ALL DIMENSIONS ARE IN MM

FIRST ANGLE PROJECTION

# 4 X 125 MW KOSTI,THERMAL POWER STATION

## NATIONAL ELECTRIC CORPORATION (NEC)
## THE REPUBLIC OF SUDAN



# TECHNICAL SPECIFICATION

# PLC end Configuration for

# Soft link between PLC system & DDCMIS

| | | | |
|---|---|---|---|
| JOB NO. 250 | TITLE | **TECHNICAL SPECIFICATION FOR CONTROL VALVES WITH ACCESSORIES (Electrically Operated)** | DOC. NO. **PE-TS-250-145-I951** |
| BHEL | **BHARAT HEAVY ELECTRICALS LTD**<br>POWER SECTOR<br>PROJECT ENGINEERING MANAGEMENT<br>NEW DELHI | DEPT CODE I | Rev 00 / DATE 08.12.15 |

spectit.dwg

# PROJECT INFORMATION

## KOSTI 4 X 125 MW THERMAL POWER PLANT

## PROJECT INFORMATION DATA

| | | |
|---|---|---|
| 1 | **Owner** | NATIONAL ELECTRICITY CORPORATION, SUDAN |
| 2 | **Project** | 4 X 125 MW RATING, CRUDE OIL FIRED THERMAL POWER PLANT |
| 3 | **Owner's consultant** | Fichtner Gmbh & Co. KG |
| 4 | **Location** | The Power Station site is located near Kosti ( White Nile State), 310 km south of Khartoum at latitude 13.10 North and longitude 32.6 East at an elevation of 380 meters above sea level. The northern boundary of the plot is adjacent to the Rabak-Sinnar highway |
| 5 | **Nearest Airport** | KHARTOUM |
| 6 | **Nearest Port** | PORT-SUDAN |
| 7 | **Access to site** | PORT-SUDAN → 850 km → KHARTOUM → 320 km → KOSTI |

## Meteorological data

| | | |
|---|---|---|
| **A** | **Altitude [Observatory]** | 380 meters above sea level |
| **B** | **Ambient Conditions:** | |
| 1. | Mean Maximum Ambient Air Temperature (in hottest month) | 45 Deg.C |
| 2. | Mean Minimum Ambient Air Temperature (in coldest month) | 18 Deg.C |
| | **Temperatures** | |
| 1. | Minimum [ Annual Mean] | 25 –30 deg C, 16 deg C lowest |
| 2. | Maximum [ Annual Mean ] | 40-45 deg C |
| **C** | **RELATIVE HUMIDITY** | Low to very low in most part of the year. Rising only during rainy season. |
| 1. | Maximum Humidity | 71% in Aug |
| 2. | Minimum Humidity | 26% in April |
| **D** | **RAINFALL** | |
| 1. | Annual Mean | 300 to 400 mm spread over 150 days. Approx.50 TO 60% rainfall in July & Aug. |
| 2. | Maximum | Max recorded is 182 mm in Aug,04 |
| **E** | **WIND DATA** | |
| 1. | Max Wind Speed | 170Kmph |
| 2. | Prevailing Wind Direction | Wind direction is northern from May to September and it is southern in other months |
| 3. | Any other features | Occasional dust storms in May and June |

# SPECIFICATION

## Specification for PLC end Configuration for Soft link between PLC system & DDCMIS

- **Scope**
  - Provide /configure necessary software/hardware at PLC end (GE Fanuc & Siemens make) to establish soft link with BHEL supplied DDCMIS for following packages:

    1. DM Plant (GE Fanuc make)
    2. Electro chlorination plant (GE Fanuc make)
    3. Raw water Intake pump house (GE Fanuc make)
    4. Fuel Oil system (Siemens make)

  - The above job will require signal mapping/configuration/ programming of database at PLC end and commissioning support for establishing soft link communication (as mentioned above).
  - Bidder's representative is required to carry the necessary tools like PLC programming software/ Programming tools/laptop/ communication cable between tools & PLC system etc. required for the above mentioned activities.
  - The activity shall be carried out at 4 x 125 MW TPS Kosti Sudan project site. The tentative duration of stay at site will be 20 days. Duration of stay at site may be split in to two visit. However payment shall be made as per actual duration of stay at site.
  - Hardware items to be supplied:

    a) Universal Protocol Convertor along with Ethernet patch cord (3 meter length)-4 nos.

    The protocol converter shall be able to convert any one form of signal to any other form signal (Ethernet to MODBUS on RS-485, Ethernet to MODBUS serial on FO link etc.)
    The protocol converter shall have minimum three port i) RS-485 port, ii) Fiber optic port, iii) Ethernet (UTP )port. Power supply and Din rail along-with mounting accessories for mounting on panel shall also be provided by bidder. Power supply system shall be capable of handling input supply from 110 V to 240 V AC.

    b) Following Media converter shall be supplied
    - Fiber Optic (Multimode-SC) to Modbus-485 – 4 nos.
    - Fiber Optic (Single mode-SC) to Modbus-485 – 4 nos.

    c) 9 Pin and 15 pin D connector 4 nos. each shall be supplied by bidder.

- **Optional Items:** Bidder to quote for "Scada Software Development License (for GE Fanuc make PLC- ECP/DM plant/RW Application)". Having feature like
  1. CIMPLICITY HMI Server 150 I/O Development & Runtime System.
  2. CIMPLICITY HMI Server 150 I/O Runtime System.
  3. Logic Developer PLC Nano/Micro without Proficy

  This quoted price shall not be used for evaluation purpose.

- **Exclusions**
  - Fiber optic link cable and its laying between PLC & DDCMIS is excluded from bidder scope
  - PLC System/ DDCMIS system

- **Documentation**
  - Preparation of backup CD (Five (5) no's for each PLC system with latest data base and configuration file.

- **Reference document attached with specification:**
  - Copies of configurations of existing PLC system & proposed soft link signals database.

# Bill of Quantity

# Bill of Quantity

| S. No. (A) | Description (B) | Quantity (C) |
|---|---|---|
| 1 | Man day charges including travel time | 24 Days |
| 2 | Universal Protocol Convertor along with its Power Supply and Ethernet patch cord (3 meter length), | 4 nos. |
| 3 | Media converter<br>Fiber Optic (Multimode-SC) to Modbus-485 | 4 nos. |
| 4 | Media converter<br>Fiber Optic (Single mode-SC) to Modbus-485 | 4 nos. |
| 5 | 9 Pin D connector | 4 nos. |
| 6 | 15 pin D connector | 4 nos. |
| | | |
| | | |
| | | |
| 7 | Optional Items | |
| a | CIMPLICITY HMI Server 150 I/O Development & Runtime System | 1 no. |
| b | CIMPLICITY HMI Server 150 I/O Runtime System. | 1 no. |
| c | Logic Developer GE Fanuc make PLC Nano/Micro without Proficy | 1 no. |
| d | CIMPLICITY HMI Server 75 I/O Development & Runtime System | 1 no. |
| e | CIMPLICITY HMI Server 75 I/O Runtime System. | 1 no. |
| | | |

Notes :

1. Bidder to specify the number of engineers (expert, technician, service-man etc.) who will visit site for establishing the requisite connectivity.
2. If the no. of engineers required is greater than 1, bidder to specify the detailed visit plan. (including travel time, no. of man-days/PLC)
3. If the no. of engineer is more than 1, then the bidder's offer shall be loaded as follows :

a. To and fro travel charges = Rs. 100000/- (Rs. One Lakh Only)
b. Man-day charges in Travel time = 4 man-day charges/person

# REFERENCE DOCUMENTS

# CONTROL PANEL FOR 4 X 125 MW KOSTI THERMAL POWER PLANT

1] INPUT SUPPLY:230V AC ,1Ø
2] PANEL SIZE: 760±3 (W) X 760±3 (H) X 300±3 (D)
3] PROGRAM NAME:
PROGRAM MADE BY:
4] POWER SUPPLY-IC200PWR002
5] CPU 1-IC200GBI001
6] DIGITAL INPUT MODULE-1,2 IC200MDL650
7] DIGITAL OUTPUT MODULE-IC200MDL750
9] ANALOG INPUT MODULE-IC200ALG264

Cal - I approved.
Hasil
12.03.12
(Md. Masihuzzaman)
BHEL-PEM

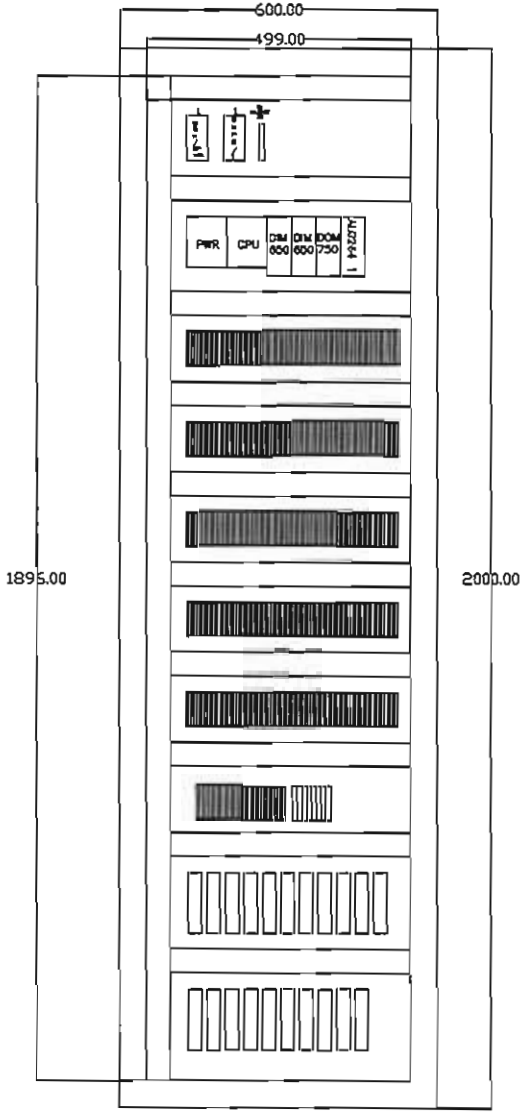
KOSTI THERMAL POWER STATION 4 X 125 MW
NATIONAL ELECTRICITY CORPORATION (NEC)
THE REPUBLIC OF SUDAN

FICHTNER Fichtner GmbH & Co. KG
Stuttgart, Germany

GENERAL MECHANICAL WORKS PVT. LTD.
185, G.I.D.C. INDUSTRIAL ESTATE, MAKARPURA
VADODARA-390 010 GUJARAT INDIA

CONTRACT

PE-VO-250-165-N510



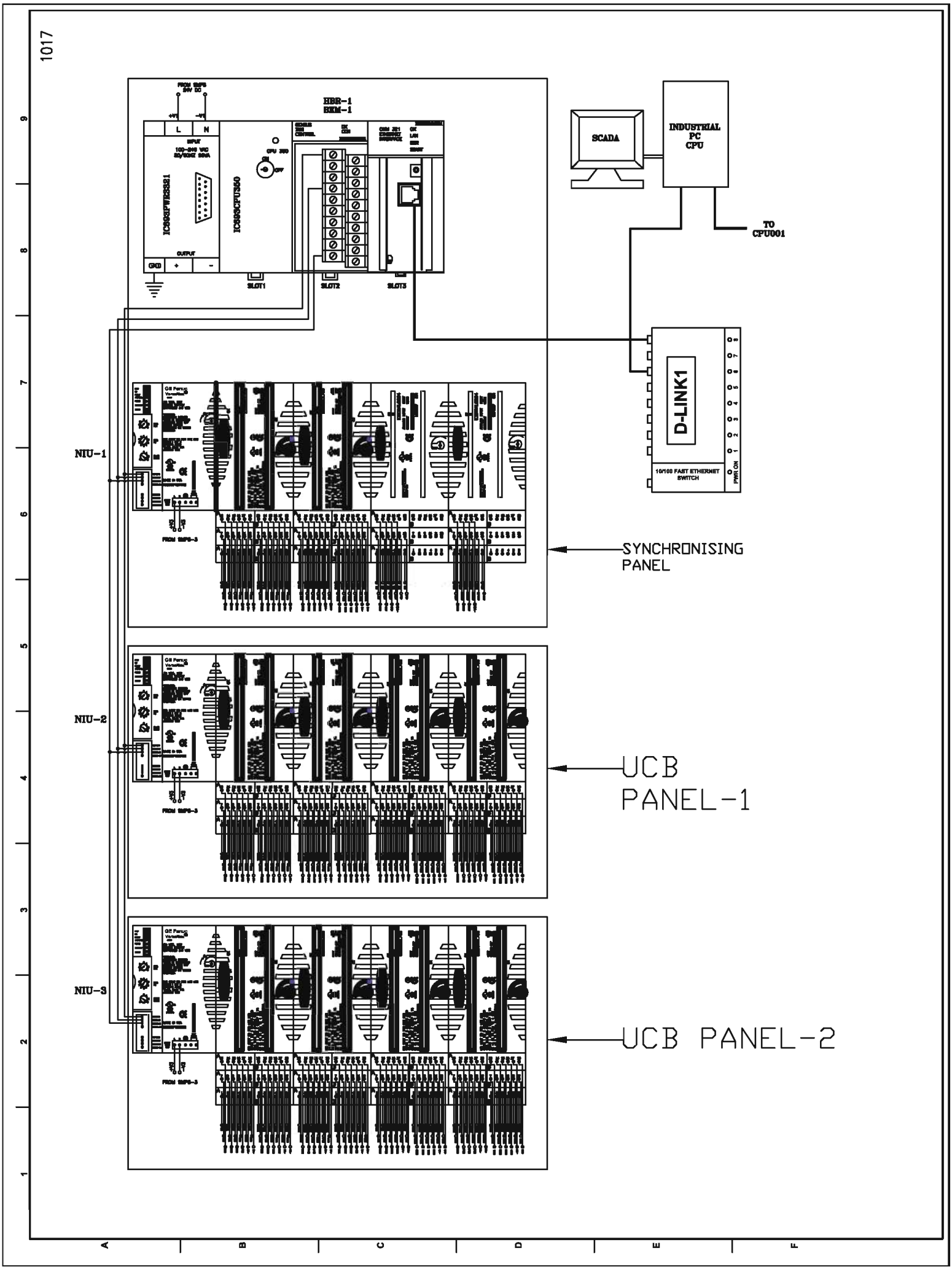

KOSTI THERMAL POWER STATION 4 X 125 MW
NATIONAL ELECTRICITY CORPORATION (NEC)
THE REPUBLIC OF SUDAN

RICHTNER Richtner GmbH & Co. KG
Stuttgart, Germany

GENERAL MECHANICAL WORKS PVT. LTD.
BIG, G.I.D.C. INDUSTRIAL ESTATE, PAKARPURA,
VADODARA-390 010 (GUJARAT) INDIA.

CONTRACT

PE-VO-250-165-N510


1017
HBR-1
HRM-1
SCADA
INDUSTRIAL PC CPU
TO CPU001
D-LINK1
10/100 FAST ETHERNET SWITCH
NIU-1
NIU-2
NIU-3
SYNCHRONISING PANEL
UCB PANEL-1
UCB PANEL-2
A
B
C
D
E
F

# G.A, CONFIGURATION, WIRING & BOM FOR PLC SYSTEM




| Revision | Date | Description | Prepared | Checked | Approved |
|---|---|---|---|---|---|
| | | | | | |
| 2 | 23/03/11 | RE-SUBMISSION FOR APPROVAL | GND | AKA | BSC |
| 1 | 24/05/10 | REVISED AS PER CLIENT COMMENTS | GND | AKA | BSC |
| 0 | 22/02/10 | SUBMISSION FOR APPROVAL | SRJ | NSK | PBP |

R E V I S I O N S

CUSTOMER

**NATIONAL ELECTRICITY CORPORATION (NEC)**
**THE REPUBLIC OF THE SUDAN**

CUSTOMER'S CONSULTANT
FICHTNER

Fichtner Gmbh & Co. KG
Stuttgart, Germany

PROJECT

**KOSTI** Thermal Power Station, 4x125 MW

**BHARAT HEAVY ELECTRICALS LTD.**
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT

VENDOR

UNITECH MACHINES LIMITED
'UM HOUSE', PLOT NO. 35P, SECTOR-44
GURGAON, HARYANA-122 002

VNDOR'S DESIGN & ENGG. CONSULTANT

PYRAMID
ENGINEERING :: CONSULTING

PACKAGE

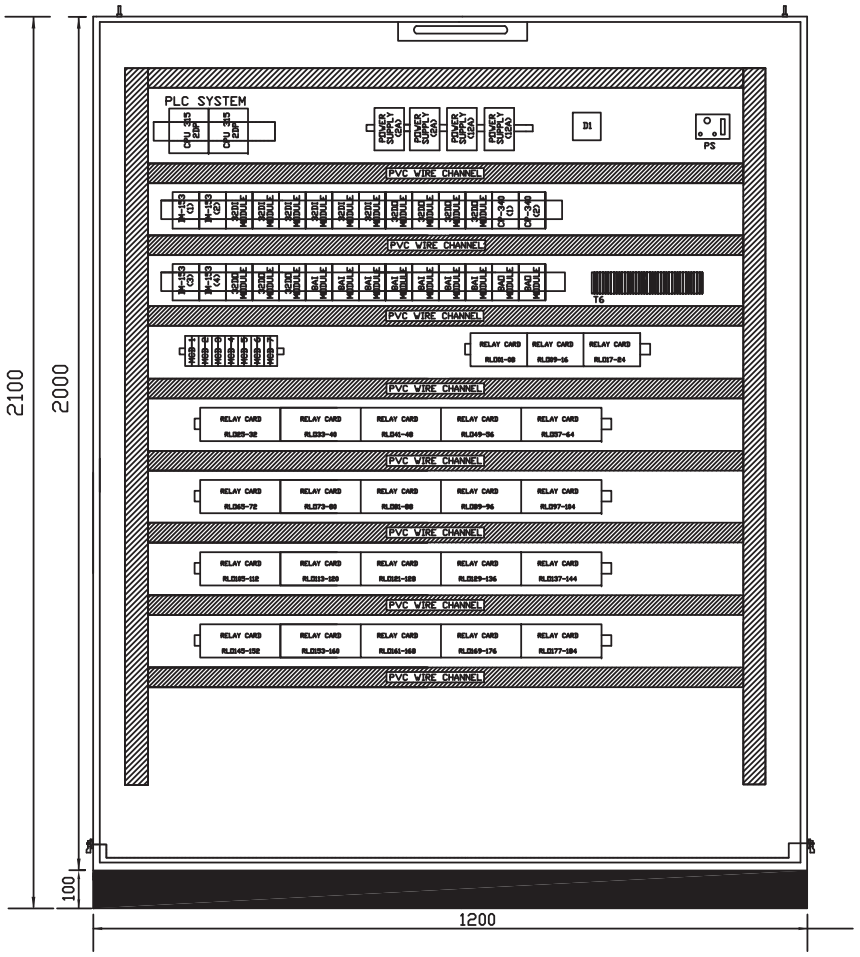
**FUEL OIL HANDLING SYSTEM**

TITLE

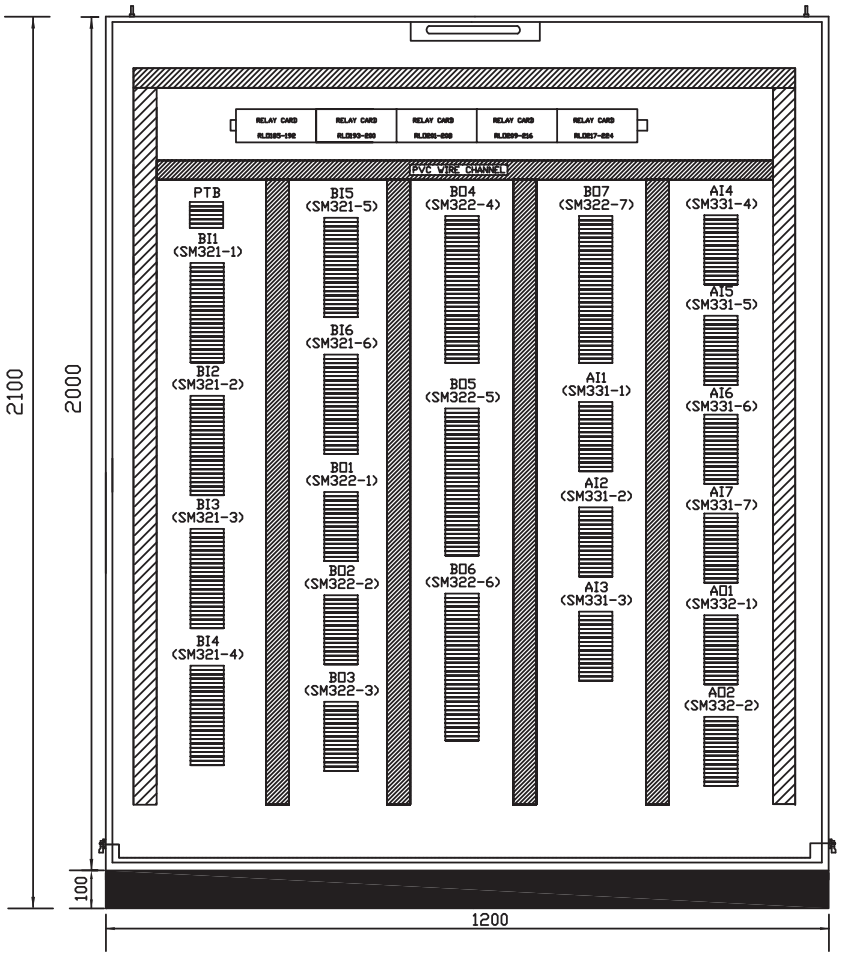
**G.A., CONFIGURATION, WIRING & BOM FOR PLC SYSTEM**

| Prepared | Checked | Approved | Date | Scale | Job No. |
|---|---|---|---|---|---|
| | | | | | P-246 |

| Customer Doc. No. | BHEL Doc.No. | Sheet | Rev. | |
|---|---|---|---|---|
| KTPS-ICLM-90EGC-PE250166A231S01VO-00 | PE-VO-250-166-A231 | Sheet 1 of 60 | Rev. | 2 |




FRONT VIEW WITH DOOR OPEN




REAR VIEW WITH DOOR OPEN

PROJECT- 4X125MW Kosti TPP, Sudan
PACKAGE- Fuel oil Handling system
BHEL Doc. No.- PE-V0-250-166-A231

SHEET- 5 OF 60

TERMINALS AT THE REAR SIDE

| REV NO | DATE | DRN | REVISION |
|---|---|---|---|
| 0.1 | 17.02.10 | | DRAWINGS FOR APPROVAL |
| 0.0 | 20.03.09 | | DRAWINGS FOR APPROVAL |

CLIENT: M/s UNITECH MACHINES
END CLIENT:
PROJECT: FUEL OIL HANDLING SYSTEM

| | | |
|---|---|---|
| DRN. | NC | 10.10.09 |
| CHD. | | |
| APPD. | | |
| SCALE | N.T.S. | |
| JOB NO. | | |
| TOTAL SHT | OF | |

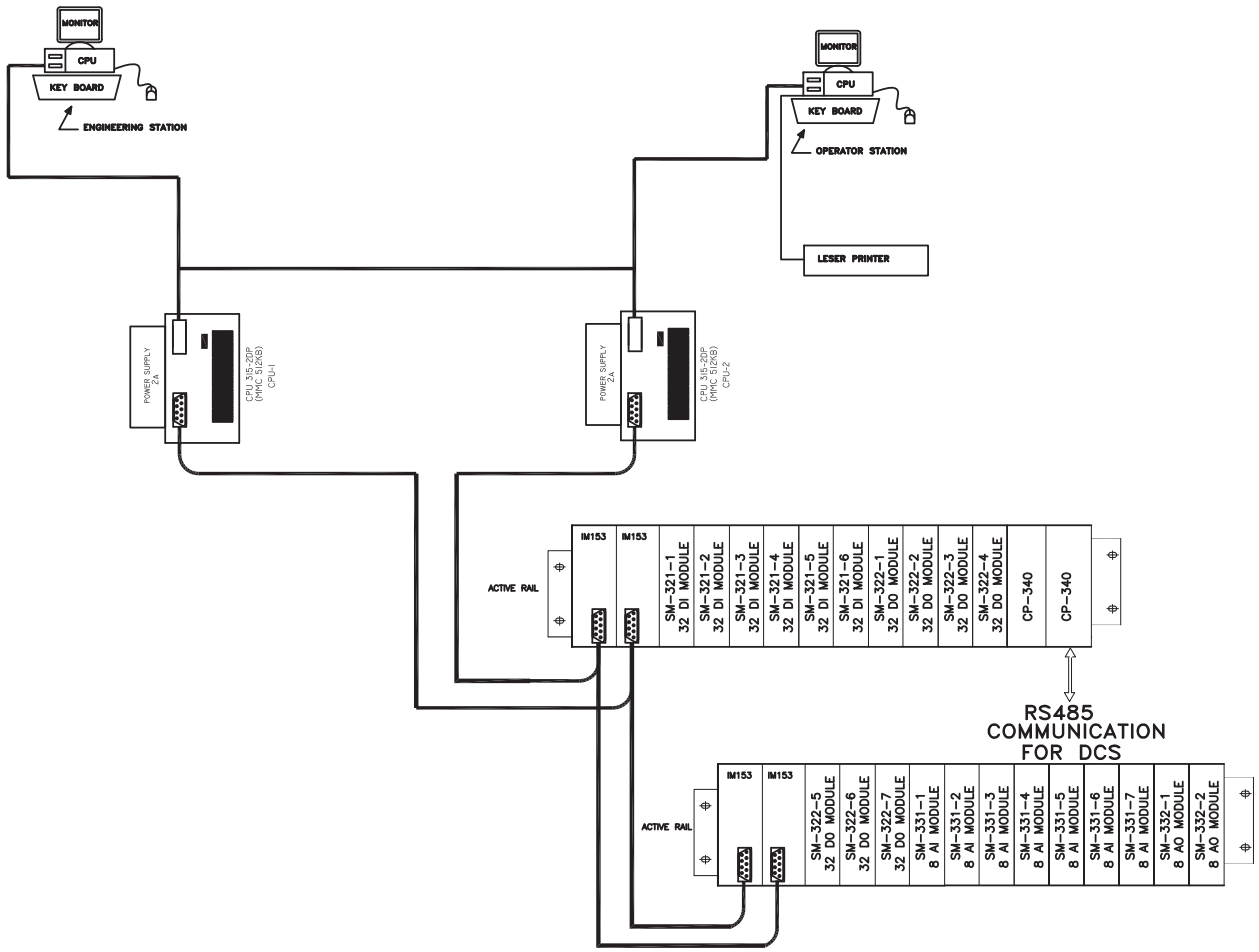
KMG SOLUTIONS (INDIA) PVT. LTD.
375 MAIN ROAD GAZIPUR, DELHI-96. (011) 43160000

TITLE: PLC PANEL (GENERAL ARRANGEMENT)

DRG. NO. =1.GA

SHEET 2 OF 2

CAD REF : 10161501.dwg




LEGEND

CPU 315-2DP
6ES7315-2AG10-0AB0

SM-321 (1-6)
32 CH DIGITAL INPUT MODULE
6ES7321-1BL00-0AA0

SM-322 (1-7)
32 CH DIGITAL OUTPUT MODULE
6ES7322-1BL00-0AA0

SM-331 (1-7)
8 CH ANALOG INPUT MODULE
6ES7331-1KF01-0AB0

SM-332 (1-2)
8 CH ANALOG OUTPUT MODULE
6ES7332-5HF00-0AB0

CP-340 WITH RS485 PORT
6ES73401-CH02-0AE0

POWER SUPPLY-2A
6EP0-133-1AA00-0AA1

PROJECT- 4X125MW Kosti TPP, Sudan
PACKAGE- Fuel oil Handling system
BHEL Doc. No.- PE-V0-250-166-A231

SHEET- 6 OF 60

| REV NO | DATE | DRN | REVISION |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| 0.1 | 17.02.10 | | DRAWINGS FOR APPROVAL |
| 0.0 | 10.10.09 | | DRAWINGS FOR APPROVAL |

CLIENT: M/s UNITECH MACHINES
CONSULTANT:
PROJECT: FUEL OIL HANDLING SYSTEM

| | | |
|---|---|---|
| DRN. | NC | 10.10.09 |
| CHD. | | |
| APPD. | | |
| SCALE | N.T.S. | |
| JOB NO. | | |
| TOTAL SHT | OF | |

KMG SOLUTIONS (INDIA) PVT. LTD.
375, MAIN ROAD GAZIPUR, DELHI. (011) 43160000

TITLE: SYSTEM CONFIGURATION (REDUNDANT PLC SYSTEM)

DRG. NO. =1.SCH

SHEET 1 OF 1

CAD REF : 101611501.dwg

| SL.NO | ITEM | MAKE | QTY | TYPE NO. | DESIGNATION | LOCATION | REMARKS |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 1 | CPU 315-2 DP | SIEMENS | 2 | 6ES7315-2AG10-0AB0 | | | |
| | 315-2 DP | | | | | | |
| | | | | | | | |
| 2 | SM321 | SIEMENS | 6 | 6ES73211BL00-0AA0 | -SM321-1...6 | -1.DI | |
| | 32 DI X 24VDC, MODULE | | | | | | |
| | | | | | | | |
| 3 | SM322 | SIEMENS | 7 | 6ES73221BL00-0AA0 | -SM322-1...7 | -1.DO | |
| | 32 DO X 24VDC, MODULE | | | | | | |
| | | | | | | | |
| 4 | SM331 8AI, MODULE | SIEMENS | 7 | 6ES7331-1KF01-0AB0 | -SM331-1...7 | -1.AI | |
| | 8AI, MODULE | | | | | | |
| | | | | | | | |
| 5 | SM332 | SIEMENS | 2 | 6ES7332-5HF00-0AB0 | -SM332-1...2 | -1.AO | |
| | 8AO, MODULE | | | | | | |
| | | | | | | | |
| 6 | 40 PIN FRONT CONNECTOR | SIEMENS | 22 | 6ES73921AM000AA0 | | | |
| | | | | | | | |
| 7 | PROFIBUS CONNECTOR WITHOUT PG | SIEMENS | 6 | 6ES79720BA410XA0 | | | |
| | | | | | | | |
| 8 | PROFIBUS CONNECTOR WITH PG | SIEMENS | 2 | 6ES79720BB410XA0 | | | |
| | | | | | | | |
| 9 | PROFIBUS CABLE | SIEMENS | 100 | 6XV18300EH10 | | | |
| | | | | | | | |
| 10 | CP340 WITH RS485 PORT | SIEMENS | 2 | 6ES7340-1CH02-0AE0 | | | |
| | | | | | | | |
| 11 | RAIL : 530MM | SIEMENS | 2 | 6ES7195-1GF30-0XA0 | | | |

PROJECT- 4X125MW Kosti TPP, Sudan
PACKAGE- Fuel oil Handling system
BHEL Doc. No.- PE-V0-250-166-A231

SHEET- 57 OF 60

| REV NO | DATE | DRN | REVISION |
|---|---|---|---|
| 0.1 | 17.02.10 | | DRAWINGS FOR APPROVAL |
| 0.0 | 10.10.09 | | DRAWINGS FOR APPROVAL |

CLIENT: M/s UNITECH MACHINES
CONSULTANT:
PROJECT: FUEL OIL HANDLING SYSTEM

DRN. NC 10.10.09
CHD.
APPD.
SCALE N.T.S.
JOB NO.
TOTAL SHT OF

KMG SOLUTIONS INDIA PVT.LTD.
375,MAIN ROAD,GHAZIPUR,DELHI-96(011)-43160000

TITLE: PLC PANEL (BILL OF MATERIAL)

DRG. NO. =1.BOM

SHEET 1 OF 4

CAD REF : 10161501.dwg

| SL.NO | ITEM | MAKE | QTY | TYPE NO. | DESIGNATION | LOCATION | REMARKS |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 12 | DIN RAIL 530 MM | SIEMENS | 2 | 6ES7390−1AF30−0AA0 | | −1.CPU | |
| | | | | | | | |
| 13 | MMC 128 KB | SIEMENS | 2 | 6ES7953−BLG11−0AA0 | | | |
| | | | | | | | |
| 14 | REDUNDAY BUNDLE | SIEMENS | 2 | 6ES7153−2AR03−0XA0 | | | |
| | | | | | | | |
| 15 | ACTIVE BUS MODULE | SIEMENS | 13 | 6ES71957HB000XA0 | | | |
| | | | | | | | |
| 16 | POWER SUPPLY 2A | SIEMENS | 2 | 6EP0−133−1AA00−0AA1 | | | |
| | | | | | | | |
| 17 | CP5611 | SIEMENS | 2 | 6GK1561−1AA01 | | | |
| | | | | | | | |
| 18 | POWER SUPPLY 24DC,12A | SIEMENS | 2 | 6EP1334−1AA00 | | | |
| | | | | | | | |
| 19 | WIC FLEXIBLE 512RT | SIEMENS | 1 | 6AV6613−1DA51−3CA0 | | | |
| | | | | | | | |
| 20 | WIC FLEXIBLE ADVAED ENGI. SOFTWARE | SIEMENS | 1 | 6AV66130AA513CA5 | | | |
| | | | | | | | |
| 21 | STEP7 BASIC PROG. S/W | SIEMENS | 1 | 6ES7810−4CC08−0YA5 | | | |
| | | | | | | | |
| 22 | INDICATING LIGHT | | | | | | |
| | RED (24VDC HEALTHY) | SIEMENS | 1 | 3SB52856HC01 | −1.H1 | −1.PD | |
| | | | | | | | |
| 23 | ANNUIATOR 110V AC ALARM | PROCON | 144 | | | | |
| | | | | | | | |
| | | | | | | | |

PROJECT- 4X125MW Kosti TPP, Sudan
PACKAGE- Fuel oil Handling system
BHEL Doc. No.- PE-V0-250-166-A231

SHEET- 58 OF 60

| REV NO | DATE | DRN | REVISION |
|---|---|---|---|
| 0.1 | 17.02.10 | | DRAWINGS FOR APPROVAL |
| 0.0 | 10.10.09 | | DRAWINGS FOR APPROVAL |

CLIENT: M/s UNITECH MACHINES
CONSULTANT:
PROJECT: FUEL OIL HANDLING SYSTEM

| | | |
|---|---|---|
| DRN. | NC | 10.10.09 |
| CHD. | | |
| APPD. | | |
| SCALE | N.T.S. | |
| JOB NO. | | |
| TOTAL SHT | OF | |

KMG SOLUTIONS INDIA PVT.LTD.
375,MAIN ROAD,GHAZIPUR,DELHI−96(011)−43160000

TITLE: PLC PANEL (BILL OF MATERIAL)

DRG. NO. =1.BOM

SHEET 2 OF 4

CAD REF : 101611501.dwg

| SL.NO | ITEM | MAKE | QTY | TYPE NO. | DESIGNATION | LOCATION | REMARKS |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 24 | PUSH BUTTON | | | | | | |
| | ACCEPT PB | SIEMENS | 1 | 3SB12020AF01 | | | |
| | TEST PB | SIEMENS | 1 | 3SB12020AF01 | | | |
| | RESET PB | SIEMENS | 1 | 3SB12020AF01 | | | |
| | | | | | | | |
| 25 | MINIATURE CIRCUIT BREAKERS | | | | | | |
| | RATING: 25A DP | SIEMENS | 2 | 5SQ22107YA25 | -MCB1,-MCB4 | -1.PD | |
| | RATING: 6A DP | SIEMENS | 7 | 5SQ22107YA06 | -MCB2,3,5,678,9 | -1.PD | |
| | | | | | | | |
| 26 | RELAY CARDS FOR OUTPUT | PHOENIX /BRISK | 28 | | | | |
| | 8CH 2 C/O,24V DC | | | | | | |
| | | | | | | | |
| 27 | SWITCH & SOCKET | SIEMENS | 1 | | | | |
| | | | | | | | |
| 28 | PANEL ILLUMINATION LAMP | PHILIPS | 2 | | | | |
| | | | | | | -1.PD | |
| 29 | TERMINALS | PHOENIX | | | -PVF | | |
| | | | | | | | |
| 30 | COOLING FAN | REXONOLD | 1 | | | | |
| | | | | | | | |
| 31 | FILTER | REPUTED | 1 | | | | |
| | | | | | | | |
| 32 | COMPUTER SYSTEM WITH LATEST | HP/EQUV. | 2 | | | | |
| | CONFIGURATION | | | | | | |
| | | | | | | | |
| 33 | PRINTER A4 SIZE B&W INK JET | HP/EQUV. | 1 | | | | |

PROJECT- 4X125MW Kosti TPP, Sudan
PACKAGE- Fuel oil Handling system
BHEL Doc. No.- PE-V0-250-166-A231

SHEET- 59 OF 60

| REV NO | DATE | DRN | REVISION |
|---|---|---|---|
| 0.1 | 17.02.10 | | DRAWINGS FOR APPROVAL |
| 0.0 | 10.10.09 | | DRAWINGS FOR APPROVAL |

CLIENT: M/s UNITECH MACHINES
CONSULTANT:
PROJECT: FUEL OIL HANDLING SYSTEM

DRN. NC 10.10.09
CHD.
APPD.
SCALE N.T.S.
JOB NO.
TOTAL SHT OF

KMG SOLUTIONS INDIA PVT.LTD.
375,MAIN ROAD,GHAZIPUR,DELHI-96(011)-43160000

TITLE: PLC PANEL (BILL OF MATERIAL)

DRG. NO. =1.BOM

SHEET 3 OF 4

CAD REF : 101611501.dwg

| 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
|---|---|---|---|---|---|---|---|---|---|

| SL.NO | ITEM | MAKE | QTY | TYPE NO. | DESIGNATION | LOCATION | REMARKS |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 34 | AUXILLARY CONTACTOR (2NO+2) | SIEMENS | 2 | 3TH3022AM0 | | | |
| | 110V AC | | | | | | |
| | | | | | | | |
| 35 | ON DELAY TIMER | SIEMENS | 1 | 3RP15111AP30 | | | |
| | TIME RANGE : 0.5–10SEC | | | | | | |

PROJECT- 4X125MW Kosti TPP, Sudan
PACKAGE- Fuel oil Handling system
BHEL Doc. No.- PE-V0-250-166-A231

SHEET- 60 OF 60

| REV NO | DATE | DRN | REVISION |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| 0.1 | 17.02.10 | | DRAWINGS FOR APPROVAL |
| 0.0 | 10.10.09 | | DRAWINGS FOR APPROVAL |

CLIENT: M/s UNITECH MACHINES
CONSULTANT:
PROJECT: FUEL OIL HANDLING SYSTEM

| | | |
|---|---|---|
| DRN. | NC | 10.10.09 |
| CHD. | | |
| APPD. | | |
| SCALE | N.T.S. | |
| JOB NO. | | |
| TOTAL SHT | OF | |

KMG SOLUTIONS INDIA PVT.LTD.
375,MAIN ROAD,GHAZIPUR,DELHI–96(011)–43160000

TITLE: PLC PANEL (BILL OF MATERIAL)

DRG. NO. =1.BOM

SHEET 4 OF 4

CAD REF : 101611501.dwg

| A | B | C | D | E | F |
|---|---|---|---|---|---|

# INFORMATION ONLY

2008.12.11 10:12:02 +05'30'

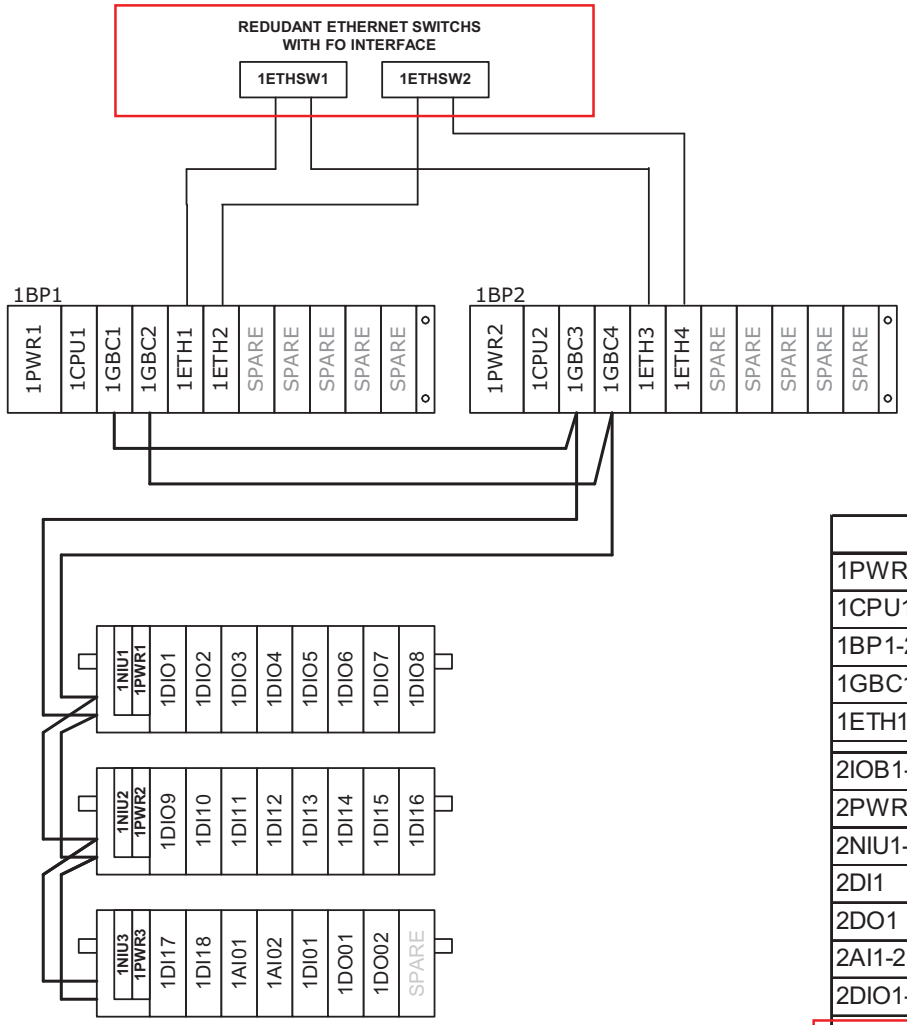
| BHARAT HEAVY ELECTRICALS LTD<br>PROJECT ENGINEERING MANAGEMENT. | |
|---|---|
| This approval status shall be interpreted as laid down in the contract and it shall not receive the contractor from the contractual obligation. | |
| APPROVAL CATEGORY AWARDED = IV | |
| CAT I - Approved<br>CAT II - Approved With Comments as Noted<br>CAT III - Not Approved<br>CAT IV - Reference Drawing | |
| DEPARTMENT | MECHANICAL AUXILIARY |
| NAME:<br>FALGUNI SAHA | |

| | |
|---|---|
| **Project** | KOSTI THERMAL POWER PLANT-SUDAN 4X125MW |
| **Work** | ELECTRO CHLORINATION SYSTEM |
| **Client** | NECL-SUDAN |
| **BHEL DOC No** | PE-VO-250-174-A121 |
| | |
| **Contractor** | BHEL, ( NEW DELHI ) |

| | | | |
|---|---|---|---|
| **System** | 3x12 Kg/h Electro Chlorination System | | |
| **System Supplier** | SEVERN TRENT SERVICES | **CAPITAL CONTROLS INDIA PVT. LTD.** | email: capitalcontrols@vsnl.com. Web:www.capitalcontrolsindia.com |
| **Contact** | 15 A/J, Laxmi Estate, Andheri, Mumbai - 400 053 | **Tel:-** +91 22 26360066 | **Fax:-** +91 22 26368185 |

| | | | | | |
|---|---|---|---|---|---|
| | | | Sandeep | | |
| | | | **PREP** | **CHKD** | **APPVD** |
| | | | **TITLE** | | |
| | | | WIRING SCHEMATIC DIAGRAM | | |
| | | | **No. of Sheets** | | 46 |
| | | | **Doc. No.** | | **Rev.** |
| **Rev. No.** | **Date** | **Remarks** | 2454-G03-001 | | 0 |

# SYSTEM CONFIGURATION




BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not receive the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = IV

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

| DEPARTMENT | MECHANICAL AUXILIARY |
|---|---|
| NAME: FALGUNI SAHA | 2021 |

2008.12.
11
11:34:39
+05'30'

| | Item Description | Catalog No. | Qty |
|---|---|---|---|
| 1PWR1-2 | Power Supply - 24VDC High Capacity | IC693PWR331 | 2 |
| 1CPU1-2 | CPU with 32K memeory & 4000 I/O capacity | IC693CPU350 | 2 |
| 1BP1-2 | CPU Base Rack 10 slots | IC693CHS391 | 2 |
| 1GBC1-4 | Genius Bus Controller | IC693BEM331 | 4 |
| 1ETH1-4 | Ethernet Interface TCP/IP Module | IC693CMM321 | 4 |
| 2IOB1-22 | Compact I/O carriers | IC200CHS022 | 23 |
| 2PWR1-3 | 24VDC Power Supply Module | IC200PWR002 | 3 |
| 2NIU1-3 | Remote I/O genius Network Interface | IC200ERM002 | 3 |
| 2DI1 | 32 Channel Digital Input Module - 24VDC | IC200MDL650 | 1 |
| 2DO1 | 32 Channel Digital Output Module - 24VDC | IC200MDL750 | 2 |
| 2AI1-2 | 15 channel Analog Input Module - 4 to 20 mA | IC200ALG264 | 2 |
| 2DIO1-18 | 10DI/6DO MIX I/O Module | IC200MDD843 | 18 |
| 1ETSW1-2 | Ethernet Switch with fibre optic MEDIA O/P | | 2 |

| REV | DATE | DRAWN | CHKD | APPD |
|---|---|---|---|---|
| 0 | 31/08/08 | SP | JF | SJ |

PROJECTION

SCALE : NTS

ALL DIMENSIONS ARE IN MILIMETERS UNLESS OTHERWISE STATED. TOLERANCE LIMITS FOR PARAMETERS MEASURED ARE ±1% OF RATED VALUES, UNLESS OTHERWISE STATED



| | |
|---|---|
| CUSTOMER | CAPITAL CONTROL INDIA PRIVATE LIMITED |
| END USER | CAPITAL CONTROL INDIA PRIVATE LIMITED |
| CONSULTANT | |
| PROJECT/ APPLICATION | PLC BASED CONTROL SYSTEM |

FANUC

KAIZEN AUTOMATION-THANE

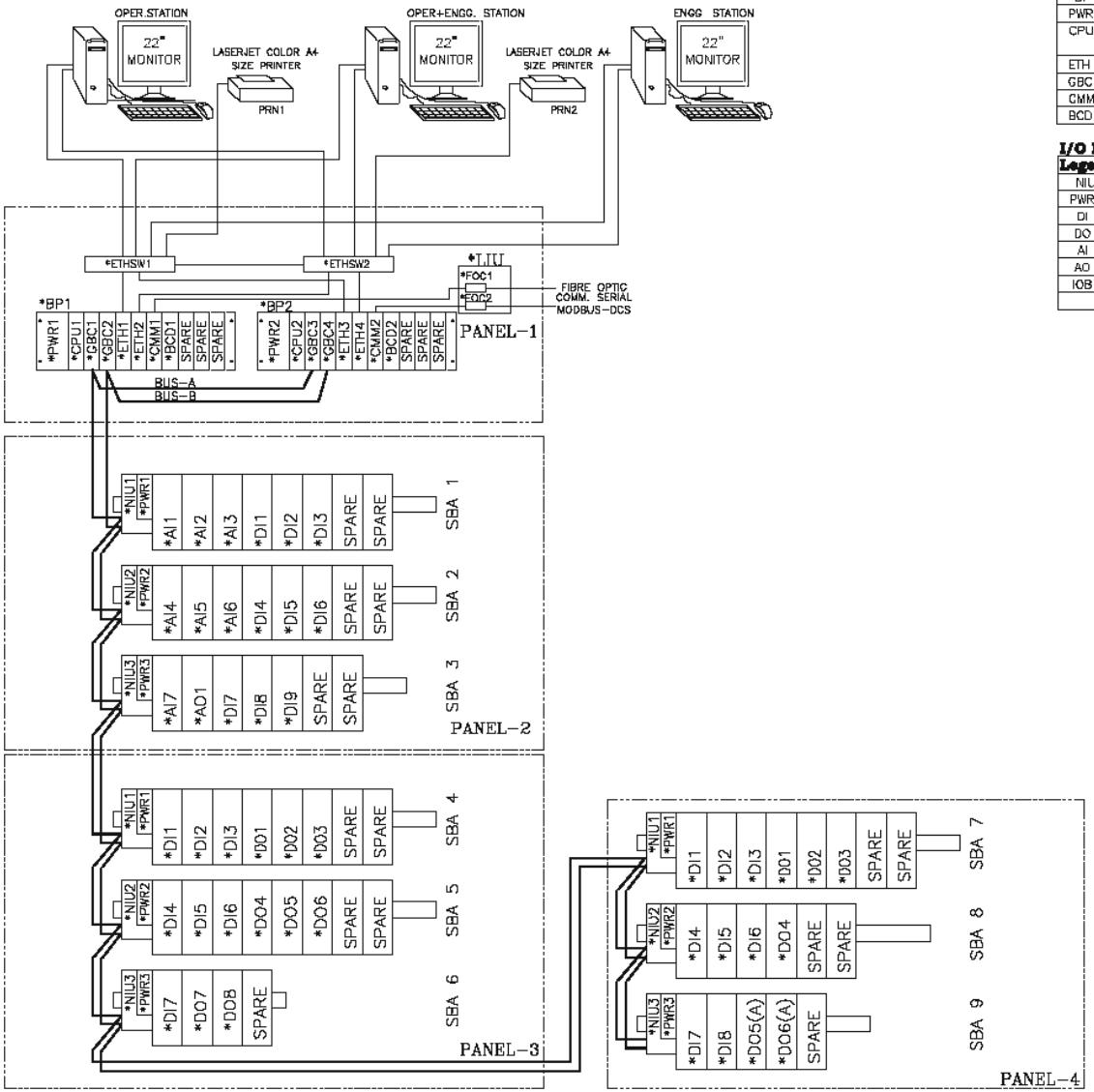
TITLE: SYSTEM CONFIGURATION

DOC.No: KA08-CC-SYS-000

SHT.No: 1 OF 2

REV.No

# SYSTEM CONFIGURATION DRAWING




**PLC HARDWARE**

| Legend | QTY | Description | Cat No |
|---|---|---|---|
| BP | 2 | BASE, CPU, 10 SLOTS, USE WITH CPU331/CSE331 AND ABOVE | IC693CHS391 |
| PWR | 2 | 24VDC HIGH CAPACITY POWER SUPPLY | IC693PWR331 |
| CPU | 2 | CPU 350 MODULE (32K BYTES CONFIGURABLE USER MEMORY, 4K I/O, 8 RACKS), NO BUILT-IN SERIAL PORTS .22MSEC/K | IC693CPU350 |
| ETH | 4 | ETHERNET INTERFACE TCP/IP MODULE | IC693CMM321 |
| GBC | 4 | GENIUS BUS CONTROLLER | IC693BEM331 |
| CMM | 2 | COMMUNICATION MODULE RS485-MODBUS RTU FOR DCS | IC693CMM311 |
| BCD | 2 | INPUT 24VDC POS/NEG LOGIC FOR IRIGB INTERFACE(TIME SYNCRONISATION) | IC693MDL655 |

**I/O HARDWARE**

| Legend | QTY | Description | Cat No |
|---|---|---|---|
| NIU | 9 | REMOTE I/O GENIUS NETWORK INTERFACE UNIT | IC200GBI001 |
| PWR | 9 | POWER SUPPLY WITH EXPANDED 3.3VDC 24VDC INPUT | IC200PWR002 |
| DI | 24 | INPUT 24VDC POS/NEG LOGIC 32PT | IC200MDL650 |
| DO | 14 | OUTPUT 24VDC POS LOGIC 0.5A PER PT (2 GROUPS OF 16) 32PT | IC200MDL750 |
| AI | 7 | ANALOG INPUT 12 BIT VOLTAGE/CURRENT 8CH | IC200ALG260 |
| AO | 1 | ANALOG OUTPUT CURRENT 8CH | IC200ALG326 |
| IOB | 62 | COMPACT I/O CARRIER BOX STYLE | IC200CHS022 |
| | | | |

NOTES:
* PREFIX SHALL BE RESPECTIVE PANEL NOs.
* THE IO MODULE QUANTITY IS SUBJECT TO APPROVAL OF IO LIST.

| REV | DATE | DRAWN | CHKD | APPD |
|---|---|---|---|---|
| 1 | 26.12.08 | AB | DV | VP |
| 0 | 31.10.08 | AB | DV | VP |

PROJECTION | SCALE: NTS | SIZE : A4

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED. TOLERANCE LIMITS FOR PARAMETERS MEASURED ARE ±1% OF RATED VALUES, UNLESS OTHERWISE STATED.



| | |
|---|---|
| CLIENT:- | M/s. VATECH WABAG LTD. |
| APPLICATION/ PROJECT:- | PLC SYSTEM FOR DM PLANT |
| END USER :- | M/s. NEC(SUDAN) |
| TITLE :- | CONFIGURATION DRAWING |

NATIONAL ELECTRICITY CORPORATION. (NEC) SUDAN
4x125 MW KOSTI THERMAL POWER PLANT

CONSULTANTS
FICHTNER CONSULTING ENGINEERS (GERMANY)

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA.
BHEL DOC NO: PE-VO-250-163-A136

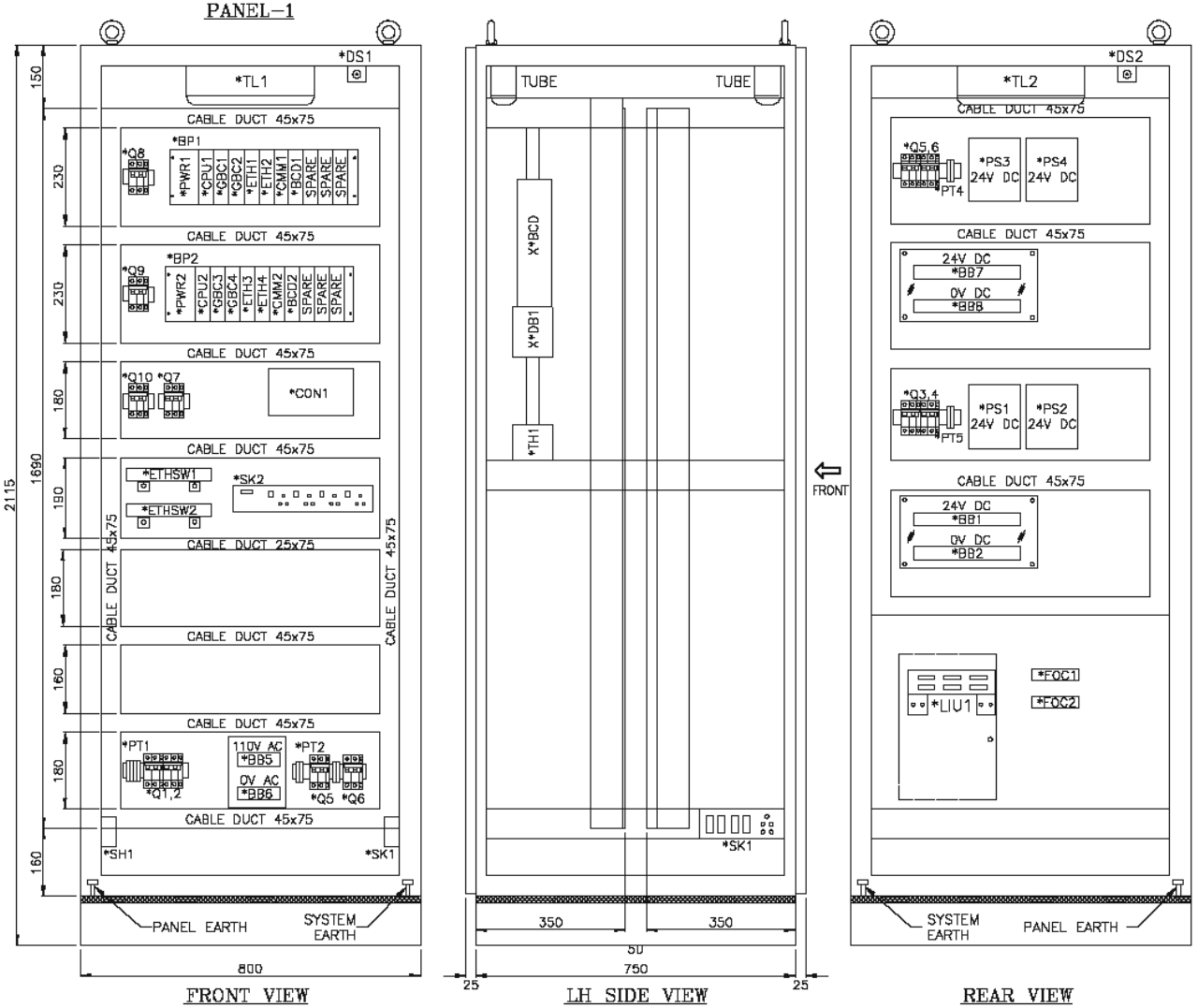
VA TECH WABAG LIMITED
Bhokti Plaza, 2nd Floor, Near Aundh Police Station, Aundh, Pune - 411 007 (India)
VATECH DOC NO:P116-10003-021

PRIME CONTROLS PROJECTS DIVISION
PH. NO: (020)64702484/64702485 Email : projects@primecontrols.in

DOCUMENT No.:- P2823KOS-02 | QA No..-
REV. No..- 1 | SHEET 1 OF 3 | P2823KOS

FORMAT NO:1110001R1

# GENERAL ARRANGEMENT DRAWING (IGA) FOR CPU PANEL–1




NOTE:
*BB3 AND * BB4 BUSBARS KEPT SPARE
*PT3 TERMINALS KEPT SPARE

*:– PREFIX SHALL BE "1"

COMPONENT ARRANGEMENT SUBJECT TO CHANGE FOR EASE OF WIRING.

NATIONAL ELECTRICITY CORPORATION. (NEC) SUDAN
4x125 MW KOSTI THERMAL POWER PLANT

CONSULTANTS
FICHTNER CONSULTING ENGINEERS (GERMANY)

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA.
BHEL DOC NO: PE–VQ–250–163–A138

VA TECH WABAG LIMITED
Bhakti Plaza, 2nd Floor.
Near Aundh Police Station,
Aundh. Pune – 411 007 (India)
VATECH DOC NO:P116–10008–001

| REV | DATE | DRAWN | CHKD | APPD | SIZE : A4 |
|---|---|---|---|---|---|
| 1 | 26.12.08 | AB | DV | VP | PROJECTION |
| 0 | 31.10.08 | AB | DV | VP | SCALE: NTS |

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED TOLERANCE LIMITS FOR PARAMETERS MEASURED ARE ±1% OF RATED VALUES, UNLESS OTHERWISE STATED.



| | |
|---|---|
| CLIENT:– | M/s. VATECH WABAG LTD. |
| APPLICATION/ PROJECT:– | PLC SYSTEM FOR DM PLANT |
| END USER :– | M/s. NEC(SUDAN) |
| TITLE :– | GENERAL ARRANGEMENT DRAWING(IGA) CPU PANEL (PANEL1) |

PRIME CONTROLS
PROJECTS DIVISION
PH. NO: (020)64702484/64702485
Email : projects@primecontrols.in

| | | |
|---|---|---|
| DOCUMENT No.:– P2823KOS–04–05 | | OA No.:– |
| REV No.:– 1 | SHEET 2 OF 7 | P2823KOS |

FORMAT NO:111D001R1

## RW PLC

| Serial No | Tag name | Tag Description | Modbus address | Point Type | ENGG. UNIT | Range | Function Code |
|---|---|---|---|---|---|---|---|
| 1 | I00035 | ON_F/B_RWIP1 | I00035 | BOOL | NA | NA | **2** |
| 2 | I00036 | **OFF_F/B_RWIP1** | I00036 | BOOL | NA | NA | **2** |
| 3 | I00039 | OVRLOAD_TRIP_RWIP1 | I00039 | BOOL | NA | NA | **2** |
| 4 | I00067 | ONF/B_RWIP2 | I00067 | BOOL | NA | NA | **2** |
| 5 | I00068 | OFF_F/B_RWIP2 | I00068 | BOOL | NA | NA | **2** |
| 6 | I00071 | TRIP_OVRLOAD_RWIP2 | I00071 | BOOL | NA | NA | **2** |
| 7 | I00099 | ONF/B_RWIP3 | I00099 | BOOL | NA | NA | **2** |
| 8 | I00100 | OFF_F/B_RWIP3 | I00100 | BOOL | NA | NA | **2** |
| 9 | I00103 | OVRLOADTRIP_RWIP3 | I00103 | BOOL | NA | NA | **2** |
| 10 | I00033 | START_RWIP1 | I00033 | BOOL | NA | NA | **2** |
| 11 | I00034 | STOP_RWIP1 | I00034 | BOOL | NA | NA | **2** |
| 12 | I00035 | ON_F/B_RWIP1 | I00035 | BOOL | NA | NA | **2** |
| 13 | I00036 | OFF_F/B_RWIP1 | I00036 | BOOL | NA | NA | **2** |
| 14 | I00065 | START_RWIP2 | I00065 | BOOL | NA | NA | **2** |
| 15 | I00066 | STOP_RWIP2 | I00066 | BOOL | NA | NA | **2** |
| 16 | I00067 | ONF/B_RWIP2 | I00067 | BOOL | NA | NA | **2** |
| 17 | I00068 | OFF_F/B_RWIP2 | I00068 | BOOL | NA | NA | **2** |
| 18 | I00097 | START_RWIP3 | I00097 | BOOL | NA | NA | **2** |
| 19 | I00098 | STOP_RWIP3 | I00098 | BOOL | NA | NA | **2** |
| 20 | I00099 | ONF/B_RWIP3 | I00099 | BOOL | NA | NA | **2** |
| 21 | I00100 | OFF_F/B_RWIP3 | I00100 | BOOL | NA | NA | **2** |
| 22 | I00044 | START_SCS1 | I00044 | BOOL | NA | NA | **2** |
| 23 | I00045 | STOP_SCS1 | I00045 | BOOL | NA | NA | **2** |
| 24 | I00046 | ON_F/B_SCS1 | I00046 | BOOL | NA | NA | **2** |
| 25 | I00047 | OFF_F/B_SCS1 | I00047 | BOOL | NA | NA | **2** |
| 26 | I00076 | START_SCS2 | I00076 | BOOL | NA | NA | **2** |
| 27 | I00077 | STOP_SCS2 | I00077 | BOOL | NA | NA | **2** |
| 28 | I00078 | ON_F/B_SCSMTR2 | I00078 | BOOL | NA | NA | **2** |
| 29 | I00079 | OFF_F/B_SCS2 | I00079 | BOOL | NA | NA | **2** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Note: 1.Tag Name and Descriptions
are of that of Slave devices
2. Modbus Address is register address in Slave Device
3. Engg unit is unit of measurement
Ex Pressure - bar, Temp Deg C etc
4. Point type is Analog or packed binary
5. Range applicable for analog value and is instrument range
6- Function code is Modbus function code used to update data from slave to master
Ex Function Code for Read Input Register etc
7. Kindly Indicate Start and end register address for each function type
and each block of data

| FOPH PLC | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Serial No** | **Tag name** | **Tag Description** | **Modbus address** | **Point Type** | **ENGG. UNIT** | **Range** | **Function Code** |
| 1 | FT-01 | GAS OIL TO STORAGE TANK FLOW (9EGC30CF001) | 1 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 2 | LIT-01 | 9EGB30BB001 LEVEL INDICATION | 3 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 3 | LIT-02 | 9EGB31BB001 LEVEL INDICATION | 5 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 4 | …… | SPARE | 7 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 5 | PIT-04 | CRUDE OIL RECEIPT LINE (9EGC10CP004) | 9 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 6 | PIT-01 | PRESSURE INDICATION CRUDE OIL LINE (9EGC10CP001) | 11 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 7 | PIT-02 | PRESSURE INDICATION CRUDE OIL LINE (9EGC10CP002) | 13 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 8 | …… | SPARE | 15 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 9 | PIT-03 | CRUDE OIL RECEIPT LINE (9EGC10CP003) | 17 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 10 | LIT-03 | CRUDE OIL STORAGE TANK (9EGB10CL001) | 19 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 11 | LIT-04 | CRUDE OIL STORAGE TANK (9EGB10CL001) | 21 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 12 | …… | SPARE | 23 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 13 | TIT-01 | CRUDE OIL STORAGE TANK (9EGB10CT001) | 25 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 14 | TIT-02 | CRUDE OIL STORAGE TANK (9EGB10CT002) | 27 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 15 | TIT-03 | CRUDE OIL STORAGE TANK (9EGB10CT003) | 29 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 16 | …… | SPARE | 31 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 17 | TIT-04 | CRUDE OIL SUCTION HTR (9EGB10CT004) | 33 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 18 | TIT-05 | CRUDE OIL STORAGE TANK (9EGB11CT001) | 35 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 19 | TIT-06 | CRUDE OIL STORAGE TANK (9EGB11CT002) | 37 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 20 | …… | SPARE | 39 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 21 | TIT-07 | CRUDE OIL STORAGE TANK (9EGB11CT003) | 41 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 22 | TIT-08 | CRUDE OIL STORAGE TANK (9EGB11CT004) | 43 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 23 | ZT-01 | FC HTR VALVE POSITION (9EGB10AA104) | 45 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 24 | …… | SPARE | 47 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 25 | ZT-04 | SUCTION HTR VALVE POSITION (9EGB1CAA105) | 49 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 26 | ZT-05 | FC HTR I/L VALVE POSITION (9EGB11AA104) | 51 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 27 | ZT-08 | SUCTION HTR I/L VALVE POSITION (9EGB11AA105) | 53 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 28 | …… | SPARE | 55 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 29 | LIT-05 | CRUDE OIL STORAGE TANK (9EGB12CL001) | 57 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 30 | LIT-06 | CRUDE OIL STORAGE TANK (9EGB13CL001) | 59 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 31 | TIT-09 | CRUDE OIL STORAGE TANK (9EGB12CT001) | 61 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 32 | …… | SPARE | 63 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 33 | TIT-10 | CRUDE OIL STORAGE TANK TEMP (9EGB12CT002) | 65 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 34 | TIT-11 | CRUDE OIL STORAGE TANK TEMP (9EGB12CT003) | 67 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 35 | TIT-12 | CRUDE OIL STORAGE TANK TEMP (9EGB12CT004) | 69 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 36 | …… | SPARE | 71 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 37 | TIT-13 | CRUDE OIL SUCTION HEATERS TEMP (9EGB13CT001) | 73 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 38 | TIT-14 | CRUDE OIL SUCTION HEATERS TEMP (9EGB13CT002) | 75 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 39 | TIT-15 | CRUDE OIL SUCTION HEATERS TEMP (9EGB13CT003) | 77 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 40 | …… | SPARE | 79 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 41 | TIT-16 | CRUDE OIL STORAGE TANK TEMP (9EGB13CT004) | 81 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 42 | ZT-09 | FC HTR I/L VALVE POSN (9EGB12AA104) | 83 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 43 | ZT-12 | SUCTION HTR I/L VALVE POSN. (9EGB12AA105) | 85 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 44 | …… | SPARE | 87 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 45 | ZT-13 | FC HTR I/L VALVE POSITION (9EGB13AA104) | 89 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 46 | ZT-16 | SUCTION HTR I/L  VALVE POSITION (9EGB13AA105) | 91 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 47 | TIT-17 | DRAIN OIL TEMPERATURE (9EGB20CT001) | 93 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 48 | …… | SPARE | 95 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 49 | ZT-17 | DRAIN OIL TANK TEMP. CTRL (9EGB20AA101) | 97 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 50 | IT-01 | CURRENT MEASUREMENT DRIVES (9EGB32AP001) | 99 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 51 | IT-02 | CURRENT MEASURMENT DRIVES (9EGB33AP001) | 101 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 52 | …… | SPARE | 103 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 53 | IT-03 | CURRENT MEASUREMENT DRIVES (9EGB34AP001) | 105 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 54 | FIT-02 | CRUDE OIL RECEIPT LINE (9EGC10CF001) | 107 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 55 | …… | SPARE | 109 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 56 | …… | SPARE | 111 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 57 | TY-01 | FC HTR I/L VALVE (9EGB10AA104) | 113 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 58 | TY-04 | SUCTION HTR I/L VALVE (9EGB10AA105) | 115 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 59 | TY-05 | FLOOR COIL HTR INLET (9EGB11AA104) | 117 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 60 | …… | SPARE | 119 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 61 | TY-08 | SUCTION HTR INLET (9EGB11AA105) | 121 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 62 | TY-09 | FLOOR COIL HTR INLET (9EGB12AA104) | 123 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 63 | TY-12 | SUCTION HTR INLET (9EGB12AA105) | 125 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 64 | …… | SPARE | 127 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 65 | TY-13 | FLOOR COIL HTR INLET (9EGB13AA104) | 129 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 66 | TY-16 | SUCTION HTR INLET (9EGB13AA105 | 131 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 67 | TY-17 | DRAIN OIL TANK TEMP CTRL (9EGB20AA101) | 133 | Analog | As per Field Instrument | As per Field Instrument | 03-Holding Registers |
| 68 | …… | SPARE | 135 | | | | 03-Holding Registers |
| 69 | …… | SPARE | 137 | | | | 03-Holding Registers |
| 70 | …… | SPARE | 139 | | | | 03-Holding Registers |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 71 | …… | SPARE | 141 | | | | 03-Holding Registers |
| 72 | …… | SPARE | 143 | | | | 03-Holding Registers |
| 73 | | SPARE | 145 | | | | 03-Holding Registers |
| 74 | | SPARE | 147 | | | | 03-Holding Registers |
| 75 | | SPARE | 149 | | | | 03-Holding Registers |
| 76 | | SPARE | 151 | | | | 03-Holding Registers |
| 77 | | SPARE | 153 | | | | 03-Holding Registers |

Note : We have considered all tags as Integers with 16 bit format

Note: 1.Tag Name and Descriptions
are of that of Slave devices

2. Modbus Address is register address in Slave Device

3. Engg unit is unit of measurement
Ex Pressure - bar, Temp Deg C etc

4. Point type is Analog or packed binary

5. Range applicable for analog value and is instrument range

6- Function code is Modbus function code used to update data from slave to master
Ex Function Code for Read Input Register etc

7. Kindly Indicate Start and end register address for each function type
and each block of data

# Modbus COMMUNICATION DETAILS ECP PLC

| | |
|---|---|
| **Vendor Name :** | Kaizen Automation |
| | |
| **System Name** | Electrochlorination |
| **Vendor Software details :** | |
| | |
| **Operating System** | |
| **OS Details :** | windows 7 |
| **Workgroup Name:** | |
| **Domain Name:** | |
| | |
| **Third party system is acting as** | |
| **Client:** | |
| **Server:** | |
| | |
| **Protocol details** | |
| **Client** | |
| **OPC DA:** | |
| **OPC H D A:** | |
| **OPC A&E:** | |
| | |
| **Server** | |
| **OPC DA:** | |
| **OPC H D A:** | |
| **OPC A&E:** | |
| | |
| **Host Details:** | |
| **Redundancy Supported:** | yes |
| | |
| **Primary Host Details:** | |
| **Name:** | |
| **IP Address:** | 192.168.100.126 |
| **Sub Net Mask:** | 255.255.255.0 |
| | |
| **Redundant Host Details (If Required)** | |
| **Name:** | |
| **IP Address:** | 192.168.101.126 |
| **Sub Net Mask:** | 255.255.255.0 |
| | |
| **Prog ID Details** | |
| **Syntax:** | |
| | |
| **CLS ID Details (If Required)** | |
| **File to be imported:** | |
| | |
| **Third party User account Details** | |
| **User Name:** | |
| **Password:** | |
| **User Name:** | |
| **Password:** | |

**NOTE:** 1) Availability of read/write permission to data on which read/write operation required from Honeywell
2) Permission to create one of the OPC user on 3rd party OPC server machine (Dcom settings)

## OPC Interface Details ECP PLC

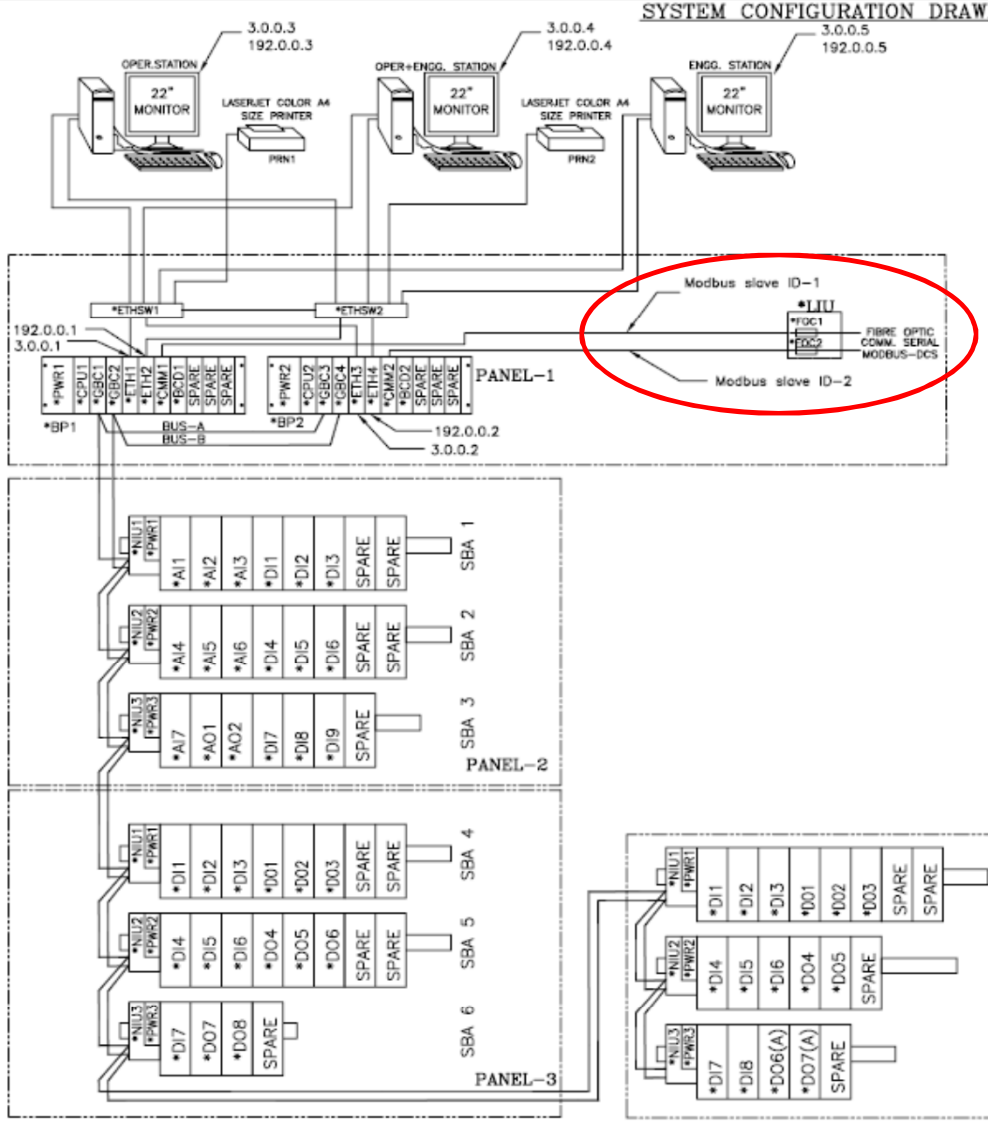
**Tagwise details**

| Sr No. | DCS Tag No. (Maximum 16 Char.) | Service Comment ( Maximum 12 + 12 Char.) | | DCS Range LO | DCS Range HI | Engg Unit (DCS) | Data Type (Note-1) | State text for 0 condition | State text for 1 condition | Normal State (State 0 or State 1) | Alarm Requirement (Y / N) | Alarm Priority (URGENT / HI / LO) | Data format | Source Address | Bit position |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ACP-MP-904A-TRIP | ACID CLEANING PUMP 1 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 0 |
| 2 | ACP-MP-904B-TRIP | ACID CLEANING PUMP 2 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 1 |
| 3 | BLW-MA-901A-TRIP | HYDROGEN DILUTING BLOWER-1 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 2 |
| 4 | BLW-MA-901B-TRIP | HYDROGEN DILUTING BLOWER-2 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 3 |
| 5 | BLW-MA-901C-TRIP | HYDROGEN DILUTING BLOWER-3 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 4 |
| 6 | BLW-MA-901D-TRIP | HYDROGEN DILUTING BLOWER-4 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 5 |
| 7 | CWP-MP-P902A-TRIP | HYPO DOSING PUMP-1 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 6 |
| 8 | CWP-MP-P902B-TRIP | HYPO DOSING PUMP-2 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 7 |
| 9 | CWP-MP-P902C-TRIP | HYPO DOSING PUMP-3 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 8 |
| 10 | CWP-MP-P902D-TRIP | HYPO DOSING PUMP-4 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 9 |
| 11 | CWP-MP-P902E-TRIP | HYPO DOSING PUMP-5 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 10 |
| 12 | CWP-MP-P902F-TRIP | HYPO DOSING PUMP-6 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 11 |
| 13 | BP-MP-P901A-TRIP | BOOSTER PUMP 1 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 12 |
| 14 | BP-MP-P901B-TRIP | BOOSTER PUMP-2 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 13 |
| 15 | BP-MP-P901C-TRIP | BOOSTER PUMP 3 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 14 |
| 16 | ST-MF-F901A-TRIP | SELF CLEANING STRAINER 1 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 15 |
| 17 | ST-MF-F901B-TRIP | SELF CLEANING STRAINER 2 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 16 |
| 18 | ST-MF-F901C-TRIP | SELF CLEANING STRAINER 3 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 17 |
| 19 | NDP-MP-903A-TRIP | DEWATERING PUMP -1 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 18 |
| 20 | NDP-MP-903B-TRIP | DEWATERING PUMP -2 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 19 |
| 21 | MF-Y901A | RECTIFIER 1 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 20 |
| 22 | MF-Y901B | RECTIFIER 2 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 21 |
| 23 | MF-Y901C | RECTIFIER 3 TRIP | | | | | bool | ok | Tripped | | y | HI | | %RD1000 | 22 |
| 24 | | Both the air dilution Blowers trip. | | | | | bool | | | | y | HI | | %RD1000 | 23 |
| 25 | | High alarm at Hydrogen Detector. | | | | | bool | | | | y | HI | | %RD1000 | 24 |
| 26 | | HYPO DOSING PUMP-1 Run | | | | | bool | | | | | | | %RD1000 | 25 |
| 27 | | HYPO DOSING PUMP-2 Run | | | | | bool | | | | | | | %RD1000 | 26 |
| 28 | | HYPO DOSING PUMP-3 Run | | | | | bool | | | | | | | %RD1000 | 27 |
| 29 | | HYPO DOSING PUMP-4 Run | | | | | bool | | | | | | | %RD1000 | 28 |
| 30 | | HYPO DOSING PUMP-5 Run | | | | | bool | | | | | | | %RD1000 | 29 |
| 31 | | HYPO DOSING PUMP-6 Run | | | | | bool | | | | | | | %RD1000 | 30 |
| 32 | Spare | | | | | | bool | | | | | | | %RD1000 | 31 |
| 33 | Spare | | | | | | bool | | | | | | | %RD1001 | 0 |
| 34 | Spare | | | | | | bool | | | | | | | %RD1001 | 1 |
| 35 | Spare | | | | | | bool | | | | | | | %RD1001 | 2 |
| 36 | Spare | | | | | | bool | | | | | | | %RD1001 | 3 |
| 37 | Spare | | | | | | bool | | | | | | | %RD1001 | 4 |
| 38 | Spare | | | | | | bool | | | | | | | %RD1001 | 5 |
| 39 | FT-902 | FLOW AT MAIN WATER INLET | | | | m3/hr | real | | | | | | | %RD1002 | |
| 40 | LT-901A | LEVEL AT HYPO TANK-1 | | | | meter | real | | | | | | | %RD1003 | |
| 41 | LT-901B | LEVEL AT HYPO TANK-2 | | | | meter | real | | | | | | | %RD1004 | |
| | | | | | | | | | | | | | | | |

Notes:
1. Data type (AI/AO/DI/DO) shall be specified with respect to DCS. (i.e. Analog signal from TPI to DCS shall be specified as AI
2. For Digital points (IOs) please indicate the alarm state

**MODBUS COMMUNICATION DETAILS FOR KOSTI PROJECT** **REFER FOLLOWING DWG.**

# SYSTEM CONFIGURATION DRAWING




**PLC HARDWARE**

| Legend | QTY | Description | Cat No |
|---|---|---|---|
| BP | 2 | BASE, CPU, 10 SLOTS, USE WITH CPU331/CSE331 AND ABOVE | IC693CHS391 |
| PWR | 2 | 24VDC HIGH CAPACITY POWER SUPPLY | IC693PWR331 |
| CPU | 2 | CPU 360 MODULE (240K BYTES CONFIGURABLE USER MEMORY, 4K I/O, 8 RACKS), NO BUILT-IN SERIAL PORTS .22MSEC/K | IC693CPU360 |
| ETH | 4 | ETHERNET INTERFACE TCP/IP MODULE | IC693CMM321 |
| GBC | 4 | GENIUS BUS CONTROLLER | IC693BEM331 |
| CMM | 2 | COMMUNICATION MODULE RS485-MODBUS RTU FOR DCS | IC693CMM311 |
| BCD | 2 | INPUT 24VDC POS/NEG LOGIC FOR IRIGB INTERFACE(TIME SYNCRONISATION) | IC693MDL655 |

**I/O HARDWARE**

| Legend | QTY | Description | Cat No |
|---|---|---|---|
| NIU | 9 | REMOTE I/O GENIUS NETWORK INTERFACE UNIT | IC200GBI001 |
| PWR | 9 | POWER SUPPLY WITH EXPANDED 3.3VDC 24VDC INPUT | IC200PWR002 |
| DI | 24 | INPUT 24VDC POS/NEG LOGIC 32PT | IC200MDL650 |
| DO | 15 | OUTPUT 24VDC POS LOGIC 0.5A PER PT (2 GROUPS OF 16) 32PT | IC200MDL750 |
| AI | 7 | ANALOG INPUT 12 BIT VOLTAGE/CURRENT 8CH | IC200ALG260 |
| AO | 2 | ANALOG OUTPUT CURRENT 8CH | IC200ALG326 |
| IOB | 62 | COMPACT I/O CARRIER BOX STYLE | IC200CHS022 |

NOTES:
* PREFIX SHALL BE RESPECTIVE PANEL NOs.
* THE IO MODULE QUANTITY IS SUBJECT TO APPROVAL OF IO LIST.

| REV | DATE | DRAWN | CHKD | APPD |
|---|---|---|---|---|
| 3 | 24.03.09 | AB | DV | VP |
| 2 | 10.02.09 | AB | DV | VP |
| 1 | 26.12.08 | AB | DV | VP |
| 0 | 31.10.08 | AB | DV | VP |

PROJECTION
SCALE: NTS
SIZE : A4
FORMAT NO:1110001R1



| | |
|---|---|
| CLIENT:- | M/s. VATECH WABAG LTD. |
| APPLICATION/ PROJECT:- | PLC SYSTEM FOR DM PLANT |
| END USER :- | M/s. NEC(SUDAN) |
| TITLE :- | CONFIGURATION DRAWING |

NATIONAL ELECTRICITY CORPORATION. (NEC) SUDAN
4x125 MW KOSTI THERMAL POWER PLANT

CONSULTANTS
FICHTNER CONSULTING ENGINEERS (GERMANY)

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA.
BHEL DOC NO: PE-VO-250-163-A136

VA TECH WABAG LIMITED
Bhakti Plaza, 2nd Floor, Near Aundh Police Station, Aundh, Pune - 411 007 (India)
VA TECH WABAG VATECH DOC NO:P116-I0003-021

PRIME CONTROLS PROJECTS DIVISION
PH. NO: (020)64702484/64702485 Email : projects@primecontrols.in
DOCUMENT No.:- P2823KOS-02 OA No.:-
REV. No.:-ASBUILT SHEET 1 OF 3 P2823KOS

**By:** Prime Controls

**For DCS communication the protocol in the PLC is configured as**

**Mobus RTU Slave**
**Protocol shall be use :** RS422 / RS485
**Station address :** CPU - A = 1 CPU - B = 2
**Communication details like :**
**Baud Rate :** 19200
**Parity :** ODD
**FOR DETAILS SEE CFG DWG. SHEET**

The tags are all for DCS communication to be **'Read only"**

**Following modbus function to be used in DCS**

| **Function:** | | | | | |
|---|---|---|---|---|---|
| | **FUNCTION CODE** | **GEF PLC address** | **SCALING** | **DESCRIPTION** | **TYPE** |
| **Coils** | 0xxxx or 0xxxxx | %Q1 onwards | N. A. | DIGITAL OUTPUTS | BOOL / BIT |
| **Inputs** | 1xxxx or 1xxxxx | %i1 onwared | N. A. | DIGITAL INPUTS | BOOL / BIT |
| **Registers** | 3xxxx or 3xxxxx | %R1 onward | 1:1 | INTERNAL REGISTERS (16BIT MEMORY AREA) | INTEGER |
| **Analog Inputs** | 4xxxx or 4xxxxx | %Ai1 onwards | 4-20ma corr. 0 -32000 counts (RAW VALUE) The same is to be scaled in DCS as per data given by VATech (Integer data) | | INTEGER |

**TO READ THE HARDWARE SIGNALS, REFER MODULE DRAWINGS. (DOC. NO.: P2823KOS-08)**

**DEVELOPEER NEEDS TO ADD THE RESPECTIVE FUNCTION CODES TO THE PLC ADDRESS TO READ THE STATUS AT DCS END.**

**FOR eq.**

| **ADDRESS TYPE** | **ADDRESS TO BE READ** | **FUNCTIN CODE** | **MODBUS ADDRESS AT DCS END** |
|---|---|---|---|
| DIGITAL INPUT (BIT) | %i00115 | 1 | 10115 or 100115 |
| DIGITAL OUTPUT (BIT) | %Q00217 | 0 | 00217 or 000217 |
| REGISTER (INTEGER) | %R7183 | 3 | 37183 or 307183 |
| ANALOG INPUTS (INTEGER) | %R0042 | 4 | 40042 or 400042 |

**FOR THIS SHEET ONLY**

* GE PLC ADDRESS MARKED IN COLOR

** VALUES MARKED IN COLOR

MODBUS / DCS ADDRESS MARKED IN COLOUR

VALUES TO BE CAOMPARE AT DCS END FOR THE STATUS OF EACH FILTER.

| ** | PSF | | | |
|---|---|---|---|---|
| VALUES | A.SERVICE | PSF 1 | PSF 2 | PSF 3 |
| 2** | 1. Refill | %R4601 | %R4602 | %R4604 |
| 4 | 2. Service | | | |
| 1 | 3. Off | | | |
| 7 | B. BACKWASH | | | |
| 1 | 1. Draindown | %R4603 | | |
| 2 | 2. Air Scouring | | | |
| 3 | 3. Backwash | | | |
| 4 | 4. Fast Rinse | | | |
| 5 | 5. Standby | | | |

| | ACF | | | |
|---|---|---|---|---|
| VALUES | A.SERVICE | ACF 1 | ACF 2 | ACF 3 |
| 2 | 1. Refill | %R4611 | %R4612 | %R4614 |
| 4 | 2. Service | | | |
| 1 | 3. Off | | | |
| 7 | B. BACKWASH | | | |
| 1 | 1. Draindown | %R4613 | | |
| 2 | 2. Fast Rinse | | | |
| 3 | 3. Standby | | | |

| | FBCE | | | |
|---|---|---|---|---|
| VALUES | A.SERVICE | FBCE 1 | FBCE 2 | FBCE 3 |
| 2 | 1. Air Release | %R4621 | %R4622 | %R4624 |
| 4 | 2. Service | | | |
| 1 | 3. Off | | | |
| 7 | B. REGENERATION | | | |
| 1 | 1. Acid Injection 2% | %R4623 | | |
| 2 | 2. Acid Injection 4% | | | |
| 3 | 3. Acid Displacement | | | |
| 4 | 4. Fast Rinse to Drain | | | |
| 5 | 5. Recycle Rinse | | | |
| 6 | 6. Stand By | | | |

| | FBAE | | | |
|---|---|---|---|---|
| VALUES | A.SERVICE | FBAE 1 | FBAE 2 | FBAE 3 |
| 2 | 1. Air Release | %R4631 | %R4632 | %R4634 |
| 4 | 2. Service | | | |
| 1 | 3. Off | | | |
| 7 | B. REGENERATION | | | |
| 1 | 1. Alkali injection | %R4633 | | |
| 2 | 2. Alkali Displacement | | | |
| 3 | 3. Acid Displacement | | | |
| 4 | 4. Recycle Rinse | | | |
| 5 | 5. Stand By | | | |

| | MB | | | |
|---|---|---|---|---|
| VALUES | A.SERVICE | MB 1 | MB 2 | MB 3 |
| 2 | 1. Air Release | %R4641 | %R4642 | %R4644 |
| 3 | 2. Rinse | | | |
| 4 | 3. Service | | | |
| 1 | 4. Off | | | |
| 7 | B. REGENERATION | | | |
| 1 | 1. Middle Collector Wash | %R4643 | | |
| 2 | 2. Back wash | | | |
| 3 | 3. Settle | | | |
| 4 | 4. Alkali/ Acid Power Water | | | |
| 5 | 5. Alkali/ Acid Injection | | | |
| 6 | 6. Alkali/ Acid Displacement | | | |
| 7 | 7. Drain Down | | | |
| 8 | 8. Air Mixing | | | |
| 9 | 9. Fill up | | | |
| 10 | 10. Final Rinse | | | |
| 11 | 11. Stand By | | | |

| | CPWS-PSF | |
|---|---|---|
| VALUES | A.SERVICE | 1 |
| 2 | 1. Refill | %R4661 |
| 4 | 2. Service | |
| 1 | 3. Off | |
| 7 | B. BACKWASH | |
| 1 | 1. Draindown | %R4663 |
| 2 | 2. Air Scouring | |
| 3 | 3. Backwash | |
| 4 | 4. Fast Rinse | |
| 5 | 5. Standby | |

| | PPWS-PSF | |
|---|---|---|
| VALUES | A.SERVICE | 1 |
| 2 | 1. Refill | %R4651 |
| 4 | 2. Service | |
| 1 | 3. Off | |
| 7 | B. BACKWASH | |
| 1 | 1. Draindown | %R4653 |
| 2 | 2. Air Scouring | |
| 3 | 3. Backwash | |
| 4 | 4. Fast Rinse | |
| 5 | 5. Standby | |

| VALUES | NEUTRA PIT SELECTION | 1 | |
|---|---|---|---|
| 1 | NPIT 1 SELECTED | %R4671 | LOGIC TO BE WRITTEN IN COMBINATION |
| 2 | NPIT 2 SELECTED | | |
| | NEUTRALIZATION STEPS RUNNING | | |
| 1 | 1. RECIRCULATION RUNNING | %R4672 | |
| 2 | 2. ACID INJECTION RUNNING | | |
| 3 | 3. CAUSTIC INJECTION | | |
| 4 | 4. DUMPING RUNNING | | |
| 0 | 5. IDLE | | |

| GE FANUC ADDRESSING | MODBUS ADDRESSING | GE FANUC ADDRESSING | MODBUS ADDRESSING |
|---|---|---|---|
| %R4601 | 34601 | %R4631 | 34631 |
| %R4602 | 34602 | %R4632 | 34632 |
| %R4603 | 34603 | %R4633 | 34633 |
| %R4604 | 34604 | %R4634 | 34634 |
| %R4611 | 34611 | %R4641 | 34641 |
| %R4612 | 34612 | %R4642 | 34642 |
| %R4613 | 34613 | %R4643 | 34643 |
| %R4614 | 34614 | %R4644 | 34644 |
| %R4621 | 34621 | %R4651 | 34651 |
| %R4622 | 34622 | %R4653 | 34653 |
| %R4623 | 34623 | %R4621 | 34621 |
| %R4624 | 34624 | %R4661 | 34661 |
| %R4671 | 34671 | %R4663 | 34663 |
| %R4672 | 34672 | | |