

Modular Drive

CFW-11W

Addendum of the Frequency Inverter

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CFW-11W

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640...3040 A/500...690 V

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SUMMARY OF THE REVISIONS

The information below describes the revisions of this manual.

Version	Revision	Description
-	R00	First edition
-	R01	General revision
-	R02	Inclusion of Table 2.3 on page 2-8 , Table 2.4 on page 2-9 and Table 2.5 on page 2-9 Inclusion of Item 2.4.2 Cooling System Maintenance on page 2-10 and Item 2.4.3 Cleaning the Cooling System on page 2-11
-	R03	General revision

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1 GENERAL INFORMATION



ATTENTION!

Strictly follow the safety instructions contained in this addendum and in the CFW-11M user manual.

1.1 ABOUT THE MANUAL

This manual provides information about the CFW-11W Modular Drive frequency inverter series. Refer to the CFW-11M user manual and the CFW-11 programming manual.

1.2 ABOUT THE CFW-11W

The inverters of CFW-11W series present a modular design, with configurations from one to five Power Units (UP11), one Unit Control (UC11) and wiring cables. The modular assembly increases the reliability of the inverter and simplifies its maintenance. A single control unit (UC11) can control up to 5 UP11s.

These inverters are water cooled, being more compact than other inverters. Moreover, the DC link features plastic film capacitors, which reduce losses and increase maintenance intervals.

The UP11s are directly powered by the DC link and the UC11 is powered by an external +24 Vdc power supply. [Figure 1.1 on page 1-1](#) shows the standard configuration with an input six pulses rectifier.

The power units are controlled by the UC11. The UC11 contains the control rack of CFW-11 series and the IPS board. This board sends signals to all UP11s (PWM, control signals, etc.) and receives signals from them (voltage feedback, current, etc.).

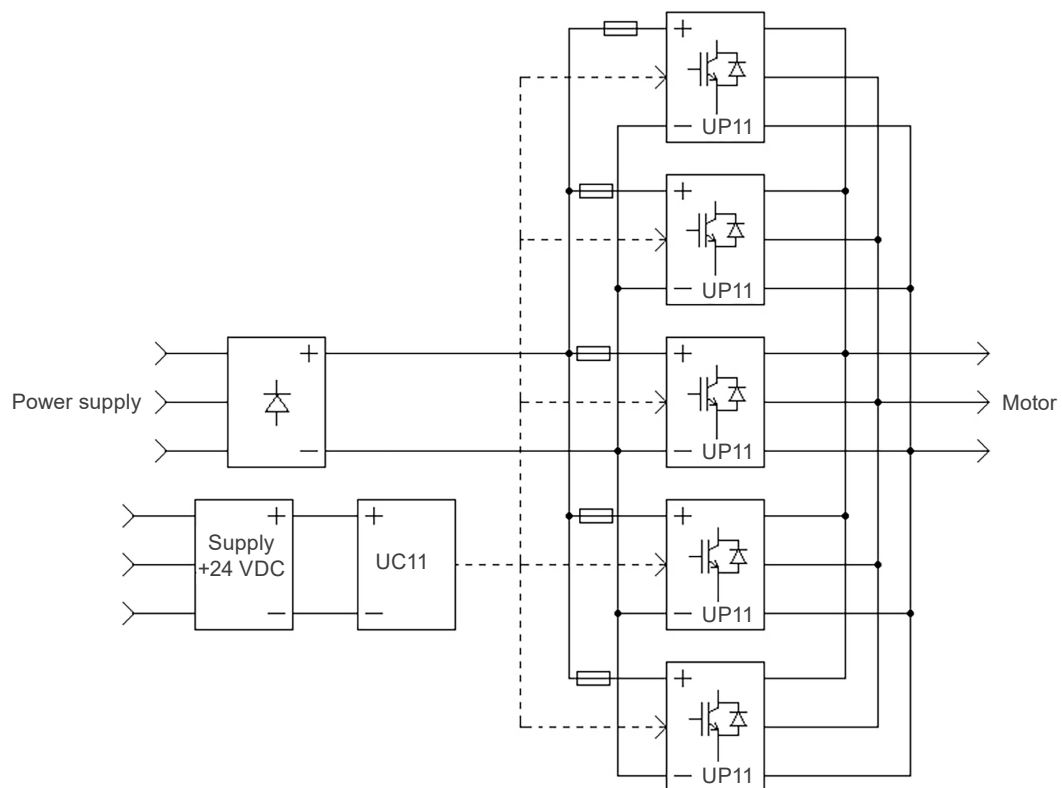


Figure 1.1: Example of configuration with 5 UP11s and 6-pulse rectifiers

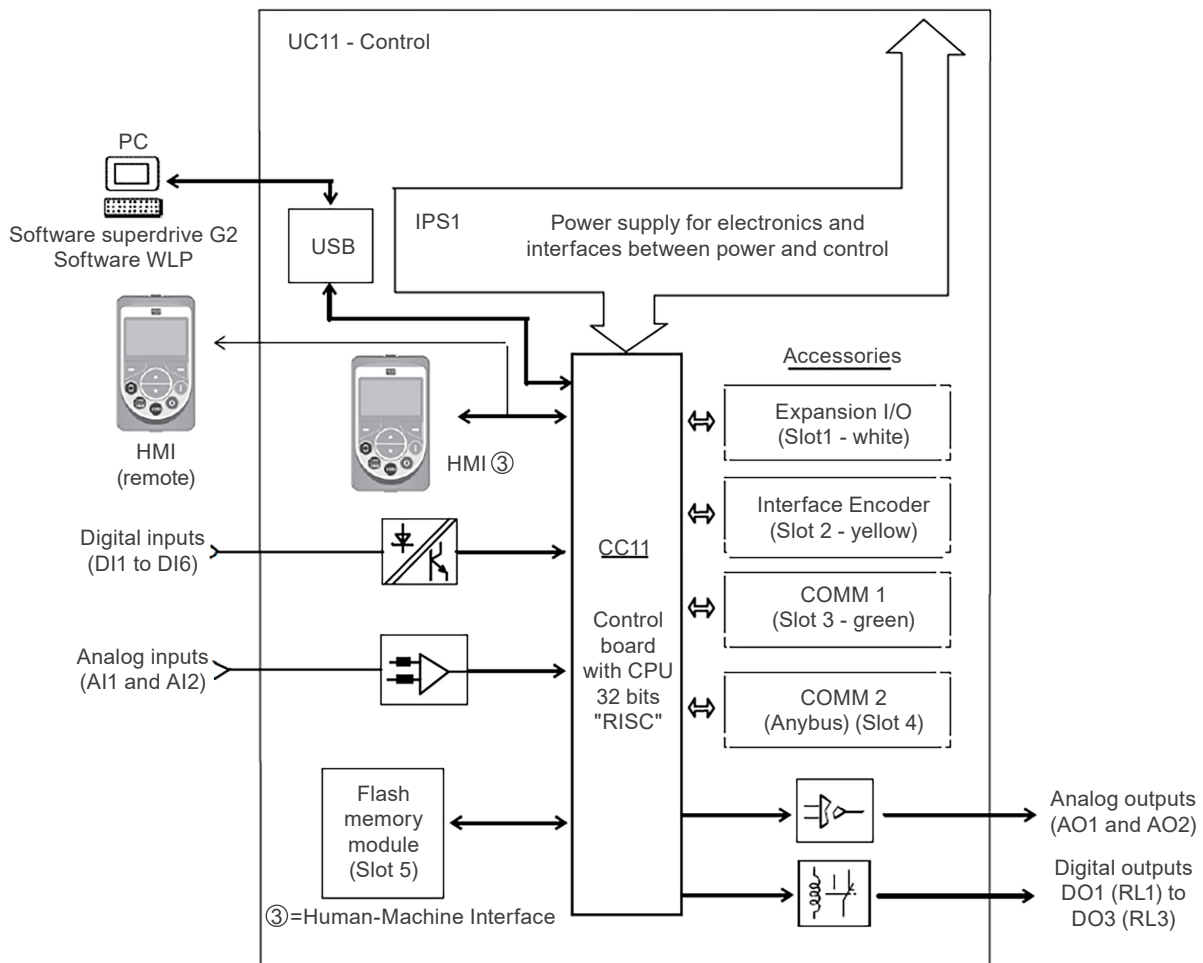
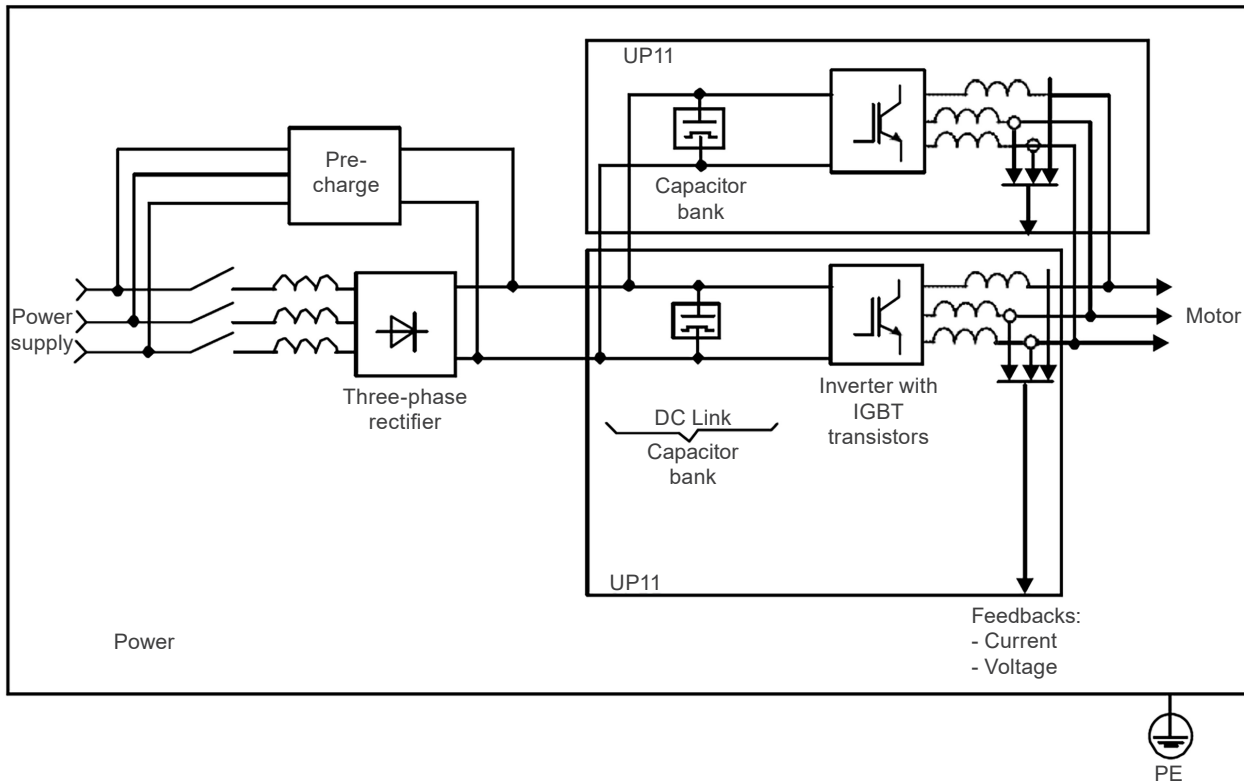


Figure 1.2: Block Diagram of the CFW-11W

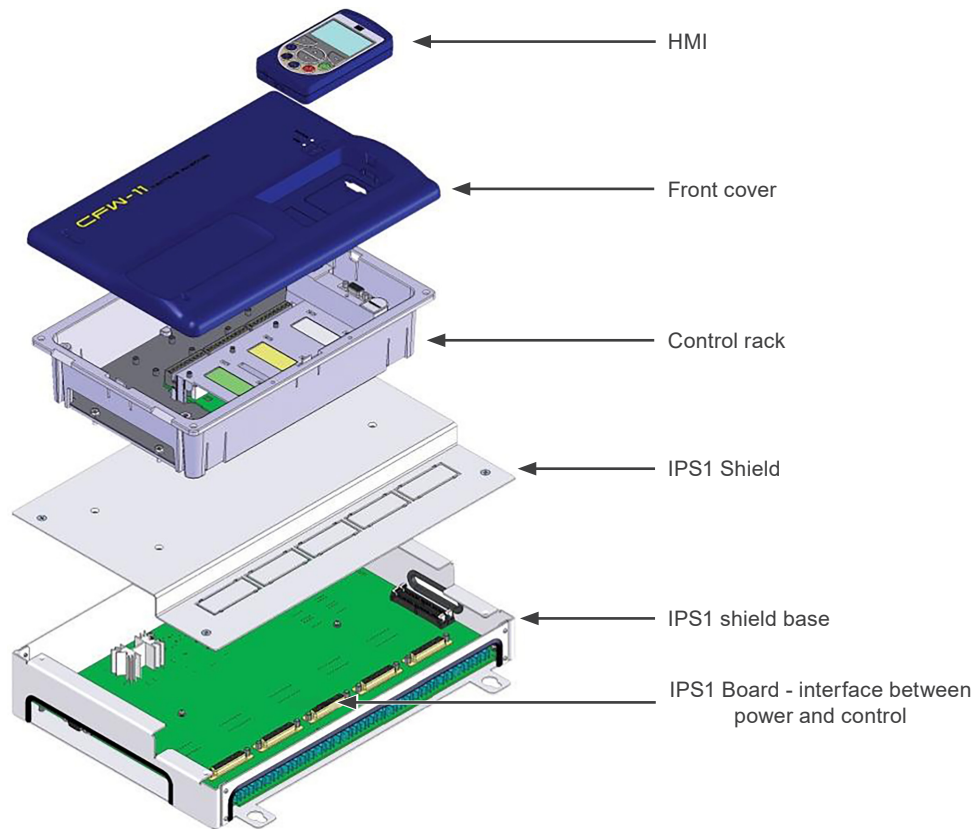


Figure 1.3: UC11 Main parts

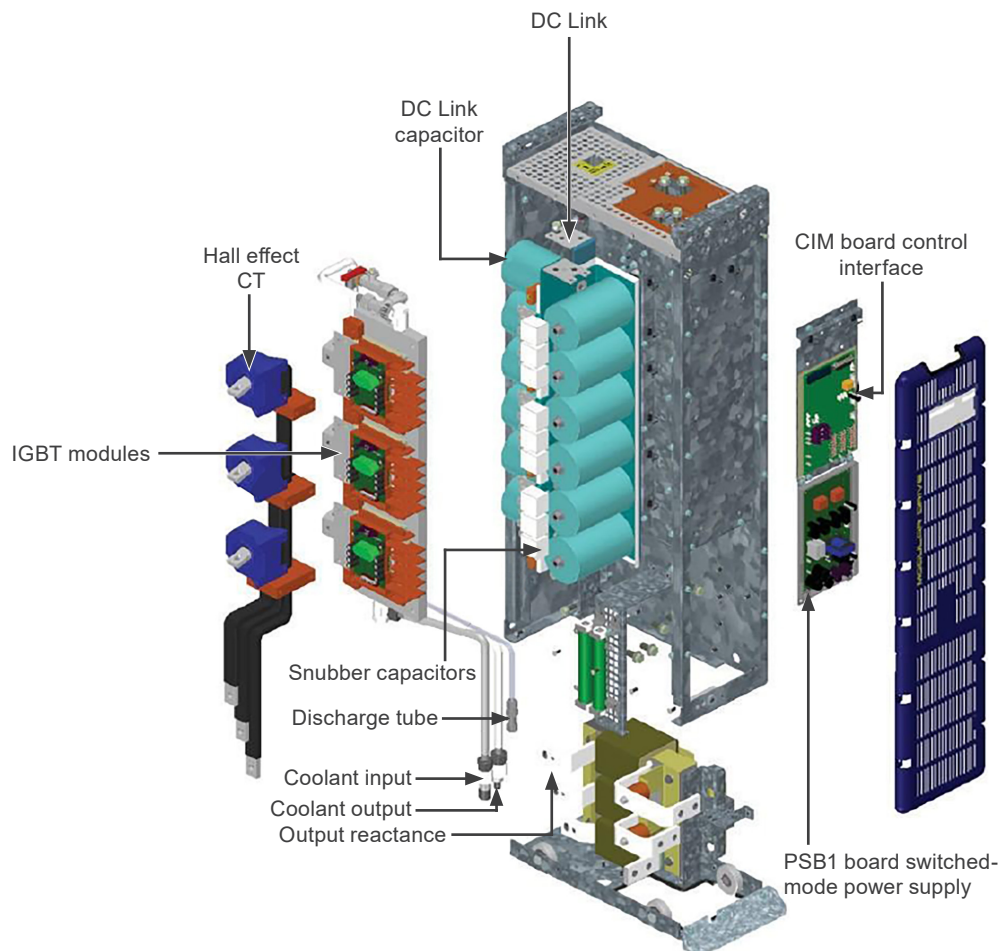


Figure 1.4: UP11 Main parts

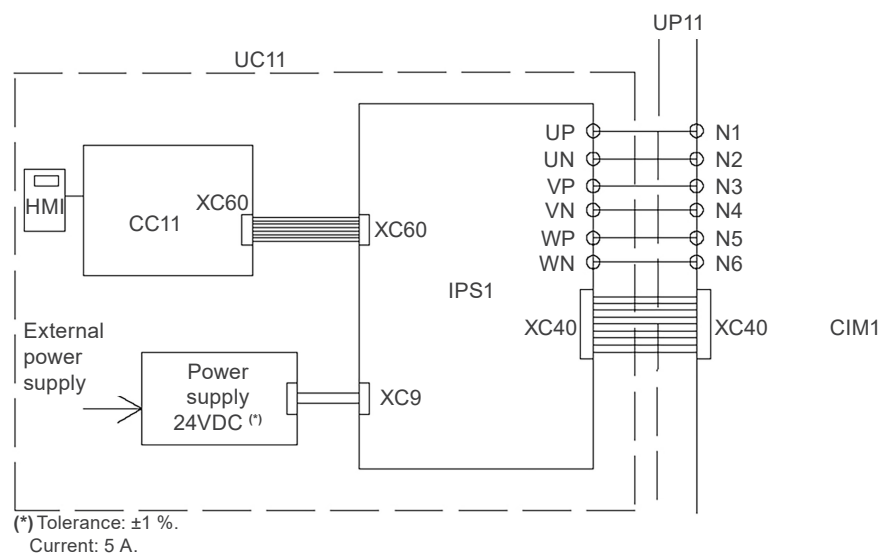


Figure 1.5: UP11 connections between the IPS1 interface board and CIM1

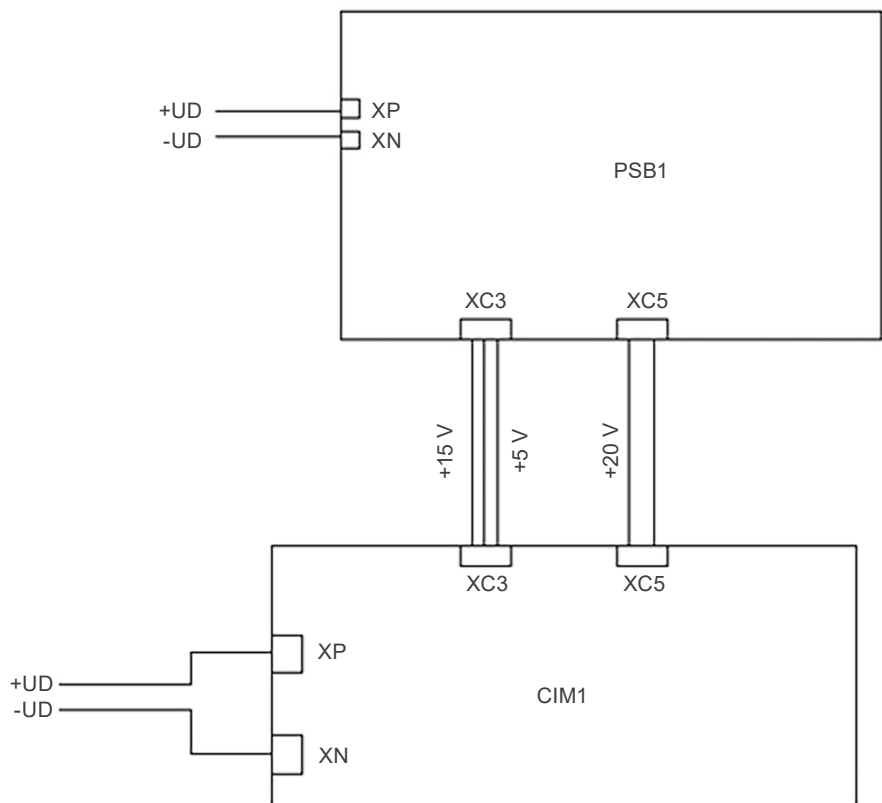


Figure 1.6: UP11 connections between the CIM1 interface board and the PSB1 power supply board

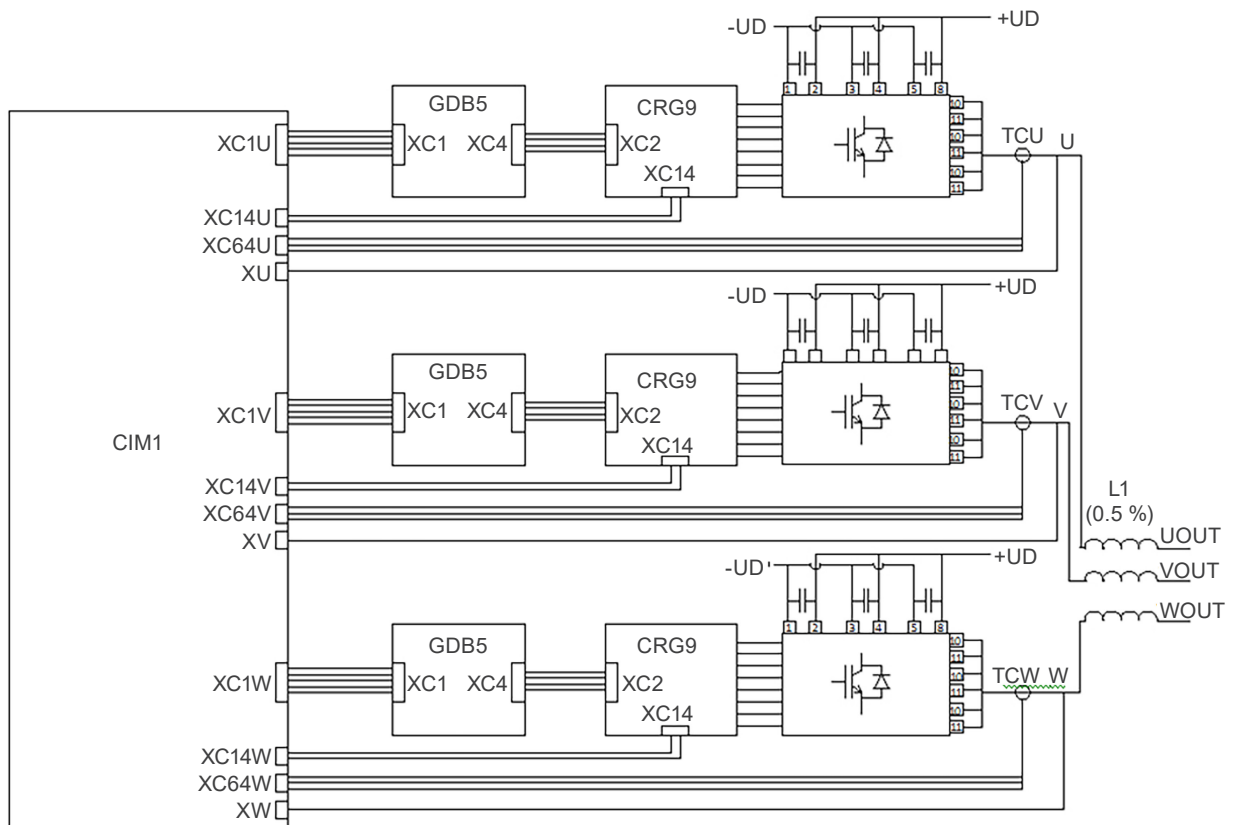


Figure 1.7: UP11 connections between the CIM1 interface board, the gate driver boards, module and sensors for output voltage and current condition



NOTE!

In order to assemble the complete drive, several additional items are needed, such as: input rectifier, fuses on the DC power supply for each UP11, external pre-charge circuit and input reactance with minimum input impedance of 3 % when it is a 6-pulse rectifier.



NOTE!

It is not necessary to add the ground fault CT to the drive, since the UP11s have their own protection.

1.3 HOW TO SPECIFY THE MODEL

In order to specify the model of the CFW-11W, replace the smart code values with the desired rated supply voltage and rated output current in the respective fields, for operation under normal duty cycle (ND), as shown in the example:

Table 1.1: Smart code

		Inverter Model				Option Items Available					
		Refer to the model list of the CFW-11W series in chapter 5, which also contains the technical specifications of the inverters				Refer to chapter 7 of the CFW11M user manual for further details on the option items					
Example	BR	CFW11W	06 40	T	6 (*)	S	--	--	--	--	Z
Field description	Identification of the market (defines the manual language and factory settings)	WEG frequency inverter series 11	Rated output current for use with the Normal Duty (ND) cycle	Number of output phases	Rated output voltage	Option kit	Braking	Safety stop	Special hardware	Special software	Character that identifies the code end
Options available	2 characters			T = three-phase	4 = 380...480 V 6 = 500...690 V	S = standard product O = product with option items	Blank = standard RB = regenerative braking	Blank = standard (without safety stop) Y = with safety stop function as per EN-954-1 category 3	Blank = standard H1 = special hardware # 1	Blank = standard S1 = special software # 1	

(*) This field (voltage) represents the three-phase input voltage on the rectifier that feeds DC voltage to the CFW-11W. The rectifier is not part of the CFW11W.



NOTE!

For the other fields of the code, refer to the CFW-11M user manual.

E.g.: CFW11W0640T6SZ corresponds to a standard CFW-11W inverter with 640-A three-phase output and input supply voltage of 500 - 690 V. The options for the inverter rated current under normal duty (ND) cycle are available in [Table 1.2 on page 1-6](#) below:

Table 1.2: Rated currents under normal duty cycle

380-480 V	500-690 V
0700 = 700 A	0640 = 640 A
1330 = 1330 A	1216 = 1216 A
1995 = 1995 A	1824 = 1824 A
2660 = 2660 A	2432 = 2432 A
3325 = 3325 A	040 A

2 INSTALLATION AND CONNECTION

This chapter describes the procedures for the electrical and mechanical installation of the CFW-11W Modular Drive. The directions and suggestions must be observed so as to ensure the safety of people and equipment, and the proper operation of the inverter.

2.1 ENVIRONMENTAL CONDITIONS

Avoid installing the CFW-11W in areas with:

- Direct exposure to sunlight, rain and high humidity.
- Inflammable or corrosive gases or liquids.
- Excessive vibration.
- Dust, metallic particles and oil mist.

Environment conditions for the operation of the inverter:

- Ambient temperature: 0 °C to 40 °C (32 °F to 104 °F) – nominal conditions (measured around the inverter). 40 °C to 45 °C (104 °F to 113 °F) – current derating of 2 % for each 1 °C (1.8 °F) above 40 °C (104 °F).
- Coolant input temperature: 0 °C to 40 °C (32°F to 104°F) according to the coolant used. 40 °C to 45 °C (104 °F to 113 °F) – current derating of 3 % for each 1 °C (1.8 °F) above 40 °C (104 °F) Coolant flow: 20 l/min.
- Air relative humidity: 5 % to 90 % non-condensing.
- Maximum altitude: up to 1000 m (3,300 ft) – nominal conditions. 1000 m to 4000 m (3,300 ft to 13,200 ft) – current derating of 1 % for each 100 m (or 0.3 % each 100 ft) above 1000 m (3,300 ft). 2000 m to 4000 m (6,600 ft to 13,200 ft) – maximum voltage derating of 1.1 % for each 100 m (or 0.33 % each 100 ft) above 2000 m (6,600 ft). Maximum altitude up to 4000 m (13,200 ft).
- Pollution degree: 2 (according to EN50178 and UL508C), with non-conductive pollution. Condensation shall not originate conduction through the accumulated residues.

2.2 COMPONENT LIST

The kit for panel mounting is composed of the control set and the UP11 power units, whose number varies according to the current. The control set contains the UC11 control unit, the cable sets required for wiring the IPS board to the power units and the ribbon cable that connects the IPS board to the CC11 control board.

Table 2.1: Currents and settings at 390-490 V

Rated Current (A)		Number of UP11-04 Power Units
ND	HD	
700	515	1
1330	979	2
1995	1468	3
2660	1957	4
3325	2446	5

Table 2.2: Currents and settings at 500-690V

Rated Current (A)		Number of UP11-05 Power Units
ND	HD	
640	477	1
1216	906	2
1824	1359	3
2432	1812	4
3040	2265	5

For other components, such as cable set and fiber optic cables, refer to Item 3.2 – Component List of the CFW11M user manual.

2.3 MECHANICAL INSTALLATION

The power units must be installed on the drive panel appropriately, allowing easy extraction and reassembly in case of maintenance. The fastening must be such to avoid damage during panel transportation.

Ø 22.5 (0.89) Hoisting eyes

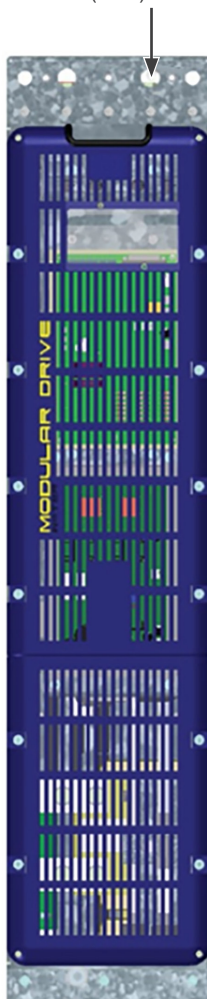


Figure 2.1: UP11 hosting eyes

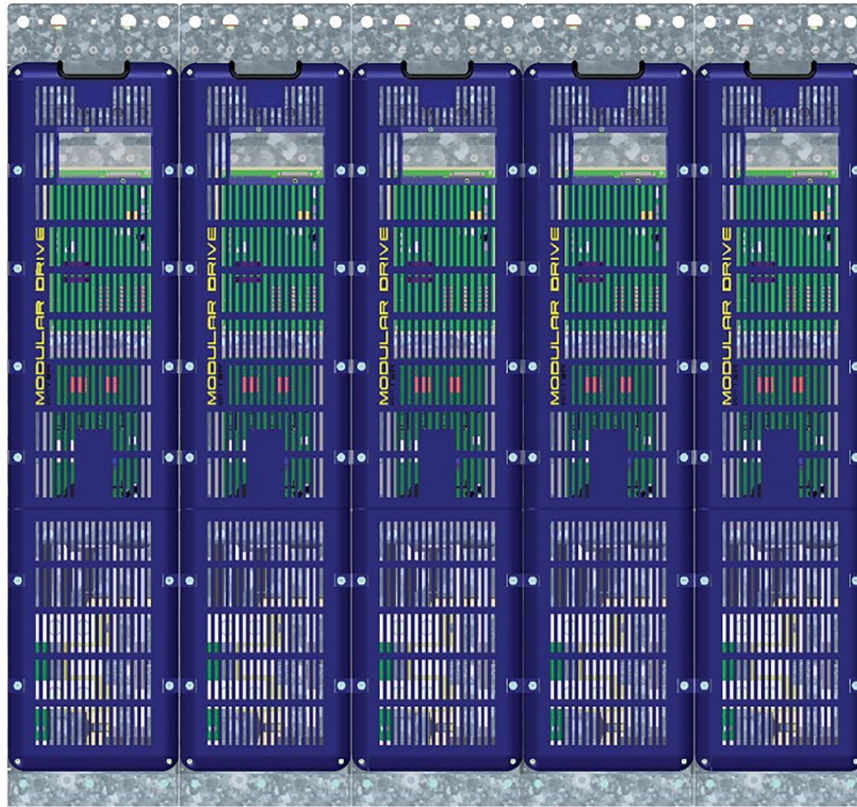


Figure 2.2: Mounting of the UP11 side by side without lateral gap

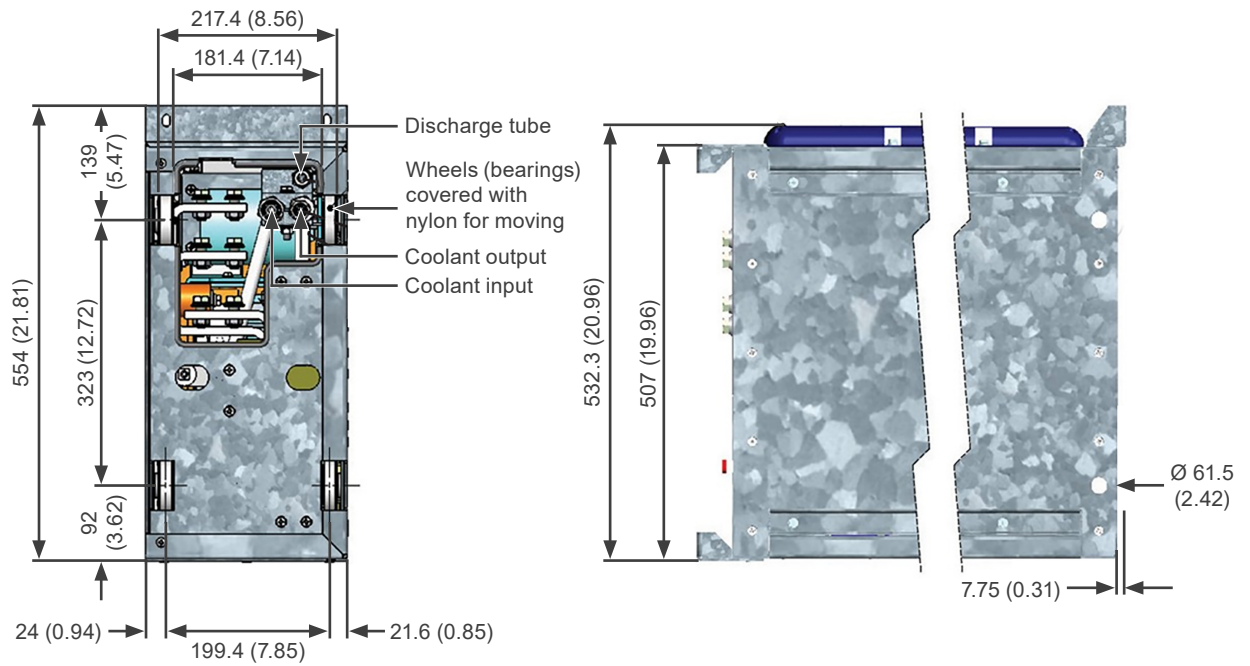


Figure 2.3: UP11 bottom view [mm(in)]

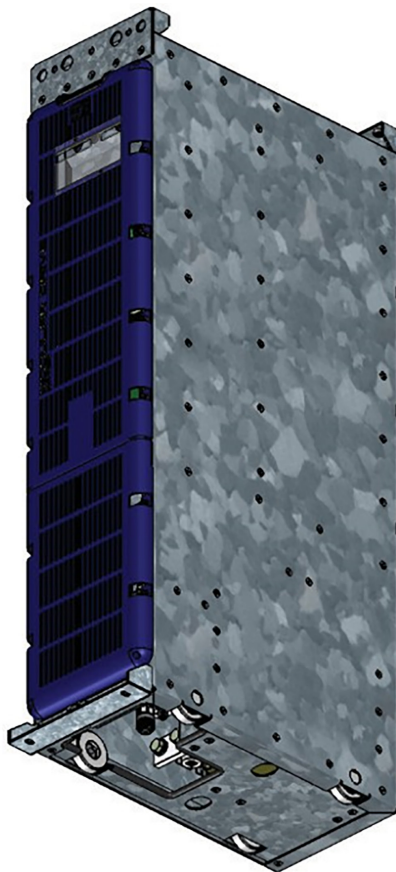
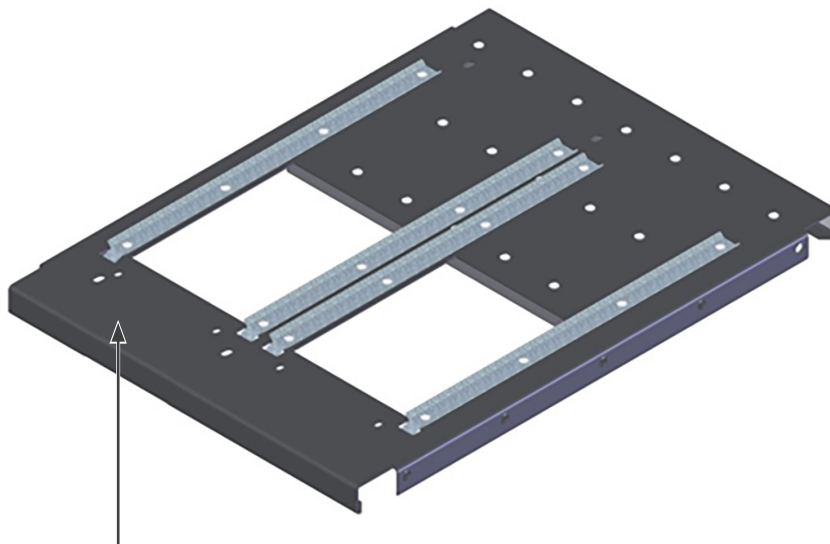


Figure 2.4: UP11 bottom view highlighting the wheels

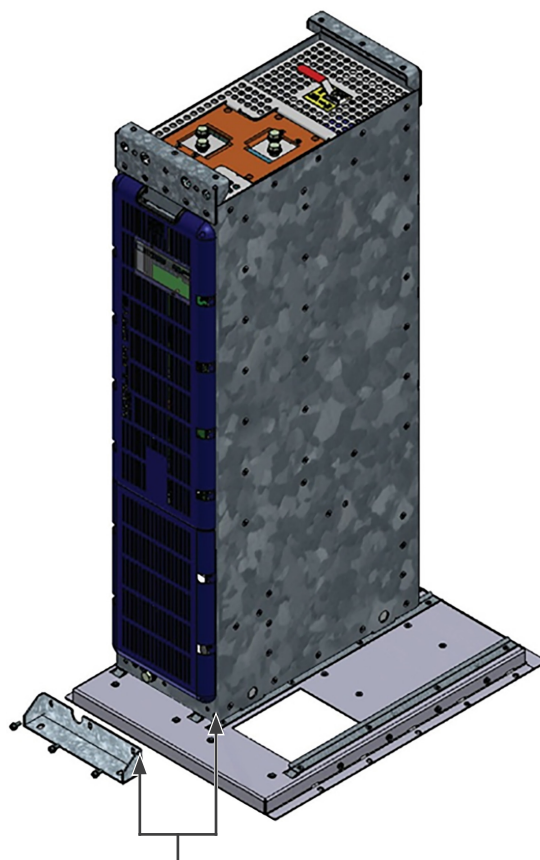
The base where the UP11s are installed has rails for proper positioning ([Figure 2.5 on page 2-4](#)).



The base for the rails is dimensioned according to the number of UP11 power units which will be installed on the panel

Figure 2.5: Rails on the mounting base

In order to insert the UP11 in the panel, it is necessary to remove the lower bracket that comes installed on the power unit (Figure 2.6 on page 2-5).



In order to move the UP11 on the rails, it is necessary to remove the lower bracket

Figure 2.6: UP11 lower bracket

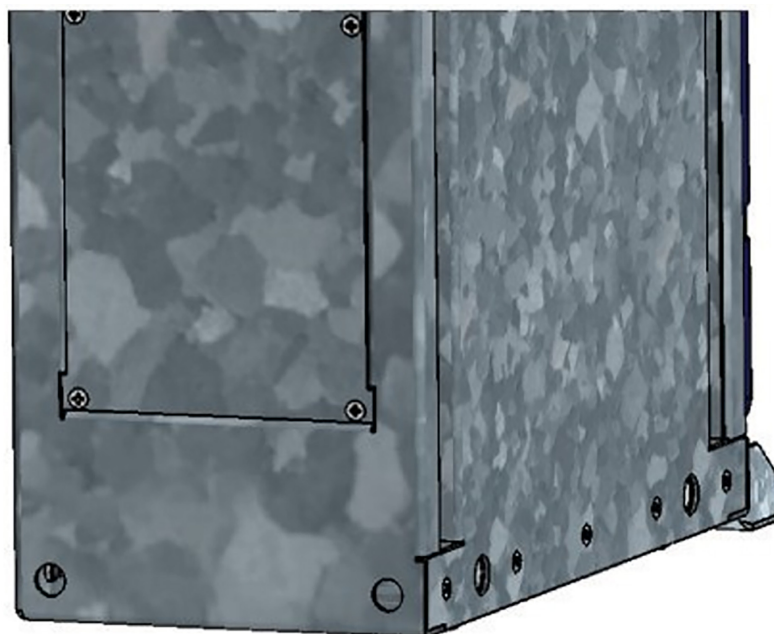


Figure 2.7: Fastening holes for the power unit

INSTALLATION AND CONNECTION

Besides the lower bracket, there are holes for fastening the upper part of the power unit (Figure 2.8 on page 2-6).

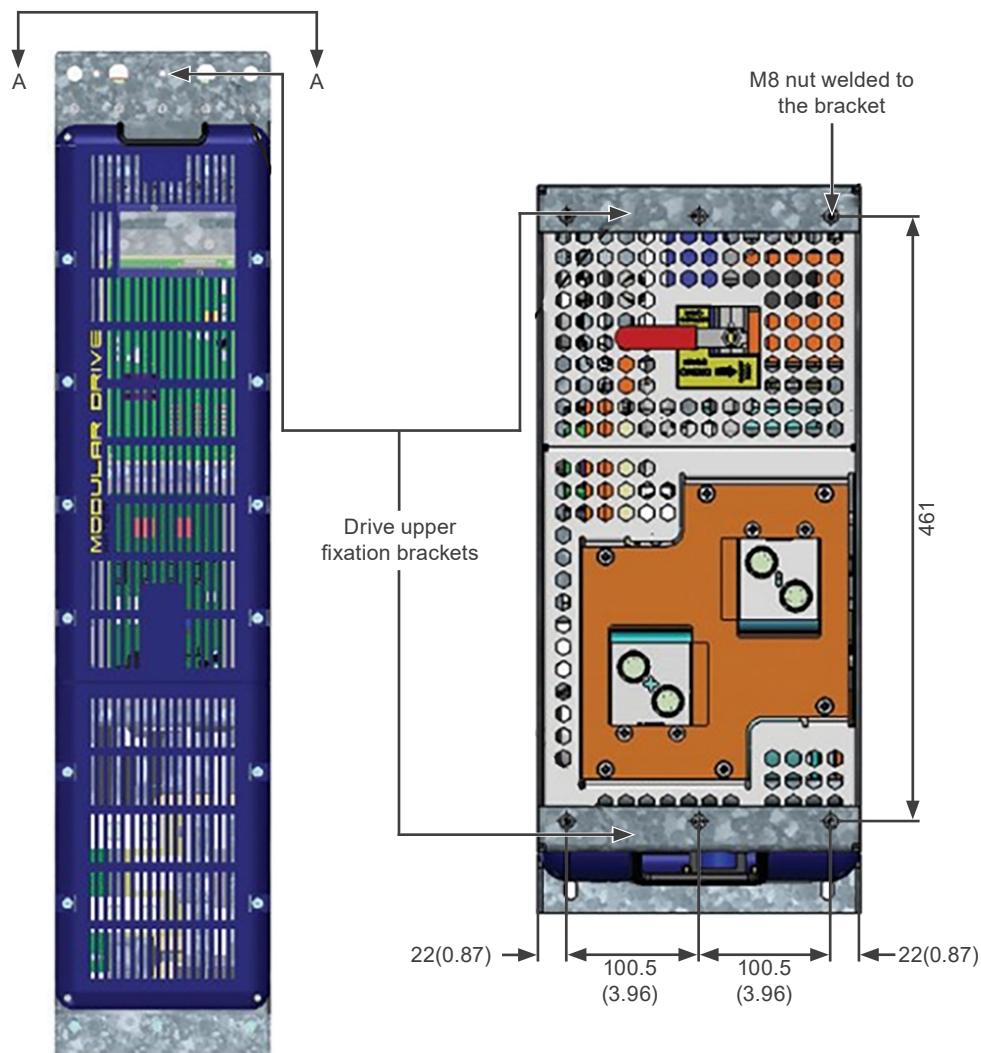


Figure 2.8: Upper fixation bracket [mm(in)]

For further information about the mechanical installation, refer to item 3.3 - mechanical installation of the CFW11 M user manual.



ATTENTION!

It is recommended the use of stainless steel hydraulic connections in the application cooling system.



ATTENTION!

The acceptable differential pressure in the cooling circuit in relation to the atmosphere must not exceed 6 bar.



ATTENTION!

The cooling of the UP11Ws G2 must not be connected in series in the circuit of the cooling system.

2.4 COOLING SYSTEM

Figure 2.8 on page 2-6 shows the main components and scheme of the cooling system.

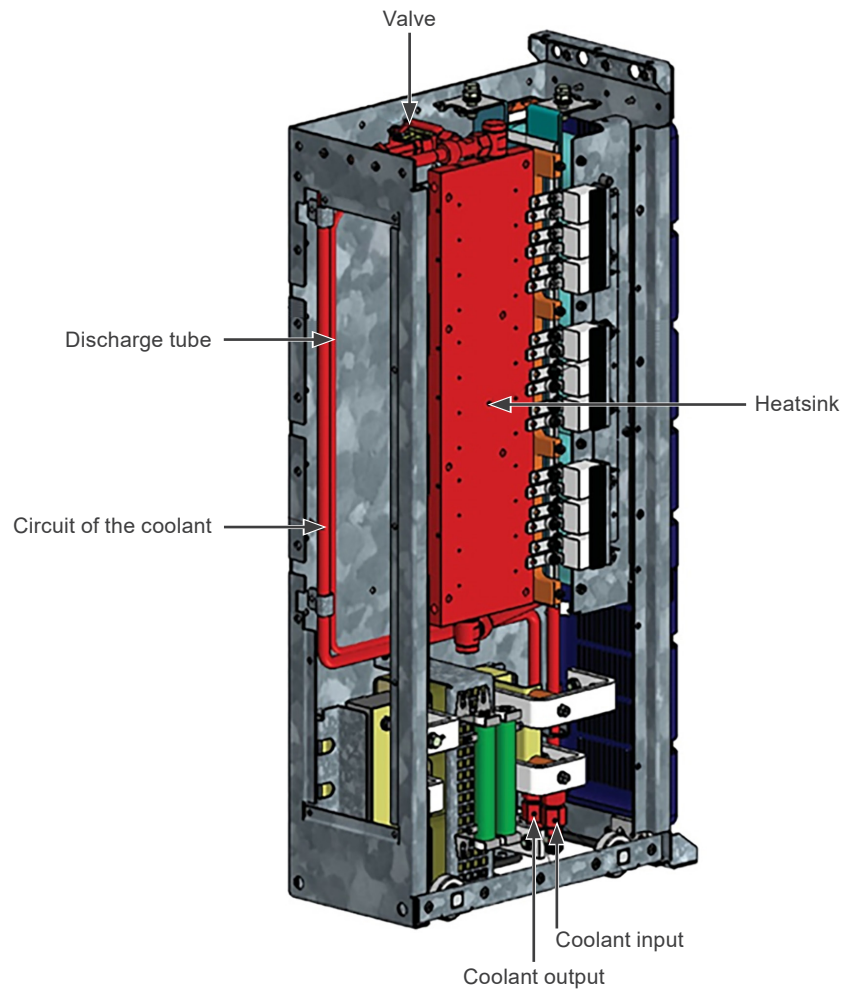


Figure 2.9: Coolant circulation scheme

INSTALLATION AND CONNECTION

The valve located in the upper part of the UP11 drains possible accumulations of air pockets. This valve is connected to the discharge tube located in the lower part of the UP11.

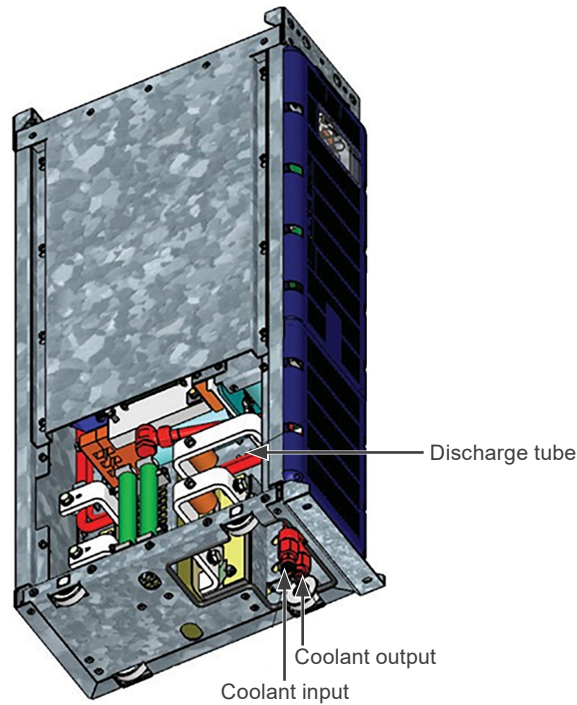


Figure 2.10: Detail of the coolant input and output

Table 2.3 on page 2-8 contains detailed specifications of the UP11W G1 cooling system.

Table 2.3: Specifications of the cooling system

Temperature of the Air Surrounding the Inverter	0 °C to 40 °C (32 °F to 104 °F) for nominal conditions. 40 °C to 45 °C (104 °F to 113 °F) with output current derating of 2 % for each 1 °C (1.8 °F) above 40 °C (104 °F)
Humidity	5 % to 90 % non-condensing, according to Table 2.3 on page 2-8
Pollution Degree	2 (according to EN50178 and UL508C), with non-conductive pollution
Coolant Input Temperature	From 0 °C to 40 °C (32 °F to 104 °F), depending on the coolant used (see Table 2.4 on page 2-9 and Table 2.5 on page 2-9). From 40 °C to 45 °C (104 °F to 113 °F) with the output current derated by 3 % for each 1 °C (1.8 °F) above 40 °C (104 °F)
Coolant Temperature Rise ⁽¹⁾	9 °C (16.2 °F) above the input temperature (nominal conditions)
Coolant Flow	20 l/min (1.2 m³/hour)
Maximum Allowed Flow Rate	30 l/min
Maximum System Pressure in Relation to the Atmosphere	6 bar (600 kPa)
Pressure Drop on the UP11 Module @ 20 l/min ⁽¹⁾	3.3 bar (330 kPa)
Water Volume Used in the UP11 Module	0.4 l (0.4 dm³)
Coolant Input and Output Connections Used in the Inverter	Coolant input: Quick connecting SMC KKA4S-04M, thread R 1/2 Coolant output: Quick connecting SMC KKA4P-04M, thread R 1/2

(1) Considering a flow rate of 20 l/min and coolant according to the composition and trademarks presented in [Table 2.4 on page 2-9](#) and [Table 2.5 on page 2-9](#). The specifications of the inverter output current informed in [Chapter 5 TECHNICAL SPECIFICATIONS on page 5-1](#) are for a coolant temperature between 5 and 40 °C (41 and 104 °F).

Table 2.4: Coolant composition for temperatures between 5 and 40 °C (41 and 104°F)

WEG Item	Trademark	Component	Proportion
10562331	Ref. Table 2.5 on page 2-9	Deionized Water	89.0 %
12014320	URSA ELC NF	Ethylene glycol	10 %
12767585	CorteC VpCI-649	Anticorrosive	1.0 %



NOTE!

The use of the coolant specified in this manual is essential, as it extends the equipment service life, mitigating problems with corrosion, oxidation, contamination and proliferation of microorganisms.

Below is Table 2.5 on page 2-9 for the technical specifications of the deionized water to be used in the coolant.

Table 2.5: Water specification

Characteristic	Unit	Value
pH		6 - 8
Hardness	°dH	< 10
Conductivity	µS/cm	< 10
Chlorine	mg/l	< 10
Iron	mg/l	< 0.1
Maximum particle size	µm	< 300



ATTENTION!

Never use sea water or drinking water in the coolant.

2.4.1 Condensation

The condensation occurs when the incoming water temperature is excessively below the ambient temperature. To avoid condensation the water temperature varies according to the relative humidity and ambient temperature. The temperature at which the water vapor in the air turns into liquid as droplets is known as "dew point".

The Table 2.6 on page 2-9 and Table 2.7 on page 2-10 show the dew point in relation to the air relative humidity and the ambient temperature for an atmosphere pressure of 1 atm. If the water temperature is lower than the presented value, condensation may occur.

Table 2.6: Dew point in relation to the air relative humidity and the ambient temperature in °C

		Air Relative Humidity [%]									
		5	10	20	30	40	50	60	70	80	90
Ambient Temperature [°C]	10	<0	<0	<0	<0	<0	0.1	2.6	4.8	6.7	8.4
	20	<0	<0	<0	1.9	6.0	9.3	12.0	14.4	16.4	18.3
	25	<0	<0	0.5	6.2	10.5	13.8	16.7	19.1	21.3	23.2
	30	<0	<0	4.6	10.5	14.9	18.4	21.4	23.9	26.2	28.2
	35	<0	<0	8.7	14.8	19.4	23.0	26.1	28.7	31.0	33.1
	40	<0	2.6	12.7	19.1	23.8	27.6	30.7	33.5	35.9	38.0
	45	<0	6.3	16.8	23.4	28.2	32.1	35.4	38.2	40.7	43.0

Table 2.7: Dew point in relation to the air relative humidity and the ambient temperature in °F

		Air Relative Humidity [%]									
		5	10	20	30	40	50	60	70	80	90
Ambient Temperature [°F]	50	<0	<0	<0	<0	<0	32.18	36.68	40.64	44.06	47.12
	68	<0	<0	<0	35.42	42.8	48.74	53.6	57.92	61.52	64.94
	77	<0	<0	32.9	43.16	50.9	56.84	62.06	66.38	70.34	73.76
	86	<0	<0	40.28	50.9	58.82	65.12	70.52	75.02	79.16	82.76
	95	<0	<0	47.66	58.64	66.92	73.4	78.98	83.66	87.8	91.58
	104	<0	36.68	54.86	66.38	74.84	81.68	87.26	92.3	96.62	100.4
	113	<0	43.34	62.24	74.12	82.76	89.78	95.72	100.8	105.3	109.4



ATTENTION!

The water temperature must always be higher or equal to the dew point.

The values presented in [Table 2.6 on page 2-9](#) are based on the August-Roche-Magnus approximations, which are valid for:

- Ambient temperature 0 °C to 60 °C (32 °F to 140 °F).
- Air relative humidity 1 % to 100 %.
- Dew point 0 °C to 50 °C (32 °F to 122 °F).

2.4.2 Cooling System Maintenance

[Table 2.8 on page 2-10](#) below details the preventive/corrective maintenance of the components used directly in the CFW11W G1 cooling circuit, such as the coolant specified in [Table 2.4 on page 2-9](#) and [Table 2.5 on page 2-9](#).

Table 2.8: Preventative/corrective maintenance

Component	Interval	Faults	Instructions
Internal cooling system - Panel	Once a month	Leaks	Immediate replacement of components
Internal cooling system - Module/Panel	Quarterly in the first year	Leaks	Immediate replacement of components
	Annually from the fifth year onwards		
Coolant	Quarterly in the first year	IGBTs overheating/ coolant contamination	Sample collection and analysis according to Table 2.9 on page 2-11
	Annually from the fifth year onwards		

It is essential to ensure the fulfillment of the system coolant technical requirements. The intervals indicated in [Table 2.8 on page 2-10](#) are mandatory for a long service life and the correct operation of the equipment.

To guarantee the integrity of the coolant, its characteristics must be in accordance with the values contained in [Table 2.9 on page 2-11](#).

Table 2.9: Rated characteristics for the coolant integrity

Characteristic	Unit	Value	Analysis Method
pH at 20 °C	-	7.6 – 8.2	ASTM D1287
Appearance	-	Liquid	Visual
Color	-	Orange	Visual
URSA ELC NF Concentration	%	10	Refractometer



NOTE!

If any variation is found in the data collected during the monitoring of the coolant, it must be properly discarded. The cooling system must be cleaned according to [Item 2.4.3 Cleaning the Cooling System on page 2-11](#) of this manual before refilling it with new coolant.

2.4.3 Cleaning the Cooling System

Cooling system cleaning procedure if, during laboratory analysis, the data contained in [Table 2.9 on page 2-11](#) shows variations outside the specification:

Steps	Actions
E1	Cut off the inverter power supply and wait for 10 minutes. Ensure that the equipment is properly de-energized
E2	With the UP11 G1 connected to the system, drain the contaminated coolant, discard it correctly and inspect the hoses and fittings
E3	After removing the contaminated coolant, carry out a first cleaning with the coolant indicated in Table 2.5 on page 2-9 to remove impurities and contaminants
E4	With the UP11 G1 connected to the system and new coolant indicated in Table 2.5 on page 2-9 , repeat step 3 (E3) two or three times for one hour or until the fluid appears visually clean (original color)
E5	After cleaning, add new coolant as specified in Table 2.4 on page 2-9 and Table 2.5 on page 2-9
E6	After one week of operation with the new fluid, analyze the coolant as per the monitoring indicated in Table 2.8 on page 2-10

2.5 ELECTRICAL INSTALLATION



ATTENTION!

The water temperature must always be higher or equal to the dew point.



DANGER!

The water temperature must always be higher or equal to the dew point.



DANGER!

Vérifiez que l'alimentation secteur est débranchée avant de commencer l'installation.



ATTENTION!

The CFW-11W can be connected to circuits with short-circuit capacity of up to 100000 symmetric Arms (maximum 480 V/690 V).



ATTENTION!

The short-circuit protection of the inverter does not provide short-circuit protection for the power supply circuit. The short-circuit protection of the power supply circuit must be provided in accordance with applicable local standards.

2.5.1 Input Rectifier

The main rectifier bridge is selected to comply with the nominal power of the drive. The heat dissipation caused by losses at the rectifier bridge should be taken into account for the sizing of the heatsink, as well as in the heating up of the panel internal air.

The resistors of the pre-charge circuit must be dimensioned according to the following criteria:

- Maximum voltage.
- Maximum energy.
- Power overload capacity of the resistors during the pre-charge period (energy dissipation capacity).

Table 2.10: Dimensioning of the pre-charge

Peak Current During Pre-Charge (A)		0.82 (Vline/R)
Energy Stored in the Capacitor Bank (J)	Line 400 V	$N \cdot 0.008 \cdot V_{line}^2$
	Line 600 V	$N \cdot 0.004 \cdot V_{line}^2$
Duration of the Pre-Charge (s)	Line 400 V	$0.02 \cdot N \cdot R$
	Line 600 V	$0.01 \cdot N \cdot R$

Where R is the ohmic value of the resistor used in each phase and N is the number of power units. Example:

In a drive composed of three power units, whose line voltage at the rectifier input is 380 Vrms (line 400 V), the obtained values would be:

- Energy stored in the capacitor bank: $3 \cdot 0.008 \cdot 380^2 = 3466$ J.
- Using 3 resistors of 10 Ω (one per phase), each resistor must withstand 1155 J.
- The manufacturer of the resistor informs the energy the component withstands.
- The peak current during pre-charge would be 31 A and the duration of the pre-charge would be 0.6 s.

2.5.2 Fuses

It is recommended the use of fuses suitable for operation with direct current at the UP11 DC supply. The maximum bus voltage at the 400 V line is 800 Vdc, at the other lines it is 1200 Vdc (IGBT overvoltage trip level). Fuses used in AC lines can be used; however, a derating in the AC voltage must be applied. Consult the fuse manufacturer in order to obtain the derating factor.

Fuses examples:

- Line 400 V 10URD73TTF1000 (FERRAZ).
- Line 600 V 12URD73TTF900 (FERRAZ).

2.5.3 UP11 Connections

The installation of the input connections of the UP11 is done with 4 screws M12X25 (recommended torque: 60 Nm), see [Figure 2.11](#) on page 2-13.

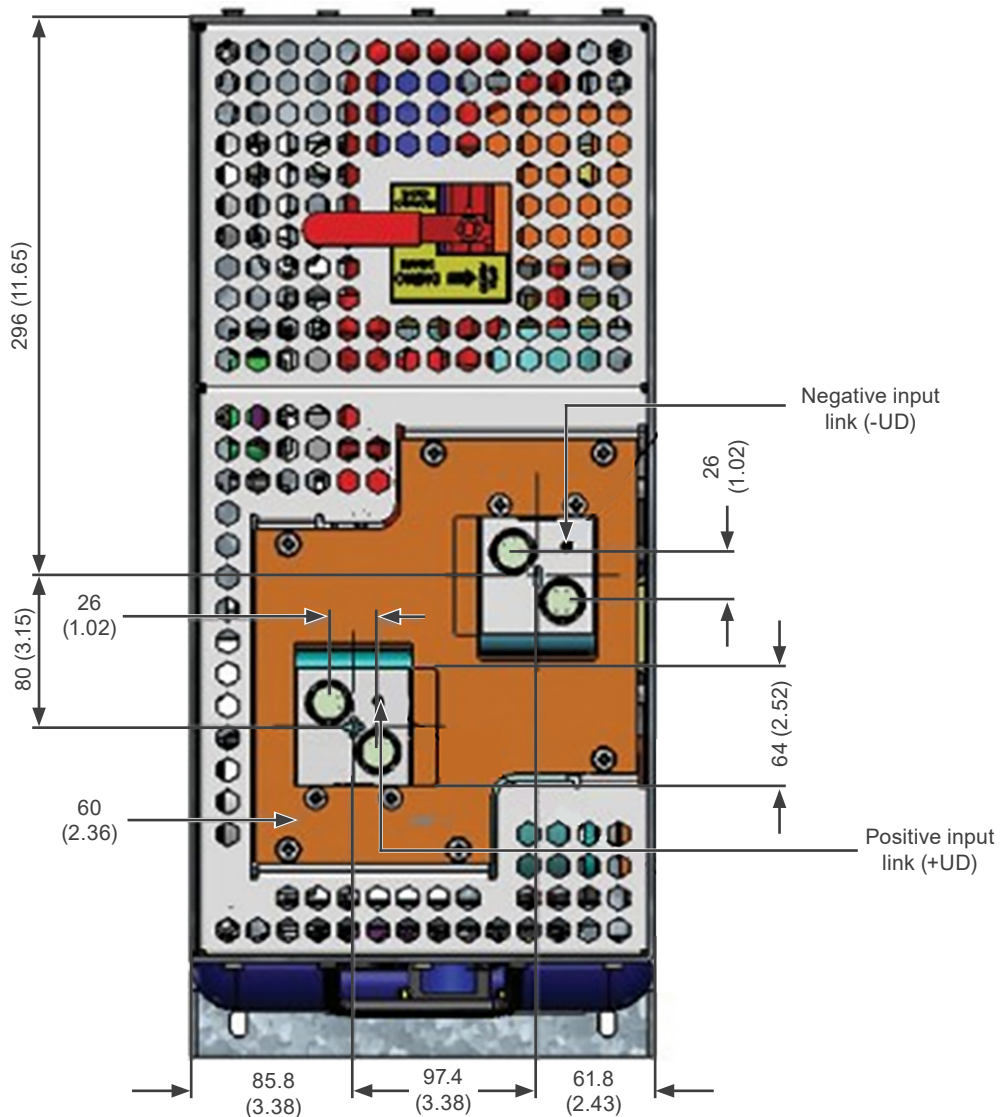


Figure 2.11: Input links of the UP11; DC input connection [mm(in)]

The output connections in the internal reactance are done by means of 6 screws M12X30 (recommended torque: 60 N.m), 2 screws are used for each phase. The links are 40X10 mm and the fastening is done through nut M12 inserted in the link, refer to [Figure 2.1](#) on page 2-2.

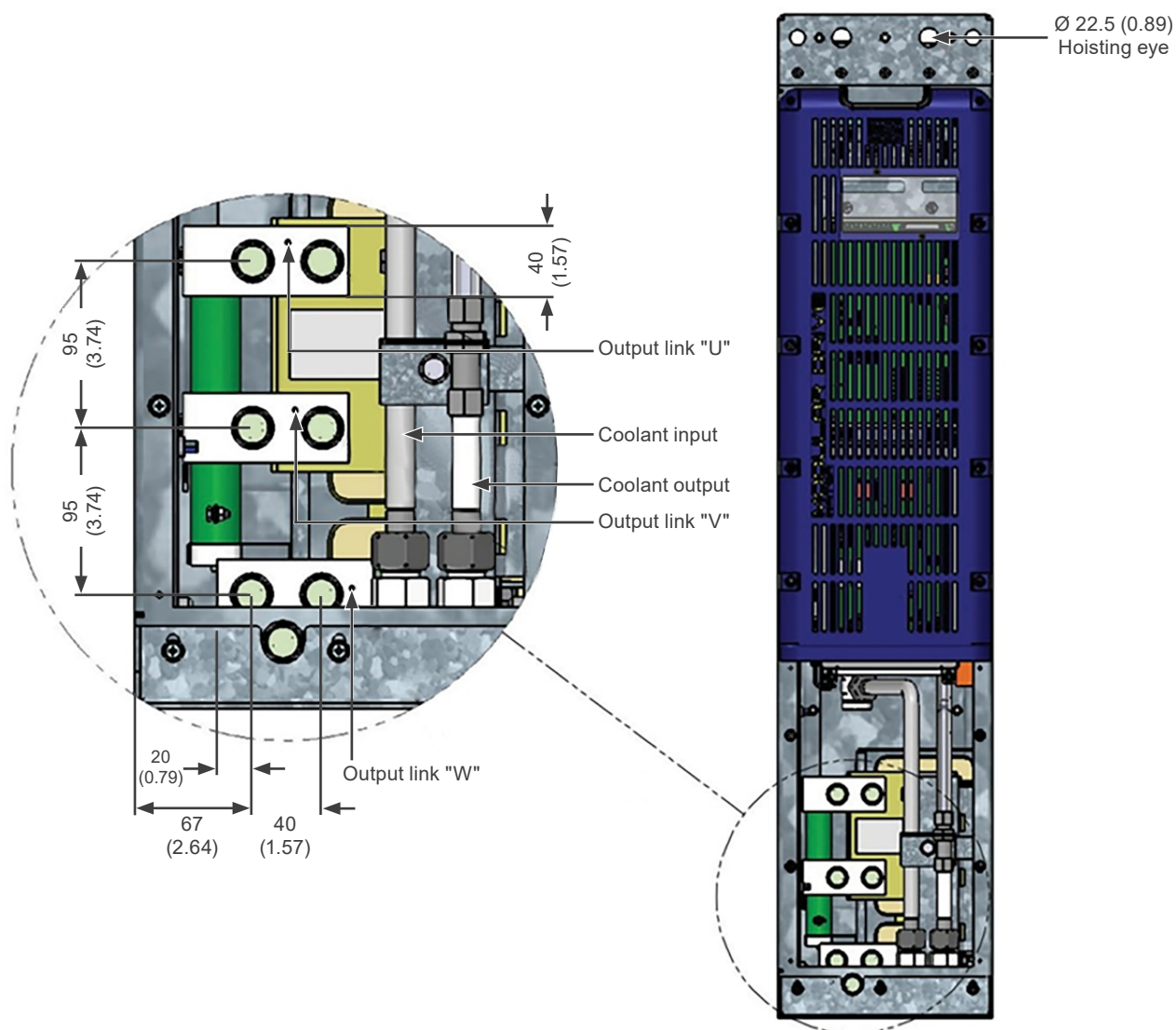


Figure 2.12: Output links of the UP11; output connections to the motor [mm(in)]

Use two cables in parallel, with the recommended gauge indicated in the, for connecting the UP11 output reactor to the output bus bar (motor connection).

Table 2.11: Output cables

Current (A)	Voltage (V)	Duty	Minimum Cables Cross-Section (mm ²)
700	380-480	ND	(2x) 240
515		HD	(2x) 150
640	500-690	ND	(2x) 240
477		HD	(2x) 150

The screw used to fasten the grounding cable of the UP11 is M12X30 (recommended torque: 60 N·m), refer to [Figure 2.13 on page 2-15](#).

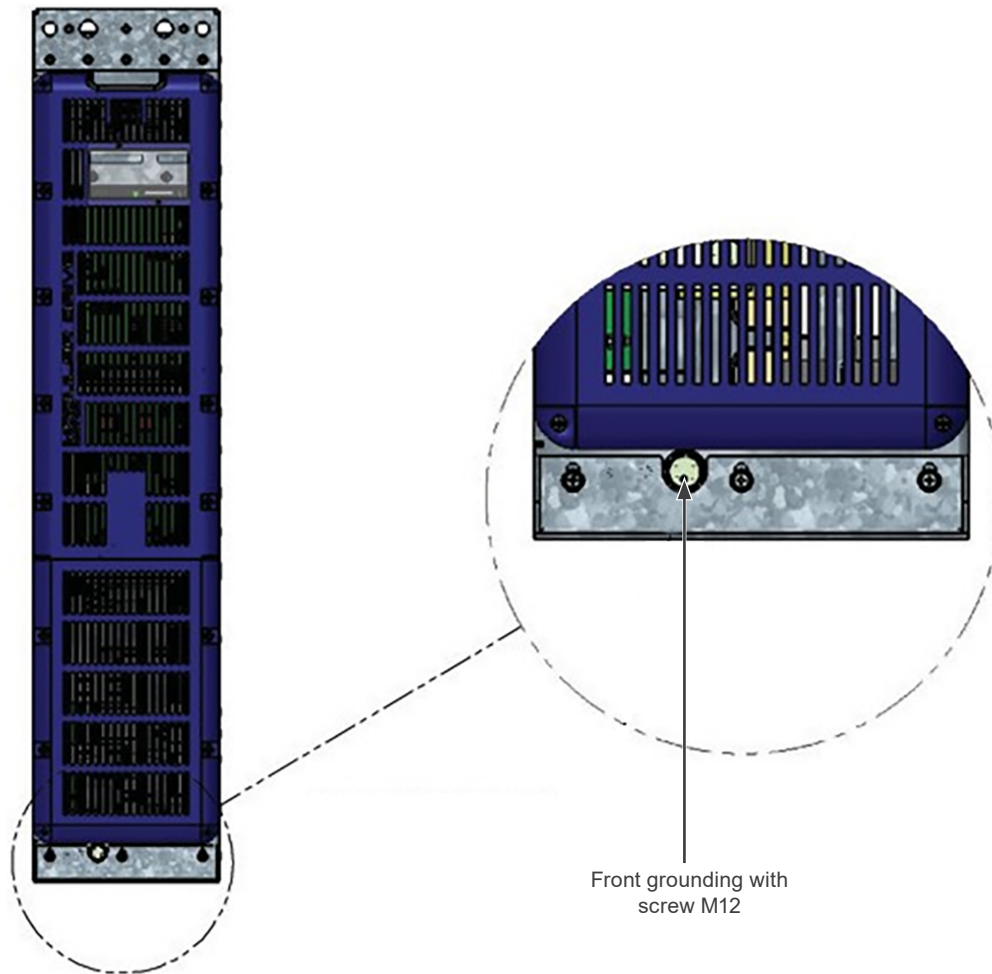


Figure 2.13: Grounding points of the UP11

Use the cables with the gauge indicated in [Table 2.11 on page 2-14](#) to ground the UP11 power units.

Table 2.12: Grounding cables

Current (A)	Voltage (V)	Duty	Minimum Cross-Section of the Grounding Cable
700	380-480	ND	240
515		HD	150
640	500-690	ND	240
477		HD	150

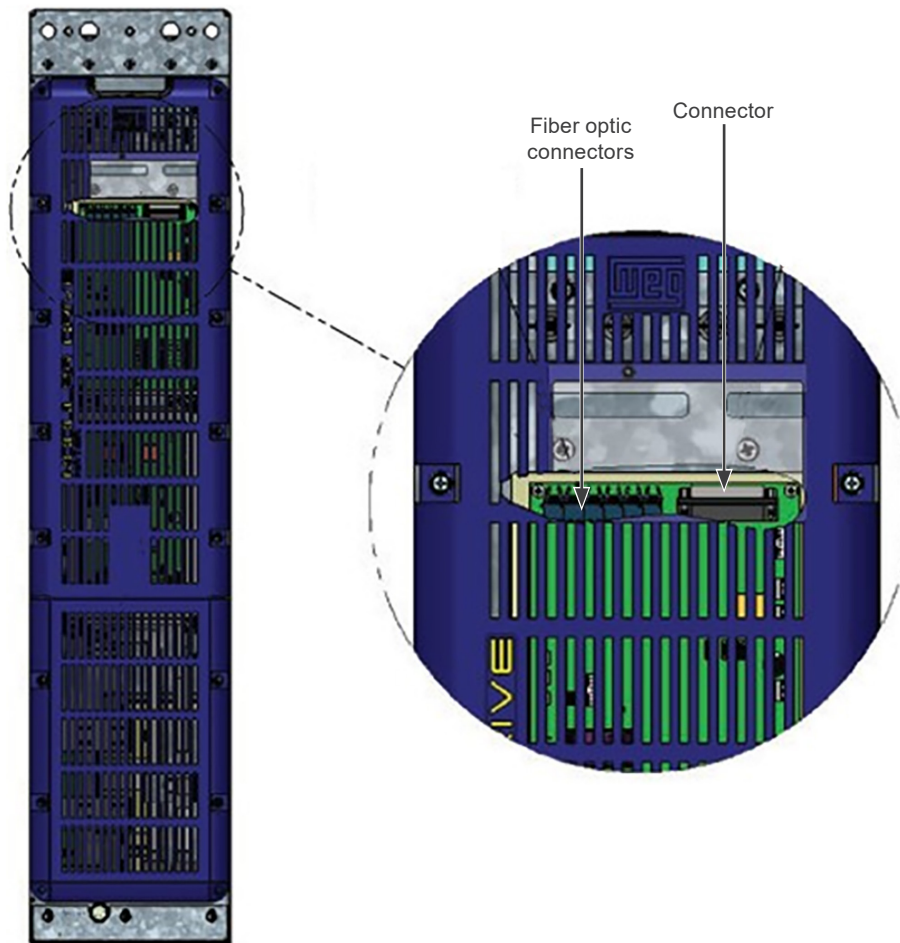


Figure 2.14: Connection points of control cables on the UP11

Keep the optic fiber bending radius bigger or equal to 35 mm (1.38 in). If the control is mounted on the panel door, let a curvature that causes a minimum stress on the optic fiber cables when the door is opened or closed. For further details about the electrical installation, refer to item 3.4 – electrical installation of the CFW11M user manual.

2.6 INSTALLATIONS ACCORDING TO THE EUROPEAN DIRECTIVE OF ELECTROMAGNETIC COMPATIBILITY

The CFW-11W inverters, when correctly installed, meet the requirements of the "EMC Directive 2004/108/EC".

2.6.1 Conformal Installation

For Conformal installation use:

1. CFW-11W standard inverter for emission levels in accordance with IEC/EN 61800-3 "Adjustable Speed Electrical Power Drive Systems", C4 category.
2. Additional external filters in order to comply with the conducted emission levels C2 or C3 categories.
3. Shielded output cables (motor cables) and connect the shield at both ends (motor and inverter) with a low impedance connection for high frequency. The required cable separation is presented in Table 3.11 of the CFW-11M user manual.
4. Shielded control cables. Keep the separation of the other cables according to Item 3.4.8 - Control Connection of the CFW-11M user manual.
5. Grounding of the inverter according to instructions of [Item 2.5.3 UP11 Connections on page 2-13](#).

2.6.2 Standard Definitions

IEC/EN 61800-3: "Adjustable Speed Electrical Power Drives Systems"

■ Environment:

First Environment: includes domestic premises. It also includes establishments directly connected without intermediate transformer to a low-voltage power supply network which supplies buildings used for domestic purposes.

Example: houses, apartments, commercial installations, or offices located in residential buildings.

Second Environment: includes all establishments other than those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes.

Example: industrial area, technical area of any building supplied by a dedicated transformer.

■ Categories:

Category C1: inverters with a voltage rating less than 1000 V and intended for use in the First Environment.

Category C2: inverters with a voltage rating less than 1000 V, intended for use in the First Environment, not provided with a plug connector or a movable installations, and installed and commissioned by a professional.



NOTE!

A professional is a person or organization familiar with the installation and/or commissioning of inverters, including the EMC aspects.

Category C3: inverters with a voltage rating less than 1000 V and intended for use in the Second Environment only (not designed for use in the First Environment).

Category C4: inverters with a voltage rating equal to or greater than 1000 V, or with a current rating equal to or greater than 400 Amps, or intended for use in complex systems in the Second Environment.

EN 55011: "Threshold values and measuring methods for radio interference from industrial, scientific and medical (ISM) high-frequency equipment".

Class B: equipment intended for use in the low-voltage power supply network (residential, commercial, and light-industrial environments).

Class A1: equipment intended for use in the low-voltage power supply network. Restricted distribution.



NOTE!

Must be installed and commissioned by a professional when applied in the low-voltage power supply network.

Class A2: equipment intended for use in industrial environments.

2.6.3 Emission and Immunity Levels

Table 2.13: Emission and Immunity Levels

EMC Phenomenon	Basic Standard	Level
Emission:		
Mains terminal disturbance voltage Frequency range: 150 kHz to 30 MHz	IEC/EN61800-3	■ Without external filter: Category C4 ■ With external filter: Category C2 or C3
Electromagnetic radiation disturbance Frequency range: 30 MHz to 1 GHz		
Immunity:		
Electrostatic discharge (ESD)	IEC/EN61000-4-2	4 kV for contact discharge and 8 kV for air discharge
Fast transient-burst	IEC/EN61000-4-4	2 kV/5 kHz (coupling capacitor) power input cables 1 kV/5 kHz control cables 2 kV/5 kHz (coupling capacitor) motor output cables
Conducted radio-frequency common mode	IEC/EN61000-4-6	0.15 to 80 MHz; 10 V; 80 % AM (1 kHz) Motor input cables, control cables and remote HMI cables
Surge immunity	IEC/EN61000-4-5	1.2/50 μs, 8/20 μs 1 kV line-to-line coupling 2 kV line-to-ground coupling
Radio-frequency electromagnetic field	IEC/EN61000-4-3	80 to 1000 MHz 10 V/m 80 % AM (1 kHz)

2.6.4 External RFI Filters

Use them only when the conducted emission levels C2 or C3 are not according to IEC/EN61800-3. The models below are manufactured by Epcos.

Table 2.14: Filters for networks 380-480 V

Inverter Model	Duty	Filter Model
700	ND	B84143-B1000-S20
	HD	B84143-B600-S20
1330	ND	B84143-B1600-S20
	HD	B84143-B1000-S20
1995	ND	B84143-B2500-S20
	HD	B84143-B1600-S20
2660	ND	----
	HD	B84143-B2500-S20
3325	ND	----
	HD	B84143-B2500-S20

Table 2.15: Filters for networks 500-690 V

Inverter Model	Duty	Filter Model
640	ND	B84143-B1000-S21
	HD	B84143-B600-S21
1216	ND	B84143-B1600-S21
	HD	B84143-B1000-S21
1824	ND	B84143-B2500-S21
	HD	B84143-B1600-S21
2432	ND	B84143-B2500-S21
	HD	B84143-B2500-S21
3040	ND	----
	HD	B84143-B2500-S21

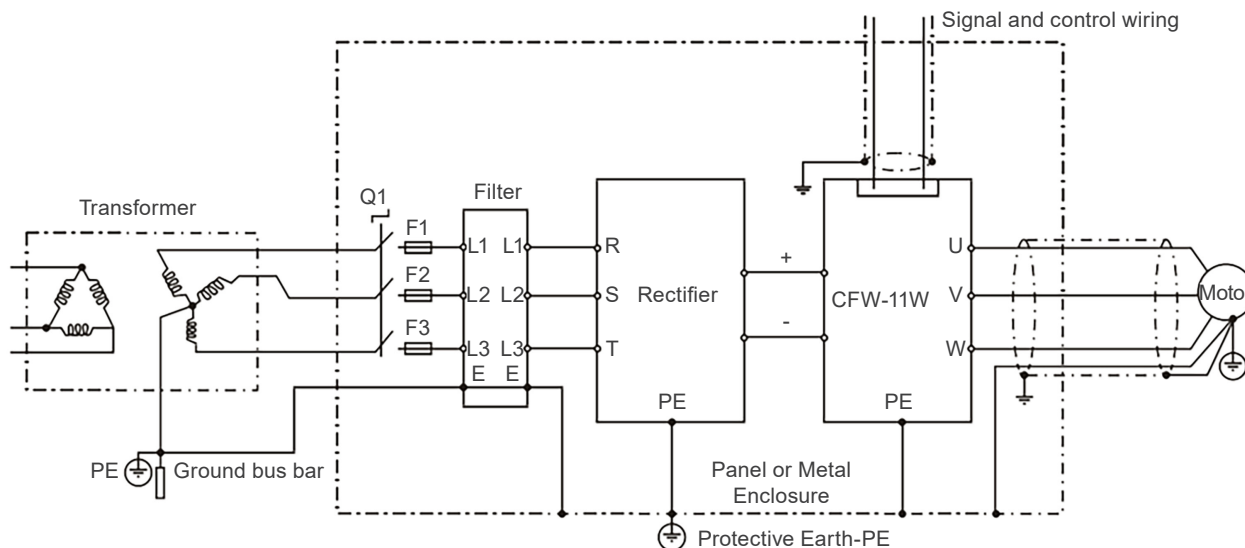


Figure 2.15: Connections of the external RFI filter

Only use the listed filters in networks with solidly grounded neutral. Do not use them in IT networks, networks not grounded or grounded by high impedance.

At the installation of the filters, take the usual precautions with EMC filters: do not cross the filter input and output cables, mount the filter on a metal plate ensuring as much contact area as possible between the filter and the plate, ground this metal plate via flexible braid.

Filter technical data:

Table 2.16: Filter characteristics

Filter	Rated Current [A]	Dissipated Power [W]	Weight [kg]
B84143-B600-S20	600	57	22
B84143-B1000-S20	1000	99	28
B84143-B1600-S20	1600	169	34
B84143-B2500-S20	2500	282	105
B84143-B600-S21	600	57	22
B84143-B1000-S21	1000	99	28
B84143-B1600-S21	1600	169	34
B84143-B2500-S21	2500	282	105

3 TROUBLESHOOTING AND MAINTENANCE

3.1 FAULTS, ALARMS AND POSSIBLE CAUSES

All the alarms and faults of the CFW-11M series are valid for the CFW-11W. Refer to the CFW-11M user manual for further details of alarms and faults.

The specific faults and alarms of the CFW-11W, and the most likely causes for their occurrence are presented below.

Table 3.1: Fault and alarm description

Fault/Alarm	Description	Possible Causes
A300: high temperature IGBT U B1	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase U book 1	■ High temperature of the coolant [$>40^{\circ}\text{C}$ ($>104^{\circ}\text{F}$)] ■ Clogged hydraulic circuit ■ Defective hydraulic pump ■ Power supply not connected to the hydraulic pump ■ Leakage
F301: overtemperature IGBT U B1	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase U book 1	
A303: high temperature IGBT V B1	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase V book 1	
F304: overtemperature IGBT V B1	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase V book 1	
A306: high temperature IGBT W B1	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase W book 1	
F307: overtemperature IGBT W B1	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase W book 1	
A309: high temperature IGBT U B2	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase U book 2	
F310: overtemperature IGBT U B2	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase U book 2	
A312: high temperature IGBT V B2	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase V book 2	
F313: overtemperature IGBT V B2	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase V book 2	
A315: high temperature IGBT W B2	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase W book 2	
F316: overtemperature IGBT W B2	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase W book 2	
A318: high temperature IGBT U B3	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase U book 3	
F319: overtemperature IGBT U B3	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase U book 3	
A321: high temperature IGBT V B3	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase V book 3	
F322: overtemperature IGBT V B3	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase V book 3	
A324: high temperature IGBT W B3	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase W book 3	
F325: overtemperature IGBT W B3	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase W book 3	
A327: high Temperature IGBT U B4	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase U book 4	
F328: overtemperature IGBT U B4	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase U book 4	
A330: high Temperature IGBT V B4	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase V book 4	
F331: overtemperature IGBT V B4	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase V book 4	

TROUBLESHOOTING AND MAINTENANCE

Fault/Alarm	Description	Possible Causes
A333: high temperature IGBT W B4	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase W book 4	■ High temperature of the coolant [$>40^{\circ}\text{C}$ ($>104^{\circ}\text{F}$)] ■ Clogged hydraulic circuit ■ Defective hydraulic pump ■ Power supply not connected to the hydraulic pump ■ Leakage
F334: overtemperature IGBT W B4	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase W book 4	
A336: high temperature IGBT U B5	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase U book 5	
F337: overtemperature IGBT U B5	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase U book 5	
A339: high temperature IGBT V B5	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase V book 5	
F340: overtemperature IGBT V B5	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase V book 5	
A342: high temperature IGBT W B5	Alarm indicating high temperature measured on the IGBT temperature sensor (NTC) of phase W book 5	
F343: overtemperature IGBT W B5	Fault because of overtemperature measured on the IGBT temperature sensor (NTC) of phase W book 5	
A345: high load on IGBT U B1	Overload alarm on IGBT of phase U book 1	High current at the inverter output (See Figure 5.1 on page 5-4)
F346: overload on IGBT U B1	Overload fault on IGBT of phase U book 1	
A348: high load on IGBT V B1	Overload alarm on IGBT of phase V book 1	
F349: overload on IGBT V B1	Overload fault on IGBT of phase V book 1	
A351: high load on IGBT W B1	Overload alarm on IGBT of phase W book 1	
F352: overload on IGBT W B1	Overload fault on IGBT of phase W book 1	
A354: high load on IGBT U B2	Overload alarm on IGBT of phase U book 2	
F355: overload on IGBT U B2	Overload fault on IGBT of phase U book 2	
A357: high load on IGBT V B2	Overload alarm on IGBT of phase V book 2	
F358: overload on IGBT V B2	Overload fault on IGBT of phase V book 2	
A360: high load on IGBT W B2	Overload alarm on IGBT of phase W book 2	
F361: overload on IGBT W B2	Overload fault on IGBT of phase W book 2	
A363: high load on IGBT U B3	Overload alarm on IGBT of phase U book 3	
F364: overload on IGBT U B3	Overload fault on IGBT of phase U book 3	
A366: high load on IGBT V B3	Overload alarm on IGBT of phase V book 3	
F367: overload on IGBT V B3	Overload fault on IGBT of phase V book 3	
A369: high load on IGBT W B3	Overload alarm on IGBT of phase W book 3	
F370: overload on IGBT W B3	Overload fault on IGBT of phase W book 3	
A372: high load on IGBT U B4	Overload alarm on IGBT of phase U book 4	
F373: overload on IGBT U B4	Overload fault on IGBT of phase U book 4	

Fault/Alarm	Description	Possible Causes
A398: current imbalance phase W B3	Alarm indicating current imbalance of phase W book 3. It indicates an imbalance of 20 % in the current distribution between this phase and the lowest current of the same phase in another book, only when the current in this phase is above 75 % of its rated value	■ Poor electrical connection between the DC link and the power unit ■ Poor electrical connection between the power unit output and the motor Note: In case of fast accelerations and brakes, this alarm may be displayed momentarily, disappearing after some seconds. That does not indicate any anomalies on the inverter. In case this alarm remains on when the motor is running at constant speed, it indicates an anomaly in the current distribution between the power units
A399: current imbalance phase U B4	Alarm indicating current imbalance of phase U book 4. It indicates an imbalance of 20 % in the current distribution between this phase and the lowest current of the same phase in another book, only when the current in this phase is above 75 % of its rated value	
A400: current imbalance phase V B4	Alarm indicating current imbalance of phase V book 4. It indicates an imbalance of 20 % in the current distribution between this phase and the lowest current of the same phase in another book, only when the current in this phase is above 75 % of its rated value	
A401: current imbalance phase W B4	Alarm indicating current imbalance of phase W book 4. It indicates an imbalance of 20 % in the current distribution between this phase and the lowest current of the same phase in another book, only when the current in this phase is above 75 % of its rated value	
A402: current imbalance phase U B5	Alarm indicating current imbalance of phase U book 5. It indicates an imbalance of 20 % in the current distribution between this phase and the lowest current of the same phase in another book, only when the current in this phase is above 75 % of its rated value	
A403: current imbalance phase V B5	Alarm indicating current imbalance of phase V book 5. It indicates an imbalance of 20 % in the current distribution between this phase and the lowest current of the same phase in another book, only when the current in this phase is above 75 % of its rated value	
A404: current imbalance phase W B5	Alarm indicating current imbalance of phase W book 5. It indicates an imbalance of 20 % in the current distribution between this phase and the lowest current of the same phase in another book, only when the current in this phase is above 75 % of its rated value	
F406: overtemperature on the braking module	This fault/alarm is related to the setting of parameter P0832 and P0833 ■ DIM1 input function ■ DIM2 input function	■ Overtemperature (rectifier/braking) ■ Fault on the electrical connection between digital input and the sensor ■ Fault of the corresponding sensor ■ Fault on the device monitored by the sensor
F408: fault of the cooling system		
F410: external fault		
F412: overtemperature on the rectifier		
A010: high temperature on the rectifier		

3.2 NECESSARY INFORMATION TO CONTACT TECHNICAL SUPPORT

**NOTE!**

For technical support and servicing, it is important to have the following information at hand:

- Inverter model.
- Serial number, manufacturing date and hardware revision that are listed in the product nameplate.
- Installed software version (check P0023).
- Application data and inverter settings.

3.3 PREVENTIVE MAINTENANCE

**DANGER!**

- Always turn off the mains power supply before touching any electrical component associated to the inverter.
- High voltage may still be present even after disconnecting the power supply.
- To prevent electric shock, wait at least 10 minutes after turning off the input power for the complete discharge of the power capacitors.
- Always connect the equipment frame to the protective ground (PE). Use appropriate connection terminal at the inverter.

**DANGER!**

- Débranchez toujours l'alimentation principale avant d'entrer en contact avec un appareil électrique associé au variateur.
- Des tensions élevées peuvent encore être présentes, même après déconnexion de l'alimentation.
- Pour éviter les risques d'électrocution, attendre au moins 10 minutes après avoir coupé l'alimentation d'entrée pour que les condensateurs de puissance soient totalement déchargés.
- Raccordez toujours la masse de l'appareil à une terre protectrice (PE). Utiliser la borne de connexion adéquate du variateur.

**ATTENTION!**

The electronic boards have electrostatic discharge sensitive components.

Do not touch the components or connectors directly. If necessary, first touch the grounded metallic frame or wear a ground strap.

**Do not perform any withstand voltage test!
If necessary, consult WEG.**

The inverters require low maintenance when properly installed and operated. [Table 3.2 on page 3-5](#) presents the main procedures and time intervals for preventive maintenance. [Table 3.3 on page 3-5](#) provides recommended periodic inspections to be performed every 6 months after the inverter start-up.

Table 3.2: Preventive maintenance

Maintenance	Interval	Instructions
Replacement of the HMI battery	Every 10 year	Refer to chapter 4 - HMI CFW-11M user manual

Table 3.3: Recommended periodic inspections every 6 months

	Abnormality	Corrective Action
Terminals, connectors	Loose screws	Tighten
	Loose connectors	
Printed circuit boards	Accumulations of dust, oil, humidity, etc.	Cleaning
	Odor	Replacement
Power module/ Power connections	Accumulations of dust, oil, humidity, etc.	Cleaning
	Loose connection screws	Tighten
Power resistors	Discoloration	Replacement

3.3.1 Cleaning Instructions

When it is necessary to clean the inverter, follow the instructions below:

Electronic boards:

- Disconnect the inverter power supply and wait at least 10 minutes.
- Remove the dust from the electronic board by using an anti-static brush or an ion air gun (Charges Burtel Ion Gun - reference A6030-6DESCO).
- If necessary, remove the boards from the inverter.
- Always wear a ground strap.

4 OPTIONAL KITS

4.1 OPTIONAL KITS AND ACCESSORIES

For further information about option devices and accessories, refer to Item 7.1 - Option Kits and Accessories of the CFW11M user manual.

In case accessory boards are necessary, they will be mounted on the standard control rack. All accessory boards of the CFW-11 series are available.

All the alarms and faults of the CFW-11M series are valid for the CFW-11W. Refer to the CFW-11M user manual for further details of alarms and faults.

The specific faults and alarms of the CFW-11W, and the most likely causes for their occurrence are presented below.

5 TECHNICAL SPECIFICATIONS

This chapter describes the technical specifications (electrical and mechanical) of the CFW-11W inverters.

5.1 POWER DATA

Refer to [Table 5.1 on page 5-2](#) and [Table 5.2 on page 5-3](#).

DC power supply: refer to [Table 5.1 on page 5-2](#) (for complete operation, an external rectifier must be used).

The drive with CFW11 W inverter can be used in networks with the following specification:

Maximum rated line voltage: 480 V for models 380...480 V and 690 for models 500...690 V up to altitude of 2000 m (6,600 ft). 2000 m to 4000 m (6,600 ft to 13,200 ft), voltage derating of 1.1 % for each 100 m (or 0.33 % each 100 ft) above 2000 m (6,600 ft). Maximum altitude up to 4000 m (13,300 ft).

Voltage tolerance: -15 to +10 %.

Table 5.1: Technical specifications for the CFW-11W series

Model	Power Supply [Vdc]	Operation Under Normal Duty (ND)						Operation Under Heavy Duty (HD)							
		Rated Output Current [Arms]	Overload Current		Switching Frequency [kHz]	Maximum Motor [CV/kW]	Rated Input Current [A _{dc}]	Dissipated Power [kW] ^(*)	Rated Output Current [Arms]	Overload Current [Arms]		Switching Frequency [kHz]	Maximum Motor [CV/kW]	Rated Input Current [A _{dc}]	Dissipated Power [kW] ^(*)
			1 min	3 s						1 min	3 s				
CFW11W0700T4	436...713	700	770	1030	2.5	600/450	805	6.2	515	773	1030	2.5	450/320	592	4.0
CFW11W1330T4		1330	1463	1957	2.5	1100/900	1530	12.4	979	1468	1957	2.5	800/600	1126	8.0
CFW11W1995T4		1995	2195	2935	2.5	1600/1300	2294	18.6	1468	2202	2935	2.5	1200/900	1688	12.0
CFW11W2660T4		2660	2926	3914	2.5	2200/1800	3059	24.8	1957	2936	3914	2.5	1600/1200	2251	16.0
CFW11W3325T4		3325	3658	4892	2.5	2800/2300	3824	31.0	2446	3669	4892	2.5	2000/1500	2813	20.0
CFW11W0640T6	574...1025	640	704	954	2.5	800/600	736	9.0	477	716	954	2.5	600/450	549	6.5
CFW11W1216T6		1216	1338	1812	2.5	1500/1100	1398	18.0	906	1359	1812	2.5	1100/800	1043	13.0
CFW11W1824T6		1824	2006	2718	2.5	2200/1600	2098	27.0	1359	2038	2718	2.5	1600/1200	1563	19.5
CFW11W2432T6		2432	2675	3624	2.5	3000/2200	2797	36.0	1812	2718	3624	2.5	2200/1600	2083	26.0
CFW11W3040T6		3040	3344	4530	2.5	3800/2800	3496	45.0	2265	3397	4530	2.5	2800/2000	2604	32.5

(*) Consider more 12 % of those losses for the environment. Provide proper ventilation to keep ambient temperature of 40 °C (104 °F).

Table 5.2: Specifications of the cooling system

Temperature of the air Surrounding the Inverter	0 °C to 40 °C (32 °F to 104 °F) for nominal conditions. 40 °C to 45 °C (104 °F to 113 °F) with output current derating of 2 % for each 1 °C (1.8 °F) above 40 °C (104 °F)
Humidity	5 % to 90 % non-condensing, according to Table 2.3 on page 2-8
Altitude	Maximum altitude: up to 1000 m (3,300 ft) - normal conditions. 1000 m to 4000 m (3,300 ft to 13,200 ft) - current derating of 1 % for each 100 m (or 0.3 % each 100 ft) above 1000 m (3,300 ft) of altitude. 2000 m to 4000 m (6,600 ft to 13,200 ft) - maximum voltage derating of 1.1 % for each 100 m (or 0.33 % each 100 ft) above 1000 m (3,300 ft) of altitude
Pollution Degree	2 (according to EN50178 and UL508C), with non-conductive pollution
Coolant Input Temperature	0 °C to 40 °C (32 °F to 104 °F) according to the coolant used. 40 °C to 45 °C (104 °F to 113 °F) with output current derating of 3 % for each 1 °C (1.8 °F) above 40 °C (104 °F)
Coolant Output Temperature	9 °C (16.2 °F) above the input temperature (nominal conditions)
Coolant Used	According to Table 2.4 on page 2-9 and Table 2.5 on page 2-9
Coolant Flow	20 l/min (1.2 m³/hour)
Pressure Drop on the UP11 Module @ 20 l/min	3.3 bar (330 kPa)
Maximum System Pressure in Relation to the Atmosphere	6 bar (600 kPa)
Recommended System Pressure in Relation to the Atmosphere	0.8 to 4.5 bar (80 to 450 kPa)
Water Volume used in the UP11 Module	0.4 l (0.4 dm³)
Coolant Input and Output Connections	Coolant input: Quick connecting SMC KKA4S-04M, thread R 1/2 Coolant output: Quick connecting SMC KKA4P-04M, thread R 1/2



ATTENTION!

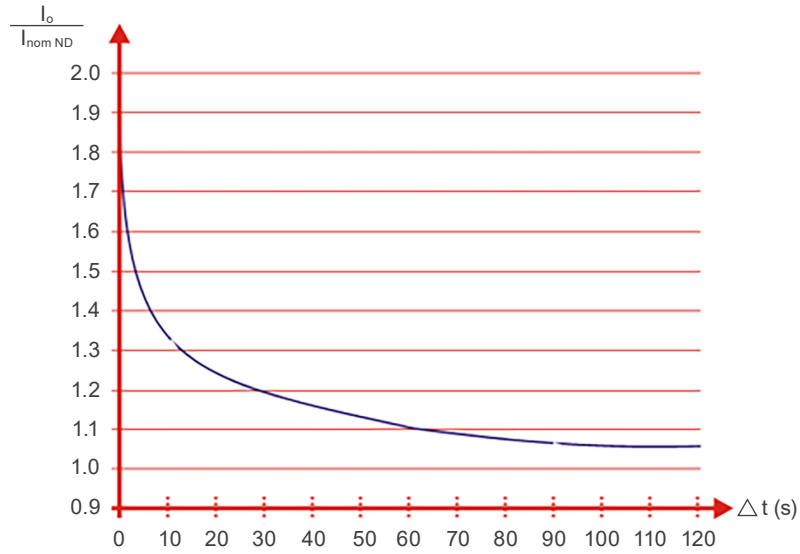
The cooling system of the UP11 modules cannot be connected in series.

Note:

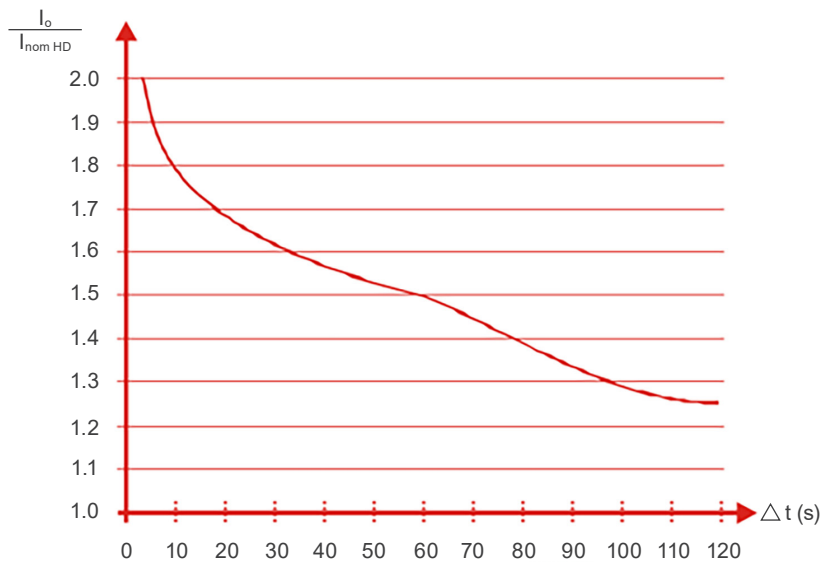
1. Steady state rated current in the following conditions:

- Ambient temperature: 0 °C to 40 °C (32 °F to 104 °F) - nominal conditions (measured around the inverter). 40 °C to 45 °C (104 °F to 113 °F) - current derating of 2 % for each 1 °C (1.8 °F) above 40 °C (104 °F).
- Coolant input temperature: 0 °C to 40 °C (32 °F to 104 °F) according to the coolant specified in [Table 2.4 on page 2-9](#) and [Table 2.5 on page 2-9](#). 40 °C to 45 °C (104 °F to 113 °F) - current derating of 3 % for each 1 °C (1.8 °F) above 40 °C (104 °F).
- Fluid flow: 20 l/min.
- Air relative humidity: 5 % to 90 % non- condensing.
- Maximum altitude: up to 1000 m (3,300 ft) - nominal conditions. 1000 m to 4000 m (3,300 ft to 13,200 ft) - current derating of 1 % for each 100 m (or 0.3 % each 100 ft) above 1000 m (3,300 ft) of altitude. 2000 m to 4000 m (6,600 ft to 13,200 ft) – maximum voltage derating of 1.1 % for each 100 m (or 0.33 % each 100 ft) above 2000 m (6,600 ft), maximum altitude up to 4000 m (13,200 ft).
- Pollution degree: 2 (according to EN50178 and UL508C), with non-conductive pollution. The condensation must not cause conduction through the accumulated residues.

2. [Table 5.1 on page 5-2](#) presents only two points of the overload curve (activation time of 1min and 3 s). The complete IGBT overload curves for Normal and Heavy Duty Cycles are presented next.



(a) IGBT overload curve for the Normal Duty (ND) cycle



(b) IGBT overload curve for the Heavy Duty (HD) cycle

Figure 5.1: IGBTs overload curves

3. The motor power ratings are merely a guide for 440 V 4 poles WEG motor, in the 400 V series, 575 V in the 500 V series and 690 V in the 600 V series. The adequate inverter sizing must be based on the used motor rated current.
4. The information provided about the inverter losses is valid for the rated operating conditions, i.e., for rated output current and rated switching frequency.

5.2 ELECTRONICS/GENERAL DATA

Control	Method	■ Voltage source ■ Types of control: ■ V/F (Scalar) ■ VVW: Voltage vector control WEG ■ Vector control with encoder ■ Sensorless vector control (without encoder) ■ PWM SVM (Space Vector Modulation) ■ Full digital (software) current, flux and speed regulators Execution rate: ■ Current regulators: 0.2 ms (5 kHz) ■ Flux regulator: 0.4 ms (2.5 kHz) ■ Speed regulator / speed measurement: 1.2 ms
	Output frequency	■ 0 to 3.4 x rated motor frequency (P0403). This frequency is programmable from 0 Hz to 300 Hz in the scalar mode and from 30 Hz to 120 Hz in the vector mode
Performance (Vector Mode)	Speed control	<u>V/F (Scalar):</u> ■ Regulation (with sleep compensation): 1 % of rated speed ■ Speed variation range: 1:20 <u>V V W:</u> ■ Regulation: 1 % of the rated speed ■ Speed variation range: 1:30 <u>Sensorless:</u> ■ Regulation: 0.5 % of the rated speed ■ Speed variation range: 1:100 <u>Vector with Encoder:</u> ■ Regulation: ±0.01 % of the rated speed with a 14-bit analog input (IOA) ±0.01 % of the rated speed with a digital reference (Keypad, Serial, Fieldbus, Electronic Potentiometer, Multispeed) ±0.05 % of the rated speed with a 12-bit analog input (CC11)
	Torque control	■ Range: 10 to 180 %, regulation: ±5 % of the rated torque (with encoder) ■ Range: 20 to 180 %, regulation: ±10 % of the rated torque (sensorless above 3 Hz)
Inputs (CC11 Board)	Analog	■ 2 isolated differential inputs per differential amplifier; resolution of AI1:12 bits, resolution of AI2: 11bits + signal, (0 to 10) V, (0 to 20) mA or (4 to 20) mA, Impedance: 400 kΩ for (0 to 10) V, 500 Ω for (0 to 20) mA or (4 to 20) mA
	Digital	■ 6 isolated digital input, 24 Vdc, programmable functions
Outputs (CC11 Board)	Analog	■ Two isolated outputs (0 to 10) V, $R_L \geq 10 \text{ k}\Omega$ (maximum load), 0 to 20 mA / 4 to 20 mA ($R_L \leq 500 \Omega$) resolution: 11 bits, programmable functions
	Relay	■ 3 relays with NO/NC contacts, 240 Vac, 1 A, programmable functions
Safety	Protection	■ Output overcurrent/short-circuit ■ Under/overvoltage ■ Overtemperature ■ Braking resistor overload ■ IGBT overload ■ Motor overload ■ External fault / alarm ■ CPU or memory fault ■ Output phase-ground short-circuit
Human-Machine Interface (HMI)	Standard HMI	■ 9 key: Start/Stop, Up arrow, Down arrow, Direction of rotation, Jog, Local/ Remote, Right soft key and Left soft key ■ Graphical LCD display ■ View/editing of parameter ■ Indication accuracy: ■ Current: 5 % of the rated current ■ Speed resolution: 1 rpm ■ Possibility of remote mounting
Degree of Protection PC Connection for Inverter Programming	IP00 USB Connector	■ USB standard Rev. 2.0 (basic speed) ■ Type B (device) USB plug ■ Interconnection cable: standard host/device shielded USB cable

5.2.1 Codes and Standards

Safety Standards	■ UL 840 - Insulation coordination including clearances and creepage distances for electrical equipment ■ EN61800-5-1 - Safety requirements electrical, thermal and energy ■ EN 50178 - Electronic equipment for use in power installations ■ EN 60204-1 - Safety of machinery. Electrical equipment of machines. Part 1: General requirements Note: the final assembler of the machine is responsible for installing an safety stop device and a supply disconnecting device ■ EN 60146 (IEC 146) - Semiconductor converters ■ EN 61800-2 - Adjustable speed electrical power drive systems - Part 2: General requirements – Rating specifications for low voltage adjustable frequency AC power drive systems
Electromagnetic Compatibility (EMC)	■ EN 61800-3 - Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods ■ EN 55011 - Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment ■ CISPR 11 - Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement ■ EN 61000-4-2 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test ■ EN 61000-4-3 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test ■ EN 61000-4-4 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test ■ EN 61000-4-5 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test ■ EN 61000-4-6 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
Mechanical Standards	■ EN 60529 - Degrees of protection provided by enclosures (IP code) ■ UL 50 - Enclosures for electrical equipment

5.3 MECHANICAL DATA

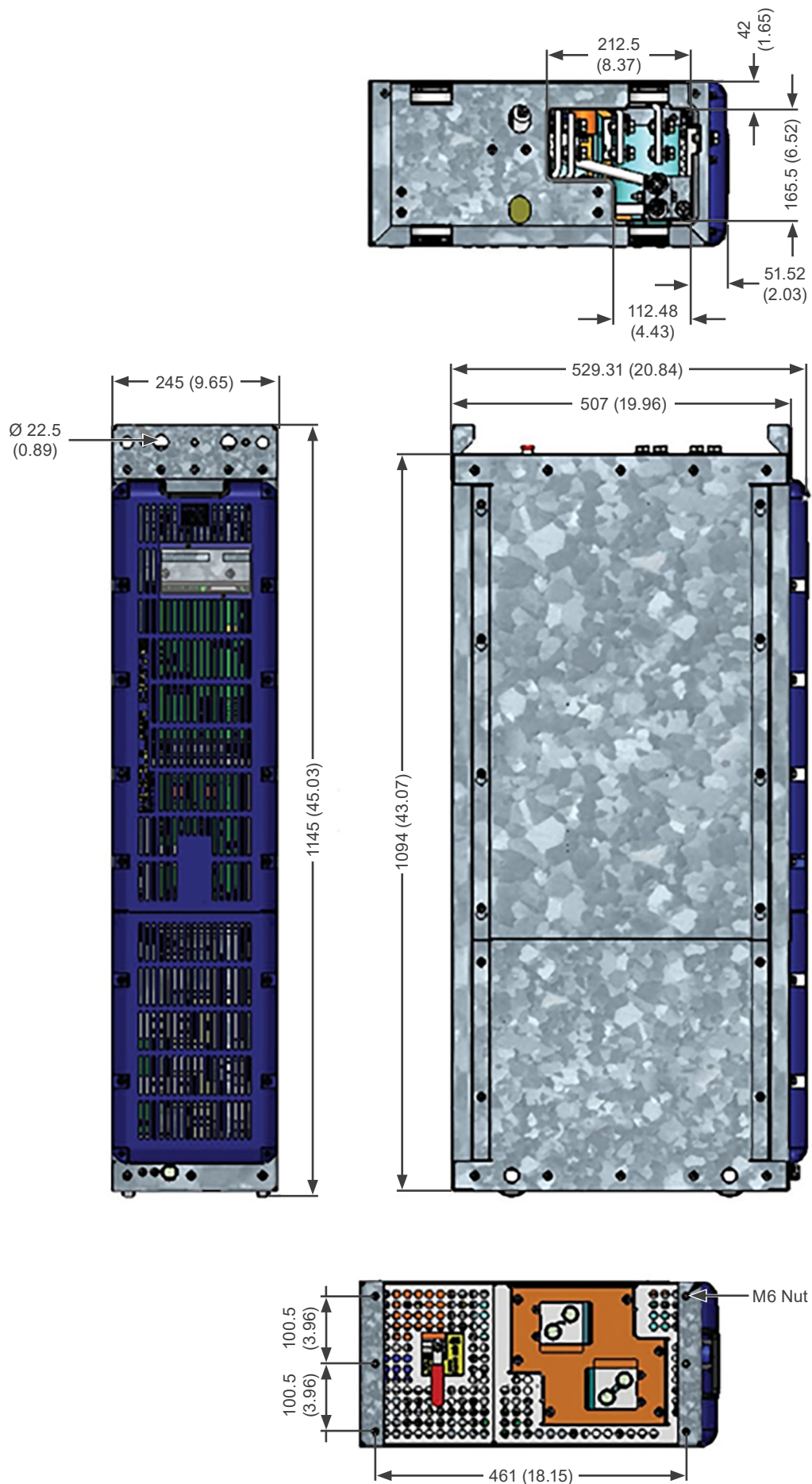


Figure 5.2: UP11 dimensions [mm(in)]

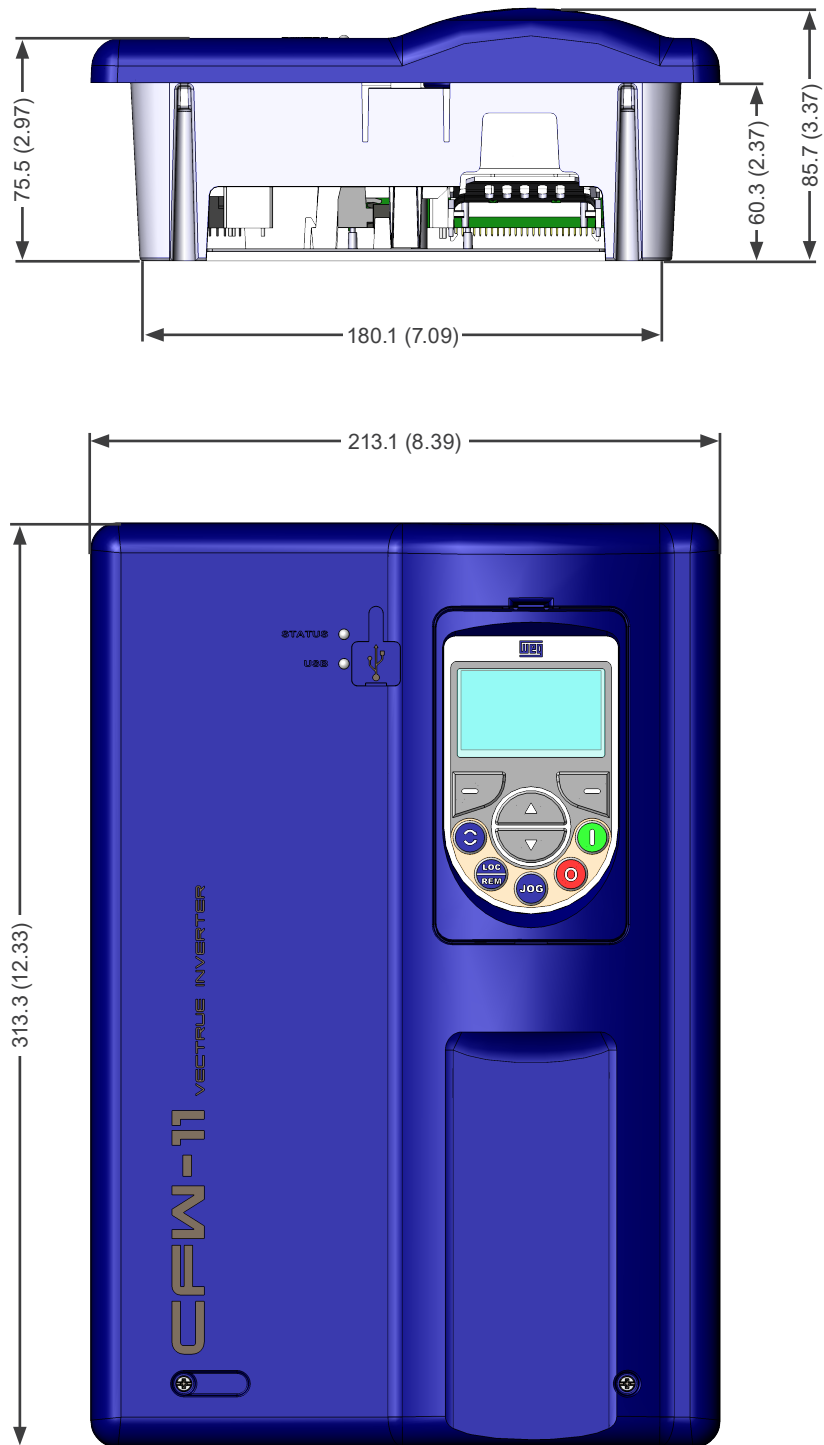


Figure 5.3: Dimensions of control rack [mm(in)]

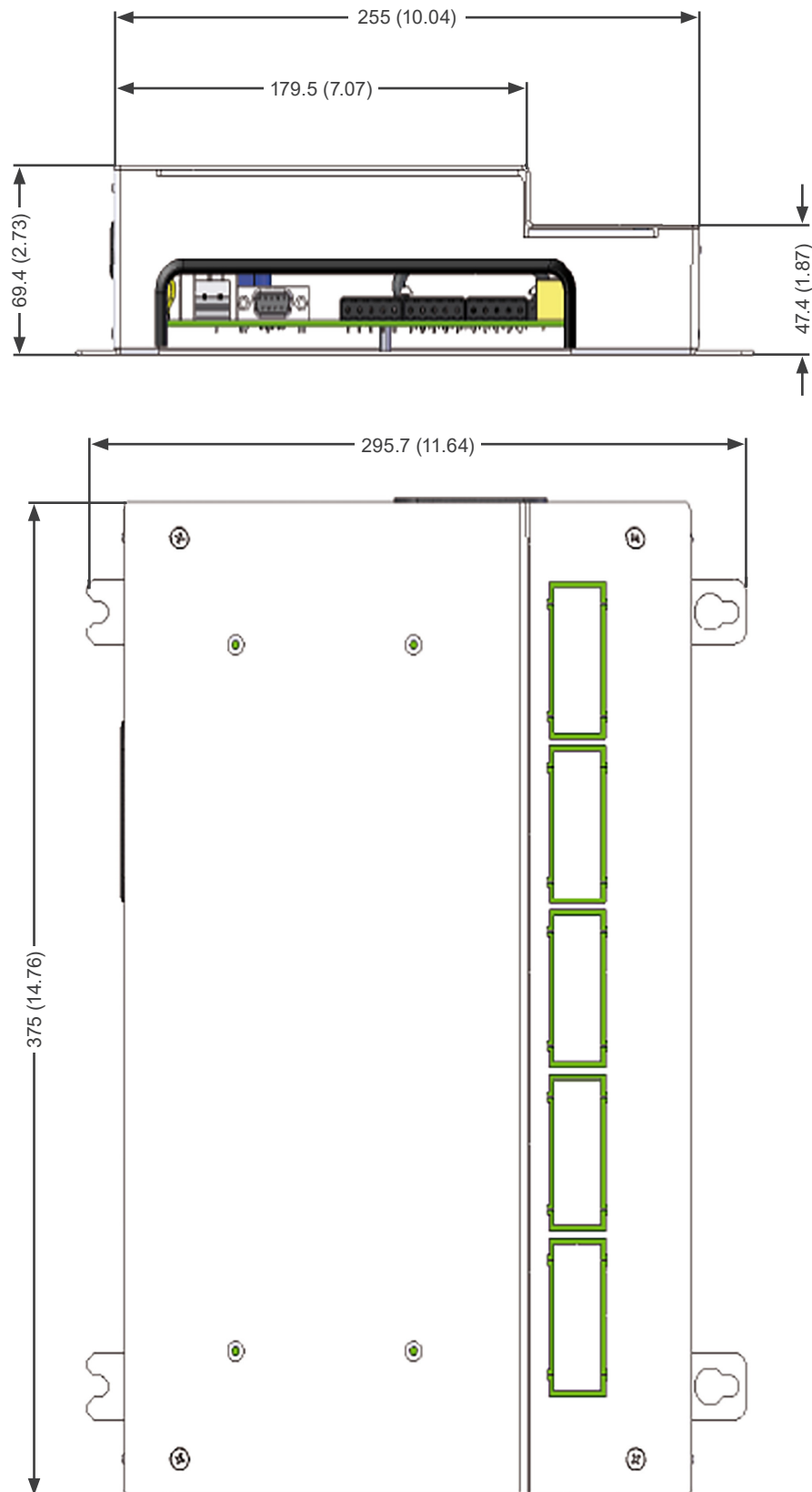


Figure 5.4: Dimensions of the IPS board metal enclosure [mm(in)]

5.4 REGENERATIVE BRAKING OPERATION

When the CFW-11W is used in a drive as a regenerative converter (CFW-11W RB), consider the following information:

Line 380-480 V:

- Consider the same losses indicated in [Table 5.1 on page 5-2](#).

Line 500-690 V:

- The CFW-11W RB (line 500-690 V) has switching frequency of 2.5 kHz, instead of 2.0 kHz, as presented in [Table 5.1 on page 5-2](#).
- Due to the higher switching frequency, the losses in this converter are also higher. Consider an increase of 17 % in the losses of the inverter.

All lines:

- Use the same mechanical data presented in this addendum.
- Data about control connections and electrical installation, refer to the CFW-11M RB user manual.
- LCL filter for the converters, contact WEG.



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