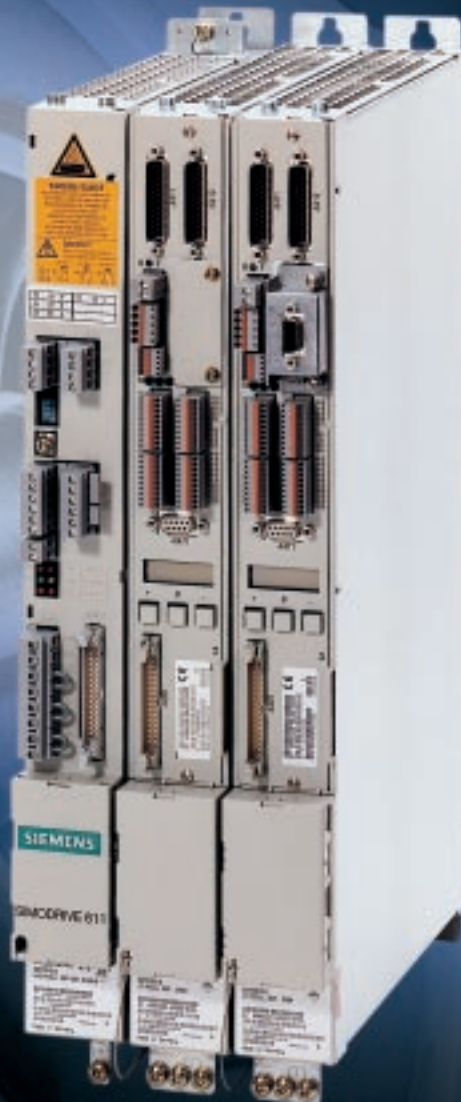


For coordinated,  
highly dynamic motion control



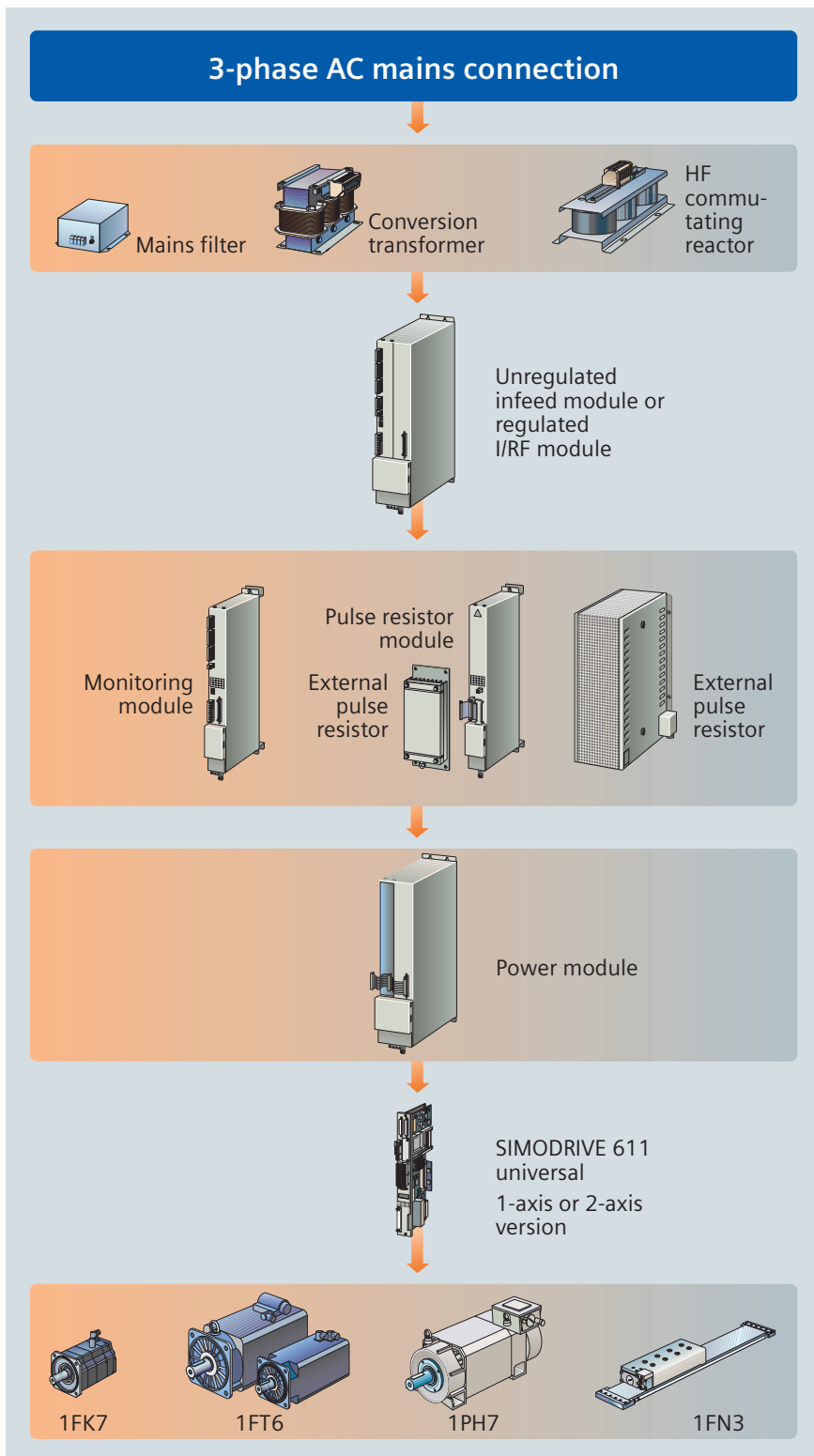
# simodrive

## 611 UNIVERSAL

**SIEMENS**

# SIMODRIVE 611:

The drive concept that moves your machine toward maximum productivity and flexibility!

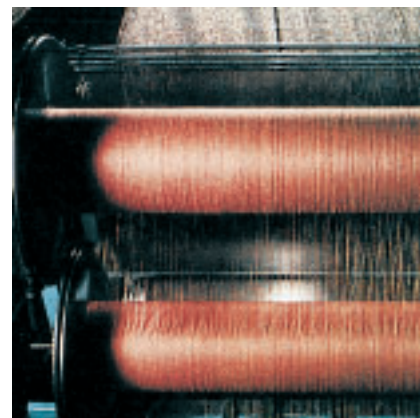


## SIMODRIVE – the modular, flexible converter system for your machine

With the SIMODRIVE® 611 converter system, you can combine individual drive systems and easily tune them to the drive performance and the number of axes on machines.

SIMODRIVE 611 is a modular transistor pulse converter that enables multi-axis as well as drive combination solutions. Based on its modular design, SIMODRIVE always offers flexible, economic drive solutions tailored to the task at hand.

SIMODRIVE 611 consists of several individual function modules. Power-rated infeed modules supply a total power of up to 120 kW.





### Fit for any industry – passing the test a million times

Over a million drives are in operation with the SIMODRIVE 611 system, especially in machine tools.

The SIMODRIVE 611 universal closed-loop control plug-in unit is suitable for all three-phase motors and offers the ideal drive solution for any area of application including production machines for printing, packaging, plastic, glass, ceramic and stone as well as for presses, material handling, conveyor and transport equipment.

Thanks to the international seals of approval CE, EN, CUL – and a wide range of line voltage – SIMODRIVE 611 is ready for operation anywhere in the world.

### Highly dynamic positioning for maximum machine utilization

Aside from such classic drive functions as speed and torque control, SIMODRIVE 611 universal also offers integrated positioning functions in further standard versions, helping take a considerable load off the controller.

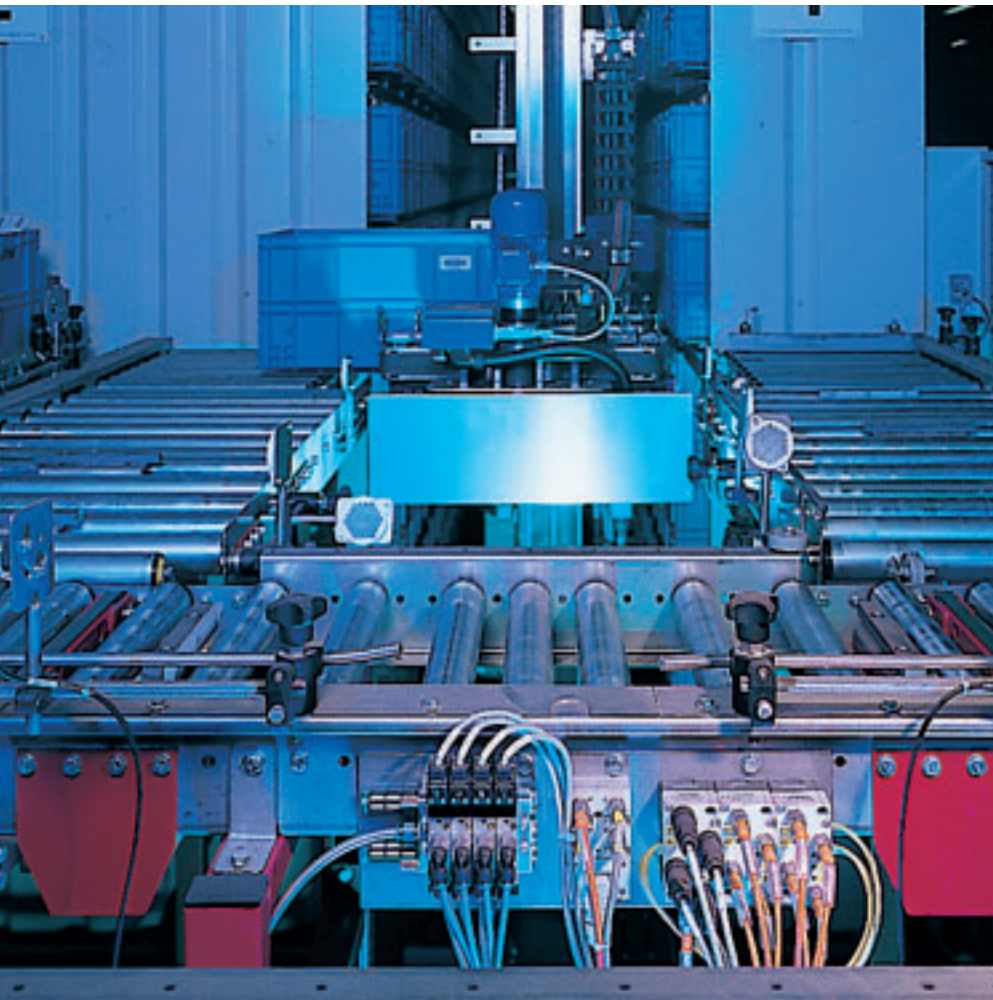
In the traversing block editor, you can store up to 64 independent traversing blocks per axis in plain text. The SimoCom U startup tool, for example, enables easy entry and storage of the blocks during commissioning.

### SIMODRIVE 611 universal – a concept for all motors

The SIMODRIVE power modules can be set to accommodate any motor. The SIMODRIVE 611 universal closed-loop control plug-in unit enables control of all kinds of motors, including synchronous, induction, linear or torque motors, for servo or spindle applications. The induction motors can be operated with or without an encoder depending on the application.

### Extremely compact with SIMODRIVE 611 for 2 axes

In addition to the 1-axis version, SIMODRIVE 611 is also available in a 2-axis version. The 2-axis power module enables extremely compact set-ups.



## **“Modular” is the motto:** a modular system that gives you complete freedom in designing machines.

The SIMODRIVE 611 converter system mainly consists of infeed modules, power modules and closed-loop control units. The range is rounded off by a number of optional modules.

### **Mains power connections for global players**

SIMODRIVE 611 takes into account different mains power supplies, making it operational all over the world:

- Large range of mains voltage  
3 AC 400 V, 3 AC 415 V, 3 AC 480 V
- Direct operation on TN networks
- Also operable on "selective universal current sensitive residual-current protective devices" in combination with mains filters tuned to the I/RF module (16 kW and higher).

### **I/RF modules for increased operational safety and a clear reduction of system perturbation**

- Supplied by the closed-loop power interface modules, the drive axes operate independently of mains tolerances.
- During braking, the excess energy is fed back into the power network for added utility.

### **Different cooling solutions for every need**

Various cooling methods are available for the I/RF modules and power modules:

- Internal heat dissipation
- External heat dissipation
- Hose heat dissipation

#### **Internal heat dissipation**

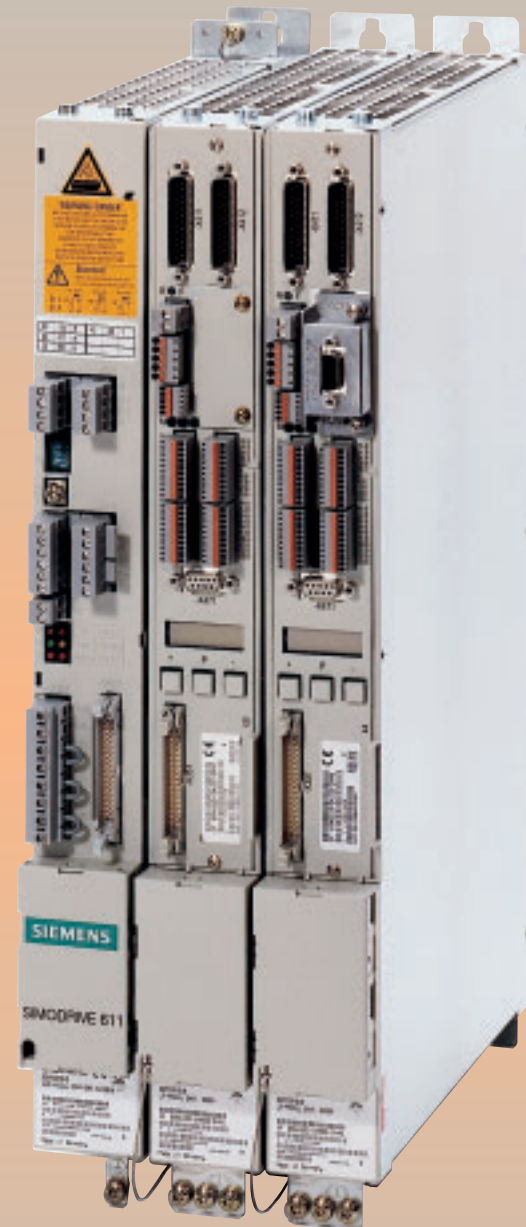
With this standard solution, the heat generated by the power loss of the converter components in the electronics and in the power section is dissipated to the interior of the control cabinet.

#### **External heat dissipation**

The heat sinks on the modules are installed through the mounting surface in the control cabinet, allowing the heat from power loss of the power circuit to dissipate to an external ventilation system. The "mechanical interface", the external heat sink, allows for a degree of protection IP 54.

#### **Hose heat dissipation**

Hose heat dissipation is available for 300 mm modules. The heat generated by power loss in the power section is dissipated from the cabinet via flexible hoses. The "mechanical interface" to the ambient air allows for a degree of protection IP 54.



### The universal closed-loop control plug-in unit in 1-axis and 2-axis versions

The SIMODRIVE 611 universal closed-loop control plug-in unit has earned a name for itself – thanks to the wide variety of motors it can operate and the wide range of versions, functions and interfaces offered.

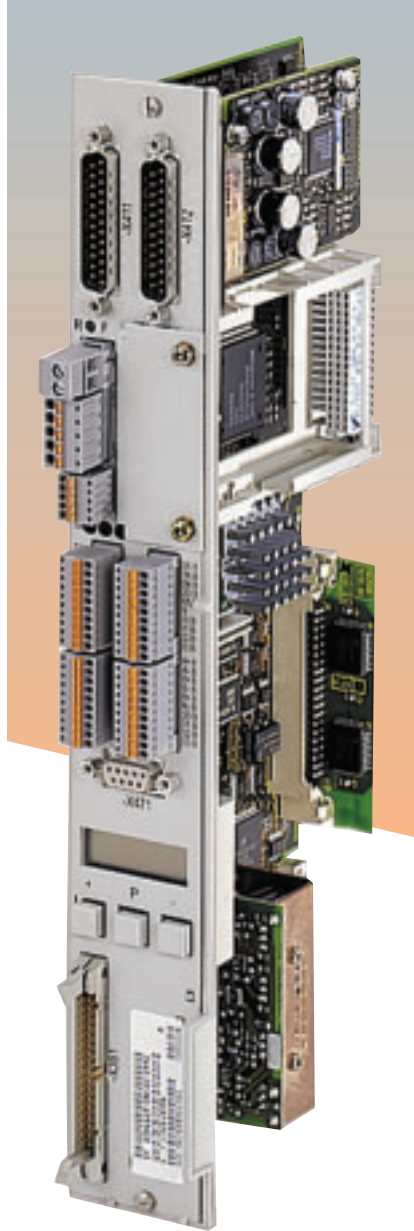
- Closed-loop control plug-in units for various encoder systems:  
2-pole to 6-pole resolvers, incremental encoders with sin/cos  $1 V_{pp}$  signals and up to 65,535 pulses, absolute value encoder with sin/cos  $1 V_{pp}$  and EnDat protocol. It is also possible to connect a second, direct measuring system.
- Aside from speed and torque control, one version of the SIMODRIVE 611 universal features integrated positioning functions.
- The 2-axis closed-loop control plug-in units feature an especially compact design. For example, a 4-axis drive combination with a non-regenerative 5 kW power supply can fit into a space just 15 cm (6 in) wide. That means you can keep the volume of the control cabinet to a minimum.

### All the data safely in one package

SIMODRIVE 611 universal keeps all its drive data, such as system software and user data, safely on one exchangeable memory module. If need be, the memory module can be replaced without any additional aids.

### “Safe standstill”

The “safe standstill” function is a facility for avoiding unexpected startup according to EN 60204-1 Section 5.4 and is used for safe disconnection of the power supply to the motor in the event of a fault or in conjunction with a machine function. The starting lockout supports this “safe standstill” function and is certified by the German statutory industrial accident insurance institution according to DIN EN 954-1, Category 3 in conjunction with an external circuit. In this way it is possible to dispense with contactors on the motor side.

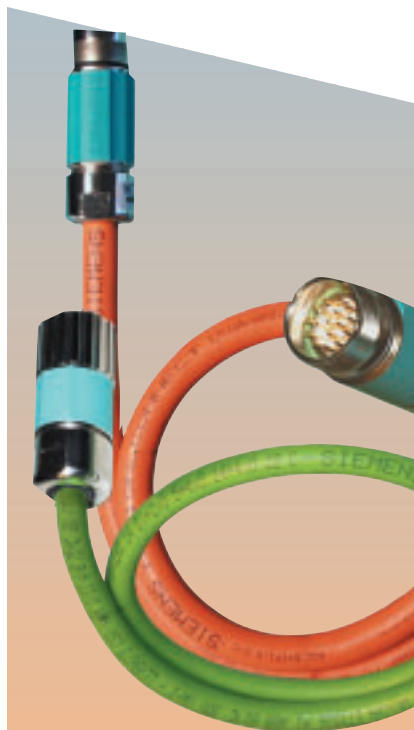


### MOTION-CONNECT: customized top connections for your machines

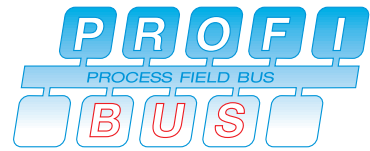
The new MOTION-CONNECT® connection technology is the ideal solution for high-quality production machines and machine tools.

MOTION-CONNECT lines feature maximum quality and reliability and can meet all your demands, from an economic solution for mainly fixed cabling to the version for extreme acceleration and traversing velocities as is the case with linear motors, for example.

By using prefabricated MOTION-CONNECT cables, you can save considerable costs for logistics, design, assembly and purchasing compared to self-fabricated cables.



# Integrated communications: open-ended all the way around.



A first-rate drive should be flexible enough to fit into any automation solution. The SIMODRIVE 611 fits the bill.

## Great connections in any automation environment

No matter whether you are integrating into SIMATIC® or into another automation system, the SIMODRIVE 611 universal can be integrated into any automation environment via PROFIBUS DP or even CAN bus.

## Communication via PROFIBUS DP, the world's most successful fieldbus standard

SIMODRIVE 611 universal drives are in line with PROFIBUS DP, the world's most successful fieldbus standard, with 12 Mbit/s data throughput. The optional PROFIBUS module ensures smooth communication, even in synchronous operation or between slaves thanks to direct slave-to-slave transmission. That enables the transfer of setpoints from converter to converter without straining the automation system. Integration into the SIMATIC automation environment is also extremely convenient with Drive ES.

## SimoCom U – the exceptionally easy-to-operate and powerful startup tool

The configuration and startup tool SimoCom U was developed to be exceptionally easy-to-operate and offer a maximum of functions.

This powerful software tool for Windows 95/98/NT/2000/XP features startup functions, service information and online help in a simple menu-based user interface.

In addition to configuration of the drive system, SimoCom U offers exceptional functions such as:

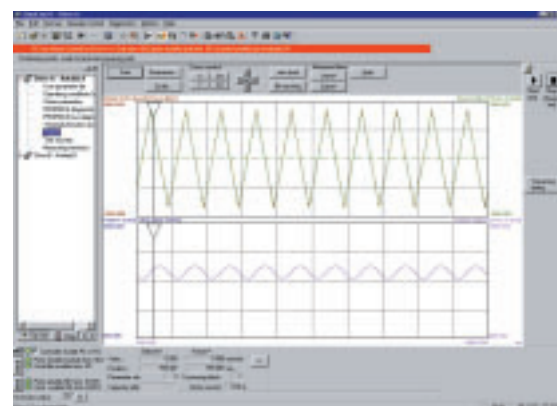
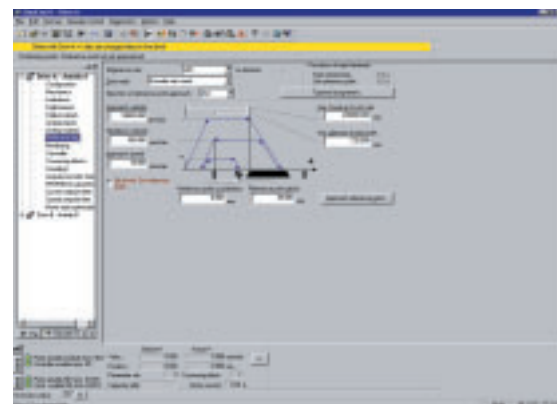
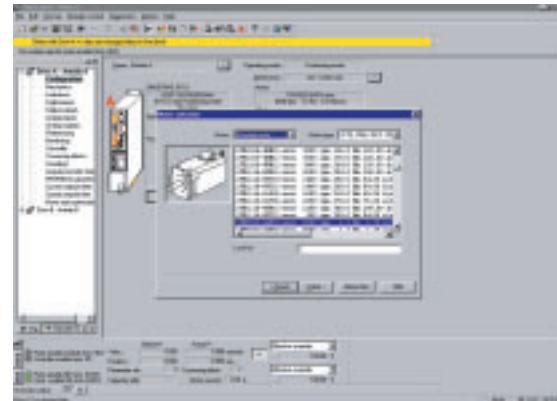
- Automatic speed controller optimization by setting filters at points of resonance.
- Analysis using FFT (Fast Fourier Transformation) for phase/amplitude response for assessment and optimization of controlled systems.
- Function generator for assessment of drives when running-in the mechanical system.
- Diagnosis via fault memory

An integrated trace memory permits convenient oscilloscope functions for many drive variables. Transient functions or signal trends can be displayed directly on the PC and saved on diskette for documentation purposes. An integrated function generator lets you specify various setpoints and fault variables to assess drive behavior.

A firmware update or comparison of drive parameters (original data – modified data) is easy to carry out at any time using SimoCom U.

Download the latest version of SimoCom U free of charge from the Internet at:

<http://www.siemens.com/simodrive>



# Totally Integrated Automation: SIMODRIVE 611 universal fits seamlessly into your automation environment – now and in the future.

Totally Integrated Automation (TIA) stands for a successful concept from Siemens for a complete range of automation and drive components offering a maximum degree of integration. At the heart of this concept is integrated data management, configuration and communication for all components. That ensures users consistency throughout the entire project and lower costs thanks to engineering and life-cycle savings. SIMODRIVE 611 universal is completely integrated into the TIA concept.

## Totally Integrated Automation: Drive ES makes it all possible

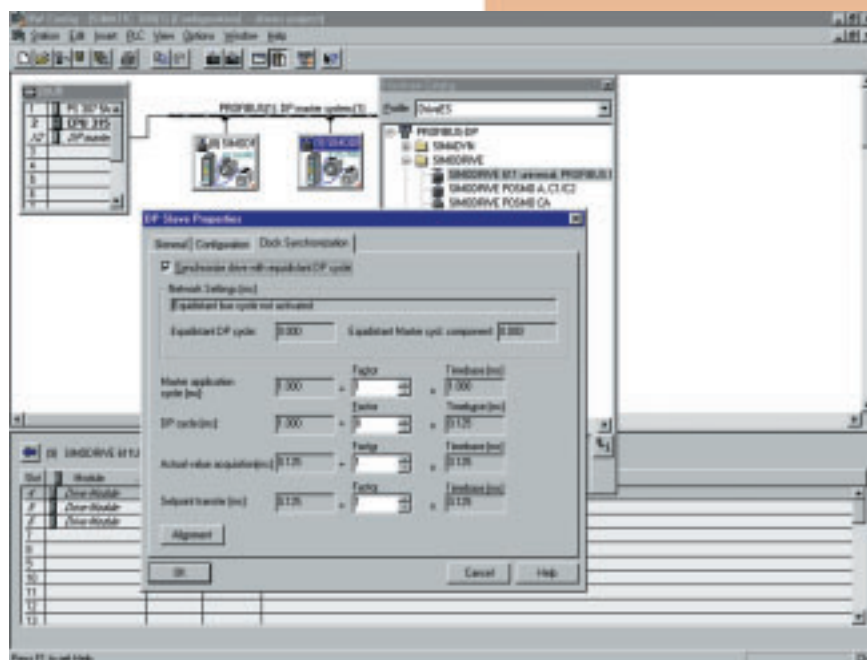
Do you need integrated data management, integrated communication and integrated configuration? Then SIMODRIVE 611 universal is the right choice for you – thanks to the drive engineering system Drive ES. Nothing can compare for integrating drive technology more easily, speedily and economically into the automation environment of SIMATIC and SIMOTION® – for total customization.

## Drive ES Basic: your gate to the world of Totally Integrated Automation

Startup, parameter configuration, trace and fault assessment: the basic package Drive ES Basic lets you manage your automation system and your drives on the interface of the SIMATIC Manager. Drive ES Basic is the starting point for shared data archiving from complete projects and for using the teleservice of SIMATIC for your drives, too.

## Drive ES SIMATIC: configuring communication

Drive ES SIMATIC provides function blocks and sample projects for the SIMATIC CPU. These can then be communicated via PROFIBUS DP with drives from Siemens. The major advantage is not having to program all communications – just configure and that's it.



# SIMODRIVE 611 universal: the positioning master!

## Speed ( $n_{\text{setpoint}}$ )/Torque (M mode)

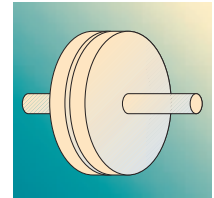
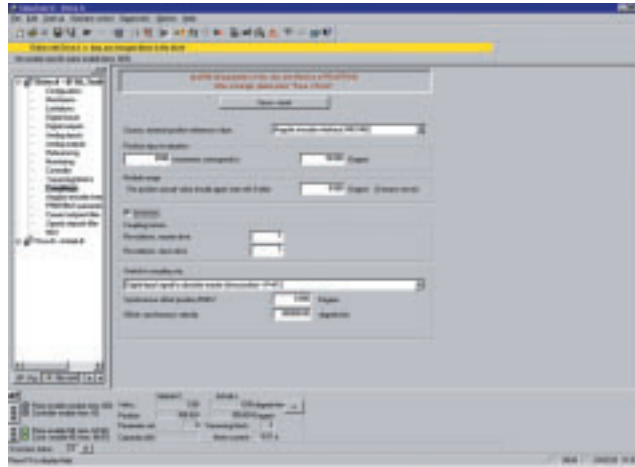
In the "speed/torque setpoint" operating mode, you can specify a speed/torque setpoint or a reduction of torque via the analog inputs 1 and 2 or via PROFIBUS.

## Positioning: extremely convenient implementation of functions via the powerful traversing block editor of SimoCom U

You can enter up to 64 separate traversing blocks per axis and store them in plain text in the drive with SimoCom U or using PROFIBUS. You set the blocks either via digital input terminals or using PROFIBUS DP. What's more, you can program acceleration, speed and target position (absolute or relative) individually in each traversing block. Additional functions include external block exchange, jerk limitation, driving/positioning to a fixed stop and axis coupling.

Different types of referencing are possible:

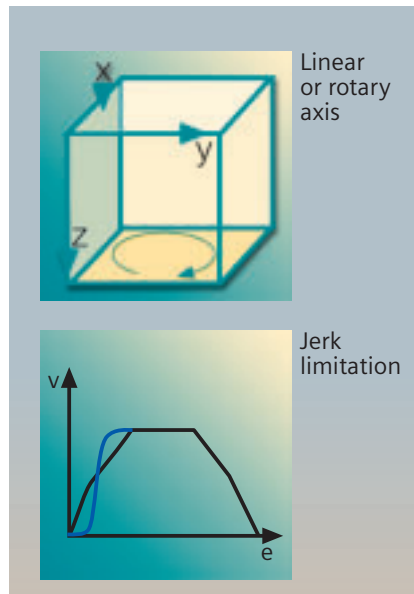
- Reference point approach to cam or zero mark with configurable offset
- Reference point setting as a configured value by signals, terminal/PROFIBUS DP.



Coupling

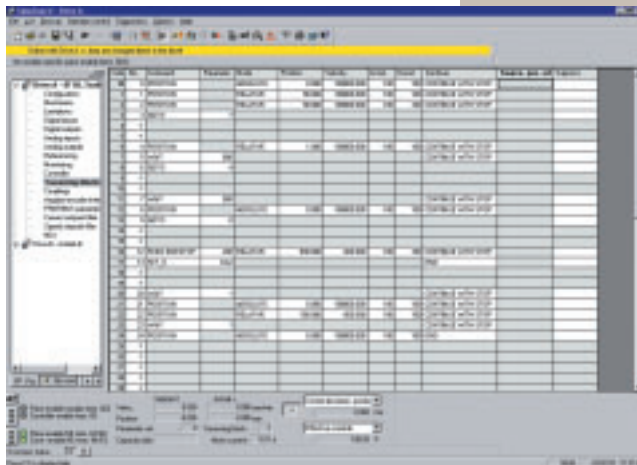


Positioning



Linear or rotary axis

Jerk limitation



## Axis coupling

SIMODRIVE 611 universal lets you link drives using PROFIBUS DP or terminals. Both external drives as well as an internal 2-axis module can be coupled. Axis coupling via PROFIBUS is based on the PROFIBUS DP direct slave-to-slave communication. When linked using terminals, the actual positions are coupled via the selectable direction incremental shaft-angle encoder interface and a torque link via the integrated analog inputs/outputs.

## Teach In

With "Teach In", an axis position can be entered directly into a specific traversing block as the target position. For example, the axis can be driven to the desired position with "JOG" and/or "Incremental JOG". Then, the command is stored in the traversing block editor. This enables you to link the "learned" positions easily into a traversing program.

### Universal interfaces to higher-level control systems

SIMODRIVE 611 universal provides a number of communications interfaces for flexible connection to higher-level control systems.

- **Analog interface  $\pm 10$  V for setpoint input (speed/torque setpoint)**

This is one of the widely used interfaces for analog technology. You can use it to link SIMODRIVE 611 universal to conventional control concepts.

- **Incremental shaft-angle encoder interface WSG (RS 422)**

Used as outputs, differential tracks A/B/R offer external control pulse encoder simulation, or as inputs, the pulse/direction signals are analyzed in the same way as on a stepper motor and processed as shaft-angle setpoint.

The higher-level control can be a SIMATIC S7-300 function module, such as FM 353 or FM 357-2, or in the simplest scenario a counter module or a pulse-clocked output. You can link reference setpoint values or synchronize operation by means of parallel pulse/direction signals on several SIMODRIVE 611 universal drives.

- **“Starting lockout”**

The starting lockout (internal safety relay) interrupts the power supply from the drive to the motor. This enables the “safe standstill” function, in conjunction with an external circuit, to be implemented according to DIN EN 954-1, Category 3.

- **PROFIBUS DP**

The PROFIBUS DP interface allows seamless integration of the SIMODRIVE 611 universal into any automation environment. At the entry level, PROFIBUS DP can be used as a communications bus for the control via a PLC. Diagnostics and startup can also be performed via this bus.

For more complex tasks, you can use the clock-synchronized “Motion Control with PROFIBUS DP” to implement a closed-loop system via a higher-level control (such as SIMOTION, SIMATIC or SINUMERIK®). This allows operations such as synchronized operation, angle synchronization and interpolation.

Starting lockout

PROFIBUS DP

Analog interfaces

Digital inputs/outputs

WSG

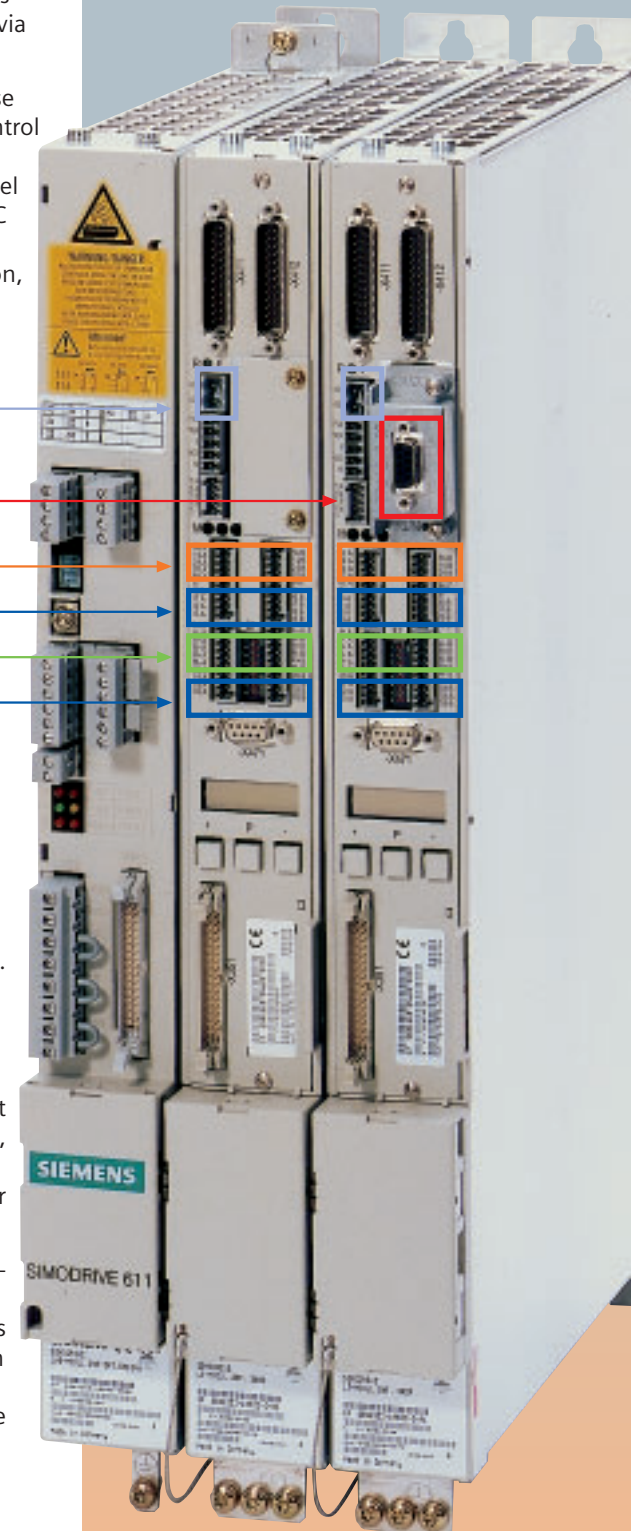
Digital inputs/outputs

- **Digital inputs/outputs**

SIMODRIVE 611 universal provides 4 digital inputs and 4 digital outputs. They are freely programmable.

Enables, activation/switching commands and selections can be sent to the device via the digital inputs. Digital outputs can be used for output of status messages (position reached, permissible torque exceeded etc.), according to your settings, for further processing.

The optional terminal expansion module, used in place of the PROFIBUS module, provides 8 additional inputs and 8 additional outputs. These can be used, for example, to call traversing blocks for the positioning of the inputs and outputs of a PLC.



# Technology: the essence of modularity – homogeneous system technology.

## Technology you can rely on – around the world

To make sure the SIMODRIVE 611 universal gets to where it is needed, we offer you a sophisticated logistics system offering you uncomplicated ordering and on-time delivery to the four corners of the world.

And to make sure everything goes smoothly on-site, we offer a worldwide service program. Do you need a product expert or service specialist or have a question? Just get in touch with our Service & Support Team.

**Siemens Helpline (Germany)**  
Tel. +49 180/5 05 0111

**Siemens Dispatch Center (USA)**  
Tel. +1 800 333 74 21

## Infeed modules

Unregulated	Regulated	Module width	Infeed module Internal heat dissipation
Rated DC link power (S1) kW	Rated DC link power (S1) kW	mm	Order No.
5	–	50	6SN11 46-1AB00-0BA1
10	–	100	6SN11 45-1AA01-0AA1
28	–	200	6SN11 45-1AA00-0CA0
–	16	100	6SN11 45-1BA01-0BA1
–	36	200	6SN11 45-1BA02-0CA1
–	55	300	6SN11 45-1BA01-0DA1
–	80	300	6SN11 45-1BB00-0EA1
–	120	300	6SN11 45-1BB00-0FA1

## Power modules

For 1FT6/1FK7/1FN3 synchronous motors $f_p = 4$ kHz	For 1PH7 motors, induction motors $f_p = 3.2$ kHz	Module width	Power module Internal heat dissipation
Rated current A	Rated current A	mm	Order No.
<b>1-axis version</b>			
3	3	50	6SN11 23-1AA00-0HA1
5	5	50	6SN11 23-1AA00-0AA1
9	8	50	6SN11 23-1AA00-0BA1
18	24	50	6SN11 23-1AA00-0CA1
28	30	100	6SN11 23-1AA00-0DA1
42	45	150	6SN11 23-1AA00-0LA1
56	60	150	6SN11 23-1AA00-0EA1
70	85	300	6SN11 23-1AA01-0FA1
100	120	300	6SN11 23-1AA00-0JA1
140	200	300	6SN11 23-1AA00-0KA1
<b>2-axis version</b>			
2 x 3	2 x 3	50	6SN11 23-1AB00-0HA1
2 x 5	2 x 5	50	6SN11 23-1AB00-0AA1
2 x 9	2 x 8	50	6SN11 23-1AB00-0BA1
2 x 18	2 x 24	100	6SN11 23-1AB00-0CA1

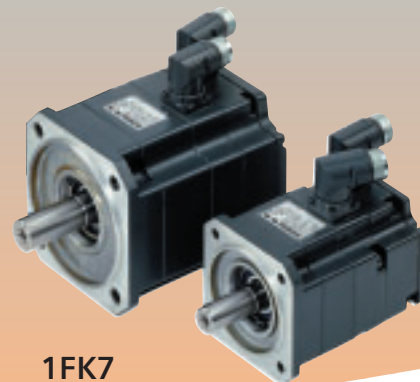
Hp = kW \* 1.341; Lbf-in = Nm \* 8.850; in = mm \* 0.03937; Lbs = kg \* 2.2046

## Digital closed-loop control plug-in units SIMODRIVE 611 universal

Designation		Order No.
<b>Closed-loop control plug-in unit with analog speed setpoint interface</b>		
<b>1-axis version</b>	resolver, speed/torque setpoint	6SN11 18-0NJ01-0AA0
	resolver, speed/torque setpoint, positioning	6SN11 18-1NJ01-0AA0
<b>2-axis version</b>	resolver, speed/torque setpoint	6SN11 18-0NK01-0AA0
	resolver, speed/torque setpoint, positioning	6SN11 18-1NK01-0AA0
	sin/cos 1 $V_{pp}$ /Absolute value encoder EnDat, speed/torque setpoint	6SN11 18-0NH01-0AA0
	sin/cos 1 $V_{pp}$ /Absolute value encoder EnDat, speed/torque setpoint, positioning	6SN11 18-1NH01-0AA0
<b>Optional modules</b>		
<b>Terminal expansion for axis A</b>	8 digital inputs/8 digital outputs, 24 V/500 mA (max.) isolated, configurable	6SN11 14-0NA00-0AA0
<b>PROFIBUS DP</b>	Standard slave for up to 2 axes cyclic and acyclic Data exchange up to 12 Mbaud	6SN11 14-0NB00-0AA1
<b>Motion Control with PROFIBUS DP</b>	Clock-synchronized standard slave for up to 2 axes cyclic and acyclic data exchange up to 12 Mbaud, Profidrive profile 3 with DSC	6SN11 14-0NB01-0AA0

## Synchronous servo motors 1FK7 HD for SIMODRIVE 611 universal

Rated speed $n_N$ rpm	Rated power $P_N$ kW	Rated torque $M_N$ (100 K) Nm	Torque at standstill $M_0$ (100 K) Nm	Motor phase current $I_0$ (100 K) A	Servo motor 1FK7 HD Self-cooling Order No.	Moment of inertia without brake $J$ $10^{-4}$ kgm <sup>2</sup>	Weight without brake $m$ kg	Required converter rated current $I_N$ (100 K) A	SIMODRIVE 611 power module Order No.
3000	1.1	3.5	4.0	4.5	1FK7044-7AF71-1...	1.28	7.5	5	6SN112.-1AA00-0AA1
	1.7	5.4	6.4	6.1	1FK7061-7AF71-1...	3.4	10.1	9	6SN112.-1AA00-0BA1
	2.51	8.0	12.0	11.0	1FK7064-7AF71-1...	6.5	15.3	18	6SN112.-1AA00-0CA1
	2.51	8.0	14.0	10.6	1FK7082-7AF71-1...	14.0	17.2	18	6SN112.-1AA00-0CA1
	2.04	6.5	22.0	22.5	1FK7085-7AF71-1...	23.0	23.5	28	6SN112.-1AA00-0DA1
4500	1.23	2.6	3.1	4.5	1FK7043-7AH71-1...	1.01	6.7	5	6SN112.-1AA00-0AA1
	1.41	3.0	4.0	6.3	1FK7044-7AH71-1...	1.28	7.5	9	6SN112.-1AA00-0BA1
	2.03	4.3	6.4	8.0	1FK7061-7AH71-1...	3.4	10.1	9	6SN112.-1AA00-0BA1
	2.36	5.0	12.0	15.0	1FK7064-7AH71-1...	6.5	15.3	18	6SN112.-1AA00-0CA1
6000	0.57	0.9	1.3	2.2	1FK7033-7AK71-1...	0.27	3.1	3	6SN112.-1AA00-0HA1
	1.26	2.0	3.1	6.4	1FK7043-7AK71-1...	1.01	6.7	9	6SN112.-1AA00-0BA1



1FK7

## Synchronous servo motors 1FK7 CT for SIMODRIVE 611 universal

Rated speed $n_N$ rpm	Rated power $P_N$ kW	Rated torque $M_N$ (100 K) Nm	Torque at standstill $M_0$ (100 K) Nm	Motor phase current $I_0$ (100 K) A	Servo motor 1FK7 CT Self-cooling Order No.	Moment of inertia without brake $J$ $10^{-4}$ kgm <sup>2</sup>	Weight without brake $m$ kg	Required converter rated current $I_N$ (100 K) A	SIMODRIVE power module Order No.
3000	0.82	2.6	3.0	2.2	1FK7042-5AF71-1...	3.01	4.8	3	6SN112.-1AA00-0HA1
	1.48	4.7	6.0	4.5	1FK7060-5AF71-1...	7.95	8.0	5	6SN112.-1AA00-0AA1
	2.29	7.3	11.0	8.0	1FK7063-5AF71-1...	15.1	12.0	9	6SN112.-1AA00-0BA1
	2.14	6.8	8.0	4.8	1FK7080-5AF71-1...	15.0	11.3	5	6SN112.-1AA00-0AA1
	3.3	10.5	16.0	10.4	1FK7083-5AF71-1...	27.3	14.0	18	6SN112.-1AA00-0CA1
	3.77	12.0	18.0	11.2	1FK7100-5AF71-1...	55.3	18.9	18	6SN112.-1AA00-0CA1
	4.87	15.5	27.0	19.0	1FK7101-5AF71-1...	79.9	25.0	28	6SN112.-1AA00-0DA1
	4.39	14.0	36.0	27.5	1FK7103-5AF71-1...	105.0	29.0	28	6SN112.-1AA00-0DA1
4500	1.74	3.7	6.0	6.2	1FK7060-5AH71-1...	7.95	8.0	9	6SN112.-1AA00-0BA1
	1.41	3	11.0	12.0	1FK7063-5AH71-1...	15.1	12.0	18	6SN112.-1AA00-0CA1
	2.12	4.5	8.0	7.4	1FK7080-5AH71-1...	15.0	11.3	9	6SN112.-1AA00-0BA1
	1.41	3	16.0	15.0	1FK7083-5AH71-1...	27.3	16.0	18	6SN112.-1AA00-0CA1
6000	0.5	0.6	0.85	1.8	1FK7022-5AK71-1...	0.28	1.8	3	6SN112.-1AA00-0HA1
	0.38	0.8	1.1	1.7	1FK7032-5AK71-1...	0.61	2.7	3	6SN112.-1AA00-0HA1
	0.69	1.1	1.6	2.25	1FK7040-5AK71-1...	1.69	3.4	3	6SN112.-1AA00-0HA1
	0.94	1.5	3.0	4.4	1FK7042-5AK71-1...	3.01	4.8	5	6SN112.-1AA00-0AA1

Hp = kW \* 1.341; Lbf-in = Nm \* 8.850; in = mm \* 0.03937; Lbs = kg \* 2.2046

### Other operable motors:

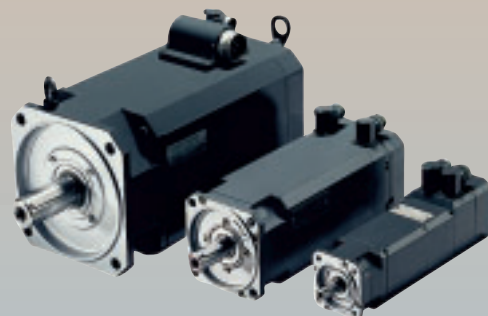
- Permanently energized synchronous motors (servo, spindle, linear and torque motors):  
1FT6, 1FN, 1FE, 1FW6
- Induction motors:  
1PH7, 1LA



1FN3



1PH7



1FT6

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Responsible for  
Technical content:  
Siemens AG, A&D MC PM, Erlangen  
Editing:  
Siemens AG, A&D PT 5, Erlangen

Order No.: **6ZB5711-0AB02-0BA1**

Printed in Germany  
18401/322134 VOG 0303 3.0  
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