



PowerView4 – HMI Module

Operating Manual



Original instructions

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Read through this operating manual carefully before use and become familiar with the product. Installation and start-up should not be carried out before reading and understanding this document. Keep this manual readily available so that you can reference it as needed.

1.1 What Is the Purpose of this Operating Manual?

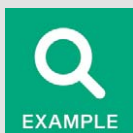
This manual serves as an aid for the installation and operation of the product and supports the technical staff with all operating and maintenance tasks to be performed. Furthermore, this manual is aimed at preventing dangers to life and health of the user and third parties.

1.2 Who Is this Operating Manual Targeted to?

The operating manual provides a code of conduct for personnel tasked with the setup, operation, maintenance, and repair of gas engines. A certain level of technical knowledge with respect to the operation of gas engines and basic knowledge of electronic ignition systems are necessary. Persons who are only authorized to operate the gas engine shall be trained by the operating company and shall be expressly instructed concerning potential hazards.

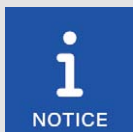
1.3 Which Symbols Are Used in the Operating Manual?

The following symbols are used in this manual and must be observed:



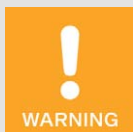
Example

This symbol indicates examples, which point out necessary handling steps and techniques. In addition, you receive additional information from the examples, which will increase your knowledge.



Notice

This symbol indicates important notices for the user. Follow these. In addition, this symbol is used for overviews that give you a summary of the necessary work steps.



Warning

This symbol indicates warnings for possible risks of property damage or risks to health. Read these warning notices carefully and take the mentioned precautionary measures.

1 General Information



Danger

This symbol indicates warnings for danger to life, especially due to high voltage. Read these warning notices carefully and take the mentioned precautionary measures.

1.4 Which Abbreviations/Acronyms Are Used in the Operating Manual?

In the operating manual or the user interface, the following abbreviations/acronyms are used.

Abb.	Term	Description	Explanation
AC	Alternating Current		
ADC	Analog-to-Digital Converter		Component that converts analog input signals into digital signals.
ATDC	After Top Dead Center		
BTDC	Before Top Dead Center		
CAN bus	Controller Area Network bus	Bus for control devices/networks	Asynchronous serial connection system for linking control units
CE	Conformité Européenne	Conformity with EU directives	Mark based on EU legislation for certain products in conjunction with product safety
CiA®	CAN in Automation		Users' and manufacturers' group standardizing CAN protocols
°crank	Degree crankshaft		Unit for the rotation angle of the crankshaft
CSV	Comma-separated Values	Data separated by comma	Text file for storage or exchange of structured data
DC	Direct Current		
DetCon	Detonation Controller		Serves to prevent major engine damage that can be caused by knocking combustion.
DIS	Draft International Standard		Draft ISO standard
EEPROM	Electrically Erasable Programmable Read-Only Memory		Non-volatile electronic memory module whose stored information can be deleted electrically.
ESD	Electrostatic Discharge		

Abb.	Term	Description	Explanation
HMI	Human-Machine Interface		Interface between a human and a machine or a computer
IEC	International Electrotechnical Commission		International organization for standardization in the field of electrical engineering and electronics
I/O	Input/Output		Communication of an information system with the outside world
ISO	International Organization for Standardization		
LSS	Layer Setting Services		Service for configuration of node ID and bit rate in a CAN-open® network
MIC	MOTORTECH Ignition Controller		
MICT	MOTORTECH Integrated Configuration Tool		Software for configuring MOTORTECH devices
MMC	Multimedia Card		Digital storage medium
NMT	Network Management		
PRAK	PIN Reset Authorization Key	Key for resetting all PINs	Key that resets all PINs of the PowerView4.
PRRK	PIN Reset Request Key	Key for applying for a PIN reset key	Key with which the key for resetting all PowerView4 PINs can be requested.
RS232	Recommended Standard 232		Industrial standard for a physical interface for asynchronous serial data transfer
SAE	Society of Automotive Engineers		International organization for standardization in the field of mobility technology
SD card	Secure Digital card	Secure digital data memory card	Digital storage medium
SDHC card	Secure Digital High-Capacity card	Secure, high-capacity digital memory card	Digital storage medium
SPI	Serial Peripheral Interface		Bus system for a synchronous serial data bus
Temp-Scan	Temperature Scanner		Serves for monitoring temperatures of thermocouples
USB	Universal Serial Bus		Serial connection system to link a computer to external devices

2 Safety Instructions

2.1 General Safety Instructions

The following safety instructions must be followed in the area in which the device is operated:



High voltage! Danger to life!

While the engine is running, there is danger to life through high voltage particularly in the area of the ignition system. The following parts should therefore not be touched or removed unless explicitly stated otherwise:

- Ignition coils and caps
- Wires of the high voltage circuit
- In- and output wiring of the ignition controller
- Pickups and their wiring



Danger to persons with implanted cardiac devices!

Electromagnetic impulses in the wiring of the ignition system may exceed the permissible limits of active implanted cardiac devices such as pace-makers or defibrillators. Persons with cardiac devices must therefore not be present in the vicinity of the ignition system being operated. Mark the operating location of the ignition system with the corresponding standardized warning symbol.

MOTORTECH equipment is manufactured as state of the art and therefore safe and reliable to operate. Nevertheless, the equipment can cause risks or damage can occur if the following instructions are not complied with:

- The gas engine must only be operated by trained and authorized personnel.
- Observe all safety instructions of the system and all safety instructions of the system operator.
- Operate the equipment only within the parameters specified in the technical data.
- Use the equipment correctly and for its intended use only.
- Never apply force.
- For all work such as installation, conversion, adaptation, maintenance, and repair, all equipment must be disconnected from the mains and secured against unintentional reactivation.
- Perform only such maintenance and repair work as is described in the operating manual, and follow the instructions given while working.
- Only use spare parts supplied by MOTORTECH for the maintenance of the device.
- Further work must only be performed by personnel authorized by MOTORTECH. Non-compliance with the instructions will void any warranties for the proper function of the equipment as well as the responsibility for the validity of the certifications.
- Safety devices must not be dismantled or disabled.
- Avoid all activities that can impair the function of the equipment.
- Operate the equipment only while it is in proper condition.

- Investigate all changes detected while operating the gas engine or ignition system.
- Ensure compliance with all laws, directives, and regulations applicable to the operation of your system, including such not expressly stated herein.
- If the system is not entirely tight and sealed, gas may escape and result in explosion hazard. The inhalation of gas can also lead to death or severe health damages. Therefore, upon completion of all assembly works, always check the system's tightness.
- Always ensure adequate ventilation of the engine compartment.
- Ensure a safe position at the gas engine.
- There is a risk of burning on hot surfaces. Allow the gas engine to cool down before starting any work.
- Personal protective equipment (PPE), e.g. safety shoes and gloves, must be worn during all work on the gas engine.
- Noise from the system can cause permanent or temporary damage to your hearing. Wear suitable hearing protection at the system.
- Your behavior can reduce possible residual risks to a minimum. Observe responsible handling of the gas engine and the gas-carrying system.

2.2 Electrostatic Discharge Hazards

Electronic equipment is sensitive to static electricity. To protect these components from damage caused by static electricity, special precautions must be taken to minimize or prevent electrostatic discharge.

Observe these safety precautions while you work with the equipment or in its vicinity.

- Before performing maintenance or repair work, ensure that the static electricity inherent to your body is discharged.
- Do not wear clothing made from synthetic materials to prevent static electricity from building up. Your clothing should therefore be made of cotton or cotton mix materials.
- Keep plastics such as vinyl and Styrofoam materials as far away from the equipment and the work environment as possible.
- Do not remove the circuit boards from the housing of the device.

2.3 Information on Electric Isolation

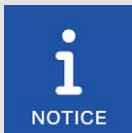
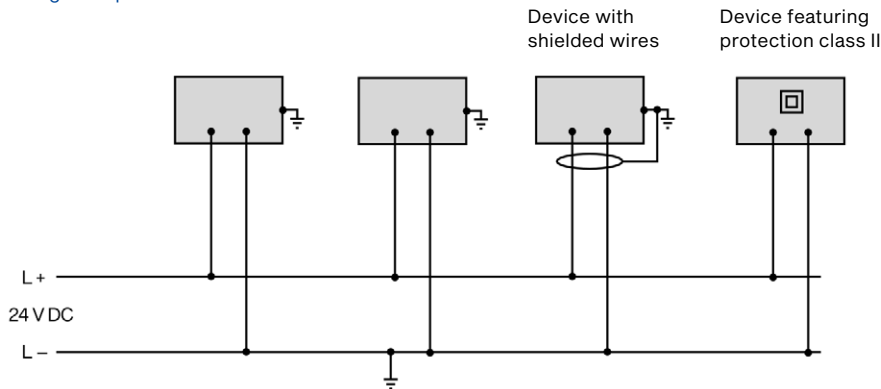
If ground and earth potential are not properly isolated, the following problems as well as others can occur:

- Electromagnetic interferences (e.g. ground loops)
- Signal corruption (e.g. of the analog voltage signal)
- Unwanted leakage currents

Therefore, earth potential and the negative pole of the power supply of all devices in the electric assembly that provide the option, should be connected separately. If possible, the negative pole of the power supply should only be connected to earth potential at one point in the entire system.

2 Safety Instructions

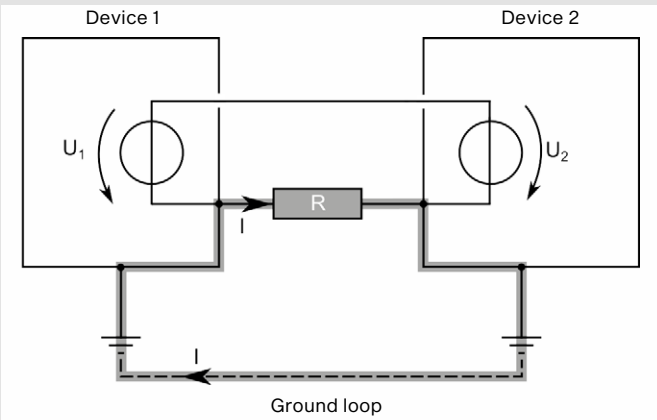
Wiring Example



Occurrence of ground loops

The devices shown in the following image do not feature the possibility to connect the earth potential and the negative pole of the power supply separated from each other. This results in a ground loop.

A ground loop is a ground connection of an electric wiring assembly that is closed as a loop. Due to impedance (resistance $R > 0$) of the loop, low-frequency interference currents can lead to an unwanted voltage drop in the signal path.



2.4 Special Safety Instructions for the PowerView4



Explosion hazard!

The following operations may only be executed providing the environment is classified as non-explosive:

- Establishing and terminating communications via PowerView4 interfaces and connections.
- Inserting and removing memory cards.



Risk of destruction and injury!

The PowerView4 is an electrically operated device, and there is the risk of electrostatic discharges. Therefore, never operate the device without the appropriate grounding, to prevent injuries and damage.



Risk of injury!

The PowerView4 is designed for operation in circuits with **protected extra-low voltage (PELV)**. The voltages in these circuits must not exceed 50 V AC or 75 V DC.

The PowerView4 must not be electrically connected to circuits which carry dangerously high voltages or which could do so if a single fault occurs.

Therefore, the following conditions, among others, must be fulfilled:

- The power supply may only be provided from power supply units with safe electrical isolation or from batteries.
- Relays with safe isolation must be used for coupling to circuits that carry or in the event of a failure could carry dangerous voltage.
- All currently applicable standards and regulations must be taken into account.



Operational safety!

The PowerView4 and the software are not designed for safety-critical applications. The analog and binary inputs and outputs of the PowerView4 system must not be used for safety-critical purposes.

2 Safety Instructions



Risk of destruction!

It is possible to damage the ignition kit and engine through PowerView4 settings. Consequently, protect your device against unauthorized access.

- Enable access control.
- Log out after using the access level employed.



Risk of destruction!

When using the PowerView4, observe the following points:

- Do not let the device fall.
- The device must not come into contact with water and other liquids.
- Do not operate the device in direct sunlight, near heat sources or in humid environments.
- Only operate the device in accordance with the technical specifications.

Disregard of these guidelines can lead to the destruction of the device.



Risk of damage and malfunctions!

Safe operation is no longer guaranteed in the following cases:

- The PowerView4 shows visible damage.
- The display remains dark or shows unusual patterns for a longer period of time.
- The screen saver does not turn off when touching the display.
- The PowerView4 does not react after a restart.

The PowerView4 must then be turned off and must not be used any longer.



Risk of destruction!

The surface of the touchscreen is sensitive to pointed and sharp-edged objects. Therefore handle the touchscreen carefully. Pixel errors due to improper handling are excluded from the warranty.

2.5 Proper Disposal

For the proper disposal of MOTORTECH equipment, observe the information provided at www.motortech.de.

3 Intended Use

3.1 Functional Description

The PowerView4 HMI module visualizes and records engine operating data provided by MOTORTECH control units and is used for monitoring and error analysis in the field.

For further evaluation, recorded engine operating data can be exported to a USB flash drive.

The PowerView4 HMI module has two CAN bus interfaces via which it can be connected to the supported devices.

Using the I/O communication module BPlus specially available from MOTORTECH and I/O modules supporting device profile CiA® 401 or CiA® 404, the PowerView4 can be expanded with physical analog and binary inputs and outputs in order to communicate with other devices, e.g. a master control.

Depending on your purchased device activation, the PowerView4 can integrate the following devices:

- Ignition controller
 - Support of one MOTORTECH ignition controller MIC100, MIC3, MIC3+, MIC4, MIC5, or MIC6 via CAN1
 - Visualization and optionally recording of provided engine operating data
 - Export of recorded engine operating data
 - Runtime adjustment of selected ignition controller settings
- Detonation controller
 - Support of one MOTORTECH detonation controller DetCon2, DetCon16, or DetCon20 via CAN1
 - Visualization and optionally recording of provided engine operating data
 - Export of recorded engine operating data
 - Switching of binary outputs via CAN1 for warnings and errors
- Temperature module
 - Support of up to three temperature modules TempScan20 from MOTORTECH via CAN1
 - Visualization and optionally recording of provided engine operating data
 - Export of recorded engine operating data
 - Complete configuration of temperature module
 - Switching of binary outputs via CAN1 for warnings and errors
- I/O communication module, I/O module (device profile CiA® 401/404)
 - Support of up to three I/O modules supporting device profile CiA® 401 or 404 via CAN1 including a maximum of two I/O communication modules from the manufacturer BPlus, which are specially available from MOTORTECH
 - Use of analog and binary inputs and outputs via CANopen® for communication e.g. with a master control
 - Analog and binary inputs and outputs assignable depending on application
 - No activation required

- Generic device
 - Integration of up to three generic devices not supported by the PowerView4 via CAN1
 - Automatic start of generic device when PowerView4 is started up
 - Connection status monitoring
 - No activation required

3.2 Applications

The PowerView4 must be installed in a control cabinet and is designed for use in a non-hazardous area. The PowerView4 must only be operated with the devices specified for this purpose. The PowerView4 does not support safety-critical applications.

Any use other than the one described in the operating manual shall be considered improper use and will result in the voiding of all warranties.

4 Product Description

4.1 Technical Data

4.1.1 PowerView4

4.1.1.1 Certifications

The PowerView4 is certified as follows: CE

The EU Declaration of Conformity can be obtained on request from your MOTORTECH contact person (see section *Customer Service Information* on page 142).

4.1.1.2 Mechanical Data

The PowerView4 has the following mechanical characteristics.

Feature	Value
Dimensions	206.9 mm x 126.2 mm x 35.6 mm (8.15" x 4.97" x 1.4") (length x width x height)
Weight	861 g (1.9 lbs)
Shape of device	See section <i>Overview Drawings</i> on page 22
Noise level	Fanless design
Mechanical environmental conditions	Protection: IP66 (front), IP20 (rear)
Climatic environmental conditions	Operation: 0 °C to +60 °C (+32 °F to +140 °F) Up to 3,000 m (9,842') above sea level Storage: –20 °C to +70 °C (–4 °F to +158 °F) Up to 10,000 m (32,808') above sea level 5 % to 90 % humidity without condensation

4.1.1.3 Warning Notices on the Device

Warning Notice on Back of Device

WARNING! Read and understand the installation and operating manual prior to installing or making any adjustments. For wiring details refer to the operating manual.

Information Text on Memory Card Slot

To preserve data integrity, do not remove memory card!

Warning Symbol on Back of Device and on Memory Card Slot

Warning



4.1.1.4 Product Identification – Labeling on the Device

The numbers required for unique product identification are on the rear side of the PowerView4:

- Part number of the HMI module (P/N)
- Arrangement number of the HMI module (A/N)
- Revision number of the HMI module indicating its precise construction status (R/N)
- Serial number of the HMI module (S/N)

The device label additionally informs you which device activations your PowerView4 was delivered with:

- Ignition Control: ignition controllers
- Knock Control: detonation controllers
- Temperature Control: temperature modules

P/N	06.05.150
A/N	PV4.00.0000-100-AA-C
R/N	R0103000001-01.00.01
S/N	05043903

PowerView4
MOTORTECH HMI MODULE

Ignition Control	✓
Knock Control	✓
Temperature Control	✓

www.motortech.de

Illustration example

The relevant devices supported by the PowerView4 can be found in the section *Functional Description* on page 16. In certain cases, you can retrofit further devices (see section *Device Activation* on page 53).

4.1.1.5 Electrical Data

The PowerView4 has the following electrical characteristics:

Feature	Value
Power consumption	5.3 W typical, max. 22.8 W
Power supply	Nominal voltage: 24 V DC Operating voltage: 9 V DC to 32 V DC
Required current	Max. 1.5 A
Real-time clock accuracy	± 30 ppm at 25 °C (77 °F)
Internal backup battery	Non-rechargeable lithium manganese dioxide portable battery CR1220, 3 V, 35 mAh Service life: approx. 8 years (depending on application)

4 Product Description

4.1.1.6 Display

The PowerView4 display has the following features:

Feature	Value
Screen diagonal	178 mm (7")
Resolution	800 x 480 pixels
Color depth	18 bit (262,144 colors)
Brightness	400 cd/m² typical
Viewing angle	50°, 70°, 70°, 70° (UDRL)
Touch technology	Projected capacitive multi touch
Backlight service life	50,000 hours typical

4.1.1.7 Interfaces

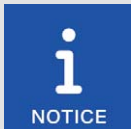
The PowerView4 has the following interfaces:

USB Interface

- Compatible with USB 2.0
- Data rate: 480 Mbit/s (Host)
- Suitable for USB flash drives formatted with FAT (FAT12, FAT16, FAT32)

CAN Bus Interfaces

- Quantity: 2
- Galvanically separated
- Network protocol: CANopen® (CAN1), SAE J1939 (CAN2)
- As per ISO/DIS 11898
- Transmission rate: 250 kbit/s
- Max. cable length 250 m (820')
- The CAN bus interfaces of the PowerView4 are exclusively intended for communication with devices that are supported by the PowerView4.



Do not replace memory card

The PowerView4 is delivered with an SDHC card, which is inserted in the HMI module and is required for recording device data. To ensure the integrity of the data recorded on it, the SDHC card must not be removed or replaced.

To visualize and process recordings of the PowerView4 on a PC, export the desired recordings to a USB flash drive (see section *Recordings* on page 63).

If the SDHC card requires mandatory replacement (e.g. due to a defect), contact your MOTORTECH contact person (see section *Customer Service Information* on page 142).

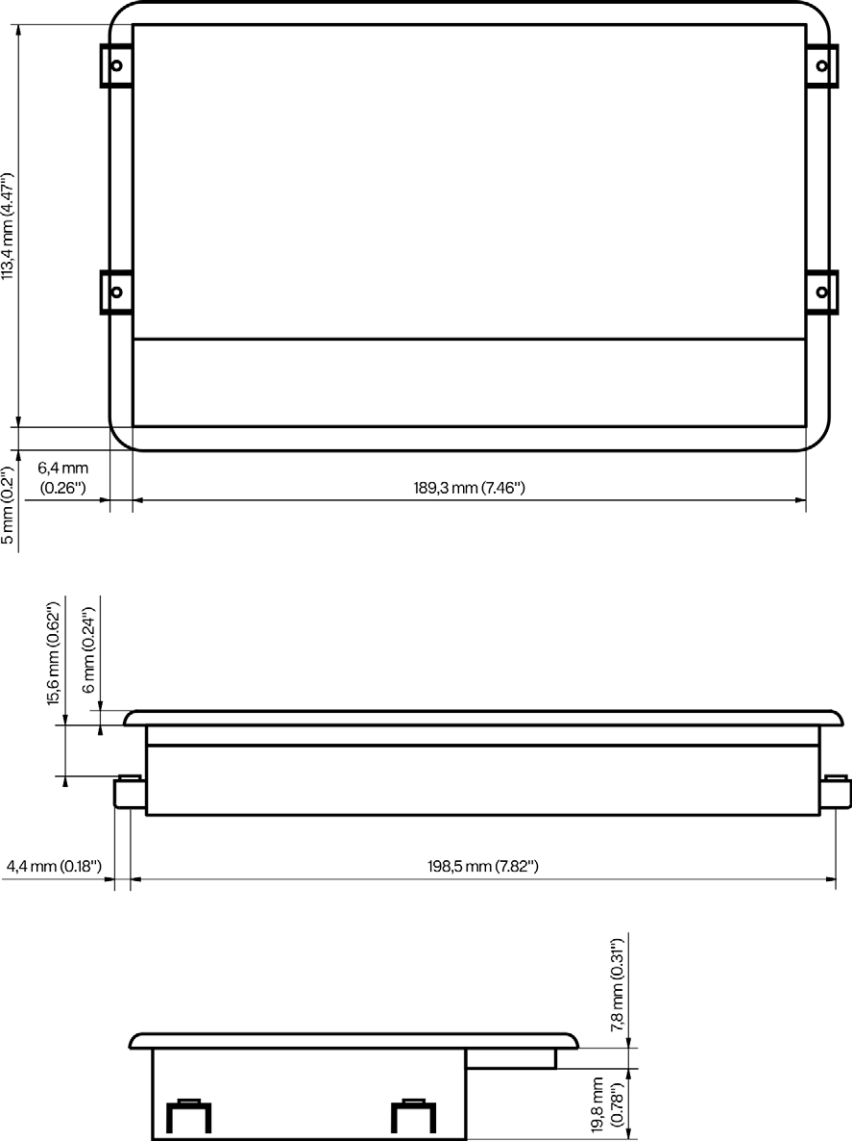
Memory Card Slot

- Supported memory card types: SDHC, SD, MMC
- Formatting: FAT (FAT12, FAT16, FAT32)

4 Product Description

4.1.1.8 Overview Drawings

Dimensions



4.1.1.9 Connections

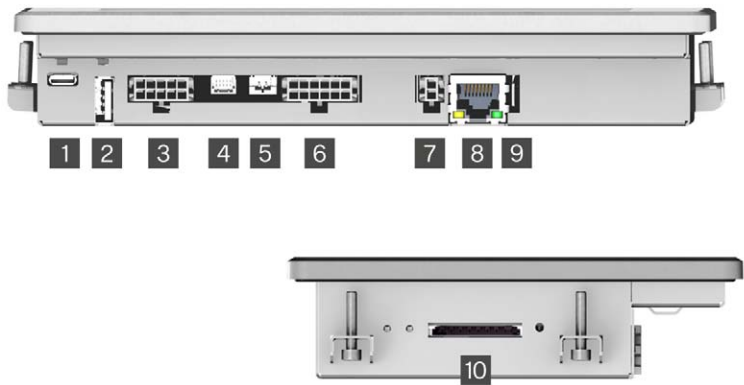


Illustration similar to product

Pos.	Description
1	Micro-USB (no function)
2	USB port
3	Serial interface (no function)
4	SPI/Keypad (no function)
5	Audio (no function)
6	CAN connection (CAN1, CAN2)
7	Power supply
8	Network (no function)
9	Shield connection
10	Memory card slot

4 Product Description

4.1.2 I/O Communication Module BPlus (Optional)

4.1.2.1 Certifications

The I/O communication module BPlus is certified as follows: CE

The EU Declaration of Conformity can be requested from your MOTORTECH contact person (see section *Customer Service Information* on page 142) if required.

4.1.2.2 Mechanical Data

The I/O communication module BPlus has the following mechanical characteristics:

Feature	Value
Dimensions	Without wiring: 100 mm x 97 mm x 48 mm (3.94" x 3.82" x 1.89") (length x width x height)
Weight	Without harnesses: 320 g (0.71 lbs)
Shape of device	See section <i>Overview Drawings</i> on page 25
Mechanical environmental conditions	Protection: IP20
Climatic environmental conditions	–40 °C to +85 °C (–40 °F to +185 °F) Max. 85 % humidity without condensation Up to 2,000 m (6,561') above sea level

4.1.2.3 Product Identification – Labeling on the Device

The numbers required for unique product identification are on the bottom side of the top hat rail spring clip:



Abb.	Meaning
P/N	Part number of the I/O communication module
S/N	Serial number of I/O communication module

4.1.2.4 Electrical Data

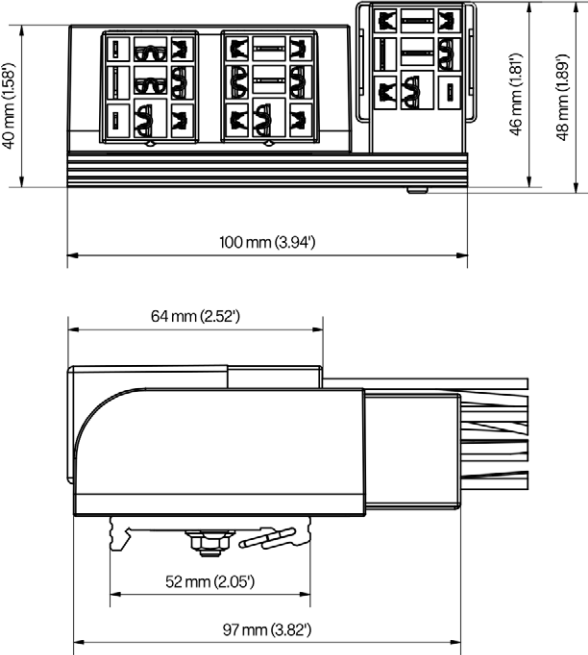
The I/O communication module BPlus has the following electrical characteristics:

Feature	Value
Power consumption	0.72 W with unloaded outputs
Power supply	Nominal voltage: 24 V DC Operating voltage: 8 V DC to 32 V DC
Required current	30 mA at 24 V and with unloaded outputs

Feature	Value
Binary input	Low level: 0 V High level: corresponds to supply voltage Safe low level at 24 V: 0 V to 12 V Safe high level at 24 V: 14 V to 24 V
Binary outputs	Quantity: 3 Plus/ground switching Low level: 0 V High level: corresponds to supply voltage
Analog input	Current range for measured values: 4 mA to 20 mA
Analog output	Output current: 4 mA to 20 mA

4.1.2.5 Overview Drawings

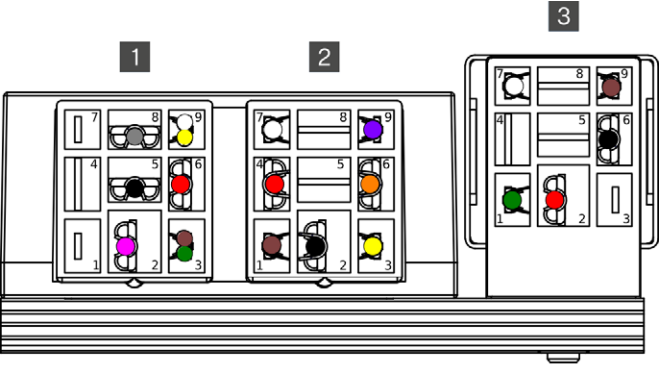
Dimensions



4 Product Description

4.1.2.6 Assignment

The I/O communication module BPlus is designed for wiring via a terminal strip in the control cabinet. The contacts and wires of the module are assigned as follows:



Relay connector left 1

Contact	Wire color	Assignment	Function
1	–	–	Not used
2	Pink	Binary input	Function configurable (see <i>Binary Inputs</i> on page 135)
3	Brown	CAN Lo	CAN connection to the previous device in the CANopen® network
	Green	CAN Lo	CAN connection to the following device in the CANopen® network or connection of the terminating resistor
4	–	–	Not used
5	Black	L –	Supply voltage for I/O communication module BPlus (8 V DC to 32 V DC, nominal voltage 24 V DC)
6	Red	L +	
7	–	–	Not used
8	Gray	Analog input	Function configurable (see <i>Analog Inputs</i> on page 137)
9	White	CAN Hi	CAN connection to the previous device in the CANopen® network
	Yellow	CAN Hi	CAN connection to the following device in the CANopen® network or connection of the terminating resistor

Relay connector center **2**

Contact	Wire color	Assignment	Function
1	Brown	CAN Lo	Internal CAN connection to the right I/O module
2	Black	L –	Pass-through of the supply voltage to the right I/O module
3	Yellow	Binary output 3	Function configurable (see <i>Binary Outputs</i> on page 136)
4	Red	L +	Pass-through of the supply voltage to the right I/O module
5	–	–	Not used
6	Orange	Binary output 2	Function configurable (see <i>Binary Outputs</i> on page 136)
7	White	CAN Hi	Internal CAN connection to the right I/O module
8	–	–	Not used
9	Purple	Binary output 1	Function configurable (see <i>Binary Outputs</i> on page 136)

Relay connector right **3**

Contact	Wire color	Assignment	Function
1	Green	Analog output	Function configurable (see <i>Analog Outputs</i> on page 138)
2	Red	L +	Supply voltage for right I/O module
3	–	–	Not used
4	–	–	Not used
5	–	–	Not used
6	Black	L –	Supply voltage for right I/O module
7	White	CAN Hi	Internal CAN connection to left I/O module
8	–	–	Not used
9	Brown	CAN Lo	Internal CAN connection to left I/O module

5 Functions

5.1 Ignition Controller

The PowerView4 can visualize and record specific engine operating data from supported MOTORTECH ignition controllers (see section *Functional Description* on page 16). You can make runtime adjustments to selected ignition controller settings via the PowerView4. One supported ignition controller can be connected to the PowerView4 via the CAN bus interface CAN1.

A description of the functions and views of an added ignition controller can be found in the section *Ignition Controller* on page 75.

5.2 Detonation Controller

The PowerView4 can visualize and record specific engine operating data from supported MOTORTECH detonation controllers (see section *Functional Description* on page 16). If warnings and errors occur in the detonation controller, the PowerView4 can switch two binary outputs via the CAN bus interface CAN1. One supported detonation controller can be connected to the PowerView4 via the CAN bus interface CAN1.

A description of the functions and views of an added detonation controller can be found in the section *Detonation Controller* on page 104.

5.3 Temperature Module

The PowerView4 can visualize and record engine operating data from supported MOTORTECH temperature modules (see section *Functional Description* on page 16). If warnings and errors occur in the temperature module, the PowerView4 can switch binary outputs correspondingly via the CAN bus interface CAN1. Supported temperature modules are fully configurable via the PowerView4. Up to three supported temperature modules can be connected to the PowerView4 via the CAN bus interface CAN1.

A description of the functions and views of an added temperature module can be found in the section *Temperature Module* on page 112.

5.4 I/O Communication Module BPlus

The optional I/O communication module BPlus available from MOTORTECH provides the PowerView4 with the following inputs and outputs:

- One analog input
- One analog output
- One binary input
- Three binary outputs

Depending on the application, these inputs and outputs can be linked to different functions, for example for signalling warnings and errors to a master control. Up to two I/O communication modules BPlus can be connected to the PowerView4 via the CAN bus interface CAN1.

A description of the functions and views of an added I/O communication module BPlus can be found in the section *I/O Communication Module BPlus, I/O Module (CiA401, CiA404)* on page 130.

5.5 I/O Module (Device Profile CiA® 401/404)

The PowerView4 can use analog and binary inputs and outputs from I/O modules that support the device profile CiA® 401 or 404 and that are connected to the PowerView4 via the CAN interface CAN1. The number of available analog and binary inputs and outputs depends on the I/O module to which the PowerView4 is connected.

Depending on the application, the inputs and outputs can be linked to different functions, for example for signalling warnings and errors to a master control.

Up to three supported I/O modules can be connected to the PowerView4 via the CAN bus interface CAN1. Of these, a maximum of two modules can be the I/O communication modules from BPlus (see section *I/O Communication Module BPlus* on page 28), which are specially available from MOTORTECH.

For more information on the functions and views of an added I/O module, read the section *I/O Communication Module BPlus, I/O Module (CiA401, CiA404)* on page 130 .

5.6 Generic Device

The PowerView4 can integrate up to three devices that it does not support directly, but to which it is connected via the CAN bus interface CAN1 (for example a protocol converter), as a so-called generic device each. Generic devices are started along with the PowerView4, and their connection status is monitored by the PowerView4. Generic devices are not displayed in the start menu, but their connection status is visualized in the menu bar of the PowerView4 and logged in the *Event Log* view. For more information on the generic devices, see section *Generic Device* on page 139.

6 Operation

6.1 Start-up PowerView4

Start up the device as follows:

1. Install the device into a control cabinet with a second person (see section *Installation of PowerView4* on page 33).
2. Connect the device to the supported devices in the CAN bus via the CAN bus interface CAN1 (see sections *Wiring CAN Bus Interface* on page 36 and *CAN Bus Wiring CAN1* on page 40).
3. Establish the power supply (see section *Wiring of Power Supply* on page 38).
 - ▶ The PowerView4 starts automatically after establishing the power supply.
4. Set the time zone as well as the date and time (see section *Display* on page 58).
5. Configure the PowerView4 (see section *Devices* on page 51).

6.2 Shutdown PowerView4

Shut down the device as follows:

1. Interrupt the power supply to the PowerView4 (see section *Wiring of Power Supply* on page 38). Files on the PowerView4 will not be damaged by this.
 - ▶ The PowerView4 switches off automatically after interruption of the power supply.
2. Separate the device from the CAN bus (see section *Wiring CAN Bus Interface* on page 36).
3. If inserted, remove the USB flash drive.
 - ▶ You can dismount the device from the control cabinet with a second person (see section *Installation of PowerView4* on page 33).

6.3 Software Update

**Risk of software damage!**

The power supply must not be interrupted under any circumstances during the software update. Otherwise, this can lead to serious errors and the PowerView4 will no longer work.

**Back up device activations and configuration**

Before updating the software, back up the activated devices (see section *Devices* on page 51) and the PowerView4 configuration (see section *Display* on page 58).

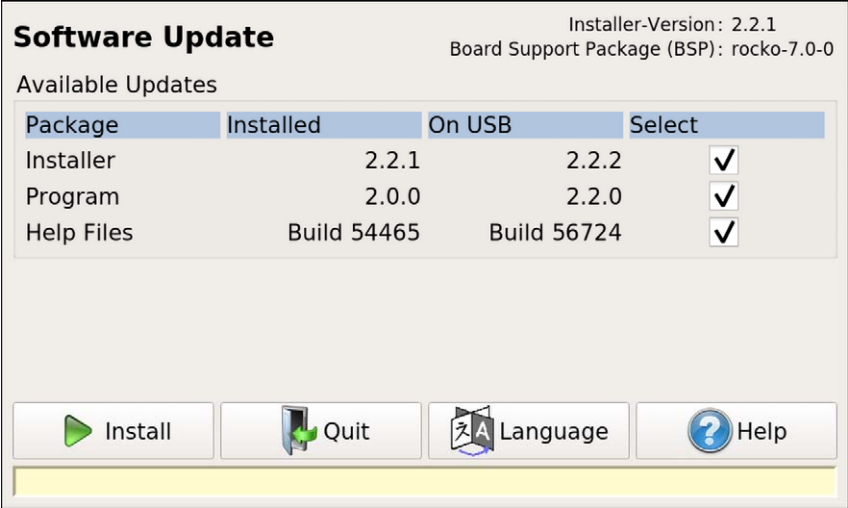
You receive software updates for the PowerView4 from MOTORTECH. A software update consists of several update files with signature files for verification of the update files. You need a USB flash drive to install updates. The current software version of your PowerView4 is displayed in the *Display Information* view (see section *Display* on page 58).

Perform updates as follows:

1. Read and observe all information provided with the update (e.g. release notes, README file).
2. Make sure that the update files correspond to the board support package of your PowerView4. The *Display Information* view (see section *Display* on page 58) displays the installed board support package of your PowerView4. In the file name of the update files, you can identify the board support package by the version number after *BSP* (e.g. *rocko-7.0-0*).
3. Save the update files with the extension *.tar.bz2* and the corresponding signature files with the extension *.sha1* in the root directory of a USB flash drive.

6 Operation

- 4. Insert the USB flash drive into your running PowerView4.
 - ▶ After a few seconds, the standard PowerView4 interface closes, and the installer interface opens.



- 5. Available update packages are displayed in the *Package* column. If necessary, tap on the *Language* button to change the language. Under *Installed* the version of the respective package installed on the PowerView4 is displayed, under *On USB* the version to which the respective package in the PowerView4 will be updated. As a rule, the suitable update packages are preselected. To change the selection if needed, activate or deactivate the checkbox under *Select* for the respective packages. To install the selected packages, tap *Install*.
 - ▶ The selected update packages are installed. After an installer update, the installation of the remaining packages must be restarted by tapping the *Install* button.
 - ▶ Certain update packages may require a restart of the PowerView4.
- 6. After installing the desired update packages, exit the installer by tapping the *Quit* button and remove the USB flash drive.
 - ▶ You can now use the PowerView4 with the new software.

7.1 Unpacking

Unpack the equipment, taking care not to damage it, and ensure that the operating manual is always stored with the equipment and is easily accessible. Check the contents for completeness and verify that the equipment meets your application requirements.

Scope of Supply

The scope of supply of the PowerView4 includes:

- PowerView4 incl. inserted SDHC card (16 GB)
- Cable for power supply (15 m / 49.2")
- Connector for power supply via an MIC ignition controller
- CAN cable (15 m / 49.2")
- Wire end ferrules (8x)
- 120 Ω terminating resistor
- Attachment clamps (4x)
- Attachment screws M3 (4x)
- Storage device with PowerView4 operating manual and MOTORTECH Trend Viewer software for visualizing PowerView4 recordings
- Safety instructions for the PowerView4 HMI module

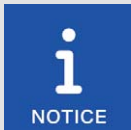
Optional accessories:

- I/O communication module BPlus

7.2 Installation of PowerView4

The PowerView4 is designed for installation in a control cabinet door. For installation, you need the supplied four attachment clamps and M3 attachment screws.

Install the device as follows:



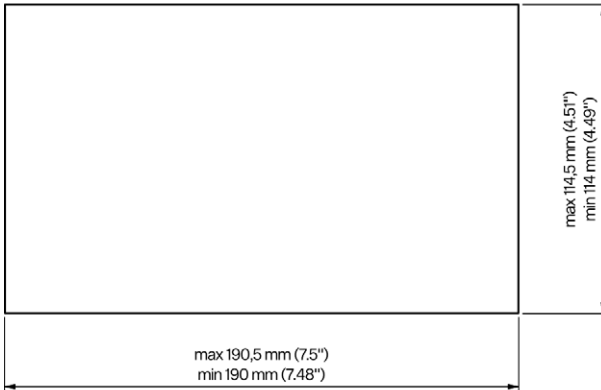
Installation by two people

MOTORTECH recommends that the PowerView4 is installed by two people.

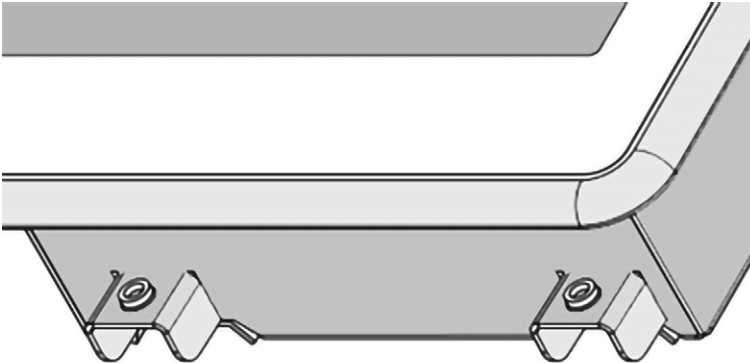
1. Select a suitable place for the PowerView4. When selecting observe the following points:
 - The display must be easily visible and accessible for the user.
 - The interfaces of the device must not be covered by other components and wires (even when the door of the control cabinet is closed).
 - When the door of the control cabinet is closed, a minimum distance of 50 mm (2") to other components and cables must be maintained.
 - The device front has larger dimensions than the cut-out dimensions (see *Overview Drawings* on page 22).

7 Installation Instruction

2. Cut a rectangular opening with the following dimensions into the control cabinet door:



3. Remove sharp edges. In order to prevent corrosion, apply a suitable primer to the cutting edges if necessary and paint the cutting edges with a suitable varnish.
4. Carefully insert the PowerView4 into the opening from the outside.
5. Hold the PowerView4 firmly while a second person hooks in the four attachment clamps in the openings provided for this on the sides of the device.



6. While the second person firmly holds the PowerView4, carefully screw in the four M3 attachment screws from the back.
7. Check if the PowerView4 is mounted tightly in the correct position.
 - ▶ The PowerView4 is installed in the control cabinet.

7.3 Mounting of I/O Communication Module BPlus

In the optional I/O communication modules BPlus, the node IDs are unchangeably pre-configured. The MOTORTECH part number (P/N) tells you which node ID is configured in the respective I/O communication module.

Part number	Node ID
P/N 63.05.014-01	10 (0x0A)
P/N 63.05.014-02	11 (0x0B)

Mount the I/O communication module BPlus with the desired node ID onto a horizontal top hat rail in the control cabinet of the respective engine. In doing so, observe that the CANopen® network to which the PowerView4 and the I/O communication modules BPlus are connected must comply with the maximum cable length of 250 m (820').

7.4 Mounting of I/O Module (Device Profile CiA® 401/404)

For mounting the I/O modules supporting device profile CiA® 401 or CiA® 404, read the manufacturer's documentation accompanying the product.

8 Wiring and Configuration

8.1 PowerView4

The PowerView4 must be securely mounted in a control cabinet before wiring (see section *Installation of PowerView4* on page 33). The PowerView4 must be wired without voltage.



Wiring of components

If you are not using harnesses manufactured by MOTORTECH, carry out the wiring according to the following specifications:

- Power supply:
2-wire cable, min. wire cross-section 0.5 mm²
Ensure that the power supply wires are correctly fused.
- CAN bus:
shielded bus cable in compliance with ISO 11898-2 and CiA® 303-1, e.g. 2-pair (CAN1 or CAN2 only) or 3-pair (both CAN connections), min. wire cross-section 0.25 mm², max. cable length 250 m (820') at 250 kbit/s

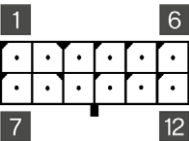
8.1.1 Grounding

Make sure that the HMI module PowerView4 is connected to the earth of the system via its attachment screws. If necessary, connect a separate earth wire to the attachment screws.

8.1.2 Wiring CAN Bus Interface

Connect the 12-pole connector of the supplied CAN cable to the CAN connection of the PowerView4 (position 6 in the section *Connections* on page 23).

The pins of the CAN connection of the PowerView4 are assigned as follows:



Pin	Assignment	Description
1	CAN1	Com Common ground for CAN1 and CAN2
2		Term CAN bus termination on CAN1 when bridged with 3
3		Hi CAN1 Hi
4		Lo CAN1 Lo
5		Term CAN bus termination on CAN1 when bridged with 4
6		– Not to be used

Pin	Assignment	Description
7	CAN2	Com Common ground for CAN1 and CAN2
8		Term CAN bus termination on CAN2 when bridged with 9
9		Hi CAN2 Hi
10		Lo CAN2 Lo
11		Term CAN bus termination on CAN2 when bridged with 10
12		– Not to be used



CAN bus termination

The PowerView4 has a built-in 120 Ω terminating resistor for each CAN bus. In the supplied CAN cable, the corresponding connections for termination on CAN1 and CAN2 are bridged. If the PowerView4 is not to be the first or last device in both CAN buses, you can cut the bridges of the respective connections once.

The conductors of the CAN cable included are assigned as follows:

Color	Assignment
White	Ground for CAN1 (Com)
Yellow	CAN1 Hi
Green	CAN1 Lo
Brown	Ground for CAN2 (Com)
Pink	CAN2 Hi
Gray	CAN2 Lo

If needed, use the supplied wire end ferrules to connect the strands to clamps.

If needed, connect the connector for shielding to the shield connection on the bottom side of the PowerView4 (position 9 in section *Connections* on page 23) in order to connect the common shield of the CAN buses CAN1 and CAN2 to earth potential. For further details on the wiring of the CAN bus at CAN1, read the section *CAN Bus Wiring CAN1* on page 40.

The PowerView4 currently does not support any devices that can be connected to the PowerView4 via the CAN bus interface CAN2.

8 Wiring and Configuration

8.1.3 Wiring of Power Supply

The power supply connection at the PowerView4 is assigned as follows:



Pin	Assignment
1	L –
2	L + (9 V DC to 32 V DC, nominal voltage 24 V DC)

The conductors of the cable included for the power supply are assigned as follows:

Color	Assignment
White	L –
Brown	L + (9 V DC to 32 V DC, nominal voltage 24 V DC)



Switching on the PowerView4

When the power supply of the PowerView4 is connected, the device switches on automatically. If the power supply is interrupted, the device switches off.

You have the following options to supply the PowerView4 with power:

- Via an external power supply
- Via a MOTORTECH ignition controller with service cover and connector strip, provided that you do not supply any other devices with power via the PowerView4

For more information, read the following sections.

8.1.3.1 Wiring with External Power Supply

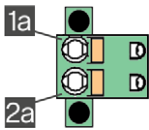
Connect the PowerView4 with the supplied cable for power supply to the external power supply via the corresponding connection at the PowerView4 (position 7 in section *Connections* on page 23). Ensure that the power supply cable is correctly fused. If needed, use the supplied wire end ferrules to connect the strands to clamps.

MOTORTECH does not recommend supplying the PowerView4 with power from the engine's starter battery. Ensure a stable power supply.

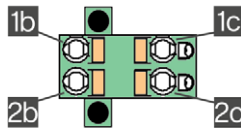
8.1.3.2 Wiring with MOTORTECH Ignition Controller

If you use a MOTORTECH ignition controller with a service cover and connector strip and do not supply any other devices with power via the PowerView4, you have the option of supplying power to the PowerView4 via the ignition controller using the power supply cable provided with the PowerView4. For this purpose, a special connector is included in the PowerView4's scope of supply. The connector for the voltage supply of the ignition controller must be replaced by this one.

Connector supplied with the ignition controller:



Connector supplied with PowerView4:



Proceed as follows:

1. Disconnect the power supply to the ignition controller and, if necessary, to the PowerView4.
2. Remove the connector for the power supply from the ignition controller.
3. Negative terminal: Disconnect the conductor from contact **1a** and insert it into contact **1b** of the connector provided with the PowerView4.
4. Positive terminal: Disconnect the conductor from contact **2a** and insert it into contact **2b** of the connector provided with the PowerView4.
5. Plug the wire L – (white) from the power supply cable provided with the PowerView4 into contact **1c**. For plugging into the contact, use a wire end ferrule provided with the PowerView4.
6. Plug the wire L + (brown) from the power supply cable provided with the PowerView4 into contact **2c**. For plugging into the contact, use a wire end ferrule provided with the PowerView4.
7. Insert the connector provided with the PowerView4 into the power supply connection of the ignition controller.
8. Insert the connector at the other end of the power supply cable from the PowerView4's scope of supply into the PowerView4 power supply connection.
9. Ensure that the power supply cables to the ignition controller and between the ignition controller and the PowerView4 are correctly fused.
10. Connect the device's power supply.
 - ▶ The power supply of the PowerView4 is now provided through the connector on the ignition controller.

8 Wiring and Configuration

8.2 CAN Bus Wiring CAN1

The CAN bus interface CAN1 of the PowerView4 connects the PowerView4 to a CANopen® network. Via this CANopen® network, you connect the PowerView4 to the following devices:

- Ignition controller
- Detonation controller
- Temperature module
- I/O communication module BPlus
- I/O module (device profile CiA® 401 or 404)
- Generic device

Observe the device restrictions in the section *Adding a Device* on page 54.

The PowerView4 functions as NMT manager in the CANopen® network.

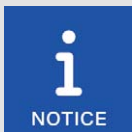
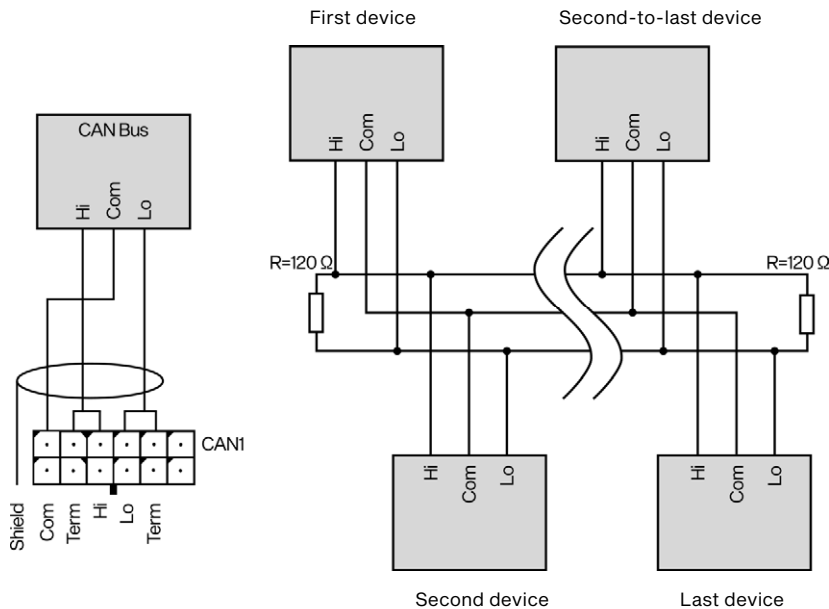
The wiring of the CAN bus requires three conductors (CAN Hi, CAN Lo, and CAN Com). The conductors for CAN Hi and CAN Lo must be twisted wires. At a bit rate of 250 kbit/s, the bus may only have a maximum cable length of 250 m (820') and must be terminated at both ends by a terminating resistor of 120 Ω between the CAN Hi and CAN Lo conductors to prevent reflections.

Only use shielded CAN cables in compliance with the standards ISO 11898-2 and CiA® 303-1. The shield must be connected across the entire bus cable. To avoid ground loops, the shield is to be grounded at only one point, e.g. via the shield connection of the PowerView4 (see section *Wiring CAN Bus Interface* on page 36). If only bus segments are shielded, every bus segment must be grounded at one point each.



CAN bus termination

The PowerView4 has a built-in 120 Ω terminating resistor on CAN1. In the supplied CAN cable, the corresponding connections for CAN1 termination are bridged. If the PowerView4 is not to be the first or last device in the CAN bus on CAN1, you can cut the bridges of the respective connections (see section *Wiring CAN Bus Interface* on page 36) once.



Common mode voltage in CAN bus

If the CAN bus contains devices with CAN bus interfaces that are not isolated from the power supply (e.g. the I/O communication module BPlus available from MOTORTECH), error-free communication of the devices in the CAN bus is only guaranteed if the voltage levels of the signal lines CAN Hi and CAN Lo are within the range of -2 V to $+7\text{ V}$. If this common mode voltage range is not maintained, use a CAN bus insulator (available from MOTORTECH as accessory) for potential isolation between the interfaces.

8 Wiring and Configuration



CAN bus wiring

Note the following when connecting the CAN bus:

- Each bus end must be fitted with a terminating resistor of 120 Ω (see drawing).
- The maximum cable length depends on the bit rate:

Bit rate	Maximum cable length	Maximum length of a stub	Maximum length of all stubs
1 Mbit/s	25 m (82')	1.5 m (5')	7.5 m (25')
800 kbit/s	50 m (164')	2.5 m (8')	12.5 m (41')
500 kbit/s	100 m (328')	5.5 m (18')	27.5 m (90')
250 kbit/s	250 m (820')	11 m (36')	55 m (180')
125 kbit/s	500 m (1,640')	22 m (72')	110 m (360')
50 kbit/s	1,000 m (3,280')	55 m (180')	275 m (902')

- Only use cables that are specified by the manufacturer for use in the CAN bus.
- Comply with the standards ISO 11898-1 and CiA® 303-1.

The PowerView4 is delivered with a bit rate set to 250 kbit/s.

Settings on the Devices

All connected devices are designated as nodes on the CAN bus. Each node is identified by a CANopen®-node ID. These node numbers must be indicated both in the connected devices as well as in the configuration of the PowerView4. Refer to the operating manuals of the respective devices for instructions on how to set the node ID for each device and to determine if further settings must be made to communicate via the CAN bus.

A node ID can only be assigned once within a CAN bus and must be a number between 1 and 127. Note that some devices use several node numbers. The node numbers must be assigned in the configuration after start-up of the PowerView4. Observe that the node IDs of the I/O communication modules BPlus are firmly preset (see section *Device Setup PowerView4* on page 45).



Overview of the CAN bus

Setting up the CAN bus in the CANopen® network requires the following settings:

- Activate CAN interface on the devices if applicable.
- Assign unique CANopen®-node IDs to the devices.
- Set bit rate of all devices to 250 kbit/s.

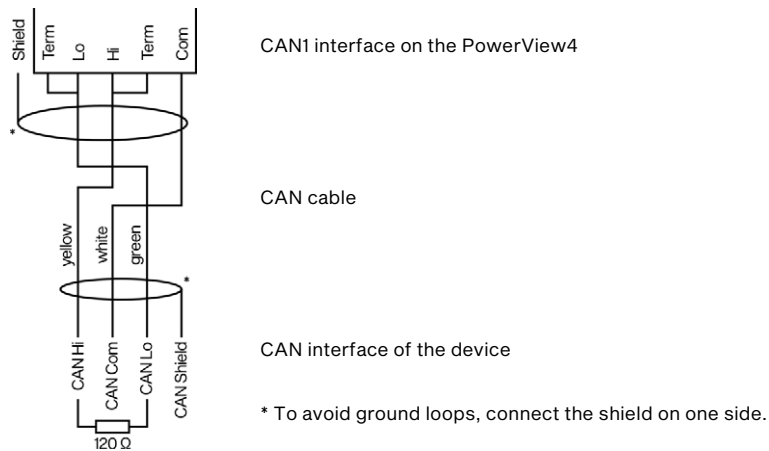


CANopen® protocol

If you require information on the CANopen® protocol of your PowerView4, contact your MOTORTECH contact person (see section *Customer Service Information* on page 142).

Direct Connection Between PowerView4 and a Device in the CANopen® Network

If the PowerView4 is only to be connected to one supported device in the CANopen® network, you can connect the PowerView4 directly to this device using the supplied CAN cable. To do so, you need to insert the connector into the CAN connection of the PowerView4. On the respective device, connect the color-coded conductors of the CAN cable to the corresponding connections, contacts, or conductors of the device's CAN interface.



The connection or contact assignment can be found in the operating manual of the supported device. Regarding the I/O communication module BPlus, refer to the section *CAN Bus Wiring, CAN Bus Termination* on page 44 for more information.

When connecting the CAN cable shield, observe the following with the devices listed below:

- DetCon detonation controller: Place the shield of the CAN cable onto the ground lug of the DetCon.
- TempScan20 temperature module: Lay the shield onto the ground stud of the TempScan20 or connect the shield to the *CAN/RS232 Shield* connection.

8.3 CAN Bus Wiring CAN2

The PowerView4 currently does not support any devices in a J1939 network to which the PowerView4 can be connected via the CAN bus interface CAN2.

8 Wiring and Configuration

8.4 I/O Communication Module BPlus

The following sections describe the wiring and configuration of the optional I/O communication module BPlus.

The I/O communication module BPlus is designed for wiring via a terminal strip in the control cabinet. The I/O communication module must be wired without voltage.

8.4.1 Wiring of Power Supply

The I/O communication module BPlus must be supplied with power via the control cabinet of the respective engine. Connect the black wire L – and the red wire L + of the left relay connector (see position **1** in the section *Assignment* on page 26) to the power supply via a terminal strip in the control cabinet.

To ensure error-free device communication in the CAN bus, make sure that the potential difference between the voltage supply grounds of the I/O communication modules BPlus and the PowerView4 is as small as possible.

8.4.2 CAN Bus Wiring, CAN Bus Termination



Common mode voltage in CAN bus

If the CAN bus contains devices with CAN bus interfaces that are not isolated from the power supply (e.g. the I/O communication module BPlus available from MOTORTECH), error-free communication of the devices in the CAN bus is only guaranteed if the voltage levels of the signal lines CAN Hi and CAN Lo are within the range of –2 V to +7 V. If this common mode voltage range is not maintained, use a CAN bus insulator (available from MOTORTECH as accessory) for potential isolation between the interfaces.

For wiring, use a terminal strip in the control cabinet. On the left relay connector of the I/O communication module BPlus (see position **1** in section *Assignment* on page 26), the white wire CAN Hi and the brown wire CAN Lo are used for the CAN connection to the previous device in the CANopen® network. Use the yellow wire CAN Hi and the green wire CAN Lo of the left relay connector to connect the I/O communication module to the following device in the CANopen® network. If the I/O communication module is the last device in the CANopen® network, connect the supplied 120 Ω terminating resistor to these wires.

Reference ground of the CAN bus interface of the I/O communication module BPlus is the supply voltage ground.

8.4.3 Wiring of Inputs and Outputs



Operational safety!

The PowerView4 and the software are not designed for safety-critical applications. The analog and binary inputs and outputs of the Power-View4 system must not be used for safety-critical purposes.

Wire the binary and analog inputs and outputs of the I/O communication module BPlus via a terminal strip in the control cabinet as needed. For further details on the assignment of the relay connectors, refer to the section *Assignment* on page 26.

Relay connector	Wire color	Assignment
Left	Pink	Binary input
	Gray	Analog input
Center	Yellow	Binary output 3
	Orange	Binary output 2
	Purple	Binary output 1
Right	Green	Analog output

Note that, in the PowerView4, you must assign the desired function to the wired inputs and outputs of the I/O communication module BPlus before you can use them (see section *Preferences* on page 134). To do so, the respective BPlus module must have been added as a device in the PowerView4 (see following section *Device Setup PowerView4* on page 45).

Reference ground of the analog and binary inputs and outputs of the I/O communication module BPlus is the supply voltage ground.

8.4.4 Device Setup PowerView4

For each I/O communication module BPlus you use, add a *BPlus* device in the *Device Setup* view of the PowerView4 (see section *Adding a Device* on page 54).

The node IDs of the I/O communication modules BPlus are unchangeably pre-configured. The MOTORTECH part number (P/N) tells you which node ID is configured in the respective I/O communication module.

Part number	Node ID
P/N 63.05.014-01	10 (0x0A)
P/N 63.05.014-02	11 (0x0B)

8.5 I/O Module (Device Profile CiA® 401/404)

For the wiring and configuration of the I/O modules supporting device profile CiA® 401 or CiA® 404, read the manufacturer's documentation accompanying the product.

9 General Operation

General functions and setting options for the PowerView4 are described in this chapter. You can find information on the menus of added devices in chapter *Devices* on page 75.



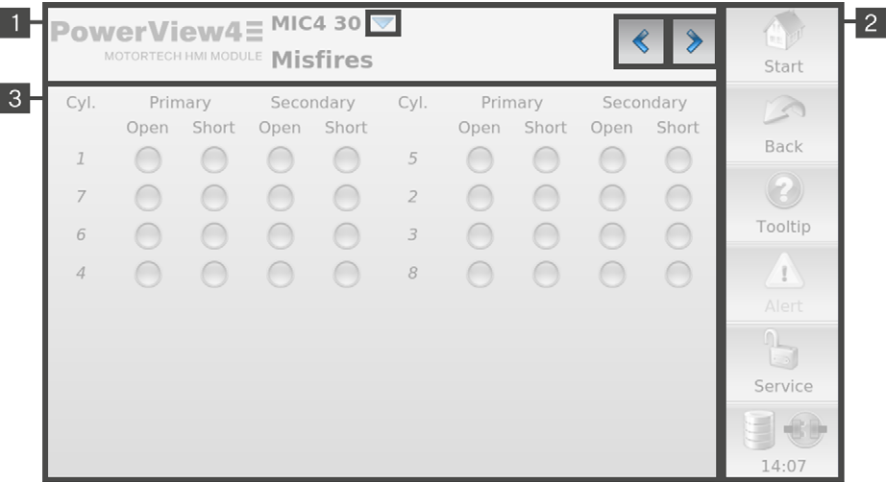
Notice
In this manual, the screenshots and buttons are displayed in day mode. You can find out how to toggle between day and night mode in the section *Start Menu* on page 49.

9.1 Switching on and off the Device

The device is switched on by connection to the power supply and switched off by interrupting the power supply.

9.2 Navigation




The PowerView4 has a touchscreen, which can be operated directly with the finger or a stylus pen suitable for capacitive touchscreens (not included in scope of supply). The screen comprises the following areas:



Title Area ¹

The name of the current view is displayed in the title area of the PowerView4. If you are in a device menu, the device and its node ID set in the PowerView4 are additionally displayed.

By tapping on the logo in the upper left corner, you can display detailed information about the PowerView4 in an information window, regardless of the selected view. If a USB flash drive with the folder *temp* created in its root directory is inserted in the PowerView4, tapping on the logo also creates a screenshot of the current view. An information text in the title bar of the information window informs you about the successfully created screenshot.

In certain views you can access additional options via the button  or open additional views via the buttons  and .

Menu Bar ²




The menu bar on the right-hand side of the screen is always displayed. There is more information in the section *Menu Bar* on page 47.

Main Window ³









In the main window, the PowerView4 is configured, and the device menus of added devices are shown.

9.3 Menu Bar

The menu bar is always displayed and offers the following options and information:

Symbol	Function
 Start	With the <i>Start</i> button you reach the <i>Start Menu</i> . There is more information in the section <i>Start Menu</i> on page 49.
 Back	With the <i>Back</i> button you reach the next higher operating level of the PowerView4.
 Tooltip	<p>Information on the buttons and functions can be displayed in pop-up windows. Proceed as follows:</p> <ol style="list-style-type: none">In the menu bar, tap the <i>Tooltip</i> button.<ul style="list-style-type: none">The <i>Tooltip</i> button is now activated and framed light blue.Tap a button or an area of the display.<ul style="list-style-type: none">A pop-up window with information opens.The <i>Tooltip</i> button is deactivated.Tap the screen at any location to close the pop-up window. <p>To get information about other buttons and areas, the <i>Tooltip</i> button must be reactivated.</p>

9 General Operation

Symbol	Function
	<p>The <i>Alert</i> button in the menu bar can display two states:</p> <ul style="list-style-type: none">– If the button is grayed, there are no new messages.– The button is activated when messages are present. <p>By tapping the activated button, you acknowledge messages and open the <i>Event Log</i> view.</p> <ul style="list-style-type: none">▶ The filter of the <i>Event Log</i> view is automatically set so that only messages of devices that have reported alarms, warnings, or errors are displayed.▶ The <i>Alert</i> button is grayed out.▶ In the <i>Start Menu</i>, devices which had a yellow frame now get a turquoise frame again.
	<p>This button informs about the status of the access control:</p> <ul style="list-style-type: none">– <i>Operator, Service, Master</i>: The corresponding access level is set.– <i>Locked</i>: The <i>Read Only</i> access level is set.– <i>Disabled</i>: The access control is disabled. <p>By tapping this button, you can access the <i>Access Control</i> view. There is more information in the section <i>Access Control</i> on page 67.</p>
	<p>Status information of added devices is shown in the lowest field of the menu bar.</p> <p>If, for supported devices (ignition controller, detonation controller, temperature module), the recording of trend data is activated (see section <i>Devices</i> on page 51), the database symbol provides information on the following states:</p> <ul style="list-style-type: none"> Trend data is being recorded onto the memory card inserted in the PowerView4. An error has occurred while recording the trend data (e.g. insufficient memory space on memory card, memory card not readable). <p>For all added devices, the communication status symbol provides information about the following states:</p> <ul style="list-style-type: none"> There is a connection to all added devices. The connection is not established to all added devices. No other device is connected. <p>The system time is displayed at the very bottom.</p> <p>If you tap the button for the connection status, the <i>Event Log</i> view opens. There is more information in the section <i>Event Log</i> on page 72.</p>

9.4 Start Menu

The *Start Menu* will be displayed after the PowerView4 has started. You can access the *Start Menu* any time via the *Start* button in the menu bar.



You have the following options in the *Start Menu*:

Devices

With this button you open the *Device Setup* view, in which you can add new devices and edit device settings. There is more information in the section *Devices* on page 51.

Display

With this button, you open the *Display Configuration* view. Among other things, you can set the language and system time of the PowerView4 and activate a screen saver. There is more information in the section *Display* on page 58.

Connection

With this button, you open the *Communication Setup* view. You can change the node ID and the bit rate of the PowerView4 and of all LSS-capable devices to which the PowerView4 is connected via the CAN bus interface CAN1. There is more information in the section *Connection* on page 61.

9 General Operation

Night Mode / Day Mode

With this button, you can change the display colors to ensure legibility under various lighting conditions.



Recordings

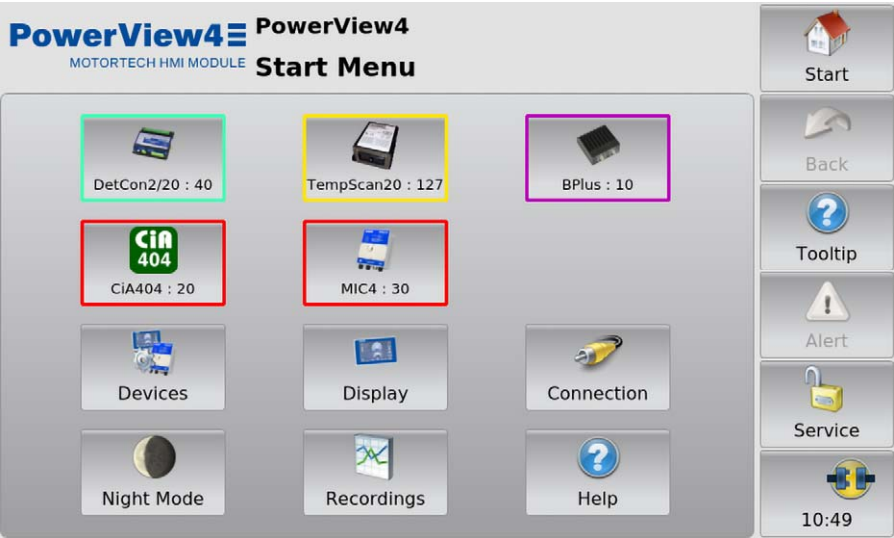
With this button, you open the *Recorded Files* view. You can display and administer recorded trend data of certain devices from the inserted memory card. There is more information in the section *Recordings* on page 63.

Help

This button opens the operating manual of the PowerView4. There is more information in the section *Help* on page 74.

Added Devices

The buttons of added devices each contain a device icon, the device name, and the node ID configured in the PowerView4. The frames of the buttons can take different colors.



The frames of the device buttons have the following meaning:

- Turquoise: There are no errors.
- Yellow: There are one or more messages for the device. Acknowledge the messages via the *Alert* button (see section *Menu Bar* on page 47).
- Purple: The device is not activated (see section *Device Activation* on page 53).
- Red: The device is not connected. Check the connection and connection settings.

Tapping on a device opens the *Main Menu* of the particular device. For information on how to configure devices, see section *Devices* on page 75.

9.4.1 Devices

The *Devices* button in the *Start Menu* opens the *Device Setup* view.



The *Device Setup* view provides the following options:

- [List of Added Devices](#)
In this field, all added devices are listed. If you tap a device, the class, the node ID, and the logging status of the device are displayed below.
- [Edit](#)
With the button you open the *Edit Device* dialog. You can find more information in the section *Editing a Device* on page 56.
- [Logging](#)
With the button, you can select for certain devices (ignition controller, detonation controller, temperature module) whether trend data of the device should be recorded on the memory card inserted in the PowerView4. There is more information in the section *Logging Device Data* on page 57.

9 General Operation

- **Add**
With the button you open the dialog *Add Device*. You can find more information in the section *Adding a Device* on page 54.
- **Delete**
Tap this button to delete an added device. You can find more information in the section *Deleting a Device* on page 56.
- **Device Activation**
The PowerView4 HMI modules are activated differently ex works. In certain cases, you can activate additional devices in the PowerView4 with software dongles from MOTORTECH. There is more information in the section *Device Activation* on page 53. With the *Back up* button, you can save all device activations to a USB flash drive (e.g. before software updates). A device-specific software dongle is stored on the USB flash drive for each activated device, including those activated ex works. If necessary, you can re-activate the devices with these software dongles.
- **Binary Outputs**
The PowerView4 provides the binary outputs *Warning* and *Error* virtually via the CAN bus interface CAN1. In order to use them in the CAN bus, they must be activated in the PowerView4. Additionally, they can each be connected to a physical binary output of an optional I/O module (see section *Binary Outputs* on page 136). Observing the following safety instructions, you can use the *Unlock* button to activate the binary outputs *Warning* and *Error* and the *Lock* button to deactivate them. The status displays *Warning* and *Error* indicate the switching status of these binary outputs.



Operational safety!

The PowerView4 and the software are not designed for safety-critical applications. The analog and binary inputs and outputs of the PowerView4 system must not be used for safety-critical purposes.

- **Test**
For test purposes, you can switch the binary outputs *Warning* and *Error*, which the PowerView4 provides virtually via the CAN bus interface CAN1, on and off. To do so, use the *Test* button to open the *Binary Output Test* window. In this window, you can switch the binary outputs while observing the following safety instructions and thereby test the behavior of the devices that are connected to these binary outputs.



Operational safety!

Testing the outputs affects the connected devices. Before performing tests, make sure that switching the outputs will not result in hazards or damage.

– Demo

To access the device-specific pages for demonstration or pre-configuration without the device being connected, you can activate and deactivate the demo mode by tapping the button while observing the following safety instructions. The demo mode is indicated in the information bar in the logo by the text *DEMO MODE*.



Operational safety!

The demo mode is not a normal operating state of the PowerView4. In combination with other devices the PowerView4 must not be operated in demo mode.

9.4.1.1 Device Activation

For certain devices, activation is required in order to add and use them in the PowerView4 (see section *Adding a Device* on page 54).

If your PowerView4 HMI module is not activated for a specific device ex works, you may retrofit the device in certain cases by purchasing a software dongle from your MOTORTECH contact person (see section *Customer Service Information* on page 142). With this software dongle, you then activate the respective device in your PowerView4. After activation, you can add the device to the device configuration of your PowerView4.

Software dongles are tied to the respective PowerView4 via the serial number. For retrofitting your PowerView4 with a software dongle, you need to specify its serial number. You can find the serial number on the device label of your PowerView4 (see section *Product Identification – Labeling on the Device* on page 19) or display it in the PowerView4 in the *Display Information* view (see section *Display* on page 58).

If you have received a software dongle from MOTORTECH, proceed as follows to activate the respective device in the PowerView4:

1. The PowerView4 reads software dongles from a USB flash drive inserted in the PowerView4. Therefore, ensure that the desired software dongle from MOTORTECH is on a USB flash drive.
2. Insert the USB flash drive with the desired software dongle into your PowerView4.
3. In the *Device Setup* view in the area *Device Activation*, tap *Activate*.
 - ▶ The storage locations available are displayed in a window.
4. Navigate to the desired software dongle with the file extension *.usd* and select it.
5. Tap *Enter*.
 - ▶ The device is activated.
 - ▶ You can add the device in the PowerView4 (see section *Adding a Device* on page 54) and use it.

9 General Operation



Activating multiple devices

If you have multiple software dongles for device activation, you can alternatively copy the software dongles into one folder on the USB flash drive. Then mark this folder in the device activation selection window so that the PowerView4 reads all the software dongles that are in this folder.

9.4.1.2 Adding a Device



Maximum number of added devices

You can add a maximum of ten devices in the PowerView4. In addition, you can add a maximum of three devices of the type *Generic*.

The following restrictions apply to the following devices: You can add a maximum of one ignition controller, one detonation controller, three temperature modules, and three I/O modules including a maximum of two I/O communication modules BPlus.



To add a device, proceed as follows:

1. In the *Device Setup* view, tap the *Add* button.
 - ▶ The dialog *Add Device* opens.

2. Select the device. For information on the *Generic* device, read the section *Generic Device* on page 139.



This symbol next to a device indicates this device has been activated at least once. You can add the device multiple times until the maximum number of activated devices of this type is reached. In certain cases, you can retrofit additional devices (see section *Device Activation* on page 53).

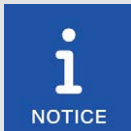


This symbol next to a device indicates that no activation is required for the device. The device can be added to the device configuration if its maximum number has not been exceeded.



This symbol next to a device indicates that the device has not been activated and cannot be added to the device configuration. In certain cases, you can retrofit additional devices (see section *Device Activation* on page 53).

3. Set the node ID of the device that is to be added with the arrow keys.



Node ID

The node ID entered must correspond to the node ID of the device to be added. To learn about the node ID, refer to the operating manual of the respective device.

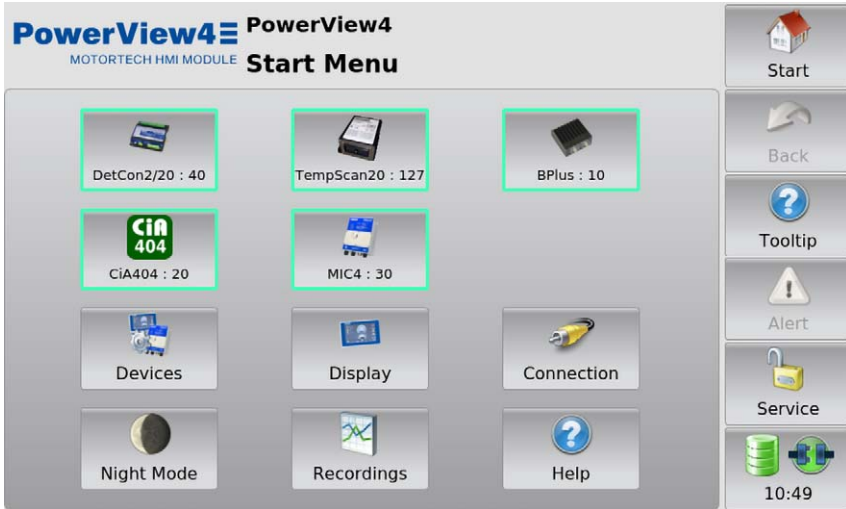
4. Confirm your entry via the Save button.

- The dialog is closed, and you are returned to the *Device Setup* view. The device is displayed in the list of added devices with device class and node ID.

5. To add more devices, repeat steps 1 to 4.

9 General Operation

- When you tap *Start* in the menu bar, the added devices are displayed in the *Start Menu* with node ID.



9.4.1.3 Editing a Device

In order to edit the settings for a device, proceed as follows:

- In the *Device Setup* view, select the device whose settings you want to change from the list of added devices.
- Tap the *Edit* button.
 - The dialog for editing devices opens.
- Set the device and the node ID.
- Tap *Save*.
 - The dialog is closed.
 - The device is displayed with changed settings in the *Device Setup* view and in the *Start Menu*.

9.4.1.4 Deleting a Device

To delete an added device, proceed as follows:

- In the *Device Setup* view, select the device you want to delete from the list of added devices.
- Tap *Delete*.
 - The device is no longer displayed in the *Device Setup* view and in the *Start Menu*.

9.4.1.5 Logging Device Data

The PowerView4 enables you to record trend data (e.g. speed, knocking intensity, and temperature) from certain added devices (ignition controller, detonation controller, temperature module) onto the memory card inserted in the PowerView4. You can then display and administer the recordings with the PowerView4 (see section *Recordings* on page 63) or the MOTORTECH Trend Viewer (see section *Processing Data on the PC* on page 66). For each supported device, you can start and stop the recording of trend data in the *Device Setup* view (see section *Devices* on page 51).




Recording data


If the power supply to the PowerView4 is interrupted during recording or the inserted memory card is removed, data will be lost.

Each time you restart the PowerView4 and each time you insert a memory card, a new recording file is created.

Starting a Recording

1. In the *Device Setup* view, mark the device whose data you want to record in the list of added devices. If the device has the recording status *Off* under *Logging*, no data is recorded from the device.
2. Tap the *Logging* button.
 - ▶ The recording status of the device in the list of added devices changes to *On*.
 - ▶ If the device is connected to the PowerView4 and switched on, a database symbol  in the menu bar indicates that data is being recorded.
 - ▶ You can start or end more recordings and use other functions of the PowerView4 without an active recording ending.
 - ▶ The recording is not interrupted by the screen saver.

Ending a Recording



1. From the list of added devices in the *Device Setup* view, select the device from which you no longer wish to record data. If the device has the recording status *On* under *Logging*, data is recorded from the device.
2. Tap the *Logging* button.
 - ▶ The recording status of the device in the list of added devices changes to *Off*.
 - ▶ The recording is ended. The database symbol  in the menu bar disappears if no more data is being recorded from other devices.
 - ▶ You can administer and display the recorded data (see section *Recordings* on page 63).

9 General Operation

9.4.2 Display

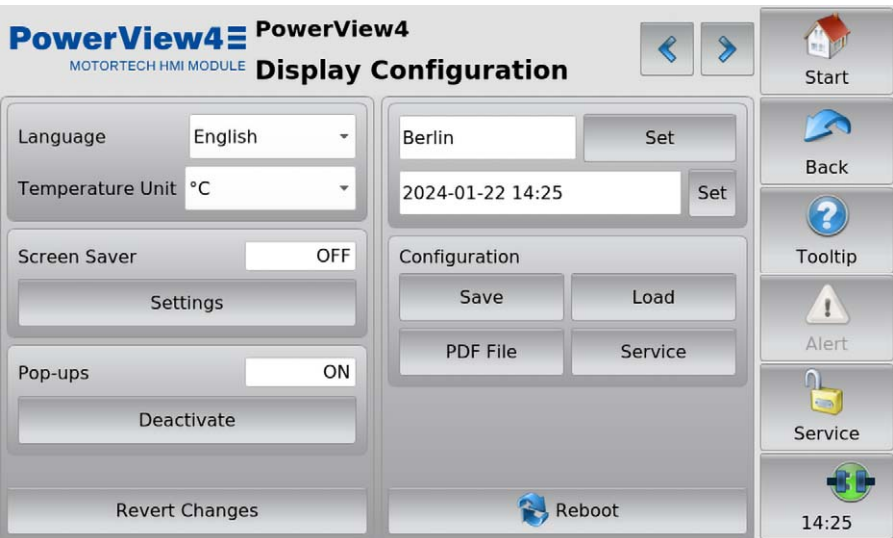
The *Display* button in the *Start Menu* opens the following views:

- *Display Configuration*
- *Display Information*

The  and  buttons allow you to switch between the views.

The views are described as follows.

Display Configuration



You have the following options:

- **Language**
Select the desired system language.
- **Temperature Unit**
Select, whether temperatures in the PowerView4 are to be displayed in °C or in °F. Recordings are likewise created in the units selected.
- **Screen Saver**
Tap *Settings* to configure the screen saver. When the screen saver has been activated, the display is darkened and switched off after a specified time (*Power Save* option) or a slide show starts. In addition, the PowerView4 is placed on the access level *Read Only* (displayed status *Locked* in the menu bar). By touching the display, a running screen saver is stopped.
- **Pop-ups**
Activate or deactivate pop-ups with information for the user. Important pop-ups, e.g. with information on errors, are always displayed. Pop-ups which e.g. provide information on successful actions can be deactivated.

- **Revert Changes**
Tap *Revert Changes* to restore the last saved configuration state. Date and time are not reset.
- **Time Zone**
Tap *Set* to set the time zone.
- **Date, Time**
Tap *Set* to set the system time and date. Your configuration options depend on the access level you are logged in to (see section *Access Control* on page 67).
- **Configuration**
You have the following options:
 - **Save**
Save the configuration of your PowerView4 to a USB flash drive inserted in the PowerView4. One file is created each for the configuration of the PowerView4 and one file for each added temperature module and I/O module. This enables you to easily restore the configuration of your PowerView4 or transfer it to another PowerView4 using a USB flash drive. With the temperature module and I/O module, the configuration of deleted devices is also saved so that it is also available on another PowerView4 if you add the device with an identical node ID to the device configuration. The following configuration files are saved:

File	Content
Configuration.xml	General configuration of the PowerView4 including the list of added devices from the <i>Device Configuration</i> view
TempScanxxx.xml	Configuration of a temperature module with node ID xxx
Dev401_xxx.json	Configuration of an I/O communication module BPlus or an I/O module supporting device profile CiA® 401 with node ID xxx
Dev404_xxx.json	Configuration of an I/O module supporting device profile CiA® 404 with node ID xxx
 - **Load**
Load a configuration of your PowerView4 stored on a USB flash drive. For this, select the desired configuration files via the displayed context menu.
 - **PDF File**
Save a PDF document with information on the configuration of your PowerView4 to a USB flash drive.
 - **Service**
Creates a service report in English as a PDF document on a USB flash drive. In addition to the configuration information, this service report also contains information on memory usage and a list of events. To receive the best possible support, send the service report to your MOTORTECH contact person (see *Customer Service Information* on page 142) for service requests.
 - **Reboot**
With the *Reboot* button, you carry out a reboot of your PowerView4. Unsaved settings will get lost, and databases will be closed!

9 General Operation

Display Information

In the *Display Information* view, you can find the following information:


- Display ID
- MOTORTECH serial number
- Arrangement number
- Board support package version
- Software version of your PowerView4


PowerView4
MOTORTECH HMI MODULE


PowerView4
Display Information


←


→



Start


Back


Tooltip


Alert


Service


10:49

Display ID	03238295
MOTORTECH S/N	05043903
Arrangement Number	PV4.00.0000-100-AA-C
Board Support Package	rocko-7.0-0
Software	2.2.0

In demo mode (see section *Devices* on page 51), data on the Ethernet connection of the PowerView4 is additionally displayed for service purposes. The Ethernet interface of the PowerView4 is intended exclusively to be used by MOTORTECH service.

9.4.3 Connection

The *Connection* button in the *Start Menu* opens the *Communication Setup* view.

PowerView4 **PowerView4**
MOTORTECH HMI MODULE **Communication Setup**

PowerView4
Node ID 66
Bit Rate
500 kbit/s 125 kbit/s
● 250 kbit/s 100 kbit/s
Save Reset

LSS Commands
Node ID 127
Bit Rate
500 kbit/s 125 kbit/s
● 250 kbit/s 100 kbit/s
Send Command

Start
Back
Tooltip
Alert
Service
17:24



Bit rate settings in the CAN bus

For communication via the CAN bus, it is mandatory that all connected devices use the same bit rate. MOTORTECH devices are usually delivered with a bit rate set to 250 kbit/s.

If the PowerView4 is connected to a CANopen® network via the CAN bus interface CAN1, you can make the following settings for this network in the *Communication Setup* view:

PowerView4

Changing Node ID

The factory setting for the node ID on your PowerView4 is 66. Change the node ID as follows:

1. You can set a node ID for your PowerView4 in the *PowerView4* area using the arrow keys.
2. Tap *Save* to confirm the setting of the node-ID.
 - ▶ The node ID of the PowerView4 is changed.

The changed node ID will be discarded if you tap *Reset* before saving or leave the *Communication Setup* view without saving.

9 General Operation

Changing Bit Rate

Change the bit rate of the PowerView4 as follows:

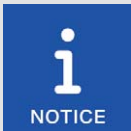
1. Select the desired bit rate in the *PowerView4* area.
2. Tap *Save*.
 - ▶ The bit rate of the PowerView4 is changed.

The changed bit rate will be discarded if you tap *Reset* before saving or leave the *Communication Setup* view without saving.

Other Devices

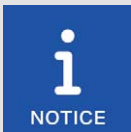
If supported by the respective device, you can use LSS commands to change the node ID and the bit rate of devices in the CAN bus on CAN1. The following MOTORTECH device supports changing the node ID and bit rate via LSS commands:

- Temperature module TempScan20



LSS commands: Disconnect all other devices from the CAN bus!

When sending LSS commands, all devices connected to the CAN bus via CAN1 are addressed. In order to change the bit rate or the node ID of the desired device only, no other devices may be connected to the PowerView4 via CAN1.



LSS commands: Use identical bit rates!

LSS commands can only be received from another device in the CAN bus if the LSS manager (here: PowerView4) is set to the bit rate of the other device. If necessary, set the corresponding bit rate in the PowerView4 before sending the LSS command.

Changing Node ID

You can change the node ID of another device in the CANopen® network as follows:

1. Make sure that the current bit rate of the other device is set in the PowerView4.
2. Make sure that there is only the other device connected to the PowerView4 via CAN1.
3. Set the node ID that the other device is to be given in the *LSS Commands* area.
4. Tap *Send Command*.
 - ▶ The node ID of the other device is changed.
5. If you have changed the bit rate of the PowerView4 in step 1, set the PowerView4 back to the previous bit rate in the *PowerView4* area, if required.

Changing Bit Rate

You can change the bit rate of another device in the CANopen® network as follows:

1. Make sure that the current bit rate of the other device is set in the PowerView4.
2. Make sure that there is only the other device connected to the PowerView4 via CAN1.
3. Make sure that the current node ID of the other device is set in the *LSS Commands* area. Otherwise, it will be changed accordingly when the LSS command is sent.
4. Select the bit rate that the other device is to be given.
5. Tap *Send Command*.
 - The bit rate and the node ID of the other device are changed.
6. If you have changed the bit rate of the PowerView4 in step 1, set the PowerView4 back to the previous bit rate in the *PowerView4* area, if required.

9.4.4 Recordings

The PowerView4 allows you to record trend data from certain added devices (ignition controller, detonation controller, temperature module) on the memory card inserted in the PowerView4. The *Recordings* button in the *Start Menu* opens the *Recorded Files* view, which allows you to display and administer these recordings.

PowerView4
MOTORTECH HMI MODULE

Recorded Files

Device	Node ID	Date	Time	Size	Logging
All Types	All Nodes	All Dates		All Sizes	
Device	ID	Date	Time	Size	Logging
MIC4	30	2023-05-10	14:05:23	1.72K	x
MIC4	30	2023-05-10	13:57:06	212	
MIC4	30	2023-05-10	13:55:06	0	
MIC4	30	2023-05-10	13:25:28	2.30K	
MIC4	30	2023-05-10	13:19:01	1.51K	
MIC4	30	2023-05-10	10:21:07	2.65K	
MIC4	30	2023-05-10	10:16:12	0	
TempScan20	21	2014-01-06	13:46:53	50.4K	
MIC4	30	2013-04-30	12:31:21	4.59K	
DetCon2/20	40	2013-04-29	18:04:53	324K	
DetCon2/20	40	2013-04-29	18:04:53	324K	

Buttons: Delete, Delete All, Back up, Plot

Right Sidebar: Start, Back, Tooltip, Alert, Service, 15:47

At first all recorded files are displayed. You have the option of filtering the recordings according to device type, node ID, alteration date and file size. In the *Date* and *Size* drop-down lists, the double arrows indicate the sorting order.

9 General Operation

You have the following options for navigating in the list:

- Tap in the list and drag the displayed list section in the desired direction.
- Double-tap in the upper or lower border area of the list to jump to the end of that border area.
- Tap and hold the upper or lower border area of the list to scroll in the desired direction.
- Move the scroll bar to scroll in the desired direction.

The view has the following buttons:

- **Delete**
Deletes the currently selected file.
- **Delete All**
Deletes all currently listed files based on the filter settings.
- **Back up**
With this button you can back up the currently selected file to a USB flash drive inserted in the PowerView4.
- **Plot**
Displays the currently selected file in the PowerView4 (see *Displaying Recordings* on page 65).

Files of running recordings are marked with an X in the *Logging* column. These files can neither be saved nor deleted.

To start or end a recording, read the section *Logging Device Data* on page 57.

9.4.4.1 Displaying Recordings

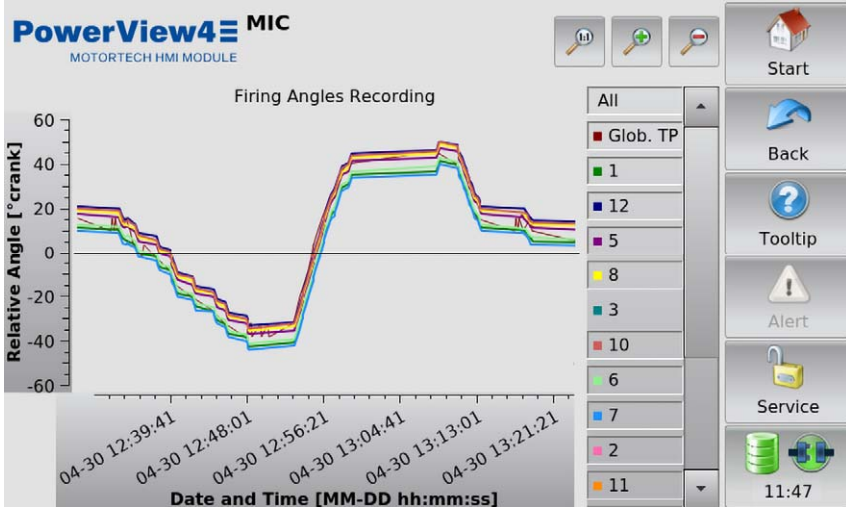
You have the option to display recorded data from the memory card inserted in the PowerView4:

1. Select the desired file in the *Recorded Files* view.
2. Tap the *Plot* button.
 - ▶ The selected file is opened.



9 General Operation

3. Select a button in the view (for example *Firing Angles*) to display the recorded data.
 - ▶ The selected data is displayed.



You can customize the recording views to suit your requirements:

- Use the legend on the right of the graph to display and hide trend lines individually.
- Adjust the enlargement factor:



Overall view



Larger



Smaller

- Move the trend lines by tapping and dragging them directly in the display.

9.4.4.2 Processing Data on the PC

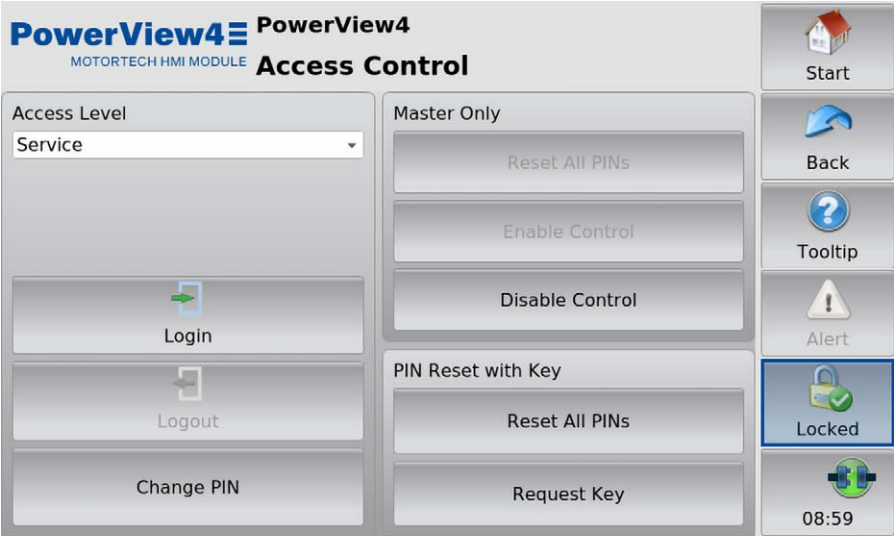
You can use the MOTORTECH Trend Viewer software to process recordings of the PowerView4, which you have saved on a USB flash drive using the *Recorded Files* view (see section *Recordings* on page 63), on a PC. The software provides the following options:

- Visualization of data
- Export of data as CSV file
- Export of data as graphic file

Further information can be found in the MOTORTECH Trend Viewer manual.

9.5 Access Control

The access control can be accessed in the menu bar via the highlighted button. Depending on the current setting, the button is labeled *Disabled*, *Locked*, *Operator*, *Service*, or *Master*.



The access control of the PowerView4 serves to protect sensitive data and functions. When access control is disabled, there are no restrictions. With enabled access control (see section *Enabling/Disabling Access Control* on page 68), four access levels with different rights are available:

Access level	Rights
Read Only (displayed status in the menu bar: <i>Locked</i>)	<ul style="list-style-type: none">– Read access to all data provided– Switching between day and night mode– Activating and deactivating pop-ups– Changing detonation controller preferences
Operator	<ul style="list-style-type: none">– Read Only rights– Display configuration– Recording device data– Ignition controller:<ul style="list-style-type: none">– Acknowledging runtime errors– Acknowledging alarms– Resetting misfire rate

9 General Operation

Access level	Rights
Service	<ul style="list-style-type: none">– Operator rights– Device setup– Activating devices– Changing the node ID and the bit rate of the PowerView4– Ignition controller:<ul style="list-style-type: none">– Adjusting ignition timing (globally, cylinder individually), energy, voltage calibration, and reset position– Setting of spark plug operating hours and engine operating hours– Self test– Changing preferences of the following devices:<ul style="list-style-type: none">– Temperature module– I/O communication module BPlus– I/O module (device profile CiA® 401/404)
Master	<ul style="list-style-type: none">– Service rights– Setting system time and system date– Enabling/disabling access control– Resetting all PINs– Sending LSS commands



Access to locked functions

If you would like to access a function with enabled access control, which exceeds your currently set rights, you will be prompted to enter the PIN for the access level required in a dialog window. The required access level is displayed in the header of the dialog window respectively (e.g. *Enter Operator PIN*).

9.5.1 Enabling/Disabling Access Control



Access control in as-delivered state

In as-delivered state, the access control is not enabled, and all PINs are set to 0000. After enabling the access control, assign an individual PIN for each access level including *Master* (see *Changing the PIN* on page 71).

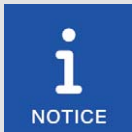
Enabling Access Control

Enable the access control for all access levels as follows:

1. Tap the *Enable Control* button.
 - ▶ You are prompted to enter the PIN for the access level *Master*.
2. Enter the PIN for the access level *Master* and tap *OK*.
 - ▶ Access control for all access levels is enabled.
 - ▶ You are logged in as *Master*.
 - ▶ The *Logout* button is activated.
 - ▶ The *Disable Control* button is activated.

If necessary, you can log in to a different access level. Refer to the section *Logging in and Logging out* on page 70.

Disabling Access Control



Disabling access control

If the access control is not to be used for a longer period of time, we recommend that you write down the Master PIN or reset all PINs to 0000 before disabling the access control. A renewed enabling of the access control is only permitted with the Master PIN. If you have forgotten the Master PIN, you must contact MOTORTECH for a reset of all PINs (see *Resetting the PINs* on page 71).

Disable the access control for all access levels as follows:

1. Tap the *Disable Control* button.
 - ▶ You are prompted to enter the PIN for the access level *Master*.
2. Enter the PIN for the access level *Master* and tap *OK*.
 - ▶ The *Disabling Access Control* dialog window appears.
3. Observe the note in the *Disabling Access Control* dialog window. If you are certain that you want to disable the access control, answer the displayed question by tapping *Yes*.
 - ▶ Access control for all access levels is disabled.
 - ▶ In the menu bar the condition *Disabled* is displayed.
 - ▶ The buttons *Login* and *Logout* are deactivated.
 - ▶ The *Enable Control* button is activated.

9 General Operation

9.5.2 Logging in and Logging out

With enabled access control, you can log in to the access levels *Operator*, *Service* and *Master*.

Logging in

Log in to the desired access level as follows:

1. From the drop-down list under *Access Level*, select the desired access level (*Operator*, *Service*, or *Master*).
2. Tap the *Login* button.
 - ▶ You will be prompted to enter the corresponding PIN.
3. Enter the PIN and tap *OK*.
 - ▶ You have now logged in to the desired access level and can use the associated functions.
 - ▶ The access level set is displayed in the menu bar.

Logging out



Automatic logout

You are automatically logged out of the access levels *Operator*, *Service*, or *Master*,

- if you have not entered anything for six minutes.
- if for six minutes only functions of lower access levels are used.
- if the screen saver is switched on.

The PowerView4 is then placed on the access level *Read Only* with the displayed status *Locked*.

There are two options for logging out manually from the access levels *Operator*, *Service*, or *Master*:

Option 1:

Leave the currently set access level with the *Logout* button in the *Access Control* view.

- ▶ In the menu bar, the condition *Locked* is displayed.
- ▶ The set access level is *Read Only*.
- ▶ The *Logout* button is deactivated.
- ▶ The *Login* button is activated.

Option 2:

1. From the drop-down list under *Access Level* in the *Access Control* view, select a different access level (*Operator*, *Service*, or *Master*).
2. Tap the *Login* button.
 - ▶ You will be prompted to enter the corresponding PIN.
3. Enter the PIN and tap *OK*.
 - ▶ You have now logged in to the desired access level and can use the associated functions.
 - ▶ The access level set is displayed in the menu bar.

9.5.3 Changing the PIN

Change the PIN of the access levels *Operator*, *Service*, or *Master* as follows:

1. Log in to the access level (*Operator*, *Service*, or *Master*) whose PIN you want to change (see section *Logging in and Logging out* on page 70).
2. Tap the *Change PIN* button.
 - ▶ You are prompted to enter a new PIN for the active access level.
3. Enter the new four-digit PIN and tap *OK*.
4. In the *Confirm new PIN* field, re-enter the new four-digit PIN and tap *OK*.
 - ▶ The PIN of the active access level was changed.

9.5.4 Resetting the PINs

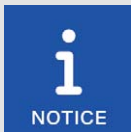
Forgotten Operator PIN / Service PIN

If you have forgotten the PIN of the access levels *Operator* or *Service*, contact the Master. The latter can reset all PINs to the value 0000 as described in the following. Afterwards, new PINs must be assigned to all access levels.

Resetting All PINs

The authorization for the access level *Master* allows you to reset the PINs of all access levels:

1. Log in to the access level *Master* (see section *Logging in and Logging out* on page 70).
2. In the area *Master Only*, tap on *Reset All PINs*.
 - ▶ All PINs are reset to the value 0000.



Assign new PINs!

After resetting the PINs, new PINs must be assigned to all access levels to guarantee maximum security.

Master PIN Forgotten

If you have forgotten the Master PIN, you must apply for a PIN Reset Authorization Key from MOTORTECH. With this key, you can reset all PINs without authorization for the access level *Master*.

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Requesting Key

Request the key from MOTORTECH as follows:

1. Tap the *Request Key* button.
 - ▶ A dialog window with the new and actual PIN Reset Request Key opens.
 - ▶ Write down the new PIN Reset Request Key (*New PRRK*) and send it to your MOTORTECH contact person.
2. Tap the *Confirm* button.
 - ▶ MOTORTECH sends you a PIN Reset Authorization Key based on *New PRRK*. Note that the PIN Reset Authorization Key is only valid for a limited period of time.

Entering Key

Enter the key from MOTORTECH in your PowerView4 as follows:



1. Insert a USB flash drive on which the MOTORTECH key is stored into your PowerView4.
2. In the area *PIN Reset with Key*, tap the button *Reset All PINs*.
 - ▶ The storage locations available are displayed in a window.
3. Navigate to the desired PIN Reset Authorization Key (file extension *.prak*) and select it.
4. Tap the *Enter* button.
 - ▶ All PINs are reset to the value 0000.


9.6 Event Log


If you tap on the status information field in the menu bar (see marking), the *Event Log* view opens. In this view you get messages concerning the PowerView4.


PowerView4
MOTORTECH HMI MODULE

PowerView4
Event Log





 Start

 Back

 Tooltip

 Alert

 Service

 11:23

Date	Time	ID	Device	Message
2023-12-19	15:29:53	30	MIC4	Try to activate logging was s
2023-12-19	15:29:49	40	DetCon2/20	Try to activate logging was s
2023-12-19	15:28:29	30	MIC4	Connection restored
2023-12-19	15:28:27	30	MIC4	Status Alert
2023-12-19	15:28:27	40	DetCon2/20	Connection restored
2023-12-19	15:28:25	40	DetCon2/20	Knocking detected
2023-12-19	15:28:17	67	HMI	Access control enabled.
2023-12-19	15:28:17	67	HMI	Started 1.99.00001
2023-12-19	15:26:41	40	DetCon2/20	Trip Shutdown
2023-12-14	16:05:52	40	DetCon2/20	Knocking detected
2023-12-14	16:05:13	30	MIC4	Status Alert
2023-12-14	14:59:11	30	MIC4	1 - Connection restored
2023-12-14	15:02:06	40	DetCon2/20	Trip Shutdown
2023-12-14	15:02:06	40	DetCon2/20	Knocking detected
2023-12-14	15:01:06	40	DetCon2/20	Connection restored

The following data is displayed: date (YYYY-MM-DD) and time (hh:mm:ss) of the entry, node ID of the device, device name and the accompanying message. The abbreviation *HMI* represents the PowerView4. A maximum of 1,000 messages are displayed and stored. Older messages are deleted.

In the title area, two buttons are displayed. The symbols on the buttons change depending on their setting and are described in the following.

Filter Button

The button's appearance has the following meaning:



No filters are active. All entries are displayed.



Filters are active. Only certain entries are displayed.

To set or change filters, tap the *Filter* button. The *Filter Settings* dialog window appears. Select time and node IDs of the entries you want to display. If you select none of the listed node IDs, the entries of all listed node IDs are displayed. Confirm your selection with *OK*. Tap *Clear* to reset the filters.

Automatic Scrolling Button

The button's appearance has the following meaning:



Automatic scrolling is inactive.



Automatic scrolling is active.

To activate and deactivate automatic scrolling, tap the *Automatic Scrolling* button. When the function is activated, the PowerView4 scrolls automatically to newly registered entries.

You have the following options for navigating in the list:

- Tap in the list and drag the displayed list section in the desired direction.
- Double-tap in a border area of the list (top, bottom, left, right) to jump to the end of that border area.
- Tap and hold in a border area of the list (top, bottom, left, right) to scroll in the desired direction.
- Move one of the scroll bars to scroll in the desired direction.

9 General Operation

9.7 Help

You can access the operating manual of the PowerView4 or an added device as follows:

- *Help* button in *Start Menu*: operating manual of the PowerView4
- *Help* button in the *Main Menu* of an added I/O communication module BPlus or I/O module: operating manual of the PowerView4
- *Help* button in the main menu of an added device: operating manual of the added device

In the browser, tap on the appropriate links, and then use the bars on the right side of the screen to scroll and the buttons for navigation:

- [Start](#)
Use this button to go to the first page of the operating manual.
- [Back](#)
Use this button to go to the previously displayed page of the operating manual.
- [Close](#)
Use this button to exit the Help menu.

This chapter describes the device menus of the devices that can be added in the PowerView4. Information about adding devices can be found in the section *Devices* on page 51.

You can access the device menus of added devices via the corresponding buttons in the *Start Menu*.

10.1 Ignition Controller

Unless otherwise indicated, the functions and views of an added ignition controller are described in this section based on the example of an MIC4 ignition controller.

10.1.1 Main Menu

The main menu of an added ignition controller can be opened in the *Start Menu* via the button with the corresponding device name (e.g. *MIC4*, *MIC100*).



Depending on the device type of the ignition controller, the main menu has the following buttons:

- [Overview](#)
The button provides you with information on the most important operating data. There is more information in the section *Overview* on page 76.
- [Timing](#)
The button provides you with information on ignition timing. There is more information in the section *Timing* on page 80.
- [Ignition](#)
With the exception of the MIC100, the button provides you with information on estimated secondary voltages and misfires. There is more information in the section *Ignition* on page 82. With an MIC100, the button provides you with information on the absolute firing angles, the energy output, and the spark duration. There is more information in the section *MIC100* on page 84.



10 Devices

- **Energy**
The button provides you with information on energy output and spark duration. There is more information in the section *Energy* on page 84. With the MIC100, this button is not available.
- **Firing Angles**
The button provides you with information on the absolute and relative firing angles. There is more information in the section *Firing Angles* on page 86. With the MIC100, this button is not available.
- **Adjustments**
The button gives you access to further views in which you can make runtime adjustments for the ignition controller. In addition, you can carry out a self test. There is more information in the section *Adjustments* on page 88.
- **Trends**
The button gives you access to the firing angles trend and additionally, with the exception of the MIC100, to the estimated secondary voltages trend. There is more information in the section *Trends* on page 96.
- **Message Log**
The button gives you access to status messages as well as information, alarms, warnings, and error messages from the ignition controller. There is more information in the section *Message Log* on page 99. With the MIC100, this button is not available.
- **Diagnosis**
The button provides you with information on the operating data of the ignition controller. There is more information in the section *Diagnosis* on page 101.
- **Information**
The button provides you with data on the hardware and software of the connected ignition controller. There is more information in the section *Information* on page 102.
- **Help**
This button opens the operating manual of the ignition controller. There is more information in the section *Help* on page 74.

10.1.2 Overview

The *Overview* button in the *Main Menu* of the added ignition controller opens the following views:

- *Overview*
- *Ignition Data*

The  and  buttons allow you to switch between the views.

The views are described as follows.

Overview



The following operating data of the ignition controller are summarized in the view:

- **Pickup**
The status display shows whether pickup signals are being detected.
 - Gray: No signals are detected.
 - Yellow: The ignition controller is being synchronized to the pickup signals.
 - Green: Signals are detected.
- **Ignition Outputs**
The status display shows the status of the ignition outputs of the ignition controller.
 - Gray: There are no firings.
 - Green: The outputs are firing without any errors.
 - Yellow: There were previous misfires, but there are no misfires at present.
 - Red: There are misfires.

Detailed information on ignition outputs can be found in the *Ignition* view (see section *Ignition* on page 82, for the MIC100 see section *MIC100* on page 84).

- **Ignition Enabled**
The status display shows whether the ignition controller has received an ignition enabled command.
 - Gray: Ignition is not enabled.
 - Green: Ignition is enabled.
 - Yellow: Ignition is enabled but the ignition controller is waiting for the engine to stop.

10 Devices

– System

The status display shows the system status.

- Gray: No signal is received.
- Green: The system works flawlessly.
- Yellow: There are warnings or alarms, which do not lead to an engine stop.
- Red: There are errors, which have led to an engine stop. If errors occur, the ignition controller is put into error state.

– GPO

The status display shows the status of the general purpose output. The functions of the general purpose output are set in the MICT. Further information can be found in the operating manual of your ignition controller.

- Green: The general purpose output is switched.
- Gray: The general purpose output is not switched.

– Engine Speed

In the analog display the current engine speed is presented with a pointer and also numerically.

- Green area: The engine speed is below nominal speed.
- Yellow area: The engine speed is between nominal speed and overspeed.
- Red area: Overspeed

With the exception of the MIC100, the following operating data is displayed additionally:

– Schedule

The status display shows the active schedule of the ignition controller. If schedules have been named in the MICT, the names are displayed (for example *Biogas* and *Natural Gas*). If no names have been assigned, the schedules are called *A* and *B* in the PowerView4.

- Gray: The schedule is not active.
- Blue: The schedule is active.

– Ignition Timing

Shows the current global ignition timing in °crankshaft.

– Spark Plugs

Displays the present operating hours of the spark plugs.

Only with the MIC6, the following operating data is displayed additionally:

– Pickup Redundancy

The status display shows the status of the pickup redundancy.

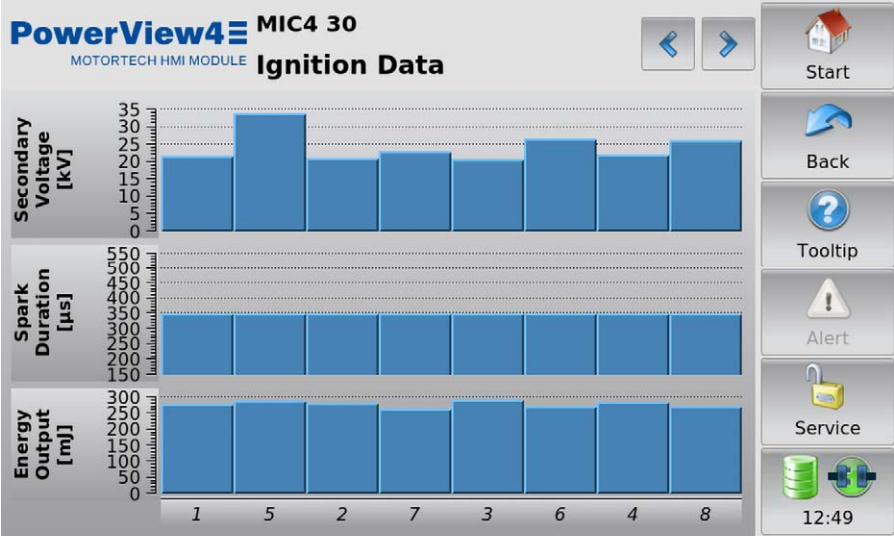
- Gray: Pickup redundancy is deactivated.
- Yellow: Pickup redundancy is activated.
- Green: Both pickup sets are synchronized and working error-free.

– Set 1, Set 2

The status display respectively signals the following states:

- Gray: No signals are received from the pickup set.
- Yellow: The pickup set is being synchronized.
- Green: The pickup set works without errors.

Ignition Data



For each ignition output of the ignition controller, this view displays the energy output, the spark duration, and, with the exception of the MIC100, the estimated secondary voltage as bars. If cylinder names have been assigned in the configuration of the ignition controller (not available with the MIC100), they are displayed on the X-axis. If no cylinder names have been assigned in the configuration of the ignition controller, the corresponding ignition output number (A1, A2, ...) is displayed instead.


With all supported ignition controllers except the MIC100, numerical values for the estimated secondary voltage are displayed in the *Ignition* view (see section *Ignition* on page 82) and for the energy output and spark duration in the *Energy* view (see section *Energy* on page 84).

With the MIC100, numerical values for the energy output and spark duration are displayed in the *Ignition* view (see section *MIC100* on page 84).

10 Devices

10.1.3 Timing

The *Timing* button in the *Main Menu* of the added ignition controller opens the *Timing* view.

**MIC4 30**
MOTORTECH HMI MODULE


Timing


Global Timing Calculation


Base Timing	20.0	BTDC	
Potentiometer Timing	0.1	RET	48.9 %
Analog Current Input Timing	4.9	RET	19.8 mA
Analog Voltage Input Timing	0.0	RET	0.0 V
Speed Curve Correction	1.3	RET	
Timing Correction	0.0	RET	
Global Timing Point	13.7	BTDC	


Individual Timing


Minimum	15.7	ATDC
Maximum	10.7	ATDC
Average	13.8	ATDC



Start


Back


Tooltip


Alert


Service


14:06

Depending on the device type of the ignition controller, the following information is provided:

Global Timing Calculation

Overview of the values from which the global ignition timing is calculated.

- **Base Timing**
Shows the base timing in °crankshaft.
- **Potentiometer Timing** (not available with the MIC100)
Displays the adjustment of the ignition timing via the potentiometer in °crankshaft in the direction advanced or retarded and right next to it the adjustment on the potentiometer in percent.
- **Analog Current Input Timing**
Displays the adjustment of the ignition timing via the analog current signal in °crankshaft in direction advanced or retarded. On the right next to it, the current measurement value of the analog current input is displayed in mA.
- **Analog Voltage Input Timing** (not available with the MIC100)
Displays the adjustment of the ignition timing via the analog voltage signal in °crankshaft in direction advanced or retarded. On the right next to it the current measurement value of the analog voltage input is displayed in V.
- **Speed Curve Correction**
Displays the adjustment via the speed curve in °crankshaft in direction advanced or retarded.
- **Timing Correction**
Displays the adjustment via the ignition timing correction in °crankshaft in direction advanced or retarded.

- **Global Timing Point**

Displays the current ignition timing in °crankshaft, which was calculated for the engine from the previously named settings.

With the exception of the MIC100, the following information on the adjustment the cylinder-specific ignition timing is additionally provided:

Individual Timing

Overview of the adjustment of the cylinder-specific ignition timing:

- **Minimum**

Displays the minimum ignition timing in °crankshaft resulting from the cylinder-specific adjustment.

- **Maximum**

Displays the maximum ignition timing in °crankshaft resulting from the cylinder-specific adjustment.

- **Average**



Displays the average value of the cylinder-specific ignition timing adjustment in °crankshaft for all cylinders.

10 Devices

10.1.4 Ignition

With the exception of the MIC100, the *Ignition* button in the *Main Menu* of the added ignition controller opens the following views:

- *Ignition*
- *Misfires*

The  and  buttons allow you to switch between the views.

The views are described as follows.

For the MIC100, read the section *MIC100* on page 84.



Cyl. / Output column


If cylinder names have been assigned in the configuration of the ignition controller, they are displayed in the *Cyl.* column. If no cylinder names have been assigned in the configuration of the ignition controller, the *Output* column with the corresponding ignition output numbers (A1, A2, ...) is displayed instead.

Ignition

PowerView4 MIC4 30
MOTORTECH HMI MODULE



Ignition

Cyl.	Secondary Voltage [kV]	Misfire	Cyl.	Secondary Voltage [kV]	Misfire
1	21.4		5	28.8	
7	20.8		2	24.6	
6	22.4		3	29.0	
4	23.8		8	27.2	


Start


Back


Tooltip


Alert


Service


14:06

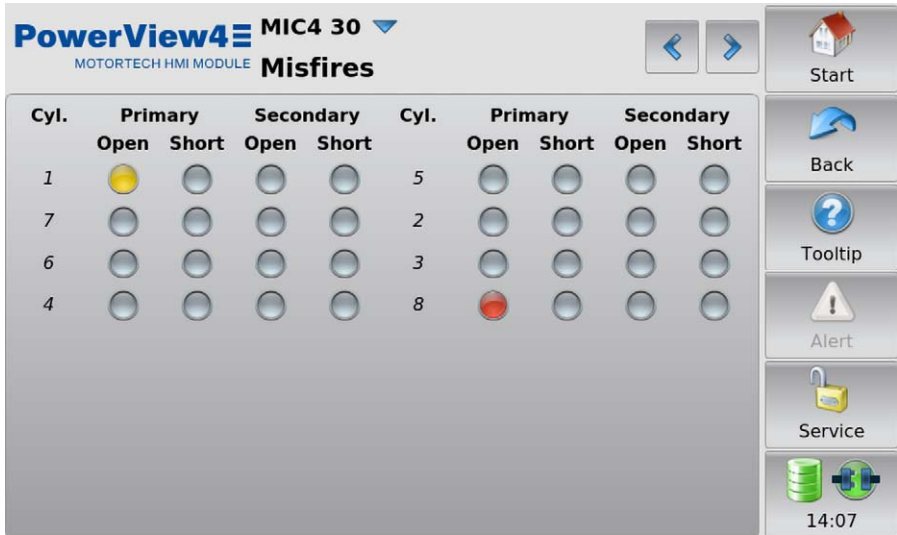
The following information is provided:

- The estimated secondary voltage is displayed individually for every ignition output of the ignition controller.

- The status display provides information about misfires for each cylinder:
 - Gray: No misfires have been registered.
 - Yellow: There were previous misfires, but there are no misfires at present.
 - Red: Misfires occurred, and there is no warning or error status.

You can view the estimated secondary voltages as a bar chart in the *Ignition Data* view, which can be accessed via the *Overview* (see section *Overview* on page 76).

Misfires



You receive information on where an error has occurred in the ignition circuit:


- *Primary*: The information relates to the primary side of the ignition circuit.
- *Secondary*: The information relates to the secondary side of the ignition circuit.

You receive information on which error has occurred in the wiring of the ignition coils:

- *Open*: The ignition circuit is not closed.
- *Short*: short circuit

The status displays can show different colors:

- Gray: There are no errors.
- Red: Misfires occurring at the moment.
- Yellow: At least one misfire has occurred.
- White: The wrong ignition coils were set via the MICT, or the misfire detection is unavailable for the coils selected.

With the  button you can reset the misfire counters of the ignition controller.

10 Devices

10.1.4.1 MIC100

The *Ignition* button in the *Main Menu* of an added MIC100 ignition controller opens the *Ignition* view.


PowerView4


MOTORTECH HMI MODULE


MIC100 30


Ignition


Output	Firing Angle [°crank]	Spark Duration [µs]	Energy Output [mJ]
A1	48.9	570	52
A2	93.9	570	50
A3	138.9	570	50
A4	183.9	570	50
A5	228.9	570	52
A6	273.9	570	52


Start

Back

Tooltip

Alert

Service

13:40

For each output of the ignition controller, the absolute firing angles of the cylinders in °crankshaft, the spark duration in µs, and the energy output in mJ are displayed. The values for spark duration and energy output can be used to detect possible wear of the spark plugs.

Alternatively, you can view the spark duration and energy output as a bar chart in the *Ignition Data* view, which can be accessed via the *Overview* (see section *Overview* on page 76).

10.1.5 Energy

The *Energy* button in the *Main Menu* of certain added ignition controllers opens the *Energy* view.

With the MIC100, the *Energy* view is not available. Instead, the information of this view can be found in the *Ignition* view (see section *MIC100* on page 84).



Cyl. / Output column

If cylinder names have been assigned in the configuration of the ignition controller, they are displayed in the *Cyl.* column. If no cylinder names have been assigned in the configuration of the ignition controller, the *Output* column with the corresponding ignition output numbers (A1, A2, ...) is displayed instead.


PowerView4


MOTORTECH HMI MODULE


MIC4 30


Energy


Cyl.	Spark Duration [μs]	Energy Output [mJ]	Cyl.	Spark Duration [μs]	Energy Output [mJ]
1	300	270	5	300	296
7	300	280	2	300	266
6	300	282	3	300	270
4	300	280	8	300	274


Start

Back

Tooltip

Alert

Service

14:06

This view displays the *Spark Duration* in μs and the *Energy Output* in mJ. The values can be used to detect possible wear of the spark plugs.



You can view the spark duration and the energy output as a bar chart in the *Ignition Data* view, which can be accessed via the *Overview* (see section *Overview* on page 76).

10 Devices

10.1.6 Firing Angles

The *Firing Angles* button in the *Main Menu* of certain added ignition controllers opens the following views:

- *Firing Angles*
- *Firing Angles Drift*

The  and  buttons allow you to switch between the views.

The views are described as follows.

With the MIC100, the views *Firing Angles* and *Firing Angles Drift* are not available. Instead, information on the firing angles can be found in the *Ignition* view (see section *MIC100* on page 84).



Cyl. / Output column

If cylinder names have been assigned in the configuration of the ignition controller, they are displayed in the *Cyl.* column. If no cylinder names have been assigned in the configuration of the ignition controller, the *Output* column with the corresponding ignition output numbers (A1, A2, ...) is displayed instead.

Firing Angles

PowerView4

MOTORTECH HMI MODULE

MIC4 30

Firing Angles

Left Arrow

Right Arrow

Start

Back

Tooltip

Alert

Service

14:07

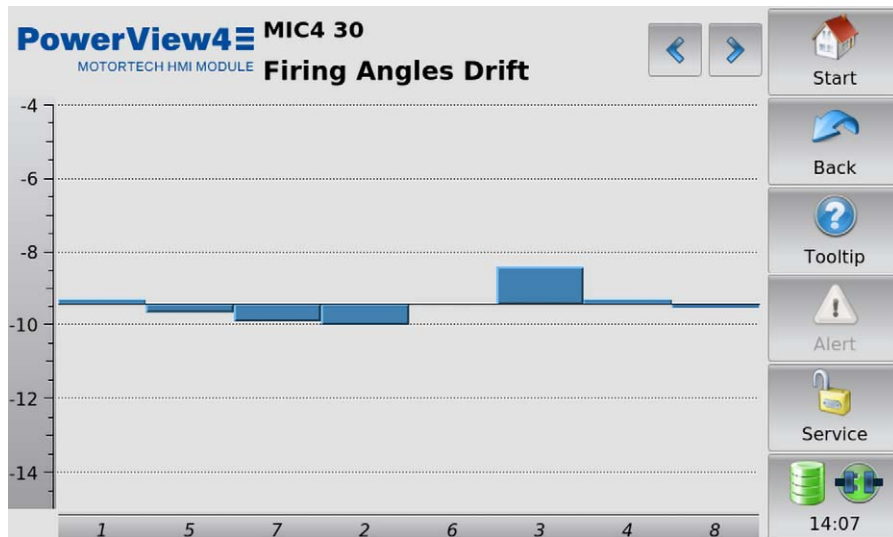
Cyl.	Firing Angle [°crank]		Cyl.	Firing Angle [°crank]	
1	17.8	BTDC	5	17.8	BTDC
7	17.8	BTDC	2	17.8	BTDC
6	17.8	BTDC	3	17.8	BTDC
4	17.8	BTDC	8	17.8	BTDC

The firing angles of the cylinders are displayed in °crankshaft for each output of the ignition controller.

With the ▼ button you can switch the display of the firing angles:

- *Absolute*: Firing angle in °crankshaft related to the top dead center of the first cylinder in firing order
- *Relative*: Firing angle in °crankshaft related to its own top dead center

Firing Angles Drift





The deviations from the global ignition timing in °crankshaft are displayed in a bar chart.

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10.1.7 Adjustments

The *Adjustments* button in the *Main Menu* of the added ignition controller opens the following views:

- *Self Test*
- *Timing Adjustment*
- *Operating Hours*
- *Energy Adjustments*
- *Voltage Calibration* (not available with the MIC100)
- *Reset Position*
- *Cylinder Individual Offset* (not available with the MIC100)

The  and  buttons allow you to switch between the views.

The views are described as follows.



Risk of destruction!

Incorrect settings for energy, firing angles and the reset position can lead to damage to the engine and the ignition system. Therefore make sure that engine and ignition kit are designed for the corresponding settings.



Risk of destruction!

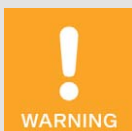
Changes to the settings for energy, firing angles, voltage and reset position take effect *immediately and without further confirmation*. Therefore always comply with the operating manuals of the engine and all components of the ignition kit.

Self Test



Entry Cylinder / Output

If cylinder names have been assigned in the configuration of the ignition controller (not available with the MIC100), this view displays the entry *Cylinder* with the assigned cylinder names. If no cylinder names have been assigned in the configuration of the ignition controller, this view displays the entry *Output* and the corresponding ignition output numbers (A1, A2, ...) instead.

**Operational safety!**

If you carry out a self test, it is essential for the gas supply to be switched off and no more residual gas is left in the combustion chamber. Non-compliance can result in damage to equipment or injury to persons.

You can run a self test to check the order of the wiring and the connection between the ignition controller outputs down to the spark plugs.

The status display indicates whether the ignition controller is ready for the self test.

- Red: The ignition controller is in a state in which no self test can be done. For example, there is an error or a configuration is currently being downloaded into the device.
- Yellow: The self test is running.
- Green: The ignition controller is ready and the self test can be started.

Carry out the self test as follows:

1. Stop the gas supply to the engine.
2. Purge the engine.
 - The engine is ready for the self test.
3. Set the *Cycle Time* (the interval between the two ignitions).
4. Define via the *Number of Cycles* whether the self test is to run *Unlimited* or whether it should be ended after a defined number of cycles.

10 Devices

5. Define whether *All* configured outputs or only a defined output should be fired during the self test.
6. Start the self test via the *Start* button.
 - ▶ The self test runs until it is stopped. In the meantime you can inspect the data received in other views.
7. End the self test via the *Stop* button.
 - ▶ The self test is concluded.

Timing Adjustment

PowerView4 MIC4 30
MOTORTECH HMI MODULE **Timing Adjustment**

Timing Correction [°crank] RET

Global Timing Point [°crank] BTDC

-0.5 -0.1 +0.1 +0.5

Start
Back
Tooltip
Alert
Service
14:07

Via the corresponding buttons, the global ignition timing can be corrected in 0.1° or 0.5° increments to advance or retard.

Operating Hours



Set the operating hours of the spark plugs or the engine via the arrow keys to the desired value. You can reset the operating hours value of the spark plugs and the engine to 0 with the *Reset* buttons.

10 Devices

Energy Adjustments

PowerView4 MOTORTECH HMI MODULE

MIC4 30

Energy Adjustments

<

>

Schedule A - Biogas

Spark Duration μs

<<

<

>

>>

Spark Intensity mA

<<

<

>

>>

Schedule B - Natural Gas

Spark Duration μs

<<

<

>

>>

Spark Intensity mA

<<

<

>

>>

Start

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14:08

With an added MIC100, *Schedule A* is available only.

In this view, you have the following options:

- The *Spark Duration* for the schedules can be lowered or increased via the corresponding buttons by 1 μs or 5 μs .
- The *Spark Intensity* for the schedules can be lowered or increased via the corresponding buttons by 1 mA or 5 mA.

Voltage Calibration

PowerView4 MIC4 30
MOTORTECH HMI MODULE **Voltage Calibration**

A1	1.5	A2	0.4	B1	1.8	B2	1.0
A3	1.5	A4	-0.5	B3	1.4	B4	0.5
A5	1.0	A6	0.0	B5	1.5	B6	-0.3
A7	1.2	A8	1.4	B7	2.1	B8	0.4

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 Service
 14:08

With the MIC100, the *Voltage Calibration* view is not available.

In this view, you can set a unitless correction value for the secondary voltage estimation for each output. Observe that in this view the PowerView4 does not display any cylinder names, but only ignition output numbers, even if cylinder names are assigned in the configuration of the ignition controller.

Changes are made to selected outputs. You have the following options for selecting outputs:

- Tap the desired output directly to select it. To remove the output from the selection, tap the output again.
- Tap a group symbol (e.g.) to invert the selection for the respective group.
 - ▶ Selected outputs have a blue frame.

- Tap to clear all selections.

For the selected outputs, set the correction value using the arrow keys:

- With and in steps of 0.1
- With and in steps of 0.5

10 Devices

Reset Position

PowerView4 MOTORTECH HMI MODULE

MIC4 30

Reset Position

<

>

Reset [°crank]

34.0

ADV

0.5 ADV

0.1 ADV

0.1 RET

0.5 RET

Start

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14:08

Using the arrow keys, correct the index/reset position (*Reset*) in steps of 0.1 °crankshaft or 0.5 °crankshaft to advance or retard. If the correction range is not sufficient, the reset/index position must be adjusted in the configuration in the MICT.

Cylinder Individual Offset

PowerView4 MIC4 30
MOTORTECH HMI MODULE

Cylinder Individual Offset

A1	1.0	A2	0.0	B1	0.5	B2	0.0
A3	0.3	A4	-0.5	B3	0.0	B4	0.0
A5	0.1	A6	0.2	B5	0.2	B6	0.2
A7	0.9	A8	0.0	B7	0.0	B8	0.3

[°]

Start
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With the MIC100, the *Cylinder Individual Offset* view is not available.

In this view, you can adjust the ignition timing position for each cylinder individually. Observe that in this view the PowerView4 does not display any cylinder names, but only ignition output numbers, even if cylinder names are assigned in the configuration of the ignition controller.

Changes are made to selected outputs. You have the following options for selecting outputs:

- Tap the desired output directly to select it. To remove the output from the selection, tap the output again.
- Tap a group symbol (e.g.) to invert the selection for the respective group.
 - ▶ Selected outputs have a blue frame.
- Tap to clear all selections.

For the selected outputs, set the correction value using the arrow keys:

- With and in steps of 0.1°
- With and in steps of 0.5°

10 Devices

10.1.8 Trends

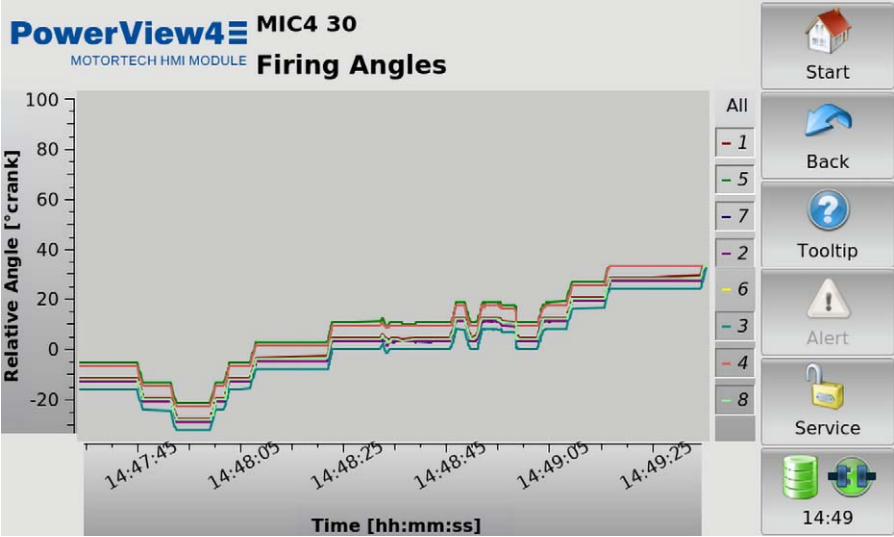
The *Trends* button in the *Main Menu* of the added ignition controller opens the *Trends* view.



To view the current trend of the firing angles or (not available with the MIC100) the estimated secondary voltages (*High Voltages*), tap the desired button.

Firing Angles

The *Firing Angles* button in the *Trends* view of the added ignition controller opens the *Firing Angles* view.

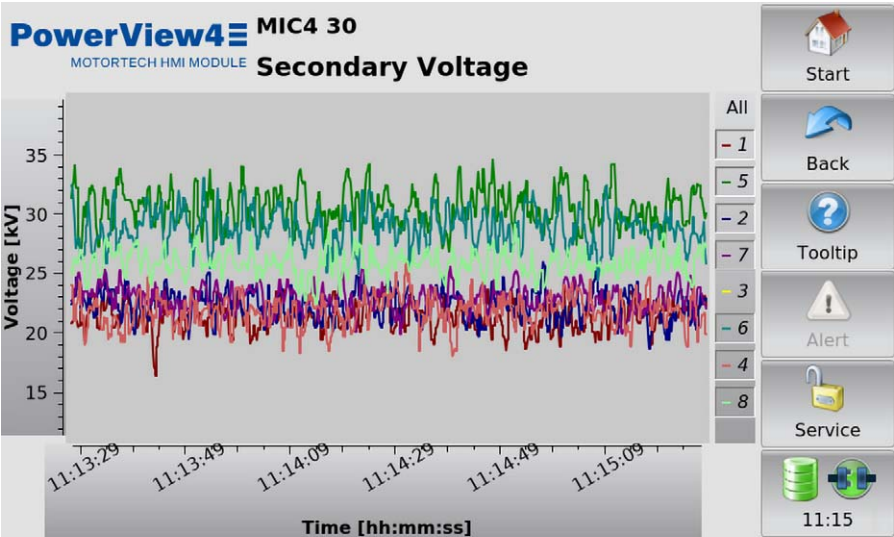


You receive information on the current trend of the firing angles. The cylinders can be hidden and shown individually using the legend.

10 Devices

Secondary Voltage

The *High Voltages* button in the *Trends* view of certain added ignition controllers opens the *Secondary Voltage* view. With the MIC100, the *High Voltages* button and the *Secondary Voltage* view are not available.





You receive information on the current trend of the estimated secondary voltages. The cylinders can be hidden and shown individually using the legend.

10.1.9 Message Log

The *Message Log* button in the *Main Menu* of certain added ignition controllers opens the following views:

- *States*
- *Message Log*

The  and  buttons allow you to switch between the views.

The views are described as follows.

With the MIC100, the *States* and *Message Log* views are not available.

States

PowerView4

MIC4 30

MOTORTECH HMI MODULE

States

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17:27

Operating Hours	Time	Status Message
68:09:56.283	2024-02-05 17:27:40	Analog current input failure (current: 1,0
67:46:29.930	2024-02-05 17:04:14	Cylinder individual timing limited.
68:09:49.885	2024-02-05 17:27:34	PU1: Missing Signal. Signal timeout occu

Status messages are listed in the *States* view.

The following information is provided:

- *Operating Hours*: total operating hours of the ignition controller at the time of the message
- *Time*: date and time of the message
- *Status Message*: message text

Status messages are displayed in black if they are current. If a status is reset, the status message is displayed gray for 10 seconds before it is deleted from the list.

10 Devices

Message Log

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Message Log

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Operating Hours	Time	Category	Message
44,561:26:43.121	2024-01-24 09:03:28	Info	CANopen on interface CA
44,561:26:43.122	2024-01-24 09:03:28	Info	CANopen on interface CA
44,561:26:43.122	2024-01-24 09:03:28	Info	CANopen on interface CA
44,561:26:43.370	2024-01-24 09:03:28	Info	J1939 on interface CAN1
44,561:28:04.176	2024-01-24 09:04:49	Info	CANopen on interface CA
44,561:28:04.176	2024-01-24 09:04:49	Info	CANopen on interface CA
44,561:28:19.498	2024-01-24 09:05:04	Info	CANopen on interface CA
44,561:28:57.670	2024-01-24 09:05:43	Info	Device switched off.
44,561:28:58.936	2024-01-24 09:09:25	Info	Device (firmware 0.0.1.3
44,561:28:58.936	2024-01-24 09:09:25	Info	J1939 on interface CAN1
44,561:28:58.938	2024-01-24 09:09:25	Info	CANopen on interface CA
44,561:28:58.944	2024-01-24 09:09:25	Info	CANopen on interface CA
44,561:28:58.945	2024-01-24 09:09:25	Info	CANopen on interface CA
44,561:28:58.945	2024-01-24 09:09:25	Info	CANopen on interface CA
44,561:28:59.192	2024-01-24 09:09:25	Info	J1939 on interface CAN1
44,561:29:10.122	2024-01-24 09:09:36	Info	CANopen on interface CA
44,561:29:10.122	2024-01-24 09:09:36	Info	CANopen on interface CA
44,561:29:25.313	2024-01-24 09:09:51	Info	CANopen on interface CA

The *Message Log* view lists information, alarms, warnings, and errors (with ignition controller MIC4 working from version 0.16).

The following information is provided:

- *Operating Hours*: total operating hours of the ignition controller at the time of the message
- *Time*: date and time of the message
- *Category*: type of message (information, warning, error, alarm)
- *Message*: message text

With the  button you open the menu *Actions*. You have the following options:

- Acknowledge alarms
- Acknowledge runtime errors
- Switch automatic scrolling on and off

10.1.10 Diagnosis

The *Diagnosis* button in the *Main Menu* of the added ignition controller opens the *Diagnosis* view.

PowerView4

MOTORTECH HMI MODULE

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Diagnosis

Temperatures

Controller Board 54.8 °C

Output Board 51.3 °C

Voltages

Supply Voltage 24.3 V

Operating Hours

Device 55926:39

Engine 44586

Spark Plugs 4584

Engine Total 55462

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Depending on the device type of the ignition controller, information on the operating values of the ignition controller is displayed in the *Diagnosis* view:

Temperatures

Overview of the temperatures of the ignition controller

- [Controller Board](#)
Temperature of the controller board
- [Output Board](#)
Temperature of the output board. For the MIC100, this information is omitted.

i

NOTICE

Switching between °C and °F

In the *Display Configuration* view, you can specify whether the temperatures are displayed in °C or in °F (see section *Display* on page 58).

Voltages

Information on the supply voltage of the ignition controller

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Operating Hours

The operating time of the ignition controller is displayed in hours and minutes. The operating time of the engine and the spark plugs is displayed in hours.

- [Controller](#)
Total operating time of the ignition controller
- [Spark Plugs](#)
Current operating hours of the spark plugs
- [Engine](#)
Current operating hours of the engine
- [Engine Total](#)
Total engine operating hours registered by the ignition controller disregarding changes caused by runtime adjustments (see section *Adjustments* on page 88) or the MICT

10.1.11 Information

The *Information* button in the *Main Menu* of the added ignition controller opens the *Information* view.

PowerView4 MIC4 30
MOTORTECH HMI MODULE

Information

Hardware


Device ID	1.5.1	Revision	1.4.0.19856
Serial Number	01011134	Arrangement	421.08.C000-000-AA-4


Software Version


Bootloader	0.26.2.20138	Firmware	1.12.0.40630
------------	--------------	----------	--------------


Coil Data


Name	06.50.104	Version	1
------	-----------	---------	---



Start


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In the *Information* view, hard- and software data of the ignition controller are displayed.

Hardware

Overview of the hardware of the connected ignition controller

- [Device ID](#)
The identification number of the device provides information on type and subtype of the MOTORTECH device.
- [Revision](#)
Hardware revision number of the device

- [Serial Number](#)
The unique serial number is assigned once to each device.
- [Arrangement](#)
The arrangement number comprises the type and subtype of the ignition controller.

Software Version

Information on the software of the connected ignition controller

- [Bootloader](#)
Version number of the bootloader
- [Firmware](#)
Version number of the firmware of the device

Coil Data

Information on the ignition coil type set in the connected ignition controller

- [Name](#)
Ignition coil type
- [Version](#)
Version of the ignition coil data set stored in the device

10 Devices

10.2 Detonation Controller

This section describes the functions and views of an added detonation controller.

10.2.1 Main Menu

The main menu of an added detonation controller can be opened in the *Start Menu* via the button with the corresponding device name (e.g. *DetCon2/20*).



The main menu has the following buttons:

- [Overview](#)
The button provides you with information on the most important operating data. There is more information in the section *Overview* on page 105.
- [Intensity](#)
The button provides you with information on the knocking intensity of each cylinder. There is more information in the section *Intensity* on page 107.
- [Trends](#)
The button gives you access to the knocking intensity and analog output signal trend. There is more information in the section *Trends* on page 108.
- [Preferences](#)
This button gives you access to the settings for processing the detonation controller signals. There is more information in the section *Preferences* on page 111.
- [Help](#)
This button opens the operating manual of the detonation controller. There is more information in the section *Help* on page 74.

10.2.2 Overview

The Overview button in the *Main Menu* of the added detonation controller opens the Overview.



The most important operating data of the detonation controller are summarized in the view.

- **Analog Output**
The current analog output signal strength is presented in percent with a pointer and also numerically in the display.
- **Knocking Intensity**
The maximum knocking intensity measured is presented in percent with a pointer and also numerically in the display.
 - Green area: The knock level does not exceed any limits of the detonation controller.
 - Yellow area: The knock level is above the *Ignition reduction limit* configured in the detonation controller.
 - Red area: The knock level is above the *Immediate stop limit* configured in the detonation controller.

In the field *Status*, the operating condition of the detonation controller is presented via status displays:

- **Engine Knocking**
A yellow status display indicates that the knock level is above the *Ignition reduction limit* configured in the detonation controller.

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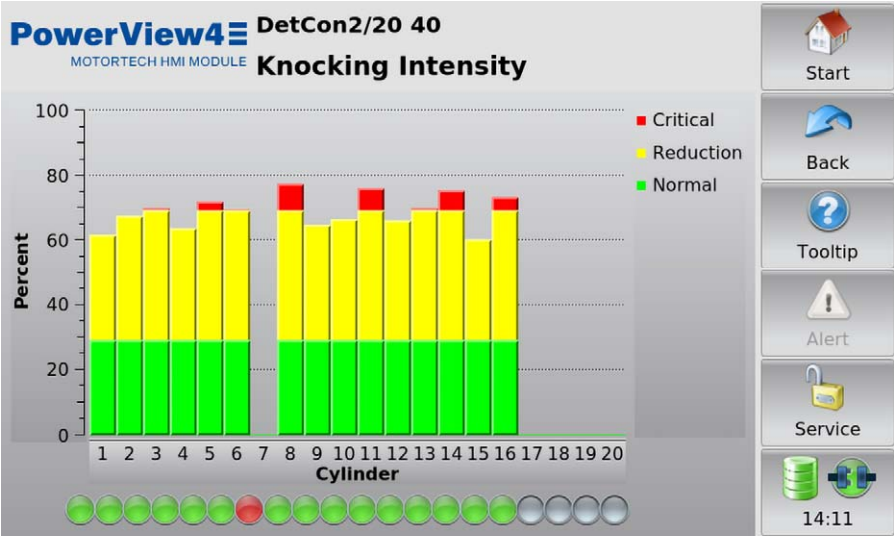
- **Trip**
If the output TRIP of the detonation controller is configured as "normally open", a red status display indicates that the knock level is above the configured *Immediate stop limit* in the detonation controller. If the output TRIP is configured as "normally closed", a red status display indicates that the knock level does not exceed the configured *Immediate stop limit*. If needed, the status display *Trip* in the PowerView4 can be inverted (see section *Preferences* on page 111).
- **Reduction**
A yellow status display indicates that the reduction of the knock level via the analog output signal has exceeded the maximum value. The load reduction is activated.

In the field *Errors*, errors of detonation controller are indicated via status displays:

- **Low RPM**
A yellow status display indicates that the detonation control is ineffective on account of insufficient speed.
- **No Sync Pulse**
A red status display indicates that no pulses are being detected at the ignition pulse input of the detonation controller.
- **Spurious Pulse**
A red status display indicates that the signals at the ignition pulse input are faulty.
- **EEPROM Fault**
A red status display indicates that configuration data is defective.
- **Bad Sensors**
A red status display indicates that at least one faulty detonation sensor signal has been detected.

10.2.3 Intensity

The *Intensity* button in the *Main Menu* of the added detonation controller opens the *Knocking Intensity* view.



In the *Knocking Intensity* view the current knocking intensity is shown as a bar for each cylinder monitored. For the measured values to be displayed in cylinder sequence, the firing order of the cylinders must be specified in the *Preferences* view. For more information, refer to the section *Preferences* on page 111. If you have specified a firing order, only as many cylinders are displayed as are used in the firing order.

The colors of the bars have the following meanings:

Color	Meaning	Explanation
Green	Normal	The knock level does not exceed any limits of the detonation controller.
Yellow	Reduction	The knock level is above the <i>Ignition reduction limit</i> configured in the detonation controller.
Red	Critical	The knock level is above the <i>Immediate stop limit</i> configured in the detonation controller.

The status displays show the detonation sensor status for each cylinder. The colors of the status displays have the following meaning:

- Gray: The detonation sensor is not in use.
- Green: The detonation sensor is active.
- Red: The detonation sensor is providing faulty signals or has failed entirely.

10 Devices

10.2.4 Trends

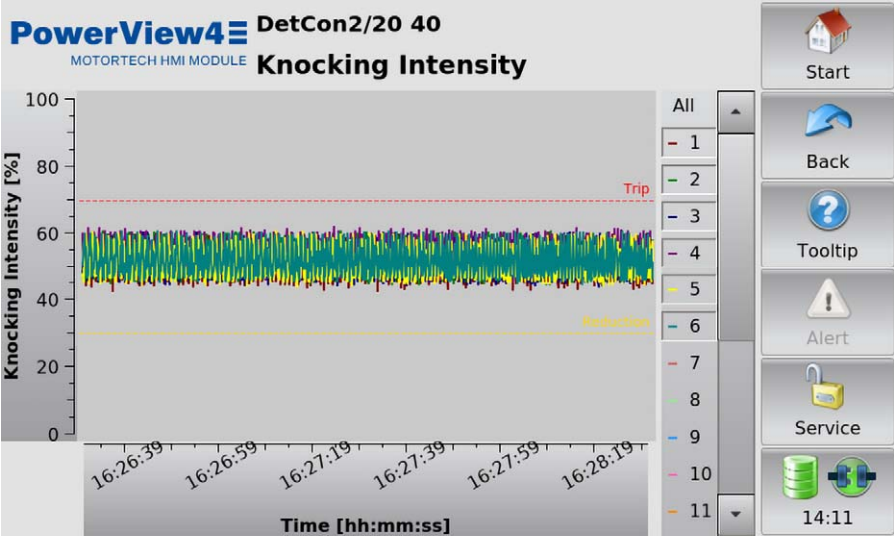
The *Trends* button in the *Main Menu* of the added detonation controller opens the *Trends* view.



To view the current knocking intensity or the analog output signal trend, tap the desired button.

Knocking Intensity

The *Knocking* button in the *Trends* view of the added detonation controller opens the *Knocking Intensity* view.



In this view the current knocking intensity trend of all cylinders is presented. The cylinders are presented in different colors and can be hidden and shown individually using the buttons to the right of the display window. For the trend to be displayed in cylinder sequence, the firing order of the cylinders must be specified in the *Preferences* view. For more information, refer to the section *Preferences* on page 111.

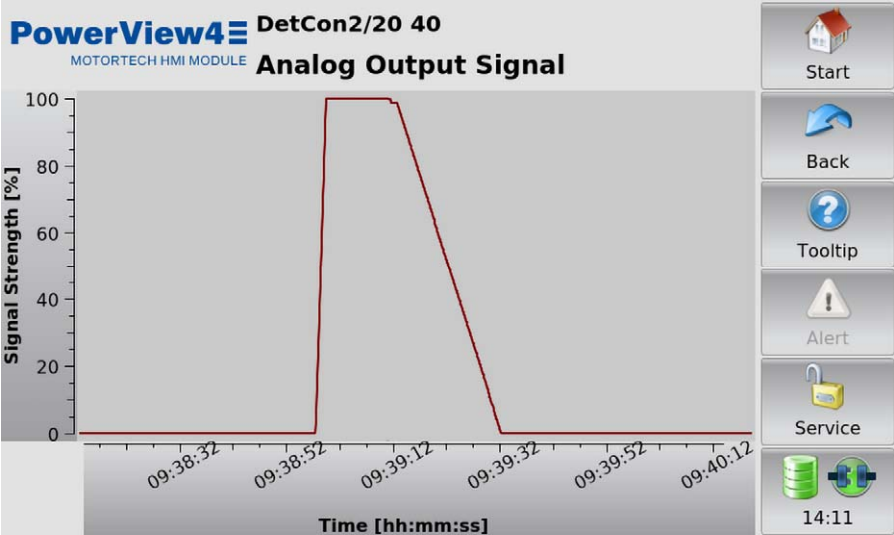
The areas have the following meaning:

Area	Meaning
From 0 to the yellow line <i>Reduction</i>	The knock level does not exceed any limits of the detonation controller.
From the yellow line <i>Reduction</i> to the red line <i>Trip</i>	The knock level is above the <i>Ignition reduction limit</i> configured in the detonation controller.
From the red line <i>Trip</i> to 100	The knock level is above the <i>Immediate stop limit</i> configured in the detonation controller.

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Analog Output Signal

The *Analog Output* button in the *Trends* view of the added detonation controller opens the *Analog Output Signal* view.



The diagram indicates the current trend of the analog output signal in percent.

10.2.5 Preferences

The *Preferences* button in the *Main Menu* of the added detonation controller opens the *Preferences* view.

In this view you change the settings for processing the signals that the PowerView4 receives from the detonation controller and can activate messages via the binary outputs of the PowerView4 (see section *Devices* on page 51).

Firing Order

The detonation sensors are usually connected to the detonation controller in firing order. To ensure that the PowerView4 displays the measured values of the detonation sensors in cylinder sequence, tap the *Change* button and enter the firing order in the input window that appears. If the knocking intensity of certain cylinders is not to be displayed, omit the relevant cylinders.

Trip Handling

Activate the checkbox to invert the status display *Trip* in the *Overview* of the detonation controller (see section *Overview* on page 105). This setting does not change the setting of the *Trip contact inactive* entry in the detonation controller.

Binary Outputs

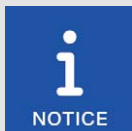
You can activate the following messages:

- [Warning on Knocking](#)
If the detonation controller registers engine knocking, the PowerView4's binary output *Warning* (see section *Devices* on page 51) is switched via CAN1.
- [Error on Trip](#)
If the *Trip* output is activated on the detonation controller, the PowerView4's binary output *Error* (see section *Devices* on page 51) is switched via CAN1.

10 Devices

10.3 Temperature Module

This section describes the functions and views of an added temperature module.



Switching between °C and °F

In the *Display Configuration* view, you can specify whether the temperatures are displayed in °C or in °F (see section *Display* on page 58).

10.3.1 Main Menu

The main menu of an added temperature module can be opened in the *Start Menu* via the *TempScan20* button.






The main menu has the following buttons:

- **Overview**
This button opens the *Overview* in which all currently measured temperatures are listed. There is more information in the section *Overview* on page 114.
- **Preferences**
This button opens the *Preferences* view from which you can access all of the configuration pages for your temperature module. There is more information in the section *Preferences* on page 115.

- [Help](#)
This button opens the operating manual of the temperature module. There is more information in the section *Help* on page 74.

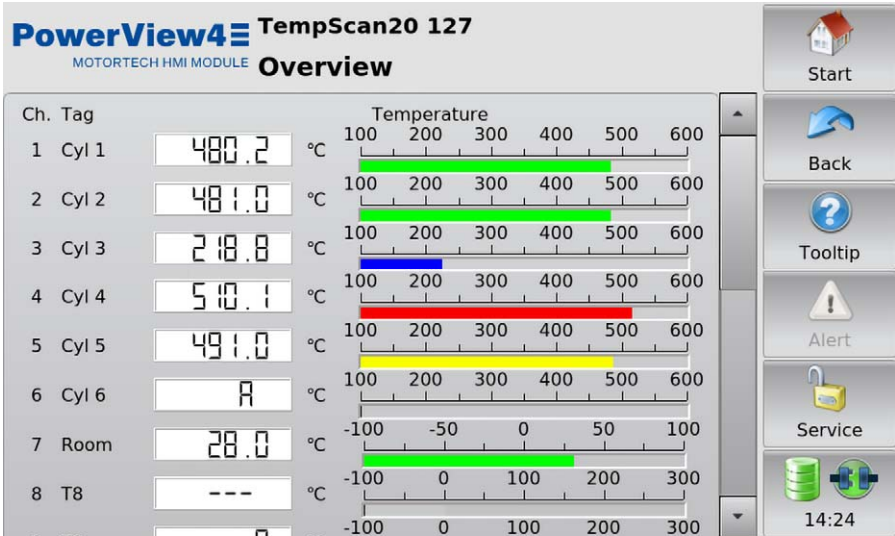
Groups can be assigned to the channels of the temperature module (see section *Groups* on page 117). For each group with at least one assigned channel, additional buttons for opening group-specific views are displayed in the *Main Menu*. The buttons are labeled with the name of the group (here: *Bank A*).

Button	Function
	With this button you can open an overview with the measured temperatures of all channels in a group (see <i>Overview</i> on page 127).
	With this button you can open a view with the temperature trends of all channels in a group (see <i>Temperatures</i> on page 128).
	This button is only displayed if the checkbox <i>Average</i> in the <i>Group Names</i> view is activated (see <i>Groups</i> on page 117). The deviation of each channel from the average temperature of all group channels is displayed (see <i>Average Deviation</i> on page 129).

10 Devices

10.3.2 Overview

The *Overview* button in the *Main Menu* of the added temperature module opens the *Overview*.



This view lists the currently measured temperatures of all temperature module channels.

The following information is provided:

- *Ch.*: channel number
- *Tag*: user-specified abbreviation
- *Temperature*: currently measured temperature (A = thermocouple failed; --- = channel not activated)

The colors of the temperature displays have the following meaning:

- Green: The temperature is within the permitted range.
- Blue: The temperature has dropped below the lower warning threshold.
- Yellow: The upper warning threshold has been exceeded.
- Red: The upper shutdown threshold has been exceeded.

Information about setting thresholds can be found in section *Thresholds* on page 123.

10.3.3 Preferences

The *Preferences* button in the *Main Menu* of the added temperature module opens the *Preferences* view.



The *Preferences* view contains the following buttons:

- **Names**
This button opens the *Channel Names* view, in which you can assign names to the available channels. There is more information in the section *Names* on page 116.
- **Groups**
This button opens the *Group Names* view, in which you can assign names to the available groups. There is more information in the section *Groups* on page 117.
- **Channels**
This button opens the views for configuring the individual channels. There is more information in the section *Channels* on page 119.
- **Type**
This button opens the *Thermocouples* view, which allows you to set the thermocouple type for each channel. There is more information in the section *Type* on page 121.
- **Activation**
This button opens the *Channel Activation* view, in which you can activate and deactivate individual channels for the display of measured values and assign them to groups. There is more information in the section *Activation* on page 122.
- **Thresholds**
This button opens the views for configuring the warning and shutdown thresholds. There is more information in the section *Thresholds* on page 123.


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- [Internal Status](#)
This button opens views, in which you can access internal parameters of the temperature module. There is more information in the section *Internal Status* on page 124.
- [Store Setup](#)
Tap this button to permanently save the following information in the temperature module:
 - Warning and shutdown thresholds
 - Thermocouple types
 - The information whether a channel is activated or deactivated.

Otherwise, this information will be lost in the temperature module if the temperature module is switched off temporarily and is not connected to the PowerView4 after switching on.

10.3.3.1 Names

The *Names* button in the *Preferences* view of the added temperature module opens the *Channel Names* view.




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MOTORTECH HMI MODULE

Channel Names


Ch.	Tag	Name	Advanced Settings
1	Cyl 1	Cylinder 1	Configure Channel
2	Cyl 2	Cylinder 2	Configure Channel
3	Cyl 3	Cylinder 3	Configure Channel
4	Cyl 4	Cylinder 4	Configure Channel
5	Cyl 5	Cylinder 5	Configure Channel
6	Cyl 6	Cylinder 6	Configure Channel
7	Room	Room Temperature	Configure Channel
8	T8	none	Configure Channel
9	T9	none	Configure Channel
10	T10	none	Configure Channel
11	T11	none	Configure Channel




Start




Back




Tooltip



Alert



Service



14:25

This view lists all the channels of the temperature module. You have the following options:

Tag

To enter an abbreviation, proceed as follows:

1. Tap the desired field in the *Tag* column.
2. Enter an abbreviation (maximum five characters) via the on-screen keyboard and confirm with *OK*.
 - ▶ The abbreviation is displayed and then always used in the user interface of the PowerView4 if there is insufficient space for the full name.

Name

Name the channel as follows:

- 1. Tap the desired field in the *Name* column.
- 2. Enter a channel name (maximum 20 characters) via the on-screen keyboard and confirm with *OK*.
 - ▶ The name is displayed.

Advanced Settings

The *Configure Channel* button opens the channel settings. There you can edit all the settings of the respective channel (see section *Channels* on page 119).

10.3.3.2 Groups

The *Groups* button in the *Preferences* view of the added temperature module opens the *Group Names* view.


PowerView4


MOTORTECH HMI MODULE

TempScan20 127


Group Names

Label	Group Name	Average
A	Bank A	<input checked="" type="checkbox"/> Enabled
B	Bank B	<input checked="" type="checkbox"/> Enabled
C	Room	<input checked="" type="checkbox"/> Enabled
D	none	<input type="checkbox"/> Enabled


Start


Back


Tooltip


Alert


Service


14:26

Up to four groups (labels A to D) can be assigned to the channels of the temperature module. For each group with at least one assigned channel, additional group-specific views are available, which can be accessed via the *Main Menu* of the temperature module (see section *Group-Specific Views* on page 127).

10 Devices

In this view, you can assign group names and activate the display of average temperature deviations for each group:

Group Name

Name the groups A to D as follows:

1. Tap the desired field in the *Group Name* column.
2. Enter a group name (maximum eleven characters) via the on-screen keyboard and confirm with *OK*.
 - ▶ The group name is displayed.

Average



The deviation of each individual channel in the group from the average group temperature can be displayed via the PowerView4. For this, activate the desired checkbox in the *Average* column. If the checkbox is activated for a group, the following additional button with the corresponding group name is available in the *Main Menu* of the temperature module:



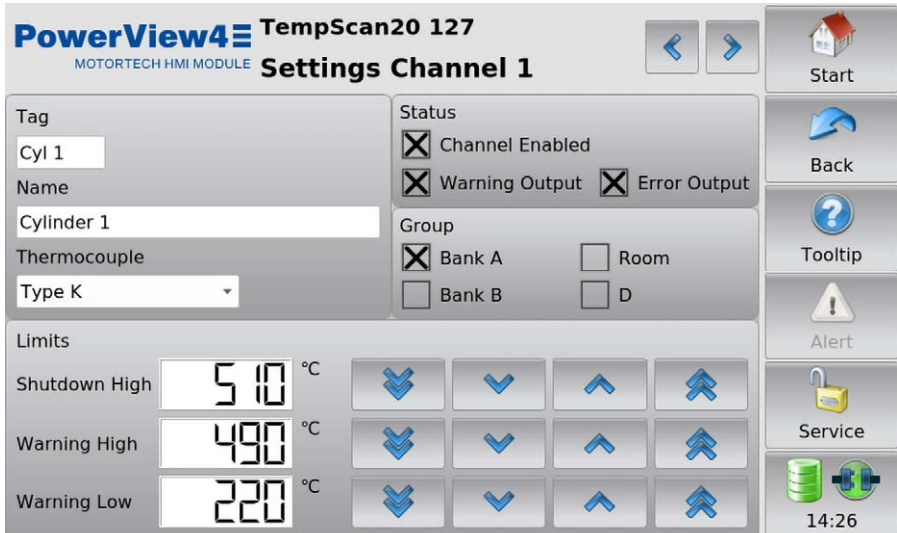
This button opens the view in which the average temperature deviations within the group are displayed. Read the section *Average Deviation* on page 129 for more information.

10.3.3.3 Channels

The *Channels* button in the *Preferences* view of the added temperature module opens views for individual configuration of the single channels. In each view, you make all the settings for one channel.

The  and  buttons allow you to switch between the channels.

The configured channel is always the one shown in the title area.



PowerView4 **TempScan20 127**
MOTORTECH HMI MODULE **Settings Channel 1**

Tag: Cyl 1
Name: Cylinder 1
Thermocouple: Type K

Status:
☒ Channel Enabled
☒ Warning Output ☒ Error Output

Group:
☒ Bank A ☐ Room
☐ Bank B ☐ D

Limits:
 Shutdown High: 510 °C
 Warning High: 490 °C
 Warning Low: 220 °C

Navigation buttons: Start, Back, Tooltip, Alert, Service. Time: 14:26

You have the following options:

Tag

To enter an abbreviation, proceed as follows:

1. Tap in the field below *Tag*.
2. Enter an abbreviation (maximum five characters) via the on-screen keyboard and confirm with *OK*.
 - ▶ The abbreviation is displayed and then always used in the user interface of the PowerView4 if there is insufficient space for the full name.

Name

Name the channel as follows:

1. Tap in the field below *Name*.
2. Enter a channel name (maximum 20 characters) via the on-screen keyboard and confirm with *OK*.
 - ▶ The name is displayed.

10 Devices

Thermocouple

Set the thermocouple type that is connected to the channel of the temperature module accordingly.

Status

In the *Status* area you have the following options:

- Activate the checkbox *Channel Enabled* to activate the displayed channel for displaying measured values in the PowerView4.
- Activate the checkbox *Warning Output*, so that for the displayed channel the PowerView4's binary output *Warning* (see section *Devices* on page 51) is switched via CAN1 if the warning thresholds are not met.
- Activate the checkbox *Error Output*, so that for the displayed channel the PowerView4's binary output *Error* (see section *Devices* on page 51) is switched via CAN1 if the shutdown threshold is not met.

Group

Assign a channel to one or several groups. Activate the checkbox for the desired groups.

Limits

The colors of the temperature displays in the *Overview* and in the group-specific views are dependent on the threshold settings (see sections *Overview* on page 114 and *Group-Specific Views* on page 127).

You can set the following threshold values:

- *Shutdown High* defines the upper shutdown threshold value.
- *Warning High* defines the upper warning threshold value.
- *Warning Low* defines the lower warning threshold value.

Adjust the threshold values as follows:

- With  and  in steps of 1 °C or 1 °F
- With  and  in steps of 20 °C or 20 °F

To save the set warning and shutdown thresholds, thermocouple types and channel activations permanently in the temperature module, use the *Back* button to go back to the *Preferences* view and tap the *Store Setup* button.

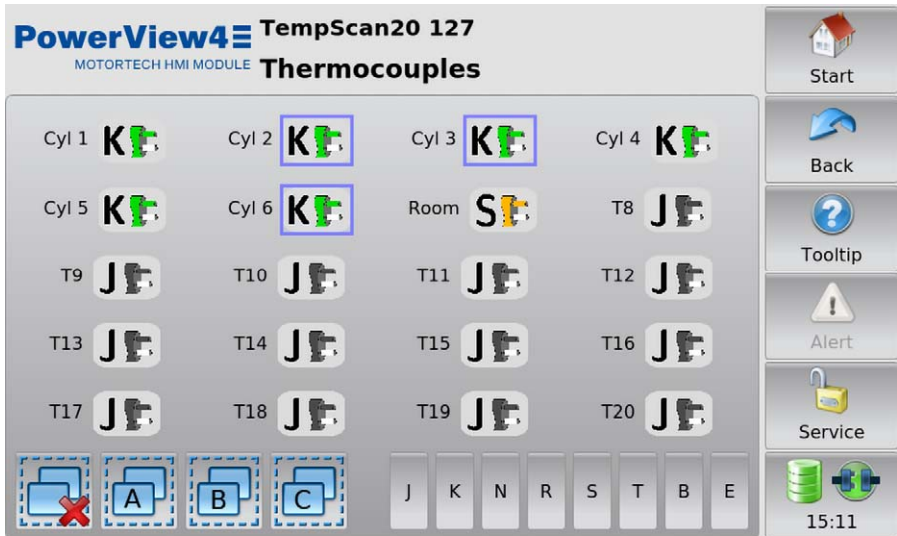


Minimum separation of threshold values

The threshold values *Shutdown High*, *Warning High* and *Warning Low* must each be separated by at least 10 °C (18 °F).



10.3.3.4 Type

The *Type* button in the *Preferences* view of the added temperature module opens the *Thermocouples* view.



In this view, you can set the thermocouple type connected to the temperature module for each channel. The colors of the thermocouple types shown correspond to the standard IEC 60584-3: 2007.

Changes are made to selected channels. You have the following options for selecting channels:

- Tap the desired channel directly to select it. To remove the channel from the selection, tap the channel again.
- Tap a group symbol (e.g. ) to invert the selection for the respective group.
 - ▶ Selected channels have a blue frame.
- Tap  to clear all selections.

For the selection, set the desired thermocouple type by pressing the corresponding button (for example *K* or *J*).



To save the set thermocouple types permanently in the temperature module, use the *Back* button to go back to the *Preferences* view and tap the *Store Setup* button.

10 Devices

10.3.3.5 Activation

The *Activation* button in the *Preferences* view of the added temperature module opens the following views:

- *Channel Activation*
- *Warning Output*
- *Error Output*
- *to Group x* (A, B, C, D or configured group name)

The  and  buttons allow you to switch between the views.

The views are described as follows.



All channels are displayed with their numbers or an abbreviation (if available).

Channel Activation

Activate the checkbox of the desired channels to activate them for the display of measured values in the PowerView4.

To save the set channel activation permanently in the temperature module, use the *Back* button to go back to the *Preferences* view and tap the *Store Setup* button.

Warning Output

Activate the checkbox of the desired channels if the PowerView4's binary output *Warning* (see section *Devices* on page 51) is to be switched via CAN1 when warning thresholds are not met.

Error Output

Activate the checkbox of the desired channels if the PowerView4's binary output *Error* (see section *Devices* on page 51) is to be switched via CAN1 when shutdown thresholds are not met.



to Group x

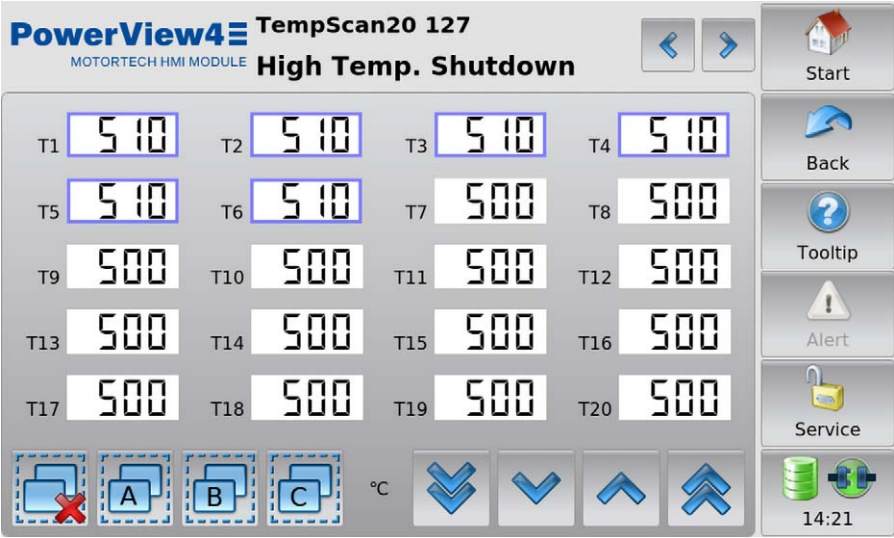
Activate the checkbox of the channels that you want to assign to the displayed group (A, B, C, D, or configured group name).

10.3.3.6 Thresholds

The *Thresholds* button in the *Preferences* view of the added temperature module opens the following views:

- *High Temp. Shutdown*: Defines the upper shutdown thresholds (*Shutdown High* in *Settings Channel x* view).
- *High Temp. Warning*: Defines the upper warning thresholds (*Warning High* in *Settings Channel x* view).
- *Low Temp. Warning*: Defines the lower warning thresholds (*Warning Low* in *Settings Channel x* view).

The  and  buttons allow you to switch between the views.





The colors of the temperature displays in the *Overview* and in the group-specific views are dependent on the threshold settings (see sections *Overview* on page 114 and *Group-Specific Views* on page 127).

Changes are made to selected channels. You have the following options for selecting channels:

- Tap the desired channel directly to select it. To remove the channel from the selection, tap the channel again.

10 Devices

- Tap a group symbol (e.g. ) to invert the selection for the respective group.
 - ▶ Selected channels have a blue frame.
- Tap  to clear all selections.

For the selected channels, set the thresholds using the arrow keys:

- With  and  in steps of 1 °C or 1 °F
- With  and  in steps of 20 °C or 20 °F

To save the set warning and shutdown thresholds permanently in the temperature module, use the *Back* button to go back to the *Preferences* view and tap the *Store Setup* button.





Minimum separation of threshold values

The threshold values *High Temp. Shutdown*, *High Temp. Warning* and *Low Temp. Warning* must each be separated by at least 10 °C (18 °F).

10.3.3.7 Internal Status

The *Internal Status* button in the *Preferences* view of the added temperature module opens the following views:

- *Status*
- *Reference Junction*

The  and  buttons allow you to switch between the views.

These views support service personnel when troubleshooting and are described in the following.

Status

PowerView4 MOTORTECH HMI MODULE **TempScan20 127** **Status**

Error React Delay [ms]	5000
Power Supply Measured [V]	8.20
ADC Filter Frequency [Hz]	50
Start in Operational Mode	0

Start
Back
Tooltip
Alert
Service
14:27

The following information is provided:

- [Error React Delay \[ms\]](#)
Time span after which the temperature module sends an error message if a warning or shut-down threshold is not met.
- [Power Supply Measured \[V\]](#)
The internal supply voltage varies depending on the external supply voltage of the temperature module.
- [ADC Filter Frequency \[Hz\]](#)
Information on the filter frequency of the temperature module's inputs.
- [Start in Operational Mode](#)
This entry must show the value 0 so that the temperature module does not start in operational mode and can be configured at any time via the PowerView4. If any other value occurs, please contact your MOTORTECH contact person (see section *Customer Service Information* on page 142).

10 Devices


Reference Junction


PowerView4
MOTORTECH HMI MODULE


TempScan20 127
Reference Junction


←


→


Start

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	Channels 1-10	Channels 11-20
Input Field Value [°C]	26.75	27.25
Auto Correct on [bits]	3FF	3FF

The following information is provided:

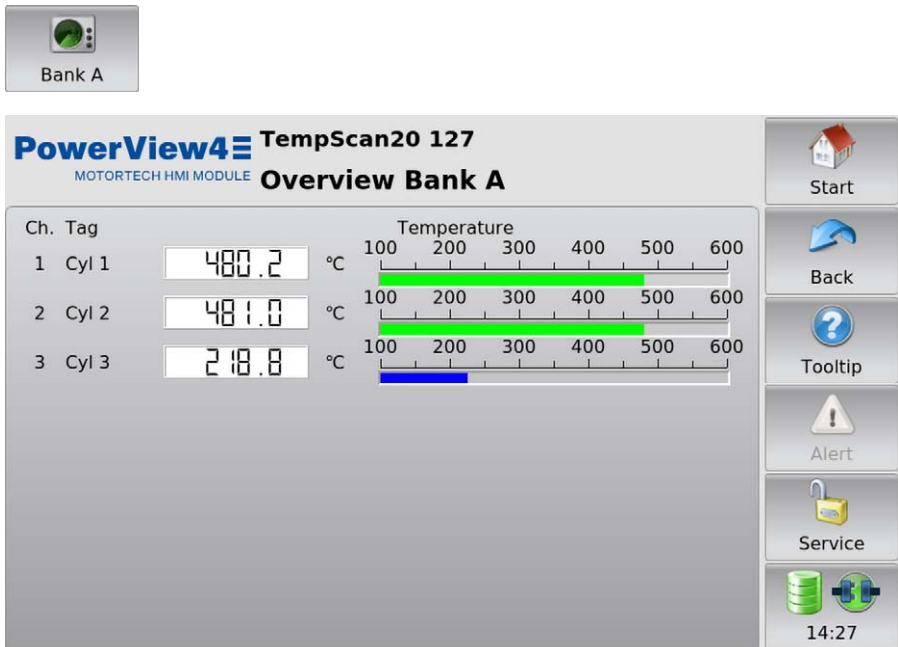
- **Input Field Value [°C]**
In order to determine a temperature with thermocouples, you need a reference junction temperature. This entry provides information on the current temperature measured at the reference junctions.
- **Auto Correct on [bits]**
The hexadecimal number *3FF* indicates that the temperature measured at the reference junction is used for determining the temperature with the thermocouples. If any other value occurs, please contact your MOTORTECH contact person (see section *Customer Service Information* on page 142).

10.3.4 Group-Specific Views

If at least one activated channel is assigned to a group, you can open the following views via additional buttons in the *Main Menu* of the added temperature module.

10.3.4.1 Overview

The *Overview* of a group (here: *Bank A*) can be opened in the *Main Menu* of the added temperature module via the following button with the corresponding group name:



This view displays the currently measured temperatures of all channels in a group.

- *Ch.:* channel number
- *Tag:* user-specified abbreviation
- *Temperature:* currently measured temperature (A = thermocouple failed; --- = channel not activated)

The colors of the temperature displays have the following meaning:

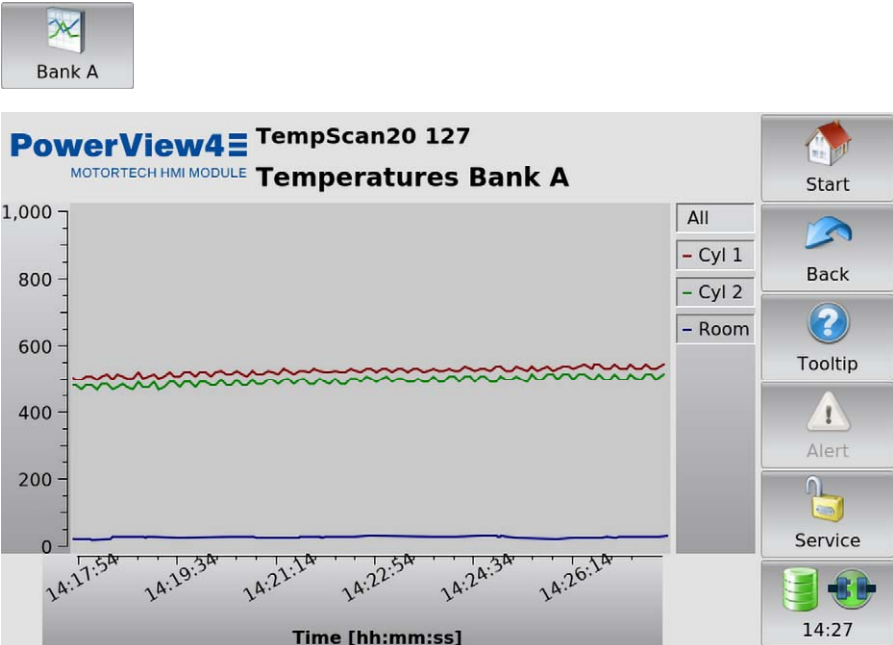
- Green: The temperature is within the permitted range.
- Blue: The temperature has dropped below the lower warning threshold.
- Yellow: The upper warning threshold has been exceeded.
- Red: The upper shutdown threshold has been exceeded.

Information about setting thresholds can be found in section *Thresholds* on page 123.

10 Devices

10.3.4.2 Temperatures

The group-specific view *Temperatures* is opened in the *Main Menu* of the added temperature module using the following button with the corresponding group name (here: *Bank A*):



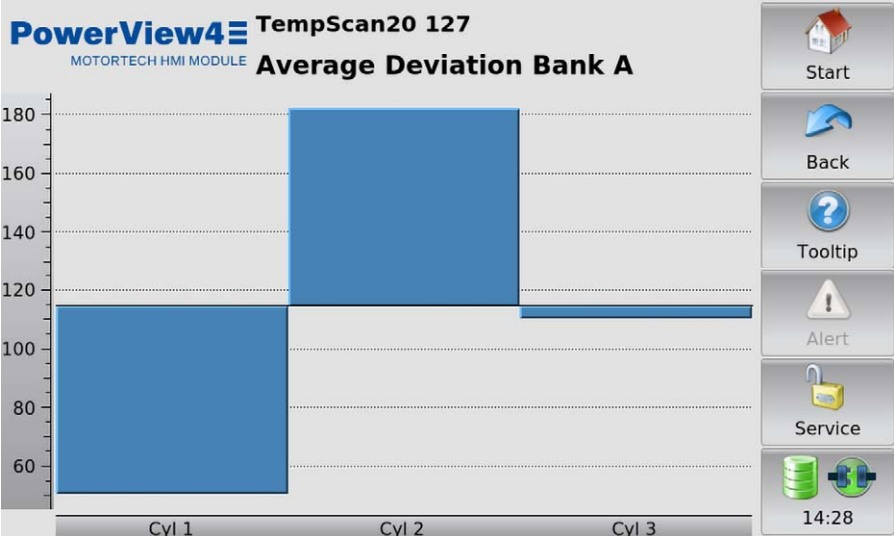
This view displays the current temperature trends of all channels in a group. The available channels can be displayed or hidden via the legend.

10.3.4.3 Average Deviation

The group-specific view *Average Deviation* is opened in the *Main Menu* of the added temperature module using the following button with the corresponding group name (here: *Bank A*):



This button is only displayed if for the relevant group the checkbox *Average* is activated in the *Group Names* view (see section *Groups* on page 117).



The deviation of each channel from the average temperature of all channels in the group is displayed.

10 Devices

10.4 I/O Communication Module BPlus, I/O Module (CiA401, CiA404)

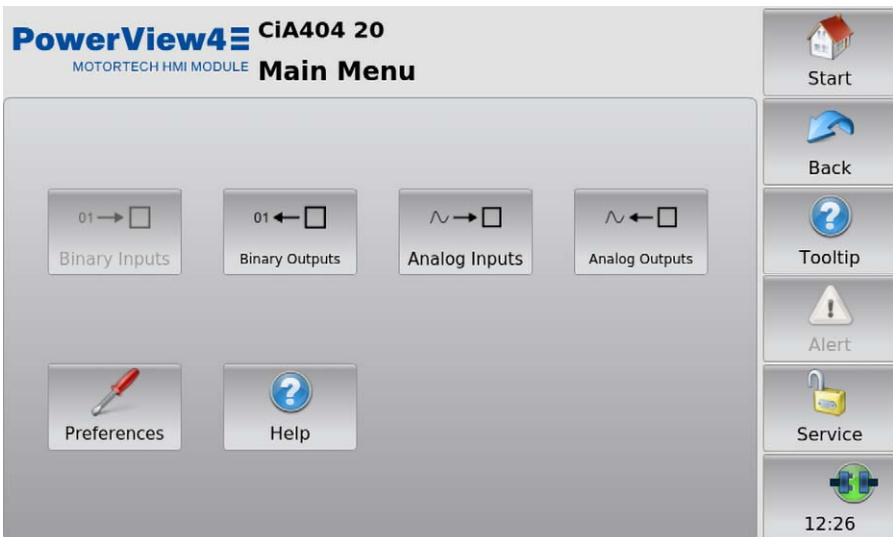
This section uses the example of an I/O module supporting device profile CiA® 404 to describe the functions and views of the I/O communication module BPlus specially available from MOTORTECH and of an I/O module supporting device profile CiA® 401.

The number of available analog and binary inputs and outputs depends on the respective I/O module to which the PowerView4 is connected via the CAN bus interface CAN1. For the I/O communication module BPlus, you can find this information in the section *I/O Communication Module BPlus* on page 28.

Also observe the node ID that is set for the module in the PowerView4 and displayed behind the device name in the module's views. It must match the node ID of the respective module.

10.4.1 Main Menu

The main menu of an added I/O communication module BPlus or I/O module supporting device profile CiA® 401 or CiA® 404 can be opened in the *Start Menu* via the respective button (*BPlus*, *CiA401*, or *CiA404*).



If a specific input or output type is not available with the I/O module, the respective button is grayed out.

The main menu has the following buttons:

- **Binary Inputs**

The button opens the *Binary Inputs* view. In this view, a green status display in the *Status* column shows that the corresponding binary input in the *Channel* column is closed (see illustration example binary outputs below). In the *Function* column, the view displays the function that you have assigned to the channel. For an explanation of the function and for assigning the channel a function, read the section *Binary Inputs* on page 135.

– Binary Outputs

The button opens the *Binary Outputs* view. In this view, a green status display in the *Status* column shows that the corresponding binary output in the *Channel* column is switched. In the *Function* column, the view displays the function that you have assigned to the channel. For an explanation of the function and for assigning the channel a function, read the section *Binary Outputs* on page 136. You can switch binary outputs that are not linked to any function (displayed as ---) for test purposes (see section *Testing of Outputs* on page 132).

Illustration example binary outputs

Channel	Status	Linked to Function	Test
1		Warning Output	
2		Error Output	
3		---	<input type="checkbox"/>

– Analog Inputs

The button opens the *Analog Inputs* view. In this view, the incoming signal that is present at the corresponding analog input in the *Channel* column is displayed in the *Value* column (see illustration example analog outputs below). In the *Function* column, the view displays the function that you have assigned to the channel. For an explanation of the function and for assigning the channel a function, read the section *Analog Inputs* on page 137. If an I/O module supporting device profile CiA® 404 is configured and connected to the PowerView4, the PowerView4 displays the respective value in the *Value* column with unit. With the I/O communication module BPlus and with an I/O module supporting device profile CiA® 401, the PowerView4 displays the respective raw value.

– Analog Outputs

The button opens the *Analog Outputs* view. In this view, the outgoing signal that is output by the I/O module at the corresponding analog output in the *Channel* column is displayed in the *Value* column. In the *Function* column, the view displays the function that you have assigned to the channel. For an explanation of the function and for assigning the channel a function, read the section *Analog Outputs* on page 138. If an I/O module supporting device profile CiA® 404 is configured and connected to the PowerView4, the PowerView4 displays the respective value in the *Value* column with unit. With the I/O communication module BPlus and with an I/O module supporting device profile CiA® 401, the PowerView4 displays the respective raw value. You can assign values to analog outputs that are not linked to any function (displayed as ---) for test purposes (see section *Testing of Outputs* on page 132).

Illustration example analog outputs

Channel	Value	Function	Test
1	<input type="text" value="0.000"/>	V ---	<input type="checkbox"/>

– Preferences

This button provides access to the settings of the added I/O module. There is more information in the section *Preferences* on page 134.

– Help

This button opens the operating manual of the PowerView4. There is more information in the section *Help* on page 74.

10 Devices

10.4.1.1 Testing of Outputs



Operational safety!

The PowerView4 and the software are not designed for safety-critical applications. The analog and binary inputs and outputs of the Power-View4 system must not be used for safety-critical purposes.



Operational safety!

Testing the outputs affects the connected devices. Before performing tests, make sure that switching the outputs will not result in hazards or damage.

Analog outputs to which no function is assigned can be used to output values for test purposes. Binary outputs to which no function is assigned can be switched for test purposes. This allows you to test the behavior of devices connected to these outputs.

Start Testing

If you want to test an output, proceed as follows:

1. For the respective output, tap on the empty rectangle in the *Test* column.

- ▶ A black dot appears in the rectangle.



- ▶ The field *Test Off* at the bottom left of the respective view is empty.
- ▶ If another output has been tested before, this test is ended, the value of the respective output is reset, and the black dot in the respective rectangle is deleted.

2. Test the output.

- Binary output: Tap the *Toggle* button to switch the output on and off. A turquoise frame around the *Toggle* button indicates that the output to be tested is switched.



- Analog output: Use the slider to set the desired analog test value.



End Testing

You have two options to end the test of an output.

Option 1:

Tap on the field *Test Off*.

- ▶ A black dot appears in the *Test Off* field.



- ▶ The test of the respective output is ended, its value is reset and the black dot in the *Test* column is deleted for the respective output.

Option 2:

Exit the view using the *Back* button in the menu bar.

- ▶ The test of the respective output is ended and its value reset.

10 Devices

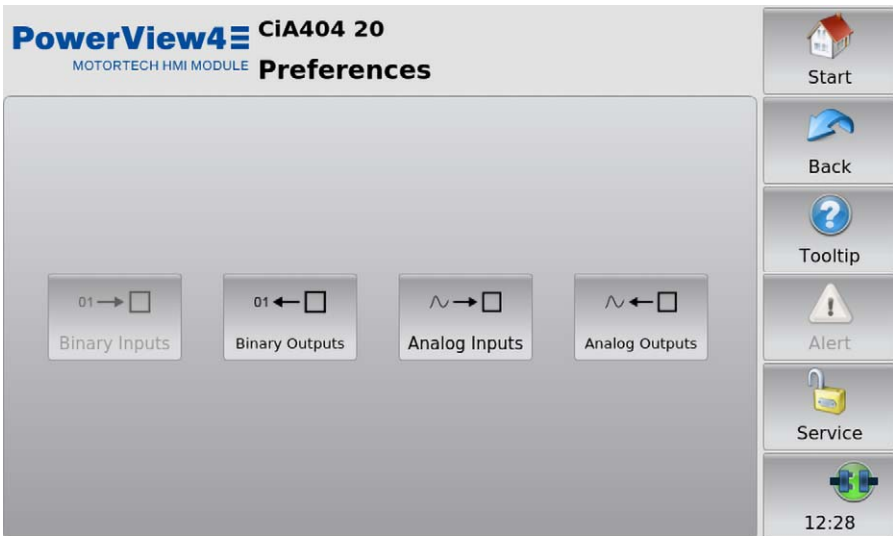
10.4.2 Preferences



Operational safety!

The PowerView4 and the software are not designed for safety-critical applications. The analog and binary inputs and outputs of the PowerView4 system must not be used for safety-critical purposes.

The *Preferences* button in the *Main Menu* of an added I/O communication module BPlus or I/O module supporting device profile CiA® 401 or CiA® 404 opens the *Preferences* view.



If a specific input or output type is not available with the I/O module, the respective button is grayed out.

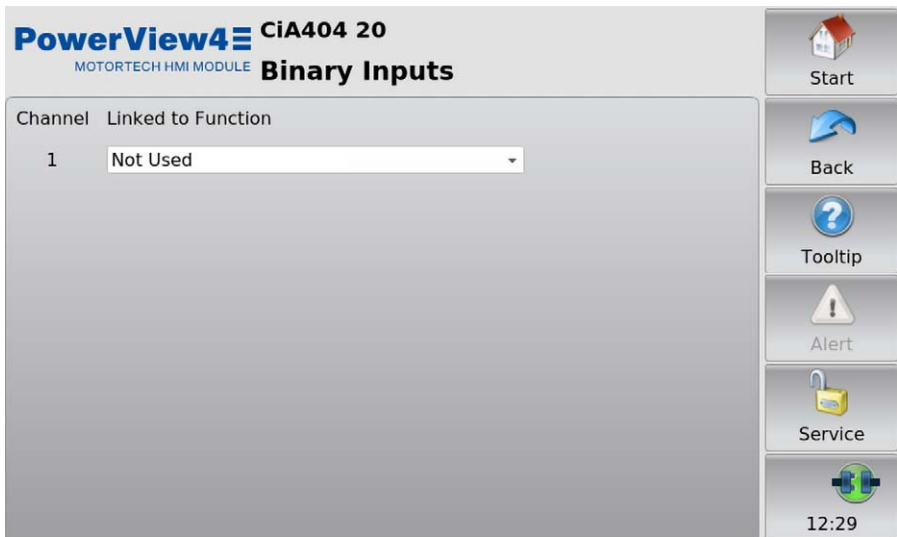
The *Preferences* view contains the following buttons:

- **Binary Inputs**
Use the button to open a view in which you can link the binary inputs of the respective I/O module to a function of the PowerView4. There is more information in the section *Binary Inputs* on page 135.
- **Binary Outputs**
Use the button to open a view in which you can link the binary outputs of the respective I/O module with a function of the PowerView4. There is more information in the section *Binary Outputs* on page 136.

- [Analog Inputs](#)
Use the button to open a view in which you can link the analog inputs of the respective I/O module to a function of the PowerView4. There is more information in the section *Analog Inputs* on page 137.
- [Analog Outputs](#)
Use the button to open a view in which you can link the analog outputs of the respective I/O module with a function of the PowerView4. There is more information in the section *Analog Outputs* on page 138.

10.4.2.1 Binary Inputs

The *Binary Inputs* button in the *Preferences* view of an added I/O communication module BPlus or I/O module supporting device profile CiA® 401 or CiA® 404 opens the *Binary Inputs* view.



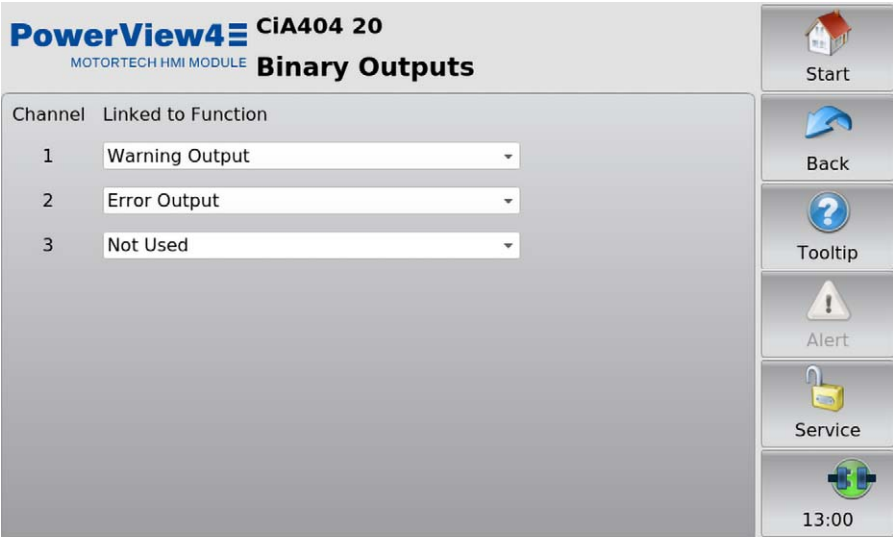
Note that changes in this view are not saved and applied by the I/O module until you exit the view. Use the drop-down list to link the I/O module's binary inputs displayed in the *Channel* column to the desired function:

- [Not Used](#)
The binary input is not linked to any function.
- [Normal Operation Release for NOx1/NOx2](#)
These functions are reserved for the EasyNO_x NO_x monitoring from MOTORTECH and cannot be used with the PowerView4.

10 Devices

10.4.2.2 Binary Outputs

The *Binary Outputs* button in the *Preferences* view of an added I/O communication module BPlus or I/O module supporting device profile CiA® 401 or CiA® 404 opens the *Binary Outputs* view.

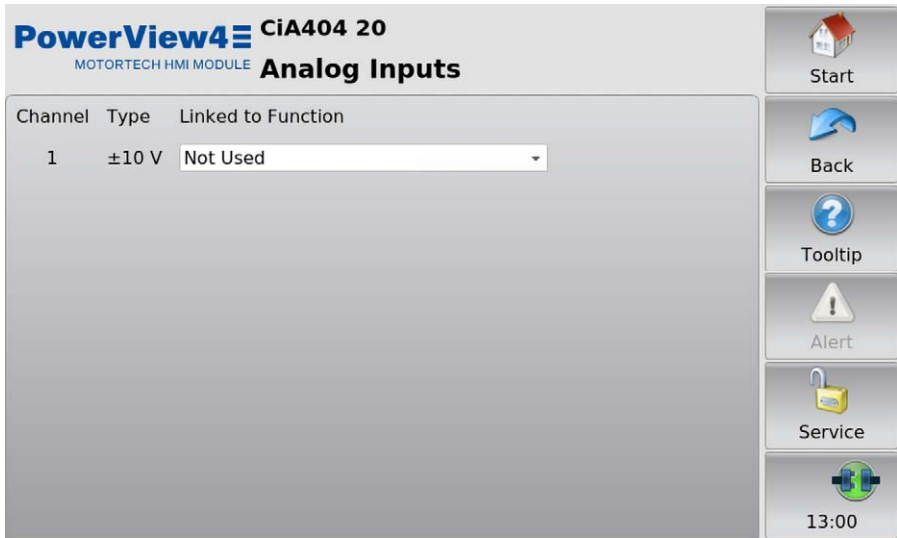


Note that changes in this view are not saved and applied by the I/O module until you exit the view. Use the drop-down list to link the I/O module's binary outputs displayed in the *Channel* column to the desired function:

- **Not Used**
The binary output is not linked to any function.
- **Error Output, Warning Output**
The binary output of the respective I/O module is assigned to the binary output *Error* or *Warning* of the PowerView4. If the binary outputs of the PowerView4 are activated (see section *Devices* on page 51), the PowerView4 switches the assigned binary output of the I/O module if a corresponding monitoring function of an added device requires it.
- **Cat. Temperature Error NOx1/NOx2, NOx Exceedance NOx1/NOx2, Normal Operation NOx1/NOx2**
These functions are reserved for the EasyNOx NOx monitoring from MOTORTECH and cannot be used with the PowerView4.

10.4.2.3 Analog Inputs

The *Analog Inputs* button in the *Preferences* view of an added I/O communication module BPlus or I/O module supporting device profile CiA® 401 or CiA® 404 opens the *Analog Inputs* view.



Note that changes in this view are not saved and applied by the I/O module until you exit the view. If an I/O module supporting device profile CiA® 404 is set and connected to the PowerView4, the PowerView4 displays the analog input type (e.g. ± 10 V) in the *Type* column.

Use the drop-down list to link the I/O module's analog inputs displayed in the *Channel* column to the desired function:

- [Not Used](#)
The analog input is not linked to any function.
- [Load Input for NOx1/NOx2](#)
These functions are reserved for the EasyNO_x NO_x monitoring from MOTORTECH and cannot be used with the PowerView4.

10 Devices

10.4.2.4 Analog Outputs

The *Analog Outputs* button in the *Preferences* view of an added I/O communication module BPlus or I/O module supporting device profile CiA® 401 or CiA® 404 opens the *Analog Outputs* view.

PowerView4

MOTORTECH HMI MODULE

CiA404 20

Analog Outputs

Channel	Type	Linked to Function
1	±10 V	Not Used

Start

Back

Tooltip

Alert

Service

13:00

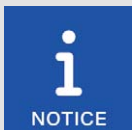
Note that changes in this view are not saved and applied by the I/O module until you exit the view. If an I/O module supporting device profile CiA® 404 is set and connected to the PowerView4, the PowerView4 displays the analog output type (e.g. $\pm 10\text{ V}$) in the *Type* column.

Use the drop-down list to link the I/O module's analog outputs displayed in the *Channel* column to the desired function:

- [Not Used](#)
The analog output input is not linked to any function.
- [Average NO_x from NO_x1/NO_x2, Actual NO_x from NO_x1/NO_x2](#)
These functions are reserved for the EasyNO_x NO_x monitoring from MOTORTECH and cannot be used with the PowerView4.

10.5 Generic Device

You have the option of adding up to three devices that are connected to the PowerView4 via the CAN bus interface CAN1 but not directly supported by it as a generic device (display name *Generic*). The generic device is started along with the PowerView4, and its connection status is monitored by the PowerView4.



Generic devices are not displayed in the Start Menu

Generic devices appear in the *Device Setup* view in the list of added devices (display name *Generic*). They are not displayed in the *Start Menu*.

Functions

- When a generic device is added to the device configuration, it is started if this has not already been done.
- The communication status is monitored by the PowerView4 and is visualized in the menu bar (see section *Menu Bar* on page 47).
- Changes to the communication status are listed in the *Event Log* view (see section *Event Log* on page 72).

11 Errors

11.1 Possible Faults

Fault	Possible cause	Solution
 The connection status symbol in the menu bar is yellow.	To at least one device there is no connection. The node ID of at least one added device is incorrect.	Establish the connection to the relevant devices. Set the correct node ID on the relevant devices (see section <i>Devices</i> on page 51).
 The connection status symbol in the menu bar is red.	No other device is connected.	Check the CAN bus wiring.
 The databank symbol in the menu bar is red.	The disk space on the memory card is insufficient.	Via the PowerView4, delete recordings that are no longer needed (see section <i>Recordings</i> on page 63).
	The write-protect switch of the memory card is in write-protect position.	Move the write-protect switch to the position write protection deactivated.
	The memory card is defective.	Contact your MOTORTECH contact person (see section <i>Customer Service Information</i> on page 142).
The display does not register touches at the desired position.	The display is dirty.	Clean the display (see section <i>Cleaning the Touchscreen</i> on page 143).
The displays on the screen are difficult to recognize.	The lighting conditions are unfavorable.	Adjust the display to the lighting conditions using the <i>Night Mode / Day Mode</i> button in the <i>Start Menu</i> .
The system time is repeatedly incorrect.	The internal battery is dead.	The battery must be replaced (see section <i>Battery Change</i> on page 143).
An added device is indicating erroneous operating data.	Node IDs in the CAN bus are incorrectly assigned.	Check the set node IDs of all devices connected to the CAN bus.
	The device is incorrectly wired.	Check the wiring of the device.
	The device is configured incorrectly.	Check the configuration of the device.

Fault	Possible cause	Solution
Signals do not arrive at an added I/O module (BPlus, CiA401/404) or are not received by the PowerView4.	The input or output is not linked to a function in the PowerView4.	Link the respective input or output to the desired function (see section <i>Preferences</i> on page 134).
	The input or output is linked to the wrong function in the PowerView4.	Link the respective input or output to the correct function (see section <i>Preferences</i> on page 134).
	The wiring is faulty.	Check the wiring including the CAN bus wiring. For outputs, also use the test function of the PowerView4 (see section <i>Testing of Outputs</i> on page 132).
Data is not getting updated.	The wiring of the CAN bus is defective.	Check the CAN bus wiring and correct any defects found.
	The device is not sending any data (for example if it is defective).	Check the device and fix the problems.
 <p>The device cannot be added, although the above symbol appears next to the device in the <i>Add Device</i> dialog.</p>	The number of available activations for this device has been exceeded.	In certain cases, you can activate additional devices with software dongles (see section <i>Device Activation</i> on page 53).
 <p>The symbol appears in the <i>Add Device</i> dialog next to devices.</p>	This device has not been activated.	Activate the device with a software dongle (see section <i>Device Activation</i> on page 53).
When tapping on a device in the <i>Start Menu</i> , you get the error message "No connection to this device has been established!"	The wiring of the CAN bus is defective.	Check the CAN bus wiring and correct any defects found.
	The bit rate of the device does not correspond to the bit rate of the PowerView4.	Set the correct bit rate for the device.
	The node ID of at least one added device is incorrect.	Set the correct node ID for the device in the PowerView4 (see section <i>Devices</i> on page 51).
The PowerView4 does not recognize an inserted USB flash drive and cannot read data from or write data to it.	The formatting of the USB flash drive is not compatible with the PowerView4.	Format the USB flash drive to a compatible format (see section <i>Interfaces</i> on page 21).
	The USB flash drive is not inserted correctly in the PowerView4.	Ensure that the USB flash drive is properly inserted into the device.
	The USB flash drive is defective.	Use a properly working USB flash drive.

11 Errors

11.2 Customer Service Information

You can reach us during our business hours by:

Phone: +49 5141 93 99 0
Email: service@motortech.de (technical support)
sales@motortech.de (all other matters)

11.3 Returning Equipment for Repair/Inspection

To return the device for repair and inspection, first consult your MOTORTECH contact person (see *Customer Service Information* on page 142). From him you will receive all the information you need to process your order quickly and smoothly. For return shipment, also observe the instructions in the section *Instructions for Packaging the Equipment* on page 142.

11.4 Instructions for Packaging the Equipment

For return shipment, equipment should be packaged as follows:

- Use packaging material that does not damage the equipment surfaces.
- Wrap the equipment with sturdy materials and stabilize it inside the packaging.
- Use sturdy adhesive film to seal the packaging.

12.1 Cleaning the Touchscreen

**Risk of destruction!**

Organic solvents as well as acids and alkaline solutions could damage the touchscreen. Therefore only clean the device with a soft cotton cloth and alcohol.

**Risk of destruction!**

Dirt affects the function of the touchscreen. Water, fingerprints, and other dirt should be removed immediately from the touchscreen and the frame to avoid spots.

To avoid spots and input problems, always remove dirt immediately. Clean the touchscreen if it reacts incorrectly when entering information.

Use a soft cotton cloth and alcohol to clean the PowerView4 touchscreen. Do not use organic solvents. Do not use acidic or alkaline solutions.

12.2 Battery Change

The internal board of the PowerView4 has a backup battery of the type CR1220, whose service life is approximately eight years, depending on use.

**Risk of injury!**

The PowerView4 is an electrically operated device. Disconnect the PowerView4 from all power supplies before changing the battery.

**Explosion hazard!**

Only use lithium batteries of type R1220. Using the wrong battery can cause an explosion.

12 Maintenance



Risk of destruction or injury!

Batteries must only be changed by qualified professionals following the operating manual. Improperly changing the battery can lead to destruction of the device or to injuries.



Disposal of batteries

Dispose of empty batteries in an environmentally responsible manner and complying with local regulations.

Change the battery as follows:

1. Shut down the device as described in the section *Shutdown PowerView4* on page 30.
 - ▶ All connections including the power supply and, if applicable, the USB flash drive have been removed from the PowerView4.
2. Dismount the device from the control cabinet with a second person (see section *Installation of PowerView4* on page 33).
3. Put the PowerView4 on an even, soft surface.
4. Unscrew the four screws that attach the back cover panel. Observe that the screws have different lengths.
5. Carefully remove the back cover panel.



Risk of destruction!

The circuit board and the components mounted on it can be damaged by touch, contact with foreign bodies and contamination. Use an antistatic ESD table mat and carry out the following steps with extreme caution.

6. Remove the battery.

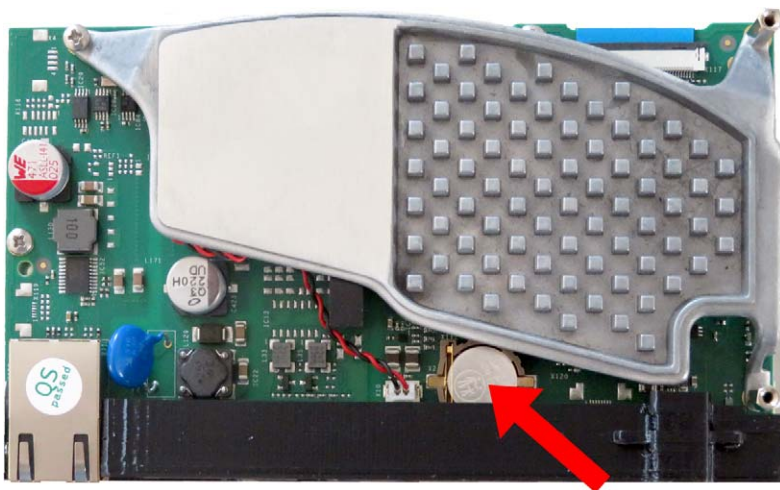


Illustration example

7. Insert a new lithium battery of type CR1220. The positive pole of the battery must be pointing upwards.
8. Close and screw shut the housing.
 - ▶ You can now reinstall and restart the device (see sections *Installation of PowerView4* on page 33 and *Start-up PowerView4* on page 30).
9. Note that due to the battery change, the time and date settings of the PowerView4 are no longer accurate. After start-up, adjust the time and date (see section *Display* on page 58).

12.3 Spare Parts and Accessories

For spare parts and accessories, please refer to our current Product Guide, which is available for you to download on the internet at www.motortech.de.

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GAS ENGINE TECHNOLOGY

