



# energy manager (EM4x)

SMART POWER MANAGEMENT

PRODUCT SHEET



EM4x-01



EM4x-02

## Features

The EM4x microcontroller based DC system controller provides the control and monitoring functions for Enatel's energypak batteries, RM series rectifiers, CM series DC/DC converters along with solar/wind converter modules and inverters. Lead-acid batteries are managed with Enatel's ancillary BMS boards. With an appropriate comms connection third party lithium batteries can also be managed.

The EM4x monitors all power system conditions including energypak status, DC voltage, rectifier current, battery current, battery temperature, and distribution failure. This includes a full suite of hybrid control and reporting functionality. It has an in-built web based configurator allowing setup of system parameters, monitoring, updating and download of logs using a web browser as well as a front panel interface through which key parameters are also configurable. Visual notification of alarm conditions is given by LEDs and a display mounted on the front of the EM4x, with remote notification being enabled by relay contacts, RS232 or TCP/IP (using SNMP).

The EM4x utilizes a USB communications port which allows for local monitoring of system operations as well as pre-commission and power down configuration of the Web UI.

The EM4x also incorporates the following features:

- Support for Enatel's energypak battery modules with optimized battery backup functions
- Support for third-party external batteries, both lead-acid and lithium based
- Support for AC-DC rectifiers (24V, 48V, 60V and 110V Outputs)
- Support for DC-DC converters (12V, 24V, 48V and 60V Outputs)
- Support for Enatel's range of solar and wind converter modules plus associated inverters
- Support for hybrid functionality for industry benchmark efficiency of genset, solar and battery interaction.
- Support for Enatel's range of ancillary devices including fan controllers, AC metering and battery monitors
- Control of up to two low voltage disconnects (magnetically-latched contactors) per I/O board\*
- Network connectivity (web access)
- System voltage metering for primary system DC supply. (e.g. 48V primary DC output)
- Load, battery and rectifier current metering and alarms
- Active rectifier and converter current share
- Automatic system voltage control
- Effectively unlimited alarm thresholds as standard, for use with multiple DC outputs
- Advanced monitoring, display and logging of energypaks, and system performance data
- Phase balance controls for multi-phase generators



# energy manager (EM4x)

SMART POWER MANAGEMENT

PRODUCT SHEET

- Sophisticated programmable logic control
- Grid tariff optimization – the ability to program schedules for battery assumption of load during peak grid tariff rates
- For lead-acid external batteries -
  - Battery and room temperature metering and alarms (when fitted with optional temperature sensors)
  - Optional complete or battery mid-point monitoring (when fitted with optional battery monitors)
  - Temperature compensation of float voltage (when fitted with optional temperature sensors)
  - Manual equalise charging to prolong the life of the batteries
  - Periodic equalise charging to prolong the life of the batteries
  - Fast charging after battery discharge
  - Battery capacity remaining indication
  - Battery testing facility
  - Battery current limit
- Six user defined digital inputs\*
- Six relay outputs\*
- I/O Expansion card capability\*
- Expanded serial and CAN communications

\* **Note:** the addition of an I/O Expansion card to the EM4x allows for analogue inputs and increases the number of digital inputs and relay outputs available. The controller allows for these new inputs/outputs to be logically combined allowing a degree of control of peripheral functions. E.g. a temperature triggered room fan or humidity detection.

## Specifications

|                                      |                 |
|--------------------------------------|-----------------|
| Operating supply voltage:            | 18V to 80V      |
| Operating ambient temperature range: | -20°C to 70°C   |
| Storage ambient temperature range:   | -25°C to 80°C   |
| Relative humidity range:             | 5% to 95%       |
| Altitude:                            | less than 3500m |

## Protocols Supported

- IPv4
- 10/100 Base TX
- SNMP V2/V3
- Modbus - Modbus TCP server and master (via Ethernet)
- USB 2.0

## Definition

The energy manager EM4x is offered in two variants:

1. **Model Number: EM4x-01** a "large display" module with a 4¼" (108mm) LCD touch screen interface, typically fitted on a 3U DC system fold-down front panel, or pull-out drawer mounted.
2. **Model Number: EM4x-02** a 1U "tray mount" inserted module with a 2.5" (67mm) LCD screen with a keypad interface.

Both variants offer the same functions.

# Monitoring and Control

## Summary – EM4x Comm's & Peripheral Card Architecture

