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OGGETTO : **DOTI MODULYS XM300 (50 to 250+50kW)**

Subject Technical information dossier

Edit. <i>Edit.</i>	Data <i>Date</i>	Emissione <i>Issued by</i>	Validazione <i>Checked by</i>	Approvazione <i>Approved by</i>	Causa <i>Reason</i>
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Please notice, DOTI must be used in conjunction with the [User Manual](#).

Additional [test reports](#) are available in the marketing library.

The parts highlighted in yellow are not available yet.
The parts highlighted in light blue are not definitive.

DEFINITIONS AND TESTS CONDITION

For the purpose of this document, the following definitions apply.

PARAMETER	SYMBOL	DESCRIPTION
NOMINAL VOLTAGE	V_n	Nominal RMS voltage phase-phase (400Vac for 3 phase systems).
NOMINAL APPARENT POWER	S_n	UPS nominal output apparent power (VA).
NOMINAL ACTIVE POWER	P_n	Nominal output active power (kW) provided by UPS. It depends from the UPS output Power Factor.
INPUT POWER FACTOR	λ	Measured with the UPS operating in normal mode at nominal input voltages at nominal output apparent power, and fully charged energy storage system (battery). It's calculated as (P_n/S_n) .
LOAD POWER FACTOR	$\cos \varphi$	Characteristics of an a.c. load expressed by the ratio of active power to apparent power assuming an ideal sinusoidal voltage.
NOMINAL INPUT CURRENT	I_n	Input current with UPS operating in normal mode, at nominal input voltage, nominal output apparent power, nominal output active power and fully restored d.c. energy storage system (battery)
MAXIMUM INPUT CURRENT	I_{max}	Input current with UPS operating in normal mode, at worst-case input voltage, nominal load and with a fully depleted energy storage system (battery).
INPUT CURRENT DISTORTION	THDi	Input current harmonic distortion (average value of the phase L1, L2 and L3) in normal mode condition. It's measured with input voltage supply with THDv less than 1%.
OUTPUT VOLTAGE DISTORTION	THDv	Output voltage harmonic distortion (average value of the phase L1, L2 and L3) in normal mode condition.
OVERLOAD CAPABILITY	OVL	Output current capability of the UPS in excess of its stated continuous current over a given time, with the output voltage remaining within its rated range, in normal or in stored energy mode.

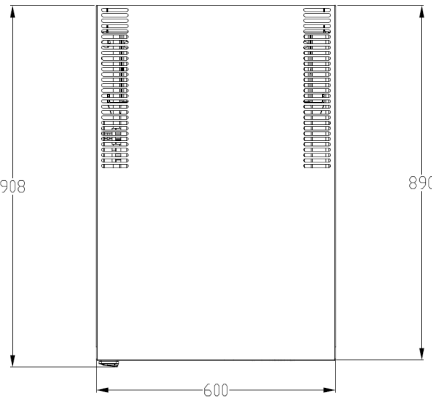
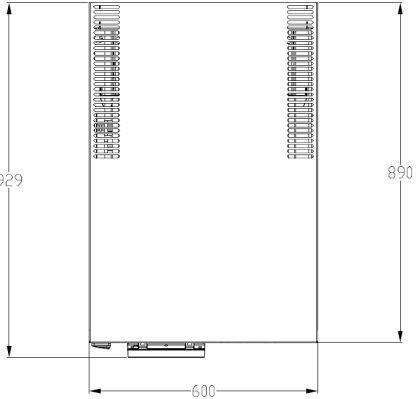
Please notice: Particular test conditions are indicated closed to the data reported. If not explicitly indicated, nominal conditions have to be considered.

1 GENERAL VIEW, MECHANICAL DATA, ELECTRICAL INSTALLATION

See [User Manual](#)

2 SPECIFICATIONS

2.1 GENERAL DATA

Number of Power modules	1	2	3	4	5	6
MECHANICAL						
Colour	RAL 7016					
Dimensions (length x depth x height)	L=600mm x D=890mm x H=1990mm					
	Top view (HMI closed)			Top view (HMI open)		
						
Weight M5-S-300-82 (1x Bypass module)	289 kg	325 kg	361 kg	397 kg	433 kg	469 kg
Weight M5-S-300-88 (2x Bypass modules)	313 kg	349 kg	385 kg	421 kg	457 kg	493 kg
Ventilation	Inlet front / exhausted rear (Top ventilation – option)					
Wooden packaging	YES (option)					
Wooden pallet	YES					
Lifting system	NO					
Access for Electronic Maintenance	Front					
Access for Battery Maintenance	No internal battery					
Access for cabling	Bottom front (Top cabling - option)					

Number of Power modules	1	2	3	4	5	6
GENERAL						
Earthing system compatibility	TT – TN-C – TN-S – IT (TN-C option available)					
Neutral Configuration	Passing through neutral					
Switches	Mains – Auxiliary mains – Maintenance bypass – Output					
External maintenance bypass (feedback contact management)	YES (dedicated connector)					
Maintenance bypass	Internal					
Auxiliary mains configuration	Separate auxiliary mains (Common mains – option)					
Back feed	Integrated for Input mains Tripping coil drivers for Auxiliary mains (Internal Back feed protection – option)					
Slots for option	3 slots					
Power Share	Not present					
Parallel configuration	NO					
User Interface (mimic panel)	7" resistive touch screen					
Remote mimic panel	7" resistive touch screen (option)					

Number of Power modules		1	2	3	4	5	6
N+1 redundant System Power (kW)		50+0 ¹	50+50	100+50	150+50	200+50	250+50
ENVIRONMENT							
Air clearances (single UPS unit @: P _n , T _{amb} =40°C) (refer to the room positioning on the User Manual)		Rear ≥ 40cm Top ≥ 80cm					
Maintenance access		Front ≥ 100cm					
Storage and transport ambient temperature range		-25°C to +55°C (-13°F to 131°F)					
Operating ambient temperature range		0°C to +40°C (32°F to 104°F) [25°C recommended for batteries] Max +50°C (122°F) @ 70% S _n ²					
Nominal altitude		1000m (3.300ft) without derating					
De-rating for higher altitude		P _{max} =0,9P _n / T _{max} =35°C @ 3000m (max altitude)					
Relative humidity		95% max. without condensation					
Overvoltage category		OVC II					
Protection level (according to IEC 60529)		IP20					
Anti-vermin protection		YES					
Seismic level		UBC Level 4 or EUROCODE 8 zone 3 – option					
Chassis mechanical resistance		IK 10					
Acoustic noise	@ 70% P _n	50 dBA	49 dBA	50 dBA	55 dBA	56 dBA	57 dBA
	@ 100% P _n	56 dBA	49 dBA	54 dBA	61 dBA	62 dBA	63 dBA
Required air flow capacity ³		600 m³/h	1200 m³/h	1800 m³/h	2400 m³/h	3000 m³/h	3600 m³/h

¹ No redundancy

² The UPS working at 50°C is permitted for limited time. The max non-repetitive over-temperature condition is limited for few days.

³ Estimated at the full speed working point

2.2 ELECTRICAL INPUT CHARACTERISTICS

Number of Power modules		1	2	3	4	5	6
N+1 redundant System Power (kW)		50+0 ¹	50+50	100+50	150+50	200+50	250+50
Rectifier technology		3 Level double Boost IGBT					
Nominal mains input voltage (Vn)		3x400V+N					
Input configuration		Three phase with neutral					
Galvanic isolation		NO (Transformer Less)					
Voltage tolerance		-15%+20% (output load at power factor 1) -20%+20% (output load at power factor 0,9) up to -40% at 70% of nominal active load (linear decrease)					
Nominal ⁽²⁾ / Maximum ⁽³⁾ Input Current		75A / 90A	75A / 180A	150A / 270A	226A / 360A	301A / 450A	376A / 450A
Input frequency range		from 40Hz up to 70Hz					
Acceptable frequency gradient		6 Hz/s max					
Programmable delay from battery Mode to On Line Mode		YES, 15s default (selectable from 15s to 300s)					
Soft start time (power walk-in)		YES, 4s default (selectable from 4s to 300s)					
Max inrush current at start-up		< I _n (no overcurrent)					
Cold start		YES (optional)					
Black start		NO					
Input current distortion (THD _i) (@ P _n , V _n , Mains THD _v ≤1%)		≤ 2%					
Input power factor (@ P _n , V _n , Mains THD _v ≤1%)		≥ 0,99					
Recommended protection on input mains ⁽⁴⁾	Breaker C curve	100A	200A	320A	400A	450A	450A
	Fuse gG	100A	200A	320A	400A	450A	450A
Recommended RCD (for TT system only)		0,5A selective type B					
Maximum Input cable core size ⁽⁵⁾		2x150 mm ²					

¹ No redundancy

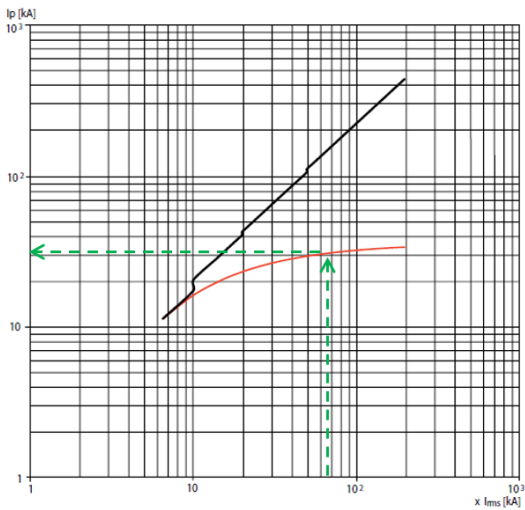
² The nominal input current (I_n) is with batteries fully restored (according to EN62040-1), the redundant module is not considered

³ The maximum input current (I_{max}) is the max current for continuous working (according to EN62040-3): for I>I_{max} a limit Overload time is applied

⁴ Recommended values to avoid unwanted tripping with UPS at full power.

⁵ Max cable core is determined by the size of the crimp terminals (M10) and the available space for connection. Use cables with tin-plated eyelets for the connections.

2.4 BYPASS CHARACTERISTICS

Number of Bypass modules		1	1+1 ¹
Number of Power modules		1 → 6	
Nominal input voltage (phase-neutral)		230V +/-15% (± 20% in operation together with generator - selectable)	
Nominal By-Pass Current ² (according to EN62040-3)		398A	
Nominal input frequency		50/60Hz ± 2% (selectable from ± 1% to ± 10%) 50/60Hz ± 8% in operation together with generator	
Frequency variation speed		1Hz/s default (3Hz/s in operation together with generator - selectable)	
Maximum phase error		6° with stable AUX MAINS 10° with 3Hz/s AUX MAINS frequency variation	
Architecture for parallel		N/A	
Cooling device redundancy		YES	
Current overload ³ on bypass INITIAL CONDITION: 80%Sn, cosφ=1, T _{AMB} = 25°C	continuos	398A	
	30'	417A	
	10'	453A	
	1'	543A	
	20''	634A	
Recommended protection on auxiliary mains (⁴)	Fuse/ Type ⁵	450A gG	
	Breaker ⁶	450A C curve	
Maximum Input AUX cable core size (⁷)		2x150 mm ²	
Maximum i ² t and I _{PK} the by-pass SCR can withstand (max 10ms = max 20ms)		1125kA ² s 15kA max	3920kA ² s 28kA max
Conditional short circuit current rating (Icc) (According IEC 62040-1 2017)		65kA	
Limiting curve of the input protective device: Peak current (I _{pk}) vs. Prospective RMS short circuit current (I _{cp})		 <p>I_{pk} max 31 kA @ I_{cp} 65 kA</p>	

¹ Redundant bypass

² The Nominal bypass current is calculated at 400V, considering a continuous overload of 110%

³ The overload percentage is referred at the nominal output current (230V).

⁴ Recommended values to avoid unwanted tripping with UPS at full power.

To be used a current limiting device in case of exceeding maximum i²t and I_{PK} of the by-pass SCR.

⁵ Recommended for UPS without an output transformer

⁶ With an output transformer it's recommended to use a D curve breaker

⁷ Max cable core is determined by the size of the crimp terminals (M10) and the available space for connection. Use cables with tin-plated eyelets for the connections.




4 REFERENCE DIRECTIVES AND STANDARDS

4.1 GENERAL INFORMATION

The equipment, installed, used and serviced in accordance with its intended use, its regulations and standards, its manufacturer instructions and rules, is in compliance with the relevant Union harmonisation legislation:


REFERENCE	TITLE
2014/35/EU	Directive of the European Parliament and of the council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.
2014/30/EU	Directive of the European Parliament and of the council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.
2011/65/EU	Directive of the European Parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
2012/19/EU	Directive of the European Parliament and of the council of 4 July 2012 on waste electrical and electronic equipment (WEEE).

4.2 SAFETY

STANDARD	DESCRIPTION	DETAIL
IEC 62040-1:2017 IEC 62040-1/A1:2021	Uninterruptible power systems (UPS) Part 1: Safety requirements	
IEC 62040-1:2017 IEC 62040-1/A1:2021 EN IEC 62040-1:2019	Uninterruptible Power Systems (UPS) Part 1: General and safety requirements for UPS	  only for made in Italy

Tab. 4.A

4.3 PERFORMANCES AND EFFICIENCY

STANDARD	DESCRIPTION	DETAIL
EN IEC 62040-3:2021	Uninterruptible power systems (UPS) Part 3: Method of specifying the performance and test requirements	-
IEC 62040-3:2021 Annex J	Uninterruptible power systems (UPS). Part 3: Method of specifying the performance and test requirements ANNEX J : UPS efficiency and no load losses – Methods of measurement	 only for made in Italy

Tab. 4.B

4.4 OTHER STANDARDS

STANDARD	DESCRIPTION	DETAIL
(EN) IEC 60529	Degree of protection of the housing	-


Tab. 4.C

4.5 ROHS

STANDARD	DESCRIPTION	DETAIL
EN 50581:2012 EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances	-

Tab. 4.D

4.6 ELECTROMAGNETIC COMPATIBILITY

STANDARD	DESCRIPTION	DETAIL
EN IEC 62040-2:2018	Electromagnetic compatibility (EMC) requirements	 only for made in Italy

Tab. 4.E

Immunity	EN62040-2 compulsory	MODULYS	Additional test for MODULYS
Conducted and radiated emissions	LEVEL C3	LEVEL C3	
Electrostatic discharge immunity (61000-4-2)	LEVEL C3 Contact discharge ±4kV Air discharge ±8kV	LEVEL C3 Contact discharge ±4kV Air discharge ±8kV	
Electromagnetic field immunity (61000-4-3)	LEVEL C3	LEVEL C3	-
Burst immunity (61000-4-4)	LEVEL C3 AC power supply ports ±2kV	LEVEL C3	x2 AC power supply ports ±4kV
Surge immunity (61000-4-5)	LEVEL C3 Common mode ±2kV Differential mode ±1kV	LEVEL C3	x2 Common mode ±4kV Differential mode ±2kV
Conducted disturbance immunity (61000-4-6)	LEVEL C3	LEVEL C3	-
Power frequency magnetic field immunity (61000-4-8)	LEVEL C3	LEVEL C3	-

Tab. 4.F