DATA SHEET

FM562

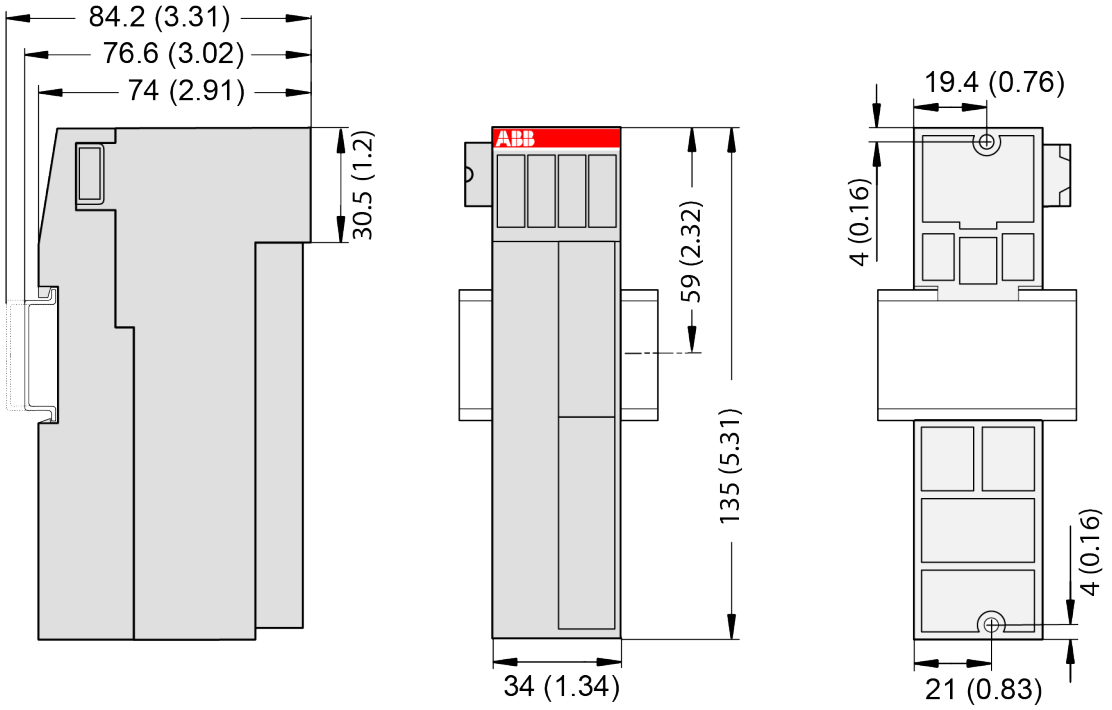
Function modules

1 Ordering data

Part no.	Description	Product life cycle phase *)
1SAP 233 100 R0001	FM562, pulse-train output module, 2 axes, RS-422, 4 DI, 24 V DC	Active
1TNE 968 901 R3101	Terminal block TA563-9, 9 pins, screw front, cable side, 6 pieces per unit	Active
1TNE 968 901 R3102	Terminal block TA563-11, 11 pins, screw front, cable side, 6 pieces per unit	Active
1TNE 968 901 R3103	Terminal block TA564-9, 9 pins, screw front, cable front, 6 pieces per unit	Active
1TNE 968 901 R3104	Terminal block TA564-11, 11 pins, screw front, cable front, 6 pieces per unit	Active
1TNE 968 901 R3105	Terminal block TA565-9, 9 pins, spring front, cable front, 6 pieces per unit	Active
1TNE 968 901 R3106	Terminal block TA565-11, 11 pins, spring front, cable front, 6 pieces per unit	Active

*) *Modules in lifecycle Classic are available from stock but not recommended for planning and commissioning of new installations.*

2 Dimensions



The dimensions are in mm and in brackets in inch.

3 Technical data

The system data of AC500-eCo apply.

Chapter 4 “System data AC500-eCo” on page 5

Only additional details are therefore documented below.

Parameter	Value
Digital inputs	4 inputs (2 per axis) 24 V DC, can be used as source inputs or as sink inputs
Input channels 0 and 2	Input signal used for axis enable and limit switch
Input channels 1 and 3	Stop, configurable
Input data length	32 bytes
Pulse outputs	Pulse specification ● 2 outputs for each axis, configurable ● Type: RS-422 differential signal ● Mode: CW & CCW or Pulse & Direction ● Frequency: 10 Hz to 250 kHz ● Pulse number: -2147483648 to 2147483647 (32 bits) ● Motion profiles generator
Output data lenth	32 bytes

Parameter	Value
LED displays	For power supply, errors and signal states
Internal power supply	Via I/O bus
External power supply	Via the terminals ZP and UP (process voltage 24 V DC)

Process supply voltage UP	Value
Connections	Terminal 19 for UP (+24 V DC) and terminal 20 for ZP (0 V)
Rated value	24 V DC
Current consumption via UP terminal	42 mA
Max. ripple	5 %
Inrush current from UP (at power up)	0.067 A^2s
Protection against reversed voltage	Yes
Rated protection fuse for UP	Not necessary
Current consumption from 24 V DC power supply at the L+/UP and M/ZP terminals of the CPU/ communication interface module	Ca. 5 mA
Galvanic isolation	Yes, between input groups and the output group and the rest of the module
Isolated groups	5 groups (2 groups for 4 input channels, 1 group for 4 pulse train output channels, 1 group for process supply voltage, 1 group for the rest of the module)
Surge-voltage (max.)	35 V DC for 0.5 s
Max. power dissipation within the module	1.2 W
Weight	Ca. 125 g
Mounting position	Horizontal or vertical
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the control cabinet.

No effects of multiple overloads

No effects of multiple overloads on isolated multi-channel modules occur, as every channel is protected individually by an external fuse.

3.1 Technical data of the digital inputs

Parameter		Value
Number of channels per module		4
Distribution of the channels into axes		1 group of 2 channels for each axis
	Axis 1	Inputs I0 ... I1
	Axis 2	Inputs I2 ... I3
Connections of the channels I0 ... I1		Terminals 2 ... 3
Connections of the channels I1 ... I3		Terminals 11 ... 12

Parameter		Value	
Reference potential for the channels I0 ... I1		Terminal 1 (Signal name C0 ... C1)	
Reference potential for the channels I2 to I3		Terminal 10 (Signal name C2 ... C3)	
Galvanic isolation		Yes, per axis	
Indication of the input signals		1 yellow LED per channel; the LED is ON when the input signal is high (signal 1)	
Input type according to EN 61131-2		Type 1 source	Type 1 sink
Input signal range		-24 V DC	+24 V DC
	Signal 0	-5 V ... +3 V	-3 V ... +5 V
	Undefined signal	-15 V ... + 5 V	+5 V ... +15 V
	Signal 1	-30 V ... -15 V	+15 V ... +30 V
Ripple with signal 0		-5 V ... +3 V	-3 V ... +5 V
Ripple with signal 1		-30 V ... -15 V	+15 V ... +30 V
Input current per channel			
	Input voltage +24 V	Typ. 5 mA	
	Input voltage +5 V	Typ. 1 mA	
	Input voltage +15 V	> 2.5 mA	
	Input voltage +30 V	< 8 mA	
Max. permissible leakage current (at 2-wire proximity switches)		1 mA	
Input delay (0->1 or 1->0)		Typ. 0.1 ms ... 32 ms (configurable via software), default: 0.1 ms	
Max. cable length			
	Shielded	500 m	
	Unshielded	300 m	

3.2 Technical data of the pulse outputs

Parameter		Value
Number of channels		2 per axis, 4 per module
Output type		RS-422
Output mode		Clockwise and counter-clockwise or pulse and direction
Output frequency		10 Hz to 250 kHz
Frequency accuracy		
	From 10 Hz to 500 Hz	± 2 %
	From 501 Hz to 250 kHz	± 1 %
Differential output voltage (at terminal block)		2.8 V at 140 Ω differential load 2.56 V at 100 Ω differential load

Parameter		Value
Output voltage of positive output (P0+, P1+) referenced to SGND if used for single ended application		Max. 3.3 V without any load Typ. 2.5 V at 100 Ω load
Max. short circuit current		40 mA
Max. cable length		
	Shielded	300 m (at max. frequency, criterion: V ≥ 2 V, tested with 100 Ω termination)
	Unshielded	30 m

4 System data AC500-eCo

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
24 V AC		
	Voltage	24 V (-15 %, +10 %)
	Frequency	50/60 Hz (-6 %, +4 %)
100 V AC		
	Voltage	100 V (-15 %, +10 %)
	Frequency	50/60 Hz (-6 %, +4 %)
230 VAC		
	Voltage	230 V (-15 %, +10 %)
	Frequency	50/60 Hz (-6 %, +4 %)
100 V AC ... 240 V AC wide-range supply		
	Voltage	100 V ... 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!

Risk of damaging the PLC due to improper voltage levels!

– Never exceed the maximum tolerance values for process and supply voltages.
– Never fall below the minimum tolerance values for process and supply voltages.
Observe the **system data** and the **technical data** of the used module.
↳ *Chapter 4 “System data AC500-eCo” on page 5*

NOTICE!

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

– AC voltage above 264 V
– Frenquency 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 and 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

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

Parameter	Value	
200 V ... 240 V circuits against other circuitry	2500 V	1.2/50 µs
100 V ... 127 V circuits against other circuitry	1500 V	1.2/50 µs

Parameter	Value	
100 V ... 240 V circuits against other circuitry	2500 V	1.2/50 µs
24 V circuits (supply, 24 V inputs/outputs, analog inputs/ outputs), if they are galvanically isolated against other circuitry	500 V	1.2/50 µs
COM interfaces, galvanically isolated	500 V	1.2/50 µs
COM interfaces, electrically not isolated	Not applicable	Not applicable
FBP interface	500 V	1.2/50 µs
Ethernet	500 V	1.2/50 µs
ARCNET	500 V	1.2/50 µs
200 V ... 240 V circuits against other circuitry	1350 V	AC 2 s
100 V circuits against other cir-cuitry	820 V	AC 2 s
100 V ... 240 V circuits against other circuitry	1350 V	AC 2 s
24 V circuits (supply, 24 V inputs/outputs, analog inputs/ outputs), if they are galvanically isolated against other circuitry	350 V	AC 2 s
COM interfaces, galvanically 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 SELV or PELV specifications must be used.

Safety Extra Low Voltage (SELV) and Protective Extra Low Voltage (PELV)

To ensure electrical safety of AC500/AC500-eCo extra low voltage circuits, 24 V DC supply, communication interfaces, I/O circuits, and all connected devices must be powered from sources meeting requirements of SELV, PELV, class 2, limited voltage or limited power according to applicable standards.

WARNING!

Improper installation can lead to death by touching hazardous voltages!

To avoid personal injury, safe separation, double or reinforced insulation and separation of the primary and secondary circuit must be observed and implemented during installation.

– Only use power converters for safety extra-low voltages (SELV) with safe galvanic separation of the primary and secondary circuit.
– Safe separation means that the primary circuit of mains transformers must be separated from the secondary circuit by double or reinforced insulation. The protective extra-low voltage (PELV) offers protection against electric shock.

4.5 Electromagnetic compatibility

Table 2: Range of use

Application
Device suitable only as *Control Equipment for Industrial Applications*.

Immunity against electrostatic discharge (ESD):		**According to IEC 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 control 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.
Immunity against the influence of radiated (CW radiated):		According to IEC 61000-4-3, zone B, criterion A
	Test field strength	10 V/m
Immunity against transient interference voltages (burst):		According to IEC 61000-4-4, zone B, criterion B
	Power supply (DC)	2 kV
	Power supply (AC)	2 kV
	Digital inputs/outputs (24 V DC / 24 VAC)	1 kV
	Digital inputs/outputs (100 V AC ... 240 V AC)	2 kV
	Analog inputs/outputs	1 kV
	Serial RS-485 interfaces (COM)	1 kV
	Ethernet	1 kV
	I/O supply, DC-out	1 kV
Immunity against the influence of line-conducted interferences (CW conducted):		According to IEC 61000-4-6, zone B, criterion A
	Test voltage	10 V

Immunity against electrostatic discharge (ESD):		**According to IEC 61000-4-2, zone B, criterion B**
High energy surges		According to IEC 61000-4-5, zone B, criterion B
	Power supply (DC)	2 kV CM / 1 kV DM [2])
	Power supply (AC)	1 kV CM / 0.5 kV DM [2])
	DC I/O supply, add. DC-supply-out	1 kV CM / 0.5 kV DM [2])
	Communication lines, shielded	1 kV CM [2])
	AC I/O unshielded [3])	2 kV CM / 1 kV DM [2])
	Analog inputs/outputs, I/O DC unshielded [3])	1 kV CM / 0.5 kV DM [2])
Radiation (radio disturbance)		According to IEC 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

[3]) When DC I/O inputs are used with AC voltage, external filters limiting high energy surges to 1 kV CM / 0.5 DM are required to meet requirements according IEC 61131-2.

4.6 Mechanical data

Parameter	Value
Mounting	Horizontal
Degree of protection	PLC system: IP 20 ● with all modules plugged in ● with all terminals plugged in ● with all covers closed
Housing	Classification V-2 according to UL 94
Vibration resistance acc. to EN 61131-2	all three axes (DIN rail mounting) 5 Hz ... 8.4 Hz, continuous 3.5 mm 8.4 Hz ... 150 Hz, continuous 1 g
Shock test	All three axes 15 g, 11 ms, half-sinusoidal
Mounting of the modules:	
DIN rail according to DIN EN 50022	35 mm, depth 7.5 mm or 15 mm
Mounting with screws	Screws with a diameter of 4 mm
Fastening torque	1.2 Nm

4.7 Approvals and certifications

Information on approvals and certificates can be found in the PLC Automation *catalog*, in the table "Certifications" in the chapter "Additional information".

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