




Calibration Certificate

 <p>www.cinergia.coop CONTROL INTEL·LIGENT DE L'ENERGIA C/Can Baletes 7, Nau A (Polígon el Cros) • 08310 Argentona (BARCELONA) Tlf: +34 934864358</p>	CUSTOMER:	
	ODTÜ-GÜNAM	
	EQUIPMENT'S PROFILE	
	Model:	GEL AC&DC
	Rated Power:	27 kVA
	Serial number:	20220720
	Rated Current (phase):	40 A
	Rated Current:	120 A
	Voltage range:	0-750V
	Date of calibration:	31/08/2022
INSTRUMENTS USED		
1. Power Analyser:	YOKOGAWA DIGITAL POWER METER WT 330	CIN0087
2. Oscilloscope:	YOKOGAWA DLM2024 91RC26057	
3. Multimeter:	FLUKE 179 TRUE RMS	
4. Current Probe:	LEM IT400S ULTRASTAB/INTERNAL SHUNT WT330	
5. Current Probe:	FLUKE i30 AC/DC CURRENT CLAMP	
6. Voltage Probe:	PICO DIFFERENTIAL PROBE TA057	
CINERGIA recommend to validate the calibration of the unit once every two years.		

Current Setpoint @AC	Reading acquisition (A)	% Error F.S.	Result
40	40.09	0.08%	PASS
35	35.08	0.07%	PASS
30	30.07	0.06%	PASS
20	20.06	0.05%	PASS
15	15.05	0.04%	PASS
10	10.05	0.04%	PASS

Voltage Setpoint @DC	Reading acquisition (V)	% Error F.S.	Result
50	50.16	0.02%	PASS
115	115.03	0.00%	PASS
230	230.13	0.02%	PASS
550	550.20	0.03%	PASS
750	750.00	0.00%	PASS

	Input side (W)	Output side(W)	Losses (W)	η (%)
Pn (-In)	24526.7	27042	2515.3	90.70
Pn (In)	29027	27040	1987	93.15

OPERATOR:	SUPERVISOR:
	

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VISUAL AND MECHANICAL INSPECTION

TEST	PASS/NO PASS
Internal connection equipment	PASS
Position and configuration of control boards	PASS
Connection between boards	PASS
Input/Output terminals position	PASS
Disconnecting switch and circuit breaker revision	PASS
Current probes position	PASS
Emergency stop and LCD screen position	PASS
Housing	PASS
EQUIPMENT BOARDS	REFERENCE
Control board 701B00	21310080701B0151
Interface board 702B00	21310080702B0078
BBB board 703B00	21410080703B0133

START UP TEST

TEST	PASS/NO PASS
Start with Emergency stop button	PASS
Status word (Initialization)	PASS
Remove Emergency stop button	PASS
Status word (Standby)	PASS
Enable	PASS
Run	PASS
DC link voltage	PASS
Operational Screen	PASS

POWER TEST@AC

VOLTAGE MODE	PASS/NO PASS
Grid setpoint: 230V 50Hz. Current setpoints 10/20/50/100/125%/150%	PASS
Grid setpoint: 115V 60Hz. Current setpoints 10/20/50/100/125%/150%	PASS
Different voltage SP and frequency SP	PASS
CURRENT MODE	PASS/NO PASS
Source: 230V 50Hz. Current setpoints 10/20/50/100/125%/150%	PASS
Source: 277V 50Hz. Current setpoints 10/20/50/100/125%/150%	PASS
Source: 230V 20Hz. Current setpoints 10/20/50/100/125%/150%	PASS
Source: 110V 60Hz. Current setpoints 10/20/50/100/125%/150%	PASS
Source: 150V 200Hz. Current setpoints 10/20/50/100/125%/150%	PASS
Source: 100V 400Hz. Current setpoints 10/20/50/100/125%/150%	PASS
Source: GRID. Current setpoints 10/20/50/100/125%/150%	PASS
POWER MODE	PASS/NO PASS
Source: 230V 50Hz. Power setpoints 10/20/50/100/125%/150%	PASS
Source: 110V 60Hz. Power setpoints 10/20/50/100/125%/150%	PASS
IMPEDANCE MODE	PASS/NO PASS
R, L, C values: Rated/50/10%	PASS

TEMPERATURE TEST	PASS/NO PASS
Maximum temperature RA at rated power	PASS (<70°C)
Maximum temperature INV at rated power	PASS (<70°C)
Long term test (more than one hour) at rated	PASS

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POWER TEST@DC

VOLTAGE MODE	Max. Error	PASS/NO PASS
Voltage SP: 50V 100% Load	< 0.750V	PASS
Voltage SP: 250V 100% Load	< 0.750V	PASS
Voltage SP: 400V 100% Load	< 0.750V	PASS
Voltage SP: 550V 100% Load	< 0.750V	PASS
Voltage SP: 750V 100% Load	< 0.750V	PASS
CURRENT MODE	Max. Error	PASS/NO PASS
Current SP: 30A 50V	< 0.03A	PASS
Current SP: 30A 230V	< 0.03A	PASS
Current SP: 16A 550V	< 0.03A	PASS
Current SP: 12A 750V	< 0.03A	PASS
POWER MODE		
Source: 115V Power setpoints 10/20/50/100/110%		PASS
Source: 230V Power setpoints 10/20/50/100/110%		PASS
Source: 550V Power setpoints 10/20/50/100/110%		PASS
RESISTANCE MODE		
R values: Rated/50/10%		PASS

FAULTS	PASS/NO PASS
OverVoltage 100-200% - UnderVoltage 0-100% - Flicker	PASS
AC faults current mode sequence	PASS
AC faults power and impedance mode	PASS

COMUNICATIONS	RESULT
Modbus TCP	PASS
RS232	NOT PRESENT
RS485	NOT PRESENT
CAN	NOT PRESENT
Change IP	PASS
Burn EEPROM Limits and Alarms	PASS

HARMONICS TEST	PASS/NO PASS
Harmonic control in current/voltage mode	PASS
Harmonic sequence file in current/voltage mode	PASS

LIMIT TEST	PASS/NO PASS
Voltage limit (277Vrms in AC and 750Vrms in DC)	PASS
Current limit (100% rated, continuous mode) @AC	PASS
Current limit (100% rated, continuous mode) @DC	PASS
Power limit (100% rated, continuous mode)	PASS
Current limit (125% rated, 10 min) @ AC	PASS
Current limit (150% rated, 1 min) @AC	PASS
Current limit (200% rated, 2 sec) @ AC	PASS
Current limit (110% rated, 1 min @ DC	PASS
Frecuency limit (15 to 400Hz)	PASS
25% extra power during 10 min	PASS
50% extra power during 1 min	PASS
100% extra power during 2 sec	PASS

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ALARMS	PASS/NO PASS
Emergency stop	PASS
Overload (10 min. Power and current)	PASS
Overload (1 min. Power and current)	PASS
Overload (2 sec. Power and current)	PASS
Overcurrent	PASS
Overvoltage	PASS
Warning Failed on synchronization	PASS

LCD SUPERVISION AND CONTROL	PASS/NO PASS
Check grafctet states (alarm/initialization/standby/ready/run)	PASS
Control mode (all control modes available)	PASS
Operation (enable/disable/ready/run)	PASS
Current mode (setpoints)	PASS
Power mode (setpoints)	PASS
Voltage mode (setpoints)	PASS
Impedance mode (setpoints)	PASS
Supervision Screen values	PASS
Scada Screen values	PASS
Alarm Screen values - Historic	PASS
Settings Screen	PASS

DIGITAL AND ANALOG INPUTS/OUTPUTS	PASS/NO PASS
Control equipment with digital inputs	PASS
Control setpoint with analog input signal	PASS
Supervision internal values with analog output signal	PASS

OPTIONALS/SOFTWARE UPGRADE

SEPARATED PHASES	PASS/NO PASS
ON/OFF each phase	PASS
Different control mode each phase	PASS
Setpoint different each phase	PASS
Reset alarm only one phase	PASS
LCD control	PASS

DC MODE OPTIONALS	PASS/NO PASS
Battery Test	PASS
Battery Emulator	PASS
PV emulator	PASS
LCD control	PASS

POWER AMPLIFIER	PASS/NO PASS
AC mode	PASS
DC mode	PASS

HARDWARE OPTIONALS	PASS/NO PASS
HV in AC&DC mode	PASS
HF switching	PASS
IEC	PASS