

Arcon RDI – 16 / 32 / 40 kVA
14 / 28 kVA
Single Phase Inverter Systems
(Cabinet Modular System)

1. Introduction

1.1 Scope

This document is an user's guide for the ARCON - RDI (Stackable Rack System) Inverter Systems *from 14 kVA to 40 kVA single-phase as described in Table 1.1*. The application range of this guide is defined below. It describes the electrical and mechanical installation.

Inverter systems using modular subracks must be handled and installed according to the rules and recommendations described in this manual.

This manual is not suitable for an inverter system different then the one listed in the table 1 below.

For information : Standard is **TOP cabling** or **BOTTOM cabling** (**Top cabling** if not specified)
It is however possible to run DC cables through the bottom of top cabled cabinet but
ONLY DC CABLES
 Standard **DC connector** is **multiple individual connectors**
 Standard **basic Alarms** consist in either **SYS100** or through **AUTOMATIC STATIC SWITCH** (if any).

APPLICATION RANGE			
Voltage		Description	Available Options
48 VDC / 230 VAC	16 KVA	Equipped Cabinet 19" 4x4kVA without Static Switch	DOOR SYS 3000 COMMON DC FEED SNMP AC DISTRIBUTION Breakers W or W/O help contacts
		Equipped Cabinet 19" 4x4kVA with Static Switch	
	32 KVA	Equipped Cabinet 19" 8x4kVA without Static Switch	
		Equipped Cabinet 19" 8x4kVA with Static Switch	
	40 KVA	Equipped Cabinet 19" 10x4kVA without Static Switch	
		Equipped Cabinet 19" 10x4kVA with Static Switch	
48 VDC / 120 VAC 60 Hz	14 KVA	Equipped Cabinet 19" 4x3,5kVA without Static Switch	Square D breaker for 120VAC only AIR FILTRATION
		Equipped Cabinet 19" 4x3,5kVA with Static Switch	
	28 KVA	Equipped Cabinet 19" 8x3,5kVA without Static Switch	
		Equipped Cabinet 19" 8x3,5kVA with Static Switch	

Table 1-1 : Inverter system application range of the present User's Manual

Remarks :

EQ4 Zone 4 cabinet is available but only with **TOP CABLING and **MAX 8 INVERTERS****

CAUTION :

When the inverter cabinet system is integrated in a larger installation (including UPS , or other power equipment), a special care must be taken, with regards to start and stop the inverter bays. (Emergency stop could be placed for example)

The remote ON/OFF function (see section 5.4.4) could be used for this purpose

1.2 Revision history

Version	Author	Description	Date
1.0	CA		June, 2003
2.0	CD	Following remarks First Emission	June 24, 2004
2.1	OB	Revision 1	July 26, 2004
2.2	CD	Revision 2	September 06, 2004
2.3	OB	Revision 3	June 2007
2.4	FLE	Revision 4	September , 2007

1.3 Important Safety Instructions

- Installation may be undertaken only by adequately trained personnel with satisfactory knowledge of the power supply system. The most recent revision of the safety rules (RULES 1550-1004 Uen), and safety rules in force locally shall be adhered to during the installation.
- All external circuits to be connected to the power supply system must comply with SELV, as defined in EN60950.
- Special care must be exercised in servicing any Systems because high voltage can be present. Even when the **main AC power** to the unit has been disconnected, potential harm still exists from the inverter module taking power from the external battery. So, When work is being done in a power cabinet, the power supply system shall be de-energized. The battery voltage and, if any, the mains supply shall be disconnected.
- The distribution cables shall be arranged and protected in such a way that no involuntary contact with them can occur during work with the equipment connected to voltage.

1.4 Tools

The following tools are recommended for installations :

- + General installation tools, like screwdrivers, pliers, ring wrenches, cable cutters, etc.
- + A torque wrench.
- + Press tool for cable lugs, including press pliers suitable for the used cable lugs.
- + A multimeter
- + The following documentation :
 - This guide
 - The mechanical and electrical drawings (see Table 2)
 - The operation manuals of SYS 3000, Arcon RDI Inverter Module manual, Arcon STM 65/150

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2. Function

The ARCON Inverter systems supplies uninterrupted and disturbance-free ac power to telecommunication site loads.

2.1 Arcon Inverter without static by-pass switch

In normal operation the inverters deliver the power to load. The DC power is either coming from the rectifier system when the mains power line is present or from the battery during the mains power line breakdown.

In order to keep important equipment live especially the battery, each inverter is equipped with an internal LVD (Low Voltage Disconnection) monitoring unit. This function shuts down the inverter modules from the DC when the min DC value is reached.

2.2 Arcon Inverter with static by-pass switch

There are two operating modes, ON LINE and OFF LINE.

In the ON LINE mode the inverter is being powered by the DC power System and is providing AC power to the loads. Each inverter has a build-in LVD (low voltage disconnect) that will disconnect the inverter from the DC power System if the pre-set DC minimum input voltage level is reached. This feature protects batteries in the DC power System from being discharged too deeply.

In case of total inverter module failure, the STM65 will transfer the load to the AC power supply connected to the system.

See Arcon STM manual for more detail

In the OFF LINE mode the inverter are in standby and commercial AC powers the loads. If the power fails the static bypass switches the load to the inverter which will take power from the dc power System.

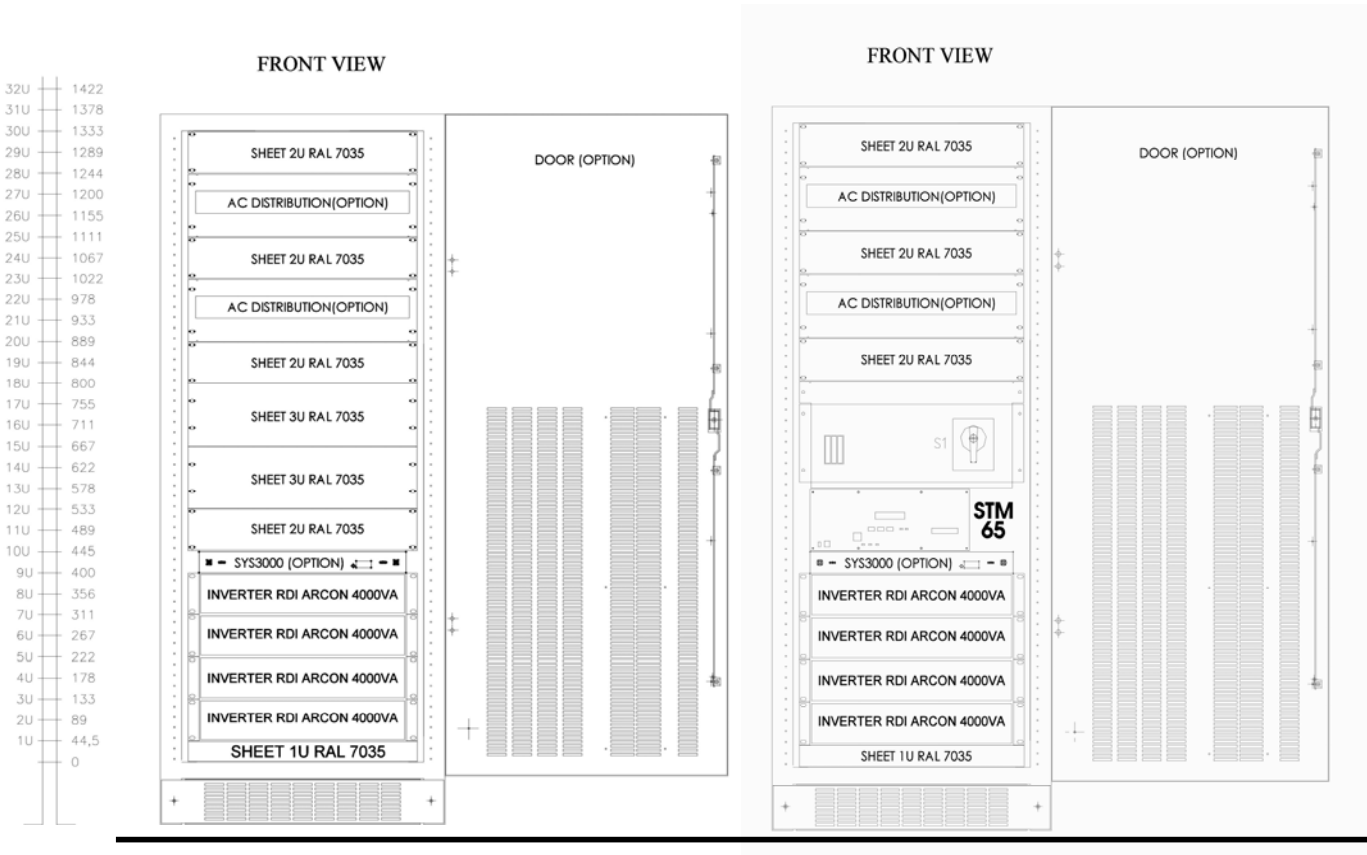
Note : Selection to work ON LINE or OFF LINE can be done through the STATIC TRANSFER SWITCH configuration menu. Please refer to Arcon STM manual.

3. Configurations

3.1 4 inverters (3,5 kVA [120VAC] or 4 kVA [230VAC])

Configuration of the Equipped Cabinet 19" (1500 mm high) :

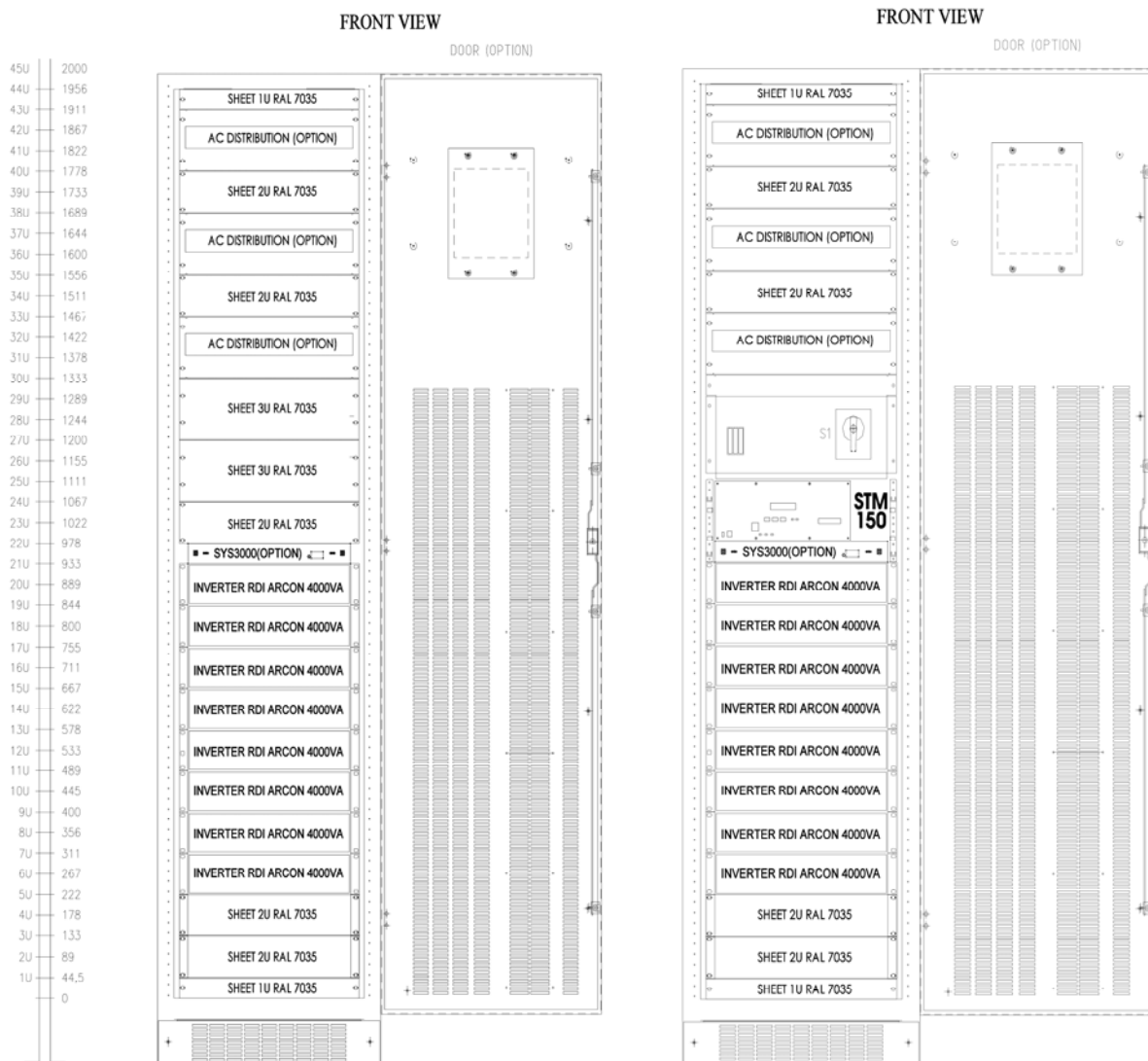
- 4 x 4 kVA 48VDC/230VAC 50/60Hz without static switch incl. Basic alarms
- 4 x 4 kVA 48VDC/230VAC 50/60Hz with static switch incl. Basic alarms
- 4 x 3,5 kVA 48VDC/120VAC 60Hz without static switch incl. Basic alarms
- 4 x 3,5 kVA 48VDC/120VAC 60Hz with static switch incl. Basic alarms



3.2 8 inverters (3,5 kVA [120VAC] or 4 kVA [230VAC])

Configuration of the Equipped Cabinet 19" (2130 mm high):

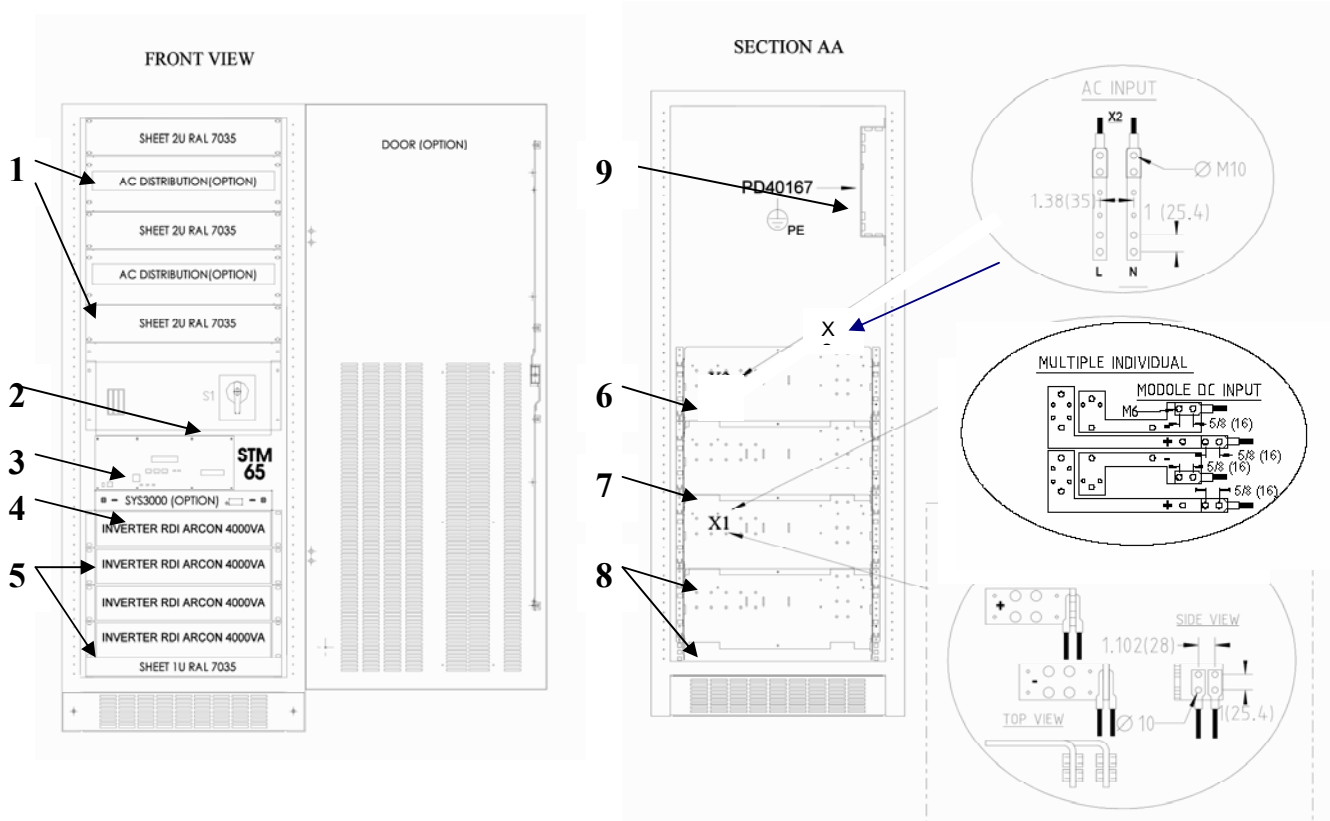
- 8 x 4 kVA 48VDC/230VAC 50/60Hz without static switch incl. Basic alarms
- 8 x 4 kVA 48VDC/230VAC 50/60Hz with static switch incl. Basic alarms
- 8 x 3,5 kVA 48VDC/120VAC 60Hz without static switch incl. Basic alarms
- 8 x 3,5 kVA 48VDC/120VAC 60Hz with static switch incl. Basic alarms



4. Units in the system

4.1 Cabinet description : TOP CABLING

The System consists of : cabinet made with stackable rack, inverter modules, static switch, maintenance bypass, dc and ac distribution units and control System.



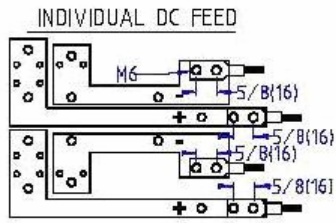
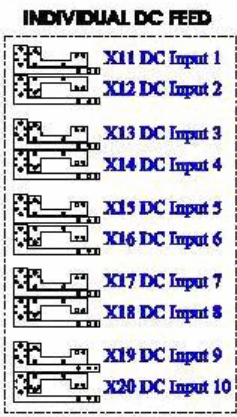
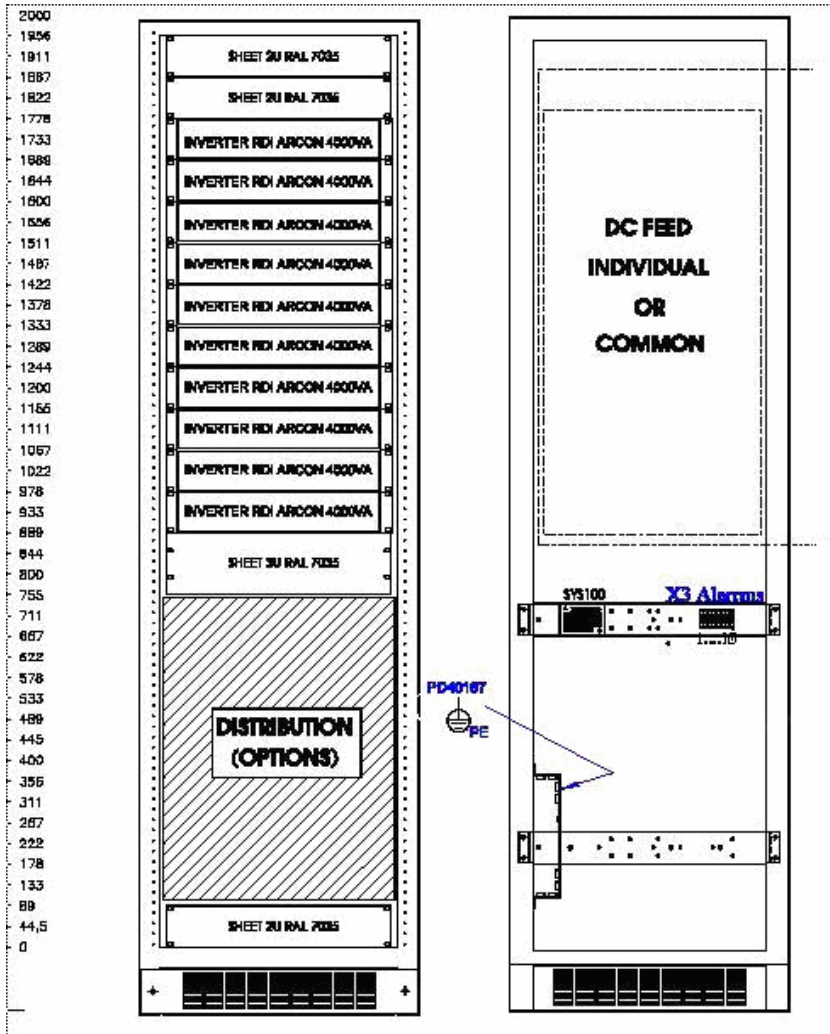
1	AC Distribution Output (option)
2	Manual By-Pass
3	Static Switch
4	Controller – Supervision (option)
5	Inverters modules
6	Subrack Manual By-Pass
7	Subrack Static Switch + controller
8	Subracks Inverters
9	Ground (PE) Terminal connection

Figure 4-1 : Equipped cabinet description

This cabinet is ready to receive the inverter modules with rear connection. All the modules (Static Switch, Inverters) can be plugged / unplugged without any wiring.

The inverter modules can be replaced without interrupting the operation of the power supply. The STM static switch can be replaced AFTER manual by-pass operation.

4.2 Cabinet description : BOTTOM CABLING



4.3 Inverter description

ARCON RDI 4000VA (230 VAC) or ARCON RDI 3500VA (120 VAC)

The Arcon RDI inverter module is a high-frequency switchmode inverter, which can be paralleled in order to offer modular power System to the end user.

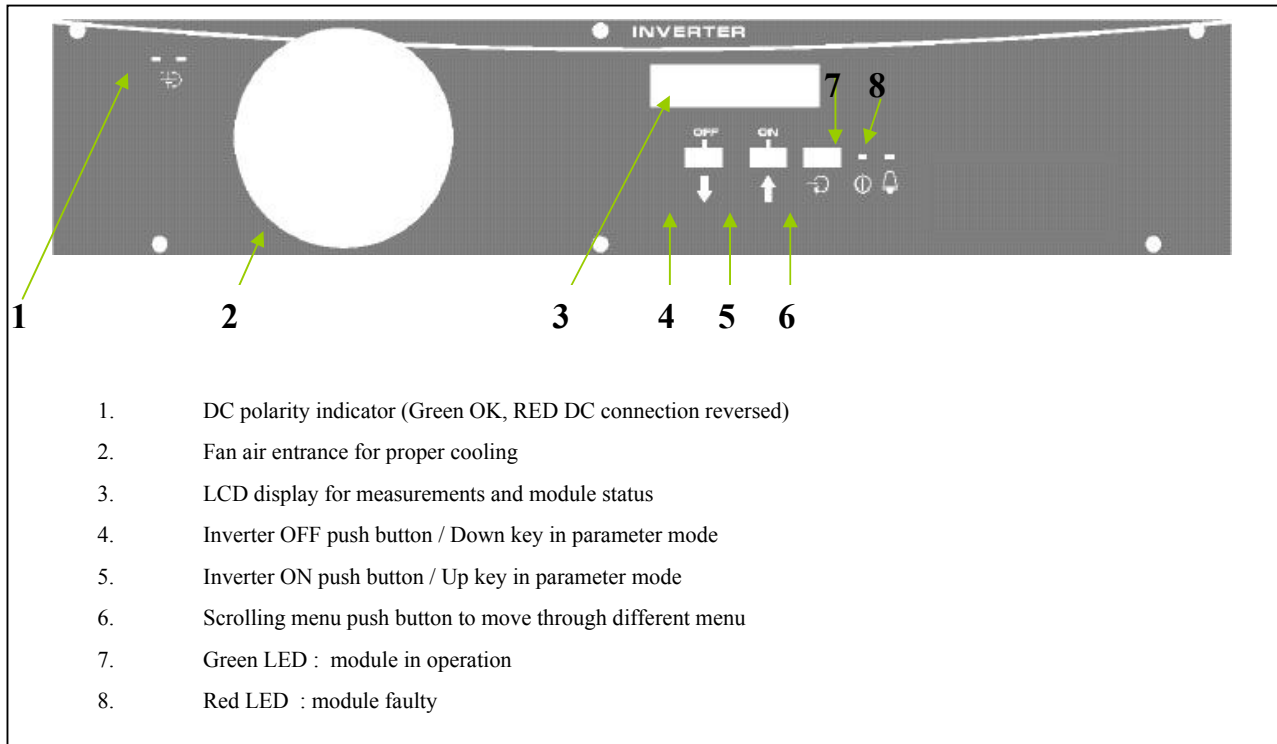


Figure 4-2 : Front panel of an Inverter Arcon RDI Module [120 VAC or 230 VAC]

Inverter module is designed to offer:

- maximum utilization of the energy source
- affective utilization of commercial power cabling
- low losses
- lower total weight
- Hot-swappable capabilities

The inverter is based on switchmode technology that provides:

- low RFI
- high efficiency
- limited chance of ac output disturbances
- lower weight
- compact module

The inverter has an intelligent overload and current limit mode process as well as a selective disconnection capability in case of module failure.

User interface and module installation or replacement is described in Arcon RDI Inverter Module manual. Please refer to this manual for more detail.

4.4 Static Switch Description

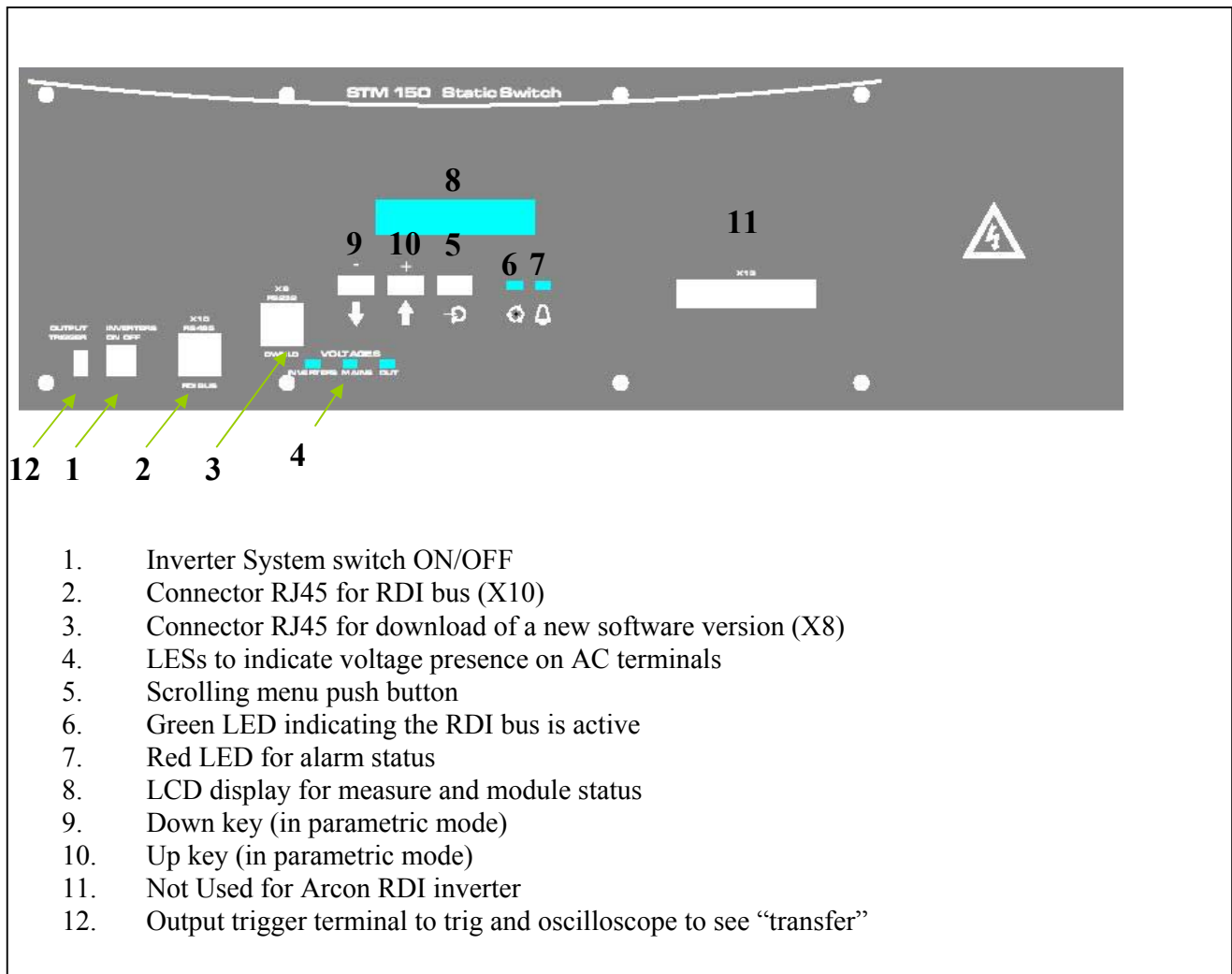
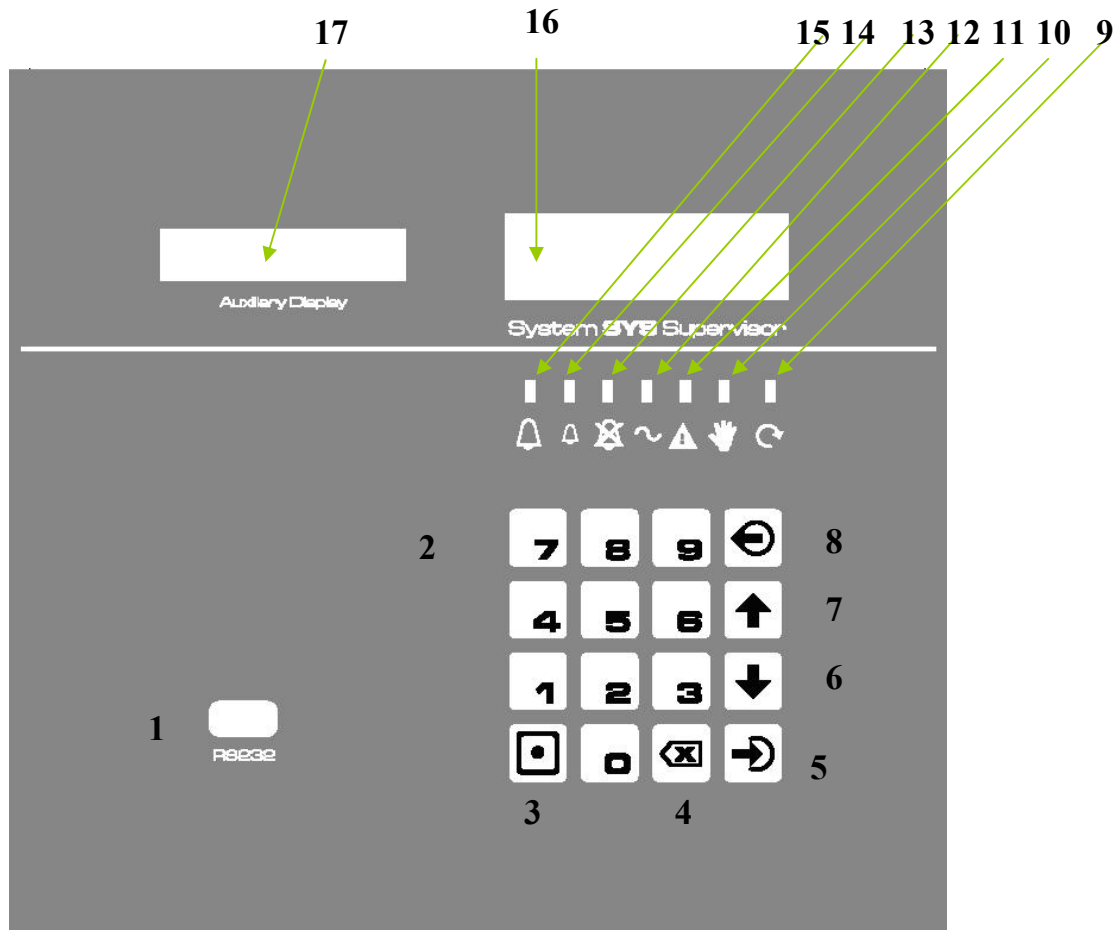


Figure 4-3 : Front panel of an Static Switch STM 150 Module (120 VAC or 230 VAC)

4.5 Supervision SYS3000 Description (optional)



1. RS 232 Connector	9. "Controller in operation" LED
2. Numeric keyboard	10. "Manual Mode active" LED
3. "Record" key	11. <i>No application in Inverter use.</i>
4. "Backspace" key	12. "AC input failure" LED
5. "Enter" key	13. "Alarm stop active" LED
6. "Down" key	14. "Minor alarm" LED
7. "Up" key	15. "Major alarm" LED
8. "Escape" key	16. System status display
	17. Measurements display

Figure 4-4 : Front panel of a SYS3000 controller

The controller is a monitoring unit LOCATED in the drawer.

It will control and monitor the following:

- Individual inverter module individually
- Static switch
- ac output distribution
- Manual bypass for maintenance

The controller has two LCDs and five LEDs to display System status locally and remotely to:

- free potential contact
- local PC through ISM software
- remotely through modem link

The controller user interface contains:

- keyboard
- local LED
- measurements display
- status display

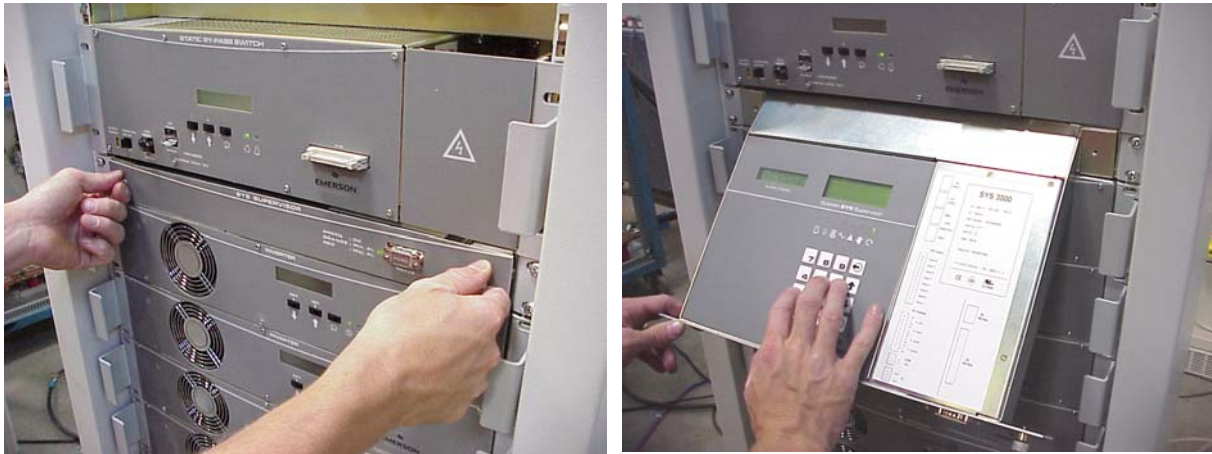


Figure 4-5 : SYS 3000 is mounted in a drawer

Note : To open the drawer just unscrew the 2 left and right “handscrews” and pull out the SYS3000 from its drawer.

Concrete expansion anchors used to base mount the framework to the floor should be suitable for earthquake (dynamic) applications, as specified by the manufacturer.

Concrete expansion anchors should use steel construction to minimize creep. Concrete expansion anchors used for waveform testing must conform to the physical performance requirements of the Seismic Zone in which it is. If substitute fasteners are used in place of concrete expansion anchors during testing, the peak fastener load measured during the tests must not exceed the preload specified for the concrete expansion anchors by the manufacturer.

	Hazard	Bolt Diameter	Bolt Embedment into concrete	Distance from end of sill
Zone 1	Low	0.5 in	3 in	
Zone 2	Moderate	0.5 in	4 in	
Zone 3	High	0.5 in	7 in	7 x Bolt diameter
Zone 4	Very High	5/8 in	7 in	7 x Bolt diameter

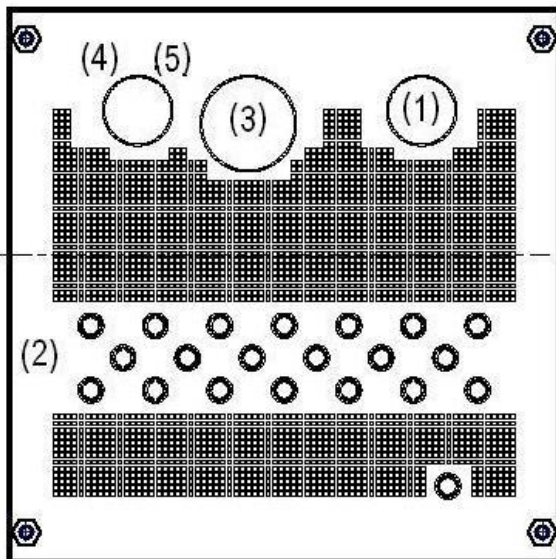
Table 5-1 : Anchor bolt specification according UBC chapter 18

5.4 Electrical connection

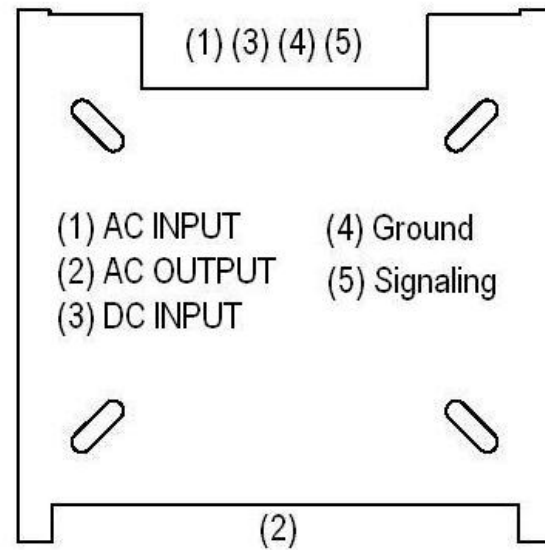
Remark : Cables must be strapped to support the weight

According to cabling, (Top cabling or Bottom cabling) cables shall pass through the knockouts in the top plate or through the opening in the bottom plate.

TOP VIEW



FOOT PRINT



5.4.1 DC Input connection [X1]

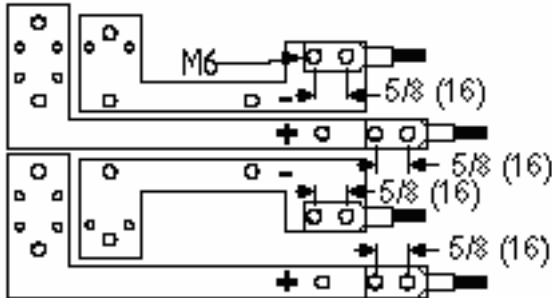
In the mechanical and electrical schematics, the DC input is marked “**X1**”.

As a standard, the equipped cabinet is delivered with the Individual DC input. But at the order, a COMMON DC input may be chosen as an option.

Individual DC input means that every inverters are fed with two wires (positive & negative) independent of the feed of the other inverters.

COMMON DC input means that all the inverters(all the bay) are(is) fed by two single wires (positive & negative).

5.4.1.1 Individual DC Feed



The individual DC input consists of one DC input per inverter. You will need to prepare each individual DC input as the number of modules installed in your system.

So up to 10 DC inputs for the system with 10 inverters.

To connect the Individual DC Feed, use :

- Copper wires, **Recommended 125 deg C temperature** rated with section listed in table below.
- Each DC cable must be ended with a double 2 holes lug as listed in table below.
- To protect the DC input lines, use an input circuit breaker as listed in table below.
- Tighten the screws with the torque as listed in table below.

General remark :

In the following, reference is made at the Burndy lugs. In appendix, is given the table with reference number and dimensions of these. It is possible to use another equivalent product.

Be careful the stud hole size has to be sized for M6 (6 mm) and the stud hole spacing is 16 mm (5/8 “)



Arcon RDI Inverter System

Voltage	Description	Wire Section for DC Input Connection		DC Input protection [A]	Lugs for DC input Connection	Tightening Torque	
		[mm ²]	AWG			[Nm]	[in.lbs]
48 Vdc / 230 Vac 50-60 Hz	Equipped Cabinet 19" 4x4kVA without Static Switch	35	2/0	100	YA2CL-2TC14	13	110
	Equipped Cabinet 19" 4x4kVA with Static Switch	35	2/0	100	YA2CL -2TC14	13	110
	Equipped Cabinet 19" 8x4kVA without Static Switch	35	2/0	100	YA2CL -2TC14	13	110
	Equipped Cabinet 19" 8x4kVA with Static Switch	35	2/0	100	YA2CL -2TC14	13	110
	Equipped Cabinet 19" 10x4kVA without Static Switch	35	2/0	100	YA2CL -2TC14	13	110
	Equipped Cabinet 19" 10x4kVA with Static Switch	35	2/0	100	YA2CL -2TC14	13	110
48 Vdc / 120 Vac 60 Hz	Equipped Cabinet 19" 4x3,5kVA without Static Switch	35	2/0	100	YA2CL -2TC14	13	110
	Equipped Cabinet 19" 4x3,5kVA with Static Switch	35	2/0	100	YA2CL -2TC14	13	110
	Equipped Cabinet 19" 8x3,5kVA without Static Switch	35	2/0	100	YA2CL -2TC14	13	110
	Equipped Cabinet 19" 8x3,5kVA with Static Switch	35	2/0	100	YA2CL -2TC14	13	110

Table 5-2 : Individual DC Feed connection

5.4.1.2 COMMON DC Feed

The Common DC input consists of one DC input per cabinet (4, 8 or 10 modules in a cabinet).

To connect the COMMON DC Feed, use :

- Copper wires, **Recommended 125 deg C temperature rated** with section listed in table below.
- Each DC cable must be ended with a double 2 holes lug as listed in table below.
- To protect the DC input lines, use an input circuit breaker as listed in table below.
- Tighten the screws with the torque as listed in table below.

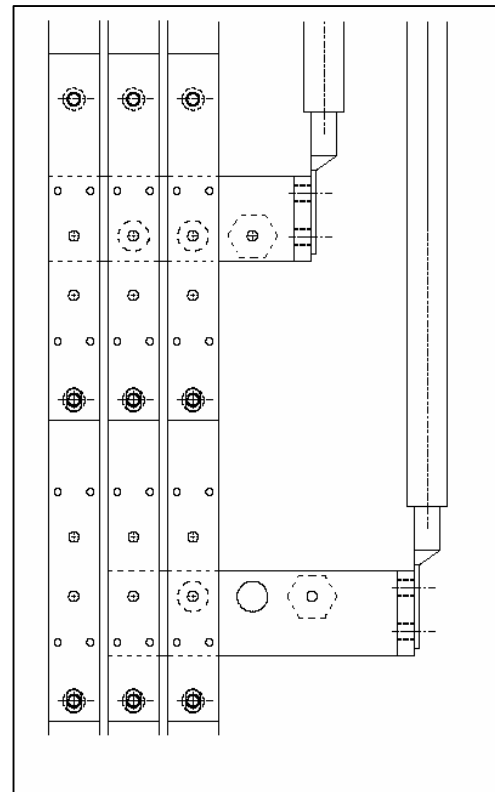
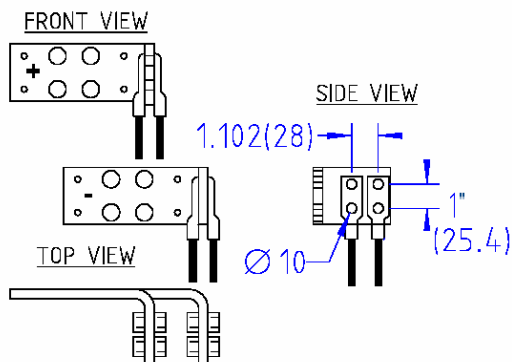


Figure 5-3 : Connection of the wires at the bus bars for **COMMUN** DC feed

General remark :

In the following, reference is made at the Burndy lugs. In appendix, is given the table with reference number and dimensions of these. It is possible to use another equivalent product.

Be careful the stud hole size has to be sized for M10 (10 mm) and the stud hole spacing is 25.4 mm (1 “)

Cable of recommendation is 150mm² to make eaiser the handling. This is valid when cable is min 90 DEG C type.



Arcon RDI Inverter System

Voltage	Description	Wire Section for DC Input Connection		DC Input protection [A]	Lugs for DC input Connection	Tightening Torque	
		[mm ²]	AWG			[Nm]	[in.lbs]
48 Vdc / 230 Vac 50-60 Hz	Equipped Cabinet 19" 4x4kVA without Static Switch	2 x 150	300MCM	400	YAG34L-2TC38	50	420
	Equipped Cabinet 19" 4x4kVA with Static Switch	2 x 150	300MCM	400	YAG34L-2TC38	50	420
	Equipped Cabinet 19" 8x4kVA without Static Switch	4 x 150	4 x 300MCM	800	2 x YAG34L-2TC38	50	420
	Equipped Cabinet 19" 8x4kVA with Static Switch	4 x 150	4 x 300MCM	800	2 x YAG34L-2TC38	50	420
	Equipped Cabinet 19" 10x4kVA without Static Switch	4 x 150	4 x 300MCM	1000	3 x YAG34L-2TC38-	50	420
	Equipped Cabinet 19" 10x4kVA with Static Switch	4 x 150	4 x 300MCM	1000	3 x YAG34L-2TC38	50	420
48 Vdc / 120 Vac 60 Hz	Equipped Cabinet 19" 4x3,5kVA without Static Switch	2 x 150	300MCM	400	YAG32L-2TC38	50	420
	Equipped Cabinet 19" 4x3,5kVA with Static Switch	2 x 150	300MCM	400	YAG32L-2TC38	50	420
	Equipped Cabinet 19" 8x3,5kVA without Static Switch	4 x 150	2 x 300MCM	800	2 x YAG34L-2TC38	50	420
	Equipped Cabinet 19" 8x3,5kVA with Static Switch	4 x 150	2 x 300MCM	800	2 x YAG34L-2TC38	50	420

Table 5-4 : COMMON DC Feed connection

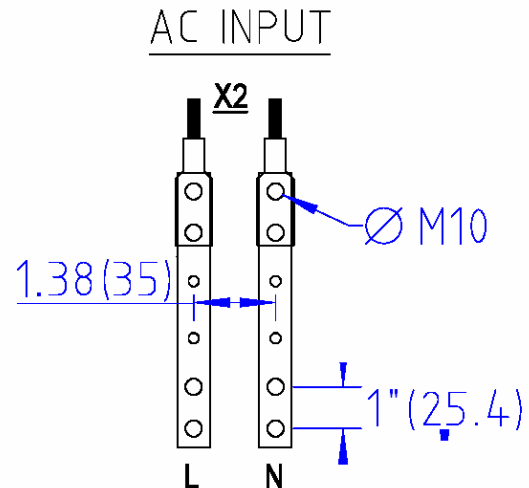
5.4.2 AC Input connection [X2]

In the mechanical and electrical schematics, the AC Input is marked “**X2**”.

The AC Input (L/N/PE) is called “Mains input” on the drawing above. The AC Input connection is place is the Manual By-Pass rack. There is one AC Input per cabinet.

To connect the AC Input, use :

- Copper wires, **Recommended 125 deg C temperature rated** with section listed in table below.
- Each AC cable must be ended with a double 2 holes lug as listed in table below.
- To protect the AC input lines, use an input circuit breaker as listed in table below.
- Tighten the screws with the torque as listed in table below.
- Remove earth bond bridge before connecting AC input cable. The purpose of that bridge is to connect Neutral to earth PE in case no AC input cable is connected to the System. The tightening torque is 28 Nm.
- Connect AC GROUND on PE plated busbar on top of frame. Cable must be ended with suitable listed lug (table below)



General remark :

In the following, reference is made at the Burndy lugs. In appendix, is given the table with reference number and dimensions of these. It is possible to use another equivalent product.

Be careful the stud hole size has to be sized for M10 (10 mm) and the stud hole spacing is 25.4 mm (1 “)



Arcon RDI Inverter System

Voltage	Description	Wire Section for MAINS AC Input Connection		MAINS AC Input Current	Lugs for MAINS AC Input Connection	Tightening Torque	
		[mm ²]	AWG	[A]	Reference : BURNDY Double Hole Lug	[Nm]	[in.lb]
48 Vdc / 230 Vac 50-60 Hz	Equipped Cabinet 19" 4x4kVA without Static Switch	NA	NA	NA	NA	NA	NA
	Equipped Cabinet 19" 4x4kVA with Static Switch	25	4	70	YAV26L-2TC38-FX	28	240
	Equipped Cabinet 19" 8x4kVA without Static Switch	NA	NA	NA	NA	NA	NA
	Equipped Cabinet 19" 8x4kVA with Static Switch	70	2/0	140	YAV26L-2TC38-FX	28	240
	Equipped Cabinet 19" 10x4kVA without Static Switch	NA	NA	NA	NA	NA	NA
	Equipped Cabinet 19" 10x4kVA with Static Switch	70	2/0	175	YAV26L-2TC38-FX	28	240
48 Vdc / 120 Vac 60 Hz	Equipped Cabinet 19" 4x3,5kVA without Static Switch	NA	NA	NA	NA	NA	NA
	Equipped Cabinet 19" 4x3,5kVA with Static Switch	50	1	120	YAV26L-2TC38-FX	28	240
	Equipped Cabinet 19" 8x3,5kVA without Static Switch	NA	NA	NA	NA	NA	NA
	Equipped Cabinet 19" 8x3,5kVA with Static Switch	95	3/0	240	YAV26L-2TC38-FX	28	240

Table 5-5 : AC Input Connection

5.4.3 AC output distribution [X4]

In the mechanical and electrical schematics, the AC output is marked “X4”.

IEC 60364-3 describes 4 power distribution systems : IT, TT and TN (TN-S/TN-C).

Connection of an AC Power distribution system depending on the arrangement of current-carrying conductors and the method of earthing.

Please, refer to the schematic SO570 in Appendix 4.

Distribution	IT	TT	TN-S	TN-C
L1, N, PE	SO 570 Case A	SO 570 Case B	SO570 Case C	SO570 Case D
L1, L2, L3, N, PE	SO 570 Case E	SO 570 Case F	SO570 Case G	SO570 Case H

Table 5-6 : Power distribution system

AC output distribution is connected to distribution breaker for L, and N and common bus bar for PE. See table below for wire minimal cross-section and tightening torque details:

	EES Part Number	System Output Power	Output Current [A]	Distribution Breaker Rating 1P or 2P [A]	Minimal Wire Section	Tightening Torque [Nm]	LUG
					Belgium [mm ²] / phase		
Rail distribution	ALL	ALL	ALL	2	0,5	5.2 Nm	See remark
				6	0,75		
				10	1,5		
				16	2,5		
				25	6		
				32	6		
				40	10		
No output breaker Mono-phase output voltage ----- PE bar		4 x 4 kVA	70		25	5.2 Nm	See remark
		8 x 4 kVA	140		70		
		10 x 4 kVA	175		70		
		4 x 3,5 kVA (120Vac)	120		50		
		(7+1) x 3,5 kVA (120Vac)	240		95		
N bar	ALL	ALL	ALL		Refer to national electrical code	28	M10

Distribution line with 2P breakers



3 Distributions line without breaker



Procedure to install new DIN rail breaker (here example for 2P breakers)

Breaker must be DIN rail mountable please follow instruction to install breakers:

0. Remove front panel covering the breaker
1. Plug In the DIN rail breaker to be installed closed to the first free position
2. Be sure the breaker is in OFF position
3. Wire the breaker 2 poles L to Brown terminal and N to neutral terminal. Use the wire prepared for wiring
 - a. Insert wire into breaker first
 - b. Then insert wire to the multiclip terminal closed to the breaker

Note: For personnel safety and protection of Equipment this unit must be properly grounded (DC ground connected on plate area, soldered on frame).

Neutral and PR copper bars :

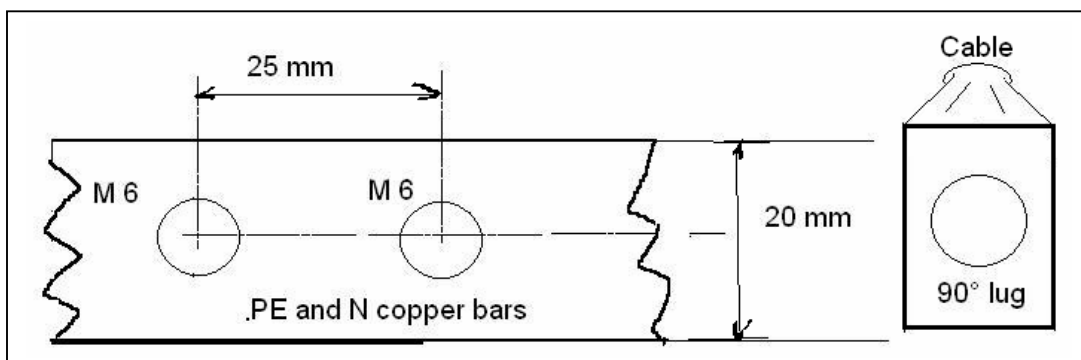
There are 20 Holes for M6 screws in copper bars
- No screws are attached



Cable lugs are required for connecting cables on copper bar



The single hole cable lugs (90°) type will be in relation with cable section.
The lugs size must be max 20 mm long & max 20 mm width :



5.4.4 Alarm output terminal [X3]

The X3 terminal is situated in the bottom of the cabinet above the Manual By-pass. Section for connecting wire of 0,75 mm² is sufficient. Potential free contacts are Normally Closed.

In the electrical schematics, the Digital Inputs / Output terminal is marked “X3”.

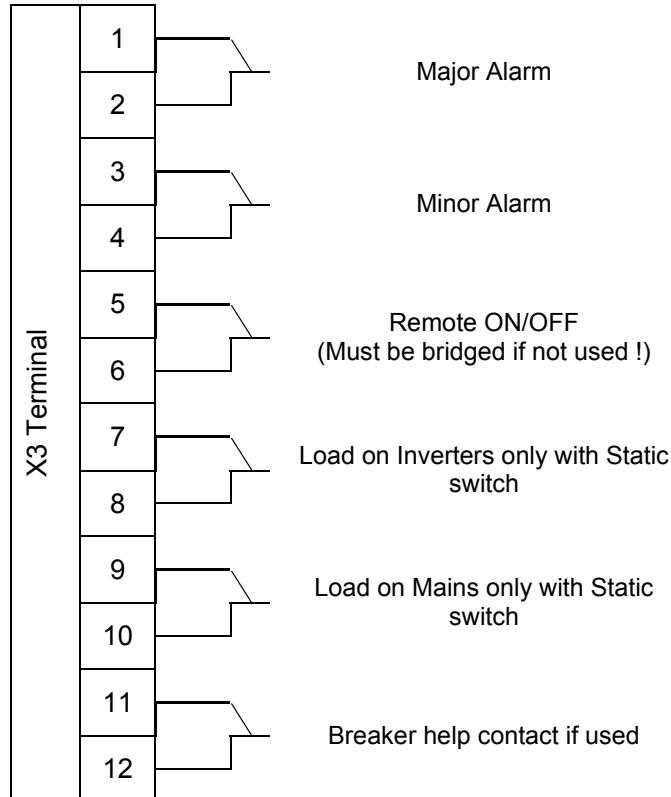


Figure 5-1 : X3 Terminal

Relay characteristics:

CAUTION: *The relay contacts may only be connected to SELV circuits (max 60 Vdc or 42.4 Vpeak).*

In this context, following relay characteristics are given for info only:

	DC	AC
• Nominal voltage:	24 Vdc	120 Vac
• Nominal current:	1A à 24 Vdc	0.5A à 120 Vac
• Max commutation current	2 A	2 A
• Max commutation power with resistive load	30 W	60 VA

Six signals are available on the terminal X3.

Four are Digital Outputs : Alarms (Major Alarm and Minor Alarm)
or Information Signals (Load on Inverters and Load on Mains)
Two are Digital Inputs : ON/OFF (starting/stopping remote command)

5.4.4.1 Alarms

Alarms are reported locally through LED and LCD displays and remotely through four potential free contacts :

- Minor alarm
- Major alarm
- Load on Inverters (Option)
- Load on Mains (Option)

Systems sends an alarm in following failure :

Alarm Level	Alarm Description
MINOR	AC input voltage failure in ON LINE
	AC input frequency out of range
	One inverter module failure
	DC input voltage out of range in OFF LINE
	Overload (please note that this alarm is adjustable on SYS 3000 in % of nominal power control unit)
MAJOR	AC input voltage failure in OFF LINE
	More than one module faulty
	DC input voltage out of range in ON LINE
	Static by-pass engaged (if used !)
	AC output breaker tripped (if used !)
LOAD ON INVERTER	Load is fed by inverters output
LOAD ON MAINS	Load is fed by AC input. The inverter system is by-passed.

Table 5-8 : Alarms description

5.4.4.2 Remote Command

To allow the system functioning, bond bridges link 5/6 terminals.

5.4.5 Grounding :

Inside the cabinet, at the right top, a steel bar is mounted which receives all the ground connection of the equipments of the cabinet. It's the point where client has to make his ground connection.

Be care of the Power Distribution System in which you are (see 5.4.3. AC output distribution)

Use for connection screws M10.
A more detailed plan is in the Appendix 3.

Refer to below table for more detailed information.

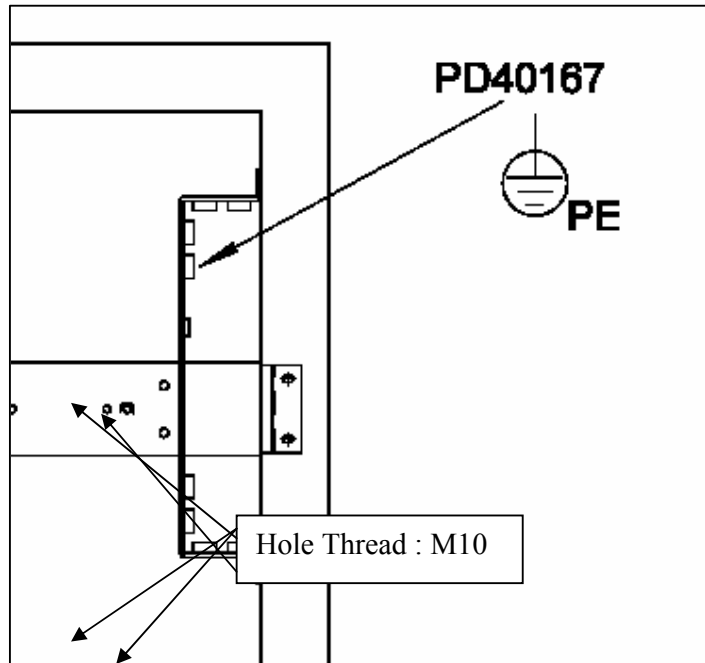


Figure 5-2 : Ground connection

	System Output Power	Output Current [A]	Minimal Wire Section	Tightening Torque		LUG
				[in.lbs]	[Nm]	
X	X	X	[mm ² / phase]			If use of Burndy double hole lug
	4 x 4 kVA	70	25	240	28	YAG4CL-2TC38-(0/45/90)
	8 x 4 kVA	140	70			YAG26L-2TC38-(0/45/90)
	10 x 4 kVA	175	70			YAG26L-2TC38-(0/45/90)
	4 x 3,5 kVA (120Vac)	120	50			YAG1CL-2TC38-(0/45/90)
	(7+1) x 3,5 kVA (120Vac)	240	95			YAG27L-2TC38-(0/45/90)

Table5-9 : Ground connection

5.4.6 Module (Inverter / Static Switch) connection

Please refer to the inverters user's manual for more detailed information

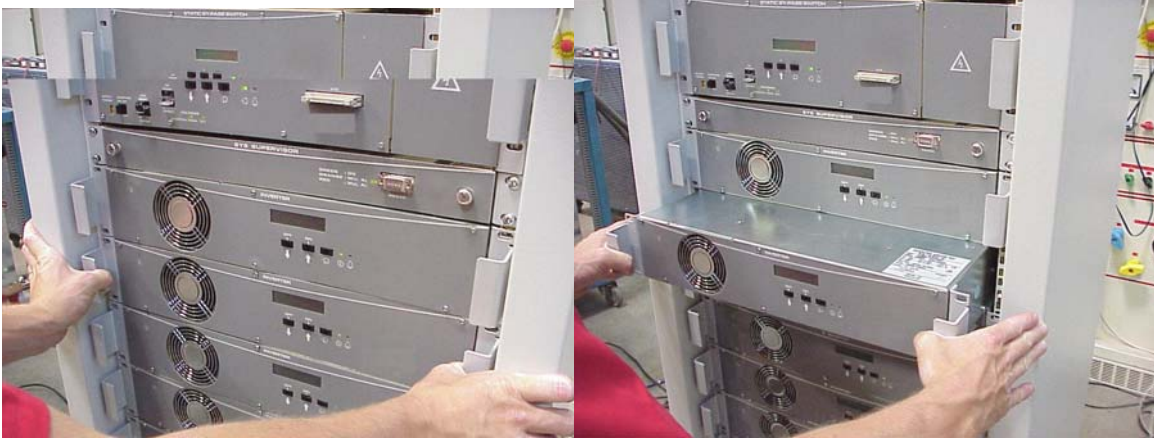


Figure 5-3 : Plug each inverter module in the provided space and secure them to the frame cabinet with the 4 previewed screws.

6. Commissioning

6.1 Start up for system without Static by-pass switch

Before connecting any power DC or AC to the System:

- Make sure you have followed the instruction for Installation.

1) Switch OFF all AC output breakers

3) Apply the DC power to the System

The Inverter will display:



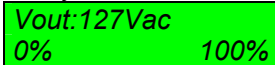
OFF RDI REM
0% 100%

4) Start the module one by one BEFORE CONNECTING THE LOAD

■ Switch ON the inverter by pressing one button ON

■ Switch ON the static switch ON/OFF switch in position ON

Verify that each module display:



Vout:127Vac
0% 100%


These values depends on factory setting and load condition

■ Switch OFF the inverter by pressing the button OFF

Repeat this process until you have tested all units

5. Switch ON all module locally by pressing the button ON

Each module displays:



OFF REM
0% 100%

6. Switch ON the LOAD breaker

6.2 Start up for system with Static by-pass switch

Before connecting any power DC or AC to the System:

- Make sure you have followed the instructions for Installation.
- Make sure the manual bypass is not ENGAGED (see section 6.1.3).
Wrong manipulation may damage the inverter.

2) Set the static switch ON/OFF switch in position OFF

3) Switch OFF all AC output breakers

5) Apply the DC power to the System

The Inverter will display:

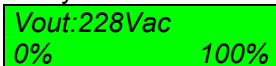


OFF RDI REM
0% 100%

6) Start the module one by one BEFORE CONNECTING THE LOAD

- Switch ON the inverter by pressing one button ON
- Switch ON the static switch ON/OFF switch in position ON

Verify that each module display:



Vout:228Vac
0% 100%

These values depend on factory setting and load condition

- Switch OFF the inverter by pressing the button OFF

Repeat this process until you have tested all units

5) Set static switch ON/OFF switch in position OFF

6) Switch ON all module locally by pressing the button ON

Each module displays:



OFF REM
0% 100%

7) Set the static switch ON/OFF switch on position ON

All modules will start.

8) Switch OFF all modules through static switch

9) Connect the commercial power to the System.

Static Switch displays Module OFF

Load supplied by Commercial power

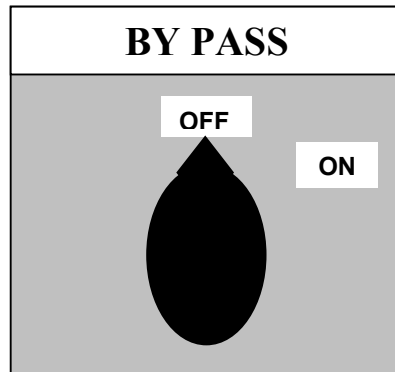
10) Start the inverter through the static switch ON/OFF switch

Inverter will start and synchronised with commercial power ac

11) Switch ON the LOAD breaker

6.2.1 Manual Bypass

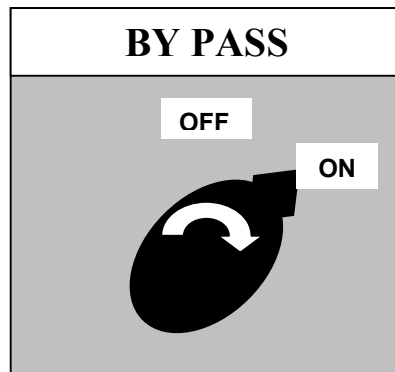
The Manual Bypass switch is shown below. It will allow the user to insulate the inverter and static switch from the load when some service has to be done on the System.



In normal operation, the manual by-pass is not engaged and is in the OFF position. In case of necessity the manual by-pass can be engaged to insulate the System from the load.

Procedure to engage the manual By-pass

- 1) Stop the inverters or transfer the load on Mains.
- 2) Set the switch to the ON position.



Procedure to disable the manual By-pass

- 1) Wait STM (if installed) start up displaying "load on mains"
- 2) Set the switch to the OFF position.
- 3) Start the inverters

WARNING!!! The Manual Bypass must be operated by qualified and trained personnel. An error in the procedure may result in power outage to the load and damage the inverter.

7. Extension

7.1 Install more inverters

An equipped cabinet is designed to receive a fixed maximum number of inverters (see table below).

	Description	Maximum number of inverters
	Equipped Cabinet 19" 4x4kVA without Static Switch	4
	Equipped Cabinet 19" 4x4kVA with Static Switch	4
	Equipped Cabinet 19" 8x4kVA without Static Switch	8
	Equipped Cabinet 19" 8x4kVA with Static Switch	8
	Equipped Cabinet 19" 10x4kVA without Static Switch	10
	Equipped Cabinet 19" 10x4kVA with Static Switch	10
	Equipped Cabinet 19" 4x3,5kVA without Static Switch	4
	Equipped Cabinet 19" 4x3,5kVA with Static Switch	4
	Equipped Cabinet 19" 8x3,5kVA without Static Switch	8
	Equipped Cabinet 19" 8x3,5kVA with Static Switch	8

Table 7-1 : Maximum number of inverters for each equipped cabinet

If in your system, the number of installed inverters is inferior to the maximum number of inverters for your cabinet, then it is possible to extend your system by installing some more inverters.

Our inverter technology is designed in “plug and play” philosophy. So, our inverters support hot swap and may be insert in the cabinet without disturbance when the system is under voltage and functioning.

To install an inverter more, please refer to 5.4.6. for more information.

To start up an inverter, please refer to 6.1 for more information.

7.2 Install extra DIN rail breakers

In the top of an equipped cabinet, an AC distribution of AC breakers is available.

AC distribution consist on one, two, three or no DIN rail bar on which are mounted breakers.

In case of choice of “no distribution”, a terminal is available.

On each AC distribution bar, breakers will have the same rating.
The breaker ratings available are 2, 6, 10, 16, 25, 32, 40 A.

Breakers are fed via a Multiclip connector to make very useful the distribution of phases and neutral to the breakers and to make easy an extension.

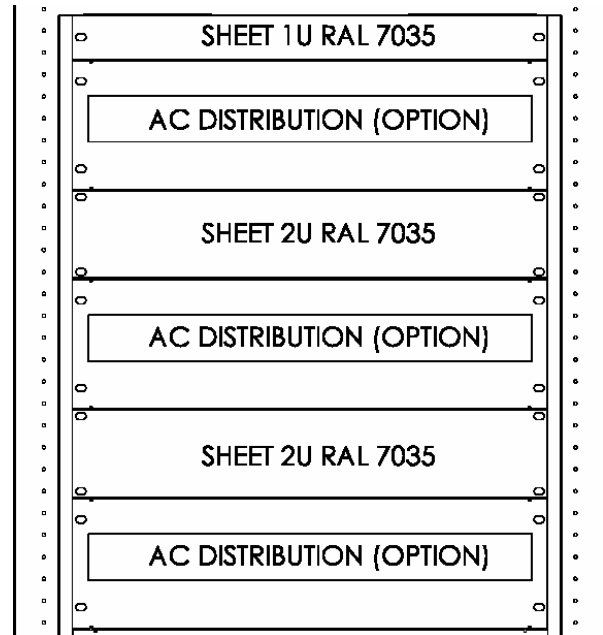


Figure 7-1 : Detail of the top of an equipped cabinet with its AC distribution

The possibilities in AC distribution are :

Distribution	Number of poles			
	1P	1P +Help	2P	2P + Help
No	NA	NA	NA	NA
1 bar	24	16	12	9
2 bars	48	32	24	18
3 bars	72	48	36	27

Table 7-2 : Maximum number of breakers per bar of distribution

Please follow instructions to install breakers :

0. Remove front panel covering the breaker
4. Plug in the DIN rail breaker to be installed closed to the first free position
5. Wire the breaker poles phases (and neutral).
 - a. Insert wire into breaker first
 - b. Then insert wire to the terminal of the multiclip closed to the breaker. (BROWN for phases and BLUE for Neutral)
6. Be sure the breaker is in OFF position
7. Connect the cable from the load to the breaker

Note: For personnel safety and protection of Equipment this unit must be properly grounded (DC ground connected on plate area, soldered on frame).

8. Troubleshooting

8.1 Fault Status

Fault Status are signaled on the LCD display of

- the inverters
- the Static Switch (if present)
- the supervision SYS 3000 (if this option is present)

If an alarm is signaled on the LCD display, please refer to the operation manual of the failing equipment.

Some outgoing signals are also available to control remotely that the system is going on/down. Please refer to 5.4.4 for more detailed information about alarms signaling.

8.2 Module replacement

Due to the modularity concept, it is very easy to replace one inverter. The replacement can be done while the System is under operation “hot-swappable solution”. See *inverter manual for more details*.

8.3 Diagnostic

To help us to diagnostic and solve your problem, please fill in the document in Appendix 2 : “Module Defect Sheet” and fax it.

9. Maintenance

Maintenance as to be done by trained personnel only

The purpose of the maintenance is to check the proper operation of the System.

9.1 General Aspect

Care must be taken to prevent dust, which can damage electronic components, by reducing the ESD distances. If necessary, remove dust by using industrial tools such as industrial vacuum cleaner.

DO NOT use any cleaning equipment using any liquid
DO NOT insert any metallic tool inside the equipment.

If necessary engage the manual bypass (see section 6.2.1) and remove each unit from the System to clean it properly.

9.2 Inverter Module

The System is based on modular concept. Thus, we will check each individual unit and verify that they operate all at the same level of load and conditions.

Please refer to inverter controller manual and static switch manual for more detail

Check that all inverter modules are operating by looking on the LCD display and scrolling the menu :

- the AC output voltage on the LCD display
- the AC output current of each individual module are correctly balanced

This balance can be calculated by reading the total current given all module and divide by the number of module

Each inverter should give this value within 10% tolerance

- Verify the T° of the heatsink and all units should be in the same range with a maximum of 10 degrees Centigrade deviation.

The T° can be read on the LCD display by scrolling the menu

- Static switch in the System
- check that output voltage and current is in accordance with the load
- verify that no alarms is present

10. Technical Data

10.1 EMC

The inverter fulfill the following standards:

EN50081/ IEC 61000-6-3	Generic emission standard
EN50082 / IEC 61000-6-1	Generic immunity standard
CISPR 22 class B	Limits and methods of measurements of radio interference characteristics of information technology equipment.

10.2 Safety

IEC/EN 60 950-1 Safety of information technology equipment.

The power supply System fulfills those international and national safety standard that are made for these Systems according to earthing, fire protection and other safety matters. It's has designed to be installed in a retricted access location only and over a concrete or non-combustible ground.

It uses 90°C copper conductors only.

10.3 Commercial power interface

ETS 300 132-1 Power supply interface at the input to telecommunications equipment.

10.4 AC input

AC Input voltage	230 Vac rms +/- 10%	120VAC rms +/- 10%
Frequency	50Hz +/- 5%	60 Hz +/- 5%
AC input type	Single phase	Single phase
AC input current	max 175 A rms permanent	Max 175 A rms permanent

10.5 DC input

DC input voltage	48 Vdc or 60 Vdc nominal (min 40 Vdc max 60 Vdc)
DC input current	600 A max. at 21000W Vin = 40VDC 1200 A during 5 seconds overload 42000 W
Inrush current	max In/2

10.6 DC distribution

Each inverter has an input DC fuses 100 A, C curve one pole
 The DC input fuse is in the negative pole.
See cabinet arrangement for detail

10.7 AC output distribution

AC Voltage		Output Power	Output Current [A]
230 VAC 50 / 60 Hz		4 x 4 kVA	70
		8 x 4 kVA	140
		10 x 4 kVA	175
120 VAC 60 Hz		4 x 3,5 kVA (120Vac)	120
		(7+1) x 3,5 kVA (120Vac)	240

Table 10-1 : AC output distribution

10.8 System dimensions & weight

Height	2100 mm	83.0 inches
Width	600 mm	23.62 inches
Depth	600 mm	23.62 inches
Weight	190 kg without modules	420 lbs. Without modules

10.9 Environment

Ambient operation temperature	0 °C to +40 °C	32 °F to 113 °F
Storage Temperature	-40 °C to +85 °C	-40 °F to 185 °F
Vibration	IEC 721-3-3	
Shock	IEC 721-3-2	
Cooling	Forced convection	
Audible noise	< 55 dB(A)	

11. APPENDIX

11.1 Appendix 1 : Installation and Commissioning certificate

The scope of this document is to provide a commissioning protocol for the contractor personnel that install and commissions a CMS inverter System. Please refer to the operation manual for more details.

11.1.1 Installation

Cabinet are properly placed and stable	
Cables support are properly fixed	
Positive bus bar connection « + » connected to DC input + terminal	
Negative bus bar connection « - » connected to DC input – terminal	
AC input and output cables installation AC	
AC input connection properly done (L + N + PE) on terminal X2	
AC output connection properly done (L + N) on output terminal	
PE connection properly done	
Inverter module are correctly installed and fixed in the rack	
DC, AC and Digital bus cable are correctly connected to each inverter module	
Inverter module are correctly inserted and fixed	
Inverter cabinet is correctly connected to EARTH	
Neutral N is connected to EARTH (If required!)	

11.1.2 Commissioning

11.1.2.1 Verification

All Cable DC and AC are connected	
All EARTH connection are done (cabinet and AC output)	
Controller – version Serial Number	
Inverter module type: 48 V /..... KVA	
Serial N°	
Digital bus connected between inverter, static switch and control unit	
Inverter labelling	
DC input, commercial power AC input, LOAD AC output labelling	

11.1.2.2 Connect the DC voltage to the System

SYS3000 configuration (see menu 10. Configuration)	
SYS3000 password if required	
Start All inverter module through STM150 if present or through module ON/OFF	
Current Load sharing between inverter (see on inverter current LCD display)	

Apply AC voltage to the System if required

Apply commercial power ac input measure ac voltage on terminal X2	
If STM150 is present verify synchronism on STM150 LCD display	

11.1.2.3 Alarms Test

DEFAULT	UA	NUA	OK
One Inverter module OFF		X	
More than one inverter OFF	X		
Ac output MCB tripped	X		
Ac input failure (commercial power failure)		X	

Contractor :

Date :	Contact :	Visa :
--------	-----------	--------

11.2 Appendix 2 : Defective module sheet

The scope of this sheet is to receive as much information to identify the reasons and gives to the user a report on what happened in this faulty case. Further to this it will help our service and quality departments to improve the quality of our products. Please fill this document carefully and return it with the defect unit or FAX.

Configuration	Answer
Number of inverters installed in the system	
Module type and model	
Serial number	
SYS3000 software version if installed in the system	
Model and serial number of the Arcon STM in the system	

Fault description : Please, describe the fault conditions, type of load, and output current

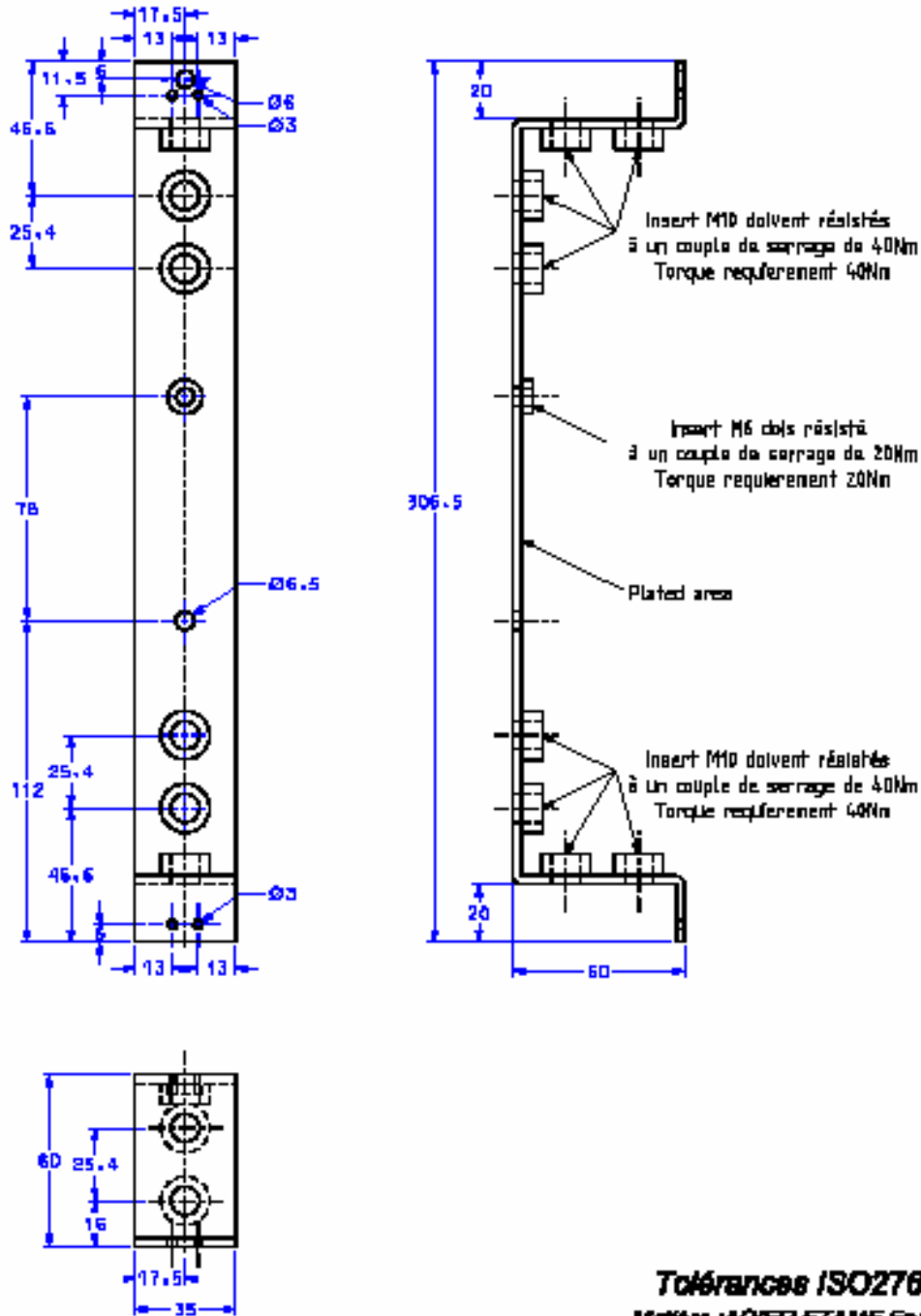
Message on the Inverter Module LCD display :

Message on the STM Module LCD display (if present) :

Contractor :

Date :	Contact :	Visa :

11.3 Appendix 3 : Detail of the ground connector of the cabinet



Tolérances ISO2768-IT
Matière : ACIER ETAINÉ Ep: 3mm
PLATED STEEL

11.4 Appendix 4 : The different electrical installations in buildings

