INSTALLATION AND USER INSTRUCTIONS

EDGE

GLT CONTROLLER TYPE "EMR813"

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Version 1.0.0

DISCLAIMER

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Document Revisions

Date	Version Number	Document Changes
13-04-2022	01.0.0	Initial draft

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1. PREFACE

1.1. Purpose of Document

The EDGE as a GLT controller provides an internal Modbus Server to read the analog and Digital inputs and control digital outputs.

In this application it used to monitor and control a Glove Leak Testing application by controlling a pneumatic pump and monitoring the pressure drop in an inflated glove. The complete system is battery operated and housed in a nylon enclosure for portability. For this reason, all communication is handled by the on-board Wi-Fi module of the EDGE.

EDGE calibration, test and network configuration options have been added to the latest iteration of this application of the EDGE.
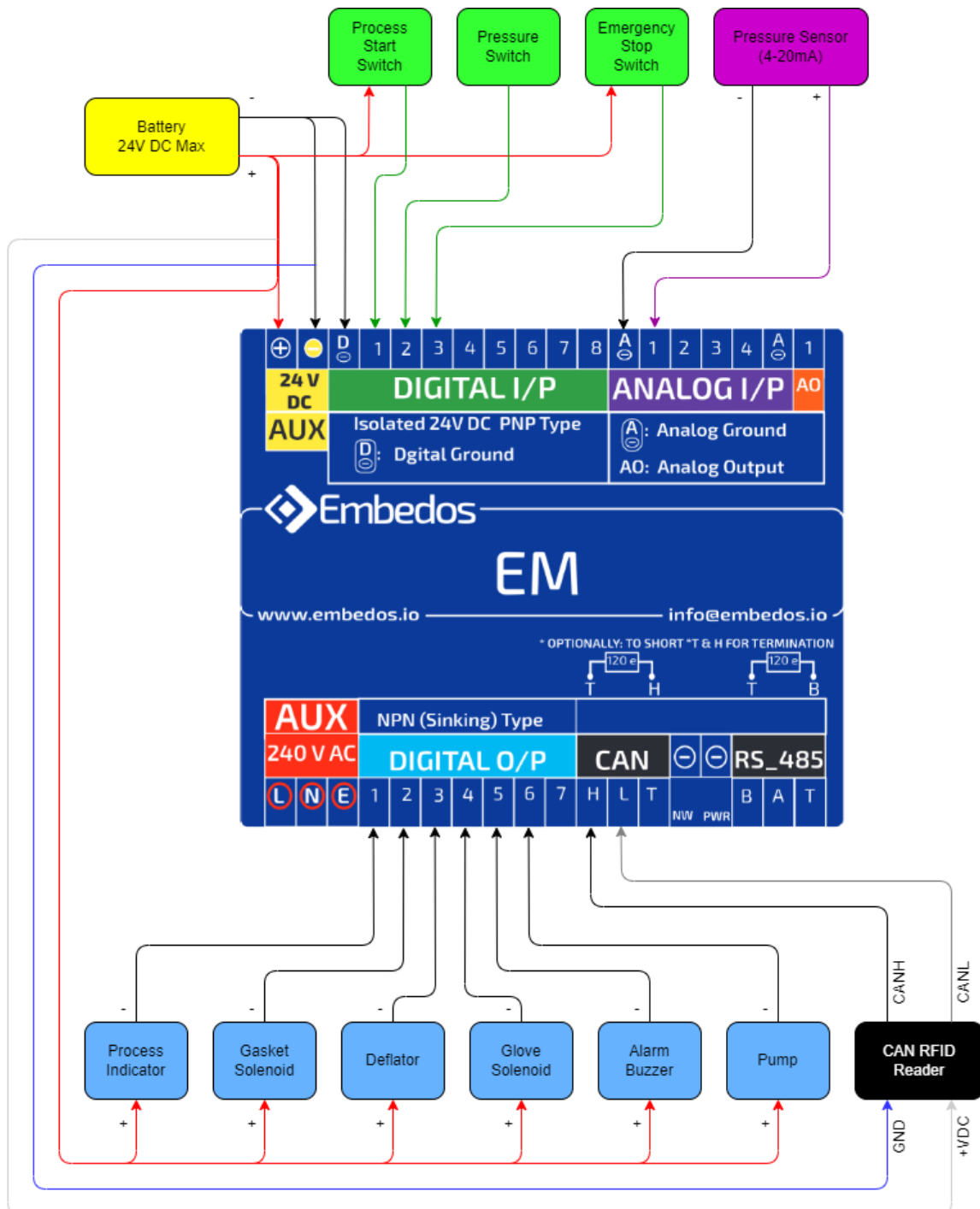
2. Factory Set Configuration

- Analog Current Input (4-20mA) on Analog Input channel 1 of device.
- Digital Pulse Input (24V) on Digital Input channel 1, 2 and 3 of device.
- Sinking output up to 24V on Digital Output channel 1, 2, 3, 4, 5 and 6 of device.
- Modbus TCP Slave running on port 11502
- CAN interface set to 125000bps for CAN RFID reader with node-id 32 (IFM default)
- Hotspot SSID: EM- "mac-id of device" (Defined on side of the device enclosure)
- Hotspot Password: edge@12345
- Always available IP over Hotspot – 192.168.4.1
- Web Page URL (over hotspot) – http://192.168.4.1
- Web Page URL (over Wi-Fi) – http://"ip_address_assign_to_device"
- Web Page Credentials – User – admin, Password – admin

3. Connections

- **Digital Input 1 – Process Start Input**
- **Digital Input 2 – Pressure Switch Input**
- **Digital Input 3 – Emergency Stop Input**
- **Digital Output 1 – Process Indicator Output**
- **Digital Output 2 – Gasket Solenoid Valve Output**
- **Digital Output 3 – Deflator Output**
- **Digital Output 4 – Glove Solenoid Valve Output**
- **Digital Output 5 – Alarm Buzzer Output**
- **Digital Output 6 – Pump Output**

4. Connection Diagram

5. Modbus Register Addresses

Address	Function	Persistence
40001	Pressure Sensor value on Analog Input 1	No
40003	Analog Input Setpoint	No
40005	Gasket Inflation Time in seconds	Yes
40006	Glove Inflation Time in seconds	Yes
40007	Stabilization Time in seconds	Yes
40008	Process Time in seconds	Yes
40009	Data read bit toggling interval in seconds	Yes
40010.0	Digital Input 1 (Process Start Input)	
40010.1	Digital Input 2 (Pressure Switch Input)	
40010.2	Digital Input 3 (Emergency Stop Input)	
40010.3	Digital Input 4	
40010.4	Digital Input 5	
40010.5	Digital Input 6	
40010.6	Digital Input 7	
40010.7	Digital Input 8	
40010.8	Digital Output 1 (Process Indicator Output)	
40010.9	Digital Output 2 (Gasket Solenoid Valve Output)	
40010.10	Digital Output 3 (Deflator Output)	
40010.11	Digital Output 4 (Glove Solenoid Valve Output)	
40010.12	Digital Output 5 (Alarm Buzzer Output)	
40010.13	Digital Output 6 (Pump Output)	
40010.14	Digital Output 7	
40011.0	Process failed in Gasket Inflation Alarm	
40011.1	Process failed in Glove Inflation Alarm	
40011.2	Process Passed (1) / Process Failed (0)	
40011.3	Process On (1) / Process OFF (0)	
40011.5	Toggling Bit (For Data logging)	
40011.6	RFID Tag Detect bit	
40011.8	Emergency Button pressed Alarm	
40011.9	Asserted on first analog value lock in process time, cleared on final value lock	
40011.10	Asserted on start of stabilization time, cleared at the end of time	
40011.11	Asserted when process failed in stabilization time	
40012.1	Assert to clear all alarms	

40012.3	**Assert to Reset Batch Count**	
40013	**Maximum allowable difference in logged values**	Yes
40014	**First latched analog value in process time**	
40015	**Last latched analog value in process time**	
40016	**Data to write to RFID Tag (MSB)**	
40017	**Data to write to RFID Tag (LSB)**	
40018	**Data read from RFID Tag (MSB)**	
40019	**Data read from RFID Tag (LSB)**	
40020	**Assert to write data to RFID Tag**	
40024	**Batch Count – Number of batches created**	Yes
40025	**Progressive Count – Number of times process started in Batch**	
40026	**Minimum Pressure to continue with process. Pressure should not drop below this value during stabilization time**	Yes
40027	**Batch Status. Assert to start a Batch. Clear to stop the batch**	
40028	**Assert to enable maintenance mode. Clear to disable the mode**	
40029.0	**Maintenance Mode Control Digital Output 1**	
40029.1	**Maintenance Mode Control Digital Output 2**	
40029.2	**Maintenance Mode Control Digital Output 3**	
40029.3	**Maintenance Mode Control Digital Output 4**	
40029.4	**Maintenance Mode Control Digital Output 5**	
40029.5	**Maintenance Mode Control Digital Output 6**	
40029.6	**Maintenance Mode Control Digital Output 7**	
40030	**Minimum pressure below which pump output is turned ON during purging time. Pump output stays ON while pressure is less than purging pressure threshold**	Yes
40031	**Purging Time in seconds**	Yes

6. Operation

There is total 8 states [stages] of Operation:
1) **Idle state**
2) **Process ON state**
3) **Gasket Inflation state**
4) **Glove Inflation state**
5) **Purging state**
6) **Stabilization state**
7) **Measurement/Process state**

By default, the device is in Idle State.

1. **To make the device in Process ON state following points need to be satisfied –**
    1.1. **No. alarm should be present, if yes disable all the alarms by asserting on bit 1 of register 40012.**
    1.2. **RFID tag should be detected by RFID header indication of the same can be verified on bit 6 of register 40011.**
    1.3. **Batch Status on register 40027 should be 1. If not write 1 to the same.**
    1.4. **Provide pulse Input on Digital Input 1.**

    When above all conditions are satisfied the device will go into process on mode and indicating Digital Output 1 – ON.

2. **As soon as Digital Output 1 is ON, device will go into Gasket Inflation state indicating Digital Output 2 & 6 – ON.**

3. **At this point, the device can go into two states, either Glove Inflation state or Alarm state. If pressure switch input is provided on Digital Input 2 within Gasket Inflation time (defined in register 40005), device will go into Glove Inflation state, else it will go into Alarm state, indicating Digital Output 5 - ON & the process stops.**

4. **Once the input is provided on Digital Input 2 within Gasket Inflation time, device will go into Glove Inflation state, indicating Digital Output 4 - ON & Digital Output 2 – OFF.**

5. **At this point, the device can go into two states, either Purging state or Alarm state. If the analog current input (pressure input) provided on analog input channel 1 of device increases above analog input setpoint (defined in register 40003) within Glove Inflation time (defined in register 40006), device will go into Purging state,**

else it will go into Alarm state, indicating Digital Output 5 - ON & the process stops.

6. Once the pressure input crosses analog input setpoint, the device goes into Purging state and remains in this state till purge time (defined in register 40031).

7. In this state, Digital Output 4 and 6 will be OFF. If the pressure input decreases below the analog input setpoint, Digital Output 4 and 6 will turn ON and if the pressure input increases above analog input setpoint, Digital Output 4 and 6 will turn OFF.

8. Once the purging time is completed, the device will go into Stabilization state. In this state, only Digital Output 1 will remain ON. At this point, device can go into two states, either Measurement/Process state or Alarm state. If the pressure input decreases below Stabilization threshold (defined in register 40026) within stabilization time (defined in register 40007), device will go into Alarm state, indicating Digital Output 5 - ON & the process stops. Else, device will remain in stabilization state for stabilization time.

9. Once the stabilization time is completed, device will go into Measurement/Process state and remains in this state for process time (defined in register 40008). While the device is in this state, it captures two pressure input values for the difference calculation (i.e., one at the start of this state & one at the end of this state). If the difference is greater than maximum allowable difference (defined in register 40013), the process will fail, else, the process will pass & the device goes into Idle State.
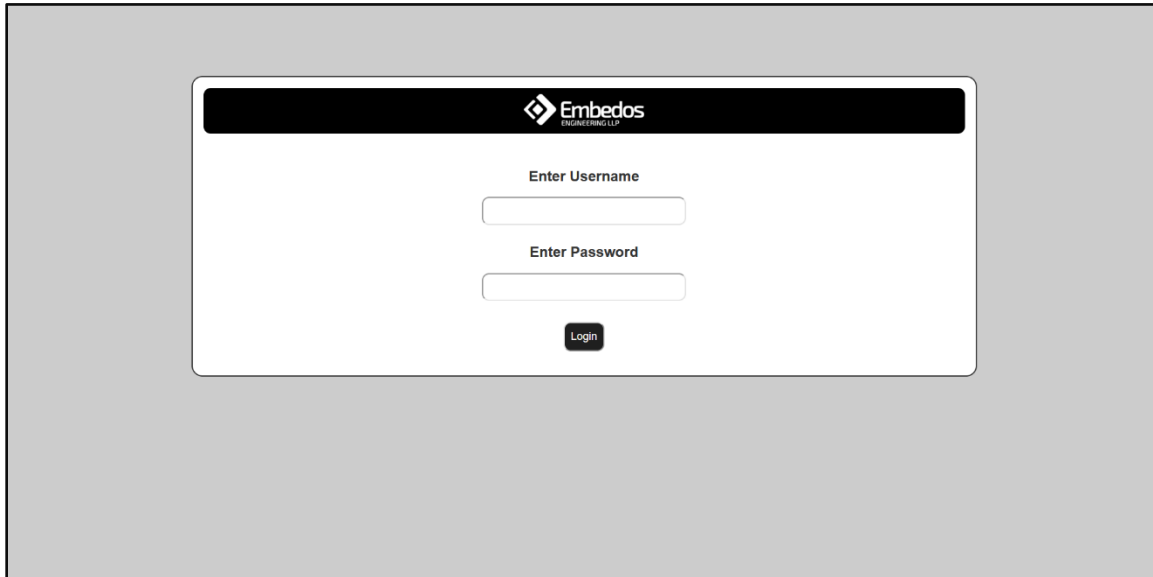
Alarms generated by device –
- 40011.0 – Alarm 1
- 40011.1 – Alarm 2
- 40011.8 – Emergency Alarm
- 40011.11 – Process failed in stabilization state

1. Alarm 1 will be triggered in Gasket Inflation state. (Refer point 3 of operation)
2. Alarm 2 will be triggered in Glove Inflation state. (Refer point 5 of operation)
3. If the device is in any of these states from 2 to 7 (refer stages) & Digital Input is provided on Digital Input 3, Emergency Alarm is Triggered.
4. Process Fail Alarm will be triggered in Stabilization state. (Refer point 8 of operation)

To disable Alarms, assert on register 40012.1. Alarms will be disabled indicating Digital Output 5 – OFF.
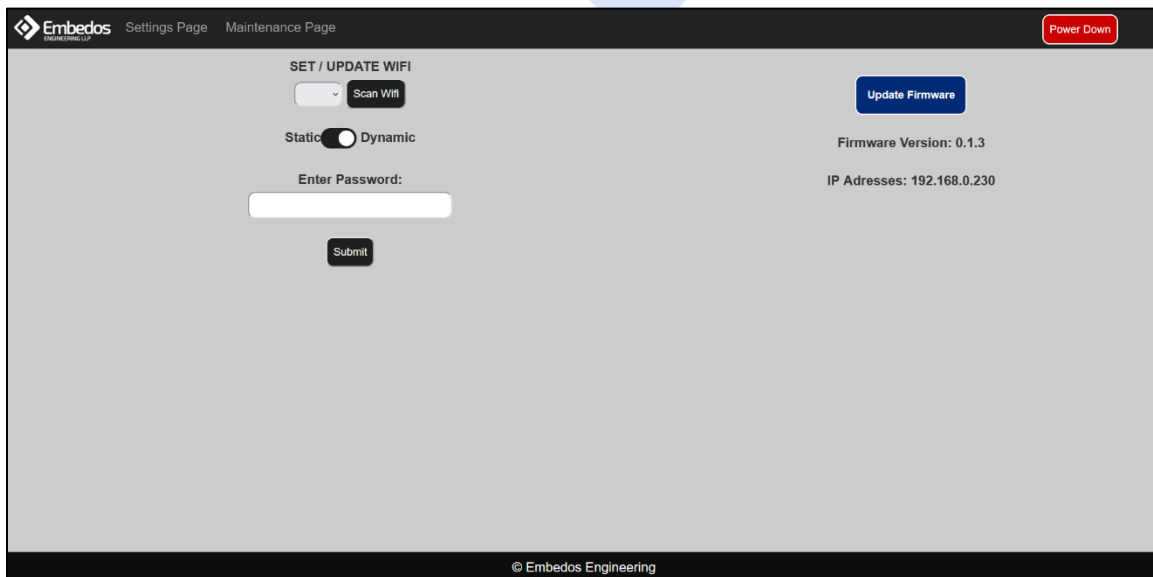
7. Web UI Interface

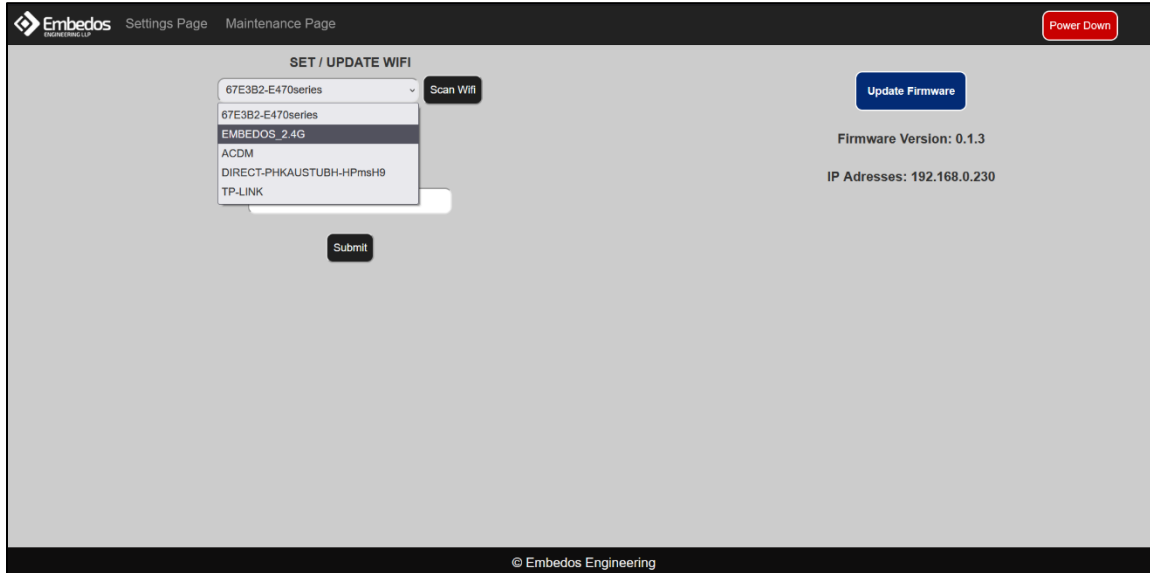**To access the web UI of the device, connect the hotspot generated by the device and enter the URL - http://192.168.4.1 on the browser.**

Enter the login credentials to access the web UI. Once logged in, settings page will appear.

User can scan Wi-Fi networks and connect to the network statically or dynamically.

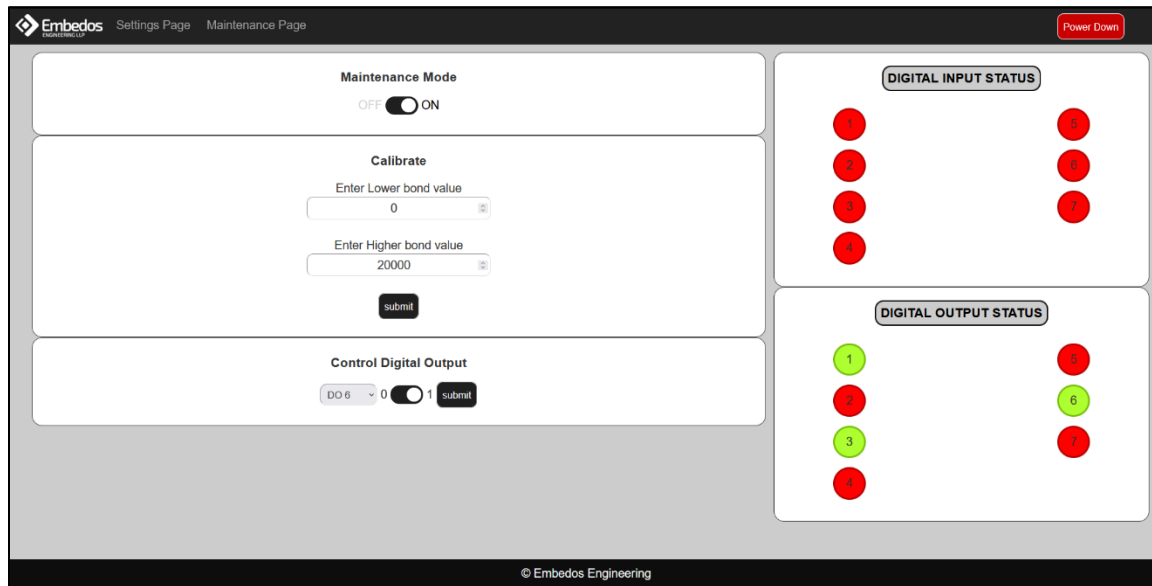**To connect the network statically, user needs to provide IP address, Subnet mask and Gateway along with the password.**

To access maintenance mode, click on Maintenance page.

1) User can enable/disable maintenance mode using the toggle switch.
2) User can calibrate the analog input channel by providing range of the sensor used.
3) Once in maintenance mode, user can control Digital Outputs.
4) The same will be reflected on Digital Output Status.
5) The Digital Input status indicates input provided on digital input channels.