



- Energia - Energie Rinnovabili
- Siderurgia - Metallurgia
- Oil&Gas e Petrochimica
- Cemento - Vetro
- Farmaceutico - Alimentare - Navale
- Offshore
- Infrastrutture
- Chiavi in mano



## OFFERTA N° SG25012016-0

The Company	Attention to	Date
PAUL WHURTH	Mr. Cau M. Mr. Granone P. Mr. Roberto Mario	19/01/2016

Plant	Copy	Note	Page N.°	Attention to	Tel.N.°	Fax .N.°
TATA STEEL- JAMSHEDPUR						

# PAUL WURTH TATA STEEL- JAMSHEDPUR – CDQ COB 10& 11

Date	N.° rev.	Description	Elaborated	Technical Ap.	Commercial Ap.	Manager Ap.
25/01/2016	01	offerta	G.S.	S.S.	G.S.	G.S.

**OFFER OBJECTS: LEVEL 1 AUTOMATION SYSTEM FOR CDQ 10 & 11**

**DESCRIZIONE OFFERTA:**

**ACTIVITIES LIST :**

**INDEX :**

**1.0 GENERAL SPECIFICATION**

1.1 Scope of supply

1.2 Type of supply

**2.0 REFERENCES**

**3.0 PROJECT DATA**

**4.0 LAY-OUT AUTOMATION SYSTEM**

**5.0 SUPPLY DESCRIPTION AND CHARACTERISTICS**

5.1 PLC hardware

5.2 Field Interface - Terminal Boards

5.3 HMI supervision system, Client - Server PC-Based

5.4 Control Networks

5.5 System software and user software

5.6 Boiler Emergency Desk

5.7 Drawings and Documentation

5.8 Inspection Test and FAT

**6.0 SUPPLY EQUIPMENT DESCRIPTION AND CHARACTERISTICS**

6.1 Electrical Control Panel CDQ#10 PLC

6.2 Electrical Control Panel CDQ#10 RIO

6.3 Electrical Control Panel CDQ#10 PLC

6.4 Electrical Control Panel CDQ#10 RIO

6.5 Electrical BOILER Emergency DESCK

6.6 SPARE PARTS

- 7.0 STANDARDS
- 8.0 TESTS
- 9.0 LIMIT OF SUPPLY - REMARKS
- 10.0 TERMS AND CONDITION

## 1.0 GENERAL SPECIFICATION

### 1.1 Scope of Supply

The Scope of Supply of this document is to clarify the provision includes the following activities and supplies:

- G1680.CDQ0.6750.01-02.TA.PWIT Level – 1 Automation system CDQ#10
- G1680.CDQ1.6750.01-02.TA.PWIT Level – 1 Automation system CDQ#11

Engineering, documentation and commissioning activities of 2 Nos. Level-1 Automation System (1 No. For CDQ#10 and 1 No. For CDQ#11), each one mainly composed by (as described in the following chapters):

- 1 No. PLC Panel and 1 No. RIO Panel (Remote I/O)
- HMI supervisor, system PC-based
- Control network devices
- system software and user software
- Boiler emergency desk
- Commissioning activities

In particular for CDQ#10:

- PLC Panel in Boiler Auxiliary Room
- RIO Panel in Electrical Room
- HMI in control room integrated in Boiler Auxiliary room

And for CDQ#11

- PLC Panel in Boiler Auxiliary Room
- RIO Panel in Electrical Room
- HMI in control room integrated in Boiler Auxiliary room

The system is redundant type as far as CPU, SERVERS, control and HMI network, I/O communications and power feeder, as described in the following configurations LAY-OUT.

## 1.2 Type of Supply

- Design
- Documentation
- Material supply
- Packing
- Transport
- Training
- Technical assistance during erection
- Technical assistance during commissioning and start up / Performances tests

## 2.0 REFERENCES

### References to documents received:

n.° document	n.° rev.	Description	Date	Received by:
02522G1680		THECNICAL SPECIFICATION	15/01/2016	email
02522G1680		TENEDER	15/01/2016	email
		FORM FOR DECLARATION OF OFFER SUBMISSION	15/01/2016	email
		CDQ#10 Level-1 Architecture	15/01/2016	email
		CDQ#11 Level-1 Architecture	15/01/2016	email
		D168050KBA001_0001	15/01/2016	email
		D168050KBA001_0001	15/01/2016	email
GS.01-10		GENERAL SPECIFICATIONS	15/01/2016	email
GCP-G/S-PWIT		GENERAL CONDITION	15/01/2016	email
IRQM02 rev.2		PRESCRIPTION	15/01/2016	email
		PLC room PDQ#10	26/01/2016	email
		PLC room PDQ#11	26/01/2016	email
		RIO room PDQ#10	26/01/2016	email
		RIO room PDQ#11	26/01/2016	email

### References to documents issued:

n.° document	n.° rev.	Description	Date	Sent by:
	0	SG25012016-0 Tecnica	27-01-2016	email
	0	SG25012016-0 Commerciale	27-01-2016	email
	0	CDQ10_OFF ECONOMICA	27-01-2016	email
	0	CDQ11_OFF ECONOMICA	27-01-2016	email
	0	SE16-001 LAY-OUT	27-01-2016	email

### 3.0 PROJECT DATA

Electrical equipment will be provided with the following requirement of installation  
And operating conditions:

The specification as described in the following chapters:

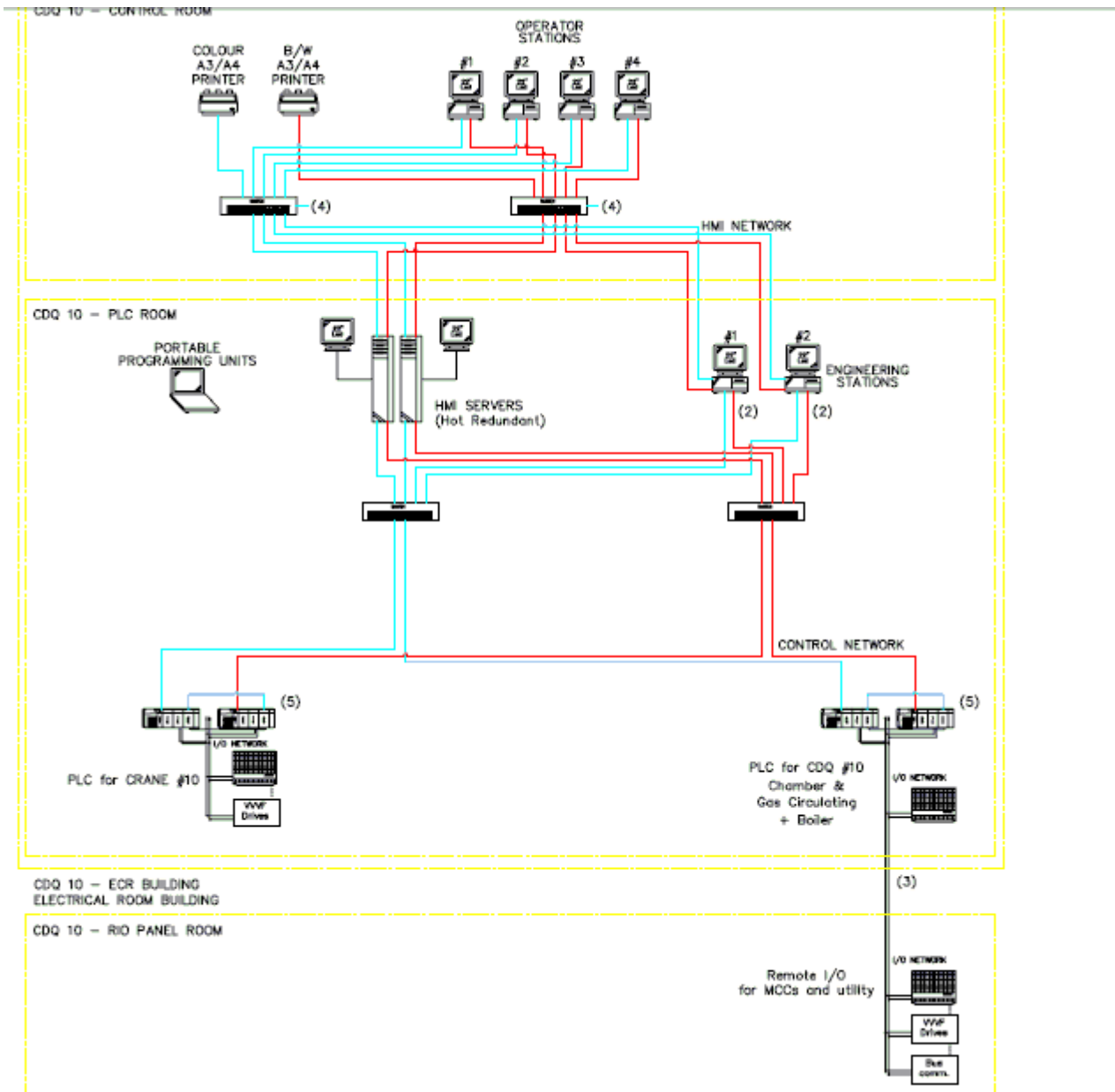
#### 1.5 Prescription for design and construction

- 1.5.1 Site Condition
- 1.5.2 Internal climatic conditions
- 1.5.3 Measurement units
- 1.5.4 Electrical and Instrumentation prescriptions

*Remarks: see complete description in your technical specification G1680.15.CDQ0.6750st02 pag.20-21*

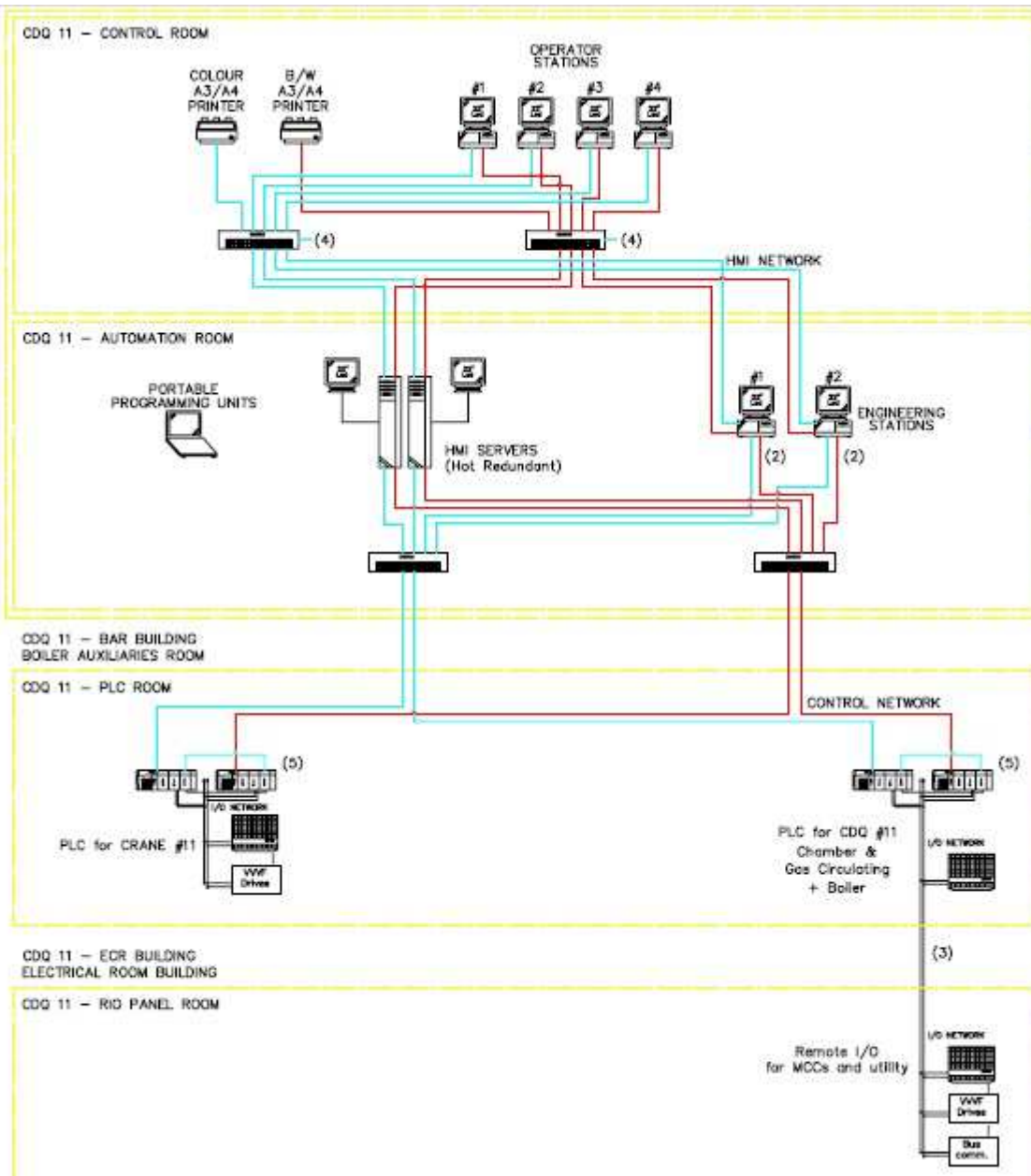
## 4.0 LAY-OUT CONFIGURATION ( PRELIMINARY ) SYSTEM

### CDQ10 - SYSTEM





## CDQ11 - SYSTEM





## 5,0 SUPPLY DESCRIPTION AND CHARACTERISTICS

### 5,1 hardware

The hardware is SIEMENS Control system is redundant type both for PLC and RIO, as far as:

- CPU card
- Control network (LAN), communication bus for I/O (card and devices) and Fieldbus ( Profibus)
- Power feeder

Transfer time in case of redundancy changeover from 100 to 200 msec.

Bump less transfer among redundant components shall be possible without any loss of data.

The following tables resume the estimated I/O quantities (including Spare) divided into: digital Input/Digital Output (Potential Free + Solenoid Valves / Analog Input (4+20mA + PT100/Analog Output (4+20mA) / Bus Card.

<i>PLC CDQ#10 Panel</i>							<b>ET200M</b>		
Note	Type Signal	I/O Request.	Spare 15%	Tot.I/O Request.	I/O Install.	Card Modularity	Q.ty	Slot Spare	Rack Q.ty
.+16DI Int PF+SOV	DI	640	96	736	<b>736</b>	32	<b>24</b>		
	DO	144+48	21+8	165+56	<b>221</b>	32+8	<b>13</b>		
	AI	40	8	48	<b>48</b>	8	<b>6</b>		
	AO	24	8	32	<b>32</b>	8	<b>4</b>		
<b>Totali</b>		<b>896</b>	<b>137</b>	<b>1033</b>	<b>1033</b>		<b>52</b>	<b>12</b>	<b>8</b>

<i>RIO CDQ#10 Panel</i>							<b>ET200M</b>		
Note	Type Signal	I/O Request.	Spare 15%	Tot.I/O Request.	I/O Install.	Card Modularity	Q.ty	Slot Spare	Rack Q.ty
	DI	512	64	576	<b>576</b>	32	<b>18</b>		
	DO	256	32	288	<b>288</b>	32	<b>9</b>		
	AI	8	8	12	<b>12</b>	8	<b>2</b>		
	AO	8	8	12	<b>12</b>	8	<b>2</b>		
<b>Totali</b>		<b>784</b>	<b>112</b>	<b>892</b>	<b>892</b>		<b>31</b>	<b>5</b>	<b>4</b>

<i>PLC CDQ#11 Panel</i>							<b>ET200M</b>		
Note	Type Signal	I/O Request.	Spare 15%	Tot.I/O Request.	I/O Install.	Card Modularity	Q.ty	Slot Spare	Rack Q.ty
.+16DI Int PF+SOV	DI	640	96	736	<b>736</b>	32	<b>24</b>		
	DO	144+48	21+8	165+56	<b>221</b>	32+8	<b>13</b>		
	AI	40	8	48	<b>48</b>	8	<b>6</b>		
	AO	24	8	32	<b>32</b>	8	<b>4</b>		
<b>Totali</b>		<b>896</b>	<b>137</b>	<b>1033</b>	<b>1033</b>		<b>52</b>	<b>12</b>	<b>8</b>

RIO CDQ#11 Panel							ET200M		
Note	Type Signal	I/O Request.	Spare 15%	Tot.I/O Request.	I/O Install.	Card Modularity	Q.ty	Slot Spare	Rack Q.ty
	DI	512	64	576	<b>576</b>	32	<b>18</b>		
	DO	256	32	288	<b>288</b>	32	<b>9</b>		
	AI	8	4	12	<b>12</b>	8+4	<b>2</b>		
	AO	8	4	12	<b>12</b>	8+4	<b>2</b>		
<b>Totali</b>		<b>784</b>	<b>104</b>	<b>888</b>	<b>888</b>		<b>31</b>	<b>5</b>	<b>4</b>

The control system we proposed, and 'structured in a completely modular, and responds in particular to the following features:

- Easily expandable
- The pages are graphic video interface (not tabulated), freely configurable and extendable
- The system we propose is based on our distributed system believe that fully meets your requirements assuring you also the possibility 'of future expansion to meet future expansion.

The integrated control system with HMI , in particular, provides:

- Development Station with integrated tools, and supervision to the remote I / O
- Easy scalability - handling uniquely different plant sections
- Process diagnostics
- System Diagnostics
- Messages, alarms and
- Driver standard

We will configure the data acquisition system and develop application software. This work will be conducted by our staff at our Headquarters. In particular we will develop the following activities:

- Manage process database
- Manage alarm database
- Creation of graphs of variables acquired (see sample pages)
- Our listing includes No. 3gg man working for our activities. Tech Specializes in your office for the joint establishment of specific sY.La Our listing includes the following documents:
- Databases
- Manuals standard provided instrumentations
- Sources of application programs
- Manual operator

The specifications and lists will be made on the subject of "A4". The documentation will be written in English, except the standard manuals that are produced exclusively in English. The symbols of the signals used will appear in the same form, in all documentation, software , video pages and windows, according to our standards.

The system have an extensive set of self diagnostic routines wich shall loate and identify system failure at least up to module level including redundant components, through detailed CRT displays and report printout. At the local level, failure of a module in a sub-system is also indentified by an individual Led display.

The memory of control system have a capacity of 50% is kept for Puchaser's use after complete programming of the system

The manufacture have an availability of spares and service support for a period of not less than ten years.

### DIGITAL INPUT

Digital input card 110VAC

Each DI channels have fuse switch terminal

### DIGITAL OUTPUT

Digital Output card 110VAC wired in two different typology:

- PT (potential free): auxiliary contact directly wired at Terminal Board
- SOV (solenoid valve): auxiliary contact with 110VAC feeding for solenoid valve

All the signals is interfaced with field devices by means of switching interposing relay contact, assembled and wired in both boards, having the following characteristics:

- Coil nominal input voltage 110VAC
- Max coil nominal input current: 200mA
- Contacts operating current: 5A/220Vdc

### ANALOG INPUT

Analog Input 24Vdc of two different typology:

4÷20mA analog input shall be wired to terminal board with 4 terminal strip each channel:  
24Vdc+(FST fuse switch terminal)/IN+/IN-/24Vdc in order to be free to connect 2-wires or 4-wires transmitters Analog Input.

All PT100 channels shall have single switch terminals.

### ANALOG OUTPUT

Analog Output 4÷20mA type

Analog Output single insulated

## COMMUNICATION CARD

For each PLC and RIO Panel is foreseen:

- Profibus network connection
- Modbus network connection
- 1 No. serial connection card Rs-485 (type shall be defined during Detail Engineering)

*Remarks: see complete description in your technical specification G1680.15.CDQ0.6750st02 pag.5*

## 5.2 Field Interface-Terminal Boards

All the lines incoming to/outgoing from the boards must be wired to a terminal board. Therefore they are installed and wired all the necessary terminal boards for power, Auxiliaries and I/O signals.

Separated terminal boards is foreseen for:

- Power
- Commands
- Signalisation
- Instrumentation

In particular, for each I/O card hosted in the board it shall be foreseen an individual terminal board, according to the indications here below.

Main Characteristic of system are:

- Field terminal blocks is suitable for 2.5mm<sup>2</sup> wires
- Single layer terminals grouped on support rail 32'' according to DIN 46277 in order to obtain different terminal boards
- Each individual terminal board identified by means of a name plate (tags according to the electrical diagrams)
- Each individual terminal numbered on both sides
- Terminal mounted at a minimum distance of 300mm from the bottom of the board.
- For each terminal boards it is foreseen 20% spare terminals.
- For each terminal, the connection of only one wire is allowed

### 5.3 HMI supervisor system, Client-Server PC-based

- HMI system, scada based, is indicated in principle on the attached configuration drawings and is composed **for each CDQ** by:
- Redundant Servers (2 Nos. for each CDQ)
- Operator Stations (4 Nos. for each CDQ)
- Engineering Stations (2 Nos. for each CDQ)
- Laptop for programming (1 No. for each CDQ)
- 1 No. A3 colour Laser Printers + 1 No. A4 colour Laser Printers 1 (2 Nos. for each CDQ)
- Network devices (see dedicated item)
- Accessories

The Control system use an open architecture: Station have MS Windows operating system and be capable Ethernet LAN connection.

HMI system is hot redundant type as far as:

- Server stations
- Communication between Server Stations & Operator/Engineering stations (Ethernet)
- Communication between PLC/RIO & Server Stations
- N.°2 Server SIMATIC IPC547E (RACK PC DA 19", 4UA)
- N.°4 Operator Station SIMATIC IPC547D (RACK PC DA 19", 4UA)
- N.°2 Operator Station SIMATIC IPC547D (RACK PC DA 19", 4UA)
- N.°1 Latop for Programming SIMATIC FIELD PG M4

Main Characteristic system are:

- Each operator station client/server architecture with latest hardware specification as available during detail engineering stage. Cursor positioning is through optical mouse.
- Engineering functions is available at Engineering stations
- Operator stations, industrial type, high-resolution 22" Led type monitor. The visualization system is capable of responding the change in equipment or process data very quickly. The screen response for process initiative changes will be better (lesser) than 1 sec. This includes alarm transmission and command transmission time.
- Operator Internationals keyboard (standard type) with multipurpose, user configurable featuring a number of assigned keys and optical mouse facility. These keys is available for providing dedicated display call up and other similar function.
- Engineering Stations have system configuration & Control system programming functions & all the functions of operator station.

*Remarks: see complete description in your technical specification G1680.15.CDQ0.6750st02 pag.6*

## 5.4 Control networks

Networks system for Control system and HMI indicated in principle on the attached configuration drawings is composed by:

- Control Network (LAN)
- I/O Network
- Fieldbus Network (profibus)
- HMI network (Ethernet TCP/IP ring bus system 1 Gbit/s)
- Communication with external system

All network devices necessary for network realization, to be installed into electrical room as attached layout (Hub-switches, Patch cord, Optical Fiber converter...) are included in Supplier scope.

Fibre Optic Cables is used outside electrical rooms for the necessary converter and accessories included in the scope of supply. Supervision for FO connections, tests and certifications .

All network system is hot redundant type, based on double separate lines (or ring for Ethernet) and double communication interface.

Transfer time in case of redundancy changeover is indicated in < 200 msec.

Bump less transfer among redundant components is possible without any loss of data.

CISO manageable network switch (10/100/1000 gbps) with necessary FO ports is considered.

Moreover CDQ system shall be connected with external Coke Oven Battery control system.

Connection realized via OPC Client/Server; necessary tunnelling software packages (details at DE stage) and firewall (hw+sw) equipment.

4+4 Nos. FO port (at switch or firewall) .

19 "rack enclosure 600x800x1656h mm

2 switch 10 gigabit Cisco SG200-10FP, 2 mini-GBIC adapters

UPS 1000VA

Ethernet cables connection included

Fiber optic connection included

## 5.5 System software and user software

Servers, Operator station and Engineering Stations (including laptop) are complete of necessary software packages and licences:

Engineering Stations have system configuration & Control system programming functions & all the functions of operator station.

Development, testing & commissioning of the system, including software licenses for communication with external (third party) systems as follow:

N.º2 Wincc Runtime Professional SW Package for Simatic IPC 65536 powertags

N.°2 Wincc/Server V7.3, Option for Simatic Wincc V7.3, Runtime Software, Single License  
 N.°1 Wincc/Redundancy v7.3, Option for Simatic Wincc V7.3, Runtime Software, Single License  
 N.°4 Wincc Runtime Prof. SW Package for Simatic IPC 128 Powertags.  
 N.°1 Software System Wincc v7.3, RC 65536 (65536 power tag), Runtime & Configuration SW

N.°1 Simatic S7, Step7 V5.5, Floating License for 1 operator

Automation system provide the function and features but not limited to the following:

- Condition monitoring of critical equipment (by user software)
- Data logging and on line configurable report generation with time stamping
- Multilevel password
- Maintenance related information and alarm on reaching set value
- Remote training troubleshooting, software upgrade, analysis of data through internet.
- Screen refresh time shall be less than 1 sec
- Third party intelligent system interface
- Bump less transfer among redundant component without any loss of data
- IO module fault reported to processor
- Self-diagnostic test of IO modules-open input/open loop detection
- Maintenance related information and alarm on reaching set value
- Operator Station shall perform the following functions:
- Provide indication of Analog/Digital process variables and loop related parameters and control of all electrical devices (motor, valves etc)
- Provide Operator's/Engineer's intervention for manipulation of controls including changing of set point, mode, output, turning parameters, ratios, computational constants.
- Provide Engineer's intervention for configuration of close/open loops, graphic displays, logging formats and other database related parameters.
- Provide standard displays (including live process information) (e.g.; Overview/Group Loop/Trend) and user-defined displays (e.g. Graphic/Texts/Message/Special formats)
- Provide Status of Event/Alarm processing, self-diagnostic messages and annunciation.
- Store configuration/application/historical database.
- Real time display of system status and error information
- Audio annunciation of some high priority alarm
- Provide hard copy printouts/records/logs
- Run user- defined programs on special high-level language developed by manufacturers of system.

The operator, as a minimum shall have access to the following through operator keyboard/optical mouse at all times:

- Selection of the displays including direct selection of loop in alarm turning facility, overview, group view, and loop view selection etc.
- To acknowledge alarm as and when they are annunciated on the operator console.
- Facility for easy positioning of cursor for the selection of any parameter.

- Special function keys for single stroke operation to have direct access to any parameter assigned.
- Selection of hard copy printout, logging printout, alarm history printout and assigning any parameter for trend recording in Assignable Trend Recorder.
- In addition the Keyboard shall have the following capabilities for restricted user/engineer through a password key-lock
- Change of data base configuration (including group loop, multi-loop and multivariable control configuration logic change)
- Group or multi-loop alarm inhibits for a plant under maintenance
- Reconfiguration of alarm settings and their values
- Tuning of controls
- On-line compilation of graphic displays using standard user-defined symbols
- Changing of parameters to be logged
- Assigning of parameters for historical trending
- To call detailed self-diagnostic for maintenance aid

Any change made for any parameter for any input from any displays shall be automatically updated on all displays configured for that input.

The language for displays is English.

*Remarks: see complete description in your technical specification G1680.15.CDQ0.6750st02 pag.7-8-10*

## 5.6 Boiler Emergency Desk

For each CDQ one Boiler emergency desk, with desk and front panels is provided with the following devices:

- 5 No. bar graph for analog input indication (PT, LT, PT, TT, FT)
- 6 Nos. display for valve position indication
- 6 No. Close-0-Open selector, spring return, for valve/Damper manual command
- 3 No. indicating lamp (Alarms)
- 3 No. pushbutton
- 1 No. Selector Emergency Desk / PLC
- 1 No. Emergency pushbutton
- 1 No. Siemens Touch-Screen 15"

*Remarks: see complete description in your technical specification G1680.15.CDQ0.6750st02 pag.11*



## 5.6 Drains and documentation

Documentation / Drawings to be prepared and supplied by the manufacturer shall include but not limited to the following:

- Detail Automation System Configuration Drawing (Hardware topology with graphic representation of all hardware components and their connections)
- System Definition, description and specification of the hardware with Bill of material.
- Installation and assignment diagrams / lists (cabinet, rack) including possible location related module codes and function codes on the individual module.
- Rack / Nest Internal Layouts, Card File Layout Drawings
- GA of Panels, consoles, control desk with Bill of material and base frame details.
- System Termination & Panel Drawings
- Internal wiring diagrams of Panels/control desks and circuit diagrams,
- Cable lists of the cabinet - internal and external wiring.
- Power consumption (UPS/Non-UPS) and Heat Load data
- Power distribution diagram (UPS/Non-UPS)
- System Earthing scheme with details
- Input/Output module loading and cabling scheme
- Peripheral device cabling schemes
- Input/output assignment drawings
- Complete system data base
- Project data manual
- Logic diagrams and control schematics
- Documents about fault diagnostic, services and maintenance.
- Marshalling details and loop wiring drawings with termination details
- HMI display documents, Graphic schemes including colour hard copy of graphics
- Report and log format printouts

The software engineering and documentation shall comprise the following as a minimum:

- Software specification
- Description of the automation, signaling and operating / monitoring philosophy
- Programming / configuration manual
- Logic, sequence, control and functional diagrams.

However a preliminary schedule for submission of drawings, data & manuals by the supplier Shall be as follows:

- Two weeks after Placement of Order (Preliminary)
  - System Configuration drawing
  - Panel Arrangement (external & Internal) drawing
  - Single line diagram
- One months (or before) after Placement of Order ( Preliminary for Approval):

- System Configuration drawing with Bill of Material.
- Panel Arrangement (external & Internal) Drawing with specification
- Single line diagrams, panel wiring diagrams and signals wiring diagram
- List of users with brief specification of the equipment supplied.
- List of spares required for commissioning and 2 years normal operations, with prices.
- List of Critical Spares with prices

Drawings shall be controlled by PW and submitted to customer for Information and notes (if any). Only PW clearance Supplier shall proceed with panel construction.

Two month after PW clearance:

- Details system Configuration drawing & Bill of materials.
- Panel Arrangement (external & Internal) drawing
- Single line diagrams, panel wiring diagrams and signals wiring diagram
- Bus Layout with cabling details
- Console Drawing
- List of Software
- Technical Data sheet/specification
- Colour Hardcopy of Graphics
- Operation Philosophy
- Logic & Control Schematic
- Mimic screen pictures
- Complete System database.
- Instrumentation Loop Diagram.
- Manufacturer's detailed catalogues / technical literatures.

All field modifications shall carefully recorded by the vendor's commissioning personnel and the same shall be incorporated in the final "As Built" drawings.

***Remarks: see complete description in your technical specification G1680.15.CDQ0.6750st02 pag.12***

## 5.7 Inspection, Test and FAT (Factory Acceptance Test)

Hardware and software shall be checked for compliance with the regulations and PWIT's specifications and the following tests on the completely interconnected and system components shall be conducted.

- Healthiness of all hardware
- Healthiness of network interfaces
- Hardware inventory check
- Hardware tests up to module level
- Hardware functionality including system wiring test and interface matching check
- Back up facilities functionality checks
- Checking of application software related to functions and HMI screens
- Individual loop testing where applicable
- Complete integrated test including communication
- Measurement of bandwidth utilization

The test concluded by the manufacture, and in presence of final customer if any, shall include but not limited to the following:

- System overview
- Configuration test
- Back up facilities functionality checks
- Software downloading & system booting check
- Environment access security check
- Sub-System loading check
- Input/output scan time, display update time, display call-up time check
- Redundancy checks
- Software and utility functionality and accuracy check
- Diagnostics functionality check
- Job specific data base check
- Job specific historical, alarm/event/log report check
- Job specific graphics check
- Job specific loop check

Include but not limited to the following:

Commissioning activities shall include but not limited to the following:

- I/Os test (and necessary adaptation if any)
- Cold test of user software
- On Load on-line debugging of the system and assistance to mechanical/process people
- Complete commissioning of the system

Acceptance Criteria :

- Availability of Level-1 automation system  $\geq 99.8\%$
- HMI screen refresh time  $\leq 1$  sec
- PLC scan time/Data up gradation time  $\leq 150$  msec for Analog signals/ $\leq 30$  msce for Digital signals/Priority processing will be provided for the data requiring faster scan rate
- Network bandwidth utilisation (average-to be measured over continuous period of 8 hours)  $\leq 10\%$
- Spare (free) memory capacity available:  $\geq 50\%$  (after commissioning)
- CPU loading 8peak):  $\leq 50\%$  (after commissioning)-Average / $\leq 60\%$  (after commissioning)
- Peak value duration less than 2 seconds

*Remarks: see complete description in your technical specification G1680.15.CDQ0.6750st02 pag.14-15*

## 6.0 DESCRIPTION OF CONTROL BOARD SUPPLY LINE

### 6.1 Electrical Control Panel CDQ#10 PLC

The supply of the electrical installation includes control Panel for System control, installed in the technical control room (as indicated on the plant layout), to operate the process, run through the PLC unit linked to the HMI supervision system, and to the Remote control system (by client).

#### Manufacturing specification

Board made of carbon steel plate complete with:

- Front-opened doors.
- Wiring through the bottom with fixing bars for cable fixing at bottom.
- Forced air ventilation
- Operating temperature: 0 - 30° C
- Form 0 construction (EN60439-1).
- Approx. Dimension: 3200mm. (W) x 600mm. (D) x 2000mm. (H) + 100mm base.

#### Painting

- Outside: RAL 7035 (gray) - Epoxy powder painting.
- Inside plate: zinc plated (EN10142).

Protection rate : IP 65. IP20 inside (EN60259).

#### Electrical specification

- ⇒ Fixed Main Circuit switch 3x25A 40kA; rated voltage 230V - 50Hz.
- ⇒ Auxiliary power supply at 230Vac, and control voltage at 24Vdc protected with automatic breaker.
- ⇒ Board illumination 13W lamps.
- ⇒ Control circuits for the items described in your specifications and equipping the processing plant.
- ⇒ Feeding line protection
- ⇒ Screw/Cage clamp type terminal strips for cabling (no withdrawable chassis design).

#### **On the front panel :**

- Power signals lamps.
- 1 lamp for general purpose alarm (thermal breaking, overload, level,...).
- Auto/Man switch.
- Emergency «mushroom» pushbutton.
- Alarm mute/reset command and buzzer.

#### **Accessories to complete the supply**

- plates silkscreened.
- Terminal numbered according to IEC
- Tabbed interface for optically isolated digital inputs and outputs.

- Group power auxiliary circuits 230 V AC single phase power transformer with 1500 VA
- Protections for utilities 230 V AC circuit breakers by Siemens model 5SY.
- Group power auxiliary circuits 110 V AC single phase power transformer with 1500 VA
- Protections for utilities 110 V AC circuit breakers by Siemens brand model 5SY.
- Group power auxiliary circuits 24 V DC power supply model Sitop Power 40 A
- Protections for utilities 24 VDC through circuit breakers Siemens model 5SY.
- Internal lighting with fluorescent lamps of power 11 W
- Groups detectors door open
- Terminal numbered CEI-IEC

### Column PLC and control logic:

The new logic is managed by a Siemens S7-400 series PLC, and will be as follows:

- N.°2 CPU 417-5H PN/DP 32MB
- N.°2 Mem. 16 Mb. RAM
- N.°2 Sync module V6 near
- N.°4 Cable 1m for mod.sync.
- N°.2 Rack UR2H 2\*9 slot x S7- 400H
- N°2 Supply 220V-10A ( 2 Slot )
- N.°1 CP 443-1 per Ethernet TCP/IP

### Column RIO control logic:

- N.°8 2 IM153-2 x redundant
- N.°8 Support 530 mm. x redundant
- N.°44 Bus Module x Cards 40mm
- N.°26 Bus Module x Cards 80mm
- N.°24 Fast Profibus Connection
- N.°2 Supply 24VDC/10A
- N.°1 16 DI Process Interupt
- N.°23 32 DI 120 VAC Cards
- N.°5 32 DO 24 VDC Cards
- N.°7 32 DO 120 VAC / 2A Cards
- N.°7 8 AI 13bit, V,I,PT100std Cards (AI 260 ms)
- N.°3 8 AO 12bit Cards
- N.°64 Conectors 40p.
- N.°1 CP 341-1A RS232V V.24
- N.°1 CP 341-1C RS422/485 X.27
- N.°1 ModBus Master

All Digital Inputs are protected to terminals with fuse

All Output Digital cards will be interfaced to relay with fuse

Communication between PLC and drives shall be Profibus network, while the data exchange with the remote IO, RFID, and supervision PC and HMI panels type Profinet, Ethernet and WLAN.

## 6.2 Electrical Control Panel CDQ#10 RIO

The supply of the electrical installation includes control Panel for System control, installed in the technical control room (as indicated on the plant layout), to operate the process, run through the PLC unit linked to the HMI supervision system, and to the Remote control system (by client).

### Manufacturing specification

Board made of carbon steel plate complete with:

- Front-opened doors.
- Wiring through the bottom with fixing bars for cable fixing at bottom.
- Forced air ventilation
- Operating temperature: 0 - 30° C
- Form 0 construction (EN60439-1).
- Approx. Dimension: 1600mm. (W) x 600mm. (D) x 2000mm. (H) + 100mm base.

### Painting

- Outside: RAL 7035 (gray) - Epoxy powder painting.
- Inside plate: zinc plated (EN10142).

Protection rate : IP 65. IP20 inside (EN60259).

### Electrical specification

- ⇒ Fixed Main Circuit switch 3x25A 40kA; rated voltage 230V - 50Hz.
- ⇒ Auxiliary power supply at 230Vac, and control voltage at 24Vdc protected with automatic breaker.
- ⇒ Board illumination 13W lamps.
- ⇒ Control circuits for the items described in your specifications and equipping the processing plant.
- ⇒ Feeding line protection
- ⇒ Screw/Cage clamp type terminal strips for cabling (no withdrawable chassis design).

### **On the front panel :**

- Power signals lamps.
- 1 lamp for general purpose alarm (thermal breaking, overload, level,...).
- Auto/Man switch.
- Emergency «mushroom» pushbutton.
- Alarm mute/reset command and buzzer.

### **Accessories to complete the supply**

- Plates silkscreened.
- Terminal numbered according to IEC
- Tabbed interface for optically isolated digital inputs and outputs.
- Group power auxiliary circuits 230 V AC single phase power transformer with 1500 VA
- Protections for utilities 230 V AC circuit breakers by Siemens model 5SY.
- Group power auxiliary circuits 110 V AC single phase power transformer with 1500 VA

- Protections for utilities 110 V AC circuit breakers by Siemens brand model 5SY.
- Group power auxiliary circuits 24 V DC power supply model Sitop Power 40 A
- Protections for utilities 24 VDC through circuit breakers Siemens model 5SY.
- Internal lighting with fluorescent lamps ante power 11 W
- Groups detectors door open
- Terminal numbered CEI-IEC

### **Column RIO and control logic:**

The new logic is managed by a Siemens S7 series PLC, and will be as follows:

- N.°4 2 IM153-2 x redundant
- N.°4 Support 530 mm. x redundant
- N.°36 Bus Module x Cards 40mm
- N.°24 Fast Profibus Connection
- N.°2 Supply 24VDC/10A
- N.°18 32 DI 120 VAC Cards
- N.°9 32 DO 24 VDC Cards
- N.°2 8 AI 13bit, V,I,PT100std Cards
- N.°2 8 AO 12bit Cards

All Digital Inputs are protected to terminals with fuse

All Output Digital cards will be interfaced to relay with fuse

Communication between PLC and drives shall be Profibus network, while the data exchange with the remote IO, RFID, and supervision PC and HMI panels sara type Profinet, Ethernet and WLAN.



### 6.3 Electrical Control Panel CDQ#11 PLC

The supply of the electrical installation includes control Panel for System control, installed in the technical control room (as indicated on the plant layout), to operate the process, run through the PLC unit linked to the HMI supervision system, and to the Remote control system (by client).

#### Manufacturing specification

Board made of carbon steel plate complete with:

- Front-opened doors.
- Wiring through the bottom with fixing bars for cable fixing at bottom.
- Forced air ventilation
- Operating temperature: 0 - 30° C
- Form 0 construction (EN60439-1).
- Approx. Dimension: 3200mm. (W) x 600mm. (D) x 2000mm. (H) + 100mm base.

#### Painting

- Outside: RAL 7035 (gray) - Epoxy powder painting.
- Inside plate: zinc plated (EN10142).

Protection rate : IP 65. IP20 inside (EN60259).

#### Electrical specification

- ⇒ Fixed Main Circuit switch 3x25A 40kA; rated voltage 230V - 50Hz.
- ⇒ Auxiliary power supply at 230Vac, and control voltage at 24Vdc protected with automatic breaker.
- ⇒ Board illumination 13W lamps.
- ⇒ Control circuits for the items described in your specifications and equipping the processing plant.
- ⇒ Feeding line protection
- ⇒ Screw/Cage clamp type terminal strips for cabling (no withdrawable chassis design).

#### **On the front panel :**

- Power signals lamps.
- 1 lamp for general purpose alarm (thermal breaking, overload, level,...).
- Auto/Man switch.
- Emergency «mushroom» pushbutton.
- Alarm mute/reset command and buzzer.

#### **Accessories to complete the supply**

- Plates silkscreened.
- Terminal numbered according to IEC
- Tabbed interface for optically isolated digital inputs and outputs.
- Group power auxiliary circuits 230 V AC single phase power transformer with 1500 VA
- Protections for utilities 230 V AC circuit breakers by Siemens model 5SY.
- Group power auxiliary circuits 110 V AC single phase power transformer with 1500 VA

- Protections for utilities 110 V AC circuit breakers by Siemens brand model 5SY.
- Group power auxiliary circuits 24 V DC power supply model Sitop Power 40 A
- Protections for utilities 24 VDC through circuit breakers Siemens model 5SY.
- Internal lighting with fluorescent lamps ante power 11 W
- Groups detectors door open
- Terminal numbered CEI-IEC

### Column PLC and control logic:

The new logic is managed by a Siemens S7-400 series PLC, and will be as follows:

- N.°2 CPU 417-5H PN/DP 32MB
- N.°2 Mem. 16 Mb. RAM
- N.°2 Sync module V6 near
- N.°4 Cable 1m for mod.sync.
- N.°2 Rack UR2H 2\*9 slot x S7- 400H
- N.°2 Supply 220V-10A ( 2 Slot )
- N.°1 CP 443-1 per Ethernet TCP/IP

### Column RIO control logic:

- N.°8 2 IM153-2 x redundant
- N.°8 Support 530 mm. x redundant
- N.°44 Bus Module x Cards 40mm
- N.°26 Bus Module x Cards 80mm
- N.°24 Fast Profibus Connection
- N.°2 Supply 24VDC/10A
- N.°1 16 DI Process Interrupt
- N.°18 32 DI 120 VAC Cards
- N.°5 32 DO 24 VDC Cards
- N.°7 8 DO 120 VAC / 2A Cards
- N.°6 8 AI 13bit, V,I,PT100std Cards (AI 260 ms)
- N.°4 8 AO 12bit Cards
- N.°64 Conectors 40p.
- N.°1 CP 341-1A RS232V V.24
- N.°1 CP 341-1C RS422/485 X.27
- N.°1 ModBus Master

All Digital Inputs are protected via terminals with fuse

All Output Digital cards will be interfaced via relay with fuse

Communication between PLC and drives avverra via Profibus network, while the data exchange with the remote IO, RFID, and supervision PC and HMI panels sara type Profinet, Ethernet and WLAN.

#### 6.4 Electrical Control Panel CDQ#11 RIO

The supply of the electrical installation includes control Panel for System control, installed in the technical control room (as indicated on the plant layout), to operate the process, run through the PLC unit linked to the HMI supervision system, and to the Remote control system (by client).

##### Manufacturing specification

Board made of carbon steel plate complete with:

- Front-opened doors.
- Wiring through the bottom with fixing bars for cable fixing at bottom.
- Forced air ventilation
- Operating temperature: 0 - 30° C
- Form 0 construction (EN60439-1).
- Approx. Dimension: 1600mm. (W) x 600mm. (D) x 2000mm. (H) + 100mm base.

##### Painting

- Outside: RAL 7035 (gray) - Epoxy powder painting.
- Inside plate: zinc plated (EN10142).

Protection rate : IP 65. IP20 inside (EN60259).

##### Electrical specification

- ⇒ Fixed Main Circuit switch 3x25A 40kA; rated voltage 230V - 50Hz.
- ⇒ Auxiliary power supply at 230Vac, and control voltage at 24Vdc protected with automatic breaker.
- ⇒ Board illumination 13W lamps.
- ⇒ Control circuits for the items described in your specifications and equipping the processing plant.
- ⇒ Feeding line protection
- ⇒ Screw/Cage clamp type terminal strips for cabling (no withdrawable chassis design).

##### **On the front panel :**

- Power signals lamps.
- 1 lamp for general purpose alarm (thermal breaking, overload, level,...).
- Auto/Man switch.
- Emergency «mushroom» pushbutton.
- Alarm mute/reset command and buzzer.

##### **Accessories to complete the supply**

- Plates silkscreened.
- Terminal numbered according to IEC
- Tabbed interface for optically isolated digital inputs and outputs.
- Group power auxiliary circuits 230 V AC single phase power transformer with 1500 VA
- Protections for utilities 230 V AC circuit breakers by Siemens model 5SY.
- Group power auxiliary circuits 110 V AC single phase power transformer with 1500 VA

- Protections for utilities 110 V AC circuit breakers by Siemens brand model 5SY.
- Group power auxiliary circuits 24 V DC power supply model Sitop Power 40 A
- Protections for utilities 24 VDC through circuit breakers Siemens model 5SY.
- Internal lighting with fluorescent lamps ante power 11 W
- Groups detectors door open
- Terminal numbered CEI-IEC

### **Column RIO and control logic:**

The new logic is managed by a Siemens S7 series PLC, and will be as follows:

- N.°4 2 IM153-2 x redundant
- N.°4 Support 530 mm. x redundant
- N.°36 Bus Module x Cards 40mm
- N.°24 Fast Profibus Connection
- N.°2 Supply 24VDC/10A
- N.°18 32 DI 120 VAC Cards
- N.°9 32 DO 24 VDC Cards
- N.°2 8 AI 13bit, V,I,PT100std Cards
- N.°2 8 AO 12bit Cards

All Digital Inputs are protected via terminals with fuse

All Output Digital cards will be interfaced via relay with fuse

Communication between PLC and drives avverra via Profibus network, while the data exchange with the remote IO, RFID, and supervision PC and HMI panels sara type Profinet, Ethernet and WLAN.

## 6.5 Boiler Emergency Desk

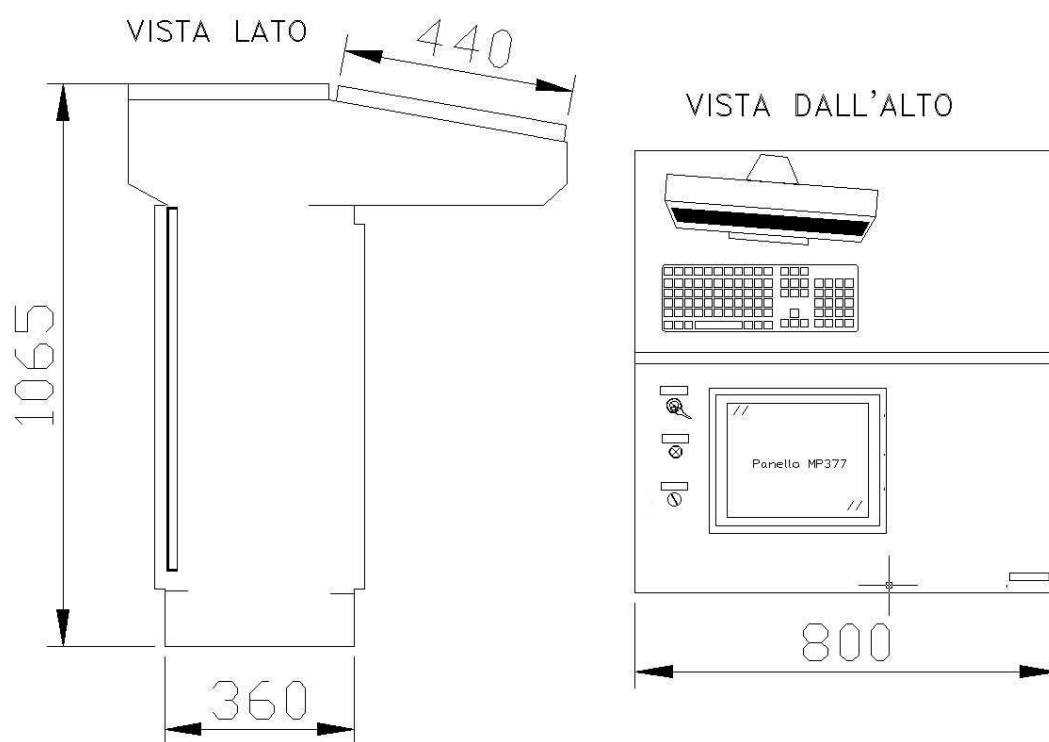
The pulpit must have the following arrangement:

- Switch arrival for distribution 10A 24VDC
- 2 power switches 10A to 24V dc distribution
- Switch arrival 16A for distribution at 230V-50Hz
- 4 sockets 230V-50Hz 10A of DIN rail

The design of the pulpit, with the size and layout of the controls, must be submitted for approval . Standard color RAL 7035.

The pulpit will Rittal standard type, depth 850mm, width 800, see Annex.

The control section will have to have the support plane inclined in stainless steel. The lectern must be hinged, complete cylinder shock absorbers for easy opening. The pulpit must be mounted a panel TP MP377 15 ".



## 6.6 Spare Parts

Supply List for spare Parts Commissioning and Start Up:

N.°1 2 IM153-2 x redundant  
N.°1 Bus Module x Cards 40mm  
N.°4 Fast Profibus Connection  
N.°1 Supply 24VDC/10A  
N.°1 32 DI 120 VAC Cards  
N.°1 32 DO 24 VDC Cards  
N.°1 8 AI 13bit, V,I,PT100std Cards  
N.°1 8 AO 12bit Cards

Supply List for spare Parts Commissioning and Start Up:

- N.°2 2 IM153-2 x redundant  
N.°2 Bus Module x Cards 40mm  
N.°4 Fast Profibus Connection  
N.°2 Supply 24VDC/10A  
N.°2 16 DI process interrupt  
N.°2 32 DI 120 VAC Cards  
N.°2 32 DO 24 VDC Cards  
N.°2 8 AI 13bit, V,I,PT100std Cards  
N.°2 8 AO 12bit Cards
- N.°2 Server SIMATIC IPC547E (RACK PC DA 19", 4UA)
  - N.°4 Operator Station SIMATIC IPC547D (RACK PC DA 19", 4UA)
  - N.°2 Operator Station SIMATIC IPC547D (RACK PC DA 19", 4UA)
  - N.°1 Laptop for Programming SIMATIC FIELD PG M4

## 7.0 STANDARD

Design, fabrication, testing and supply of the plant equipment, materials and facilities shall be based on under listed engineering codes and standards:

### 7.1 General codes and standards:

- European Standards (EN)
- ISO Standards
- DIN Standards
- IEC Standards

### 7.2 Job prescriptions

PAUL WURTH standards:

- GS.01 - General Specification "ENGINEERING" - rev. 0
- GS.02 - General Specification "SUPPLY OF MATERIALS" - rev. 0
- GS.05 - General Specification "SURFACE PROTECTION" - rev. 0
- GS.06 - General Specification "PACKAGING AND MARKING" - rev. 1
- GS.07 - General Specification "NOISE CONTROL" - rev. 1
- GS.08 - General Specification "QUALITY CONTROL" - rev.
- GS.10 - General Specification "CAD MANUAL for engineering services suppliers" -rev. 0
- RQM02 - "PRESCRIPTIONS FOR THE MANUFACTURE AND THE INSPECTION OF WELDED STEEL ASSEMBLIES" - rev. 2

Indian Standards

- IS 3043 Code of practice for earthing

TISCO Standards

- TISCO GS-E-09 Installation, Testing and Commissioning
- TISCO GS-E-10 Electrical equipment, cables and earthing
- TISCO GS-E-11 Power, Control and special cables
- TISCO GS-A-01 Automation
- TISCO GS-I-01 Instrumentation and control
- TISCO GS-P-01 Painting

Manuals

- The supply includes the Instruction Manuals.
- See item 1.3.1.6 Drawings and Documentation

Electrical equipment must conform to the following codes, standards and regulations:

- IEC 60439-2 Low-voltage switchgear and control groups gears - Part 1: and partially type-tested Type - tested
- Current transformers IEC 60185
- IEC 60186 Voltage Transformers
- Current transformers IEC 6044-1
- IEC 60038 ( IEC standard voltages )
- IEC 60529 ( Degrees of protection provided by enclosures : IP Code)
- EN 60664 - series ( Insulation coordination for equipment in LV systems )
- IEC 61000 - series (electromagnetic compatibility)

#### **SOFTWARE**

The software shall be available following codes , standards and regulations :

- IEC 1131-1

#### **EARTH**

The grounding system must comply with the following codes , standards and regulations :

- ANSI / IEEE 80 Guide for safety in AC substation earth
- IEC 61000-5-2 Electromagnetic compatibility - Installation and mitigation guidelines for grounding and wiring.

#### **AUXILIARY RELAY**

The auxiliary relays shall comply with the following codes , standards and regulations :

- IEC 60255 series Electrical relays
- Relay IEC 61810 - General Requirements
- IEC 62314 solid state relay



## 8.0 TESTS

The electrical system, completely finished will be subjected to a series of tests performed by testing our personnel present on site.

Will be performed the following tests:

- Checks to view
- Control circuits (typing cables)
- Tests insulation
- Test voltage at industrial frequency 50HZ
- FAT Cold Test of PLC

At the end of these checks will be issued documentation certifying that the good of the tests exist.

### REMARKS ABOUT OUR PROPOSAL:

1. *All materials used for the manufacturing of the control boards are certified according to international regulations.*
2. *Dimension of the electrical and control boards may be subject to change according to in-depth definition of the project.*
3. *All goods will be delivered to the Client ex our works and custody costs and liability will be on charge of the Client, which will guarantee against missing and/or damaging of goods during the whole period of installation.*
4. *All PLC outputs interfaced to relays. Free slots available on PLC units. Cabled spare signals: 15%.*

***Remarks:Fully in According with the description in your technical specification  
G1680.15.CDQ0.6750st02***

### 9.0 LIMIT OF SUPPLY-REMARKE

The supply does not include:

- HT/MT Transformers and MT/BT Power Centers
- Ground system for the civil structures.
- Sensors and instrumentation installation.
- Boards hauling and settling in control/electrical rooms.
- Networking
- Interconnection with existing plants and networks.
- Intercom and fire extinguishing equipment.

Will be provided by the Customert.

- Water, F.M. (380V AC) for the needs assembly the Plant. The delivery points will be defined directly by the Customer
- Area of assembly Plant near of the affected area installations

The supply includes:

- complete technical documentation in 3 copies in the user interface: English
- wiring diagrams (for approval and as-built).
- User guide for the entire supply and for the individual parts.
- Document List \ English
- Programs list \ English
- Assignment List – I / O \ English
- Certificate

### INDICE REVISIONI:

Data	N° Rev	Descrizione	Redazione Tercnica	Approvazione Tecnica	Approvazione Commerciale:

### 10.0 TERMS AND CONDITION :

Ingeneria & Software	N°	Prezzo cad. In €	Importo complessivo in €



/

**Fornitura E Posa Impianto Elettrico-Strumentale**

D **Commissioning Spare Parts**

/

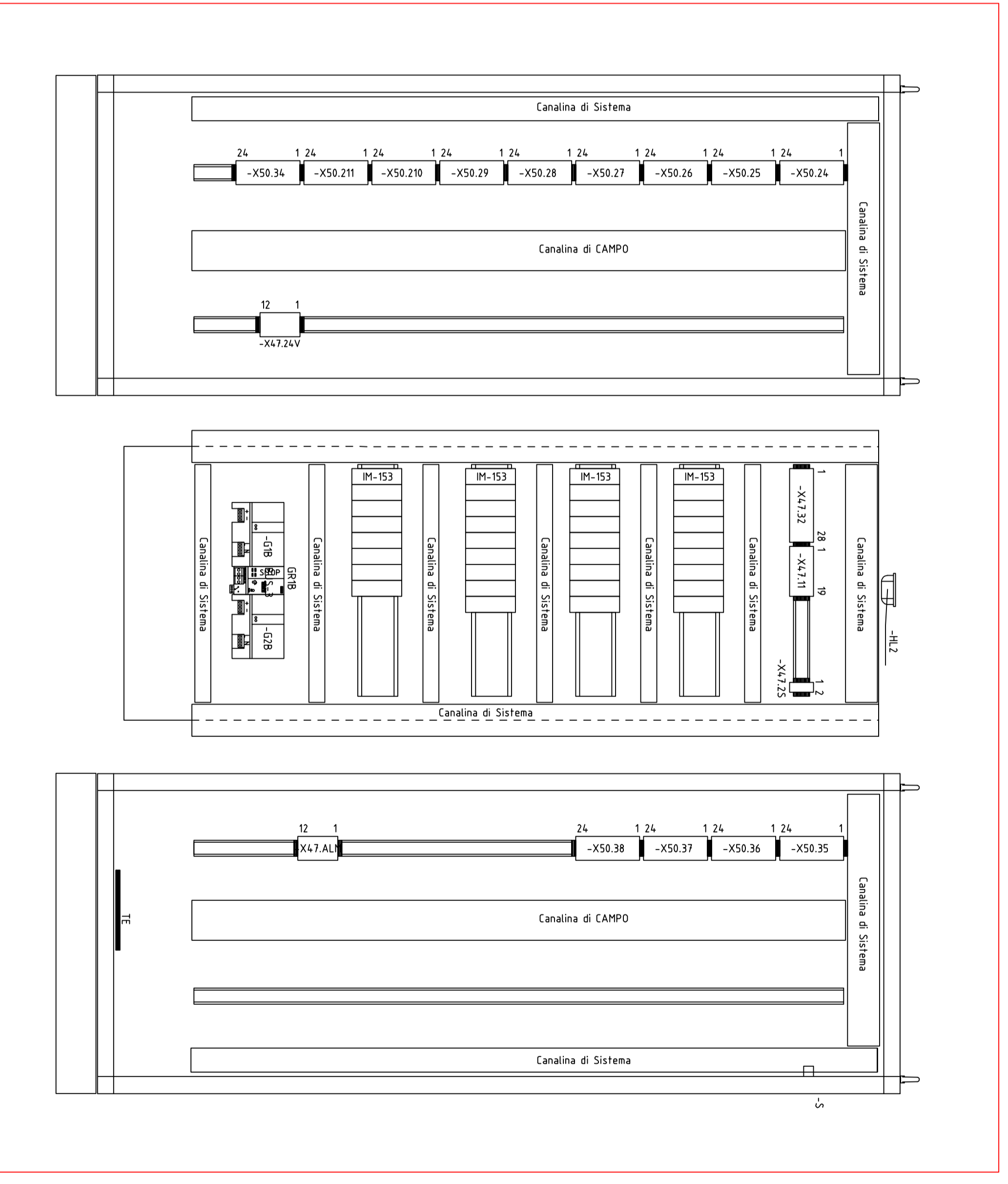
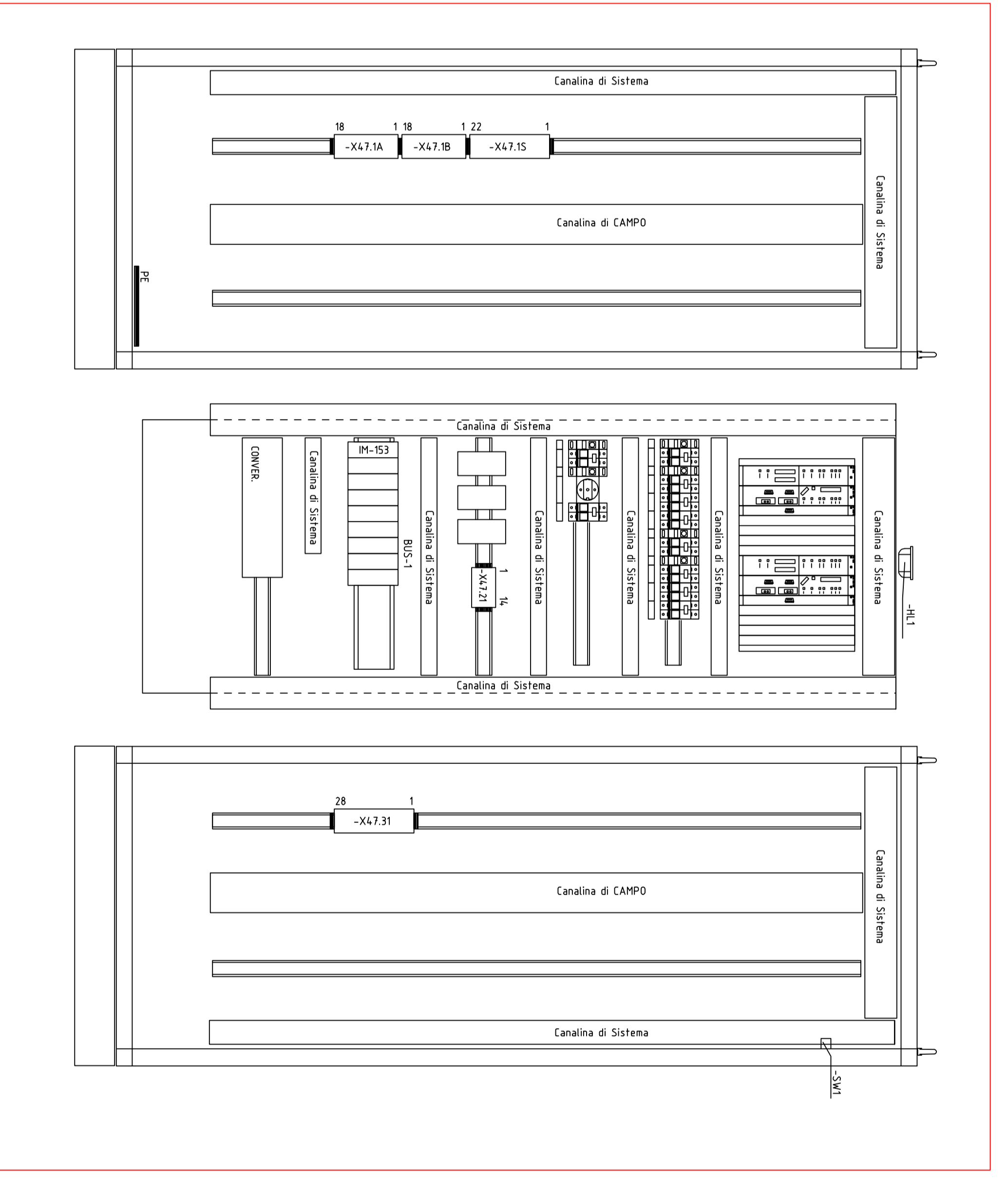
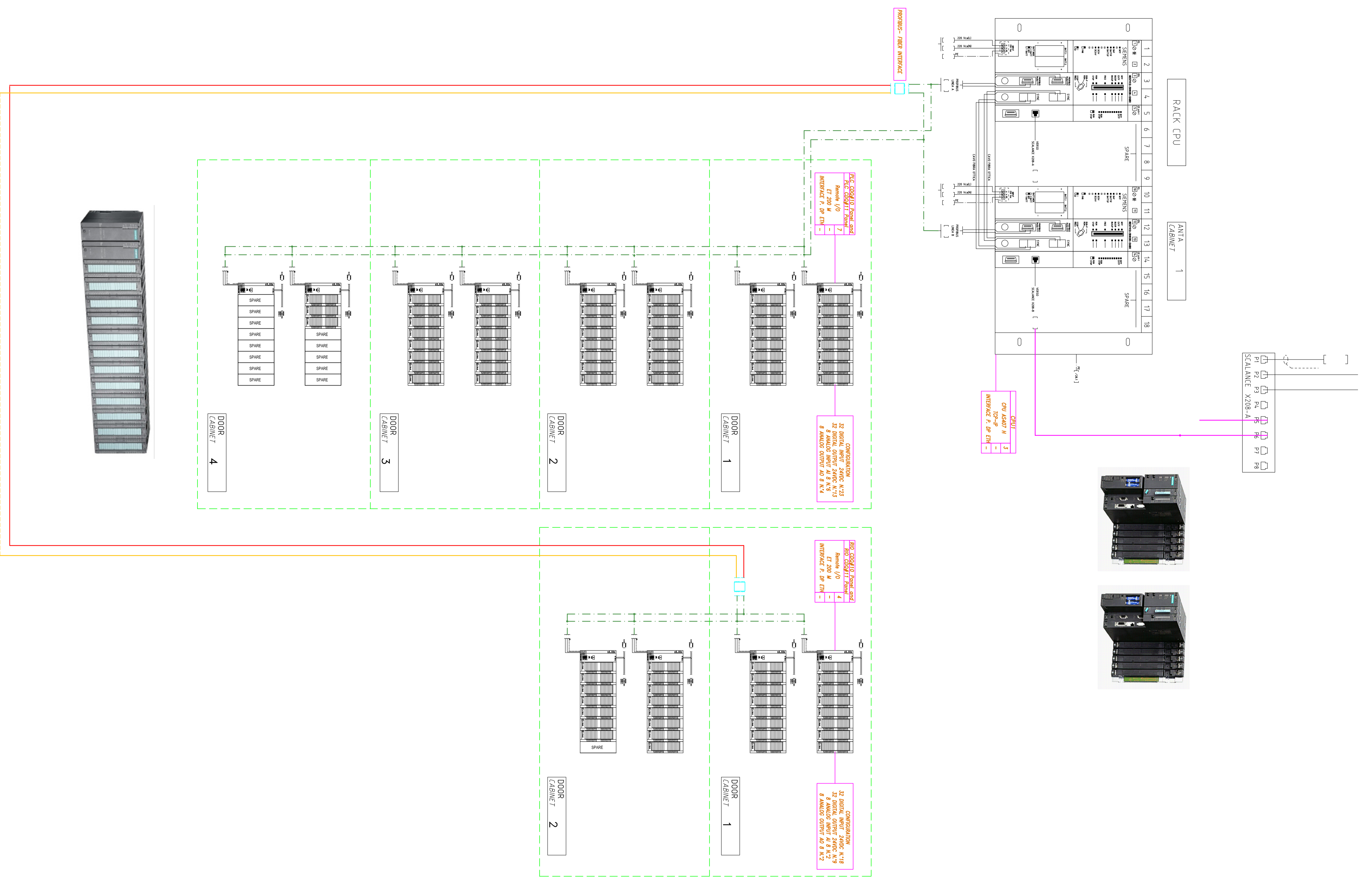


A disposizione per ogni chiarimento e/o variazione eventualmente necessaria.  
In attesa di riscontro, è gradita l'occasione per porgere Distinti Saluti.

25/01/2016

SAIE E&A srl - Serviati Giovanni + 39 348 8706871

[Gianni.serviati@saiesrl.it](mailto:Gianni.serviati@saiesrl.it)



**IDENTIFICATION**

PROHIBIS CABLE  
 REDUNDANCY FIBER OPTIC  
 REDUNDANCY TCP-IP ETHERNET

DOCUMENTI DI RIFERIMENTO

DOS. N°	REV.	DOCUMENTAZIONE

**PAUL WURTH - Genova**

PROGETTO: TYPICAL AUTOMATION IMPLANT  
 Level-1 Automation system  
 for CDD#10 and CDD#11

REVISIONI:

NO.	DATA	REVISIONI	APPROVAZIONI

PROGETTO: S.G.  
 ASSISTENTE: S.G.  
 VERIFICATO: S.G.  
 APPROVATO: S.G.

DATA: 25/01/16  
 SCALE: 1:1  
 REVISIONI: SPT6-001

E' vietata la ristampa o l'uso non autorizzato di questo disegno.