Parameter		Value
Max. permissible leakage current (at 2-wire proximity switches)		1 mA
Max. cable length		
	Shielded	1000 m
	Unshielded	600 m

Ordering data

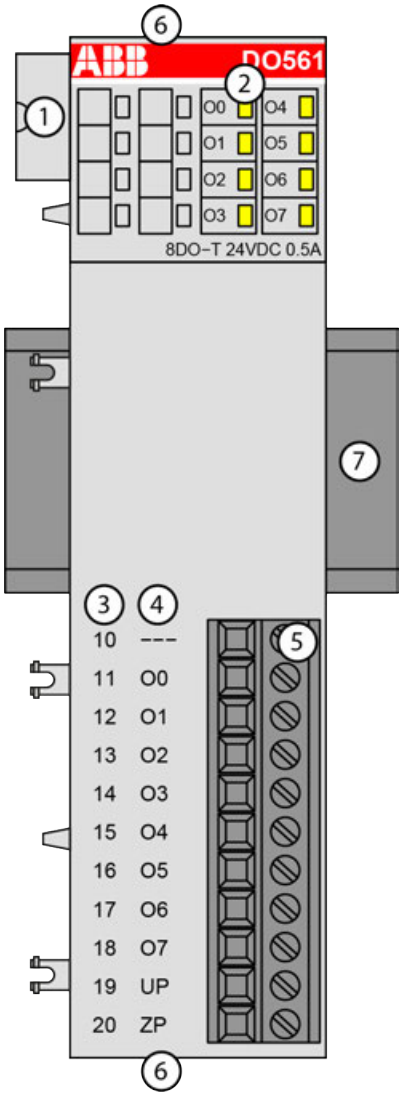
Part no.	Description	Product life cycle phase *)
1SAP 230 500 R0000	DI572, digital input module, 16 DI, 100 V AC...240 V AC	Active
1TNE 968 901 R3101	Terminal block TA563-9, 9 pins, screw front, cable side, 6 pieces per unit	Active
1TNE 968 901 R3102	Terminal block TA563-11, 11 pins, screw front, cable 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.*

1.6.1.1.7 DO561 - Digital output module

- 8 digital outputs 24 V DC (O0 to O7) in 1 group
- Module-wise galvanically isolated



1 I/O bus
2 8 yellow LEDs to display the signal states of the outputs O0 to O7
3 Terminal number
4 Allocation of signal name
5 Terminal block for output signals (11-pin)
6 2 holes for wall-mounting with screws
7 DIN rail

Intended purpose

The device can be used as a decentralized I/O extension module for S500 communication iInterface modules (e. g. CI592-CS31, CI501-PNIO, CI541-DP, CI581-CN) or as a centralized extension module for AC500 CPUs.

The outputs are group-wise galvanically isolated from each other.

All other circuitry of the module is galvanically isolated from the outputs.

The I/O module must not be used as a decentralized I/O module with CI590-CS31-HA communication interface modules.

Functionality

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

Connections



For a detailed description of the mounting, disassembly and connection of the module, please refer to the System Assembly chapter ↳ Chapter 2.5 “AC500-eCo” on page 925.

The connection is carried out by using removable 9-pin and 11-pin terminal blocks. These terminal blocks differ in their connection system (spring terminals or screw terminals, cable mounting from the front or from the side). The terminal blocks are not included in the module's scope of delivery and must be ordered separately.

The following block diagram shows the internal construction of the digital outputs:

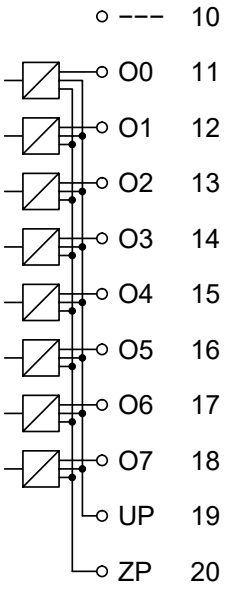


Table 66: Assignment of the terminals:

Terminals	Signal	Description
10	---	Reserved
11	O0	Output signal O0
12	O1	Output signal O1
13	O2	Output signal O2
14	O3	Output signal O3
15	O4	Output signal O4

Terminals	Signal	Description
16	O5	Output signal O5
17	O6	Output signal O6
18	O7	Output signal O7
19	UP	Process supply voltage UP +24 V DC
20	ZP	Process supply voltage ZP 0 V

The internal power supply voltage for the module's circuitry is carried out via the I/O bus (provided by a communication interface module or a CPU). Thus, the current consumption from 24 V DC power supply at the terminals L+/UP and M/ZP of the CPU/communication interface module increases by 10 mA per DO561.

The external power supply connection is carried out via the UP (+24 V DC) and ZP (0 V DC) terminals.



WARNING!

Removal/Insertion under power

The devices are not designed for removal or insertion under power. Because of unforeseeable consequences, it is not allowed to plug or unplug devices with the power being ON.

Make sure that all voltage sources (supply and process voltage) are switched off before you

– connect or disconnect any signal or terminal block
– remove, mount or replace a module.

Disconnecting any powered devices while energized in a hazardous location could result in an electric arc, which could create a flammable ignition resulting in fire or explosion.

Make sure that power is removed and that the area has been thoroughly checked to ensure that flammable materials are not present prior to proceeding.

The devices must not be opened when in operation. The same applies to the network interfaces.



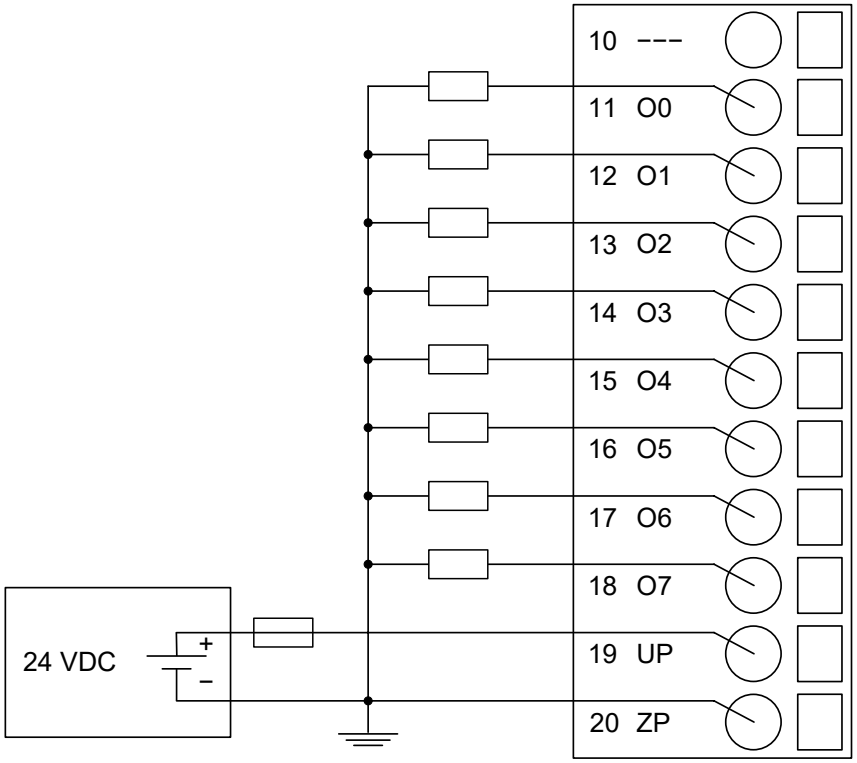
NOTICE!

Risk of damaging the PLC modules!

Overvoltages and short circuits might damage the PLC modules.

– Make sure that all voltage sources (supply voltage and process supply voltage) are switched off before you begin with operations on the system.
– Never connect any voltages or signals to reserved terminals (marked with ---). Reserved terminals may carry internal voltages.

The following figure shows the connection of the digital output module DO561:



NOTICE!

Risk of malfunctions in the plant!

The outputs may switch on for a period of 10 to 50 µs if the process supply voltage UP/ZP is switched on.

This must be considered in the planning of the application.

NOTICE!

Risk of damaging the I/O module!

The outputs are not protected against short circuits and overload.

- Never short-circuit or overload the outputs.
- Never connect the outputs to other voltages.
- Use an external 3 A fast-protection fuse for the outputs.

The module provides several diagnosis functions (see Diagnosis *Chapter 1.6.1.1.7.6 “Diagnosis” on page 198*).

The meaning of the LEDs is described in the section State LEDs *Chapter 1.6.1.1.7.7 “State LEDs” on page 199*.

I/O configuration

The module itself does not store configuration data. It receives its parameterization data from the master device of the I/O bus (CPU or communication interface module) during power-up of the system.

Hence, replacing I/O modules is possible without any re-parameterization via software.

If the external power supply voltage via UP/ZP terminals fails, the I/O module loses its configuration data. The whole station has to be switched off and on again to re-configure the module.

Parameterization

The arrangement of the parameter data is performed with Automation Builder software.

The parameter data directly influences the functionality of modules.

For non-standard applications, it is necessary to adapt the parameters to your system configuration.

Name	Value	Internal Value	Internal Value, Type	Default	Min.	Max.	EDS Slot Index
Module ID	Internal	6120 [1])	WORD	6120 0x17E8	0	65535	xx01
Ignore module	No Yes	0 1	BYTE	No (0x00)			
Parameter length	Internal	1	BYTE	0	0	255	xx02 [2])

[1]) with CS31 and addresses smaller than 70, the value is increased by 1

[2]) Value is hexadecimal: HighByte is slot (xx: 0...7), LowByte is index (1...n)

GSD file:

Ext_User_Prm_Data_Len =	0x03
Ext_User_Prm_Data_Const(0) =	0xE9, 0x17, 0x00;

Diagnosis

E1...E4	**d1**	**d2**	**d3**	**d4**	**Identifier 000...063**	**AC500-Display**	**<− Display in**
Class	**Comp**	**Dev**	**Mod**	**Ch**	**Err**	**PS501 PLC Browser**	
Byte 6 Bit 6...7	**-**	**Byte 3**	**Byte 4**	**Byte 5**	**Byte 6 Bit 0...5**	**PNIO diagnosis block**	

Class	**Interface**	**Device**	**Module**	**Channel**	**Error Identifier**	**Error message**	**Remedy**
	[1])	**[2])**	**[3])**	**[4])**			
Module error DO561							
3	14	1...10	31	31	19	Checksum error in the I/O module	Replace I/O module
	11 / 12	ADR	1...10				

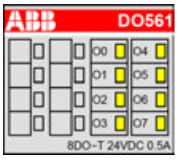
E1...E4	d1	d2	d3	d4	Identifier 000...063	AC500-Display	<– Display in
Class	Comp	Dev	Mod	Ch	Err	PS501 PLC Browser	
Byte 6 Bit 6...7	-	Byte 3	Byte 4	Byte 5	Byte 6 Bit 0...5	PNIO diagnosis block	

Class	Interface	Device	Module	Channel	Error Identifier	Error message	Remedy
	[1])	[2])	[3])	[4])			
Module error DO561							
3	14	1...10	31	31	43	Internal error in the module	Replace I/O module
	11 / 12	ADR	1...10				
3	14	1...10	31	31	9	Overflow diagnosis buffer	Restart
	11 / 12	ADR	1...10				
3	14	1...10	31	31	26	Parameter error	Check master
	11 / 12	ADR	1...10				

Remarks:

[1])	In AC500 the following interface identifier applies: 14 = I/O bus, 11 = COM1 (e.g. CS31-Bus), 12 = COM2. The PNIO diagnosis block does not contain this identifier.
[2])	With "Device" the following allocation applies: 31 = module itself, 1...10 = decentralized communication interface module 1...10, ADR = hardware address (e. g. of the DC551-CS31)
[3])	With "Module" the following allocation applies depending on the master: Module error: I/O bus or PNIO: 31 = module itself; COM1/COM2: 1...10 = expansion 1...10 Channel error: I/O bus or PNIO = module type (2 = DO); COM1/COM2: 1...10 = expansion 1...10
[4])	In case of module errors, with channel "31 = Module itself" is output.

State LEDs

LED		State	Color	LED = OFF	LED = ON
	Outputs O0...O7	Digital output	Yellow	Output is OFF	Output is ON (the output voltage is only displayed if the supply voltage of the module is ON)

Technical data

The System Data of AC500-eCo apply ↳ *Chapter 2.5.1 “System data AC500-eCo V3” on page 925*

Only additional details are therefore documented below.

Parameter		Value
Process supply voltage UP		
	Connections	Terminal 19 for UP (+24 V DC) and terminal 20 for ZP (0 V DC)
	Rated value	24 V DC
	Current consumption via UP terminal	5 mA + max. 0.5 A per output
	Max. ripple	5 %
	Inrush current	0.000002 A^2s
	Protection against reversed voltage	Yes
	Rated protection fuse for UP	Recommended; the outputs must be protected by an 3 A fast-acting fuse
Current consumption from 24 V DC power supply at the L+/UP and M/ZP terminals of the CPU/communication interface module		Ca. 10 mA
Galvanic isolation		Yes, between the output group and the rest of the module
Isolated groups		1 (8 channels per group)
Surge-voltage (max.)		35 V DC for 0.5 s
Power dissipation within the module (max.)		1.6 W
Weight		Ca. 115 g
Mounting position		Horizontal or vertical
Cooling		The natural convection cooling must not be hindered by cable ducts or other parts in the switchgear 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.

Technical data of the digital outputs

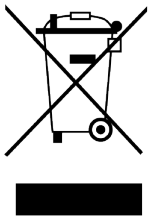
Parameter	Value
Number of channels per module	8 transistor outputs (24 V DC, 0.5 A max.)
Distribution of the channels into groups	1 (8 channels per group)
Connection of the channels O0 to O7	Terminals 11 to 18
Common power supply voltage	Terminal 19 (positive pole of the process voltage, signal name UP)
Reference potential for the channels O0 to O7	Terminal 20 (negative pole of the process voltage, signal name ZP)
Indication of the output signals	1 yellow LED per channel; the LED is on when the output signal is high (signal 1) and the module is powered via the I/O bus

Parameter		Value
Way of operation		Non-latching type
Min. output voltage at signal 1		20 V DC at max. current consumption
Output delay (max. at rated load)		
	0 to 1	50 µs
	1 to 0	200 µs
Output data length		1 byte
Output current		
	Rated current per channel (max.)	0.5 A at UP 24 V DC
	Rated current per group (max.)	4 A
	Lamp load (max.)	5 W
Max. leakage current with signal 0		0.5 mA
Output type		Non-protected
Protection type		External fuse on each channel
Rated protection fuse (for each channel)		3 A fast
Demagnetization when inductive loads are switched off		Must be performed externally according to driven load specification
Switching Frequencies		
	With inductive loads	Max. 0.5 Hz
	With lamp loads	Max. 11 Hz at max. 5 W
Short-circuit-proof / Overload-proof		No
	Overload message	No
	Output current limitation	No
	Resistance to feedback against 24 V DC	No
Connection of 2 outputs in parallel		Not possible
Max. cable length		
	Shielded	500 m
	Unshielded	150 m

Ordering data

Part no.	Description	Product life cycle phase *)
1TNE 968 902 R2201	DO561, digital output module, 8 DO, transistor output	Active
1TNE 968 901 R3102	Terminal block TA563-11, 11 pins, screw front, cable side, 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 R3106	Terminal block TA565-11, 11 pins, spring front, cable front, 6 pieces per unit	Active

2.4.7 Recycling



Disposal and recycling information

This symbol on the product (and on its packaging) is in accordance with the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive.

The symbol indicates that this product must be recycled/disposed of separately from other household waste.

It is the end user's responsibility to dispose of this product by taking it to a designated WEEE collection facility for the proper collection and recycling of the waste equipment.

The separate collection and recycling of waste equipment will help to conserve natural resources and protect human health and the environment.

For more information about recycling, please contact your local environmental office, an electrical/electronic waste disposal company or the store where you purchased the product.

2.5 AC500-eCo

2.5.1 System data AC500-eCo V3

2.5.1.1 Environmental conditions

Table 186: 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 V AC		
	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

NOTICE!

Exceeding the maximum power supply voltage (> 30 V DC) for process or supply voltages could lead to unrecoverable damage of the system. The system might be destroyed.

Parameter				Value				
				PM5012-x-ETH	PM5032-x-ETH	PM5052-x-ETH	PM5072-T-2ETH	PM5072-T-2ETHW
Temperature								
	Operating							
		Horizontal mounting						
			Standard temperature range	0 °C...+55 °C	0 °C...+60 °C			-
			Wide temperature range	-				-20 °C...+70 °C I/O derating in range 60 °C…70 °C: 75 %
		Vertical mounting (output load reduced to 50 % per group)						
			Standard temperature range	0 °C...+40 °C				-
			Wide temperature range	-				-20 °C...+40 °C
	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				PLC System: IP 20 in accordance with IEC 60529 ● with all modules or option boards plugged in ● with all terminal blocks plugged in ● with all covers closed				

Option boards	Temperature range
TA5101-4DI	0 °C... 60 °C
TA5105-4DOT	0 °C... 60 °C
TA5110-2DI2DOT	0 °C... 60 °C
TA530-KNXPB	0 °C... 60 °C
TA5131-RTC	0 °C...+55 °C
TA5141-RS232I	0 °C... 60 °C
TA5142-RS485I	0 °C... 60 °C
TA5142-RS485	0 °C... 60 °C

2.5.1.2 Creepage distances and clearances

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

2.5.1.3 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.

2.5.1.4 Electromagnetic compatibility

Electromagnetic Compatibility		
Device suitable for:		
	Industrial applications	Yes
	Domestic applications	Yes
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	6 kV
	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
	Supply voltage units (DC)	2 kV
	Digital inputs/outputs (24 V DC)	1 kV

Electromagnetic Compatibility		
	Digital inputs/outputs (100 V AC...240 V AC)	Relay 2 kV
	Ethernet	1 kV
	Serial interfaces	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 pass A
High energy surges		According to IEC 61000-4-5, zone B, criterion B
	Power supply DC	1 kV CM / 0.5 kV DM [1])
	DC I/O supply	1 kV CM / 0.5 kV DM [1])
	Ethernet	1 kV CM [1])
	Serial interfaces	1 kV CM [1])
	AC I/O unshielded	2 kV CM, 1 kV DM [1])
	I/O analog, I/O DC unshielded	1 kV CM [1])
Radiation (radio disturbance)		According to IEC 55011, group 1, class A

[1]) CM = Common Mode, DM = Differential Mode

2.5.1.5 Mechanical data

Parameter	Value
Mounting	Horizontal
Degree of protection	EN61131-2: IP20 with all option boards or option board slot covers attached (and all terminal screws are tightened)
Housing	Classification V0 according to UL 94
Vibration resistance acc. to EN 61131-2	all three axes (DIN rail mounting) 5 Hz...8.2 Hz: ±7.5 mm peak 8.2 Hz...150 Hz: 2 g peak
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	M3
Fastening torque	1.2 Nm

2.5.1.6 Approvals and certifications

Information on approvals and certificates can be found in the corresponding chapter of the *Main catalog, PLC Automation*.

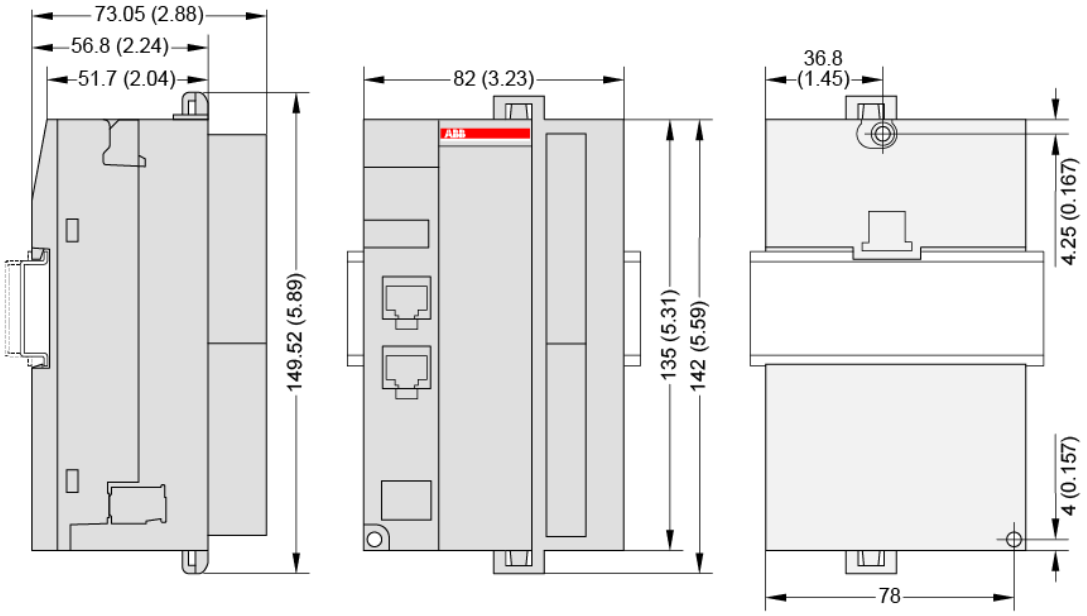


Fig. 177: Side, front and back view

2.5.2.4 Mechanical dimensions S500-eCo

All mechanical dimensions are given in millimeters and inches. The value in brackets is the inch-value.

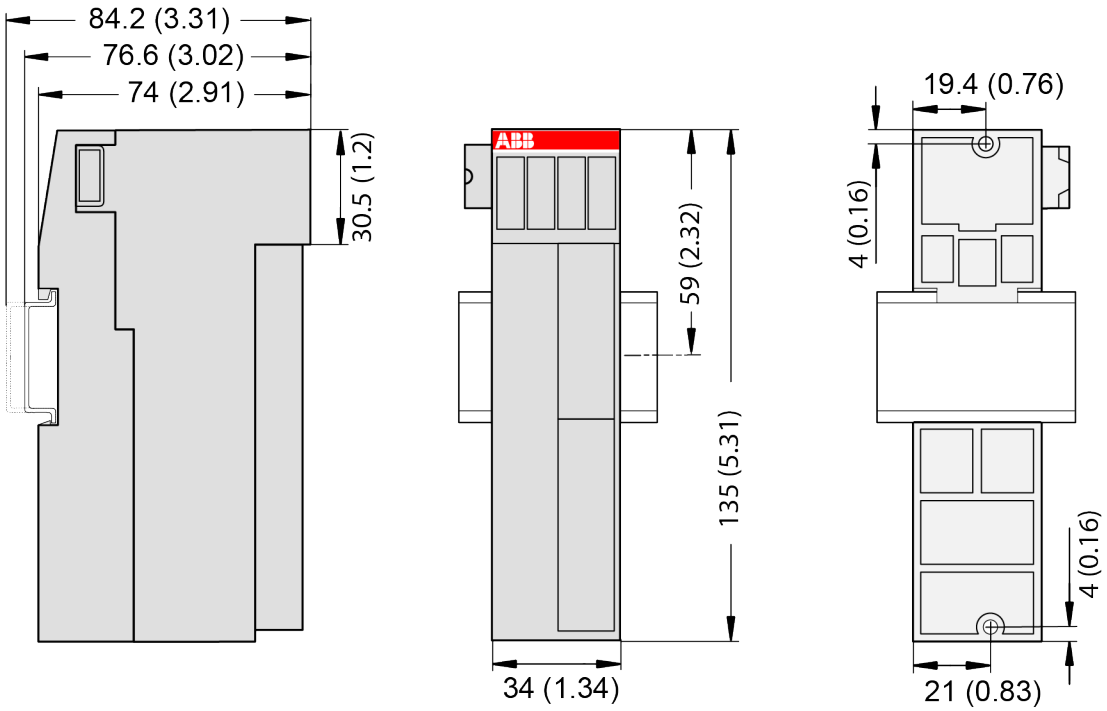


Fig. 178: Side, front and back view