

**PRELIMINARY TECHNICAL INFORMATION**

**HIGHLIGHTS**

- Wide range.
- Reliability.
- Short delivery time
- Modular system.
- Cooling system included.
- Current, voltage and temperature sensors.
- IGBT drivers included.
- Ready to use.

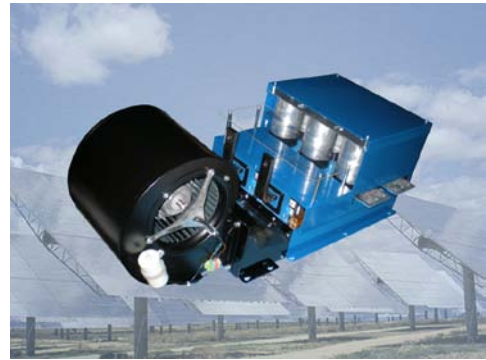


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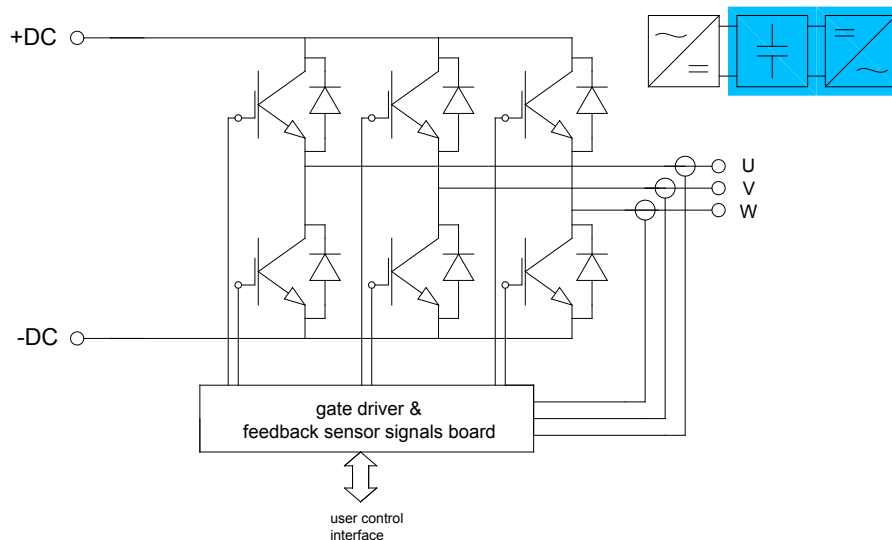
**ABOUT MT SERIES**

RECTIFICADORES GUASCH S.A. offers the most modifiable way for designing power stages AC-AC or DC-AC by connecting rectifier block, DC-link block and IGBT power stack. This way, the customer (and not the builder) decides which the block that limits the power of the entire system. The customer can obtain in a short delivery time a wide range of power assemblies in a compact size.

Each block is designed for obtaining the maximum efficiency by itself in the minimum dimensions. MT series is suitable to realize converters, choppers, half, full or three phases bridge inverters for motor control, welding, renewable energies, UPS...

**BRIEFING**

Topology	B6I + capacitor bank
Market	industrial
Cooling system	centrifugal fan
Driver system	SCiCoreLink67
Parameters monitored	DC voltage, Output current (each phase) temperature on heatsink, internal module NTC
Max Voltage applied to DClink	800 V
Output current per phase	fsw=2kHz, TJ<125°C Tamb=40°C fo=50Hz P.F.=0,85 m=1 VDClink=600V 570 A



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## POWER STACK GENERAL CHARACTERISTICS

Description	symbol	notes/test conditions	Min	Typ	Max	Units
Voltage applied to DClink	$V_{DClink}$	<b>note 1</b>		600	800	$V_{DC}$
Output current per phase	$I_{U,V,W}$	fsw=2kHz, $T_J < 125^\circ C$ , $T_{amb} = 40^\circ C$ fo=50Hz P.F.=0,85 m=1 $V_{DClink} = 600V$			570	$A_{RMS}$
IGBT maximum junction temperature	$T_{Jmax}$				150	$^\circ C$
IGBT temp. under switching conditions	$T_{J(sw)}$		-40		125	$^\circ C$
Storage temperature	$T_{stg}$		-40		85	$^\circ C$
Operating temperature	$T_{op}$		-25		85	$^\circ C$
Power-to-control isolation voltage	$V_{ISOp-c}$	50 Hz @1min/ <b>note 2</b>	3			$kV_{AC}$
Module isolation voltage	$V_{ISOmod}$	50 HZ @1min/ <b>note 3</b>	4			kV
Mounting Torque DC terminals		M8	8		10	N·m
Weight (aprox)					38.5	kg

## COOLING SYSTEM CHARACTERISTICS

Description	symbol	notes/test conditions	Typical	Units
Type		centrifugal fan		
Fan system supply voltage	$V_{FAN}$		230	$V_{RMS}$
Fan system consumption	$I_{FAN}$	50Hz/60Hz	1,11/1,36	A

## IGBT MODULE ELECTRICAL CHARACTERISTICS

Description	symbol	notes/test conditions	Min	Typ	Max	Units
Collector-Emitter Voltage	$V_{CES}$	$T_J = 25^\circ C$			1200	V
DC Collector current	$I_{Cnom}$	$T_C = 80^\circ C$ , $T_J = 150^\circ C$			600	A
Repetitive peak collector current	$I_{CRM}$	$t_p = 1ms$			1200	A
Power dissipation (per module)	$P_{DISS}$	$T_C = 25^\circ C$ , $T_J = 150^\circ C$			3350	W
Collector-emitter saturation voltage	$V_{CEsat}$	$I_c = 600 A$ , $T_J = 125^\circ C$		2,05		V

**note 1:** This voltage is limited by IGBT module. Restriction by DC Link capacitors voltage must be considered.

**note 2:** This isolation voltage is referred to the minimum isolation voltage between any control/feedback signal (PWM, reset fault, feedback sensor signals and supply of boards) and any power voltage (DC input, AC output).

**note 3:** This is an inner property of the IGBT module. It refers to the isolation between the internal chip and the external case.

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## CAPACITOR BANK CHARACTERISTICS

Description	symbol	Typical	Units
Single capacitor	C	MKP type 420uF -15%..0% 1100V	
Total equivalent capacitance	$C_{equiv}$	3780	$\mu$ F
max capacitor bank DC voltage	$V_{DClink}$	1100	<b>note 4</b> V

## ENVIRONMENTAL SPECIFICATIONS

Description	
Protection grade (EN-60529 / CEI529 / UNE-20324)	IP-00
Humidity max.	50% RH @ 35°C / 90% RH @ 20°C
Pollution degree	III

## MOUNTING CONSIDERATIONS

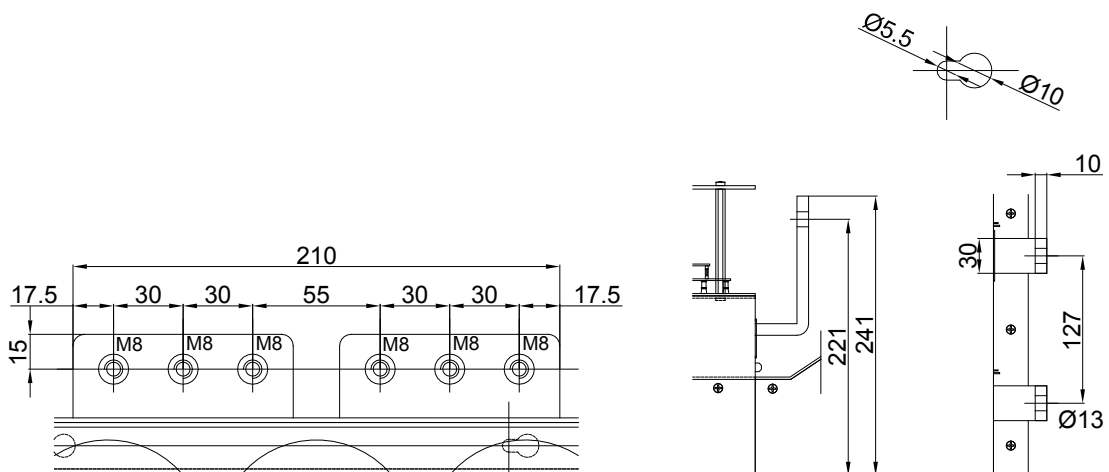
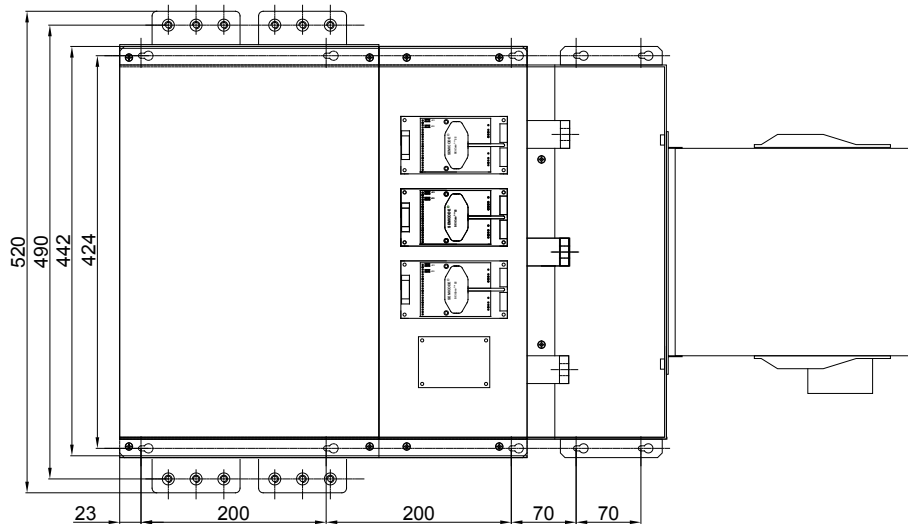
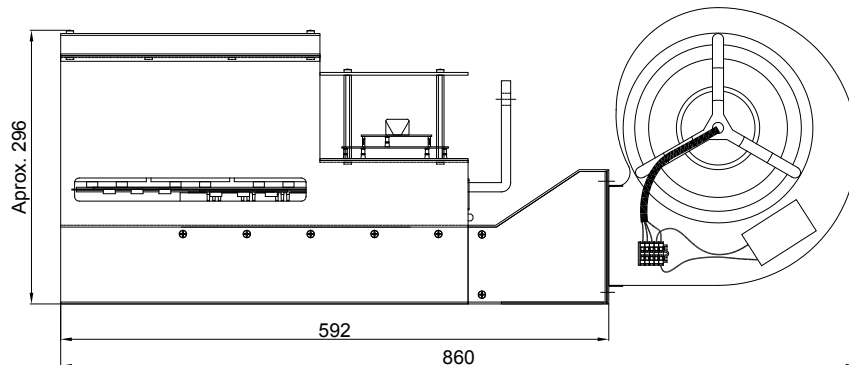
It's necessary a minimum distance of 100 mm with regard to the envelope. The free air circulation should be guaranteed. Avoiding the heat sources of nearby to assembly.

In the real applications it is important to consider a safety margin with regarding the working current, we recommend a margin of the 20%.

For critical cases (24 hours work, repetitive overloads...), margins of the 30% to 50% are used.

**note 4:** This voltage is limited by DC Link capacitors. Restriction by IGBT maximum voltage must be considered.

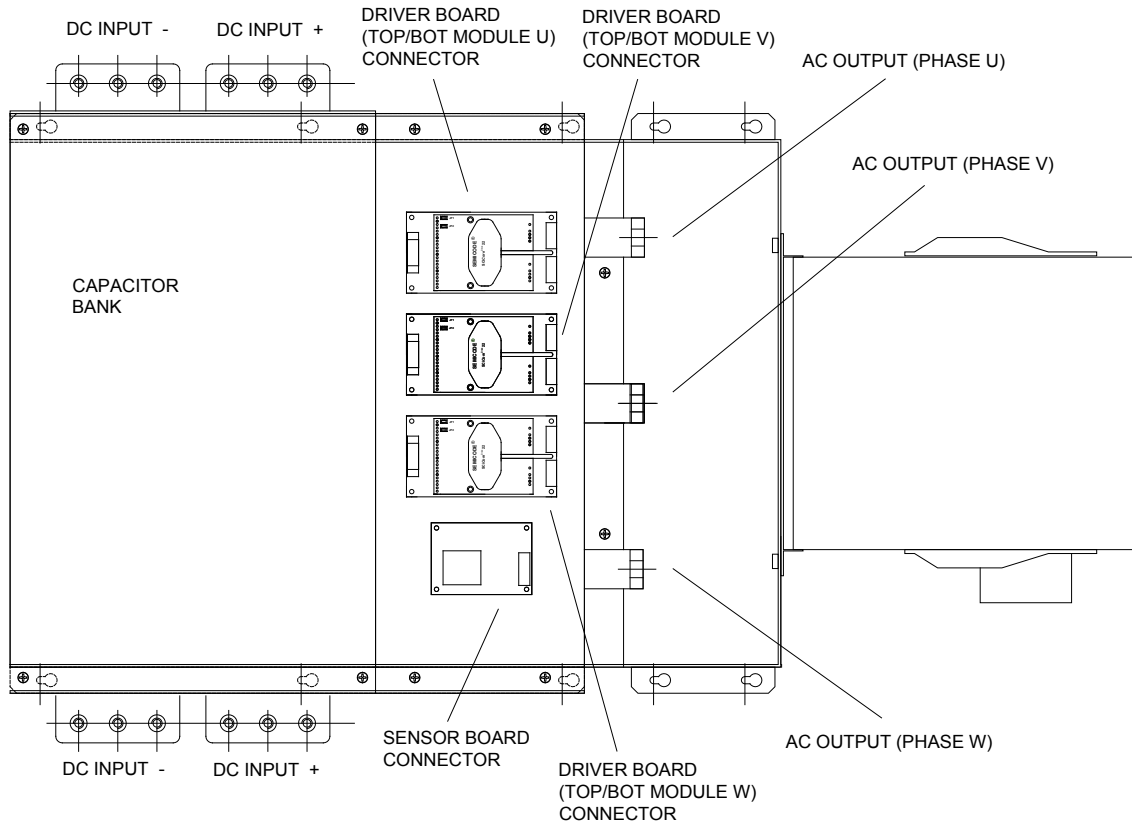
**MECHANICAL DIMENSIONS**



All dimensions in millimeters

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**POWER AND CONTROL CONNECTION**



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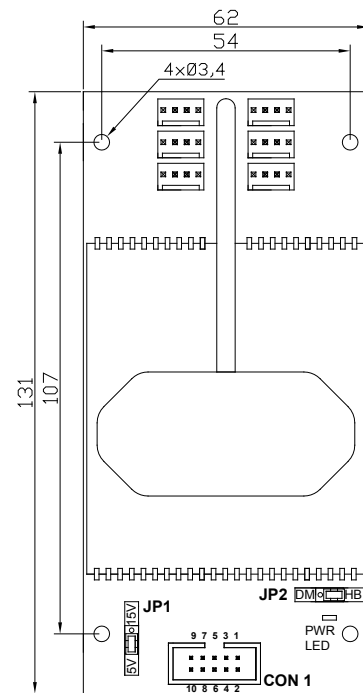
**GATE DRIVER BOARD ELECTRICAL CHARACTERISTICS**

Description	symbol	notes/test conditions	Min	Typ	Max	Units
Supply voltage	$V_{CC}$			15		V
Current consumption	$I_{CC}$	$f_{sw} = 10\text{kHz}; Q_{G/pulse} = 6\mu\text{C}$		370		mA
PWM & reset High state Input voltage	$V_{IN\_H}$	JP1 to 5V connected	3,5		5	V
PWM & reset Low state Input voltage	$V_{IN\_L}$		0		1,5	V
PWM & reset High state Input voltage	$V_{IN\_H}$	JP1 to 15V connected	11		15	V
PWM & reset Low state Input voltage	$V_{IN\_L}$		0		4	V
Fault High state Output Voltage	$V_{FAULT\_H}$	working in logic lev; JP1 to 15V			15	V
Fault High state Output Voltage	$V_{FAULT\_H}$	working in logic lev; JP1 to 5V			5	V
Fault (working as open collector) current	$I_{FAULT}$	working as open collector			20	mA

**GATE DRIVER BOARD PINOUT**

CON 1	designation	function
1	PWM <sub>TOP</sub>	Input logic signal for switching TOP IGBT
2	GND	Ground terminal for supply and logic signals
3	GND	Ground terminal for supply and logic signals
4	RESET	reset input signal (low state)
5	GND	Ground terminal for supply and logic signals
6	VCC	+15VDC for supply voltage
7	FAULT	fault output signal
8	VCC	+15VDC for supply voltage
9	VCC	+15VDC for supply voltage
10	PWM <sub>BOT</sub>	Input logic signal for switching BOT IGBT

JUMPERS	
JP1	right connected: 15V logic level left connected: 5V logic level
JP2	right connected: half bridge mode left connected: direct mode



All dimensions in mm.

**DEFAULT VALUES**

- half bridge mode (direct mode optional)
- 4µs dead time between channels generated
- Gate resistor depending of the IGBT module used
- 0-5V input PWM and reset logic levels (0-15V optional)
- 0-5V logic fault output (0-15V or low level-open collector fault output optional)

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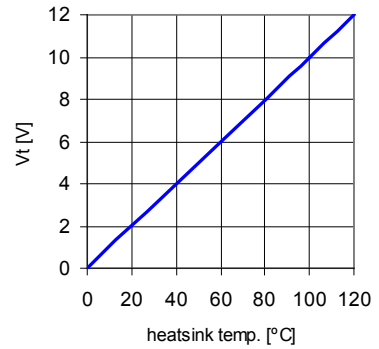
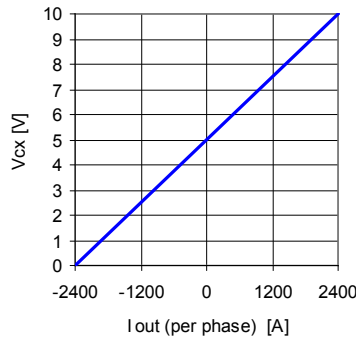
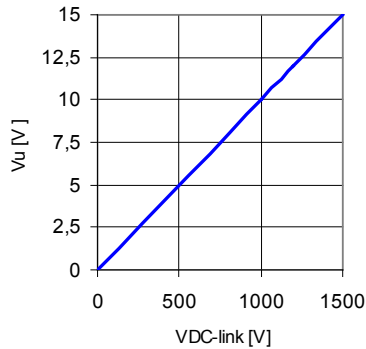
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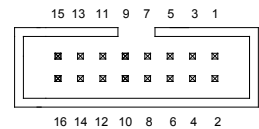
**SENSOR BOARD ELECTRICAL CHARACTERISTICS**

Description	symbol	notes/test conditions	Min	Typ	Max	Units
Supply voltage	$V_{CC}$			$\pm 15$		V
Feedback signal of heatsink temp.	$V_T$	relative error <2,5%	0		12	V
Heatsink temp. measurable range			0		120	°C
Feedback signal of output current	$V_{CX}$	relative error <3%	0		10	V
Current measurable range			-2400		2400	A
Feedback signal of VDC-link voltage	$V_U$	relative error <2,8%	0		15	V
DC-link measurable voltage range			0		1500	$V_{DC}$
Thermostat		Normally connected		90		°C
NTC rated resistance	$R_{NTC 25}$	internal module NTC TC=25°C		5		kΩ
NTC B value	$B_{25/50}$	<b>note 1</b>		3375		K



**SENSOR BOARD PINOUT**

CON 2	designation	function
1	+15Vcc	+15VDC for supply voltage
2	NTCA1	NTC terminal 1 of IGBT module A
3	NTCB2	NTC terminal 2 of IGBT module B
4	NTCB1	NTC terminal 1 of IGBT module B
5	NTCC1	NTC terminal 1 of IGBT module C
6	NTCA2	NTC terminal 2 of IGBT module A
7	NTCC2	NTC terminal 2 of IGBT module C
8	TH <sub>2</sub>	Thermostat terminal 2
9	$V_T$	Output voltage representation of heatsink temperature
10	TH <sub>1</sub>	Thermostat terminal 1
11	$V_{C,V}$	Output voltage representation of phase V output current
12	$V_U$	Output voltage representation of VDC-link voltage
13	$V_{C,W}$	Output voltage representation of phase W output current
14	$V_{C,U}$	Output voltage representation of phase U output current
15	-15Vcc	-15VDC for supply voltage



note 1: 
$$R_T = R_{25} \cdot e^{B \left( \frac{1}{T[K]} - \frac{1}{298,15K} \right)}$$

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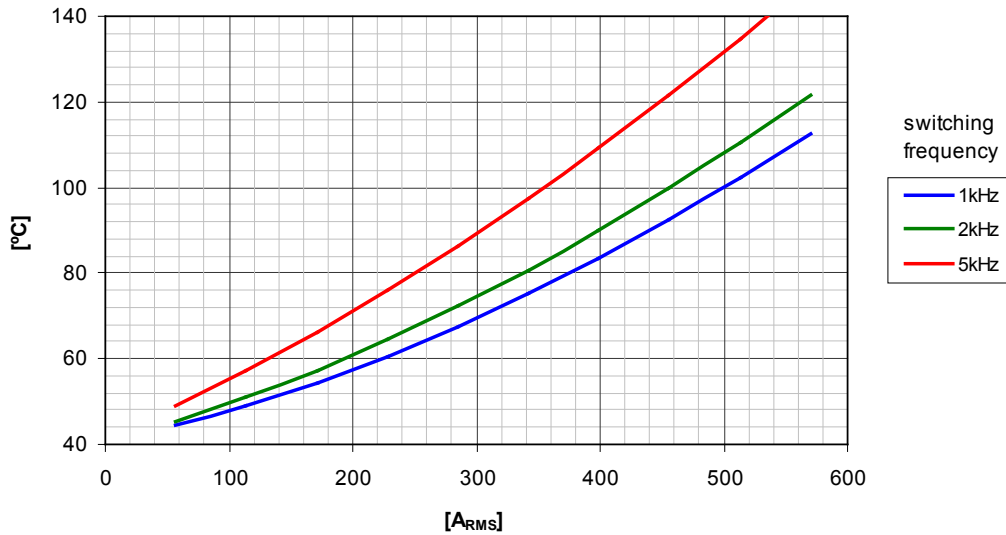
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**PERFORMANCE CURVES**

Stack working as an inverter

**T<sub>J\_IGBT</sub> vs I<sub>OUT</sub> (per phase, AC output)**



Condition	Symbol	Value	Units
Ambient temperature	T <sub>A</sub>	40	°C
DCLink Voltage	V <sub>DCLink</sub>	600	V
Load Power Factor	PF	0,85	
Modulation index	m	1	
Output frequency	f <sub>OUT</sub>	50	Hz





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