DRAWING NO:-SATS/EFEW/PLC/20-21/SM03122021

	Strip Terminal No.	Target sign. Main Sign.
	XI:	
	1	2WAY SELECTOR SWITCH
	2	2WAY SELECTOR SWITCH
	3	2WAY SELECTOR SWITCH
	4	2WAY SELECTOR SWITCH
	230V AC SUPLY:	
Q1-1	1	6A DP MCB Q2
Q1-2	2	6A DP MCB Q4
	3	
	4	
	24V DC:	
	1	6A SP MCB
	2	7 INCH HMI
	3	
	XCPUDI:	
	1	AIR FLOW SWITCH 1 FEEDBACK
	2	
	3	AIR FLOW SWITCH 1 FEEDBACK
	4	
	5	DP switch-1 FEEDBACK
	6	
	7	DP switch-2 FEEDBACK
	8	
	9	Airstat FEEDBACK
	10	
	11	Geyserstat FEEDBACK
	12	
	13	Package AC-1 ON feedback
	14	
	15	Package AC-1 OFF feedback
	16	
	17	Package AC-1 TRIP feedback
	18	
	19	Package AC-2 ON feedback
	20	
	21	Package AC-2 OFF feedback
	22	
	23	Package AC-2 TRIP feedback
	24	
	25	Supply fan 1 ON feedback
	26	
	27	Supply fan 1 OFF feedback
	28	
	29	Supply fan 1 TRIP feedback
	30	
	31	Supply fan 2 ON feedback
	32	
	33	Supply fan 2 OFF feedback
	34	
	35	Supply fan 2 TRIP feedback
	36	
	37	Supply fan 3 ON feedback
	38	
	39	Supply fan 3 OFF feedback
	40	
	41	Supply fan 3 TRIP feedback
	42	
	43	Exhaust fan 1 ON feedback
	44	
	45	Exhaust fan 1 OFF feedback
	46	
	47	Exhaust fan 1 TRIP feedback
	48	
	49	Exhaust fan 2 ON feedback
	50	
	51	Exhaust fan 2 OFF feedback
	52	
	53	Exhaust fan 2 TRIP feedback
	54	
	55	SPARE
	56	

OUT GOING TERMINALS

Issue				
Remarks				
Date				
Name			P.Date	12.12.2021
Date	Ckd.By		P.Date	12.12.2021
12.12.2021			Prep. By	S.M

SATS AUTOMATION PVT LTD

Description:- TERMINAL DETAILS

Work:- PLC PANEL

Sales Ref.:-

Item No.:-

Qty.:- 1

W.O.:-

REV:R1

Sheet 13 / 16

DRAWING NO:-SATS/EFEW/PLC/20-21/SM03122021

Strap-Joint	Strip Terminal No.	Target sign. Main Sign.	
	XCPUDO:		
O	1	Package AC-1 On command	OUT GOING TERMINALS
O	2		
O	3	Package AC-1 OFF command	
O	4		
O	5	Package AC-2 On command	
O	6		
O	7	Package AC-2 OFF command	
O	8		
O	9	Supply fan1 ON feedback	
O	10		
O	11	Supply fan1 OFF feedback	
O	12		
O	13	Supply fan2 ON feedback	
O	14		
O	15	Supply fan2 OFF feedback	
O	16		
O	17	Supply fan3 ON feedback	
O	18		
O	19	Supply fan3 OFF feedback	
O	20		
O	21	Exhaust fan1 On command	
O	22		
O	23	Exhaust fan1 OFF command	
O	24		
O	25	Exhaust fan2 On command	
O	26		
O	27	Exhaust fan2 OFF command	
O	28		
O	29	Exhaust fan3 On command	
O	30		
O	31	Exhaust fan3 OFF command	
O	32		
O	33	Fresh Air Fan On command	
O	34		
O	35	Fresh Air Fan OFF command	
O	36		
O	37	Heater fan 1 On command	
O	38		
O	39	Heater fan 1 OFF command	
O	40		
	XAI:1		
O	1	TEMPERATURE FEEDBACK	
O	2		
O	3	RH SENSOR	
O	4		
O	5	SPARE	
O	6		
O	7	SPARE	
O	8		

Issue	Remarks	Date	Name		
				Prep. By	S.M
			P.Date	12.12.2021	
			Ckd.By		
			Date	12.12.2021	

SATS AUTOMATION PVT LTD

Description:- TERMINAL DETAILS

Work:- PLC PANEL

Sales Ref.:-

Item No.:-

Qty.:- 1

W.O.:-

REV:R1

Sheet 14 / 16

DRAWING NO:-SATS/EFEW/PLC/20-21/SM03122021

Strap-Joint	Strip Terminal No.	Target sign. Main Sign.	
	XDI:1		
O	1	Exhaust fan 3 ON feedback	
O	2		
O	3	Exhaust fan 3 OFF feedback	
O	4		
O	5	Exhaust fan 3 TRIP feedback	
O	6		
O	7	Fresh Air Fan ON feedback	
O	8		
O	9	Fresh Air Fan OFF feedback	
O	10		
O	11	Fresh Air Fan TRIP feedback	
O	12		
O	13	Heater fan 1 ON feedback	
O	14		
O	15	Heater fan 1 OFF feedback	
O	16		
O	17	Heater fan 1 TRIP feedback	
O	18		
O	19	Heater fan 2 ON feedback	
O	20		
O	21	Heater fan 2 OFF feedback	
O	22		
O	23	Heater fan 2 TRIP feedback	
O	24		
O	25	Heater fan 3 ON feedback	
O	26		
O	27	Heater fan 3 OFF feedback	
O	28		
O	29	Heater fan 3 TRIP feedback	
O	30		
O	31	HUMIDIFIER ON feedback	
O	32		
O	33	HUMIDIFIER OFF feedback	
O	34		
O	35	HUMIDIFIER TRIP feedback	
O	36		
O	37	Fire damper 1 ON feedback	
O	38		
O	39	Fire damper 1 OFF feedback	
O	40		
O	41	Fire damper 1 TRIP feedback	
O	42		
O	43	Fire damper 1 START PB	
O	44		
O	45	Fire damper 1 STOP PB	
O	46		
O	47	Fire damper 2 ON feedback	
O	48		
O	49	Fire damper 2 OFF feedback	
O	50		
O	51	Fire damper 2 TRIP feedback	
O	52		
O	53	Fire damper 2 STOP PB	
O	54		
O	55	Fire damper 2 OFF feedback	
O	56		
O	57	SPARE	
O	58		
O	59	SPARE	
O	60		
O	61	SPARE	
O	62		
O	63	SPARE	
O	64		

OUT GOING TERMINALS

Issue	Remarks	Date	Name	
				Prep. By S.M
			P.Date 12.12.2021	
			Ckd.By	
			Date 12.12.2021	

SATS AUTOMATION PVT LTD

Description:- TERMINAL DETAILS

Work:- PLC PANEL

Sales Ref.:-

Item No.:-

Qty.:- 1

W.O.:-

REV:R1

Sheet 15 / 16

DRAWING NO:-SATS/EFEW/PLC/20-21/SM03122021

Strap-Joint	Strip Terminal No.	Target sign. Main Sign.	
	XDI:2		
O	1	SPARE	
O	2		
O	3	SPARE	
O	4		
O	5	SPARE	
O	6		
O	7	SPARE	
O	8		
O	9	SPARE	
O	10		
O	11	SPARE	
O	12		
O	13	SPARE	
O	14		
O	15	SPARE	
O	16		
O	17	SPARE	
O	18		
O	19	SPARE	
O	20		
O	21	SPARE	
O	22		
O	23	SPARE	
O	24		
O	25	SPARE	
O	26		
O	27	SPARE	
O	28		
O	29	SPARE	
O	30		
O	31	SPARE	
O	32		
	XDO:1		
O	1	Heater fan 2 ON command	
O	2		
O	3	Heater fan 2 OFF command	
O	4		
O	5	Heater fan 3 On command	
O	6		
O	7	Heater fan 3 Off command	
O	8		
O	9	HUMIDIFIER On command	
O	10		
O	11	HUMIDIFIER OFF command	
O	12		
O	13	Fire damper 1 On command	
O	14		
O	15	Fire damper 1 Off command	
O	16		
O	17	Fire damper 2 On command	
O	18		
O	19	Fire damper 2 Off command	
O	20		
O	21	SPARE	
O	22		
O	23	SPARE	
O	24		
O	25	SPARE	
O	26		
O	27	SPARE	
O	28		
O	29	SPARE	
O	30		
O	31	SPARE	
O	32		

OUT GOING TERMINALS

Issue	Remarks	Date	Name		
				Prep. By	S.M
				P.Date	12.12.2021
				Ckd.By	
				Date	12.12.2021

SATS AUTOMATION PVT LTD

Description:- TERMINAL DETAILS

Work:- PLC PANEL

Sales Ref.:-

Item No.:-

Qty.:- 1

W.O.:-

REV:R1

Sheet 16 / 16

Principal Client :- Nation Thermal Power Corporation Limited.
Main Contractor :- BHEL Limited. Noida
Materials Description: - RH Sensor
Name of Projects : - 3X200 MW ESP CONTROL ROOM - R&M-NTPC RAMAGUNDAM- For Unit-1, Unit-2 and Unit-3.

Technical Specification

Relative Humidity

Make	: Honeywell
Model	: **H7080B3242**
Humidity Range	: 0 – 100%
Output	: 20mA or 0-10 VDC
Accuracy	: 2%-5% RH (25°C 20%-80% RH)
Humidity Output	: 4-20mA/0-10V

Temperature

Power Supply	: 24VAC +-15%/24VDC+-10%
Current output Load	: 500 Ohms Max.
Voltage Output Load	: 10K Ohms Min
Currents Consumption	: DC 70mA Max AC 190mA Max
Working Temp.	: -30°C to +- 70°C
Housing Materials	: Plastic (PC – ABS) Flame retardant acc with UL94-V0
Protection Standard	: IP 54
Protection Standard	: EN 61000-6-1
	EN 61000-6-3
	EN 61000-3-2
	EN 61000-3-3

H7080B TEMPERATURE/ HUMIDITY DUCT SENSOR

- 4~20mA/ 0~10VDC or resistance output for temperature
- 4~20mA/ 0~10VDC output for humidity
- Duct mounted
- Excellent linearity
- Good long term stability
- High reliability
- Wide sensing range
- Easy installation

APPLICATION

H7080B series duct mounting humidity and temperature sensors are designed for environmental monitoring and control applications in industrial, commercial and general building.

These sensors can be used for discharge, or return air control.

Technical Specification

Relative Humidity

Measurement Range:	0~100%RH
Output:	20mA or 0~10VDC
Accuracy:	2%, 3%, 5%RH (25°C , 20~80%RH) 5%, 9%RH (25°C , 0%~20% and 80%~100%
Long Term Stability	RH per year

Temperature

Temperature Sensor:	NTC10K, NTC20K, Pt1000
Measurement Range:	0~50 (resistance output) -10~40 or 0~70 (transducer)
Output:	4~20mA or 0~10VDC NTC10K, NTC20K, Pt1000
Accuracy:	+0.2K at 25°C for NTC10K sensor ±0.2K at 25°C for NTC20K sensor ±0.3K at 0°C for Pt1000 sensor ±0.5°C (10~40°C or 0~70°C) for transducer

Temperature

Power Supply:	24 VAC ±15% /24 VDC ±10%
Current Output Load:	500 Ohms Max
Voltage Output Load:	10K Ohms Min
Current Consumption:	DC 70mA Max, AC 190mA Max
Working Temperature:	-30°C ~+70°C
Transport and Storage	
Temperature:	-40°C ~+70°C
Housing Material:	Plastic (PC-ABS) Flame retardant acc. with UL94-V0
Protection Standard:	IP 54
Protection Standard:	EN 61000-6-1 EN 61000-6-3 EN 61000-3-2 EN 61000-3-3

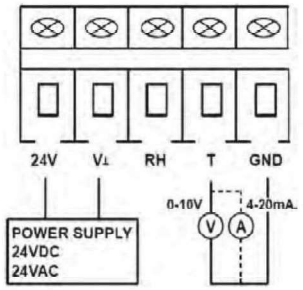
Honeywell

Models

OS Number	Humidity Output	Humidity Accuracy	Temperature Output Type	Temperature Range
C7080A3240	NA	NA	4~20mA/0-10V	-10°C~40°C
C7080A3270	NA	NA	4~20mA/0-10V	0°C~70°C
H7080B3102	4~20mA/0-10V	±2%	Pt1000	0°C~50°C
H7080B3242	4~20mA/0-10V	±2%	4~20mA/0-10V	-10°C~40°C
H7080B3272	4~20mA/0-10V	±2%	4~20mA/0-10V	0°C~70°C
H7080B2103	4~20mA/0-10V	±3%	NTC20K	0°C~50°C
H7080B1103	4~20mA/0-10V	±3%	NTC20K	0°C~50°C
H7080B3103	4~20mA/0-10V	±3%	Pt1000	0°C~50°C
H7080B3243	4~20mA/0-10V	±3%	4~20mA/0-10V	-10°C~40°C
H7080B3273	4~20mA/0-10V	±3%	4~20mA/0-10V	0°C~70°C
H7080B2105	4~20mA/0-10V	±5%	NTC20K	0°C~50°C
H7080B1105	4~20mA/0-10V	±5%	NTC20K	0°C~50°C
H7080B3105	4~20mA/0-10V	±5%	Pt1000	0°C~50°C

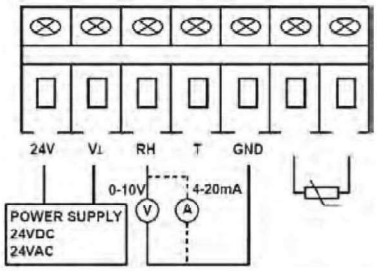
Wiring

- For temperature output model:



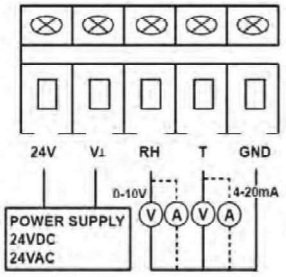
C7080A3240
C7080A3270

- For temperature sensor & humidity output:



H7080B3102
H7080B1103
H7080B2105
H7080B3105
H7080B 2103
H7080B 3103
H7080B 1105

- For temperature & humidity output model:



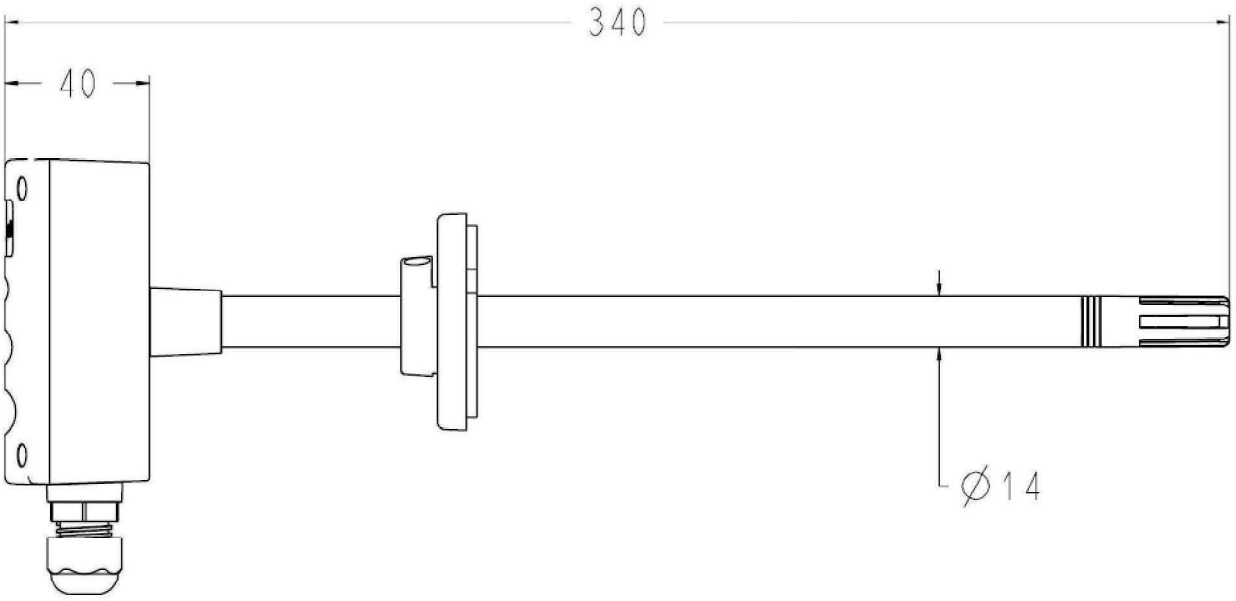
H7080B3242
H7080B3272
H7080B3243
H7080B3273

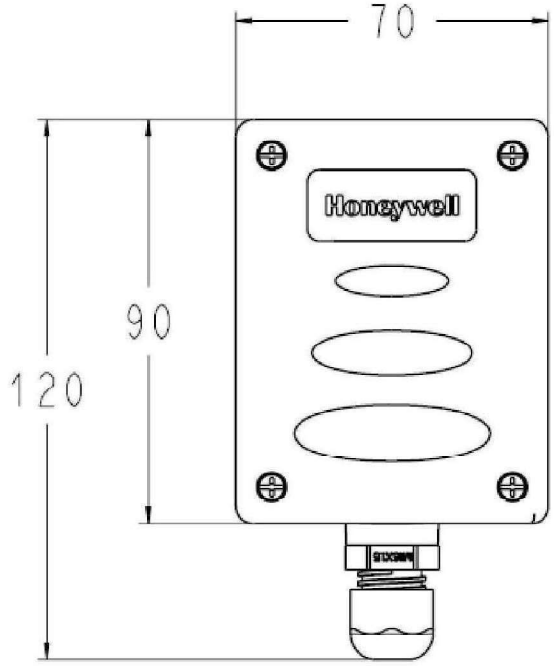
Note 1. Output is voltage mode (0-10V) when load resistance is over 10k Ω
2. Output is current mode (4-20mA) when load resistance is less than 500 Ω . 500 Ω is recommended.
3. Power on again after load resistor switch.
4. Field wiring AWG 18 to 24 connects to a terminal block on the PCB.
5. Maximum length 200m (current output recommended).
6. Offset for temperature sensor due to wire resistance per 10m distance from sensor to controller:

Wiring of Type	Pt1000	NTC
1.0mm²(Awg18)	0.11K	negligible
0.5mm² (Awg20)	0.18K	
0.3mm²(Awg22)	0.28K	

Accessories

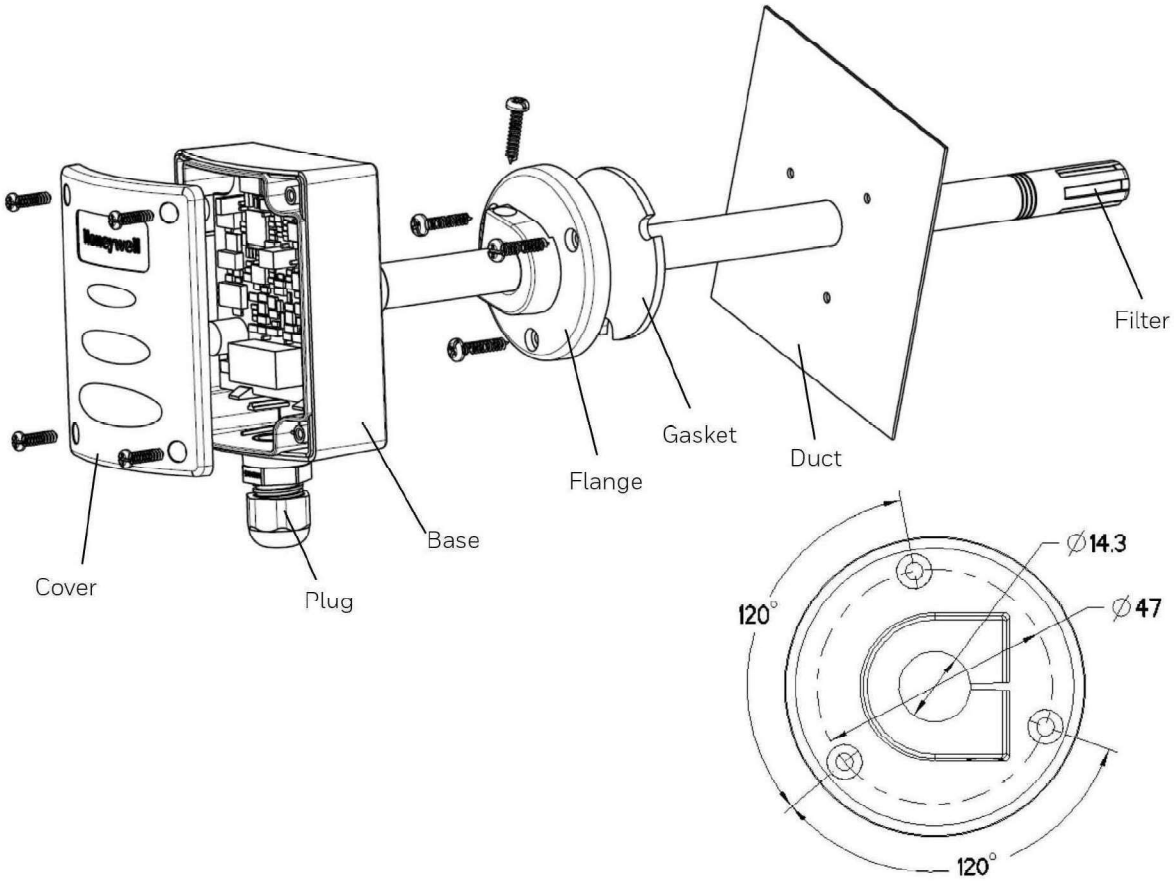
Dimension in mm





Installation

Dimension in mm



Installation Guidelines

- Drilling a mounting hole on the duct near measuring point.
- Use enclosed screws to install the flange with gasket on the duct. Insert the probe pipe into flange and duct.
- Fix the probe pipe on the flange by enclosed screw. (Note: Plug face to the bottom direction)
- Lead wire from DDC or PLC panel through plug.
  Using screw driver to connect each wire to the terminals of the transducer module according to field wiring diagram.
- Tighten the waterproof plug around the wires.
- Put front cover back and tighten front cover by screws.

ATTENTION:

Absolutely avoid extreme mechanical and unspecified strain.

When using a 24 VAC transformer, use an isolated Transformer (Class II). If sharing the transformer with your controller, valve, actuator, or any other device, be sure to connect all of the devices with the proper polarity, since most controllers are earth grounded. Failure to do so may result in damage to the transducer, your controller, or any other devices that are attached due to a ground loop problem.

The product is equipped with stainless steel filter: since the sensor is an ESD sensitive device, you should avoid touching the sensor cap during operation.
For maintenance purposes it is recommended, that you observe the valid ESD-safety precautions!

Please don't use in corrosive environment.

For more information,
https://honeywellbuildings.in
Call: 1-800-103-0339
Email: HBT-Indiabuildings@honeywell.com

Honeywell HBT India Buildings
Unitech Trade Center, 5th Floor, Sector-43,
Block C, Sushant Lok Phase - I,
Gurgaon - 122 002

www.honeywell.com

Principal Client Nation Thermal Power Corporation Limited.
Main Contractor BHEL Limited. Noida.
Materials Description: Air Flow sensors
Name of Projects 3X200 MW ESP CONTROL ROOM - R&M-NTPC RAMAGUNDAM- For Unit-1, Unit-2 and Unit-3.

Technical specification of Air Flow sensors.

Make	: Honeywell.
Model	: AWM5104
Flow Range	: 20SLPM, N2 Calibration.
Power consumption	: 100
Response Time	: 60 Sec.
Temperature Range	: -20 Degree to +70 Degree
Weight	: 60 Grams.
Shock Range	: 100G Peak, 6 m sce Half Sine
Output	: 5 VCD @ Full Scale Flow
Repeatability & Hysteresis	: +-0.5% Reading (Max)
Connector	: Micro Switch (SS12143)/AMP (103956-3)
Excitation VCD	: 15
Null output VCD	: 1.05
Suffix – Calibration Gas	: N2
Leak Rate Max	: 0.1 psi/min
Null output Shift(-20Degree To 70 Degree)	: +-200VCD

High Flow Mass Airflow/Amplified

FEATURES
- Linear voltage output
- Venturi design
- Remote mounting capability
- Active laser trimming improves interchange ability
- Separate gas calibration types:
  - Ar (argon)
  - N_2 (nitrogen) or
  - CO_2 (carbon dioxide)

In-Line Flow Measurement
AWM5000 Series Microbridge Mass Airflow Sensors feature a venturi type flow housing. They measure flow as high as 20 standard liters per minute (SLPM) while inducing a maximum pressure drop of 2.25″ H_2O. The microbridge chip is in direct contact with the flow stream, greatly reducing error possibilities due to orifice or bypass channel clogging.

Rugged, Versatile Package
The rugged plastic package has been designed to withstand common mode pressures up to 50 psi, and the small sensing element allows 100 gs of shock without compromising performance. The included "AMP" compatible connector provides reliable connection in demanding applications.

On-board Signal Conditioning
Each AWM5000 sensor contains circuitry which performs amplification, linearization, temperature compensation, and gas calibration. Figure 1 (Heater Control Circuit) and Figure 2 (Sensor Bridge Circuit and Amplification Linearization Circuit) illustrate the on-board electrical circuitry for the AWM5000 Series. A 1 to 5 VDC linear output is possible for all listings regardless of flow range (5, 10, 15, or 20 SLPM) or calibration gas (nitrogen, carbon dioxide, nitrous oxide, or argon). All calibration is performed by active laser trimming.

Figure 1

Heater Control Circuit

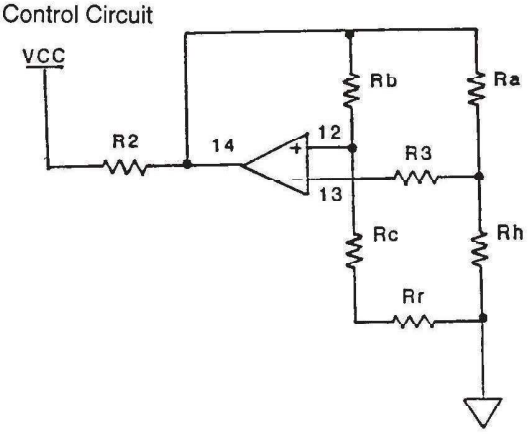
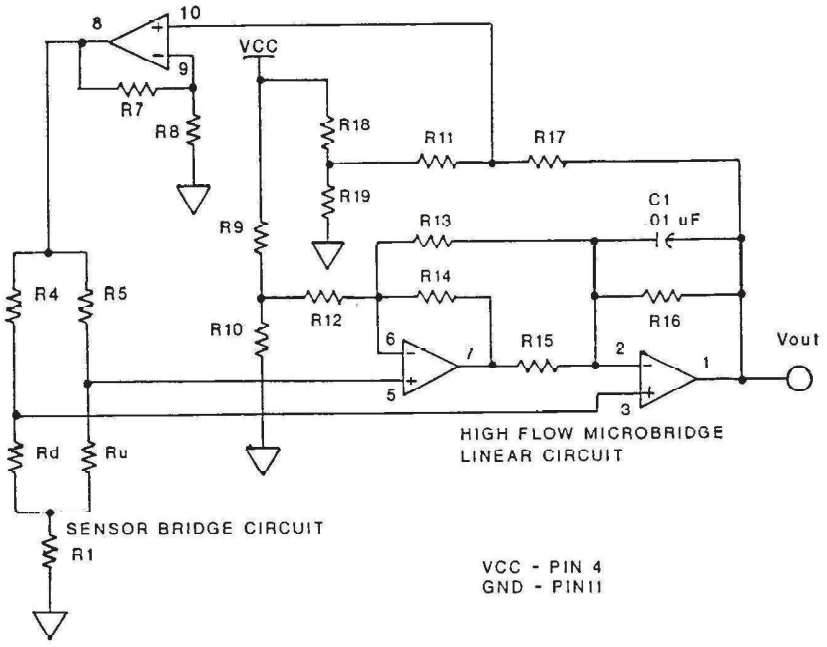


Figure 2

Sensor Bridge Circuit and Amplification Linearization Circuit



Airflow

SPECIFICATIONS (Performance Characteristics @ 10.0 ±0.01 VDC, 25°C)

	AWM5101	AWM5102	AWM5103	AWM5104
Flow Range (Note 3)	0-5 SLPM	0-10 SLPM	0-15 SLPM	0-20 SLPM
Suffix - Calibration gas	**VA** - Argon (Ar)	**VC** - Carbon dioxide (CO_2)	**VN** - Nitrogen (N_2)	
	Min.	**Typ.**	**Max.**	
Excitation VDC	8	10±0.01	15	
Power consumption (mW)	—	—	100	
Response time (msec)	—	—	60	
Null output VDC	0.95	1	1.05	
Null output shift −20° to 70°C	—	±0.050 VDC	±.200 VDC	
Common Mode Pressure (psi)	—	—	50	
Temperature range	−20° to +70°C, (−4° to 158°F)			
Weight	60 grams (2.12 oz.)			
Shock ratings	100 g peak, 6 msec half-sine (3 drops, each direction of 3 axes)			
Output @ laser trim point	5 VDC @ Full Scale Flow			
Output voltage shift +20° to −25°C, +20° to 70°C	Suffix VA or VN ±7.0% Reading, Suffix VC ±10.0% Reading			
Linearity error (2)	±3.0% Reading (max.)			
Repeatability & Hysteresis	±0.5% Reading (max.)			
Connector (Included) —Four pin receptacle	MICRO SWITCH (SS12143)/AMP (103956-3)			
Leak rate, max	0.1 psi/min. at static condition, (Note 2)			

Notes:
1. Linearity specification applies from 2 to 100% full scale of gas flow range, and does not apply to null output at 0 SLPM.
2. The AWM5000 series product has a leakage spec of less than 0.1 psi per minute at 50 psi common mode pressure. If during installation, the end adapters are twisted with respect to the flowtube, this may compromise the seal between the o-ring and the flowtube and may cause a temporary leak. This leak might be as high as 1 psi or might remain in specification. It will self-reseal as the o-ring takes a new set. Approximately 85% of the leakage will dissipate in 24 hours. Within 48 hours, complete recovery will take place.
3. SLPM denotes standard liters per minute, which is a flow measurement referenced to standard conditions of 0°C/1 bar (sea level), 50% RH.

NOTICE

AWM5000—Chimney Effect

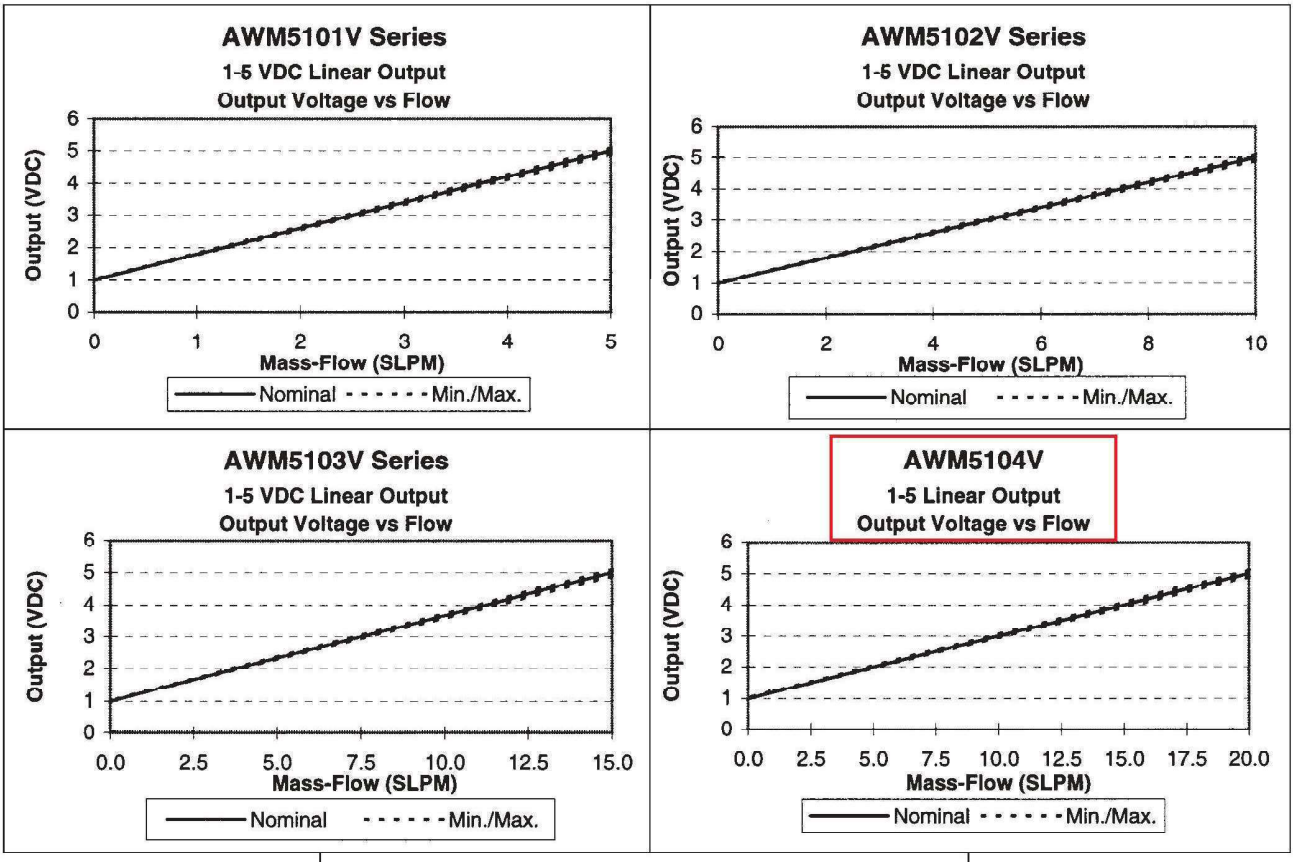
AWM microbridge mass airflow sensors detect mass airflow caused by heat transfer. The thermally isolated microbridge structure consists of a heater resistor positioned between two temperature sensing resistors.

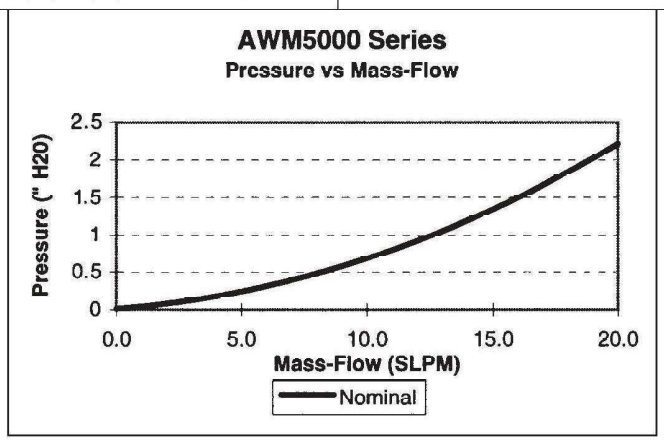
The heater resistor maintains a constant temperature, 160°C above ambient, during sensor operation. Airflow moving past the chip transfers heat from the heater resistor. This airflow warms the downstream resistor and cools the upstream resistor. The temperature change and the resulting change in resistance of the temperature resistors is proportional to the mass airflow across the sensing element.

When the sensor is mounted in a vertical position, under zero flow conditions, the sensor may produce an output that is the result of thermally induced convection current. This occurrence is measurable in the AWM5000 Series, particularly in the 5 SLPM versions. When designing the sensor into applications where null stability is critical, avoid mounting the sensor in a vertical position.

High Flow Mass Airflow/Amplified

OUTPUT CURVES (Performance Characteristics @ 10.0 ±0.01 VDC, 25°C)





Airflow

AWM5000 ORDER GUIDE

Catalog Listing	Flow Range
AWM5101VA	5 SLPM, Argon calibration
AWM5101VC	5 SLPM, CO_2 calibration (2)
AWM5101VN	5 SLPM, N_2 calibration (1)
AWM5102VA	10 SLPM, Argon calibration
AWM5102VC	10 SLPM, CO_2 calibration (2)
AWM5102VN	10 SLPM, N_2 calibration (1)
AWM5103VA	15 SLPM, Argon calibration
AWM5103VC	15 SLPM, CO_2 calibration (2)
AWM5103VN	15 SLPM, N_2 calibration (1)
AWM5104VA	20 SLPM, Argon calibration
AWM5104VC	20 SLPM, CO_2 calibration (2)
AWM5104VN	20 SLPM, N_2 calibration (1)

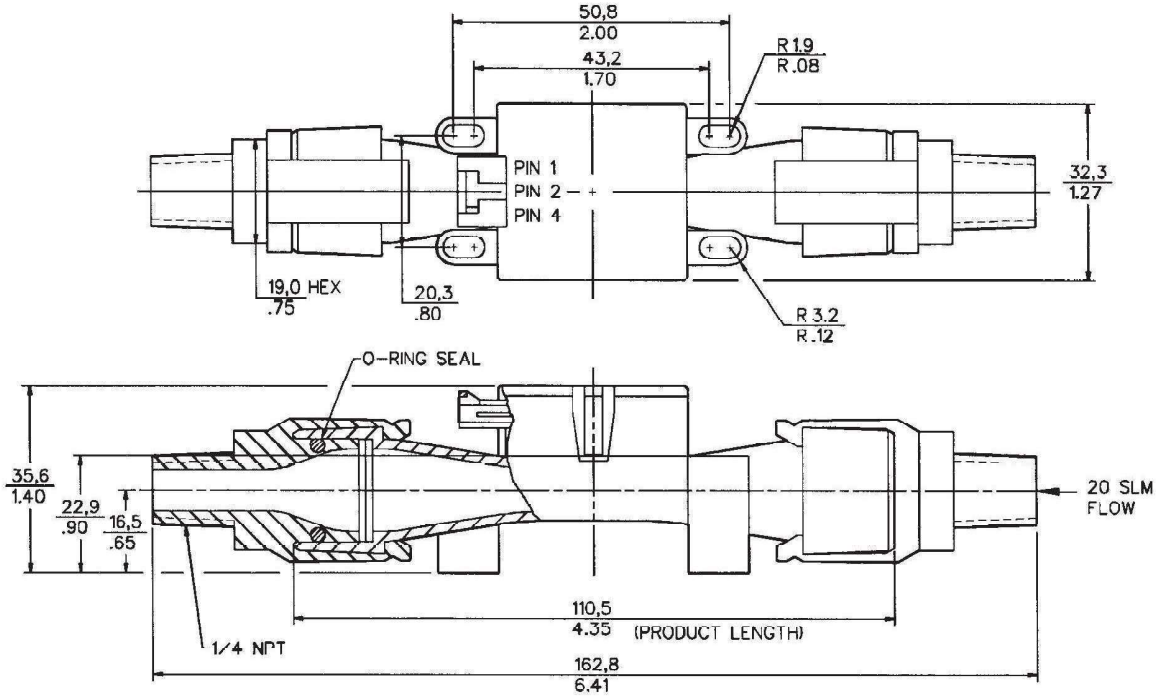
CONNECTOR ORDER GUIDE

Catalog Listing	Description
SS12143	Four pin Electrical connector Connectors use Amp 103956-3

Note: All listings have 1 - 5 VDC linear output with 10 VDC supply over given flow range for a specific calibration gas.
1. N_2 calibration is identical to 0_2 and air calibration.
2. CO_2 calibration is identical to N_2O calibration.
3. For additional gas correction factors, see Application Note 3.

OUTPUT CONNECTIONS
Pin 1 + Supply voltage
Pin 2 Ground
Pin 3 No connection
Pin 4 Output voltage
Arrow on bottom of housing indicates direction of flow.

MOUNTING DIMENSIONS (for reference only)



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Honeywell:

AWM5101VA AWM5101VN AWM5102VN AWM5103VC AWM5103VN AWM5104VA AWM5104VC AWM5103VA

Principal Client :- Nation Thermal Power Corporation Limited.
Main Contractor :- BHEL Limited. Noida
Materials Description: - 25 NB Valves
Name of Projects : - 3X200 MW ESP CONTROL ROOM - R&M-NTPC RAMAGUNDAM- For Unit-1, Unit-2 and Unit-3.

Technical Specification

25 NB Gate Valves

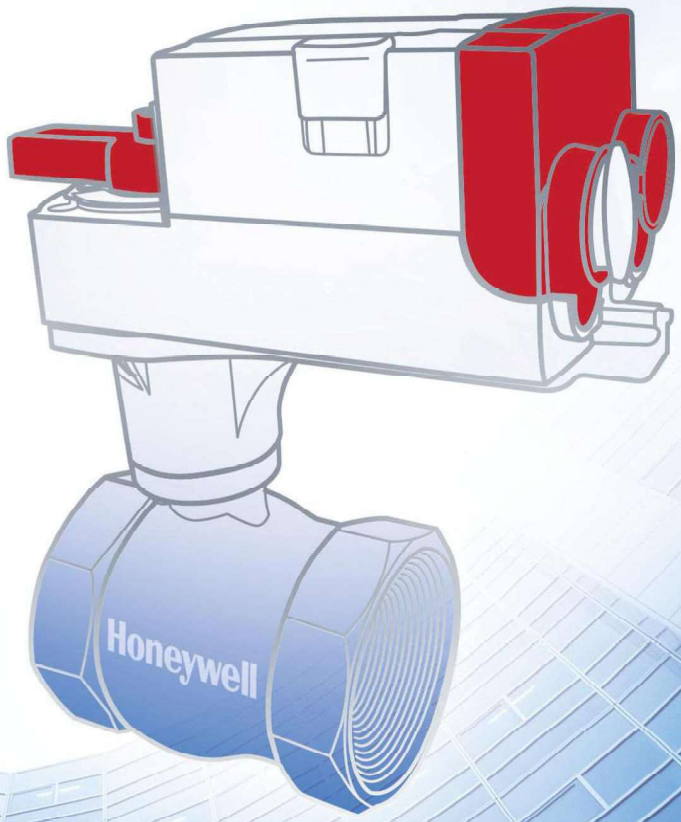
Make	: Honeywell
Model	: DN 25
Nominal Pressure	: PN 16
Flow Characteristics	: Equal Percentage
Rangeability	: 100:1
Leakage Rate	: ≤ 0.01% Kvs of (ANSI/ FCI/ 70-2CLASS -4
Threaded connection	: BSSP
Medium	: Hot and Cold Water neutral liquid.
Medium Temperature	: -5…120°C .
Flow Coefficient (Kvs)	: 10
Close of Pressure	: 1600
Actuator Torque	: 5 (MVN..05)

Materials

Valves Body	: Brass HPB 59-1 .
Cap	: Brass HPB 59-1
Seat	: PTFE
Ball	: Stainless Steel
Stem	: Stainless Steel
Sealing Ring	: FPM

Honeywell
THE POWER OF CONNECTED

Field Device



Control Ball Valve

VBA16P, VBA16F and MVN Series

VBA16P-Series

Two-way control ball valve

Features

- Equal percentage flow characteristic
- Low leakage rate
- Low driving torque
- Stainless steel ball and stem
- Straight through flow with reduced flow resistance
- High flow capacity

Specifications

Size	DN20-80
Nominal pressure	PN16
Flow characteristics	Equal percentage
Rangeability	100:1
Leakage rate	≤0.01% Kvs of (ANSI/FCI 70-2 Class IV)
Threaded connection	BSPP
Medium	Hot and cold water or neutral liquid
Medium temperature	-5...120°C

Material

Valve body	Brass HPb59-1
Cap	Brass HPb59-1
Seat	PTFE
Ball	Stainless steel
Stem	Stainless steel
Sealing ring	FPM

Overview

The VBA16P-series of two-way control ball valves can be used in the HVAC water systems of commercial and public buildings to achieve modulating or On/Off control

DN20-DN50

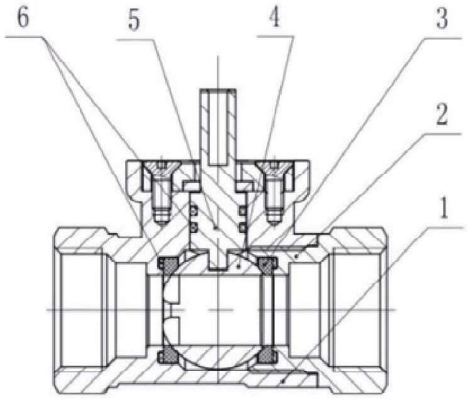
DN65-DN80

KVs and close-off pressure

Size (mm)	Model	Flow coefficient Kvs(m^3/h)	Close-off pressure (KPa)	Actuator torque (N•m)
20	VBA16P020	6.3	1600	5(MVN..05..)
25	VBA16P025	10	1600	5(MVN..05..)
32	VBA16P032	16	1600	5(MVN..05..)
40	VBA16P040	26	1600	10(MVN..10..)
50	VBA16P050	41	1600	10(MVN..10..)
65	VBA16P065	51	1600	20(MVN..20)
80	VBA16P080	81	1600	20(MVN..20)

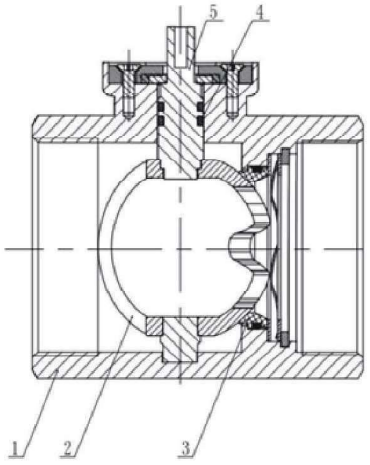
Structure

DN20-DN50



No.	Name	Material
1	Valve body	Brass HPb59-1
2	Cap	Brass HPb59-1
3	Seat	PTFE
4	Ball	Stainless Steel
5	Stem	Stainless Steel
6	Sealing ring	FPM

DN65-DN80



No.	Name	Material
1	Valve body	Brass HPb59-1
2	Ball	Stainless Steel
3	Seat	PTFE
4	Sealing ring	FPM
5	Stem	Stainless Steel

Set Points from 0.5 to 150 psi

5000 Series Extended Duty Pressure Switch With Direct Action Blade Contacts

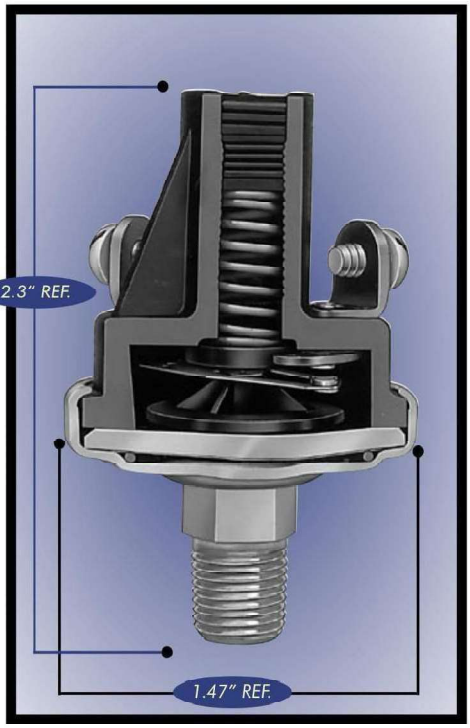
The 5000 Series switch is specifically designed to stand up to extended duty applications. This switch is factory set but capable of field adjustment. It features a Kapton diaphragm for compatibility with a wide variety of fluids, and various terminations including a Metri-Pack connector that forms a tight seal when connected. Among the outstanding design benefits are its durable construction, compact size, and enhanced set point integrity.

MODEL NO 76059-80PSI
80 PSI Pressure Switch

Standard Specifications

Type: Direct action blade contact
Contacts: Silver alloy, gold plated
Set Point: Factory set from 0.5 to 150 PSI
Operating Pressure:
150 PSI for 0.5-24 PSI set point range,
250 PSI for 25-150 PSI set point range
Proof Pressure: 500 PSI
Burst Pressure: 750 PSI for 0.5-24 PSI set point range
1250 PSI for 25-150 PSI set point range.

Switch Boot P/N 79380 for Vacuum and Pressure

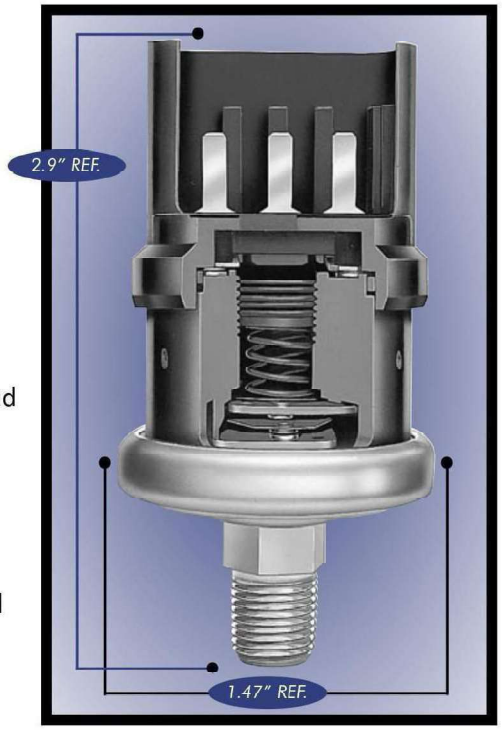


5000 Series Switch with Screw Terminals

Ratings:

Resistive:	15 AMP-	6	VDC
	8 AMP-	12	VDC
	4 AMP-	24	VDC
Inductive:	1 AMP-	120	VAC
	0.5 AMP-	240	VAC

Diaphragm: Polyimide film
Temperature Range: -40° F to + 250° F
Connector: 1/8 -27 NPT male thread
Terminals: #8-32 screws, 1/4" blade, 280 Series Metri-Pack
Circuitry: SPST-N.O., N.C., 1 circuit adjustable dual circuit, or 2 circuits adjustable dual circuit. Also available are N.O./N.O. dual circuit and N.C./N.C. dual circuit.
Base: Plated Steel
Cover: Glass reinforced polyester
Options: Brass, plastic or stainless steel base; various base connector thread sizes; wire leads (potted & sealed).



5000 Series Switch with Metri-Pack Terminal

NOTE: *OPERATING MEDIA (PRESSURE SWITCH)*
The pressure switch is designed to operate with air, motor oils, transmission oils, jet fuels and other similar hydrocarbon media.

5000 Series Pressure Switch With Standard Terminal

			Single Circuit 1 Terminal		Single Circuit 2 Terminals		Dual Circuit One circuit adjustable[1]		Dual Circuit Both circuits adjustable[2]		
Contact Setting	Factory Set At	Circuitry	Part Number		Part Number		Part Number		Contact Setting[3]	Part Number	
			Screw	Blade	Screw	Blade	Screw	Blade		Screw	Blade
0.5-1 PSI ±0.3	1 PSI	N.O.	78630	78631	78628	78629	78711	78712	3-4 PSI ±0.5	76081	76086
		N.C.	78634	78635	78632	78633					
1.1-3 PSI ±0.5	2 PSI	N.O.	78142	78399	76051	76056	76071	76076	5-8 PSI ±1	76582	76590
		N.C.	78149	78406	76061	76066					
3.1-7 PSI ±1	4 PSI	N.O.	78143	78400	76575	76583	76579	76587	9-21 PSI ±2	76082	76087
		N.C.	78150	78407	76577	76585					
8-13 PSI ±2	10 PSI	N.O.	78144	78401	76576	76584	76580	76588	25-50 PSI ±3	76083	76088
		N.C.	78151	78408	76578	76586					
14-24 PSI ±3	15 PSI	N.O.	78145	78402	76052	76057	76072	76077	51-90 PSI +5/-2	76084	76089
		N.C.	78152	78409	76062	76067					
25-50 PSI ±5	35 PSI	N.O.	78146	78403	76053	76058	76073	76078	91-150 PSI +8/-2	76085	76090
		N.C.	78153	78410	76063	76068					
51-90 PSI ±7	60 PSI	N.O.	78147	78404	76054	76059	76074	76079			
		N.C.	78154	78411	76064	76069					
91-150PSI ±10	100 PSI	N.O.	78148	78405	76055	76060	76075	76080			
		N.C.	78155	78412	76065	76070					

5000 Series Pressure Switch With Metri-Pack Terminal

			Single Circuit (Mates with Packard P/N 15300027)	Dual Circuit One circuit adjustable[1] (Mates with Packard P/N 12034147)	Dual Circuit Both circuits adjustable[2] (Mates with Packard P/N 12034147)	
Contact Setting	Factory Set At	Circuitry	Part Number	Part Number	Contact Setting[3]	Part Number
1-3 PSI ±0.5	2 PSI	N.O.	77029	77038	3-4 PSI ±0.5	77047
		N.C.	77020			
4-6 PSI ±1	5 PSI	N.O.	77030	77039	5-10 PSI ±1	77048
		N.C.	77021			
7-12 PSI ±2	10 PSI	N.O.	77031	77040	11-24 PSI ±2	77049
		N.C.	77022			
13-24 PSI ±3	20 PSI	N.O.	77032	77041	25-46 PSI ±3	77050
		N.C.	77023			
25-46 PSI ±5	35 PSI	N.O.	77033	77042	47-76 PSI +5/ 2	77051
		N.C.	77024			
47-76 PSI ±6	60 PSI	N.O.	77034	77043	77-100 PSI +7/-2	77052
		N.C.	77025			
77-100 PSI ±7	85 PSI	N.O.	77035	77044	101-126 PSI +9/-2	77053
		N.C.	77026			
101-126 ±9	115 PSI	N.O.	77036	77045	127-150 PSI +10/-2	77054
		N.C.	77027			
127-150 PSI ±10	135 PSI	N.O.	77037	77046		
		N.C.	77028			

Notes:

1. The N.C. circuit is the reference circuit for the dual circuit switch; the normally open circuit is not adjusted. The expected dead band between the N.C. & N.O. circuit is shown in the chart below. For applications requiring the normally open circuit as the reference circuit the N.C. circuit is not adjusted.

2. Switch may be adjusted so that:
A. N.C. circuit opens before N.O. circuit closes.
B. N.C. and N.O. circuit have same set point.
C. N.O. circuit closes before the N.C. circuit opens. (There is no dead band and both circuits are on for a brief period of time.)

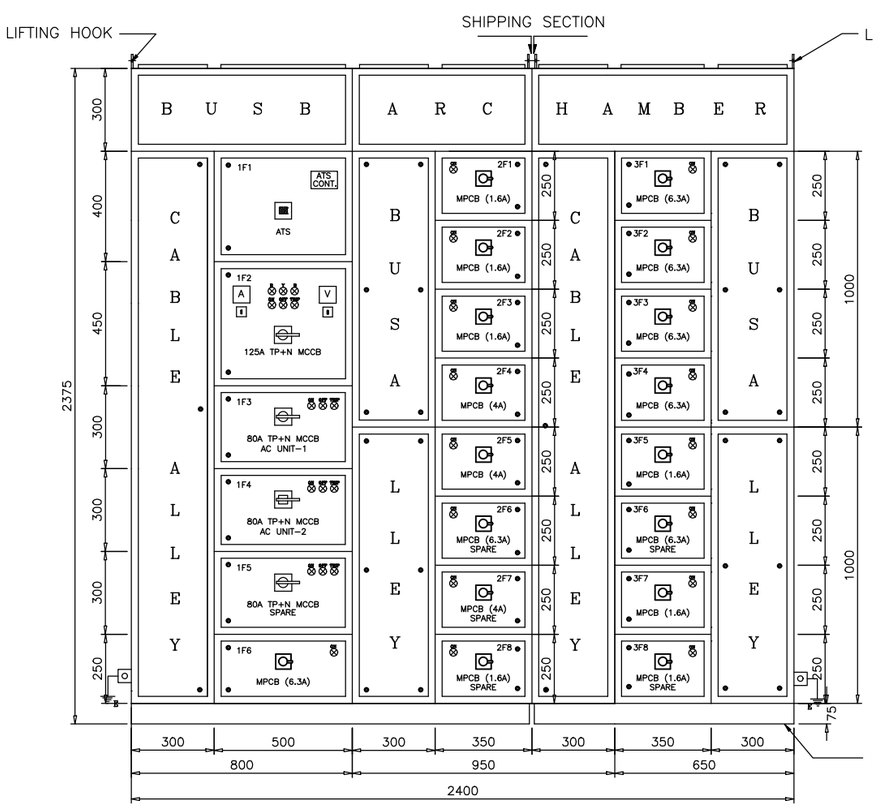
3. The tolerances given in the table are applicable to a switch adjusted so that the N.O. circuit closes before the N.C. circuit opens and applies to the N.C. circuit. The N.O. set point and tolerances are such that a minimum overlap of 1 PSI exists during which both circuits are on.

Note 1: Expected Dead Band (Higher than N.C. circuit)

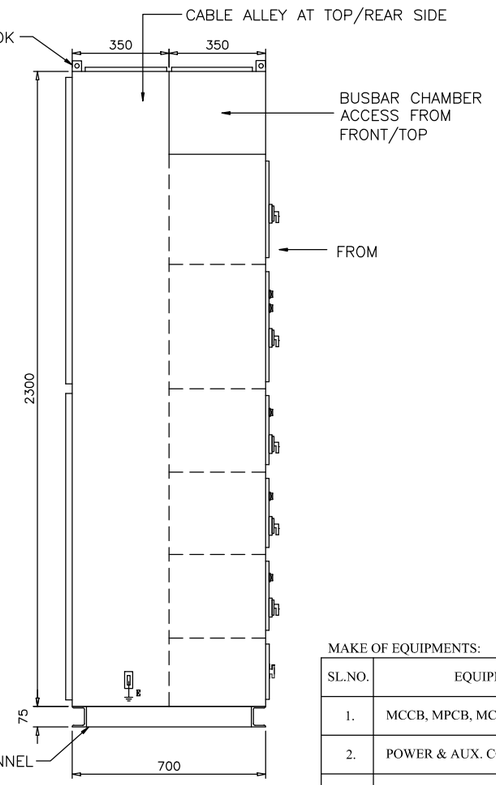
Contact Setting	Dead Band
0.5-3 PSI	1.5 PSI
4-7 PSI	2.5 PSI
8-13 PSI	3.5 PSI
14-24 PSI	8 PSI
25-50 PSI	15 PSI
51-90 PSI	23 PSI
91-150 PSI	40 PSI

MODEL NO 76059-80PSI
80 PSI Pressure Switch

GA DIAGRAM OF ACDB (QTY-3)



FRONT VIEW
WITH FRONT DOOR



SIDE VIEW

MAKE OF EQUIPMENTS:

SL.NO.	EQUIPMENT	MAKE
1.	MCCB, MPCB, MCB	L&T
2.	POWER & AUX. CONTACTOR	L&T
3.	O/L RELAY	L&T
4.	INDICATION LAMP & PUSH BUTTON	ESBEE
5.	LOCAL/REMOTE SEL. SW. AMMETER SEL. SW. VOLTMETER SEL. SW.	KAYCEE
6.	AMMETER & VOLTMETER	AE
7.	CURRENT TRANSFORMER	NTPC APPROVED MAKE
8.	AUTOMATIC TRANSFER SWITCH	HAVELLS'

SYSTEM PARAMETERS

1. Ambient temperature	: 50 Deg C
2. Maximum ambient air temperature (Deg. C)	: 90 Deg C
3. Reference ambient temperature for design (Deg. C)	: 50 Deg C
4. Main System / Frequency	: 3-Phase,4-Wire AC,50+5%Hz
5. Rated operational voltage	: 415+ 10% V AC
6. Dry Frequency withstand voltage	: 2.5 kV

CONSTRUCTION

1. Type of switchboard	: Non Drawout
2. Location floor mounting	: Indoor
3. Lifting Arrangement	: Lifting angles provided
4. Front access	: 2000mm (Maximum)
5. Operating height	: Yes
6. Rear access	: Yes
7. Degree of protection for enclosure	: IP-52
8. Painting	: Siemens Grey / Light Dove Grey
9. Procedure	: Pre-treatment & painting
10. Material	: Powder coating
11. Shade inside	: RAL 7032
12. Shade outside	: RAL 7032
13. Name plate material	: Metal-Aluminum
14. Colour of lettering	: White letters on Black background
15. Sheet steel thickness of various parts	: 2.0 mm

BUSBARS/CONNECTIONS

1. Busbar Material	: Aluminum (50 x 12 mmsq)
2. Neutral Material	: Aluminum (50 x 6 mmsq)
3. Earth Material	: G.I (50 x 6 mmsq)

WIRING

1. Insulation grade	: 1100V
2. Terminations	: With crimping type lugs
3. Control Circuits	: 1.5 Sqmm Cu Cable
4. CT circuit	: 2.5 Sqmm Cu Cable

TERMINATION ARRANGEMENTS

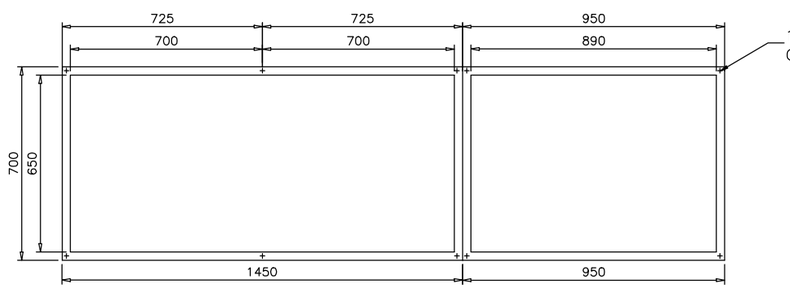
1. Cables	
2. Power cable entry from	: TOP
3. Control cable entry from	: TOP
4. Power terminal	: As per rating
5. Control terminals Size Suitable for	: 6 Sqmm Cu wire
6. Earthing of doors with equipment mounted	: With 2.5mm sq. PVC(Yellow, Green colour) insulated

WIRE COLOUR CODING

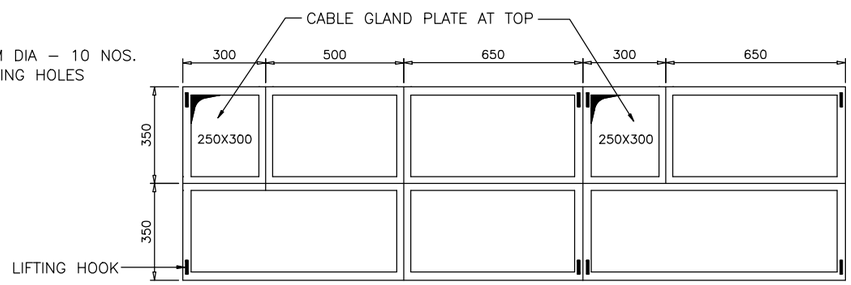
1. AC Control cable (P)	: GREY
2. AC Control cable (N)	: BLACK
3. Power Cable	: BLACK
4. Power Earth	: YELLOW GREEN STRIPED

GENERAL NOTES

1. Air clearance Phase to phase	: 25.4mm (minimum)
2. Air clearance Phase to earth	: 25mm (minimum)
3. Busbar Rating (current density)	: 1.0 A/sq.mm for Aluminimum



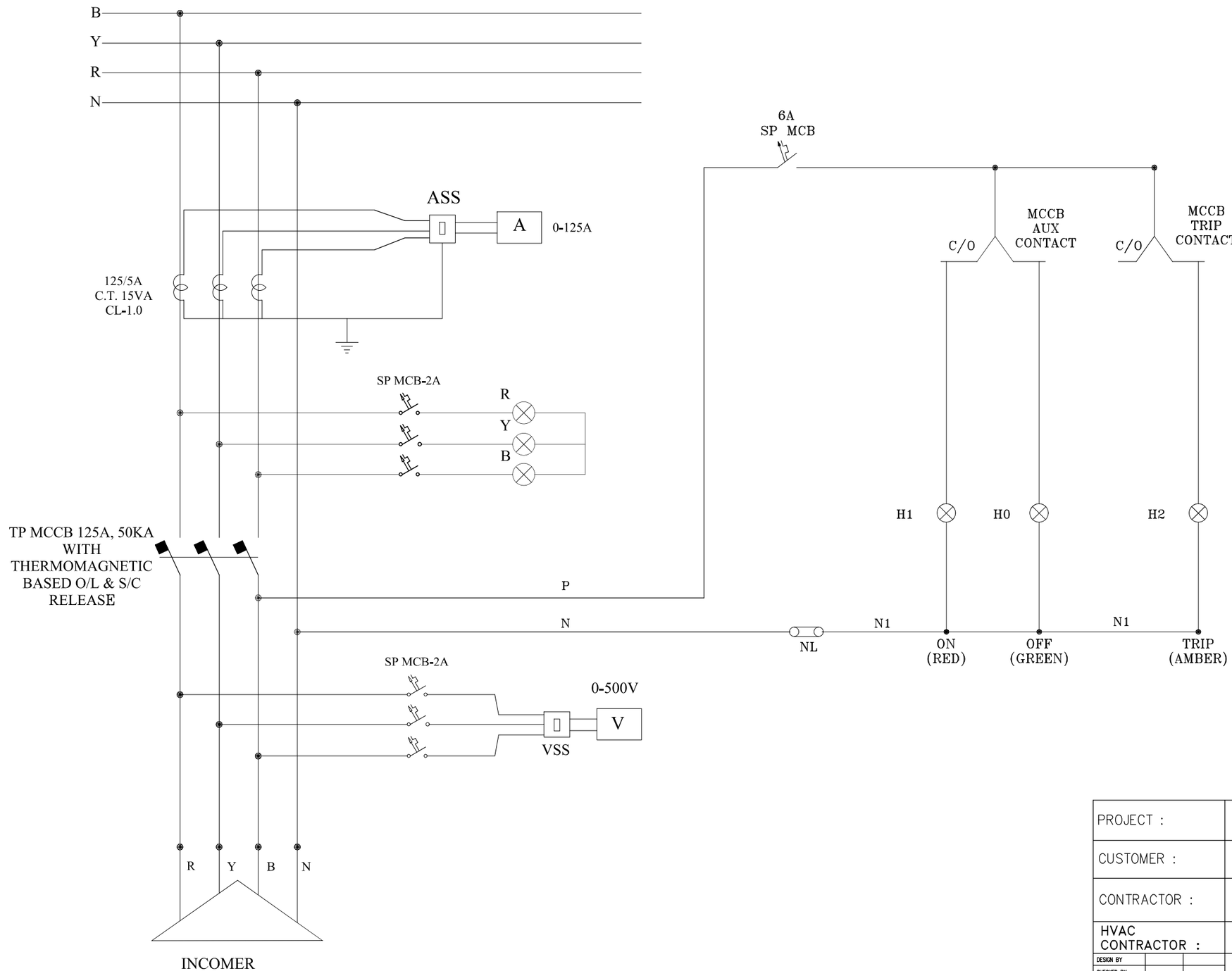
FOUNDATION PLAN
WITH DETAILS



TOP VIEW SHOWING
CABLE GLAND PLATE

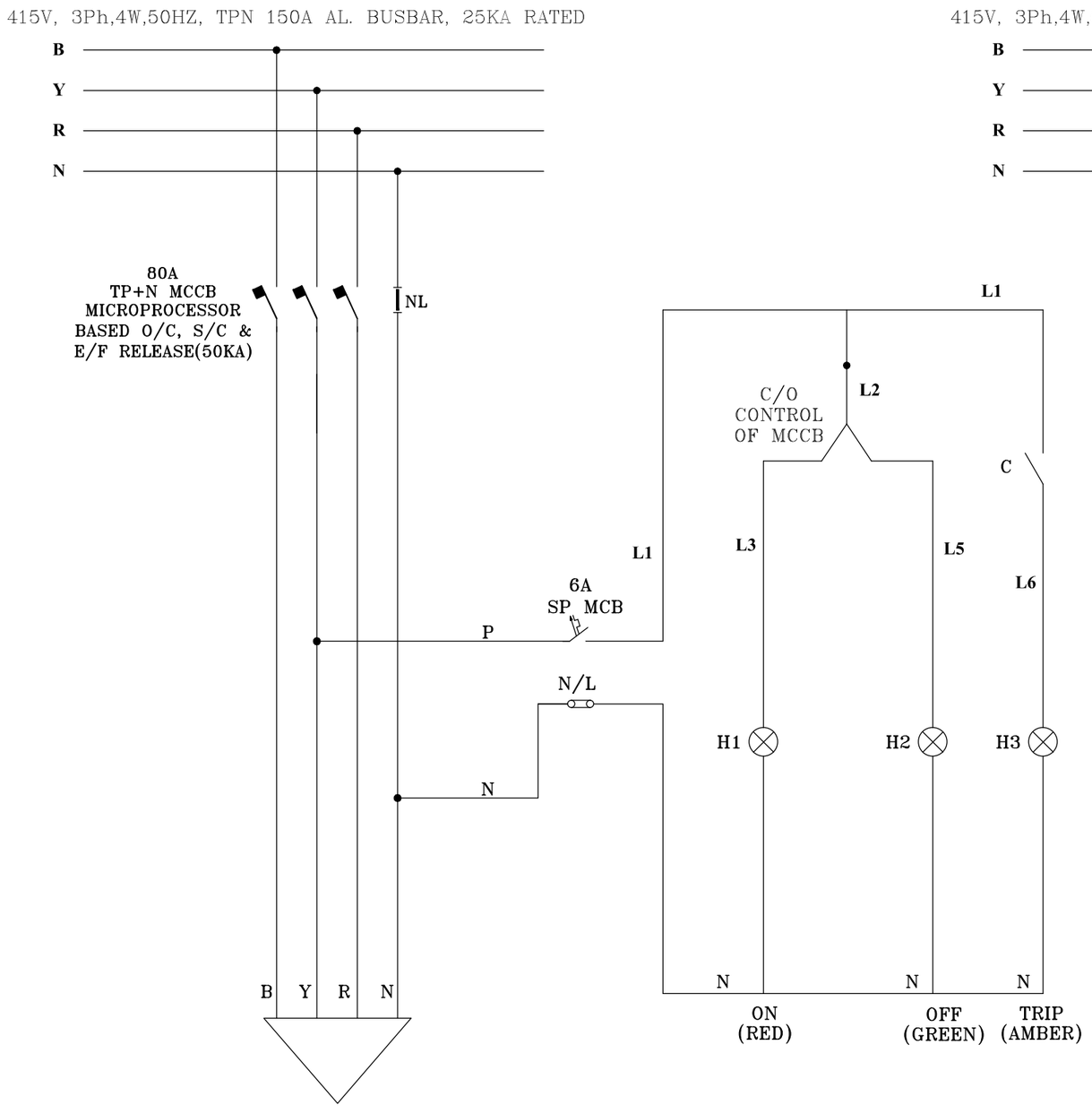
PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M
CUSTOMER :	NTPC LIMITED
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA
HVAC CONTRACTOR :	EFE WORKS KOLKATA INDIA
DESIGN BY / CHECKED BY / APPROVED BY / SUPERSEDES / SUPERSEDES BY SYSTEM	TITLE:– GA DIAGRAM OF ACDB (QTY-3)
SIZE :	PROJECT NO :
SHEET NO : 1 OF 1	
ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/ACDB-GA-1
REV.03	

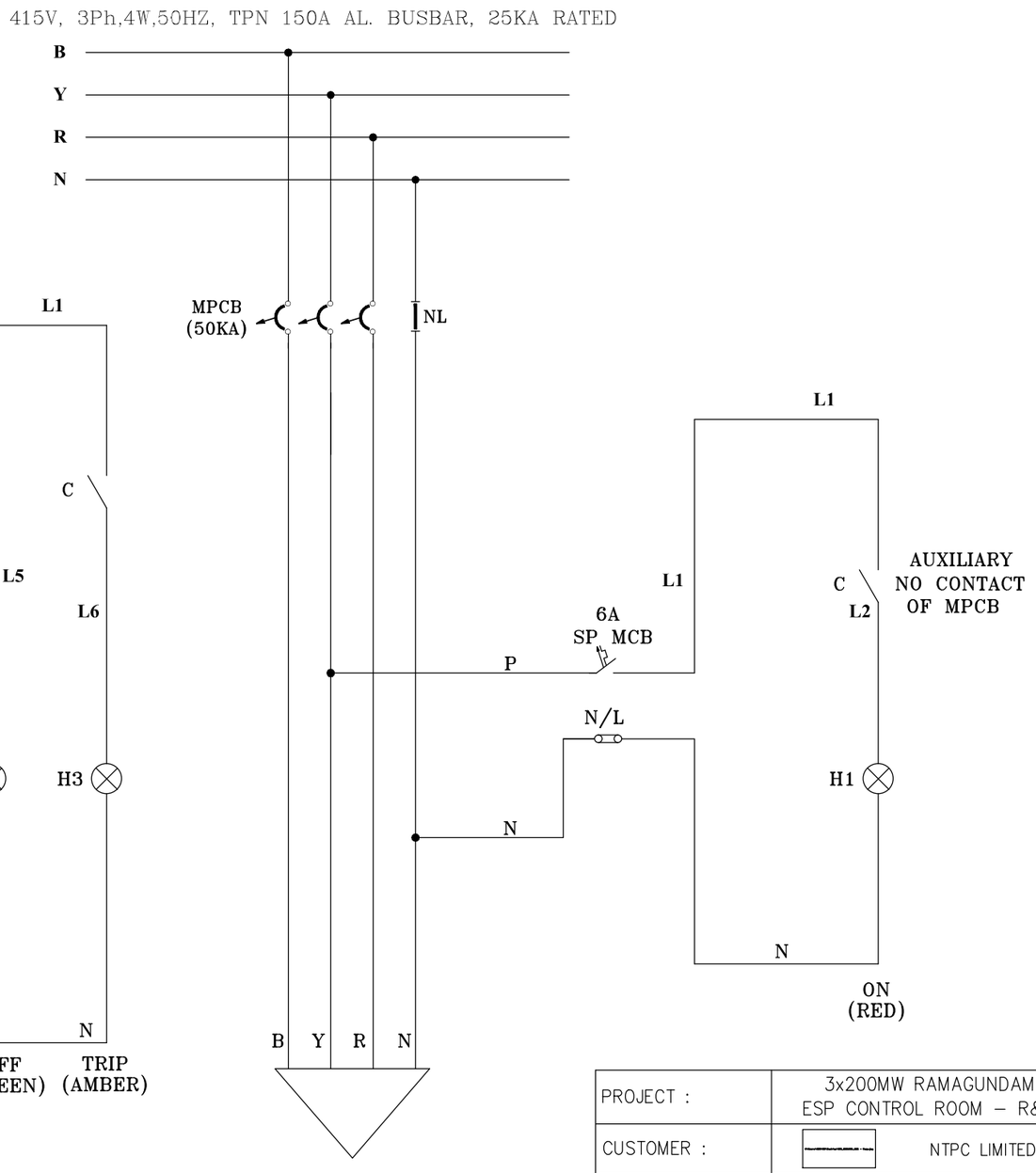
SCHEMATIC DIAGRAM OF INCOMING MCCB FEEDER



PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M	
CUSTOMER :	NTPC LIMITED	
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA	
HVAC CONTRACTOR :	EFE WORKS KOLKATA INDIA	
DESIGN BY / CHECKED BY / APPROVED BY / SUPERSEDES / SUPERSEDES BY SYSTEM	TITLE:– SCHEMATIC DIAGRAM OF IMCOMIMG MCCB FEEDER	
	SIZE :	PROJECT NO : / SHEET NO : 1 OF 2
	ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/ACDBSCHM-1 / REV.03

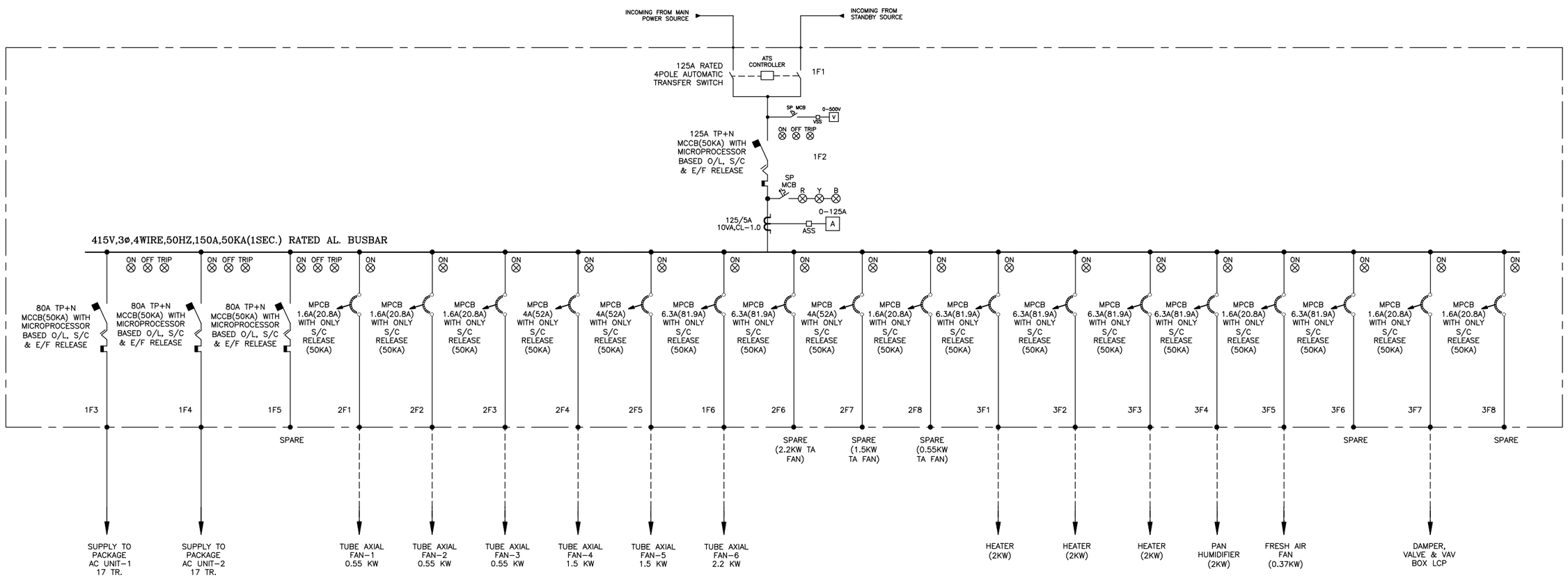
SCHEMATIC DIAGRAM OF SUPPLY TO OUTGOING FEEDER





PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M
CUSTOMER :	NTPC LIMITED
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA
HVAC CONTRACTOR :	EFE WORKS KOLKATA INDIA
DESIGN BY / CHECKED BY / APPROVED BY / SUPERSEDES / SUPERSEDES BY SYSTEM	TITLE:– SCHEMATIC DIAGRAM OF SUPPLY TO OUTGOING FEEDER
SIZE :	PROJECT NO : / SHEET NO : 2 OF 2
ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/SCHEMF-2 / REV.02

SINGLE LINE DIAGRAM OF ACDB (QTY-3)

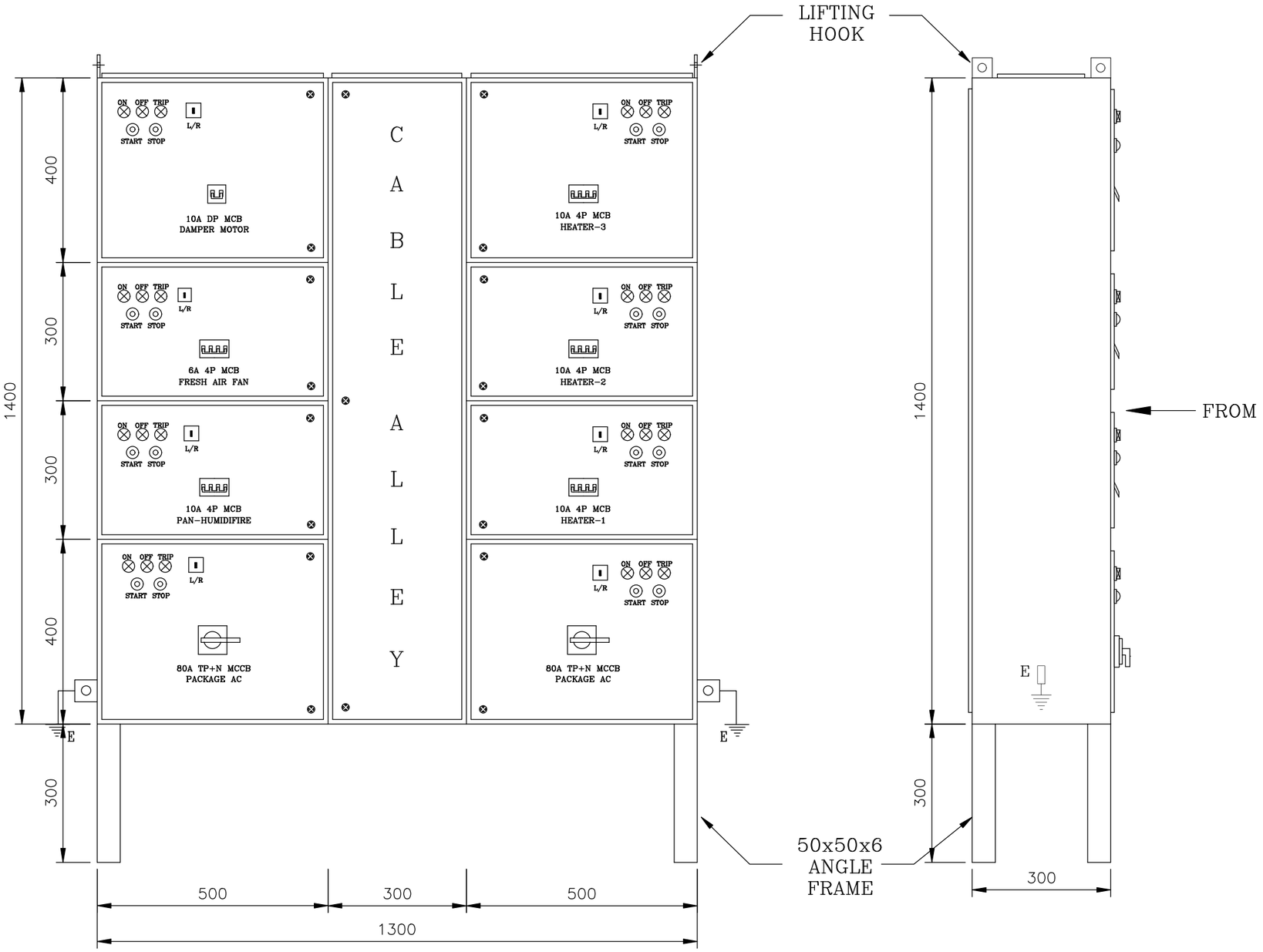


NOTE:

MCCB SHALL BE PROVIDED WITH MICROPROCESSOR BASED INBUILT FRONT AJUSTABLE RELEASES (OVERLOAD AND SHOR CIRCUIT) AND SHALL HAVE ADJUSTABLE EARTH FAULT PROTECTION UNIT ALSO.

PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M		
CUSTOMER :	NTPC LIMITED		
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA		
HVAC CONTRACTOR :	EFE WORKS KOLKATA INDIA		
DESIGN BY	TITLE:– SINGLE LINE DIAGRAM OF ACDB (QTY-3)		
CHECKED BY			
APPROVED BY			
SUPERSEDES	SIZE :	PROJECT NO :	SHEET NO : 1 OF 1
SUPERSEDES BY SYSTEM	ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/ACDB-SLD-1	REV.03

GA DIAGRAM OF COMBINED LOCAL STARTER PANEL



FRONT VIEW

SIDE VIEW

MAKE OF EQUIPMENTS:

SL.NO.	EQUIPMENT	MAKE
1.	MCCB, MPCB, MCB	L&T
2.	POWER & AUX. CONTACTOR	L&T
3.	O/L RELAY	L&T
4.	INDICATION LAMP & PUSH BUTTON	ESBEE
5.	LOCAL/REMOTE SEL. SW.	KAYCEE

SYSTEM PARAMETERS

1. Ambient temperature	: 50 Deg C
2. Maximum ambient air temperature (Deg. C)	: 90 Deg C
3. Reference ambient temperature for design (Deg. C)	: 50 Deg C
4. Main System / Frequency	: 3-Phase,4-Wire AC,50+5%Hz
5. Rated operational voltage	: 415+ 10% V AC
6. Dry Frequency withstand voltage	: 2.5 kV

CONSTRUCTION

1. Type of switchboard	: Non Drawout
2. Location floor mounting	: Indoor
3. Lifting Arrangement	: Lifting angles provided
4. Front access	: 2000mm (Maximum)
5. Operating height	: Yes
6. Rear access	: NO
7. Degree of protection for enclosure	: IP-55
8. Painting	: Siemens Grey / Light Dove Grey
9. Procedure	: Pre-treatment & painting
10. Material	: Powder coating
11. Shade inside	: RAL 7032
12. Shade outside	: RAL 7032
13. Name plate material	: Metal-Aluminum
14. Colour of lettering	: White letters on Black background
15. Sheet steel thickness of various parts	: 2.0 mm

WIRING

1. Insulation grade	: 1100V
2. Terminations	: With crimping type lugs
3. Control Circuits	: 1.5 Sqmm Cu Cable
4. CT circuit	: 2.5 Sqmm Cu Cable

TERMINATION ARRANGEMENTS

1. Cables	
2. Power cable entry from	: TOP
3. Control cable entry from	: TOP
4. Power terminal	: As per rating
5. Control terminals Size Suitable for	: 6 Sqmm Cu wire
6. Earthing of doors with equipment mounted	: With 2.5mm sq. PVC(Yellow, Green colour) insulated

WIRE COLOUR CODING

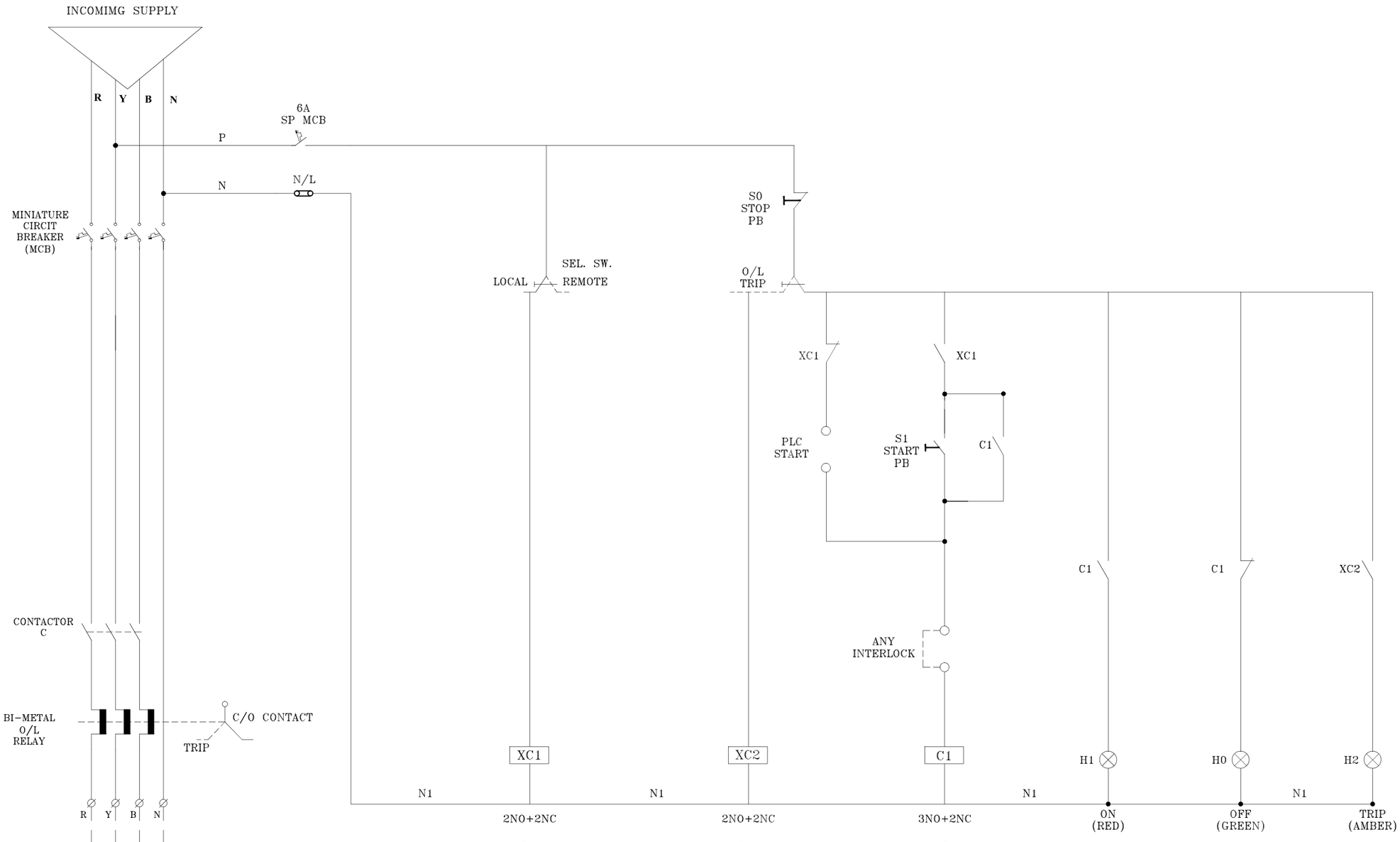
1. AC Control cable (P)	: GREY
2. AC Control cable (N)	: BLACK
3. Power Cable	: BLACK
4. Power Earth	: YELLOW GREEN STRIPED

GENERAL NOTES

1. Air clearance Phase to phase	: 25.4mm (minimum)
2. Air clearance Phase to earth	: 19.4mm (minimum)
3. Busbar Rating (current density)	: 1.0 A/sq.mm for Aluminimum

PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M		
CUSTOMER :	NTPC LIMITED		
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA		
HVAC CONTRACTOR :	EFE WORKS KOLKATA INDIA		
DESIGN BY / CHECKED BY / APPROVED BY / SUPERSEDES / SUPERSEDES BY SYSTEM	TITLE:– GA DIAGRAM OF COMBINED LOCAL STARTER PANEL		
	SIZE :	PROJECT NO :	SHEET NO : 1 OF 1
	ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/STARTERGA-1	REV.01

SCHEMATIC DIAGRAM OF DOL START FEEDER OF HEATER/PAN/HUMIDIFIRE



HEATER/FAN/HUMIDIFIRE

SL. NO.	ITEM	K.W.	MCB RATING (A)	CONTACTOR (A)	O/L RELAY (A)	QTY.
1	HEATER	2	10	12	4-6.3	3
2	PAN HUMIDIFIRE	2	10	12	4-6.3	1
3	FRESH AIR FAN	0.37	6	9	1-1.6	1

○ – TERMINAL BLOCK AT ACDB FEEDER

PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M
CUSTOMER :	NTPC LIMITED
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA
HVAC CONTRACTOR :	FFF WORKS KOLKATA INDIA

DESIGN BY		TITLE:–	SCHEMATIC DIAGRAM OF DOL START FEEDER OF HEATER/FAN/HUMIDIFIRE
CHECKED BY			
APPROVED BY			
SUPERSEDES		SIZE :	PROJECT NO : / SHEET NO : 2 OF 3
SUPERSEDES BY SYSTEM		ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/STARTERSCHM-2 / REV.01

SCHEMATIC DIAGRAM OF SUPPLY TO PACKAGE AC UNIT FEEDER

INCOMIMG SUPPLY

R Y B N

6A SP MCB

P

N

N/L

80A TP+N MCCB THERMOMAGNETIC BASED O/C & S/C RELEASED

NL

80A CONTACTOR C

30–50A BI–METAL O/L RELAY

C/O CONTACT

TRIP

R Y B N

TO PACKAGE AC UNIT 17 TR.

SO STOP PB

O/L TRIP

LOCAL SEL. SW. REMOTE

XC1 XC1

PLC START

S1 START PB

C1

ANY INTERLOCK

C1 C1 XC2

XC1 XC2 C1

H1 H0 H2

N1 N1 N1 N1 N1

ON (RED) OFF (GREEN) TRIP (AMBER)

2NO+2NC 2NO+2NC 3NO+2NC

LOCAL SELECTION (PLC FEEDBACK)

REMOTE SELECTION (PLC FEEDBACK)

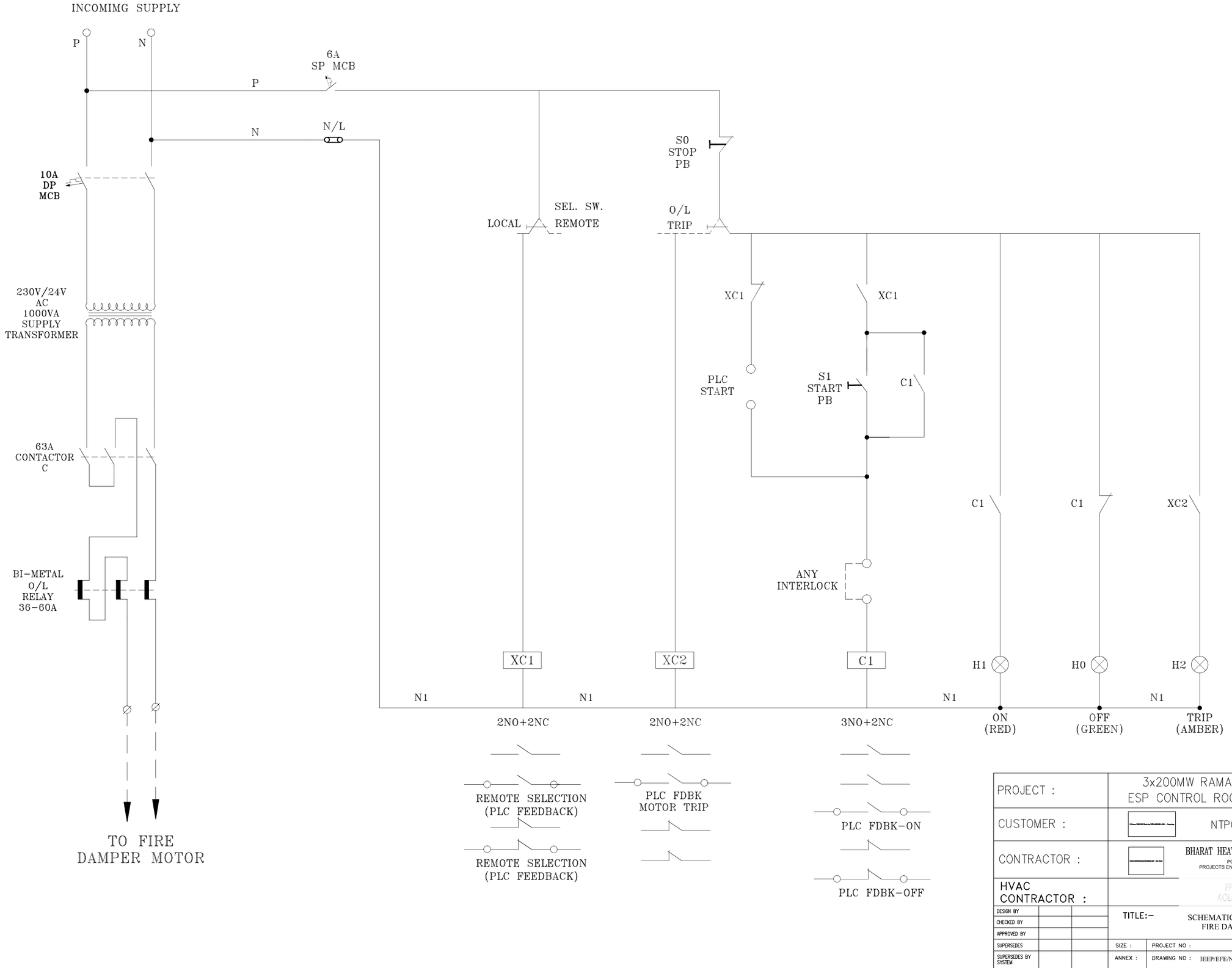
PLC FDBK MOTOR TRIP

PLC FDBK–ON

PLC FDBK–OFF

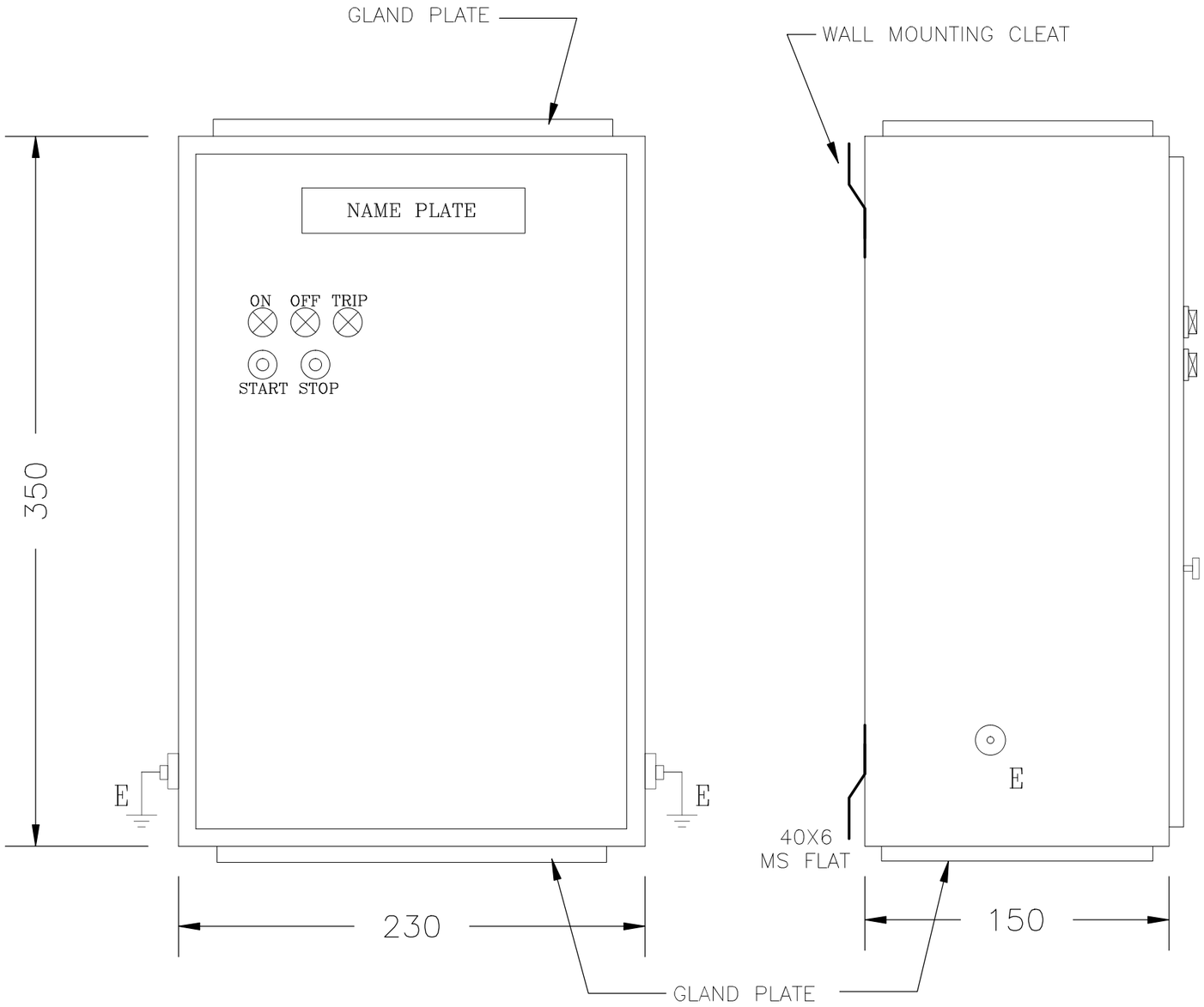
PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M
CUSTOMER :	NTPC LIMITED
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA
HVAC CONTRACTOR :	EFE WORKS KOLKATA INDIA
DESIGN BY / CHECKED BY / APPROVED BY / SUPERSEDES / SUPERSEDES BY SYSTEM	TITLE:– SCHEMATIC DIAGRAM OF SUPPLY TO PACKAGE AC UNIT FEEDER
SIZE :	PROJECT NO :
SHEET NO : 1 OF 3	
ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/STARTERSCHM-1
REV.01	

SCHEMATIC DIAGRAM OF SUPPLY TO FIRE DAMPER MOTOR FEEDER



PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M
CUSTOMER :	NTPC LIMITED
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA
HVAC CONTRACTOR :	EFE WORKS KOLKATA INDIA
DESIGN BY	TITLE:– SCHEMATIC DIAGRAM OF SUPPLY TO FIRE DAMPER MOTOR FEEDER
CHECKED BY	
APPROVED BY	
SUPERSEDES	SIZE : / PROJECT NO : / SHEET NO : 3 OF 3
SUPERSEDES BY SYSTEM	ANNEX : / DRAWING NO : IEEP/EFE/NTPC-RMGDM/STARTERSCHM-3 / REV.01

GA DIAGRAM OF DOL STARTER PANEL FOR T.A FAN



FRONT VIEW
WITH DOOR

SIDE VIEW

MAKE OF EQUIPMENTS:

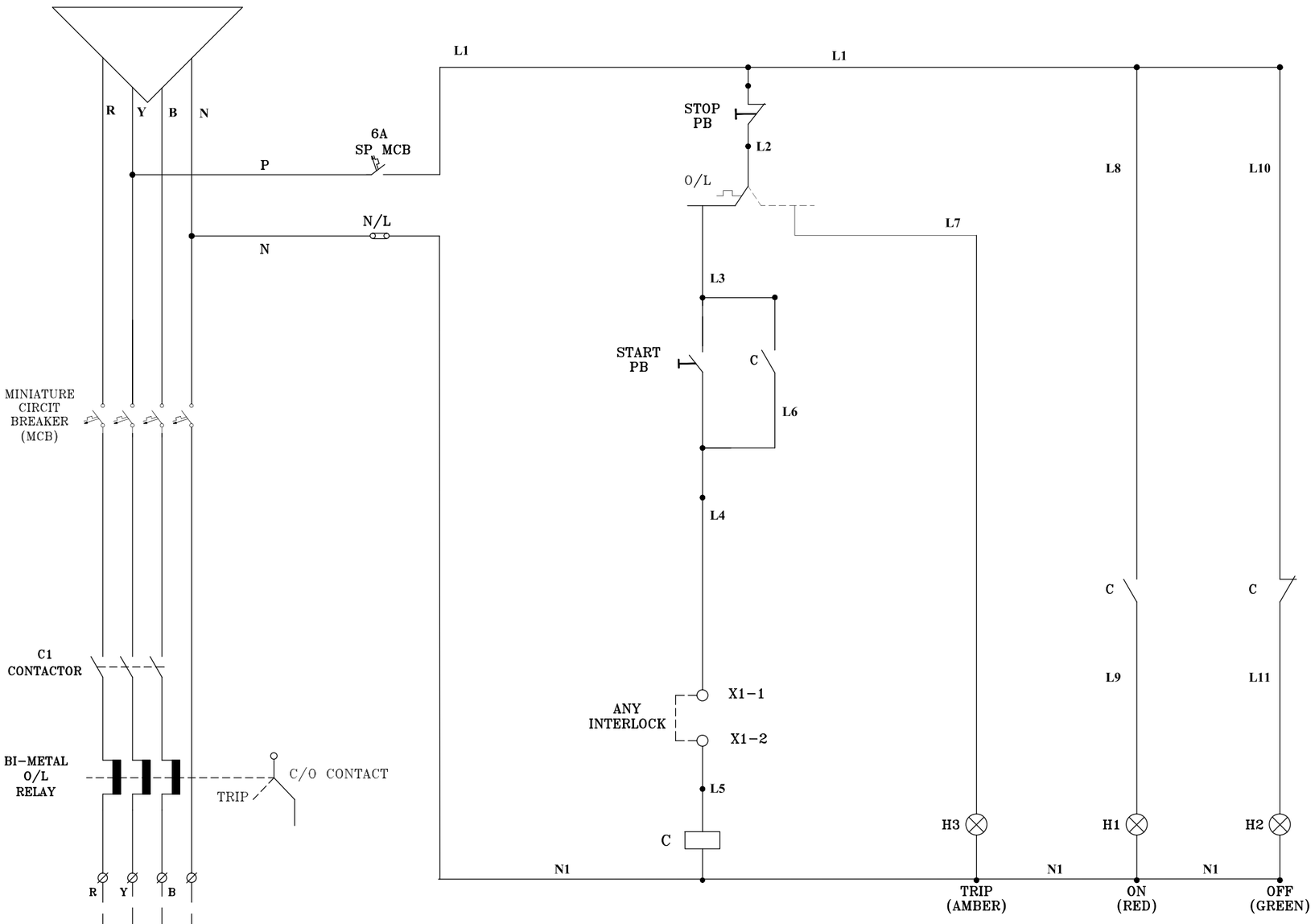
SL.NO.	EQUIPMENT	MAKE
1.	MCCB, MPCB, MCB	L&T
2.	POWER & AUX. CONTACTOR	L&T
3.	O/L RELAY	L&T
4.	INDICATION LAMP & PUSH BUTTON	ESBEE
5.	LOCAL/REMOTE SEL. SW.	KAYCEE

NOTE:–

1. Sheet Steel Thickness – 14 SWG
2. Paint shed– RAL–9002
3. Enclosure Protection shall be suitable for IP–55.

PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M
CUSTOMER :	NTPC LIMITED
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA
HVAC CONTRACTOR :	EFF WORKS KOLKATA INDIA
DESIGN BY / CHECKED BY / APPROVED BY / SUPERSEDES / SUPERSEDES BY SYSTEM	TITLE:– GA DIAGRAM OF DOL STARTER PANEL FOR T.A FAN
SIZE :	PROJECT NO :
SHEET NO : 1 OF 1	
ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/T.AFAN-GA-1
REV.02	

SCHEMATIC DIAGRAM OF DOL STARTER OF T.A FAN



TUBE AXIAL FAN
MOTOR

K.W.	MCB (A)	CONTACTOR (A)	O/L RELAY (A)	QTY.
0.55	10	9	1-1.6	4
1.5	25	12	2.5-4	3
2.2	32	18	4-6.3	2

○ – TERMINAL BLOCK AT ACDB FEEDER

PROJECT :	3x200MW RAMAGUNDAM ESP CONTROL ROOM – R&M
CUSTOMER :	NTPC LIMITED
CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA
HVAC CONTRACTOR :	EFE WORKS KOLKATA INDIA
DESIGN BY / CHECKED BY / APPROVED BY / SUPERSEDES / SUPERSEDES BY SYSTEM	TITLE:- SCHEMATIC DIAGRAM OF DOL STARTER OF TA FAN
SIZE :	PROJECT NO : / SHEET NO : 1 OF 1
ANNEX :	DRAWING NO : IEEP/EFE/NTPC-RMGDM/T.AFANSCHM-1 / REV.02