

**SD750K**

# **HARDWARE AND INSTALLATION MANUAL**



LOW VOLTAGE VARIABLE SPEED DRIVE



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## **Hardware and Installation Manual**

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# ABOUT THIS MANUAL

## PURPOSE

This manual contains important instructions for the installation, configuration and use of Power Electronics SD750 Kompakt variable speed drives.

Power Electronics reserves the right to modify product features.

## TARGET AUDIENCE

This manual is intended for qualified customers who will install, configure and operate Power Electronics SD750 Kompakt variable speed drives.

Only qualified technical personnel validated by Power Electronics may install and start up the drives.

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## REFERENCE MANUALS

The following reference documents are available for this equipment:

- SD750 Kompakt Hardware and Installation Manual.
- Pumps Application Manual.

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**REVISIONS CONTROL**

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<b>DATE (DD/MM/YYYY)</b>	<b>REVISION</b>	<b>DESCRIPTION</b>
13 / 08 / 2021	A	First edition.
13 / 06 / 2022	B	Acronyms. Configuration table & standard ratings. Dimensions. Power connection. Control connection. Modbus communication. Commissioning. Inductances. Accessories. Misprints correction.

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The equipment and technical documentation are periodically updated. Power Electronics reserves the right to modify all or part of the contents of this manual without previous notice. To consult the most updated information of this product, you may access our website [www.power-electronics.com](http://www.power-electronics.com), where the latest version of this manual can be downloaded. The reproduction or distribution of the present manual is strictly forbidden, unless express authorization from Power Electronics.

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# ACRONYMS

The terms commonly used in the documentation of Power Electronics' products are listed in the table below.

Please notice this is a general series of terms and it encompasses all our product divisions (industrial, solar, storage, and electric mobility), thus, some of the following expressions may not apply to this particular manual.

ACRONYM	MEANING
AASS	Auxiliary Services
AC	Alternating Current
AI	Analogue Input
AO	Analogue Output
BESS	Battery Energy Storage System
BMS	Battery Manager Solution
CCID	Charge circuit interrupting device
CCL	Charge Current Limit.
CCS	Combined charging system – charging and communications protocol following the standard IEC 61851-23 Annex CC
CHAdeMO	Charging and communications protocol following the standard IEC 61851-23 Annex AA
CPU	Central Processing Unit
DC	Direct Current
DCL	Discharge Current Limit
DI	Digital Input
DSP	Digital Signal Processor
DO	Digital Output
EMS	Energy Management System
EV	Electric Vehicle
FPGA	Programmable device (Field-Programmable Gate Array)
FRU	Field Replaceable Unit
GFDI	Ground Fault Detector Interrupter
GPRS	General Packet Radio Services, a data transmission system
HVAC	Heating, Ventilation, and Air Conditioning
IGBT	Insulated Gate Bipolar Transistor
IMI	Insulation monitoring device
IT	Grid system where the power supply is kept isolated and the electrical equipment system is grounded.
LOTO	Lock Out – Tag Out
MCB	Miniature Circuit Breaker
MCCB	Moulded Case Circuit Breaker
MPCS	Multi Power Conversion System
MID	Measuring Instrument Directive
MV	Medium Voltage. This term is used to refer to high voltage in general
PE	Ground connection
PI	Proportional and Integral
POI	Point Of Interconnection
PPE	Personal Protection Equipment
PV	Photovoltaic energy

<b>ACRONYM</b>	<b>MEANING</b>
RCD	Residual Current Device
RCM	Residual Current Monitor
RFID	Radio Frequency Identification
SOC	State Of Charge – referred to battery
SOH	State Of Health – referred to battery. It compares the actual state of the battery to its initial conditions. It is measured in percentage
STO	Safe Torque Off
TN	Grid system where the power supply is grounded, and the electrical equipment system is brought to the same ground through the neutral connector.
TT	Grid system where both the power supply and the electrical devices are connected to the ground via separate connections
UPS	Uninterruptible Power Supply
VSD / VFD	Variable Speed Drive, Variable Frequency Drive. Both terms are used

# SAFETY SYMBOLS

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

In this manual, safety messages are classified as follows:



## WARNING

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

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



## CAUTION

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

Read the message and follow the instructions carefully.



## NOTICE

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

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Other symbols used in this manual for safety messages are the following:



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



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



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



Caution, risk of hearing damage. Wear hearing protection.

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# SAFETY INSTRUCTIONS

## IMPORTANT!

Read carefully all documentation before manipulating the equipment and pay special attention to safety recommendations to maximize the performance of this product and to ensure its safe use and installation.

It is the installer's responsibility to follow the instructions provided on this manual, to follow good electrical practices and to identify all mentioned warnings and recommendations before starting up and operating the SD750 Kompakt.



## WARNING

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

Otherwise, you may get an electric shock.

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**Do not run the drive with the front cover removed.**

Otherwise, you may get an electric shock.

---

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

If you do not remove the power supply, you may get an electric shock.

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**Do not remove the cover except for periodic inspections or wiring, even if the input power is not applied.**

Otherwise, you get an electric shock.

---

**Operate the drive with dry hands.**

Otherwise, you may get an electric shock.

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

Otherwise, you may get an electric shock.

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**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 while the drive is connected.**

---

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## WARNING



10 min

Both wiring and periodic inspections must be carried out at least 10 minutes after disconnecting the input power. To remove the front cover, make sure that the red "DC Link" LED is off. Then remove the metal cover from the terminals and check the following with a multimeter:

- Voltage between the output busbars U, V, W, and the cabinet is around 0V.
- Voltage between the terminals + HVDC, -HVDC and the cabinet is below 30VDC.

If you omit this recommendation, you may get an electric shock.



Even though multimeters have their own revisions Schedule, it is convenient to verify it works properly, specially to check voltage absence. It could be damaged and show incorrect values. Use a 1.5V battery to verify proper functioning.



## CAUTION

**Install the drive on a non-flammable surface. Do not place flammable material nearby.**

Otherwise, a fire could occur.



**Disconnect the input power if the drive is damaged.**

Otherwise, it could result in a secondary accident or fire.

**Do not allow lint, paper, wood chips, dust, metallic chips, or other foreign matter into the drive.**

Otherwise, a fire or accident could occur.



**After stopping the drive, some of its parts will stay warm for a while. Wait for the drive to cool down for handling.**

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 allowed to weld the cabinet or structure;** this could damage the sensitive electronic components inside the cabinet or structure.



## NOTICE

---

### RECEPTION

SD750 Kompakt drives are delivered tested and perfectly packed.

In the event of damage during transport, please ensure to notify the transport agency and POWER ELECTRONICS: 902 40 20 70 (International +34 96 136 65 57) or your nearest agent, within 24h from receiving the goods.

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### 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.

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### RECYCLING

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



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

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

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

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

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

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### ELECTROMAGNETIC COMPATIBILITY (EMC)

The drive is intended to be used in industrial environment (Second Environment). It achieves compliance with category C3 defined in IEC/EN 61800-3 standard when the installation recommendations within this manual are followed. The driver can optionally operate in domestic environments (First Environment), complying with category C2 defined in IEC / EN 61800-3 standard. For category C1 consult Power Electronics. Optional IT filter.

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

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### CAPACITORS DEPLETION

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

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**SAFETY**

- Before operating the drive, read this manual thoroughly to gain an understanding of the unit. If any doubt exists, please contact POWER ELECTRONICS, (902 40 20 70 / +34 96 136 65 57) or your nearest agent.
  - Wear safety glasses when operating the drive with power applied or for when 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 clearance distances.
  - Do not drop the drive or subject it to impact.
  - The SD750 Kompakt drives contain static sensitive printed circuits boards. Use anti-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 a 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, the external ground fault protection threshold value should be adjusted ad hoc.
  - Do not disconnect motor cables if the input power supply remains connected.
  - The internal circuits of the SD750 Kompakt 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.
  - Do not connect the drive in grids whose THDv is higher than 8%.
- 

**COMMISSIONING**

- 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 the levels indicated in this manual. Otherwise, damage to the drive may occur.
  - For correct starting, refer to the start-up section.
- 

**HANDLING PRECAUTIONS**

- When the "Automatic Restart" function is selected, observe the appropriate safety measures to avoid any damage in case of sudden restart of the motor after an emergency and subsequent reset.
  - The "STOP / RESET" key on the driver's own keypad will be operative as long as this option has been selected. By pressing this button, the drive will not perform an emergency stop. The driver has a STO function which, installed with an external EMERGENCY pushbutton, will disconnect the motor power supply and prevent the ability to generate torque in the motor.
  - If an alarm is reset without having lost the reference signal (setpoint), an automatic start may occur. Check that the system has not been configured as such. Failure to do so could result in personal injury.
  - Do not modify anything inside the driver without the supervision of Power Electronics.
  - Before starting the parameter setting, reset all parameters.
-

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**EARTH CONNECTION**

- Ground the drive and adjoining cabinets to ensure a safe 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, nor chassis screw for grounding.
  - Ground the drive chassis through the labelled terminals. Use appropriate conductors to comply with 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) is equal or greater than the active conductor (U, V, W).
  - If the user decides to use screened motor cable, ensure a good 360° connection of the cable screen in both the drive cabinet and the motor terminal box.
- 

**CYBER SECURITY DISCLAIMER**

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

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

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# TORQUE AND SCREW SIZING

The following table shows, broadly speaking, the recommended tightening torque for both mechanical and electrical connections, applicable to all cabinets <sup>[1, 2]</sup>:

SCREW SIZE		RECOMMENDED TORQUE			
METRIC (mm)	ENGLISH (inches)	DIN (Nm)		ASTM (ft*lb)	
		6,9 QUALITY <sup>[a]</sup>	8,8 QUALITY <sup>[a]</sup>	A449 TYPE 1 <sup>[a]</sup>	A325 TYPE 1 <sup>[a]</sup>
M3	1/8	1	1,3	-	
M4	5/32	2,5	3		
M5	3/16	4	6		
M6	1/4	5	8	4	-
M8	5/16	20	20	9	
M10	7/16	40	40	25	
M12	1/2	60	60	38	50 – 58
M14	9/16	100	120	54	-
M16	5/8	150	210	75	99 – 120

[a] For other qualities, follow the screw's manufacturer guidelines.



## CAUTION

For all screwing that hold a **particular component** such as a bus, contactor, etc. it will be necessary to **apply the tightening torque indicated by the manufacturer** of the same component.

Screwing should be tightened correctly only when necessary, i.e. when the factory marks are not in place. For small screws that do not have marks, the good electrical praxis will determine if it is loose.

<sup>1</sup> Power Electronics recommends the use of **Zinc Steel quality 8.8 bolts for internal connections** in general, DC and earth connections included.

<sup>2</sup> Power Electronics recommends the use of **A2-70 stainless bolts for external connections** in general, AC connections included.

# 1. INTRODUCTION

1

The SD750 Kompakt series with a power density up to 800kW/m<sup>3</sup> is the suitable solution when space saving is necessary. The drive keeps the advanced SD750 family features reducing up to 2.5 times the size. This series is available from 132kW to 800kW with a voltage range from 380 – 480 Vac, 525 Vac, 600 – 690 Vac. The customer, following Power Electronics' recommendations, will easily install the components in a dedicated cabinet or technical room.

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## 2.CONFIGURATION TABLE & STANDARD RATINGS



### Configuration table

To consult the configuration table of SD750 Kompakt drives manufactured by Power Electronics, please refer to the latest brochure (visit <http://www.power-electronics.com>).

### Standard ratings

Voltages in the standard ratings shown in the following tables are the three-phase input voltages for the drive.

#### 400Vac

FRAME	CODE	OPERATION TEMPERATURE 40 °C NORMAL DUTY			OPERATION TEMPERATURE 50 °C HEAVY DUTY			OVERLOAD (A)
		Motor Power (kW)	Motor Power (hp)	I(A) Rated	Motor Power (kW)	Motor Power (hp)	I(A) Rated	
1	SD75K0260 5BCDE	132	200	260	110	150	210	315
	SD75K0320 5BCDE	160	250	320	132	200	250	375
	SD75K0340 5BCDE	200	270	340	150	220	275	413
2	SD75K0400 5BCDE	220	300	400	160	250	330	495
	SD75K0450 5BCDE	250	350	450	200	270	370	555
	SD75K0570 5BCDE	315	400	570	250	350	460	690
3	SD75K0700 5BCDE	400	550	700	315	450	580	870
	SD75K0800 5BCDE	450	650	800	355	500	650	975
	SD75K0900 5BCDE	500	700	900	400	550	720	1080
4	SD75K1050 5BCDE	560	800	1050	450	700	840	1260
	SD75K1140 5BCDE	630	900	1140	500	750	925	1388
	SD75K1230 5BCDE	710	940	1230	560	800	990	1485
> 4	SD75K1400 5BCDE	800	1000	1400	630	900	1150	1725
	SD75K1550 5BCDE	900	1250	1550	710	1000	1260	1890
	SD75K1800 5BCDE	1000	1400	1800	800	1150	1440	2160
	SD75K1950 5BCDE	1100	1500	1950	900	1250	1580	2370
	SD75K2250 5BCDE	1200	1750	2250	1000	1450	1800	2700
	SD75K2750 5BCDE	1500	2200	2750	1200	1750	2200	3300
	SD75K3100 5BCDE	1750	2450	3100	1400	2000	2500	3750

## 440Vac

FRAME	CODE	OPERATION TEMPERATURE 40 °C NORMAL DUTY			OPERATION TEMPERATURE 50 °C HEAVY DUTY			OVERLOAD (A)
		Motor Power (kW)	Motor Power (hp)	I(A) Rated	Motor Power (kW)	Motor Power (hp)	I(A) Rated	
1	SD75K0260 5BCDE	132	200	236	110	150	191	286
	SD75K0320 5BCDE	160	250	291	132	200	227	341
	SD75K0400 5BCDE	220	300	364	160	250	300	450
2	SD75K0450 5BCDE	250	350	409	220	300	336	505
	SD75K0570 5BCDE	315	400	518	250	350	418	627
	SD75K0700 5BCDE	400	550	636	315	450	527	791
3	SD75K0800 5BCDE	450	650	727	355	500	591	886
	SD75K0900 5BCDE	500	700	818	400	550	655	982
	SD75K1050 5BCDE	560	800	955	450	700	764	1145
4	SD75K1140 5BCDE	630	900	1036	500	750	841	1262
	SD75K1400 5BCDE	800	1000	1273	630	900	1045	1568
> 4	SD75K1550 5BCDE	900	1250	1409	710	1000	1145	1718
	SD75K1800 5BCDE	1000	1400	1636	800	1150	1309	1964
	SD75K1950 5BCDE	1100	1500	1773	900	1250	1436	2155
	SD75K2250 5BCDE	1200	1750	2045	1000	1450	1636	2455
	SD75K2750 5BCDE	1500	2200	2500	1200	1750	2000	3000
	SD75K3100 5BCDE	1750	2450	2818	1400	2000	2273	3409

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## 480Vac

FRAME	CODE	OPERATION TEMPERATURE 40 °C NORMAL DUTY			OPERATION TEMPERATURE 50 °C HEAVY DUTY			OVERLOAD (A)
		Motor Power (kW)	Motor Power (hp)	I(A) Rated	Motor Power (kW)	Motor Power (hp)	I(A) Rated	
1	SD75K0260 5BCDE	132	200	217	110	150	175	263
	SD75K0320 5BCDE	160	250	267	132	200	208	313
	SD75K0400 5BCDE	220	300	333	160	250	275	413
2	SD75K0450 5BCDE	250	350	375	220	300	308	463
	SD75K0570 5BCDE	315	400	475	250	350	383	575
	SD75K0700 5BCDE	400	550	583	315	450	483	725
3	SD75K0800 5BCDE	450	650	667	355	500	542	813
	SD75K0900 5BCDE	500	700	750	400	550	600	900
	SD75K1050 5BCDE	560	800	875	450	700	700	1050
4	SD75K1140 5BCDE	630	900	950	500	750	771	1157
	SD75K1400 5BCDE	800	1000	1167	630	900	958	1438
> 4	SD75K1550 5BCDE	900	1250	1292	710	1000	1050	1575
	SD75K1800 5BCDE	1000	1400	1500	800	1150	1200	1800
	SD75K1950 5BCDE	1100	1500	1625	900	1250	1371	1975
	SD75K2250 5BCDE	1200	1750	1875	1000	1450	1500	2250
	SD75K2750 5BCDE	1500	2200	2292	1200	1750	1833	2750
	SD75K3100 5BCDE	1750	2450	2583	1400	2000	2083	3125

**525Vac**

FRAME	CODE	OPERATION TEMPERATURE 40 °C NORMAL DUTY			OPERATION TEMPERATURE 50 °C HEAVY DUTY			OVERLOAD (A)
		Motor Power (kW)	Motor Power (hp)	I(A) Rated	Motor Power (kW)	Motor Power (hp)	I(A) Rated	
1	SD75K0160 7BCDE	110	150	160	90	125	130	195
	SD75K0180 7BCDE	132	180	180	110	150	150	225
	SD75K0210 7BCDE	150	200	210	132	180	170	255
2	SD75K0250 7BCDE	185	250	250	150	200	210	315
	SD75K0310 7BCDE	220	300	310	185	250	260	390
	SD75K0400 7BCDE	280	400	400	220	300	320	480
3	SD75K0480 7BCDE	355	450	480	280	400	385	578
	SD75K0570 7BCDE	400	550	570	355	450	460	690
4	SD75K0680 7BCDE	500	650	680	400	550	550	825
	SD75K0825 7BCDE	560	800	825	500	650	660	990
> 4	SD75K0930 7BCDE	630	900	930	560	800	750	1125
	SD75K1050 7BCDE	710	1000	1050	630	900	840	1260
	SD75K1200 7BCDE	900	1200	1200	710	1000	950	1425
	SD75K1400 7BCDE	1000	1400	1400	900	1200	1140	1710
	SD75K1550 7BCDE	1100	1500	1550	1000	1400	1270	1905
	SD75K1750 7BCDE	1250	1700	1750	1100	1500	1420	2130
	SD75K1850 7BCDE	1400	1800	1850	1250	1700	1500	2250
	SD75K2200 7BCDE	1600	2100	2200	1400	1800	1800	2700
	SD75K2500 7BCDE	1800	2400	2500	1600	2100	2000	3000

**600Vac**

FRAME	CODE	OPERATION TEMPERATURE 40 °C NORMAL DUTY			OPERATION TEMPERATURE 50 °C HEAVY DUTY			OVERLOAD (A)
		Motor Power (kW)	Motor Power (hp)	I(A) Rated	Motor Power (kW)	Motor Power (hp)	I(A) Rated	
1	SD75K0160 6BCDE	132	180	160	110	150	130	195
	SD75K0180 6BCDE	150	200	180	132	180	150	225
	SD75K0210 6BCDE	180	250	210	150	200	170	255
2	SD75K0250 6BCDE	220	300	250	180	250	210	315
	SD75K0310 6BCDE	250	350	310	220	300	260	390
	SD75K0400 6BCDE	355	450	400	250	350	320	480
3	SD75K0480 6BCDE	400	550	480	355	450	385	578
	SD75K0570 6BCDE	500	650	570	400	550	460	690
4	SD75K0680 6BCDE	560	800	680	500	650	550	825
	SD75K0825 6BCDE	710	950	825	560	800	660	990
> 4	SD75K0930 6BCDE	800	1100	930	710	950	750	1125
	SD75K1050 6BCDE	900	1250	1050	800	1100	840	1260
	SD75K1200 6BCDE	1000	1400	1200	900	1250	950	1425
	SD75K1400 6BCDE	1200	1600	1400	1000	1400	1140	1710
	SD75K1550 6BCDE	1300	1700	1550	1200	1600	1270	1905
	SD75K1750 6BCDE	1500	2000	1750	1300	1700	1420	2130
	SD75K1850 6BCDE	1600	2200	1850	1500	2000	1500	2250
	SD75K2200 6BCDE	1900	2500	2200	1600	2200	1800	2700
	SD75K2500 6BCDE	2200	2900	2500	1900	2500	2000	3000

**690Vac**

FRAME	CODE	OPERATION TEMPERATURE 40 °C NORMAL DUTY			OPERATION TEMPERATURE 50 °C HEAVY DUTY			OVERLOAD (A)
		Motor Power (kW)	Motor Power (hp)	I(A) Rated	Motor Power (kW)	Motor Power (hp)	I(A) Rated	
1	SD75K0160 6BCDE	132	200	160	110	150	130	195
	SD75K0180 6BCDE	160	250	180	132	200	150	225
	SD75K0210 6BCDE	200	300	210	160	250	170	255
2	SD75K0250 6BCDE	250	350	250	200	300	210	315
	SD75K0310 6BCDE	315	400	310	250	350	260	390
	SD75K0400 6BCDE	355	450	400	315	400	320	480
3	SD75K0480 6BCDE	450	600	480	355	450	385	578
	SD75K0570 6BCDE	500	670	570	450	600	460	690
4	SD75K0680 6BCDE	630	900	680	500	670	550	825
	SD75K0825 6BCDE	800	1000	825	630	900	660	990
> 4	SD75K0930 6BCDE	900	1200	930	800	1000	750	1125
	SD75K1050 6BCDE	1000	1400	1050	900	1200	840	1260
	SD75K1200 6BCDE	1200	1600	1200	1000	1400	950	1425
	SD75K1400 6BCDE	1400	1800	1400	1200	1600	1140	1710
	SD75K1550 6BCDE	1500	2000	1550	1400	1800	1270	1905
	SD75K1750 6BCDE	1700	2200	1750	1500	2000	1420	2130
	SD75K1850 6BCDE	1800	2400	1850	1700	2200	1500	2250
	SD75K2200 6BCDE	2100	2750	2200	1800	2400	1800	2700
	SD75K2500 6BCDE	2200	3000	2500	2100	2750	2000	3000

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### 3. TECHNICAL CHARACTERISTICS

# 3

<b>INPUT</b>	Power range <sup>[1]</sup>	110 kW – 2200 kW
	Voltage range	380 – 480 Vac ( $\pm 10\%$ ), 525 (-5/+10%), 600 - 690 Vac (-5/+10%)
	Input frequency	50 Hz / 60 Hz ( $\pm 6\%$ )
	Input rectifier technology	Diode-Diode F1-F2/Thyristor-Diode F3-F11 (multipulse available <sup>[1]</sup> )
	Displacement power factor (DPF = $\cos \varphi$ )	$\geq 0.98$
	Power factor (PF = $I_1/I_{rms} \cdot \cos \varphi$ )	$\geq 0.91$
	Momentary power loss	> 2 s (depending on the load inertia)
	EMC input filter	Second environment (Industrial): C3 Standard First environment (Domestic): C2 (Optional). C1 consult Power Electronics Optional IT filter
	Harmonics filter	3 %
	Current THD (%)	< 40 %
	Regenerative	No
	<b>OUTPUT</b>	Output frequency <sup>[2]</sup>
Overload capacity		Constant torque/heavy duty: 150 % during 60 s at 50°C Variable torque/normal duty: 120 % during 60 s at 40°C
Efficiency (at full load)		$\geq 98$ %
		V/Hz
Control method		VECTOR CONTROL Open Loop: PMC speed / torque control, AVC: speed / torque control Close Loop (Encoder): PMC speed / torque control, AVC: speed / torque control PMSM I/f, Sensorless and HEPOL (High Efficiency Performance Open Loop)
Carrier frequency		4 a 8 kHz – PEWave
Output dV/dt filter		500 to 800 V/ $\mu$ s
Output cable length <sup>[3]</sup>		USC 300 m, SC 150 m
Dynamic brake		External B150 Dynamic Brake (Frames 1 and 2 integrated)
Operation ambient temperature		Minimum: -20 °C    Maximum: +50 °C (Heavy duty) Minimum: -20 °C    Maximum: +40 °C (Normal duty)
Storage temperature	Minimum: -40 °C    Maximum: +70 °C	
Altitude	1000 m	
<b>ENVIRONMENTAL CONDITIONS</b>	Power altitude derating <sup>[1]</sup>	>1000 m, 1% P <sub>N</sub> (kW) per 100 m; 4000 m maximum (consult Power Electronics for higher altitudes).
	Ambient humidity	<95%, non-condensing
	Degree of protection	IP00, IP20, Marine series adapted (IP44/IP54, under request)
	Vibration	Amplitude: $\pm 1$ mm (2 Hz-13.2 Hz), $\pm 0.075$ mm (13.2 Hz-57 Hz) Acceleration: 6.86 m/s <sup>2</sup> (13.2 Hz-57 Hz), 9.8 m/s <sup>2</sup> (57 Hz-150 Hz)
	Heating resistors	Optional
	<b>PROTECTIONS</b>	Motor protections
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] Consult availability with Power Electronics.

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

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

[4] Certification in process.

<b>HARDWARE</b>	Digital inputs	6 programmable, Active high (24 Vdc). Isolated power supply.
	Digital outputs	3 programmable changeover relays (250 Vac, 8 A or 30 Vdc, 8 A).
	Analogue input	3 programmable differential inputs: 0 – 20 mA, 4 – 20 mA, 0 – 10 Vdc and $\pm 10$ Vdc, PT100 (optically isolated).
	Analogue outputs	1 isolated programmable output: 0 – 20 mA, 4 – 20 mA, 0 – 10 Vdc and $\pm 10$ Vdc.
	Encoder inputs (optional)	2 differential encoder inputs. Voltage inputs from 5 to 24 Vdc.
	User power supply	+24 Vdc user power supply (Max 180 mA) regulated and short-circuit protected. +10 Vdc user power supply (Max 2 potentiometers R= 1 k $\Omega$ ) regulated and short-circuit protected.
	I/O Extension board (optional)	Digital I/O board: 5 Digital Inputs: Programmable inputs and active high (24 Vdc). Optically isolated. 5 Digital Outputs: Programmable multi-function relays. Analogue I/O board: 2 Analogue Inputs: Programmable and differential input. 2 Analogue Outputs: Programmable outputs in voltage / current.
	External power supply (optional)	24 V External Power Supply integrated
	SD card	Port for an external SD Card. Data logging, events registration
	<b>COMMUNICATION</b>	Standard hardware
Optional hardware		Optical fiber Communication Cards
Standard protocol		Modbus-RTU Ethernet (Modbus TCP)
Optional protocol		Profibus-DP Ethernet IP ProfiNet
Type		Removable
Length		3 meters (optional)
<b>CONTROL PANEL</b>	Connection	USB
	Visualization leds	LED RUN: Motor receiving power supply LED FAULT: Flashing displays that a fault has occurred
	LCD display	LCD screen Keypad with 8 keys to control and configure the drive, start and stop / reset Independent memory
	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
	Others	Real time clock Perpetual calendar 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 outputs value Motor overload and equipment status Drive and rectifier temperature Fault history (last 6 faults)

<b>REGULATIONS</b>	Certifications	CE, cTick, UL <sup>[4]</sup> , cUL <sup>[4]</sup> , Marine certifications (under request)
	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
		IEC60068-2-6 – Vibration
Functional safety	IEC/EN 61800-5-2 Safety Stop (STO)	

# 4. DIMENSIONS

# 4



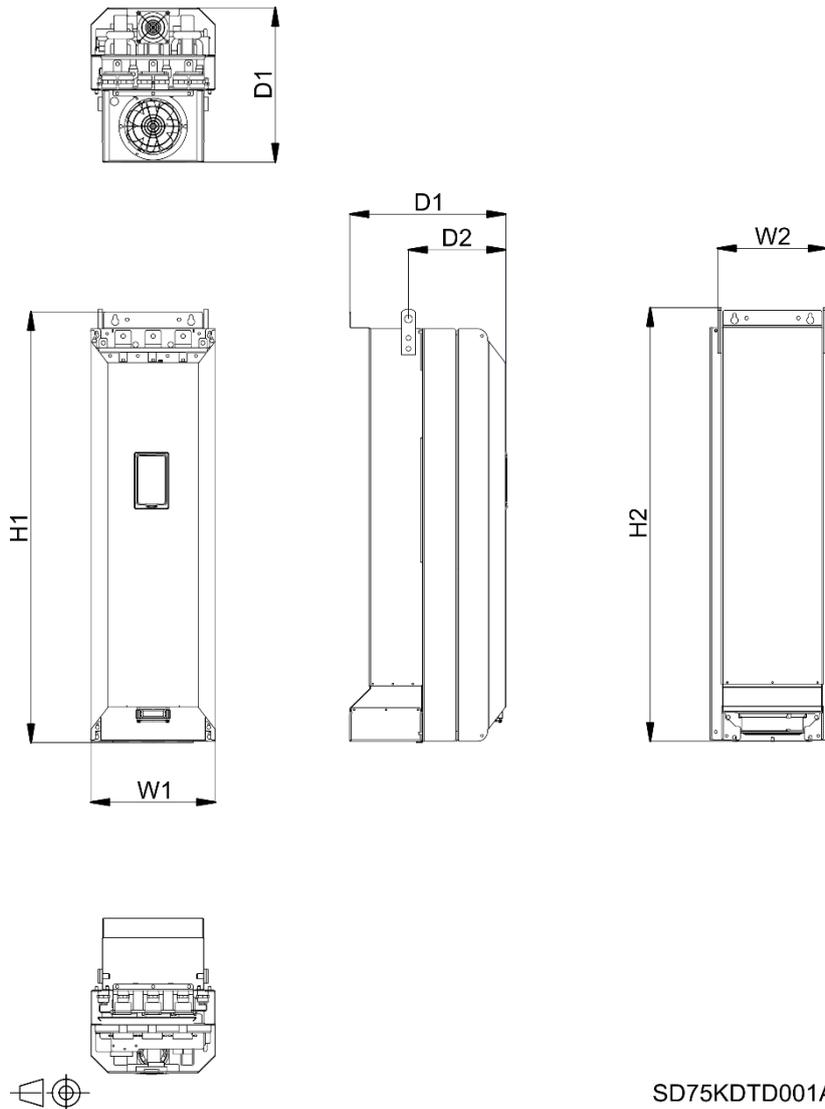
## NOTICE

Consult drives input supply voltage in section "Technical characteristics".

## IP00

### Frame 1

DIMENSIONS (mm)						WEIGHT (Kg)
W1	W2	D1	D2	H1	H2	
312.3	275	390.5	243.7	1088.5	1095.3	78.2

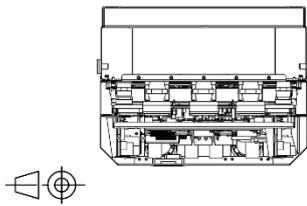
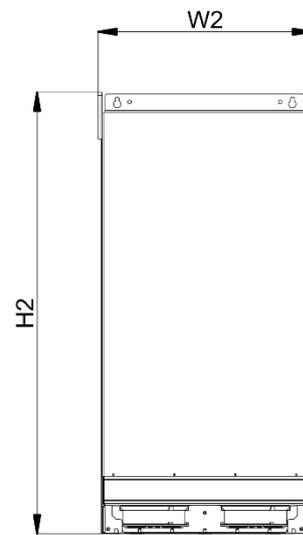
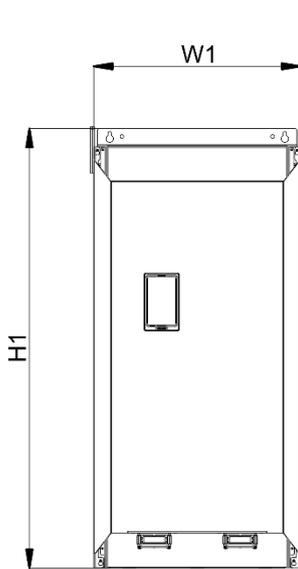
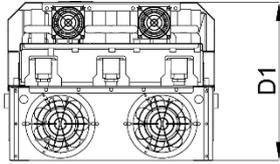


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**Frame 2**

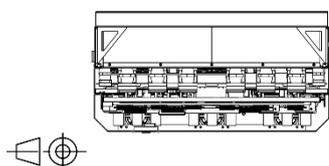
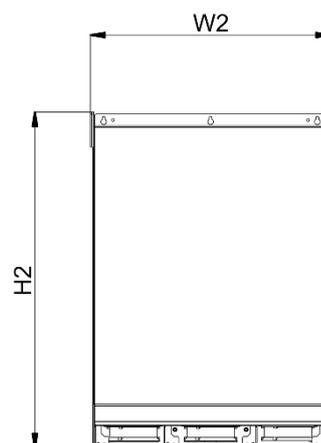
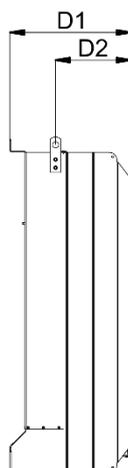
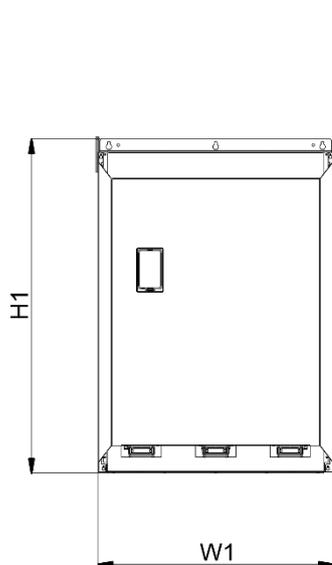
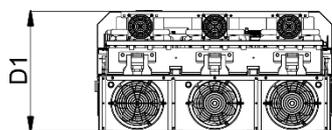
DIMENSIONS (mm)						WEIGHT (Kg)
W1	W2	D1	D2	H1	H2	
509	525	391.5	244.5	1088.8	1093	148



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### Frame 3

DIMENSIONS (mm)						WEIGHT (Kg)
W1	W2	D1	D2	H1	H2	
759	775	391	244	1088.9	1095.3	200

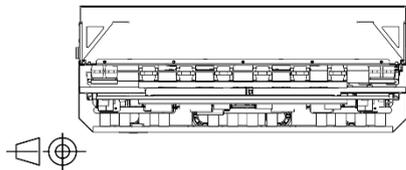
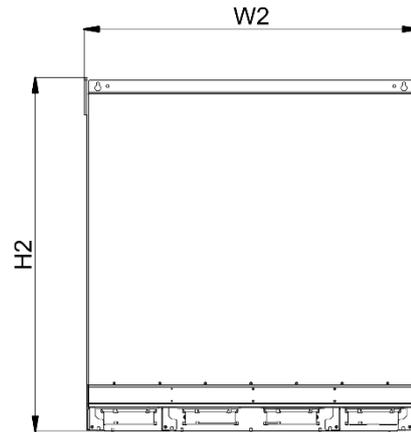
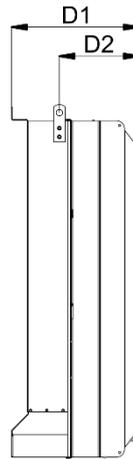
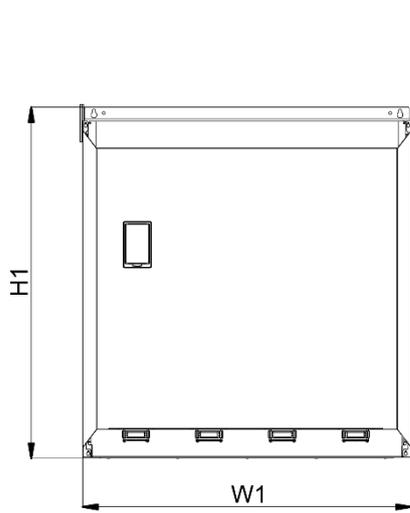
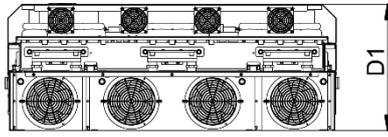


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### Frame 4

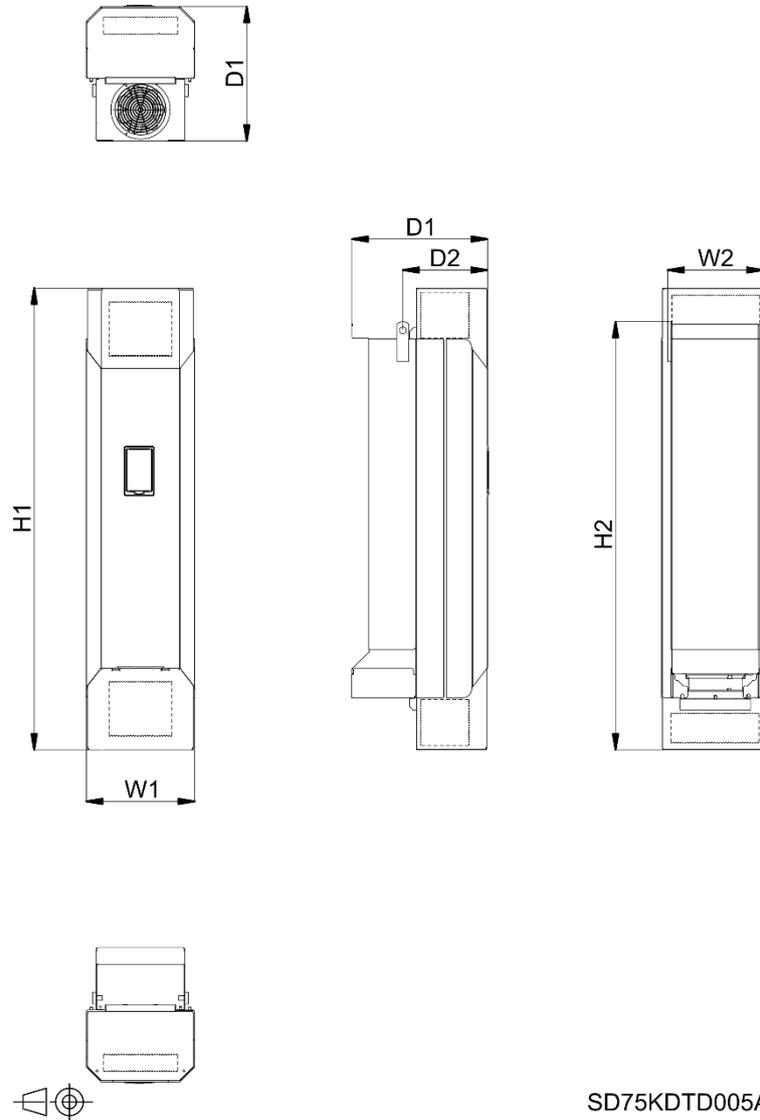
DIMENSIONS (mm)						WEIGHT (Kg)
W1	W2	D1	D2	H1	H2	
1009	1025	391	244.5	1087.5	1095.4	280



SD75KDTD004A

**IP20****Frame 1**

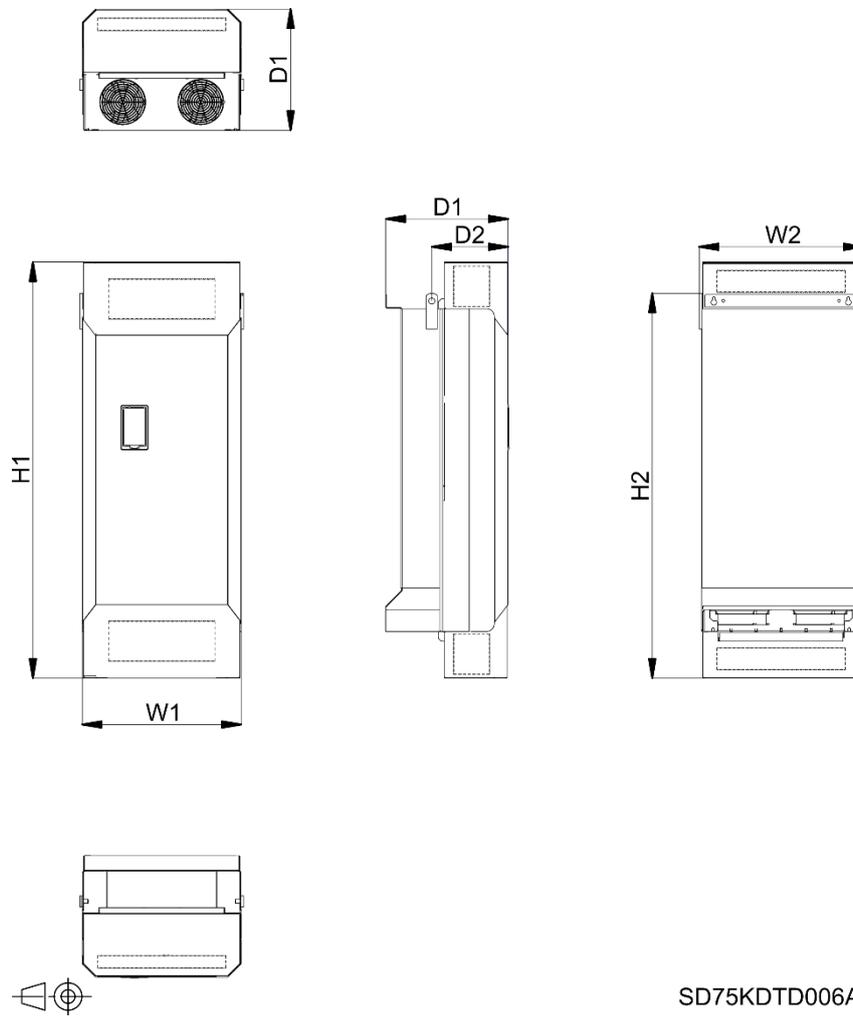
DIMENSIONS (mm)						WEIGHT (Kg)
W1	W2	D1	D2	H1	H2	
312.3	275	390.5	243.7	1340.3	1242.7	85.5



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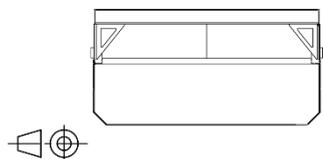
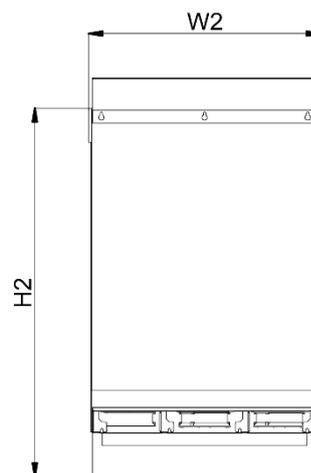
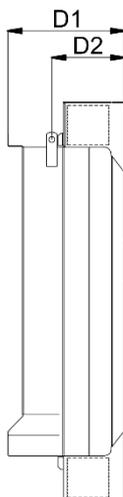
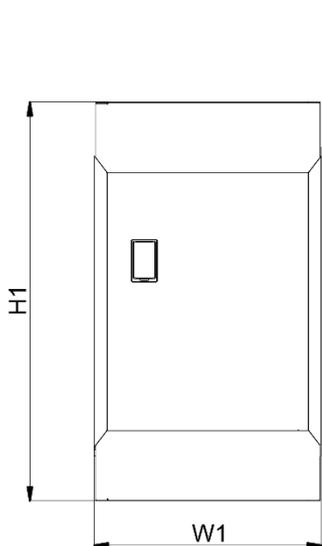
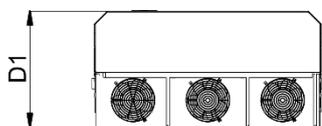
### Frame 2

DIMENSIONS (mm)						WEIGHT (Kg)
W1	W2	D1	D2	H1	H2	
509	525	391.5	244.5	1342.7	1242.1	159



### Frame 3

DIMENSIONS (mm)						WEIGHT (Kg)
W1	W2	D1	D2	H1	H2	
759	775	391	244	1344	1242.7	215.3

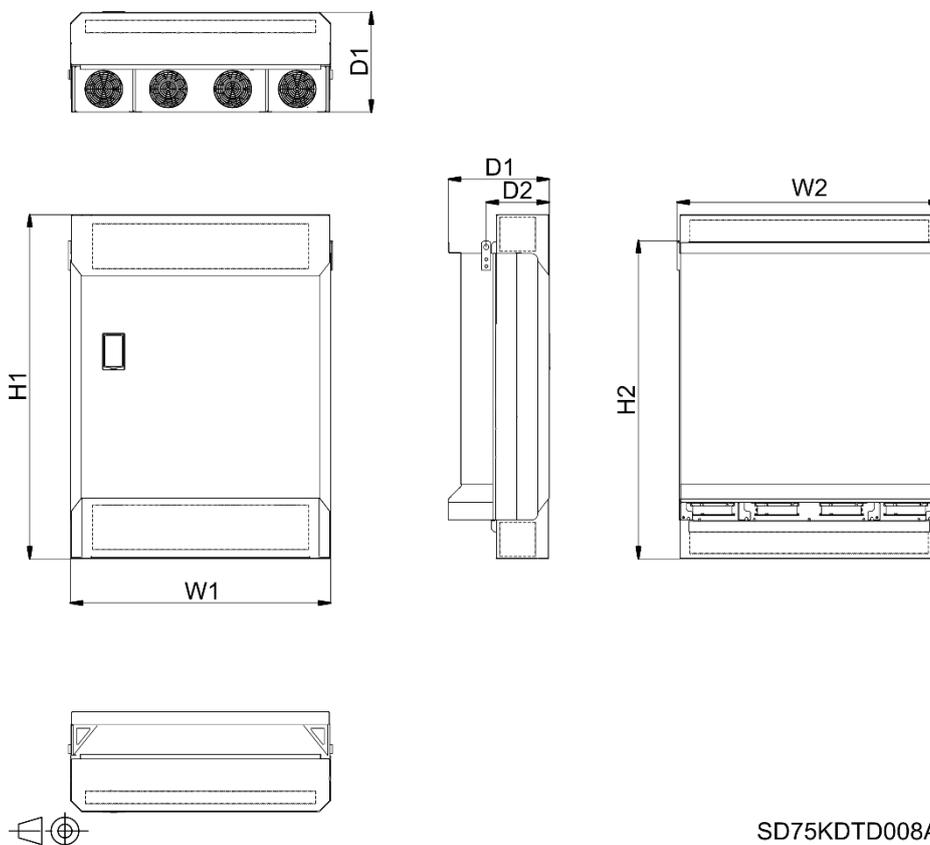


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## Frame 4

DIMENSIONS (mm)						WEIGHT (Kg)
W1	W2	D1	D2	H1	H2	
1009	1025	391	244.5	1344	1242.8	299.7



## Frames 5 to 9 and multipulse equipment

Multipulse equipment and frames 5 to 9 of SD750 Kompakt are made up of several modules of smaller frames, depending on the power required by the customer. Therefore, the overall dimensions of the equipment will vary according to the number of modules and their size.

The possible combinations of the equipment depending on the voltage and number of pulses are listed below. Additionally, the total width is shown for each case.

### 400Vac – 480Vac (6 pulses)

FRAME	CODE	COMBINATION	BASE MODEL CODE (INDIVIDUAL EQUIPMENT)	TOTAL WIDTH (W)
5	SD75K1400 50CD	2xT3	SD75K08005x	1550
	SD75K1550 50CD	2xT3	SD75K09005x	1550
6	SD75K1800 50CD	2xT4	SD75K10505x	2050
	SD75K1950 50CD	2xT4	SD75K11405x	2050
7	SD75K2250 50CD	3xT3	SD75K09005x	2325
8	SD75K2750 50CD	3xT4	SD75K10505x	3075
	SD75K3100 50CD	3xT4	SD75K12305x	3075

**400Vac – 480Vac (12 pulses)**

FRAME	CODE	COMBINATION	BASE MODEL CODE (INDIVIDUAL EQUIPMENT)	TOTAL WIDTH (W)
2	SD75K0450 50CD	2xT1	SD75K026050	624.6
	SD75K0570 50CD	2xT1	SD75K032050	624.6
3	SD75K0700 50CD	2xT2	SD75K040050	1050
	SD75K0900 50CD	2xT2	SD75K05705x	1050

**400Vac – 480Vac (18 pulses)**

FRAME	CODE	COMBINATION	BASE MODEL CODE (INDIVIDUAL EQUIPMENT)	TOTAL WIDTH (W)
3	SD75K0900 50CD	3xT2	SD75K040050	1575
4	SD75K1140 50CD	3xT2	SD75K045050	1575
	SD75K1230 50CD	3xT2	SD75K045050	1575
5	SD75K1400 50CD	3xT2	SD75K057050	1575
6	SD75K1800 50CD	3xT3	SD75K070050	2325

**525Vac (6 pulses)**

FRAME	CODE	COMBINATION	BASE MODEL CODE (INDIVIDUAL EQUIPMENT)	TOTAL WIDTH (W)
5	SD75K0930 70CD	2 x T3	SD75K0570 7	1550
	SD75K1050 70CD	2 x T3	SD75K0570 7	1550
6	SD75K1200 70CD	2 x T4	SD75K0680 7	2050
	SD75K1400 70CD	2 x T4	SD75K0825 7	2050
7	SD75K1550 70CD	3 x T3	SD75K0570 7	2325
8	SD75K1750 70CD	3 x T4	SD75K0680 7	3075
	SD75K1850 70CD	3 x T4	SD75K0680 7	3075
	SD75K2200 70CD	3 x T4	SD75K0825 7	3075
9	SD75K2500 70CD	4 x T4	SD75K0680 7	4100

**600Vac – 690Vac (6 pulses)**

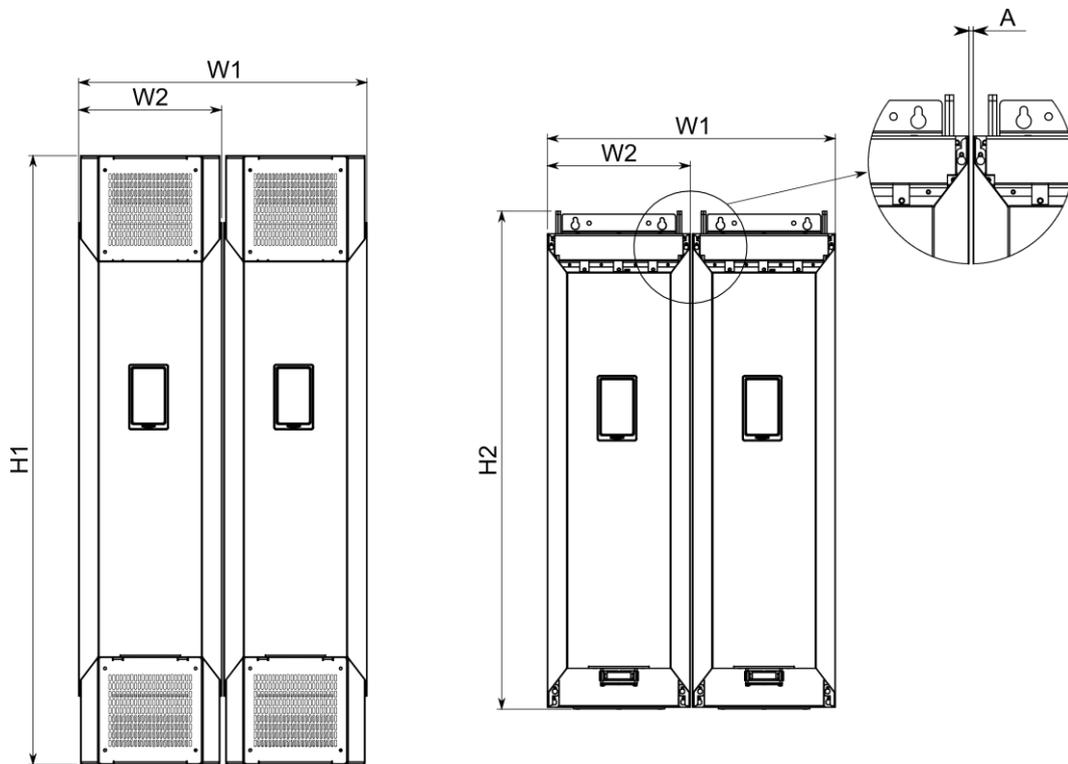
FRAME	CODE	COMBINATION	BASE MODEL CODE (INDIVIDUAL EQUIPMENT)	TOTAL WIDTH (W)
5	SD75K0930 60CD	2 x T3	SD75K0570 6	1550
	SD75K1050 60CD	2 x T3	SD75K0570 6	1550
6	SD75K1200 60CD	2 x T4	SD75K0680 6	2050
	SD75K1400 60CD	2 x T4	SD75K0825 6	2050
7	SD75K1550 60CD	3 x T3	SD75K0570 6	2325
8	SD75K1750 60CD	3 x T4	SD75K0680 6	3075
	SD75K1850 60CD	3 x T4	SD75K0680 6	3075
	SD75K2200 60CD	3 x T4	SD75K0825 6	3075
9	SD75K2500 60CD	4 x T4	SD75K0680 6	4100

Below are two configuration examples and their dimensions.

**Example 1**

SD750 Kompakt frame 2 composed of two modules of frame 1.

DIMENSIONS (mm)				
H1	H2	W1	W2	A
1340.31	1095.73	629.5	312	5

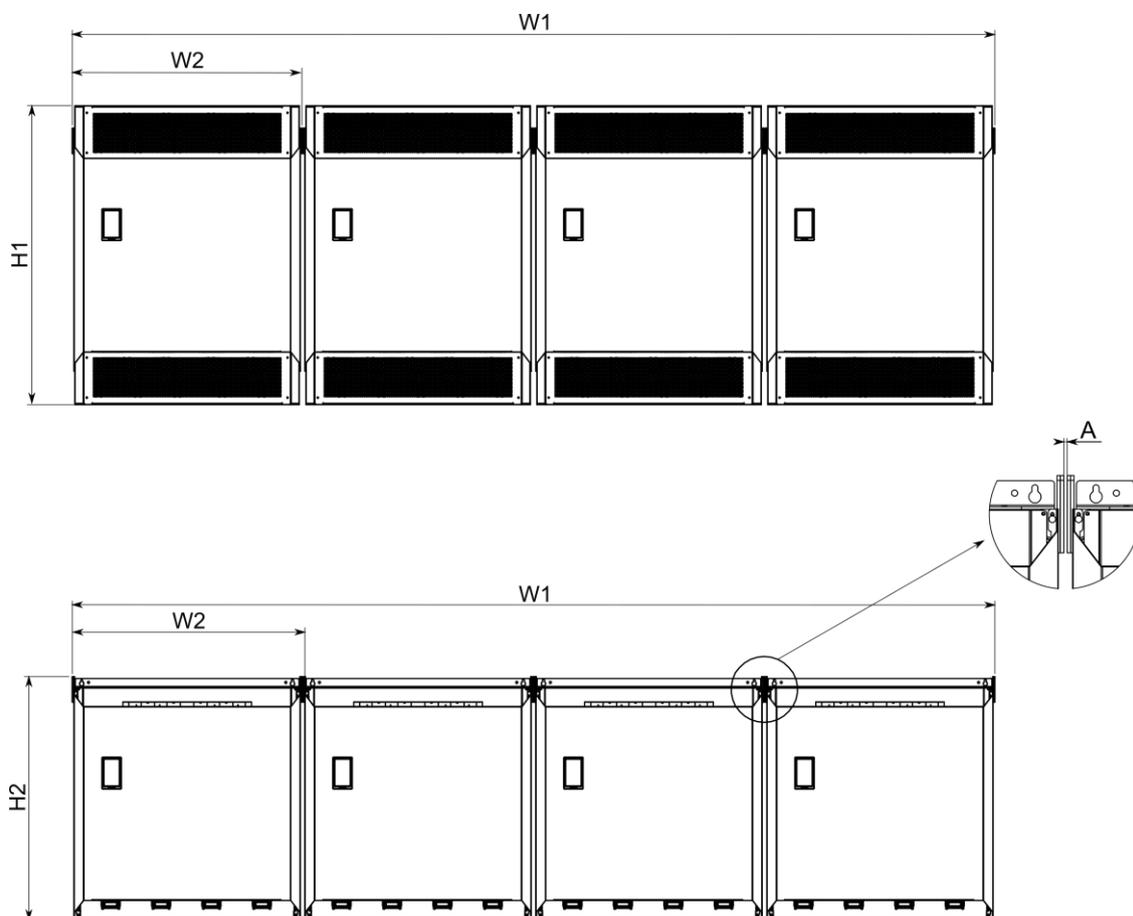


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**Example 2**

SD750 Kompakt frame 9 composed of four modules of frame 4.

DIMENSIONS (mm)				
H1	H2	W1	W2	A
1340.31	1095.73	629.5	312	5



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# 5. RECEPTION, HANDLING AND TRANSPORTATION

## 5



### CAUTION

**Read carefully the following installation instructions for a correct mechanical installation.**

Otherwise, the equipment can be damaged and lead to personal injury.

## Reception

Power Electronics' equipment are carefully tested and packed for shipment. In the event of damage to the unit during transportation notify the transport agency and Power Electronics: 902 40 20 70 (International +34 96 136 65 57) or your nearest agent, within 24h from receipt of the goods.

Make sure model and serial number of the drive match the information on the delivery packing list.

The drive should be stored in a location that is protected from direct sun and moisture excess. The storage temperature rating for the drive is  $-40^{\circ}\text{C}$  and  $+70^{\circ}\text{C}$ ,  $< 95$  RH without condensation. It is recommended not to stack more than two units.

## Standard storage

In case the equipment is stored for a short period (up to 6 months) before its connection, the following rules will keep the unit safe until it is ready for installation:

- The equipment should be stored in a location that is protected from moisture (inside and outside the equipment).
- Avoid floodable grounds. No part of the equipment should ever be submerged under water.
- Temperature in the storage location must be kept between  $-40^{\circ}\text{C}$  and  $+70^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  and  $+158^{\circ}\text{F}$ ).
- Store unit on a flat, even surface.
- Store unit away from high traffic areas where the drive could get damaged.
- Make sure animals cannot get inside the unit.
- Keep doors closed and covers in place during storage.
- Store unit away from corrosive chemical products or gases.
- Keep the equipment packed until the moment of installation.

## Extended storage

If the equipment is stored for an extended period (more than 6 months) before installation for an undefined date, new considerations should be taken, in addition to the recommendations in section "Standard storage".

- The drive must be stored in its original packaging.
- Draining bags shall be included inside the packaging to prevent moisture from damaging the equipment or its electronic components. These shall be replaced when storage conditions require it.
- Periodic inspections of the internal equipment status should be performed when possible. Proper internal cleanness must also be checked.
- To prevent deterioration of the capacitors, connect the equipment without load for 30-60 minutes once a year.
- Before commissioning, it is recommended to follow the instructions to connect power supply safely to the equipment. Please refer to document **VFIC001**.

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## 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.

SD750 Kompakt is delivered horizontally. The drives are delivered fastened to a wooden pallet, covered with a cardboard box in frame 1 or with a wooden box from frames 2. 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 carry the drive with a pallet truck, a forklift truck, or a crane, taking into account the load distribution and its center of gravity. Check the size and weight of the VFD to choose a proper equipment that can lift a higher weight.

Remove the drive packaging carefully (do not use sharp tools). After removing the packaging, please check the material inside. Verify that the number of items included in the package is in accordance with the inventory. In case of receiving spare parts with the product, please separate it and store it in a safe place. It should not be exposed to vibrations, falls or moisture.

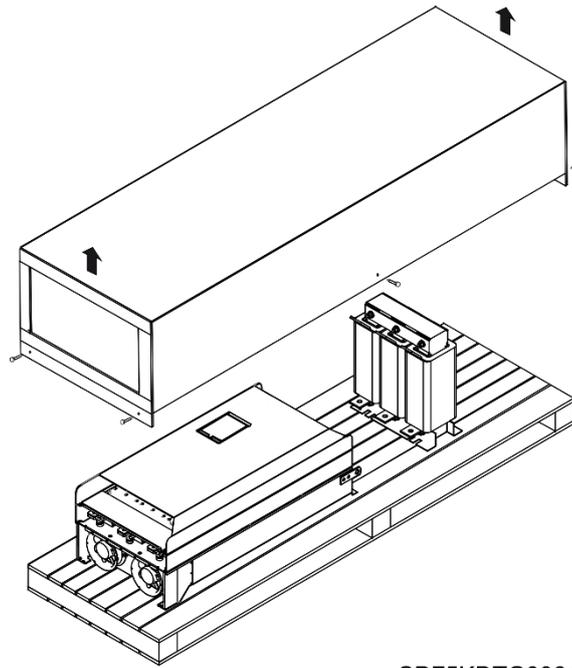


### CAUTION

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**If the weight of the load to be handled is greater than the maximum permissible weight of the crane, it could damage the equipment and personnel.**

---



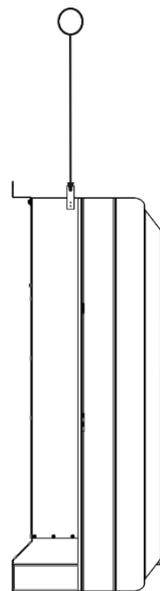
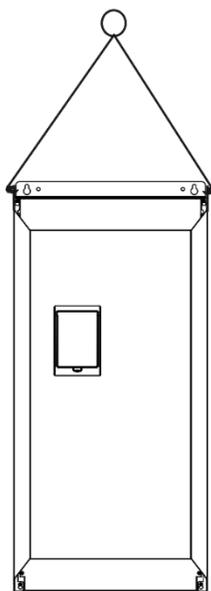
SD75KDTG006A

To unpack, if necessary, unscrew the screws that fix the cardboard or wooden box to the pallet. Then, unscrew the fixing screws on the angle brackets.

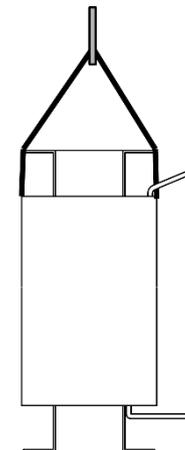
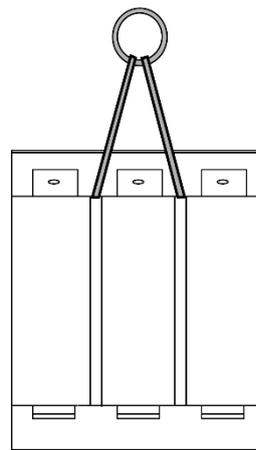
To rise to an upright position, use only a crane or forklift equipped with belts or slings. Lift it carefully pulling from the top eyebolts.

Avoid sudden movements and blows during transportation. When placing the equipment on the ground, stop the lowering movement just before contacting the ground, and after this, lower it very slowly to avoid shocks.

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°.



SD75KDTG001A



SD75KDTG001A

# 6. MECHANICAL INSTALLATION

## 6



### CAUTION

**The installation must be done by qualified personal.**

Otherwise, the equipment can be damaged and lead to personal injury.

**Before installation, make sure the location chosen is appropriate.** There should be sufficient space to adapt the unit to the recommended distances and to ensure that there are no obstacles preventing the airflow from the fans.

## Environmental ratings

Power Electronics recommends following the instructions in this manual carefully to ensure a correct operation of the drive. The installer is responsible for performing a proper indoor installation in order to comply with the ambient conditions of the VFD. In addition, the installer is solely responsible for complying with the local regulations. The environmental conditions are:

- Environmental category: Indoor
- Outdoor: No
- Pollution degree: Dirty area: PD3
- Ingress protection rating: IP00 for SD750 Kompakt cabinet and inductances  
IP20 with SD750 Kompakt housing
- Operation Ambient temperature: -20°C to 50°C Heavy duty  
-20°C to 40°C Normal duty
- Storage Ambient temperature: -40°C to 70°C
- Humidity: < 95% (non-condensing)
- Heating resistors: Optional
- Maximum altitude and power derating: 1000m 1% PN (kW) every 100m; 3000m maximum
- Vibration (IEC60068-2-6): Amplitude  $\pm 1\text{mm}$  (2Hz-13.2Hz),  $\pm 0.075\text{mm}$  (13.2Hz-57Hz)  
Acceleration  $6.86\text{m/s}^2$  (13.2Hz-57Hz),  $9.8\text{m/s}^2$  (57Hz-150Hz)
- Audible Noise: < 79Db
- Overvoltage category: III
- Protection class: Class 1
- Painting: Standard colour RAL 7035, other under request

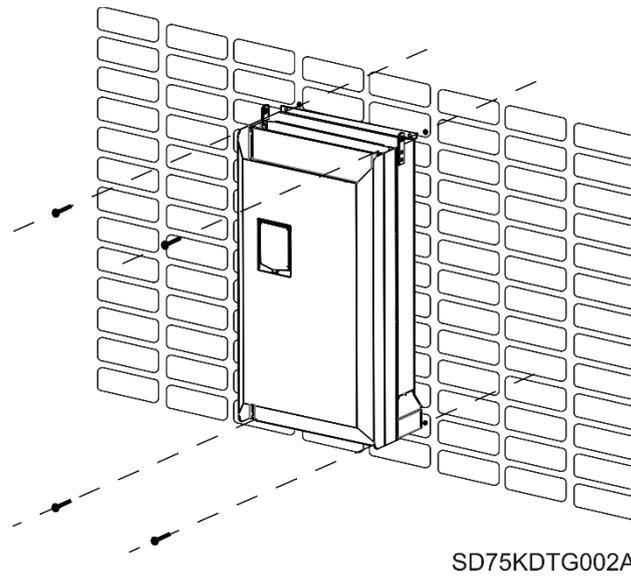
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## Drive mounting

This section contains assembly instructions for optimum operation of the drive and precautions to avoid personal injury and property damage.

SD750 Kompakt drives are designed to be mounted on the wall, specially in a technical room or inside a cabinet.

The installation method and mounting location must be suitable for the weight and dimensions of the drive. Power electronics recommend hanging the SD750 Kompakt 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.

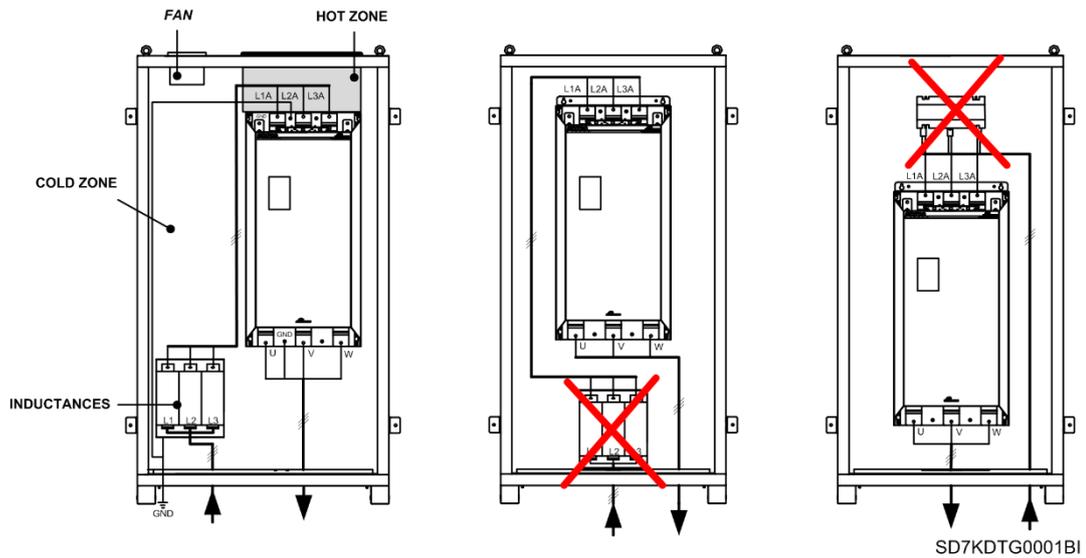


### Installation inside a cabinet

For cabinet installation, the drive will be mounted without extension box (IP20). Otherwise, the drive could have refrigeration problems. The drive should be mounted vertically. It should be well fastened through the anchorages to avoid any movement.

The input inductances (CHOKe) delivered with the drive must be mounted vertically aside the drive in front of the inlet fan to ensure a correct operation. They will never be installed aligned under or above the drive to avoid crossing the power cables or a cooling defect.

The maximum length of the cables between the inductances and the drive must be 3 m. It is recommended to install the display outside the cabinet and integrated on the door. This configuration will permit a safety drive operation and configuration.



The cabinet must have two isolated zones, which permit independent cooling systems:

- The Hot Zone consists of the back and top part of the drive, the air must be expelled out of the cabinet and should avoid the internal or external recirculation. The hot zone inlet grating must be aligned with the fan inlets of the drive. The inlet and outlet gratings for IP20, and the additional fans for IP54 cabinet must be designed according to the following tables.
- The cold zone consists of the Choke inductances, the electronics and connection terminals. The cold zone inlet fan must be in front of the inductances and the exhaust fan on the upper part of the cabinet. The inlet and outlet fans for IP20 or IP54 cabinet must be designed according to the following tables.

MINIMUM FLOW RATES IP20 & IP54

SD750 Kompakt Frame	Hot Zone Air Flow (m <sup>3</sup> /h)	Cold Zone Air Flow (m <sup>3</sup> /h)	
		Inlet fan	Exhaust fan
1	800	150	191
2	1600	200	227
3	2400	220	250
4	3200	250	300

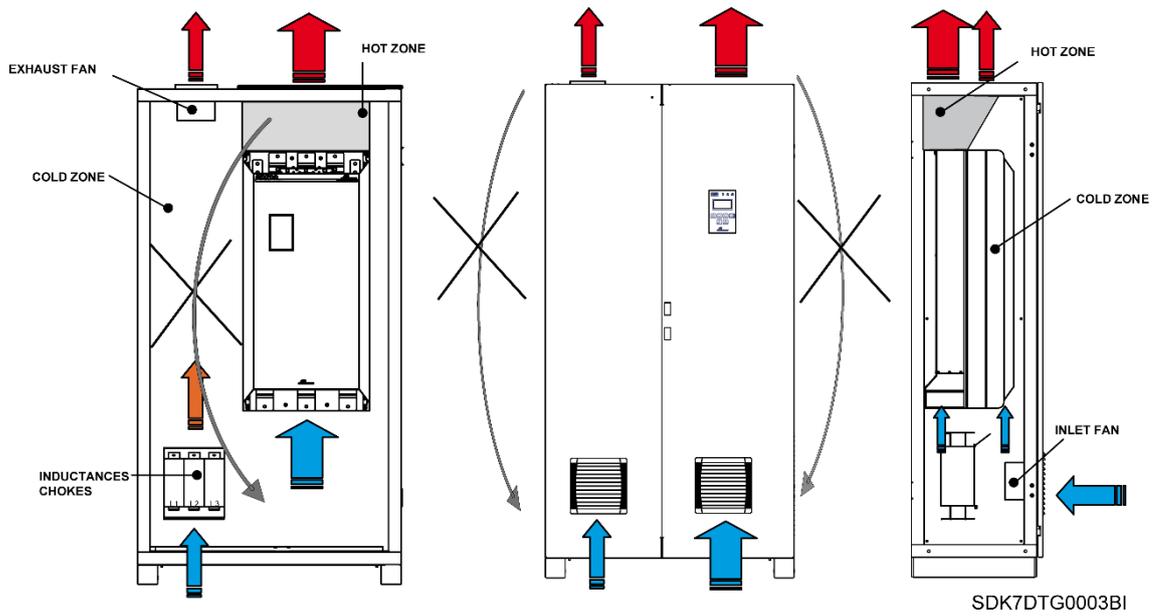
MINIMUM GRATINGS AREA IP20 & IP54

SD750 Kompakt Frame	Hot Zone		Cold Zone	
	Inlet grating (mm <sup>2</sup> )	Outlet grating (mm <sup>2</sup> )	Inlet grating (mm <sup>2</sup> )	Outlet grating (mm <sup>2</sup> )
1	25.500	92.500	12.000	18.000
2	40.000	172.500	20.000	28.000
3	63.000	252.500	30.000	45.000
4	90.000	332.500	42.000	62.500

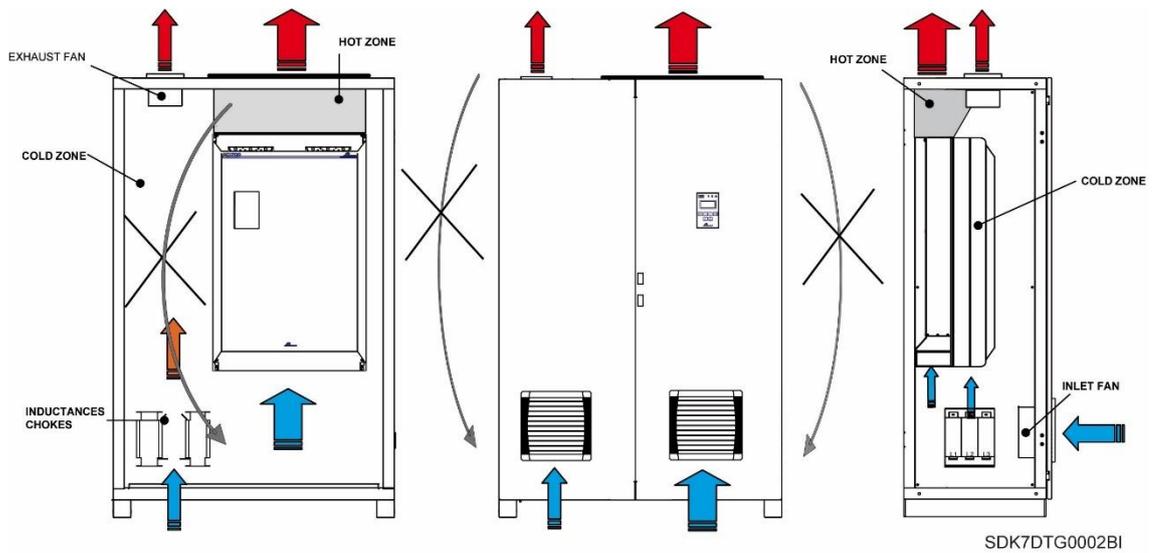


The following figures describe the SD750 Kompakt IP20 cabinet component distribution.

- Cooling air flow in frames 1 and 2:



- Cooling air flow in frames 3 and 4:



The IP54 cabinet must be equipped with the additional features:

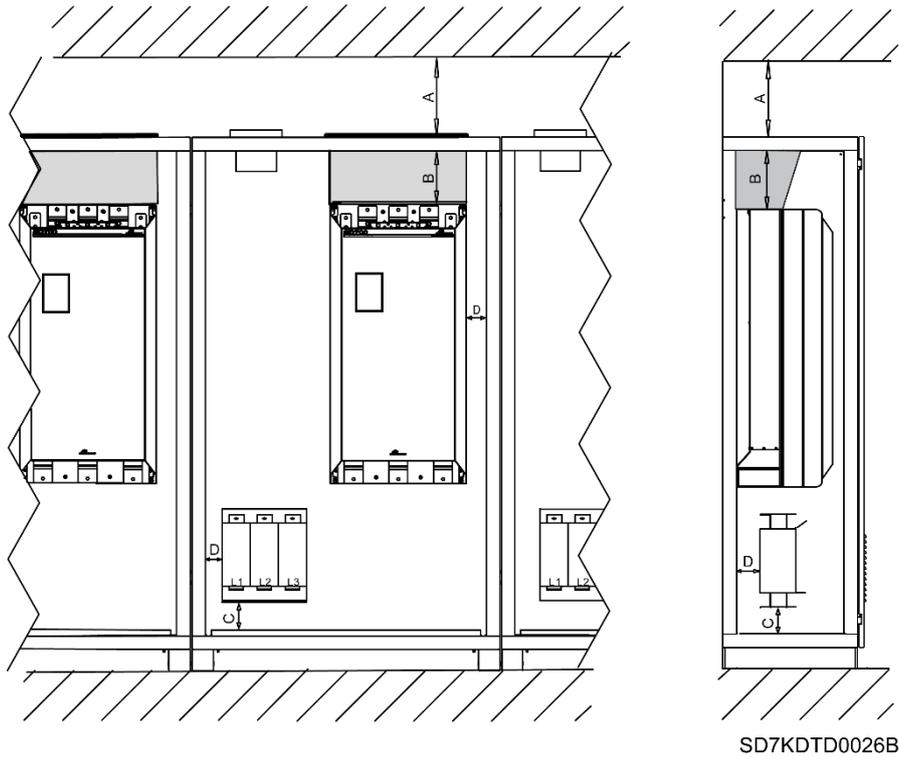
- Additional dust filters in all the inlet and outlet gratings.
- Additional IP54 exhaust fan for the hot zone.

Follow this requirements to ensure a correct maintenance and cooling of the cabinet:

- Minimum cabinet dimensions according to the following table.

SD750 KOMPAKT FRAME	MINIMUM CABINET SIZE (H / W / D) (mm)
1	2000x1000x500
2	2000x1000x500
3	2000x1500x600
4	2000x1800x600

- Minimum clearances between the inductances, the drive and de adjacent equipment. See following drawings.



MINIMUM CLEARANCES (mm)

A	B	C	D
400	350	150	100

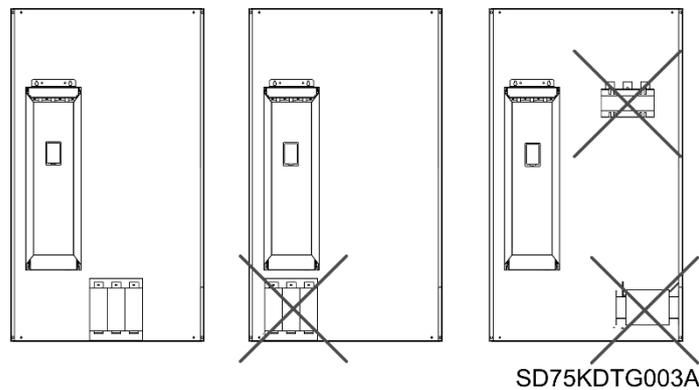
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### Installation in technical room

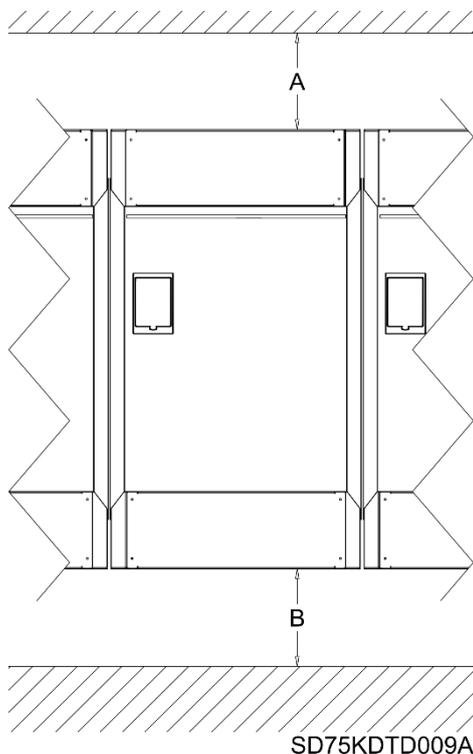
For technical room installation, the drive can be mounted with an extension box (IP20). The drive should be mounted vertically. It should be well fastened through the anchorages to avoid any movement. The input inductances (CHOKE) delivered with the drive must be mounted vertically aside the drive to ensure a correct operation. They will never be installed aligned under or above the drive to avoid crossing the power cables or a cooling defect. The maximum length of the cables between the chokes and the drive must be 3 m.

The inductance connection must be done with aluminum plates, with nickel-plated copper plates, or plain copper plates but using contact paste in order to prevent galvanic corrosion between copper and aluminum. The screw attachment of the connection plates and the inductance aluminum terminal must be protected from humidity by applying petroleum jelly on the screw thread, the washer and nut.

The following picture shows the correct position of the inductances:



The following picture shows the vertical clearances depending on the power range:



FRAME	POWER RANGE (kW)	CLEARANCE (mm)	
		A	B
1	110-150	145	145
2	160-250	190	145
3	315-400	290	240
4	450-630	390	240

## Tables of heat dissipation

Heat dissipation values have been obtained with a carrier frequency of 4 kHz. The heat sources inside the equipment correspond with the inverter bridge (IGBTs), rectifier bridge, the input filter and the output dV/dt filter. SD750 Kompakt 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 and the frame size.

### 400Vac

FRAME	CODE	OPERATION TEMPERATURE 40 °C NORMAL DUTY			OPERATION TEMPERATURE 50 °C HEAVY DUTY			OVERLOAD (A)
		I(A) Rated	Motor Power (kW)	Dissipated heat (W)	I(A) Rated	Motor Power (kW)	Dissipated heat (W)	
1	SD75K0260 5BCDE	260	132	2993,8	210	110	2494,8	315
	SD75K0320 5BCDE	320	160	4320	250	132	3564	375
	SD75K0340 5BCDE	340	200	5440	275	150	4080	413
2	SD75K0400 5BCDE	400	220	5720	330	160	4160	495
	SD75K0450 5BCDE	450	250	6625	370	200	5300	555
	SD75K0570 5BCDE	570	315	8473,5	460	250	6725	690
3	SD75K0700 5BCDE	700	400	10320	580	315	8127	870
	SD75K0800 5BCDE	800	450	11700	650	355	9230	975
	SD75K0900 5BCDE	900	500	13200	720	400	10560	1080
4	SD75K1050 5BCDE	1050	560	14504	840	450	11655	1260
	SD75K1140 5BCDE	1140	630	16443	925	500	13050	1388
	SD75K1230 5BCDE	1230	710	17600	990	560	13970	1485

### 690Vac

FRAME	CODE	OPERATION TEMPERATURE 40 °C NORMAL DUTY			OPERATION TEMPERATURE 50 °C HEAVY DUTY			OVERLOAD (A)
		I(A) Rated	Motor Power (kW)	Dissipated heat (W)	I(A) Rated	Motor Power (kW)	Dissipated heat (W)	
1	SD75K0160 6BCDE	160	132	3564	130	110	2970	195
	SD75K0180 6BCDE	180	160	4384	150	132	3616,8	225
	SD75K0210 6BCDE	210	200	5560	170	160	4448	255
2	SD75K0250 6BCDE	250	250	6450	210	200	5160	315
	SD75K0310 6BCDE	310	315	8190	260	250	6500	390
	SD75K0400 6BCDE	400	355	8946	320	315	7938	480
3	SD75K0480 6BCDE	480	450	11430	385	355	9017	578
	SD75K0570 6BCDE	570	500	12900	460	450	11610	690
4	SD75K0680 6BCDE	680	630	16254	550	500	12900	825
	SD75K0825 6BCDE	825	800	20800	660	630	16380	990

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# 7. POWER CONNECTION



## CAUTION

**Please read the following instructions for proper electrical installation.** Otherwise, it could result in damage to equipment and personnel.

The access to the SD750 Kompakt power terminals can be only done removing the front cover. The front cover can be removed unscrewing the 4 screws located in the four cover corners. The SD750 Kompakt cover integrates cooling fans and a display. Ensure disconnect these fans and the display before removing the cover. Otherwise, the drive could be damaged.

## NOTICE

Consult the recommended tightening torque for both mechanical and electrical connections in section [“Torque and screw sizing”](#).

## Basic configuration

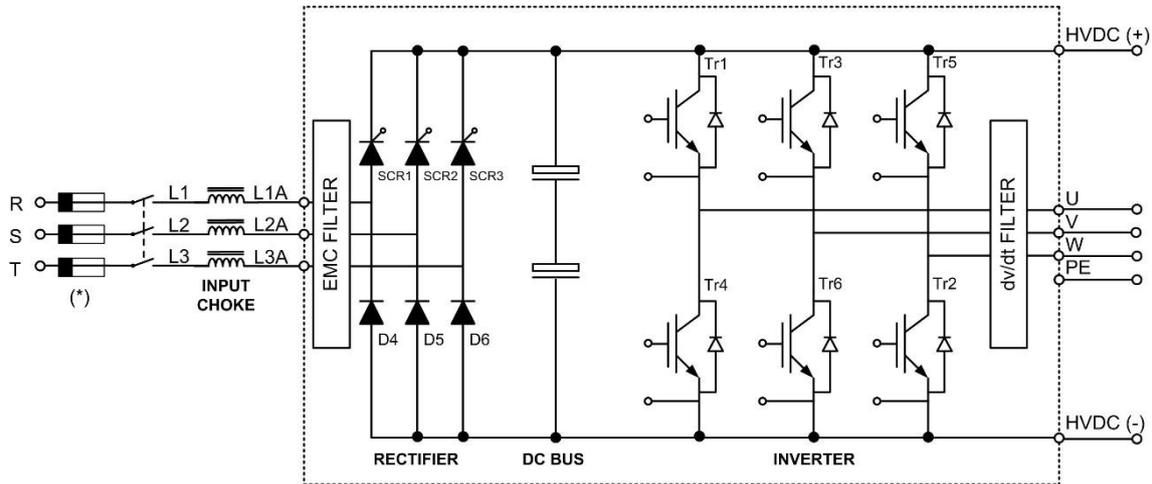
Select the appropriate safety equipment and perform the wiring properly to ensure proper operation of the equipment. Incorrect application or installation can lead to malfunction of the drive and consequently reduce its life or damage its components. Read and understand this manual thoroughly before performing any operations.

	<table border="1"> <tr> <td data-bbox="558 1187 750 1299">AC Power Supply</td> <td data-bbox="766 1187 1356 1299">Use a power supply according to the selected drive. The SD750 Kompakt drives are provided to operate with the neutral connected to the ground.</td> </tr> <tr> <td data-bbox="558 1310 750 1433">Earth leakage circuit breaker (ELB)</td> <td data-bbox="766 1310 1356 1433">Select circuit breakers or fuses in accordance with applicable national and local codes. We recommend using specified circuit breakers or fuses to operate with drive.</td> </tr> <tr> <td data-bbox="558 1444 750 1534">Inline Magnetic Contactor</td> <td data-bbox="766 1444 1356 1534">Install if necessary. When installed, do not use it for the purpose of starting or stopping the drive.</td> </tr> <tr> <td data-bbox="558 1545 750 1691">Input inductance</td> <td data-bbox="766 1545 1356 1691">The input inductance (CHOKE) reduces the current and voltage harmonic distortion, protects the drive from main disturbances decreasing the risk of damage due to over-voltages.</td> </tr> <tr> <td data-bbox="558 1702 750 1814">Installation and wiring</td> <td data-bbox="766 1702 1356 1814">To operate the drive reliably, install the drive in the proper orientation and with proper clearances. Incorrect terminal wiring could result in the equipment damage.</td> </tr> <tr> <td data-bbox="558 1825 750 1993">Motor</td> <td data-bbox="766 1825 1356 1993">Do not connect power factor capacitors, surge arrestors or radio noise filters to the output side of the drive.</td> </tr> </table>	AC Power Supply	Use a power supply according to the selected drive. The SD750 Kompakt drives are provided to operate with the neutral connected to the ground.	Earth leakage circuit breaker (ELB)	Select circuit breakers or fuses in accordance with applicable national and local codes. We recommend using specified circuit breakers or fuses to operate with drive.	Inline Magnetic Contactor	Install if necessary. When installed, do not use it for the purpose of starting or stopping the drive.	Input inductance	The input inductance (CHOKE) reduces the current and voltage harmonic distortion, protects the drive from main disturbances decreasing the risk of damage due to over-voltages.	Installation and wiring	To operate the drive reliably, install the drive in the proper orientation and with proper clearances. Incorrect terminal wiring could result in the equipment damage.	Motor	Do not connect power factor capacitors, surge arrestors or radio noise filters to the output side of the drive.
AC Power Supply	Use a power supply according to the selected drive. The SD750 Kompakt drives are provided to operate with the neutral connected to the ground.												
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Motor	Do not connect power factor capacitors, surge arrestors or radio noise filters to the output side of the drive.												

## Topology

SD750 Kompakt 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.

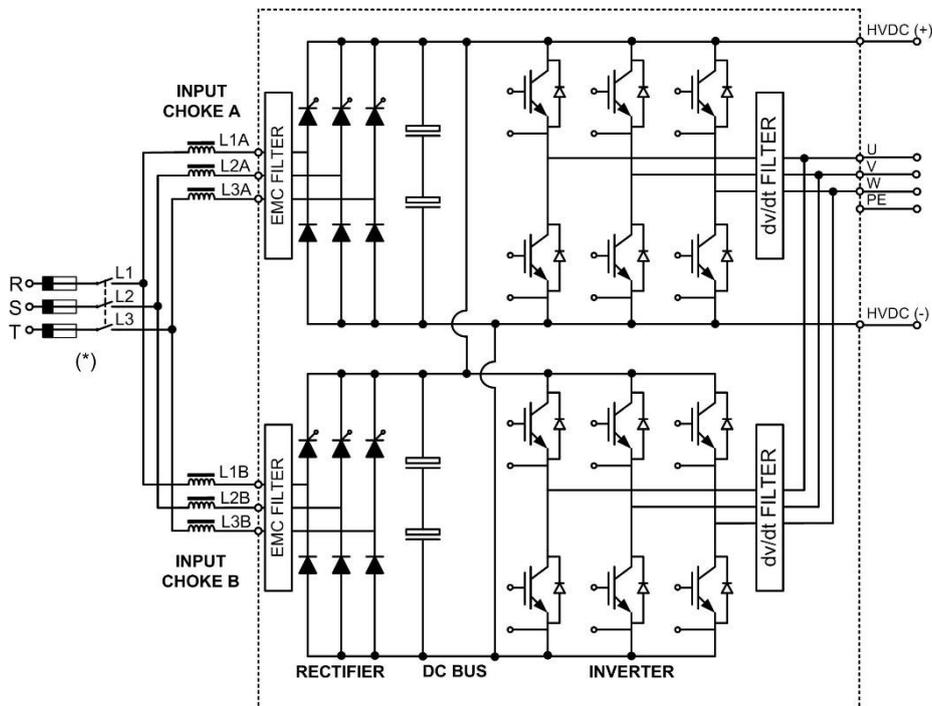
### General Block Scheme for frames 1 and 2



(\*) Protections and fuses not included

SD7KDTP0001CI

### General Block Scheme for frames 3 and 4



(\*) : Protections and fuses not included

SD7KDTP0007AI

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SD750 Kompakt integrates external input chokes filters. These filters reduce the THDi values significantly and increase the impedance line protecting the drive against electrical distortions. The input choke filter must be installed in the input side, for more information see the [Mechanical installation](#) section.

The SD750 Kompakt 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, color touch-screen display and alphanumeric display, etc.

The inverter bridge generates the PWM wave that controls the motor performance (voltage, current, torque, etc...). SD750 Kompakt Series by Power Electronics, integrate as standard output dV/dt filters that reduces significantly the dV/dt rise time below 500 V/ $\mu$ s – 800 V/ $\mu$ s, therefore, it reduces the voltages peaks at the motor windings, the common mode currents and the EMC emissions.

It is recommended to install ultra fast fuses that protect the drive against downstream overcurrent. SD750 Kompakt integrates multiple electrical protections that protect the drive and the motor as a motor relay does.

## Power connection



### CAUTION

The following installation recommendations are suitable for TN and TT grids. For IT grids refer the dedicated section. Otherwise, you could cause damage to equipment and personnel.

Wiring and periodic inspections should be performed at least 10 minutes after disconnecting the input power. When removing the front cover, check that the red DC Link LED is off. Afterwards you can remove the metal cover and check with a multimeter the following measures:

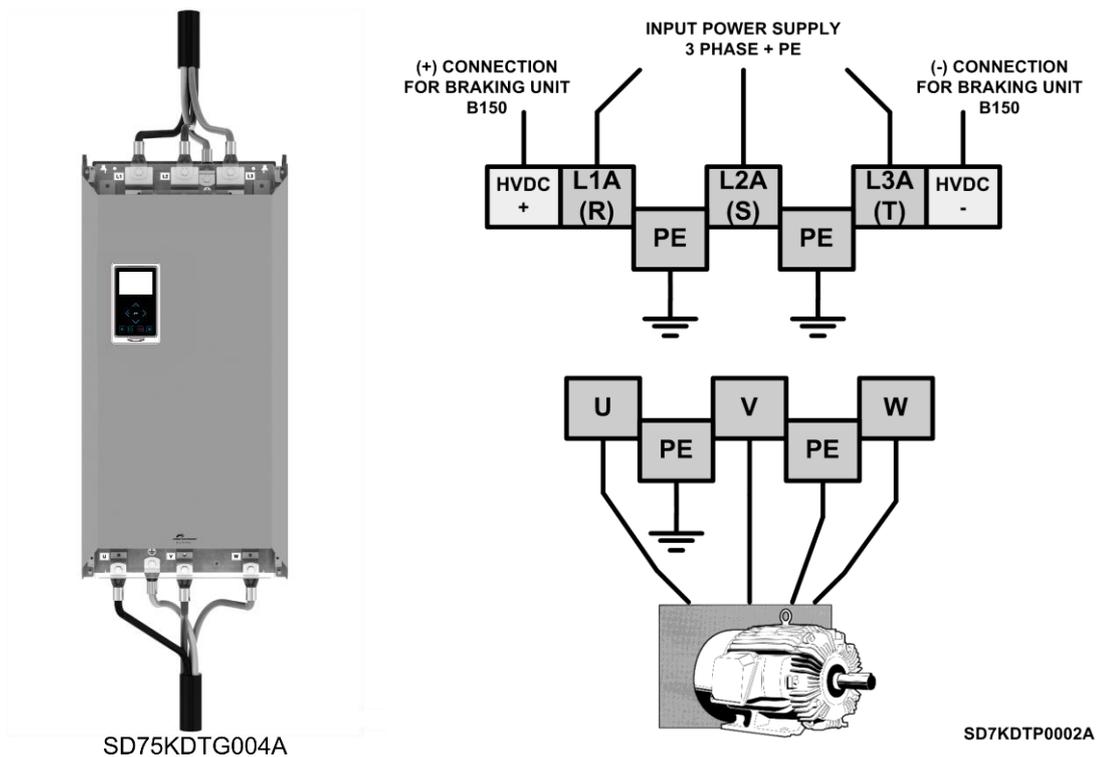
- The voltage between the output plates U, V, W and the cabinet must be around 0V.
- The voltage between the DC link +, - terminals and the chassis must be below 30Vdc.

Otherwise, you may get an electric shock.

SD750 Kompakt is designed for working with 3-phase supply with the neutral connected to the earth.

Input terminals (drive supply) are accessible from the top while output terminals (motor supply) are accessible from the bottom of the SD750 Kompakt.

We recommend installing the drive according to the following diagram:



**Note:** It is recommended to use an earth cross section equal or higher than active wires cross section.



### NOTICE

To perform the fiber optic connections regarding the inverter part between modules, refer to the manual of the fiber optic board (SD75MA07).



## CAUTION

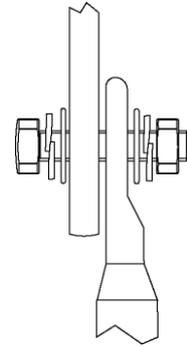
**Line voltage (input supply) must never be connected to U, V and W terminals.** Otherwise, the drive will be damaged.

Line voltage L1, L2 and L3 terminals, and earth will be connected to the terminals assigned for this function. Motor should be connected to the terminals indicated as U, V and W.

Terminals HVDC+ and HVDC- are used to connect a dynamic braking unit if the application requires it.

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 busbars depends on the frame size. Check the “Power terminals” section.
- Before connecting the cables, clean the contact surface with a clean cloth and ethanol cleaner.
- Use a pressure washer and a flat washer between the nut or bolt head and the terminal lug.
- Use copper or aluminum 600Vac conductors for up to 500Vac rated voltage. For 525Vac and 690 Vac phase to phase rated equipment use 1kV conductors.



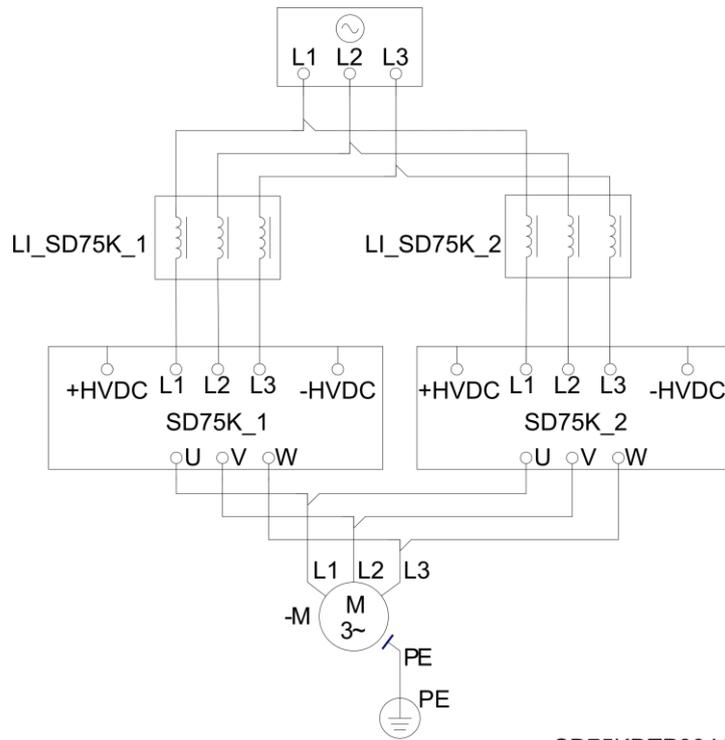
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The recommended cable types and lengths between the drive (with factory settings) and the motor are:

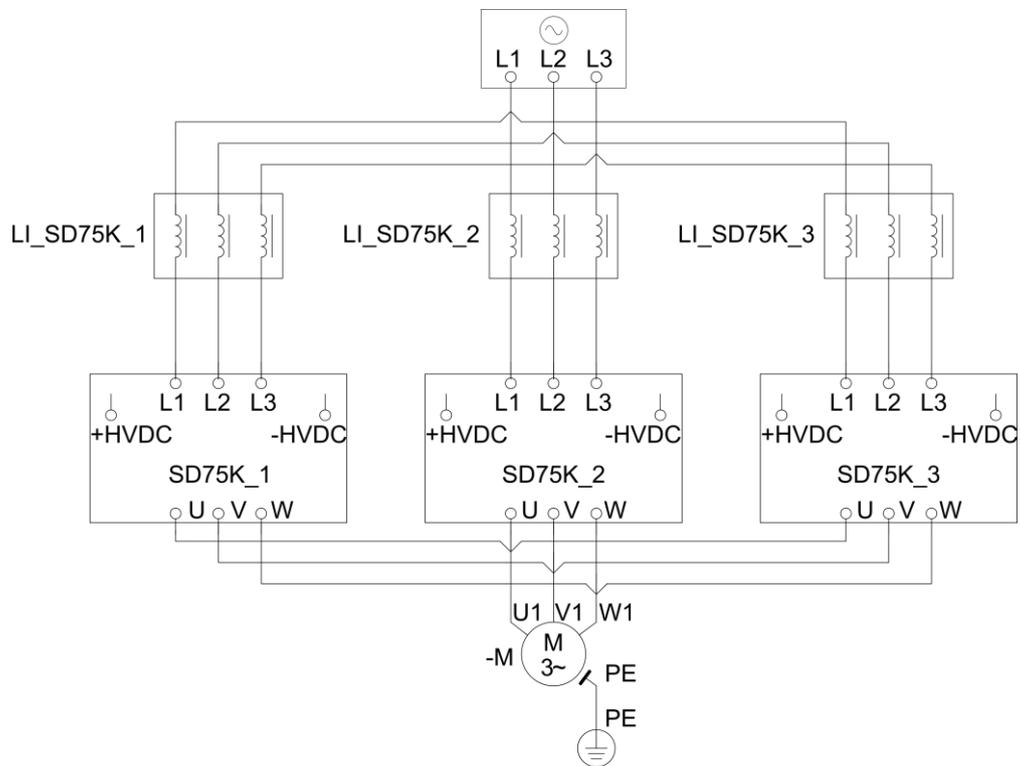
- **Unshielded cable:** 300 m. Asymmetrical 4-wire cable including PE conductor. It is recommended to use a motor ground cable (PE) with a cross section equal or higher than the supply motor wires cross section (U, V, W). When single-wire cables are used in three-phase systems, the three phase conductors must be bundled symmetrically.
- **Shielded cable:** 150 m. Symmetrical 3-wire cable with PE conductor- with concentric shield. To implement an effective shield bonding, an EMC cable gland should be used in both the motor junction box and the drive cabinet to ensure effective 360° ground connection and a low impedance path for high frequency current. Refer to “EMC installation requirements” section.

## Power connection for 6 pulses

Connection of two modules must be made as shown in the following diagram.

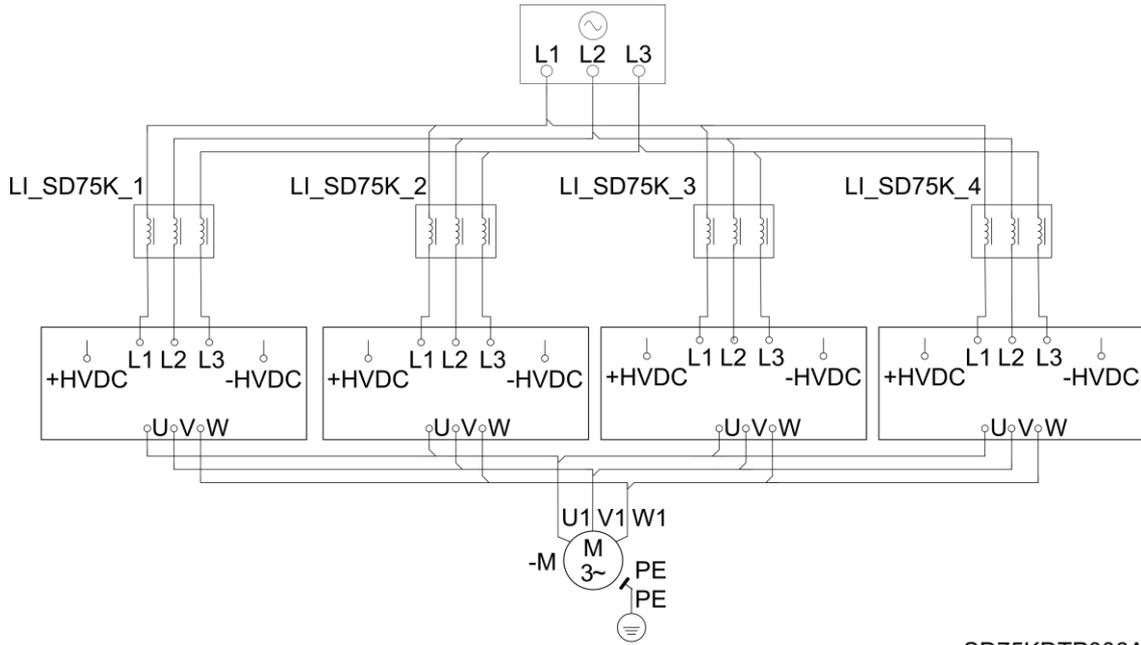


Connection of three modules must be made as shown in the following diagram.



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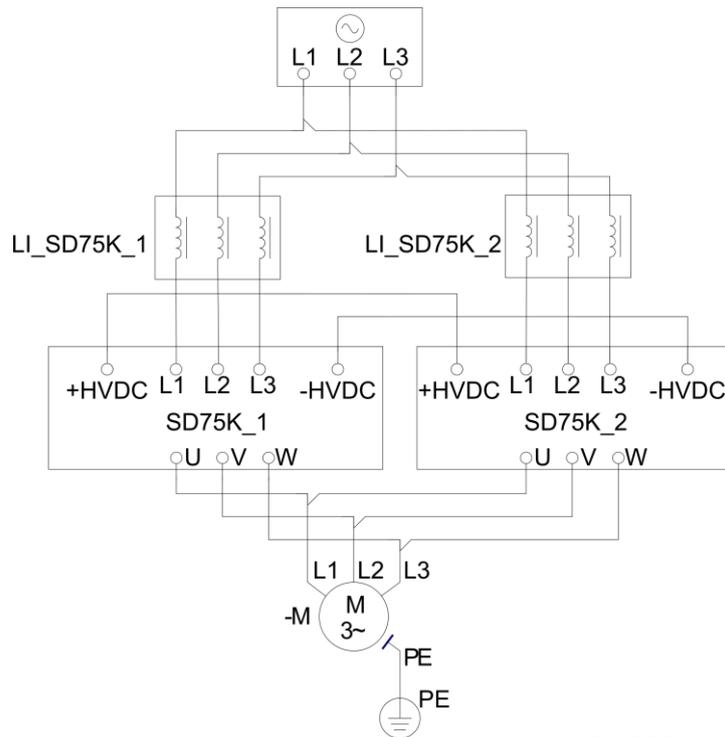
Connection of four modules must be made as shown in the following diagram.



SD75KDTP006A

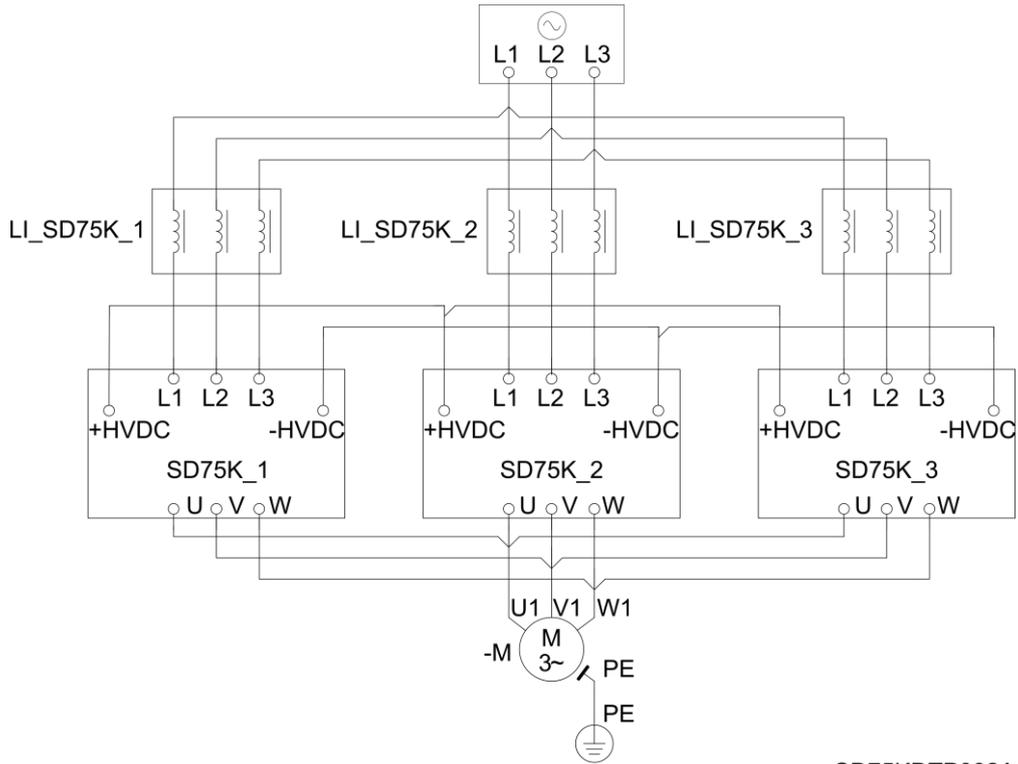
### Power connection for multipulse (12 and 18)

Connection of two modules must be made as shown in the following diagram.



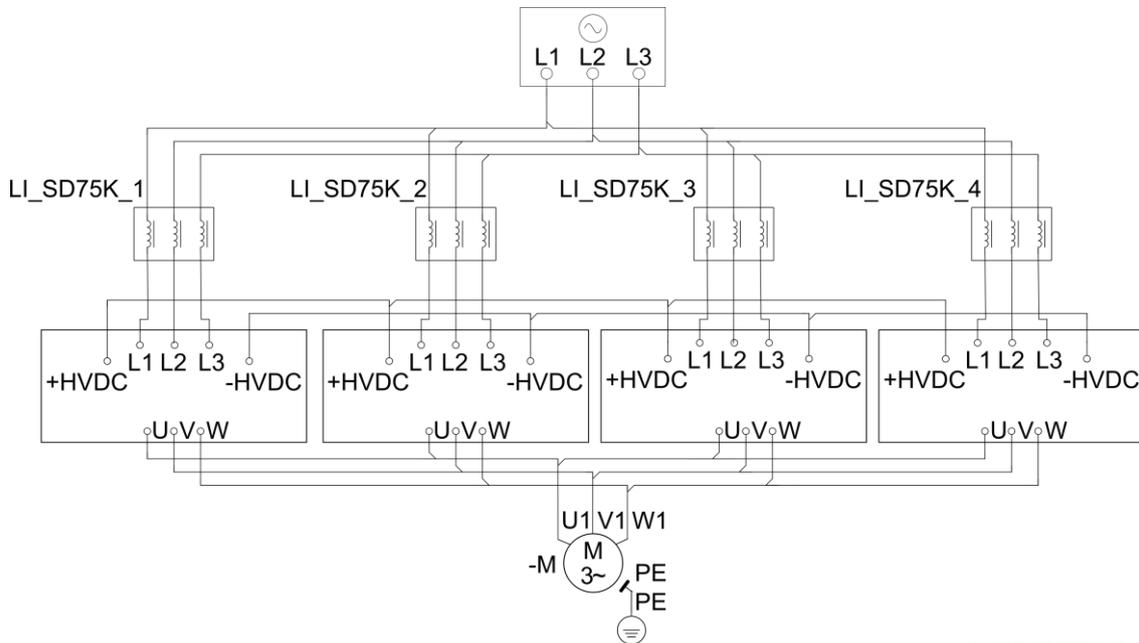
SD75KDTP001A

Connection of three modules must be made as shown in the following diagram.



SD75KDTP002A

Connection of four modules must be made as shown in the following diagram.

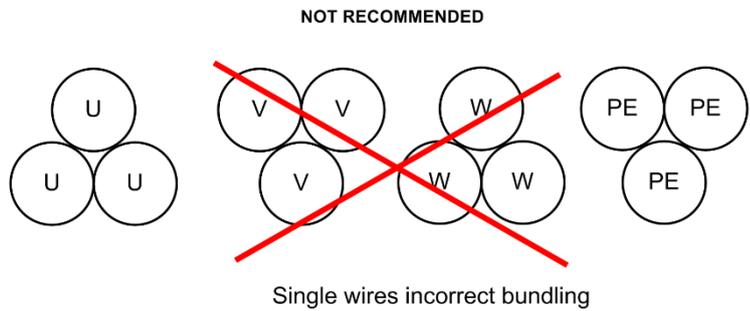
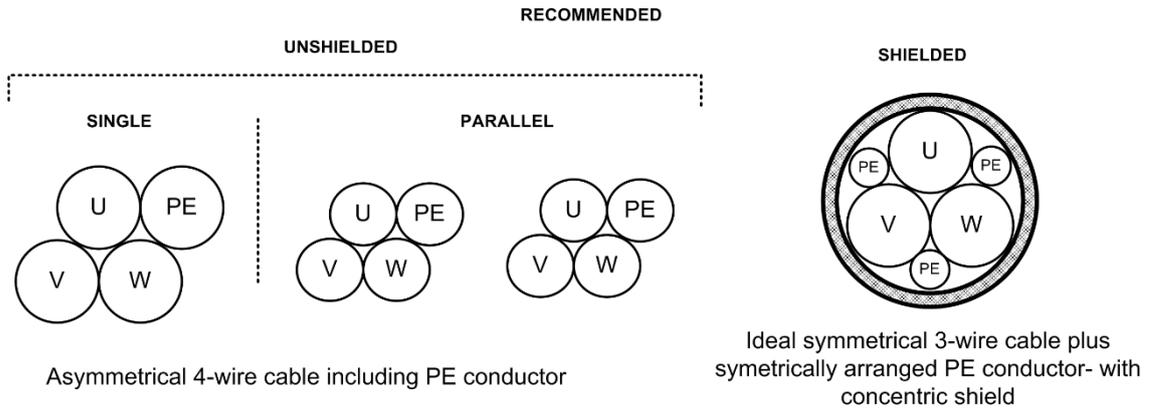


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# Wiring

The following figures show the recommended cable type and bundling.

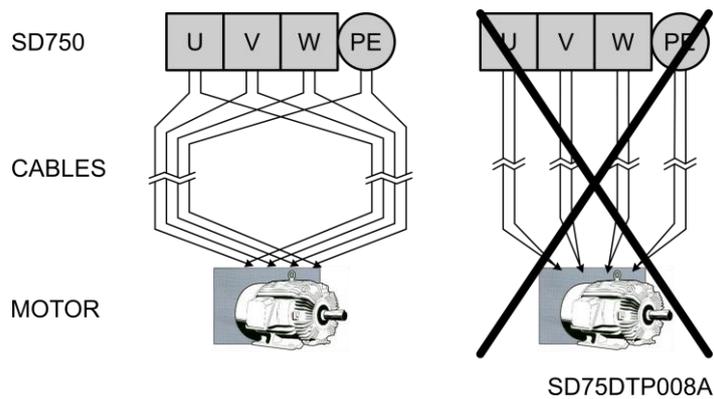


SD70DTP0006EI



## NOTICE

The number of three phase plus neutral cable hose (U, V, W, PE) to the motor should be equal to the number of IGBTs in the drive, having one 4-wire cable hose by each IGBTs block.





## CAUTION

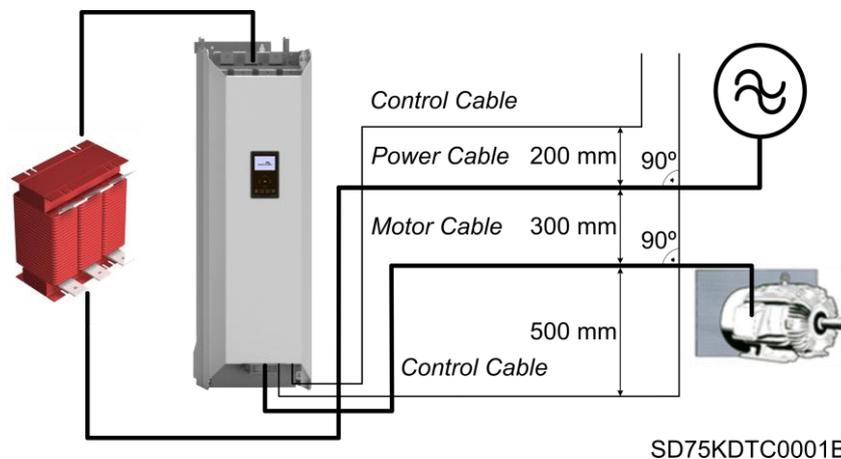
**Line voltage (input supply) must never be connected to U, V and W terminals.**

Otherwise, the drive may get be damaged.

**It is necessary that the installer ensures correct compliance with the laws and regulations in force in the countries or areas where the drive is 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 or the drive itself.

All power conductors such as power input cables, output cables to the motor or 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:



Power Electronics recommends installing separately the following circuits, whether in cable racks, trays or in different wire ducts:

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

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 aluminum cables. The maximum cable section and the available holes per phase could be found in the following section.

## Reference cable section

The following tables show the **reference cable section** for each SD750 Kompakt frame, based on the internal drive sections. **The installer must consider the cable cross-section, cable type, wiring method and ambient conditions to select the appropriate cable to be installed between the drive and the motor.**

**Note:** The cable must permanently support a  $T^a > 75$  °C. Use cable of 1000 Vac (e.g. RV-K) for all equipment (400 to 690 Vac). **Make sure to comply with local regulations.**

### 400 Vac – 6 pulses

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
1	SD75K0260 5BCD	260	315	3x(1x185-240)	185-240
	SD75K0320 5BCD	320	375	3x(2x150)	150
	SD75K0340 5BCD	340	413	3x(2x150)	150
2	SD75K0400 5BCD	400	495	3x(2x185)	185
	SD75K0450 5BCD	450	555	3x(2x240)	240
	SD75K0570 5BCD	570	690	3x(2x240)	240
3	SD75K0700 5BCD	700	870	3x(2x240)	240
	SD75K0800 5BCD	800	975	3x(4x185)	185
	SD75K0900 5BCD	900	1080	3x(4x185)	185
4	SD75K1050 5BCD	1050	1260	3x(4x240)	240
	SD75K1140 5BCD	1140	1388	3x(4x240)	240
	SD75K1230 5BCD	1230	1485	3x(4x240)	240
5	SD75K1400 5BCD	1400	1725	2x(3x(4x185))	185
	SD75K1550 5BCD	1550	1890	2x(3x(4x185))	185
6	SD75K1800 5BCD	1800	2160	2x(3x(4x240))	240
	SD75K1950 5BCD	1950	2370	2x(3x(4x240))	240
7	SD75K2250 5BCD	2250	2700	3x(3x(4x185))	185
8	SD75K2750 5BCD	2750	3300	3x(3x(4x240))	240
	SD75K3100 5BCD	3100	3750	3x(3x(4x240))	240

**440 Vac – 6 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
1	SD75K0260 5BCD	260	315	3x(1x185-240)	185-240
	SD75K0320 5BCD	320	375	3x(2x150)	150
	SD75K0340 5BCD	340	413	3x(2x150)	150
2	SD75K0400 5BCD	400	495	3x(2x185)	185
	SD75K0450 5BCD	450	555	3x(2x240)	240
	SD75K0570 5BCD	570	690	3x(2x240)	240
3	SD75K0700 5BCD	700	870	3x(2x240)	240
	SD75K0800 5BCD	800	975	3x(4x185)	185
	SD75K0900 5BCD	900	1080	3x(4x185)	185
4	SD75K1050 5BCD	1050	1260	3x(4x240)	240
	SD75K1140 5BCD	1140	1388	3x(4x240)	240
	SD75K1230 5BCD	1230	1485	3x(4x240)	240
5	SD75K1400 5BCD	1400	1725	2x(3x(4x185))	185
	SD75K1550 5BCD	1550	1890	2x(3x(4x185))	185
6	SD75K1800 5BCD	1800	2160	2x(3x(4x240))	240
	SD75K1950 5BCD	1950	2370	2x(3x(4x240))	240
7	SD75K2250 5BCD	2250	2700	3x(3x(4x185))	185
8	SD75K2750 5BCD	2750	3300	3x(3x(4x240))	240
	SD75K3100 5BCD	3100	3750	3x(3x(4x240))	240

**480 Vac – 6 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
1	SD75K0260 5BCD	260	315	3x(1x185-240)	185-240
	SD75K0320 5BCD	320	375	3x(2x150)	150
	SD75K0340 5BCD	340	413	3x(2x150)	150
2	SD75K0400 5BCD	400	495	3x(2x185)	185
	SD75K0450 5BCD	450	555	3x(2x240)	240
	SD75K0570 5BCD	570	690	3x(2x240)	240
3	SD75K0700 5BCD	700	870	3x(2x240)	240
	SD75K0800 5BCD	800	975	3x(4x185)	185
	SD75K0900 5BCD	900	1080	3x(4x185)	185
4	SD75K1050 5BCD	1050	1260	3x(4x240)	240
	SD75K1140 5BCD	1140	1388	3x(4x240)	240
	SD75K1230 5BCD	1230	1485	3x(4x240)	240
5	SD75K1400 5BCD	1400	1725	2x(3x(4x185))	185
	SD75K1550 5BCD	1550	1890	2x(3x(4x185))	185
6	SD75K1800 5BCD	1800	2160	2x(3x(4x240))	240
	SD75K1950 5BCD	1950	2370	2x(3x(4x240))	240
7	SD75K2250 5BCD	2250	2700	3x(3x(4x185))	185
8	SD75K2750 5BCD	2750	3300	3x(3x(4x240))	240
	SD75K3100 5BCD	3100	3750	3x(3x(4x240))	240

**525 Vac – 6 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
1	SD75K0160 7BCD	160	195	3x(1x95-150)	150
	SD75K0180 7BCD	180	225	3x(1x120-240)	240
	SD75K0210 7BCD	210	255	3x(1x185-240)	240
2	SD75K0250 7BCD	250	315	3x(2x150)	150
	SD75K0310 7BCD	310	390	3x(2x185)	185
	SD75K0400 7BCD	400	480	3x(2x240)	240
3	SD75K0480 7BCD	480	578	3x(2x240)	240
	SD75K0570 7BCD	570	690	3x(4x185)	185
4	SD75K0680 7BCD	680	825	3x(4x240)	240
	SD75K0825 7BCD	825	990	3x(4x240)	240
5	SD75K0930 7BCD	930	1125	2x(3x(4x185))	185
	SD75K1050 7BCD	1050	1260	2x(3x(4x185))	185
6	SD75K1200 7BCD	1200	1425	2x(3x(4x240))	240
	SD75K1400 7BCD	1400	1710	2x(3x(4x240))	240
7	SD75K1550 7BCD	1550	1905	3x(3x(4x185))	185
	SD75K1750 7BCD	1750	2130	3x(3x(4x240))	240
8	SD75K1850 7BCD	1850	2250	3x(3x(4x240))	240
	SD75K2200 7BCD	2200	2700	3x(3x(4x240))	240
9	SD75K2500 7BCD	2500	3000	4x(3x(4x240))	240

**600 Vac – 6 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
1	SD75K0160 6BCD	160	195	3x(1x95-150)	150
	SD75K0180 6BCD	180	225	3x(1x120-240)	240
	SD75K0210 6BCD	210	255	3x(1x185-240)	240
2	SD75K0250 6BCD	250	315	3x(2x150)	150
	SD75K0310 6BCD	310	390	3x(2x185)	185
	SD75K0400 6BCD	400	480	3x(2x240)	240
3	SD75K0480 6BCD	480	578	3x(2x240)	240
	SD75K0570 6BCD	570	690	3x(4x185)	185
4	SD75K0680 6BCD	680	825	3x(4x240)	240
	SD75K0825 6BCD	825	990	3x(4x240)	240
5	SD75K0930 6BCD	930	1125	2x(3x(4x185))	185
	SD75K1050 6BCD	1050	1260	2x(3x(4x185))	185
6	SD75K1200 6BCD	1200	1425	2x(3x(4x240))	240
	SD75K1400 6BCD	1400	1710	2x(3x(4x240))	240
7	SD75K1550 6BCD	1550	1905	3x(3x(4x185))	185
	SD75K1750 6BCD	1750	2130	3x(3x(4x240))	240
8	SD75K1850 6BCD	1850	2250	3x(3x(4x240))	240
	SD75K2200 6BCD	2200	2700	3x(3x(4x240))	240
9	SD75K2500 6BCD	2500	3000	4x(3x(4x240))	240

**690 Vac – 6 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
1	SD75K0160 6BCD	160	195	3x(1x95-150)	150
	SD75K0180 6BCD	180	225	3x(1x120-240)	240
	SD75K0210 6BCD	210	255	3x(1x185-240)	240
2	SD75K0250 6BCD	250	315	3x(2x150)	150
	SD75K0310 6BCD	310	390	3x(2x185)	185
	SD75K0400 6BCD	400	480	3x(2x240)	240
3	SD75K0480 6BCD	480	578	3x(2x240)	240
	SD75K0570 6BCD	570	690	3x(4x185)	185
4	SD75K0680 6BCD	680	825	3x(4x240)	240
	SD75K0825 6BCD	825	990	3x(4x240)	240
5	SD75K0930 6BCD	930	1125	2x(3x(4x185))	185
	SD75K1050 6BCD	1050	1260	2x(3x(4x185))	185
6	SD75K1200 6BCD	1200	1425	2x(3x(4x240))	240
	SD75K1400 6BCD	1400	1710	2x(3x(4x240))	240
7	SD75K1550 6BCD	1550	1905	3x(3x(4x185))	185
	SD75K1750 6BCD	1750	2130	3x(3x(4x240))	240
	SD75K1850 6BCD	1850	2250	3x(3x(4x240))	240
8	SD75K2200 6BCD	2200	2700	3x(3x(4x240))	240
	SD75K2500 6BCD	2500	3000	4x(3x(4x240))	240

**400 Vac – 12 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
2	SD75K0450 5BCD	450	555	2x(3x(1x185-240))	240
	SD75K0570 5BCD	570	690	2x(3x(2x150))	150
3	SD75K0700 5BCD	700	870	2x(3x(2x185))	185
	SD75K0900 5BCD	900	1080	2x(3x(2x240))	240

**480 Vac – 12 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
2	SD75K0450 5BCD	450	555	2x(3x(1x185-240))	240
	SD75K0570 5BCD	570	690	2x(3x(2x150))	150
3	SD75K0700 5BCD	700	870	2x(3x(2x185))	185
	SD75K0900 5BCD	900	1080	2x(3x(2x240))	240

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**400 Vac – 18 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
3	SD75K0900 5BCD	900	1080	3x(3x(2x185))	185
4	SD75K1140 5BCD	1140	1388	3x(3x(2x240))	240
	SD75K1230 5BCD	1230	1485	3x(3x(2x240))	240
5	SD75K1400 5BCD	1400	1725	3x(3x(2x240))	240
6	SD75K1800 5BCD	1800	2160	3x(3x(2x240))	240

**480 Vac – 18 pulses**

FRAME	CODE	I(A) RATED AT 40°C	I(A) MAXIMUM AT 40°C	REFERENCE CABLE SECTION (mm <sup>2</sup> )	REFERENCE CABLE SECTION FOR GROUND CABLE (mm <sup>2</sup> )
3	SD75K0900 5BCD	900	1080	3x(3x(2x185))	185
4	SD75K1140 5BCD	1140	1388	3x(3x(2x240))	240
	SD75K1230 5BCD	1230	1485	3x(3x(2x240))	240
5	SD75K1400 5BCD	1400	1725	3x(3x(2x240))	240
6	SD75K1800 5BCD	1800	2160	3x(3x(2x240))	240

## Ground connection

Before connecting the power conductors, make sure that the chassis of the drive and the adjoining cabinets are connected to ground through the dedicated (PE) terminals. These are situated at both sides of the bottom metal walls of the drive and they are labeled with the earth symbol. Check section “Power Terminals”.

The motor chassis ground must be connected to the drive. In other words, connect the motor’s ground conductor to the PE protection terminal of the drive and not to the installation’s ground. It is recommended that the section of the motor ground conductor (PE) has at least the same cross section as the motor power cables sections (U, V, W). Additionally, it must be installed following the recommendations indicated in section “Power connection and wiring”.

When connecting the earth, ensure that all connected cable terminals are properly tight and protected from mechanical forces.



### CAUTION

**For safety reasons, the earth resistance of the installation must be measured.** This must be established before the first start up of the plant and with the drive disconnected.

**It is the responsibility of the installer to provide the appropriate number, type and section of cables for the ground conductor** in accordance with the characteristics of the equipment used and the plant to minimize ground resistance, which must comply with local and national regulations.

# EMC installation requirements

## Introduction

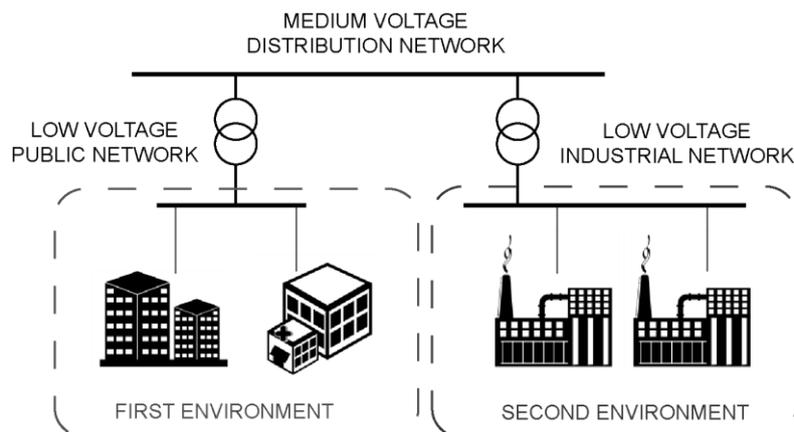
The EMC European Directive defines electromagnetic compatibility as the capability of an apparatus, an industrial plant, or a system to work satisfactorily in the electromagnetic environment without at the same time causing electromagnetic disturbances in the apparatus, industrial plant or systems present in the same environment.

The Electromagnetic Compatibility (EMC) depends on two main characteristics of the equipment: 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. This means that 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 the European Union, EN61800-3 standard takes priority over all generic 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:* Domestic installations. It also includes premises directly connected to a low-voltage power supply network without an intermediate transformer which supplies buildings used for domestic purposes such as shopping malls, cinemas, hospitals...
- *Second environment:* Industrial installations. Second Environment includes all plants other than those directly connected to the public low-voltage network which supplies buildings used for domestic purposes, e.g. factories and those other premises supplied by their own dedicated transformer.



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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
<b>Restricted Installation</b> <sup>[1]</sup>	NO	YES	YES	YES <sup>[2]</sup>

**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 1000 V or 400 A which are unable to comply with the limits of C3 Category. In these cases, C4 Category can be achieved by adjusting the equipment in situ and applying the EMC recommendations.

## SD750 Kompakt compliance

SD750 Kompakt variable speed drives have been designed for the industrial use (Second Environment). The implementation of radio frequency interference filters (RFI filters) and dV/dt filters as standard, and the correct installation following the recommendations within this manual, permit to achieve compliance with C3 category defined in IEC/EN 61800-3.

Optionally, the SD750 Kompakt drive with non-floating earth can be installed in residential areas (First Environment) by employing optional RFI filters that permit to achieve the C2 category.

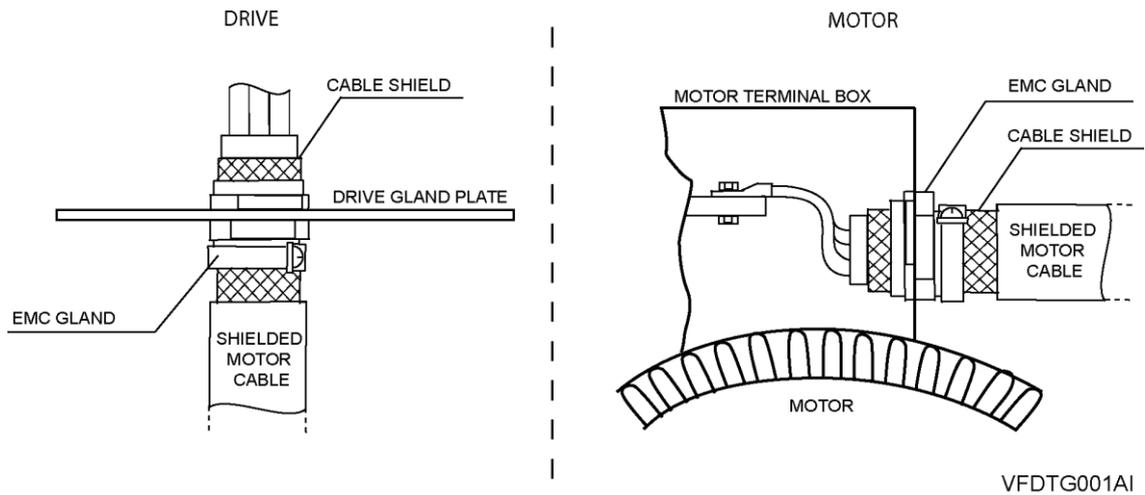
The SD750 Kompakt is not a retail unit. It is neither a plug in device nor a movable device and it is intended to be installed and commissioned by qualified personnel. Therefore, C1 category will not be required.

The SD750 Kompakt with floating earth configuration can be installed in industrial (Second Environment) IT grids. Although it does not integrate RFI filters, following the installation recommendations within this manual and with its integrated dV/dt filter, it achieves the C3 category defined in IEC/EN61800-3.

## Connection

The SD750 Kompakt 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 "Power connection and wiring" and "Ground connection".

In shielded cables it is recommended to connect the shield by making 360° contact in both the drive cabinet and the motor terminal box. As an example, EMC cable glands can be installed as shown in the next figure.



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

## Protections

### Ground fault protection

The drive is equipped with an internal software that protect the motor and the drive against input and output unbalanced currents. The response threshold can be set from 0% to 30% of the rated current. For further information, see *Programming and Software Manual*.

This function is not intended to protect people against direct or indirect contacts or against fire, so an external protection must be provided to ensure that a substantial ground fault current is promptly interrupted. The SD750 Kompakt drives are suitable to operate with RCD components Type B, if it is required. The EMC / EMC filters and motor cable lengths increase the earth leakage currents, so the protection range is set according to the installation conditions. For additional information, contact Power Electronics.

### Motor thermal protection

The drive includes a motor thermal protection based on the motor performance parameters which mathematically calculates the remaining heating capacity in the motor. When this reservoir is reduced below the limits, this is, the motor temperature approaches the maximum, the drive automatically stops the motor. For further information consult the *Software and Programming Manual*.

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

## Other protections

Apart from the protections mentioned above, the drive implements additional protections such as temporary loss of power, automatic re-start, high and low input and output voltage, overload or underload of the pump, etc. For further information, consult the *Software and Programming Manual*.

## Safety Stop Function

The Safety Stop Function allows the drive's output to be disabled so that the drive cannot provide power or generate torque in the motor.

The Safe Torque Off function complies with EN ISO 13849-1 PLd and EN 61508 SIL3 (EN60204-1 stop category 0). This feature is standard and allows you to comply with current safety standards. For more information see section "STO - Safe Torque Off".

## IT Grids - Floating earth drives

When planning an IT grid electrical installation select the drive for floating earth operation. Check the drive reference and make sure that the drive is suitable for this type of installations.

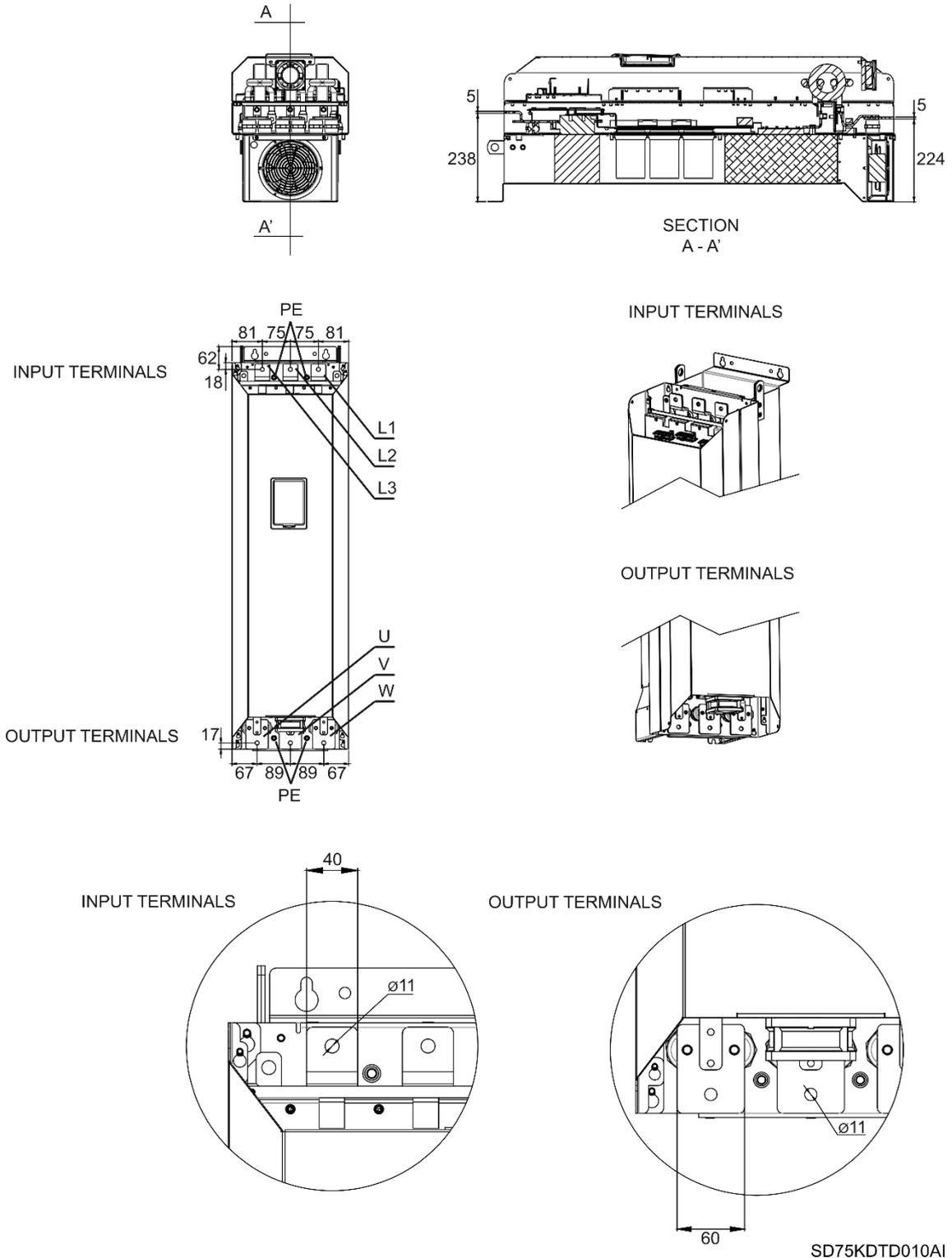
IT grids must be equipped with an insulation monitoring system. To adjust the parameters, consider that the drive has a very high impedance even if there is a large number of equipment working in parallel in the same IT network.

It is recommended the installation of lightning rods to ground in order to protect against transient overvoltage. The lightning rod must have a rated voltage greater than the drive rated voltage for the purpose of preventing its operation during normal conditions.

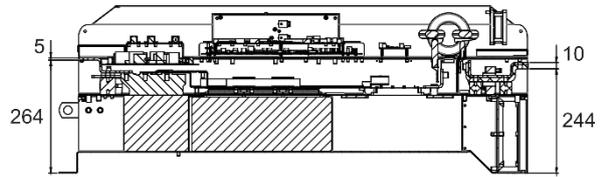
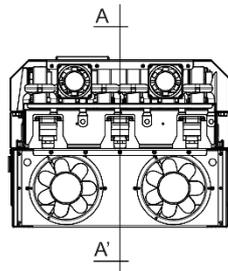
# Power terminals

The following figures show the location, in millimeters, of power terminals for each frame of SD750 Kompakt.

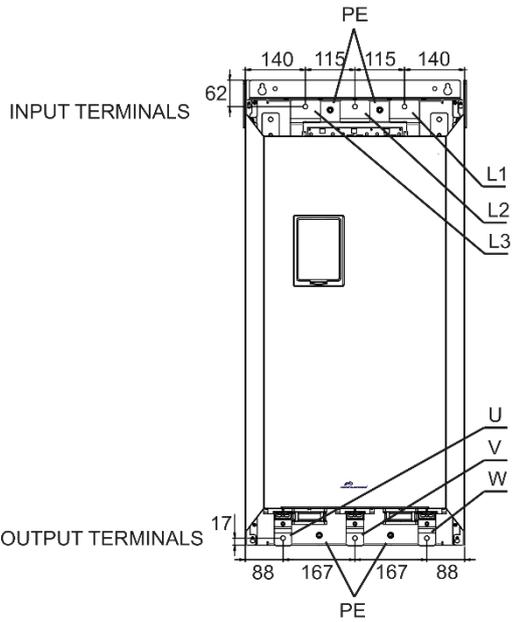
## Connections for frame 1



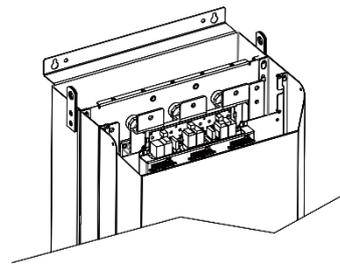
### Connections for frame 2



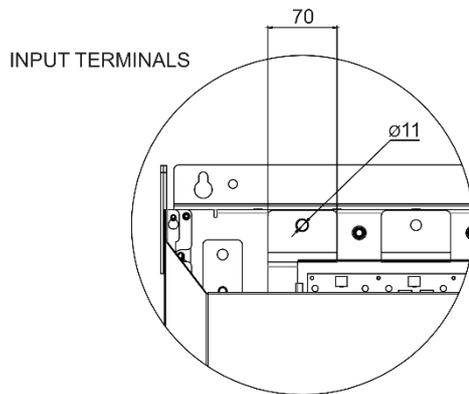
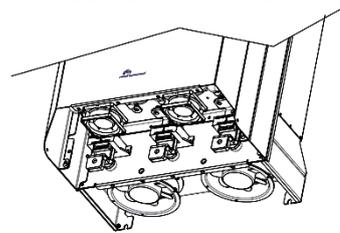
SECTION A - A'



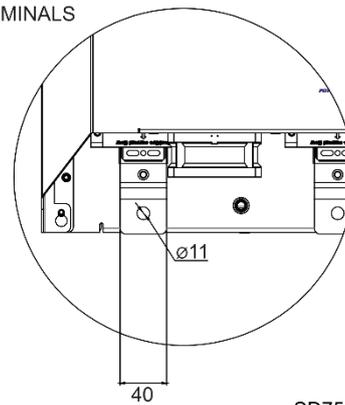
INPUT TERMINALS



OUTPUT TERMINALS

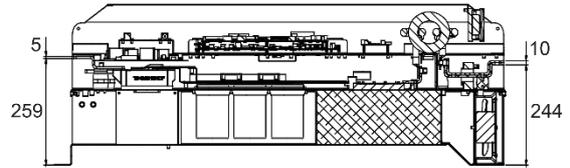
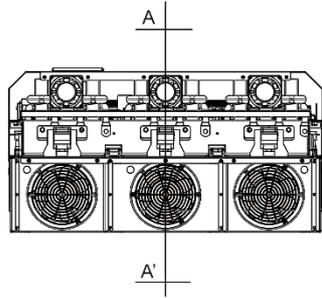


OUTPUT TERMINALS

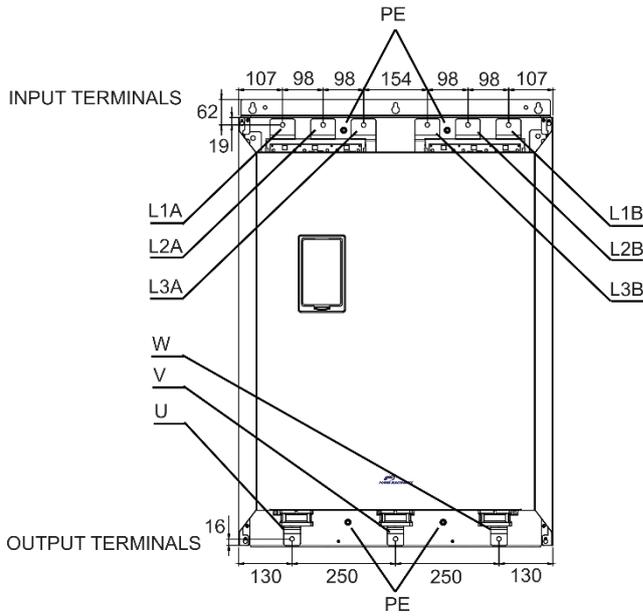


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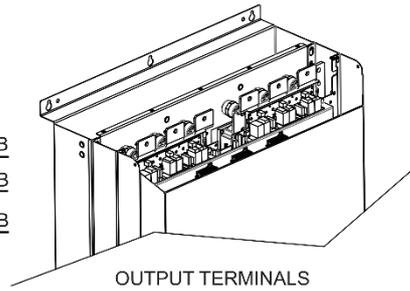
### Connections for frame 3



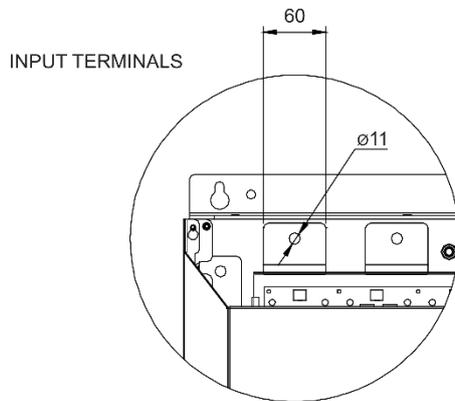
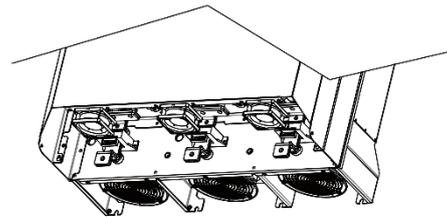
SECTION  
A - A'



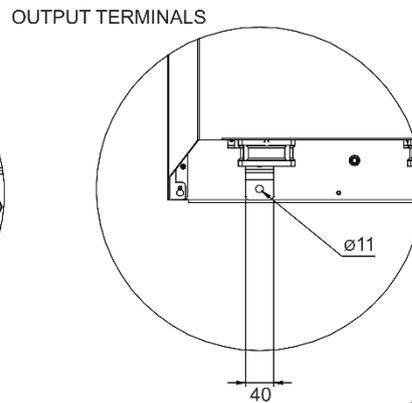
INPUT TERMINALS



OUTPUT TERMINALS



INPUT TERMINALS

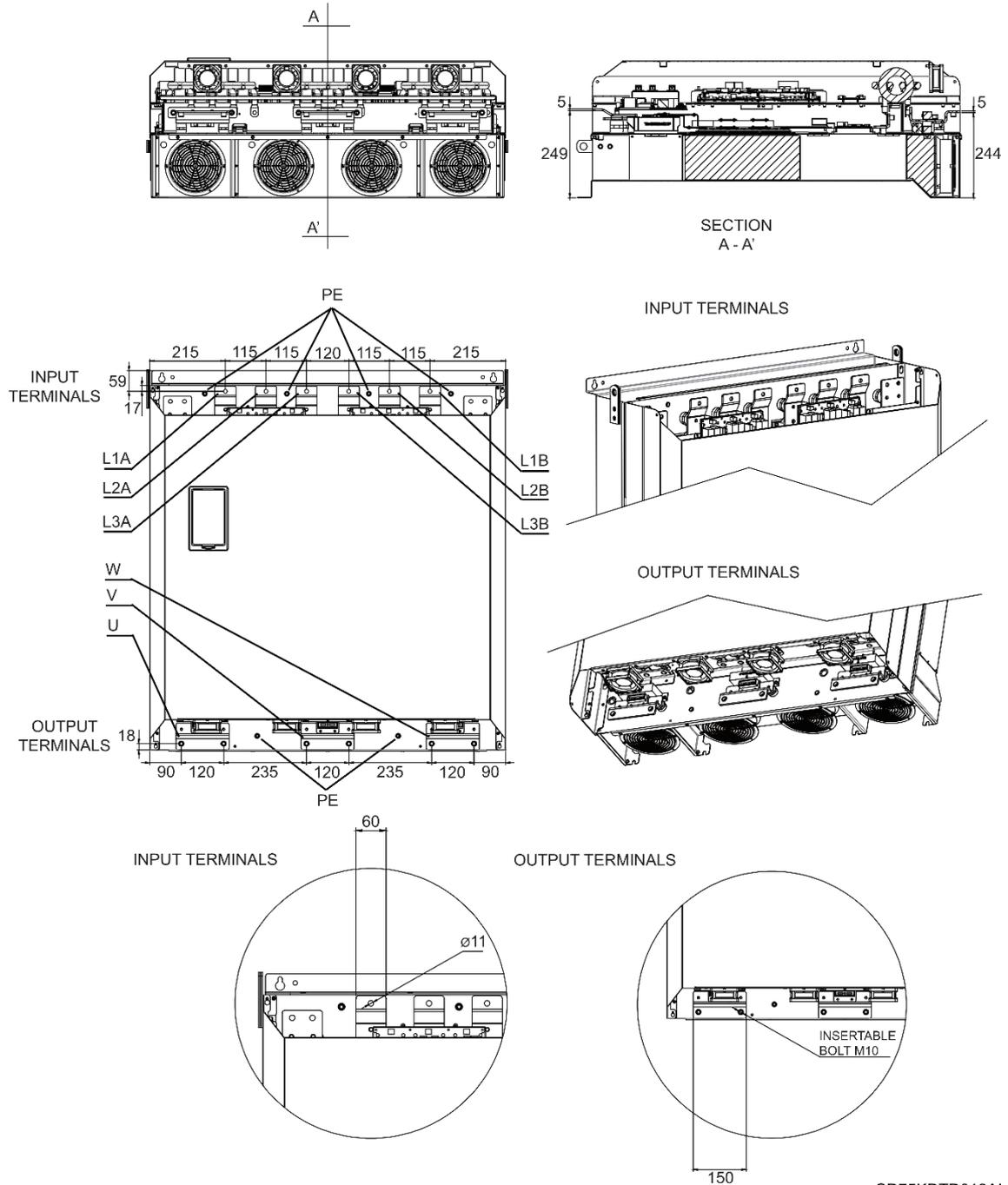


OUTPUT TERMINALS

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### Connections for frame 4



### Connections for frames 5 to 9

For the location of the connection plates, consult the connection diagrams of frames 1, 2, 3 or 4 as appropriate.

## 8. CONTROL CONNECTION

8



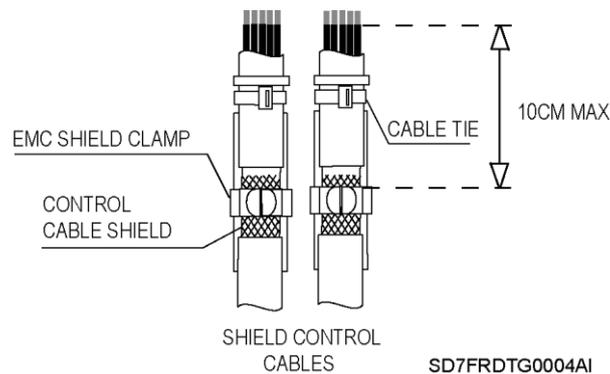
### CAUTION

The access to the SD750 Kompakt control board can be only done removing the front cover. The front cover can be removed unscrewing the 4 screws located in the four cover corners. The SD750 Kompakt cover integrates cooling fans and a display. Ensure disconnect these fans and the display before removing the cover. Otherwise, the drive could be damaged.

### Wiring recommendations

Before planning the installation, follow and understand the next recommendations. The parallel cable routing should be avoided 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 cable for all the data, signal or control cables coming from the variable speed drive. Each cable must have an EMC clip that secures an effective ground shield, making a contact of the 360° shield.



Cable shields for digital signal 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 using analogue signals, a low interference is experienced (hum loops), disconnect the shield grounding from one of the ends. The maximum section for the control cables is 2.5mm<sup>2</sup> and the recommended tightening torque is 0.4Nm.

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



### CAUTION

Any change to the control board wiring or bridges must be performed following the safety instructions indicated before. Otherwise, it could cause damage to the equipment and cause damage to people.

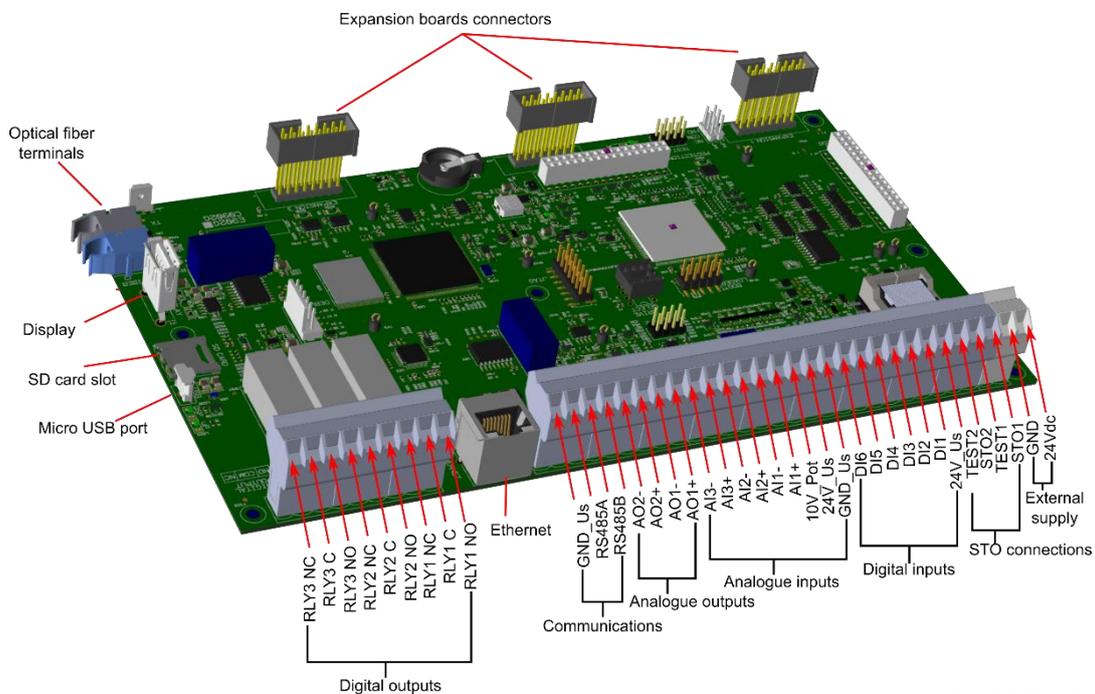
EN

# Control board terminals description



**Any changes to the control board wiring or bridges must be performed at least 10 minutes after disconnecting the input power and after checking the bus voltage (DC Link) is discharged below 30VDC. Otherwise, you may get an electric shock.**

User will have access to the drive control board equipped with user interface ports and connectors. It integrates PTC connection, analogue inputs and outputs, digital inputs and outputs, DC external input power supply, RS485 communication ports, Ethernet, USB port and display connection. In addition, the board is ready for the connection of optional boards such as I/O expansion board, encoder board, communication boards, fiber optic board, etc.

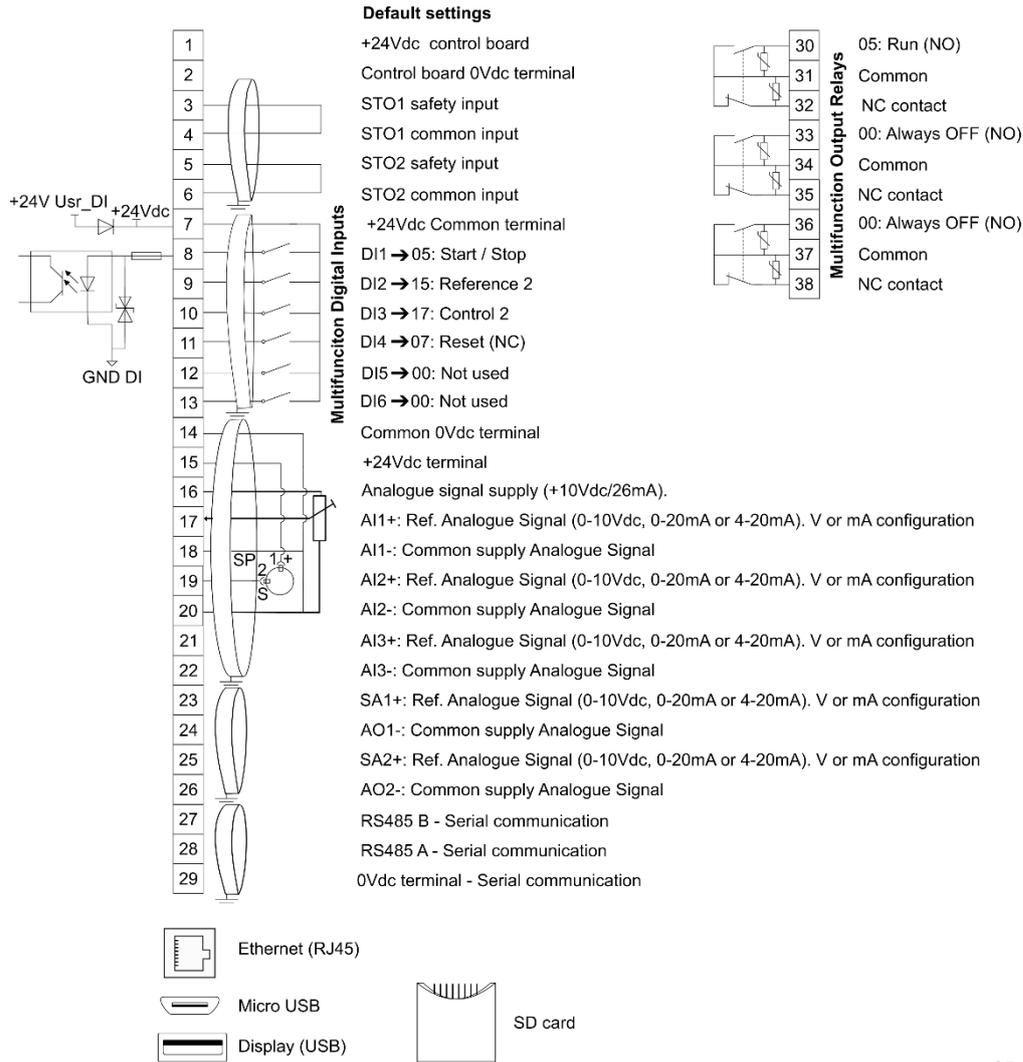


SD75ITC002DI

**Note:** Each expansion board connector is attached to a rack. The following table details, from right to left, the default position of each expansion board connector, with rack No. 1 being the rightmost and rack No. 3 the leftmost.

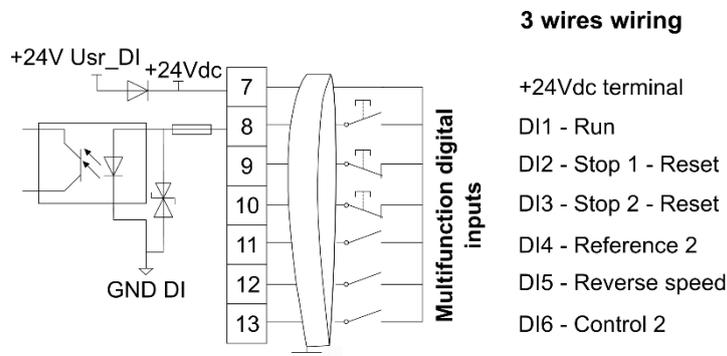
RACK	DEFAULT POSITION
1	O.F. Expansion board (only for parallel equipment).
2	I/O Expansion board.
3	Not used.

The following figure provides a standard wiring overview of the control terminals.



SD75DTC0002EI

Digital inputs can be configured individually or collectively. Analogue inputs can be configured as comparators. For further information on configurations, please refer to the *Software and Programming Manual*. The following figure shows the wiring detail of the X1 connector with the wiring of the three-wire start / stop buttons.



SD75DTC0003BI

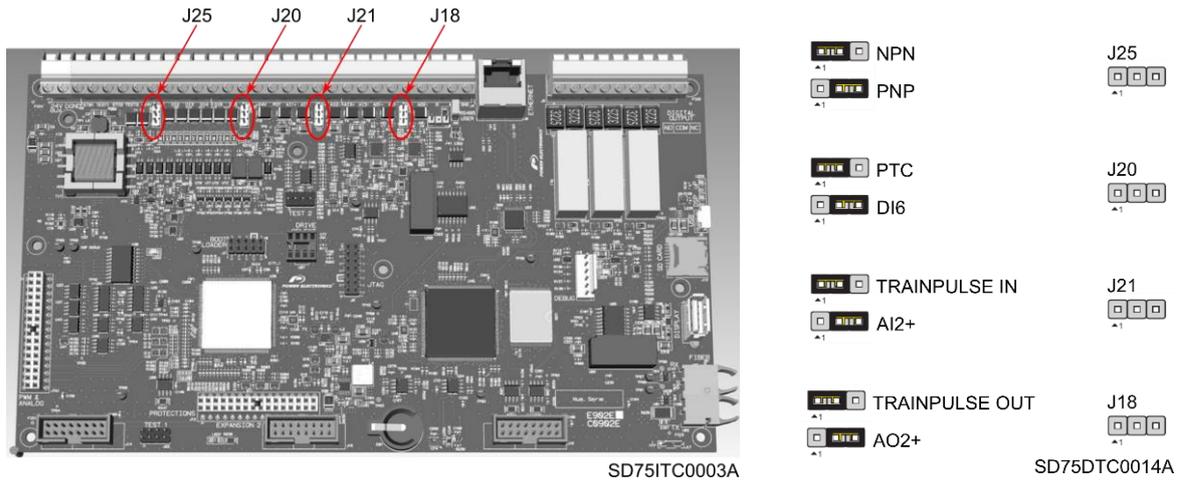
	PIN	SEÑAL	DESCRIPCIÓN
EXT. SUPPL	1	+24Vdc	Power supply 24Vdc control card.
	2	GND	GND control board.
STO FUNCION	3	STO 1[1]	Safety input STO 1.
	4	TEST 1	Safety common input STO 1.
	5	STO 2[1]	Safety input STO 2.
	6	TEST 2	Safety common input STO 2.
DIGITAL INPUTS	7	+24V_USER	Power supply for digital inputs. Protect against short circuit and overload. (Maximum +24Vdc, 180mA).
	8	DI1	Programmable Digital Input 1 (Digital Input 1). Digital inputs are configured in the Input group. Their status can be displayed in the visualization group. It is powered from terminal 7 or from an external power 24Vdc supply. If an external power supply is used, the common must be connected to terminal 29 (GND_USER). Programmable input as PNP and NPN [2].
	9	DI2	Programmable Digital Input 2. Same features as DI1.
	10	DI3	Programmable Digital Input 3. Same features as DI1.
	11	DI4	Programmable Digital Input 4. Same features as DI1.
	12	DI5	Programmable Digital Input 5. Same features as DI1.
	13	DI6	Programmable Digital Input 6. Same features as DI1. Besides, input configurable as digital PTC.
ANALOGUE INPUTS	14	GND_USUARIO	GND connection (0 V) for inputs
	15	+24V_USUARIO	Supply voltage for analog inputs
	16	10V_POT	10V power supply for potentiometer. Ready to supply a maximum of 2 potentiometers ( $R \geq 1k\Omega$ ).
	17	AI1+	Voltage or current Programmable Analogue Input 1 (V o mA). Configurable to 0-10Vdc, 0-20mA or 4-20mA [3]. The value of the input resistance in voltage mode is $R_i = 20k\Omega$ . The value of the input resistance in current mode is $R_i = 250\Omega$ .
	18	AI1-	Common Analog Input 1.
	19	AI2+-	Voltage or current Programmable Analogue Input 2 (V o mA). Configurable to 0-10Vdc, 0-20mA or 4-20mA. The value of the input resistance in voltage mode is $R_i = 20k\Omega$ . The value of the input resistance in current mode is $R_i = 250\Omega$ .
	20	AI2-	Common Analog Input 2.
	21	AI3+-	Voltage or current Programmable Analogue Input 3 (V o mA). Configurable to 0-10Vdc, 0-20mA or 4-20mA. The value of the input resistance in voltage mode is $R_i = 20k\Omega$ . The value of the input resistance in current mode is $R_i = 250\Omega$ .
	22	AI3-	Common Analog Input 3.
ANALOGUE OUTPUTS	23	AO1+	Voltage or current Programmable Analogue Output 1 (V o mA). Configurable to 0-10Vdc, 0-20mA or 4-20mA.
	24	AO1-	Common Analog Output 1.
	25	AO2+	Voltage or current Programmable Analogue Output 2 (V o mA). Configurable to 0-10Vdc, 0-20mA or 4-20mA.
	26	AO2-	Common Analog Output 2.
COMMUNICATIONS	27	RS485 B	RS485 Modbus serial communication interface.
	28	RS485 A	RS485 Modbus serial communication interface.
	29	GND_USER	GND Connection.
DIGITAL OUTPUTS	30	RLY1 NO	Digital Output 1. Programmable change over relay (NO / NC). Potential free (Maximum: 250VAC, 8A; 30VDC, 8A).
	31	RLY1 C	
	32	RLY1 NC	
	33	RLY2 NO	Digital Output 2. Programmable change over relay (NO / NC). Potential free (Maximum: 250VAC, 8A; 30VDC, 8A).
	34	RLY2 C	
	35	RLY2 NC	
	36	RLY3 NO	Digital Output 3. Programmable change over relay (NO / NC). Potential free (Maximum: 250VAC, 8A; 30VDC, 8A).
	37	RLY3 C	
38	RLY3 NC		

<sup>[1]</sup> It is recommended to use double shielded twisted-pair cable for 24Vdc power supply and safety channels. The shield must be grounded as shown in the examples.

<sup>[2]</sup> When a PNP or NPN input is configured, the rest of digital inputs will have to be the same. This means, PNP and NPN inputs cannot coexist.

<sup>[3]</sup> Analogue inputs and outputs are configured individually and through the use of Software. In case of configuring the AI3 in mode PT100, the analogue output (any of the two) must be configured in mode 10mA.

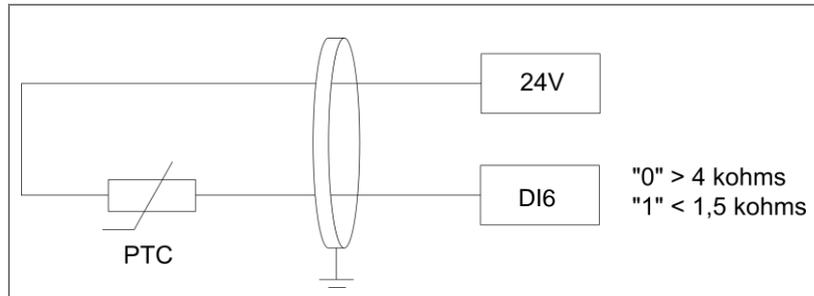
Up next, information about location and use of the jumpers associated to the control board are shown:



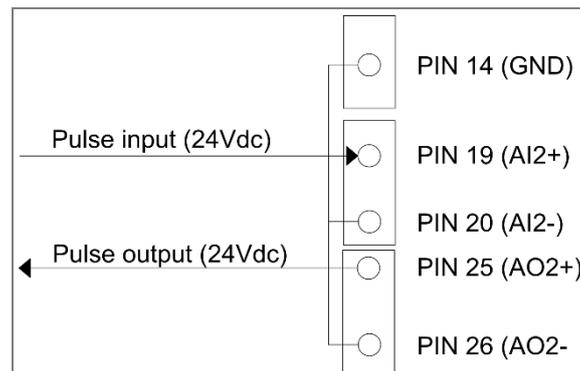
Jumper (Signal)	Description	Positions
J18 (AO2+)	Configures AO2+ as Analogue Output or Pulse Output.	
J20 (DI6)	Configures the AI6 as Digital Input or PTC.	
J21 (AI2+)	Configures the AI2+ as Analogue Input or Pulse Input.	
J25 (DI1 a DI6)	Configures each DIx as NPN or PNP.	

**DI6 (PIN13) PTC sensor input mode.**

It is possible to connect a PTC sensor in the digital input 6 (DI6) so that the equipment acts from a temperature (resistance) value associated to motor's temperature and to allow enabling cooling or stop motor running. It must be considered that sensor resistance does not exceed trigger point (pass from 1 to 0) of the DI6 when motor is under normal conditions of operation temperature. Cable ground screening must be connected only in one end.

**AI2/AO2 (PIN19/25) pulse input/output mode.**

Both analogue input and output 2 can be configured as pulse input/output. To do so, bridge J21 must be connected in the position indicated in the table above and, besides, they must be connected to GND (PIN 14).

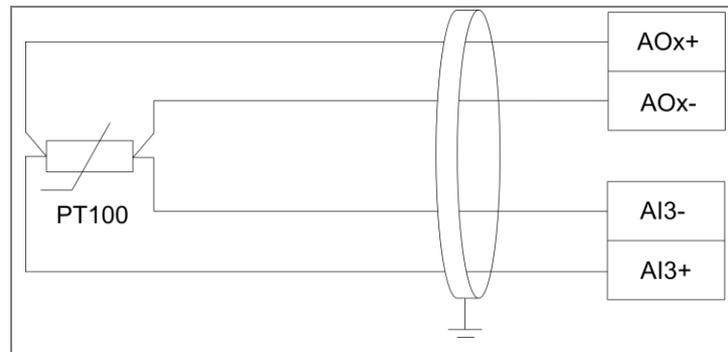


**AI3 (PIN 21/22) PT100 mode.**

The AI3 allows configuring a PT100 sensor. With this sensor, motor temperature can be measured continuously. Ground cable screening must be connected only in one end. For further information about parameter configuration, consult the *Software and Programming Manual*.

**Measurement process:**

- a. The chosen analogue output will be configured in current mode, 10 mA, through software. It is recommended to use analogue output 1.
- b. The analogue input 3 (AI3) will be configured in PT100 mode through software.
- c. A current of 1mA (generated by the analogue output) is injected through the PT100.
- d. Voltage in the analogue input is measured.
- e. With injected current and voltage, the PT100 resistance is calculated.
- f. With the PT100 table, and knowing the resistance, temperature is obtained.

**NOTICE**

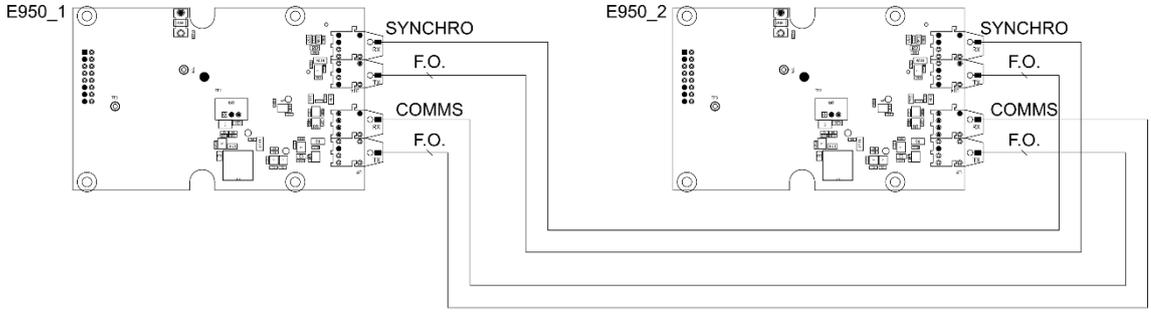
Terminals PIN14 and PIN15 can be used for other functions depending on the inverter bridge characteristics (frequency regulation by external potentiometer, analogue feedback, etc.). to avoid multiple connections in one terminal (PIN 14, PIN 15), it is advisable to add external terminals for supply distribution.

# Fiber optic connections

## Connection between modules

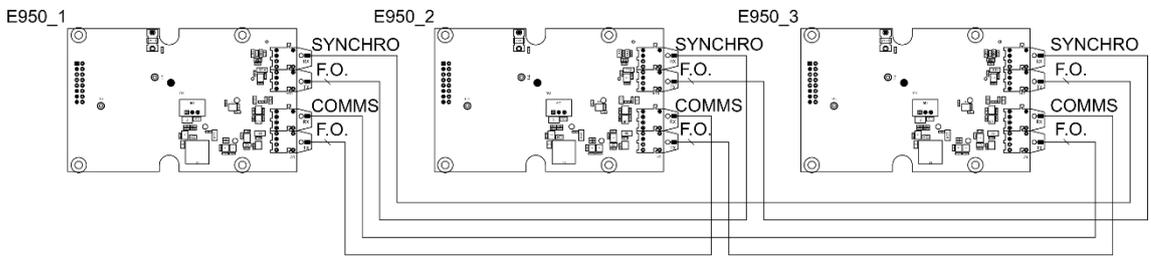
Follow the next electrical schemes to connect up to SD750 Kompakt variable speed drives.

### Connection of 2 modules



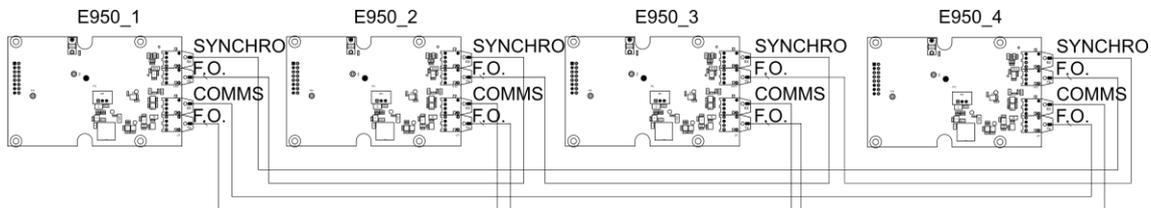
SD75FRDTG003A

### Connection of 3 modules



SD75FRDTG004A

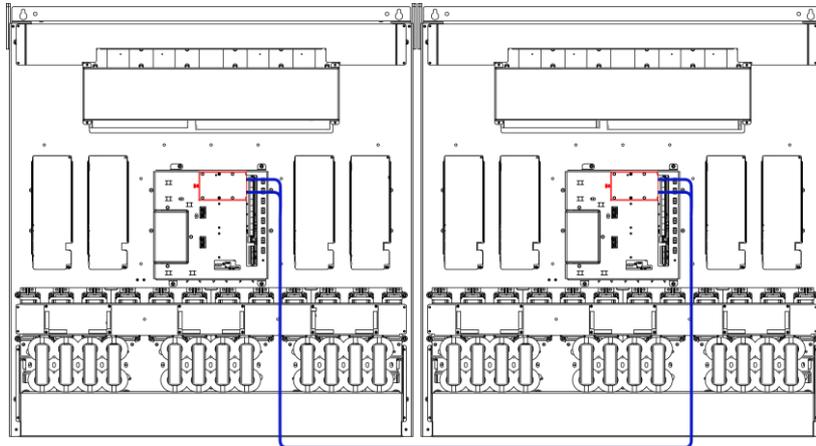
### Connection of 4 modules



SD75KDTG007A

## Wire routing

The image below shows how wiring should be routed for connecting the different modules. Use plastic clamps to hold the optical fiber to the rest of the wires.



SD75KDTG009A



### NOTICE

To perform **the fiber optic connections regarding the inverter part between modules**, refer to the manual of the fiber optic board (SD75MA07).

## STO - Safe Torque Off

The STO function is defined as: *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 three-phase power supply to the stator.

This function corresponds to a Category 0 Emergency Stop 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 STO function integrated as standard in the SD750 Kompakt permits to achieve safety level SIL3 (PLe) for the safe stop function. SIL3 requires the use of an emergency pushbutton. The maximum reaction time of STO function is less than 50ms. See section "Safety Integrity Level SIL3-PLe" for additional information.

By using this function, you can safely carry out cleaning, maintenance or emergency work on non-electric parts of the equipment, without having to disconnect the power supply. In case STO safety function is not used, user must connect the corresponding terminals.

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



### CAUTION

**The STO safety function does not disconnect nor the main neither the auxiliary power supply. With STO function the drive disconnects the motor power supply. To carry out electrical maintenance tasks, isolate the drive. Take particular care with the active conductors inside the drive.** Failure to do so could result in damage to equipment and personnel.

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

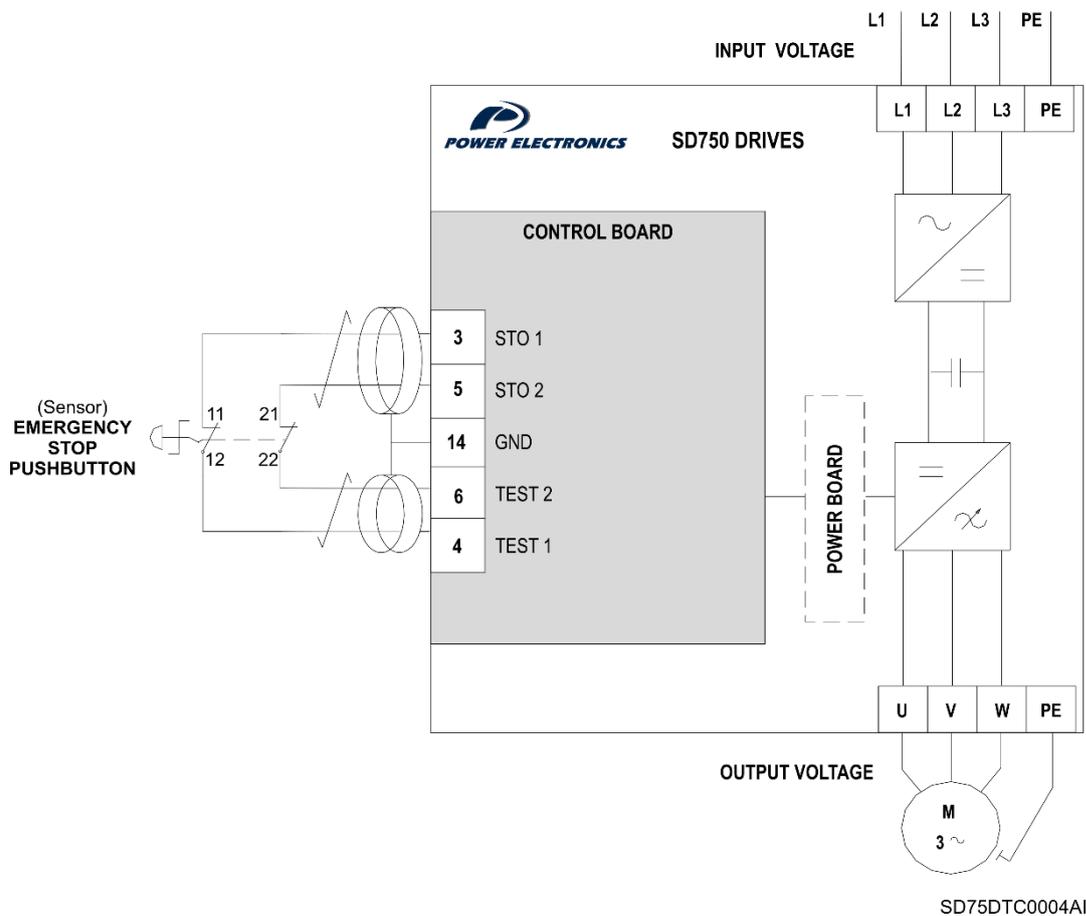
### Safety integrity level SIL3- PLe

This configuration provides a highly reliable safety level. When the sensor is activated due to an emergency situation, the STO function interrupts the power supply to the motor. The motor will stop for its own inertia or will prevent an accidentally start.

The sensors (emergency push buttons, limit switches, etc.) must be certified as safety elements.

The value of the average probability of a dangerous failure per hour (PFH) of all elements applicable to the safety function, must not exceed the limit of the corresponding SIL level. The installation must be performed by trained personal with experience in functional safety.

**Example 1: Safety function with automatic restart by emergency stop buttons (SIL3, PLe).** It is mandatory that the stop button has 2 closed contacts (NC) that will be connected to the safety inputs of the relay.

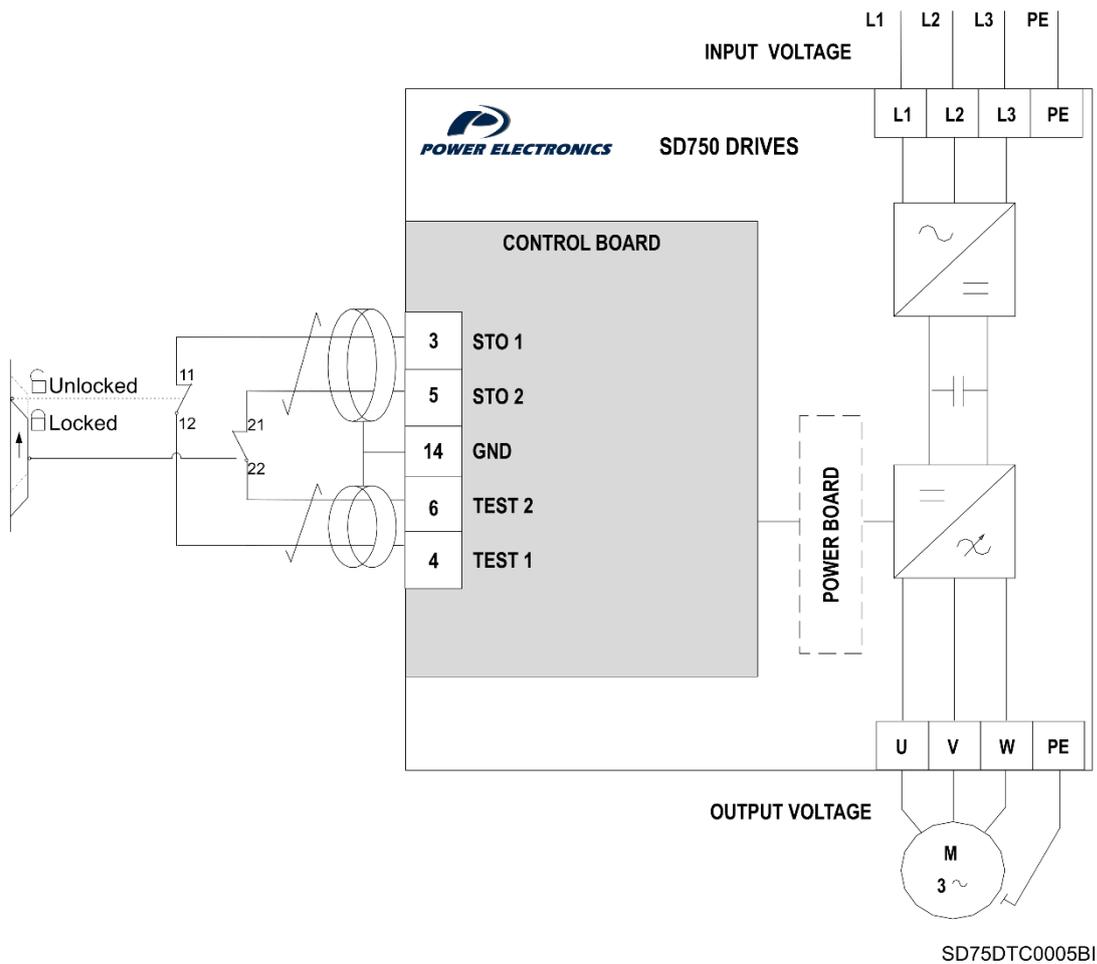


 **CAUTION**

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

**Example 2: SIL3 (PLe) Safety door opening 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 pushbutton will be installed to force a relay manual restart and a lamp connected to the NC close contact to indicate it.



## CAUTION

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

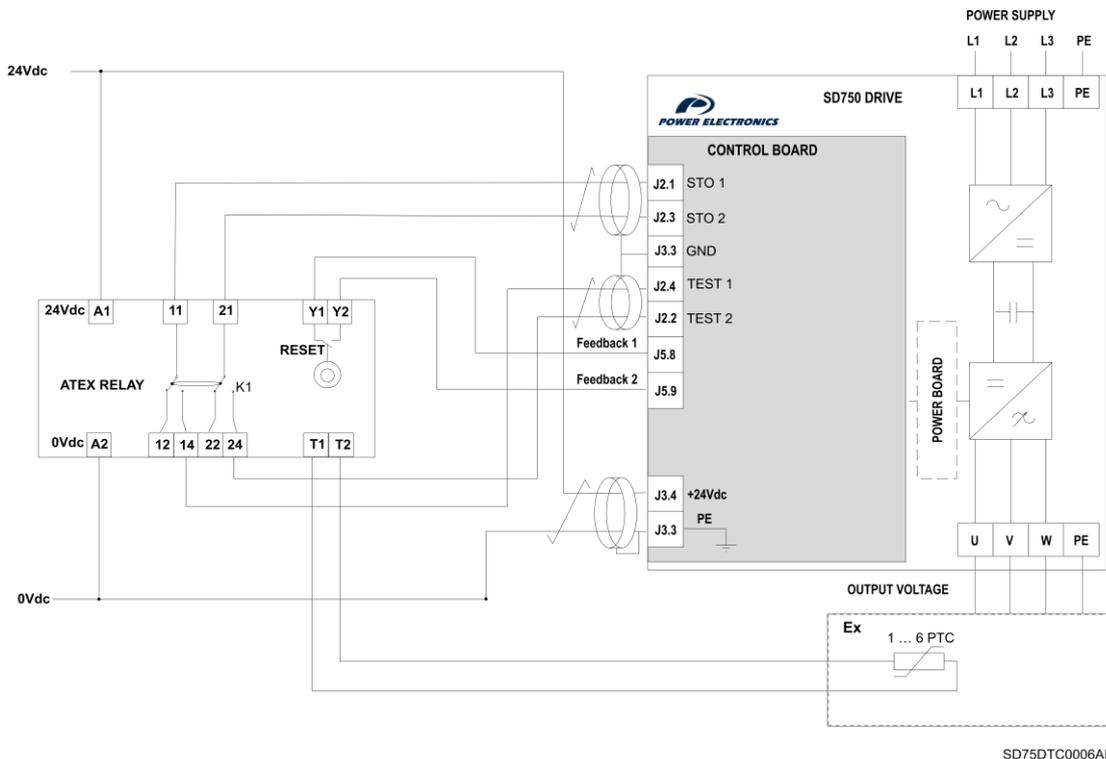
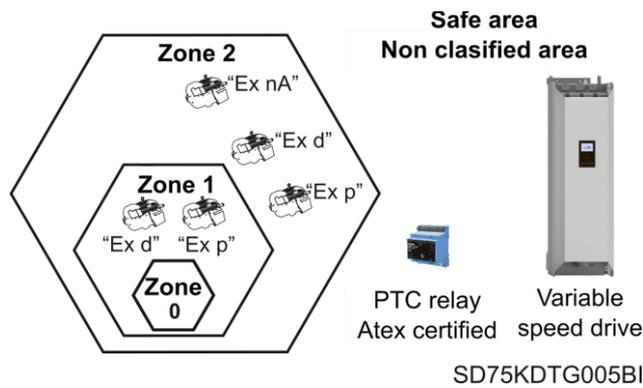
According to EN 60204-1 automatic restart is not allowed after an emergency stop. For this reason, the machine control must prevent an automatic start after an emergency stop.

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

# Connection with ATEX motors

The ATEX standard is related to the use of machinery, installations and equipment in areas with a potentially explosive atmosphere. In the European Union, the use of equipment in these areas. Is regulated by two complementary directives: Directive 1999/92/EC for the installation environment and worker’s 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 limitation of equipment that can be installed in each of them.

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 motor and ATEX zone combinations, consult Power Electronics.



As shown in the figure above, the SD750 Kompakt drive and the ATEX relay must be installed in a safe zone, outside the ATEX zone. This solution is valid for motors with "Ex d" or "Ex p" protection installed in zones 1 and 2, or motors with "EX nA" protection installed in zone 2. The external relay must be certified for ATEX zones and must be compatible with the following features: 24 Vdc power supply voltage, 2 safety inputs, at least 2 open contacts and reset function. (Example: ZIEHL - PTC MSR 220Vi).

The SD750 Kompakt series features a  $dV/dt$  filter and a unique CLAMP<sup>3</sup> system that reduces  $dV/dt$  and voltage peaks in the motor windings. This reduces the risk of voltage leaks in the windings, motor overheating and leakage currents through the bearings. In addition, it is possible to regulate the thermal protection of the motor, thus increasing the protection against overheating in the motor. In self-ventilated motors, the inverter may require an oversizing according to the derating curves provided by the motor manufacturer.

EN

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<sup>3</sup> Only in equipment with rated voltage of 690 Vac.

# 9. MODBUS COMMUNICATION

## 9

### Introduction

To guarantee a correct operation of the drive, peripheral elements must be correctly selected and properly connected. A wrong installation and / or application could cause a wrong operation of the system or a reduction of the long life of the equipment, as well as damage to the components. This manual should be read and understood carefully before proceeding.

The purpose of the Serial Communication Bus of the SD750 Kompakt drive is to integrate the drive itself into a network compatible with the Modbus communications protocol. This is possible using the physical communications ports RS485, Ethernet or USB port.

The Modbus communications system allows the SD750 Kompakt drive to be controlled and / or monitored as a slave by a Modbus master from a remote location.

The RS485 network allows to connect up to 240 computers on the same network.

The SD750 Kompakt drive operates as a peripheral slave when connected to a Modbus system. This means that the drive does not initiate the communication task, the master will start the task instead.

Virtually all of the drive operating modes, parameters and drive characteristics are accessible through serial communications. As an example, the master can give command to start and stop the drive, check the status of the SD750 Kompakt, read the current consumed by the motor, etc. The master mode can access all the possibilities of the drive.

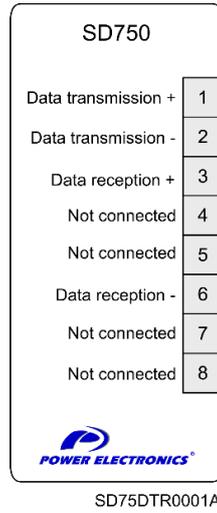
## Hardware technical specifications

ETHERNET	Physical level	8 cables, half and full duplex, RJ45 ending
	Terminals	1 → Transmission data +
		2 → Transmission data -
		3 → Reception data +
		4 → Not connected
		5 → Not connected
		6 → Reception data -
		7 → Not connected
		8 → Not connected
	Type of wiring	Ethernet 10Base-T, Ethernet 100Base-TX
Data Interconnection Protocol	Modbus TCP/IP, Ethernet/IP Supports DHCP auto-addressing	
Data Transfer Rate	10Mbps, 100Mbps, auto-negotiation 10 / 100	
Compliance Standards	IEEE 802.3, IEEE 802.3u (only for 100Base-TX)	
Maximum cable length	100m per network segment	
RS485	Physical level	2 cables, optically insulated, half duplex, RS485 differential mode
	Terminals	27 → RS485 A (negative)
		28 → RS485 B (positive)
		29 → 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 SD750 Kompakt 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, it is necessary to install the proper drivers. To this, simply access to the information of the appropriate model in: <a href="http://www.ftdichip.com/Drivers/VCP.htm">http://www.ftdichip.com/Drivers/VCP.htm</a> From this site you can download the required files and complete their correct installation.

**Note:** For the installation of the driver in the Host of the SD750 Kompakt USB, it is only necessary to indicate the driver at the time of the installation. The USB device will be detected by the operating systems XP or later versions. 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.

## Ethernet connection

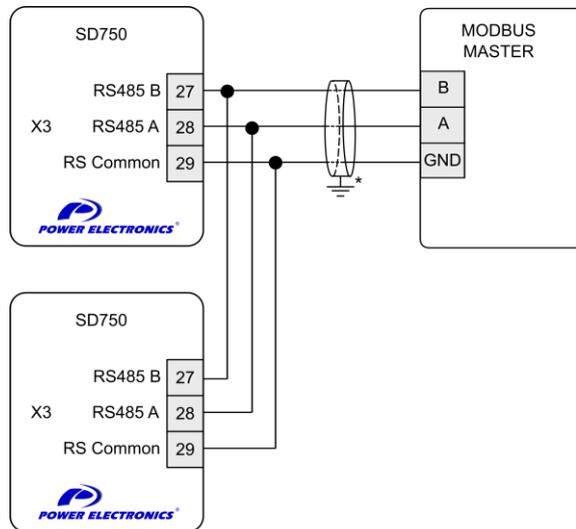
The following diagram shows the common wiring for an Ethernet connection:



To configure the connection, it is necessary to define the port and default IP address, among others. Refer to the *Software and Programming Manual*.

## RS485 connection

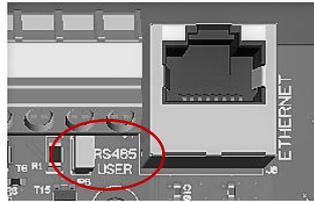
The following diagram shows a common wiring for a RS485 connection:



\* Screen connection must be performed on the side of the Modbus master or on the other side depending on the installation.

SD75DTR0002CI

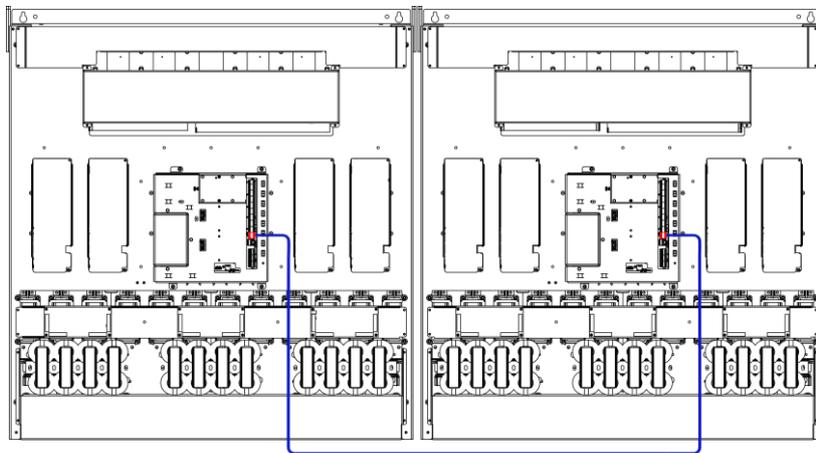
It is recommended to connect the jumper "RS485 USER" at the first and the last device of the RS485 communication network, to connect the end of line resistor.



To configure the connection, it is necessary to define the port and default IP address, among others. Refer to the *Software and Programming Manual*.

## Wire routing

The image below shows how wiring should be routed for connecting the different modules. Use plastic clamps to hold the wires.



SD75KDTG008A

# 10. COMMISSIONING

## 10



### CAUTION

**Only qualified personnel are allowed to commission the drive. Read carefully and follow the safety instructions of this manual.**

Failure to do so may result in damage to the equipment and you may suffer an electric shock.

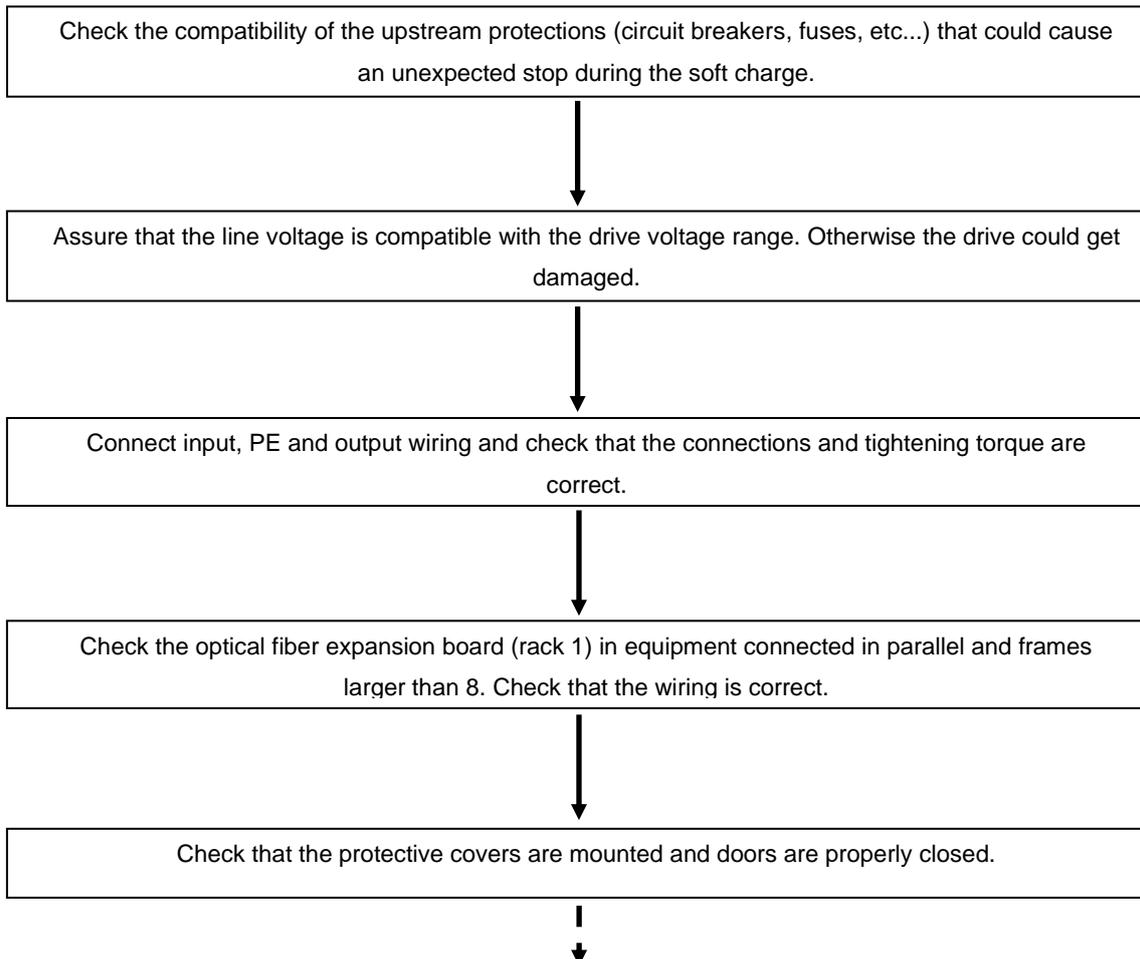
**Make sure that there is no voltage at the power terminals. Make sure that voltage is not connected to the computer unexpectedly.**

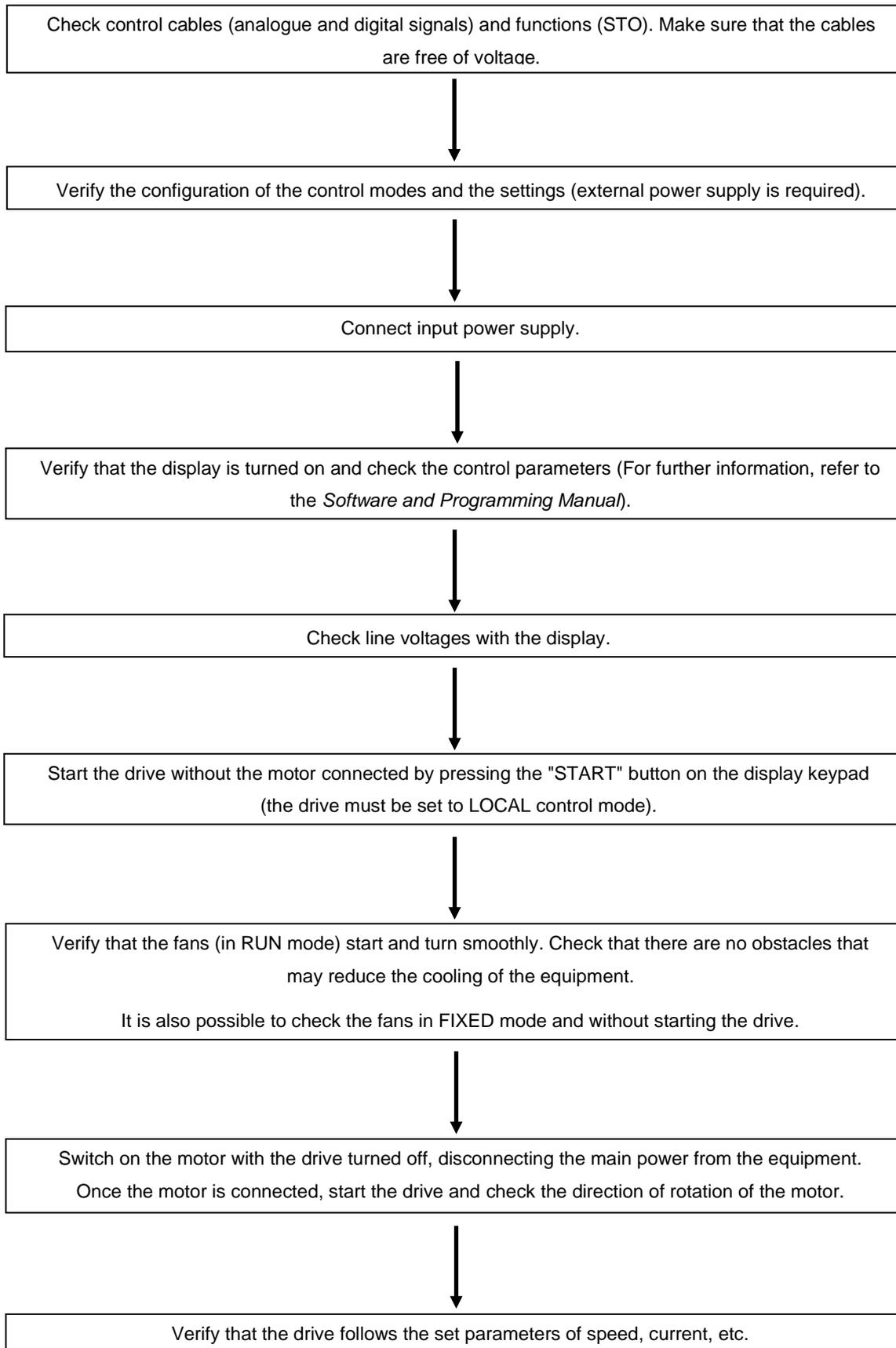
**This section does not include all the tasks to be performed during the commissioning of the equipment. Follow local and national regulations.**

**If the equipment is stored for an extended period (more than 6 months) before installation, the recommendations from section “Extended storage” must be taken into account.**

Ensure all the instructions on such section have been followed before starting the commissioning of the equipment.

For a proper commissioning, follow the next steps:





# 11. INDUCTANCES

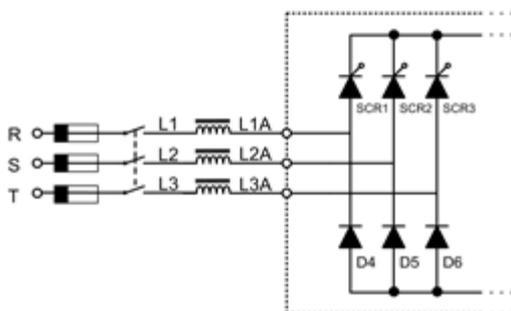


## Inductances for SD750 Kompakt drive

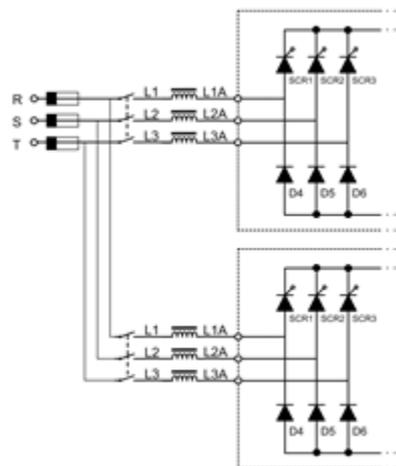
400 - 480Vac

DRIVE			INDUCTANCE			
FRAME	CODE	REFERENCE	I (A)	QUANTITY	CONNECTION	WEIGHT (kg)
1	SD75K0260 5BCDE	P246B	250	1	Type A	33
	SD75K0320 5BCDE					
	SD75K0340 5BCDE	P256A				
2	SD75K0400 5BCDE	P256A	370	1	Type A	65
	SD75K0450 5BCDE					
	SD75K0570 5BCDE	P233A				
3	SD75K0700 5BCDE	P297A	2x290	2	Type B	2x48
	SD75K0800 5BCDE	P298A	2x360	2	Type B	2x43
	SD75K0900 5BCDE					
4	SD75K1050 5BCDE	P233A				
	SD75K1140 5BCDE					
	SD75K1230 5BCDE					

Connector Type A



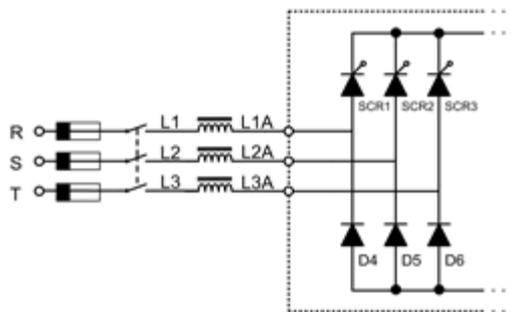
Connector Type B



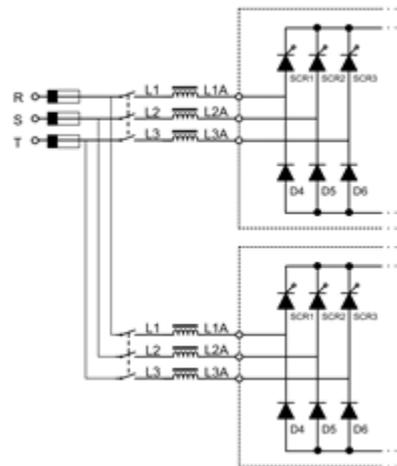
## 525Vac

DRIVE			INDUCTANCE			
FRAME	CODE	REFERENCE	I (A)	QUANTITY	CONNECTION	WEIGHT (kg)
1	SD75K0160 7BCDE	<b>P317B</b>	210	1	Type A	40
	SD75K0180 7BCDE	<b>P246B</b>	250	1	Type A	33
2	SD75K0210 7BCDE	<b>P233A</b>	500	1	Type A	53
	SD75K0250 7BCDE					
3	SD75K0310 7BCDE	<b>P297A</b>	2x290	2	Type B	2x48
	SD75K0400 7BCDE					
	SD75K0480 7BCDE					
4	SD75K0570 7BCDE	<b>P298A</b>	2x360	2	Type B	2x43
	SD75K0680 7BCDE					
	SD75K0825 7BCDE					
4	SD75K0160 7BCDE	<b>P233A</b>	2x500	2	Type B	2x53
	SD75K0160 7BCDE					

Connector Type A



Connector Type B

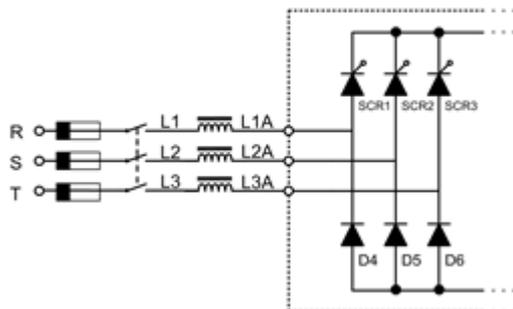


EN

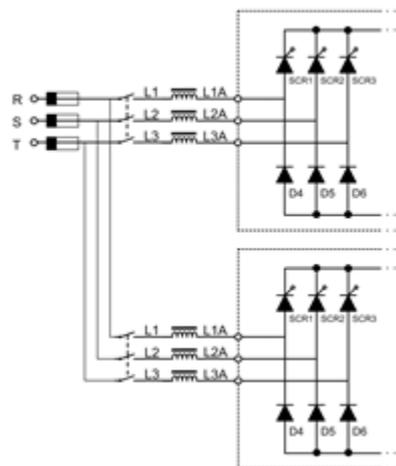
**600 - 690Vac**

DRIVE			INDUCTANCE			
FRAME	CODE	REFERENCE	I (A)	QUANTITY	CONNECTION	WEIGHT (kg)
1	SD75K0160 6BCDE	<b>P316B</b>	170	1	Type A	33
	SD75K0180 6BCDE					
	SD75K0210 6BCDE					
2	SD75K0250 6BCDE	<b>P317B</b>	210	1	Type A	40
	SD75K0310 6BCDE	<b>P318A</b>	330	1	Type A	62
	SD75K0400 6BCDE					
3	SD75K0480 6BCDE	<b>P319B</b>	2x230	2	Type B	2x42
	SD75K0570 6BCDE					
4	SD75K0680 6BCDE	<b>P318A</b>	2x330	2	Type B	2x62
	SD75K0825 6BCDE					

**Connector Type A**

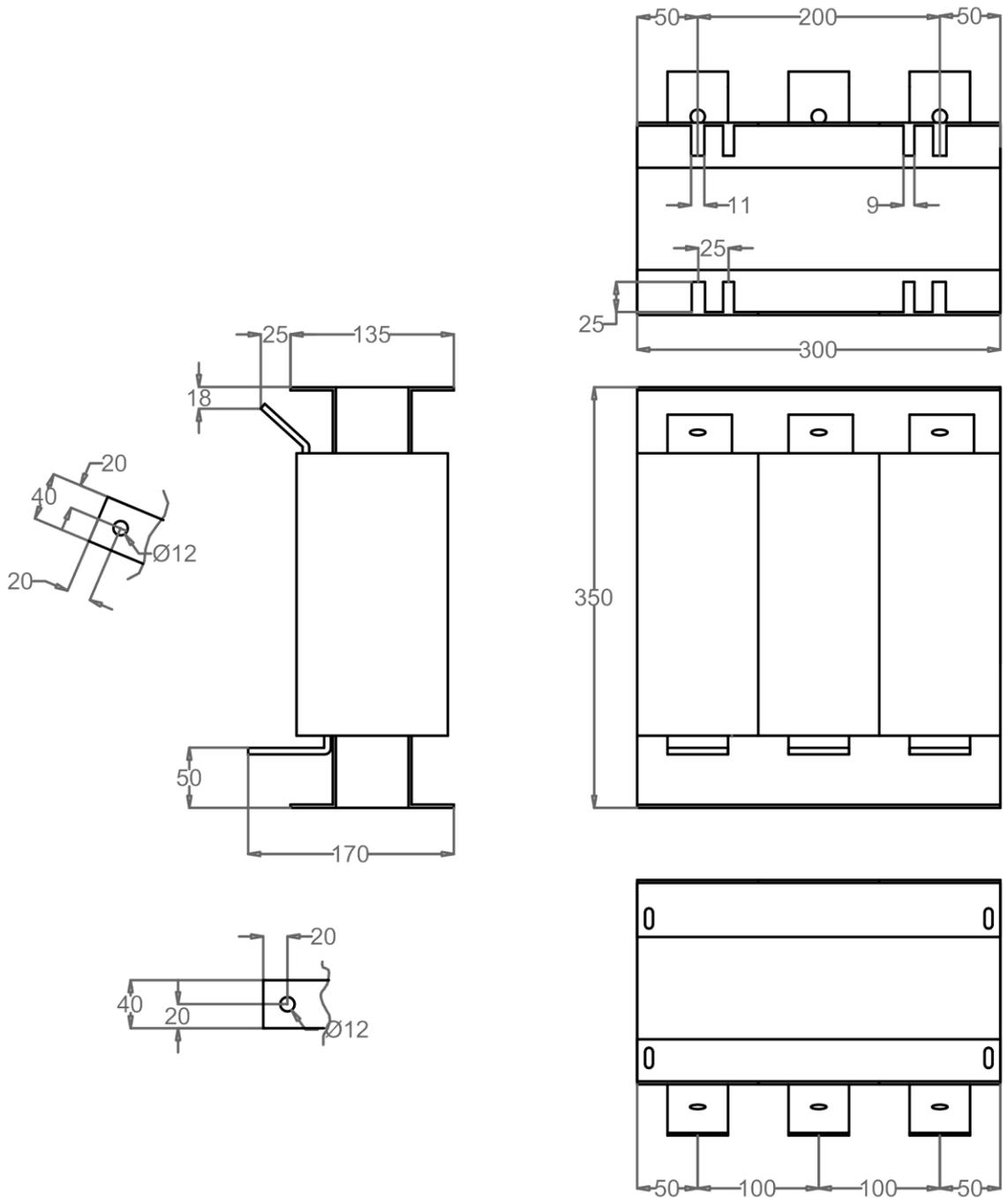


**Connector Type B**



## Dimensions of inductances

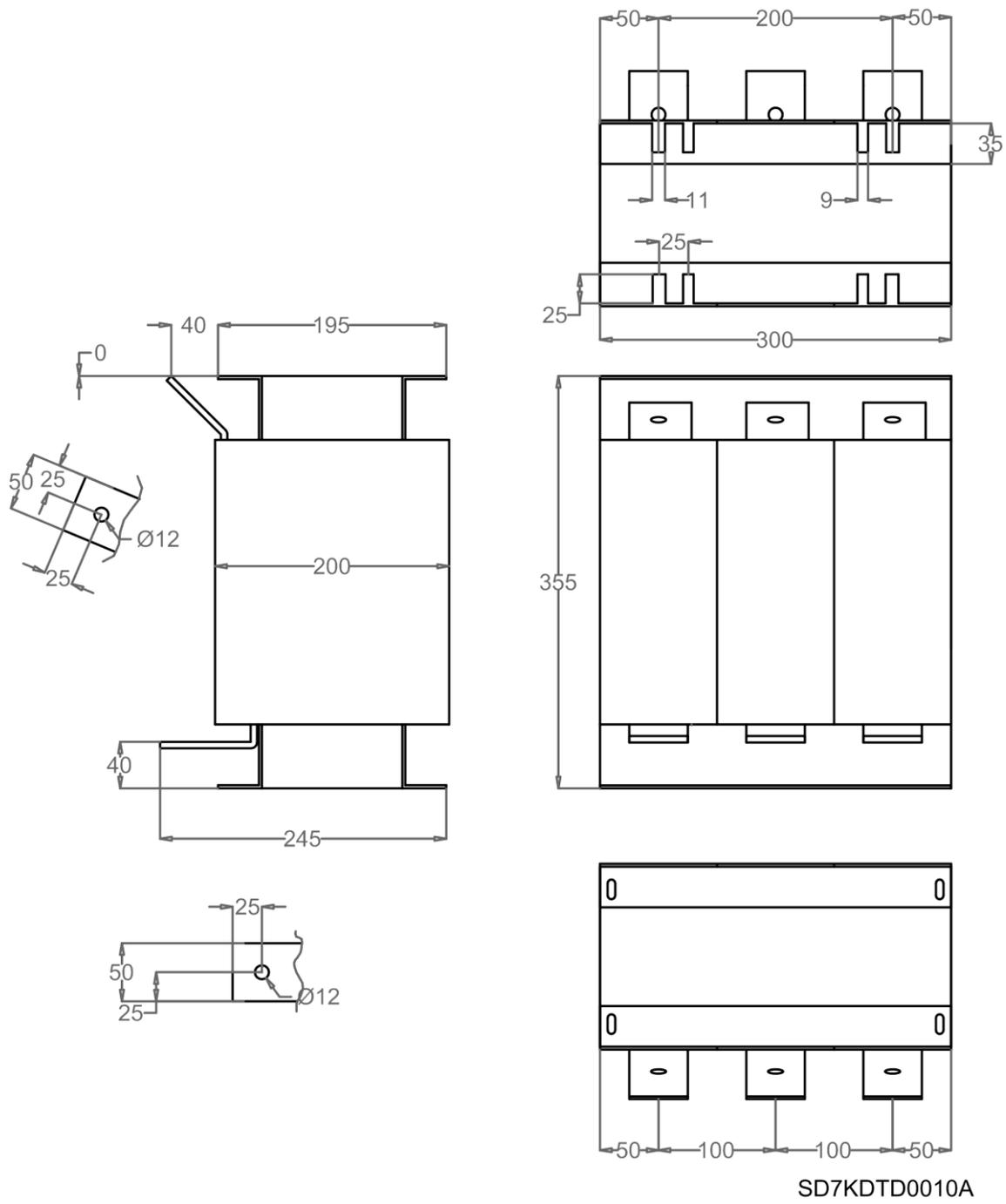
### P246B Inductance



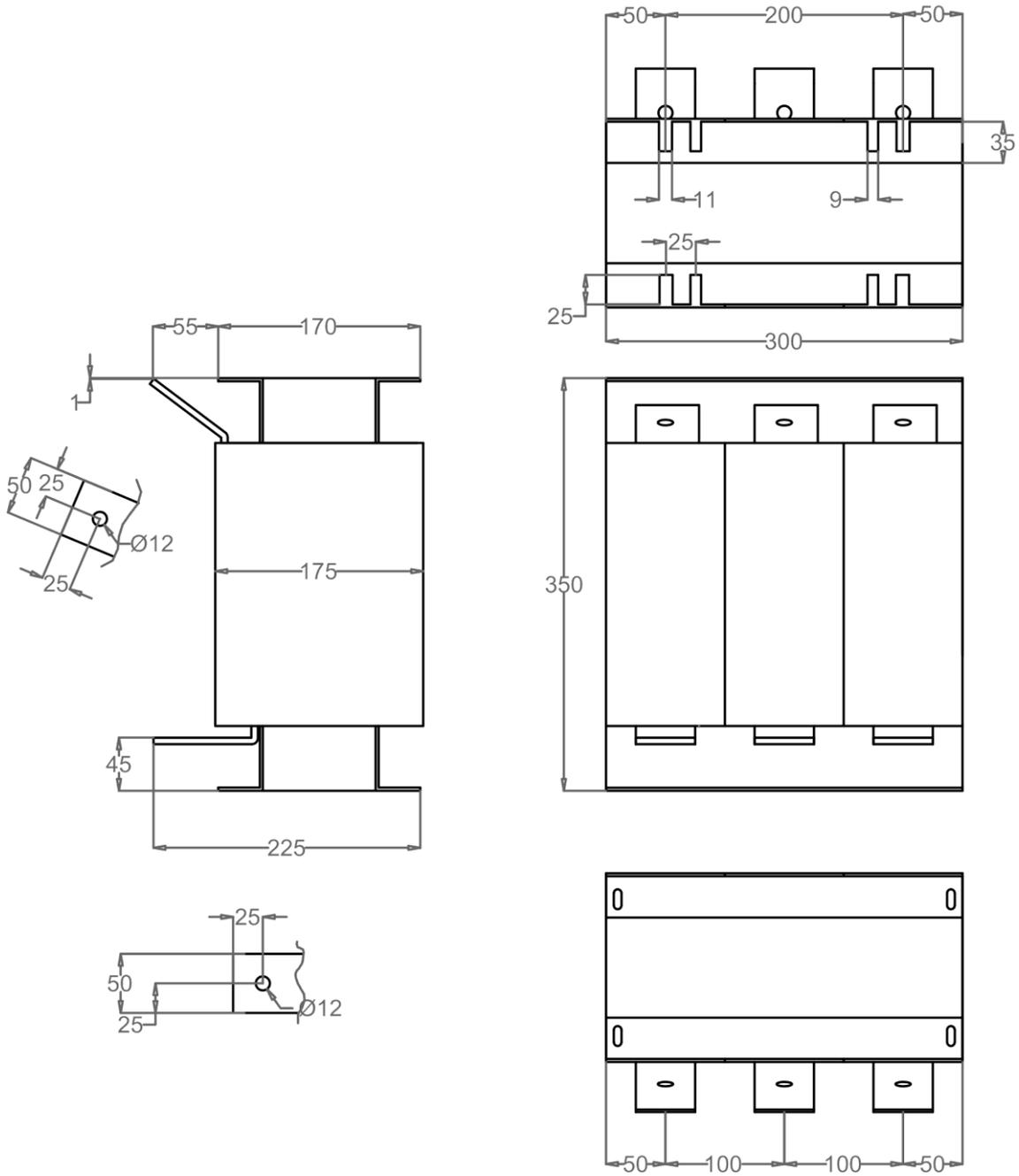
EN

SD7KDTD0009A

### P256A Inductance



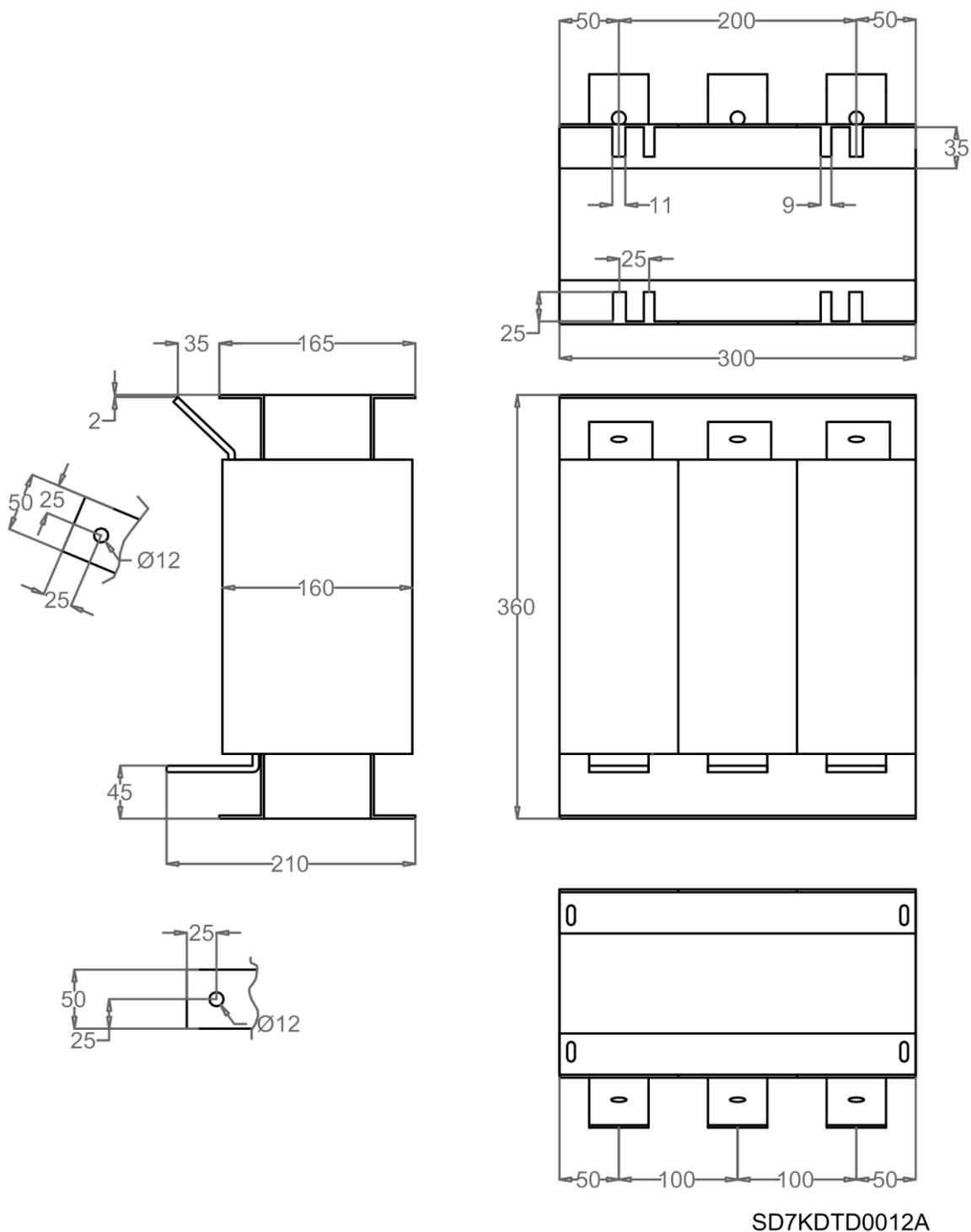
**P233A Inductance**



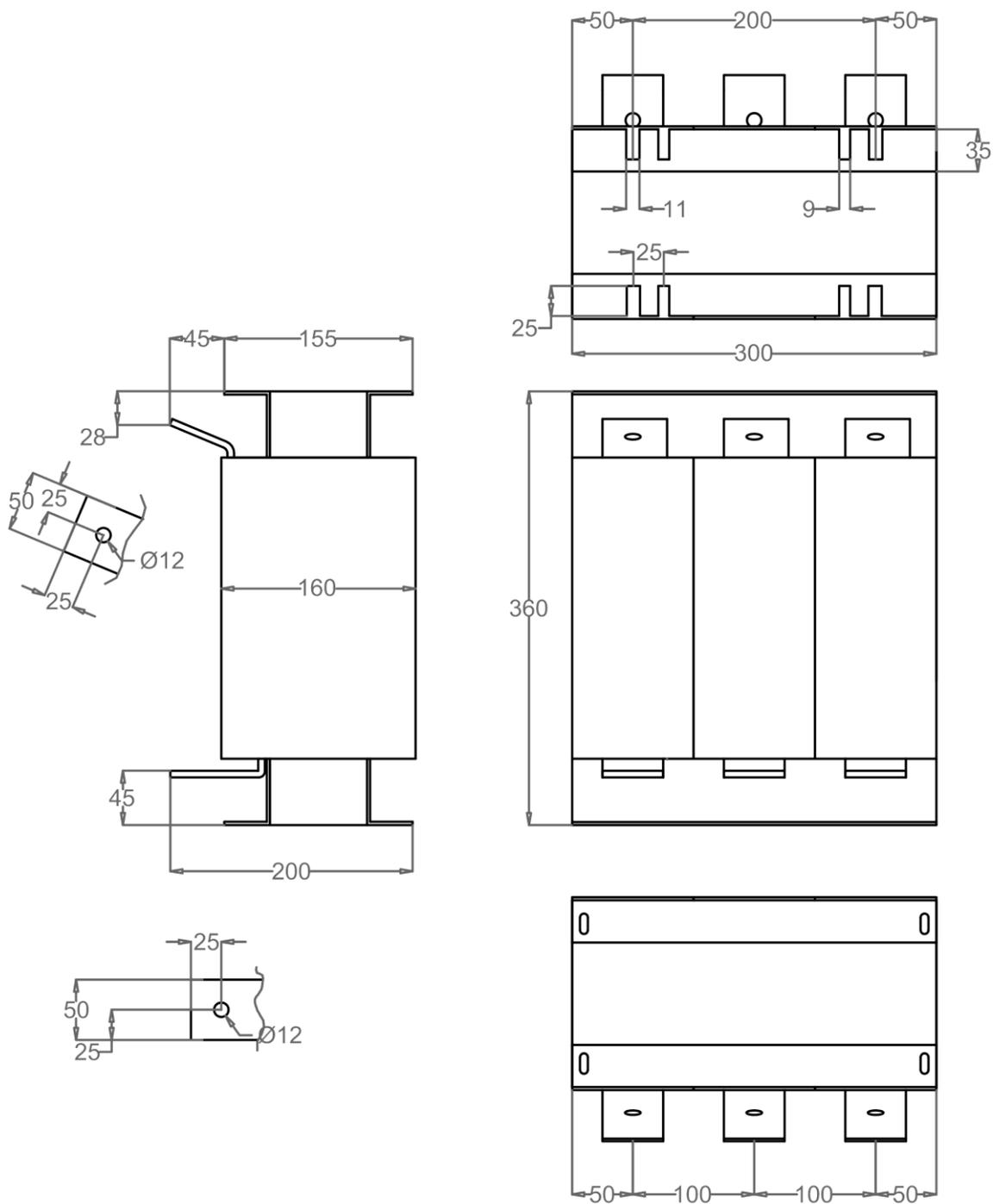
EN

SD7KDTD0011A

### P297A Inductance



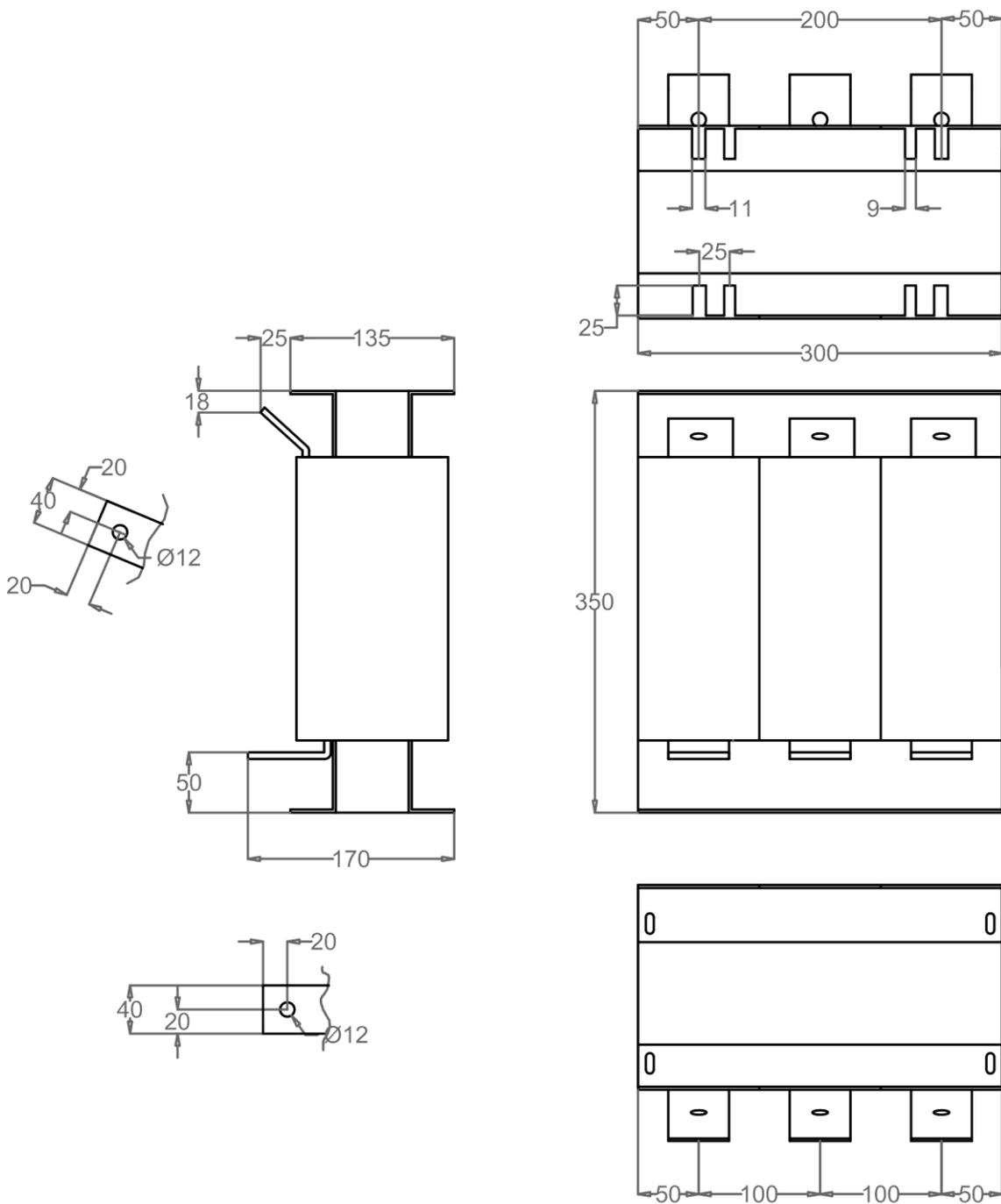
## P298A Inductance



SD7KDTD0013A

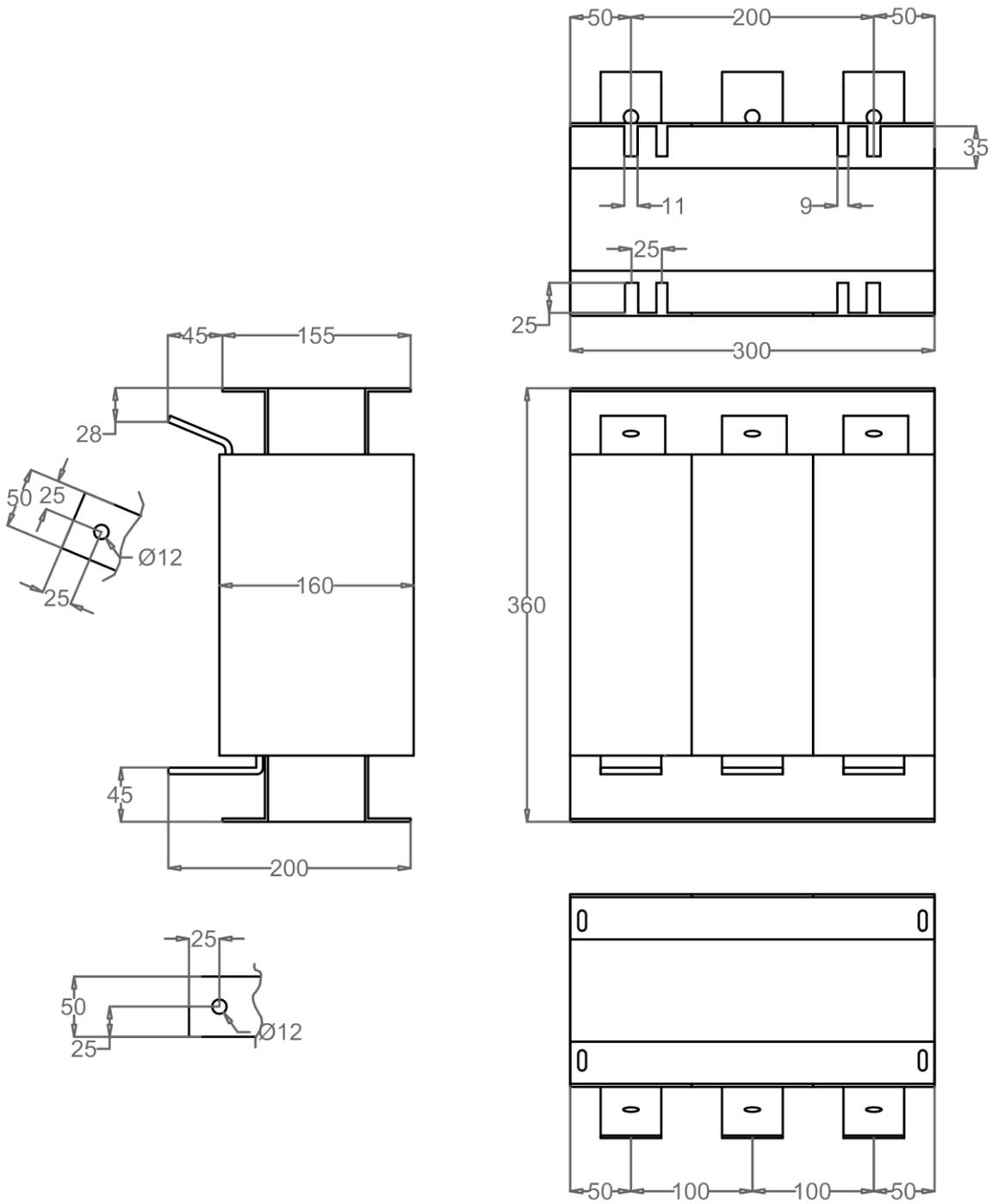
EN

### P316A Inductance



SD7KDTD0014A

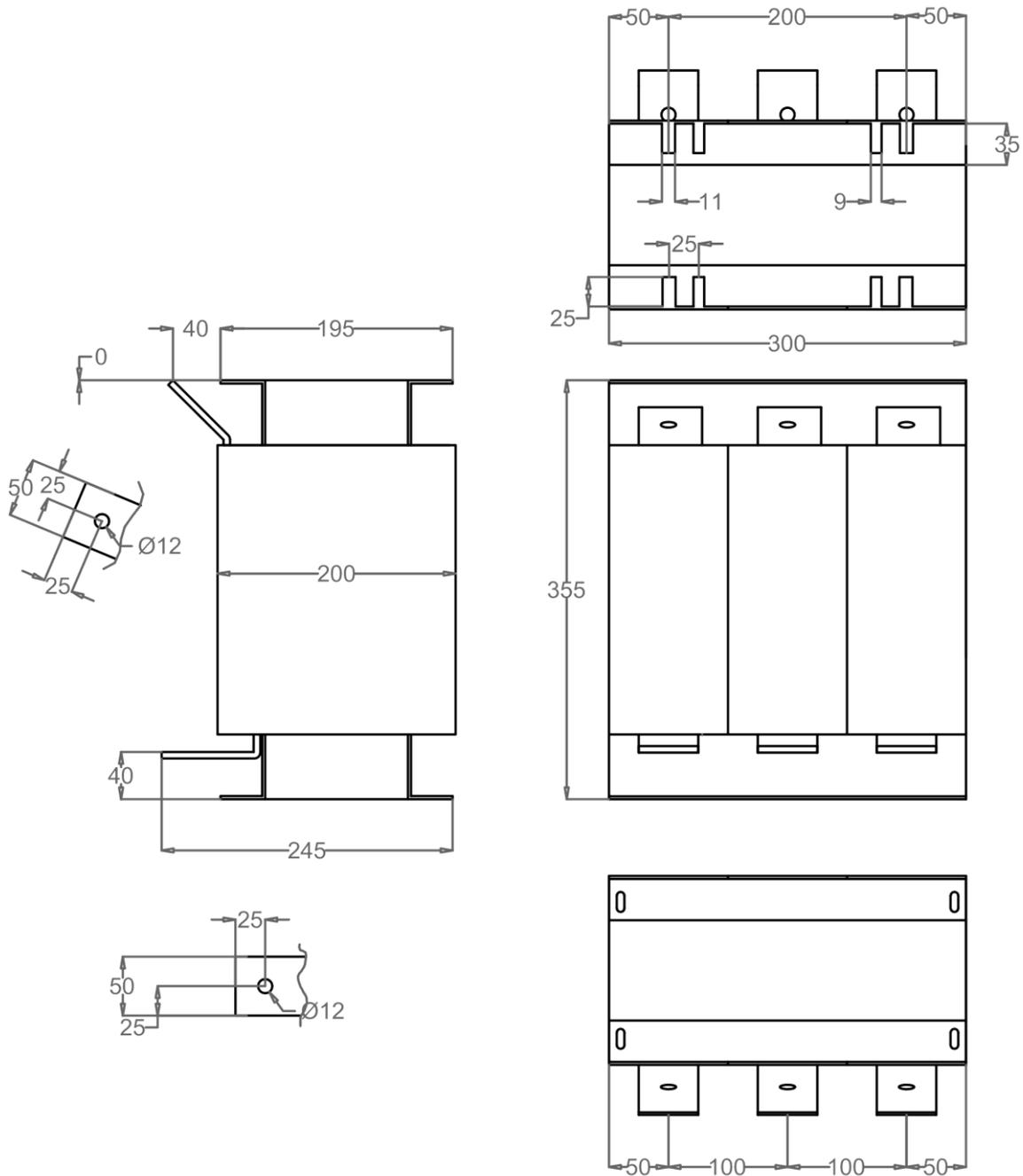
**P317A Inductance**



EN

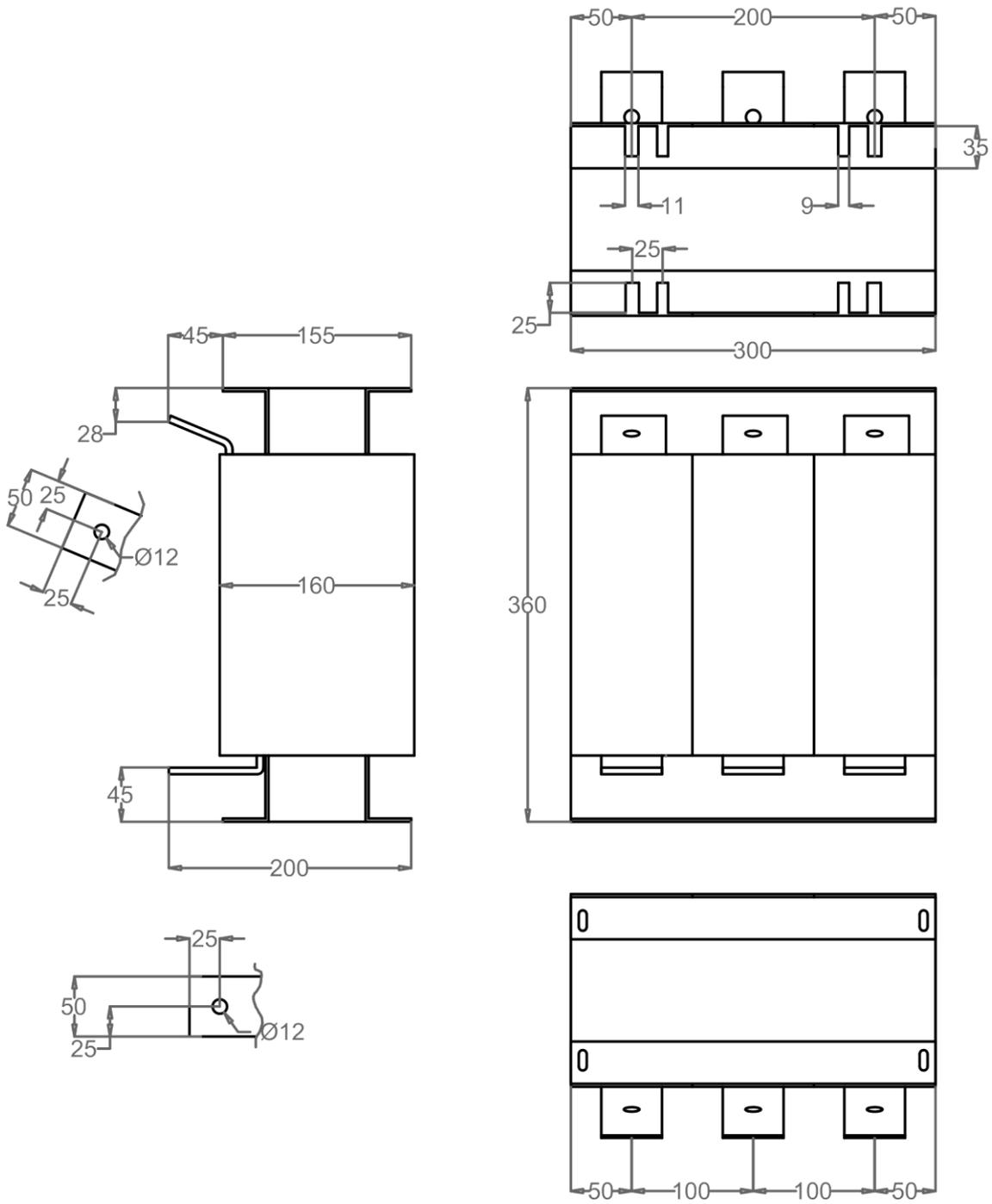
SD7KDTD0015A

### P318A Inductance



SD7KDTD0016A

**P319A Inductance**



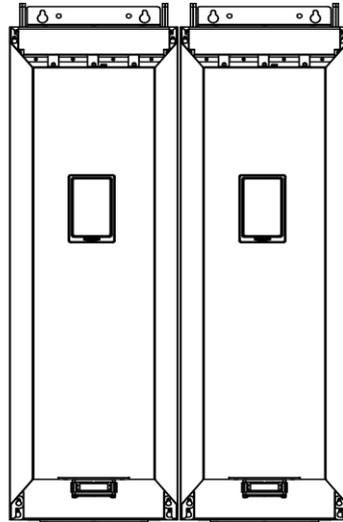
EN

SD7KDTD0017A

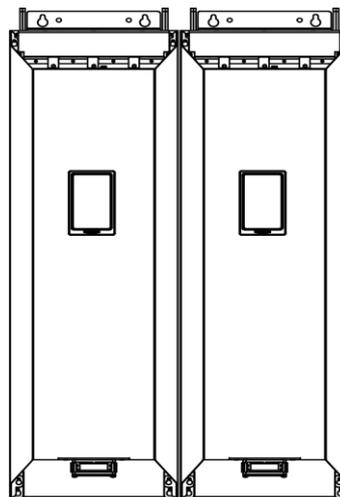
## Location of inductances

The following pictures show two examples of the location of the inductances when connecting more than one equipment to each other.

### Two SD750 Kompakt frame 1



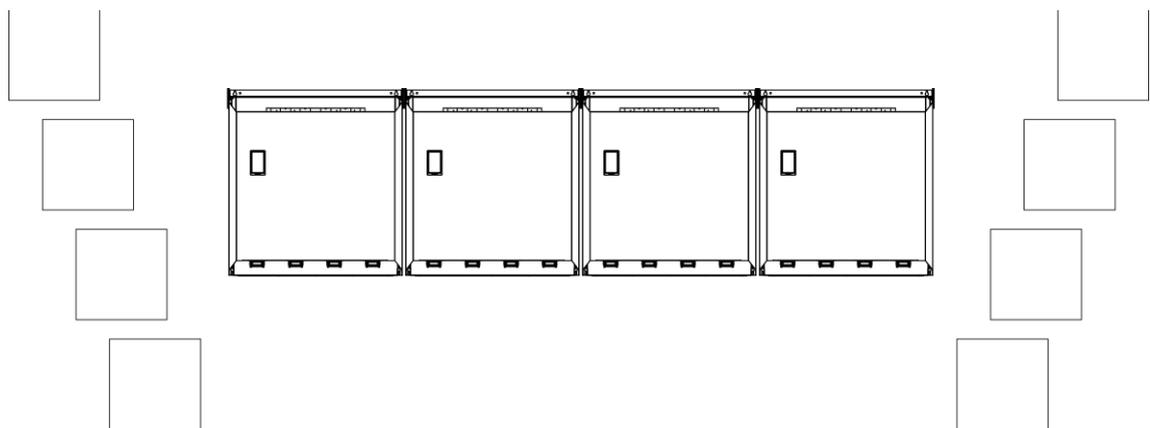
SD75KDTG012A



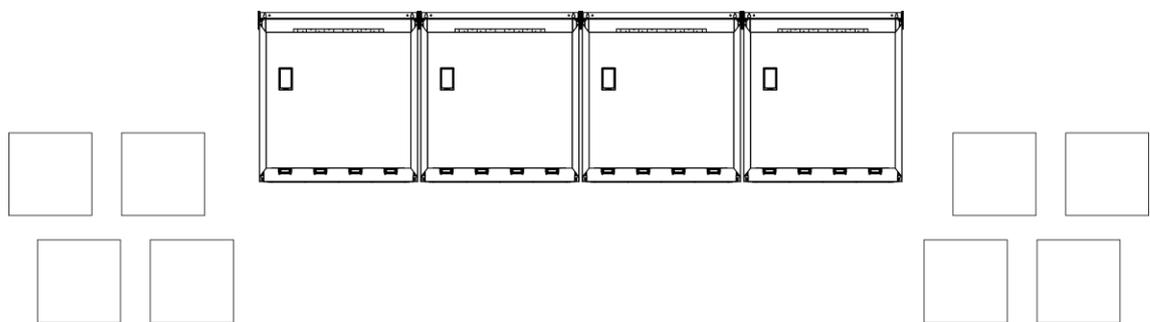
SD75KDTG013A

**Four SD750 Kompakt frame 4**

Take into account that frames 3 and 4 need two inductances when they are connected to another drive.



SD75KDTG010A



SD75KDTG011A

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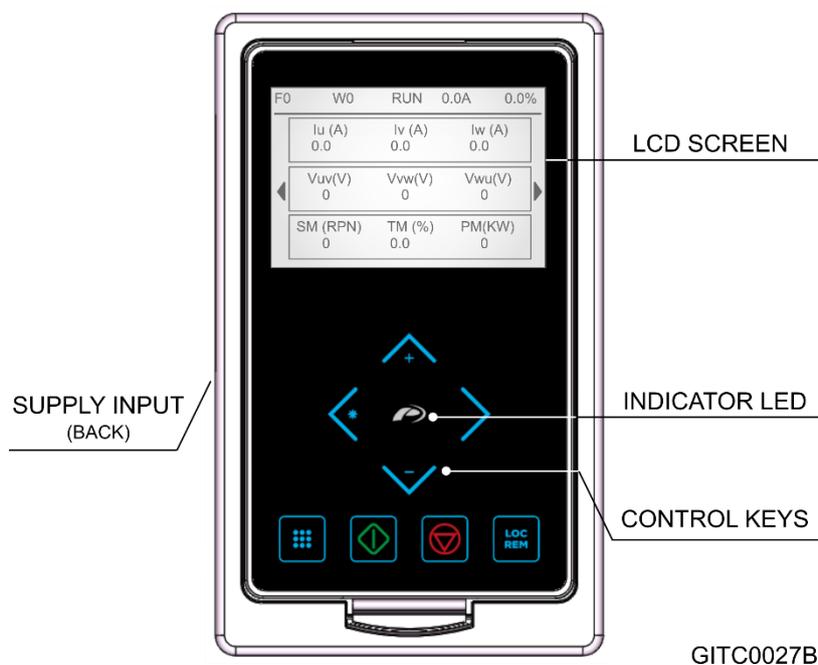
## 12. USE OF THE DISPLAY

# 12

The SD750 Kompakt drive has two types of screens, a monochrome graphics and an optional, tactile and color. Both screens provide intuitive data presentation, easy navigation through the control parameters and allow thousands of customized configurations to be stored by the user.

### Graphic display

The graphic display is a removable display unit for remote installation. It is shown in the following figure. There is a built-in LED indicator on the display that provides information on the operating status of the device. In addition, there is a 2.8" LCD screen and eight control keys.



The LED indicator generates three different colors depending on the status of the drive, which indicates the following information:

- Yellow: Warning
- Red: Fault
- Green: Running

# 13. MAINTENANCE

13

The SD750 Kompakt drives are industrial electronic products that contain advanced semiconductor elements. For this reason, temperature, humidity, vibrations and worn components can affect performance. To avoid any possible irregularities, it is recommended to carry out periodic inspections.



## WARNING

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**Ensure to follow all instructions to safely carry out maintenance tasks.**  
Otherwise, you could cause damages to the equipment and personnel.

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## Warnings

Make sure to remove the input power while performing maintenance.

Make 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. **Wait until the capacitors have been discharged** before carrying out any maintenance task.

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.

## Routine Inspection

It is necessary to perform periodic inspections of the drive. The frequency of the tasks shown in the table below are recommended, the times indicated depend on the working conditions in each case.

Tasks with monthly recommendation must be performed, at least, every three months.

Make 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.

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Inspection site	Inspection element	Inspection	Period			Inspection method	Criterion	Instrument of Measurement
			Monthly	3 months	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 GND.		Digital multimeter. Tester.
	Power connections	Are the Power terminals correctly fastened?		o		Measure the temperature and torque of the power connections	Fasten the bolts again one week after its start-up. Check that the temperature is homogeneous and below 70°C	Infrared thermometer, Torque key
Main circuit	Conductor/ Cable	Is the conductor corroded? Is the sheathing of the cable damaged?		o		Visual check.	No anomaly.	
	Terminal	Is any damage visible?		o		Visual check.	No anomaly.	
	IGBT's module Diodes module and Rectifier	Check the resistance value between each one of the terminals			o	Disconnect the cables of the inverter and measure the resistance value between: L1, L2, L3, ⇔ VDC+, VDC- and U, V, W ⇔ VDC+, VDC- with a tester > 10kΩ		Digital multimeter. Analogue tester.
	Correct capacitor	Have fluid leakages been observed? Is the capacitor well fastened? Is any dilation or retraction sign observed? Measure the capacitance	o	o	o	Visual check. Measure the capacitance with a proper instrument.	No anomaly Capacitance higher than 85% of rated capacitance. See the capacitance of the bus at the end of this section.	Instrument for measuring capacity.
	Input Inductances	Is there any liquid leak? Is there any overheated point?		o	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	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	o		Disconnect the power supply (OFF) and rotate the fan manually. Check the connections.	Fan should rotate effortlessly. No anomaly.	
	Dust filters	Are the dust filters obstructed?		o		Visual check	No anomaly	

Inspection site	Inspection element	Inspection	Period			Inspection method	Criterion	Instrument of Measurement
			Monthly	3 months	2 years			
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 5M $\Omega$	Megger type 500 V

**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.

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## Capacitance of the buses

The following tables show the capacitance of the capacitors of the buses depending on the frame and the power of each drive.

The capacitance of frames higher than 4 correspond with the capacitance of the parallel connected equipment that make them up.

### 400 – 480 Vac

FRAME	CODE	QUANTITY	CODE	C TOTAL ( $\mu$ F)	TOLERANCE	C MIN. ( $\mu$ F)	C MAX. ( $\mu$ F)
1	SD75K02605x	6	P512 (5600 $\mu$ F)	8400	20%	6720	10080
	SD75K03205x	6	P512 (5600 $\mu$ F)	8400	20%	6720	10080
	SD75K03405x	6	P512 (5600 $\mu$ F)	8400	20%	6720	10080
2	SD75K04005x	12	P512 (5600 $\mu$ F)	16800	20%	13440	20160
	SD75K04505x	12	P512 (5600 $\mu$ F)	16800	20%	13440	20160
	SD75K05705x	12	P512 (5600 $\mu$ F)	16800	20%	13440	20160
3	SD75K07005x	18	P512 (5600 $\mu$ F)	25200	20%	20160	30240
	SD75K08005x	18	P512 (5600 $\mu$ F)	25200	20%	20160	30240
	SD75K09005x	18	P512 (5600 $\mu$ F)	25200	20%	20160	30240
4	SD75K10505x	24	P512 (5600 $\mu$ F)	33600	20%	26880	40320
	SD75K11405x	24	P512 (5600 $\mu$ F)	33600	20%	26880	40320
	SD75K12305x	24	P512 (5600 $\mu$ F)	33600	20%	26880	40320
> 4	SD75K14005x	2xT3	P512 (5600 $\mu$ F)	25200	20%	20160	30240
	SD75K15505x	2xT3	P512 (5600 $\mu$ F)	25200	20%	20160	30240
	SD75K18005x	2xT4	P512 (5600 $\mu$ F)	33600	20%	26880	40320
	SD75K19505x	2xT4	P512 (5600 $\mu$ F)	33600	20%	26880	40320
	SD75K22505x	3xT3	P512 (5600 $\mu$ F)	25200	20%	20160	30240
	SD75K27505x	3xT4	P512 (5600 $\mu$ F)	33600	20%	26880	40320
	SD75K31005x	3xT4	P512 (5600 $\mu$ F)	33600	20%	26880	40320

**525 – 690 Vac**

FRAME	CODE	QUANTITY	CODE	C TOTAL (uF)	TOLERANCE	C MIN. (uF)	C MAX. (uF)
1	SD75K01606x	6	P512 (5600uF)	3733,3	20%	2986,7	4480
	SD75K01806x	6	P512 (5600uF)	3733,3	20%	2986,7	4480
	SD75K02106x	6	P512 (5600uF)	3733,3	20%	2986,7	4480
2	SD75K02506x	12	P512 (5600uF)	7466,7	20%	5973,3	8960
	SD75K03106x	12	P512 (5600uF)	7466,7	20%	5973,3	8960
	SD75K04006x	12	P512 (5600uF)	7466,7	20%	5973,3	8960
3	SD75K04806x	18	P512 (5600uF)	11200,0	20%	8960	13440
	SD75K05706x	18	P512 (5600uF)	11200,0	20%	8960	13440
4	SD75K06806x	24	P512 (5600uF)	14933,3	20%	11946,7	17920
	SD75K08256x	24	P512 (5600uF)	14933,3	20%	11946,7	17920
> 4	SD75K09306x	2xT3	P512 (5600uF)	11200,0	20%	8960	13440
	SD75K10506x	2xT3	P512 (5600uF)	11200,0	20%	8960	13440
	SD75K12006x	2xT4	P512 (5600uF)	14933,3	20%	11946,7	17920
	SD75K14006x	2xT4	P512 (5600uF)	14933,3	20%	11946,7	17920
	SD75K15506x	3xT3	P512 (5600uF)	11200,0	20%	8960	13440
	SD75K17506x	3xT4	P512 (5600uF)	14933,3	20%	11946,7	17920
	SD75K18506x	3xT4	P512 (5600uF)	14933,3	20%	11946,7	17920
	SD75K22006x	3xT4	P512 (5600uF)	14933,3	20%	11946,7	17920
	SD75K25006x	4xT4	P512 (5600uF)	14933,3	20%	11946,7	17920

# 14. ACCESSORIES

# 14

## Codes and description

CODE	DESCRIPTION
SD75ET	<b>Ethernet/IP communication board</b>
SD75PN	<b>Profinet communication board.</b>
SD75PB	<b>Profibus communication board.</b>
SD75EC	<b>Encoder board.</b> It allows connecting 1 differential Encoder in TTL or HTL, from 5 to 24VDC.
SD75DIO	<b>Digital Inputs / Outputs Expansion board.</b> It allows increasing the number of inputs and outputs of the drive. It includes: <ul style="list-style-type: none"> <li>• 5 Programmable Digital Inputs optically isolated.</li> <li>• 5 Digital Outputs (Relays).</li> </ul>
SD75AIO	<b>Analogue Inputs / Outputs Expansion board.</b> It allows increasing the number of inputs and outputs of the drive. It includes: <ul style="list-style-type: none"> <li>• 2 Programmable Analogue Input.</li> <li>• 2 Programmable Analogue Output.</li> </ul>
SD75FO	<b>Fiber Optic board.</b> It allows communication between multiple drives in a master slave configuration. <b>This board is optional for drives frame 5 to 8. For frame 9, it is supplied by default, along with the modules connection kit.</b>
SD75PT	<b>Board for 8 thermal probes type PT100 or PT1000 (configurable).</b>
B150	<b>Dynamic Braking Unit.</b> (For further information, see section "Dynamic Braking Unit B150").
SD75DE3	<b>Kit 3 meters Extender for Display.</b>

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## Communication boards

SD750 Kompakt family is compatible with the most commonly used communication protocols (Profibus-DP, Profinet, Modbus TCP, Ethernet IP, Field Bus, etc.), thanks to its optional boards.

Refer to the specific manual of each board for further information.

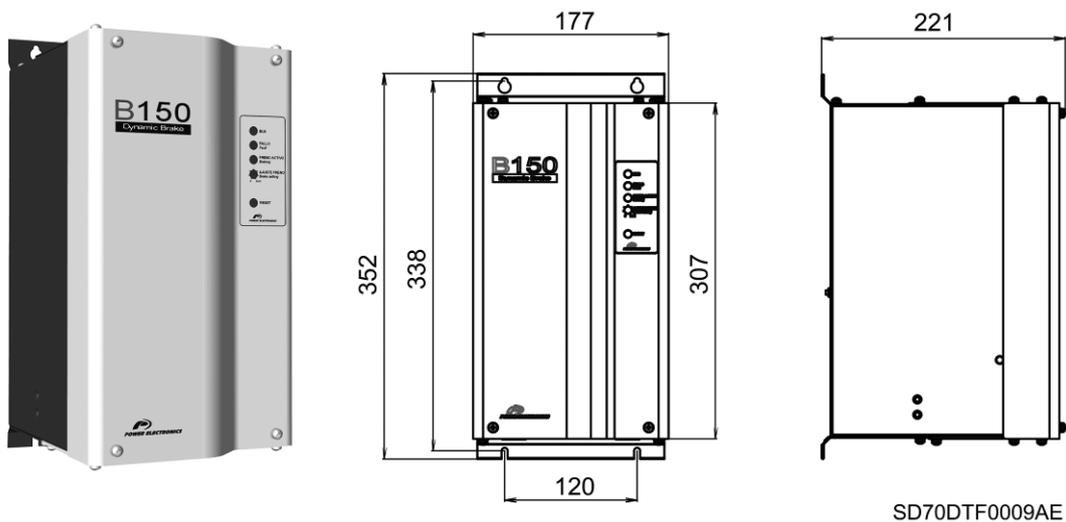
## Expansion boards

SD750 Kompakt series is compatible with the most commonly used communication protocols (Profibus, Profinet, Ethernet I/P, etc.), thanks to its optional boards.

## Mechanical accessories

### Dynamic Breaking Unit B150

The Dynamic brake permits to control the regenerated energy for series SD750 Kompakt. The B150, with reduced dimensions and high reliability, is the main power-switching device of such a dynamic braking systems. It activates an IGBT to discharge the DC bus over external resistors when the DC voltage overpasses a pre-set value.



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

## 15. CE MARKING

**15**

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.

### EMC Directive

The EMC Directive defines the requirements for immunity and emissions of electrical equipment used within the European Union. SD750 Kompakt series drives are in accordance with the directive IEC/EN 61800-3 about adjustable speed electrical power drive systems.

### 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. SD750 Kompakt series drives are in accordance with the directive IEC 61800-5-1 and IEC 61800-5-2 about adjustable speed electrical power drive systems.

**EN**

# DECLARATION OF CONFORMITY CE

## DECLARACIÓN DE CONFORMIDAD CE

**The Company La empresa:**

Name *Nombre:* **POWER ELECTRONICS ESPAÑA, S.L.**  
 Address *Dirección:* C/Ronda Camp d'Aviació, 4 Pol. Ind. Les Carrases, 46160 Liria, Valencia, Spain  
 Telephone *Teléfono:* +34 96 136 65 57  
 Fax: +34 96 131 82 01

**Declares under its own responsibility, that the product:**  
*Declara bajo su propia responsabilidad, que el producto:*

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

**Brand Marca:** Power Electronics

**Model Modelo:** SD75K

**Serial Number Nº serie:**

**Is in conformity with the following European Directives:**  
*Se halla en conformidad con las siguientes Directivas Europeas:*

Reference <i>Referencia</i>	Title <i>Título</i>
2014/30/UE	Electromagnetic Compatibility <i>Compatibilidad Electromagnética</i>
2014/35/UE	Electrical Material intended to be used with certain limits of voltage <i>Material Eléctrico para su utilización con determinados límites de tensión (Baja tensión)</i>
2006/42/CE	Machinery directive <i>Directiva de Máquinas</i>

**References of the harmonized technical norms applied under the Electromagnetic Compatibility Directive:**  
*Referencias de las normas técnicas armonizadas aplicadas bajo la Directiva de Compatibilidad Electromagnética:*

Reference <i>Referencia</i>	Title <i>Título</i>
EN 61800-3:2018	Adjustable speed electrical power drive systems. Part 3: EMC requirements and specific test methods. <i>Accionamientos eléctricos de potencia de velocidad variable. Parte 3: Requisitos CEM y métodos de ensayo específicos.</i>

**References of the harmonized technical norms applied under the Low Voltage Directive:**  
*Referencias de las normas técnicas armonizadas aplicadas bajo la Directiva de Baja Tensión:*

Reference <i>Referencia</i>	Title <i>Título</i>
EN 61800-5-1:2007 /A11:2021	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy <i>Accionamientos eléctricos de potencia de velocidad variable. Parte 5-1: Requisitos de seguridad. Eléctricos, térmicos y energéticos.</i>

**References of the harmonized technical norms applied under the Machinery Directive:**  
*Referencias de las normas técnicas armonizadas aplicadas bajo la Directiva de Máquinas*

Reference <i>Referencia</i>	Title <i>Título</i>
EN 61800-5-2:2017	Adjustable speed electrical power drive systems. Part 5-2: Safety requirements – Functional. <i>Accionamientos eléctricos de potencia de velocidad variable. Parte 5-2: Requisitos de Seguridad Funcional.</i>

Liria, 10<sup>th</sup> of June 2022



Signature /Stamp Company







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