

DCS Configuration, hardware & software components

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CONTENT

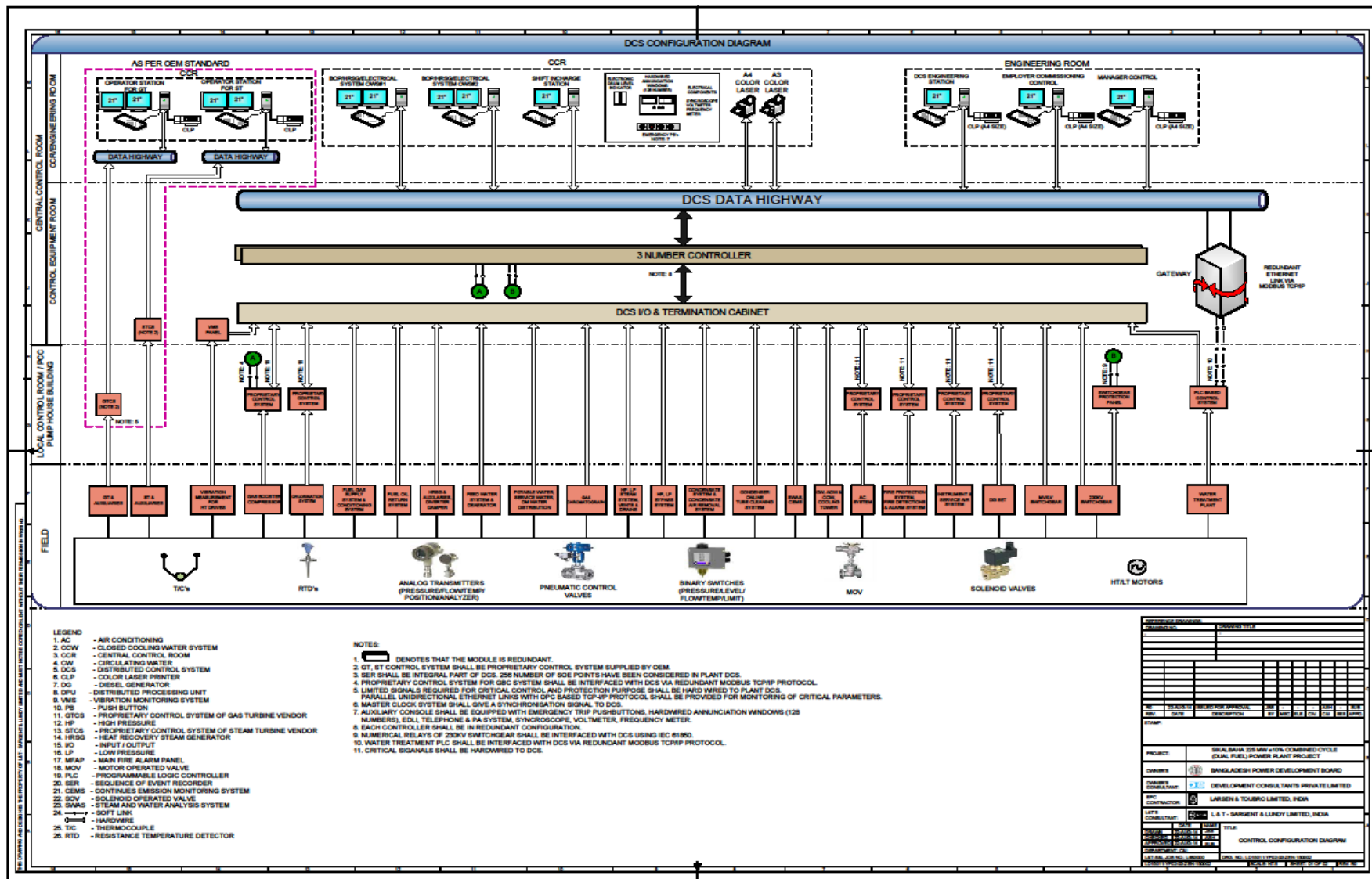
- DCS
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- GRAPHIC PHILOSOPHY
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- DCS FUNCTIONS
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DCS (DISTRIBUTED CONTROL SYSTEM)



for
collaborated
work

DCS CONFIGURATION DIAGRAM



DCS BASIC COMPONENTS

- Marshalling Cabinets
- System Cabinets
- I/O Modules
- Controller
- Data highway
- Operator/Engineering Stations
- Network printers
- Gateways for third party devices

DCS BASIC COMPONENTS

MARSHALLING CABINETS



DCS BASIC COMPONENTS

SYSTEM CABINETS



DCS BASIC COMPONENTS

I/O MODULES

Type of Module	No. of Channel	Functionality
Analog	8-16	➤ Signal Conditioning ➤ A/D Conversion ➤ Signal Validation ➤ Diagnostics ➤ Time stamping
Digital	16-32	
Thermocouple	8-16	
RTD	8-16	
SOE	8-16	

DCS BASIC COMPONENTS

I/O MODULES

Concept of I/O Grouping

- No two-identical/ similar equipment to be grouped in same input/ output module.
- Input & outputs cannot be combined in single modules
- Redundant instruments shall be assigned to different cards
- I/O modules of one equipment & associated auxiliaries to be located in the same racks.
- I/O of redundant equipment shall be assigned to separate I/O cards.

DCS BASIC COMPONENTS

CONTROLLER

Word Length	32 bits
No. of tags per controller	1000
Controller Loading	<60%
Loop Execution Time	
▪ Interlocks	- 100 msec
▪ Closed Loops (fast)	- 250 msec
▪ Closed Loops (slow)	- 500 msec

DCS BASIC COMPONENTS

CONTROLLER

Concept of controller segregation

- Redundant drive shall not be controlled by a common controller.
- Inter-related controls shall be provided in one controller
- Failure of one function shall not affect the plant operation or cause shut down

DCS BASIC COMPONENTS

DATA HIGHWAY

Data highway	Ethernet
Data highway speed	100 MBPS/1 GBPS
Loading	<60%
Transfer to redundant data highway	instantaneous

DCS BASIC COMPONENTS

OPERATOR/ENGINEERING STATIONS



DCS BASIC COMPONENTS

NETWORK PRINTERS



DCS BASIC COMPONENTS

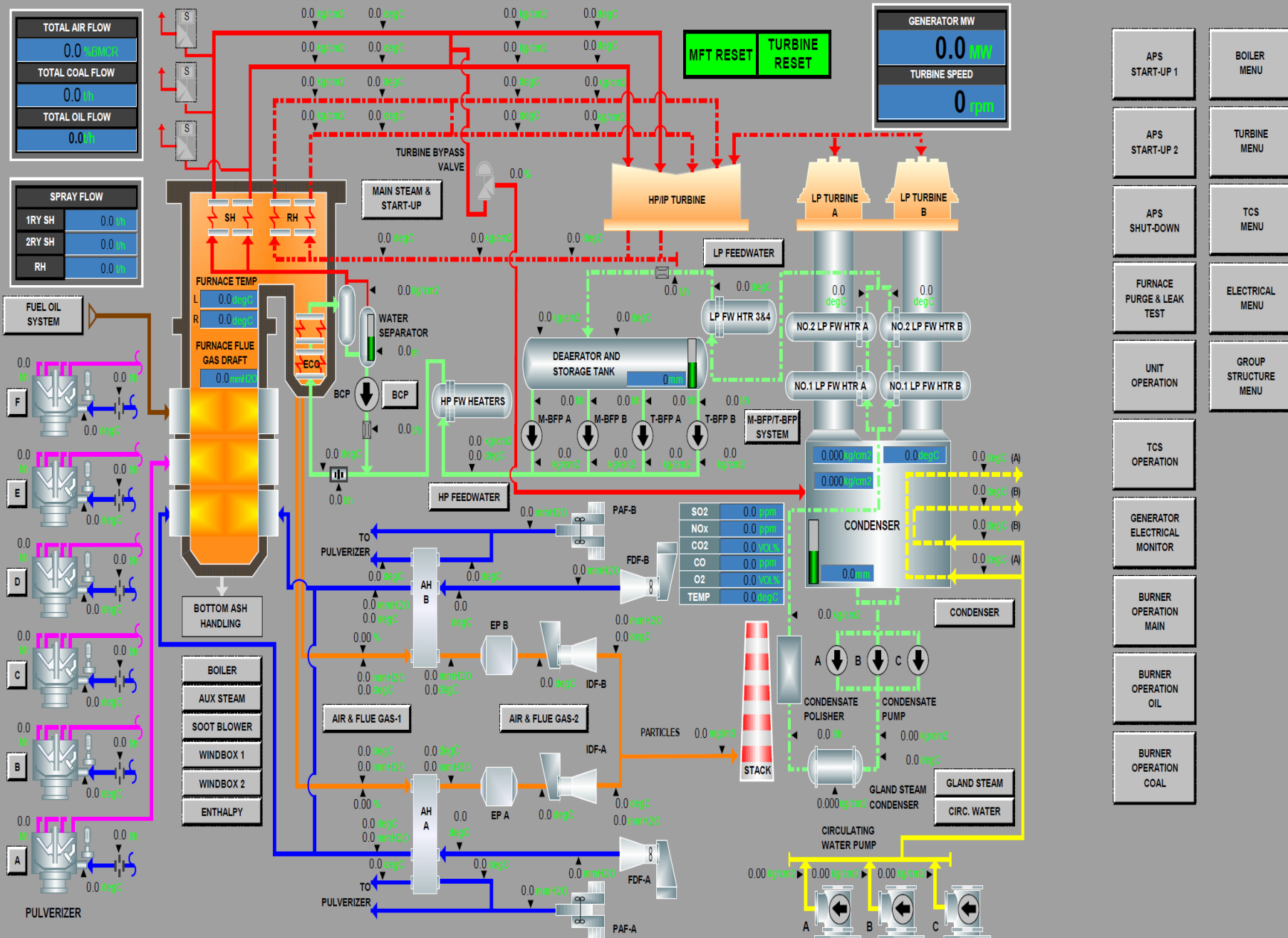
GATEWAY SERVERS



GRAPHIC PHILOSOPHY

- Process Line Colour
- Equipment Shape Philosophy
- Drive Start/Intermittent/Stop Colour
- Control Valve On/Intermittent/Off
- Faceplate
- Trend Display
- Alarm Display

PLANT OVERVIEW



HMIWeb Display Builder - [BOP INDEX]

FileEditViewArrangeTransformationsToolsWindowHelp

BOP INDEX

SHP STEAM SYSTEM_1106	CONDENSATE SYSTEM_1121	CLOSED COOLING WATER SYSTEM_1142	FULE OIL SYSTEM (FO) _1178
SHP STEAM SYSTEM_1107	CONDENSATE SYSTEM_1122	CLOSED COOLING WATER SYSTEM_1143	FULE OIL SYSTEM (HSD) _1181
SHP STEAM SYSTEM_1108	CONDENSATE SYSTEM_1123	INSTRUMENT AIR SYSTEM_1146	FULE OIL SYSTEM (HSD) _1182
SHP STEAM SYSTEM_1109	CONDENSATE SYSTEM_1124	INSTRUMENT AIR SYSTEM_1147	FULE OIL SYSTEM (HSD) _1183
HP STEAM SYSTEM_1110	SHP FEED WATER SYSTEM_1125	NITROGEN SYSTEM_1161	FULE OIL SYSTEM (HSD) _1184
HP STEAM SYSTEM_1111	SHP FEED WATER SYSTEM_1126	LP DOSING SYSTEM_1163	FULE OIL SYSTEM (HSD) _1185
HP STEAM SYSTEM_1112	SHP FEED WATER SYSTEM_1127	LP DOSING SYSTEM_1164	FULE OIL SYSTEM (HSD) _1186
HP STEAM SYSTEM_1113	SHP FEED WATER SYSTEM_1128	SERVICE WATER SYSTEM_1165	FULE OIL SYSTEM (HSD) _9966
LP STEAM SYSTEM_1114	SHP FEED WATER SYSTEM_1129	POTABLE WATER SYSTEM_1167	FULE OIL SYSTEM (FO) _1188
LP STEAM SYSTEM_1115	MP FEED WATER SYSTEM_1130	FULE OIL SYSTEM (FO) _1171	
MP STEAM SYSTEM_1116	FULE GAS SYSTEM_1137	FULE OIL SYSTEM (FO) _1172	
CONDENSATE SYSTEM_1117	FULE GAS SYSTEM_1138	FULE OIL SYSTEM (FO) _1174	
CONDENSATE SYSTEM_1118	CIRCULATING WATER SYSTEM_1139	FULE OIL SYSTEM (FO) _1175	
CONDENSATE SYSTEM_1119	CIRCULATING WATER SYSTEM_1140	FULE OIL SYSTEM (FO) _1176	
CONDENSATE SYSTEM_1120	CLOSED COOLING WATER SYSTEM_1141	FULE OIL SYSTEM (FO) _1177	

cell data

cell data

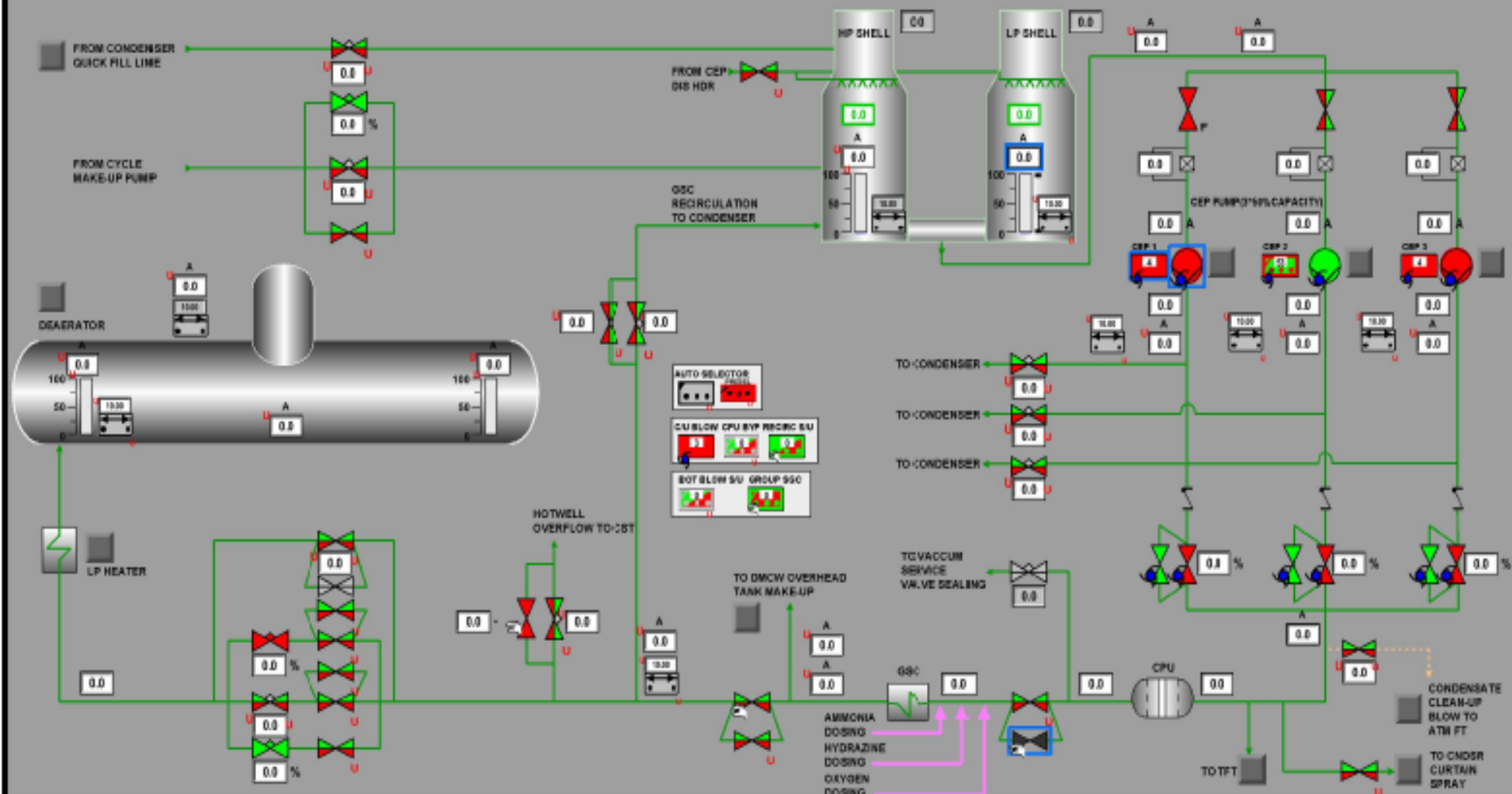
PLANT OVERVIEWUNIT OVERVIEWCG1TG1

Ready

start

HMIWeb Display Build...GRAPHICSG1STEAM AND WATER ...

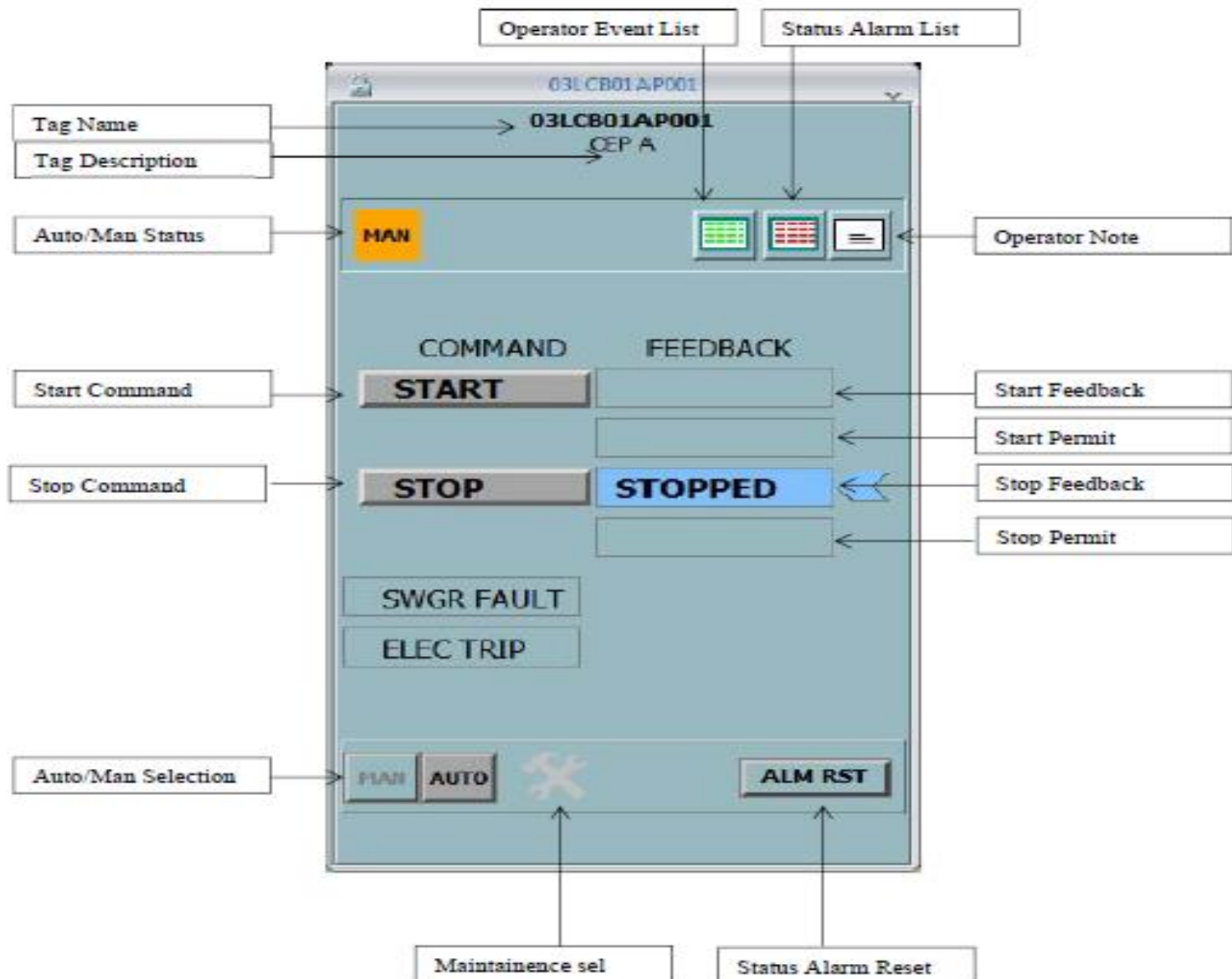
CAPNUM3:34 PM



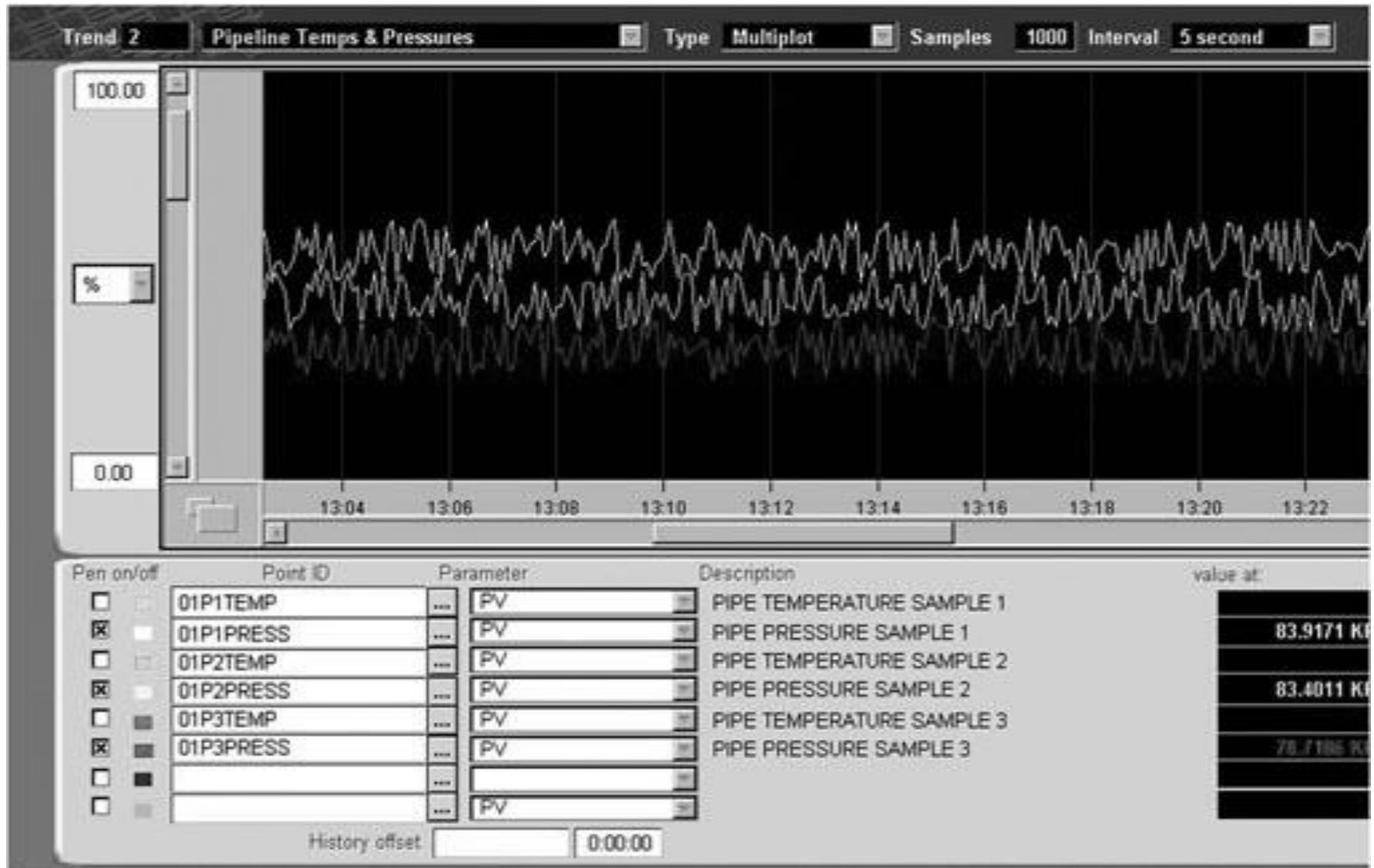
MW	ACTUAL	TARGET	FREQUENCY	POWER FACTOR	MAIN STM PR/TEMP	HRH PR/TEMP	CONDENSER VACUUM	REACTIVE POWER	FURNACE PRESSURE	COMBUSTION AIR FLOW	COAL FLOW	OIL FLOW	DEAERATOR LEVEL	AUX POWER	TURBINE SPEED
0.0	NW		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	NW		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Date: 11/09/10				MO: 00				VLCA				GFC08			
Drawn By: Pto				MO: 00				VLCA				GFC08			
Checked By: Stan				MO: 00				VLCA				GFC08			
Standard: AS				MO: 00				VLCA				GFC08			
Part Display				MO: 00				VLCA				GFC08			

Face Plate



Trend Display



Alarm Display

Operations Explorer - [Alarm Groups]

Hydroc: Analog Digital Acoustic Diagnost System Thermal

6/20/2012 12:35:09 625 DPLYPCE_APCH_073 DESC03 ONE AL

6/20/2012 12:35:09

Alarm Groups

Default Alarm Gro... x

All Priorities Alarm Groups Current Alarms

Prio	Date / Time	Name	Signal	Description	Value	Limit	Units	Message	Area
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_077		DESC07	NO ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_073		DESC03	NO ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_068		DESC08	NO ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_062		DESC02	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_059		DESC09	NO ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_057		DESC07	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_056		DESC06	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_052		DESC02	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_051		DESC01	NO ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_050		DESC10	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_047		DESC07	NO ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_042		DESC02	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_034		DESC04	NO ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_033		DESC03	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_032		DESC02	NO ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_030		DESC10	ONE ...				
1	6/20/2012 12:35:08.625	DPLYPCE_APCH_026		DESC06	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_023		DESC03	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_021		DESC01	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_013		DESC03	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE_APCH_011		DESC01	ONE ...				
0	6/20/2012 12:35:08.625	DPLYPCE APCH_010		DESC10	ONE ...				

Ready

SYSMGR WIN-1R536QDCNRK CAP NUM SCRI ABB

REDUNDANCY

Redundancy is the duplication of critical components or functions of a system with the intention of increasing availability of the system, usually in the form of a backup or fail-safe.

LEVELS OF REDUNDANCY

- I/O card redundancy
- I/O bus redundancy
- Controller redundancy
- Data highway redundancy
- Power supply redundancy

DCS FUNCTIONS

- Human Machine Interface
- Data Acquisition of plant parameters and status
- Interlock and Protection
- Monitoring of off-site packages at CCR
- Sequence of Events Recording
- Historical trending of parameters
- Alarm / Event reporting
- Logs and Reports
- Comprehensive System diagnostics

Integrated packages with DCS



➤ Master Clock

- ❑ It synchronizes real time clocks of DCS and all other critical control systems of Plant with the GPS signals received from satellites.

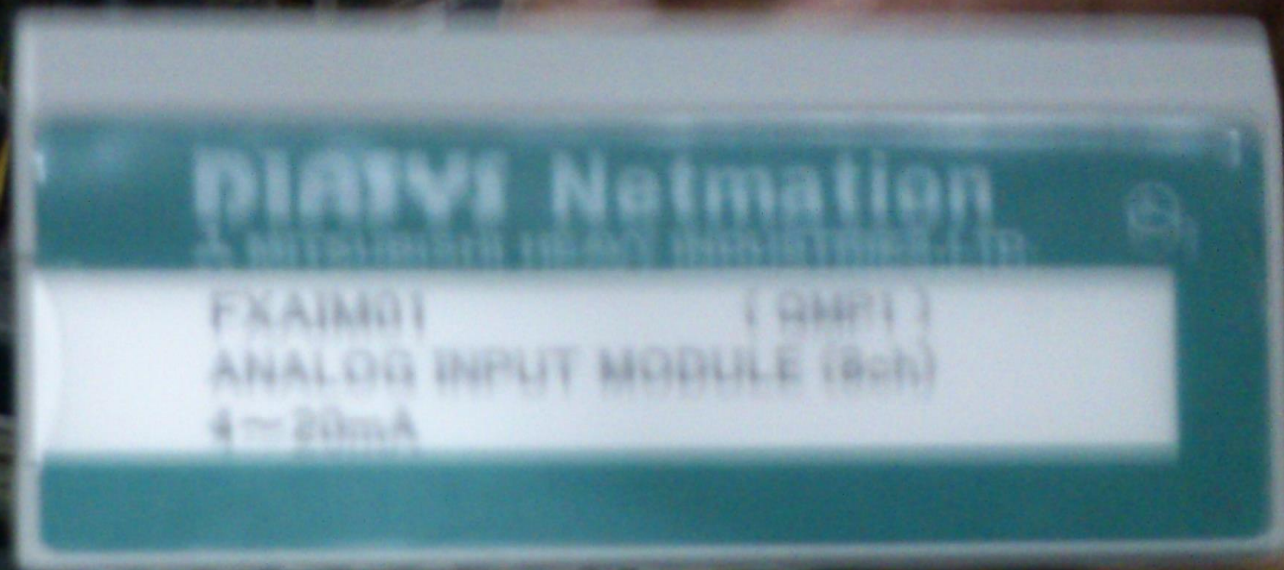
➤ Large Video Screen (LVS)

- ❑ It is provided in control room to show critical parameters of the Plant in Large display.

DCS Vendors

- L&T AUTOMATION : MHI-Diasys Netmation
- EMERSON
- ABB
- HONEYWELL
- YOKOGAWA
- SIEMENS





DIASYS Netmation

Δ METALWORKS HEAVY INDUSTRIES, LTD.

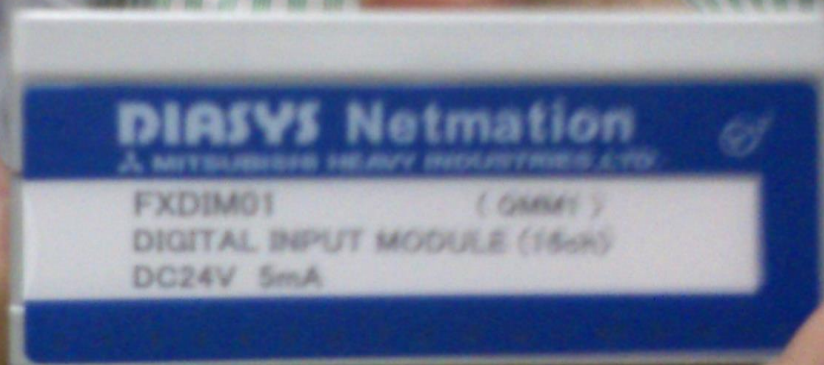


FXADM01A

(QSN1)

ANALOG OUTPUT MODULE (8ch)

4~20mA/0~550Ω













Questions?



THANK YOU