PMC motion control

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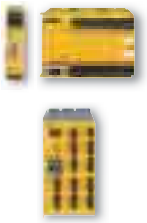
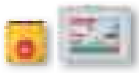
Operation, control and movement of highly dynamic drives

Motion from Pilz – Safe, open, complete.

Business activities

Excellent Components

Sensor technology	▸ Safety switches ▸ Safety bolts ▸ Optoelectronic protective devices ▸ Safe camera systems	
Control and communication	▸ Electronic monitoring relays ▸ Safety relays ▸ Programmable safety and control systems ▸ Industrial communication	
Motion Control	▸ Control systems ▸ Servo amplifiers ▸ Motors	
Operating and monitoring	▸ Control and signal devices ▸ Operator terminals	
Software	▸ System software ▸ User software ▸ Software tools	

Professional Services

Consulting and Engineering	▸ Plant assessment ▸ Risk assessment ▸ Safety concept ▸ CE services ▸ Inspection of ESPE ▸ Safety design ▸ Safety sign-off	
Training	▸ Seminars ▸ Courses	

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Support

Technical help round the clock!

Technical support is available from Pilz round the clock. This service is provided free of charge beyond standard business hours.

Americas
- Brazil
  +55 11 8245-8267
- Mexico
  +52 55 5572 1300
- USA
  +1 734 354 0272

Asia
- China
  +86 21 62494658-216
- Japan
  +81 45 471-2281
- Korea
  +82 2 2263 9540

Australia
- Australia
  +61 3 95446300

Europe
- Austria
  +43 1 7986263-0
- Belgium, Luxembourg
  +32 9 3217575
- England
  +44 1536 462203
- France
  +33 3 88104000
- Germany
  +49 711 3409-444
- Ireland
  +353 21 4804983
- Italy
  +39 031 789511
- Scandinavia
  +45 74436332
- Spain
  +34 938497433
- Switzerland
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Why does Pilz offer more?

Because the integrality of our business activities is what sets us apart.

Pilz is a solution supplier for all automation functions. Including standard control functions. Developments from Pilz protect man, machine and the environment. That's why all our experience and knowledge goes into individual products as well as consistently sophisticated system solutions.

- Sensor technology
- Control and communication
- Motion Control
- Operating and monitoring
- Software
- Consulting and engineering
- Training

Appropriate services relating to individual components and independent generic services guarantee that our customers obtain customised automation solutions, all from one source.

Pilz is a family business that's closer to its customers.

Pilz has a tradition as a family-run company stretching back over 50 years.
Real proximity to customers is visible in all areas, instilling confidence through individual consultation, flexibility and reliable service.

We are your contact, guide and competency leader en route to an optimum automation solution.

Contents

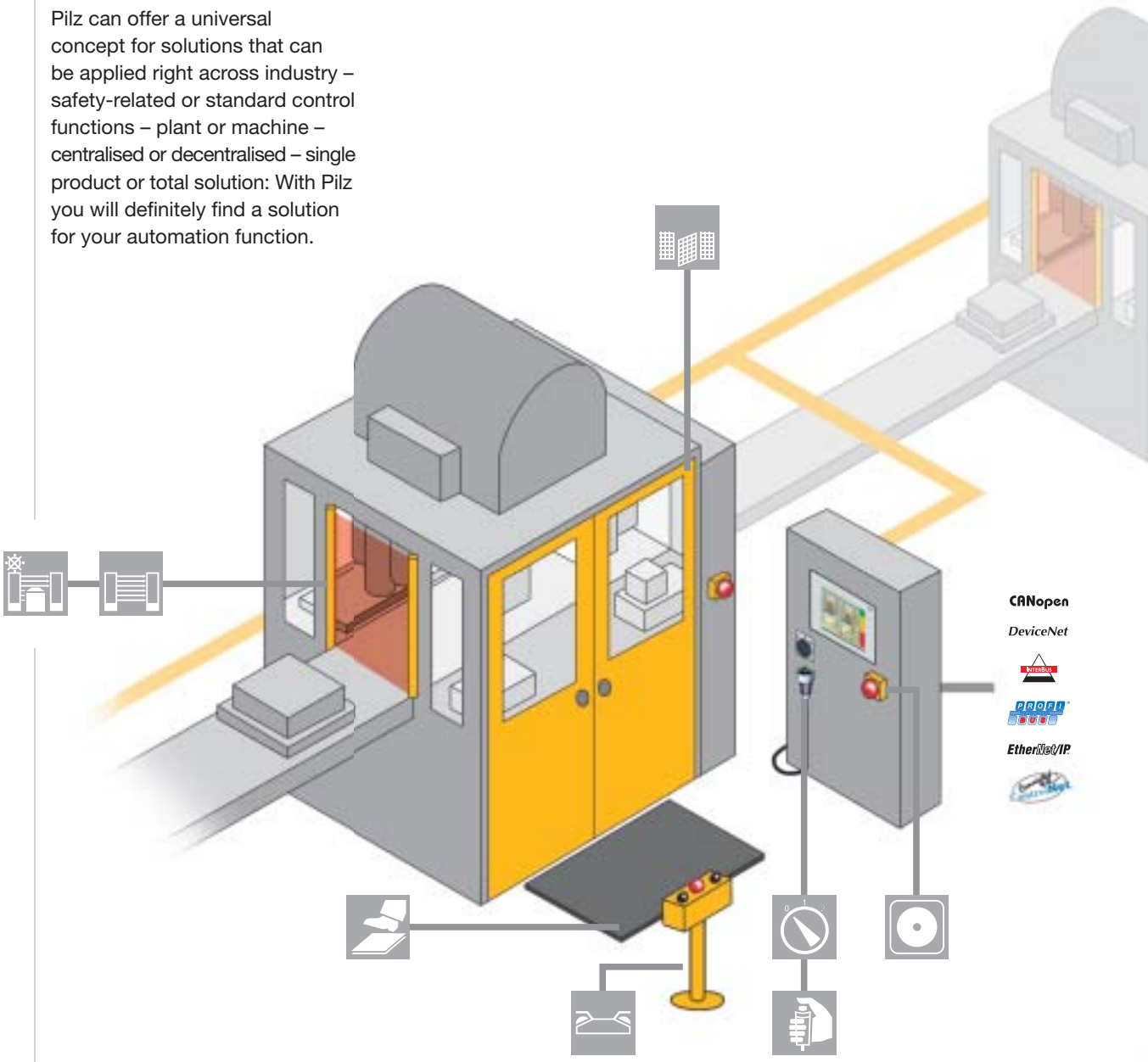
Individual solutions

As market and technology leader, Pilz offers solutions for both safety and standard control technology.
Part of these solutions is Pilz motion control (PMC). PMC provides overall solutions for automating your machine. From control systems to servo amplifiers, right up to servo motors. At Pilz you can buy everything from one source. Embedded within the respective system environment, including all safety aspects plus the relevant accessories.

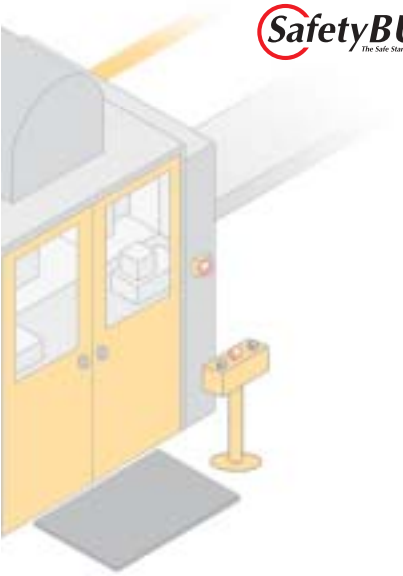
The focus is always on your application. Whether it‘s individual components or the complete solution: With Pilz Motion Control, there are no limits.

Solution supplier for safety and standard

Pilz can offer a universal concept for solutions that can be applied right across industry – safety-related or standard control functions – plant or machine – centralised or decentralised – single product or total solution: With Pilz you will definitely find a solution for your automation function.

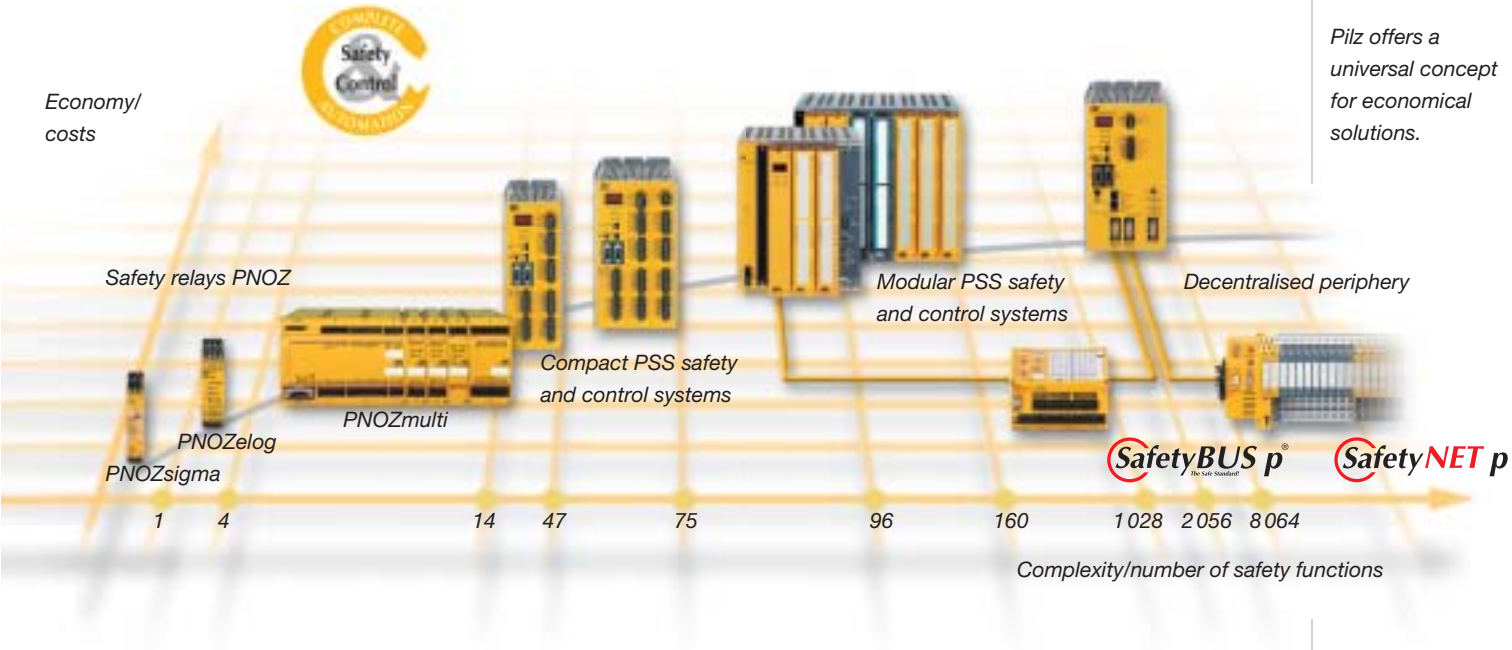


Sensor technology *Operating and monitoring* *Electronic monitoring relays PMDsrange* *Motion control*



- For electrical safety such as voltage or true power monitoring, electronic PMDsrange monitoring relays provide the optimum solution.
- Pilz Motion Control (PMC) represents a flexible, modular and expandable automation system for complex motion and control functions. This automation system manages all the movements of a large number of physically separate servo axes within a plant.
- For monitoring E-STOPs, safety gates, light curtains/ light barriers, two-hand control and many other functions, we recommend Pilz safe control technology in terms of functional safety. Standard control functions are included.
  - For simple plant and machinery with up to 4 safety functions, use the safety relays PNOZ X, PNOZsigma and PNOZelog.
  - To cover 4 to 14 safety functions, the modular safety system PNOZmulti is the most economical solution.
  - On complex machinery or distributed plants, PSS programmable safety and control systems can be used with decentralised networking via SafetyBUS p and SafetyNET p.

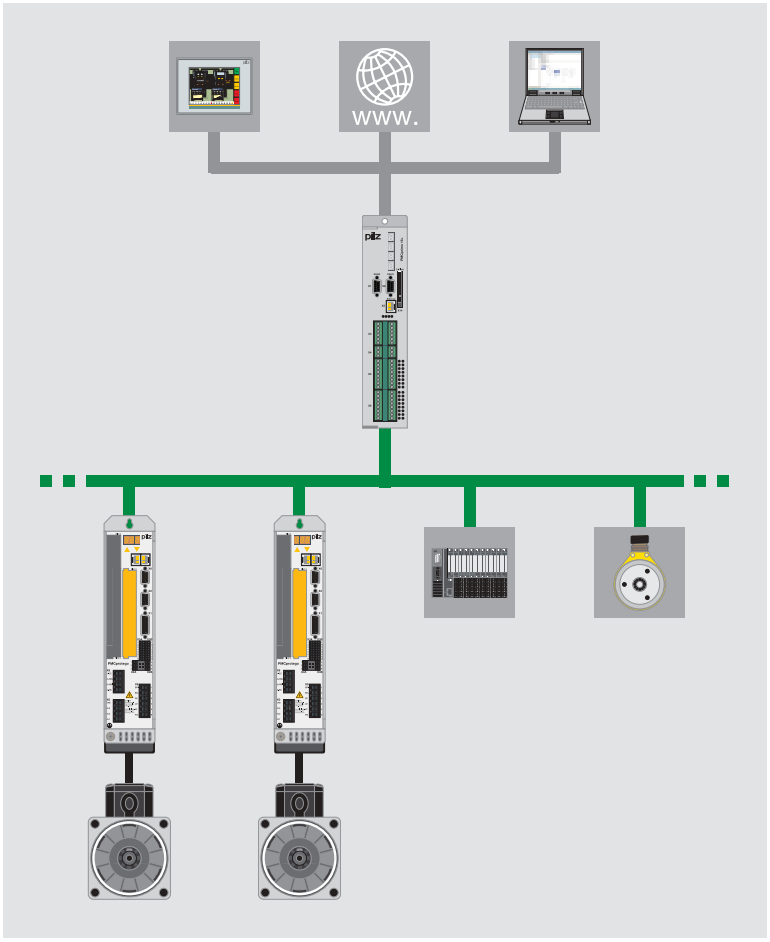
Enjoy the benefits of approved, co-ordinated, complete solutions. Our portfolio is being extended to include control and signal devices such as E-STOP pushbuttons, compatible sensor technology such as safety switches, light curtains/light grids and safe camera systems as well as operator terminals for diagnostics and visualisation. A wide range of services round off our business activities.



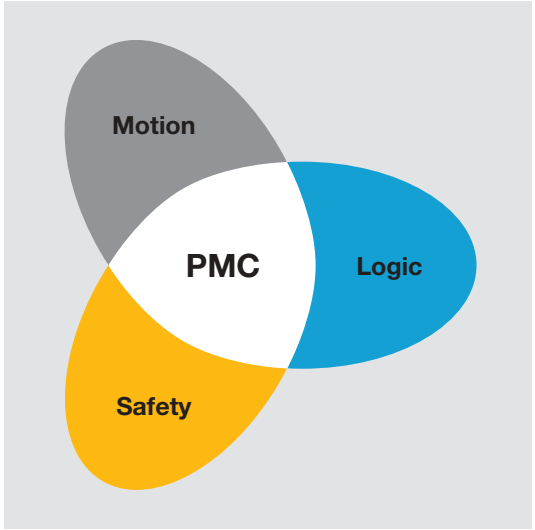
Pilz offers a universal concept for economical solutions.

Motion from Pilz – Safe, open, complete

PMC offers complete, safe, scalable drive technology as part of the Pilz solution for engineering. Pilz motion control, PMC for short, provides overall solutions for automating your machine. From controller operation through to movement of highly dynamic drives, including all safety aspects.



The overall solution: control systems, servo amplifiers, motors plus the appropriate system environment.



Pilz motion control combines logic, motion control functionalities and safety within one system.

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Control systems for PLC and motion

PMCprimo control systems consist of PLC and motion technology. They perform the automation within a plant, including management of all the movements for a large number of physically separate servo axes.

Intelligent servo amplifiers for all ratings

Servo amplifiers PMCtendo DD and PMCprotego D are used as drive controllers for implementing the widest range of motor technologies. You can use it to operate all common types of motor, from servo motors to asynchronous and linear motors. Plus rotary direct drives, linear servo motors and applications with special motors.

Your benefits at a glance

- For simple through to high end applications
- Solution is always expandable thanks to the modular design
- Open for house standards and customer requirements
- Fast to commission and simple to service thanks to universal programming in accordance with IEC 61131-3
- Complete automation solution or individual components – depending on your requirement
- Sophisticated solution includes all safety aspects – from the safety technology professionals
- Individual advice and customer care

Motors for every application

PMCtendo AC servo motors represent a modern range of servo motor. The right motor for every application Whether the focus is on dimensions, dynamics, controllability, connection types or feedback systems.

Universal software for simple operation

Use professional tools for your jobs. Use our comprehensive software PMCtools to configure, program and monitor your machine.

Keep up-to-date on PMC motion control:

Webcode 2307

Online information at www.pilz.com

Safe motion – Safe drive technology from Pilz

Safe motion describes the implementation of safety functions on a drive axis. As a supplier of safe automation, the focus at Pilz is on safety. Our expertise in the area of safety technology is transferred to drive technology. The result is an optimum solution comprising safety and standard – for each application. With external or drive-integrated safety.

For universal use – Safe monitoring of speed and standstill

Speed and standstill on drives are monitored safely using the PNOZmulti speed module. The speed module PNOZ ms1p/ms2p accesses measurements in the motor's feedback system.

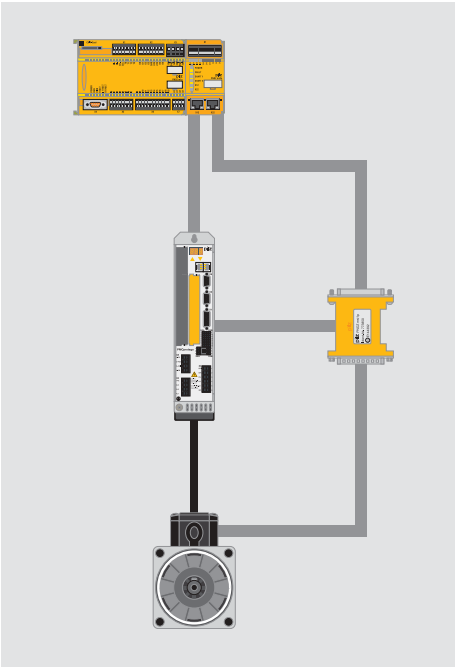
Speed information signalled from the encoder to the servo amplifier is forwarded to the servo amplifier. The PNOZmulti speed module records the relevant signals in parallel and evaluates them.

If overspeed is detected, for example, the drive must be shut down safely. The PNOZmulti safety system sends a signal to the servo amplifier for controlled braking. The integrated "safe stop" in the servo amplifier then ensures that the energy supply to the motor is interrupted safely.

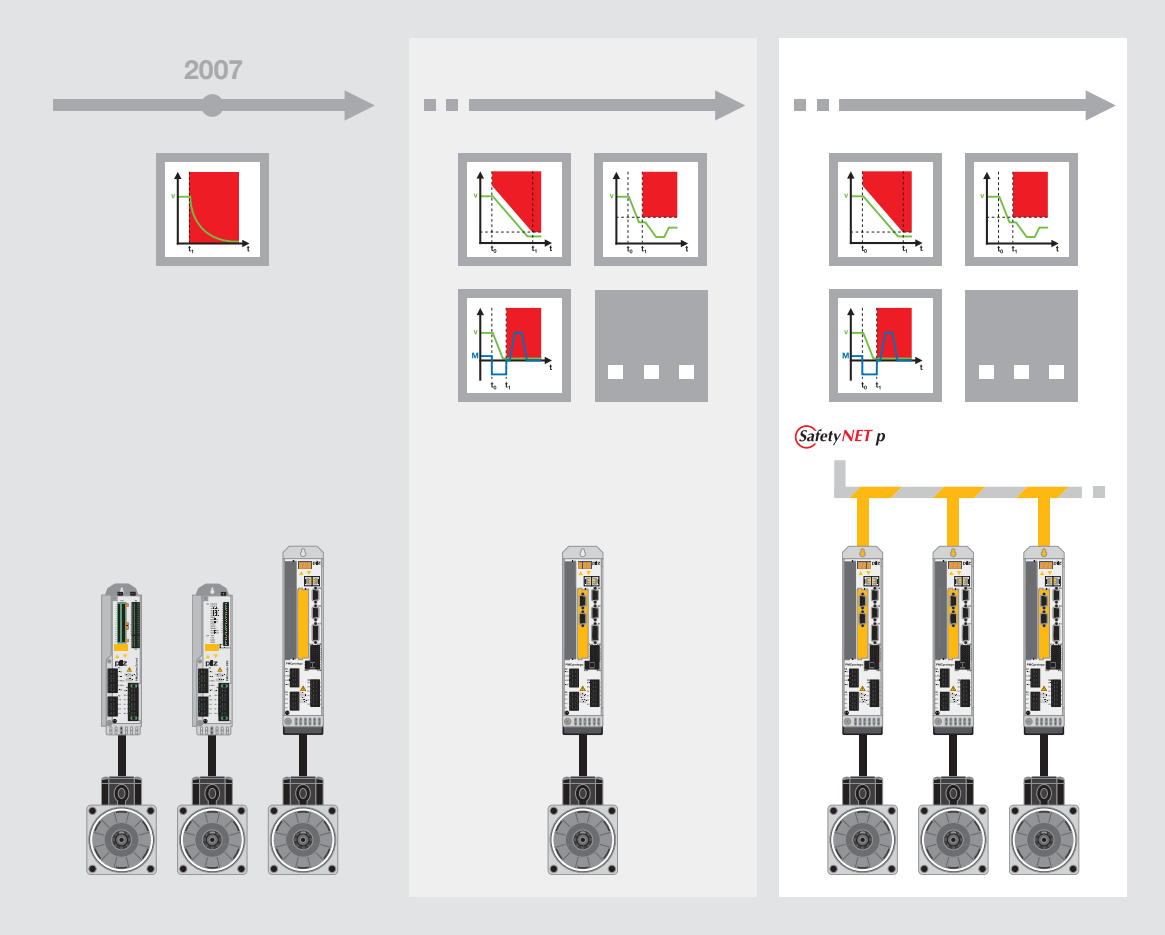
Using a combination of the modular safety system PNOZmulti and the servo amplifiers PMCtendo DD5/ PMCprotego D you can monitor:

- Safe standstill
- Safely limited speed
- Safe rotational direction
- Safe overspeed (up to 8 different limit values can be set)

Various operating states on your plant can be monitored safely due to the flexible limit value settings.



Safety with the PNOZmulti speed module



Always included – Safe stop

Even the basic versions of the servo amplifiers PMCtendo DD5 and PMCprotego D have a “safe stop” (reset lock) in accordance with Category 3 of EN 954. The PMCprotego D is ready to accept additional safety functions.
A special slot for the forthcoming safety card is already integrated.

A plus for safety – Even more functions

Numerous safety functions are available with the safety card[1)] for the PMCprotego D:

- Safe STOP functions
- Safe motion monitoring
- Safe brake control
- …

[1)] *in development*

Multi axis applications

In the long term, safely networked systems will also be covered via the safety card. Interdependent movements will also be resolved safely using the real-time Ethernet SafetyNET p.

Keep up-to-date on:
- *the modular safety system PNOZmulti*

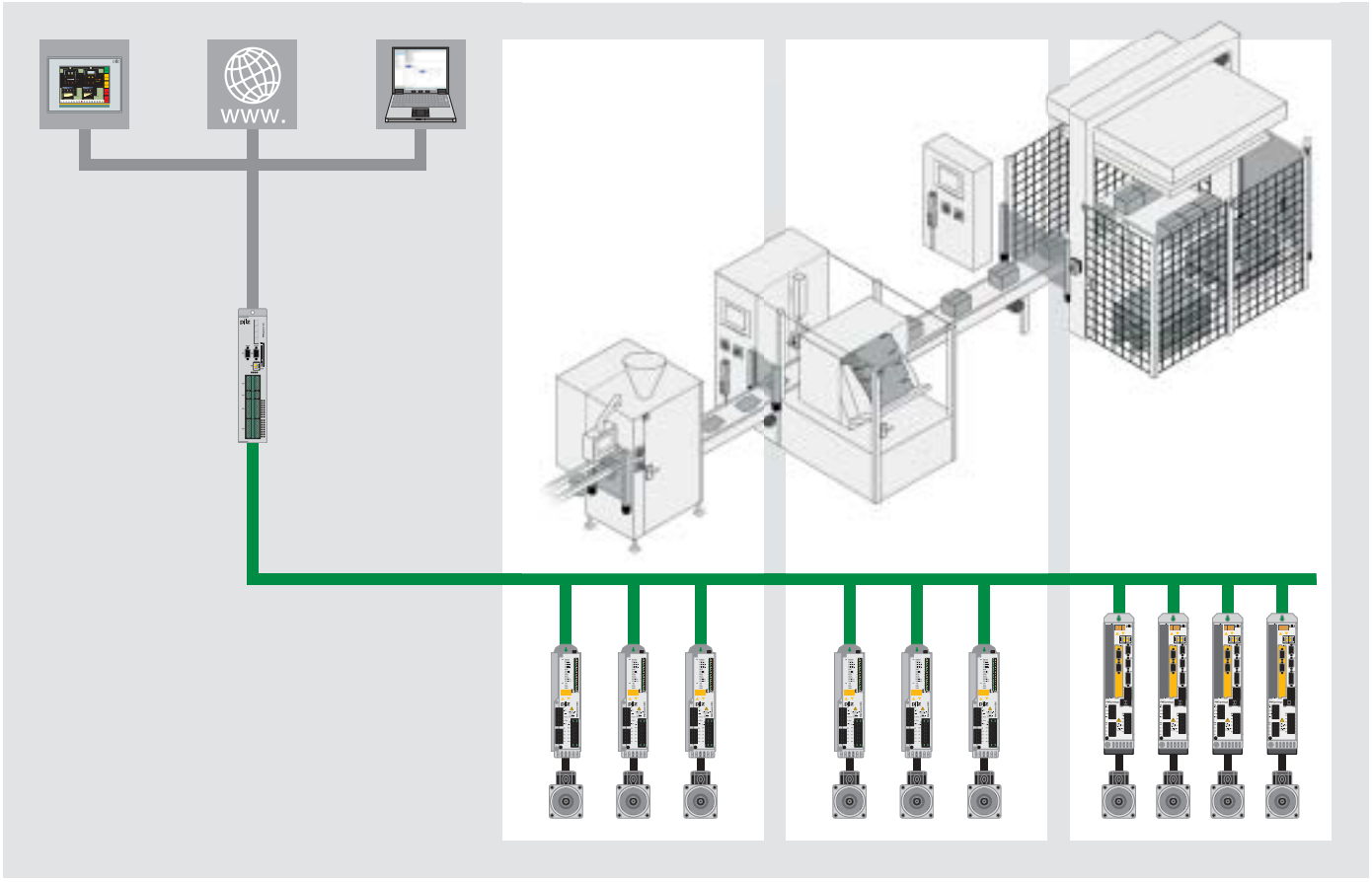
Webcode 0243

- *the real-time Ethernet SafetyNET p*

Webcode 2541

Online information at www.pilz.com

For a wide range of applications



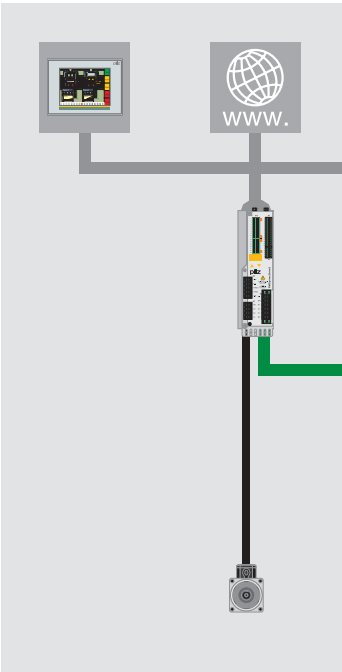
Motion control for the packaging industry

Applications in the motion sector are many and varied. Whatever the application – the requirements are the same:

- Consistent quality
- High flexibility
- High availability
- Low costs

Tailor-made solution

Simple to complex applications can be implemented quickly and easily using Pilz motion control. The result is a tailor-made complete solution for your motion function. However many axes you are using, all safety aspects are included. All the components within the motion control solution can also be used in combination with other systems.

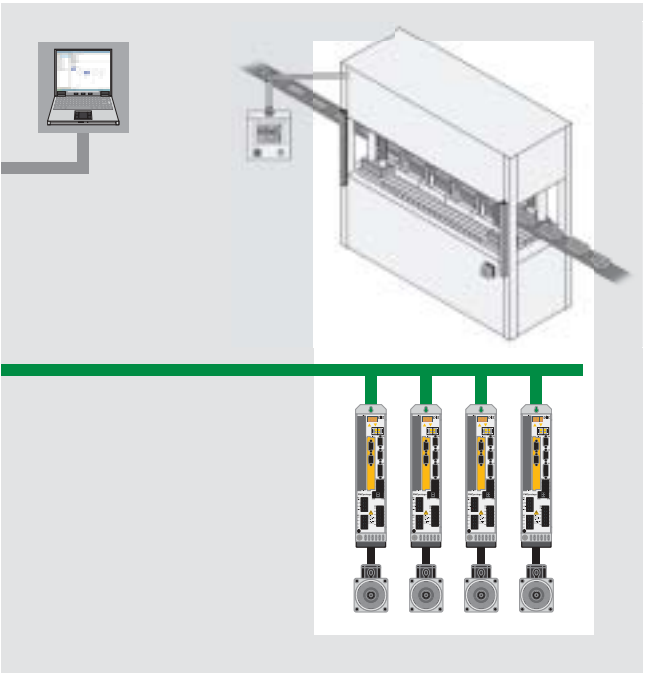


Solutions for the packaging industry

Motion control with decentralised drive technology provides maximum flexibility for meeting individual customer requirements, such as those relating to design and packaging sizes, for example. Recipes are used to make it easy to switch to different products and packaging sizes, simply at the touch of a button.

Solutions for servo presses

Pilz motion control provides the necessary motion sequences for the most varied of press applications. From absolute synchronisation through to controlled motion via eccentric press. For various product types, everything can be done at the touch of a button.



Motion control for servo presses

Visualisation and diagnostics

The PMI operator terminals provide a complete range of units for visualising motion control applications. From a compact 3.5" unit with touchscreen and keys to the 15.0" unit for complex applications. The appropriate operator terminal for every requirement.

Thanks to the PVIS diagnostic concept [1)], system messages from the PMC control systems and servo amplifiers can be displayed in plain text. Remedy messages are displayed for each event. PVIS significantly reduces downtimes in the case of a fault. Thanks to pre-defined messages, even project configuration is child's play.

[1)] in development

PMCtools – Professional tools

Motion control made simple

Professional tasks require professional tools. Use our comprehensive software to configure, program and monitor your machine.

Universal programming in accordance with IEC 61131-3 guides you through an application, from planning to production. All the key components for commissioning an automation system are integrated. From the rapid generation of motion curves through to simple drive parameterisation. Nothing presents a problem thanks to the integrated commissioning tools.

Programming environment under IEC 61131-3

The basis for the entire programming is a soft PLC under IEC 61131-3. Individual programming requirements are considered thanks to the six editors. The system is compatible on both Pilz control platforms PMCprimo 16+ and PMCprimo Drive. External devices are easy to integrate via various bus systems thanks to the resource manager.

Function libraries

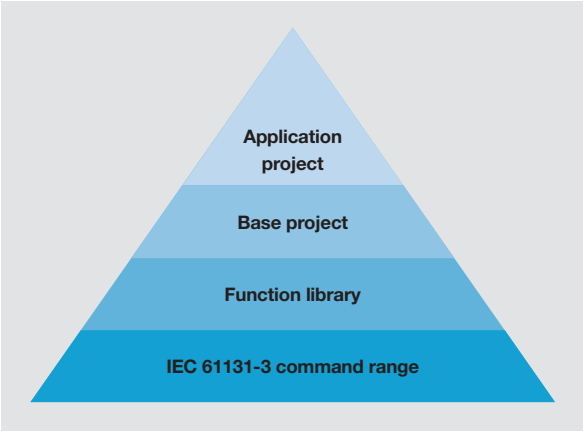
A large number of standard libraries provide all common PLC and motion control functions. The function libraries for curve and drive parameterisation are a particular feature. They form the interface to the graphical auxiliary programs and act as a memory cell for the calculated data.

Software with integrated motion control functions (base project)

The base project‘s ready-made program structures simplify the implementation of the application considerably, as the motion part is pre-programmed and fully functional. All that‘s left is to adapt the specific parameters and program the calls for the various operating states.

Parameterisation instead of programming (application project)

Ready-made application projects can be employed if common functions such as cross cutting, flying saw, synchronisation or similar are used on your machine, whether individually or in combination. You can dispense with time-consuming programming; all you need to do is adapt the application-specific parameters on the operator terminal.



PMC software

PMC software

Type	Application	Order number
Motion Control Tools	Configuration software for motion control devices	1 802 959
CoDeSys Target	Software to enable CoDeSys functionality, incl. Motion Control Tools	8 175 974

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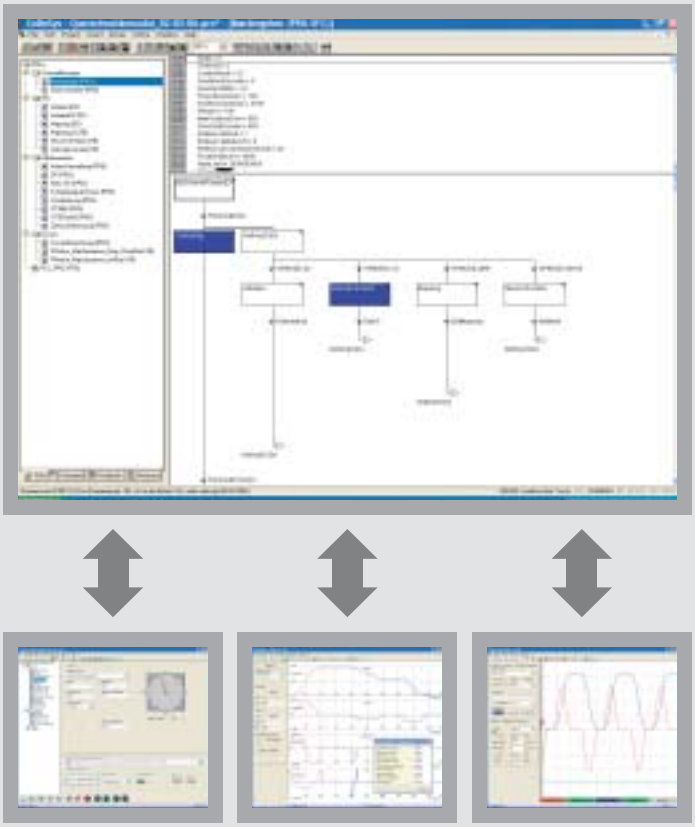


PDrive *PMotion* *PScope*

Your benefits at a glance

- Parameterisation instead of programming thanks to base projects/application projects
- Safe handling of all automation data and programs, as everything is combined in one project
- Save time thanks to simple operation and ready-made function blocks
- Your drives can be commissioned quickly and easily thanks to graphic tools and a storage oscilloscope
- From planning to production: Everything in one project file thanks to universal programming in accordance with IEC 61131-3

Setting parameters for the servo amplifier with PDrive

No specialist knowledge is required to set the parameters for all the motor and servo amplifiers. A complete parameter database is available for all common servo amplifier/motor combinations.

Curve generation with PMotion

Master-slave relationships can be created quickly and easily using the sophisticated plotting program PMotion.
It is possible to display the angle assignment, as well as speed, acceleration and shock for the motor and mechanical design.

Graphical diagnostics with PScope

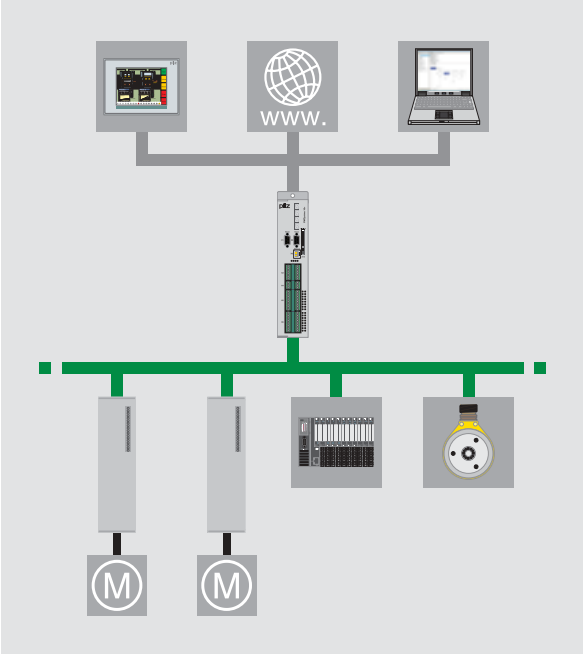
PScope is a powerful diagnostic tool. All relevant analogue and digital processes in the control system and drives are displayed graphically on the PC. So all the necessary information is available at all times, in a clear, compact form.

Keep up-to-date on PMC software:

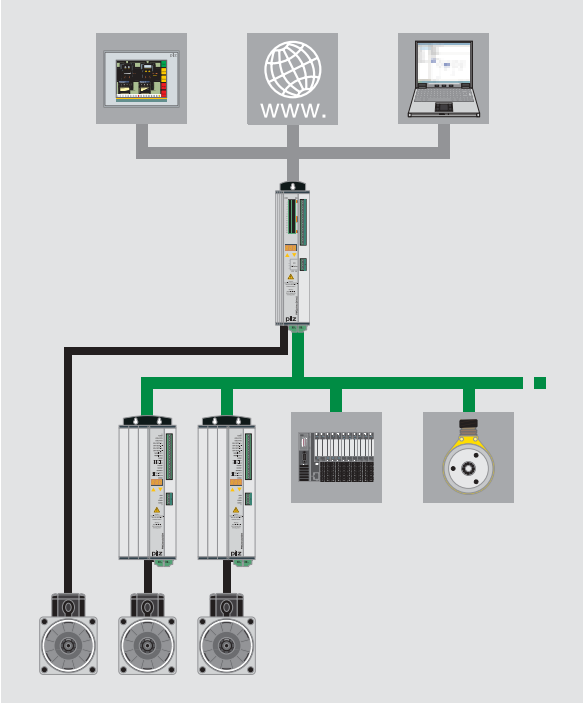
Webcode 3072

Online information at www.pilz.com

Control systems PMCprimo



Open, controller-based control system PMCprimo 16+



Drive-integrated control system PMCprimo Drive

Control systems PMCprimo 16+ and PMCprimo Drive are used for all types of motion and control functions. They consist of PLC and motion technology. They perform the automation within a plant, including management of all the movements for a large number of physically separate servo axes.
Universal programming to IEC 61131-3 within one project, covering standard PLC to motion control functionality, provides the basis for simple, quick implementation of each task.

From simple to high end applications

With Pilz motion control, all your plant‘s functions are compatible with each other. This allows production processes to run smoothly with fewer failures, providing more economical production. Take advantage of the wide range of functions:

- IEC 61131-3
- (Shock-free) positioning
- Virtual main shaft
- Electrical gear
- Cam mechanism
- Integral “flexible cam”
- Register control
- Web tension control
- PLC functionality
- Linear and circular interpolation
- Electronic camshaft
- Fast inputs to detect printer‘s marks

Selection guide – Control systems PMCprimo Controller

Type	Number of axes	Hardware platform
PMCprimo 16+	1 to > 100 [1)]	Controller-based
PMCprimo Drive2	1 to 9	Drive-integrated
PMCprimo Drive3	1 to 9	Drive-integrated

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High performance axis control for 1 to > 100 axes

The PMCprimo 16+ is a control system for complex motion and control functions. As a stand-alone system it can be used for applications with up to 20 axes. Networked it can be used for well over 100 axes. PMCprimo 16+ can be used as centralised or distributed intelligence. Thanks to its modularity, there are no limits when designing the system. Thanks to the openness of the PMCprimo 16+, house standards and customised requirements can be considered during planning. So you can be flexible when setting up your automation system.

Drive-integrated axis control for 1 to 9 axes

The control system PMCprimo Drive is used for motion and control functions from 1 to 9 axes. It combines intelligence and drive within one compact unit. Simply add additional servo amplifiers from the second axis onwards. This reduces the space requirement in your control cabinet, plus you have an economical solution for your application. Without having to compromise on performance.

Compatible

The control platforms PMCprimo 16+ and PMCprimo Drive are compatible in terms of performance and design. This means that application programs can be used on both platforms in an identical form.

Your benefits at a glance

- Solution is always expandable thanks to the modular design
- Two hardware platforms, providing the optimum hardware basis for each application
- Combination of PLC and power element (PMCprimo Drive) provides an economical solution
- Open for house standards and customer requirements thanks to a wide range of interfaces
- Fast to commission and simple to service thanks to universal programming in accordance with IEC 61131-3
- Suitable for simple to complex applications

Openness	Size	Safe stop	Interfaces	
			Ethernet	Bus systems
▸ Possible to use third party drives ▸ CAN-based drives ▸ Frequency converter ▸ DC drives ▸ Special drives	Standard	-	◆	Modbus, PROFIBUS-DP Small, PROFIBUS-DP Master, PROFIBUS-DP Slave, Interbus, DeviceNet, Modbus Plus, CANopen[2)]
▸ CAN-based drives ▸ Frequency converter ▸ DC drives ▸ Special drives	Standard	External	◆ (optional via expansion cards)	Modbus, PROFIBUS-DP Small, CANopen
▸ CAN-based drives ▸ Frequency converter ▸ DC drives ▸ Special drives	Compact	Integrated	◆ (optional via expansion cards)	Modbus, PROFIBUS-DP Small, CANopen

[1)] Networking of several control systems PMCprimo 16+
[2)] Additional bus systems on request

Keep up-to-date on control systems PMCprimo:

Webcode 2314

Online information at www.pilz.com

Technical details – PMCprimo 16+

Controller-based control systems PMCprimo 16+

PMCprimo 16+

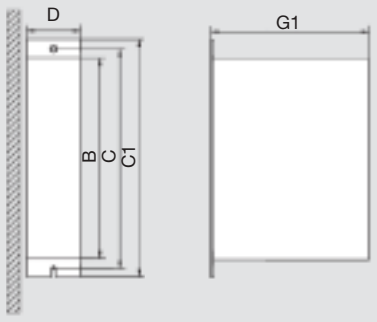
Technical details

- 20 axes available
  - 18 of which are real axes (+/-10 V)
  - and 2 virtual axes
- Each axis can be operated virtually
- 3 master encoder inputs
- Up to 20 virtual axes
- Modular, ability to network up to 60 PMCprimo 16+
- Cycle time in position control loop 1 ms
- 16 digital inputs and 16 digital outputs
- 2 analogue inputs and 2 analogue outputs
- Up to 16 electrical cams
- 128 KByte variable memory, battery-buffered
- 2 MByte Flash memory for user program
- Programming port RS 232
- 2 x CANopen
- Ethernet up to 100 MBit/s
- Serial interface RS 422 (Modbus)
- 2 x expansion slots for fieldbus systems
- Supply voltage: 24 VDC
- Protection type: IP20
- Mounting position: Vertical

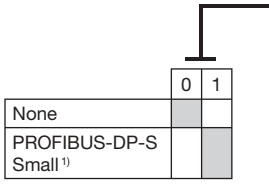
Options

- Fieldbuses:
  - PROFIBUS-DP (Master and Slave)
  - PROFIBUS-DP-S Small
  - Interbus-S
  - DeviceNet
  - CANopen (third CANopen)
- Internal cam editor
- Soft PLC IEC 61131-3
- CompactFlash, up to 1 GByte, plug-in

Dimensions



Order references



Designation		Unit	Performance data
Nominal data			
CPU supply voltage		VDC	24
I/O supply voltage		VDC	24
Rotary encoder supply voltage		VDC	5 … 24 (external feed)
CAN supply voltage			Internal
Power dissipation		W	Max. 16
Ambient conditions			
Ventilation			Natural convection
Ambient temperature		°C	0 ... +45
Rel. humidity during operation		%	0… 95, non-condensing
Storage temperature		°C	-25 … +70, max. 20 K/hour variation
Storage humidity		%	Max. 95 rel. humidity, non-condensing
Pollution degree			2 in accordance with VDE 0100
Overvoltage category			II
Max. installation height		m above sea level	3,000
Mechanics			
Dimensions	Fixing screw		M5
	B	mm	280
	C	mm	296
	C1	mm	317
	D	mm	64
	G1	mm	185/225

Further technical details in the installation manual

Always state when ordering	Type	Mains voltage
Order number	PMCprimo 16+. 00/_ /_ /_ /_	24 VDC

Slot 1 Expansion cards

	0	1	2	3	4	5	6
None	■						
CAN-2		■					
DeviceNet			■				
Interbus-S				■			
Modbus Plus					■		
PROFIBUS-DP-S						■	
PROFIBUS-DP-M							■

Slot 2 Expansion cards

	0	1	2	3	4	5	6
None	■						
CAN-2		■					
DeviceNet			■				
Interbus-S				■			
Modbus Plus					■		
PROFIBUS-DP-S						■	
PROFIBUS-DP-M							■

	2	3	4	5	6	7
None	■					
Motion		■		■		■
PLC software			■	■	■	■
Interpolation					■	■

[1)] *Modbus has no function when PROFIBUS-DP-IC is activated*

Standard bus systems
Ethernet, 2 x CANopen, Modbus

Standard hardware
CompactFlash slot

Technical details – PMCprimo Drive2

Drive-integrated control systems PMCprimo Drive2

PMCprimo Drive2

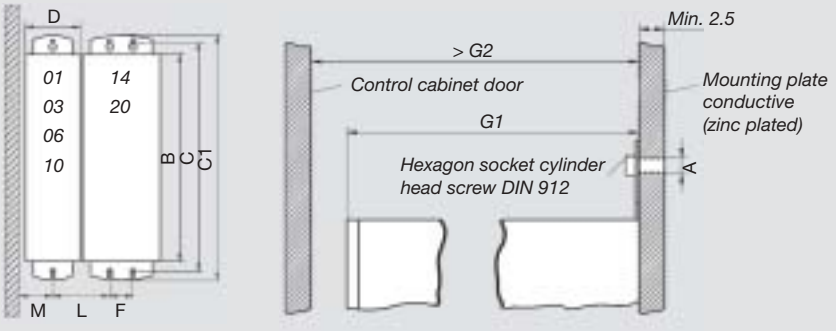
Technical details

- 10 axes available
- 9 real axes
- Intermediate circuits can be connected in parallel
- 1 master encoder input
- Up to 10 virtual axes
- Cycle time in position control loop 1 ms
- 12 digital inputs and 8 digital outputs
- 2 analogue inputs and 2 analogue outputs
- Up to 8 electrical cams
- 8 KByte variable memory, battery-buffered
- 2 MByte Flash memory for user program
- Programming port RS 232
- CANopen
- Integrated mains filter
- Internal ballast resistance
- Serial interface RS 422 (Modbus)
- Auxiliary voltage: 24 VDC
- Protection type: IP20
- Mounting position: Vertical
- CE and UL approval

Options

- Fieldbuses:
  - PROFIBUS-DP Small
  - CANopen (second CANopen)
- Internal cam editor
- Soft PLC in accordance with IEC 61131
- Expansion card with:
  - CANopen interface
  - CompactFlash, up to 1 GByte, plug-in
  - 8 KByte variable memory, battery-buffered
  - Ethernet up to 100 MBit/s

Dimensions



Designation		Unit	Size 01	03	06	10	14	20
Nominal data								
Supply voltage (power)		VAC	3 x 230 … 3 x 480 V ±10 %					
Frequency range		Hz	50 … 60					
Residual voltage at I_{rms}		VAC	Supply voltage less 5 V					
Continuous output current		A_{eff}	1.5	3	6	10	14	20
Peak output current (max. 5 s)		A_{eff}	3.0	6	12	20	28	40
Rated power		kVA	1.0	2	4	7	10	14
Output stage clock frequency at I_{rms}		kHz	8					
Control loop band width		Hz	> 1,200					
Supply voltage (auxiliary voltage)		VDC	24 +15 % (ca. 1 A, without brake control)					
Power dissipation at I_{rms}		W	30	40	60	90	160	200
Ballast circuit								
Internal brake resistor:								
Continuous output		W	80		200			
Max. peak output for max. 1 s		kW	8		16			
External brake resistor:								
Max. continuous output		kW	0.4		1.2			
Max. peak output for max. 5 s		kW	16		16			
Ambient conditions								
Ventilation			Forced ventilation through built-in fans					
Ambient temperature		°C	0 … +45 at rated power, +45 … +55 with power derating 2.5 %/K					
Rel. humidity during operation		%	85, non-condensing					
Storage temperature		°C	-25 … +55					
Installation height		m above sea level	Up to 1,000 at rated power, 1,000 … 2,500 with current reduction of around 1.5 %/100 m					
Mechanics								
Weight		kg	4				5	7.5
Dimensions	A		M5					
	B	mm	275					
	C	mm	310					
	C1	mm	325					
	D	mm	70				100	120
	F	mm	-				30	50
	G1/G2	mm	265/273					
	M	mm	40					

Further technical details in the installation manual

Order references

Always state when ordering	Type	Mains voltage
Order number	PMCprimo Drive2. _ _ /_ _ /_	230 … 480 VAC

Current	Size
1.5 A	01
3 A	03
6 A	06
10 A	10
14 A	14
20 A	20

	11	16	21	22	23	24	25	26
None	■							
AS relay		■		■		■		■
Expansion card [1]			■	■			■	■
PROFIBUS-DP-S Small [2]					■	■	■	■

	2	3	4	5	6	7
None	■					
Motion		■		■		■
PLC software			■	■	■	■
Interpolation					■	■

Standard bus systems
CANopen, Modbus

[1] *Expansion card with:*
- *CompactFlash slot*
- *Ethernet*
- *Second CANopen*
- *Real-time clock*
- *Battery-buffered RAM*

[2] *Modbus has no function when PROFIBUS-DP-IC is activated*

Technical details – PMCprimo Drive3

Drive-integrated control systems PMCprimo Drive3

PMCprimo Drive3

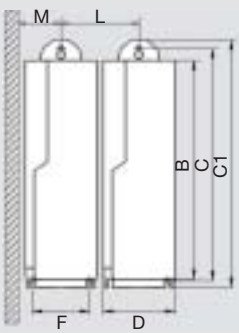
Technical details

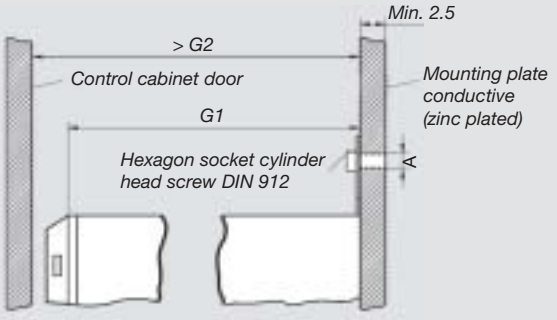
- 10 axes available
- 9 real axes
- Intermediate circuits can be connected in parallel
- 1 master encoder input
- Up to 10 virtual axes
- Cycle time in position control loop 1 ms
- 12 digital inputs and 8 digital outputs
- 2 analogue inputs
- Up to 8 electrical cams
- 8 KByte variable memory, battery-buffered
- 2 MByte Flash memory for user program
- Programming port RS 232
- CANopen
- Start interlock with safety relay up to Category 3 of EN 954-1
- Integrated mains filter
- Internal ballast resistance
- Serial interface RS 422 (Modbus)
- Auxiliary voltage: 24 VDC
- Protection type: IP20
- Mounting position: Vertical
- CE and UL approval

Options

- Fieldbuses:
  - PROFIBUS-DP Small
  - CANopen (second CANopen)
- Internal cam editor
- Soft PLC in accordance with IEC 61131-3
- Expansion card with:
  - CANopen interface
  - CompactFlash, up to 1 GByte, plug-in
  - 8 KByte variable memory, battery-buffered
  - Ethernet up to 100 MBit/s

Dimensions





Designation	Unit	Size					
		03	06	10	01	03	06
Nominal data							
Supply voltage (power)	VAC	1 x 110 … 1 x 230 V ±10 %, 3 x 110 … 3 x 230 V ±10 %			3 x 208 … 3 x 480 V ±10 %		
Frequency range	Hz	50 … 60					
Max. motor voltage	VAC	Supply voltage less 5 V					
Continuous output current (at 3 x 230 V)	A_{eff}	3	6	10	-		
Peak output current (max. 5 s at 3 x 230 V)	A_{eff}	9	15	20	-		
Continuous output current (at 3 x 400 V)	A_{eff}	-			1.5	4	6
Peak output current (max. 5 s at 3 x 400 V)	A_{eff}	-			4.5	7.5	12
Power consumption in S1 mode	kVA	1.1	2.4	4	1.2	2.5	5
Output stage clock frequency at I_{rms}	kHz	8					
Control loop band width	Hz	> 1,200					
Supply voltage (auxiliary voltage)	VDC	24 +15 % (approx. 1.3 A, without brake and fan)					
Power dissipation at I_{rms}	W	35	60	90	40	60	90
Ballast circuit							
Internal brake resistor:							
Continuous output	W	20	50	50	20	50	50
Max. peak output for max. 1 s	kW	3 [1]	3 [1]	3 [1]	7 [2]	7 [2]	7 [2]
External brake resistor:							
Max. continuous output	kW	0.3	1	1	0.3	1	1
Max. peak output for max. 5 s	kW	3 [1]	3 [1]	3 [1]	7 [2]	7 [2]	7 [2]
Ambient conditions							
Ventilation		Forced ventilation through built-in fans					
Ambient temperature	°C	0 … +40 at rated power, +40 … +55 with power derating 2.5 %/K					
Rel. humidity during operation	%	85, non-condensing					
Storage temperature	°C	-25 … +55					
Installation height	m above sea level	Up to 1,000 at rated power, 1,000 … 2,500 with current reduction of around 1.5 %/100 m					
Mechanics							
Weight	kg	2.6			2.7		
Dimensions A		M5					
B	mm	246					
C	mm	257					
C1	mm	279					
D	mm	70				100	120
F	mm	51					
G1/G2	mm	171/200			171/230		
M	mm	40					

Further technical details in the installation manual

[1] *at 230 V*
[2] *at 400 V*

Order references

Always state when ordering	Type	Mains voltage
Order number	PMCprimo Drive3. _ _ /_ _ /_	_ _ _ _ _ VAC

	Current	Size
230 V series	3 A	03
	6 A	06
	10 A	10
480 V series	1.5 A	01
	3 A	03
	6 A	06

	11	21	23	25
None	■			
Expansion card [3]		■		■
PROFIBUS-DP-S Small [4]			■	■

	2	3	4	5	6	7
None	■					
Motion		■		■		■
PLC software			■	■	■	■
Interpolation					■	■

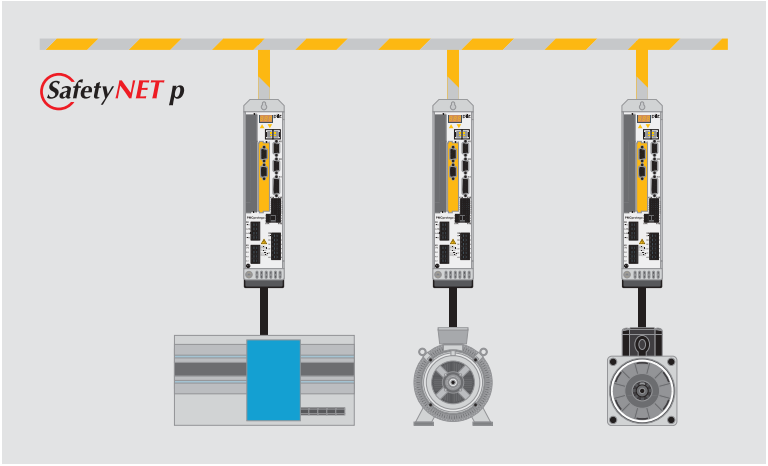
115 … 230 VAC	230 V series
208 … 480 VAC	480 V series

Standard bus systems
CANopen, Modbus

[3] *Expansion card with:*
- *CompactFlash slot*
- *Ethernet*
- *Second CANopen*
- *Real-time clock*
- *Battery-buffered RAM*

[4] *Modbus has no function when PROFIBUS-DP-IC is activated*

Servo amplifiers PMCtendo DD and PMCpr



Servo amplifiers PMCtendo DD and PMCprotego D can be used with the widest range of motor technologies.

Intelligent servo amplifiers from Pilz are used as drive controllers for the widest range of motor technologies.
You can use it to operate all common types of motor, from servo motors to asynchronous and linear motors. Plus rotary direct drives, linear servo motors and applications with special motors.
Take advantage of the benefits of these servo amplifiers: During design, control, application and operation.

These modern servo amplifiers do much more than drive the motor:

- Positioning (driven via bus or inputs)
- Ability to store up to 200 motion tasks
- Ability to run small motion sequences
- Speed control
- Torque control
- Electric gear function

Universal application

The servo amplifiers PMCtendo DD and PMCprotego D are designed for stand alone operation. Even the basic version provides all the functions necessary to operate a brushless motor in asynchronous or synchronous technology. More than 20 different feedback systems can be connected directly for operating the widest range of motor technologies. The servo amplifiers are compatible with a wide range of control systems thanks to the optional bus cards.

Open, enabling the appropriate equipment to be used in almost every application

The option slot on the servo amplifier is used for direct access to all amplifier functions. Expansion cards for almost all relevant fieldbus systems or PLC can simply be plugged in. The intermediate circuit connection with intelligent ballast circuit enables an optimum energy balance.
So frequently there is no need for external ballast circuits, even on critical axes.

Selection guide – Servo amplifier PMCtendo DD and PMCpro

Type	Rated current	Peak current (5 s)
PMCtendo DD4	1.5 … 70 A	3.0 … 140 A
PMCtendo DD5	3.0 … 10 A 1.5 … 6 A	9.0 … 20 A 4.5 … 12 A
PMCprotego D	1.5 … 24 A (larger power ratings in development)	4.5 … 48 A (up to max. 3x rated current)

more than automation
safe automation

otego D

Safe motion

Even the basic versions of all the servo amplifiers have a “safe stop” (reset lock) in accordance with Category 3 of EN 954. The PMCprotego D is ready to accept additional safety functions. A special slot for the forthcoming safety card is already integrated.

Further information on safe motion from Pilz can be found on pages 8 and 9.

PMCtendo DD

The servo amplifiers PMCtendo DD are available in two sizes. Choose the appropriate product for your application:

- Standard series PMCtendo DD4 – with a large performance range
- Compact series PMCtendo DD5 – with safe stop

PMCprotego D

The servo amplifiers PMCprotego D are used as drive controllers when the demand is for safety. Applications can be implemented economically thanks to drive-integrated safety. The slot for the safety card is already integrated, so servo amplifiers PMCprotego D are ready to be upgraded with additional safety functions such as safely reduced speed, safe operational stop or safe standstill. Networking with the real-time Ethernet SafetyNET p is also in development.

Your benefits at a glance

- Extensive application area for the most diverse functions
- Open hardware and software architecture
- Quick and easy to learn how to use, clear project documentation thanks to user-friendly, understandable user software
- Wide range of drive and status enquiry options makes it easier to incorporate into the machine concept

tego D

Power supply	Current cycle time	Size	Safe stop	Additional safe drive functions	
				External solution	Drive-integrated solution
230 … 480 VAC	62.5 µs	Standard		◆	
110 … 208 VAC 230 … 480 VAC	62.5 µs	Compact	◆	◆	
208 … 480 VAC	31.25 µs	Standard	◆	◆	◆ [1)]

[1)] *in development*

Keep up-to-date on:

- *SafetyNET p*

Webcode 2541

- *Servo amplifiers PMCtendo DD and PMCprotego D*

Webcode 2584

Online information at www.pilz.com

Technical details – PMCtendo DD4

Servo amplifier PMCtendo DD4

PMCtendo DD4

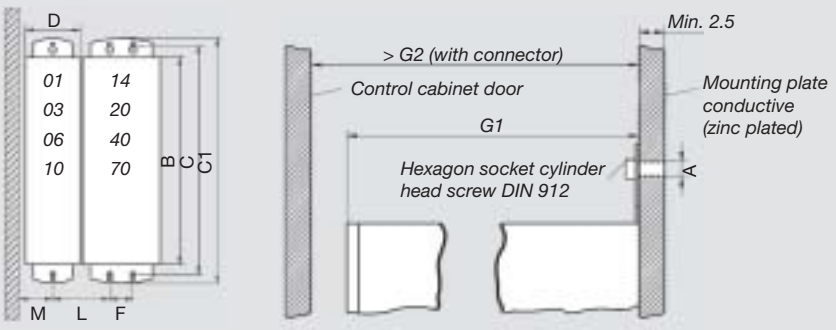
Technical details

- Position controller with max. 180 motion tasks
- Universal voltage range from 230 ... 480 VAC
- Intermediate circuits can be connected in parallel
- Auxiliary voltage 24 VDC
- 1 master encoder input
- 1 rotary encoder output
- CANopen
- Integrated mains filter
- Internal ballast resistance
- 4 digital inputs and 2 digital outputs
- 2 analogue inputs and 2 analogue outputs
- Protection type: IP20
- Mounting position: Vertical
- CE and UL approval

Options

- D1 I/O expansion card with 14 inputs and 8 outputs
- DA1 I/O expansion card with 2 analogue outputs, 8 inputs and 8 outputs
- AS restart interlock
- Fieldbuses:
  - PROFIBUS-DP-S
  - Sercos

Dimensions



Designation		Unit	Size							
			01	03	06	10	14	20	40	70
Nominal data										
Supply voltage (power)		VAC	3 x 230 … 3 x 480 V ±10 %							
Frequency range		Hz	50 … 60							
Residual voltage at I_{rms}		VAC	Supply voltage less 5 V							
Continuous output current		A_{eff}	1.5	3	6	10	14	20	40	70[1]
Peak output current (max. 5 s)		A_{eff}	3.0	6	12	20	28	40	80	140[1]
Power consumption in S1 mode		kVA	1.0	2	4	7	10	14	30	50
Output stage clock frequency at I_{rms}		kHz	8							
Control loop band width		Hz	> 1,200							
Supply voltage (auxiliary voltage)		VDC	24 +15 % (ca. 1 A, without brake control)							
Power dissipation at I_{rms}		W	30	40	60	90	160	200	400	700
Ballast circuit										
Internal brake resistor:										
Continuous output		W	80		200				-	
Max. peak output for max. 1 s		kW	8		16				-	
External brake resistor:										
Max. continuous output		kW	0.4		1.2				6	
Max. peak output for max. 5 s		kW	16		16				35	50
Ambient conditions										
Ventilation			Forced ventilation through built-in fans							
Ambient temperature		°C	0 … +45 at rated power, +45 … +55 with power derating 2.5 %/K							
Rel. humidity during operation		%	85, non-condensing							
Storage temperature		°C	-25 … +55							
Installation height		m above sea level	Up to 1,000 at rated power, 1,000 … 2,500 with current reduction of around 1.5 %/100 m							
Mechanics										
Weight		kg	4				5	7.5	19.5	21
Dimensions	A		M5						M6	
	B	mm	275						345	
	C	mm	310						361	
	C1	mm	325						375/495[2]	
	D	mm	70				100	120	250	
	F	mm	-				30	50	215	
	G1/G2	mm	265/273						300/325	
	M	mm	40						70	

Further technical details in the installation manual

[1] at 480 V

[2] with shielding sheet

Order references

Always state when ordering	Type	Mains voltage
Order number	PMCtendo DD4. _ _ /_ _ _	230 … 480 VAC

Current	Size
1.5 A	01
3 A	03
6 A	06
10 A	10
14 A	14
20 A	20
40 A	40
70 A	70

			112	116	117	122	132	162	166	167	172	182
Version of base unit	Standard		■	■	■	■	■					
	AS relay							■	■	■	■	■
Expansion slot	I/O expansion	D1[3]				■					■	
		D/A[4]					■					■
	Bus interface	Sercos		■					■			
		PROFIBUS-DP			■					■		

Standard bus systems
CANopen

[3] D1: 14 digital inputs, 8 digital outputs

[4] D/A: Analogue outputs, 8 digital inputs, 8 digital outputs

Technical details – PMCtendo DD5

Servo amplifier PMCtendo DD5

PMCtendo DD5

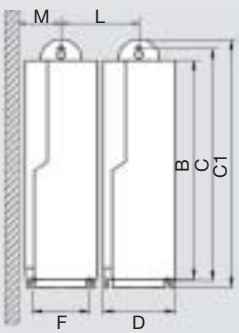
Technical details

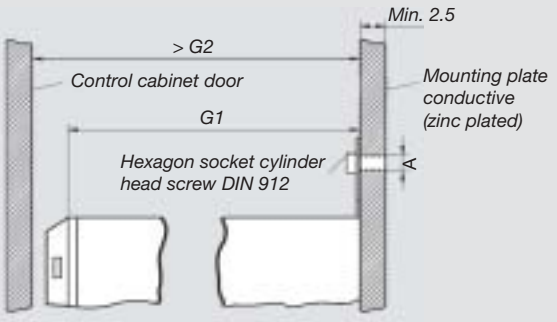
- Position controller with max. 180 motion tasks
- Universal voltage range
- Intermediate circuits can be connected in parallel
- Auxiliary voltage 24 VDC
- 1 master encoder input
- 1 rotary encoder output
- CANopen
- Start interlock with safety relay up to Category 3 of EN 954-1
- Integrated mains filter
- Internal ballast resistance
- 4 digital inputs and 2 digital outputs
- 2 analogue inputs
- Protection type: IP20
- Mounting position: Vertical
- CE and UL approval

Options

- D1 I/O expansion card with 14 inputs and 8 outputs
- Fieldbuses:
  - PROFIBUS-DP-S
  - Sercos

Dimensions





Designation	Unit	Size					
		03	06	10	01	03	06
Nominal data							
Supply voltage (power)	VAC	1 x 110 … 1 x 230 V ±10 %, 3 x 110 … 3 x 230 V ±10 %			3 x 208 … 3 x 480 V ±10 %		
Frequency range	Hz	50 … 60					
Max. motor voltage	VAC	Supply voltage less 5 V					
Continuous output current (at 3 x 230 V)	A_{eff}	3	6	10	-		
Peak output current (max. 5 s at 3 x 230 V)	A_{eff}	9	15	20	-		
Continuous output current (at 3 x 400 V)	A_{eff}	-			1.5	4	6
Peak output current (max. 5 s at 3 x 400 V)	A_{eff}	-			4.5	7.5	12
Power consumption in S1 mode	kVA	1.1	2.4	4	1.2	2.5	5
Output stage clock frequency at I_{rms}	kHz	8					
Control loop band width	Hz	> 1,200					
Supply voltage (auxiliary voltage)	VDC	24 +15 % (approx. 1.3 A, without brake and fan)					
Power dissipation at I_{rms}	W	35	60	90	40	60	90
Ballast circuit							
Internal brake resistor:							
Continuous output	W	20	50	50	20	50	50
Max. peak output for max. 1 s	kW	3 [1]	3 [1]	3 [1]	7 [2]	7 [2]	7 [2]
External brake resistor:							
Max. continuous output	kW	0.3	1	1	0.3	1	1
Max. peak output for max. 5 s	kW	3 [1]	3 [1]	3 [1]	7 [2]	7 [2]	7 [2]
Ambient conditions							
Ventilation		Forced ventilation through built-in fans					
Ambient temperature	°C	0 … +40 at rated power, +40 … +55 with power derating 2.5 %/K					
Rel. humidity during operation	%	85, non-condensing					
Storage temperature	°C	-25 … +55					
Installation height	m above sea level	Up to 1,000 at rated power, 1,000 … 2,500 with current reduction of around 1.5 %/100 m					
Mechanics							
Weight	kg	2.6			2.7		
Dimensions A		M5					
B	mm	246					
C	mm	257					
C1	mm	279					
D	mm	70				100	120
F	mm	51					
G1/G2	mm	171/200			171/230		
M	mm	40					

Further technical details in the installation manual

[1] *at 230 V*
[2] *at 400 V*

Order references

Always state when ordering	Type	Mains voltage
Order number	PMCtendo DD5. _ _ /_ _ _	_ _ _ _ _ VAC

	Current	Size
230 V series	3 A	03
	6 A	06
	10 A	10
480 V series	1.5 A	01
	3 A	03
	6 A	06

			112	117	122
Version of base unit	Standard with AS option				
Expansion slot	I/O expansion	D1 [3]			
	Bus interface	PROFIBUS-DP			

115 … 230 VAC	230 V series
208 … 480 VAC	480 V series

[3] *D1: 14 digital inputs, 8 digital outputs*

Standard bus systems
CANopen

Technical details – PMCprotego D

Servo amplifiers PMCprotego D

PMCprotego D

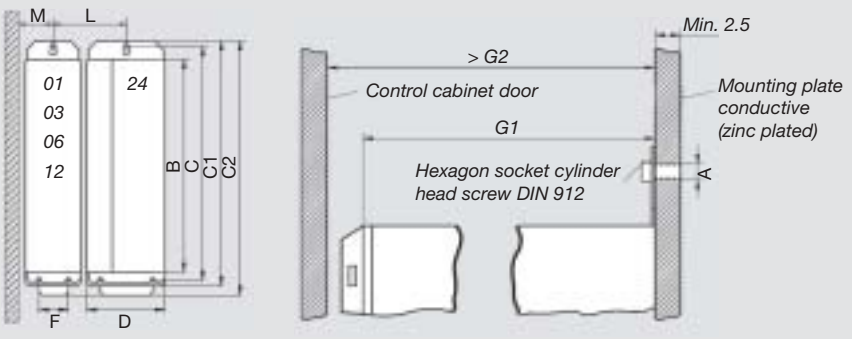
Technical details

- Position controller with max. 200 motion tasks
- Supply voltage (universal voltage range)
- Intermediate circuits can be connected in parallel
- Auxiliary voltage 20 … 30 VDC
- 1 master encoder input
- 1 rotary encoder output
- CANopen
- Ethernet-based bus communication
- Start interlock with safety relay up to Category 3 of EN 954-1
- Slot for safety card (card in development)
- Integrated mains filter
- Internal ballast resistance
- 4 digital inputs and 2 digital outputs
- 2 analogue inputs
- Multimedia card
- Protection type: IP20
- Mounting position: Vertical
- CE and UL approval

Options

- D1 I/O expansion card with 14 inputs and 8 outputs
- Fieldbuses:
  - PROFIBUS-DP-S
  - Sercos
  - DeviceNet

Dimensions



Designation		Unit	Size (other sizes in development) 01	03	06	12	24
Nominal data							
Supply voltage (power)		VAC	3 x 208 … 3 x 480 V ±10 %				
Frequency range		Hz	50 … 60				
Max. motor voltage		VAC	Supply voltage less 4 V				
Continuous output current (at 400 VAC)		A_{eff}	1.5	3	6	12	24
Peak output current (max. 5 s)		A_{eff}	4.5	9	18	30	48
Power consumption in S1 mode		kVA	1.1	2.2	4.5	9	18
Output stage clock frequency at I_{rms}		kHz	8				
Control loop band width		Hz	> 1,200				
Supply voltage (auxiliary voltage)		VDC	20 … 30 (max. 2 A, without brake)				
Power dissipation at I_{rms}		W	40	70	100	160	330
Ballast circuit							
Internal brake resistor:							
Continuous output		W	20	50		100	200
Max. peak output for max. 1 s		kW	15				23
External brake resistor:							
Max. continuous output		kW	0.3	1		1.5	4
Max. peak output for max. 5 s		kW	4 … 21				6 … 30
Ambient conditions							
Ventilation			Forced ventilation through built-in fans				
Ambient temperature		°C	0 … +40 at rated power, +40 … +55 with power derating 2.5 %/K				
Rel. humidity during operation		%	85, non-condensing				
Storage temperature		°C	-25 … +55				
Installation height		m above sea level	Up to 1,000 at rated power, 1,000 … 2,500 with current reduction of around 1.5 %/100 m				
Mechanics							
Weight		kg	4.4				5.5
Dimensions	A		M5				
	B	mm	295				
	C	mm	308				
	C1/C2	mm	320/345				320/348
	D	mm	70				100
	F	mm	45				75
	G1/G2	mm	243/285				
	M	mm	40				

Further technical details in the installation manual

Order references

Always state when ordering	Type	Mains voltage
Order number	PMCprotego _ _ . _ _ /_ _ / 0	208 … 480 VAC

	D	DS
Drive		
Safety [1]		

Current	Size
1.5 A	01
3 A	03
6 A	06
12 A	12
24 A	24

		00	11	12	13
Expansion slot [2]	None				
	I/O expansion				
	PROFIBUS-DP				
	Sercos				

Standard bus systems
CANopen

[1] *in development*

[2] *Ethernet-based bus communication on request*

Servo motors PMCtendo AC

The right motor for every application

PMCtendo AC servo motors represent a modern range of servo motor. Here you'll find the right motor for each specific application. Whether the focus is on dimensions, dynamics, controllability, connection types or feedback systems.

Good controllability

The excellent controllability of the PMCtendo AC motors is achieved using the high resolution absolute encoder as a feedback system. Through this you can read out the absolute position of the motors during operation. Even when the machine has been switched off or there is a power failure, the absolute position will still be available.

High dynamics

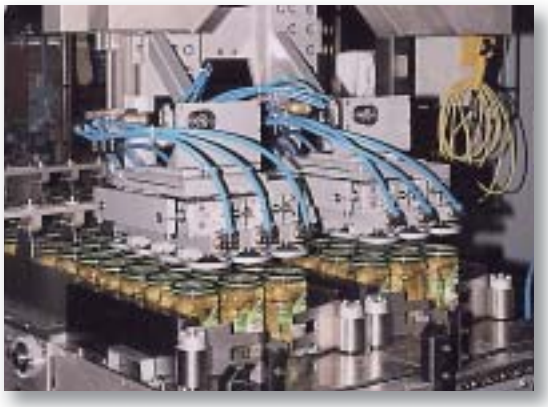
The PMCtendo AC3 and PMCtendo AC4 series have an extremely low mass moment of rotor inertia at optimised energy density. Extremely fast acceleration can be achieved as a result. That is the basis for increasing the machine speed and subsequently increasing productivity.

More than just motors

All motors are available with a range of gear units. Special versions, various connector types, ATEX versions etc. are also available.

Support with your motor design

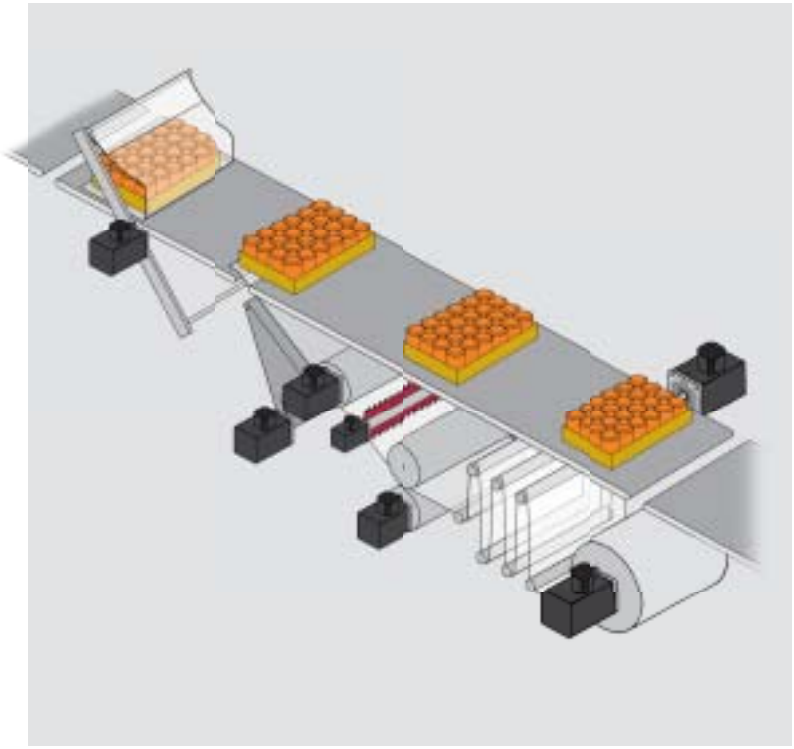
The standard range contains four different series and the widest range of motor sizes. On request we can also supply customised solutions. And of course, Pilz application engineers will provide support with the motor design and definition of the power transmission.



Selection guide – Servo motors PMCtendo AC

Type	Application
PMCtendo AC1	For universal use with large power ratings
PMCtendo AC2	For universal use
PMCtendo AC3	Low moment of inertia, dynamic version
PMCtendo AC4	Compact, highly dynamic version

more than automation
safe automation



The appropriate, decentralised drive for every detail.

Your benefits at a glance

- High dynamics and torque stability
- Excellent ratio between torque/moment of inertia
- Extremely quiet operation in all speed ranges
- Smooth operation at low speed
- High reliability even in extreme working conditions
- High resolution absolute value encoder for highest performance and absolute positioning
- Support with your motor design

Standstill torque M_0 in Nm	Rated speed n_N in rpm	Flange in mm
24 … 66	1,200 … 3,000	190
0.2 … 28	3,000 … 6,000	58 … 142
0.6 … 23	3,000 … 6,000	70 … 142
4 … 10	3,000 … 6,000	100

Keep up-to-date on servo motors PMCtendo AC:

Webcode 2597

Online information at www.pilz.com

Technical details – PMCtendo AC

Servo motors PMCtendo AC

PMCtendo AC3

General technical details

The performance data in the tables below refers to the following boundary conditions:

- Operating mode: S1
- Current: Sinusoidal
- Cooling: Self-cooling IC410 (free convection)
- Ambient temperature: +5 … +40 °C (you must consult technical support if the temperature is outside this range or the installation is encapsulated)
- Installation height: 1,000 m above sea level
- Insulation material class: H, performance measurement, F
- Temperature switch

Technical details, Hiperface® encoder system

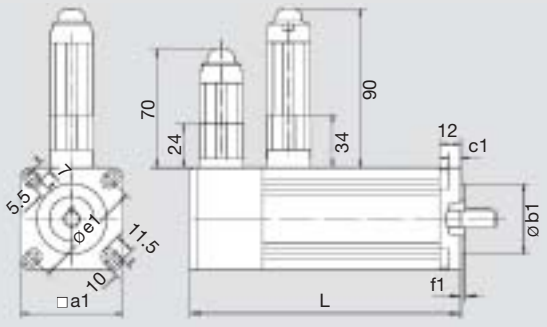
- Single-turn: Resolution of 32,768 steps per revolution
- Multi-turn: Resolution of 4,096 revolutions, each with 32,768 steps
- Absolute measuring system
- Programmable position value
- Process data channel in real-time
- Safe data transfer

Options

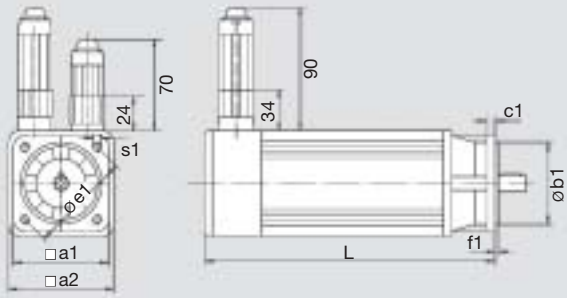
- Holding brake 24 VDC
- Plug for power connection (size 51–AB): In the terminal box, on the housing or on the B-side of the connection cover
- Smooth shaft
- Other feedback systems
- Mounting prepared for external encoders
- 230 V winding (no surcharge)
- Tropical insulation
- External fan

Dimensions

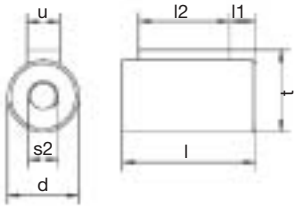
PMCtendo AC2, size: 2X

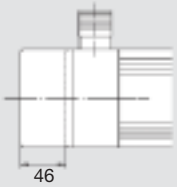


PMCtendo AC3, size: 3X



Shaft dimensions generally





PMCtendo AC3, Size: 3X, with Hiperface rotary encoder (additional length)

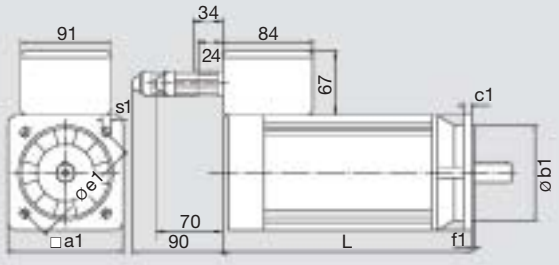
Dimension list PMCtendo AC1–AC3

Size	□a1	□a2	b1 j6	c1	d k6	e1	f1	L	l	l1	l2	s1	s2	t	u h9
21-25	58	-	40	8	9	63	2.5	See technical details Page 34-36	20	2.5	15	5.5	-	10.5	3
31-35	70	77	60	6	11	75	2.5		23	4	14	5.8	M 4 x 9	12.5	4
51-55	92	-	80	11	14	100	3		30	5	20	6.6	M 5 x 10	16	5
61-65	115	-	95	8	19	115	3		40	5	30	9	M 6 x 20	21	6
72-77	142	-	130	12	24	165	3.5		50	5	40	12	M 8 x 20	27	8
A2-AB	190	-	180	16	32	215	4		58	6.5	45	13	M 12 x 20	35.5	10

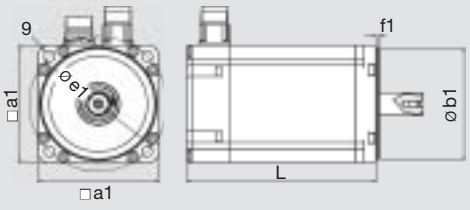
Dimension list PMCtendo AC4

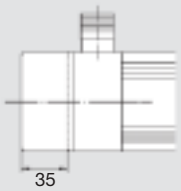
Size	□a1	□a2	b1 j6	c1	d k6	e1	f1	L	l	l1	l2	s1	s2	t	u h9
62-65	100	-	95	18	19	115	3	See technical details Page 36	40	5	30	9	M 6 x 16	21.5	6

PMCtendo AC1–AC3, size: 5X–AB



PMCtendo AC4, size: 6X





PMCtendo AC4, Size: 6X, with Hiperface rotary encoder (additional length)

Technical details – PMCtendo AC

For universal use with large power ratings

Performance data, servo motors PMCtendo AC1

Motor size	Length L without/ with brake [1] mm	Weight without/ with brake kg	Rated speed n_N rpm	Continuous stand-still torque M_0 Nm	Rated torque M_N Nm	Peak torque M_{max} Nm	Therm. time constant τ th min	Moment of inertia without/ with brake 10^{-4} kgm²	Torque constant K_T Nm/A	Continuous stand-still current (eff.) I_0 A	Peak current (eff.) I_{max} A
A4	301/365	26/32.6	2,000 3,000	24	21.8 20.9	89	55	136/168	2.45 1.63	9.8 14.7	36.3 54.5
A5	326/390	29.8/36.4	2,000 3,000	30	27.3 26.2	99	60	170/202	2.45 1.63	12.2 18.4	40.5 61
A7	376/440	38/44.6	1,200	43	41.2	139	65	238/270	4.08	10.5	34
A9	426/490	46/52.6	1,200	54	50.4	163	70	300/332	4.08	13.2	40
AB	476/540	54/60.6	1,200	66	61.6	199	70	370/402	4.08	16.2	49

[1] Entry for resolver as feedback

Performance data, servo motors PMCtendo AC2

For universal use

Motor size	Length L without/ with brake [1] mm	Weight without/ with brake kg	Rated speed n_N rpm	Continuous stand-still torque M_0 Nm	Rated torque M_N Nm	Peak torque M_{max} Nm	Therm. time constant τ th min	Moment of inertia without/ with brake 10^{-4} kgm²	Torque constant K_T Nm/A	Continuous stand-still current (eff.) I_0 A	Peak current (eff.) I_{max} A
21	118/146	1.5/1.65	3,000 4,000 6,000	0.2	0.19 0.18 0.16	0.7	32	0.1/0.16	1.45 1.09 0.73	0.14 0.18 0.28	0.48 0.64 0.97
22	133/161	1.7/1.85	3,000 4,000 6,000	0.4	0.38 0.35 0.32	1.4	35	0.16/0.22	1.45 1.09 0.73	0.28 0.37 0.55	0.97 1.29 1.93
23	148/176	1.9/2.05	3,000 4,000 6,000	0.6	0.57 0.52 0.48	2.1	38	0.21/0.27	1.45 1.09 0.73	0.41 0.55 0.83	1.45 1.93 2.9
24	163/191	2.1/2.25	3,000 4,000 6,000	0.8	0.76 0.7 0.64	2.8	40	0.26/0.32	1.45 1.09 0.73	0.55 0.74 1.1	1.93 2.57 3.86
25	178/206	2.3/2.45	3,000 4,000 6,000	1	0.95 0.87 0.8	3.5	43	0.31/0.37	1.45 1.09 0.73	0.69 0.92 1.38	2.41 3.22 4.83
53	236/263	5.4/6	3,000 4,000 6,000	3.2	2.6 2.3 1.7	10	38	1.84/2.22	1.48 1.11 0.74	2.17 2.89 4.33	6.77 9.02 13.54
54	261/288	6.4/7	3,000 4,000 6,000	4.2	3.4 3 2.3	14	40	2.28/2.66	1.48 1.11 0.74	2.84 3.79 5.69	9.48 12.63 18.95
55	286/313	7.4/8	3,000 4,000 6,000	5.3	4.3 3.8 2.8	18	40	2.72/3.1	1.48 1.11 0.74	3.59 4.78 7.17	12.18 16.24 24.36
62	224/255	7.1/8	3,000 4,000 6,000	4	3.6 3.2 3.2	20	25	6.2/9.8	1.63 1.22 0.82	2.5 3.3 4.9	12.3 16.4 24.4
63	249/280	9/10.1	3,000 4,000 6,000	6	5.4 4.8 4.8	30	30	8.01/11.61	1.63 1.22 0.82	3.7 4.9 7.4	18.5 24.5 36.6
64	274/305	10.1/12	3,000 4,000 6,000	8	7.2 6.4 6.4	40	30	10/13.6	1.63 1.22 0.82	4.9 6.5 9.8	24.5 32.7 48.7
65	299/330	12/13.9	3,000 4,000 6,000	10	9 8 8	50	30	11.9/15.5	1.63 1.22 0.82	6.1 8.2 12.3	30.5 40.9 60.9
72	234/264	12/13.9	3,000 4,000 6,000	8	7 6 6	40	40	12.7/22.2	1.63 1.22 0.82	4.9 6.5 9.8	24.5 32.7 49
73	259/289	14.2/16.1	3,000 4,000 6,000	12	10.5 9 9	60	45	17.4/26.9	1.63 1.22 0.82	7.4 9.8 14.7	36.8 49.1 73.6
74	284/314	16.4/18.3	3,000 4,000 6,000	16	14 12 12	80	45	22.1/31.6	1.63 1.22 0.82	9.8 13.1 19.6	49.1 65.4 98
75	309/339	18.6/20.5	3,000 4,000 6,000	20	17.5 15 15	100	50	26.8/36.3	1.63 1.22 0.82	12.3 16.4 24.5	61.3 81.8 123
76	334/364	20.3/22.7	3,000 4,000	24	21 19.5	120	50	31.5/41	1.63 1.22	14.7 19.6	73.6 86
77	359/389	23/24.9	3,000 4,000	28	24.5 21	140	55	36.2/45.7	1.63 1.22	17.2 22.9	85.9 114.5

[1] *Entry for resolver as feedback*

Technical details – PMCtendo AC

Performance data, servo motors PMCtendo AC3

Low moment of inertia, dynamic version

Motor size	Length L without/ with brake [1]	Weight without/ with brake	Rated speed	Continuous stand-still torque	Rated torque	Peak torque	Therm. time constant	Moment of inertia without/ with brake	Torque constant	Continuous stand-still current (eff.)	Peak current (eff.)
	mm	kg	n_N rpm	M_0 Nm	M_N Nm	M_{max} Nm	τ th min	10^{-4} kgm²	K_T Nm/A	I_0 A	I_{max} A
31	126/173	1.4/2	3,000 4,000 6,000	0.6	0.55 0.52 0.5	2.1	32	0.42/0.8	1.45 1.09 0.73	0.41 0.55 0.82	1.44 1.92 2.89
32	151/198	2.2/2.8	3,000 4,000 6,000	1.2	1.1 1.06 1	4.2	35	0.77/1.15	1.45 1.09 0.73	0.82 1.1 1.65	2.89 3.85 5.77
33	176/223	3.1/3.7	3,000 4,000 6,000	1.8	1.65 1.6 1.5	6.3	38	1.1/1.48	1.45 1.09 0.73	1.24 1.65 2.47	4.33 5.77 8.66
34	201/248	4/4.6	3,000 4,000 6,000	2.5	2.2 2.1 2	8.75	40	1.42/1.8	1.45 1.09 0.73	1.72 2.29 3.44	6.01 8.02 12.03
35	226/273	4.9/5.5	3,000 4,000 6,000	3	2.75 2.6 2.5	10.5	43	1.74/2.12	1.45 1.09 0.73	2.06 2.75 4.12	7.22 9.62 14.43
72	234/264	12/13.9	3,000 4,000	7	6 5.33	32	32	6.2/15.7	1.63 1.22	4.3 5.72	19.63 26.14
73	259/289	14.1/16	3,000 4,000	11	9.5 8.44	46	35	8.1/17.6	1.63 1.22	6.8 8.99	28.22 37.58
74	284/314	16.4/18.3	3,000 4,000	15	12.8 11.38	62	38	10/19.5	1.63 1.22	9.2 12.26	38 50.66
75	309/339	18.6/20.5	3,000 4,000	19	15.8 14.04	80	40	11.9/21.4	1.63 1.22	11.7 15.52	49.08 65.36
76	334/364	20.8/22.7	3,000 4,000	23	19 16.89	94	40	13.8/23.3	1.63 1.22	14.1 18.79	57.7 76.8

Performance data, servo motors PMCtendo AC4

Compact, highly dynamic version

Motor size	Length L without/ with brake [1]	Weight without/ with brake	Rated speed	Continuous stand-still torque	Rated torque	Peak torque	Therm. time constant	Moment of inertia without/ with brake	Torque constant	Continuous stand-still current (eff.)	Peak current (eff.)
	mm	kg	n_N rpm	M_0 Nm	M_N Nm	M_{max} Nm	τ th min	10^{-4} kgm²	K_T Nm/A	I_0 A	I_{max} A
62	160/192	3.9/4.74	3,000 4,500	4.0	3.00 2.40	10	25	1.75/2.82	1.63 1.09	2.5 3.7	6.1 9.2
63	180/212	5.3/6.14	3,000 4,500	6.0	4.50 3.60	15	30	2.51/3.58	1.63 1.09	3.7 5.5	9.2 13.8
64	204/236	6.7/7.54	3,000 4,500	8,0	6,00 4,80	20	30	3.29/4.36	1.63 1.09	4.9 7.4	12.3 18.4
65	224/256	8.1/8.94	3,000 4,500	10.0	7.50 6.00	25	35	4.07/5.14	1.63 1.09	6.1 9.2	15.3 23

[1] *Entry for resolver as feedback*

Technical details, holding brake PMCtendo AC1–AC3

Motor size	Braking torque M_B Nm	Rated voltage U_N VDC	Rated current I_N A	Rated power P W
2X	1.2	24	0.35	8.5
3X/5X	3.2	24	0.5	12
6X	9.5	24	0.7	17
7X	27	24	0.85	20.5
AX	48	24	0.9	22

Technical details, holding brake PMCtendo AC4

Motor size	Braking torque M_B Nm	Rated voltage U_N VDC	Rated current I_N A	Rated power P W
6X	5	24	0.65	16

Order references

Always state when ordering	Type	Size	Brake	Feedback	Design	Connection	Connection direction	Voltage	Rotational speed
Order number	PMCtendo AC _ .								

Series	
PMCtendo AC1	1
PMCtendo AC2	2
PMCtendo AC3	3
PMCtendo AC4	4

21 … AB	

Without brake [2]	0
With brake	1

Resolver 2-pole [2]	5
Resolver 4-pole	A
Hiperface single-turn	L
Hiperface multi-turn	M

B5, shaft with feather key [2]	1
B5, shaft without feather key	2

1	1,200 min^{-1}
2	2,000 min^{-1}
3	3,000 min^{-1}
4	4,000 min^{-1}
D	4,500 min^{-1}
6	6,000 min^{-1}

M	230 V
H	400 V [2]

1	To the right [3]
2	To the left [3]
4	Upwards [2]
5	To B-side
6	To A-side

1	Connector for motor and feedback on housing [2]
2	Terminal box with connector for feedback
3	Terminal box with connector for motor and feedback
6	Angled connector for motor and feedback
7	Angled swivel connector for motor and feedback

[2] *Preferred types*

[3] *Right/left looking towards the shaft extension*

Technical details – PMC motion control acc

Suitability guaranteed

Pilz offers a wide range of accessories. From gear units to individually customised cable and connection types, through to appropriate feedback systems for the application.

The accessories described here represent just a selection. Individually customised types are available to suit your application. Just contact us!

Accessories

Ballast resistor

Mains filter

Motor throttle

Cable

CAN adapter

Type
Ballast resistor
Mains filter
Motor throttle
Cable
CAN adapter

essories

Application	Technical details
Ballast resistors are used to remove excess energy from the system. Due to the compact design, the various sizes are suitable for wall mounting or for assembly on or in the control cabinet.	Ballast resistors in the range 180 … 1,600 W
Mains filter for advanced environmental protection against mains-bound interference.	Mains voltage: up to 3 x 480 VAC Rated current: 7 … 180 A
The motor throttle is built into the output on the servo amplifier, particularly where there are long cable connections. This increases smoothness, reduces noise and extends the service life of the motor.	Rated voltage: up to 3 x 400 VAC Rated current: n stages up to 3 x 25 A
Power cable, motor feedback cable, programming cable, network cable, rotary encoder cable and other cable	Also available in variable lengths
Networking aid in the amplifier PMCtendo DD and PMCprotego D	-

Technical documentation on PMC motion control accessories:

Webcode 0682

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...
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Please refer to our homepage for further details or contact our headquarters.

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