

OFFICIAL DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected official ABB technical pages

ABB AC500 communications

CM578-CN

CANOPEN MASTER COMMUNICATION MODULE

Selected official pages retain the original technical tables, ratings, notes and pagination.

OFFICIAL SOURCE

ABB 3ADR010018 rev.2 (2018-05-04) and AC500 Hardware V2 CM578-CN section (03.2007)

CM578-CN wiring/protocol section pp.121-125 and revision-2 standard-version datasheet pp.1-6

This technical extract does not replace the complete equipment and system manuals. Check the installed hardware and project before use.

CM578-CN Communication module CANopen

- CANopen Master 1 Mbit/s

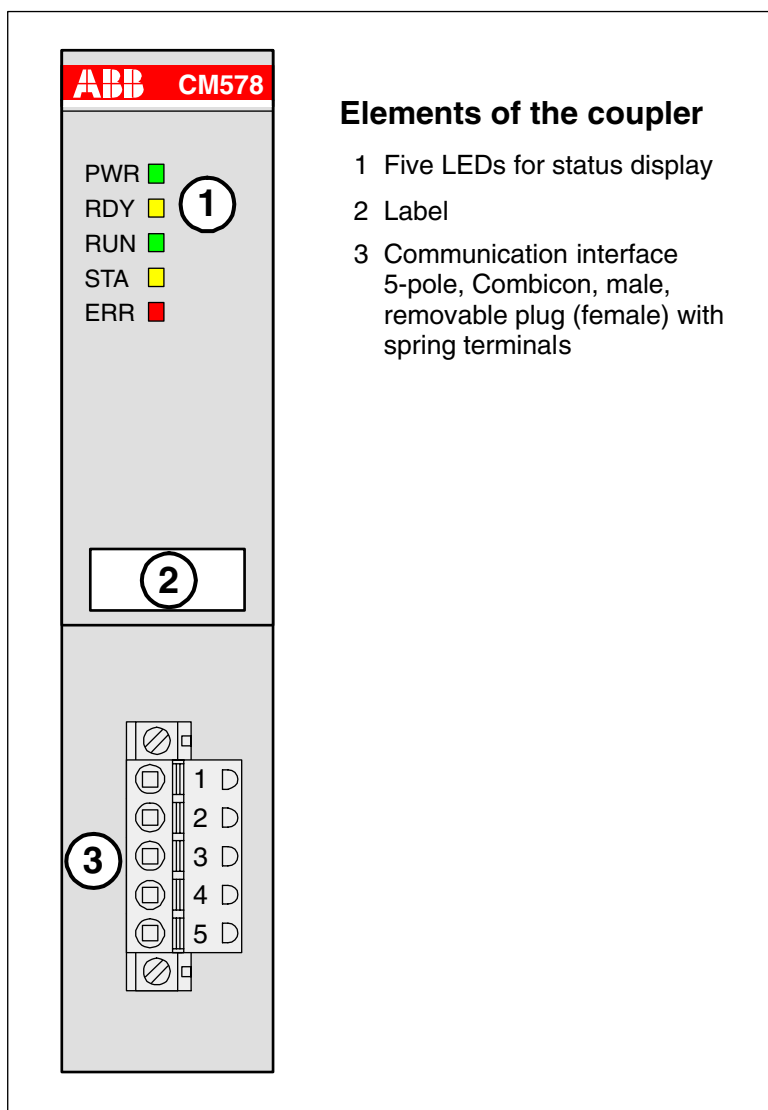


Figure: Communication module CANopen CM578-CN

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Purpose

The AC500 communications module CM578-CN makes a communication over the CANopen field bus possible. The coupler is mounted on the left side of the CPU on the same Terminal Base. The communication between the CPU and the coupler takes place through the coupler bus (coupler interface), which is integrated in the Terminal Base. The data interchange is realized by a dual-port RAM. Depending on the used Terminal Base, 1, 2 or 4 couplers (also different types) can be employed (see also the description of the Terminal Bases).

Functionality

Coupler CM578-CN	
Protocol	CANopen
Usable CPUs	PM571-xxx, PM581-xxx, PM591-xxx
Usable Terminal Bases	all of the TB5xx
Field bus connector	Pluggable connector COMBICON, 5-pole
Internal power supply	via the coupler interface of the Terminal Base

Mounting and electrical connection

The coupler is mounted on the left side of the CPU on the same Terminal Base. The electrical connection is established automatically when mounting the coupler.



Note: Mounting, disassembling, electrical connection and dimensioned drawings for the Terminal Bases, CPUs, communication modules, I/O Terminal Units and the I/O expansion modules are described in detail in the AC500 system data chapters.



Caution: Removal of energized modules is not permitted. All power sources (supply and process voltages) must be switched off while working on any AC500 system.

Field bus interface

The CANopen connector has the following pin assignment:

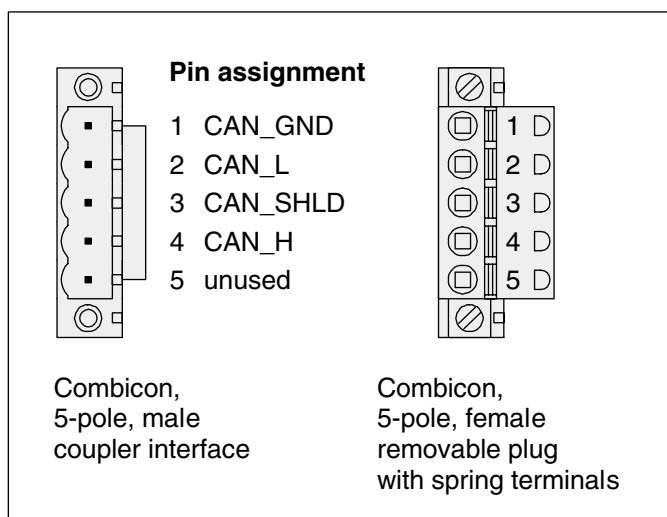


Figure: Pin assignment of the CANopen field bus interface

Cable lengths

The maximum possible cable length of a CANopen network depends on the baud rate (transmission rate).

Bit rate (speed)	Bus length
1 Mbit/s	30 m
800 kbit/s	50 m
500 kbit/s	100 m
250 kbit/s	250 m
125 kbit/s	500 m
62.5 kbit/s	1000 m
20 kbit/s	2500 m
10 kbit/s	5000 m

Table: Maximum cable length within a CANopen field bus

Bus termination

The data line ends must be equipped with 120-Ohm bus terminating resistors. Normally, the resistors are integrated in the interface connectors.

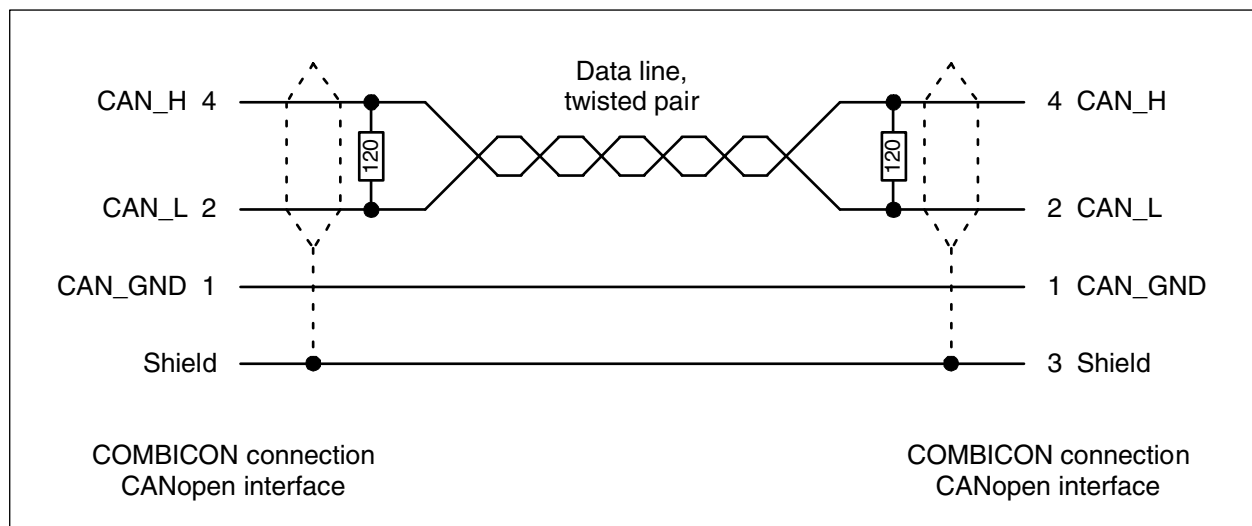


Figure: CANopen interface, bus terminating resistors at the line ends

LED status displays

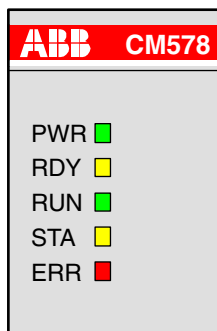
The status of the CANopen coupler is displayed by means of 5 status LEDs. After power ON, the coupler initializes a self-test. If this test was successful, the yellow RDY LED goes ON. Otherwise the LED starts flashing and aborts the further initialization. If the RDY LED remains OFF, the coupler is defective.

In the course of initialization, the RUN LED is OFF for the first time. The LED is only activated after configuration data has been sent to the coupler and the operating mode of the coupler was set. If the operating system of the coupler detects a parameterization or a configuration error, the green RUN LED flashes non-cyclically. If this LED flashes cyclically, the coupler is ready for communication, but the communication is not active yet. In case of an active communication, the RUN LED lights continuously.

During the initialization procedure and also if the coupler is configured (anew) - in particular if the operating mode was changed - it can occur that all or some LEDs light up for a short period of time, before reaching a defined condition.

The green PWR LED indicates, that the supply voltage is present.

The following figure shows the positions of the LEDs. The table after that shows the LED statuses and their meanings.



LED	Color	Status	Meaning
PWR	green	ON (light)	Voltage is present
		OFF (dark)	Voltage is missing
RDY	yellow	ON	Coupler is ready
		flashes cyclic	Bootstrap Loader is active
		flashes non-cyclic	Hardware or system error
		OFF	Defective hardware or no power supply
RUN	green	ON	Communication is running
		flashes cyclic	Ready for communication
		flashes non-cyclic	Parameterization error
		OFF	No communication or no power supply
STA	yellow	ON	CANopen master: transmits data
		OFF	CANopen master: no data
ERR	red	ON	CANopen error
		OFF	No error

Further important information

CANopen basics

CANopen is a standardized 7-layer protocol for decentralized industrial automation systems, based on the Controller Area Network (CAN) and the CAN Application Layer (CAL).

CANopen bases on a communication profile in which the basic communication mechanisms and their descriptions are defined, e.g. mechanisms for interchange of process data in real time or transmitting of alarm messages.

The different CANopen device profiles make use of this common communication profile. The device profiles describe the specific functionality of a device class or its parameters. For the most important device classes used in the industrial automation technology, such as digital and analog input/output modules, sensors, drives, operator panels, loop controllers, programmable control systems and encoders, suitable device profiles exist. Others are in preparation.

A central element of the CANopen standard is the description of the device functionality in an object directory. The object directory is subdivided into a general part and a device-specific part. The general part contains details on the device, such as device identification, name of manufacturer, communication parameters etc. The device specific part describes the specific functionality of the concerned device. These features of a CANopen device are described in a standardized Electronic Data Sheet (EDS).

A CANopen network consists of a maximum of 128 devices, one NMT master and a maximum of 127 NMT slaves. In contrast to other typical master-slave systems such as PROFIBUS, the CANopen terms Master and Slave have a different meaning.

In operational mode, all devices are able to transmit messages via the bus. In addition, the master can change the operating mode of the slaves.

Normally a CANopen master is realized by a PLC or a PC. The bus address of a CANopen slave can be set from 1 to 127. By the device address, a number of identifiers are created, which are then used by the device.

Important address

CAN in automation

Am Weichselgarten 26
D-91058 Erlangen
Germany/Deutschland

Telephone +49-9131-69086-0
Fax +49-9131-69086-79
E-Mail headquarters@can-cia.org
Internet www.can-cia.org

Technical data

The system data of AC500 and S500 are valid here. Only additional details are therefore documented below.

Coupler CM578-CN	
Field bus	CANopen
Transmission rate	10 kBit/s to 1 MBit/s
Protocol	CANopen Master
Field bus connector	Pluggable connector COMBICON, 5-pole
Processor	EC1, 160 pins
Clock frequency	48 MHz
Usable CPUs	PM571-xxx, PM581-xxx, PM591-xxx
Usable Terminal Bases	all
Ambient temperature	0 °C...60 °C
Coupler interface	Dual-port memory, 8 kByte
Current consumption over the coupler bus	typ. 290 mA
Internal RAM memory (EC1)	256 kByte
External RAM memory	-
External Flash memory	512 kByte (firmware)
Status display	PWR, RDY, RUN, STA, ERR
Weight	ca. 150 g

Ordering data

Order No.	Scope of delivery
1SAP 170 800 R0001	CM578-CN, Communication module CANopen Master
Link to other ordering data	See Overview of the AC500 communication modules

DATA SHEET

CM578

CANopen Communication Module



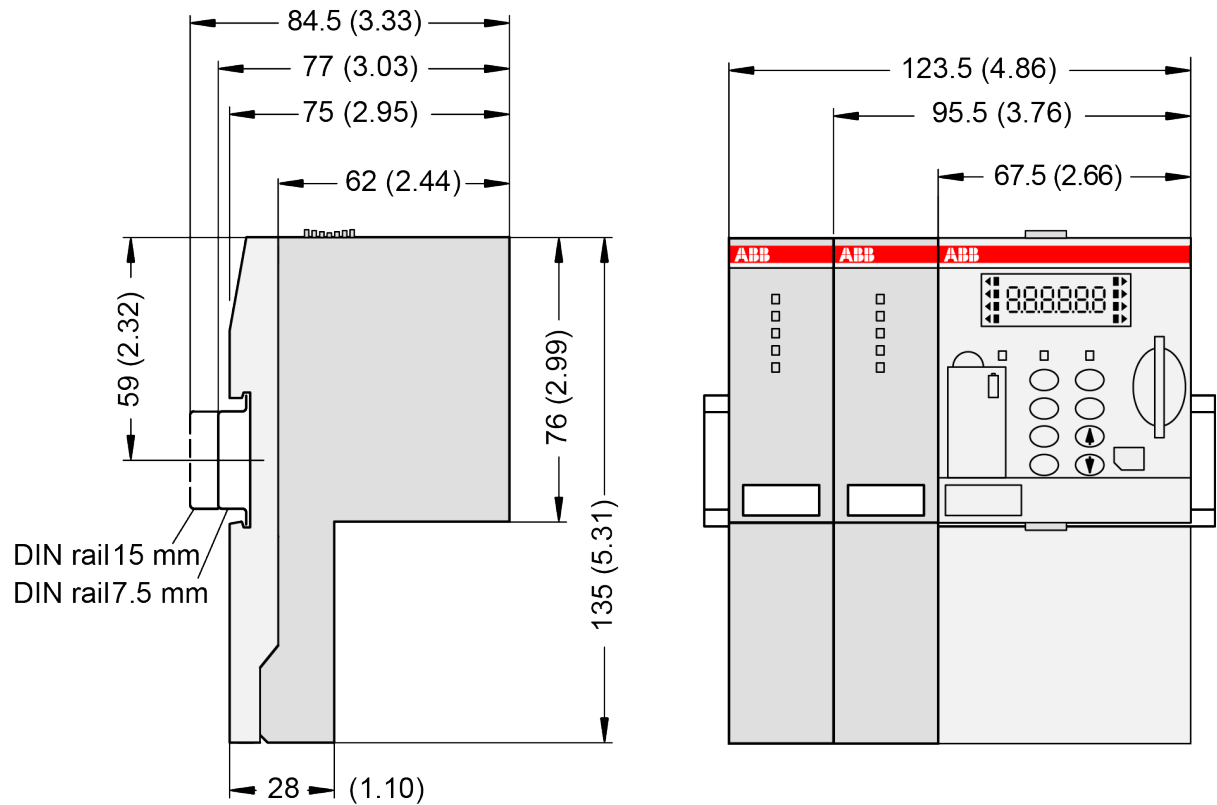
1 Ordering Data

Part No.	Description	Product Life Cycle Phase *)
1SAP 170 800 R0001	CM578-CN, communication module CANopen master	Classic
1SAP 370 800 R0001	CM578-CN-XC, communication module CANopen master, XC version	Classic



*) For planning and commissioning of new installations use modules in Active status only.

2 Dimensions



The dimensions are in mm and in brackets in inch.

3 Technical Data

The System Data of AC500 and S500 ↗ Chapter 4 “System Data AC500” on page 3 are valid for standard version.

The System Data of AC500-XC ↗ Chapter 5 “System Data AC500-XC” on page 7 are valid for the XC version.

Only additional details are therefore documented below.

Parameter	Value
Field bus	CANopen
Transmission rate	10 kBit/s to 1 MBit/s
Processor	EC1, 160 pins
Ambient temperature	see: System data AC500 ↗ Chapter 4 “System Data AC500” on page 3
Extended ambient temperature (XC version)	On Request
Usable CPUs	PM57x, PM58x, PM59x
Usable terminal bases	All TB5xx

Parameter	Value
Field bus connector	Pluggable connector COMBICON, 5-pin
Internal power supply	Via the communication module interface of the terminal base
Communication module interface	Dual-port memory, 8 kByte
Current consumption from 24 VDC power supply at the terminal base of the CPU	Typ. 50 mA
Current consumption over the communication module bus	Typ. 290 mA
Internal RAM memory (EC1)	256 kByte
External RAM memory	-
External Flash memory	512 kByte (firmware)
Weight	Ca. 150 g

4 System Data AC500

4.1 Environmental Conditions

Table 1: Process and supply voltages

Parameter	Value
24 V DC	
Voltage	24 V (-15 %, +20 %)
Protection against reverse polarity	Yes
120 V AC	
Voltage	120 V (-15 %, +10 %)
Frequency	50/60 Hz (-6 %, +4 %)
230 V AC	
Voltage	230 V AC (-15 %, +10 %)
Frequency	50/60 Hz (-6 %, +4 %)
120...240 V AC wide range supply	
Voltage	120...240 V (-15 %, +10 %)
Frequency	50/60 Hz (-6 %, +4 %)
Allowed interruptions of power supply, according to EN 61131-2	
DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2
AC supply	Interruption < 0.5 periods, time between 2 interruptions > 1 s



NOTICE!

Exceeding the maximum power supply voltage for process or supply voltages could lead to unrecoverable damage of the system. The system could be destroyed.


NOTICE!

Improper voltage level or frequency range which cause damage of AC inputs:

- AC voltage above 264 V
- Frequency below 47 Hz or above 62.4 Hz


NOTICE!

Improper connection leads cause overtemperature on terminals.

PLC modules may be destroyed by using wrong cable type, wire size and cable temperature classification.

Parameter		Value
Temperature		
	Operating	0 °C ... +60 °C: Horizontal mounting of modules. 0 °C ... +40 °C: Vertical mounting of modules. Output load reduced to 50 % per group.
	Storage	-40 °C ... +70 °C
	Transport	-40 °C ... +70 °C
Humidity		Max. 95 %, without condensation
Air pressure		
	Operating	> 800 hPa / < 2000 m
	Storage	> 660 hPa / < 3500 m
Ingress protection		IP20

4.2 Creepage Distances and Clearances

The creepage distances and clearances meet the requirements of the overvoltage category II, pollution degree 2.

4.3 Insulation Test Voltages, Routine Test

According to EN 61131-2

230 V circuits against other circuitry	2500 V	1.2/50 µs
120 V circuits against other circuitry	1500 V	1.2/50 µs
120 V to 240 V circuits against other circuitry	2500 V	1.2/50 µs
24 V circuits (supply, 24 V inputs/outputs, analogue inputs/outputs), if they are electrically isolated against other circuitry	500 V	1.2/50 µs
COM interfaces, electrically isolated	500 V	1.2/50 µs

COM interfaces, electrically not isolated	Not applicable	Not applicable
FBP interface	500 V	1.2/50 μ s
Ethernet	500 V	1.2/50 μ s
ARCNET	500 V	1.2/50 μ s
230 V circuits against other circuitry	1350 V	AC 2 s
120 V circuits against other circuitry	820 V	AC 2 s
120 V to 240 V circuits against other circuitry	1350 V	AC 2 s
24 V circuits (supply, 24 V inputs/outputs, analogue inputs/outputs), if they are electrically isolated against other circuitry	350 V	AC 2 s
COM interfaces, electrically isolated	350 V	AC 2 s
COM interfaces, electrically not isolated	Not applicable	Not applicable
FBP interface	350 V	AC 2 s
Ethernet	350 V	AC 2 s
ARCNET	350 V	AC 2 s

4.4 Power Supply Units

For the supply of the modules, power supply units according to PELV specifications must be used.

4.5 Electromagnetic Compatibility

Immunity		
Immunity against electrostatic discharge (ESD):		According to EN 61000-4-2, zone B, criterion B
	Electrostatic voltage in case of air discharge	8 kV
	Electrostatic voltage in case of contact discharge	4 kV, in a closed switch-gear cabinet 6 kV ¹⁾
	ESD with communication connectors	In order to prevent operating malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.
	ESD with connectors of Terminal Bases	The connectors between the Terminal Bases and Processor Modules or Communication Modules must not be touched during operation. The same is valid for the I/O-Bus with all modules involved.

Immunity		
Immunity against the influence of radiated (CW radiated):		According to EN 61000-4-3, zone B, criterion A
	Test field strength	10 V/m
Immunity against transient interference voltages (burst):		According to EN 61000-4-4, zone B, criterion B
	Supply voltage units (AC, DC)	4 kV
	Digital inputs/outputs (24 V DC)	2 kV
	Digital inputs/outputs (120/230 V AC)	2 kV
	Analog inputs/outputs	1 kV
	CS31 system bus	2 kV
	Serial RS-485 interfaces (COM)	2 kV
	Serial RS-232 interfaces (COM, not for PM55x and PM56x)	1 kV
	ARCNET	1 kV
	FBP	1 kV
	Ethernet	1 kV
	I/O supply, DC-out	1 kV
Immunity against the influence of line-conducted interferences (CW conducted):		According to EN 61000-4-6, zone B, criterion A
	Test voltage	3V zone B, 10 V is also met.
High energy surges		According to EN 61000-4-5, zone B, criterion B
	Power supply DC	1 kV CM / 0.5 kV DM ²⁾
	DC I/O supply	0.5 kV CM / 0.5 kV DM ²⁾
	Communication Lines, shielded	1 kV CM ²⁾
	AC-I/O unshielded	2 kV CM / 1 kV DM ²⁾
	I/O analog, I/O DC unshielded	1 kV CM / 0.5 kV DM ²⁾
Radiation (radio disturbance)		According to EN 55011, group 1, class A

¹⁾ High requirement for shipping classes are achieved with additional specific measures (see specific documentation).

²⁾ CM = Common Mode, DM = Differential Mode

4.6 Mechanical Data

Mounting	Horizontal
Degree of protection	IP 20
Housing	According to UL 94
Vibration resistance acc. to EN 61131-2	all three axes 2 Hz...15 Hz, continuous 3.5 mm 15 Hz...150 Hz, continuous 1 g (higher values on request)
Vibration resistance with SD Memory Card inserted	15 Hz...150 Hz, continuous 1 g