Altus® Energy Management System (EMS)

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Contents

1. Introduction

Energy Storage Systems (ESS) are large scale energy storage products, designed for multiple applications such as micro grid, hybrid and all-electric ferries, tugs, cruise ships, superyachts, and port cranes etc. Hundreds of ESS modules are connected in series and parallel, together with bi-directional energy converter to make one operating system (See Fig 1: typical ESS). All of the modules of the ESS and bidirectional energy convert are connected to Energy management System (EMS) via Ethernet or Rs-485 communication link. Which depends on the type of energy storage system (ESS) used ((See Fig 2: Typical Network architecture).
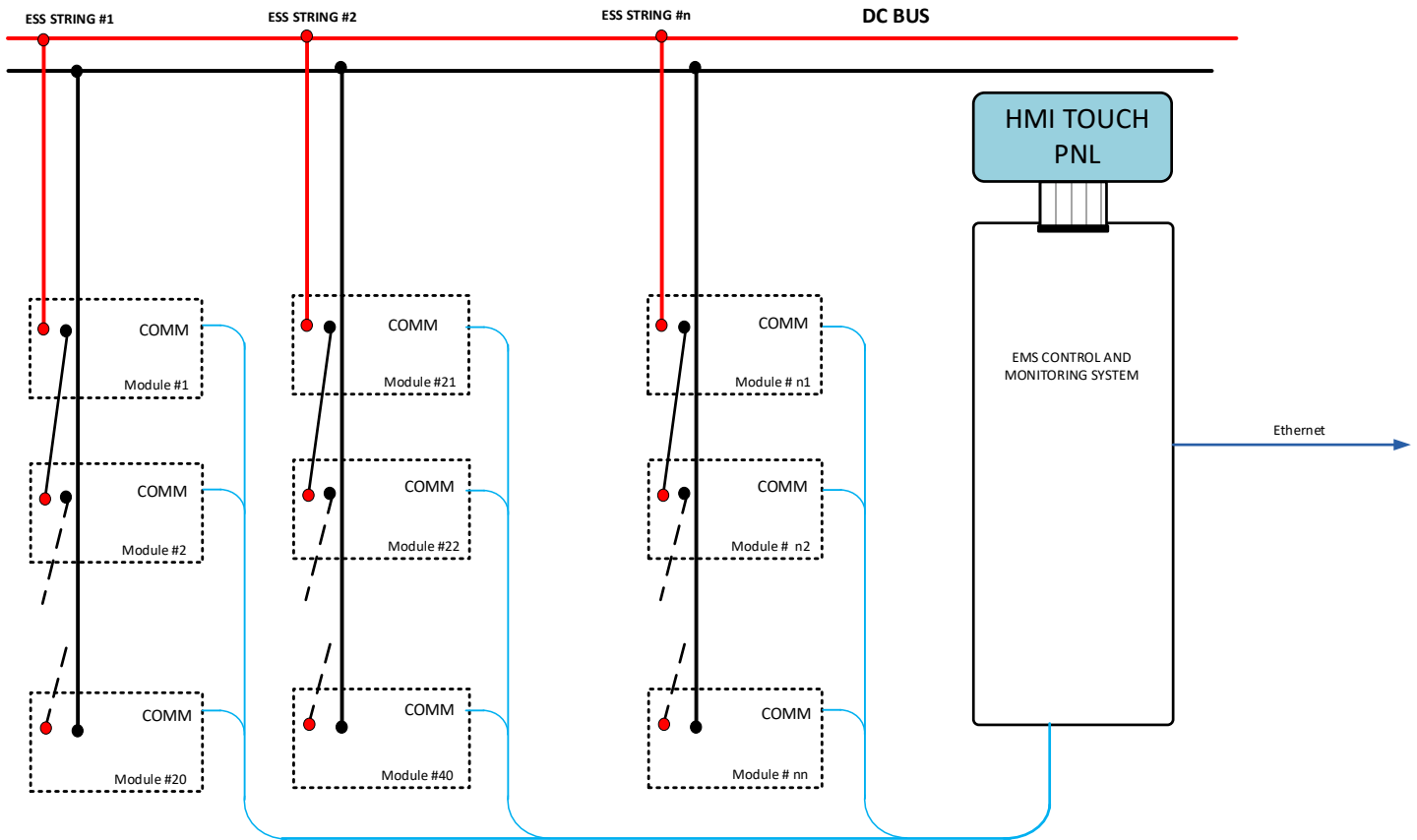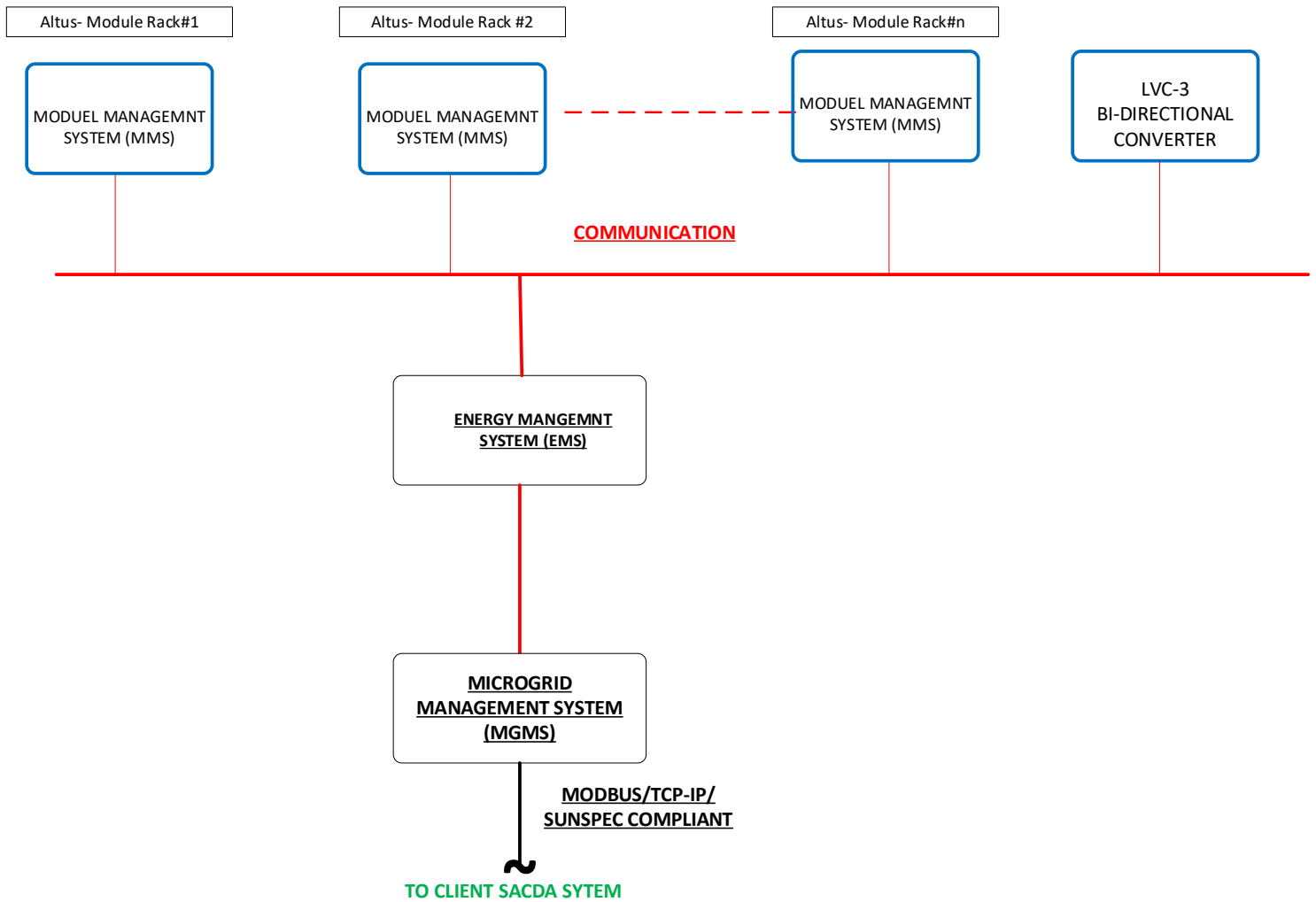

Fig 1: Typical ESS

Altus- Module Rack#1		Altus- Module Rack #2		Altus- Module Rack#n		
MODUEL MANAGEMNT SYSTEM (MMS)		MODUEL MANAGEMNT SYSTEM (MMS)	- - - - -	MODUEL MANAGEMNT SYSTEM (MMS)		LVC-3 BI-DIRECTIONAL CONVERTER

COMMUNICATION

ENERGY MANGEMNT SYSTEM (EMS)

MICROGRID MANAGEMENT SYSTEM (MGMS)

MODBUS/TCP-IP/ SUNSPEC COMPLIANT

TO CLIENT SACDA SYTEM

Fig 2: Typical Network Architecture

2. Description

Spar Power's Energy Management System (EMS) system is a state-of-the-art technology uses most advanced and fast micro controller to process the information and comminate with all devices and client's grid controller/SCADA system. Four and a half inch (4.5") local HMI panel is used to control and monitor the connected devices.

3. Hardware configuration

Microprocessor-based system with following configuration (See Fig. 3):

1. Eight isolated digital inputs
2. Eight isolated digital outputs
3. Four Analog inputs (0-10V, 4-20ma)
4. Ethernet, RS485 and CAN communication networks.
5. 4.5-inch touch panel HMI,

NOTE: Flow of information between Spar devices and client SCADA System is configured on project-to-project basis, which depends on the client requirements.
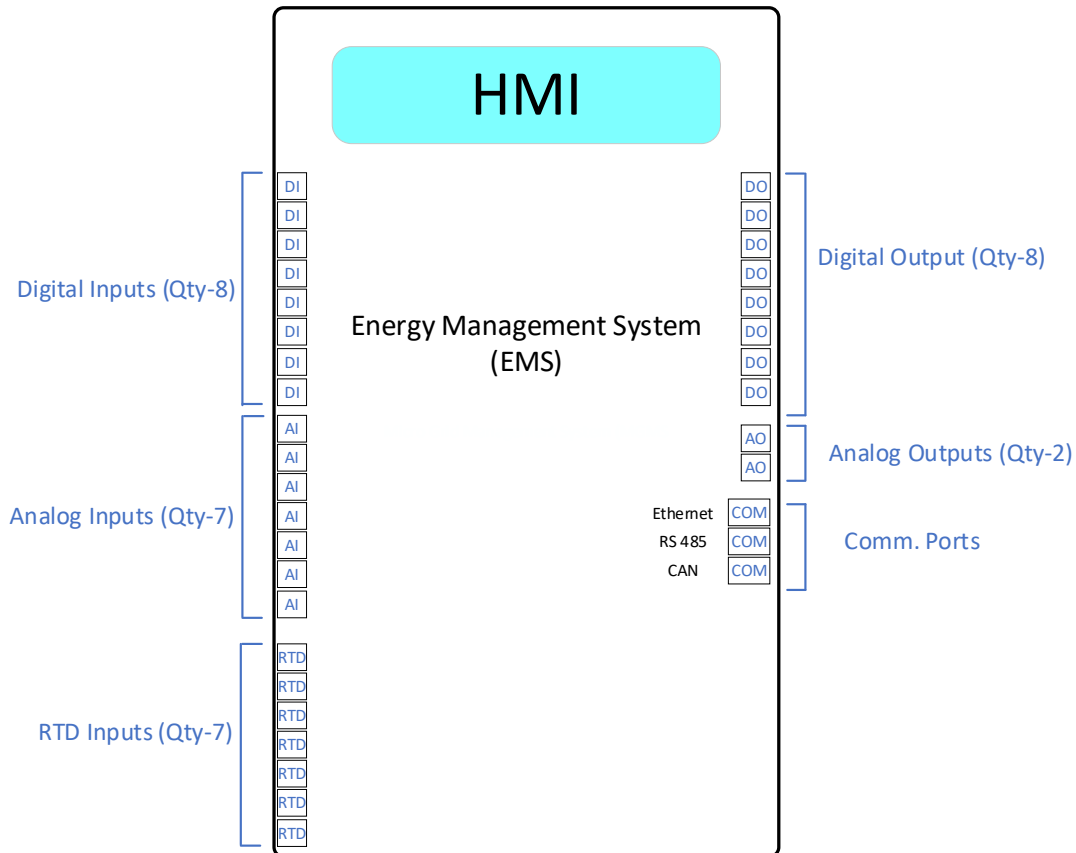

Fig 3: Hardware Configuration

4. Configurable features

All of the monitoring and control functions are based on the client requirement and configured accordingly. The System monitors and display alarms and faults in the Battery Storge systema, bidirectional converter and DC/DC battery charger. Clint can configure control parameters for maximum cost saving schedules etc.

4.1 Touch Panel HMI Screens

Following table illustrates the typical available information from each and every module:

4.2 Power on screen

You will see this screen most of the times and at power up, this screen shows the status, ESS state of charge and converter status etc.
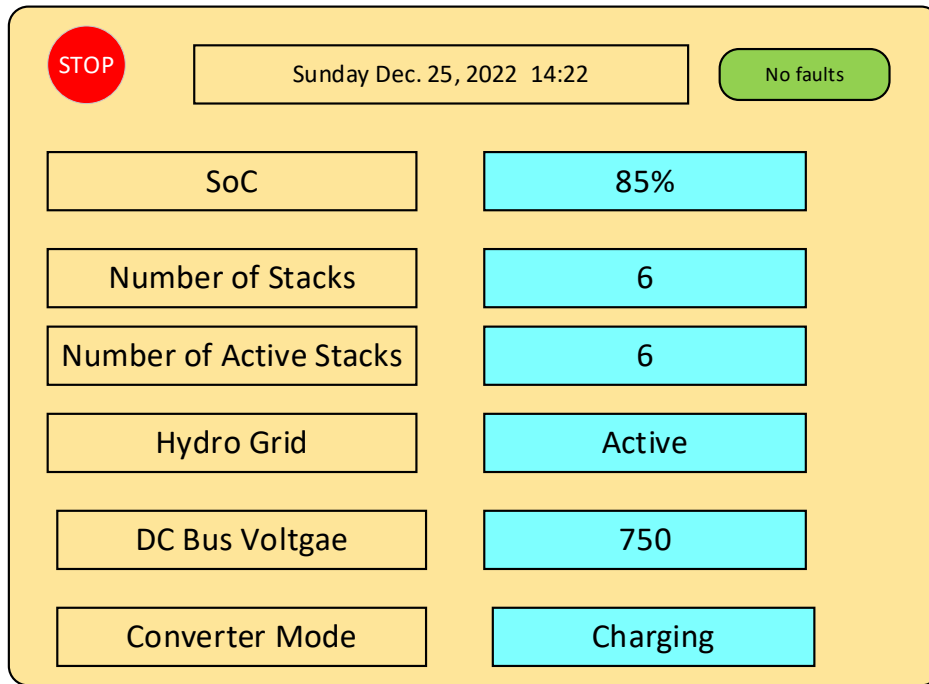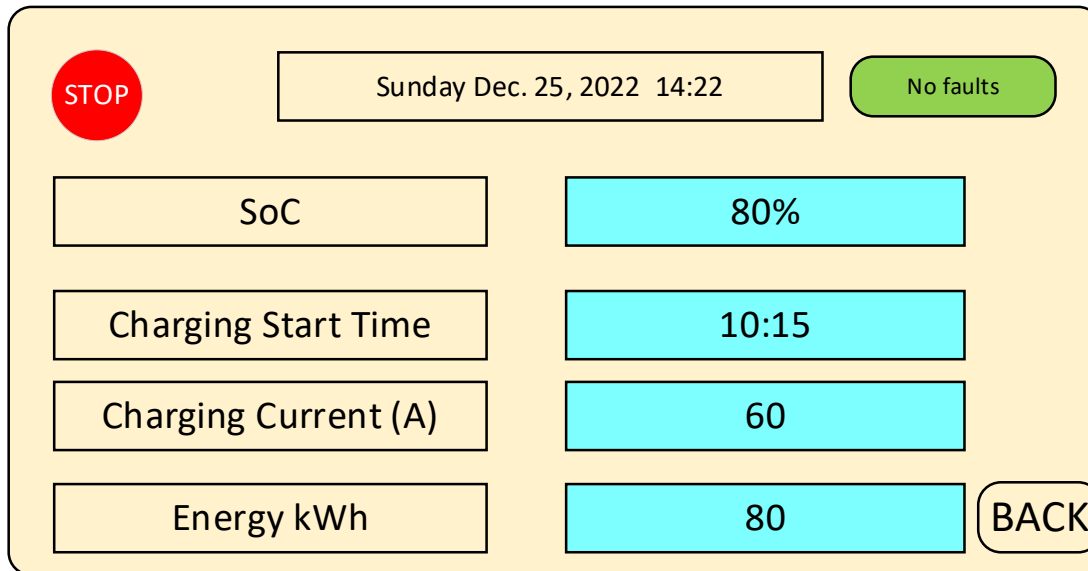
Fig: 4 Power on screen

4.3 State of Charge SoC Screen

If you touch the SoC yellow window, the following screen will appear indicating the status of charge (SoC):

Fig; 5 SoC Screen

4.4 Stack information

If you touch number of active stacks, following window will appear providing the status of each module in the stack. Use page up/down to scroll through the pages and Back key to exit from the stck information screen.

			Sunday Dec. 25, 2022 14:22					No faults

Stack #1 Information

Module #	Volt	T (Deg. C)	Module #	Volt	T (Deg. C)	Module #	Volt	T (Deg. C)
1	22.1	23.6	11	22.1	23.6	21	22.1	23.6
2	23.1	23.6	12	23.1	23.6	22	23.1	23.6
3	24.1	23.6	13	24.1	23.6	23	24.1	23.6
4	25.1	23.6	14	25.1	23.6	24	25.1	23.6
5	22.1	23.6	15	22.1	23.6	25	22.1	23.6
6	23.1	23.6	16	23.1	23.6	26	23.1	23.6
7	24.1	23.6	17	24.1	23.6	27	24.1	23.6
8	25.1	23.6	18	25.1	23.6	28	25.1	23.6
9	26.1	23.6	19	26.1	23.6			
10	27.1	23.6	20	27.1	23.6			

BACK

4.5 Hydro Grid Screen
If you touch the hydro grid, the following window will appear

STOP	Sunday Dec. 25, 2022 14:22	No faults

Hydro Grid	Active
Voltage	482.6
Current (Amp)	60
Energy (kWh)	75

BACK

Fig. 6: Grid Screen

4.6 Converter Screen
If you touch converter screen following window will appear. You can go to converter monitor or converter control page.
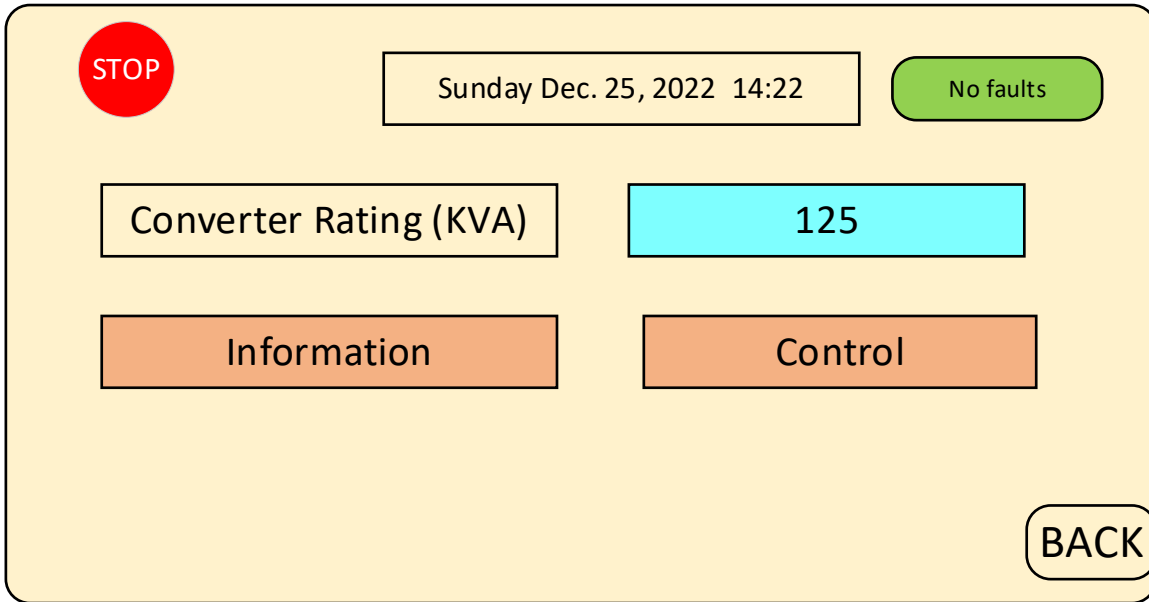
Fig 7: Converter Information and control screen

4.7 Converter Information Screen

If you touch Information on the above screen, following screen will appear (Fig. 7)
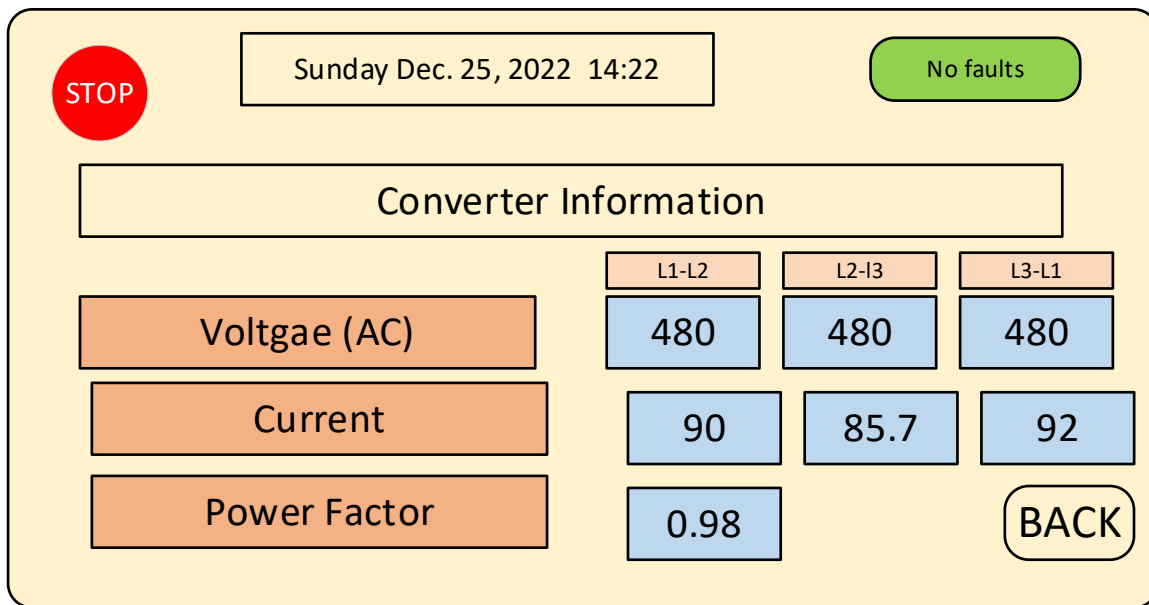

Fig 7: Converter Information

4.8 Converter Control

Converter can be controlled from local HMI panel or from the EMS HMI panel. It is preferable that the control of the converter be performed from the local panel only. If client prefers to control the converter from the EMS panel, risk factors must be evaluated before enabling the remote control. However, for safety reasons, remote

stop (RED) from the EMS HMI panel is always enabled/Active

4.9 Fault alarm Screen

If you touch Fault/Alarm window on any screen following screen will appear showing the current alarms (if any), and the alarm history.

STOP	
	Sunday Dec. 25, 2022 14:22

Alarms History

ESS Temperature high Alarm   Dec. 18 14:22

Converter Current limit Active Alarm Dec. 10   9:15
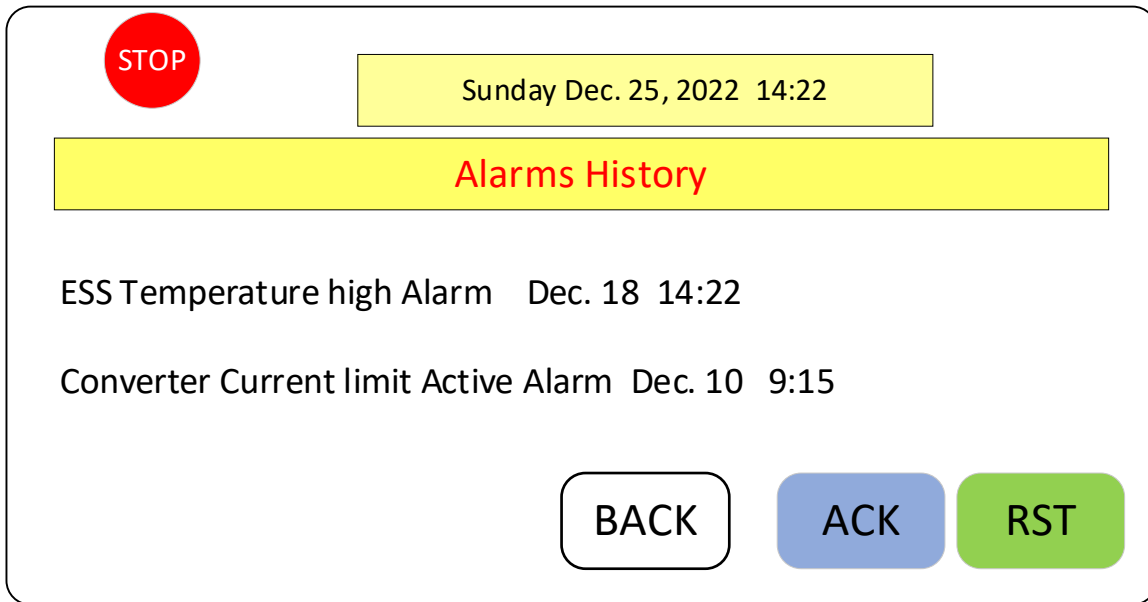
BACK   ACK   RST

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Fig 8: Fault/Alarm Screen

5   Mechanical

Wall mounted enclosure 18 (W)X24 (H)X10 (D) inch