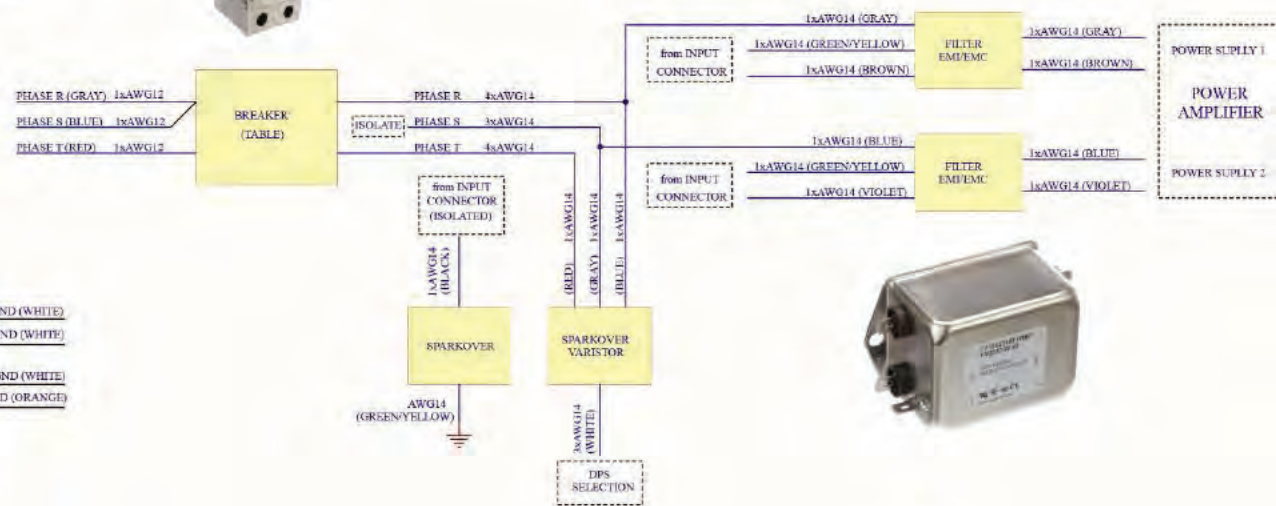


B220

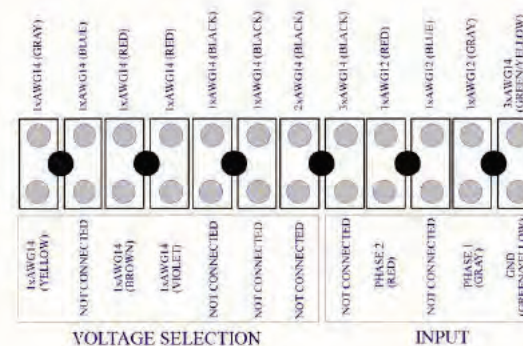
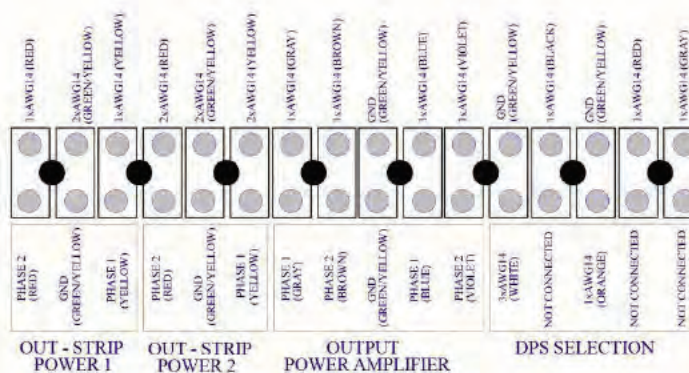
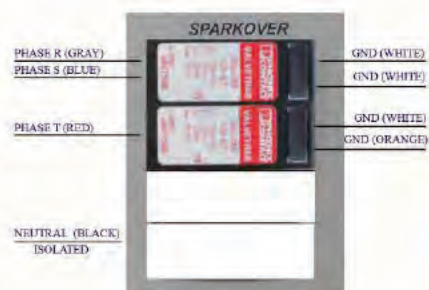
BIPHASIC 220VAC
2 PHASE (110VAC) + GND



MOD MCCB 40307	
VOLTAGE	BREAKER
B220	25A (2CD6232001R0254)
B220	25A (2CD6232001R0254)
T220	20A (2CD6232001R0204)
T300	16A (2CD6232001R0164)



NEUTRAL



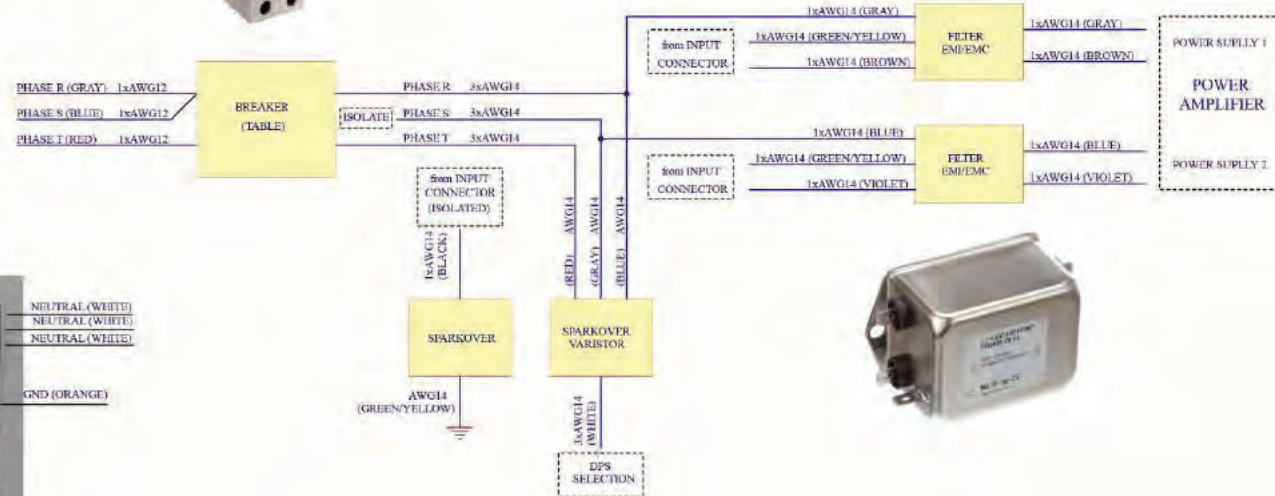
HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQP13C701HP-BB3			
Size: A3	Number: MCCB-40307	Revision	CIP
Date: 23-07-2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 3 of 7	

M220

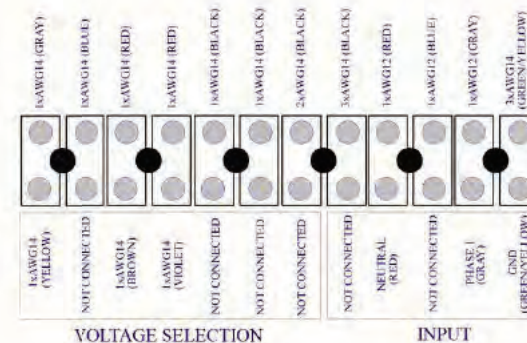
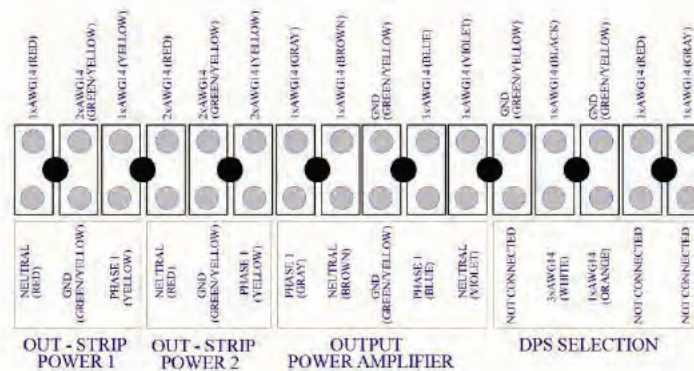
SINGLEPHASE 220VAC
1 PHASE + NEUTRAL + GND



MOD-MCCB 40307	
VOLTAGE	BREAKER
M220	25A(2CD5232001R0254)
B220	25A(2CD5232001R0254)
T220	20A(2CD5233001R0204)
T380	18A(2CD5233001R0164)



NEUTRAL



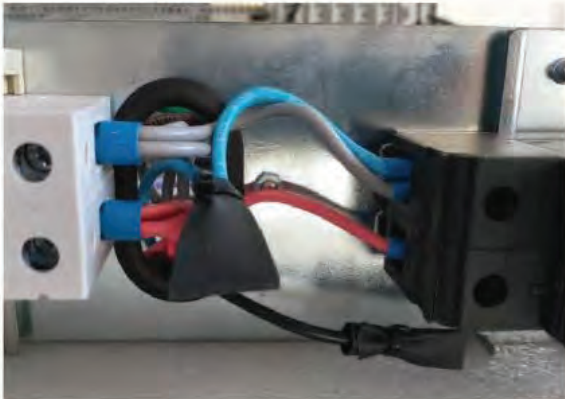
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Title: EQPEC701HP-BB3			
Size: A3	Number: MCCB 40307	Revision	CIP
Date: 23-07-2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 4 of 7	

SINGLEPHASE 220VAC
1 PHASE + NEUTRAL + GND

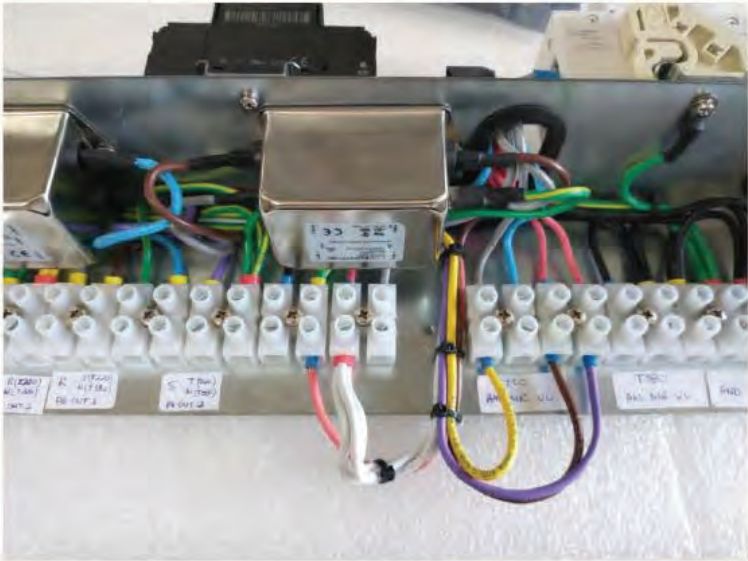
INPUT BREAKER



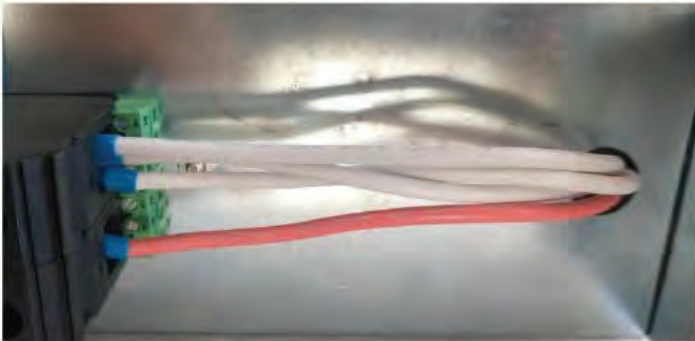
OUTPUT BREAKER



SELECTION DPS END VOLTAGE



OUTPUT DPS



HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQPEC701HP-BB3			
Size: A3	Number: MCCB 40307	Revision	CIP
Date: 23/07/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 5 of 8	

B220

BIPHASIC 220VAC
2 PHASE (127VAC) + GND

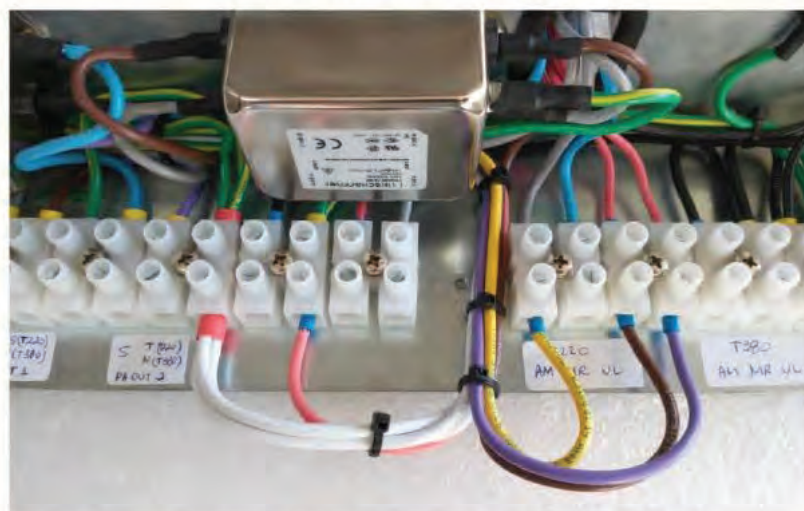
INPUT BREAKER



OUTPUT BREAKER



SELECTION DPS END VOLTAGE



OUTPUT DPS

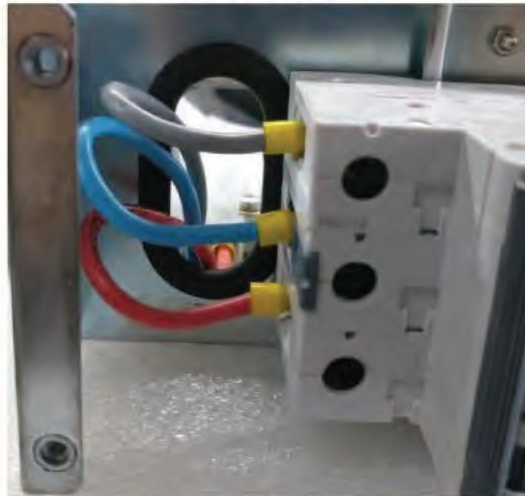


HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQPECT01HP-BB3			
Size: A3	Number: MCCB 40307	Revision	CIP
Date: 23/07/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 6 of 8	

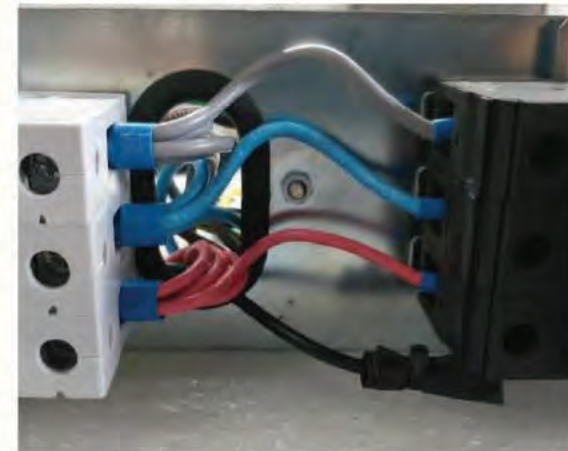
T220

THREE-PHASE 220VAC
3 PHASE (110VAC) + GND

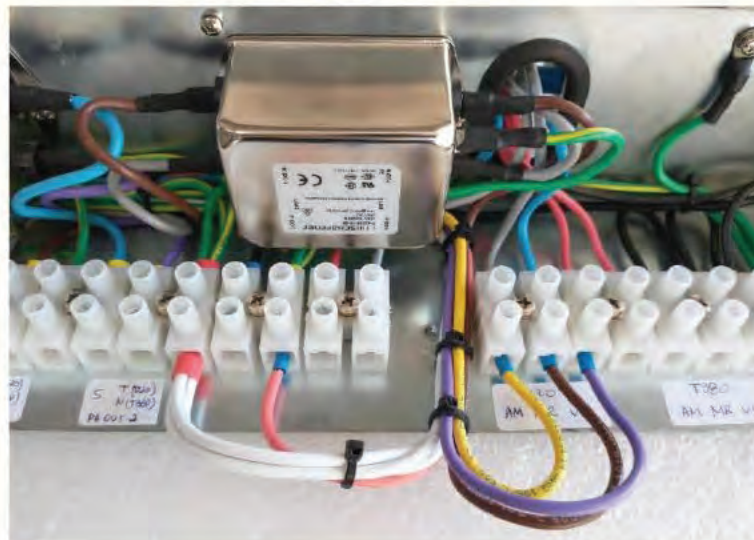
INPUT BREAKER



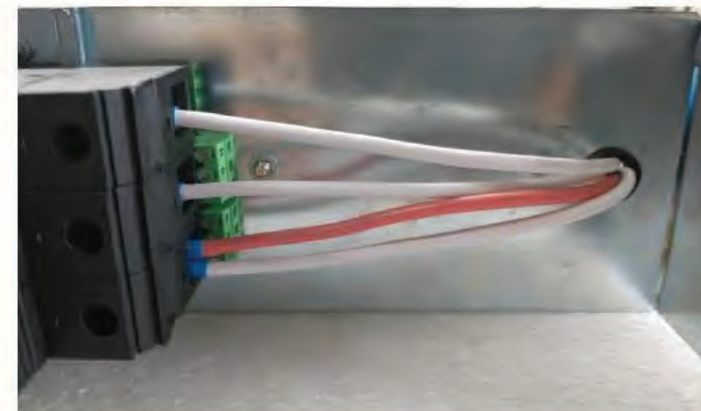
OUTPUT BREAKER



SELECTION DPS END VOLTAGE



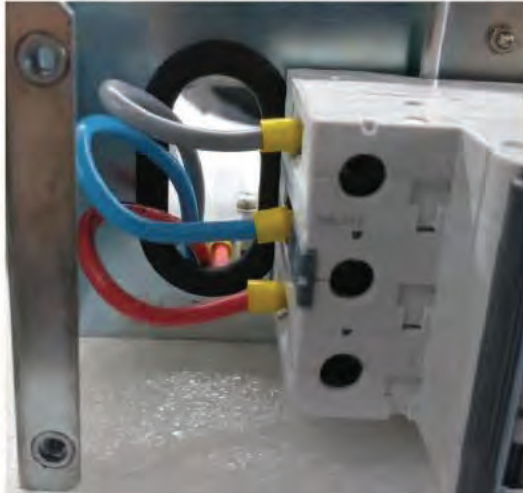
OUTPUT DPS



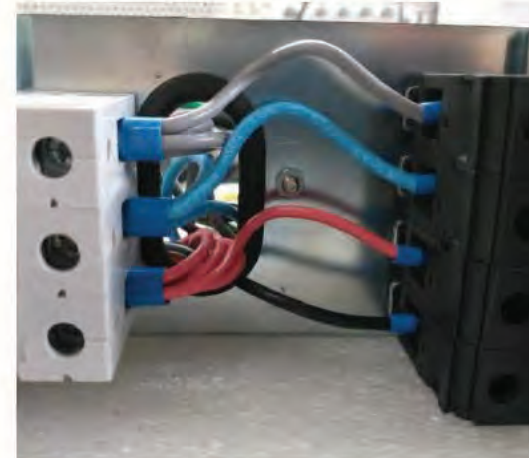
HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQPEC701HP-BB3			
Size: A3	Number: MCCB 40307	Revision	CIP
Date: 23/07/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 7 of 8	

THREE-PHASE 380VAC 3 PHASE (220VAC) + NEUTRAL + GND

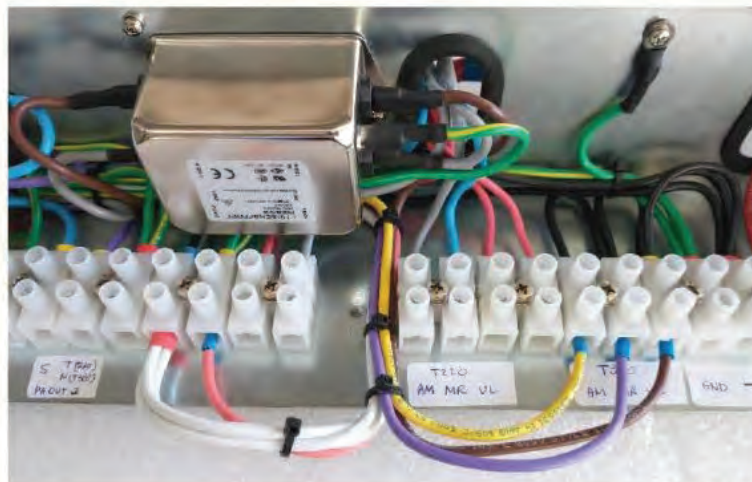
INPUT BREAKER



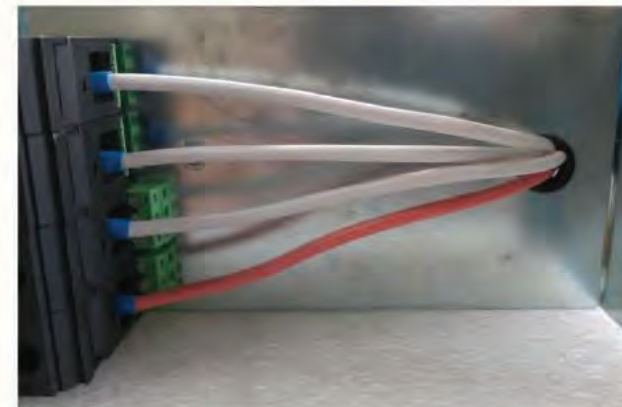
OUTPUT BREAKER



SELECTION DPS END VOLTAGE

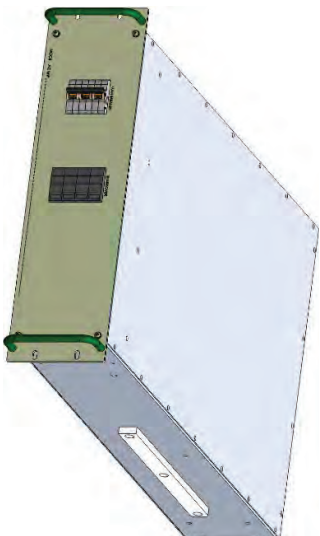


OUTPUT DPS



HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQPEC701HP-BB3			
Size:	Number:	Revision	CIP
A3	MCCB-40307		
Date: 23/07/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 8 of 8	

3.7.2. 8.0kW to 18kW MCCB



Characteristics:

- Equipment protection in the event of over-voltage or phase failure in the AC network
- Surge Protection Device (SPD)
- Circuit Breaker
- Phase loss protection
- Overvoltage Protection (>300VAC)
- Undervoltage Protection (<180VAC)
- Provides + 50V for the load bank drawer
- Provides + 8V for the reflectometer
- Provides + 15V for the relay

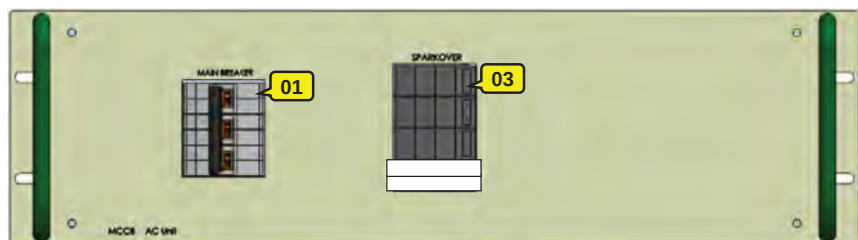
Equipment	MCCB Model	Capacity
EC702HP-BB3	MOD GV 40256	8.0kW
EC703HP-BB3	MOD GV 40257	11.0kW
EC704HP-BB3	MOD GV 40258	18.0kW

Interfaces

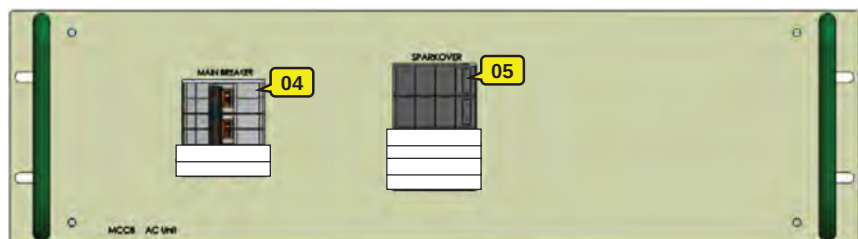
In addition to differentiating themselves regarding the load capacity (for each type of equipment), the MCCB also differs by its AC power:



MCCB AC Mains T380 (Front View)



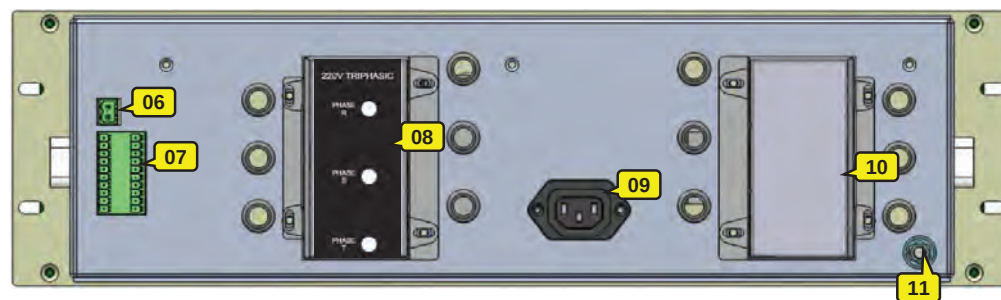
MCCB AC Mains T208 / T240 (Front View)



MCCB AC Mains M208 / B240 (Front View)

AC MAINS TYPE

M208	208 VAC WILD LEG 208VAC Between Phase B (Wild Leg) and Neutral
B240	SINGLE PHASE 240 vac 240VAC Between 2-Phases
T208	WYE THREE PHASE 208 VAC 208VAC Between 3-Phases.
T240	DELTA THREE PHASE 240 vac 240VAC Between 3-Phases.
T380	WYE THREE PHASE 380 VAC 380VAC Between 3 Phases / 220VAC Between each Phases and Neutral

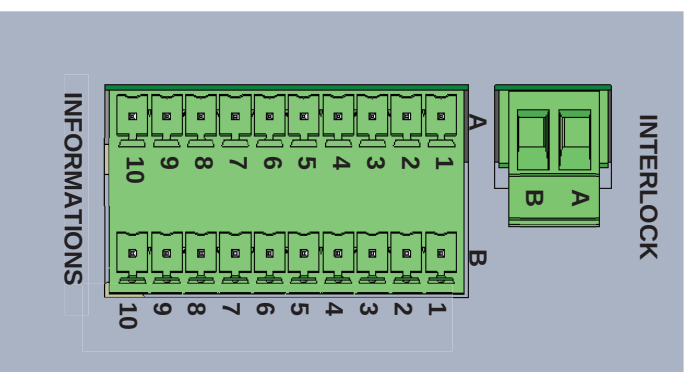


MCCB AC Mains (Rear View)

01	3-Phase Circuit Breaker.
02	3-Phase Surge Protection Device na Neutral (SPD).
03	3-Phase Surge Protection Device (SPD).
04	2-Phase Circuit Breaker.
05	2-Phase Surge Protection Device (SPD).
06	Interlock.
07	Communication Interface.
08	AC Input Connector (See variations on AC mains type).
09	AC output for strip power
10	AC output for Power Amplifiers Drawers (See variations on AC mains type).
11	Ground (GND) Connector.

About AC MAINS TYPE, see Section 8 – Attachments, USA AC Mains Types for E-Compact Series.

Interlock Connection / Information Connection



INFORMATION	
A	B
1- GND	1- Output +50VA
2- GND	2- Output +50VB
3- Alarm +5V - Phase OK	3- Output +15V
4- Alarm +5V - PA	4- Output +8V
5- Command Unit Control +5V	5- Output +5V
6- Interlock IN	
7- Interlock OUT	
	8- Measure +50VA, +50VB
	9- Measure +15V
	10- Measure +8V

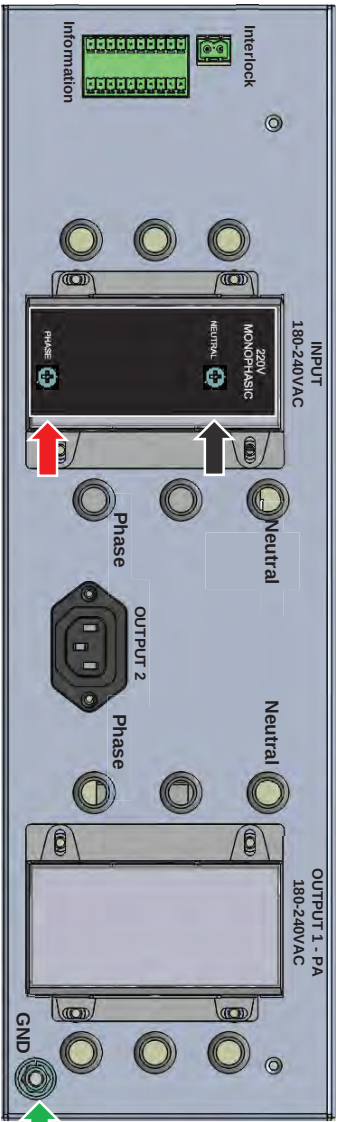
INTERLOCK	
A-B Short Circuited	MCCB ACTIVE
A-B Opened	MCCB DISABLE

The Equipment AC mains is configured at the factory according to the internal connections and can not be changed by the customer.

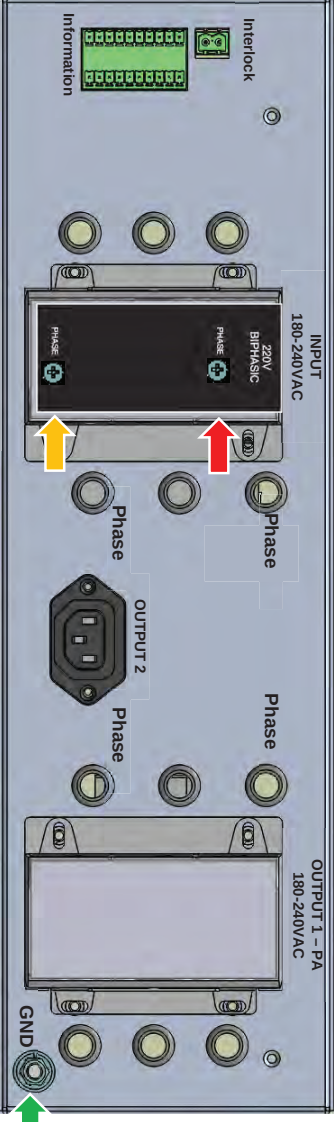
If it is necessary to change the structure of the transmitter's AC mains, contact Comark customer service for the corresponding instructions.

NEVER change the grid structure of the transmitter without prior instruction from Comark customer service. Undue or mixed changes may not only endanger the equipment, but also the people who operate it.

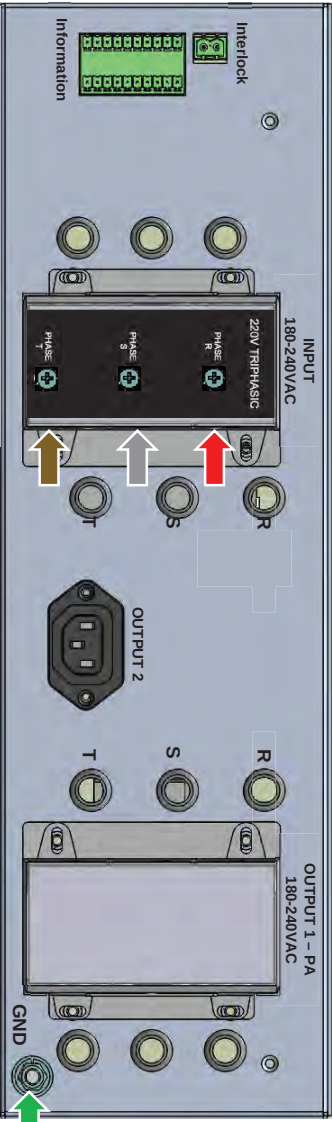
Mains Connection



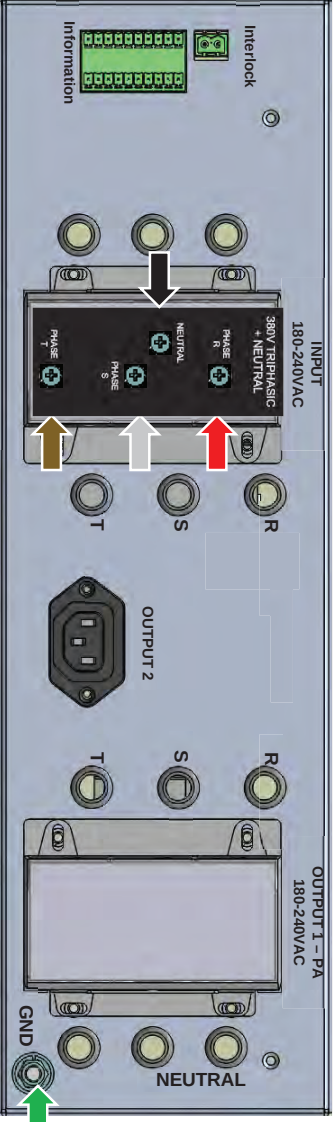
MCCB AC Mains M220 (Rear View)



MCCB AC Mains B220 (Rear View)



MCCB AC Mains T220 (Rear View)

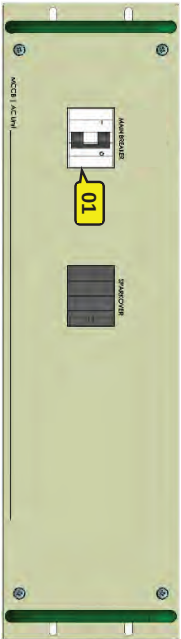


MCCB AC Mains T380 (Rear View)

AC Mains Input

	A Phase Input (R)
	B Phase Input (S)
	C Phase Input (T)
	Neutral
	Ground

Circuit Breakers



MCCB AC Mains M220 / B220 (Front View)



MCCB AC Mains T220 / T380 (Front View)

Equipment	CIRCUIT BREAKERS TYPE			
	M220 (01) 2-POLES	B220 (01) 2-POLES	T220 (02) 3-POLES	T380 (02) 3-POLES
EC702HP-BB3 MOD GV 40256	50A	50A	40A	32A
EC703HP-BB3 MOD GV 40257	63A	63A	63A	32A
EC704HP-BB3 MOD GV 40258	80A	80A	63A	40A

Sparkover - Phase Surge Protection Device (SPD)

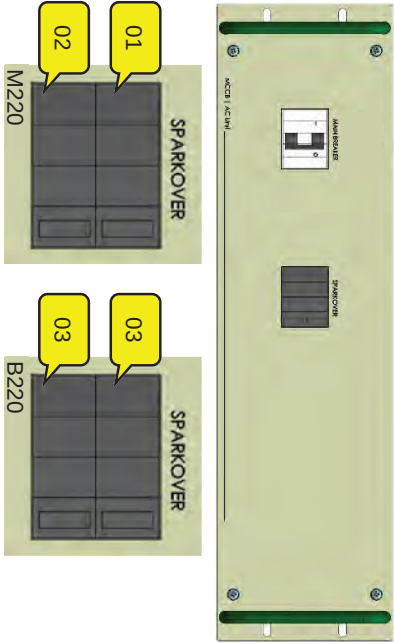
It is a device that limits overvoltages in the mains by diverting the current line to ground, in order to limit the amplitude of this overvoltage to a value that is not dangerous to the equipment. It is connected in parallel between the line and the ground and has high impedance. Once the transient overvoltage appears in the system, the impedance of the device decreases and directs the current to earth, protecting the equipment.

When this occurs, the device signals a red flag and requires replacement:

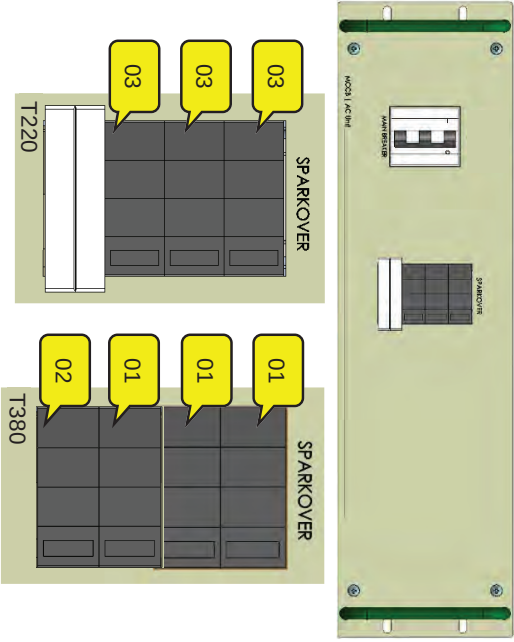


Sparkovers types:

MCCB AC Mains M220 / B220 (Front View)

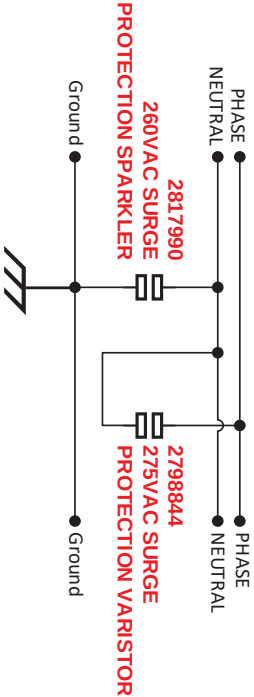


MCCB AC Mains T220 / T220 / T380 (Front View)

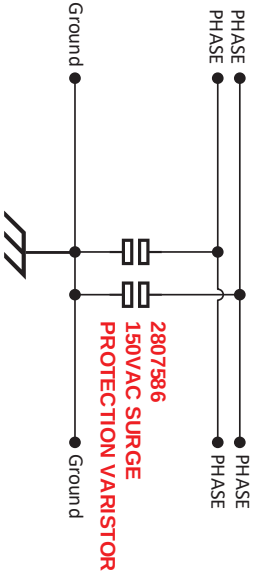


01	2798844 – 275VAC SURGE PROTECTION VARISTOR
02	2817990 – 260VAC SURGE PROTECTION SPARKLER
03	2807586 – 150VAC SURGE PROTECTION VARISTOR

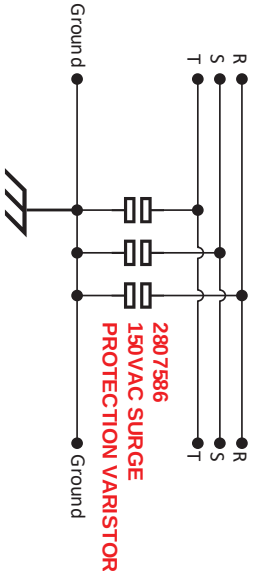
M208



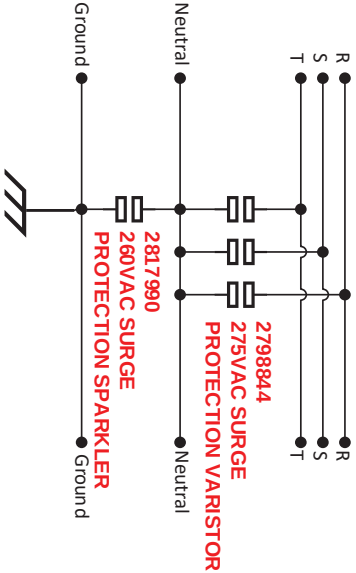
B240



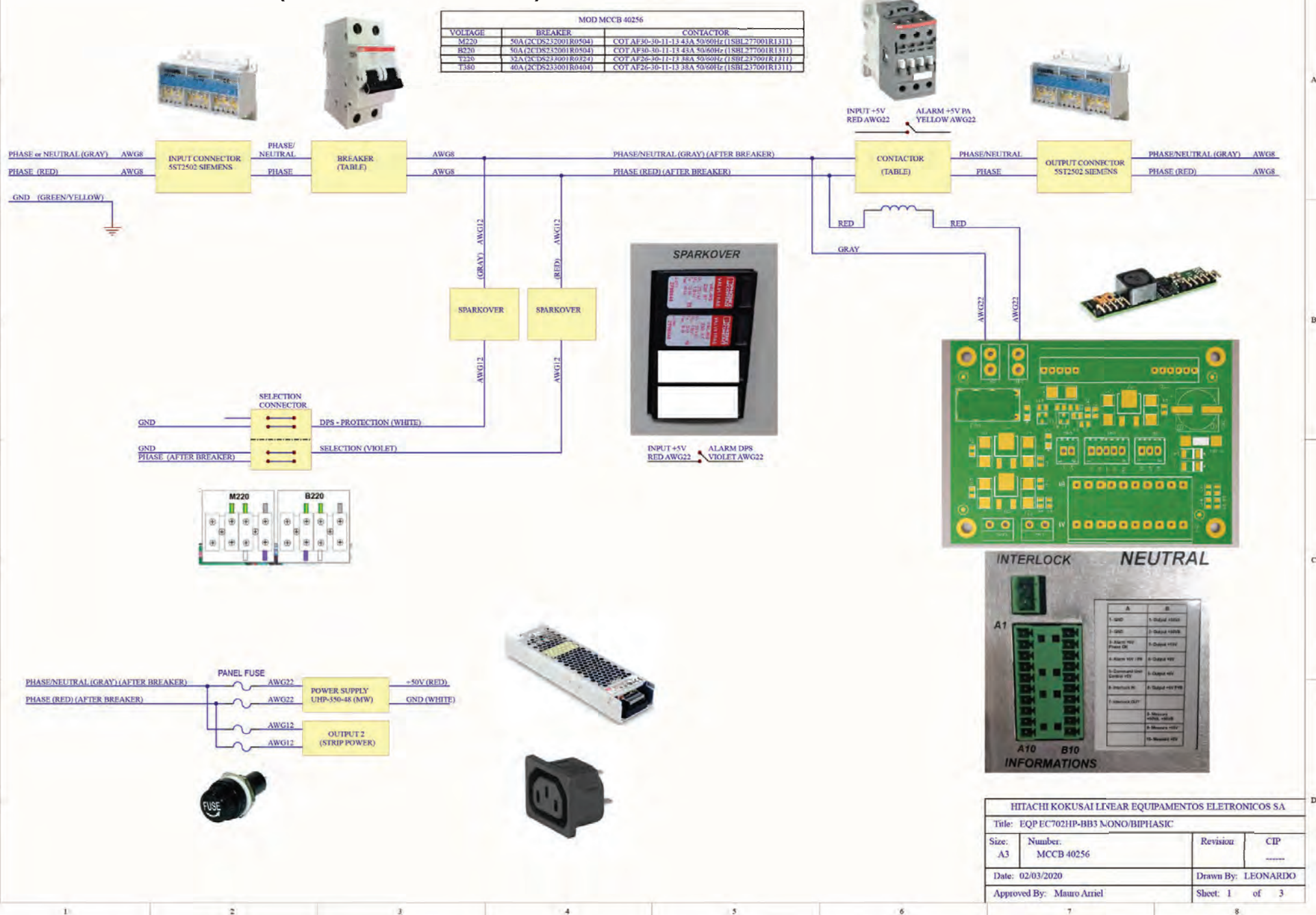
T208 / T240

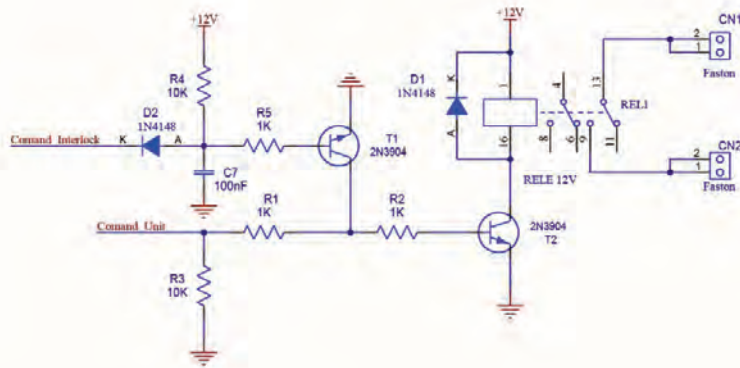


T380

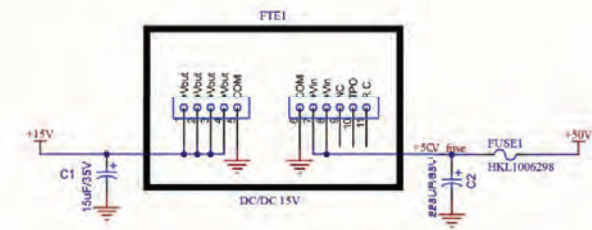
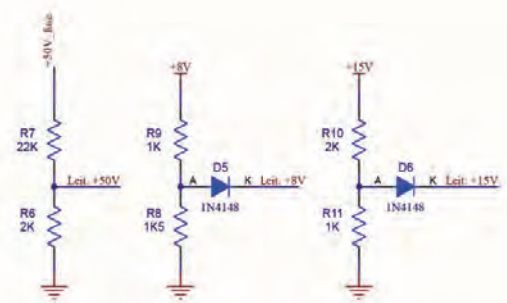
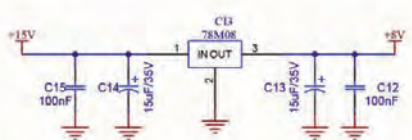
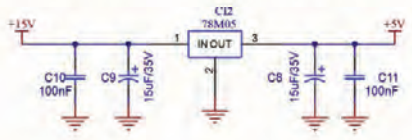
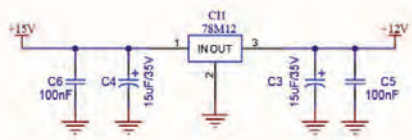
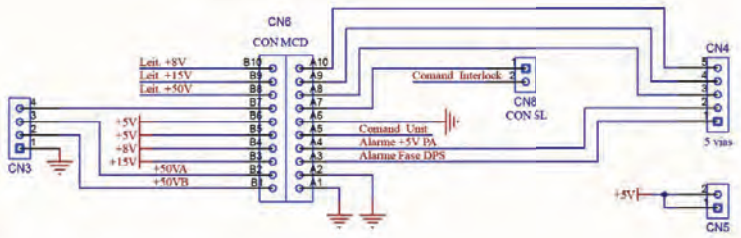


MCCB 8Kw – MOD GV 40256 (SINGLE-PHASE/2-PHASES)



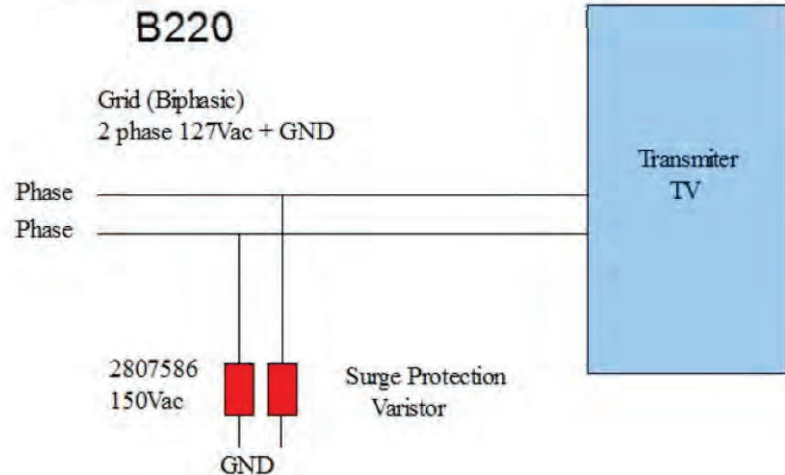


Input +50VA
Input +50VB
Input GND

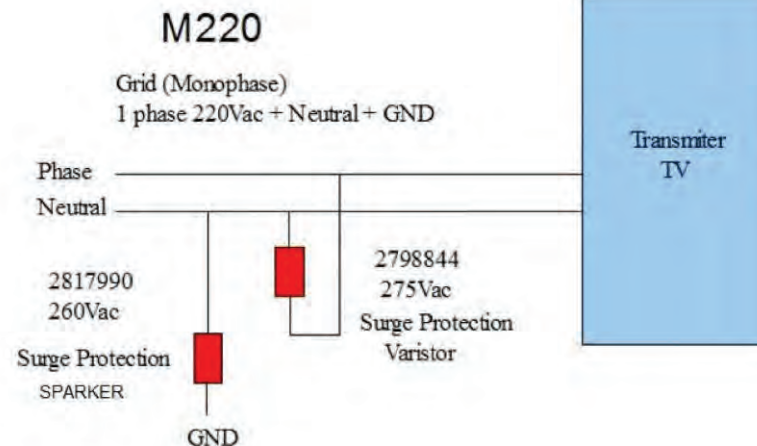


HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQP EC702HP-BB3 MONO/BIPHASIC			
Size: A3	Number: MCCB 40256	Revisao	CIP
Date: 02/03/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 2 of 3	

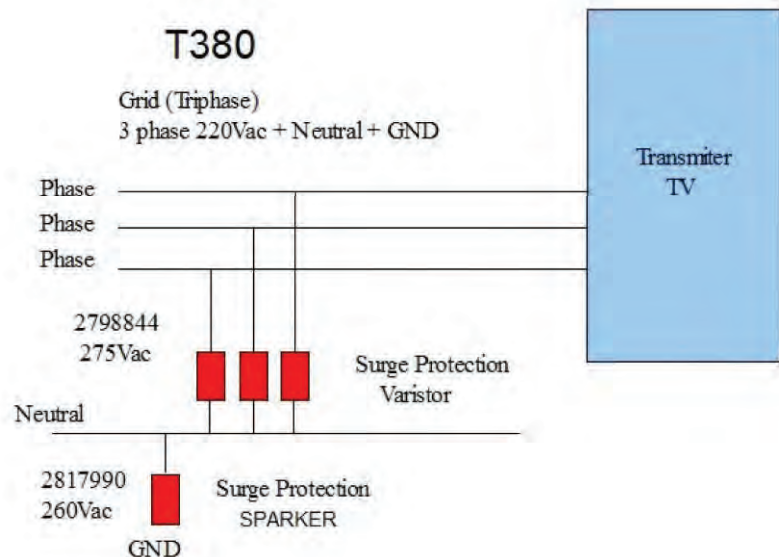
BIPHASIC 220V (B220)



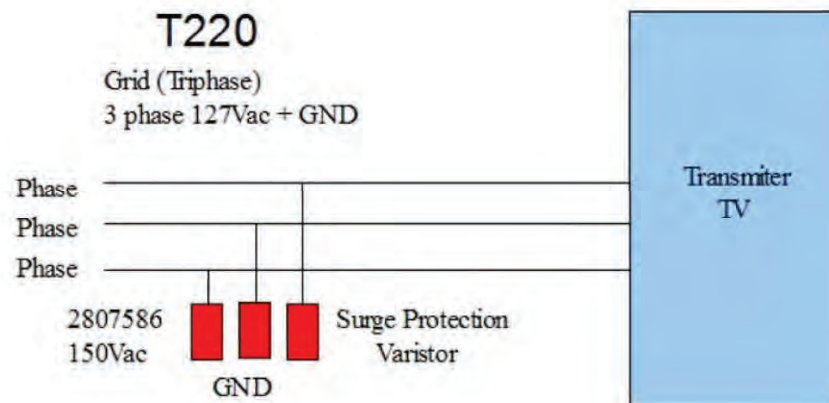
MONOPHASIC 220V (M220)



TRIPHASIC 380V (T380)



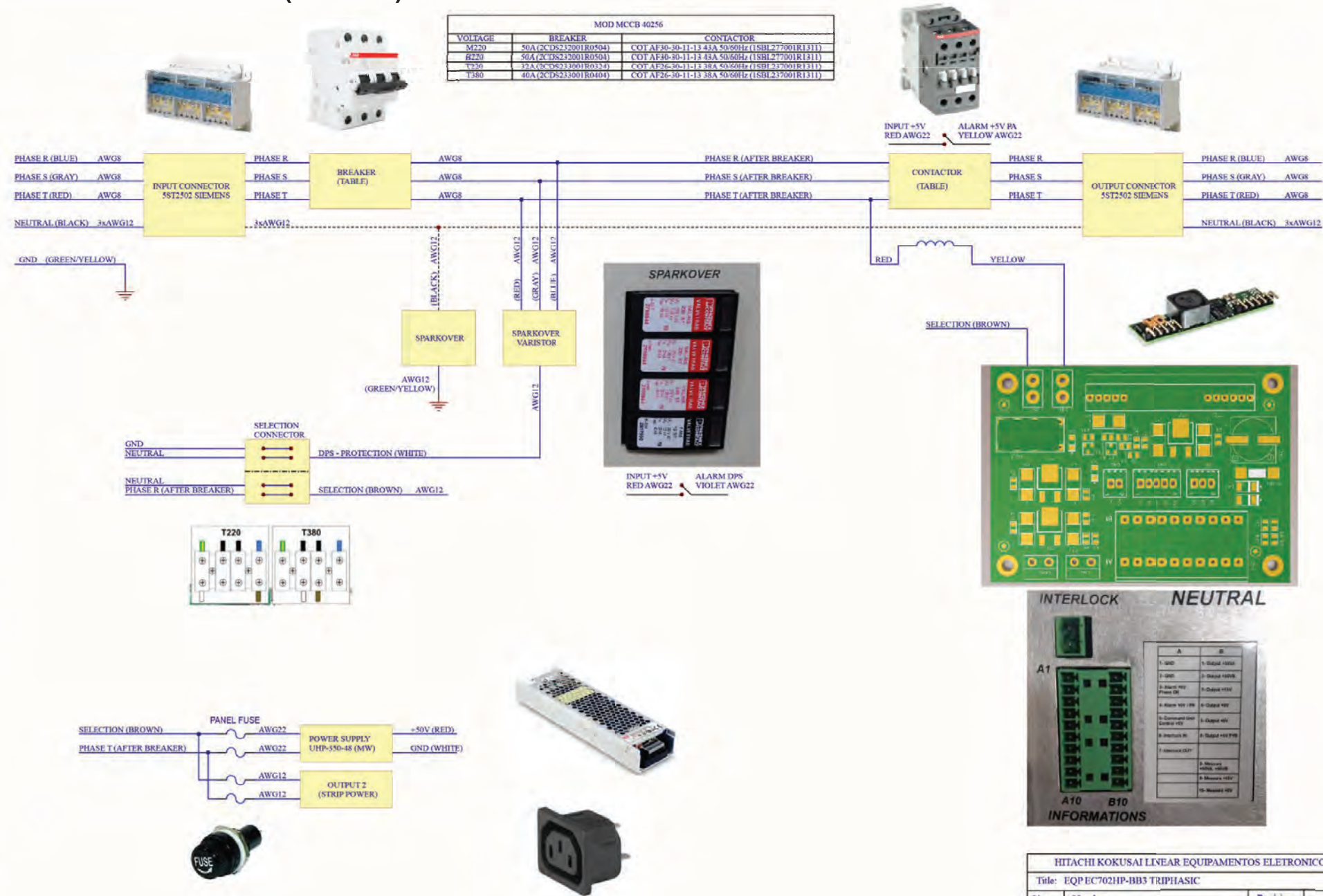
TRIPHASIC 220V (T220)



HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQP EC702HP-BB3 MONO/BIPHASIC			
Size: A3	Number: MCCB 40256	Revisao:	CIP
Date: 02/03/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 3 of 3	

MCCB 8Kw – MOD GV 40256 (3-PHASES)

MOD MCCB 40256		
VOLTAGE	BREAKER	CONTACTOR
M220	50A(2CD5232001R0504)	COT AF30-30-11-13 43A 50/60Hz (1SBL277001R1311)
H220	50A(2CD5232001R0504)	COT AF40-40-11-13 43A 50/60Hz (1SBL277001R1311)
T230	32A(2CD5233001R0334)	COT AF26-30-11-13 38A 50/60Hz (1SBL277001R1311)
T380	40A(2CD5233001R0404)	COT AF26-30-11-13 38A 50/60Hz (1SBL277001R1311)



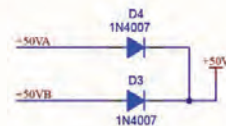
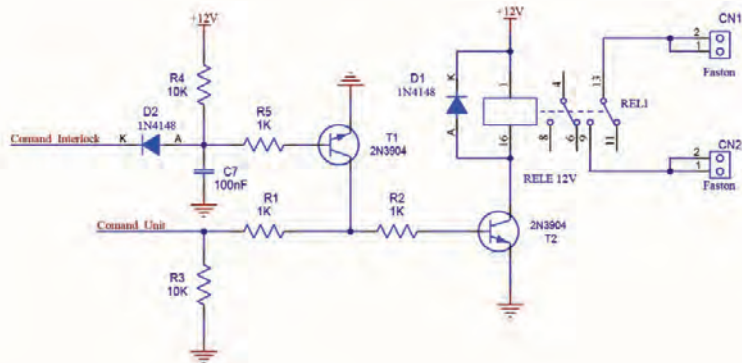
HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA

Title: EQP EC702HP-BB3 TRIPHASIC

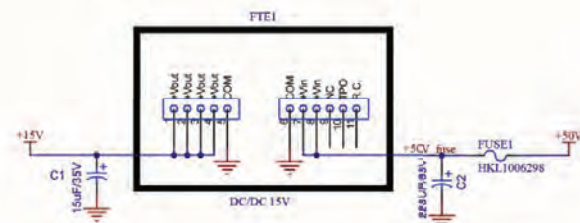
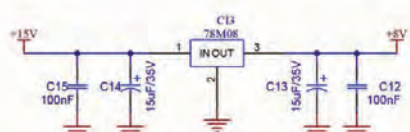
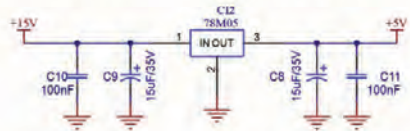
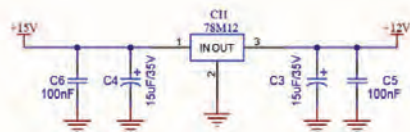
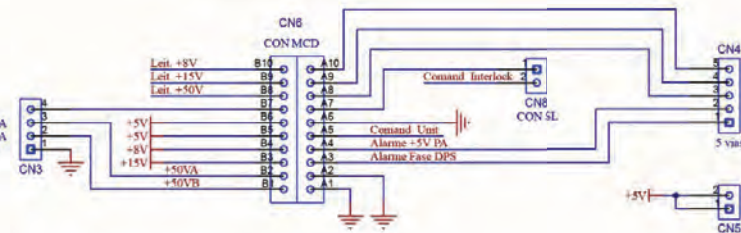
Size:	Number:	Revision	CIP
A3	MCCB 40256		

Date: 02/03/2020 Drawn By: LEONARDO

Approved By: Mauro Arriel Sheet: 1 of 3



Input +50VA
Input +50VB
Input GND

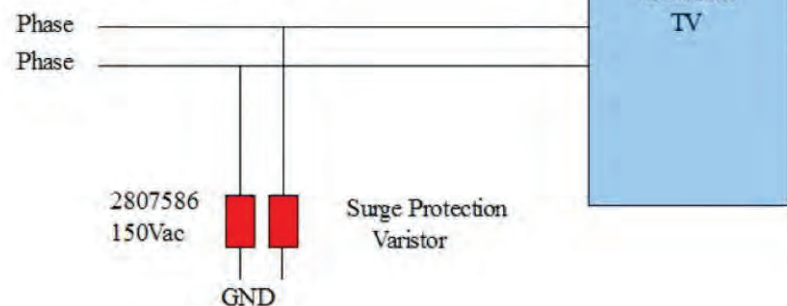


HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQPEC702HP-BB3 TRIPHASIC			
Size: A3	Number: MCCB 40256	Revision:	CIP
Date: 02/03/2020		Drawn By: LEONARDO	
Approved By: Mauro Atriell		Sheet: 2 of 3	

BIPHASIC 220V (B220)

B220

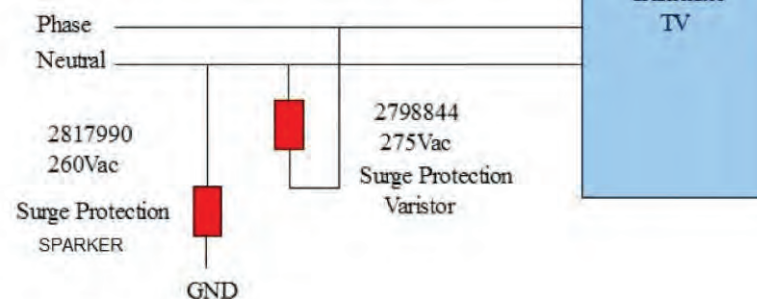
Grid (Biphasic)
2 phase 127Vac + GND



MONOPHASIC 220V (M220)

M220

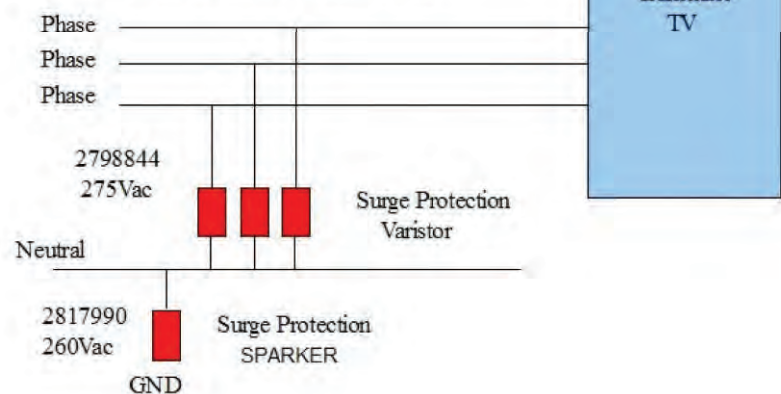
Grid (Monophase)
1 phase 220Vac + Neutral + GND



TRIPHASIC 380V (T380)

T380

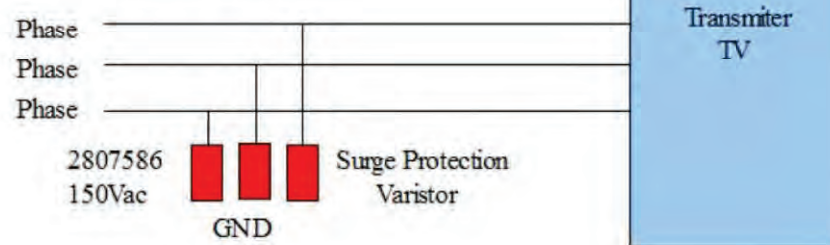
Grid (Triphase)
3 phase 220Vac + Neutral + GND



TRIPHASIC 220V (T220)

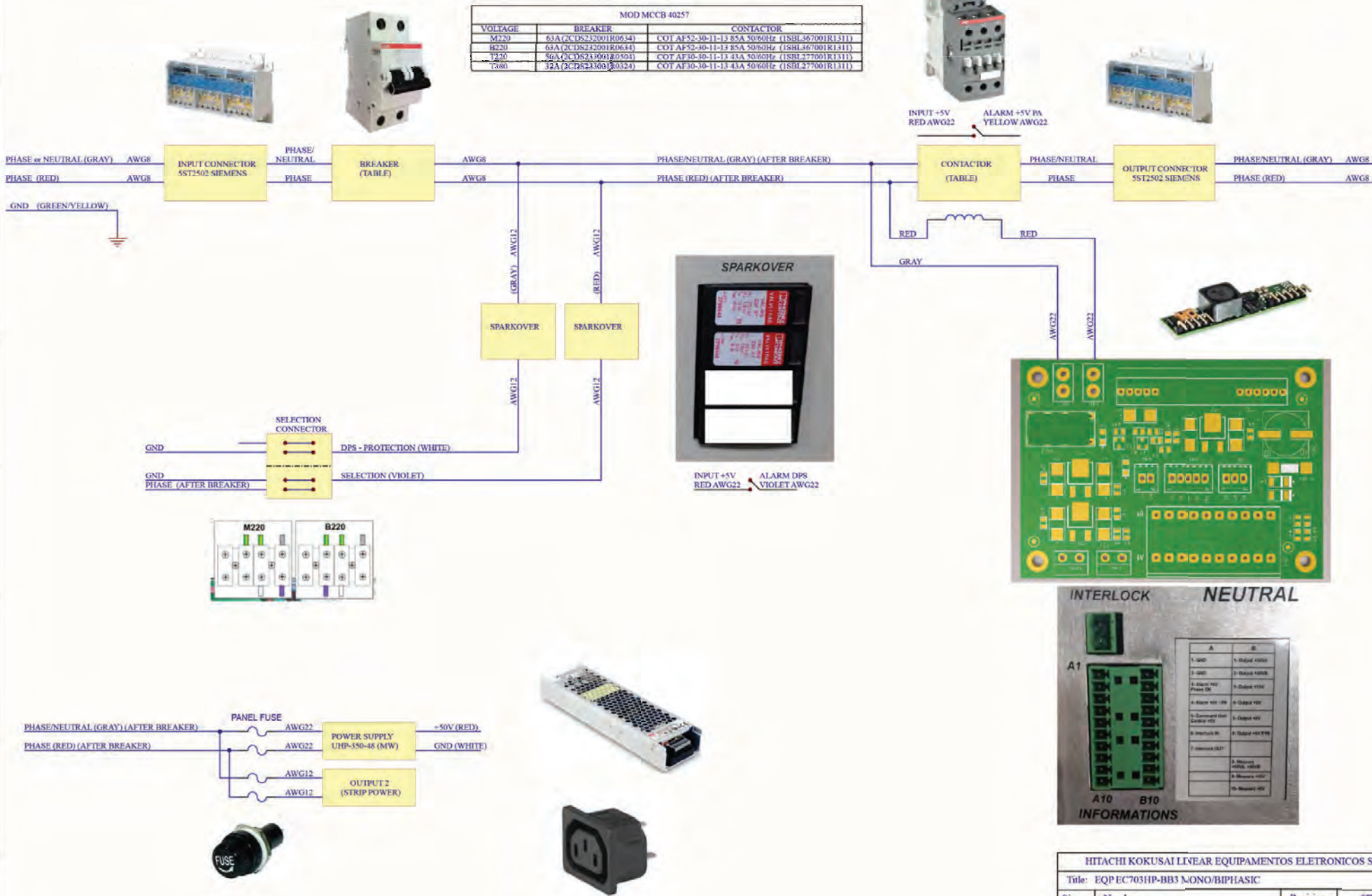
T220

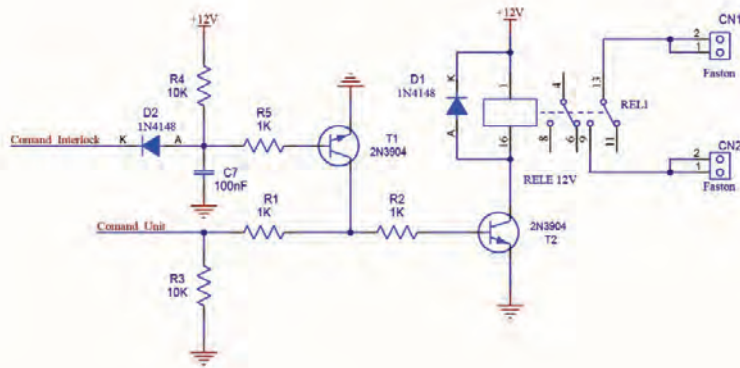
Grid (Triphase)
3 phase 127Vac + GND



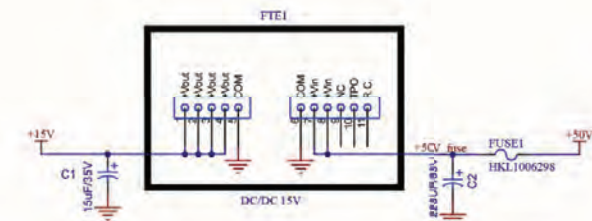
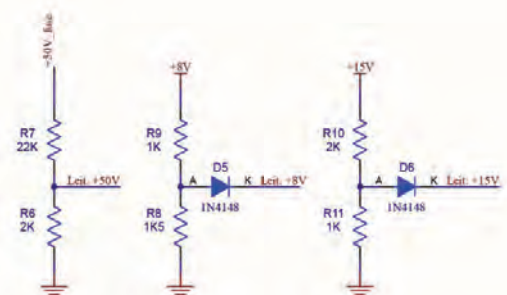
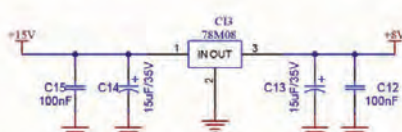
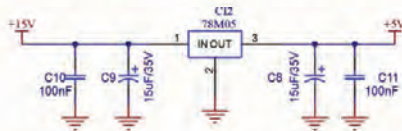
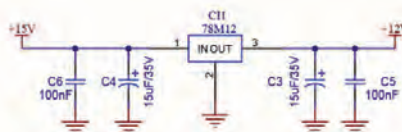
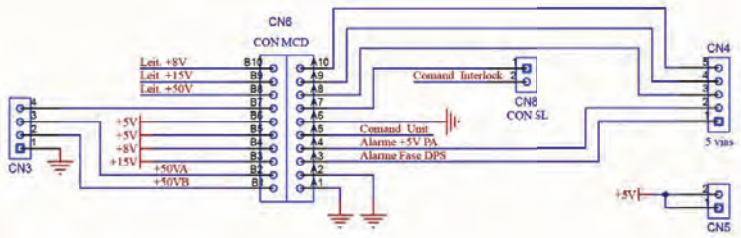
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Title: EQPEC702HP-BB3 TRIPHASIC			
Size: A3	Number: MCCB 40256	Revision	CIP
Date: 02/03/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 3 of 3	

MCCB 11Kw – MOD GV 40257 (SINGLE-PHASE/2-PHASES)



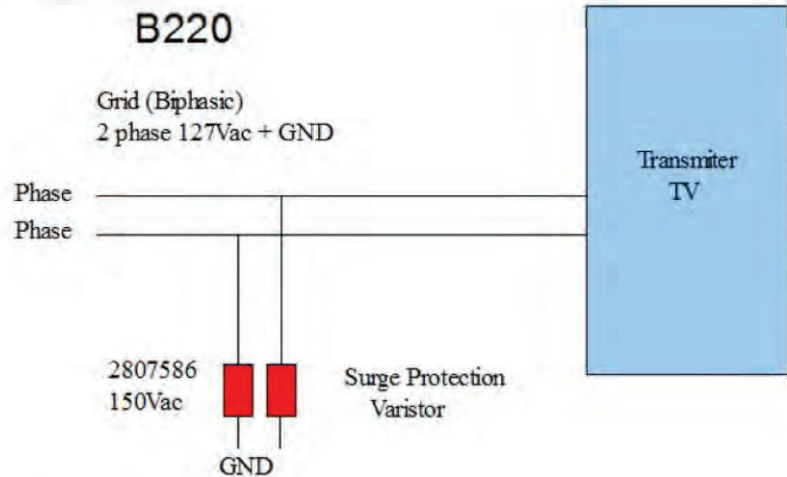


Input +50V
Input +50V
Input GND

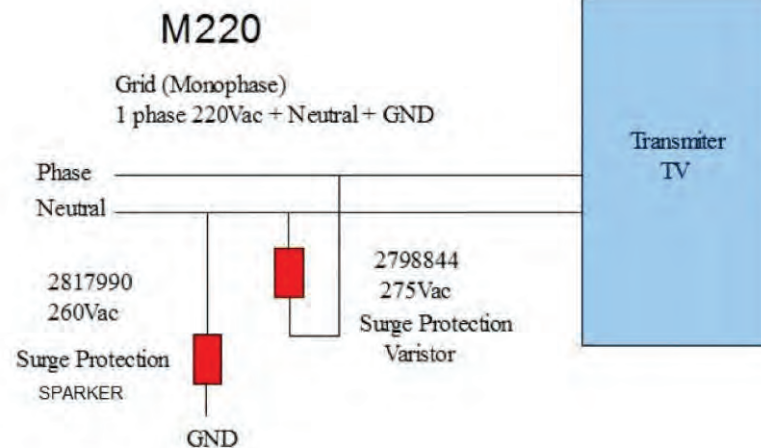


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Title: EQP EC703HP-BB3 MONO/BIPHASIC			
Size: A3	Number: MCCB 40257	Revision	CIP
Date: 03/08/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 2 of 3	

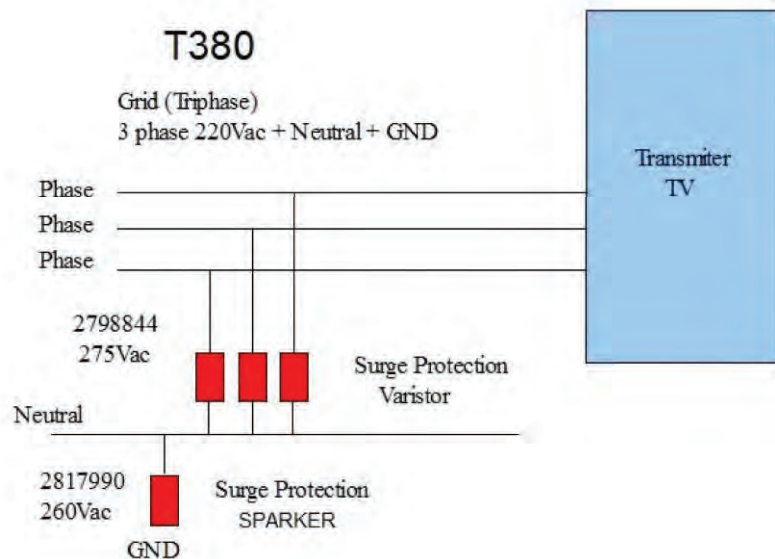
BIPHASIC 220V (B220)



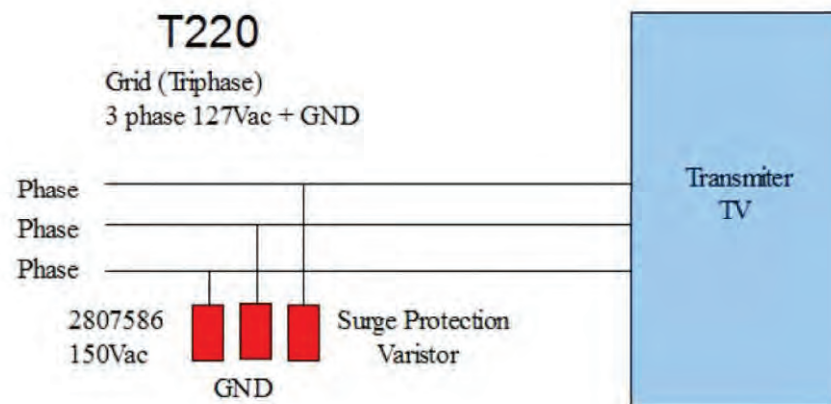
MONOPHASIC 220V (M220)



TRIPHASIC 380V (T380)



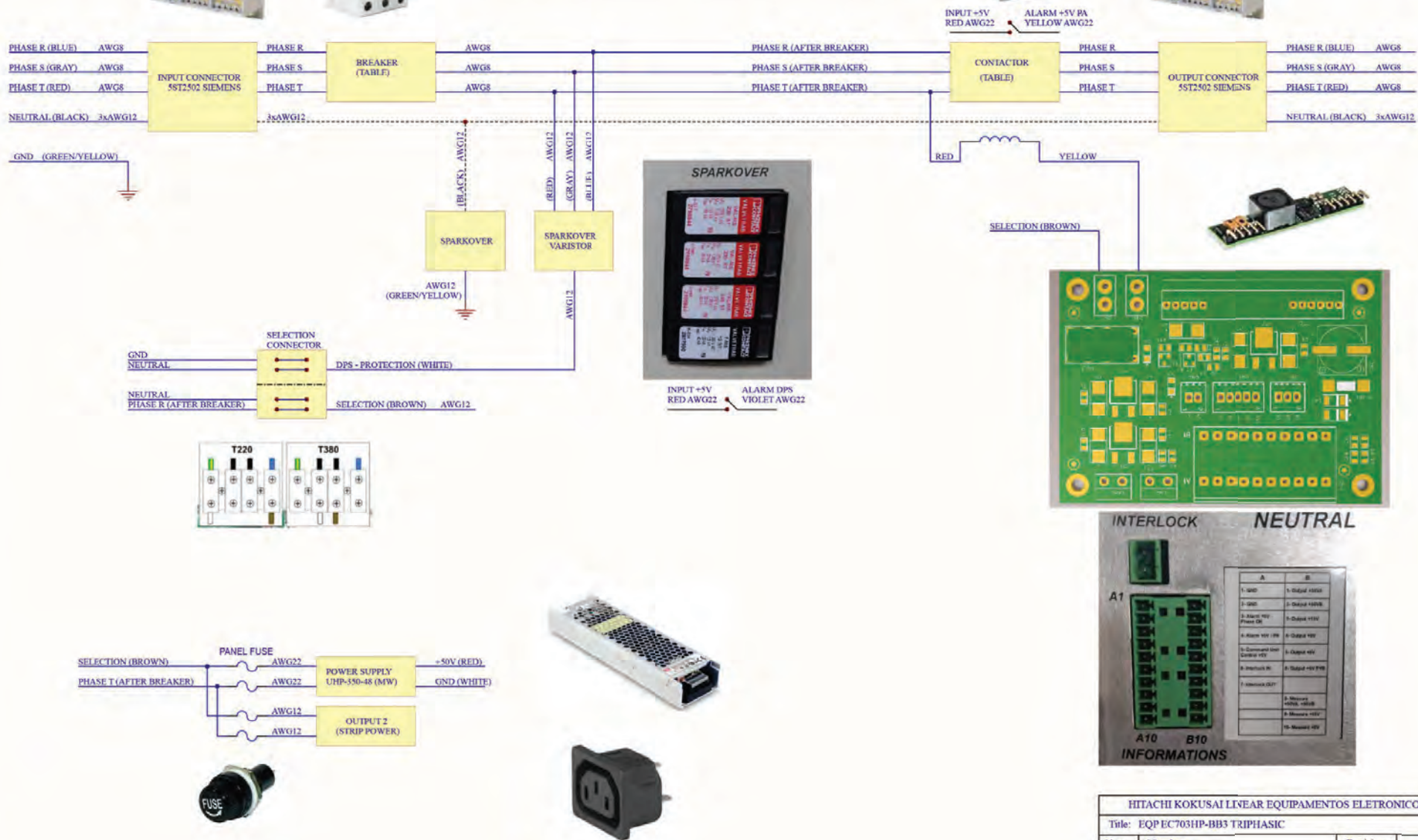
TRIPHASIC 220V (T220)



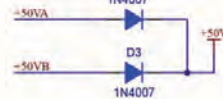
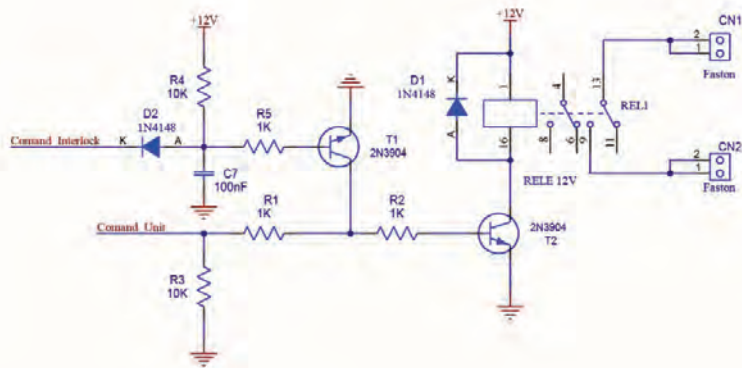
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Title: EQPEC703HP-BB3 MONO/BIPHASIC			
Size: A3	Number: MCCB 40257	Revision	CIP
Date: 03/08/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 3 of 3	

MCCB 11Kw – MOD GV 40257 (3-PHASES)

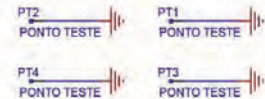
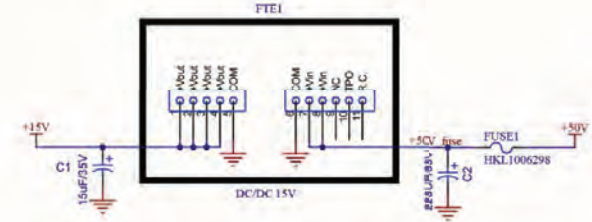
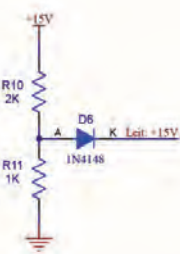
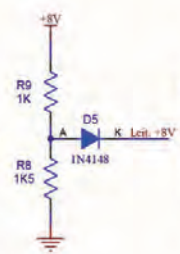
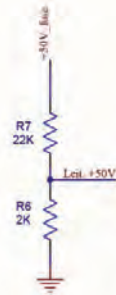
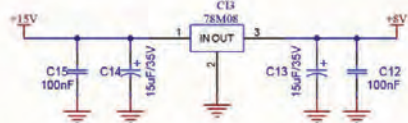
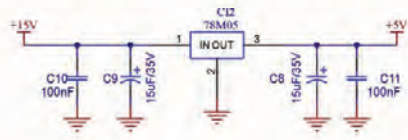
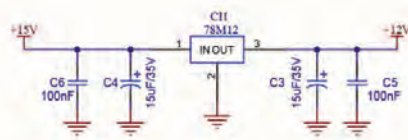
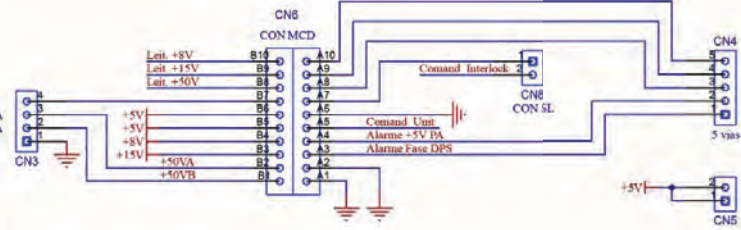
MOD MCCB 40257		
VOLTAGE	BREAKER	CONTACTOR
M220	63A (2CDS212001R0634)	COT AF52-40-11-13 85A 50/60Hz (1SHL467001R1311)
T220	63A (2CDS232001R0634)	COT AF52-40-11-13 85A 50/60Hz (1SHL467001R1311)
T220	80A (2CDS234001R0804)	COT AF30-40-11-13 43A 50/60Hz (1SHL277001R1311)
T380	32A (2CDS233001R0324)	COT AF30-40-11-13 43A 50/60Hz (1SHL277001R1311)



HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQPEC703HP-BB3 TRIPHASIC			
Size: A3	Number: MCCB 40257	Revision	CIP
Date: 03/08/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 1 of 3	

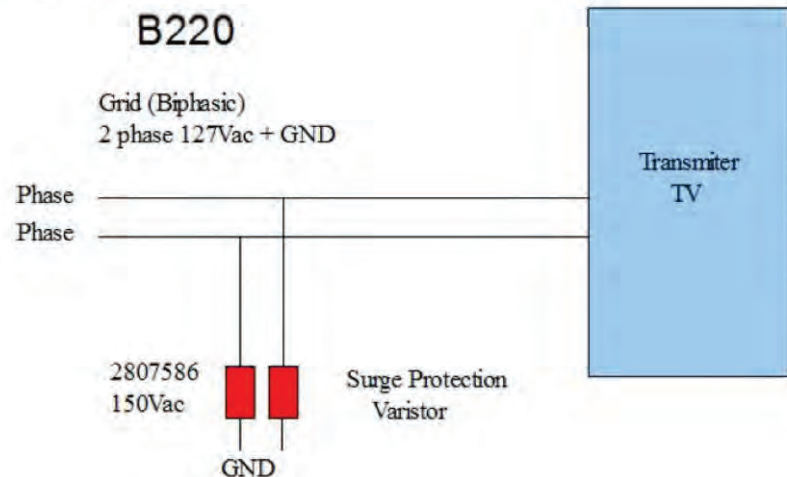


Input +50VA
Input +50VA
Input GND

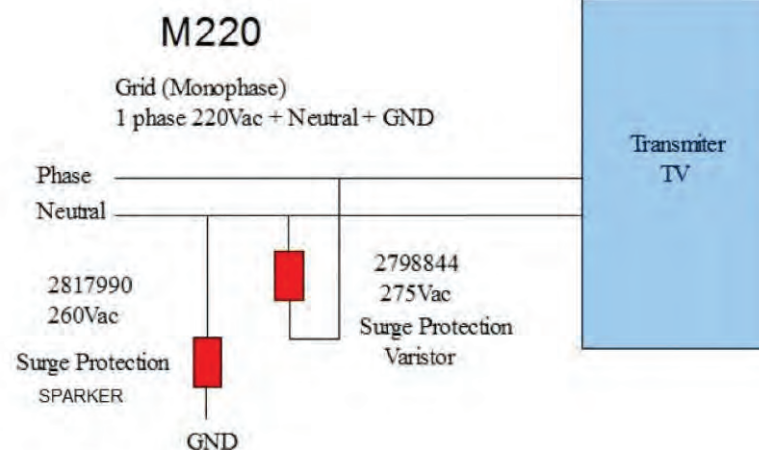


HITACHI KOKUSAI LIXEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQP EC703HP-BB3 TRIPHASIC			
Size: A3	Number: MCCB 40257	Revision:	CIP
Date: 03/08/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 2 of 3	

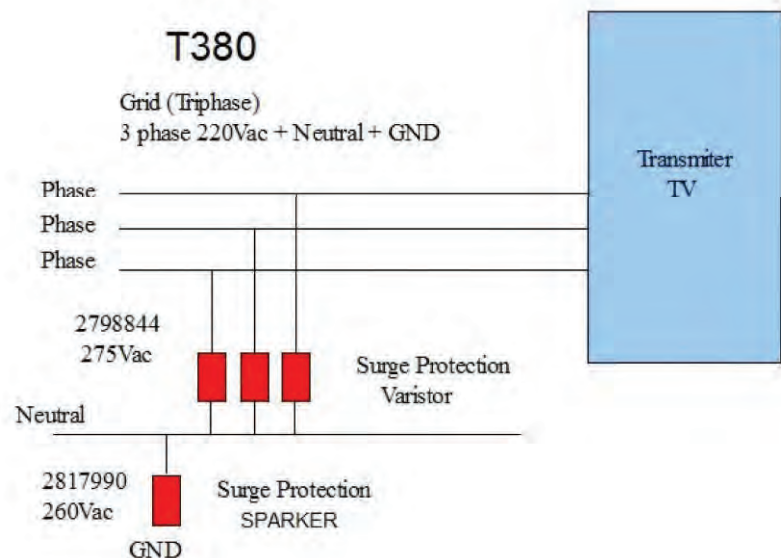
BIPHASIC 220V (B220)



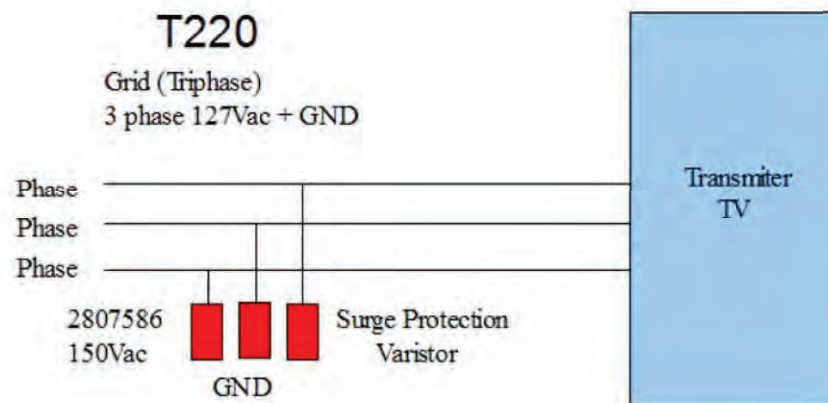
MONOPHASIC 220V (M220)



TRIPHASIC 380V (T380)

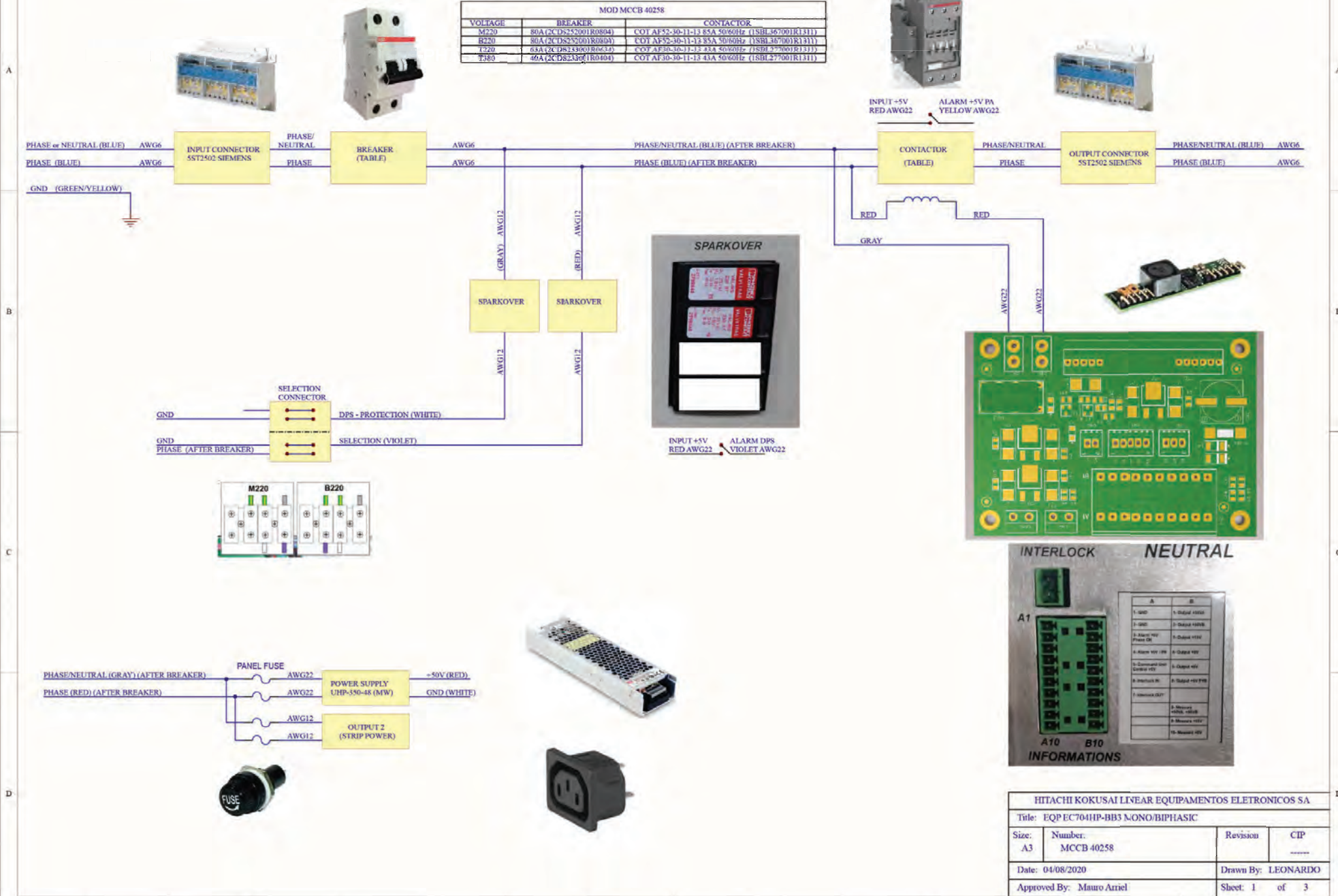


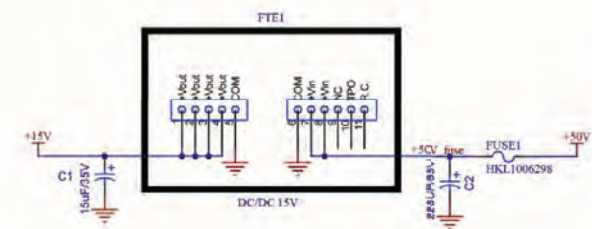
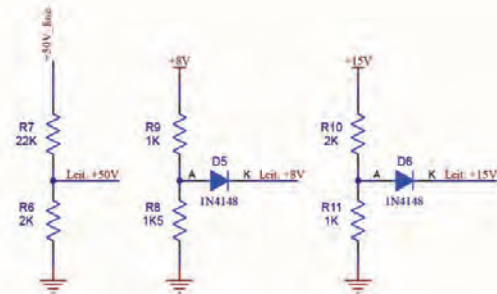
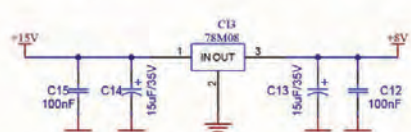
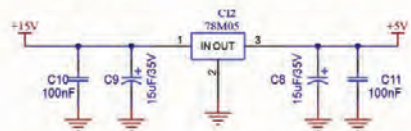
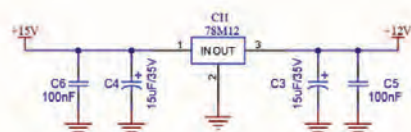
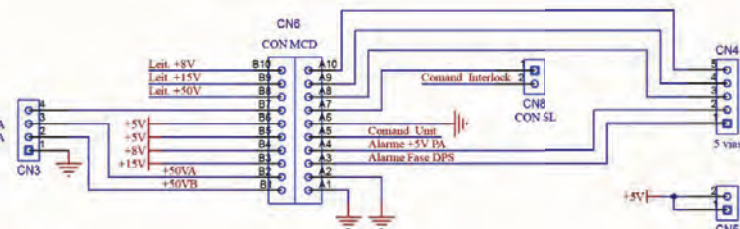
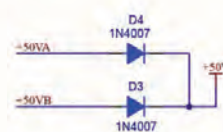
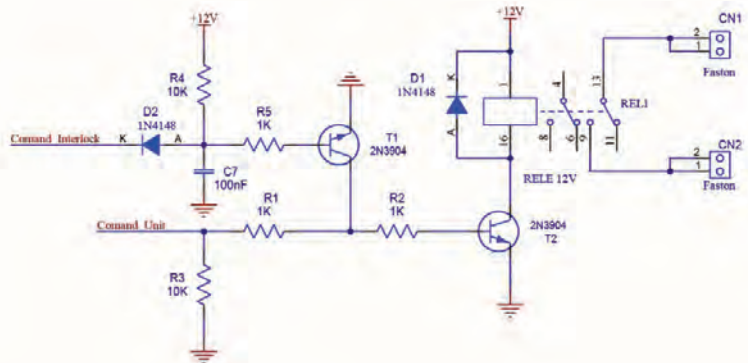
TRIPHASIC 220V (T220)



HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQPEC703HP-BB3 TRIPHASIC			
Size:	Number:	Revision	CIP
A3	MCCB 40257		
Date: 03/08/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 3 of 3	

MCCB 18Kw – MOD GV 40258 (SINGLE-PHASE/2-PHASES)



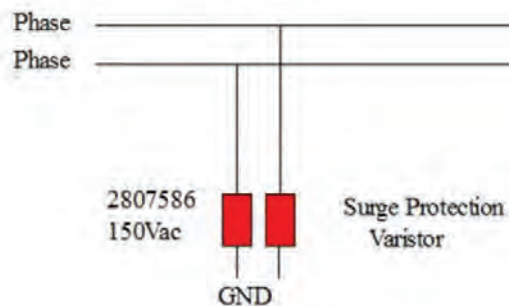


HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQP EC704HP-BB3 MONO/BIPHASIC			
Size:	Number:	Revision	CIP
A3	MCCB 40258		
Date: 04/08/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 2 of 3	



B220

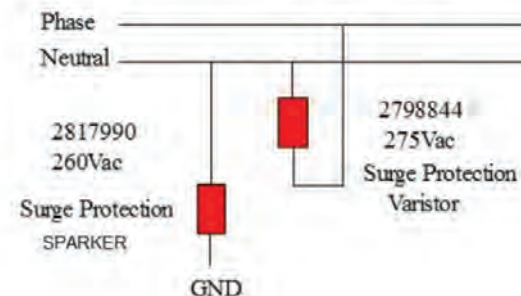
Grid (Biphasic)
2 phase 127Vac + GND



Transmitter
TV

M220

Grid (Monophase)
1 phase 220Vac + Neutral + GND

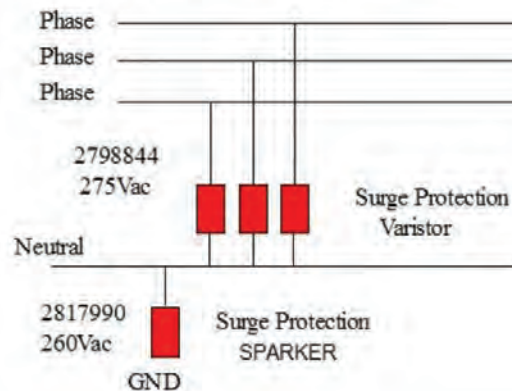


Transmitter
TV

TRIPHASIC 380V (T380)

T380

Grid (Triphase)
3 phase 220Vac + Neutral + GND

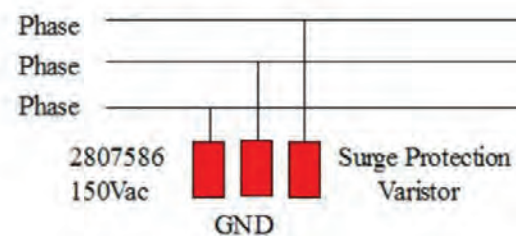


Transmitter
TV

TRIPHASIC 220V (T220)

T220

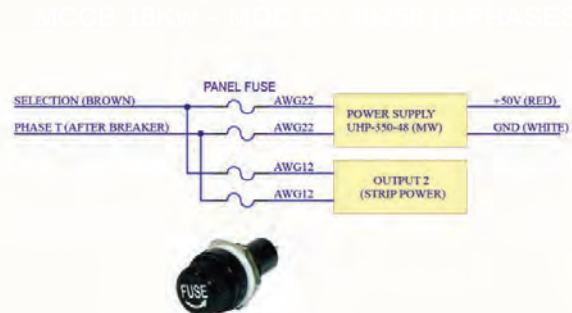
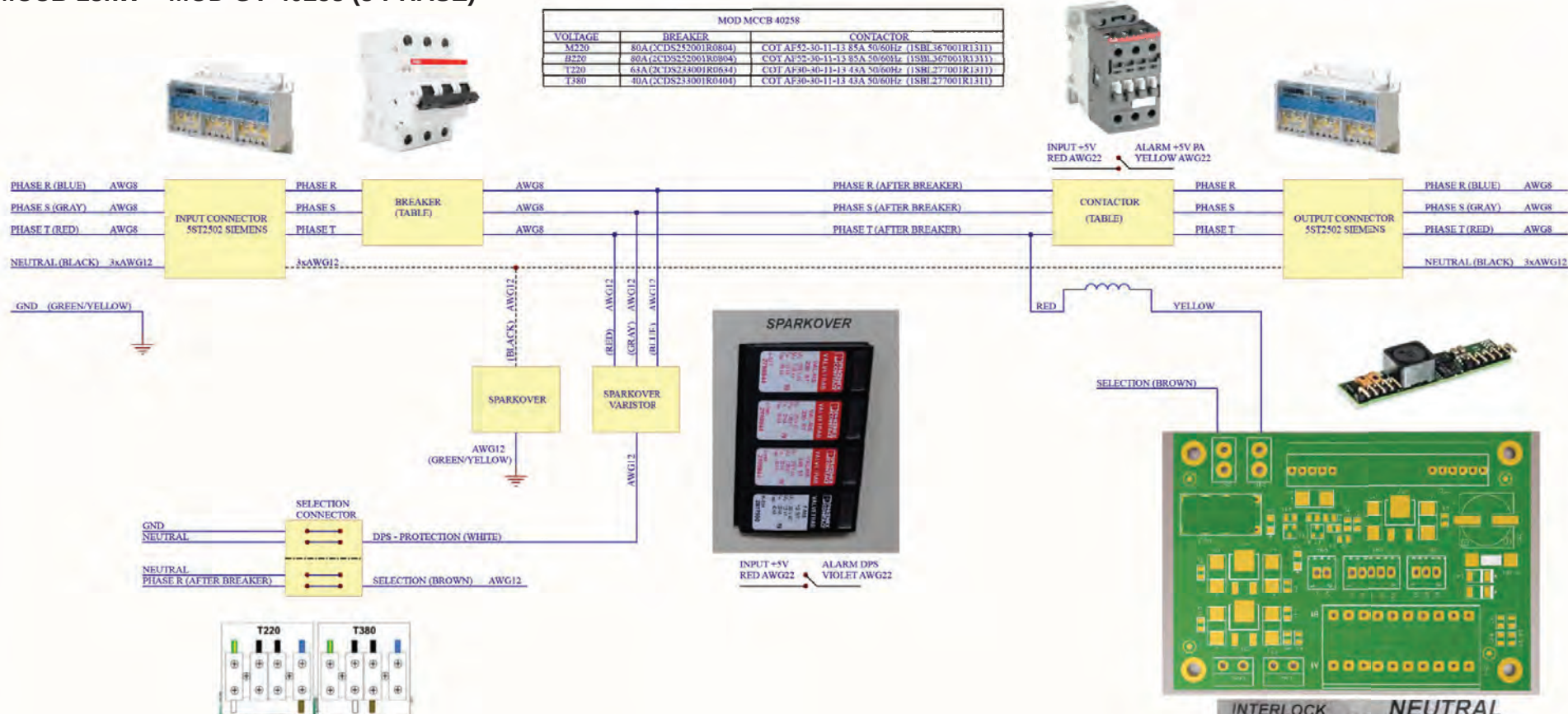
Grid (Triphase)
3 phase 127Vac + GND



Transmitter
TV

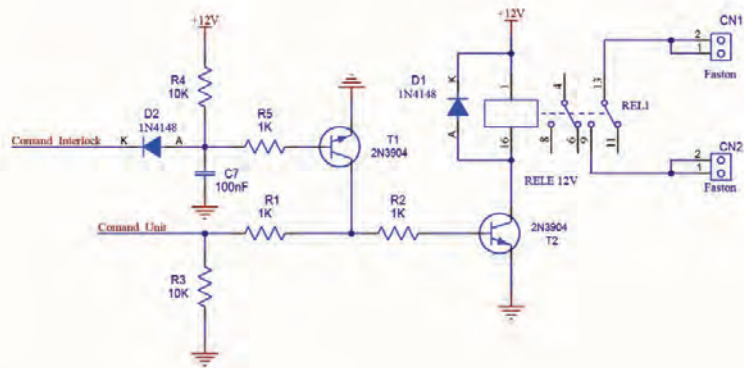
HITACHI KOKUSAI LINEAR EQUIPAMENTOS	
Title: EQP EC704HP-BB3 MONO/BIPHASIC	
Size: A3	Number: MCCB 40258
Date: 04/08/2020	
Approved By: Mauro Atrieli	

MCCB 18kW – MOD GV 40258 (3-PHASE)

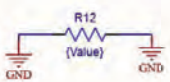
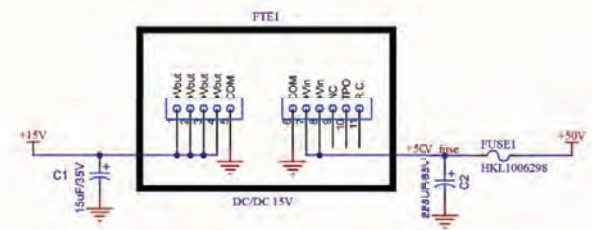
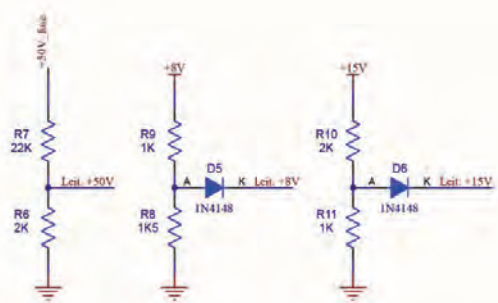
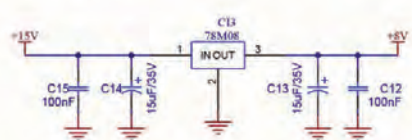
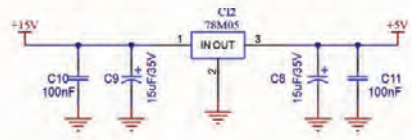
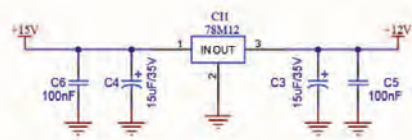
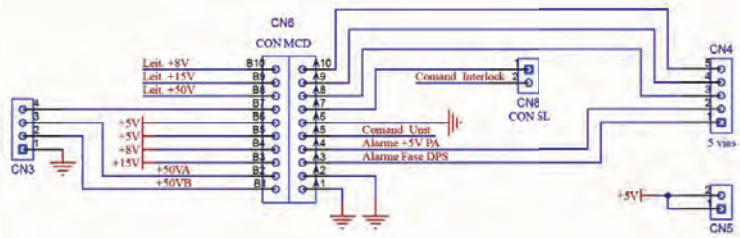


MOD MCCB 40258		
VOLTAGE	BREAKER	CONTACTOR
M220	80A(2CDS24200IR0804)	COT AF52-30-11-13 85A 50/60Hz (1SBL367001R1311)
B220	80A(2CDS24200IR0804)	COT AF52-30-11-13 85A 50/60Hz (1SBL367001R1311)
T220	63A(2CDS2400IR0604)	COT AF30-40-11-13 43A 50/60Hz (1SBL277001R1311)
T380	40A(2CDS2300IR0404)	COT AF30-40-11-13 43A 50/60Hz (1SBL277001R1311)

HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQP EC704HP-BB3 TRIPHASIC			
Size: A3	Number: MCCB 40258	Revision	CIP -----
Date: 04/08/2020		Drawn By: LEONARDO	
Approved By: Mauro Arnel		Sheet: 1 of 3	

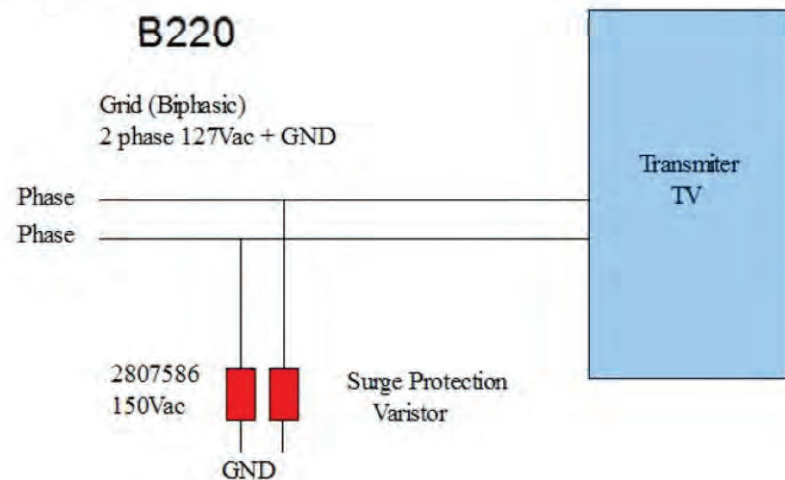


Input +50VA
Input +50VA
Input GND

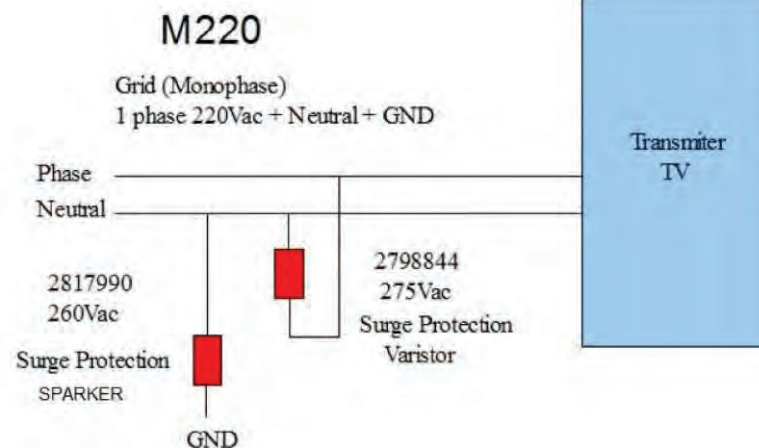


HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQP EC704HP-BB3 TRIPHASIC			
Size: A3	Number: MCCB 40258	Revision	CTP
Date: 04/08/2020	Drawn By: LEONARDO		
Approved By: Mauro Arriel	Sheet: 2 of 3		

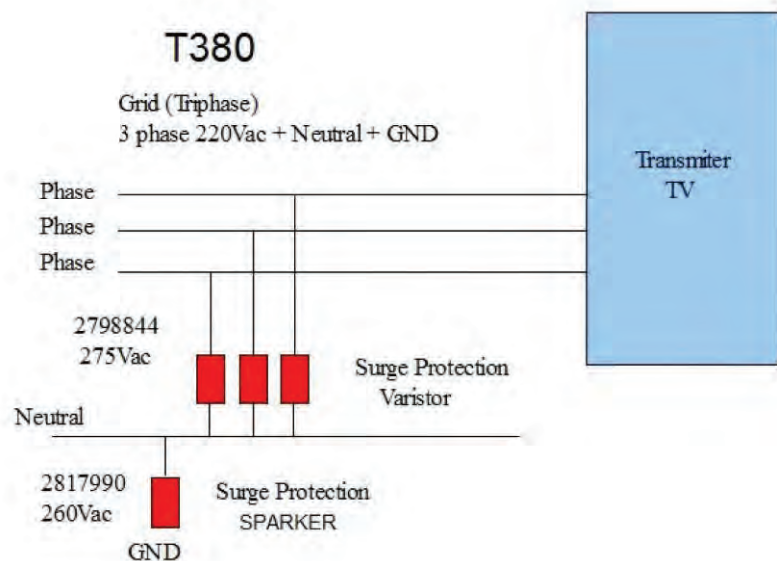
BIPHASIC 220V (B220)



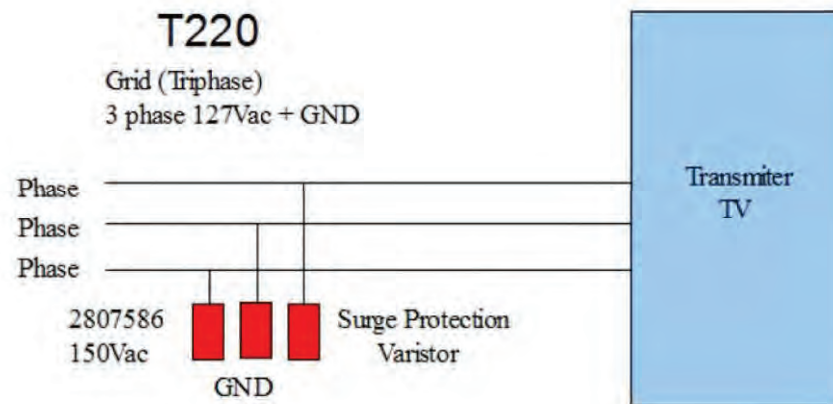
MONOPHASIC 220V (M220)



TRIPHASIC 380V (T380)



TRIPHASIC 220V (T220)



HITACHI KOKUSAI LINEAR EQUIPAMENTOS ELETRONICOS SA			
Title: EQPEC704HP-BB3 TRIPHASIC			
Size: A3	Number: MCCB 40258	Revision	CIP
Date: 04/08/2020		Drawn By: LEONARDO	
Approved By: Mauro Arriel		Sheet: 3 of 3	

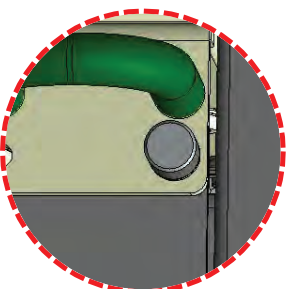
3.8. Touch Screen Display (Optional)



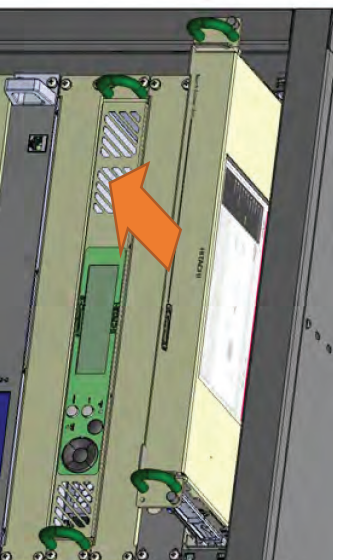
3.8.1. Introduction

The entire device management and configuration system can be remotely accessed via a touch screen browser. For touch screen display, we use the Galaxy Tab A 10.1" (SM-T510NZSLZTO), this device embeds a dedicated app that allows you to navigate the equipment's parameters in an easy way, with access to its statuses and also makes it possible to change its settings in a more friendly, graphical environment.

3.8.2. Access



Unscrew the touch screen front panel

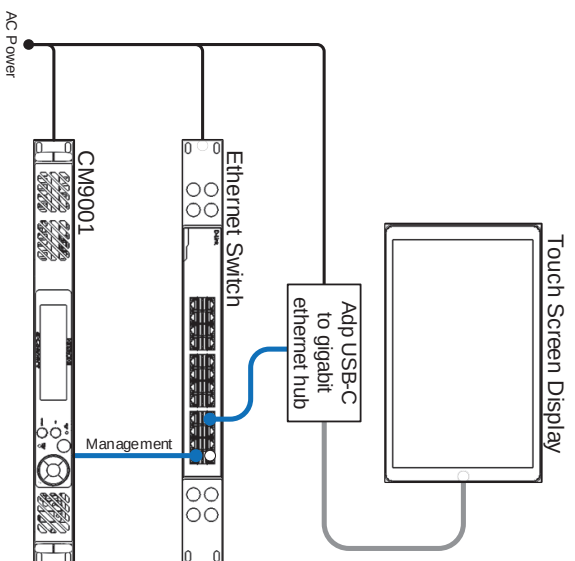


Pull the touch screen front panel forward to the rail end.

To close the Touch Screen, perform the process in reverse

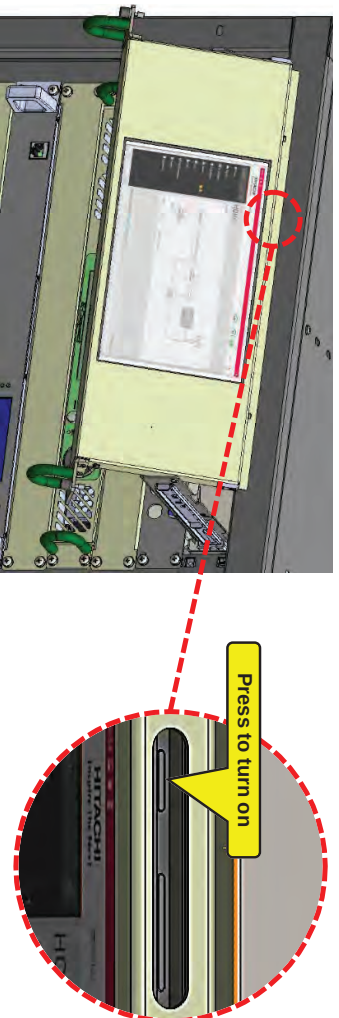


3.8.3. Connections

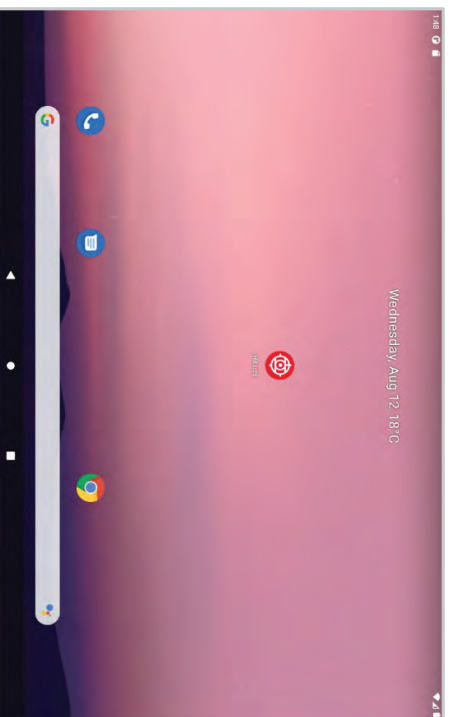


3.8.4. Start / Configure

Touch the screen to turn it on:



Select the "Hitachi" icon to start the app:



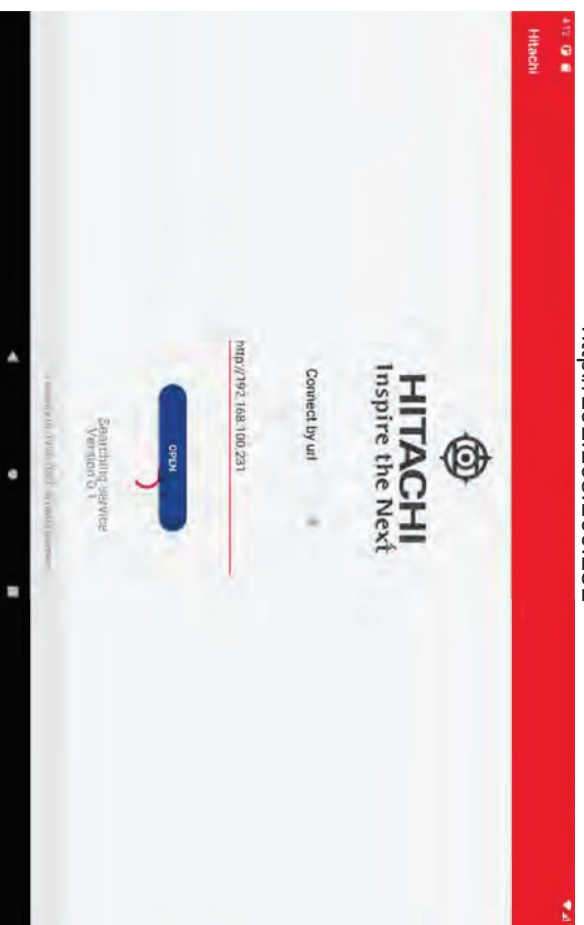
When accessing the application for the first time, you must enter the operating License. Contact Comark customer service and send the code below to receive the license key.

Insert the License key Number and press "activate":

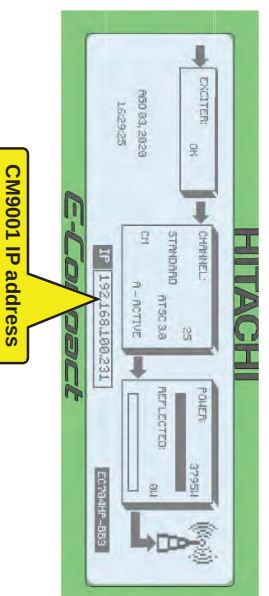


To connect with the CM9001, enter its full IP address. Example:

<http://192.168.100.231>



This IP address is a simple example.
View the settings on the device before
accessing the Web Interface.



When initially login in, use the factory password:

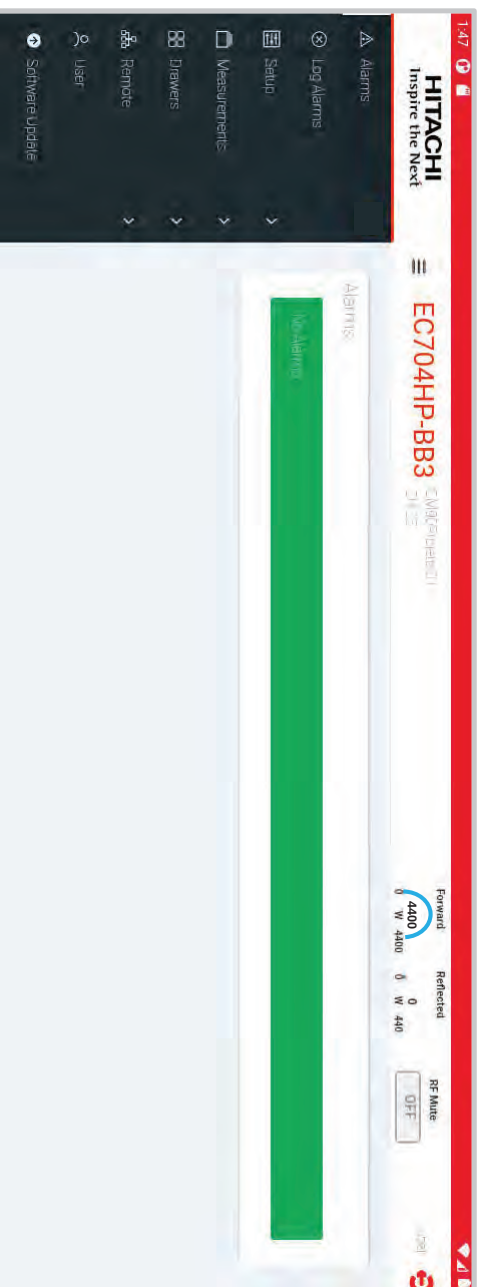
Login: **user**

Password: **linear**



For security reasons, we recommend that once the first login is made, change the factory password to a personal password.

3.8.5. Touch Screen Operation



To operate the touch screen keyboard, follow the instructions in the "WEB Interface - Remote Access" in the "Control Module CM9001" section.

Section 4 – Installation

1. Overview

This section provides general information for planning the installation of the E-Compact High Power Line Transmitters, such as recommendations regarding Shelter, Tower, Antennas, Cables, Grounding, Power Line, Prevention against transients, etc.

2. Inspection

The package and the equipment must be inspected upon delivery in order to detect eventual visible damages. If there are signs of violation or physical damage (which points to transportation problems), the corresponding details should be described in the delivery documentation provided by the transport company. Such notice would be used to establish the responsibilities for the product integrity.

Comark carries out operating tests at the factory on every transmitter in order to ensure proper operation after delivery to the user. Nevertheless, if the equipment does not operate after the start-up and there is no evidence of transportation damage, it might be necessary to send the equipment back to the factory for repair or replacement. In such a case, please get in contact with Hitachi Kokusai Electric Comark LLC's customer support.

3. Installation Recommendations

3.1. Preventive Protection

Voltage transients with a duration of micro and nano-seconds are a constant challenge for solid state circuits. The downtime and the equipment maintenance make the preventive protection the best warranty against these surges. This protection can be in many forms, from isolation transformers and no-breaks to the more efficient but more expensive AC Voltage Protectors. Since lightning is the most common cause of transients, AC Voltage Protectors are the best choice.

An efficient AC Voltage Protection must be able to dissipate the energy to a low voltage, sufficient to guarantee the protection of the electronic components. The protection must always be placed transversely to the AC line, even during blackout periods. In addition, it must be immediately and automatically turned-on and ready in case of repeated transients.

3.2. Tower

For the installation of the transmission and reception system, the tower must be made with hot-dip galvanized steel. A lightning protection system should be installed in the tower as well as nocturnal beacons bulbs with red glass.

The following information about the tower must be obtained:

- a) It features a special insulator support for descent of cordage of the lightning rod with a maximum space of 1.5m between them.
- b) There must be lightning signaling system every 20m along the tower.
- c) It must be painted with orange and white stripes every 2m with special paint that complies with local regulations.
- d) It must endure winds of up to 150 Km/h.

In a retransmission station the tower is the highest and therefore the most vulnerable device to be hit by lightning. Because of this the tower is used as a part of the protection system. The lightning protection device used in these cases is called a lightning rod and has the function of guiding the electrical discharge safely, avoiding other parts of the system that could be hit and damaged by it.

The use of a lightning rod is MANDATORY. The project and installation of grounding and lightning protection systems must be performed by specialized companies. Eventual damage to the equipment caused by missing or malfunctioning arresters are not covered by warranty.

3.3.Fastening of cables, antennas and connectors

Please observe the following items when installing antennas:

Direction of Antennas and Aperture Angles

Use a pocket compass when directing the antenna and a field strength meter for the fine adjustment of the reception antenna.

Height

It mainly depends on the receiving signal and the transmission conditions (obstructions, attended area, etc). It's very important to verify how far the antenna is from the lightning protection device, since the antenna must stay inside its cone protection.

Distance between the Rx and Tx Antennas

They should be placed as far as possible from each other in order to isolate the transmitted signal from the received signal.

Polarization

It is very important to verify the polarization of the received signal, which can be vertical, horizontal or circular.

Phasing

When receiving a signal with vertical polarization, the system must be mounted vertically, otherwise the gain of the antenna will be drastically reduced, likewise in case of a signal with horizontal polarization.

To receive a signal with circular polarization with a non-circular antenna, the system can be mounted either vertically or horizontally.

Stacking antennas

When using this system, the distance between them depends on the kinds of antenna used and the kind of stacking used. This must be studied thoroughly in order to obtain the best solution for each case.

Cables and Connectors

All cables must be carefully installed in order not to be twisted during the installation process. When using 7/8" or 1/2" cables, please pay attention to their bending that must not be made in spaces smaller than 80cm. The cables can't force the connectors in the Input/Output of the equipment. The entry holes for the cables in the shelter must be done in a way to avoid the water from entering them.

Follow the manufacturer's instructions when assembling them. All splices done outside the shelter must be isolated with a special plastic tape and/or a plastic insulation material.

Avoid using silicon to coat the isolation made with auto-fusion tape. It has been verified that the silicon chemical characteristics may provoke the drying of the auto-fusion tape.

3.4. Indoors Equipment Installation

Small equipment must be placed on a table in a way to provide easy access from all sides and be at least one meter far from the walls.

Do not compromise the equipment's air flow by placing objects on its top panel, which is its natural ventilation.

The equipment must be placed directly on the shelter's floor as long as it is flat and they must be placed at least one meter far from the walls to avoid obstruction of its ventilation system.

Some of these air outlet must be connected to the outside of the shelter through PVC tubing.

The AC cable has two terminations to be used exclusively in the equipment.

3.5. Equipment Grounding

Assemble the grounding separately from the power supply, with a rig and a grounding terminal that comes with the equipment.

Normally, the retransmission sites are located in the highest spot of the chosen location, making them more vulnerable to lightning strikes.

These discharges carry a great amount of electric energy, putting at risk not only the antenna and its structure but also the equipment in the shelters. In order to minimize this effect and guarantee their protection and continuous service during thunderstorms with lightning, the use of a reliable grounding system is mandatory.

Lightning is a transient, high-current electric discharge that happens between the ground and the clouds. Therefore, the most important part of a lightning protection system are the parts that are on the ground. In order to maintain the low impedance of the technical grounding system, it must be carefully executed in a way that the electric field energy is drained away without affecting the equipment. In order to define a system, the characteristics of the soil resistivity must be taken into consideration.

To determine the behavior of the soil capacity to drain the currents, its resistivity has to be measured. For an adequate protection this value should not exceed 5, with zero being the ideal value

Generally, the grounding method used for TV retransmitters is a system with a single vertical electrode made with copper measuring 2.5 meters or more.

In case the conditions and characteristics of the soil are of high resistivity or high incidence of lightning discharges, the grounding system must be thoroughly analyzed.

It is very important to notice that the grounding systems of the equipment and the lightning rod are independent and should never be connected to each other. A poorly elaborated grounding system can cause damages to the equipment that won't be covered by the warranty.

3.6. Electric Installation Grounding

The shelter installations receive power through an aerial power line. Moreover, because of it, the lightning discharges that might hit the power lines generate power surges that can reach the shelter and consequently the equipment.

To protect the equipment against eventual power surges, we recommend the use of gas filled surge protectors, after an isolation transformer with electrostatic shield.

When installing the grounding system, please observe the following items:

- Connect all equipment carcasses to the grounding system using the grounding rig that comes with them.
- Connect the gate and all the wires from the fence to the grounding system. Connect the neutral wire from the public power line to the grounding system.
- Connect the rig from the lightning rod to the grounding system with the shortest connection possible avoiding cable splices.
- The tower's structure must also be connected to the grounding system. Use porcelain isolators to insulate the lightning rod rig.

3.7. Power Supply

Before plugging the equipment to the power supply, verify the voltage in the outlet to make sure that it is correct. If its variation is greater than 10%, it is necessary to use a power stabilizer to correct the voltage.

The power provided by the stabilizer must be at least 30% greater than the consumption of the equipment.

4. Equipment Assembly



Only trained personnel should conduct physical assembly on site.



Observe the requirements described in this manual in Sections 1 (Care, Warranty and Service) and Section 2 (Minimum Installation Requirements).

The following precautions must be taken when positioning the transmitter at the installation site:

1. The air intake (front) and the air outlet (rear) must be completely unobstructed.
2. The transmitter rack should be positioned to ensure easy access from either side. The distance between the transmitter and the walls of the shed must be at least 1.0 meter.
3. In case of installation on a site containing other connected transmitters, do not position the transmitter in a location that can receive hot air from other transmitters.

4.1. Assembly

1. Unpacking the transmitter and drawers.

2. Position the rack where the equipment is installed in compliance with the following equipment:
 - Antenna cable
 - AC Power Supply
 - RF Cable
 - Transport Stream (ASI) cables
 - Grounding point

3. Visual Inspection:

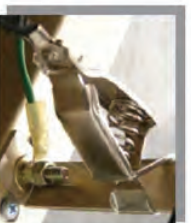
Remove the lateral and rear panel of the transmitter and proceed to a visual inspection searching for any alteration that may have happened during the transportation of the equipment.

Pay special attention on the RF and signal cable connectors, ie. loose screws.

Check the power switches located on the left of the rear panel of the units, make sure they are in the "ON" position.

4. Grounding:

For personal and equipment safety reasons, connect the ground of the of the transmitter room to the ground of equipment before proceeding to the next steps.

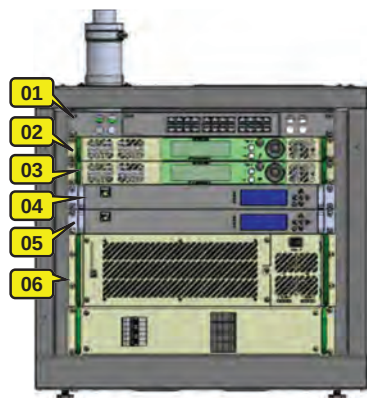


5. Remove the cabinet rear and side housings to facilitate equipment mount.

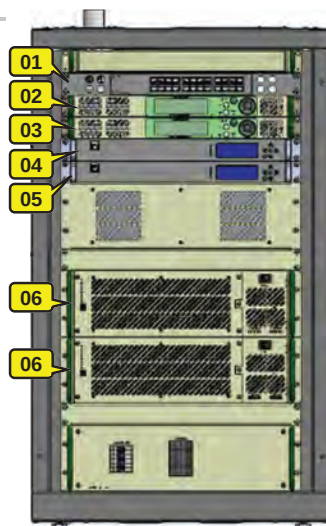
6. Assembly Drawers:

Mount the drawers to the rack:

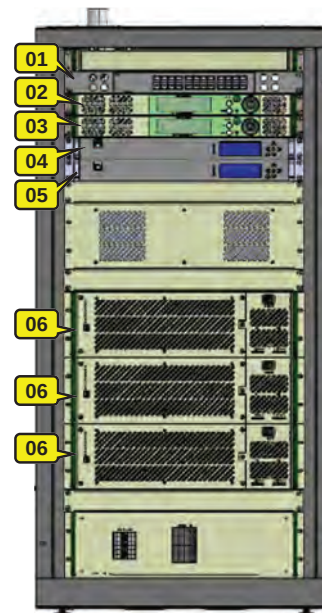
Ref	Drawer
01	Switch
02	Main Control Module CM9001 (A)
03	Backup Control Module CM9001 (B)
04	Main Exciter (A)
05	Backup Exciter (B)
06	All Power Amplifier Drawers



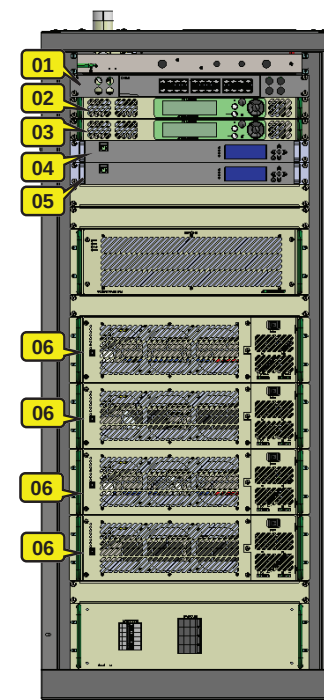
EC701HP-BB3



EC702HP-BB3

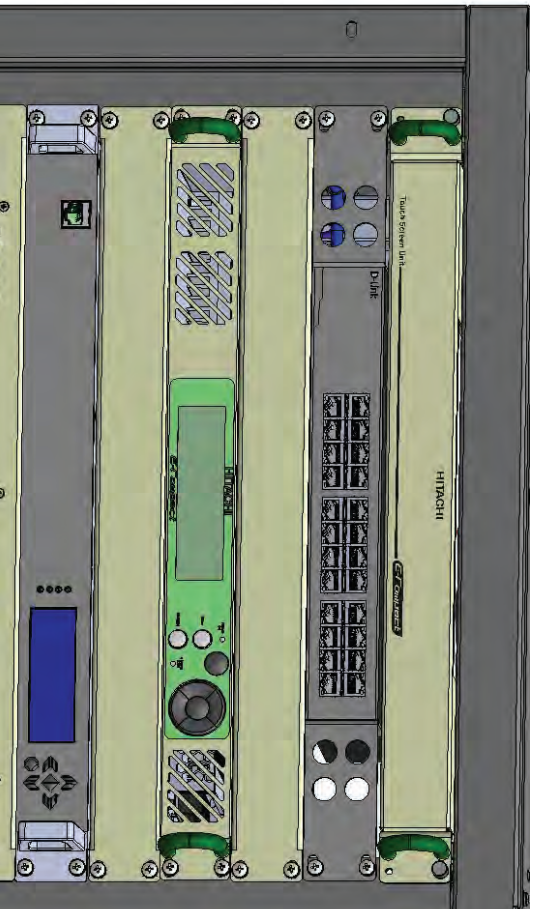


EC703HP-BB3



EC704HP-BB3

7. Screw in all rack drawers:



4.2. Internal Connections

The following connections must be made:

- RF cables
- AC power cables and grounding
- Control Modules cables
- Rejection loads drawer cables
- Ethernet Switch
- Transport Stream cables (ASI)

8. Loosen all the fixed cables inside the rack by removing yellow clamp ties:

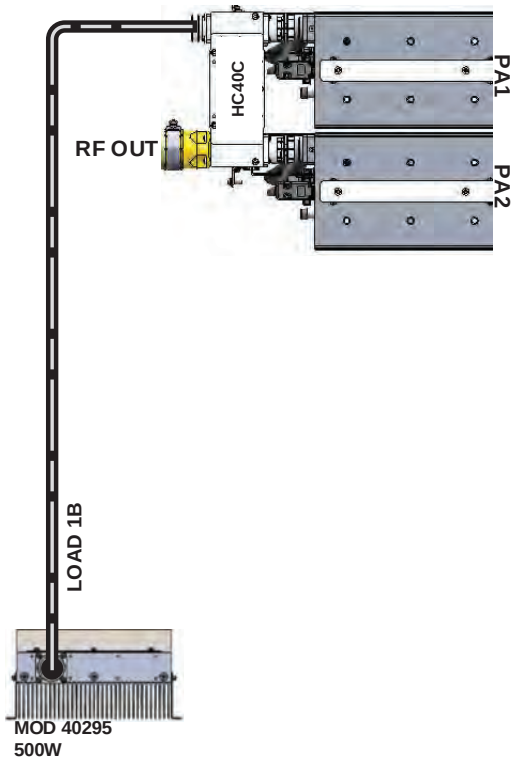


9. Plug the RF Output Hybrid Combiners cables:

Connect the cables between the Dummy Loads Drawers and the Hybrid Combiners (this does not apply for the model EC701HP-BB3).

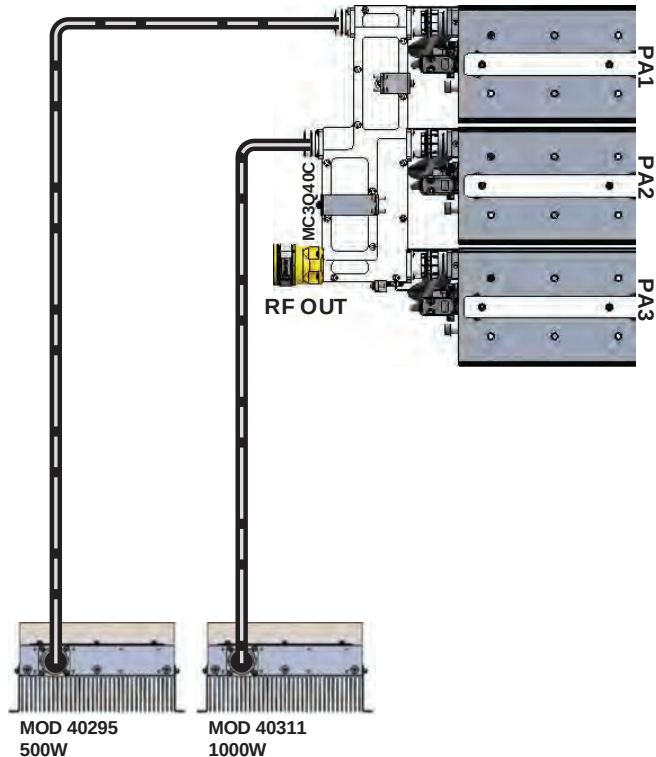
EC702HP-BB3

EC702HP-BB vista lateral



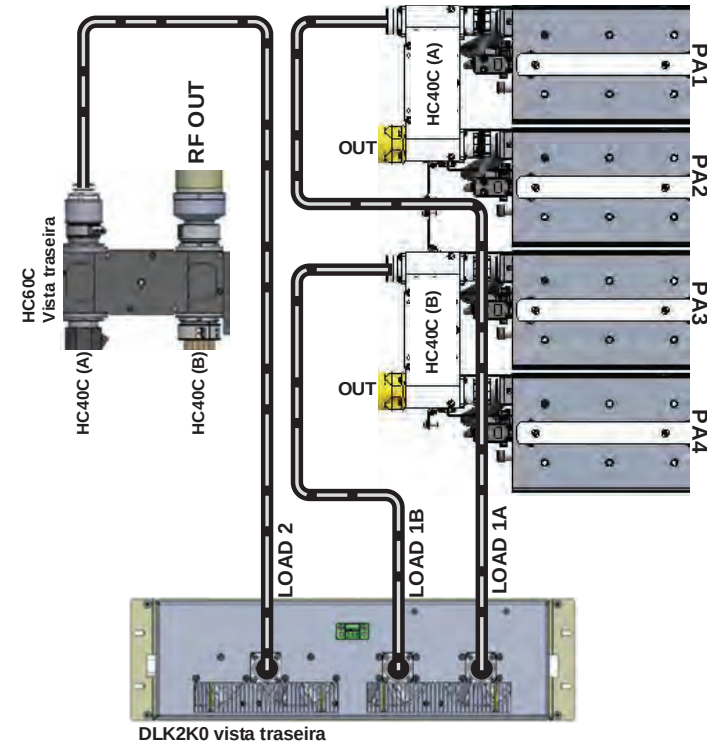
EC703HP-BB3

EC703HP-BB vista lateral



EC704HP-BB3

EC704HP-BB Vista lateral

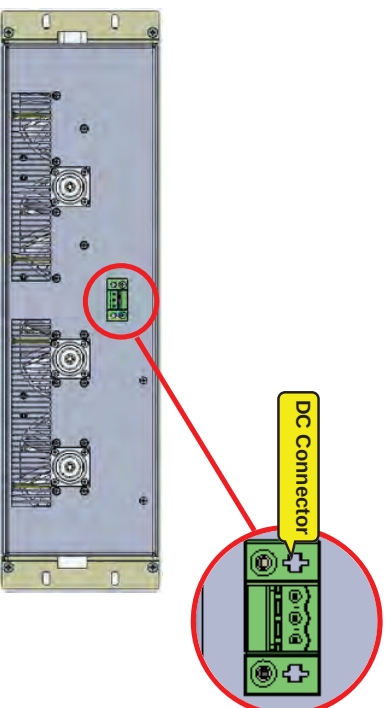


RF 50 Ω Coaxial Cable
DIN 7/16" Connector

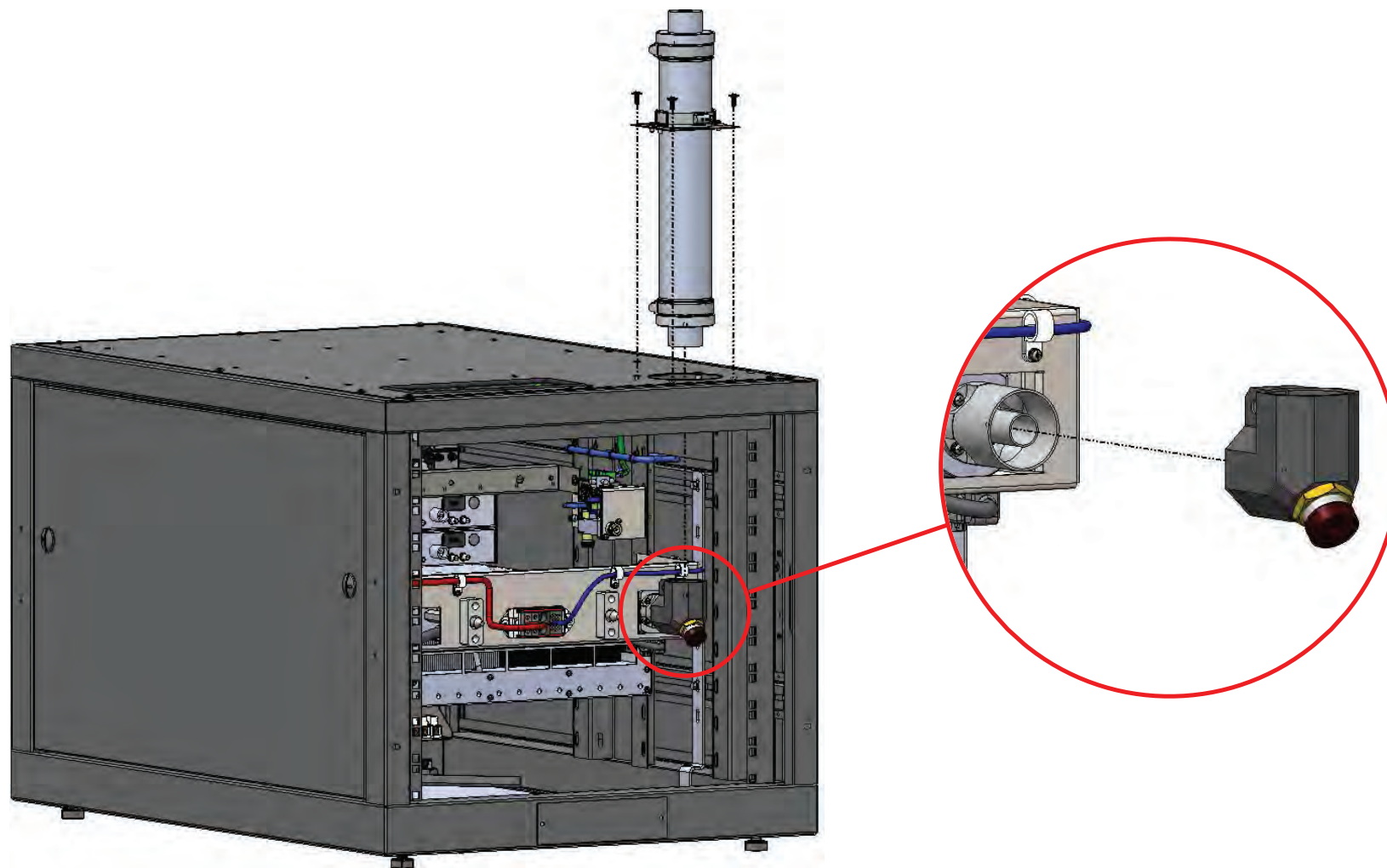
Tighten the Dummy Load Drawer connectors with a wrench.



Plug the DC connector on Dummy Load Drawer:



10. Plug the Low Pass Filter (only EC701HP-BB3):



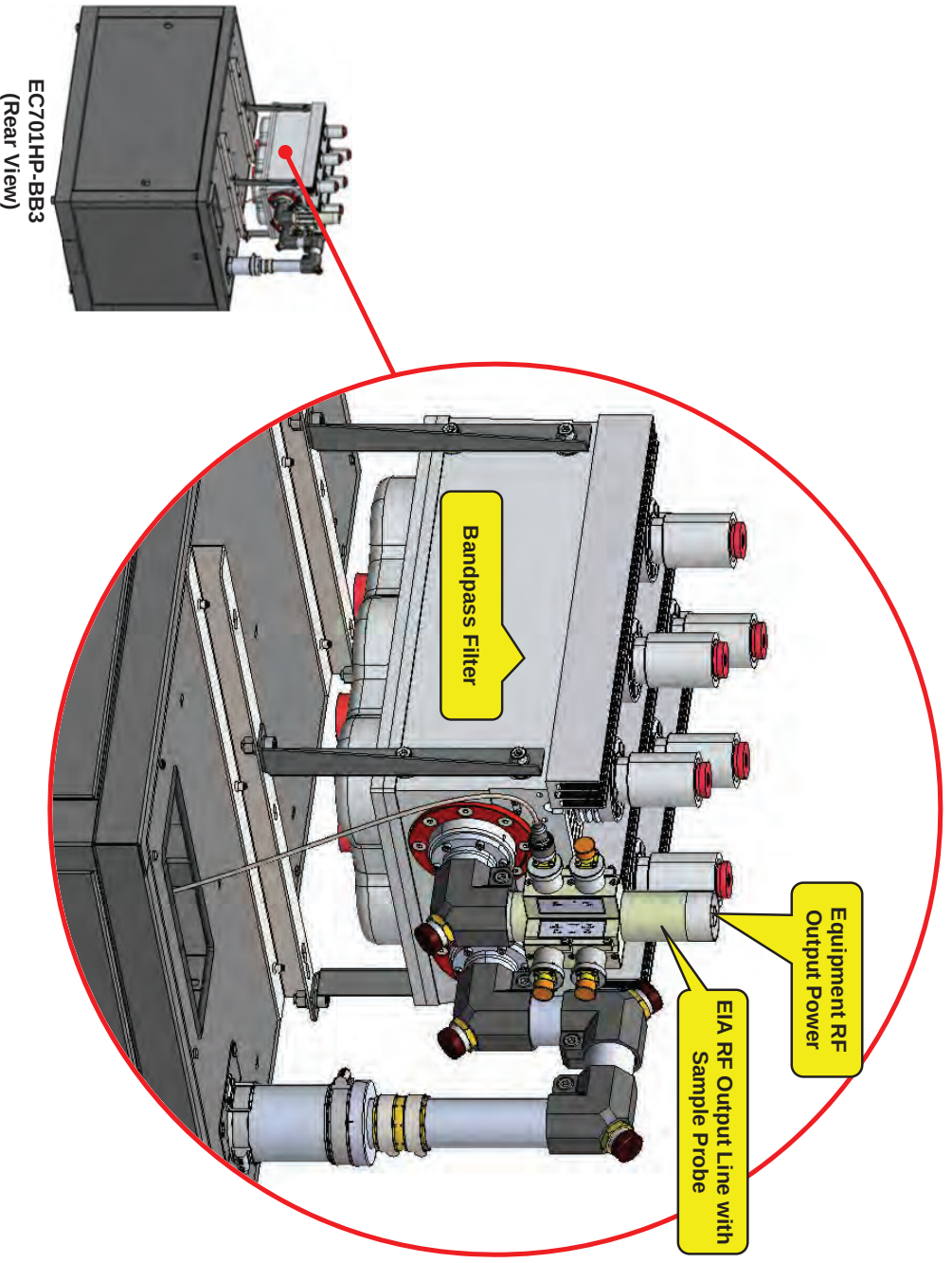
4.3. External RF Connections



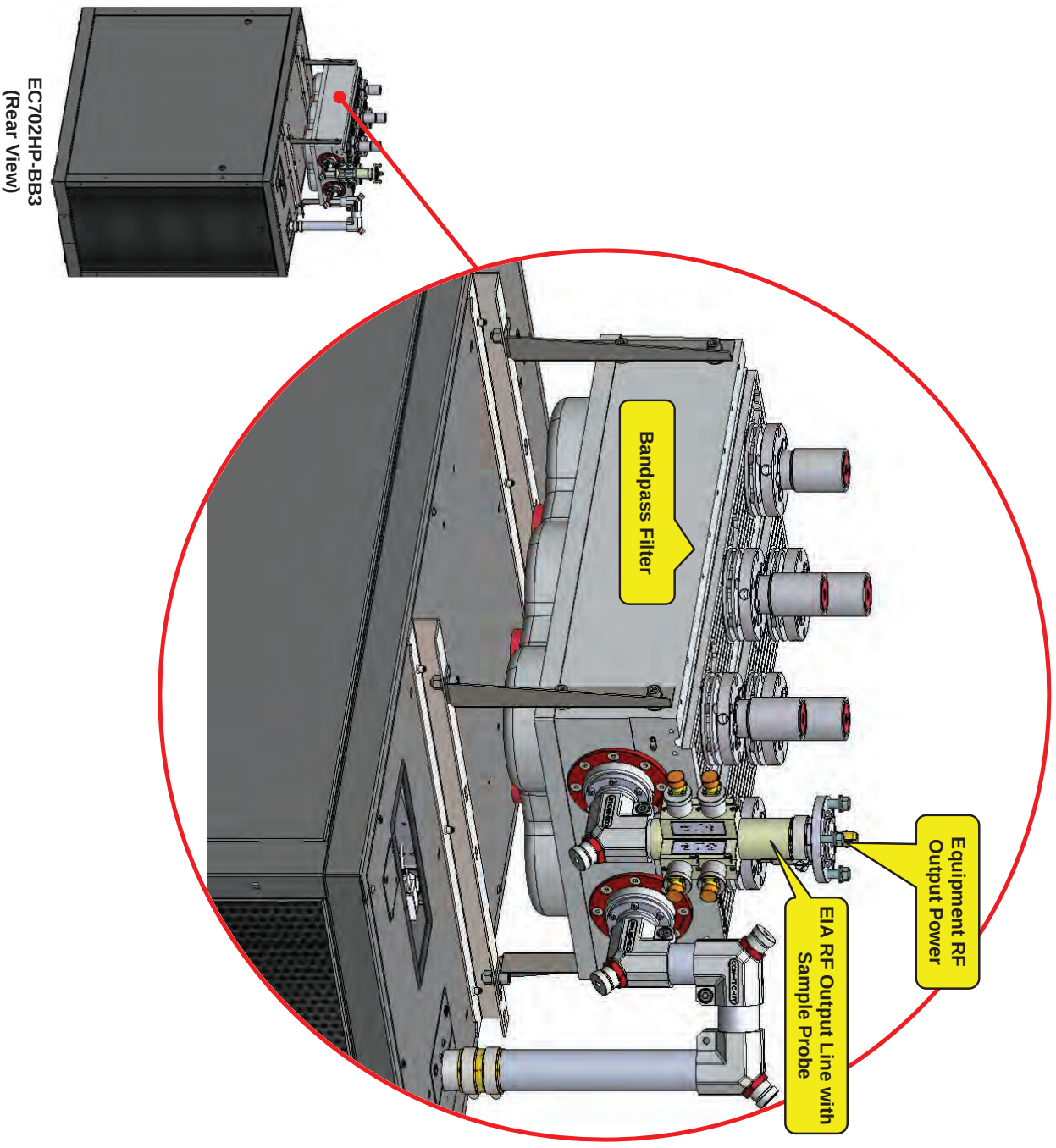
External RF connections are not supplied with the equipment and should be made with EIA 50Ω rigid line or 50Ω Coaxial Cables.

The E-Compact High Power Series Output Devices must follow the connection sequence as show in the diagram below:

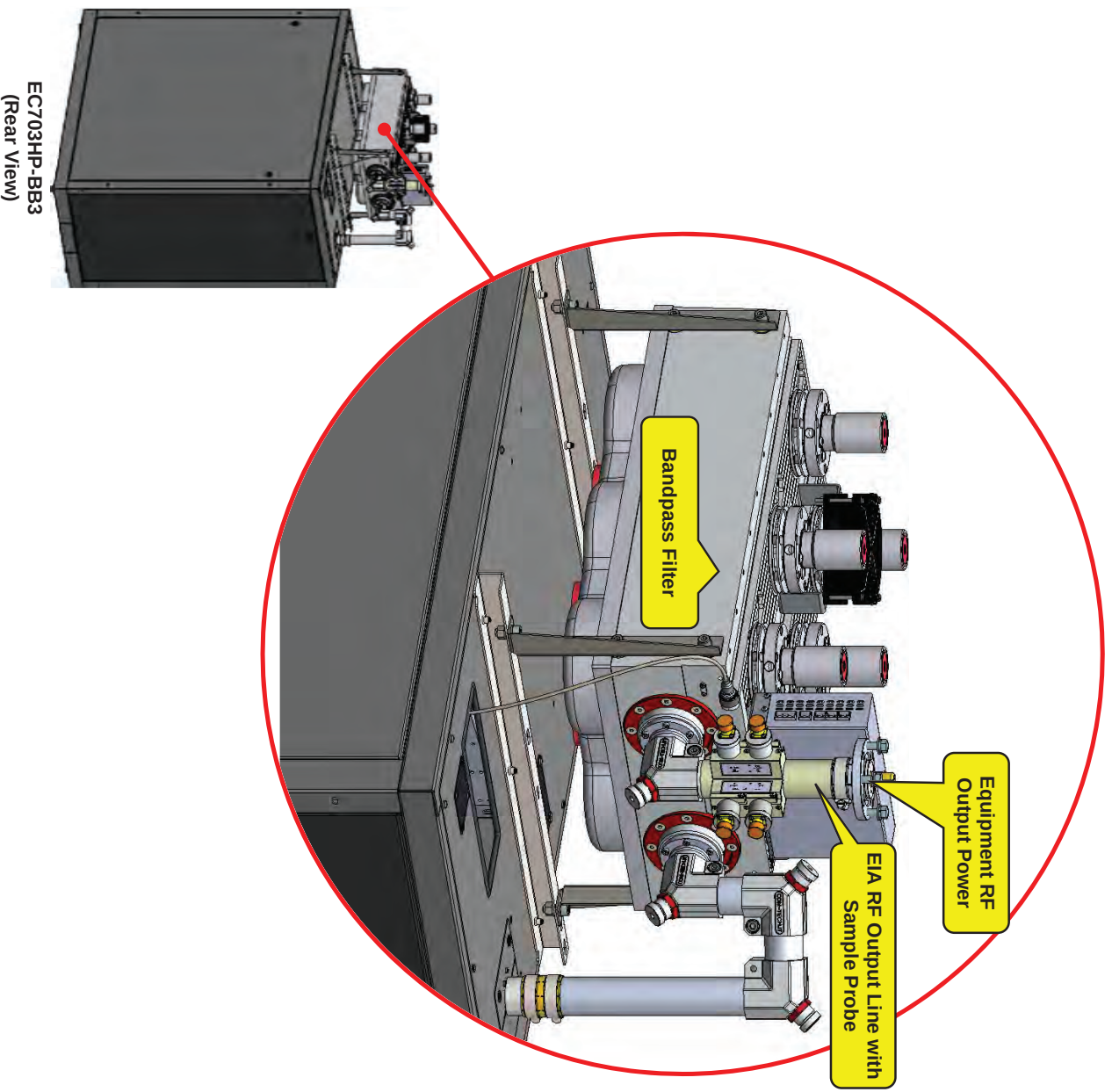
4.3.1. EC701HP-BB3



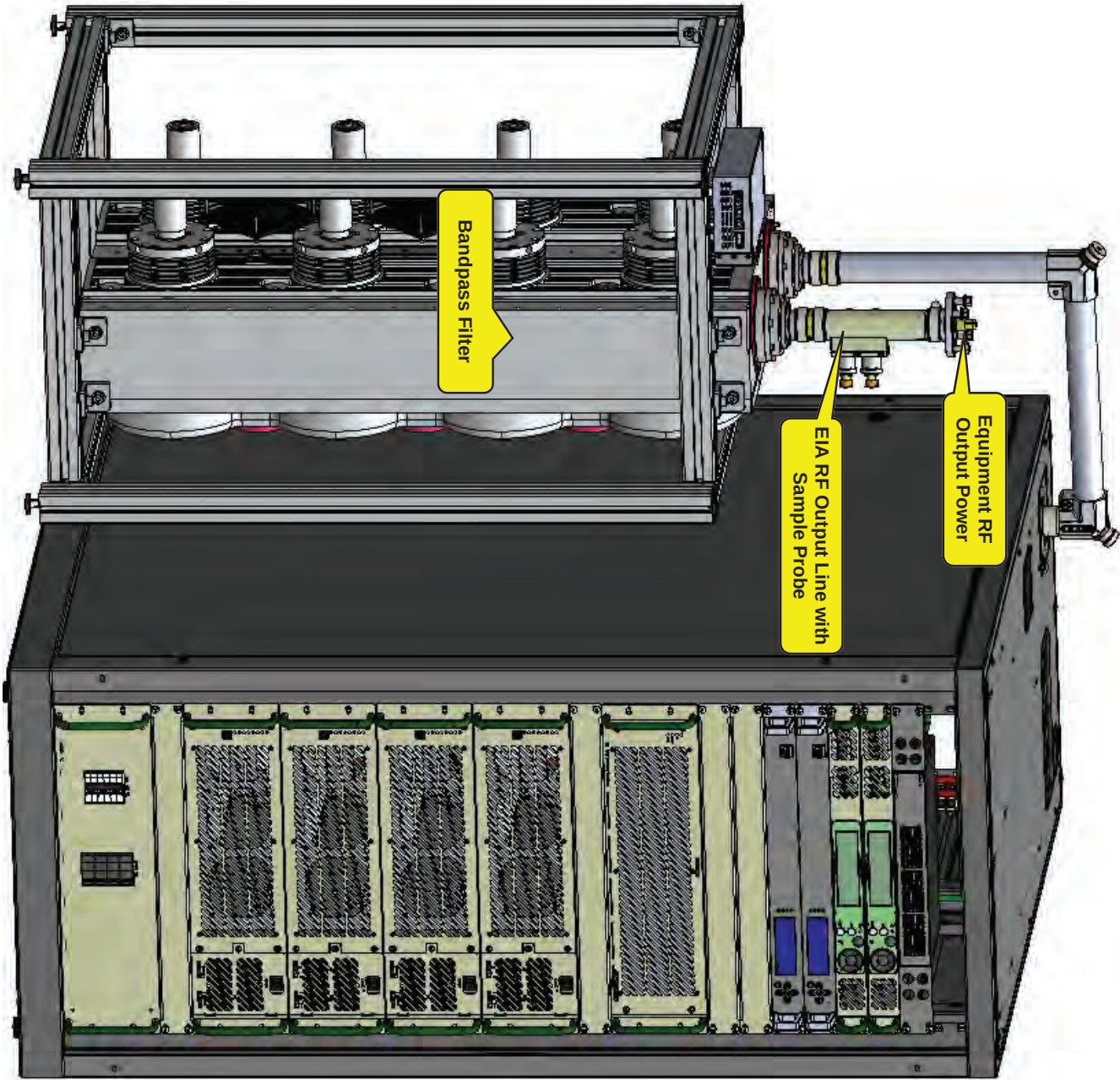
4.3.2. EC702HP-BB3



4.3.3. EC703HP-BB3



4.3.4. EC704HP-BB3



EC704HP-BB3
(Front View)