Technical Data Sheet

IAC1500 RANGE
1200…1500 W / DC/AC INVERTER

FEATURES

- Sine Wave Output Voltage
- Selectable Output Frequency: 50/60Hz
- Adjustable Output Voltage
- High Input-Output Isolation 3000Vrms
- Remote Inhibit
- Remote Control Via RS232
- Alarm by Isolated Relay Contacts
- Remote Off Opto-Coupled
- Optional Railway Version EN45545-2
- Fire and Smoke: EN45545-2 Approved
- Efficiency Up to 91%



APPLICATION



SAFETY & EMC

RoHS 2 compliant 10 from 10 | Reach compliant | WARRANTY 3 YEARS | WARRANTY 5 YEARS

DESCRIPTION

The IAC1500 consists of single phase sine-wave DC/AC inverts with galvanic isolation between input and output.
The unit allows:

- Select 50/60Hz by means of DIP-switch
- Select local / remote (RS-232) by means of DIP-switch
- Shutdown applying voltage on pins 3 and 4 of signal connector
- Local signalizations of Output OK by means of green LED
- Alarm. Open contacts when output voltage is not OK
- Set and monitor parameters via RS-232
- Local Alarm. Red LED ON when:
  - Output Voltage is not OK
  - Output current > output current alarm
  - Input voltage out of margins
  - Unit shutdown by over-current or remote OFF

EN45545 EN50155

The IAC1500 are equipped with maximum power protection as well as maximum output peak current protection. This protects the unit even when an output short-circuit occurs. It also features a disable function for input under-voltage, which allows protecting the batteries from harmful discharges.

MODELS

	12VDC 10…15V(1)	24VDC 16.8…30V	36VDC 25.2…45V	48VDC 33.6…60V	72VDC 50.4…90V	110VDC 77…138V
120VAC	IAC1500-7121 1200W	IAC1500-7123 1500W	IAC1500-7124* 1500W	IAC1500-7125 1500W	IAC1500-7126 1500W	IAC1500-7127 1500W
230VAC	IAC1500-7111 1200W	IAC1500-7113 1500W	IAC1500-7114 1500W	IAC1500-7115 1500W	IAC1500-7116 1500W	IAC1500-7117 1500W

*References subject to special MOQs and lead times.

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IAC1500 RANGE
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BASIC CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.
Input				
Input Voltage Range	-30, +25% Vin nom	10VDC		15VDC
Maximum Input Ripple	Vrms, 100Hz		5% Vin nom	
Output				
Output Voltage	Sinusoidal	120VAC		230VAC
Output Frequency Range	±0.25Hz		50/60H	
Output Wave Distortion THD	16 Samples Average		<2%	
Output HF Ripple			<2.5%	
Line Regulation	ΔVin -25…+25%		<2%	
	ΔVin -30…+30%		<2%	
Load Regulation			<4%	

ENVIRONMENTAL

Parameter	Conditions	Value
Operating Temperature Range	Full Load, EN50155 OT1	-25°C to +55°C
	50% Load, EN50155 OT3	-25°C to +70°C
Storage Temperature		-25°C to +80°C
Cooling	Controlled Internal Fan	
Relative Humidity		5…95%
MTBF (MIL-HDBK-217-E; Gb, 25°C)		130.000h

SAFETY AND CERTIFICATION

Certification (Type)	Standard
Safety According	EN60950-1, EN62368-1
Dielectric Strength: Input/Output	3000Vrms/50Hz/1min
Dielectric Strength: Output/Ground	1500Vrms/50Hz/1min
Dielectric Strength: Input/Ground	500Vrms/50Hz/1min
Fire and Smoke	EN45545-2

EMC

	Conditions	Value
Immunity According		EN61000-6-2 (EN50121-3-2)
Emission According		EN61000-6-4(EN50121-3-2)

PROTECTIONS

Parameter	Type	Value
Against Overloads and Short-Circuits		Shutdown with Auto-Recovery (see working parameters)
Against Over-Temperature		Shutdown with Auto-Recovery

CONTROL

Type	Description
Output OK LEC	Green
Alarm LED	Red
Output Failure Alarm	Isolated Contact Relay Open when Alarm (<0.3A at 150VDC)
Remote OFF	Off Applying 14.4…137.5VDC, Impedance > 22k5Ω (Note-1)
Status and Programming	RS232 Port

Note-1: -only available depending on HW version. Former models were 4…30V, Impedance 3k3Ω

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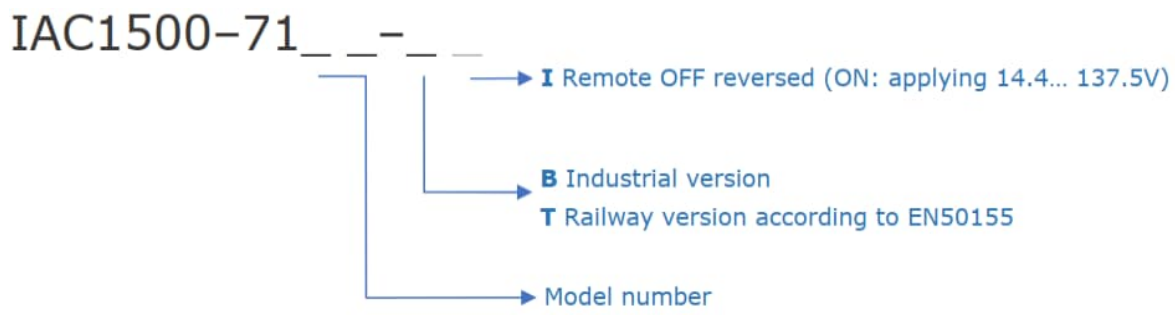
IAC1500 RANGE
1200…1500 W / DC/AC INVERTER

ORDERING CODES

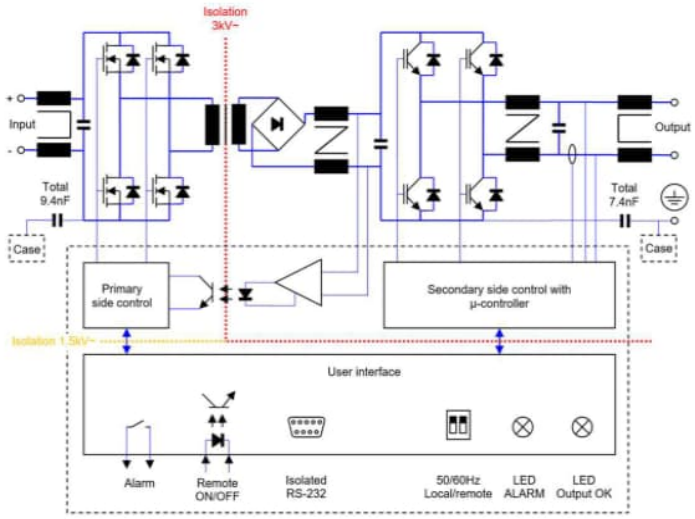
Model	Input Voltage DC [V]	Input Voltage Range [V]	Output Voltage AC [V]	Output Current [A]	Active Output Power [W]	Appar. Output Power [VA]	Output Peak Curr. 10ms		Efficiency [%] *	No Load Input Current [A]*
							5s [Arms]	(Iopk) 10ms [Apk]		
IAC1500-7111	12	10.0-15	230	5.2	1200	1200	6.8	16	87	<2.0
IAC1500-7113	24	16.8-30	230	6.5	1500	1500	10	16	88	<1.0
IAC1500-7114	36	25.2-45	230	6.5	1500	1500	10	16	89	<0.66
IAC1500-7115	48	33.6-60	230	6.5	1500	1500	10	16	90	<0.45
IAC1500-7116	72	50.4-90	230	6.5	1500	1500	10	16	90	<0.34
IAC1500-7117	110	77-138	230	6.5	1500	1500	10	16	91	<0.21
IAC1500-7121	12	10.0-15	120	10.0	1200	1200	13	30	86	<1.5
IAC1500-7123	24	16.8-30	120	12.5	1500	1500	20	30	88	<0.80
IAC1500-7124	36	25.2-45	120	12.5	1500	1500	20	30	88	<0.51
IAC1500-7125	48	33.6-60	120	12.5	1500	1500	20	30	89	<0.35
IAC1500-7126	72	50.4-90	120	12.5	1500	1500	20	30	89	<0.28
IAC1500-7127	110	77-138	120	12.5	1500	1500	20	30	90	<0.16

*References subject to special MOQs and lead times

Note: Grounding bolt implemented recently. Please check with manufacturer to confirm availability of model

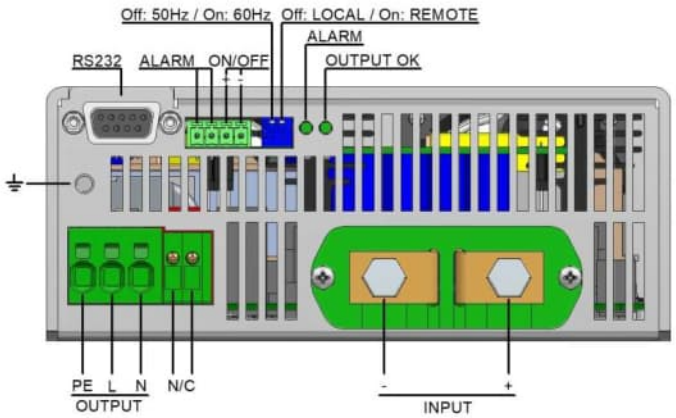


BLOCK DIAGRAM



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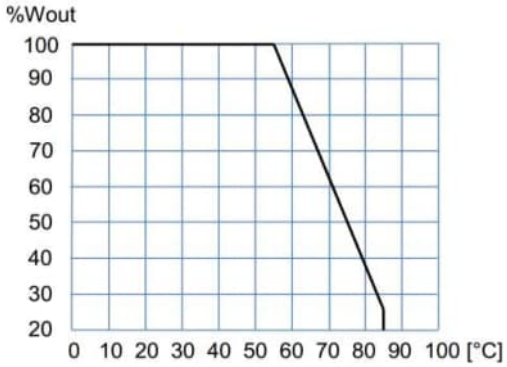
CONNECTIONS



CONNECTIONS

Connection	Notes
Input	Terminal M6 (Rec. Torque 6Nm)
Output	Cable Up to 4mm²
Earth	Bolt M5 (Rec. Torque 3.8 Nm)
Alarm	Phoenix Contact MC1.5/4-G-3.81 (See Accessories)
ON/OFF	
RS232	DB9
N/C	Do Not Use

POWER DERATING vs AMBIENT TEMPERATURE



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INSTALLATION

- The unit has 6 threaded holes for the fixation on a mounting surface.
- The unit has internal fans. For an appropriate cooling, the air input and output should be free of elements that cause and an air flow reduction (minimum recommended distance to other objects 50mm).
- Make connection as shown in the figure
- The default output frequency is 50Hz. For 60Hz simply actuate the dip-switch as indicated in the figure (see connection)
-
- For safety reasons, the following requirements must be met:
- Provide the equipment with some kind of protective enclosure that complies with the electrical safety directives in effect within the country where the equipment is installed
- Include an input fuse with a rating immediately higher than the maximum input current
- Use cables of adequate cross-sections to connect inputs and outputs. The following table lists the maximum currents and the minimum cross-sections for the cables used for each power connection.

	Input 12V	Input 24V	Input 36V	Input 48V	Input 72V	Input 110V	Input 120V	Input 230V
Max. Current	140A	100A	75A	50A	33A	22A	13A	6.7A
Cable Cross-Section	35 mm²	16 mm²	16 mm²	10 mm²	6 mm²	2.5 mm²	1.5 mm²	1.0 mm²

	Monitor	Set
RS232 Functions	Input Voltage	Input Under-Voltage Lockout
	Output Voltage	Input Under-Voltage Alarm
	Output Current	ON/OFF
	Internal Temperature	Output Frequency
	Output Frequency	Maximum Output Current
	Output Power	Output Voltage

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RS232 COMMUNICATION PORT

It is possible to control and monitor de unit via RS232 by means a terminal emulator like “Tera Term” or “Putty”. Also, it is possible to control and monitor de unit directly using the protocol showed in table:

Protocol Configuration: ASCII Code, 19200Bauds, Parity None, 8Bits, 1Bit Stop

TABLE

Header		Function	Parameter		Returns	Description
P	R	L	V		PTV■■■.■	Input Voltage in Volts
			U		PTU■■■.■	Output voltage in Volts RMS
			I		PTI■■■.■	Output Current in Amps RMS
			T		PTT■■■.■	Internal Temperature in °C
			F		PTF■■■.■	Output Frequency in Hz
			W		PTW■■■.■	Output Power in W
			S		PTS■■■.■	Inverter Status 999.9 -> Inverted Enabled 000.0 -> Inverted Disabled 222.2 -> Inverted Blocked by Overload 111.1 -> Inverter Blocked by Overload or Short-Circuit
			M		PTM■■■.■	Model Number
			R		PTR■■■.■	Firmware Version
			Other Character		PTE	Command Not Supported
		G	1	■■■.■	OK	Set the Minimum Input Working Voltage in Volts
					ERR	Value NO VALID for this Parameter
			2	■■■.■	OK	Set the Minimum Alarm Input Voltage in Volts (it should be higher than PRG1)
					ERR	Value NO VALID for this Parameter
			3	■■■.■	OK	CHANGES THE Status Bit (After Start-Up Enabled with SW3 = LOCAL and Disable with SW3 = REMOTE) 999.9 -> Inverted Enable 000.0 -> Inverted Disable
					ERR	Value NO VALID for this Parameter
			4	■■■.■	OK	Set the Output Voltage in Volts RMS 80% Vnom ≤ ■■■.■ ≤ 105% Vnom
					ERR	Value NO VALID for this Parameter
			5	■■■.■	OK	Set the Maximum Output Current in Amps 20% Inom ≤ ■■■.■ ≤ 100% Inom
					ERR	Value NO VALID for this Parameter
			6	■■■.■	OK	Changes the Output Frequency (it is not stored for the next start-up) 050.0 -> 50Hz 060.0 -> 60Hz
					ERR	Value NO VALID for this Parameter
			7	■■■.■	OK	Set the Output Current Alarm 0 ≤ ■■■.■ ≤ 100% Imax_warning
					ERR	Value NO VALID for this Parameter
			8	■■■.■	OK	111.1 -> Reset the Inverter
					ERR	Value NO VALID for this Parameter
			A	■■■.■	OK	Set the Start-up Voltage in Volts (it should be higher than PRG1)
					ERR	Value NO VALID for this Parameter

Note: OK (Data Accepted) / ERR (Data not Valid for the Current Parameter)

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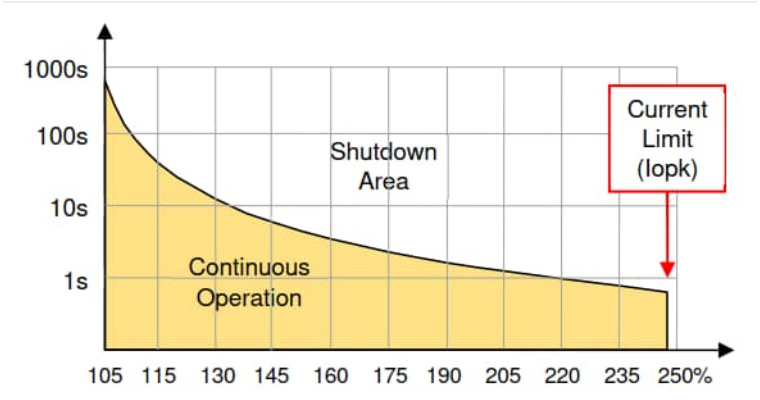
IAC1500 RANGE
1200…1500 W / DC/AC INVERTER

WORKING PARAMETERS

Thermal Protection	7442…7457					
Internal Warning Temperature	88°C					
Internal Shutdown Temperature	92°C					
Internal Restart Temperature After Over-Temperature Shutdown	75°C					
Input Voltage Parameters	71X1	71X3	71X4	71X5	71X6	71X7
Max. Input Voltage Timed Shutdown 0.1s	16.8 VDC	33.7 VDC	50.6 VDC	67.3 VDC	100.9 VDC	154.1 VDC
Max. Input Voltage Instantaneous Shutdown	15.1 VDC	30.1 VDC	45.2 VDC	60.1 VDC	90.1 VDC	138.6 VDC
Maximum Start-Up Voltage	14.9 VDC	29.9 VDC	44.9 VDC	59.8 VDC	89.7 VDC	137.4 VDC
Minimum Start-Up Voltage	10.6 VDC	17.9 VDC	26.9 VDC	35.9 VDC	53.9 VDC	82.4 VDC
Min. Input Voltage Shutdown Timed 0.1s	10.0 VDC	16.7 VDC	25.1 VDC	33.5 VDC	50.3 VDC	76.9 VDC
Min. Input Voltage Shutdown Instantaneous	9.6 VDC	14.4 VDC	21.6 VDC	28.7 VDC	43.1 VDC	65.9 VDC
Output Voltage Parameters	711X			712X		
Output Voltage of Short Circuit or Deep Overload	<164 VAC			<86 VAC		
Time of Short-Circuit	1000ms					
Time of Start-Up After Shutdown by Short-Circuit	2000ms					
Number of Start-Up Attempts After Short-Circuit	5					
Output Current Parameters	7111	7113/4/5/6/7		7121	7123/4/5/6/7	
Maximum Continuous Output Current	5.3 A	6.6 A		10.1 A	12.7 A	
Warning Current	5.2 A	6.5 A		10 A	12.5 A	
Start-Up Time After Shutdown by Overload	1000 ms	1500 ms		1000 ms	2000 ms	
Maximum Overload I^2t	See Figure Below					
Number of Attempts of Consecutive Overload	5					
Start-Up and Working Failures	71XX					
Maximum Time for Overload or Internal Failure	Unlimited					
Minimum time Required Between Disconnection and Newt Connection	2					

OVERLOAD PROTECTION

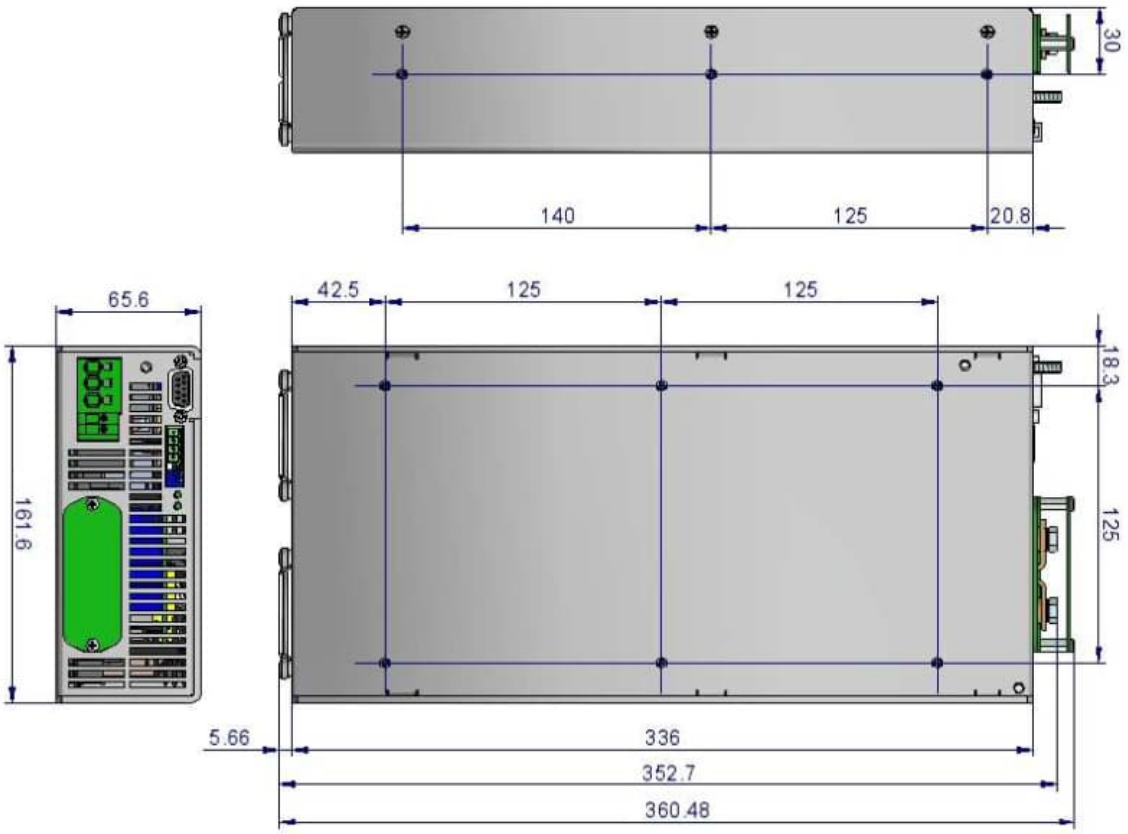
Protection Against Overloads and Short-Circuit	By Current Limiting at Iopk By I^2t. The Unit Shutdown when the Current-Time is over the Continuous Operation Curve
Overload Protection Recovery	Every 2 Seconds After Shutdown, the Unit tries to Restart Up to 5 Times. If the Overload Persists, the Unit Reminds Shutdown Until an Input Reconnection



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DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Weight		3800g



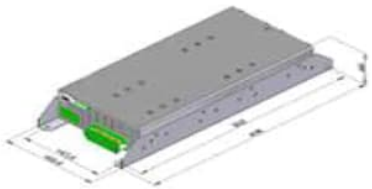
Fixing screws of the base: 6 x M4, maximum penetration depth 3.5mm

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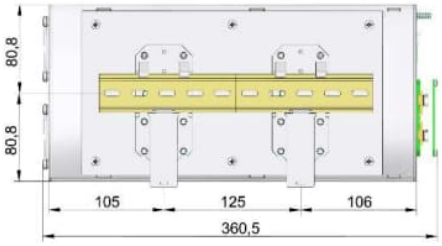
ACCESSORIES

Description	Notes	Code
Mounting Brackets Kit	Contains Two Brackets and Screws	NP-9282
DIN Rail Assembly Kit	Screws Included	NP-9339
2U 19" Rack Mounting Tray Kit	It Allows to Install One or Two Units	NP-9353
Signals Female Connector	Phoenix Contact MC1.5/4-ST-3.81	2601-409

NP-9282



NP-9339



NP-9353



2601-409







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ANNEX

Applicable values for the different sections of the norm EN50155: 2017

4.3.1	Working Altitude	Up to 2000m
4.3.2	Ambient Temperature	Class OT1 (-25 to 55°C): load < 100% Class OT2 (-40 to 55°C): load < 100% (Without connectors handling) Class OT3 (-25 to 70°C): load <75% Class OT4 (-40 to 70°C): load <75% (Without Connectors handling)
4.3.3	Switch-On Extended Operating Temp.	ST1
4.3.4	Rapid Temperature Variation	H1
4.3.5	Shocks And Vibrations	According EN61373:2010 Category 1 class B

4.3.6 EMC Electromagnetic Compatibility

EN50121-3-2:2016

Test	Norm	Port	Frequency	Limits
Radiated Emissions	IEC55016	Case	30MHz…230MHz	40dB(µV/m) Qpk at 10m
			230MHz…1GHz	47dB(µV/m) Qpk at 10m
			1…3GHz	Do not apply
			3…6GHz	Internal freq. < 108MHz
Conducted Emissions	IEC55016	Input	150kHz…500kHz	99dB(µV) Qpk
			500kHz…30MHz	93dB(µV) Qpk

Test	Norm	Port	Severity	Conditions	P
Electrostatic Discharge	IEC61000-4-2	Case	±8kV	Air (isolated parts)	B
			±8kV	Contact (conductive parts)	
Radiated High Frequency	IEC61000-4-3	X/Y/Z Axis	20V/m	0.08…1.0GHz M. 80% 1kHz	A
			10V/m	1.4…2.1GHz M. 80% 1kHz	
			5V/m	2.1…2.5GHz M. 80% 1kHz	
			3V/m	5.1…6Ghz M. 80% 1kHz	
Fast Transients	IEC61000-4-4	Input	±2kV	Tr/Th: 5/50 ns	A
		Output	±2kV		
		Signal	±2kV		
		PE	±1kV		
Surge	IEC61000-4-5	Input L to L	±1kV	Tr/Th: 1.2/50µs	B
		Input L to PE	±2kV		
Conducted RF	IEC61000-4-6	Input	10V	0.15...80MHz M. 80% 1kHz	A
		Output	10V		
		Signal	10V		
		PE	10V		
Magnetic field	IEC61000-4-8	X/Y/Z Axis	300A/m	0Hz, 16.7Hz, 50/60Hz	A

P= Performance criteria, L= Line, PE= Protective Earth

4.3.7	Relative Humidity	Up to 95%
5.1.1.2	DC Power Supply Range	From 0.70 to 1.25 Un continuous
5.1.1.3	Temporary DC Power Supply Fluctuation	From 0.60 to 1.40 Un 0.1s From 1.25 to 1.40 Un 1s without damage
5.1.1.4	Interruptions Of Voltage Supply	Class S1 (without interruptions)
5.1.1.6	Input Ripple Factor	10% peak to peak with a DC Ripple Factor of 5 %
5.1.3	Supply Change-Over	0,6 Un duration 100 ms (without interruptions). Performance criterion A
7.2.7	Input Reverse Polarity Protection	By External fuse
10.7	Protective Coating For PCB Assemblies	Class PC2

13.3	Tests List	1 Visual Inspection	Routine
		2 Performance test	Routine
		3 Power supply test	Routine
		4 Insulation test	Routine
		5 Low temperature storage test	-
		6 Low temperature start-up test	Type
		7 Dry heat test	Type
		8 Cyclic damp heat test	Type
		9 Salt mist test	-
		10 Enclosure protection test (IP code)	-
		11 EMC test	Type
		12 Shocks and vibrations test	Type
		13 Equipment stress screening test	Routine: 40°C and load 100%
		14 Rapid Temperature variation test	Type

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