

*phy***MOTION**<sup>™</sup>

**Power Supply Modules**

**POWM01.2, POWM02.2,**

**POWM03.1 and POWM04.1**

**TRANSLATION OF THE ORIGINAL GERMAN MANUAL**

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Intention of the manual:

In this manual you will find descriptions and specifications of the *phyMOTION*<sup>TM</sup> module: Power Supply POWM01, POWM02, POWM03 and POWM04

This manual is a supplementary volume to the operating instructions *phyMOTION*<sup>TM</sup> *Modular Multi-axis Controller for Stepper Motors*

In the manual *phyMOTION*<sup>TM</sup> *Modular Multi-axis Controller for Stepper Motors* (<http://www.phytron.de/phyMOTION>) are the descriptions of the features and specifications for the *phyMOTION*<sup>TM</sup> stepper motor controller.

Every possible care has been taken to ensure the accuracy of this technical manual. All information contained in this manual is correct to the best of our knowledge and belief but cannot be guaranteed. Furthermore we reserve the right to make improvements and enhancements to the manual and / or the devices described herein without prior notification.

We appreciate suggestions and criticisms for further improvement.

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Questions about the use of the product described in the manual that you cannot find answered here, please contact your representative of phytron (<http://www.phytron.eu/>) in your local agencies.

# 1 Legal Instructions



## This manual:

*Read this manual very carefully before mounting, installing and operating the device and if necessary further manuals related to this manual.*

- Please pay special attention to instructions that are marked as follows:

	<b>DANGER – Serious injury!</b>	<i>Indicates a high risk of serious injury or death!</i>
	<b>DANGER – Serious injury from electric shock!</b>	<i>Indicates a high risk of serious injury or death from electric shock!</i>
	<b>WARNING – Serious injury possible!</b>	<i>Indicates a possible risk of serious injury or death!</i>
	<b>WARNING – Serious injury from electric shock!</b>	<i>Indicates a possible risk of serious injury or death from electric shock!</i>
	<b>CAUTION – Possible injury!</b>	<i>Indicates a possible risk of personal injury.</i>
	<b>CAUTION – Possible damage!</b>	<i>Indicates a possible risk of damage to equipment.</i>
	<b>CAUTION – Possible damage due to ESD!</b>	<i>Refers to a possible risk of equipment damage from electrostatic discharge.</i>
	<b>”Any heading“</b>	<i>Refers to an important paragraph in the manual.</i>

Observe the following safety instructions!

### Qualified personnel



#### **WARNING – Serious injury possible!**

*Serious personal injury or serious damage to the machine and drives could be caused by insufficiently trained personnel!*

Without proper training and qualifications damage to devices and injury might result!

- Design, installation and operation of systems may only be performed by qualified and trained personnel.
- These persons should be able to recognize and handle risks emerging from electrical, mechanical or electronic system parts.
- The qualified personnel must know the content of this manual and be able to understand all documents belonging to the product. Safety instructions are to be provided.
- The trained personnel must know all valid standards, regulations and rules for the prevention of accidents, which are necessary for working with the product.

## Safety Instructions



### Further Manual

*This manual is an addition to the following main manual:*

*“**phyMOTION™** Modular Multi-axis Controller for Stepper Motors”*

- First, read the main manual and then continue with this manual.



### Intended use:

*The **phyMOTION™** is designed for operating in a drive system.*

- An installation is allowed only if the requirements of the EC Machinery and EMC Directives are conformed with.



### Part of a machine:

*This product is used as a part of a complete system, therefore risk evaluations concerning the specific application must be made before using the product.*

- Safety measures have to be taken and verified according to the results of risk evaluation.
- Personnel safety must be ensured by the concept of this overall system (e.g. machine concept).



### **WARNING – Serious injury from electric shock!**

*If the **phyMOTION™** is not operated with SELV/PELV voltages, the risk of dangerous voltages may be on the device. Touching these components carrying high voltages can cause serious injury or death from electric shock:*

- Always observe the safety concept SELV / PELV to ensure safe isolation and separation of low voltage supplies from the mains.



### **WARNING – Serious injury from electric shock!**

*During electrical installation cables, connectors, etc. can be live.*

- Before starting wiring, make sure that none of the power supplies are connected to the primary side of the mains supply. Isolate the power supplies from the mains or remove the appropriate fuses.
- All modules must be inserted and screwed into the **phyMOTION™** housing before powering up. If necessary, unoccupied module slots must be covered with the supplied blank front plates. Never operate the equipment when open.
- Do not plug or unplug the modules while powered.
- Do not plug or unplug the connectors while powered.
- If the equipment was energised, wait 3 minutes after power off to allow the capacitors to discharge and ensure that there are no residual charges on cables, connectors and boards.

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### 3 POWM – Power Supply of the *phyMOTION*™

POWM stands for “Power Module“. POWM01 and POWM02 are used for the *phyMOTION*™ with external supply **EXT** POWM03 and POWM04 for the *phyMOTION*™ with internal supply **INT**.

POWM01 and POWM02 **EXT** include the external power supply for the power stages (24 V<sub>DC</sub> to 70 V<sub>DC</sub>) as well as the power supply for the I/Os and the limit switches (isolated 24 V<sub>DC</sub>). The supply voltage for the power stages (24 V<sub>DC</sub> to 70 V<sub>DC</sub>) also generates the internal logic supply of 5 V.

POWM03 and POWM04 **INT** direct the supply voltages, which are generated internally, for the power stages (48 V<sub>DC</sub> / 70 V<sub>DC</sub>), as well as the power supply for the I/Os and the limit switches (isolated 24 V<sub>DC</sub>) and the internal logic voltage of 5 V.

Each power module can supply a maximum of 10 more modules.

The main power modules POWM01 and POWM03 contain additional features for the configuration of the *phyMOTION*™.

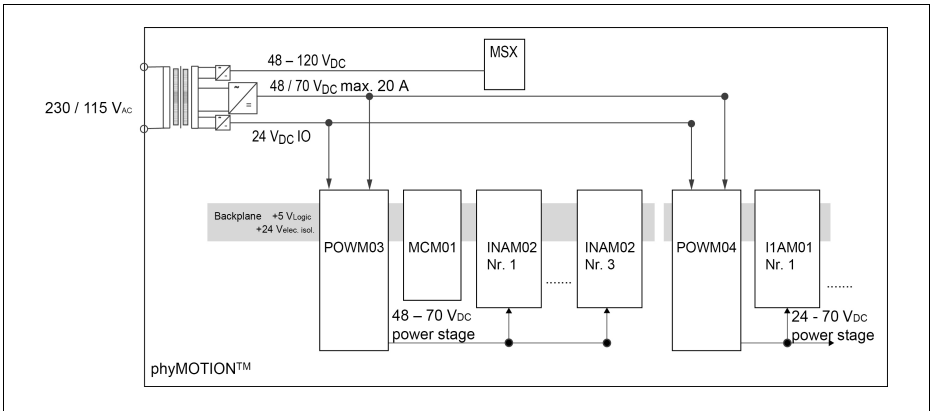


Fig. 1: Wiring diagram of the *phyMOTION*™ with internal supply **INT**

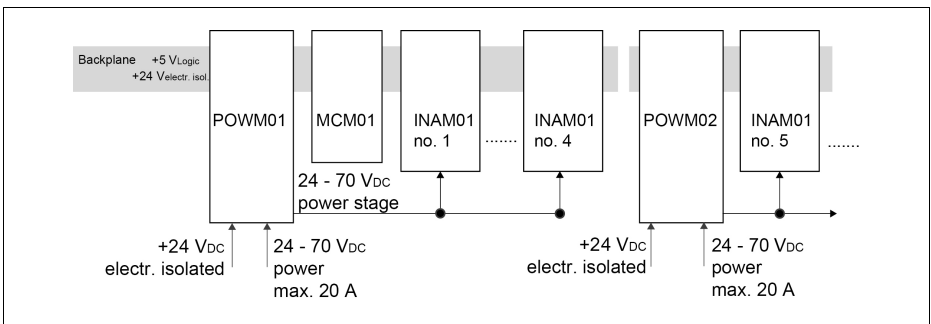


Fig. 2: Wiring diagram of the *phyMOTION*™ with external supply **EXT**

## 4 Module Overview

### 4.1 Main supply POWM01 and POWM03

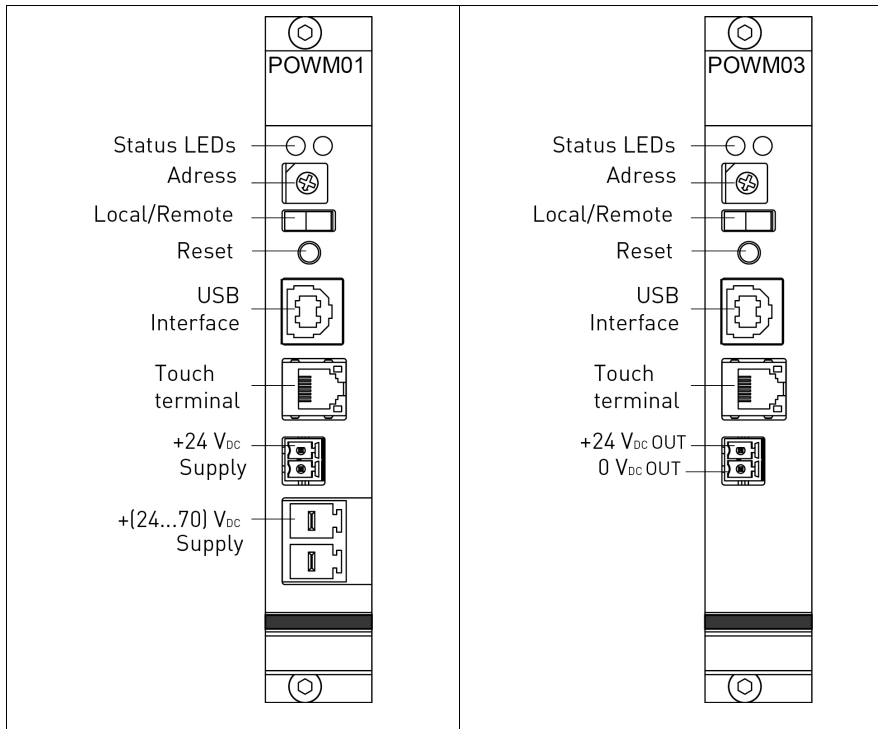


Fig. 3: POWM01 **EXT**

POWM03 **INT**

#### **EXT:** POWM01 Feed-in to the power supply:

- 24 to 70 V<sub>DC</sub> supply voltage (for motors and generates internally the logic voltages) – 20 A max.
  - Optional electrically isolated 24 V<sub>DC</sub> for inputs/outputs, limit and reference switches
- The external supply must be designed for the required current (e.g. by the SPH 240-2410-24 power supply unit).

#### **INT:** POWM03 For looping through the supply voltages:

- 48 / 70 V<sub>DC</sub> supply voltage (for motors and generates internally the logic voltages) – 20 A max.
- Optional electrically isolated 24 V<sub>DC</sub> for inputs/outputs, limit and reference switches
- 24 V<sub>DC</sub> output (for i.e. sensors)



**Configuration:**

- USB interface for programming and diagnostics
- Device address switch
- Remote/Local switch
- Reset button
- Connection of an external phytron touch panel

## 4.2 Intermediate supply POWM02 and POWM04

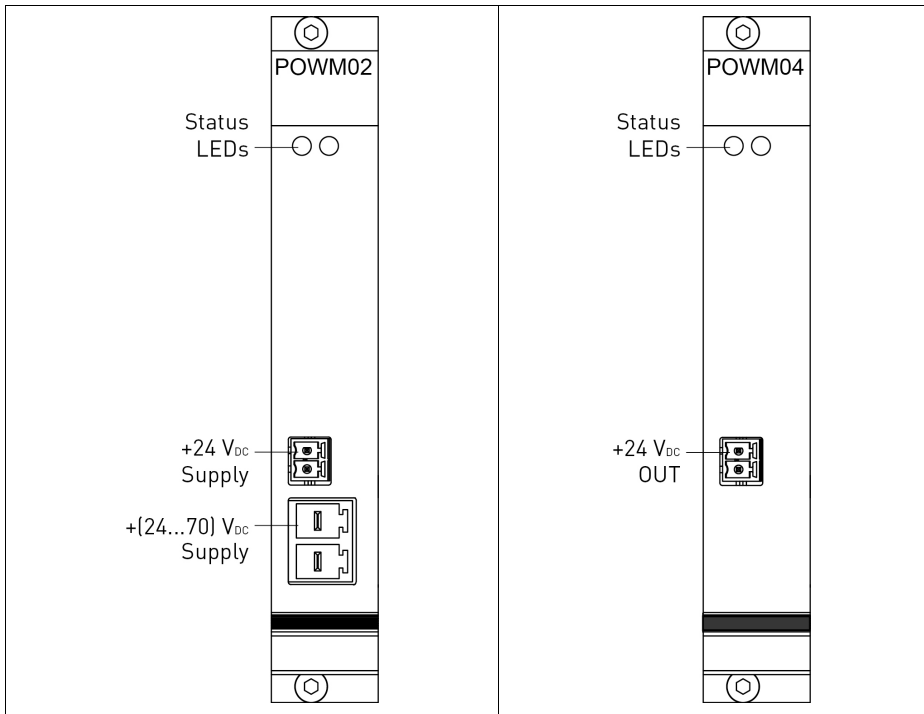


Fig. 4: POWM02 **EXT**

POWM04 **INT**

### **EXT:** Feed-in to the power supply:

- 24 to 70 V<sub>DC</sub> supply voltage (for motors and generates internally the logic voltages) – 20 A max.
- Optional electrically isolated 24 V<sub>DC</sub> for inputs/outputs, limit and reference switches

### **INT:** For looping through the supply voltages:

- 24 bis 70 V<sub>DC</sub> Versorgungsspannung (für Motoren und internes Erzeugen der Logikspannungen) – max. 20 A
- Galvanisch getrennte 24 V<sub>DC</sub> für Ein-/Ausgänge, sowie End- und Referenzschalter
- 24 V<sub>DC</sub> Ausgang (für z.B. Sensoren)

### **Configuration:**

The POWM02 and POWM04 are purely an intermediate supply and thus provide no configuration interface.

## 5 Technical Data

### 5.1 Declaration of Incorporation: Modules gen. and ext. Supply **EXT**



#### Declaration of Conformity according to EC directive 2004/108/EC (EMC-Directive)

**Name and address of the manufacturer:**

Phytron GmbH,  
Industriestr. 12  
82194 Gröbenzell

We declare that the following product is in conformity with the EC Directives 2004/108/EC relating to EMC.

**Product denomination**

Part-Name	Description
AIM01.1	Analog Input-Module
AIOM01.1	Analog I/O Module
AOM01.1	Analog Output-Module
APS01.1	High-End Stepper Motor Power Stage
CANS01.1	CAN Communication Sub Module
DIOM01.1	Digital I/O Module
DIOM0a.1	Digital I/O Module (customer-specific version)
ECAS01.1	SSI/ Quadratic Encoder Sensing Sub Module
ECES01.1	EnDat Encoder Sensing Sub Module
ECMS01.1	Resolver Evaluation Submodule
EXAM01.1	Indexer Interface Module
I1AM01.1	1-Axis Stepper Motor Drive
I1AM0a.1	1-Axis Stepper Motor Drive (customer-specific version)
I1AM0b.1	Indexer & Power Stage Carrier (cust)
I4XM01.1	4 Axes HighEnd Indexer
INAM01.1	Carrier Module for APS Power Stage
MCM01.1	Main Controller Module
MCM02.1	Main Controller & ext. Power Input
PBS01.1	Profibus Communication Sub Module
PNS01.1	ProfiNet Communication Sub Module
POWM01.1	Main Power Input Module
POWM02.1	Intermediate Power Input Module
RSS01.1	RS485/RS232 Communication Sub Module

From serial number 1506xxxxx

AP QS-067Z-6  
CE 7034 Rev.3

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## Applied harmonized standards

- EN 61000-6-1: 2007-01 Electromagnetic Compatibility (EMC) - Immunity for residential, commercial and light-industrial environmental
- EN 61000-6-2: 2005-08 Electromagnetic compatibility (EMC) - Immunity for industrial environments
- EN 61000-6-3: 2007-01 Electromagnetic compatibility (EMC) - Emission standard for residential, commercial and light-industrial environments
- EN 61000-6-4: 2007-01 Electromagnetic compatibility (EMC) - Emission standard for industrial environments

## Comment:

This declaration of conformity is valid only if the product is built in a suitable casing e.g. phyMOTION-6SL-MR-s.

Gröbenzell, 2015-06-25

Birgit Hartmann  
Managing Director

5.2 Declaration of Incorporation: Modules with internal Supply **INT**



**Declaration of Conformity**  
according to EC directive 2004/108/EC (EMC-Directive) and  
EC directive 2006/95/EC (electrical equipment)

**Name and address of the manufacturer:**

Phytron GmbH,  
Industriestr. 12  
82194 Gröbenzell

We declare that the following product is in conformity with the EC Directives 2004/108/EC relating to EMC.

**Product denomination**

Part-Name	Description
NETM01.1	Power Supply Input 230V
POWM03.1	Main Power Input; int. Supply
POWM04.1	Secondary Power Input; int. Supply
MCM03.1	Main Controller & internal Supply
PEM01.1	Protective Earth Module
INAM02.1	High Performance Power Stage Carrier
MSXS01.1	Power Stage; 15A

From serial number 1506xxxxx

**Applied harmonized standards**

- EN 60664-1: 2008-01 Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests
- EN 61000-6-1: 2007-01 Electromagnetic Compatibility (EMC) - Immunity for residential, commercial and light-industrial environmental
- EN 61000-6-2: 2005-08 Electromagnetic compatibility (EMC) - Immunity for industrial environments
- EN 61000-6-3: 2007-01 Electromagnetic compatibility (EMC) - Emission standard for residential, commercial and light-industrial environments
- EN 61000-6-4: 2007-01 Electromagnetic compatibility (EMC) - Emission standard for industrial environments

**Comment:**

This declaration of conformity is valid only if the product is built in a suitable casing e.g. phyMOTION-6SL-MR-s.

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### 5.3 Mechanical Data

<b>Dimension</b>	100 x 100 mm without front panel
<b>Weight</b>	POWM01: 68 g / 90 g (without/with front panel) POWM02: 53 g / 86 g (without/with front panel) POWM03: 63 g / 85 g (without/with front panel) POWM04: 48 g / 81 g (without/with front panel)
<b>Mounting</b>	Plug-in module into the modular stepper motor controller <i>phyMOTION</i> <sup>TM</sup>  POWM01/02/03/04 modules are exclusively for mounting in the specially designed power slots.
<b>Mounting position</b>	vertical

## 5.4 Features POWM01 and POWM03

Features	
<b>Power supply</b>	<p>24...70 V<sub>DC</sub> / 20 A max. (motor supply U<sub>B</sub>)  +24 V<sub>DC</sub> (±20 %) electrically isolated / 5 A max. (I/O supply)</p> <p><b>POWM01</b> <b>EXT</b></p> <p>24...70 V<sub>DC</sub> / max.20 A (motor supply U<sub>B</sub>)  +24 V<sub>DC</sub> (±20%) electrically isolated / max. 5 A (I/O supply)</p> <p><b>POWM03</b> <b>INT</b></p> <p>48 / 70 V<sub>DC</sub> / max.20 A (motor supply U<sub>B</sub>)  +24 V<sub>DC</sub> (±20%) electrically isolated / max. 5 A (I/O supply)  +24 V<sub>DC</sub> output voltage i.e. for sensors</p>
<b>Voltage range</b>	<p><b>POWM01</b>  between 24...70 V<sub>DC</sub> and 24 V<sub>DC</sub> I/O</p> <p><b>POWM03</b>  between 48 / 70 V<sub>DC</sub> and 24 V<sub>DC</sub> I/O</p>
<b>Current capacity</b>	<p>20 A max. / U<sub>B</sub>, 5 A max. / +24 V<sub>DC</sub></p> <p>The total current at + 24V<sub>DC</sub> for all inputs / outputs, as well as limit and reference switches, encoders and sensors incl. the 24 V<sub>DC</sub> tap of POWM03 / 04 modules must not exceed the value of 5 A per total <i>phyMOTION</i><sup>TM</sup>.</p>
<b>Power loss</b>	<p><b>POWM01 / POWM03</b>  1400 mW at U<sub>B</sub>= 70 V<sub>DC</sub></p>
<b>Over voltage protection</b>	no
<b>Short circuit protection</b>	<p>Logic voltage (5 V): auto-reset 2.6 A  U<sub>B</sub>: 2 x 10 A</p>
<b>Diagnostics</b>	2 status LEDs on the front panel
<b>Switch/button</b>	<p>DIP switch for adjusting the controller's address</p> <p>Remote/Local switch</p> <p>Reset button</p>



Interfaces	
<b>24-70 V<sub>DC</sub> Motor-Supply (POWM01)</b>	24 V <sub>DC</sub> to 70 V <sub>DC</sub> input range for the supply of the power stages and for generating the internal logic supply.
<b>24 V<sub>DC</sub> I/O-Supply (POWM01)</b>	Separate 24 V <sub>DC</sub> for the supply of I/Os (e.g. digital inputs/outputs of the DIOM01), limit and reference switches (e.g. on the I1AM01, INAM01 and EXAM01).
<b>24 V<sub>DC</sub> Output voltage (POWM03)</b>	24 V <sub>DC</sub> supply i.e. for sensors max. 5 A/+24 V <sub>DC</sub>
<b>USB</b>	USB interface for parameterising and programming of the <i>phyMOTION</i> <sup>TM</sup> .
<b>Touch panel</b>	4 pin Western modular connector flat oval 4p/4K for the connection of an external touch panel
<b>Bus connection rear panel</b>	Module supply of the <i>phyMOTION</i> <sup>TM</sup> 5 V <sub>Logic</sub> : 2 A max.

The number of connected modules after a POWM01 or POWM03 depends on the total current of all modules in a voltage group. This sum may not exceed the maximum current capacity (20 A)!

## 5.5 Features POWM02 and POWM04

If the total current of all modules in a voltage group (20 A) is exceeded, or if a voltage group has various voltages to begin with, the POWM02 and POWM04 module must be applied for the supply of the power stages and I/Os.

A power module can be inserted only in designated slots. These slots must be already defined before ordering the *phyMOTION*<sup>TM</sup>.

Features	
<b>Power supply</b>	<b>POWM02 EXT</b> 24...70 V <sub>DC</sub> / max.20 A (motor supply U <sub>B</sub> ) +24 V <sub>DC</sub> (±20%) electrically isolated / max. 5 A (I/O supply) <b>POWM04 INT</b> 48 / 70 V <sub>DC</sub> / max.20 A (motor supply U <sub>B</sub> ) +24 V <sub>DC</sub> (±20%) electrically isolated / max. 5 A (I/O supply) +24 V <sub>DC</sub> output voltage i.e. for sensors
<b>Voltage range</b>	<b>POWM02</b> between 24...70 V <sub>DC</sub> and 24 V <sub>DC</sub> I/O <b>POWM04</b> between 48 / 70 V <sub>DC</sub> and 24 V <sub>DC</sub> I/O
<b>Current capacity</b>	max. 20 A / U <sub>B</sub> , max. 5 A / +24 V <sub>DC</sub> The total current at + 24V <sub>DC</sub> for all inputs / outputs, as well as limit and reference switches, encoders and sensors incl. the 24 V <sub>DC</sub> tap of POWM03 / 04 modules must not exceed the value of 5 A per total <i>phyMOTION</i> <sup>TM</sup> .
<b>Power loss</b>	<b>POWM02 / POWM04</b> 1400 mW at U <sub>B</sub> = 70 V
<b>Over voltage protection</b>	no
<b>Short circuit protection</b>	Logic voltage (5 V): auto-reset 2.6 A U <sub>B</sub> : 2 x 10 A
<b>Diagnostics</b>	2 status LEDs on the front panel

Interfaces	
<b>24–70V<sub>DC</sub> Motor-Supply (POWM02)</b>	24 V <sub>DC</sub> to 70 V <sub>DC</sub> input range for the supply of the power stages and for generating the internal logic supply.
<b>24 V<sub>DC</sub> I/O-Supply (POWM02)</b>	Separate 24 V <sub>DC</sub> for the supply of I/Os (e.g. digital inputs/outputs of the DIOM01), limit and reference switches (e.g. on the I1AM01, INAM01 and EXAM01).
<b>24 V<sub>DC</sub> Output voltage (POWM04)</b>	24 V <sub>DC</sub> supply i.e. for sensors max. 5 A/+24 V <sub>DC</sub>
<b>Bus connection rear panel</b>	Module supply of the <i>phyMOTION</i> <sup>TM</sup> 5 V <sub>Logic</sub> : max. 2 A

The number of connected modules after a POWM02 and POWM04 depends on the total current of all modules in a voltage group. This sum may not exceed the maximum current capacity (20 A)!

### 4.5 Functions

---

#### POWM01 and POWM02:

##### Feed-in to the power supply:

- 24 to 70 V<sub>DC</sub> supply voltage (for motors and generates internally the logic voltages) – 20 A max.
- Optional electrically isolated 24 V<sub>DC</sub> for inputs/outputs, limit and reference switches

#### POWM03 and POWM04:

##### Feed-in to the power supply:

- 48 and 70 V<sub>DC</sub> supply voltage (for motors and generates internally the logic voltages) – 20 A max.
- Optional electrically isolated 24 V<sub>DC</sub> for inputs/outputs, limit and reference switches
- +24 V<sub>DC</sub> output voltages i.e. for sensors  
The total current at + 24V<sub>DC</sub> for all inputs / outputs, as well as limit and reference switches, encoders and sensors incl. the 24 V<sub>DC</sub> tap of POWM03 / 04 modules must not exceed the value of 5 A per total *phyMOTION*<sup>TM</sup>..

#### Only POWM01 and POWM03:

##### Configuration:

- **USB** interface for programming and diagnostics
- **Device address switch** for setting a fixed bus address (is necessary e.g. with RS 485, CAN etc.)
- **Remote/Local switch** for switching the mode from **Remote** (controller receives the commands via HOST interface) to **Local** (the controller is running in pure stand-alone mode with a sequential program).
- **Reset button** for the resetting of the controller
- Connection of an external phytron **touch panel** (e.g. Android-based tablet)

## 6 Installation

### 6.1 Mechanical Installation

phytron always delivers the **phyMOTION™** completely assembled in order to make sure you can start with the installation and the wiring right way.



#### Further Manual

*Detailed information on this subject is in a supporting manual:*

*“**phyMOTION™** Modular Multi-axis Controller for Stepper Motors”*

The POWM is delivered as a single module card if sent after service or repair or when an expansion card was ordered.

In case you receive an individually packed POWM as an expansion module or after repair or service unpack the module in ESD protected area only.



#### CAUTION – Possible damage by ESD!

*The modules of the **phyMOTION™** consist of sensitive electronic components that can be destroyed by electrostatic discharge voltages.*

- Always store and transport single modules in ESD protective packaging.
- Always handle the components in compliance with the ESD protection measures.
- No liability is accepted for any consequences resulting from improper handling or non-ESD-friendly packaging.

Before you install or replace modules, make sure that the **phyMOTION™** is unplugged.



### **WARNING – Serious injury from electric shock!**

*During electrical installation cables, connectors, etc. can be live.*

- Before starting wiring, make sure that none of the power supplies are connected to the primary side of the mains supply. Isolate the power supplies from the mains or remove the appropriate fuses.
- All modules must be inserted and screwed into the *phyMOTION*<sup>™</sup> housing before powering up. If necessary, unoccupied module slots must be covered with the supplied blank front plates.  
Never operate the equipment when open.
- Do not plug or unplug the modules while powered.
- Do not plug or unplug the connectors while powered.
- If the equipment was energised, wait 3 minutes after power off to allow the capacitors to discharge and ensure that there are no residual charges on cables, connectors and boards.

## 6.1.1 Assembly Rules

Observe the following when installing a POWM01/POWM02 module:

### POWM01 and POWM03

Each configuration starts with a POWM01 or POWM03 main supply and configuration module. Then mount a CPU module MCM01 or MCM02 which also contain a selectable host interface module.

### POWM01 and POWM02

Each supply module:

- Can supply at maximum of 10 further modules with the internal logic voltage (**5 V**).
- May exceed 20 A at **24–70 V<sub>DC</sub>** at any time from the power supply unit – this may limit the number of axis cards which can be supplied.
- Can supply a total of 5 A from the **24 V<sub>DC</sub>** I/O supply for the outputs (analogue, digital) or for the supply to limit switches.

### POWM03 and POWM04

Each supply module:

- Can supply at maximum of 10 further modules with the internal logic voltage (**5 V**).
- May exceed 20 A at **48/70 V<sub>DC</sub>** at any time from the power supply unit – this may limit the number of axis cards which can be supplied.
- Can supply a total of 5 A from the **24 V<sub>DC</sub>** I/O supply for the outputs (analogue, digital) or for the supply to limit switches...
- Can supply a total of 5 A from the **24 V<sub>DC</sub>** output for loads.

If any of these conditions is exceeded, an additional intermediate module POWM02 or POWM04 must be provided, or an autonomous *phyMOTION*<sup>™</sup> (POWM01 + MCM01 or POWM03 + MCM01...) should be considered.

The total current at + 24V<sub>DC</sub> for all inputs / outputs, as well as limit and reference switches, encoders and sensors incl. the 24 V<sub>DC</sub> tap of POWM03 / 04 modules must not exceed the value of 5 A per total *phyMOTION*<sup>™</sup>.

Power modules can only be plugged into the designated slots. You must define these slots before ordering.

An intermediate module can also be used to separate the motor supply voltage on the rear backplane. Thus two different motor power supplies can be driven in the *phyMOTION*<sup>™</sup>.

Be careful that no slots are left empty ensure correct addressing of the modules.

Push the module card carefully into the guide rail until the rear contacts the housing's frame of the *phyMOTION*<sup>TM</sup>.

Connect the POWM01 or POWM03 module with the connector (2x10 pins, ribbon cable) to the MCM01 on the rear side.

In the last few millimetres the module's plug has to match with the backplane's socket. You should be able to push in the module with light pressure. In case you experience problems move the module's front plate slightly to the left and to the right while pushing in the module, so that the plug's pins can slide into the backplane's socket.

As soon as the module's front plate contacts the housing's frame the module is integrated properly and can be fixed with two electro-conductive bolts.

Now you can start with the electrical installation.



6.2 Electrical Installation

Ensure sufficient bending radius of the cables during installation. Do not lay the cables in tension or bend them.

We recommend labelling the mating connectors to prevent interchanging the connectors. If all the connections are made, the last step is to plug in the power supply to the mains.

6.2.1 Connectors – Overview

Module type	Connector	Number of pins	Connector on the module (Phoenix)	Mating connector (Phoenix)	Mating connector ID number
POWM01 and POWM02	+(24...70) V Supply	1x2	PC4/2-G-7,62	PC4/22-ST-7,62	10014443
	+24 V Supply	1x2	MCDN1,5/2-G1-3,5P26	FMC1,5/2-ST-3,5	10007077
POWM03 and POWM04	+24 V OUT	1x2	MCDN1,5/2-G1-3,5P26	FMC1,5/2-ST-3,5	10007077

The mating connector is included in delivery of the module and is usually plugged into the module at the factory.

CAUTION – Possible error messages!

**i** The POWM module generates from the 24 V<sub>DC</sub> I/O supply voltage the internal supply voltage of the SUB modules (i.e. limit or reference switches) and of the DIOM module.

- Please ensure that the 24 V<sub>DC</sub> I/O supply voltage is always connected.

6.2.2 Pin Assignment POWM02 and POWM04

Here is the pin assignment for the POWM02 and POWM04 module:

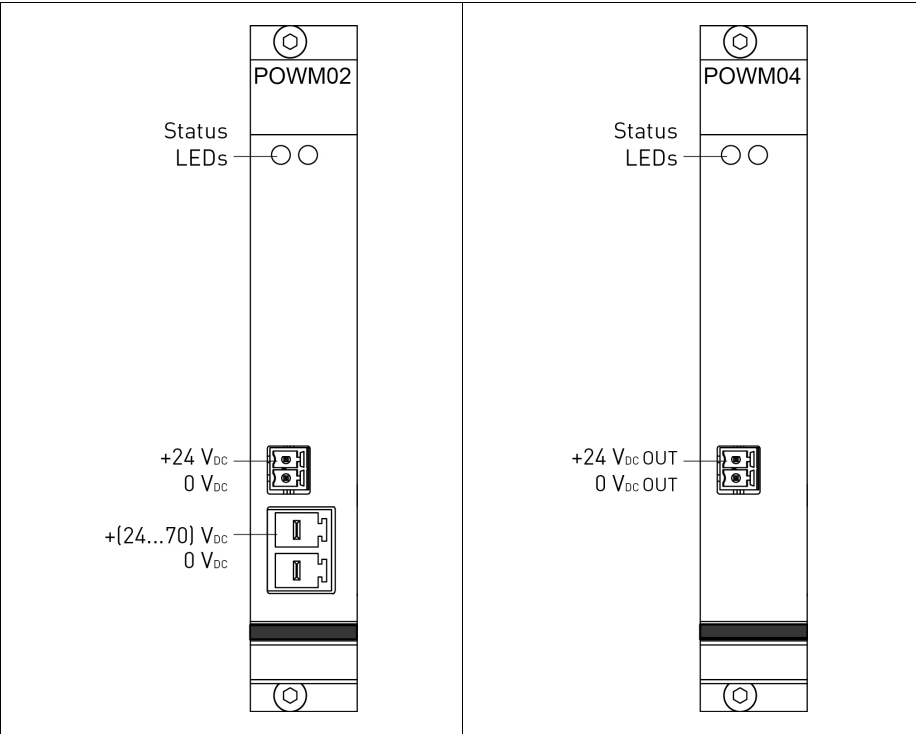


Fig. 5: Pin assignment POWM02 and POWM04

For wiring please use the above defined mating connectors.

### 6.2.3 Pin Assignment POWM01

Here is the pin assignment for the POWM01 module:

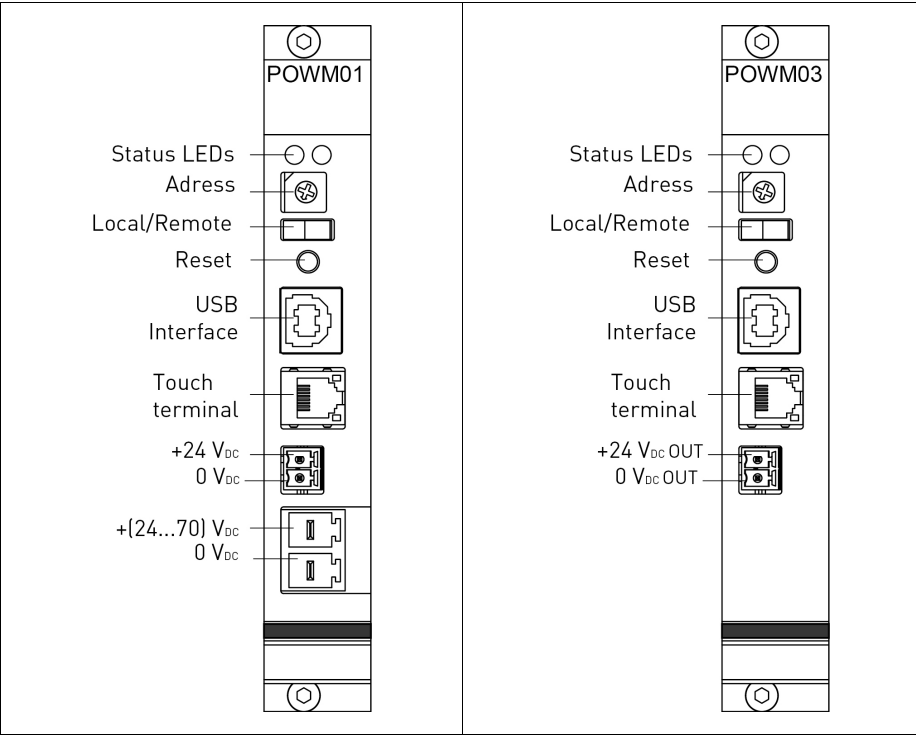


Fig. 6: Pin Assignment POWM01 and POWM03

## USB interface

### Factory settings:

115 200 baud

8 data bits

1 stop bit

no parity

Protocol: <STX> | address | data | separator | check sum | <ETX> | <CR> | <LF>

**Baud rate** and **interface parameter** can be adjusted after installation with the *phyLOGIC™* ToolBox in the menu item *Options/interface parameter*.

A direct connection from the PC to the POWM01 is made with the USB cable type A-B. There the USB port of the PC (type A) is directly connected with the USB port of the controller (type B).

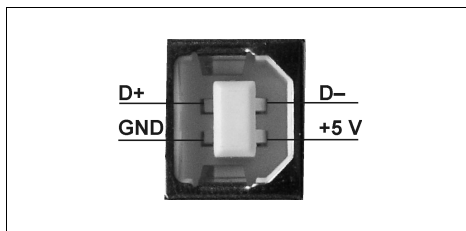


Fig. 7: X5 Com: USB port type B (DIN IEC 61076-3-108)

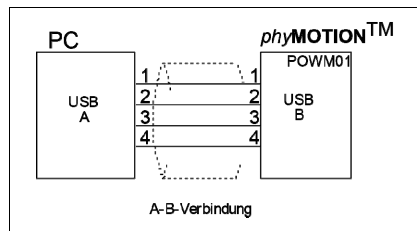


Fig. 8: Wiring scheme PC ↔ POWM01 by cable A-B

## USB driver

**i**

*To use the USB interface please install the appropriate USB driver in advance before connecting the phyMOTION™.*

- Install the USB drivers from the delivered phytron CD.
- Administrator authorizations are required for the driver installation.
- Use a USB cable with a maximum length of 2 m!
- If you want to test several USB devices, which are identical in construction, you should use the same USB port on the PC. Thus, you avoid changing the COM port number.

## Touch Panel Connection

A terminal with touch functionality (e.g. Android-based tablet) can be connected to this interface.

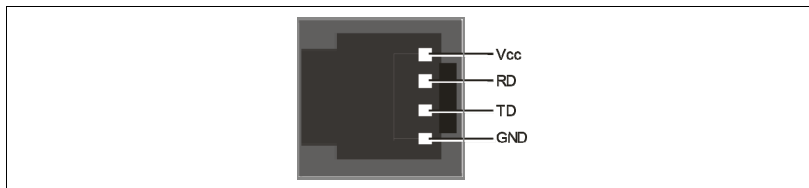


Fig. 9: 4 pin Western modular connector L flat oval 4p/4 K

It is used e.g. for configuring and diagnosing the *phyMOTION*<sup>TM</sup> controller e.g. functions such as entering of movement commands, output settings or status message display.

### 7 Commissioning

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Please read the manual for basic commissioning information of the DIOM01 module:



#### Further manual

*Detailed information on this subject is in a supporting manual:*

“**phyMOTION™** Modular Multi-axis Controller for Stepper Motors”

The programming environment **phyLOGIC™** ToolBox is explained in the following manual:



#### Further manual

*Detailed information on this subject is in a supporting manual::*

“**phyLOGIC™** ToolBox – Communication Software for the **phyMOTION™** Stepper Motor Controller“

For programming the sequential program please read:



#### Further manual

*Detailed information on this subject is in a supporting manual:*

“**phyLOGIC™** Command Reference for the **phyMOTION™** Controller”

**i**

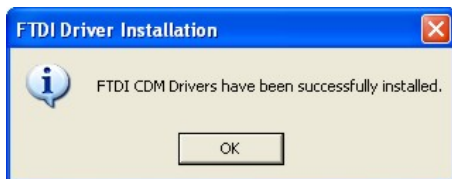
#### CAUTION – Possible damage!

*Some modules are set to a default value on delivery. So, e.g., the motor current must be set to the corresponding value (see the motor data from the motor manufacturer). Connected components like motors can be damaged by incorrectly set values.*

- Please check before starting if the parameters are correct.

## 7.1 USB Driver Installation (Windows)

- Insert the Phytron-CD and open the folder **USB Driver** by the Windows Explorer. Select the **.exe** program which goes with your system software and start it by double clicking. The following window is shown on the desktop after a successful installation:



- Connect the POWM01 directly or via USB converter to the USB port of your PC by USB cable.
- For checking the correct USB driver installation, continue as follows (i.e. Windows XP):  
Start the device manager by clicking **Start→Settings→System control** and double-click on **System**. Then select the **Device manager** tab. The USB components can be found in **Computer→Ports** and in **Universal Serial Bus Controller**. Here the new USB-component is shown: **USB Serial Port (Com X)**
- You'll find information about the driver installation for the chip FT232R and more drivers for Linux and MAC on <http://www.ftdichip.com>

### USB driver

**i** *Using the USB interface please install the appropriate USB driver in advance before connecting the phyMOTION™.*

- Install the USB drivers from the delivered phytron CD.
- Administrator authorizations are required for the driver installation.
- Use a USB cable with a maximum length of 2 m!
- If you want to test several USB devices, which are identical in construction, you should use the same USB port on the PC. Thus, you avoid changing the COM port number.

### 7.2 DIP Coded Rotary Switch

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The DIP switch is used to set the bus address for systems such as RS 485 or CAN.

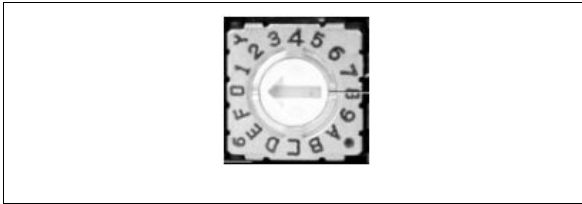


Fig. 10: 16 stage DIP coded rotary switch: calibration 0...F

### 7.3 REMOTE/LOCAL Switch R/L

---

The mode can be selected with the REMOTE/LOCAL switch:

REMOTE: The controller is connected via an interface with the PC. In this mode user-created programs can be transferred to the controller and back. It is possible to test individual commands in the REMOTE mode or to drive the motor for test purposes via *phyLOGIC*<sup>TM</sup> ToolBox.



LOCAL: Switching to LOCAL starts the stored program automatically. The program must be in the start up tab.



- a) The program is executed **without** connecting to a computer.
- b) Program execution **with** connection to an external computer: During the program sequence you can access it on the external computer to exchange current data.



### 7.4 Diagnostic by LED Display

The LEDs indicate the status of the power modules by colours and flashing:

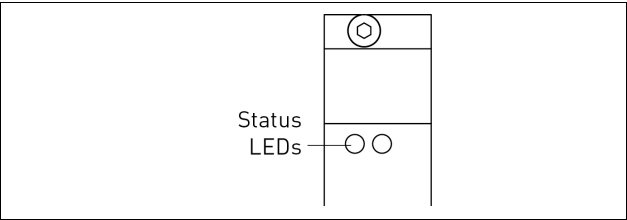


Fig. 11: Status LEDs

LEDs	left	right
off	No power supply connected	–
green	Ready, power supply available	$U_B > 20\text{ V}$
red	–	$U_B < 20\text{ V}$

### 7.5 Reset Button

The reset button on the Remote/Local switch is recess mounted in order to prevent unintentional activation.

The Reset resets any error messages.

Waite time after removal of the reset signal: approx. 3 sec.

### 8 Parameterising the Module

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There is no parameterising for the POWM modules!

For more information about parameters and programming of the *phyMOTION*<sup>TM</sup> see the following manual:



#### **Further manual**

*Detailed information on this subject is in a supporting manual:*

*“**phyLOGIC**<sup>TM</sup> Command Reference for the **phyMOTION**<sup>TM</sup> Controller”*

## 9 Service

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In case of a service contract, please proceed as follows:

First try to identify the technical problem and document the fault. Feel free to ask our support team for help. We are pleased to assist you: tel. 0049-8142-503252 (local rate).

### Removal of a module:

- Switch off the *phyMOTION*™'s supply voltage
- Disconnect the supply voltage
- Cut the red seal tape and the black label tape carefully on the left and right edge of the module/front panel which you want to remove. Don't slide the blade between the front panels by no means. When backfitting by our service the red seal tape is renewed.
- Loosen the screw on top and the screw on the bottom of the module's front plate
- Pull the card carefully by the handle.
- If you want to use the *phyMOTION*™ after removing a module, the gap has to be sealed with a blanking plate before power supply is reconnected and switched on.
- To send a module to phytron use ESD packaging only.

## 10 Version / Compatibility

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POWM01.2/POWM02.2 can NOT be used to replace POWM01.1/POWM02.1.

If you want to fill a power slot, first ensure that the backplane and the power module are compatible:

For your first power module type POWM01.1 you need the power module type POWM01.1/POWM02.1.

For your first power module type POWM01.2 you need the power module type POWM01.2/POWM02.2.

## 11 Warranty, Disclaimer and Registered Trademarks

### 11.1 Disclaimer

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Phytron GmbH has verified the contents of the manual to match with the hardware and software. However, errors and omissions are exempt and phytron GmbH assumes no responsibility for complete compliance. The information contained in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

### 11.2 Warranty

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The *phyMOTION*<sup>TM</sup> modules are subject to **legal warranty**. phytron will repair or exchange devices which show a failure due to defects in material or caused by the production process. This warranty does not include damage caused by the customer, for example, not intended use, unauthorized modifications, incorrect handling or wiring.

### 11.3 Registered Trademarks

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In this manual several trademarks are used which are no longer explicitly marked as trademarks within the text. The lack of these signs may not be used to draw the conclusion that these products are free from third parties' rights. For example, some product names used herein are:

- *phyMOTION*<sup>TM</sup> is a trademark of Phytron GmbH.
- *phyLOGIC*<sup>TM</sup> is a trademark of Phytron GmbH.
- Microsoft is a registered trade mark and WINDOWS<sup>TM</sup> is a trade mark of the Microsoft Corporation in the USA and other countries.

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