

SIEMENS



[siemens.com/sinamics-v90](https://www.siemens.com/sinamics-v90)

SINAMICS V90

The performance-optimized and easy-to-use servo drive system

Answers for industry.



Content

System overview	03
System highlights	06
SINAMICS V-ASSISTANT engineering tool	10
Complete solution for motion control applications	11
SINAMICS V90 technical data and control features	12
SINAMICS V90 dimensions and mounting clearances	15
SIMOTICS S-1FL6 technical data and torque-speed characteristics	16
SIMOTICS S-1FL6 dimension drawings	18
System overview and connection diagrams	20
SINAMICS V90 and SIMOTICS S-1FL6 ordering information	22

SINAMICS V90 and SIMOTICS S-1FL6

Belonging to two comprehensive drive technology families

SINAMICS V90 is the new member of the SINAMICS drive family, and SIMOTICS S-1FL6 is the new member of the SIMOTICS motor family. Together, they form an optimized servo drive system for positioning, as well as speed and torque control. Through its optimized design, the system ensures high servo performance in a cost-efficient and easy way as well as a high degree of ruggedness.



SINAMICS and SIMOTICS products are part of Siemens Integrated Drive Systems. Drive technology based on Integrated Drive Systems ensures maximum productivity, energy-efficiency, and reliability in any automation environment and throughout the entire lifecycle.

The SINAMICS family offers the optimum drive for every application. All drives can be engineered, parameterized, commissioned and operated in the same way.

- The SINAMICS family can tackle any drive application
- Wide range of power ratings from 0.12 kW to 120 MW
- Available in low-voltage, medium-voltage and DC versions
- Standard functionality using a common hardware and software platform.
- High degree of flexibility and combinability

SIMOTICS motors provide you with an ideal solution for any application. They are the most comprehensive range of electric motors worldwide.

SIMOTICS stands for:

- 125 years of experience in building electric motors
- Optimum solutions in all sectors, regions and performance classes
- Innovative motor technologies with the highest quality and reliability
- Highest dynamic performance, precision and efficiency – but still extremely compact

The complete range for all application consists of:

- SIMOTICS low-voltage motors – high-efficiency up to 1250 kW
- SIMOTICS motion control motors – highest dynamic performance and precision
- SIMOTICS DC motors – the pioneers in DC motors
- SIMOTICS high-voltage motors – maximum efficiency and reliability

Siemens supports its customers worldwide throughout the entire lifecycle of machines and plants with services for products, systems and applications.

SINAMICS V90

Optimized servo drive solution for motion control applications

SINAMICS V90 single-axis servo drives

SINAMICS V90 is designed to meet general purpose servo applications, taking into consideration the challenges of machine builders and system integrators regarding costs and time to market.

It is easy to commission the SINAMICS V90 system – essentially just plug & play. Further, it has optimized servo performance, can be quickly integrated into SIMATIC PLC control systems and has a high degree of reliability. A seamless drive system is created by combining SINAMICS V90 servo drive with our SIMOTICS S-1FL6 servomotor.

SINAMICS V90 features internal positioning, positioning with pulse train and speed and torque control modes. With integrated real-time auto tuning and automatic suppression of machine resonances, the system automatically optimizes itself to achieve a high dynamic performance and smooth operation. Further, as a result of the high frequency limit up to 1MHz, the pulse train input facilitates high positioning accuracy.

SINAMICS V-ASSISTANT engineering tool

A PC with installed SINAMICS V-ASSISTANT software tool can be connected to SINAMICS V90 via a standard USB port. It is used for setting parameters, test operation, troubleshooting – and has powerful monitoring functions.



Highlights of the SINAMICS V90 and SIMOTICS S-1FL6 servo drive system:

Optimized servo performance

- Auto tuning enables machines to achieve a high dynamic performance
- Automatic suppression of machine resonances
- 1 MHz high-frequency pulse train input
- Multi-turn absolute encoder with 20-bit resolution

Cost-effective

- Integrated control modes: Pulse train positioning, internal positioning, speed and torque control modes
- Integrated internal positioning function
- Integrated braking resistor in all frame sizes
- Integrated holding brake switch, no external relay necessary

Easy to use

- Easy servo tuning and machine optimization
- Easy commissioning with SINAMICS V-ASSISTANT
- Parameter cloning

Reliable operation

- Wide voltage range 380 V ~ 480 V, -15% / +10%
- High quality motor bearings
- All motors have IP65 degree of protection and are equipped with oil seal
- Integrated safe torque off (STO)
- Reliable drive and motor combination

Power range: 0.4 kW to 7.0 kW

Voltage range: 3AC 380 V ... 480 V (-15% / +10%)

Control modes: Pulse train positioning, internal positioning, speed, torque

SIMOTICS S-1FL6

Optimized servomotor solution for motion control applications

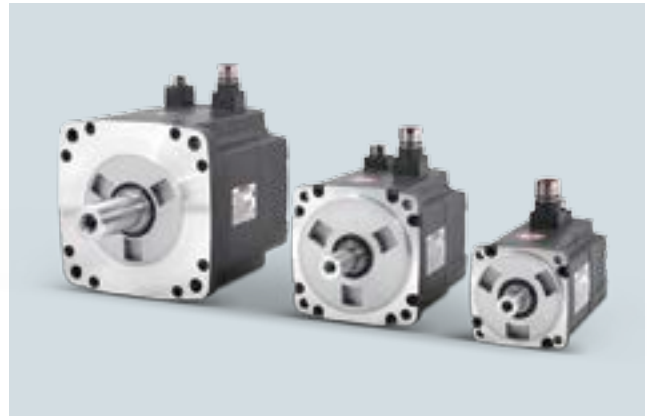
SIMOTICS S-1FL6 servomotors

SIMOTICS S-1FL6 are naturally cooled, permanent-magnet synchronous motors where the heat is dissipated through the motor surface. The motors can be simply and quickly installed using the quick-release connectors

- 3 shaft heights: 45mm, 65mm, 90mm
- Rated torques from 1.27 Nm up to 33.40 Nm
- Rated speed of 2000 or 3000 rpm
- Incremental encoders TTL 2500 S/R (13-bit resolution) and absolute encoders (20-bit resolution) are available
- Degree of protection IP65, natural cooling
- Optional holding brake
- With plain shaft or feather key

The motors have a 300 percent overload capability and can be combined with the SINAMICS V90 drives to create a powerful servo system with high functionality. Incremental or absolute encoders can be selected depending on the application. SIMOTICS S-1FL6 motors have a high

degree of dynamic performance, wide speed control range and high shaft end and flange precision.



Typical applications

- Handling machines
e.g. pick & place machines
- Packaging machines
e.g. labeling machines
horizontal packaging machines
- Automatic assembly machines
- Metal forming machines
- Printing machines
e.g. screen printing machines
- Winders and unwinders



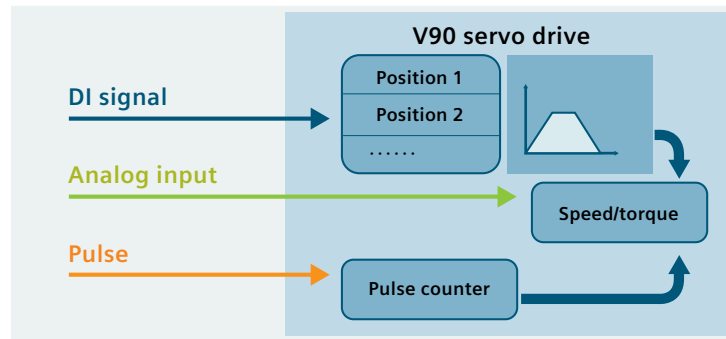
Cost-effective

Many integrated functions to reduce machine costs

Integrated control modes

Pulse train input position control mode (PTI), internal position control mode (IPos), speed control mode and torque control are all integrated in the SINAMICS V90.

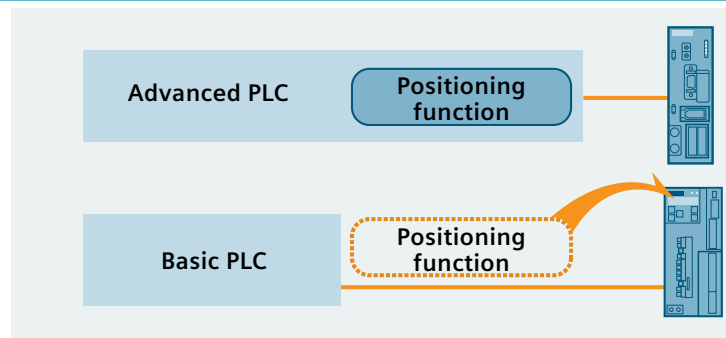
The drive has various integrated control modes to address a wide range of applications.



Integrated positioning function

- Position, speed, and acceleration setpoints can be entered
- Integrated referencing function
- Feed forward and feed backward – or a combination of digital inputs to select position
- Positioning step enable from external digital input
- Absolute and relative positioning.

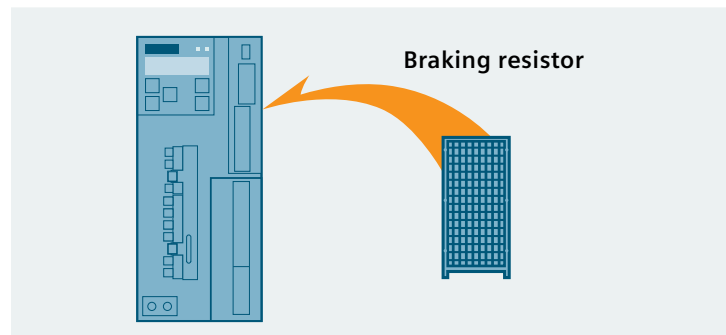
Point-to-point positioning possible using a PLC without positioning functionality.



Integrated braking resistor for all frame sizes

Braking resistor is integrated for all frame sizes to dissipate the regenerative power for fast braking.

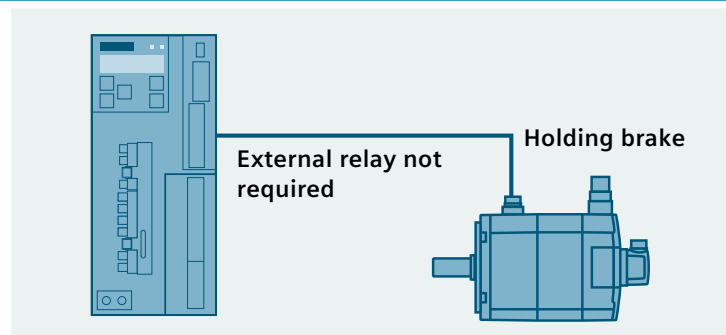
Most applications can be realized without an additional braking resistor.



Integrated holding brake switch

Integrated holding brake switch – the brake can be directly connected to the drive if a motor with holding brake is used.

Holding brake can be connected without requiring an external relay.



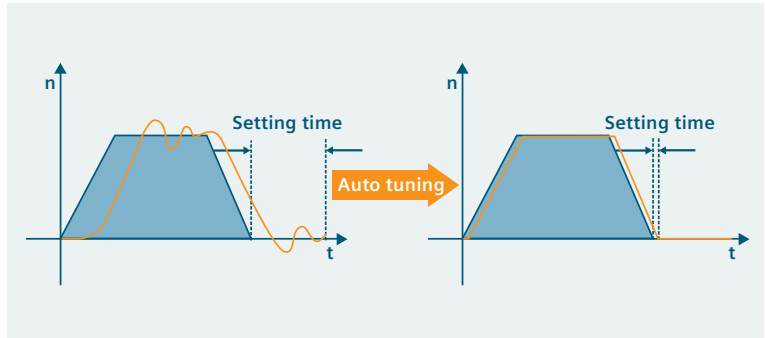
Optimized servo performance

Quick, smooth and precise positioning

Advanced auto tuning

Control loop parameters are optimized automatically. This function can be used when commissioning the system and in operation for changing loads.

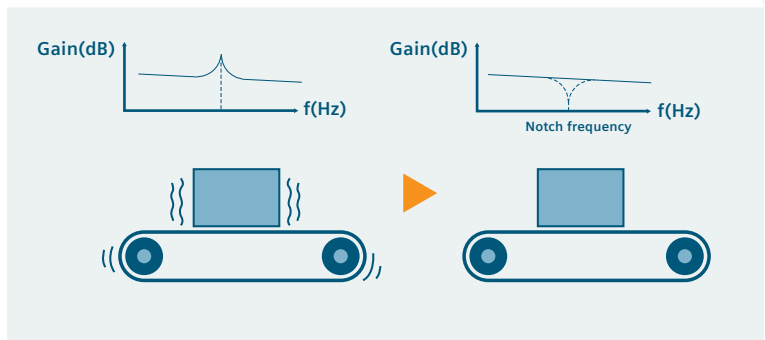
This allows machines to achieve a high dynamic performance and smooth operation in a wide range of applications.



Automatic suppression of machine resonances

When this function is activated the drive identifies mechanical resonance frequencies and automatically suppresses these using a filter. Vibration and noise during operation are reduced.

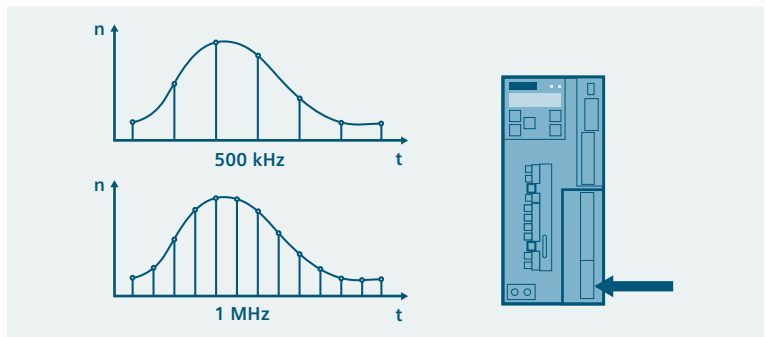
This ensures a high dynamic response of the machine while decreasing machine vibration.



1MHz pulse train setpoint and 20-bit encoder resolution

The command pulse train input operate at the high frequency up to 1MHz and the feedback absolute encoder available with 20 bit resolution.

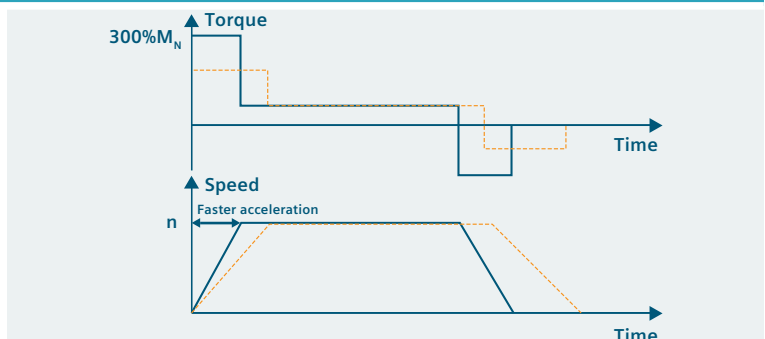
Makes the machine to reach high positioning accuracy and low speed ripple.



Optimized system performance

- 300 percent overload capability of drive and motor
- Low motor torque ripple
- Motor and drive are perfectly coordinated with one another

Fast acceleration and braking while maintaining a smooth running system to ensure high machine productivity.



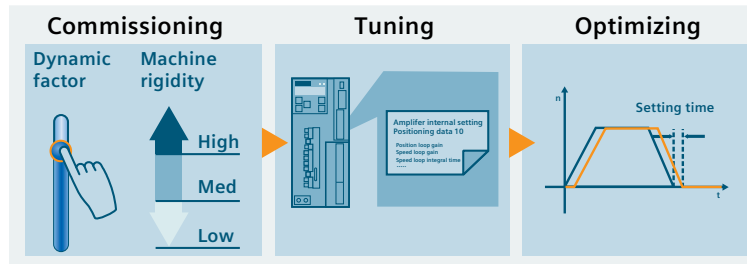
Easy to use

Simple tuning and quick commissioning

Easy servo tuning and machine optimization

The system can be automatically optimized using the auto tuning function and automatic suppression of machine resonances.

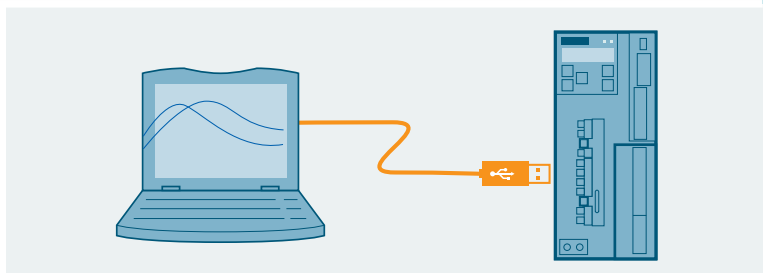
Simply plug & play, no in-depth servo know-how required.



Easy commissioning using the SINAMICS V-ASSISTANT engineering tool

Graphic screen forms guide the user when setting application-specific parameters; intuitive drive and motor status check; integrated trace and measuring functionality.

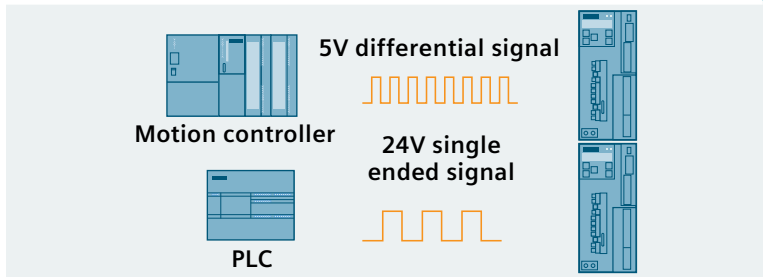
SINAMICS V-ASSISTANT makes commissioning and diagnostics quick and easy.



Simple connection to a control system

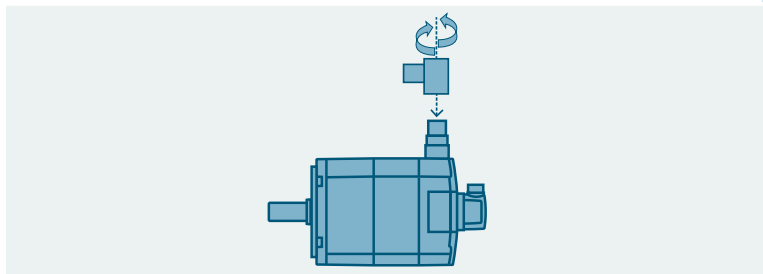
Two channel pulse train for position setpoint, one exclusively for 5V differential (RS422 standard), one for 24V single ended signal.

Standard interface makes it easy to couple the drive with PLCs and motion controllers.



Optimized system for easy use

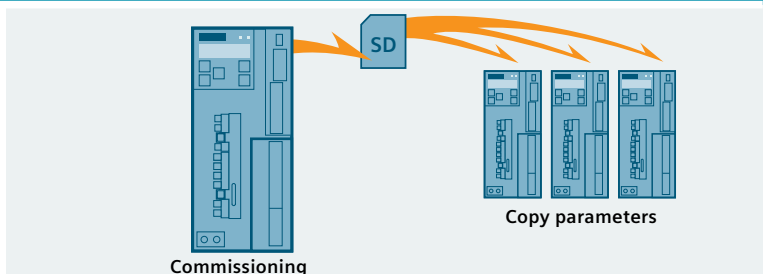
- Rotatable connector on the motor
- Quick-release coupling for the encoder and brake connectors between motor and cable (only a plug without screws is used)
- Error-free system selection



Parameter cloning

SINAMICS V90 servo drives have a standard SD card slot, parameter setting can be easily transferred between drive devices.

Efficient commissioning of serial machines.

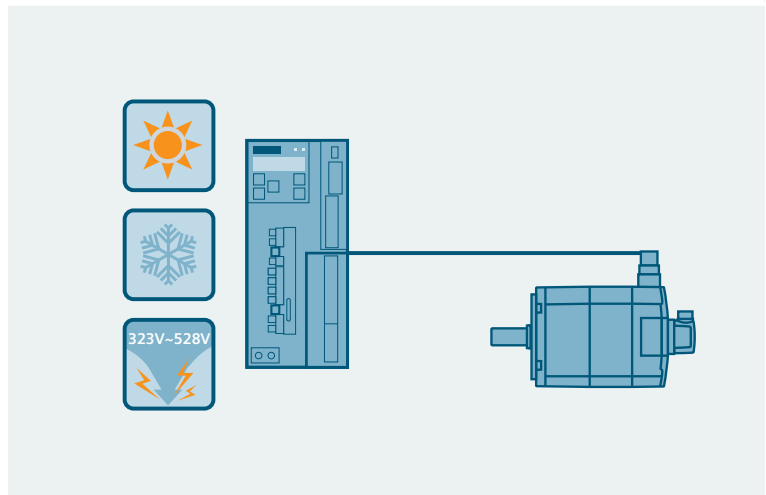


Reliable operation

Robust design and safe choice

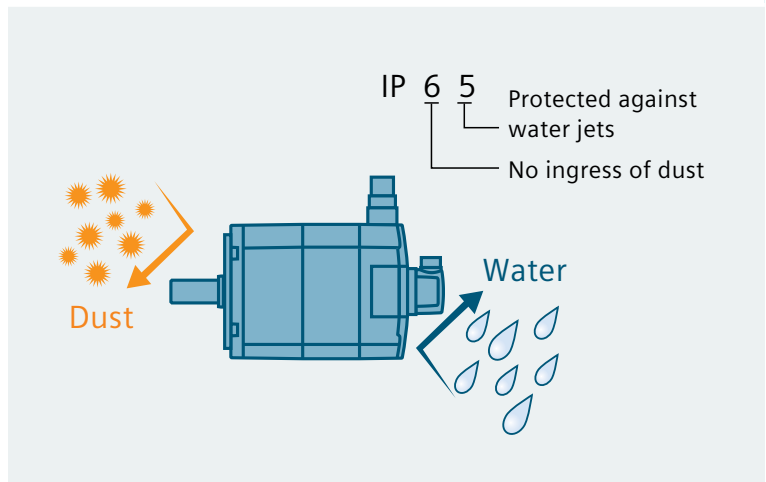
Can withstand harsh environments

- Wider voltage range 380 V ~ 480 V, -15% / +10%
- Coated PCB increases robustness of the drive to cope with harsh environments
- Motor is equipped with high-quality bearings



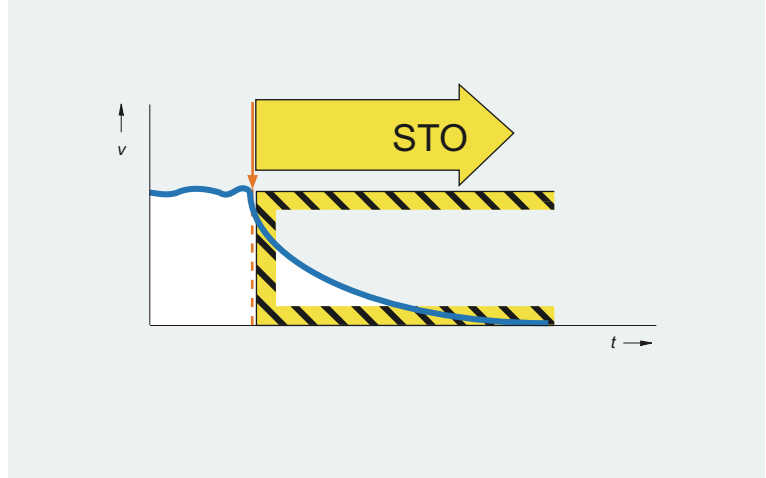
High degree of motor protection

- SIMOTICS S-1FL6 motors have degree of protection IP65 as standard - this includes the cable connectors
- Oil seal at shaft end as standard
- High quality metal motor connector



Integrated safety function STO (safe torque off)

The STO (safe torque off) function is a standard feature of all SINAMICS V90 servo drives. This function prevents the motor from moving unexpectedly and complies with safety standard SIL2 (EN618005-2). This safety functionality can be realized without additional components.



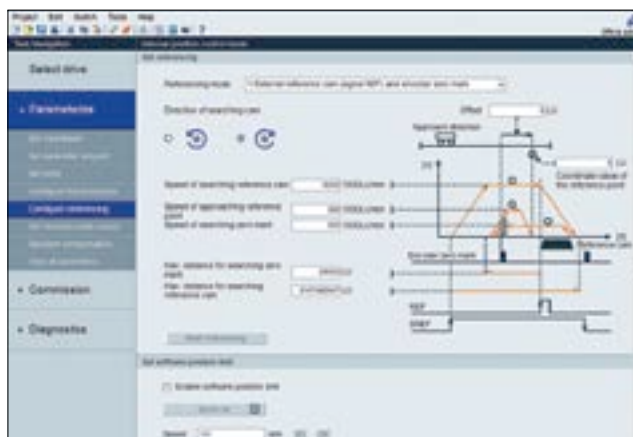
SINAMICS V-ASSISTANT

Easy-to-use engineering tool for commissioning and diagnostics

- Intuitive menu navigation provides a clear overview of the commissioning workflow
- Simple commissioning with point-to-point communication via USB interface
- Graphic screen forms guide the user when setting application-specific parameters
- High degree of usability:
 - compact
- can be downloaded from the SINAMICS V90 internet page: www.siemens.com/sinamics-v90
- languages can be toggled on-the-fly
- Advanced tools such as the trace function, machine-measuring function, servo tuning function and control panel are available to optimize the machine performance and for diagnostics
- Convenient data handing for commissioning series machines and archiving different machine versions



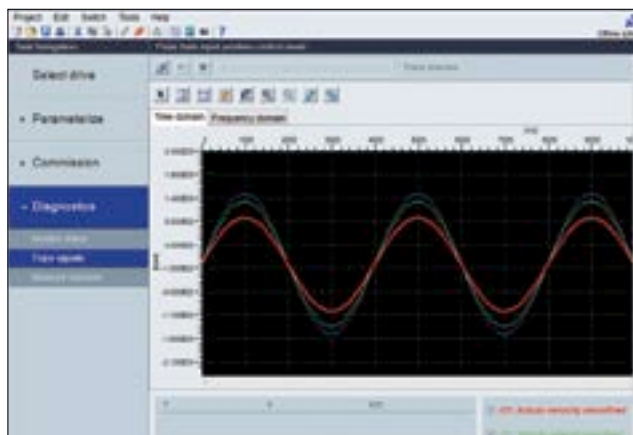
User task-centric design for prompted machine commissioning



Graphic screen so that users can quickly and simply configure machines



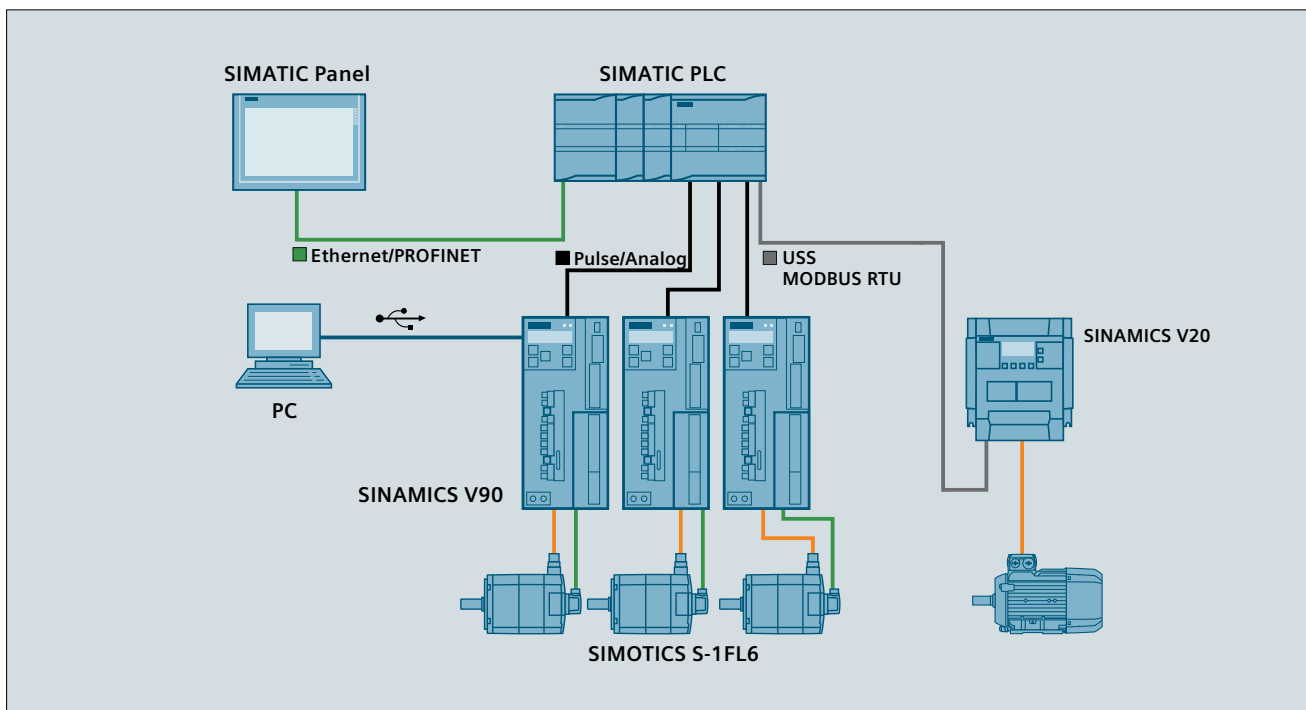
Graphic view to monitor the digital inputs/outputs and other control signals



Trace function to monitor the drive and motor status


Complete solution for motion control applications

With SINAMICS V90 and SIMOTICS S-1FL6, the optimized servo drive system – together with SIMATIC Panel, SIMATIC PLC and SINAMICS V20 – SIEMENS is offering comprehensive solutions from a single source for general motion control applications. Typical sectors include textiles, packaging, material handling – as well as many others.



SINAMICS V90

Technical data

Technical data									
Order No.	6SL3210-5FE	10-4UA0	10-8UA0	11-0UA0	11-5UA0	12-0UA0	13-5UA0	15-0UA0	17-0UA0
Frame size		FSAA	FSA		FSB		FSC		
Rated power (kW)		0.40	0.75	1.00	1.50	2.00	3.50	5.00	7.00
Rated output current (A)		1.2	2.1	3.0	5.3	7.8	11.0	12.6	13.2
Max. output current (A)		3.6	6.3	9.0	15.9	23.4	33.0	37.8	39.6
Line supply	Voltage	3AC 380V ... 480V, (-15% / +10%)							
	Frequency	50/60Hz, (-10% / +10%)							
	Capacity (kVA)	1.7	3.0	4.3	6.6	11.1	15.7	18.0	18.9
Control power supply	Voltage (V) ¹⁾	24 DC (-15% / +20%)							
	Current (A)	1.6 (without holding brake), 3.6 (with holding brake)							
Line supply system		TN, TT, IT, TT earthed line							
Overload capacity		300% x rated current for 300ms every 10s							
Control system		Servo control							
Braking resistor		Integrated							
Ambient temperature	Operation	0 °C to 45 °C, without power derating 45 °C to 55°C, with power derating up to 20% at 55 °C							
	Storage	-40°C to +70°C							
Ambient humidity	Operation	< 90% (no condensation)							
	Storage	90% (no condensation)							
Pollution class		2							
Vibration severity	In operation	≤ 1 g (g=9,81 m/s ²)							
	During transport	≤ 2 g (g=9,81 m/s ²)							
Degree of protection		IP20							
Cooling		Natural cooling				Fan cooling			
Altitude		≤ 1000 m (without power derating); > 1000 m and up to 5000 m (with power derating)							
Weight approx. (kg)		1.5 kg	2.1 kg		2.7 kg		5.9 kg		
Standards		 , cULus, C-tick							
Interface									
USB		Mini USB							
Pulse train input		2 channel, one exclusively for 5V differential signal, one for 24V single ended signal							
Pulse train encoder output		5 V differential signal, phases A, B, Z							
Digital inputs/outputs		10 inputs, NPN/PNP; 6 outputs, sink type							
Analog inputs		2 analog inputs, input voltage range +/-10V, 13-bit							
Analog outputs		2 analog outputs, output voltage range +/-10V, 10-bit							

¹⁾ When SINAMICS V90 controls a motor equipped with brake, the tolerance of the 24 V DC power supply must be -10% to +10% to comply with the voltage required by the brake.

SINAMICS V90

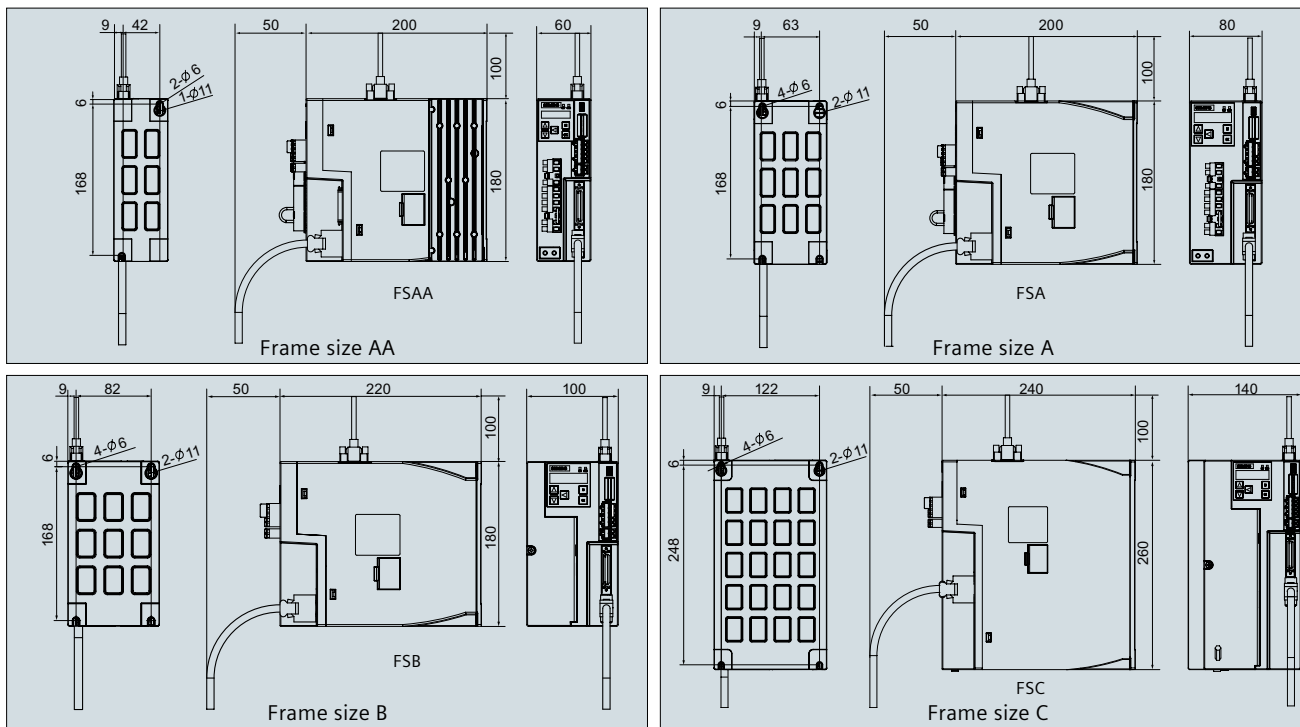
Control features

Control features		
Control modes		<ul style="list-style-type: none"> • Pulse train input position control (PTI), with torque and speed limit • Internal position control (IPos), setpoints selected using a combination of digital inputs (traversing blocks) • Speed control (S), via analog input or fixed internal speed setpoint, with torque limit • Torque control (T), via analog input or fixed internal torque setpoint, with speed and torque limits • Control mode switchover, e.g. switchover from position control to speed control on-the-fly via digital input • Jog using buttons on the integrated operator panel (BOP)
Speed control mode	Speed control range	Analog speed command: 1:2000 Internal speed command:1:5000
	Analog speed input	-10 V DC to +10 V DC/rated speed
	Torque limit	Set using a parameter or an analog input command
Pulse train input position control	Max.input pulse frequency	High-speed differential line driver (5V), 1MHz optocoupler(24V), 200kHz
	Multiplying factor	Electronic gear ratio (A/B), A:1-65535, B:1-65535, 1/50<A/B<200
	In-position range	0 to ±1000pulse(command pulse unit)
	Torque limit	Set using a parameter or analog input command
Torque control	Analog torque input	-10 V DC to +10 V DC/max. torque (input impedance >25 kΩ)
	Speed limit	Set using a parameter or an analog input command
Control functions	Real time auto tuning	Estimates the machine characteristic and sets the closed loop control parameters (gain, integral, etc.) continuously in real time without any user intervention
	Resonance suppresses	Suppress the mechanical resonance, such as workpiece and foundation vibration
	One-button tuning	Optimizes the control parameters such as position loop gain, speed loop gain, speed loop integral time, mechanical resonance frequency etc. by just clicking one button on the operator panel or SINAMICS V-ASSISTANT
	Gain switch	Switches between gains using an ext. signal or int. operating conditions to reduce noise, shorten positioning time and improve the operational stability of a servo system
	PI/P control switch	Switches from PI control to P control with an external signal or internal operating conditions
	Speed and torque limit	Limits motor speed using an external analog speed limit command (0 to ±10 V DC) or internal speed limit commands (up to three groups)
	DI/DO parameterization	Freely assigns the control signals to 8 digital inputs and 6 digital output
	External braking resistor	An external braking resistor can be used when the internal braking resistor is not capable of handling the regenerative energy
	Position smoothing	Transforms position characteristics from the pulse train input setpoint into an S-curve profile with a parameterized time constant
	Measuring machine function	The machine frequency characteristics are analyzed using SINAMICS V-ASSISTANT
	Zero speed clamp	Stops motor and locks motor axis when motor speed setpoint is below a parameterized threshold level
SD card	SD card for parameter cloning and FW update	
Safety functions	Safe torque off (STO) via terminal	
Operator Panel (OP)	Integrated, 6-digit / 7-segment display, 5 buttons	
PC tool	SINAMICS V-ASSISTANT engineering tool exclusively for SINAMICS V90	

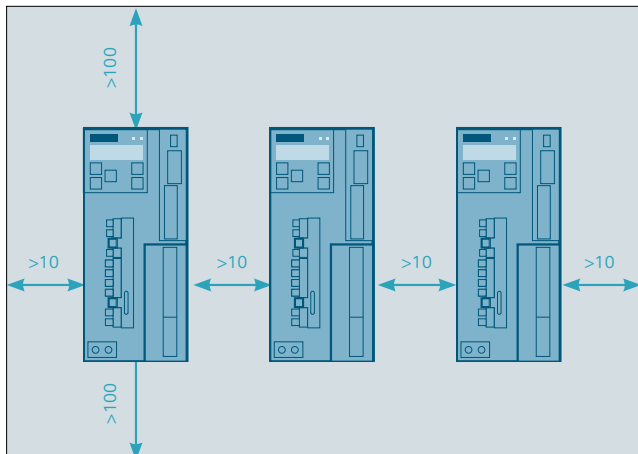
SINAMICS V90

Dimensions and mounting clearances

Dimension drawings (mm)




Mounting clearances (mm)



SIMOTICS S-1FL6

Technical data

Technical data											
Order number 1FL6	042– 1AF	044– 1AF	061– 1AC	062– 1AC	064– 1AC	066– 1AC	067– 1AC	090– 1AC	092– 1AC	094– 1AC	096– 1AC
Rated power (kW)	0.40	0.75	0.75	1.00	1.50	1.75	2.00	2.50	3.50	5.00	7.00
Horsepower (HP)	0.54	1.02	1.02	1.36	2.04	2.38	2.72	3.40	4.76	6.80	9.52
Rated torque (Nm)	1.27	2.39	3.58	4.78	7.16	8.36	9.55	11.90	16.70	23.90	33.40
Rated speed (rpm)	3000		2000					2000			
Maximum torque (Nm)	3.8	7.2	10.7	14.3	21.5	25.1	28.7	35.7	50.0	70.0	90.0
Maximum speed (r/min)	4000		3000					3000		2500	2000
Rated current (A)	1.2	2.1	2.5	3.0	4.6	5.3	5.9	7.8	11.0	12.6	13.2
Maximum current (A)	3.6	6.3	7.5	9.0	13.8	15.9	17.7	23.4	32.9	36.9	35.6
Torque constant (Nm/A)	1.1	1.2	1.5	1.7	1.6	1.7	1.7	1.6	1.6	2.0	2.7
Moment of inertia (10 ⁻⁴ kg·m ²) () with brake	2.8 (3.4)	5.3 (5.9)	8.2 (9.4)	15.7 (16.9)	15.7 (16.9)	23.2 (24.4)	30.7 (31.9)	50.2 (56.5)	73.0 (79.2)	96.4 (102.6)	145.6 (151.8)
Thermal class	B (130°C)										
Degree of protection	IP65										
Recommended load to motor inertia ratio	Max. 10x		Max. 5x					Max. 5x			
Encoder types	Incremental encoder TTL 2500 ppr, absolute encoder 20-bit single-turn + 12-bit multi-turn										
Type of construction	IM B5 (IM V1 and IM V3)										
Weight (kg) () with brake	3.3 (4.6)	5.1 (6.4)	5.6 (8.6)	8.3 (11.3)	8.3 (11.3)	11.0 (14.0)	13.6 (16.6)	15.3 (21.3)	19.7 (25.7)	24.3 (30.3)	33.2 (39.1)
Operating temperature	0 ~ 40 °C (without any restrictions)										
Operating humidity	90% RH maximum (no condensation at 30°C)										
Vibration severity grade	Grade A (IEC 60072-1)										
Radial runout tolerance	N (IEC 60034-14)										
Installation altitude	≤ 1000 m (without power derating); > 1000 m and up to 5000 m (with power derating)										
Standards											
Holding brake data											
Holding torque (Nm)	3.5		12.0					30.0			
Rated voltage (V)	24V DC ±10%										
Opening time (ms)	60		180					220			
Closing time (ms)	45		60					115			
Rated current (A)	0.9		1.5					1.9			

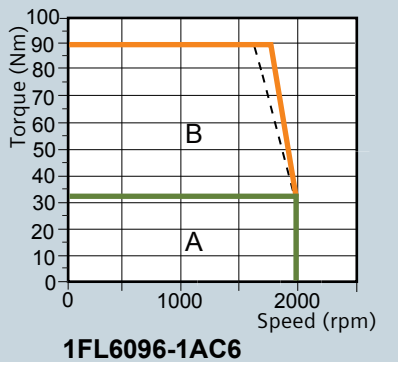
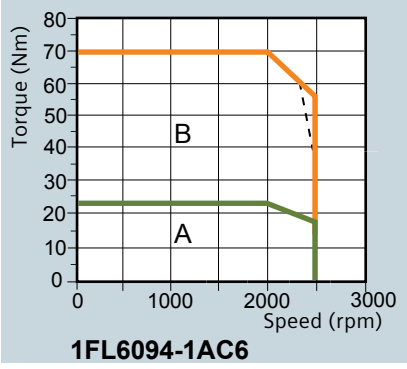
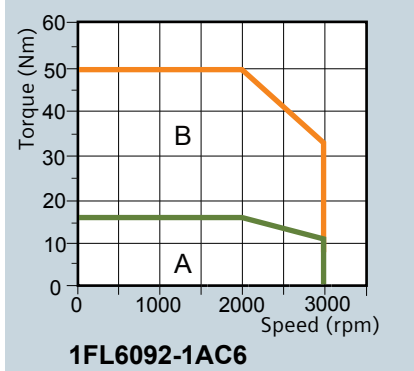
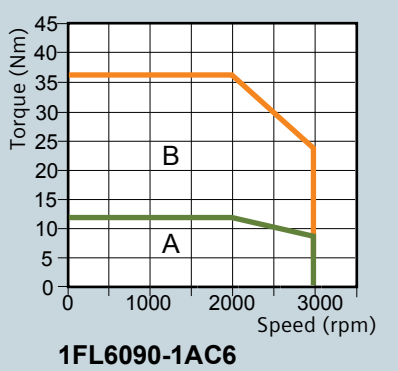
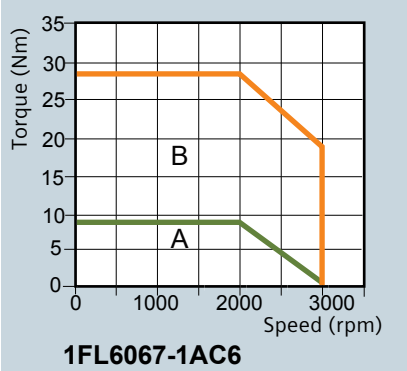
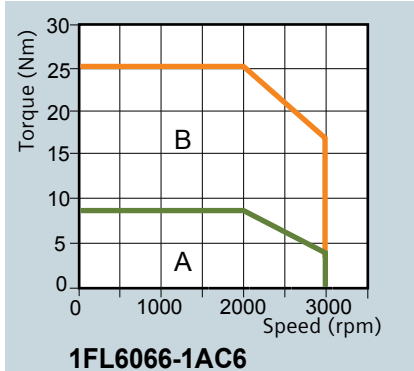
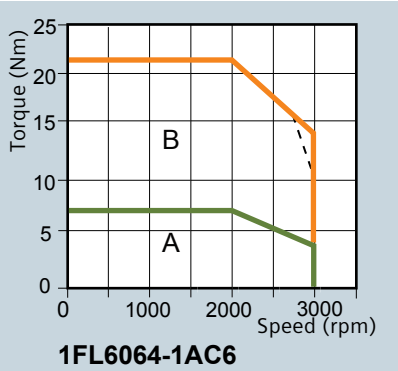
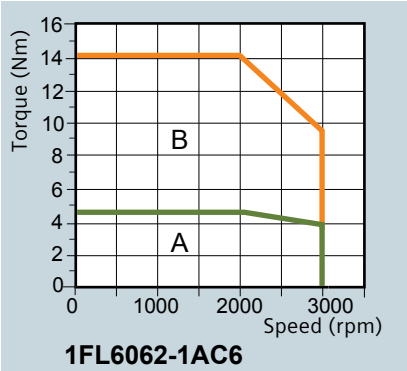
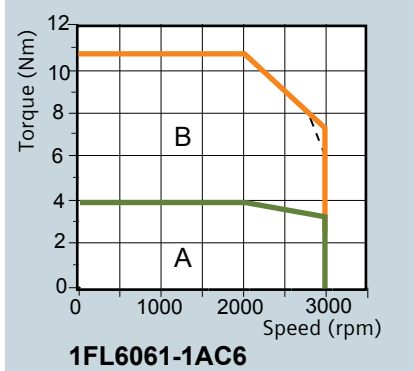
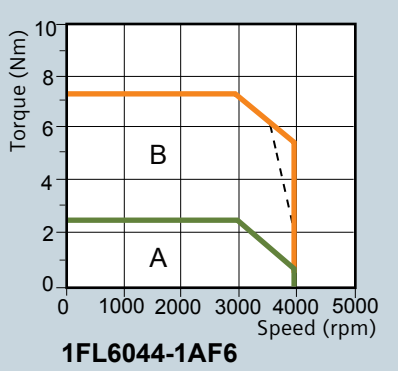
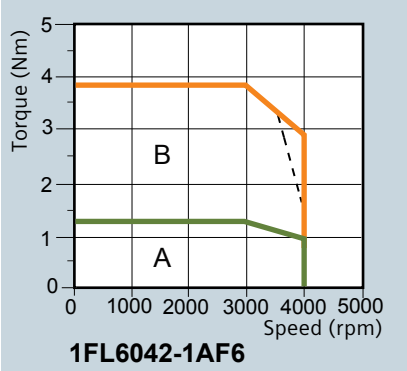
1) The data of rated torque, rated power and maximum torque in the table above allow a tolerance of 10%, due to production tolerances.

2) For 1FL6096 motor with brake, when the ambient temperature is more than 30°C, the power should be derated by 10%.
Power derating is not required for other motors.

3) It is not permissible to use the holding brake for an emergency stop.

SIMOTICS S-1FL6

Torque-speed characteristic when connected to SINAMICS V90



Notes:
 A: Continuous operating area
 B: Short-term operating area

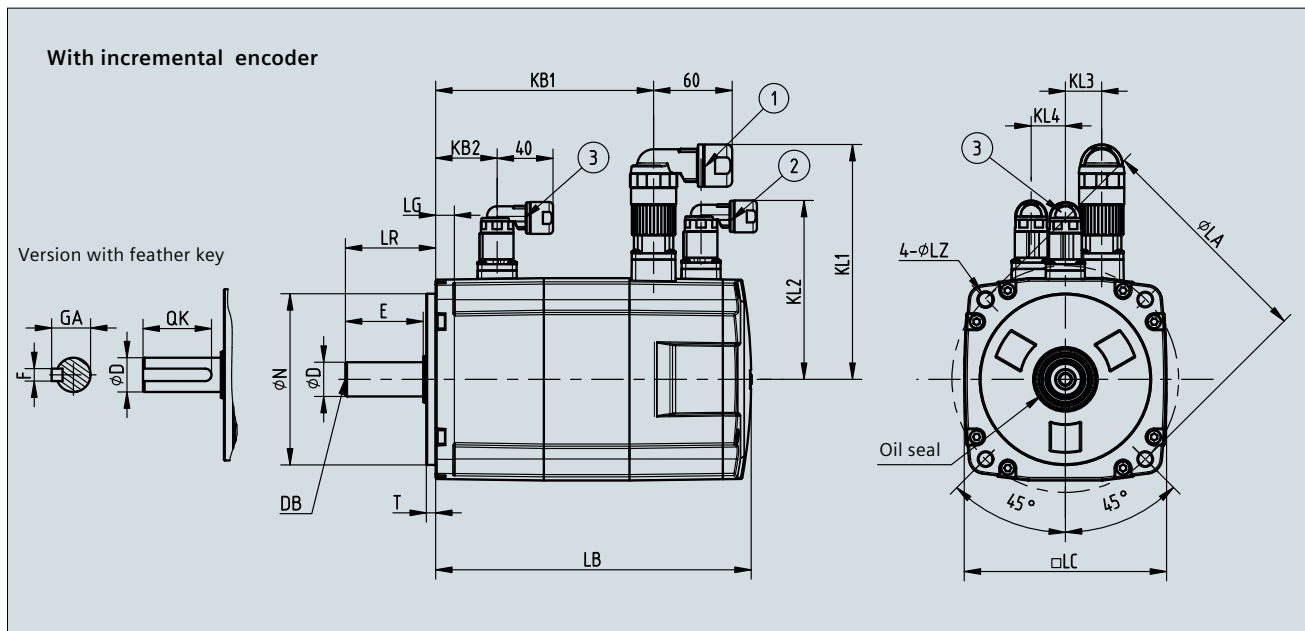
— : Supply voltage 400V
 - - - : Supply voltage 380V

SIMOTICS S-1FL6

Dimension drawings

Motor with incremental encoder (dimensions in mm)

Shaft																Without brake			With brake						
height	Type	LC	LA	LZ	N	LR	T	LG	D	DB	E	QK	GA	F	LB	KB1	KB2	LB	KB1	KB2	KL1	KL2	KL3	KL4	
45	1FL6042	90	100	7	80	35	4	10	19	M6x16	30	25	22	6	155	94	–	201	140	32	129	92	–	–	
	1FL6044	90	100	7	80	35	4	10	19	M6x16	30	25	22	6	202	141	–	248	187	32	129	92	–	–	
65	1FL6061	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	148	86	–	203	140	40	151	115	23	22	
	1FL6062	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	181	119	–	236	173	40	151	115	23	22	
	1FL6064	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	181	119	–	236	173	40	151	115	23	22	
	1FL6066	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	214	152	–	269	206	40	151	115	23	22	
	1FL6067	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	247	185	–	302	239	40	151	115	23	22	
90	1FL6090	180	200	14	114	80	3	18	35	M8x16	75	60	38	10	190	140	–	255	206	45	177	149	34	34	
	1FL6092	180	200	14	114	80	3	18	35	M8x16	75	60	38	10	212	162	–	281	232	45	177	149	34	34	
	1FL6094	180	200	14	114	80	3	18	35	M8x16	75	60	38	10	238	188	–	307	258	45	177	149	34	34	
	1FL6096	180	200	14	114	80	3	18	35	M8x16	75	60	38	10	290	240	–	359	310	45	177	149	34	34	

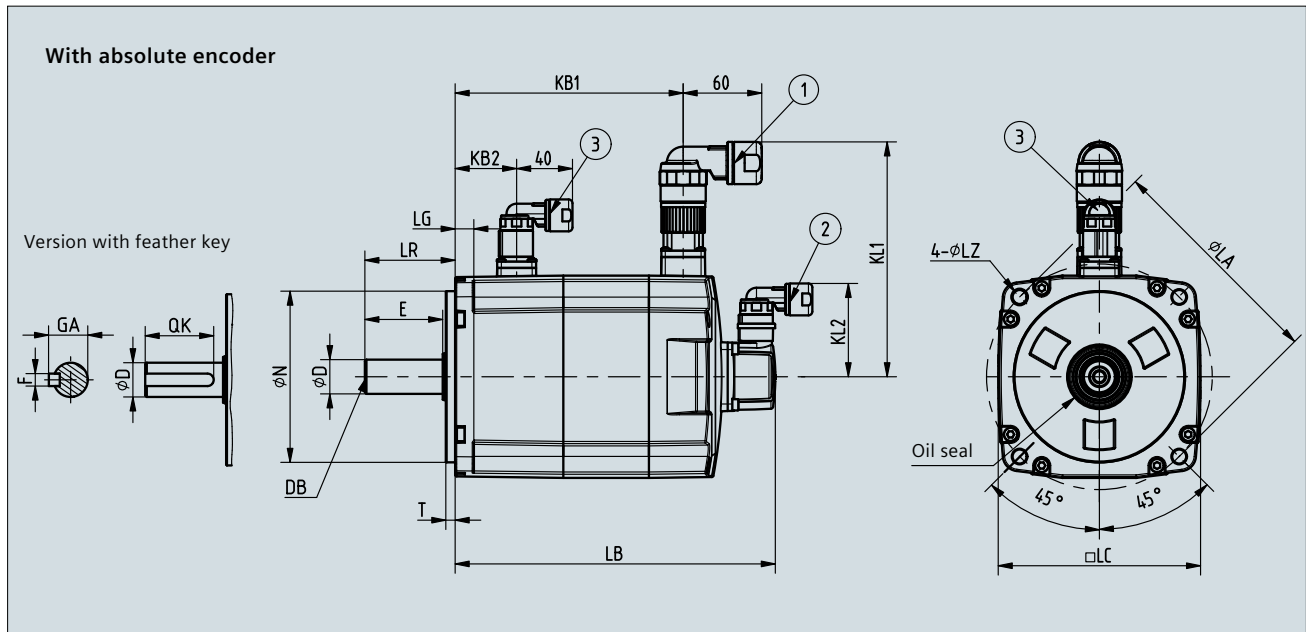


- Note:**
- 1) ① Power connector, ② Incremental encoder connector, ③ Brake connector
These connectors should be ordered separately, for ordering information please refer to section "Options" in this document.
 - 2) The outline dimensions of ② incremental encoder connector ③ brake connector are the same.
 - 3) Shaft height 90mm motor has M8 screws for eyebolts.

Dimension drawings

Motor with absolute encoder (dimensions in mm)

Shaft																Without brake			With brake						
height	Type	LC	LA	LZ	N	LR	T	LG	D	DB	E	QK	GA	F	LB	KB1	KB2	LB	KB1	KB2	KL1	KL2	KL3	KL4	
45	1FL6042	90	100	7	80	35	4	10	19	M6x16	30	25	22	6	157	100	—	204	147	32	129	60	—	—	
	1FL6044	90	100	7	80	35	4	10	19	M6x16	30	25	22	6	204	147	—	251	194	32	129	60	—	—	
65	1FL6061	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	151	92	—	206	147	40	151	60	—	—	
	1FL6062	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	184	125	—	239	180	40	151	60	—	—	
	1FL6064	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	184	125	—	239	180	40	151	60	—	—	
	1FL6066	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	217	158	—	272	213	40	151	60	—	—	
	1FL6067	130	145	9	110	58	6	12	22	M8x16	50	44	25	8	250	191	—	305	246	40	151	60	—	—	
90	1FL6090	180	200	14	114	80	3	18	35	M8x16	75	60	38	10	197	135	—	263	201	45	177	60	—	—	
	1FL6092	180	200	14	114	80	3	18	35	M8x16	75	60	38	10	223	161	—	289	227	45	177	60	—	—	
	1FL6094	180	200	14	114	80	3	18	35	M8x16	75	60	38	10	249	187	—	315	253	45	177	60	—	—	
	1FL6096	180	200	14	114	80	3	18	35	M8x16	75	60	38	10	301	239	—	367	305	45	177	60	—	—	



- Note:** 1) ① Power connector, ② Absolute encoder connector, ③ Brake connector
 These connectors should be ordered separately, for ordering information please refer to section "Options" in this document.
- 2) The outline dimensions of ② absolute encoder connector ③ brake connector are the same.
- 3) Shaft height 90mm motor has M8 screws for eyebolts.

System at a glance

Status indicator

- RDY indicates the servo ready/alarm
- COM indicates communication with PC

Integrated Operator Panel

- 6 digits, 7-segment LED
- 5 buttons

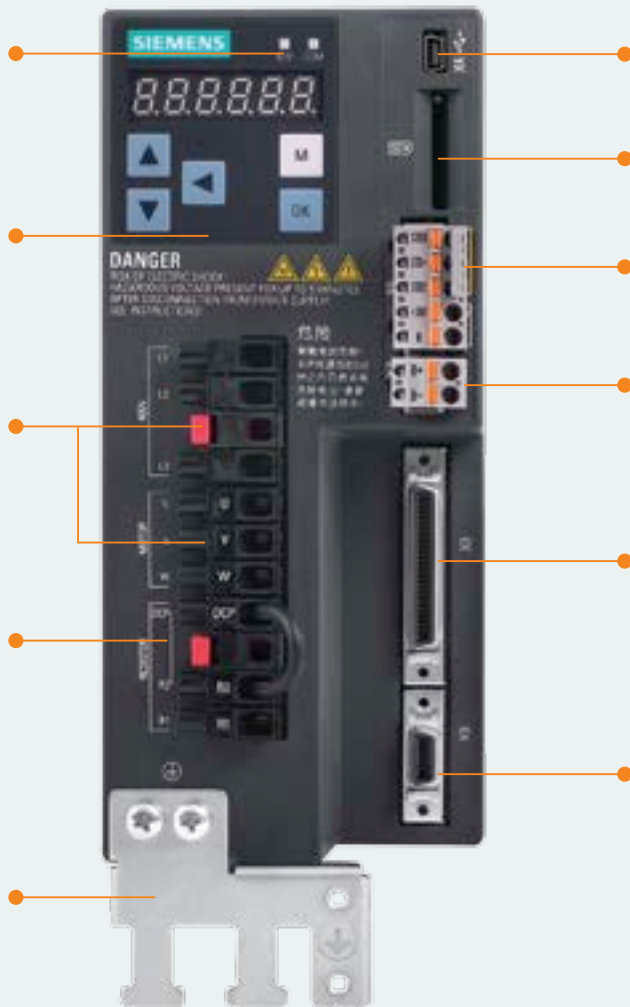
High quality safety connectors

Braking resistor

- If internal braking resistor is not sufficient, disconnect DCP and R2, then connect DCP and R1 with an external braking resistor

Shield plate

- Easy to attach cables and better EMC performance



Standard mini USB

- To connect a PC with engineering tool

SD card slot

- To copy parameters

Safe Torque off

- Safe torque off function

Motor holding brake

- Motor holding brake can be connected without external relay

Control/status interface

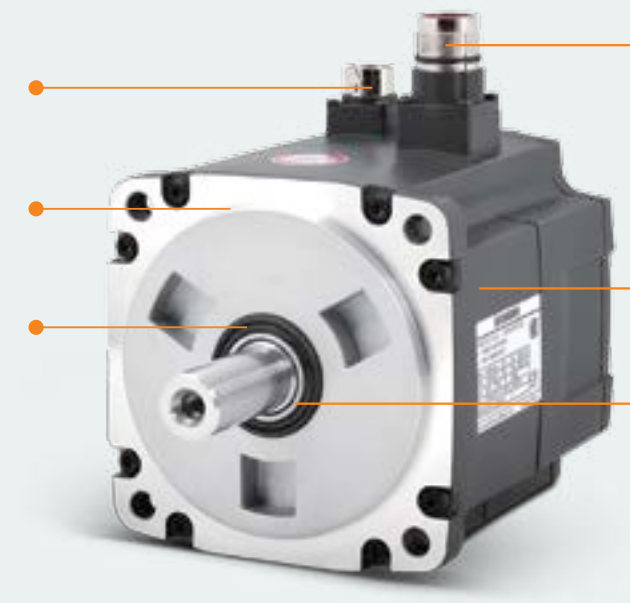
- 50 pins
- Pulse train input
- Encoder emulation pulse output
- DI/DO, AI/AO

Small encoder connector

Quick release connector

IP65 as standard for all motors

High wear-resistant oil seal material

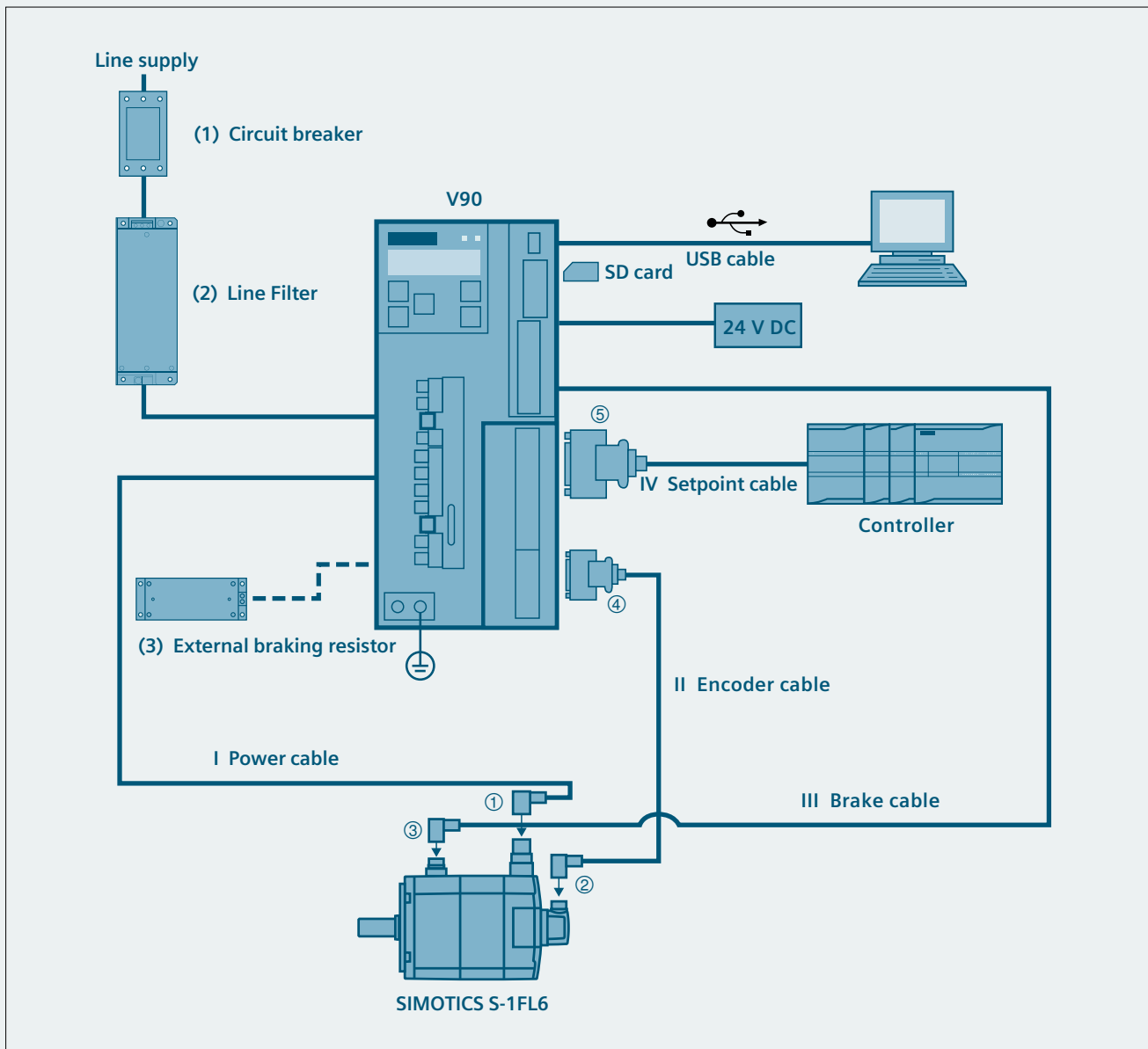


High quality metal connector

High-quality bearings

Shaft sleeve protection

System connection diagram



(1)	Circuit breaker
(2)	Line filter
(3)	External braking resistor
I	Power cable
II	Encoder cable
III	Brake cable
IV	Setpoint cable

①	Power connector (motor side)
②	Encoder connector (motor side)
③	Brake connector (motor side)
④	Encoder connector (drive side)
⑤	Setpoint connector

SINAMICS V90 and SIMOTICS S-1FL6

Ordering information

SINAMICS V90 servo drive

6SL3210 - 5F E 17 - 0 UA0



Symbol	Line supply voltage
E	380...480 3AC

Symbol	Rated power of supported servomotor
10 - 4	0.40 kW
10 - 8	0.75 kW
11 - 0	1.00 kW
11 - 5	1.50 kW
12 - 0	2.00 kW
13 - 5	3.50 kW
15 - 0	5.00 kW
17 - 0	7.00 kW

SIMOTICS S-1FL6 servomotor

1FL6 06 7- 1A C 61 - 0 A H 1



Symbol	Shaft height
04	45 mm
06	65 mm
09	90 mm

Symbol	Shaft version
A	Feather key, without holding brake
B	Feather key, with holding brake
G	Plain shaft, without holding brake
H	Plain shaft, with holding brake

Symbol	Rated torque
04 2	1.27 Nm
04 4	2.39 Nm
06 1	3.58 Nm
06 2	4.78 Nm
06 4	7.16 Nm
06 6	8.36 Nm
06 7	9.55 Nm
09 0	11.90 Nm
09 2	16.70 Nm
09 4	23.90 Nm
09 6	33.40 Nm

Symbol	Rated speed
C	2000 rpm
F	3000 rpm

Symbol	Encoder types
A	Incremental TTL 2500ppr
L	Absolute 20-bit

SIMOTICS S-1FL6					SINAMICS V90				
Rated Power (kW)	Rated torque (Nm)	Rated speed (rpm)	Shaft height (mm)	Order number	Order number	Frame size			
0.40	1.27	3000	SH45	1FL6042 -1AF61-0	<input type="checkbox"/>	<input type="checkbox"/>	1	6SL3210-5FE10-4UA0	FSAA
0.75	2.39	3000		1FL6044 -1AF61-0	<input type="checkbox"/>	<input type="checkbox"/>	1	6SL3210-5FE10-8UA0	
0.75	3.58	2000		1FL6061 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1	6SL3210-5FE11-0UA0	FSA
1.00	4.78	2000	SH65	1FL6062 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1	6SL3210-5FE11-5UA0	FSB
1.50	7.16	2000		1FL6064 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1		
1.75	8.36	2000		1FL6066 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1		
2.00	9.55	2000		1FL6067 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1		
2.50	11.90	2000	SH90	1FL6090 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1	6SL3210-5FE12-0UA0	FSC
3.50	16.70	2000		1FL6092 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1	6SL3210-5FE13-5UA0	
5.00	23.90	2000		1FL6094 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1	6SL3210-5FE15-0UA0	
7.00	33.40	2000		1FL6096 -1AC61-0	<input type="checkbox"/>	<input type="checkbox"/>	1	6SL3210-5FE17-0UA0	
Encoder type		Incremental encoder TTL 2500 ppr			<input type="checkbox"/>	<input type="checkbox"/>	A		
		Absolute encoder 20-bit single-turn + 12-bit multi-turn			<input type="checkbox"/>	<input type="checkbox"/>	L		
Shaft version		Feather key, without holding brake			<input type="checkbox"/>	<input type="checkbox"/>	A		
Feather key and holding brake		Feather key, with holding brake			<input type="checkbox"/>	<input type="checkbox"/>	B		
		Plain shaft, without holding brake			<input type="checkbox"/>	<input type="checkbox"/>	G		
		Plain shaft, with holding brake			<input type="checkbox"/>	<input type="checkbox"/>	H		

Full range of options

Selection and ordering information

MOTION-CONNECT 300 cables and connectors (between SINAMICS V90 servo drive and SIMOTICS S-1FL6 motor)

Name	Order No. 6FX3002-...	No. of cores x cross-section (mm ²)	Length (m)	Name	Used for	Order No. 6FX2003-...
MOTION-CONNECT MC300 power cable for FSAA and FSA	5CL01-1AD0	4 x 1.5	3	Power connector	Motor side	0LL11
	5CL01-1AF0	4 x 1.5	5	Absolute encoder con- nector	Motor side	0DB11
	5CL01-1BA0	4 x 1.5	10	Incremental encoder connector	Motor side	0SL11
	5CL01-1CA0	4 x 1.5	20	Brake connector	Motor side	0LL51
MOTION-CONNECT MC300 power cable for FSB and FSC	5CL11-1AD0	4 x 2.5	3	Encoder connector	Drive side	0SB14
	5CL11-1AF0	4 x 2.5	5			
	5CL11-1BA0	4 x 2.5	10			
	5CL11-1CA0	4 x 2.5	20			
MOTION-CONNECT MC300 encoder cable (for absolute encoder)	2DB10-1AD0	3 x 2 x 0.22 + 2 x 2 x 0.25	3			
	2DB10-1AF0	3 x 2 x 0.22 + 2 x 2 x 0.25	5			
	2DB10-1BA0	3 x 2 x 0.22 + 2 x 2 x 0.25	10			
	2DB10-1CA0	3 x 2 x 0.22 + 2 x 2 x 0.25	20			
MOTION-CONNECT MC300 encoder cable (for incremental en- coder)	2CT10-1AD0	3 x 2 x 0.22 + 2 x 2 x 0.25	3			
	2CT10-1AF0	3 x 2 x 0.22 + 2 x 2 x 0.25	5			
	2CT10-1BA0	3 x 2 x 0.22 + 2 x 2 x 0.25	10			
	2CT10-1CA0	3 x 2 x 0.22 + 2 x 2 x 0.25	20			
MOTION-CONNECT MC300 brake cable (for holding brake)	5BL02-1AD0	2 x 0.75	3			
	5BL02-1AF0	2 x 0.75	5			
	5BL02-1BA0	2 x 0.75	10			
	5BL02-1CA0	2 x 0.75	20			

Connector and cable (between V90 servo drive and control system)

Name	Order No.
Control/setpoint connector 50-pin	6SL3260-2NA00-0VA0
Control/setpoint cable (50-pin) with 1m cable	6SL3260-4NA00-1VB0

Recommended line-side component

V90 Order No.	Line filter		Recommended fuse/circuit breaker Corresponding to the IEC standard		
	Rated current (A)	Order No.	Standard fuse		Circuit breaker
			Current (A)	Order No.	Order No.
10-4UA0	6	6SE6400-2FA00-6AD0	6	3NA3 801-6	3RV1021-1DA10
10-8UA0	6		6	3NA3 801-6	3RV1021-1EA10
11-0UA0	6		10	3NA3 803-6	3RV1021-1FA10
11-5UA0	12	6SL3000-0HE15-0AA0	16	3NA3 805-6	3RV1021-1JA10
12-0UA0	12		16	3NA3 805-6	3RV1021-4AA10
13-5UA0	24	6SL3000-0HE21-0AA0	25	3NA3 807-6	3RV1021-4BA10
15-0UA0	24		25	3NA3 807-6	3RV1021-4DA10
17-0UA0	24		25	3NA3 810-6	3RV1021-4DA10
			25	3NA3 810-6	3RV1021-4DA10

External braking resistor*

Frame size	Resistance (Ω)	Max. Power (kW)	Rated power (W)	Max. energy (KJ)
FSAA	533	1.2	30	2.4
FSA	160	4	100	8.0
FSB	70	9.1	229	18
FSC	27	23.7	1185	190

* When the internal braking resistor is not sufficient, select a standard braking resistor according to the table

Spare parts

Replacement fan	Order No.
FSB	6SL3200-0WF00-0AA0
FSC	6SL3200-0WF01-0AA0

Accessories

Siemens SD card	6ES7954-8LB01-0AA0
V90 and 1FL6 demo	6SL3260-2NV00-0VA0

There's more to it

www.siemens.com/ids

Discover in detail how
Integrated Drive Systems
boost your competitive
edge and improve
your time to profit.

Integrated
Drive Systems
to go: Visit our
mobile site!



Follow us on:

www.twitter.com/siemensindustry

www.youtube.com/siemens

Siemens AG
Industry Sector
Motion Control Systems
P.O. Box 31 80
91050 ERLANGEN
GERMANY

Subject to change without prior notice
Order No.: E20001-A280-P670-X-7600
DISPO 21500
21/48195 GD.MC.GM.SIPR.52.3.17 WS 0813 PDF
Printed in Germany
© Siemens AG 2013

The information provided in this brochure contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners