

SD700 Series

VARIABLE SPEED DRIVE



Variable Speed Drive Hardware and Installation Manual

SD700

Series

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Hardware and Installation Manual

Edition: October 2012
SD70MTHW01CI Rev. C

SAFETY SYMBOLS

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

**WARNING**

This symbol means improper operation may result in serious personal injury or death.

**CAUTION**

Identifies shock hazards under certain conditions. Particular attention should be given because dangerous voltage may be present. Maintenance operation should be done by qualified personnel.



Identifies potential hazards under certain conditions. Read the message and follow the instructions carefully.



Identifies shock hazards under certain conditions. Particular attention should be given because dangerous voltage may be present.

Edition October 2012

This publication could present technical imprecision or misprints. The information here included will be periodically modified and updated, and all those modifications will be incorporated in later editions.

To consult the most updated information of this product you might access through our website www.power-electronics.com where the latest version of this manual can be downloaded.

Revisions

Date	Revision	Description
08 / 01 / 2009	A	First edition
23 / 11 / 2010	B	Code description updating. Ratings at 440VAC. Misprinting errors.
08 / 10 / 2012	C	Transportation. EMC installation requirements. Installation recommendations. STO board safety function. ATEX. Multipulse drive connection. CE marking.

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SAFETY INSTRUCTIONS

IMPORTANT!

- Read this manual carefully to maximise the performance of this product and to ensure its safe use and installation.
- Power Electronics accepts no responsibility or liability for any damage resulting from inappropriate use of the equipment.
- In this manual, safety messages are classified as follows:



WARNING

Do not remove the metal cover while the power is applied or the unit is in operation. Otherwise electric shock could occur.

Do not run the drive with the front cover removed. Otherwise, you may get an electric shock due to the high voltage terminals or exposure of charged capacitors.

The drive does not remove the voltage from the input busbars of the drive. Before working on the drive, isolate the whole drive from the supply.

Do not remove the cover except for periodic inspections or wiring, even if the input power is not applied. Otherwise, you may access to the charged circuits and may get an electric shock.

Wiring and periodic inspections should be performed at least 10 minutes after disconnecting the input power. To remove the front cover check that the DC Link red LED is off, then remove the terminals metallic cover and check with a multimeter the following measures:

- **Measure between the output power busbars U, V, W and the cabinet and check that the voltage is around 0V.**
- **Measure that the DC link terminals +, - and chassis voltage are below 30VDC.**

Otherwise, you may get an electric shock.

Operate the switches with dry hands. Otherwise, you may get an electric shock.

Do not use cables with damaged insulation. Otherwise, you may get an electric shock.

Do not subject the cables to abrasions, excessive stress, heavy loads or pinching. Otherwise, you may get an electric shock.

Do not make any insulation or voltage withstand tests on the motor with the drive connected.



CAUTION

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

Disconnect the input power if the drive is damaged. Otherwise, it could result in a secondary accident or fire.

After stopping the drive, it 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 may get an electric shock.

It is not permitted to weld the cabinet; this can damage the electronic sensitive equipment inside.

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



WARNINGS

RECEPTION

- The SD700 are carefully tested and perfectly packed before delivering.
 - 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 model and serial number of the variable speed drive are the same on the box, delivery note and unit.
 - Each variable speed drive is delivered with Hardware and Software technical manuals.
-

RECYCLING

- Packing of the equipments should be recycled. For this, it is necessary to separate different materials included (plastic, paper, cardboard, wood ...) and deposit them on proper banks.
 - Waste products of electric and electronic devices should be selectively collected for your correct recycling company.
-

ELECTROMAGNETIC COMPATIBILITY (EMC)

- The drive is intended to be used in industrial environment (Second Environment), it achieve compliance with C3 category defined in IEC/EN 61800-3 standard following the installation recommendation within this manual.
 - Select communication and control system according to the drive EMC environment. Otherwise, systems could suffer from interferences due to a low EMS level.
-

SAFETY

- Before operating the drive, read this manual thoroughly to gain an understanding of the unit. If any doubt exists then please contact POWER ELECTRONICS, (902 40 20 70 / +34 96 136 65 57) or your nearest agent.
- Wear safety glasses when operating the drive with power applied or the front cover is removed.
- Handle and transport the drive following the recommendations within this manual.
- Install the drive according to the instructions within this manual and the local regulations.
- Do not place heavy objects on the drive.
- Ensure that the drive is mounted vertically and keeping the minimum clearances distances.
- Do not drop the drive or subject it to impact.
- The SD700 drives contain static sensitive printed circuits boards. Use static safety procedures when handling these boards.
- Avoid installing the drive in conditions that differ from those described in the *Environmental Ratings* section.

CONNECTION PRECAUTIONS

- To ensure correct operation of the drive it is recommended to use a SCREENED CABLE for the control wiring.
- The motor cable should comply with the requirements within this manual. Due to increased leakage capacitance between conductors, external ground fault protection threshold value should be adjusted ad hoc.
- Do not disconnect motor cables if input power supply remains connected.
- The internal circuits of the SD700 Series will be damaged if the incoming power is connected and applied to output terminals (U, V, W).
- Do not use power factor correction capacitors banks, surge suppressors, or RFI filters on the output side of the drive. Doing so may damage these components.
- Always check whether the DC Link red LED is OFF before wiring terminals. The capacitors may hold high-voltage even after the input power is disconnected.

TRIAL RUN

- Verify all parameters before operating the drive. Alteration of parameters may be required depending on application and load.
- Always apply voltage and current signals to each terminal that are within levels indicated within this manual.

OPERATION PRECAUTIONS

- When the Auto Restart function is enabled, keep clear of driven equipment, as the motor will restart suddenly after the fault reset.
- The “STOP / RESET” key on the keypad is active only if the appropriate function setting has been made. Pushing this button the drive will NOT perform a safe stop. It is available STO optional board, which installed with a separate EMERGENCY pushbutton, will disconnect the power and will be unable to generate torque in the motor with high reliability.
- If a fault is reset with the reference signal still active, the drive will unexpectedly restart. Verify that it is permissible for this to happen. Otherwise, it may lead to injury to people.
- Do not modify or alter internal wiring and spare parts without Power Electronics supervision.
- Before programming or operating the SD700 Series, initialise all parameters back to factory default values.

EARTH CONNECTION

- Ground the drive and adjoining cabinets to ensure a safety operation and to reduce electromagnetic emission.
 - Connect the input PE terminal only to the dedicated PE terminal of the drive. Do not use the case or the chassis screw for grounding.
 - Ground the drive chassis through the dedicated and labelled terminals. Use appropriate conductors to comply with the local regulations. The ground conductor should be connected first and removed last.
 - Motor ground cable must be connected to the PE output terminal of the drive and not to the installation's ground. We recommend that the section of the ground conductor (PE) should be equal or greater than the active conductor (U, V, W).
 - If the user decides to use shielded motor cable, ensure a correct 360° shield bonding in both the drive cabinet and the motor terminal box.
-

HOW TO USE THIS MANUAL

Quick Guide

- 1- Make sure model and serial number of the drive are the same on the delivery note and unit. **See Chapter 2.**
- 2- Read carefully the safety instructions before installation, commissioning, operation and maintenance of the drive. **See safety instructions section.**
- 3- For reception, handling and transportation **see Chapter 4.**
- 4- Before the mechanical installation, check the environmental ratings, drive configuration mounting and clearances. **See chapter 5.**
- 5- Follow the mechanical installation instructions. **See Chapter 5.**
- 6- Before the electrical installations, check basic configuration and wiring recommendations, **see Chapter 6 and Chapter 7.**
- 7- Follow the electrical installation instructions in **Chapter 6 and Chapter 7.**
- 8- For Modbus Communication hardware, **see Chapter 8.**
- 9- Follow the commissioning instructions in **Chapter 9.**
- 10- For preventive maintenance instructions, follow the recommendations in **Chapter 11.**

1. INTRODUCTION

SD700 low voltage drives by Power Electronics is the most extensive product family with a power range from 1.5kW to 2000kW. It has been designed focused on maximum motor care, components durability and easy maintenance. SD700 portfolio is divided in 3 products series that comply with specific demands and standards in worldwide installations thanks to its own specific features: SD700, SD700KOMPAKT, SD700FREEMAQ (SD700FR & SD700FL).

SD700 SERIES is the core of the family, available from 1.5kW to 2000kW, a voltage range from 230VAC to 690VAC and available up to 24 pulses. IP20 and IP54 mechanical designs cover all general industry applications, making it the most flexible and extensive series.

The whole family integrates unique features such as low dV/dt , smart mechanical design and accurate control. It is divided in 11 frames to cover the whole power range.



Figure 1.1 SD700 Series

SD700 products provide high efficiency, maximum control, functional safety, durability, easy commissioning and easy maintenance for the whole range. Power Electronics delivers flexible integrated solutions, fully tested under the most demanding environmental and electrical conditions.

2. CONFIGURATION TABLE & STANDARD RATINGS

2.1. Configuration table

EXAMPLE

CODE: SD703705212T

SD7		0370		5		2		12		-		-		T		-	
SERIE		Output current ^[1]		Input Voltage		Degree of protection		Pulses number		Cabinet Plinths ^[2]		EMC Filter		Floating Earth		Input Frequency	
SD7	SD700	0050	50A	2	230VAC	2	IP20	-	6 Pulses	-	Standard	-	Second Environment	-	Without floating earth	-	50Hz
		0100	100A	5	380-500VAC	5	IP54	12	12 Pulses	20	Total Height 2000mm	F	First Environment ^[3]	T	With floating earth	6	60Hz ^[4]
		7	525VAC			18	18 Pulses	22	Total Height 2200mm	M	Optional IT Filter				
				6	690VAC			24	24 Pulses								

GENERAL CONSIDERATIONS:

- [1] Verify the rated current of the motor nameplate to guarantee the compatibility with the selected drive.
 [2] SD700 frame 4 only available with 1712mm total height.
 [3] Floating earth drive not available with first environment filter.
 [4] Consult availability.

CODIFICATION EXAMPLES:

- **SD718006212** SD700, 1800A, 690Vac, Degree of protection IP20, 12 pulses, Second Environment, 50Hz.
- **SD718006212F** SD700, 1800A, 690Vac, Degree of protection IP20, 12 pulses, First environment, 50 Hz.
- **SD701002518M** SD700, 100A, 230Vac, Degree of protection IP54, 18 pulses, IT filter, 50Hz.

The following figure shows an example of designation label:



Figure 2.1 Type designation label (located on lateral panel)

2.2. Standard ratings – 230Vac

6 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 230VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 230VAC	120% Overload (A)
1	SD70006 2X Y	6	1,5	9	7,5	2,2	9
	SD70009 2X Y	9	2,2	14	11	3	14
	SD70012 2X Y	12	3	18	15	5,5	18
	SD70020 2X Y	20	5,5	30	25	7,5	30
	SD70026 2X Y	26	7,5	39	33	9	39
2	SD70032 2X Y	32	9	48	40	11	48
	SD70039 2X Y	39	11	59	49	15	59
	SD70050 2X Y	50	15	75	63	18,5	75
3	SD70064 2X Y	64	18,5	96	80	22	96
	SD70075 2X Y	75	22	113	94	25	113
	SD70090 2X Y	90	25	135	113	33	135
	SD70115 2X Y	115	33	173	144	45	173
4	SD70150 2X Y	150	45	225	188	51	225
	SD70170 2X Y	170	51	255	213	63	255
5	SD70210 2X Y	210	63	315	263	75	315
	SD70250 2X Y	250	75	375	313	86	375
	SD70275 2X Y	275	86	413	344	100	413
6	SD70330 2X Y	330	100	495	413	110	495
	SD70370 2X Y	370	110	555	463	140	555
	SD70460 2X Y	460	140	690	575	185	690
7	SD70580 2X Y	580	185	870	725	200	870
	SD70650 2X Y	650	200	975	813	220	975
	SD70720 2X Y	720	220	1080	900	250	1080

2.3. Standard ratings – 400Vac

6 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 400VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 400VAC	120% Overload (A)
1	SD70006 5X Y	6	2,2	9	7,5	3	9
	SD70009 5X Y	9	4	14	11	5,5	14
	SD70012 5X Y	12	5,5	18	15	7,5	18
	SD70018 5X Y	18	7,5	27	23	11	27
	SD70024 5X Y	24	11	36	30	15	36
2	SD70032 5X Y	32	15	48	40	18,5	48
	SD70038 5X Y	38	18,5	57	48	22	57
	SD70048 5X Y	48	22	72	60	30	72
3	SD70060 5X Y	60	30	90	75	37	90
	SD70075 5X Y	75	37	113	94	45	113
	SD70090 5X Y	90	45	135	113	55	135
	SD70115 5X Y	115	55	173	144	75	173
4	SD70150 5X Y	150	75	225	188	90	225
	SD70170 5X Y	170	90	255	213	110	255
5	SD70210 5X Y	210	110	315	263	132	315
	SD70250 5X Y	250	132	375	313	160	375
	SD70275 5X Y	275	150	413	344	200	413

6 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 400VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 400VAC	120% Overload (A)
6	SD70330 5X Y	330	160	495	413	220	495
	SD70370 5X Y	370	200	555	463	250	555
	SD70460 5X Y	460	250	690	575	315	690
7	SD70580 5X Y	580	315	870	725	400	870
	SD70650 5X Y	650	355	975	813	450	975
	SD70720 5X Y	720	400	1080	900	500	1080
8	SD70840 5X Y	840	450	1260	1050	560	1260
	SD70925 5X Y	925	500	1388	1156	630	1388
	SD70990 5X Y	990	560	1485	1238	710	1485
9	SD71150 5X Y	1150	630	1725	1438	800	1725
	SD71260 5X Y	1260	710	1890	1575	900	1890
	SD71440 5X Y	1440	800	2160	1800	1000	2160
10	SD71580 5X Y	1580	900	2370	1975	1100	2370
	SD71800 5X Y	1800	1000	2700	2250	1200	2700
11	SD72200 5X Y	2200	1200	3300	2750	1500	3300
	SD72500 5X Y	2500	1400	3750	3100	1750	3750

12 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 400VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 400VAC	120% Overload (A)
6	SD70330 5X 12 Y	330	160	495	413	220	495
	SD70370 5X 12 Y	370	200	555	463	250	555
	SD70460 5X 12 Y	460	250	690	575	315	690
8	SD70840 5X 12 Y	840	450	1260	1050	560	1260
	SD70925 5X 12 Y	925	500	1388	1156	630	1388
	SD70990 5X 12 Y	990	560	1485	1238	710	1485
9	SD71150 5X 12 Y	1150	630	1725	1438	800	1725
	SD71260 5X 12 Y	1260	710	1890	1575	900	1890
	SD71440 5X 12 Y	1440	800	2160	1800	1000	2160
11	SD72200 5X 12 Y	2200	1200	3300	2750	1500	3300
	SD72500 5X 12 Y	2500	1400	3750	3100	1750	3750

18 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 400VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 400VAC	120% Overload (A)
7	SD70580 5X 18 Y	580	315	870	725	400	870
	SD70650 5X 18 Y	650	355	975	813	450	975
	SD70720 5X 18 Y	720	400	1080	900	500	1080
9	SD71150 5X 18 Y	1150	630	1725	1438	800	1725
	SD71260 5X 18 Y	1260	710	1890	1575	900	1890
	SD71440 5X 18 Y	1440	800	2160	1800	1000	2160
10	SD71580 5X 18 Y	1580	900	2370	1975	1100	2370
	SD71800 5X 18 Y	1800	1000	2700	2250	1200	2700
11	SD72200 5X 18 Y	2200	1200	3300	2750	1500	3300
	SD72500 5X 18 Y	2500	1400	3750	3100	1750	3750

24 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 400VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 400VAC	120% Overload (A)
8	SD70840 5X 24 Y	840	450	1260	1050	560	1260
	SD70925 5X 24 Y	925	500	1388	1156	630	1388
	SD70990 5X 24 Y	990	560	1485	1238	710	1485
11	SD72200 5X 24 Y	2200	1200	3300	2750	1500	3300
	SD72500 5X 24 Y	2500	1400	3750	3100	1750	3750

2.4. Standard ratings – 440Vac

6 PULSES									
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY				Operation Temperature 40°C NORMAL DUTY			
		I(A) Rated	Motor Power at 440VAC		150% Overload (A)	I(A) Rated	Motor Power at 440VAC		120% Overload (A)
			kW	HP			kW	HP	
1	SD70006 5X Y	5,5	2,2	3	8,2	6,8	3	4	8,2
	SD70009 5X Y	8	4	5	12	10	5,5	7-1/2	12
	SD70012 5X Y	11	5,5	7-1/2	16,5	13,75	7,5	10	16,5
	SD70018 5X Y	16	7,5	10	24	20	11	15	24
	SD70024 5X Y	22	11	15	33	27,5	15	20	33
2	SD70032 5X Y	29	15	20	43,5	36,25	18,5	25	43,5
	SD70038 5X Y	34,5	18,5	25	51,7	43,1	22	30	51,7
	SD70048 5X Y	43,6	22	30	65,4	54,5	30	40	65,4
3	SD70060 5X Y	54,5	30	40	81,7	68,1	37	50	81,7
	SD70075 5X Y	68	37	50	102	85	45	60	102
	SD70090 5X Y	82	45	60	123	102,5	55	75	123
	SD70115 5X Y	104,5	55	75	156,7	130,6	75	100	156,7
4	SD70150 5X Y	136	75	100	204	170	90	125	204
	SD70170 5X Y	154,5	90	125	231,6	193	110	150	231,6
5	SD70210 5X Y	191	110	150	286,5	238,7	132	180	286,5
	SD70250 5X Y	227	132	180	340,5	283,7	160	240	340,5
	SD70275 5X Y	250	150	200	375	312,5	200	275	375
6	SD70330 5X Y	300	160	240	450	375	220	300	450
	SD70370 5X Y	336	200	275	504	420	250	340	504
	SD70460 5X Y	418	250	340	627	522,5	315	400	627
7	SD70580 5X Y	527	315	400	790,5	658,7	400	500	790,5
	SD70650 5X Y	591	355	450	886,5	738,7	450	600	886,5
	SD70720 5X Y	654,5	400	500	981,7	818,1	500	650	981,7
8	SD70840 5X Y	764	450	600	1146	955	560	750	1146
	SD70925 5X Y	841	500	650	1261,5	1051,2	630	850	1261,5
	SD70990 5X Y	900	560	750	1350	1125	710	900	1350
9	SD71150 5X Y	1045,5	630	850	1568	1306,8	800	1000	1568
	SD71260 5X Y	1145,5	710	900	1718	1431,8	900	1250	1718
	SD71440 5X Y	1309	800	1000	1963,5	1636,2	1000	1400	1963,5
10	SD71580 5X Y	1436	900	1250	2154	1795	1100	1500	2154
	SD71800 5X Y	1636	1000	1400	2454	2045	1200	1600	2454
11	SD72200 5X Y	2000	1200	1600	3000	2500	1500	2000	3000
	SD72500 5X Y	2300	1400	1900	3450	2800	1750	2350	3450

12 PULSES									
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY				Operation Temperature 40°C NORMAL DUTY			
		I(A) Rated	Motor Power at 440VAC		150% Overload (A)	I(A) Rated	Motor Power at 440VAC		120% Overload (A)
			kW	HP			kW	HP	
6	SD70330 5X 12 Y	300	160	240	450	375	220	300	450
	SD70370 5X 12 Y	336	200	275	504	420	250	340	504
	SD70460 5X 12 Y	418	250	340	627	522,5	315	400	627
8	SD70840 5X 12 Y	764	450	600	1146	955	560	750	1146
	SD70925 5X 12 Y	841	500	650	1261,5	1051,2	630	850	1261,5
	SD70990 5X 12 Y	900	560	750	1350	1125	710	900	1350
9	SD71150 5X 12 Y	1045,5	630	850	1568	1306,8	800	1000	1568
	SD71260 5X 12 Y	1145,5	710	900	1718	1431,8	900	1250	1718
	SD71440 5X 12 Y	1309	800	1000	1963,5	1636,2	1000	1400	1963,5
11	SD72200 5X 12 Y	2000	1200	1600	3000	2500	1500	2000	3000
	SD72500 5X 12 Y	2300	1400	1900	3450	2800	1750	2350	3450

18 PULSES									
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY				Operation Temperature 40°C NORMAL DUTY			
		I(A) Rated	Motor Power at 440VAC		150% Overload (A)	I(A) Rated	Motor Power at 440VAC		120% Overload (A)
			kW	HP			kW	HP	
7	SD70580 5X 18 Y	527	315	400	790,5	658,7	400	500	790,5
	SD70650 5X 18 Y	591	355	450	886,5	738,7	450	600	886,5
	SD70720 5X 18 Y	654,5	400	500	981,7	818,1	500	650	981,7
9	SD71150 5X 18 Y	1045,5	630	850	1568	1306,8	800	1000	1568
	SD71260 5X 18 Y	1145,5	710	900	1718	1431,8	900	1250	1718
	SD71440 5X 18 Y	1309	800	1000	1963,5	1636,2	1000	1400	1963,5
10	SD71580 5X 18 Y	1436	900	1250	2154	1795	1100	1500	2154
	SD71800 5X 18 Y	1636	1000	1400	2454	2045	1200	1600	2454
11	SD72200 5X 18 Y	2000	1200	1600	3000	2500	1500	1800	3000
	SD72500 5X 18 Y	2300	1400	1900	3450	2800	1750	2350	3450

24 PULSES									
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY				Operation Temperature 40°C NORMAL DUTY			
		I(A) Rated	Motor Power at 440VAC		150% Overload (A)	I(A) Rated	Motor Power at 440VAC		120% Overload (A)
			kW	HP			kW	HP	
8	SD70840 5X 24 Y	764	450	600	1146	955	560	750	1146
	SD70925 5X 24 Y	841	500	650	1261,5	1051,2	630	850	1261,5
	SD70990 5X 24 Y	900	560	750	1350	1125	710	900	1350
11	SD72200 5X 24 Y	2000	1200	1600	3000	2500	1500	2000	3000
	SD72500 5X 24 Y	2300	1400	1900	3450	2800	1750	2350	3450

2.5. Standard ratings – 500Vac

6 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 500VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 500VAC	120% Overload (A)
1	SD70006 5X Y	4,8	2,2	7,2	6	4	7,2
	SD70009 5X Y	7	4	10	9	5,5	10
	SD70012 5X Y	9,5	5,5	14	12	7,5	14
	SD70018 5X Y	14	7,5	21	18	11	21
	SD70024 5X Y	19	11	28	24	15	28
2	SD70032 5X Y	25	15	38	32	18,5	38
	SD70038 5X Y	30	18,5	45	38	22	45
	SD70048 5X Y	38	22	57	48	30	57
3	SD70060 5X Y	48	30	72	60	37	72
	SD70075 5X Y	60	37	90	75	45	90
	SD70090 5X Y	72	45	108	90	55	108
	SD70115 5X Y	92	55	138	115	75	138
4	SD70150 5X Y	120	75	180	150	90	180
	SD70170 5X Y	136	90	204	170	110	204
5	SD70210 5X Y	168	110	252	210	132	252
	SD70250 5X Y	200	132	300	250	150	300
	SD70275 5X Y	212	150	318	265	160	318
6	SD70330 5X Y	264	160	396	330	200	396
	SD70370 5X Y	296	200	444	370	250	444
	SD70460 5X Y	368	250	552	460	315	552
7	SD70580 5X Y	464	315	696	580	355	696
	SD70650 5X Y	520	355	780	650	400	780
	SD70720 5X Y	576	400	864	720	450	864
8	SD70840 5X Y	672	450	1008	840	500	1008
	SD70925 5X Y	740	500	1110	925	560	1110
	SD70990 5X Y	767	560	1151	959	630	1151
9	SD71150 5X Y	920	630	1380	1150	710	1380
	SD71260 5X Y	1008	710	1512	1260	800	1512
	SD71440 5X Y	1152	800	1728	1440	900	1728
10	SD71580 5X Y	1264	900	1896	1580	1000	1896
	SD71800 5X Y	1440	1000	2160	1800	1200	2160
11	SD72200 5X Y	1760	1200	2640	2200	1500	2640
	SD72500 5X Y	2000	1400	3000	2500	1750	3000

12 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 500VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 500VAC	120% Overload (A)
6	SD70330 5X 12 Y	264	160	396	330	200	396
	SD70370 5X 12 Y	296	200	444	370	250	444
	SD70460 5X 12 Y	368	250	552	460	315	552
8	SD70840 5X 12 Y	672	450	1008	840	500	1008
	SD70925 5X 12 Y	740	500	1110	925	560	1110
	SD70990 5X 12 Y	767	560	1151	959	630	1151
9	SD71150 5X 12 Y	920	630	1380	1150	710	1380
	SD71260 5X 12 Y	1008	710	1512	1260	800	1512
	SD71440 5X 12 Y	1152	800	1728	1440	900	1728
11	SD72200 5X 12 Y	1760	1200	2640	2200	1500	2640
	SD72500 5X 12 Y	2000	1400	3000	2500	1750	3000

18 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 500VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 500VAC	120% Overload (A)
7	SD70580 5X 18 Y	464	315	696	580	355	696
	SD70650 5X 18 Y	520	355	780	650	400	780
	SD70720 5X 18 Y	576	400	864	720	450	864
9	SD71150 5X 18 Y	920	630	1380	1150	710	1380
	SD71260 5X 18 Y	1008	710	1512	1260	800	1512
	SD71440 5X 18 Y	1152	800	1728	1440	900	1728
10	SD71580 5X 18 Y	1264	900	1896	1580	1000	1896
	SD71800 5X 18 Y	1440	1000	2160	1800	1200	2160
11	SD72200 5X 18 Y	1760	1200	2640	2200	1500	2640
	SD72500 5X 18 Y	2000	1400	3000	2500	1750	3000

24 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 500VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 500VAC	120% Overload (A)
8	SD70840 5X 24 Y	672	450	1008	840	500	1008
	SD70925 5X 24 Y	740	500	1110	925	560	1110
	SD70990 5X 24 Y	767	560	1151	959	630	1151
11	SD72200 5X 24 Y	1760	1200	2640	2200	1500	2640
	SD72500 5X 24 Y	2000	1400	3000	2500	1750	3000

2.6. Standard ratings – 525Vac

6 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Range 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 525VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 525VAC	120% Overload (A)
4	SD70100 7X Y	100	75	150	122	90	150
	SD70120 7X Y	120	90	180	147	110	180
	SD70145 7X Y	145	110	218	176	132	218
5	SD70180 7X Y	180	132	270	222	150	270
	SD70205 7X Y	205	150	308	254	185	308
6	SD70270 7X Y	270	200	405	334	250	405
	SD70295 7X Y	295	220	443	360	280	443
	SD70340 7X Y	340	250	510	417	315	510
7	SD70425 7X Y	425	315	638	526	400	638
	SD70470 7X Y	470	355	705	586	450	705
	SD70535 7X Y	535	400	803	666	500	803
8	SD70660 7X Y	660	500	990	824	600	990
	SD70750 7X Y	750	560	1125	936	700	1125
9	SD70845 7X Y	845	630	1268	1052	800	1268
	SD70950 7X Y	950	710	1425	1157	900	1425
10	SD71070 7X Y	1070	800	1605	1337	1000	1605
	SD71205 7X Y	1205	900	1808	1504	1100	1808
	SD71340 7X Y	1340	1000	2010	1672	1250	2010
	SD71605 7X Y	1605	1200	2408	2006	1500	2408
11	SD72005 7X Y	2005	1500	3008	2507	1900	3008

12 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 525VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 525VAC	120% Overload (A)
6	SD70270 7X 12 Y	270	200	405	334	250	405
	SD70295 7X 12 Y	295	220	443	360	280	443
	SD70340 7X 12 Y	340	250	510	417	315	510
8	SD70660 7X 12 Y	660	500	990	824	600	990
	SD70750 7X 12 Y	750	560	1125	936	700	1125
9	SD70845 7X 12 Y	845	630	1268	1052	800	1268
	SD70950 7X 12 Y	950	710	1425	1157	900	1425
11	SD72005 7X 12 Y	2005	1500	3008	2507	1900	3008

18 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 525VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 525VAC	120% Overload (A)
7	SD70425 7X 18 Y	425	315	638	526	400	638
	SD70470 7X 18 Y	470	355	705	586	450	705
	SD70535 7X 18 Y	535	400	803	666	500	803
9	SD70845 7X 18 Y	845	630	1268	1052	800	1268
	SD70950 7X 18 Y	950	710	1425	1157	900	1425
10	SD71070 7X 18 Y	1070	800	1605	1337	1000	1605
	SD71205 7X 18 Y	1205	900	1808	1504	1100	1808
	SD71340 7X 18 Y	1340	1000	2010	1672	1250	2010
	SD71605 7X 18 Y	1605	1200	2408	2006	1500	2408
11	SD72005 7X 18 Y	2005	1500	3008	2507	1900	3008

24 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 525VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 525VAC	120% Overload (A)
8	SD70660 7X 24 Y	660	500	990	824	600	990
	SD70750 7X 24 Y	750	560	1125	936	700	1125
11	SD72005 7X 24 Y	2005	1500	3008	2507	1900	3008

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2.7. Standard ratings – 690Vac

6 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 690VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 690VAC	120% Overload (A)
3	SD70052 6X Y	52	45	78	65	55	78
	SD70062 6X Y	62	55	93	78	75	93
4	SD70080 6X Y	80	75	120	100	90	120
	SD70105 6X Y	105	90	157	131	110	157
5	SD70130 6X Y	130	110	195	163	132	195
	SD70150 6X Y	150	132	225	188	160	225
	SD70170 6X Y	170	160	255	213	200	255
6	SD70210 6X Y	210	200	315	263	250	315
	SD70260 6X Y	260	250	390	325	315	390
	SD70320 6X Y	320	315	480	400	355	480
7	SD70385 6X Y	385	355	578	481	450	578
	SD70460 6X Y	460	450	690	575	500	690
8	SD70550 6X Y	550	500	825	688	630	825
	SD70660 6X Y	660	630	990	825	800	990
9	SD70750 6X Y	750	710	1125	938	900	1125
	SD70840 6X Y	840	800	1260	1050	1000	1260
	SD70950 6X Y	950	900	1425	1188	1100	1425
10	SD71140 6X Y	1140	1000	1710	1425	1300	1710
	SD71270 6X Y	1270	1200	1905	1588	1600	1905
	SD71420 6X Y	1420	1400	2130	1775	1700	2130
11	SD71500 6X Y	1500	1500	2250	1875	1800	2250
	SD71800 6X Y	1800	1800	2700	2250	2000	2700

12 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 690VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 690VAC	120% Overload (A)
6	SD70210 6X 12 Y	210	200	315	263	250	315
	SD70260 6X 12 Y	260	250	390	325	315	390
	SD70320 6X 12 Y	320	315	480	400	355	480
8	SD70550 6X 12 Y	550	500	825	688	630	825
	SD70660 6X 12 Y	660	630	990	825	800	990
9	SD70750 6X 12 Y	750	710	1125	938	900	1125
	SD70840 6X 12 Y	840	800	1260	1050	1000	1260
	SD70950 6X 12 Y	950	900	1425	1188	1100	1425
11	SD71500 6X 12 Y	1500	1500	2250	1875	1800	2250
	SD71800 6X 12 Y	1800	1800	2700	2250	2000	2700

18 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 690VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 690VAC	120% Overload (A)
7	SD70385 6X 18 Y	385	355	578	481	450	578
	SD70460 6X 18 Y	460	450	690	575	500	690
9	SD70750 6X 18 Y	750	710	1125	938	900	1125
	SD70840 6X 18 Y	840	800	1260	1050	1000	1260
	SD70950 6X 18 Y	950	900	1425	1188	1100	1425
10	SD71140 6X 18 Y	1140	1000	1710	1425	1300	1710
	SD71270 6X 18 Y	1270	1200	1905	1588	1600	1905
	SD71420 6X 18 Y	1420	1400	2130	1775	1700	2130
11	SD71500 6X 18 Y	1500	1500	2250	1875	1800	2250
	SD71800 6X 18 Y	1800	1800	2700	2250	2000	2700

24 PULSES							
FRAME	CODE	Operation Temperature 50°C HEAVY DUTY			Operation Temperature 40°C NORMAL DUTY		
		I(A) Rated	Motor Power (kW) at 690VAC	150% Overload (A)	I(A) Rated	Motor Power (kW) at 690VAC	120% Overload (A)
8	SD70550 6X 24 Y	550	500	825	680	630	825
	SD70660 6X 24 Y	660	630	990	825	800	990
11	SD71500 6X 24 Y	1500	1500	2250	1875	1800	2250
	SD71800 6X 24 Y	1800	1800	2700	2250	2000	2700

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3. TECHNICAL CHARACTERISTICS

SD700 SERIES		
INPUT	POWER RANGE ^[1]	1.5kW – 2000kW
	VOLTAGE RANGE	230Vac, 380-500Vac, 525 Vac, 690Vac, 3 phases (±10%)
	INPUT FREQUENCY	50Hz/60Hz (±6%)
	INPUT RECTIFIER TECHNOLOGY	Thyristor-Diode
	DISPLACEMENT POWER FACTOR (DPF = cos Φ)	≥ 0.98
	POWER FACTOR (PF= I₁/I_{rms} · cos Φ)	≥ 0.91
	MOMENTARY POWER LOSS	> 2sec (depending on the load inertia)
	EMC INPUT FILTER	Second environment (Industrial): (C3 Standard) First environment (Domestic): C2 (Optional). C1 consult with Power Electronics IT filter optional
	HARMONICS FILTER	Choke coils 3% impedance
	CURRENT THD (%)	< 40%
	REGENERATIVE	NO
OUTPUT	OUTPUT FREQUENCY ^[2]	0...200Hz
	OVERLOAD CAPACITY	Constant torque/heavy duty: 150% during 60 sec at 50°C Variable torque/normal duty: 120% during 60 sec at 40°C.
	EFFICIENCY (At full load)	≥98%
	CONTROL METHOD	V/Hz VECTOR CONTROL Open Loop: PWM speed / torque control, AVC: speed / torque control Close Loop (Encoder): PWM speed / torque control, AVC: speed / torque control
	CARRIER FREQUENCY	4 to 8kHz – PEWave
	OUTPUT DV/DT FILTER	500 to 800V/μs ^[3]
	OUTPUT CABLE LENGTH ^[4]	USC 300m, SC 150m
	DYNAMIC BRAKE	External B150 Dynamic Brake (Frames 1 and 2 integrated)
ENVIRONMENTAL RATINGS	OPERATION AMBIENT TEMPERATURE	Minimum: -30°C Maximum: +50°C (Heavy Duty) Minimum: -30°C Maximum: +40°C (Normal Duty)
	STORAGE TEMPERATURE	Minimum: -40°C Maximum: +70°C
	ALTITUDE	1000m
	POWER ALTITUDE DERATING	>1000m, 1% P _N (kW) per 100m; 4000m maximum
	AMBIENT HUMIDITY	<95%, non-condensing
	DEGREE OF PROTECTION	IP20, IP54, GL Marine series (IP44/IP54)
	VIBRATION	Amplitude: ± 1mm (2Hz-13.2Hz), ± 0.075mm (13.2Hz-57Hz) Acceleration: 6.86m/s ² (13.2Hz-57Hz), 9.8m/s ² (57Hz-150Hz)
	HEATING RESISTORS	Optionals
PROTECTIONS	MOTOR PROTECTIONS	Rotor locked, Motor overload (thermal model), Output current limit, Phase current imbalance, Phase voltage imbalance, Motor over-temperature (PTC signal), Speed limit Torque limit.
	DRIVE PROTECTIONS	IGBT's overload, Input phase loss, Low input voltage, High input voltage, DC Bus voltage limit, Low DC Bus voltage, High input frequency, Low input frequency, IGBT temperature, Heat-sink over-temperature, Power supply fault, Drive thermal model, Ground fault, Software and Hardware fault, Analogue input signal loss (speed reference loss), Safe stop/Emergency Stop

[1]: Other configuration, consult Power Electronics.

[2]: For operation frequencies higher than 100Hz consult Power Electronics.

[3]: Valid for frames 3 to 11 depending on the SD700 rated power. For frames 1 and 2 it is available optional filter.

[4]: SC: Shielded cable, USC: Unshielded Cable. Follow Power Electronics installation recommendations. For greater cable lengths, consult Power Electronics.

SD700 SERIES		
HARDWARE	DIGITAL INPUTS	6 programmable, Active high (24Vdc), Isolated power supply 1 PTC input
	DIGITAL OUTPUTS	3 programmable changeover relays (250Vac, 8A or 30Vdc, 8A)
	ANALOGUE INPUT	2 programmable differential inputs. 0 – 20mA, 4 – 20mA, 0 – 10Vdc and ±10Vdc. (Optically isolated)
	ANALOGUE OUTPUTS	2 isolated programmable outputs: 0 – 20mA, 4 – 20mA, 0 – 10Vdc and ±10Vdc
	ENCODER INPUTS (Optional)	Two differential encoders input. Voltages inputs from 5 to 24Vdc
	USER POWER SUPPLY	+24Vdc user power supply (Max 180mA) regulated and short-circuit protected +10Vdc user power supply (Max 2 potentiometers R= 1 k Ω) regulated and short-circuit protected
	I/O EXTENSION BOARD (Optional)	4 Digital Inputs: Programmable inputs and active high (24Vdc). Optically isolated. 1 Analogue Input: Programmable and differential input. 5 Digital Outputs: programmable multi-function relays. 1 Analogue Output: Programmable outputs in voltage / current.
	EXTERNAL POWER SUPPLY (Optional)	24 V External Power Supply, Fault Relay integrated
COMMUNICATION	STANDARD HARDWARE	USB port
		RS232 port
		RS485 port
	OPTIONAL HARDWARE	Optical fiber
		Ethernet
	STANDARD PROTOCOL	Modbus-RTU
	OPTIONAL PROTOCOL	Profibus-DP
		DeviceNet
Ethernet (Modbus TCP)		
Ethernet IP		
CAN Open		
	N2 Metasys Gateway	
CONTROL PANEL	TYPE	Removable
	LENGTH	3 meters and 5 meters (optional)
	CONNECTION	RJ45
	VISUALIZATION LEDES	LED ON: Control board is energized
		LED RUN: Motor receiving power supply
		LED FAULT: Flashing displays that a fault has occurred
	ALPHANUMERIC DISPLAY	4 lines x 16 characters
		Keypad with 6 keys to control and configure the drive, start and stop/reset Independent memory
	TOUCH AND COLOUR GRAPHIC DISPLAY (Optional)	Optional Colour touch-screen display 3.5"
		4Gbytes Micro SD for register and notification of faults, events and configurations. Quad band GSM modem / Start, Stop, reset and remote consultations with SMS.
		Ethernet RJ45 dual connection, micro-USB connection
		Possibility of external or battery 5Vdc power supply
	DISPLAY INFORMATION	Average current and 3-phase motor current
		Average voltage and 3-phase motor voltage
		Average input voltage and 3-phase input voltage
		3-phase input and output frequency
		DC Bus Voltage
Drive Status		
Speed, Torque, Power, Power factor of motor		
Register of total and partial drive running time with reset function. (hours)		
Register of total and partial drive energy consumption with reset function (kWh)		
Relay status		
Digital inputs / PTC status		
Output comparator status		
Analogue inputs and sensor values		
Analogue output value		
Motor overload and equipment status		
Drive and rectifier temperature		
Fault history (last 6 faults)		
OTHERS	Real time clock	
	Perpetual calendar	

SD700 SERIES		
REGULATIONS	CERTIFICATIONS	CE, cTick, UL ^[5] , cUL ^[5] , GL ^[6]
	ELECTROMAGNETIC COMPATIBILITY	EMC Directive (2004/108/CE)
		IEC/EN 61800-3
	DESIGN AND CONSTRUCTION	LVD Directive (2006/95/CE)
		IEC/EN 61800-2 General requirements
		IEC/EN 61800-5-1 Safety
		IEC/EN 60146-1-1 Semiconductor converters
FUNCTIONAL SAFETY	IEC60068-2-6 – Vibration	
	IEC/EN 61800-5-2 Safety Stop (STO)	

[5]: On certification process.

[6]: SD700 Series from frame 5 on. For further information, please consult Power Electronics.

4. RECEPTION, HANDLING AND TRANSPORTATION



CAUTION

Read carefully the following installation instructions for a correct mechanical installation. Otherwise, the equipment can be damaged and lead to injury to people.

4.1. Reception and Storage

The SD700 are carefully tested and perfectly packed before delivering. 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 model and serial number of the drive are the same on the delivery note and unit.

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 not pile more than two units.

4.2. 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.

SD700 is delivered horizontally. Frames 1 and 2 are delivered in a cardboard box and frames 3 on are delivered fastened to a wooden pallet, covered with a cardboard box in frames 3 and 4 or with a wooden box in frames 5 on. Depending on the transport method, the drive could be moisture protected with a vacuum plastic bag. Move the complete pallet as close as possible to its final installation place before unpacking, to avoid any damage during transportation.

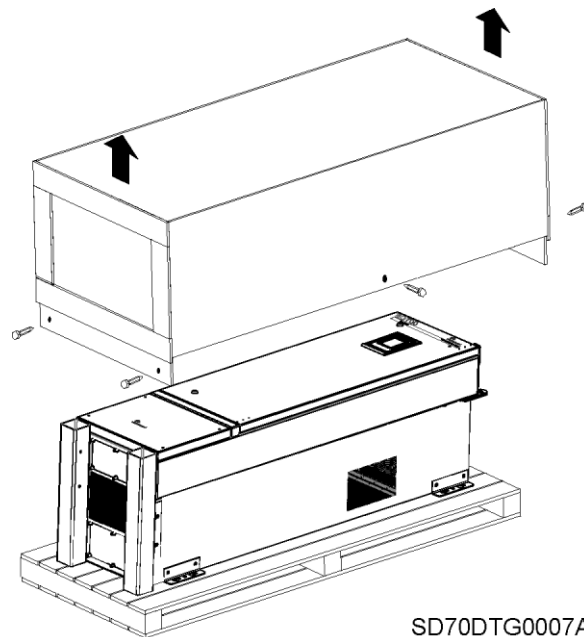
It is mandatory to transport it with a pallet truck, forklift or crane fork, taking care about the load distribution and centre of gravity. Check the size and weight of VFD components to choose proper lifting equipment with a capacity greater than the drive weight.

Unpack the drive carefully. Do not use edge tool to protect the product from damage. After open the package, please check the goods contained. Verify the item numbers 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

If the maximum tonnage of cranes cannot meet the requirement, it could cause damage to the equipment and lead to injury to people.



SD70DTG0007A

Figure 4.1 Frame 5 unpacking

To unpack, if necessary, unscrew the bolts that fix the wooden box with the pallet. Then, the drive is fixed to the pallet through the L shapes place in its four corners, unscrew all the fixation screws, otherwise if the cabinet is lifted the pallet could cause damage.

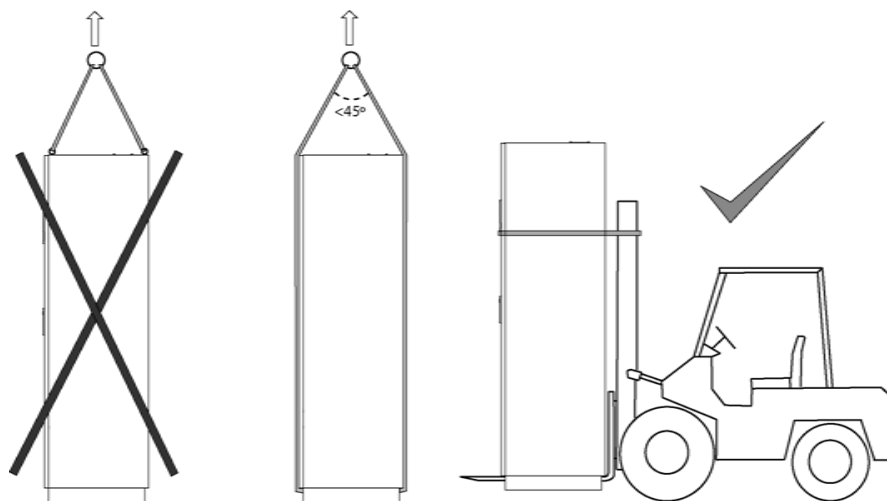
To rise to an upright position use only a crane or forklift equipped with belts or slings. Lift it carefully pulling from the top eyebolts.



CAUTION

Do not lift the VSD from the eyebolts place on the top part under any circumstance, it could cause damage to the equipment and lead to injury to people.

Once it is upright positioned, reallocate the belts/slings, the forklift or crane's fork to lift the drive pulling from the bottom part. Avoid brusque movements and shocks during transportation. At the time of placing the drive on the floor, stop lowering it just before reaching the floor and then slowly lower it on the floor to avoid any shock.



SD70DTG0004A

Figure 4.2 Lifting of the equipment

During handling and transportation, the goods should not be exposed to moisture, overturned, inverted, tilted or impacted. The tilting angle should be no more than 30°.

5. MECHANICAL INSTALLATION



CAUTION

The installation must be done by qualified personal.
Otherwise, the equipment can be damaged and lead to injury to people.

5.1. 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 of a properly indoor installation to ensure the ambient conditions of the VFD. Additionally, the installer is ultimate responsible of the local regulation fulfilment. The environmental ratings are the following ones:

- Environmental category: Indoor
- Wet locations: No
- Pollution degree: PD3
- Ingress protection rating: Clean zone: Electronics IP54 or IP20
Power connection and Input filters: IP20
- Operation Ambient temperature: -30°C to 50°C Heavy duty
-30°C to 40°C Normal Duty
- Storage Ambient temperature: -40°C to 70°C
- Humidity: 10 % to 95 % (non condensing)
- Heating resistors: Optionals
- Maximum altitude and power derating: 1000m 1% PN(kW) per 100m; 4000m maximum
- Vibration (IEC60068-2-6): Amplitude $\pm 1\text{mm}$ (2Hz – 13.2Hz), ± 0.075 (13.2Hz – 57Hz)
Acceleration 6.86m/s^2 (13.2Hz-57Hz), 9.8m/s^2 (57Hz-150Hz)
- Audible Noise: < 79dB
- Overvoltage category: III
- Protection class: Class 1
- Painting: Standard colour RAL 7047 in the front part and RAL 7016 in the rear part, other under request

5.2. Drive mounting

This section provides guidelines to select the best mounting location to ensure the optimum performance, cautions and warnings that you should follow to avoid injury and/or equipment damage.

5.2.1. Wall mounting drives

The variable speed drives of the SD700 series from frame 1 to 4 are wall-mounting drives. Additionally frame 4 has available an optional plinth that converts it into a stand-alone cabinet.

The installation method and mounting location must be suitable for the weight and dimensions of the drive. Power electronics recommend hanging the SD700 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.

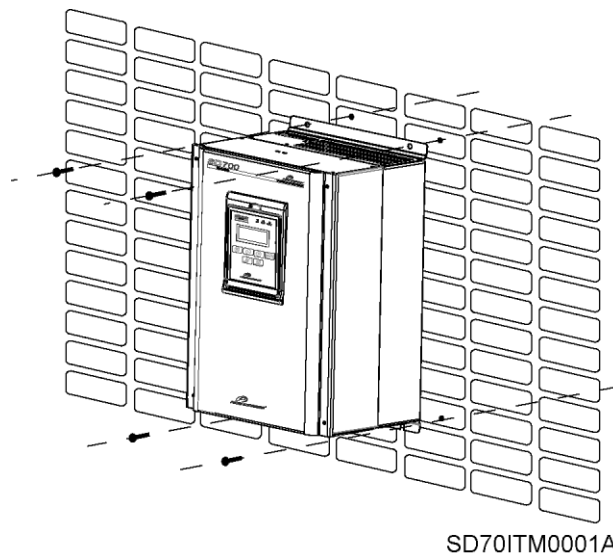


Figure 5.1 SD700 wall mounted

5.2.2. Stand alone drives

Frames 5 to 11 are designed to be placed over a technical floor, if needed there are available optional plinths that increase the height of the drive from 1710mm to 2000mm or 2200mm. The floor must guarantee a non-flammable, solid, plain and levelled surface to the drive, a minimum clearance around it and a smoothly cable access. The maximum allowed slope is 1cm in every 6 meters. The installation site should be levelled, if necessary, as the cabinet is not equipped with adjustable feet. The walls adjoining the drive must be made of a non-flammable material. Fix the SD700 cabinets to the wall or floor by using the L brackets placed in both sides of the drive. They have an $\text{Ø}11$ hole and can be use either in the legs or in the rear part of the drive.

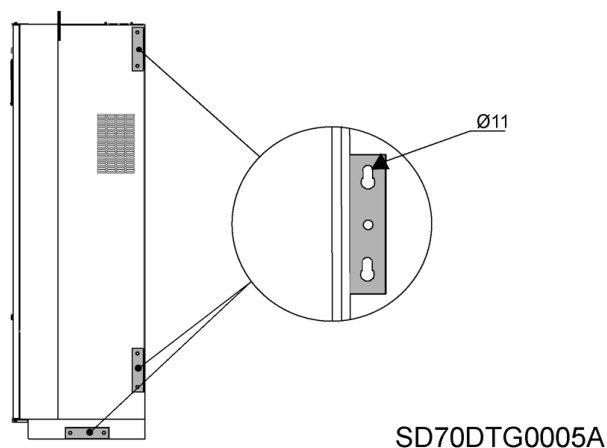


Figure 5.2 Wall or floor fixation

It is recommended to construct a cable duct below the middle part of the cabinet. The duct width may not exceed 300 mm and the contact surface of the floor must resist the cabinet weight that lies on the legs.

5.3. Clearances

The SD700 VFD must be installed in vertical position, and firmly fastened through the dedicated anchorages placed in the rear part of the drive that avoid any movement.

If the equipment is installed inside a cabinet, ensure that the hot air expelled from the VFD is evacuated outside. This hot air can be aspirated again so the drive may suffer from overheating. To ensure a suitable cooling avoid the recirculation of air and keep the minimum clearance distances indicated below.

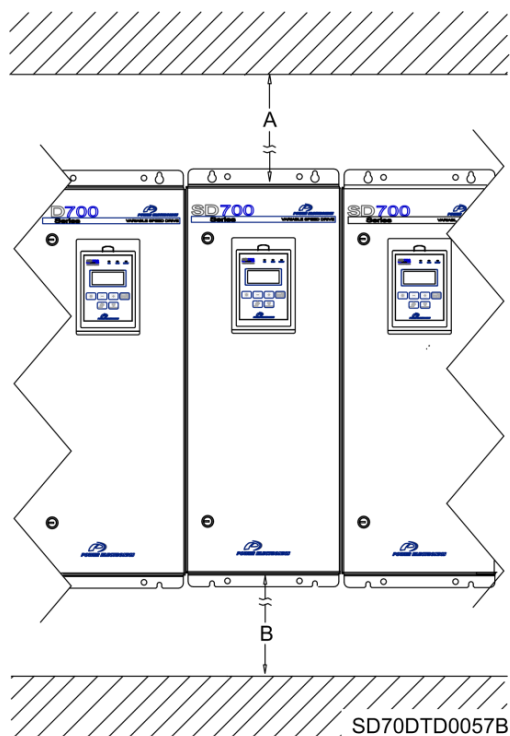


Figure 5.3 Minimum clearances for frames 1 to 4

FRAME	DISTANCE (mm)		FRONT CLEARANCE
	A	B	
1	200	200	700
2	200	200	800
3	200	200	800
4	300	300	820

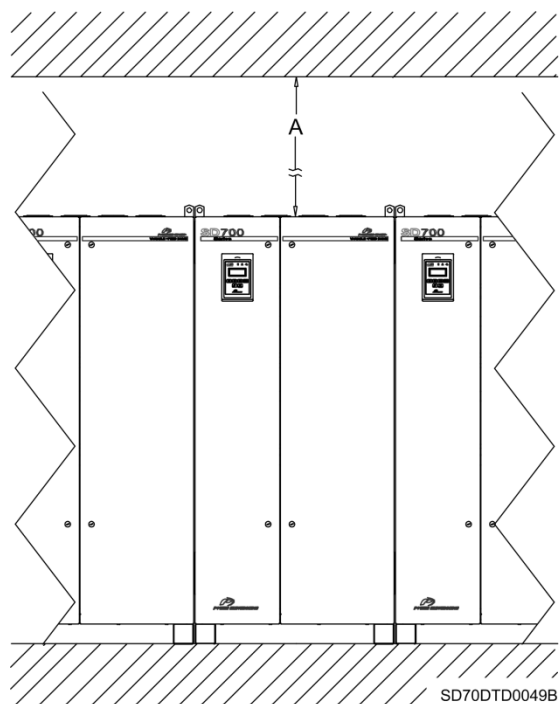


Figure 5.4 Minimum clearances for frames 5 to 11

FRAME	DISTANCE (mm)	FRONT CLEARANCE
	A	
5	400	930
6	400	940
7	400	1260
8	400	1260
9	400	940
10	400	1260
11	400	1260

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5.4. Cooling

The heat sources inside the equipment correspond with the inverter bridge (IGBTs), rectifier bridge, the input filter and the output dV/dt filter. SD700 series present an overall efficiency higher than 98% at rated power, so the heat dissipation approximately corresponds to 2% of the input power.

The cooling system of the drive depends on the degree of protection, the frame type and the frame size. In general terms, the drive is designed with three independent cooling areas.

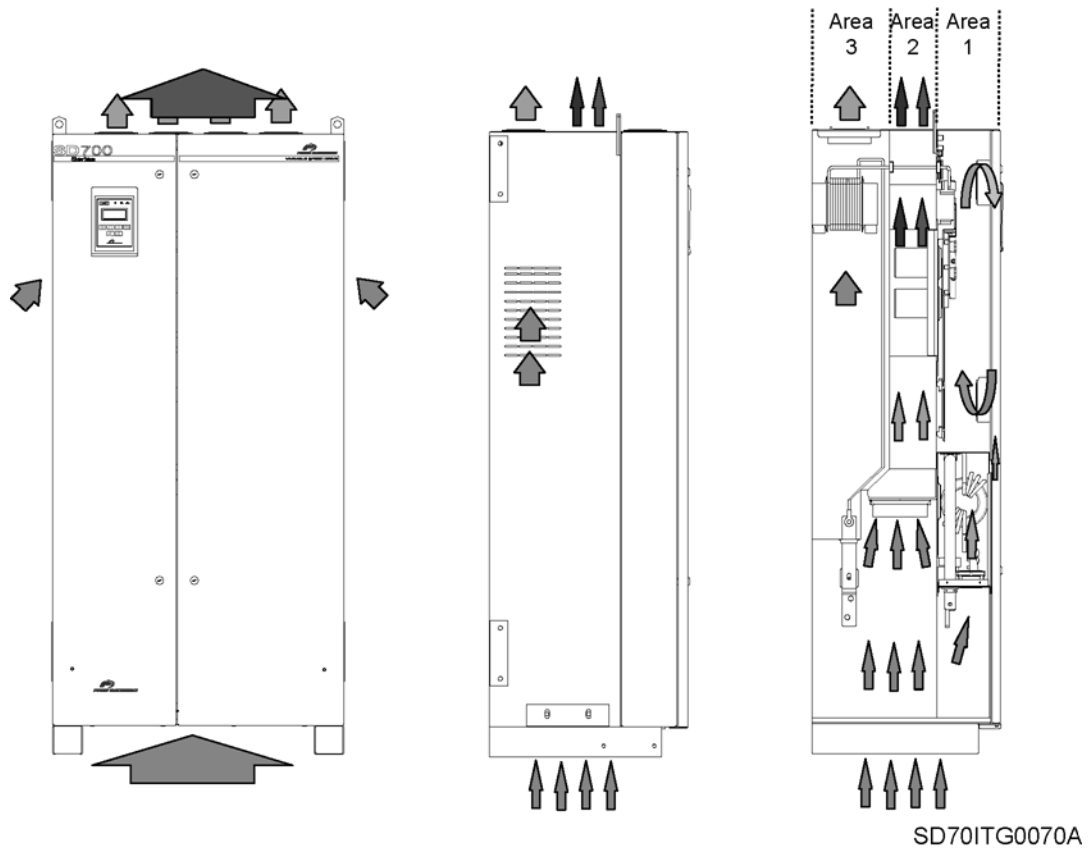


Figure 5.5 Cooling airflow for SD700. Frames 4 to 11 (Protection Grade IP54).

1st Area - Electronics:

IP20 cabinets are equipped with fans on the top of the cabinet that evacuates the internal heat generated in the area.

IP54 cabinets have a totally sealed electronics. The internal heat generated is evacuated through the metallic doors by an internal forced convection system (See fig. 5.5).

2nd Area – Rectifier bridge, Inverter bridge and DC bus cooling area:

The drive integrates axial fans that intake the air from the bottom part of the drive and evacuates it through the middle top outlet gratings. The fans propel the air through the heat sink evacuating the heat generated by the main components.

3rd Area – Filters:

The inlet gratings are located at both sides of the drive; additionally the drive is equipped with exhaust fans on the top part.

The following figure identifies the gratings and fans of the different cooling areas.

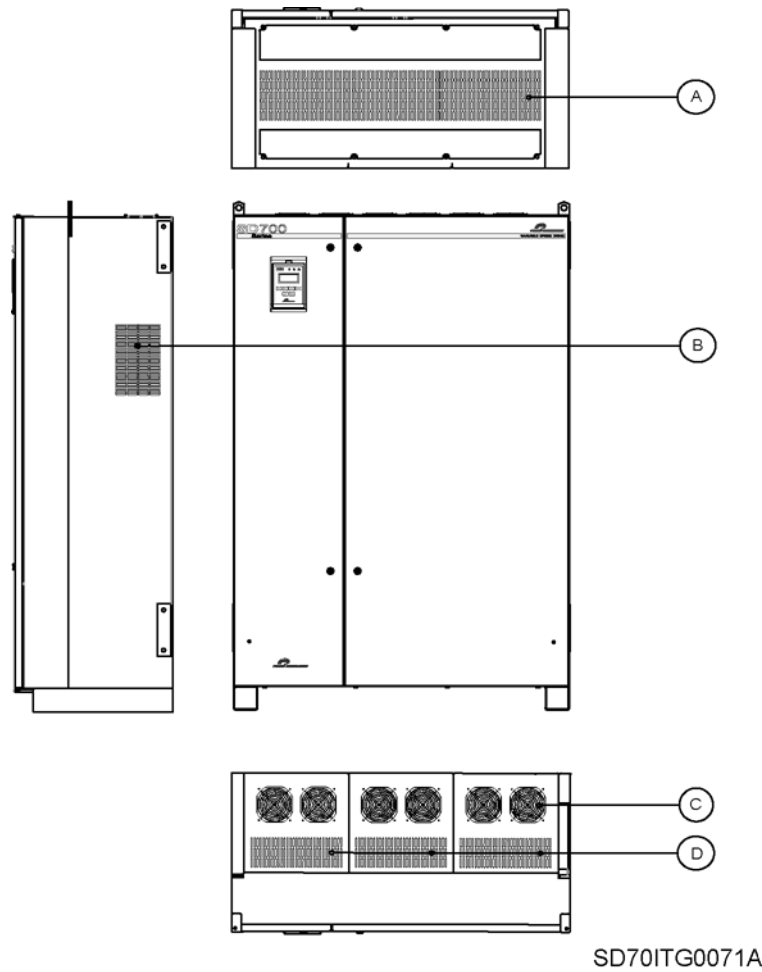


Figure 5.6 SD700 gratings and fans

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		FRAMES											
		ID	1	2	3	4	5	6	7	8	9	10	11
AREA 2	OPERATION FLOW (m ³ /h) (*)	D	64-77	239-287	306-367	342-410	396-475	486-583	720-864	972-1166	1458-1750	2178-2614	2898-3478
	INLET GRATING NET SECTION (m ²)	A	0.081	0.016	0.025	0.031	0.034	0.064	0.101	0.123	0.192	0.303	0.369
	OUTLET GRATING NET SECTION (m ²)	D	0.003	0.013	0.017	0.019	0.022	0.027	0.040	0.054	0.081	0.121	0.161
AREA 3	OPERATION FLOW (m ³ /h)	C	-	-	-	180	360	720	1080	1440	2160	3240	4320
	INLET GRATING NET SECTION (m ²)	B	0.081	0.016	0.025	0.031	0.034	0.041	0.041	0.041	0.122	0.122	0.122

Heat dissipation

The heat generated by the SD700 depends on the carrier frequency (Hz), the grid frequency and the load. It could be estimated by the following equation. Rated power condition is the worst case.

$$P_{loss} [W] = 0,02 \cdot P_{motor} [W]$$

(*)The air velocity, which passes through the gratings, varies between 5 and 6 m/s depending on the blocking of the gratings.

6. POWER CONNECTION

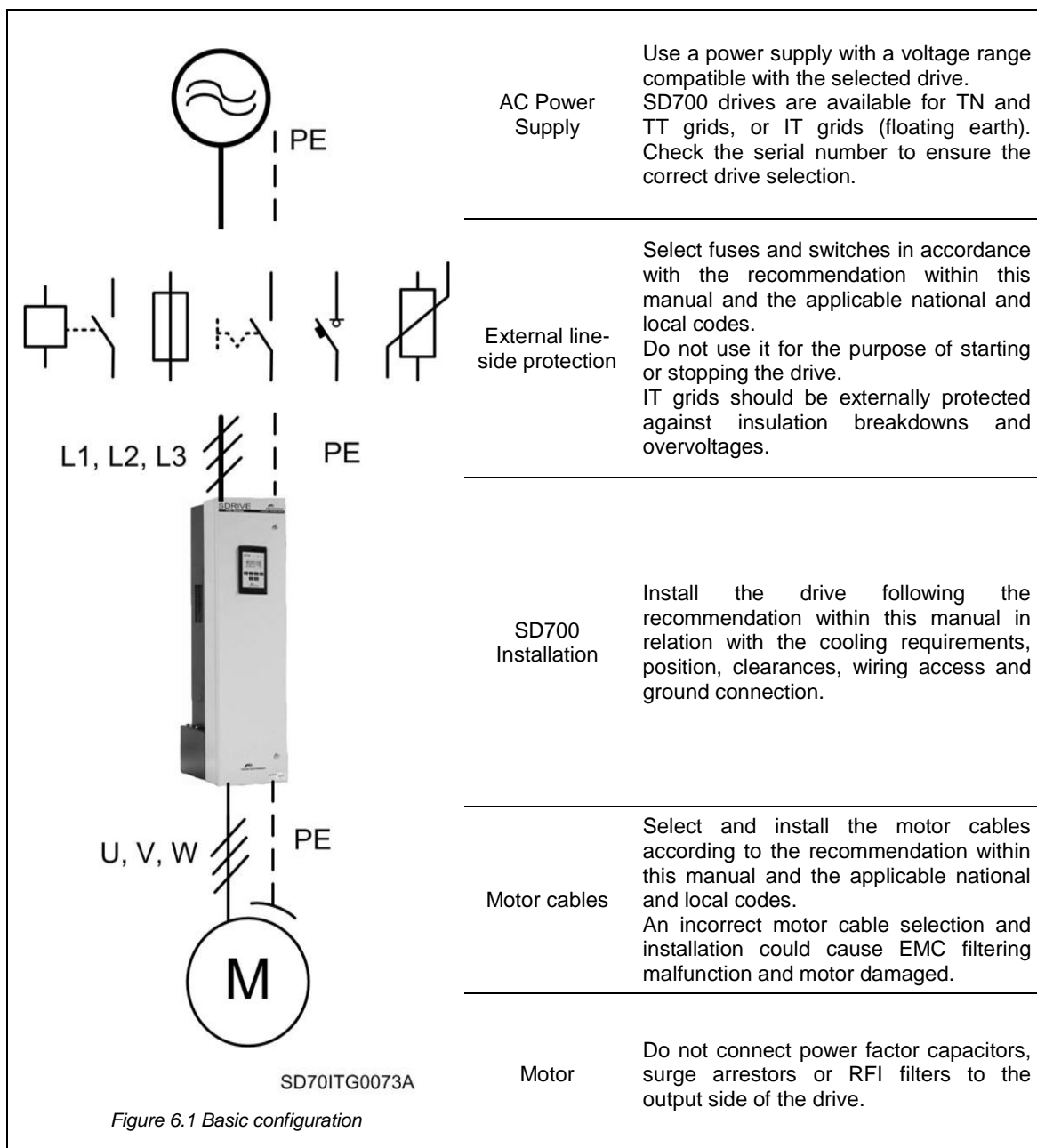


CAUTION

Read carefully the following installation instructions for a correct electrical installation. Otherwise, it could cause damage to the equipment and lead to injury to people.

6.1. Basic configuration

Proper safety equipment must be selected and correct connections must be done to ensure proper operation. An incorrectly applied or installed drive can result in system malfunction or reduction in product lifetime as well as component damage. You must read and understand this manual thoroughly before proceeding.



6.2. Topology

SD700 drive operates according to the principle of pulse-width modulation (PWM). Varying the power supply voltage and the grid frequency, it is possible to control the speed and torque of the connected induction three-phase motors by means of its main components: rectifier bridge, the DC bus, inverter bridge, and power and control board.

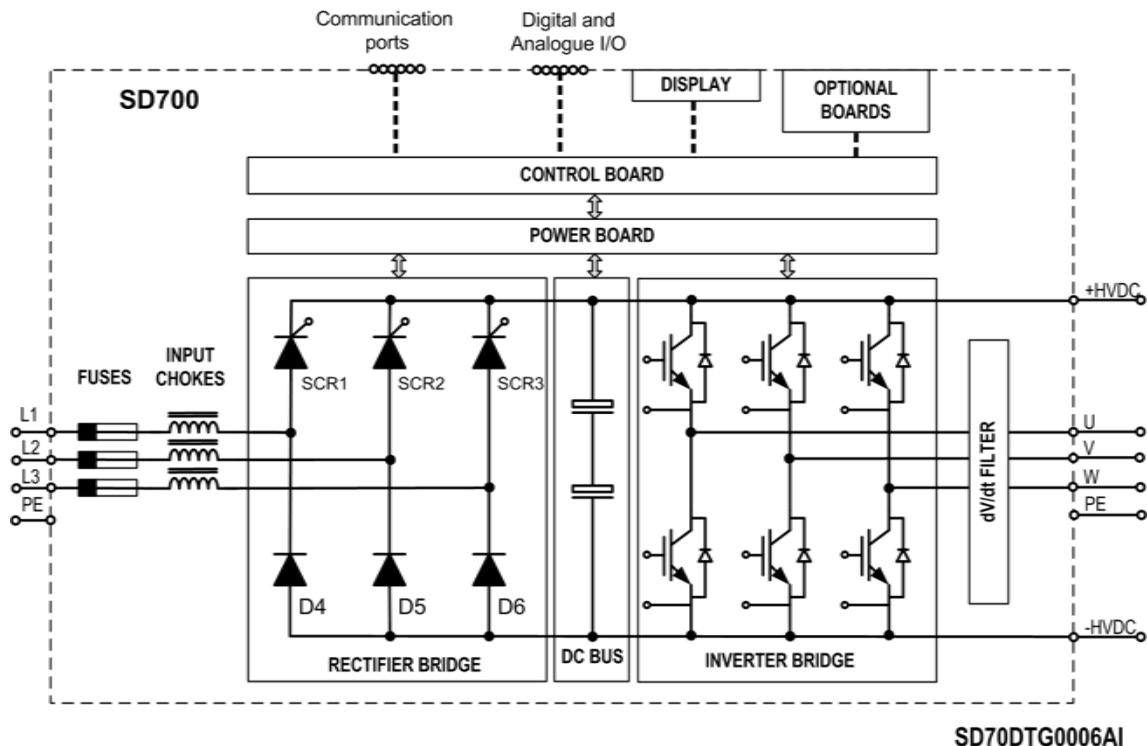


Figure 6.2 General Block Scheme for frames 3 to 11

SD700 integrate as standard input chokes filters. These filters significantly reduce the THDi values, and increase the impedance line protecting the drive against electrical distortions. Depending on the frame, the input choke filter is installed in the input side or in the DC bus. For frames 3 to 11 filter is installed in the input side. For frames 1 and 2 filter is installed in the DC bus (see figure 6.3).

SD700 frames 5 to 11 integrate as standard ultra fast fuses that protect the drive against downstream overcurrents. Additionally the drive integrates multiple electrical protections that protect the drive and the motor as a motor relay does.

The SD700 includes a power and a control board to control the rectifier thyristor diode's bridge shooting, the inverter IGBT's bridge shooting, the soft charge, the DC bus voltage and the motor performance. In addition, control board integrates the interface terminals such as communication ports, the digital and analogue inputs and outputs, colour touch-screen display and alphanumeric display, etc.

The inverter bridge generates the PWM wave that controls the motor performance (voltage, current, torque, etc...). SD700 Series by Power Electronics, integrate as standard output dV/dt filters and a CLAMP system that reduces significantly the dV/dt rise time below $500\text{V}/\mu\text{s}$ - $800\text{V}/\mu\text{s}$, therefore, it reduces the voltages peaks at the motor windings, the common mode currents and the EMC emissions.

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The following schemes illustrate the SD700 internal power structure.

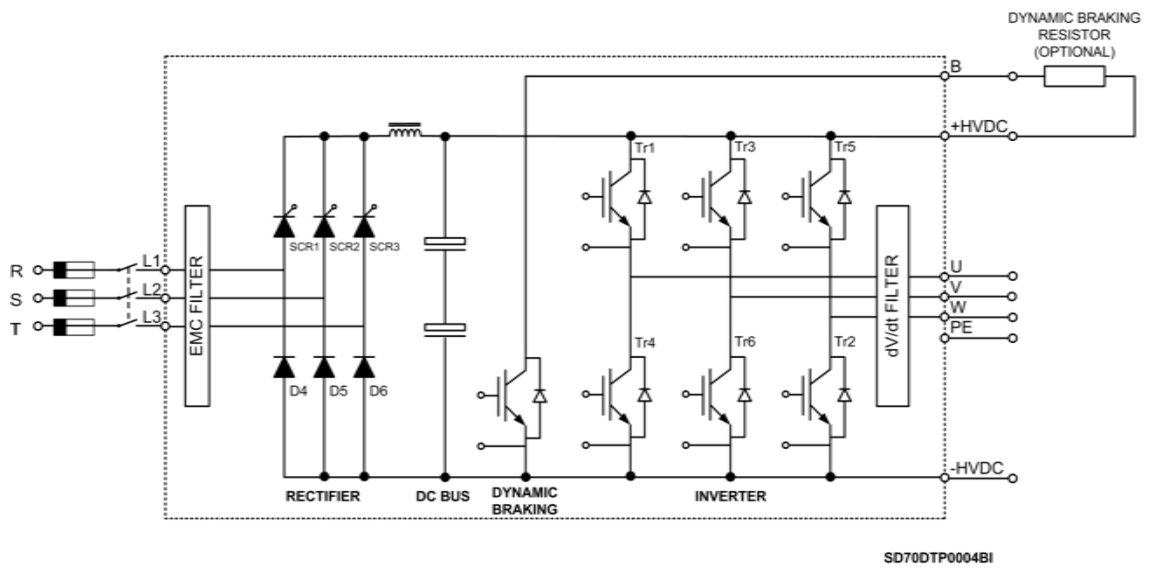


Figure 6.3 SD700 frames 1 and 2 power electronics

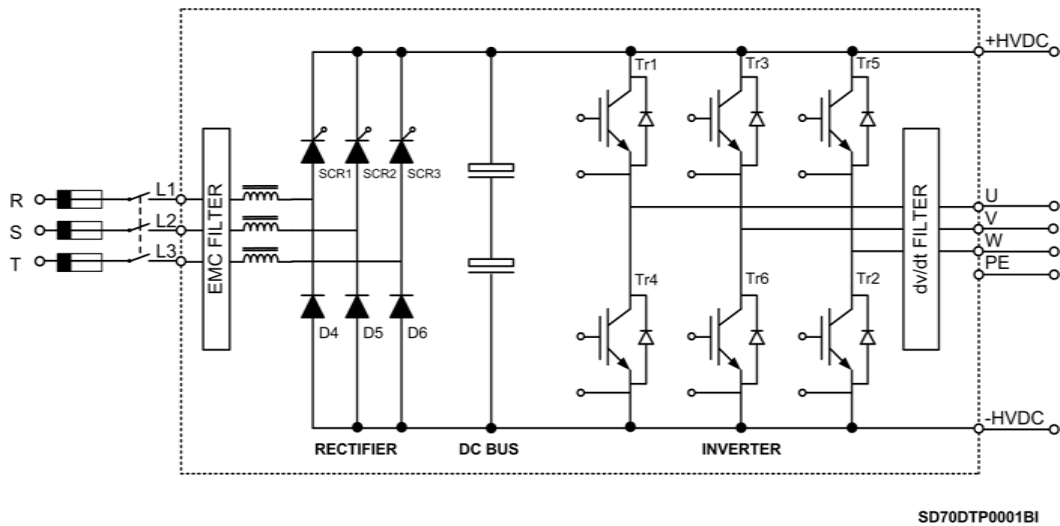


Figure 6.4 SD700 frames 3 and 4 power electronics

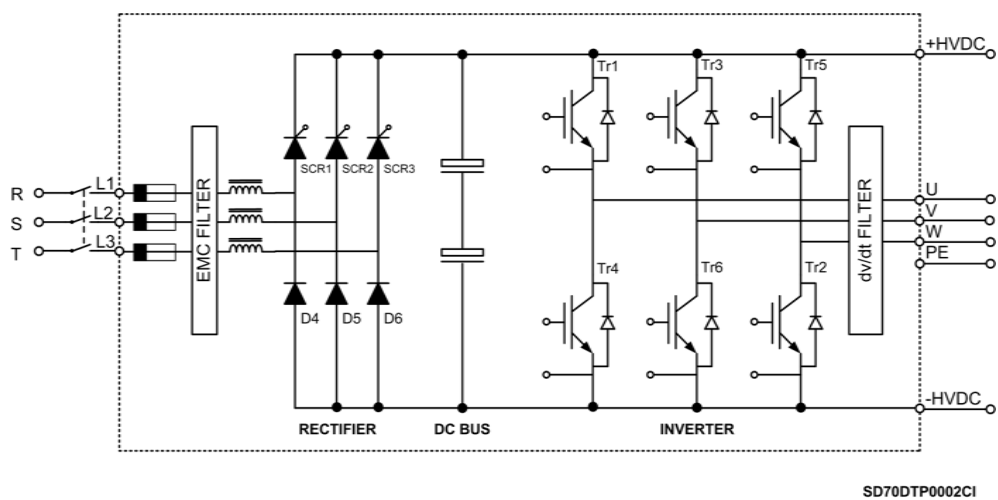


Figure 6.5 SD700 frames 5 to 11 power electronics

6.3. Power connection and wiring



CAUTION

The following installation recommendations are suitable for TN and TT grids. For IT grids check the dedicated section. Otherwise, it could cause damage to the equipment and lead to injury to people.

Wiring and periodic inspections should be performed at least 10 minutes after disconnecting the input power. To remove the front cover check that the DC Link red LED is off, then remove the metallic cover and check with a multimeter the following measures:

- Measure between the output power busbars U, V, W and the cabinet and check that the voltage is around 0V.
- Measure that the DC link terminals +, - and chassis voltage are below 30VDC. Otherwise, you may get an electric shock.

The user input and output busbars are labelled according to the following diagram.

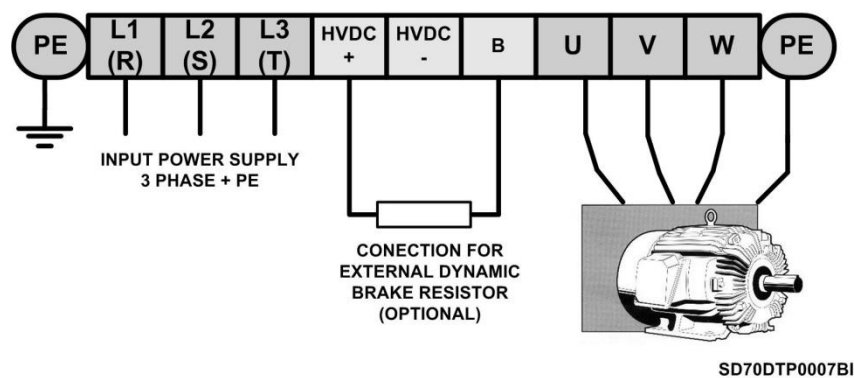


Figure 6.6 Power wiring connection for frames 1 and 2

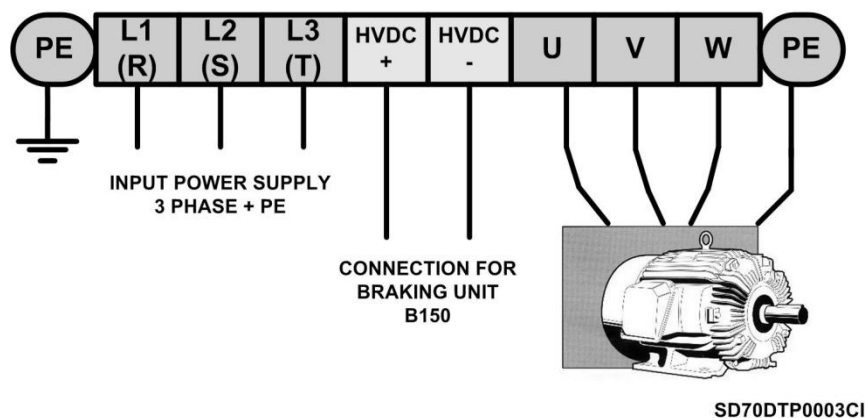


Figure 6.7 Power wiring connection for frames 3 to 11

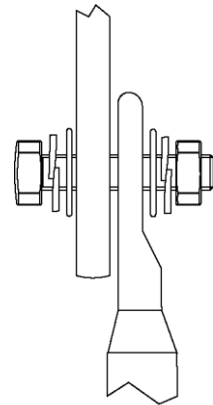
The input terminals L1, L2, L3 and PE (drive supply), and output terminals U, V, W and PE (motor supply) must be introduced through the metallic panels situated in the bottom part of the cabinet. Do not drill or mechanize the gratings. Otherwise, the drive could reduce its cooling capacity.

The front metal panel corresponds to the motor cables and the rear metal panel to the input cables; these are not delivered drilled or pre-cut to fulfil worldwide configurations. Each cable must be equipped with its own cable gland or grommet that prevent for dust or moisture penetration.

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As standard, the input and output terminals are made of tin plated copper. If they are oxidized prior to its installation, the connections will be poorly executed and will cause overheating. To avoid this effect is recommended to follow the next steps.

- It is recommended to use Ø11 tin plated copper terminal lugs.
- Use M10 zinc bolts and nuts and apply a torque of 40Nm. Check after the first week of operation that the torque applied is maintained.
- The number of available terminals depends on the frame size. Check the power terminal section.
- Before connecting the cables, clean the contact surfaces with a clean cloth and ethanol cleaner.
- Use a spring washer and a fender washer between the nuts or bolts head and the busbar or terminal lug.
- Use copper or aluminium 600Vac conductors for up to 500Vac rated voltage. For 525Vac and 690Vac phase to phase rated equipment use 1kV conductors.



FSITG0038A

Figure 6.8 Terminal lug connection

The recommended cable types and lengths between the drive (at factory settings) and the motor are:

- **Unshielded cable:** 300m. Asymmetrical 4-wire including PE conductor. It is recommended to use a motor ground cable (PE) cross section equal or higher than active motor wires cross section (U, V, W). When single-wire cables are used in three-phase systems, the three phase conductors must be bundled symmetrically.
- **Shielded cable:** 150m. Ideal symmetrical 3-wire cable plus symmetrically arranged PE conductor- with concentric shield. To implement an effective shield bonding it could be used an EMC gland in both motor terminal box and drive cabinet to ensure effective 360° ground connection and a low high frequency impedance path. Check the EMC recommendations section.



CAUTION

The number of three phase cable hose (U,V,W, PE) to the motor should be equal to the number of IGBT's in the drive, being one cable hose by each IGBT's Block.

The following figures show the recommended cable type and bundling.

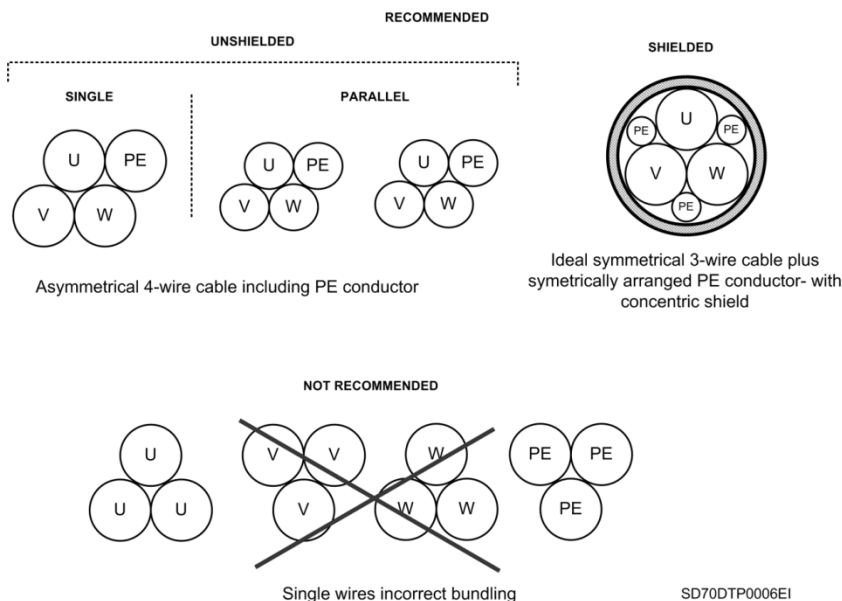


Figure 6.9 Recommended cable type and bundling

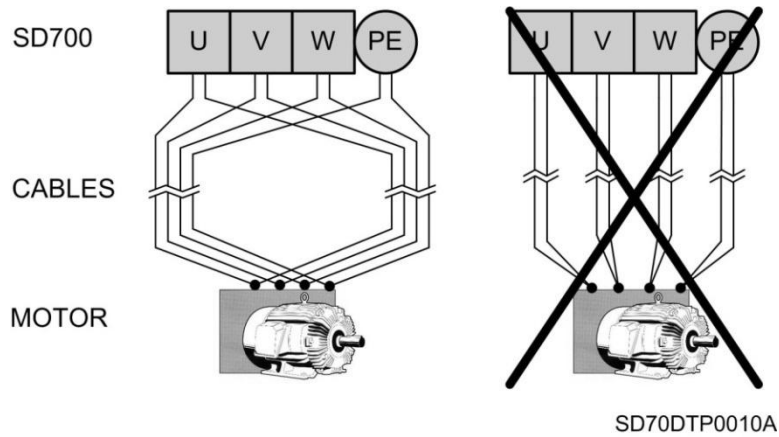


Figure 6.10 Recommended cable bundling scheme



CAUTION

Line voltage (input supply) must never be connected to U, V and W terminals. Otherwise, the drive will be damaged.

It is necessary that installer guarantee the correct observance of the law and the regulations that are in force in those countries or areas where this device is going to be installed.

Do not use capacitors for power factor correction, surge suppressors, or RFI filters on the output side of the drive. Doing so may damage these components.

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All power conductors, such as input power cables, output motor cables, DC link cables must be routed separately from the control, signal, PTC, encoder or data cables. The recommended distances between the cables are shown in the next figure:

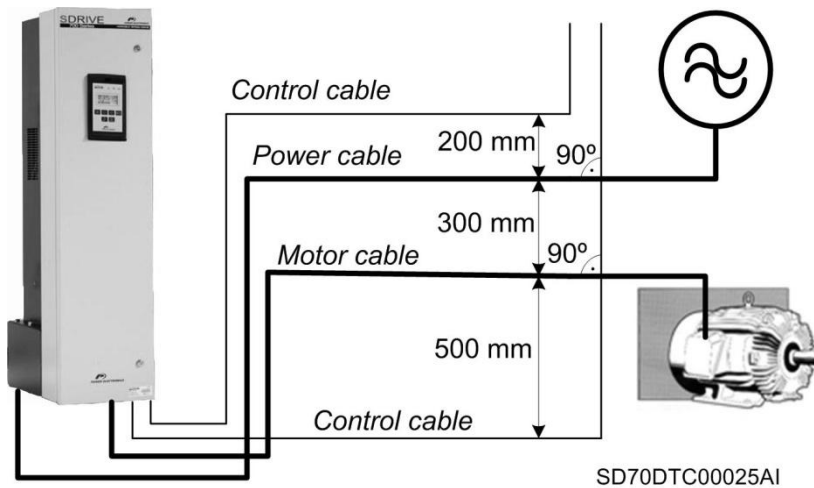


Figure 6.11 Cable routing distances

It is recommended to route in separately cable racks, trays or ducts, the following cable types:

- Single-wire signal or data cables with $V < 60V$
- Single wire cable with $60V < V < 230V$
- Input power cables with low level of interferences $230V < V < 1000V$
- Output motor power cables and Dynamic brake DC cables with high level of interferences $230V < V < 1000V$.
- Medium voltage cables with $V < 1000V$

The power cables must have sufficient current rating to prevent important wiring overheating and voltage drops. The installer must consider the cable cross-section, cable type, routing method and the ambient conditions to select the appropriate cable. It is only permitted the use of cooper or aluminium cables. The maximum cable section and the available holes per phase could be found in the "Power connection terminals" section.

6.3.1. Recommended Cable Section for 400VAC

FRAME	CODE	I(A) Rated	Power (kW) at400VAC	Recommended Cable Section per Phase		Recommended Cable Section for Earth Wire	
				AWG / kcmil	mm ²	AWG / kcmil	mm ²
1	SD70006 5X	6	2,2	12 – 10	2,5 – 4	12 – 10	2,5 – 4
	SD70009 5X	9	4	12 – 10	2,5 – 4	12 – 10	2,5 – 4
	SD70012 5X	12	5,5	10 – 8	4 – 6	10 – 8	4 – 6
	SD70018 5X	18	7,5	10 – 8	4 – 6	10 – 8	4 – 6
	SD70024 5X	24	11	10 – 8	4 – 6	10 – 8	4 – 6
2	SD70032 5X	32	15	6 – 4	6 – 10	6 – 4	6 – 10
	SD70038 5X	38	18,5	6 – 4	10 – 16	6 – 4	10 – 16
	SD70048 5X	48	22	3 – 1	16 – 25	3 – 1	16 – 25
3	SD70060 5X	60	30	3 – 1	16 – 35	3 – 1	16 – 35
	SD70075 5X	75	37	1 – 1/0	25 – 50	1 – 1/0	25 – 50
	SD70090 5X	90	45	1/0 – 3/0	25 – 50	1/0 – 3/0	25 – 50
	SD70115 5X	115	55	2/0 – 4/0	50 – 95	2/0 – 4/0	50 – 95
4	SD70150 5X	150	75	3/0 – 300	70 – 120	3/0 – 300	70 – 120
	SD70170 5X	170	90	3/0 – 300	95 – 150	3/0 – 300	95 – 150
5	SD70210 5X	210	110	300 – 500	120 – 240	300 – 500	120 – 240
	SD70250 5X	250	132	350 – 500	185 – 240	350 – 500	185 – 240
	SD70275 5X	275	150	2 x 300	2 x 150	2 x 300	2 x 150
6	SD70330 5X	330	160	2 x 350	2 x 185	2 x 350	2 x 185
	SD70370 5X	370	200	2 x 500	2 x 240	2 x 500	2 x 240
	SD70460 5X	460	250	2 x 500	2 x 240	2 x 500	2 x 240
7	SD70580 5X	580	315	3 x 500	2 x 240	3 x 500	2 x 240
	SD70650 5X	650	355	3 x 500	3 x 240	3 x 500	3 x 240
	SD70720 5X	720	400	4 x 500	3 x 240	4 x 500	3 x 240
8	SD70840 5X	840	450	4 x 500	4 x 240	4 x 500	4 x 240
	SD70925 5X	925	500	4 x 500	4 x 240	4 x 500	4 x 240
	SD70990 5X	990	560	6 x 500	6 x 240	6 x 500	6 x 240
9	SD71150 5X	1150	630	6 x 500	6 x 240	6 x 500	6 x 240
	SD71260 5X	1260	710	6 x 500	6 x 240	6 x 500	6 x 240
	SD71440 5X	1440	800	7 x 500	7 x 240	7 x 500	7 x 240
10	SD71580 5X	1580	900	8 x 500	8 x 240	8 x 500	8 x 240
	SD71800 5X	1800	1000	8 x 500	8 x 240	8 x 500	8 x 240
11	SD72200 5X	2200	1200	9 x 500	9 x 240	9 x 500	9 x 240

Note: Cable must be suitable for a permanent $T^a > 75^{\circ}C$. Use 600V cables for up to 500Vac rated voltage. For 525Vac and 690Vac phase to phase rated equipment use 1kV cables. **However, this is only a recommendation. You must follow the local regulation.**

6.3.2. Recommended Cable Section for 690VAC

FRAME	CODE	I(A) Rated	Power (kW) at 690VAC	Recommended Cable Section per Phase		Recommended Cable Section for Earth Wire	
				AWG / kcmil	mm ²	AWG / kcmil	mm ²
3	SD70052 6X	52	45	3 – 1	16 – 25	3 – 1	16 – 25
	SD70062 6X	62	55	3 – 1	16 – 25	3 – 1	16 – 25
4	SD70080 6X	80	75	100	95	100	95
	SD70105 6X	105	90	2/0 – 4/0	50 – 95	2/0 – 4/0	50 – 95
5	SD70130 6X	130	110	3/0 – 300	70 – 120	3/0 – 300	70 – 120
	SD70150 6X	150	132	3/0 – 300	70 – 120	3/0 – 300	70 – 120
	SD70170 6X	170	160	3/0 – 300	95 – 150	3/0 – 300	95 – 150
6	SD70210 6X	210	200	300 – 500	120 – 240	300 – 500	120 – 240
	SD70260 6X	260	250	2 x 300	2 x 150	2 x 300	2 x 150
	SD70320 6X	320	315	2 x 500	2 x 185	2 x 500	2 x 185
7	SD70385 6X	385	355	2 x 500	2 x 240	2 x 500	2 x 240
	SD70460 6X	460	450	2 x 500	2 x 240	2 x 500	2 x 240
8	SD70550 6X	550	500	2 x 500	2 x 240	2 x 500	2 x 240
	SD70660 6X	660	630	3 x 500	3 x 240	3 x 500	3 x 240
9	SD70750 6X	750	710	4 x 500	4 x 240	4 x 500	4 x 240
	SD70840 6X	840	800	4 x 500	4 x 240	4 x 500	4 x 240
	SD70950 6X	950	900	4 x 500	4 x 240	4 x 500	4 x 240
10	SD71140 6X	1140	1000	6 x 500	6 x 240	6 x 500	6 x 240
	SD71270 6X	1270	1200	6 x 500	6 x 240	6 x 500	6 x 240
	SD71420 6X	1420	1400	7 x 500	7 x 240	7 x 500	7 x 240
11	SD71500 6X	1500	1500	8 x 500	8 x 240	8 x 500	8 x 240
	SD71800 6X	1800	1800	8 x 500	8 x 240	8 x 500	8 x 240

Note: Cable must be suitable for a permanent $T^a > 75^{\circ}\text{C}$. Use 600V cables for up to 500Vac rated voltage. For 525Vac and 690Vac phase to phase rated equipment use 1kV cables. **However this is only a recommendation. You must follow the local regulation.**

6.4. Ground connection

Before connecting the power conductors, be sure that the chassis of the drive and the adjoining cabinets are connected to ground through the dedicated (PE) terminals. They are situated at both sides of the bottom metallic walls of the drive and they are labelled with the appropriate ground connection. Check section “6.10 Power Terminals”.

Motor’s chassis grounding must be connected to the drive. In other words, connect the motor’s ground conductor to the PE output terminal of the drive and not to the installation’s ground. We recommend that the cross section of the motor’s ground conductor (PE) should have at least the cross section of the active conductor (U, V, W). Additionally, it should be installed following the recommendations indicated in section “6.3 Power Connection and wiring”.

When connecting the earth, ensure that all connected terminal lugs are securely tight and protected from mechanical forces. The tightening torque in case of M10 PE terminals is 40Nm.



CAUTION

For safety reasons it is determinant to measure the grounding resistance of the plant itself. This must be established before the first start up of the plant and with the drive disconnected.

It is responsibility of the installer to provide the adequate number, type and cross section grounding conductor alongside with the characteristics of the drive used and of the Plant in order to minimize the grounding resistance, that comply with the local and national regulation.

6.5. Multipulse drives

This section specifies the technical characteristics that may be considered by the installer to select the appropriate transformer for a multipulse drive. The configurations given in this section are recommendations. The user could use another configuration that may not appear in this section.

6.5.1. 12 Pulses Configuration Example

General characteristics:

- | | |
|--|--|
| ▪ Suggested Vector Diagram: | Dd0/Dy11 |
| ▪ Nominal Secondary Windings Voltage (V): | $3\sqrt{3}V_n^1$ |
| ▪ Recommended Tap Voltage on Primary Side (%): | $\pm 10\%$ |
| ▪ Total Nominal Current (A): | I_n (A) |
| ▪ Total Overload (A): | 120% ND (60 seconds)
150% HD (60 seconds) |
| ▪ Short Circuit Impedance (%): | < 7% |
| ▪ Secondary Winding Power Factor: | 0.90 |
| ▪ Recommended Rated Power (kVA): | +20% Motor Power |

SD700 12 pulses connection scheme:

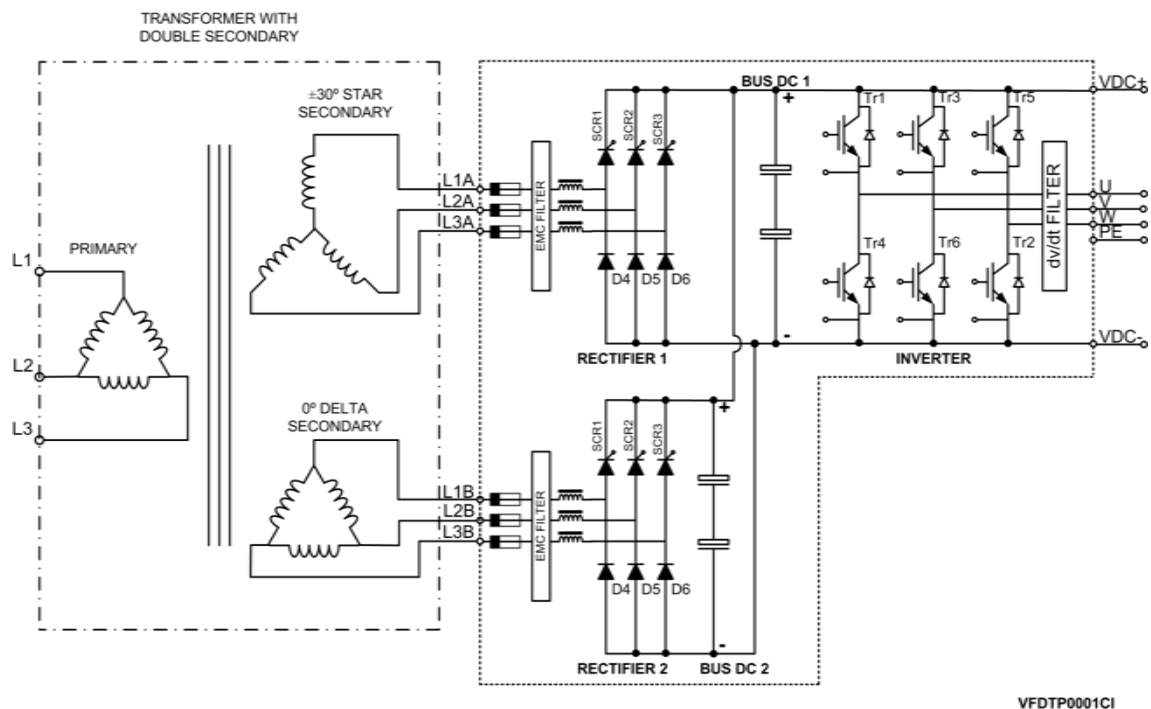


Figure 6.12 SD700 12 pulses

¹ For improved performance, it is recommended to increase a 3% the nominal secondary voltage.

6.5.2. 18 Pulses Configuration Example

General characteristics:

- Secondary winding phase shift (°): **+20°, 0°, -20°**
- Nominal secondary windings voltage (V): $3xV_n^1$
- Recommended Tap voltage on primary side (%): $\pm 10\%$
- Total Nominal current (A): I_n (A)
- Total Overload (A):
120% ND (60 seconds)
150% HD (60 seconds)
- Short circuit Impedance (%): $< 7\%$
- Secondary winding power factor: 0.90
- Recommended Rated Power (kVA): **+20% Motor Power**

SD700 18 pulses connection scheme:

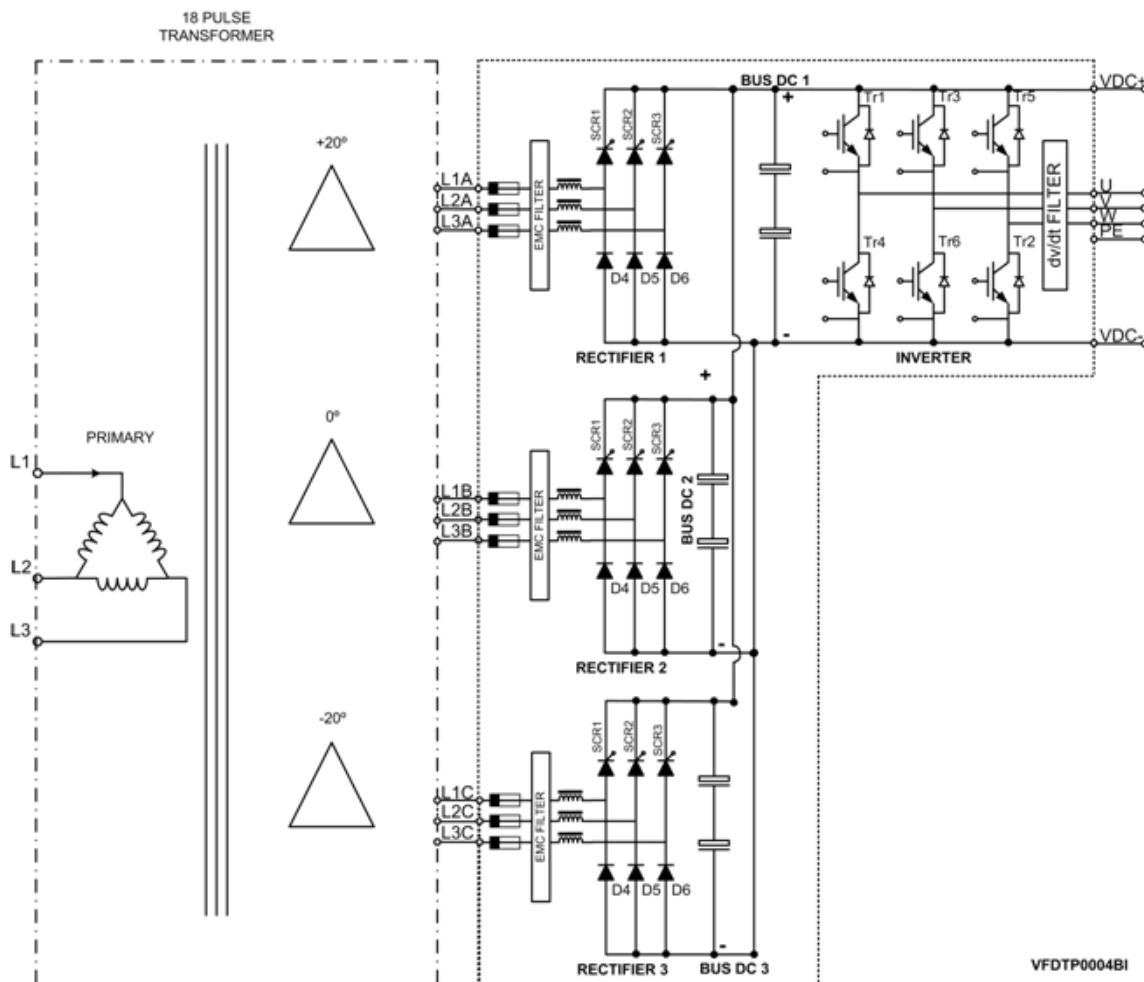


Figure 6.13 SD700 18 pulses

¹ For improved performance, it is recommended to increase a 3% the nominal secondary voltage.

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6.5.3. 24 Pulses Configuration Example

General characteristics:

- Suggested Vector Diagram: **D(-7.5)d0/D(-7.5)y11**
D(+7.5)d0/D(+7.5)y11
- Nominal secondary windings voltage (V): $3 \times V_n^1$
- Recommended Tap voltage on primary side (%): $\pm 10\%$
- Total Nominal current (A): I_n (A)
- Total Overload (A): 120% ND (60 seconds)
150% HD (60 seconds)
- Short circuit Impedance (%): $< 7\%$
- Secondary winding power factor: 0.90
- Recommended Rated Power (kVA): +20% Motor Power

SD700 24 pulses connection scheme:

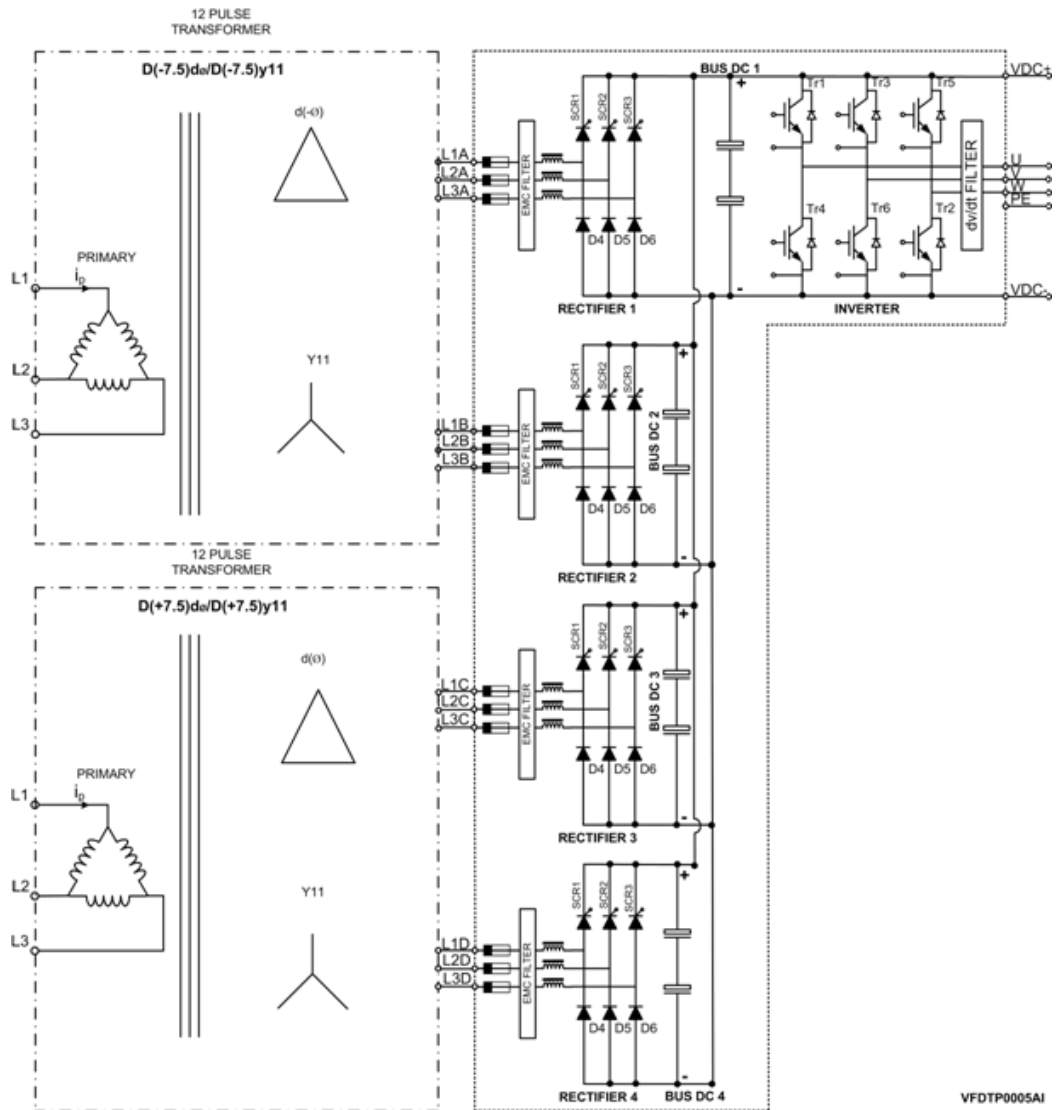


Figure 6.14 SD700 24 pulses

¹ For improved performance, it is recommended to increase a 3% the nominal secondary voltage.

6.6. EMC Installation Requirements

6.6.1. 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.

- *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.

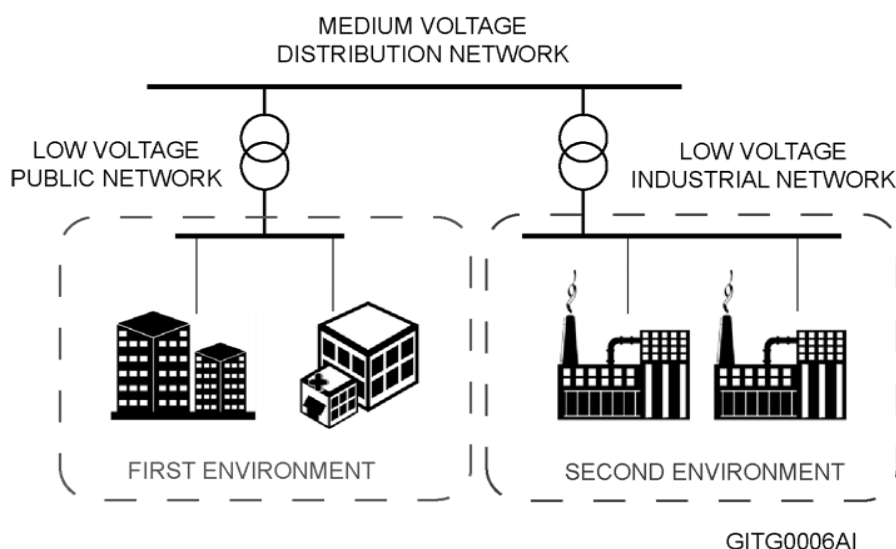


Figure 6.15 Environments definition

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.

6.6.2. SD700 compliance

SD700 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.

Optionally the SD700 non-floating earth variable speed drive could be installed in residential areas (first environment) by employing optional RFI filters that permits to achieve compliance with C2 category.

SD700 is not a retail unit, which is neither a plug in device nor a movable device and it is intended to be installed and commissioned by qualified personnel. Therefore, C1 category will not be required.

SD700 with floating earth configuration can be installed in Industrial (Second Environment) IT grids. Although they do not integrate normal RFI filters, following the installation recommendation within this manual and its dV/dt filter as standard, permits to achieve compliance with C3 category defined in IEC/EN61800-3.

6.6.3. Connection

SD700 do not require 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 sections "6.3 Power Connection and wiring" and "6.4 Ground connection".

It is recommended to implement a 360° contact that creates an effective shield bonding in both the SD700 cabinet and the motor terminal box. As an example, it could be installed EMC cable glands as shown in the next figure.

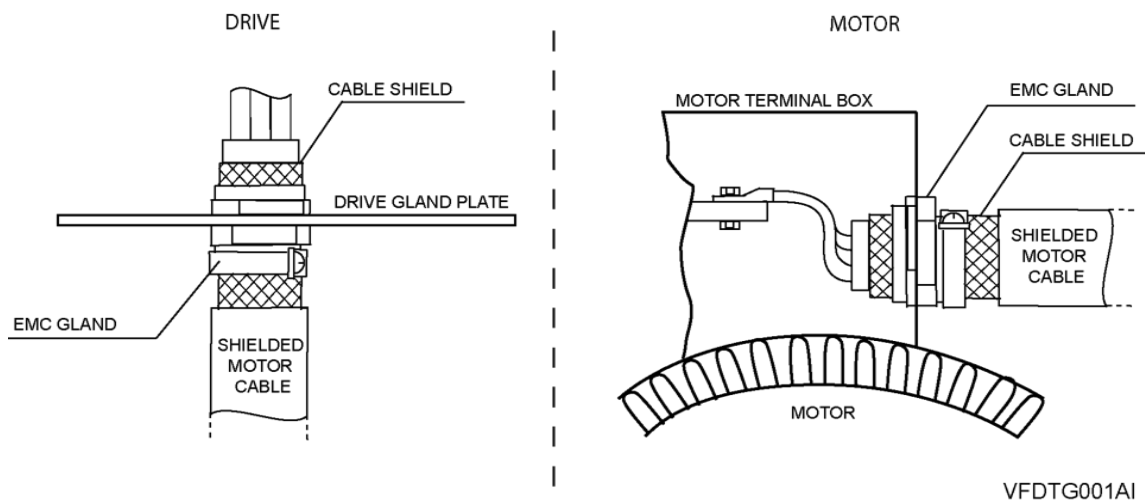


Figure 6.16 Correct output motor cables shield bonding

It is recommended for control signals to use shielded cable and to follow recommendations included in section "7.1 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.

6.7. Protections

6.7.1. Short circuit

SD700 includes from frame 5 to 11 ultra fast fuses as standard. Frame 5 includes one fuse per phase with a rated current that depends on the drive's nominal current. Frames 6 on are constructed through the parallel connection of frame 5 so the fuses per phase in those frames correspond with the number of parallel drive modules (frame 5) interconnected. The breaking capacity of the fuses and the rated current is described in the following table.

FUSE CHARACTERISTICS						
In (A)	Ic @ Un (A)	I ² t @ 1ms I ² t _p (A ² s)	I ² t @ Un (A ² s)	Un (V)	Manufacturer	Model
200A	200kA	2600	13500	690VAC	WESTCODE	069UR1S0250B
250A	200kA	4700	25000	690VAC	WESTCODE	069UR1S0250B
350A	200kA	10500	55000	690VAC	WESTCODE	069UR1S0350B

Therefore, it is not recommended to install the drive in points where the short-circuit current available is higher than 200kA. If so, install general fuses with a greater breaking capacity and with fastest overcurrent capacity.

Acquiring frames 1 to 4, the installer must select a protection according to the characteristics mentioned previously.

230Vac		
FRAME	DRIVE	FUSES PER PHASE (n°x In)
5	SD70210 2X Y	1x350A
	SD70250 2X Y	1x350A
	SD70275 2X Y	1x350A
6	SD70330 2X Y	2x350A
	SD70370 2X Y	2x350A
	SD70460 2X Y	2x350A
7	SD70580 2X Y	3x350A
	SD70650 2X Y	3x350A
	SD70720 2X Y	3x350A
380Vac- 500Vac		
5	SD70210 5X Y	1x350A
	SD70250 5X Y	1x350A
	SD70275 5X Y	1x350A
6	SD70330 5X Y	2x350A
	SD70370 5X Y	2x350A
	SD70460 5X Y	2x350A
7	SD70580 5X Y	3x350A
	SD70650 5X Y	3x350A
	SD70720 5X Y	3x350A
8	SD70840 5X Y	4x350A
	SD70925 5X Y	4x350A
	SD70990 5X Y	4x350A
9	SD71150 5X Y	6x350A
	SD71260 5X Y	6x350A
	SD71440 5X Y	6x350A
10	SD71580 5X Y	9x350A
	SD71800 5X Y	9x350A
11	SD72200 5X Y	12x350A
	SD72500 5X Y	12x350A

525Vac		
FRAME	DRIVE	FUSES PER PHASE (n°x In)
5	SD70180 7X Y	1x350A
	SD70205 7X Y	1x350A
6	SD70270 7X Y	2x350A
	SD70295 7X Y	2x350A
	SD70340 7X Y	2x350A
7	SD70425 7X Y	3x350A
	SD70470 7X Y	3x350A
	SD70535 7X Y	3x350A
8	SD70660 7X Y	4x350A
	SD70750 7X Y	4x350A
9	SD70845 7X Y	6x350A
	SD70950 7X Y	6x350A
10	SD71070 7X Y	9x350A
	SD71205 7X Y	9x350A
	SD71340 7X Y	9x350A
	SD71605 7X Y	9x350A
11	SD72005 7X Y	12x350A
690 Vac		
5	SD70130 6X Y	1x250A
	SD70150 6X Y	1x250A
	SD70170 6X Y	1x250A
6	SD70210 6X Y	2x250A
	SD70260 6X Y	2x250A
	SD70320 6X Y	2x250A
7	SD70385 6X Y	3x250A
	SD70460 6X Y	3x250A
8	SD70550 6X Y	4x250A
	SD70660 6X Y	4x250A
9	SD70750 6X Y	6x250A
	SD70840 6X Y	6x250A
	SD70950 6X Y	6x250A
10	SD71140 6X Y	9x250A
	SD71270 6X Y	9x250A
	SD71420 6X Y	9x250A
11	SD71500 6X Y	12x250A
	SD71800 6X Y	12x250A

6.7.2. Ground fault protection

The drive is equipped with an internal software ground fault protective function to protect the drive against input and output unbalanced currents. The response threshold can be set from 0% to 30% of the rated current (G.11.3). For further information, see Programming and Software Manual.

This function is not intended to work as a personnel safety or fire protection, so an external protection must be provided to ensure that a substantial ground fault current is promptly interrupted. The SD700 drives are suitable to operate with RCD components Type B, if it is required. The EMC filters and long motor cables increase the ground leakage currents so the threshold response of the protection should be adjusted according to the relevant plant conditions. For additional information, contact with Power Electronics.

6.7.3. Motor thermal protection

The drive includes a motor thermal protection that based on the motor performance parameters mathematically calculates the thermal reservoir of the motor. When this reservoir is reduced below the limits, the drive automatically stops the motor. The thermal model sensitivity could be configured in parameter G2.7, for further information consult Software and programming manual.

The drive includes as standard a PTC connection that permits to monitor the motor temperature. Once connected and configured the drive could either stop the motor or generate a warning signal.

6.7.4. Others

The drive implements additional motor and drive protections such as power-loss ride through, automatic fly restart, high and low input and output voltage, pump overload and underload... For further information, consult Software and Programming manual.

6.7.5. Safety Stop Function

Safe Torque Off (STO) allows the drive output to be disabled so that the drive cannot provide power or generate torque in the motor. The STO safety function has been certified by Tüv Rheinland according to IEC/EN 61800-5-2. For further information, see section 7.3.

6.8. IT grids - floating earth drives

When planning an IT grid electrical installation select the drive for floating earth operation. Check the drive reference to ensure the correct drive selection.

IT grids must be equipped with an insulation monitoring system. To set the parameter settings, consider that the drive has inherent very high impedance, even when a large number of drives are working in parallel on the same IT system.

It is recommended the installation of surge arrester to ground to protect against transient overvoltages. The surge arrester must have rated voltage greater than the drive voltage range to prevent its operation during normal conditions.

6.9. Dynamic Braking Resistors for Equipments of Frames 1 and 2

The equipments of Frames 1 and 2 include the built-in dynamic brake as standard. The user should only connect a resistor between terminals +HVDC and B, as the following drawing shows.

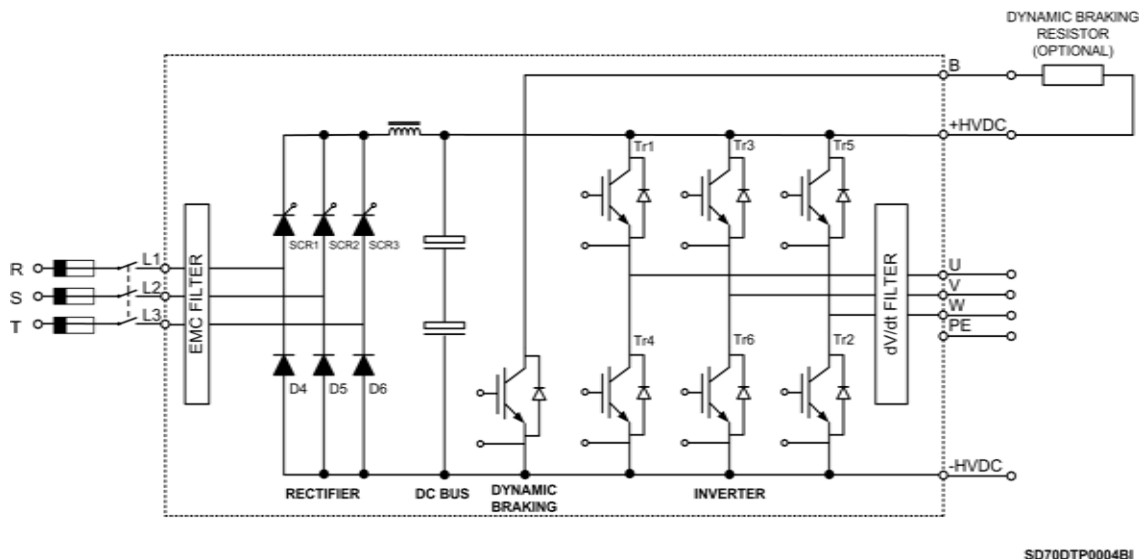


Figure 6.17 Power electronics for equipments of Frames 1 and 2

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I
S
H

6.9.1. Resistor Values for Dynamic Brake (Optional)

FRAME	CODE	I(A) Rated	Motor Power (kW) at 400VAC	Dynamic Braking Resistor (Ω)	Power of Braking Resistor (kW)
1	SD70006 5X	6	2,2	250	2,2
	SD70009 5X	9	4	140	4
	SD70012 5X	12	5,5	100	5,5
	SD70018 5X	18	7,5	75	7,5
	SD70024 5X	24	11	50	11
2	SD70032 5X	32	15	40	15
	SD70038 5X	38	18,5	30	18,5
	SD70048 5X	48	22	25	22

Note: This table is based on ED (Enable Duty) of 100%. For other ED's different than 100%, it will be used braking resistor with the same value in ohms and their power will be calculated by multiplying their power value at 100% (table value) by the new ED. Enable Duty means the time operated by the resistor (regeneration). Resistors for 100% of ED = continuous operation. For example, in case of ED of 30%, it will be multiplied by 0.3.

6.9.2. Terminals of the Resistor for Dynamic Brake

The terminals of the braking resistors are:

TERMINAL	DESCRIPTION
B1, B2	Connection terminals to connect the resistor to the terminals of the dynamic brake built in the drive.
TH1, TH2 ^[1]	Thermal sensor of the resistor. The status of which will change according to the temperature. - For normal temperature (ambient): Normally closed (NC) (TH1 – TH2 closed contact). - In case of resistor over temperature: Normally open (NO) (TH1 – TH2 open contact). Connect this signal to a terminal of one digital input of the drive configured as 'external fault'.

^[1] Terminals TH1 and TH2 will be available when the used braking resistor is equipped with thermal sensor.

Note: It is recommended to use braking resistors equipped with thermal sensors. Connect it to one digital input of the drive and configure this input as 'external fault'.

6.9.3. Connection Drawing

The connection between the optional external resistor for the built-in dynamic brake and the drive is shown in the following figure.

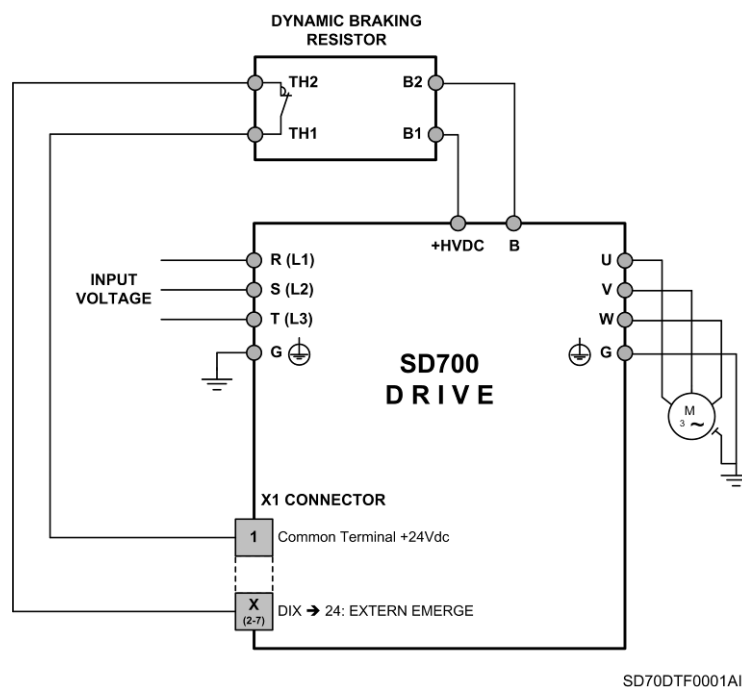


Figure 6.18 Connection drawing of the resistor for the dynamic brake in equipments of Frames 1 and 2

Notes:

- The braking resistor should be non-inductive.
- To connect the sensor to the drive, it is recommended to use shielded cable.
- The maximum cable length between the drive and the external braking resistor is 20m. For other configurations, contact with Power Electronics.

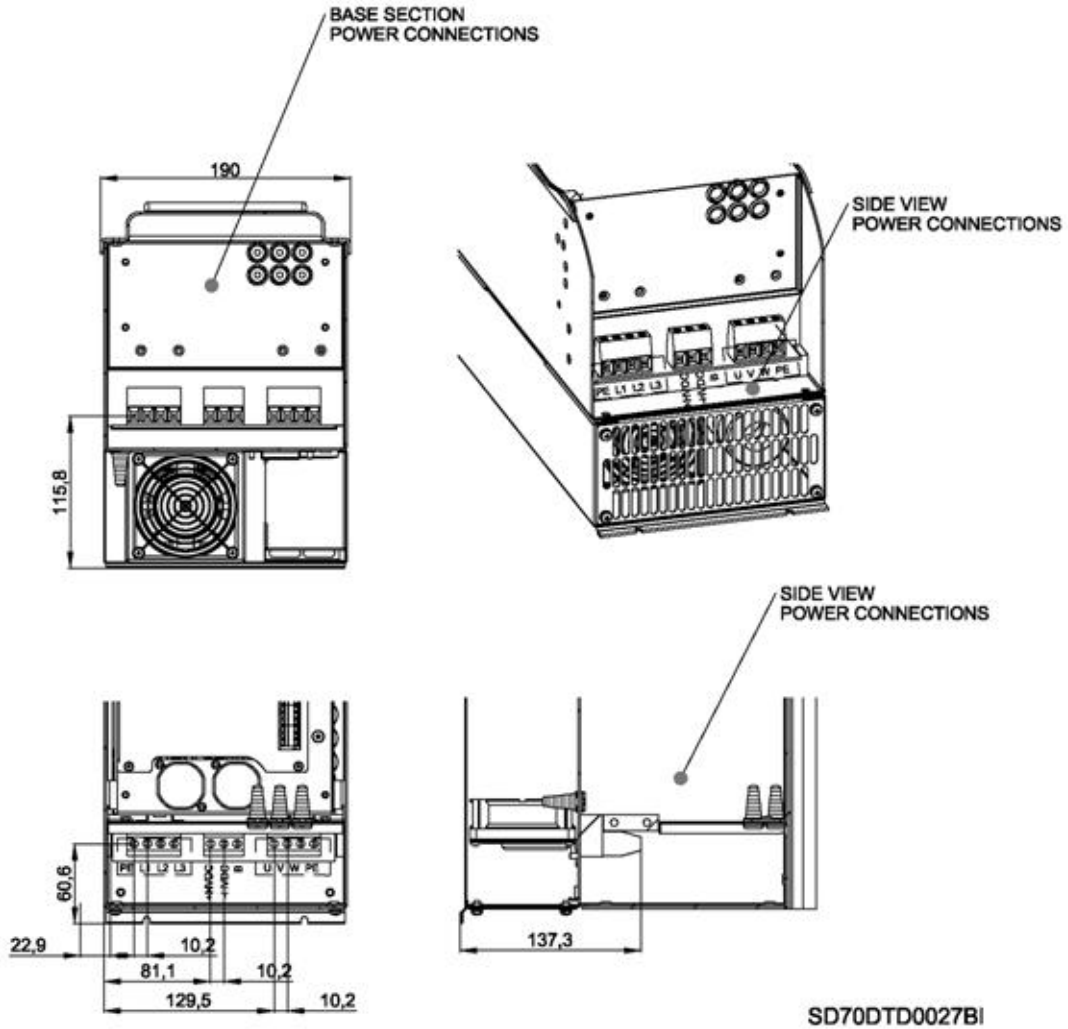


CAUTION

Do not touch the braking resistor during the drive operation since it could be very hot (more than 150°C).

6.10. Power terminals

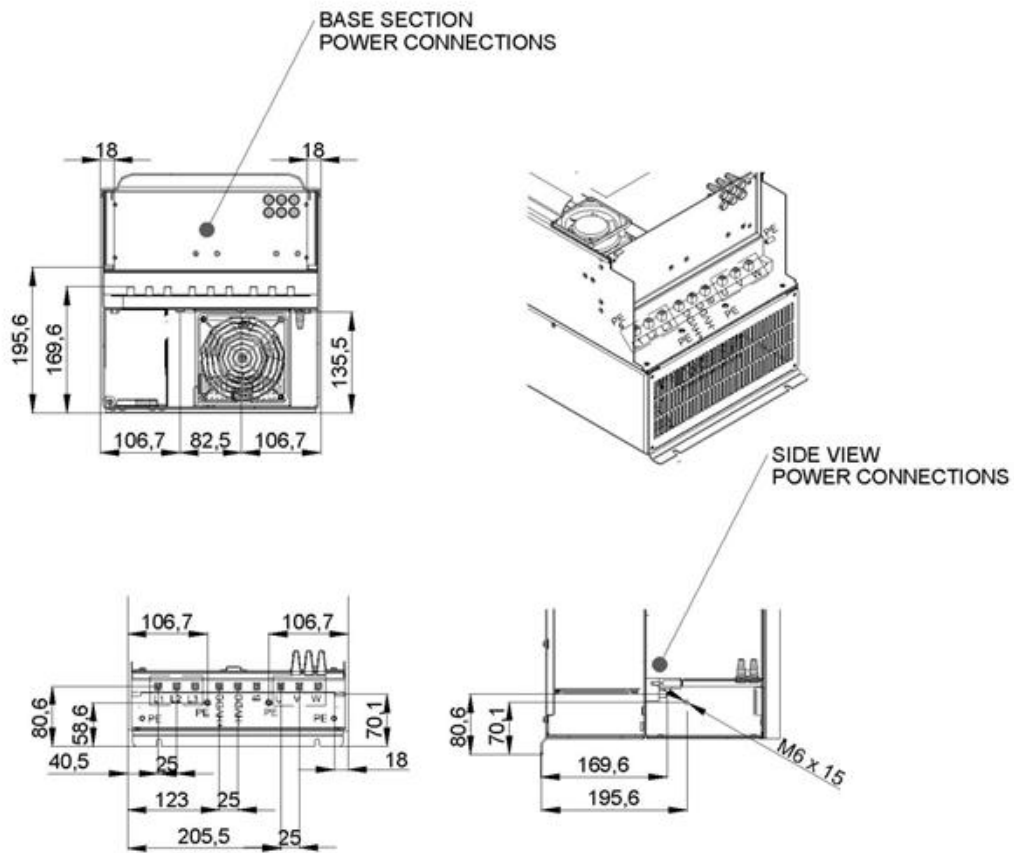
6.10.1. Connections for Frame 1



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Figure 6.19 Location of power connections for equipments of Frame 1 [mm]

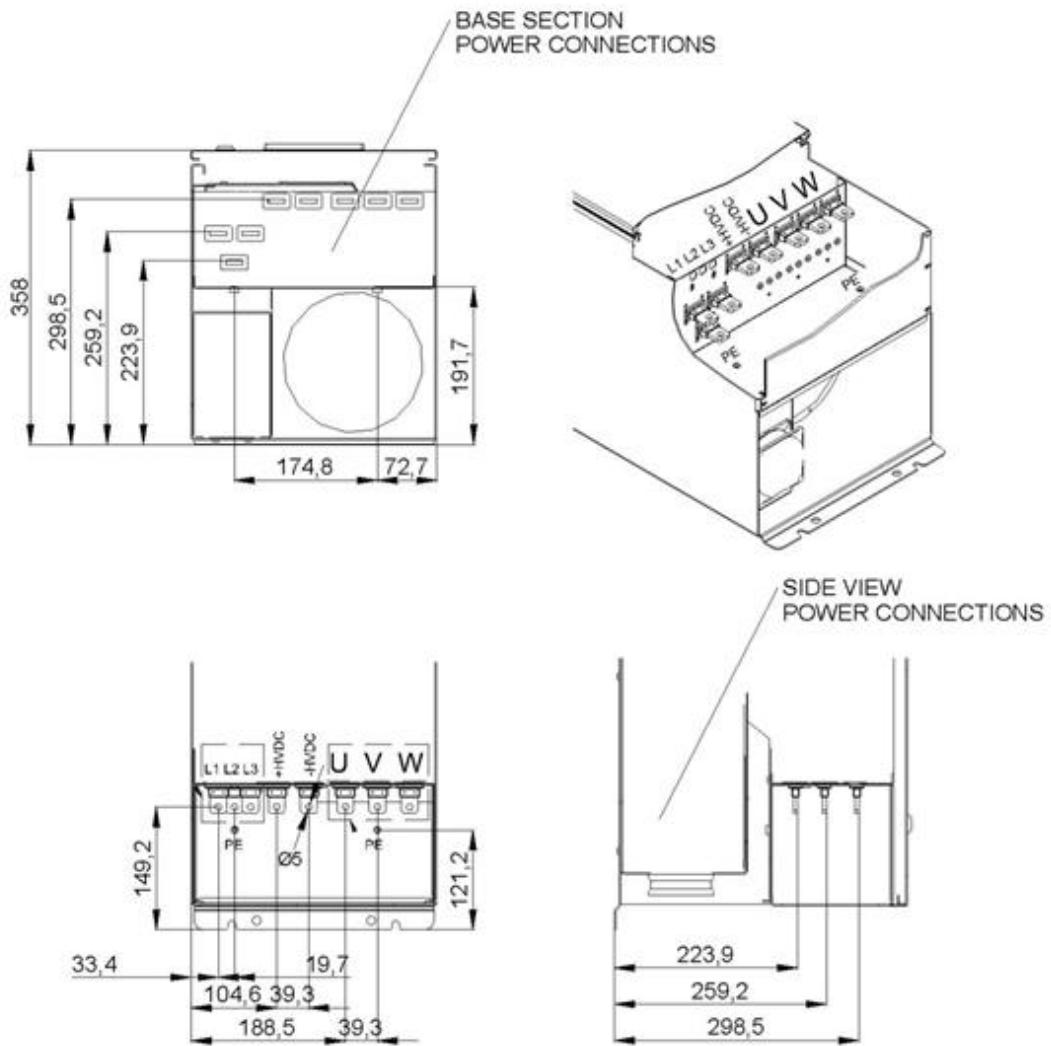
6.10.2. Connections for Frame 2



SD70DTD0028BI

Figure 6.20 Location of power connections for equipments of Frame 2 [mm]

6.10.3. Connections for Frame 3

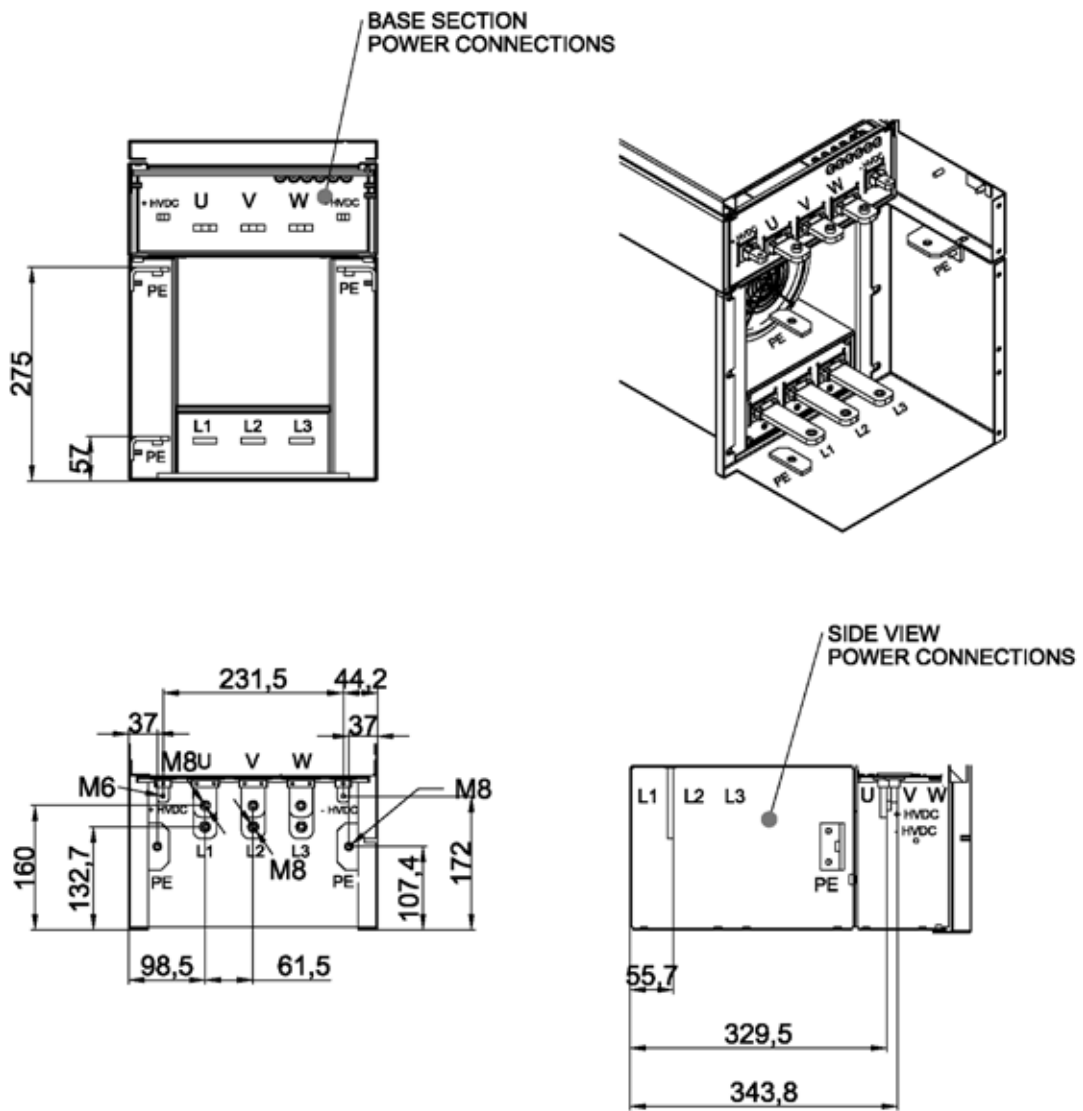


SD70DTD0024BI

Figure 6.21 Location of power connections for equipments of Frame 3 [mm]

E
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I
S
H

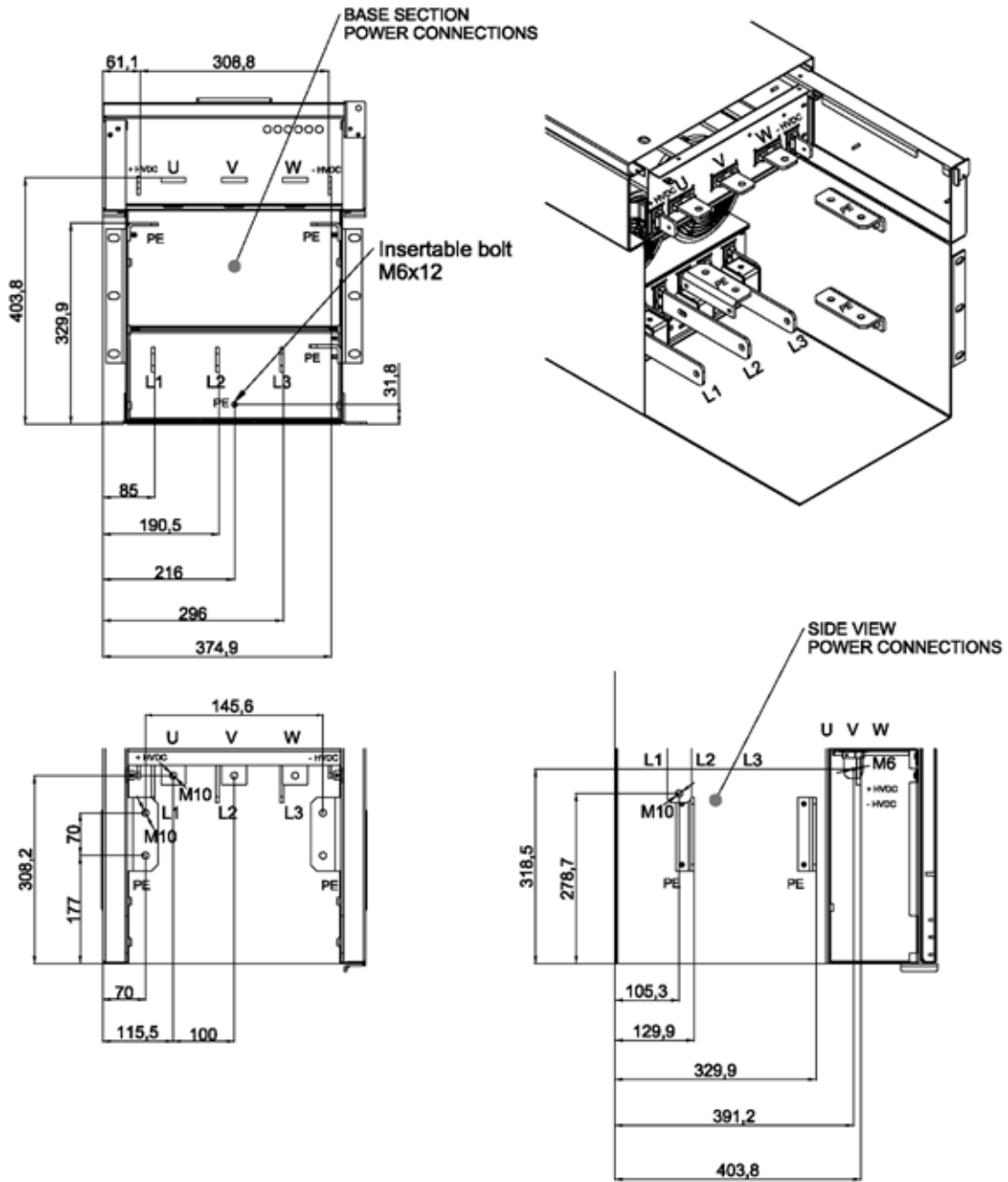
6.10.4. Connections for Frame 4



SD70DTD0005BI

Figure 6.22 Location of power connections for equipments of Frame 4 [mm]

6.10.5. Connections for Frame 5

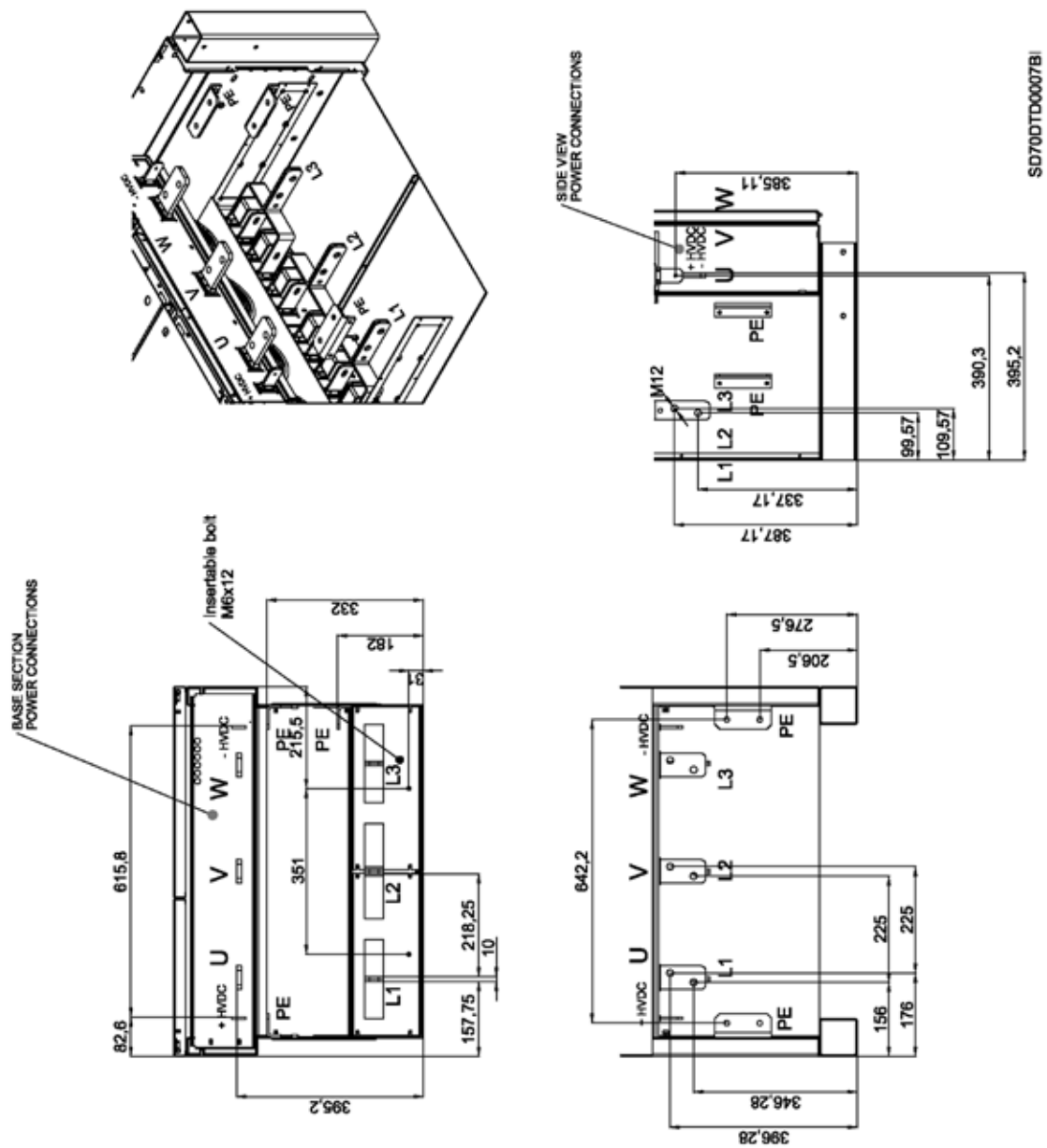


SD70DTD0006B1

Figure 6.23 Location of power connections for equipments of Frame 5 [mm]

E
N
G
L
I
S
H

6.10.6. Connections for Frame 6



SD700TD0007B1

Figure 6.24 Location of power connections for equipments of Frame 6 [mm]

6.10.7. Connections for Frame 7

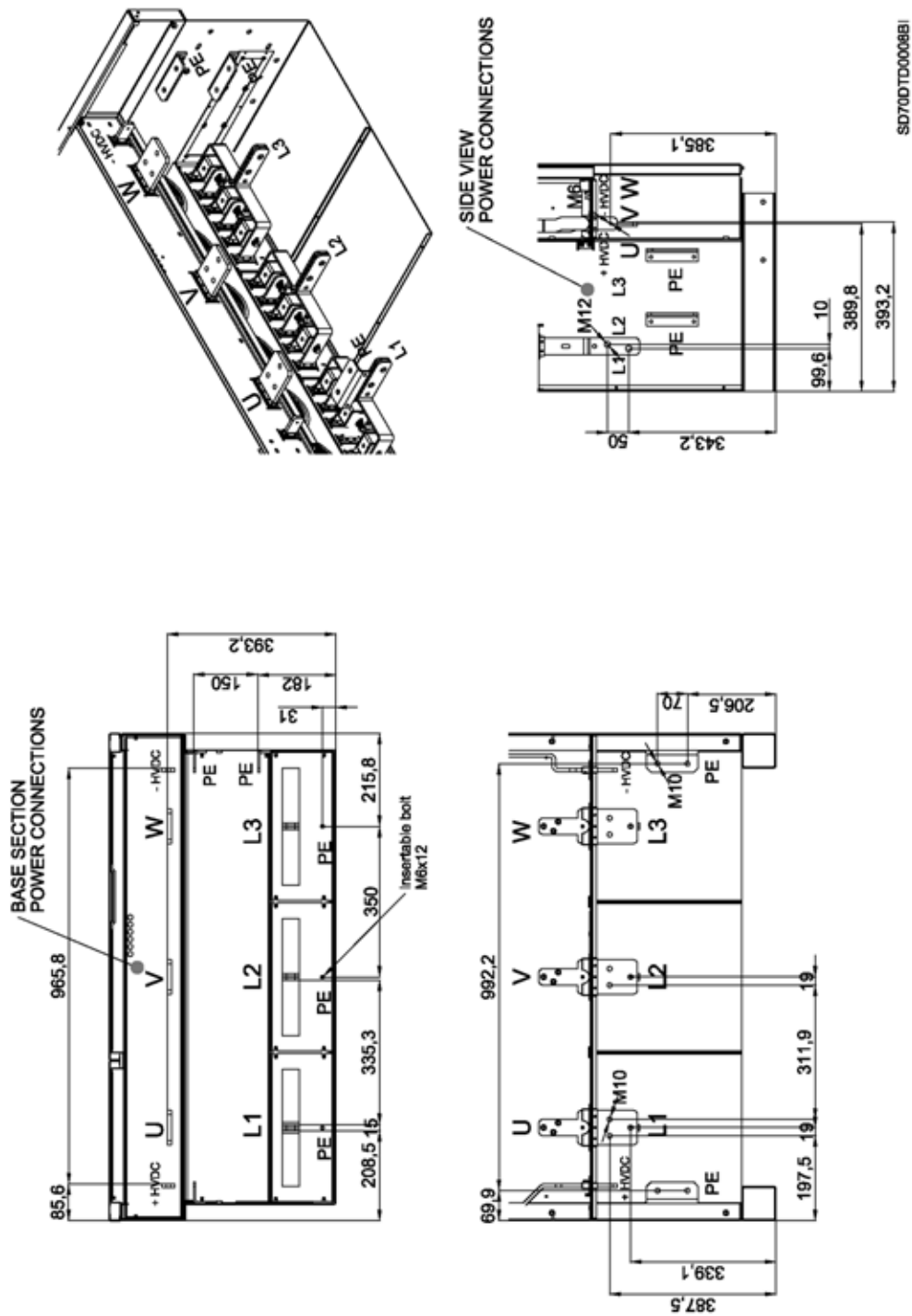
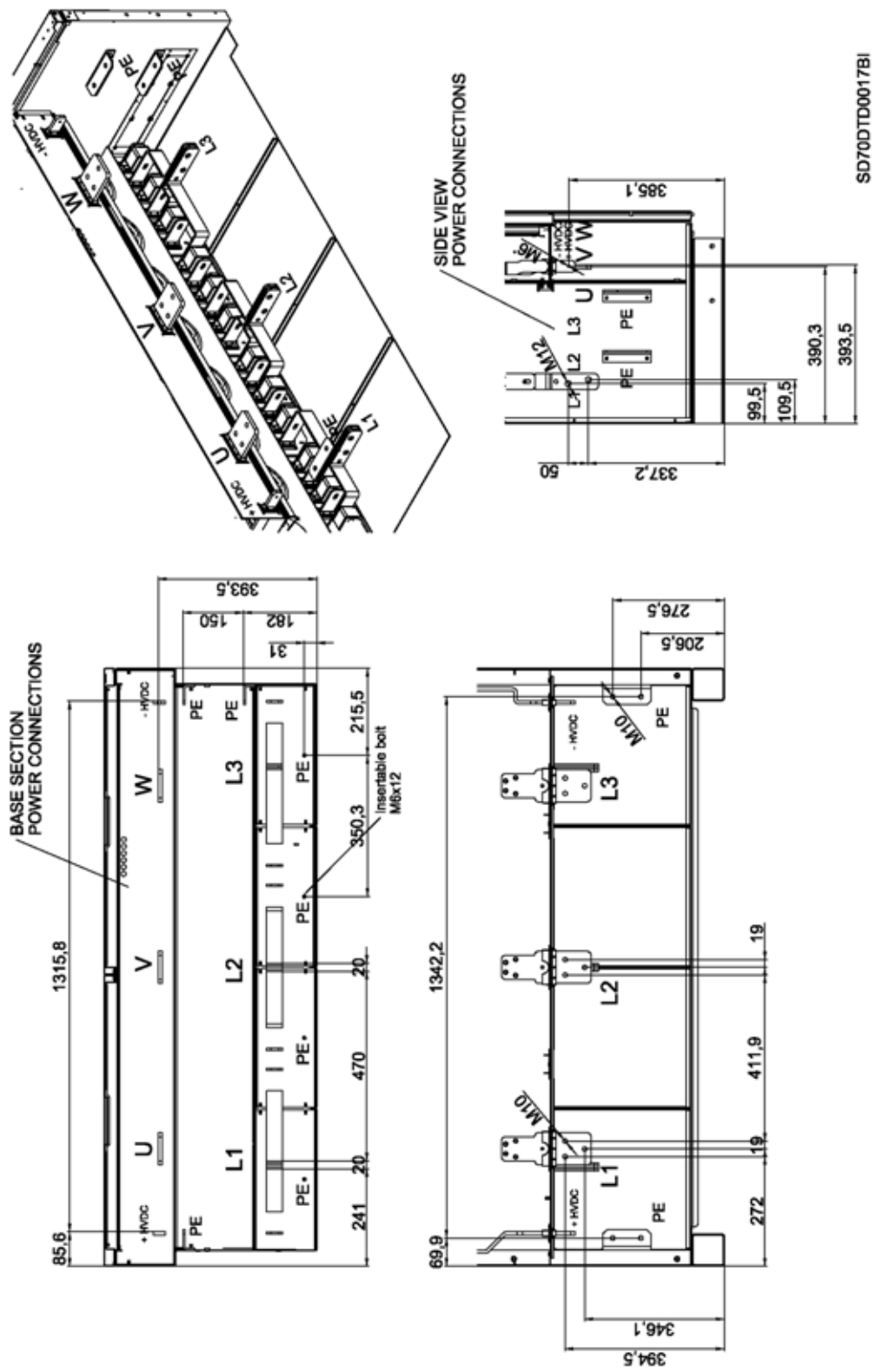


Figure 6.25 Location of power connections for equipments of Frame 7 [mm]

E N G I S H

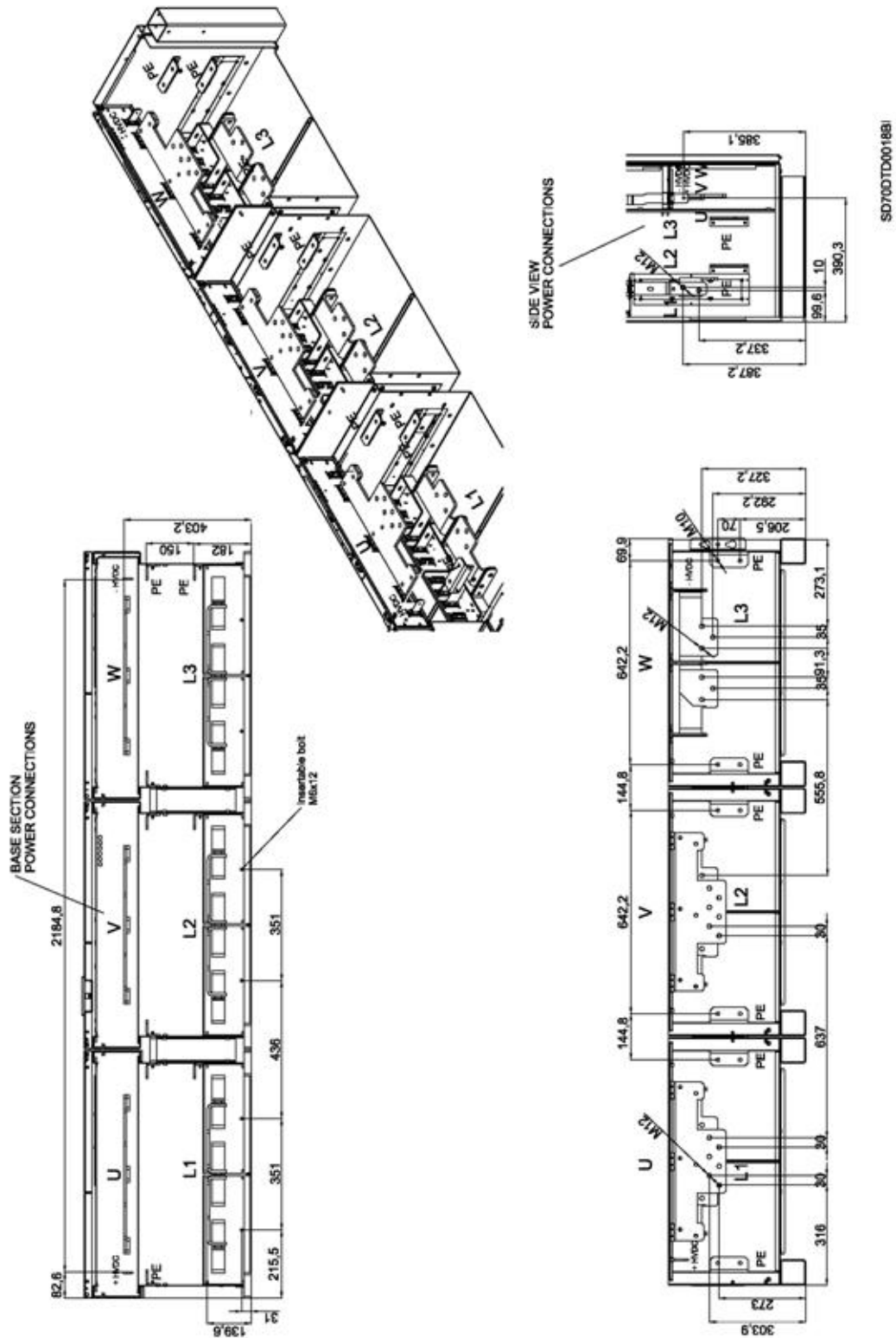
6.10.8. Connections for Frame 8



SD700DTD0017BI

Figure 6.26 Location of power connections for equipments of Frame 8 [mm]

6.10.9. Connections for Frame 9



SD700TD001881

E N G I N E E R S

Figure 6.27 Location of power connections for equipments of Frame 9 [mm]

6.10.10. Connections for Frame 10

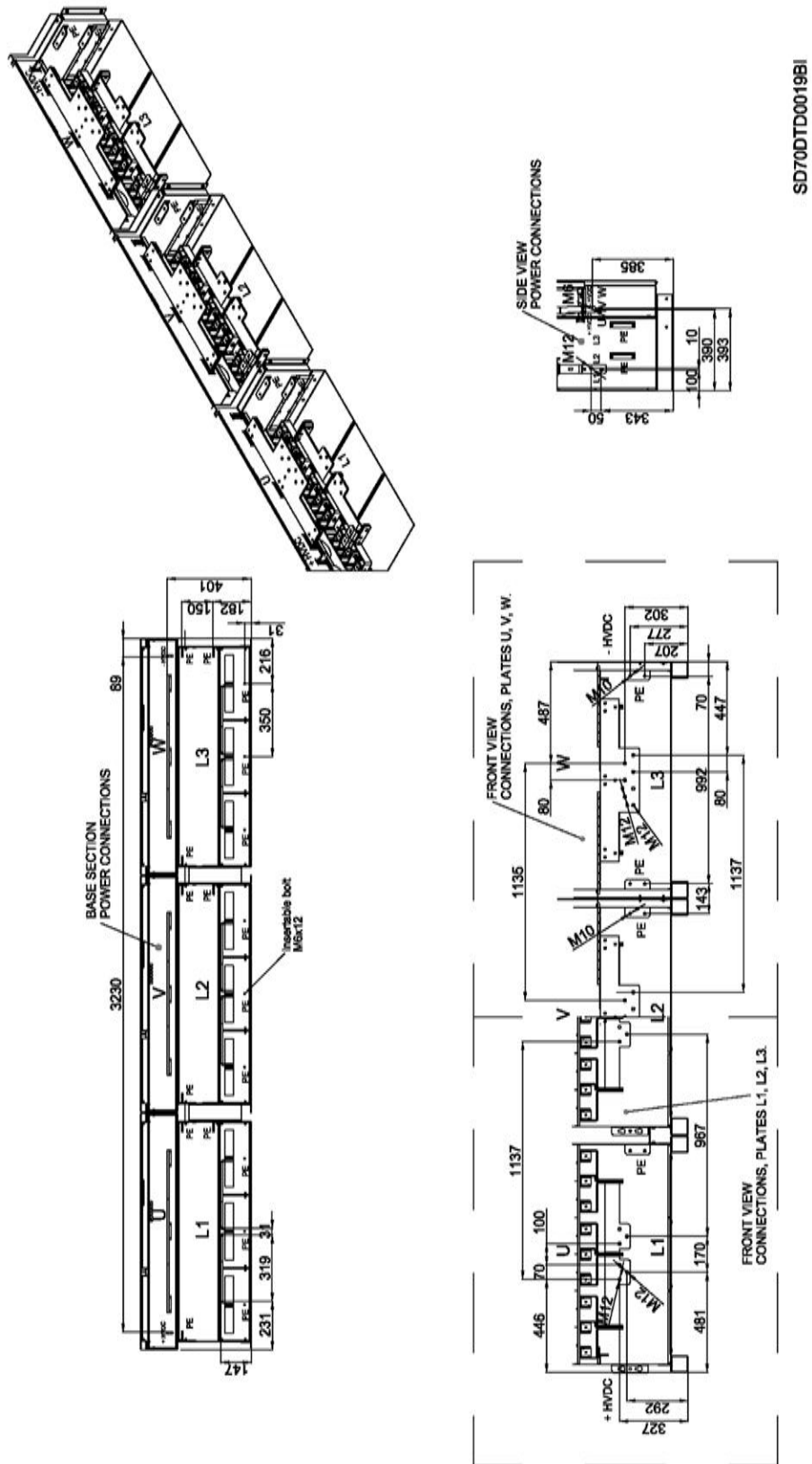


Figure 6.28 Location of power connections for equipments of Frame 10 [mm]

6.10.11. Connections for Frame 11

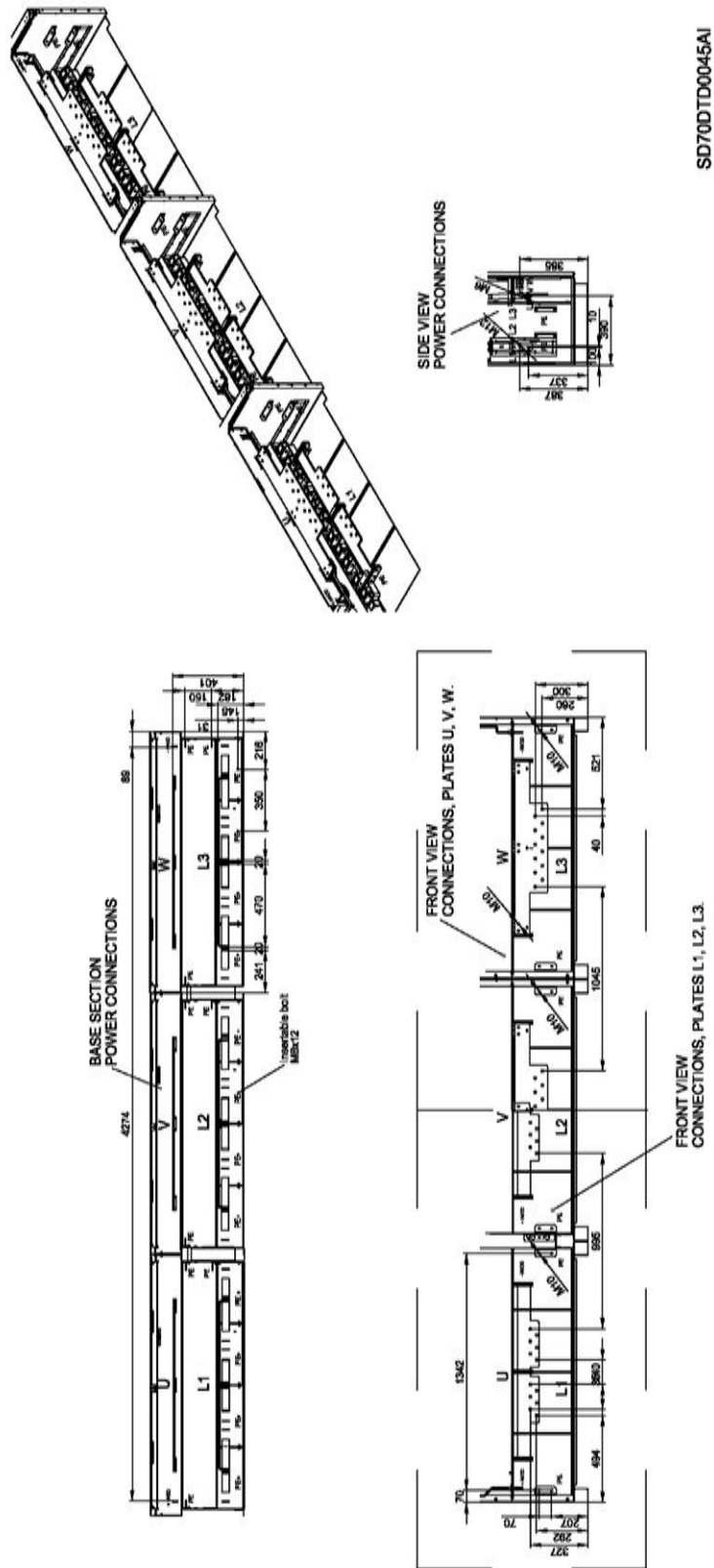


Figure 6.29 Location of power connections for equipments of Frame 11 [mm]

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7. CONTROL CONNECTION

7.1. 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 SD700 front metal panel of the control board, EMC shield clamps that ensure a 360° effective shield bonding.

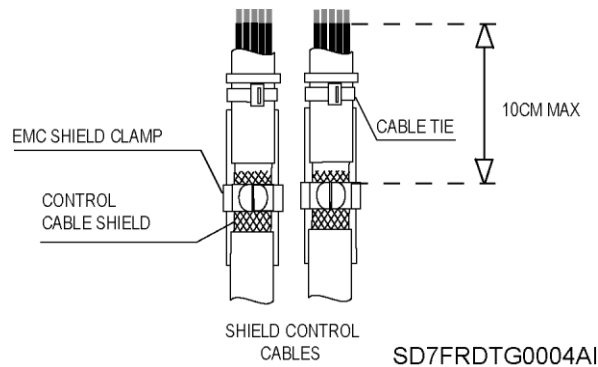


Figure 7.1 Shield bonding

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 2.5mm² 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

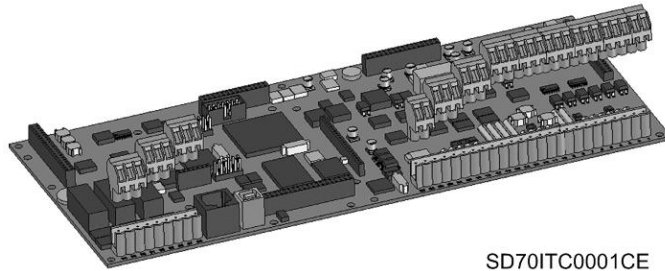
Changes of control wiring or bridges should be performed following the safety instructions indicated before. Otherwise, it could cause damage to the equipment and lead to injury to people.

7.2. Control board terminals description



CAUTION

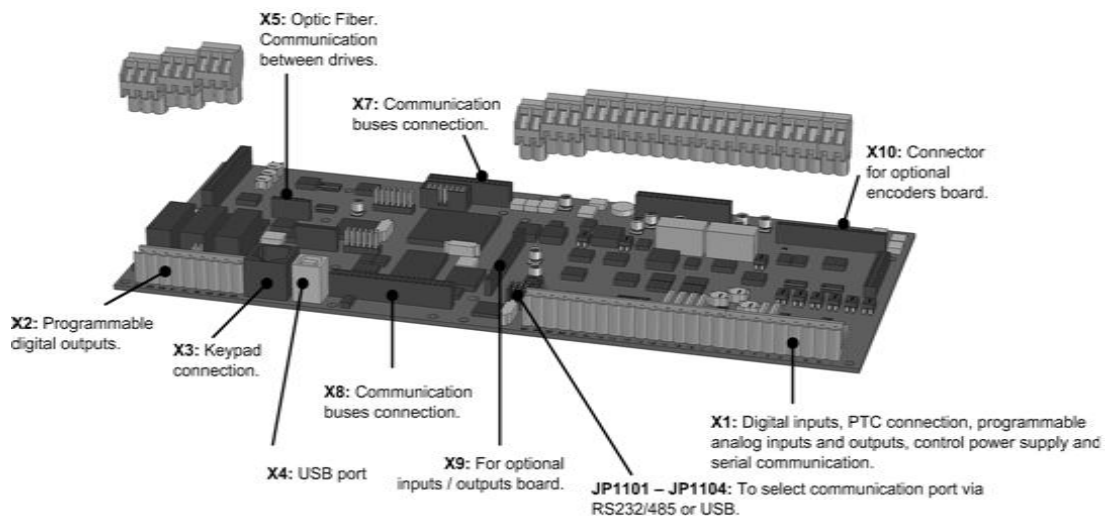
Changes of control wiring or bridges should be performed at least 10 minutes after disconnecting the input power and after checking the DC Link voltage is discharged with a meter (below 30VDC). Otherwise, you may get an electric shock.



SD700ITC0001CE

Figure 7.2 Control board of SD700

The user will have only access to the inverter control board that is equipped with the user interface ports and connectors. It integrate as standard PTC connection, analogue inputs and outputs, digital inputs and outputs, DC external input power supplies, RS485, RS232 and USB communication and display ports. Moreover, the board is ready for the connection of optional boards such as I/O expansion board, encoder board, communication boards, fiber optic board, etc.



SD700ITC0002II

Figure 7.3 Location and description of user connectors

The following figure provides an overview of the standard wiring of control terminals through the X1 and X2 user connectors.

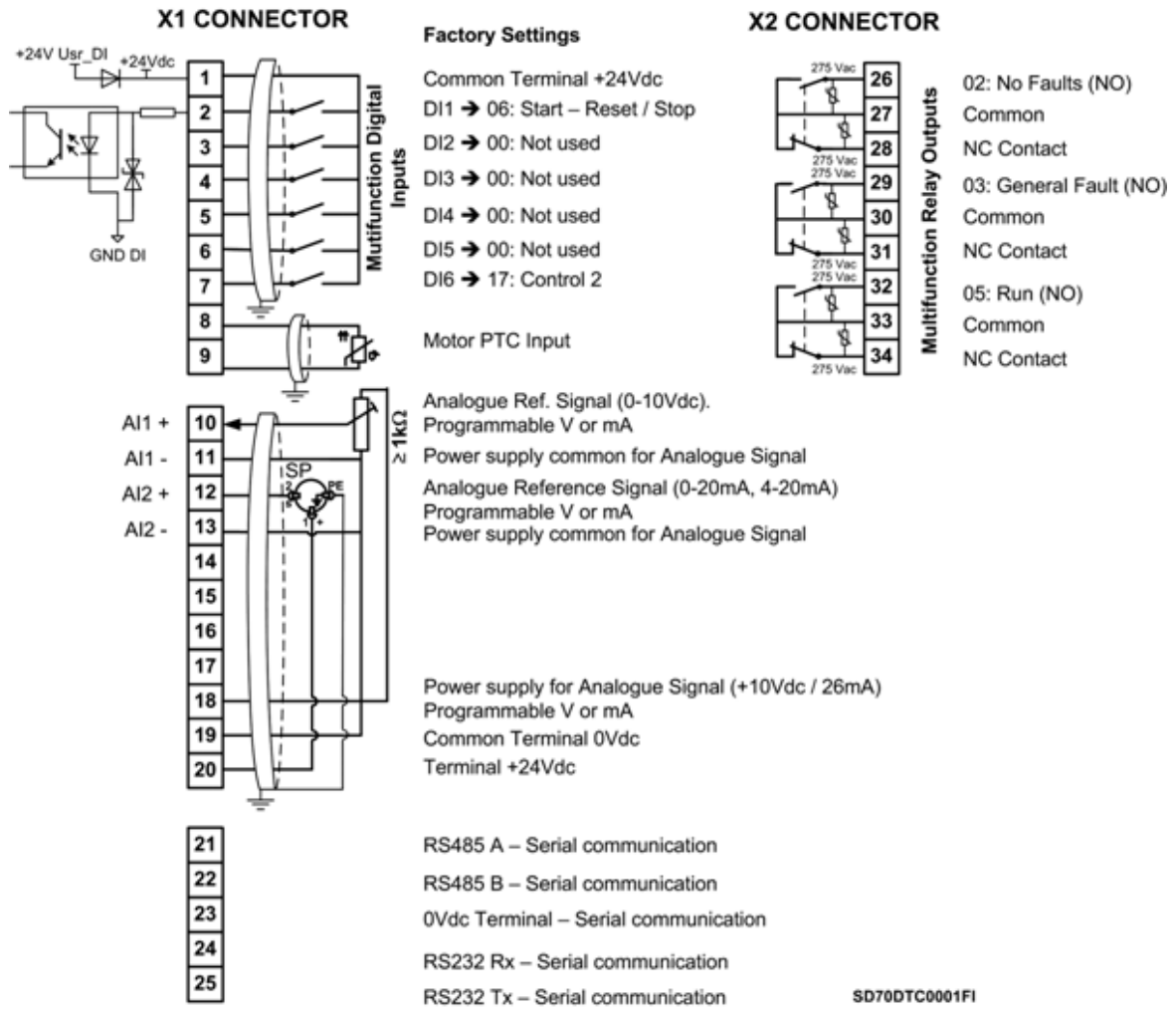


Figure 7.4 Example of control terminals standard wiring

Digital inputs can be configured individually or collectively. Analogue inputs can be configured as comparators. Details on varying standard configurations are available in the Software manual to assist the user. The following figure shows typical wiring configuration for a 3-wire start / stop push button system.

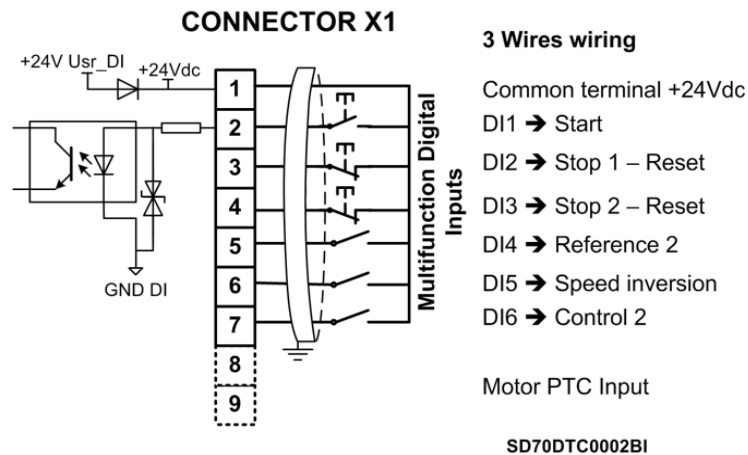


Figure 7.5 Wire control terminals wiring

		PIN	SIGNAL	DESCRIPTION
X1 CONNECTOR	DIGITAL INPUTS	1	+24V_USER	Power supply for digital inputs. Short circuit and overload protected. (Maximum +24VDC, 180mA)
		2	DI1	Programmable Digital Input 1. Digital inputs are configured in the Input group. Their status can be displayed in the visualisation group. It is powered from terminal 1 or an external power 24VDC supply. If an external power supply is used, the common should be connected to the terminal 19 (user GND).
		3	DI2	Programmable Digital Input 2. See DI1 description.
		4	DI3	Programmable Digital Input 3. See DI1 description.
		5	DI4	Programmable Digital Input 4. See DI1 description.
		6	DI5	Programmable Digital Input 5. See DI1 description.
		7	DI6	Programmable Digital Input 6. See DI1 description.
		8	PTC +	Control signal of the motor temperature through the connection of a PTC.
		9	PTC -	
	ANALOGUE INPUTS	10	AI1 +	Voltage or current programmable Analogue Input 1 (V or mA). Configurable for 0-10VDC, ±10VDC, 0-20mA or 4-20mA. Input resistance value in voltage mode is Ri=20kΩ. Input resistance value in current mode is Ri=250Ω.
		11	AI1 -	Common for Analogue Input 1.
		12	AI2 +	Voltage or current programmable Analogue Input 2 (V or mA). See AI1 description.
		13	AI2 -	Common for Analogue Input 2.
	ANALOGUE OUTPUTS	14	AO1 +	Voltage or current programmable Analogue Output 1 (V or mA). Configurable for 0-10VDC, ±10VDC, 0-20mA or 4-20mA.
		15	AO1 -	Common for Analogue Output 1.
		16	AO2 +	Voltage or current programmable Analogue Output 2 (V or mA). Configurable for 0-10VDC, ±10VDC, 0-20mA or 4-20mA.
		17	AO2 -	Common for Analogue Output 2.
	USER POWER SUPPLY	18	+10V_POT	10VDC power supply for analogue inputs. Input power for maximum 2 potentiometers (R≥1kΩ).
		19	GND_USER	Common for analogue inputs (0VDC).
		20	+24V_USER	User power supply. It provides a DC supply to an external sensor. (Maximum: +24VDC, 180mA).
	SERIAL COMMUNICATION	21	RS485 A	RS485 serial communication interface for Modbus.
		22	RS485 B	
		23	RS Common	Common for RS485 / RS232 serial communication signals.
		24	RS232 Rx	RS232 serial communication interface for Modbus.
		25	RS232 Tx	
X2 CONNECTOR	DIGITAL OUTPUTS	26	RLY1 NO	Digital Output 1. Programmable change over relay (NO / NC). Potential free (Maximum: 250VAC, 8A; 30VDC, 8A).
		27	RLY1 C	
		28	RLY1 NC	
		29	RLY2 NO	Digital Output 2. Programmable change over relay (NO / NC). Potential free (Maximum: 250VAC, 8A; 30VDC, 8A).
		30	RLY2 C	
		31	RLY2 NC	
		32	RLY3 NO	Digital Output 3. Programmable change over relay (NO / NC). Potential free (Maximum: 250VAC, 8A; 30VDC, 8A).
		33	RLY3 C	
34	RLY3 NC			

7.3. STO - Safe Torque Off

The STO function is defined as follows:

Power, that can cause rotation, is not applied to the motor. The frequency converter will not provide energy to the motor, which can generate torque.

For three-phase asynchronous motor, that means to stop supplying alternating three-phase power to the stator.

This function corresponds with an Emergency Stop Category 0 according to IEC 60204-1. When the drive is running and the STO function is applied, the motor will freely stop by its own inertia.

The SD700's STO optional board permits to achieve two Safety Levels for the STO function. The safety integrity level SIL3 (PLe) requires the use of an external SELV/PELV 24V_{DC} source, emergency push button, and a safety relay SIL3 certified with feedback. For safety integrity, level SIL1 (PLc) it is only required an external push button. Maximum reaction time of STO function is less than 50ms. See section 7.3.1 and 7.3.2 for additional information.

By using this function, cleaning, emergencies or maintenance work on non-electrical parts of the machinery can be performed without switching off the input power supply to the drive.

Based on the study of each application and a risk assessment, the designer should define the safety function required and each safety level.

The STO safety function has been certified by Tüv Rheinland according to IEC/EN 61800-5-2.



CAUTION

The STO safety function does not disconnect the main input power and auxiliary power supply. The drive disconnects the output motor power supply. Therefore, active conductors may be present inside so do not carry out electric maintenance tasks without isolating the drive. Otherwise, it could cause damage to the equipment and lead to injury and death to people.

Do not use the STO function as a normal drive stop.

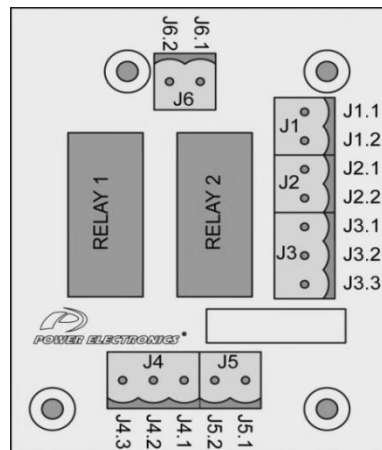


Figure 7.6 Optional STO board terminals

It is recommended to use double-shielded twisted pair cable for external 24V_{DC} and safety channels. Shielded must be connect to ground as it is indicated in the examples.

CON.	Terminal	Description
J1	J1.1 (STO O1)	STO output channel 1
	J1.2 (STO O2)	STO output channel 2
J2	J2.1 (GND)	GND
	J2.2 (STO I1)	STO input channel 1
J3	J3.1 (STO I2)	STO input channel 2
	J3.2 (FB1)	Feedback 1 contact
	J3.3 (FB2)	Feedback 2 contact
J6	J6.1 (+24Vdc)	24V _{DC} power supply. (24 V _{DC} , Max:2W)
	J6.2 (GND)	0 V _{DC} power supply

^[1] This safety integrity level replaces the older Category 3 according to EN954-1.

7.3.1. Safety Integrity Level SIL3- PLe

This assembly provide a highly reliable safety function. When the sensor (E-Push Button) is activated, the STO function interrupts providing energy to the motor. Therefore, it will stop the motor by its own inertia or will avoid any possible unexpected start.

The use of an external safety relay permits to monitor all the safety elements and feedbacks signals, therefore in case a relay failure or elements malfunction the motor will safely stop and a restart will be prevented. The external safety relay must be SIL3 or PLe certified, and compatible with the following features: 24Vdc power supply, 2 safety input terminals, at least 2 NO and 1 NC outputs contacts and a reset function (Ej: PILZ PNOZ X2.P8). The sensors (emergency push buttons, interlock switches, etc) must be certified as safety elements.

The total probability of a dangerous random hardware failure per hour (PFH) value of all elements, which are applied for the realization of the safety function, shall not exceed the limit of the corresponding SIL level. The installation must be performed by trained personal with experience in functional safety.

Example 1: Emergency stop (SIL3, PLe) safety function with automatic restart. The STO's board power terminals will be connected to an external auxiliary SELV/PELV 24Vdc power supply. Both input safety channels will be connected to NO contacts of safety relay, and the monitoring channel (J3.2 and J3.3) will be connected to the terminals of the safety relay restart. To ensure a correct drive response when a fault occurs, J3.1 terminal must be connected to the digital input 5 of the SD700, previously set as external fault (G4.1.9 option 24 EXTERN EMERGE). It is mandatory to use a push button equipped with two normally close contacts that will be connected to the relay's safety inputs.

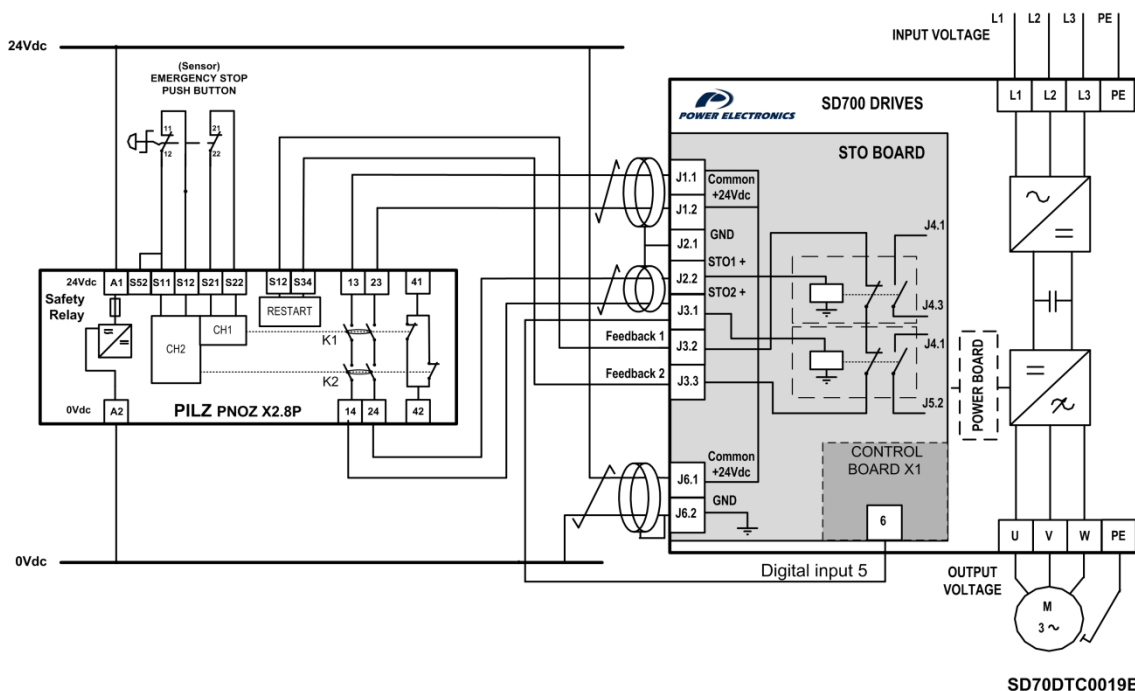


Figure 7.7 Example 1- Emergency stop push button



CAUTION

According to EN 60204-1 automatic restart is not allowed after an emergency stop. For this reason the machine control must prevent an automatic start after emergency stop. For SIL 3 applications the safety function has to be tested regularly (approximately once per month) in order to detect certain failures.

To ensure a correct drive response when a fault occurs, J3.1 terminal must be connected to the digital input 5 of the SD700 drive, previously set as external fault (G4.1.9 option 24 EXTERN EMERGE).

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Example 2: SIL3 (PLe) Safety door opening stop for maintenance tasks with manual restart. This function is used to prevent an unexpected restart when a maintenance task is being carried out in a risk area. In this case, the relay's safety inputs will be connected to a safety interlock switch placed in the door. Additionally a push button is installed to force a manual restart of the safety relay and a lamp connected to the NC output contact of the external safety relay will indicate the restart. To ensure a correct drive response when a fault occurs, J3.1 terminal must be connected to the digital input 5 of the SD700, previously set as external fault (G4.1.9 option 24 EXTERN EMERGE).

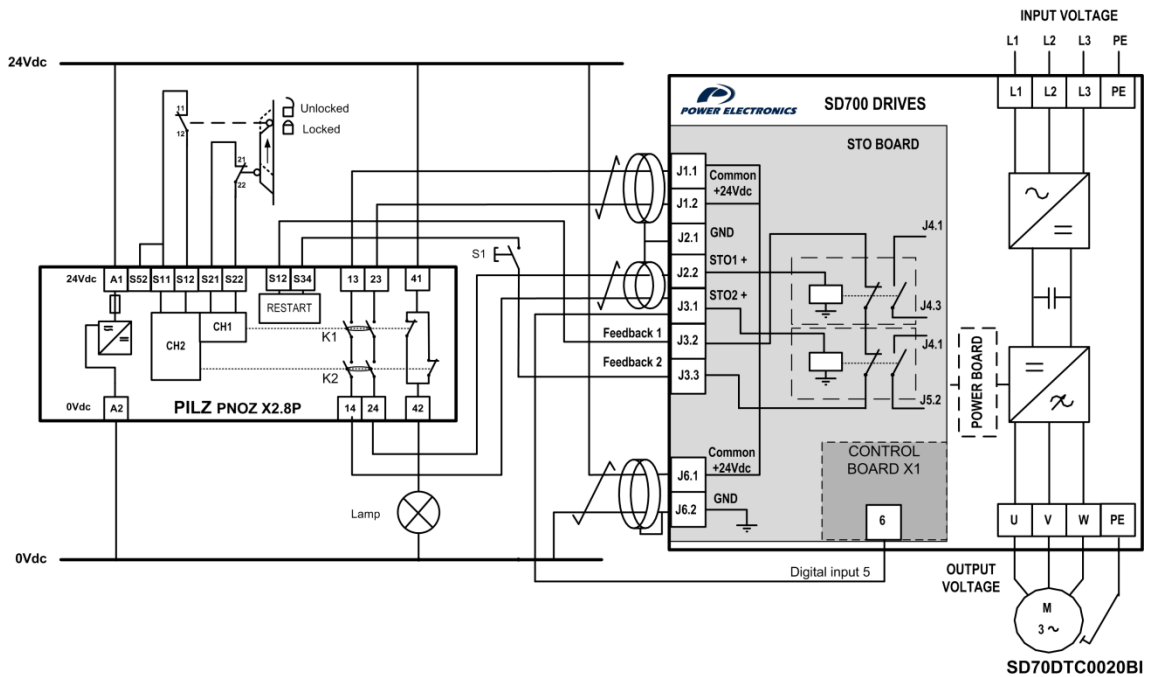


Figure 7.8 Example 2- Safety door opening

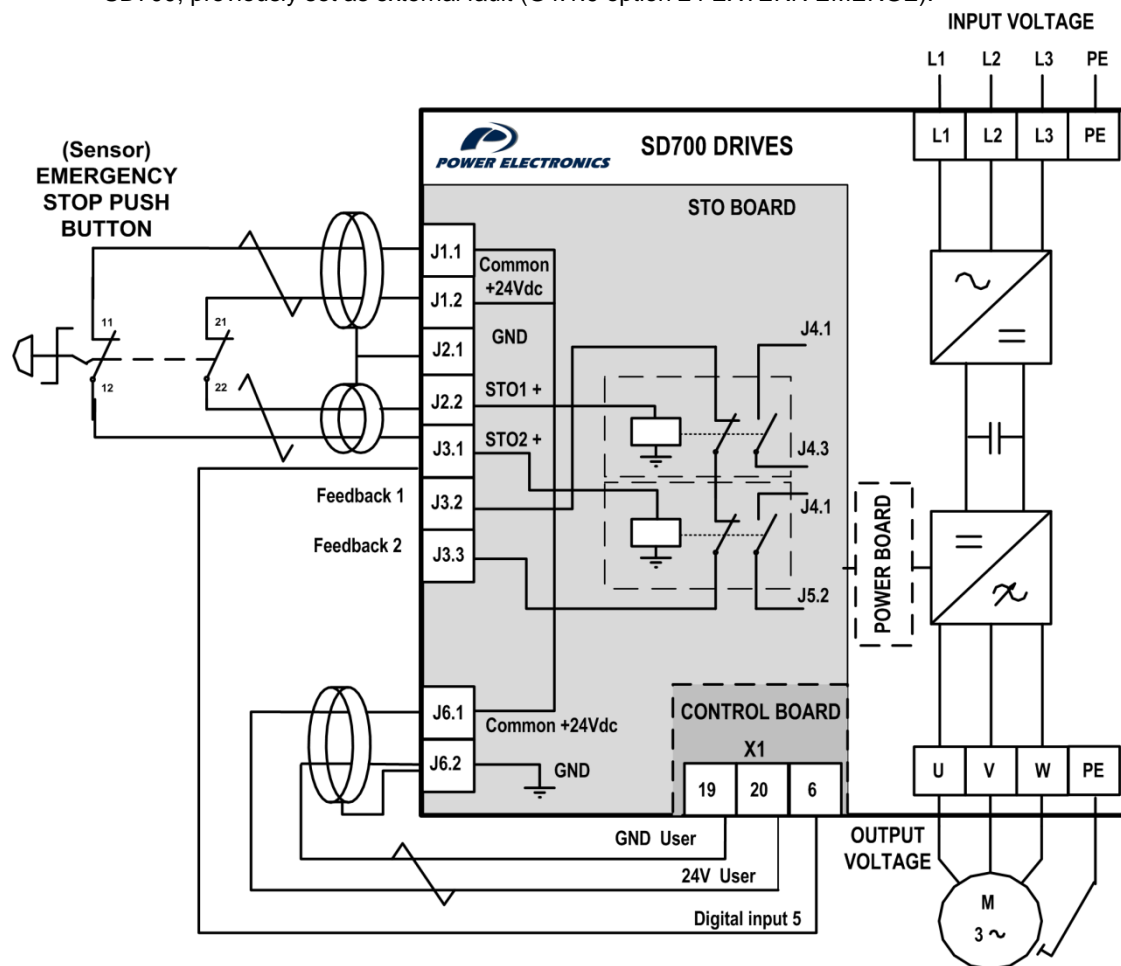
 **CAUTION**

For SIL 3 applications the safety function has to be tested regularly (approximately once per month) in order to detect certain failures.

To ensure a correct drive response when a fault occurs, J3.1 terminal must be connected to the digital input 5 of the SD700 drive, previously set as external fault (G4.1.9 option 24 EXTERN EMERGE).

7.3.2. Safety Integrity Level SIL1- PLc

This connection scheme provides an easy and cost effective solution for installations that not require the highest safety level requirements. In this case, the two NC contacts from the external push button are directly connected to the optional STO board. As the previous solutions, the operator pressing sensor will deactivates the IGBT switching of the inverter bridge through two independent channels, disconnecting the motor power supply and avoiding any possible unexpected restart. The monitoring terminals will not be connected. To ensure a correct drive response when a fault occurs, J3.1 terminal must be connected to the digital input 5 of the SD700, previously set as external fault (G4.1.9 option 24 EXTERN EMERGE).



SD70DTC0021BI

Figure 7.9 Emergency Stop Push button connection scheme – SIL 1 -PLc

X1.19 and X1.20 terminals can be used for other purpose depending on the inverter applications (frequency reference performed by an external potentiometer, analogue feedback etc...). In order to avoid the multiple cable connection in a single terminal (X1.19, X1.20), it is recommended to add additional external terminals to distribute the power supply.

CAUTION

According to EN 60204-1 automatic restart is not allowed after an emergency stop. For this reason the machine control must prevent an automatic start after emergency stop.

To ensure a correct drive response when a fault occurs, J3.1 terminal must be connected to the digital input 5 of the SD700 drive, previously set as external fault (G4.1.9 option 24 EXTERN EMERGE).

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7.4. Connection with ATEX motors

ATEX regulations and guidelines are related to the regulations governing the use of machinery, installations or equipment within potentially explosive atmospheres. In the European Union, the use of equipment within these areas becomes a legal requirement described in two complementary directives: Directive 1999/92/EC for the installation environment and workers protection, and Directive 94/9/EC for the ATEX equipment. These guidelines and directives are based on two basic concepts: the classification of potentially explosive areas or zones, and the branding of products that are able to be installed within a zone.

Power Electronics provides a solution for driving ATEX motors such as “Ex nA”, “Ex d” and “Ex p”, under the ATEX zone areas illustrated below. For different ATEX motor and zone combination, consult Power Electronics.

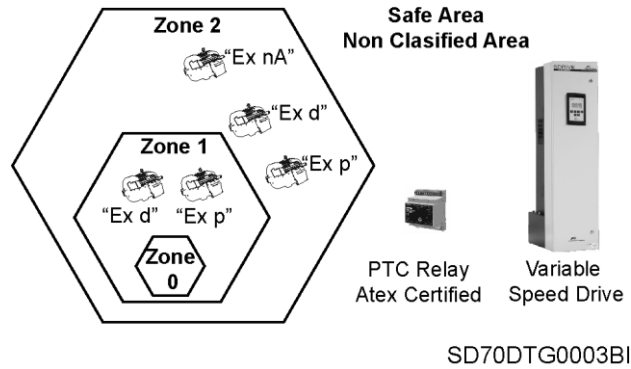


Figure 7.10: ATEX motors and Zones combination

The solution is valid for motors with type of protection “Ex d” or “Ex p” installed in ATEX zone 1 and 2, or motors with type of protection “EX nA” located in zone 2. The external PTC relay must be ATEX certified, and compatible with the following features: 24Vdc power supply, 2 safety input terminals, at least 2 NO and a reset function. As illustrated below, the SD700 drive and ATEX relay must be placed in a safe area, outside the ATEX zone. (Example: ZIEHL -PTC MSR 220 Vi)

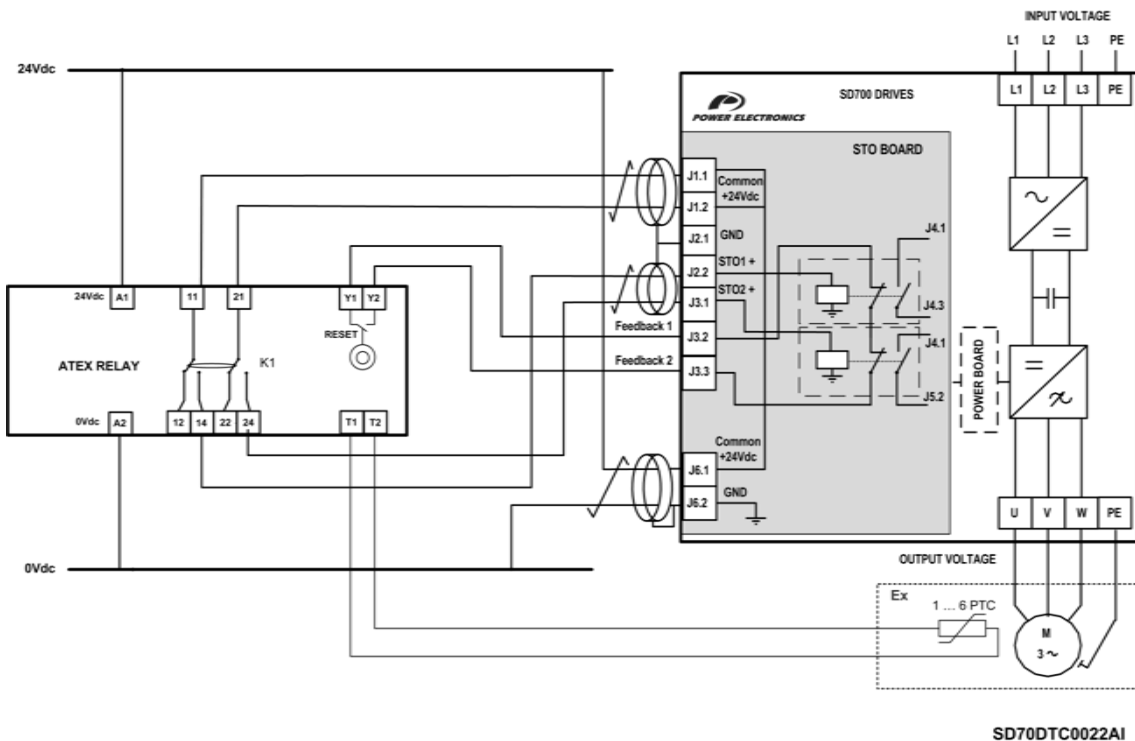


Figure 7.11: Connection scheme (Example with ZIEHL -PTC Thermistor Relay Type MSR 220 Vi)

SD700 series are built-in as standard with dV/dt filter and a unique CLAMP system that reduce the dV/dt and voltage peaks at the motor windings. Therefore, it reduces the risk of winding sparks, motor overheating and bearing currents.

Additionally, the motor thermal mode protection could be adjusted to increase the protection against motor overheating. In case of self-ventilated motors, it could be required to apply a derating to the drive according to the motor manufacturer derating curves.

8. MODBUS COMMUNICATION

8.1. Introduction

To guarantee a correct operation of the drive, peripheral elements should be selected correctly and should be connected properly. A wrong installation and/or application could cause a wrong operation of the system or a reduction of the long life of the equipment, and its parts may be damaged. This manual should be read carefully and understood before proceeding.

The purpose of the Serial Communication Network of the SD700 is to integrate the drive itself into a network compatible with the Modbus communications protocol. This is possible using RS232 or RS485 physical communications port or USB port. For this, it is necessary to modify the position of the jumper of the control board JP1101 – JP1104. Communications ports are clearly indicated in that connector. Put the jumper in the desired position according to your needs.

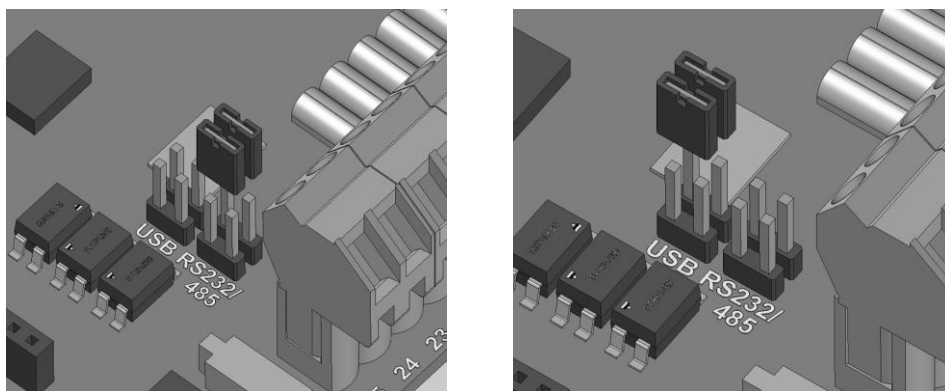


Figure 8.1 Jumper for communications port selection

Modbus communication system allows SD700 drives to be controlled and/or monitored as a slave by a Modbus master from a remote location.

RS485 network allows connecting up to 240 equipments in the same network. Nevertheless, RS232 network only allows connecting one unit (slave) into the network.

SD700 drives operate as a peripheral slave when connected to Modbus system. This means that the drive do not start the communication task, master will be the one that starts this task.

Practically all of the operating modes, parameters and drive characteristics are accessible through serial communications. For example, master can give start and stop order to the drive, control SD700 status, read the current used by the motor etc., in short, master can access all of the possibilities of the drive.

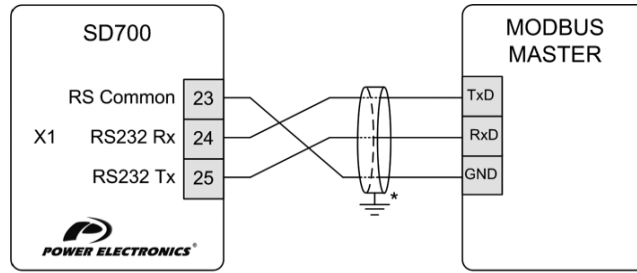
8.2. Hardware technical specifications

RS232	Physical level	3 cables, optically insulated, half duplex, RS232 single ending
	Terminals	23 → RS Common (0VDC)
		24 → RS232 Rx (receiving line)
		25 → RS232 Tx (transmitting line)
	Output signal level	'1' logical ≤ 6.5V regarding to 0V '0' logical ≥ 6.5V regarding to 0V
	Input signal level	'1' logical < +0.8V '0' logical > +2.4V
	Maximum line impedance	2500pF, 3kΩ
	Insulation	± 50VDC regarding to the earth
	Programmable inputs via Modbus	7 digital inputs 2 programmable analogue inputs (0 – 10V, ±10V, 0 – 20mA, 4 – 20mA)
	Programmable outputs via Modbus	3 relay outputs
		2 programmable analogue outputs (0 – 10V, ±10V, 0 – 20mA, 4 – 20mA)
Max. number of SD700 in network	1	
Maximum cable length	15m	
RS485	Physical level	2 cables, optically insulated, half duplex, RS485 differential mode
	Terminals	21 → RS485 A (negative)
		22 → RS485 B (positive)
		23 → RS Common (0VDC)
	Output signal level	'1' logical = +5V differential '0' logical = -5V differential
	Input signal level	'1' logical = +5V differential '0' logical = -5V differential
	Insulation	± 50VDC regarding to the earth
	Programmable inputs via Modbus	7 digital inputs 2 programmable analogue inputs (0 – 10V, ±10V, 0 – 20mA, 4 – 20mA)
	Programmable outputs via Modbus	3 relay outputs
		2 programmable analogue outputs (0 – 10V, ±10V, 0 – 20mA, 4 – 20mA)
Max. number of SD700 in network	240	
Maximum cable length	1000m	
USB	Connector: USB 1.1 and 2.0 type B. Controller FTDI chip Model FT232BM	For the correct operation of the USB connection, you should install the proper drivers. For this, you only need to access to the information of the proper model in: http://www.ftdichip.com/Drivers/VCP.htm From here, you can download the required files and complete their correct installation.

Note: Installation in the driver Host of the SD700 USB, USB device of the SD700 will be detected by operating systems XP and 2000, it is only necessary to indicate the driver at the time of the installation. In case of operating systems before W98 / Me, execute a search of new Hardware in the device administrator, and complete the installation by indicating the drivers when the computer requires them.

8.3. RS232 Connections

The following diagram shows a common wiring for a RS232 connection:



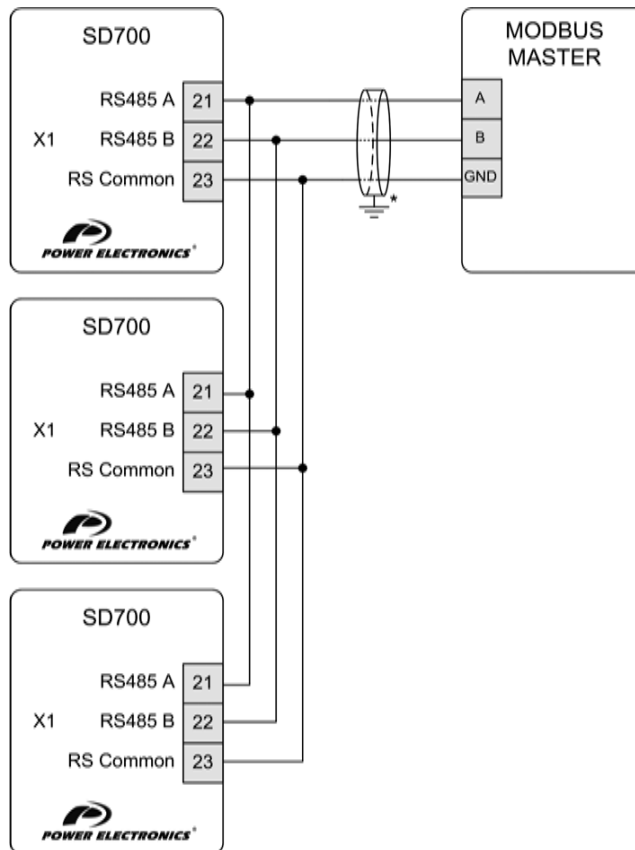
* The connection of the shield could be realized on the gateway terminals or on the opposite extreme of the cable, depending on the installation conditions.

SD70DTR0005AI

Figure 8.2 RS232 Connection

8.4. RS485 Connections

The following diagram shows a common wiring for a RS232 connection RS485:



* The connection of the shield could be realized on the gateway terminals or on the opposite extreme of the cable, depending on the installation conditions.

SD70DTR0006AI

Figure 8.3 RS485 connection

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9. COMMISSIONING



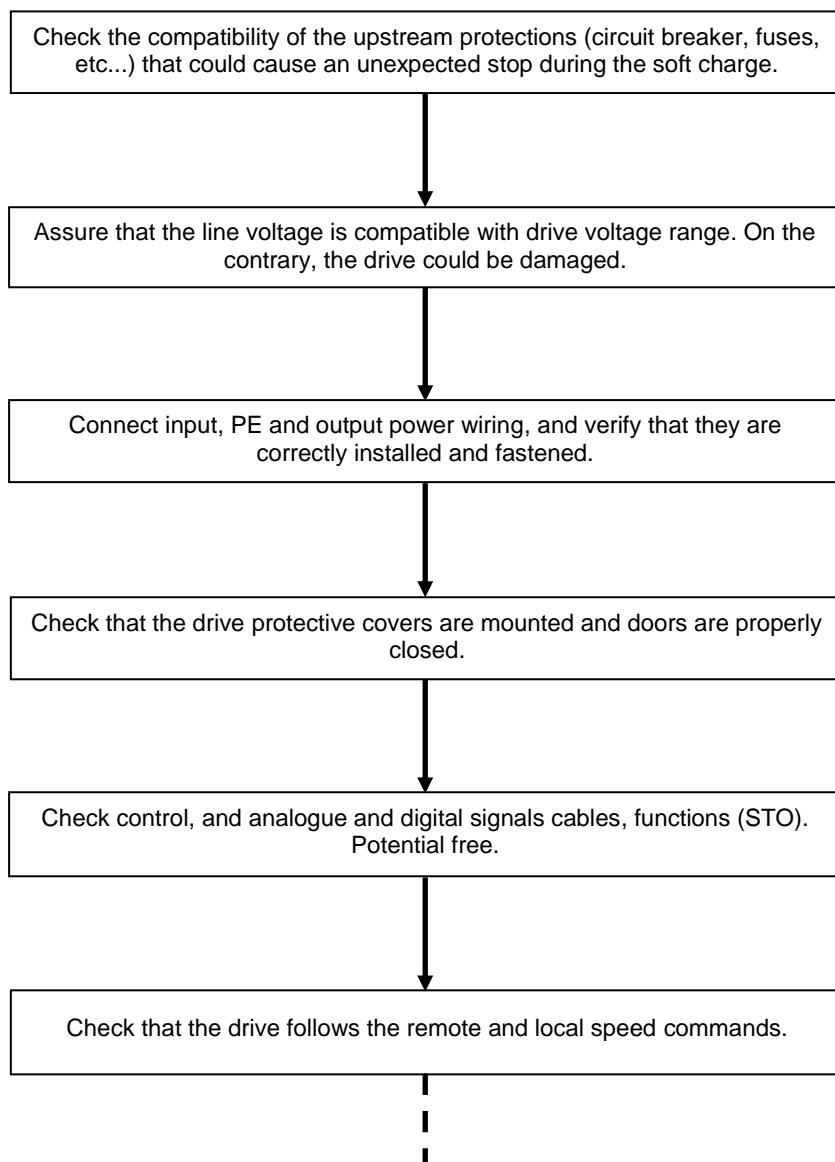
CAUTION

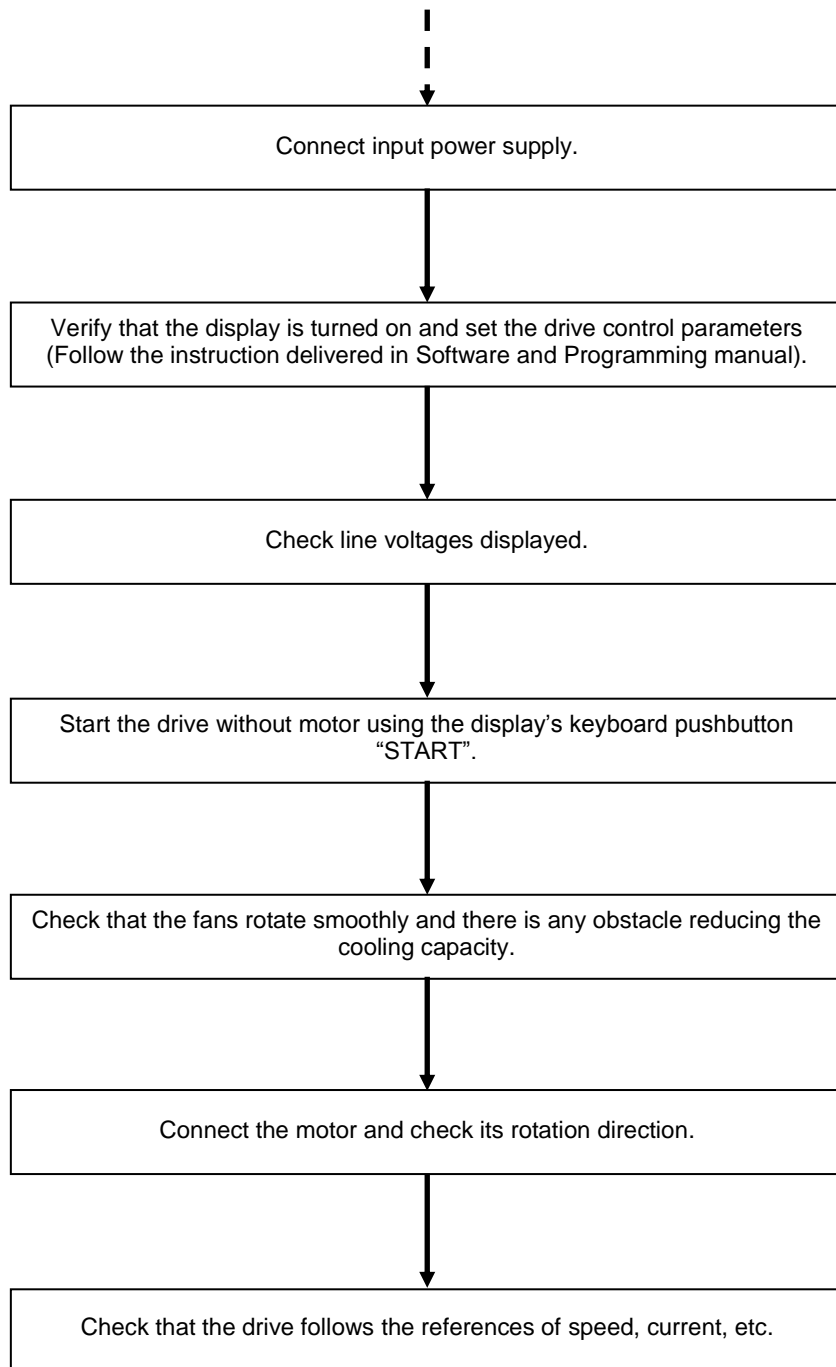
Only qualified personnel are allowed to commission the drive. Read and follow the safety instructions on the first pages of this manual. Neglecting the safety instructions can cause injury or death.

Ensure that there is no voltage present in the input power terminals and no voltage can be connected to the drive inadvertently.

This chapter do not include all the tasks to be performed during commissioning, follow local and national regulations.

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





10.DIMENSIONS

10.1. Dimensions of Frames 1 and 2

FRAME	INPUT VOLTAGE	EQUIPMENTS
1	230VAC ($\pm 20\%$)	SD70006 2X Y, SD70009 2X Y, SD70012 2X Y, SD70020 2X Y, SD70026 2X Y
	380 – 500VAC (-20% to +10%)	SD70006 5X Y, SD70009 5X Y, SD70012 5X Y, SD70018 5X Y, SD70024 5X Y,
	525VAC (-20% to +10%)	-
	690VAC (-15% to +10%)	-
2	230VAC ($\pm 20\%$)	SD70032 2X Y, SD70039 2X Y, SD70050 2X Y
	380 – 500VAC (-20% to +10%)	SD70032 5X Y, SD70038 5X Y, SD70048 5X Y
	525VAC (-20% to +10%)	-
	690VAC (-15% to +10%)	-

FRAME	DIMENSIONS (mm)									WEIGHT (kg)
	H1	H2	H3	W1	W2	D1	D2	Y1	Y2	
1	507.6	473	11.1	190	120	278.6	271.1	498.4	6.8	15
2	510.3	464.7	20.6	296	212.4	328.8	315.2	493.6	7	26

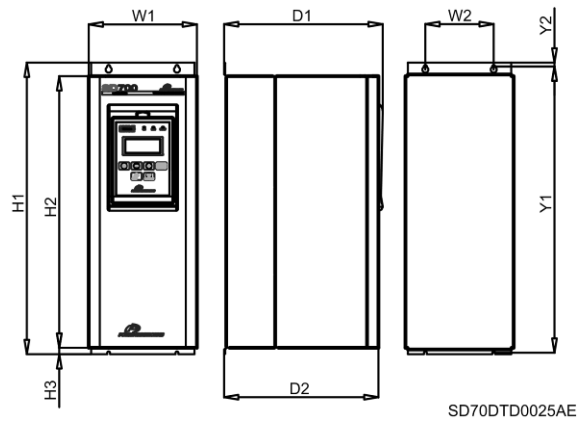


Figure 10.1 Dimensions of Frame 1

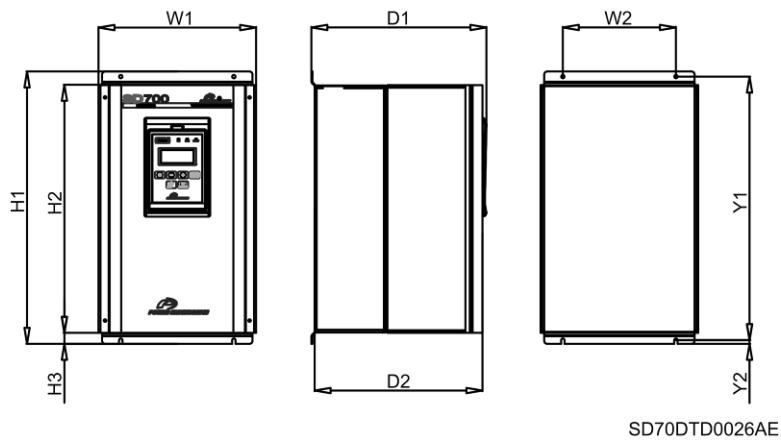


Figure 10.2 Dimensions of Frame 2

10.2. Dimensions of Frames 3, 4 and 5

FRAME	INPUT VOLTAGE	EQUIPMENTS
3	230VAC ($\pm 20\%$)	SD70064 2X Y, SD70075 2X Y, SD70090 2X Y, SD70115 2X Y
	380 – 500VAC (-20% to +10%)	SD70060 5X Y, SD70075 5X Y, SD70090 5X Y, SD70115 5X Y
	525VAC (-20% to +10%)	-
	690VAC (-15% to +10%)	SD70052 6X Y, SD70062 6X Y
4	230VAC ($\pm 20\%$)	SD70150 2X Y, SD70170 2X Y
	380 – 500VAC (-20% to +10%)	SD70150 5X Y, SD70170 5X Y
	525VAC (-20% to +10%)	SD70100 7X Y, SD70120 7X Y, SD70145 7X Y
	690VAC (-15% to +10%)	SD70080 6X Y, SD70105 6X Y
5	230VAC ($\pm 20\%$)	SD70210 2X Y, SD70250 2X Y, SD70275 2X Y
	380 – 500VAC (-20% to +10%)	SD70210 5X Y, SD70250 5X Y, SD70275 5X Y
	525VAC (-20% to +10%)	SD70180 7X Y, SD70205 7X Y
	690VAC (-15% to +10%)	SD70130 6X Y, SD70150 6X Y, SD70170 6X Y

FRAME	DIMENSIONS (mm)											WEIGHT (kg)
	H1	H2	W1	W2	W3	D1	D2	Y1	Y2	Y3	Y4	
3	853.5	838.5	300.5	200	140	358	-	827	15	-	-	67.5
4	1245	1206	320	251	-	438.5	-	881	527.5	353.5	-	94
5	1712	1667	431	396	-	529	460	1403.5	1240.5	81.5	-	200

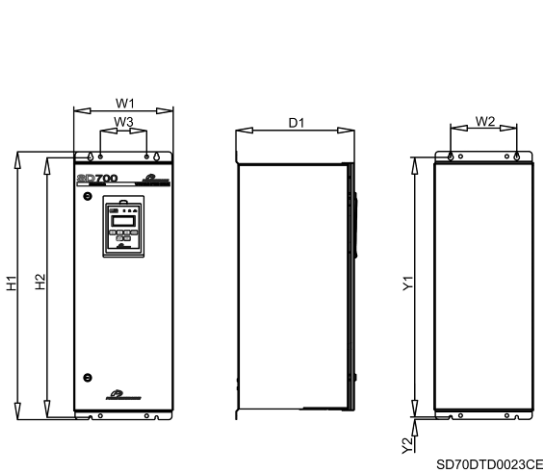


Figure 10.3 Dimensions of Frame 3

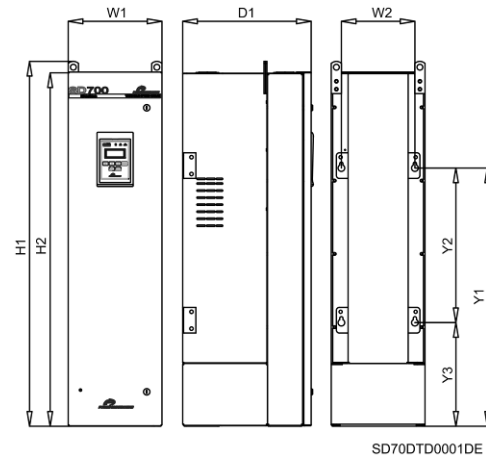


Figure 10.4 Dimensions of Frame 4

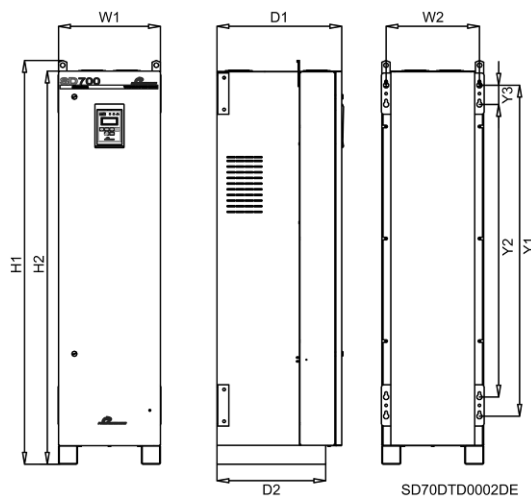


Figure 10.5 Dimensions of Frame 5

ENGLISH

10.3. Dimensions of Frames 6 and 7

FRAME	INPUT VOLTAGE	EQUIPMENTS
6	230VAC ($\pm 20\%$)	SD70330 2X Y, SD70370 2X Y, SD70460 2X Y
	380 – 500VAC (-20% to +10%)	SD70330 5X Y, SD70370 5X Y, SD70460 5X Y, SD70330 5X 12 Y, SD70370 5X 12 Y, SD70460 5X 12 Y
	525VAC (-20% to +10%)	SD70270 7X Y, SD70295 7X Y, SD70340 7X Y, SD70270 7X 12 Y, SD70295 7X 12 Y, SD70340 7X 12 Y
	690VAC (-15% to +10%)	SD70210 6X Y, SD70260 6X Y, SD70320 6X Y, SD70210 6X 12 Y, SD70260 6X 12 Y, SD70320 6X 12 Y
7	230VAC ($\pm 20\%$)	SD70580 2X Y, SD70650 2X Y, SD70720 2X Y
	380 – 500VAC (-20% to +10%)	SD70580 5X Y, SD70650 5X Y, SD70720 5X Y, SD70580 5X 18 Y, SD70650 5X 18 Y, SD70720 5X 18 Y
	525VAC (-20% to +10%)	SD70425 7X Y, SD70470 7X Y, SD70535 7X Y, SD70425 7X 18 Y, SD70470 7X 18 Y, SD70535 7X 18 Y
	690VAC (-15% to +10%)	SD70385 6X Y, SD70460 6X Y, SD70385 6X 18 Y, SD70460 6X 18 Y

FRAME	DIMENSIONS (mm)											WEIGHT (kg)
	H1	H2	W1	W2	W3	D1	D2	Y1	Y2	Y3	Y4	
6	1712	1667	786	747	-	529	460	1602	1208.5	230.5	81.5	335
7	1712	1667	1132	1097	-	529	460	1602	1208.5	230.5	81.5	479

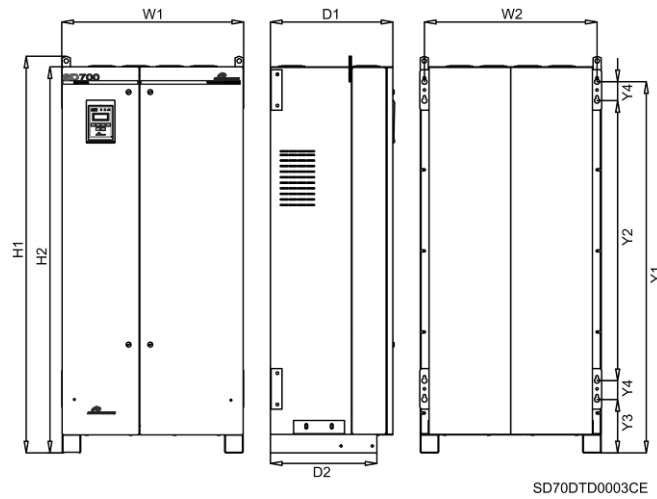


Figure 10.6 Dimensions of Frame 6

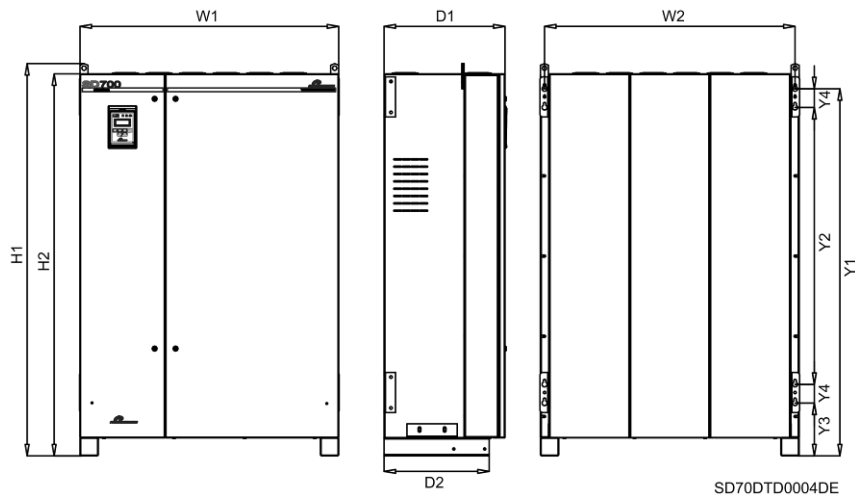


Figure 10.7 Dimensions of Frame 7

10.4. Dimensions of Frames 8 and 9

FRAME	INPUT VOLTAGE	EQUIPMENTS
8	230VAC ($\pm 20\%$)	-
	380 – 500VAC (-20% to +10%)	SD70840 5X Y, SD70925 5X Y, SD70990 5X Y, SD70840 5X 12 Y, SD70925 5X 12 Y, SD70990 5X 12 Y, SD70840 5X 24 Y, SD70925 5X 24 Y, SD70990 5X 24 Y
	525VAC (-20% to +10%)	SD70660 7X Y, SD70750 7X Y, SD70660 7X 12 Y, SD70750 7X 12 Y, SD70660 7X 24 Y, SD70750 7X 24 Y
	690VAC (-15% to +10%)	SD70550 6X Y, SD70660 6X Y, SD70550 6X 12 Y, SD70660 6X 12 Y, SD70550 6X 24 Y, SD70660 6X 24 Y
9	230VAC ($\pm 20\%$)	-
	380 – 500VAC (-20% to +10%)	SD71150 5X Y, SD71260 5X Y, SD71440 5X Y, SD71150 5X 12 Y, SD71260 5X 12 Y, SD71440 5X 12 Y, SD71150 5X 18 Y, SD71260 5X 18 Y, SD71440 5X 18 Y
	525VAC (-20% to +10%)	SD70845 7X Y, SD70950 7X Y, SD70845 7X 12 Y, SD70950 7X 12 Y, SD70845 7X 18 Y, SD70950 7X 18 Y
	690VAC (-15% to +10%)	SD70750 6X Y, SD70840 6X Y, SD70950 6X Y, SD70750 6X 12 Y, SD70840 6X 12 Y, SD70950 6X 12 Y, SD70750 6X 18 Y, SD70840 6X 18 Y, SD70950 6X 18 Y

FRAME	DIMENSIONS (mm)											WEIGHT (kg)
	H1	H2	W1	W2	W3	D1	D2	Y1	Y2	Y3	Y4	
8	1712	1667	1482	1447	-	529	460	1619	1209	247.5	81.5	585
9	1712	1667	2352	747	38	529	460	1619	1209	247.5	81.5	1005

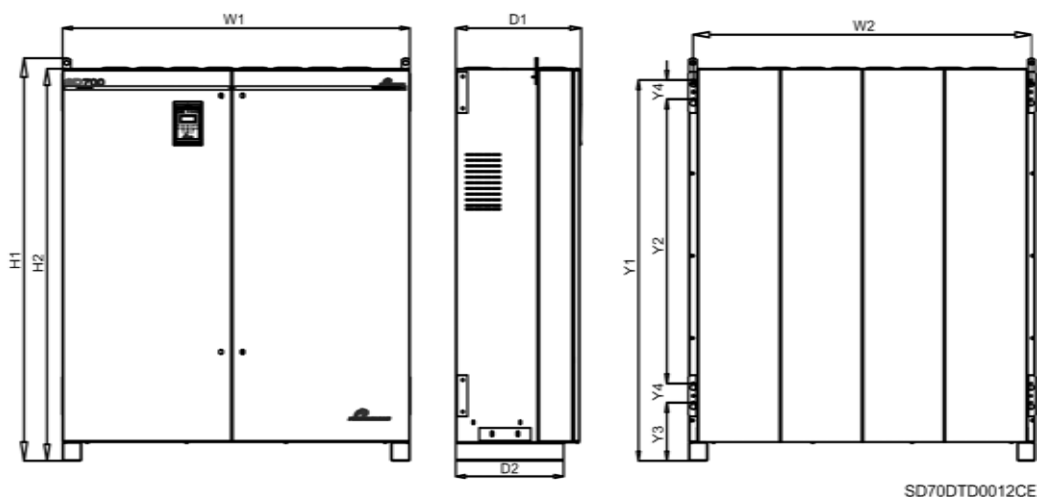


Figure 10.8 Dimensions of Frame 8

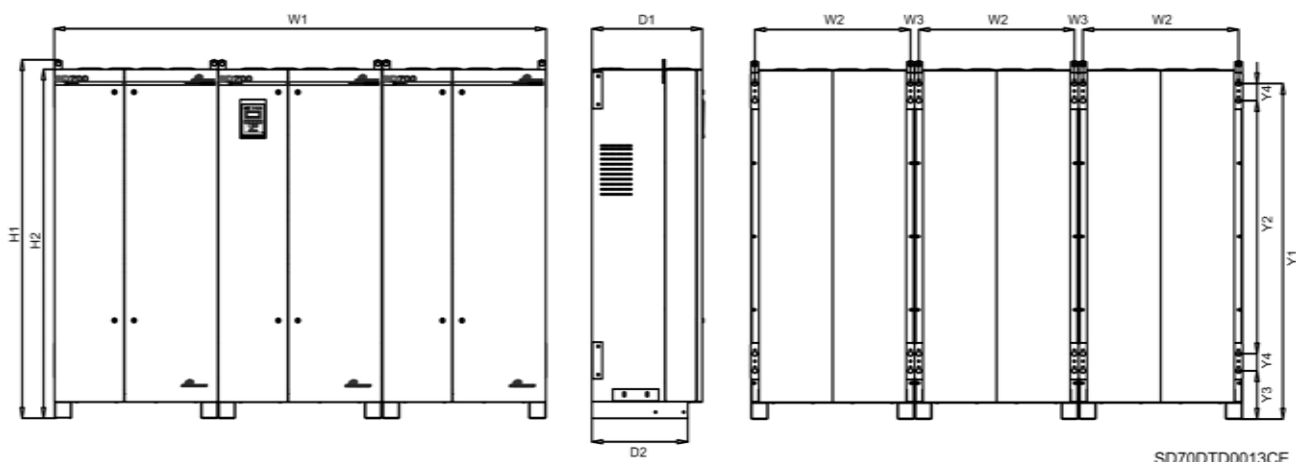


Figure 10.9 Dimensions of Frame 9

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10.5. Dimensions of Frames 10 and 11

FRAME	INPUT VOLTAGE	EQUIPMENTS
10	230VAC ($\pm 20\%$)	-
	380 – 500VAC (-20% to +10%)	SD71580 5X Y, SD71800 5X Y, SD71580 5X 18 Y, SD71800 5X 18 Y
	525VAC (-20% to +10%)	SD71070 7X Y, SD71205 7X Y, SD71340 7X Y, SD71605 7X Y, SD71070 7X 18 Y, SD71205 7X 18 Y, SD71340 7X 18 Y, SD71605 7X 18 Y
	690VAC (-15% to +10%)	SD71140 6X Y, SD71270 6X Y, SD71420 6X Y, SD71140 6X 18 Y, SD71270 6X 18 Y, SD71420 6X 18 Y
11	230VAC ($\pm 20\%$)	-
	380 – 500VAC (-20% to +10%)	SD72200 5X Y, SD72500 5X Y, SD72200 5X 12 Y, SD72500 5X 12 Y, SD72200 5X 18 Y, SD72500 5X 18 Y, SD72200 5X 24 Y, SD72500 5X 24 Y,
	525VAC (-20% to +10%)	SD72005 7X Y, SD72005 7X 12 Y, SD72005 7X 18 Y, SD72005 7X 24 Y
	690VAC (-15% to +10%)	SD71500 6X Y, SD71800 6X Y, SD71500 6X 12 Y, SD71800 6X 12 Y, SD71500 6X 18 Y, SD71800 6X 18 Y, SD71500 6X 24 Y, SD71800 6X 24 Y

FRAME	DIMENSIONS (mm)											WEIGHT (kg)
	H1	H2	W1	W2	W3	D1	D2	Y1	Y2	Y3	Y4	
10	1712	1667	3402	1097	38	529	460	1619	1209	247.5	81.5	1437
11	1712	1667	4452	1447	38	529	460	1619	1209	247.5	81.5	1755

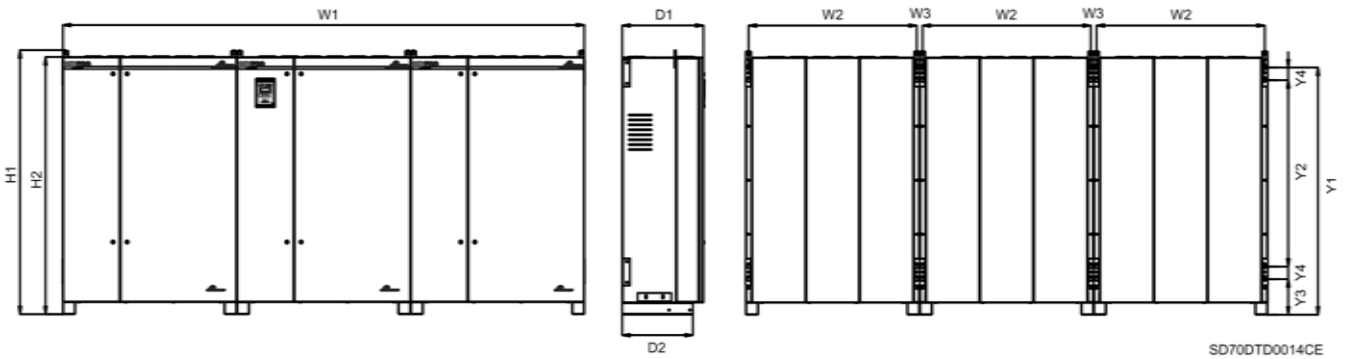


Figure 10.10 Dimensions of Frame 10

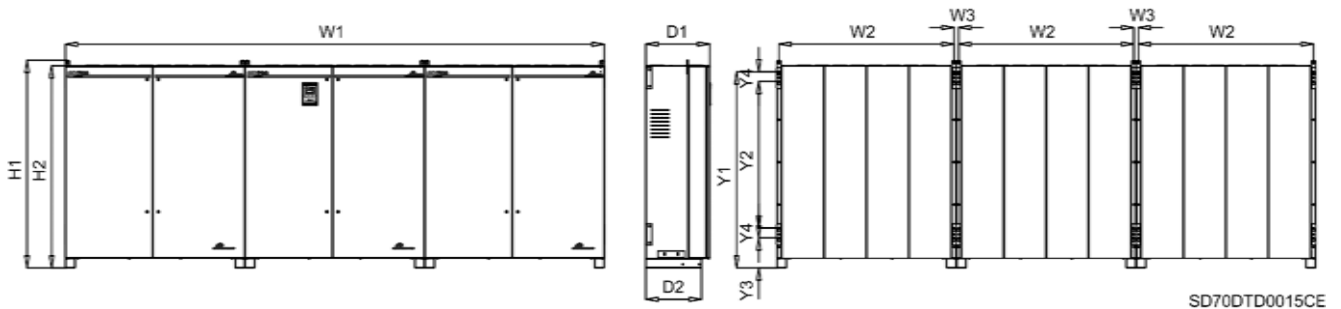


Figure 10.11 Dimensions of Frame 11

11.MAINTENANCE

SD700 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.

11.1. Warnings

- Be sure to remove the input power while performing maintenance.
- Be sure to perform maintenance after checking the DC Link capacitor has discharged. Check that the voltage between terminals +HVDC and -HVDC is below DC 30V. The bus capacitors in the drive 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. Others voltage meters, including digital voltage meters, are likely to display incorrect values caused by the high frequency PWM output voltage of the drive.

11.2. Routine Inspection

Be sure to check the following points 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: -30 to +50 (or 40°C) Humidity: below 95% non-condensing.	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 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.

Inspection site	Inspection element	Inspection	Period			Inspection method	Criterion	Instrument of Measurement
			Monthly	1 year	2 years			
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 capacity.
	Input Inductances	Is there any liquid leak? Is there any overheated point?		o		Visual check. Measure the surface and connectors' temperature.	No anomaly. Check that the temperature is homogeneous and below 70°C	Infrared thermometer.
	Contactors	Is there any contactor chatter? 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 8V difference for 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? Has any unusual smell been perceived?	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: Long life of the main components above indicated are based on a continuous operation for the stipulated load. These conditions can change according to the environment conditions.

12. OPTIONAL EQUIPMENT

12.1. Accessories

CODE	DESCRIPTION
SD7PD	Profibus Communication Board.
SD7ET	Ethernet Communication Board.
SD7DN	DeviceNet Communication Board.
SD7CO	CAN Open Communication Board.
- *	N2 Metasys Communication Gateway.
SD7EC	Encoder Board. It allows connecting up to 2 differential Encoders (one of them for the user and the other one for vector control) working from 5 to 24VDC, according to the requirements.
SD7IO	Inputs / Outputs Expansion Board. It allows increasing the number of inputs and outputs of the drive. It includes: <ul style="list-style-type: none"> • 4 Programmable Digital Inputs optically isolated • 1 Programmable Analogue Input • 5 Digital Outputs (Relays) • 1 Programmable Analogue Output
SD7FO	Fibre Optic Board. It allows to communicate trough fiber optics multiple drive in a master slave configuration.
SD7STO	Safe Torque Off (STO) board. Allows implementing in the drive the safe torque off function according to IEC 61800-5-2 (SIL1 or SIL3).
SD7ES01E	External 24V_{DC} Power Supply. For Frames 1, 2 and 3 of SD700. Exterior Assembly. Requires SD7EBI
SD7ES04I	External 24V_{DC} Power Supply. For Frame 4 of SD700. Interior Assembly.
SD7ES05I	External 24V_{DC} Power Supply. For Frame 5 of SD700. Interior Assembly.
SD7ES06I	External 24V_{DC} Power Supply. For Frames 6, 7, 9 and 10 of SD700. Interior Assembly.
SD7ES08I	External 24V_{DC} Power Supply. For Frame 8 and 11 of SD700. Interior Assembly.
SD7TD	Touch-Graphic Display. (For further information, see section '12.5 Touch-Graphic Display').
V11	Kit 3 meters Extender for Display.
V12	Kit 5 meters Extender for Display.
GSM01	GSM Module. (For Touch-Graphic Display option).
B150	Dynamic Braking Unit. (For further information, see section '12.4 Dynamic Braking Unit B150').
SD7DB	Optional Board for Slave Mode Brake. (For Dynamic Braking Unit B150 option).

* Consult availability with Power Electronics.

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12.2. Extension Box

FRAME	CODE	Dimensions (mm)		
		W	H	D
1	SD7EB1	189	122	161
2	SD7EB2	295	122	161
3	SD7EB3	300	151	168

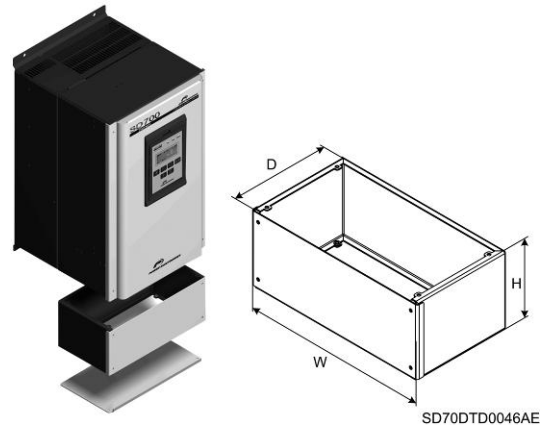


Figure 12.1 Dimensions for Extension Box

12.3. Plinths

FRAME	CODE	Dimensions (mm)			Total Drive Height (mm)
		W	H	D	
4	SD7PL0417	320	464	438.5	1712
5	SD7PL0520	431	413.5	529	2000
	SD7PL0522	431	613.5	529	2200
6	SD7PL0620	786	413.5	529	2000
	SD7PL0622	786	613.5	529	2200
7	SD7PL0720	1132	413.5	529	2000
	SD7PL0722	1132	613.5	529	2200
8	SD7PL0820	1482	413.5	529	2000
	SD7PL0822	1482	613.5	529	2200
9	SD7PL0920	3 x SD7PL0620			2000
	SD7PL0922	3 x SD7PL0622			2200
10	SD7PL1020	3 x SD7PL0720			2000
	SD7PL1022	3 x SD7PL0722			2200
11	SD7PL1120	3 x SD7PL0820			2000
	SD7PL1122	3 x SD7PL0822			2200

Code Explanation: SD7PL0520

SD7	PL05	20
SD700 Series	Plinth for Frame 5	Total Height 2000mm

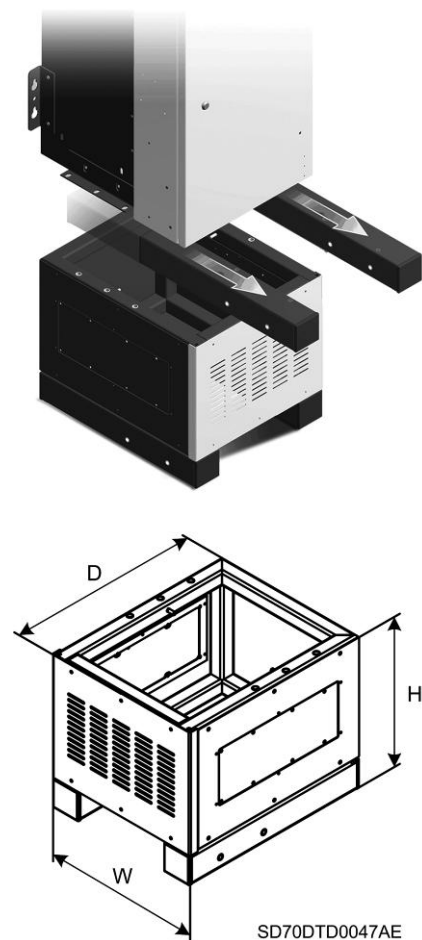


Figure 12.2 Dimensions for Plinths

12.4. Dynamic Braking Unit B150

The Dynamic brake permits to control the regenerated energy for series SD700, SD700KOMPAKT and SD700FL. B150 dynamic brake activates an IGBT to discharge the DC bus over external resistors when the DC voltage overpasses a pre-set value. This activation signal could also be delivered by the drive acquiring an optional Master- Slave mode braking board.

The B150, with reduced dimensions and high reliability, is the main power-switching device of such a dynamic braking systems.

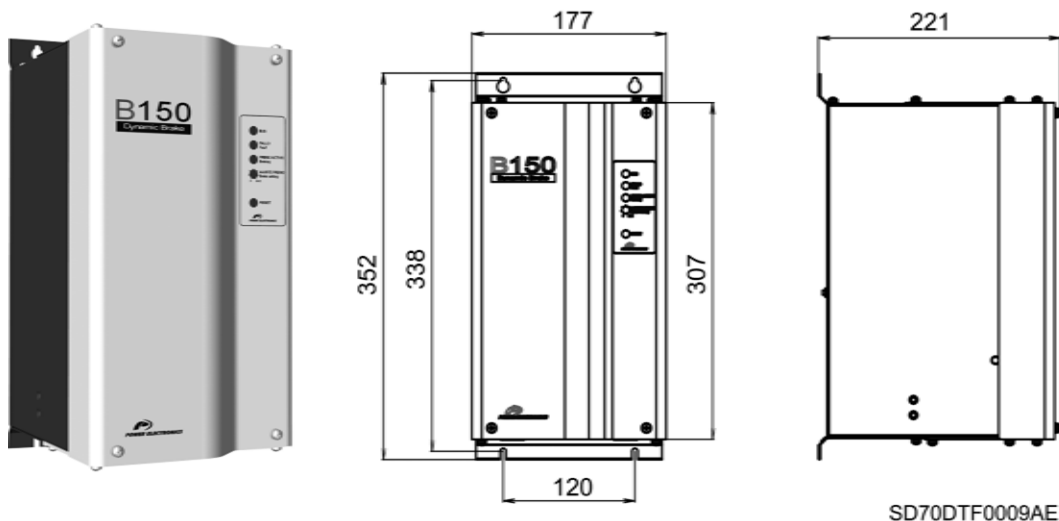
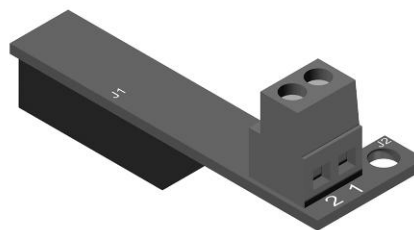


Figure 12.3 Dynamic Braking Unit. Dimensions [mm]

REFERENCE	VOLTAGE	CURRENT (A)		MINIMUM RESISTANCE RATING (Ω)	DIMENSIONS (MM)			WEIGHT
		MAXIMUM	CONTINUOUS		W	D	H	
B150.2	230Vac	300A	150A	2.4 Ω	177	221	352	7 kg
B150	400Vac, 500Vac	300A	150A	2.4 Ω				
B150.6	690Vac	200A	100A	5.75 Ω				

12.4.1. Optional Board for Slave Mode Brake

There is the possibility for the drive to control the activation of the dynamic braking module B150. In this way, the optional board SD7DB must be used to allow the drive to control the dynamic braking unit B150 that will operate as slave unit of the drive. This optional board is not required in case of the unit B150 operates in master mode.



SD70ITF0006BE

Figure 12.4 Optional Board for Slave Mode Brake (SD7DB)

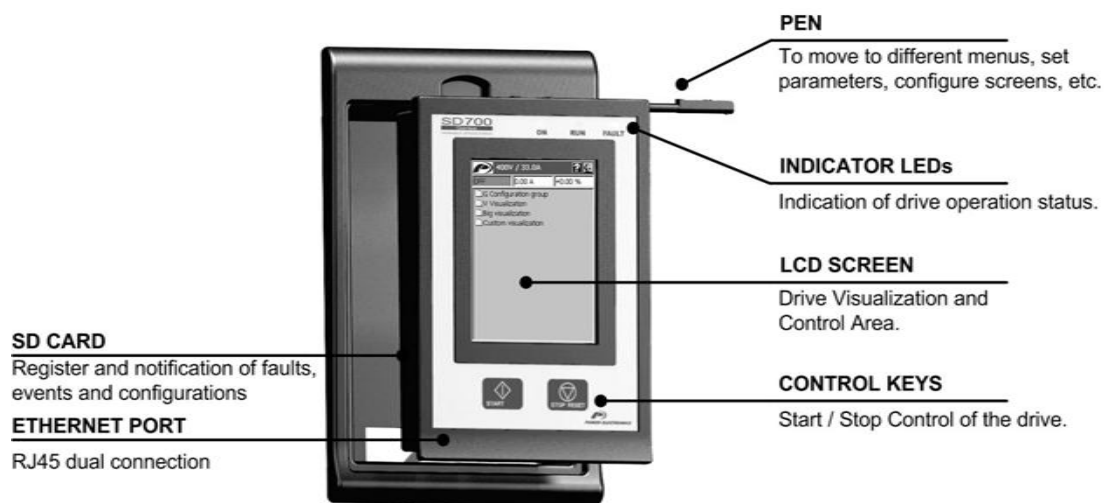
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12.5. Touch-Graphic Display

The Touch-Graphic Display provides a much more intuitive data presentation, an easy navigation through the control parameters and allows saving thousands of customized configurations defined by the user. Some of the outstanding characteristics of the graphic display are:

- TFT-LCD Touch screen of 3,5 inches and 240x320 pixels
- Customized visualization by the user
- GSM and GPRS communication (SMS Service)
- System help built-in
- Fault Register (Logs)
- Language selection
- 4 Gbytes Micro SD for data history storage.
- Built in Quad band GSM Modem for sending SMS with Consultations or Notifications (Events, Alarms...)
- Dual Ethernet Connection –LAN RJ45 and USB connection.
- Possibility of external or battery 5Vdc power supply.

The Touch-Graphic display for the SD700 is a removable display unit for its remote installation, as the following figure shows:



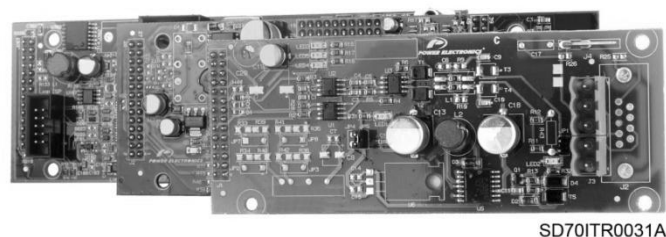
SD70ITC0025CI

Figure 12.5 Touch-Graphic Display Unit

There are three indicator leds integrated on the display that supply information about the drive operational status. In addition, there are a LCD screen of 3.5" and two control keys to Start / Stop the drive.

12.6. Communication boards

SD700 family is compatible with the most commonly used communication protocols (Profibus-DP, DeviceNet, Modbus TCP, Ethernet IP, N2 Metasys, CAN Open...), thanks to its optional boards.



SD70ITR0031A

Figure 12.6 Example of Profibus optional board

13.CE MARKING

The CE Marking is a system to identify equipment that complies with the relevant directives (EMC directive). CE marking guarantees the free movement of the product within the EEA. CE marking shows that the product complies with technical safety, compatibility issues and conformity assessment.

13.1. EMC Directive

The EMC Directive defines the requirements for immunity and emissions of electrical equipment used within the European Union. SD700 Series drives are in accordance with the directive IEC 61800-3:2004 about adjustable speed electrical power drive systems.

13.2. Low Voltage Directive

The low voltage directive defines the security requirements of low voltage electrical equipment in order to circulate freely within the European Economic Area. SD700 Series drives are in accordance with the directive IEC 61800-5-1:2007 about adjustable speed electrical power drive systems.

DECLARATION OF CONFORMITY CE

The Company:

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

Declares under its own responsibility, that the product:

Variable Speed Drive for A.C. motors

Brand: Power Electronics
Model name: SD700 Series

Is in conformity with the following European Directives:

References	Title
2006/95/CE	Electrical Material intended to be used with certain limits of voltage
2004/108/CE	Electromagnetic Compatibility
*2006/42/CE	Machinery directive

*Models with optional STO card installed

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

References	Title
EN 61800-5-1:2007	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy (IEC 61800-5-1:2007);

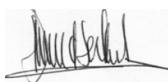
References of the harmonized technical norms applied under the Electromagnetic Compatibility Directive:

References	Title
IEC 61800-3:2004	Adjustable speed electrical power drive systems. Part 3: EMC requirements and specific test methods.

References of the harmonized technical norms applied under the Machinery Directive:

References	Title
IEC 61800-5-2:2007	Adjustable speed electrical power drive systems. Part 5-2: Safety requirements - Functional

Paterna, October 5th 2012



David Salvo
Executive Director



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