BOSCH

Access Modular Controller 2

ADS-AMC2-2WCF | APC-AMC2-2WCF
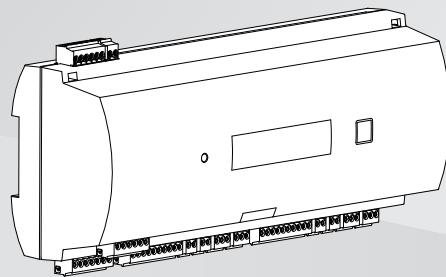
en   Installation manual

Table of contents

1   Safety

Read instructions

Read all technical documentation before installing or using the device. Make sure that you have understood all information described in the technical documentation. Do not ignore safety messages, as this can cause property or personal damage. Retain instructions for future reference.

Warning!

Risk of physical injury due to blocked escape routes

The access modular controller may block escape routes if not installed correctly. To keep escape routes free:

- Use locks in fail-safe mode, so that doors will be released if power fails.

- Install manual override switches, such as break-glass or lever stations, to unlock doors in an emergency.

Warning!

Risk of explosion of lithium battery

The battery can explode if replaced incorrectly.

Replace battery with the same type as recommended by Bosch. Dispose used batteries according to the instructions of the manufacturer of the batteries.

Caution!

Fire hazard and risk of electric shock due to unauthorized spare parts and accessories

Unauthorized spare parts and accessories might lack grounding wires or other safety elements. External power supplies must be installed and put into service by qualified personnel. The service technician must use replacement parts or accessories that are specified by the manufacturer.

> **Notice!**
> **Device damage due to electrostatic discharge**
> Protect the hardware from electrostatic discharge, especially
> when the device is opened. Always disconnect the controller
> from the power source before modifying the installation. The
> controller does not support hot-plugging.

> **Notice!**
> **Unauthorized access**
> If the access modular controller is installed in an unprotected
> environment, unauthorized people may be able to enter.
> Install the controller in a location with restricted access.

> **Notice!**
> **Device damage due to incorrect mounting**
> The controller can fall and break. Mount the controller on the
> matching mounting rails.

This product is RoHS compliant. See Technical data for the full
table of hazardous components.

1.1   **Unpacking**

Check the packaging for visible damage. If anything has been
damaged during transport, please inform the transport agency.
Unpack the unit carefully. This is an electronic device that must
be handled with care to avoid damage. Do not attempt to put
the unit into operation if components are damaged.
If any parts are missing, inform your customer service
representative or a Bosch Security Systems salesperson. The
shipping carton is the safest transport container for the unit.
Store it and the other packaging material for future use. If the
unit has to be sent back, use the original packaging.

2 Short information

This controller is able to control up to two Wiegand card readers.

It is designed to fully process the access logic at assigned access points. Access points consist of doors, gates, barriers, turn stiles, revolving doors, mantraps, ID card readers, door opening elements and sensors.

All the product versions use encrypted connections between the access modular controller and the host system.

The controller stores all necessary information in a battery-buffered memory and in a compact flash storage element. Even when the unit is offline, it is able to perform:

– Independent status and authorization checks on access points
– Take access decisions
– Activate and deactivate connected peripheral elements
– Detect and register all relevant events

The Access Modular Controller (AMC) is supported by the Access Professional Edition (APE), BIS Access Engine (ACE) and the Access Management System (AMS).

For more information about our products, visit our online product catalog.

Manufacturing dates
For product manufacturing dates, go to http://www.boschsecurity.com/datecodes/ and refer to the serial number on the product label.

Remarks
This hardware is part of a security system.

Access should be limited to authorized people only.
Some states do not allow the exclusion or limitation of implied
warranties, or limitation of liability for incidental or
consequential damages, hence the above limitation or exclusion
might not apply to you.

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3 Introduction

3.1 Description

The controller is equipped with two independent interfaces for Wiegand type readers. It is able to control one door with one reader in each direction and up to two doors with a reader in one direction only.
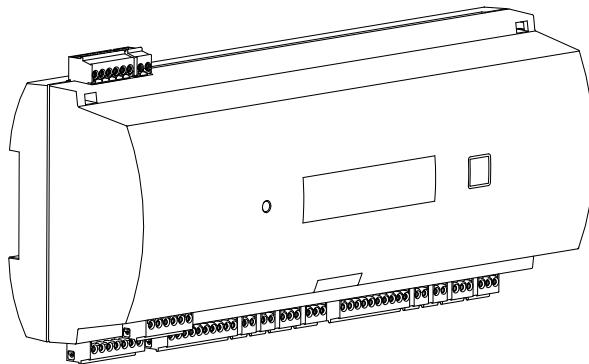

Figure 3.1: Access Modular Controller

All necessary information for access verification is stored in a battery buffered on-board memory and a Compact Flash (CF) memory card. This guarantees autonomous access decisions and complete access registrations even if the management host system is offline. The built in compact flash card provides adequate storage capability for cardholders and events.

The electronics of the controller are completely covered by a plastic housing. The LCD (liquid crystal display) provides all important status information.

Unsecured Area
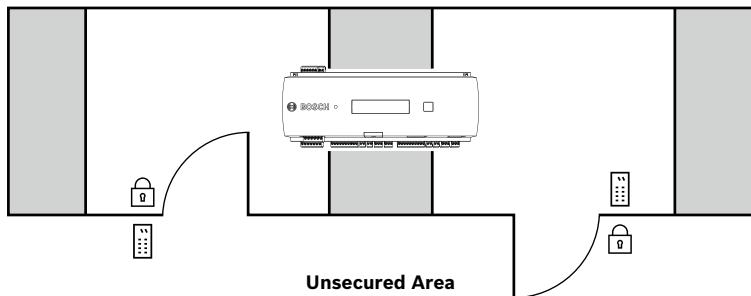
The controller can communicate upstream to the host computer using RS-485 multi-dropped. It has four analog input devices and four relay outputs. With its analog input devices, the controller verifies, for example, if a lock is closed or open. The relay outputs can be used to activate lock mechanisms if access is granted, or activate the burglar alarm system if an intrusion or system alert is detected. If the four inputs and four outputs on board are not enough to configure the system, up to three additional extension boards can be connected. The extensions offer 8 or 16 additional inputs and outputs.
The setup procedure for a controller is made very simple and fast by the use of door templates. Once selected, all the inputs and outputs are predefined. These settings can be changed to choose every free contact of the controller or a connected extension.
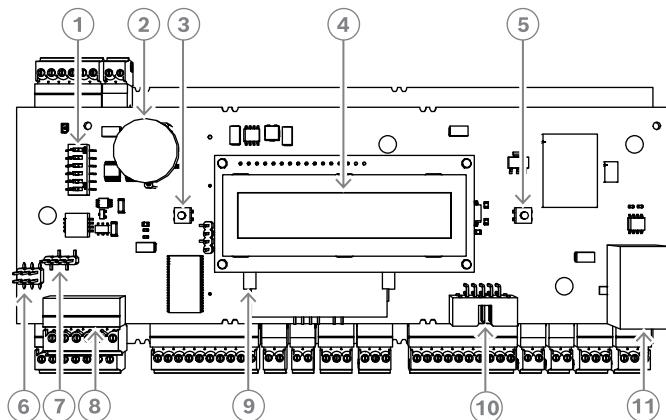
3.2 Product overview

Mainboard

Figure 3.2: Upper circuit board with display (front)

1	DIL switch for RS-485 address selection , protocol, and RS-232/RS-485 selection.
2	Lithium battery for buffering of static RAM and real time clock (RTC). The battery life is estimated at 10 years, nevertheless an error message is generated if the voltage sinks below a preset minimum level. **NOTICE:** In order to avoid an error message caused by an earlier voltage drop we suggest to replace the battery every 8 years**. Spare part: VARTA CR 2032 PCB.**
3	Reset push button - reachable through the casing using a screwdriver
4	Liquid Crystal Display
5	Push button, available on top of the housing, to select different display modes
6	Jumper: Equalization of potential between different systems and earth ground (shield)

7	Jumper: Interface selector RS-485 host connection, RS-485 two wire or RS-485 four wire (depends on external wiring)
8	Configurable RS-485 host interface
9	Docking port for compact flash memory
10	Configurable RS-232 host interface (ribbon cable connector)
11	Configurable 10/100 Mbit/s Ethernet host interface
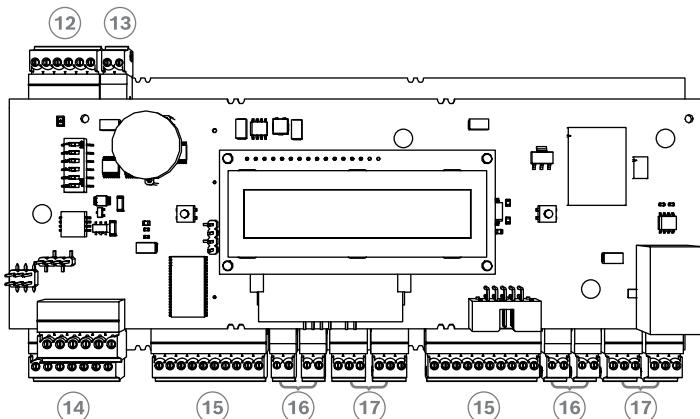
Figure 3.3: Interfaces - overview

12	RS-485 extension module bus
13	External tamper contact
14	Connector for power supply
15	Wiegand interfaces for card readers
16	Connectors for analog inputs
17	Connectors for relay outputs

Figure 3.4: Jumper (back)

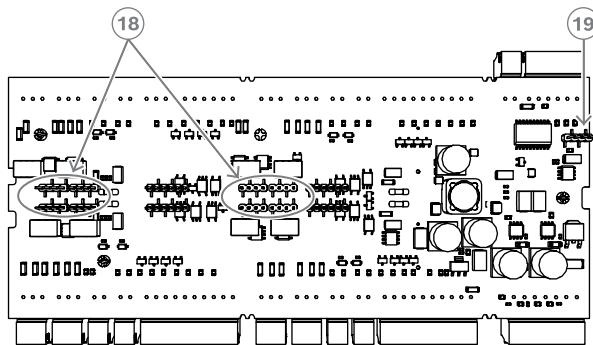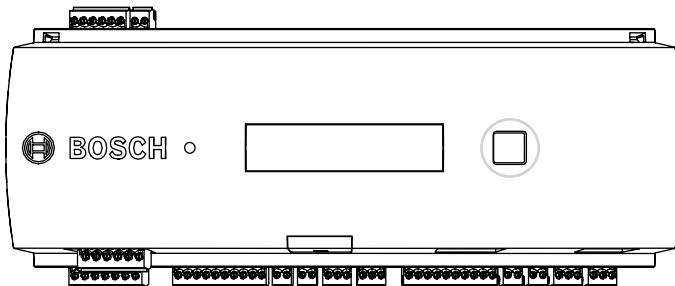|	
18	Jumper for setting either voltage free relay output ("dry" mode) or looped-in voltage from the AMC internal power supply ("wet" mode).
19	Jumper: Equalization of potential between different systems and earth ground (shield) for the extension interface.

Status display

The liquid crystal display delivers status information about the controller. Push the dialog button to switch between different modes.

The selected display mode remains set until the next time the button is pressed. The order of the display pages is shown in the following table.

Push	Display (Example)	Description
0	V01.00 02.03.07 or LBUS or BG900	Software versions and date of the firmware - every 5 sec. alternating with the display of the reader interface.
1a	S/N1: 0910019212	Bosch serial number
1b	S/N2: 00000001	
2	02.06 15:35:15 (S)	Current date and time (S) = Summer; (W) = Winter
3	Dig. IO: ::::::::::::::::	Display of the digital contacts: the input signals set will be shown with an extension above - output signals with an extension below. The first eight digits display the

Push	Display (Example)	Description
		controller's signals. The second eight digits display the extension board's signals.
3a	Dig. I1: :::::::::::::::	If there are I/O-Boards connected the signals will be shown on separate pages.
3b	Dig. I2: :::::::::::::::	
3c	Dig. I3: :::::::::::::::	
4	MAC 0010174C8A0C	Network device address (MAC)
5	N AMC-1234-5678	Network name of the controller
6	I 192.168.10.18	IP-address of the controller
7	G 192.168.10.255	IP-address of the gateway (Version V 00.44 or higher)
8	M 255.255.255.0	Subnetmask (Version V 00.44 or higher)
9	H 192.168.10.10	IP-address of the host computer
10	DHCP 1	DHCP-status: 1 = on 0 = off
11	D 192.168.10.1	IP-address of the DNS server
12	Host: + "C"	Host activity: + = online - = offline "C" = Counter of the received data packages from the host interface. RS 485 Bus connection: A = Address 1 ... H = Address 8

3.3   System overview

The controller is connected to the host system via RS485 or
Ethernet, depending on the type of installation. The host
interface is selected during installation. The two interfaces are
available on the device by default. With RS485 operation, a
maximum of eight access controllers can be connected to one
party line.
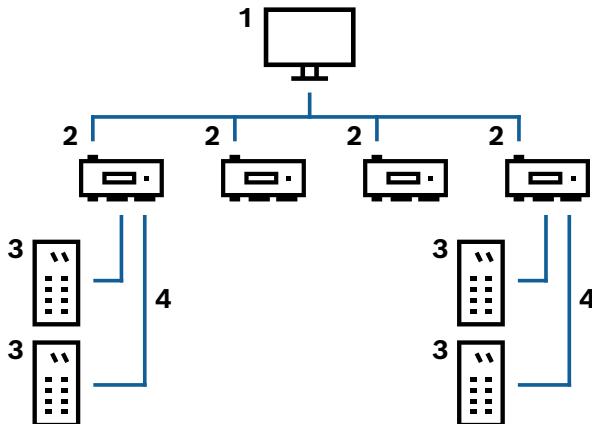
1	Host computer
2	Access Modular Controller
3	Card reader
4	Communication and power supply

In the communication chain of a system, the access controller is
integrated between the host system and the peripheral devices.
It is possible to connect up to two readers to the access
modular controller.

4   Installing

4.1   Mounting the device on a mounting rail

The controller can be attached on a standard 35 mm (1.377 in.) mounting rail using a snap-in mechanism. Attach the controller into the upper edge of the mounting rail, then push down the device and snap it onto the rail by pushing it towards the back.
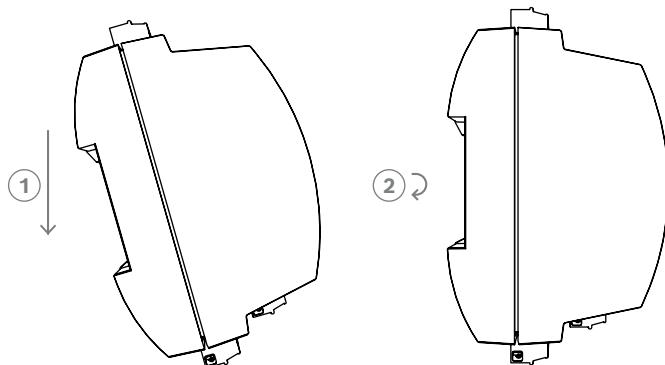

Figure 4.1: Mounting the controller on a mounting rail

4.2   Unmounting the device from a mounting rail

> **Notice!**
> To remove the controller from a mounting rail, first remove all pluggable connectors.

Push down the controller until the lower edge snaps out of the mounting rail [**1**]. Pull the lower end of the controller from the mounting rail [**2**].
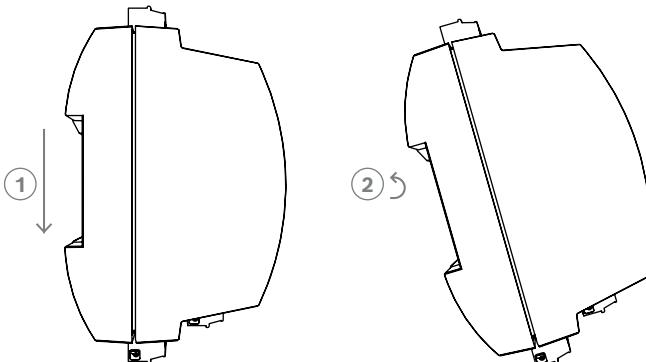

Figure 4.2: Unmounting the controller from a mounting rail

4.3   Opening the case

Notice!

To open the controller, first remove all pluggable connectors.

The controller's case consists of a top cover mounted with a two-point snap-in closure on a chassis. To open the case, push down the two snap-ins with a screwdriver, then swing the cover down.
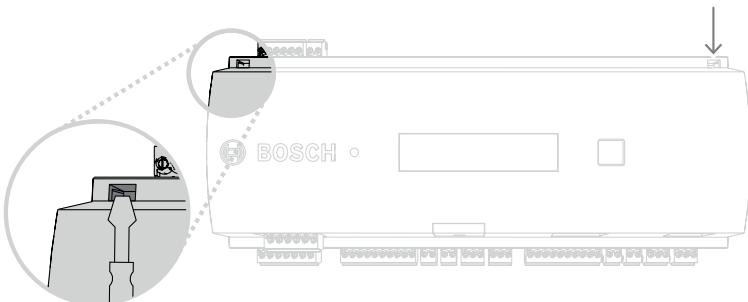

Figure 4.3: Opening the controller's case

4.4   Closing the case

Before aligning the covers, unplug any pluggable screw
connectors. Insert the hooks on the lower edge of the front
cover into the lugs on lower edge of the plastic back cover [**1**].
Please ensure that the BOSCH logo is not upside-down. The
upper edge of the front cover now aligns with the two-point
snap-in closures on the upper edge of the back cover [**2**], and
may thus be clicked gently into place.
Hence the closing process is the reverse of the opening process.
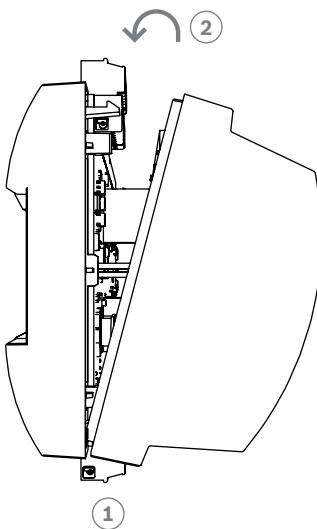

Figure 4.4: Closing the case

Notice!

Risk of damage to equipment

If excessive force is required to close the front cover then it is
probably incorrectly hooked into the back cover. In such cases
the display dialog button in the front cover will be misaligned
and will not function correctly.

4.5   Cabling

Notice!

Risk of malfunction

The cables used in the controller are not prone to electrical interference. However, you should avoid routing cables close to heavy load switching cables and equipment. If this is unavoidable, cross the cable at right angles every 1 to 2 m (3 to 6 ft) to reduce interference.

4.5.1   Conductor data for powering the controller

With the calculation below you can find out which cable type must be used. If you connect the power supply and the controller with the delivered cable set from the enclosure the calculation is not necessary.

For distances below 25 m (75 ft) use AWG18 conductors (1mm²). For longer distances, install an additional power supply close to the controller.

Please, calculate the voltage drop by checking the conductor specifications for characteristic resistance values. The voltage drop shall not exceed 2 V.

Example:

Length = 100 m/328 ft

$$U = 12V, I = 1A, \text{maximum } U_{Drop} = 2V$$

$$i.\,e.\,R\,AWG18\,(acc.\,specs) = 6.385\,\frac{\Omega}{1000\,ft}\,or\,20{,}948\,\frac{\Omega}{km}$$

$$U_{Drop} = 20{,}948\,\frac{\Omega}{km} \times 0.1\,km \times 1A = 2.1V$$

$$U_{Drop} = 6.385\,\frac{\Omega}{1000\,ft} \times 328\,ft \times 1A = 2.1V$$

Critical condition! Install the power supply closer to the controller.

Notice!

These specifications apply to power supply, readers, relay outputs, and extension interface.

Regarding inputs, specific voltage-drop values need to be taken into account. Refer to Connecting Analog Input Devices.

4.6 Grounding and shielding

The main grounding point at the controller is connected to pin 2
of the power supply connector - see Connecting Diagrams.
It is good practice to shield all wires carrying low level signals.

The controller allows you to create a central ground or shielding
point, simply by setting certain jumpers. Set these jumpers only
if grounding or shielding is not achieved by other means.

> **Notice!**
> Risk of malfunction
> Ensure that no ground loops are formed.

> **Notice!**
> In general the following apply:
> If the devices have their own power supplies, the shielding is
> applied to one side only. The free end should be insulated to
> avoid inadvertent connections.
> If one device is fed power by another, the cable shielding
> should be applied to both sides.

4.6.1 Grounding for Host Interface

A 1:   Delivery status

A 2:   JP1
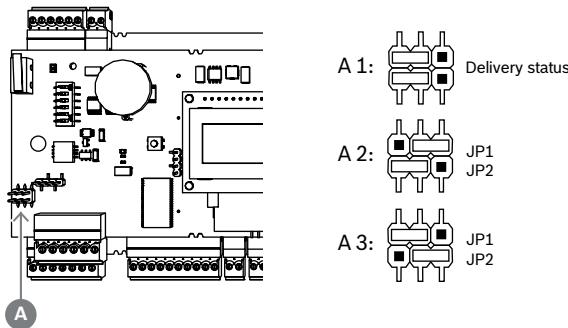   JP2

A 3:   JP1
       JP2

Figure 4.5: Location of ground jumper RS-485 host interface

The internal ground of the controller is always connected with the ground of the RS-485 host.

The jumper setting A1 shows the factory settings.

Jumper JP1 connects the internal ground of the controller to the ground of the RS-485 host interface.

Jumper JP2 manages the signal ground.

Settings for jumper JP1:

If the ground conductor and the shield on the host are not connected and:

- no party line exists, the jumper JP1 is set (= A2)
- a party line exists, the jumper JP1 is set at the first device only (= A2)

Settings for jumper JP2:

If the ground conductor and the shield on the host are not connected and:

- no party line exists, the jumper JP2 is set (= A3)
- a party line exists and signal ground is connected, the jumper JP2 is set at the first device only (= A3)
- a party line exists and signal ground is not connected, the jumper JP2 is set at all devices (= A3)

4.6.2   Grounding for Extension Interface
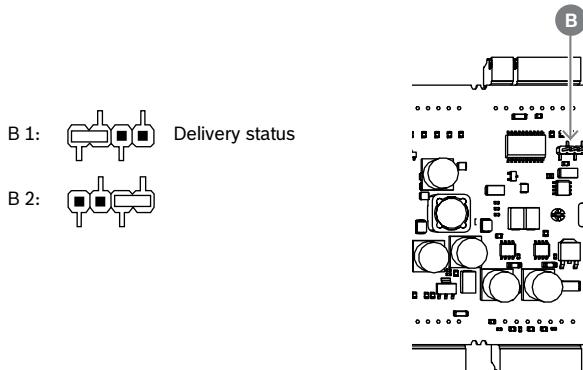
B 1:   Delivery status

B 2:

Figure 4.6: Location of ground jumper bottom side

Jumper B connects the internal ground of the controller to the RS-485 ground of the slave interface. Only set jumper B (B2) if the controller powers all other peripheral devices directly connected to it.

4.7 Connecting the power supply to the controller

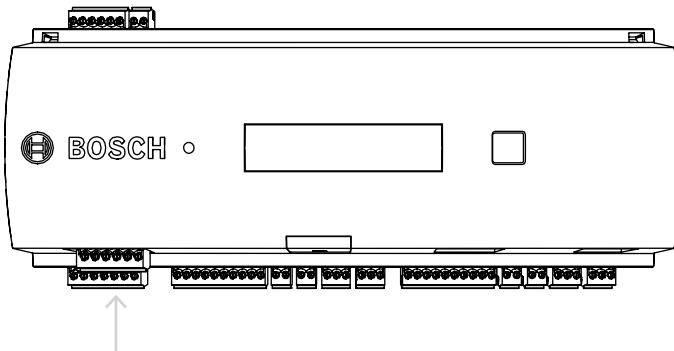Connect the power supply to the POWER 7-pin pluggable screw connector.

Figure 4.7: Location of the power supply connector

Connect an external power supply (10 - 30 Vdc) for the controller at pin 1 (positive) and pin 3 (0 V) of the pluggable screw connector.

If an uninterruptible power supply (UPS) is used, the relay output for power good signals from the UPS is connected to the following pins:
– pin 4 and 7 for power good AC
– pin 5 and 7 for power good Battery
– pin 6 and 7 for power good DC
Otherwise these pins must be short-circuited.

Notice!

The battery status is checked every 5 minutes by the power supply unit (APS-PBC-60 or APS-PSU-60).
As the battery charging/discharging levels tend to vary, the AMC2 provides information about the battery status every 10 minutes. This feature allows a more reliable battery status information.

4.8   Ethernet Host Interface

The controller offers a 10/100 Mbit/s Ethernet auto-sensing
interface to connect to a local area network or host computer.

Notice!
Use a CAT5 or higher version to connect the controller with the
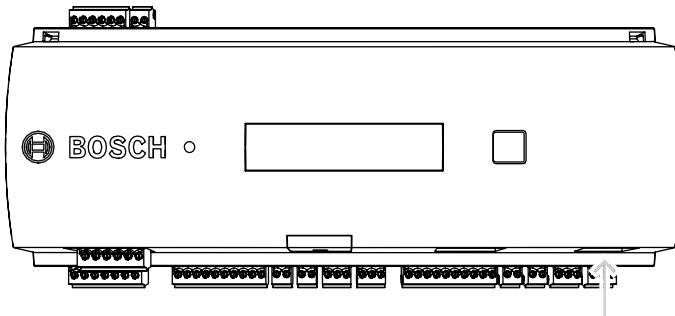network.

Figure 4.8: Location of the Ethernet interface

Notice!
After connecting a new controller to a network using DHCP, it
can take some time before the new controller is recognized by
the remote server.
You can accelerate this process by running the following
command:
```
ipconfig /flushdns
```
This makes the controller immediately available by its name.

4.9   RS-485 Host Interface

The RS-485 host interface of the controller can be set for using a 2- or 4-wire connection. Up to eight controllers can be used on one host bus.
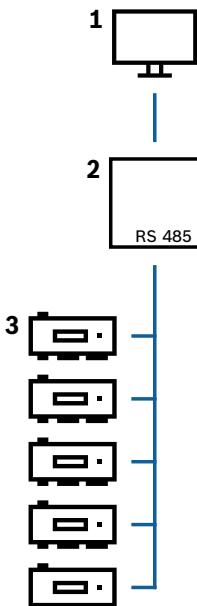
Figure 4.9: Configuration of a RS-485 host system

Position	Description
1	Host
2	RS-485 bus
3	Access Modular Controller

The following conditions apply for a RS-485 bus system:
– A bus system consists of a bus line and/or one or more branch lines.
– Cable lengths exceeding 100 m (300 ft) must be installed as bus lines.
– Branch lines are branching connections from a bus line.

- Peripheral devices are controllers which are connected to the host computer.
- Maximum cable length of a bus line must not exceed 1200 m (4000 ft).
- The cable length of branch lines must not exceed 100 m (330 ft).

To use RS-485 mode at the controller, connect the data cables to the pluggable screw connector of the RS-485 host interface.
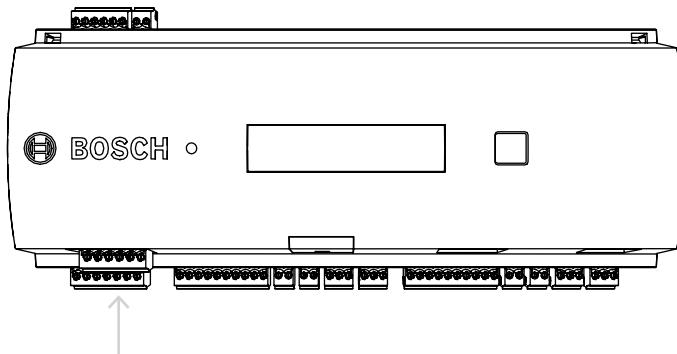

Figure 4.10: RS-485 host interface

5 Operating

5.1 Configuring Ethernet interface

To configure the controller in a TCP/IP network environment, use the AmcIpConfig tool. It is located in a directory on the standalone or the remote server of the BIS:
\\Runtime-drive:\MgtS\AccessEngine\AC\bin
and in the Program Folder of the Access PE:
Start > **Programs** > **Access Personal Edition** > **AmcIpConfig**
This tool can be copied and used on every computer on the network.
Consult the online help of the AmcIpConfig for details on configuring the controller.

To ensure that the controller can communicate with the software follow these naming rules:
– Use only alphanumeric characters plus the seperator "-" (minus/dash).
– Do not use special characters or spaces.
– **The network name must start with a letter.**
– The names are **not** case sensitive.

6   Troubleshooting

If problems occur read the table below.

Adjust only those controls specified in the installation manual. Improper adjustment of other controls may result in damage, and require extensive work by a qualified technician to restore the unit to normal operation.

If you are unsure of the problem or if the problem persists, contact *After sales support, page 34*.

Problem	Cause	Solution
Display is not working.	– Voltage is too low. – Power is off.	– Make sure the power supply has enough voltage to power the controller. – Power up the controller.
Controller is not online.	– Network connection is missing. – DIL switch **5** is set to **OFF** (BPA protocol is selected).	– Plug the Ethernet cable into the controller. – Make sure to configure the Ethernet interface correctly. Refer to Configuring the Ethernet Interface for instructions.

Problem	Cause	Solution
		– Set DIL switch **5** to **ON** (SDEB protocol is selected).
Controller does not work as expected.		– Switch the power of the controller off and on again. – Check the configuration of the controller. If necessary, delete all configuration data by Resetting the Device to Factory Default. – Reset the controller as described in *Resetting the software, page 32*.

6.1 Resetting the software

1. Insert the provided screwdriver into the hole until it reaches the reset button as shown in the figure below.
2. Press the reset button for at least three seconds.
3. The controller deletes its application program leaving only its bootloader and network setting.

As soon as it is online again, controller's bootloader will download a fresh copy of the application program and configuration. If the problem persists contact after sales support.
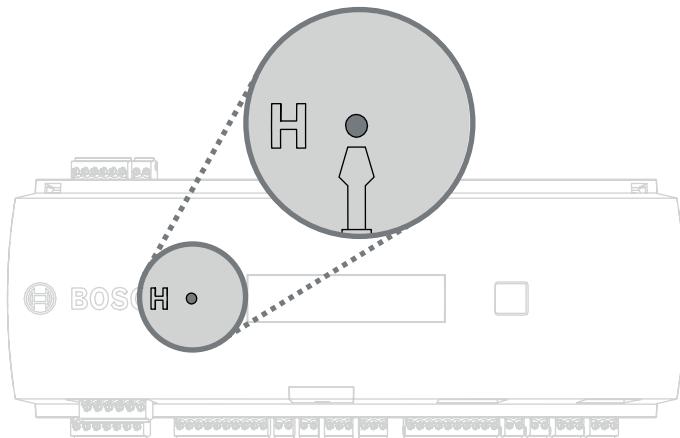
6.2 Resetting the device to factory default

1. Reset the controller as described in *Resetting the software, page 32*.
2. Open the upper case of the controller as described in Opening the Case.
3. Set all six DIL switches of the RS-485 selector to **ON** as shown in the figure below.
4. Press the reset button on the board.

5. Set the DIL switches back in the address state before resetting.
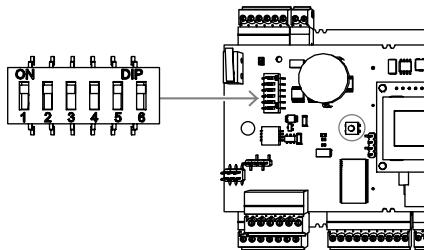
The controller now has the following network configuration:
– DHCP = 1
– IP = [assigned by DHCP server or "0.0.0.0" if not available]
– Subnet mask = [assigned by DHCP server or "0.0.0.0" if not available]
– Password = no password
    – Create your password in the IP Config settings of the AMC.

7 Service and repair

The controller is backed by a standard warranty of 3 years. Contact your dealer to buy a warranty extension.

> ⚠ **Warning!**
>
> Risk of electric shock
>
> Opening or removing the covers can expose you to dangerous voltages. An electric shock can cause injuries or death. Do not perform servicing tasks yourself. Refer all servicing to qualified service personnel.

Damage that requires service

Disconnect the controller from the main AC or DC power source and refer servicing to qualified service personnel under the following conditions:

- If the power supply cord or plug is damaged.
- If liquid has been spilled or an object has fallen into the controller.
- If the controller has been exposed to water and/or humid weather (rain, snow, etc.).
- If the controller has been dropped or the cabinet damaged.
- If the controller shows a distinct change in performance.

Safety check

Upon completion of service or repair work on the controller, ask the service technician to perform safety checks to ensure that the controller operates properly.

After sales support

For more information, visit https://www.boschsecurity.com/xc/en/support/.

8   Disposal

Electrical and electronic waste

This product and/or battery must be discarded separately from household waste. Discard this product according to local laws and regulations, to allow its reuse and/or recycling. This will help in conserving resources, and in protecting human health and the environment.

9 Technical specifications

Mechanical

Type	DIN rail mounting
Housing material	ABS and Polycarbonate (UL94V-0)
Dimensions (H × W × D)	232 mm × 90 mm × 63 mm (9.13 in. × 3.54 in. × 2.48 in.)
Weight	503 g
Color	White

System specifications

Memory	– Serial EEPROM – Pluggable 2 GB compact flash
Reader interfaces	– 2× Wiegand
Host interface	– RJ45 for TCP IP communication – RS485
Outputs	– 4× relay outputs – 30 V DC max. (switching voltage) – 1,25 A max. (switching current) @ 30Vdc
Inputs	4× 4-State inputs
Tamper switch	2-wire
Reset button	Yes
Power	– 10 VDC to 30 VDC – 60 VA max.

	– 55 VA (available for external devices)
Display	LCD

Environmental

Temperature	0 °C to +50 °C (32 °F to 122 °F)
Environmental rating	IP 30
RoHS	Compliant

> **Notice!**
> To determine the environmental impact of an installation, take the most extreme values of all participating devices into account.

> **Notice!**
> To determine the vulnerability of an installation, take the most restrictive values of all participating devices into account.

Access Modular Controller Series

Hazardous substance table according to SJ/T 11364-2014						
	Pb (Pb)	Hg (Hg)	Cd (Cd)	Cr 6+ (Cr 6+)	PBB (PBB)	PBDE (PBDE)
Housing & enclosures	O	O	O	O	O	O
PCBA	X	X	O	O	O	O
Connectors	X	O	O	O	O	O
Electronic components	X	O	O	O	O	O

Hazardous substance table according to SJ/T 11364-2014						
Plastic materials	O	O	O	O	O	O
Metal materials	O	O	O	O	O	O
This table was created according to the provisions of SJ/T 11364						
O: The content of such hazardous substance in all homogeneous materials of such component is below the limit defined in GB/T 26572						
X: The content of such hazardous substance in a certain homogeneous material is above the limit defined in GB/T 26572						

Notice!

The voltage drop from the power supply to the controller affects the interfaces of the controller. The total drop must not exceed 2V.
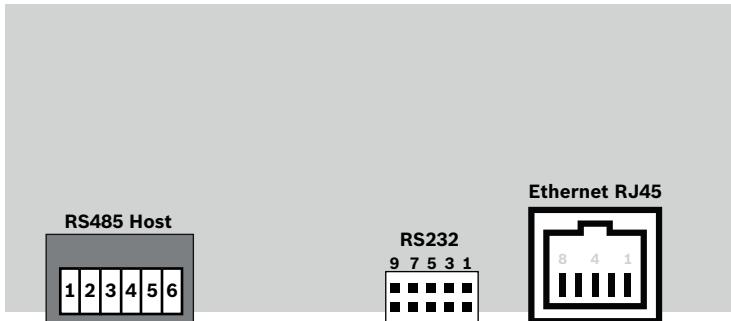
10   Appendices

10.1   Connecting diagrams

Figure 10.1: Connectors on upper PCB

	1	Shield
	2	Data RxTx+ (2-wire) Data Rx+ (4-wire)
	3	Data RxTx- (2-wire) Data Rx- (4-wire)
	4	Ground (PAG)
	5	Data Tx+ (4-wire)
	6	Data Tx- (4-wire)

Tab. 10.1: RS-485 host on upper PCB

	1	TXD+
	2	TXD-
	3	RXD+
	4	Not connected
	5	Not connected
	6	RXD-
	7	Not connected
	8	Not connected

Tab. 10.2: Ethernet Network socket (RJ45)
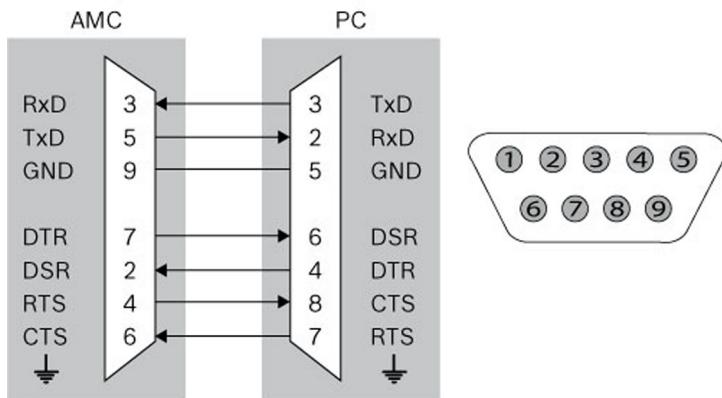
Figure 10.2: Interconnect diagram of the RS-232 serial interface

Power Supply	Power Supply	1 2 3				6 5 4	
		4 5 6 7	S1	S12	3 2 1	RS485-Slave-Bus	**Additional**
	UPS						
				S13	2 1	Tamper Contact	
	Reader Interface 1	1 2 3 4 5 6 7 8 9 10	S2				
	Analog Input 1	1 2	S3				
	Analog Input 2	1 2	S4		**AMC2 2W**		
	Relay Output 1	1 2 3	S5				
	Relay Output 2	1 2 3	S6				
	Reader Interface 2	1 2 3 4 5 6 7 8 9 10	S7				
	Analog Input 3	1 2	S8				
	Analog Input 4	1 2	S9				
	Relay Output 3	1 2 3	S10				
	Relay Output 4	1 2 3	S11				

Figure 10.3: Connector blocks of the AMC2-2W
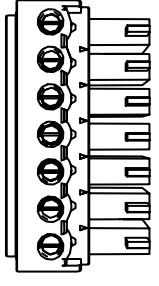
	1	Power supply, DC positive (10V - 30V)
	2	Shield
	3	Power supply (0V)
	4	UPS (power good signal) - AC
	5	UPS (power good signal) - Battery
	6	UPS (power good signal) - DC
	7	UPS (power good signal) - Common

Tab. 10.3: Power supply
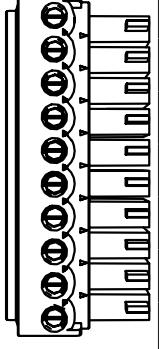
	1	red	Reader Supply (12V)
	2	black	Reader Supply (0V)
	3	green	Data 0
	4	white	Data 1
	5	drain	Shield
	6	orange	green LED
	7	brown	red LED
	8	yellow	Beeper
	9	blue	Hold
	10	violet	Card Present

Tab. 10.4: Wiegand interface AMC

Notice!

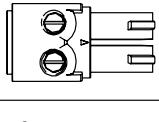For reader settings refer to the respective reader manual.
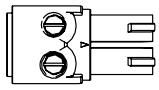
	1	Analog Input, in
	2	Analog Input, out

Tab. 10.5: Analog input
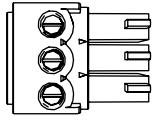
	1	Relay Output, normally open
	2	Relay Output, common
	3	Relay Output, normally closed

Tab. 10.6: Relay output
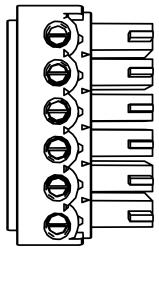
	1	Power supply for external devices (10V - 30V)
	2	Power supply for external devices (0V)
	3	Shield
	4	Data RxTx+
	5	Data RxTx-
	6	Ground (PAG)

Tab. 10.7: Host / Extension interface

	1	Tamper Contact, in
	2	Tamper Contact, out

Tab. 10.8: External tamper contact