

Technical Specification For 80 kVA Online UPS for Cryogenic Station

Background: C-MET Pune is in process of procuring Cryogenic Station. The Inductive and other loads are listed below for the equipment. To provide backup to these crucial operating parts of Cryogenic station C-MET Pune requires 80 kVA (80KW, PF= Unity 1) online UPS which should provide back up for 30 min at full load.

Table 1.0: Load from Cryogenic Station

Sr. No.	Equipment	Load type	Input Voltage	Current	Power
1	He-3 Compressor	Inductive Load	Three Phase, 380-415V, 50Hz	75A	32.0KW
2	Water Chiller & Pump (5TR Werner Finley)	Inductive	Three Phase, 380-415V, 50Hz	12.5A	7.0KW
3	Lakeshore Controller	Non-Inductive	Single Phase, 230V, 50Hz	5A	1.5KW
4	Magnet Power Supply	Non-Inductive	Single Phase, 230V, 50Hz	5A	1.5KW
5	Scroll Pump	Inductive Load	Single Phase, 230V, 50Hz	4A	1.0KW
6	Cold Head Motor	Inductive Load	Single Phase, 230V, 50Hz	0.25A	0.1KW
7	Additional User Electronics (Total 06, 5A sockets)	Non-Inductive	Single Phase, 230V, 50Hz	30A	9.0KW
Total Load					~52KW

For the above load, C-MET requires 80 kVA True online configuration with double conversion UPS with the following technical specifications:

Sr. No.	Parameters	C-MET Specification
	TECHNOLOGY	<ol style="list-style-type: none"> 1. Should be IGBT based DSP controlled double conversion On-line VFI according to IEC62040-3 specification 2. Built-in OR external Isolation Transformer should be provided on the Inverter output 3. UPS should be designed at rated PF of 1 i.e. kVA/kW UPS rating 4. Dual input design 5. IGBT topology for both PFC (Power factor correction) and inverter 6. Make, model number and part no to be specified by the vendor

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01.	Input	
	Rated voltage	415 VAC three-phase + Neutral + Ground(Earthing)
	Voltage Range	220/380V, 230/400V, 240/415V (3Φ4W) Range (Full Load) 173~276 / 300~477VAC Range (Derating to 70% Load) 132~173 / 228~300VAC
	Number of Phases	Three i.e. R, Y, B along with Neutral & Ground
	Rated Frequency	45-65Hz
	Current Harmonic Distortion (ITHD)	< 3%
	Dual Input	Dual Input design: provision for separate source as a bypass input
	Input Protection (Thru In-built 1P MCB)	Should be provided at the input of the UPS suitable for the full rated capacity of the UPS
	Control Supply	Dual Aux Power Supply: Redundant Aux/Control Power Supply
	Power Factor (PF)	≥ 0.99 (full load)
02.	By Pass (Auto & manual)	
	Nominal Output voltage	380V/400V/415V (3Φ4W)
	Number of Phases	Three i.e. R, Y, B along with Neutral
	Permitted voltage range	± 15% (selectable from ± 10% to ± 20% from front panel)
	Rated Frequency	~ 50 Hz
	Automatic & Bi-directional static by-pass (In-built)	Bypass To Inverter ±10 % (Rated Voltage) Inverter To Bypass ±7 % (Rated Voltage)
03.	Battery Bank	
	Backup time	30 Mins. at full load 80KW
	Battery Type	12V SMF/ VRLA
	Battery Rack	Suitable MS Rack with Powder coating
	Preferred make	Amara Raja / Enerrocket
	Minimum VAH requirement	VAH should be a 30-minute backup with a full load mentioned in Tab 1.0. The minimum should be 72,000 VAH or higher Vendor must include battery sizing calculations with tender
	Recharge Time	4-6 Hrs.
	Number of Battery Banks	Vendor to specify
	Charger Rating	Vendor to specify
	Charger type / Charging Method & Charging Voltages	Constant Voltage Constant Current Solid state SMPS charger Float Charge 270V±(2V) Boost Charge 280V±(2%V)
	Battery recharge time (After complete discharge) to 90% capacity	10-12 hours
	Charging	Float & Boost (Auto/Manual selectable)
	Common Battery	Capability of Independent or Common battery bank operation of the UPS when operated in PRS.
	Battery End Cell Voltage	1.75 V/cell

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	Automatic battery test	The UPS should carry out battery bank tests automatically at regular intervals
	Number of Battery	Bidder must provide how many batteries they are providing
	Manufacturing batch	The vendor must provide all batteries from the same manufacturing batch
	Date of Manufacturing	The vendor must provide batteries manufactured not more than one-month duration from the date of delivery
	Cables	Cables and required lugs or any material required to connect the battery bank should be provided by the vendor only
04.	Output	
	Active Power	80KW
	Number of Phases	Three i.e. R, Y, B along with Neutral
	Rated Voltage	380 – 400 – 415 V AC Selectable with $\pm 1\%$ regulation
	Power Factor	Unity
	Output Frequency	50/60Hz, $\pm 0.05\text{Hz}$
	Output Voltage Distortion (THDu)	< 2% (linear load)
	Crest factor (I_{peak}/I_{rms})	3 : 1
	Output Short circuit Protection	Electronic Protection
	Parallel Capability	Possibility of enhancing UPS capacity / redundancy by operating UPS in N+X Parallel Redundant Configuration (PRS) up to 4 Units
	Waveform	Pure Sinewave
	Frequency	~ 50 Hz
	Overload	$\leq 105\%$: continuous, $106\% \sim \leq 125\%$: 10 minutes; $126\% \sim \leq 150\%$: 1 minute; $> 150\%$: 1 second
	Efficiency (At Nominal Voltage & Resistive Load up to kW rating of UPS)	
	Overall Efficiency (AC to AC) - Online (Double Conversion)	>95%
	Overall Efficiency (AC to AC) - ECO Mode (Bypass feeding the load under normal conditions)	>99%
	Maintenance Bypass	UPS should have Maintenance Bypass Provision
	Transient Response / Recovery	
	Transient Response: Dynamic Regulation for 10% to 90% step linear load	$\pm 7\%$
	Transient Recovery to steady state condition	< 1 cycle

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	after 10% to 90% step linear load	
05.	Protection	
	Normal Protection	Input, output, rectifier input, battery fuse, bypass fuse, short circuit etc. Thermal on system, rectifier, bypass and inverter. Protection against prolonged battery discharge
	Back Feed Protection	The back feed protection device should prevent any current that could cause an electric shock from back feeding to the incoming power supply connection
06.	Environmental Conditions	
	Operating temp. for UPS	0 – 40° C
	Relative humidity	<95% non-condensing
	Noise	<60dBAat 1 m
	Type of Cooling	Forced Air
	Speed of Fan	Fan speed control
	Fan Failure Detection	Fan speed to be monitor and trigger alarm in case of failure
07.	Mechanical Data	
	Protection Degree of the cabinet	IP 20
	Cable input	Bottom
08.	Display & Indications:	
	Minimum List of information to be appeared on the LCD Display	Input: Voltage / Frequency, Bypass: Voltage / Frequency, Output: Voltage / frequency, Battery: Remaining time / Battery Level Indicator, Load: Percentage / Load Level Indicator, Battery Voltage Capacity/Status/Test Result, System Date/Time Setting, Current Time, PFC Fuse Open, Battery Temperature Too High, Battery Over Charge, Battery Out of Date, INV Short Circuit, Output Breaker Off, kVA, kW, output current, Battery current.
	Fault Indication (On LCD)	Main Input Sequence Fault, Power Module General Fault, Battery Ground Fault, Bypass Static Switch Fault, Parallel Fault, System General Fault, Provide Bypass O/P Even If UPS Fault.
	LED Indication	UPS Start, Standby, Bypass Mode, Line Mode, Battery Mode, Fault, Warning Battery Test, ECO Mode
	Buzzer	Beeping sound for Bypass, Standby, Battery Test, Low Battery, Fault, Warning for overload, No load
09	Cabling from UPS to main power connection	Vendor must visit C-MET Pune site before quoting this item. Scope of work involves following along with supply, installation, training and commissioning of:

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		<ol style="list-style-type: none"> 1. Cable assembly from main power connection to G+3 building Room 201 (Approximately ~ 75 meter of appropriate size). Approximately, copper conductor 4 core power multicore armoured cable of 35 sq.mm. of 1.1 kV grade. 2. Four Earth connections for three-phase power connection including earth pit (Input / Output) 3. MCBs required on both ends i.e. Input and Output (of well-known brand Schneider, L&T, Simens and Legrand etc) 4. Cable Trays, conduits and clamping accessories for anchoring cable from the power station to the location of UPS 5. Industrial sockets along with switch board with receptacles at UPS output to connect equipment mentioned in Table 1.0.
10.	Interfaces	
	Serial Communication RS232 Port (Option of USB Port should be available)	RS232 Port should be provided as standard in the UPS. However, there should be provision for USB port also in the UPS.
	REPO(Remote Emergency Power OFF) / ROO(Remote ON - OFF) Port	Provide both onsite & remote EPO to shutdown UPS when emergency situation happens. REPO Port with a user-supplied switch
	Interface to NMS (Network Management System) - To be quoted as option	SNMP (IPV6) Card for connecting the UPS to LAN thru Ethernet port & monitoring thru NMS should be available (The cost of SNMP Card / NMS software to be quoted separately)
	Interface to BMS (Building Management System) - To be quoted as option	ModBus Card for connecting to UPS to BMS thru RS485 & monitoring thru BMS
	Interface to DCS (Distributed Control System) - To be quoted as option	Relay I/O Card or PFC (Potential free contacts) for connecting to UPS to DCS / PLC / SCADA system for communicating UPS operating status
	UPS status information presented as 3 contact closures	UPS should have configurable input signal as shutdown UPS or battery test dry contact.
11	Restart/ Testing capability	
	Cold Start	UPS should start up On AC Supply (Mains) without DC Supply (Batteries) On DC Supply (Batteries) without AC Supply (Mains)
	Automatic Restart	UPS should start up automatically on mains resumption after battery low shutdown
	Self Diagnosis	UPS should be capable to carry out self test of Rectifier / Charger /Battery & Inverter module during start-up

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12.	Other Key features:	
	Reliability of the system	The total system (Charger & Inverter section) should be controlled by a redundant microprocessor system. If a fault occurred to either of the microprocessors, the power supply to the protected load will not be interrupted
	EMI Filter	Input & output EMI Filter should be provided inside the UPS
	Mimic Display	A mimic diagram should be provided to know the status of the rectifier, inverter, battery and output.
	Self-Diagnostics	The system should provide an "EVENT RECORDING" facility its include the cause of the fault and should be able to display the name of the faulty area in terms of rectifier fault, inverter fault, battery contactor fault etc. through code. All events are readable from front panel LCD/LED of the system and also from PC/Laptop through the RS 232 communication interface port.
	Input Phase Reversal	In the event of any phase reversal in the input power source, the system should neither trip nor go to battery discharge mode. It should work on mains but with fault alarm indicating input phase reversal.
	EPO (Emergency Power Off)	In the event of an emergency the UPS should be completely shut down by an external command
	Standards	ESD: IEC61000-4-2: level4 RS : IEC61000-4-3: level3 EFT: IEC61000-4-4: level4 SURGE: IEC61000-4-5: level4 CS: IEC61000-4-6: level3 IEC 61000-2-2, EN 62040-2 EN 61000-3-2, ROHS
	Quality Certification	QMS: As per ISO 9001: 2008 EMS: As per ISO 14001: 2004 OSHAS: As per ISO 18001: 2007 TL9000 QA Lab should be NABL Accredited.
	Warranty (onsite)	1 year for UPS and 2 years for Batteries

Minimum Eligibility Criteria:

Note:

- 1) Bidder should submit printed technical literature / brochure of the offered model, which should be fully complied with the specification as mentioned above otherwise the bid will be disqualified.
- 2) The Bidder shall be an established UPS Manufacturing company registered under the Companies Act, 1956 having operations in India for a minimum period of 10 years. Copy of Certificate of Incorporation shall be submitted.
- 3) The OEM should successfully install and commissioned similar or higher rating UPS Systems to any Govt. / Research Institutions. Copy of PO / Installation report / Performance certificates should be submitted towards evidence.
- 4) OEM should have registered office in Pune for service setup..