


Fault and warning codes





NOTICE

If there are multiple active faults and alarms, the BOP first displays all faults one after another. Once all faults are displayed, it displays all alarms in succession.

Faults

Immediately when a fault occurs the fault icon  is lit and the display transitions to the faults screen. The faults screen displays the fault number preceded by "F".


Acknowledging / clearing faults

- To navigate through the current list of faults, press  or .
- To clear / acknowledge the fault, press  or acknowledge externally if the inverter has been set up so.
- To ignore the fault, press .

After you acknowledge or ignore the fault, the screen returns to the previous display. The fault icon remains lit until the fault is cleared / acknowledge.

NOTICE

Under the following circumstances, the faults screen displays again:

- If the fault has not been cleared and the  button is pressed, the faults screen displays again.
- If there is no key press for 60 seconds.

If a fault is active and there has been no key press for 60 seconds, the backlight (P0070) flashes.

Fault code list

Fault	Cause	Remedy
F1 Overcurrent	<ul style="list-style-type: none"> Motor power (P0307) does not correspond to the inverter power (r0206). Motor lead short circuit Earth faults r0949 = 0: Hardware reported r0949 = 1: Software reported	Check the following: <ul style="list-style-type: none"> Motor power (P0307) must correspond to inverter power (r0206). Cable length limits must not be exceeded. Motor cable and motor must have no short-circuits or earth faults. Motor parameters must match the motor in use. Value of stator resistance (P0350) must be correct. Motor must not be obstructed or overloaded. Increase ramp-up time (P1120) Reduce starting boost level (P1312)
F2 Overvoltage	<ul style="list-style-type: none"> Main supply voltage too high Motor is in regenerative mode r0949 = 0: Hardware reported r0949 = 1 or 2: Software reported	Check the following: <ul style="list-style-type: none"> Supply voltage (P0210) must lie within limits indicated on rating plate. Ramp-down time (P1121) must match inertia of load. Required braking power must lie within specified limits. Vdc controller must be enabled (P1240) and parameterized properly. Note: Regenerative mode can be caused by fast ramp downs or if the motor is driven by an active load. Higher inertia requires longer ramp times; otherwise, apply braking resistor.
F3 Undervoltage	<ul style="list-style-type: none"> Main supply failed. Shock load outside specified limits. r0949 = 0: Hardware reported r0949 = 1 or 2: Software reported	Check supply voltage.
F4 Inverter overtemperature	<ul style="list-style-type: none"> Inverter overloaded Ventilation inadequate Pulse frequency too high Ambient temperature too high Fan inoperative 	Check the following: <ul style="list-style-type: none"> Load or load cycle too high? Motor power (P0307) must match inverter power (r0206) Pulse frequency must be set to default value Ambient temperature too high? Fan must turn when inverter is running
F5 Inverter I ² t	<ul style="list-style-type: none"> Inverter overloaded. Load cycle too demanding. Motor power (P0307) exceeds inverter power capability (r0206). 	Check the following: <ul style="list-style-type: none"> Load cycle must lie within specified limits. Motor power (P0307) must match inverter power (r0206)

Fault	Cause	Remedy
F6 Chip temperature rise exceeds critical levels	<ul style="list-style-type: none"> • Load at start-up is too high • Load step is too high • Ramp-up rate is too fast 	Check the following: <ul style="list-style-type: none"> • Load or load step too high? • Increase ramp-up time (P1120). • Motor power (P0307) must match inverter power (r0206). • Use setting P0290 = 0 or 2 for preventing F6.
F11 Motor overtemperature	Motor overloaded	Check the following: <ul style="list-style-type: none"> • Load or load step too high? • Motor nominal overtemperatures (P0626 - P0628) must be correct • Motor temperature warning level (P0604) must match
F12 Inverter temperature signal lost	Wire breakage of inverter temperature (heat sink) sensor.	
F20 DC ripple too high	The calculated DC ripple level has exceeded the safe threshold. This is commonly caused by loss of one of the mains input phases.	Check the mains supply wiring.
F35 Auto restart after n	Auto restart attempts exceed value of P1211.	
F41 Motor data identification failure	Motor data identification failed. <ul style="list-style-type: none"> • r0949 = 0: Load missing • r0949 = 1: Current limit level reached during identification. • r0949 = 2: Identified stator resistance less than 0.1% or greater than 100%. • r0949 = 30: Current controller at voltage limit • r0949 = 40: Inconsistency of identified dataset, at least one identification failed Percentage values based on the impedance $Z_b = V_{mot,nom} / \sqrt{3} / I_{mot,nom}$	Check the following: <ul style="list-style-type: none"> • r0949 = 0: is the motor connected to the inverter? • r0949 = 1 - 49: are the motor data in P0304 - P0311 correct? • Check what type of motor wiring is required (star, delta).
F51 Parameter EEPROM fault	Read or write failure while access to EEPROM. This can also be caused by the EEPROM being full, too many parameters have been changed.	<ul style="list-style-type: none"> • Must be power cycled to cancel this bug as some parameters may not be read correct. • Factory reset and new parameterization, if power cycle does not remove fault. • Change some parameters back to default values if the EEPROM is full, then power cycle. • Change inverter.

Fault	Cause	Remedy
		<p>Note:</p> <ul style="list-style-type: none"> • r0949 = 1: EEPROM full • r0949 = 1000 + block No: reading data block failed • r0949 = 2000 + block No: reading data block timeout • r0949 = 3000 + block No: reading data block CRC failed • r0949 = 4000 + block No: writing data block failed • r0949 = 5000 + block No: writing data block timeout • r0949 = 6000 + block No: writing data block verify failed • r0949 = 7000 + block No: reading data block at wrong time • r0949 = 8000 + block No: writing data block at wrong time • r0949 = 9000 + block No: factory reset did not work because restart or power failure
<p>F52 Inverter software fault</p>	<p>Read failure for inverter information or invalid data.</p>	<p>Note:</p> <ul style="list-style-type: none"> • r0949 = 1: Failed reading inverter identity • r0949 = 2: Inverter identity wrong • r0949 = 3: Failed reading inverter version • r0949 = 4: Inverter version wrong • r0949 = 5: Start of Part 1 inverter data wrong • r0949 = 6: Inverter number of temperature sensor wrong • r0949 = 7: Inverter number of application wrong • r0949 = 8: Start of Part 3 inverter data wrong • r0949 = 9: Reading inverter data string wrong • r0949 = 10: Inverter CRC failed • r0949 = 11: Inverter is blank • r0949 = 15: Failed CRC of inverter block 0 • r0949 = 16: Failed CRC of inverter block 1 • r0949 = 17: Failed CRC of inverter block 2 • r0949 = 20: Inverter invalid • r0949 = 30: Directory size wrong • r0949 = 31: Directory ID wrong • r0949 = 32: Invalid block • r0949 = 33: File size wrong • r0949 = 34: Data section size wrong


Fault	Cause	Remedy
F52 (continued)		<ul style="list-style-type: none"> • r0949 = 35: Block section size wrong • r0949 = 36: RAM size exceeded • r0949 = 37: Parameter size wrong • r0949 = 38: Device header wrong • r0949 = 39: Invalid file pointer • r0949 = 40: Scaling block version wrong • r0949 = 41: Calibration block version wrong • r0949 = 50: Wrong serial number format • r0949 = 51: Wrong serial number format start • r0949 = 52: Wrong serial number format end • r0949 = 53: Wrong serial number format month • r0949 = 54: Wrong serial number format day • r0949 = 1000 + addr: Inverter read data failed • r0949 = 2000 + addr: Inverter write data failed • r0949 = 3000 + addr: Inverter read data wrong time • r0949 = 4000 + addr: Inverter write data wrong time • r0949 = 5000 + addr: Inverter read data invalid • r0949 = 6000 + addr: Inverter write data invalid • Power-cycle inverter • Contact service department or change inverter
F60 Asic timeout	Internal communications failure.	<p>Check inverter. Fault appears sporadically:</p> <p>Note:</p> <ul style="list-style-type: none"> • r0949 = 0: Hardware reported link fail • r0949 = 1: Software reported link fail • r0949 = 6: Feedback is not disabled for reading inverter data • r0949 = 7: During inverter download, message didn't transmit to disable feedback • Communication failure due to EMC problems • Check - and if necessary - improve EMC • Use EMC filter
F61 MMC / SD card parameter cloning failed	<p>Parameter cloning failed.</p> <ul style="list-style-type: none"> • r0949 = 0: MMC / SD card not connected or incorrect card type or the card failed to initialize for automatic cloning • r0949 = 1: Inverter data cannot write to the card. • r0949 = 2: Parameter cloning file not available 	<ul style="list-style-type: none"> • r0949 = 0: Use an MMC / SD card with FAT16 or FAT32 format , or fit an MMC / SD card to the inverter. • r0949 = 1: Check the MMC / SD card (e.g., is the card memory full?) - format the card again to FAT16 or FAT32. • r0949 = 2: Put the correct named file in the correct directory /USER/SINAMICS/DATA. • r0949 = 3: Make sure file is accessible -

Fault	Cause	Remedy
	<ul style="list-style-type: none"> r0949 = 3: The MMC / SD card cannot read the file r0949 = 4: Reading data from the clone file failed (e.g., reading failed, data or checksum wrong) 	<p>recreate file if possible.</p> <ul style="list-style-type: none"> r0949 = 4: File has been changed - recreate file.
F62 Parameter cloning contents invalid	File exists but the contents are not valid control word corruption.	Recopy and ensure operation completes.
F63 Parameter cloning contents incompatible	File exists but was not the correct inverter type.	Ensure clone from compatible inverter type.
F64 Inverter attempted to do an automatic clone during startup	No Clone00.bin file in the correct directory /USER/SINAMICS/DATA.	<p>If an automatic clone is required:</p> <ul style="list-style-type: none"> - Insert the MMC / SD card with correct file and power cycle. <p>If no automatic clone is required:</p> <ul style="list-style-type: none"> - Remove the card if not needed and power cycle. - Reset P8458 = 0 and power cycle. <p>Note: Fault can only be cleared by a power cycle.</p>
F71 USS setpoint fault	No setpoint values from USS during telegram off time	Check USS master
F72 USS / MODBUS setpoint fault	No setpoint values from USS / MODBUS during telegram off time	Check USS / MODBUS master
F80 AI lost input signal	<ul style="list-style-type: none"> Broken wire Signal out of limits 	
F85 External fault	External fault triggered via command input via control word 2, bit 13.	<ul style="list-style-type: none"> Check P2106. Disable control word 2 bit 13 as command source. Disable terminal input for fault trigger.
F100 Watchdog reset	Software Error	Contact service department or change inverter.
F101 Stack overflow	Software error or processor failure.	Contact service department or change inverter.
F221 PID feedback below minimum value	PID feedback below minimum value P2268.	<ul style="list-style-type: none"> Change value of P2268. Adjust feedback gain.
F222 PID feedback above maximum value	PID feedback above maximum value P2267.	<ul style="list-style-type: none"> Change value of P2267. Adjust feedback gain.
F350 Configuration vector for the inverter failed	During startup the inverter checks if the configuration vector (SZL vector) has been programmed correctly and if hardware matches the programmed vector. If not the inverter will trip.	<p>Internal failures cannot be fixed.</p> <p>r0949 = 13 - Make sure the right power module is fitted.</p> <p>Note: Fault needs power cycle to be acknowledged.</p>

Fault	Cause	Remedy
	<ul style="list-style-type: none"> • r0949 = 1: Internal failure - no hardware configuration vector available. • r0949 = 2: Internal failure - no software configuration vector available. • r0949 = 11: Internal failure - inverter code not supported. • r0949 = 12: Internal failure - software vector not possible. • r0949 = 13: Wrong power module fitted. • r0949 > 1000: Internal failure - wrong I/O board fitted. 	
F395 Acceptance test / confirmation pending	<p>This fault occurs after a startup clone. It can also be caused by a faulty read from the EEPROM, see F51 for more details.</p> <p>A startup clone could have changed and might not match the application.</p> <p>This parameter set needs to be checked before the inverter can start a motor.</p> <ul style="list-style-type: none"> • r0949 = 3/4: Inverter data change • r0949 = 5: Startup clone via an MMC / SD card has been performed • r0949 = 10: Previous startup clone was aborted 	<p>The current parameter set needs to be checked and confirmed by clearing the fault.</p>
F410 Cavitation protection failure	<p>Conditions exist for cavitation damage. Cavitation damage is damage caused to a pump in pumping systems when the fluid is not flowing sufficiently. This can lead to heat build up and subsequent damage to the pump.</p>	<p>If cavitation is not occurring, reduce the cavitation threshold P2361, or increase the cavitation protection delay. Ensure sensor feedback is working.</p>
F452 Belt failure	<p>Load conditions on motor indicate belt failure or mechanical fault.</p> <ul style="list-style-type: none"> • r0949 = 0: trip low torque / speed • r0949 = 1: trip high torque / speed 	<p>Check the following:</p> <ul style="list-style-type: none"> • No breakage, seizure or obstruction of inverter train. • Apply lubrication if required. <p>If using an external speed sensor, check the following parameters for correct function:</p> <ul style="list-style-type: none"> - P2192 (delay time for permitted deviation) - P2182 (threshold frequency f1) - P2183 (threshold frequency f2) - P2184 (threshold frequency f3)

Fault	Cause	Remedy
		<p>If using a specific torque / speed range, check parameters:</p> <ul style="list-style-type: none"> - P2182 (threshold frequency 1) - P2183 (threshold frequency 2) - P2184 (threshold frequency 3) - P2185 (upper torque threshold 1) - P2186 (lower torque threshold 1) - P2187 (upper torque threshold 2) - P2188 (lower torque threshold 2) - P2189 (upper torque threshold 3) - P2190 (lower torque threshold 3) - P2192 (delay time for permitted deviation)

Alarms

If an alarm is activated the alarm icon  is immediately lit and then the display shows the alarm code preceded by "A".

NOTICE

Note that alarms cannot be acknowledged. They are cleared automatically once the warning has been rectified.

Alarm code list

Alarm	Cause	Remedy
A501 Current limit	<ul style="list-style-type: none"> • Motor power does not correspond to the inverter power • Motor leads are too long • Earth faults 	<p>Check the following:</p> <p>See F1.</p>
A502 Overvoltage limit	Overvoltage limit is reached. This warning can occur during ramp down, if the Vdc controller is disabled (P1240 = 0).	If this warning is displayed permanently, check inverter input voltage.
A503 Undervoltage limit	<ul style="list-style-type: none"> • Main supply failed. • Main supply and consequently DC-link voltage (r0026) below specified limit. 	Check main supply voltage.
A504 Inverter overtemperature	Warning level of inverter heat sink temperature, warning level of chip junction temperature, or allowed change in temperature on chip junction is exceeded, resulting in pulse frequency reduction and / or output frequency reduction (depending on parameterization in P0290).	<p>Note:</p> <p>r0037 = 0: Heat sink temperature</p> <p>r0037 = 1: Chip junction temperature (includes heat sink)</p> <p>Check the following:</p> <ul style="list-style-type: none"> • Ambient temperature must lie within specified limits

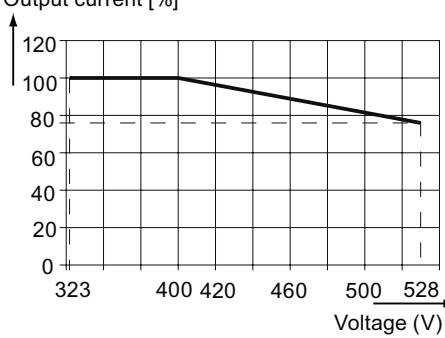
Alarm	Cause	Remedy
		<ul style="list-style-type: none"> Load conditions and load steps must be appropriate Fan must turn when inverter is running
A505 Inverter I ² t	Warning level exceeded, current will be reduced if parameterized (P0610 = 1).	Check that load cycle lies within specified limits.
A506 IGBT junction temperature rise warning	Overload warning. Difference between heat sink and IGBT junction temperature exceeds warning limits.	Check that load steps and shock loads lie within specified limits.
A507 Inverter temperature signal lost	Inverter heat sink temperature signal loss. Possible sensor fallen off.	Contact service department or change inverter.
A511 Motor overtemperature I ² t	<ul style="list-style-type: none"> Motor overloaded. Load cycles or load steps too high. 	<p>Independently of the kind of temperature determination check:</p> <ul style="list-style-type: none"> P0604 motor temperature warning threshold P0625 motor ambient temperature Check if name plate data is correct. If not, perform quick commissioning. Accurate equivalent circuit data can be found by performing motor identification (P1900 = 2). Check if motor weight (P0344) is reasonable. Change if necessary. With P0626, P0627, and P0628 the standard overtemperature can be changed, If the motor is not a SIEMENS standard motor.
A535 Braking resistor overload	<p>The braking energy is too large.</p> <p>The braking resistor is not suited for the application.</p>	<p>Reduce the braking energy.</p> <p>Use a braking resistor with a higher rating.</p>
A541 Motor data identification active	Motor data identification (P1900) selected or running.	
A600 RTOS overrun warning	Internal time slice overrun	Contact service department.
A910 V _{dc} max controller deactivated	<p>Occurs</p> <ul style="list-style-type: none"> if main supply voltage (P0210) is permanently too high. if motor is driven by an active load, causing motor to go into regenerative mode. at very high load inertias, when ramping down. 	<p>Check the following:</p> <ul style="list-style-type: none"> Input voltage must lie within range. Load must be match. In certain cases apply braking resistor.

Alarm	Cause	Remedy
	If warning A910 occurs while the inverter is in standby (output pulses disabled) and an ON command is subsequently given, the Vdc_max controller (A911) will not be activated unless warning A910 is rectified.	
A911 Vdc_max controller active	The Vdc_max controller works to keep the DC-link voltage (r0026) below the level specified in r1242.	Check the following: <ul style="list-style-type: none"> Supply voltage must lie within limits indicated on rating plate. Ramp-down time (P1121) must match inertia of load. Note: Higher inertia requires longer ramp times; otherwise, apply braking resistor.
A912 Vdc_min controller active	The Vdc_min controller will be activated if the DC-link voltage (r0026) falls below the level specified in r1246. The kinetic energy of the motor is used to buffer the DC-link voltage, thus causing deceleration of the inverter! So short mains failures do not necessarily lead to an undervoltage trip. Note that this warning may also occur on fast ramp-ups.	
A921 AO parameters not set properly	AO parameters (P0777 and P0779) should not be set to identical values, since this would produce illogical results.	Check the following: <ul style="list-style-type: none"> Parameter settings for output identical Parameter settings for input identical Parameter settings for output do not correspond to AO type Set P0777 and P0779 to different values.
A922 No load applied to inverter	No Load is applied to the inverter. As a result, some functions may not work as under normal load conditions.	Check that motor is connected to inverter.
A923 Both JOG left and JOG right are requested	Both JOG right and JOG left (P1055 / P1056) have been requested. This freezes the RFG output frequency at its current value.	Do not press JOG right and left simultaneously.
A930 Cavitation protection warn	Conditions exist for possible cavitation damage.	See F410.
A936 PID autotuning active	PID autotuning (P2350) selected or running	Warning disappears when PID autotuning has finished.
A952 Belt failure detected	Load conditions on motor indicate belt failure or mechanical fault.	See F452.

Technical specifications

Electrical specifications

Line supply characteristics

Three phase 400 V inverters	
Voltage range	380 ... 480 V AC (tolerance: -15 % ... +10 %) 47 ... 63 Hz Current derating at high input voltages: Output current [%] 
Overvoltage category	EN 60664-1 Category III
Permissible supply configuration	TN, TT, IT ¹⁾ , TT earthed line
Supply environment	Second environment (private power network)

¹⁾ Note that only unfiltered inverters can be operated on IT power system.

Overload capability

Average output current	100 % rated
Overload current	150 % rated for 60 seconds
Maximum overload cycle	150 % rated for 60 seconds followed by 94.5 % rated for 540 seconds (average 100 % rated)

EMC requirements

NOTICE

Install all inverters in accordance with the manufacturer's guidelines and in accordance with good EMC practices.

Use screened cable type CY. The maximal cable length is 10 m for frame size A or 25 m for frame size B...D.

Do not exceed the default switching frequency 4 kHz.

Three phase 400 V inverters

ESD	EN 61800-3 Category C3
Radiated immunity	
Burst	
Surge	
Conducted immunity	
Voltage distortion immunity	
	Three phase 400 V filtered inverters
Conducted emissions	EN 61800-3 Category C3
Radiated emissions	

Output current deratings at different PWM frequencies and ambient temperatures

Three phase 400 V inverters													
Frame size	Power rating [kW]	Current rating [A] at PWM frequency											
		PWM frequency range: 2 ... 16 kHz (default: 4 kHz)											
		2 kHz			4 kHz			6 kHz			8 kHz		
		40 °C	50 °C	60 °C	40 °C	50 °C	60 °C	40 °C	50 °C	60 °C	40 °C	50 °C	60 °C
A	0.37	1.3	1.0	0.7	1.3	1.0	0.7	1.1	0.8	0.5	0.9	0.7	0.5
A	0.55	1.7	1.3	0.9	1.7	1.3	0.9	1.4	1.0	0.7	1.2	0.9	0.6
A	0.75	2.2	1.8	1.1	2.2	1.8	1.1	1.9	1.3	0.9	1.5	1.1	0.8
A	1.1	3.1	2.6	1.6	3.1	2.6	1.6	2.6	1.9	1.3	2.2	1.6	1.1
A	1.5	4.1	3.4	2.1	4.1	3.4	2.1	3.5	2.5	1.7	2.9	2.1	1.4
A	2.2	5.6	4.6	2.8	5.6	4.6	2.8	4.8	3.4	2.4	3.9	2.8	2.0
B	3.0	7.3	6.3	3.7	7.3	6.3	3.7	6.2	4.4	3.1	5.1	3.7	2.6
B	4.0	8.8	8.2	4.4	8.8	8.2	4.4	7.5	5.3	3.7	6.2	4.4	3.1
C	5.5	12.5	10.8	6.3	12.5	10.8	6.3	10.6	7.5	5.3	8.8	6.3	4.4
D	7.5	16.5	14.5	8.3	16.5	14.5	8.3	14.0	9.9	6.9	11.6	8.3	5.8
D	11	25.0	21.0	12.5	25.0	21.0	12.5	21.3	15.0	10.5	17.5	12.5	8.8
D	15	31.0	28.0	15.5	31.0	28.0	15.5	26.4	18.6	13.0	21.7	15.5	10.9

Three phase 400 V inverters													
Frame size	Power rating [kW]	Current rating [A] at PWM frequency											
		PWM frequency range: 2 ... 16 kHz (default: 4 kHz)											
		10 kHz			12 kHz			14 kHz			16 kHz		
		40 °C	50 °C	60 °C	40 °C	50 °C	60 °C	40 °C	50 °C	60 °C	40 °C	50 °C	60 °C
A	0.37	0.8	0.5	0.4	0.7	0.5	0.3	0.6	0.4	0.3	0.5	0.4	0.3
A	0.55	1.0	0.7	0.5	0.9	0.6	0.4	0.8	0.5	0.4	0.7	0.5	0.3
A	0.75	1.3	0.9	0.7	1.1	0.8	0.6	1.0	0.7	0.5	0.9	0.6	0.4
A	1.1	1.9	1.3	0.9	1.6	1.1	0.8	1.4	1.0	0.7	1.2	0.9	0.6
A	1.5	2.5	1.7	1.2	2.1	1.4	1.0	1.8	1.3	0.9	1.6	1.1	0.8
A	2.2	3.4	2.4	1.7	2.8	2.0	1.4	2.5	1.7	1.2	2.2	1.6	1.1
B	3.0	4.4	3.1	2.2	3.7	2.6	1.8	3.3	2.3	1.6	2.9	2.0	1.5
B	4.0	5.3	3.7	2.6	4.4	3.1	2.2	4.0	2.7	1.9	3.5	2.5	1.8
C	5.5	7.5	5.3	3.8	6.3	4.4	3.1	5.6	3.9	2.8	5.0	3.5	2.5
D	7.5	9.9	6.9	5.0	8.3	5.8	4.1	7.4	5.1	3.6	6.6	4.6	3.3
D	11	15.0	10.5	7.5	12.5	8.8	6.3	11.3	7.8	5.5	10.0	7.0	5.0
D	15	18.6	13.0	9.3	15.5	10.9	7.8	14.0	9.6	6.8	12.4	8.7	6.2

Motor control

Control methods	Linear V/F, quadratic V/F, multi-point V/F, V/F with FCC
Output frequency range	Default range: 0 ... 599 Hz Resolution: 0.01 Hz
Maximum overload cycle	150 % rated for 60 seconds followed by 94.5 % rated for 540 seconds (average 100 % rated)

Mechanical specifications

		3 AC 400 V						
		Frame size A		Frame size B	Frame size C	Frame size D		
		With fan	Without fan			7.5 kW	11 kW	15 kW
Outline dimensions (mm)	W	90	90	140	184	240		
	H	166	150	160	182	206.5		
	D	145.5	145.5	164.5	169	172.5		
Net weight (kg)	unfiltered	1.0	0.9	1.6	2.4	3.7	3.7	3.9
	filtered	1.1	1.0	1.8	2.6	4.0	4.1	4.3
Gross weight (kg)		1.4		2.1	3.0	5.0		
Mounting methods		<ul style="list-style-type: none">• Cabinet panel mounting (frame sizes A ... D)• Push-through mounting (frame sizes B ... D)						

Environmental conditions

Ambient temperature	0 ... 40 °C: without derating 40 ... 60 °C: with derating
Storage temperature	-40 ... + 70 °C
Protection class	IP 20
Maximum humidity level	95 % (non-condensing)
Shock and vibration	Long-term storage in the transport packaging according to EN 60721-3-1 Class 1M2
	Transport in the transport packaging according to EN 60721-3-2 Class 2M3
	Vibration during operation according to EN 60721-3-3 Class 3M2
Operating altitude	Up to 4000 m above sea level 1000 ... 4000 m: output current derating 2000 ... 4000 m: input voltage derating
Environmental classes	Pollution class: 3S2 Gas class: 3C2 (SO ₂ , H ₂ S) Climate class: 3K3
Minimum mounting clearance	Top: 100 mm Bottom: 100 mm (85 mm for fan-cooled frame size A) Side: 0 mm

Standards

CE marking	European Low Voltage Directive (EN61800 -5-1 and EN 60204-1)
	European EMC Directive (EN 61800 - 3)
UL certification (UL508C)	
CTick marking	
ISO 9001	