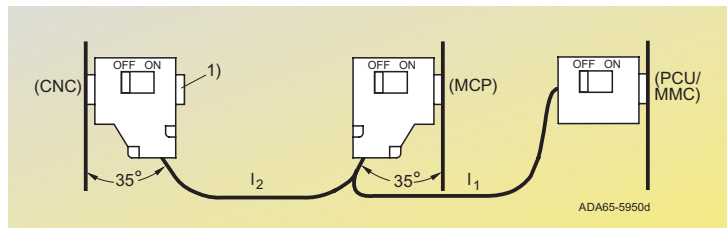
	Order No.
Pre-assembled MPI bus cable of variable length	6FX2 002-4EA0□-□ □ □ 0
with 3 connectors	
suitable for trailing	2
not suitable for trailing	1
Length l:	



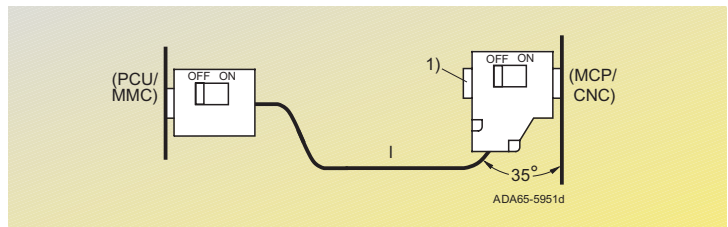
Pre-assembled MPI bus cable of fixed length $l_2 = 1$ m	6FX2 002-4EA0 4- 1 □ □ 0
not suitable for trailing	
with 3 connectors	
Length l_1	5 m A F
Length l_2	10 m B A



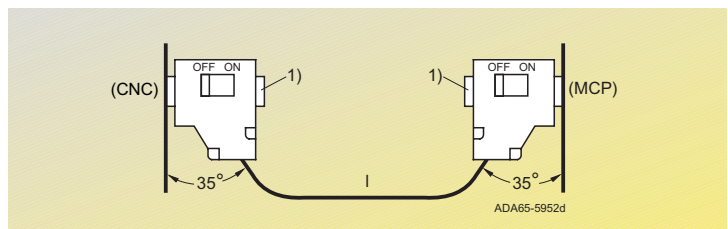
Pre-assembled MPI bus cable of variable length	6FX2 002-4EA□ 0-□ □ □ 0
with 3 connectors	
suitable for trailing	8
not suitable for trailing	0
Length l:	



Pre-assembled MPI bus cable of variable length	6FX2 002-4EA□ 8-□ □ □ 0
with 2 connectors	
suitable for trailing	8
not suitable for trailing	0
Length l:	



Pre-assembled MPI bus cable of variable length	6FX2 002-4EA□ 7-□ □ □ 0
with 2 connectors	
suitable for trailing	8
not suitable for trailing	1
Length l:	



For length code, refer to page A/10

OFF ON
Termination resistors can be deactivated
MCP Machine control panel

1) Connection socket for programming device or other devices.

SIMODRIVE 611 universal and POSMO MOTION-CONNECT

Pre-assembled cables Length codes

6FX□ 002-.....-□□□0 and 6FC9 ...-.....-□□□0

Pre-assembled cable	6FC 9 340-...Y00-	□ □ □ 0
Pre-assembled cable	6FC 9 344-...Y00-	□ □ □ 0
Pre-assembled cable	6FX□ 002-.....-	□ □ □ 0

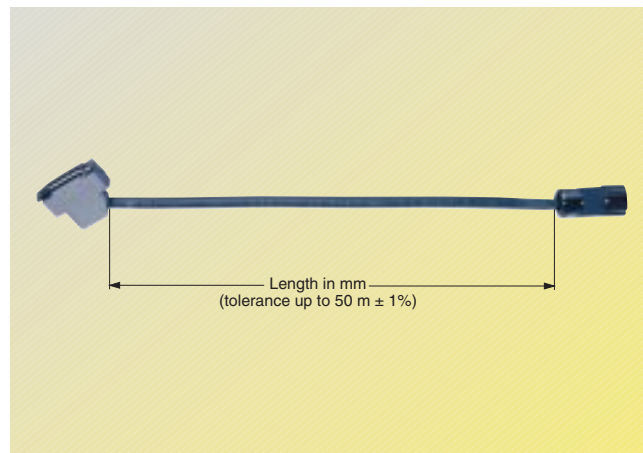
		▲	▲	▲
MOTION CONNECT 500	5			
MOTION CONNECT 700	7			
MOTION CONNECT 800	8			
Length code				
0 m	1			
100 m	2			
200 m	3			
0 m				A
10 m				B
20 m				C
30 m				D
40 m				E
50 m				F
60 m				G
70 m				H
80 m				J
90 m				K
0 m				A
1 m				B
2 m				C
3 m				D
4 m				E
5 m				F
6 m				G
7 m				H
8 m				J
9 m				K

Examples:

1 m	-1AB0
8 m	-1AJ0
17 m	-1BH0
59 m	-1FK0
111 m	-2BB0
262 m	-3GC0

For the bending radius for MOTION-CONNECT signal lines, see Catalog NC Z.

Length specification for pre-assembled cables



When specifying the cable lengths for the systems described in this catalog, strict compliance with the permitted

maximum cable lengths specified in the connection diagrams is essential otherwise faults can occur.

Conditions of sale and delivery**In Germany**

Subject to the General Conditions of Sale as well as the General Conditions of Supply and Delivery for Products and Services of the Electrical and Electronics Industry.

For Export

Subject to the General Conditions of Supply and Delivery for Products and Services of the Electrical and Electronics Industry and to any other conditions agreed upon with the recipients of catalogs/price lists.

■ Software products are subject to the General Licence Conditions for Software Products for Automation and Drives.

Prices are listed in € (Euro) ex delivery point, excluding packaging.

Turnover tax (VAT) is not included in the prices. It will be added according to legal provisions at the applicable rate.

We reserve the right to adjust prices and shall charge the prices applying on the date of delivery.

All dimensions in this catalog/price list are in mm. The illustrations are for reference only.

We reserve the right to make changes, in particular to the specified values, dimensions and weights, unless specified otherwise on the individual pages of this catalog/price list.

Export regulations

The products listed in this catalog/price list may be subject to European/German and/or US export provisions.

Any export requiring approval is therefore subject to authorization by the relevant authorities.

For the products listed in this catalog/price list, the following export regulations must be adhered to in accordance with currently valid regulations.

AL	Number of the <u>German export list</u> Products with a code other than "N" must be approved for export. The export codes of the respective data medium must also be adhered to for software products. Goods labeled with " <u>AL not equal to N</u> " are subject to European or German export authorization when being exported out of the EU.
ECCN	Number of US export list (<u>Export Control Classification Number</u>) Products with a code other than "N" require approval for re-export to certain countries. The export codes of the respective data medium must also be adhered to for software products. Goods labeled with " <u>ECCN not equal to N</u> " are subject to US reexport authorization.

Even without a label, or with label "AL: N" or "ECCN: N", authorization may be required due to the final whereabouts and purpose for which the goods are to be used.

The AL and ECCN export codes specified in our confirmations, delivery notes and invoices apply.

Subject to change without prior notice.

Catalogs of the Automation and Drives Group (A&D)

Further information can be obtained from our branch
offices listed in the appendix of this catalog

Automation & Drives		<i>Catalog</i>
Interactive catalogs on CD-ROM		
• Components for Automation & Drives	CA 01	
• Electrical Installation Technology	ET 01	
Analysis Systems		
Gas Analysis Equipment for the Process Industry	PA 10	
Process Analysis, Components for Sample Preparation	PA 11	
SIPAN Liquid Analysis	PA 20	
Drive Systems		
<u>Variable-Speed Drives</u>		
DC Motors	DA 12	
DC Drives Preferred Series up to 500 kW	DA 12.1	
DC Drives Preferred Series 215 kW to 1500 kW	DA 12.2	
SIMOREG Chassis Converters	DA 21	
SIMOREG Converter Cabinet Units	DA 22	
SIMOVERT PM Modular Converter Systems	DA 45	
SIEMOSYN Motors	DA 48	
MICROMASTER 420/440 Inverters	DA 51.2	
SIMOVERT A Current-Source DC Link Converters	DA 62	
SIMOVERT MV Medium-Voltage Drives	DA 63	
MICROMASTER, MIDIMASTER	DA 64	
Low-Voltage Motors for Variable-Speed Drives	DA 65.3	
SIMOVERT MASTERDRIVES Vector Control	DA 65.10	
SIMOVERT MASTERDRIVES Motion Control	DA 65.11	
SIMADYN D Control System	DA 99	
<u>Automation Systems for Machine Tools SIMODRIVE</u>	NC 60	
• AC Main Spindle Motors 1FE1, 1PH2, 1PH3, 1PH4, 1PH7		
• AC Servomotors 1FK6, 1FT5, 1FT6		
• AC Linear motors 1FN1, 1FN3		
• Converter System SIMODRIVE 611		
• Converter Systems SIMODRIVE POSMO A/CD/CA/SI		
<u>Low-Voltage Three-Phase-Motors</u>		
• Project Manual	M 10	
• Squirrel-Cage Motors, Totally Enclosed, Fan-Cooled	M 11	
Drive and Control Components for Hoisting Equipment	HE 1	
Automation Systems for Machine Tools		
SINUMERIK & SIMODRIVE	NC 60	
Cables, Connectors and System Components	NC Z	
Human Machine Interface Products/Systems		ST 80
SIMATIC HMI		
SIMATIC Industrial Automation Systems		
SIMATIC PCS Process Control System	ST 45	
SIMATIC S5/PC/505 Automation Systems	ST 50	
Components for Totally Integrated Automation	ST 70	
Supplementary Components	ST 71	
SIMATIC PCS 7 Process Control System	ST PCS 7	
Electrical Installation Technology		
Protective Switching and Fuse Systems	I 2.1	
Building Management Systems with <i>instabus EIB</i>		
Program Overview Modular Devices	I 2.11	
STAB Wall-Mounting Distribution Boards	I 2.31	
SIKUS Floor-Mounting Distribution Boards	I 2.32	
8PU Busway System	I 2.36	
Systems Engineering		<i>Catalog</i>
Power supplies SITOP power	KT 10.1	
System cables SIMATIC TOP connect	KT 10.2	
MOBY Identification Systems	KT 21	
Industrial Microcomputers SICOMP	KT 51	
Industrial Communication and Field Devices		IK PI
Low-Voltage Controls and Distribution		
<u>Low-Voltage Controlgear, Switchgear and Systems</u>	NS K	
Communication-Capable SIRIUS NET Controlgear, Controlgear, SIGUARD Safety Systems, Control and Signalling Devices, Switchgear, Transformers and DC Power Supplies, Main- and EMERGENCY-STOP Switches, Control Switches, Terminal Blocks		
BERO - Sensors for Automation	NS BERO	
Products and Systems	NS PS	
for Low-Voltage Power Distribution		
SETRON WL	NS WL	
TELEPERM M Process Control System		
AS 235, AS 235H and AS 235K automation systems	PLT 111	
AS 388/TM and AS 488/TM automation systems	PLT 112	
OS 525 operating and monitoring system	PLT 122	
Operating and monitoring with WinCC/TM	PLT 123	
CS 275 bus system	PLT 130	
Process Engineering		
Field Instruments for Process Automation	FI 01	
Measuring Instruments for Pressure, Differential Pressure, Flow, Level and Temperature, Positioners and Liquid Meters		
SIWAREX Weighing Systems	WT 01	
Process Recorders and Accessories	MP 20	
SIPART, Controllers and Software	MP 31	
Vacuum Pumps/Compressors		
Oil-Free Vacuum Pumps, Compressors (Blowers), Radial Blowers, Liquid Pumps	PV	
Pumps		
Vacuum Pumps and Compressors, System ELMO-F	Cat. Sheets PF	
Vacuum Pumps and Compressors, System ELMO-G	Cat. Sheets PG	
SIPOS Electric Actuators		
Electric Rotary, Linear and Part-turn Actuators	MP 35	
Electric Rotary Actuators for Nuclear Plants	MP 35.1/.2	
System Solutions		
Applications, Products and Services for Industry	SL 01	
Automation Solutions in the Plastic Industry		
• with SIMATIC S7	SL 10	
• with SIMATIC S5	ST 58	

Automation & Drives Group
Motion Control Systems
Postfach 32 69, D-91050 Erlangen
Federal Republic of Germany
<http://www.siemens.de/automation/mc>

Siemens Aktiengesellschaft

Order No. E86060-K5165-A401-A1-7600
Token fee € 5,-



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