4.4.2 Interface description

4.4.2.1 Overview

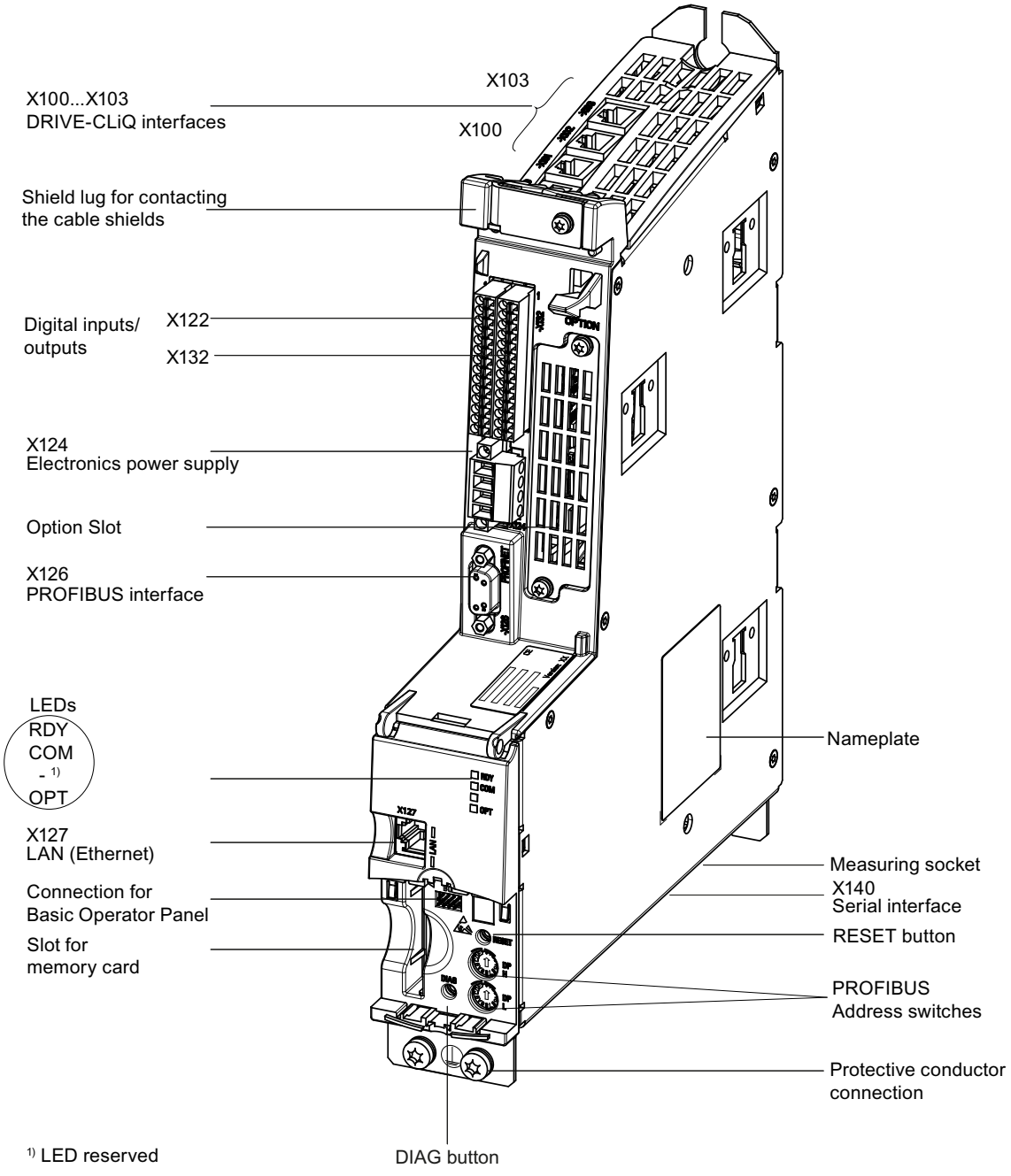
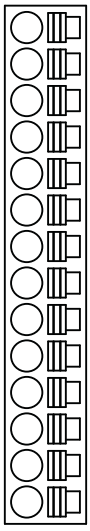


Figure 4-10 Interface overview CU320-2 DP (without cover and blanking cover)

4.4.2.3 X122 digital inputs/outputs

Table 4-18 X122 digital inputs/outputs

	Terminal	Designation[1]	Technical data
1 	1	DI 0	Voltage: -3 ... +30 V DC Electrical isolation: Yes Reference potential: M1 Input characteristic acc. to IEC 61131-2, type 1 Input voltage (including ripple) "1" signal: 15 ... 30 V "0" signal: -3 ... +5 V Input current at 24 V DC: typ. 3.5 mA at <0.5 mA: Signal "0" reliably detected Input delay for "0" → "1": typ. 50 µs for "1" → "0": typ. 150 µs
	2	DI 1	
	3	DI 2	
	4	DI 3	
	5	DI 16	
	6	DI 17	
	7	M1	Reference potential for terminals 1 ... 6
	8	M	Electronics ground
	9	DI/DO 8	**As input**: Voltage: -3 ... +30 V DC Electrical isolation: no Reference potential: M Input characteristic acc. to IEC 61131-2, type 1 Input voltage (including ripple) "1" signal: 15 ... 30 V "0" signal: -3 ... +5 V Input current at 24 V DC: typ. 3.5 mA at <0.5 mA: Signal "0" reliably detected Input delay for "0" → "1": typ. 5 µs for "1" → "0": typ. 50 µs DI 8, DI 9, DI 10 and DI 11 are "fast inputs"[2] **As output**: Voltage: 24 V DC Electrical isolation: no Reference potential: M Output voltage "1" signal, with load: > X124.+ -2 V Output current for each output: ≤ 0.5 A Sum of all four outputs: ≤ 2 A Residual current for "0" signal: < 0.5 mA Short-circuit protection, automatic restart after a short-circuit Load types: ohmic, capacitive, inductive Output delay[3] for "0" → "1": typ. 150 µs / max. 400 µs (ohmic load) for "1" → "0": typ. 75 µs / max. 100 µs (ohmic load)
	10	DI/DO 9	
	11	M	
	12	DI/DO 10	
	13	DI/DO 11	
	14	M	

	Terminal	Designation[1)]	Technical data
			Switching frequency for ohmic load: Max. 100 Hz For inductive load: Max. 0.5 Hz For lamp load: max. 10 Hz Lamp load: max. 5 W
Type: Spring-loaded terminal 3 (Page 320)			

1) DI: digital input; DI/DO: bidirectional digital input/output; M: electronics ground; M1: reference potential

2) The rapid inputs can be used as probe inputs or as inputs for the external zero mark.

3) Data for: V_{cc} = 24 V; load 48 Ω; high ("1") = 90% V_{out}; low ("0") = 10% V_{out}

The maximum cable length that can be connected is 30 m.

Note

Ensuring the function of digital inputs

An open input is interpreted as "low".

Terminal M1 must be connected so that the digital inputs (DI) can function.

This is achieved by using one of the following measures:

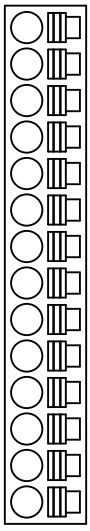
1. Providing the ground reference of the digital inputs
2. A jumper to terminal M
   Note: This removes isolation for these digital inputs.

Note

If the 24 V supply is briefly interrupted, then the digital outputs are deactivated during this time.

4.4.2.4 X132 digital inputs/outputs

Table 4-19 X132 digital inputs/outputs

	Terminal	Designation[1]	Technical data
1 	1	DI 4	Voltage: -3 ... +30 V DC Electrical isolation: Yes Reference potential: M2 Input characteristic acc. to IEC 61131-2, type 1 Input voltage (including ripple) "1" signal: 15 ... 30 V "0" signal: -3 ... +5 V Input current at 24 V DC: typ. 3.5 mA at <0.5 mA: Signal "0" reliably detected Input delay for "0" → "1": typ. 50 µs for "1" → "0": typ. 150 µs
	2	DI 5	
	3	DI 6	
	4	DI 7	
	5	DI 20	
	6	DI 21	
	7	M2	Reference potential for terminals 1 ... 6
	8	M	Electronics ground
	9	DI/DO 12	**As input**: Voltage: -3 ... +30 V DC Electrical isolation: no Reference potential: M Input characteristic acc. to IEC 61131-2, type 1 Input voltage (including ripple) "1" signal: 15 ... 30 V "0" signal: -3 ... +5 V Input current at 24 V DC: typ. 3.5 mA at <0.5 mA: Signal "0" reliably detected Input delay for "0" → "1": typ. 5 µs for "1" → "0": typ. 50 µs DI 12, DI 13, DI 14 and DI 15 are "fast inputs"[2] **As output**: Voltage: 24 V DC Electrical isolation: no Reference potential: M Output voltage "1" signal, with load: > X124.+ -2 V Output current for each output: ≤ 0.5 A Sum of all four outputs: ≤ 2 A Residual current for "0" signal: < 0.5 mA Short-circuit protection, automatic restart after a short-circuit Load types: ohmic, capacitive, inductive Output delay[3] for "0" → "1": typ. 150 µs / max. 400 µs (ohmic load) for "1" → "0": typ. 75 µs / max. 100 µs (ohmic load)
	10	DI/DO 13	
	11	M	
	12	DI/DO 14	
	13	DI/DO 15	
	14	M	

	Terminal	Designation[1)]	Technical data
			Switching frequency for ohmic load: Max. 100 Hz For inductive load: Max. 0.5 Hz For lamp load: max. 10 Hz Lamp load: max. 5 W
Type: Spring-loaded terminal 3 (Page 320)			

1) DI: digital input; DI/DO: bidirectional digital input/output; M: electronics ground; M2: reference potential

2) The rapid inputs can be used as probe inputs or as inputs for the external zero mark

3) Data for: V_{cc} = 24 V; load 48 Ω; high ("1") = 90% V_{out}; low ("0") = 10% V_{out}

The maximum cable length that can be connected is 30 m.

Note

Ensuring the function of digital inputs

An open input is interpreted as "low".

To enable the digital inputs (DI) to function, terminal M2 must be connected.

This is achieved by using one of the following measures:

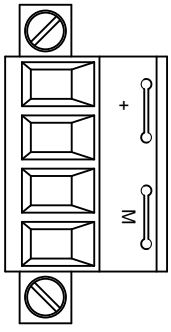
1. Providing the ground reference of the digital inputs
2. A jumper to terminal M
   Note: This removes isolation for these digital inputs.

Note

If the 24 V supply is briefly interrupted, then the digital outputs are deactivated during this time.

4.4.2.5 X124 electronics power supply

Table 4-20 X124 electronics power supply

	Terminal	Designation	Technical data
	+	Electronics power supply	Voltage: 24 V DC (20.4 ... 28.8 V) Current consumption: max. 6.5 A (including DRIVE-CLiQ and digital outputs) Max. current via jumper in connector: 20 A (15 A according to UL/CSA)
	+	Electronics power supply	
	M	Electronics ground	
	M	Electronics ground	
Type: Screw terminal 2 (Page 321)			

The maximum cable length that can be connected is 30 m.

Note

The two "+" or "M" terminals are jumpered in the connector. This ensures that the supply voltage is looped through.

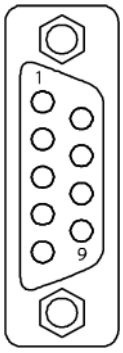
Note

The terminal block must be screwed on tightly using a flat-bladed screwdriver.

4.4.2.6 X126 PROFIBUS

The PROFIBUS interface can be operated isochronously.

Table 4-21 X126 PROFIBUS interface

	Pin	Signal name	Meaning	Range
	1	-	Not assigned	-
	2	M24_SERV	Teleservice supply, ground	0 V
	3	RxD / TxD–P	Receive/transmit data P (B)	RS485
	4	CNTR-P	Control signal	TTL
	5	DGND	PROFIBUS data reference potential	-
	6	VP	Supply voltage plus	5 V ± 10%
	7	P24_SERV	Teleservice supply, + (24 V)	24 V (20.4 ... 28.8 V)
	8	RxD / TxD–N	Receive/transmit data N (A)	RS485
	9	-	Not assigned	-
Connector type: 9-pin Sub-D socket				

A teleservice adapter can be connected to the PROFIBUS interface for remote diagnostics. The power supply for the teleservice (terminals 2 and 7) can have a load of up to 150 mA.

NOTICE

Damage to components due to connecting a CAN bus cable

If a CAN bus cable is connected to the X126 interface, this can damage the Control Unit or other CAN bus nodes.

- Do not connect any CAN bus cables to the X126 interface.

PROFIBUS connectors

The first and last nodes in a bus must contain terminating resistors. Otherwise, data transmission will not function correctly.

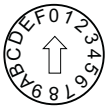
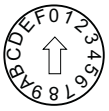
The bus terminating resistors are activated in the connector.

The cable shield must be connected at both ends and over a large surface area.

4.4.2.7 Setting the PROFIBUS address

On the CU320-2 DP, the PROFIBUS address is set as a hexadecimal value via two rotary coding switches. You can set values from 0_{dec} (00_{hex}) to 127_{dec} ($7F_{hex}$). At the upper rotary coding switch (H) you set the hexadecimal value for 16^1 and at the lower rotary coding switch (L) you set the hexadecimal value for 16^0.

Table 4-22 PROFIBUS address switch

Rotary coding switches	Significance	Examples		
		21_{dec}	**35_{dec}**	**126_{dec}**
		15_{hex}	**23_{hex}**	**$7E_{hex}$**
	$16^1 = 16$	1	2	7
	$16^0 = 1$	5	3	E

Setting the PROFIBUS address

Observe the properties of the rotary coding switch:

- The rotary coding switches used to set the PROFIBUS addresses are located beneath the cover.
- The factory setting for the rotary coding switches is 0_{dec} (00_{hex}).
- Address 126 is used for commissioning. Permitted PROFIBUS addresses are 1 ... 126.
- The currently set address of the rotary coding switch is displayed in parameter r2057.
- When several Control Units are connected to a PROFIBUS line, set the addresses differently than for the factory setting. Each PROFIBUS address in a PROFIBUS line can only be assigned once. Either set the PROFIBUS address in absolute terms using the rotary coding switches – or selectively in parameter p0918. Each change made to the bus address is not effective until POWER ON.

Note

Only values from 1 to 126 ($7E_{hex}$) are valid for PROFIBUS addressing. If values above 127 are set, then the set value is interpreted as "0". If a value "0" or "127" is set, the value in parameter p0918 defines the PROFIBUS address.

There are two ways to set the PROFIBUS address:

1. Using the STARTER commissioning tool (parameter p0918)
   - To set the bus address for a PROFIBUS node using STARTER, first set the rotary code switches to 0_{dec} (00_{hex}) and/or 127_{dec} ($7F_{hex}$).
   - Then set the address to a value from 1 to 126 using parameter p0918.
2. Using the PROFIBUS address switches on the Control Unit
   - The address is set manually to values from 1 to 126 using the rotary coding switches. In this case, parameter p0918 is only used to read the address.

More information

Further information for setting the PROFIBUS address is available in the SINAMICS S120 Function Manual "Drive Functions".

4.4.2.8 X127 LAN (Ethernet)

Note

Application

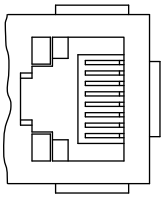
Ethernet interface X127 is intended for commissioning and diagnostics, which means that it must always be accessible (e.g. for service).

Furthermore, the following restrictions apply to X127:

- Only local access is permissible
- No networking - or only local networking is permissible in a locked control cabinet

If remote access to the control cabinet is required, then additional security measures must be taken to prevent misuse through sabotage, unqualified data manipulation and intercepting confidential data (see also the Chapter "Industrial Security").

Table 4-23 X127 LAN interface (Ethernet)

	Pin	Signal name	Technical data
	1	TXP	Ethernet transmit data +
	2	TXN	Ethernet transmit data -
	3	RXP	Ethernet receive data +
	4	Reserved, do not use	-
	5	Reserved, do not use	-
	6	RXN	Ethernet receive data -
	7	Reserved, do not use	-
	8	Reserved, do not use	-
Connector type: RJ45 socket			

4.4.2.12 Slot for memory card



Figure 4-13 Slot for memory card

Note

Plant standstill by withdrawing or inserting the memory card during operation

If the memory card is withdrawn or inserted during operation, then data can be lost, possibly resulting in a plant standstill.

- Only withdraw and insert the memory card when the Control Unit is in a no-voltage condition.

Note

Insertion direction for the memory card

Only insert the memory card as shown in the photo above (arrow at top right).

NOTICE
Memory card damage caused by electric fields or electrostatic discharge Electrical fields or electrostatic discharge may result in the memory card being damaged. • When removing and inserting the memory card, always observe the ESD regulations.

4.4.5 Dimension drawing

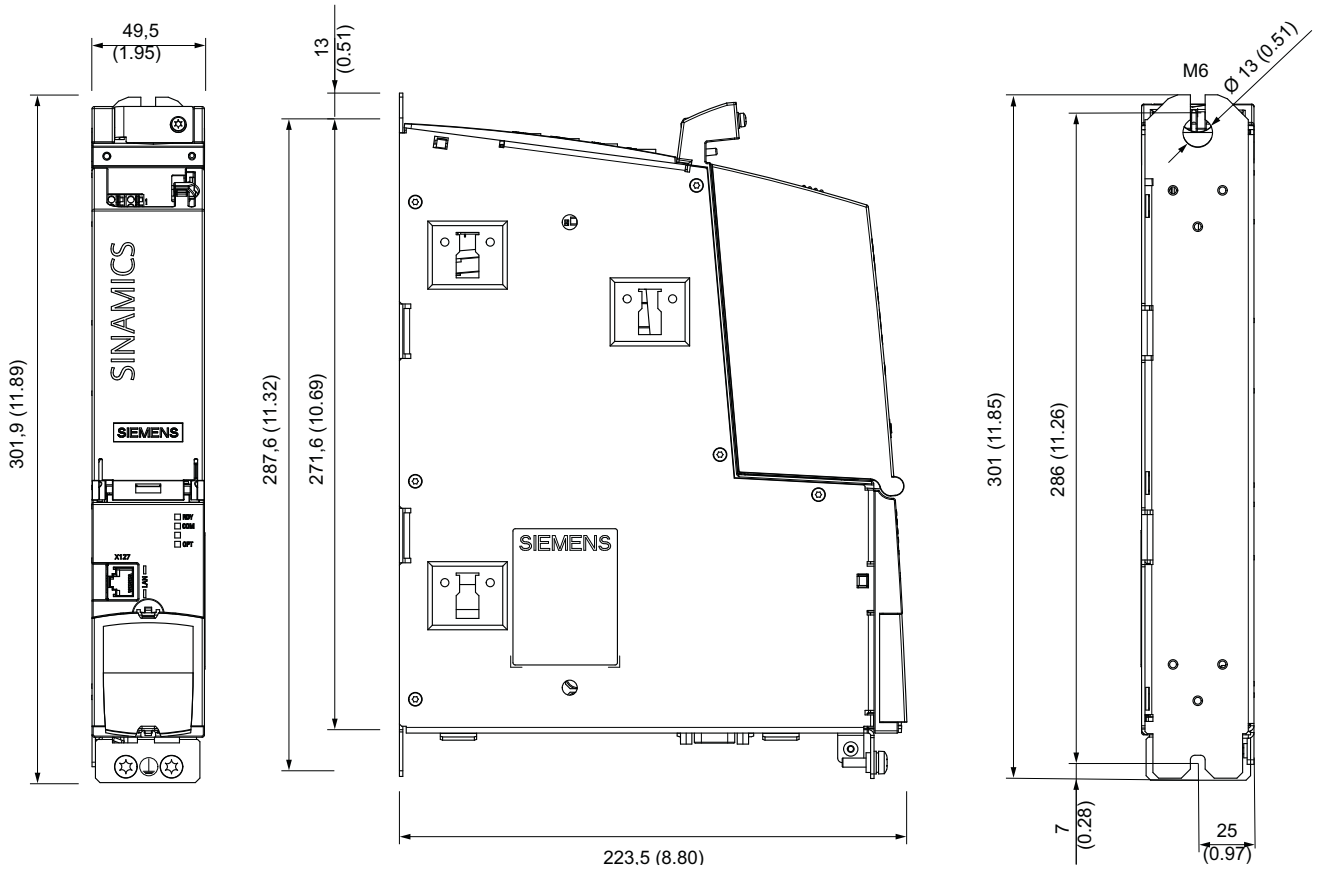


Figure 4-15 Dimension drawing of CU320-2 DP, all data in mm and (inches)

4.4.6 Technical data

Table 4-30 Technical data

6SL3040-1MA00-0AA0	Unit	Value
Electronics power supply Voltage Current (without DRIVE-CLiQ and digital outputs) Power loss	 V_{DC} A_{DC} W	 24 (20.4 ... 28.8) ≤1.0 ≤24
The sum of the maximum permissible output currents	A	5.5
Maximum DRIVE-CLiQ cable length	m	100
Protective ground conductor connection	At the housing with M5 screw	