MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA

ELECTRICAL ENGG DEPARTMENT

Energy Management System

Sr. No.	Description of item	Qty.	Unit
1	PLC - ETHERNET Programmable Field-bus Controller; Multitasking; MODBUS. **Make – WAGO CPU**	1	No.
	SMPS; EPSITRON®; ECO Power; 1-phase; 24 VDC; 2.5A	1	No.
	RS-232/485 Serial Interface (Modbus Master)	1	No.
	4-channel digital output; 24 V AC/DC; 0.5 A Output module	1	No.
	4-channel digital Input; 24 V AC/DC; 0.5 A Input module	1	No.
	2-channel analog input & Output module	1	No.
	End Module	1	No.
	I/O-PRO (CoDeSys 2.3) Software Package **(detailed technical specification: Annexure 1)**	1	No.
2	Energy meters, Schneider 6400 including CT & PT for tapping current and voltage for power measurement. **Make - Schneider and NewTech**	4	Nos.
3	Temperature Sensor, LM 35 – **55°C to 150°C** temperature range	3	Nos.
	PIR Sensor wide operating voltage range: default voltage DC 3.6V~20V temperature rises to 30~32, detection distance is slightly shorter; temperature compensation can be used for certain performance compensation.	5	Nos.
4	LUX Sensor Interface: I2C, Power supply: 3-5V, Data range- 0-65535 Sensor built 16bit AD converter measurement variation (+/-20%)	3	Nos.
5	Enclosure for PLC and router	1	No.
6	Contactor (24V dc operated, 15A ac controller)	2	Nos.
7	Relay (230V, 10A (10 Nos.) and 20A (06 Nos.))	16	Nos.
8	Power Module Solar/Electric,100W ac interface for battery charging on solar panel	2	Nos.
9	Solar Panel 100 watt **moserbaer** Polycrystalline silicon solar cells connected in series fitted on a metal tilt stand.	2	Nos.
10	Automatic Change Over (Over voltage controller for device safety for voltage above 260V, 100W) ISI make	1	No.
11	Resistive Load suitable ratings for performing experiments	1	No.
12	Capacitive Load suitable ratings for performing experiments	1	No.
13	Inductive load suitable ratings for performing experiments	1	No.
14	Real time motor with speed control drive 0.5 HP	1	No.
15	Wires	As per actual	
16	Installation	As per Requirement	

Annexure-1:

Technical specifications:-

1. Advance PLC based hardware & software system

Hardware:

1. Moduler Type of system Controllers & I/O modules with Modbus TCP, Bacnet, KNX, DALI and Various Other configuration.

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2. On board serial port capable of communicating over EIA232 or EIA485 network (switchable)

3. On board 2X 10/100 MBPS Managed Ethernet ports with in built bob smith termination.

4. On board SD card slot capable of supporting up to 32 GB.

5. Minimum 256 MB Flash RAM and 256 MB Main Memory.

6. EMC immunity of interference as per EN61000-6-2.

7. EMC emission of interference as per EN61000-6-2.

8. Standard 35mm DIN Rail Mounted IO cards.

9. All Status and Diagnostic LEDs.

10. Supports Analog signals with minimum 12-16 bit resolution.

11. Operating temperature range of 0 °C to 60 °C and 95% RH.

Software/Programming:

1. Complete programming and configuration for PLC ,on Linux Operating system

2. Supports IT protocols for communication including FTP, FTPS, HTTP, HTTPS, SNMP, DHCP, NTP, FNS, SSH.

3. Supports industrial communication protocol MODBus (TCP, UDP and RTU).

4. Supports all IEC 61131-3 programming languages (Ladder, Functional Block Diagram, Instruction List, Structured Text, Continuous Function Code).

5. Able to log data for a minimum of 30 days on onboard SD card.

6. Able to log data on PC based SQL, CSV for trend and report generation.

7. Programmable be other languages like Linux, C++, Visual Basic, Java, MATLAB etc

8. Configurable via onboard Ethernet as well as USB ports.

The company must provide a 1 year hardware warranty and service for the system supplied.

2. Scope of Supply:

The Scope of Supply / work will be as per mention below, along with BOQ WHICH include complete hardware and other accessories as mentioned

- THE Supplier need to provide complete project equipments to implement latest mode of smart energy conversation and automation methodology for a smart class room which will enhance the energy saving models.
- The supplier will install motion, sensors , temperature / humidity sensors and trigger electrical as per actual, need & requirement
- The supplier will provide solar panel and will connect the same with the electrical terminals
- The supplier will install all energy meters and will record and present all the energy consumption, in a proper excel format, and store the data for 6 months.
- The supplier will install/program the PLC, and record / control and store all the energy consumptions etc.
- Control of lights/fan using the occupancy sensors
- Automatically switching of lights when there no occupancy in the room.
- AC will turn automatically maintaining temp and depending upon on the occupancy as well as temp
- Facility for manual electrical switches for general operation
- Subject to optimize use of resource and prediction of life.
- Their repair service and replace will we timely schedule and take n care
- Automatic changeover will detect the suitable energy produce from solar and grid.
- Energy meters selec/Schneider make for the energy storage with modbus.

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