THYTRON ENERGY SDN BHD
No. 31, Jalan Taming 10,
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THYTRON
Power and Energy Solutions

HPMI INTEGRATED MODULAR UPS SYSTEM

KEY FEATURE

- True redundant N+ X UPS system with Online Pure Sine Wave Output.
- Multiple Input Power Source, with Single phase or Three Phase.
- Combination output with different voltages and frequency sharing same autonomy battery time.
- High compact power density with smallest footprint.
- Zero Downtime with modular, fault-tolerant design.
- Rectifier System independent from Inverter module.
- Maximum power per system up to 81kW.
- 400/415 VAC three-phase expandable to 225kVA (180kW) with multiple cabinet.
- Wide input voltage range for Single Phase 90 ~ 240Vac.
- Wide operating temperature range.
- Input installed with class H galvanic isolation transformer.
- Online upgradable to multiple Battery strings.
- Light weight, rectifier < 2 kg, inverter module < 5 kg.
- Improve Stock management by Reduce Component Storage.
- Long MTBF, Short MTTR.
- Multiple AC Output, DC output 24V, 48V, 72V,110V, 220V DC. (with DC /DC converter).
- Scalable Power Management, DC and AC input ratio can be scaled accordingly.
- Input / Output Voltage from 120/277, 415Vac, 480Vac.
- Battery type VRLA, Nicad, Sodium Nickel Chloride with DC Voltage, 24V, 48V,110V, 220V DC.
- "Set and forget" with comprehensive alarms, status indication, and battery health monitoring
- Options for remote monitoring (TCP/IP, SNMP,).
- Options for Battery Monitoring System.
- Options for Air to Air-to-Air Heat Exchanger increase to NEMA 4X / IP66.

When a critical load requires a super stable power supply, a programmable scale able power distribution of dual supply source, a true redundant N+ X UPS system is recommended. During Maintenance, when the faulty module is removed and replaced with spare, no shutdown, no tools and no set-up is required.

Each power module designed with high power density up to 27 W/in3. Less heat dissipation with high efficiency up to 95% even with low load.

Battery cell failure is also tolerated: THYTRON AC UPS solution has a battery made up of, so failure of one cell does not compromise system integrity. Battery replacement is simple; if you already manage 48V or 110V or 220V batteries, then you can also service the batteries of our AC UPS systems. Full Battery Monitoring System with history log and field report can be offered as optional.

HPMI modular ups with Sodium Nickel chloride battery

UPS TECHNICAL DATA	
UPS Rating	From 5 ~ 40 Kva with 2.5 kva / 3kva module upgrade (system shelf range 10/20/30/40 Kva)
BYPASS INPUT	
Bypass Input AC (Nominal)	Three/ Single-phase (415/480/120/240) Vac
Bypass Input AC Range	-35% ~ +15%
Bypass Output Stability	±1% from 10% to 100% load
Bypass Input Frequency	50/60Hz (selectable) 50Hz: (47~53Hz) / 60Hz: (57~63Hz)
RECTIFIER INPUT	
Voltage	120/240Vac nominal, Single-phase: 90-275VAC Range@240Vac 415/480 Vac nominal Three-phase: 147.2 ~ 476.3V AC L-L.@415V
Inrush Current	Does not exceed full-load current.
Efficiency	95.50%
Power Factor	Typically, 0.99
Current distortion	THD less than 5% at full load.
DC OUTPUT	
Voltage	24/48/110/240V DC
Power	4.8KW to 81 KW
OUTPUT AC	
Voltage	Three/ Single-phase (415/480/120/240) Vac
Frequency	50Hz (60 Hz selectable)
Voltage distortion	less than 1.5%
Voltage regulation	Better than 2% under all variations of AC and DC supply voltage and load power.
Frequency accuracy	Better than 0.03%.
Crest factor	3:1
Power Limit/per module	Type A: 1 kW / 1. 25kVA. Type B: 2.0kW / 2. 5kVA.Type C: 2.5Kw / 3kva per inverter module
System power	Up to 60kVA
Protection	Surge protection provided within each module; enhanced surge protection available.
ENVIRONMENTAL	
Cooling	Fan-forced
Operating range:(Full Power)	-40°C to +55°C up to 2000m
Derated Operation	+55°C ~ +75°C
Storage	-60°C to +85°C
Transport	-40°C to +70°C
CABINET	
Dimensions and Ingress Protection	Standard enclosures are rated IP42 ~ IP 52/Option for IP 66 with Air conditional unit. Other enclosures are available to suit specific requirements, eg: outdoor installation, swing- frame, corrosive atmospheres

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INVERTER DISPLAY MODULE

USER INTERFACE

GUI LCD touchscreen display with web-based GUI access via ethernet and browser Display 7” color touchscreen, 800x480 pixels LED major / minor alarms LED major / minor alarms.

DESCRIPTION

Internet ready and remotely accessible for monitoring supervision and system configuration. Highly configurable interface with user definable input and output alarms. Data logging provides flexibility measures for system troubleshooting.

Last generation touchscreen GUI for simple and convenient setup. A built-in web server provides setup via local or remote IP access using standard internet browser. The logging features provide and allow the capture of multiple inputs for AC / DC input measurements, battery current, AC load, ... GUI LCD touchscreen display with web-based GUI access via ethernet and browser Display 7” color touchscreen, 800x480 pixels LED major / minor alarms LED major / minor alarms.

USB and Micro SD ports for data log and configuration files storage.

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RECTIFIER DISPLAY MODULE

DESCRIPTION

- Very compact: 4U x 2U
- Charging current control of two battery strings, independently.
- Ready to manage up to 30 modules (I < 3000 A).
- Backlight LCD panel of 4x40 characters.
- Navigation keypad, ENT (validate/acknowledge and alarm) and ESC (escape/cancel).
- Indicators of communication transmission/reception through the INT and COM2 port.

MEASUREMENTS

- Input, output and battery voltage
- Frequency.
- Output, input and charge/discharge current for each battery string
- Percentage of connected load.
- Ambient and battery temperature.
- Date and time.

ALARMS

- More than 20 alarms, with information of date and time of triggering.
- 3 data loggers: general, modules and peripherals (200 events each).

7 LED

- 1 to 3: Status of the 3 dry contacts.
- 4 and 5: Status of the two LVD contactors: for critical and non-critical loads.
- General alarm.
- Energy system ON

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INVERTER MODULE TECHNICAL DATA (MODEL: HPMI-BRV)
(TYPE1) 2.5 KVA INVERTER MODULE /230VAC OUTPUT

GENERAL					
EMC (immunity)	EN61000-4-2 / EN61000-4-3 / EN61000-4-4 / EN61000-4-5 / EN61000-4-6 / EN61000-4-8				
EMC (emission) (class)	EN 55022 (A)	EN 55022 (B)	EN 55022 (A)	EN 55022 (B)	
Safety	IEC 60950 / EN62040-1 / EN62040-2				
Cooling / Isolation	Forced / Doubled				
MTBF	240 000 hrs (MIL-217-F)				
Efficiency (Typical): EPC/online	>95.5% / 89.5%	96% / 91%			96.5% / 92.5%
Dielectric strength DC/AC	4300Vdc				
True Redundant Systems – compliant	3 disconnection levels on AC out and DC in power ports 4 Disconnection levels on AC in ports				
RoHS	Compliant				
Vibration	GR63 office vibration 0 to 100hz-0.1g 100 to 500hz-0.5g / Drop test				
Operating Conditions	Self-adaptive to wide operating conditions and comprehensive table of trouble shooting codes				
Altitude above sea without de-rating	<1500m / derating > 1500m-0.8% per 100m				
Ambient / Stronge Temperature / Relative humidity	-20 to 50°C / 95%, non-condensing				
Material (casing)	Coated steel-ALU ZINC				
AC OUTPUT POWER					
Nominal output power (VA) / (W)	1500 / 1200	2500 / 2000			
Short time overload capacity	150% (15 seconds) 110% permanent within T° range				
Admissible load power factor	Full power rating from 0 inductive to 0 capacitive				
Internal temperature management and switch off	YES				
DC INPUT SPECIFICATIONS					
Nominal voltage (DC)	24V	48V	60V	110V	220V
Voltage range (DC)	19-35V	40-60V	48-72V	90-160V	170-300V
Nominal current	56A (at 24 Vdc & 1200 W output)	56A (at 40 Vdc & 2000 W output)	35A (at 60 Vdc & 2000 W output)	19A (at 110 Vdc & 2000 W output)	9.8A (at 220 Vdc & 2000 W output)
Maximum input current (for 15second) / voltage ripple	84A / <100 mv rms	84A / 2mv Psopho	52A < 100 mv rms	29A / 200 mv rms	14.9A / <200 mv rms
Input voltage boundaries	User Selectable with T2S interface				
AC INPUT SPECIFICATIONS					
Nominal voltage (AC)	230V 1P or 3P (min 3 shelves for 3P)				220V
Voltage range (AC)	150-265V	150-265V			
Brownout	150 to 185V linear derating 150 VA / 120 Watts per 10 Vac 120 VA /960 W @ 150VAC | 2000 VA / 1600 W @ 150 Vac				
Conformity range	Adjustable				
Power factor	>99%				
Frequency range (selectable) /synchronization range	50-60Hz / range 47-53Hz / 57-63Hz				
AC OUTPUT SPECIFICATIONS					
Power factor	230V				
Frequency / frequency accuracy	50-60Hz / 0.03%				
Total harmonic distortion (resistive load)	<1.5 %				
Load impact recovery time	0.4ms				
Turn on delay	20s to 40s depending on the number of modules installed				
Nominal current protected against reverse current	6.6A	10.9A			
Crest factor at nominal power	2.8 : 1	3 : 1			
With short circuit management and protection					
Short circuit clear up capacity	10 X I for 20m sec – Available while mains is available at AC input port with magnitude control and management				
Short circuit current after clearing up capacity	2.1 I during 15s and 1.5I after 15s				
IN TRANSFER PERFORMANCE					
Max. voltage interruption/total transient voltage duration (max)	0s / 0s				
SIGNALING AND SUPERVISION					
Display	Syncopation LED				
Alarms output / supervision	Dry contacts on shelf / Standard USB port and MODBUS on T2S optional : Candis Display / Candis TCP-IP				

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Power and Energy Solutions

(TYPE1) 2.5 KVA INVERTER MODULE /120VAC OUTPUT

	48 / 120	125 / 120
GENERAL		
EMC (immunity)	IEC 1000-4	
EMC (emission) (class)	FCC part 15	
Safety	cUL 1778 Recognized	
Cooling/Isolator	Forced / Doubled	
MTBF	240,000 hrs (MIL-217-F)	
Efficiency (Typical) : Enhanced power conversion / online	95% / 91%	
Dielectric strength DC/AC	4300 VDC	
True Redundant Systems – compliance	3 disconnection levels on AC out and DC in power ports 4 Disconnection levels on AC in ports	
RoHS	Compliant	
Vibration	GR63 office vibration 0 to 100hz-0.1g 100 to 500hz-0.5g / Drop test	
Operating Conditions	Self-adaptive to wide operating conditions and comprehensive table of trouble shooting codes	
Altitude above sea without de-rating	<1500m / derating > 1500m-0.8% per 100m	
Ambient / Stronger Temperature / Relative humidity	-20 to 50°C / -40 to 70°C / 95%, non-condensing	
Material (casing)	Coated steel-ALU ZINC	
AC OUTPUT POWER		
Nominal output power (VA) / (W)	2500 / 2000	
Short time overload capacity	150% (15 seconds) 110% permanent within T° range	
Admissible load power factor	Full power rating from 0 inductive to 0 capacitive	
Internal temperature management and switch off	2% / °C derating beyond 50°C with cut off at 65°C	
DC INPUT SPECIFICATIONS		
Nominal voltage (DC)	48V	125V
Voltage range (DC)	40 – 60V	90 – 160V
Nominal current	56A (at 40 Vdc & 2000 W output)	25A (at 90 Vdc & 2000 W output)
Maximum input current(for 15second) / voltage ripple	84A / <2 mv Psopho	37A / <200mv rms
Input voltage boundaries	User Selectable with T2S interface	
AC INPUT SPECIFICATIONS		
Nominal voltage (AC)	120VAC (120/240V or 120/208V with combination of shelves)	
Voltage range (AC)	100-138 VAC (without derating) (can be disabled)	
Brownout	80-100VAC use DC source contribution if need be (can be disabled)	
	2000VA / 1600 W @ 150VAC	
Conformity range before transfer to DC	Adjustable	
Power factor	>99%	
Frequency range (selectable) / synchronization range	50-60Hz / range 47-53Hz / 57-63Hz	
AC OUTPUT SPECIFICATIONS		
Nominal voltage (AC°)	120V	
Frequency / frequency accuracy	50-60Hz / 0.03%	
Total harmonic distortion (resistive load)	<1.5 %	
Load impact recovery time	0.4ms	
Turn on delay	20s to 40s depending on the number of modules installed	
Nominal current protected against reverse current	21A	
Crest factor at nominal power	3 : 1	
With short circuit management and protection		
Short circuit clear up capacity	10 X I for 20m sec – Available while mains is available at AC input port with magnitude control and management	
Short circuit current after clearing up capacity	2.1 I during 15s and 1.5I after 15s	
IN TRANSFER PERFORMANCE		
Max. voltage interruption/total transient voltage duration (max)	0s / 0s	
SIGNALING AND SUPERVISION		
Display	Synoptic LED	
Alarms output / supervision	Dry contacts on shelf / Standard USB port and MODBUS on T2S optional : Candis Display / Candis TCP-IP	

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INVERTER MODULE TECHNICAL DATA (MODEL: HPMI-BRV3)
(TYPE 2) 3 KVA INVERTER MODULE /230VAC OUTPUT

POWER	
AC INPUT DATA	
Nominal voltage / current	230 VAC / 11.8A, 240VAC / 11.0A and VAC / 9.5A
Voltage range	150-293 VAC (De-rating from 195 to 150 VAC)
Brownout	1600 W @ 150 VAC / 2500 W @ 195 VAC linear decreasing
Power factor / THD	> 0.99 / < 3 %
Frequency (Synchronization range)	50Hz (47 – 53Hz) or 60Hz (57 – 63Hz)
DC INPUT DATA	
Nominal voltage (range)	110 VDC (90 – 150 VDC)
Nominal current (at 110 VDC and 2500 W output)	24.3A
Maximum input current (for 15 seconds) / voltage ripple	30.3A / < 10 mv RMS
Reverse polarity protection	Yes
AC OUTPUT DATA	
Efficiency AC to AC (EPC) / DC to AC	> 96% / 93.7%
Nominal votalge[2] / current (user selectable)	230VAC / 13A, 240VAC / 12.5A and 277VAC / 10.8A (200- 277 VAC)
Frequency / frequency accuracy	50 or 60 Hz / 0.03%
Nominal output power	3KVA /2.5 kw at 230 VAC
Short time overload capacity	125% (15 seconds)
Admissible load power factor	Full power rating from 0 inductive to 0 capacitive
Total harmonic distortion (resistive load)	< 3%
Load impact recovery time (10% - 90%)	≤ 0.4ms
Nominal current	13A @ 230VAC
Crest factor at nominal power Short circuit clear up capacity < 20ms at AC input / ON battery	3 : 1 for load P.F. ≤0.7 104 Arms for 20ms / 30.2 Arms for 20ms
Short circuit current after > 20 ms	18.6 Arms for 15 seconds
AC output voltage stability	±1% from 10% to 100% load
Static / Dynamic voltage regulation	±1% between 10% and 100% load / <5% from 0 to 100% to 0 load impact (100ms)
Cooling / Audible noise	Fan forced cooling / <65db @ 1 meter
MTBF	240 000 hrs (MIL-217-F) at 30°C ambient and 80% load
Dielectric strength DC/AC	2100VDC
RoHS / Material (casing)	Compliant / Aluzinc steel
Operation T° / Relative Humidity (RH) non-condensing	Tested according to ETS300-019-2-3 Class 3.1 -20°C to 65°C, power de-rating from 40°C to 65°C / Max RH 95% for 96 hours per year
Storage T° / Relative Humidity (RH) non-condensing	Tested according to ETS300-019-2-1 Class 1.2 -40°C to 70°C / Max RH95% for 96 hours per year
Public Transport T° / Relative Humidity (RH) non-condensing	Tested according to ETS300-019-2-2 Class 3.1 -40°C to 70°C / Max RH95% for 96 hours per year
Vibration	GR63 office vibration 0 to 100hz-0.1g / transport vibration 5-100hz-0.5g / drop test
Altitude above sea without de-rating of power	<1500m / derating > 1500m – 0.8% per 100m/max 4000m

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TS-DC FEATURE

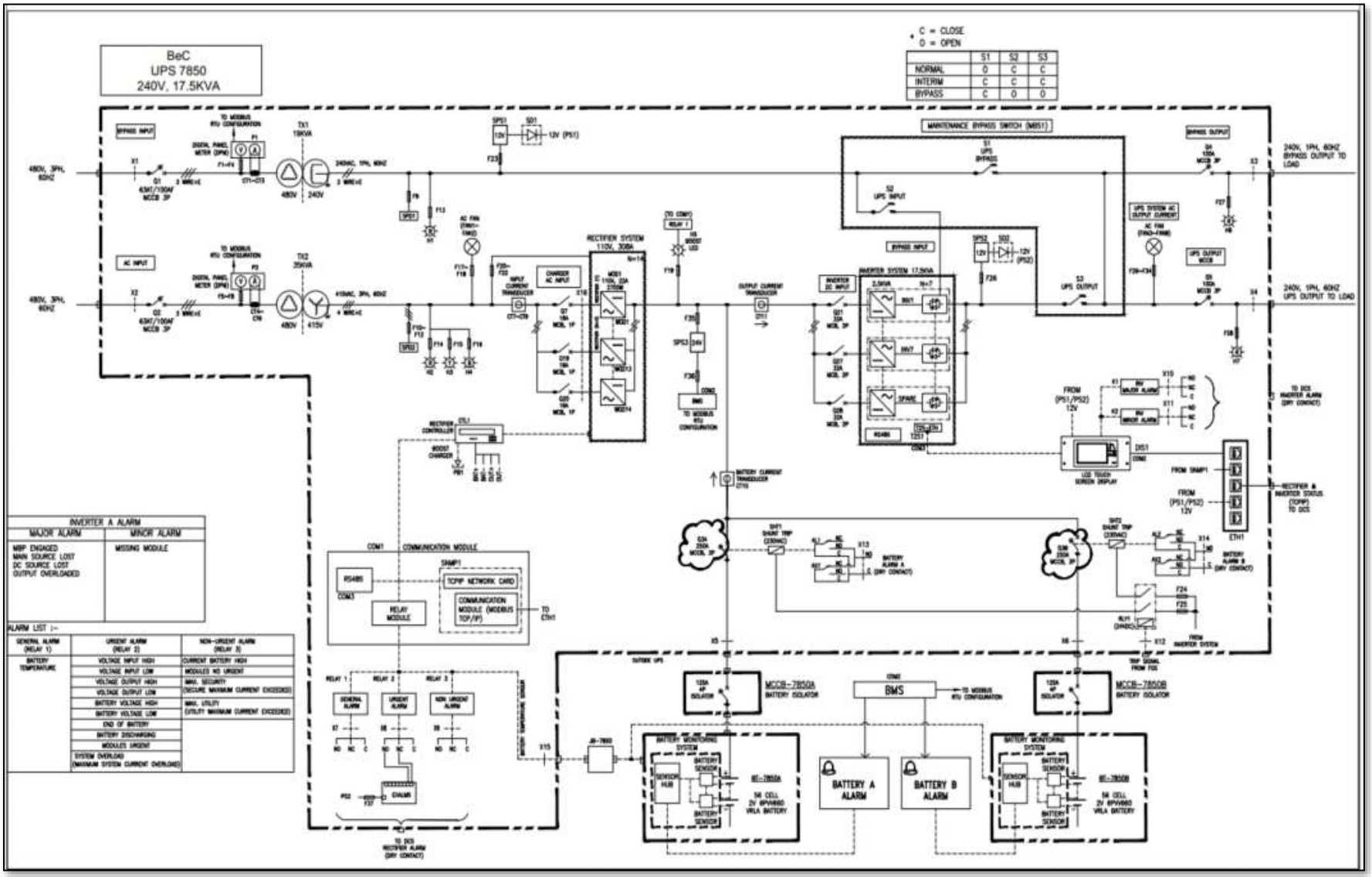
	MODEL	TS-DC
INPUT	AC voltage	120 / 127 / 220 / 230 /240 V 3x208 / 220 / 380 / 400 / 415 V (3Ph+N)
	Range (phase-neutral)	90 ÷ 290 Vac
	Frequency	50/60 Hz
	Power factor	>0.99 (PFC)
	THDi	<5%
	Efficiency	Up to 95.5%
OUTPUT	DC voltage	24, 48, 110, 125, 220 V
	Voltage adjustment range	-15% +25% (1)
	Accuracy	±1%
	Psophometric noise	<2 mV
	Load sharing between modules	Active parallel
	Rectifier module power	1000 / 2000 / 2700 W
	Maximum number of parallel modules	30
	Maximum system power (depending on	30 / 60 / 81 kW
BATTERIES	Type	PbCa / NiCd / Li-ion / Sodium Nickel Chloride
	Charge type	Constant I/U in accordance with DIN 41773
	Charging current	0.1C to 0.3C adjustable
	Recharge time	Up to 80% in 4 hours (0.2C)
	Protection	Against overvoltage, undervoltage and overload
	Voltage/temperature compensation	Yes, customizable (mV/°C)
	Electrolyte level detection (NiCd battery)	Optional
PROTECTION	Input and output	Circuit breakers
	Battery	Fuses + switch
GENERAL	Dielectric strength (Input - Output)	2000 V @1 minute to 24, 48 Vdc / 4000 V @ 1 minute to 110, 125, 220 Vdc
	Degree of protection	IP42
	Ventilation	Forced
	Acoustic noise at 1 meter	<55 dB(A)
	Operating temperature	-20°C ÷ +55°C (2)
	Storage temperature	-40°C ÷ +70°C (3)
	Relative humidity	Up to 95%, non-condensing
	Maximum operating altitude	3,000 masl
	Mean time between failures (MTBF)	250,000 hours
	Mean time to repair (MTTR)	15 minutes
SYNOPTIC	Backlit LCD display	Yes (4x40 characters)
	Indicators (LED)	5
COMMUNICATION	Ports	RS-232/485
	Dry contacts	3 relays (expandable to 9)
	SNMP	Optional
	Slot	Yes, one
STANDARDS	Safety	IEC/EN 61204-7, IEC/EN 60950-1
	Electromagnetic compatibility (EMC)	IEC/EN 61204-3
	Quality and environmental management	ISO 9001 and ISO 14001

OUTDOOR STAINLESS STEEL BATTERY CABINET

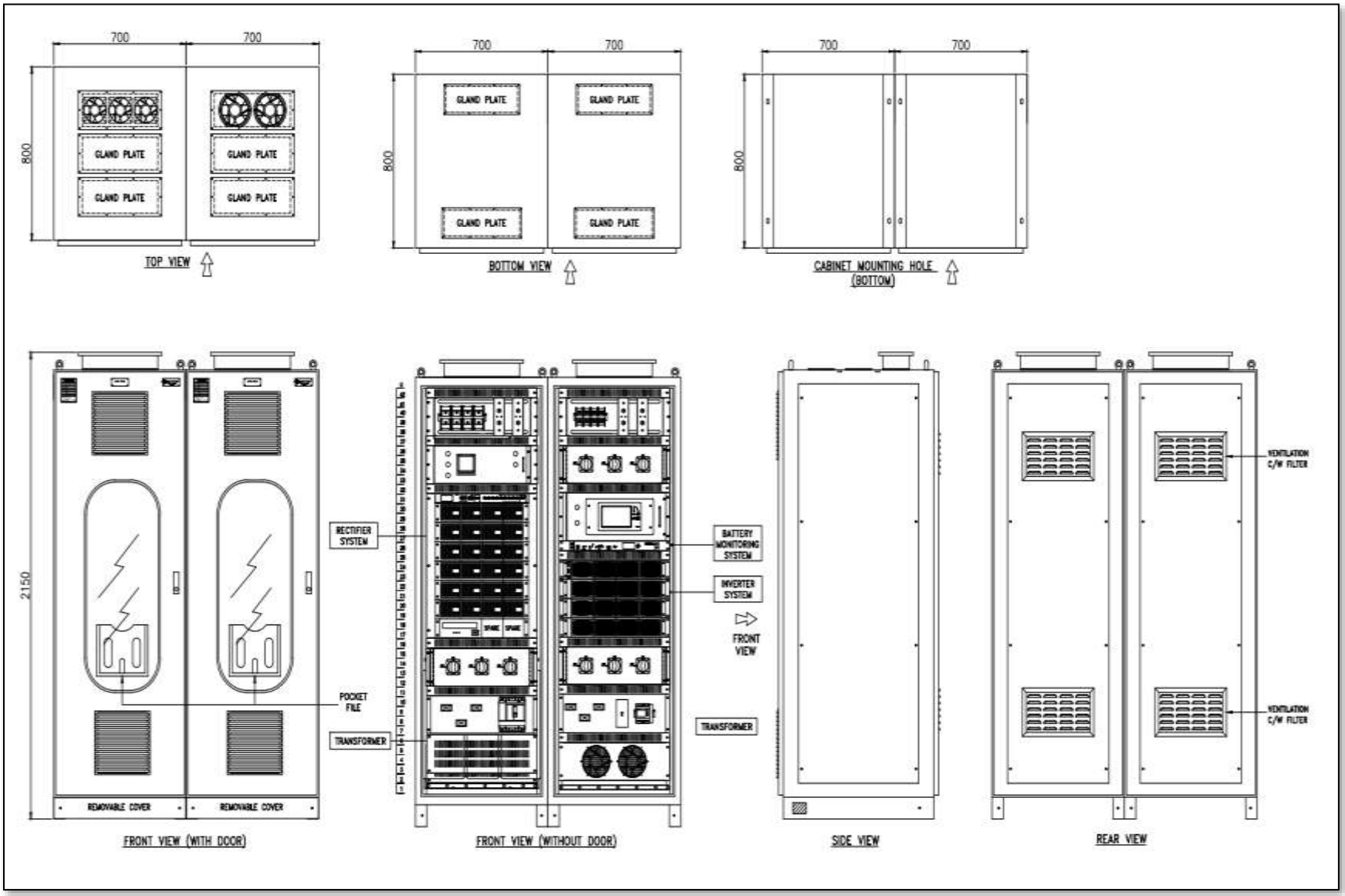
IP 55 DUAL VOLTAGE O/P HPMI UPS

IP 66/NEMA4X CABINET WITH ENVIRONMENT CONTROL

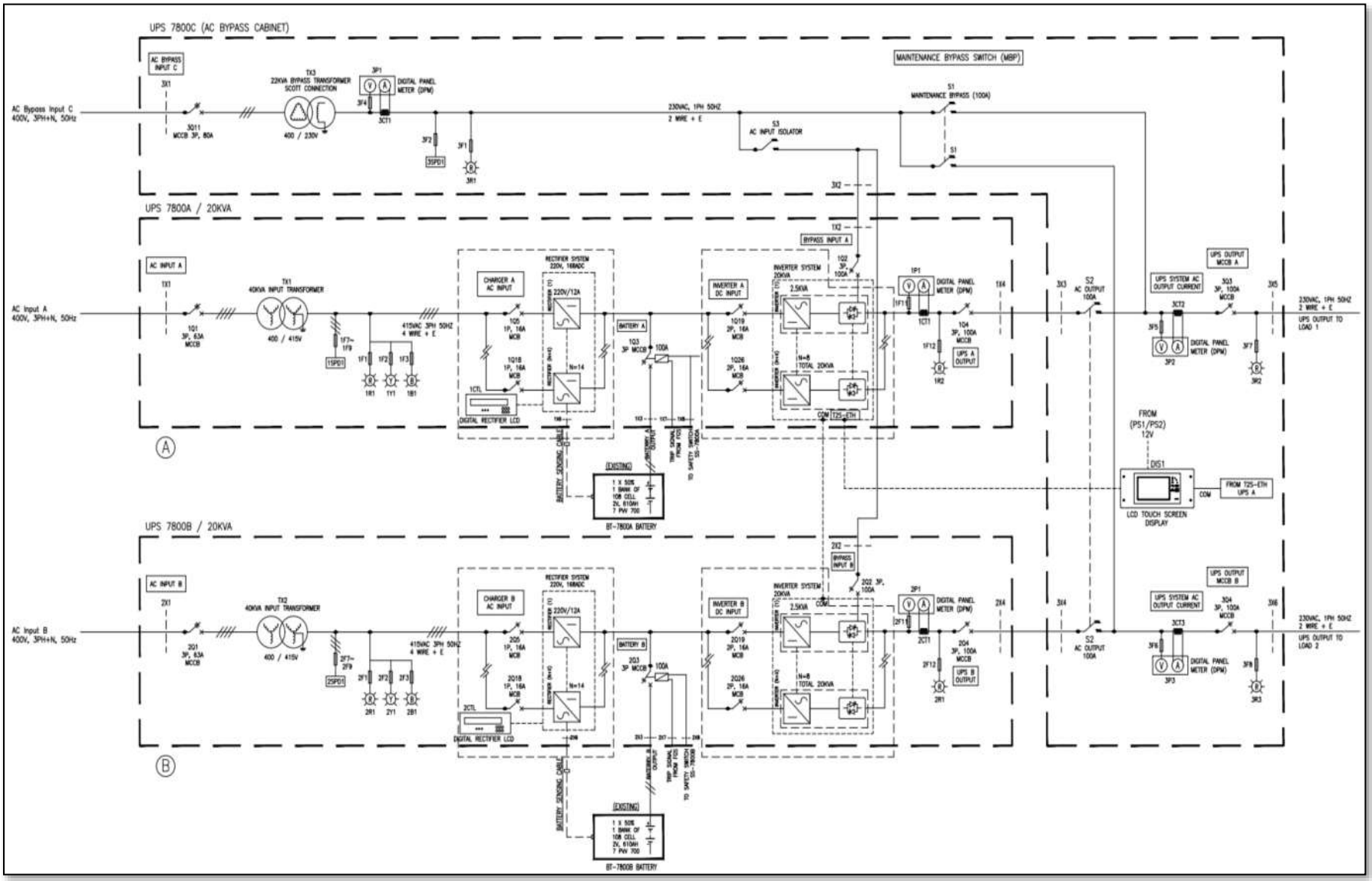
1 X 100 % UPS CONFIGURATION



TYPICAL 1 X 100% (40 KVA UPS GENERAL ARRANGEMENT)



2 X 50% OR 2 X 100% UPS CONFIGURATION



TYPICAL 2 X 50% OR 2 X 100% UPS CONFIGURATION