Catalog DA 65.3 • 2002

motion control

SERVOMOTORS

Synchronous and asynchronous
servomotors for
SIMOVERT MASTERDRIVES

SIEMENS

Configuring with PFAD/PATH Plus

With the PFAD/PATH Plus program, three-phase drives fed by frequency converters for SIMOVERT® MASTERDRIVES Vector Control and Motion Control units can be configured easily and quickly.

The program is a powerful engineering tool which supports the user in all stages of configuration – from power supply to the motor.

Menu-guided selection and layout of the frequency converters enable the system components and the motors necessary for a specific drive task to be determined. Automatically displayed information ensures fault-free planning.

A comprehensive help system also supports the first-time user of the program. PFAD/PATH Plus provides a logical and easy-to-use dialog procedure to guide the planning engineer towards a reliable, reproducible and economically efficient drive configuration, starting from the mechanical requirements of the machine and the drive task involved. The technical data of the frequency converters and motors, the selected system components and the necessary accessories are listed in detail.

PFAD/PATH Plus enables drives to be configured on the basis of a load characteristic or a load cycle and enables planning of applications such as the following:

- traversing and hoisting gear
- slewing gear
- spindle drives and
- center winders.

PFAD/PATH Plus also includes a comfortable graphic display for showing

- torque, velocity and acceleration over time and
- torque, current and output over the speed of rotation.

Any system perturbations are calculated and graphically displayed as well.

The planning and configuring results can be stored on data carriers, printed on paper or copied to other user programs via the clipboard.

PFAD/PATH Plus is available with either a German or English user interface.

You can order a demo version of PFAD/PATH Plus on CD free of charge. To do this, visit our Internet homepage under **http://www.siemens.com** or use the fax form attached to the catalog.

You can also download the demo version of PFAD/PATH Plus from this Internet address.

If you need the full version of PFAD/PATH Plus, contact your local Siemens office and quote the following order number: **E20001-P121-Y210-M.** You will find the address in the appendix to this catalog.

SIEMENS

Servomotors

Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES

Catalog DA 65.3 · 2002

Supersedes: Catalog DA 65.3 · 2000

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

Management System

DQS-certified in accordance with
DIN EN ISO 9001 Reg.-No. 125805
DIN EN ISO 14001 Reg.-No. 81342UM

Note:

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.

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

Servomotors
Overview

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1

Overview

Brief description

SIEMENS servomotors have been specially designed to satisfy the high requirements placed on variable-speed drives.

Versions

- Synchronous servomotors
- Asynchronous servomotors

Principal characteristics

- Compact design
- High power density and overload capability
- High maximum speeds
- Integral encoder system
- High dynamic response due to low rotor moment of inertia
- Excellent concentricity properties
- Rugged, almost maintenance-free design

Synchronous servomotors

The special synchronous servomotors characteristics include

- high overload capability,
- high dynamic response and
- high static torque.

1FK6 and 1FK7 servomotors

The 1FK6 servomotors satisfy the requirements in the lower power range from 0.5 kW to 5.2 kW. Their optimized design means they are the most economical solution for many applications.

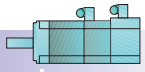
The new 1FK7 servomotors are based on the experiences gained with the 1FK6 range, and are especially characterized by

- an extremely high dynamic response (1FK7 HD, high dynamic),
- compact design (1FK7 CT, compact) and
- expanded range of performances and options.

1FT6 servomotors – high performance

The 1FT6 servomotors can be used for extreme requirements in a power range from 0.2 kW to 45 kW.

Synchronous Servomotors



These motors are available with self-cooling in protection classes IP 64 to IP 68, with separate cooling, or with water cooling. The wide range of options means they are the optimum solution for many high-end applications.

1FS6 servomotors – explosion-protected

The 1FS6 servomotors are designed for use in Zone 1 hazardous areas. These motors conform to type of protection EEx de IIC T3.

1PH7, 1PL6, 1PH4 asynchronous servomotors

The compact asynchronous motors supplement the synchronous servomotors for applications in the upper power range (up to 630 kW).

Asynchronous Servomotors

Versions:

- Force-cooled 1PH7 motors in protection class IP 55
- Water-cooled 1PH4 motors in protection class IP 65
- Air-through and force-cooled 1PL6 motors in protection class IP 23.

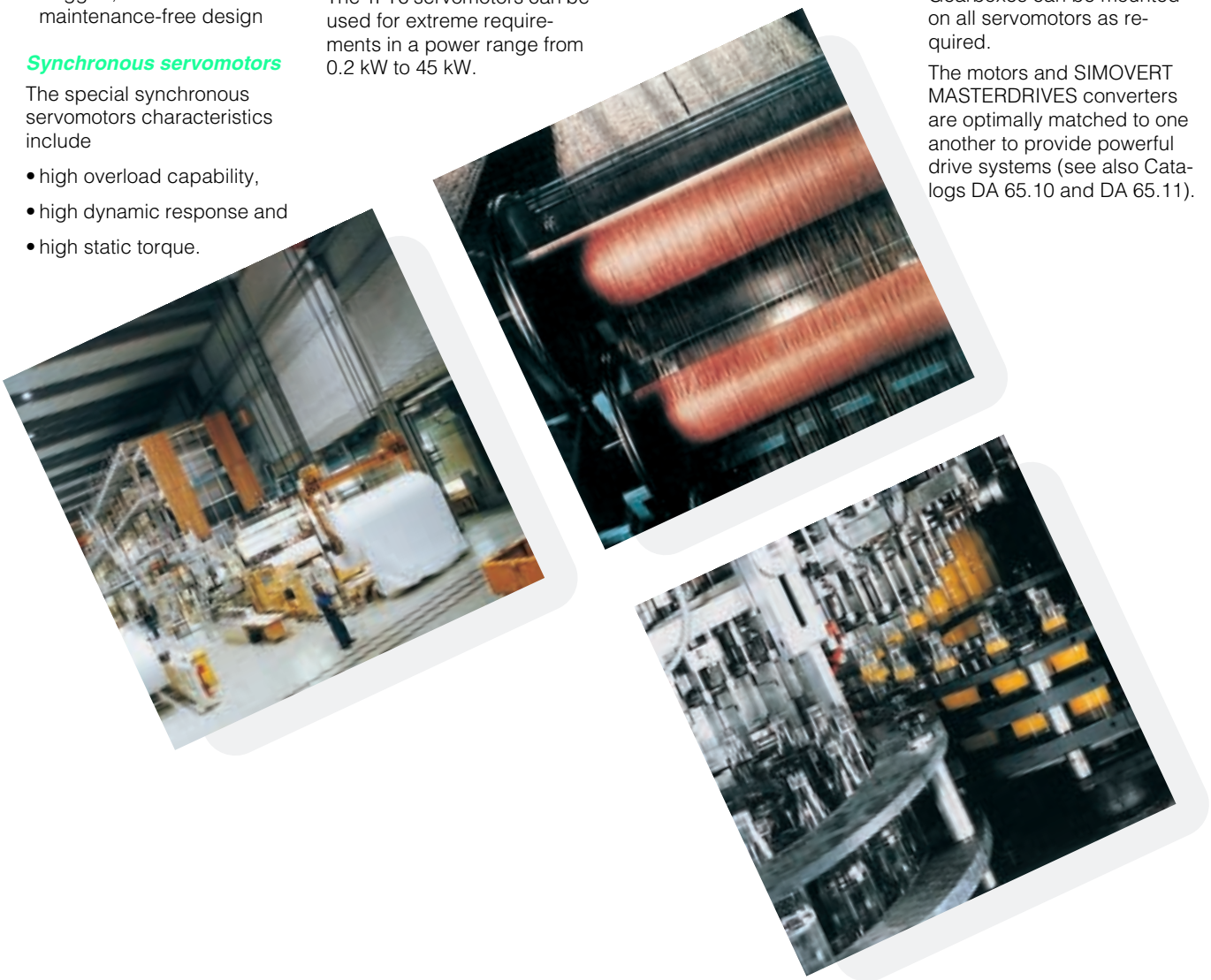
These motors permit the full rated torque throughout the entire constant flux range.

Depending on the requirements, the motors may be fitted with the appropriate options:

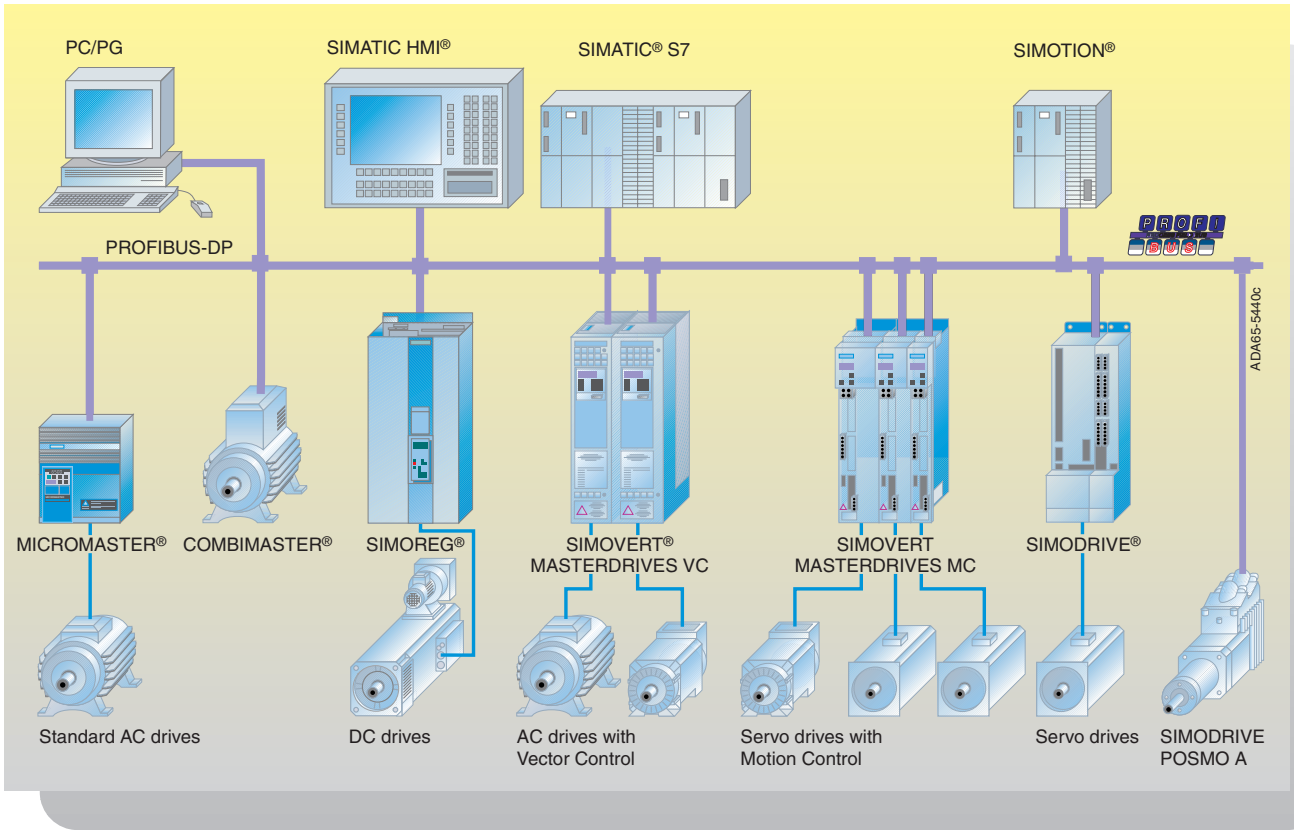
- Encoders (incremental encoder HTL, resolver, sin/cos incremental encoder 1 V_{pp}, absolute-value encoder)
- Holding brakes.

Gearboxes can be mounted on all servomotors as required.

The motors and SIMOVERT MASTERDRIVES converters are optimally matched to one another to provide powerful drive systems (see also Catalogs DA 65.10 and DA 65.11).



Optimal integration of drives into the world of automation



Overview

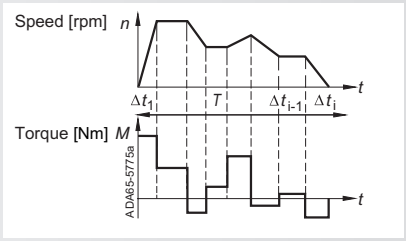
Flowchart for selection procedure

Synchro-nous Servomotors

Asynchro-nous Servomotors

Basic information

In order to select the correct drive and motor, the specific speed and load cycle of the drive application must be known.



Step 1

Specifying the degree of protection:

IP 23; IP 55; IP 64; IP 65; IP 67; IP 68

For details, see Part 1

Step 2

Specifying the supply voltage:

380 to 400 V; 460 to 480 V

Step 3

Specifying the type of construction:

For details, see Part 7

IM B 3 (foot-mounting); IM B 5 (flange-mounting); IM B 35 (foot/flange-mounting)

Step 4

Specifying the maximum torque from the load-cycle profile

Step 5

Specifying the average (rms) torque

Step 6

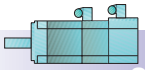
Specifying the motor type needed (synchronous/asynchronous servomotor):

1FK6; 1FK7; 1FT6; 1FS6; 1PH7; 1PL6; 1PH4

See Overview in Part 1

Step 7

Asynchro-nous Servomotors



Synchro-nous Servomotors

Flowchart for selection procedure

Step 7

Selecting the motor from the corresponding data page (Part 2 or 3) which satisfies the following criteria:

Synchronous servomotor:
$n_{max} \leq 1.1 \cdot n_{rated}$
$M_{eff} \leq M_{rated}$

Asynchronous servomotor:
n_{max} must not be exceeded
$M_{eff} \leq M_{rated}$
The load points (n, *P*) must be at least 30% below the stalling limit curve.

Step 8

Specifying the encoder system needed: For details, see Part 4

Incremental encoder HTL; resolver; sin/cos incremental encoder 1 V_{pp}; absolute-value encoder

Step 9

Complete motor order number with all the necessary options:

1FK6; 1FK7; 1FT6; 1FS6; 1PH7; 1PL6; 1PH4 For details, see Part 2 or 3

Order No. for motor:

1FK6 □□□-□□□□□-□□□□
1FK7 □□□-□□□□□-□□□□
1FT6 □□□-□□□□□-□□□□
1FS6 □□□-□□□□□-□□□□
1PH7 □□□-□□□□□-□□□□
1PL6 □□□-□□□□□-□□□□
1PH4 □□□-□□□□□-**Option + plain text**

Step 10

Specifying the length and cross-section of the prefabricated power cable needed or specifying the plug size for customer fitting:

For details and order number structure, see Part 5

Step 11

Specifying the prefabricated encoder cable needed or specifying the plug size for customer fitting:

Incremental encoder HTL; resolver; sin/cos incremental encoder 1 V_{pp}; absolute-value encoder

For details and order number structure, see Part 5

in the case of standard overload [1])

Step 12

Selecting the converter/inverter for the selected motor in the selection and ordering data on the basis of the standard overload conditions:

The selection of converters/inverters in this catalog is based on the respective motor stall current or rated motor current.
For 1FK6, 1FK7, 1FT6; 1FS6 see Part 2;
For 1PH7, 1PL6 and 1PH4 see Part 3.

in the case of high overload [2])

Step 13

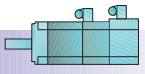
If higher overload times and overload components are necessary, see Catalogs DA 65.11 (SIMOVERT MASTERDRIVES Motion Control), DA 65.10 (SIMOVERT MASTERDRIVES Vector Control) or Configuring with "PFAD Plus".

1) 160 % for 30 s or 136 % for 60 s during 300 s load cycle.

2) In the case of exceeding the standard overload.

Overview

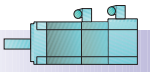
Overview of types and rated data



Motor types	Designation/Method of functioning	Degree of protection	Cooling	Size
1FK6	Servomotor Frameless permanent-magnet synchronous motor	IP 64 (IP 65 optional)	Natural cooling	36 to 100
1FK7 CT (Compact)	Compact servomotor (like 1FK6, but shorter)		Natural cooling	28 to 100
1FK7 HD (High Dynamic)	High Dynamic servomotor with extremely low rotor moment of inertia		Natural cooling	36 to 80
1FT6	Servomotor – High Performance Permanent-magnet synchronous motor	IP 64 (IP 65, IP 67, IP 68 optional)	Natural cooling	28 to 132
			Separate ventilation	80 to 132
			Water cooling	63 to 100
1FS6 	Servomotor – explosion-proof Permanent-magnet synchronous motor and EEx de II C T3 explosion protection	IP 64 (IP 65 optional)	Natural cooling	71 to 132
1PH7	Asynchronous servomotor Frameless three-phase squirrel-cage motor	IP 55	Separate ventilation Surface cooling	100 to 280 [1])
1PL6	Asynchronous servomotor Frameless three-phase squirrel-cage motor	IP 23	Separate ventilation Axial ventilation	180 to 280 [1])
1PH4	Asynchronous servomotor Liquid-cooled three-phase squirrel-cage motor	IP 65	Water cooling	100 to 160

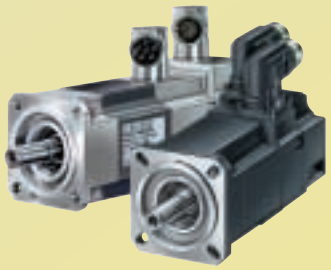
1) Size 280 available as of 07/2002.

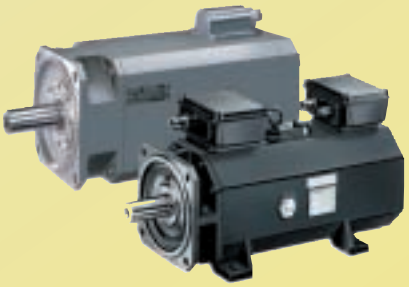

Asynchro-nous Servomotors


Synchro-nous Servomotors

Overview of types and rated data

Power range in kW (0.1 1 10 100 1000)	Rated torque	Selection and ordering data on pages
0.5 – 5.2	0.8 to 16.5 Nm	2/3
0.4 – 5.4	0.5 to 20.5 Nm	2/5
0.6 – 3.1	0.9 to 12 Nm	2/5
0.2 – 15.5	0.3 to 88 Nm	2/7 to 2/9
6.9 – 45.5	17 to 160 Nm	2/8 and 2/9
3.2 – 34	10 to 116 Nm	2/10
1.2 – 12.4	1.9 to 68 Nm	2/13
3.7 – 385	22 to 2480 Nm	3/4 to 3/7
20.5 – 630	370 to 3600 Nm	3/13 to 3/16
7.5 – 65	45 to 333 Nm	3/20





1

Specifications, standards, regulations

The motors comply with pertinent standards and specifications; please refer to the table.

As a result of the adaptation of national specifications to the international recommendation IEC 60034-1, already implemented in many countries, there are no longer any differences in coolant temperatures, temperature classes and temperature rise limits.

The motors listed below are UL-approved to Underwriters Laboratories Inc.®, including the Canadian specification with the identification URc: 1FK6, 1FK7, 1FT6 non-ventilated, 1PH7 [2]) (without brake), 1PL6 [2]) and 1PH4.

Title	DIN/VDE	EN	IEC
General regulations for electrical rotating machines	DIN VDE 0530 Part 1	EN 60 034-1	IEC 600 34-1
Terminal designations and direction of rotation for electrical machines	DIN VDE 0530 Part 8	EN 60 034-8	IEC 600 34-8
Types of electrical rotating machines	DIN VDE 0530 Part 7	EN 60 034-7	IEC 600 34-7
Cooling methods for electrical rotating machines	DIN VDE 0530 Part 6	EN 60 034-6	IEC 600 34-6
Degrees of protection for electrical rotating machines	DIN VDE 0530 Part 5	EN 60 034-5	IEC 600 34-5
Vibration severity of electrical rotating machines	DIN VDE 0530 Part 14	EN 60 034-14	IEC 600 34-14
Noise limits of electrical rotating machines	DIN VDE 0530 Part 9	EN 60 034-9	IEC 600 34-9
Cylindrical shaft ends for electrical machines	DIN 748 Part 3	–	IEC 600 72

The most common degrees of protection of three-phase motors to IEC 60034-5

Depending on operating and environmental conditions, the choice of a suitable degree of protection is intended to prevent:

- continuous effect of water, dust and foreign matter
- contact with rotating parts within a motor
- contact with live parts.

The degrees of protection of electrical machines are indicated by a code consisting of two letters, two digits and, if applicable, an additional letter.

IP (International Protection)
Identification letter for degrees of protection against contact and the ingress of foreign matter and water

0 to **6**
First identification digit for degrees of protection against contact and the ingress of foreign matter

0 to **8**
Second identification digit for degrees of protection against the ingress of water (no oil protection)

W, S and **M**
Additional identification letters for special degrees of protection

The motors are supplied mainly in the following degrees of protection:

Motor	Degree of protection	1st digit Contact protection	Foreign matter protection	2nd digit Water protection
Open-circuit cooling	**IP 23**	Protection against contact with fingers	Protection against medium-size solid foreign bodies of more than 12 mm dia.	Protection against rain water at up to 60 degrees from the vertical
Fan-cooled	**IP 54**	Full protection against contact	Protection against harmful dust deposits	Splash water from all directions
	IP 55			Water jets from all directions
	IP 64	Full protection against contact	Protection against the ingress of dust	Splash water from all directions
	IP 65 [1])			Water jets from all directions
	IP 67 [1])			Motor immersed in water under stated conditions of pressure and time
	IP 68 [1])			Motor is suitable for full immersion in water under conditions to be described by the manufacturer

1) According to DIN VDE 0530 Part 5 or EN 60034 Part 5, there are only five degrees of protection for the first digit, and eight degrees of protection for the second digit for electrical rotating machines. However, IP 6 is contained in DIN 40050, which generally applies to electrical apparatus.

2) Approbation for size 280 is pending.

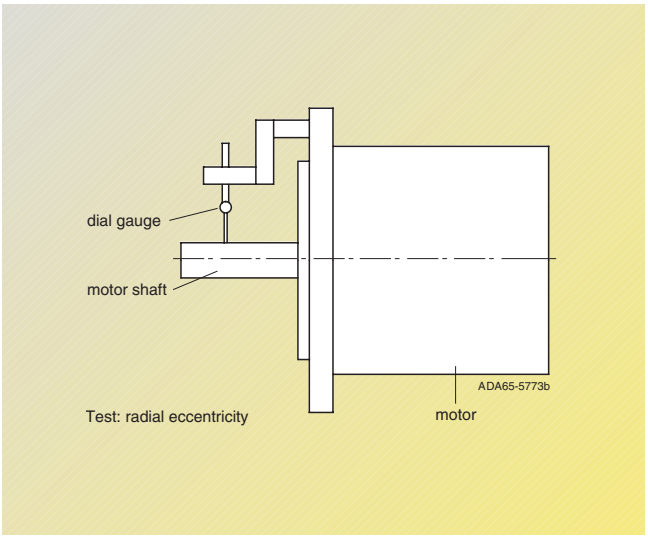
Radial eccentricity tolerance, shaft and flange accuracy (concentricity and axial eccentricity) to IEC 60 072

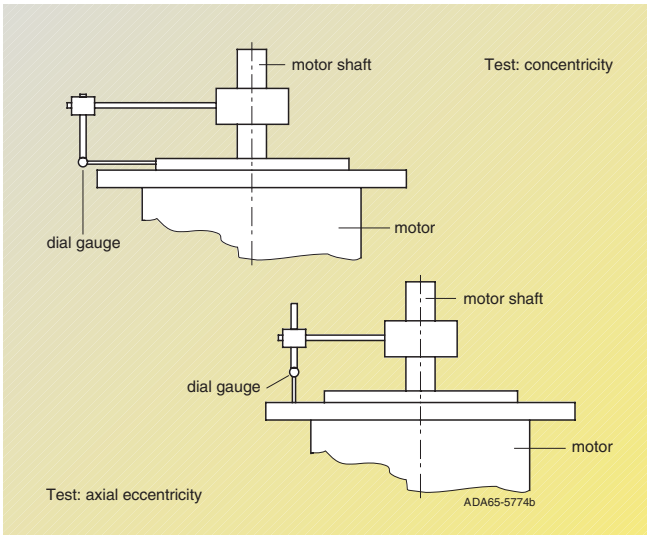
Radial eccentricity tolerance of the shaft with respect to housing axis
(referred to the cylindrical shaft ends)

Frame size	Standard N mm	Option R mm
28, 36	0.035	0.018
48, 63, 71	0.04	0.021
80, 100, 132	0.05	0.025

Concentricity and axial eccentricity of the flange surface with respect to the shaft axis
(referred to the centering diameter of the mounting flange)

Frame size	Standard N mm	Option R mm
28, 36, 48	0.08	0.04
63, 71, 80, 100	0.1	0.05
132	0.125	0.063



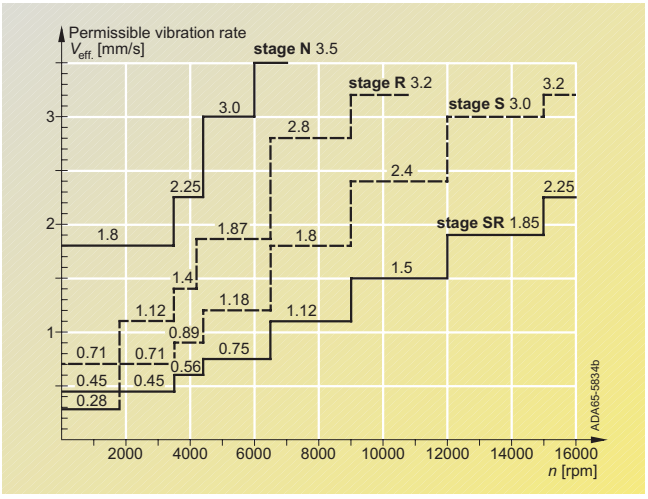


Vibration severity grades to IEC 60 034-14

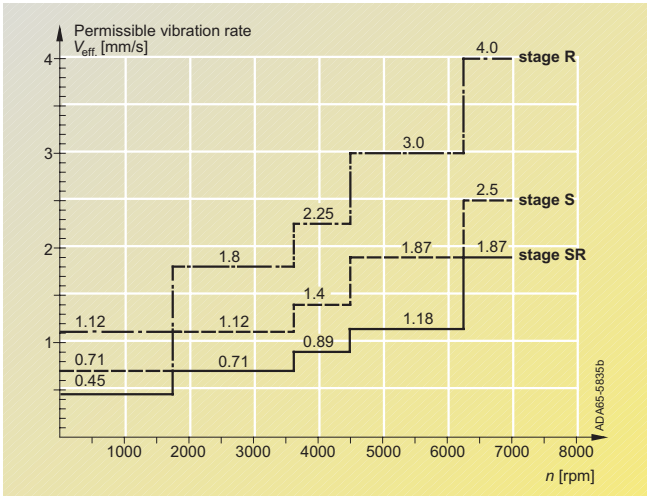
The vibration severity is the rms value of the vibration rate (frequency range from 10 to 1000 Hz). The vibration severity is measured with electrical measuring instruments to DIN 45 666.

The specified values relate to the motor only. Installation-related system vibrations can lead to an increase in these values.

Speeds of 1800 rpm and 3600 rpm and the corresponding limit values are specified according to IEC 60 034-14. The speeds of 4500 rpm and 6000 rpm and the specified values have been stipulated by the motor manufacturer.



Limits of vibration severity grades for frame sizes 28 to 132.



Limits of vibration severity grades for frame sizes 160 to 280.

Balancing to DIN ISO 8821

Requirements of the balancing process for fitted parts, particularly belt pulleys

The vibration response of motors fitted with belt pulleys is decisively governed by the balance of the fitted part, in addition to the balance quality of the motor.

If the motor and the part to be fitted are balanced separately before assembly, the balancing process for the belt pulley must be adapted to the balancing method for the motor. A distinction must be made between the following balancing methods for motors 1PH4, 1PH7 and 1PL6:

- Half-key balancing
- Full-key balancing
- Smooth shaft end

For 1PH7 and 1PL6 motors, the balancing method is coded in the ordering designation. Motors with half-key and full-key balancing are identified by the abbreviation "H" (half-key) and "F" (full-key) at the shaft end face.

Motors 1FK6, 1FK7 and 1FT6 with a fitted key are always half-key balanced.

The basic recommendation is for the highest demands for system balance quality. For motors with full-key balancing, belt pulleys with two opposite keyways are recommended, but only one key in the shaft end.

Vibration stress, induced vibration values

Permanent-magnet synchronous motors 1FK6, 1FK7, 1FT6 and 1FS6: the following, maximum permissible limits for vibration stress at full reliability performance apply only to motors without brake or with closed brake.

Vibration acceleration:

- 10 m/s^2 axial (20 Hz to 2 kHz)
- 30 m/s^2 radial (20 Hz to 2 kHz).

All induction motors 1PH7, 1PH4 and 1PL6: the following limits apply for all vibration values induced in the motor from the exterior:

Vibration frequency	Vibration values for	Sizes 100 to 160	180 to 280
<6.3 Hz	Vibration excursion s	≤0.16 mm	≤0.25 mm
6.3 ... 63 Hz	Vibration rate V_{eff}	≤4.5 mm/s	≤7.1 mm/s
>63 Hz	Vibration acceleration a	≤2.55 m/s^2	≤4.0 m/s^2

Coolant temperature and installation altitude

The rated power (rated torque) applies to continuous duty (S1 operation) to DIN EN 60 034-1 at rated frequency, at a coolant temperature of 40 °C and at an installation altitude of up to 1000 m above sea level.

The motors are all designed in temperature class F and are utilized according to temperature class F. In the event of different conditions, the permissible power (torque) must be determined according to the table.

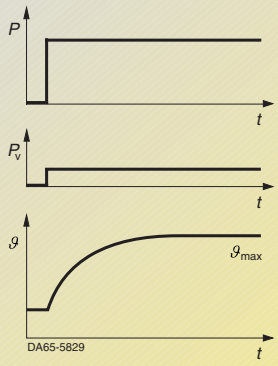
Coolant temperature and installation altitude are rounded off to 5 °C and 500 m.

Remark concerning the surface temperature:
The temperature of the motor surface can reach 100 °C and more.

Installation altitude above sea level	Coolant (air) temperature in °C					
in m	<30	30-40	45	50	55	60
1000	**1.07**	**1.00**	**0.96**	**0.92**	**0.87**	**0.82**
1500	1.04	0.97	0.93	0.89	0.84	0.79
2000	1.00	0.94	0.90	0.86	0.82	0.77
2500	0.96	0.90	0.86	0.83	0.78	0.74
3000	0.92	0.86	0.82	0.79	0.75	0.70
3500	0.88	0.82	0.79	0.75	0.71	0.67
4000	0.82	0.77	0.74	0.71	0.67	0.63

Duty types S1 and S6 to EN 0530

S1: Continuous operation

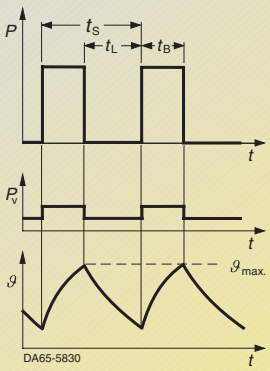


Operation under constant load whose duration is sufficient to reach thermal equilibrium.

Identification: S1

Specification of power (torque).

S6: Continuous operation with intermittent loading



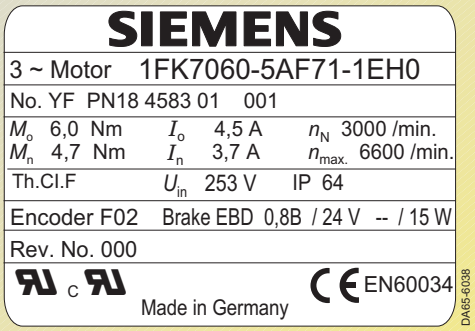
Operation consisting of a sequence of cycles of the same type, each of which consists of a time with constant load and a no-load time. There is no interval.

Identification:

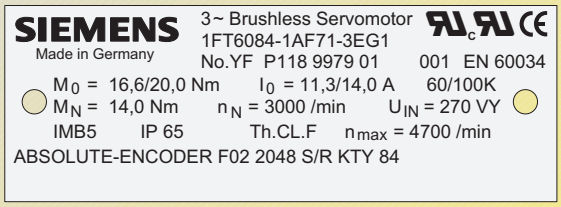
e.g.: S6 - 40 %, 85 kW.

$t_r = \frac{t_B}{t_B + t_L}$, $t_s = 10\,\text{min}$

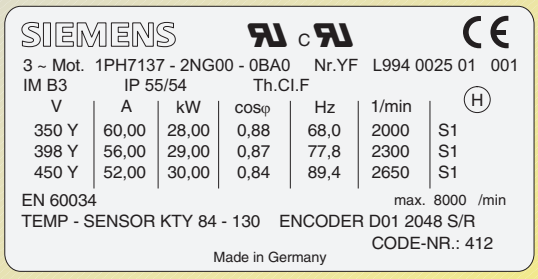
Rating plates



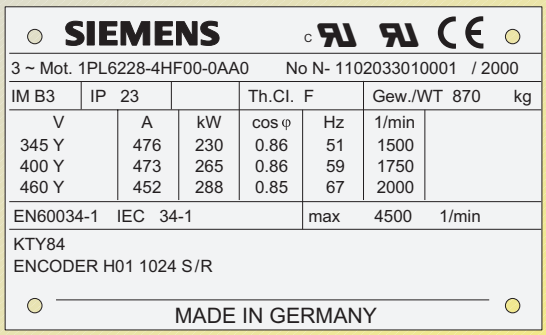
Example from series 1FK7 (adhesive plate)



Example from series 1FT6 (metal plate)



Example from series 1PH7, shaft height 100 to 160 (adhesive plate)



Example from series 1PL6, shaft height 180 to 280 (metal plate)

Technical explanations

Synchro-nous Servomotors

Asynchro-nous Servomotors

1

Rated torque

The motor power in the technical selection tables is calculated from the torque and speed values.

$$M_n = 9.55 \cdot P_n \cdot \frac{1000}{n_n}$$

P_n Rated power in kW

n_n Rated speed in rpm

DURIGNIT IR2000 insulation

The DURIGNIT® IR2000 insulating material system comprises high-grade enameled wire and insulating sheet materials, combined with solvent-free impregnating resin.

It guarantees great mechanical and electrical strength, as well as a high service value and long service life of the motors.

The insulation extensively protects the winding from the effects of corrosive gases, vapors, dust, oil and increased humidity, and withstands the usual vibration stress.

The insulation of the motors is tropic-proof, i.e. it is suitable for humidity up to 100 %.

All motors are in temperature class F.

Utilization of the motors corresponds to temperature rise class F at rated power/rated torque.

Motor protection

Sensing of the motor temperature for converter operation takes place with the KTY 84-130 temperature sensor.

This sensor is a semiconductor whose resistance varies according to temperature, following a defined curve.

The Siemens converters determine the motor temperature by means of the resistance of the temperature sensor.

They can be set to a desired temperature for warning and tripping.

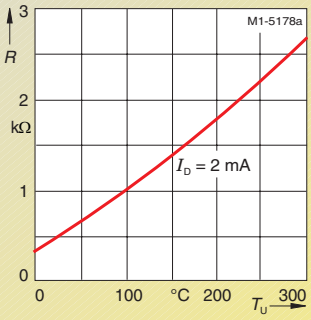
The KTY 84-130 temperature sensor is fitted in the end winding of the motor like a PTC thermistor.

Evaluation takes place as standard in the SIMOVERT MASTERDRIVES converter.

If the motors are operated on converters which do not have KTY 84 evaluation, the temperature evaluation can be carried out using the external 3RS10 temperature monitoring relay.
For a precise description, see Catalog NS K, Part 7.

Device examples:

- Control supply voltage: 24 V AC/DC
  Order No.
  3RS1040-1GD50
- Control supply voltage: 24-240 V AC/DC
  Order No.
  3RS1040-1GW50.



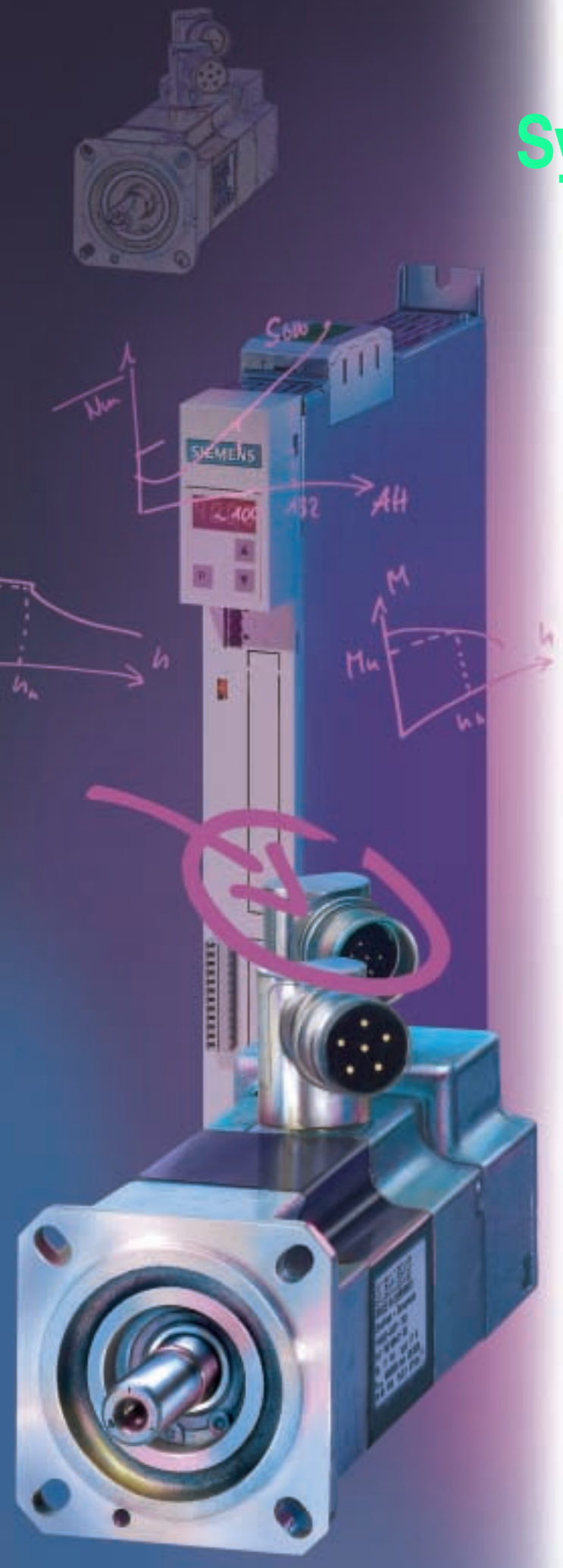
Coating

The following motor coatings are possible:

- No paint finish
  (with impregnating resin coating)
  e.g. 1FK6
- Primer
  (as corrosion protection)
  e.g. 1PH7, 1PL6
- Normal paint finish
  (e.g. RAL 7016)
  e.g. 1PH4, 1PH7, 1PL6, 1FK7, 1FS6
- Special paint finish
  (e.g. RAL 7016)
  e.g. 1FT6, 1PH7, 1PL6.

Paint finish	Suitability of coating for climate group to DIN IEC 60 721, Part 2–1		
Normal paint finish	**Moderate** (extended) for indoor and outdoor installation	Short-time: Continuous:	up to 120 °C up to 100 °C
Special paint finish	**Worldwide** (extended) for outdoor installation	Short-time: Continuous: Additional:	up to 140 °C up to 120 °C For corrosive atmosphere up to 1% acid and caustic solution concentration or in protected rooms in continuous moisture

All motors can be painted using commercially available paints (max. 2 additional paint finishes).



Synchronous Servomotors

1FK6 servomotors

2/2 • Technical data

2/3 • Selection and ordering data with SIMOVERT MASTERDRIVES

2/3 • Order No. suffix

1FK7 servomotors

2/4 • Technical data

2/5 • Selection and ordering data with SIMOVERT MASTERDRIVES

2/5 • Order No. suffix

1FT6 servomotors

2/6 • Technical data

2/7 • Selection and ordering data of 1FT6 air-cooled with SIMOVERT MASTERDRIVES

2/10 • Selection and ordering data of 1FT6 water-cooled with SIMOVERT MASTERDRIVES

2/11 • Order No. suffix

1FS6 explosion-proof servomotors

2/12 • Technical data

2/13 • Selection and ordering data with SIMOVERT MASTERDRIVES

2/13 • Order No. suffix

Technical data

1FK6 servomotor

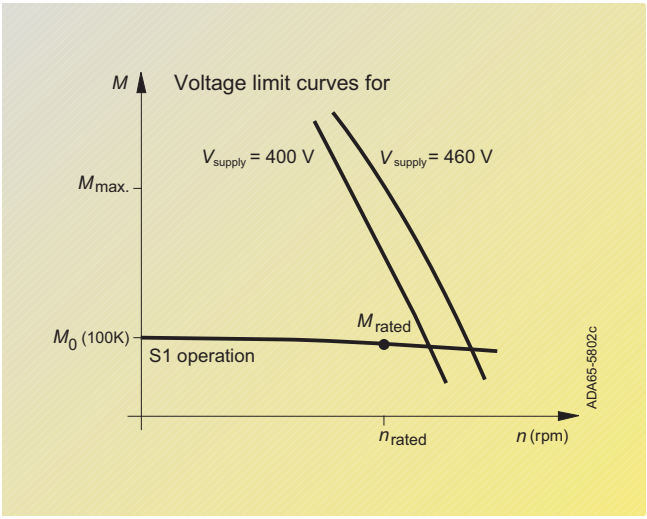
Technical characteristics

The 1FK6 three-phase servomotors are frameless permanent-magnet synchronous motors. The magnets are made of rare-earth materials.

The 1FK6 servomotors cannot be operated with SIMOVERT MASTERDRIVES Vector Control.

They are especially characterized by the following properties:

- high power density with low physical volume
- winding insulation for temperature class F
- high short-time overload capability (250 ms) $M_{max} \approx 3 \cdot M_0$ (100 K)
- very good efficiency
- torque ripple 3 % (mean value)
- high degree of protection
- low maintenance requirements
- high concentricity and vibration quality
- high lateral-force withstand capability
- high mechanical stiffness
- low weight
- monitoring of motor temperature by KTY 84



Torque-speed characteristic

- integrated encoder system for detecting motor speed and rotor position
- standard connector for encoder and power connections.

Application

Machines for all sectors of industry, e.g. for:

Packing machines, storage and retrieval units for high-bay warehouses, conveyor and robotic systems, handling systems, wood processing, etc.

	Standard	Option
Type of construction	IM B 5 (IM V 1, IM V 3)	–
Degree of protection	IP 64	IP 65 with radial shaft seal for oil-tight flange
Vibration severity	N	–
Shaft and flange accuracy	N	–
Shaft extension	Smooth shaft extension	Featherkey with half-key balancing
Power connection	Connector socket (rotatable approx. 270° by customer)	–
Motor protection	KTY 84 in the stator winding	–
Encoder system (plug connector, rotatable approx. 270° by customer)	Multi-pole resolver	sin/cos incremental encoder 1 V_{pp} Absolute-value encoder (EnDat) 2048 p/r (from size 48 on) [2]) Basic absolute-value encoder (EnDat) 32 p/r (from size 48 on) [2]) 2-pole resolver
Paint finish	Without paint coating	–
Bearings	Permanently lubricated deep-groove ball bearing (locating bearing on ND-end)	–
Cooling	Natural cooling	–
Brake	–	Holding brake integrated in motor
Gearbox mounting [1])	–	The following gears can be fitted: • Alpha planetary gear, LP series

1) To find out which gears can be used with which motors, see Chapter 4 “Built-on Accessories”.

2) If an absolute-value encoder is used, the rated torque must be reduced by 10 %.

Selection and ordering data with SIMOVERT MASTERDRIVES Motion Control [1])

Motor data for a 100 K temperature increase											Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Stall torque	Stall current	Moment of inertia without brake	Weight without brake	Plug size for power cable	Rated current	Inverter
n_{rated}			P_{rated}	M_{rated}	I_{rated}	M_0	I_0	J	m		$I_{U_{rated}}$	
rpm		Order No.	kW	Nm	A	Nm	A	x 10^{-3} kgm^2	kg		A	Order No.
Mains voltage 3 AC 400 to 480 V for SIMOVERT MASTERDRIVES Motion Control												
3000	48	**1FK6042–6AF71–1 . . .**	0.82	2.6	2.4	3.0	2.6	0.33	5.0	1	4	**6SE7014–0TP50**
	63	**1FK6060–6AF71–1 . . .**	1.26	4.0	3.1	6.0	4.3	0.86	9.0	1	6.1	**6SE7016–0TP50**
	63	**1FK6063–6AF71–1 . . .**	1.88	6.0	4.7	11.0	7.9	1.61	13.2	1	10.2	**6SE7021–0TP50**
	80	**1FK6080–6AF71–1 . . .**	2.14	6.8	5.2	8.0	5.8	1.5	12.5	1	6.1	**6SE7016–0TP50**
	80	**1FK6083–6AF71–1 . . .**	3.30	10.5	7.7	16.0	10.4	2.73	17.0	1	13.2	**6SE7021–3TP50**
	100	**1FK6100–8AF71–1 . . .**	3.77	12.0	8.4	18.0	12.2	5.53	21.0	1	13.2	**6SE7021–3TP50**
	100	**1FK6101–8AF71–1 . . .**	4.87	15.5	10.8	27.0	17.5	7.99	26.0	1.5	17.5	**6SE7021–8TP50**
	100	**1FK6103–8AF71–1 . . .**	5.18	16.5	11.8	36.0	23.5	10.5	30.0	1.5	25.5	**6SE7022–6TP50**
6000	36	**1FK6032–6AK71–1 . . .**	0.50	0.8	1.5	1.1	1.7	0.07	2.9	1	2	**6SE7012–0TP50**
	48	**1FK6040–6AK71–1 . . .**	0.50	0.8	1.75	1.6	2.8	0.18	3.7	1	4	**6SE7014–0TP50**

Order No. suffix

	1 2 3 4 5 6 7	8 9 10 11 12	13 14	15	16
	1FK6 . . . – . A . 7 1 – 1		□	□	□

Encoder system

sin/cos incremental encoder 1 V_{pp}	**A**
Absolute-value encoder (EnDat) 2048 p/r (from size 48 on) [2])	**E**
Basic absolute-value encoder (EnDat) 32 p/r (from size 48 on) [2])	**G**
Multi-pole resolver (resolver pole number equivalent to motor pole number)	**S**
2-pole resolver	**T**

Shaft extension	Radial eccentricity toleran.	Holding brake	
Smooth	N	without	**G**
Smooth	N	with	**H**
With featherkey	N	without	**A**
With featherkey	N	with	**B**

Vibration severity	Degree of protection	
N	IP 64	**0**
N	IP 65, radial shaft seal for oil-tight flange [3])	**2**

1) For further assignments see also Catalog DA 65.11.

2) If an absolute-value encoder is used, the rated torque must be reduced by 10 %.

3) For oil-tight flange or gearbox mounting.

Technical data

1FK7 servomotor

Technical characteristics

The 1FK7 three-phase servomotors are frameless servomotors in a permanent state of electromagnetic excitation, just like the 1FK6 servomotors. The new 1FK7 servomotors are based on the experiences gained with the 1FK6 series, and are available in high dynamic response or compact versions.

The 1FK7 servomotors cannot be operated with SIMOVERT MASTERDRIVES Vector Control.

1FK7 CT (**c**ompact) servomotors)

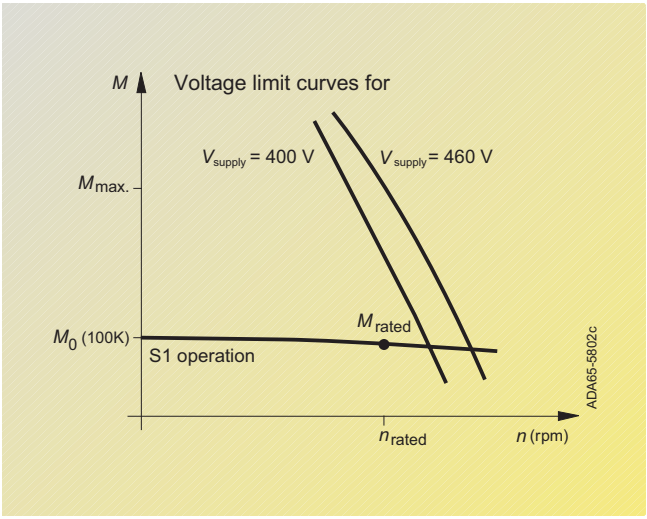
Properties:

- compact design (up to 25 % smaller than 1FK6)
- improved torque ripple compared with 1FK6
- mechanically compatible with 1FK6 (shaft, flange and connector)
- wide range of performances and options

1FK7 HD (**h**igh **d**ynamic) servomotors)

Properties:

- extremely high dynamic response resulting from new rotor design (very low rotor moments of inertia)
- mechanically compatible with 1FK6 (shaft, flange and connector)
- high short-term overload capability (250 ms)
  $M_{max} = 3 \cdot M_0$ (100 K)



Torque-speed characteristic

Area of application

Machines for all industrial sectors.

	Standard	Option
Type of construction	IM B 5 (IM V 1, IM V 3)	–
Degree of protection	IP 64	IP 65 with radial shaft seal for oil-tight flange
Vibration severity	N	–
Shaft and flange accuracy	N	–
Shaft extension	Smooth shaft extension	Featherkey with half-key balancing
Power connection	Connector socket (rotatable approx. 270° by customer)	–
Motor protection	KTY 84 in the stator winding	–
Encoder system (plug connector, rotatable approx. 270° by customer)	Multi-pole resolver	sin/cos incremental encoder 1 V_{pp} Absolute-value encoder (EnDat) 2048 p/r (from size 48 on) [2] Absolute-value encoder (EnDat) 512 p/r (only sizes 28 and 36) [2] Basic absolute-value encoder (EnDat) 32 p/r (from size 48 on) [2] Resolver, 2-pole
Paint finish	Without paint coating	Normal paint finish anthracite RAL 7016
Bearings	Permanently lubricated deep-groove ball bearing (locating bearing on ND-end)	–
Cooling	Natural cooling	–
Brake	–	Holding brake integrated in motor
Gearbox mounting [1]	–	The following gears can be fitted: • Alpha planetary gears, LP series • Other gears on request

1) To find out which gears can be used with which motors, see Chapter 4 “Built-on Accessories”.

2) If an absolute-value encoder is used, the rated torque must be reduced by 10 %.

Footnotes for Page 2/5

1) For further assignments see also Catalog DA 65.11 Page 3/3.

2) Start of delivery as of 08/2002.

3) Rated data refer to n = 2500 rpm.

4) Rated data refer to n = 4000 rpm.

5) Rated data refer to n = 3500 rpm.

6) Rated data refer to n = 5000 rpm.

7) If an absolute-value encoder is used, the rated torque of the motor must be reduced by 10 %.

8) For oil-tight flange or gearbox mounting.

Selection and ordering data with SIMOVERT MASTERDRIVES Motion Control [1]
(other converters/inverters can also be used)

Motor data for a 100 K temperature increase											Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Stall torque	Stall current	Moment of inertia without brake	Weight without brake	Plug size for power cable	Rated current	Inverter
n_{rated} rpm		Order No.	P_{rated} kW	M_{rated} Nm	I_{rated} A	M_0 Nm	I_0 A	J x 10^{-3} kgm^2	m kg		$I_{U_{rated}}$ A	Order No.
1FK7 CT (Compact) – Mains voltage 3 AC 400 to 480 V for SIMOVERT MASTERDRIVES Motion Control												
3000	48	**1FK7042-5AF71-1 ...**	0.82	2.6	1.95	3	2.2	0.301	4.8	1	4	**6SE7014–0TP50**
	63	**1FK7060-5AF71-1 ...**	1.48	4.7	3.7	6	4.5	0.795	8	1	6.1	**6SE7016–0TP50**
	63	**1FK7063-5AF71-1 ...**	2.29	7.3	5.6	11	8	1.51	12	1	10.2	**6SE7021–0TP50**
	80	**1FK7080-5AF71-1 ...**	2.14	6.8	4.4	8	4.8	1.5	11.3	1	6.1	**6SE7016–0TP50**
	80	**1FK7083-5AF71-1 ...**	3.3	10.5	7.4	16	10.4	2.73	16	1	13.2	**6SE7021–3TP50**
	100	**1FK7100-5AF71-1 ...**	3.77	12	8	18	11.2	5.53	18.9	1	13.2	**6SE7021–3TP50**
	100	**1FK7101-5AF71-1 ...**	4.87	15.5	11.8	27	19	7.99	25	1.5	25.5	**6SE7022–6TP50**
	100	**1FK7103-5AF71-1 ...**	5.37 [3]	20.5 [3]	16.5 [3]	36	27.5	10.5	31	1.5	34	**6SE7023–4TP50**
4500	63	**1FK7060-5AH71-1 ...**	1.74	3.7	4.1	6	6.2	0.795	8	1	6.1	**6SE7016–0TP50**
	63	**1FK7063-5AH71-1 ...**	2.09 [4]	5 [4]	6.1 [4]	11	12	1.51	12	1	13.2	**6SE7021–3TP50**
	80	**1FK7080-5AH71-1 ...**	2.38 [4]	5.7 [4]	5.6 [4]	8	7.4	1.5	11.3	1	10.2	**6SE7021–0TP50**
	80	**1FK7083-5AH71-1 ...**	3.04 [5]	8.3 [5]	9 [5]	16	15	2.73	16	1	17.5	**6SE7021–8TP50**
6000	28	**1FK7022-5AK71-1 ...** [2]	0.4	0.63	1.26	0.85	1.69	0.028	on requ.	1	2	**6SE7012–0TP50**
	36	**1FK7032-5AK71-1 ...** [2]	0.47	0.75	1.2	1.1	1.6	0.061	on requ.	1	2	**6SE7012–0TP50**
	48	**1FK7040-5AK71-1 ...**	0.69	1.1	1.7	1.6	2.25	0.169	3.4	1	4	**6SE7014–0TP50**
	48	**1FK7042-5AK71-1 ...**	1.02 [6]	2.0 [6]	3.1 [6]	3	4.4	0.301	4.8	1	6.1	**6SE7016–0TP50**
1FK7 HD (High Dynamic) – Mains voltage 3 AC 400 to 480 V for SIMOVERT MASTERDRIVES Motion Control												
3000	48	**1FK7044-7AF71-1 ...**	1.1	3.5	4	4	4.5	0.128	7.5	1	6.1	**6SE7016–0TP50**
	63	**1FK7061-7AF71-1 ...**	1.7	5.4	5.3	6.4	6.1	0.34	10.1	1	6.1	**6SE7016–0TP50**
	63	**1FK7064-7AF71-1 ...**	2.51	8	7.5	12	11	0.65	15.3	1	13.2	**6SE7021–3TP50**
	80	**1FK7082-7AF71-1 ...**	2.51	8	6.7	14	10.6	1.4	17.2	1	13.2	**6SE7021–3TP50**
	80	**1FK7085-7AF71-1 ...**	3.14 [3]	12 [3]	12.5 [3]	22	22.5	2.3	23.5	1.5	25.5	**6SE7022–6TP50**
4500	48	**1FK7043-7AH71-1 ...**	1.23	2.6	4	3.1	4.5	0.101	6.7	1	6.1	**6SE7016–0TP50**
	48	**1FK7044-7AH71-1 ...**	1.41	3	4.9	4	6.3	0.128	8	1	10.2	**6SE7021–0TP50**
	63	**1FK7061-7AH71-1 ...**	2.03	4.3	5.9	6.4	8	0.34	10.1	1	10.2	**6SE7021–0TP50**
	63	**1FK7064-7AH71-1 ...**	2.36	5	7	12	15	0.65	15.3	1	17.5	**6SE7021–8TP50**
6000	36	**1FK7033-7AK71-1 ...**	0.57	0.9	1.5	1.3	2.2	0.027	3.15	1	4	**6SE7014–0TP50**
	48	**1FK7043-7AK71-1 ...**	1.26	2	4.4	3.1	6.4	0.101	6.7	1	10.2	**6SE7021–0TP50**

Order No. suffix

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1FK7 . . . –□A . 7 1 – 1□ □ □

1FK7 CT (Compact)	**5**
1FK7 HD (High Dynamic)	**7**

Encoder system

sin/cos incremental encoder 1 V_{pp}	**A**
Absolute-value encoder (EnDat) 2048 p/r (from size 48 on) [7]	**E**
Absolute-value encoder (EnDat) 512 p/r (only sizes 28 and 36) [7]	**E**
Basic absolute-value encoder (EnDat) 32 p/r (from size 48 on) [7]	**G**
Resolver, multi-pole (resolver pole number equivalent to motor pole number)	**S**
Resolver, 2-pole	**T**

Shaft extension	Radial eccentricity toleran.	Holding brake	
Smooth	N	without	**G**
Smooth	N	with	**H**
With featherkey	N	without	**A**
With featherkey	N	with	**B**

Vibration severity	Degree of protection/paint finish	
N	IP 64/without paint finish	**0**
N	IP 65 radial shaft seal for oil-tight flange [8])/without paint finish	**2**
N	IP 64/RAL 7016	**3**
N	IP 65 radial shaft seal for oil-tight flange [8])/RAL 7016	**5**

Footnotes on Page 2/4.

Technical data

1FT6 three-phase servomotor

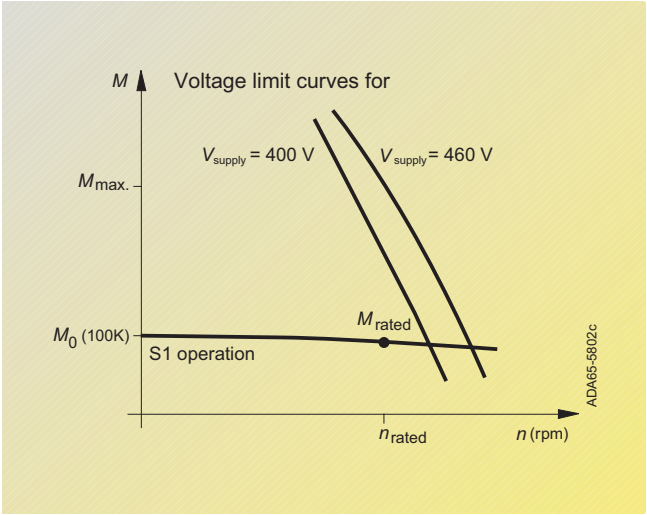
Technical characteristics

The 1FT6 three-phase servomotors are permanent-magnet synchronous motors. The magnets are made of rare-earth materials.

The 1FT6 servomotors cannot be operated with SIMOVERT MASTERDRIVES Vector Control.

They are especially characterized by:

- high power density with low physical volume
- winding insulation for temperature class F
- high thermal reserves for continuous load and overload
- high overload capability (250 ms)
  $M_{max} \approx 4 \cdot M_0$ (100 K) for sizes 28, 36, 48 and 63
  $M_{max} \approx 3.3 \cdot M_0$ (100 K) for sizes 80 and 100,
  $M_{max} \approx 2.5 \cdot M_0$ (100 K) for size 132 for naturally cooled motors
- low losses with very good efficiency
- high acceleration factors and therefore very good dynamic response of the drive
- low torque ripple 1 % (average value)
- high degree of protection
- low maintenance
- high concentricity and vibration quality
- high lateral-force withstand capability
- high mechanical stiffness
- low weight
- monitoring of motor temperature by KTY 84
- integrated encoder system for detecting rotational speed of motor and position of rotor
- plug for signal and power connection as standard. Terminal box for power cable available for motors of 1FT6 range, size 100 or above



Torque-speed characteristic

Technical and commercial features of the main 1FT6 types

- high-resolution optical sensor system (incremental encoder or absolute-value encoder)
- vibration severity grade N
- degree of protection IP 65
- holding brake option
- motors with short delivery (delivery time: 20 working days)
- more favorable price than comparable motor

Area of application

Machines for all industrial sectors with high dynamic response, precision and flexibility demands, e.g. packaging machines, storage and retrieval systems for high-bay warehouses, conveyor and robotic systems, handling systems, printing machines (sheet and rotary presses) as well as for machine tool applications.

	Standard	Option
Type of construction	IM B 5 (IM V 1, IM V 3)	IM B 14 (sizes 63 to 100)
Degree of protection	IP 64	IP 65, IP 67 , IP 68 (IP 54 in the case of separate cooling)
Vibration severity	N	R
Shaft and flange accuracy	N	R
Shaft extension	Smooth shaft extension	Featherkey with half-key balancing, 1FT5-compatible shaft extension on request
Power connection	Connector socket	Terminal box (only for sizes 100 and132)
Motor protection	KTY84 in the stator winding	–
Encoder system (plug connector)	Multi-pole resolver	sin/cos incremental encoder 1 V_{pp} Absolute-value encoder (EnDat) 2048 p/r (from size 36 on) [2] Absolute-value encoder (EnDat) 512 p/r (only size 28) [2] 2-pole resolver
Paint finish	Anthracite RAL 7016	K23 (worldwide)
Bearings	Permanently lubricated deep-groove ball bearing	–
Cooling	Natural cooling	Separate cooling (only for sizes 80 to 132) Water cooling (only for sizes 63 to 100)
Brake	–	Holding brake integrated in motor
Gearbox mounting [1]	–	The following gears can be fitted: • Alpha low-play planetary gears, SPG series

1) To find out which gears can be used with which motors, see Chapter 4 “Accessories”.

2) If an absolute-value encoder is used, the rated torque of the motor must be reduced by 10 %.

Selection and ordering data 1FT6 core-type (natural cooling) with SIMOVERT MASTERDRIVES Motion Control [1])

Motor data for a 100 K temperature increase											Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Stall torque	Stall current	Moment of inertia without brake	Weight without brake	Plug size for power cable	Rated current	Inverter
n_{rated} rpm		Order No.	P_{rated} kW	M_{rated} Nm	I_{rated} A	M_0 Nm	I_0 A	J x 10^{-3} kgm^2	m kg		$I_{U_{rated}}$ A	Order No.
Mains voltage 3 AC 400 to 480 V for SIMOVERT MASTERDRIVES Motion Control												
2000	100	**1FT6102–1AC71–...1**	4.8	23.0	11.0	27	12.4	9.9	27.5	1.5	13.2	**6SE7021–3TP50**
	100	**1FT6105–1AC71–...1**	8.0	38	17.6	50	22.9	16.8	39.5	1.5	25.5	**6SE7022–6TP50**
3000	48	**1FT6044–1AF71–...1**	1.4	4.3	2.9	5	3.0	0.51	8.3	1	4	**6SE7014–0TP50**
	63	**1FT6062–1AF71–...1**	1.5	4.7	3.4	6	4.0	0.85	9.5	1	4	**6SE7014–0TP50**
	63	**1FT6064–1AF71–...1**	2.2	7.0	4.9	9.5	6.1	1.3	12.5	1	6.1	**6SE7016–0TP50**
	80	**1FT6082–1AF71–...1**	3.2	10.3	8.7	13	10.2	3.0	15.0	1.5	10.2	**6SE7021–0TP50**
	80	**1FT6084–1AF71–...1**	4.6	14.7	11.0	20	14	4.8	20.5	1.5	17.5	**6SE7021–8TP50**
	80	**1FT6086–1AF71–...1**	5.8	18.5	13.0	27	17.5	6.6	25.5	1.5	17.5	**6SE7021–8TP50**
4500	63	**1FT6062–1AH71–...1**	1.7	3.6	3.9	6.0	5.6	0.85	9.5	1	6.1	**6SE7016–0TP50**
	63	**1FT6064–1AH71–...1**	2.3	4.8	5.5	9.5	9.1	1.3	12.5	1	10.2	**6SE7021–0TP50**
	80	**1FT6084–1AH71–...1**	4.9	10.5	12.5	20	21.6	4.8	20.5	1.5	25.5	**6SE7022–6TP50**
	80	**1FT6086–1AH71–...1**	5.7	12.0	12.6	27	25.3	6.65	25.5	1.5	25.5	**6SE7022–6TP50**
6000	36	**1FT6034–1AK71–...1**	0.88	1.4	2.1	2.0	2.6	0.11	4.4	1	4	**6SE7014–0TP50**
	80	**1FT6084–1AK71–...1**	4.1	6.5	9.2	20	25.0	4.8	20.5	1.5	25.5	**6SE7022–6TP50**

Order No. suffix for core types

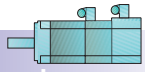
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1FT6 . . . – 1A . 7 1 – □ □ □ 1

Plug direction (D-end view)			
Transversely to the right (only sizes 80 and 100)			**1**
Transversely to the left (only sizes 80 and 100)			**2**
Axial ND-end			**3**
Axial D-end			**4**
Encoder system			
sin/cos incremental encoder 1 V_{pp}			**A**
Absolute-value encoder (EnDat) 2048 p/r [2])			**E**
Shaft extension	Radial eccentricity tolera.	Holding brake	
Smooth	N	without	**G**
Smooth	N	with	**H**

1) For further assignments see also Catalog DA 65.11.

2) If an absolute-value encoder is used, the rated torque of the motor must be reduced by 10 %.



Selection and ordering data 1FT6 air-cooled with SIMOVERT MASTERDRIVES Motion Control [1]

Motor data for a 100 K temperature increase											Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Stall torque	Stall current	Moment of inertia without brake	Weight without brake	Plug size for power cable	Rated current	Inverter
n_{rated}			P_{rated}	M_{rated}	I_{rated}	M_0	I_0	J	m		$I_{U_{rated}}$	
rpm		Order No.	kW	Nm	A	Nm	A	x 10^{-3} kgm^2	kg		A	Order No.
Mains voltage 3 AC 400 to 480 V for SIMOVERT MASTERDRIVES Motion Control												
1500 Non-ventilated	100	**1FT6102–8AB7.–....**	3.8	24.5	8.4	27	8.4	9.9	27.5	1.5	10.2	**6SE7021–0TP50**
	100	**1FT6105–8AB7.–....**	6.4	41	14.5	50	17.2	16.8	39.5	1.5	17.5	**6SE7021–8TP50**
	100	**1FT6108–8AB7.–....**	9.6	61	20.5	70	22.1	26.0	55.5	1.5	25.5	**6SE7022–6TP50**
	132	**1FT6132–6AB7.–....**	9.7	62	19	75	23	43.0	85	1.5	25.5	**6SE7022–6TP50**
	132	**1FT6134–6AB7.–....**	11.8	75	24	95	29	54.7	100	1.5	34	**6SE7023–4TP50**
	132	**1FT6136–6AB7.–....**	13.8	88	27	115	34	66.4	117	1.5	34	**6SE7023–4TP50**
1500 Separately ventilated	100	**1FT6105–8SB7.–....**	9.3	59	21.7	65	23.5	16.8	45.5	1.5	25.5	**6SE7022–6TP50**
	100	**1FT6108–8SB7.–....**	13.0	83	31	90	31	26.0	61.5	1.5	34	**6SE7023–4TP50**
	132	**1FT6132–6SB7.–....**	16.0	102	36	110	39	43.0	91	3	47	**6SE7024–7. D51**
	132	**1FT6134–6SB7.–....**	20.4	130	45	140	48	54.7	106	3	47	**6SE7024–7. D52**
	132	**1FT6136–6SB7.–....**	25.1	160	55	175	55	66.4	123	3	59	**6SE7026–0. D51**
2000 Non-ventilated	63	**1FT6061–6AC7.–....**	0.8	3.7	1.9	4.0	2.0	0.6	8.0	1	2	**6SE7012–0TP50**
	63	**1FT6062–6AC7.–....**	1.1	5.2	2.6	6.0	2.7	0.85	9.5	1	4	**6SE7014–0TP50**
	80	**1FT6081–8AC7.–....**	1.6	7.5	4.1	8.0	4.1	2.1	12.5	1.5	6.1	**6SE7016–0TP50**
	63	**1FT6064–6AC7.–....**	1.7	8.0	3.8	9.5	4.2	1.3	12.5	1	6.1	**6SE7016–0TP50**
	80	**1FT6082–8AC7.–....**	2.4	11.4	6.6	13	6.9	3.0	15.0	1.5	10.2	**6SE7021–0TP50**
	80	**1FT6084–8AC7.–....**	3.5	16.9	8.3	20	9.5	4.8	20.5	1.5	10.2	**6SE7021–0TP50**
	80	**1FT6086–8AC7.–....**	4.7	22.5	10.9	27	12.0	6.65	25.5	1.5	13.2	**6SE7021–3TP50**
	100	**1FT6102–8AC7.–....**	4.8	23.0	11.0	27	12.4	9.9	27.5	1.5	13.2	**6SE7021–3TP50**
	100	**1FT6105–8AC7.–....**	8.0	38	17.6	50	22.9	16.8	39.5	1.5	25.5	**6SE7022–6TP50**
	100	**1FT6108–8AC7.–....**	11.5	55	24.5	70	29	26.0	55.5	1.5	34	**6SE7023–4TP50**
	132	**1FT6132–6AC7.–....**	11.5	55	23	75	31	43.0	85	1.5	34	**6SE7023–4TP50**
	132	**1FT6134–6AC7.–....**	13.6	65	27	95	39	54.7	100	1.5	47	**6SE7024–7. D51**
	132	**1FT6136–6AC7.–....**	15.5	74	30	115	43	66.4	117	3	47	**6SE7024–7. D51**
2000 Separately ventilated	100	**1FT6105–8SC7.–....**	11.7	56	28	65	32	16.8	45.5	1.5	34	**6SE7023–4TP50**
	100	**1FT6108–8SC7.–....**	16.8	80	40	90	41	26.0	61.5	3	47	**6SE7024–7. D51**
	132	**1FT6132–6SC7.–....**	20.5	98	46	110	51	43.0	91	3	59	**6SE7026–0. D51**
	132	**1FT6134–6SC7.–....**	26.2	125	57	140	62	54.7	106	3	72	**6SE7027–2. D51**
	132	**1FT6136–6SC7.–....**	32.5	155	72	175	78	66.4	123	3	92	**6SE7031–0. E50**
3000 Non-ventilated	48	**1FT6041–4AF7.–....**	0.7	2.15	1.7	2.6	1.8	0.29	6.6	1	2	**6SE7012–0TP50**
	63	**1FT6061–6AF7.–....**	1.1	3.5	2.6	4	2.75	0.6	8.0	1	4	**6SE7014–0TP50**
	48	**1FT6044–4AF7.–....**	1.4	4.3	2.9	5	3	0.51	8.3	1	4	**6SE7014–0TP50**
	63	**1FT6062–6AF7.–....**	1.5	4.7	3.4	6	4	0.85	9.5	1	4	**6SE7014–0TP50**
	80	**1FT6081–8AF7.–....**	2.2	6.9	5.6	8	6	2.1	12.5	1.5	6.1	**6SE7016–0TP50**
	63	**1FT6064–6AF7.–....**	2.2	7.0	4.9	9.5	6.1	1.3	12.5	1	6.1	**6SE7016–0TP50**
	80	**1FT6082–8AF7.–....**	3.2	10.3	8.7	13	10.2	3.0	15.0	1.5	10.2	**6SE7021–0TP50**
	80	**1FT6084–8AF7.–....**	4.6	14.7	11.0	20	14.0	4.8	20.5	1.5	17.5	**6SE7021–8TP50**
	80	**1FT6086–8AF7.–....**	5.8	18.5	13.0	27	17.5	6.65	25.5	1.5	17.5	**6SE7021–8TP50**
	100	**1FT6102–8AF7.–....**	6.1	19.5	13.2	27	17.2	9.9	27.5	1.5	17.5	**6SE7021–8TP50**
	100	**1FT6105–8AF7.–....**	9.7	31	22.5	50	34	16.8	39.5	1.5	34	**6SE7023–4TP50**
	132	**1FT6132–6AF7.–....**	11.3	36	23.0	75	46	43	85	3	47	**6SE7024–7. D51**
3000 Separately ventilated	80	**1FT6084–8SF7.–....**	6.9	22	17.0	26	19.3	4.8	25.0	1.5	25.5	**6SE7022–6TP50**
	80	**1FT6086–8SF7.–....**	9.7	31	24.5	35	26	6.65	30.0	1.5	34	**6SE7023–4TP50**
	100	**1FT6105–8SF7.–....**	15.7	50	35	65	45	16.8	45.5	3	47	**6SE7024–7. D51**
	132	**1FT6132–6SF7.–....**	28.3	90	62	110	74	43.0	91	3	72	**6SE7027–2. D51**
	132	**1FT6134–6SF7.–....**	34.6	110	72	140	90	54.7	106	3	92	**6SE7031–0. E50**
	132	**1FT6136–6SF7.–....**	45.5	145	104	175	111	66.4	123	3	124	**6SE7031–2. F50**

Order No. suffix see page 2/11.

1) For further assignments see also Catalog DA 65.11.

Selection and ordering data 1FT6 air-cooled with SIMOVERT MASTERDRIVES Motion Control [1])

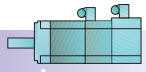
Motor data for a 100 K temperature increase											Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Stall torque	Stall current	Moment of inertia without brake	Weight without brake	Plug size for power cable	Rated current	Inverter
n_{rated}			P_{rated}	M_{rated}	I_{rated}	M_0	I_0	J	m		$I_{U_{rated}}$	
rpm		Order No.	kW	Nm	A	Nm	A	x 10^{-3} kgm^2	kg		A	Order No.
Mains voltage 3 AC 400 to 480 V for SIMOVERT MASTERDRIVES Motion Control												
4500 Non-ventilated	63	**1FT6061–6AH7.–....**	1.4	2.9	3.4	4.0	4.1	0.6	8.0	1	6.1	**6SE7016–0TP50**
	63	**1FT6062–6AH7.–....**	1.7	3.6	3.9	6.0	5.6	0.85	9.5	1	6.1	**6SE7016–0TP50**
	63	**1FT6064–6AH7.–....**	2.3	4.8	5.5	9.5	9.1	1.3	12.5	1	10.2	**6SE7021–0TP50**
	80	**1FT6081–8AH7.–....**	2.7	5.8	7.3	8.0	9.0	2.1	12.5	1.5	10.2	**6SE7021–0TP50**
	80	**1FT6082–8AH7.–....**	4.0	8.5	11.0	13	15.0	3.0	15.0	1.5	17.5	**6SE7021–8TP50**
	80	**1FT6084–8AH7.–....**	4.9	10.5	12.5	20	21.6	4.8	20.5	1.5	25.5	**6SE7022–6TP50**
	80	**1FT6086–8AH7.–....**	5.7	12.0	12.6	27	25.3	6.65	25.5	1.5	25.5	**6SE7022–6TP50**
	100	**1FT6102–8AH7.–....**	5.7	12.0	12.0	27	24.8	9.9	27.5	1.5	25.5	**6SE7022–6TP50**
4500 Separately ventilated	80	**1FT6084–8SH7.–....**	9.4	20.0	24.5	26	28	4.8	25.0	1.5	34	**6SE7023–4TP50**
	80	**1FT6086–8SH7.–....**	12.7	27.0	31.5	35	39	6.65	30.0	3	47	**6SE7024–7. D51**
	100	**1FT6105–8SH7.–....**	18.8	40.0	41.0	65	64	16.8	45.5	3	72	**6SE7027–2. D51**
6000 Non-ventilated	28	**1FT6021–6AK71–....**	0.19	0.3	1.1	0.4	1.25	0.021	1.2	1	2	**6SE7012–0TP50**
	28	**1FT6024–6AK71–....**	0.31	0.5	0.9	0.8	1.25	0.034	2.1	1	2	**6SE7012–0TP50**
	36	**1FT6031–4AK7.–....**	0.47	0.75	1.2	1.0	1.45	0.065	3.1	1	2	**6SE7012–0TP50**
	36	**1FT6034–4AK7.–....**	0.88	1.4	2.1	2.0	2.6	0.11	4.4	1	4	**6SE7014–0TP50**
	48	**1FT6041–4AK7.–....**	1.1	1.7	2.4	2.6	3.0	0.29	6.6	1	4	**6SE7014–0TP50**
	63	**1FT6061–6AK7.–....**	1.3	2.1	3.1	4.0	5.0	0.6	8.0	1	6.1	**6SE7016–0TP50**
	63	**1FT6062–6AK7.–....**	1.3	2.1	3.2	6	7.5	0.85	9.5	1	10.2	**6SE7021–0TP50**
	63	**1FT6064–6AK7.–....**	1.3	2.1	3.5	9.5	12.1	1.3	12.5	1	13.2	**6SE7021–3TP50**
	48	**1FT6044–4AK7.–....**	1.9	3.0	4.1	5.0	5.9	0.51	8.3	1	6.1	**6SE7016–0TP50**
	80	**1FT6081–8AK7.–....**	2.9	4.6	7.7	8.0	11.1	2.1	12.5	1.5	13.2	**6SE7021–3TP50**
	80	**1FT6082–8AK7.–....**	3.5	5.5	9.1	13	18.2	3.0	15.0	1.5	25.5	**6SE7022–6TP50**
	80	**1FT6084–8AK7.–....**	4.1	6.5	9.2	20	25.0	4.8	20.5	1.5	25.5	**6SE7022–6TP50**
6000 Separately ventilated	80	**1FT6084–8SK7.–....**	10.7	17.0	25.5	26	36.0	4.8	25.0	1.5	37.5	**6SE7023–8TP50**
	80	**1FT6086–8SK7.–....**	13.8	22.0	29.0	35	45.0	6.65	30.0	3	47	**6SE7024–7. D51**

Order No. suffix see page 2/11.

Notes on the blower-ventilated design

	Frame sizes 80 and 100	Frame size 132
Direction of air flow	From ND-end to D-end	From D-end to ND-end
Connecting method	Plug, size 1	Terminal box
Power cable type	6FX.002–5CA01–...0	6FX.008–1BB11–..A0
Pin/terminal assignment	Pin1: L1, Pin2: N	U1/L1; V2/L2; W3/L3
Supply voltage	1 AC 220/260 V, 50/60 Hz	3 AC 400/460 V, 50/60 Hz
Max. fan current	0.3 A	0.4 A
Weight of the ventilation module	approx. 4.8 kg	approx. 5.6 kg
Sound pressure level	size 80: 69 dB (A) size 100: 71 dB (A)	74 dB (A)

1) For further assignments see also Catalog DA 65.11.



Selection and ordering data 1FT6 water-cooled with SIMOVERT MASTERDRIVES Motion Control [1]

Motor data for a 100 K temperature increase											Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Stall torque	Stall current	Moment of inertia without brake	Weight without brake	Plug size for power cable	Rated current	Inverter
n_{rated}			P_{rated}	M_{rated}	I_{rated}	M_0	I_0	J	m		$I_{U_{rated}}$	
rpm		Order No.	kW	Nm	A	Nm	A	x 10^{-3} kgm^2	kg		A	Order No.
Mains voltage 3 AC 400 to 480 V for SIMOVERT MASTERDRIVES Motion Control												
1500	100	**1FT6108–8WB7.–....**	18.2	116	43	119	41	26.0	61.5	3	47	**6SE7024–7. D51**
2000	100	**1FT6105–8WC7.–....**	17.2	82	60	85	58	16.8	45.5	3	59	**6SE7026–0. D51**
	100	**1FT6108–8WC7.–....**	24.1	115	57	119	54	26.0	61.5	3	59	**6SE7026–0. D51**
3000	63	**1FT6062–6WF7.–....**	3.2	10.1	6.7	10.2	6.8	0.85	9.5	1	10.2	**6SE7021–0TP50**
	63	**1FT6064–6WF7.–....**	5.1	16.1	10.2	16.2	10.4	1.3	12.5	1	13.2	**6SE7021–3TP50**
	80	**1FT6084–8WF7.–....**	11.0	35	27	35	26	4.8	21.0	1.5	34	**6SE7023–4TP50**
	80	**1FT6086–8WF7.–....**	14.5	46	37	47	35	6.65	26.0	1.5	37.5	**6SE7023–8TP50**
	100	**1FT6105–8WF7.–....**	24.5	78	82	85	83	16.8	45.5	3	92	**6SE7031–0. E50**
	100	**1FT6108–8WF7.–....** [2]	34.2	109	81	119	81	26.0	61.5	3	92	**6SE7031–0. E50**
4500	63	**1FT6062–6WH7.–....**	4.7	10	9.3	10.2	9.5	0.85	9.5	1	13.2	**6SE7021–3TP50**
	63	**1FT6064–6WH7.–....**	7.5	16	15.2	16.2	15.5	1.3	12.5	1	25.5	**6SE7022–6TP50**
	80	**1FT6084–8WH7.–....**	16.5	35	39	35	38	4.8	21	1.5	47	**6SE7024–7. D51**
	80	**1FT6086–8WH7.–....**	21.2	45	53	47	53	6.65	26	3	59	**6SE7026–0. D51**
6000	63	**1FT6062–6WK7.–....**	6.2	9.8	12.2	10.2	12.8	0.85	9.5	1	17.5	**6SE7021–8TP50**
	63	**1FT6064–6WK7.–....**	9.9	15.8	20	16.2	20.6	1.3	12.5	1	34	**6SE7023–4TP50**
	80	**1FT6084–8WK7.–....**	21.4	34	51	35	49	4.8	21	3	59	**6SE7026–0. D51**
	80	**1FT6086–8WK7.–....**	27.7	44	58	47	61	6.65	26	3	59	**6SE7026–0. D51**

Order No. suffix see page 2/11.

Notes on the water-cooled version 1FT6

- Cooling-waterflow rate: 5 l/min,
- Cooling-water inlet temperature: 25 °C,
- Cooling-medium: Water with up to a max. of 25 % anti-corrosion agent,
- Cooling-water pressure at the inlet: max. 3 bar,
- Pressure loss between inlet and outlet: < 0.1 bar,
- Cooling-water connection: G 3/8″ on D-end, plug side.

1) For further assignments see also Catalog DA 65.11.

2) Motor type 1FT6108-8WF7 . – . . . . is only available in vibration severity grade N.

Order No. suffix (does not apply to core types)

1 2 3 4 5 6 7	8 9 10 11 12	13	14	15	16
1 FT6 . . .	– . . . 7 □	– □	□	□	□

Type of construction

IM B 5, IM V 1, IM V 3	1
IM B 14 (only sizes 63, 80 and 100) [1])	2

Plug connection direction (looking at D-end)

Transversely to the right (only sizes 80, 100 and 132)	1
Transversely to the left (only sizes 80, 100 and 132)	2
Axial ND-end (not with size 132)	3
Axial D-end	4

Terminal box, direction of cable entry (looking at D-end) (only sizes 100 and 132)

Transversely to the right	5
Transversely to the left	6
Axial ND-end	7
Axial D-end	8

Encoder system

sin/cos incremental encoder 1 V_{pp}	A
Absolute-value encoder (EnDat) 2048 p/r (from size 36 on) [2])	E
Absolute-value encoder (EnDat) 512 p/r (only size 28) [2])	E
Resolver, multi-pole	S
Resolver, 2-pole	T

Shaft extension	Radial eccentricity toleran.	Holding brake	
Smooth	N	without	G
Smooth	N	with	H
Smooth	R	without	K
Smooth	R	with	L
With featherkey	N	without	A
With featherkey	N	with	B
With featherkey	R	without	D
With featherkey	R	with	E

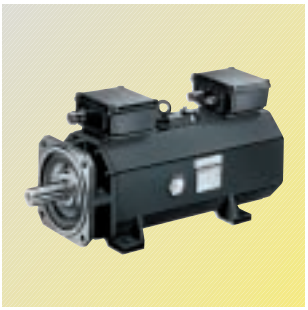
Vibration severity	Degree of protection [3])	
N	IP 64	0
N	IP 65	1
N	IP 67	2
N	IP 68	6
R	IP 64	3
R	IP 65	4
R	IP 67	5
R	IP 68	7

1) Same flange as with the IM B 5 type of construction but with threaded inserts in the four mounting holes.

2) If an absolute-value encoder is used, the rated torque must be reduced by 10 %.

3) With 1FT602. only IP 64 or IP 67 possible.

Technical data



1FS6 explosion-proof servomotor

Technical characteristics

The 1FS6 three-phase servomotors are synchronous motors in a permanent state of electromagnetic excitation for applications in hazardous Zone 1 areas.
They are designed in type of protection EEx de IIC T3.

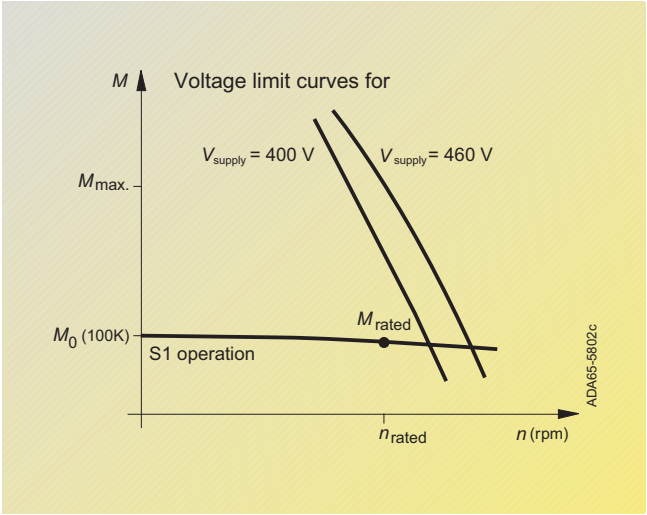
The 1FS6 servomotors cannot be operated with SIMOVERT MASTERDRIVES Vector Control.

In addition to fulfilling the applicable standards and regulations for areas subject to explosion hazards, the motors also comply with the following European guidelines:

- EN 50 014
  General standards for electrical equipment for hazardous areas.
- EN 50 018
  Standard for type of protection EEx d
- EN 50 019
  Standard for type of protection EEx e
- EN 50 021
  Standard for type of protection Ex nA

Technical features

- winding insulation for temperature class H
- high lateral-force withstand capability
- non-ventilated motors with terminal box for power connection
- additional terminal box for connection of encoder system



Torque-speed characteristic

- monitoring of motor temperature by KTY 84-130 and PTC thermistor (triggering device must be certified with mark of conformity PTB 3.53-PTC/A)

  Note:

  The PTC thermistor triggering device is mandatory for operation of the motors in hazardous areas.

Area of application

Machines for all industrial sectors with applications in hazardous Zone 1 areas.

	Standard	Option
Type of construction	IM B 5 (only frame sizes 71 and 90) IM B 35 (only frame sizes 112 and 132)	–
Degree of protection	IP 64	IP 65 with radial shaft seal for oil-tight flange
Vibration severity	N	–
Shaft and flange accuracy	N	R
Shaft extension	Smooth shaft extension	Featherkey with half-key balancing
Power connection	Terminal box	–
Motor protection	3 x PTC thermistor + KTY 84 in the stator winding	–
Encoder system (connection via 2nd terminal box)	sin/cos incremental encoder 1 V_{pp}	Absolute-value encoder (EnDat) 2048 p/r [1])
Paint finish	Normal paint finish anthracite RAL 7016	–
Bearings	Permanently lubricated deep-groove ball bearing	–
Cooling	Natural cooling	–

1) If an absolute-value encoder is used, the rated torque must be reduced by 10 %.

Selection and ordering data 1FS6 natural-cooled with SIMOVERT MASTERDRIVES Motion Control

Motor data for a 100 K temperature increase										Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Stall torque	Stall current	Moment of inertia without brake	Weight without brake	Rated current	Inverter
n_{rated}			P_{rated}	M_{rated}	I_{rated}	M_0	I_0	J	m	$I_{U_{rated}}$	
rpm		Order No.	kW	Nm	A	Nm	A	x 10^{-3} kgm^2	kg	A	Order No.
Mains voltage 3 AC 400 to 480 V for SIMOVERT MASTERDRIVES Motion Control											
1500	112	**1FS6115–8AB73–....**	5.8	37	13	40	14	16.8	87	13.2	**6SE7021–3TP50**
	132	**1FS6134–6AB73–....** [1]	10.6	68	22	76	23	54.7	119	25.5	**6SE7022–6TP50**
2000	71	**1FS6074–6AC71–....**	1.5	7.2	3.4	7.6	3.4	1.3	29	4	**6SE7014–0TP50**
	90	**1FS6096–8AC71–....**	4.2	20	9.8	22	9.6	6.65	55	10.2	**6SE7021–0TP50**
	112	**1FS6115–8AC73–....**	7.2	34	16	40	18	16.8	87	17.5	**6SE7021–8TP50**
	132	**1FS6134–6AC73–....** [1]	12.2	58	24	76	31	54.7	119	25.5	**6SE7022–6TP50**
3000	71	**1FS6074–6AF71–....**	2.0	6.3	4.4	7.6	4.9	1.3	29	6.1	**6SE7016–0TP50**
	90	**1FS6096–8AF71–....**	5.2	17	12	22	14	6.65	55	13.2	**6SE7021–3TP50**
	112	**1FS6115–8AF73–....**	8.7	28	20	40	27	16.8	87	25.5	**6SE7022–6TP50**
4500	71	**1FS6074–6AH71–....**	2.1	4.5	5	7.6	7.3	1.3	29	6.1	**6SE7016–0TP50**
	90	**1FS6096–8AH71–....**	5.1	11	11.5	22	20	6.65	55	13.2	**6SE7021–3TP50**
6000	71	**1FS6074–6AK71–....**	1.2	1.9	3.2	7.6	9.7	1.3	29	4	**6SE7014–0TP50**

Order No. suffix

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1 F S 6 . . . – . A . 7 □ – □ □ □ □

Type of construction

IM B 5	**1**
IM B 35	**3**

Terminal box for power and encoder connection

Cable entry transversely to the right	**5**
Cable entry transversely to the left	**6**
Cable entry axial ND-end	**7**
Cable entry axial D-end	**8**

Encoder system

sin/cos incremental encoder 1 V_{pp}	**A**
Absolute-value encoder (EnDat) 2048 p/r [2]	**E**

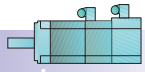
Shaft extension	Radial eccentricity tolerance	
Smooth	N	**G**
With featherkey	N	**A**
Smooth	R	**K**
With featherkey	R	**D**

Vibration severity	Degree of protection	
N	IP 64	**0**
N	IP 65 with radial shaft seal for oil-tight flange	**1**

1) Start of delivery as of 08/2002.

2) If an absolute-value encoder is used, the rated torque must be reduced by 10 %.

Notes



Asynchronous Servomotors

1PH7 Asynchronous servomotors

3/2 • Technical data

3/4 • Selection and ordering data with SIMOVERT MASTERDRIVES converters

3/8 • Order No. suffix

1PL6 Asynchronous servomotors

3/11 • Technical data

3/14 • Selection and ordering data with SIMOVERT MASTERDRIVES converters

3/18 • Order No. suffix

1PH4 Water-cooled asynchronous servomotors

3/20 • Technical data

3/21 • Selection and ordering data with SIMOVERT MASTERDRIVES converters

3

Technical data

1PH7 three-phase motors,
frame sizes 100 . . . 160

1PH7 three-phase motors,
frame sizes 180 . . . 225

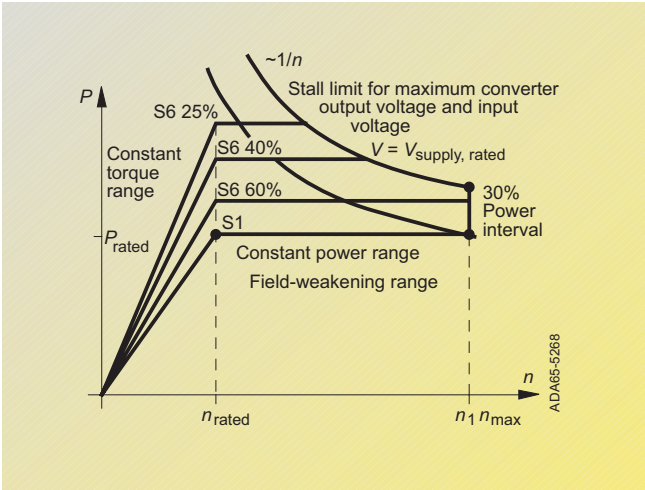
1PH7 three-phase motors,
frame size 280

Technical characteristics

The 1PH7 three-phase servomotors are compact, separately-cooled asynchronous motors with squirrel-cage rotor.

They are especially characterized by the following properties:

- high power density with low physical volume
- high degree of protection
- high speed ranges
- speed to zero without reduction of torque
- robustness
- low maintenance requirements
- high lateral-force withstand capability
- high level of concentricity even at low speeds
- integrated encoder system for detecting motor speed, connected by plug
- terminal box for power cable connection
- monitoring of motor temperature by KTY 84



Power-speed characteristic

Application

Hoisting equipment:

- hoists and drives in storage and retrieval systems for high-bay warehouses

Printing industry:

- single and main drives for printing machines

Rubber, plastic, wire and glass:

- drives for extruders, calenders, rubber injection mouldings, film machines, conveyor systems
- wire-drawing machines, cable stranding machines etc.

General applications such as winding and coiling machines.

1PH7 motors, frame sizes 100 ... 160

	Standard	Option
Type of construction	IM B 3	IM B 5 (only for sizes 100, 132), IM B 35
Degree of protection	IP 55	–
Vibration severity	R	S SR
Shaft and flange accuracy	R	–
Shaft extension	With featherkey, half-key balancing	Smooth shaft extension With featherkey, full-key balancing
Terminal box	On top, cable entry from the right	Cable entry from the left or ND-end
Motor protection	KTY 84 in the stator winding	–
Encoder system (plug connection)	Incremental encoder HTL (with SIMOVERT MASTERDRIVES VC and MC)	Without encoder (with SIMOVERT MASTERDRIVES VC) sin/cos incr. encoder 1 V_{pp} (with SIMOVERT MASTERDRIVES MC) Abs.-value encoder (EnDat) 2048 p/r (with SIMOVERT MASTERDRIVES MC) 2-pole resolver (with SIMOVERT MASTERDRIVES MC)
Paint finish	Without paint coating (with impregnating resin coating)	Normal paint finish anthracite RAL 7016 Special paint finish “worldwide” RAL 7016, other colors on request
Bearings	Permanently lubricated deep-groove ball bearing for coupling and belt drive	Special version for increased speed
Cooling	Separate ventilation, the fan is axially mounted on the ND-end, air flow ND-end to D-end	Without separate fan, for pipe connection Air flow from D-end to ND-end
Brake	–	Holding brake with emergency stop function, as a brake module on D-end
Gearbox mounting [1])	–	The following gearboxes can be mounted: • 2-gear units 2LG4

Technical data

1PH7 motors, frame sizes 180 . . . 225

	Standard	Option
Type of construction	IM B 3	IM B 35
Degree of protection	IP 55	–
Vibration severity	R	S SR
Shaft and flange accuracy	N	R
Shaft extension	With featherkey, half-key balancing	Smooth shaft extension With featherkey, full-key balancing
Terminal box	On top Cable entry from the right	Cable entry from D-end, ND-end or the left
Motor protection	KTY 84 in the stator winding	–
Encoder system (plug connection)	Incremental encoder HTL (with SIMOVERT MASTERDRIVES VC and MC)	Without encoder (with SIMOVERT MASTERDRIVES VC) sin/cos incremental encoder 1 V_{pp} (with SIMOVERT MASTERDRIVES MC) Abs.-value encoder (EnDat) 2048 p/r (with SIMOVERT MASTERDRIVES MC) 2-pole resolver (with SIMOVERT MASTERDRIVES MC)
Paint finish	Normal paint finish anthracite RAL 7016	Primed Special paint finish “worldwide” RAL 7016, other colors on request
Bearings	Permanently lubricated deep-groove ball bearing for coupling drive	Cylindrical roller bearing for belt drive Cylindrical roller bearing for increased lateral forces Special design for greater maximum speed (only for types 1PH718. and 1PH7224)
Cooling	Separate ventilation, the fan is axially mounted on the ND-end, air flow from D-end to ND-end	Without separate fan, for pipe connection Air flow from ND-end to D-end
Brake	–	Holding brake with emergency stop function on D-end, suitable for coupling drive
Gearbox mounting [1])	–	Prepared for fitting a ZF gear unit, see Chapter 4
Silencer	–	Silencer for reducing the sound pressure level (retrofit also possible)

1PH7 motors, frame size 280 [2])

	Standard	Option
Type of construction	IM B 3	IM B 35
Degree of protection	IP 55	–
Vibration severity	N	R
Shaft and flange accuracy	N	R
Shaft extension	With featherkey, half-key balancing	Smooth shaft extension With featherkey, full-key balancing
Terminal box	On the right (ND-end), cable entry from below, encoder connector (D-end)	On the left (ND-end), cable entry from below, encoder connector (D-end) On top (ND-end), in the case of a fan ND-end left or right, cable entry from the right, encoder connector (D-end), D-end on request
Motor protection	KTY 84 in the stator winding Additional KTY 84 as standby	–
Encoder system (plug connection)	Incremental encoder HTL (with SIMOVERT MASTERDRVES VC)	Without encoder (with SIMOVERT MASTERDRVES VC) Other encoders on request
Paint finish	Normal paint finish anthracite RAL 7016	Primed Special paint finish „worldwide“ RAL 7016 Other colors on request
Bearings	Bearing concept for coupling drive with relubricating device	Bearing concept for belt drive or increased lateral forces with relubricating device
Cooling	Separate ventilation, the fan is axially mounted on the ND-end, air flow ND-end to D-end	Without separate fan, for single pipe connection Fan ND-end left or right Fan radially mounted on the D-end (air flow from D-end to ND-end) on request

1) Notes on built-on gears in Chapter 4 “Accessories”.

2) Start of delivery as of 07/2002.

Selection and ordering data with SIMOVERT MASTERDRIVES Vector Control converters

Motor data (utilization to temperature class F)																	Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [1]	Max. operating speed [2]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter / Inverter	
n_{rated} rpm		Order No.	P_{rated} kW	M_{rated} Nm	I_{rated} A	U_{rated} V	n_1 rpm	n_{max} rpm	cos φ	I_μ A	η_n	f_{rated} Hz	J kgm^2	m kg	$I_{U_{rated}}$ A	Order No.	E / T
Mains voltage 3 AC 400 V for SIMOVERT MASTERDRIVES Vector Control converters																	
400	160	**1PH7163–..B..–....**	9.5	227	30	274	2000	6500	0.88	11.5	0.809	14.3	0.185	175	34	**6SE7023–4 . C61**	
	160	**1PH7167–..B..–....**	13	310	37	294	1600	6500	0.88	14	0.814	14.3	0.228	210	37.5	**6SE7023–8 . D61**	
	180	**1PH7184–..B..–....**	16.3	390	51	271	1800	5000	0.84	26	0.830	14.2	0.503	370	59	**6SE7026–0 . D61**	
	180	**1PH7186–..B..–....**	21.2	505	67	268	2000	5000	0.81	38.5	0.845	14.0	0.666	440	72	**6SE7027–2 . D61**	
	225	**1PH7224–..B..–....**	30.4	725	88	268	1700	4500	0.87	36.5	0.864	14.0	1.479	630	92	**6SE7031–0 . E60**	
	225	**1PH7226–..B..–....**	39.2	935	114	264	2000	4500	0.86	49	0.880	14.0	1.930	750	124	**6SE7031–2 . F60**	
	225	**1PH7228–..B..–....**	48	1145	136	272	2000	4500	0.85	60.5	0.888	13.9	2.326	860	146	**6SE7031–5 . F60**	
500	280	**1PH7284–..B..–....**	80	1529	144	400	1150	3300	0.87	60	0.922	17.0	4.2	1300	146	**6SE7031–5 . F60**	
	280	**1PH7286–..B..–....**	100	1909	180	400	1300	3300	0.86	78	0.930	17.0	5.2	1500	186	**6SE7031–8 . F60**	
	280	**1PH7288–..B..–....**	130	2481	233	400	1400	3300	0.87	100	0.933	17.0	6.3	1700	260	**6SE7032–6 . G60**	
1150	100	**1PH7103–..D..–....**	4.3	36	10	391	2200	9000	0.81	5.0	0.813	40.6	0.017	40	10.2	**6SE7021–0 . A61**	
	100	**1PH7107–..D..–....**	7.2	60	17.5	360	3000	9000	0.81	8.8	0.838	40.3	0.029	65	17.5	**6SE7021–8 . B61**	
	132	**1PH7133–..D..–....**	13.5	112	29	381	2500	8000	0.85	13	0.877	39.7	0.076	90	34	**6SE7023–4 . C61**	
	132	**1PH7137–..D..–....**	19.5	162	43	367	2600	8000	0.86	19	0.887	39.6	0.109	150	47	**6SE7024–7 . D61**	
	160	**1PH7163–..D..–....**	25	208	55	364	3400	6500	0.84	25	0.904	39.2	0.185	175	59	**6SE7026–0 . D61**	
	160	**1PH7167–..D..–....**	31	257	70	357	3700	6500	0.83	34	0.909	39.1	0.228	210	72	**6SE7027–2 . D61**	
	180	**1PH7184–..D..–....**	44	366	89	383	2800	5000	0.82	42	0.920	39.2	0.503	370	92	**6SE7031–0 . E60**	
	180	**1PH7186–..D..–....**	58	482	116	390	3100	5000	0.81	58	0.925	39.1	0.666	440	124	**6SE7031–2 . F60**	
	225	**1PH7224–..D..–....**	81	670	160	385	3300	4500	0.81	79	0.938	38.9	1.479	630	186	**6SE7031–8 . F60**	
	225	**1PH7226–..D..–....**	105	870	197	390	3000	4500	0.84	87.5	0.941	38.9	1.930	750	210	**6SE7032–1 . G60**	
	225	**1PH7228–..D..–....**	129	1070	238	390	2800	4500	0.85	98	0.943	38.9	2.326	860	260	**6SE7032–6 . G60**	
	280	**1PH7284–..D..–....**	170	1414	314	400	3300	3300	0.82	158	0.956	38.6	4.2	1300	315	**6SE7033–2 . G60**	
	280	**1PH7286–..D..–....**	210	1745	414	380	3300	3300	0.81	218	0.958	38.6	5.2	1500	510	**6SE7035–1 . K/J60**	
	280	**1PH7288–..D..–....**	260	2160	497	385	3300	3300	0.82	252	0.960	38.6	6.3	1700	510	**6SE7035–1 . K/J60**	
1750	100	**1PH7101–..F..–....**	4.3	24	10	398	4600	9000	0.75	5.7	0.855	60.0	0.017	40	10.2	**6SE7021–0 . A61**	
	100	**1PH7103–..F..–....**	6.25	34	13.0	398	2600	9000	0.84	5.3	0.849	61.0	0.017	40	13.2	**6SE7021–3 . B61**	
	100	**1PH7105–..F..–....**	8.0	44	17.5	398	3500	9000	0.77	9.3	0.875	60.0	0.029	65	17.5	**6SE7022–6 . C61**	
	100	**1PH7107–..F..–....**	10.0	55	23	381	4200	9000	0.80	10.6	0.870	60.3	0.029	65	25.5	**6SE7022–6 . C61**	
	132	**1PH7131–..F..–....**	13	71	24	398	3300	8000	0.88	8.1	0.902	59.7	0.076	90	25.5	**6SE7022–6 . C61**	
	132	**1PH7133–..F..–....**	17.5	96	34	398	3400	8000	0.85	14	0.900	59.7	0.076	90	34	**6SE7023–4 . C61**	
	132	**1PH7135–..F..–....**	21.5	117	42	398	3800	8000	0.86	16	0.906	59.5	0.109	150	47	**6SE7024–7 . D61**	
	132	**1PH7137–..F..–....**	25	136	56	357	4800	8000	0.85	23	0.902	59.5	0.109	150	59	**6SE7026–0 . D61**	
	160	**1PH7163–..F..–....**	34	186	72	364	4600	6500	0.86	28	0.915	59.2	0.185	175	72	**6SE7027–2 . D61**	
	160	**1PH7167–..F..–....**	41	224	79	398	3900	6500	0.86	30	0.920	59.2	0.228	210	92	**6SE7031–0 . E60**	
	180	**1PH7184–..F..–....**	60	327	120	388	5000	5000	0.78	64	0.934	59.0	0.503	370	124	**6SE7031–2 . F60**	
	180	**1PH7186–..F..–....**	85	465	169	385	5000	5000	0.80	84	0.940	59.0	0.666	440	186	**6SE7031–8 . F60**	
	225	**1PH7224–..U..–....**	110	600	203	395	4500	4500	0.84	88	0.944	58.9	1.479	630	210	**6SE7032–1 . G60**	
	225	**1PH7226–..F..–....**	135	737	254	395	4500	4500	0.82	120	0.947	58.9	1.930	750	260	**6SE7032–6 . G60**	
	225	**1PH7228–..F..–....**	179	975	342	395	4500	4500	0.81	169	0.948	58.8	2.326	860	370	**6SE7033–7 . G60**	
	280	**1PH7284–..F..–....**	225	1228	393	400	3300	3300	0.86	163	0.962	58.7	4.2	1300	510	**6SE7035–1 . K/J60**	
	280	**1PH7286–..F..–....**	270	1474	466	400	3300	3300	0.87	184	0.963	58.7	5.2	1500	510	**6SE7035–1 . K/J60**	
	280	**1PH7288–..F..–....**	340	1856	586	400	3300	3300	0.87	234	0.965	58.7	6.3	1700	590	**6SE7036–0 . K/J60**	
2300	100	**1PH7103–..G..–....**	7.5	31	17	388	5400	9000	0.79	8.2	0.866	78.8	0.017	40	17.5	**6SE7021–8 . C61**	
	100	**1PH7107–..G..–....**	12	50	26	400	5400	9000	0.80	12	0.878	78.7	0.029	65	25.5	**6SE7022–6 . C61**	
	132	**1PH7133–..G..–....**	22.5	93	45	398	4600	8000	0.86	17	0.900	78.0	0.076	90	47	**6SE7024–7 . D61**	
	132	**1PH7137–..G..–....**	29	120	56	398	5500	8000	0.87	21	0.903	77.8	0.109	150	59	**6SE7026–0 . D61**	
	160	**1PH7163–..G..–....**	38	158	82	398	6500	6500	0.78	43	0.900	77.3	0.185	175	92	**6SE7031–0 . E60**	
	160	**1PH7167–..G..–....**	44	183	85	398	6500	6500	0.84	40	0.911	77.4	0.228	210	92	**6SE7031–0 . E60**	
2900	180	**1PH7184–..L..–....**	81	265	158	395	5000	5000	0.80	77	0.934	97.4	0.503	370	186	**6SE7031–8 . F60**	
	180	**1PH7186–..L..–....**	101	333	206	385	5000	5000	0.78	107	0.936	97.3	0.666	440	210	**6SE7032–1 . G60**	
	225	**1PH7224–..L..–....**	149	490	274	395	4500	4500	0.84	115	0.946	97.3	1.479	630	315	**6SE7033–2 . G60**	
	225	**1PH7226–..L..–....**	185	610	348	390	4500	4500	0.83	154	0.946	97.2	1.930	750	370	**6SE7033–7 . G60**	
	225	**1PH7228–..L..–....**	215	708	402	395	4500	4500	0.82	186	0.946	97.2	2.326	860	510	**6SE7035–1 . K/J60**	

1) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached or at which the speed is limited by the SIMOVERT MASTERDRIVES Vector Control converter due to $f_{max.} \leq 5 \cdot f_{rated}$.

2) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} \leq 5 \cdot f_{rated}$.

Selection and ordering data with SIMOVERT MASTERDRIVES Vector Control converters

Motor data (utilization to temperature class F)																Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [1]	Max. operating speed [2]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter Inverter	E T
n_{rated}			P_{rated}	M_{rated}	I_{rated}	U_{rated}	n_1	n_{max}		I_μ	η_n	f_{rated}	J	m	$I_{U_{rated}}$		
rpm		Order No.	kW	Nm	A	V	rpm	rpm	cos φ	A		Hz	kgm²	kg	A	Order No.	
Mains voltage 3 AC 480 V for SIMOVERT MASTERDRIVES Vector Control converters																	
500	160	**1PH7163–..B..–....**	12	230	30	340	2100	6500	0.86	13	0.841	17.6	0.185	175	34	**6SE7023–4 . C61**	
	160	**1PH7167–..B..–....**	16	306	35	350	1700	6500	0.89	13	0.836	17.7	0.228	210	37.5	**6SE7023–8 . D61**	
	180	**1PH7184–..B..–....**	20.5	392	51	335	2000	5000	0.83	26	0.858	17.5	0.503	370	59	**6SE7026–0 . D61**	
	180	**1PH7186–..B..–....**	26.5	506	67	335	2300	5000	0.79	39.5	0.870	17.3	0.666	440	72	**6SE7027–2 . D61**	
	225	**1PH7224–..B..–....**	38	725	86	335	1800	4500	0.85	37.5	0.888	17.3	1.479	630	92	**6SE7031–0 . E60**	
	225	**1PH7226–..B..–....**	49	935	112	330	2100	4500	0.85	50	0.900	17.3	1.930	750	124	**6SE7031–2 . F60**	
	225	**1PH7228–..B..–....**	60	1145	135	340	2200	4500	0.84	61.5	0.907	17.2	2.326	860	146	**6SE7031–5 . F60**	
600	280	**1PH7284–..B..–....**	95	1519	144	480	1650	3300	0.86	61	0.932	20.3	4.2	1300	146	**6SE7031–5 . F60**	
	280	**1PH7286–..B..–....**	120	1916	180	480	1750	3300	0.86	80	0.939	20.3	5.2	1500	186	**6SE7031–8 . F60**	
	280	**1PH7288–..B..–....**	155	2474	233	480	1850	3300	0.86	102	0.941	20.3	6.3	1700	260	**6SE7032–6 . G60**	
1350	100	**1PH7103–..D..–....**	4.7	33	9.5	433	3000	9000	0.81	4.5	0.830	47.1	0.017	40	10.2	**6SE7021–0 . A61**	
	100	**1PH7107–..D..–....**	8.0	57	17	405	3800	9000	0.80	8.1	0.853	47.0	0.029	65	17.5	**6SE7021–8 . B61**	
	132	**1PH7133–..D..–....**	15	106	30	433	3100	8000	0.84	12	0.887	46.4	0.076	90	34	**6SE7023–4 . C61**	
	132	**1PH7137–..D..–....**	22	156	42	416	3200	8000	0.85	17	0.895	46.3	0.109	150	47	**6SE7024–7 . D61**	
	160	**1PH7163–..D..–....**	28	198	53	413	4100	6500	0.83	24	0.911	45.8	0.185	175	59	**6SE7026–0 . D61**	
	160	**1PH7167–..D..–....**	34	241	67	400	4600	6500	0.83	34	0.910	45.8	0.228	210	72	**6SE7027–2 . D61**	
	180	**1PH7184–..D..–....**	50	375	86	450	3400	5000	0.81	42	0.928	45.8	0.503	370	92	**6SE7031–0 . E60**	
	180	**1PH7186–..D..–....**	67	475	114	460	3600	5000	0.79	59.5	0.930	45.7	0.666	440	124	**6SE7031–2 . F60**	
	225	**1PH7224–..D..–....**	92	650	156	450	3800	4500	0.80	78.5	0.942	45.6	1.479	630	186	**6SE7031–8 . F60**	
	225	**1PH7226–..D..–....**	120	847	193	460	3500	4500	0.82	88.5	0.945	45.6	1.930	750	210	**6SE7032–1 . G60**	
	225	**1PH7228–..D..–....**	147	1043	232	460	3300	4500	0.84	99.5	0.947	45.6	2.326	860	260	**6SE7032–6 . G60**	
	280	**1PH7284–..D..–....**	200	1416	314	470	3300	3300	0.82	159	0.958	45.3	4.2	1300	315	**6SE7033–2 . G60**	
	280	**1PH7286–..D..–....**	245	1733	414	445	3300	3300	0.80	217	0.960	45.3	5.2	1500	510	**6SE7035–1 . K/J60**	
	280	**1PH7288–..D..–....**	305	2158	497	450	3300	3300	0.82	250	0.962	45.3	6.3	1700	510	**6SE7035–1 . K/J60**	
2000	100	**1PH7101–..F..–....**	4.7	22	10	459	6000	9000	0.72	6.0	0.862	68.2	0.017	40	10.2	**6SE7021–0 . A61**	
	100	**1PH7103–..F..–....**	7.0	33	13	459	3400	9000	0.82	5.6	0.860	69.1	0.017	40	13.2	**6SE7021–3 . B61**	
	100	**1PH7105–..F..–....**	9.0	43	17.5	450	5000	9000	0.78	9.3	0.878	68.3	0.029	65	17.5	**6SE7021–8 . C61**	
	100	**1PH7107–..F..–....**	11	53	23	433	5300	9000	0.79	10.8	0.876	68.6	0.029	65	25.5	**6SE7022–6 . C61**	
	132	**1PH7131–..F..–....**	15	72	25	459	3900	8000	0.88	8.5	0.903	68.0	0.076	90	25.5	**6SE7022–6 . C61**	
	132	**1PH7133–..F..–....**	20	96	34	459	4100	8000	0.84	15	0.900	68.0	0.076	90	34	**6SE7023–4 . C61**	
	132	**1PH7135–..F..–....**	24	115	42	459	4700	8000	0.85	17	0.905	67.8	0.109	150	47	**6SE7024–7 . D61**	
	132	**1PH7137–..F..–....**	28	134	55	402	5800	8000	0.85	23	0.900	67.9	0.109	150	59	**6SE7026–0 . D61**	
	160	**1PH7163–..F..–....**	37	177	70	412	6300	6500	0.85	29	0.912	67.5	0.185	175	72	**6SE7027–2 . D61**	
	160	**1PH7167–..F..–....**	45	215	76	459	5400	6500	0.84	32	0.916	67.4	0.228	210	92	**6SE7031–0 . E60**	
	180	**1PH7184–..F..–....**	68	325	120	450	5000	5000	0.78	66	0.935	67.3	0.503	370	124	**6SE7031–2 . F60**	
	180	**1PH7186–..F..–....**	94	450	165	445	5000	5000	0.78	87	0.941	67.3	0.666	440	186	**6SE7031–8 . F60**	
	225	**1PH7224–..U..–....**	124	590	200	460	4500	4500	0.82	91	0.944	67.2	1.479	630	210	**6SE7032–1 . G60**	
	225	**1PH7226–..F..–....**	153	730	254	450	4500	4500	0.82	119	0.948	67.2	1.930	750	260	**6SE7032–6 . G60**	
	225	**1PH7228–..F..–....**	196	936	332	450	4500	4500	0.79	168	0.950	67.1	2.326	860	370	**6SE7033–7 . G60**	
	280	**1PH7284–..F..–....**	255	1218	393	455	3300	3300	0.86	162	0.962	67.0	4.2	1300	510	**6SE7035–1 . K/J60**	
	280	**1PH7286–..F..–....**	310	1481	466	455	3300	3300	0.87	182	0.964	67.0	5.2	1500	510	**6SE7035–1 . K/J60**	
	280	**1PH7288–..F..–....**	385	1838	586	455	3300	3300	0.87	232	0.965	67.0	6.3	1700	590	**6SE7036–0 . K/J60**	
2650	100	**1PH7103–..G..–....**	8.0	29	16.5	440	7000	9000	0.78	8.2	0.871	90.3	0.017	40	17.5	**6SE7021–8 . C61**	
	100	**1PH7107–..G..–....**	13	47	24.5	459	6700	9000	0.78	12	0.887	90.2	0.029	65	25.5	**6SE7022–6 . C61**	
	132	**1PH7133–..G..–....**	24	87	42	450	5900	8000	0.85	17	0.898	89.6	0.076	90	47	**6SE7024–7 . D61**	
	132	**1PH7137–..G..–....**	30	108	52	450	7100	8000	0.84	21	0.894	89.4	0.109	150	59	**6SE7026–0 . D61**	
	160	**1PH7163–..G..–....**	40	144	76	433	6500	6500	0.82	37	0.895	89.0	0.185	175	92	**6SE7031–0 . E60**	
	160	**1PH7167–..G..–....**	44	159	77	459	6500	6500	0.80	40	0.911	89.0	0.228	210	92	**6SE7031–0 . E60**	
2900	180	**1PH7184–..L..–....**	81	267	158	395	5000	5000	0.80	77	0.934	97.4	0.503	370	186	**6SE7031–8 . F60**	
	180	**1PH7186–..L..–....**	101	333	206	385	5000	5000	0.78	107	0.936	97.3	0.666	440	210	**6SE7032–1 . G60**	
	225	**1PH7224–..L..–....**	149	490	274	395	4500	4500	0.84	115	0.946	97.3	1.479	630	315	**6SE7033–2 . G60**	
	225	**1PH7226–..L..–....**	185	610	348	390	4500	4500	0.83	154	0.946	97.2	1.930	750	370	**6SE7033–7 . G60**	
	225	**1PH7228–..L..–....**	215	708	402	395	4500	4500	0.82	188	0.954	97.2	2.326	860	510	**6SE7035–1 . K/J60**	

1) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached or at which the speed is limited by the SIMOVERT MASTERDRIVES Vector Control converter due to $f_{max.} \leq 5 \cdot f_{rated}$.

2) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} \leq 5 \cdot f_{rated}$.

Selection and ordering data with SIMOVERT MASTERDRIVES Motion Control converters [1]

Motor data (utilization to temperature class F)																Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [2]	Max. operating speed [3]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter Inverter	E T
n_{rated}			P_{rated}	M_{rated}	I_{rated}	U_{rated}	n_1	n_{max}		I_μ	η_n	f_{rated}	J	m	$I_{U_{rated}}$		
rpm		Order No.	kW	Nm	A	V	rpm	rpm	cos φ	A		Hz	kgm^2	kg	A	Order No.	
Mains voltage 3 AC 400 V for SIMOVERT MASTERDRIVES Motion Control converters																	
400	160	**1PH7163–..B..–....**	9.5	227	30	274	800	6500	0.88	11.5	0.809	14.3	0.185	175	34	**6SE7023–4 . C51**	
	160	**1PH7167–..B..–....**	13	310	37	294	800	6500	0.88	14	0.814	14.3	0.228	210	37.5	**6SE7023–8 . D51**	
	180	**1PH7184–..B..–....**	16.3	390	51	271	800	5000	0.84	26	0.830	14.2	0.503	370	59	**6SE7026–0 . D51**	
	180	**1PH7186–..B..–....**	21.2	505	67	268	800	5000	0.81	38.5	0.845	14.0	0.666	440	72	**6SE7027–2 . D51**	
	225	**1PH7224–..B..–....**	30.4	725	88	268	800	4500	0.87	36.5	0.864	14.0	1.479	630	92	**6SE7031–0 . E50**	
	225	**1PH7226–..B..–....**	39.2	935	114	264	800	4500	0.86	49	0.880	14.0	1.930	750	124	**6SE7031–2 . F50**	
	225	**1PH7228–..B..–....**	48	1145	136	272	800	4500	0.85	60.5	0.888	13.9	2.326	860	155	**6SE7031–8 . F50**	
1000	100	**1PH7103–..D..–....**	3.7	35	10	343	1800	9000	0.82	4.8	0.794	35.6	0.017	40	10.2	**6SE7021–0 . A51**	
	100	**1PH7107–..D..–....**	6.25	60	17.5	319	2000	9000	0.81	8.9	0.822	35.3	0.029	65	17.5	**6SE7021–8 . B51**	
	132	**1PH7133–..D..–....**	12	115	30	336	1800	8000	0.86	13	0.865	34.8	0.076	90	34	**6SE7023–4 . C51**	
	132	**1PH7137–..D..–....**	17	162	43	322	2000	8000	0.86	19	0.878	34.6	0.109	150	47	**6SE7024–7 . D51**	
	160	**1PH7163–..D..–....**	22	210	55	315	2000	6500	0.85	24	0.899	34.2	0.185	175	59	**6SE7026–0 . D51**	
	160	**1PH7167–..D..–....**	28	267	71	312	2000	6500	0.84	33	0.903	34.2	0.228	210	72	**6SE7027–2 . D51**	
	180	**1PH7184–..D..–....**	39	372	90	335	2000	5000	0.83	44	0.913	34.2	0.503	370	92	**6SE7031–0 . E50**	
	180	**1PH7186–..D..–....**	51	485	116	340	2000	5000	0.81	58	0.918	34.1	0.666	440	124	**6SE7031–2 . F50**	
	225	**1PH7224–..D..–....**	71	678	161	335	2000	4500	0.81	78.5	0.934	33.9	1.479	630	175	**6SE7032–1 . G50**	
	225	**1PH7226–..D..–....**	92	880	198	340	2000	4500	0.84	87.5	0.935	33.9	1.930	750	218	**6SE7032–6 . G50**	
	225	**1PH7228–..D..–....**	113	1080	240	340	2000	4500	0.85	98	0.938	33.9	2.326	860	262	**6SE7033–2 . G50**	
1500	100	**1PH7101–..F..–....**	3.7	24	10	350	3000	9000	0.74	5.9	0.847	51.6	0.017	40	10.2	**6SE7021–0 . A51**	
	100	**1PH7103–..F..–....**	5.5	35	13.0	350	2100	9000	0.84	5.4	0.832	52.7	0.017	40	13.2	**6SE7021–3 . B51**	
	100	**1PH7105–..F..–....**	7.0	45	17.5	346	3000	9000	0.78	9.4	0.866	51.7	0.029	65	17.5	**6SE7021–8 . B51**	
	100	**1PH7107–..F..–....**	9.0	57	23.5	336	3000	9000	0.80	11	0.859	52.0	0.029	65	25.5	**6SE7022–6 . C51**	
	132	**1PH7131–..F..–....**	11	70	24	350	2900	8000	0.88	8.4	0.896	51.3	0.076	90	25.5	**6SE7022–6 . C51**	
	132	**1PH7133–..F..–....**	15	96	34	346	2500	8000	0.85	14	0.895	51.3	0.076	90	34	**6SE7023–4 . C51**	
	132	**1PH7135–..F..–....**	18.5	118	42	350	3000	8000	0.85	17	0.902	51.1	0.109	150	47	**6SE7024–7 . D51**	
	132	**1PH7137–..F..–....**	22	140	57	308	3000	8000	0.85	23	0.900	51.2	0.109	150	59	**6SE7026–0 . D51**	
	160	**1PH7163–..F..–....**	30	191	72	319	3000	6500	0.85	30	0.912	50.9	0.185	175	72	**6SE7027–2 . D51**	
	160	**1PH7167–..F..–....**	37	236	82	350	3000	6500	0.86	32	0.916	50.8	0.228	210	92	**6SE7031–0 . E50**	
	180	**1PH7184–..F..–....**	51	325	120	335	3000	5000	0.78	64	0.930	50.7	0.503	370	124	**6SE7031–2 . F50**	
	180	**1PH7186–..F..–....**	74	471	170	330	3000	5000	0.81	84	0.937	50.7	0.666	440	175	**6SE7032–1 . G50**	
	225	**1PH7224–..U..–....**	95	605	204	340	3000	4500	0.84	88.5	0.944	50.6	1.479	630	218	**6SE7032–6 . G50**	
	225	**1PH7226–..F..–....**	130	828	278	340	3000	4500	0.84	120	0.945	50.6	1.930	750	308	**6SE7033–7 . G50**	
	225	**1PH7228–..F..–....**	160	1019	350	340	3000	4500	0.82	169	0.949	50.5	2.326	860	423	**6SE7035–1 E K50**	
2000	100	**1PH7103–..G..–....**	7	33	17.5	343	4000	9000	0.80	8.3	0.857	68.9	0.017	40	17.5	**6SE7021–8 . C51**	
	100	**1PH7107–..G..–....**	10.5	50	26	350	4000	9000	0.80	12	0.869	68.6	0.029	65	25.5	**6SE7022–6 . C51**	
	132	**1PH7133–..G..–....**	20	96	45	350	3900	8000	0.86	18	0.898	68.0	0.076	90	47	**6SE7024–7 . D51**	
	132	**1PH7137–..G..–....**	28	134	60	350	4000	8000	0.88	21	0.903	68.0	0.109	150	59	**6SE7027–3 . D51**	
	160	**1PH7163–..G..–....**	36	172	85	333	4000	6500	0.84	37	0.906	67.5	0.185	175	92	**6SE7031–0 . E50**	
	160	**1PH7167–..G..–....**	41	196	89	350	4000	6500	0.84	40	0.907	67.4	0.228	210	92	**6SE7031–0 . E50**	
2500	180	**1PH7184–..L..–....**	78	298	171	340	5000	5000	0.82	77	0.937	84.1	0.503	370	175	**6SE7032–1 . G50**	
	180	**1PH7186–..L..–....**	106	405	235	335	5000	5000	0.82	108	0.942	84.1	0.666	440	262	**6SE7033–2 . G50**	
	225	**1PH7224–..L..–....**	142	542	298	340	4500	4500	0.84	115	0.948	84.0	1.479	630	308	**6SE7033–7 . G50**	
	225	**1PH7226–..L..–....**	168	642	362	335	4500	4500	0.84	154	0.95	84.0	1.93	750	423	**6SE7035–1 E K50**	
	225	**1PH7228–..L..–....**	205	783	433	340	4500	4500	0.84	185	0.95	83.9	2.326	860	491	**6SE7036–0 E K50**	

1) For rated currents below 37.5 A Compact PLUS units can also be used.

2) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached or at which the speed is limited by the SIMOVERT MASTERDRIVES Motion Control converter due to $f_{max.} \leq 2 \cdot f_{rated}$.

3) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} \leq 2 \cdot f_{rated}$.

Selection and ordering data with SIMOVERT MASTERDRIVES Motion Control converters [1]

Motor data (utilization to temperature class F)																Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [2]	Max. operating speed [3]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter / Inverter	E / T
n_{rated}			P_{rated}	M_{rated}	I_{rated}	U_{rated}	n_1	n_{max}		I_μ	η_n	f_{rated}	J	m	$I_{U_{rated}}$		
rpm		Order No.	kW	Nm	A	V	rpm	rpm	cos φ	A		Hz	kgm²	kg	A	Order No.	
Mains voltage 3 AC 480 V for SIMOVERT MASTERDRIVES Motion Control converters																	
400	160	**1PH7163–..B..–....**	9.5	227	30	274	800	6500	0.88	11.5	0.809	14.3	0.185	175	34	**6SE7023–4 . C51**	
	160	**1PH7167–..B..–....**	13	310	37	294	800	6500	0.88	14	0.814	14.3	0.228	210	37.5	**6SE7023–8 . D51**	
	180	**1PH7184–..B..–....**	16.3	390	51	271	800	5000	0.84	26	0.830	14.2	0.503	370	59	**6SE7026–0 . D51**	
	180	**1PH7186–..B..–....**	21.2	505	67	268	800	5000	0.81	38.5	0.845	14.0	0.666	440	72	**6SE7027–2 . D51**	
	225	**1PH7224–..B..–....**	30.4	725	88	268	800	4500	0.87	36.5	0.864	14.0	1.479	630	92	**6SE7031–0 . E50**	
	225	**1PH7226–..B..–....**	39.2	935	114	264	800	4500	0.86	49	0.880	14.0	1.930	750	124	**6SE7031–2 . F50**	
	225	**1PH7228–..B..–....**	48	1145	136	272	800	4500	0.85	60.5	0.888	13.9	2.326	860	155	**6SE7031–8 . F50**	
1150	100	**1PH7103–..D..–....**	4.3	36	10	391	2200	9000	0.81	5.0	0.813	40.6	0.017	40	10.2	**6SE7021–0 . A51**	
	100	**1PH7107–..D..–....**	7.2	60	17.5	360	2300	9000	0.81	8.8	0.838	40.3	0.029	65	17.5	**6SE7021–8 . B51**	
	132	**1PH7133–..D..–....**	13.5	112	29	381	2300	8000	0.85	13	0.877	39.7	0.076	90	34	**6SE7023–4 . C51**	
	132	**1PH7137–..D..–....**	19.5	162	43	367	2300	8000	0.86	19	0.887	39.6	0.109	150	47	**6SE7024–7 . D51**	
	160	**1PH7163–..D..–....**	25	208	55	364	2300	6500	0.84	25	0.904	39.2	0.185	175	59	**6SE7026–0 . D51**	
	160	**1PH7167–..D..–....**	31	257	70	357	2300	6500	0.83	34	0.909	39.1	0.228	210	72	**6SE7027–2 . D51**	
	180	**1PH7184–..D..–....**	44	366	89	383	2300	5000	0.83	42	0.920	39.2	0.503	370	92	**6SE7031–0 . E50**	
	180	**1PH7186–..D..–....**	58	482	116	390	2300	5000	0.81	58	0.925	39.1	0.666	440	124	**6SE7031–2 . F50**	
	225	**1PH7224–..D..–....**	81	670	160	385	2300	4500	0.81	79	0.938	38.9	1.479	630	175	**6SE7032–1 . G50**	
	225	**1PH7226–..D..–....**	105	870	197	390	2300	4500	0.84	87.5	0.941	38.9	1.930	750	218	**6SE7032–6 . G50**	
	225	**1PH7228–..D..–....**	129	1070	238	390	2300	4500	0.85	98	0.943	38.9	2.326	860	262	**6SE7033–2 . G50**	
1750	100	**1PH7101–..F..–....**	4.3	24	10	398	3500	9000	0.75	5.7	0.855	60.0	0.017	40	10.2	**6SE7021–0 . A51**	
	100	**1PH7103–..F..–....**	6.25	34	13.0	398	2600	9000	0.84	5.3	0.849	61.0	0.017	40	13.2	**6SE7021–3 . B51**	
	100	**1PH7105–..F..–....**	8.0	44	17.5	398	3500	9000	0.77	9.3	0.875	60.0	0.029	65	17.5	**6SE7021–8 . C51**	
	100	**1PH7107–..F..–....**	10	55	23	381	3500	9000	0.80	10.6	0.870	60.3	0.029	65	25.5	**6SE7022–6 . C51**	
	132	**1PH7131–..F..–....**	13	71	24	398	3300	8000	0.88	8.1	0.902	59.7	0.076	90	25.5	**6SE7022–6 . C51**	
	132	**1PH7133–..F..–....**	17.5	96	34	398	3400	8000	0.85	14	0.900	59.7	0.076	90	34	**6SE7023–4 . C51**	
	132	**1PH7135–..F..–....**	21.5	117	42	398	3500	8000	0.86	16	0.906	59.5	0.109	150	47	**6SE7024–7 . D51**	
	132	**1PH7137–..F..–....**	25	136	56	357	3500	8000	0.85	23	0.902	59.5	0.109	150	59	**6SE7026–0 . D51**	
	160	**1PH7163–..F..–....**	34	186	72	364	3500	6500	0.86	28	0.915	59.2	0.185	175	72	**6SE7027–2 . D51**	
	160	**1PH7167–..F..–....**	41	224	79	398	3500	6500	0.86	30	0.920	59.2	0.228	210	92	**6SE7031–0 . E50**	
	180	**1PH7184–..F..–....**	60	327	120	388	3500	5000	0.78	64	0.934	59.0	0.503	370	124	**6SE7031–2 . F50**	
	180	**1PH7186–..F..–....**	85	465	169	385	3500	5000	0.80	84	0.940	59.0	0.666	440	186	**6SE7032–1 . G50**	
	225	**1PH7224–..U..–....**	110	600	203	395	3500	4500	0.84	88	0.944	58.9	1.479	630	210	**6SE7032–6 . G50**	
	225	**1PH7226–..F..–....**	135	737	254	395	3500	4500	0.82	120	0.947	58.9	1.930	750	262	**6SE7033–2 . G50**	
	225	**1PH7228–..F..–....**	179	975	342	395	3500	4500	0.81	169	0.948	58.8	2.326	860	423	**6SE7035–1 E K50**	
2300	100	**1PH7103–..G..–....**	7.5	31	17	388	4600	9000	0.79	8.2	0.866	78.8	0.017	40	17.5	**6SE7021–8 . C51**	
	100	**1PH7107–..G..–....**	12	50	26	400	4600	9000	0.80	12	0.878	78.7	0.029	65	25.5	**6SE7022–6 . C51**	
	132	**1PH7133–..G..–....**	22.5	93	45	398	4600	8000	0.86	17	0.900	78.0	0.076	90	47	**6SE7024–7 . D51**	
	132	**1PH7137–..G..–....**	29	120	56	398	4600	8000	0.87	21	0.903	77.8	0.109	150	59	**6SE7026–0 . D51**	
	160	**1PH7163–..G..–....**	38	158	82	398	4600	6500	0.78	43	0.900	77.3	0.185	175	92	**6SE7031–0 . E50**	
	160	**1PH7167–..G..–....**	44	183	85	398	4600	6500	0.84	40	0.911	77.4	0.228	210	92	**6SE7031–0 . E50**	
2900	180	**1PH7184–..L..–....**	81	265	158	395	5000	5000	0.80	77	0.934	97.4	0.503	370	175	**6SE7032–1 . G50**	
	180	**1PH7186–..L..–....**	101	333	206	385	5000	5000	0.78	107	0.936	97.3	0.666	440	218	**6SE7032–6 . G50**	
	225	**1PH7224–..L..–....**	149	490	274	395	4500	4500	0.84	115	0.946	97.3	1.479	630	308	**6SE7033–7 . G50**	
	225	**1PH7226–..L..–....**	185	610	348	390	4500	4500	0.83	154	0.947	97.2	1.93	750	423	**6SE7035–1 E K50**	
	225	**1PH7228–..L..–....**	215	708	402	395	4500	4500	0.82	186	0.946	97.2	2.326	860	491	**6SE7036–0 E K50**	

1) For rated currents below 37.5 A Compact PLUS units can also be used.

2) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached or at which the speed is limited by the SIMOVERT MASTERDRIVES Motion Control converter due to $f_{max.} \leq 2 \cdot f_{rated}$.

3) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} \leq 2 \cdot f_{rated}$.

Order No. suffix for sizes 100 to 160

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1PH7 . . . – □ □ . □ □ – □ □ □ □

Fan															
With fan, mains supply voltage 3 AC 400 V ± 10 %, 50/60 Hz; 480 V + 5 % –10 %, 60 Hz							2								
Without fan, for pipe connection							6								
Encoder															
Without encoder								A							
Absolute-value encoder (EnDat) (2048 p/r)								E							
Incremental encoder HTL (1024 p/r)								H							
Incremental encoder HTL (2048 p/r)								J							
sin/cos incremental encoder 1 V_{pp} (without C-track and D-track)								N							
sin/cos incremental encoder 1 V_{pp} (with C-track and D-track)								M							
2-pole resolver								R							
Direction of cable entry (terminal box on top, looking at D-end)															
From the right									0						
From ND-end									2						
From the left									3						
Type of construction															
IM B 3, IM V 5, IM V 6										0					
IM B 5, IM V 1, IM V 3 (only sizes 100 and 132)										2					
IM B 35, IM V 15, IM V 36										3					
Holding brake with emergency-stop function [1]															
No brake											0				
Brake supply voltage: AC 230 V, 50 ... 60 Hz															
With brake											1				
With brake (brake with microswitch)											2				
With brake (brake with manual release)											3				
With brake (brake with manual release and microswitch)											4				
Brake supply voltage: DC 24 V															
With brake											5				
With brake (brake with microswitch)											6				
With brake (brake with manual release)											7				
With brake (brake with manual release and microswitch)											8				

Type of drive	Vibration severity	Shaft and flange accuracy													
Coupling and belt	R	R											B		
Coupling and belt	S	R											C		
Coupling and belt	SR	R											D		
Coupling and belt	N	N (only in conjunction with brake mounting)											K		
Increased max. speed [2]	SR	R											L		

Air-flow direction	Shaft extension														
D-end → ND-end	With featherkey, half-key balancing													A	
ND-end → D-end	With featherkey, half-key balancing													B	
D-end → ND-end	With featherkey, full-key balancing													C	
ND-end → D-end	With featherkey, full-key balancing													D	
D-end → ND-end	Smooth													J	
ND-end → D-end	Smooth													K	
Paint finish															
Without															0
Without, oil-tight flange with radial shaft seal ring [3]															2
Anthracite, normal coating (RAL 7016)															3
Anthracite, normal coating (RAL 7016), oil-tight flange with radial shaft seal ring [3]															5
Anthracite, special coating (RAL 7016)															6
Anthracite, special coating (RAL 7016), oil-tight flange with radial shaft seal ring [3]															8

1) Version with brake:
12th data digit "2" or "3",
14th data digit "K",
15th data digit "A", "B", "J" or "K",
16th data digit "0", "3" or "6".

2) Max. possible speed
Size 100: 12 000 rpm
132: 10 000 rpm
160: 8 000 rpm
Only with smooth shaft
(15th data digit "J" or "K").

3) Version prepared for ZF gear-change unit mounting
12th data digit "2" or "3",
13th data digit "0",
14th data digit "B",
15th data digit "C" or "D",
16th data digit "2", "5" or "8".
No build-up of fluid permitted at the shaft exit.

For notes on gearbox mounting, see Chapter 4 "Accessories".

Order No. suffix for frame sizes 180 and 225

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1PH7 . . . –□ □ . □ □ – □ □ □ □

Fan			
With fan, mains supply voltage 3 AC 400 V ± 10 %, 50 Hz; 480 V + 5 % –10 %, 60 Hz			2
Without fan, for pipe connection			6
Encoder			
Without encoder			A
Absolute-value encoder (EnDat) (2048 p/r)			E
Incremental encoder HTL (1024 p/r)			H
Incremental encoder HTL (2048 p/r)			J
sin/cos incremental encoder 1 V_{pp} (without C-track and D-track)			N
sin/cos incremental encoder 1 V_{pp} (with C-track and D-track)			M
2-pole resolver			R
Direction of cable entry (terminal box on top, looking at D-end)			
From the right			0
From D-end			1
From ND-end			2
From the left			3
Type of construction			
IM B 3	(for all sizes)		0
IM B 6, IM B 7, IM B 8, IM V 5, IM V 6	(for all sizes)		1
IM B 35	(only for 1PH7 184 with flange A400)		3
IM B 35	(only for 1PH7 184 with flange A450)		4
IM B 35	(for 1PH7 186 with flange A450 and 1PH7 22. with flange A550)		3
IM V 36, IM V 15	(only for 1PH7 184 with flange A400)		5
IM V 36, IM V 15	(only for 1PH7 184 with flange A450)		6
IM V 36, IM V 15	(for 1PH7 186 with flange A450 and 1PH7 22. with flange A550)		5
Holding brake with emergency-stop function (suitable for coupling drive in IM B 3 type of construction) [1]			
No brake			0
With brake (brake with emergency release screws and microswitch)			2
With brake (brake with manual release and microswitch)			4
Type of drive	**Vibration severity**	**Shaft and flange accuracy**	
Coupling	R	N	A
Coupling	R	R	B
Coupling	S	R	C
Coupling	SR	R	D
Belt	R	N	E
Belt	R	R	F
Increased lateral forces	R	N	G
Increased lateral forces	R	R	H
Increased max. speed [3]	S	R	J
Air-flow direction	**Shaft extension**	**Blow-out direction**	
D-end → ND-end	With featherkey, half-key balancing	right	A
D-end → ND-end	With featherkey, full-key balancing	right	C
D-end → ND-end	Smooth	right	J
ND-end → D-end	With featherkey, half-key balancing	axial	B
ND-end → D-end	With featherkey, full-key balancing	axial	D
ND-end → D-end	Smooth	axial	K
Paint finish			
Primed			0
Primed, prepared for ZF gear mounting [2]			2
Anthracite, normal coating (RAL 7016)			3
Anthracite, normal coating (RAL 7016), prepared for ZF gear mounting [2]			5
Anthracite, special coating (RAL 7016)			6
Anthracite, special coating (RAL 7016), prepared for ZF gear mounting [2]			8

1) Version with brake:
12th data digit "0",
14th and 15th data digits "A" and
16th data digit "0", "3" or "6".

2) Version prepared for ZF gear mounting:
only for types 1PH7184, 186 and 224,
12th data digit "3" or "5",
13th data digit "0",
14th data digit "B",
15th data digit "C",
16th data digit "2", "5" or "8".
No build-up of fluid at shaft exit permissible.

3) For size 180 $n_{max.}$ = 7,000 rpm
1PH7224 $n_{max.}$ = 5,500 rpm
only coupling drive possible.

For notes on gearbox mounting, see Chapter 4 "Accessories".

Order No. suffix for frame size 280 (start of delivery as of 07/2002)

1 2 3 4 5 6 7	8	9	10	11	12	13	14	15	16
1PH728. –	□	□	.	□	□	–	0	□	□	□

Fan (3 AC 400 V ± 10 %, 50 Hz/60 Hz; 480 V ± 10 %, 60 Hz)

With fan, ND-end top, direction of air flow ND-end to D-end	0
With fan, ND-end right, direction of air flow ND-end to D-end	1
With fan, ND-end left, direction of air flow ND-end to D-end	2
Without fan, for single pipe connection to ND-end	6

Encoder

Without encoder	A
Incremental encoder HTL (1024 p/r)	H
Incremental encoder HTL (2048 p/r)	J

Terminal box/direction of cable entry (looking at D-end)

Terminal box ND-end right/cable entry below/encoder connector on D-end [1])	0
Terminal box ND-end left/cable entry below/encoder connector on D-end [2])	1
Terminal box ND-end top/cable entry right/encoder connector on D-end [3])	2

Type of construction

IM B 3	0
IM B 6, IM B 7, IM B 8, IM V 5, IM V 6	1
IM B 35 (with flange A660)	3
IM V 36, IM V 15 (with flange A660)	5

Type of drive	Vibration severity	Shaft and flange accuracy	
Coupling	N	N	A
Coupling	R	R	B
Belt/increased lateral forces	N	N	E
Belt/increased lateral forces	R	R	F

Shaft extension

With featherkey, half-key balancing	A
With featherkey, full-key balancing	C
Smooth	J

Paint finish

Primed	0
Anthracite, normal coating (RAL 7016)	3
Anthracite, special coating (RAL 7016)	6

1) Only possible for 8th data digit “0”, “2”, “6”.

2) Only possible for 8th data digit “0”, “1”, “6”.

3) Only possible for 8th data digit “1”, “2”, “6”.

Technical data

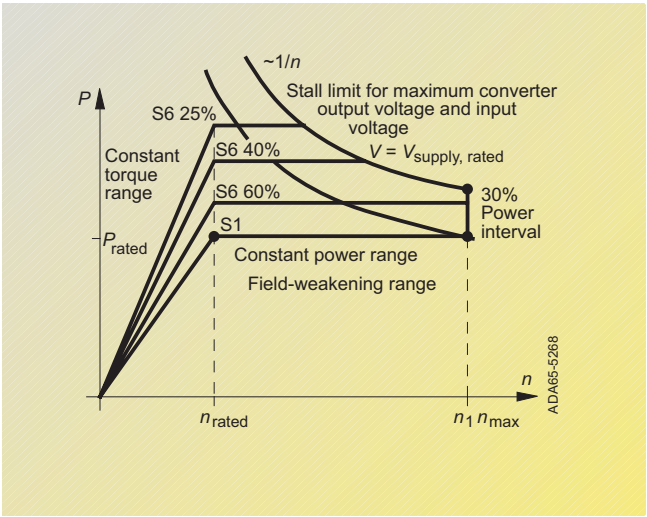
1PL6 three-phase motors, frame sizes 180 and 225

Technical characteristics

The 1PL6 three-phase servomotors are compact, separately-cooled asynchronous motors with additional axial ventilation and with degree of protection IP 23.

They are especially characterized by the following properties:

- extremely high power density with low physical volume (50 % more power compared with 1PH7 motors with degree of protection IP 55)
- speed down to zero without torque reduction
- robustness
- low maintenance requirements
- high lateral-force withstand capability
- high level of concentricity even at lowest speeds
- integrated encoder system for motor speed detection, plug connection
- terminal box for connecting the power cable
- Monitoring of motor temperature by KTY 84



Power-speed characteristic

Degree of protection IP 23

The three-phase induction motors of Series 1PL6 are rotor-cooled and stator-cooled by means of open-circuit cooling.
A built-on separately-driven fan unit is implemented as standard for cooling.

The motors comply with the DIN standards and the IP 23 degree of protection according to EN 60034-5 (or IEC 60034-5). With this degree of protection, the motors are not suitable for operation in corrosive atmospheres or for installation outdoors.

Technical data

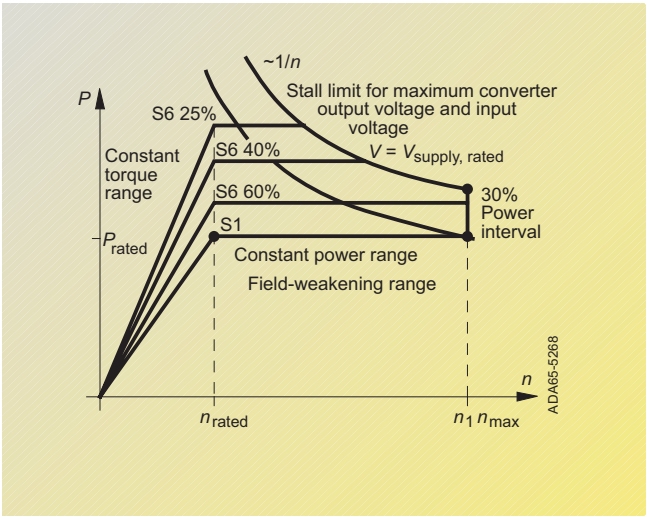
1PL6 three-phase motors, frame size 280

Technical characteristics of frame size 280

The newly developed asynchronous motors of size 280 expand the performance range of the compact asynchronous servomotors of Series 1PL6.

The new size is characterized, in particular, by its compact construction despite enhanced performance and consistent emphasis on suitability for use in production machines.

- extremely high power/weight ratio for minimal overall volume (60 % more power than 1PH7 in the IP 55 degree of protection)
- variable ventilation design; Standard: Fan unit at non-drive-end
- simple external ventilation by means of connected hose
- terminal box either above, left or right (ND-end) as required
- integrated encoder system for sensing the motor speed, connected with connector on terminal box
- monitoring of motor temperature by KTY 84; additional KTY 84 as spare part
- bearings with relubricating mechanism and insulated bearing as standard (ND-end)



Power-speed characteristic

Applications for 1PL6 servomotors

Installation in dry indoor locations (no aggressive atmosphere).

Hoisting equipment:

- hoists and closing gear for cranes

Printing industry:

- main drives for printing machines

Rubber, plastic and wire:

- drives for extrudes, calenders, rubber injection mouldings, film machines, conveyor systems
- wire-drawing machines, cable stranding machines etc.

General applications such as winding and coiling machines.

Technical data

1PL6 motors, frame sizes 180 and 225

	Standard	Option
Type of construction	IM B 3	IM B 35
Degree of protection	IP 23	–
Vibration severity	R	S SR
Shaft and flange accuracy	N	R
Shaft extension	With featherkey, half-key balancing	Smooth shaft extension With featherkey, full-key balancing
Terminal box	On top, cable entry from the right	Cable entry from D-end, ND-end or the left
Motor protection	KTY 84 in the stator winding	–
Encoder system (plug connection)	Incremental encoder HTL (with SIMOVERT MASTERDRIVES VC and MC)	Without encoder (with SIMOVERT MASTERDRIVES VC) sin/cos incremental encoder 1 V_{pp} (with SIMOVERT MASTERDRIVES MC) Abs.-value encoder (EnDat) 2048 p/r (with SIMOVERT MASTERDRIVES MC)
Paint finish	Normal paint finish anthracite RAL 7016	Primed Special paint finish “worldwide” RAL 7016, other colors on request
Bearings	Permanently lubricated deep-groove ball bearing for coupling drive	Cylindrical roller bearing for belt drive Cylindrical roller bearing for increased lateral forces
Cooling	Separate ventilation and axial ventilation Axial fan on ND-end Air-flow direction from D-end to ND-end	(Without blower, for pipe connection on request) (Air-flow direction from ND-end to D-end on request)
Silencer	–	Silencer for reducing the sound pressure level (retrofit also possible)

1PL6 motors, frame size 280

	Standard	Option
Type of construction	IM B 3	IM B 35
Degree of protection	IP 23	–
Vibration severity	N	R
Shaft and flange accuracy	N	R
Shaft extension	With featherkey, half-key balancing	Smooth shaft extension With featherkey, full-key balancing
Terminal box	On the right (ND-end), cable entry from below, encoder connector (D-end)	On the left (ND-end), cable entry from below, encoder connector (D-end) On top (ND-end), in the case of a fan ND-end left or right, cable entry from the right, encoder connector (D-end), D-end on request
Motor protection	KTY 84 in the stator winding Additional KTY 84 as standby	–
Encoder system (plug connection)	Incremental encoder HTL (with SIMOVERT MASTERDRIVES VC)	Without encoder (with SIMOVERT MASTERDRIVES VC) Other encoders on request
Paint finish	Normal paint finish anthracite RAL 7016	Primed Special paint finish “worldwide“ RAL 7016 Other colors on request
Bearings	Bearing concept for coupling drive with relubricating device	Bearing concept for belt drive or increased lateral forces with relubricating device
Cooling	Separate ventilation, the fan is axially mounted on the ND-end, air flow from ND-end to D-end	Without separate fan, for single pipe connection Fan ND-end left or right Fan radially mounted on the D-end (air flow from D-end to ND-end) on request

Selection and ordering data with SIMOVERT MASTERDRIVES Vector Control converters

Motor data (utilization to temperature class F)																	Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [1]	Max. operating speed [2]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter Inverter	E T
n_{rated}			P_{rated}	M_{rated}	I_{rated}	U_{rated}	n_1	n_{max}		I_μ	η_n	f_{rated}	J	m	$I_{U_{rated}}$		
rpm		Order No.	kW	Nm	A	V	rpm	rpm	cos φ	A		Hz	kgm^2	kg	A	Order No.	
Mains voltage 3 AC 400 V for SIMOVERT MASTERDRIVES Vector Control converters																	
400	180	**1PL6184–..B..–....**	24.5	585	69	300	1000	5000	0.86	33	0.80	14.4	0.503	370	72	**6SE7027–2 . D61**	
	180	**1PL6186–..B..–....**	31.5	752	90	290	1400	5000	0.85	47	0.814	14.3	0.666	440	92	**6SE7031–0 . E60**	
	225	**1PL6224–..B..–....**	45	1074	117	300	1150	4500	0.87	45	0.844	14.2	1.479	630	124	**6SE7031–2 . F60**	
	225	**1PL6226–..B..–....**	57	1361	145	305	1400	4500	0.85	67	0.868	14.0	1.930	750	146	**6SE7031–5 . F60**	
	225	**1PL6228–..B..–....**	72	1719	181	305	1300	4500	0.86	77	0.871	14.0	2.326	860	186	**6SE7031–8 . F60**	
1150	180	**1PL6184–..D..–....**	65	540	121	400	1750	5000	0.86	46	0.906	39.4	0.503	370	124	**6SE7031–2 . F60**	
	180	**1PL6186–..D..–....**	85	706	158	400	1950	5000	0.86	62	0.910	39.4	0.666	440	186	**6SE7031–8 . F60**	
	225	**1PL6224–..D..–....**	120	997	218	400	2100	4500	0.85	86	0.930	39.1	1.479	630	260	**6SE7032–6 . G60**	
	225	**1PL6226–..D..–....**	155	1287	275	400	2000	4500	0.87	92	0.930	39.2	1.930	750	315	**6SE7033–2 . G60**	
	225	**1PL6228–..D..–....**	190	1578	334	400	1850	4500	0.88	102	0.931	39.2	2.326	860	370	**6SE7033–7 . G60**	
	280	**1PL6284–..D..–....**	280	2325	478	400	2400	3300	0.89	156	0.950	38.9	4.2	1300	510	**6SE7035–1 . K/J60**	
	280	**1PL6286–..D..–....**	355	2944	637	380	2450	3300	0.89	214	0.953	38.9	5.2	1500	690	**6SE7037–0 . K/J60**	
	280	**1PL6288–..D..–....**	435	3607	765	385	2450	3300	0.89	248	0.955	38.9	6.3	1700	860	**6SE7038–6 T K60**	
1750	180	**1PL6184–..F..–....**	89	486	166	400	3500	5000	0.84	68	0.921	59.3	0.503	370	186	**6SE7031–8 . F60**	
	180	**1PL6186–..F..–....**	125	682	231	400	3400	5000	0.84	92	0.935	59.3	0.666	440	260	**6SE7032–6 . G60**	
	225	**1PL6224–..F..–....**	165	900	292	400	3000	4500	0.87	90	0.942	59.2	1.479	630	315	**6SE7033–2 . G60**	
	225	**1PL6226–..F..–....**	200	1091	350	400	3550	4500	0.87	122	0.942	59.1	1.930	750	370	**6SE7033–7 . G60**	
	225	**1PL6228–..F..–....**	265	1446	470	400	3700	4500	0.86	174	0.948	59.0	2.326	860	510	**6SE7035–1 . K/J60**	
	280	**1PL6284–..F..–....**	370	2019	616	400	3250	3300	0.90	162	0.959	59.0	4.2	1300	690	**6SE7037–0 . K/J60**	
	280	**1PL6286–..F..–....**	445	2429	736	400	3250	3300	0.91	182	0.960	59.0	5.2	1500	860	**6SE7038–6 T K60**	
	280	**1PL6288–..F..–....**	560	3055	924	400	3300	3300	0.91	232	0.962	59.0	6.3	1700	1100	**6SE7041–1 T K60**	
2900	180	**1PL6184–..L..–....**	113	372	209	400	5000	5000	0.85	79	0.938	97.6	0.503	370	210	**6SE7032–1 . G60**	
	180	**1PL6186–..L..–....**	150	494	280	390	5000	5000	0.84	110	0.943	97.5	0.666	440	315	**6SE7033–2 . G60**	
	225	**1PL6224–..L..–....**	205	675	365	400	4500	4500	0.86	118	0.950	97.5	1.479	630	370	**6SE7033–7 . G60**	
	225	**1PL6226–..L..–....**	270	889	470	400	4500	4500	0.87	160	0.952	97.4	1.930	750	510	**6SE7035–1 . K/J60**	
	225	**1PL6228–..L..–....**	300	988	530	400	4500	4500	0.86	188	0.952	97.3	2.326	860	590	**6SE7036–0 . K/J60**	

1) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached.

2) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} < 5 \cdot f_{rated}$.

Selection and ordering data with SIMOVERT MASTERDRIVES Vector Control converters

Motor data (utilization to temperature class F)																	Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [1]	Max. operating speed [2]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter / Inverter	
n_{rated}			P_{rated}	M_{rated}	I_{rated}	U_{rated}	n_1	n_{max}		I_μ	η_n	f_{rated}	J	m	$I_{U_{rated}}$		
rpm		Order No.	kW	Nm	A	V	rpm	rpm	cos φ	A		Hz	kgm^2	kg	A	Order No.	
Mains voltage 3 AC 480 V for SIMOVERT MASTERDRIVES Vector Control converters																		
500	180	**1PL6184–..B..–....**	30	573	66	370	1300	5000	0.84	34	0.844	17.6	0.503	370	72	**6SE7027–2 . D61**	E	
	180	**1PL6186–..B..–....**	40	764	91	355	1500	5000	0.84	46	0.845	17.6	0.666	440	92	**6SE7031–0 . E60**		
	225	**1PL6224–..B..–....**	55	1050	114	370	1300	4500	0.86	46	0.875	17.5	1.479	630	124	**6SE7031–2 . F60**		
	225	**1PL6226–..B..–....**	72	1375	147	375	1500	4500	0.85	66	0.887	17.4	1.930	750	146	**6SE7031–5 . F60**		
	225	**1PL6228–..B..–....**	90	1719	180	380	1400	4500	0.85	79	0.894	17.4	2.326	860	186	**6SE7031–8 . F60**		
1350	180	**1PL6184–..D..–....**	74	523	119	460	2200	5000	0.86	44	0.918	46.1	0.503	370	124	**6SE7031–2 . F60**		
	180	**1PL6186–..D..–....**	98	693	156	460	2400	5000	0.85	60	0.920	46.0	0.666	440	186	**6SE7031–8 . F60**		
	225	**1PL6224–..D..–....**	137	969	215	460	2600	4500	0.85	82	0.940	45.8	1.479	630	260	**6SE7032–6 . G60**		
	225	**1PL6226–..D..–....**	172	1217	265	460	2500	4500	0.87	88	0.940	45.8	1.930	750	315	**6SE7033–2 . G60**		
	225	**1PL6228–..D..–....**	218	1542	332	460	2200	4500	0.88	100	0.938	45.8	2.326	860	370	**6SE7033–7 . G60**		
	280	**1PL6284–..D..–....**	325	2299	478	470	2850	3300	0.89	157	0.955	45.5	4.2	1300	510	**6SE7035–1 . K/J60**		
	280	**1PL6286–..D..–....**	410	2901	637	445	2950	3300	0.89	215	0.957	45.5	5.2	1500	690	**6SE7037–0 . K/J60**		
	280	**1PL6288–..D..–....**	505	3573	765	450	2950	3300	0.89	248	0.959	45.5	6.3	1700	860	**6SE7038–6 T K60**		
2000	180	**1PL6184–..F..–....**	98	468	161	460	4200	5000	0.83	70	0.934	67.5	0.503	370	186	**6SE7031–8 . F60**		
	180	**1PL6186–..F..–....**	135	645	220	460	4200	5000	0.83	94	0.94	67.5	0.666	440	260	**6SE7032–6 . G60**		
	225	**1PL6224–..F..–....**	178	850	275	460	3800	4500	0.86	91	0.944	67.5	1.479	630	315	**6SE7033–2 . G60**		
	225	**1PL6226–..F..–....**	220	1050	342	460	4200	4500	0.86	124	0.948	67.5	1.930	750	370	**6SE7033–7 . G60**		
	225	**1PL6228–..F..–....**	288	1375	450	460	4500	4500	0.85	176	0.948	67.3	2.326	860	510	**6SE7035–1 . K/J60**		
	280	**1PL6284–..F..–....**	415	1981	616	455	3300	3300	0.90	161	0.961	67.3	4.2	1300	690	**6SE7037–0 . K/J60**		
	280	**1PL6286–..F..–....**	500	2387	736	455	3300	3300	0.91	181	0.963	67.3	5.2	1500	860	**6SE7038–6 T K60**		
	280	**1PL6288–..F..–....**	630	3009	924	455	3300	3300	0.91	231	0.965	67.3	6.3	1700	1100	**6SE7041–1 T K60**		
2900	180	**1PL6184–..L..–....**	113	372	209	400	5000	5000	0.85	79	0.938	97.6	0.503	370	210	**6SE7032–1 . G60**		
	180	**1PL6186–..L..–....**	150	494	280	390	5000	5000	0.84	110	0.943	97.5	0.666	440	315	**6SE7033–2 . G60**		
	225	**1PL6224–..L..–....**	205	675	365	400	4500	4500	0.86	118	0.950	97.5	1.479	630	370	**6SE7033–7 . G60**		
	225	**1PL6226–..L..–....**	270	889	470	395	4500	4500	0.87	160	0.952	97.4	1.930	750	510	**6SE7035–1 . K/J60**		
	225	**1PL6228–..L..–....**	300	988	530	400	4500	4500	0.86	188	0.952	97.3	2.326	860	590	**6SE7036–0 . K/J60**		

1) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached.

2) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} < 5 \cdot f_{rated}$.

Selection and ordering data with SIMOVERT MASTERDRIVES Motion Control converters

Motor data (utilization to temperature class F)																Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [1]	Max. operating speed [2]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter Inverter	E T
n_{rated}			P_{rated}	M_{rated}	I_{rated}	U_{rated}	n_1	n_{max}		I_μ	η_n	f_{rated}	J	m	$I_{U_{rated}}$		
rpm		Order No.	kW	Nm	A	V	rpm	rpm	cos φ	A		Hz	kgm^2	kg	A	Order No.	
Mains voltage 3 AC 400 V for SIMOVERT MASTERDRIVES Motion Control converters																	
400	180	**1PL6184–..B..–....**	20.5	489	58	290	800	5000	0.84	33.4	0.820	14.2	0.503	370	59	**6SE7026-0 . D51**	
	180	**1PL6186–..B..–....**	30.5	728	87	290	800	5000	0.84	48.6	0.828	14.1	0.666	440	92	**6SE7031-0 . E50**	
	225	**1PL6224–..B..–....**	40	955	105	296	800	4500	0.86	45.8	0.864	14	1.479	630	124	**6SE7031-2 . F50**	
	225	**1PL6226–..B..–....**	57	1361	145	305	800	4500	0.85	67	0.868	14	1.93	750	155	**6SE7031-8 . F50**	
	225	**1PL6228–..B..–....**	72	1719	181	305	800	4500	0.86	77	0.871	14.1	2.326	860	218	**6SE7032-6 . G50**	
1000	180	**1PL6184–..D..–....**	57	544	122	345	1300	5000	0.87	45	0.897	34.4	0.503	370	124	**6SE7031-2 . F50**	
	180	**1PL6186–..D..–....**	74	707	157	345	1600	5000	0.86	61	0.907	34.3	0.666	440	155	**6SE7031-8 . E50**	
	225	**1PL6224–..D..–....**	105	1003	220	345	1700	4500	0.86	86	0.927	34.5	1.479	630	218	**6SE7032-6 . G50**	
	225	**1PL6226–..D..–....**	135	1289	278	345	1700	4500	0.88	90	0.927	31.1	1.93	750	308	**6SE7033-7 . G50**	
	225	**1PL6228–..D..–....**	165	1576	331	348	1600	4500	0.89	103	0.928	34.2	2.326	860	423	**6SE7035-1 E K50**	
1500	180	**1PL6184–..F..–....**	76	484	165	345	3000	5000	0.84	70	0.924	50.9	0.503	370	175	**6SE7032-1 . G50**	
	180	**1PL6186–..F..–....**	108	688	233	340	3000	5000	0.85	91	0.930	50.9	0.666	460	262	**6SE7033-2 . G50**	
	225	**1PL6224–..F..–....**	142	904	292	345	2500	4500	0.87	91	0.940	50.9	1.479	640	308	**6SE7033-7 . G50**	
	225	**1PL6226–..F..–....**	175	1114	356	345	3000	4500	0.87	125	0.944	50.7	1.93	760	423	**6SE7035-1 E K50**	
	225	**1PL6228–..F..–....**	230	1465	468	345	3000	4500	0.86	177	0.947	50.7	2.326	870	491	**6SE7036-0 E K50**	
2500	180	**1PL6184–..L..–....**	100	382	208	345	5000	5000	0.86	80	0.936	84.2	0.503	390	218	**6SE7032-6 . G50**	
	180	**1PL6186–..L..–....**	130	497	275	340	5000	5000	0.85	113	0.943	84.1	0.666	470	308	**6SE7033-7 . G50**	
	225	**1PL6224–..L..–....**	178	680	358	345	4500	4500	0.87	119	0.95	84.1	1.479	640	423	**6SE7035-1 E K50**	
	225	**1PL6226–..L..–....**	235	898	476	340	4500	4500	0.88	157	0.953	84	1.93	760	491	**6SE7036-0 E K50**	
	225	**1PL6228–..L..–....**	265	1013	535	345	4500	4500	0.87	189	0.952	84	2.326	870	491 [3]	**6SE7036-0 E K50**	

1) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached.

2) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} < 2 \cdot f_{rated}$.

3) Warning!
The rated converter current is lower than the rated motor current.

Selection and ordering data with SIMOVERT MASTERDRIVES Motion Control converters

Motor data (utilization to temperature rise class F)																Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [1]	Max. operating speed [2]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter / Inverter	E / T
n_{rated}			P_{rated}	M_{rated}	I_{rated}	U_{rated}	n_1	n_{max}		I_μ	η_n	f_{rated}	J	m	$I_{U_{rated}}$		
rpm		Order No.	kW	Nm	A	V	rpm	rpm	cos φ	A		Hz	kgm²	kg	A	Order No.	
Mains voltage 3 AC 480 V for SIMOVERT MASTERDRIVES Motion Control converters																	
400	180	**1PL6184–..B..–....**	24.5	585	69	300	800	5000	0.86	33	0.80	14.4	0.503	370	72	**6SE7027–2 . D51**	
	180	**1PL6186–..B..–....**	31.5	752	90	290	800	5000	0.85	47	0.814	14.3	0.666	440	92	**6SE7031–0 . E50**	
	225	**1PL6224–..B..–....**	45	1074	117	300	800	4500	0.87	45	0.844	14.2	1.479	630	124	**6SE7031–2 . F50**	
	225	**1PL6226–..B..–....**	57	1361	145	305	800	4500	0.85	67	0.868	14.0	1.930	750	155	**6SE7031–8 . F50**	
	225	**1PL6228–..B..–....**	72	1719	181	305	800	4500	0.86	77	0.871	14.0	2.326	860	175	**6SE7032–1 . G50**	
1150	180	**1PL6184–..D..–....**	65	540	121	400	1750	5000	0.86	46	0.906	39.4	0.503	370	124	**6SE7031–2 . F50**	
	180	**1PL6186–..D..–....**	85	706	158	400	1950	5000	0.86	62	0.910	39.4	0.666	440	155	**6SE7031–8 . F50**	
	225	**1PL6224–..D..–....**	120	997	218	400	2100	4500	0.86	86	0.930	39.1	1.479	630	218	**6SE7032–6 . G50**	
	225	**1PL6226–..D..–....**	155	1287	275	400	2000	4500	0.87	92	0.930	39.2	1.930	750	308	**6SE7033–7 . G50**	
	225	**1PL6228–..D..–....**	190	1578	334	400	1850	4500	0.88	102	0.931	39.2	2.326	860	423	**6SE7035–1 E K50**	
1750	180	**1PL6184–..F..–....**	89	486	166	400	3500	5000	0.84	68	0.921	59.3	0.503	370	175	**6SE7032–1 . G50**	
	180	**1PL6186–..F..–....**	125	682	231	400	3400	5000	0.84	92	0.935	59.3	0.666	440	262	**6SE7033–2 . G50**	
	225	**1PL6224–..F..–....**	165	900	292	400	3000	4500	0.87	90	0.942	59.2	1.479	630	308	**6SE7033–7 . G50**	
	225	**1PL6226–..F..–....**	200	1091	350	400	3500	4500	0.87	122	0.945	59.1	1.930	750	423	**6SE7035–1 E K50**	
	225	**1PL6228–..F..–....**	265	1446	470	400	3500	4500	0.86	174	0.948	59.0	2.326	860	491	**6SE7036–0 E K50**	
2900	180	**1PL6184–..L..–....**	113	372	209	400	5000	5000	0.85	79	0.938	97.6	0.503	370	218	**6SE7032–6 . G50**	
	180	**1PL6186–..L..–....**	150	494	280	390	5000	5000	0.84	110	0.943	97.5	0.666	440	308	**6SE7033–7 . G50**	
	225	**1PL6224–..L..–....**	205	675	365	400	4500	4500	0.86	118	0.950	97.5	1.479	630	423	**6SE7035–1 K U50**	
	225	**1PL6226–..L..–....**	270	889	470	400	4500	4500	0.87	160	0.952	97.4	1.930	750	491	**6SE7036–0 K U50**	
	225	**1PL6228–..L..–....**	300	988	530	400	4500	4500	0.86	188	0.952	97.3	2.326	860	491 [3]	**6SE7036–0 E K50**	

1) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached.

2) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} < 2 \cdot f_{rated}$.

3) Warning! The rated converter current is lower than the rated motor current.

1PL6 Asynchronous servomotors

Order No. suffix for frame sizes 180 and 225

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1PL6 . . . – □ □ . □ □ – 0 □ □ □

Fan supply voltage			
3 AC 400 V ± 10 %, 50 Hz; for 1PL618., also for 480 V + 5 % –10 %, 60 Hz			4
3 AC 480 V + 5 % – 10 %, 60 Hz (only for 1PL622.)			5
Encoder			
Without encoder			A
Absolute-value encoder (EnDat) (2048 p/r)			E
Incremental encoder HTL (1024 p/r)			H
Incremental encoder HTL (2048 p/r)			J
sin/cos incremental encoder 1 V_{pp} (without C-track and D-track)			N
sin/cos incremental encoder 1 V_{pp} (with C-track and D-track)			M
Direction of cable entry (terminal box on top)			
From the right			0
From D-end			1
From ND-end			2
From the left			3
Type of construction	**Hoist concept**		
IM B 3	Standard		0
IM B 6, IM B 7, IM B 8, IM V 5, IM V 6	For vertical types of construction		1
IM B 35	Standard		3
IM V 36, IM V 15	For vertical types of construction		5
Type of drive	**Vibration severity**	**Shaft and flange accuracy**	
Coupling	R	N	A
Coupling	R	R	B
Coupling	S	R	C
Coupling	SR	R	D
Belt	R	N	E
Belt	R	R	F
Increased lateral forces	R	N	G
Increased lateral forces	R	R	H
Air-flow direction	**Shaft extension**		
D-end → ND-end	With featherkey, half-key balancing		A
D-end → ND-end	With featherkey, full-key balancing		C
D-end → ND-end	Smooth		J
Paint finish			
Primed			0
Anthracite, normal coating (RAL 7016)			3
Anthracite, special coating (RAL 7016)			6

Order No. suffix for frame size 280 (start of delivery as of 07/2002)

	1 2 3 4 5 6 7	8	9	10 11	12	13 14	15	16
	1PL628. –	□	□	. □	□	– 0 □	□	□
Fan (3 AC 400 V ± 10 %, 50 Hz/60 Hz; 480 V ± 10 %, 60 Hz)								
With fan, ND-end top, direction of air flow ND-end to D-end		0						
With fan, ND-end right, direction of air flow ND-end to D-end		1						
With fan, ND-end left, direction of air flow ND-end to D-end		2						
Without fan, for single pipe connection to ND-end		6						
Encoder								
Without encoder			A					
Incremental encoder HTL (1024 p/r)			H					
Incremental encoder HTL (2048 p/r)			J					
Terminal box/direction of cable entry (looking at D-end)								
Terminal box ND-end right/cable entry below/encoder connector on D-end [1])				0				
Terminal box ND-end left/cable entry below/encoder connector on D-end [2])				1				
Terminal box ND-end top/cable entry right/encoder connector on D-end [3])				2				
Type of construction								
IM B 3					0			
IM B 6, IM B 7, IM B 8, IM V 5, IM V 6					1			
IM B 35 (with flange A660)					3			
IM V 36, IM V 15 (with flange A660)					5			

Type of drive	Vibration severity	Shaft and flange accuracy				
Coupling	N	N			A	
Coupling	R	R			B	
Belt/increased lateral forces	N	N			E	
Belt/increased lateral forces	R	R			F	

Shaft extension						
With featherkey, half-key balancing					A	
With featherkey, full-key balancing					C	
Smooth					J	
Paint finish						
Primed						0
Anthracite, normal coating (RAL 7016)						3
Anthracite, special coating (RAL 7016)						6

1) Only possible for 8th data digit “0”, “2”, “6”.

2) Only possible for 8th data digit “0”, “1”, “6”.

3) Only possible for 8th data digit “1”, “2”, “6”.

Water-cooled 1PH4 Asynchronous servomotors

Technical data

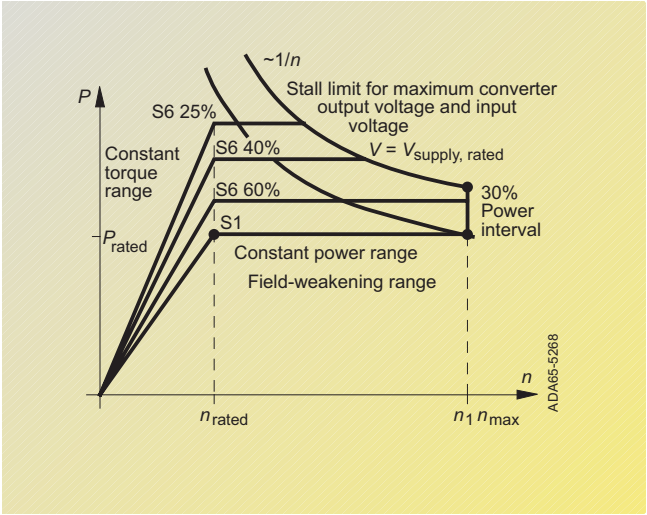
1PH4 three-phase motors, sizes 100 ... 160

Technical characteristics

The 1PH4 three-phase motors are compact, water-cooled asynchronous motors with a squirrel-cage rotor.

They are especially characterized by the following properties:

- high power density with low physical volume
- high degree of protection
- large speed range
- speed down to zero without torque reduction
- robustness
- low maintenance requirements
- high lateral-force withstand capability
- high level of concentricity even at lowest speeds
- integrated encoder system for motor speed detection, plug connection
- terminal box for power cable connection
- Monitoring of motor temperature by KTY 84



Power-speed characteristic

Applications

- wherever extreme ambient conditions such as high temperature, dust, dirt or aggressive atmosphere prevent air cooling
- in processes where the environment must not be thermally influenced
- on special machines where cooling water is available from the process

1PH4 motors, frame sizes 100 ... 160

	Standard	Options	Option codes
Type of construction	IM B 35/IM V 15/IM V 36	–	–
Degree of protection	IP 65, Shaft exit IP 55	IP 65, Shaft exit oil-tight	K18
Vibration severity	R	S (with double bearing) SR (with single bearing) S (with single bearing)	K05 K03 K02
Shaft and flange accuracy	N	R	K04
Shaft extension	With featherkey, full-key balancing	Smooth shaft extension, half-key balancing	K42 L69
Terminal box (looking at D-end)	On top (can be rotated by 4 x 90°) Cable entry from the right	On the right-hand side On the left-hand side Cable entry from D-end Cable entry from ND-end Cable entry from the left	K09 K10 K83 K84 K85
Motor protection	KTY 84 in the stator winding	–	–
Encoder system (plug connection)	Incremental encoder HTL (with SIMOVERT MASTERDRIVES VC)	sin/cos incremental encoder 1 V_{pp} (with SIMOVERT MASTERDRIVES MC) Absolute-value encoder (EnDat) 2048 p/r (with SIMOVERT MASTERDRIVES MC) Without encoder	– H30
Paint finish	Anthracite RAL 7016	–	–
Bearings	Double bearing on D-end for belt drive (minimum lateral force necessary)	Single bearing on D-end for coupling drive and planetary gear (low lateral forces) Increased max. speed [2])	K00 L37
Cooling [3])	Water cooling [1]) Coolant feed temp. ≤ 30 °C connected at ND-end	–	–
Gearbox mounting [4])	–	Suitable for fitting a ZF gear unit	K00
Other	–	Second rating plate supplied as a loose item	K31
Holding brake	–	ZF holding brake on D-end	G46

1) Cooling water rate; connection thread
Size 100: 6 l/min; G 1/4"
132: 8 l/min; G 3/8"
160: 10 l/min; G 1/2"
max. pressure: 6 bar.

2) Max. possible speeds;
Size 100: 12 000 rpm
132: 10 000 rpm
160: 8 000 rpm
(no ZF built-on gear possible).

3) Sound pressure level
Size 100: 69 dB(A)
132: 69 dB(A)
160: 71 dB(A).

4) For notes on gearbox mounting, see Chapter 4 "Accessories".

Selection and ordering data with SIMOVERT MASTERDRIVES converters [1]

Motor data (utilization to temperature class F)																	Converter data	
Rated speed	Size	Motor	Rated power	Rated torque	Rated current	Rated voltage	Speed during field-weakening [2]	Max. operating speed [3]	Power factor	Magnetizing current	Efficiency	Rated frequency	Moment of inertia	Weight	Rated current	Converter	E
																Inverter	T
n_{rated}			P_{rated}	M_{rated}	I_{rated}	U_{rated}	n_1	n_{max}		I_μ	η_n	f_{rated}	J	m	$I_{U_{rated}}$		
rpm		Order No.	kW	Nm	A	V	rpm	rpm	cos φ	A		Hz	kgm²	kg	A	Order No.	
Mains voltage 3 AC 400 V for SIMOVERT MASTERDRIVES Vector Control converters																	
1750	100	**1PH4103–4 . F56**	8.8	48	20.5	400	2800	7500	0.75	11.5	0.841	61.2	0.017	52	25.5	**6SE7022–6 . EC61–1AA0**	
	100	**1PH4105–4 . F56**	12.8	70	28	400	2600	7500	0.78	13.5	0.854	61.3	0.024	67	34	**6SE7023–4 . EC61–1AA0**	
	100	**1PH4107–4 . F56**	16.3	89	35.5	400	2800	7500	0.78	18	0.867	61.0	0.031	80	37.5	**6SE7023–8 . ED61–1AA0**	
	132	**1PH4133–4 . F56**	17.5	96	35.5	400	2100	6700	0.82	12	0.887	60.2	0.046	90	37.5	**6SE7023–8 . ED61–1AA0**	
	132	**1PH4135–4 . F56**	25.5	139	52	400	2500	6700	0.79	22	0.901	59.8	0.071	112	59	**6SE7026–0 . ED61–1AA0**	
	132	**1PH4137–4 . F56**	31.5	172	63	400	2300	6700	0.81	23	0.905	59.9	0.085	130	72	**6SE7027–2 . ED61–1AA0**	
	160	**1PH4163–4 . F56**	43	235	88	400	2800	5300	0.78	42	0.914	59.3	0.170	175	92	**6SE7031–0 . EE60–1AA0**	
	160	**1PH4167–4 . F56**	54	295	107	400	2600	5300	0.80	44	0.920	59.4	0.206	210	124	**6SE7031–2 . EF60–1AA0**	
	160	**1PH4168–4 . F56**	61	333	117	400	2400	5300	0.82	43	0.921	59.4	0.220	240	124	**6SE7031–2 . EF60–1AA0**	
Mains voltage 3 AC 480 V for SIMOVERT MASTERDRIVES Vector Control converters																	
2000	100	**1PH4103–4 . F56**	9.5	45	19.5	450	3300	7500	0.74	11.2	0.856	69.3	0.017	52	25.5	**6SE7022–6 . EC61–1AA0**	
	100	**1PH4105–4 . F56**	14	67	26.5	450	3000	7500	0.79	12.9	0.870	69.4	0.024	67	34	**6SE7023–4 . EC61–1AA0**	
	100	**1PH4107–4 . F56**	18	86	34.5	450	3200	7500	0.78	17.1	0.879	69.1	0.031	80	37.5	**6SE7023–8 . ED61–1AA0**	
	132	**1PH4133–4 . F56**	19	91	33.5	450	2400	6700	0.83	11.9	0.899	68.4	0.046	90	34	**6SE7023–4 . EC61–1AA0**	
	132	**1PH4135–4 . F56**	28	134	50	450	2700	6700	0.80	21.5	0.909	68.1	0.071	112	59	**6SE7026–0 . ED61–1AA0**	
	132	**1PH4137–4 . F56**	34	162	59	450	2600	6700	0.83	22.1	0.914	68.1	0.085	130	59	**6SE7026–0 . ED61–1AA0**	
	160	**1PH4163–4 . F56**	47	224	84	450	3000	5300	0.79	39.7	0.923	67.6	0.170	175	92	**6SE7031–0 . EE60–1AA0**	
	160	**1PH4167–4 . F56**	58	277	101	450	3000	5300	0.81	42.6	0.926	67.6	0.206	210	124	**6SE7031–2 . EF60–1AA0**	
	160	**1PH4168–4 . F56**	65	310	110	450	2800	5300	0.83	41.0	0.928	67.6	0.220	240	124	**6SE7031–2 . EF60–1AA0**	
Mains voltage 3 AC 400 V for SIMOVERT MASTERDRIVES Motion Control converters																	
1500	100	**1PH4103–4 . F56**	7.5	48	20.5	350	2400	7500	0.74	12	0.820	52.8	0.017	52	25.5	**6SE7022–6 . C51**	
	100	**1PH4105–4 . F56**	11	70	28	350	2100	7500	0.78	13.5	0.836	52.9	0.024	67	34	**6SE7023–4 . C51**	
	100	**1PH4107–4 . F56**	14	89	35.5	350	2400	7500	0.77	18.5	0.851	52.5	0.031	80	37.5	**6SE7023–8 . D51**	
	132	**1PH4133–4 . F56**	15	95	35	350	1800	6700	0.81	13	0.877	51.8	0.046	90	37.5	**6SE7023–8 . D51**	
	132	**1PH4135–4 . F56**	22	140	52	350	2100	6700	0.79	24	0.890	51.4	0.071	112	59	**6SE7026–0 . D51**	
	132	**1PH4137–4 . F56**	27	172	62	350	1900	6700	0.81	24	0.895	51.5	0.085	130	72	**6SE7027–2 . D51**	
	160	**1PH4163–4 . F56**	37	236	89	350	2400	5300	0.77	45	0.905	50.9	0.170	175	92	**6SE7031–0 . E50**	
	160	**1PH4167–4 . F56**	46	293	107	350	2200	5300	0.79	48	0.910	51.0	0.206	210	124	**6SE7031–2 . F50**	
	160	**1PH4168–4 . F56**	52	331	117	350	2100	5300	0.81	46	0.913	51.0	0.220	240	124	**6SE7031–2 . F50**	
Mains voltage 3 AC 480 V for SIMOVERT MASTERDRIVES Motion Control converters																	
1750	100	**1PH4103–4 . F56**	8.8	48	20.5	400	2800	7500	0.75	11.5	0.841	61.2	0.017	52	25.5	**6SE7022–6 . C51**	
	100	**1PH4105–4 . F56**	12.8	70	28	400	2600	7500	0.78	13.5	0.854	61.3	0.024	67	34	**6SE7023–4 . C51**	
	100	**1PH4107–4 . F56**	16.3	89	35.5	400	2800	7500	0.78	18	0.867	61.0	0.031	80	37.5	**6SE7023–8 . D51**	
	132	**1PH4133–4 . F56**	17.5	96	35.5	400	2100	6700	0.82	12	0.887	60.2	0.046	90	37.5	**6SE7023–8 . D51**	
	132	**1PH4135–4 . F56**	25.5	139	52	400	2500	6700	0.79	22	0.901	59.8	0.071	112	59	**6SE7026–0 . D51**	
	132	**1PH4137–4 . F56**	31.5	172	63	400	2300	6700	0.81	23	0.905	59.9	0.085	130	72	**6SE7027–2 . D51**	
	160	**1PH4163–4 . F56**	43	235	88	400	2800	5300	0.78	42	0.914	59.3	0.170	175	92	**6SE7031–0 . E50**	
	160	**1PH4167–4 . F56**	54	295	107	400	2600	5300	0.80	44	0.920	59.4	0.206	210	124	**6SE7031–2 . F50**	
	160	**1PH4168–4 . F56**	61	333	117	400	2400	5300	0.82	43	0.921	59.4	0.220	240	124	**6SE7031–2 . F50**	

Incremental encoder HTL (1024 p/r)	**H**
Incremental encoder HTL (2048 p/r)	**J**
sin/cos incremental encoder 1 V_{pp} (without C-track and D-track)	**N**
sin/cos incremental encoder 1 V_{pp} (with C-track and D-track)	**M**
Absolute-value encoder (EnDat) (2048 p/r)	**E**

1) For rated currents below 37.5 A Compact PLUS units can also be used.

2) n_1: motor speed at which, when $P = P_{rated}$, there is still a power reserve of 30 % before the stalling limit is reached or at which the mechanical speed limit is reached.

3) Warning! The maximum speed in field-weakening mode is sometimes limited to lower values due to $f_{max.} < 2 \cdot f_{rated}$ for SIMOVERT MASTERDRIVES Motion Control and $f_{max.} < 5 \cdot f_{rated}$ for SIMOVERT MASTERDRIVES Vector Control.

Notes

Servomotors
Accessories

Encoder systems

4/2 • Incremental encoder HTL
4/2 • Resolver
4/3 • sin/cos incremental encoder 1 V_{pp}
4/3 • Absolute-value encoder (EnDat)

Holding brakes

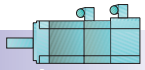
4/4 • Integrated holding brakes for 1FK6, 1FK7 and 1FT6 motors
4/5 • Built-on holding brakes for 1PH7 motors
4/6 • Order No. code

Built-on gears

4/7 • Planetary gears, LP series (from alpha)
4/9 • Planetary gears, SPG series (from alpha)
4/12 • 2-gear units (from ZF)

4

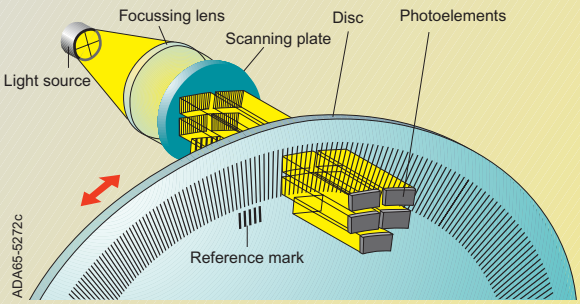
Encoder systems


Synchro-nous Servomotors

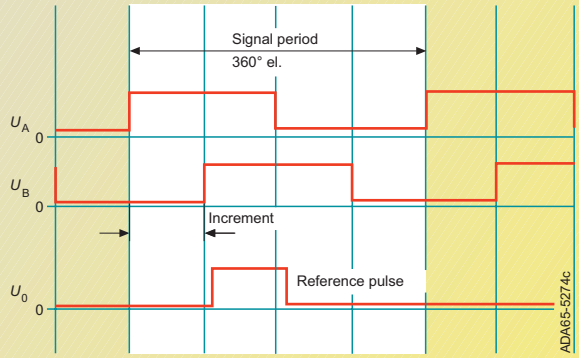

Asynchro-nous Servomotors

Incremental encoder HTL (1024 p/r and 2048 p/r)

Method of functioning: photoelectric scanning



Output signals

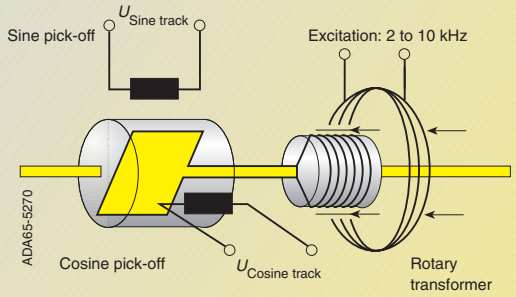


Technical data

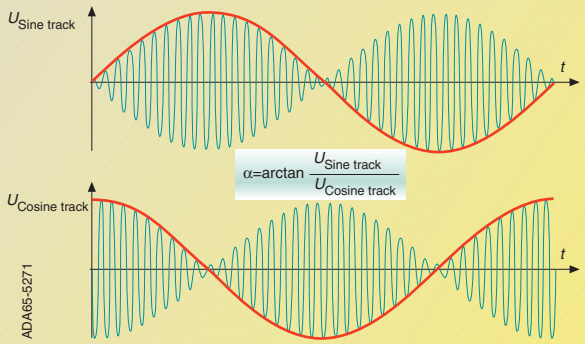
Supply voltage:	+10 ... 30 V
Output signals:	HTL Track A, track B Zero pulse and inverted signals
Number of pulses per revolution:	1024 (optional: 2048)
Accuracy:	± 1'
Frequency limit (–3 dB):	160 kHz
Use:	1PH7, 1PL6, 1PH4 asynchronous servomotors
Max. possible connecting cable length:	
– without transfer of the inverted signals	150 m
– with transfer of the inverted signals	300 m

Resolver 2-pole/multi-pole [1])

Method of functioning: inductive sampling, sine/cosine evaluation for rotor position



Output signals



Technical data

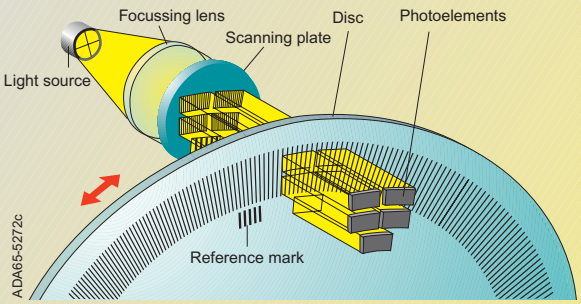
Operating voltage/frequency:	+5 V/4 kHz
Output signals [2]):	$U_{Sine\ track} = \ddot{u} \cdot U_{Excitation} \cdot \sin \alpha$ $U_{Cosine\ track} = \ddot{u} \cdot U_{Excitation} \cdot \cos \alpha$
Transmission ratio:	$\ddot{u} = 0.5 \pm 5\ \%$
Width of angular error:	< 5' (multi-pole), < 14' (2-pole)
Use:	1FT6, 1FK6, 1FK7 synchronous servomotors 1PH7, 1PH4 asynchronous servomotors
Max. possible connecting cable length:	150 m

1) When using a multi-pole resolver, the number of poles corresponds to the number of poles of the motor.

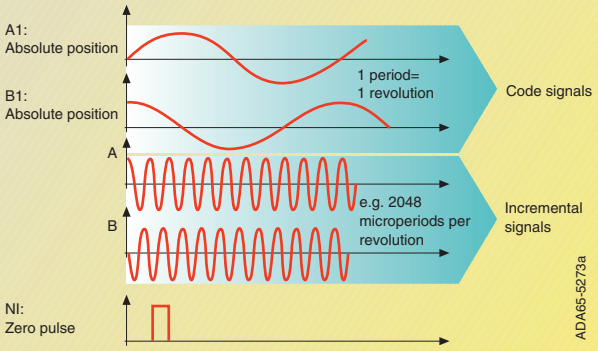
2) Output signals:
- 2-pole resolver: one sin/cos signal per revolution
- 4-pole resolver: two sin/cos signals per revolution
- 6-pole resolver: three sin/cos signals per revolution.

sin/cos incremental encoder 1 V_{pp}

Method of functioning: photoelectric scanning



Output signals



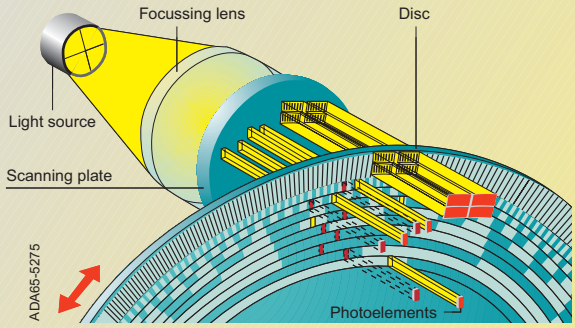
Technical data

Supply voltage:	+ 5 V ±5 %
Incremental signals (sinusoidal): • Voltage: • Number of pulses per revolution: • Accuracy:	 1 V_{pp} 2048 ±40"
Code signals: • Voltage: • Type of signals (C-tracks and D-tracks):	 1 V_{pp} 1 sine signal and 1 cosine signal per revolution
Use:	1FT6, 1FK6, 1FK7, 1FS6 synchronous servomotors 1PH7, 1PL6, 1PH4 asynchronous servomotors
Max. possible connecting cable length:	100 m

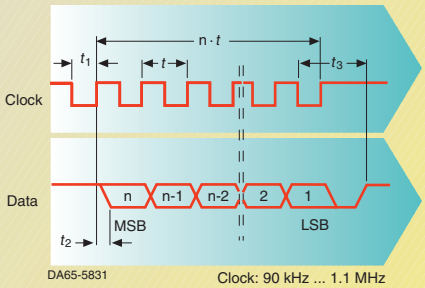
Note to the method of functioning graphics:
The functioning graphics for the incremental and absolute-value encoders were taken out of the catalog of Dr. JOHANNES HEIDENHAIN GmbH, Traunreut by the company's kind permission.

Absolute-value encoder (EnDat)

Method of functioning: photoelectric scanning



Output signals (serial interface)

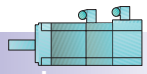


Technical data

Supply voltage:	+ 5 V ±5 %
Incremental signals (sinusoidal): • Voltage: • Number of pulses per revolution: • Accuracy:	 1 V_{pp} 2048 / 512 / 32 [1]) ±40" / ± 80" / ± 400"
Code signals:	Synchronous serial EnDat interface Dual code 4096 coded revolutions
Use:	1FT6, 1FK6, 1FK7, 1FS6 synchronous servomotors 1PH7, 1PL6, 1PH4 asynchronous servomotors
Max. possible connecting cable length:	100 m

1) • Absolute-value encoder (EnDat) with 2048 p/r for 1FT6, 1FK., 1FS6 motors from size 48 on and all asynchronous motors.
• Absolute-value encoder (EnDat) with 512 p/r for 1FT6 motors for size 28 and 1FK7 motors for sizes 28 and 36.
• Single absolute-value encoder (EnDat) with 32 p/r for 1FK. motors from size 48 on.

Holding brakes



Motors may need a holding brake with an emergency-stop function for reasons relating to the process involved or for safety. There are two different ways of attaching a brake to the motor.

1. Brake integrated in the motor 1FK. and 1FT6 (integrated holding brake).
2. Brake built onto the D-end of the 1PH7 motor (built-on holding brake).

Integrated holding brakes for 1FK. and 1FT6 motors

The permanent-magnet and spring-loaded single-face brakes used for these series of motors work on the closed-circuit current principle. The magnetic field of the permanent magnet exerts a pulling force on the brake's armature plate, i.e. in a zero-current condition, the brake is closed, thus preventing the motor shaft from turning. When there is a rated voltage of 24 V DC applied to the brake, the current-carrying coil generates an opposing field which cancels out the force exerted by the permanent magnet and releases the brake or holds it open.

In the case of the spring-loaded single-face brake the force is exerted by the spring and not by the permanent magnet.

For "emergency stops" or on power failure, approximately 2000 braking operations can be carried out at maximum switching capacity without causing excess wear on the holding brake (condition: the maximum external moment of inertia = the motor's own moment of inertia and n_{max} in relation to the type).

The holding brake is not designed as a stopping device during normal operations.

To avoid switching overvoltages and any associated influence on the plant or system environment, the brake feeder must be connected externally to a varistor. It is connected using the power plug or a terminal box.

The technical data are given in the table below (for dimension drawings, see Chapter 8).

Technical data of the integrated holding brakes (brake supply voltage 24 V DC ± 10 %)

Size	Motor type	Brake type	Holding torque	Direct current	Opening time with varistor	Closing time with varistor	Moment of inertia	Maximum switching energy per braking operation when braking from n = 3000 rpm
			Nm	A	ms	ms	10^{-4} kgm^2	J
For 1FK7 CT motors								
28	**1FK7 022**	**EBD 0,11 BN**	1.1	0.3	25	15	0.07	8
36	**1FK7 032**	**EBD 0,13 BN**	1.3	0.4	45	25	0.08	17
48	**1FK7 04.**	**EBD 0,3 BV**	3.8	0.6	70	20	0.72	74
63	**1FK7 06.**	**EBD 0,8 BK**	13.2	0.8	90	20	2.25	350
80	**1FK7 080**	**EBD 1,5 BN**	10	0.7	90	20	3.1	400
80	**1FK7 083**	**EBD 2 BY**	22	0.9	100	30	8.6	1400
100	**1FK7 100**	**EBD 2 BY**	22	0.9	100	30	8.6	1400
100	**1FK7 101/103**	**EBD 3,5 BV**	41	1.0	140	50	13.5	3000
For 1FK7 HD motors								
36	**1FK7 033**	**1EB 14**	1.3	0.45	70	35	0.12	14
48	**1FK7 04.**	**1EB 20**	4	0.6	110	40	0.13	96
63	**1FK7 06.**	**1EB 28**	12	0.8	150	45	0.34	230
80	**1FK7 08.**	**1EB 35**	22	1.2	190	50	2.0	700
For 1FK6 motors								
36	**1FK6 032**	**EBD 0,13 BS**	1.1	0.4	30	10	0.07	13
48	**1FK6 04.**	**EBD 0,3 B**	3.2	0.6	35	10	0.26	68
63	**1FK6 06.**	**EBD 0,8 B**	10	0.7	55	15	0.9	318
80	**1FK6 08.**	**EBD 1,4 BV**	18	0.9	150	30	3.0	535
100	**1FK6 100**	**EBD 2 BY**	20	0.9	100	30	7.9	1135
100	**1FK6 101/103**	**EBD 3,8 B**	36	0.9	180	25	12.9	1233
For 1FT6 motors								
28	**1FT6 02.**	**EBD 0,11 B**	1.2	0.3	20	10	0.07	34
36	**1FT6 03.**	**EBD 0,15 B**	2	0.4	30	15	0.12	27
48	**1FT6 04.**	**EBD 0,4 BA**	5	0.8	30	15	1.06	126
63	**1FT6 06.**	**EBD 1,5 BN**	22	0.7	130	20	3.2	321
80	**1FT6 081/082**	**EBD 1,2 B**	12	0.8	70	35	3.2	740
80	**1FT6 084/086**	**EBD 3,5 BN**	28	0.9	180	35	13.5	1640
100	**1FT6 10.**	**EBD 4 B**	80	1.4	180	20	32	2150
132	**1FT6 13.**	**EBD 8 B**	140	1.7	260	70	76	9870

Built-on holding brakes for 1PH7 motors

A brake can be built onto the drive-end of **1PH7** motors frame sizes 100, 132, 160, 180 and 225.

These brakes are electromagnetic brakes for dry running. An electromagnetic field is used to cancel out the braking effect caused by a spring. The brakes function according to the closed-circuit current principle, i.e. the spring-applied brake brakes when no current is applied and prevents the motor from moving. When current flows again, the brake is released and the motor can rotate.

During power failures and "emergency stops", the motor is braked from its current speed until it comes to a standstill. The respective holding torque and the number of emergency stops are given in the table on page 4/6.

The brakes are designed for connection to an AC voltage of 230 V AC, 50 to 60 Hz or 24 V DC (only up to size 160) which has to be provided on site.

The rectifier is built into the terminal box of the brake. The degree of protection is IP 55.

In its basic design, the brake contains three emergency-release screws (only frame sizes 180 and 225) which are axially accessible from the front. The built-in or built-on microswitch can be incorporated as an NC contact or an NO contact in a higher-level control unit. The fast-switching rectifier is for overexcitation of the coil in order to release the brake and achieve short release times (release current = 2 × holding current).

All the technical data such as holding torque, permissible speeds, number of emergency braking operations and braking current are given in the table 2.

The operating instructions for built-on holding brakes are supplied together with the motor-brake unit.

Ordering example:
1PH7 186–2HF0**0–2**AA3
IM B 3 type of construction, holding brake contains a microswitch and an emergency release screw (for further ordering possibilities, see order number code on page 4/6).

Built-on holding brake for motors of frame sizes 100 to 160

The holding brakes for motors frame sizes 100, 132 and 160 are braking modules (made by Binder) with their own bearings, flange and shaft extension. The dimensions of the flange and shaft extension of the braking module are identical with those of the motor. If a motor is to be equipped with a brake, the motor is supplied with a flange type of construction and with a plain shaft (without featherkey). The shaft of the braking module is then hot-shrunk onto the motor shaft. It can be removed again by means of an oil interference fit. The braking module is then screwed onto the motor flange. The shaft extension at the braking module is fitted with a featherkey (with half-key balancing).

Output is then possible by means of a coupling or belt pulley. The permissible lateral forces are indicated in the corresponding lateral-force diagrams.

The 1PH7 (frame sizes 100 and 132) motors can be supplied with an IM B 5 type of construction. In addition, frame sizes 100, 132 and 160 motors can be supplied with an IM B 35 type of construction (installation with IM B 3 foot mounting is therefore possible).

As an option, a manual release can be fitted to the brake module so that, in the event of power failure or motor stoppage, the brake can be released by hand. If the manual-release lever is released, it automatically returns to the braking-mode position. Another option is a built-on microswitch which can be incorporated in a higher-level control unit as an NC contact or an NO contact. The microswitch is connected by means of a separate cable.

The braking module complies with degree of protection IP 55. Motors with a built-on braking module are only available with vibration severity grade N and with shaft and flange accuracy N.

All the technical data such as holding torque, maximum braking energy, permissible speeds, lateral forces and braking currents are given in the table on page 4/6. The dimensions are shown in the dimension drawings in Chapter 8.

Ordering example:
1PH7 137–2HF0**2–3K**B3
type of construction IM B 5, holding brake with manual release (for further ordering possibilities, see order number code on page 4/6).

Built-on holding brake for 1PH7 motors frame sizes 180 and 225

With these motors, the brake (made by Stromag) is mounted on the drive-end bearing shield. To do this, the motor shaft is extended by means of a shrunk-on shaft extension. The torque is transmitted by means of a featherkey to DIN 6885/1. The shaft extension can be additionally secured axially by a pressure washer and a central screw (M 20). The holding brake does not have its own bearings. The output forces are therefore absorbed by the motor bearings. Belt pulleys cannot be fitted for reasons of space and because of the high lateral forces. When a coupling is being selected for connection to the brake-motor combination, it should be noted that the diameter of the shaft extension is now larger than the diameter of the motor shaft extension. Use of REVOLEX 2LF6337 pin couplings is preferred for size 180 and 2LF6338 for size 225.

For ordering data and dimensions see Catalog M 11. The exact motor dimensions are given in the dimension drawings in Chapter 8.

Built-on holding brakes for 1PH7 motors (continued)

Technical data of the built-on holding brakes with emergency-stop function (brake supply voltage 230 V AC, 50 ... 60 Hz/24 V DC)

Size	Motor type	Brake type	Holding torque (tolerance ±20 %)	Speed $n_{max.}$	Permissible power on energy W_E	Lifetime switching energy $W_{max.}$	Number of emergency stops until change of lining from $n_{max.}$ at J		Coil current AC	Coil current DC	Flange dimension DIN 42 948	Shaft extension dimension DIN 748 Ø	Shaft extension dimension DIN 748 length	Permissible lateral force (3000 rpm, $x_{max.}$)	Moment of inertia of the brake	Weight of the brake	Opening time	Closing time
			Nm	rpm	kJ	MJ	z	kgm²	A	A		mm	mm	N	kgm²	kg	ms	ms
For 1PH7 brake supply voltage 230 V AC, 50 ... 60 Hz																		
100	**1PH710 .**	**Size 19**	60 ... 150	5500	25	90	8700	0.062	1.0	4.7	A250	38	80	2300	0.005	21	255	60
132	**1PH713 .**	**Size 24**	140 ... 310	4500	40	226	9400	0.208	1.3	6.3	A350	42	110	2000	0.015	46	330	95
160	**1PH716 .**	**Size 29**	280 ... 500	3700	60	401	11900	0.448	1.35	6.7	A400	55	110	6800	0.028	66	350	450
180	**1PH7184** **1PH7186**	**NFE 60** **NFE 60/80**	600 800	3500	69 91	154 56	2230 620	1.02 1.36	0.9	–	–	90	90	2800	0.027 0.026	55	400	160
225	**1PH7224** **1PH7226** **1PH7228**	**NFE 100** **NFE 100** **NFE 100/140**	1000 1000 1400	3100	158 206 248	153 109 32	970 530 130	3.0 3.9 4.7	1.3	–	–	100	100	2800	0.041 0.041 0.041	75	460	200

Holding torque in Nm: In the case of frame sizes 100 to 160 motors, the holding torque can be varied infinitely within the specified range of values by means of an adjusting ring. The dynamic braking torque is approximately 0.7 to 0.8 x the holding torque.
Speed n_{max}: Maximum permissible speed at which emergency stops are possible.

Permissible power-on energy W_E in kJ: Permissible switching energy in the event of an emergency stop, $W_E = J_{tot.} \times n^2/182.5 \times 10^{-3}$ (J in kgm², n in rpm).
Lifetime switching energy $W_{max.}$ in MJ: The maximum possible power-on energy of the brake (in the case of emergency stop) until the brake linings have to be renewed, $W_{max.} = W_E \times z$.

Number of emergency stops z: The specified number of emergency stops relates to the following conditions: braking from speed $n_{max.}$, $J_{tot.} = 2 \times J_{mot.}$ In the event of other conditions, it is possible to calculate as follows: number of emergency stops $z = W_{max}/W_E$.
Coil current in A: Current for keeping the brake in a released position. For the NFE brakes, the following applies: Release current = 2 × holding current.

Permissible lateral force in N: In the case of frame sizes 100 to 160 motors, coupling and pulley output is possible. In the case of frame sizes 180 and 225, only coupling output is permissible.
Opening time in ms: Time until the brake opens (specified values related to max. braking torque).
Closing time in ms: Time until the brake closes (specified values related to max. braking torque).

Order No. code for 1PH7 motors, frame sizes 100, 132 and 160 for built-on holding brake with emergency-stop function

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1PH7 . . . – . . . . . – □ K . .

Without brake	**0**
Brake supply voltage: 230 V AC, 50 – 60 Hz	
With brake (brake supply voltage: 230 V AC, 50 – 60 Hz)	**1**
With brake (brake with microswitch)	**2**
With brake (brake with manual release)	**3**
With brake (brake with microswitch and manual release)	**4**
Brake supply voltage: 24 V DC	
With brake (brake supply voltage: 24 V DC)	**5**
With brake (brake with microswitch)	**6**
With brake (brake with manual release)	**7**
With brake (brake with microswitch and manual release)	**8**

Versions with brake are only available in the following combinations:
- Vibration severity grade N, shaft and flange accuracy N ("**K**" at the 14th digit)
- Shaft extension on the braking module with featherkey and semi-wedge balancing ("**A**" or "**B**" at 15th digit) or plain shaft extension ("**J**" or "**K**" at 15th digit)
- Type of construction IM B 5 (only for sizes 100 and 132, "**2**" at the 12th digit) or IM B 35 ("**3**" at the 12th digit, installation with IM B 3 foot mounting possible)
- and "**0**", "**3**" or "**6**" at the 16th digit.

Order No. code for 1PH7 motors, frame sizes 180 and 225 for built-on holding brake with emergency-stop function

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1PH7 . . . – . . . . 0 – □ AA .

Without brake	**0**
With brake (brake with microswitch and emergency release screw)	**2**
With brake (brake with microswitch and manual release)	**4**

Versions 2 and 4 are only available with type of construction IM B 3, i.e.:
- only "**0**" at 12th digit
- only "**A**" at 14th digit
- only "**A**" at 15th digit
- and only "**0**", "**3**" or "**6**" possible at 16th digit.

Planetary gears, LP series (from alpha)

Plantary gear unit, LP series

1FK6 and 1FK7 servomotors 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, the additional dynamic loading must be taken into account (see configuration aids). 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 featherkey.

Technical features of the planetary gear units

- High efficiency (>94 %)
- Power transmission from the central sun gear to the planetary gears
- Torque play:
  single-stage <12 arc min.
- No shaft deflections in the planetary gear set due to the symmetrical force distribution
- The enclosed gear units are attached to the shaft by means of an integral clamping hub. This requires a smooth motor shaft extension with rotational accuracy tolerance N according to DIN 42 955. 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 (guide value for service life ca. 20,000 h).
- Degree of protection 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 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 duty). Continuous operation (S1 duty) is permissible at the rated speed and rated torque of the gear unit. The gear unit temperature must not exceed +90 °C. The torsional 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.

The three-phase servomotors 1FK6 032 to 1FK6 103 and 1FK7 022 to 1FK7 103 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

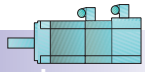
Service Gewerbegebiet Harthausen

Address:
Postfach 1163
D-97997 Igersheim

Walter-Wittenstein-Str. 1
D-97999 Igersheim

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

Internet: http://
www.alphagetriebe.de



Planetary gears, LP series (from alpha)

Order data: **1FK□□□□-□A□71-1□□□-Z V□□**

Order No. of the motor (standard type) with identifier **"-Z"** and short code for mounting the planetary gear assigned to the motor

G	Smooth shaft, without holding brake
H	Smooth shaft, with holding brake

Smooth motor shaft end is prerequisite for LP gear mounting.

Servomotor Self-cooled	**Planetary gear Single-stage** Torsional play ≤ 12 arc min		**Transmission ratios available *i* =**		Max. permissible input speed [1]	Max. permissible output torque [1]		Max. permissible drive shaft load [2]	Moment of inertia of the gears
Type 1FK6… 1FK7…	Type	Weight of the gears approx. kg	5	10	n_{G1} rpm	M_{G2} i = 5 Nm	M_{G2} i = 10 Nm	F_r N	J_G i = 5/10 10^{-4} kgm^2
022	LP 050-M01	0.77	■	■	6000	11.5	10.5	650	0.059
032	LP 070-M01	1.9	■	■	6000	32	29	1450	0.28
033			■	■					
040	LP 090-M01	4.1	■	■	6000	80	72	2400	1.77
042			■	■					
043			■	■					
044			■	■					
060	LP 120-M01	9	■	■	4800	200	180	4600	5.42
061			■	■					
063			■	■					
064			■	■					
080	LP 155-M01	17.5	■	■	4800	400	320	7500	25.73
082			■	■					
083			■	■					
085			■	■					
100			■						
101			■						
103			■						
Short code • For gear shaft **with** featherkey			**V40**	**V42**					

Continuous operation S1

Continuous operation is permissible in the case of rated speed and rated torque.

The gears should not exceed a temperature of +90 °C.

Planetary gear Single-stage Torque play ≤ 12 arc min	Rated speed	Max. permissible output torque	
Type	n_{rated1} rpm	M_{rated2} at i = 5 Nm	M_{rated2} at i = 10 Nm
LP 050-M01	4000	5.7	5.2
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.

Planetary gears, SPG series (from alpha)

1FT6 three-phase servomotors with built-on planetary gear unit

1FT6 three-phase servomotors can be combined with planetary gear units 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, the additional dynamic loading must be taken into account (see configuration aids). 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 (> 97 % single-stage, > 94 % two-stage)
- Power transmission from the central sun gear to the 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 smooth motor shaft extension with rotational accuracy tolerance N according to DIN 42 955. 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 for the IM B 5 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.
- Degree of protection 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 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 duty). For applications involving continuous operation at high speed, please contact the gear unit manufacturer.

The three-phase servomotors 1FT6 024 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
Address:
Postfach 1163
D-97997 Igersheim
Walter-Wittenstein-Str. 1
D-97999 Igersheim
Phone: +49(0)7931-493-0
Fax: +49(0)7931-493-200
Internet: http://www.alphagetriebe.de

Planetary gears, SPG series (from alpha)

Order data: **1FT6□□□-□A□7□-□□□□-Z V□□** Order No. of the motor (standard type) with identifier **"-Z"** and short code for mounting the planetary gear assigned to the motor

Servomotor Non-ventilated	**Planetary gear Single-stage** Torsional play [1] ≤ 4 arc min		**Transmission ratios available** ***i*** **=**				Max. permissible input speed	Max. permissible output torque	Max. permissible drive shaft load [2]	Moment of inertia of the gears	
Type	Type	Weight of the gears approx. kg	4	5	7	10	n_{G1} rpm	M_{G2} Nm	F_r N	J_G i = 4 10^{-4} kgm^2	J_G i = 10 10^{-4} kgm^2
1FT6 024	SPG 060-MF1	1.5	■	■	■	■	6000	40 (32 for i = 10)	2600	0.17	0.15
1FT6 031			■	■	■	■					
1FT6 034			■	■	■						
1FT6 034	SPG 075-MF1	2.8				■	6000	100 (80 for i = 10)	3800	0.57	0.4
1FT6 041			■	■	■	■				0.63	0.46
1FT6 044			■	■	■						
1FT6 044	SPG 100-MF1	6.2				■	4500	250 (200 for i = 10)	6000	2	1.3
1FT6 061			■	■	■	■				2.7	2
1FT6 062			■	■	■	■					
1FT6 064			■	■	■	■					
1FT6 081	SPG 140-MF1	11.5	■	■	■	■	4000	500 (400 for i = 10)	9000	8.4	6.2
1FT6 082			■	■	■	■					
1FT6 084			■	■	■	■					
1FT6 086			■	■	■						
1FT6 086	SPG 180-MF1	27				■	3500	1100 (880 for i = 10)	14000	30.6	17.4
1FT6 102			■	■	■	■				31.7	18.5
1FT6 105			■	■	■						
1FT6 108			■	■	■						
1FT6 105	SPG 210-MF1	53				■	2500	1900 (1520 for i = 10)	18000	75.8	47.1
1FT6 108						■					
1FT6 132			■	■	■						
1FT6 134			■	■	■						
1FT6 136			■	■	■						
1FT6 132	SPG 240-MF1	80				■	2200	2720	27000	146.3	83.1
1FT6 134						■					
1FT6 136						■					

Short code				
• For gear shaft **with** featherkey	**V02**	**V03**	**V05**	**V09**
• For gear shaft **without** featherkey	**V22**	**V23**	**V25**	**V29**

1) With SPG 060 and SPG 075: ≤ 6 arc min.

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.

Planetary gears, SPG series (from alpha)

Order data: **1FT6□□□-□A□7□-□□□□-Z V□□** Order No. of the motor (standard type) with identifier **"-Z"** and short code for mounting the planetary gear assigned to the motor

Servomotor Non-ventilated	**Planetary gear 2-stage** Torsional play [1] ≤ 6 arc min		**Transmission ratios available** i =					Max. permissible input speed	Max. permissible output torque	Max. permissible drive shaft load [2]	Moment of inertia of the gears
Type	Type	Weight of the gears approx. kg	16	20	28	40	50	n_{G1} rpm	M_{G2} Nm	F_r N	J_G i = 20 10^{-4} kgm^2
1FT6 024	SPG 075-MF2	3.1	■	■	■	■	■	6000	100	3800	0.52
1FT6 031			■	■	■	■	■				
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			■	■							

Short code					
• For gear shaft **with** featherkey	**V12**	**V13**	**V15**	**V16**	**V17**
• For gear shaft **without** featherkey	**V32**	**V33**	**V35**	**V36**	**V37**

1) With SPG 060 and SPG 075: ≤ 8 arc min.

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 075 to SPG 180.
$F_a = F_r$ with SPG 210 and SPG 240.

2-gear units (from ZF)

Sectional view of a planetary gear unit

Gear units increase the drive torque at low motor speeds and expand the band of constant power output available from the asynchronous servomotors.

Technical features of the 2-gear units

- Drive power up to 100 kW
- Constant power band at drive shaft up to 1:24
- Bi-directional
- Motor frame sizes SH 100 to SH 225
- Types IM B 35 and IM V 15 (IM V 36 on request)
- 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-gear units have a planetary design. The central sun gear distributes the power to several planetary wheels which revolve around it. The outstanding advantage of this design is its compactness. The gear-changing device, a foothed 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 three-phase motor must be suitably prepared for mounting.

At shaft heights of 160 and above, the type IM B 35 and IM V 15 motor has to be supported at the ND-end end to prevent distortion.

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

The motor 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 V 15 and IM V 36 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 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 60 034-14 (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 flanged planetary gear units. The motor gear unit is function-tested. The entire drive unit, i.e. 1PH7 or 1PH4 motor with built-on ZF gear unit, can be ordered direct from Siemens:

Siemens AG
Industrial Solutions and Services
Contact partner:
Mr. Britz
Im Schiffelland 10
D-66386 St. Ingbert
Fax:
+49(0)6894-891-112
E-mail:
hans-peter.britz
@siemens.com

When ordering, the following must be quoted:

Ordering example for 1PH4 motor:

Motor complete with gear
1PH4 133-4NF56-Z
K00
2LG4 315-3FD11

Ordering example for 1PH7 motor:

Motor complete with gear
1PH7 186-2NF03-0BC2
2LG4 260-1JD21

1) Not included in the scope of supply.

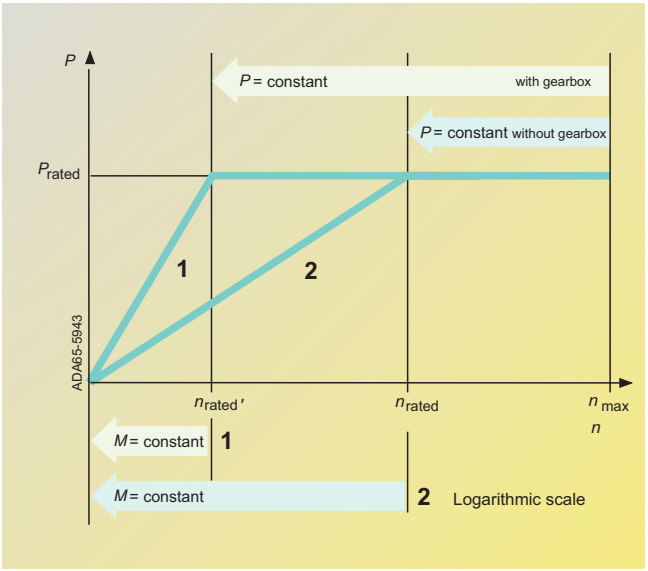
2-gear units (from ZF)

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.
			Input	Input	Output		Input	Output		Output	Output	
			n_{max}		$i_2 = 1$	$i_1 = 4$		$i_2 = 1$	$i_1 = 4$	$i_2 = 1$	$i_1 = 4$	
			rpm	Nm	Nm	Nm	Nm	Nm	Nm	J kgm^2	J kgm^2	kg
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 request									

For further 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 three-phase motor and gear unit).

In the case of motor 1PH4 168 or 1PH7 167-2.B, for example, the rated torque must be reduced to 300 Nm. In the case of the 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.



Speed/power graph

Legend:

n_{rated}	Rated speed
n_{rated}'	Rated speed with 2-stage gear unit
n_{max}	Max. perm. speed
P_{rated}	Rated speed and constant power of the motor in the speed range from n_{rated} to n_{max} or n_{rated}' to n_{max}
M	Torque

Type for complete unit	Gear output shaft dimension D_2 (see Chapt. 8)	**2-stage gear unit (standard version)** [1] Gear stage $i_1 = 4$	
	mm	Order No.	ZF designation
For 1PH7 10. / 1PH4 10. motors			
IM B 5/B 35/V 1/V 15	100	**2LG4 312-3CC31**	2K 120
For 1PH7 13. / 1PH4 13. motors			
IM B 5/B 35	118	**2LG4 315-3FD11**	2K 250
IM V 1/V 15	118	**2LG4 315-3FC11**	2K 250
For 1PH7 16. / 1PH4 16. motors			
IM B 35	130	**2LG4 320-3JD11**	2K 300
IM V 15	130	**2LG4 320-3JC11**	2K 300
For 1PH7 184 motors			
IM B 35	180	**2LG4 250-1JD11**	2K 800
IM V 15	180	**2LG4 250-1JC11**	2K 800
For 1PH7 186 motors			
IM B 35	180	**2LG4 260-1JD21**	2K 801
IM V 15	180	**2LG4 260-1JC21**	2K 801

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

ZF Maschinenantriebe GmbH

D-88038 Friedrichshafen

Phone:
+49(0)7541-77-0

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

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

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).

4

Servomotors
Connecting Systems

Cables
MOTION-CONNECT® 500 and 800

5/2 • Technical characteristics and application, technical data

5/3 • Connection overview SIMOVERT MASTERDRIVES Motion Control and Vector Control

5/4 • Power cables for 1FK., 1FT6, 1FS6, 1PH., 1PL6

Encoder cables

5/6 • for connection to motors with an incremental encoder HTL

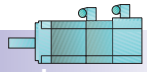
5/7 • for connection to motors with a resolver

5/8 • for connection to motors with a sin/cos incremental encoder 1 V_{pp}

5/9 • for connection to motors with an absolute-value encoder (EnDat)

5

Cables
MOTION-CONNECT 500 and 800


Synchro-nous Servomotors


Asynchro-nous Servomotors

Technical characteristics and application

The 6FX5 and 6FX8 cables are suitable for use in the widest variety of production and processing machines.

The cables are universally applicable. They are:

- capable of withstanding mechanical and chemical loads,
- CFC-free and silicone-free,
- EMC-tested, and
- have UL approval.

They meet high demands and feature:

- high bending cycles in the case of small bending radii,
- resistance to aggressive media,
- environment-compatibility (CFC-free, silicone-free and halogen-free),
- a high contribution to electromagnetic compatibility.

The cables can be supplied in specific lengths and as preassembled cables (with connectors).

The preassembled cables have the following advantages:

- The exact length can be ordered to the meter.
- They are subject to extensive tests, thus ensuring outstanding quality.
- They are safe and reliable as they are optimally matched to the components which have to be connected.
- The savings in logistics, construction and purchasing reduce overall costs.

The 6FX. cables, prefabricated and sold by the meter are described in detail in Catalog NC Z.

Technical data

		MOTION-CONNECT 500 Type 6FX5008– . . . . . –	MOTION-CONNECT 800 Type 6FX8008– . . . . . – . . . .
Certifications			
Power/signal cables	• VDE [1] • c/UL or UL/CSA • UL-CSA File No. [2]	yes 758/C22.2 N.210.2–M9C yes	yes 758/C22.2 N.210.2–M9C yes
Electrical data acc. to DIN VDE 0472			
Rated voltage	• power cable U_0/U – supply cores – signal cores • signal cable	 600/1000 V 24 V (VDE) 1000 V (UL) 30 V	 600/1000 V 24 V (VDE) 1000 V (UL/CSA) 30 V
Test voltage	• power cable – supply cores – signal cores • signal cable	 2 kV_{eff} 1 kV_{eff} 500 V_{eff}	 4 kV_{eff} 2 kV_{eff} 500 V_{eff}
Operating temperature			
on the surface	• fixed cable • moving cable	–20 °C to +80 °C 0 °C to +60 °C	–50 °C to +80 °C –20 °C to +60 °C
Mechanical data			
Max. tensile stress Power/signal cables	• fixed cable • moving cable	50 N/mm² –	50 N/mm² 20 N/mm²
Smallest permissible bending radius	• fixed cable (power cable) • fixed cable (signal cable) • moving cable (power cable) • moving cable (signal cable)	5 x D_{max} 60 mm see Catalog NC Z 180 mm	6 x D_{max} 60 mm see Catalog NC Z 100 mm
Torsional stress 30°/m absolute/bends	• 1.5 to 6 mm² + signal 10 to 185 mm²	100000 100000	10 Mio. 3 Mio.
Traverse rate	• 1.5 to 6 mm² + signal 10 to 185 mm²	30 m/min 30 m/min	180 m/min 100 m/min
Acceleration		2 m/s²	5 m/s²
Chemical data			
Insulation material		CFC-free, silicone-free	halogen-free, CFC-free, silicone-free DIN 47 2815 / IEC 60 754-1
Oil resistance		VDE 0472, part 803 type of test B (only hydraulic oil)	VDE 0472, part 803 type of test B
Outer sheath	• power cable	PVC color DESINA: orange RAL 2003	PUR DIN VDE 0282, part 10 color DESINA: orange RAL 2003
	• signal cable	PVC color DESINA: green RAL 6018	PUR DIN VDE 0282, part 10 color DESINA: green RAL 6018
Flame resistant		IEC 60 332.1	IEC 60 332.1

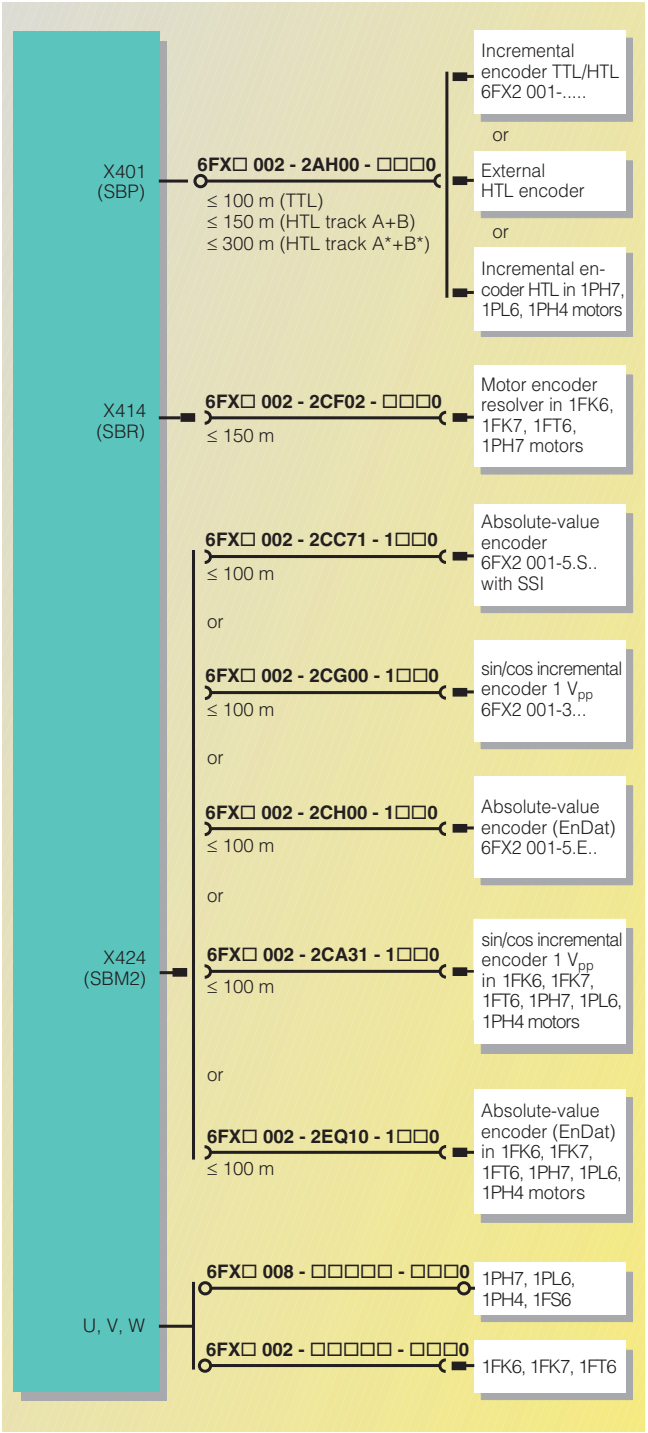
The cables are not suitable for exposure to outdoor use.
The technical data of these cables only apply to single bends with horizontal travel of up to five meters.
Degree of protection for the customized power and signal cables and their extension cables **when closed and plugged: IP 67**

1) The corresponding registration numbers are printed on the cable sheath.

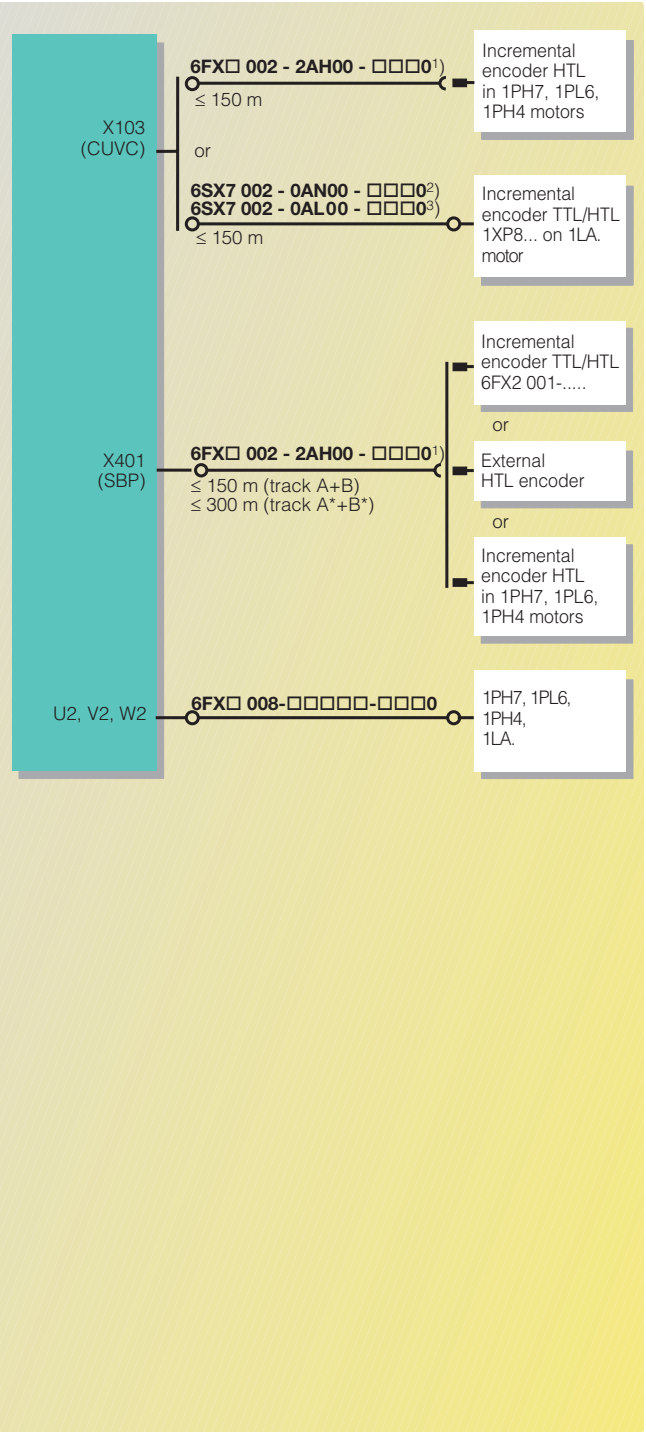
2) The file no. of the respective manufacturers are printed on the cable sheath.

Connection overview SIMOVERT MASTERDRIVES Motion Control and Vector Control

SIMOVERT MASTERDRIVES Motion Control



SIMOVERT MASTERDRIVES Vector Control



1) Max. 150 m for HTL, supplementy board DTI essential for:
– TTL encoders
– requested electrical isolation
– length > 150 m.

2) Track A, B, N and A*, B*, N*.

3) Track A, B.

Power cables for 1FK., 1FT6, 1FS6, 1PH., 1PL6

6FX☐ 002–5CA . . without braking cable, with shield

	Connector size	Prefabricated cables	D_{max}		Cable by the meter	Weight [1]		Smallest permissible bending radius	
			6FX8	6FX5		6FX8	6FX5	6FX8	6FX5
mm^2		Order No.	mm	mm	Order No.	kg/m	kg/m	mm	mm
4 x 1.5	1	**6FX☐002–5CA01–☐☐☐0**	10.4	10.1	**6FX☐008–1BB11–☐☐A0**	0.16	0.18	100	185
	1.5	**6FX☐002–5CA21–☐☐☐0**							
4 x 2.5	1	**6FX☐002–5CA11–☐☐☐0**	12.1	11.5	**6FX☐008–1BB21–☐☐A0**	0.24	0.24	120	210
	1.5	**6FX☐002–5CA31–☐☐☐0**							
4 x 4	1.5	**6FX☐002–5CA41–☐☐☐0**	13.2	13.3	**6FX☐008–1BB31–☐☐A0**	0.31	0.32	130	240
4 x 6	1.5	**6FX☐002–5CA51–☐☐☐0**	16	15.6	**6FX☐008–1BB41–☐☐A0**	0.43	0.46	170	285
4 x 10	3	**6FX☐002–5CA13–☐☐☐0**	19.4	20.0	**6FX☐008–1BB51–☐☐A0**	0.63	0.73	210	360
	1.5	**6FX☐002–5CA61–☐☐☐0**							
4 x 16	3	**6FX☐002–5CA23–☐☐☐0**	23.6	24.2	**6FX☐008–1BB61–☐☐A0**	0.95	1.1	260	440
4 x 25	–	–	–	28.0	**6FX 5 008–1BB25–☐☐A0**	–	1.42	–	505
4 x 35	–	–	–	31.5	**6FX 5 008–1BB35–☐☐A0**	–	1.87	–	570
4 x 50	–	–	–	38.0	**6FX 5 008–1BB50–☐☐A0** [2]	–	3.42	–	685
4 x 70	–	–	–	42.6	**6FX 5 008–1BB70–☐☐A0** [2]	–	4.12	–	770
4 x 95	–	–	–	51.7	**6FX 5 008–1BB05–☐☐A0** [2]	–	4.78	–	935
4 x 120	–	–	–	56.0	**6FX 5 008–1BB12–☐☐A0** [2]	–	6.11	–	1010
4 x 150	–	–	–	63.0	**6FX 5 008–1BB15–☐☐A0** [2]	–	7.75	–	1135
4 x 185	–	–	–	66.2	**6FX 5 008–1BB18–☐☐A0** [2]	–	9.45	–	1195

6FX☐ 008–1BB . . without braking cable, with shield

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

1	0 m	**A**	0 m	**A**	0 m
2	100 m	**B**	10 m	**B**	1 m
3	200 m	**C**	20 m	**C**	2 m
		D	30 m	**D**	3 m
		E	40 m	**E**	4 m
		F	50 m	**F**	5 m
		G	60 m	**G**	6 m
		H	70 m	**H**	7 m
		J	80 m	**J**	8 m
		K	90 m	**K**	9 m

Length code

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

1	**B**	10 m	Rings (25, 35, 50 mm^2)
1	**F**	50 m	Rings (for deviations see table)
2	**A**	100 m	Rings (for deviations see table)
3	**A**	200 m	Disposable drum (not for cables > 10 mm^2)
6	**A**	500 m	Disposable drum (not for cables > 10 mm^2)

Form of delivery

Example:

1 m: . . .	–	1	A	B	0
8 m: . . .	–	1	A	J	0
17 m: . . .	–	1	B	H	0
59 m: . . .	–	1	F	K	0
111 m: . . .	–	2	B	B	0
262 m: . . .	–	3	G	C	0

Deviations from form of delivery

6FX . 008–	50 m (–1FA0)	100 m (–2AA0)
–1BA25	Disposable drum	Disposable drum
–1BA35	Disposable drum	Disposable drum
–1BA50	Disposable drum	Disposable drum
–1BA51/–1BB51		Disposable drum
–1BA61/–1BB61		Disposable drum

The cross-sections 25, 35 and 50 mm^2 can also be ordered and delivered to the meter from 10 m to 49 m (according to the length code of the prefabricated cables) and in 10 m rings.

Current carrying capacity I_z of PVC-insulated copper conductors acc. to IEC 60 204-1: 1997 ++ Corrigendum 1998 · Correction factor

Cross-section mm^2	Current carrying capacity I_z with installation type C A
0.75	–
1.0	11.7
1.5	15.2
2.5	21
4	28
6	36
10	50
16	66
25	84
35	104
50	123
70	155
95	192
120	221

Ambient air temperature °C	Correction factor
30	1.15
35	1.08
40	1.00
45	0.91
50	0.82
55	0.71
60	0.58

Note:
The correction factors are taken from IEC 60 364-5-523, table 52-D1.

1) Weight of cables sold by the meter excluding connector.

2) For a cable cross-section ≥ 50 mm^2 and a cable length of 50 m, 100 m and 200 m, the form of delivery is on drums.

Power cables for 1FK., 1FT6, 1FS6, 1PH., 1PL6

6FX☐ 002–5DA . .
with braking cable, with shield

6FX☐ 008–1BA . .
with braking cable, with shield

	Con-nector size	Prefabricated cables	D_{max}		Cable by the meter	Weight [1]		Smallest per-missible bend-ing radius	
			6FX8	6FX5		6FX8	6FX5	6FX8	6FX5
mm^2		Order No.	mm	mm	Order No.	kg/m	kg/m	mm	mm
4 x 1.5 + 2 x 1.5	1	**6FX ☐002–5DA01–☐ ☐ ☐0**	12.9	13.1	**6FX ☐008–1BA11–☐ ☐A0**	0.25	0.22	125	240
	1.5	**6FX ☐002–5DA21–☐ ☐ ☐0**							
4 x 2.5 + 2 x 1.5	1	**6FX ☐002–5DA11–☐ ☐ ☐0**	14.2	14.2	**6FX ☐008–1BA21–☐ ☐A0**	0.31	0.28	140	260
	1.5	**6FX ☐002–5DA31–☐ ☐ ☐0**							
4 x 4 + 2 x 1.5	1.5	**6FX ☐002–5DA41–☐ ☐ ☐0**	15.3	15.9	**6FX ☐008–1BA31–☐ ☐A0**	0.40	0.36	150	290
4 x 6 + 2 x 1.5	1.5	**6FX ☐002–5DA51–☐ ☐ ☐0**	17.8	16.9	**6FX ☐008–1BA41–☐ ☐A0**	0.53	0.54	195	305
4 x 10 + 2 x 1.5	3	**6FX ☐002–5DA13–☐ ☐ ☐0**	20.8	21.7	**6FX ☐008–1BA51–☐ ☐A0**	0.74	0.75	230	395
	1.5	**6FX ☐002–5DA61–☐ ☐ ☐0**							
4 x 16 + 2 x 1.5	3	**6FX ☐002–5DA23–☐ ☐ ☐0**	24.7	24.2	**6FX ☐008–1BA61–☐ ☐A0**	1.10	1.10	275	440
4 x 25 + 2 x 1.5	3	**6FX ☐002–5DA33–☐ ☐ ☐0**	27.9	29.4	**6FX ☐008–1BA25–☐ ☐A0**	1.46	1.56	325	530
4 x 35 + 2 x 1.5	3	**6FX ☐002–5DA43–☐ ☐ ☐0**	32	32.6	**6FX ☐008–1BA35–☐ ☐A0**	2.10	2.01	380	590
4 x 50 + 2 x 1.5	3	**6FX ☐002–5DA53–☐ ☐ ☐0**	35.8	38.0	**6FX ☐008–1BA50–☐ ☐A0**	2.75	3.30	420	685

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

1	0 m	**A**	0 m	**A** 0 m
2	100 m	**B**	10 m	**B** 1 m
3	200 m	**C**	20 m	**C** 2 m
		D	30 m	**D** 3 m
		E	40 m	**E** 4 m
		F	50 m	**F** 5 m
		G	60 m	**G** 6 m
		H	70 m	**H** 7 m
		J	80 m	**J** 8 m
		K	90 m	**K** 9 m

Length code

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

1	**B**	10 m Rings (25, 35, 50 mm^2)
1	**F**	50 m Rings (for deviations see table)
2	**A**	100 m Rings (for deviations see table)
3	**A**	200 m Disposable drum (not for cables > 10 mm^2)
6	**A**	500 m Disposable drum (not for cables > 10 mm^2)

Form of delivery

Example:

1 m: . . .	–	1	A	B	0
8 m: . . .	–	1	A	J	0
17 m: . . .	–	1	B	H	0
59 m: . . .	–	1	F	K	0
111 m: . . .	–	2	B	B	0
262 m: . . .	–	3	G	C	0

Deviations from form of delivery

6FX . 008–	50 m (–1FA0)	100 m (–2AA0)
–1BA25	Disposable drum	Disposable drum
–1BA35	Disposable drum	Disposable drum
–1BA50	Disposable drum	Disposable drum
–1BA51/–1BB51		Disposable drum
–1BA61/–1BB61		Disposable drum

The cross-sections 25, 35 and 50 mm^2 can also be ordered and delivered to the meter from 10 m to 49 m (according to the length code of the prefabricated cables) and in 10 m rings.

1) Weight of cables sold by the meter excluding connector.

Encoder cables

Synchro-nous Servomotors | Asynchro-nous Servomotors

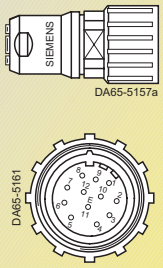
For connection to motors with an incremental encoder HTL (1024 p/r and 2048 p/r) [1]

Cable design and pin assignment

Base cable type 6FX . 002–2AH00– . . . .

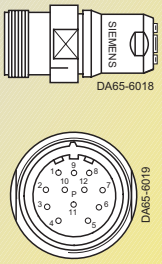
Converter side	Motion Control	Vector Control	Cable by the meter 6FX . 008–1BD21		Measurement system side
	PIN	PIN	Signal name	Signal name	PIN
Cable end cut off	71		*B	*B	1
	63	30	KTY84 +	KTY84 +	2
	72	26	ZERO TRACK	ZERO TRACK	3
	73		*ZERO TRACK	*ZERO TRACK	4
	68	24	A	A	5
	69		*A	*A	6
	74	27	CTRL TACHO	CTRL TACHO	7
	70	25	B	B	8
				free	9
	61	23	0 V	0 V	10
	62	29	KTY84 –	KTY84 –	11
	60	28	15 V	15 V	12
			Outer shield on plug housing		yes

Plug type: 6FX2 003–0CE12



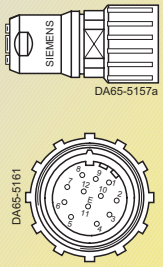
Cable extension type 6FX . 002–2AH04– . . . 0

Plug type: 6FX2 003–1CF12



PIN assignment of the cable extension corresponding to the base cable

Plug type: 6FX2 003–0CE12



5

Selection and ordering data

Cable	Order No.
Prefabricated cables	
Encoder cables for connection to motors with an incremental encoder HTL	**6FX ☐ 002–2AH00– ☐ ☐ ☐ 0**

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

1	0 m	**A**	0 m	**A**	0 m
2	100 m	**B**	10 m	**B**	1 m
3	200 m	**C**	20 m	**C**	2 m
4	300 m	**D**	30 m	**D**	3 m
		E	40 m	**E**	4 m
		F	50 m	**F**	5 m
		G	60 m	**G**	6 m
		H	70 m	**H**	7 m
		J	80 m	**J**	8 m
		K	90 m	**K**	9 m

Length code

Example:

1 m: . . .	–	1	A	B	0	59 m: . . .	–	1	F	K	0
8 m: . . .	–	1	A	J	0	111 m: . . .	–	2	B	B	0
17 m: . . .	–	1	B	H	0	262 m: . . .	–	3	G	C	0

Cable	Length m	Order No.
Cable, sold by the meter		
Encoder cables for connection to motors with an incremental encoder HTL No. of cores × cross-section [mm²] 4 x 2 x 0.34 + 4 x 0.5	50	**6FX ☐ 008–1BD21–1FA0**
	100	**6FX ☐ 008–1BD21–2AA0**
	200	**6FX ☐ 008–1BD21–3AA0**
	500	**6FX ☐ 008–1BD21–6AA0**

Outer diameter of cable for 6FX8: 9.3 mm **8**
Outer diameter of cable for 6FX5: 9.3 mm **5**

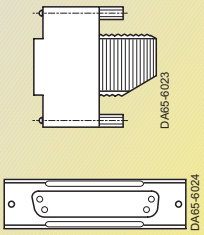
1) Cable length ≤ 150 m without transmission of the inverted signals and cable length 150 m to 300 m with transmission of the inverted signals and use of the DTI unit.

For connection to motors with a resolver 2-pole/multi-pole

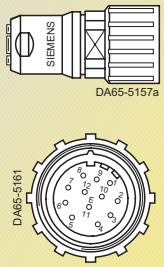
Cable design and pin assignment

Base cable type 6FX . 002–2CF02– . . . .

Converter side		Cable by the meter 6FX . 008–1BD41		Measurement system side
	PIN	Signal name	Signal name	PIN
Plug type: 6FC9 348–7HP00	3	SIN	SIN	1
	4	*SIN	*SIN	2
	5	Inner shield		3
	6	COS	COS	11
	7	*COS	*COS	12
	8	Inner shield		5
	13	+TEMP	+TEMP	8
	25	–TEMP	–TEMP	9
	24	Inner shield		4
	9	$+V_{pp}$	$+V_{pp}$	10
	11	$–V_{pp}$	$–V_{pp}$	7
	yes	Outer shield on plug housing		yes



Plug type: 6FX2 003–0CE12

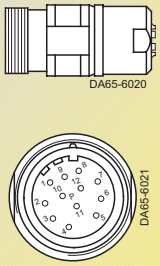


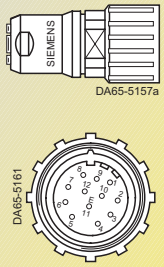
Cable extension type 6FX . 002–2CF04– . . . .

Plug type: 6FX2 003–1CF12

PIN assignment of the cable extension corresponding to the base cable

Plug type: 6FX2 003–0CE12





Selection and ordering data

Prefabricated cables (length < 150 m)

Cable	Order No.
Encoder cables for connection to motors which are fitted with a resolver (detection of rotor position and speed) prefabricated	**6FX ☐ 002–2CF02– ☐ ☐ ☐ 0**

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

1	0 m	**A**	0 m	**A**	0 m
2	100 m	**B**	10 m	**B**	1 m
		C	20 m	**C**	2 m
		D	30 m	**D**	3 m
		E	40 m	**E**	4 m
		F	50 m	**F**	5 m
		G	60 m	**G**	6 m
		H	70 m	**H**	7 m
		J	80 m	**J**	8 m
		K	90 m	**K**	9 m

Length code

Example:
1 m: . . . – 1 A B 0
8 m: . . . – 1 A J 0
17 m: . . . – 1 B H 0
59 m: . . . – 1 F K 0
111 m: . . . – 2 B B 0

Cable, sold by the meter [1])

Cable	Length m	Order No.
Encoder cables for connection to motors which are fitted with a resolver (detection of rotor position and speed) No. of cores × cross-section [mm²] 3 x 2 x 0.14 + 4 x 0.14 + 2 x 0.5	50	**6FX ☐ 008–1BD41–1FA0**
	100	**6FX ☐ 008–1BD41–2AA0**
	200	**6FX ☐ 008–1BD41–3AA0**
	500	**6FX ☐ 008–1BD41–6AA0**

Outer diameter of cable for 6FX8: 9.2 mm **8**
Outer diameter of cable for 6FX5: 9.3 mm **5**

1) Maximum permissible length of the prefabricated cables for the resolvers: 150 m.

Encoder cables

Synchro-nous Servomotors | Asynchro-nous Servomotors

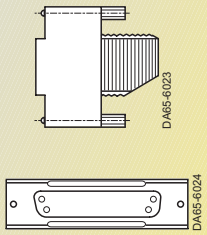
For connection to motors with a sin/cos incremental encoder 1 V_{pp}

Cable design and pin assignment

Base cable type 6FX . 002–2CA31– . . . . / 6FX . 002–2YS01– . . . .

Converter side		Cable by the meter 6FX . 008–1BD51		Measurement system side
PIN	Signal name		Signal name	PIN
3	A		Ua1	1
4	*A		*Ua1	2
5		Inner shield		17
6	B		Ua2	11
7	*B		*Ua2	12
8		Inner shield		17
17	R		Ua0	3
18	*R		*Ua0	13
24		Inner shield		17
19	C		Ua3	5
20	*C		*Ua3	6
21	D		Ua4	14
22	*D		*Ua4	4
13	+Temp		+Temp	8
25	–Temp		–Temp	9
1	P encoder		P encoder	10
14	5 V sense		5 V sense	16
2	M encoder		M encoder	7
16	0 V sense		0 V sense	15
yes		Outer shield on plug housing		yes

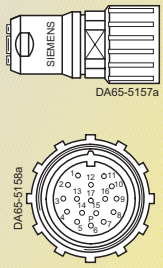
Plug type: 6FC9 348–7HP00



6FX . 002–2CA31– . . . .
Cable outlet at the bottom

6FX . 002–2YS01– . . . .
Cable outlet at the top

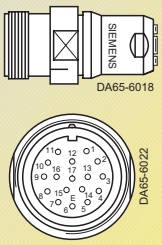
Plug type: 6FX2 003–0CE17



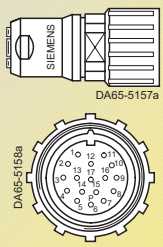
Cable extension type 6FX . 002–2CA34– . . . .

PIN assignment of the cable extension corresponding to the base cable

Plug type: 6FX2 003–1CF17



Plug type: 6FX2 003–0CE17



Selection and ordering data

Prefabricated cables (length < 100 m)

Encoder cables for connection to motors which are fitted with a sin/cos incremental encoder 1 V_{pp} (detection of rotor position and speed)

prefabricated **6FX ☐002–2CA31–☐☐☐0**

MOTION-CONNECT 800	8
MOTION-CONNECT 500	5

1	0 m	**A**	0 m	**A**	0 m
2	100 m	**B**	10 m	**B**	1 m
		C	20 m	**C**	2 m
		D	30 m	**D**	3 m
		E	40 m	**E**	4 m
		F	50 m	**F**	5 m
		G	60 m	**G**	6 m
		H	70 m	**H**	7 m
		J	80 m	**J**	8 m
		K	90 m	**K**	9 m

Length code

Example:

1 m: . . .	–	1	A	B	0	17 m: . . .	–	1	B	H	0
8 m: . . .	–	1	A	J	0	59 m: . . .	–	1	F	K	0

Cable	Length m	Order No.
Cable, sold by the meter [1]		
Encoder cables for connection to motors which are fitted with a sin/cos incremental encoder 1 V_{pp} (detection of rotor position and speed) No. of cores × cross-section [mm²] 3 x 2 x 0.14 + 4 x 0.14 + 2 x 0.5 + 4 x 0.23	50	**6FX ☐008–1BD51–1FA0**
	100	**6FX ☐008–1BD51–2AA0**
	200	**6FX ☐008–1BD51–3AA0**
	500	**6FX ☐008–1BD51–6AA0**

Outer diameter of cable for 6FX8: 9.9 mm	8
Outer diameter of cable for 6FX5: 9.9 mm	5

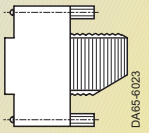
1) Maximum permissible length of the prefabricated cables for the sin/cos incremental encoder 1 V_{pp}: 100 m.

For connection to motors with an absolute-value encoder (EnDat)

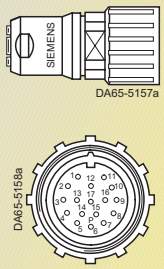
Cable design and pin assignment

Base cable type 6FX . 002–2EQ10– . . . .

Converter side		Cable by the meter 6FX . 008–1BD51		Measurement system side
	PIN	Signal name	Signal name	PIN
Plug type: 6FC9 348–7HP00	3	A	Ua1	1
	4	*A	*Ua1	2
	5	Inner shield		17
	6	B	Ua2	11
	7	*B	*Ua2	12
	8	Inner shield		17
	15	Data	Data	3
	23	*Data	*Data	13
	24	Inner shield		17
	10	Clock	Clock	5
	12	*Clock	*Clock	14
	13	+Temp	+Temp	8
	25	–Temp	–Temp	9
	1	P encoder	P encoder	10
	14			16
	14	5 V sense	5 V sense	16
	2	M encoder	M encoder	7
	16			15
	16	0 V sense	0 V sense	15
	yes	Outer shield on plug housing		yes

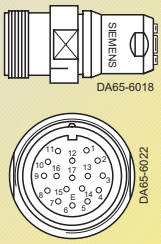


Plug type: 6FX2 003–0CE17



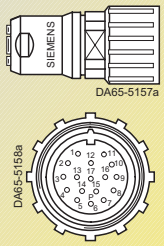
Cable extension type 6FX . 002–2EQ14– . . . .

Plug type: 6FX2 003–1CF17



PIN assignment of the cable extension corresponding to the base cable

Plug type: 6FX2 003–0CE17



Selection and ordering data

Cable	Order No.
Prefabricated cables (length < 100 m)	
Encoder cables for connection to motors which are fitted with an absolute-value encoder (EnDat) (detection of absolute position and speed)	
prefabricated	**6FX ☐002–2EQ10– ☐ ☐ ☐0**
MOTION-CONNECT 800	**8**
MOTION-CONNECT 500	**5**

1	0 m	**A**	0 m	**A**	0 m
2	100 m	**B**	10 m	**B**	1 m
		C	20 m	**C**	2 m
		D	30 m	**D**	3 m
		E	40 m	**E**	4 m
		F	50 m	**F**	5 m
		G	60 m	**G**	6 m
		H	70 m	**H**	7 m
		J	80 m	**J**	8 m
		K	90 m	**K**	9 m

Length code

Example: 1 m: . . . – 1 A B 0 | 17 m: . . . – 1 B H 0
8 m: . . . – 1 A J 0 | 59 m: . . . – 1 F K 0

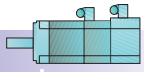
Cable	Length m	Order No.
Cable, sold by the meter [1])		
Encoder cables for connection to motors which are fitted with an absolute-value encoder (EnDat) (detection of absolute position and speed) No. of cores × cross-section [mm²] 3 x 2 x 0.14 + 4 x 0.14 + 2 x 0.5 + 4 x 0.23	50	**6FX ☐008–1BD51–1FA0**
	100	**6FX ☐008–1BD51–2AA0**
	200	**6FX ☐008–1BD51–3AA0**
	500	**6FX ☐008–1BD51–6AA0**
Outer diameter of cable for 6FX8: 9.9 mm		**8**
Outer diameter of cable for 6FX5: 9.9 mm		**5**

1) Maximum permissible length of the prefabricated cables for the absolute-value encoders (EnDat): 100 m.

Servomotors
Documentation

6/2 **Operating instructions**

Operating instructions



Synchro-nous Servomotors

Asynchro-nous Servomotors

Motor type	Language	Order No.	Edition
1FK603. to 1FK610.	German / English / French / Spanish / Italian / Swedish	**610.43430.21**	April 2002
1FK702. to 1FK710.	German / English / French / Spanish / Italian / Swedish	**610.40700.21**	April 2002
1FT602. to 1FT613.	German / English / French / Spanish / Italian / Swedish	**610.43410.21**	May 2002
1FS607. to 1FS613.	German / English	**610.40068.01**	January 2002
1PH710. to 1PH716.	German / English / French / Spanish / Italian / Swedish	**610.43429.21**	January 1997
1PH718. to 1PH722.	German / English / French Spanish / Italian / Swedish	**A1A 3435**	May 1998
1PL618. to 1PL622.	German / English / French Spanish / Italian / Swedish	**A1A 3438**	May 1997
1PH728. and 1PL628.	German / English / French Spanish / Italian	on request	
1PH410. to 1PH416.	German / English	**610.43093.02.b**	May 1998

Servomotors
Configuration Aids

Additional data for 1PH7 and 1PL6 motors

7/2 • Ventilation data and sound pressure level

7/2 • Bearing design/type of drive and maximum speeds

7/3 • Lateral-force diagrams

7/5 • Terminal box assignment, max. cable cross-sections

7/6 • Overview of possible types of construction

7

Additional data for 1PH7 and 1PL6 motors

Ventilation data and sound pressure levels

Size	Fan motor: Current and power consumption at						Air-flow-direction Standard	Sound pressure level LpA	Air-flow rate at	
	400 V/50 Hz (±10 %)		400 V/60 Hz (±10 %)		480 V/60 Hz (+5 %, –10 %)			Motor and separate fan Rated load, 50 Hz Tolerance + 3 dB (A)	50 Hz approx.	60 Hz approx.
	A	W	A	W	A	W		dB (A)	m^3/s	m^3/s
1PH7 motors										
100	0.13	37	0.08	35	0.13	51	ND-end → D-end	70	0.04	0.05
132	0.25	85	0.19	100	0.26	125	ND-end → D-end	70	0.1	0.13
160	0.24	135	0.31	200	0.30	230	ND-end → D-end	72	0.15	0.19
180	1.4	850	–	–	1.4	980	D-end → ND-end	75 (70) [3]	0.19	0.22
225	1.8	1000	–	–	2.4	1300	D-end → ND-end	76 (72) [3]	0.33	0.39
280	6.4	3000	–	–	on request		ND-end → D-end D-end → ND-end	74	0.45	on request
1PL6 motors										
180	1.7	900	–	–	2.1	1400	D-end → ND-end	75 [1]	0.27	0.32
225	2.1	1200	–	–	2.3	2100	D-end → ND-end	76 [1]	0.37	0.38
280	on request									

Bearing design/type of drive and maximum speeds

Size/ Motor type	Bearing design/ Type of drive	Type of bearings		Max. continuous speed in S1 operation		Max. limiting speed [4]		Max. permissible lateral force [2]
				n_{s1}	n_{s1} [5]	$n_{max.}$	$n_{max.}$ [5]	$F_{Qmax.}$
		Motor end	Bearing designation	rpm	rpm	rpm	rpm	N
100	Deep-groove ball bearings for coupling or belt output	D-end ND-end	6308 C4 6208 C4	5500	10000	9000	12000	2800
132	Deep-groove ball bearings for coupling or belt output	D-end ND-end	6310 C4 6210 C4	4500	8500	8000	10000	4000
160	Deep-groove ball bearings for coupling or belt output	D-end ND-end	6312 C4 6212 C4	3700	7000	6500	8000	8400
180	Deep-groove ball bearings for coupling output	D-end ND-end	6214 C3 6214 C3	3500	4500	5000	7000	4900
180	Cylindrical roller bearings for belt output	D-end ND-end	NU2 14E + 6214 C3 6214 C3	3500	–	5000	–	12800
180	Cylindrical roller bearings for increased lateral forces	D-end ND-end	NU22 14E + 6214 C3 6214 C3	3000	–	5000	–	16500
225	Deep-groove ball bearings for coupling output	D-end ND-end	6216 C3 6216 C3	3100	3600 (for 1PH7224)	4500	5500 (for 1PH7224)	5200
225	Cylindrical roller bearings for belt output	D-end ND-end	NU2 16E + 6216 C3 6216 C3	3100	–	4500	–	15000
Types 224, 226	Cylindrical roller bearings for increased lateral forces	D-end ND-end	NU22 16E + 6216 C3 6216 C3	2700	–	4500	–	20000
Type 228	Cylindrical roller bearings for increased lateral forces	D-end ND-end	NU22 16E + 6216 C3 6216 C3	2500	–	4000	–	20000
280	Deep-groove ball bearings for coupling output	D-end ND-end	6220 C3 6220 C3	–	–	3300	–	approx. 8700
280	Cylindrical roller bearings for belt output	D-end ND-end	NU22 OE 6220 C3	–	–	3300	–	approx. 26700

1) At speeds of 3000 to 5000 rpm, LpA rises to a max. of 85 dB (A).

2) Max. permissible lateral force when X = 50 shaft-extension length and n = 1000 rpm. For further values, see lateral-force diagrams.

3) Values are valid for a version with silencer (can also be mounted at a later time).

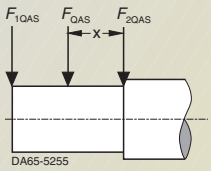
4) In disengage mode (with 30 % n_{max}, 60 % $^2/_3$ n_{max}, 10 % standstill) for a duration of 10 min.

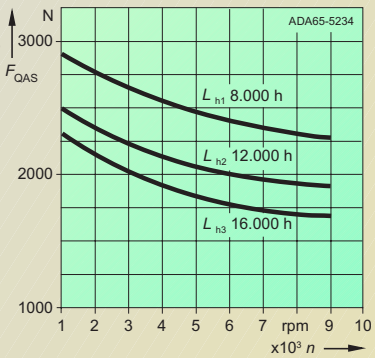
5) For version for increased maximum speed, see order option in chapter 3 (only for 1PH7).

Lateral-force diagrams

Permissible lateral forces for 1PH7 motors size 100

Bearings D-end: 6308 C4
ND-end: 6208 C4



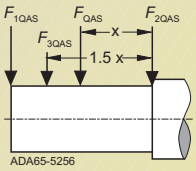


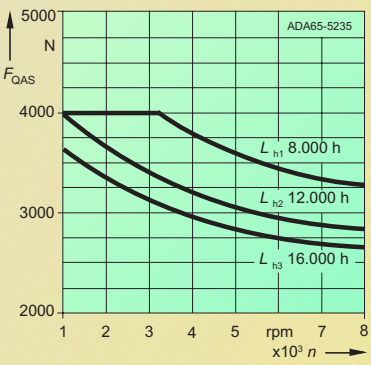
x = 40 mm
$F_{1QAS} = 0.9\ F_{QAS}$
$F_{2QAS} = 1.1\ F_{QAS}$
L_{h1}, L_{h2}, L_{h3} = Estimate of useful life under changing operating conditions (F_{QAS}; n)
q = Operating duration [%] under constant conditions

$$L_{htot} = \frac{100}{\frac{q_1}{L_{h1}} + \frac{q_2}{L_{h2}} + \frac{q_3}{L_{h3}}}$$

Permissible lateral forces for 1PH7 motors size 132

Bearings D-end: 6310 C4
ND-end: 6210 C4



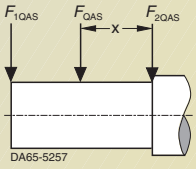


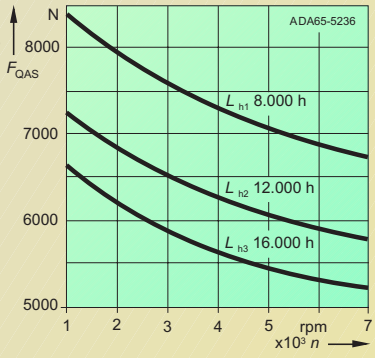
x = 55 mm
F_{1QAS} = max. 2000 N
$F_{2QAS} = 1.1\ F_{QAS}$
F_{3QAS} = max. 2500 N
L_{h1}, L_{h2}, L_{h3} = Estimate of useful life under changing operating conditions (F_{QAS}; n)
q = Operating duration [%] under constant conditions

$$L_{htot} = \frac{100}{\frac{q_1}{L_{h1}} + \frac{q_2}{L_{h2}} + \frac{q_3}{L_{h3}}}$$

Permissible lateral forces for 1PH7 motors size 160

Bearings D-end: 6312 C4
ND-end: 6212 C4



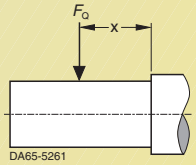


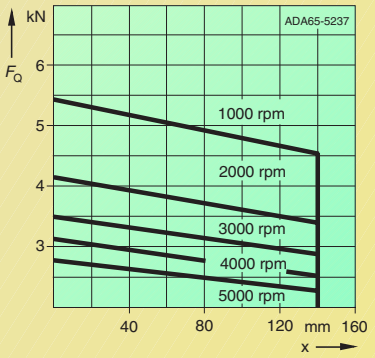
x = 55 mm
$F_{1QAS} = 0.9\ F_{QAS}$
$F_{2QAS} = 1.1\ F_{QAS}$
L_{h1}, L_{h2}, L_{h3} = Estimate of useful life under changing operating conditions (F_{QAS}; n)
q = Operating duration [%] under constant conditions

$$L_{htot} = \frac{100}{\frac{q_1}{L_{h1}} + \frac{q_2}{L_{h2}} + \frac{q_3}{L_{h3}}}$$

Permissible lateral forces for 1PH718. and 1PL618. motors size 180 for coupling output

Bearings D-end: 6214 C3
ND-end: 6214 C3

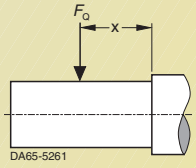


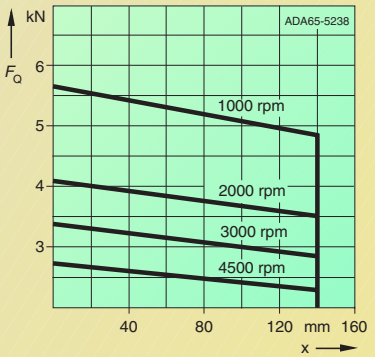


L_{h1} = 20 000 h

Permissible lateral forces for 1PH722. and 1PL622. motors size 225 for coupling output

Bearings D-end: 6216 C3
ND-end: 6216 C3

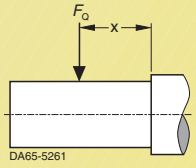




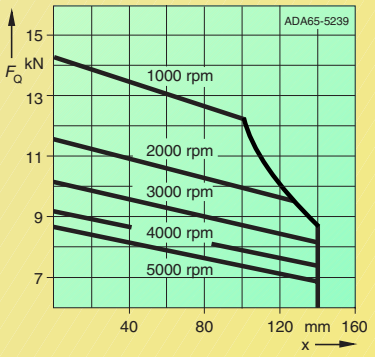
L_h = 20 000 h

Permissible lateral forces for 1PH718. and 1PL618. motors size 180 for belt output

Bearings D-end: NU2 14E + 6214 C3
ND-end: 6214 C3



Minimum lateral force 3 kN



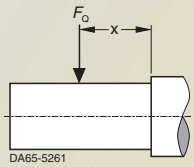
L_h = 12 000 h

If the roller bearings used here are operated without load, damage may occur to the bearings.
Minimum lateral forces must be complied with!

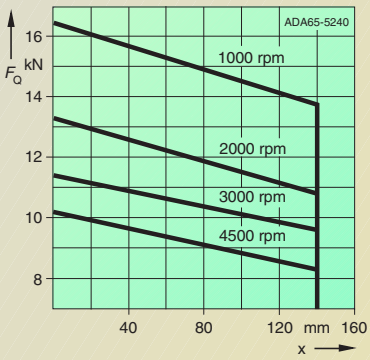
Lateral-force diagrams

Permissible lateral forces for 1PH722. and 1PL622. motors size 225 for belt output

Bearings D-end: NU2 16E + 6216 C3
ND-end: 6216 C3



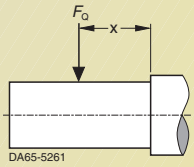
Minimum lateral force 4 kN



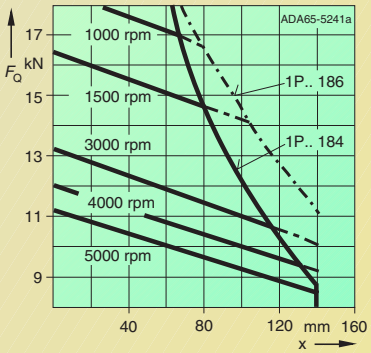
L_h = 12 000 h

Permissible lateral forces for 1PH718. and 1PL618. motors size 180 for belt output with increased lateral force

Bearings D-end: NU22 14E + 6214 C3
ND-end: 6214 C3



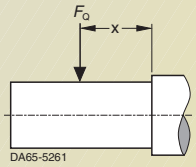
Minimum lateral force 4 kN



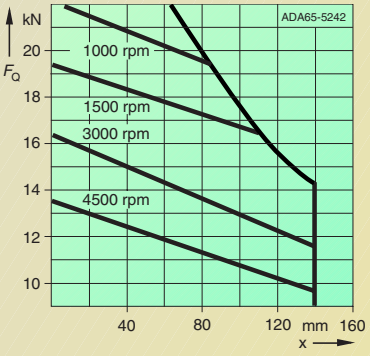
L_h = 12 000 h

Permissible lateral forces for 1PH722. and 1PL622. motors size 225 for belt output with increased lateral force

Bearings D-end: NU22 16E + 6216 C3
ND-end: 6216 C3



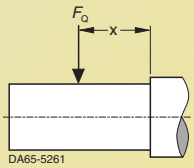
Minimum lateral force 5 kN

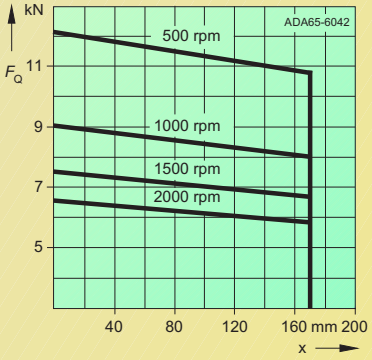


L_h = 12 000 h

Permissible lateral forces for 1PH728. and 1PL628. motors size 280 for coupling output

Bearings D-end: 6220 C3
ND-end: 6220 C3

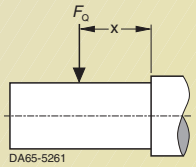




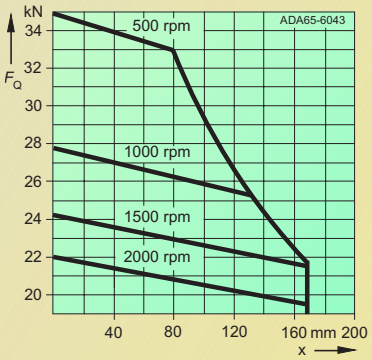
L_h > 24 000 h with relubrication

Permissible lateral forces for 1PH728. and 1PL628. motors size 280 for belt output with increased lateral force

Bearings D-end: NU220 E
ND-end: 6220 C3



Minimum lateral force 9 kN



L_h = 24 000 h with relubrication

If the roller bearings used here are operated without load, damage may occur to the bearings.
Minimum lateral forces must be complied with!

Asynchro-
nous Servomotors

Additional data for 1PH7 and 1PL6 motors

Terminal box assignment, max. cable cross-sections

Size	Motor type	Terminal-box type	Cable entry	Max. possible outer cable diameter mm	Number of main terminals	Max. cable cross-section per terminal mm^2	Max. possible current per terminal [1] A
1PH7 motors, sizes 100 to 280							
100	**1PH710 . –2 . .**	integrated	PG 29	28	6 x M5	25	67
132	**1PH713 . –2 . .**	integrated	PG 36	34	6 x M6	35	83
160	**1PH716 . –2 . .**	integrated	PG 42	40	6 x M6	50	123
180	**1PH7184–2 . .**	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PH7186–2 . B	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PH7186–2 . D	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PH7186–2 . F	**1XB7422**	2 x M72x2	56	3 x M12	2 x 70	242
	1PH7186–2 . L	**1XB7422**	2 x M72x2	56	3 x M12	2 x 70	242
225	**1PH7224–2 . B**	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PH7224–2 . D	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PH7224–2 . U	**1XB7422**	2 x M72x2	56	3 x M12	2 x 70	242
	1PH7224–2 . L	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PH7226–2 . B	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PH7226–2 . D	**1XB7422**	2 x M72x2	56	3 x M12	2 x 70	242
	1PH7226–2 . F	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PH7226–2 . L	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PH7228–2 . B	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PH7228–2 . D	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PH7228–2 . F	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PH7228–2 . L	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
280	**1PH728 .**	**1XB7712**	Data on request				
1PL6 motors, size 180 to 280							
180	**1PL6184–4 . B**	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PL6184–4 . D	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PL6184–4 . F	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PL6184–4 . L	**1XB7422**	2 x M72x2	56	3 x M12	2 x 70	242
	1PL6186–4 . B	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PL6186–4 . D	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PL6186–4 . F	**1XB7422**	2 x M72x2	56	3 x M12	2 x 70	242
	1PL6186–4 . L	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
225	**1PL6224–4 . B**	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PL6224–4 . D	**1XB7422**	2 x M72x2	56	3 x M12	2 x 70	242
	1PL6224–4 . F	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PL6224–4 . L	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PL6226–4 . B	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PL6226–4 . D	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PL6226–4 . F	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PL6226–4 . L	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PL6228–4 . B	**1XB7322**	2 x PG 42	40	3 x M12	2 x 50	191
	1PL6228–4 . D	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PL6228–4 . F	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
	1PL6228–4 . L	**1XB7700**	3 x M72x2	56	3 x 2 x M12	3 x 150	583
280	**1PL628 .**	**1XB7712**	Data on request				

Notes on cable glands

Cable glands and EMC cable glands for shielded cables with PG thread or metric thread and adapter element between PG and metric thread can be obtained from the following companies:

AGRO AG
CH-5502 Hunzenschwil
Phone: ++ 41 (0) 6 28 89 47 47
Fax ++ 41 (0) 6 28 89 47 50

- EMC cable glands
- Cable glands with heavy-gauge conduit thread
- Metric cable glands
- Adapter elements Heavy-gauge conduit thread ↔ metric

Karl Dose GmbH
Postfach 54 05 24
D-22505 Hamburg
Phone: ++ 49 (0) 40-54 73 22 13
Fax. ++ 49 (0) 40-54 73 22 99

- Cable glands up to PG 42 and M72x2

Pflitsch GmbH & Co. KG
Postfach 10 03 51
D-42492 Hückeswagen
Phone: ++ 49 (0) 21 92-91 10
Fax ++ 49 (0) 21 92-91 12 11

- Cable glands up to PG 42
- Locking screws/filler plugs

Ernst Heinrich GmbH
Postfach 45 09 48
D-22509 Hamburg
Phone: ++ 49 (0) 40-8 50 10 83
Fax. ++ 49 (0) 40-8 50 01 97

- Cable glands M72x2
- Locking screws M72x2

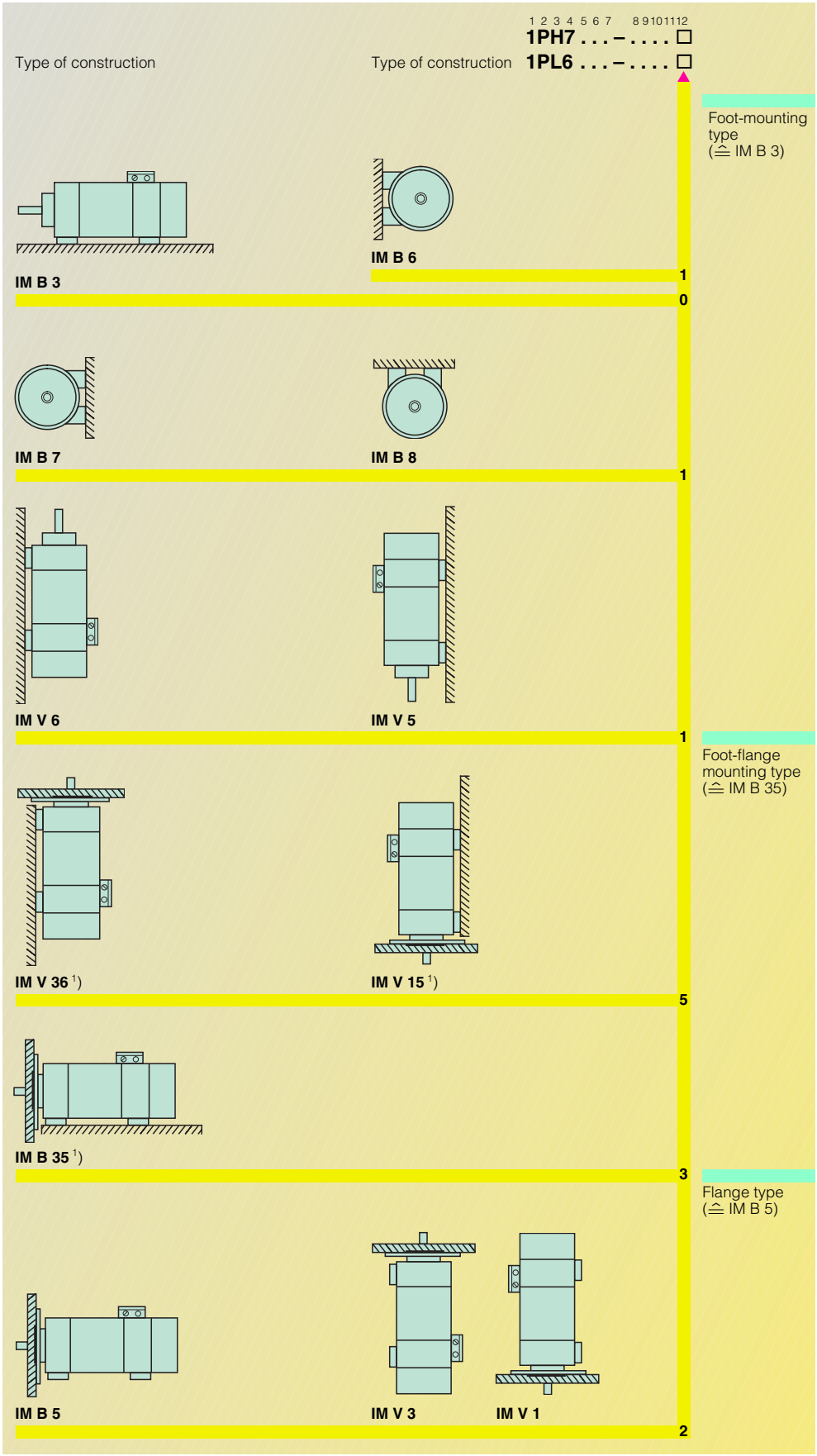
1) Frame sizes 100 to 160: reduction factor 0.75,
Frame sizes 180 and 225: reduction factor 0.60.

Additional data for 1PH7 and 1PL6 motors

Overview of types of construction

The types of construction available for 1PH7 and 1PL6 motors are IM B 3 (normal design), IM B 5 and IM B 35. Other types of construction (IM V 15, IM V 36, IM B 6, IM B 7, IM B 8 etc.) are also possible. Depending on how and where the motor is installed, the motor (sizes 180 and 225) should be ordered so that the lifting eyebolts for the intended type of installation are suitably positioned on the motor by the supplying factory (12th data digit of the Order No. for the motor). For motor sizes 100 to 160, the screwed-in lifting eyebolts can be repositioned at a later date for different methods and types of installation.

Note: There are no condensation holes in the machine. An anti-condensation heater is not necessary.



1) Foot-mounting and flange-mounting necessary.

Servomotors
Dimension Drawings

Synchronous servomotors

8/2 • 1FK6 motors, non-ventilated
8/3 • 1FK7 (CT) motors, non-ventilated
8/4 • 1FK7 (HD) motors, non-ventilated
8/5 • 1FK6 motors, non-ventilated, with planetary gear
8/6 • 1FK7 (CT) motors, non-ventilated, with planetary gear
8/7 • 1FK7 (HD) motors, non-ventilated, with planetary gear
8/8 • 1FT6 motors, non-ventilated
8/11 • 1FT6 motors, separately ventilated
8/13 • 1FT6 motors, non-ventilated, with planetary gear
8/15 • 1FT6 motors, water-cooled
8/16 • 1FS6 motors, non-ventilated

Asynchronous servomotors

8/17 • 1PH7 motors
8/21 • 1PH7 motors with brake module
8/23 • 1PH7 motors with pipe connection
8/25 • 1PL6 motors
8/27 • 1PH4 motors
8/28 • 1PH7/1PH4 motors with 2-gear unit

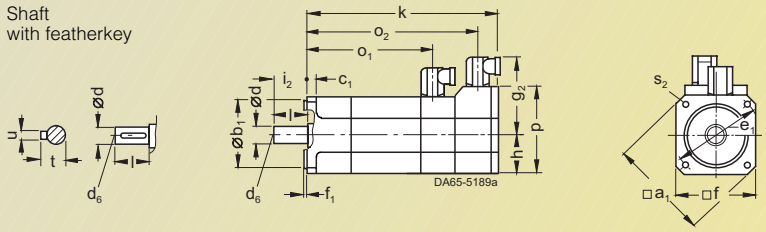
Notes:
Siemens reserves the right to alter technical data without advanced notice. The dimensions in this catalog can become out of date. Current dimension drawings can be supplied free-of-charge on request.

1FK6 motors, non-ventilated

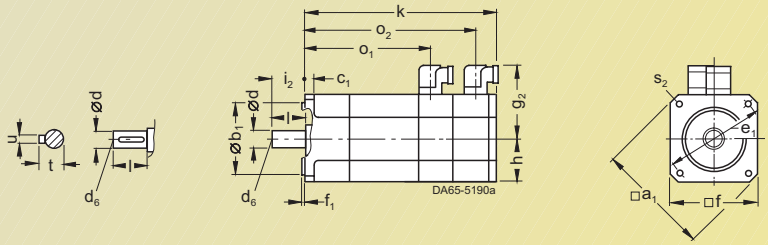
For motor		Dimension in mm														Resolver	sin/cos incr. encod. 1 V_{pp}	D-end of shaft				
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_2 –	h H	i_2 –	o_1 –	o_2 –	p HD	s_2 S	k LB	k LB	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, non-ventilated, with angled plug, with/without brake																						
36	**1FK6032**		92	60	8	75	72	3	79	36	30	95.5	154	78	6.5	179	–	**14**	M5	30	16	5
48	**1FK6040** **1FK6042**		120	80	10	100	96	3	85	48	40	83 115	134 166	–	7	160 192	203.5 235.5	**19**	M6	40	21.5	6
63	**1FK6060** **1FK6063**		155	110	10	130	126	3.5	100	63	50	104 154	170 220	–	9	200 250	238 288	**24**	M8	50	27	8
80	**1FK6080** **1FK6083**		186	130	13	165	155	3.5	114.5	77.5	58	97 135	165 203	–	11	195 233	242 280	**32**	M12	58	35	10
100	**1FK6100** **1FK6101** **1FK6103**		240	180	13	215	192	4	132 150	96	80	113 148 174	188 214 240	155	14	218 244 270	265 291 317	**38**	M12	80	41	10

1FK6032

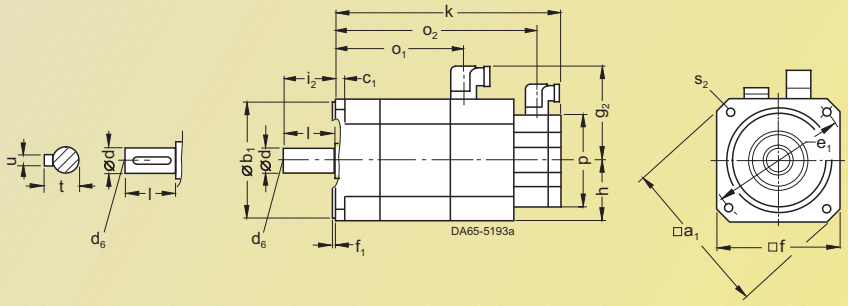
Shaft
with featherkey



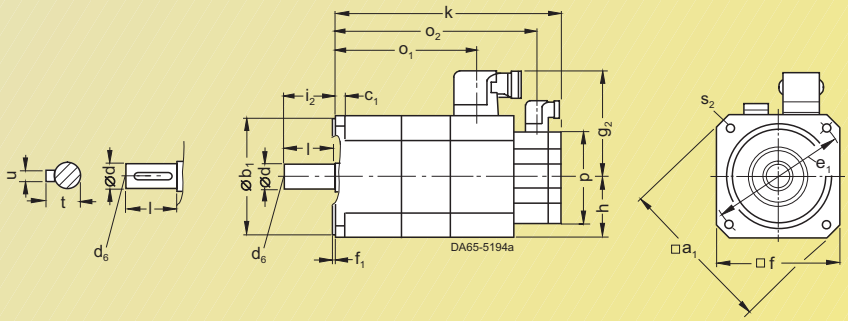
1FK604 .
1FK606 .
1FK608 .



1FK6100



1FK6101
1FK6103

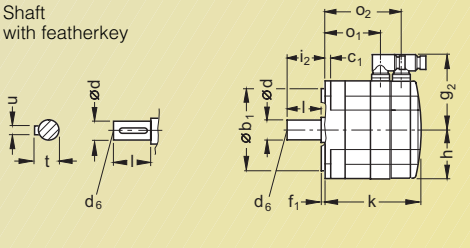


For motor		Dimension in mm											Resolver					
													without brake			with brake		
Size	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_2 –	h H	i_2 –	s_2 S	k LB	o_1 –	o_2 –	k LB	o_1 –	o_2 –
1FK7 CT (compact), type of construction IM B 5, non-ventilated, with angled plug, with/without brake																		
28	**1FK7022-5**		–	40	7	63	55	2.5	69.5	27.5	20	5.8	150	75.5	125	178	104.5	154
36	**1FK7032-5**		93	60	8	75	72	3	78	36	30	6.5	150	75.5	125	179	104.5	154
48	**1FK7040-5**		120	80	10	100	96	3	90	48	40	7	135	74	107	164	74	136
	1FK7042-5		120	80	10	100	96	3	90	48	40	7	162	101	134	191	101	163
63	**1FK7060-5**		155	110	10	130	126	3.5	105	63	50	9	157	93	125	200	93	168
	1FK7063-5		155	110	10	130	126	3.5	105	63	50	9	202	138	170	245	138	213
80	**1FK7080-5**		186	130	13	165	155	3.5	119.5	77.5	58	11	156	91	124	184	91	152
	1FK7083-5		186	130	13	165	155	3.5	119.5	77.5	58	11	194	129	162	245	152	213
100	**1FK7100-5**		240	180	13	215	192	4	138	96	80	14	185	113	153	204	113	172
	1FK7101-5		240	180	13	215	192	4	160	96	80	14	211	139	179	240	139	208
	1FK7103-5		240	180	13	215	192	4	160	96	80	14	237	165	205	266	165	234

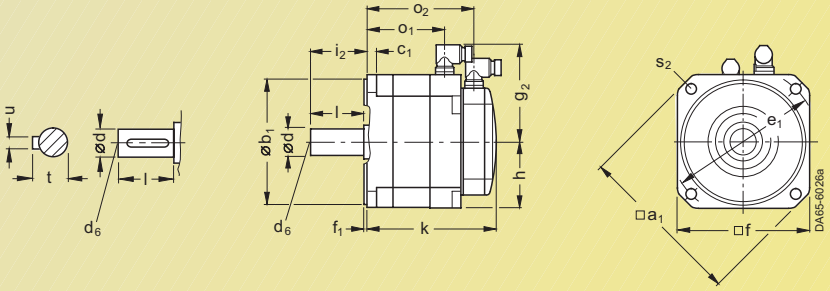
(continued)		Basic absolute-value encoder (EnDat) (from size 48 on) sin/cos incremental encoder 1 V_{pp}						Absolute-value encoder (EnDat)										
		without brake			with brake			without brake			with brake							
		k LB	o_1 –	o_2 –	k LB	o_1 –	o_2 –	k LB	o_1 –	o_2 –	k LB	o_1 –	o_2 –	**d** **D**	d_6 –	l E	t GA	u F
28	**1FK7022-5**	182	85	134.5	210	113	162.5	182	85	134.5	210	113	162.5	**9**	M3	20	10.2	3
36	**1FK7032-5**	182	85	134.5	211	114	163.5	182	85	134.5	211	114	163.5	**14**	M5	30	16	5
48	**1FK7040-5**	155	64	106	184	73	135	164	65	107	193	74	136	**19**	M6	40	21.5	6
	1FK7042-5	183	92	134	212	101	163	191	92	134	220	101	163	**19**	M6	40	21.5	6
63	**1FK7060-5**	180	93	125	223	93	168	188	93	125	231	93	168	**24**	M8	50	27	8
	1FK7063-5	225	138	140	268	138	213	233	138	170	276	138	213	**24**	M8	50	27	8
80	**1FK7080-5**	179	91	124	206	91	151	187	91	124	215	91	152	**32**	M12	58	35	10
	1FK7083-5	217	129	162	268	153	213	225	129	162	276	152	213	**32**	M12	58	35	10
100	**1FK7100-5**	208	113	153	227	113	172	216	113	153	235	113	172	**38**	M12	80	41	10
	1FK7101-5	234	139	179	263	139	208	242	139	179	271	139	208	**38**	M12	80	41	10
	1FK7103-5	260	165	205	289	165	234	268	165	205	297	165	234	**38**	M12	80	41	10

1FK702 . –5
1FK703 . –5
1FK704 . –5
1FK706 . –5
1FK708 . –5

Shaft with featherkey



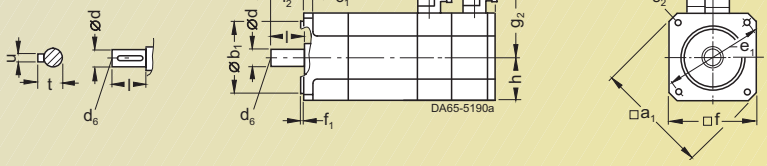
1FK7100–5
1FK7101–5
1FK7103–5

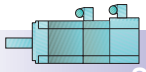


1FK7 (HD) motors, non-ventilated

For motor		Dimension in mm													Resolver	sin/cos incremental encoder 1 V_{pp}	Absolute-value encoder (EnDat)	D-end of shaft				
													without brake/with brake									
Size	Type	**DIN** a_1 **IEC** 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 –	s_2 S	k LB	k LB	k LB	**d** **D**	d_6 –	l E	t GA	u F
1FK7 HD (High Dynamic), type of construction IM B 5, non-ventilated, with angled plug, with/without brake																						
36	**1FK7033-7**	92	60	8	75	72	3	78	36	30	114.5	164/164	6.5	171.5/192.5	196.5/217	–/–	**14**	M5	30	16	5
48	**1FK7043-7** **1FK7044-7**	120	80	10	100	96	3	90	48	40	135 161	177/200 202/225	7	191.5/220.5 216.5/245.5	212/241 237/266	220.5/249.5 245.5/274.5	**19**	M6	40	21.5	6
63	**1FK7061-7** **1FK7064-7**	155	110	10	130	126	3.5	105	63	50	123 187	166/184 230/248	9	186.5/228.5 250.5/292.5	209.5/251.5 273.5/315.5	218/260 282/324	**24**	M8	50	27	8
80	**1FK7082-7** **1FK7085-7**	186	130	13	165	155	3.5	119.5 132.5	77.5	58	142.5 192.5	186/228 236/278	11	210.5/253 260.5/303	233.5/276 283.5/326	242/284.5 292/334.5	**32**	M12	58	35	10

Shaft
with featherkey





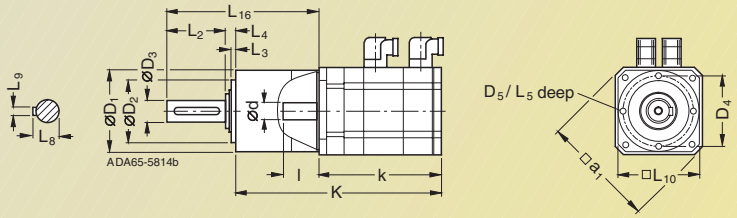
Synchro-nous Servomotors

1FK6 motors non-ventilated, with planetary gear

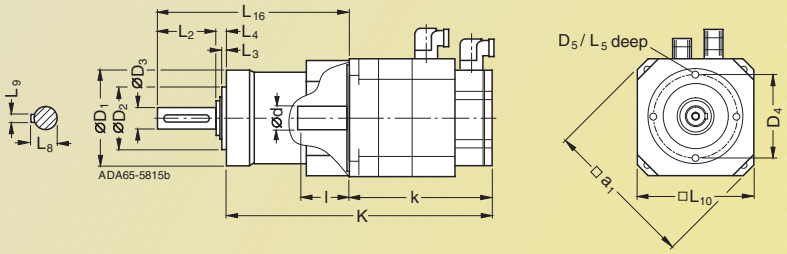
For motor		Dimension in mm						Planetary gear single-stage														Resolver	sin/cos incremental encoder 1 V_{pp}
		Resolver	sin/cos incremental encoder 1 V_{pp}																				
Size	Type	**DIN** k **IEC** LB	k LB	l E	d D	a_1 P	Type	D_1 –	D_2 –	D_3 –	D_4 –	D_5 –	L_{16} –	L_2 –	L_3 –	L_4 –	L_5 –	L_8 –	L_9 –	L_{10} –	K –	K –
Type of construction IM B 5, non-ventilated, with plug, with/without brake, with planetary gear (from alpha) LP single-stage																							
36	**1FK6032**	179	–	30	14	92	**LP070–M01**	70	52	16	62	M5	126	28	5	8	10	18	5	70	269	–
48	**1FK6040**	160	204	40	19	120	**LP090–M01**	90	68	22	80	M6	158	36	5	10	12	24.5	6	90	272	316
	1FK6042	192	236																		304	348
63	**1FK6060**	200	238	50	24	155	**LP120–M01**	120	90	32	108	M8	210	58	6	12	16	35	10	120	340	378
	1FK6063	250	288																		390	428
80	**1FK6080**	195	242	58	32	186	**LP155–M01**	155	120	40	140	M10	265	82	8	15	20	43	12	150	363	410
	1FK6083	233	280																		401	448
100	**1FK6100**	218	265	80	38	240	**LP155–M01**	155	120	40	140	M10	265	82	8	15	20	43	12	192	386	433
	1FK6101	244	291																		412	459
	1FK6103	270	317																		438	485

For motor dimensions, see dimension drawings on page 8/2.

1FK6032
1FK604 .
1FK606 .
1FK608 .



1FK610 .



8

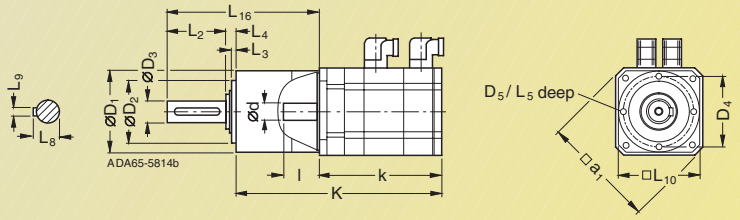
1FK7 (CT) motors non-ventilated, with planetary gear

For motor		Dimension in mm														
			Resolver				Basic absolute-value encoder (EnDat) sin/cos incremental encoder 1 V_{pp}				Absolute-value encoder (EnDat)						
			without brake		with brake		without brake		with brake		without brake		with brake				
Size	Type	**DIN**	k	K	k	K	k	K	k	K	k	K	k	K	l	d	a_1
		IEC	LB	–	LB	–	LB	–	LB	–	LB	–	LB	–	E	D	P
Type of construction IM B 5, non-ventilated, with plug, with/without brake, with planetary gear (from alpha) LP single-stage																	
28	**1FK7022-5**		133	245	157	269	164	276	162	274	187	299	193	305	20	9	–
36	**1FK7032-5**		160	272	185	297	192	304	189	301	214	326	221	333	30	14	93
48	**1FK7040-5**		133	245	162	274	157	269	187	299	164	276	193	305	40	19	120
	1FK7042-5		160	272	189	301	185	297	214	326	192	304	221	333			
63	**1FK7060-5**		155.5	296	198.5	339	179.5	320	222.5	363	187.5	328	230.5	371	50	24	155
	1FK7063-5		200.5	341	243.5	384	224.5	365	267.5	408	232.5	373	275.5	416			
80	**1FK7080-5**		154.5	322	182	350	178.5	346	206	374	186.5	354	214	382	58	32	186
	1FK7083-5		192.5	360	243.5	411	216.5	384	267.5	435	224.5	392	275.5	443			
100	**1FK7100-5**		183.5	351	202.5	370	207.5	375	226.5	394	215.5	383	234.5	402	80	38	240
	1FK7101-5		209.5	377	228.5	396	233.5	401	252.5	420	241.5	409	260.5	428			
	1FK7103-5		235.5	403	254.5	422	259.5	427	278.5	446	267.5	435	286.5	454			

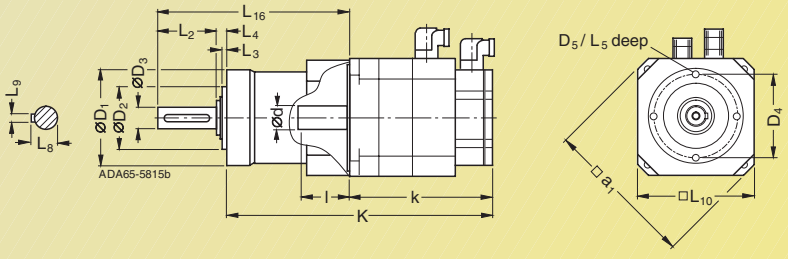
(continued)		Planetary gear single-stage													
Size	Type	Type	D_1 –	D_2 –	D_3 –	D_4 –	D_5 –	L_{16} –	L_2 –	L_3 –	L_4 –	L_5 –	L_8 –	L_9 –	L_{10} –
28	**1FK7022-5**	**LP050-M01**	90	68	22	80	M6	158	36	5	10	12	25	6	90
36	**1FK7032-5**	**LP070-M01**	90	68	22	80	M6	158	36	5	10	12	25	6	90
48	**1FK7040-5**	**LP090-M01**	90	68	22	80	M6	158	36	5	10	12	25	6	90
	1FK7042-5														
63	**1FK7060-5**	**LP120-M01**	120	90	32	108	M8	210	58	6	12	16	35	10	120
	1FK7063-5														
80	**1FK7080-5**	**LP155-M01**	155	120	40	140	M10	265	82	8	15	20	43	12	150
	1FK7083-5														
100	**1FK7100-5**	**LP155-M01**	155	120	40	140	M10	265	82	8	15	20	43	12	192
	1FK7101-5														
	1FK7103-5														

For motor dimensions, see dimension drawings on page 8/3.

1FK7022-5
1FK7032-5
1FK704 .-5
1FK706 .-5
1FK708 .-5



1FK710 .-5

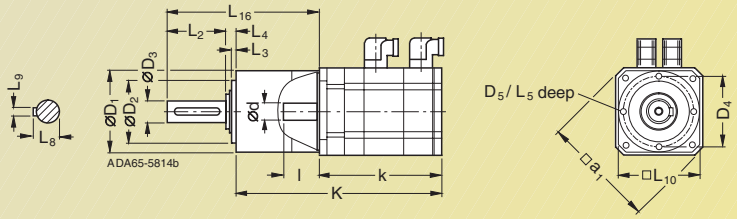


For motor		Dimension in mm														
			Resolver				Basic absolute-value encoder (EnDat) sin/cos incremental encoder 1 V_{pp}				Absolute-value encoder (EnDat)						
			without brake		with brake		without brake		with brake		without brake		with brake				
Size	Type	**DIN** **IEC**	k LB	K –	k LB	K –	k LB	K –	k LB	K –	k LB	K –	k LB	K –	l E	d D	a_1 P
Type of construction IM B 5, non-ventilated, with plug, with/without brake, with planetary gear (from alpha) LP single-stage																	
36	**1FK7033-7**		171.5	297.5	192.5	318.5	196.5	322.5	217.5	343.5	-	-	-	-	30	14	92
48	**1FK7043-7** **1FK7044-7**		191.5 216.5	349.5 374.5	220.5 245.5	378.5 403.5	212 237	370 395	241 266	399 424	220.5 245.5	378.5 403.5	249.5 274.5	407.5 432.5	40	19	120
63	**1FK7061-7** **1FK7064-7**		186.5 250.5	396.5 460.5	228.5 292.5	438.5 502.5	209.5 273.5	419.5 483.5	251.5 315.5	461.5 525.5	218 282	428 492	260 324	470 534	50	24	155
80	**1FK7082-7** **1FK7085-7**		210.5 260.5	475 525	253 303	517.5 567.5	233.5 283.5	498 548	276 326	540.5 590.5	242 292	506.5 556.5	284 334.5	548.5 599	58	32	186

(continued)		Planetary gear single-stage													
Size	Type	Type	D_1 –	D_2 –	D_3 –	D_4 –	D_5 –	L_2 –	L_3 –	L_4 –	L_5 –	L_8 –	L_9 –	L_{10} –	L_{16} –
36	**1FK7033-7**	**LP070-M01**	70	52	16	62	M5	28	5	8	10	18	5	70	126
48	**1FK7043-7** **1FK7044-7**	**LP090-M01**	90	68	22	80	M6	36	5	10	12	25	6	90	158
63	**1FK7061-7** **1FK7064-7**	**LP120-M01**	120	90	32	108	M8	58	6	12	16	35	10	120	210
80	**1FK7082-7** **1FK7085-7**	**LP155-M01**	155	120	40	140	M10	82	8	15	20	43	12	150	265

For motor dimensions, see dimension drawings on page 8/4.

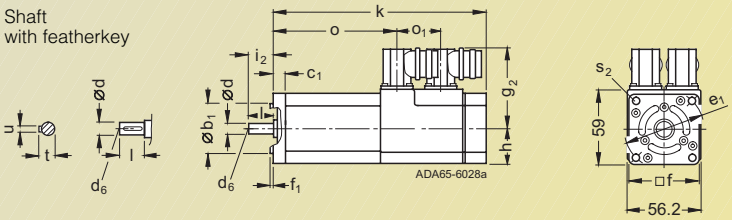
1FK7033-7
1FK704 .-7
1FK706 .-7
1FK708 .-7



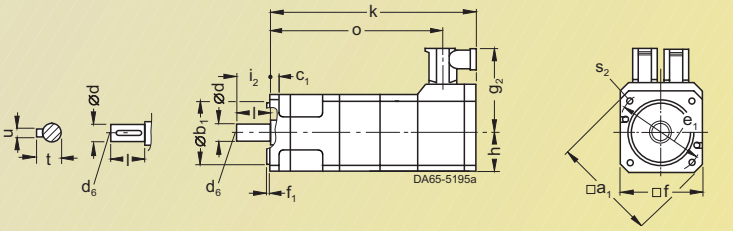
1FT6 motors, non-ventilated

For motor		Dimension in mm													Resolver				sin/cos incremental encoder 1 V_{pp}				D-end of shaft				
															without brake		with brake		without brake		with brake						
Size	Type	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 –	p HD	s_2 [1] S	s_2 [2] S	o_1 –	k LB	o –	k LB	o –	k LB	o –	k LB	o –	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, non-ventilated, with plug, with/without brake																											
28	**1FT6021** **1FT6024**		– –	40	10	63	55	2.5	63	28	20	–	5.8	–	34.5	193 233	122 162	218 258	147 187	193 233	122 162	218 258	147 187	**9**	M3	20	10.2	3
36	**1FT6031** **1FT6034**		92	60	8	75	72	3	77	36	30	–	6	–	–	180 220	151 191	200 240	171 211	220 260	151 191	240 280	171 211	**14**	M5	30	16	5
48	**1FT6041** **1FT6044**		120	80	10	100	96	3	81	48	40	–	7	–	–	187 237	157 207	222 272	192 242	228 278	157 207	263 313	192 242	**19**	M6	40	21.5	6
63	**1FT6061** **1FT6062** **1FT6064**		146	110	10	130	116	3.5	91	58	50	–	9	M8	–	198 223 273	172 197 247	228 253 303	202 227 277	228 253 303	172 197 247	258 283 333	202 227 277	**24**	M8	50	27	8

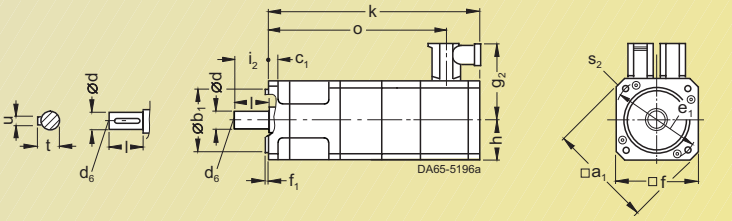
1FT602 .



1FT603 .



1FT604 .
1FT606 .

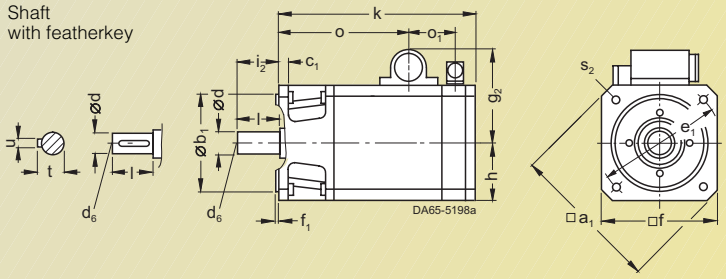


1) IM B 5.
2) IM B 14.

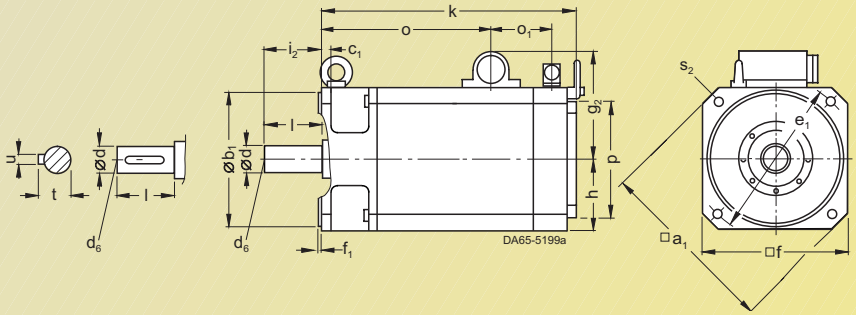
8

For motor		Dimension in mm														Resolver				sin/cos incremental encoder 1 V_{pp}				D-end of shaft				
																without brake		with brake		without brake		with brake						
Size	Type	**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 –	p HD	s_2 1) S	s_2 2) S	o_1 –	k LB	o –	k LB	o –	k LB	o –	k LB	o –	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, non-ventilated, with plug, with/without brake																												
80	**1FT6081** **1FT6082** **1FT6084** **1FT6086**		194	130	12	165	155	3.5	127.5	77.5	58	–	11	M10	76	221 246 296 346	113 138 188 238	248 273 342 392	140 165 234 284	221 246 296 346	113 138 188 238	248 273 342 392	140 165 234 284	**32**	M12	58	35	10
100	**1FT6102** **1FT6105** **1FT6108**		240	180	13	215	192	4	146	96	80	155	14	M12	76	295 370 470	186 261 361	341 416 516	232 307 407	295 370 470	186 261 361	341 416 516	232 307 407	**38**	M12	80	41	10
132	**1FT6132** **1FT6134** **1FT6136**		–	250	18	300	260	5	172.5	132	82	245	18	–	66	423 473 523	288 338 388	473 523 573	338 388 438	423 473 523	288 338 388	473 523 573	338 388 438	**48**	M16	82	51.5	14

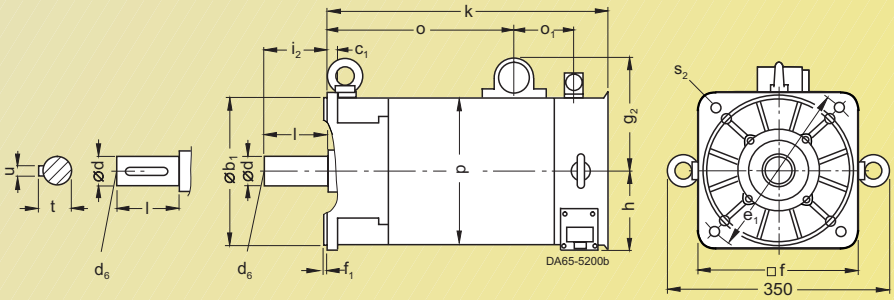
1FT608 .



1FT610 .



1FT613 .



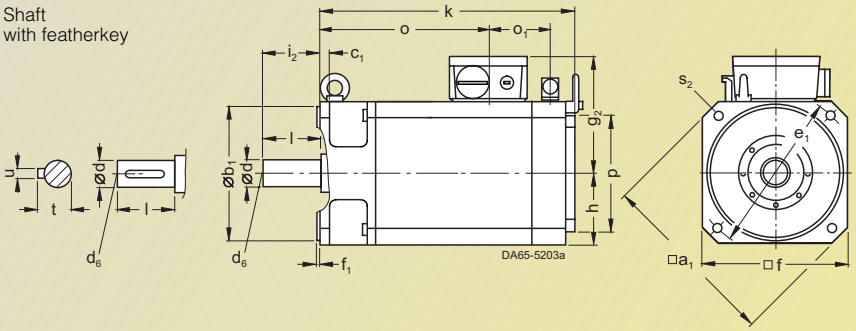
1) IM B 5.
2) IM B 14.

1FT6 motors, non-ventilated

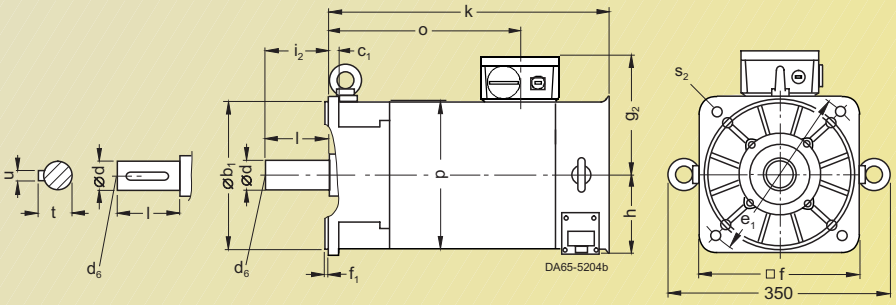
For motor		Dimension in mm														Resolver				sin/cos incremental encoder 1 V_{pp}				D-end of shaft				
																without brake		with brake		without brake		with brake						
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_2 –	h H	i_2 –	p HD	s_2 [1] S	s_2 [2] S	o_1 –	k LB	o –	k LB	o –	k LB	o –	k LB	o –	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, non-ventilated, with terminal box, with/without brake																												
100	**1FT6102** **1FT6105** **1FT6108**		240	180	13	215	192	4	155	96	80	155	14	M12	76	295 370 470	186 261 361	341 416 516	232 307 407	295 370 470	186 261 361	341 416 516	232 307 407	**38**	M12	80	41	10
132	**1FT6132** **1FT6134** **1FT6136**		–	250	18	300	260	5	186.5	132	82	245	18	–	–	423 473 523	288 338 388	473 523 573	338 388 438	423 473 523	288 338 388	473 523 573	338 388 438	**48**	M16	82	51.5	14

1FT610 .

Shaft
with featherkey



1FT613 .

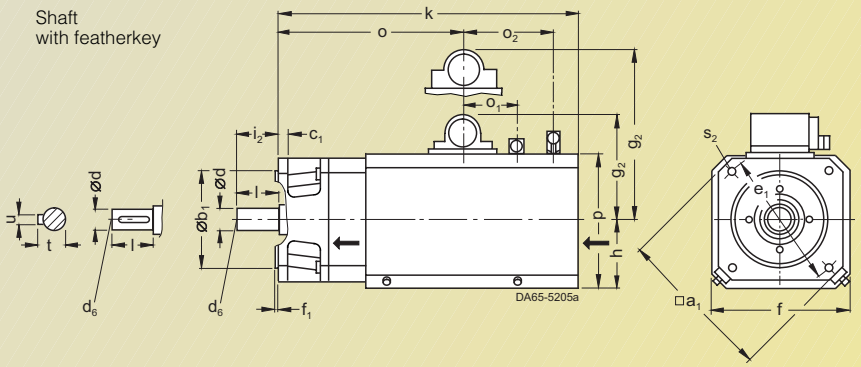


1) IM B 5.
2) IM B 14.

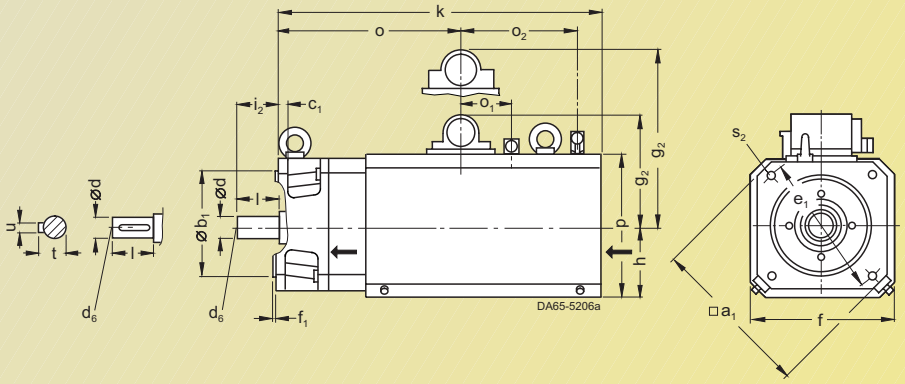
For motor		Dimension in mm							Plug								Resolver/sin/cos incremental encoder 1 V_{pp}				D-end of shaft				
									Size 1.5	Size 3							without brake		with brake						
Size	Type	DIN IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_2 –	g_2 –	h H	i_2 –	p HD	s_2 1) S	s_2 2) S	o_1 –	o_2 –	k LB	o –	k LB	o –	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, separately ventilated, with plug, with/without brake																									
80	**1FT6084** **1FT6086**		194	130	12	165	185	3.5	139.5	153.5	92.5	58	175	11	M10	76	169	399 449	188 238	445 495	234 284	**32**	M12	58	35	10
100	**1FT6105** **1FT6108**		240	180	13	215	221	4	158	172	110.5	80	212	14	M12	76.5	170	473 573	261 361	519 619	307 407	**38**	M12	80	41	10
132	**1FT6132** **1FT6134** **1FT6136**		–	250	18	300	260	5	–	186.5	132	82	245	18	–	66	–	541 591 641	288 338 388	591 641 691	338 388 438	**48**	M16	82	51.5	14

1FT608 .

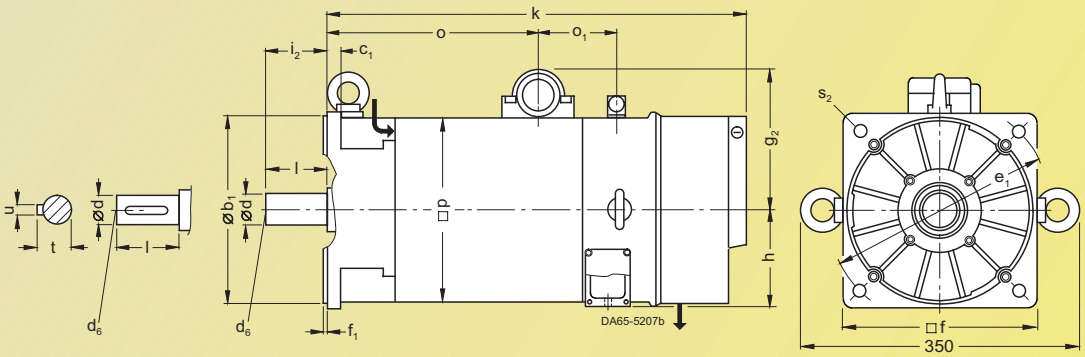
Shaft with featherkey



1FT610 .



1FT613 .



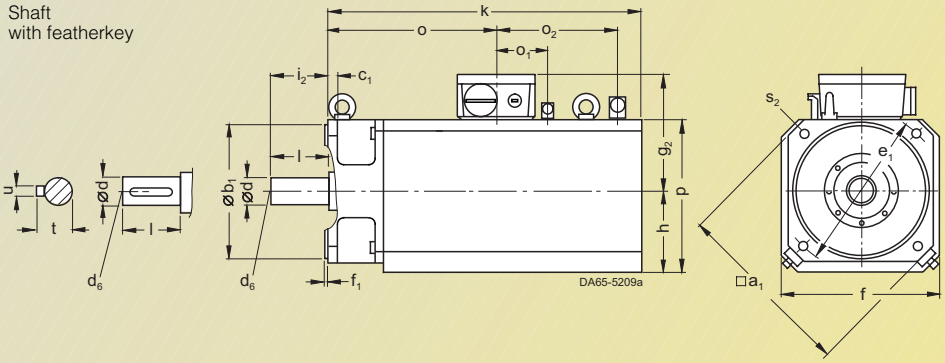
1) IM B 5.
2) IM B 14.

1FT6 motors, separately ventilated

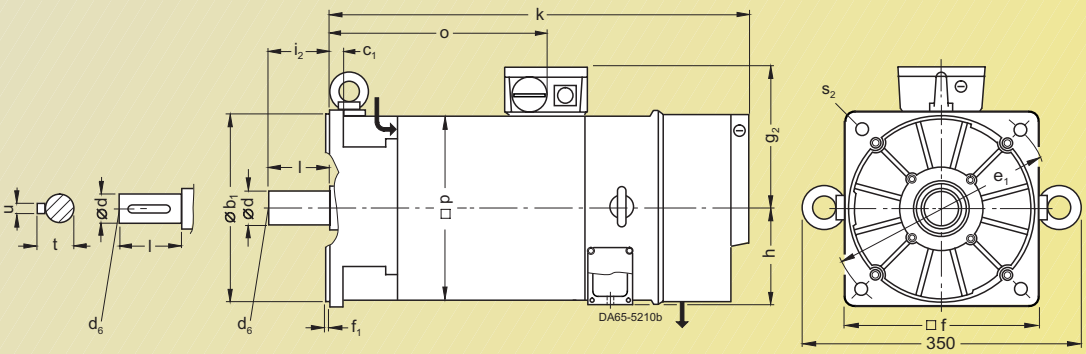
For motor		Dimension in mm							Terminal box gk 130								Resolver/sin/cos incremental encoder 1 V_{pp}				D-end of shaft				
									*gk 420	gk 230							without brake		with brake						
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g_2 –	g_2 –	h H	i_2 –	p HD	s_2 [1] S	s_2 [2] S	o_1 –	o_2 –	k LB	o –	k LB	o –	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, separately ventilated, with terminal box, with/without brake																									
100	**1FT6105**		240	180	13	215	221	4	–	172	110.5	80	212	14	M12	76.5	170	473	261	519	307	**38**	M12	80	41	10
	1FT6108								–									573	361	619	407					
132	**1FT6132**		–	250	18	300	260	5	202*	186.5	132	82	245	18	–	–	–	541	288	591	338	**48**	M16	82	51.5	14
	1FT6134								202*	186.5								591	338	641	388					
	1FT6136								202*									641	388	691	438					

1FT610 .

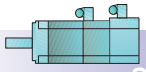
Shaft
with featherkey



1FT613 .



1) IM B 5.
2) IM B 14.

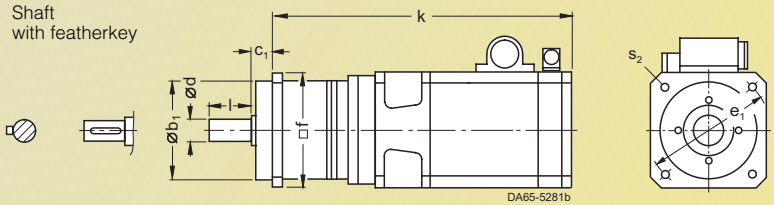


Synchro-nous Servomotors

1FT6 motors, non-ventilated, with planetary gear

For motor		With planetary gear-box **single-stage**	Dimension in mm					without brake	with brake		D-end of shaft		For motor dimensions, see dimension drawings on pages 8/8, 8/9
Size	Type	Type	**DIN** **IEC**	b_1 N	c_1 LA	e_1 M	f AB	k [1]) LB	k [1]) LB	s_2 S	**d** **D**	l E	
Type of construction IM B 5, non-ventilated, with plug, with/without brake, with planetary gear (from alpha) SPG single-stage													
28	**1FT6024**	**SPG 060-MF1**		60	20	68	62	314	339	5.5	**16**	28	
36	**1FT6031**	**SPG 060-MF1**		60	20	68	62	301	321	5.5	**16**	28	
	1FT6034	**SPG 060-MF1**						341	361				
		SPG 075-MF1		70		85	76	360	380	6.6	**22**	36	
48	**1FT6041**	**SPG 075-MF1**		70	20	85	76	328	363	6.6	**22**	36	
	1FT6044	**SPG 075-MF1**						378	413				
		SPG 100-MF1		90	30	120	101	392	427	9	**32**	58	
63	**1FT6061**	**SPG 100-MF1**		90	30	120	101	342	372	9	**32**	58	
	1FT6062	**SPG 100-MF1**						367	397				
	1FT6064	**SPG 100-MF1**						417	447				
80	**1FT6081**	**SPG 140-MF1**		130	30	165	141	365	393	11	**40**	82	
	1FT6082	**SPG 140-MF1**						391	418				
	1FT6084	**SPG 140-MF1**						441	487				
	1FT6086	**SPG 140-MF1**						491	537				
		SPG 180-MF1		160		215	182	531	577	13	**55**	82	
100	**1FT6102**	**SPG 180-MF1**		160	30	215	182	480	526	13	**55**	82	
	1FT6105	**SPG 180-MF1**						555	601				
		SPG 210-MF1		180	38	250	212	577	623	17	**75**	105	
	1FT6108	**SPG 180-MF1**		160	30	215	182	655	701	13	**55**	82	
		SPG 210-MF1		180	38	250	212	677	723	17	**75**	105	
132	**1FT6132**	**SPG 210-MF1**		180	38	250	212	630	680	17	**75**	105	
	1FT6132	**SPG 240-MF1**		200	40	290	242	689	739		**85**	130	
	1FT6134	**SPG 210-MF1**		180	38	250	212	680	730		**75**	105	
	1FT6134	**SPG 240-MF1**		200	40	290	242	739	789		**85**	130	
	1FT6136	**SPG 210-MF1**		180	38	250	212	730	780		**75**	105	
	1FT6136	**SPG 240-MF1**		200	40	290	242	789	839		**85**	130	

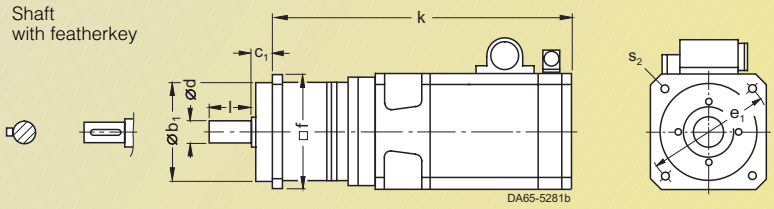
Shaft with featherkey



1) Motors with encoder.

1FT6 motors, non-ventilated, with planetary gear

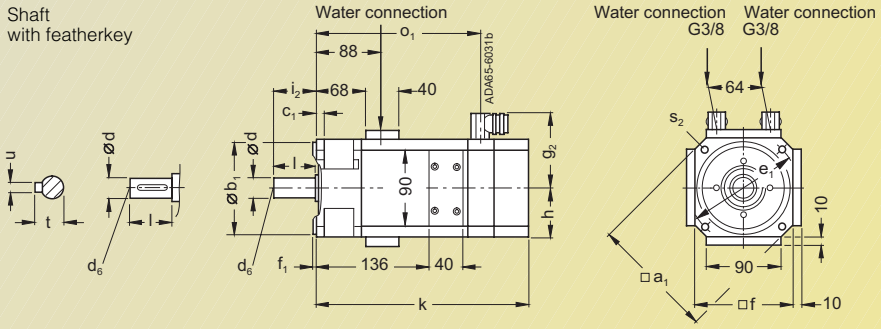
For motor		With planetary gear-box **2-stage**	Dimension in mm					without brake	with brake		D-end of shaft		For motor dimensions, see dimension drawings on pages 8/8, 8/9
Size	Type	Type	**DIN** **IEC**	b_1 N	c_1 LA	e_1 M	f AB	k [1] LB	k [1] LB	s_2 S	**d** **D**	l E	
Type of construction IM B 5, non-ventilated, with plug, with/without brake, with planetary gear (from alpha) SPG 2-stage													
28	**1FT6024**	**SPG 075-MF2**		70	20	85	76	360	385	6.6	**22**	36	
36	**1FT6031**	**SPG 075-MF2**		70	20	85	76	347	367	6.6	**22**	36	
	1FT6034	**SPG 075-MF2**						387	404				
		SPG 100-MF2		90	30	120	101	407	427	9	**32**	58	
48	**1FT6041**	**SPG 100-MF2**		90	30	120	101	375	410	9	**32**	58	
		SPG 140-MF2		130		165	141	413	448	11	**40**	82	
	1FT6044	**SPG 100-MF2**		90		120	101	425	460	9	**32**	58	
		SPG 140-MF2		130		165	141	463	498	11	**40**	82	
63	**1FT6061**	**SPG 100-MF2**		90	30	120	101	375	405	9	**32**	58	
		SPG 140-MF2		130		165	141	413	443	11	**40**	82	
	1FT6062	**SPG 100-MF2**		90		120	101	400	430	9	**32**	58	
		SPG 140-MF2		130		165	141	438	468	11	**40**	82	
		SPG 180-MF2		160		215	182	457	487	13	**55**		
	1FT6064	**SPG 140-MF2**		130		165	141	488	518	11	**40**		
		SPG 180-MF2		160		215	182	507	537	13	**55**		
80	**1FT6081**	**SPG 180-MF2**		160	30	215	182	425	452	13	**55**	82	
	1FT6082	**SPG 180-MF2**						450	477				
		SPG 210-MF2		180	38	250	212	500	527	17	**75**	105	
	1FT6084	**SPG 180-MF2**		160	30	215	182	500	546	13	**55**	82	
		SPG 210-MF2		180	38	250	212	550	596	17	**75**	105	
		SPG 240-MF2		200	40	290	242	580	626		**85**	130	
	1FT6086	**SPG 180-MF2**		160	30	215	182	550	596	13	**55**	82	
		SPG 210-MF2		180	38	250	212	600	646	17	**75**	105	
		SPG 240-MF2		200	40	290	242	630	676		**85**	130	
100	**1FT6102**	**SPG 210-MF2**		180	38	250	212	549	595	17	**75**	105	
		SPG 240-MF2		200	40	290	242	579	626		**85**	130	
	1FT6105	**SPG 210-MF2**		180	38	250	212	624	670		**75**	105	
		SPG 240-MF2		200	40	290	242	654	700		**85**	130	
	1FT6108	**SPG 240-MF2**						754	800				



1) Motors with encoder.

For motor		Dimension in mm							Plug								Resolver/ sin/cos incremental encoder 1 V_{pp}				with/without brake			D-end of shaft				
									Size								without brake		with brake		Resolver	sin/cos incremental encoder 1 V_{pp}						
									1	1.5	3																	
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 –	g_2 –	h H	i_2 –	p HD	s_2 [1] S	s_2 [2] S	o –	k LB	o_1 –	k LB	o_1 –	k LB	k LB	o_1 –	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, water-cooled, with plug, with/without brake																												
63	**1FT6062** **1FT6064**		146	110	10	130	116	3.5	99	–	–	58	50	–	9	M8	–	–	–	–	–	253 303	283 333	227 277	**24**	M8	50	27	8
80	**1FT6084** **1FT6086**		194	130	12	165	155	3.5	–	139.5	153.5	77.5	58	–	11	M10	76	296 346	188 238	342 392	234 284	– –	– –	– –	**32**	M12	58	35	10
100	**1FT6105** **1FT6108**		240	180	13	215	192	4	–	158	172	96	80	155	14	M12	76	370 470	261 361	416 516	307 407	– –	– –	– –	**38**	M12	80	41	10

1FT606 .



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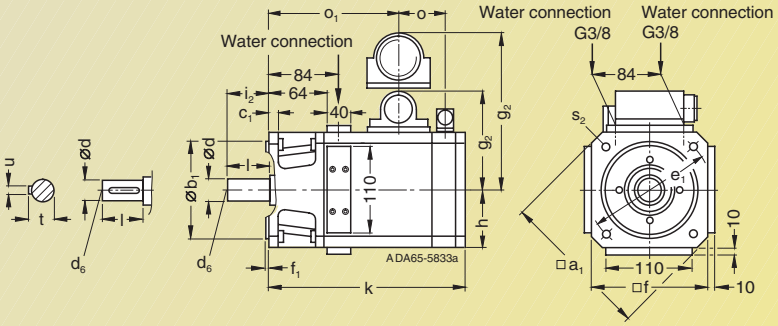

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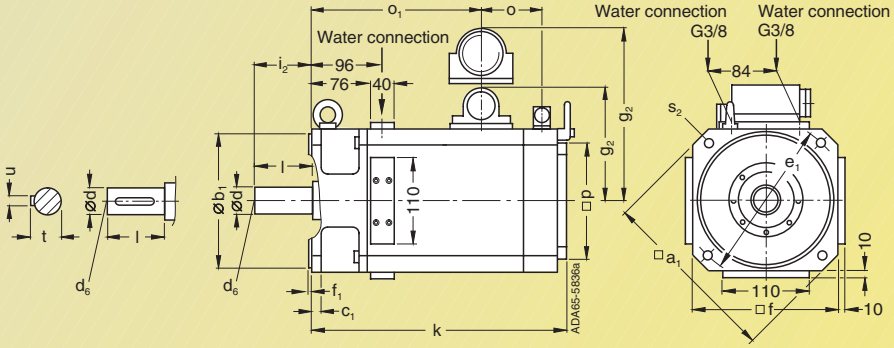
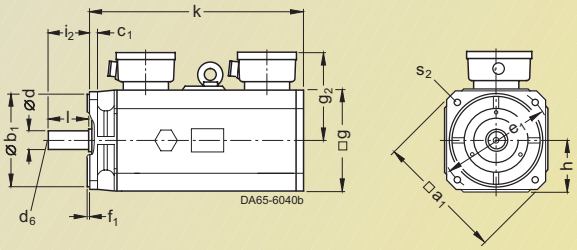


1) IM B 5.
2) IM B 14.

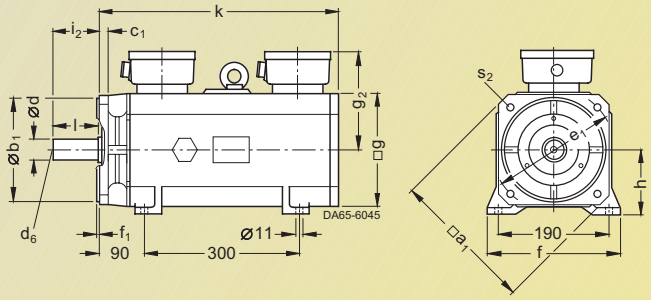
1FS6 motors, non-ventilated

For motor		Dimension in mm													D-end of shaft		
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	g AC	g_2 –	h H	i_2 LE	k LB	s_2 S	**d** **D**	l E	d_6 DB
Type of construction IM B 5 (sizes 71, 90) / IM B 35 (sizes 112, 132), non-ventilated, with terminal box																	
71	**1FS6 074**		146	110	12	130	–	3.5	128	149	64	50	414	9	**24**	50	M8
90	**1FS6 096**		194	130	12	165	–	3.5	166	168	83	58	476	11	**32**	58	M12
112	**1FS6 115**		240	180	14	215	235	4	200	184	112	80	515	14	**38**	80	M12
132	**1FS6 134**		–	250	18	300	260	5	256	213	132	82	559	18	**48**	82	M16

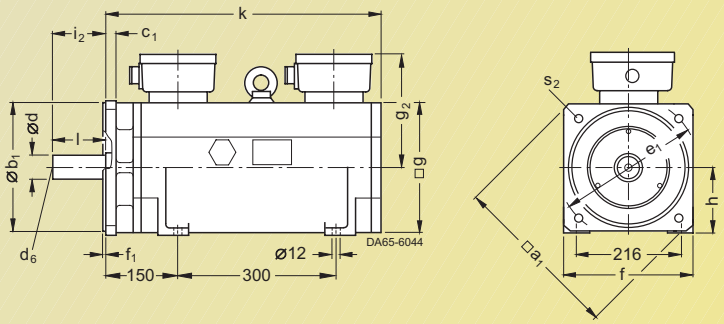
1FS6 074
1FS6 096



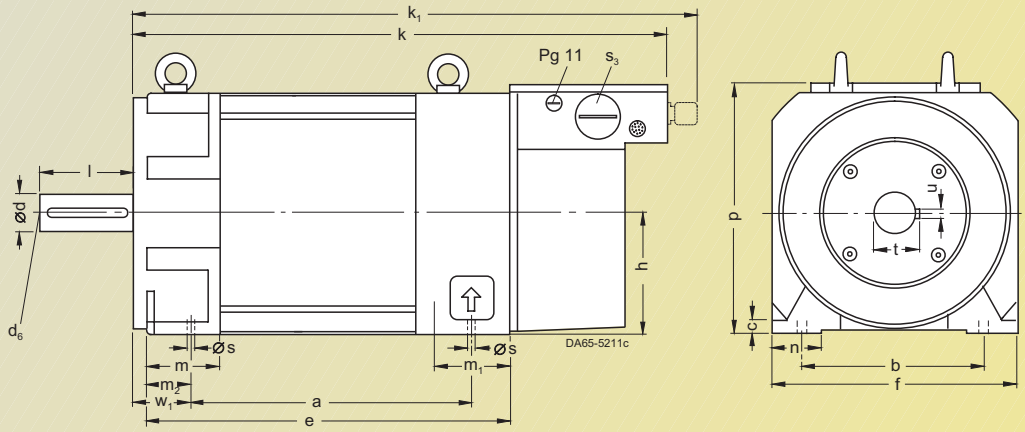
1FS6 115



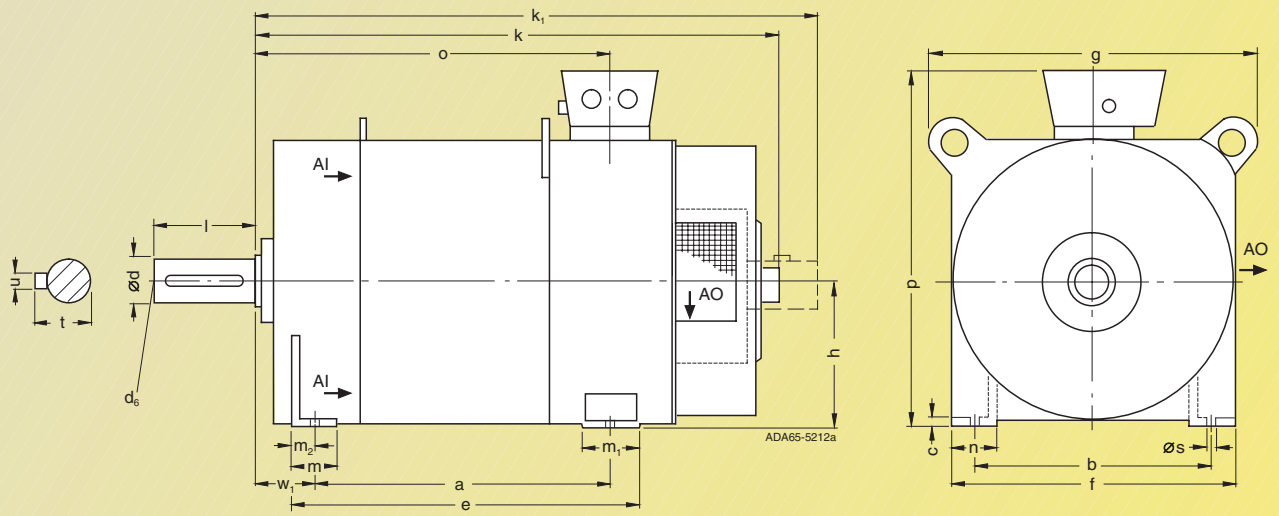
1FS6 134



For motor		Dimension in mm																	D-end of shaft				
Size	Type	**DIN** **IEC**	a B	b A	c LA	e M	f AB	h H	k LB	k_1 –	m BA	m_1 –	m_2 –	n AA	p HD	s K	s_3 –	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 3																							
100	**1PH7101** **1PH7103** **1PH7105** **1PH7107**	202.5 297.5	160	11	263 358	196	100	411 506	434 529	52	64	27	39	220	12	Pg 29	40	**38**	M12	80	41	10
132	**1PH7131** **1PH7133** **1PH7135** **1PH7137**	265.5 350.5	216	14	341 426	260	132	538 623	561 646	63	75	33	52	275	12	Pg 36	50	**42**	M16	110	45	12
160	**1PH7163** **1PH7167**	346.5 406.5	254	17	438 498	314	160	640 700	663 723	78	81	42	62	330	14	Pg 42	64	**55**	M20	110	59	16

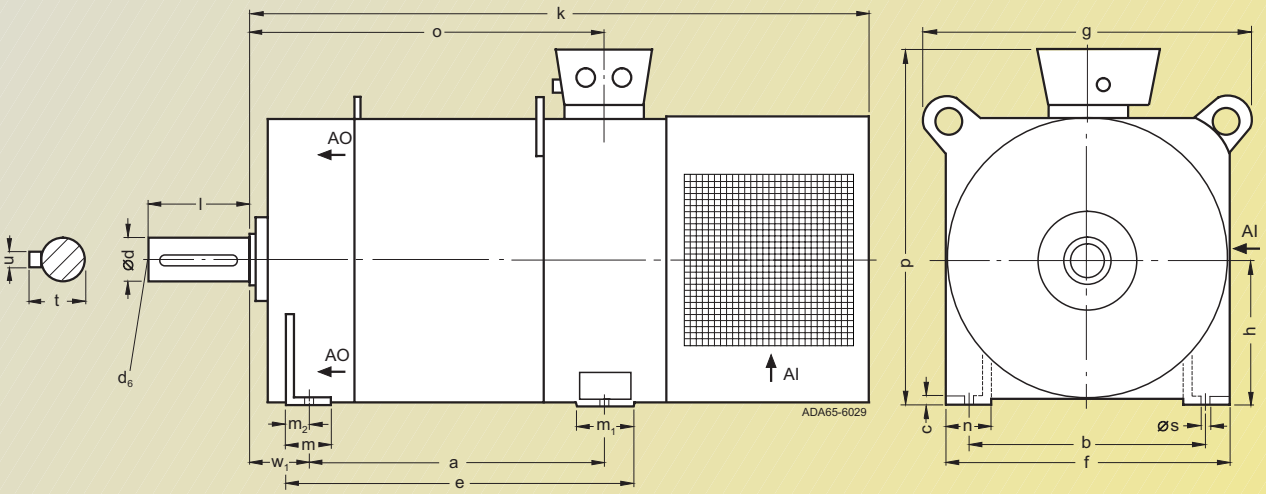


For motor		Dimension in mm																		D-end of shaft				
Size	Type	**DIN** **IEC**	a B	b A	c LA	e M	f AB	g AC	h H	k LB	k_1 –	m BA	m_1 –	m_2 –	n AA	o –	p [1] HD	s K	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 3, air flow from D-end to ND-end																								
180	**1PH7184** **1PH7186**	430 520	279	14	510 600	360	395	180	820 910	–	52	110	35	65	541 631	500 560	14.5	121	**60** **65**	M20	140	64 69	18
225	**1PH7224** **1PH7226** **1PH7228**	445 545 635	356	18	540 640 730	450	495	225	–	1100 1200 1290	60	110	40	85	629 729 819	680	18.5	149	**75**	M20	140	79.5	20



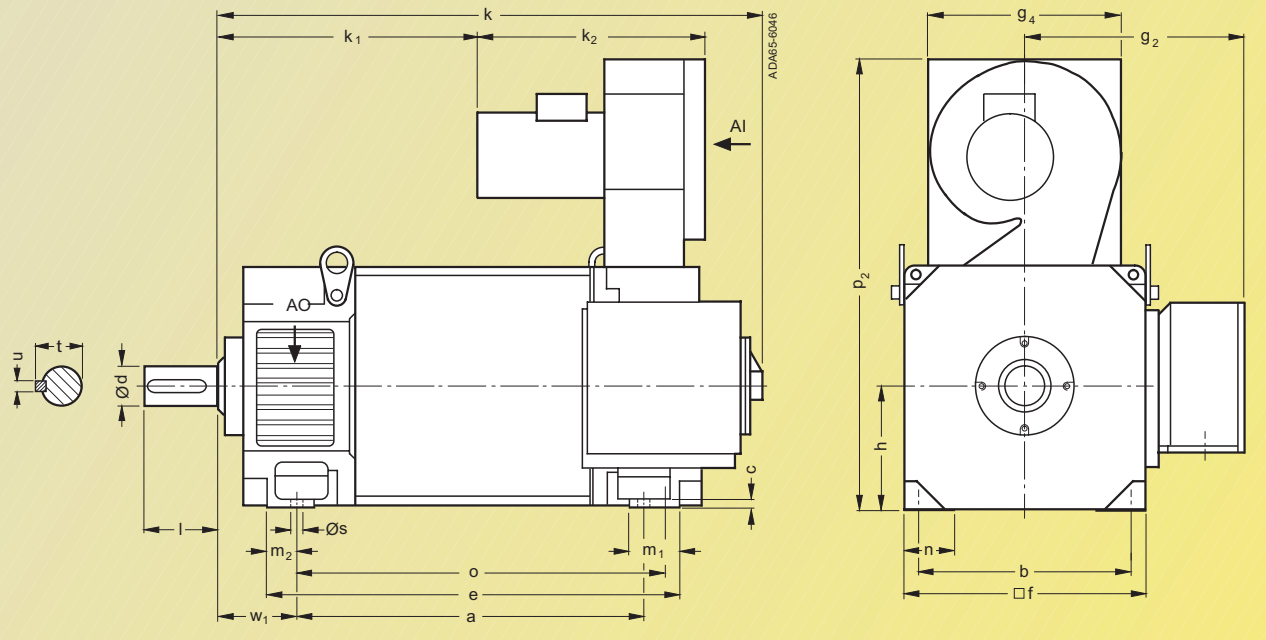
1) Maximum dimensions. Depending on the electrical design (terminal box type) smaller dimensions are also possible.

For motor		Dimension in mm																	D-end of shaft				
Size	Type	**DIN** **IEC**	a B	b A	c LA	e M	f AB	g AC	h H	k LB	m BA	m_1 –	m_2 –	n AA	o –	p [1]) HD	s K	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 3, air flow from ND-end to D-end																							
180	**1PH7184**		430	279	14	510	360	395	180	1010	52	110	35	65	541	500	14.5	121	**60**	M20	140	64	18
	1PH7186		520			600				1100					631	560			**65**			69	
225	**1PH7224**		445	356	18	540	450	495	225	1110	60	110	40	85	629	680	18.5	149	**75**	M20	140	79.5	20
	1PH7226		545			640				1210					729								
	1PH7228		635			730				1300					819								

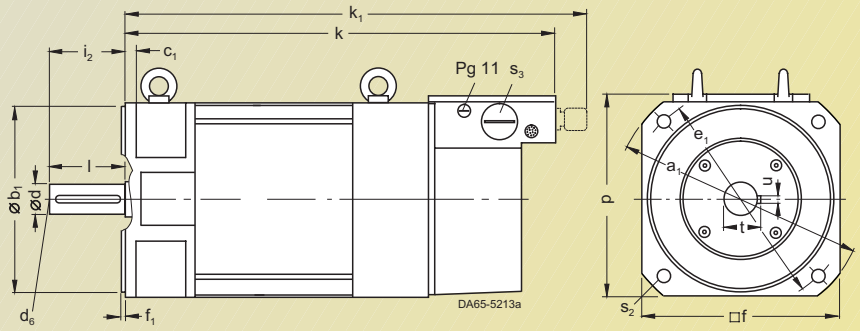


1) Maximum dimensions. Depending on the electrical design (terminal box type) smaller dimensions are also possible.

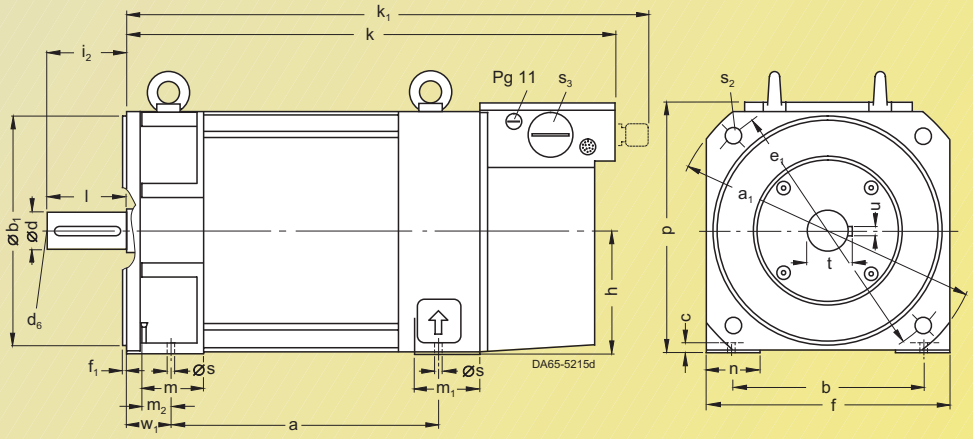
For motor		Dimension in mm																		D-end of shaft			
Size	Type	**DIN** **IEC**	a B	b A	c HA	e BB	f AB	g_2 AD	g_4 –	h H	k LB	k_1 –	k_2 –	m_1 –	m_2 –	n AA	o –	p_2 –	s K	w_1 C	**d** **D**	l E	t GA	u FA
Type of construction IM B 3																							
280	**1PH7284**		684	457	22	840	560	500	449	280	1150	490	535	108	80	100	730	1042	24	190	**95**	170	100	25
	1PH7286		794			950					1260	600					840				**95**	170	100	25
	1PH7288		924			1080					1390	730					970				**95**	170	100	25



For motor		Dimension in mm																			D-end of shaft					
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	i_2 –	k LB	k_1 –	p HD	s_2 S	s_3 –	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5																			
100	**1PH7101** **1PH7103** **1PH7105** **1PH7107**	250	180	10	215	196	4	80	411 506	434 529	218	14	Pg 29	**38**	M12	80	41	10
132	**1PH7131** **1PH7133** **1PH7135** **1PH7137**	350	250	16	300	260	5	110	538 623	561 646	273	18	Pg 36	**42**	M16	110	45	12



For motor		Dimension in mm																							D-end of shaft					
Size	Type	**DIN** **IEC**	a B	a_1 P	b A	b_1 N	c LA	e_1 M	f AB	f_1 T	h H	i_2 –	k LB	k_1 –	m BA	m_1 –	m_2 –	n AA	p HD	s K	s_2 S	s_3 –	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 35																													
100	**1PH7101** **1PH7103** **1PH7105** **1PH7107**	202.5 297.5	250	160	180	11	215	196	4	100	80	411 506	434 529	52	64	27	39	220	12	14	Pg 29	40	**38**	M12	80	41	10
132	**1PH7131** **1PH7133** **1PH7135** **1PH7137**	265.5 350.5	350	216	250	14	300	260	5	132	110	538 623	561 646	63	75	33	52	275	12	18	Pg 36	50	**42**	M16	110	45	12
160	**1PH7163** **1PH7167**	346.5 406.5	400	254	300	17	350	314	5	160	110	640 700	663 723	78	81	42	62	330	14	18	Pg 42	64	**55**	M20	110	59	16



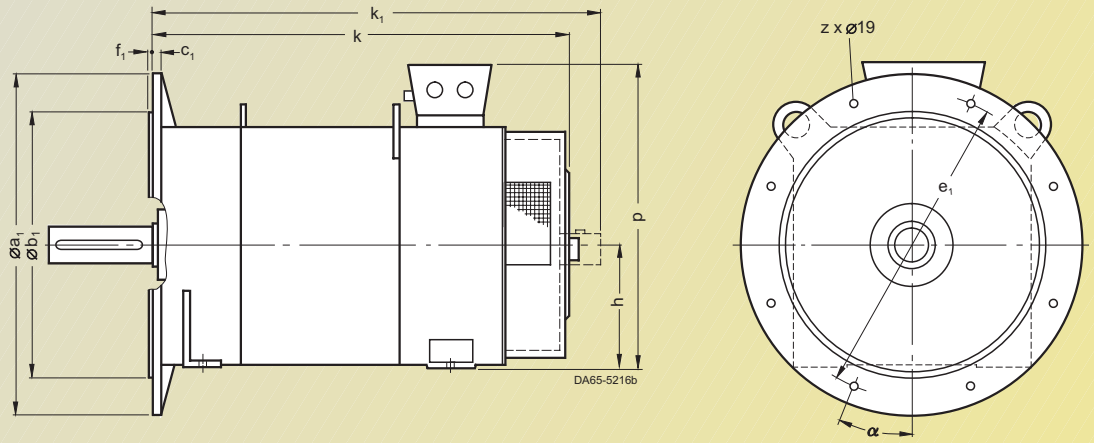
8

1PH7 motors

For motor — Dimension in mm

For dimensions for foot mounting, shaft and terminal box, see dimension drawing of 1PH718. and 1PH722. motors, type of construction IM B 3, on page 8/17.

Size	Type	DIN / IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f_1 T	h H	k LB	k_1 –	p [1] HD	z	α
Type of construction IM B 35, air flow from D-end to ND-end													
180	**1PH7184** [2]		400	300	15	350	5	180	820	–	500	4	45°
	1PH7184 [2]		450	350	16	400			820		500	8	22.5°
	1PH7186								910		560		
225	**1PH7224**		550	450	18	500	5	225	–	1100	680	8	22.5°
	1PH7226									1200			
	1PH7228									1290			



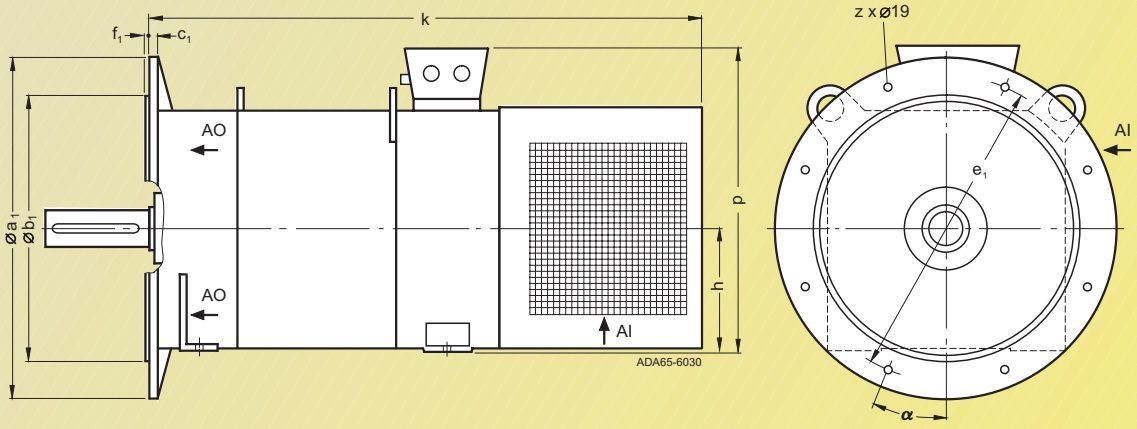
1) Maximum dimensions. Depending on the electrical design (terminal box type) smaller dimensions are also possible.

2) See Order No. suffix in Chapter 3.

For motor — Dimension in mm

For dimensions for foot mounting, shaft and terminal box, see dimension drawing of 1PH718. and 1PH722. motors, type of construction IM B 3, on page 8/18.

Size	Type	DIN / IEC	a_1 P	b_1 N	c_1 LA	e_1 M	f_1 T	h H	k LB	p [1] HD	z	α
Type of construction IM B 35, air flow from ND-end to D-end												
180	**1PH7184** [2]		400	300	15	350	5	180	1010	500	4	45°
	1PH7184 [2]		450	350	16	400			1010	500	8	22.5°
	1PH7186								1100	560		
225	**1PH7224**		550	450	18	500	5	225	1110	680	8	22.5°
	1PH7226								1210			
	1PH7228								1300			

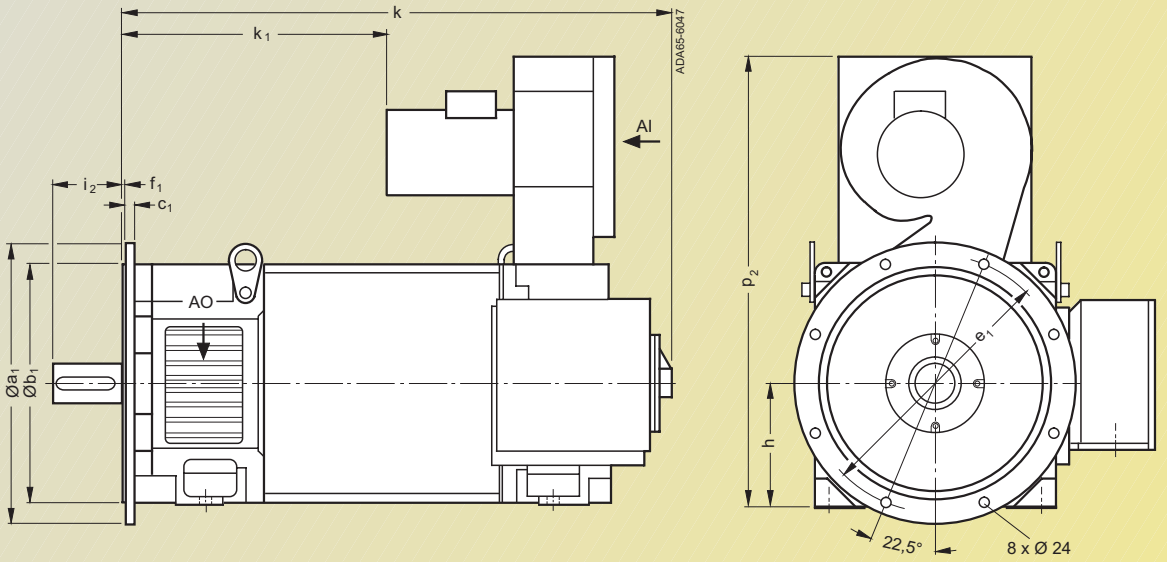


1) Maximum dimensions. Depending on the electrical design (terminal box type) smaller dimensions are also possible.

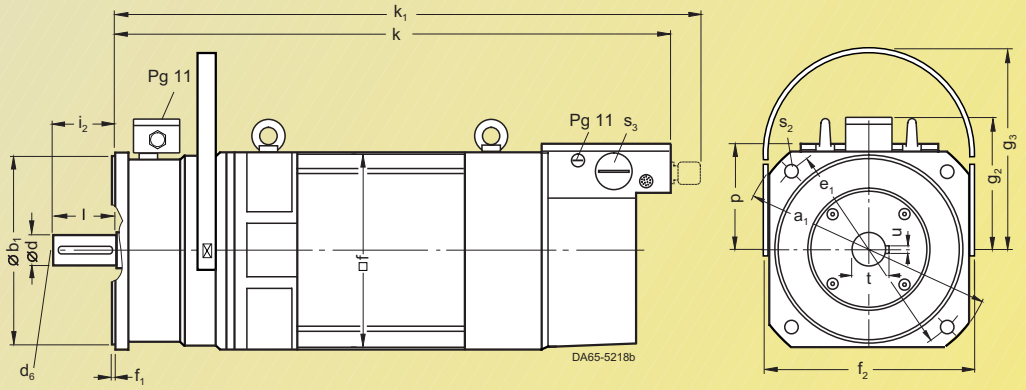
2) See Order No. suffix in Chapter 3.

For dimensions for foot mounting, shaft and terminal box, see dimension drawing of 1PH728. motors, type of construction IM B 3, on page 8/18.

For motor		Dimension in mm									
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f_1 T	h H	i_2 –	k LB	k_1 –	p_2 –
Type of construction IM B 35												
280	**1PH7284** **1PH7286** **1PH7288**		660	550	24	600	6	280	170	1150 1260 1390	490 600 730	1042

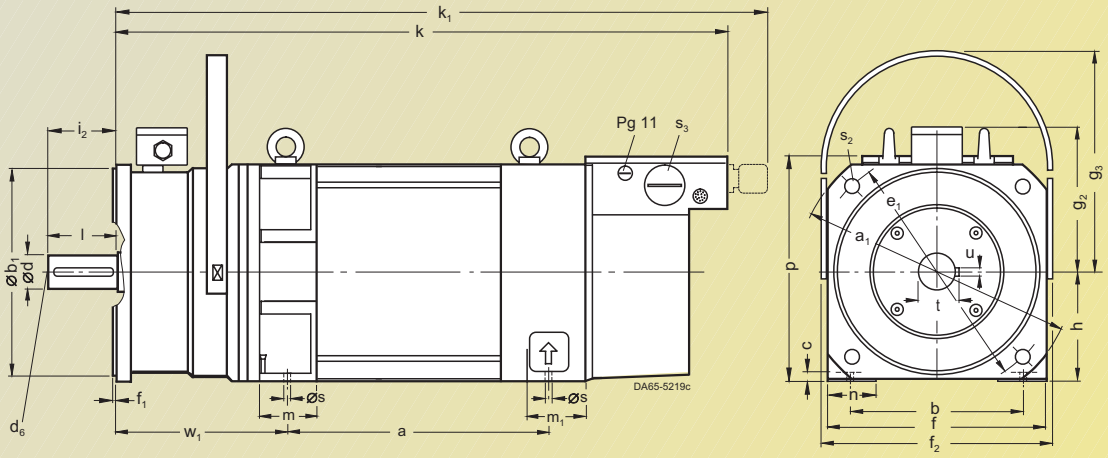


For motor		Dimension in mm															D-end of shaft				
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	f_2 –	g_2 AB	g_3 T	i_2 –	k LB	k_1 –	p HD	s_2 S	s_3 S	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, with brake module																						
100	**1PH7101** **1PH7103** **1PH7105** **1PH7107**		250	180	13	215	196	4	220	149	224	80	541 636	564 659	120	14	Pg 29	**38**	M12	80	41	10
132	**1PH7131** **1PH7133** **1PH7135** **1PH7137**		–	250	18	300	260	5	278	174	269	110	700 785	723 808	143	18	Pg 36	**42**	M16	110	45	12

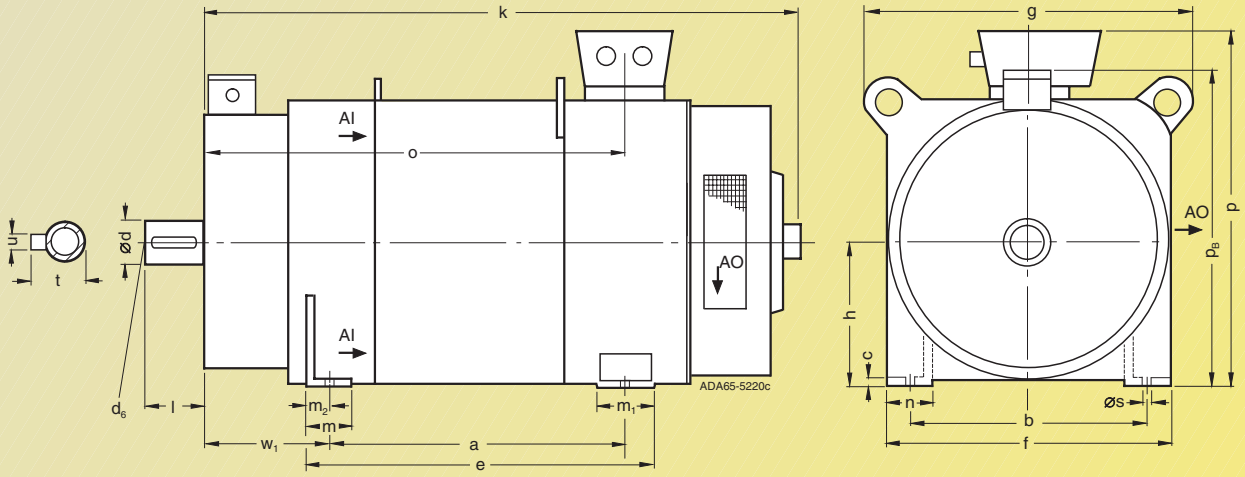


1PH7 motors

For motor		Dimension in mm																								D-end of shaft					
Size	Type	**DIN** **IEC**	a B	a_1 P	b A	b_1 N	c LA	e_1 M	f AB	f_1 T	f_2 –	g_2 –	g_3 –	h H	i_2 –	k LB	k_1 –	m BA	m_1 –	m_2 –	n AA	p –	s K	s_2 –	s_3 –	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 35, with brake module																															
100	**1PH7101** **1PH7103** **1PH7105** **1PH7107**	202.5 297.5	250	160	180	11	215	196	4	220	149	224	100	80	541 636	564 659	52	64	27	39	220	12	14	Pg 29	170	**38**	M12	80	41	10
132	**1PH7131** **1PH7133** **1PH7135** **1PH7137**	265 350.5	–	216	250	14	300	260	5	278	174	269	132	110	700 785	723 808	63	75	33	52	275	12	18	Pg 36	212	**42**	M16	110	45	12
160	**1PH7163** **1PH7167**	346.5 406.5	400	254	300	17	350	314	5	327	199	328	160	110	808 868	831 891	78	81	42	62	330	14	18	Pg 42	232	**55**	M20	110	59	16

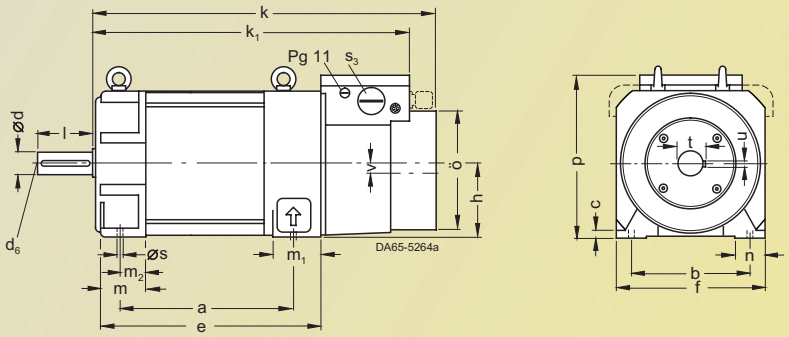


For motor		Dimension in mm																D-end of shaft				
Size	Type	**DIN** **IEC**	a B	b A	c LA	e M	f AB	g AC	h H	k LB	m BA	m_1 –	m_2 –	n AA	o –	p [1] –	p_B –	s K	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 3, with brake module																								
180	**1PH7184** **1PH7186**	430 520	279	14	510 600	360	395	180	930 1020	52	110	35	65	644 734	500 560	390	14.5	224	**90**	M20	90	95	25
225	**1PH7224** **1PH7226** **1PH7228**	445 545 635	356	18	540 640 730	450	495	225	1230 1330 1420	60	110	40	80	785 858 948	680	450	18.5	278	**100**	M20	100	106	28

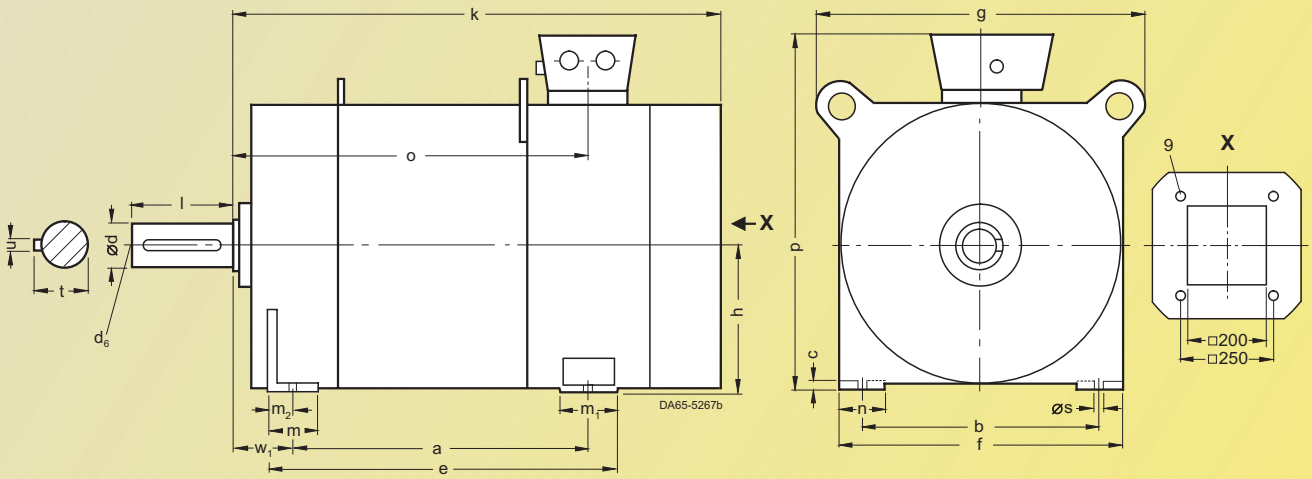


1) Maximum dimensions. Depending on the electrical design (terminal box type) smaller dimensions are also possible.

For motor		Dimension in mm																		D-end of shaft				
Size	Type	**DIN** **IEC**	a B	b A	c LA	e M	f AB	h H	k LB	k_1 –	m BA	m_1 –	m_2 –	n AA	ö –	p HD	s K	s_3 –	v –	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 3, with pipe connection at ND-end																								
100	**1PH7101** **1PH7103** **1PH7105** **1PH7107**		202.5 297.5	160	11	263 358	196	100	411 506	441 536	52	64	27	39	161	220	12	Pg 29	10.5	40	**38**	M12	80	41	10
132	**1PH7131** **1PH7133** **1PH7135** **1PH7137**		265.5 350.5	216	14	341 426	260	132	538 623	573 658	63	75	33	52	211.5	275	12	Pg 36	17	50	**42**	M16	110	45	12
160	**1PH7163** **1PH7167**		346.5 406.5	254	17	438 498	314	160	640 700	674 734	78	81	42	62	253	330	14	Pg 42	17	64	**55**	M20	110	56	16



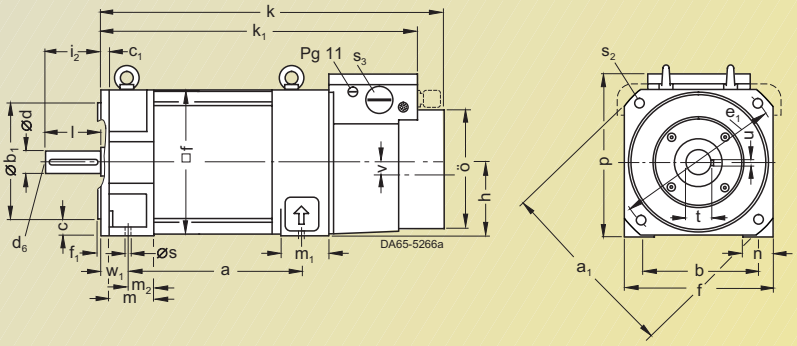
For motor		Dimension in mm																	D-end of shaft				
Size	Type	**DIN** **IEC**	a B	b A	c LA	e M	f AB	g AC	h H	k LB	m BA	m_1 –	m_2 –	n AA	o –	p [1] –	s K	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 3, with pipe connection at ND-end																							
180	**1PH7184** **1PH7186**		430 520	279	14	510 600	360	395	180	830 920	52	110	35	65	541 631	500 560	14.5	121	**60** **65**	M20	140	64 69	18
225	**1PH7224** **1PH7226** **1PH7228**		445 545 635	356	18	540 640 730	450	495	225	950 1050 1140	60	110	40	80	629 729 819	680	18.5	149	**75**	M20	140	79.5	20



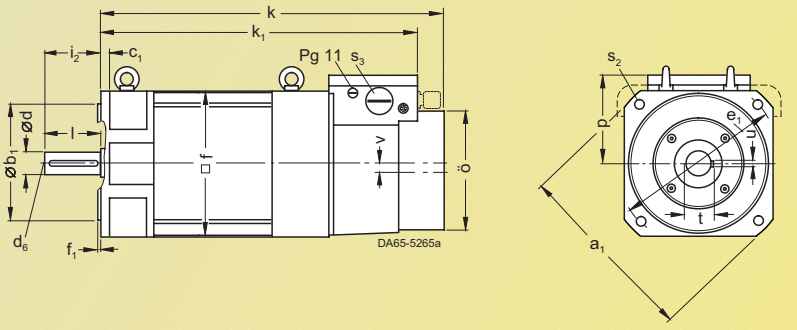
1) Maximum dimensions. Depending on the electrical design (terminal box type) smaller dimensions are also possible.

1PH7 motors

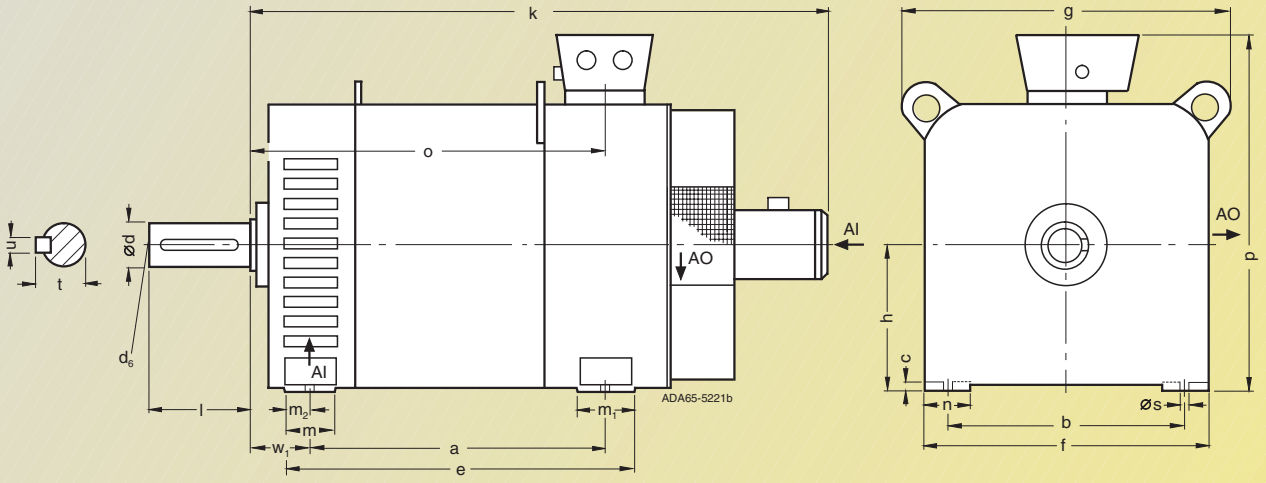
For motor		Dimension in mm																						D-end of shaft					
Size	Type	**DIN** **IEC**	a B	a_1 P	b A	b_1 N	c LA	c_1 –	e_1 –	f AB	f_1 T	h H	k LB	k_1 –	m BA	m_1 –	m_2 –	n AA	ö –	p HD	s K	s_2 K	s_3 –	v –	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 35, with pipe connection at ND-end																													
100	**1PH7101** **1PH7103**		202.5	250	160	180	11	13	215	196	4	100	411	441	52	64	27	39	161	220	12	14	Pg 29	10.5	40	**38**	M12	80	41	10
	1PH7105 **1PH7107**		297.5										506	536															
132	**1PH7131** **1PH7133**		265.5	350	216	250	14	17	300	260	5	132	538	573	63	75	33	52	211.5	275	12	18	Pg 36	17	50	**42**	M16	110	45	12
	1PH7135 **1PH7137**		350.5										623	658															
160	**1PH7163** **1PH7167**		346.5 406.5	400	254	300	17	22	350	314	5	160	640 700	674 734	78	81	42	62	253	330	14	18	Pg 42	17	64	**55**	M20	110	59	16



For motor		Dimension in mm																D-end of shaft				
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f AB	f_1 T	i_2 –	k LB	k_1 –	ö –	p HD	s_2 S	s_3 –	v –	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 5, with pipe connection at ND-end																					
100	**1PH7101** **1PH7103**		250	180	10	215	196	4	80	411	441	161	120	14	Pg 29	10.5	**38**	M12	80	41	10
	1PH7105 **1PH7107**									506	536										
132	**1PH7131** **1PH7133**		350	250	16	300	260	5	110	538	573	211.5	143	18	Pg 36	17	**42**	M16	110	45	12
	1PH7135 **1PH7137**									623	658										

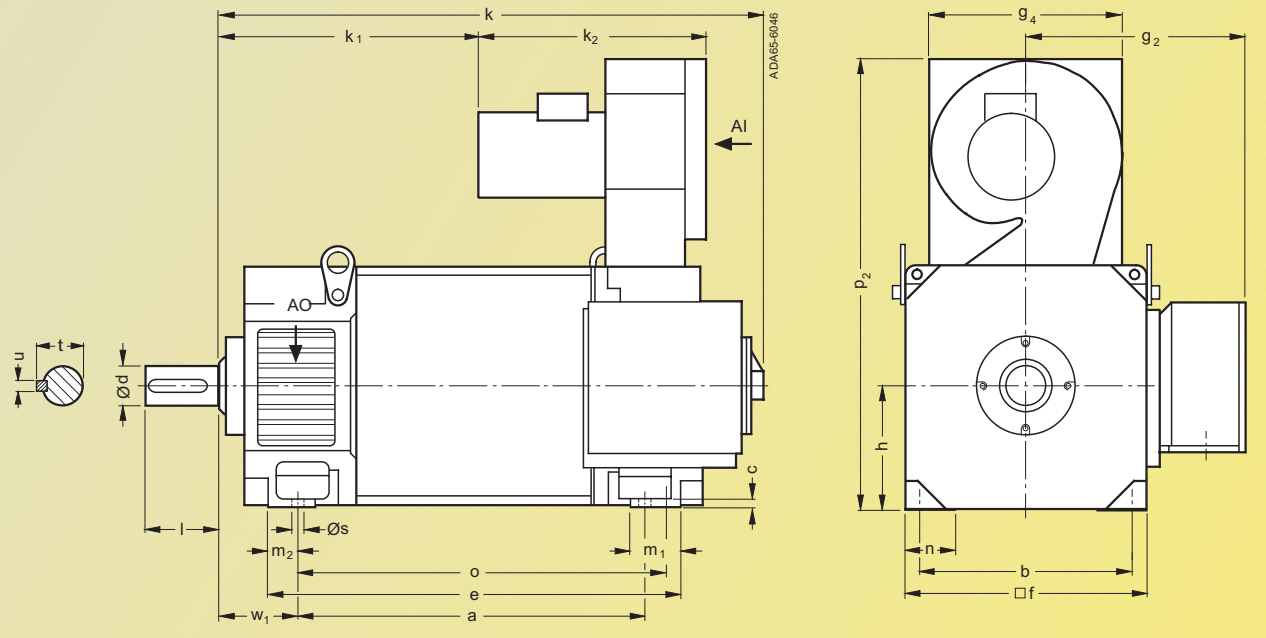


For motor		Dimension in mm																D-end of shaft				
Size	Type	**DIN** **IEC**	a B	b A	c LA	e M	f AB	g AC	h H	k LB	m BA	m_1 –	m_2 –	n AA	o –	p [1] –	s K	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 3																						
180	**1PL6184**		430	279	14	525	360	395	180	990	80	110	40	65	541	560	14.5	121	**60**	M20	140	64	18
	1PL6186		520			615				1080					631	580			**65**			69	
225	**1PL6224**		445	356	18	555	450	495	225	1100	80	110	60	85	629	680	18.5	149	**75**	M20	140	79.5	20
	1PL6226		545			660				1200					729								
	1PL6228		635			745				1290					819								



1) Maximum dimensions. Depending on the electrical design (terminal box type) smaller dimensions are also possible.

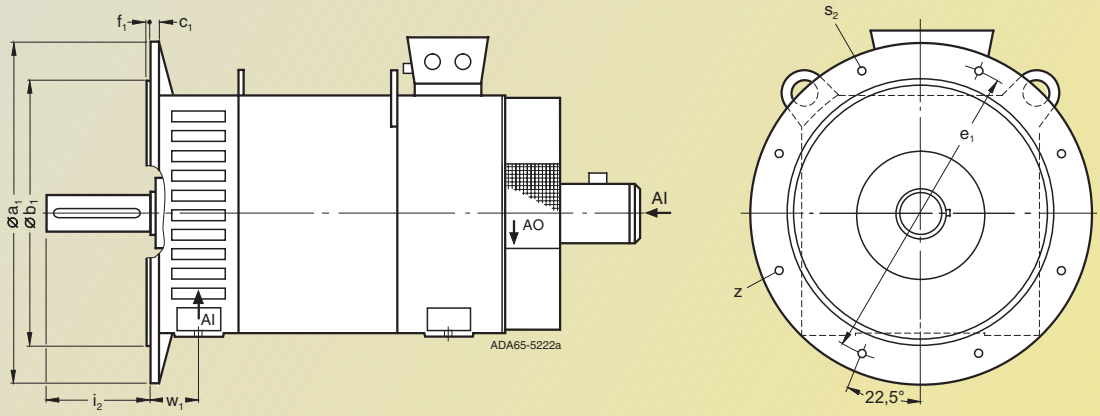
For motor		Dimension in mm																		D-end of shaft			
Size	Type	**DIN** **IEC**	a B	b A	c HA	e BB	f AB	g_2 AD	g_4 –	h H	k LB	k_1 –	k_2 –	m_1 –	m_2 –	n AA	o –	p_2 –	s K	w_1 C	**d** **D**	l E	t GA	u FA
Type of construction IM B 3																							
280	**1PL6284**		684	457	22	840	560	500	449	280	1150	490	535	108	80	100	730	1042	24	190	**95**	170	100	25
	1PL6286		794			950					1260	600					840				**95**	170	100	25
	1PL6288		924			1080					1390	730					970				**95**	170	100	25



1PL6 motors

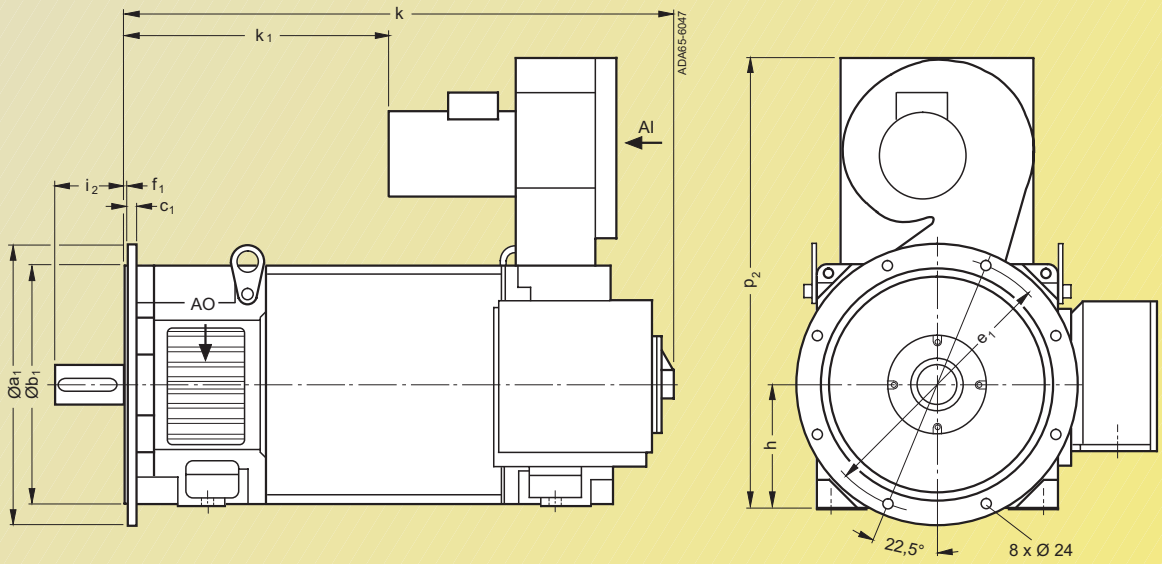
For dimensions for foot mounting, shaft and terminal box, see dimension drawing of 1PL618. and 1PL622. motors, type of construction IM B 3, on page 8/21.

For motor		Dimension in mm									
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f_1 T	i_2 –	s_2 S	z –	w_1 –
Type of construction IM B 35											
180	**1PL6184** **1PL6186**		450	350	16	400	5	140	19	8	121
225	**1PL6224** **1PL6226** **1PL6228**		550	450	18	500	5	140	19	8	149



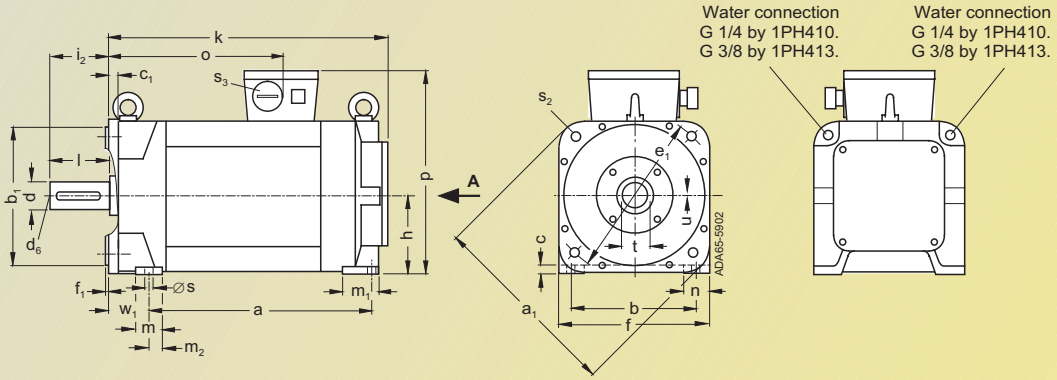
For dimensions for foot mounting, shaft and terminal box, see dimension drawing of 1PL628. motors, type of construction IM B 3, on page 8/25.

For motor		Dimension in mm										
Size	Type	**DIN** **IEC**	a_1 P	b_1 N	c_1 LA	e_1 M	f_1 T	h H	i_2 –	k LB	k_1 –	p_2 –
Type of construction IM B 35												
280	**1PL6284** **1PL6286** **1PL6288**		660	550	24	600	6	280	170	1150 1260 1390	490 600 730	1042

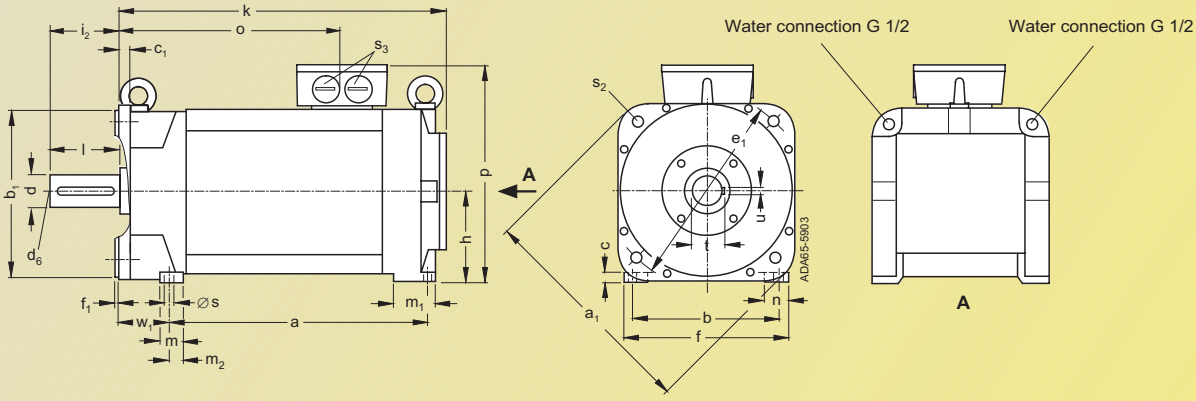


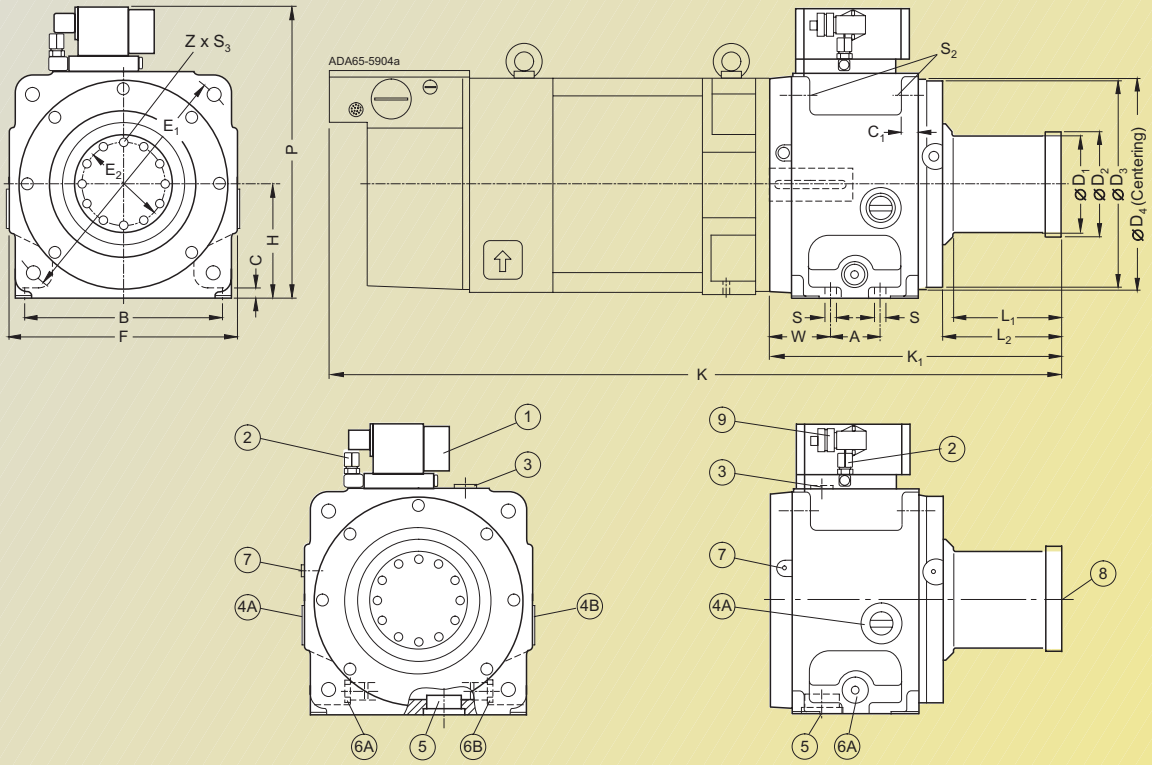
For motor		Dimension in mm																						D-end of shaft				
Size	Type	**DIN** **IEC**	a B	a_1 P	b A	b_1 N	c LA	c_1 –	e_1 –	f AB	f_1 T	h H	i_2 –	k LB	m BA	m_1 –	m_2 –	n AA	o –	p HD	s K	s_2 K	s_3 –	w_1 C	**d** **D**	d_6 –	l E	t GA	u F
Type of construction IM B 35, water-cooled																												
100	**1PH4103**		349	250	160	180	11	12	215	190	4	100	80	416	35	60	24	40	245	259	12	14	Pg 29	44	**38**	M12	80	41	10
	1PH4105		409											476					305										
	1PH4107		474											541					370										
132	**1PH4133**		377	350	216	250	14	16	300	246	5	132	110	458	36	85	25	46	264	334.5	12	18	Pg 36	53	**42**	M16	110	45	12
	1PH4135		447											528					334										
	1PH4137		497											578					384										
160	**1PH4163**		508	400	254	300	15	18	350	290	5	160	110	591	42	77	29	52	407	388	14	18	Pg 36	56	**55**	M20	110	59	16
	1PH4167		563											646					462										
	1PH4168		608											691					507										

1PH410 .
1PH413 .



1PH416 .





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 B 35.
⑥A Oil inlet for clockwise rotation and greasing around the circumference.
⑥B Oil inlet for counterclockwise rotation and greasing around the circumference.
⑦ Oil inlet for type IM V 15 (must be connected).
⑧ Oil inlet for type IM V 36.
⑨ Connector, manufacture: Harting, type HAN 8 U.

Motor		Gear unit																				Total length motor with 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	L_1	L_2	P	S	S_2	S_3	Z	W	K
1PH7, type of construction IM B 35, with 2-gear unit																							
100	**1PH7101** **1PH7103** **1PH7105** **1PH7107**	55	184	12	18	100	100	188	190	215	80	208	**108**	298	–	116	301	14	14	M8	8	63	709 709 804 804
132	**1PH7131** **1PH7133** **1PH7135** **1PH7137**	58	234	12	20	116	118	249	250	300	100	270	**136**	346.5	129.5	142.5	346	14	18	M12	12	71	885 885 970 970
160	**1PH7163** **1PH7167**	58	290	17	20	140	130	249	250	350	100	326	**164**	346.5	–	142.5	402	14	18	M12	12	71	987 1024
1PH4, type of construction IM B 35, with 2-gear unit																							
100	**1PH4103** **1PH4105** **1PH4107**	55	184	12	18	100	100	188	190	215	80	208	**108**	298	–	116	301	14	14	M8	8	63	714 774 839
132	**1PH4133** **1PH4135** **1PH4137** **1PH4138**	58	234	12	20	116	118	249	250	300	100	270	**136**	346.5	129.5	142.5	346	14	18	M12	12	71	805 875 925 960
160	**1PH4163** **1PH4167** **1PH4168**	58	290	17	20	140	130	249	250	350	100	326	**164**	346.5	–	142.5	402	14	18	M12	12	71	938 993 1038

Dimensions for 1PH7184, 1PH7186 and 1PH7224 on request.

Notes

Servomotors
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A

Environment, resources and recycling

Siemens AG is very much aware of the fact that it has an important role to play in protecting the environment and conserving valuable natural resources. This applies to both manufacturing and the products we sell.

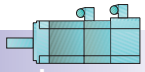
As early as the development phase, the possible impact of future products/systems on the environment is taken into consideration. Our aim is to prevent environmental pollution or, at least, reduce it to a minimum and, in doing so, look beyond existing regulations and legislation.

Below are some of the most important environment-related factors which are taken into account:

The use of dangerous substances (such as arsenic, asbestos, beryllium, cadmium, CFC, halogens and many more) is avoided as early as the development phase.

Easy to disconnect connections have been designed and materials are selected carefully with preference being given to recyclable materials or materials which can be disposed without causing problems.

Synchronous Servomotors



Asynchronous Servomotors

Materials for manufacturing purposes are identified in accordance with their recyclability. This applies, in particular, to components which contain unavoidable, dangerous 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; we also try to keep the amount of packaging material used to a minimum.

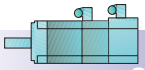
If possible, we pack our products in reusable packaging.

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 devisions of A&D of Siemens AG are certified.

Asynchro-
nous Servomotors



Synchro-
nous Servomotors

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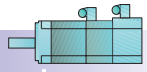
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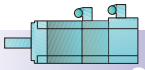

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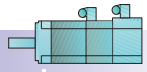

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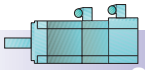

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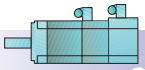

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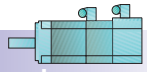

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