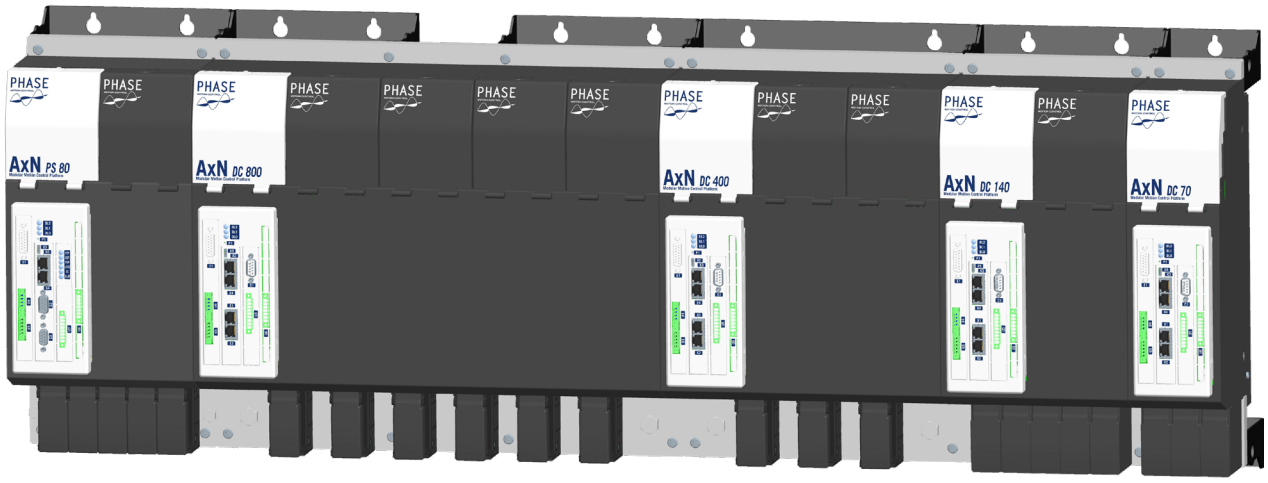
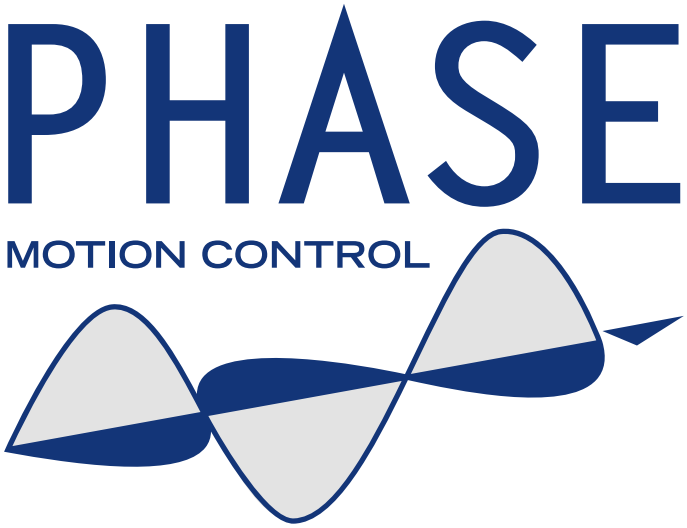


AxN-DC
User's Manual

Version: 1.02 (September 2019)

Supported Models:

AxN-PS.080.4
AxN-DC.044.6; AxN-DC.070.6
AxN-DC.100.6; AxN-DC.140.6
AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6
AxN-DC.800.6
AxN-CP.060.6; AxN-CP.470.6



Phase Motion Control S.p.A.

Uffici • Headquarters

Via Luigi Cibrario 4, 16154 Genova, Italy

Logistica • Warehouse

Via Pionieri ed Aviatori d'Italia 4, 16154 Genova, Italy

Sede Legale • Legal address

Via Luigi Cibrario 4, 16154 Genova, Italy

Telefono • Phone

+39 (010) 835161

info@phase.eu

www.phase.eu

• Indice

• General Information

1. Manual History

Note:

PMC China keeps the printed version of user's manuals as current as possible. From a safety standpoint, however, the current version from the Phase website must be used (www.phase.com.cn).

Version	Date	Comment
V1.02	2019-09-16	Changes • **Added parameter: Max. inlet pressure (for water cooling heatsink)** • **Corrected the description of the main encoder card interface and input/ output interface on page 12.**
V1.01	2019-09-13	Changes • **For the user communication interface on page 12, remove the "CANopen+EtherPMC" option.**
V1.00	2019-08-05	New

Table 1: Manual history

2. System Overview

AxN-DC series common DC bus drive is a new generation energy conversion system of PMC China, which consists of independent rectifier unit and inverter unit. It can be used for various driving tasks such as single-axis and multi-axis application control and active front end (AFE).

Figure 1 Product appearance

2.1 Rectifier Unit(Power Supply)

The rectifier unit integrates a rectifier component and a DC bus, converts the incoming voltage into DC voltage, and supplies power to the inverter unit through the DC bus. The rectifier unit can also integrate a control card, so that the upper computer can control the rectification through the field bus, and the rectifier unit itself can be used as the main station to build the AxN-DC internal bus communication network.

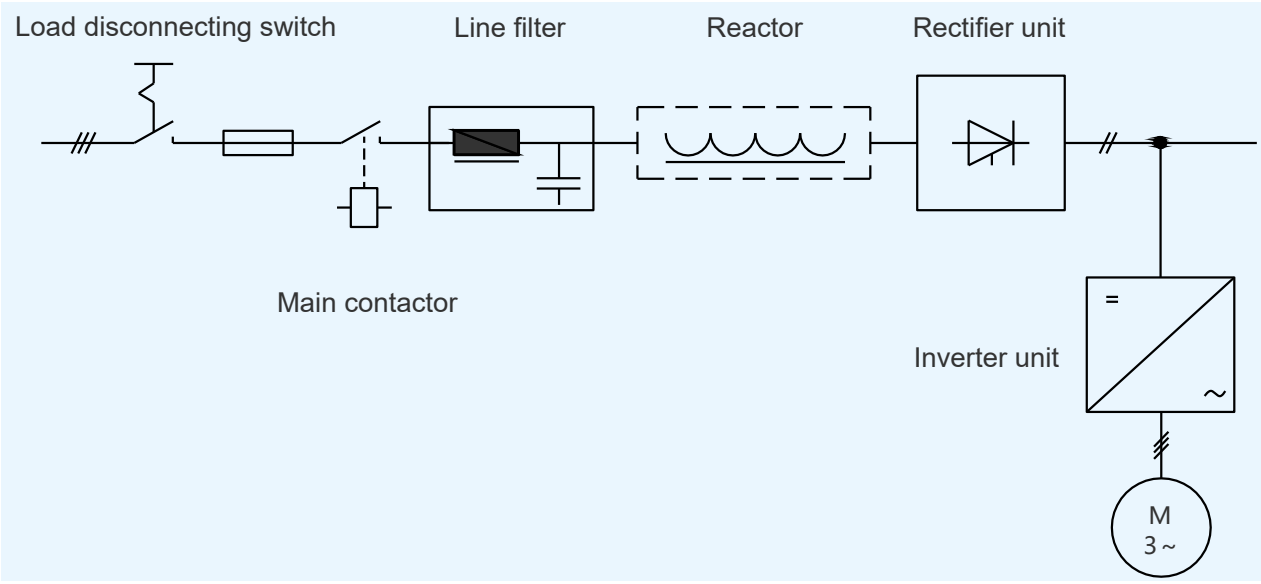


Figure 2 Rectifier unit connection diagram

2.1.1 Basic Rectifier Unit

Figure 3 AxN-PS.080.6

The basic rectifier unit is only used for power supply and cannot return regenerative energy to the grid. If regenerative energy is generated (such as when drive braking), it must be converted to heat by a braking resistor. It is necessary to install the matching line reactor and line filter when using.

2.1.2 Active Front End

The active front end can provide power and can also feedback regenerative energy to the grid. The braking resistor is only required when the grid is de-energized (when the energy cannot be fed back to the grid) to control the drive deceleration. Unlike basic rectifier unit, the active front end produces an adjustable DC voltage that is stable even with grid voltage fluctuations.

The active front end needs to be matched with matching accessories, including a small power rectifier power supply for DC bus pre-charging.

Figure 4 AxN-DC.070.6; AxN-DC.140.6

The inverter unit integrates a control card, DC busbar and inverter components for powering the motor.

The inverter units are interconnected by a common DC bus. Since the inverter modules share the same DC bus, energy can be exchanged between the modules. It means, if one inverter module is generating electric energy (generation mode), the other inverter module can use the electric energy, thereby reducing the energy waste generated by the braking resistor and the total energy consumption of the system.

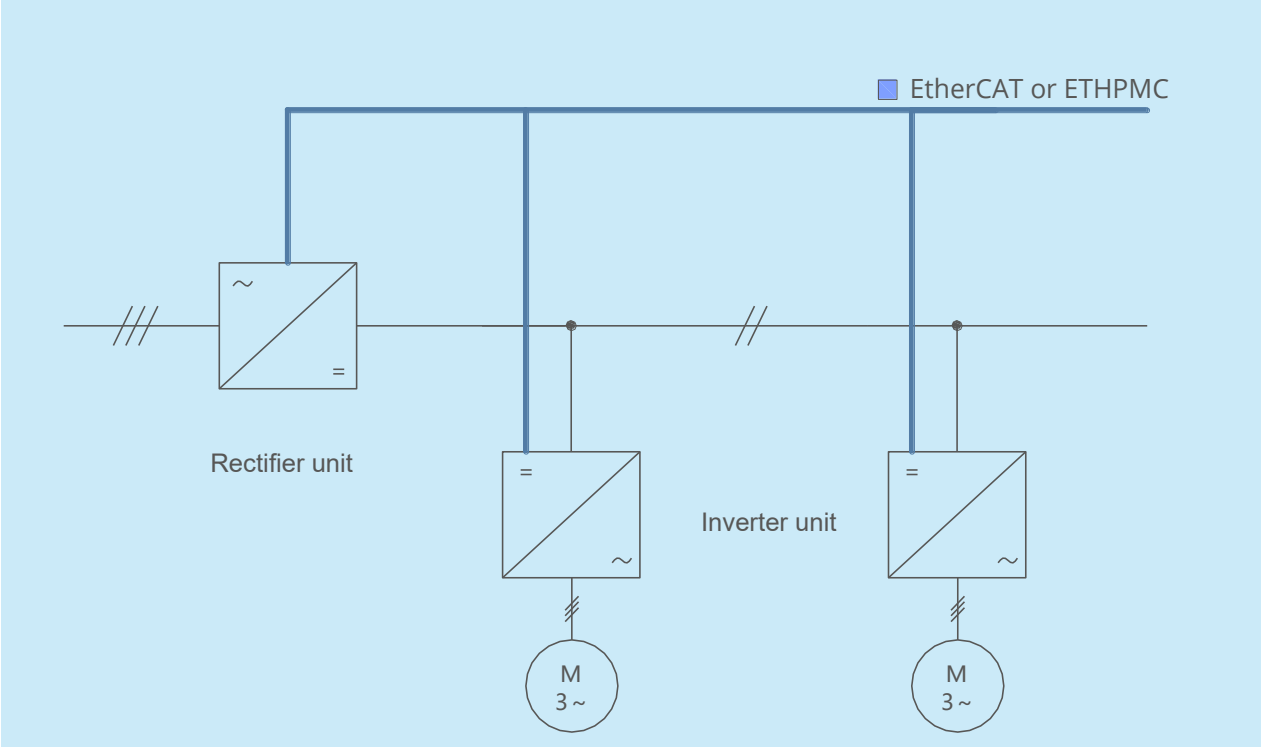


Figure 5Inverter unit connection diagram

2.3 Capacitor Unit

In applications where energy fluctuations are large, capacitor units are required to reduce bus voltage fluctuations, store braking energy, and instantaneous charging.

2.4 System Components

The system components are mainly the following:

- Input side power components

  For example: input filter, input reactor

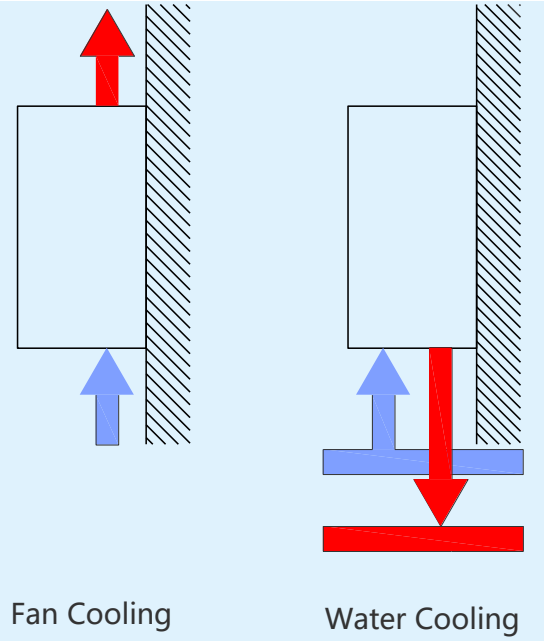
- DC bus components

  For example: braking resistor

- Active front end accessories

  For example: LC filter device, RC filter device

2.5 Cooling Method



Depending on the structure, there are two cooling methods:

- Internal air cooling

The standard cooling solution uses an air-cooled heat sink, and the power loss generated by each electronic component and power unit in the drive is dissipated through the heat sink and its fan system.

- liquid cooling

Use a cooling floor, water or oil as the cooling medium, and carry away the heat generated by the power unit when flowing through the radiator. The loss power of the drive is mostly absorbed by the cooling medium and discharged to the outside of the control cabinet. This solution is smaller, enables higher power density, and has no fan noise.

2.6 Installation Method

The AxN-DC series drives are all of the same height, only different widths, and can be mounted close to each other. The interface for the DC bus connection has been integrated into the device, making it extremely convenient to expand the number in the width direction as required. Support cabinet installation, wall installation, cooling plate installation, each of the three installation methods have advantages.

2.6.1 **Wall Mounting**

Figure 6 Wall mounting

This is the conventional mounting method for fan cooling drive. Heat is dissipated directly through the air in the control cabinet. This type of mounting is suitable for a small number of axes with low power ratings. This limitation can be circumvented by using additional fans or cooling units in the control cabinet.

2.6.2 Feed-through Mounting

Figure 7 Feed-through mounting

Feed-through mounting makes the heat sink through the back wall of the control cabinet, heat is output directly to the ambient air outside of the control cabinet. This type of mounting is suitable for a large number of axes with any range of power rating, Can be used in applications where require the heat generated in the control cabinet is as small as possible.

2.6.3 Cold Plate Mounting

Figure 8 Cold plate mounting

Heat generated by the devices is dissipated by the plate cooled with oil or water, This type of mounting requires the machine to have a cooling circulation system. At present, each power range can provide a solution with a built-in cooling plate for the drive. Only the drives which rated power is 35kW and below support the cooling plate provided by the customer and the drive only provides the base plate without heat dissipation capability (according to heat transfer efficiency, the base plate without heat dissipation is not supported above 35 kW).

2.7 Standard

Region	Certification name	Directive	Standard
Europe	CE certification	2014/30/EU	EN 61800-3:2004+A1:2012
		2014/35/EU	EN 61800-5-1:2007
		2006/42/EC	EN 61800-5-1:2007 EN 61800-5-2:2007
USA	UL certification	-	UL 61800-5-1:2007

Table 2: Standard

Note:

The relevant certifications obtained for the products are subject to the certification mark indicated on the name-plate. For specific certification information, please consult the sales manager.

• Technical Data

1. Part Number System

The 21 digits part number is formed as follows:

Example		AXN-DC.	044.	6	E0	V	0	T	F	2	00
Model Code	AXN-DC.	Inverter Unit									
	AXN-PS.	Rectifier Unit									
	AXN-CP.	Capacitor Unit									
Peak output current of Inverter unit	044.	44A									
	070.	70A									
	100.	100A									
	140.	140A									
	200.	200A									
	300.	300A									
	400.	400A									
	800.	800A									
Continuous current of Rectifier unit	020.	20kW									
	040.	40kW									
	080.	80kW									
Main Power Aupply	4	400Vac									
	6	600Vdc									
User Interface	E0	EtherCAT+PMC-bus									
Main encoder interface	0	Not installed									
	U	Universal position sensor									
	V	Increase STO feedback interface									
Auxiliary encoder interface	0	Not installed									
	U	Universal									
Rectifier control interface	0	Not installed									
	A	Only availabe for rectifier unit									
In/Out interface	0	Not installed									
	T	Standard I/O interface									
Cooling	F	Fan Cooling , Wall mounting									
	E	Fan Cooling, Feed-through mounting									
	W	Water cooling, Cold plate mounting									
Release	2	Release 2									
Internal use	00	Standard									
	10	Universal									

Table 3 Codification

2. General technical Data

Unless special stated, the following technical data is valid for all drives of the AxN-DC series.

2.1 Electrical Data

Grid voltage	3AC380…480V ±10%
Grid system	Ground TN system
Grid frequency	50—60Hz
Aux power supply	DC24V ±15%
EMC	As per 61800-3, Class 2 environment, C2/C3.
Overvoltage category	As per IEC/61800-5-1,Ⅲ.

Table 4 Electrical data

2.2 Mechanical Conditions

Vibration Limit in Transit	As per EN 61800-2, IEC 60721-3-2 class 2M1		
	(Frequency (Hz)	Amplitude (mm)	Acceleration (m/s^2)
		3.5	Not Applicable
		Not Applicable	10
		Not Applicable	15
Shock Limit in Transit	As per EN 61800-2, IEC 60721-2-2 class 2M1		
	Drop height of packed device max. 0.25m		
Vibration Limit of the system(1)	EN 61800-2,IEC 60721-3-3 3M1		
	Frequency (Hz)	Amplitude (mm)	Acceleration (m/s^2)
		0.3	Not Applicable
		Not Applicable	1

Table 5 Mechanical conditions

(1) **NOTE: The devices are only designed for stationary use.**

2.3 Ambient Conditions

Protection	As per EN60529, IP20
Accident Prevention Regulations	According to local regulations
Mounting Altitude	Up to 1000m above MSL, over 1000 m above MSL with power reduction (1% per 100m)
Pollution Severity	As pe IEC/EN 61800-5-1
Installation Type	Built-in unit, only for vertical installation in a switch cabinet with min. IP4x protection
Environment	Far away from corrosive, flammable gases, droplets of oil or dust etc.

Table 6 Ambient conditions

1.1 Climate Conditions

In transit	As per EN 61800-2, IEC 60721-3-2 class 2K3(1)	
	Temperature	-25℃ ~ +85℃
	Relative humidity	5 to 90% without condensation
In storage	As per EN 61800-2, IEC60721-3-1 class 1K3和1K4(2)	
	Temperature	-25℃ ~ +85℃
	Relative humidity	5 to 90% without condensation
In operation	As per EN 61800-2, IEC60721-3-3 class 3K3(3)	
	Temperature	0℃ ~ 40℃ When the continuous power is reduced, the ambient temperature can be increased
	Relative humidity	5 to 95% without condensation

Table 7 Climate conditions

(1) **The absolute humidity is limited to max. 60 g/m³. This means, at 70 °C for example, that the relative humidity may only be max. 40 %.**

(2) **The absolute humidity is limited to max. 29 g/m³. So the maximum values for temperature and relative air humidity stipulated in the table must not occur simultaneously.**

(3) **The absolute humidity is limited to max. 25 g/m³. That means that the maximum values for temperature and relative air humidity stipulated in the table must not occur simultaneously.**

3. Specifications

3.1 AxN-PS.080.4

Specifications		AxN-PS.080.4 Fan cooling		AxN-PS.080.4 Water cooling
Main power supply voltage	V	3AC 150…500		3AC 150…500
Rectifier power				
• **Continuous power P_N at 380VAC (S1)**	kW	80		100
• **Peak P_{max}**	kW	125		125
Input current				
• **Rated current at 3AC380V**	A	123		153
• **Max**	A	192		192
DC bus current				
• **Continuous, at DC537V**	A	150		186
• **Max**	A	250		250
DC24V Auxiliary power supply, max	A	2.1		1
Current carrying capacity				
• **24V DC busbar**	A	16		16
• **DC BUS busbar**	A	300		300
DC bus capacitor	μF	200		200
Braking power				
• **Peak power**	kW	160		160
• **Continuous power**	kW	20		25
Braking threshold				
• **Input 3AC 380V**	V	750（DC BUS）		750（DC BUS）
• **Input 3AC 480V**	V	800（DC BUS）		800（DC BUS）
Braking resistance ext.	Ω	2		2
Power loss	kW	1.4		1.8
Cooling		Fan		Water
• **Flow rate**		$5m^3$/min		10L/min
• **Max. inlet pressure**		—		5Bar
• **Nominal pressure difference**		—		0.2Bar
• **Inlet water Temp.**		—		≤20°C
Protection		IP20		IP20
Dimensions		Wall mounting	Feed-through mounting	Cold plate mounting
• **Width**	mm	196	196	196
• **Height**	mm	450	420	420
• **Depth**	mm	259.4	262.7	176.9
Approx. weight	kg	15.8	14.8	14

Table 8 AxN-PS.080.4 Specifications

3.2 AxN-DC.044.6; AxN-DC.070.6

Specifications		AxN-DC.044.6 Fan cooling		AxN-DC.070.6 Fan cooling	
DC BUS voltage	V	DC 0…800		DC 0…800	
Output current					
• **Continuous current I_N**	A	22		35	
• **Max**	A	44		70	
Continuous power					
Based on I_N	kW	11		17.5	
Switching frequency	kHz	8		8	
Output frequency					
• **Digital**	Hz	0…1200 ±0.01%		0…1200 ±0.01%	
• **Analog**	Hz	0…1200 ±0.2%		0…1200 ±0.2%	
DC bus current					
• **Continuous, at DC537V**	A	28		44	
DC24V Auxiliary power supply, max	A	1.3		1.3	
Current carrying capacity					
• **24V DC busbar**	A	16		16	
• **DC BUS busbar**	A	300		300	
DC bus capacitor	µF	100		100	
Power loss	kW	0.28		0.4	
Cooling		Fan		Fan	
• **Flow rate**		1.4m³/min		1.4m³/min	
Protection		IP20		IP20	
Dimensions		Wall mounting	Feed-through mounting	Wall mounting	Feed-through mounting
• **Width**	mm	98	98	98	98
• **Height**	mm	450	420	450	420
• **Depth**	mm	259.4	262.7	259.4	262.7
Approx. weight	kg	8.4	7.7	8.4	7.7

Table 9 AxN-DC.044.6; AxN-DC.070.6 Specifications

3.3 AxN-DC.100.6; AxN-DC.140.6

Specifications		AxN-DC.100.6 Fan cooling		AxN-DC.140.6 Fan cooling	
DC BUS voltage	V	DC 0…800		DC 0…800	
Output current					
• **Continuous current I_N**	A	50		70	
• **Max**	A	100		140	
Continuous power					
4) Based on I_N	kW	25		35	
Switching frequency	kHz	8		8	
Output frequency					
• **Digital**	Hz	0…1200 ±0.01%		0…1200 ±0.01%	
• **Analog**	Hz	0…1200 ±0.2%		0…1200 ±0.2%	
DC bus current					
• **Continuous, at DC537V**	A	63		88	
DC24V Auxiliary power supply, max	A	2.1		2.1	
Current carrying capacity					
• **224V DC busbar**	A	16		16	
• **DC BUS busbar**	A	300		300	
DC bus capacitor	µF	200		200	
Power loss	kW	0.59		0.87	
Cooling		Fan		Fan	
• **Flow rate**		$5m^3$/min		$5m^3$/min	
Protection		IP20		IP20	
Dimensions		Wall mounting	Feed-through mounting	Wall mounting	Feed-through mounting
• **Width**	mm	196	196	196	196
• **Height**	mm	450	420	450	420
• **Depth**	mm	259.4	262.7	259.4	262.7
Approx. weight	kg	14.8	13.9	14.8	13.9

Table 10 AxN-DC.100.6; AxN-DC.140.6 Specifications

4.1 AxN-DC.200.6

Specifications		AxN-DC.200.6 Fan cooling		AxN-DC.200.6 Water cooling
DC BUS voltage	V	DC 0…800		DC 0…800
Output current				
• **Continuous current I_N**	A	100		150
• **Max**	A	200		200
Continuous power				
5) **Based on I_N**	kW	50		75
Switching frequency	kHz	8		8
Output frequency				
• **Digital**	Hz	0…1200 ±0.01%		0…1200 ±0.01%
• **Analog**	Hz	0…1200 ±0.2%		0…1200 ±0.2%
DC bus current				
• **DContinuous, at DC537V**	A	126		189
DC24V Auxiliary power supply, max	A	2.7		1
Current carrying capacity				
• **24V DC busbar**	A	16		16
• **DC BUS busbar**	A	300		300
DC bus capacitor	μF	300		300
Power loss	kW	1.28		1.9
Cooling		Fan		Water
• **Flow rate**		7.5m³/min		8L/min
• **Max. inlet pressure**		-		5Bar
• **Nominal pressure difference**		-		0.2Bar
• **Inlet water Temp.**		-		≤20°C
Protection		IP20		IP20
Dimensions		Wall mounting	Feed-through mounting	Cold plate mounting
• **Width**	mm	294	24	294
• **Height**	mm	450	420	420
• **Depth**	mm	259.4	262.7	176.9
Approx. weight	kg	21.7	20.3	19

Table 11 AxN-DC.200.6 Specifications

5.1 AxN-DC.300.6

Specifications		AxN-DC.300.6 Fan cooling		AxN-DC.300.6 Water cooling
DC BUS voltage	V	DC 0…800		DC 0…800
Output current				
• **Continuous current I_N**	A	150		225
• **Max**	A	300		300
Continuous power				
6) **Based on I_N**	kW	75		112.5
Switching frequency	kHz	8		8
Output frequency				
• **Digital**	Hz	0…1200 ±0.01%		0…1200 ±0.01%
• **Analog**	Hz	0…1200 ±0.2%		0…1200 ±0.2%
DC bus current				
• **Continuous, at DC537V**	A	189		284
DC24V Auxiliary power supply, max	A	2.7		1
Current carrying capacity				
• **24V DC busbar**	A	16		16
• **DC BUS busbar**	A	300		300
DC bus capacitor	μF	300		300
Power loss	kW	1.93		2.9
Cooling		Fan		Water
• **Flow rate**		7.5m³/min		10L/min
• **Max. inlet pressure**		-		5Bar
• **Nominal pressure difference**		-		0.25Bar
• **Inlet water Temp.**		-		≤20°C
Protection		IP20		IP20
Dimensions		Wall mounting	Feed-through mounting	Cold plate mounting
• **Width**	mm	294	294	294
• **Height**	mm	450	420	420
• **Depth**	mm	259.4	262.7	176.9
Approx. weight	kg	21.7	20.3	19

Table 12 AxN-DC.300.6 Specifications

6.1 AxN-DC.400.6

Specifications		AxN-DC.400.6 Fan cooling		AxN-DC.400.6 Water cooling
DC BUS voltage	V	DC 0…800		DC 0…800
Output current				
• **Continuous current I_N**	A	200		300
• **Max**	A	400		400
Continuous power				
7) **Based on I_N**	kW	100		150
Switching frequency	kHz	8		8
Output frequency				
• **Digital**	Hz	0…1200 ±0.01%		0…1200 ±0.01%
• **Analog**	Hz	0…1200 ±0.2%		0…1200 ±0.2%
DC bus current				
• **Continuous, at DC537V**	A	254		381
DC24V Auxiliary power supply, max	A	5.8		1
Current carrying capacity				
• **24V DC busbar**	A	16		16
• **DC BUS busbar**	A	300		300
DC bus capacitor	μF	300		300
Power loss	kW	3.28		4.92
Cooling		Fan		Water
• **Flow rate**		11.4m³/min		14L/min
• **Max. inlet pressure**		-		5Bar
• **Nominal pressure difference**		-		0.3Bar
• **Inlet water Temp.**		-		≤20°C
Protection		IP20		IP20
Dimensions		Wall mounting	Feed-through mounting	Cold plate mounting
• **Width**	mm	294	294	294
• **Height**	mm	450	420	420
• **Depth**	mm	259.4	262.7	176.9
Approx. weight	kg	21.7	20.3	19

Table 13 AxN-DC.400.6 Specifications

7.1 AxN-DC.800.6

Specifications		AxN-DC.800.6 Fan cooling		AxN-DC.800.6 Water cooling
DC BUS voltage	V	DC 0…800		DC 0…800
Output current				
• **Continuous current I_N**	A	400		600
• **Max**	A	800		800
Continuous power				
8) **Based on I_N**	kW	200		300
Switching frequency	kHz	8		8
Output frequency				
• **Digital**	Hz	0…1200 ±0.01%		0…1200 ±0.01%
• **Analog**	Hz	0…1200 ±0.2%		0…1200 ±0.2%
DC bus current				
• **Continuous, at DC537V**	A	512		767
DC24V Auxiliary power supply, max	A	3.8		1
Current carrying capacity				
• **24V DC busbar**	A	16		16
• **DC BUS busbar**	A	420		420
DC bus capacitor	μF	500		500
Power loss	kW	8.86		13
Cooling		Fan		Water
• **Flow rate**		12.5m³/min		20L/min
• **Max. inlet pressure**		-		5Bar
• **Nominal pressure difference**		-		0.4Bar
• **Inlet water Temp.**		-		≤20°C
Protection		IP20		IP20
Dimensions		Wall mounting	Feed-through mounting	Cold plate mounting
• **Width**	mm	490	490	490
• **Height**	mm	450	420	420
• **Depth**	mm	259.4	262.7	176.9
Approx. weight	kg	36.5	34.1	32

Table 14 AxN-DC.800.6 Specifications

8.1 AxN-CP.060.6; AxN-CP.470.6

Specifications		AxN-CP.470.6 Fan cooling	AxN-CP.060.6 Water cooling
Capacity	μF	4700	600
DC24V Auxiliary power supply, max	A	0.12	—
Current carrying capacity			
• **24V DC busbar**	A	16	16
• **DC BUS busbar**	A	300	300
Cooling		Fan	-
• **Flow rate**		0.6m³/min	—
Protection		IP20	IP20
Dimensions		Wall mounting	Cold plate mounting
• **Width**	mm	98	490
• **Height**	mm	450	420
Depth	mm	236	176.9
Approx. weight	kg	7	6

Table 15 AxN-CP.060.6; AxN-CP.470.6 Specifications

• Dimensions and Installation

1. Exploded View

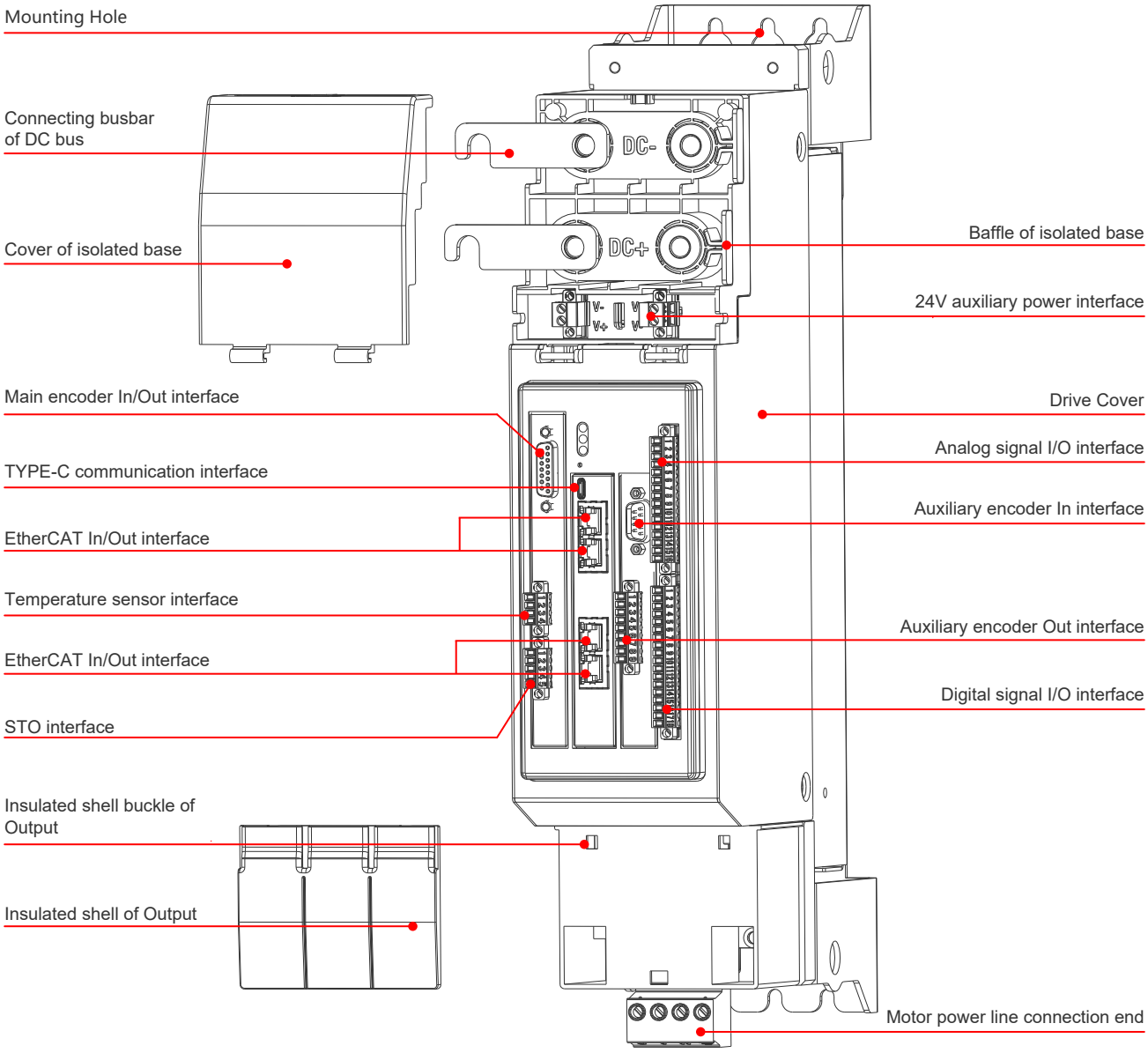


Figure 9 AxN-DC.044.6 Exploded view

2. Swivel Range of the Connector Cover

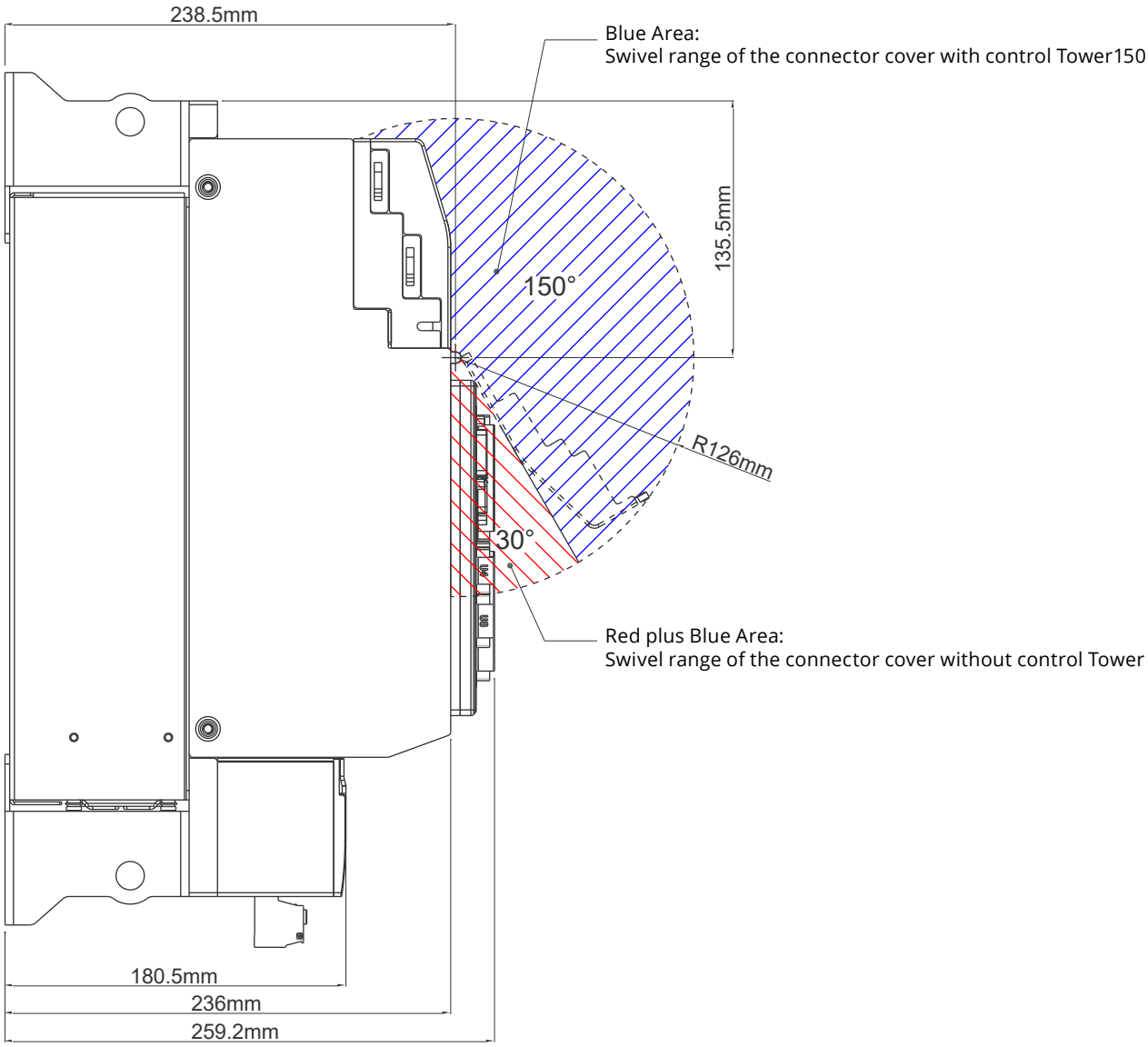


Figure 10 Swivel range of the connector cover

3. Dimensions

3.1 Fan cooling, Wall mounting

3.1.1 AxN-PS 080.4

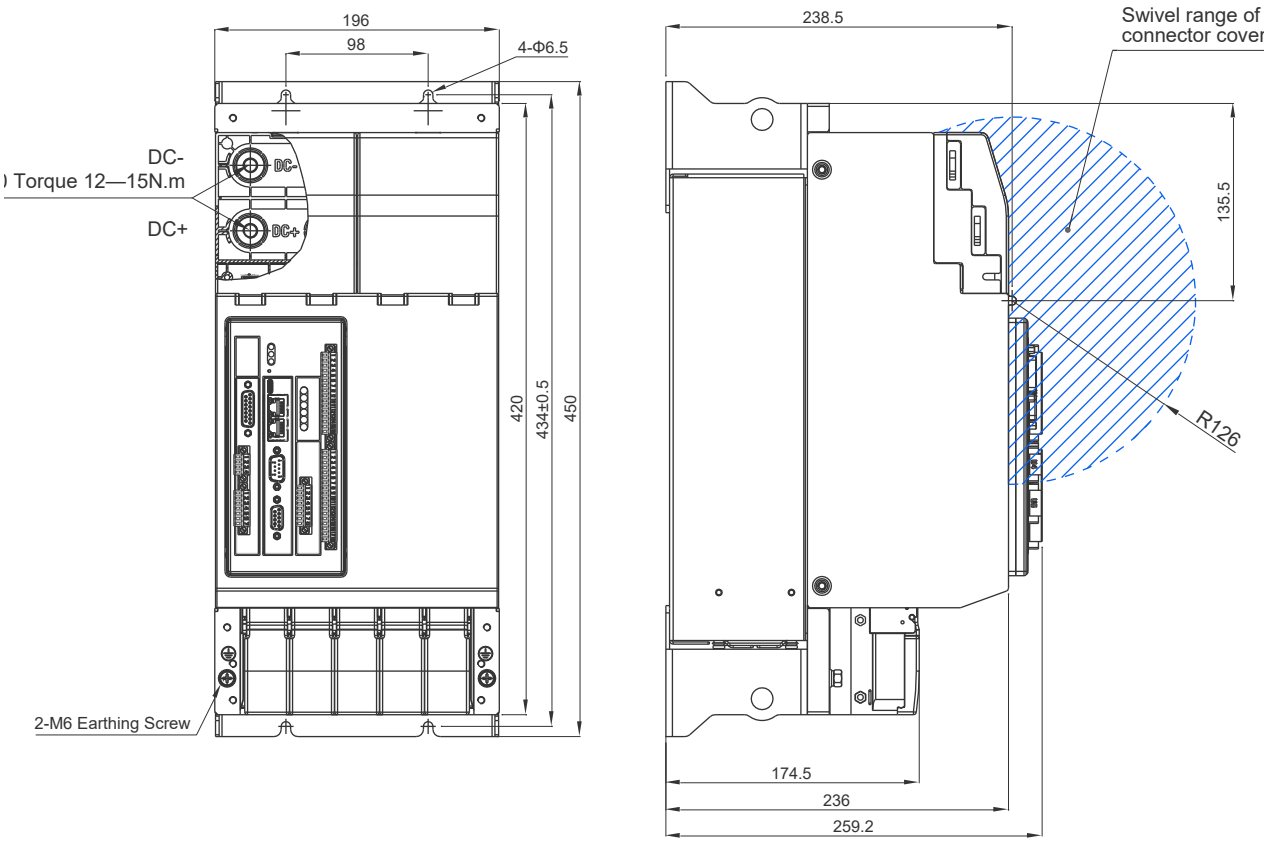


Figure 11 AxN-PS.080.4 Wall mounting

3.1.2 AxN-DC 044.6; AxN-DC.070.6

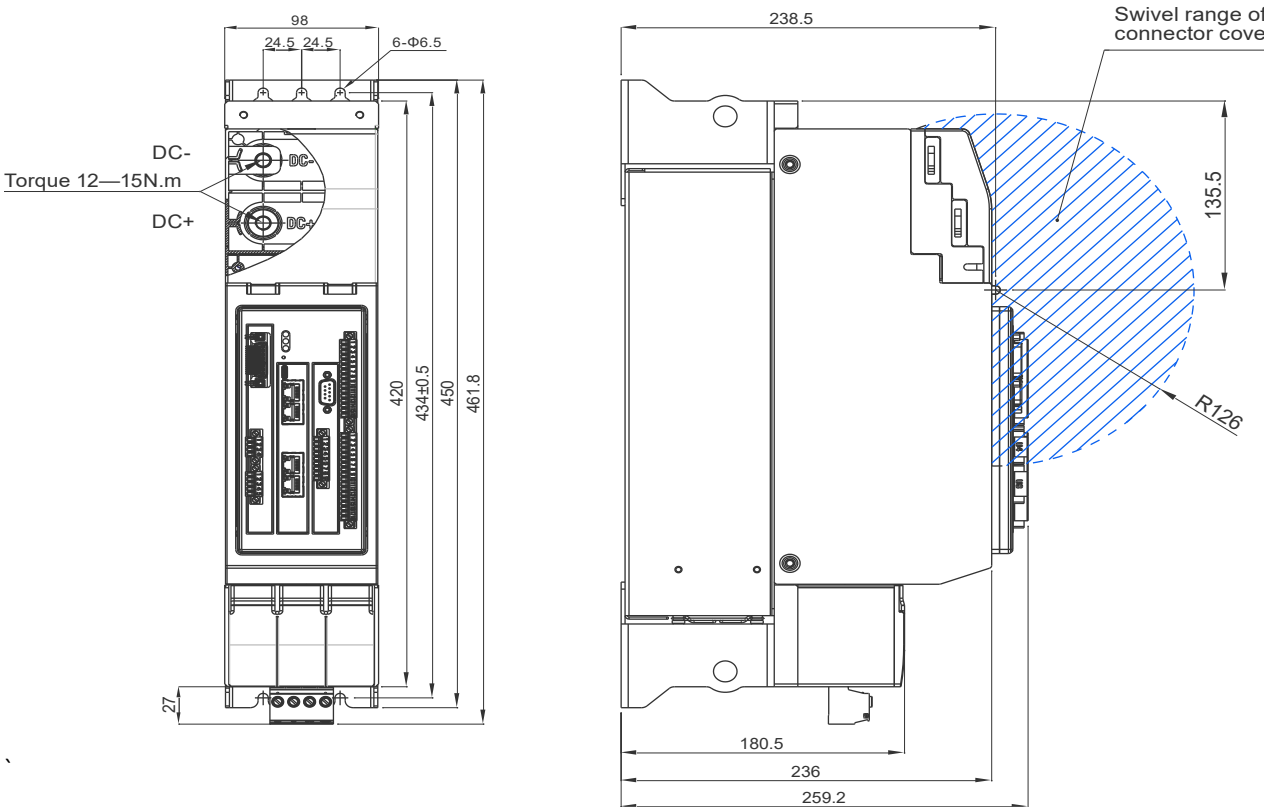


Figure 12 AxN-DC.044.6; AxN-DC.070.6 Wall mounting

3.1.3 AxN-DC.100.6; AxN-DC.140.6

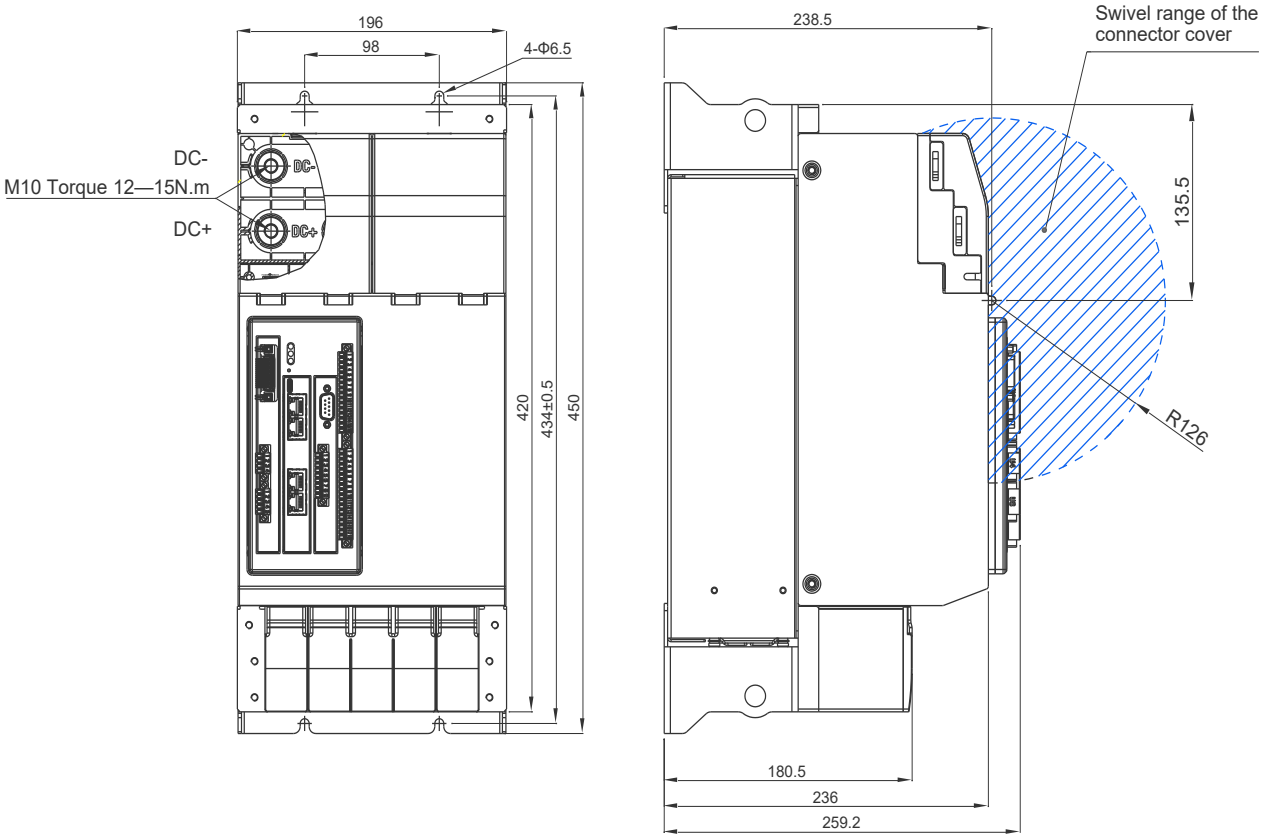


Figure 13 AxN-DC.100.6; AxN-DC.140.6 Wall mounting

3.1.4 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6

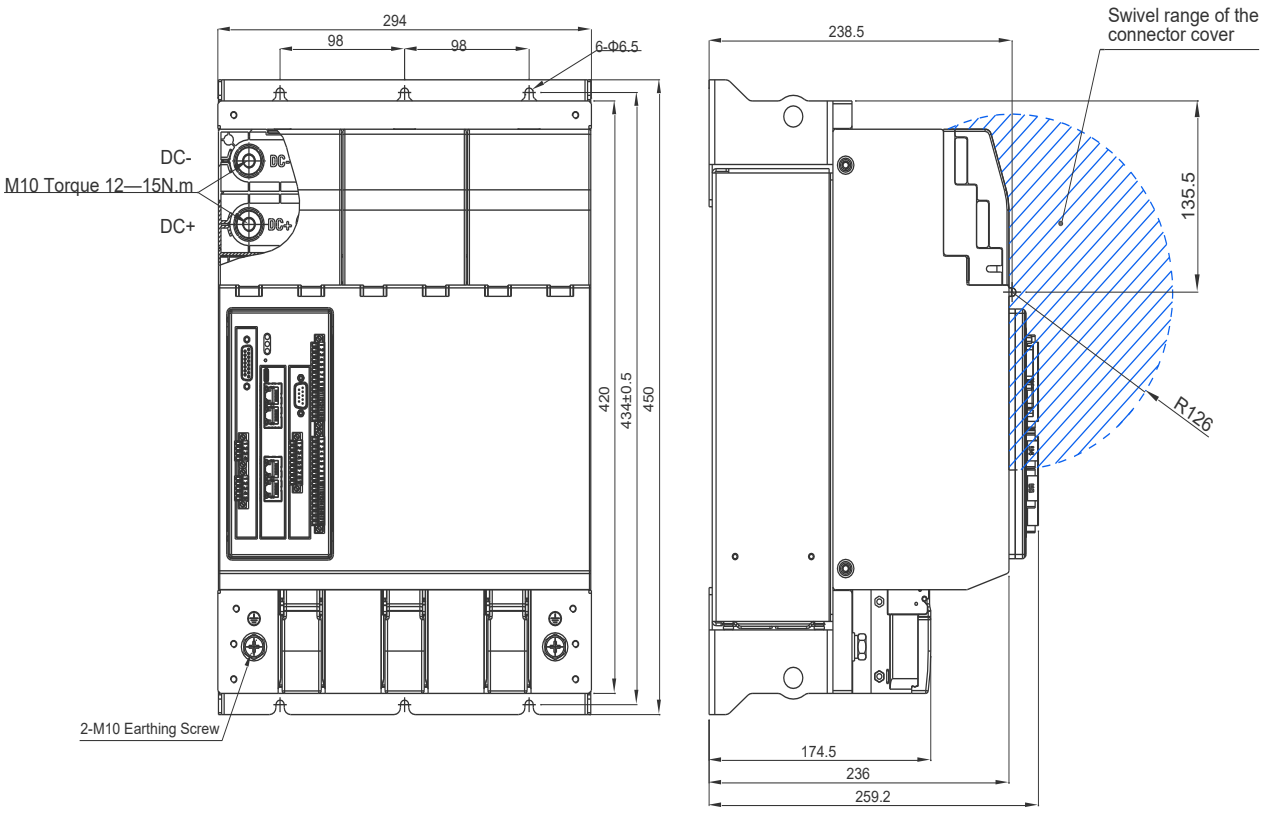


Figure 14 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6 Wall mounting

3.1.5 AxN-DC.800.6

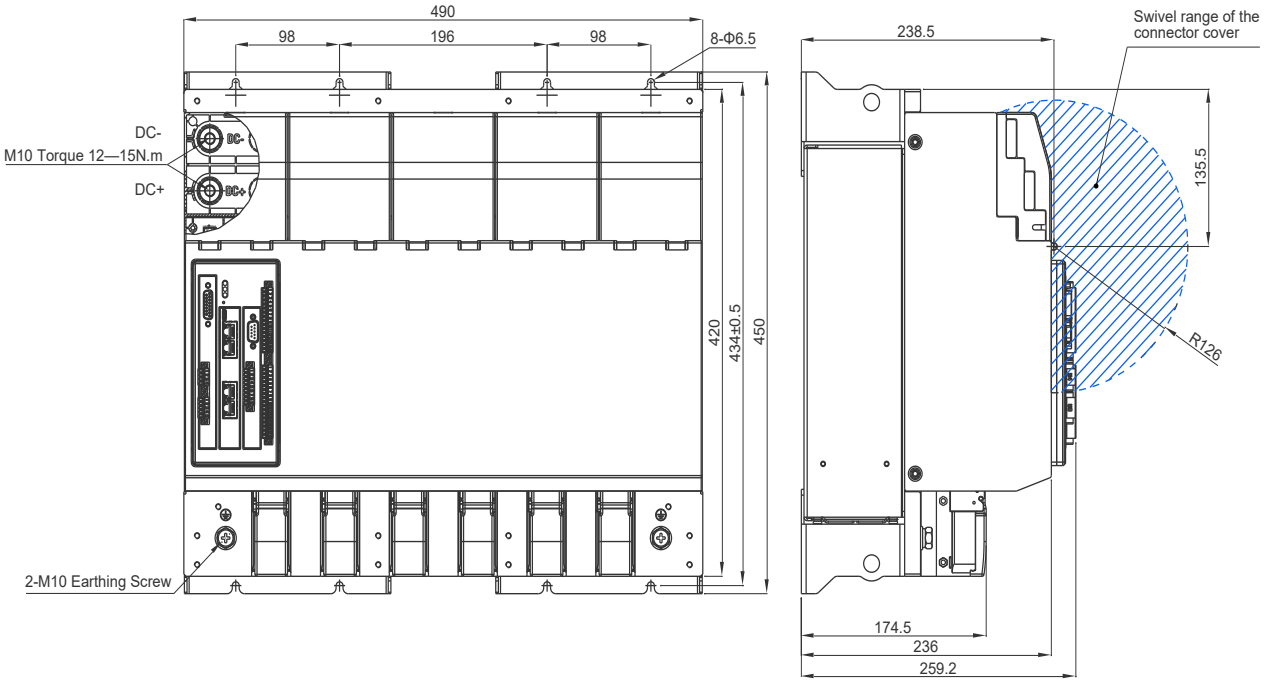


Figure 15 AxN-DC.800.6 Wall mounting

3.1.6 AxN-CP.470.6

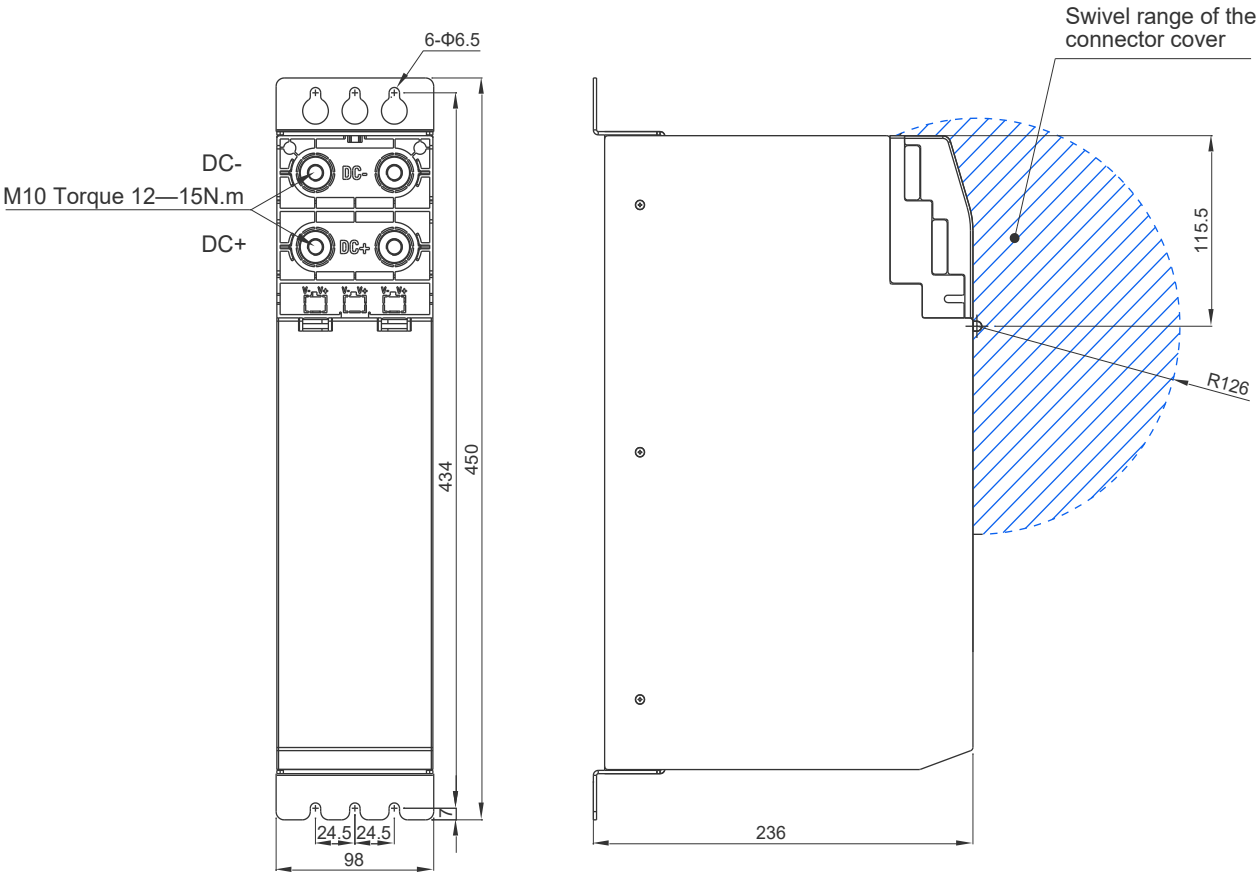


Figure 16 AxN-DCP.470.6 Wall mounting

3.2.1 AxN-PS.080.4

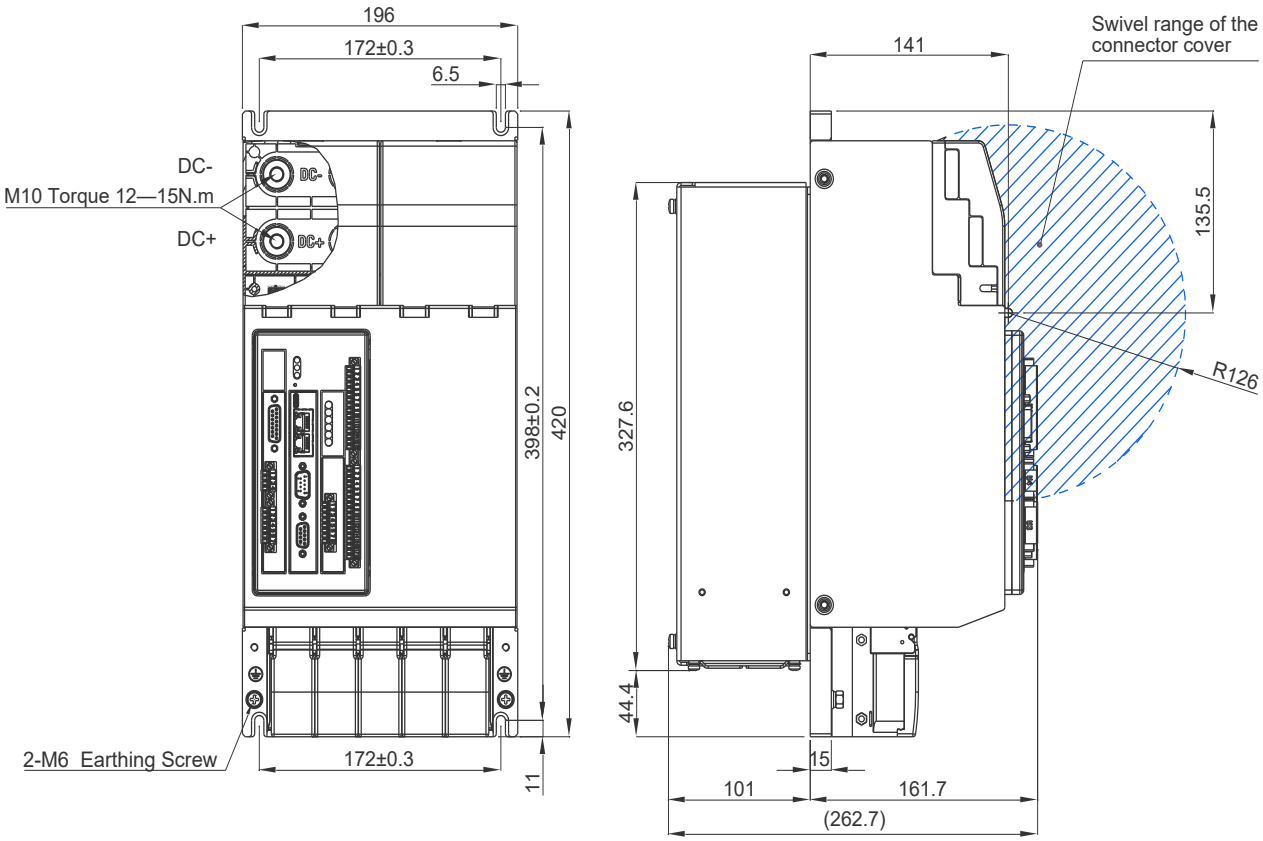


Figure 17 AxN-PS.080.4 Feed-through mounting

3.2.2 AxN-DC.044.6; AxN-DC.070.6

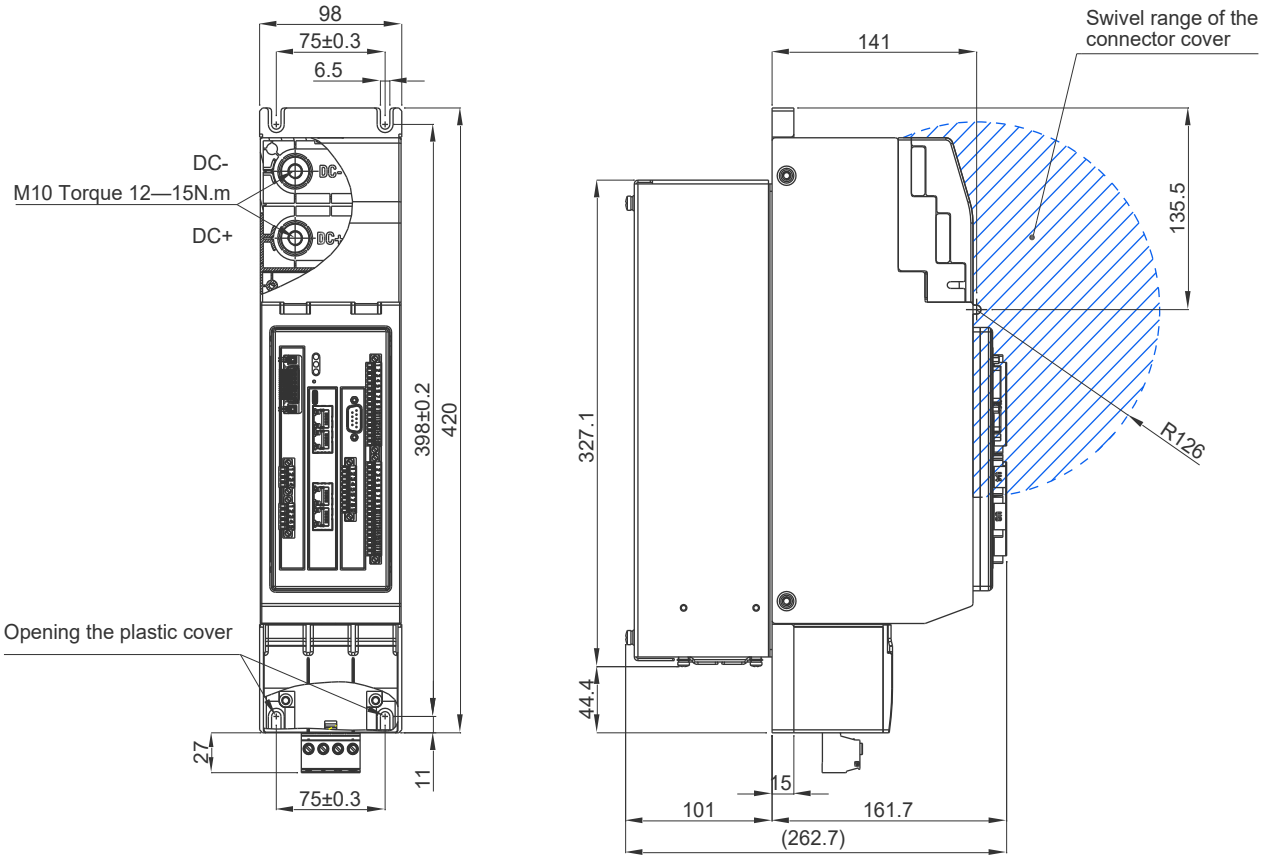


Figure 18 AxN-DC.044.6; AxN-DC.070.6 Feed-through mounting

3.2.3 AxN-DC.100.6; AxN-DC.140.6

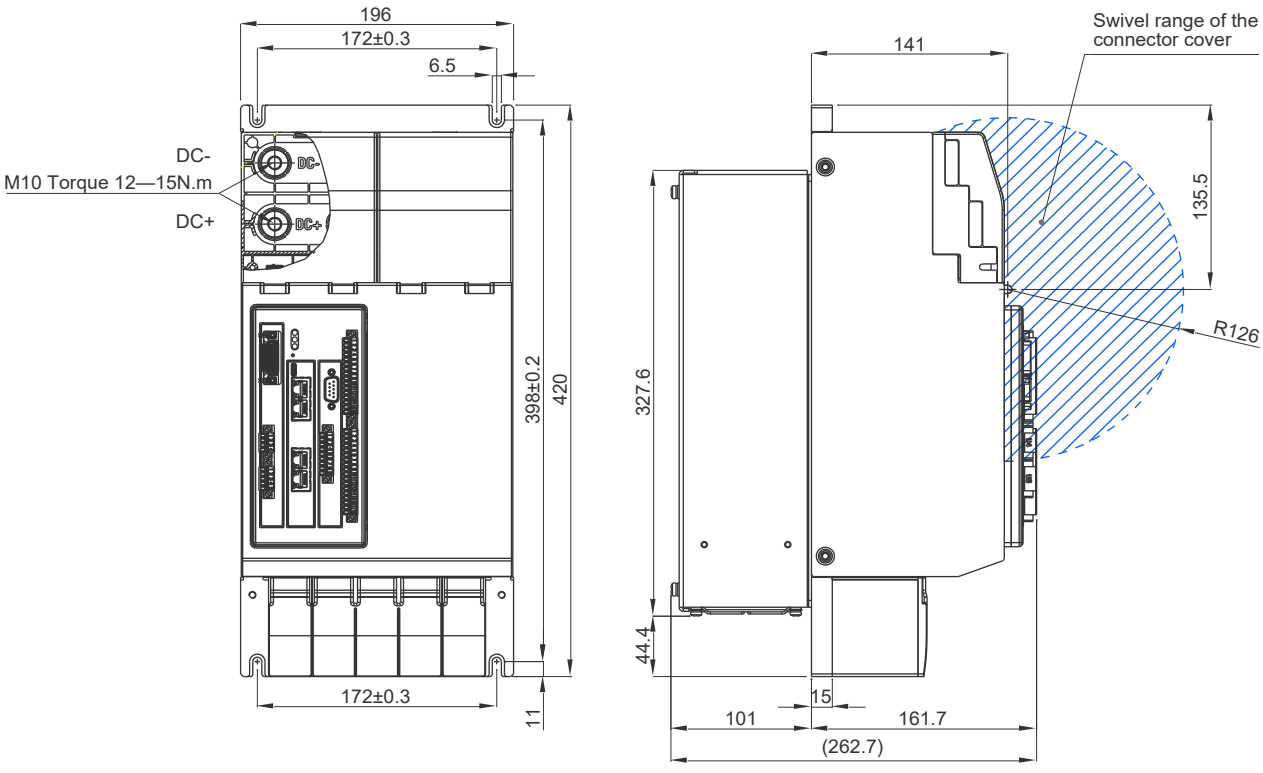


Figure 19 AxN-DC.100.6; AxN-DC.140.6 Feed-through mounting

3.2.4 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6

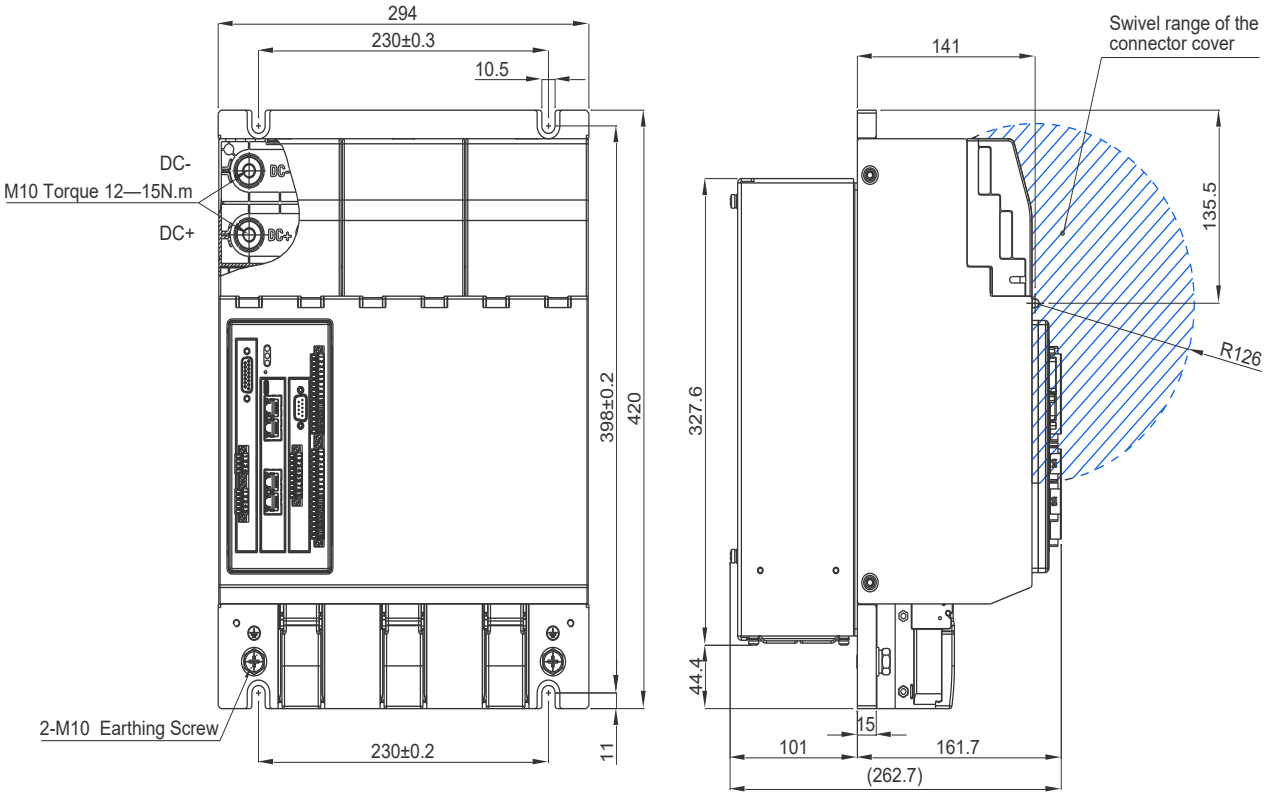


Figure 20 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6 Feed-through mounting

3.2.5 AxN-DC.800.6

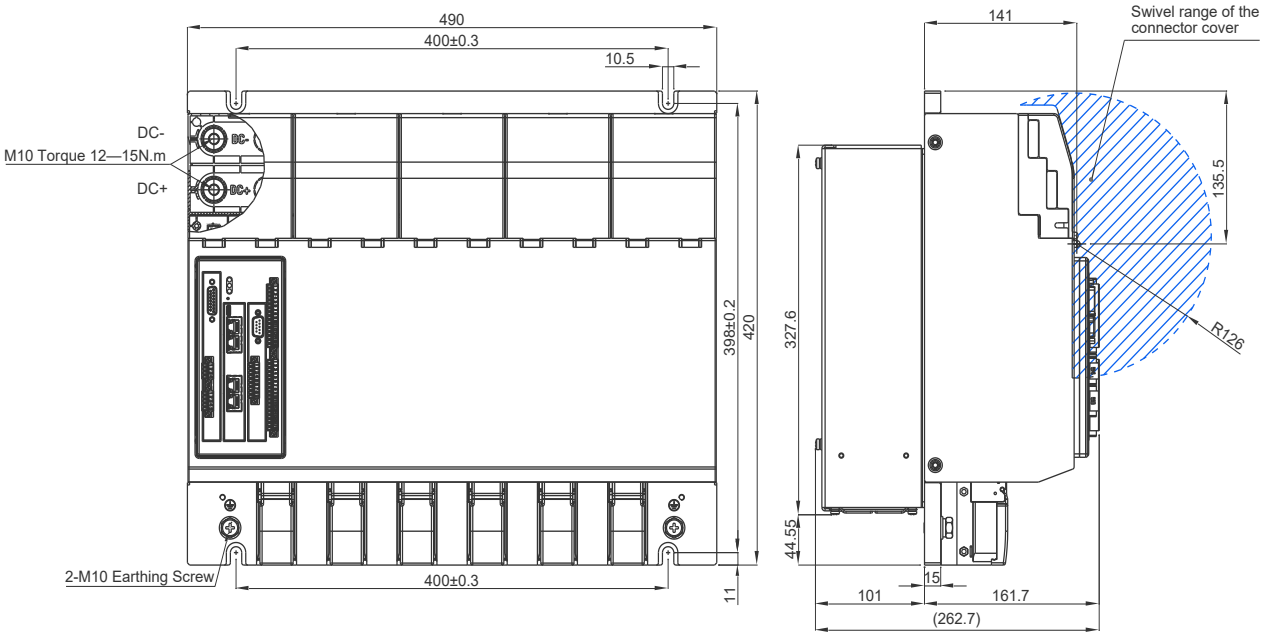


Figure 21 AxN-DC.800.6 Feed-through mounting

3.3 Water Cooling, Cold Plate Mounting

3.3.1 AxN-PS.080.4

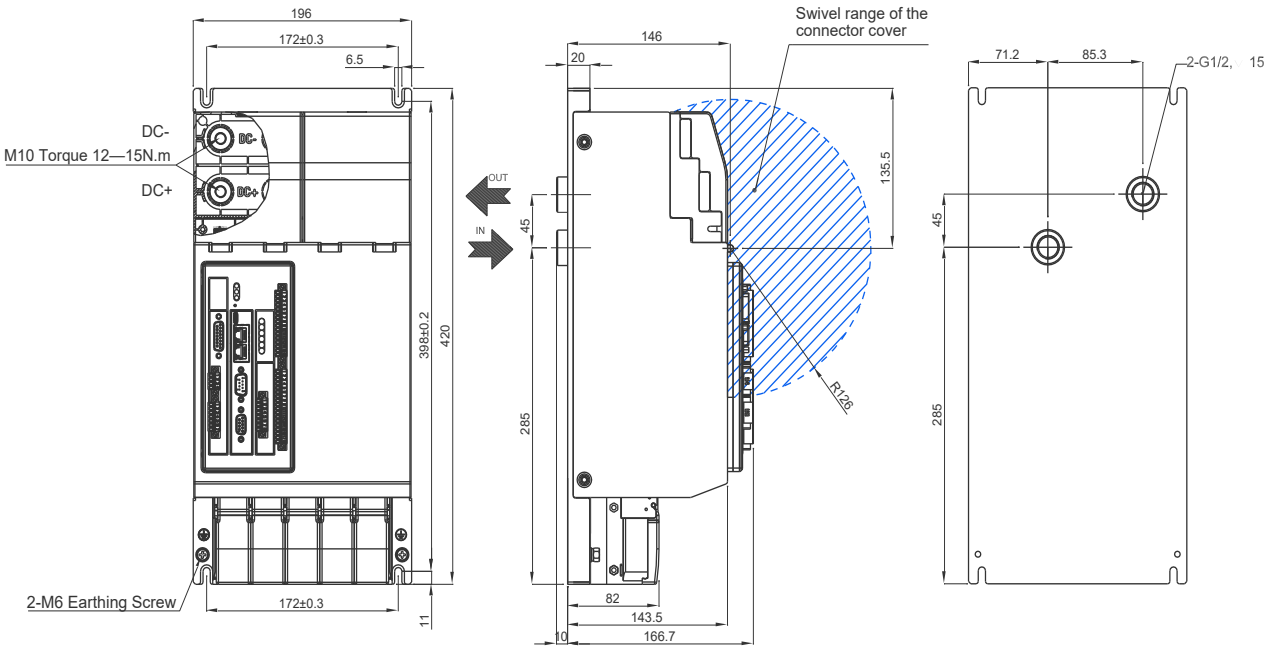


Figure 22 AxN-PS.080.4 Cold plate mounting

3.3.2 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6

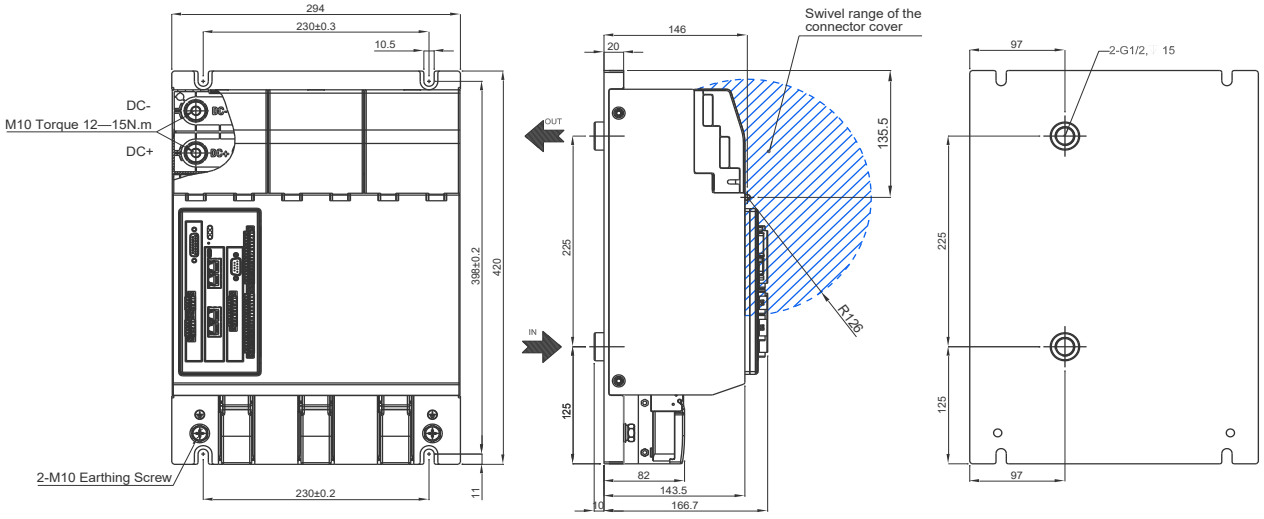


Figure 23 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6 Cold plate mounting

3.3.3 AxN-DC.800.6

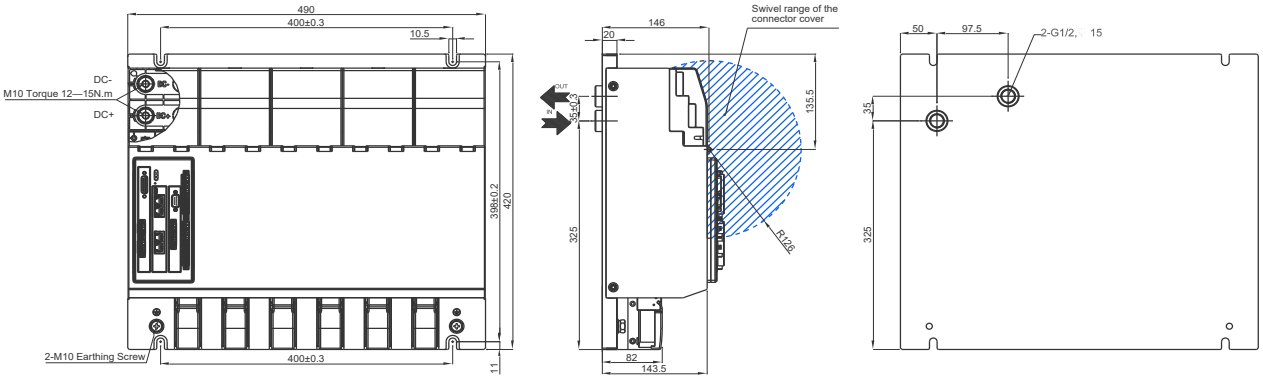


Figure 24 AxN-DC.800.6 Cold plate mounting

3.3.4 AxN-CP.060.6

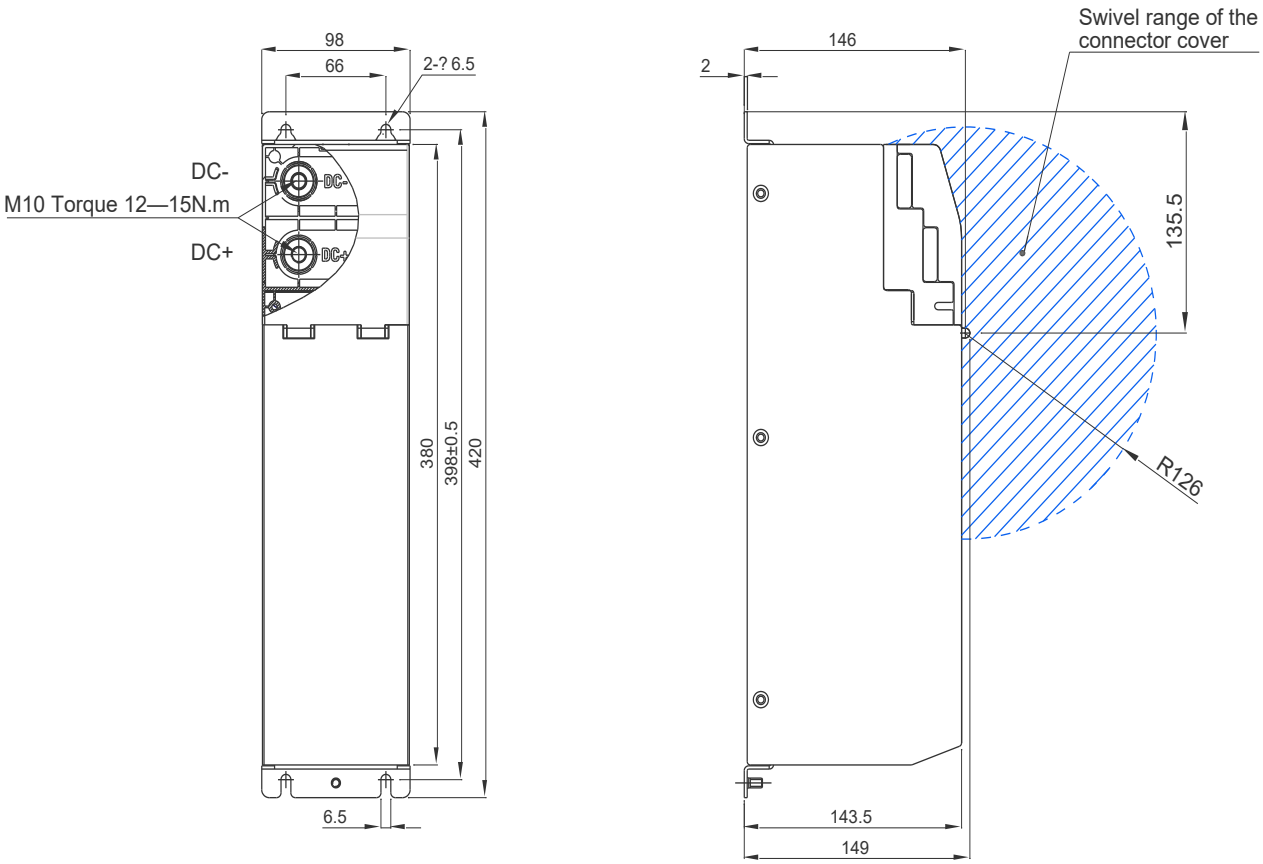
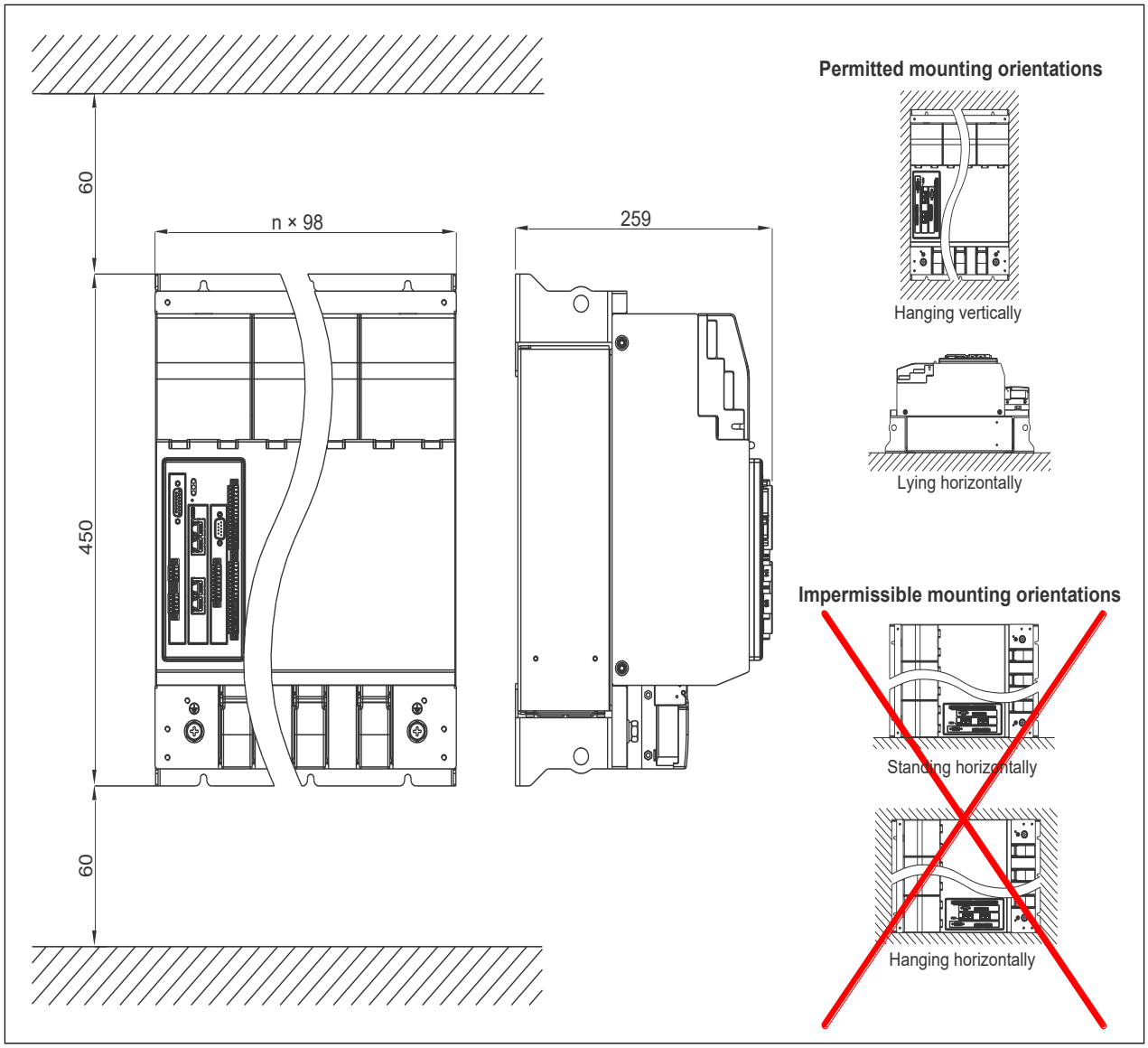


Figure 25 AxN-CP.060.6 Cold plate mounting

4. Installation Space and Direction

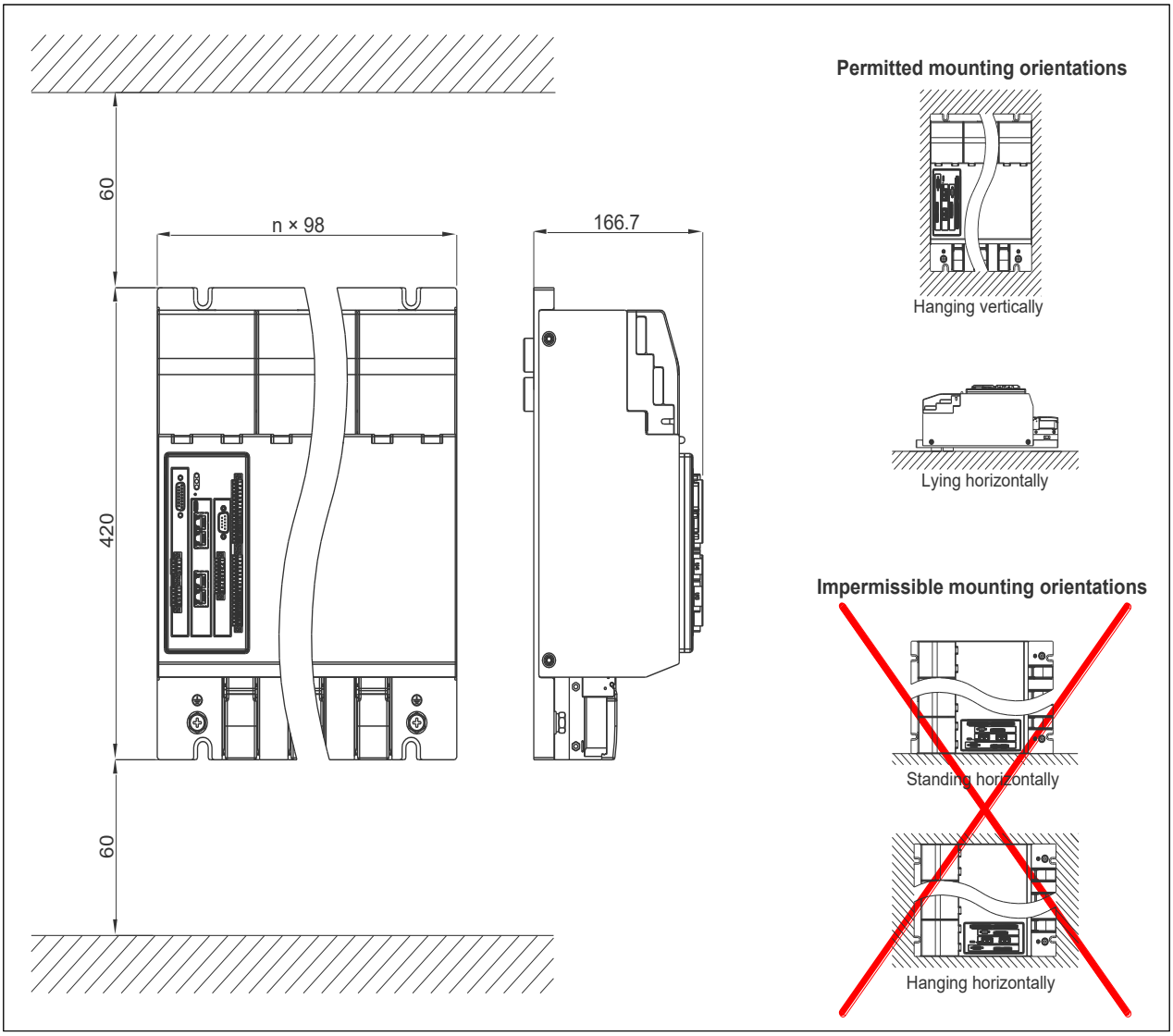
4.1 Fan Cooling



1) Preference is given to vertical suspension installation, secondary placement horizontal placement.

2) For proper air circulation,at least 60 mm clearance must be available above and below the module.

Figure 26 Fan cooling drive, installation space and direction



1) For proper air circulation,at least 60 mm clearance must be available above and below the module.

Figure 27 Water cooling drive, İInstallation space and direction

• Interface and Wiring

1. Power Main Interface

1.1 AxN-PS 080.4

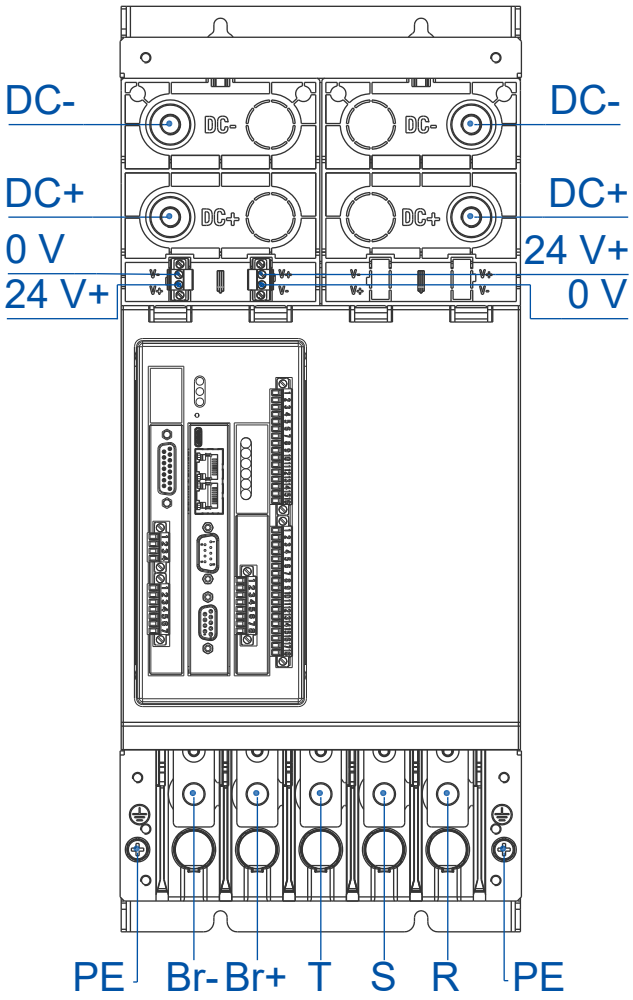


Figure 28 AxN-PS.080.4 Power Main Interface

Function	Terminal	Torque Tightening (N.m)	Wire Range (mm²)
AC Power Supply Input	R	M10 , 12~18	16 ~ 70
	S		
	T		
	PE	M6 , 6~10	16 ~ 35
DC Bus Connector	DC+	M10 , 12~15	—
	DC-		
External Brake Resistor	Br+	M10 , 12~18	16 ~ 70
	Br-		
External 24V power supply	24V+	M3 , 0.5	1.0 ~ 2.5
	0		

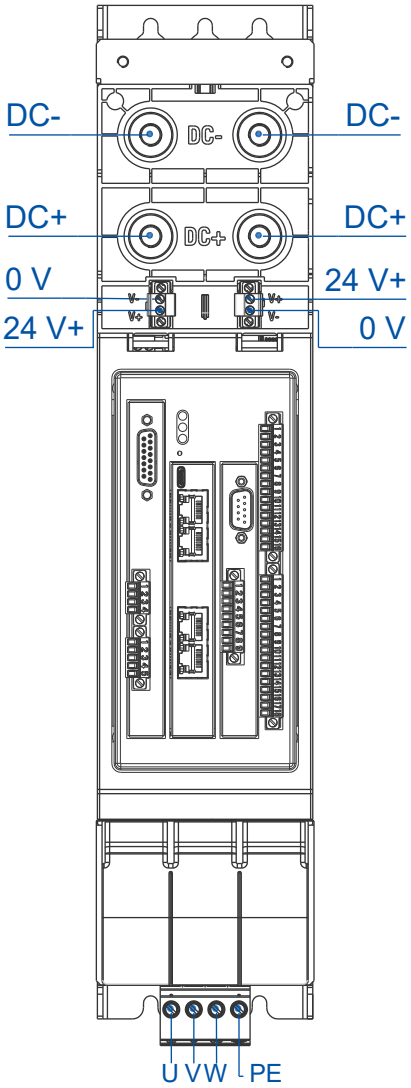


Figure 29 AxN-DC.044.6; AxN-DC.070.6 Power Main Interface

Function	Terminal	Torque Tightening (N.m)	Wire Range (mm²)
DC Bus Connector	DC+	M10 , 12~15	—
	DC-		
Motor Power Output	U	M4 , 1.2	2.5 ~ 16
	V		
	W		
	PE		
External 24V power supply	24V+	M3 , 0.5	1.0 ~ 2.5
	0V		

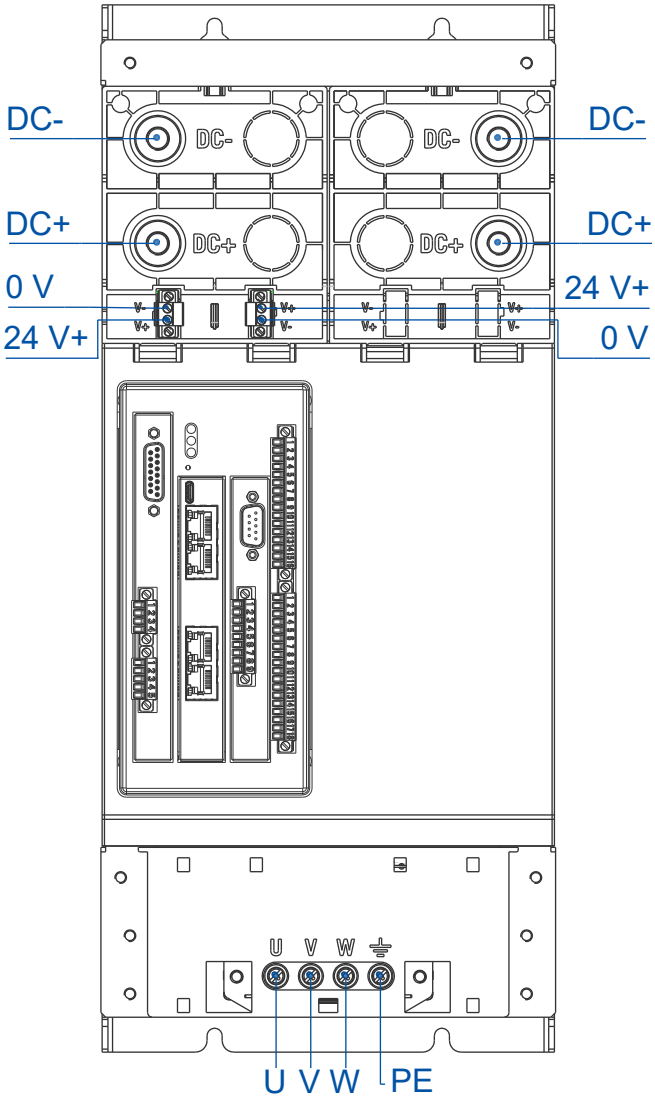


Figure 30 AxN-DC.100.6; AxN-DC.140.6 Power Main Interface

Function	Terminal	Torque Tightening (N.m)	Wire Range (mm²)
DC Bus Connector	DC+	M10 , 12~15	—
	DC-		
Motor Power Output	U	M5 , 2.0	4 ~ 35
	V		
	W		
	PE		
External 24V power supply	24V+	M3 , 0.5	1.0 ~ 2.5
	0V		

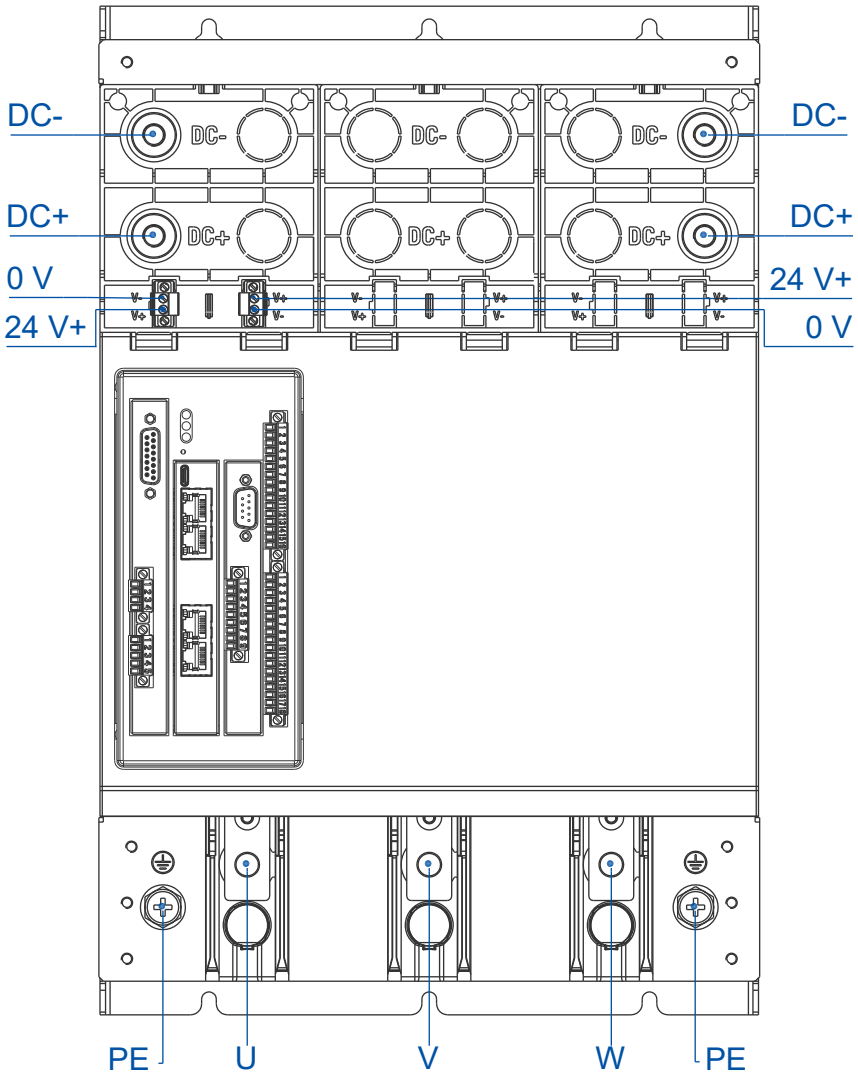


Figure 31 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6 Power Main Interface

Function	Terminal	Torque Tightening (N.m)	Wire Range (mm²)
DC Bus Connector	DC+	M10 , 12~15	—
	DC-		
Motor Power Output	U	M10 , 12~18	16 ~ 70
	V		
	W		
	PE		
External 24V power supply	24V+	M3 , 0.5	1.0 ~ 2.5
	0V		

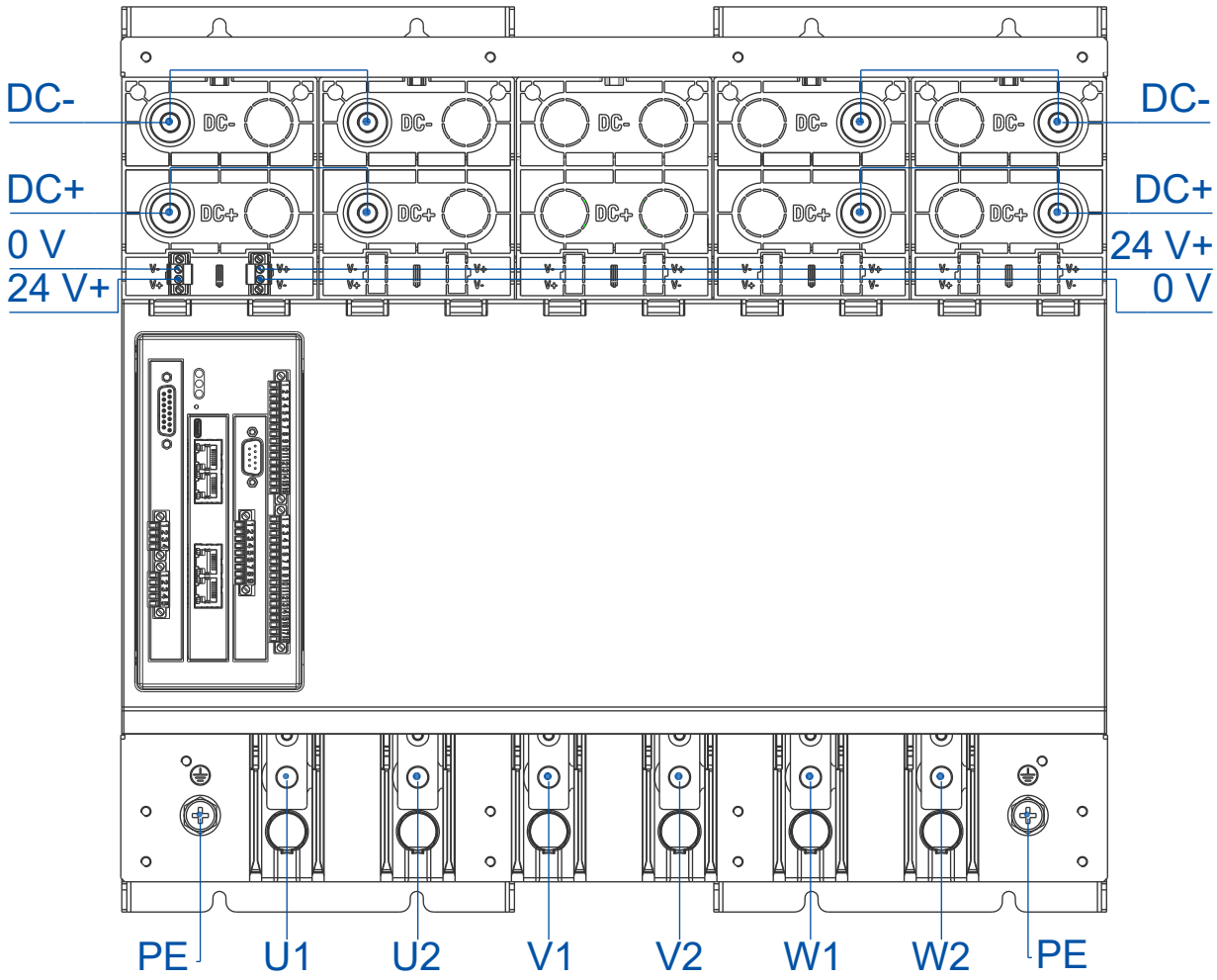


Figure 32 AxN-DC.800.6 Power Main Interface

Function	Terminal	Torque Tightening (N.m)	Wire Range (mm²)
DC Bus Connector	DC+	M10 , 12~15	—
	DC-		
Motor Power Output	U1	M10 , 12~18	16 ~ 70
	U2		
	V1		
	V2		
	W1		
	W2		
	PE		
External 24V power supply	24V+	M3 , 0.5	1.0 ~ 2.5
	0V		

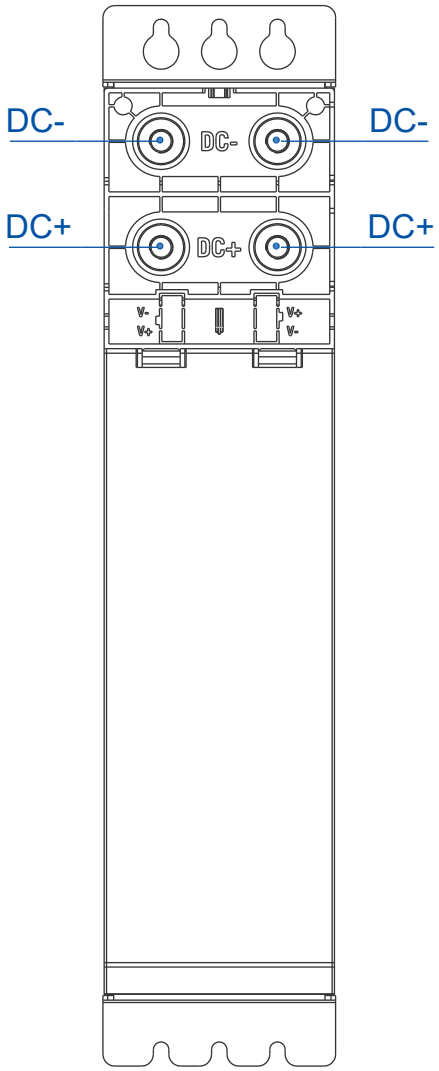


Figure 33 AxN-CP.470.6 Power Main Interface

Function	Terminal	Torque Tightening (N.m)	Wire Range (mm²)
DC Bus Connector	DC+	M10 , 12~15	—
	DC-		

2. Power Main Connection Diagram

2.1 Rectifier Unit

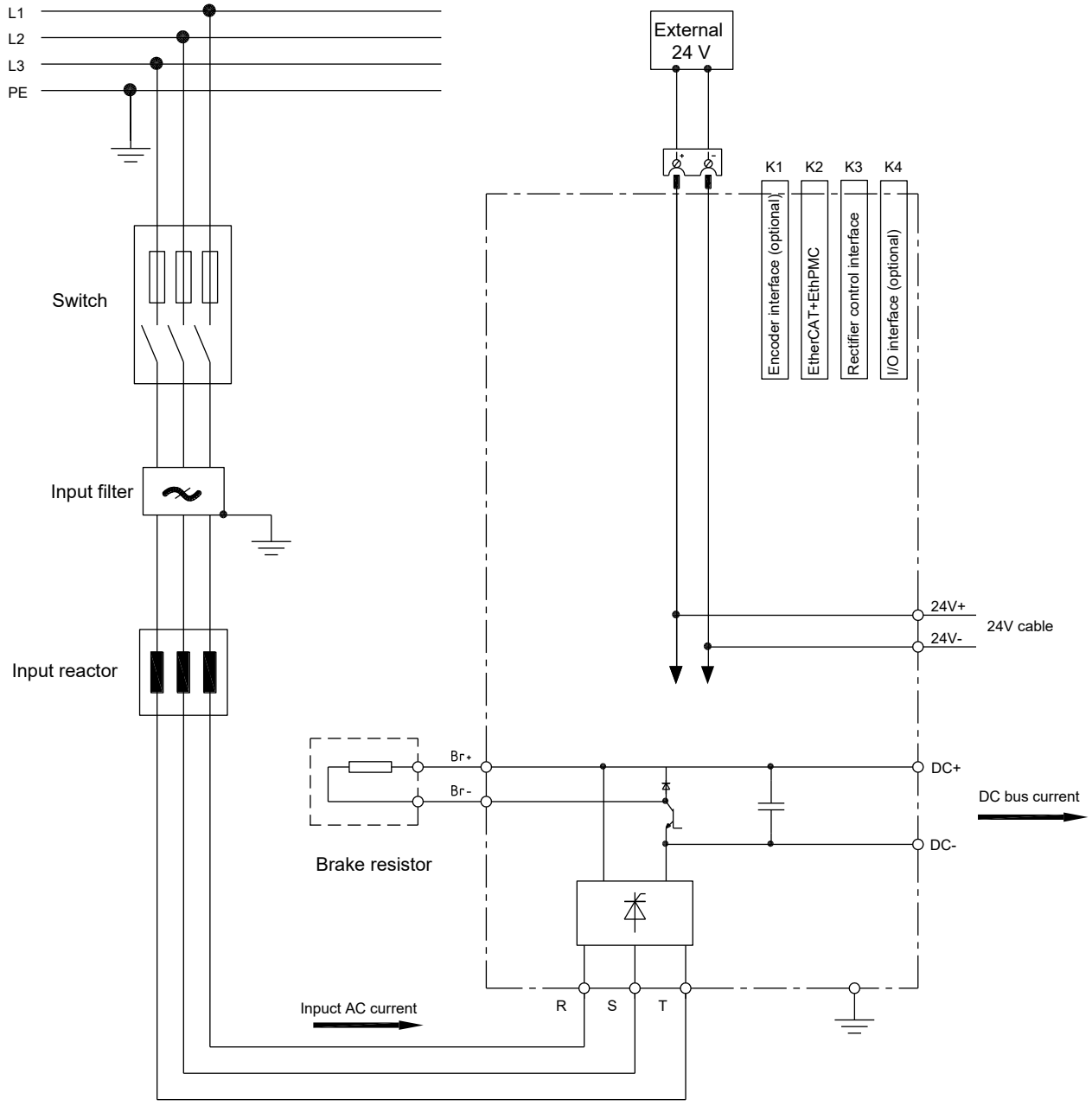


Figure 34 Power main connection diagram of rectifier unit

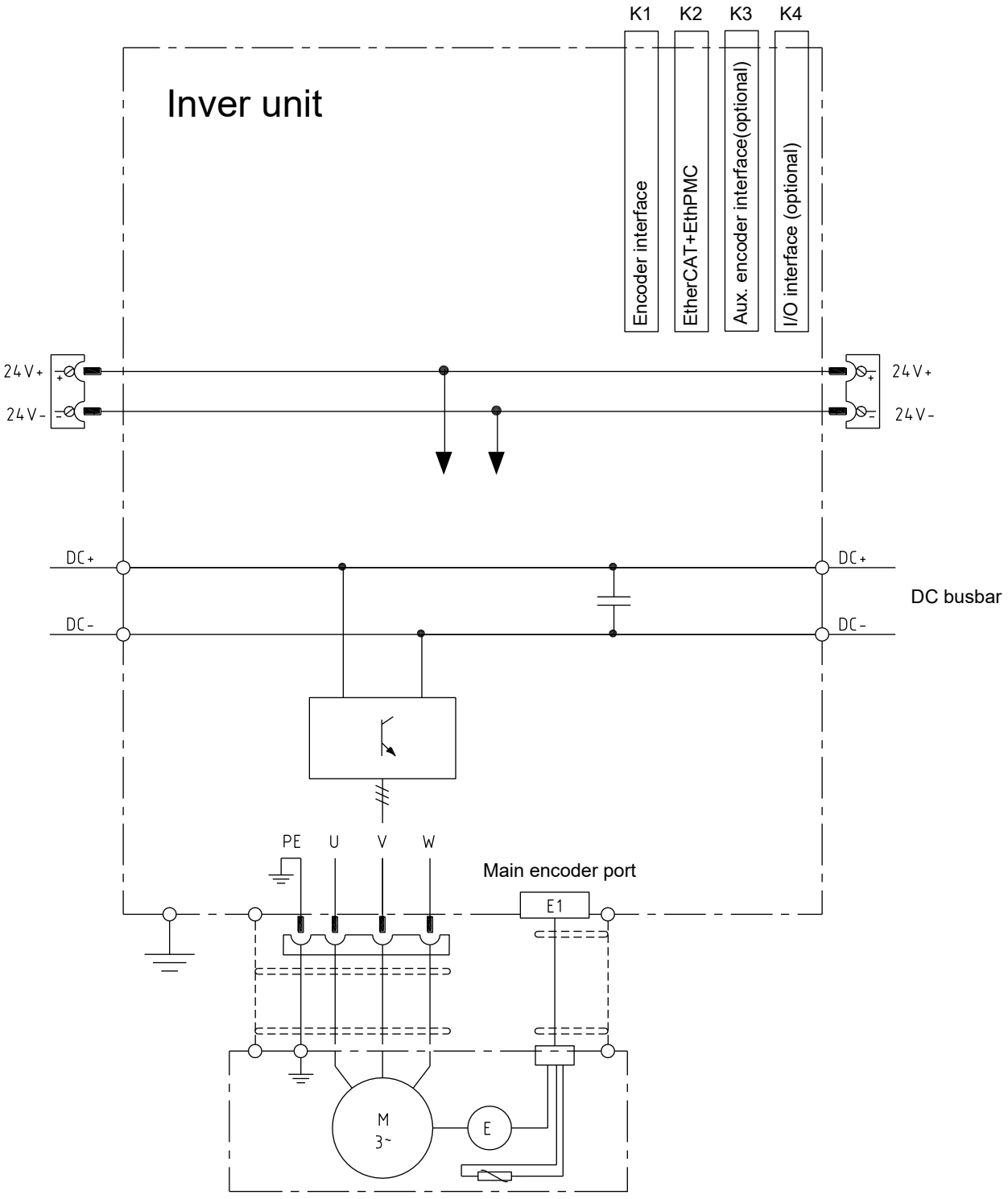


Figure 35 Power main connection diagram of inverter unit

3. Control card interface

3.1 Overview

The rectifier unit and the inverter unit use the same control card box.

The control card box has 4 card slots, which are K1, K2, K3, and K4 from left to right, and can be modularized according to requirements.

Slot	Card	Interface	Note
K1	Main Encoder Card	• Main encoder nterface • Temperature sensor interface • STO interface	PS/DC
K2	CPU Card	• User interface – EtherCAT – EtherPMC	PS/DC
K3	Auxiliary Encoder Card	• Auxiliary encoder input interface • Auxiliary encoder output interface	DC
	Rectifier control Card	• Rectifier control interface	PS
K4	Input/Output Card	• Analog signal I/O interface • Digital signal I/O interface	PS/DC

Table 16 Control card box slot description

3.1.1 Control Card Box for Rectifier Unit

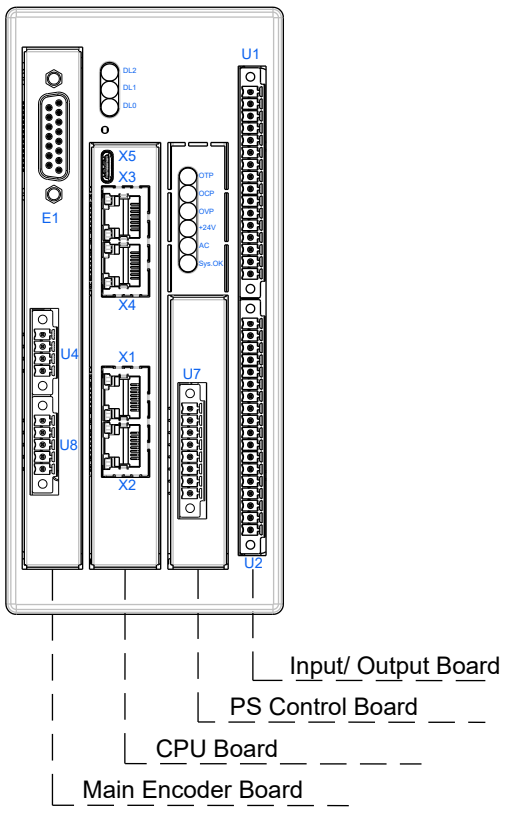


Figure 36 Overview of rectifier unit control card box

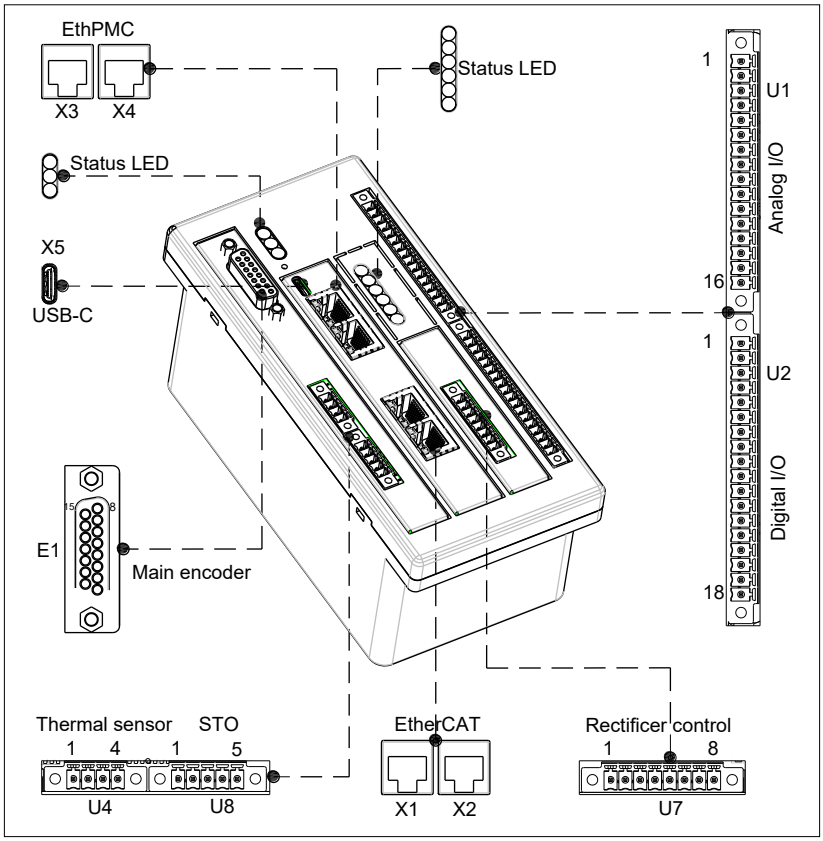


Figure 37 2 Second overview of rectifier unit control card box

3.1.2 Control Card Box for Inverter Unit

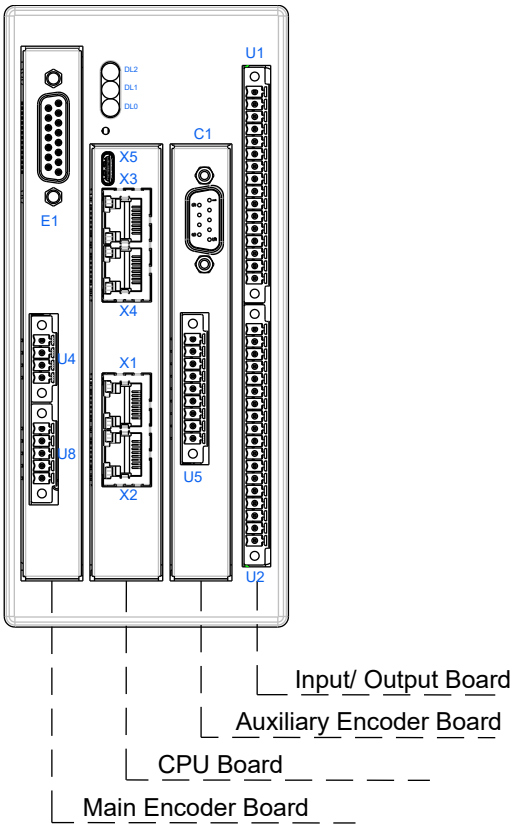


Figure 38 Overview of inverter unit control card box

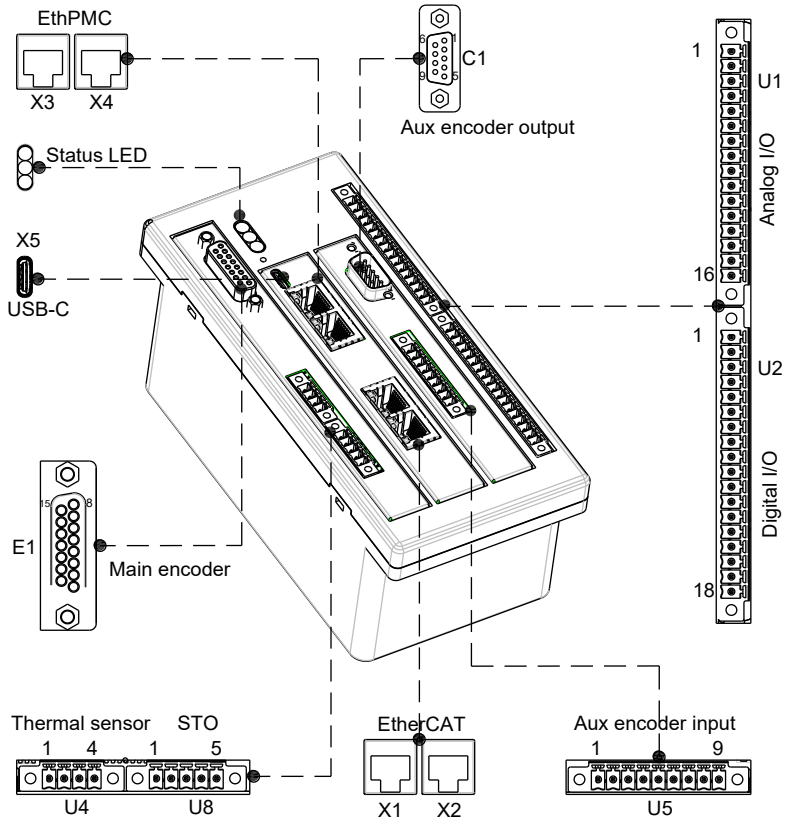


Figure 39 2 Second overview of inverter unit control card box

3.2 Main Encoder Card

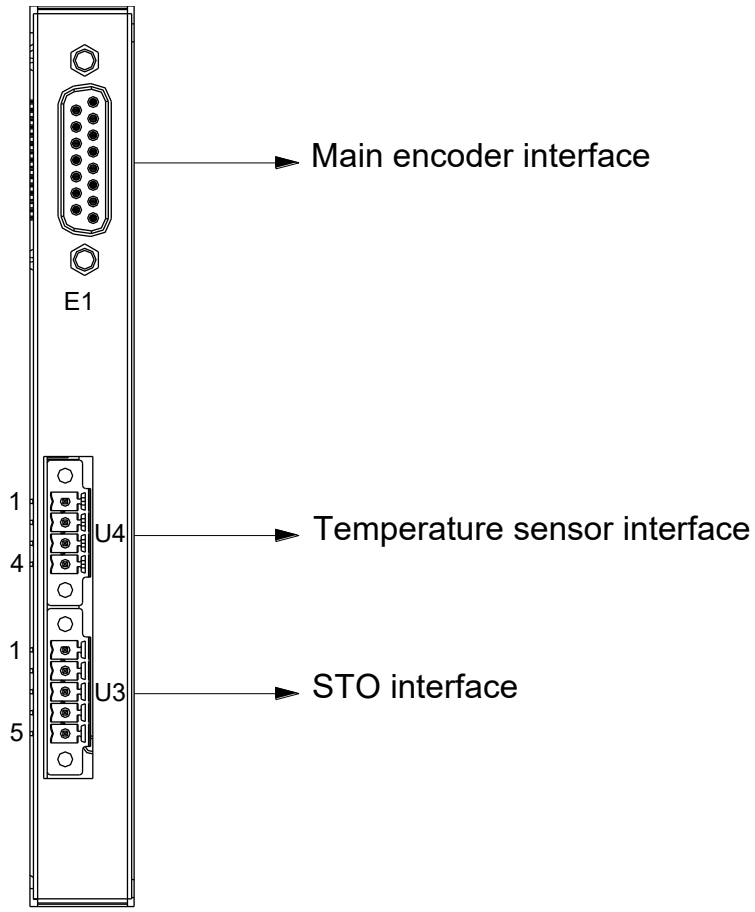


Figure 40 Main encoder card

The control platform of AxN-DC.800 drive supports Sincos encoder, Endat 2.2 encoder, Resolver, digital incremental encoder, Nikon encoder and Hiperface encoder.

3.2.1 STO interface (U3)

Pin	Name	Function Description
1	+24V	+24V auxiliary power supply
2	STO_IN_H	+24V STO high input
3	STO_IN_L	+24V STO low input
4	STO_OUT_H	STO high feedback
5	STO_OUT_L	STO low feedback

Table 17 STO Definition

3.2.2 Motor temperature sensor interface (U4)

Pin	Name	Function Description
1	Motor_Temp+	Thermal sensor + input interface
2	Motor_Temp-	Thermal sensor - input interface
3	Motor_PTC+	PTC sensor + input interface
4	Motor_PTC-	PTC sensor - input interface

Table 18 Motor temperature sensor definition

- **SinCos Encoder definition**

Pin Assignment

Pin	Name	Function	Signal Description
1	GND	Supply ground	Encoder ground
2	SIN+	Encoder absolute channel	1 Vpp differential
3	COS+	Encoder absolute channel	1 Vpp differential
4	COS-	Encoder absolute channel	1 Vpp differential
5	SIN-	Encoder absolute channel	1 Vpp differential
6	+Vcc	Encoder supply, 5Vdc	Positive supply voltage
7	A+	Encoder incremental channel	1 Vpp differential
8	KTY+	Thermal sensor positive	
9	I-	Encoder index	1 Vpp differential
10	——	——	——
11	——	——	——
12	A-	Encoder incremental channel	1 Vpp differential
13	B-	Encoder incremental channel	1 Vpp differential
14	I+	Encoder index	1 Vpp differential
15	B+	Encoder Incremental channel	1 Vpp differential

Table 19 Sincos pin assignment

Connection Table (with Ultract Series Motor)

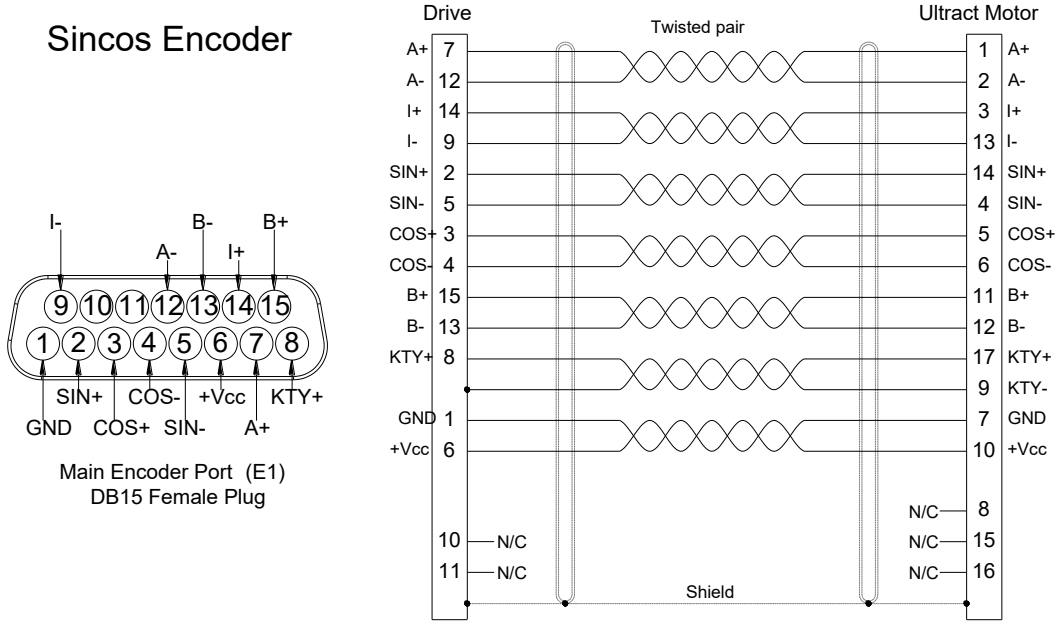


Figure 41 Encoder cable definition, SinCos

- **N/C——No Connection;**
- **Connector back shell shielded 360°(Both ends);**
- **"●" means that the shield or cable should connect to connectors.**

Endat Encoder Definition

Pin Assignment

Pin	Name	Function	Signal Description
1	GND	Supply ground	Encoder ground
2	——	——	——
3	CLOCK+	Endat clock	TTL
4	CLOCK-	Endat clock	TTL
5	——	——	——
6	+Vcc	Encoder supply, 8Vdc	Positive supply voltage
7	A+	Encoder incremental channel	TTL
8	KTY+	Thermal sensor positive	
9	DATA-	Endat data	TTL
10	——	——	——
11	——	——	——
12	A-	Encoder incremental channel	TTL
13	B-	Encoder incremental channel	TTL
14	DATA+	Endat data	TTL
15	B+	Encoder incremental channel	TTL

Table 20 Endat pin assignment

Connection Table (with Ultract Series Motor)

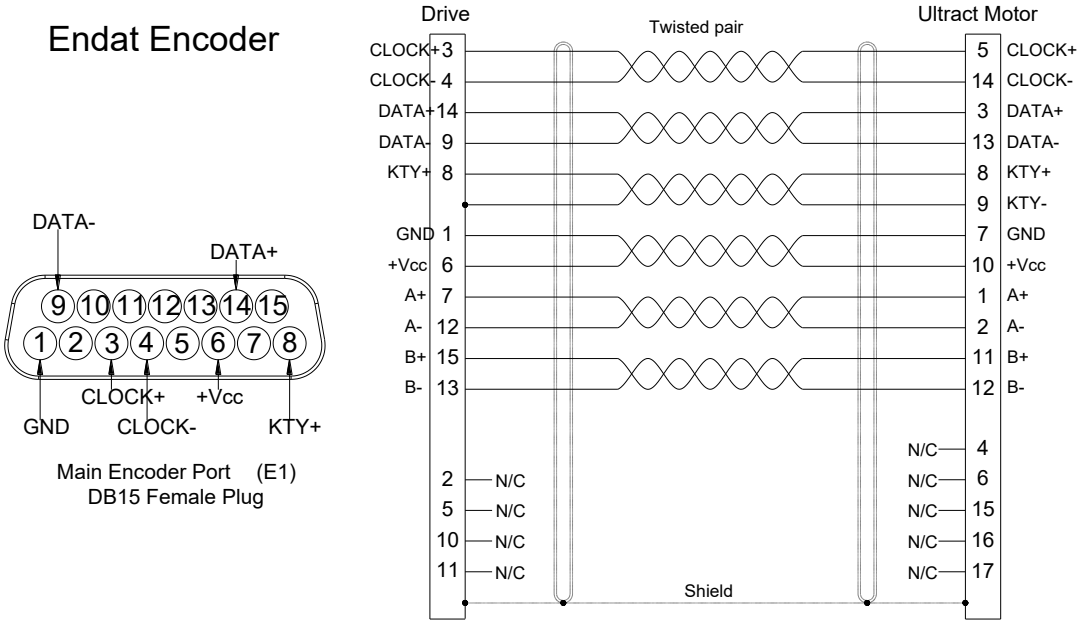


Figure 42 Encoder cable definition, Endat

- **N/C——No Connection;**
- **Connector back shell shielded 360°(Both ends);**
- **"●" means that the shield or cable should connect to connectors.**

Incremental Encoder Definition

Pin Assignment

Pin	Name	Function	Signal Description
1	GND	Supply ground	Encoder ground
2	——	——	——
3	H1	Hall sensor	TTL
4	H2	Hall sensor	TTL
5	H3	Hall sensor	TTL
6	+Vcc	Encoder supply, 8Vdc	Positive supply voltage
7	B+	Encoder incremental channel	TTL
8	KTY+	Thermal sensor positive	
9	I-	Encoder index	TTL
10	——	——	——
11	——	——	——
12	B-	Encoder incremental channel	TTL
13	A-	Encoder incremental channel	TTL
14	I+	Encoder index	TTL
15	A+	Encoder incremental channel	TTL

Table 21 Incremental pin assignment

Connection Table (with Ultract Series Motor)

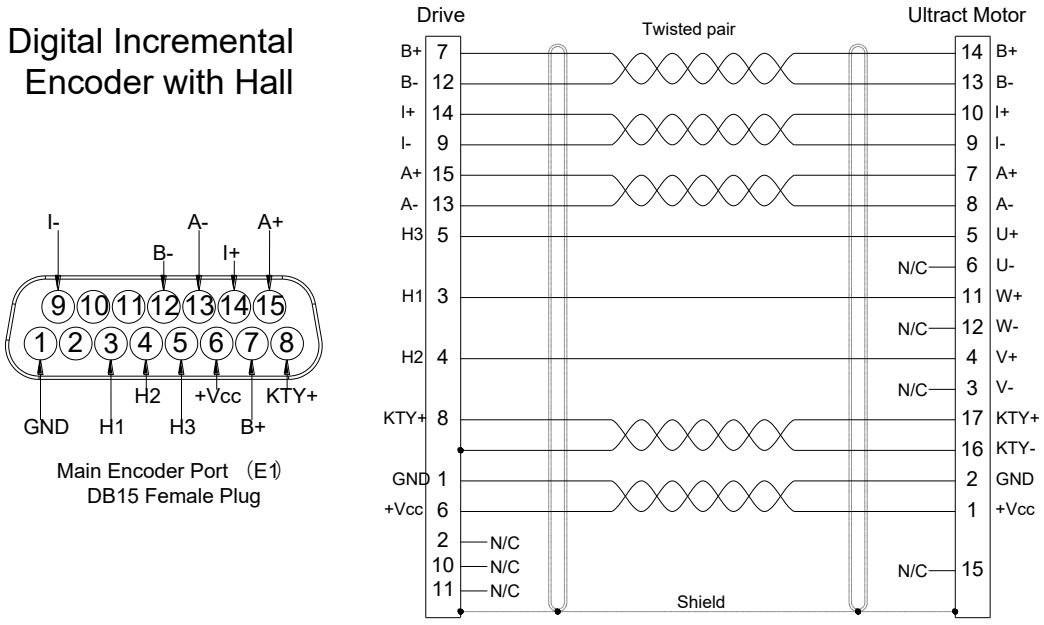


Figure 43 Encoder cable definition, Incremental

- **N/C——No Connection;**
- **Connector back shell shielded 360°(Both ends);**
- **"●" means that the shield or cable should connect to connectors**

Resolver Definition

Pin Assignment

Pin	Name	Function	Signal Description
1	——	——	——
2	SIN+	Absolute channel	Differential signal
3	COS+	Absolute channel	Differential signal
4	COS-	Absolute channel	Differential signal
5	SIN-	Absolute channel	Differential signal
6	——	——	——
7	——	——	——
8	KTY+	Thermal sensor positive	
9	——	——	——
10	RESEX+	Resolver energising +	8kHz sinusoidal wave
11	RESEX-	Resolver energising -	8kHz sinusoidal wave
12	——	——	——
13	——	——	——
14	——	——	——
15	——	——	——

Table 22 Resolver pin assignment

Connection Table (with Ultract Series Motor)

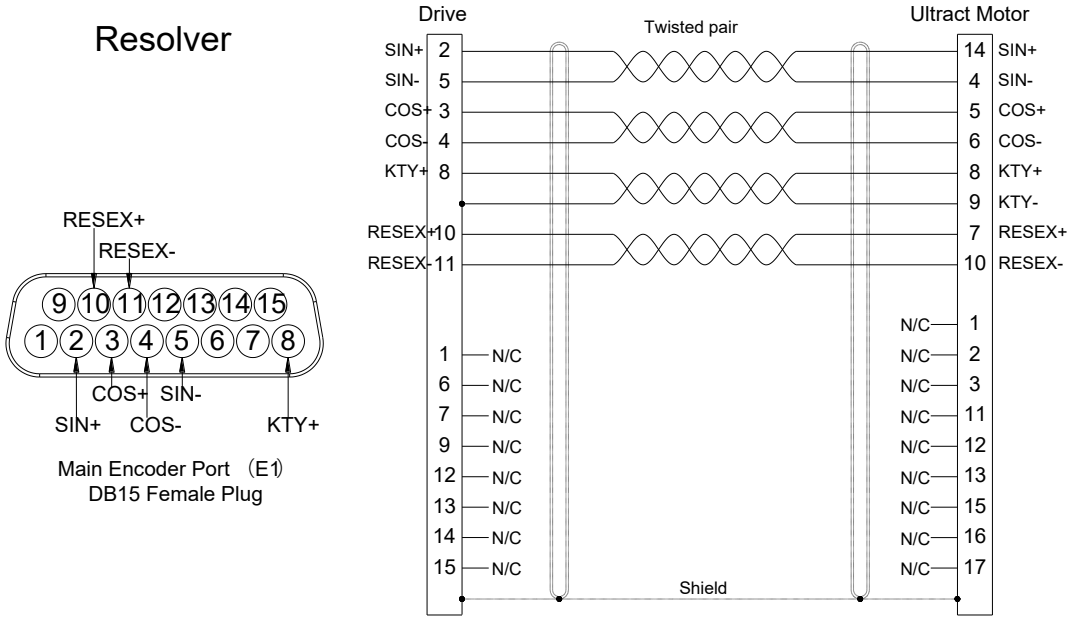


Figure 44 Encoder cable definition, Resolver

- **N/C——No Connection;**
- **Connector back shell shielded 360°(Both ends);**
- **"●" means that the shield or cable should connect to connectors.**

Hiperface Encoder Definition

Pin Assignment

Pin	Name	Function	Signal Description
1	GND	Supply ground	Encoder ground
2	——	——	——
3	——	——	——
4	——	——	——
5	——	——	——
6	+Vcc	Encoder supply, 8Vdc	Positive supply voltage
7	A+	Process data channel	TTL
8	KTY+	Thermal sensor positive	
9	DATA-	RS-485 parameter channel	TTL
10	——	——	——
11	——	——	——
12	A-	Process data channel	TTL
13	B-	Process data channel	TTL
14	DATA+	RS-485 parameter channel	TTL
15	B+	Process data channel	TTL

Table 23 Hiperface pin assignment

Connection Table (with Ultract Series Motor)

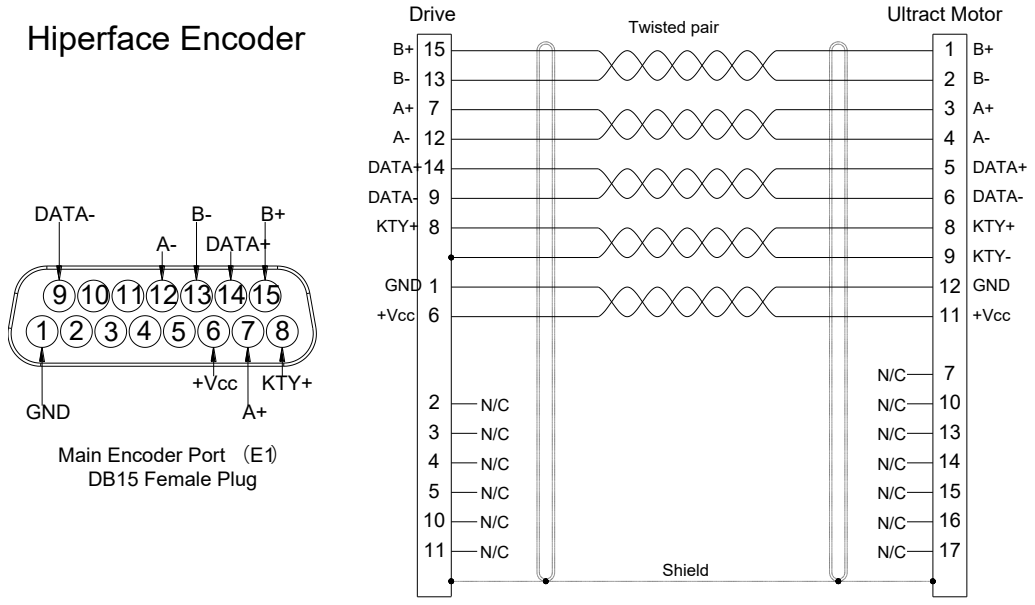


Figure 45 Encoder cable definition, Hiperface

- **N/C——No Connection;**
- **Connector back shell shielded 360°(Both ends);**
- **"●" means that the shield or cable should connect to connectors.**

3.3 CPU Card

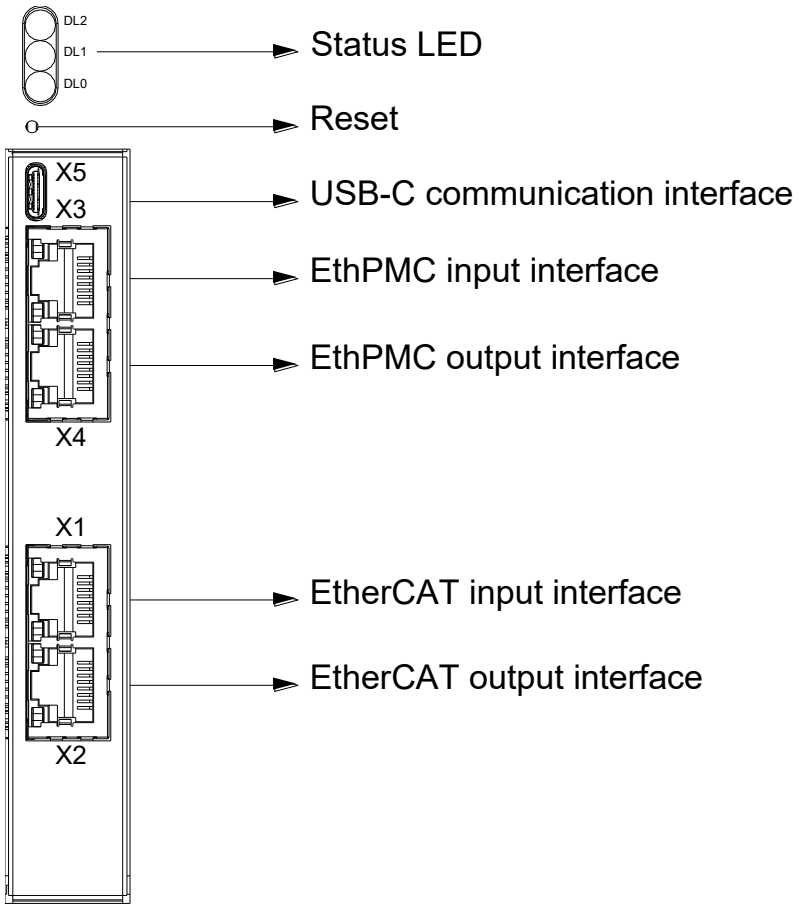


Figure 46 CPU card

3.3.1 Status LED

	Name	Function	
1	DL2	Fault Status	Blinking light per 0,5 second
2	DL1	Warning	Blinking light per second, E.g. when the STO have not been activated
3	DL0	Drive Ok	Drive is enable, it is fixed If drive is If Ok, it blinks per second

Table 24 Status LED of CPU card

3.3.2 RJ45 Pin Assignment

Pin	Name	Function
1	TX +	Transmit Data +
2	TX -	Transmit Data -
3	RX +	Receive Data +
4	---	---
5	---	---
6	RX -	Receive Data -
7	---	---
8	---	---

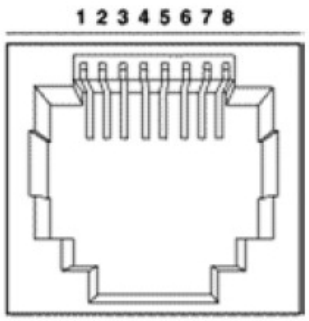


Table 25 RJ45 pin assignment

Four RJ45 connectors have the same definition

3.4 Rectifier Control Card

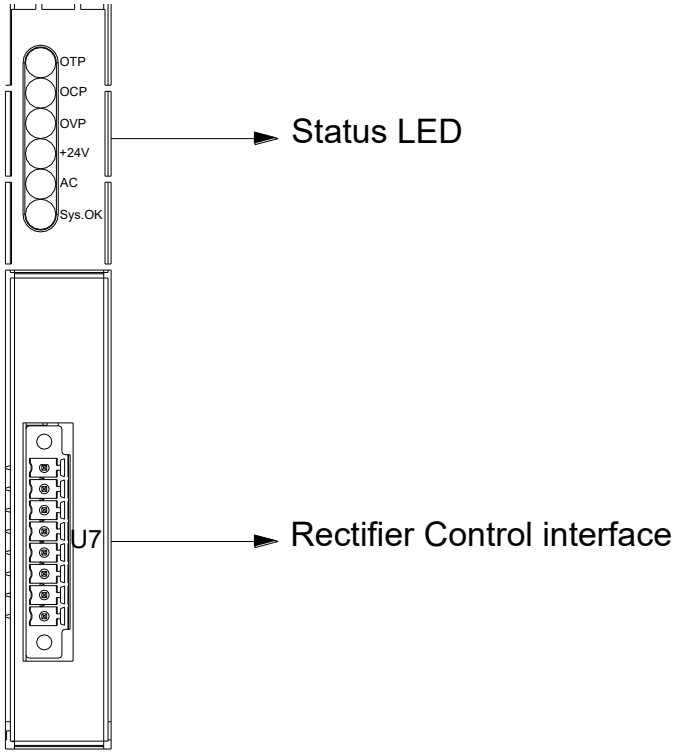


Figure 47 Rectifier control card

3.4.1 Status LED

	Name	Off	Blink	On
1	OTP	Temperature Normal	Fan Working	Temperature Alarm
2	OCP	Current Normal	Overload Current	Over Current Alarm
3	OVP	DCBus Normal	Brake Open	Over Voltage Alarm
4	+24V	Auxiliary Power Off	Auxiliary Power Low	Auxiliary Power Normal
5	AC	Main Power Off	Main Power Abnormal	Main Power Normal
6	Sys.OK	DCBus Disable	DCBus Abnormal	DCBus Enable

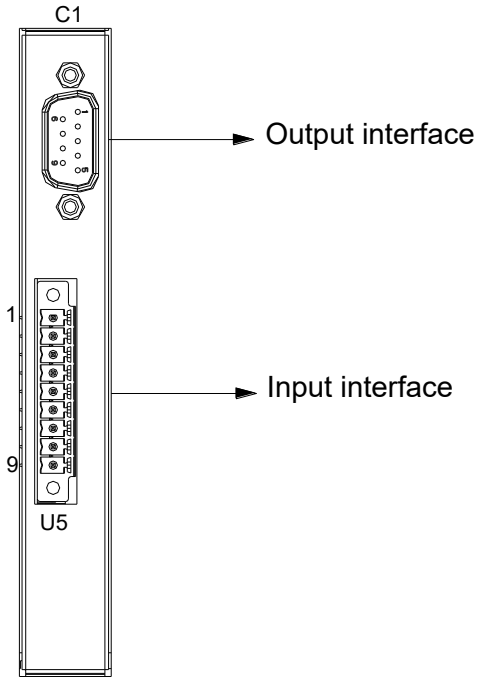
Table 26 Status LED of rectifier control card

3.4.2 Rectifier Control interface

Pin	Name	Function Description
1	Sys.OK	Contact Output1: CLOSED (Power OK)
2	Sys.OK	OPEN (Power not OK)
3	Ready	Contact Output2: CLOSED (System Ready)
4	Ready	OPEN (System not Ready, Active Alarms)
5	Enable	Contact Input: CLOSED (Enable PSU)
6	Enable	OPNE (Disable PSU)
7	+24V	Auxiliary power supply Input positive
8	0V	Auxiliary power supply Input negative

Table 27 Definition of rectifier control card

3.5 Auxiliary Encoder Card



3.5.1 Auxiliary encoder output interface (C1)

Pin	Name	Function Description
1	B+	Auxiliary encoder output of B+ channel
2	Null	Not defined
3	0V	Auxiliary encoder ground connection
4	A-	Auxiliary encoder output of A- channel
5	I-	Auxiliary encoder output of I- channel
6	B-	Auxiliary encoder output of B- channel
7	V+	Power supply for auxiliary encoder
8	A+	Auxiliary encoder output of A+ channel
9	I+	Auxiliary encoder output of I+ channel

Table 28 Output definition of Aux. encoder card

3.5.2 Auxiliary encoder input interface (U5)

Pin	Name	Function Description
1	A+	Auxiliary encoder input of A+ channel
2	A-	Auxiliary encoder input of A- channel
3	I+	Auxiliary encoder input of I+ channel
4	I-	Auxiliary encoder input of I- channel
5	B+	Auxiliary encoder input of B+ channel
6	B-	Auxiliary encoder output of B- channel
7	V+	Power supply for auxiliary encoder
8	0V	Auxiliary encoder ground connection
9	SHIELD	Auxiliary encoder shield connection

Table 29 Intput definition of Aux. encoder card

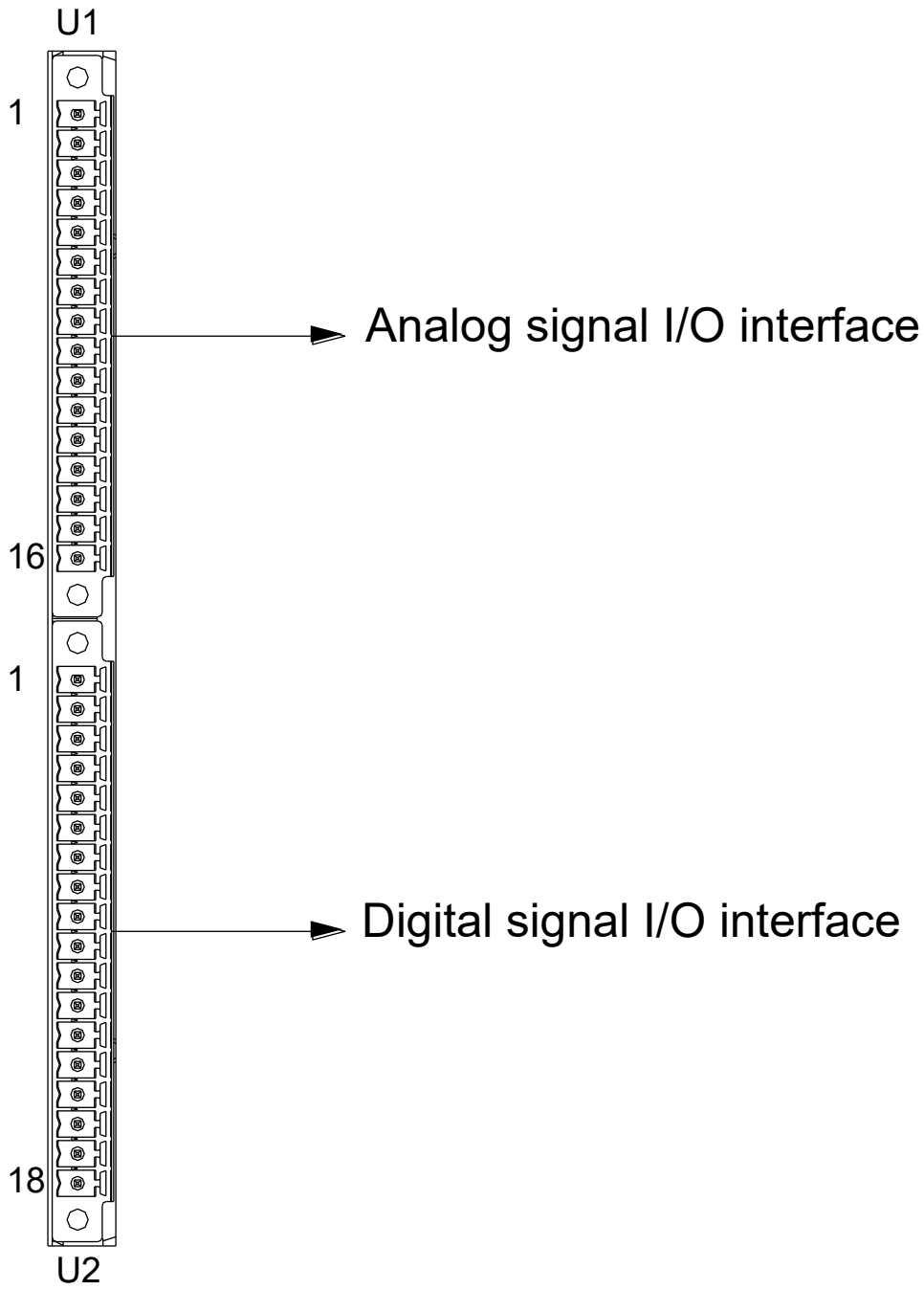


Figure 48 Input/Output Card

3.6.1 Analog signal I/O interface (U1)

Pin	Name	Function Description
1	AI0+	Differential Analog input 0 channel Positive
2	AI0-	Differential Analog input 0 channel negative
3	Ground_A	Analog signal ground
4	AI1+	Differential Analog input 1 channel Positive
5	AI1-	Differential Analog input 1 channel negative
6	Ground_A	Analog signal ground
7	AI2+	Differential Analog input 2 channel Positive
8	AI2-	Differential Analog input 2 channel negative
9	Ground_A	Analog signal ground
10	AI3+	Differential Analog input 3 channel Positive
11	AI3-	Differential Analog input 3 channel negative
12	Ground_A	Analog signal ground
13	AO0	Analog output 0 channel
14	Ground_A	Analog signal ground
15	AO1	Analog output 1 channel
16	Ground_A	Analog signal ground

The Voltage of analog input channel is -10V to +10V.

Table 30 Analog signal I/O definition

3.6.2 Digital signal I/O interface (U2)

Pin	Name	Function Description
1	Ground_D	Digital signal ground
2	DI0	Digital input 0 channel
3	DI1	Digital input 1 channel
4	DI2	Digital input 2 channel
5	DI3	Digital input 3 channel
6	DI4	Digital input 4 channel
7	DI5	Digital input 5 channel
8	DI6	Digital input 6 channel
9	DI7	Digital input 7 channel
10	Ground_D	Digital signal ground
11	DO0+	Digital Output 0 channel positive
12	DO0-	Digital Output 0 channel negative
13	DO1+	Digital Output 1 channel positive
14	DO1-	Digital Output 1 channel negative
15	DO2+	Digital Output 2 channel positive
16	DO2-	Digital Output 2 channel negative
17	DO3+	Digital Output 3 channel positive
18	DO3-	Digital Output 3 channel negative

Digital output channel is NO relay contacts, 24Vdc / 2A

Table 31 gital signal I/O definition

• Figure Index

• Table index