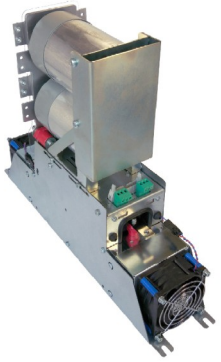
MTM-1/2B2ICx

IGBT Modular Power Stacks

PRELIMINARY TECHNICAL INFORMATION

HIGHLIGHTS

- Modular & easy-to-stack concept
- IGBT drivers included
- Capacitor bank included
- Output current sensor included
- Cooling system included
- Easy to reuse single stacks on a different converter



Non-contractual image

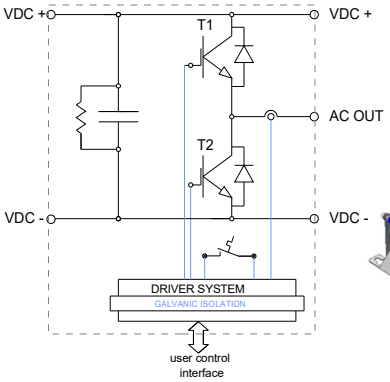
OVERVIEW

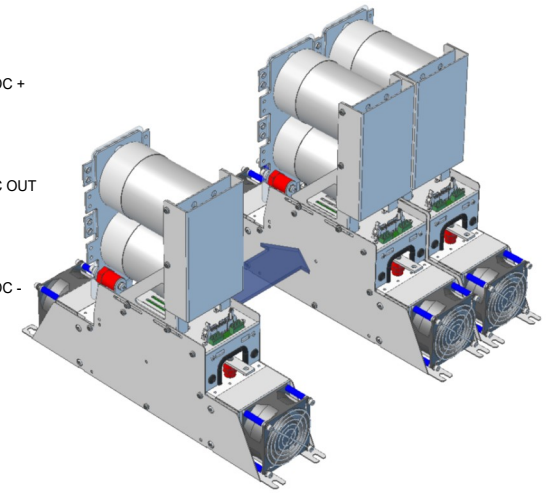
With a very optimized and compact design and a half bridge topology and capacitor bank this series of IGBT assemblies part as a constructive solution which allows a high versatility to compose customized IGBT power equipment. By simply stacking half-bridge modules a great range of topologies can be implemented, as choppers, three-phase inverters, back-to-back converters, etc.

Additionally this series offers the possibility of paralleling modules in order to increase the output current per phase, whilst incorporating the IGBT driver, output current sensor and thermal switch protection.

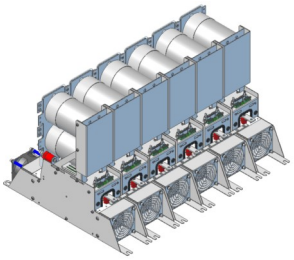
There are also available several compatible modules as power rectifier stage and supplementary capacitor bank modules in order to completely customize your power equipment. Please ask for more information.

ELECTRICAL DIAGRAM:

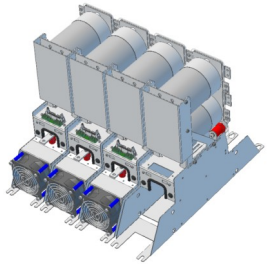




Easy to stack-&-connect.



Back to back assembly example.



3-phase inverter with an additional capacitor bank.

POWER RANGE AND CHARACTERISTICS (BASE MODULES)

Reference	I_{OUT} [A_{RMS}]* (per stack)		Power [kW] 400 V_{AC} 50/60 Hz* B2I (2x stacks)		Power [kW] 400 V_{AC} 50/60 Hz* B6I (3x stacks)	
	10 kHz	5 kHz	10 kHz	5 kHz	10 kHz	5 kHz
MTM-1/2B2ICx0225F12xxHB	75	105	25 kW	35 kW	44 kW	61 kW
MTM-1/2B2ICx0225F12xxIB	100	130	34 kW	44 kW	58 kW	76 kW
MTM-1/2B2ICx0450F12xxJB	140	200	47 kW	68 kW	82 kW	117 kW
MTM-1/2B2ICx0450F12xxKB	180	240	61 kW	81 kW	106 kW	141 kW

**Data given at T_{AMB} = 40ºC, $V_{DC\text{-}Link}$ = 600 V_{DC}, m = 0.94, V_{OUT} = 400 V_{AC}, f_{SW} as a parameter, T_J < 125ºC, T_{HK} < 90ºC.*

Rectificadores Guasch, S.A.U. reserves the right to change limits, test conditions and dimensions given in this data sheet at any time without previous notice.

ELECTRICAL SCHEMES & COMPONENTS

STANDARD MODULAR HALF BRIDGE REFERENCES 1/2B2IC & 1/2B2ICM (with central point connection)

Reference	IGBT Driver	Current Sensor	Fan supply	Figure
MTM-1/2B2IC0225F12xxHB	SCiCoreDrive22 Semicode	HO 50-S/SP33 LEM	230 V_{AC}	1
MTM-1/2B2ICM0225F12xxHB				2
MTM-1/2B2IC0225F12xxIB		HO 100-S/SP33 LEM		1
MTM-1/2B2ICM0225F12xxIB				2
MTM-1/2B2IC0450F12xxJB	SP0115T2Cx-17 Power Integrations	HO 150-S/SP33 LEM	24 V_{DC}	1
MTM-1/2B2ICM0450F12xxJB				2
MTM-1/2B2IC0450F12xxKB		HO 200-S/SP33 LEM		1
MTM-1/2B2ICM0450F12xxKB				2

Other configurations than the standards on this table can be customized under demand.
Alphanumeric characters 'xx' on reference depending on manufacturer of IGBT module mounted on the power stack.

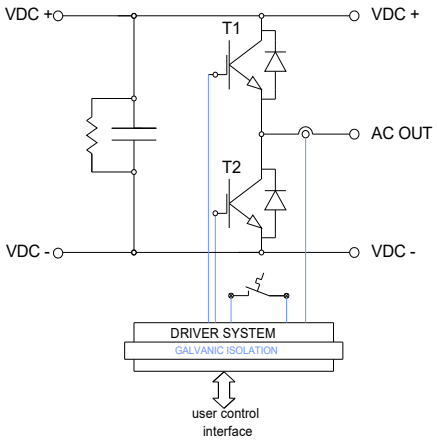


Figure 1: Standard version (1/2B2IC)

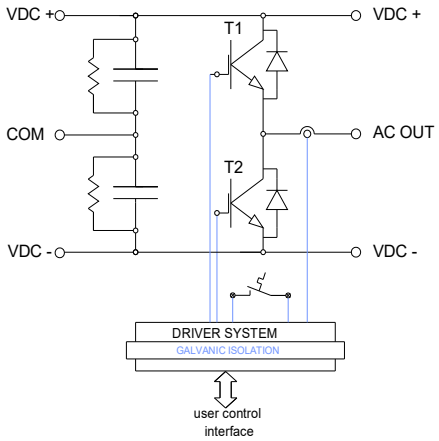


Figure 2: DC-Link with central point connection (1/2B2ICM)

STANDARD ADDITIONAL CAPACITOR BLOCKS

Reference	Type	V_{DCmax}	C_N	Figure
MTM-DCL00840MKP1100xxBA	Standard	1100 V_{DC}	840 µF	3
MTM-DCM00240MKP1100xxBA	With central point conn.	1100 V_{DC}	240 µF	4

Selected additional capacitor block must match the configuration of IGBT half-bridge module (with or without central point connection).
Other capacitance nominal values under demand.
Alphanumeric characters 'xx' on reference depending on manufacturer of capacitors mounted on the equipment.

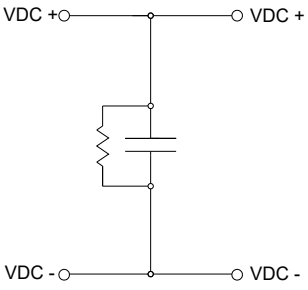


Figure 3: Additional standard capacitor bank.

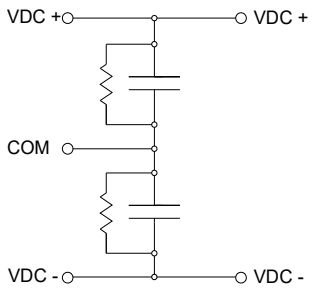


Figure 4: Additional capacitor bank with central point connection.

MECHANICAL ASSEMBLY

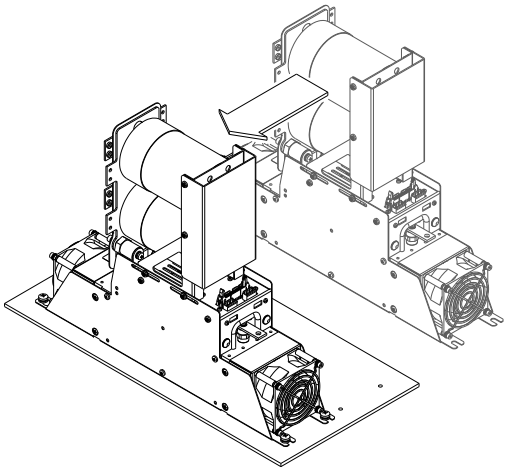


Figure 5: Slide in a second module.

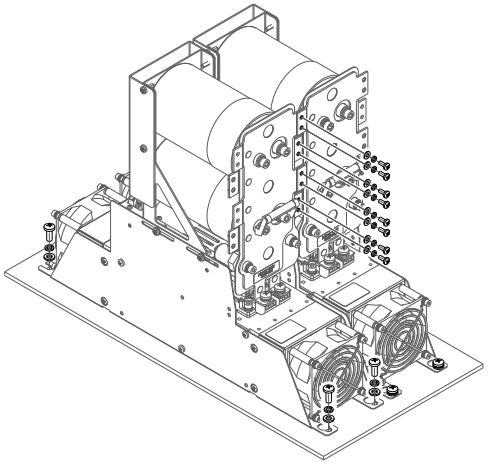


Figure 6: DC connection and mechanical fastening of the second module attached.

- Fasten the first module to its final mounting base.
- Slide in laterally the next module and align correctly the DC-Link electrical connections (interdigitated pads).
- Fasten slightly the DC-Link electrical connections.
- Fasten slightly the module to the mounting base and then proceed to make the final tightening, first the DC-Link electrical connections and the module to the base the last.
-

Note: When 2 or more modules should be mechanically assembled together prior to its final assembly on a mounting base 4x fasten braces (2x on top, 2x on bot) can be used to fasten together 2 modules as shown in Figure7.

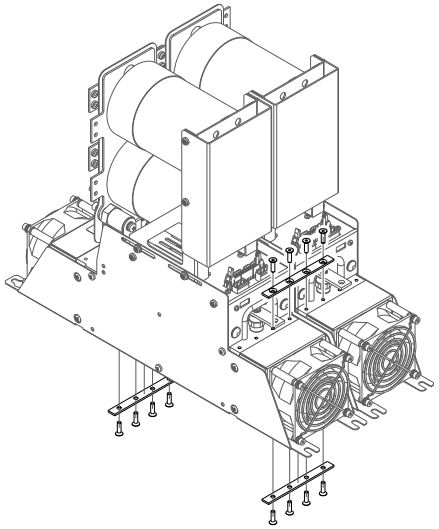
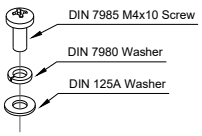
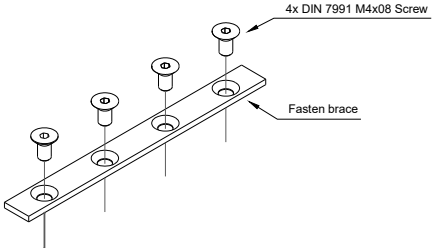


Figure 7: Assembly for 2 modules using 4x fasten braces. (1 of them hidden on figure)

FASTENING HARDWARE SUPPLIED

DC-LINK ELECTRICAL CONNECTION		MECHANICAL FASTENING	
16x		4x	

PARALLELED STACK OPERATION

Up to 3 modules can be configured to operate in parallel mode, increasing the total current per arm.
MTM-1/2B2IC-Px modules can be paralleled in order to increase the overall system power.
This can be achieved due the very low propagation delay and low jittering of the module's installed driver 2SP0115T2Cx-17 from Power Integrations.

In order to do so some driver interfacing recommendations should be taken into account:

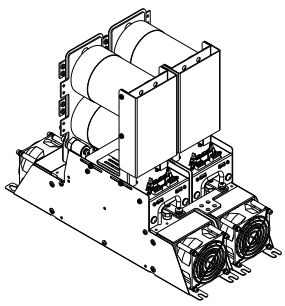
- Supply voltage VCC of all parallel connected modules must come from the same voltage source in order to ensure symmetrical operation of the drivers.
- Both input signals INA and INB of all parallel connected drivers must come from the same logic buffer (driver) in order to ensure very small delay differences.
- The slew rate of INA and INB must be high enough (> 0.25 V/ns) in order to minimize the delay jitter. In particular, if the input signals INA and INB are filtered with an RC network (e.g. for short pulse suppression), a Schmidtt trigger buffer must be used to generate a high slew rate at INA and INB.
- The length difference of the interface cables from the host board to the module's connectors J1 should be less than 40 cm for all parallel-connected drivers in order to keep the additional delay differences below about 2 ns.
- All drivers must work in direct mode. The half-bridge mode is not suitable for parallel operation.
- In case of fault turn-off, it is necessary to wait until the fault feedback of all paralleled drivers is reset in order to ensure that the blocking time of all paralleled drivers has elapsed.
- The status outputs SO1 and SO2 of parallel-connected drivers can be evaluated individually to allow precise fault diagnosis, or they can be connected together.

Please read driver's technical documentation for more information.

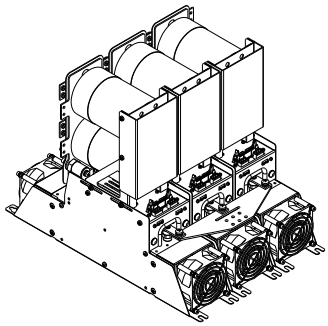
A current derating factor (Kα) must be applied when calculating the maximum output current for n paralleled modules. The recommended derating factors and total currents are given on the following tables.

2x paralleled stacks: Kα = 1.67
3x paralleled stacks: Kα = 2.33
$I_{OUT_TOT} = I_{OUTNOM\ (1stack)} * K\alpha$

Reference	I_{OUT} [A_{RMS}] *(per stack)*		I_{OUT} [A_{RMS}] *2x paralleled (P2)*		I_{OUT} [A_{RMS}] *3x paralleled (P3)*	
	10 kHz	*5 kHz*	*10 kHz*	*5 kHz*	*10 kHz*	*5 kHz*
MTM-1/2B2IC-Px-0225F12IXHB	75	105	125	175	175	245
MTM-1/2B2IC-Px-0225F12IXIB	100	130	167	217	233	303
MTM-1/2B2IC-Px-0450F12IXJB	140	200	233	333	327	467
MTM-1/2B2IC-Px-0450F12IXKB	180	240	300	400	420	560



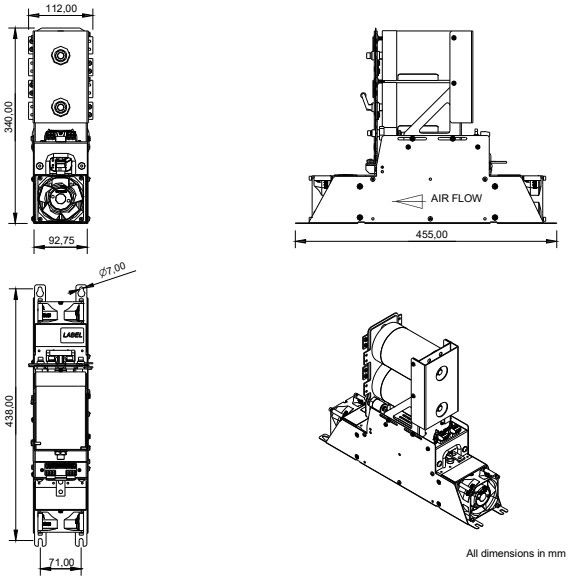
2 paralleled modules example, with power terminal.



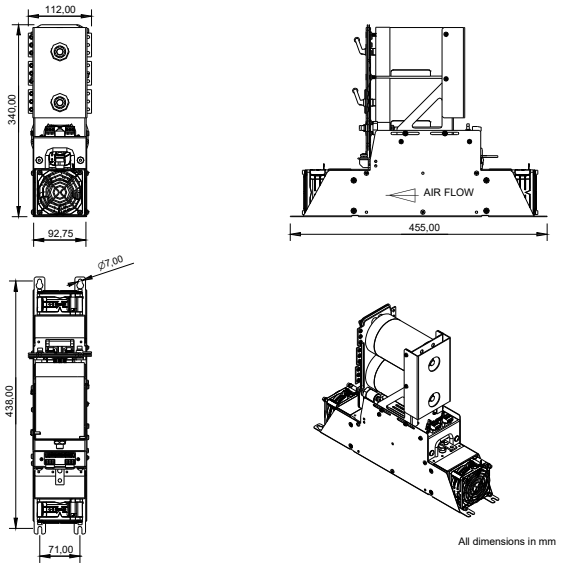
3 paralleled modules example, with power terminal.

BASE MODULES MECHANICAL DIMENSIONS

MTM-1/2B2ICxxxxxxx

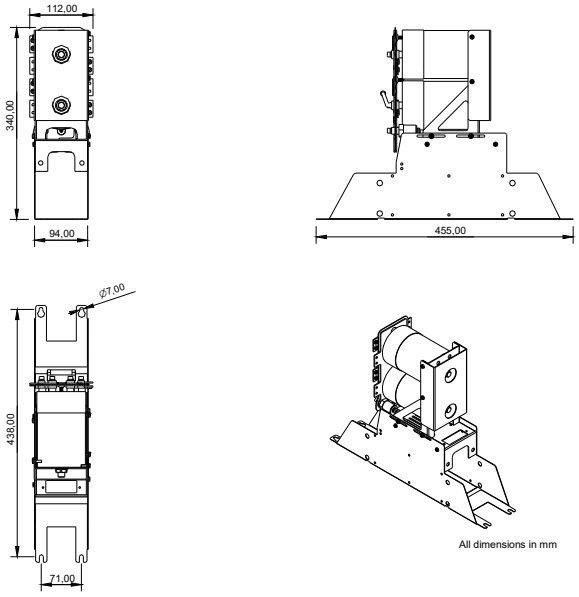


MTM-1/2B2ICMxxxxxxx (WITH CENTRAL POINT CONN.)

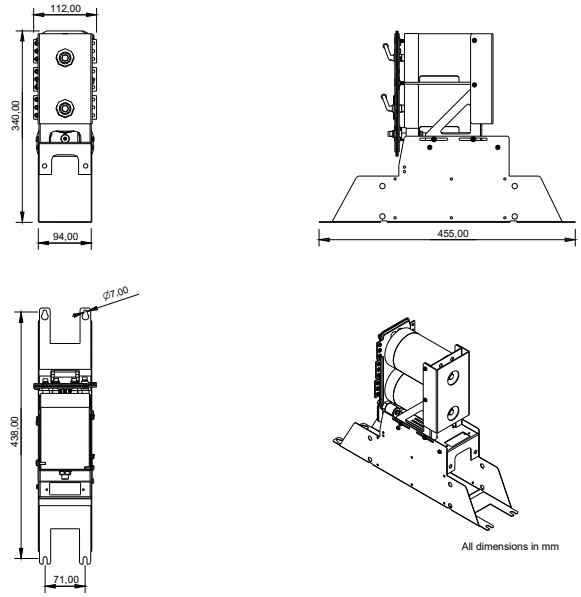


Dimension	Typ	Units
Length	455	mm
Height	340	mm
Width	112	mm
Weight	9.4	kg

MTM-DCL00840MKP1100xxBA (MKP CAPACITOR BANK)



MTM-DCM00240MKP1100xxBA (MKP CAPACITOR BANK WITH CENTRAL POINT CONN.)



Dimension	Typ	Units
Length	455	mm
Height	340	mm
Width	112	mm
Weight	3.5	kg

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