

*phy***MOTION**<sup>™</sup>

## **CPU and Bus Module**

### **MCM01.1**

**Firmware Version from:**

**V1.0.2 (Loader)**

**V1.1.3 (System)**

**V1.1.1 (*phy*LOGIC System)**

**TRANSLATION OF THE GERMAN ORIGINAL MANUAL**

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Phytron GmbH

Industriestraße 12

82194 Gröbenzell, Germany

Tel.: +49(0)8142/503-0

Fax: +49(0)8142/503-190

In this manual you will find the descriptions of the features and specifications of the **phyMOTION™** module: CPU and Bus Module MCM01

(<http://www.phytron.de/phyMOTION>).

This manual is supplementary to the “**phyMOTION™** *Modular Multi-axis Controller for Stepper Motors*” manual.

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.

Email address: [doku@phytron.de](mailto:doku@phytron.de)

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.de/>) in your local agencies.

## 1 Legal Information



### This manual:

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

- 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 in 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 according to the results and be verified.
- 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.

## 2 Contents

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<b>1 Legal Information .....</b>	<b>3</b>
<b>2 Contents.....</b>	<b>6</b>
<b>3 MCM01 Module Overview .....</b>	<b>7</b>
<b>4 Technical Data .....</b>	<b>9</b>
4.1 Declaration of Incorporation .....	9
4.2 Mechanical Data.....	10
4.3 Features .....	11
4.4 Functional Description.....	12
<b>5 Installation .....</b>	<b>13</b>
5.1 Mechanical Installation of the MCM01 Module.....	13
5.2 Electrical Installation.....	15
5.2.1 Connectors - Overview .....	15
5.2.2 Connection Plan for RS 232 / RS 485 .....	16
5.2.3 Connection Plan for CAN .....	17
5.2.4 Connection Plan for ProfiBus .....	18
5.2.5 Connection Plan for ProfiNet/Ethernet .....	19
<b>6 Commissioning .....</b>	<b>20</b>
<b>7 Diagnostics by the LEDs .....</b>	<b>21</b>
<b>8 Service.....</b>	<b>22</b>
<b>9 Warranty, Disclaimer and Registered Trademarks .....</b>	<b>23</b>
9.1 Disclaimer.....	23
9.2 Warranty.....	23
9.3 Registered Trademarks.....	23
<b>10 Index .....</b>	<b>24</b>

### 3 MCM01 Module Overview

MCM01 stands for "Main Controller Module." This module is the intelligent head unit of *phyMOTION™* and thus part of each device. The module carries the main CPU and an optional selectable host interface.

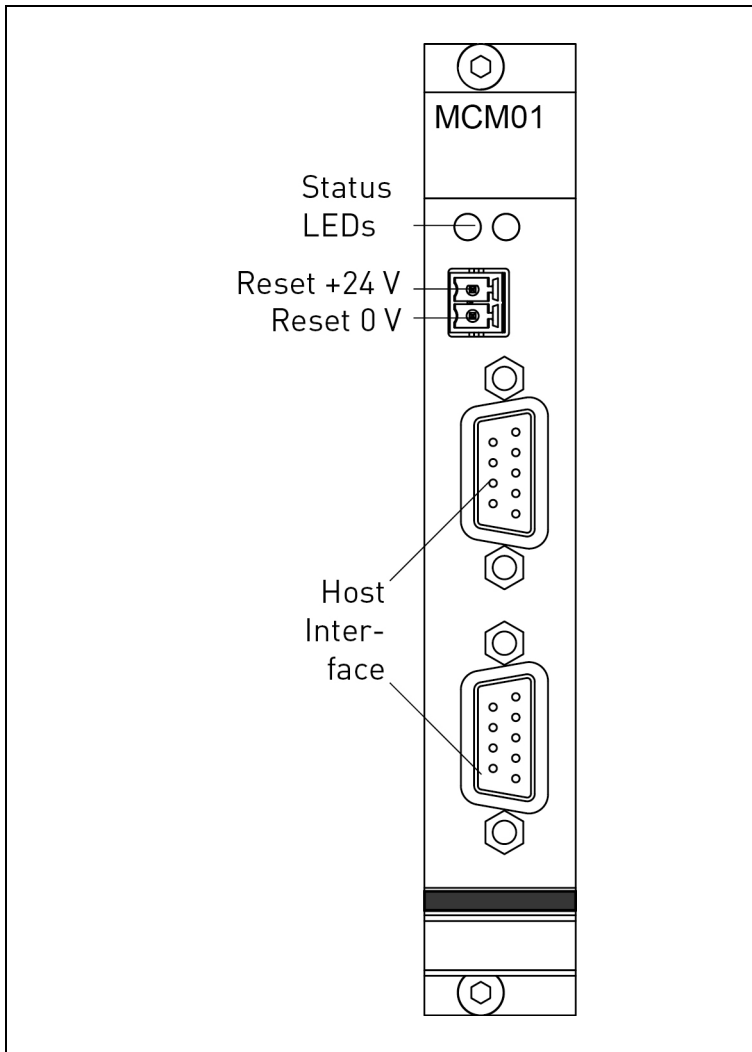


Fig. 1: MCM01 front view e.g. with RS 485 or CAN

#### Intelligent CPU:

- Controls and administers up to 64 modules (in the current housing concept limited to 21 modules per device)
- Program and register memory up to 4 MB
- Internal memory expandable with future memory modules
- Script program administration
- Firmware administration
- Elegant programming with *phyLOGIC™*

### Selectable communication interface:

- RS 485, RS 232, RS 422
- CAN
- Ethernet
- ProfiBus
- ProfiNet

### Ordering code of the main controller module (MCM):

Ordering code (example): **MCM01-RSS01**

Ordering Code		
Type	Host communication	
MCM01	- RSS01	
Options		
Host communication	RSS01 CANS01 ETHS01 PBS01 PNS01 NNS01	RS 232 or RS485/422 CAN-Bus Ethernet ProfiBus ProfiNet no interface
Mating connectors are included in delivery.		



## 4 Technical Data

### 4.1 Declaration of Incorporation



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

**Name and address of the manufacturer:**

Phytron-Elektronik 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-No.	Title	
10015035	MCM01.1	Main Controller Module
10015036	CANS01.1	CAN Communication Sub Module
10015037	ETHS01.1	Ethernet Communication Sub Module
10015039	PBS01.1	Profibus Communication Sub Module
10015040	PNS01.1	ProfiNet Communication Sub Module
10015041	RSS01.1	RS485/RS232 Communication Sub Module

From serial number 1205xxxxx

**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 device is built in a suitable casing e.g. phyMOTION-6SL-MR-s.

Gröbenzell, 2012-05-10

  
Johannes Schmid  
Technical Director

AP QS-0672-3  
CE 7035 Rev. 1

Phytron-Elektronik GmbH  
Industriestr. 12 - 82194 Gröbenzell  
Postfach 1255 - 82180 Gröbenzell  
T +49-8142-503-0 F +49-8142-503-190  
E info@phytron.de W www.phytron.de

Geschäftsführung Birgit Hartmann  
Reg.-Gerecht München - HRB 44 426  
USt-Ident. Nr. DE 128 242 222  
Steuernummer 117-135-10027

Genossenschaftsbank - Kto. 96610 - BLZ 70169464  
IBAN DE 6770 1694 6400 0009 6610 - BIC GENODEF1M07  
Sparkasse Fürstentfeldbruck - Kto. 1801265 - BLZ 70053070  
Oberbank München - Kto. 1041021021 - BLZ 70120700  
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### 4.2 Mechanical Data

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<b>Dimensions</b>	100 x 100 mm (without front panel)
<b>Weight</b>	61 g without and 82 g with font panel
<b>Mounting</b>	Plug-in module into the modular stepper motor controller <i>phy</i> <b>MOTION</b> <sup>TM</sup>
<b>Mounting position</b>	Vertical

## 4.3 Features

Features	
<b>Power supply</b>	5 V <sub>DC</sub> The module is powered internally via phytron's backplane on the rear side.
<b>Current consumption (max.)</b>	180 mA 70 mA (RS interface) 120 mA (ProfiNet)
<b>Cable length Reset input</b>	shielded: 100 m max.
<b>Diagnostic</b>	2 Status LEDs on the front panel for diagnostic
<b>Operating modes of the controller</b>	<ul style="list-style-type: none"> <li>• Remote</li> <li>• Local: Stand-alone device with sequence program</li> </ul>
<b>Refresh rate</b>	2 ms
Interfaces	
<b>Communication via backplane bus</b>	Proprietary phytron bus
<b>Bus connection host</b>	Selectable host interface: RS 232, RS 485, RS 422, CAN, Ethernet, ProfiBus, ProfiNet
<b>Digital input</b>	Reset (24 V <sub>DC</sub> electrically isolated)
Communication and programming	
<b>Programming</b>	via phytron's programming environment <i>phyLOGIC</i> <sup>TM</sup> Toolbox
<b>Communication</b>	Master slave communication with all modules and interfaces of the <i>phyMOTION</i> <sup>TM</sup> .
<b>Memory</b>	Up to 4 MB

### 4.4 Functional Description

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#### **System control**

The MCM01 controls the complete program sequence and coordinates all the modules (master-slave communication, interrupt enabled) and interfaces.

#### **Communication module**

The MCM01 can be expanded with a communication module containing either a CAN, RS 232 RS 485, Ethernet, ProfiNet or ProfiBus interface (with electrically isolation).

#### **Reset interface**

Through the 24 V<sub>DC</sub> input to reset the controller

## 5 Installation

### 5.1 Mechanical Installation of the MCM01 Module

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



#### Further manual

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

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

In case you receive an individually packed MCM01 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 integrating or switching modules always make sure that the **phyMOTION™** is shut down and the power supply is disconnected.

Identify the correct slot position for your MCM01 referring to your order and documentation. The MCM01 is always installed directly on the right of a POWM01 module.



### **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.

Make sure not to leave free slots in between modules so the module addressing sequence can work correctly.

Push the module carefully into the guide rail until the rear contacts the housing's frame of the **phyMOTION™**.

Connect the connector (2x10 pins, ribbon cable) of the POWM01 module 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.

## 5.2 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.

### 5.2.1 Connectors - Overview

Connector	Number of pins	Connector on the module (Phoenix)	Mating connector (Phoenix)	Mating connector ID number
Reset	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.

## 5.2.2 Connection Plan for RS 232 / RS 485

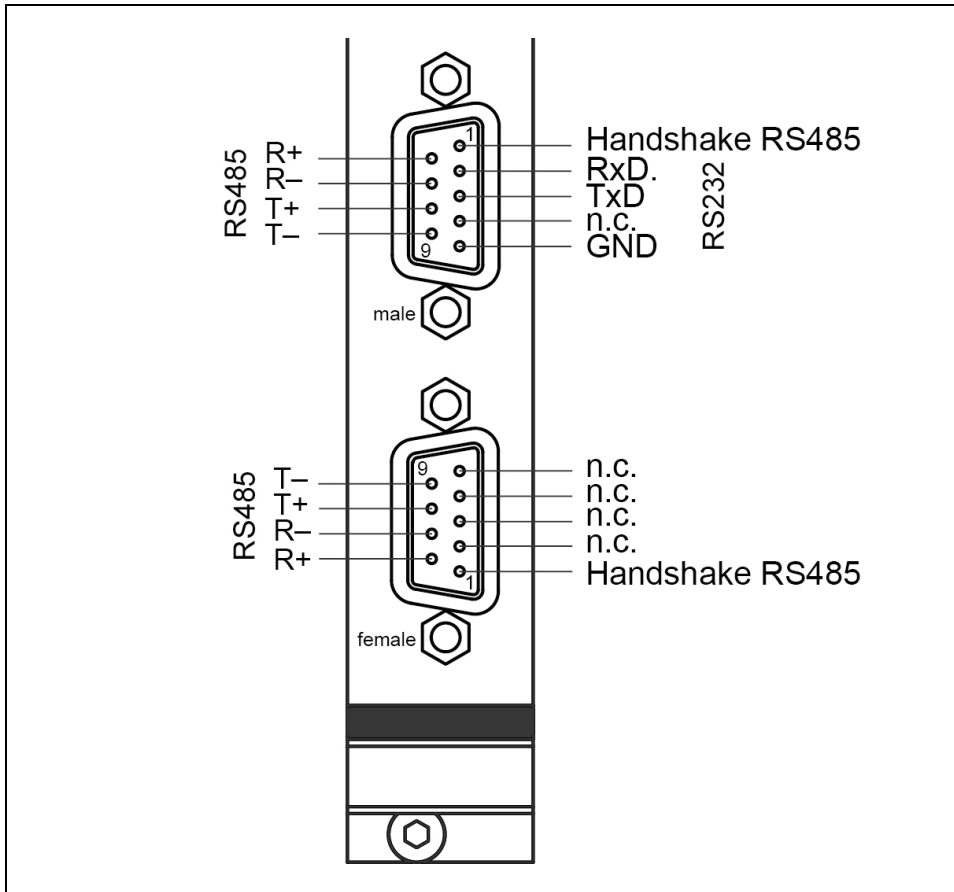


Fig. 2: Pin assignment RS 232 and RS 485

Use the commercially available 9-pin D-SUB connector for RS 232 or RS 485 communication.



### 5.2.3 Connection Plan for CAN

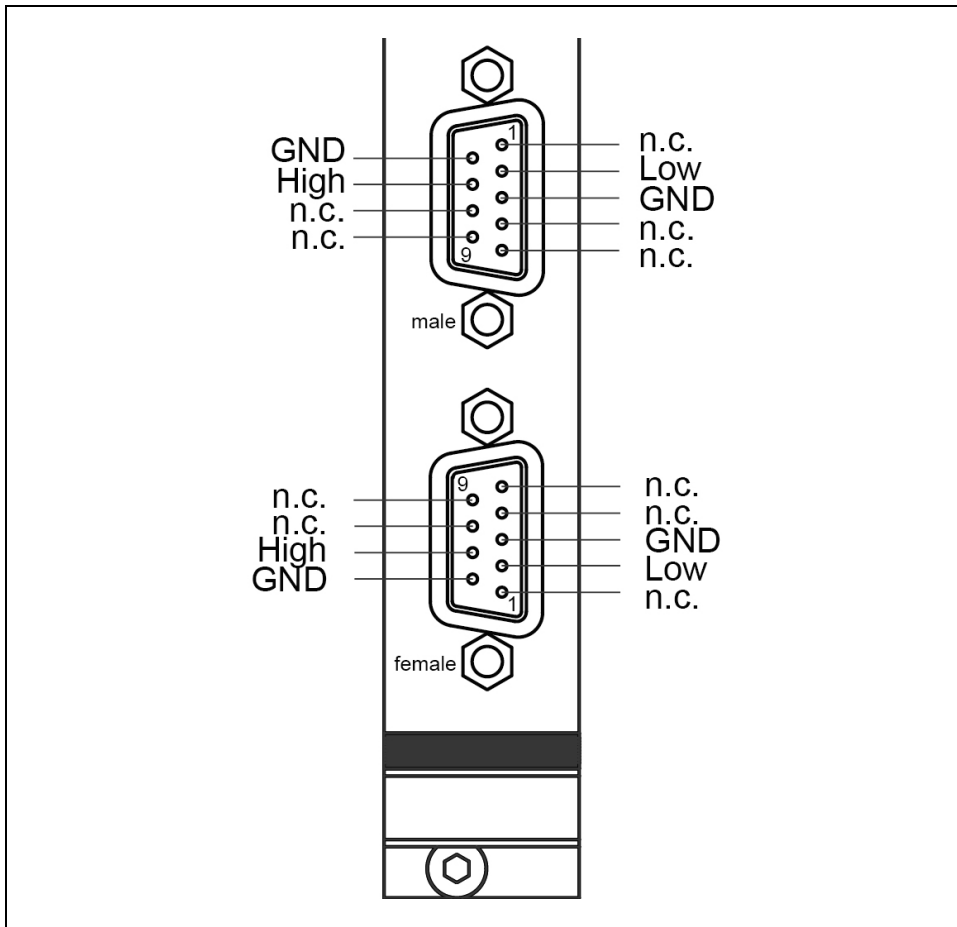


Fig. 3: Pin assignment CAN

Communicate with your HOST via CAN and use two commercially available 9-pin D-SUB connectors.

### 5.2.4 Connection Plan for ProfiBus

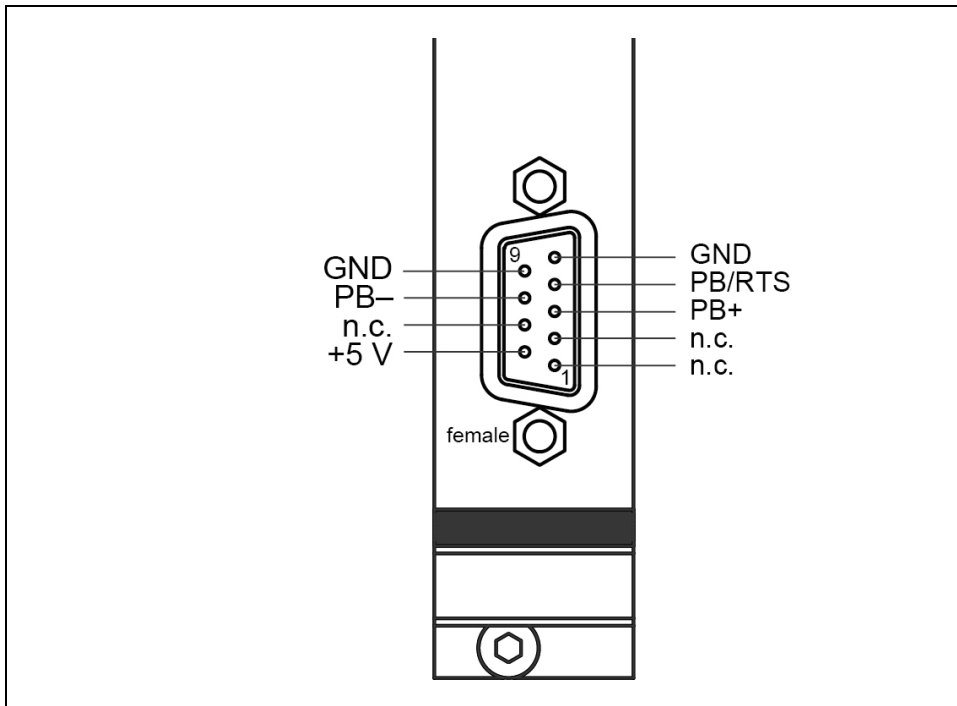


Fig. 4: Pin assignment ProfiBus

For ProfiBus communication use a commercially available 9-pin D-SUB connector.

## 5.2.5 Connection Plan for ProfiNet/Ethernet

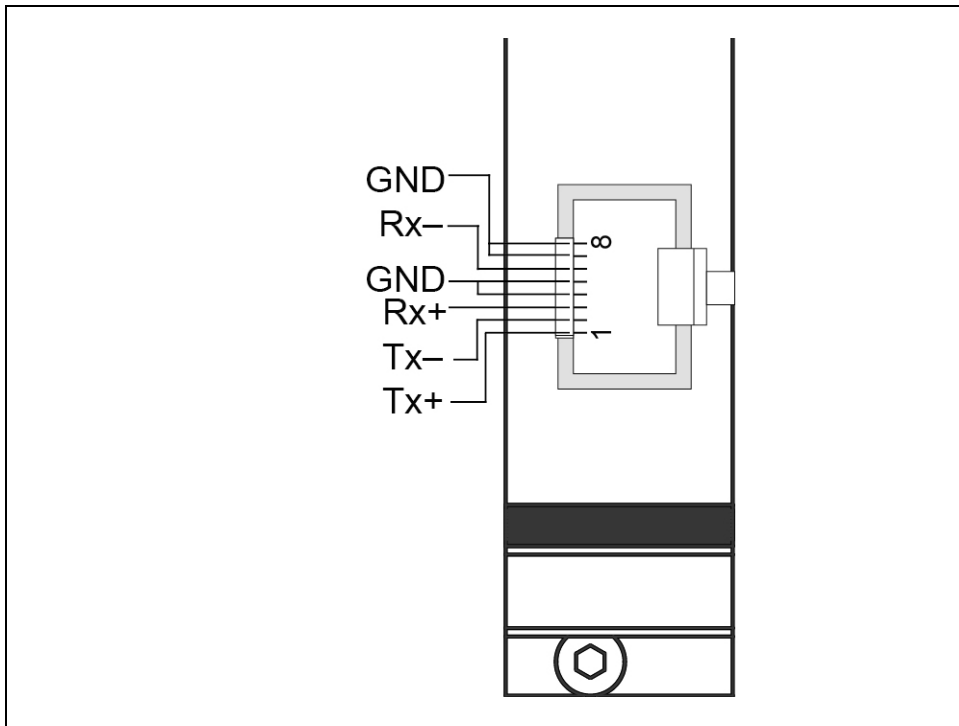


Fig. 5: Pin assignment Ethernet/ProfiNet

ProfiNet and Ethernet hosts are connected with commercially available cable with RJ 45 connectors.

### 6 Commissioning

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Please read the manual for basic commissioning information of the MCM01 module:



#### **Further manual**

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

*“**phyMOTION**<sup>TM</sup> Modular Multi-axis Controller for Stepper Motors”*

The programming environment phyLOGIC<sup>TM</sup> ToolBox is explained in the following manual:



#### **Further manual**

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

*“**phyLOGIC**<sup>TM</sup> ToolBox – Communication Software for the  
**phyMOTION**<sup>TM</sup> Stepper Motor Controller”*

For programming the sequential program please read:



#### **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”*

## 7 Diagnostics by the LEDs

The LEDs indicate the status and error of the MCM01 module by colours and blinking:

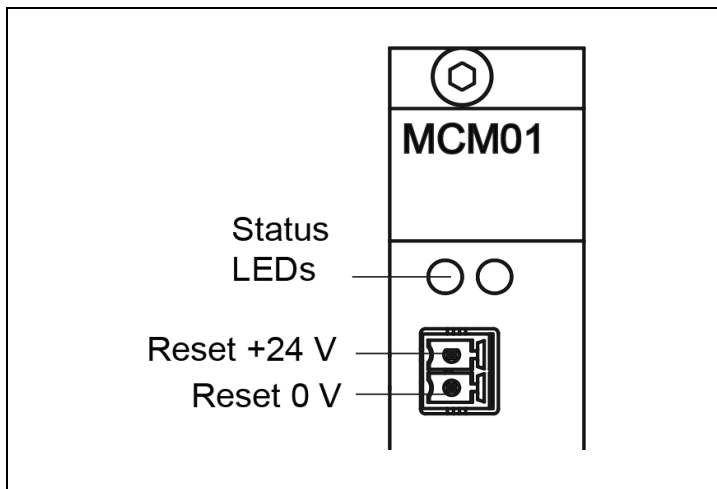


Fig. 6: Status-LEDs

LEDs	left	right
<b>off</b>	–	No program active
<b>green</b>	System o.k., ready	Program active
<b>red</b>	Administration necessary	Program failure
<b>orange</b>	Booting (addressing is running...)	–

### 8 Service

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

First try to identify the technical problem. Feel free to ask our support team for help. We are pleased to assist you.

#### Removal of a module:

- Switch off the *phyMOTION*<sup>TM</sup>'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*<sup>TM</sup> 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.

## 9 Warranty, Disclaimer and Registered Trademarks

### 9.1 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.

### 9.2 Warranty

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The *phyMOTION*<sup>™</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.

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

## 10 Index

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### C

CAN bus 17  
Communication 11  
Copyright 2

### E

Ethernet 19

### H

Host interface 11

### I

Installation 13, 15  
Interface 11

### L

LED 21

### M

Mating connector 15  
Memory 11

### O

Operating modes 11

### P

Power supply 11  
ProfiBus 18  
ProfiNet 19

### R

RJ45 19  
RS 232 16  
RS 485 16

### W

Warranty 23