TECHNICAL MANUAL

DCI/G4 48V INVERTER MODULES

600VA - 1.2 KVA - 2KVA - 3KVA

DESCRIPTION AND OPERATING MANUAL

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Réf. DCI/G4 48V.DOC
Edition 1
02/05/00

ISO9001 certified

TECHNICAL MANUAL

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I. GENERAL INFORMATION

The DCI/G4 48V inverters are modern converters using new concepts in the fields of DC/AC conversion.

Light and very compact, these inverters are designed to operate with all direct voltages used in the industry and telecommunication field (voltage input range from 40 to 80V).

In addition to their excellent functional capability and their exceptional dynamic performance characteristics, mention should be made of their great flexibility of use in various configurations:

- inverter alone,
- inverter alone + integrated static by-pass (ISTM) to have a standalone inverter with an electronic by-pass,
- inverters working in parallel with n+1 redundancy,
- inverters working in parallel with n+1 redundancy and electronic by-pass.

The scope of this manual is restricted to give a description of the DCI/G4 48V inverters. The various configurations in which these converters can be used are described in separate documentation.

II. CONSTRUCTIONAL FEATURES

1. The DCI/G4 48V Inverters

The DCI 48V Inverter modules are built into the form of a 19 " rack, 3 U height and 5 U height (see FIG. 1a,1b and 1c).

Located on the front panel are (see Fig.2a,2b):

- the AC output socket
- the output breaker
- the input breaker
- the DC input connector
- the synchronisation and parallel working connector
- the ON and OFF push button
- the menu push button to go in the different menu on the display or in the configuration menu.
- the LEDs for the local status
- the display 2 lines x 16 characters each for measurements, messages and parameters setting.
- the RS 232 connector to upload easily, in the control card, any upgrade version of the program.

2. The front panel interface

This is a printed circuit board designed to provide :

- a digital display of the inverter status and measurement,
- 1On and 1OFF push button for switching the inverter ON or OFF or to modify the configurable parameters.
- a push button to allow selection of the displayed value in the menu (voltage, current, frequency, power), or to enter in the configuration menu
- various LEDs indicating the functional state of the unit and any malfunctions,
- a digital bus connector to parallelize and synchronise the inverter module and to provide alarm contacts of the module

III. FUNCTIONAL CHARACTERISTICS

1. Inverter and user interface

When the module is installed and connected the following are available to the operator :

a) the following local controls :

- the ON and OFF control push button of the inverter(these push button also allow to modify the configurable parameters.

- the MENU push button by pressing allows the user to go in the different sub menu to display various measurements (voltage, current, frequency, power, temperature). This push button also allows to enter in the configuration menu (see the apposite section)

b) the display :

- 2 LEDs are provided to indicate the following :

- GREEN : Inverter is ON and operational → Led continuously on
  Inverter in recoverable error state → Led blinks

- RED : Major fault → Led continuously on
  The module is failed or wrong. In such case, a message is displayed on the display to give the fault reason or origin.
  Minor fault → Led blinks
  The inverter continues to work and the origin of the minor fault appears **blinking** on second line of the display

- 2 lines x 16 characters each to display measurement, messages and configuration parameters of inverter module.

2. Inverter in stand alone operation:

To install the module require
- the DC+AC cable kit
- to use the starting connector (V510482314) you plug in X13 if you don't need remote alarm
- to use the alarm PCB Interface (V 510482195) if you need remote alarm

3. Inverters working in parallel (see fig. 7)

The inverters modules can be set to work in parallel by carrying out the following operations:

- by forming an AC power bus (connecting together the outputs sockets),
- by forming a DC power bus,
- by forming parallelization and synchronisation bus, connecting together the ad hoc terminals of the bus connector (in case you don't use a STS, you have to add the PCB interface V510482301.

To obtain a good active current sharing between the modules the individual output voltage are set in factory at 230 V with a ½ full load .

It is easy to change the value of the nominal output voltage following the procedure described in the menus section.

Before to start the first time a system with inverter working in parallel, the user has to read the section VI concerning the module addressing procedure!

4. ON/OFF management

The modules can be started or stopped from 3 different process.

1) the **local ON/OFF** push button: **DCI** indication on display
2) Through the bus using the pins **MSTAIN** and **REMOTE**: **REM** indication on display (it is easier to use the PCB interface V510482301 if the user needs remote control)
3) From the bus through IS 1000 commands: **IS** indication on display .

A module can only start if the 3 previous process allow it

The default menu shows the off state with all processes responsible of this off state.
Example:

OFF DCI REM IS 0%[----------]100%	This module is off because the all 3 processes stop it. Pressing the ON push button this module remains off due to REM and IS and the display becomes :
OFF REM IS 0%[----------]100%	If an command ON comes from IS 1000, the display shows this module remains off due to REM mode and the display becomes:
OFF REM 0%[----------]100%	If the remote switch is in ON mode the module starts and the **display will** show the physical values in visualisation mode. After that if the module is stopped with the local push button the display will show the following indication:
OFF DCI 0%[----------]100%	This screen clearly shows only local push button is responsible of the OFF state

IV. OPERATING PRINCIPLES

1. The DCI / G4 48V inverters

The module shown in Fig. 1a contains principally 2 mains PCB and 3mains PCB for the modules shown in Fig 1b,1c:

- 1 main board for the module of the Fig. 1a and 2 main boards for the module of the Fig. 1b,1c
- 1 " control card " with all control functions :

- digital control and regulation of the inverter,
- to watch the DC input voltage,
- to watch the limit temperature on rear heat sink,
- to monitor the module and giving status on the display in case of failure,
- the interfacing with external operator and digital bus for parallel operation between module,
- To change some parameters with the "parameter menu"

The diagram in Fig. 3 shows the essential functional parts of the inverter.

At the output from the low frequency filter, a dual forward circuit builds a PWM sinusoidally modulated voltage.

After filtering by elements, a rectified sine wave is obtained with a frequency of 100 Hz.
An sinusoidal voltage is obtained by means of the 50 Hz inverting bridge.

Because of the unidirectional operation of the forward circuit it was found necessary to introduce a compensator making it possible to connect inductive loads to the inverter output.
This compensator includes capacitors, the insertion of which is controlled through the control board depending on the load characteristics.
A " dissipator " stage makes it possible:
- to compensate exactly inductive loads,
- for the inverter to feed capacitive loads up to cosine phi of 0.9,
- to make transient compensation in the event of loading or unloading inductive load (the compensation capacitors are only connected when the voltage cross through zero).

Fig. 3 also shows at the input:

- a low-frequency filter which limits the AC current taken from the power supply source,
- an RFI filter for reducing conducted interference,
- an input DC contactor to connect the DC supply (or disconnect in the event of an inverter breakdown)
- a protective input circuit breaker.

The following will be found at the output:

- a protective circuit breaker,
- an output contactor which closes only when the inverter is working properly, and opens in the event of an incident (insulation in relation to AC power bus when several inverters are working in parallel);
- a RFI filter for reducing conducted interference to level B in EN55022.

2. Starting and running sequence

By switching-on input breaker, the auxiliary switching power supply starts and the big input capacitors are soft charging.

This state remains until the push button " ON " on control board is not pressed.

By pressing the suitable push button on the control board, the inverter starts following this sequence:

- closing of input contactor and starting of the different power conversion stages,
- when the power stages are running, before closing the output contactor, the control board verifies if any AC voltage is present on the bus. If yes, the processor checks the phase between inverter AC output and the bus

- if both are in phase, the output contactor is closed and the voltage is on the AC bus. If not, the module will stop and display " output voltage inverse ".

The default-displayed values are :

- output voltage — Vout = 230 Volts
- output current — bar-graph with 10 steps of 10%

By pressing the push button “MENU”, operator can display several data about the module or the system.

Hereafter some values or information you can see (see the section **“MENUS”** to have more details) :

- Active output power of the module
- Value of the output current in Amp.
- Total power given by all modules in parallel
- Total current given by all modules in parallel
- Power factor of load (Pf)
- Crest factor of the module current
- DC input voltage
- Heatsink temperature
- Output voltage frequency
- Serial number and software version
- Address number of the module and number of modules
- Group number where the module is installed

If the inverters module are paralleled with an electronic by-pass (STS 20 000 or STS 6000) the local ON and OFF push button have no direct action without the STS switch “ON-OFF” in position “ON” because all inverters are started or stopped with this last switch (consult the STS manual to have more details).

V. PROTECTIONS AND ALARMS

1. Internal electronic protection

The DCI/G4 48V modules are provided with internal electronic protections. With the control board it is possible to see locally or to report faraway the action to the protections.

There are 3 protection types :

a) Protections stopping the module without automatic re-starting

That kind of protection acts when a serious internal fault results. There is module disconnection in relation to DC input power bus and AC output power bus (without automatic re-starting). When a module will stop, it will display the reason or fault origin.

b) Protections stopping the module with automatic re-starting

That kind of protection acts when some parameters reach temporarily their own tolerable limit.

The action of that protection results by stopping the inverter with automatic re-starting if the parameter out of range finds a normal value again.

Those protections switch-on when :

A DC input voltage out of range occurs (standard value are V< 40 V or V > 80 V). If the under input voltage protection is switched-on, the re-starting happens when V > 47 V ± 1 V (standard value).
If the over input voltage protection is switched-on, the re-starting occurs when V < 79 V (standard value).

The message " input voltage too low " or " input voltage too high " will be displayed in such cases.

c) Protection without module stopping

That protection concerns only the output power limiting. The module is able to give an output power in a large range during more than 5 sec (see fig. 4a and 4b). If the overload continues over, the inverter output current is limited depending on heatsink temperature.

Between Pn and 1.15 Pn (1.3 Pn for the 2KVA) → see fig 5a,5b an overload is permitted without a fixed time duration.
In fact in such a case, the overload time is only limited depending from a programmed limit of temperature on the rear heatsink.

2. Breakers protection

As shown in Fig. 2a,2b the DCI / G4 48V modules are protected by input breaker and output breaker.
If the output breaker is open, a message " output fuse open " is displayed.

3. Errors and messages

The inverter can be in 3 different states:
FO = fully operational: an output voltage is present on output terminal.
NFO_NFAULT = not fully operational, no fault: the inverter is deliberately stopped.
NFO_FAULT = 1 detected fault has stopped the inverter.
2 kinds of detected fault exist: **recoverable and unrecoverable error.**
Recoverable error: the inverter restarts if the fault disappear
Unrecoverable error: the inverter only can be manually restarted.
The user can read the following error message list on the front display.
Note:

- Vo too low or too high are fixed through a parameter having the value 20V and represent the deviation with the nominal output voltage.
- Recoverable errors in the list are indicated with **R**

Error message list:

Out of sync	**R**: inverter not synchronised
Cable not conn.	: An internal cable is not connected
No bus connected	**R**: X13 is not connected
Same module number	**R**: hard or numerical error (2 modules have the same address: with G4 generation that is only possible if G4 Inverters run with previous old inverters.
Vin inverse	: the DC input wires are inverted (polarity error)
Vin too low	**R**: input voltage under the stopping (or restarting) voltage).
Vin too high	**R**: input voltage over the stopping (or restarting) voltage
Charge failed	:the input capacitors are not correctly charged
Vout too low	: Vo is too low and the Io is < 70% of nominal current
Vout too high	: Vo too high and Po is > 0
Vout inverse	: the output voltage on the AC power bus is not in phase
Output fuse open	**R**: the output breaker is open.
Temp too high	**R**: Temperature > 95°C.
Temp too low	: Temperature < -20°C.
Over current	: over current in the IGBT bridge
Too many starts	: more than 10 attempts/minute (5x2sec+5x10sec)
Error mod. type	: hardware type ≠ EEPROM type
*Vout too low***.**	: Vo is too low and the output power is negative→ the module is stop within 30 to 50 msec.
AC bus failure	: If the output power is < 1% and the theoretical power must be over 10% → the module stops if this situation remains present during more than 5 sec.5
Power inverse	: inverse output power
Start Vout low	**R**: the inverter cannot give a sufficient voltage at starting.
Start Vout high	**R**: the inverter gives a too high voltage at starting.
Overload too lng	: overload giving an output voltage under Vout min during a time > permitted delay (see parametric menu)

Minor alarm can appear on the second line of the display in **Blinking** mode:

Load shar. low : the inverter has reached the minimum internal correctable voltage value and cannot more ensure the load sharing.

Param. query : the inverter ask the other inverters to get their set parameters for verification.

Param. mismatch :the parameter verification process detects an incompatible situation and the inverter cannot start.

Param. modify.. : In the parametric mode process, the inverter gives to the other inverters the order to modify their parameters.(note that Vout is modified with a slope rate of 1V/sec).

Imminent restart : the inverter will start in a laps time of 5 sec.

Limit./ overload : Irms>limit → see the overload limit in parametric mode.

Vout modify : the inverter modifies its own voltage following the order received from an other inverter.

Time elapsed : the running time in relation with payment protection is elapsed.

Limited running : the payment protection is activated.

Vout below limit : Vout under the fixed limit.

4. Payment protection

Normally, the payment protection is deactivated when the inverters leave the factory.
This protection is only activated for customers in chronic state of overdue payment.
The protection only can be deactivated introducing the apposite code the customer can get from CE+T after payment (each inverter has its own code).
See the menu “payment protection” in parametric menu to deactivate the protection.
When the protection is deactivated it becomes quite invisible for the user.
When the protection is activated, the message “limited working” is displayed every 5 seconds.
After to run 90 days, the protection avoid to start the module → the module becomes unusable.
If the module run when the limit time is reached, it continues to run but gives alarms each 10 seconds with alarm relay and is definitively stopped after the first stop → after that it is impossible to restart the module without to deactivate the protection.

VI. Module addressing process:

It is possible to parallelize up to 16 modules.
When several modules work in parallel, each module must have a different address.
The possible address numbers start from 0 up to 15.
In the previous, and compatible, version of DCI modules the address number was set using an address selector.
In the G4 version, there are 2 modes to address a module:

- Automatic addressing (self addressing)
- Manual addressing with the configuration menu

The user has to know that each G4 inverter leaves the factory with the address "0".

1. Automatic addressing

This process addressing can be performed in the 2 following cases:

- **Several inverters have to run in parallel in a system, without IS 1000 controller, started the first time after the inverters left the factory.**
- **A new module is used to replace a faulty module in a system without IS 1000 controller.**

1.1 Process for a system started the first time with module not used in a system after to have left the factory:

- Each module is installed in the system with input and output circuit breakers in position "OFF"
- Connect the DC voltage to the system
- Set the input breaker of each inverter, one by one, in position "ON" in the order you wish to have the address (first inverter started takes the address 0, the second takes the address 1, the third the address 2…)
- After that you can start each module following the procedure suitable for the system (with or without STS).

Note:

1. If the DC voltage is apply on the system with the input circuit breaker of each inverter in position "ON", the inverters take a address with a random process and keep it.
2. In any case the inverters keep the automatic address received which only can be change with manual addressing procedure.

1.2 Process to replace a faulty module:

If a new module takes the place of a faulty module in a system, it takes automatically the first free address when the input breaker is switched in "ON" position. The "hot swap" replacement can be performed without complicate procedure.

2. Manual addressing procedure

The manual addressing procedure is recommended in the following cases:

- The inverter system is split in several group of inverters
- The inverter system with controlled by an IS 1000
- In a “hot swap” procedure when the faulty module must be changed with a module having exactly the same address.

To give the apposite address to each inverter you have to follow the procedure described in the “MENU” section.

VII. Menus:

The menus are divided into 3 groups:

- Visualisation menus: display information such Vin, Vout, Iout, frequency…
- Parametric menus: display the modifiable menus.
- Factory mode menu: display information useful for service.

1. Menus in visualisation mode

Vout : 235 Vac 0% ▮▮▯▯▯ 100%	Vout: output voltage The bar graph shows the output current level
Vout : 235 Vac 100% ▮▯▯▯ 200%	Vout: output voltage The bar graph shows the overload level
OFF DCI REM IS 0% ▯▯▯▯▯ 100%	The inverter is stopped and the one or more possible reasons are shown(see the ON/OFF Management in the **Functional Characteristic** section, point 4)

The previous screen are default displays.

Briefly pushing the taste "→" the following screen can be seen if the module is running:

P(module : 1360W I(module) : 5.7A	Output power of this module Output current of this module

Each brief pushing of the taste "→" allows to display the other following screen:

P(system) : 5.9kW I(system) : 25.6A	Total power of the system Total current of the system

Pf(module) : 0.95 Icf(module) : 1.42	Power factor of the module (active power/apparent power) Crest factor of the module current (Imax/Irms)
Input: 45.8Vdc	DC input voltage
Temp.: 57°C Freq.: 50.00Hz	Temp.: temperature on the heat sink Freq.: measured frequency
Module: 15/02 SN09111111 V3.38	First number = number of modules in the system Second number = address of the module Serial number and number of software version Note: If a special version of the basic (default) parameters is Installed the software version is for instance:S3.38 for Switzerland. Other default parameter can be created. Today, only the standard and Switzerland version exist.

Brief pushing on taste “menu” after this screen go back on the first screen

2. Menus in parametric mode:

When the inverter is supplied by the DC source, but not started (with the input breaker in "ON" position and output breaker in position "ON" or "OFF"), it is possible to enter in the parametric mode.
Pressing more than 2 seconds the key "→" the user enters in the parametric mode.
The first screen the user can see is the following:

Module: >>14

Pressing the key ↑ and ↓ it is possible to increase or decrease the inverter number.
Note:

- If a number is already used for an other inverter, this number is automatically passed.
- If the inverter is running, the following message appear:

Access denied NOT LOCAL OFF

If an inverter of the previous generation is present on the paralleling bus, any parametric menus cannot be modified.
If all inverters belong to the new generation, the parameters of the following menus can be modified.
After the previous screen, pushing briefly the key → the user can see all the following menus and modify the parameters:

Contrast: >> 100

The contrast can be modified to higher or lower values with the key ↑ and ↓

Range: >> 200..240 Vout: 232Vac

To choose the output voltage range between 2 ranges (110..130 and 200..240Vac)
Actual value of the output voltage at the 1/2 nominal and resistive load.
Note: Today, only the range 200..240V is activated.

Range: 200..240 Vout: >> 232Vac

Range of the output voltage value of the output voltage to modify

(with step of 1V) to higher or lower values with the keys ↑ and ↓

Note: To modify the output voltage of a complete system it is only sufficient modifying one

stopped inverter→ the other inverters follow the modification with a slope rate of 1V/sec.

Vout min:>>80Vac Delay: 600.0s	Limit of Vout min. Can be modified with the keys ↑ and ↓ Under this output voltage the running time is limited. After this time the inverter under the above voltage value stops and gives the message ”overload too long” Note: Vout min can be change in the range 80..240Vac
Vout min: 80Vac Delay: >> 600.0s	Limit of the minimum voltage under which the running time is limited. The delay time can be set in the range 0..600sec
Vi low stop: >> 41.0V	Minimum stopping input voltage Step change: 0.1V. Range : 39..81V
Vi low restart: >> 47.0V	Minimum input restarting voltage Setting value
Vi high restart: >> 75.0V	Maximum input restarting voltage Setting value
Vi high stop: >> 80.0V	Maximum input stopping voltage Setting value **Note: Vi low or high, stop or restart can be changed with step of 0.1V in the range 39..81V and a minimum hysteresis of 3.0V**
Frequency: >> 50Hz	Menu to set the output frequency between 2 values (50.0 or 60.0 Hz)

Briefly pressing the key → the following menu is only activated if the payment protection is activated.

Code: >>025 253 Time: 11620

To introduce the code to deactivate the protection (3 first figures)
Remaining running time in minute (step of 10 min)

Code: 025 >> 253 Time: 11620

To introduce the 3 last figures of the code

Next pushing on key → come back to the first screen in parametric mode.
Pressing the key → during 2 sec allows to store the parameters in EEPROM and to come back in visualisation menu.

3. Menus in factory mode

Pressing more than 2 sec on key ↑ or on key ↓ allows to enter in the first menu in factory mode.

D:2 C:33 Lim.I:6 L:-25 PE:10W

D: dissipator table C: number of capacitors activated in the compensator. Lim.I: give the curve used for the output current limitation. L: load sharing curve used (65 possible curves).
PE: estimated power in the dissipator.

Briefly pressing the key → allows to enter in the following menu:

Last error: 5 Output fuse open

Show the value of the error counter.

Indicate the type of the recorded error.

Briefly pressing the key → allows to come back in the visualisation mode.

VIII. Installation and Commissioning

1. Installation

Figure 7 shows an Inverter system with several inverter connected in parallel.
To install an inverter module inside an existing precabled rack:

1.1 Fit the appropriate accessories in order to install the module in the rack

- Brace of 19 inches handles for 19 inches standard rack
- Brace of Steel angle to install the module inside our rack

1.2 Install the module in the rack (mechanical fixing + connections) setting the input and output breaker in position “off”

2. commissioning

2.1 Supply the system with DC source.

2.2 Set the input breaker on position “ON” in the order you want to have each module address in your system (see the section **“module addressing procedure”)**

2.3 Set the output breaker on position “ON”

2.4 Reading the display:

Vout = 0 Volt
Iout bar graph indicating 0%

2.5 Press the ON push button of each module.
If there is no electronic by-pass the modules start.
(If there is an electronic by-pass read the apposite manual to continue).

Reading the displays :

Vout = 230 Volt
Iout bar graph shows the % of nominal load supplies by the module.
It is possible to move in the visualisation menu by pressing shortly the menu push button and see if everything’s all right.

I. DATA AND SPECIFICATIONS

1. Input specifications

1.1 Input voltage

Nominal input voltage	48 V DC
Operating voltage range	40 up to 80 V DC
Stopping voltages	40 V ± 1 V and 80 V ± 1 V (These standard values are adjustable)
Restart voltages	47 V ± 1 V and 78 V ± 1 V (These standard values are adjustable)

2.1 Input current

Maximum input current (**600VA**)	< 17A at Sout = 600 VA at Uin min < 30A during t ≥5 sec at 100% overload and 48V input voltage
Maximum input current (**1.2 KVA**)	< 34A at Sout = 1.2 KVA at Uin min < 58A during t ≥5 sec at 100% overload and 48V input voltage
Maximum input current (**2 KVA**)	< 58A at Sout = 2 KVA at Uin min < 112A during t ≥5 sec at 100% overload and 48V input voltage
Maximum input current (**3 KVA**)	< 86A at Sout = 3 KVA at Uin min < 138A during t ≥5 sec at 100% overload and 48V input voltage
Inrush current	In/2

2. Output specifications

2.1 Output voltage

Nominal output voltage	230 V AC (standard value)
Adjustable output voltage range	200…240 V
Output voltage tolerance	UN ± 3%…
	(DC voltage range + load range + t° range)
Output voltage frequency	50 Hz ± 0,1 Hz (standard value)
	60 Hz ± 0,1 Hz (adjustable value)
Total harmonic distortion	≤3% at linear load in the range of fig. 6
Total transient recovery time	≤ 0,3msec
Turn on delay	< 3 sec

2.2 Output current

Nominal value of output current	2.6A at Uout nominal = 230V	**(600 VA)**
Short circuit output current	> 5.6A peak during min. 5 sec	**(600 VA)**
Nominal value of output current	5.2A at Uout nominal = 230V	**(1.2 KVA)**
Short circuit output current	> 11A peak during min. 5 sec	**(1.2 KVA)**
Nominal value of output current	8.7A at Uout nominal = 230V	**(2 KVA)**
Short circuit output current	> 24A peak during min. 5 sec	**(2 KVA)**
Nominal value of output current	13A at Uout nominal = 230V	**(3 KVA)**
Short circuit output current	> 36A peak during min. 5 sec	**(3 KVA)**
Crest factor	> 2,8	**All model**

3. Output power

Nominal value of the apparent power	Sn out = 600 VA – 1.2 KVA – 2 KVA – 3 KVA
Overload during 5 sec (self protected)	1000 VA – 2 KVA – 4 KVA – 5 KVA
Other overload depend versus T° conditions	
See the fig 4a and 4b for overload capabilities.	
Nominal value of the output power	Pn out = 600 W – 1.2 kW – 2 kW – 3 kW
power factor	see Fig. 5

4. Electro magnetic compatibility

4.1 Standards applied for immunity

EN 61000-4-2
EN 61000-4-3
EN 61000-4-4
EN 61000-4-6
ENV 50204

4.2 Standards applied for emission

EN55022 class B (radiated)
EN55022 class B (conducted)

5. Efficiency

≥ 89% at nominal voltage and nominal resistive load

6. Operational mode:

Parallelable operation allowed up to 16 modules in parallel

7. Temperature

Storage temperature:	- 40° to 80°C
Permissible ambient temperature in service:	O° to 50°C

8. MTBF

According to MIL-HDBK 217F method

600 VA	1.2 KVA	2 KVA	3 KVA
≥ 190000 H	≥ 180000 H	≥ 160000 H	≥ 150000 H

9. Dielectric strength

4000 V DC input/output

4000 V DC output/ground

2000 V DC input/ground

10. Input and output breakers

	600 VA	1.2 KVA	2 KVA	3 KVA	
DC input breaker :	25 A	50A	80A	2x50A	**medium**
AC output inverter breaker:	7.5 A	15A	25A	35A	**medium**

11. Safety

Conform to IEC 950

12. Dimension and weight

Dimension (W x D x H in mm):	436 x 347 x 3 Units high (600VA and 1.2 KVA)
	436 x 347 x 5 Units high (2 KVA and 3 KVA)
Weight approximately:	11 Kg (600 VA , 1.2 KVA); 18 Kg (2 KVA, 3KVA)

Figure 1a : DCI/G4 600VA and 1.2KVA - 48 VDC module

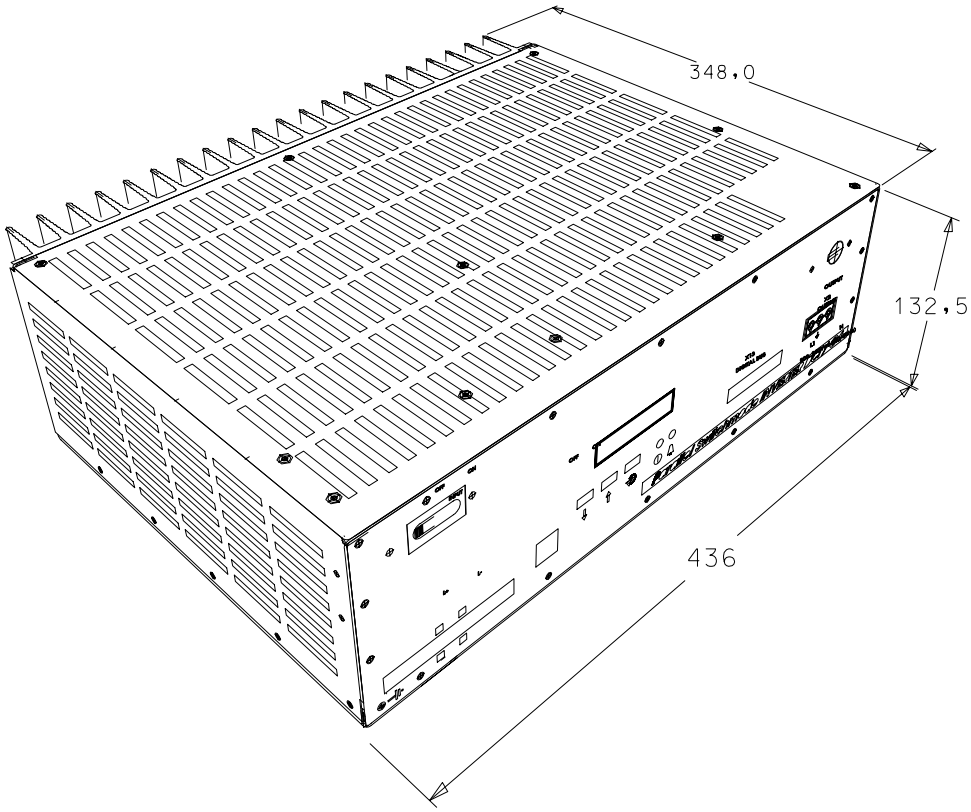


Figure 1b : DCI 2KVA - 48 VDC module

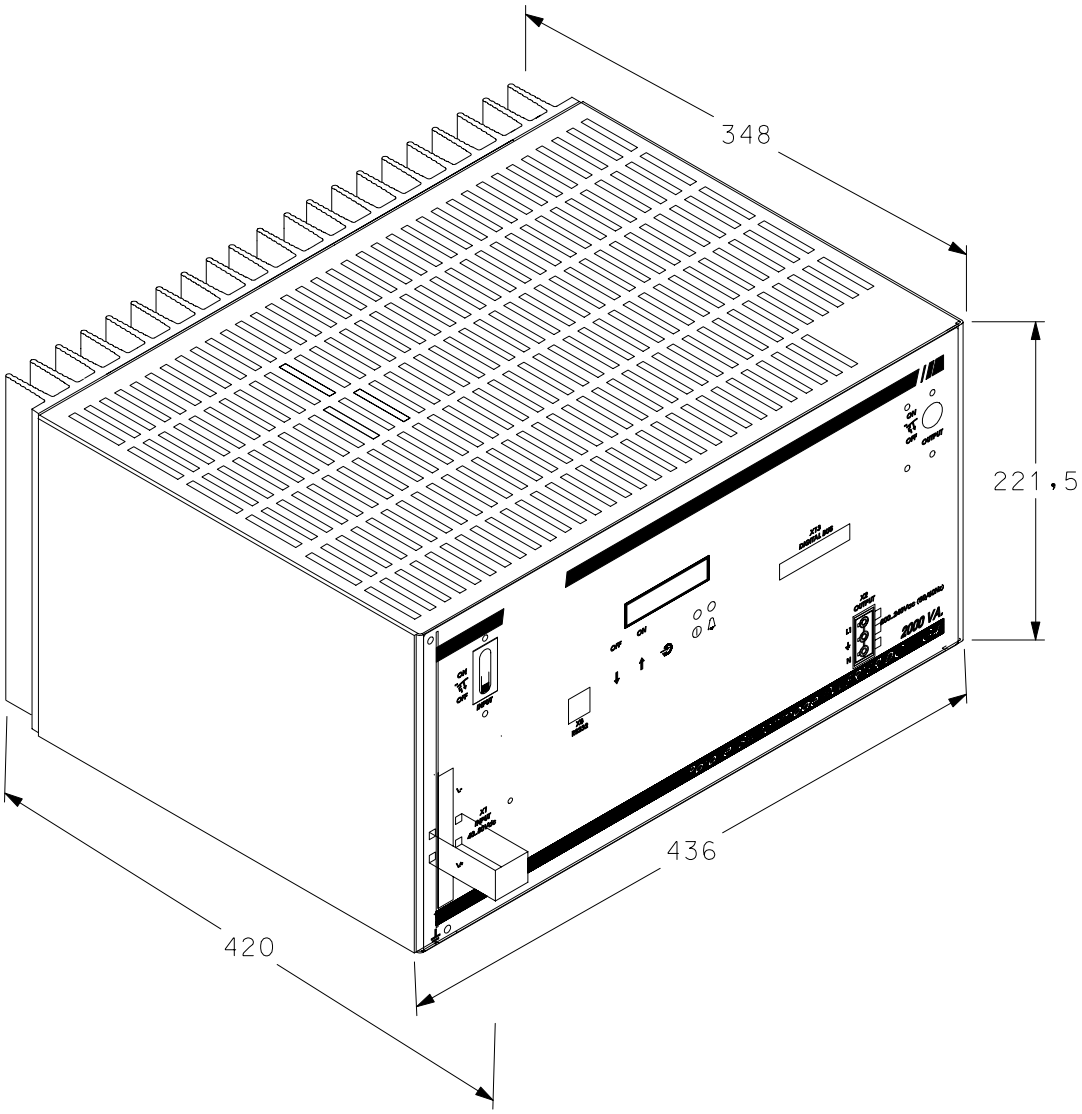
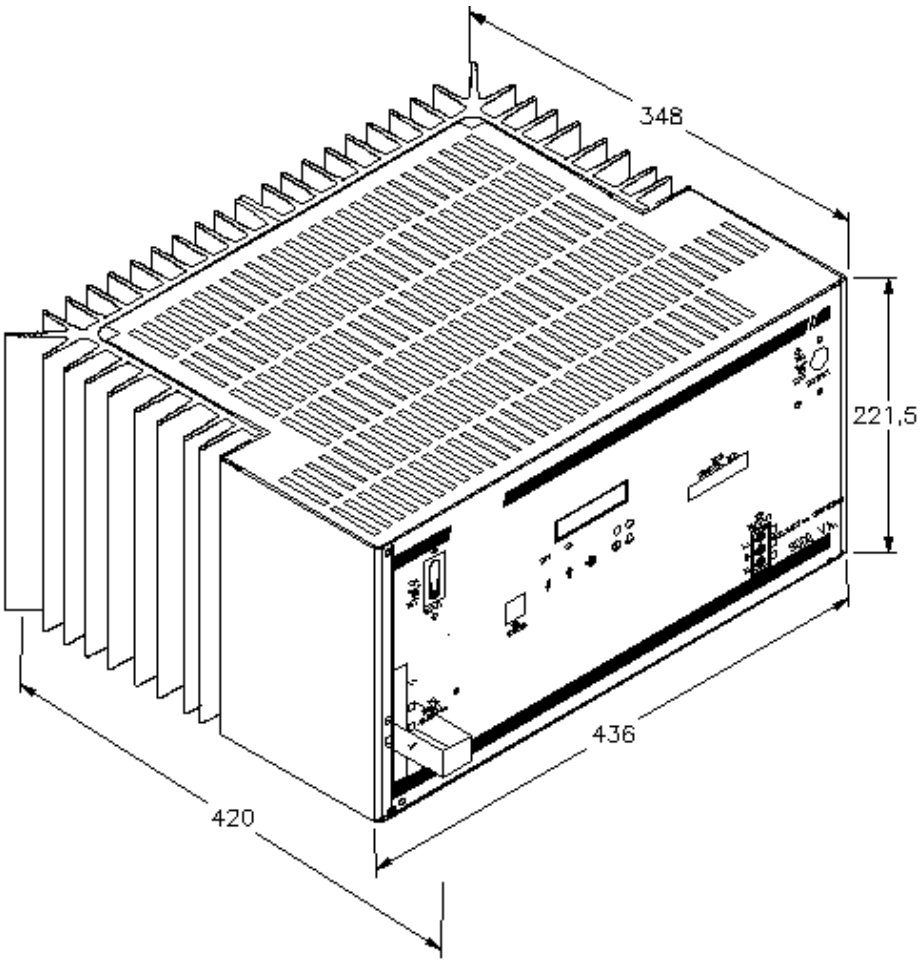
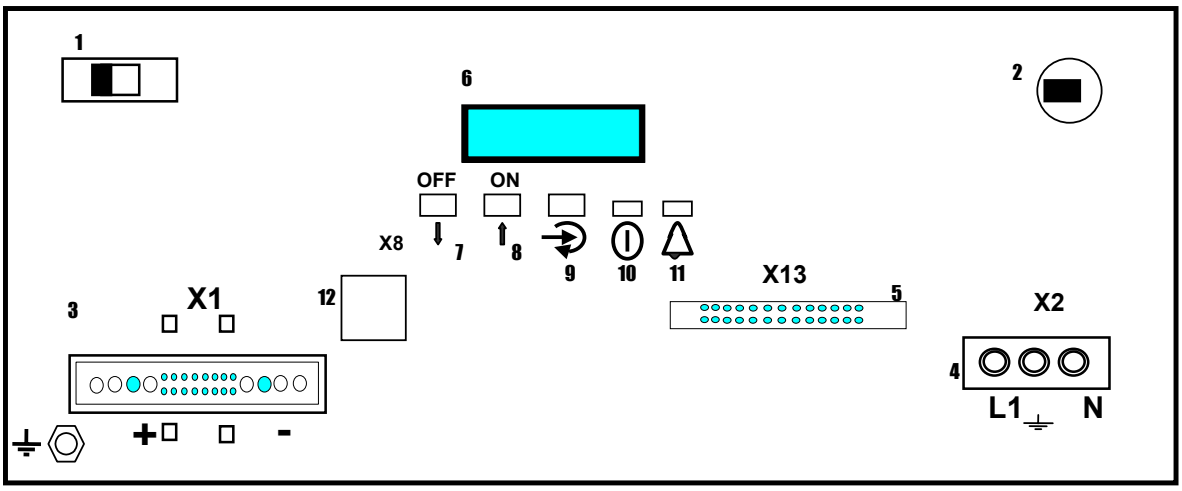


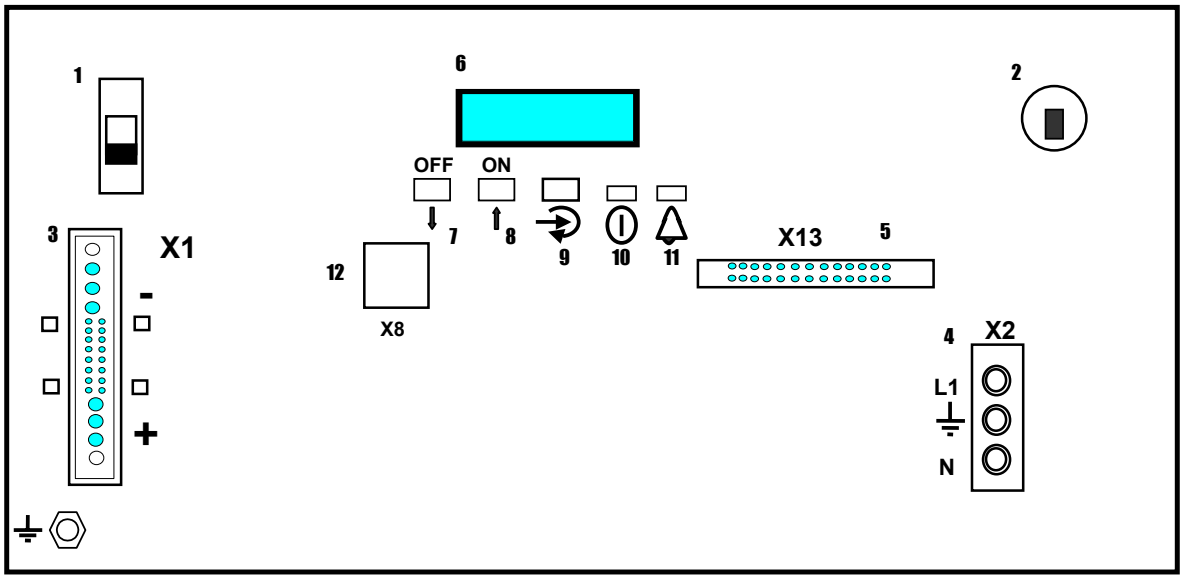
Figure 1c : DCI/G4 3KVA - 48 VDC module





1. DC Input breaker
2. AC output breaker
3. DC [X1] input terminal
4. AC [X2] output socket
5. Digital bus [X13]
6. LCD display
7. Local OFF push button
8. Local ON push button
9. Menu push button
10. Inverter operating - Green LED
11. Inverter internal fault - Red LED
12. RS 232 connector

Figure 2a : Front panel of inverters 600VA and 1.2 KVA



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7. Local OFF push button
8. Local ON push button
9. Menu push button
10. Inverter operating - Green LED
11. Inverter internal fault - Red LED
12. RS 232 connector

Figure 2b : Front panel of the 2 KVA and 3 KVA DCI/G4 inverters

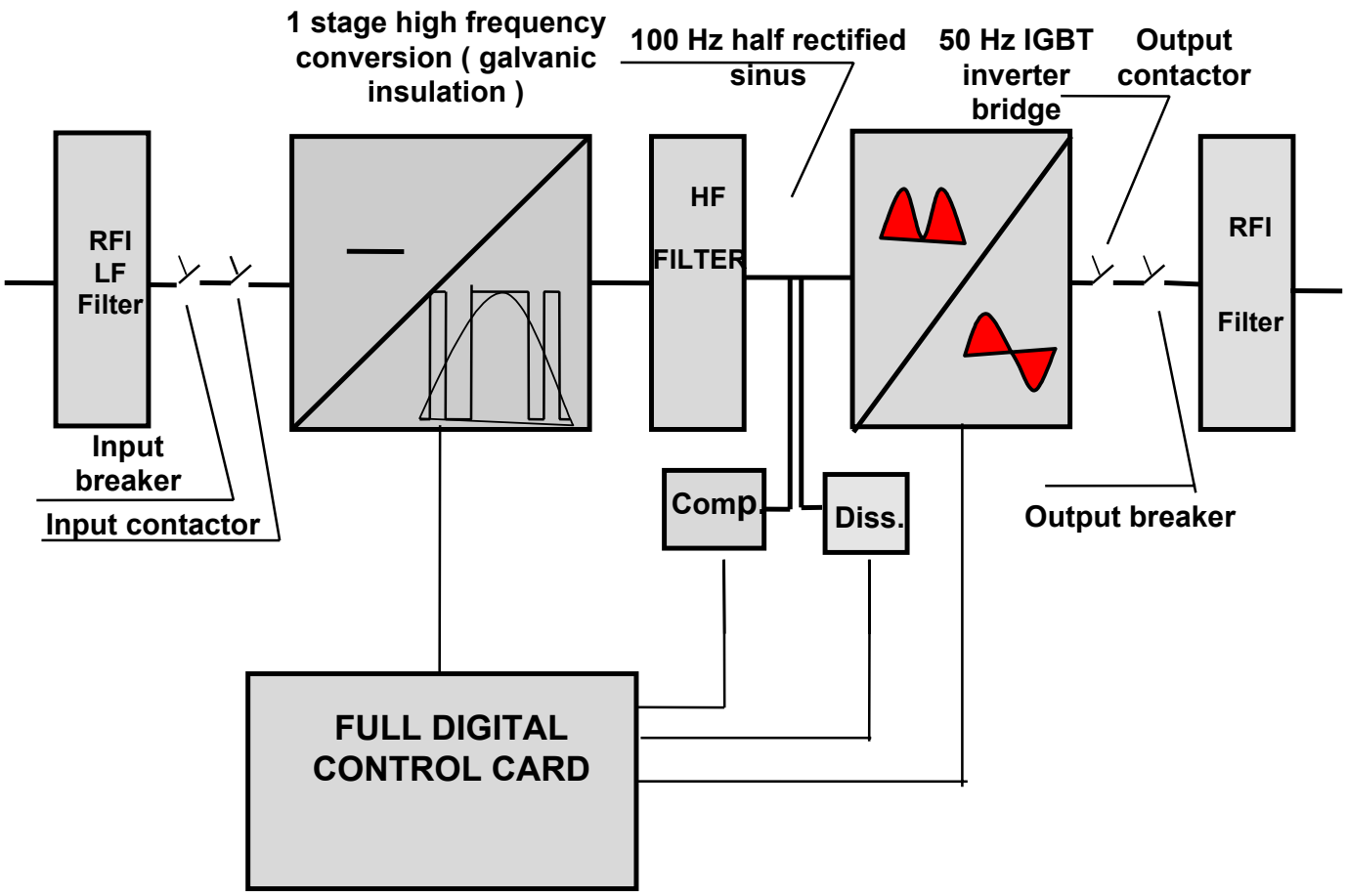

Figure 3 : Bloc Diagram

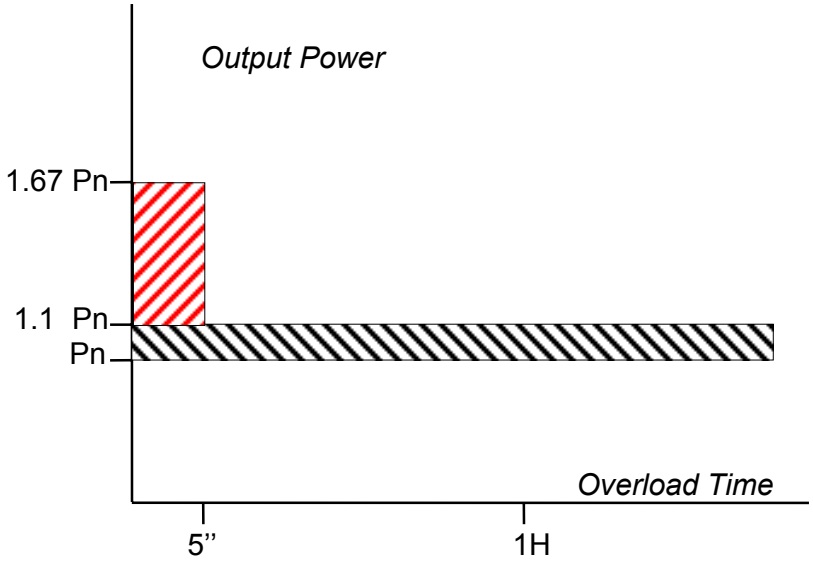

Figure 4a : Inverter overload capacity for the 600VA, 1.2 KVA and 3 KVA models

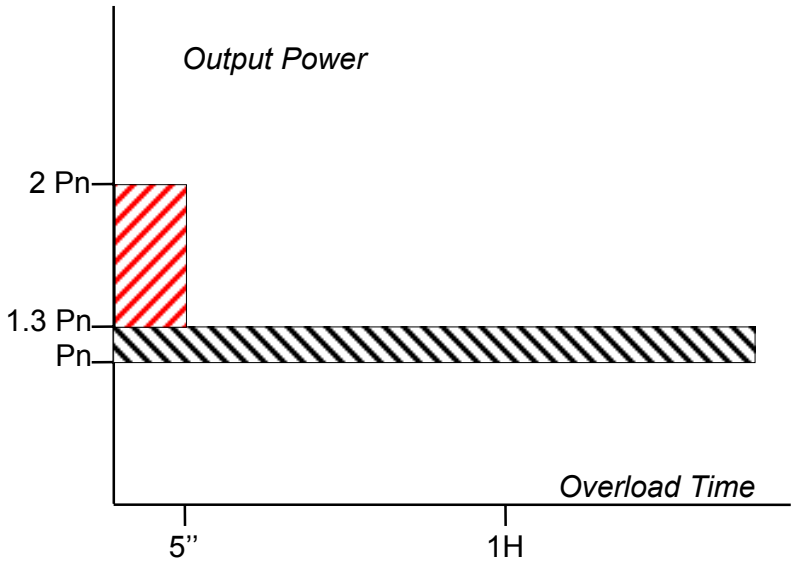

Figure 4b : Inverter overload capacity for the 2 KVA model

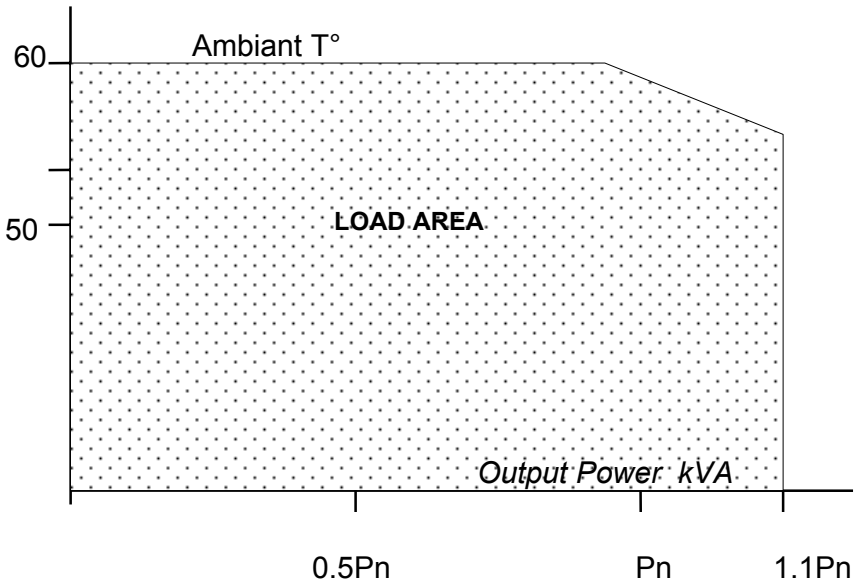

Figure 5a : Permissible load area for the 600VA, 1.2 KVA, 3 KVA DCI/G4 inverters

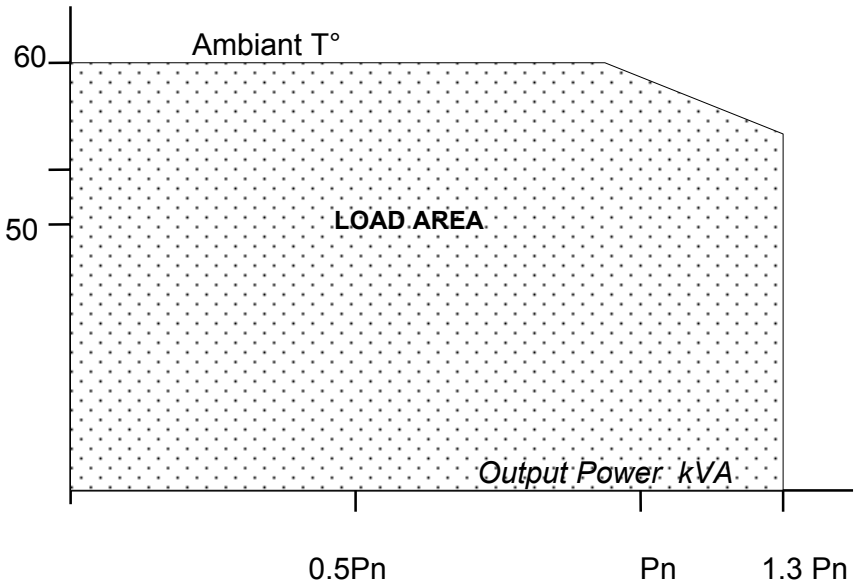

Figure 5b : Permissible load area for 2 KVA DCI/G4 inverter

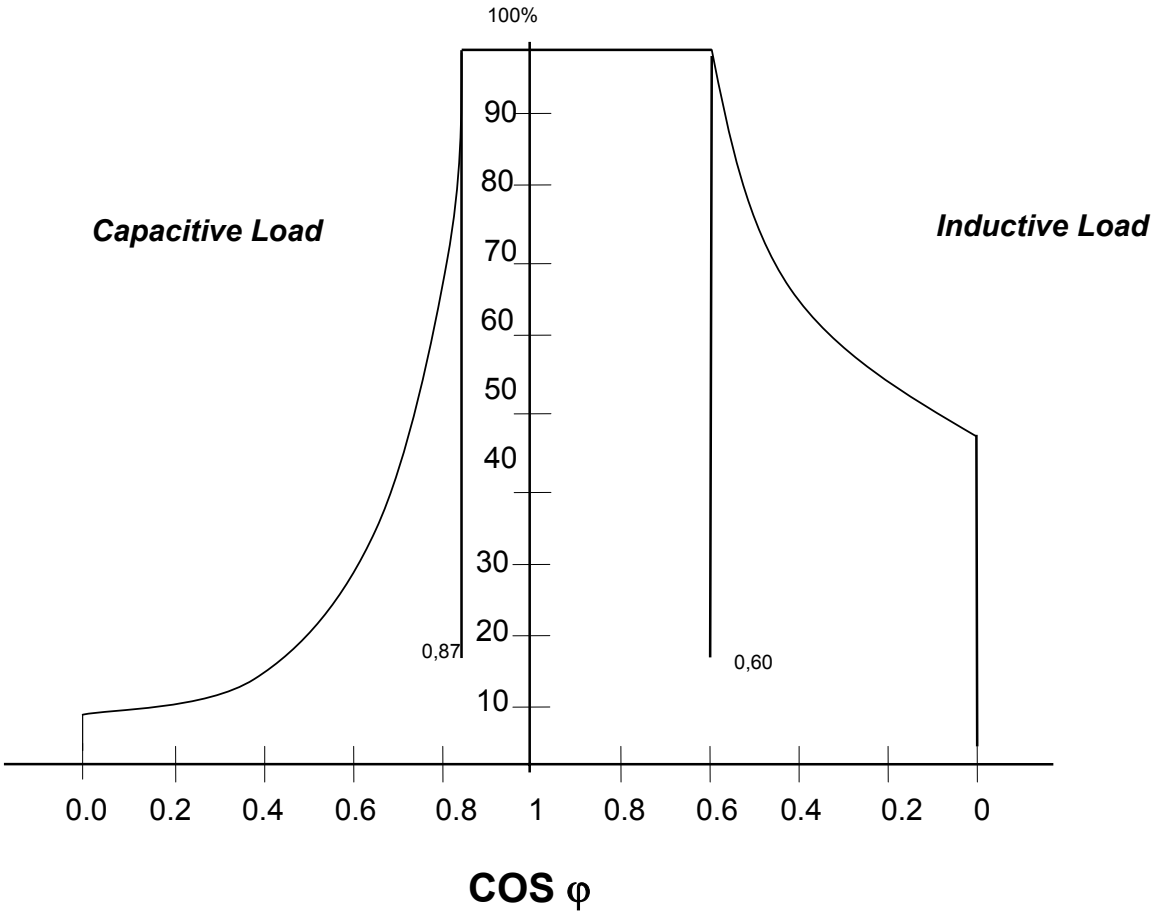

Figure 6 : inverter output power area operation

Figure 7 : Inverters in //