Case study: Special containerized solution for PLC and MCC housing

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The merging between high technological competence and ability of tailoring the solution to Customer's needs.

Location: Petrochemical complex in Hungary.

PLC and Power Board engineered and designed to be directly assembled inside and to perfectly fit fully-equipped container technical room

Thanks to 30 years PSC' experience in Automation systems and Power Distribution Boards, PSC has been asked to run a challenge to realize this system completely customized to high profile engineering standard to guarantee high performance of the system, in a solid structure container-room.
The Power Board has been engineered to be directly assembled inside the container. One of the most important criteria during development of engineering has been the material selection with the target to get the panel compact as much as possible due to the 30" container size.
After a deeply and carefully selection of possible sub suppliers, the adoption of compact starter for motor up to 15 kw from a primary Brand allow us to recovery space and place the power panel perfectly fitted on a suitable space.

POWER PANEL BOARD

The panel Board has been engineered and constructed in full compliance with IEC Normatives respecting the following technical characteristics:

Technical characteristics

- Rated Voltage: 400 V 3F+N
- Rated Frequency: 50 Hz
- Earth system: TN-S
- Insulation Voltage: 500/690/1000 V
- Short Circuit Current: 35 kA
- Segregation Form type: 2b
- Degree of Protection: IP 41 closed door
- Internal Degree Protection: IP 20 with opened door
- Carpentry: std. manufacturer
- Color: RAL 7035
- Painting cycle: std. manufacturer
- Electrical cable connections: bottom entry

Composition of switchboard

- N° 2 Incoming Line 2500A-4P with communication to DCS in IEC61850
- N° 1 Circuit Breaker 400A-3P for PFI 175kVAR
- N° 2 Circuit Breaker 160A-3P for LCP
- N°12 Circuit Breaker up to 25A-2P
- N° 3 Circuit Breaker up to 16A-2P+Earth Leakage
- N° 5 Circuit Breaker up to 20/25A-4P+Earth Leakage for tracing system
- N°10 Circuit Breaker up to 40A-2P+Earth Leakage for tracing system
- N° 2 Circuit Breaker 10A-2P for HVAC
- N° 4 Circuit Breaker 20A-2P for PLC Panel
- N° 2 SS Motor Starter 90kW
- N° 1 SS Motor Starter 110kW
- N° 3 VSD Motor Starter up to 3kW
- N°28 DOL Motor Starter up to 15kW

PLC BOARD

The automation system is based on World top brand hardware, with the following characteristic:
2x PLC System: CPUs, in redundant fault tolerant configuration, and simplex or redundant I/O standard and failsafe.

The system complies with safety requirements to SIL3 in accordance with IEC61508, AK6 in accordance with DINV19250 and Cat.4 in accordance with EN954-1.

The hardware selected is the most powerful PLC in its brand family of controllers and enables successful automation solutions.

This hardware is an automation platform for system solutions that focus on process engineering and is characterized primarily by its modularity and performance reserves.

The powerful backplane bus of the hardware selected and the communication interfaces that can be connected direct to the CPU enable high-performance operation of a host of communication lines.

This permits the division into one communications line for HMI and programming tasks, one line for the redundant Modbus communication with Client's DCS, and redundant Profibus DP line with the I/O modules.
The most critical part of the project is undoubtedly the management of the burner, the library used for the burner application was created by the brand on the basis of the functional requirements of EN 746-2 and support Oil burner, Gas burner and Solid matter burner as single and multi-burner applications. The functions of the burner library have been developed under consideration of the following standards:

The library has the following functions:

1. Function for controlling the air dampers
2. Function for controlling the ignition of the burner
3. Function for controlling the functions of a gas burner
4. Function principle of the gas tightness test
5. Functionality for control and supervision of actuators with discrete position-feedback

Standards:

- EN 746-2:2010
- EN 12067-2:2004
- EN 267:2011
- EN 676:2008
- EN 298:2012
- EN 1643:2014
- EN 12952-8:2002
- EN 12953-7:2002
- ISO 13577-2:2014
- ISO 13577-4:2014
- NFPA 85:2015
- NFPA 86:2011
- IEC 61508:2010

The supervision system consists of an operator panel installed on front of the system cabinet of each LCP. As requested, each HMI will be able to communicate with both the PLC for both the process unit of the plant.

Each panel performs the standard supervision functions, such as process monitoring through the plant graphic pages, critical process alarm on the alarm page and the historicization of all analogue measurement.

The user interface has been designed to be as simple as possible for the operator but at the same time also full of detailed information for operating the system, for example each sequence step is shown on the video page to make it clear to the operator what is actually the status and avoid anomalies during the process.

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