



**Inverter for photovoltaic applications**

# **INSTALLATION MANUAL SOLEIL DSPX**

**KEEP FOR FUTURE REFERENCE  
for the entire life of the appliance**

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# 1 AIM OF THE DOCUMENT

## 1.1 Overview

This document constitutes a rapid guide for the installation of the product in the operating room and provides summary and schematic instructions for the positioning and network connection of the product and signal connections.



In no way can this document be considered a substitute for the *IV346 Instruction Manual* to which reference is made particularly for the recommendations contained in it on the issue of safety regarding the handling and electrical connection of the equipment.







The failure to follow the recommendations contained in the *IV346 Instruction Manual* may have serious consequences, such as the destruction of the apparatus, injury to persons and death due to electrocution.







The information and technical features contained in this manual refer to the date of the drafting of the document. SIEL SPA reserves the right to modify such technical features at any moment and without warning.

## 1.2 Graphic symbols used

The following symbols are used in this manual to warn and inform users of particular situations of special importance. The symbols used and their meanings are explained below.

Symbol	Description
	<b>INFORMATION</b> Supplementary description to be taken into due consideration. Used for important notes and/or recommendations.
	<b>CAUTION</b> Danger (situation which may cause severe injuries to persons and/or damage to equipment)
	<b>ELECTRICAL DANGER</b> Serious risk of electrocution. These warnings signal compulsory behaviour.
	<b>UNPACKING INSTRUCTIONS</b> Describe how to unpack equipment.

	<p><b>INSTALLATION INSTRUCTIONS</b></p> <p>Describe the inverter installation process step by step.</p>
	<p><b>MANDATORY INSTRUCTIONS</b></p> <p>Read and understand the instruction manual before working on the inverter.</p>
	<p><b>DISPOSAL</b></p> <p>Contains information useful for disposal of the equipment.</p>
	<p><b>THE WARNING TRIANGLES INDICATE INSTRUCTIONS REGARDING SAFETY FOR STAFF. FOLLOW THEM CAREFULLY TO AVOID DAMAGES TO PERSONS OR OBJECTS.</b></p>

## 2 POSITIONING



In the installation of the Soleil product, it is recommended that the distance between the inverter and any walls or other objects be respected, as shown in the following diagrams.

**SOLEIL DSPX TRL 10, 15, 20, 25, 30**



**SOLEIL DSPX TRL 45, 55**



SOLEIL DSPX TRL 80, 100, 110  
SOLEIL DSPX TLW 90, 100, 110  
SOLEIL DSPX TRH 80, 110  
SOLEIL DSPX TLH 90, 110  
SOLEIL DSPX TRW 80, 110

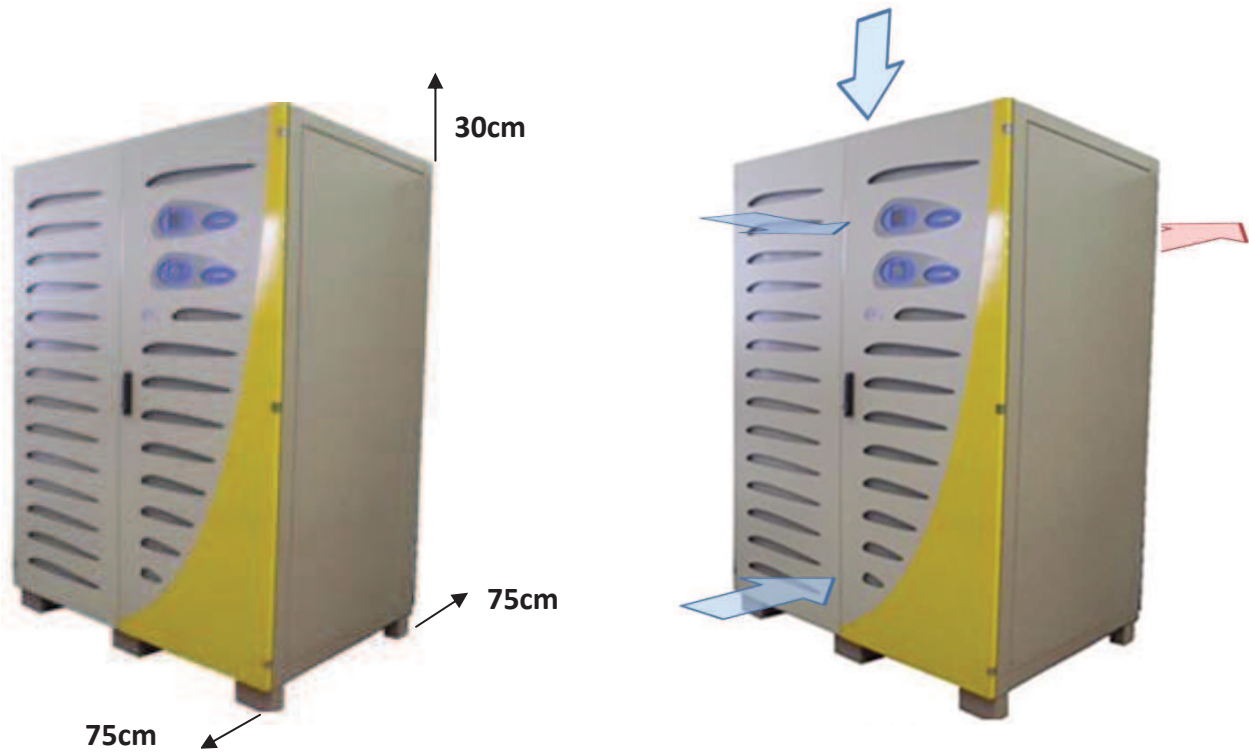


SOLEIL DSPX TRL 220, 250  
SOLEIL DSPX TLW 220, 250  
SOLEIL DSPX TRH 220, 250  
SOLEIL DSPX TLH 220, 250, 330, 380  
SOLEIL DSPX TRW 220, 250  
SOLEIL DSPX TLH 440M, 500M, 660M, 760M, 800M, 833M

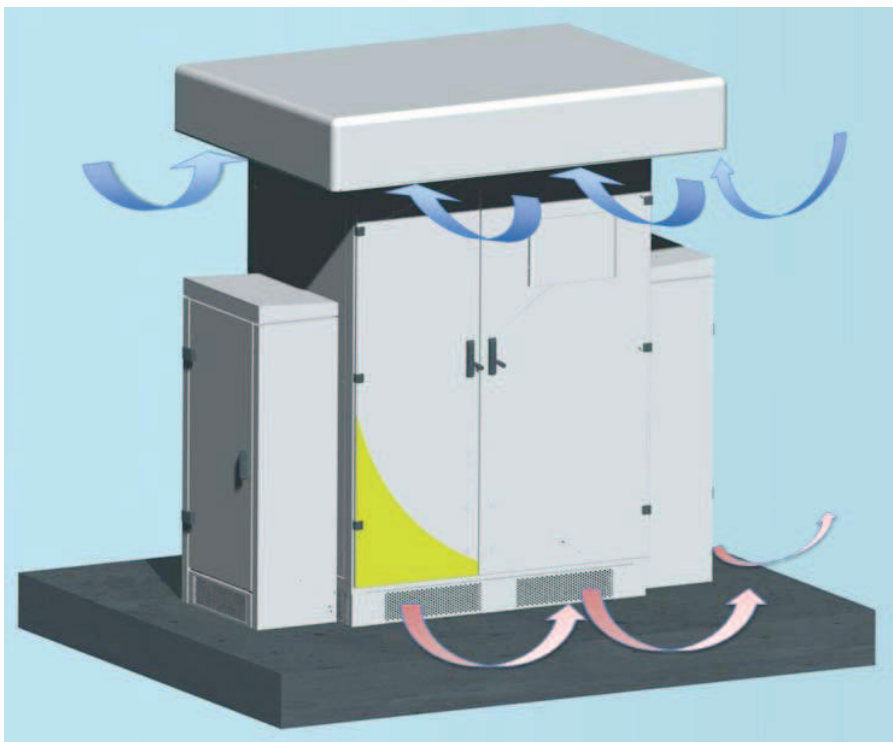


SOLEIL DSPX TLW 440, 500

SOLEIL DSPX TLH 440, 500, 660, 760, 800, 833



## SOLEIL DSPX TLH 500M, 660M, 760M outdoor



Placement of outdoor inverter has to be done on a pre-casted reinforced concrete basement, with cable conduits already in place.

Please keep at least one meter between one unit and another, if they're positioned back-to-back.

Fused Combiner boxes for string box parallel connection, have to be installed as close as possible to the lateral panels of the inverter.



**For the effective dimensions of the inverter chosen, refer to the technical information contained in the document IV346 'Instruction Manual'**



### 3 POWER CONNECTIONS AND AUXILIARIES



In order to access the power terminals, the auxiliary circuit breakers and the external supply terminals of the fans, the front protective panel must be removed after having opened the shutters.

The fan power method (External or Internal), is selected by turning the appropriate switch on the front :

- Switch turned to the left; internal fan power
- Switch turned to the right: external fan power

To carry out these operations, remove the screws that keep the panels in position; this operation must be carried out by trained staff only and may not be done without the use of a tool, given that live parts are being accessed.



Selector for fans supply  
source (internal/external)

### 3.1 Mechanical layout

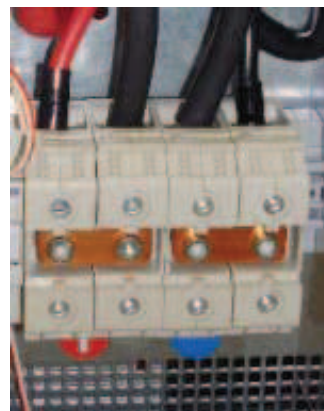
The following figures illustrate the power terminals of the DC (input) and AC (output) sections, and of the external fan power.

SOLEIL DSPX TRL 10, 15, 20, 25, 30

**Front Panel**



**DC Terminals side**



**AC Terminals side**



**External fan power**



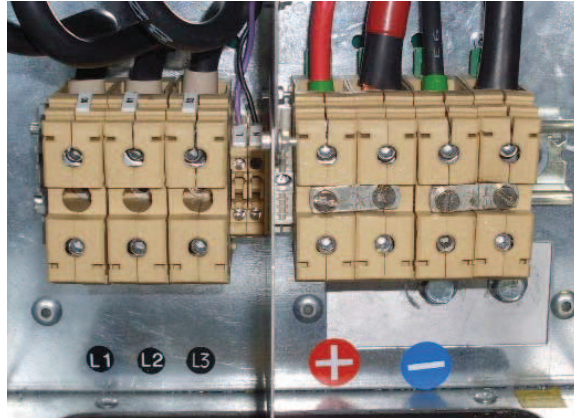
L - N TERMINALS  
EXTERNAL FANS  
AUX. SUPPLY  
230Vac 50Hz 5Amax

**SOLEIL DSPX TRL 45, 55**

**Front panel**



**AC-DC Terminals side**



**External fan power**



L - N TERMINALS  
EXTERNAL FANS  
AUX. SUPPLY  
230Vac 50Hz 5Amax

SOLEIL DSPX TRL 80, 100, 110

SOLEIL DSPX TLW 90, 100, 110

SOLEIL DSPX TRH 80, 110

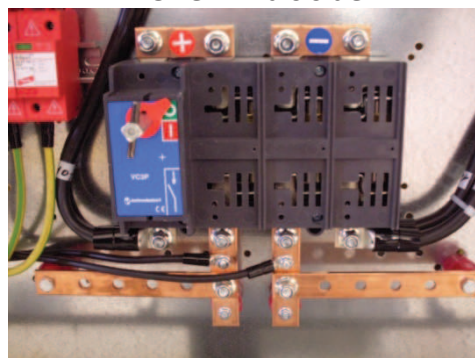
- SOLEIL DSPX TLH 90, 110

- SOLEIL DSPX TRW 80, 110

**Front panel**



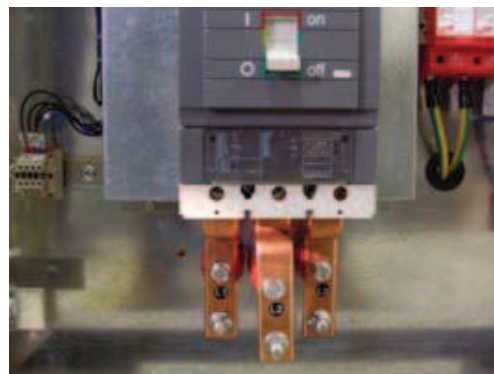
**DC Terminals side**



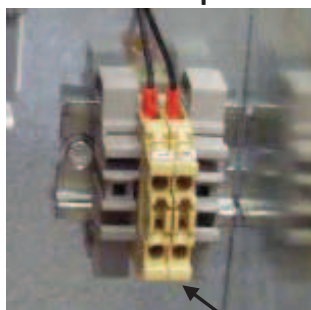
**Soleil AC, Soleil DSPX TRL, TRH and TRW Terminals side**



**Soleil DSPX TLW and TLH AC Terminals side**



**External fan power**



L - N TERMINALS  
EXTERNAL FANS  
AUX. SUPPLY  
230Vac 50Hz 5Amax

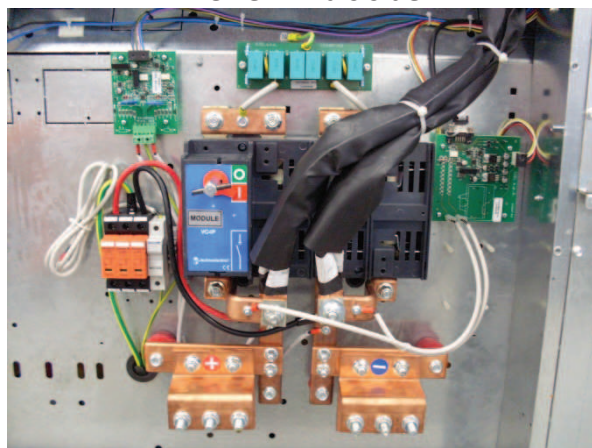


SOLEIL DSPX TRL 220, 250 - SOLEIL DSPX TLH 220, 250, 330, 380, 400, 416  
 SOLEIL DSPX TLW 220, 250 - SOLEIL DSPX TRW 220, 250  
 SOLEIL DSPX TRH 220, 250

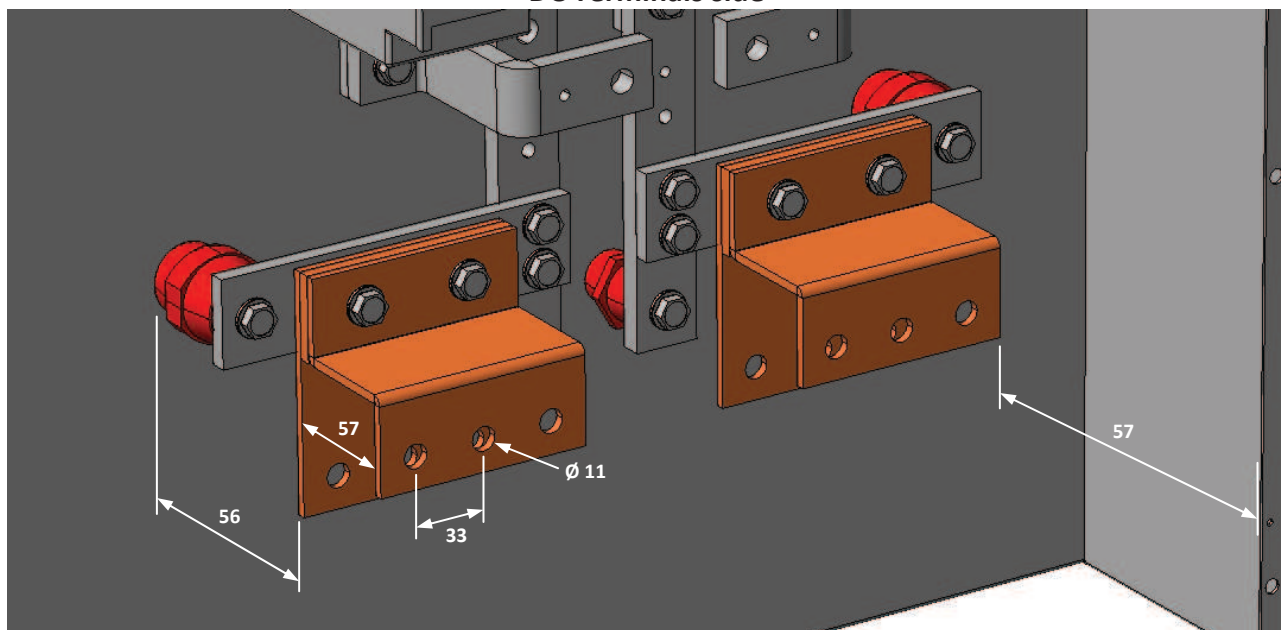
Front panel



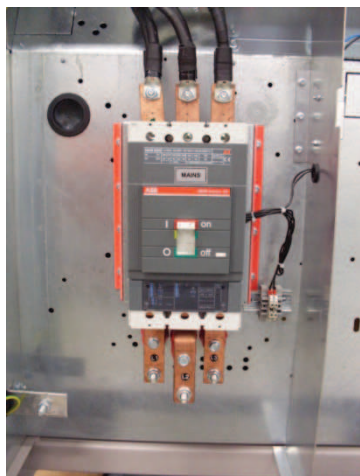
DC Terminals side



DC Terminals side



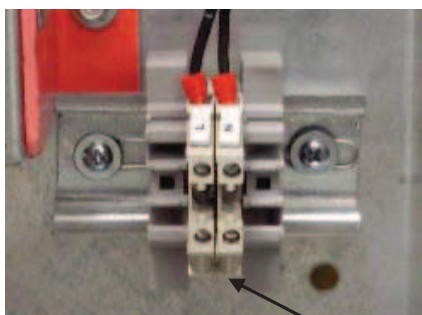
**Soleil AC, Soleil DSPX TRL, TRH and TRW  
Terminals side**



**Soleil DSPX TLW and TLH AC Terminals side**



**External fan power**



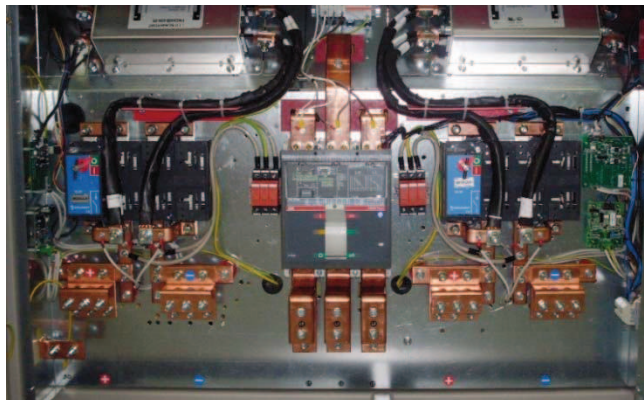
L - N TERMINALS  
EXTERNAL FANS  
AUX. SUPPLY  
230Vac 50Hz 5Amax

**SOLEIL DSPX TLH 440, 500, 660, 760, 800, 833**

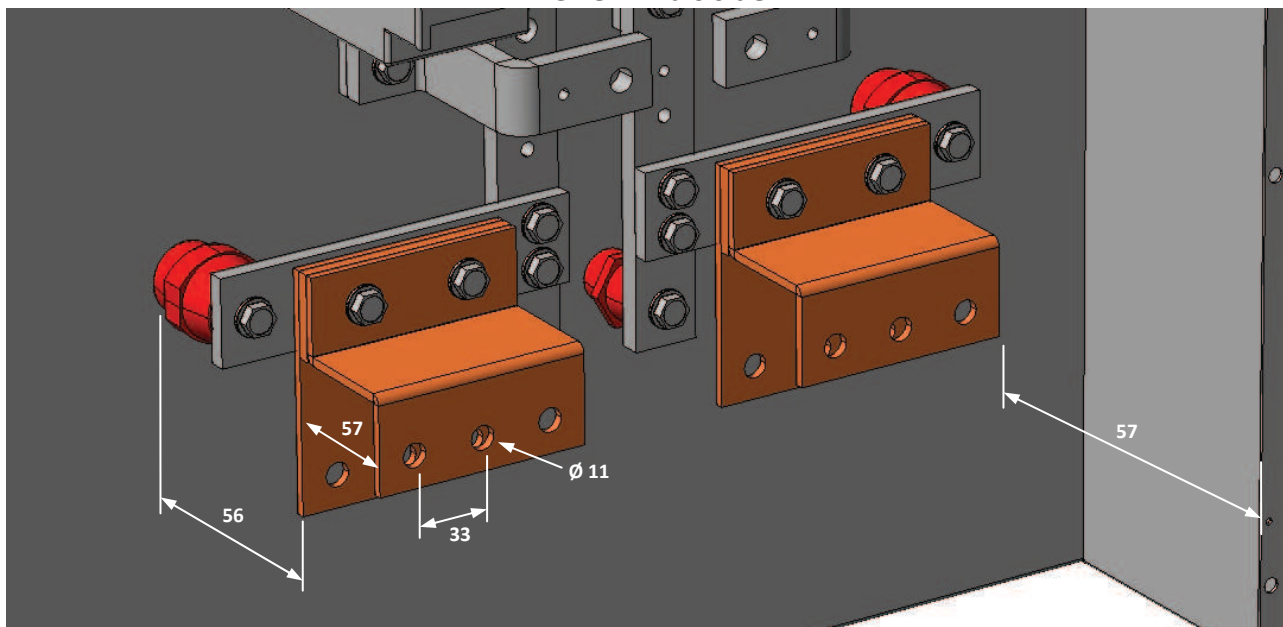
**Front panel**



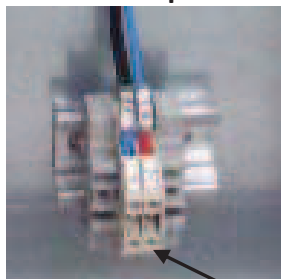
**AC and DC Terminals side**



**DC Terminals side**



**External fan power**



L - N TERMINALS  
EXTERNAL FANS  
AUX. SUPPLY  
230Vac 50Hz 5Amax

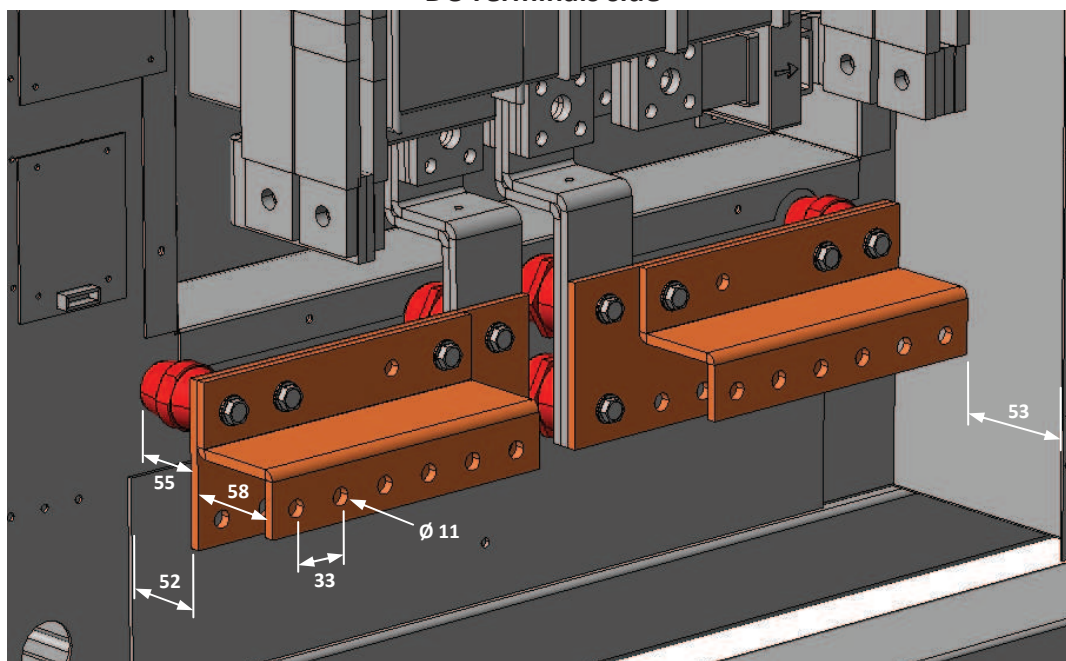
SOLEIL DSPX TLW 440M, 500M

SOLEIL DSPX TLH 440M, 500M, 660M, 760M, 800M, 833M

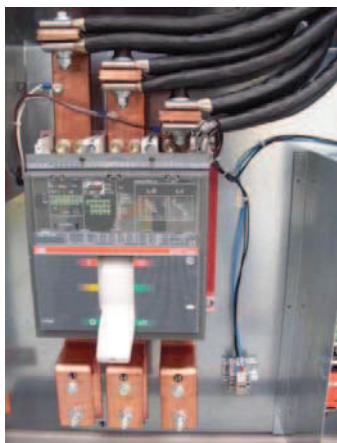
**Front panel**



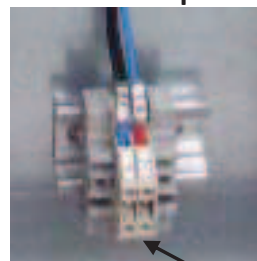
**DC Terminals side**



**AC Terminals side**



**External fan power**



L – N TERMINALS  
EXTERNAL FANS  
AUX. SUPPLY  
230Vac 50Hz 5Amax



### 3.2 AC circuit breakers on the machine

Connecting AC side cables are dimensioned taking into account the electrical parameters of the circuit breakers, summarised in the following table:

SOLEIL Type	Current(A)-Curve	Magnetic curve	Breaking capacity [kA]
10 TRL	40A-C	10 In	10kA
15 TRL	40A-C	10 In	10kA
20 TRL	40A-C	10 In	10kA
25 TRL	63A-C	10 In	10kA
30 TRL	63A-C	10 In	10kA
45 TRL	100A-C	10 In	10kA
55 TRL	100A-C	10 In	10kA
80 TRL 80 TRH	200A	Programmable (default 10.In)	36kA
80 TRW	200A	Programmable (default 10.In)	36kA
100 TRL	200A	Programmable (default 10.In)	36kA
110-TRL-110 TRH	200A	Programmable (default 10.In)	36kA
110 TRW	200A	Programmable (default 10.In)	36kA
220TRL -220 TRH	400A	Programmable (default 10.In)	36kA
220 TRW	400A	Programmable (default 10.In)	36kA
250TRL -250 TRH	400A	Programmable (default 10.In)	36kA
250 TRW	400A	Programmable (default 10.In)	36kA
90 TLW	400A	Programmable (default 10.In)	65kA
100 TLW	400A	Programmable (default 10.In)	65kA
110 TLW	400A	Programmable (default 10.In)	65kA
220 TLW	800A	Programmable (default 10.In)	85kA
250 TLW	800A	Programmable (default 10.In)	85kA
90 TLH	250A	Programmable (default 10.In)	36kA
110 TLH	250A	Programmable (default 10.In)	36kA
220 TLH	630A	Programmable (default 10.In)	50kA
250 TLH	630A	Programmable (default 10.In)	50kA
330 TLH	800A	Programmable (default 10.In)	50kA
380 TLH	800A	Programmable (default 10.In)	50kA
440M TLW	1600A	Programmable (default 10.In)	85kA
440M TLH	1250A	Programmable (default 10.In)	50kA
500M TLW	1600A	Programmable (default 10.In)	85kA
500M TLH	1250A	Programmable (default 10.In)	50kA
660 TLH	1600A	Programmable (default 10.In)	50kA
660M TLH	1600A	Programmable (default 10.In)	50kA
760M TLH	1600A	Programmable (default 10.In)	50kA
800M TLH	1600A	Programmable (default 10.In)	50kA
833M TLH	1600A	Programmable (default 10.In)	50kA



**The characteristics (curve type, magnetic current) of the switch on the electrical board connected to the inverter must be compatible with the characteristics of the machine switch.**

### 3.3 Cable quantity and section

The following tables indicate the maximum quantity and the maximum section of copper cables that can be connected to the DC input and the AC output.

Inverter with isolating transformer			
Soleil Type	DC input	AC output	Ground conductor
Soleil DSPX 10-15-20-25-30 TRL 400	Max 2 cables 70 mm <sup>2</sup> per pole	Max 1 cable 25 mm <sup>2</sup> per phase	Max 1 cable <sup>(note1)</sup>
Soleil DSPX 45-55 TRL 400	Max 2 cables 70 mm <sup>2</sup> per pole	Max 1 cable 70 mm <sup>2</sup> per phase	Max 1 cable <sup>(note1)</sup>
Soleil DSPX 80-100-110 TRL 400	Max 8 cables 120 mm <sup>2</sup> per pole	Max 2 cables 50 mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 220-250 TRL 400	Max 12 cables 120 mm <sup>2</sup> per pole	Max 2 cables 120 mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 80 -110 TRH 400	Max 8 cables 120 mm <sup>2</sup> per pole	Max 2 cables 50 mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 220 -250 TRH 400	Max 12 cables 120 mm <sup>2</sup> per pole	Max 2 cables 120 mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 80 - 110 TRW 400	Max 8 cables 120 mm <sup>2</sup> per pole	Max 2 cables 50 mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 220- 250 TRW 400	Max 12 cables 120 mm <sup>2</sup> per pole	Max 2 cables 120 mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>

Inverter Transformerless			
Soleil Type	DC input	AC output	Ground conductor
Soleil DSPX 90 - 100 - 110 TLW 280	Max 8 cables 120 mm <sup>2</sup> per pole	Max 2 cables 95 mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 220 - 250 TLW 280	Max 12 cables 120 mm <sup>2</sup> per pole	Max 4 cables 150mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 440M - 500M TLW 280	Max 12 cables 120 mm <sup>2</sup> per pole (x2)	Max 4 cables 300mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 90-110 TLH 280	Max 8 cables 120 mm <sup>2</sup> per pole	Max 2 cables 50 mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 220 - 250 TLH 280	Max 12 cables 120 mm <sup>2</sup> per pole	Max 4 cables 120mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 330 TLH 280	Max 12 cables 120 mm <sup>2</sup> per pole	Max 4 cables 150mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 660 TLH 280	Max 12 cables 120 mm <sup>2</sup> per pole (x2)	Max 4 cables 300mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 220 - 250 TLH 330 & 380	Max 12 cables 120 mm <sup>2</sup> per pole	Max 4 cables 120mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 330 - 380 TLH 330 & 380	Max 12 cables 120 mm <sup>2</sup> per pole	Max 4 cables 150mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX 660 -760- 800- 833 TLH (330 & 380)	Max 12 cables 120 mm <sup>2</sup> per pole (x2)	Max 4 cables 300mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>
Soleil DSPX TLH 440M-500M- 660M - 760M - 800M - 833M (330 & 380)	Max 24 cables 120 mm <sup>2</sup> per pole	Max 4 cables 300mm <sup>2</sup> per phase	Max 2 cables <sup>(note1)</sup>

**Note 1:** Refer to the table for the sizing of the earth wires for the calculation of the total cable section

Transformerless Inverter				
Soleil Type	DC input		AC output	
	Q.ty and section	Terminals	Q.ty and section	Terminals
Soleil DSPX 660M-760M – 800M - 833M TLH 330&380	Max 24 cables 120sqmm per pole	Ring terminal hole Ø10	Max 4 cables 300sqmm per phase	Ring terminal hole Ø10
Soleil HV TL 660-760-833 3F (330 & 380 Vac)	Max 12 cables 120sqmm per pole (x2)	Ring terminal hole Ø10	Max 4 cables 300sqmm per phase	Ring terminal hole Ø10
Soleil HV TL 660 3F 380 n°2 outputs (330 & 380 Vac)	Max 12 cables 120sqmm per pole (x2)	Ring terminal hole Ø10	Max 4 cables 150sqmm per phase (x2)	Ring terminal hole Ø10
Soleil DSPX 330 TLH outputs (330 & 380 Vac)	Max 12 cables 120sqmm per pole	Ring terminal hole Ø10	Max 4 cables 150sqmm per phase	Ring terminal hole Ø10

**The type of cable and its cross section to be used must be determined at the design stage by the designer or installer.**

### 3.4 Ground conductor Sizing

The size of the ground conductor must be made according to the following table, extracted from the product Safety standard CEI EN 62109-1.

The cross section of the phase conductors connected to the inverter, 'S' mm <sup>2</sup>	Relevant minimum cross section of the protective conductor to the ground, Sp
S ≤ 16	S
16 < S ≤ 35	16
35 < S	S/2
<b>NOTE:</b> The values shown in the previous table are valid only if the protective earthing conductor is made of the same material used for the phase conductors AC. If not, the cross section of the protective conductor to ground must be determined in order to get the same conductance value equivalent.	

### 3.5 Maximum torque tightening cables

Soleil Type	Maximum tightening torque		
	DC input	AC output	Earth cable
TRL 10-15-20-25-30	10 Nm	2,8 Nm	8 Nm
TRL 45-55	10 Nm		
TRL-TRW-TRH-TLH-TLW 80-100-110	30 Nm		
TRL-TRW-TRH-TLW-TLH 220-250-330-380-440-500-660-440M-500M-660M-760M	30 Nm\		

### 3.6 Power dissipated by ventilation

The following table includes the air flow volume and the power dissipation values.

SOLEIL Type	Air capacity [m³/h]	Dissipated power [kW]	Fan consumption [W]
TRL 10	660	0,68	90
TRL 15	660	0,9	90
TRL 20	660	1,1	90
TRL 25	880	1,3	120
TRL 30	880	1,6	120
TRL 45	750	2,3	150
TRL 55	900	2,8	300
TRL 80 – TRH 80	3700	3,4	490
TRW 80	3700	3,4	490
TRL 100	3700	3,7	490
TRL 110 – TRH 110	3700	3,8	490
TRW 110	3700	3,8	490
TRL 220 – TRH 220	4547	6,6	630
TRW 220	4547	6,6	840
TRL 250 – TRH 250	4547	8,2	630
TRW 250	4547	8,2	840
TLW 90 – TLH 90	3050	2,7	420
TLW 100	3050	3	420
TLW 110 – TLH 110	3050	3,4	420
TLW 220 – TLH 220	3313	4,9	420
TLW 250 – TLH 250	3313	6,2	420
TLH 330- 416	3400	8	490
TLW 440 – TLH 440	6166	9,2	840
TLW 500 – TLH 500	6166	11,5	840
TLH 660	6300	12	980
TLH 760 – TLH800	6300	12	980
TLH 833	6300	12	980

### 3.7 Connection of the EPO circuit



The inverter includes an electronic device (EPO) which can stop the inverter and disconnect it from the distribution network.

The connection between the external EPO contact and the inverter is established by 2 wires which shall be connected to terminal 13 and 14 on the terminal board.

This device must be remotely activated by an emergency pushbutton; to restore normal operation, first press the ON button and then the ENTER key on the touch screen.

It is important to ensure that the EPO circuit leads do not run close to the power cables.

Although the entire EPO circuit is without hazardous voltages and is metallically separated from the internal voltages of the inverter, **care must be taken since this circuit completely stops the inverter!**

### 3.8 Connection of the modules' temperature sensor

The inverter is equipped with a modules temperature sensor, which is temporary wired and is located in the terminal board I/O compartment.

This sensor is placed right behind the modules and connected to terminals **7** (Temp+) and **8** (Temp-) of the inverter terminal board with a 1.5/2.5 mm<sup>2</sup> wire pair (according to the distance: Max 250m).

The temperature value reading (°C) can be viewed on the touch screen display and via Modbus.

## 4 SERIAL COMMUNICATION CONNECTIONS

### 4.1 Type of cables to be used

The inverters of the Soleil series make a RS485 serial port available as a fieldbus, with a standard Modbus RTU protocol; they also have a RS485 serial port (SAC BUS) to collect data from the parallel string boxes.

On the Modbus serial port, information is made available to the user regarding the inverter and the parallel string boxes.

For both serial ports, the use of a bipolar/tripolar EIA RS-485 shielded cable is advised, with typical impedance of 120 Ohms.

The shields of the different cable sections shall be interconnected. As a first level check, if communications are unstable, check the continuity between the various shield sections.

### 4.2 Power supply unit line RS485 SAC BUS - 24Vdc

The RS485 line SAC side must be powered through the external power supply unit (supplied as an option).



**USE A 24Vdc POWER SUPPLY UNIT SPECIFIC FOR EACH INDIVIDUAL RS485 SAC  
FIELDBUS FV LINE (CORRESPONDING TO THE INDIVIDUAL INVERTER MODULE) –  
SEE DIAGRAM POINT 5**

### 4.3 Electrical features of the power supply unit line RS485 SAC BUS - 24Vdc

The fundamental electrical features of the power supply unit are the following:

<b>Input voltage</b>	According to the auxiliary voltage available in the plant, typically 100÷240Vac
<b>Output voltage</b>	24Vdc $\pm$ 2% (power supply CSP SAC BUS RS485)
<b>Output current</b>	(n. total CSP x 5mA + 70mA) minimum.  For ex. for 4 CSP the value will be 4 x 5 + 70=90mA. To be safe, the source should have a power equal to double the value calculated in this field and short-circuitable (Self protection).  Normally harmonised sized power supply units are used which are readily available at 30W 24Vdc 1.3A and which can be mounted on a DIN rail.
<b>Over-current protection</b>	Included
<b>Over-voltage protection</b>	Included
<b>Working temperature range</b>	Included
<b>Galvanic isolation input/output</b>	Included

## 4.4 Connection of the Modbus serial port shield

The shield of the cable section that connects the inverter Modbus serial port to the Modbus converter – TCP/IP (terminal 30), is earthed on the converter side. If communications are unstable with this type of connection, this may be due to the fact that the earth is 'noisy'.

In this case, 'earthing' the shields means connecting the shields to the negative potential of the Modbus – TCP/IP converter power supply.

## 4.5 Connection of the SAC BUS serial shield

The shield of the RS485 cable that connects the inverter SAC BUS serial port to the parallel boxes (terminal 29), is not earthed on the box side because it is already earthed inside the inverter.

## 4.6 Rules for the laying of RS485 serial cables



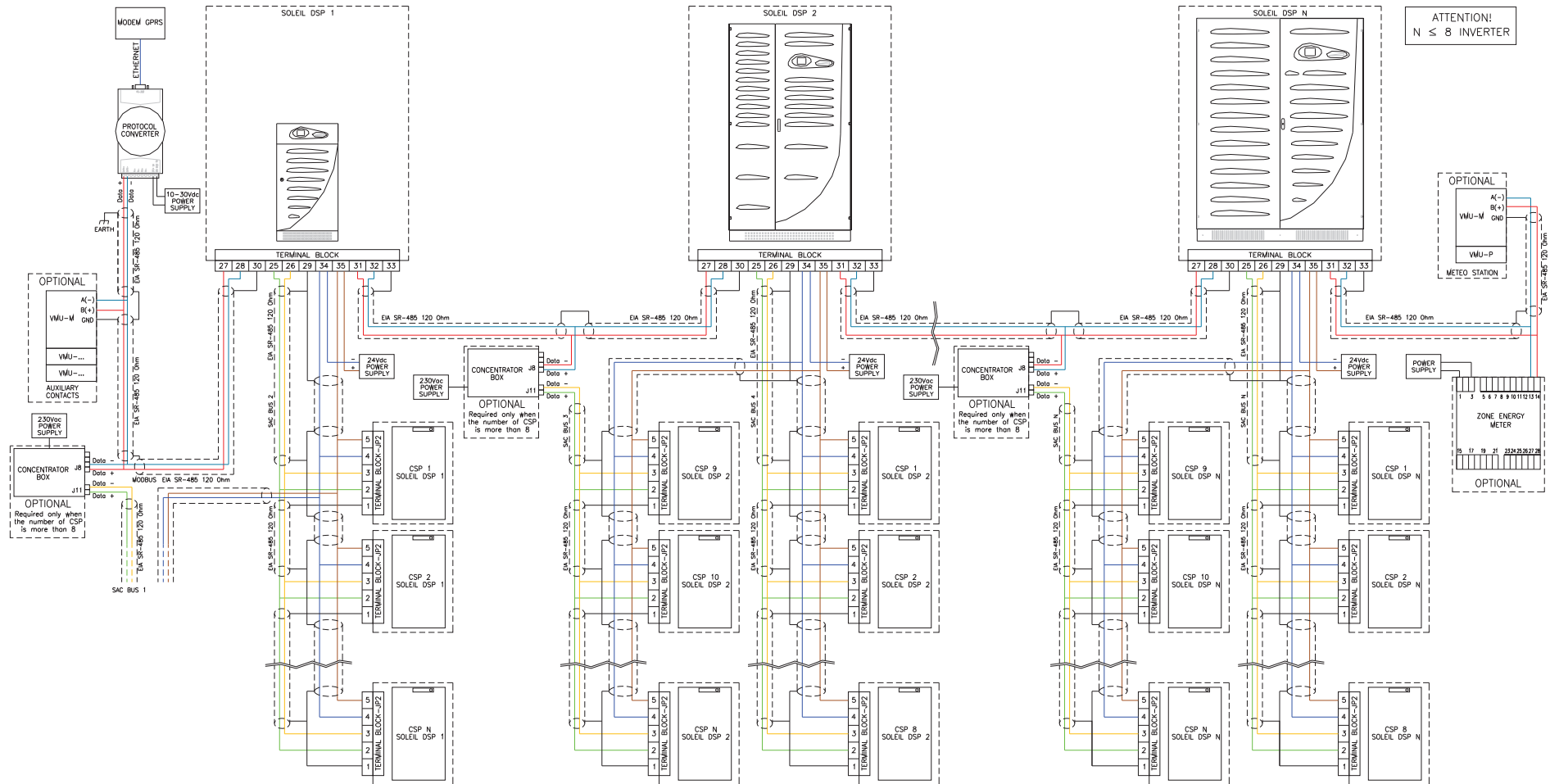
In order to minimise possible interference to serial data transmission/reception signals, it is recommended that the following rules be observed for the use and laying of the connecting cables.

- The total maximum length of the RS-485 chain shall not exceed 1200m.
- Separate, as far as possible, the signal from the power cables (particularly on the photovoltaic field side), utilising different channels.
- Separate the 24Vdc/SAC BUS RS485 supply cables from the power cables used for the connections between the FV panels and the INVERTERS.
- For SAC BUS use a shield cable with typical impedance of 120 Ohms (RS485) with four wires (nr2 for Data+ and Data- RS485 and Nr2 for the positive/negative 24Vdc power supply). Alternatively use a 120 Ohm (RS485) bipolar shielded cable for the transmission of information and a bipolar shielded cable for the 24Vdc power supply. Utilise the same cable route between the RS485 cable and the 24Vdc power supply cable.
- Maintain a minimum distance of at least 30cm between the signal cable and the power cable.
- If the signal cable and the power cable must be closer than the minimum distance, try as much as possible to minimise the length of the section along which they run parallel.

## 5 TGS2 COMMUNICATION AND DATALOGGER DIAGRAMS

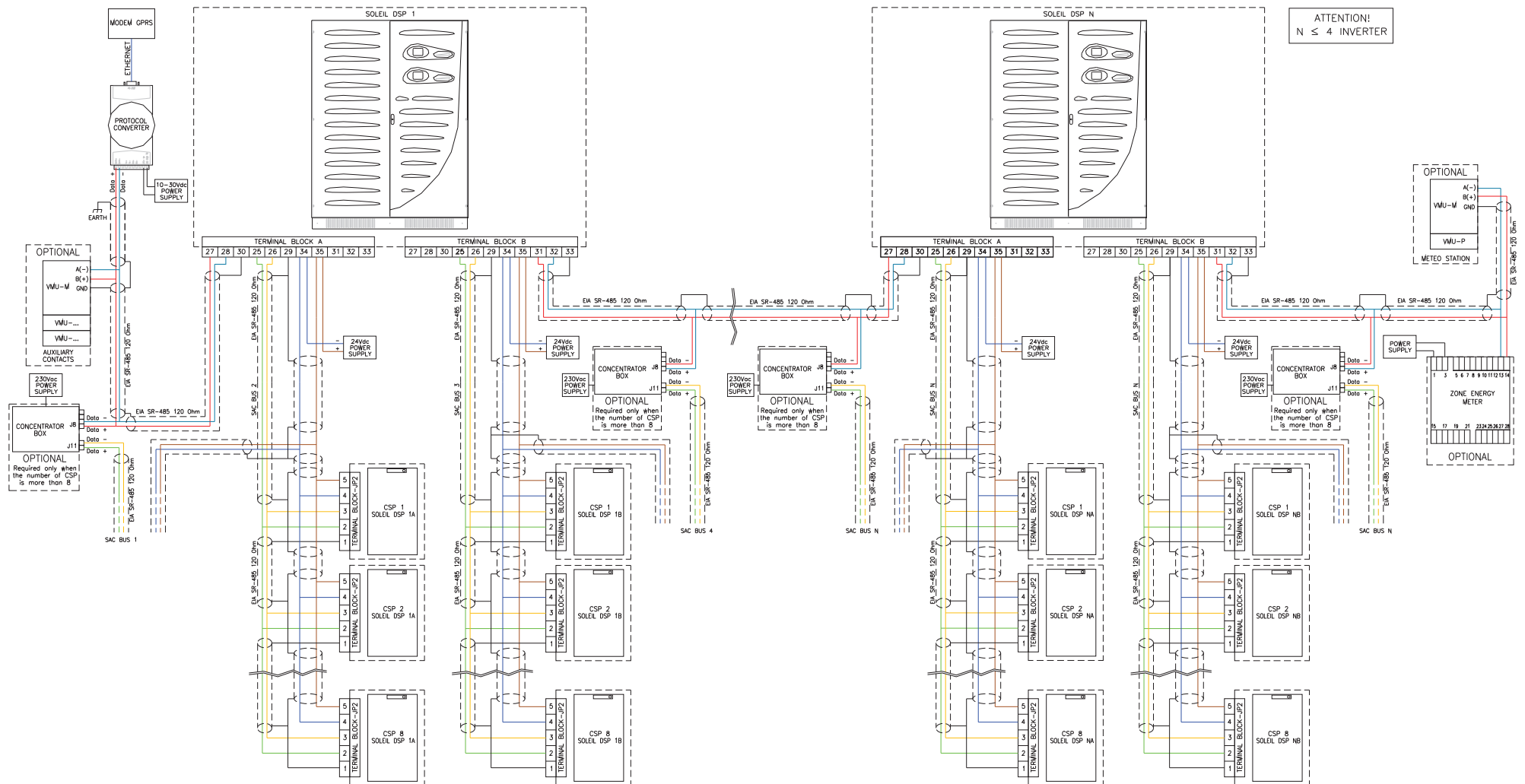
The following pages contain the cabling layouts for the monitoring of inverters and parallel string boxes based on TGS2 platform.

### LAYOUT OF CONNECTION TGS2 FOR SOLEIL DSPX INVERTERS SIZES 10-330KW

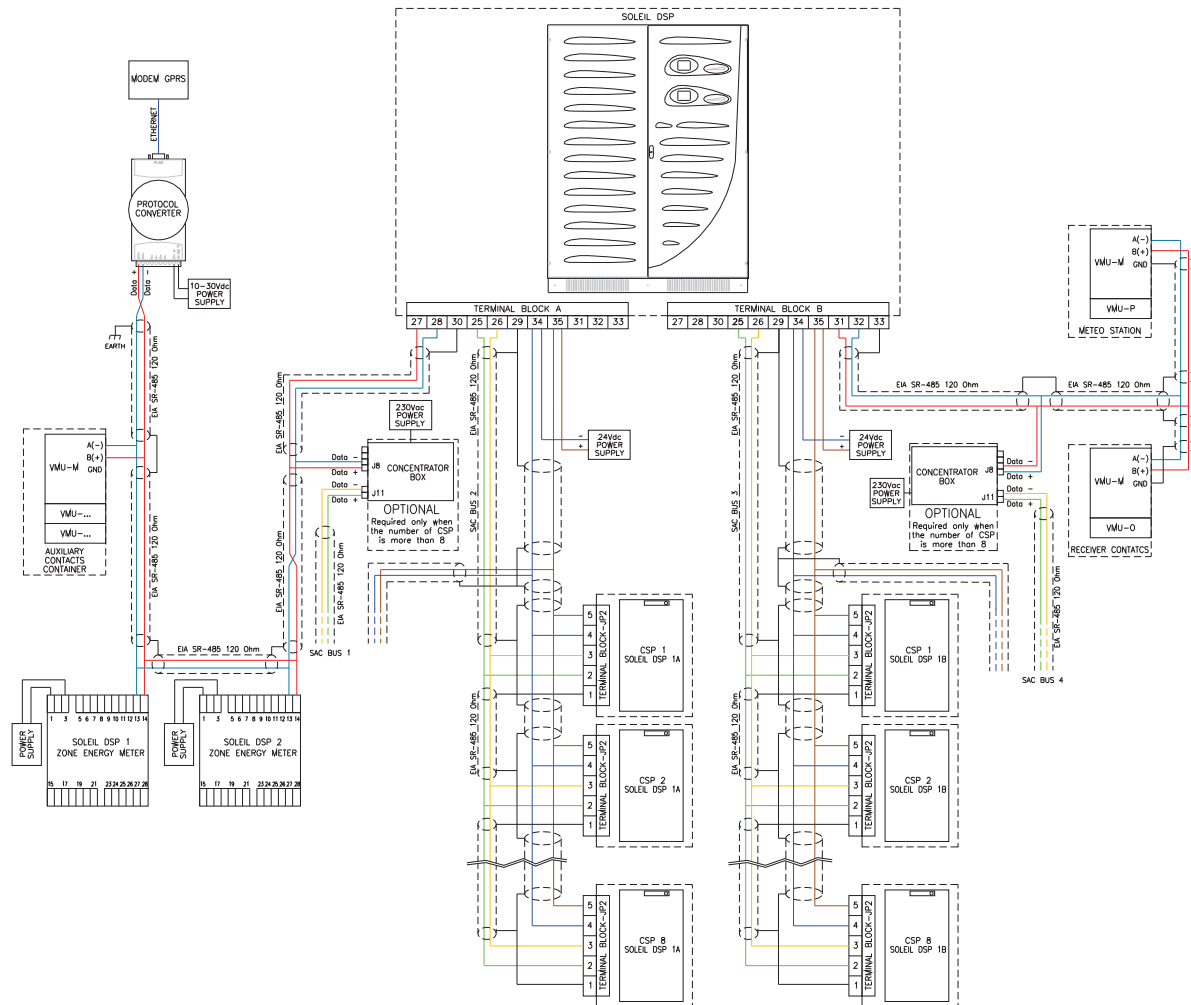


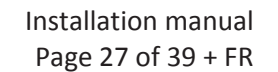


## LAYOUT OF TGS2 CONNECTION FOR SOLEIL DSPX 440-833 KW INVERTERS

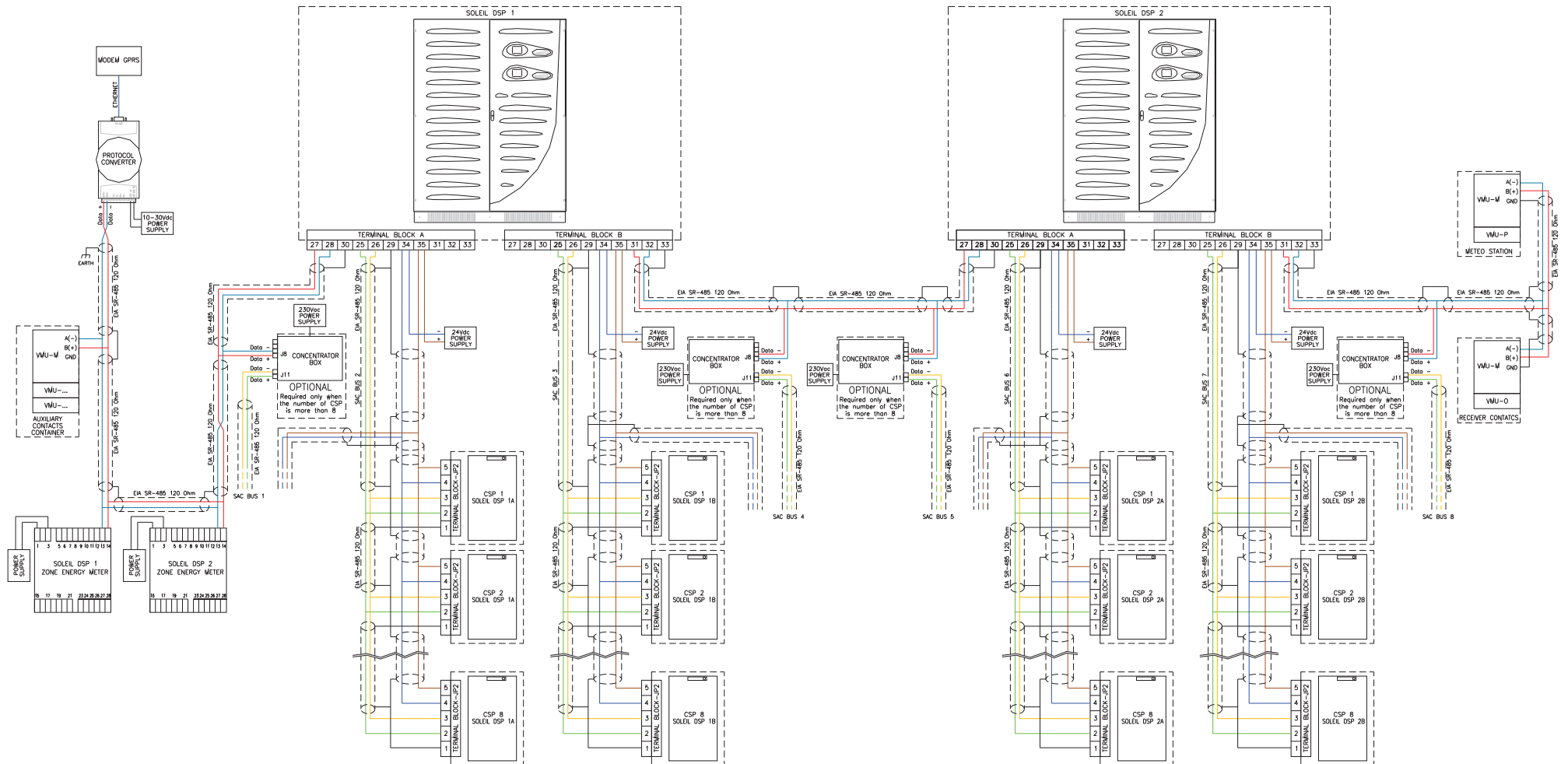


## LAYOUT OF TGS2 CONNECTION FOR PS500 - PS660 CONTAINERS

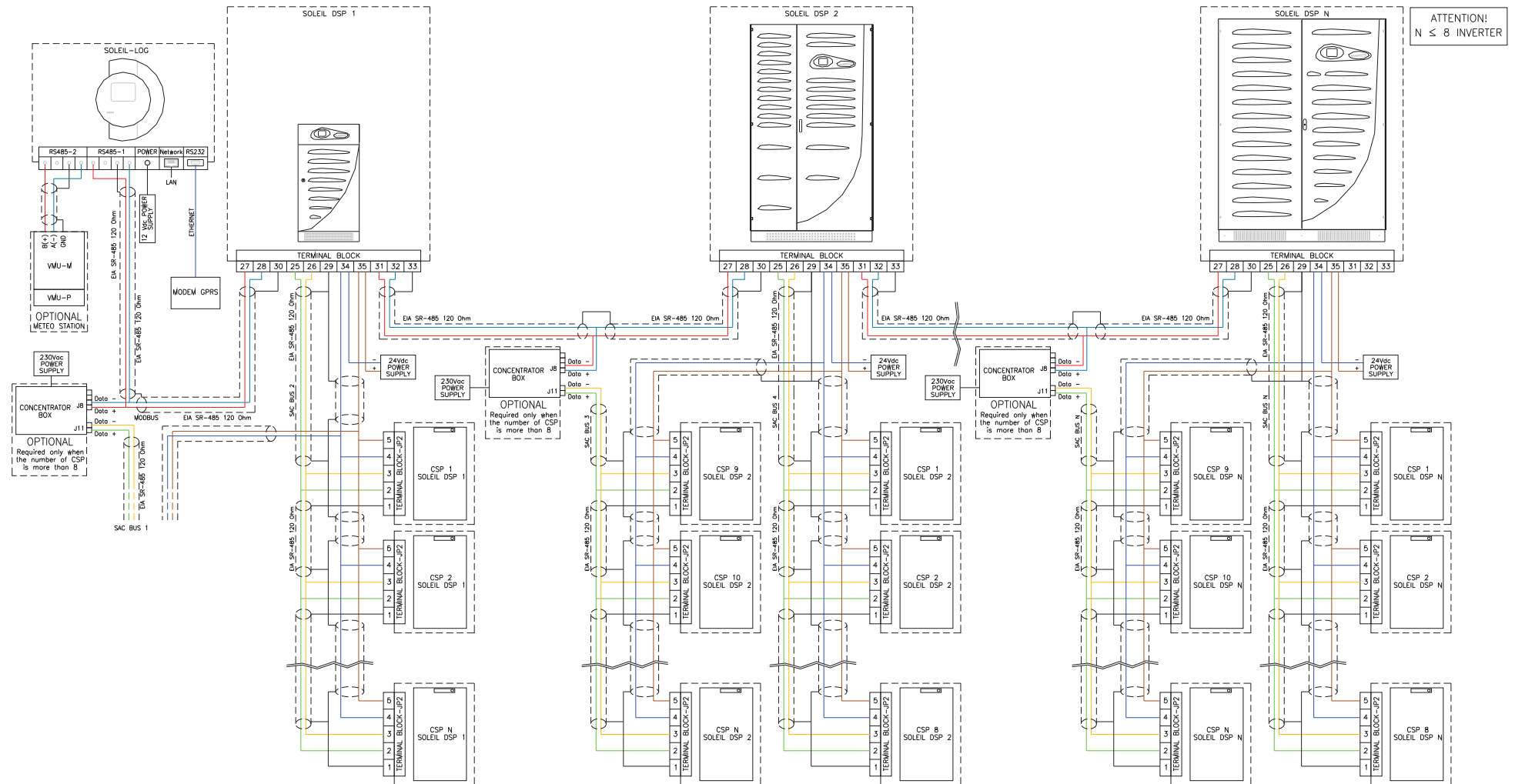




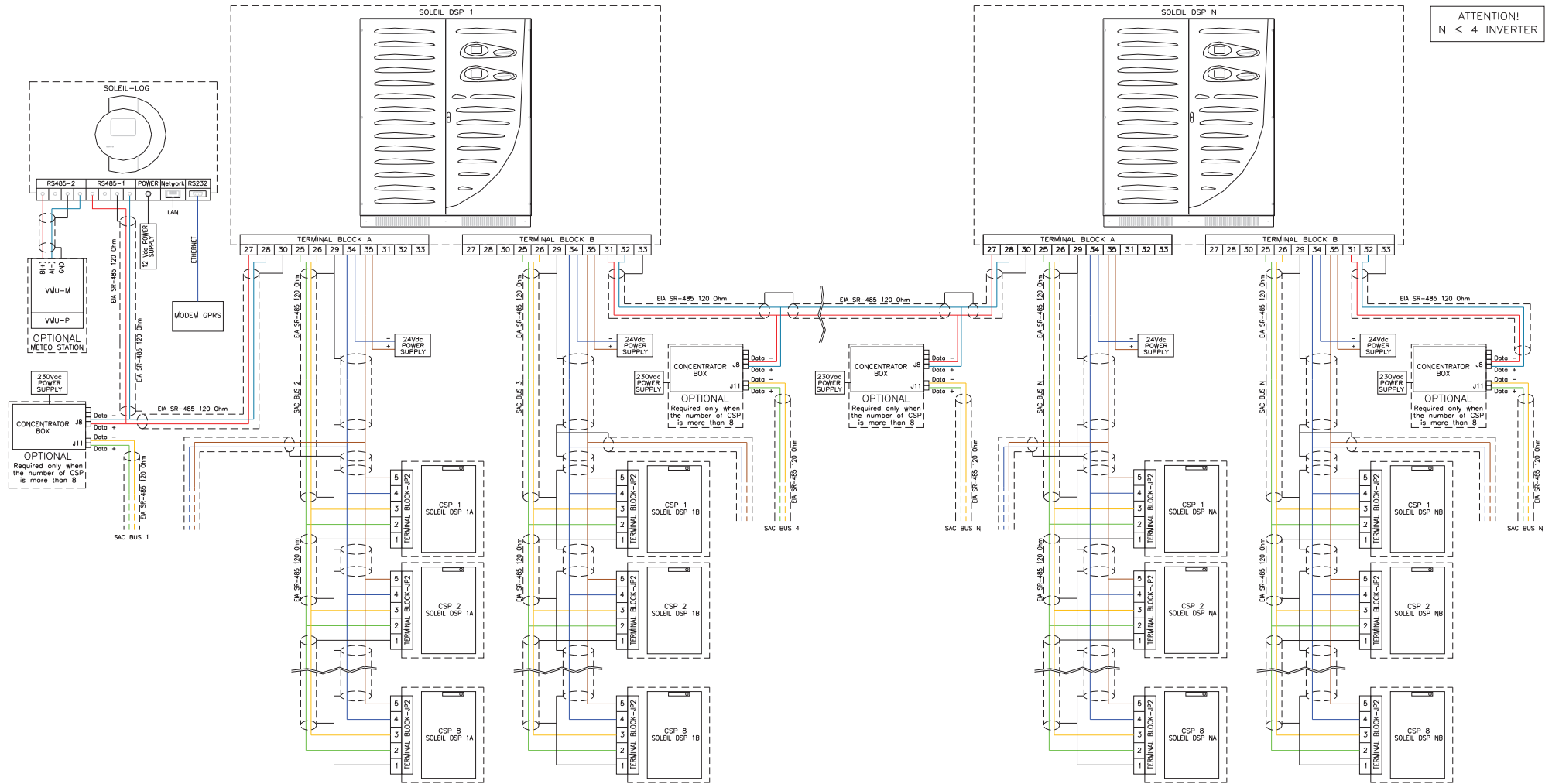
## LAYOUT OF TGS2 CONNECTION FOR PS1000 - PS1320 - PS1520 CONTAINERS



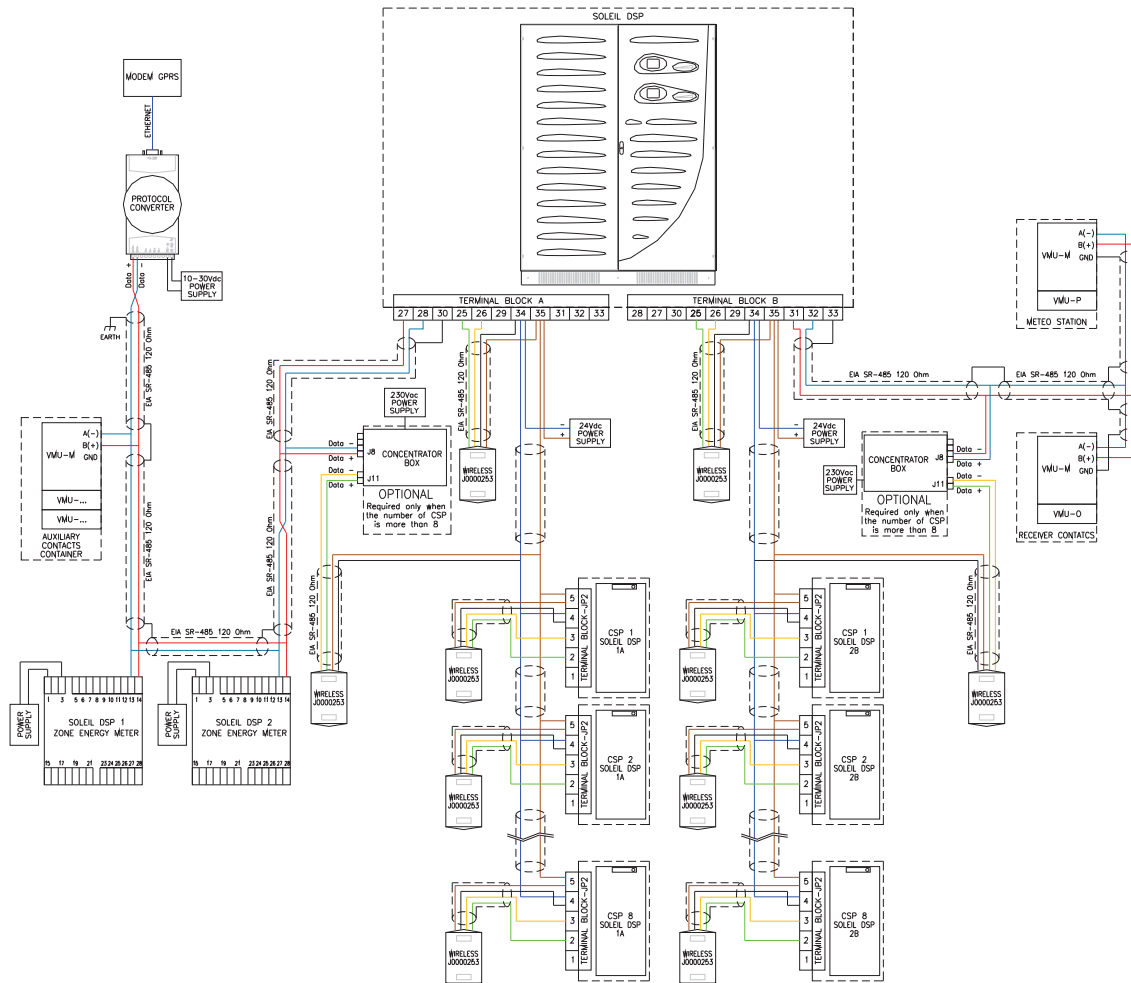
## LAYOUT OF SOLEIL-LOG SOLEIL DSPX DATALOGGER CONNECTION SIZES 10-330KW



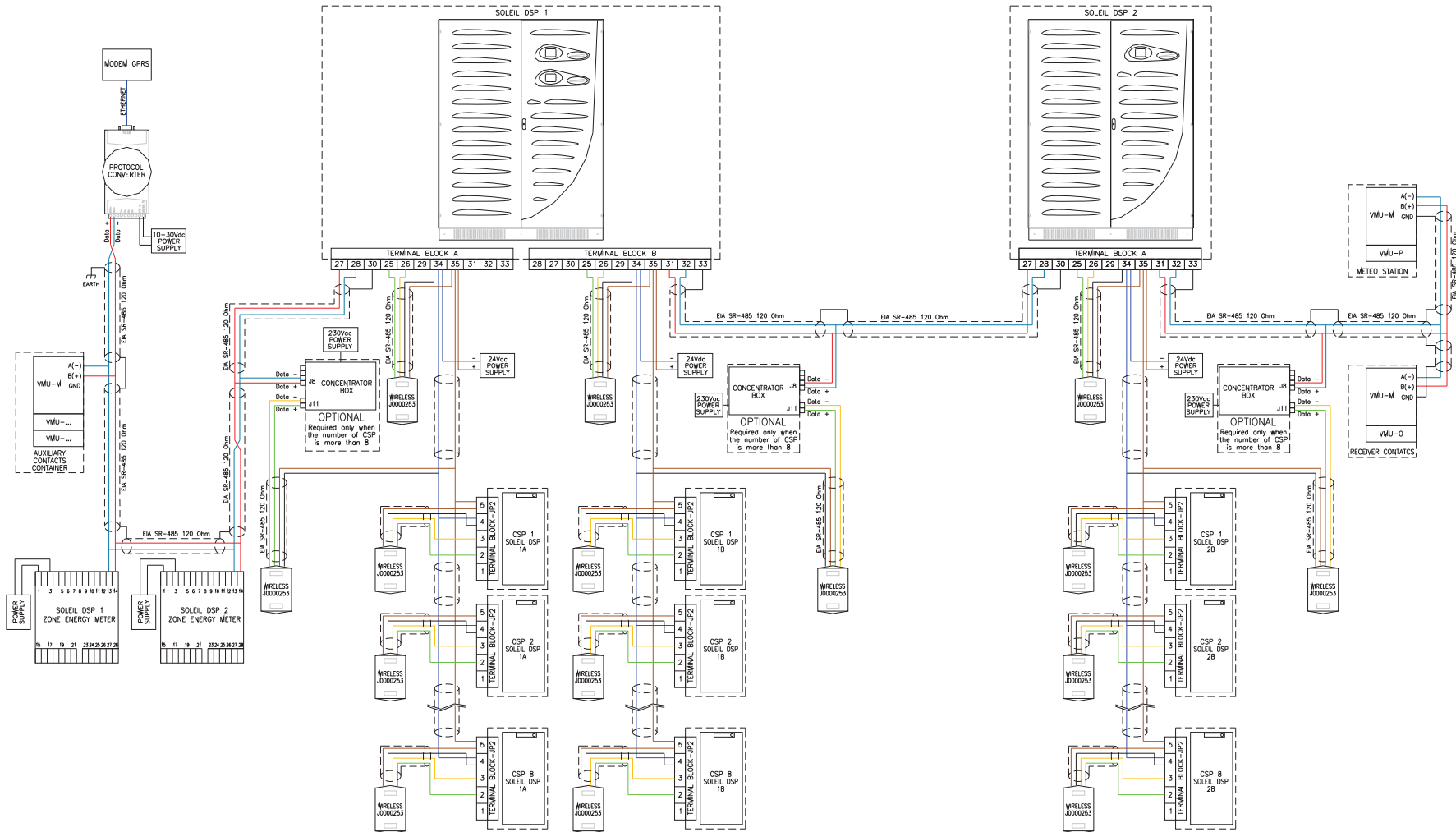
## LAYOUT OF SOLEIL-LOG SOLEIL DSPX DATALOGGER CONNECTION SIZES 440-833KW



## LAYOUT OF TGS2 CONNECTION FOR PS500 AND PS760 THROUGH WIRELESS DEVICES ON CSP-12

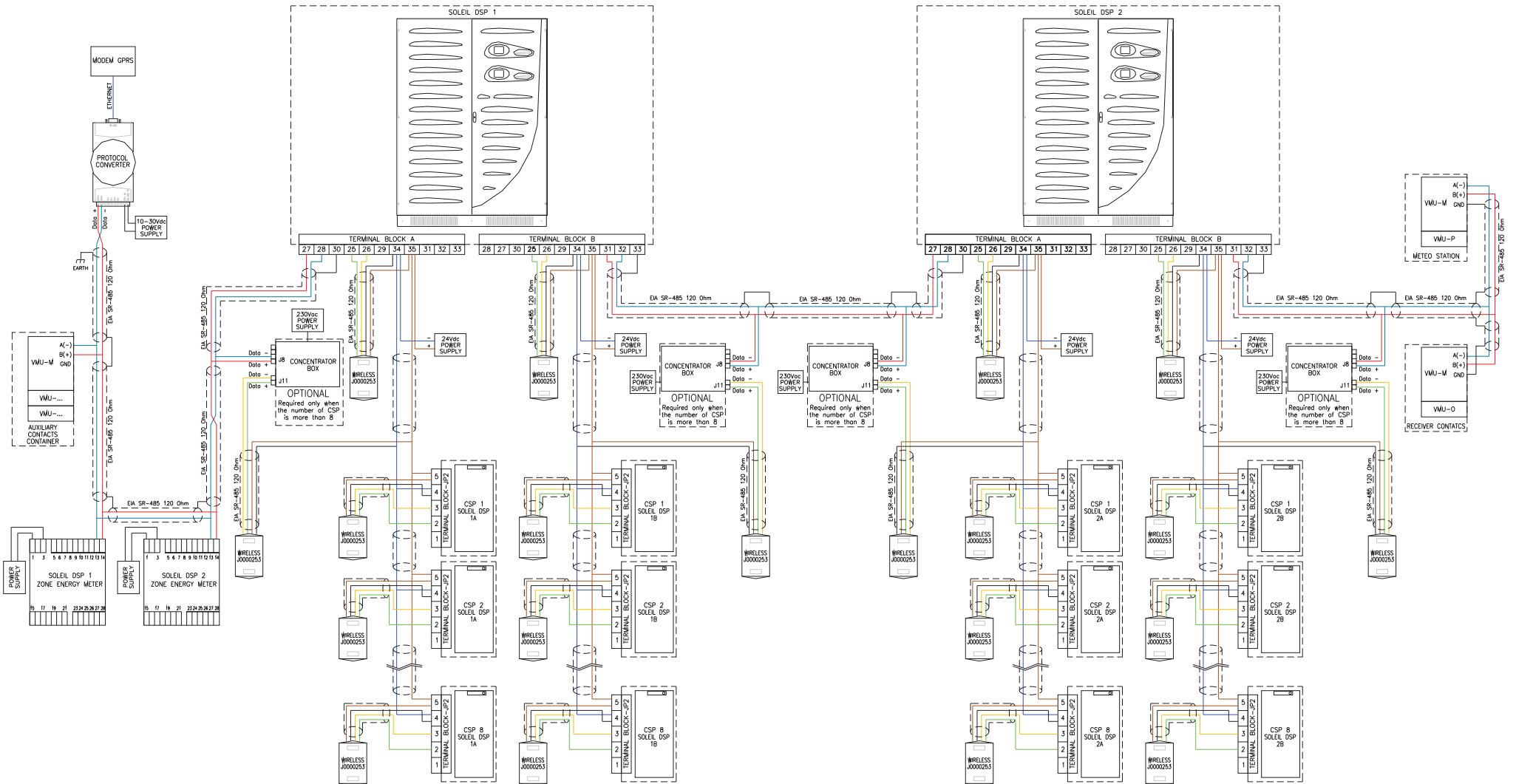


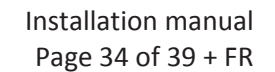
## LAYOUT OF TGS2 CONNECTION FOR PS990 THROUGH WIRELESS DEVICES ON CSP-12



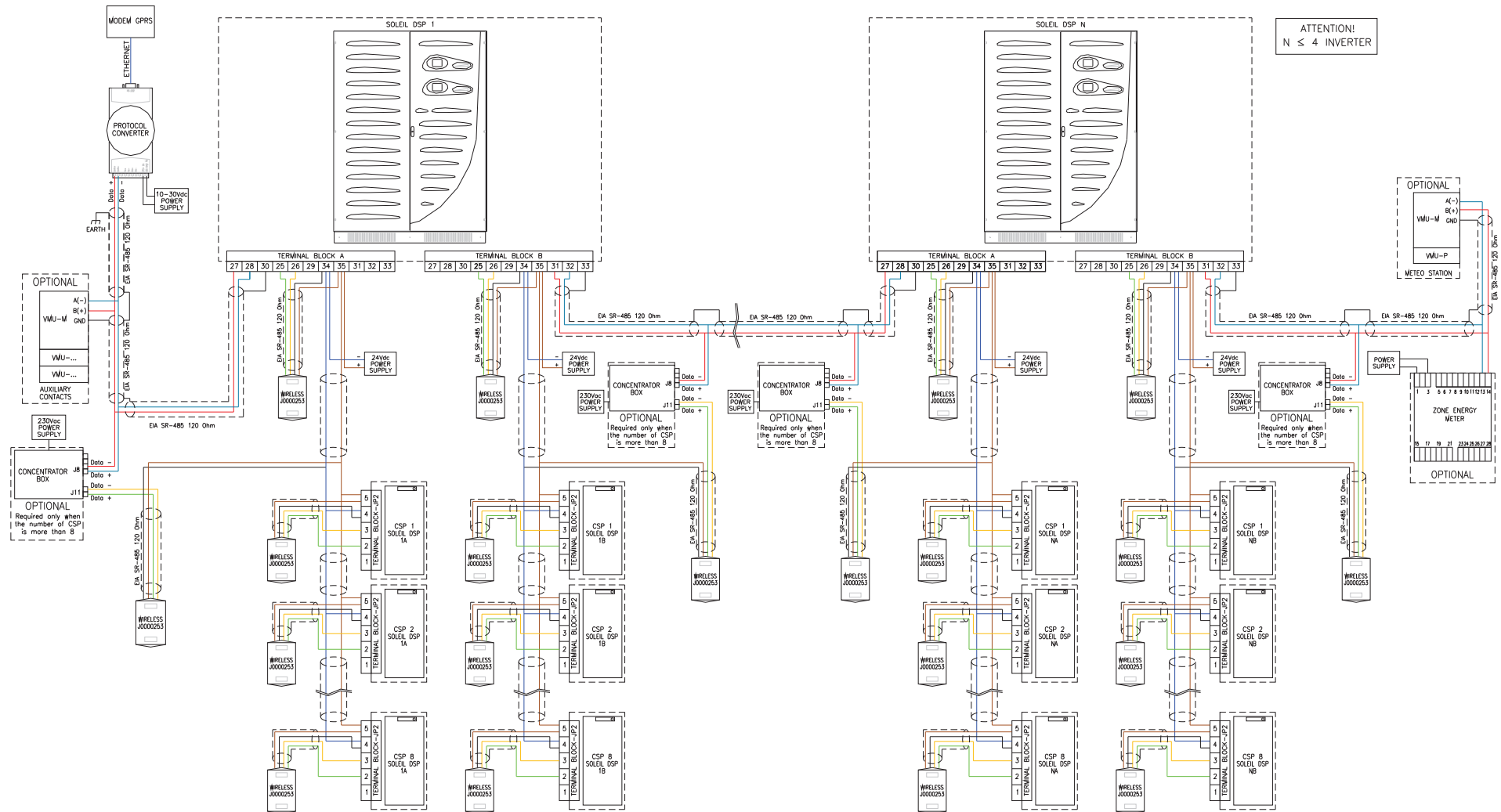


## LAYOUT OF TGS2 CONNECTION FOR PS1000 – PS1320 - PS1520 THROUGH WIRELESS DEVICES ON CSP-12

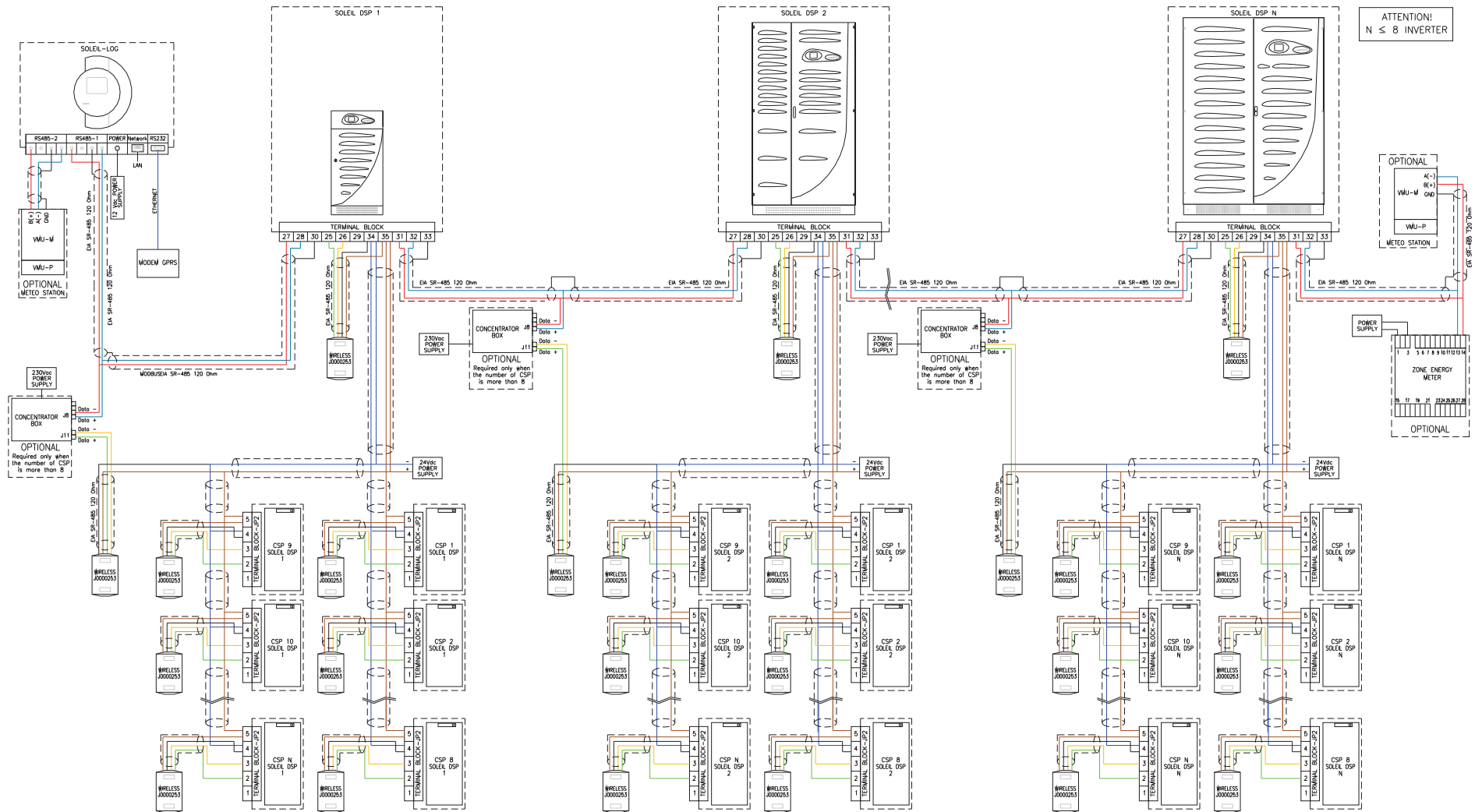


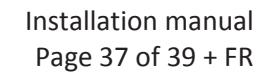


## LAYOUT OF TGS2 SOLEIL DSPX CONNECTION SIZES 440-833KW THROUGH WIRELESS DEVICES ON CSP-12



## SOLEIL DSPX 10-416KW DATALOGGER CONNECTION THROUGH WIRELESS DEVICES ON CSP-12





## 6 USER SETTINGS

### 6.1 Connecting an input pole to the photovoltaic field earth

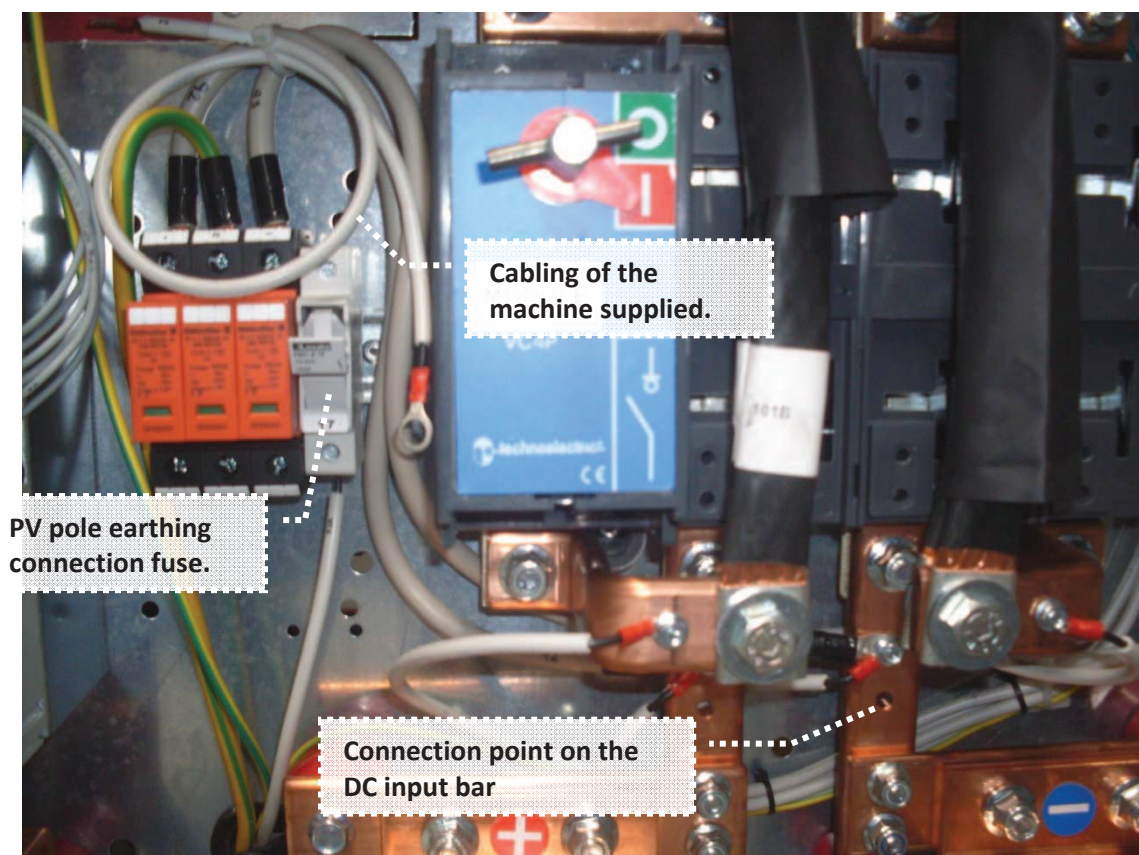
For some types of photovoltaic panels the earth connection of a pole is required.

Machines of the SOLEIL and SOLEIL HV series are designed for the easy earth connection of the positive or negative pole on input (depending on the requirements of the plant design), by means of a special fuse already installed inside the converter.

Once the settings have been appropriately configured (see chapter 10 of the IV346 'Instruction Manual'), the machine is able to detect the opening of the fuse and activate the corresponding alarm.



**SOLEIL default machines are configured in the factory WITHOUT any earth connection of the input poles.**



For the earthing connection of an input pole proceed as follows:

1. Identify the earthing connection fuse within the machine
2. Use the wire provided to connect the terminal of the fuse holder to the DC input bar (positive or negative as required by the plant constraints)
3. Set the software feature to detect the fuse opening by means of the touch screen, as described in chapter 10 of the IV346 'Instruction manual SOLEIL – SOLEIL HV'



## 6.2 Control features – Network services

Soleil and Soleil HV Inverters comply with CEI-021 regulations and with Terna attachment A70.

The features regarding the 'Network services', summarised below, can be set by the installer through the use of the inverter touch screen operating panel, in accordance with the procedure described in the IV346 'Instruction manual'.

The supported features, in accordance with section 8.5 of the CEI-021 regulations and chapter 7 of the attachment A70 are:

- Launch and gradual increase of the power to the network
- Immunity to brownouts (LVFRT Low Voltage Fault Ride Through)
- Limitation of the active power generated in the presence of transients on the transmission network
- Participation in the voltage control, in the following ways:
  - Automatic supply of reactive power according to a characteristic curve  $\cos\phi_i = f(P)$
  - Automatic supply/absorption of reactive power according to a characteristic curve  $Q = f(V)$

**SOLEIL inverters are configured by default as follows:**

<b>Launch and gradual increase of the power delivered to the grid</b>	<p><math>f=49.9...50.1</math> Hz, <math>V=85...110\%</math> <math>V_n</math> (present for 5 continuous minutes) Power ramp lasting 5 minutes</p>
<b>Immunity to LVFRT brownouts</b>	Feature disabled, may be enabled
<b>Limitation of the Active Power in the presence of frequency transients</b>	<p>Enabled with the following parameters :</p> <ul style="list-style-type: none"> <li>• frequency thresholds = 50,3 and 51.5 Hz</li> <li>• droop = 2.4%</li> <li>• frequency thresholds for restoring power = 49.9 and 50.1 Hz</li> <li>• slope of transfer after overfrequency = 5 minutes</li> </ul>
<b>Participation in the voltage control (reactive supply)</b>	Feature disabled, may be enabled



**FOR A DETAILED DESCRIPTION OF THE AVAILABLE FEATURES AND ANY CUSTOMISATION, REFER TO THE PROCEDURE DESCRIBED IN THE IV346 'INSTRUCTION MANUAL'.**