End user Application

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INDEX

1. Project Back ground
2. Challenges
3. Automation Solution Selection
4. RIO System (Selected)
5. System Built
6. Commissioning
7. Validation
8. Lessons learned

1. Project Back ground

DETAILS :-

Project : Multi product API facility
Type : Green field
Product : Bulk API
Process : Batch production
End User : Dr.Reddys Laboratories Ltd.
Location : Hyderabad, India
Year : 2012

1. Project Back ground

DETAILS :-

Major Equipments

Reactors – 25 no.
Driers - 6 no.
Centrifuges – 6 no.

IO counts :

RIO – IS :

AI :456
AO : 208
DI : 2624
DO : 1296

Soft IO (ASI) :

DI : 520
DO : 520

Total : 4584 + 1040 = 5624

2. Challenges

The Automation solution has to be designed by keeping following in mind :-

- Area classification : Zone #1

- Available engineering resources (Maint.)
  a. Engineers
  b. Expertise

- Time for execution

- Multi products

- Budget

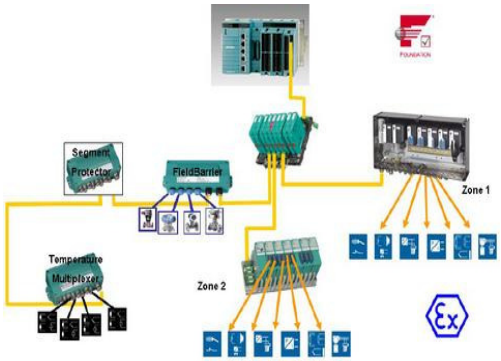
- Scalability

3. Automation Solution Selection

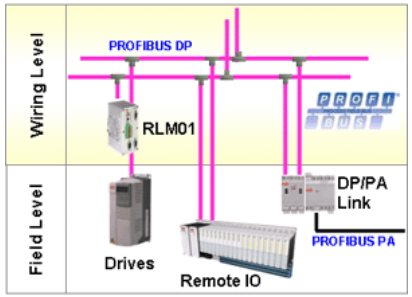
Available options :

Conventional IO System
- – JB's, Marshaling panels etc..

Field Bus
- a. Technical expertise
- b. Engineering
- c. Flexibility
- d. More Digital I/O's



Remote I/O based system
(Hybrid systems)



4. RIO System (Selected)

Features

- Less wiring
- No need for marshalling distributors, cable racks, etc.
- Time saving due to reduced wiring
- No additional mechanical protection is needed to achieve the Ex-protection class
- High flexibility: quick and easy expansion
- Low engineering overhead
- Optimal diagnosis capabilities
- Cost saving over the complete life-cycle
- Optimized connection of valves

4. RIO System (Selected)

Buses Used :-

Profibus DP – The total R I/O's on Profibus
VFD's on Profibus

ASI bus - All MCC related I/O's

Modbus - ESB's

Ethernet I/P – All centrifuges for monitoring

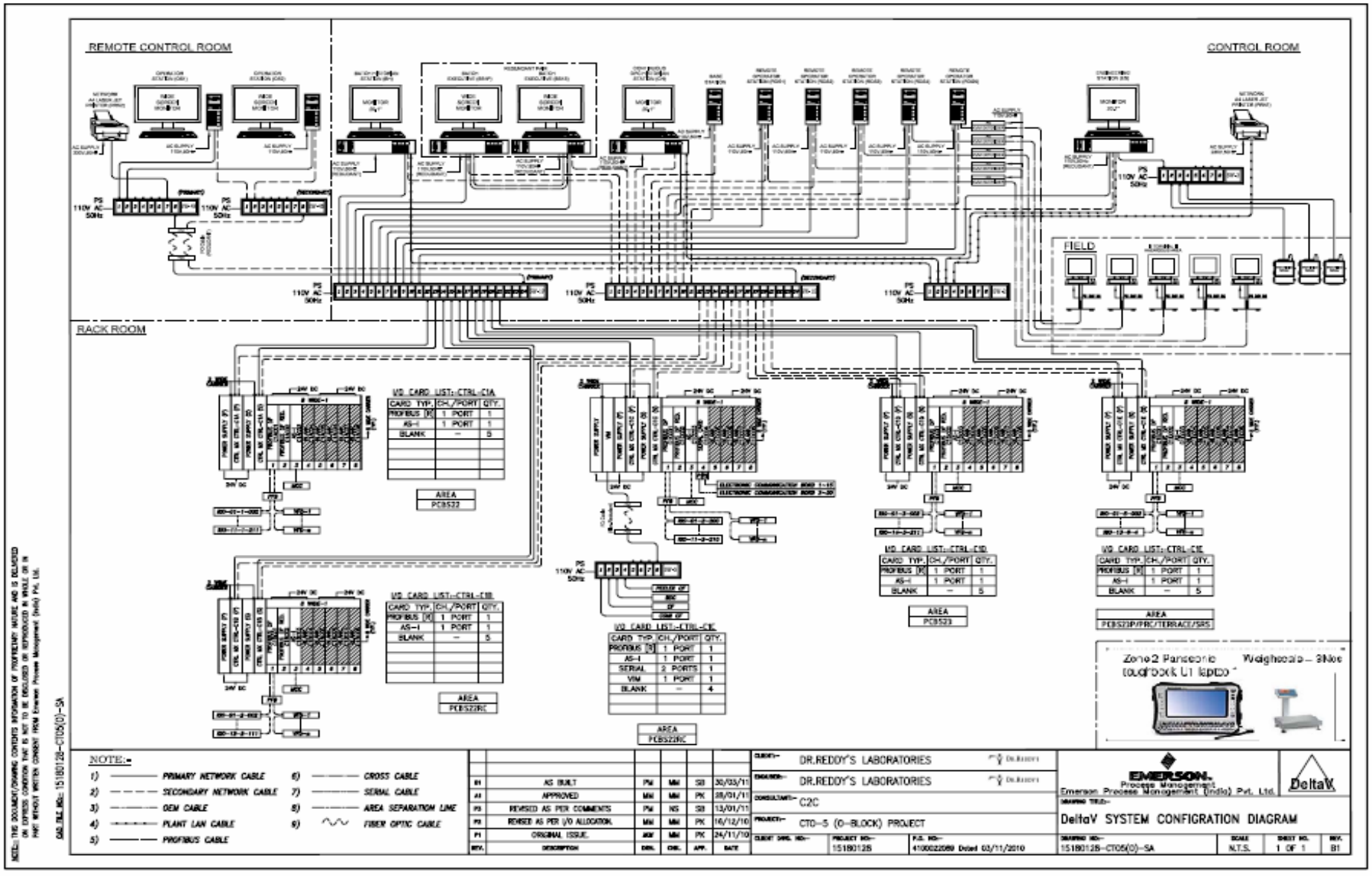
5. System Built

a. System configuration

b. Main hardware components

c. Software features

System Built - System configuration



System Built

b. Main hardware components

i. Delta V system - Features

- PSY & CPU Redundancy

- Controller : MX

- Profibus I/O comm : Redundancy

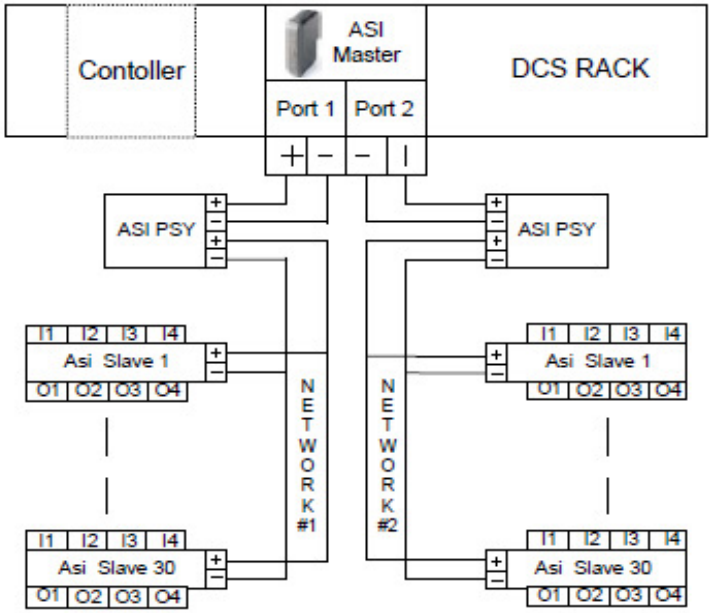
Redundant Operation

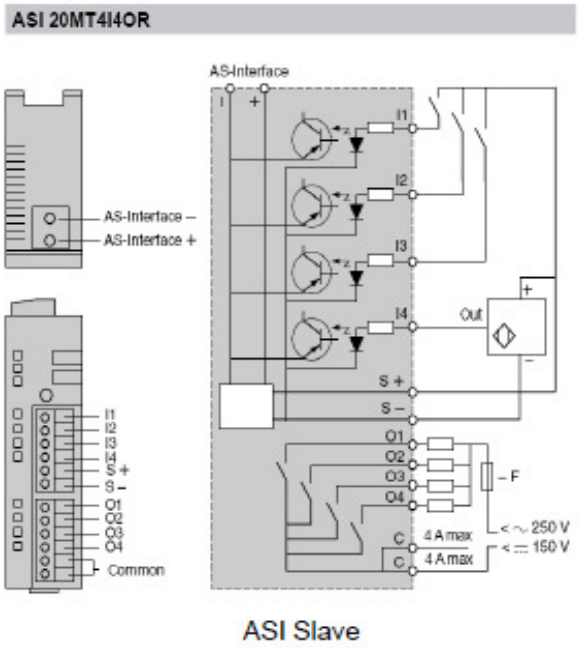
The active and standby masters are connected to the segment at the redundant terminal block, supporting a simplex wiring scheme. Configuration of redundancy is not required as the DeltaV system automatically recognizes the redundant pair of cards and assigns device signal tags (DST) to the channels on the primary card.
Switchover time for redundant master is less than 100 ms

System Built - ASI BUS

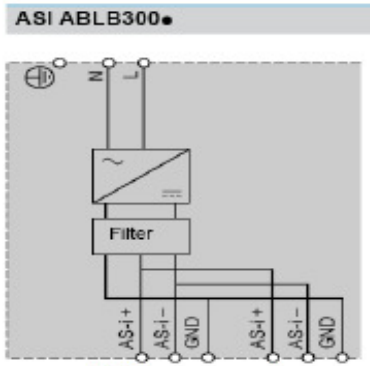
ASI CONFIGURATION

DR.REDDY'S





ASI Slave



ASI Power supply

Asi Master Details :
Make ; Emerson
Model : VE4009

Asi Slave Details :
Make ; Schneider
Model : ASI20MT4I4OR

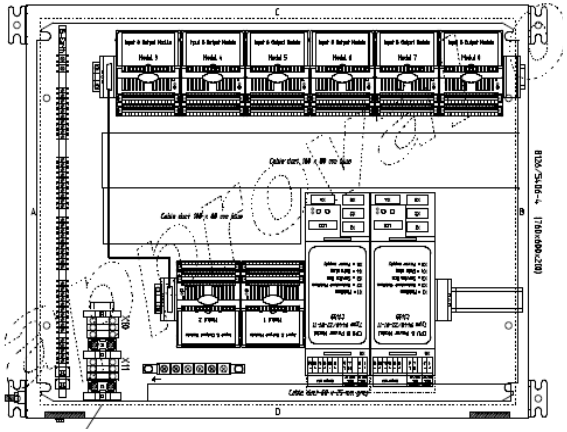
Asi PSY Details :
Make ; Schneider
Model : ASIABLB3004 (4.8 A)

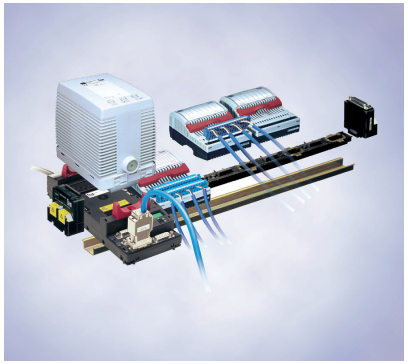
Note : The ASI power supply is to power up the ASI slave through ASI bus only.

Prep.by :BV	Dr.Reddys Laboratories Ltd.
App. By :	Project: O-Block CTO-V
18.01.2011	Title: ASI wiring scheme

5. System Built - RIO details

- Intrinsically safe Profibus DP and ServiceBus
- Integrated Ex i power supply for up to 8 I/O modules
- System redundancy (Profibus standard) and media redundancy
- ServiceBus interface for fault diagnostics and Asset Management System
- LCD indicator for local display of diagnostic data, input and output values
- I/O Module including Communication Slaves can be replaced in Zone 1 / Div. 1 in operation (hot swap)





5. System Built - RIO details

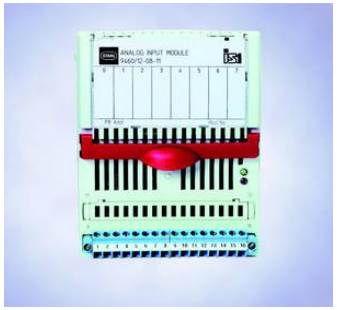
- **8 channels for 2-wire HART transmitters** (AI / AO)
- **16 channels for contacts and NAMUR proximity switches (EN 60947-5-6) – DI**
- **8 channels for Ex i / I.S. solenoid valves, piezo and booster valves - DO**

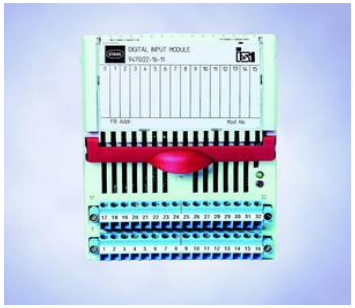
Intrinsically safe inputs Ex ia IIC

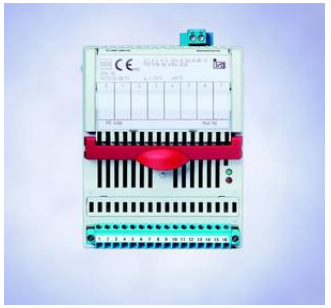
Galvanic isolation between inputs and system

Open-circuit and short-circuit monitoring for each field circuit

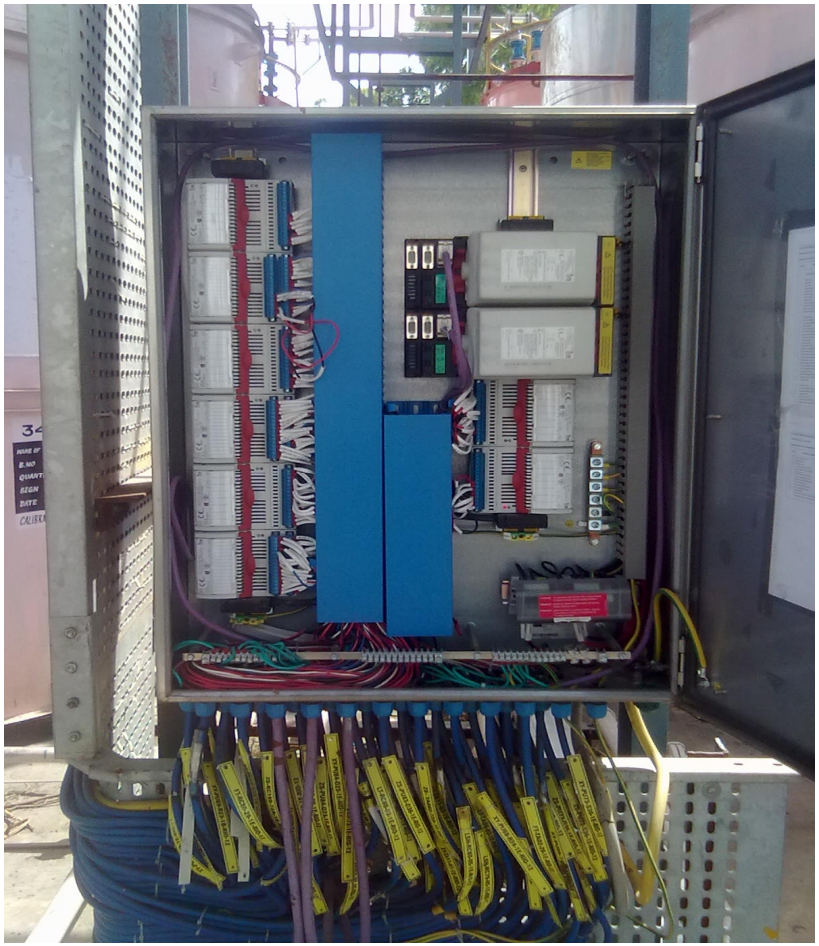
Module can be replaced in operation (hot swap)







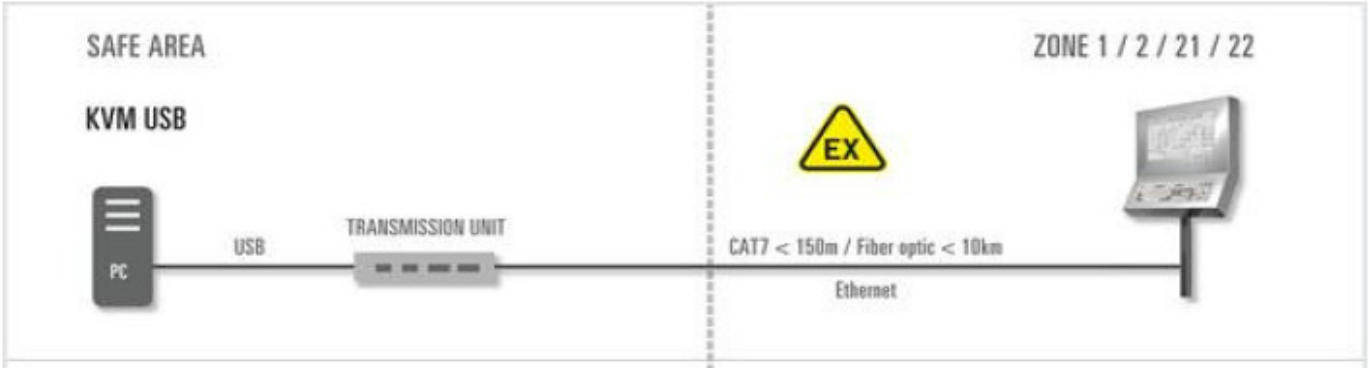
5. System Built - RIO details



5. System Built - HMI details

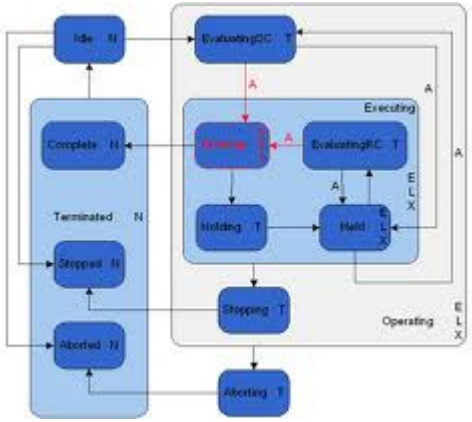
- 19" widescreen displays for Ex areas (resolutions: 1280 x 1024 / 1680 x 1050 / Full HD 1920 x 1080)

- For universal use, in particular **pharmaceutics** / chemistry / petrocl
- Brilliant picture quality through
- LED backlight technology
- Environmentally friendly through use
- lead-, mercury- and cadmium-free d
- Data transmission via **CAT7** or **optical fibre** cable (< 10,000 m)



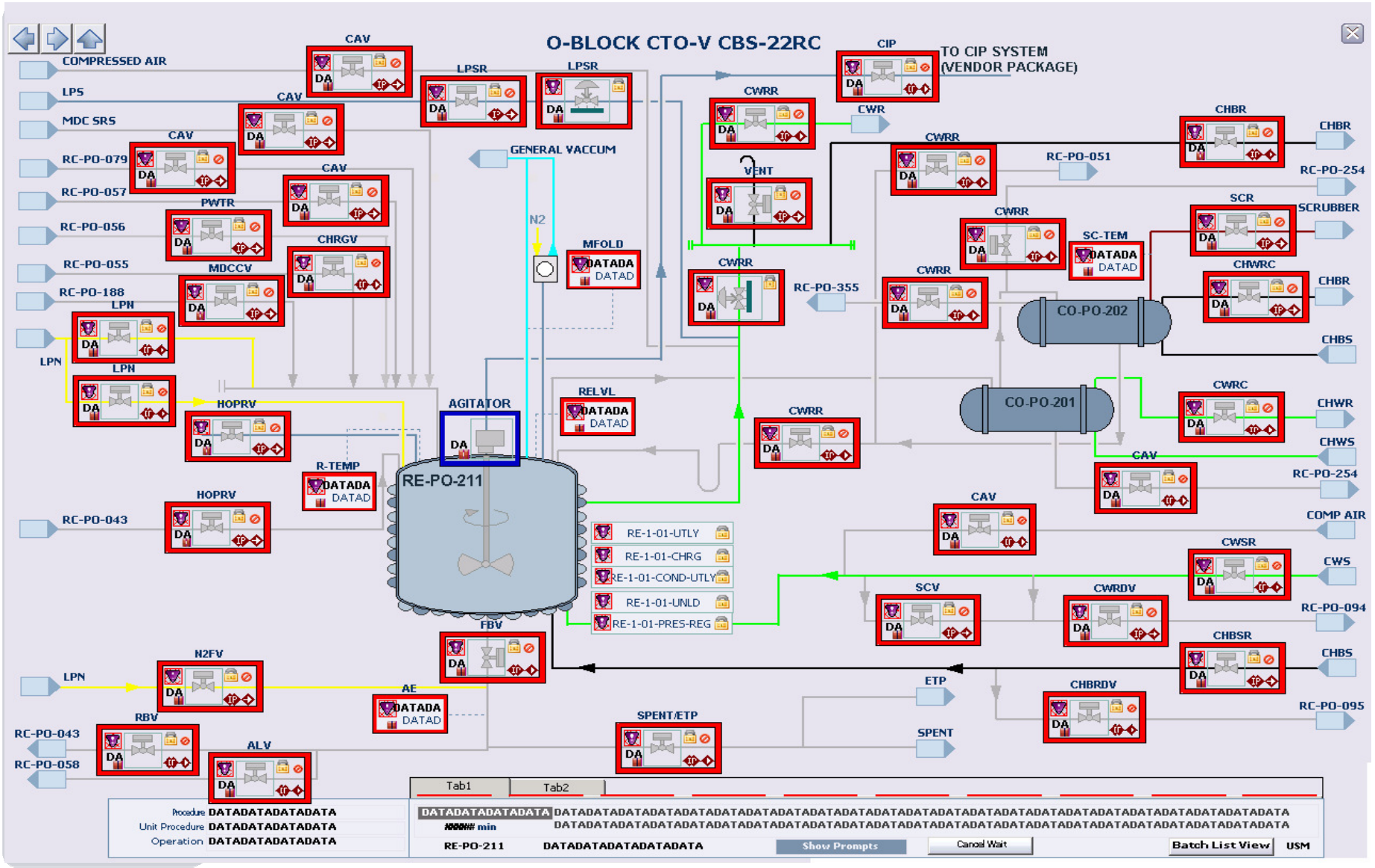
5. System Built - FEATURES

- Reactor Temp. control (Heating & Cooling)
- Solvent dispensing (Charging)
- Layer separation
- PW charging
- Reactor level/Volume monitoring
- S-88 batch standard implementation
- Recipe handling
- Data Acquisition
- Real time traceability – The ES was connected to Intranet through firewall



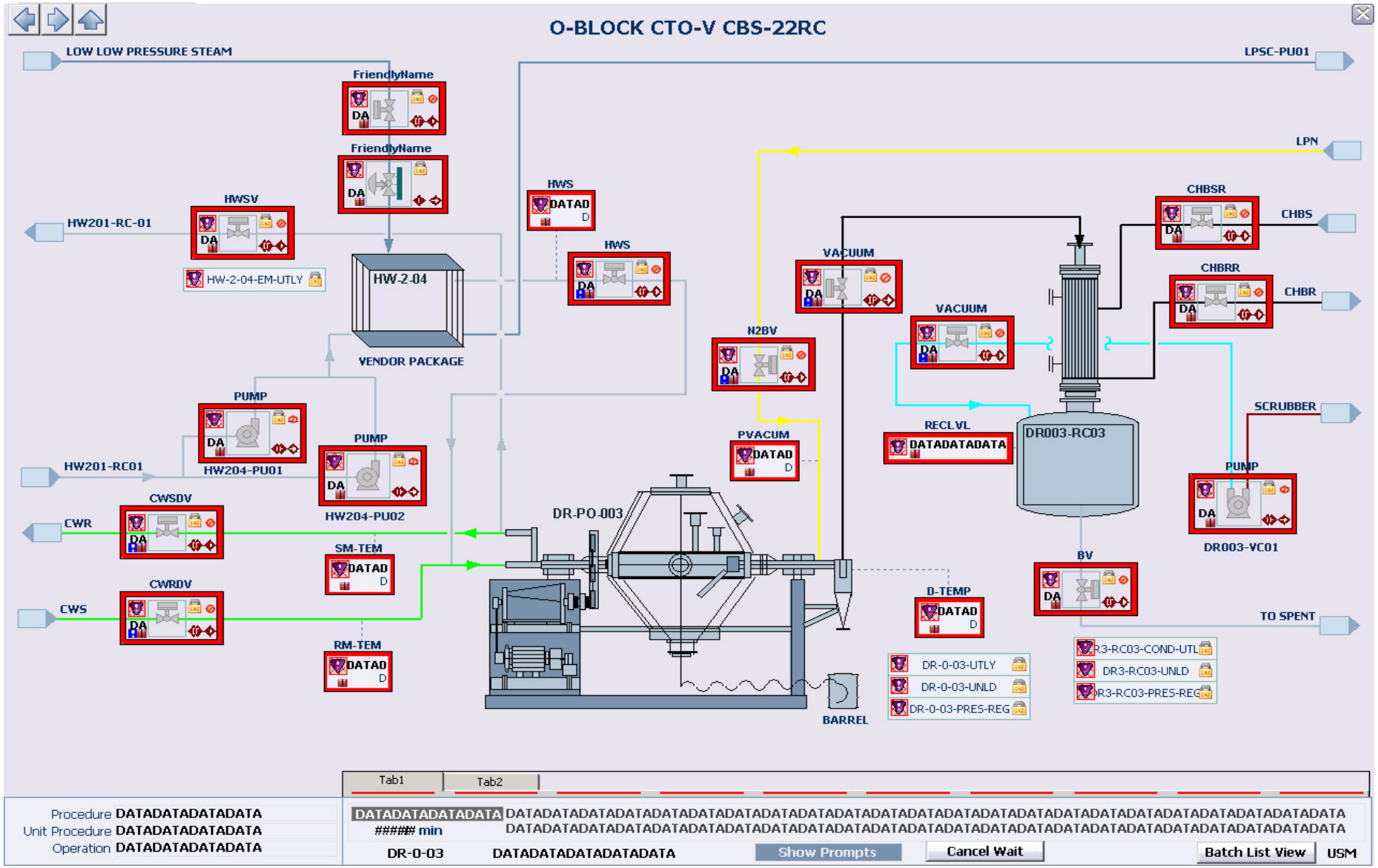
5. System Built - Snap shots

DCS- Screen Snap Shots



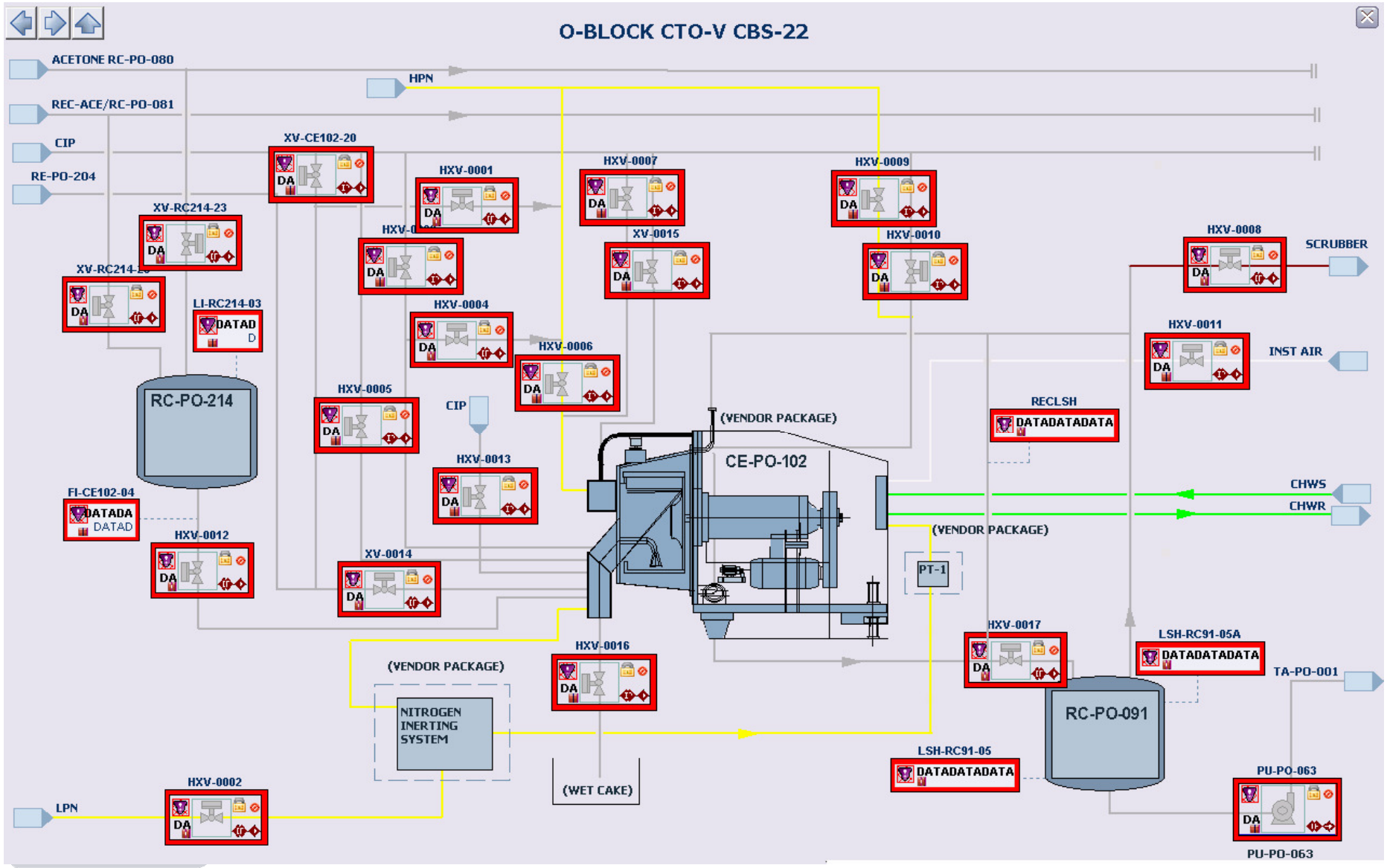
5. System Built - Snap shots

DCS- Screen Snap Shots



5. System Built - Snap shots

DCS- Screen Snap Shots



5. System Built

Field Instrumentation

Mass/ Mag / Vortex flow meters
Pressure Transmitters
Temp.transmitters
pH transmitters
Oxygen transmitters
RADAR level Transmitters
Weighing systems
Globe Control valves
ON/Off Ball Valves
Electronic Status Boards
Conductivity transmitters (Layer separation)

5. COMMISSIONING

- Erection activity
- Field instruments erection
- Cable tray and laying
- DCS panel erection
- RIO panel erection with out modules
- RIO Power and comm cable laying
- RIO modules loading
- DCS panel power up
- RIO panel power up
- RIO comm establishment
- Field inst termination
- Soft wares loading
- Ready for FAT

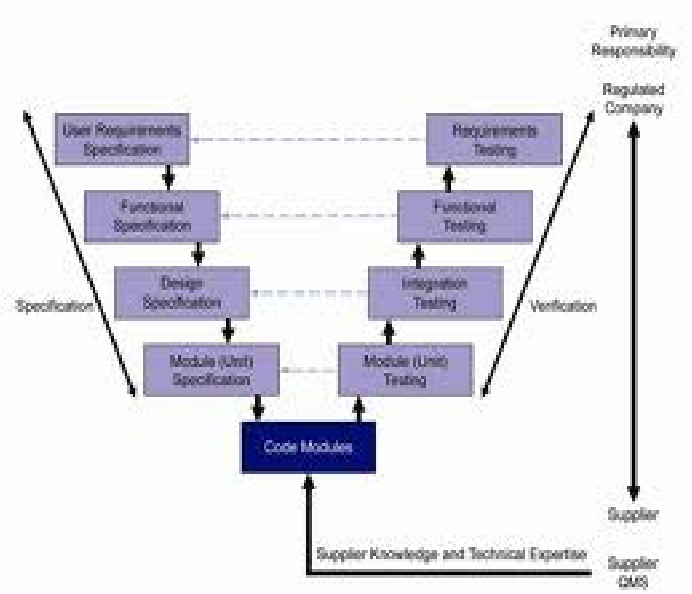
7. VALIDATION

The following documents has been prepared and got approved during various phases of project to meet part 11 requirements :

- URS – The detailed specifications for DCS.
- FRS – The detailed process description along with flow charts and P & ID.

- FDS
- FAT (Hard ware & Soft ware)
- SAT (Hard ware & Soft ware)
- IQ
- OQ

- PQ



8. Lessons learned

- Controller wise I/O segregation to avoid load on controller
  - Which leads to re engineering
  - Re grouping of tags as per controller (Process)

- Controller loading – It is very difficult to calculate in off line

PI Middle East
PROFIBUS • PROFINET

ANY
????
PLEASE

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THANK YOU