

ENERWISE SOLUTIONS

MULTI-FUNCTIONAL SCADA & EMS DEVICE SERVER



Authorised Distributor:



LKH Precicon Pte Ltd

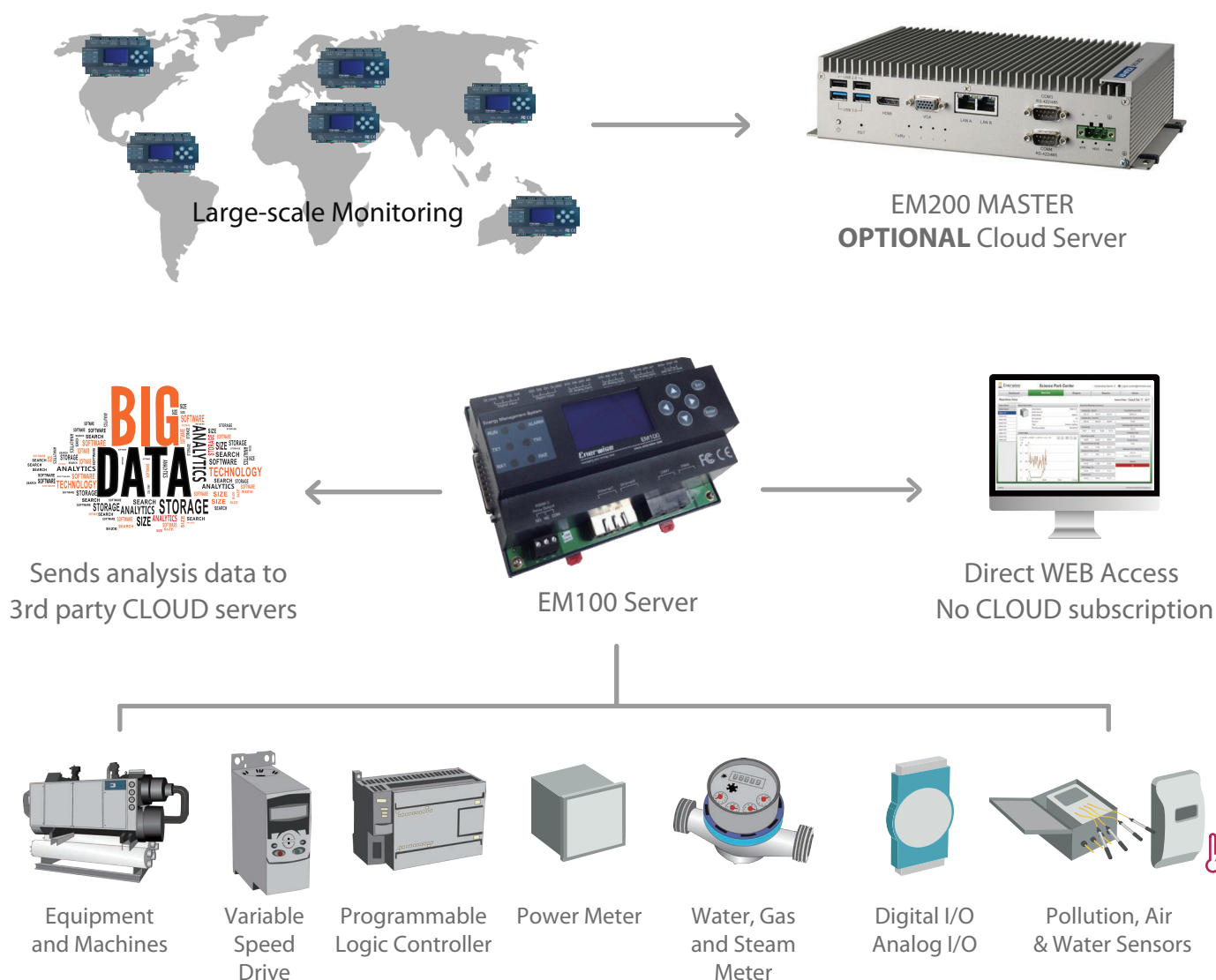
A 63 Hillview Avenue, #10-21,
Lam Soon Building, Singapore 669569
T 6672 9229 F 6897 8890
E sales@precicon.com.sg
W www.precicon.com.sg





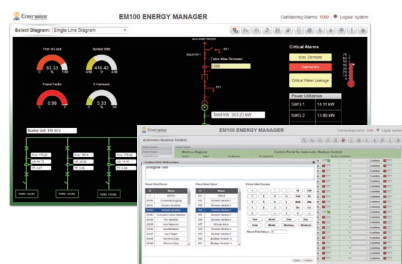
The Most Application Versatile Smart Device in the Market

The Enerwise Solutions Application Server is a multi-functional and multi-layered monitoring & control device that embeds advanced programming logic, reporting system and SCADA HMI all in a simple device unit





Enerwise Solutions strongly believes simplicity is the greatest beauty. Our SCADA device installation is hassle-free. Thus this solution unit reduces costs, commissioning time and engineering resources



Use EM100 as a controller with customizable formulas, control loops and I/O's. Build your own monitoring and control applications with our diagram creation tool to create various monitoring and control objects to fit your needs, all WEB based



IoT friendly BIG DATA engine lets EM100 send various monitored points to 3rd party CLOUD portals. Or utilize the EM200 MASTER server option for building your own Nationwide monitoring/control CLOUD HMI



Reduce operation spending and improve availability by tracking the total service time for each incident. Monitor any remote equipment without installing a server. Assign the right operator to each issue according to their location and skills all within the Smart Phone APP



**Customizable
Modbus Map
Tool with HMI**



SCADA HMI



**Modbus
Communication**

EM100 as Modbus “DEVICE SERVER” for industrial applications

Use EM100 as the device server to talk with your Modbus RTU/TCP field devices for trending analysis, alarm reporting, data logging and more!

Upgrade old facilities to advanced “Internet of Things” without requiring a PC server



Field Device Monitoring and Control Application Guide

Flexible Modbus Mapping Tool

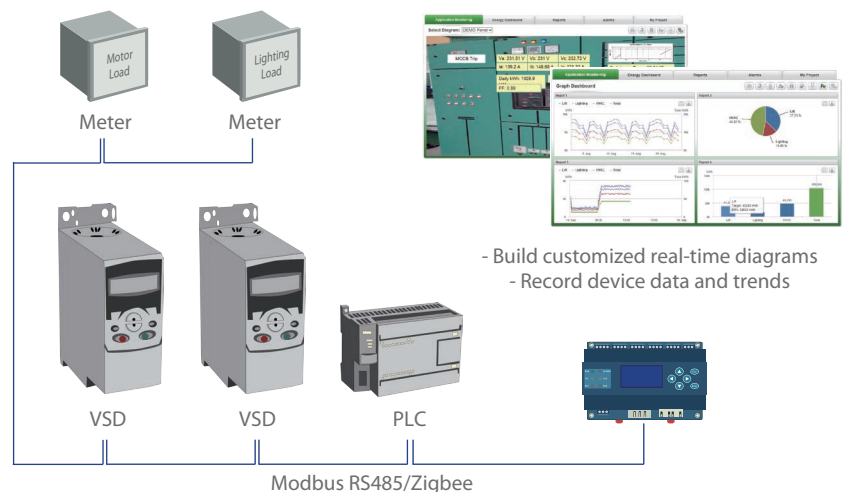
Modbus mapping tool to build your own device drivers, simple enough to create a new driver within minutes



EM100 as Modbus Master RTU or TCP

Create your own “Control” application with EM100 by setting automatic Modbus control commands via the Automatic I/O engine

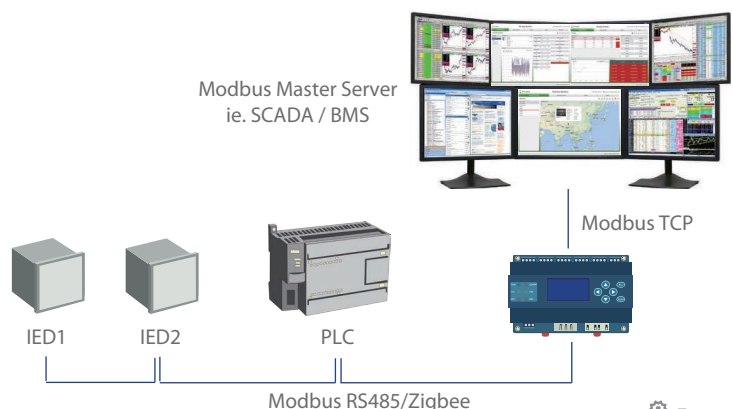
Connect to field devices for data recording, HMI SCADA display, control devices with scheduling and data reporting



EM100 as Modbus TCP Slave

Already have a SCADA or BMS?

Use EM100 as a gateway passing measured parameters to another Modbus Server





Direct CT Connection



RS485 Power Meter Connection

An "ENERGY SERVER" with built-in energy reports

Deliver your ISO50001 reporting straight from EM100's WEB report generation module. Monitor your consumption needs with baselines and normalization calculations

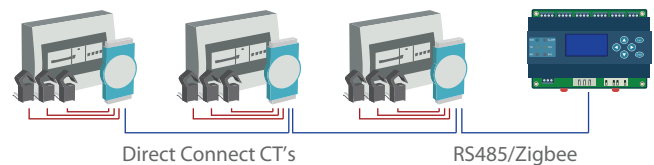
Create your energy alert alarms!



Energy Monitoring and Control Application Guide

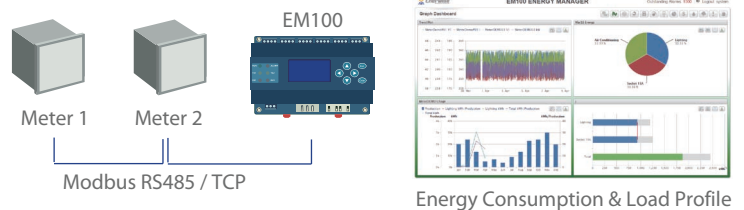
CT Direct Connection Max. 300

Direct connection with split-core CT's
Optional PT for common voltage
No Power Meter required



Energy Management

Monitor process load energy meters, allocate each meter into specific categories. Study load profile reports directly on WEB. No compulsory CLOUD subscriptions ever!



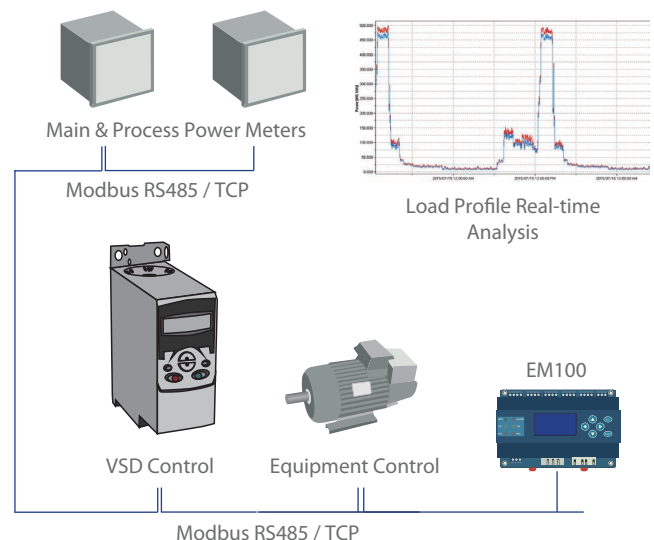
Demand Control

Factory demand control allows operators to reduce utility bills significantly.

Drag out the real-time kVA moving graph to the WEB HMI, study the load profile curve for planning the demand control schedules

Setup automatic Email/FTP Excel reports. Use the built-in Scheduler Module to control loads. Create automatic Modbus control commands to cut & reduce equipment load consumptions

Zigbee Extender provide wireless conversion between devices.





**Any Analog
Sensors
Compatible**



**1 Minute
Recording**

Smart 24-hr “ENVIRONMENT & POLLUTION” monitoring server

Create your own environment monitoring application with air and water pollution sensors, send alerts when threshold is high

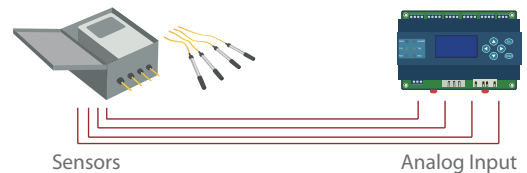
A 24-hour continuous monitoring application via the WEB



Sensor Monitoring and Control Application Guide

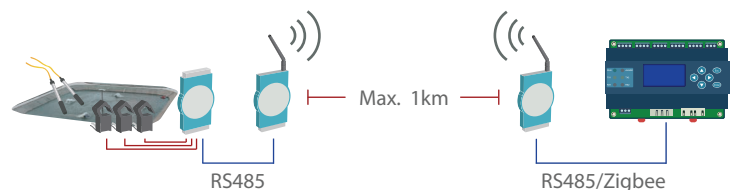
Sensor Direct Connection Max. 6

$\pm 150\text{mV}$, $\pm 500\text{mV}$, $\pm 1\text{V}$, $\pm 5\text{V}$, $\pm 10\text{V}$,
0-20mA, 4-20mA supported sensor types



Wireless Support

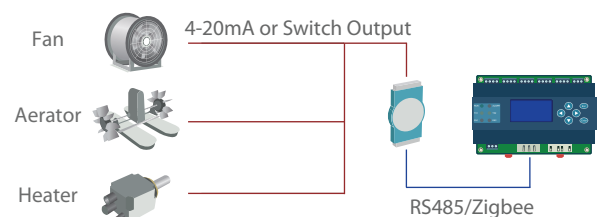
EM100-WIRELESS optional ZigBee reduces installation costs with max. distance of 1km



Analog Output Control

EM100 with 4-20mA analog output module controls heaters, fan or cooling automatically

EM100-DOUT digital/relay output module controls fans, pumps, and other electrical equipment

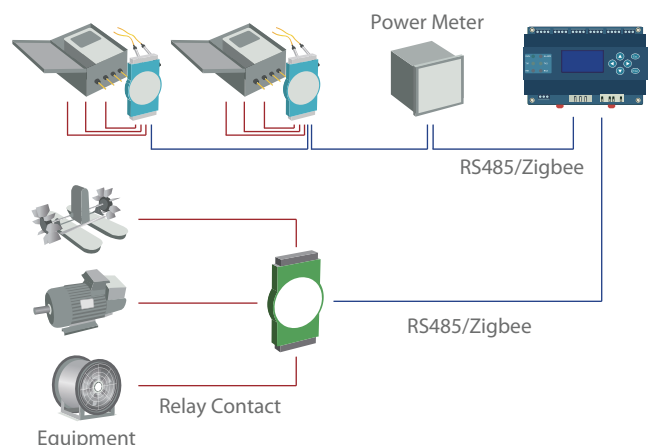


Sensor and Control Application

Monitoring of application specific sensors via analog input expander and relay out module operates equipment based on conditions set by the user.

Each relay output contact can control various loads

Zigbee Extender provides wireless conversion between devices



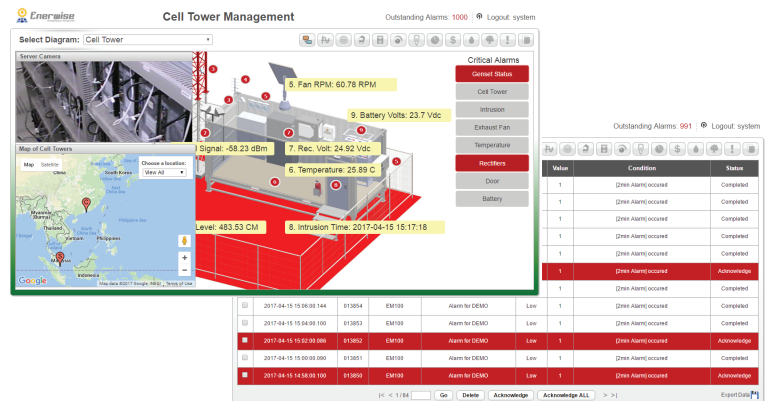
Nation-wide Monitoring

EM200 CLOUD Server collects data from up to 500 EM100 devices. EM200 CLOUD Server not only acts as the advanced SCADA server, but also monitors and controls downstream EM100's anywhere in the world.

This application is perfect for multi-site or nation-wide monitoring applications where operators need to monitor critical alarms of equipment all over different parts of the region.

EM100 device server can also be configured to send data to 3rd party CLOUD servers via network.

EM200's CLOUD dashboard HMI is 100% customizable. Due to its simplicity any operators can now easily design their own CLOUD monitoring system



Operation Center
EM200 CLOUD Server

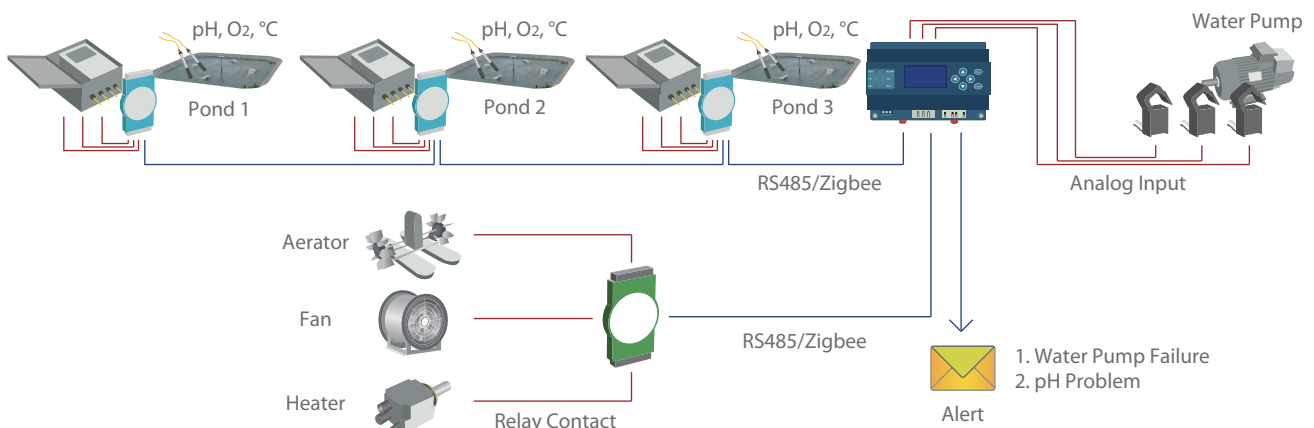
Fish Farm Water Quality Monitoring

Fishes are very valuable assets to fish farm so that water quality must be constantly monitored. pH, O₂, °C, Salinity sensors input into EM100 to provide minute to minute monitoring and min/max monitoring, alerting the operator of abnormality. Electric current monitoring of motor pumps detect if there are critical equipment failures in the farm.

Aerator, Pumps or Medicine switches can be automatically programmed to activate upon pre-set conditions.



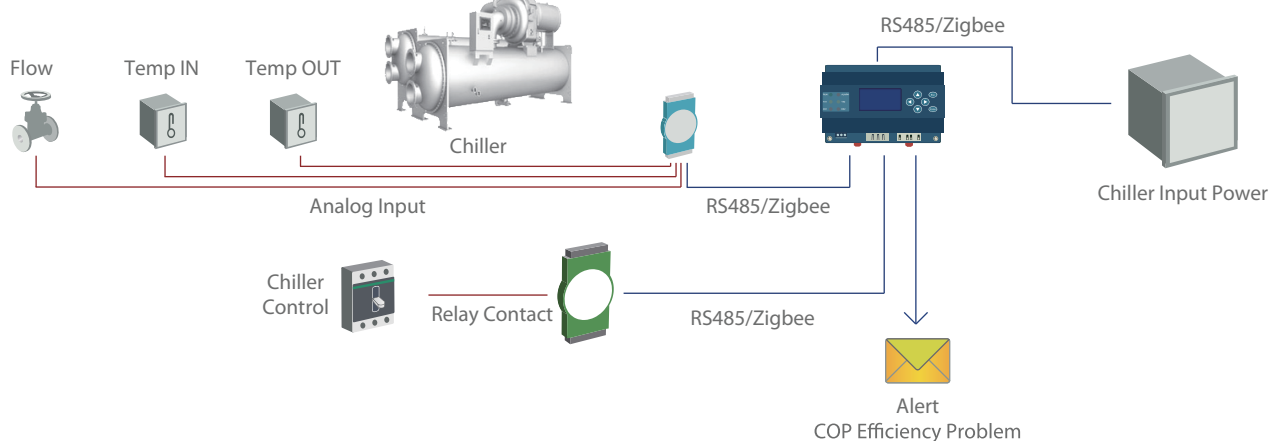
Fish farms with automatic equipment control



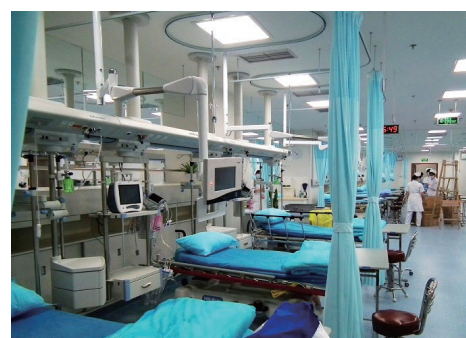
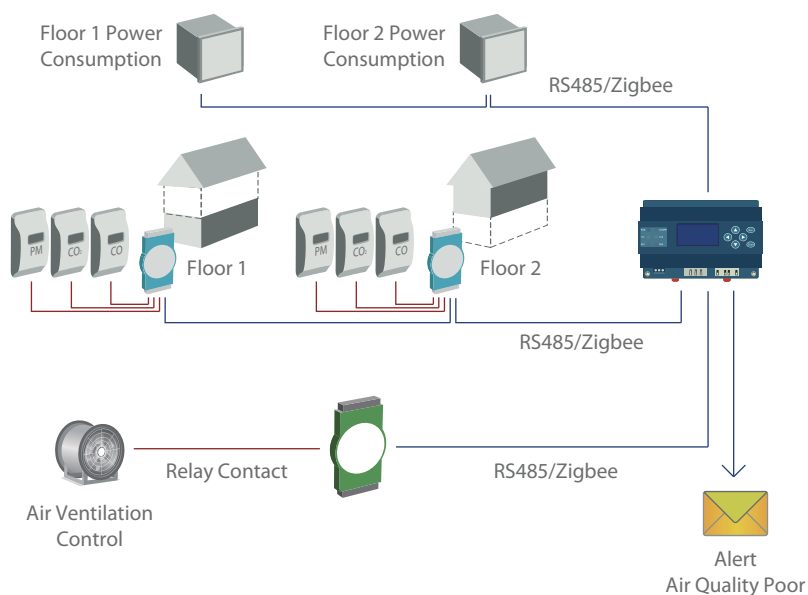
Chiller Efficiency Monitoring

Chiller plants are an essential part of the building especially in warmer climates. It consumes a large amount of energy for a building, therefore monitoring COP (coefficient of performance) is critical.

Non-intrusive sensors such as flow rate, water temperature IN/OUT can be connected to EM100 to calculate performance factors. Monitoring chiller load power meter data gives user the INPUT kW data for the performance calculation and also to understand energy used for different chillers. When a chiller performs irregularly, customized alarms will be sent to the facilities manager.



Hospital Indoor Air Quality Monitoring



PM2.5, CO₂, Ozone, °C are monitored at ICU facilities in hospitals, ensuring good air circulation and preventing air-borne diseases.

Air quality sensors monitor situations for each critical hall, then controls air ventilation equipment when air quality is poor.



Customizable Real-time Diagrams

Real-time diagrams or single-line diagrams can be fully customized via EM100's WEB settings by utilizing various SCADA HTML5.0 HMI objects freely.

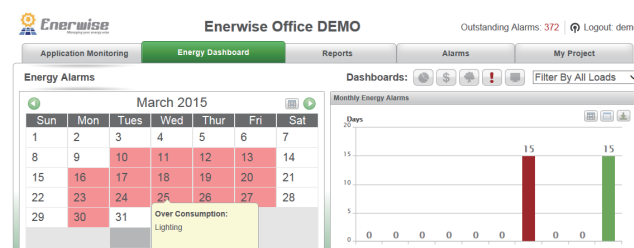
Objects can be linked by users to any sensor or energy data or even calculated data from formulas.

Basically any application screens can be tailored to your needs, EM100 is not only limited to energy analysis.

Over Energy Use Alerts

User can define a "warning" and "over" kWh energy limit for each category of loads. For example, when the lighting load kWh is reached, alarms and emails can be sent to alert the operator that lights were not turned off after office hours. Both "warning" and "over" limits can be set for all loads.

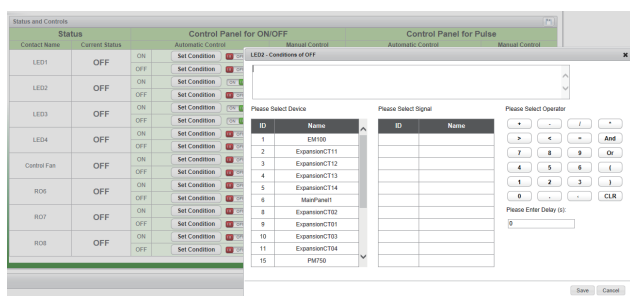
This function give power to the user for true energy savings action, not only notification after the event.



Sensor 1-min Data Recording

EM100 can record water quality, temperature or even electrical current data at every 1 minute intervals. This function gives power to the user to see quick fluctuations of the environment upon certain actions.

Analyze the impact to water quality on over-feeding, temperature fluctuations on shades or pH changes when applying medicines are extremely useful with 1 minute recording. Min, Max values are also recorded.



Automatic Control

The innovative formula function let users define any conditions to turn ON/OFF equipment such as chillers, heating or pumps via the relay output module. Pulse modulation or direct ON/OFF supported.

Since we are not operated using a portal system, the EM100 works like its own control unit and does not depend on the network status of EM100, it is basically a built-in controller.

Creating Alarms with Formulas

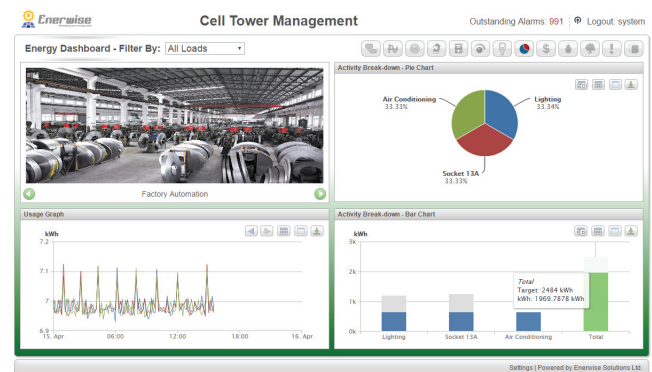
Formulas are a flexible way for the operator to define alarm by email conditions or relay output conditions for a specific application. Almost all parameters read by power meters, sensors and time can be used as formula conditions.

To determine if lights are ON for Saturday, simply:
(CT001.I > 0) AND (Day(time) = 6)

Energy Categorization

Users can self-define various different categories of energy, for example: Lighting, OutdoorLighting, Process1, Motor or HVAC. Simply assign the meter or CT into any of the user defined categories to create reports and benchmarks. 4 different layers of categories can be set and filtered.

Under each of these categories, the operator defines the occupancy, target kWh, limit kWh, area, etc properties for analysis.



User Management & Access Rights

Create administrators, maintenance users or normal user access rights with activating and de-activating pages according to the user's privilege.

Design the system so that normal operators have no control functions to avoid mis-use situations.

Alarms Table						
Time	Device Name	Type	Value	Condition	Status	
2015-10-09 18:24:49.267	EM100	Power On	1	[External] trigger [power on]	Completed	
2015-10-09 18:24:33.048	EM100	Reboot	1	[WEB] trigger [Reboot]	Completed	
2015-10-09 18:23:49.954	EM100	Firmware Upgrade	1	[WEB] trigger [Firmware Upgrade]	Completed	
2015-10-09 18:20:55.705	EM100	Close Connection	0	[WEB] trigger [Close Connection]	Completed	
2015-09-18 19:16:43.455	EM100	Reboot	1	[WEB] trigger [Reboot]	Completed	
2015-09-11 22:10:59.396	EM100	Power On	1	[External] trigger [power on]	Completed	
2015-09-11 22:10:36.228	Holding Tank	Default AI Event	385.878	[Holding Tank Dissolved O2(385.878)] outside allowable range (390.000 ~ 700.000) triggered	Completed	
2015-09-11 22:10:55.109	Product Tank	Default AI Event	7.878	[Product Tank pH(7.878)] outside allowable range (7.200 ~ 7.550) triggered	Completed	
2015-09-11 22:10:51.711	EM100	Customized Alarm	1	[COAlarm] occurred	Acknowledge	
2015-09-11 22:04:03.192	Product Tank	Default AI Event	7.262	[Product Tank pH(7.262)] inside allowable range (7.200 ~ 7.550) recovered	Completed	
2015-09-11 22:03:56.376	Holding Tank	Default AI Event	666.561	[Holding Tank Dissolved O2(666.561)] inside allowable range (390.000 ~ 700.000) recovered	Completed	
2015-09-11 22:03:51.001	Holding Tank	Default AI Event	305.424	[Holding Tank Dissolved O2(305.424)] outside allowable range (390.000 ~ 700.000) triggered	Completed	

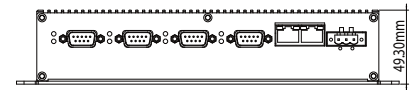
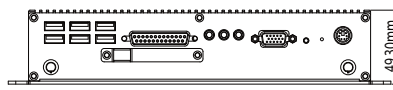
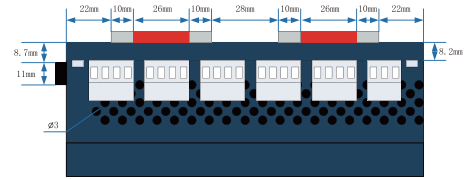
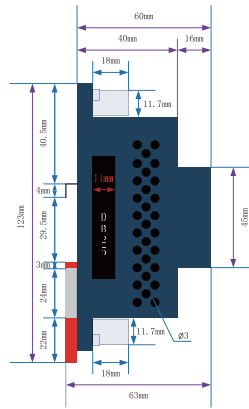
Comprehensive Alarm Recording

Alarms are recorded by date, time, trouble location, trouble category and trouble description.

Operators can create customized alarms based on conditional formulas from any parameters measured. All alarms can be configured to send as Email or SMS. Multi-language alarms are supported.

CORE FUNCTIONS	EM100	EM200
Function	mini-SCADA & EMS Server	SCADA & CLOUD Server
HARDWARE		
CPU	ARM9 256MB RAM	Intel Atom 1.91 GHz Quad 4GB RAM
Operating System	Embedded Linux	Linux
Memory	512MB Non-Volatile Storage Memory	300GB
Communications	Modbus RTU, Modbus TCP, SDI-12, ASCII, HTTP, HTML, JSON, XML, FTP, Customized Protocol Modbus RTU/TCP Slave with configurable mapping Modbus TCP Master with configurable mapping	
Logging Frequency	1min/5min/10min/15min/30min (Selectable)	
Logging Duration	Max. 2 years (Selectable)	Max. 20 years (Selectable)
Power Supply	24VDC	24VDC
LCD Display	LCD Display with Operation Keypad	None
SUPPORTED SENSOR TYPES		
Compatible Sensor Types	Modbus RTU, SDI-12, $\pm 150\text{mV}$, $\pm 500\text{mV}$, $\pm 1\text{V}$, $\pm 5\text{V}$, $\pm 10\text{V}$, 0-20mA, 4-20mA User defined measurement units (customizable)	
DIGITAL AND ANALOG I/O		
Digital Input	6 Digital Input Built-in	None
Analog Input	6 Analog Input Built-in	None
Expansion Analog Input	Optional 8-Channel per Expansion Unit, Maximum 300 units can be connected	
Expansion Digital Input	Optional 8-Channel per Expansion Unit, Maximum 300 units can be connected	
Expansion Analog Output	Optional 8-Channel per Expansion Unit, Maximum 300 units can be connected	
Expansion Relay Control Output	Optional 8-Channel per Expansion Unit, Maximum 300 units can be connected	
SOFTWARE AND WEB		
Example Measurements	Voltage, Current, PF, Power, Energy, Reactive Power, Frequency, Harmonics, Power Demand Security Sensors, IR Intrusion Sensors, Door Security Sensors, IP Camera Alarm Ambient Temp., Humidity, Sun Light Irradiation, Rain Gauge Dissolved Oxygen, pH, Temp., Salinity, Level, Conductivity, Ammonia, Turbidity, NO ₂ , ORP	
Alarms	Email Alarms, SMS Alarms, Digital Contact Alarms Customized Alarms on any measured parameters with customized condition and set points	
Direct WEB Access	Smart Phone, Laptops, Tablets with Internet WEB Browser	
CLOUD WEB Access	EM200 MASTER Cloud Server or 3rd party Cloud Server	
Big Data Upload	Configurable Parameter XML Upload to Specified Data Server	
OTHER FUNCTIONS		
Operating Temperature	-20°C to 70°C	-20°C to 60°C
RoHS	YES	YES
Dimensions	164mm x 118mm x 60mm	252mm x 149mm x 62mm
Power Consumption	<5W	28W
Certifications	CE EMC/LVD/FCC	CE EMC/LVD/FCC
Mechanical		
IP	Logger Unit IP40	IP40
Weight	0.38kg	1.6kg
Enclosure	IP65 Carbon Fibre with cable glands (Customized design upon request)	

Figure 1: Mechanical drawing of the EM100 module. The drawing shows a top-down view of the module with dimensions in millimeters. The overall dimensions are 180mm in height and 161mm in width. The module is divided into several sections: a top green section (16.5mm high) containing five pin headers (RJ45, RS485, RS422, RS485, RS422) and a power supply header; a middle dark blue section (48mm high) containing the main circuit board with components like ALARA, TSD, RSL, and RSL2, and a central display area; and a bottom green section (16.5mm high) containing two RJ45 connectors and two RJ45 connectors. The bottom section also features a large red circular component. The module is marked with 'EM100' and 'Energy Management Systems'.



Energy, Environment & Process Monitoring and Control



Our target market segments are vast, from energy supplier, building management, industrial controls, pollutions monitoring and agriculture automation.

An aerial architectural rendering of the proposed development at the former Kowloon Walled City site. The image shows a dense cluster of modern, multi-story buildings with various rooflines and facades, some featuring green roofs. A prominent yellow spherical structure is visible among the buildings. The development is situated along a waterfront, with a rocky promenade and a marina area containing several sailboats. In the background, a large highway bridge spans a valley, and a city skyline is visible under a hazy sky. The overall scene depicts a vibrant, modern urban environment integrated with natural and historical elements.