ENG www.phytron.eu

CONTROL

CATALOGUE July 2014
Stepper Motor Electronics

CONTROL for all Dimensions

Edition 2014 July

phytron
Beyond Steppers

Phytron GmbH - a small Bavarian business with a future

Stepper motor technology for special requirements:

Stepper motor technology is particularly suitable for precision applications under extreme environmental conditions. Whether vacuum, cryo environment, high temperature or under the influence of radioactivity - the phytron **motor series** are tough and do precision work, because stepper motors can position very accurately without a fragile feedback encoder.
Our **control units** perform, especially in applications that rely on very precise and smooth running behaviour. We control motors in electron microscopes, accelerator experiments or also in paper production machines - with up to 1/512 step (102 400 positions per revolution with a 200 step motor). From the power amplifier to the modular, cost-effective multi-axis system we offer the right control concept for your requirements. You remain flexible with phytron, because unlike some companies, we supplement the interest in and the ability of our customised products by developing them further. Customers from different industry sectors rely on our decades of experience in highly demanding application fields.

Why buying a phytron product is always a good decision:

We see ourselves as a customer-oriented high-technology company certified to ISO 9001 and EN13485. We have the process know-how of more than 250 stepper motors in space operations for the successful development of your demanding application!
We offer best service we also ask the right questions at the right time. Our Competence Center guarantees targeted consultation and therefore the early identification of requirements and any potential problems.
Based on our proven products used in the series, we develop solutions that provide precision work for our customers with extreme reliability. Whether for extreme environmental conditions or as a perfect fit for your particular application - quality Made in Germany need not be expensive:

phytron combines the flexibility and client-specific consulting from a niche player with the efficiency and standardised quality assurance processes of series production. As an independent, family-owned small business we produce in Gröbenzell near Munich and have the opportunity to try out new ideas of our own alongside those of our customers.

General Manager

Technical Manager

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STAND-ALONE UNITS

POWER SUPPLY | CPU | INDEX | POWER STAGE

Stand-alone units are stepper motor controllers with an intelligent processor. You can execute sequential programs and the unit can operate via Host interface or also stand-alone.

***phy*MOTION™**

Free programmable, modular multi axes controller for stepper motors

MCC-2

Free programmable controller for two axes

MCC-2 LIN

Free programmable controller for two axes with linear power stages

MCC-1

Free programmable controller for one axis

DRIVES

POWER SUPPLY | CPU | INDEX | POWER STAGE

Drives contain so-called indexers and power stages. You put instructions in a programming language to control signals, which boosts the internal power stage.

1-STEP-DRIVE-5A-48V

Stepper motor module with integrated power stage for the SIMATIC ET 200®S

POWER STAGES

Stepper motor power stages are reinforce Control pulses/Motor direction or SIN/COS signals and directly control the stepper motor.

POWER SUPPLY | CPU | INDEX | **POWER STAGE**

APS

High performance stepper motor power stage module

ZMX+

19" stepper motor power stage module with ServiceBus

MCD+

Compact stepper motor power stage with ServiceBus

MSX

19" stepper motor power stage module for high performance

CCD+

Stepper motor power stage with ServiceBus and plain text display

CLD+

Linear stepper motor power stage with ServiceBus and plain text display

SLS

19" sub-rack with plug-in stepper motor power stage modules

MR8+

Minirack for 1 - 8 power stage modules with ServiceBus

POWER SUPPLIES

POWER SUPPLY | CPU | INDEX | **POWER STAGE**

SPH 240 / 500 / 1013

Power supply for stepper motor power stages and -controllers

SOFTWARE

Our free WINDOWS® programs allow to program, to monitor and to adjust power stages and controllers comfortable and clear via PC.

*phy*LOGIC™ ToolBox

Development environment for the phyMOTION™ stepper motor controller

ServiceBus-Comm®

Communication software for stepper motor power stages

Contents

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STAND-ALONE UNITS

Stand-alone Units are stepper motor controllers with an intelligent processor. You can execute sequential programs and the unit can operate via Host interface or also stand-alone.

POWER SUPPLY | CPU | INDEX | POWER STAGE

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CONTROL

*phy*MOTION™

Modular multi-axes controller for stepper motors

The *phy***MOTION**™ combines PLC and motion control functions into a flexible and convenient automation station for multi axis stepper motor applications. Well-tried standard modules form the technology's basis with the option to add application-specific supplements.

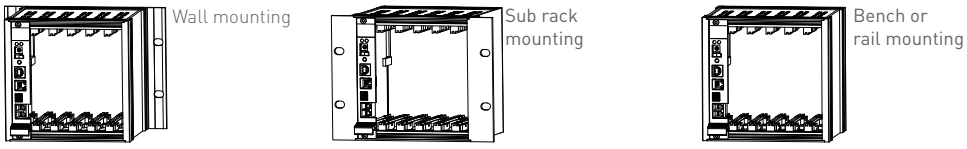
The free software *phy***LOGIC**™ Toolbox, die LabVIEW interface, the Android-based touch interface (internal/external) and the open protocol for controller drive and parameterising create additional scope for development. The integrated, high resolution power stages up to 5 A_{Peak} at 70 V_{DC} simplify the wiring significantly.

Online parameterising and -diagnostics are also standard feature as integrated limit switch/reference switch inputs per axis. Each axis can be expanded with encoder (Endat, SSI- /Quadrature) and temperature evaluation. Besides standard PLC functions such as analogue and digital I/Os, a variety of interfaces (Ethernet, Profibus, Profinet, RS232/485, USB, Bluetooth) the *phy***MOTION**™ also provides linear and circular interpolation.

The *phy***MOTION**™ can be operated below existing PLC systems as a slave system, as distributed intelligence or as a stand-alone motion control solution.

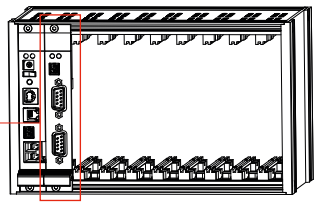
In 4 steps to your stepper motor controller

1 Choose housing
Type of mounting
Width/Depth
Main supply

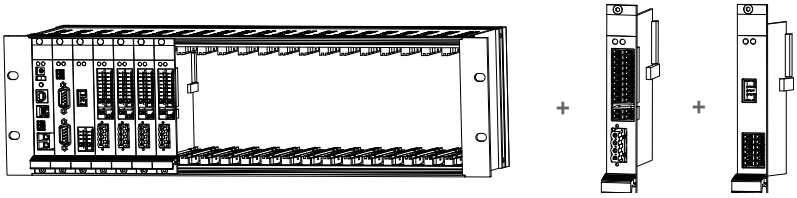


2 Define host interface

CAN, Ethernet
ProfiBus, ProfiNet
RS 232/RS 485
Bluetooth



3 Fill the module slots



4 Order and receive the fully assembled *phy*MOTION™

phytron
Beyond Steppers

Control

Module selection for your *phy*MOTION™

To make the module selection as comfortable as possible, we coded the modules by main and auxiliary functions.

CPU — This main function is included in the respective module.

CPU — The main function is not available in the respective module.

I/O D — Auxiliary functions are shown only if the module supports them.

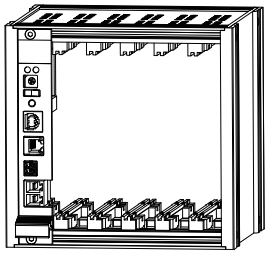
* POWER STAGE — * means the main or auxiliary function is selectable as option.

ENC *

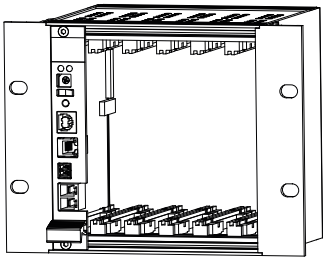
Main functions	POWER SUPPLY	The POWER SUPPLY function is marked when there is a power supply in the module (power supply unit).		
	CPU	Modules with CPU contain intelligent processors and can execute the total sequential programs and enable the *phy*MOTION™ to drive in stand-alone mode.		
	INDEX	The INDEXER represents the functionality to generate signals from commands of a programming language, which the power stage can amplify. Normally, the signal is control pulses/direction or SIN/COS.		
	POWER STAGE	POWER STAGE represents a stepper motor amplifier. Incoming control pulses/direction or SIN/COS signals are amplified and output to the motor..		
Auxiliary functions	ENC	Encoder evaluation	POW IN	Power distribution
	TEMP	Motor temperature evaluation	COM	Host interface
	I/O D	Digital inputs and/or outputs		
	I/O A	Analogue inputs and/or outputs		
	...			

1 Housing and Supply

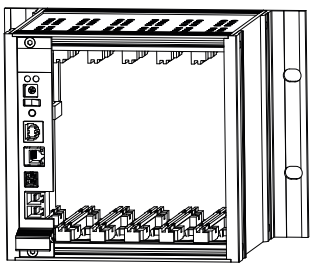
Housing Types of the *phy*MOTION™:



Bench or rail mounting



Rack mounting



Wall mounting

Type of mounting:

- Bench or rail
- Rack
- Wall

Number of slots defines the housing width:

- 6 Slots (24 U)
- 8 Slots (32 U)
- 10 Slots (40 U)
- 21 Slots (84 U or 19" sub rack)
- Special sizes on request

1 Slot = 4 U
1 U = 5.08 mm

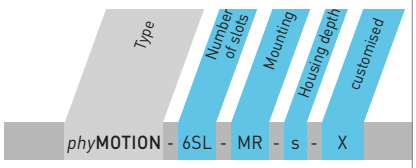
Housing depth:

- s (small): 121 mm
  All currently available modules are suitable for this depth.
- m (medium): 180 mm
  This depth is intended for future modules.

Dimensions for Bench (W x H x D) [mm]:

- 6 Slots: 137 x 132.5 x 121
- 8 Slots: 177.6 x 132.5 x 121
- 10 Slots: 218.3 x 132.5 x 121
- 21 Slots: 441.8 x 132.5 x 121
- general:
  (24 bis 84 TE) x 3 HE x 121 mm
- Mounting brackets for Rack or Wall:
  + 40.2 mm

Ordering Code

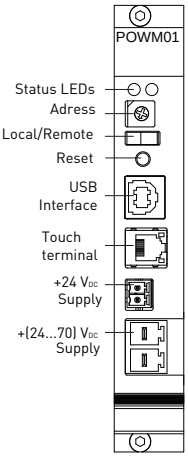


Options

Number of slots	6SL 8SL 10SL 21SL	6 Slots 8 Slots 10 Slots 21 Slots (=19")
Mounting	W MR R D	Wall mouting Rail 19" sub rack Bench
Housing depth	s m	small medium
customised	X	customer demand

POWER SUPPLY
CPU
INDEX
POWER STAGE
POW IN
COM

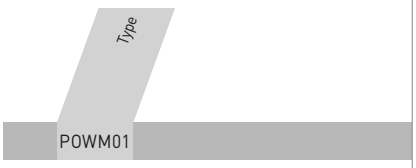
Main Supply (POWM01)



The beginning of each *phy*MOTION™

- Main supply:
  - 24 to 70 V_{DC} supply voltage (for motors and generates internally the logic voltages) – max. 20 A
  - Electrically isolated 24 V_{DC} for inputs/outputs, limit and reference switches
- Configuration
  - USB interface for programming and diagnostics
  - Device address switch
  - Reset key
  - Connection of an external phytron touch panel
- The external supply must be designed for the required current (e.g. by the PS5-48 power supply unit).

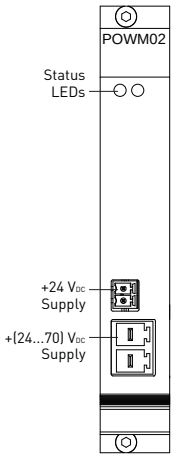
Ordering Code



Mating connectors are included in delivery.

POWER SUPPLY
CPU
INDEX
POWER STAGE
POW IN

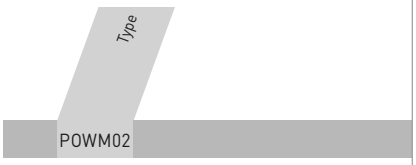
Intermediate Supply (POWM02)



Maximum 20 A per supply

- 24 to 70 V_{DC} supply voltage (for motors and generates internally the logic voltages) – max. 20 A
- Electrically isolated 24 V_{DC} for inputs and outputs, limit and reference switches
- The external supply must be designed for the required current (e.g. by the PS5-48 power supply unit).

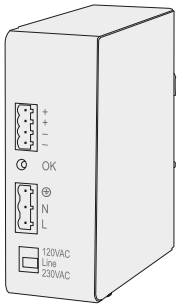
Ordering Code



Mating connectors are included in delivery.

POWER SUPPLY
CPU
INDEX
POWER STAGE

External Power Supply Unit (SPH)



Compatible Power Supply Unit (5 to 20 A)

- Mains supply voltage 115 / 230 V_{AC}
- Internally fused mains input
- Output voltage 24 V_{DC} (10 A / 20 A), 48 V_{DC} (5 A / 10 A / 20 A), 72 V_{DC} (6.7 A / 13.5 A)
- Permanently short circuit-proof output
- Overvoltage protection primary and secondary side
- Overtemperature protection
- Integrated fan
- Dimensions (WxHxD) SPH240: 45 x 125 x 121
  SPH500: 82 x 125 x 121
  SPH1013: 66 x 230 x 183
- DIN rail or wall

Ordering Code

Options		
Output power - Output	240-2410 240-4805 500-2420 500-4810 500-7207 1013-4821 1013-7214	24 V_{DC} / 10 A 48 V_{DC} / 5 A 24 V_{DC} / 20 A 48 V_{DC} / 10 A 72 V_{DC} / 6.7 A 48 V_{DC} / 20 A 72 V_{DC} / 13.5 A
Mounting	H W	Rear DIN rail Rear wall

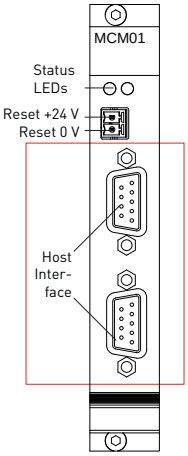
Mating connectors are included in delivery.

Control

2 Host Interface

POWER SUPPLY | CPU | INDEX | POWER STAGE | COM

Main Controller (MCM01)



Intelligent CPU and bus:

- Main CPU:
  - Controls and administers up to 64 modules
  - Program and register memory up to 4 MB
  - Internal memory expandable with future memory modules
  - Script program administration
  - Firmware administration
  - Elegant programming with *phy*LOGIC™ and G-Code
- Selectable communication interface:
  - CAN
  - Ethernet
  - ProfiBus/ProfiNet
  - RS 485, RS 232, RS 422
  - Bluetooth

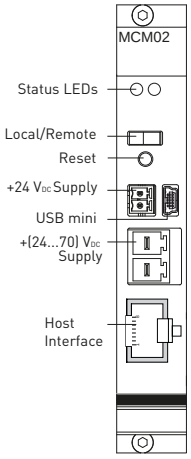
Ordering Code

Options		
Host communi-cation	CANS01	CAN-Bus
	ETHS01	Ethernet
	PBS01	ProfiBus
	PNS01	ProfiNet
	RSS01	RS 232 or RS 485/422
	BTS01	Bluetooth
	NNS01	no interface

Mating connectors are included in delivery.

POWER SUPPLY | CPU | INDEX | POWER STAGE | COM | POW IN

Main Controller (MCM02)



Intelligent CPU, bus and supply:

- Main CPU:
  - Controls and administers up to 64 modules
  - 24 to 70 V_{DC} supply voltage
  - Mini USB interface
  - Program and register memory up to 4 MB
  - Internal memory expandable with future memory modules
  - Script program administration
  - Firmware administration
  - Elegant programming with *phy*LOGIC™
- Selectable communication interface:
  - Ethernet
  - ProfiBus/ProfiNet
  - Bluetooth

Ordering Code

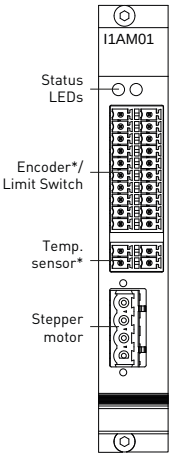
Options		
Host communi-cation	ETHS01	Ethernet
	PBS01	ProfiBus
	PNS01	ProfiNet
	BTS01	Bluetooth
	NNS01	no interface

Mating connectors are included in delivery.

3 Power Stages, Indexer, I/Os (analog/digital) & HMI

POWER SUPPLY | CPU | INDEX | POWER STAGE | ENC * | TEMP *

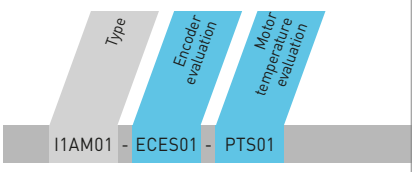
1 Axis Stepper Motor Drive (I1AM01)



Indexer with integrated 3.5 A power stage

- Integrated indexer for standard functions:
  - Relative and absolute positioning
  - Reference movements/speed mode
  - Step frequency to 40,000 steps/second
- Integrated 3.5 A power stage
  - 3.5 A_{PEAK} at 24 to 48 V_{DC} (derating dep. on application)
  - Selectable step resolution up to 1/256 step
  - Online power stage parameterisation and diagnostics
- 3 limit/reference switches
- Optional encoder evaluation
  - SSI/ Quadratic Incremental (ECAS01) or Endat (ECES01); Resolver (ECMS01)
- Optional motor temperature evaluation
  - for Pt100 sensors (PTS01) or K types (KTS01)

Ordering Code

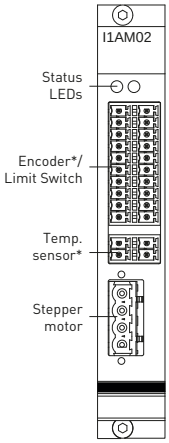


Options		
Encoder evaluation	ECES01	ENDAT encoder
	ECAS01	SSI/QUADR. encoder
	ECMS01	Resolver
		no encoder module
Temperature evaluation	PTS01	Pt sensor
	KTS01	K type
		no temperature module

Mating connectors are included in delivery.

1 Axis Stepper Motor Drive (I1AM02)

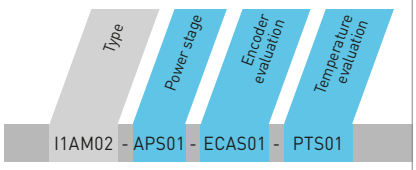
POWER SUPPLY
CPU
INDEX
* POWER STAGE
ENC *
TEMP *



Indexer with selectable APS power stage

- Integrated indexer for standard functions:
  - Relative and absolute positioning
  - Reference movements/speed mode
  - Step frequency to 40,000 steps/second
  - Up to 5 A_{PEAK} at 24 to 70 V_{DC} (derating dep. on application)
  - Selectable step resolution up to 1/256 step
  - Online power stage parameterisation and diagnostics
- 3 limit/reference switches
- Optional encoder evaluation
  - SSI/ Quadratic Incremental (ECAS01) or Endat (ECES01); Resolver (ECMS01)
- Optional motor temperature evaluation
  - for Pt100 sensors (PTS01) or K types (KTS01)

Ordering Code

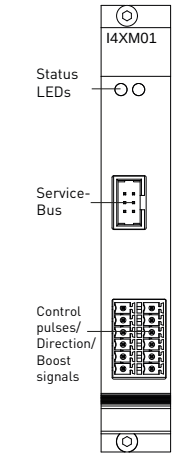


Options		
Power stage	APS01	Int. power stage 5A/70V
Encoder evaluation	ECES01 ECAS01 ECMS01	Integr. ENDAT encoder SSI/QUADR. encoder Resolver no encoder module
Temperature evaluation	PTS01 KTS01	Pt sensor K type no temperature module

Mating connectors are included in delivery.

4 Axes High End Indexer (I4XM01)

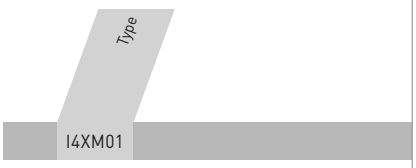
POWER SUPPLY
CPU
INDEX
POWER STAGE



Indexer module

- 1, 2, 3 and 4 axes stepper motor indexer
- Circular interpolation for 2 any axes
- Linear interpolation for 4 axes (also for reduction gears axes)
- Additional Control Pulses/Direction input and output for "electronic wave"
- Expanded indexer functions:
  - Velocity/end position during the movement changeable
  - Variable, short ramps; high velocities
  - Interpolation also for gear axes
  - High speed: up to 500,000 steps/second
  - ...

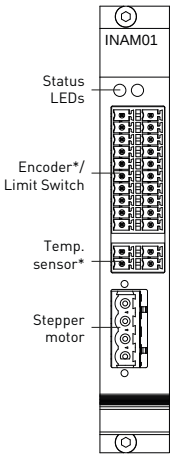
Ordering Code



Mating connectors are included in delivery.

1 Axis Carrier Module for APS Power Stage (INAM01)

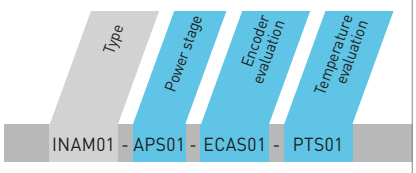
POWER SUPPLY
CPU
INDEX
* POWER STAGE
ENC *
TEMP *



APS, encoder and temperature

- Requires an upstream installed indexer for interpolation (i.e. I4XM01)
- Currently the high end power stage APS01 can be selected
  - Up to 5 A_{peak} for 24 to 70 V_{DC} (derating dep. on application)
  - Precision up to 1/512 step resolution
  - Online parameterisation and diagnostics
- 3 limit/reference switches
- Optional encoder evaluation
  - SSI/ Quadratic Incremental (ECAS01);Endat (ECES01); Resolver (ECMS01)
- Optional motor temperature evaluation
  - For Pt100 sensors (PTS01)
  - K types (KTS01)

Ordering Code



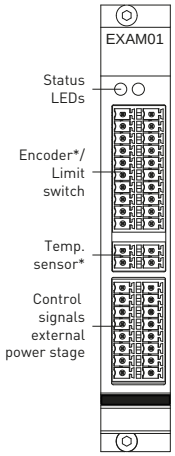
Options		
Power stage	APS01	Int. power stage 5A/70V
Encoder evaluation	ECES01 ECAS01 ECMS01	ENDAT encoder SSI/QUADR. encoder Resolver no encoder module
Temperature evaluation	PTS01 KTS01	Pt sensor K type no temperature module

Mating connectors are included in delivery.

Control

Indexer Interface (EXAM01) for External Power Stage

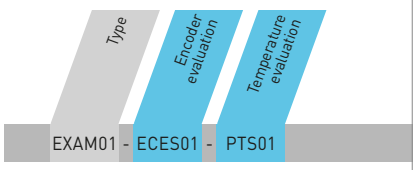
POWER SUPPLY
CPU
INDEX
POWER STAGE
ENC *
TEMP *



Interface between indexer and external power stages

- Requires an upstream installed indexer (i.e. I4XM01)
- Outputs Control pulses/Direction/Boost and Enable to an external power stage
- External power stages with ServiceBus can be parameterised online by the interface on the indexer module (i.e. I4XM01) and be diagnosed.
- 3 limit/reference switches
- Optional encoder evaluation
  - SSI/ Quadratic Incremental (ECAS01) or Endat (ECES01); Resolver (ECMS01)
- Optional motor temperature evaluation
  - for Pt100 sensors (PTS01) or K types (KTS01)

Ordering Code

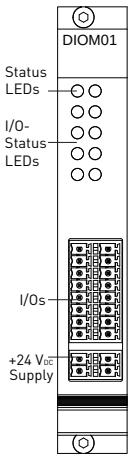


Options		
Encoder evaluation	ECES01 ECAS01 ECMS01	ENDAT encoder SSI/QUADR. encoder Resolver no encoder module
Temperature evaluation	PTS01 KTS01	Pt sensor K type no temperature module

Mating connectors are included in delivery.

Digital I/Os (DIOM01)

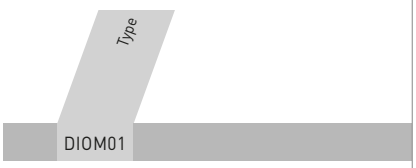
POWER SUPPLY
CPU
INDEX
POWER STAGE
I/O D
POW IN



Digital I/O module

- 8 digital inputs 24 V_{DC}
- 8 digital outputs 24 V_{DC}, max. 1 A
- 24 V supply of the inputs and outputs is centrally delivered either by the power modules or directly at the DIOM01.
- DIOM01 can also be used as a single channel counter module.

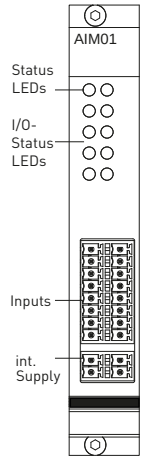
Ordering Code



Mating connectors are included in delivery.

Analogue Inputs (AIM01)

POWER SUPPLY
CPU
INDEX
POWER STAGE
I/O A



Analogue input module

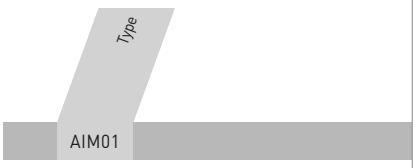
4 analogue inputs: ± 10 V
bipolar, 0...10 V, 0...20 mA

Resolution: 14 Bit

Sample rate: 416 Hz

Electrically isolated

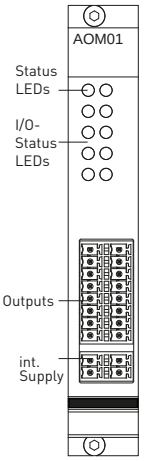
Ordering Code



Mating connectors are included in delivery.

Analogue Outputs (AOM01)

POWER SUPPLY
CPU
INDEX
POWER STAGE
I/O A



Analogue output module

4 analogue outputs

Max. output current: 16 mA

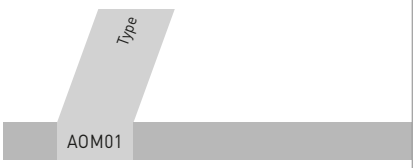
Electrically isolated

Resolution: 16 Bit

Short-circuit proof

Thermal overload protection

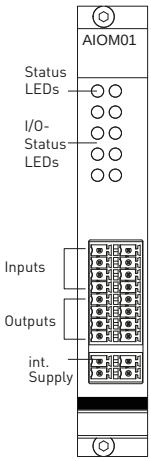
Ordering Code



Mating connectors are included in delivery.

Analogue Inputs and Outputs (AIOM01)

POWER SUPPLY
CPU
INDEX
POWER STAGE
I/O A



Analogue input and output module

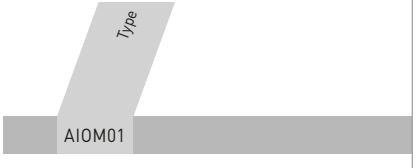
4 analogue inputs and outputs included

Inputs: ± 10 V bipolar, 0...10 V, 0...20 mA
Resolution: 14 Bit

Outputs: Max. output current: 16 mA
Resolution: 16 Bit
Short-circuit proof
Thermal overload protection

Electrically isolated

Ordering Code



Mating connectors are included in delivery.

Control

Customised Modules

POWER SUPPLY
CPU
INDEX
POWER STAGE
I/O A
I/O D
TEMP
ENC

On demand

Customised modules can be realised on demand.

HMI-Interfaces & Software

Android-based integrated Touch Panel (TPM01)

Integrated human-machine interface

- 800 x 480 px – TFT display
- Integrated in the *phy*MOTION™ housing
- Touch functionality
- As user interface i.e. for parameter selection
- For support, parameterisation and diagnostics

Ordering Code

Type
TPM01

Control via Android-based Tablets (from version V 4.0)

External human-machine interface

- from 480 x 800 px (recommended: 7"-display) – TFT display
- For connection to the POWM01 main power module (Ethernet or WLAN) or to the MCM01/MCM02 module (Bluetooth)
- Touch functionality
- As user interface i.e. for parameter selection
- For support, parameterisation and diagnostics

Control with Operator Panel BT5 AM

External human-machine interface

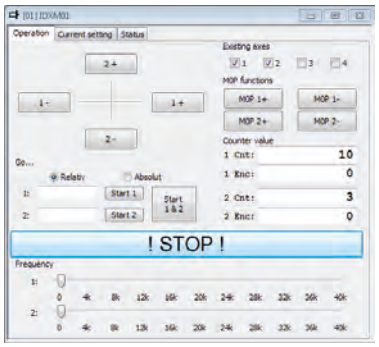
- For connection to the POWM01 main power module (terminal interface)
- For support, parameterisation and diagnostics
- Status display, operating mode
- Parameter reading
- Function keys
- Remote or Local mode

Ordering Code

Type
BT5 AM

Control

*phy*LOGIC™ ToolBox



Free of charge development environment

- Operating software and development environment for the *phy*MOTION™ phytron controller
- Easy to program: Drawing and converting of 2D contours in *phy*LOGIC™ commands (Motion Creator)
- Parameterising, programming, editing, debugging
- Support in the commissioning phase i.e. by test functions
- Display of status and graphical presentation of a current XY position
- Archiving of parameter sets and programs

*phy*LOGIC™ Control

Free of charge App for tablets

- Operating software for tablets connected to the *phy*MOTION™ phytron controller
- Direct mode, operating mode, I/O monitor, configuration of the controller
- Status display and parameter reading

LabVIEW®-VI

VIs for *phy*MOTION™

- Simulation software with a graphical style
- Use the VIs (Virtual Instruments) generated by Phytron and integrate them in your LabVIEW® project. So you can easily control the phytron controller *phy*MOTION™ from your usual programming environment.

EPICS Motor Module

Software environment for large-scale experiments

- Software environment to develop and realise distributed control systems for large-scale experiments such as telescopes and accelerators. EPICS provides the SCADA support.
- Phytron delivers the source code to integrate the phytron controller *phy*MOTION™ into the EPICS environment.
- Also in multi-axis operation: positioning, limit switches, encoder evaluation

Equipment

Motor Shield Clamp

Shielding for motor connection

- Easy to go
- Plug-in connection for motor shielding of the following modules of the phytron controller *phy*MOTION™: INAM-, EXAM-, I1AM01- or I1AM02-module
- On delivery: shielded clamp with cableties and screws
- The motor connectors are included in the package of your *phy*MOTION™ controller.

Mating connector set

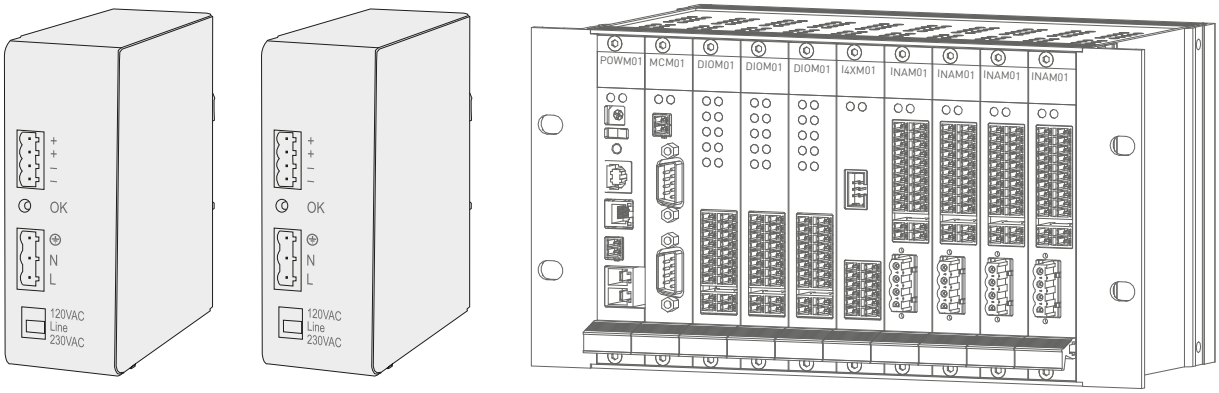
included in delivery

- Motor connector
- Power supply
- I/O digital or analog
- Quality Phoenix connectors

4 Order and Receive the Fully Assembled *phy*MOTION™

Configuration Example

10-Slot housing for rack mounting: 4 axes with indexer and I/Os



Ordering Code Example:

	Ordering Code	Description
Housing	*phy*MOTION-10SL-R-s	Rack mounting housing with 10 slots and depth 120 mm

Module	Ordering Code	Description
Slot 1	POWM01	Main power supply
Slot 2	MCM01-RSS01	Main controller with RS 485 interface
Slot 3	DIOM01	Digital I/O module
Slot 4	DIOM01	Digital I/O module
Slot 5	DIOM01	Digital I/O module
Slot 6	I4XM01	4 axes indexer module
Slot 7	INAM01-APS01-ECAS01	Internal 5 A power stage with Quadratic encoder evaluation
Slot 8	INAM01-APS01-ECES01	Internal 5 A power stage with ENDAT encoder evaluation
Slot 9	INAM01-APS01-ECAS01-PTS	Internal 5 A power stage with Quadratic encoder- and motor temperature evaluation with PT sensor
Slot 10	INAM01-APS01-ECES01-KTS	Internal 5 A power stage with ENDAT encoder- and motor temperature evaluation with K types

Power supply	SPH240-2410-W	External power supply unit with 240 W, 24 V_{DC} output voltage and 10 A for rear wall
Power supply	SPH240-4805-W	External power supply unit with 240 W, 48 V_{DC} output voltage and 5 A for rear wall

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ENG www.phytron.eu/MCC-2

CONTROL

MCC-2

Programmable controller for two axes

The MCC-2, phytron´s freely programmable dual axis stepper motor controller, is a compact stand-alone unit (CPU, Indexer and power stage) for 2 phase stepper motors providing up to 3.5 A_{PEAK} phase current.

Controllers in the MCC series have many inputs and outputs (digital and analog) and encoder inputs for step position monitoring plus possibilities to connect limit switches all as standard.

Due to the viariety of available host interfaces (Ethernet, Profibus, USB etc.), the MCC can be quickly and easily integrated into existing applications.

This controller is easy to program and can operate either directly (remote) via its host interface or stand-alone (local) with the program routines stored within.

Applications

As a compact stand-alone device, it convinces expecially in small experimental setups, machines and equipment, which can be dispensed in a PLC.

Highlights

LabVIEW®

Stand-alone

Stand-alone

Once programmed the MCC-2 can work without additional PC/controller.

PROFI®BUS

PROFI®BUS

As suggested by our customers now with optional Profibus interface!

LabVIEW®

LabVIEW® is a simulation software with a graphical interface. Use the VIs (Virtual Instruments) generated by phytron and integrate them in your LabVIEW® project. So you can easily control the MCC from your usual programming environment.

MiniLog-Comm®

MiniLog-Comm® is phytron's communication software running under Windows® to facilitate programming of the stepper motor controller. It provides quick and easy generation of sequential programs.

MiniLog-Comm® software is delivered free with phytron controllers and offers additional functions for test mode, step by step control or single sequence command execution of a motor move, a motor status window and even a Motion Creator.

In Focus

Stand-alone · Integrated Driver · Digital · Analogue · El. Isolated

- 2 axes stepper motor control unit with integrated power stages
- Bipolar control of 2 phase stepper motors
- Phase currents up to 3.5 A_{PEAK}
- Power supply 24 to 48 V_{DC}
- Step resolution 1/1 up to 1/256 step
- Host interfaces: Ethernet, USB, Profibus, RS 485 or RS 232
- Interfaces:
  - 2 encoders
  - 2 analogue inputs
  - 8 digital inputs and 8 outputs
  - 4 limit switches
  - 2 redundant designed enable inputs
- Programming in well-tried MiniLog format, acc. to DIN 66025 or in LabVIEW®
- LabVIEW® driver for including the MCC in your LabVIEW® project
- Remote or local mode

Edition 2012 July

phytron
Beyond Steppers

Control

Specification

Mechanical

Dimensions (W x H x D)	72 x 127 x 110 mm; 90 x 127 x 110 mm with attached USB converter or terminal adaptor
Weight	Approx. 950 g
Mounting	Wall- or rail mounting

Features

Stepper motors	Suitable for the control of 2 phase stepper motors with 4, (6) or 8 lead wiring
Supply voltage	Controller and motor: 24 to 48 V_{DC}; Limit switches and outputs: 24 V_{DC}
Phase current	Up to 3.5 A_{PEAK}
Step resolution	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/20; for smoother motor rotation: 1/32, 1/64, 1/128 up to 1/256 step of a full step
Step frequency	40,000 steps/sec
Hardware error detection	• Short circuit (between phase and power supply; between both phases; within a motor against ground)) • Over temperature • Under voltage
Cable length	Motor: shielded: 50 m max. Signal: shielded: 100 m max.
Diagnostic LEDs	Ready, busy, error
Operating mode	"Remote" - via bus; "Local" - stand-alone mode with sequence program

Interfaces

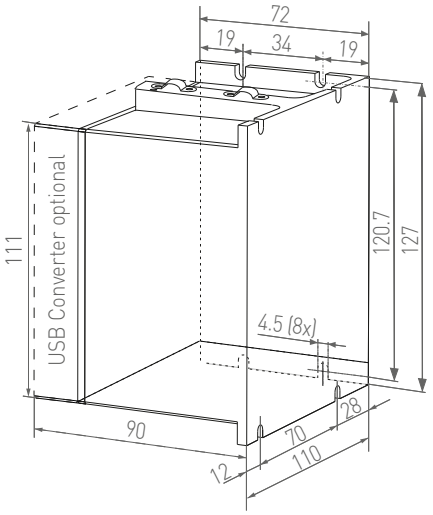
Analogue outputs	2 x (A, B, C, D) for two 2 phase stepper motors
Digital outputs	8 digital outputs, overload-proof, each electrically isolated from power supply / 24 V power supply fed separately; the maximum load is 1 A on each output; 4 A for all outputs
Host interface	Optional: Ethernet, USB, Profibus, RS 485, RS 232
Analogue inputs	2 x 10 Bit AD converter e. g. for a joystick. The joystick power (5 V_{DC}; 100 mA max.) is provided by the controller
Digital inputs	• 8 digital inputs, electrically isolated, 24 V input level • 4 limit switches: type PNP NCC or NOC • 2 encoders for optional differential incremental encoder or SSI absolute encoder; provided by the controller (5.3 V_{DC}, max. 200 mA) • 2 Motor Enable

Communication and Programming

Programming	MiniLog format acc. to DIN 66025 – MiniLog-Comm® (included in delivery) – LabVIEW® VIs (included in delivery)
Memory	128 kB program memory

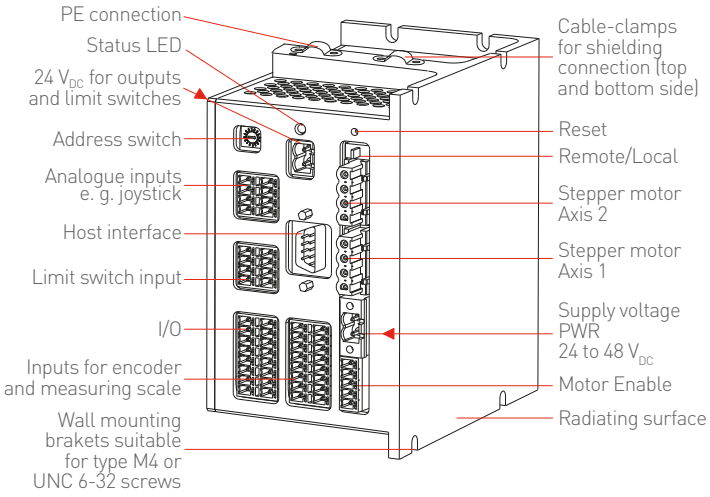
Operating Conditions

Temperatures	Operation: +5 to +50 °C; storage and transport: -10 to +85 °C
Degree of pollution	Level 2
Relative humidity	5 to 85 %, class 3K3 non-condensing
Protection class	IP 20
EMC immunity/ EMC emission	Acc. EN 61000-3-2 Acc. EN 61000-6-1, -3, -4 Acc. EN 6100-4-2...6, -11
Approval	CE

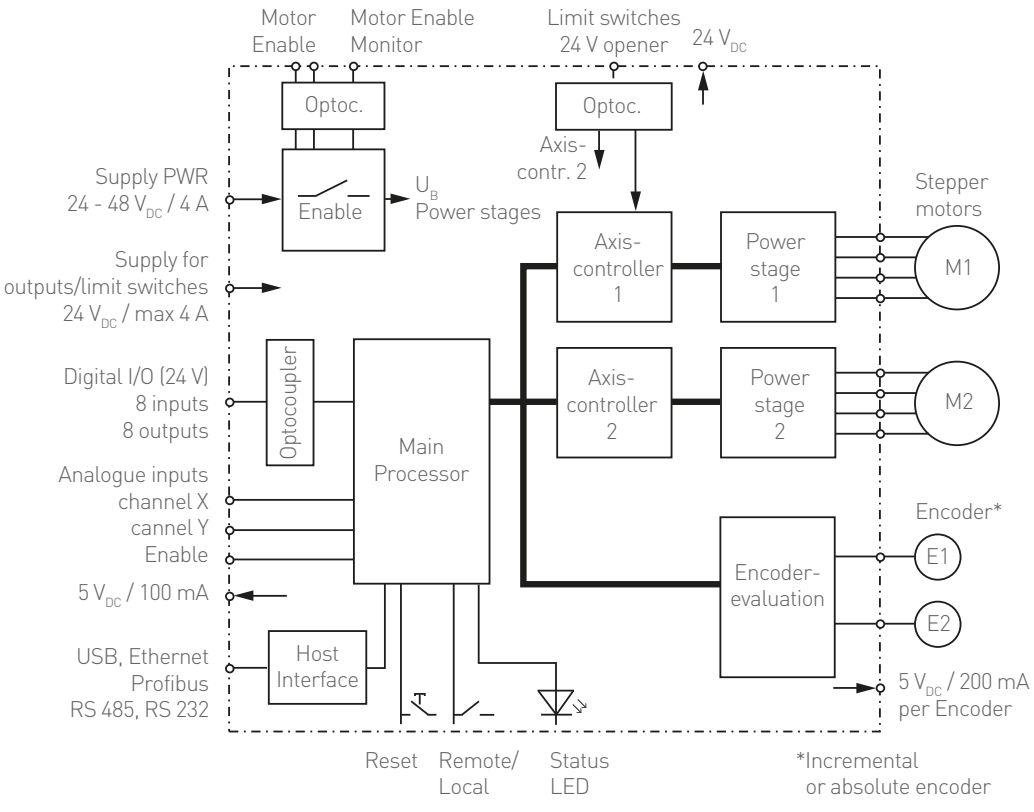


Dimensions in mm

Front View



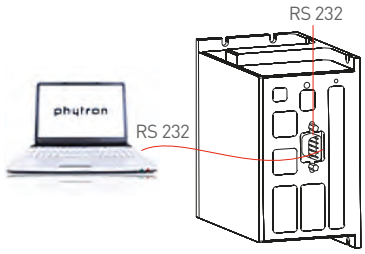
Block Diagram



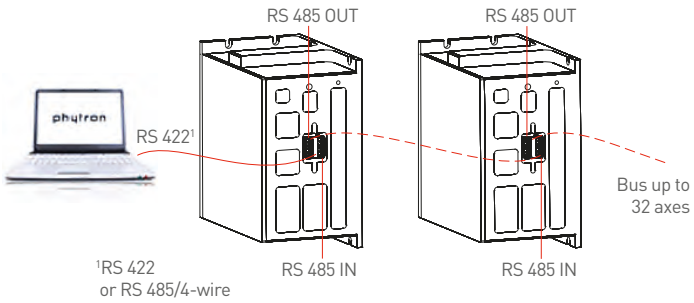
Control

Configurations

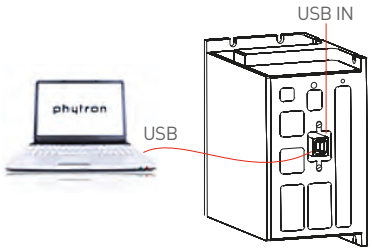
MCC-2 with RS 232 Port



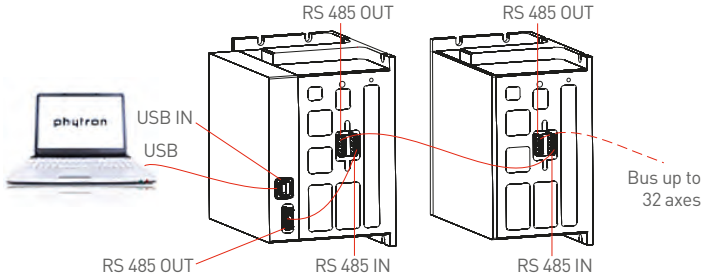
MCC-2 with RS 485 Port / Stand-alone Mode / Bus Mode



MCC-2 with USB Port



MCC-2 with attached USB Converter and RS 485 Port / Bus Mode



Ordering Code

The variable elements of the product are displayed in colour.

	Type	Current / Chopper	Motor voltage	Step resolution	Host interface	Mounting	Terminal adaptor
Ordering code	MCC-2	- 32	- 48	MINI	- USB	- W	- B

Options		
Host interface	ETH USB RS 485 RS 485-USB RS 232 PB	Ethernet port USB port RS 485/4-wire port RS 485/4-wire + USB converter RS 232 port Profibus port
Mounting	W H	Wall mounting With attached clip for DIN rail mounting
Adaptor	B	RS 232 adaptor for BT 5 operator terminal

Extent of Supply

- A CD-ROM with MiniLog-Comm® software, LabVIEW® VIs and USB driver
- Connector set
- Mini USB-RS 485 converter

Optional Accessories

- Cable assembly
- Power supply unit PS 5-48
- BT 5 operator terminal
- Mini USB-RS 485 converter

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ENG www.phytron.eu/MCC-2lin

CONTROL

MCC-2 LIN

Linear controller for two axes

The MCC-2 LIN, phytron´s freely programmable dual axis stepper motor controller, is a compact stand-alone unit (CPU, Indexer and power stage) for 2 phase stepper motors providing up to 1.7 A_{PEAK} phase current.

Controllers in the MCC series have many inputs and outputs (digital and analogue) and encoder inputs for step position monitoring plus possibilities to connect limit switches all as standard.

Due to the viariety of available host interfaces (USB, Ethernet etc.), the MCC can be quickly and easily integrated into existing applications.

This controller is easy to program and can operate either directly (remote) via its bus or stand alone (local) with the program routines stored within.

Application

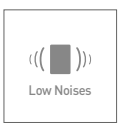
As a compact stand-alone device, it convinces expecially in small experimental setups, machines and equipment, which can be dispensed in a PLC.

Highlights

LabVIEW®

Stand-alone

Once programmed the MCC-2 LIN can work without additional PC/controller.



Low Noises

Low noises operation for sensitive applications for medical and scientific applications.

LabVIEW®

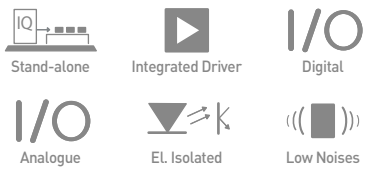
LabVIEW® is a simulation software with a graphical interface. Use the VIs (Virtual Instruments) generated by phytron and integrate them in your LabVIEW® project. So you can easily control the MCC from your usual programming environment.

MiniLog-Comm®

MiniLog-Comm® is phytron's communication software running under WINDOWS® to facilitate programming of the stepper motor controller. It provides quick and easy generation of sequential programs.

MiniLog-Comm® software is delivered free with phytron controllers and offers additional functions for test mode, step by step control or single sequence command execution of a motor move, a motor status window and even a Motion Creator.

In Focus



- 2 axes stepper motor control unit with integrated power stages
- Use in EMC-sensitive applications possible
- Phase currents up to 1.7 A_{PEAK}
- Power supply 24 to 48 V_{DC}
- Step resolution 1/1 up to 1/256 step
- Host interfaces: USB, Ethernet, RS 485 or RS 232
- Interfaces:
  - 2 encoders
  - 2 analog inputs
  - 8 digital inputs and 8 outputs
  - 4 limit switches
  - 2 redundant designed enable inputs
- Programming in well-tried MiniLog format, acc. to DIN 66025 or in LabVIEW®
- LabVIEW® drivers for including the MCC in your LabVIEW® project
- Remote or local mode

Edition 2012 July

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Beyond Steppers

Control

Specification

Mechanical

Dimensions (W x H x D)	108 x 127 x 110 mm; 126 x 127 x 110 mm with attached USB converter or terminal adaptor
Weight	Approx. 1350 g
Mounting	Wall or rail mounting

Features

Stepper motors	Suitable for the control of 2 phase stepper motors with 4, (6) or 8 lead wiring
Supply voltage	Controller and motor: 24 to 48 V_{DC}; Limit switches and outputs: 24 V_{DC}
Phase current	Up to 1.7 A_{PEAK}
Step resolution	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/20; for smoother motor rotation: 1/32, 1/64, 1/128 up to 1/256 step of a full step
Step frequency	40,000 steps/sec
Physical resolution	Approx. 51,200 positions per revolution (0.007°/step) with a 200 step motor. An encoder with a counter should be considered for very fine positioning.
Hardware error detection	• Short circuit (between phase and power supply; between both phases; within a motor against ground)) • Over temperature • Under voltage
Cable length	Motor: shielded: 50 m max. Signal: shielded: 100 m max.
Diagnostic LEDs	Ready, busy, ERROR
Operating mode	"Remote" - via bus; "Local" - stand-alone mode with sequence program

Interfaces

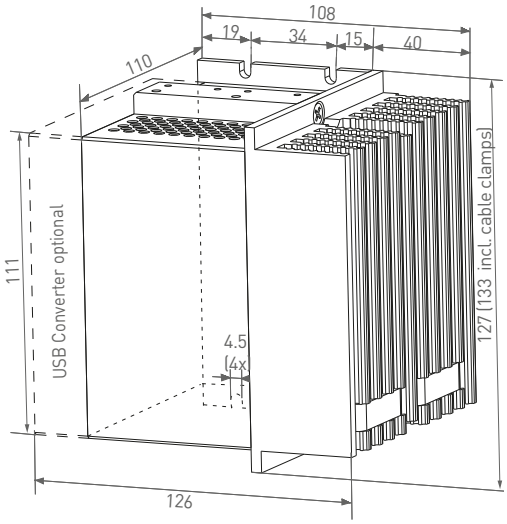
Analog outputs	2 x (A, B, C, D) for two 2 phase stepper motors
Digital outputs	8 digital outputs, overload-proof, each electrically isolated from power supply / 24 V power supply fed separately; the maximum load is 1 A on each output; 4 A for all outputs
Host interfaces	Optional: USB, Ethernet, RS 485, RS 232
Analog inputs	2 x 10 Bit AD converter e. g. for a joystick. The joystick power (5 V_{DC}; 100 mA max.) is provided by the controller
Digital inputs	• 8 digital inputs, electrically isolated, 24 V input level • 4 limit switches: type PNP NCC or NOC • 2 encoders for optional differential incremental encoder or SSI absolute encoder; provided by the controller (5.3 V_{DC}, max. 200 mA) • 2 Motor Enable

Communication and Programming

Programming	MiniLog format acc. to DIN 66025 – MiniLog-Comm® (included in delivery) – LabVIEW® VIs (included in delivery)
Memory	128 kB program memory

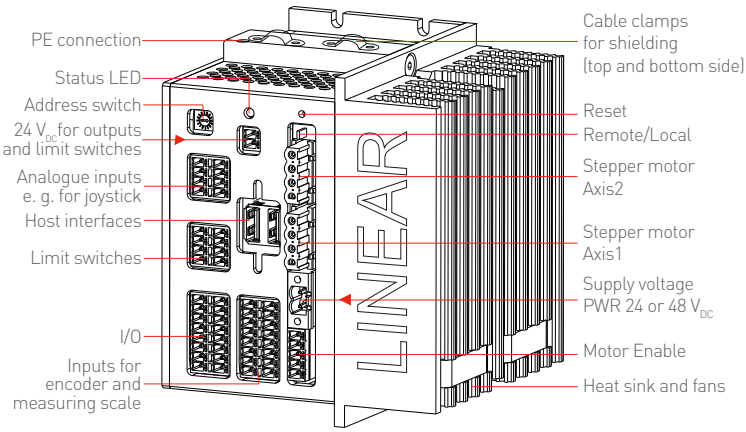
Operating Conditions

Temperatures	Operation: 5 to 50 °C; storage and transport: -10 to +85 °C
Degree of pollution	Level 2
Relative humidity	5 to 85 %, class 3K3 non-condensing
Protection class	IP 20
EMC immunity/ EMC emission	Acc. EN 61000-3-2 Acc. EN 61000-6-1, -3, -4 Acc. EN 6100-4-2...6, -11
Approval	CE

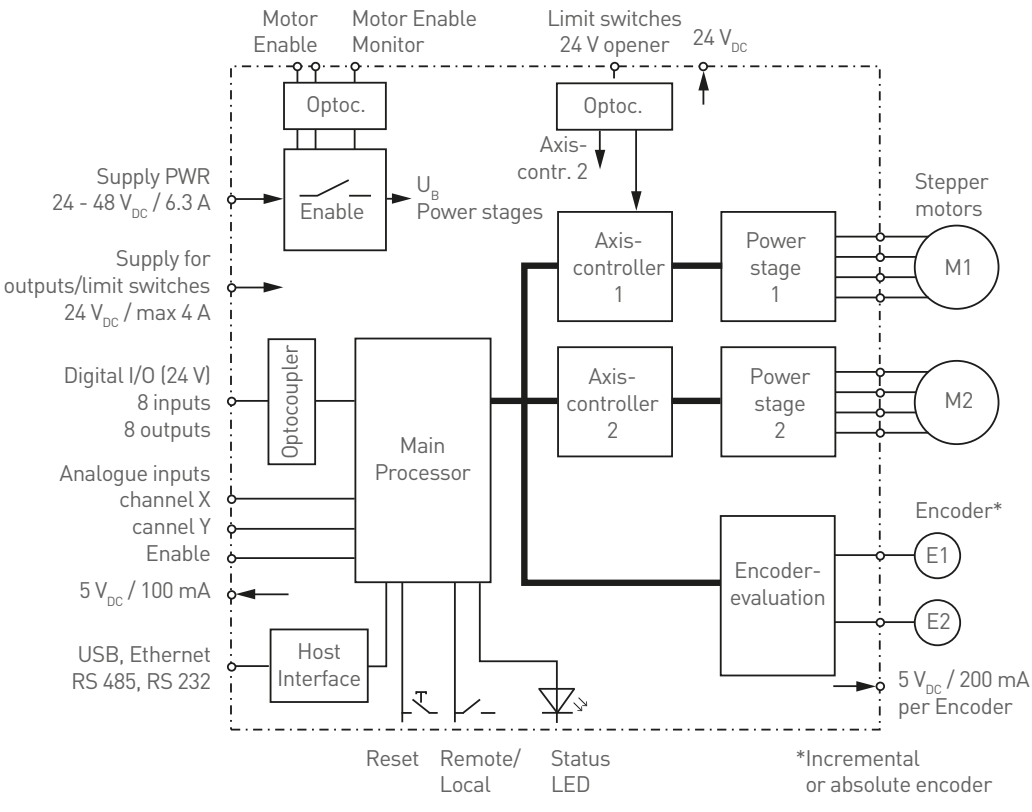


Dimensions in mm

Front View

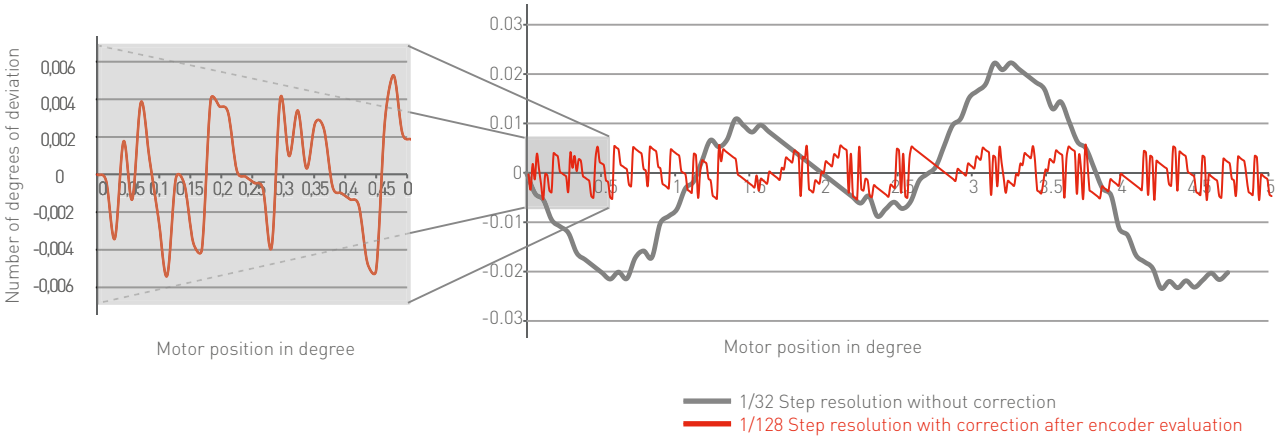


Block Diagram



Control

Positioning Accuracy



Extract at 1/128 step resolution

Ordering Code

The variable elements of the product are displayed in colour.

	Type	Current/Chopper	Motor voltage	Step resolution	Host interface	Mounting	Terminal adaptor
Ordering code	MCC-2 LIN	- 20	- 48	MINI	- USB	- W	- B

Options		
Host interface	USB ETH RS 485 RS 485-USB RS 232	USB port Ethernet port RS 485/4-wire port RS 485/4-wire + USB converter RS 232 port
Mounting	W H	Wall mounting With attached clip for DIN rail mounting
Adaptor	B	RS 232 adaptor for BT 5 operator terminal

Extent of Supply

- A CD-ROM with MiniLog-Comm® software, LabVIEW® VIs and USB driver
- Connector set

Optional Accessories

- Cable assembly
- Power supply unit PS 5-48
- BT 5 operator terminal
- Mini USB-RS 485 converter

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ENG www.phytron.eu/MCC-1

CONTROL

MCC-1

Programmable controller for one axis

The MCC-1, phytron's freely programmable dual axis stepper motor controller, is a compact stand-alone unit for 2 phase stepper motors providing up to 3.5 A_{PEAK} phase current.

Controllers in the MCC series have many inputs and outputs (digital and analogue) and encoder inputs for step position monitoring plus possibilities to connect limit switches all as standard.

Due to the viariety of available host interfaces (USB, Ethernet, Profibus etc.), the MCC can be quickly and easily integrated into existing applications.

This controller is easy to program and can operate either directly (remote) via its bus or stand-alone (local) with the program routines stored within.

Applications

As a compact stand-alone device, it convinces expecially in small experimental setups, machines and equipment, which can be dispensed in a PLC.

In Focus

Stand-alone | Integrated Driver | Digital | Analogue | El. Isolated

- 1 axis stepper motor control unit with integrated power stages
- Bipolar control of 2 phase stepper motors
- Phase currents up to 3.5 A_{PEAK}
- Power supply 24 to 48 V_{DC}
- Step resolution 1/1 up to 1/256 step
- Host interfaces: USB, Ethernet, Profibus, RS 485 or RS 232
- Interfaces:
  - 1 encoder
  - 1 analogue input
  - 8 bidirectional, digital inputs and outputs
  - 2 limit switches
  - 2 redundant designed enable inputs
- Programming in well-tried MiniLog format, acc. to DIN 66025 or in LabVIEW®
- LabVIEW® driver for including the MCC in your LabVIEW® project
- Remote or local mode

Highlights

LabVIEW®

Stand-alone

Stand-alone

Once programmed the MCC-1 can work without additional PC/controller.

All-in-one solution

A compact device with controller, I/O and power stage by 55 x 127 x 110 mm

LabVIEW®

LabVIEW® is a simulation software with a graphical interface. Use the VIs (Virtual Instruments) generated by phytron and integrate them in your LabVIEW® project. So you can easily control the MCC from your usual programming environment.

MiniLog-Comm®

MiniLog-Comm® is phytron's communication software running under Windows® to facilitate programming of the stepper motor controller. It provides quick and easy generation of sequential programs.

The MiniLog-Comm® software is delivered free with phytron controllers and offers additional functions for test mode, step by step control or single sequence command execution of a motor move, a motor status window and even a Motion Creator.

Edition 2012 July

phytron
Beyond Steppers

Control

Specification

Mechanical

Dimensions (W x H x D)	55 x 127 x 110 mm; 73 x 127 x 110 mm with attached USB converter or terminal adaptor
Weight	Approx. 660 g
Mounting	Wall or rail mounting

Features

Stepper motors	Suitable for the control of 2 phase stepper motors with 4, (6) or 8 lead wiring
Supply voltage	Controller and motor: 24 to 48 V_{DC}; Limit switches and outputs: 24 V_{DC}
Phase current	Up to 3.5 A_{PEAK}
Step resolution	1/1, 1/2, 1/4, 1/5, 1/8, 1/10, 1/20; for smoother motor rotation: 1/32, 1/64, 1/128 up to 1/256 step of a full step
Step frequency	40,000 steps/sec
Hardware error detection	• Short circuit (between phase and power supply; between both phases; within a motor against ground)) • Over temperature • Under voltage
Cable length	Motor: shielded: 50 m max. Signal: shielded: 100 m max.
Diagnostic LEDs	Ready, busy, ERROR
Operating mode	"Remote" - via bus; "Local" - stand-alone mode with sequence program

Interfaces

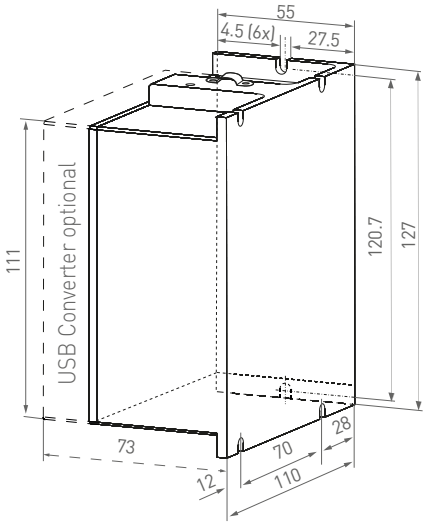
Analog outputs	A, B, C, D for a 2 phase stepper motor
Digital outputs	8 digital I/Os - programmable as in- or output - overload-proof, each electrically isolated from power supply / 24 V power supply fed separately; the maximum load is 1 A on each output; 4 A for all outputs
Host interfaces	Optional: USB, Ethernet, Profibus, RS 485, RS 232
Analog inputs	2 x 10 Bit AD converter e. g. for a joystick. The joystick power (5 V_{DC}; 100 mA max.) is provided by the controller
Digital inputs	• 8 digital I/Os - programmable as in- or output - electrically isolated, 24 V input level • 2 limit switches: type PNP NCC or NOC • 1 encoders for optional differential incremental encoder or SSI absolute encoder; provided by the controller (5.3 V_{DC}, max. 200 mA) • 2 Motor Enable

Communication and Programming

Programming	MiniLog format acc. to DIN 66025 – MiniLog-Comm® (included in delivery) – LabVIEW® VIs (included in delivery)
Memory	128 kB program memory

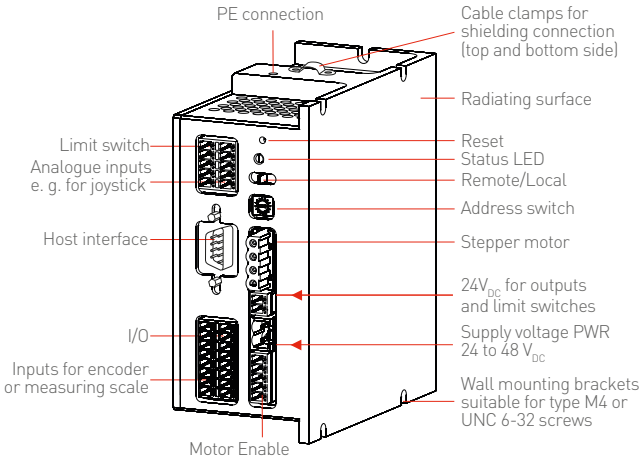
Operating Conditions

Temperatures	Operation: +5 to +50 °C; storage and transport: -10 to +60 °C
Degree of pollution	Level 2
Relative humidity	5 to 85 %, class 3K3 non-condensing
Protection class	IP 20
EMC immunity/ EMC emission	Acc. EN 61000-3-2 EMC Acc. EN 61000-6-1, -3, -4 EMC and RFI immunity Acc. EN 6100-4-2...6, -11 Immunity testing
Approval	CE

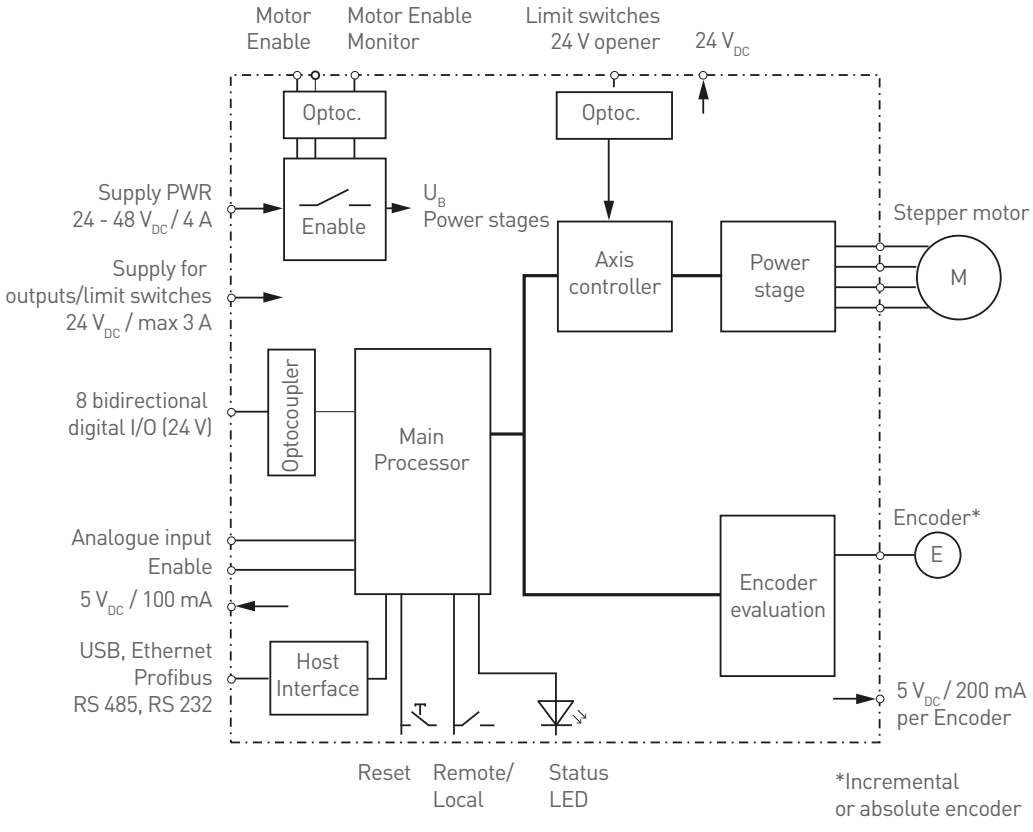


Dimensions in mm

Front View



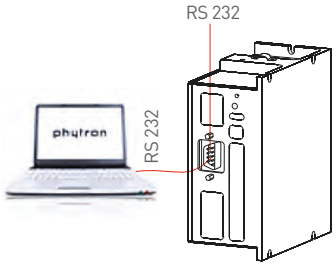
Block Diagram



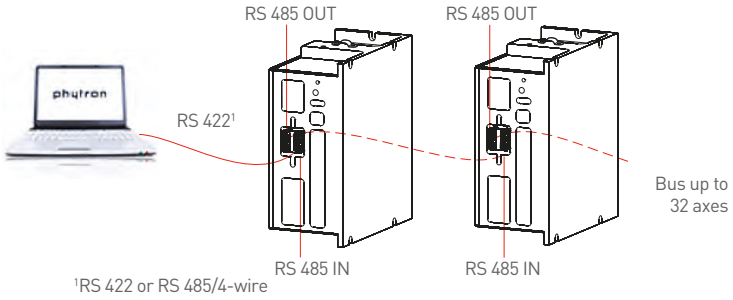
Control

Configurations

MCC-1 with RS 232 Port

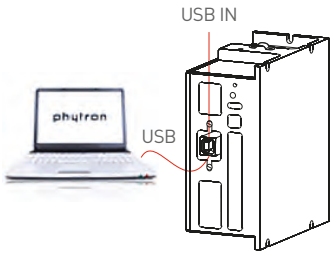


MCC-1 with RS 485 Port / Stand-alone Mode / Bus Mode

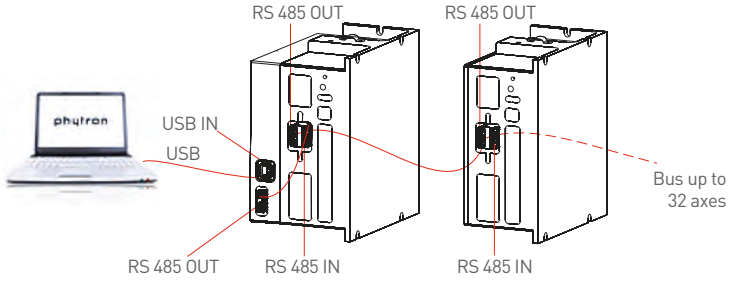


[1]RS 422 or RS 485/4-wire

MCC-1 with USB Port



MCC-1 with attached USB Converter and RS 485 Port / Bus Mode



Ordering Code

The variable elements of the product are displayed in colour.

	Type	Current / Chopper	Motor voltage	Step resolution	Host interface	Mounting	Terminal adaptor
Ordering code	MCC-1	- 32	- 48	MINI	- USB	- W	- B

Options		
Host interface	USB ETH RS 485 RS 485-USB RS 232 PB	USB port Ethernet port RS 485/4-wire port RS 485/4-wire + USB converter RS 232 port Profibus port
Mounting	W H	Wall mounting With attached clip for DIN rail mounting
Adaptor	B	RS 232 adaptor for BT 5 operator terminal

Extent of Supply

- A CD-ROM with MiniLog-Comm® software, LabVIEW® VIs and USB driver
- Connector set

Optional Accessories

- Cable assembly
- Power supply unit PS 5-48
- BT 5 operator terminal
- Mini USB-RS 485 converter

Phytron GmbH
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DRIVES

Drives contain so-called indexers and power stages. You put instructions in a programming language to control signals, which boosts the internal power stage.

POWER SUPPLY | CPU | INDEX | POWER STAGE

1-STEP-DRIVE

Stepper motor module with integrated power stage for the SIMATIC ET 200® S

ENG www.phytron.eu/1-step-drive

CONTROL

1–STEP–DRIVE–5A–48V

Stepper motor module for the SIMATIC ET 200®S

In coordination with SIEMENS

The 1-STEP-DRIVE-5A-48V is a stepper motor controller with integrated power stage. It is specially developed for application in the decentralised SIMATIC ET 200®S peripheral system.

This 1-STEP-DRIVE module is configured via mouse click with the STEP®7 by using the provided configuration files and then parameterised. The module is ready for use in a very short time and supplements the SIMATIC ET 200®S with a fully integrated, powerful and high-precision positioning controller for 2 phase stepper motors.

Application

Application examples for the 1-STEP-DRIVE module are assembly and transfer lines, building automation, x-y-tables, paper mills, printing and textile machines.

Highlights

Online parameterisation

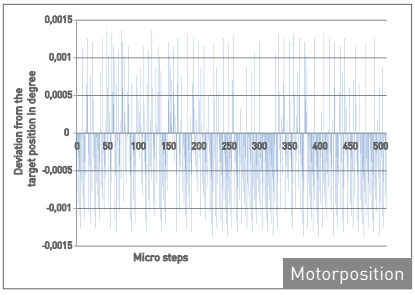
These Phytron power stages are eminently suitable for not only setting the basic parameters via interface bus, but also the technological parameters found in the application.

The power stage can be optimised for the requirements of the drive system during commissioning. Furthermore it is possible to adjust the power stage during ´CPU RUN´, particularly for the next program sequence.

For example, raise the stop current when the motor is holding a load and then reduce it as soon as the system comes to a standstill without the load to minimize the power requirement and motor heating. Using these functions combined with additional parameters bring out the best in your system.

Fine positioning to 1/512 step

Almost all commercially available stepper motor power stages can be operated in micro step mode. When driving the motor with encoder feedback, it is apparent that certain micro step positions cannot often be reached because of a lack of fine current settings and the motor may not reach the desired position. The 1-STEP-DRIVE technology guarantees a high-precision current



Motorposition

adjustment and enables fine positioning up to 1/512 step. The diagram above shows that a Phytron 200 step motor with encoder is able to be at each 1/512 micro step position with an absolute and non-cumulative error of about 0.0015°, typically much less than this.

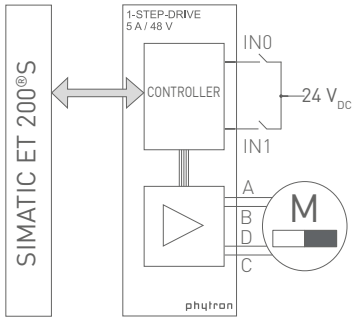
In Focus

Integrated Driver

I/O Digital

The 1-STEP-DRIVE-5A-48V module successfully completed the system compliance test performed by SIEMENS.

- Stepper motor controller with an integrated power stage for SIMATIC ET 200®S
- For 2 phase stepper motors
- 5 A_{PEAK} at 24 to 48 V_{DC}
- Up to 1/512 microsteps
- Online controller parameterisation and diagnostics
- STEP®7 programming



Overview

phytron
Beyond Steppers

Control

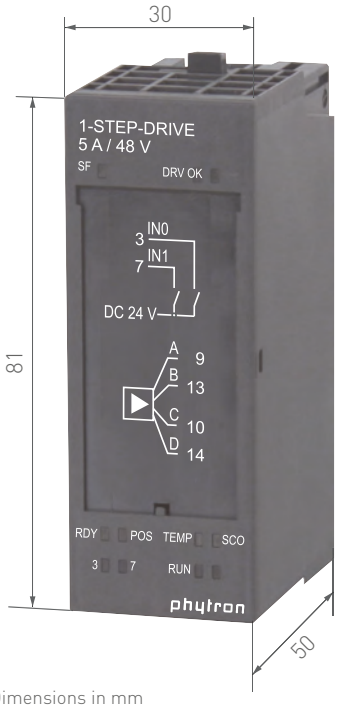
Specification

Mechanical

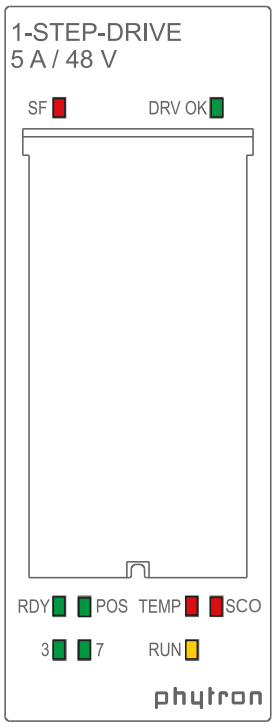
Design	SIMATIC ET 200®S plastic housing
Dimensions (W x H x D)	30 x 81 x 50 mm
Weight	80 g
Mounting position	Optional
Mounting	Plug-in in SIMATIC ET 200®S terminal modules

Features

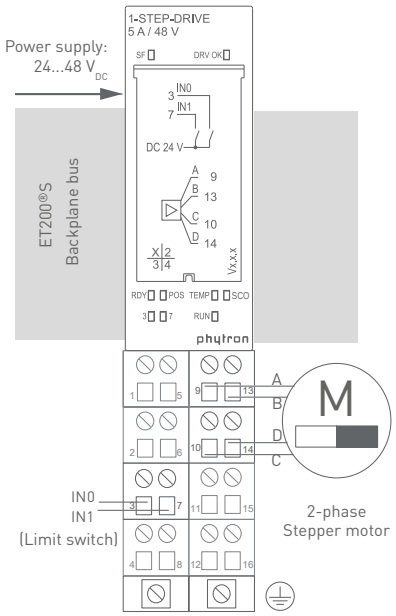
Stepper motors	Suitable for bipolar control of 2 phase stepper motors with 4, (6) or 8 lead wiring
Superior main station	SIMATIC ET 200®S
Power supply	24 to 48 V_{DC}
Reverse polarity protection	Yes
Phase current	5 A_{PEAK} (short circuit-proof, overload protected)
Motor current adjustment	20 mA increments
Step resolutions	Full step, half step, 1/2.5, 1/4, 1/5, 1/8, 1/10, 1/16, 1/20, 1/32, 1/64, 1/128, 1/256, 1/512 microstep
Maximum step frequency	510,000 steps/s
Physical resolution	Approx. 102,400 positions per revolution (0.0035°/step) with a 200 step motor. An encoder with a counter should be considered for very fine positioning.
Chopper frequency	18, 20, 22 or 25 kHz selectable Patented phytron chopper technology for a minimal heat loss in the motor and smooth rotation.
Current consumption (max.)	3 A_{DC} at 5 A_{PEAK}
Mechanical output power	Up to the 200 W range
Cable length - motor	Shielded: 50 m max.
Cable length - digital inputs	Shielded: 100 m max.
Diagnostic LEDs	• SF (group error) • DRV OK (power stage ready) • RDY (module ready) • POS (driving instruction is running) • 3 (digital input IN0 active) • 7 (digital input IN1 active) • TEMP (over temperature > 85 °C) • SCO (over current > 10 A) • RUN (motor is running)
Controller modes	• Relative positioning • Move to a reference point • Absolute positioning • Revolution mode • Reference setting
Security modes	Security modes, such as e. g. Safe Torque Off (STO) from IEC 61508-2 are not directly compatible
Mechanism of the communication via backplane bus	**Synchronous:** Control interface, feedback interface **Asynchronous:** PLC in CPU STOP mode: basic parameterising PLC in CPU RUN mode: data set transfer



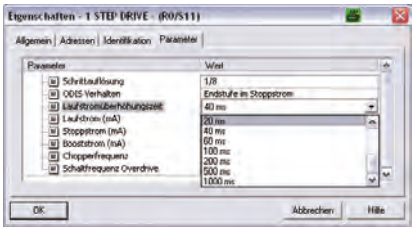
Dimensions in mm



Diagnostic LEDs



Connection diagram



Parameterisation

Specification

Features (continued)

Support of linear and modulo axes (rotary axes)	Yes
Hardware error detection	• Over current, short circuit >10 A spike at the controller • Over temperature at the power stage T > 85 °C
Refresh rate	2 ms

Interfaces

Analogue outputs	A, B, C, D - For a 2 phase stepper motor
Digital inputs	2 configurable digital inputs IN0 and IN1: 0 signal: -30 to 5 V with 2 mA max. (quiescent current) 1 signal: 11 to 30 V with 9 mA typical Input delay: 4 ms **IN0:** • External release of momentum • External stop • Limit switch towards forward / reverse **IN1:** • Reference switch and also limit switch towards forward / reverse • Limit switch configurable to open / close
Backplane bus and module supply	Backplane bus of the ET 200®S Module supply via ET 200®S power module

Compatible SIEMENS terminal modules for the 1-STEP-DRIVE

Terminal module	Order number	Terminals
TM-E30S46-A1	6ES7193-4CF40-0AA0	screw with AUX
TM-E30C46-A1	6ES7193-4CF50-0AA0	spring with AUX
TM-E30S44-01	6ES7193-4CG20-0AA0	screw without AUX
TM-E30C44-01	6ES7193-4CG30-0AA0	spring without AUX

Compatible SIEMENS power modules

Power module for the ET 200®S	Order number
DC 24V-48V with diagnostic	6ES7138-4CA50-0AB0 SIMATC DP
DC 24V-48V, AC 24 - 230 V with diagnostic and protection	6ES7138-4CB11-0AB0 SIMATC DP

Communication and Programming

Programming	Via STEP®7
Control interface (synchronous)	**Parameter assignments** • Basic frequency F_b • Multiplier i (ramp) • Multiplier n (start-stop) **Positioning** • Move to a reference point • Set home position • Relative incremental mode (relative positioning) • Absolute incremental mode (absolute positioning) • Revolution mode • Reference setting
Feedback interface (synchronous)	**Configurable** • Residual path • Absolute positioning • Velocity **Also included in the feedback** • Position reached • Parameterization error • Power stage error • Limit switch causes a stop • and other states

Control

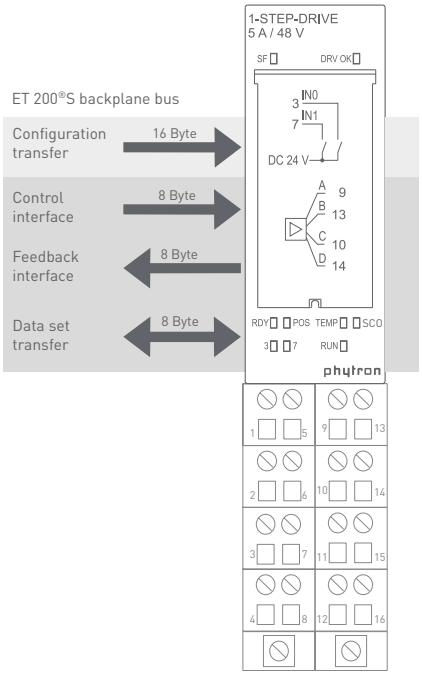
Specification

Communication and Programming (continued)

Data set transfer to the 1-STEP-DRIVE (asynchronous while CPU RUN)	**Parameterising the 1-STEP-DRIVE power stage** • Step resolution (1/1, 1/2 up to 1/512) • Preferred direction of rotation • Run current (20 mA increments) • Stop current (20 mA increments) • Boost current (20 mA increments) • Current delay time 1 up to 1000 ms • Chopper frequency 18 to 25 kHz • Switching frequency overdrive 1 to 40 kHz • ODIS behaviour
Data set transfer from the 1-STEP-DRIVE (asynchronous)	**Diagnostics** Feedback of the following driver parameters to the main station • Reverse reading controller parameter • Basic position • Error (short circuit, over temperature, parameterizing error)

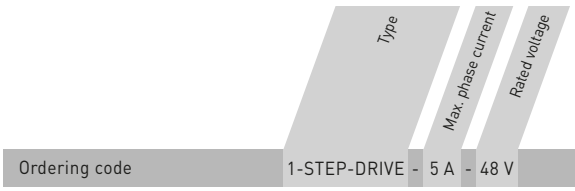
Operating Conditions

Operating temperature	0 to +60 °C
Storage and transport temperatures	-40 to +70 °C
Relative humidity	95 % max. non-condensing
Degree of pollution	Level 2
Protection class	IP 20
Vibration / Shock protection	According to EN 60068-2-6 According to EN 60068-2-27/29
EMC immunity / EMC emission	According to EN 61000-6-2 According to EN 61000-6-4
Approval	CE



Communication mechanism

Ordering Code



Extent of Supply

- 1-STEP-DRIVE module
- CD-ROM incl. configuration file (HSP), application example and PDF manual

Optional Accessories

Manual as printout (ID No.: 10013573)

Phytron GmbH
Industriestraße 12 – 82194 Gröbenzell
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POWER STAGES

Stepper motor power stages reinforce Control pulses/Motor direction or SIN/COS signals and directly control the stepper motor.

POWER SUPPLY | CPU | INDEX | POWER STAGE

APS

High performance stepper motor power stage module

CCD+

Stepper motor power stage with ServiceBus and plain text display

ZMX+

19“ stepper motor power stage module with ServiceBus

CLD+

Linear stepper motor power stage with ServiceBus and plain text display

MCD+

Compact stepper motor power stage with ServiceBus

SLS

19“ sub-rack with plug-in stepper motor power stage modules

MSX

19“ stepper motor power stage module for high performance

MR8+

Minirack for 1 - 8 power stage modules with ServiceBus

ENG www.phytron.eu/APS

CONTROL

Now available for Arduino !

APS Technology

High performance stepper motor power stage Now as OEM module with sin/cos via SPI

The phytron APS module is a high performance power stage for the operation of stepper motors up to 5 A_{PEAK} at 24 - 70 V_{DC} with a shaft power up to 250 Watts.

While almost any commercially available stepper motor power stage provides the setting of the so-called microstep operation, the generated current settings are too inaccurate to achieve the individual sub-steps and to approach the actual position.

The APS module positions with an actual step resolution of 1/512 (102,400 positions per revolution with an encoder with a 200 step motor). Based on our parameterisable chopper technology and by the use of premium components with low resistance, the APS triggers with optimal timing. So the APS technology creates a current shape close to a perfect sine wave with a minimum of heat loss in the controller. Only this highly accurate output signal enables the loss- and low resonance operation of the motor, the fast execution of each sub-step and the approach to each position.

The compact APS is the core of the 1-STEP-DRIVE (for SIMATIC ET 200®S) SPS module and as a power stage module of our phyMOTION™ available. The APS can be parameterised (run current, stop current, boost current, current delay time etc.) and diagnosed online by a ServiceBus code and is also open for instructions from the CPU in runtime within a parameterisation cycle.

Benefit from our APS power stage technology: EVA-APS board (p.3) or APS-Arduino Shield (p.4).

Specification

Mechanical

Design	Plug-in power stage module also as OEM module
Dimensions (W x H)	60 x 40 mm
Weight	16 g

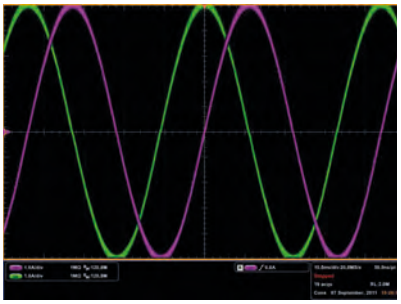
Features

Stepper motors	Suitable for bipolar control of 2 phase stepper motors with 4-, (6-) or 8 lead wiring
Phase current	Up to 5 A_{PEAK} (short circuit-proof, overload protected)
Power supply	24 to 70 V_{DC}
Reverse polarity protection	No

Specification - continuation box next side

In Focus

- OEM power stage module with control pulses/direction or sin/cos presetting via SPI
- For 2 phase stepper motors
- Up to 5 A_{PEAK} at 24 -70 V_{DC}
- Up to 1/512 step resolution
- Up to 500,000 steps/sec
- Online parameterising and diagnostic of the power stage via Serial Periphal Interface (SPI)
- Control via Control pulses/direction or via digital sin/cos (via SPI)
- Free available parameterisation and diagnosis tool ServiceBus-Comm®
- 2 development environments:
  - for industry: EVA-APS board
  - for research: APS-Arduino Shield



Violet = Phase current 1
Green = Phase current 2
1/128-Ministep, 3.5 A_{RMS} (approx. 5.0 A_{PEAK}),
U_B = 60 V

Edition 2013 June

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Beyond Steppers

Control

Specification

Features (continued)

Motor current adjustment	10 mA current resolution
Step resolutions	Full step, half step, 1/2.5, 1/4, 1/5, 1/8, 1/10, 1/16, 1/20, 1/32, 1/64, 1/128, 1/256, 1/512 microstep
Maximum step frequency	500,000 steps/sec
Physical resolution	Approx. 102,400 positions per revolution (0.0035°/step) with a 200 step motor. An encoder with a counter should be considered for very fine positioning.
Chopper frequency	18, 20, 22 or 25 kHz selectable Patented phytron Chopper technology for a minimal heat loss in the motor and smooth rotation.
Current consumption (max.)	3 A_{DC} at 5 A_{PEAK}
Mechanical output power	Up to the 250 W range
Cable length	Motor: shielded: max. 50 m
Diagnostic LEDs	Opportunity to connect on 2 signal lines with 3.3 V logic level: LED 1 (power stage ready), LED 2 (error)
Hardware error detection	• Overcurrent, short circuit > 10 A • Overtemperature T > 85 °C

Interfaces

Analogue outputs	A, B, C, D, for a 2 phase stepper motor Analogue temperature output: 0 to +90 °C at 480 to 1884 mV
Digital inputs	Control pulses, Motor direction, Boost, Deactivation, Reset SPI bus interface: • digital sin/cos presetting (alternative to Control pulses/Motor direction) • online parameterisation and diagnostic

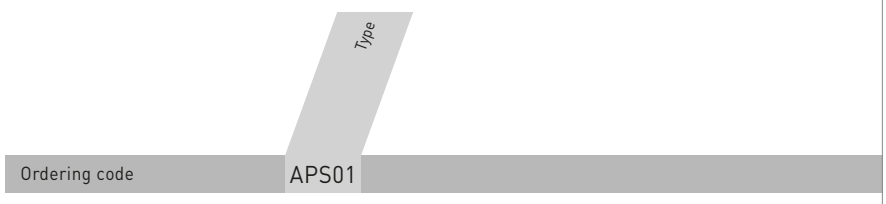
Operating Conditions

Temperature	Operation: 0 to + 60 °C; storage and transport -40 to +70 °C
Relative humidity	Max. 95 % non-condensing

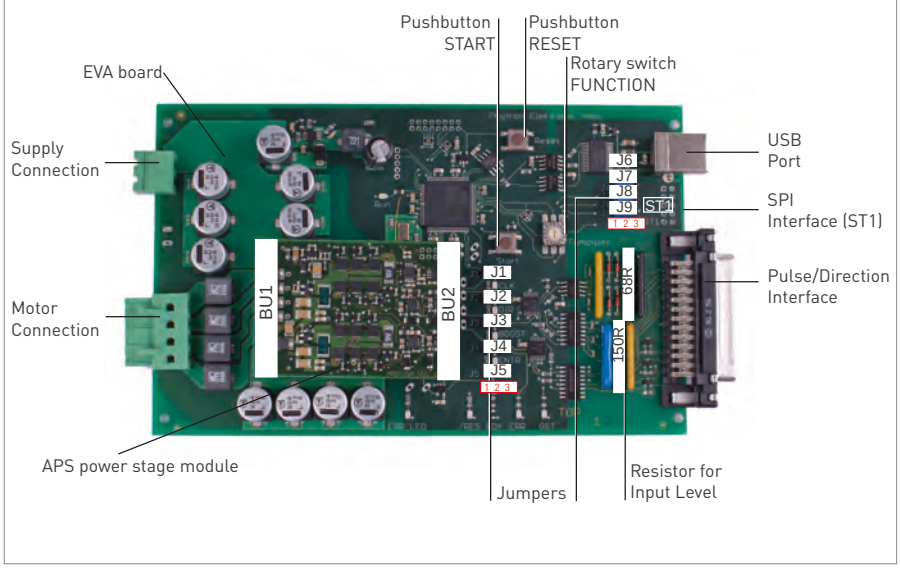
Development Environment

EVA-APS	Evaluation board for industry
APS-Arduino Shield	Application platform for research, hobby and art

Ordering Code



Evaluation board for APS Power Stage: EVA-APS



Functions

EVA-APS is an evaluation board for application development of the APS power stage and can be ordered as a bundle with the APS power stage.

- Online parameterising and diagnostics via USB
- Control via Control Pulses/Direction
- Two operating modes
- Input signals defined by jumpers
- Customised SPI interface
- ServiceBus-Comm software included

Operation/Connection

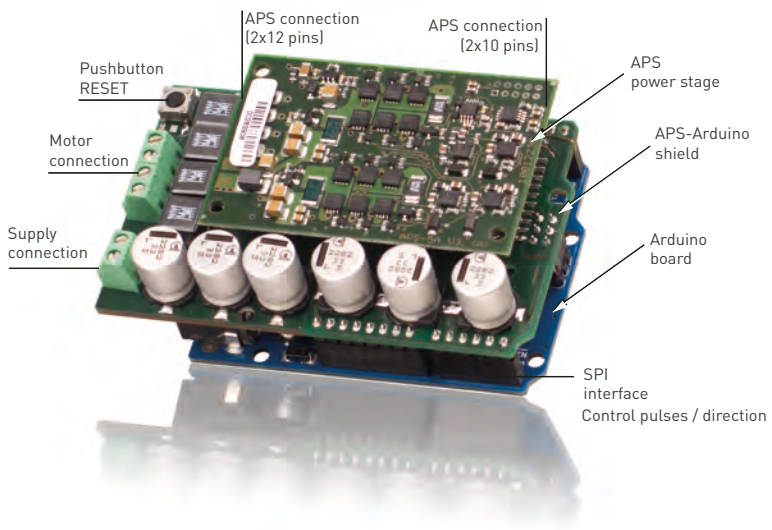
Motor voltage supply	24 V_{DC} to 70 V_{DC} Input range of supply of the power stages and to generate internal logic voltages
USB interface	For parameterising the APS power stage
Analogue outputs (motor)	A, B, C, D for a 2 phase stepper motor
SPI interface (ST1)	10-pole (2x5), pads for mounting a customised connector
Control pulses/direction interface	25-pole SUB-D connector female, opto-decoupled
PCB connectors 2x10 and 2x12 pins	2 mm grid; 0.5 mm pin Pins: 2x10 and 2x12 for APS power stage connection
2 Program pushbuttons	START: for motor running RESET: Reset of the settings
1 Rotary switch (Function)	Setting of the operating mode
9 Jumpers	For input signal specification

Ordering Code

Type	
Ordering code	EVA-APS (incl. APS)

Control

APS-Arduino Shield



Description

APS-Arduino shield is a development environment for the use of the APS power stage in research, prototyping, model making and art installations.

- APS power stage parameterising and diagnostics via SPI interface
- Control pulses/direction signal comes from the digital pins of the Arduino
- Download of the demo program and description from the phytron website
- Learn more about Arduino: www.arduino.cc

Operation/Connection

Motor voltage supply	24 V_{DC} to 70 V_{DC} Input range of supply of the power stage
Analogue outputs (motor)	A, B, C, D for a 2 phase stepper motor
SPI interface	For parameterising and diagnostics of the power stage
Control pulses/direction interface	Control pulses/direction signal from the digital pins of the Arduino
PCB connectors (APS) 2x10 and 2x12 pins	2 mm grid; 0.5 mm pin Pins: 2x10 and 2x12
Pushbutton	Reset of the Arduino

Ordering Code

Ordering Code	*Type* APS Shield (incl. APS)

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ENG www.phytron.eu/ZMXplus

ZMX+

Stepper motor power stage with ServiceBus

The ZMX+ is a plug-in stepper motor power stage for 19" sub-racks with ServiceBus for motor currents up to 9 A_{PEAK}.

Due to improved design and greatly reduced power dissipation, the ZMX+ provides reliable high-precision performance with minimised heat emission.

Parameters can be manually set by switches. The ServiceBus interface allows several additional adjustments.

Application

The ZMX+ is used in different fields of application: e.g. in inspection and test applications, labelling or packaging machines, in equipment manufacturing or in beamlines.

The ZMX+ version with a 32 pin VG connector is pin compatible with commercially available power stages. The optional ServiceBus connector is placed at the front.

Highlights

ServiceBus

ServiceBus Instruction

online setting of parameters during operation via USB, CAN, RS 485...

Integrated Driver

1/512 Microstep

precise power adjustment and fine positioning up to 1/512 microstep

El. Isolated

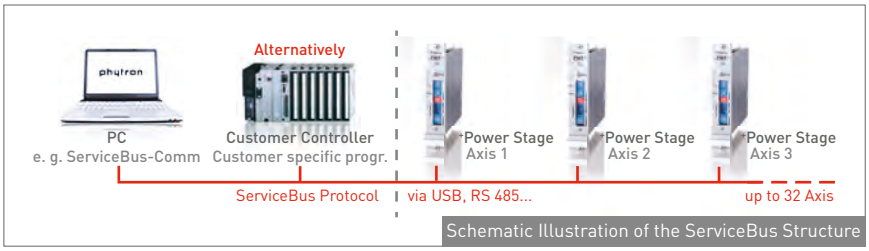
Electrical Isolation

with and without electrical isolation of the motor circuit

ServiceBus-Comm®

The royalty-free ServiceBus protocol with its extensive command set allows direct communication between phytron power stages and the PC or controller connected — even from a distance. That way not only start, stop and boost current but also parameters like current delay time can be set easily.

Our free Windows® software ServiceBus-Comm® allows to monitor and to adjust up to 32 axes while providing a comfortable and easy to use graphical interface.

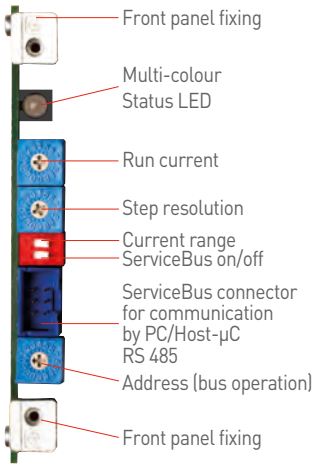


Schematic Illustration of the ServiceBus Structure

In Focus

Integrated Driver · ServiceBus · El. Isolated

- 19" sub-rack power stage for bipolar control of 2 phase stepper motors
- Up to 9 A_{PEAK} at 24 - 70 V_{DC}
- Up to 1/512 microsteps
- Parametrising and diagnostic online via ServiceBus — switches for basic adjustment
- Options:
  - 32/48 pin connector
  - With/without electrical isolation
  - With/without ServiceBus



Edition 2014 June

phytron
Beyond Steppers

Control

Specification

Mechanical

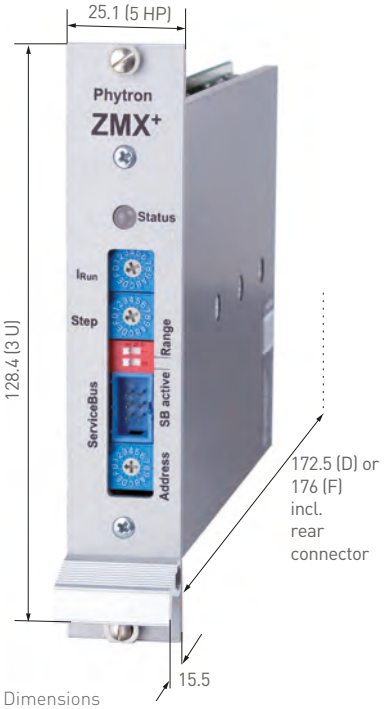
Design	Plug-in board for 19" sub-rack in the format 5HP x 3U x 160 mm
Dimensions (W x H x D)	Option with 32 pin VG connector: 25.1 (5HP) x 128.4 (3U) x 172.5 mm Option with 48 pin VG connector: 25.1 (5HP) x 128.4 (3U) x 176 mm
Weight	Approx. 450 g with front panel

Features

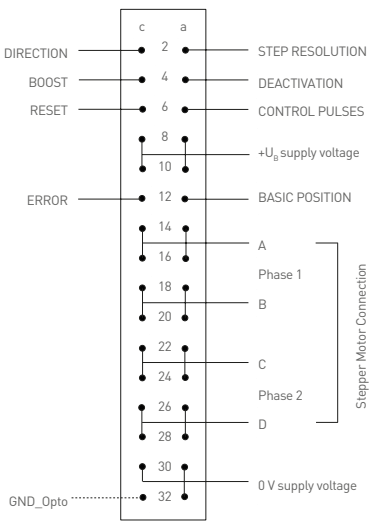
Stepper motors	Suitable for the control of 2 phase stepper motors with 4, (6) or 8 lead wiring
Supply voltage	24 to 70 V_{DC}
Phase current	2 x 9 A_{PEAK}
Adjustable current steps	**Rotary switch mode** 2 currents are selectable: 0 – 1.5 A_{PEAK} or 0 – 9 A_{PEAK} Run current is adjustable in 15 current steps, stop current is 50 %, boost current is 130 % of run current **ServiceBus mode (optional)** Run, stop and boost current from 0 - 9 A_{PEAK} in 100 mA stages
Adjustable step resolution	**Rotary switch mode** Full step, 1/2, 1/2.5, 1/4, 1/5, 1/8, 1/10, 1/16, 1/20 **ServiceBus mode (optional)** Full step, 1/2, 1/2.5, 1/4, 1/5, 1/8, 1/10, 1/16, 1/20, 1/32, 1/64, 1/128, 1/256, 1/512 Microstepping
Maximum step frequency	500,000 Hz control pulse frequency (pulse width > 1 µs)
Physical resolution:	**Without encoder:** Approx. 25,600 positions per revolution (in typical applications) **With encoder:** Precision of positioning approx. 102,400 positions per revolution with a a 200 step motor depending on the encoder (evaluating by a superior controller required)
Chopper frequency	Patented phytron chopper technology for a minimal heat loss in the motor and smooth rotation. Two chopper frequencies according to the current range: 25 kHz for currents 0 - 9 A 50 kHz for currents 0 - 1.5 A
Cable length	Motor : shielded: 50 m max. Signal: shielded: 100 m max.
Operating modes	Rotary switch mode and ServiceBus mode (optional)
Functional safety	Safety Integrity Levels, such as e. g. Safe Torque Off (STO) from IEC 61508-2 are not directly compatible
Diagnosable errors	Undervoltage error (< 22 V) Overtemperature error (T > 90 °C) Overcurrent and short circuit error (I > 30 A temporary)

Interfaces

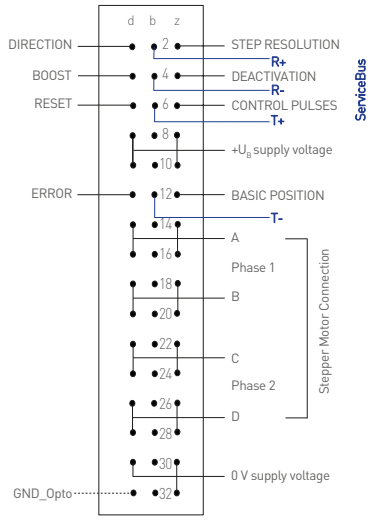
Inputs	Control pulses, direction, boost, deactivation, reset, step resolution (optional: inputs electrically isolated)
Outputs	A, B, C, D for a 2 phase stepper motor, basic position (opto-decoupled optional, type Open-Collector), ERROR (opto-decoupled optional, type Open-Collector)



Dimensions



32 pin VG connector DIN 41612, type D



48 pin VG connector DIN 41612, type F

Specification

Interfaces (continued)

Mechanical switches	Rotary switches for addressing up to 16 addresses DIP-switches for current range selection, ServiceBus activation (optional), output logic switch, overdrive activation and input logic switch
ServiceBus (optional)	phytron's power stage interface for parameterisation and diagnostic via RS 485

Communication and Programming

Diagnostic via Status LED	Ready, Busy, Fault, Reset/Disable
Parameter interface via ServiceBus (optional)	Run, stop, boost current, step resolution, current delay time, chopper frequency, define overdrive switch frequency, in- and output logic, prefe-rential direction, reset, deactivation,
Diagnostic interface via ServiceBus (optional)	Basic position, current setting, power stage temperature, power stage status, error check, intermediate circuit voltage
Programming	Phytron's ServiceBus-Comm® for Windows®

Operating Conditions

Temperature	Operation: +4 to +40°C, storage and transport: -25 to +85 °C
Relative humidity	85 % maximum non-condensing
Degree of pollution	Level 2
Protection class	IP 20 at operation in 19'' rack
Vibration / Shock protection	Acc. to EN 60068-2-6 Acc. to EN 60068-2-27/29
EMC immunity / EMC emission	Acc. to EN 61000-3-2 EMC Acc. to EN 61000-6-1, -3, -4: EMC and RFI immudity Acc. to EN6100-4-2...6, -11 immunity testing
Approval	CE

Plug-in power stage unit SLS-ZMX+

phytron delivers also fully assembled 19'' sub-rack modules with integrated power supply.

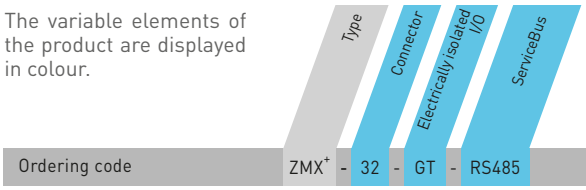
Up to 8 ZMX+ power stages are possible.

For more information look up www.phytron.eu/SLS

Control

Ordering Code

The variable elements of the product are displayed in colour.



Options		
Connector	32 48	32-pin VG connector DIN 41612 (D) 48-pin VG connector DIN 41612 (F)
Electrically isolated I/O	GT	with electrical isolation without electrical isolation
ServiceBus	RS485	ServiceBus via RS 485 without ServiceBus

Extent of Supply

- Free ServiceBus-Comm® software for the ZMX+ with ServiceBus

Optional Accessories

- Front panel Al 2.5 mm, with handle
- ServiceBus cable
- Mini USB RS 485 converter

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MCD+

Compact stepper motor power stage with ServiceBus

The MCD+ is a bipolar power stage for driving 2 phase stepper motors. The operation parameters - phase currents, step resolution and preferential motor direction - are programmable by rotary switches or in the ServiceBus mode.

The MCD+ is designed for power supplies from 24 to 70 V_{DC}.

The control pulse, motor direction, boost, activation and reset inputs are compatible with push-pull or open collector signals. The control inputs are electrically insulated from the supply and motor voltage.

A special feature of the MCD+ offers 3 terminals for each signal input. Thus separate input terminals for 5 V and 24 V are available.

Application

The MCD+ is suitable for up to 450 Watts of shaft power that is ideal for controlling spindle and toothed belt drive systems for mechanical handling or assembly applications. The high step resolution makes the MCD+ the best solution for applications that have especially high demands on precision, smoothness and durability.

Highlights

Rotary switch mode

The run and the stop current can be changed between two ranges by the current range switch. These phase currents can be set in 15 increments up to 9 A_{PEAK}. In this operating mode the step resolution can be adjusted from full step up to 1/20 step.

Compact design

The complete device plus wall mounting brackets measures only 127 x 38 x 110 mm.

ServiceBus instructions

Online parameterisation even during operation via USB, RS485...

ServiceBus mode

All settings are entered at the PC, which is easy to do with the free phytron software ServiceBus-Comm® for Windows®.

In the ServiceBus mode the phase currents can be programmed in 100 mA increments, the step resolution from full step to 1/512 step and the current delay time from 1 to 1000 ms.


ServiceBus-Comm®

In Focus


El. Isolated


ServiceBus

- Stepper motor power stage for bipolar control of 2 phase stepper motors
- Up to 9 A_{PEAK} at 24 tp 70 V_{DC}
- Up to 1/512 step resolution
- Online power stage parameterisation and diagnostic via ServiceBus
- Inputs and outputs are electrically separated
- Option: mounted USB-RS 485 converter
- Free available parameterisation and diagnosis tool ServiceBus-Comm®

Edition 2012 July

phytron
Beyond Steppers

Control

Specification

Mechanical

Dimensions (W x H x D)	38 x 127 x 110 mm incl. connectors at the back plane
Weight	650 g
Mounting	DIN rail and wall, vertically inside a cabinet is recommended

Features

Stepper motors	Suitable for the bipolar control of 2 phase stepper motors with 4, (6) or 8 lead wiring
Supply voltage	24 to 70 V_{DC}
Phase currents	Up to 9 A_{PEAK} **Rotary switch mode:** Current range selectable by rotary switch: Rotary switch position: **I:** 0.4 to 3 A_{PEAK} ,**II:** 1.1 to 9 A_{PEAK} **ServiceBus mode:** Programmable values: 0.1 to 9 A_{PEAK}
Step resolution	**Rotary switch mode:** 1/1, 1/2, 1/4, 1/8, 1/10, 1/20 of a full step **ServiceBus mode:** 1/1, 1/2, 1/4, 1/8, 1/10, 1/16, 1/20, 1/32, 1/64, 1/128, 1/256, 1/512 of a full step
Cable length	Motor : shielded: 50 m max. Signal: shielded: 100 m max
Operating modes	Rotary switch mode and ServicBus mode (optional)
Diagnosable errors	Under-/overvoltage (< 20 V_{DC} or > 85 V_{DC}), overtemperature (T > 85 °C), overcurrent, short circuit

Interfaces

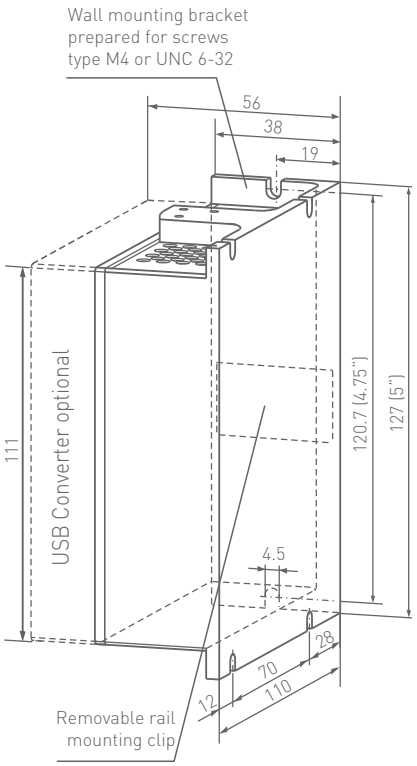
Analogue outputs	A, B, C, D for a 2 phase stepper motor
Digital outputs	Optically insulated from the motor voltage, type Open-Collector I_{max} = 20 mA, U_{max} = 30 V, P_{total} = 300 mW, $U_{CE\ sat}$ at 20 mA < 1 V Error: short circuit, overvoltage, overtemperature, undervoltage, overcurrent
Connection	ServiceBus: RS 485, optional USB-RS 485 converter
Inputs	Optically isulated from the motor voltage; control via push-pull driver or Open Collector; input level 5 V or 24 V: Control pulses, Motor direction, Boost, Activation, Reset

Communication and Programming

Rotary switch mode	Setting of run and stop current, step resolution and current shape
DIP switches	Setting of overdrive and boost function, activation and preferential motor direction
Diagnostic by LED	Basic position, overload, supply failure, overtemperature

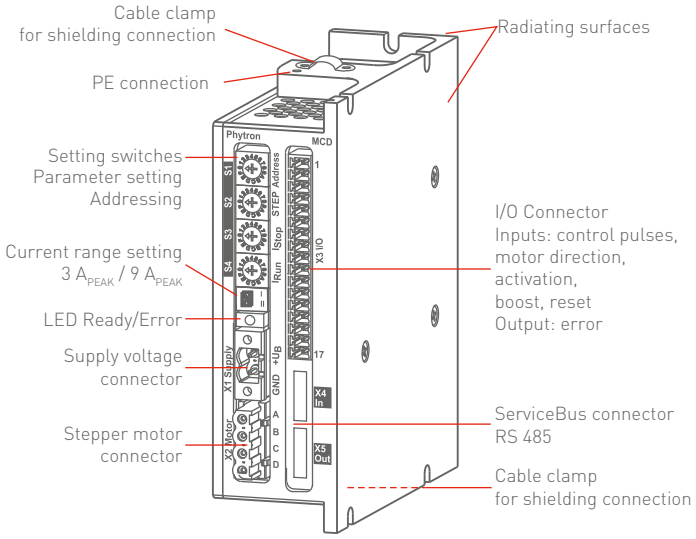
Operating Conditions

Temperature	Operation: +4 to +40 °C, storage: –25 to +55 °C, transport: –25 to +85 °C
Degree of pollution	Level 2
Relative humidity	5 – 85 %. class 3K3 non condensing
Protection class	IP 20
EMC immunity / EMC emission	Acc. to EN 61000-3-2: EMC Acc. to EN 61000-6-1, 2, 3, 4: EMC and RFI immunity
Approval	CE

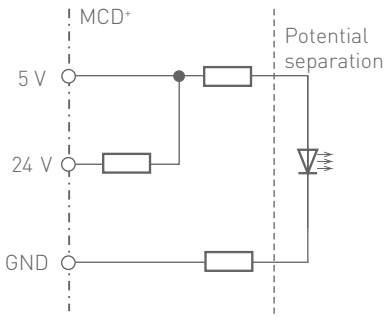


Dimensions in mm (inch)

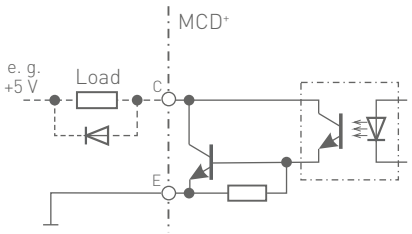
Front View



Input Wiring



Output Wiring

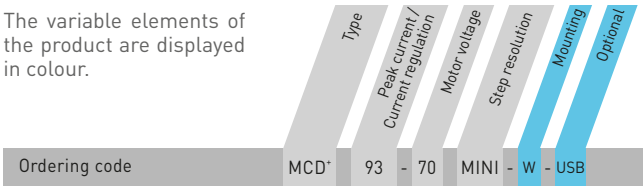


In case of connection of highly inductive equipment (e. g. relay, motor brake), a protective diode must be wired to each output.

Control

Ordering Code

The variable elements of the product are displayed in colour.



Options		
Mounting	W H	Wall mounting With attached DIN rail mounting clip
Optional	 USB	 Standard stepper motor power stage with ServiceBus Stepper motor power stage with USB-RS 485 converter

Extent of Supply

- Connector set
- A CD-ROM with ServiceBus-Comm software and USB driver

Optional Accessories

- Rail mounting assembly set with rail mounting clip attached to the housing
- ServiceBus cable
- USB cable
- Mini USB-RS 485 converter
- Power supply PS 5-48 or 10-24 for wall- or rail mounting

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ENG www.phytron.eu/MSX

CONTROL

MSX

Stepper motor power stage for bipolar control

The MSX is a power stage for bipolar control of 2 phase stepper motors. The power stage is available in three power ranges with 5, 10 or 15 A_{PEAK} maximum phase current.

Besides full and half step the MSX provides a resolution up to 1/20 MINI Step.

The setting switch provides several phase current profile settings:

- full step (conventional)
- half step
  - without / with torque compensation
  - without / with Current Shaping
- 1/4 - 1/20 step
  - without / with Current Shaping
  - with Current Shaping and BLOW UP.

The current regulation by the patented SYNCHROCHOP principle ensures a smooth operation of the stepper motor and the torque for optimum use.

The MSX is suitable to replace the well-tried older phytron power stages MSO, MSO and SMD.

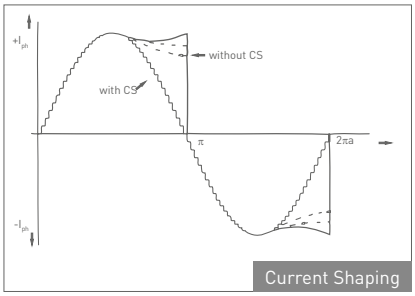
Application

As a powerful stepper motor power stage the MSX is suitable for up to 800 Watts shaft power, especially for the handling of discrete components and machine service tasks as well as for high-throughput sorting and assembly machinery.

Highlights

Current Shaping

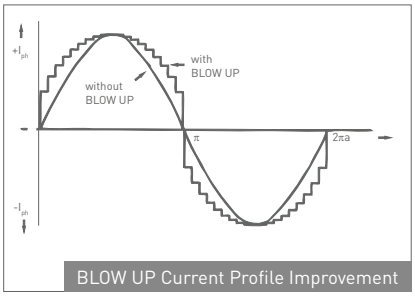
The CS (Curent Shaping) function allows adapting the actual current shape to the selected current curve over a wide frequency range.



Current Shaping

BLOW UP

Improvement of run and acceleration behaviour can be achieved - dependent on the motor type - by the current shape optimising BLOW UP function.



BLOW UP Current Profile Improvement

In Focus

El. Isolated

- Stepper motor power stage for bipolar control of 2 phase stepper motors
- 3 power ranges: 5 / 10 / 15 A_{PEAK}
- Supply voltage 60 to 120 V_{DC} (permissible range 40 to 160 V_{DC})
- DIP switches for Overdrive and Boost functions, Activation and Preferential Motor Direction
- Step resolution from full step to 1/20 step

Edition 2012 July

phytron
Beyond Steppers

Control

Specification

Mechanical

Dimensions (W x H x D)	70.8 (14HP) x 128.4 (3U) x 188 mm
Weight	Approx. 970 g
Mounting	Designed for installation into 19"/3U sub-racks, 32 pin connector acc. to DIN 41612, version D

Features

Stepper motors	Suitable for the control of 2 phase stepper motors with 4, (6) or 8 lead wiring
Power range, Phase currents	MSX 52-120: max. 5.1 A_{PEAK} MSX 102-120: max. 10.3 A_{PEAK} MSX 152-120: max. 15.4 A_{PEAK}
Supply voltage	60 to 120 V_{DC} (permissible range 40 to 160 V_{DC})
Adjustable step resolution	Full step, half step, 1/4, 1/10, 1/20 of a full step, with and without torque balance
Cable length	Motor : shielded: 50 m max. Signal: shielded: 100 m max.
Diagnosable errors	Over-/undervoltage (< 40 V_{DC} or > 160 V_{DC}), overtemperature (T > 85 °C), overcurrent, short circuit

Interfaces

Analogue outputs	A, B, C, D for a 2 phase stepper motor
Digital outputs	Optically isulated from the motor voltage, type Open-Collector Darlington; I_{max} = 20 mA, U_{max} = 45 V, UCE_{sat} at 20 mA < 0.6 V $\overline{\text{Basic position}}$, Error
Inputs	All inputs include an optocoupler with series resistors for 5 V or 24 V supply voltage: $\overline{\text{Control pulse}}$, Motor direction, $\overline{\text{Boost}}$, $\overline{\text{Activation}}$, $\overline{\text{Reset}}$ (can be enabled by a jumper)

Communication and Programming

Rotary switches	Setting of run and stop current, step resolution and current shape
DIP switches	Setting of Overdrive and Boost function, Activation and preferential motor direction
Diagnostic by LED	Basic position, overload, supply failure, overtemperature

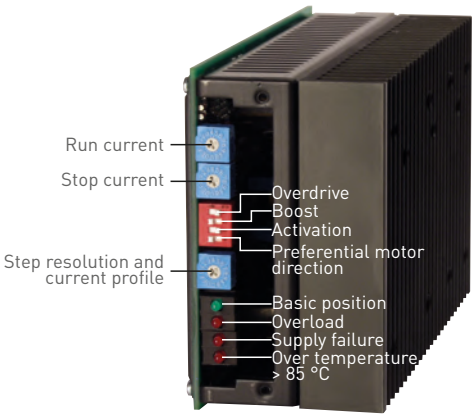
Operating Conditions

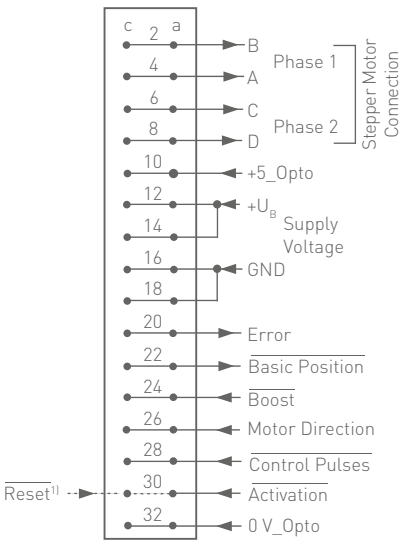
Temperature	Operation: +4 to +40 °C (we suggest additional cooling with higher operating temperatures) Storage: –25 to +55 °C Transport: –25 to +85 °C
Degree of pollution	Level 2 acc. to EN 50178
Relative humidity	5 – 85 %. class 3K3 non condensing
Protection class	IP 20
EMC immunity / EMC emission	Acc. to EN 50178: high-voltage current Acc. to EN 61000-6-1, 2, 3, 4: EMC and RFI immunity
Approval	CE

Design: plug-in board for 19" sub-rack
Euro-size 100 x 160 mm

Dimensions in mm

Front View





[1] **Standard version MSX (5 V)**
Activation signal: pin 30a and c

Version MSX (5 V-Reset) with Reset input
Activation: pin 30a / Reset: pin 30c

Pin Assignment

Power Supply Unit SLS-MSX

phytron also delivers fully assembled 19"rack plug-in units with integrated power supply and optional cooling fan tray.

Up to 4 MSX power stages are possible.

Control

Design Versions

The MSX (120 V type) is available with different phase currents and replaces the following well-tried phytron power stages:

MSX 52 (5 V) MSX 102 (5 V) MSX 152 (5 V)	Standard, replacement for MSO and MSOMINI
MSX 52 (24 V) MSX 102 (24 V) MSX 152 (24 V)	Replacement for SMD
MSX 52 (5 V Reset) MSX 102 (5 V Reset) MSX 152 (5 V Reset)	Additional Reset input (jumper plugged)

Ordering Code

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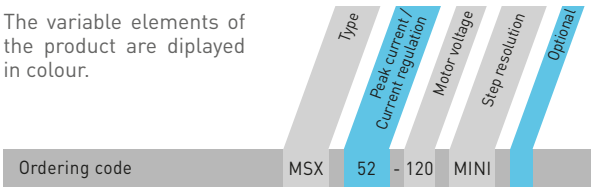

Options		
Peak current / Current regulation	52 102 152	Peak current 5.1 A with SYNCHROCHOP current regulation Peak current 10.3 A with SYNCHROCHOP current regulation Peak current 15.4 A with SYNCHROCHOP current regulation
Optional	 Reset 24 V	Standard MSX (5 V): without additional designation Reset input activated, 5 V input level 24 V input level

Optional Accessories

- Front panel (14 HP) with handle
- Mating connector with 32 pin connector
- G-MSX adapter board for easy mounting the MSX, with connectors for motor cable, signal leads and supply voltage
- Damping SB 234 module for 90 V
- Damping SB 234 module for 120 V

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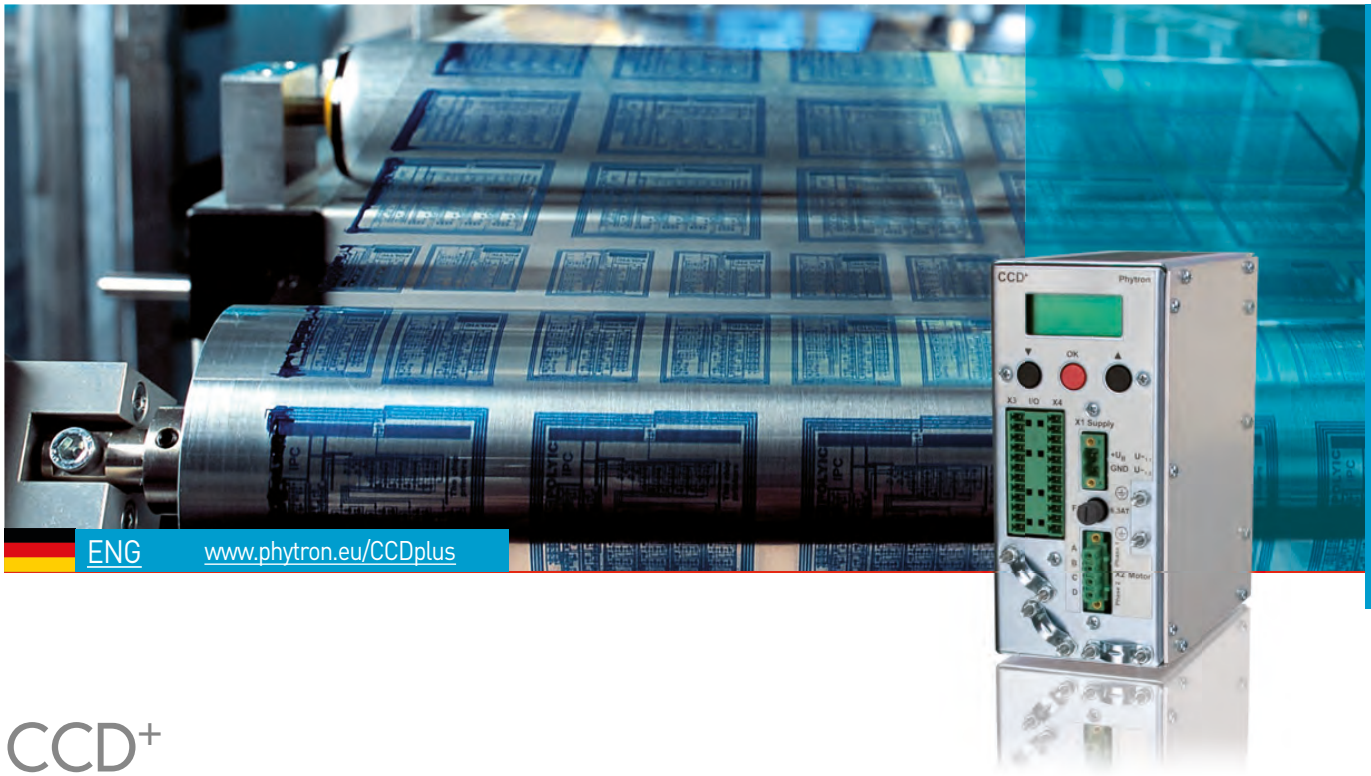


ENG www.phytron.eu/CCDplus

CONTROL

CCD+

Stepper motor power stage with plain text display

The CCD+ is a stepper motor power stage with plain text display, designed for driving 2 phase stepper motors up to 9 A peak current. The step resolution is entered by menu or via ServiceBus from full step to 1/20 step, this corresponds to 200-4000 positions per revolution for a 200 stepper motor.

All phytron power stages with the appendum + are particularly service-friendly by the way to access directly from the PC to the power stage via ServiceBus. Configuration, parameterisation or monitoring are facilitated by the delivered ServiceBus-Comm® software for Windows®.

Application

The CCD+ is particularly suitable for applications that require a parameter-control and adjustment of the device. The integrated display and the control via ServiceBus offer at any time comfortable and fast access to the performance parameters of the power stage and make the CCD+ to a optimal power stage for applications with changing requirements as the semiconductor assembly or component tests.

Highlights

ServiceBus-Comm®

ServiceBus-Comm®

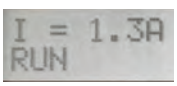
The free Windows® software program ServiceBus-Comm® is developed by phytron and allows easy programming and operation of stepper motor power stages.

Operation and other parameters are configured, stored and transmitted to the power stage on the PC via the ServiceBus.

Plain text display with menu buttons

The CCD+ can be conveniently operated via menu buttons on the front panel or from your PC using the ServiceBus.

A Setup and test menu make a simple parameter input possible. Active parameters and diagnostic information are displayed during operation.



Plain text display

In Focus

ServiceBus El. Isolated

- Bipolar control of 2 phase stepper motors
- Phase currents from 0,14 to 9 A_{PEAK}
- Power supply 50 to 70 V_{DC} Permissible range: 17 to 50 V_{AC} or 24 to 70 V_{DC} (input logic 5 V or 24 V)
- Step resolution up to 1/20 step
- ServiceBus interface: USB point-to-point
- ServiceBus-Comm® communications and operation software for WINDOWS® (included in delivery)
- Inputs compatible to RS 422 for safe operation
- Plain text display 2 x 8 digits for menu-driven operation parameter input
- Compact design 70 x 150 x 127 mm
- Userfriendly screw connectors
- Fully EMC compliant metal housing
- Integrated EMC filter for supply voltage
- DIN rail or wall mounting
- Prepared for mounting an external 24 V fan

Edition 2012 July

phytron
Beyond Steppers

Control

Specification

Mechanical

Dimensions (W x H x D)	70 x 150 x 127 mm
Weight	Ca. 1100 g
Mounting	Wall or DIN rail mounting

Features

Stepper motors	Suitabe for bipolar control of 2 phase stepper motors with 4-, (6-) or 8 lead wiring
Power supply	17 to 50 V_{AC} or 24 to 70 V_{DC}
Phase currents	0,14 to 9 A_{PEAK}
Step resolution	1/1, 1/2, 1/2,5, 1/4, 1/5, 1/8, 1/10 or 1/20 of a full step
Hardware error detection	• Short circuit (between phase and power supply; between both phases; within a motor against ground) • Over temperature • Under voltage
Cable length	Motor: shielded: 50 m max. Signal: shielded: 100 m max.
Plain text display	Menu-driven input on the front side of the power stage
Power stage operating modes	Menu-driven, ServiceBus or bus mode exclusive

Interfaces

Analogue output	A, B, C, D for a two 2 phase stepper motor
Digital outputs	Optically insulated from the motor voltage, type Open-Collector: I_{max} = 20 mA, U_{max} = 30 V, $U_{CE\ sat}$ at 20 mA < 1 V, P_{total} = 300 mW Ready Error: short circuit, under voltage, over temperature
Inputs	Optically insulated from the motor voltage control via push-pull driver or Open Collector, input level 5 V or 24 V Control pulses, Motor direction, Boost, Activation, Deselect, Reset

Communication and Programming

Plain text display	2 x 8 digits for menu-driven input
ServiceBus (optional)	Configuration- and diagnostic interface via USB point-to-point

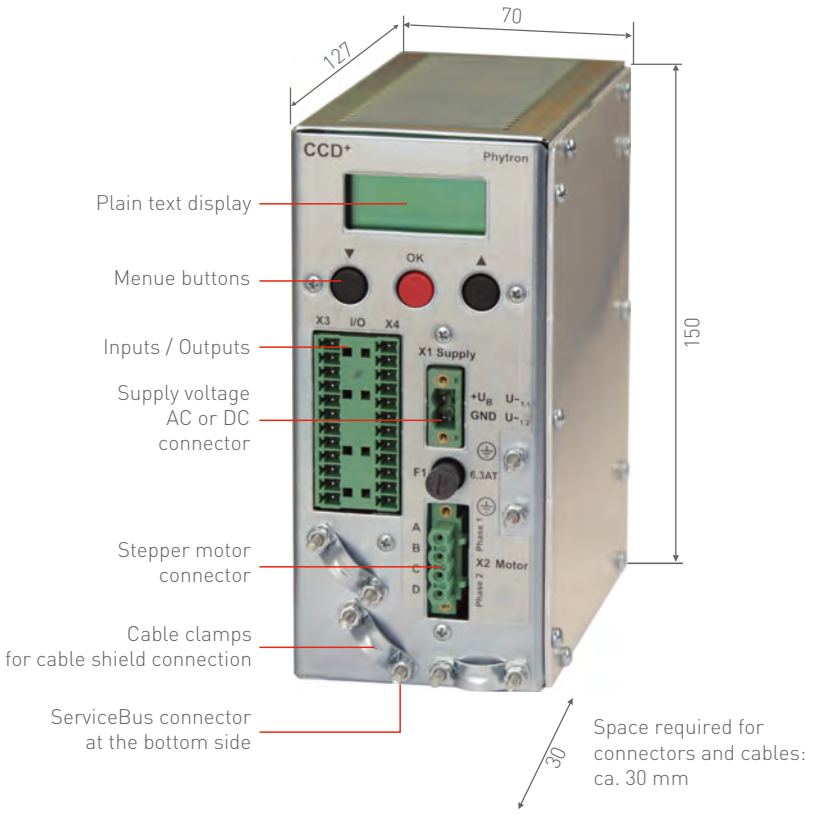
Operating Modes

Menu-driven	Adjusting the operating parameters in the SETUP menu; Function: S-BUS=DISABLED
ServiceBus	S-BUS=ENABLED in the SETUP menu activates the ServiceBus
Bus mode exclusive	Garantees a safe operation in the ServiceBus mode; activation by the „PX“command in the ServiceBus-Comm

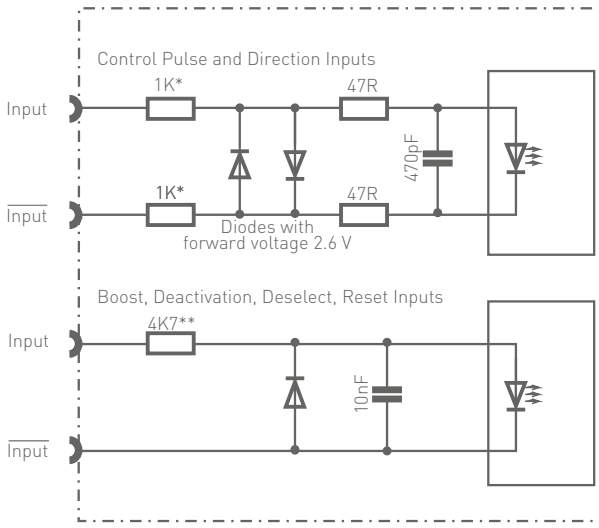
Operating Conditions

Temperatures	Operation: +5 to 40 °C; storage: -25 to +55 °C; transport: -25 to +50 °C
Degree of pollution	Level 2
Relative humidity	5 to 85 %, class 3K3 non condensing
Protection class	IP 20
EMC immunity/ EMC emission	Acc. to EN 61000-3-2 EMC Acc. to EN 61000-6-1, -2, -3, -4 EMC and RFI immunity
Approval	CE

Front View and Dimensions

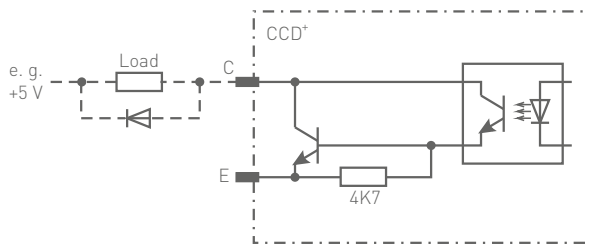


Input Wiring Diagram



The above resistance values are valid for 24 V input level.
At 5 V the following values are valid: * = 64 R
** = 145 R

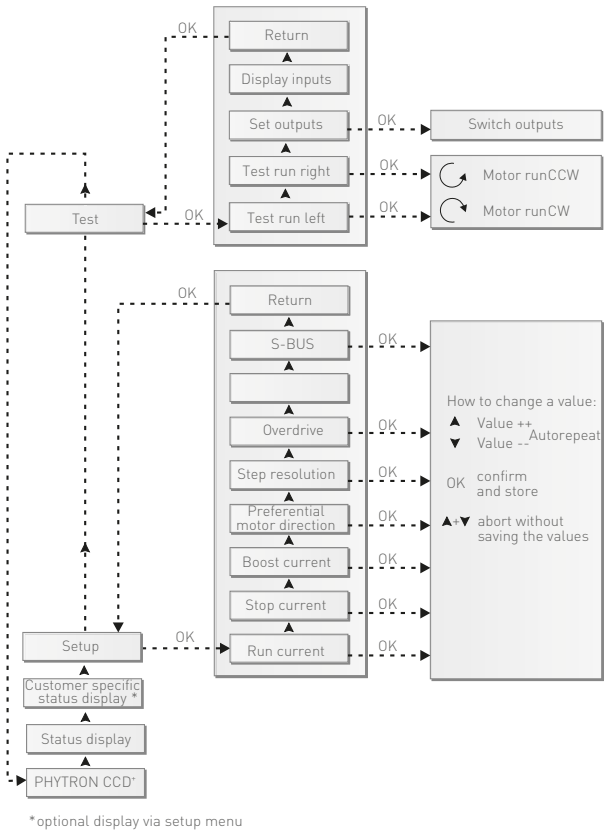
Output Wiring Diagram



In case of inductive loads (for example a relay, motor brake) protective diods must be mounted!

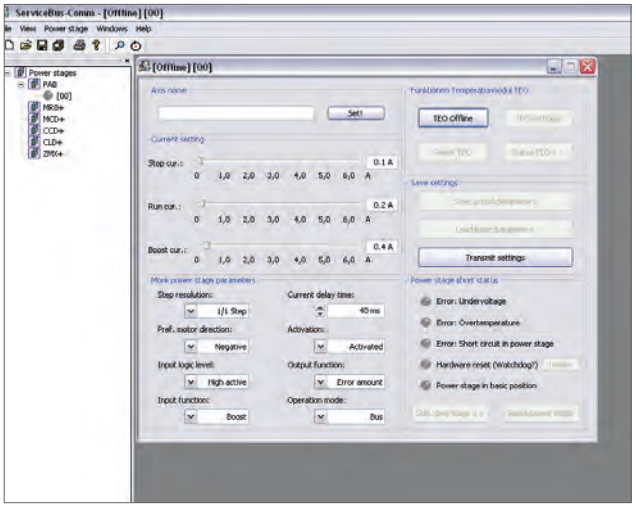
Control

Operating mode Menu



*optional display via setup menu

Operating mode ServiceBus



Ordering Code

The variable elements of the product are displayed in colour.

	Type		Current/-regulation		Motor voltage		Step resolution		Mounting		Input level
Ordering code	CCD+	-	93	-	70		MINI	-	H	-	5

Options		
Mounting	W H	Wall mounting With attached DIN rail mounting clip
Input level	5 24	5 V 24 V

Windows® is a trade mark of Microsoft.

ServiceBus-Comm® is a trade mark of Phytron GmbH.

Extent of Supply

- A CD-ROM with ServiceBus-Comm software and USB driver
- Connector set

Optional Accessories

- Fan Papst 614 / 24 V_{DC}
- Rail mounting assembly
- USB cable (A-B connection) 200 cm
- Power supply PS 5-48 (5 A, 48 V) for wall- or DIN rail mounting
- Power supply PS 10-24 (10 A, 24 V) for wall- or DIN rail mounting

Phytron GmbH

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CONTROL

CLD+

Linear stepper motor power stage with plain text display

The CLD+ is a linear stepper motor power stage with plain text display, designed for driving 2 phase stepper motors up to 2 A peak current. The step resolution is entered by menu or via ServiceBus from full step to 1/512step. This corresponds to 200 - 102,400 positions per revolution for a 200 stepper motor.

All phytron power stages with the appendum + are particularly service-friendly by the option to access directly from the PC to the power stage via ServiceBus. Configuration, parameterisation or monitoring are facilitated by the delivered ServiceBus-Comm® software for Windows®.

Application

Due to the linear structure EMC emissions are reduced to a minimum. CLD+ is the most recommendable power stage fot extreme applications where sensitive measurements could suffer from noise emission.

In Focus

ServiceBus | El. Isolated | Low Noises

- Linear control of 2 phase stepper motors
- Phase currents from 0.14 to 2 A_{PEAK}
- Power supply 24 to 48 V_{DC} (input logic 5 V or 24 V)
- Step resolution up to 1/512 step
- ServiceBus interface: USB point-to-point
- ServiceBus-Comm® communications and operation software for WINDOWS® (included in delivery)
- Plain text display 2 x 8 digits for menu-driven operation parameter input
- Compact design 70 x 150 x 127 mm
- Userfriendly screw connectors
- Fully EMC compliant metal housing
- Integrated EMC filter for supply voltage
- DIN rail or wall mounting
- Prepared for mounting an external 24 V fan

Highlights


ServiceBus-Comm®

ServiceBus-Comm®

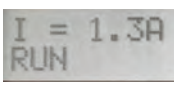
The free Windows® software program ServiceBus-Comm® is developed by phytron and allows easy programming and operation of stepper motor power stages.

Operation and other parameters are configured, stored and transmitted to the power stage on the PC via the ServiceBus.

Plain text display with menu buttons

The CLD+ can be conveniently configurated via menu buttons on the front panel or from your PC using the ServiceBus.

A Setup and test menu make a simple parameter input possible. Active parameters and diagnostic information are displayed during operation.



Plain text display

Edition 2013 February

phytron
Beyond Steppers

Control

Specification

Mechanical

Dimensions (W x H x D)	70 x 150 x 127 mm
Weight	Ca. 1100 g
Mounting	Wall or DIN rail mounting

Features

Stepper motors	Suitabe for bipolar control of 2 phase stepper motors with 4-, (6-) or 8 lead wiring
Power supply	24 to 48 V_{DC}
Phase currents	0.14 to 2 A_{PEAK}
Step resolution	1/1, 1/2, 1/2.5, 1/4, 1/5, 1/8, 1/10, 1/16, 1/20, 1/32, 1/64, 1/128, 1/256 or 1/512 of a full step
Hardware error detection	• Short circuit (between phase and power supply; between both phases; within a motor against ground) • Over temperature • Under voltage
Cable length	Motor: shielded: 50 m max. Signal: shielded: 100 m max.
Plain text display	Menu-driven input on the front side of the power stage
Power stage operating modes	Menu-driven, ServiceBus or bus mode exclusive

Interfaces

Analogue output	A, B, C, D for a 2 phase stepper motor
Digital outputs	Optically insulated from the motor voltage, type Open-Collector: I_{max} = 20 mA, U_{max} = 30 V, $U_{CE\ sat}$ at 20 mA < 1 V, P_{total} = 300 mW Ready Error: short circuit, under voltage, over temperature
Inputs	Optically insulated from the motor voltage control via push-pull driver or Open Collector, input level 5 V or 24 V Control pulses, Motor direction, Boost, Activation, Deselect, Reset

Communication and Programming

Plain text display	2 x 8 digits for menu-driven input
ServiceBus (optional)	Configuration- and diagnostic interface via USB point-to-point

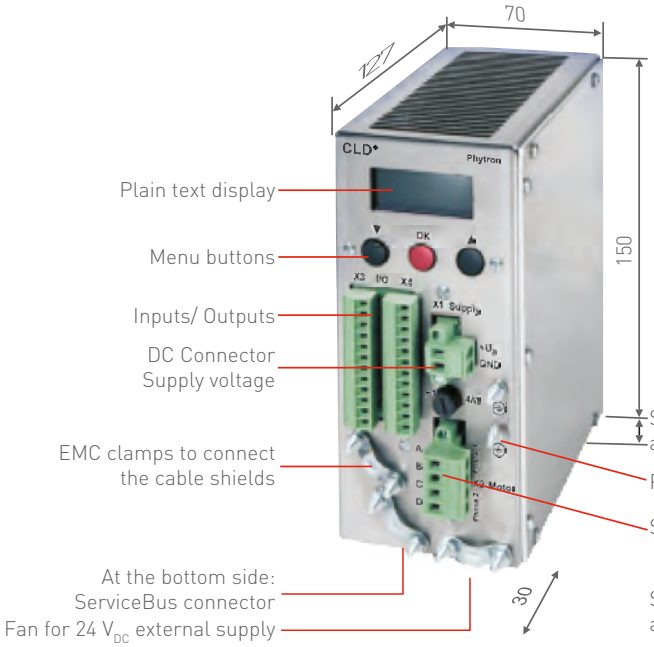
Operating Modes

Menu control	Adjusting the operating parameters in the SETUP menu; Function: S-BUS=DISABLED
ServiceBus	S-BUS=ENABLED in the SETUP menu activates the ServiceBus
Bus mode exclusive	Locks the operation using the menu control

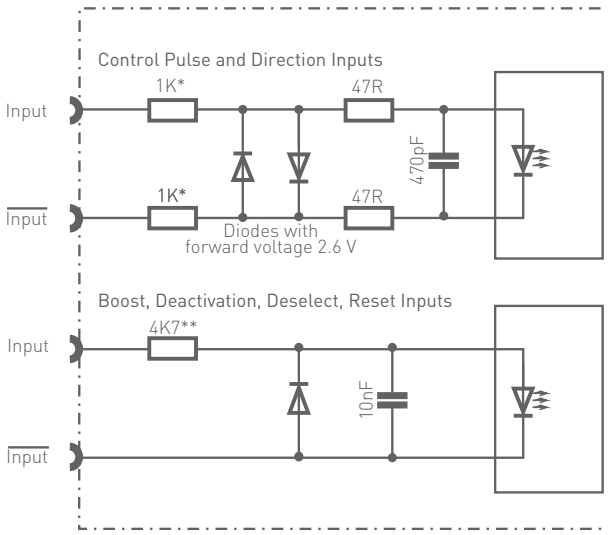
Operating Conditions

Temperatures	Operation: +4 to 50 °C; storage: -25 to +55 °C; transport: -25 to +50 °C
Degree of pollution	Level 2
Relative humidity	5 to 85 %, class 3K3 non condensing
Protection class	IP 20
EMC immunity/ EMC emission	Acc. to EN 61000-3-2 EMC Acc. to EN 61000-6-1, -2, -3, -4 EMC and RFI immunity
Approval	CE

Front View and Dimensions

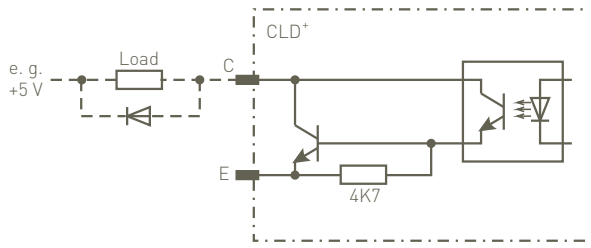


Input Wiring Diagram



The above resistance values are valid for 24 V input level.
At 5 V the following values are valid: * = 64 R
** = 145 R

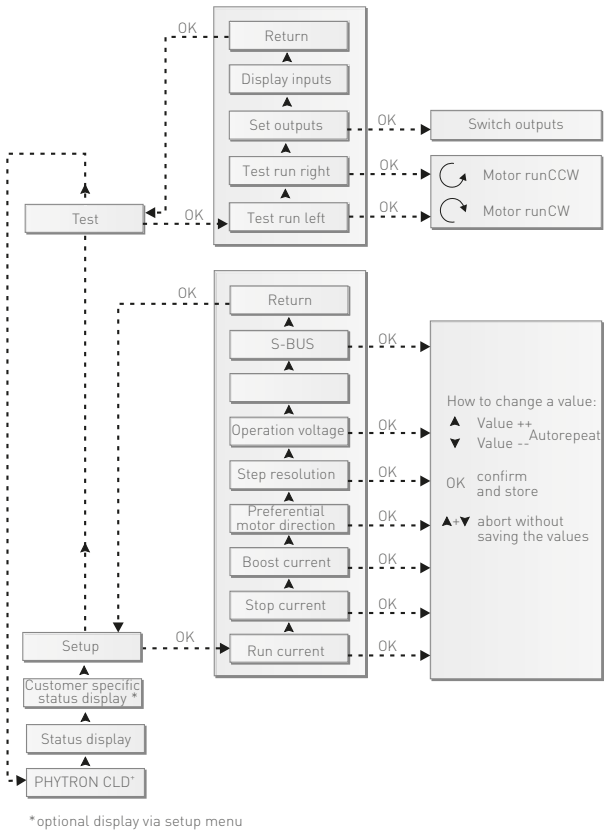
Output Wiring Diagram



In case of inductive loads (for example a relay, motor brake)
protective diods must be mounted!

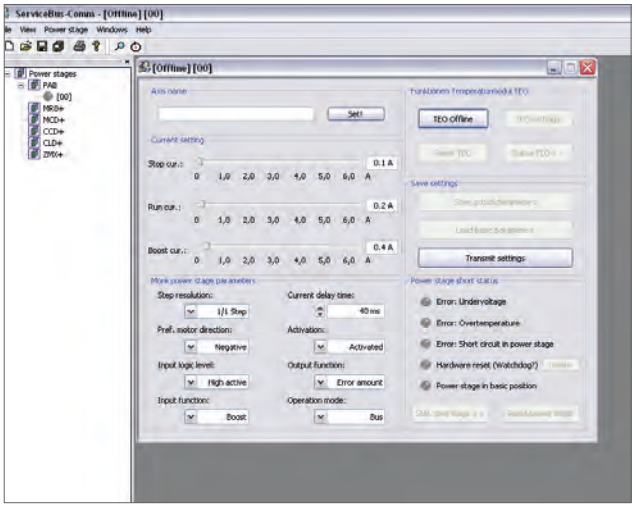
Control

Operating mode Menu



*optional display via setup menu

Operating mode ServiceBus



Ordering Code

The variable elements of the product are displayed in colour.

Ordering code	CLD+	20	-	48	MINI	-	H	-	5
		Type		Peak current	Motor voltage		Step resolution	Mounting	Input level

Options		
Mounting	W H	Wall mounting With attached DIN rail mounting clip
Input level	5 24	5 V 24 V

Windows® is a trade mark of Microsoft.

ServiceBus-Comm® is a trade mark of Phytron GmbH.

Extent of Supply

- A CD-ROM with ServiceBus-Comm software and USB driver
- Connector set

Optional Accessories

- Fan Papst 614 / 24 V_{DC}
- Rail mounting assembly
- USB cable (A-B connection) 200 cm
- Power supply SPH 240-4805 (5 A, 48 V) for wall- or DIN rail mounting
- Power supply SPH 240-2410 (10 A, 24 V) for wall- or DIN rail mounting

Phytron GmbH

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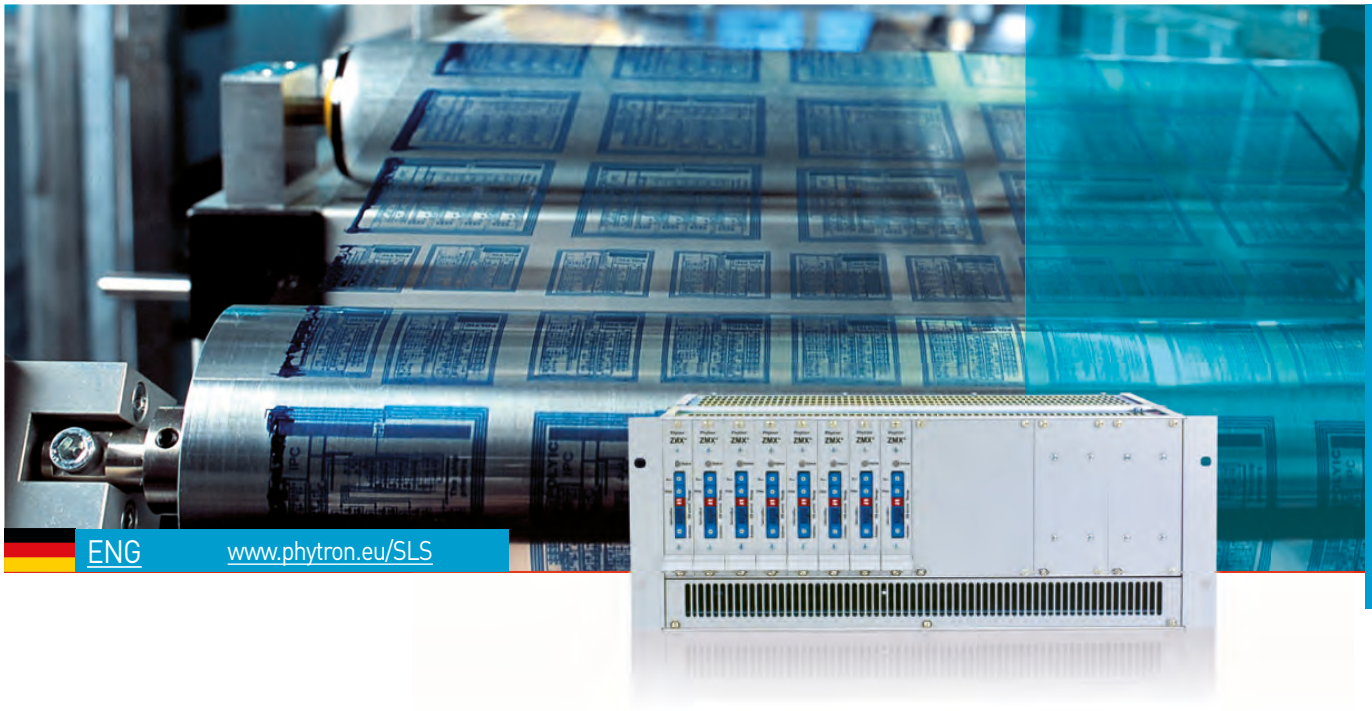


ENG www.phytron.eu/SLS

CONTROL

SLS

19“ sub rack for stepper motor controllers

Phytron's SLS housings are for up to 8 ZMX+ or 4 MSX stepper motor power stages with power supply.

Besides the standard designs we also offer individually configured units, which are designed with phytron's ZMX+ and MSX power stages for different stepper motor types.

Application

The SLS was conceived as an all-in-one solution oriented to satisfy the needs of our customers for a 19“ format:

Power suppy and fans are integrated into the housing according to the requirements in addition to the power stages. With up to 15 A_{PEAK} for each axis, the SLS is prewired, ready for connection, and ideal for demanding multi-axis applications like large manipulators, handling tasks, rapid prototyping or scientific experiments for example in the field of particle accelerators.

In addition, the SLS is the ideal extension for existing controller environments like our modular *phy*MOTION™ controller, the standard PLC systems or the PC cards with pulse outputs.

Highlights

Individually designed

The requirements for motor control systems are as individual as its applications.

Depending on customer requirements, the power supply unit is designed with modules and assemblies for signal conditioning and distribution.

Also, a selection of sockets and connectors, pin assignments and cabling are available according to requirements.

Additional functions, e.g. processing and transmission of encoder signals, control of motor brakes or the like can be integrated as needed into the SLS.

Examples

SLS with ZMX+ power stages and ServiceBus
Online parameterisation of the ZMX+ power stage during the operation via RS 485.

SLS with MSX high power stages
Phase currents 5 / 10 / 15 A_{PEAK} at 60 to 120 V_{DC} bus voltage.

Front view SLS 4 MSX

In Focus

ServiceBus

El. Isolated

- Plug-in 3U power Euromodule with power stages
- Integrated supply unit:
  115 V_{AC}, 230 V_{AC} or 400 V_{AC}
- Integrated housing fan and fuses
- Stepper motor power stages:
  ZMX+ with 40/70 V motor voltage and ServiceBus
  MSX with 60/120 V motor voltage
- Adjustments of the power stages on the front panel
- Interfaces on the rear:
  - Signal connectors
  - Motor connectors
  - Temperature sensitive switch for monitoring the transformer temperature
  - Communication connector: RS 232 or RS 485
  - Additional connectors according to customer requirements

Edition 2012 July

phytron
Beyond Steppers

Control

Specification

Mechanical

Dimensions (W x H x D)	19" (482.6 mm) x 4 U (177.1 mm) x 370 mm
Weight	Up to 30 kg , depending on the configuration
Mounting	Rack mounting

Features

Mains connection	115 V_{AC} , 230 V_{AC}, 400 V_{AC} +/- 10 %, 48 to 62 Hz
Power stages	1 to 8 ZMX+ with phase currents (with Boost) from either 0 to 1.5 A_{PEAK} or 0 to 9 A_{PEAK} 1 to 4 MSX with phase currents (with Boost) from 0 to 15.4 A_{PEAK} Custom design available
Stepper motors	Suitable for the control of 2 phase stepper motors with 4, (6) or 8 lead wiring
Cable length	Mains: 2 m max. Motor: shielded: 50 m max. Signal: shielded: 100 m max.

Interfaces

Signal connectors	Standard: 25-pole DSUB Optional: depending on the signal conditioning and distribution
Motor connectors	Standard: 6 pole connectors acc. to DIN 43652 Optional: according to customer specification
Optional connectors	For ServiceBus: RS 485, RS 232 For limit switch or Encoder connection For temperature sensitive switch for monitoring the mains transformer temperature For more customer specific applications

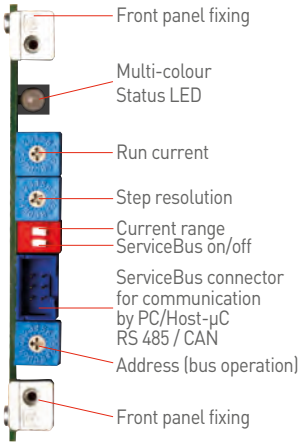
Communication and Programming

Diagnostics via Status LED of the power stages	Ready, Busy, Reset/Disable, Error diagnostics
Parameterisation via Service-Bus (optional)	Setting of all operating parameters of the ZMX+ power stage via ServiceBus interface
Operating software	Phytron ServiceBus-Comm® for Windows®

Operating Conditions

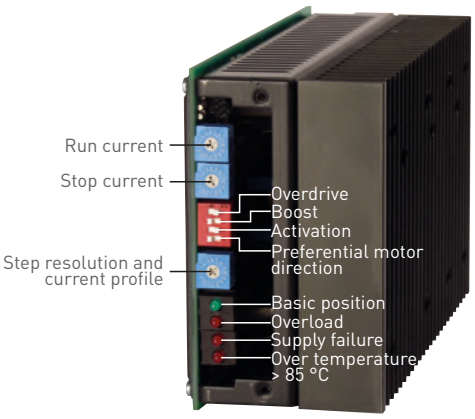
Temperature	Operation: +5 to +40 °C; storage and transport: -25 to +50 °C
Degree of pollution	Level 2
Relative humidity	5 to 85 %, class 2K3 non-condensing
Protection class	IP 20
EMC immunity / EMC emission	Acc. to EN 61000-3-2 Acc. to EN 61000-6-1, -3, -4 Acc. to EN6100-4-2...6, -11
Approval	CE

ZMX⁺ Power stage



- Stepper motor power stage for bipolar control of 2 phase stepper motors
- Up to 9 A_{PEAK} at 24 - 70 V_{DC}
- Up to 1/512 microsteps
- Switches for basic adjustment
- Parameterising and diagnostic online via ServiceBus
- Inputs: Control pulses, direction, boost, deactivation, reset, step resolution (optional: electrically isolated)
- Error ouput
- Options:
  - 32/48 pin connector
  - With/without electrical isolation
  - With/without ServiceBus

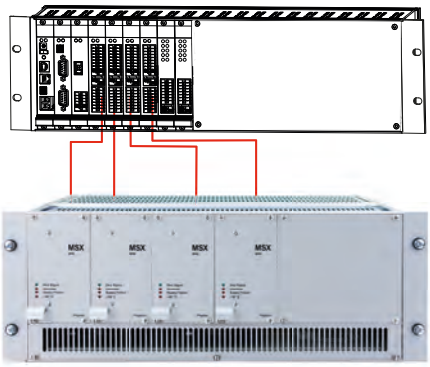
MSX Power stage



- Stepper motor power stage for bipolar control of 2 phase stepper motors
- 3 power ranges at 60 to 120 V_{DC}:
  - MSX 52-120: 5 A_{PEAK} max.
  - MSX 102-120: 10 A_{PEAK} max.
  - MSX 152-120: 15 A_{PEAK} max.
- Step resolution from full step to 1/20 step
- Run and stop current separately adjustable in 16 increments
- Selectable phase current profile settings: conventional, sinusoidal with Current Shaping or BLOW UP
- All inputs include an optocoupler with series for 5 V or 24 V input level: Control pulses, Motor direction, Boost, Activation, Reset (can be enabled by a jumper)
- Outputs: Basic position, Error

*phy*MOTION™

*phy*MOTION™



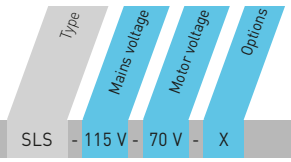
SLS 4 MSX

The SLS is optimally suited for use with high power stages in combination with the *phy*MOTION™ modular 19" sub rack mount controller.

Control

1 Ordering Code Basic Device

The variable elements of the product are displayed in colour.



+ Power stages 2a / 2b

Ordering code	SLS	- 115 V	- 70 V	- X

Options		
Mains voltage	115 V 230 V 400 V	Supply voltage of the SLS
Motor voltage	40 V 70 V 90 V 120 V	Motor voltage ZMX+ power stage Motor voltage ZMX+ power stage Motor voltage MSX power stage Motor voltage MSX power stage
Options	A AS P X	Signal connector IXE-A compatible Special signal connector IXE-A compatible Signal connector phyMOTION™ compatible Signal connector customised

Extent of Supply

- SLS- and power stage manual
- Mating connectors

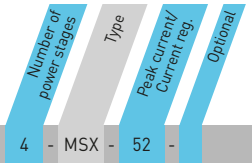
Optional Accessories

- For SLS-ZMX+ with ServiceBus:
  A CD with ServiceBus-Comm® software, USB driver (included in delivery)
- Cable assembly
- Mini USB-RS 485 converter

For information about mixed configurations (ZMX+ and MSX) please contact our sales team (sales@phytron.de).

2a Ordering Code Assembling wih MSX

The variable elements of the product are displayed in colour.

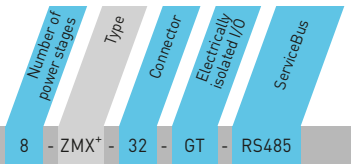


Ordering code	4	- MSX	- 52	-

Options		
Number of power stages	1 to 4	Number of installable MSX power stages
Peak current / Current regulation	52 102 152	5.1 A_{PEAK} with SYNCHROCHOP current regulation 10.3 A_{PEAK} with SYNCHROCHOP current regulation 15.4 A_{PEAK} mit SYNCHROCHOP current regulation
Optional	Reset 24 V	Standard MSX (5 V): without additonal designation Reset input activatd, 5 V input level 24 V input level

2b Ordering Code Assembling wih ZMX+

The variable elements of the product are displayed in colour.



Ordering code	8	- ZMX+	- 32	- GT	- RS485

Options		
Number of power stages	1 to 8	Number of installable ZMX+ power stages
Connector	32 48	32-pin VG connector DIN 41612 (D) 48-pin VG connector DIN 41612 (F)
Electrically isolated I/O	GT	with electrical isolation without electrical isolation
ServiceBus	RS485 CAN	ServiceBus via RS 485 ServiceBus via CAN without ServiceBus

Configuration Examples

SLS with
4 MSX high power stages

Phase currents 5 / 10 / 15 A_{PEAK} at 60 to 120 V_{DC} bus voltage.

SLS with
8 ZMX+ power stages and ServiceBus

Online parameterisation of the ZMX+ power stage during the operation via RS 485.

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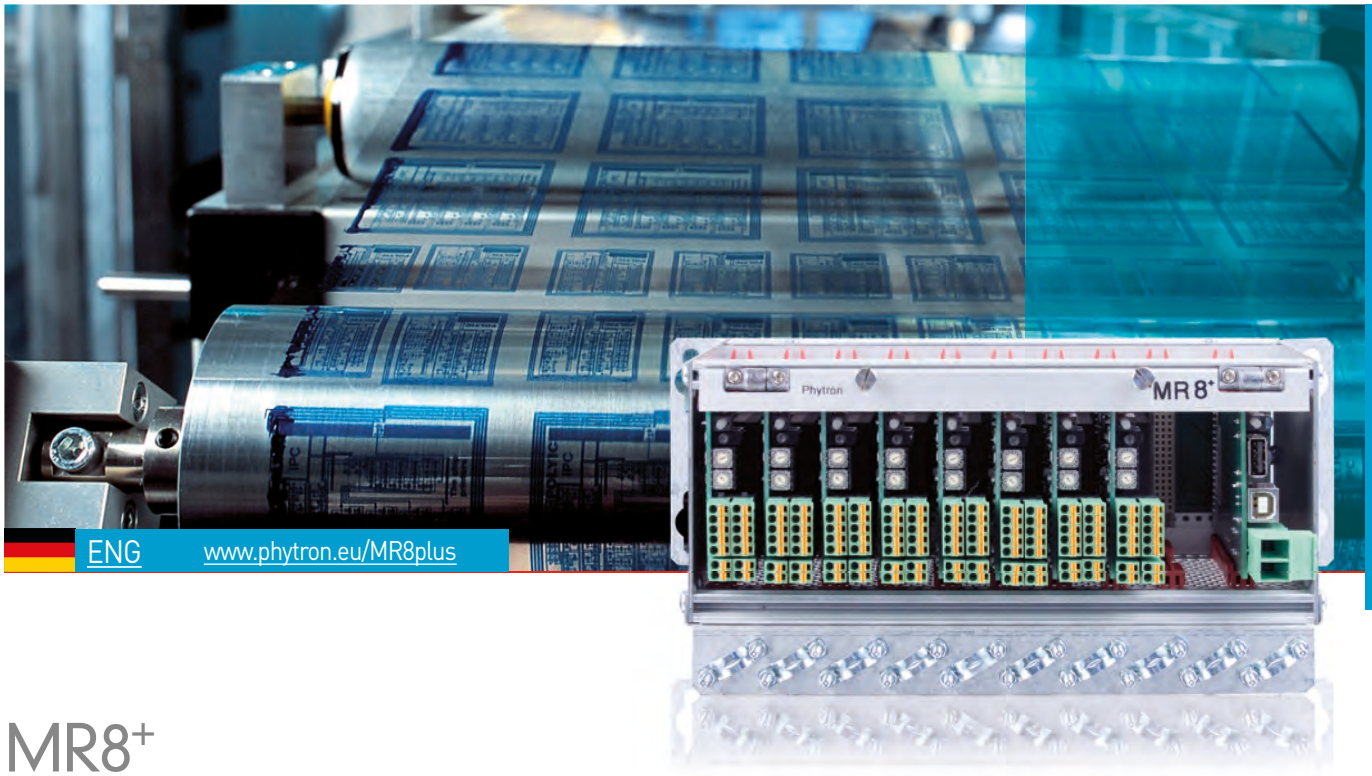


ENG www.phytron.eu/MR8plus

MR8+

Minirack for 1 to 8 power stages and ServiceBus module

The MR8+ is a minirack for up to 8 stepper motor power stages and a power and ServiceBus module (PSB).

The power supply for max. eight power stages (24 to 48 V_{DC} / 3.5 A per power stage), and the ServiceBus interface are provided by the PSB module via a backplane. The plug-in position of the power stages determines its address. So the operating parameters, programmed via ServiceBus, are definitely assigned to a certain power stage.

The integrated PSB module allows the cascading of up to 4 MR8+ (address switch 0-3). Thus, up to 32 axes can be configured centrally .

The A 32-48 power stage is for bipolar control of 2 phase stepper motors up to 3.5 A_{PEAK}. The high step resolution up to 1/512 step guarantees very high smoothness with a positioning accuracy of 1/20 step. The 5 V push-pull inputs (Control pulse, Motor direction, Boost and Activation) are electrically isolated from the supply voltage. The parameterisation is done via ServiceBus or by setting switches (step resolution, current).

Application

The compact minirack is the perfect choice for up to 50 Watts shaft power for multi-axes application in science, optics, micro handling or in semiconductor manufactoring. Furthermore, the MR8+ is the best supplement for PC controllers, that can output Control pulses, Motor direction, Boost and Activation for several axes on an incremental interface.

Highlights

ServiceBus

The ServiceBus is designed for communication with the power stages via RS 485/ 4-wire or USB. All settings can be entered at the PC, using the free ServiceBus-Comm® phytron software. So each axis can be parameterised and controlled by the ServiceBus.


ServiceBus-Comm®

More programming possibilities

Alternatively, readable ASCII-string instructions can be edited by individual software - e.g. with LabVIEW®, HyperTerminal or in C language.

So it is possible to transmit parameters to each power stage without any problem during initialising or to change components and to evaluate status information.

The MR8+ minirack can also be parameterised at each power stage: run current, step resolution and preferential motor direction are manually adjustable by setting switches.

In Focus

- up to 8 plug-in stepper motor power stages
  - Bipolar control of 2 phase stepper motors
  - Motor current up to 3.5 A_{PEAK}
  - Step resolution from 1/1 to 1/512 steps
  - Push-pull inputs: Control pulses, Motor direction, Boost, Activation
  - Electronical monitoring: overtemperature, short circuit, undervoltage
  - Programming the operating parameters by setting switches or by PC via ServiceBus
- Power- and ServiceBus module (PSB):
  - 24 to 48 V_{DC} supply voltage connector
  - ServiceBus interface for communication with the power stages
  - ServiceBus-Comm® PC software for Windows® included in delivery
- Minirack housing for wall mounting
  - 270 x 120 x 155 mm (W x H x D)
  - Front side locking bar
  - EMC clamps to connect the cable shielding

Edition 2012 July

phytron
Beyond Steppers

Control

Specification

Mechanical

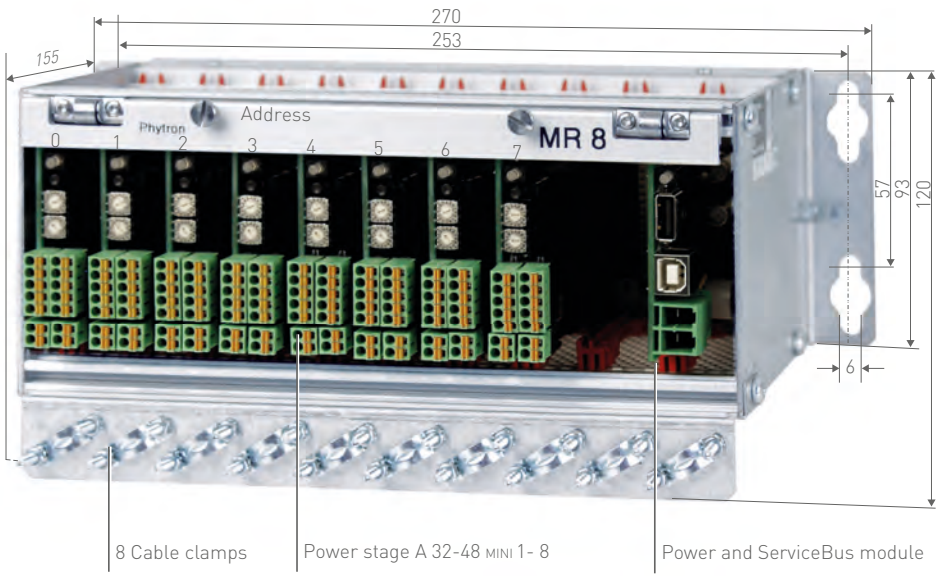
Dimensions (W x H x D)	270 x 120 x 155 mm
Weight	Approx. 2,300 g (in completion)
Mounting	Wall mounting

Features

Plug-in board	Power and ServiceBus module (PSB module) and maximum 8 plug-in A 32-48 stepper motor power stages. An additional plug-in for further developments
Power supply	24 to 48 V_{DC} Up to 3.5 A per plugged-in power stage
Signal lines	2 m
Performance	PSB module USB: with integrated USB-RS 485 converter PSB module RS 485: without USB RS 485 converter, with addressing switch for operation of max. 32 addresses in 4 miniracks
Options	Fan: DC fan 80 x 80 x 32 mm, type NMB

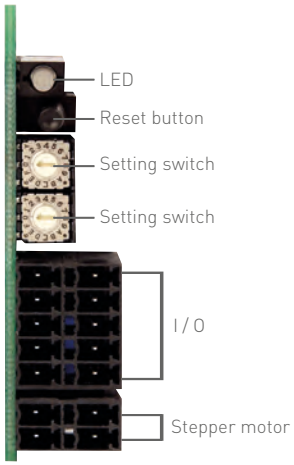
Operating Conditions

Temperatures	Operation: +5 to +40 °C (We recommend an additional cooling in case of higher operation temperatures.) Storage: -25 to +55 °C Transport: -25 to +55 °C
Degree of pollution	Level 2 acc. to EN 50178
Relative humidity	5 – 85 %, class 3K3 non-condensing
Protection class	IP 20
EMC immunity / EMC emission	Acc. to EN 61000-3-2 EMC Acc. to EN 61000-6-1, 2, 3, 4: EMC and RFI immunity
Approval	CE



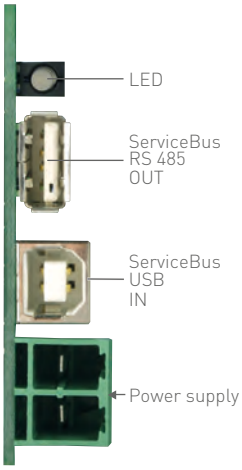
Dimensions in mm

Stepper Motor Power Stage A 32-48 MINI



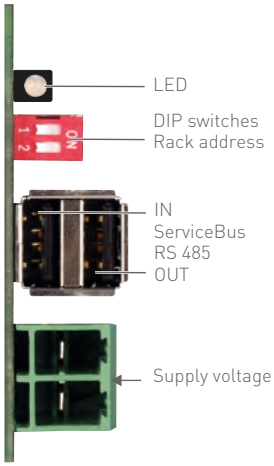
- Plug-in stepper motor power stage for control of 2 phase stepper motors
- Phase currents up to 3.5 A_{PEAK}
- Supply voltage 24 to 48 V_{DC}
- Status LED
- Reset key
- Setting switch run current and step resolution / preferential motor direction
- Operation parameter programming by setting switches or via ServiceBus
- Push-pull inputs: Control pulses, Direction, Boost, Activation
- Error output
- Front side connectors for wiring signal I/Os and stepper motor
- 48 pole rear connector for wiring supply voltage, logic voltage, ServiceBus and power stage addressing
- Size 60 x 116 x 20 mm
- Adapted for mounting in a type MR 8⁺ minirack

Power- and ServiceBus Module USB



- PSB-USB with integrated USB converter
- Supply voltage 24 to 48 V_{DC}
- LED green, if ready
- 5 V logic voltage for A 32-48 power stage
- Modes: ServiceBus mode or setting switch mode

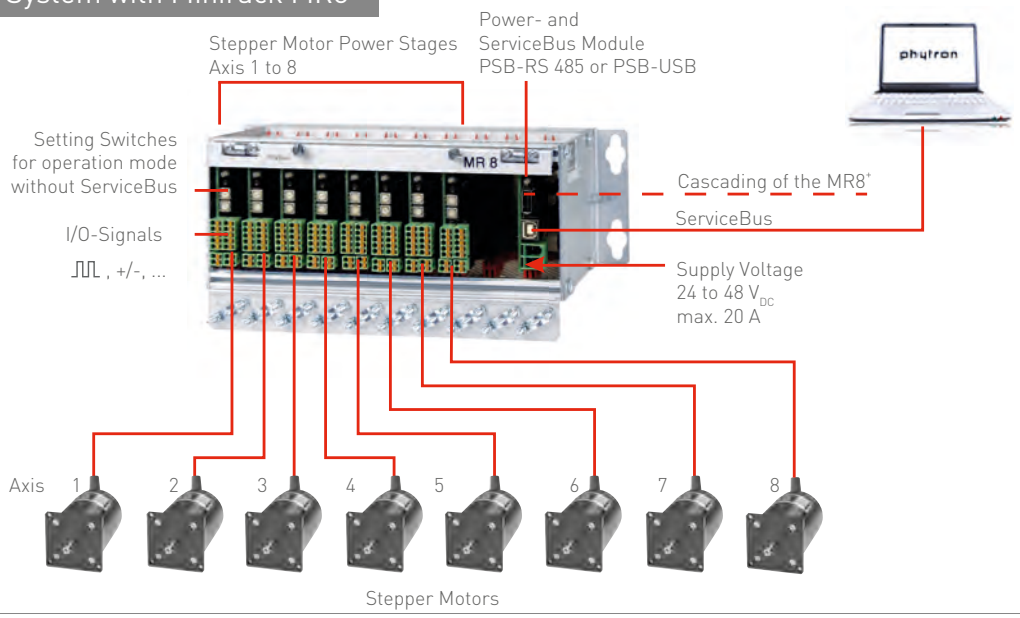
Power- and ServiceBus Module RS 485



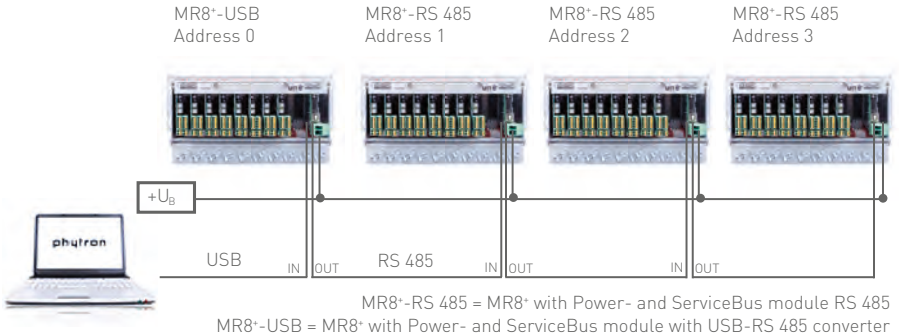
- PSB-RS 485 without integrated USB converter
- Supply voltage 24 to 48 V_{DC}
- DIP switches for the addressing of max. 32 axes in 4 miniracks
- LED green, if ready
- 5 V logic voltage for A 32-48 power stage

Control

Automation System with Minirack MR8+



Cascading MR8+ in the ServiceBus Mode



MR8+-RS 485 = MR8+ with Power- and ServiceBus module RS 485
MR8+-USB = MR8+ with Power- and ServiceBus module with USB-RS 485 converter

Ordering Code

The variable elements of the products are displayed in colour.

	Type	Power stage (Current: Peak / regulation)	Motor current	Step resolution	Stage of extension	Module
Ordering code	MR8+	/ A 32 - 48	MINI	- 8	- USB	

Options		
Stage of extension	1 - 8	1 to 8 power stages
Power- and ServiceBus module	USB RS 485	USB interface RS 485 interface

Extent of Supply

- MR8+ with PSB-USB or PSB-RS 485
- Mating connector set

Optional Accessories

- A 32-48 power stage with mating connectors
- Ventilator plate with 2 fans and mating connectors
- ServiceBus cable
- USB cable
- RS 485-USB converter

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POWER SUPPLIES

SPH 240 / 500 / 1013

Power supply for stepper motor power stages and -controllers

SPH 240 / 500 / 1013

Power supply units for stepper motor power stages and control units

The power supply units SPH 240 / 500 / 1013 are used to supply e.g. stepper motor power stages or stepper motor controllers. One power supply can supply several devices, depending on the load.

The SPH 240 can be directly connected to 230 or 115 V_{AC}, the mains voltage switch is used to change the voltage range. The SPH 500 and SPH 1013 power supply units switch automatically within the wide range input. The three-phase power supply SPH 1013 has an input range of 3 x 340 to 550 V_{AC}.

The mains input is internally fused, the output is permanently short circuit-proof. Best operation reliability is ensured by overtemperature protection, overvoltage protection and mains buffering.

A green LED indicates when the 24 V / 48 V or 72 V output voltage is ok.

The built-in fan makes the power supply unit ready for operation in any assembly position.

In Focus

- Input voltage range
  SPH 240 / 500: 90..132 or
  180...264 V_{AC}
  SPH 1013: 3 x 340-550 V_{AC}
- Output voltage: 24 / 48 / 72 V_{DC}
- Output current: 5 to 20 A
- Power category: 240 / 480 / 960 W
- Internally protected mains input
- Permanently short circuit-proof output
- Overvoltage protection primary and secondary side
- Overtemperature protection
- Integrated fan
- DIN rail or wall mounting
- Any mounting position
- Product data sheets and safety instructions are available on the following website:
  www.mgv.de

Ordering Code

The variable elements of the product are displayed in colour.

	Type	Power category/ Output voltage		Mounting mode
Ordering code	SPH	1013-4821	-	W

Options		
Power category-output voltage	240-2410	24 V_{DC} / 10 A / 240 W
	240-4805	48 V_{DC} / 5 A / 240 W
	500-2420	24 V_{DC} / 20 A / 480 W
	500-4810	48 V_{DC} / 10 A / 480 W
	500-7207	72 V_{DC} / 6.7 A / 480 W
	1013-4821	48 V_{DC} / 20 A / 960 W
	1013-7214	72 V_{DC} / 13.5 A / 960 W
Mounting mode	H	Rear DIN rail
	W	Rear wall

Mating connectors are included in delivery.

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SOFTWARE

Our free WINDOWS® programs allow to program, to monitor and to adjust power stages and controllers comfortable and clear via PC.

*phy*LOGIC™ Toolbox

Development environment for the *phy*MOTION™ stepper motor controller

ServiceBus-Comm®

Communication software for stepper motor power stages

CONTROL

*phy*LOGIC™ ToolBox

Development environment for Stand-alone stepper motor controllers

*phy*LOGIC™ is our new programming language for stepper motor power stages. It is a consistent further development of our proven MiniLog language. It supports on the one hand our established product lines and on the other hand our new modular controller *phy*MOTION™.

The disclosed *phy*LOGIC™ instruction set can be used without license fees and easily integrated into customer applications. With the free development environment *phy*LOGIC™ ToolBox, we provide a user friendly software, which can integrate, in addition to its own instruction set, can also integrate the high level C language.

*phy*LOGIC™ instructions can be sent individually to the *phy*MOTION™ controller directly via various bus protocols, combined into scripts or are stored locally on the controller.

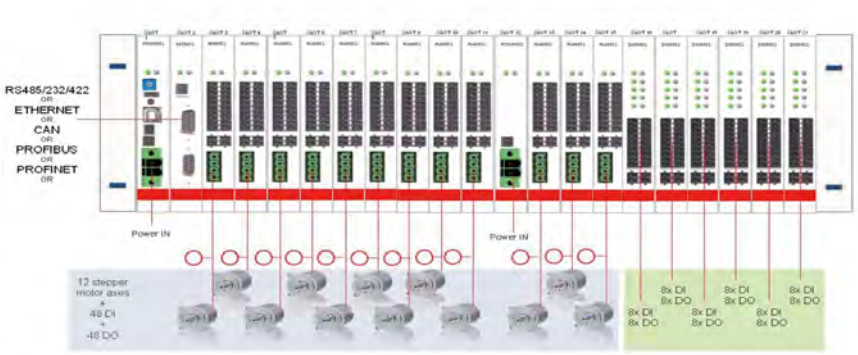
Our ToolBox contains besides the actual programming environment useful tools such as the "Motion Creator" that can easyly draw 2D contours and turn them into code, as well as numerous diagnostic, debugging and testing features.

In Focus

- Operating software and development environment for the *phy*MOTION™ phytron controller
- Easy to program: Drawing and converting from 2D contours in *phy*LOGIC™ instructions (Motion Creator)
- Parameterising, creating programs, editing, debugging
- Support in the initiation phase e.g. by test functions
- Display of statuses and graphical representation of a current XY position
- Archiving of parameter sets and programs
- Existing MiniLog programs are ported with minimal changes

Highlights

_phy_LOGIC™ in use:
Our new modular stepper motor control _phy_MOTION™



Edition 2012 November

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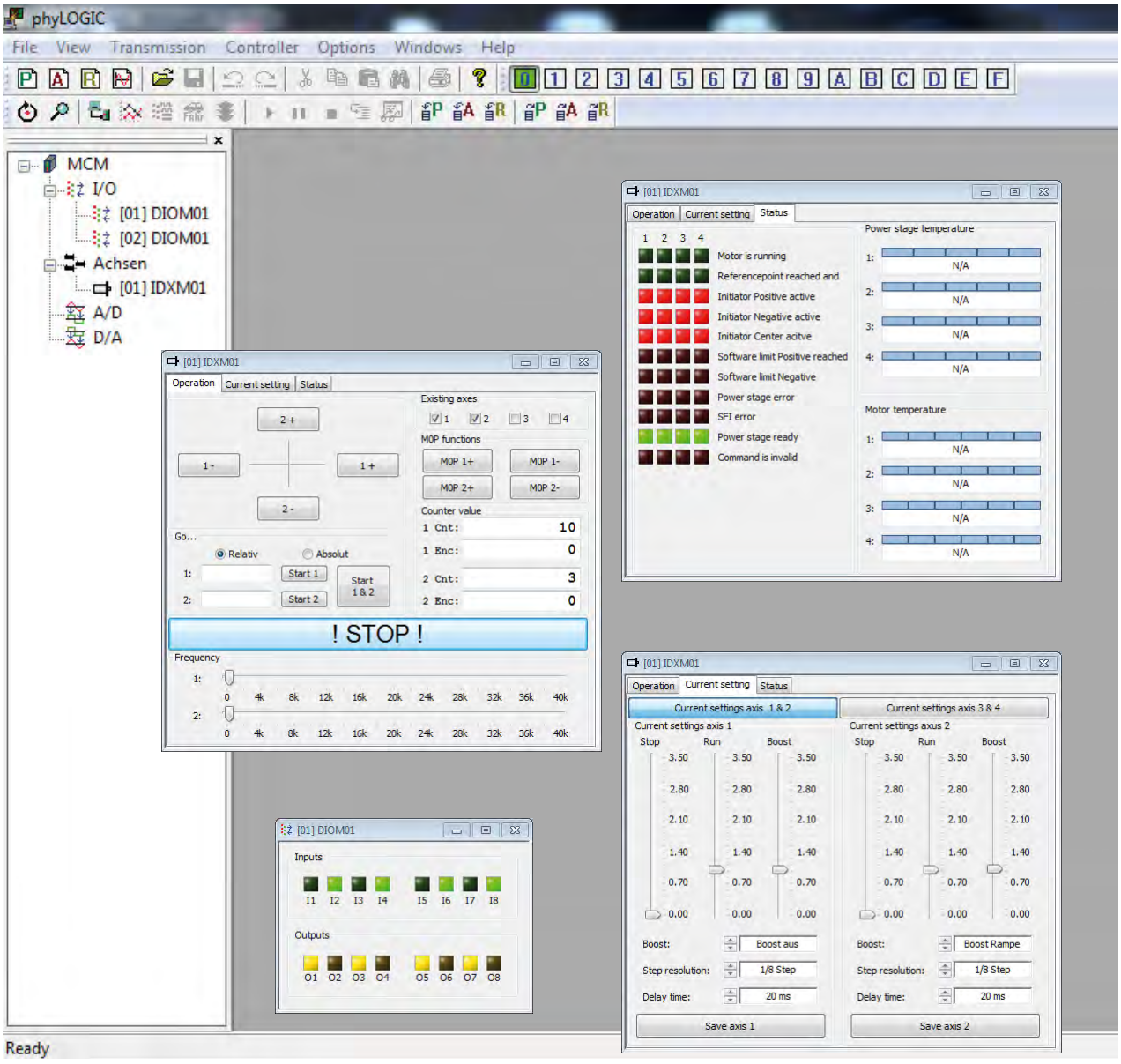
Control

Program Window



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CONTROL

ServiceBus-Comm®

Communication software for parameterising and control of stepper motor power stages

The phytron communication software Service-Bus-Comm®, designed for Windows®, assists the user to program and operate stepper motor power stages – e.g. ZMX+, MCD+, MR8+, CCD+ – equipped with Service-Bus[1] interface.

Operating parameters such as run current, stop current, step resolution, current delay time or other parameters depending on the type of power stage, can be edited by PC, saved and transmitted to each power stage by ServiceBus.

ServiceBus-Comm® helps to monitor the actual current, the power stage- or the motor temperature during operation. Status windows report input conditions and make it possible to set outputs or to display detailed error messages.

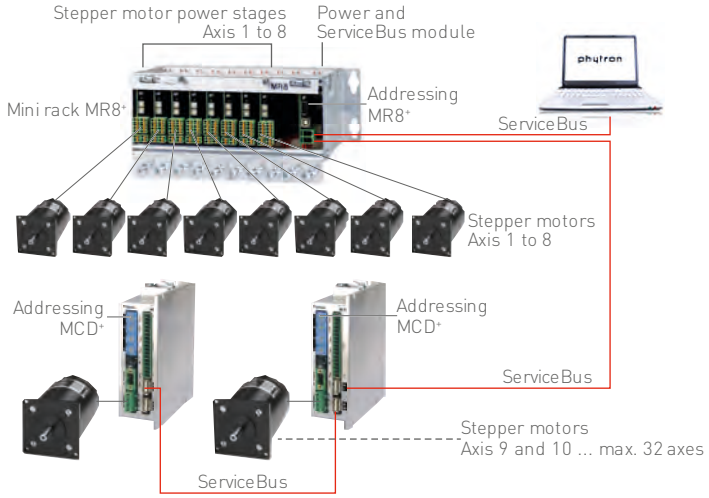
Optionally, ServiceBus instructions and functions can be handled by individual software. Readable ASCII string instructions are editable e.g. with LabView®, HyperTerminal or C language.

Up to 32 stepper motor axes can be simultaneneously distributed by ServiceBus-Comm®.

[1] All types of phytron control units with Service-Bus are labeled by the appendix +.

Highlights

Example: 10 axes at the ServiceBus



In Focus

- Communication software for stepper motor power stages with ServiceBus
  ServiceBus-Comm® is a registered trade mark of the Phytron GmbH.
- Putting into operation, configeration and error diagnosis
- Programming power stage parameters
- Online status display for safe operation and easy maintenance
- Parameter memory for data backup
- Designed for PC under Windows® 95, 98, 2000, NT, XP, 7
- Browser independent installation software
- Installation from CD
- RS 485/4-wire connection of the power stages or ServiceBus modules
- Connection to the PC by USB, RS 485/4-wire or RS 422

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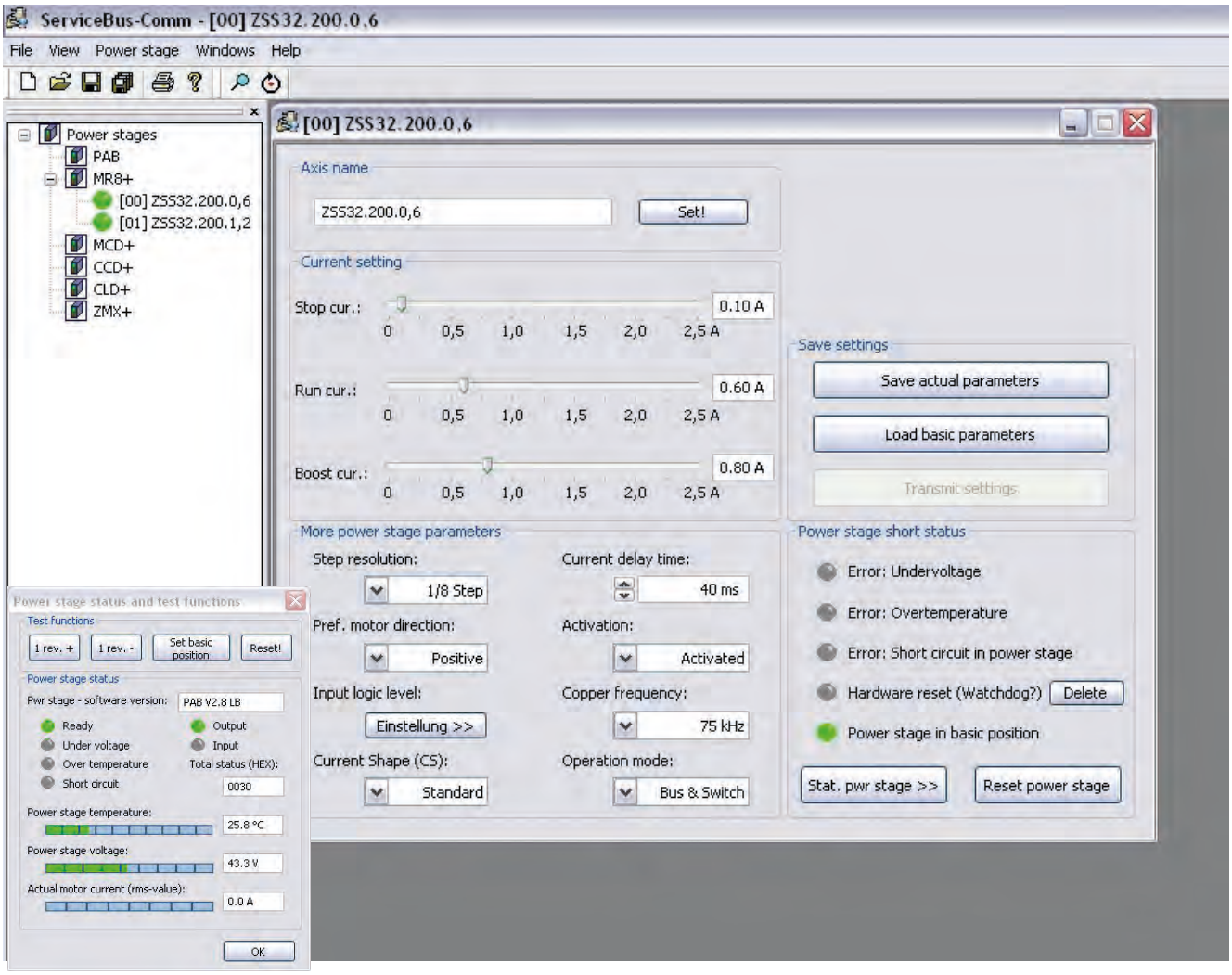
Control

Program Windows



phytron products with ServiceBus support:

- MCD⁺
- MR8⁺
- ZMX⁺
- PAB⁺
- CLD⁺
- CCD⁺

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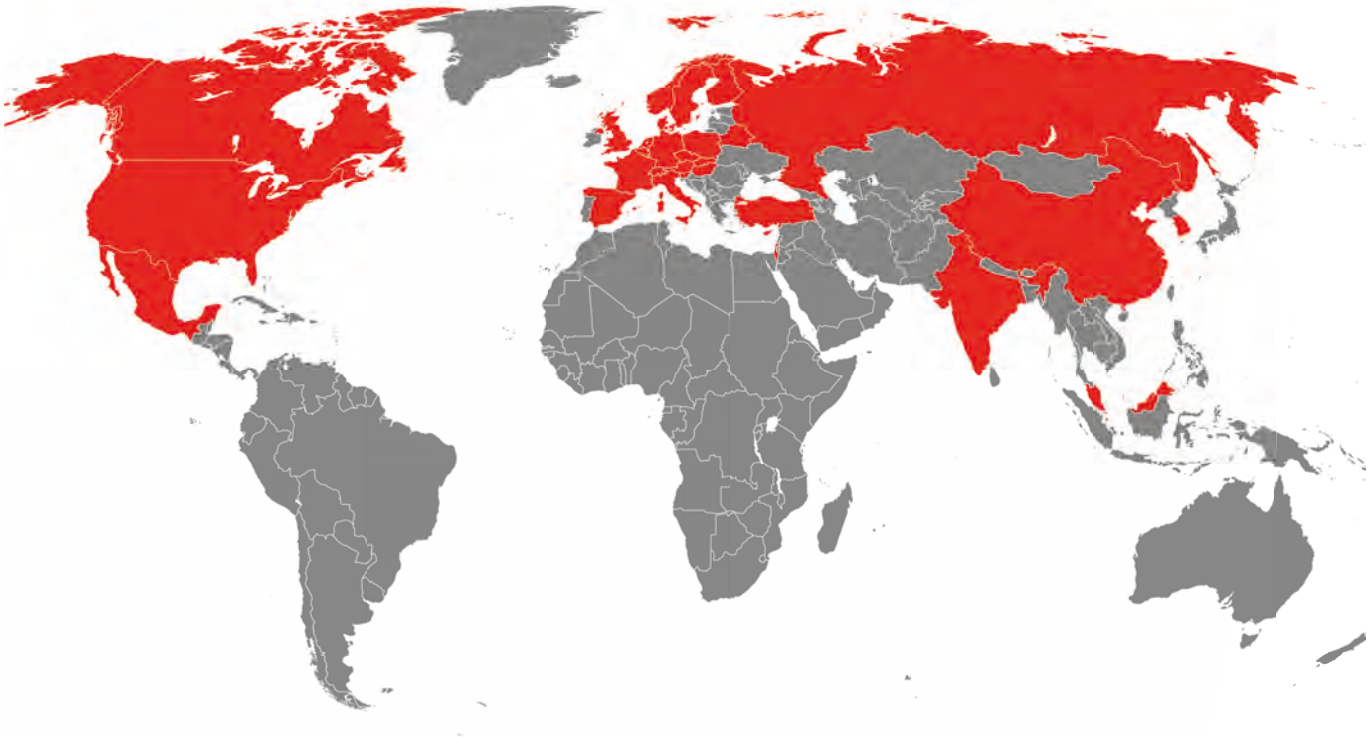
phytron INTERNATIONAL



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