AxN-DC Series DC Bus Drive

Operation Manual

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Manual History

Version	Date	Comment
V1.03	2022-08-01	Changes: ● Layout update ● LOGO to replace
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

CONTENTS

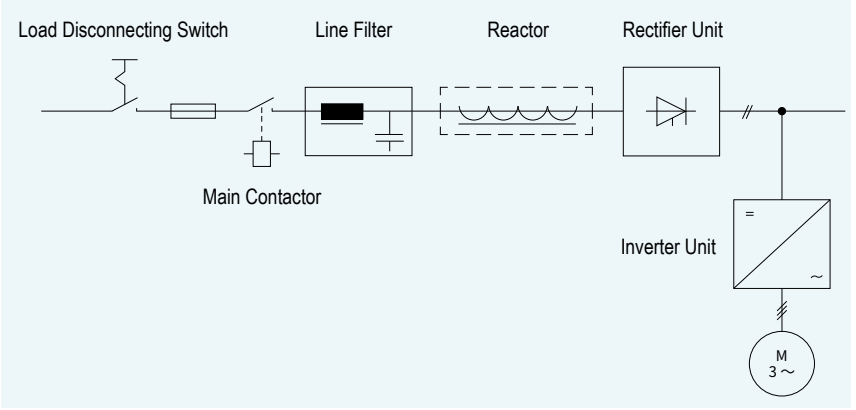
一、General Information

1 System Overview

Physis AxN-DC series sevro driver is a unified rectifier unit and multiple inverter units form the common DC bus driving system. It is very suitable for machine tools, package and printing, EIMM and other multi-axis applications!

1.1 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.



1.1.1 Basic Rectifier Unit

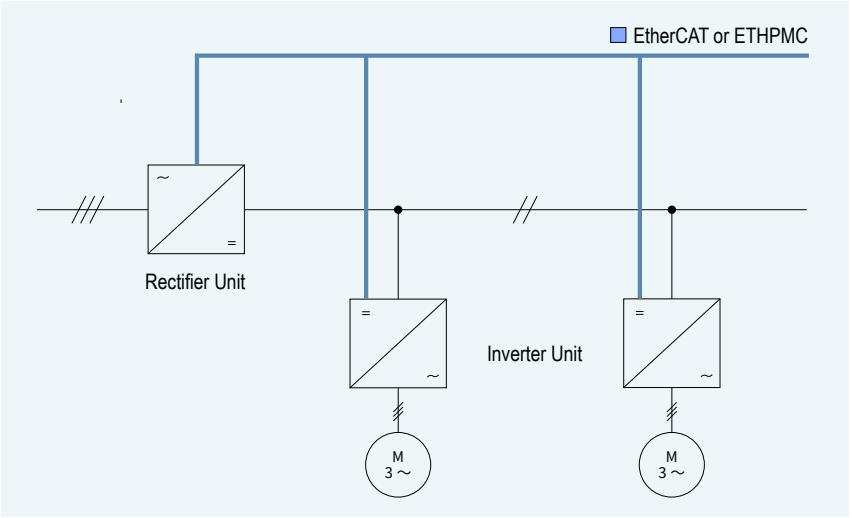
The basic rectifier unit is only used for power supply and cannot return regenerative energy to the grid. If regenerative energy is generated (such as when drive braking), it must be converted to heat by a braking resistor. It is necessary to install the matching line reactor and line filter when using.

1.1.2 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.

1.2 Inverter Unit

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.



1.3 Capacitor Unit

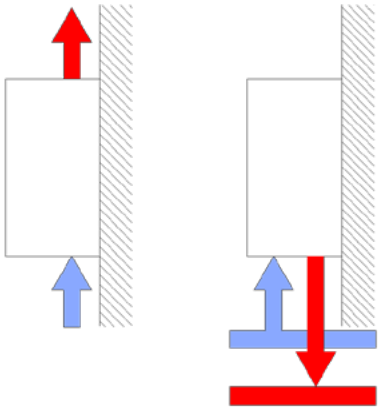
In applications where energy fluctuations are large, capacitor units are required to reduce bus voltage fluctuations, store braking energy, and instantaneous charging.

1.4 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

1.5 Inverter Unit



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.

1.6 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.

1.6.1 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.

1.6.2 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.

1.6.3 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).

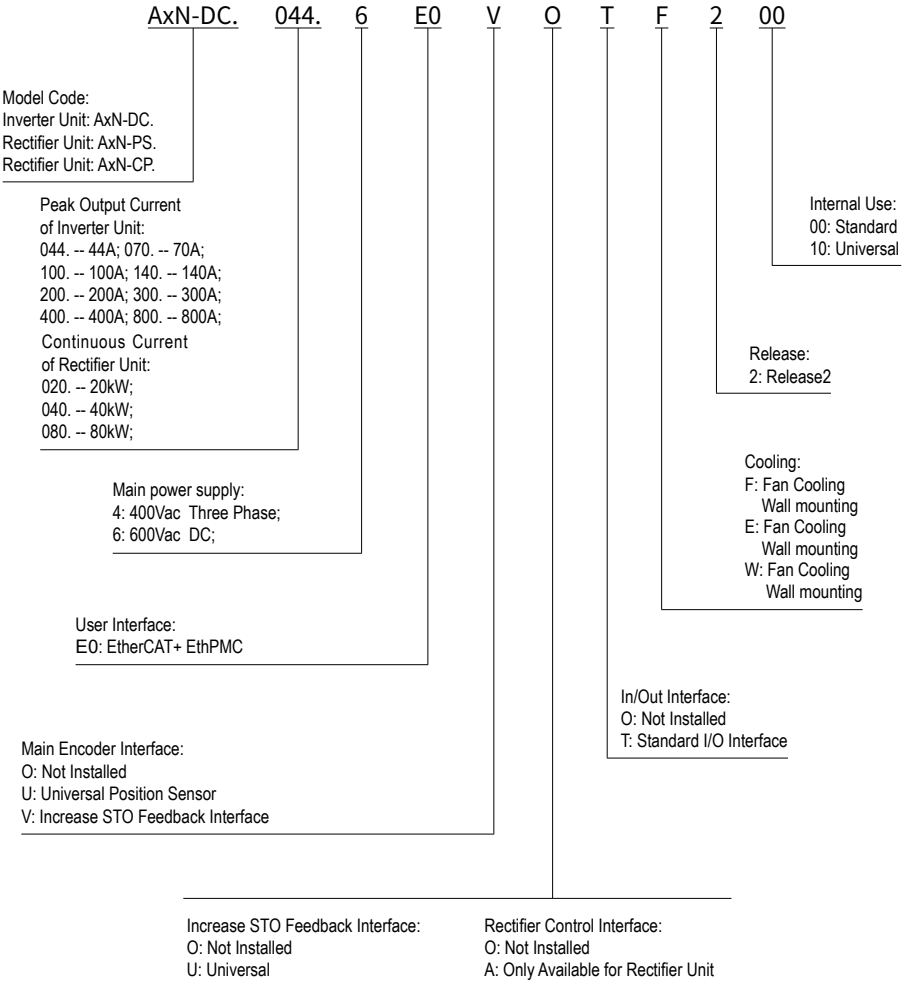
1.7 Standard

Region	Certification Name	Directive	Standard
Europe	CE certification	2014/30/EU EMC Electromagnetic compatibility instruction	EN 61800-3:2004+A1:2012
		2014/35/EU LVD Low capacitance instruction	EN 61800-5-1:2007
		2006/42/EC MD Mechanical instruction	EN 61800-5-1:2007 EN 61800-5-2:2007
USA	UL certification	—	UL 61800-5-1:2007

Note:
The relevant certifications obtained for the products are subject to the certification mark indicated on the nameplate. For specific certification information, please consult the sales manager.

二、Technical Data

1 Part Number System



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%
Overvoltage Category	As per 61800-3, Class 2 environment, C2/C3.
Overvoltage Category	As per IEC/61800-5-1, III .

2.2 Mechanical Conditions

Vibration Limit in Transit	As per EN 61800-2, IEC 60721-3-2 class 2M1		
	Frequency (Hz)	Amplitude (mm)	Amplitude (mm)
	2≤f<9	3.5	Not Applicable
	9≤f<200	Not Applicable	10
	200≤f<500	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	As per 61800-3, Class 2 environment, C2/C3.		
	Frequency (Hz)	Amplitude (mm)	Amplitude (mm)
	2≤f<9	0.3	Not Applicable
	9≤f<200	Not Applicable	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.

2.4 Climate Conditions

In Transit	As per EN 61800-2, IEC 60721-3-2 class 2K3(1)	
	Temperature	-25°C ~ +85°C
	Relative humidity	5 to 90% without condensation
In Storage	As per EN 61800-2, IEC 60721-3-1 class 1K3 and 1K4(2)	
	Temperature	-25°C ~ +85°C
	Relative humidity	5 to 90% without condensation
In Operation	As per EN 61800-2, IEC 60721-3-3 class 3K3(3)	
	Temperature	When the continuous power is reduced, the ambient temperature can be increased
	Relative humidity	5 to 95% without condensation

(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			Unit	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 PN at 380VAC (S1)		kW	80		100
	Peak Pmax			125		125
Input Current	Rated current at 3AC380V		A	123		153
	Max.			192		192
DC Bus Current	Rated Current at 3AC380V		A	150		186
	Max.			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			20		25
Braking threshold	Input 3AC 380V		V	750（DC BUS）		750（DC BUS）
	Input 3AC 480V			800（DC BUS）		800（DC BUS）
Braking Resistance Ext.			Ω	2		2
Power Loss			kW	1.4		1.8
Cooling	Power Loss			$5m^3$/min		10L/min
	Max. Inlet Pressure			—		5Bar
	Nominal Pressure Difference			—		0.2Bar
	Inlet Water Temp.			—		≤20°C
Protection				IP20		IP20
Dimensions		Installation	mm	Wall Mounting	Feed-through Mounting	Cold Plate Mounting
		Width		196	196	196
		Height		450	262.7	420
		Depth		259.4	196	176.9
Approx. Weight			kg	15.8	14.8	14

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

Specifications			Unit	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		A	22		35	
	Max.			44		70	
Continuous Power			kW	11		17.5	
Switching Frequency			kHz	8		8	
Output Frequency	Digital		Hz	0~1200 ±0.01%		0~1200 ±0.01%	
	Analog			0~1200 ±0.2%		0~1200 ±0.2%	
DC Bus Current	Continuous, at DC537V		A	28		44	
DDC24V Auxiliary Power Supply, Max.			A	1.3		1.3	
Current Carrying Capacity	24V DC Busbar		A	16		16	
	DC BUS Busbar			300		300	
DC Bus Capacitor			μF	100		100	
Power Loss			kW	0.28		0.4	
Cooling	Flow Rate			Fan 1.4m^3/min		Fan 1.4m^3/min	
Protection				IP20		IP20	
Dimensions	Installation		mm	Wall Mounting	Feed-through Mounting	Wall Mounting	Feed-through Mounting
	Width			98	98	98	98
	Height			450	420	450	420
	Depth			259.4	262.7	259.4	262.7
Approx. Weight			kg	8.4	7.7	8.4	7.7

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

Specifications		Unit	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	A	50		70	
	Max.		100		1140	
Continuous Power		kW	25		35	
Switching Frequency		kHz	8		8	
Output Frequency	Digital	Hz	0~1200 ±0.01%		0~1200 ±0.01%	
	Analog		0~1200 ±0.2%		0~1200 ±0.2%	
DC Bus Current	Continuous, at DC537V	A	63		88	
DDC24V Auxiliary Power Supply, Max.		A	2.1		2.1	
Current Carrying Capacity	24V DC Busbar	A	16		16	
	DC BUS Busbar		300		300	
DC Bus Capacitor		μF	200		200	
Power Loss		kW	0.59		0.87	
Cooling	Flow Rate		Fan $5m^3/min$		Fan $5m^3/min$	
Protection			IP20		IP20	
Dimensions	Installation	mm	Wall Mounting	Feed-through Mounting	Wall Mounting	Feed-through Mounting
	Width		196	196	196	196
	Height		450	420	450	420
	Depth		259.4	262.7	259.4	262.7
Approx. Weight		kg	14.8	13.9	14.8	13.9

3.4 AxN-DC.200.6

Specifications			Unit	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		A	100		150
	Max.			200		200
Continuous Power			kW	50		75
Switching Frequency			kHz	8		8
Output Frequency	Digital		Hz	0~1200 ±0.01%		0~1200 ±0.01%
	Analog			0~1200 ±0.2%		0~1200 ±0.2%
DC Bus Current	Continuous, 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			300		300
DC Bus Capacitor			μF	300		300
Power Loss			kW	1.28		1.9
Cooling	Flow Rate			7.5m^3/min		8L/min
	Max. Inlet Pressure			—		5Bar
	Nominal Pressure Difference			—		0.2Bar
	Inlet Water Temp.			—		≤20°C
Protection				IP20		IP20
Dimensions	Installation		mm	Wall Mounting	Feed-through Mounting	Cold Plate Mounting
	Width			294	294	294
	Height			450	420	420
	Depth			259.4	262.7	176.9
Approx. Weight			kg	21.7	20.3	19

3.5 AxN-DC.300.6

Specifications		Unit	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	A	150		225
	Max.		300		300
Continuous Power		kW	75		112.5
Switching Frequency		kHz	8		8
Output Frequency	Digital	Hz	0~1200 ±0.01%		0~1200 ±0.01%
	Analog		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		300		300
直流母线电容 DC bus capacitor		μF	300		300
Power Loss		kW	1.93		2.9
Cooling	Flow Rate		7.5m^3/min		10L/min
	Max. Inlet Pressure		—		5Bar
	Nominal Pressure Difference		—		0.2Bar
	Inlet water Temp.		—		≤20°C
Protection			IP20		IP20
Dimensions	Installation	mm	Wall Mounting	Feed-through Mounting	Cold Plate Mounting
	Width		294	294	294
	Height		450	420	420
	Depth		259.4	262.7	176.9
Approx. Weight		kg	21.7	20.3	19

3.6 AxN-DC.400.6

Specifications		Unit	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	A	200		300
	Max.		400		400
Continuous power		kW	100		150
Switching Frequency		kHz	8		8
Output Frequency	Digital	Hz	0~1200 ±0.01%		0~1200 ±0.01%
	模拟指令 Analog		0~1200 ±0.2%		0~1200 ±0.2%
DC Bus Current	Continuous, at DC537V	A	254		381
DDC24V Auxiliary Power Supply, Max.		A	5.8		1
Current Carrying Capacity	24V DC Busbar	A	16		16
	DC BUS Busbar		300		300
DC Bus Capacitor		μF	300		300
Power Loss		kW	3.28		4.92
Cooling	Flow Rate		11.4m^3/min		14L/min
	Max. Inlet Pressure		—		5Bar
	Nominal Pressure Difference		—		0.3Bar
	Inlet Water Temp.		—		≤20°C
Protection			IP20		IP20
Dimensions	Installation	mm	Wall Mounting	Feed-through Mounting	Cold Plate Mounting
	Width		294	294	294
	Height		450	420	420
	Depth		259.4	262.7	176.9
Approx. Weight		kg	21.7	20.3	19

3.7 AxN-DC.800.6

Specifications			Unit	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		A	400	600
	Max.			800	800
Continuous Power			kW	200	300
Switching Frequency			kHz	8	8
Output Frequency	Digital		Hz	0~1200 ±0.01%	0~1200 ±0.01%
	Analog			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	224V DC Busbar		A	16	16
	DC BUS Busbar			420	420
DC Bus Capacitor			μF	500	500
Power Loss			kW	8.86	13
Cooling		Flow rate		12.5m^3/min	20L/min
		Max. Inlet Pressure		—	5Bar
		Nominal Pressure Difference		—	0.4Bar
		Inlet Water Temp.		—	≤20°C
防护等级 Protection				IP20	IP20
Dimensions		Installation	mm	Wall Mounting	Feed-through Mounting	Cold Plate Mounting
		Width		490	490	490
		Height		450	420	420
		Depth		259.4	262.7	176.9
Approx. Weight			kg	36.5	34.1	32

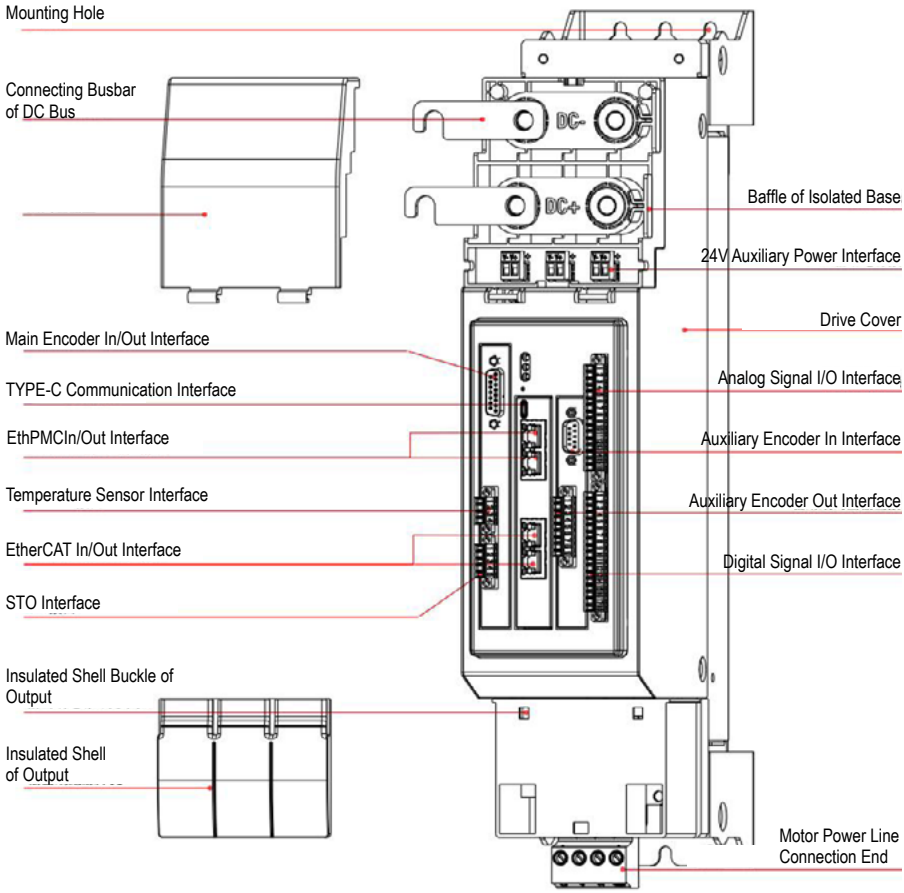
3.8 AxN-CP.060.6; AxN-CP.470.6

Specifications			Unit	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			300	300
Cooling		Flow Rate		0.6m^3/min	—
Protection				IP20	IP20
Dimensions		Installation	mm	Wall Mounting	Cold Plate Mounting
		Width		98	490
		Height		450	420
		Depth		236	176.9
Approx. Weight			kg	7	6

Cover of Isolated Base

三、Dimensions and Installation

1 Exploded View

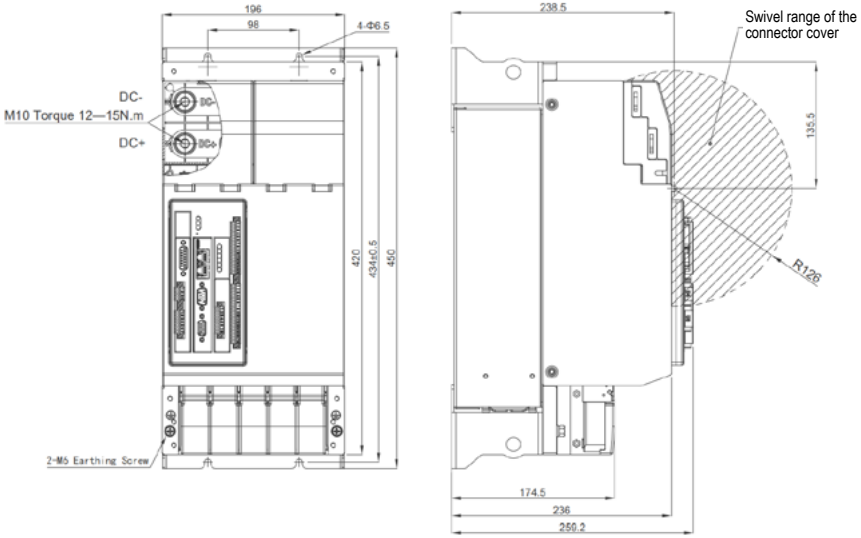


2 Swivel Range of The Connector Cover

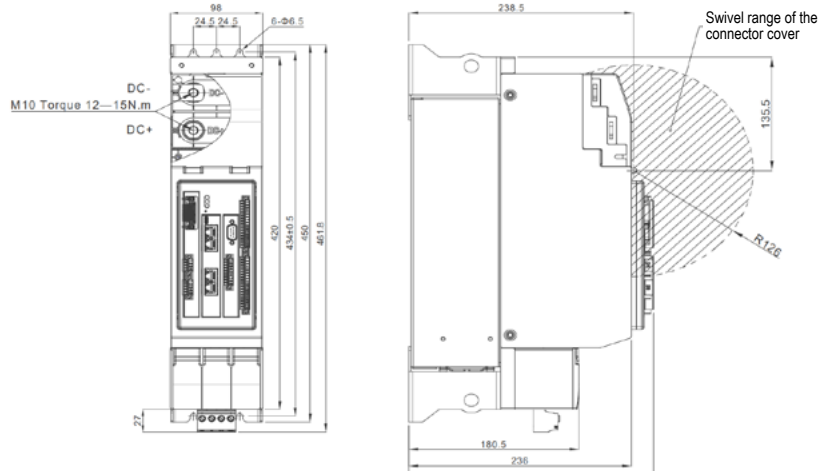
3 Dimensions

3.1 Fan Cooling, Wall Mounting

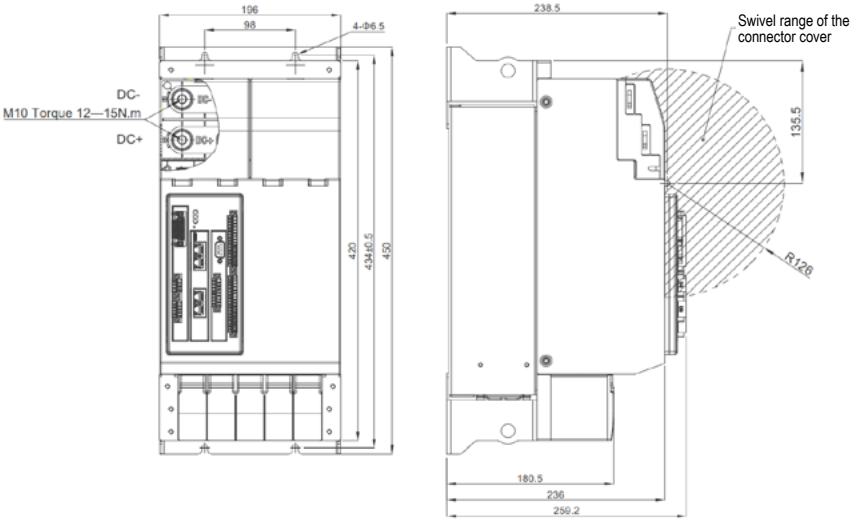
3.1.1 AxN-PS 080.4



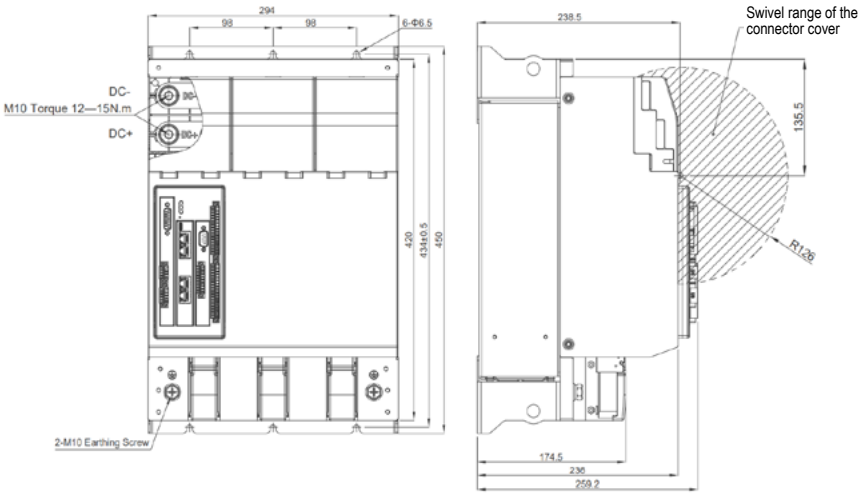
3.1.2 AxN-DC 044.6; AxN-DC.070.6



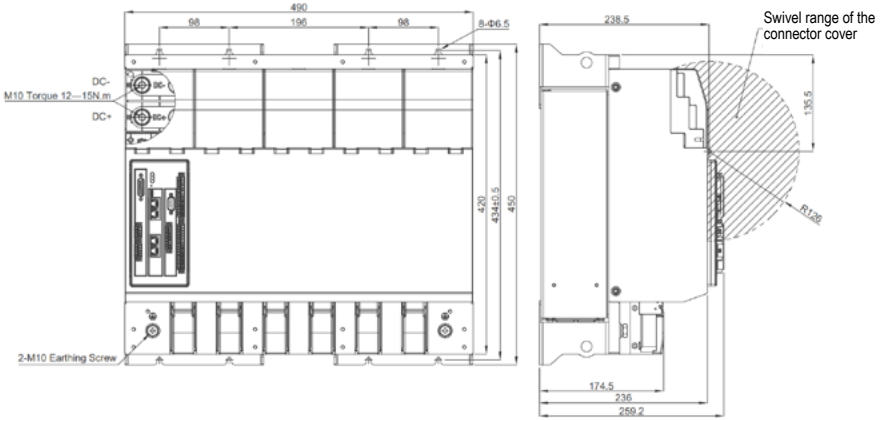
3.1.3 AxN-DC.100.6; AxN-DC.140.6



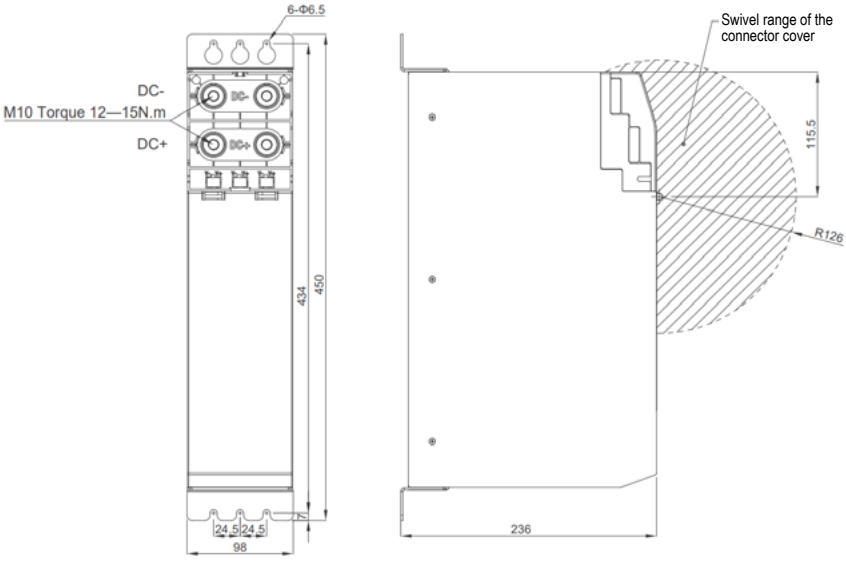
3.1.4 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6



3.1.5 AxN-DC.800.6

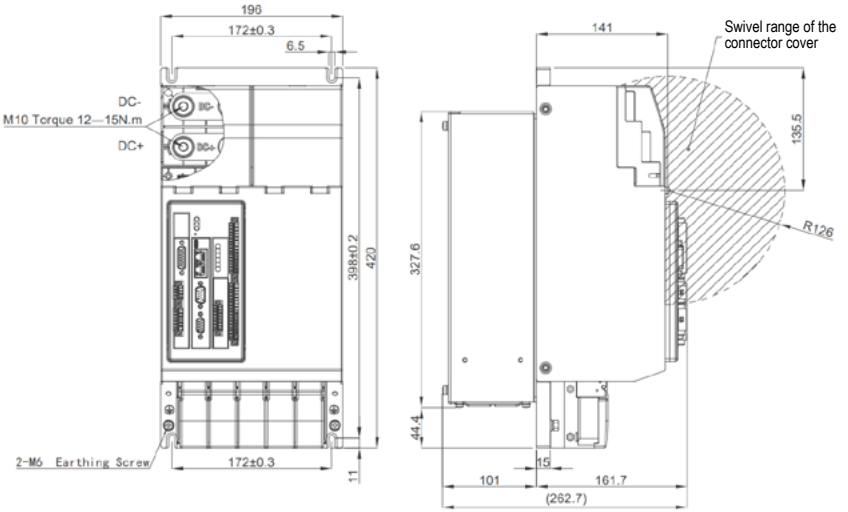


3.1.6 AxN-CP.470.6

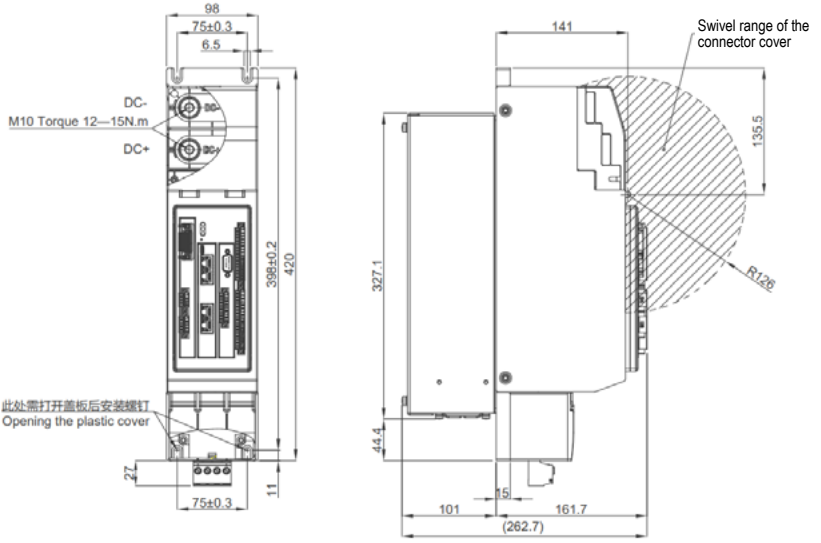


3.2 Fan Cooling, Feed-through Mounting

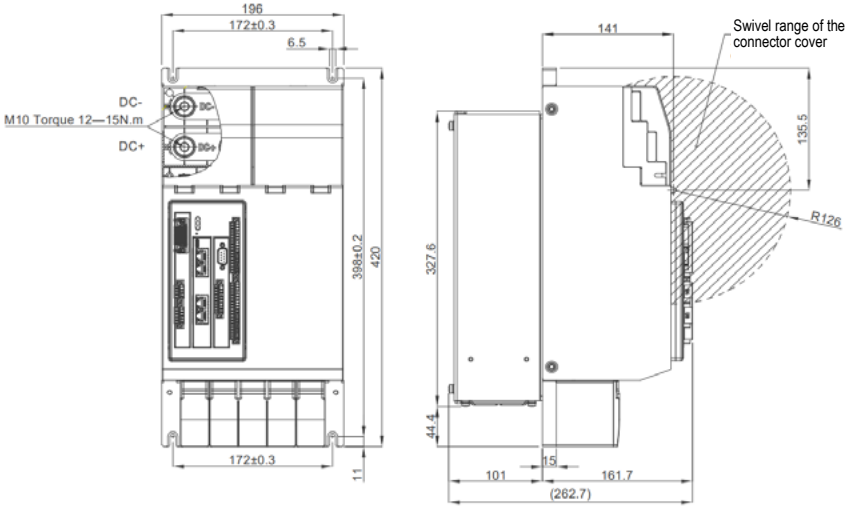
3.2.1 AxN-PS 080.4



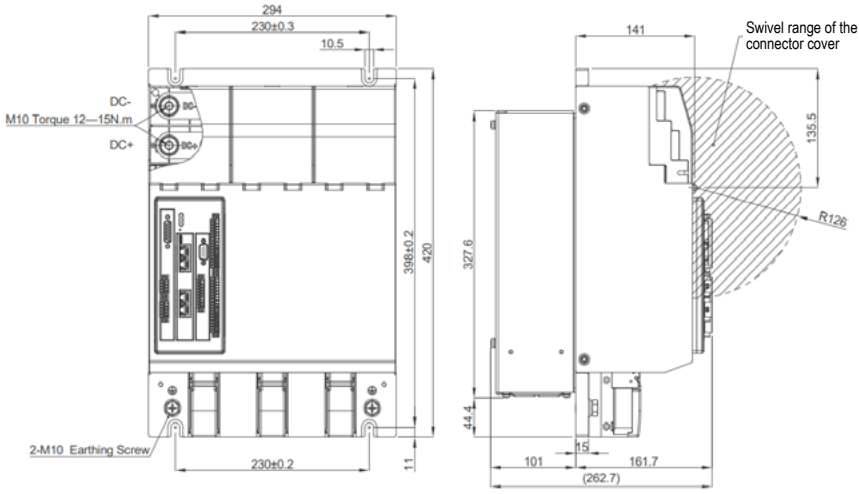
3.2.2 AxN-DC 044.6; AxN-DC.070.6



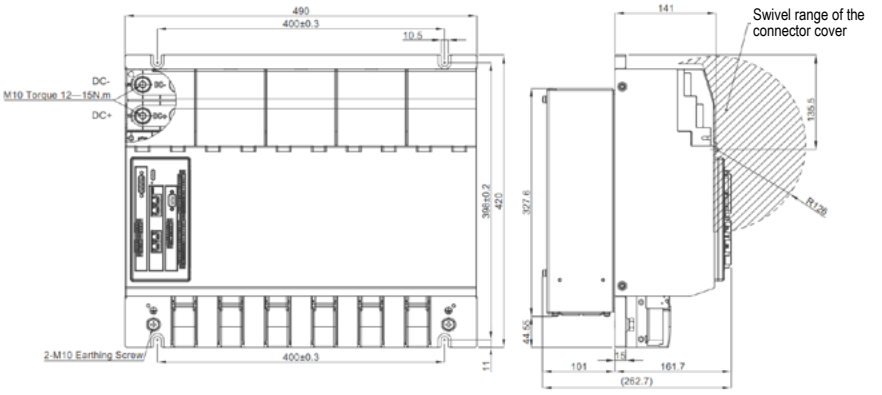
3.2.3 AxN-DC.100.6; AxN-DC.140.6



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

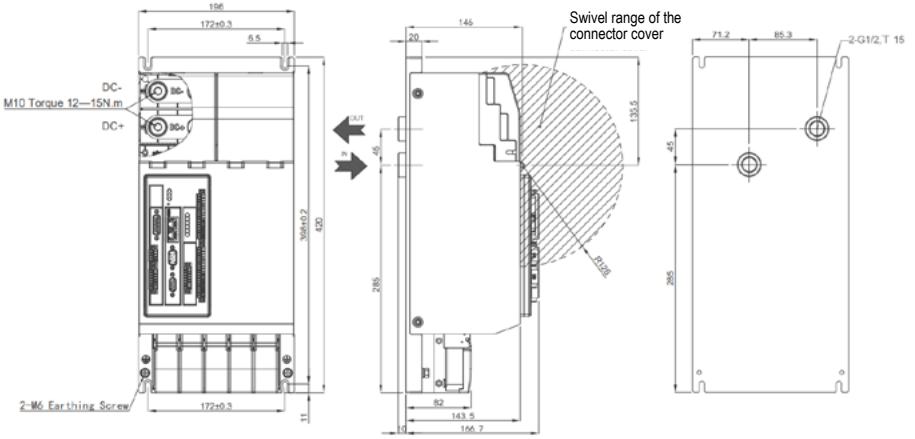


3.2.5 AxN-DC.800.6

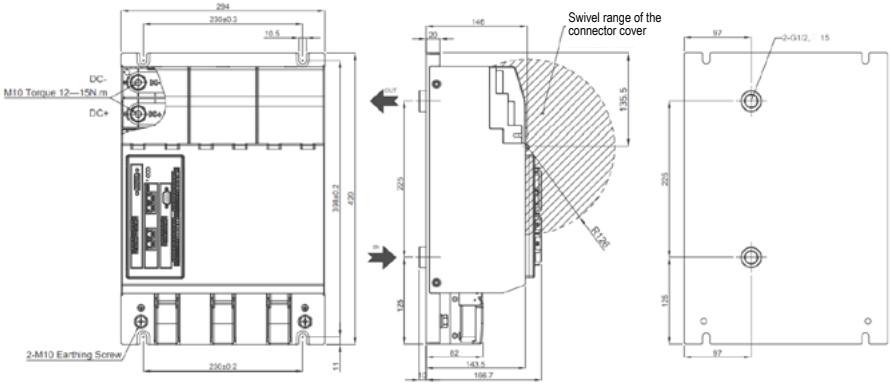


3.3 Water Cooling, Cold Plate Mounting

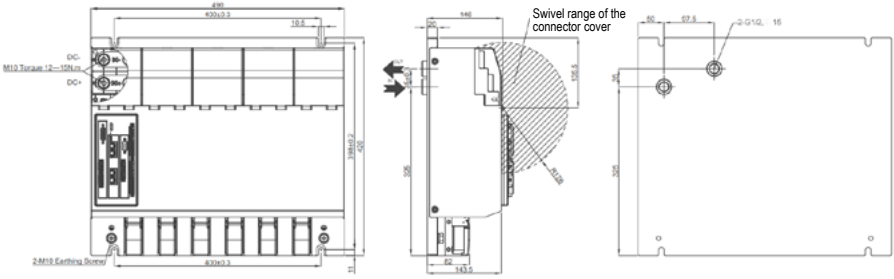
3.3.1 AxN-PS 080.4



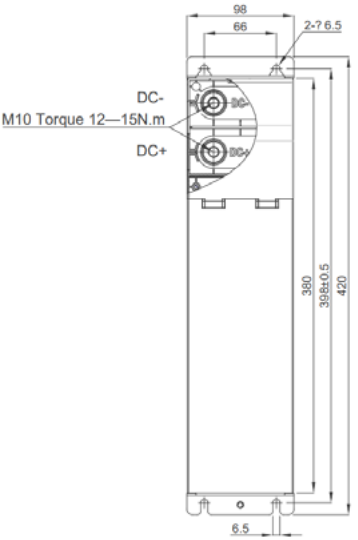
3.3.2 AxN-DC.200.6; AxN-DC.300.6; AxN-DC.400.6

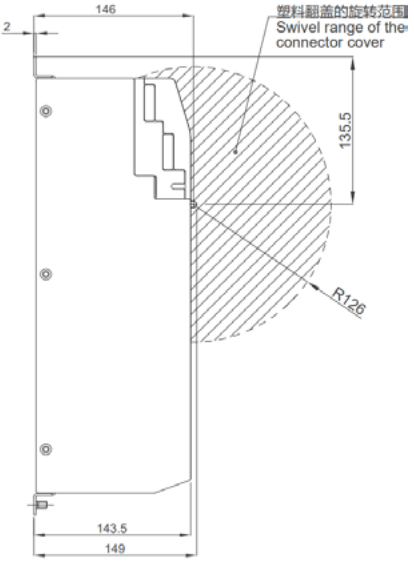


3.3.3 AxN-DC.800.6



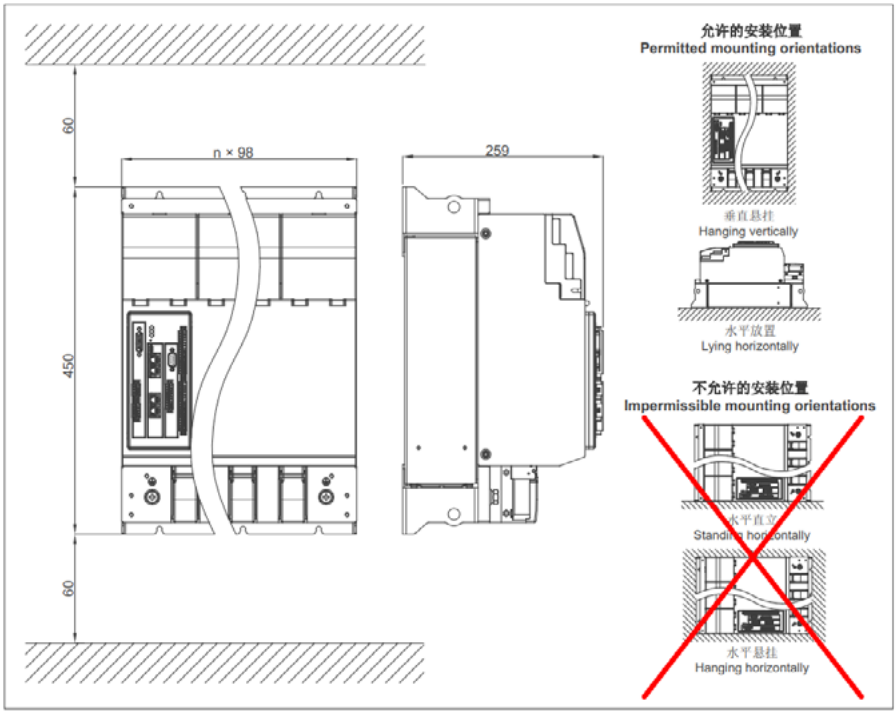
3.3.4 AxN-CP.060.6





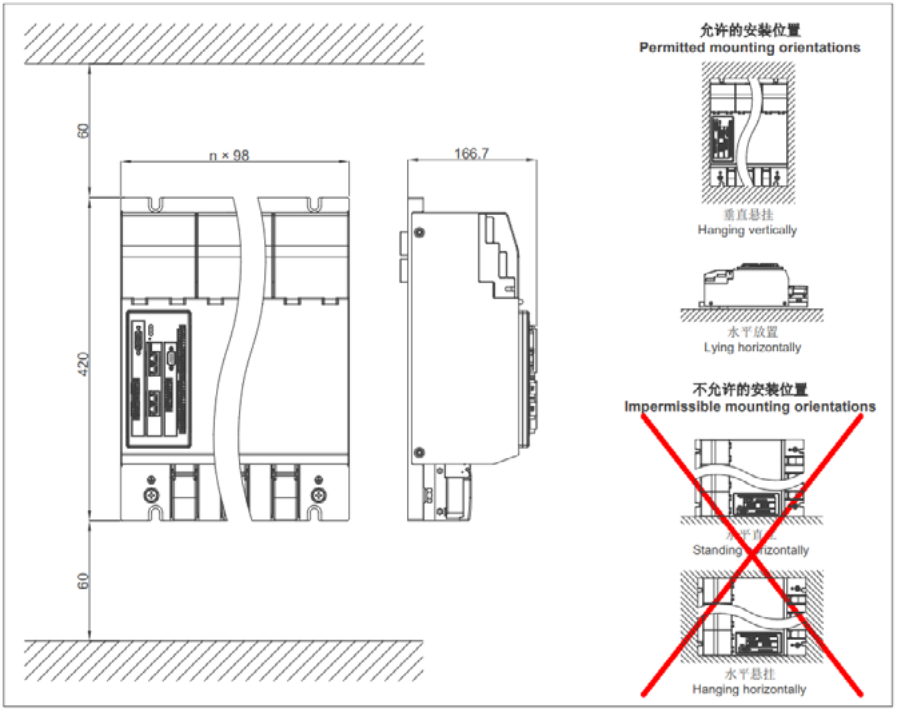
4 Installation Space and Direction

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.

4.2 Water Cooling

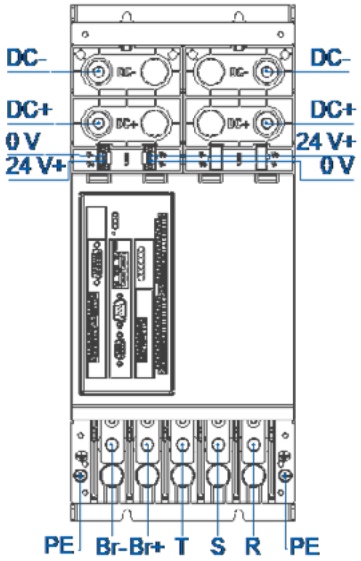


1) For proper air circulation,at least 60 mm clearance must be available above and below the module.

四、Interface and Wiring

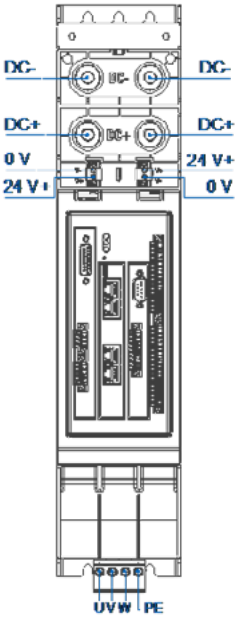
1 Power Main Interface

1.1 AxN-PS 080.4



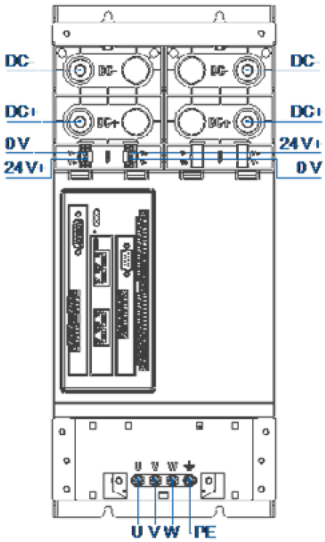
Function	Terminal	Torque Tightening(N.m)	Wire Range(mm²)
AC Power Supply Input	R	M10, 12 ~ 18	16 ~ 70
	S		
	T		
	PE	M6, 6 ~ 10	16 ~ 35
DC Bus Connector	DC+	M10, 12 ~ 15	—
	DC-		
External Brake Resistor	Br+	M10, 12 ~ 18	16 ~ 70
	Br-		
External 24V Power Supply	24V+	M10, 0.5	1.0 ~ 2.5
	0V		

1.2 AxN-DC 044.6; AxN-DC.070.6



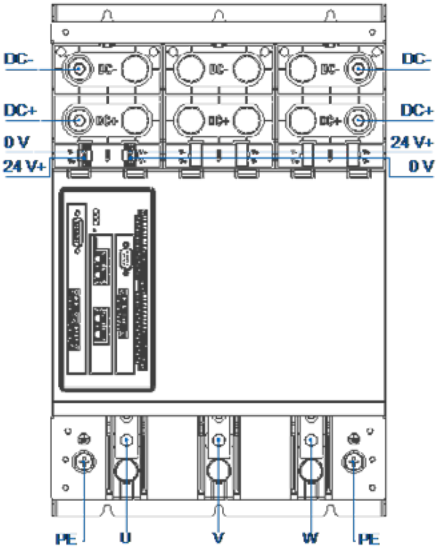
Function	Terminal	Torque Tightening(N.m)	Wire Range(mm²)
DC Bus Connector	DC+	M10, 12 ~ 15	—
	DC-		
Motor Power Output	U	M4, 1.2	2.5 ~ 16
	V		
	W		
	PE		
External 24V Power Supply	24V+	M3, 0.5	1.0 ~ 2.5
	0V		

1.3 AxN-DC.100.6; AxN-DC.140.6



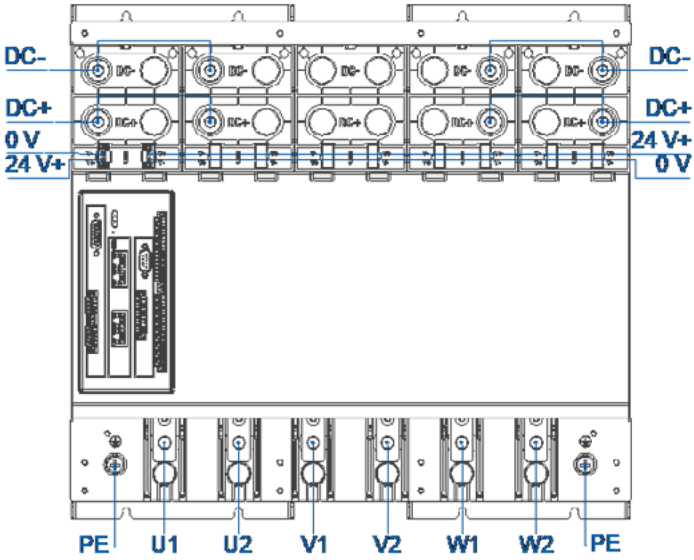
Function	Terminal	Torque Tightening(N.m)	Wire Range(mm²)
DC Bus Connector	DC+	M10, 12 ~ 15	—
	DC-		
Motor Power Output	U	M5, 2.0	4 ~ 35
	V		
	W		
	PE		
External 24V Power Supply	24V+	M3, 0.5	1.0 ~ 2.5
	0V		

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



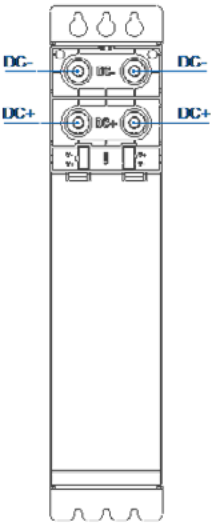
Function	Terminal	Torque Tightening(N.m)	Wire Range(mm²)
DC Bus Connector	DC+	M10, 12 ~ 15	—
	DC-		
Motor Power Output	U	M10, 12 ~ 18	16 ~ 70
	V		
	W		
	PE		
External 24V Power Supply	24V+	M3, 0.5	1.0 ~ 2.5
	0V		

1.5 AxN-DC.800.6



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		

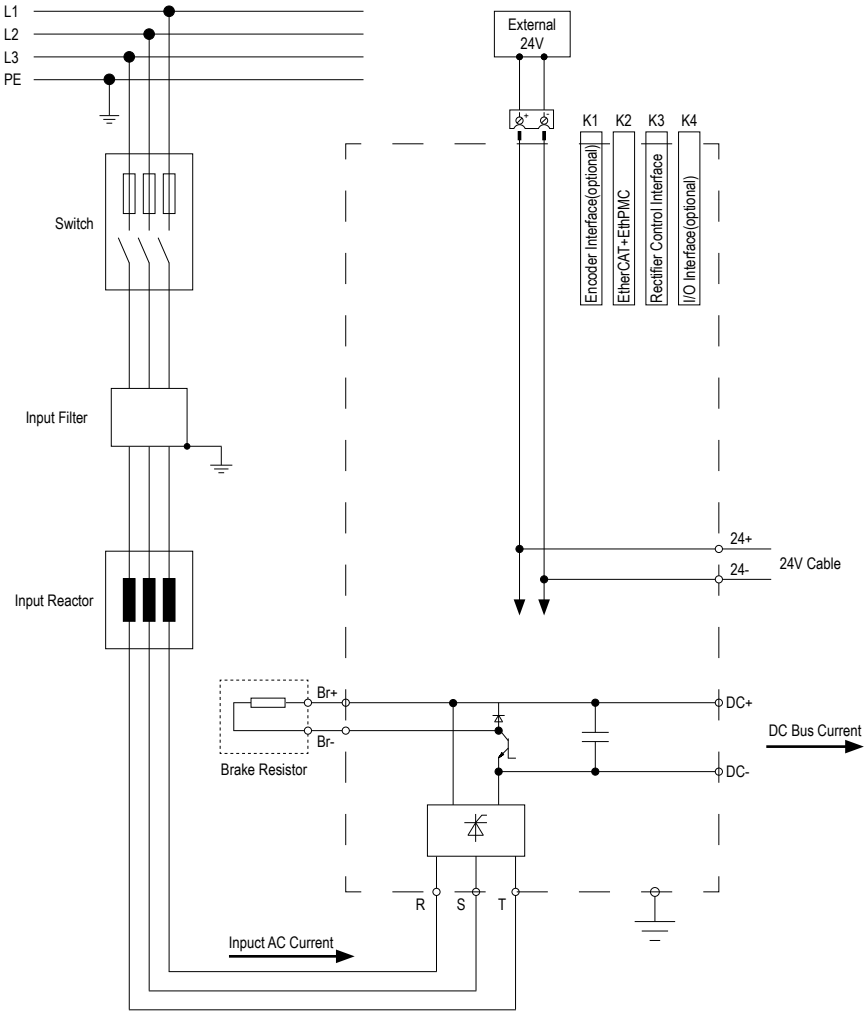
1.6 AxN-CP.470.6



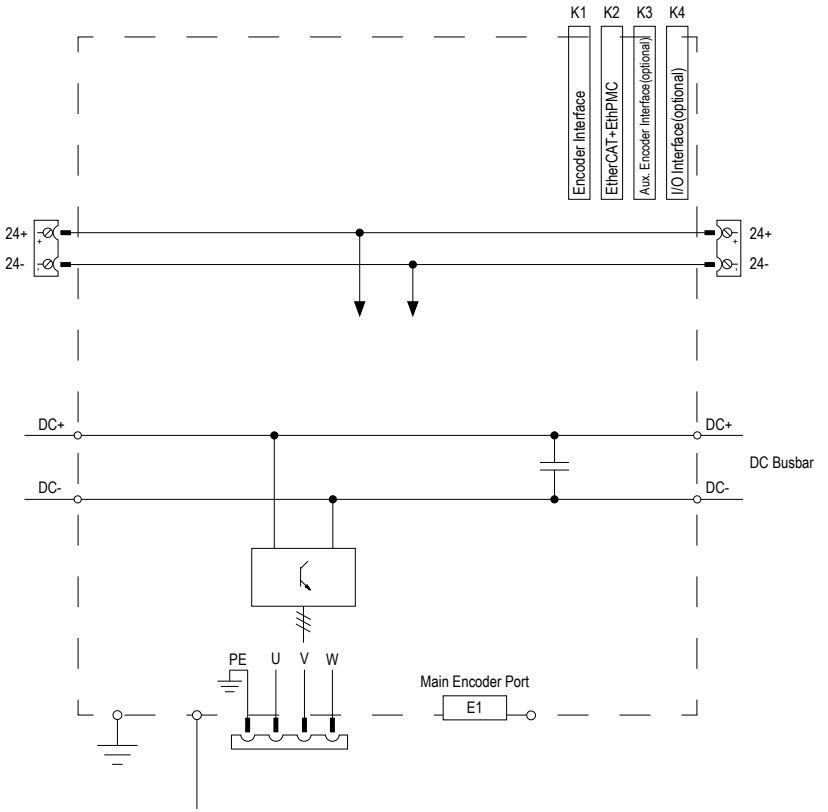
Function	Terminal	Torque Tightening(N.m)	Wire Range(mm²)
DC Bus Connector	DC+	M10, 12~15	—
	DC-		

2 Power Main Connection Diagram

2.1 Rectifier Unit



2.2 Inverter Unit



3 Control Card Interface

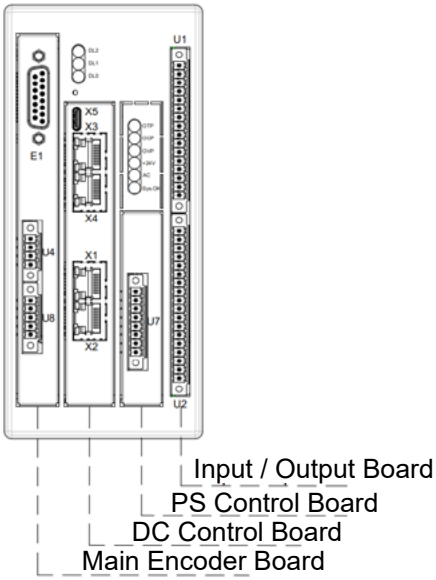
3.1 Overview

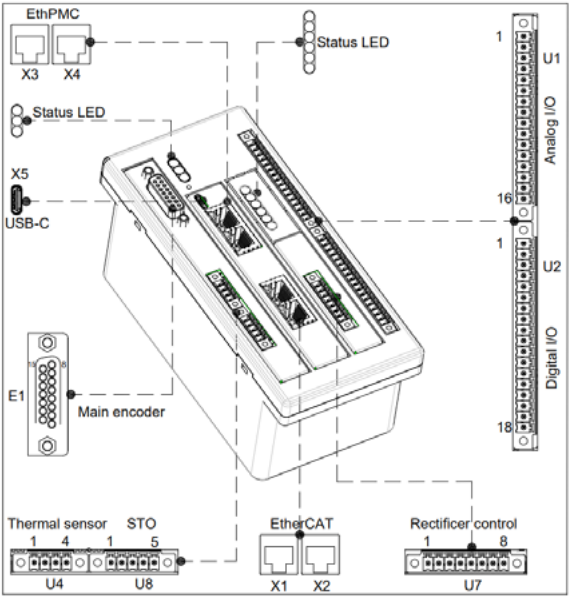
The rectifier unit and the inverter unit use the same control card box. The control card bos has 4 card slots which are K1, K2, K3 and K4 from left to right, and can be modularized according to requirements.

Control Card Box Card Slot Description

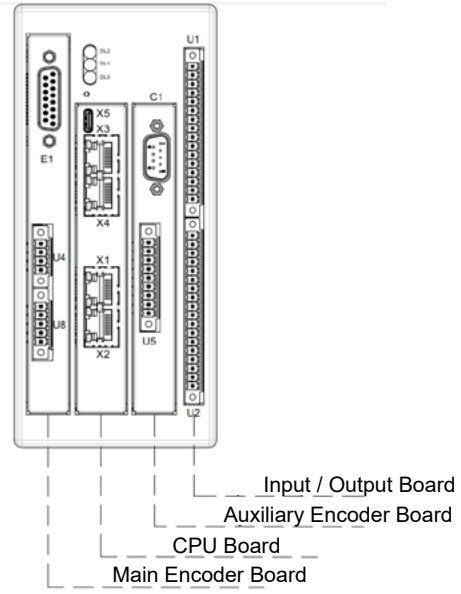
Slot	Card	Interface	Note
K1	Main Encoder Card	Main encoder interface Temperature sensor interface STO interface	PS / DC
K2	DC Control Card	User interface ● EtherCAT ● EthPMC	PS / DC
K3	Auxiliary Encoder Card	Auxiliary encoder input interface Auxiliary encoder output interface	DC
	Rectifier Control Card	Rectifier ontrol interface	PS
K4	Input / Output Card	Analog signal I/O interface Digital signal I/O interface	PS / DC

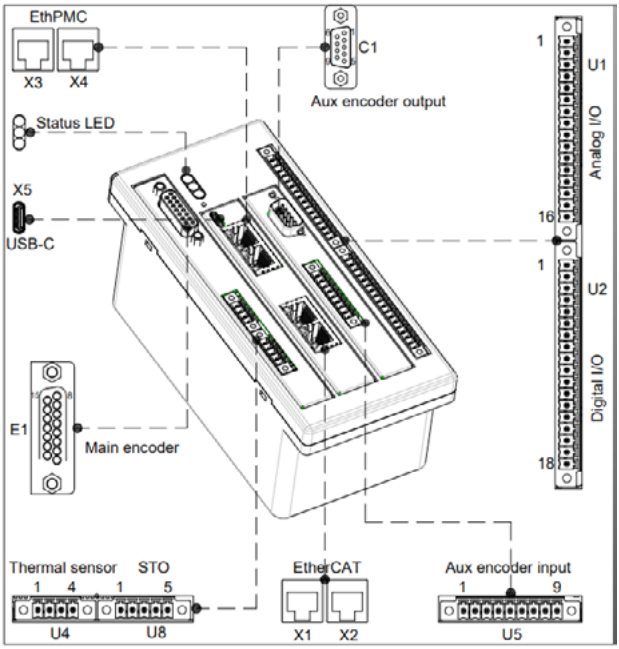
3.1.1 Control Card Box for Rectifier Unit



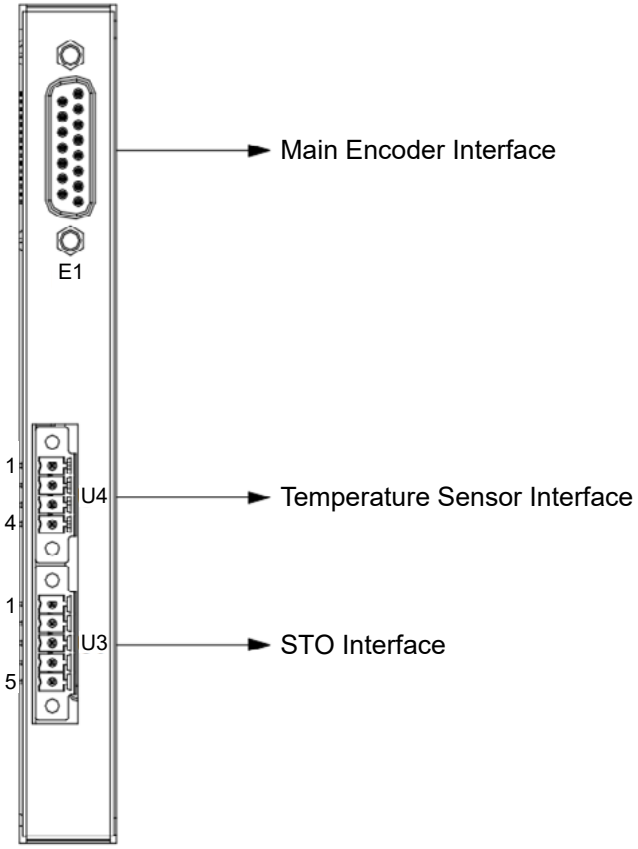


3.1.2 Control Card Box for Inverter Unit




EthPMC
X3
X4
C1
Aux encoder output
Status LED
X5
USB-C
1
U1
Analog I/O
16
1
U2
Digital I/O
18
E1
Main encoder
Thermal sensor
STO
1 4 1 5
U4
U8
EtherCAT
X1
X2
Aux encoder input
1 9
U5

3.2 Main Encoder Card



The control platform of AxN-DC drive supports SinCos encoder, Endat 2.2 encoder, Resolver, digital incremental encoder, Nikon encoder and, Tamagawa absolute 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

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

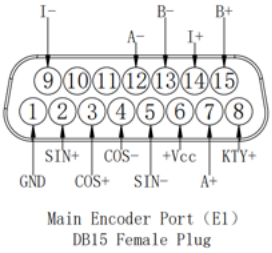
3.2.3 Main Encoder Interface (E1)

● SinCos Encoder definition

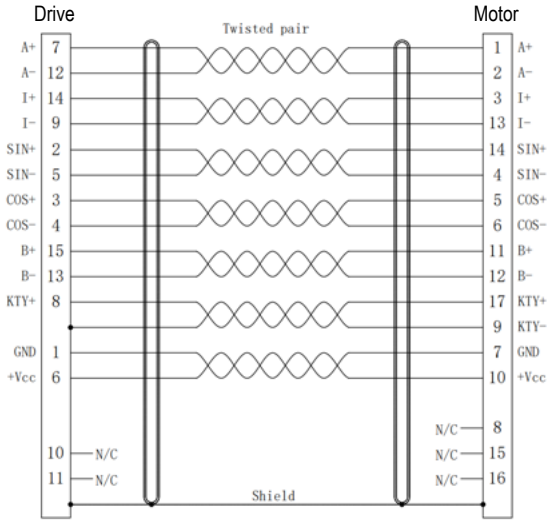
Pin Assignment

Pin	Name	Function	Signal Description
1	GND	Supply ground	Encoder ground
2	SIN+	Encoder absolute channe	1 Vpp differential
3	COS+	Encoder absolute channe	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 pole of 5V DC power supply
7	A+	Encoder incremental channel	1 Vpp differential
8	KTY+	Thermal sensor positive	1 Vpp differential
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

SinCos Encoder



Main Encoder Port (E1)
DB15 Female Plug



(1) N/C——No Connection;

(2) Connector back shell shielded 360°(Bothends);

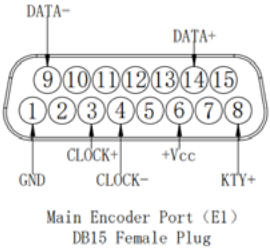
(3) "●" means that the shield or cable should connect to connectors.

● Ebdat Encoder Definition

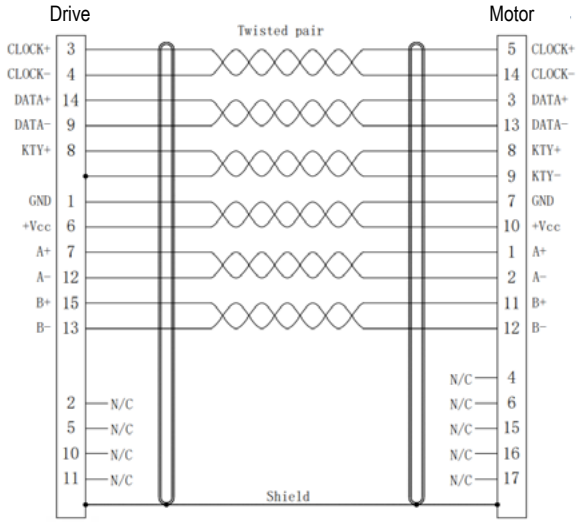
Pin Assignment

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 pole of 8V DC power supply
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

Endat Encoder



Main Encoder Port (E1)
DB15 Female Plug



(1) N/C——No Connection;

(2) Connector back shell shielded 360°(Bothends);

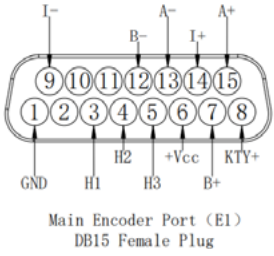
(3) "●" means that the shield or cable should connect to connectors.

● Incremental Encoder Definition

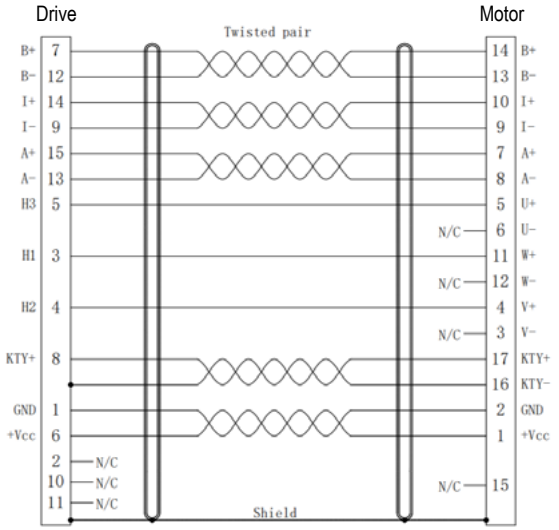
Pin Assignment

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 pole of 8V DC power supply
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

Incremental Encoder



Main Encoder Port (E1)
DB15 Female Plug



(1) N/C——No Connection;

(2) Connector back shell shielded 360°(Bothends);

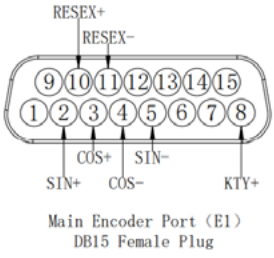
(3) "●" means that the shield or cable should connect to connectors.

● Resolver Definition

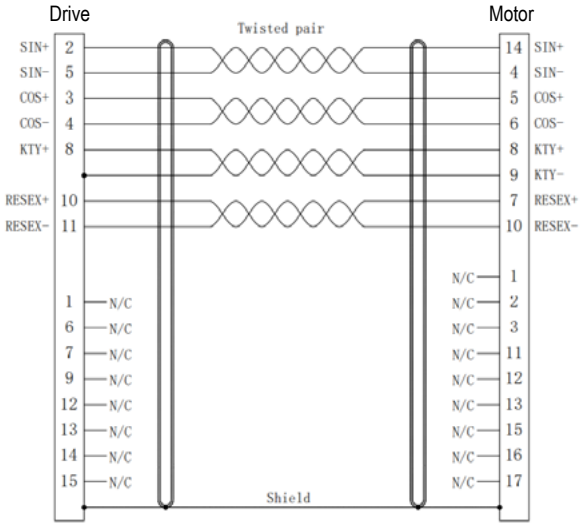
Pin Assignment

Pin	Name	Function	Signal Description
1	—	—	—
2	SIN+	Encoder absolute channe	Differential signal
3	COS+	Encoder absolute channe	Differential signal
4	COS-	Encoder absolute channel	Differential signal
5	SIN-	Encoder 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	—	—	—

Resolver



Main Encoder Port (E1)
DB15 Female Plug



(1) N/C——No Connection;

(2) Connector back shell shielded 360°(Bothends);

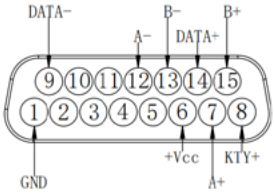
(3) "●" means that the shield or cable should connect to connectors.

● Hiperface Encoder Definition

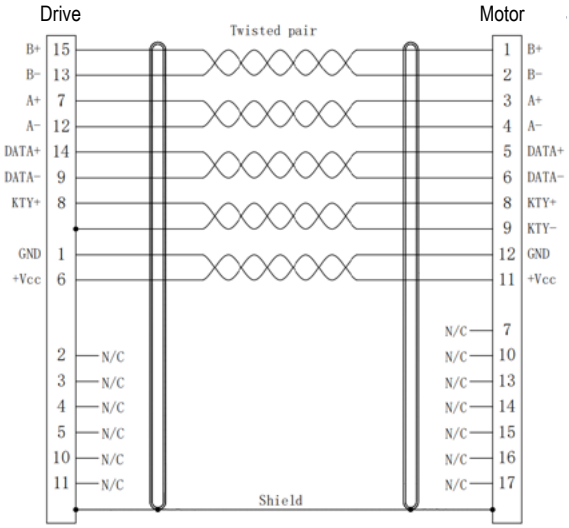
Pin Assignment

Pin	Name	Function	Signal Description
1	GND	Supply ground	Encoder ground
2	—	—	—
3	—	—	—
4	—	—	—
5	—	—	—
6	+Vcc	Encoder supply, 8Vdc	Positive pole of 8V DC power supply
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

Hiperface Encoder



Main Encoder Port (E1)
DB15 Female Plug

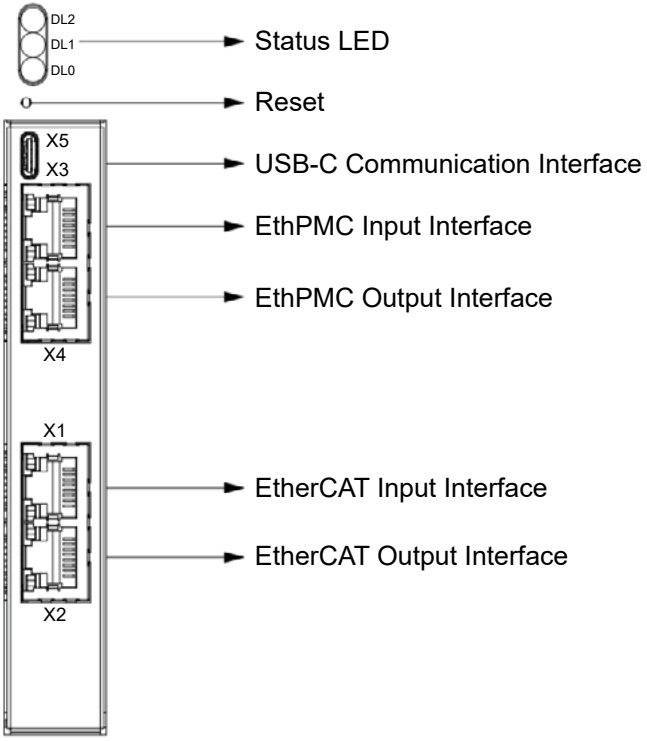


(1) N/C——No Connection;

(2) Connector back shell shielded 360°(Bothends);

(3) "●" means that the shield or cable should connect to connectors.

3.3 DC Control Card



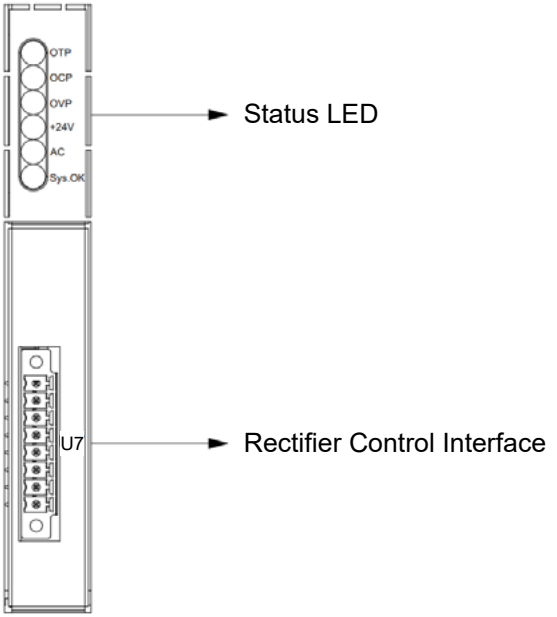
3.3.1 Status LED

	Name	Function	
1	DL2	Fault Status	Blinking light per 0.5s
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

3.3.2 RJ45 引脚分配 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	—	—

3.4 Rectifier Control Card



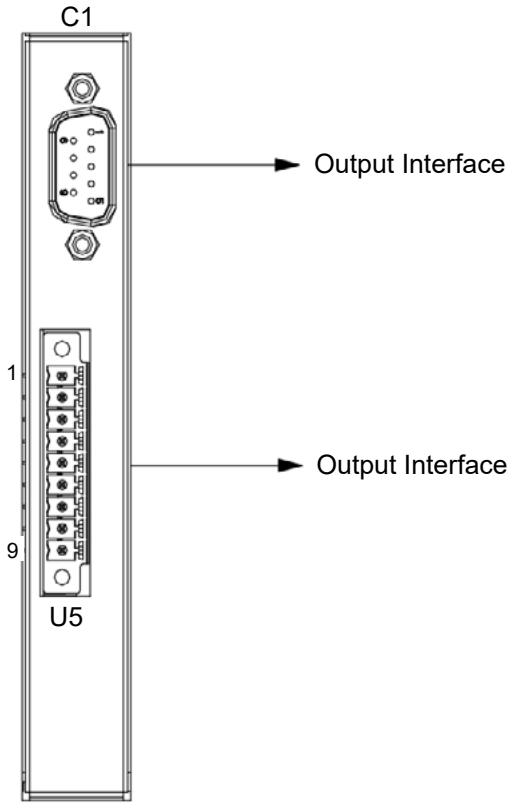
3.4.1 Status LED

Pin	Name	Off	Blink	On
1	OTP	Temperature Normal	Fan Working	Temperature Alarm
2	OCP	Current Normal	Overload Current	Over Current Alarm
3	OVP	DC Bus 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	DC Bus Disable	DC Bus Abnormal	DCBus Enable

3.4.2 Rectifier Control Interface

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

3.5 Auxiliary Encoder Card



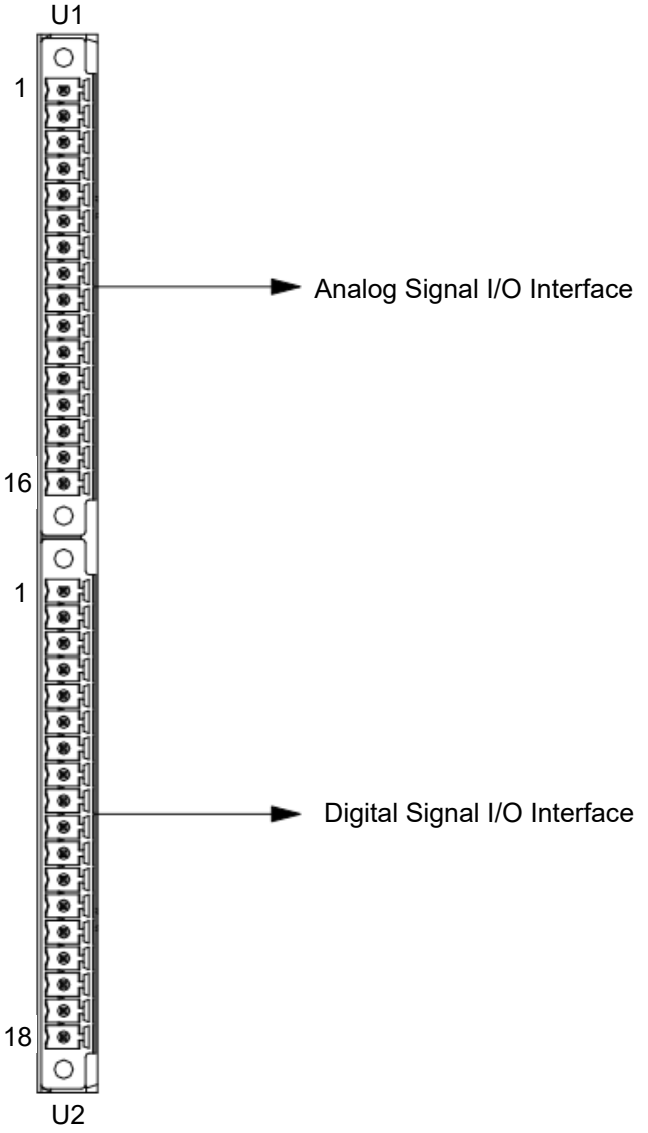
3.5.1 Auxiliary Encoder Output Interface (C1)

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

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 input of B- channel
7	V+	Power supply for auxiliary encoder
8	0V	Auxiliary encoder ground connection
9	SHIELD	Auxiliary encoder shield connection

3.6 Input/Output Card



3.6.1 Auxiliary Encoder Input Interface (U5)

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

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

3.6.2 Auxiliary Encoder Input Interface (U5)

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

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

PERPETUAL MOTION

Version: PHADCOM2208-V03