

	Unit nr:	009				
	Date:	24-10-02				
	Testengineer:	m mensink				
	Specification / requirement notes:	Nominal Vac input between 415V and 464V (decision september 2002)				
		Hw = Hardware	Sw = Software			
	Test item	Condition	Requirement	Measured hardware	Measured in software	Pass
1	Physical, Labelling & Wiring					
a	Wiring, stripping		Wiring stripped correctly, No risk of short-circuit	X	X	pass
b	Wiring colour	document 4022 430		X	X	pass
c	Wiring length	10021_134_1_200208	0.50m	X	X	pass
d	Labelling	27	Labels present on outgoing wiring.	X	X	pass
e	Mechanical dimensions	document 4022 366 7220		X	X	pass
2	Isolation					
a	Isolation voltage	separate PFCMOD modules. Input <--> chassis	4200Vdc, max 65uA leak	25uA 25uA 25uA	X X X	pass pass pass
b	Isolation voltage	complete SPM unit. Input <-->chassis	2120Vdc, max 75uA leak	50uA	X	pass
3	Prepare SPM					
a	Adjust internal supply 5Volt	Adjust P1 (spmctrl)	5.000V +/- 0.1%	5,000V	X	pass
b	Program Bootloader with MPLab software	See document 4022	Bootldr.hex	X	X	pass
c	Program Firmware with Flashtool	366	Spm.hex V1.17	X	X	pass
4	Software Test					
a	Input voltage range 250..500Volt		Local control active	X	communication possible	pass
5	Local control Security					
a	No switch ON	350V, update control (output 1..6 ON	outputs 1..6 remain OFF	pass	Update Status	pass
b	No switch ON, 10mins after power-up	350V, do NOT send any message to the controller.	After 11 minutes outputs 1..6 remain OFF	Check outputs 380V 1..6	X	pass
c	Switch ON, 10mins after power-up	370V, do NOT send any message to the controller.	After 10minutes switch-on sequence outputs 1..6 , interval 2seconds	Check outputs 380V 1..6	X	pass
6	Input 500Vac	Input 500Vac				
a	Temperature unit 1&2			22	20,9	pass
	Temperature unit 3&4	Tambient	Tsensor +/- 2dgr.C. +/- 2%	22	21,6	pass
	Temperature unit 5&6			21,5	21,1	pass
b	V380P1	200Watt	ON - OFF	X	Update Status	pass
	V380P2	200Watt	ON - OFF	X	Update Status	pass
	V380P3	200Watt	ON - OFF	X	Update Status	pass
	V380P4	200Watt	ON - OFF	X	Update Status	pass
	V380P5	200Watt	ON - OFF	X	Update Status	pass
	V380P6	200Watt	ON - OFF	X	Update Status	pass
c	V380P1 output tolerance	200Watt	Hw <= 5% . Sw <= 3%	379,3V	380,7V	pass
	V380P1 output current	200Watt		0,531A	0,533A	pass
	V380P1 output ripple	200Watt	<10% tt	20,8V	X	pass
	V380P2 output tolerance	200Watt	Hw <= 5% . Sw <= 3%	380,6V	382,2V	pass
	V380P2 output current	200Watt		0,540A	0,515A	pass
	V380P2 output ripple	200Watt	<10% tt	20,6V	X	pass
	V380P3 output tolerance	200Watt	Hw <= 5% . Sw <= 3%	378,7V	379,8V	pass
	V380P3 output current	200Watt		0,542A	0,557A	pass
	V380P3 output ripple	200Watt	<10% tt	20,9V	X	pass
	V380P4 output tolerance	200Watt	Hw <= 5% . Sw <= 3%	377,2V	380,7V	pass
	V380P4 output current	200Watt		0,537A	0,528A	pass
	V380P4 output ripple	200Watt	<10% tt	20,9V	X	pass
	V380P5 output tolerance	200Watt	Hw <= 5% . Sw <= 3%	379,0V	379,8V	pass
	V380P5 output current	200Watt		0,548A	0,560A	pass
	V380P5 output ripple	200Watt	<10% tt	20,7V	X	pass
	V380P6 output tolerance	200Watt	Hw <= 5% . Sw <= 3%	379,7V	380,3V	pass
	V380P6 output current	200Watt		0,545A	0,535A	pass
	V380P6 output ripple	200Watt	<10% tt	19,7V	X	pass
d	V48P output tolerance	60Watt (1.25A)	Hw <= 5% . Sw <= 3%	49,8V	49,2V	pass
	V48P output current	60Watt (1.25A)		1,250A	X	pass
	V48P output ripple	60Watt (1.25A)	<10%tt	3,6V	X	pass
	V380P1 output tolerance	0Watt	<= 5%	379V	382,2V	pass
	V380P1 output current (Antares Testtool)	0Watt	0Amp +/- 0.05Amp	X	0,018A	pass

	Test item	Condition	Requirement	Measured hardware	Measured in software	Pass
e	V380P2 output tolerance	0Watt	<= 5%	380V	382,2V	pass
	V380P2 output current (Antares Testtool)	0Watt	0Amp +/- 0.05Amp	X	0,014A	pass
	V380P3 output tolerance	0Watt	<= 5%	379V	308,3V	pass
	V380P3 output current (Antares Testtool)	0Watt	0Amp +/- 0.05Amp	X	0,020A	pass
	V380P4 output tolerance	0Watt	<= 5%	377V	380,3V	pass
	V380P4 output current (Antares Testtool)	0Watt	0Amp +/- 0.05Amp	X	0,016A	pass
	V380P5 output tolerance	0Watt	<= 5%	379V	380,3V	pass
	V380P5 output current (Antares Testtool)	0Watt	0Amp +/- 0.05Amp	X	0,028A	pass
	V380P6 output tolerance	0Watt	<= 5%	380V	381,2V	pass
V380P6 output current (Antares Testtool)	0Watt	0Amp +/- 0.05Amp	X	0,019A	pass	
f	V48P output tolerance	0Watt	Hw <= 5% . Sw <= 5%	50,0V	49,7V	pass
7 Input 360Vac						
a	V380P1 output tolerance	200Watt	<5%	379,8V	381,7V	pass
	V380P2 output tolerance	200Watt	<5%	380,8V	382,7V	pass
	V380P3 output tolerance	200Watt	<5%	378,9V	380,3V	pass
	V380P4 output tolerance	200Watt	<5%	377,3V	380,7V	pass
	V380P5 output tolerance	200Watt	<5%	379,1V	379,8V	pass
	V380P6 output tolerance	200Watt	<5%	379,7V	380,7V	pass
b	V48P output tolerance	60Watt	<5%	49,8V	49,2V	pass
c	Outputs 1..6 Switch OFF	200Watt	340Vac +/- 3%	333V	Update Status	pass
d	V380P1 overcurrent control	Output Load	OFF @ >650mA +/- 10% (CurrentFail)	0,669A	Update Status	pass
	V380P2 overcurrent control	Output Load	OFF @ >650mA +/- 10% (CurrentFail)	0,695A	Update Status	pass
	V380P3 overcurrent control	Output Load	OFF @ >650mA +/- 10% (CurrentFail)	0,676A	Update Status	pass
	V380P4 overcurrent control	Output Load	OFF @ >650mA +/- 10% (CurrentFail)	0,671A	Update Status	pass
	V380P5 overcurrent control	Output Load	OFF @ >650mA +/- 10% (CurrentFail)	0,660A	Update Status	pass
	V380P6 overcurrent control	Output Load	OFF @ >650mA +/- 10% (CurrentFail)	0,686A	Update Status	pass
8 Extra monitoring						
a	AC input voltage monitoring	340..500V	340..500V +/- 10V	340,3...500,4	338,9...500,9	pass
b	AC input asymmetry monitoring	500V line1 and line2 connected through 10nF (matched) to Chassis	0V +/- < 25V	X DANGER	(-) 3,4V	pass
	AC input asymmetry monitoring	500V line1 directly connected to Chassis	250V +/- < 25V	X DANGER	(-) 229V	pass
c	DC leakage monitoring	50Vdc frame to GND (circuit = 200kOhms)	max. 250uA (SPM disconnected from mains)	247uA	X	pass
			max. 250uA +/- 20uA (SPM on mains , outputs 1..6 OFF)	263uA	247uA	pass
9 Overall						
a	Power factor	450V, 6x 200W+1x60W	> 0.95	0,989	X	pass
b	Input Current	450V, 6x 200W+1x60W	X	3199,00A	X	X
c	Total output current	6x 200W + 1x60W	X	4,493A	X	X
d1	Input Power	450V, 6x 200W + 1x60W	X	1425,0W	X	X
d2	Output Power	max. loads	X	1291,6W	X	X
e	Efficiency	450V, 6x 200W +1x60W	> 90%	91%	X	pass
f	Burn in	24hrs at 50degr. Celcius, 400Vac, nominal load 180W, tube surface max. 60dgr.C.	T < 115 dgr.C. and All outputs running, delta <5%		screendump. see attached document	pass

screen dump

screendump

The screenshot displays the 'ANTARES TestTool' software interface. The main window has a menu bar with 'File', 'Settings', and 'Help'. Below the menu bar are tabs for 'String Power Module', 'Local Power Box', 'Module 3', 'Module 4', 'Module 5', and 'General'. The 'General' tab is active.

The interface is divided into several sections:

- Control:** A 'Power Supply' section with six checked checkboxes for 'Unit 1' through 'Unit 6'. Below it is an 'Update Control' button.
- Status:** Three columns of status indicators for 'Power', 'Temperature', and 'Current'. Each column has six rows corresponding to the units. The 'Power' column shows 'On' in yellow boxes. The 'Temperature' and 'Current' columns show 'Ok' in green boxes. Below this section is an 'Auto update' checkbox (unchecked), an 'Update Status' button, and a 'Reset Status' button.
- Information:** Three columns of data for 'Unit 1 & 2', 'Unit 3 & 4', and 'Unit 5 & 6'. Each column lists voltage (U), current (I), and temperature. Below this is a 'Common' section with values for 'AC input', 'AC asymetry', 'DC leak current', and '48V'. An 'Auto update' checkbox (unchecked) and an 'Update Information' button are also present.

The Windows taskbar at the bottom shows the 'ANTARES TestTool' application icon, a system clock displaying 'donderdag 24 okto', and various system tray icons.

Unit	U	I	Temperature
Unit 1 & 2	U1: 382,7 V	I1: 0,4487 A	106,4 °C
Unit 3 & 4	U3: 380,3 V	I3: 0,4640 A	111,4 °C
Unit 5 & 6	U5: 380,3 V	I5: 0,4750 A	96,5 °C

AC input	413,7 V	AC asymetry	-107,9 V	DC leak current	-0,015 mA	48V	49,3 V
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