



**POWER ELECTRONICS**<sup>®</sup>

## **SD500**

— LOW VOLTAGE VARIABLE SPEED DRIVE —



**HARDWARE AND INSTALLATION MANUAL**



# SD500

## Series

VARIABLE SPEED DRIVE

Variable Speed Drive

# Hardware and Installation Manual

**Edition: October 2017**

SD50MTHW01DI Rev. D



REVISIONS CONTROL		
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EN

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## SAFETY SYMBOLS

Always follow safety instructions to prevent accidents and potential hazards from occurring.

In this manual, safety messages are classified as follows:



### WARNING

Identifies potentially hazardous situations where dangerous voltage may be present, which if not avoided, could result in minor personal injury, serious injury or death.

Be extremely careful and follow the instructions to avoid the risk of electrical shocks.



### CAUTION

Identifies potentially hazardous situations, which if not avoided, could result in product damage, or minor or moderate personal injury.

Read the message and follow the instructions carefully.



### NOTICE

Identifies important measures to take in order to prevent damage equipment and warranty lost, as well as encouraging good use and environmental practices.

The following CAUTION symbols are used in this manual and they symbolise:



Hot surface. Be careful and follow the instructions to avoid burns and personal injuries.



Risk of fire. Be careful and follow the instructions to prevent causing an unintentional fire.



Caution, risk of electric shock. Energy storage timed discharge. Wait for the indicated time to avoid electrical hazards.



Caution, risk of hearing damage. Wear hearing protection.

# SAFETY INSTRUCTIONS

## IMPORTANT!

Read carefully this manual to maximize the performance of the product and to ensure its safe use.

In order to appropriately use the soft starter, please, follow all instructions described in the installation manual which refer to transportation, installation, electrical connection and commissioning of the equipment.

Power Electronics accepts no responsibility or liability for partial or total damages resulting from incorrect use of equipment.

Please, pay careful attention to the following recommendations:



### WARNING

---

**Do not remove the cover while the drive is powered or running.**

Doing so may cause an electric shock.

---

**Do not operate the equipment with the front cover removed.**

If you omit this safety recommendation, you may suffer an electric shock due to the high voltage at the terminals or due to the exposure of charged capacitors.

---

**Both wiring and periodic inspections must be carried out at least 10 minutes after the input power is switched off and after checking that the bus voltage has been reduced to less than 30VDC.**

Failure to follow this safety recommendation may result in an electric shock.

---

**Handle switches with dry hands.**

Failure to follow this safety recommendation may result in an electric shock.

---

**Do not use cable with damaged insulation.**

Failure to follow this safety recommendation may result in an electric shock.

---

**Do not subject the cables to abrasion, mechanical stress, strain or pickling.**

Failure to follow this safety recommendation may result in an electric shock.



The equipment contains internal capacitors in the rectification stage. **Always check that the capacitors are discharged before performing any maintenance.**



## CAUTION

**Install the drive on a non-flammable surface. Do not place flammable materials nearby.**  
Otherwise, a fire could occur.

**Disconnect the input power if the drive gets damaged.**  
Otherwise, it could result in an accident or fire.

**After the input power is applied or removed, the drive will remain hot for a couple of minutes.**  
Touching hot parts may result in skin burns.

**Do not apply power to a damaged drive or to a drive with parts missing even if the installation is complete.**  
Otherwise, you could get an electric shock.

**Do not allow lint, paper, wood chips, dust, metallic chips or other foreign matter into the drive.**  
Otherwise, a fire or accident could occur.



## NOTICE

### RECEPTION

- The SD500 is carefully tested and completely packaged before leaving the factory.
- In the event of transport damage, please ensure that you notify the transport agency and POWER ELECTRONICS: 902 40 20 70 (International +34 96 136 65 57) or your nearest agent, within 24hrs from receipt of the goods.

### UNPACKING

- Make sure the model and serial number of the variable speed drive are the same on the box, delivery note and unit.
- Each variable speed drive is supplied with the Hardware and Installation Manual.

### RECYCLING

Packaging equipment must be recycled. Separate all different materials (plastic, paper, cardboard, wood...) and place them in the corresponding containers. Ensure waste collection is properly managed with a Non-Hazardous Waste Agent.



To guarantee health and natural environmental sources protection, the European Union has adopted the WEEE directive concerning discarded electric and electronic equipment (SEEA).

**Waste of electrical and electronic equipment (WEEE) must be collected selectively for proper environmental management.**

Our products contain electronic cards, capacitors and other electronic devices that should be separated when they are no longer functional. These WEEEs should be managed accordingly with a Hazardous Waste Agent.

Power Electronics promotes good environmental practices and recommends that all its products sold outside of the European Union, once they reach the end of their life, are separated and the WEEE managed according to the particular country applicable legislation (especially: electronic cards, capacitors and other electronic devices).

If you have any questions about the electric and electronic equipment waste, please contact Power Electronics.

**EMC**

- According to EN 61800-3, the frequency inverter is not intended to be used in low voltage public network which supplies in domestic premises. Radio frequency interference is expected in such a network.
- With additional activities (e.g. EMC-Filter), it is possible to use these devices in the "First environment" according to EN 61800-3 Category C2.

**CAPACITORS DEPLETION**

If the drive has not been operated for a long time, capacitors lose their charging characteristics and are depleted. To prevent depletion, once a year run the device under no-load conditions during 30-60 minutes.

**SAFETY**

Before operating the drive, read this manual thoroughly to gain an understanding of the unit. If any doubt exists, please contact POWER ELECTRONICS (902 40 20 70 / +34 96 136 65 57) or your nearest agent.

- Wear safety glasses when operating the drive when power is applied and the front cover is removed.
- Handle the drive with care according to its weight.
- Install the drive according to the instructions within this manual.
- Do not place heavy objects on the drive.
- Ensure that the mounting orientation is correct.
- Do not drop the drive or subject it to impact.
- The SD500 drives contain static sensitive printed circuits boards. Use static safety procedures when handling these boards.
- Avoid installing the drive under conditions that differ from those described in the Technical Characteristics section of this manual.

**CONNECTION PRECAUTIONS**

- To ensure correct operation of the drive, it is recommended to use a SCREENED CABLE for the control wiring.
- For EMERGENCY STOP, make sure supply circuitry is open.
- Do not disconnect motor cables if the input power supply remains connected. If the incoming power is connected and applied to the output terminals (U, V, W), the internal circuits of the SD500 Series will be damaged.
- It is not recommended to use a 3-wire cable for long distances. Due to increased leakage capacitance between conductors, over-current protective feature may not operate correctly.
- Do not use power factor correction capacitors, surge suppressors, or RFI filters on the output side of the drive. Otherwise, these components could be damaged.
- Always check whether the DC Link LED is OFF before wiring the terminals. The capacitors may hold high-voltage even after the input power is disconnected. Use it with caution to prevent the possibility of personal injury.

The cable that connects the drive with the motor must be shorter than 100m if the cable is unshielded and 50m if the cable is shielded while the carrier frequency is below 2.5kHz. For drives below 11kW, this distance is reduced by half. For longer distances, consult Power Electronics.

**TRIAL RUN**

Verify all parameters before operating the drive. Alteration of parameters may be required depending on the application and load.

Always apply voltage and current signals to each terminal that are within levels indicated within this manual. Otherwise, damage to the drive may result.

### OPERATION PRECAUTIONS

- When the Auto Restart function is enabled, keep clear of driven equipment, as the motor will restart suddenly after the fault is reset.
- The “STOP / RESET” key on the keypad is only active if the appropriate function setting has been made. For this reason, install a separate EMERGENCY STOP push button that can be operated at the equipment.
- If a fault reset is made with the reference signal still present, then a restart will occur. Verify that it is permissible for this to happen, otherwise an accident could occur.
- Do not modify or alter anything within the drive.
- Before programming or operating the SD500 Series, initialise all parameters back to their factory default values.

### GROUND CONNECTION

- The drive is a high frequency switching device; therefore, leakage current may flow. Ground the drive to avoid electric shock. Use caution to prevent the possibility of personal injury.
- Connect only to the dedicated ground terminal of the drive. Do not use the case or the chassis screw for grounding.
- When installing, grounding wire should be connected first and removed last.
- The ground cable must have a minimal cross sectional area that meets local country electrical regulations.
- Motor ground must be connected to the drive ground terminal and not to the installation’s ground. We recommend that the section of the ground connection cable should be equal or higher than the active conductor.
- Installation ground must be connected to the drive ground terminal:

Frame	Grounding Cable Section (mm <sup>2</sup> )	
	Class 200V	Class 400V
1	3.5	2
2	5.5	3.5
3	14	8
4	22	14
5	-	22
6	-	38

### CYBER SECURITY DISCLAIMER

This product is designed to be connected to and to communicate information and data via a network interface. The customer is the sole responsible for providing and continuously ensuring a secure connection between the product and customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of antivirus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

Power Electronics and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

# INTRODUCTION

# 1

The SD500 low voltage drives by Power Electronics are the ideal frequency converters for the drive of motors from 0.75kW to 90kW. The equipment offers high precision and multiple communication protocols, maximum efficiency and motor care. The SD500 series is an affordable solution for all budget sizes and industry applications.

**EN**

The SD500 products provide high efficiency, maximum control, functional safety, durability, straightforward commissioning and simple maintenance for the whole range. They are available in six frames to optimize the usable space.

# CONFIGURATION TABLE & STANDARD RATINGS

# 2

## Configuration Table

### EXAMPLE

Code: SD5032 2 2

SD5	032		2		2	
Series SD500	Output Current		Rated Current		Protection Degree	
SD5	002	2A	2	230VAC	2	IP21
	005	5A	4	400VAC		
	...	...				
	150	150A				

### CODIFICATION EXAMPLES:

- **SD501222** SD500, 12A, 230Vac, Degree of protection IP21.
- **SD511042** SD500, 110A, 400Vac, Degree of protection IP21.

The following figure shows an example of a designation label:



## Standard Ratings at 200Vac – 230Vac (-15% to +10%)

FRAME	CODE	Operation Temperature 50°C HEAVY LOAD				Operation Temperature 40°C NORMAL LOAD			
		Rated Current (A)	Motor Power at 230Vac		Overload at 150% during 60s	Rated Current (A)	Motor Power at 230Vac		Overload at 110% during 60s
			kW	HP			kW	HP	
1	SD5005 2 2	5	0.75	1	7.5	6.8	1.5	2	7.5
	SD5008 2 2	8	1.5	2	12	11	2.2	3	12
	SD5012 2 2	12	2.2	3	18	16	3.7	5	18
	SD5016 2 2	16	3.7	5	24	22	5.5	7.5	24
2	SD5024 2 2	24	5.5	7.5	36	33	7.5	10	36
	SD5030 2 2	32	7.5	10	48	44	11	15	48
3	SD5045 2 2	46	11	15	69	60	15	20	69
	SD5060 2 2	60	15	20	90	74	18.5	25	90
4	SD5075 2 2	74	18.5	25	111	90	22	30	111
	SD5090 2 2	88	22	30	132	120	30	40	132

Power ranges for standard 4-pole AC motors (1500rpm)

For other configurations, please contact Power Electronics.

Check the rated current of the motor plate to ensure compatibility with the chosen frequency inverter.

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## Power Range at 380Vac – 480Vac (-15% to +10%)

FRAME	CODE	Operation Temperature 50°C HEAVY LOAD				Operation Temperature 40°C NORMAL LOAD			
		Rated Current (A)	Motor Power at 400Vac		Overload at 150% during 60s	Rated Current (A)	Motor Power at 400Vac		Overload at 110% during 60s
			kW	HP			kW	HP	
1	SD5002 4 2	2.8	0.75	1	4.4	4	1.5	2	4.4
	SD5004 4 2	4	1.5	2	6	5.4	2.2	3	6
	SD5006 4 2	6	2.2	3	9	8	3.7	5	9
	SD5008 4 2	8.5	3.7	5	13.2	12	5.5	7.5	13.2
2	SD5012 4 2	12	5.5	7.5	18	16	7.5	10	18
	SD5018 4 2	16.5	7.5	10	25	23	11	15	25
3	SD5024 4 2	24	11	15	36	32	15	20	36
	SD5030 4 2	30	15	20	45	40	18.5	25	45
4	SD5039 4 2	39	18.5	25	58	48	22	30	58
	SD5045 4 2	45	22	30	67	61	30	40	67
5	SD5060 4 2	61	30	40	91	78	37	50	91
	SD5075 4 2	75	37	50	112	100	45	60	112
	SD5090 4 2	91	45	60	136	115	55	75	136
6	SD5110 4 2	110	55	75	165	150	75	100	165
	SD5150 4 2	152	75	100	228	180	90	125	228

Power ranges for standard 4-pole AC motors (1500rpm)

For other configurations, please contact Power Electronics.

Check the rated current of the motor plate to ensure compatibility with the chosen frequency inverter.

# TECHNICAL CHARACTERISTICS

## 3

<b>INPUT</b>	Power Range	0.75kW – 90kW	
	Power Supply	200 - 230 Vac (-15% to +10%), 380 - 480Vac (-15% to +10%) Three phase	
	Input Frequency	50 - 60 Hz $\pm$ 5%	
	Input Power Factor	>96%	
	Input EMC Filter	C2 classification 0,75 to 22kW Classification C3 from 30kW onwards <sup>[1]</sup>	
	Rectifier Technology	Diode	
	Harmonic Filter	DC Reactance	
Current THDi (%)	<37%		
<b>OUTPUT</b>	Overload current capacity	Constant Torque: 150% during 60 sec. Variable Torque: 110% during 60 sec.	
	Output Frequency	0 to 400Hz <sup>[2]</sup>	
	Resolution of the Frequency set	Operation with digital signals: 0.01Hz Operation with analogue signals: 0.06Hz (maximum frequency: 60Hz)	
	Modulation Frequency	Maximum 15kHz <sup>[3]</sup>	
	Control Method	V/F Control, Slip compensation, Open Loop Vector Control (sensorless), Closed Loop Vector Control	
	Motor Cable Length	100m unshielded cable <sup>[4]</sup> 50m shielded cable	
	dV/dt Filter (optional) Dynamic Brake	500-800V/ $\mu$ s - 300m unshielded cable, 150m shielded cable Integrated in frames 1 to 4. Optional in frames 5 and 6.	
<b>ENVIRONMENTAL CONDITIONS</b>	Degree of protection	IP21, Display IP54	
	Working temperature	-20°C to +50°C	
	Storage temperature	-20°C to +70°C	
	Relative humidity	<90%, without condensation	
	Altitude	1000m	
	Altitude derating (> 1000)	1% for every 100m; maximum of 3000m	
	Vibration	5.9m/sec <sup>2</sup> (=0,6G)	
	Ventilation	Air forced refrigeration	
<b>PROTECTIONS</b>	Overvoltage	Low Voltage	Overcurrent
	Overcurrent detection	Overheating of the inverter	Motor thermal Protection
	Phase loss protection	Overload Protection	Communication Error
	Reference Signal Loss	Hardware Failure	Cooling Fan Fault
	Pre-PID failure	Absence of motor trip	External brake failure
	Current limitation	Overload	Underload
	Encoder error Speed reference loss	Fan fault	Keypad commands loss
<b>INPUTS / OUTPUTS</b>	Analogue Inputs	1 input 0-10Vdc, $\pm$ 10Vdc / 1 input 4-20mA / 0-20mA	
	Digital Inputs	8 configurable inputs	
	PTC Connection	Yes. With analogue or digital specific setup for PTC.	
	Analogue Outputs	1 0-10V output (Max. Output Voltage 10V, Max. Output Current 10mA) 1 0-20mA / 4-20mA Output (Max. Output Current 20mA).	
	Relay Output	1 Switched programmable relay (250VAC, 5A; 30VDC, 5A) 1 Programmable normally open relay (250VAC, 5A) 1 Programmable open collector transistor output (24VDC, 50mA)	
	Optional I/O expansion module	3 Programmable digital inputs; 2 Programmable analogue inputs; 3 Programmable digital outputs; 2 Programmable analogue outputs	
	PLC module	6 Programmable digital inputs; 4 relay outputs expandable up to 14	
	Encoder module	Line controller or opened collector, stream of bits reference. 5/12/15V isolated power supply	
<b>COMMUNICATION</b>	Standard Hardware	RS485 Port	
	Standard Protocol	Modbus-RTU	
	Optional Hardware	Profibus-DP, Ethernet, LonWorks, DeviceNet/CANopen, Profinet boards	

	Optional Protocols	Profibus, Modbus TCP, Ethernet IP, LonWorks, CANopen, DeviceNet, Profinet
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<b>CONTROL PANEL</b>	Alphanumeric Display	4 Lines of 16 characters. Parameter setting with arrows Independent memory
	Removable	1m, 2m and 3m optional
	Connection	RJ45
	Status Leds	ON LED: Power on the control board RUN LED: Power on, the motor is powered by the SD500 FAULT LED: Flashing indicates that the equipment is in fault
	Membrane Keyboard	VFD status, DC Bus voltage, Motor current, Output motor speed, Motor torque, Drive temperature, Input/Output status, PID reference and feedback, Number of operating pumps
<b>CERTIFICATION</b>	CE, cTick	

[1] For other EMC categories, an optional external filter will be used. For additional information ask Power Electronics.

[2] The maximum frequency is 300Hz when selecting the open loop control in the programming parameters.

[3] The maximum allowable depends directly on the power of the drive. Consult the SD500 Software and Programming manual for additional information.

[4] The carrier frequency must be below 2.5kHz. For drives below 11kW, this distance is reduced by half. Reinforced insulation motors allow higher motor cables length. Consult Power Electronics.

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# RECEPTION, HANDLING AND TRANSPORTATION

## 4



### CAUTION

---

**Read the following installation instructions carefully to install the equipment correctly.** Otherwise, the equipment can be damaged and/or lead to injury.

---

## Reception and Storage

The SD500 has been carefully tested and packed before delivery. In the event of transport damage, please ensure that you notify the transport agency and Power Electronics: 902 40 20 70 (International +34 96 136 65 57) or your nearest agent, within 24hrs from receipt of the goods.

Make sure the model and serial number of the drive is the same on the delivery note and unit.

The drive's storage should be sun and moisture protected and with an ambient temperature between -40°C and +70°C, < 95 RH without condensation. It is recommended to not pile more than two units on top of each other.

## Handling and Transportation

Only the transport methods described in this document or in the delivery notes are permissible. Any other transport method or system could damage the unit.

The SD500 is delivered horizontally in a cardboard box. Move the complete box as close as possible to its final installation place before unpacking to avoid any damage during transportation.

Frames 1 to 4 drives can be transported by a person taking into account their weight. It is not recommended for persons suffering from back problems to try carrying the drives.

Frames 5 and 6 drive's discharge must be done by two persons using the side handles in order to avoid drive's overturning or dropping the drive. They must be transported with a pallet truck or with a forklift, keeping in mind the load distribution and centre of gravity. Check the size and weight of the VFD components to choose proper lifting equipment with a capacity greater than the drive's weight.

Unpack the drive carefully. To protect the product from damage, do not use edge tools. After opening the package, please check the goods contained. Verify the items contained within the package with the packing inventory list. Please set aside and reserve, if contained, the case of spare parts shipped with the product. There should be no evident damage caused by vibration, dropping or moisture.



## CAUTION

---

**Do not load the drives if you suffer from back problems**, it could cause damage to the equipment and lead to injury to people.

---

To unpack, open the top part of the box and pull it up to release it.

To rise to an upright position take the drive from its top part and lift it carefully pulling it out.

Avoid brusque movements and shocks during transportation. At the time of placing the drive on the floor or another surface, stop lowering it just before reaching the surface and then slowly lower it on the surface to avoid shock.

During handling and transportation, the goods should not be overturned, inverted, tilted, impacted or exposed to moisture.

EN

# MECHANICAL INSTALLATION

# 5



## CAUTION

**The installation must be done by trained personnel.**

Otherwise, the equipment can be damaged and/or lead to injury to people.

**Do not install the drive on a flammable surface during operation.**

## Environmental Ratings

It is recommended to follow the instructions of this manual to ensure the correct operation of the drive.

The installer has the responsibility to properly install the equipment indoors to ensure the ambient conditions of the VFD. Additionally, the installer is ultimately responsible for following local regulations.

The environmental ratings are as followed:

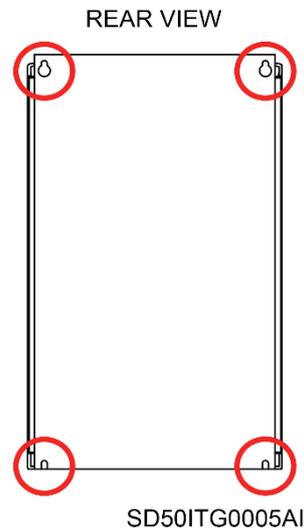
Environmental category:	Indoor
Wet locations:	No
Pollution degree:	PD3
Ingress protection rating:	Drive: IP21 Display: IP54
Operation Ambient temperature:	-30°C to 50°C
Storage Ambient temperature:	-40°C to 70°C
Humidity:	<90 % (no condensation)
Maximum altitude and power derating:	1000m 1% PN(kW) per 100m; 3000m maximum
Vibration (IEC60068-2-6):	5.9m/sec <sup>2</sup> (=0.6G)
Overvoltage category:	III
Protection class:	Class 1
Audible Noise:	

FRAME	1	2	3	4	5	6
MAX. NOISE LEVEL (dB)	54	54	56	56	56	62.5

## Drive Mounting

The variable speed drives of the SD500 series are wall-mounting drives.

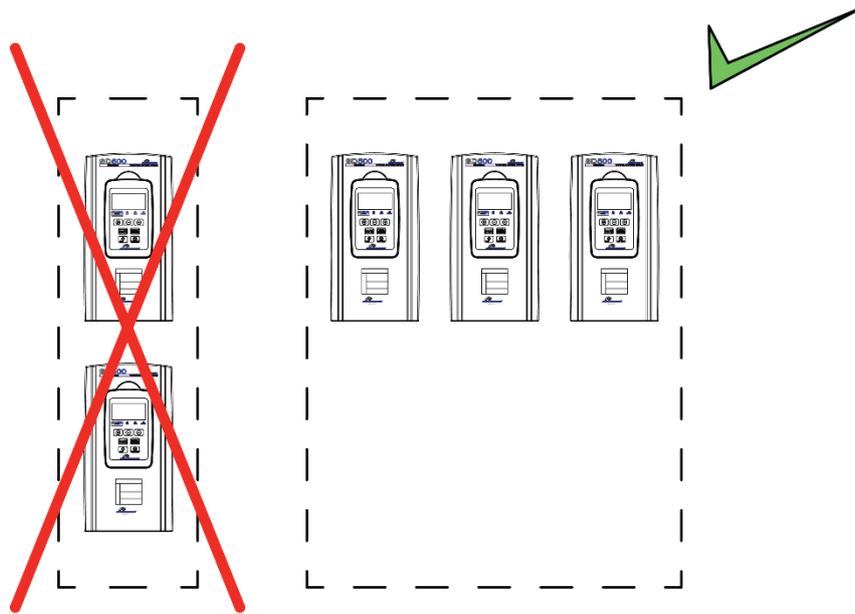
The installation method and mounting location must be suitable for the weight and dimensions of the drive. Power Electronics recommends hanging the SD500 cabinet on a solid wall or structure through the anchorages placed on the rear part of the drive, which supports the VFD's weight and the possible forces generated by the wiring.



First, the installer must allocate the screws in the wall or structure according to the dimensions section, hang the drive, then tighten the screws. The next table shows the recommended screws depending on the drive's frame.

FRAME	1	2	3	4	5	6
SCREW	M4	M4	M6	M6	M8	M8

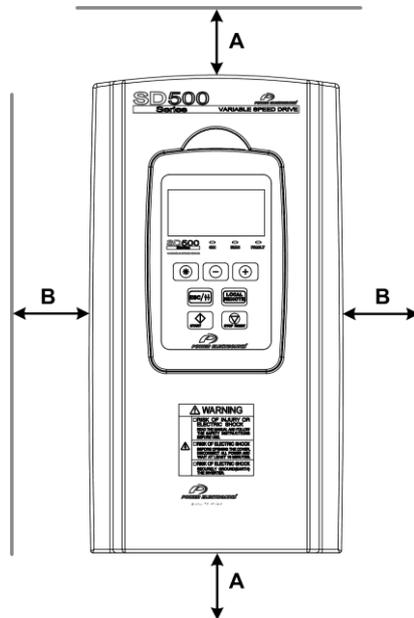
If you wish to install two or more drives in a technical room or cabinet, install them in a horizontal way and respect the minimum clearances in order to avoid that the hot air generated could be inspired again.



SD50ITG0004A

## Clearances

The drive should be mounted vertically. Leave enough space (vertically and horizontally) between adjacent drives.



SD50ITM0002A

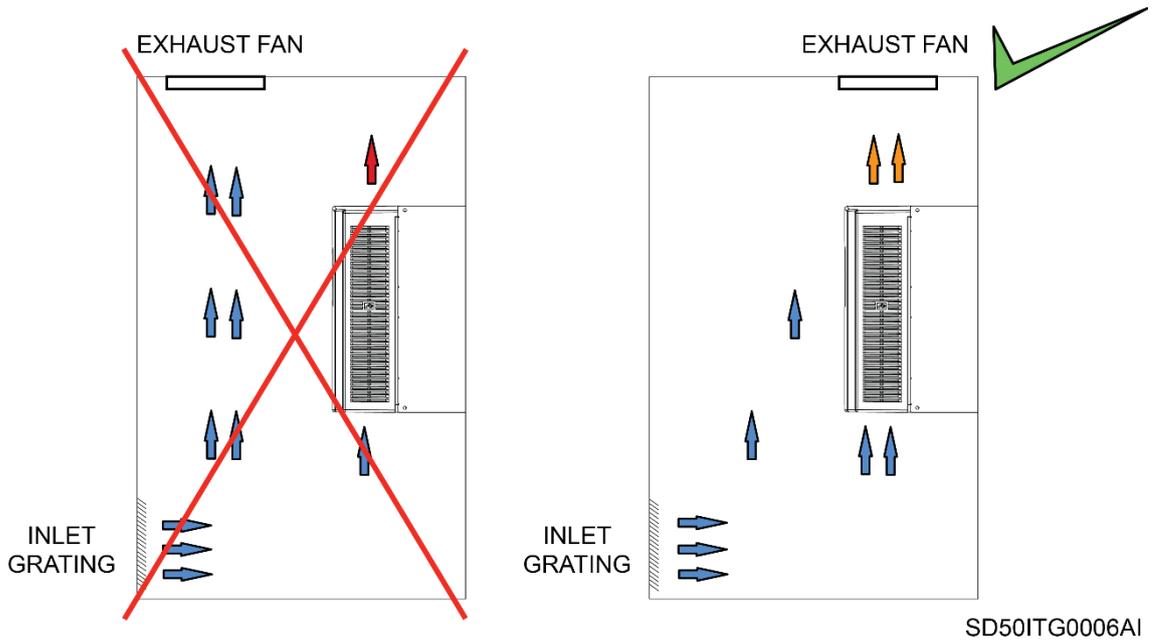
DISTANCE	DRIVES' POWER	
	<30kW	≥30kW
A	100mm	500mm
B	50mm	200mm

## Cooling

The heat sources inside the equipment correspond with the inverter bridge (IGBTs), rectifier bridge and the input filter.

The cooling system of the drive depends on the frame.

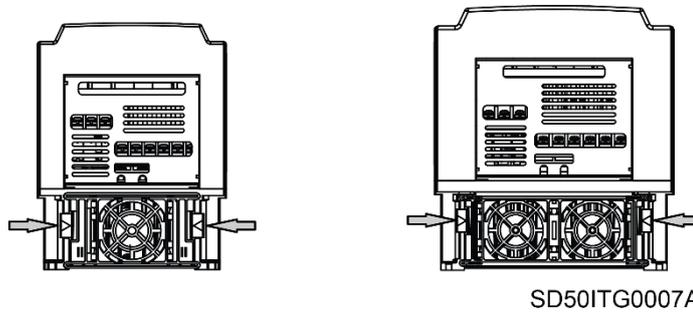
The installer must ensure that the air flows inside the technical room or cabinet, taking into account that hot air cannot be inspired again by the drive.



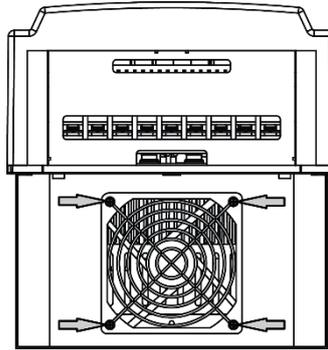
EN

Frame 1 SD500 drives integrate a cooling fan in their bottom part. To replace this fan, push the brackets on the bottom in the direction of the arrow, pull it forward and detach the connector.

Frame 2 drives present the same extracting system but using two fans in their bottom part.

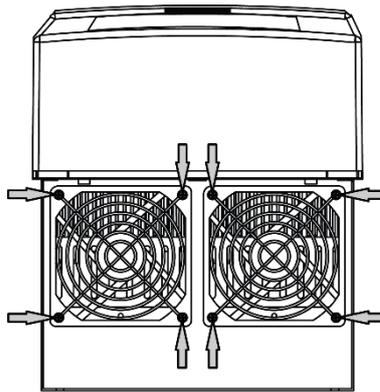


Frame 3 and 4 drives integrate a cooling fan in their bottom part. To replace this fan, the user has to unscrew the four screws located in its corners and disconnect the connector.



SD50ITG0008A

Frame 5 and 6 drives integrate two cooling fans in their top part. To replace these fans, the user has to unscrew the eight screws located in their four corners and disconnect the connectors.



SD50ITG0009A

The following tables contain information about efficiency, losses and air flow for all SD500 series drives:

Frame	Code	Efficiency (%)	Power losses (W)	Calorie losses (kcal)	Fans
					Flow rate
1	SD5005 2 2	96.00	15	13	58,8m³/h 34,6cfm
	SD5008 2 2	96.00	45	39	
	SD5012 2 2	95.00	95	82	
	SD5016 2 2	95.00	170	146	
2	SD5024 2 2	96.50	178	153	117,6m³/h 69,2cfm
	SD5030 2 2	96.80	225	194	
3	SD5045 2 2	96.80	422	363	294m³/h 173cfm
	SD5060 2 2	96.00	560	482	
4	SD5075 2 2	96.50	608	522	588m³/h 346cfm
	SD5090 2 2	97.00	620	533	

Frame	Code	Efficiency (%)	Power losses (W)	Calorie losses (kcal)	Fans
					Flow rate
1	SD5002 4 2	96.50	11	10	58,8m³/h 34,6cfm
	SD5006 4 2	98.00	15	13	
	SD5006 4 2	96.70	58	50	
	SD5008 4 2	96.70	107	92	
2	SD5012 4 2	97.00	150	129	117,6m³/h 69,2cfm
	SD5018 4 2	97.00	210	181	
3	SD5024 4 2	97.50	235	202	294m³/h 173cfm
	SD5030 4 2	97.50	335	288	
4	SD5039 4 2	97.90	348	300	588m³/h 346cfm
	SD5045 4 2	97.90	422	363	
5	SD5060 4 2	97.00	786	676	588m³/h 346cfm
	SD5075 4 2	97.00	996	857	
	SD5090 4 2	97.00	1236	1063	
6	SD5110 4 2	97.50	1261	1084	856,68m³/h 504,22cfm
	SD5150 4 2	97.50	1761	1514	

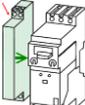
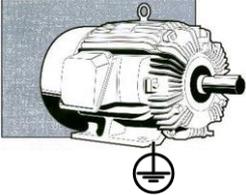
# POWER CONNECTION

## 6

### Basic Configuration

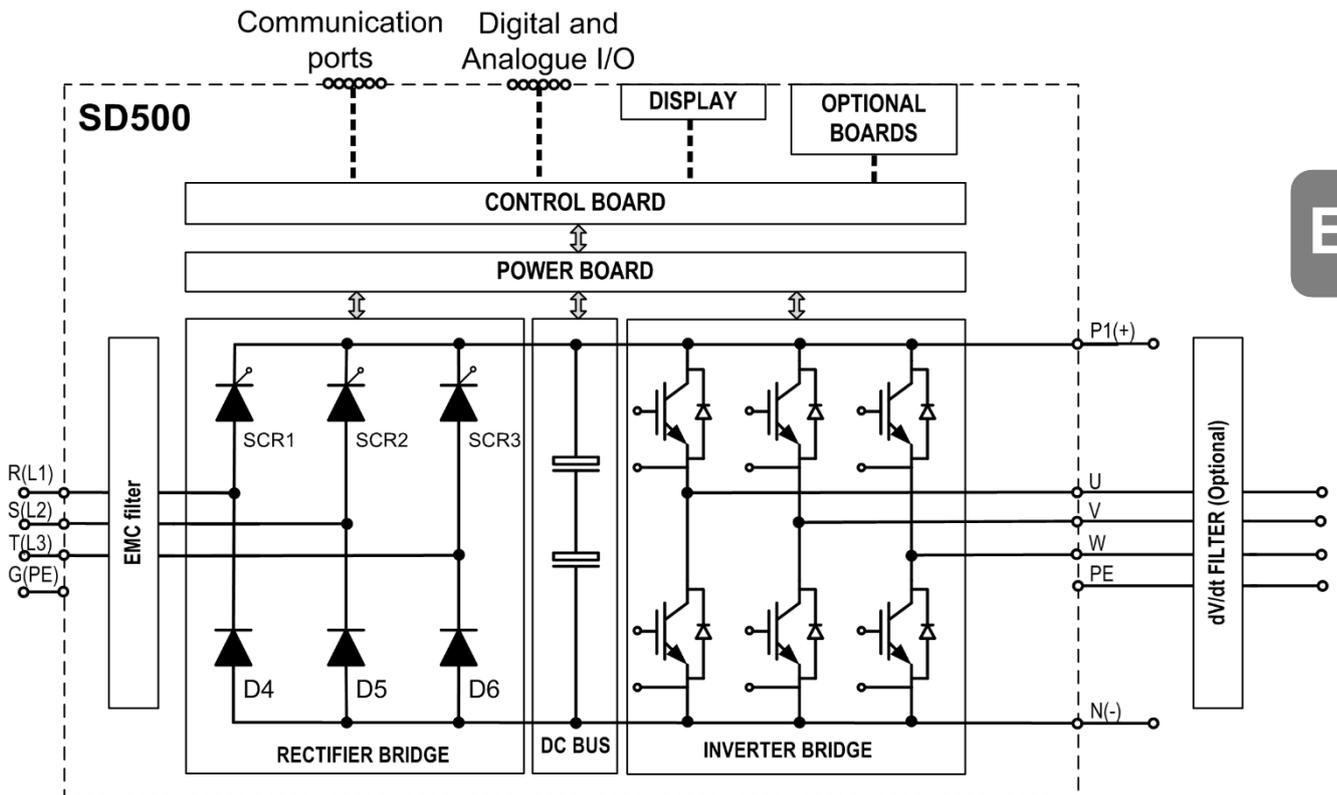
To install the drive, the additional tools described below may be required. To ensure proper operation of the drive, the supplementary devices must be properly selected and used accordingly. An improper installation or misapplication of the drive can result in a system malfunction, a reduction of the equipment's life or damage to the equipment's components. This manual should be carefully read and understood before proceeding.

The standard equipment in the SD500 includes DC reactance and RFI filters in all models up to 30kW.

	<b>AC Power Supply</b>	Use a power source with a voltage within the permissible range of the drive's input power rating.
	<b>Mounted Case Circuit Breaker (MCCB)</b>	Select circuit breakers or fuses in accordance with applicable national and local codes. We recommend using specified circuit breakers or fuses to operate with the drive.
	<b>Inline Magnetic Contactor</b>	Install if necessary. When installed, do not use it for the purpose of starting or stopping the drive.
	<b>Installation and Wiring</b>	To operate the drive, install the drive in the proper orientation and with proper clearness. Incorrect terminal wiring may result in damage of the equipment. Make sure that the grounded terminal is properly connected to the ground of the installation.
	<b>Motor</b>	Do not connect power factor capacitors, surge arrestors or radio noise filters to the output of the drive. Connect the earth to the motor properly.

## Topology

The SD500 drive operates according to the principle of pulse-width modulation (PWM). By varying the power supply voltage and the grid frequency, it is possible to control the speed and torque of the connected three-phase induction motors by means of its main components: the rectifier bridge, the DC bus, the inverter bridge, and the power and control board.



SD50DTG0002AI

The SD500 includes an electromagnetic compatibility filter (EMC) in order to reduce the noise produced by the electromagnetic waves that can be enabled or disabled. For more information, see section 6.5.

The SD500 Series rectifier bridge is built in diodes for frames 1 to 4 and in thyristor diodes for frames 5 and 6. In addition, the drives include as standard a harmonic filter that reduces harmonics and improves the power factor by using a DC reactance integrated in the DC bus. Check the following schematics for more information.

The SD500 includes a power and a control board to control the inverter IGBT's bridge shooting, the soft charge, the DC bus voltage and the motor performance in all frames, and the rectifier thyristor diode's bridge shooting in frames 5 and 6. In addition, the control board integrates the interface terminals such as communication ports, the digital and analogue inputs and outputs, the alphanumeric display, etc.

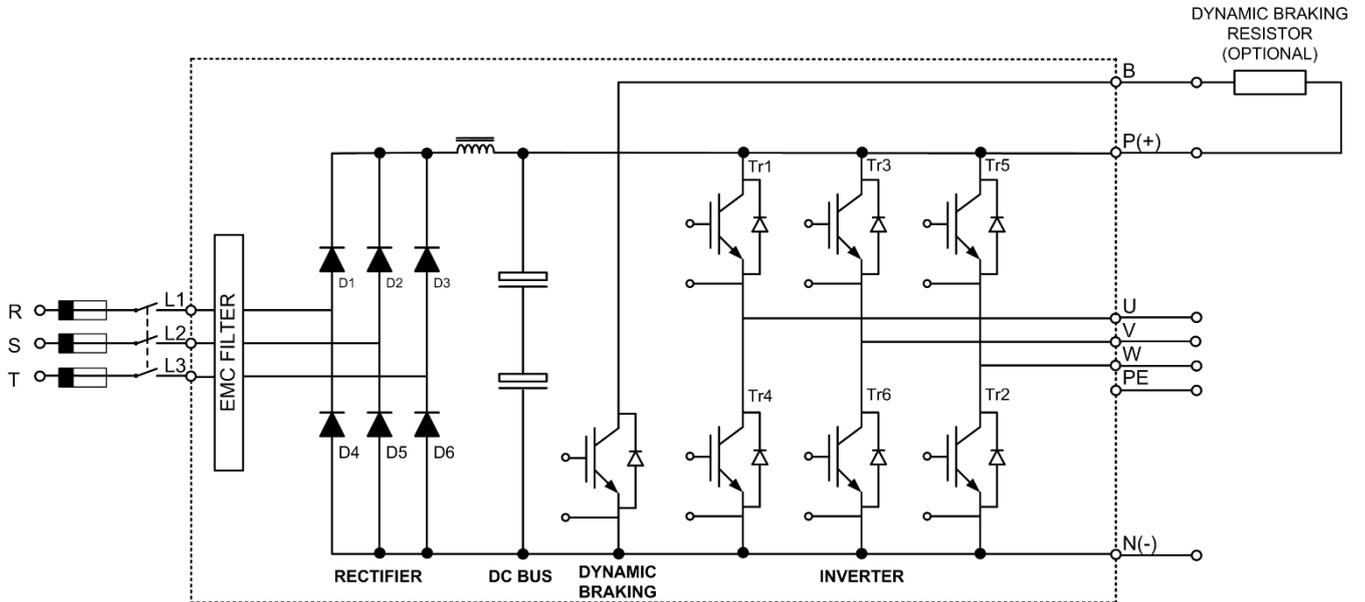
The inverter bridge generates the PWM wave that controls the motor performance (voltage, current, torque, etc...).

The dynamic braking unit is integrated in frames 1 to 4 and external in frames 5 and 6. For more information see section 12

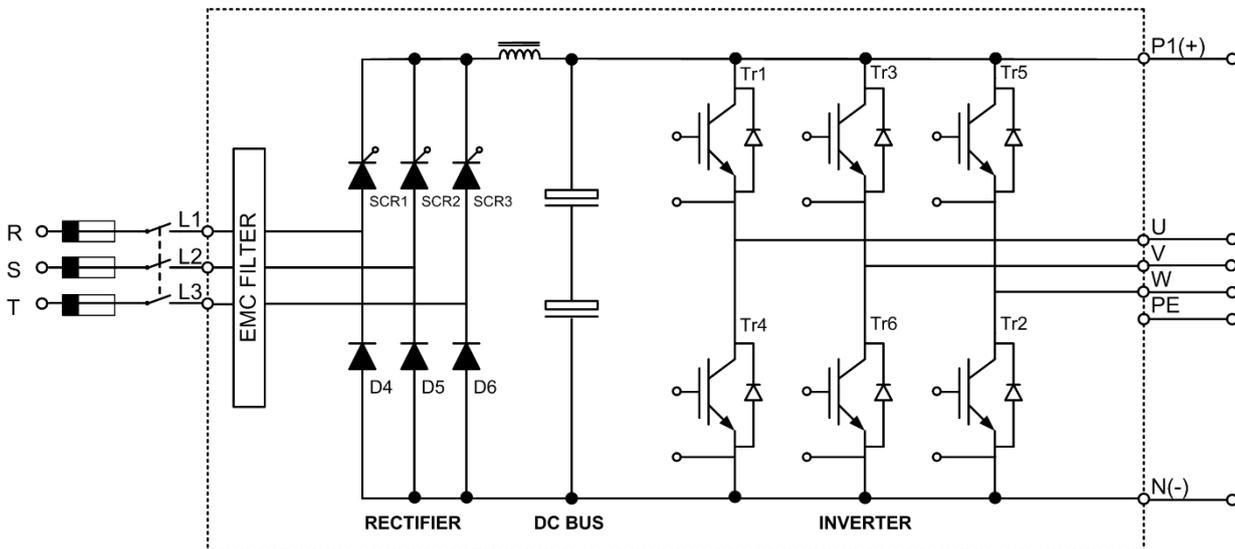
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The SD500 Series by Power Electronics optionally integrates output dV/dt filters that reduce the dV/dt rise time significantly below 500V/μs - 800V/μs. Furthermore, it reduces the voltage peaks at the motor windings, the common mode currents and the EMC emissions. For more information see sections 6 and 12.

The following schematics illustrate the internal structure of the SD500:



SD50DTP0012AI



SD50DTP0011AI

## Power Terminals Access

To access the power terminals of the supply of the drive and the output of the motor, remove the front cover as shown in the next figure. First, remove the display, unscrew the bottom screw, and then unclip the four claps located on both sides of the plastic cover.



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## Power Terminals Description

The power terminals are distributed according to the data shown in the table and figures below.

Terminal	Description
R(L1)	Input Supply Voltage Connection
S(L2)	Three-phase 200 – 230VAC
T(L3)	Three-phase 380 – 480VAC
G	Ground terminal
P(+)	Positive Terminal DC BUS – Frames 1 to 4
P1(+)	DC BUS Positive Terminal – Frames 5 and 6 – 400Vac
N(-)	DC BUS Negative Terminal
B	Connection terminal for the brake resistance – Frames 1 to 4
P2	Connection terminal for the brake resistance – Frames 5 and 6
U	Output voltage terminals to the motor.
V	
W	
G	Ground terminal



SD50ITP0009A



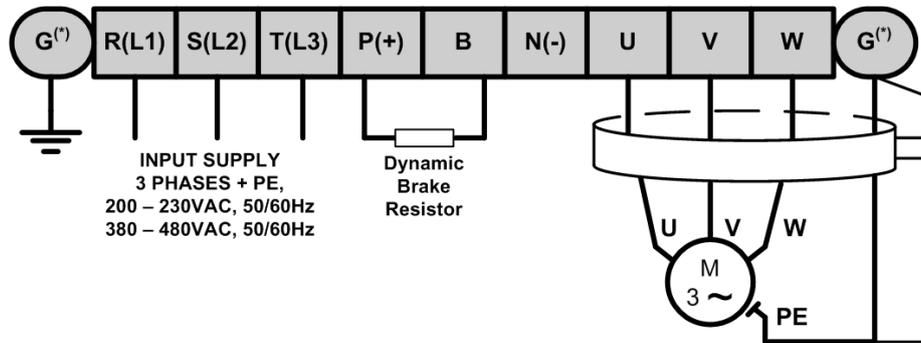
SD50ITP0010A

## Power Connection and Wiring

### Power terminal wiring for Frames 1 to 4 (230Vac & 400Vac)

This configuration is valid for the next models: SD500522 to SD509022 (for voltage supply of 230Vac) and SD500242 to SD504542 (for 400Vac)

These drives have a built-in braking unit, so it is only necessary to connect the external braking resistor required by the application and depending on the required braking effort.



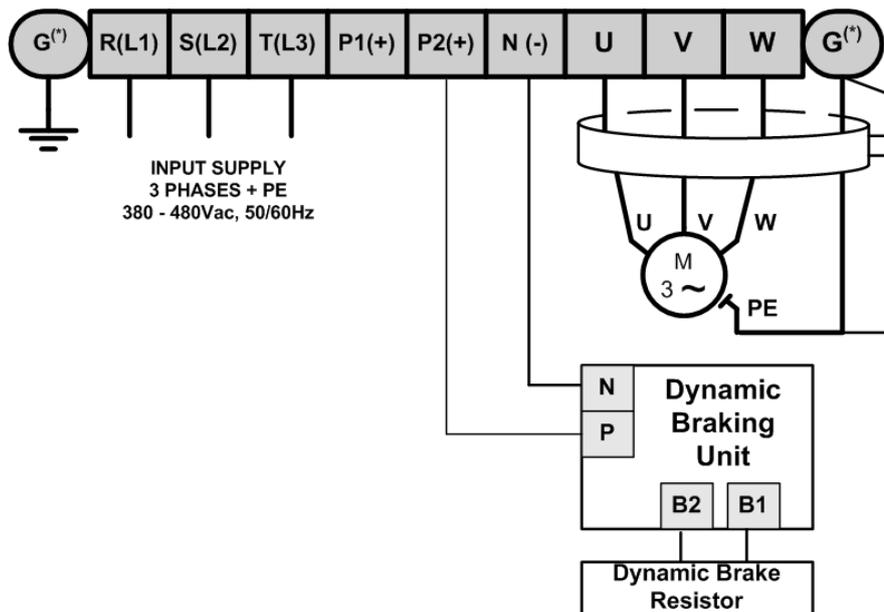
(\*) Ground Terminals placed below Main Terminals

SD50DTP0001AI

### Power wiring for Frames 5 and 6 (400Vac)

This setting is valid for SD507542 to SD515042 models for voltage supply of 400Vac.

The braking capacity depends directly on the effort required. The corresponding dynamic braking unit must be connected. The equipment mentioned above needs the external Dynamic Braking Unit, where the external braking resistance will be connected.



(\*) Ground Terminals placed below Main terminals.

SD50DTP0002AI

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## Wiring and Terminal section

Refer to the following table for the wiring terminal sections and screws in the connection of the power input (R, S, T) and output to the motor (U, V, W).

Rated Power of the Drive		Size of the terminal screw	Torque* (Kg-cm)	Cable**(mm <sup>2</sup> )	
				R,S,T	U,V,W
Voltage 230Vac	0.75kW	M4	7.1 ~ 12	2.5	2.5
	1.5kW	M4	7.1 ~ 12	2.5	2.5
	2.2kW	M4	7.1 ~ 12	2.5	2.5
	3.7kW	M4	7.1 ~ 12	4	4
	5.5kW	M5	24.5 ~ 31.8	6	6
	7.5kW	M5	24.5 ~ 31.8	10	10
	11kW	M6	30.6 ~ 38.2	16	16
	15kW	M6	30.6 ~ 38.2	25	22
	18.5kW	M8	61.2 ~ 91.8	35	30
22kW	M8	61.2 ~ 91.8	35	30	
Voltage 400Vac	0.75 ~ 1.5kW	M4	7.1 ~ 12	2.5	2.5
	2.2kW	M4	7.1 ~ 12	2.5	2.5
	3.7kW	M4	7.1 ~ 12	2.5	2.5
	5.5kW	M5	24.5 ~ 31.8	4	2.5
	7.5kW	M5	24.5 ~ 31.8	4	4
	11kW	M5	24.5 ~ 31.8	6	6
	15kW	M5	24.5 ~ 31.8	16	10
	18.5kW	M6	30.6 ~ 38.2	16	10
	22kW	M6	30.6 ~ 38.2	25	16
	30 ~ 37kW	M8	61.2 ~ 91.8	25	25
	45kW	M8	61.2 ~ 91.8	70	70
	55kW	M8	61.2 ~ 91.8	70	70
	75kW	M8	61.2 ~ 91.8	70	70

## Supply and Motor Connection

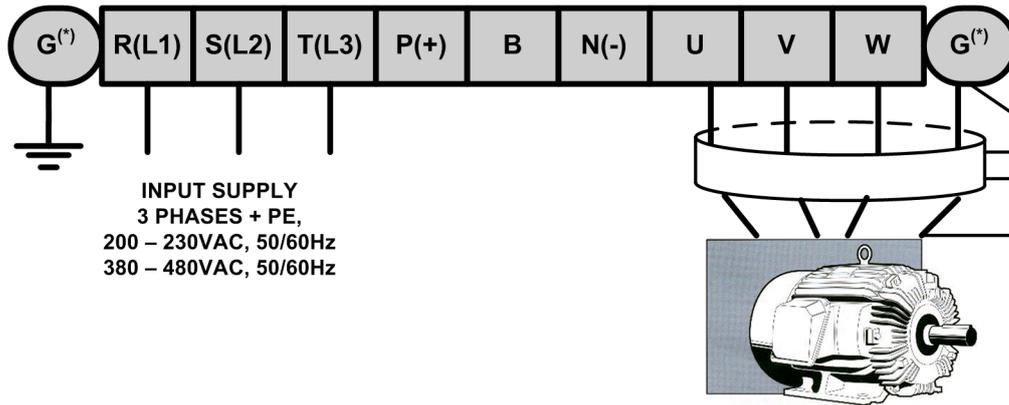
**The supply should be connected to the R (L1), S (L2) and T (L3) terminals.** If the supply is connected to the U, V and W terminals, the drive may be damaged. It is not necessary to order the sequence of the phases.

**The motor should be connected to the U, V and W terminals.** If the digital control input "forward" [FX] is connected, the motor should rotate clockwise (seen from the load part of the motor). If the motor rotates in the opposite direction, switch the connection of the U and V terminals.

\* Apply the prescribed torque for the terminal screws. If the screws are loose, it might cause a short circuit or a failure. If the applied torque is too much, it can damage the terminals and cause a malfunction.

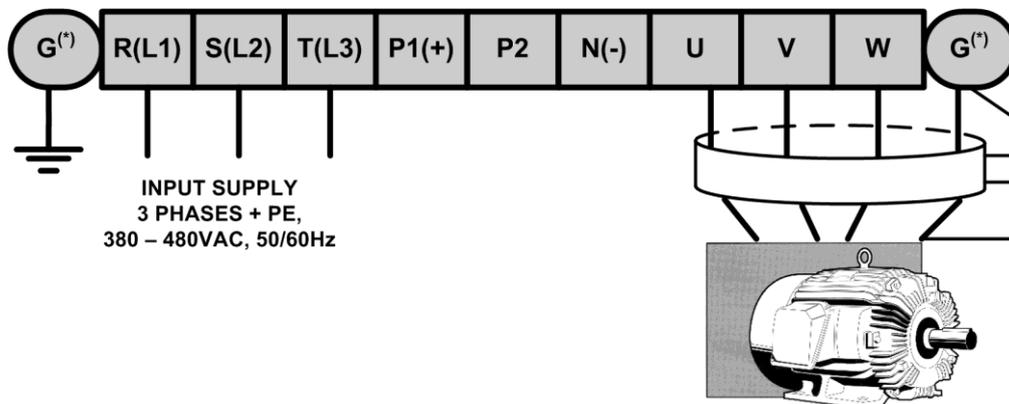
\*\* Use 600V, 75°C copper wire.

When connecting a motor, the total length should not exceed 100m for unshielded cables or 50m for shielded cables while the carrier frequency is below 2.5kHz. For drives below 11kW, this distance is reduced by half. An optional dV/dt filter is available for longer distances.



(\*) Ground Terminals placed under Main Terminals.

SD50DTP0003AI



(\*) Ground Terminals placed below Main Terminals.

SD50DTP0004AI

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## EMC Installation Requirements

### Introduction

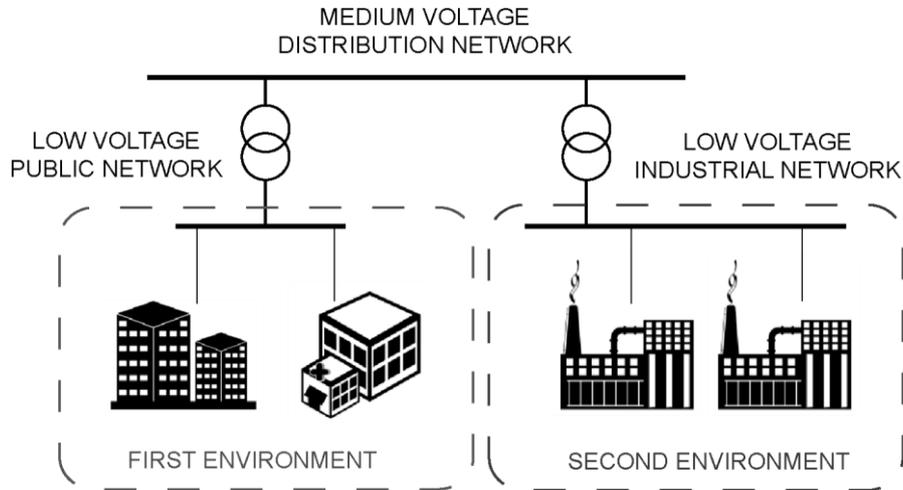
The European EMC Directive defines electromagnetic compatibility as follows: the capability of an apparatus, an industrial plant, or a system to work satisfactorily in the electromagnetic environment without at the same time causing electromagnetic disturbance, which would be unacceptable to apparatus, industrial plant, or systems present in this environment.

The Electromagnetic compatibility (EMC) depends of two mains characteristics of the equipment: the Electromagnetic Interference (EMI) and Electromagnetic Susceptibility (EMS). The EMC standards aims to ensure that all the electrical equipment that could operate simultaneously in the same environment are compatible. That means the interference immunity of all the devices is greater than the interference emission of all the devices within the same environment.

The EMC requirements for Power Drive System (PDS) are defined in IEC/EN 61800-3 standard that is included in the Declaration of conformity CE enclosed. In European Union, EN61800-3 standard takes

precedence over all generic or previously applicable product family EMC standards. The PDS in the context of this standard comprises the drive converter, the motor cables and the motor. Therefore, the installer as the ultimate responsible must follow the installation instructions given within this manual.

Depending on the location of the drive, the standards define four categories distributed in two environments.



GITG0006AI

- *First Environment:* First Environment includes domestic premises. It also includes establishments directly connected without an intermediate transformer to a low-voltage power supply network, which supplies buildings used for domestic purposes such as shopping malls, cinemas, hospitals...
- *Second environment:* Industrial use. Second Environment includes all establishments other than those directly connected to a low-voltage power supply network, which supplies buildings used for domestic purposes. E.g. factories and those other premises supplied by their own dedicated transformer.

The two environments are divided in four categories C1 to C4 that are summarized in the following table.

	FIRST ENVIRONMENT		SECOND ENVIRONMENT	
	C1	C2	C3	C4
Restricted Installation [1]	NO	YES	YES	YES [2]

**Notes:**

[1]. "Restricted Installation" means that the installation and commissioning must be carried out by specialist personnel.

[2]. C4 category applies only for complex systems or when ratings are equal or above to 1,000 V or 400 A. C4 category could be reached if the equipment in hoc complies with the EMC recommendations.

## SD500 compliance

SD500 variable speed drives are designed for industrial (second environment) use. The use of radio frequency interference filters (RFI filters) and dV/dt filters as standard, and the correct installation following the recommendations within this manual, permits to achieve compliance with C3 category defined in IEC/EN 61800-3 in all frames with a filter integrated. For equipment with no filter included, an external filter must be installed in order to comply with category C3.

Additionally, in frames 1 to 4, the SD500 includes a filter for electromagnetic compatibility (EMC) in order to reduce the noise produced by the electromagnetic waves that provides a C2 classification.

Frames 5 and 6 with filter are always classified as type C3. If another type of classification is required, optional external filters may be used. For additional information, ask Power Electronics.

SD500 is not a retail unit, which is neither a plug in device nor a movable device, therefore it must be installed and commissioned by qualified personnel. For this reason, C1 category will not be required.

SD500 with floating earth configuration can be installed in Industrial (Second Environment) IT grids. The installation recommendations within this manual and the integration of the optional dV/dt filter permits to achieve compliance with C3 category defined in IEC/EN61800-3.

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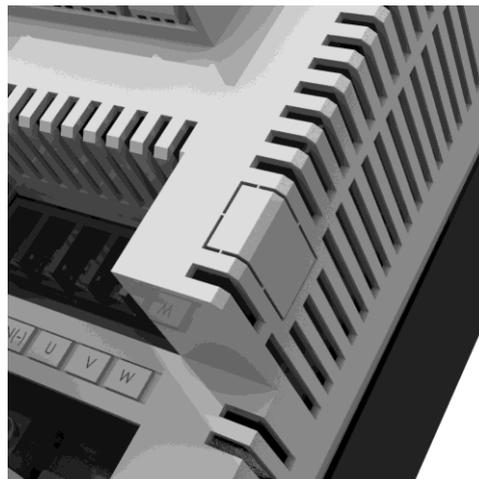
## EMC filter Connection

To activate the built-in filter, set its initial value to OFF and plug in the EMC filter as shown in the figure below. The location and access to the connector varies depending on the frame of the drive.

### Frames 1 and 2

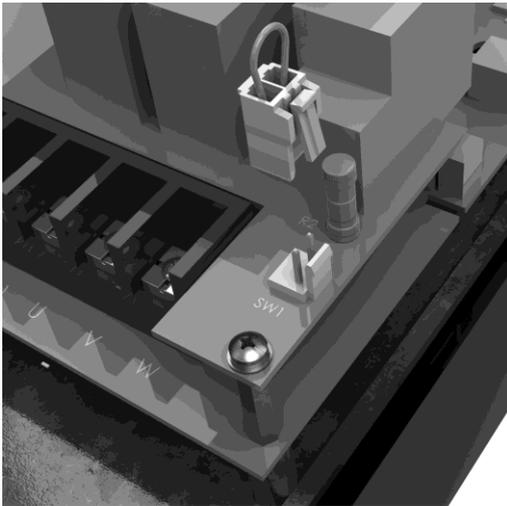
#### a) Activation of the EMC filter:

First, remove the cover of the drive. After this, break the plastic piece shown in the figure below to expose the filter.

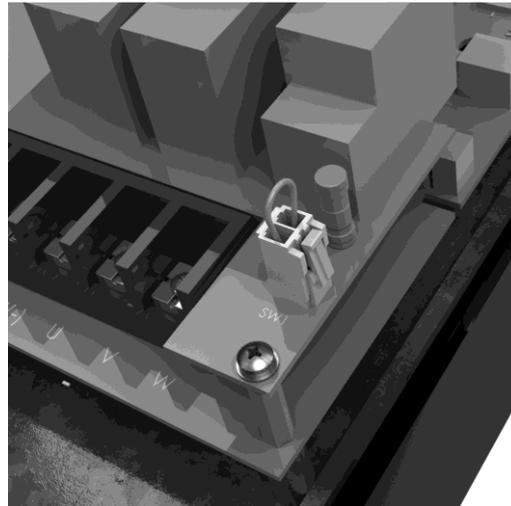


SD50ITP0001A

After removing the plastic piece, you can see that the connection filter has been activated. The two positions that it can take (ON / OFF) are shown in the following figure. To enable the EMC filter, the SW1 connector has to be connected (bridge between the two pins).



SD500TP0002A

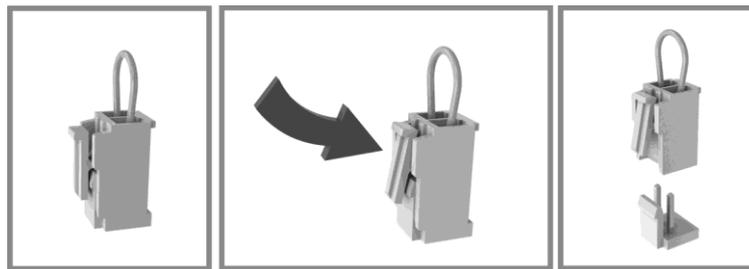


SD500TP0003A

### b) Deactivation of the EMC filter:

As a security measure, check the voltage with a tester 10 minutes after disconnecting the power supply.

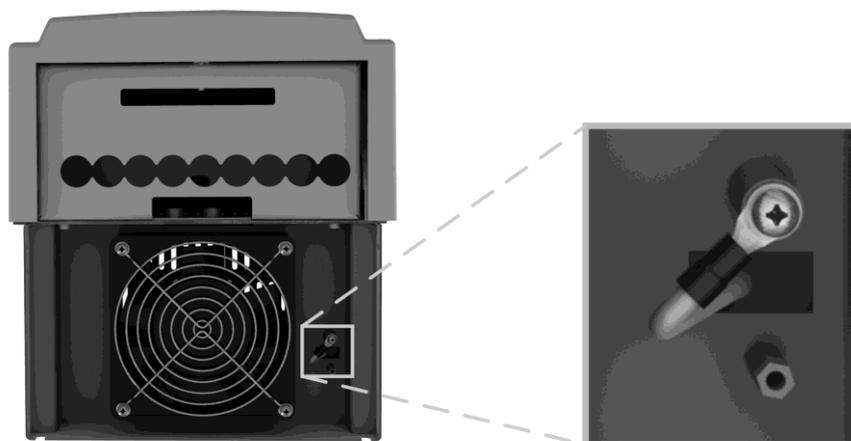
Remove the connector withdrawing it while holding down the tab. In order to reinstall the connector, make sure that you reinsert the connector with the bridge between the two pins.



SD500TP0004A

### Frames 3 and 4

The EMC filter is situated on frames 3 and 4, in the lower part of the driver. The filter is set to OFF by default.



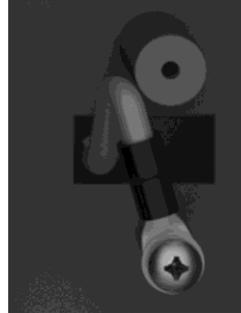
SD500TP0005A

**Activation of the EMC filter**

In order to activate the EMC filter, the cable must be connected to the upper terminal. When this cable is connected to the lower terminal, the EMC filter will be disarmed. The upper terminal will be a metallic conductor, while the lower one will be isolated.



SD50ITP0006A



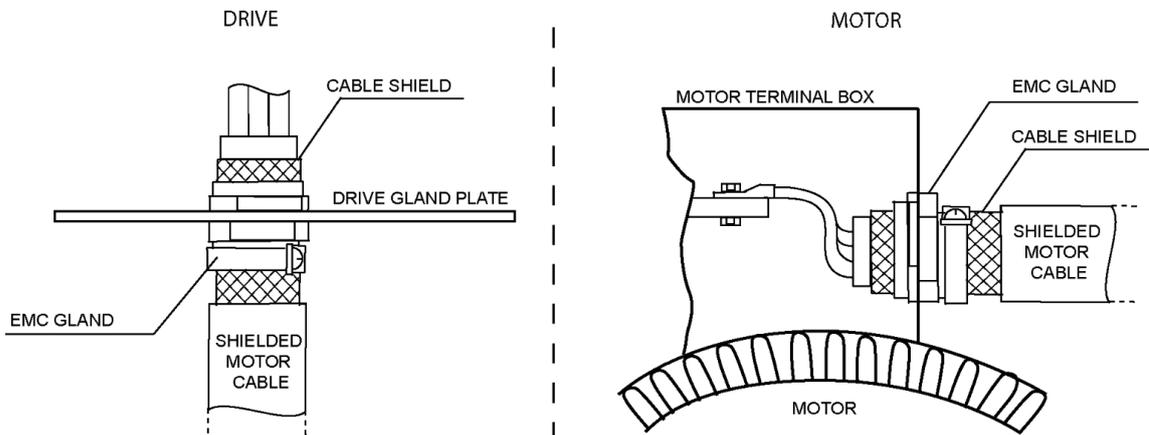
SD50ITP0007A

**Motor Cable Connection**

SD500 requires the use of shielded motor cable to achieve compliance with C3 category, when a correct installation is made. Wiring and Installation recommendations are included in the section “6.5 Power Connection and wiring”.

It is recommended to implement a 360° contact that creates an effective shield bonding in both the SD500 cabinet and the motor terminal box. As an example, it could be installed EMC cable glands as shown in the next figure..

It is recommended for control signals to use shielded cable and to follow recommendations included in



VFDTG001AI

section “7.6 Wiring recommendations”.

**CAUTION**

Select communication and control system according to the drive EMC environment. Otherwise, systems could suffer from interferences due to a low EMS level.

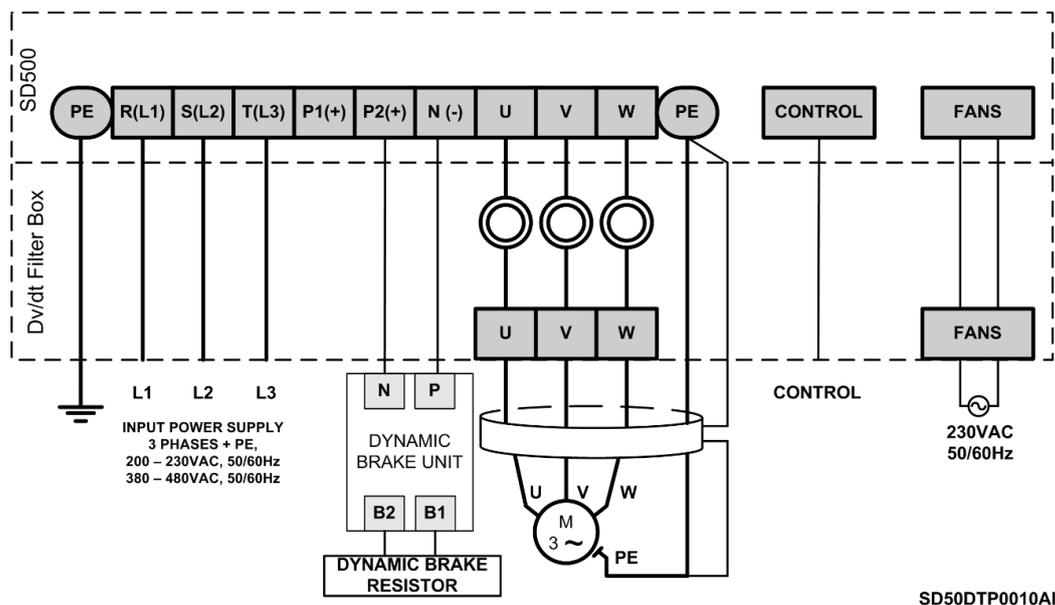
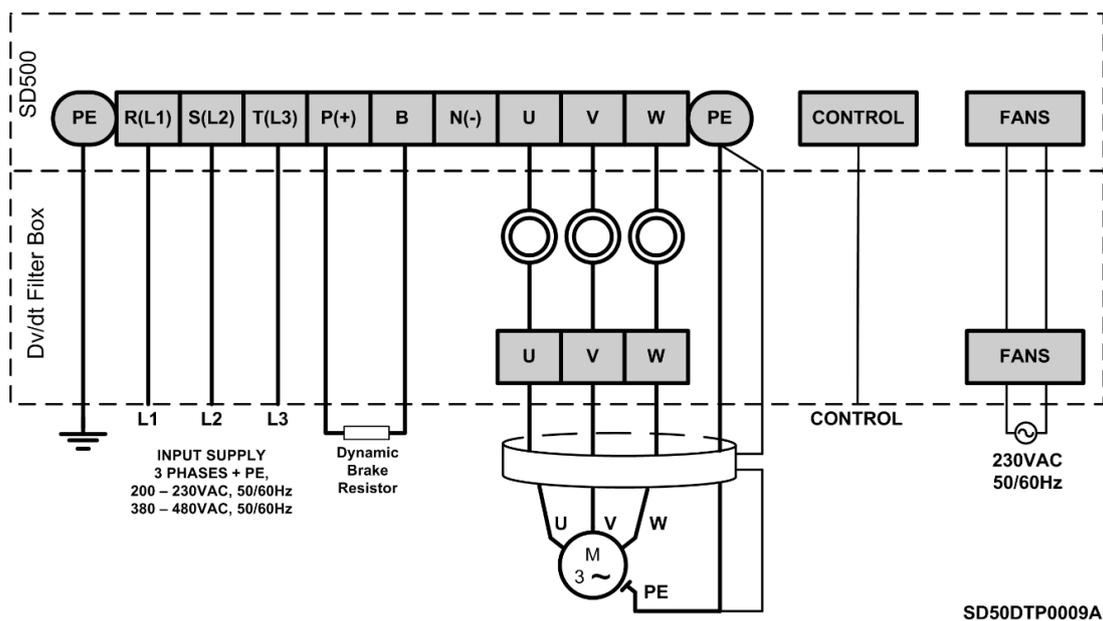
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## dV/dt Filter (Optional)

dV/dt filters, installed in the variable speed drives, provide a slower voltage rise time on the motor terminal phase-to-phase voltage, improving the useful life of the motor and avoiding the premature ageing of the motor winding. Additionally, these filters improve the distance restriction in the motor wires.

Main advantages of their use:

- Increase motor cable length up to 300 m using unshielded cable or up to 150 m using shielded cable.
- Greater motor longevity through less dV/dt stress.
- Reduced transmission of electromagnetic interference due to surrounding cables and equipment.
- Improvement of the motor heating.



## Protections

### Recommended Circuit Breaker

DRIVE	Current data for the circuit breaker (A)		
	Thermal Protection	Magnetic Protection	AC3 Category
SD5005 2 2	6,25	11,5 – 13,0	11
SD5008 2 2	10	18,4 – 20,8	13
SD5012 2 2	15	27,6 – 31,2	18
SD5016 2 2	20	36,8 – 41,6	32
SD5024 2 2	30	55,2 – 62,4	40
SD5030 2 2	40	73,6 – 83,2	55
SD5045 2 2	57,5	105,8 – 119,6	75
SD5060 2 2	75	138,0 – 156,0	105
SD5075 2 2	92,5	170,2 – 192,4	125
SD5090 2 2	110	202,4 – 228,8	150
SD5002 4 2	3,5	6,44 – 7,28	9
SD5004 4 2	5	9,20 – 10,40	9
SD5006 4 2	7,5	13,80 – 15,60	12
SD5008 4 2	10,63	19,55 – 22,10	18
SD5012 4 2	15	27,60 – 31,20	22
SD5018 4 2	20,63	37,95 – 42,90	32
SD5024 4 2	30	55,20 – 62,40	40
SD5030 4 2	37,5	69,00 – 78,00	50
SD5039 4 2	48,75	89,70 – 101,40	65
SD5045 4 2	56,25	103,50 – 117,00	75
SD5060 4 2	76,25	140,30 – 158,60	105
SD5075 4 2	93,75	172,50 – 195,00	120
SD5090 4 2	113,75	209,30 – 236,60	150
SD5110 4 2	137,5	253,00 – 286,00	180
SD5150 4 2	190	349,60 – 395,20	250

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## Recommended Magnetic Contactor

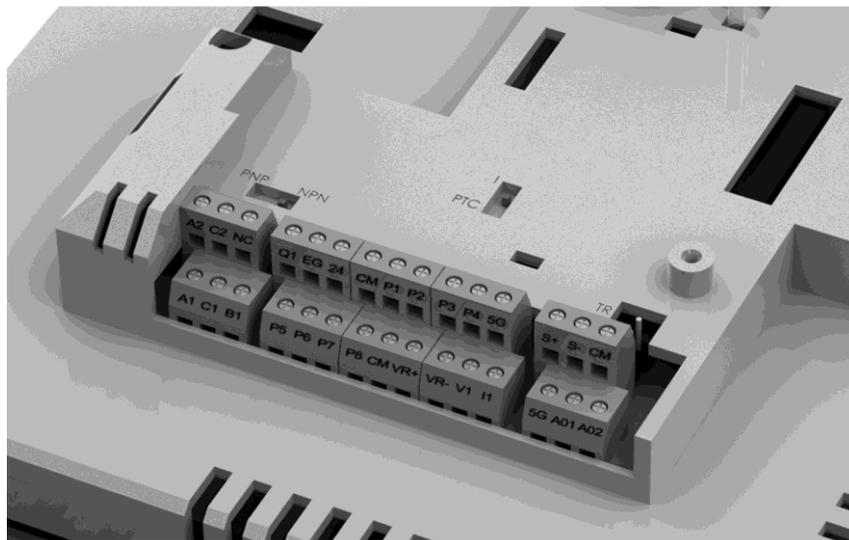
Drive	Power (kW)	Current (A)
SD5005 2 2	2.5	11
SD5008 2 2	3.5	13
SD5012 2 2	4.5	18
SD5016 2 2	7.5	32
SD5024 2 2	11	40
SD5030 2 2	15	55
SD5045 2 2	18.5	65
SD5060 2 2	30	105
SD5075 2 2	37	125
SD5090 2 2	45	150
SD5002 4 2	2.5	11
SD5004 4 2	2.5	11
SD5006 4 2	3.5	13
SD5008 4 2	4.5	18
SD5012 4 2	5.5	22
SD5018 4 2	7.5	32
SD5024 4 2	11	40
SD5030 4 2	15	55
SD5039 4 2	18.5	65
SD5045 4 2	18.5	65
SD5060 4 2	30	105
SD5075 4 2	37	125
SD5090 4 2	45	150
SD5110 4 2	55	180
SD5150 4 2	75	250

# CONTROL CONNECTION

## 7

The next figure shows the control terminals of the SD500. Here, we can find the terminals and jumpers that the user needs to manipulate the different options, including: the connection of the inputs / outputs, the RS485 communication serial port, etc. The drive has different configurations of its control terminals, so that it is possible to adjust the type of connection of the digital inputs (NPN/PNP), the connection for the thermistor (PTC) and the termination resistor for communications (TR). In the following sections, they are described thoroughly.

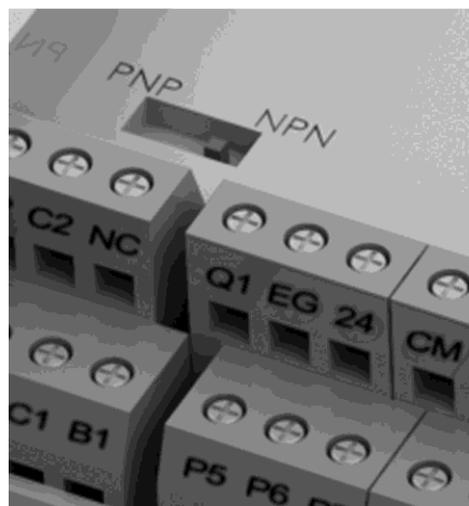
To make the connections and to connect the control circuit, use shielded twisted cables, separating the cables from the main power supply.



SD50ITC0001A

## NPN / PNP Configuration Selector

The SD500 Series provides two operating modes for the connection of input signals: NPN or PNP. The corresponding connection methods are shown below:

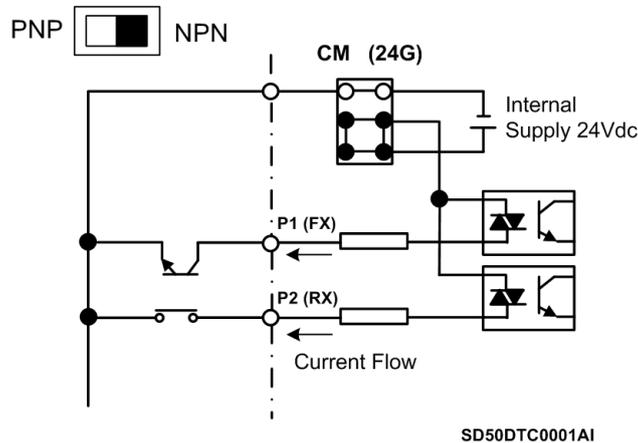


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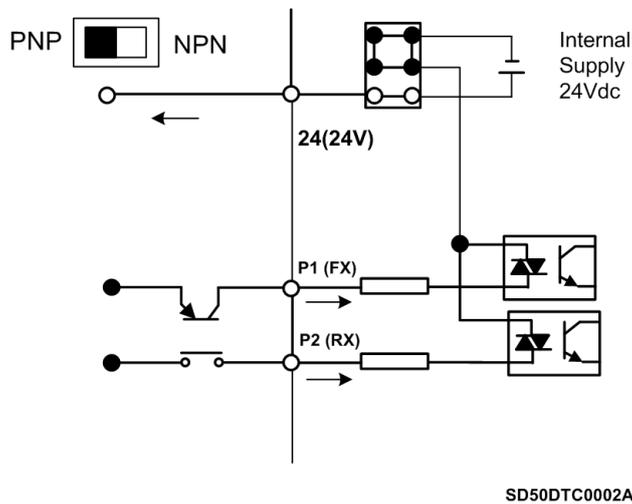
### a) NPN mode

The drive is configured in this mode when the switch is set to NPN (right position). In this mode, the input terminals are activated using the internal power of the drive. Terminal CM (24Vdc GND) is the common terminal for the input contact signals.



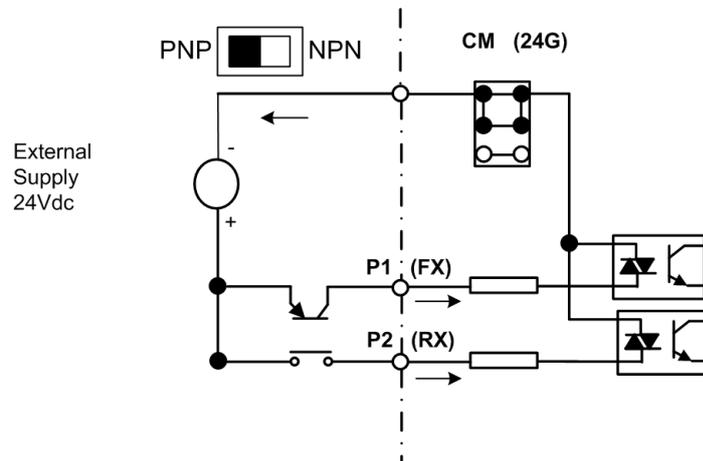
### b) PNP mode

The drive is configured in this mode when the mode switch is set to PNP (left position). In this mode, the input terminals are activated using the internal power of the drive. Terminal 24 (24Vdc) is the common terminal of the contact input signals.



### c) PNP Mode (external supply)

The drive is configured in this mode when the selector is adjusted to PNP (left position). In this mode, the input terminals will activate using a 24Vdc supply, external to the driver, but with the reference terminal attached to the CM terminal of the driver. The terminal 24 (24Vdc) of this supply is the common terminal for contact input signals.

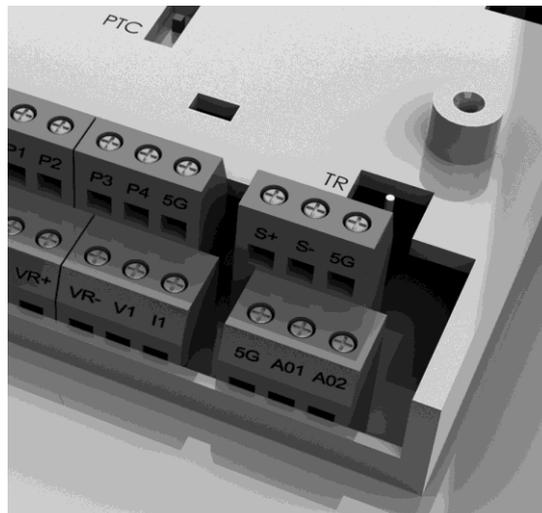


SD50DTC0003AI

## TR Jumper Configuration

For every frame, the TR terminal corresponds to the resistor of the RS485 communication terminal (120Ω).

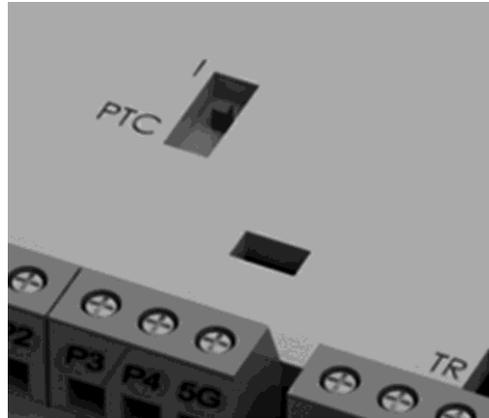
Whenever is necessary to connect the network resistor (120Ω), place the jumper inside the TR connection. This jumper is located next to the RS485 connector on the image below.



SD50ITC0003A

## I / PTC Configuration Selector

The SD500 drive uses one of the control terminal inputs as a PTC thermistor input. To configure the analogue current input (AI2 – Terminal I1) as a PTC input, the selector shown in the next figure must be adjusted to the PTC position:



SD50ITC0004A

There are three possible configurations for the connection of the PTC thermistor depending on how it's used the analogue input V1, AI1, or any of the digital inputs (P1 to P8).

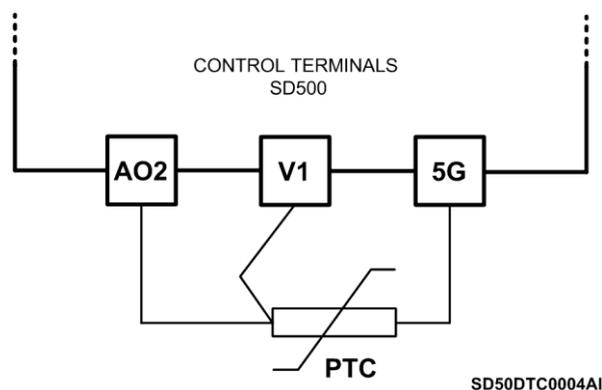
### a) PTC connection using the voltage analogue input (AI 1 – V1Terminal)

To connect the PTC to the voltage analogue input (EA1 - Terminal V1) first of all, the corresponding parameter must be adjusted in the drives software.

#### Group 11 - G11: Protections\*

Screen	Name / Description	Adjust			Start adjust
		OPC.	DESCRIPTION	FUNTION	
23 OvrHtSen= Overheat Sensor	G11.23 / Selection of the motor overheating sensor.	01	EA1	Used in the analogue input 1, setting the voltage using the PTC thermistor.	NO

\*For more information, consult the Software and Programming Manual of the SD500.



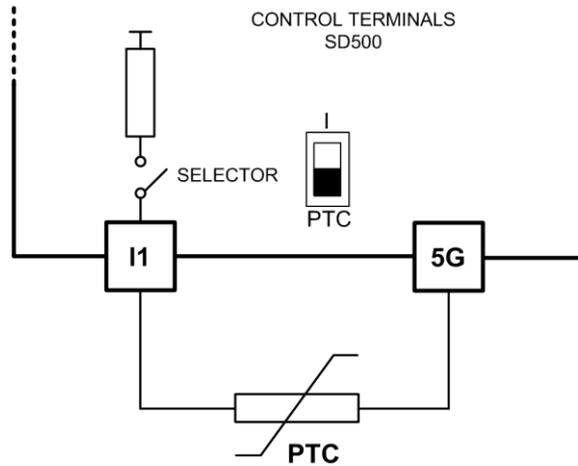
### b) PTC connection using the current analogue input (AI2 – I1 Terminal)

To connect the PTC to the current analogue input (EA2 - Terminal I1) first of all the corresponding parameter has to be adjusted in the drives software and the I / PTC switch must be in the PTC position.

Group 11 - G11: Protections

Screen	Name / Description	Adjust			Start adjust
		opc.	DESCRIPTION	FUNTION	
23 OvrHtSen= Overheat Sensor	G11.23 / Selection of the motor overtemperature sensor.	01	EA2	Used in the analogue input 2, setting by current the PTC thermistor	NO

\*For more information, consult the Software and Programming Manual of the SD500.



SD50DTC0005AI

c) PTC connection using the digital input terminals (ED1 to ED8 – P1 to P8 terminals)

To connect the PTC to one of the digital inputs, the corresponding parameters must be configured in the drives software.

First, the digital input that is going to be used as a PTC input must be adjusted. To do this, adjust any of the following parameters:

Group 4 – G4: Inputs\* → Subgroup 4.1 – S4.1: Digital Inputs

Screen	Name / Description	Adjust			Start adjust
		opc.	DESCRIPTION	FUNTION	
3 DI1= Digital Input I/P1	G4.1.3 / Setting Multifunction Digital Input 1.				NO
...	...	39	ThermalIn	Assigns the trip due to overheating when connecting a PTC sensor to the digital input.	...
10 DI8= Digital I/p8	G4.1.10 / Setting Multifunction Digital Input 8.				NO

\* For more information, consult the Software and Programming Manual of the SD500.

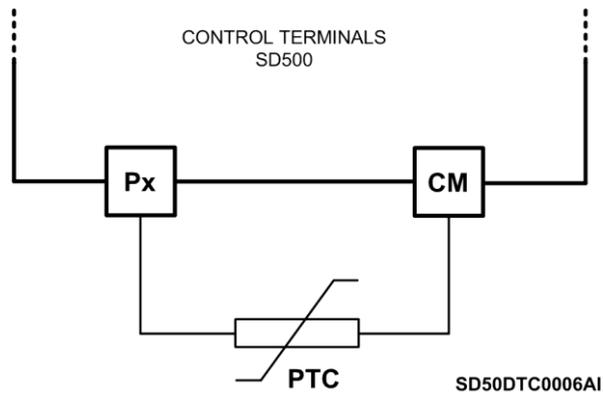
In addition, the digital input for the PTC input type NC must be configured. To do this, the following parameter must be adjusted:

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## Group 4 – G4: Inputs\* → Subgroup 4.1 – S4.1: Digital Inputs

Screen	Name / Description	Adjust	Start adjust						
16 DCTy= 0000 0000 DiContactType	G4.1.16 / Selection of the type of contact of the Digital Input.	Sets the digital input as normally open (NO) or normally closed (NC) <table border="1"> <thead> <tr> <th>OPTION</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Normally Open Switch (NO)</td> </tr> <tr> <td>X</td> <td>Normally Closed Contact (NC)</td> </tr> </tbody> </table> The order of allocation is DI1, DI2,..., DI8 starting with the bit in the right.	OPTION	FUNCTION	0	Normally Open Switch (NO)	X	Normally Closed Contact (NC)	NO
OPTION	FUNCTION								
0	Normally Open Switch (NO)								
X	Normally Closed Contact (NC)								

\* For more information, consult the Software and Programming Manual of the SD500.



## Control Terminal Description

TYPE		SYMBOL	DESCRIPTION	RECOMMENDED CABLE SELECTION	
Input Signals	Digital Inputs	P1 ~ P8	Digital Inputs DI1 to DI8. Function configurable by the user.	Shielded 0.33 to 1.25mm <sup>2</sup>	
		CM	Common terminal of the digital inputs (Note: In the set of I / O terminals, CM is different than the common 5G terminal).		
	Analogue Inputs	VR+	(+)Terminal of the power supply for the analogue input voltage V1. Max output: +12V, 100mA		
		VR-	(-)Terminal of the power supply of the analogue input voltage V1. Max output: -12V, 100mA		
		V1	Terminal of the analogue input voltage AI1 for the speed reference. Single-pole (0~+10V), Bipolar ( $\pm 10V$ ) Input Resistor 20k $\Omega$		
		I1	Current analogue Input Terminal AI2 for the speed reference. Input Range: 0/4 ~ 20mA Input Resistor: 249 $\Omega$		
		5G	Common terminal of the analogue input voltage V1 and current I1. (Note: In the set of basic I / O terminals, the common 5G terminal is different than the common CM terminal).		Shielded 0.33 to 2.0mm <sup>2</sup>
Output signals	Analogue Outputs	A01	Output Analogue Voltage Terminal SA1. It can be configured as a proportional signal to the output frequency, DC Bus Voltage, etc... Output Voltage: 0~10V Maximum Output Voltage: 10V Maximum Output Current: 10mA	Shielded 0.33 to 2.0mm <sup>2</sup>	
		A02	SA2 Output Analogue Current Terminal. It can be configured as a proportional signal to the output frequency, output current, DC Bus voltage, etc... Output Current: 4~20mA (0~20mA) Maximum Output Current: 20mA		
Output signals	Digital Outputs	Q1	SD1 Digital Output terminal configurable in the Open Collector. Maximum Output: 26V DC, 100mA	Shielded 0.33 to 1.25mm <sup>2</sup>	
		EG	Common Ground terminal for external supply of the digital open collector output.		
		24	24Vdc External power. Maximum output current: 150mA		
		A1, B1, C1	1 Multifunction relay terminal, switched (1NO + 1NC). Maximum Output: 250Vac, 1A, 30Vdc, 1A.		Shielded 0.33 to 2.0mm <sup>2</sup>
		A2, C2	2 Multifunction relay terminals, 2 switched (1NO). Maximum Output: 250VAC, 5A ; 30VDC, 5A		
Comms	Terminals	S+, S-, CM	RS485 Communication Terminals.	Shielded twisted cable 0.75mm <sup>2</sup>	

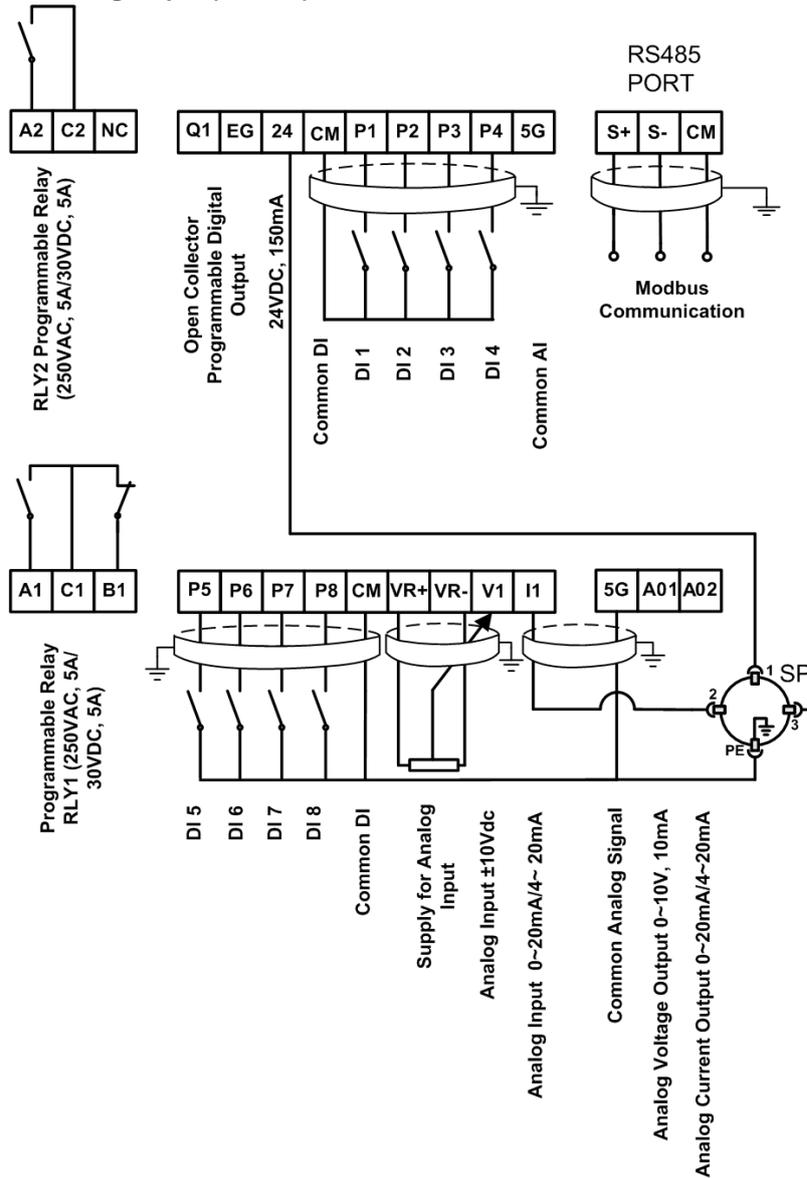
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## Control Terminal Connection Diagram

The SD500 drive has two groups of connection terminals, which depend on the frame of the drive. There is a set of basic I / O terminals for devices with up to 22kW of capacity (frames 1 to 4) and another set of I / O **isolated** terminals for devices with a capacity of more than 22kW (frames 5 and 6).

In addition, there are two different configurations for connecting the analogue input voltage to the desired input range, 0-10Vdc (single-pole) or  $\pm 10$ Vdc (bipolar). For more information about analogue and digital inputs and outputs, refer to the "Programming and Software manual".

**a) Diagram of terminal connections for the basic set of analogue I / O with an analogue bipolar voltage input ( $\pm 10$ Vdc):**

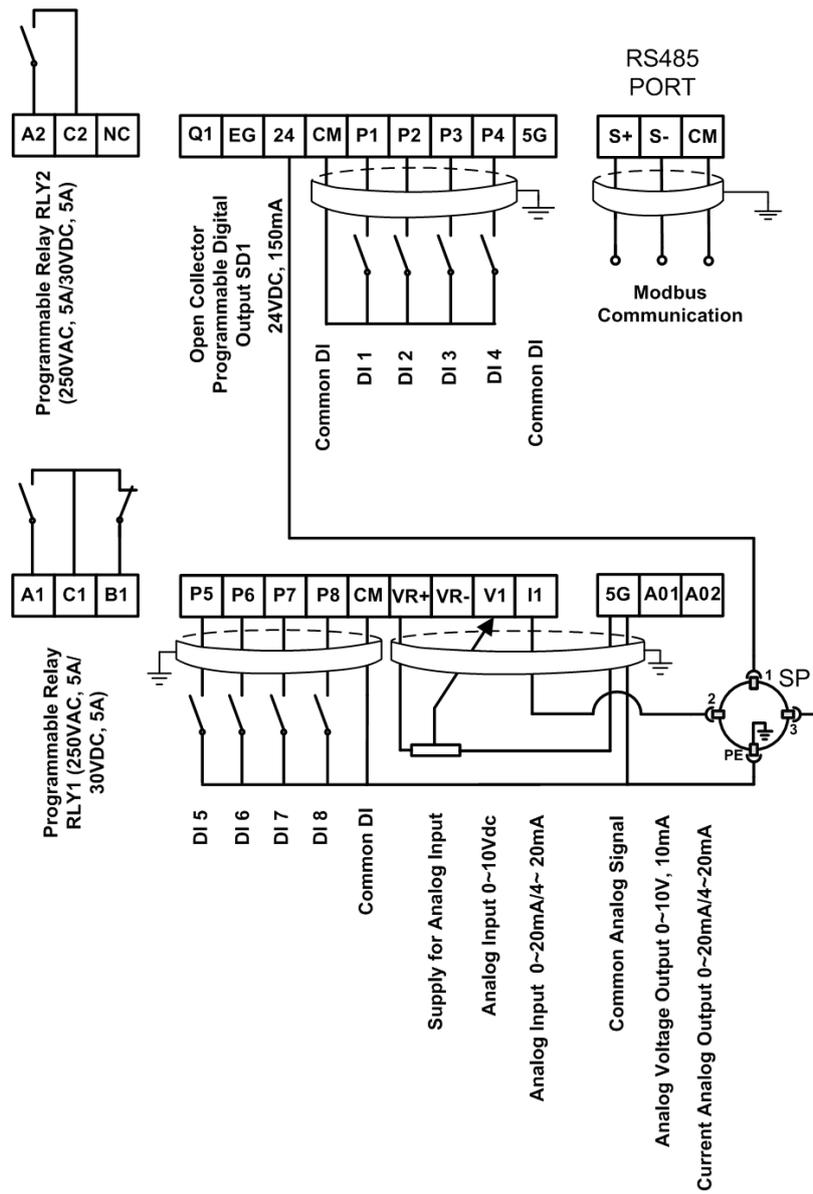


SD50DTC0007AI

**Note:** The control cables must be shielded and grounded.

The 5G terminal is different than the CM terminal for frames 1 to 4.

Diagram of terminal connections for the basic set of analogue I / O with an analogue bipolar voltage input (0-10Vdc):



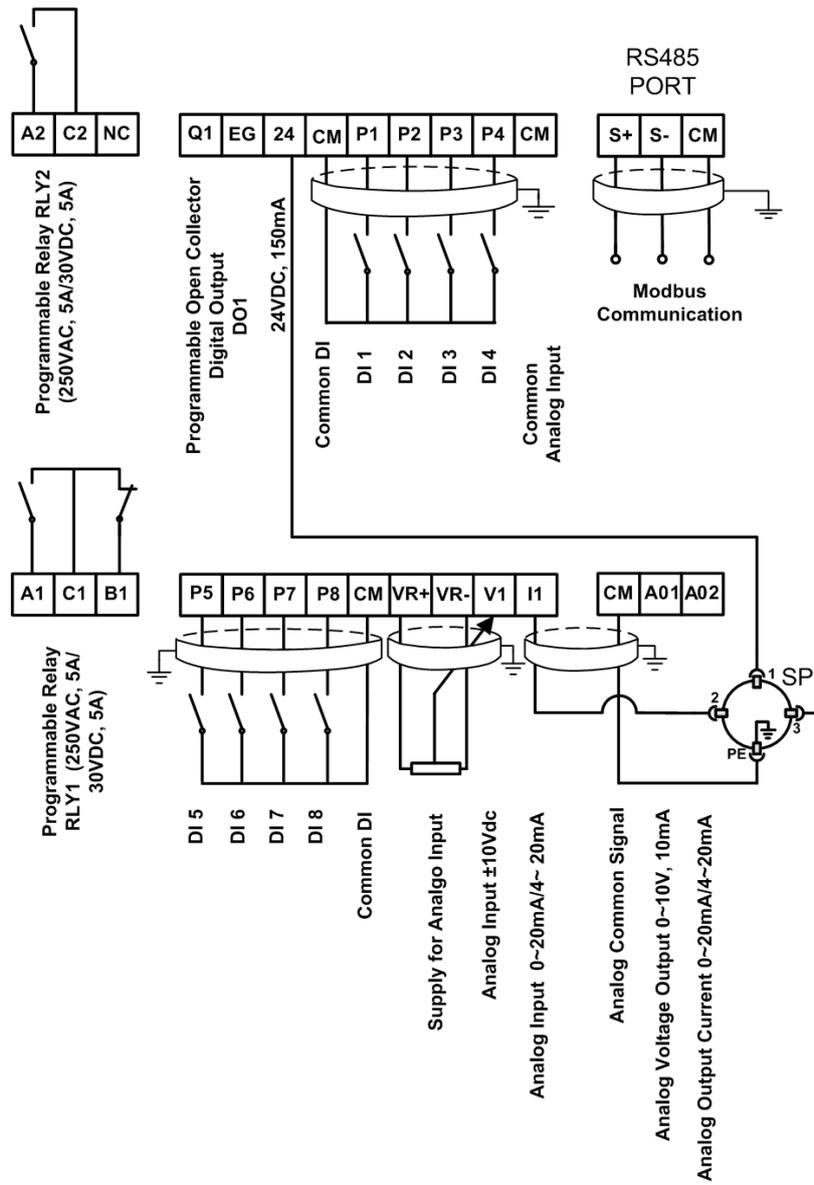
SD50DTC0008AI

**Note:** The control cables must be shielded and grounded.

The 5G terminal is different than the CM terminal for frames 1 to 4.

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b) Connection diagram for I / O set of isolated terminals with bipolar voltage analogue input ( $\pm 10Vdc$ ):

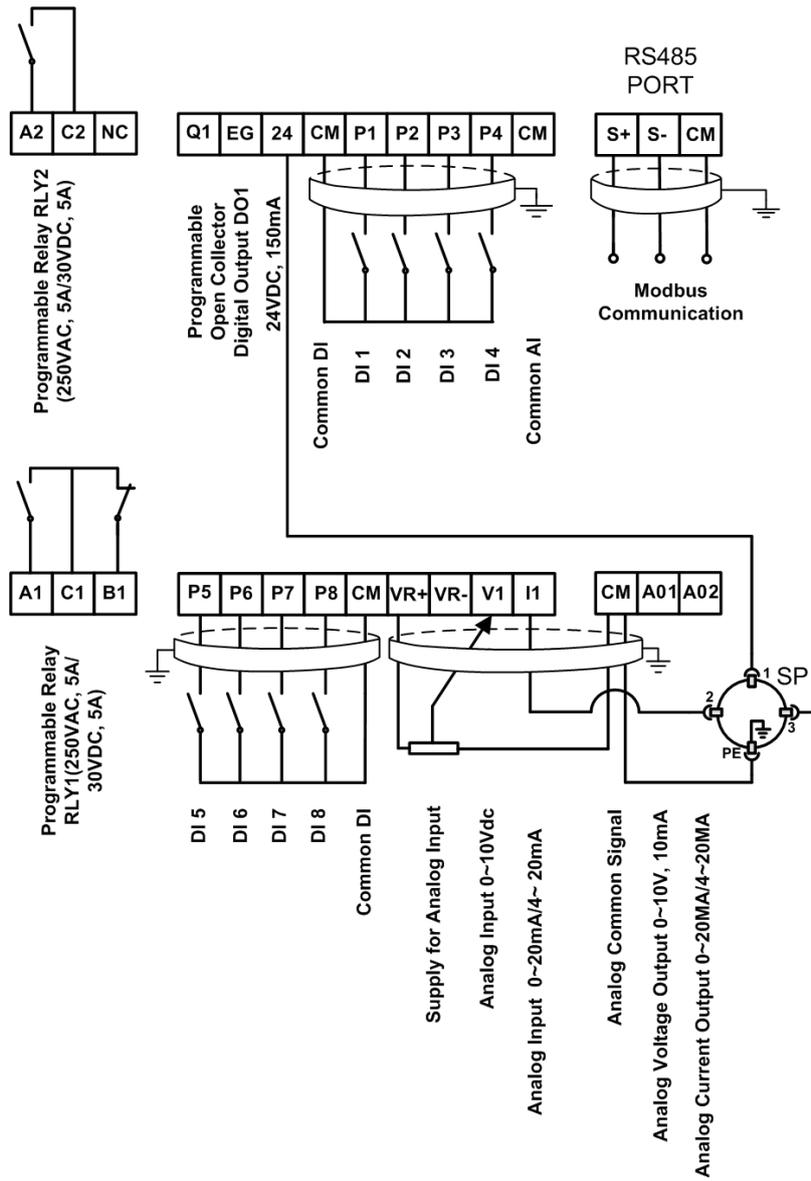


SD50DTC0009AI

**Note:** The control cables must be shielded and grounded.

The 5G terminal will be CM for frames 5 and 6.

c) Connection diagram for I / O set of isolated terminals with analogue input voltage.



SD50DTC0010AI

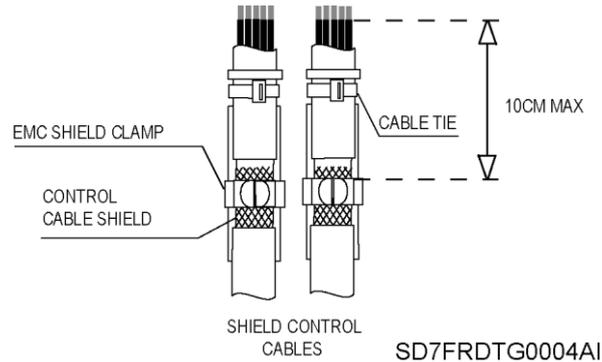
**Note:** The control cables must be shielded and grounded.

The 5G terminal will be CM for frames 5 and 6.

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## Wiring Recommendations

Before planning the installation, follow the next recommendations. The parallel cable routing should be minimized and the distance between the control wiring and the power wiring should be maximized. It is recommended to route control cables with different voltages in separately cable racks, trays or ducts. It is recommended to use shielded twisted cable for all the data, signal or control cables that came out from the variable speed drive, with the properly shield bonding to ground. To ensure an effective shield bonding, it is recommended to include in the SD500 front metal panel of the control board, EMC shield clamps that ensure a 360° effective shield bonding.



Digital signal cables must be grounded at both ends of the cable. It is recommended to use independent shielded cables for digital and analogue signals. When using multiple analogue signals do not use common return for them. If a low-interference is experienced (hum loops) using analogue signals disconnect the shield grounding from one of the ends. The maximum section for the control cables is 2.5mm<sup>2</sup> and the recommended tightening torque is 0.4Nm.

Although the control board is insulated galvanically, for safety reasons it is recommended not to modify the wiring while the equipment is connected to the input power supply.

### CAUTION

Changes of control wiring or bridges should be performed following the safety instructions indicated before. Otherwise, it could cause damage to the equipment and lead to injury to people.

# RS485 COMMUNICATION

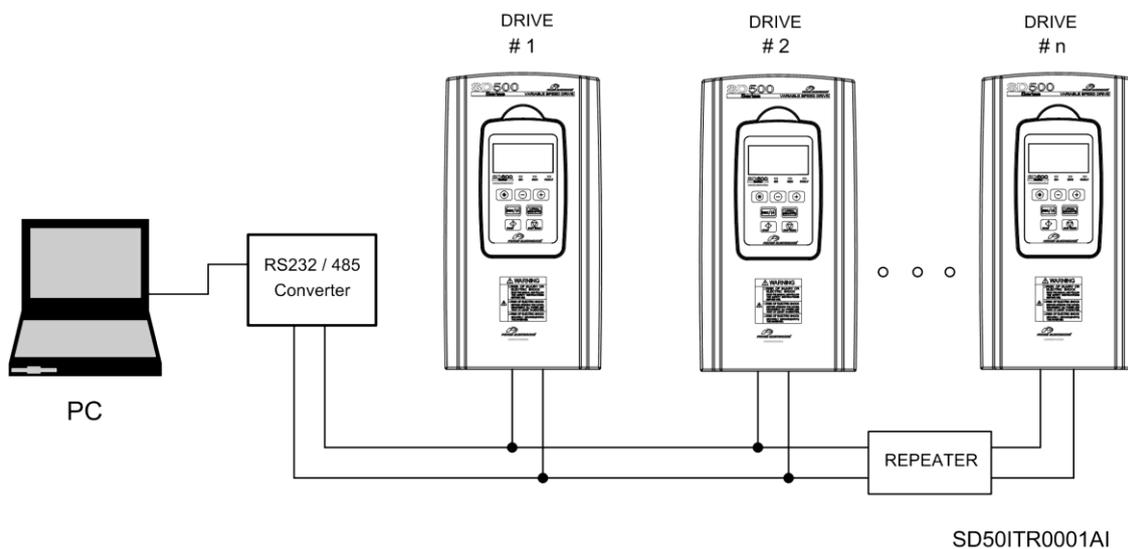
## 8

### Introduction

The drive can be controlled and monitored through a sequence program of a PLC or other master device.

Various drives or other slave devices can be connected on an RS485 communication network to be controlled by a PLC or a PC. Like this, the setting of the parameters and its monitoring can be done from a PC via a user program.

In this communication, the user can operate with any type of RS232/485 converter. Its characteristics will depend on each manufacturer.



**Note:** It is recommended to install a repeater to increase the communication speed, or in the event that the length of the communication cable is longer than 1,200m. It's also necessary to improve the quality of the communication in noisy environments.

## Specifications

General specifications:

- Communication Method: RS485.
- Transmission Type: Bus Method, Multi-drop Link system.
- Applicable to: SD500.
- Converter: RS232.
- Number of drives: Max. 16
- Transmission distance: Maximum 1,200m (recommended up to 700m).

Installation specifications:

- Recommended Cable: 0.75mm<sup>2</sup>, shielded twisted pair.
- Installation: S+, S-, CM terminals of the control terminals.
- Supply: Isolated power supply of the drive.

Communication Specifications:

- Communication Speed: 1200/2400/9600/19200/38400bps. Adjustable.
- Control Procedure: Asynchronous communication system.
- Communication system: Half duplex.
- Stop bit length: 1 bit/2bits.
- Cyclic Redundancy code: 2 bytes.
- Parity: None/Odd/Even

## Installation

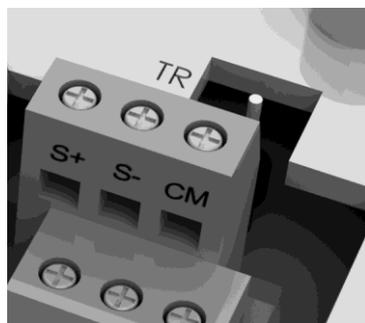
### Communication cable connection

In order to connect the high RS485 signal use terminal S+, and to connect the low signal, use terminal S-.

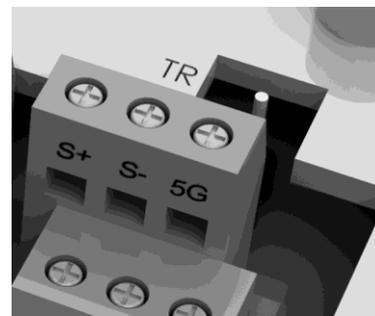
If more than one drive is going to be connected, connect the CM terminal between the two terminals to establish the communication.

Install a repeater to increase the communication speed, or in the event that the length of the communication cable is longer than 1,200m. It is also necessary to improve the quality of the communication in noisy environments.

If it is necessary to connect the end of network resistance (120Ω), place the jumper in the TR connection. This jumper is located above the RS485 connector of the image.



SD50ITR0002A



SD50ITR0003A

Once the connections are made, supply voltage to the drive and set the communication parameters as follows.

Parameter	Description	Setting	
G20.1.1	Communication Address	0 to 250	Use different numbers in case of installing more than one drive.
G20.1.2	Rs-485 Communication Protocol	MODBUS	Communication protocol MODBUS-RTU
G20.1.3	Communication Speed	9600bps	(Default setting).
G20.1.4	Communication Pattern	D8 / PN / S1	(Default setting).
G20.1.5	Transmission delay after reception	5ms	(Default setting).
G4.1.1	Main Control Mode	2 MODBUS	Communication RS485.
G3.1	Source of Speed reference 1	MDBUS	Communication RS485.
G11.2	Action in case of loss of speed reference	LostPrst	The drive will work at the defined frequency in the parameter <b>G11.4</b>
G11.3	Trip time for lack of speed reference	1.0s	(Default setting)
G11.4	Speed in case of lost of reference	0.00Hz	(Default setting)

## Starting the drive on the communication network

After carrying out the physical installation of the equipment in the communications network, and adjusting the related parameters, the steps for setting up the network drive are:

- Check that the master and the drive are connected properly.
- Supply voltage to the drive, but do not connect the load unless it is verified that the communication between the master and the drive is correct.
- Run the user application to work with the drive from the master port.
- Using the application program from the master port, verify that the drive works correctly.

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# COMMISSIONING

## 9



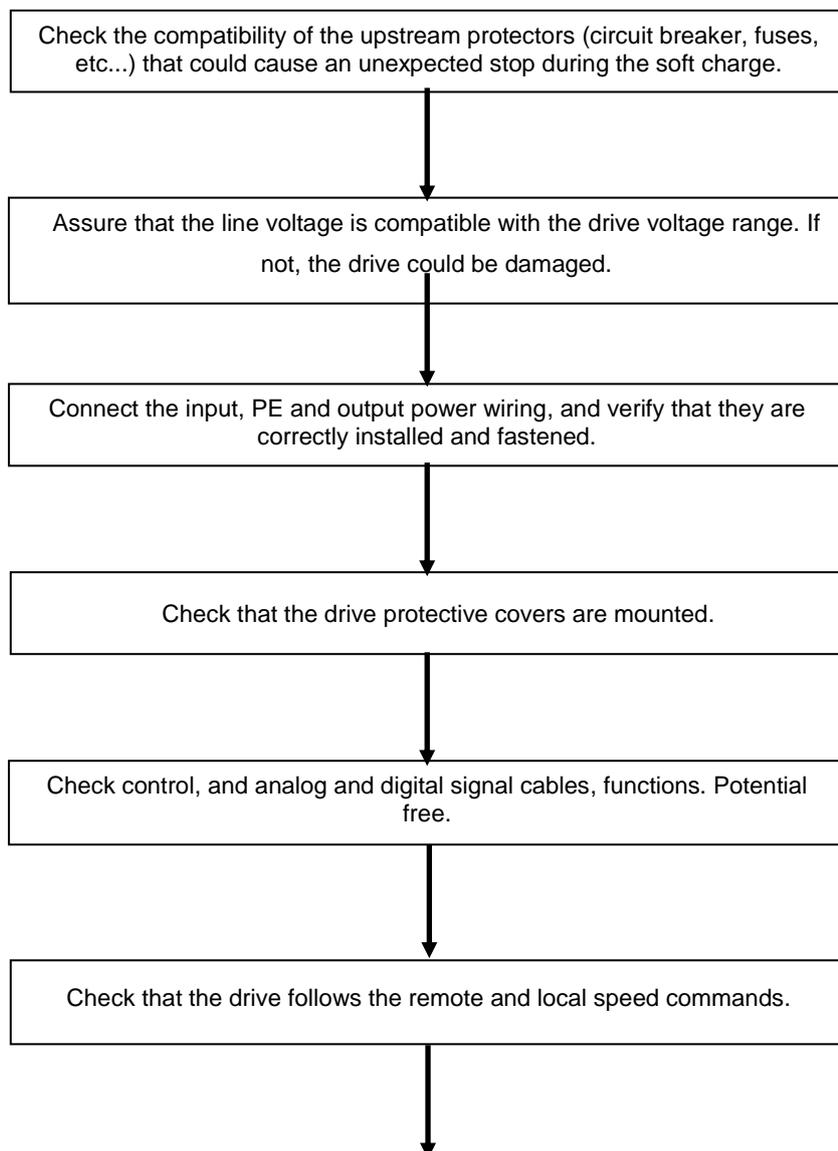
### CAUTION

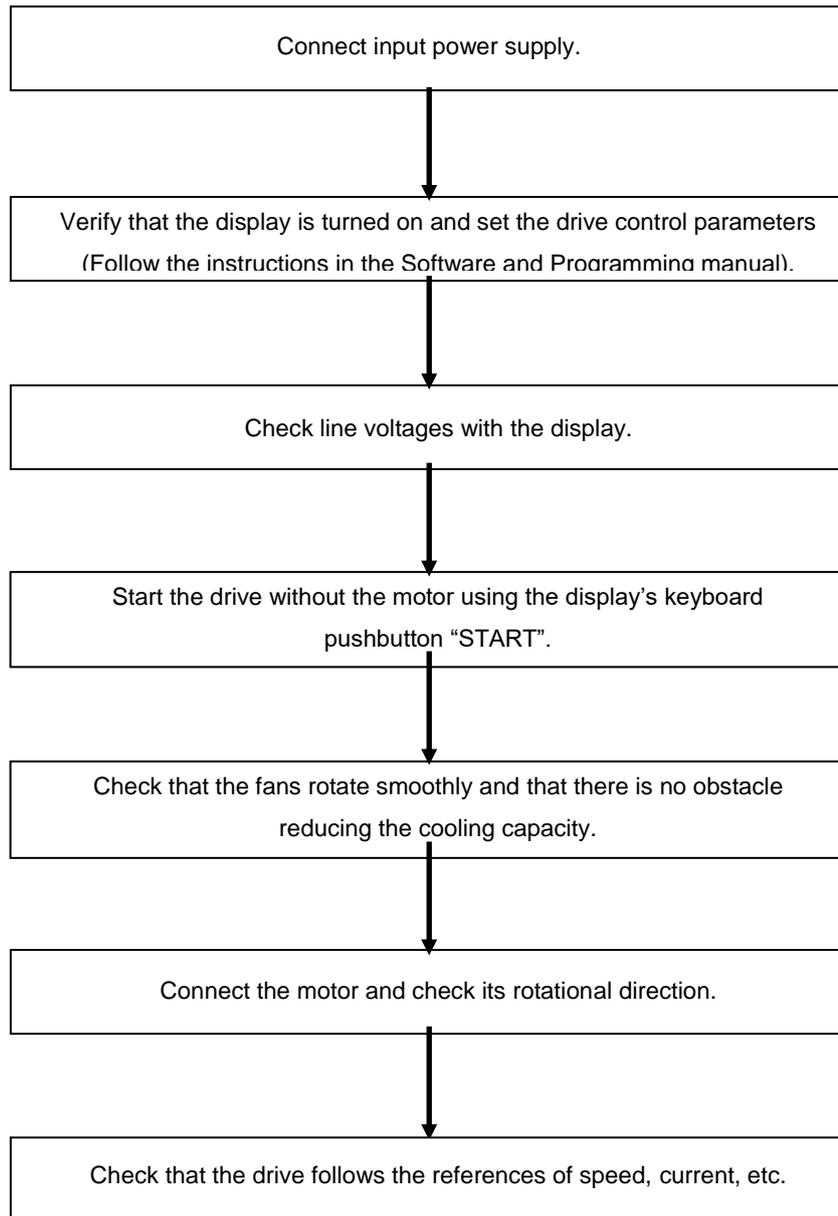
**Only qualified personnel are allowed to commission the drive. Read and follow the safety instructions on the first pages of this manual.** Neglecting the safety instructions can cause injury or death.

**Ensure that there is no voltage present in the input power terminals.** No voltage should be connected to the drive inadvertently.

**This chapter does not include all the tasks to be performed during commissioning. Always follow local and national regulations.**

For a proper commissioning, we recommend checking the following steps:





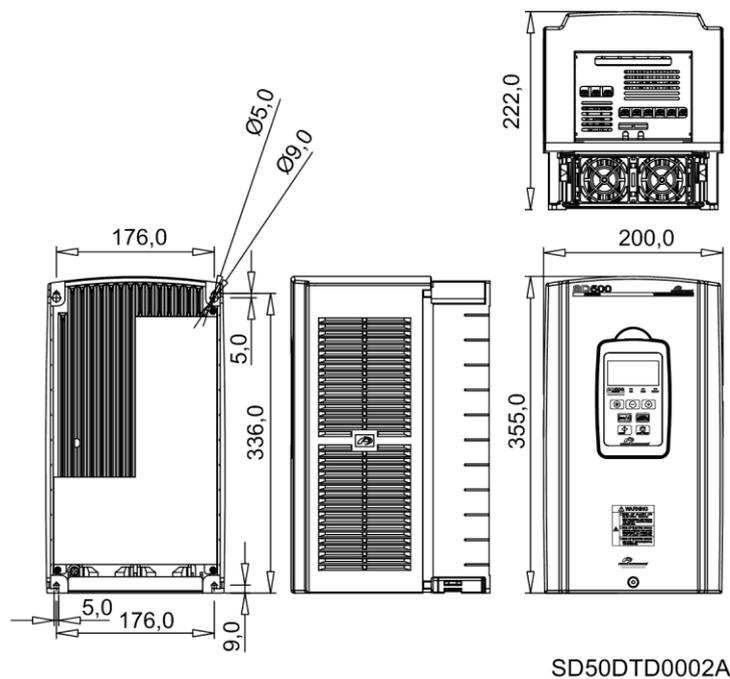
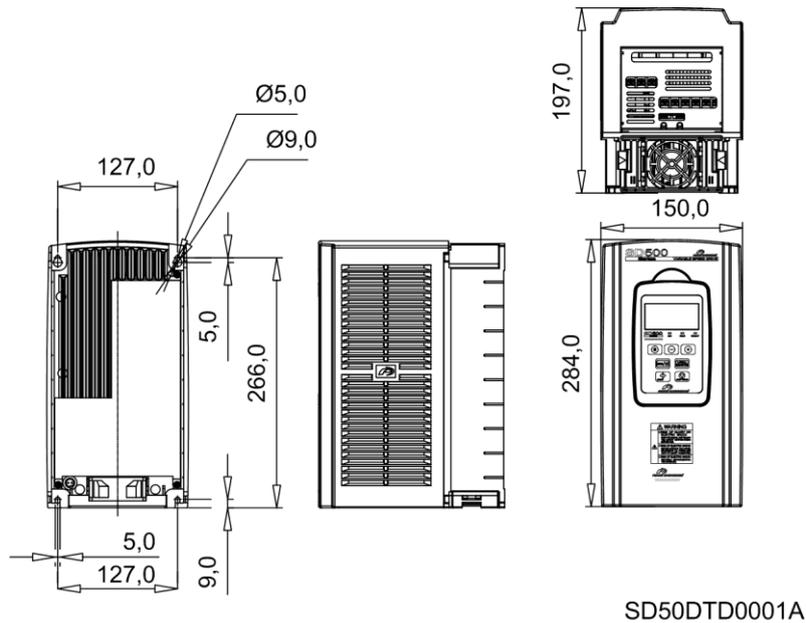
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# DIMENSIONS

# 10

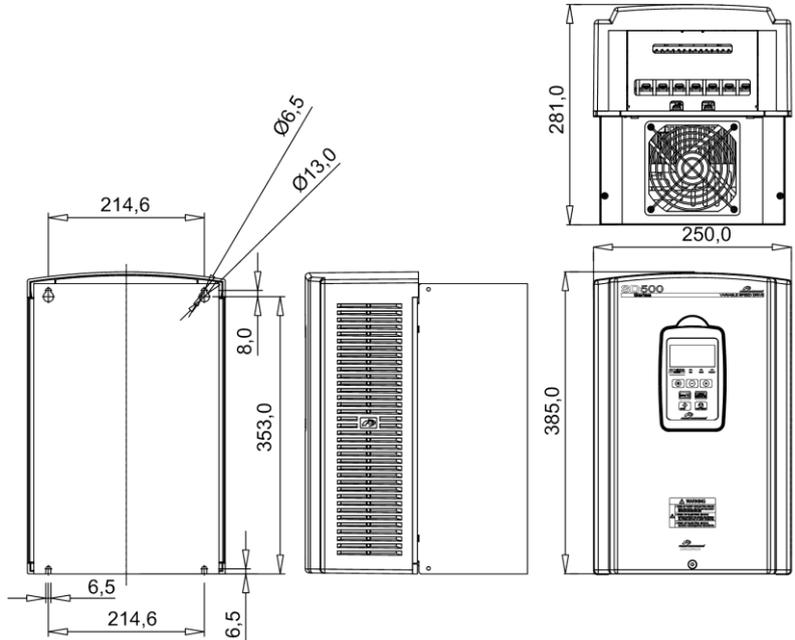
## Dimensions of Frames 1 and 2

FRAME	INPUT VOLTAGE	DRIVES	WEIGHT (kg)
1	200 - 230VAC (-15% to +10%)	SD5005 2 2, SD5008 2 2, SD5012 2 2, SD5016 2 2	5.5
	380 - 480VAC (-15% to +10%)	SD5002 4 2, SD5004 4 2, SD5006 4 2, SD5008 4 2	5.5
2	200 - 230VAC (-15% to +10%)	SD5024 2 2, SD5030 2 2	10
	380 - 480VAC (-15% to +10%)	SD5012 4 2, SD5018 4 2	10

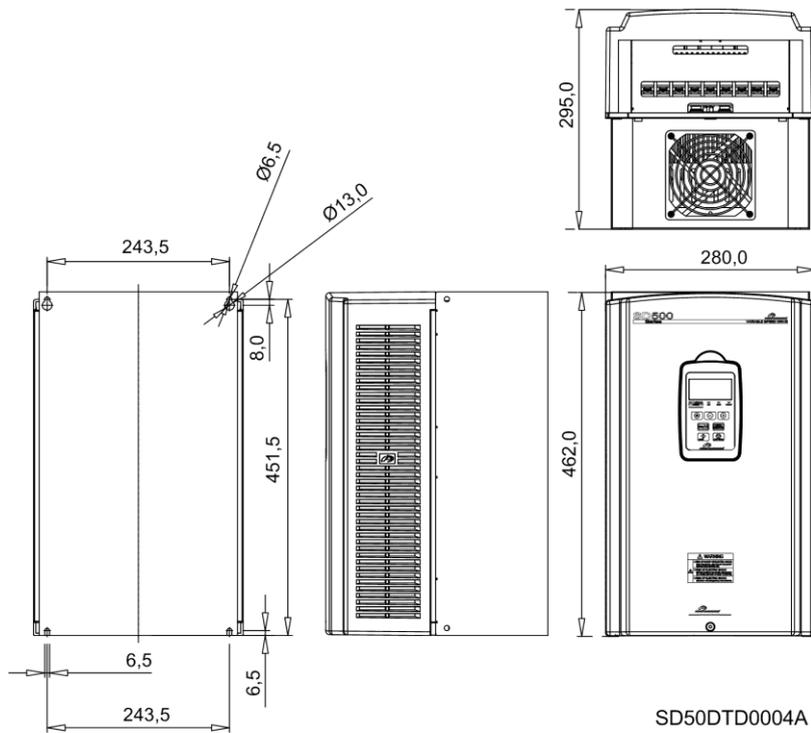


## Dimensions of Frames 3 and 4

FRAME	INPUT VOLTAGE	DRIVES	WEIGHT (Kg)
3	200 - 230VAC (-15% to +10%)	SD5045 2 2, SD5060 2 2	20
	380 - 480VAC (-15% to +10%)	SD5024 4 2, SD5030 4 2	20
4	200 - 230VAC (-15% to +10%)	SD5075 2 2, SD5090 2 2	30
	380 - 480VAC (-15% to +10%)	SD5039 4 2, SD5045 4 2	30



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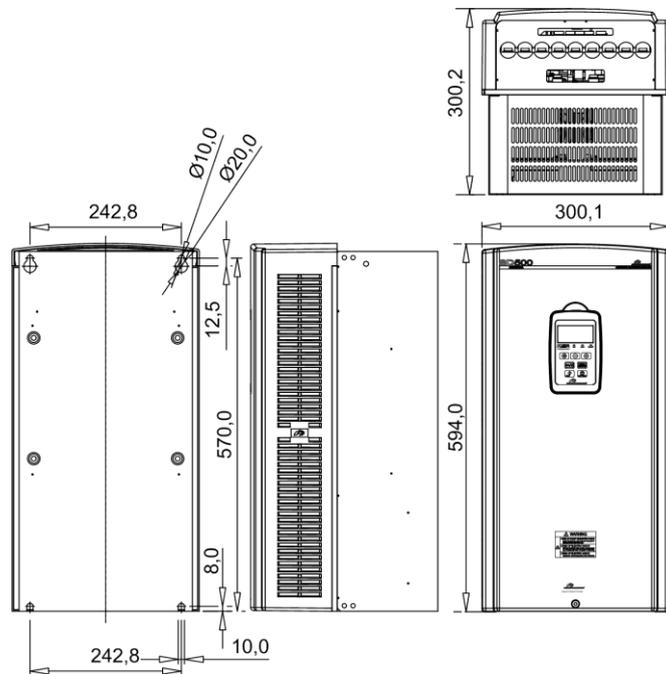


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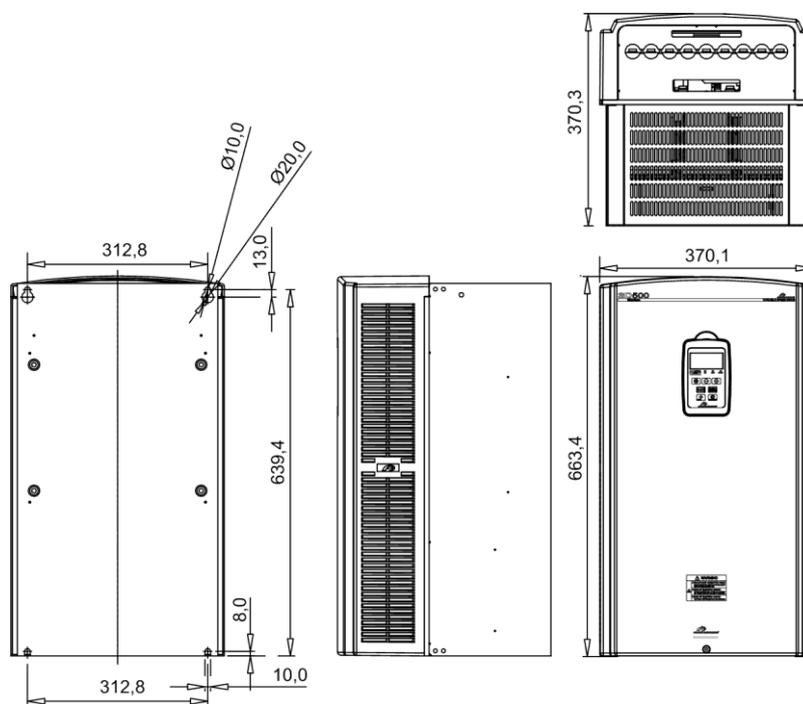
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## Dimensions of Frames 5 and 6

FRAME	INPUT VOLTAGE	DRIVES	WEIGHT (Kg)
5	200 - 230VAC (-15% to +10%)	-	-
	380 - 480VAC (-15% to +10%)	SD5060 4 2, SD5075 4 2, SD5090 4 2	41
6	200 - 230VAC (-15% to +10%)	-	-
	380 - 480VAC (-15% to +10%)	SD5110 4 2, SD5150 4 2	63



SD50DTD0005A



SD50DTD0006A

# MAINTENANCE



The SD500 drives consist of advanced semiconductor devices. Temperature, humidity, vibration and deteriorated components can reduce their efficiency. To avoid any possible irregularity, we recommend making periodic inspections.

## Warnings

Be sure to remove the input power when performing maintenance.

Be sure to perform maintenance after checking that the DC Link capacitor has been discharged. Check that the voltage between terminals +HVDC and -HVDC is below 30V DC. The bus capacitors in the drive's main circuit can still be charged even after the power is turned off.

The correct output voltage of the drive can only be measured by using an RMS voltage meter. Other voltage meters, including digital voltage meters, are likely to display incorrect values caused by the high frequency PWM output voltage of the drive.

## Routine Inspection

Be sure to check the following before handling the drive:

- Installation site conditions.
- Drive cooling system conditions.
- Excessive vibrations or noise in the motor.
- Excessive overheating.
- Normal output current value on the monitor.

Inspection site	Inspection element	Inspection	Period			Inspection method	Criterion	Instrument of Measurement
			Monthly	1 year	2 years			
All	Ambient conditions	Are there dust particles? Are the ambient temperature and the humidity within specification?	o			Visual check	Temperature: -20 to +50 ( or 40°C) Humidity: below 90% non-condensation.	Thermometer, Hygrometer, Recorder.
	Module	Are there any abnormal noises or oscillations?	o			Visual and audible.	There are no anomalies.	
	Input power	Is the input power to the main circuit correct?	o			Measure the voltage between terminals L1, L2, L3 and PE.		Digital multimeter. Tester.
	Power connections	Are the Power terminals correctly fastened?		o		Measure the temperature and torque of the power connections	Fasten the bolts again one week after its start-up. Check that the temperature is homogeneous and below 70°C	Infrared thermometer Torque key
Main circuit	Conductor/ Cable	Is the conductor corroded? Is the sheathing of the cable damaged?		o		Visual check.	No anomaly.	
	Terminal	Is any damage visible?		o		Visual check.	No anomaly.	
	IGBT's module Diodes module and Rectifier	Check the resistance value between each one of the terminals			o	Disconnect the cables of the inverter and measure the resistance value between: L1, L2, L3, ↔ VDC+, VDC- and U, V, W ↔ VDC+, VDC- with a tester > 10kΩ		Digital multimeter. Analogue tester.
Main circuit	Correct capacitor	Have fluid leakages been observed? Is the capacitor well fastened? Is any dilation or retraction sign observed? Measure the capacitance	o	o		Visual check. Measure the capacitance with a proper instrument.	No anomaly Capacitance higher than 85% of rated capacitance.	Instrument for measuring capacitance.
	Resistance	Is the insulation of the resistance damaged? Is the wiring of the resistance damaged (open)?		o		Visual check. Disconnect one of the connections and measure with a tester.	There are no anomalies. The resistance value variation does not exceed ±10%.	Digital multimeter. Analogue tester.
	Contactors	Is there any contactor chatter during operation? Is the contact damaged?		o		Audible check. Visual check.	No anomaly.	
Control circuit and Protections	Operating check	Is there any imbalance between output voltage phases?		o		Measure voltage between output terminals U, V and W.	Balanced voltage between phases i.e. lower than 4V or 8V difference for 200V or 400V models.	Digital multimeter / RMS voltage meter.
Cooling system	Cooling fans	Are there any abnormal noises or oscillations? Is the cooling fan disconnected?	o			Disconnect the power supply (OFF) and rotate the fan manually. Check the connections.	Fan should rotate effortlessly. No anomaly.	
Display	Measurement	Is the displayed value correct?	o	o		Check the reading instrument with an external measurement.	Check the specified values and the control values.	Voltage meter / Current meter etc.
Motor	All	Is there any noise or abnormal vibrations? Unusual smell?	o			Audible, sensory and visual check. Check if damages have been produced by overheating.	No anomaly.	
	Insulation resistance	Megger check (between terminals of output circuit and ground terminal)			o	Disconnect the cables U, V and W and join them together. Check the resistance between this join and ground.	More than 5MΩ	Megger type 500V

**Note:** Longevity of the main components indicated above is based on a continuous operation of the stipulated load. These conditions can change based on the environmental conditions.

# OPTIONAL EQUIPMENT

## 12

### Accessories

The SD500 Series drive has a wide range of options for different applications. In the image below it can be seen where the additional accessories are connected to the speed drive:



SD50ITC0005A

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CODE	ACCESORY	DESCRIPTION
SD5EC	Encoder Module	Closed Loop Control Pulse Train Reference Isolated power supply of 5/12/15 V Line driver or open collector Maximum input frequency 200kHz Signal loss detection
SD5IO	Expansion module input / output	3 digital outputs (250Vac/30Vdc, 5A) 3 digital inputs (selection PNP/NPN, 0~25V) 1 analogue voltage input (-10~+10V) 1 analogue current input (0~20mA) 1 analogue voltage output (-10~+10V, 10mA, 11 bits of resolution) 1 analogue current output (0~20mA, 12 bits of resolution)
SD5RC2	Connection Cable	Connection cable for keyboard of 2m.
SD5RC3	Connection Cable	Connection cable for keyboard of 3m.
SD5PLC	Control module PLC	Master Platform-K 120S 6 Normal Inputs (Sink/ Source Selectable), Maximum input with 14 points with expansion Normal output of 4 points (NO relay), maximum output of 7 points with expansion RTC (Real time clock) Operating System KGL WIN
SD5DP	Profibus Communication Module- DP	Profibus Connection Maximum speed of communication:12Mbps Maximum of 32 stations per segment Bus topology Improved online diagnosis
SD5ET	Ethernet Communication Module	100M BASE-TX, 10M BASE-T support Half duplex, full duplex support Auto negotiation Maximum Transmission Distance: 100m Star topology
SD5CO	CANopen Communication Module	Communication speed of 125kbps, 250kbps, 500kbps Bus Topology Maximum 64 nodes of connecting points Maximum transmission distance of 500m for 25kbps

CODE	ACCESORY	DESCRIPTION
SD5DN	DeviceNet communication module	Communication speed of 125kbps, 250kbps, 500kbps Bus Topology Maximum 64 nodes of connecting points Maximum transmission distance of 500m for 25kbps
SD5LW	LonWorks communication module	Communication speed of 78kbps Free/bus Topology Integrated Resistor by topology Maximum connection distance of 2,700m (bus topology)
SD5PN	ProfiNet communication module	Communication speed 100Mbps Full duplex support Maximum 64 stations per segment Bus and star topology

## Dynamic Braking Unit

The SD500 drives feature optional dynamic braking circuits for frames 5 and 6 (integrated in other sizes). A Dynamic Braking Unit (DBU) will be installed to redirect the regenerated energy with optional dynamic braking resistors.

Information about the braking units is included below. For further information, refer to the corresponding manual.

### Type of dynamic braking unit

Dimensions	Voltage	Drive Capacity	DBU	Type
Group 1	380 to 480Vac	30 ~37kW (Frame 5)	DBSD4075	No UL
		45~55kW (Frames 5 and 6)	DBSD4145	
		75kW (Frame 6)		
Group 2		30 ~37kW (Frame 5)	DBSD4075U	UL
		45~55kW (Frames 5 and 6)	DBSD4145U	
		75kW (Frame 6)		

### Terminal setting

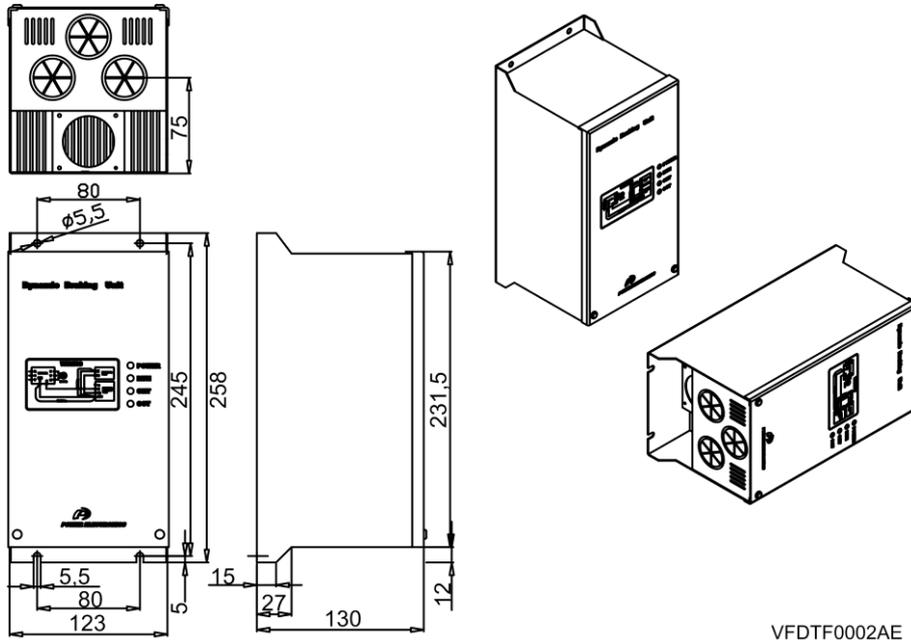
The terminals for the dynamic braking unit are the ones described in the table below:

Group	Terminal	Description
Group 1	G	Ground Terminal.
	N	Connection for the N terminal of the DC Bus of the drive.
	B2	Connection for the B2 terminal of the dynamic braking resistor.
	P/B1	Connection for the B1 terminal of the dynamic braking unit. Connection for the P terminal of the DC bus of the drive.
Group 2	P	Connection for the P terminal of the DC bus of the drive.
	N	Connection for the N terminal of the DC bus of the drive.
	G	Ground Terminal.
	B1	Connection for the B1 terminal of the dynamic braking unit.
	B2	Connection for the B2 terminal of the dynamic braking resistor.

## Dimensions

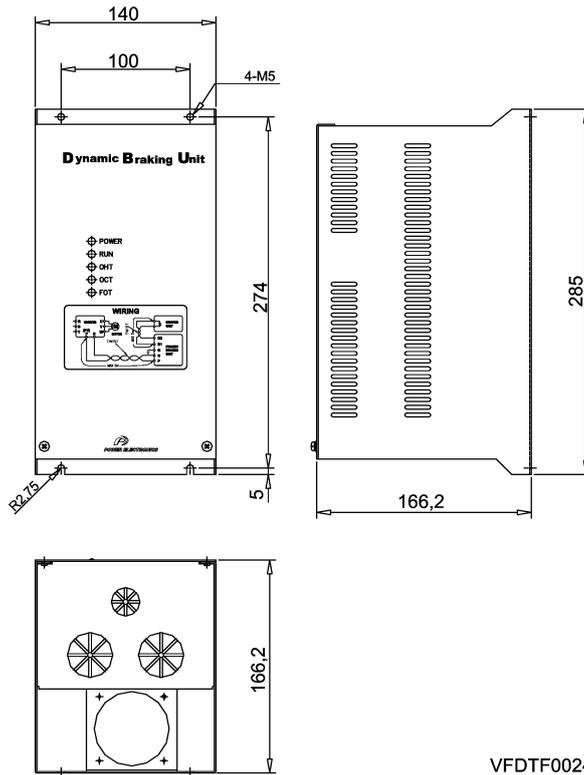
The dynamic braking units correspond with the groups indicated below:

### Group 1:



EN

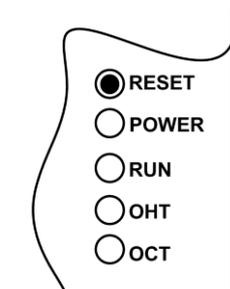
Group 2:



VFDTF0024A

LED description

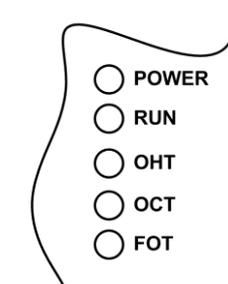
Group 1:



VFDTF0009AE

LED	Description
RESET	Press the switch to release the OCT failure (overcurrent). Pressing this switch turns off the OCT LED.
POWER (Green)	Light son when the braking unit is powered, as it is normally connected to the drive.
RUN (Green)	Flashes when the brake unit is operating properly (due to the regenerated energy by the motor).
OHT (Red)	When the exchanger is overheated and the level exceeds the limit set, the overheating protection is activated and this LED turns on after the signal is closed.
OCT (Red)	Overcurrent failure signal. When an overcurrent is produced in the IGBT, this protection function cuts the function signal and the OCT LED turns on.

## Group 2:



VFDTF0025A

LED	Description
POWER (Red)	Lights on when the brake unit is powered (normally connected to the drive).
RUN (Green)	Lights on when the brake unit is operating properly (due to the regenerated energy by the motor).
OHT (Red)	When the exchanger is overheated and the level exceeds the limit set, the overheating protection is activated and this LED turns on after the signal is closed.
OCT (Red)	Overcurrent failure signal. When an overcurrent is produced in the IGBT, this protection function cuts the function signal and the OCT LED turns on.
FOT (Red)	Lights on when the fuse of internal protection opens.

## Braking Resistance Terminals

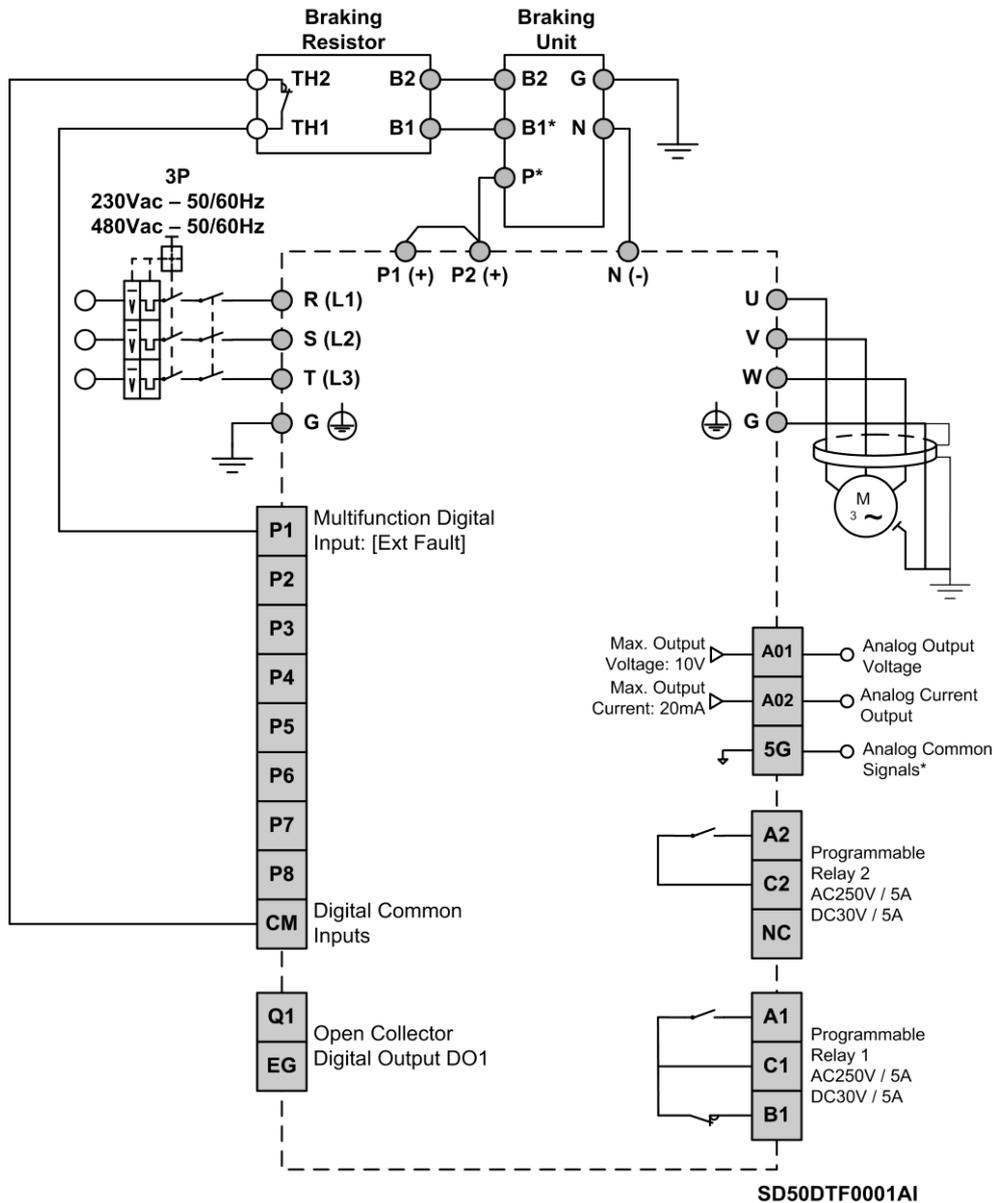
**Note:** It is recommended to use of braking resistors equipped with thermal sensors. Connect it to one of the digital input terminals of the drive (P1 to P8) after selecting the [FLL EXTERN] option in the corresponding digital input parameter.

Braking Resistor Terminals	Description
B1, B2	Connection terminals for connecting the dynamic braking unit. Wiring must be done as shown in the diagram above. Connect the terminals of the dynamic braking resistor to terminals B1 and B2 of the dynamic braking unit.
TH1, TH2 <sup>[1]</sup>	Temperature sensor resistor. Normal Temperature (ambient): Normally Closed (TH1 – TH2 Closed). Over-temperature resistance: Normally Open (TH1 – TH2 Open). Wire this signal to an input terminal configured as "External Failure".

<sup>[1]</sup> The TH1 and TH2 terminals are available when the brake resistor used is equipped with a temperature sensor.

## Wiring Diagram

The following figure shows the wiring between the drive, the DBU and the braking resistor.



### \* Notes:

- In the dynamic braking units of Group 1, the B1 and P terminals are the same. Therefore, the terminal will be connected to the B1 terminal of the braking resistor and to the positive terminal of the drive's bus.
- Maximum lengths of cables:
  - Drive → Braking Unit: max. 10m.
  - Braking Unit → Braking Resistor: max. 10m

## Dynamic Braking Resistor

This section includes the necessary external braking resistors for drives of frames 1 to 4, which include a built-in brake. And for the rest of drives (frames 5 and 6) that need an external Dynamic Braking Unit.

### External Braking Resistor Selection (Drives with internal brake)

SUPPLY VOLTAGE	DRIVE SD500	POWER (kW)	BRAKING RESISTANCE (150% of Braking Torque)	
			Resistor ( $\Omega$ )	Light Duty Cycle (5%) Watts (W)
230Vac	SD5005 2 2	0.75	150	150
	SD5008 2 2	1.5	60	300
	SD5012 2 2	2.2	50	400
	SD5016 2 2	3.7	33	600
	SD5024 2 2	5.5	20	800
	SD5030 2 2	7.5	15	1200
	SD5045 2 2	11	10	2400
	SD5060 2 2	15	8	2400
	SD5075 2 2	18.5	5	3600
	SD5090 2 2	22	5	3600
400Vac	SD5002 4 2	0.75	600	150
	SD5004 4 2	1.5	300	300
	SD5006 4 2	2.2	200	400
	SD5008 4 2	3.7	130	600
	SD5012 4 2	5.5	85	1000
	SD5018 4 2	7.5	60	1200
	SD5024 4 2	11	40	2000
	SD5030 4 2	15	30	2400
	SD5039 4 2	18.5	20	3600
	SD5045 4 2	22	20	3600

**Note:** The values in this table are based on a 5%, 15 second duty cycle (ED – Enable Duty) of continuous braking. For further information, contact the technical department of Power Electronics.



### CAUTION

**Do not touch the braking resistor during operation of the drive as it could be very hot (above 150°C).**

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## Selecting the External Braking Resistor (Drives with external brake)

Drives with up to 22kW of power capacity (Frames 1 to 4) have a built-in dynamic brake. However, it is possible to use the External Dynamic Braking Unit if necessary. The following table shows the braking resistors to be used in case of using the External Dynamic Braking Unit.

VOLTAGE SUPPLY	DRIVE SD500	POWER (kW)	BRAKING RESISTANCE (150% of Braking Torque)			
			Resistor ( $\Omega$ )	Light Duty Cycle (5%) Watts (W)	Medium Duty Cycle (15%) Watts (W)	Heavy Duty Cycle (35%) Watts (W)
400Vac	SD5002 4 2	0,75	500	50	125	270
	SD5004 4 2	1,5	250	100	250	550
	SD5006 4 2	2,2	170	125	350	800
	SD5008 4 2	3,7	100	150	555	1295
	SD5012 4 2	5,5	70	200	825	1925
	SD5018 4 2	7,5	50	400	1125	2625
	SD5024 4 2	11	35	600	1650	3850
	SD5030 4 2	15	25	800	2250	5250
	SD5039 4 2	18,5	20	1000	2775	6475
	SD5045 4 2	22	17	1100	3300	7700
	SD5060 4 2	30	12	1500	4500	10500
	SD5075 4 2	37	10	2000	5550	12950
	SD5090 4 2	45	8	2500	6750	15750
	SD5110 4 2	55	7	3000	8250	19250
SD5150 4 2	75	6	4000	11250	26250	

**Note:** The values in this table are based on a 5%, 15 second duty cycle (ED – Enable Duty) of continuous braking. For further information, contact the technical department of Power Electronics.



### CAUTION

Do not touch the braking resistor during operation of the drive as it could be very hot (above 150°C).

## dV/dt Filters

### 230VAC Power Supply

FRAME	FILTER				DRIVE	
	REFERENCE	DIMENSIONS			REFERENCE	Inom @ 40°C
		W	H	D		
1	SD50F005 2	147	128	130	SD5005 2 2	6.8
	SD50F008 2				SD5008 2 2	11
	SD50F012 2				SD5012 2 2	16
	SD50F016 2				SD5016 2 2	22
2	SD50F024 2	195	140	145	SD5024 2 2	33
	SD50F030 2				SD5030 2 2	44
3	SD50F045 2	250	126	115	SD5045 2 2	60
	SD50F060 2				SD5060 2 2	74
4	SD50F075 2	280	163	152	SD5075 2 2	90
	SD50F090 2				SD5090 2 2	120

### 400VAC Power Supply

FRAME	FILTER				DRIVE	
	REFERENCE	DIMENSIONS			REFERENCE	Inom @ 40°C
		W	H	D		
1	SD50F002 4	147	128	130	SD5002 4 2	4
	SD50F004 4				SD5004 4 2	5.4
	SD50F006 4				SD5006 4 2	8
	SD50F008 4				SD5008 4 2	12
2	SD50F012 4	195	140	145	SD5012 4 2	16
	SD50F018 4				SD5018 4 2	23
3	SD50F024 4	250	126	115	SD5024 4 2	32
	SD50F030 4				SD5030 4 2	40
4	SD50F039 4	280	163	152	SD5039 4 2	48
	SD50F045 4				SD5045 4 2	61
5	SD50F060 4	300	225	155	SD5060 4 2	78
	SD50F075 4				SD5075 4 2	100
	SD50F090 4				SD5090 4 2	115
6	SD50F110 4	370	233	172	SD5110 4 2	150
	SD50F150 4				SD5150 4 2	180

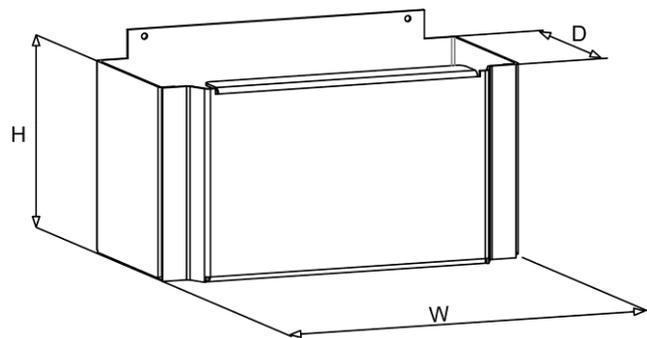
EN

**Note:** Filters for motor cables of 150m (with shielded cable) and 300m (with unshielded cable [switching freq.: 2kHz]). For more information, please contact Power Electronics.

The previous tables describe the dv/dt filters' code for any SD500 series VSD. These tables are available for every equipment charge condition.



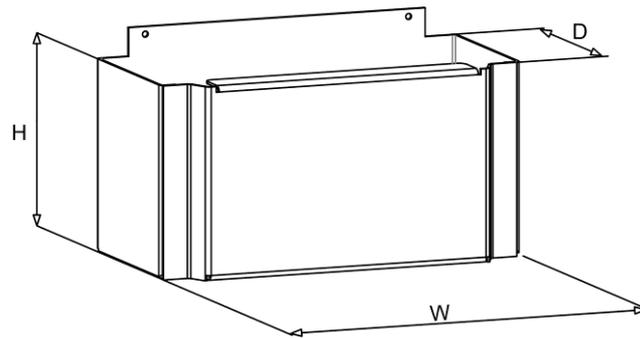
SD50ITM0003A



SD50DTD0007A

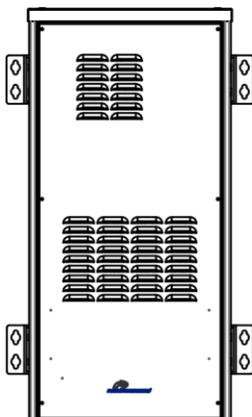
## Extension Box

FRAME	FILTER				DRIVE
	REFERENCE	DIMENSIONS			REFERENCE
		W	H	D	
1	SD5EB1	147	85	132	SD5002 XX
					SD5004 XX
					SD5006 XX
					SD5008 XX
2	SD5EB2	195	100	145	SD5012 XX
					SD5018 XX
3	SD5EB3	250	165	135	SD5024 XX
					SD5030 XX
4	SD5EB4	280	205	135	SD5039 XX
					SD5045 XX
5	SD5EB5	300	205	130	SD5060 4 2
					SD5075 4 2
					SD5090 4 2
6	SD5EB6	370	205	138	SD5110 4 2
					SD5150 4 2



SD50DTD0007A

## Freemaq Harmonic Filter



SD50DTG0003A

The Freemaq consists of a Notch Filter connected to the input of the SD500 drive in order to reduce the Harmonic Distortion below the 10% or the 5% as requested. For more information, reference the SD500 Freemaq filter manual.



# DECLARATION OF CONFORMITY CE

## DECLARACIÓN DE CONFORMIDAD CE

### The Company *La empresa:*

Name *Nombre:* POWER ELECTRONICS ESPAÑA, S.L.  
Address *Dirección:* C/ Leonardo Da Vinci, 24-26, 46980 Paterna, Valencia, Spain  
Telephone *Teléfono:* +34 96 136 65 57  
Fax: +34 96 131 82 01

### Declares under its own responsibility, that the product:

*Declara bajo su propia responsabilidad, que el producto:*

**Variable Speed Drive for AC motors**  
Variadores de velocidad para motores AC

**Brand *Marca* :** Power Electronics

**Model *Modelo*:** SD500

### Is in conformity with the following European Directives:

*Se halla en conformidad con las siguientes Directivas Europeas:*

Reference <i>Referencia</i>	Title <i>Título</i>
2014/30/UE	Electromagnetic Compatibility <i>Compatibilidad Electromagnética</i>
2014/35/UE	Electrical Material intended to be used with certain limits of voltage <i>Material Eléctrico para su utilización con determinados límites de tensión (Baja tensión)</i>

### References of the harmonized technical norms applied under the Electromagnetic Compatibility Directive:

*Referencias de las normas técnicas armonizadas aplicadas bajo la Directiva de Compatibilidad Electromagnética:*

Reference <i>Referencia</i>	Title <i>Título</i>
EN 61800-3:2004/A1:2012	Adjustable speed electrical power drive systems. Part 3: EMC requirements and specific test methods. <i>Accionamientos eléctricos de potencia de velocidad variable. Parte 3: Requisitos CEM y métodos de ensayo específicos.</i>

### References of the harmonized technical norms applied under the Low Voltage Directive:

*Referencias de las normas técnicas armonizadas aplicadas bajo la Directiva de Baja Tensión:*

Reference <i>Referencia</i>	Title <i>Título</i>
EN 61800-5-1:2007	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy <i>Accionamientos eléctricos de potencia de velocidad variable. Parte 5-1: Requisitos de seguridad. Eléctricos, térmicos y energéticos.</i>

Paterna, 20<sup>th</sup> of April, 2016

David Salvo  
CEO



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