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## Drive Engineering / Electric Machines

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### Electric Machines (Series 2700)

2730	Control Unit
2719	Brake Unit (AC)
2740.1	Universal Power Supply
2750	Universal Resistor
2701 - 16	Electric Machines
27xx-SM	Sectional Models (Fan housing not cutted)
27xx-SM-L	Sectional Models (Fan housing cutted)
2720.1-3	Machines Feet
2720.4	Coupling Half
2737.4EVXX	Software AC-Machines / DC-Machines
2737	USB Interface

### Drive Engineering

5255	Four-Quadrant Drive (DC)
2718	Brake Unit (DC)
5261	Frequency Converter
2718	Brake Unit (DC)
5264	Frequency Converter
5265	AC Motor Board

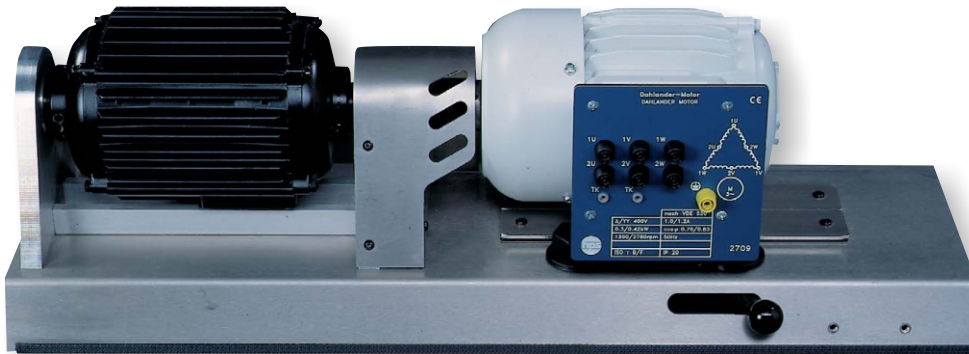


### Software

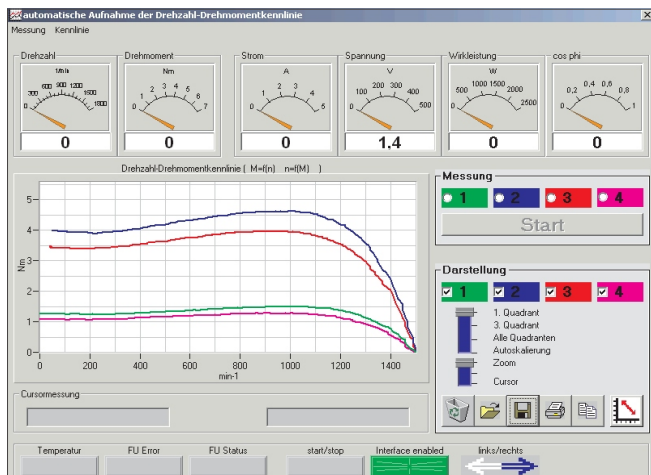
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## Electric Machines



Brake Unit with experimental machine



Display of the characteristics speed / torque

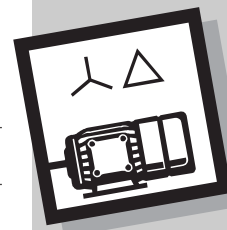
Performed with the Software  
AC Machines  
Type 2734.4EVXX

With the training system „Electric Machines“ hps SystemTechnik offers a modern, newly developed program for plotting characteristics of:

- DC machines
- AC machines
- Three-phase machines

The system is composed of the following components:

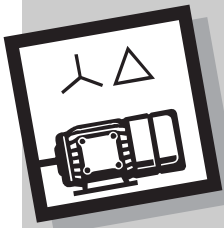
- Control Unit
- Brake Unit
- Universal Power Supply
- Universal Resistor
- Electric Machines
- Universal Power Meter
- Interface for electric machines with software



## Electric Machines

### Series 2700

- Training system for plotting characteristics of electric machines, manual and with PC
- Newly developed quick-action clamping device for experimental machines of shaft height of 63 mm, 71 mm and 80 mm
- Already existing machines, as well as usual commercial machines with one shaft end can be used
- Braking and driving of the experimental machines is done by a three-phase induction machine
- Universal Power Meter with seven-segment display and RS 232 interface
- The Universal Power Supply provides all voltages which are necessary for the experiments:  
AC, three-phase AC; fixed and adjustable DC
- The Universal Resistor as starter resistor, load resistor and field rheostat



## Control Unit Brake Unit

To conduct the experiments, Control Unit, Universal Power Supply and Universal Resistor are placed on a table or suspended in an hps bench rack for demonstration purposes.

The front panel of the units is made of 5 mm thick laminate, matt blue in colour with white printing representing the built-in function groups.

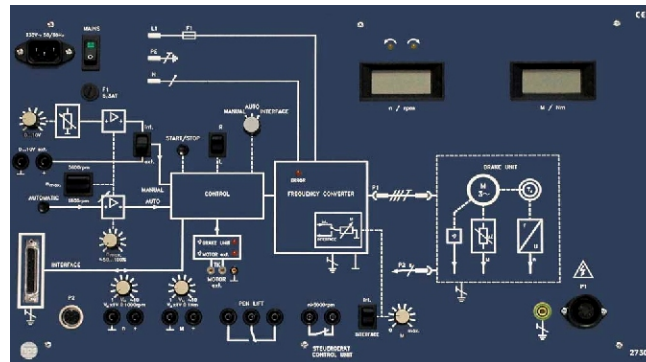
The rear is protected with a grey metal cover.

All function groups are wired through safety jacks (4 mm).

## Electric Machines

### Control Unit

Type 2730



The Control Unit controls the three-phase induction motor of the Brake Unit (Type 2719).

It comprises:

- Frequency converter
- Control unit
- RPM display
- Torque display

#### Technical data

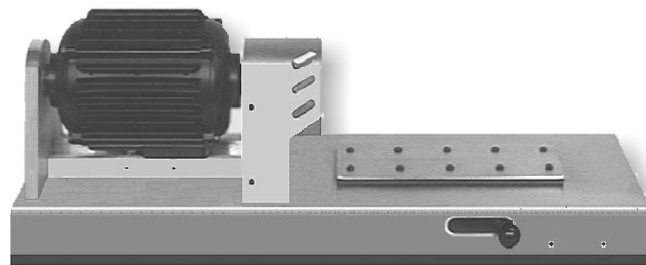
- Mains connection:  
220 ... 230 V AC;  
50 ... 60 Hz
- Working range of the Control Unit: 0.5 ... 120 Hz in both directions
- Dimensions:  
532 x 297 x 185 mm  
(w x h x d)
- Weight: approx. 7.5 kg

#### Accessories included

- Connecting Lead, 4-pin (Type 2730.1)
- Connecting Lead, 8-pin (Type 2730.2)
- 2 Connecting Leads, 2 mm (Type 9103.4)

### Brake Unit

Type 2719



The Brake Unit is composed of a suspended three-phase induction machine, a double cantilever beam with a full-bridge strain gage, a 2-channel encoder and a single-lever quick-action clamping device.

The three-phase induction machine is controlled in both directions via the frequency converter of the Control Unit in a speed range of about 15 ... 3600 rpm. This allows braking and driving of the experimental machine.

#### Accessories included

- Coupling Collar (Type 2720.5)

#### Technical data

##### Three-phase induction machine

- Power:  
400 W (at 50 Hz)  
700 W (at 87 Hz)
- Protection through internal thermal contact

##### Torque measurement

- With double cantilever beam, full-bridge strain gage and shielded amplifier module

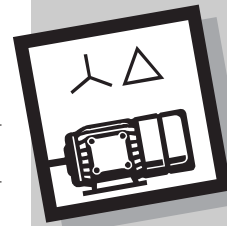
##### Speed measurement

- 2-channel, optical
- 60 pulses / revolution

##### General

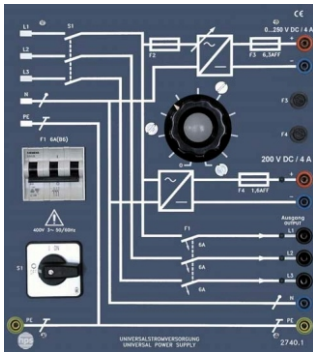
- Material of the base:  
stainless steel, brushed
- Dimensions / weight:  
680 x 220 x 240 mm  
(w x h x d) / 15.1 kg

# Electric Machines



## Universal Power Supply

Type 2740.1



This power supply unit guarantees a clear experimental set-up and a short set-up time.

### Technical data

- Mains connection, three-phase: 380 ... 415 V AC
- Outputs, three-phase: with phase pilot lamp and safety switch, 3-pole (6 A)

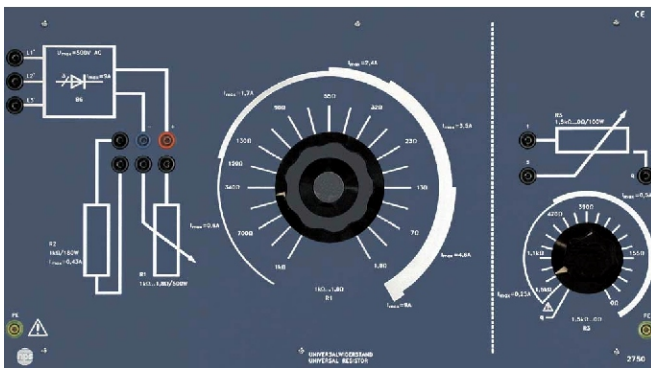
- Fixed DC: 200 V / 4 A (at 230 V mains) for field current supply of DC machines, with pilot lamp
- DC, continuously adjustable: 0 ... 250 V / 4 A
- Dimensions: 266 x 297 x 195 mm (w x h x d)
- Weight: approx 8.6 kg

## Universal Power Supply

## Universal Resistor

## Universal Resistor

Type 2750



The Universal Resistor carries out the following functions in conjunction with the electric machines:

- Starters and field rheostats for DC motors
- Field rheostats for DC generators
- Load resistors for DC generators
- Starting resistors for slipping motors
- Load resistors for synchronous machines

### Technical Data

#### Ring rheostat, 500 W

- With protection series resistor: 1.8 / 150 W
- With 5-step winding:
  - 1.8 ... 11 / 4.6 A
  - 11 ... 32 / 3.5 A
  - 32 ... 56 / 2.4 A
  - 56 ... 140 / 1.7 A
  - 140 ... 1 k / 0.6 A
- Additional series resistor, for expanding the resistance range: 1 k / 180 W;  $I_{max} = 0.43$  A
- Bridge rectifier: 3-phase, B6  $U_{max} = 500$  V AC  $I_{max} = 9$  A

#### Ring rheostat, 100 W

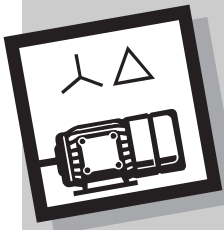
(field rheostat)

- 0 ... 1.5 k , with 2-step winding and q-contact
- Steps:
  - 0 ... 450 / 0.5 A
  - 450 ... 1.5 k / 0.25 A

The Universal Resistor is equipped with a bridge rectifier for loading of synchronous generators with the Ring rheostat (500 W).

The slipping voltage of the slipping motor can also be rectified by means of the bridge rectifier. Thus all possible steps of the slipping starter can be examined.

- Dimensions / weight 532 x 297 x 210 mm (w x h x d) / approx. 7.7 kg



## Electric Machines

## Electric Machines

### Electric Machines of the hps Series 2700

#### General technical data:

- Terminal boards, imprinted with the respective symbols
- Connections: 4 mm safety jacks (thermal contact: 2 mm jacks)
- Painting: light grey (RAL 7035)
- All electric machines are provided with four machine feet and a coupling half.
- For protection against thermal overload all machines are equipped with thermal contacts.



Type 2701



Type 2702

#### Shunt-Wound DC Machine

**Type 2701**

Power: 0.3 kW; speed: 2000 rpm; armature voltage and current: 205 V/2 A;  
field voltage and current: 205 V/0.33 A;  
dimensions: 290 x 160 x 215 mm (w x h x d); weight: 8.1 kg

#### Series-Wound DC Machine

**Type 2702**

Power: 0.3 kW; speed: 2000 rpm;  
armature voltage and current: 205 V/2.2 A;  
dimensions: 290 x 160 x 215 mm (w x h x d); weight: 8.1 kg



Type 2703



Type 2704

#### Plain Compound DC Machine

**Type 2703**

Power: 0.3 kW; speed: 1900 rpm; armature voltage and current: 205 V/1.8 A;  
field voltage and current: 205 V/0.34 A;  
dimensions: 310 x 165 x 215 mm (w x h x d); weight: 9.4 kg

#### Variable Compound DC Machine

**Type 2704**

Power: 0.3 kW; speed: 2000 rpm; armature voltage and current: 205 V/2.3 A;  
field voltage and current: 205 V/0.43 A;  
dimensions: 315 x 170 x 220 mm (w x h x d); weight: 11.6 kg



Type 2705



Type 2706

#### Universal Motor

**Type 2705**

Power: 0.3 kW; speed: 2250 rpm; AC voltage and current: 230 V/3.4 A;  
DC voltage and current: 130 V/3.4 A;  
dimensions: 310 x 165 x 215 mm (w x h x d); weight: 9.4 kg

#### Repulsion Motor

**Type 2706**

Power: 0.25 kW; speed: 2100 rpm at 50 Hz;  $\cos \phi$  : 0.69;  
AC voltage and current: 230 V/2.9 A;  
dimensions: 280 x 190 x 210 mm (w x h x d); weight: 8.3 kg



Type 2707



Type 2707.1

#### Three-Phase Induction Motor

**Type 2707**

Power: 0.37 kW; speed: 1400 rpm at 50 Hz;  $\cos \phi$  : 0.72;  
star connection: 692 V/0.58 A; delta connection: 400 V/1 A;  
dimensions: 250 x 160 x 215 mm (w x h x d); weight: 7.1 kg

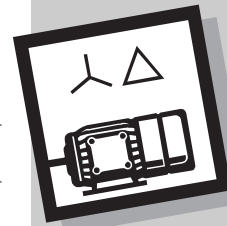
#### Three-Phase Induction Motor

**Type 2707.1**

Power: 0.37 kW; speed: 1400 rpm at 50 Hz;  $\cos \phi$  : 0.72;  
star connection: 400 V/0.85 A; delta connection: 230 V/1.47 A;  
dimensions: 250 x 160 x 215 mm (w x h x d); weight: 7.1 kg

## Electric Machines

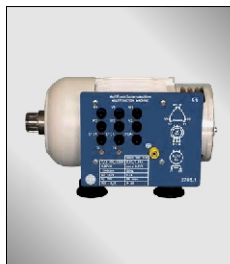
### Electric Machines of the hps Series 2700



## Electric Machines



Type 2708



Type 2708.1

#### Slipring Motor

Type 2708

Power: 0.25 kW; speed: 1340 rpm at 50 Hz;  $\cos \phi$  : 0.74;  
star connection: 400 V/1.15 A; delta connection: 230 V/2 A;  
dimensions: 280 x 160 x 215 mm (w x h x d); weight: 8.1 kg

#### Multifunction Machine

Type 2708.1

Power: 0.27 kW; speed: 1340 rpm at 50 Hz;  $\cos \phi$  : 0.7 /1;  
star connection: 400 V/0.83 A; delta connection: 230 V/1.44 A;  
dimensions: 280 x 160 x 215 mm (w x h x d); weight: 8.1 kg



Type 2709



Type 2710

#### Dahlander Motor

Type 2709

Power: 0.3/0.42 kW; speed: 1390/2780 rpm at 50 Hz;  $\cos \phi$  : 0.76/0.83;  
delta connection: 400 V/1 A; dual star connection: 400 V/1.2 A;  
dimensions: 250 x 160 x 215 mm (w x h x d); weight: 7.1 kg

#### Three-Phase Induction Motor (separate windings)

Type 2710

Power: 0.15/0.22 kW; speed: 950/1450 rpm at 50 Hz;  $\cos \phi$  : 0.57/0.64;  
star connection: 400 V/0.55 A; star connection: 400 V/0.6 A;  
dimensions: 250 x 160 x 215 mm (w x h x d); weight: 7.1 kg



Type 2711



Type 2712

#### Synchronous Machine

Type 2711

Power: 0.3 kW; speed: 1500 rpm at 50 Hz;  $\cos \phi$  : 0.97; excitation current:  
0.95 A; star connection: 400 V/0.66 A; delta connection: 230 V/1.44 A;  
dimensions: 280 x 160 x 215 mm (w x h x d); weight: 8.3 kg

#### Bifilar Wound Motor

Type 2712

Power: 0.22 kW; speed: 1360 rpm at 50 Hz;  $\cos \phi$  : 0.69;  
AC voltage and current: 230 V/2.8 A;  
dimensions: 250 x 160 x 215 mm (w x h x d); weight: 7.1 kg



Type 2715



Type 2716

#### Capacitor Motor

Type 2715

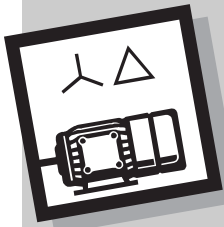
Power: 0.3 kW; speed: 1425 rpm at 50 Hz;  $\cos \phi$  : 0.93; AC voltage and  
current: 230 V/2.1 A; phase-shift and starting capacitor: 10 F/14 F;  
dimensions: 240 x 170 x 230 mm (w x h x d); weight: 7.3 kg

#### Split-Pole Motor

Type 2716

Power: 0.12 kW; speed: 2700 rpm at 50 Hz;  $\cos \phi$  : 0.6;  
AC voltage and current: 230 V/3.2 A;  
dimensions: 240 x 170 x 230 mm (w x h x d); weight: 7.3 kg





## Electric Machines

## Electric Machines

### Sectional Models

...-SM = Sectional Model (Fan housing not cutted)

...-SM-L = Sectional Model (Fan housing cutted)



Type 2701-SM



Type 2701-SM-L

#### Sectional Model Shunt-Wound DC Machine

#### Type 2701-SM

Shaft height: 71 mm; the machine is painted light grey; blank parts are coated with a clear varnish to inhibit corrosion; Fan housing not cutted.

Dimensions: 303 x 141 x 142 mm (w x h x d); weight: 7.4 kg

#### Sectional Model Shunt-Wound DC Machine

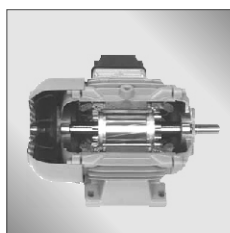
#### Type 2701-SM-L

Shaft height: 71 mm; the machine is painted light grey; blank parts are coated with a clear varnish to inhibit corrosion; Fan housing cutted.

Dimensions: 303 x 141 x 142 mm (w x h x d); weight: 7.4 kg



Type 2707.1-SM



Type 2707.1-SM-L

#### Sectional Model Three-Phase Induction Motor

#### Type 2707.1-SM

With round-bar rotor; shaft height: 71 mm; the motor is painted light grey; blank parts are coated with a clear varnish to inhibit corrosion; Fan housing not cutted.

dimensions: 273 x 141 x 142 mm (w x h x d); weight: 7.2 kg

#### Sectional Model Three-Phase Induction Motor

#### Type 2707.1-SM-L

With round-bar rotor; shaft height: 71 mm; the motor is painted light grey; blank parts are coated with a clear varnish to inhibit corrosion; Fan housing cutted.

dimensions: 273 x 141 x 142 mm (w x h x d); weight: 7.2 kg



Type 2708-SM



Type 2708-SM-L

#### Sectional Model Three-Phase Induction Motor

#### Type 2708-SM

With slipring rotor; shaft height: 71 mm; the motor is painted light grey; blank parts are coated with a clear varnish to inhibit corrosion; Fan housing not cutted.

dimensions: 273 x 141 x 142 mm (w x h x d); weight: 7.9 kg

#### Sectional Model Three-Phase Induction Motor

#### Type 2708-SM-L

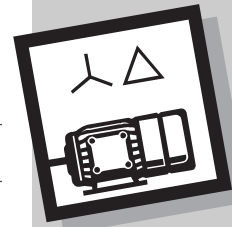
With slipring rotor; shaft height: 71 mm; the motor is painted light grey; blank parts are coated with a clear varnish to inhibit corrosion; Fan housing cutted.

dimensions: 273 x 141 x 142 mm (w x h x d); weight: 7.9 kg

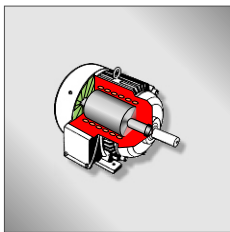


## Electric Machines

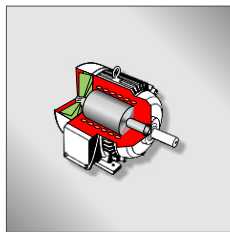
### Sectional Models



## Electric Machines



Type 2711-SM



Type 2711-SM-L

#### Sectional Model Synchronous Machine

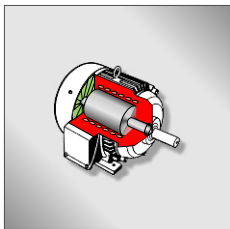
#### Type 2711-SM

Shaft height: 71 mm; the machine is painted light grey; blank parts are coated with a clear varnish to inhibit corrosion;  
Fan housing not cutted.  
dimensions: 273 x 141 x 142 mm (w x h x d); weight: 7.6 kg

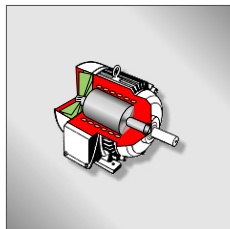
#### Sectional Model Synchronous Machine

#### Type 2711-SM-L

Shaft height: 71 mm; the machine is painted light grey; blank parts are coated with a clear varnish to inhibit corrosion;  
Fan housing cutted.  
dimensions: 273 x 141 x 142 mm (w x h x d); weight: 7.5 kg



Type 2711.1-SM



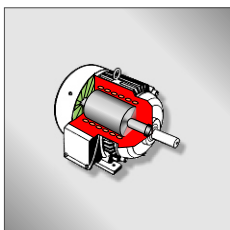
Type 2711.1-SM-L

#### Typ 2711.1-SM

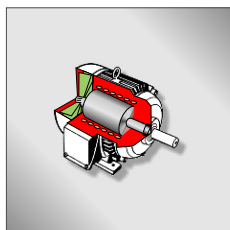
In Preparation

#### Typ 2711.1-SM-L

In Preparation



Type 2711.2-SM



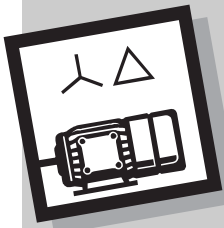
Type 2711.2-SM-L

#### Typ 2711.2-SM

In Preparation

#### Typ 2711.2-SM-L

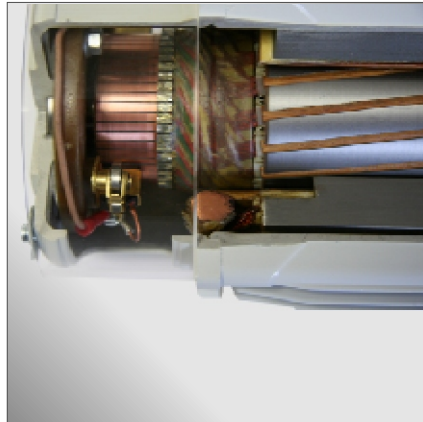
In Preparation



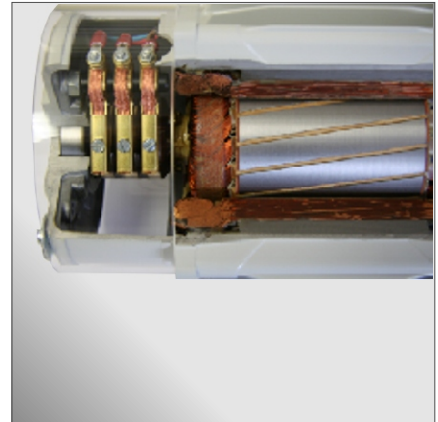
## Sectional Models Industrial Machines Accessories

## Electric Machines

### Sectional Models

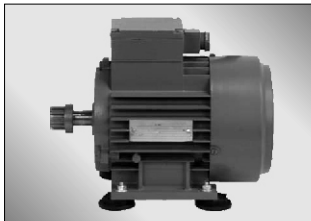


Detailed Illustration Type 2701-SM-L



Detailed Illustration Type 2708-SM-L

## Industrial machines with machine feet and coupling half



The use of machines of other training programs as well as of standard industrial machines is also possible.

The appropriate machine feet (Types 2720.1, 2720.2, 2720.3) are available for this purpose.

A prerequisite is however a standard shaft height of 63 mm, 71 mm or 80 mm.

Furthermore the suitable coupling half (Type 2720.4) has to be mounted.

### Machine feet

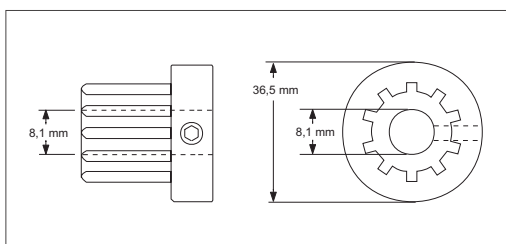


4 pieces in a set, each of which with one screw, nut, large diameter washer and tooth lock washer; for adaptation of standard machines in height and width to the Brake Unit. Machines of a width of 100 mm or more (distance of mounting hole) can be adapted directly through the machine feet with eccentrical drilling hole.

The machine feet are available in three heights.  
Height 12 mm (for machines of 80 mm shaft height): **Type 2720.1**  
Height 21 mm (for machines of 71 mm shaft height): **Type 2720.2**  
Height 29 mm (for machines of 63 mm shaft height): **Type 2720.3**  
Diameter: 45 mm; material: synthetic, glass-fibre reinforced

### Coupling Half, (schematic diagram)

**Type 2720.4**



The coupling half is fixed on the shafts of the machines with a hexagon socket screw.

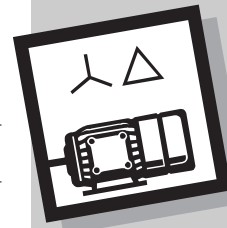
The drilling hole of the coupling half has a standard diameter of 8.1 mm. Other diameters (8.1 mm ... 15.9 mm) can also be supplied on request.

Length: 30 mm, diameter: 36.5 mm, material: sintered iron

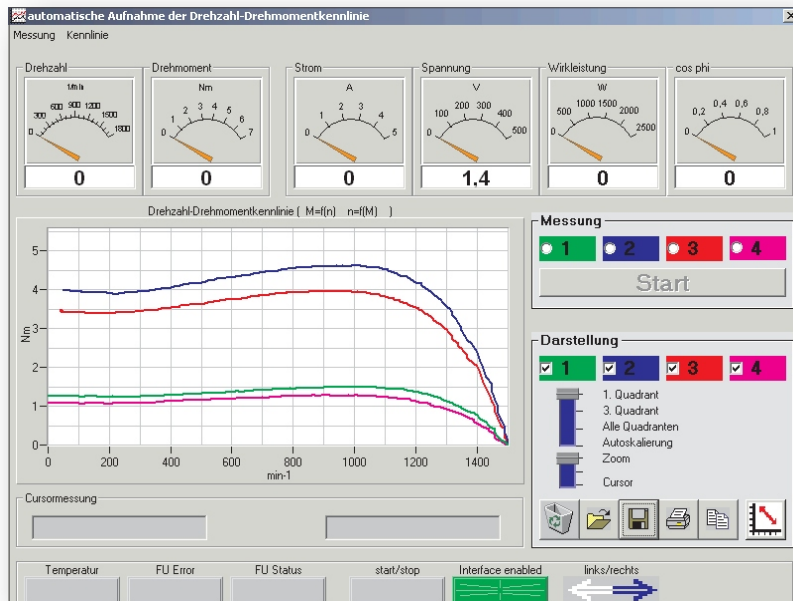
# Electric Machines

## Software AC Machines / DC Machines

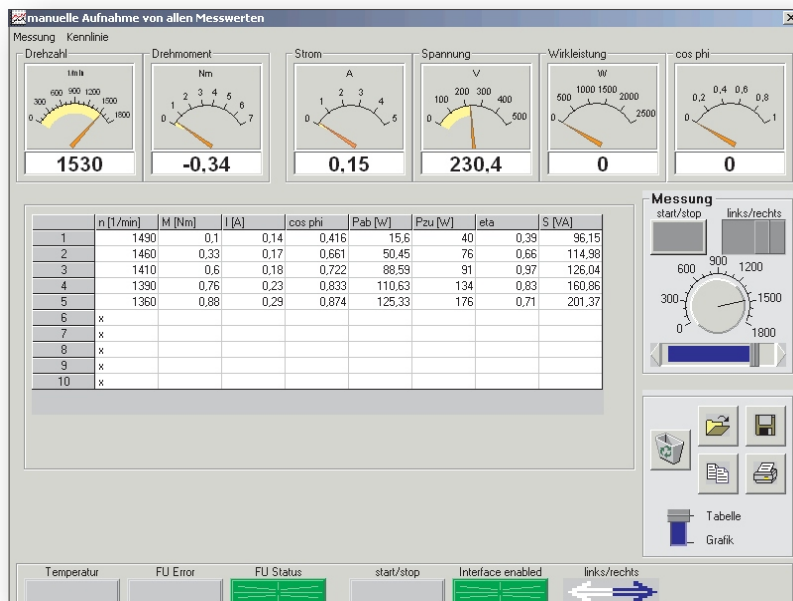
Type 2737.4EVXX



## PC Link Electric Machines



Display of the characteristics speed / torque



Display of different measuring values of an asynchronous motor (analog and digital)

With the software

- AC Machines
- DC Machines

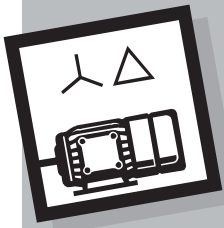
the load of AC and DC machines can be controlled comfortably with the PC in connection with the hps devices

- Control Unit
- Brake Unit
- Universal Power Meter

The following individual settings can be made on the PC:

- Start / stop
- Right / left rotation
- Speed
- Brake ramp
- Setpoint value
- Torque

Required hardware overleaf



## PC Link Accessories Recommended

The measuring values of speed and torque are generated for the PC with the PCI-I/O Card or the USB INTERFACE.

In connection with the Universal Power Meter from hps SystemTechnik additional measuring values such as voltage, current and power can be fed to the PC through a serial interface.

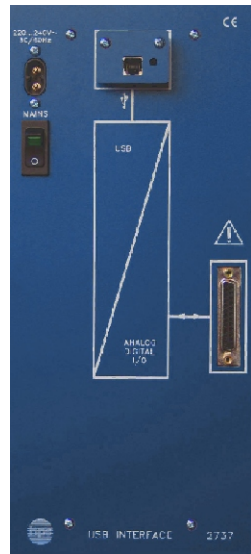
The software AC Machines/DC Machines enables all the necessary calculations of the fed measuring values.

The read-in measuring values and all calculated values are shown in analog or digital form on the screen.

## Electric Machines

### USB INTERFACE

Type 2737



- **ANALOG DIGITAL I / O**  
25-pin Sub-D jack for connection to hps Control Unit Type 2730
- **USB**  
Connection to PC
- **Mains connection**  
220 V AC ... 240 V AC; approx. 15 VA; 50 ... 60 Hz
- **Dimensions / weight**  
133 x 297 x 110 mm (w x h x d) / 1.4 kg
- **PC requirements**  
IBM-compatible PC with Windows 98 / 2000 or XP, Vista, WIN 7, free USB interface and free serial interface
- The quality of the characteristics generated with the USB INTERFACE is minor compared to those generated with the PCI-I/O Card due to the lower number of measuring values.

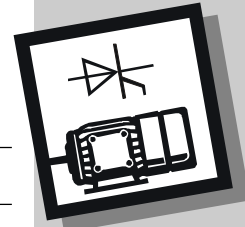
### Accessories Required for Training System Electric Machines

- Meters: Multimeter, phase-angle meter, UNIVERSAL POWER METER (Type 1091)
- Safety connecting plugs and leads
- Experiment manual: Electric Machines (Type V 0170)

#### for PC link

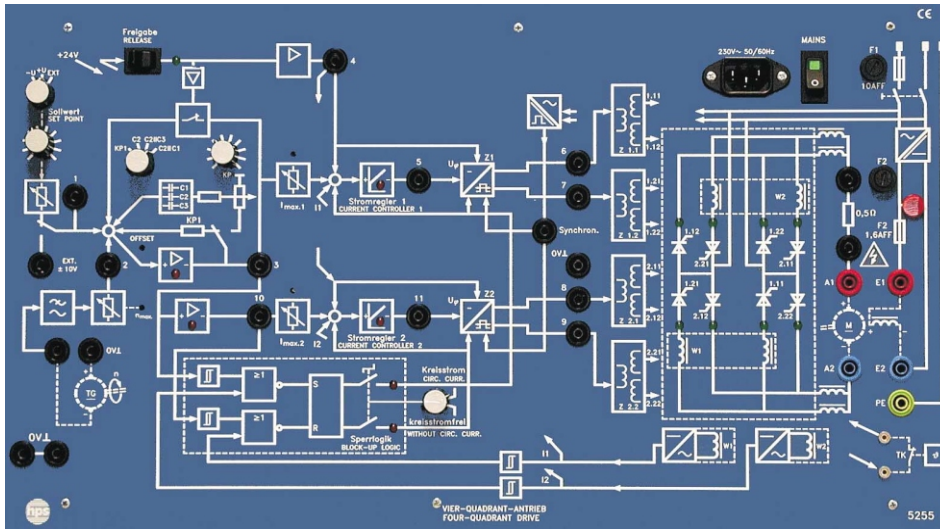
- IBM-compatible PC

Subject to technical modifications.



### Four-Quadrant Drive (DC)

Type 5255



Front view of the Four-Quadrant Drive (Type 5255)

- Compact construction for fast setup
- For DC machines of 100 W ... 1 kW
- Circulating current and circulating current-free operation, switchable
- Built-in controllers for current and speed
- Optical indicator for thyristor switching states
- Test jacks for recording electrical parameters

With the Four-Quadrant Drive hps SystemTechnik offers a training system to conduct experiments in the field of automatic monitoring and control of the speed of Shunt-Wound DC Machines.

Measuring and adjusting facilities are available for recording and displaying all the important electrical parameters.

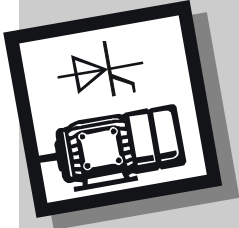
Detailed instructions are available for conducting experiments with the Four-Quadrant Drive.

The Four-Quadrant Drive is designed for operating DC machines rated up to 1 kW.

To conduct the experiments, the Four-Quadrant Drive is placed on a table or suspended in an hps rack for demonstration purposes.

### Accessories Recommended

- Experiment manual: „Four-Quadrant Drive“ (Type V 0015)
- Shunt-Wound DC Machine (Type 2701) or Variable Compound Machine (Type 2704)
- Universal Power Supply (Type 2740.1)  
DC: 200 V / 4 A (fixed),  
DC: 0 ... 250 V / 4 A  
(only required for static inverter)
- Load (Type 5512)  
three lamps and one switch
- Connecting leads
- Measuring equipment:
  - oscilloscope  
(with divider probe),
  - isolation amplifier,
  - multimeter (0 ... 300 V;  
0 ... 10 A),
  - speed indicator
- DC Brake Unit (Type 2718)



## Four-Quadrant Drive (DC)

Type 5255

### Technical Data of the Four-Quadrant Drive

#### Mains connection

- Voltage: 220 ... 240 V AC; 50 ... 60 Hz;

#### Power consumption

- Approx. 200 VA ... 1.1 kVA  
(depending on the connected machine set)

#### Armature voltage and current

- Max. 207 V; 6 A (with 230 V mains voltage)

#### Field voltage and current

- Max. 207 V; 2.5 A (with 230 V mains voltage)

#### Speed controller (can be switched off)

- Proportional part  $K_P$  continuously adjustable
- Integral part adjustable in 3 stages

#### Temperature control

- For motor set, via 2 mm jacks

#### Mechanical data

The front panel of the Four-Quadrant Drive is made of 5 mm thick Laminate, matt blue in colour with white engraving representing the built-in function groups.

The front panel also contains the necessary controls as well as the 4 mm test jacks required for conducting experiments.

The rear of the Board is protected with a grey powder-coated metal cover.

#### Dimensions

- 532 x 297 x 190 mm (w x h x d)

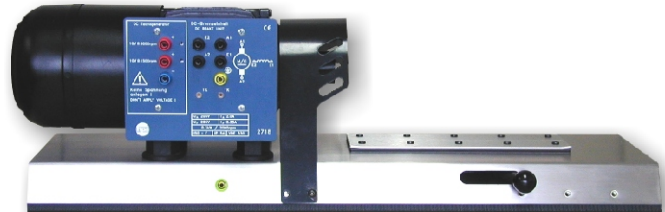
#### Weight

- Approx. 14.9 kg

Subject to technical modifications.

## Control Engineering / Power Electronics

### DC Brake Unit (Type 2718)



The DC Brake Unit has been designed for applications in the field of drive engineering, e. g. for experiments with a shunt-wound DC machine and a four-quadrant drive.

It can be used as a motor together with the Universal Power Supply (Type 2740.1) or as a generator with the Load (Type 5512).

The DC Brake Unit consists of a shunt-wound DC machine with integrated DC tachogenerator mounted on a base. The base accommodates and mechanically connects the experimental machines, e. g. a shunt-wound DC machine (Type 2701).

The hps experimental machines are equipped with 4 machine feet. They are slipped on the Brake Unit and fixed with a single-lever quick-action clamping device.

Accessories included: Coupling Collar (Type 2718.5)

### Technical data of the DC Brake Unit

#### Shunt-Wound DC Machine

- Armature voltage and current: 205 V / 2 A;
- Field voltage and current: 205 V / 0.33 A
- Power: 0.3 kW (at 2000 rpm)
- Protection through thermal contact

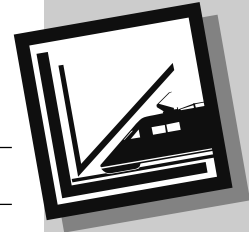
#### DC tachogenerator

- Output 1: 10 V (at 1500 rpm)
- Output 2: 10 V (at 3000 rpm)

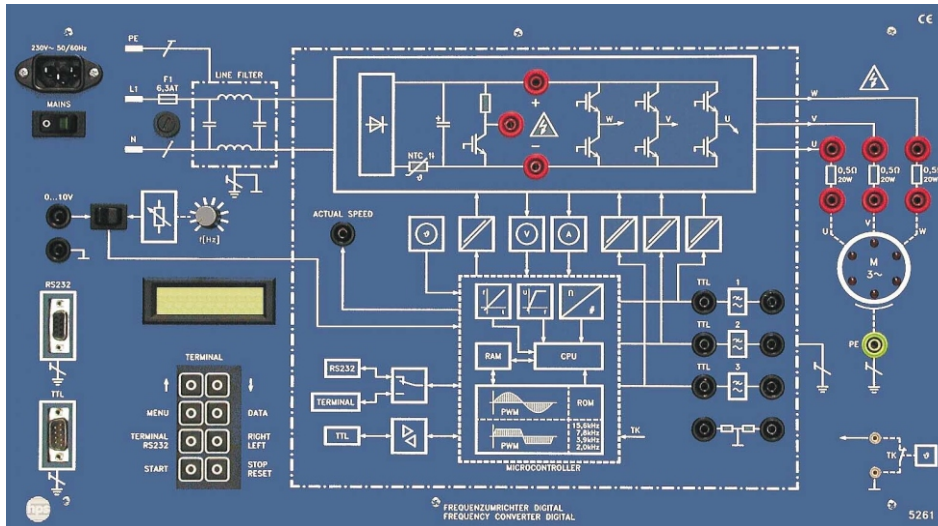
#### General

- Material of the base: stainless steel, brushed
- Dimensions: 710 x 220 x 250 mm (w x h x d)
- Weight: 13.7 kg

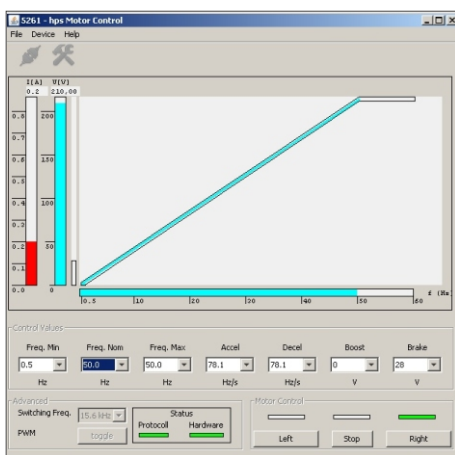




## Frequency Converter Type 5261



- For three-phase induction motors of 100 W ... 1 kW
- Four-quadrant operation
- Control and parameter assignment by the incorporated terminal or an external PC (RS 232 interface)
- Protection against over-current, overvoltage and undervoltage, excess temperature, short-circuit and earth fault
- Simple control and parameter assignment by means of menu-driven Terminal program



V/f diagram of the Frequency Converter

With the Frequency Converter hps SystemTechnik offers a training system to conduct experiments in the field of automatic monitoring and control of the speed of three-phase induction motors.

The following **parameters** can be set through an easy-to-use menu or PC:

- Minimum and maximum frequency / set frequency
- Acceleration and deceleration ramp
- Starting voltage / braking voltage / voltage / current
- Direction of rotation: right / left
- Modulation modes: sine, trapezoidal
- Modulation frequency

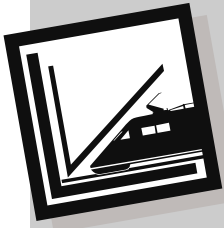
### Software for the Frequency Converter

- V/f diagram of the Frequency Converter
- Travel diagram
- Display for current and voltage
- Display for brake voltage and boost
- Simultaneous display of all parameters
- Display of working temperature
- Works with:  
Windows XP / VISTA / 7 -32/64 bit

### Accessories Recommended

- Experiment manual:  
„Frequency Converter – Digital“ (Type V 0022)
- Three-Phase Induction Motor, e. g. Type 2707.1
- Load, three lamps and one switch (Type 5512)
- Isolation Amplifier (Type 8630)
- Universal Power Supply (Type 2740.1)
- Storage oscilloscope
- PC (IBM-compatible) / software: 5261 EVGB
- Connecting lead, RS 232 (Type 9102.50)
- DC Brake Unit (Type 2718)



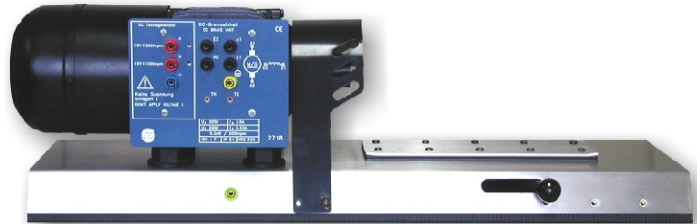


## Frequency Converter

Type 5261

## Control Engineering / Power Electronics

### DC Brake Unit (Type 2718)



### Technical data of the Frequency Converter

#### Mains connection (single-phase)

- Voltage: 230 V AC; +/-10%
- Power consumption: max. 6.3 A
- Mains frequency: 48 Hz ... 400 Hz

#### Output

- Output voltage: 3 x 220 V; 0.5 ... 120 Hz
- Output current: max. 4.5 A

#### Braking and acceleration ramp

- 11.5 Hz/s ... 588.1 Hz/s

#### Pulse width modulation (PWM)

- Frequency: 2.0 kHz; 3.9 kHz; 7.8 kHz; 15.6 kHz

#### Protection against

- Overvoltage and undervoltage
- Overcurrent
- Excess temperature of the power unit and Motor
- Short-circuit and earth fault

#### SUB-D plug (9-pin)

- To connect TTL levels (0 ... 5 V) for external control of the Frequency Converter

#### Other

- Electrical isolation of the control unit
- Braking resistor: 150 / 50 W
- Inputs: set point frequency through built-in potentiometer or external voltage 0 ... 10 V

#### Mechanical Data

The front panel of the Frequency Converter Digital is made of 5 mm thick laminate, matt blue in colour with white printing representing the built-in function groups.

The rear of the Board is protected with a grey powder-coated metal cover.

#### Dimensions / Weight

- 532 x 297 x 165 (w x h x d) / Approx. 6.2 kg

The DC Brake Unit has been designed for applications in the field of drive engineering, e. g. for experiments with a three-phase induction motor and a frequency converter.

It can be used as a motor together with the Universal Power Supply (Type 2740.1) or as a generator with the Load (Type 5512).

The DC Brake Unit consists of a shunt-wound DC machine with integrated DC tachogenerator mounted on a base. The base accommodates and mechanically connects the experimental machines, e. g. a Three-Phase Induction Motor (Type 2707.1).

The hps experimental machines are equipped with 4 machine feet. They are slipped on the Brake Unit and fixed with a single-lever quick-action clamping device.

Accessories included: Coupling Collar (Type 2718.5)

### Technical data of the DC Brake Unit

#### Shunt-Wound DC Machine

- Armature voltage and current: 205 V / 2 A;
- Field voltage and current: 205 V / 0.33 A
- Power: 0.3 kW (at 2000 rpm)
- Protection through thermal contact

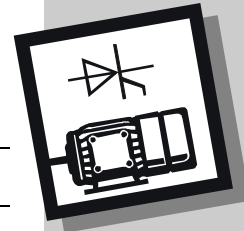
#### DC tachogenerator

- Output 1: 10 V (at 1500 rpm)
- Output 2: 10 V (at 3000 rpm)

#### General

- Material of the base: stainless steel, brushed
- Dimensions: 710 x 220 x 250 mm (w x h x d)
- Weight: 13.7 kg

Subject to technical modifications.



### FREQUENCY CONVERTER

Type 5264



FREQUENCY CONVERTER  
(Type 5264)

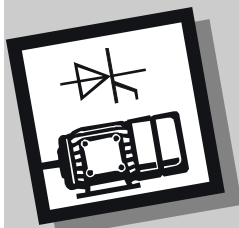
- Simple commissioning
- Didactically designed EMC connections
- Can be operated on IT networks
- Extensive protection functions against overload, short-circuits and ground faults, I<sup>2</sup>t thermal protection
- Simple cable connection (safety plugs, screw clamp, socket)
- Compound braking for improved braking performance
- Wide range of parameters which allow configuration for a wide application range
- Programmable I/O functions
- Digital PID controller with freely adjustable parameters
- Automatic parameter adaption to changes in load
- Sensorless vector control with adaptive motor model
- High pulse frequency for low noise operation

#### Optional:

- AOP Advanced Operation Panel
- Profibusmodul

### Learning aims:

- To connect and operate digital frequency converters according to EMC requirements
- To program and test drive and protection functions, interpret fault messages, troubleshooting
- Central operation and monitoring (HMI) on the PC, connection to automation systems via Profibus



## FREQUENCY CONVERTER

Type 5264

## Drive Technology / Automation Technology

### Required accessories

- Micromasterstarter Software 6SL3072-0AA00-0AG0
- PC-Inverter Connection Kit (RS232) 6SE6400-1PC00-0AA0
- MICROMASTER 4 BASIC OPERATOR PANEL 4 (BOB) 6SE6400-0BP00-0AA0

### Recommend accessories

- Experiment book: **NEW!** Type V 0023 DE  
Frequency converter with  
Micromaster 420

### Optional accessories

- ADVANCED OPERATOR PANEL (AOP) 6SE6400-0AP00-0AA1
- MICROMASTER 4 Profibusmodule 6SE6400-1BP00-0AA0
- SIMATIC NET, Connecting cable 830-2, for Profibus 6XV1830-2AH30
- Three phase induction motor Type 2707.1
- AC Motor Board Type 5265

### Technical data

#### Mains connection

- Mains voltage: 220 ... 240 V AC
- Mains frequency: 47 ... 63 Hz
- Internal fuse: 10 A slow blow

#### Motor connection

- Output voltage: 3 x 0 ... 230 V AC
- Output frequency: 0 ... 650 Hz
- Power: 0.37 kW

Three connections are available:  
screw terminals, 4 mm safety jacks or a 4-pole round  
socket (for direct connection to the conveyor belt  
Type 99011).

#### Inputs

- 3 digital inputs: 24 V DC
- 1 analogue input: 0 ... 10 V

#### Outputs

- 1 analogue output: programmable, 10 bits
- 1 relays output: error contact 230 V AV

#### Delivered accessories

- 4 mm / 19 mm safety plugs
- power cable

#### System interface

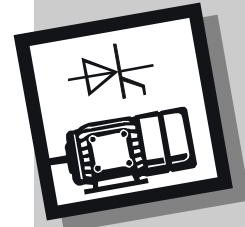
- RS 485
- Optional Profibus connection

#### Mechanical data

- Front panel material: made of laminate (5 mm)
- Rear: angled plastic cover
- Dimensions: 266 x 297 x 220 mm (w x h x d)
- Weight: approx. 3.0 kg

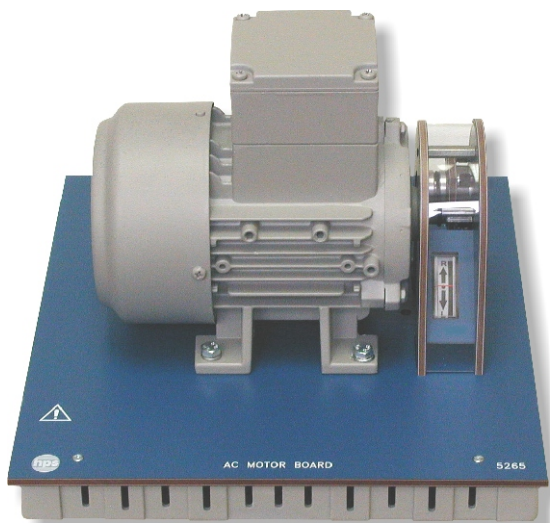
Subject to technical modifications.





### AC MOTOR BOARD

Type 5265



Front view of the  
AC MOTOR BOARD

- The AC MOTOR BOARD is a three-phase current asynchronous motor for connection to a frequency converter (FREQUENCY CONVERTER BOARD type 5264) according to EMC requirements.
- For good detection of both directions of rotation and high and low speeds, a display unit has been installed which is fed by a tachogenerator.
- A freely accessible tap in the motor shaft allows an exact speed measurement with a hand speedometer.

### Technical data

#### Mains connection

- Supply voltage:  
3 x 230 V / 50 Hz (between phases)
- Motor connecting cable:  
4 x 1.5 mm<sup>2</sup> shielded, length: 1.8 m  
with multicore cable end
- Current: 0.73 A
- Power: 0.12 kW
- Speed: 1350 rpm
- cos : 0.75

#### Mechanical data

- Material of front panel: laminate (5 mm)
- Rear: angled plastic cover
- Dimensions: 266 x 297 x 230 mm (w x h x d)
- Weight: approx. 5.5 kg

Subject to technical modifications.





**SystemTechnik**

# POWER ELECTRONICS / Drive Engineering Electric Machines

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Web: www.hps-systemtechnik.com  
E-Mail: export@hps-systemtechnik.com



## CASPOC Education

Simulation software for drive engineering and power electronics

(Typ 005012 EVXX)

**CASPOC EDUCATION** – Power Electronics is a simulation software specially developed for power electronics. The fast, simple program development and parameterization allow all circuits to be developed and simulated directly without any great introduction. The express version is restricted in the quantity of blocks and nodes in the development level.

### Performance:

- Fast simulation, no convergence problems
- View results during simulation
- Simple parameterization
- C-script to create user defined blocks
- Menu in English / German, switchable

### Teach Ware:

- Short guide on CD (English and German)
- User guide on CD (English)

### Available as:

- Licence for 1 computer incl. dongle
- Classroom licence for max. 16 computers within one network domain

### Reference:

- Only for schools and non-commercial educational institutes!

### System Requirements:

- PC with Windows® Software
- Hard disk: 10 MB free
- RAM: 4 MB
- CD ROM drive
- SVGA graphic card (800 x 600)

