



**BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.
BIFPCL**

**2X660 MW MAITREE SUPER THERMAL POWER PROJECT
AT RAMPAL, BANGLADESH**

**TECHNICAL SPECIFICATION
FOR
VENTILATION SYSTEM**

SPECIFICATION NO.: PE-TS-421-554-A002



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA**



**2X660 MW MAITREE STPP
TECHNICAL SPECIFICATION FOR
VENTILATION SYSTEM**

SPECIFICATION No: PE-TS-421-554-A002

REV. 00

AUGUST 2023

SHEET : 1 OF 1

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**2X660 MW MAITREE STPP
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SPECIFICATION No: PE-TS-421-554-A002

SECTION-A

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SECTION-A

INTENT OF SPECIFICATION



**2X660 MW MAITREE STPP
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SPECIFICATION No: PE-TS-421-554-A002

SECTION-A

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1.0 INTENT OF SPECIFICATION

- 1.1 The specification covers Design, Engineering, Manufacture, supply / procurement, inspection and testing at vendor's / sub vendor's / manufacturer's works, painting, forwarding, proper packing and shipment and Delivery "as per details indicated in commercial portion of specification, Supervision of Erection, Commissioning and Performance and guarantee testing / performance testing for balance items of **VENTILATION SYSTEM** as per details in different sections / volumes of this specification for **2X660 MW BIFPCL MAITREE KHULNA (BANGLADESH) STPP** at KHULNA BANGLADESH.
- 1.2 The contractor shall be responsible for providing all material, equipment & services, which are required to fulfil the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification, irrespective of whether it has been specifically listed herein or not. Omission of specific reference to any component / accessory necessary for proper performance of the equipment shall not relieve the contractor of the responsibility of providing such facilities to complete the supply, erection and commissioning, performance and guarantee/demonstration testing of **VENTILATION SYSTEM**.
- 1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material which in his judgement is not in full accordance herewith.
- 1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or Price schedules and other. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the drawing.
- 1.5 The general term and conditions, instructions to tenderers and other attachment referred to elsewhere are made part of the tender specification. The equipment materials and works covered by this specification is subject to compliance to all attachments referred to in the specification. The bidder shall be responsible for and governed by all requirements stipulated herein.
- 1.6 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information, ensure completeness of specification, to bring out any contradictory



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/ conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Section-III of the specification **within 10 days of receipt of tender documents.** In absence of any such clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of Purchaser / Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Purchaser/ Customer as and when brought to their notice either by the bidder or by purchaser/ customer themselves. However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.

- 1.7 The bidder's offer shall not carry any sections like clarification, interpretations and /or assumptions.
- 1.8 Deviations, if any, should be very clearly brought out clause by clause along with cost of withdrawal; otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification. If no cost of withdrawal is given against the deviation, it will be presumed that deviation can be withdrawn without any cost to BHEL/its customer.
- 1.9 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.
- 1.10 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder/ vendor and Customer/ Purchaser/ Employer will mean BHEL and / or customer including their consultant as interpreted by BHEL in the relevant context. For details refer the relevant clause in GCC.
- 1.11 Apart from specific design requirement, design of various systems/ Sub-systems and all equipment will also strictly meet the stipulations of Customer's Technical Specification.



**2x660 MW MAITREE STPP
VENTILATION SYSTEM
SPECIFIC TECHNICAL REQUIREMENT**

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SECTION: B

SUB-SECTION: B 1

**FINAL EQUIPMENT DRAWING /ENGINEERING DOCUMENTS TO BE
FOLLOWED AND BASIC TECHNICAL SPECIFICATION.**



**2x660 MW MAITREE STPP
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1.0 FUNCTION

The purpose of the system is to Supply Ventilation System equipment and accessories for 2x660 MW Maitree STPP.

2.0 SYSTEM DESCRIPTION

This specification is for Maitree, 2x660 MW Ventilation System.

Engineering of Ventilation System such as P&ID and capacities of equipment have already been finalized with customer.

Equipment /Layout drawings for specific makes of respective equipment (as per Table 1) have been finalized and are attached with this specification. Bidder has to procure various items from the makes for which the documents are already approved. Thus, bidder is not required to submit these drawings/documents afresh. However, bidder shall be required to endorse the documents attached with the specification during detail engineering.

However, in exception case where any approved make denies supply of respective item or the bidder is not able to procure the item from approved make due to reasons beyond control of the bidder, bidder may propose change of make of such item (to be necessarily selected from the approved list of makes of sub-supplier items, attached with this specification), acceptance of which shall be subject to BHEL/ customer approval.

In such a scenario, Bidder will have to submit Engineering document for such items in line with details mentioned in respective equipment GA / documents attached at Appendix 1 and the Technical specification of the equipment. However, any data which is proprietary in nature or standard for the model offered by OEM or not specifically insisted in this tender specification of the respective equipment may be updated/ modified suitably.

Note: Bidder to note that since electrical switch-gears' manufacturing and civil construction has already been completed/ in advanced stage at site, any change in rating of electrical drives and civil details (foundation/load/ location/ structural etc.) shall not be allowed under any circumstances.

3.0 SCOPE OF SUPPLIES

Scope of Main Supplies shall be as per ENCLOSED BOQ.



**2x660 MW MAITREE STPP
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TABLE 1

Sl no.	Equipment	Make for which engineering drawing/ document is already approved	Approved Document Description
1	AIR WASHER/UAF	ADVANCE VENTILATION	FOR DETAILS REFER APPENDIX 1
2	CENTRIFUGAL FAN	ADVANCE VENTILATION	
3	CENTRIFUGAL PUMP	FLOWMORE PUMPS	
4	MOTOR	LHPL & HEM	
5	FILTER	PUROMATIC	
6	PIPE	JINDAL INDUSTRIES	
7	AXIAL FANS	ADVANCE VENTILATION	
8	DIFFERENTIAL PRESSURE GAUGE	A.N INSTRUMENTS	
9	AIR FLOW SWITCH	SWITZER	
10	POT STRAINER	SANT VALVES INDUSTRIES	
11	CI GATE VALVE	BANKIM & COMPANY	
12	CHECK VALVE	BANKIM & COMPANY	
13	GM GATE VALVE	LEADER VALVE	
14	GLOBE VALVE	BANKIM & COMPANY	
15	PRESSURE GAUGE	GIC	
16	PRESSURE SWITCH	SWITZER	
17	LEVEL SWITCH	V AUTOMAT	
18	GRILLES	ADVANCE VENTILATION	
19	VOLUME CONTROL DAMPER, INTAKE LOUVERS, GRAVITY DAMPERS	ADVANCE VENTILATION	
20	LOCAL CONTROL PANEL	ADVANCE VENTILATION	
21	JUNCTION BOX	PUSTRON SHRENIK & COMPANY	



**2x660 MW MAITREE STPP
VENTILATION SYSTEM
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APPENDIX-1

SI no.	APPROVED DOCUMENT DESCRIPTION	No. of Sheets	Page Range
1	Technical datasheet and GA for Air Washer along with Centrifugal Fan and Pump	13	10-22
2	Technical datasheet and GA for UAF along with Centrifugal Fan and Pump	09	23-31
3	Technical datasheet and GA for Roof Extractor Fans	03	32-34
4	Technical datasheet and GA for Axial Flow Fans	46	35-80
5	Technical datasheet and GA for Motors	160	81-240
6	Technical datasheet and GA for Instruments	30	241-270
7	Technical datasheet and GA for Pre and Fine Filters	13	271-283
8	Technical datasheet and GA for Valves, Strainer and Air Distribution items	16	284-299
9	Local Control Panel Drawing of Ventilation System	60	300-359
10	Datasheet of Pipes for Ventilation System	02	360-361
11	Datasheet of MS Sheet	01	362-362
12	GA drawing for Manual Trolley	01	363-363
13	Operation & Control Philosophy for ventilation System	04	364-367
14	Instrument Installation and Hook up drawing	05	368-372
15	Field JB quantity and grouping document	04	373-376
16	Quality Plan for Filters	01	377-377
17	Quality Plan for Pipes	01	378-378
18	Quality Plan for Valves	03	379-381
19	Quality Plan for Motor	02	382-383
20	Quality Plan for Air Washer and UAF	02	384-385
21	Quality Plan for Centrifugal Fan	04	386-389
22	Quality Plan for Centrifugal Pump	22	390-411
23	Quality plan for Axial Fan	02	412-413
24	GA OF PROPELLER FAN	01	414-414
25	TDS & GA OF FIRE DAMPER ALONGWITH ACTUATOR	21	415-435
26	AIR WASHER LAYOUT OUTSIDE "A-ROW"	02	436-437
27	AIR WASHER LAYOUT FOR "BC BAY" SIDE	02	438-439
28	UAF LAYOUT	01	440-440
29	PG TEST PROCEDURE	07	441-447

TECHNICAL DATA SHEET & GA DRAWING OF AIR WASHER

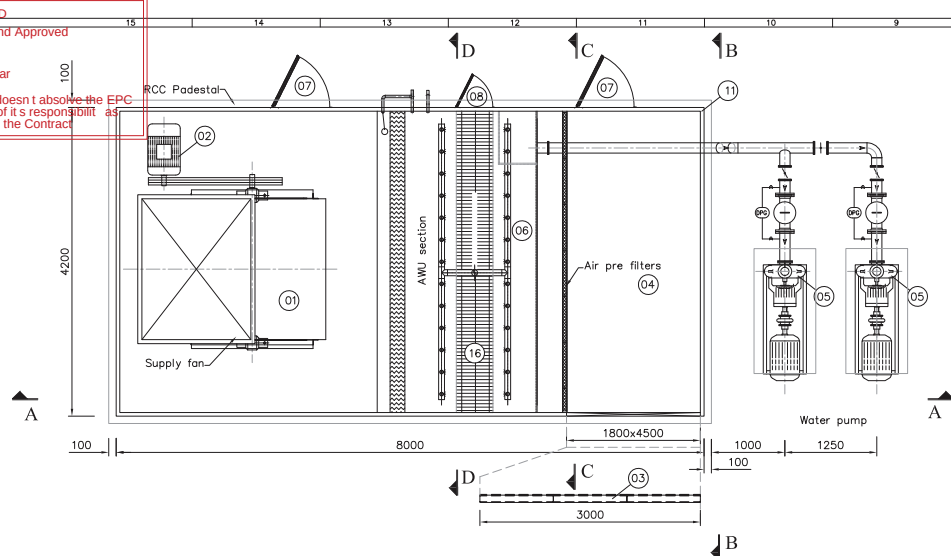
Sr. No.	ITEM	PARTICULARS	
General Description			
1	Item	Air Washer Unit	
2	Manufacturer		
3	Model No.		
4	Type	Double bank spray nozzles with eliminators, louvers, distribution plate, filters etc.	
5	Air flow Capacity	125000 CMH	
6	Recirculation water flow rate	125 CMH	
7	Pressure drop in AWU	Across air intake louver	2 mm WC
		Across filter	7.5 mm WC
		Across distribution plate	2 mm WC
		AWU chamber	12 mm WC
		Across eliminators	3 mm WC
		Fan outlet damper	4 mm WC
		Duct & accessories	24 mm WC
		Sub total	54.5 mm WC
	Fan selected for	75 mm WG	
8	Quantity Offered	16 Nos.	
9	Location	TG Building at various floors	
10	Overall Dimension	As per GA drawing of AWU, enclosed	
11	Saturation Efficiency of AWU	90 % (min.)	
12	Make up water requirement	2 CMH (max.)	
13	Maximum face air velocity at air pre-filter	2.5 m/s	
Item Description			
1	Water Eliminator	2mm thick PVC	
2	No. of Nozzles (Each AWU)	442 Nos. (221 in each Spray Bank)	
3	Size of Nozzles	3/8" (Self Cleaning Type)	
4	Pressure drop through Nozzle	1.4 to 2.4 kg/cm2	
5	Capacity of each Nozzle	5 LPM	
6	Air Pre filter Type & size	Box type, (610 x 610 x 50 mm-36 Nos. & 610 x 305 x 50-6Nos.)-For each AWU	
7	No. of Air Pre filters	(610 x 610 x 50 mm)-576 Nos. & (610 x 305 x 50)-96 Nos.	
8	Cat walk/ ladder	Yes	
9	Sump strainer	Yes, Brass	
10	Inspection door	Yes	
11	Marine Light	Yes	
12	Other Accessories	As per P & ID	
Material of Construction			
1	Air Intake Louver	20G GI sheet	
2	Air Suction Screen	GI wire mesh of 10 mm square	
3	Air Distribution Plate	18G GI sheet (50% free area)	
4	AWU Casing/ Enclosure	Air washer casing of double skin construction with 0.6 mm inside and outside GI sheets and 50mm thick sandwiched PUF insulation. Inside sheet shall be galvanised and outside sheet shall be pre-coated / pre-plasticide.	
5	Water tank	MS - 6mm thick	
6	Capacity of water tank	4.24 m³	
7	Water Eliminator	100% virgin PVC, 2mm thk	
8	Water Spray Nozzle	Brass, self cleaning type	
9	Internal & drain Piping	GI	
10	External piping	Heavy grade upto 150 NB and MS for sizes above 200 NB (ASTM A-53 & ASTM A-105)	
11	Support Structure	MS sections	
Painting			
1	Casing/ Enclosure	As per specification	
2	Water tank		
3	Support Structure		
Inspection & Testing			
1	Inspection & Testing	As per approved QAP	



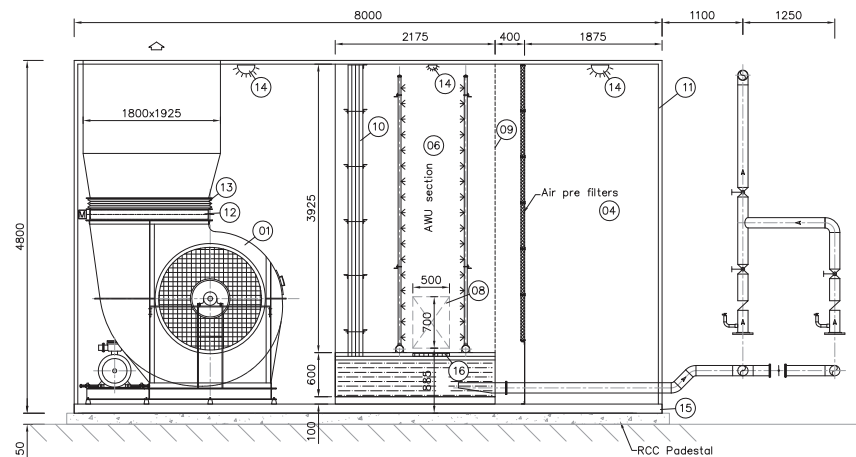
TECHNICAL DATA SHEET & GA DRAWING OF CENTRIFUGAL FAN FOR AIR WASHER

Sr. No.	ITEM	UNIT	PARTICULARS
1	Manufacturer		
2	Model No.		
3	Type of fan		Centrifugal (DIDW)
4	Type of fan Blade		Backward Curved
5	Quantity	Nos.	16
6	Location		TG Bldg. at various floors
7	Selected Capacity	CMH	125000
8	Specific Weight of air at 20 °C temperature	Kg/m ³	1.2
9	Static pressure	mmWG	75
10	Outlet Velocity	m/s	11.17
11	Impeller Wheel Diameter	mm	1372
12	Rated Speed	RPM	599
13	Class of Construction		Class - I
14	Bearing Type		Roller
15	Bearing Life		≥ 20,000 hours
16	Shaft bkW	bkW	36.75
17	Fan Efficiency at Rated Speed	%	71
18	Type of fan drive		Belt Drive
19	Recommended Motor Rating at 50 deg.C	kW/pole	45/4
20	Motor speed	RPM	1470
21	Performance curve (Enclosed/Not enclosed)		Enclosed
22	Material		
	a) Impeller		MS
	b) Casing		3 mm thk. MS
	c) Shaft		EN-8
23	Sound Pressure level at 1 M distance from fan	dB(A)	≤85
24	Fan Balancing		Statically & Dyanamically balanced
25	Painting		As per specification
26	Direction of Discharge		As per enclosed GA Drawing
27	Vibration limits		As per ISO-14694

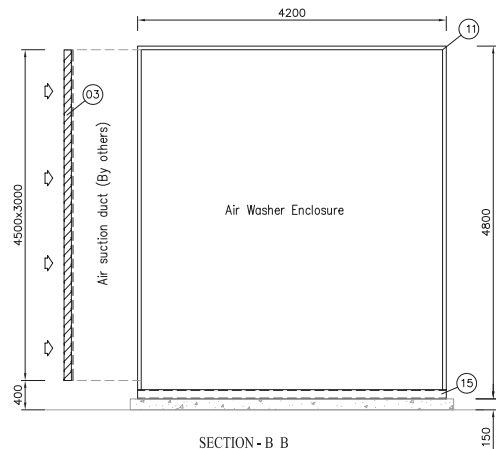
APPROVED
Checked and Approved
Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



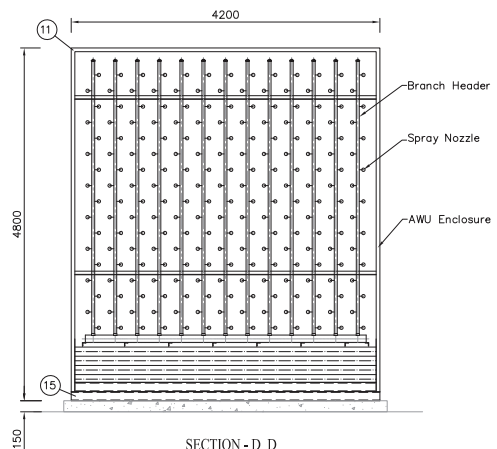
AWU PLAN
(AWU used at A row side)



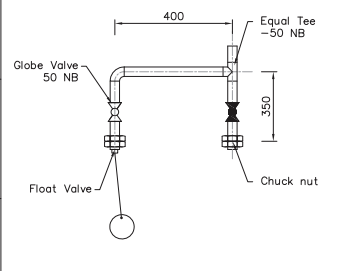
SECTION - A A



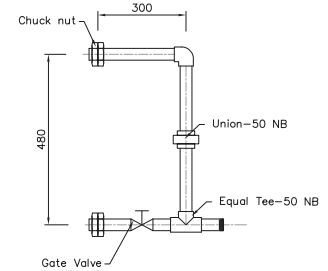
SECTION - B B
(Air Intake Louver Location valid for 'A' row side AWU)



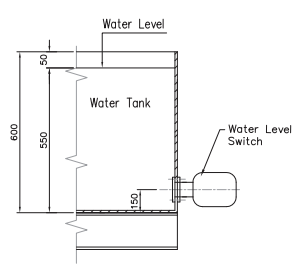
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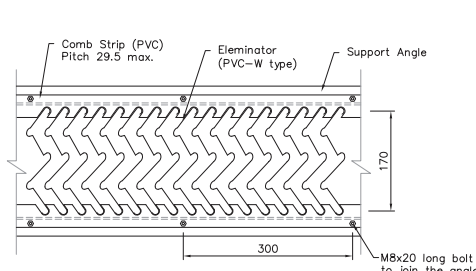
MAKEUP & QUICK FILL WATER PIPELINE ASSEMBLY



DRAIN & OVERFLOW WATER PIPELINE ASSEMBLY



FIXING DETAIL OF WATER LEVEL SWITCH



ELEMATOR FIXING DETAIL

BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NO. DOCUMENT / DRAWING TITLE

NOTES:

- ALL EQUIPMENTS SHALL BE DESIGNED FOR CONTINUOUS DUTY.
- ALL DIMENSIONS ARE IN MM, AND ELEVATIONS ARE IN MTRS, UNLESS OTHERWISE STATED.
- WATER DROPLETS / MIST ELIMINATORS SHALL BE MADE FROM RIGID PVC EXTRUDED PROFILES 6 BREAK TYPE.
- SATURATION EFFICIENCY OF AIR WASHER UNIT SHALL BE MINIMUM 90%.
- ROTATION OF SUPPLY AIR FAN, LOCATION OF AIR INTAKE LOUVERS & SIZE OF INTAKE LOUVERS WILL BE DECIDED AS PER APPROVED EQUIPMENT LAYOUTS DRAWINGS.
- MARIN LAMP CONSIDERED TWO (2) NOS. IN EACH SECTION.
- ITEM LISTED IN THE BBO FOR ONE AWU ONLY, TOTAL NO OF AWU ARE SIXTEEN (16) NOS.

SUPPLY AIR FAN (1 x 100% capacity)	
AIR FLOW CAPACITY	: 125,000 CMH
FAN STATIC PRESSURE	: 75 mmWC
WATER PUMP (2 x 100% capacity)	
WATER FLOW CAPACITY	: 125 CMH
HEAD	: 30 Mtr.

OPERATING LOAD OF AWU INCLUDING WATER : 17125 Kg.

STATIC LOAD OF FAN & MOTOR WITH ACCESSORIES	: 1875 kg.
DYNAMIC LOAD OF FAN & MOTOR WITH ACCESSORIES	: 2950 kg.
STATIC LOAD OF PUMP & MOTOR WITH ACCESSORIES	: 450 kg.
DYNAMIC LOAD OF PUMP & MOTOR WITH ACCESSORIES	: 580 kg.
STATIC LOAD OF DOUBLE SKIN AWU ENCLOSURE	: 4880 kg.
OPERATING LOAD OF AIR WASHER SECTION WITH WATER FILLED	: 6880 kg.

BILL OF QUANTITY

PART NO.	DESCRIPTION	SIZE	QTY.	MATLS./MAKE
01.	SUPPLY AIR FAN Arr : Y(s)-C2		1 no.	--
02.	MOTOR 45 kw/A POLE	--	1 no.	--
03.	FRESH AIR INTAKE LOUVERS WITH BRIDMESH	3000x4500	1 set	GSS
04.	AIR PRE FILTERS	610x610x50	36 nos.	HOPE
05.	WATER RE CIRCULATING PUMP	610x300x50	2 nos.	F 5625
06.	AIR WASHER SECTION (Spray section)	As Shown	1 no.	CRC
07.	AIR TIGHT DOOR (Outside openable)	750x2100 (ht.)	2 nos.	CRC
08.	AIR TIGHT WINDOW (Air Washer section)	500x700 (ht.)	1 no.	CRC
09.	AIR DISTRIBUTION PLATE	As Shown	1 no.	GSS
10.	WATER MIST ELIMINATOR	As Shown	1 set.	PVC
11.	DOUBLE SKIN ENCLOSURE	8000x4200x4800 ht.	1 no.	GSS
12.	FAN OUTLET DAMPER MOTORIZED	1620x1918	1 no.	GSS
13.	FAN OUTLET FLEXIBLE CONNECTION	1620x1918	1 no.	CANVAS
14.	MARIN LAMP	100 watt.	6 nos.	--
15.	ENCLOSURE BASE	125 ht.	1 no.	MS
16.	CAT WALK	450x4000	1 set	GSS

PROJECT: 2x660MW MATREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT: **FICHTNER** M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY

OWNER: BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH

POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA

SCALE: 1 : 50

SHEET 1 OF 8

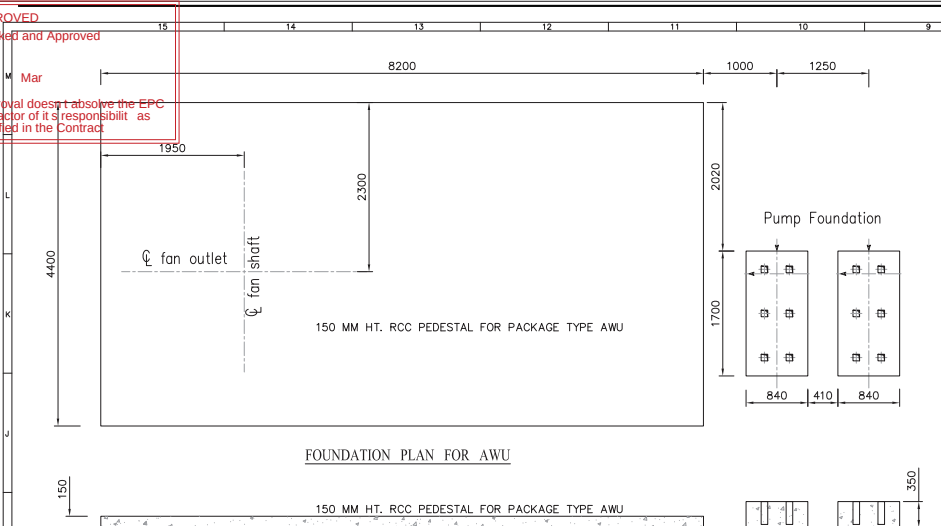
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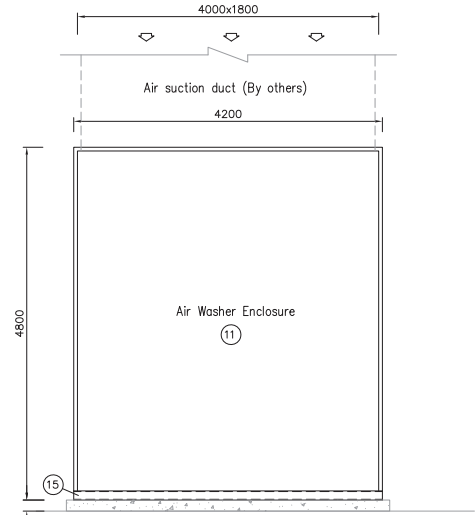
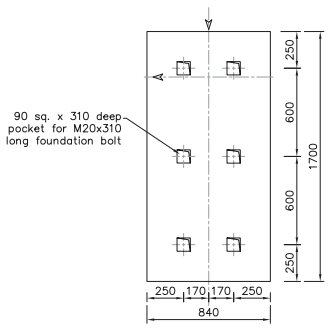
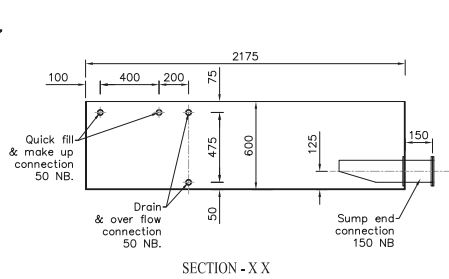
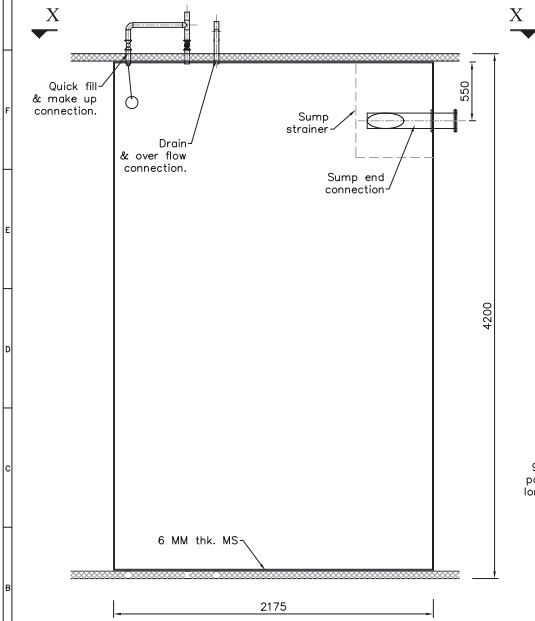
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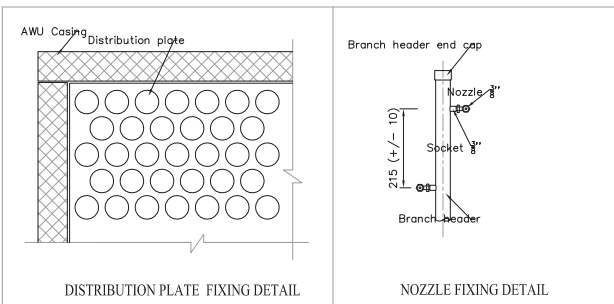
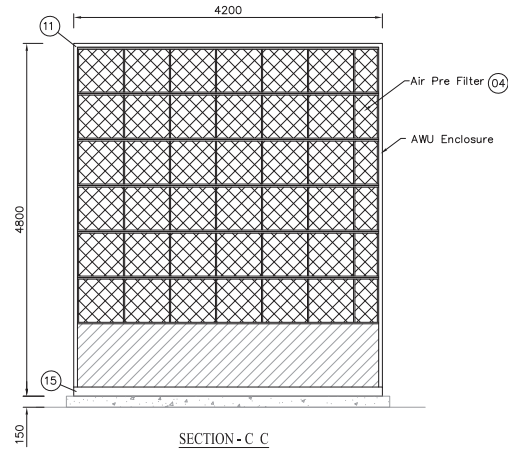
APPROVED
Checked and Approved
Date M Mar
Approval does not absolve the EPC contractor of its responsibility as specified in the Contract



FOUNDATION ELEVATION FOR AWU (Typical for all AWU)



(Air Intake Louver Location valid for 'B-C' bay side AWU)



BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NO	DOCUMENT / DRAWING TITLE

NOTES:

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OPERATING LOAD OF AIR WASHER SECTION WITH WATER FILLED	: 8680 kg.

PROJECT: 2x660MW MATRICE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT: **FICHTNER**
M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY

OWNER: **BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH**

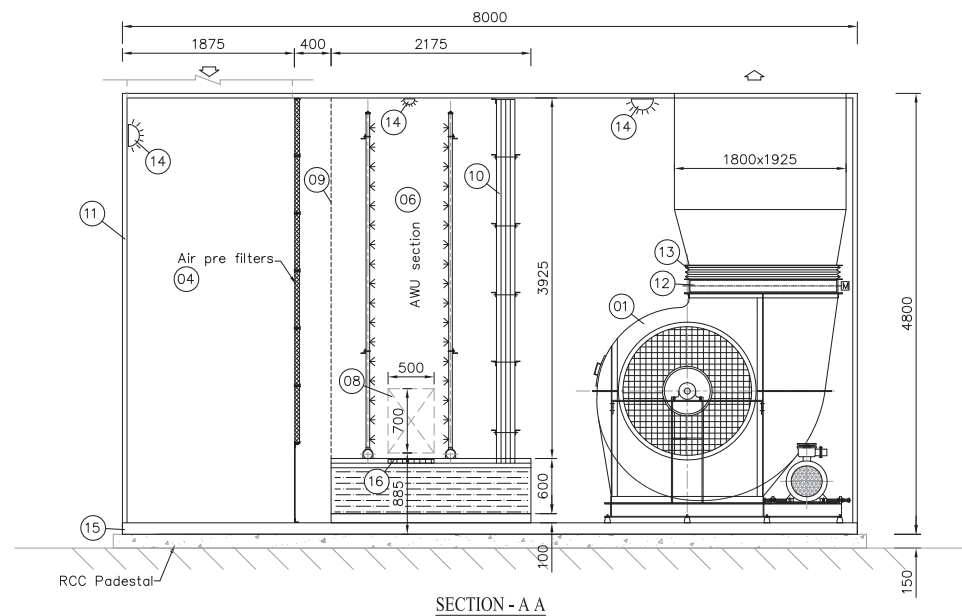
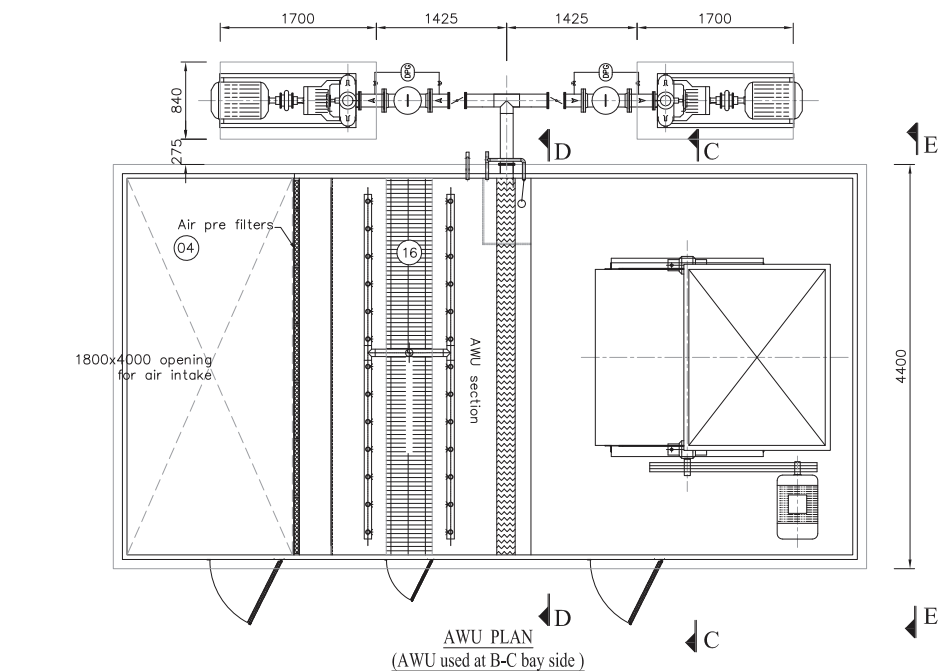
POWER SECTOR
BHARAT HEAVY ELECTRICALS LTD
PROJECTS ENGINEERING MANAGEMENT
NOIDA

TITLE: DATA SHEET & GENERAL ARRANGEMENT FOR FOR AIR WASHER & GAP ALONG WITH FAN & PUMP FOUNDATION DETAILS FOR VENTILATION SYSTEM.

SCALE: 1 : 50
SHEET 2 OF 8

SIZE: PROJECT NO: 421 FILE NO:
ANEX: MATRICE SUPR 001 / MATRICE-00-040-04-11000-PRG-0
BHEL SUPR 001 / PR-70-421-04-0400 REV-02

APPROVED
Checked and Approved
Date 14 Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NO	DOCUMENT / DRAWING TITLE

NOTES:

1. ALL EQUIPMENTS SHALL BE DESIGNED FOR CONTINUOUS DUTY.
2. ALL DIMENSIONS ARE IN MM. AND ELEVATIONS ARE IN MTRS. UNLESS OTHERWISE STATED.
3. WATER DROPLETS / MIST EXTRACTORS SHALL BE MADE FROM RIGID PVC EXTRUDED PROFILES 6 BREAK TYPE.
4. SATURATION EFFICIENCY OF AIR WASHER UNIT SHALL BE MINIMUM 90%.
5. ROTATION OF SUPPLY AIR FAN, LOCATION OF AIR INTAKE LOUVERS & SIZE OF INTAKE LOUVERS WILL BE DECIDED AS PER APPROVED EQUIPMENT LAYOUTS DRAWINGS.
6. MARN LAMP CONSIDERED TWO (2) NOS. IN EACH SECTION.
7. REFER DRAWING NO # PE-10-421-054-1033 OF AWU LAYOUT FOR B-C BAY SIDE ALONG WITH FOUNDATION DETAILS - T O BUILDING FOR SIZE & LOCATION OF INTAKE LOUVERS.

SUPPLY AIR FAN (1 x 100% capacity)	
AIR FLOW CAPACITY	: 125,000 CMH
FAN STATIC PRESSURE	: 75 mmWC

WATER PUMP (2 x 100% capacity)	
WATER FLOW CAPACITY	: 125 CMH
HEAD	: 30 Mtr.

OPERATING LOAD OF AWU INCLUDING WATER : 17125 Kg.

STATIC LOAD OF FAN & MOTOR WITH ACCESSORIES	: 1875 kg.
DYNAMIC LOAD OF FAN & MOTOR WITH ACCESSORIES	: 2950 kg.
STATIC LOAD OF PUMP & MOTOR WITH ACCESSORIES	: 450 kg.
DYNAMIC LOAD OF PUMP & MOTOR WITH ACCESSORIES	: 580 kg.
STATIC LOAD OF DOUBLE SKIN AWU ENCLOSURE	: 4890 kg.
OPERATING LOAD OF AIR WASHER SECTION WITH WATER FILLED	: 8680 kg.

PROJECT: 2x660MW MATREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT: **FICHTNER**
M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY

OWNER: **BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH**

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECTS ENGINEERING MANAGEMENT
NOIDA

TITLE: DATA SHEET & GENERAL ARRANGEMENT FOR AIR WASHER & DAP ALONG WITH FAN & PUMP FOUNDATION DETAILS FOR VENTILATION SYSTEM.

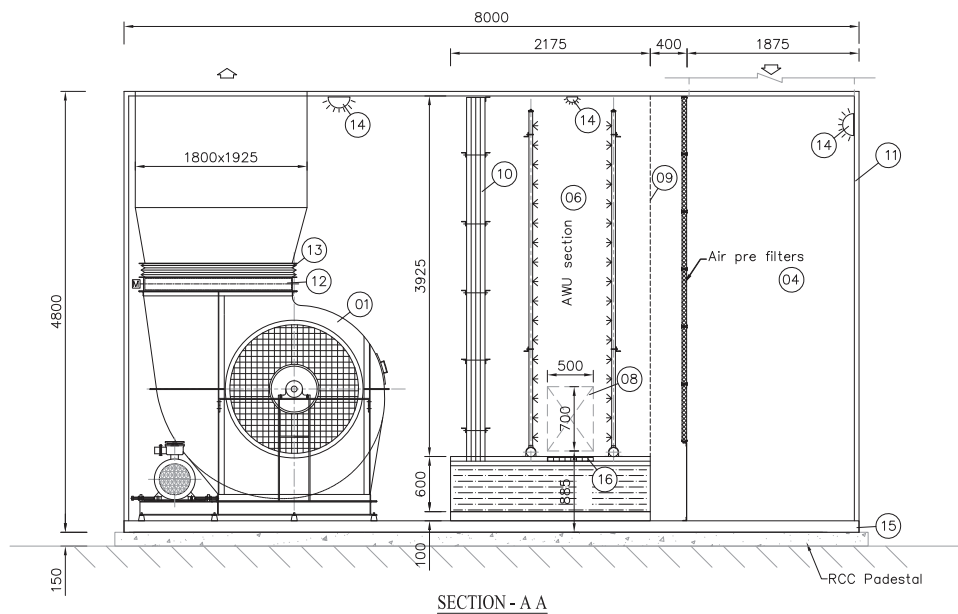
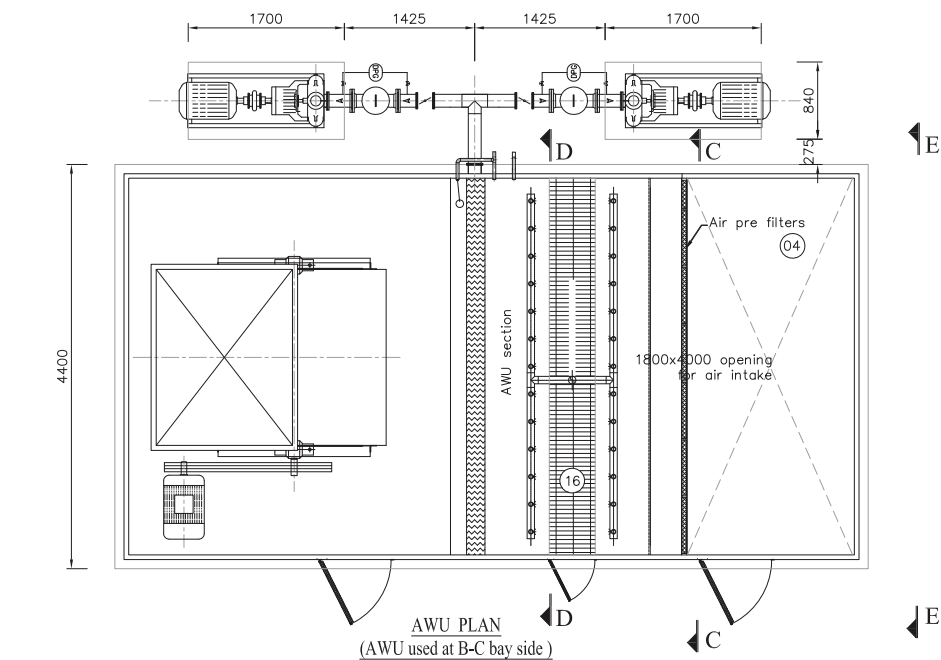
SCALE: 1 : 50
SHEET 3 OF 8

SIZE	PROJECT NO.	FILE NO.
ANEX:	MATREE-01-421	FILE NO.

REV.02

SIZE-A2

APPROVED
Checked and Approved
Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NO	DOCUMENT / DRAWING TITLE

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5. ROTATION OF SUPPLY AIR FAN, LOCATION OF AIR INTAKE LOUVERS & SIZE OF INTAKE LOUVERS WILL BE DECIDED AS PER APPROVED EQUIPMENT LAYOUTS DRAWINGS.
6. MARN LAMP CONSIDERED TWO (2) NOS. IN EACH SECTION.
7. REFER DRAWING NO. B-PE-40-401-004-003 OF AWU LAYOUT FOR B-C BAY SIDE ALONG WITH FOUNDATION DETAILS - T O BUILDING FOR SIZE & LOCATION OF INTAKE LOUVERS.

SUPPLY AIR FAN (1 x 100% capacity)	
AIR FLOW CAPACITY	: 125,000 CMH
FAN STATIC PRESSURE	: 75 mmWC

WATER PUMP (2 x 100% capacity)	
WATER FLOW CAPACITY	: 125 CMH
HEAD	: 30 Mtr.

OPERATING LOAD OF AWU INCLUDING WATER : 17125 Kg.

STATIC LOAD OF FAN & MOTOR WITH ACCESSORIES	: 1875 kg.
DYNAMIC LOAD OF FAN & MOTOR WITH ACCESSORIES	: 2950 kg.
STATIC LOAD OF PUMP & MOTOR WITH ACCESSORIES	: 450 kg.
DYNAMIC LOAD OF PUMP & MOTOR WITH ACCESSORIES	: 580 kg.
STATIC LOAD OF DOUBLE SKIN AWU ENCLOSURE	: 4890 kg.
OPERATING LOAD OF AIR WASHER SECTION WITH WATER FILLED	: 8680 kg.

PROJECT: 2x660MW MATREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT: **FICHTNER**
M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY

OWNER: **BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH**

PROJECT ENGINEERING MANAGEMENT: **POWER SECTOR**
NDA

TITLE: DATA SHEET & GENERAL ARRANGEMENT FOR AIR WASHER & DAP ALONG WITH FAN & PUMP FOUNDATION DETAILS FOR VENTILATION SYSTEM.

SIZE: PROJECT NO. 421 FILE NO. 11100-PEM-0

ANNEX: MATREE-00-001-004-003

SCALE: 1 : 50

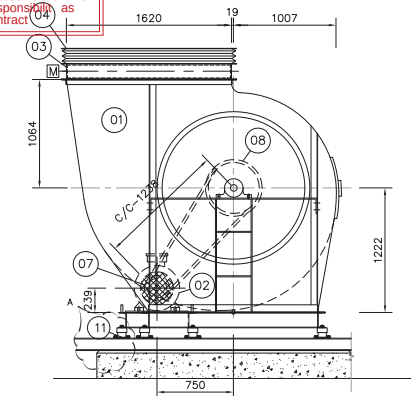
SHEET 4 OF 8

REV-00

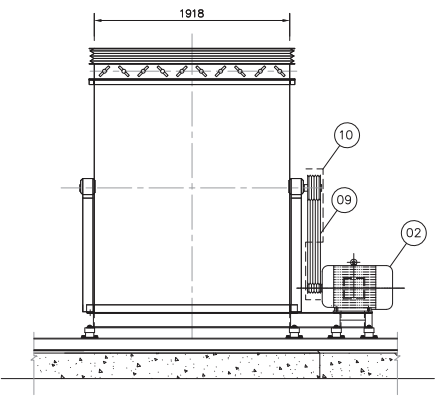
SIZE-A2

APPROVED
Checked and Approved

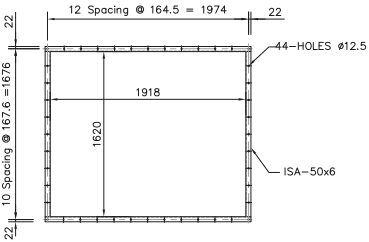
Date Mar
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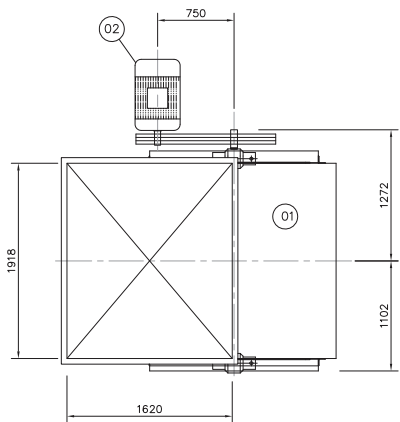
FRONT VIEW



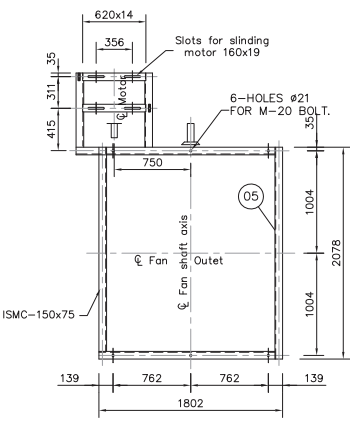
VIEW FROM - AA



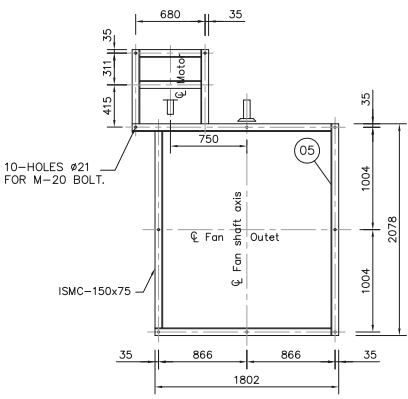
OUTLET FLANGE DETAIL



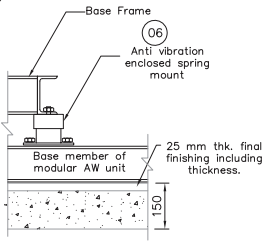
TOP VIEW



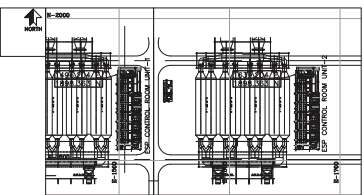
COMMON BASE FRAME
(TOP FLANGE)



COMMON BASE FRAME
(BOTTOM FLANGE)



Detail "A"



KEY PLAN

BHEL REFERENCE DOCUMENTS / DRAWINGS
DOCUMENT / DRAWING NO. DOCUMENT / DRAWING TITLE

NOTES:
1. ALL EQUIPMENTS SHALL BE DESIGNED FOR CONTINUOUS DUTY.
2. ALL DIMENSIONS ARE IN MM, AND ELEVATIONS ARE IN MTRS. UNLESS OTHERWISE STATED.

EQUIPMENT LOAD DETAILS :
STATIC LOAD OF UAF INCLUDING FAN & MOTOR : 1875 Kg.
OPERATING LOAD OF UAF INCLUDING FAN & MOTOR : 2950 Kg.

SUPPLY AIR FAN (1 x 1000 capacity)	
AIR FLOW CAPACITY	: 125,000 CMH
FAN STATIC PRESSURE	: 75 mmWC

12.	MOTOR FIXING BOLT	M-18-75L	4 nos.	M.S
11.	TONG BOLT FOR FAN TO BASE FRAME	M-18-40L	9 nos.	M.S
10.	BELT GUID	-	1 no.	M.S
09.	V-BELT	SPB 3550	4 nos.	RUBBER
08.	FAN PULLEY	500x4 SPB	1 no.	C I
07.	MOTOR PULLEY	224x4 SPB	1 no.	C I
06.	ANTI VIBRATION ENCLOSED SPRING MOUNT	-	1 no.	RUBBER
05.	COMMON BASE FRAME	ISMC-150x75	1 no.	M.S
04.	OUTLET FLEXIBLE CONNECTION	1620x1918	1 no.	CHAINS
03.	OUTLET DAMPER MOTORIZED	1620x1918	1 no.	SS
02.	MOTOR 45 KW/4POLE	F/S 225M	1 no.	STD.
01.	SUPPLY AIR FAN : FORM OF FAN : A2	-	1 no.	M.S

PART NO.	DESCRIPTION	SIZE	QTY.	MAT'L'S
----------	-------------	------	------	---------

PROJECT 2x660MW MATREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT:
M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY
OWNER:
BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH
BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECTS ENGINEERING MANAGEMENT
NOIDA

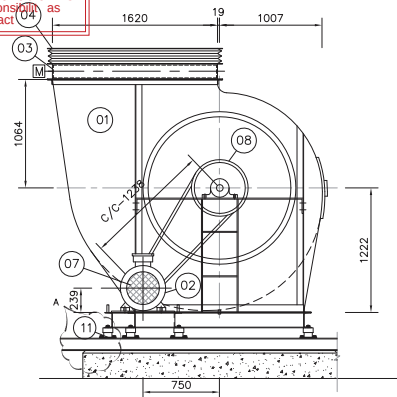
SCALE:
1 : 60
SHEET
5 OF 8

TITLE
DATA SHEET & GENERAL ARRANGEMENT FOR AIR
RAISED & LAP ALONG WITH FAN & PUMP FOUNDATION
DETAILS FOR VENTILATION SYSTEM.
SIZE: PROJECT NO. 421 FILE NO.
ANWER: MATREE SPS NO : MATREE-01-040-04-11100-04
BHEL SPS NO : PB-10-431-054-0000 REV-02

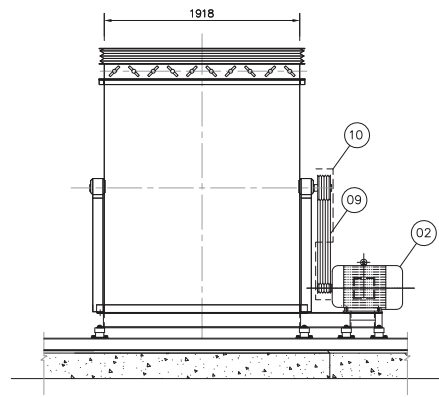
APPROVED
Checked and Approved

Date Mar

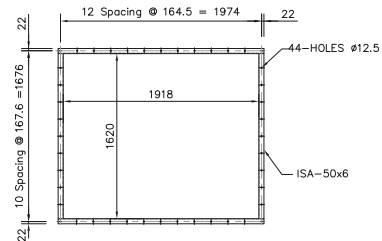
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



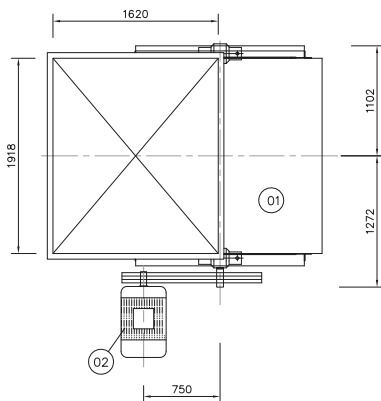
FRONT VIEW



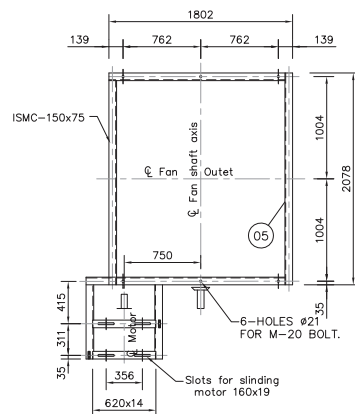
VIEW FROM - AA



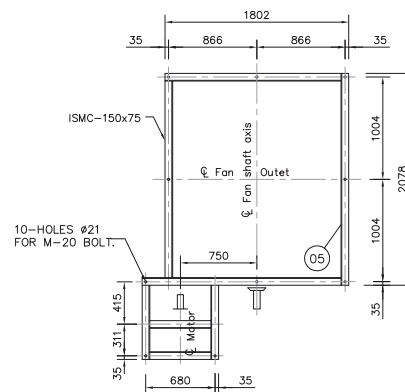
OUTLET FLANGE DETAIL



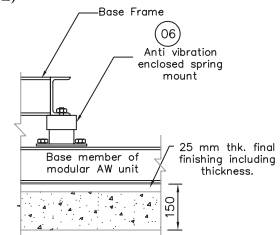
TOP VIEW



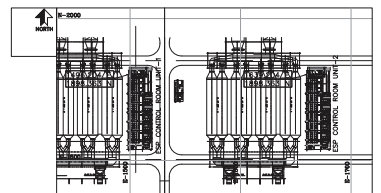
COMMON BASE FRAME
(TOP FLANGE)



COMMON BASE FRAME
(BOTTOM FLANGE)



Detail "A"



KEY PLAN

BHEL REFERENCE DOCUMENTS / DRAWINGS
DOCUMENT / DRAWING NO. DOCUMENT / DRAWING TITLE

NOTES:

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EQUIPMENT LOAD DETAILS :

STATIC LOAD OF UAF INCLUDING FAN & MOTOR : 1875 Kg.
OPERATING LOAD OF UAF INCLUDING FAN & MOTOR : 2950 Kg.

SUPPLY AIR FAN (1 x 100% capacity)	
AIR FLOW CAPACITY	: 125,000 CMH
FAN STATIC PRESSURE	: 75 mmWC

PART NO.	DESCRIPTION	SIZE	QTY.	MAT'L'S/MAKE
12.	MOTOR FIXING BOLT	M-18-75L	4 nos.	M.S.
11.	FIXING BOLT FOR FAN TO BASE FRAME	M-18-40L	9 nos.	M.S.
10.	BELT GUID		1 no.	M.S.
09.	V-BELT	SPB 3550	4 nos.	RUBBER
08.	FAN PULLEY	500x4 SPB	1 no.	C I
07.	MOTOR PULLEY	224x4 SPB	1 no.	C I
06.	ANTI VIBRATION ENCLOSED SPRING MOUNT	RUBBER	1 no.	RUBBER
05.	COMMON BASE FRAME	ISMC-150x75	1 no.	M.S.
04.	OUTLET DAMPER CONN.	1620x1918	1 no.	CHAINS
03.	OUTLET DAMPER MOTORIZED	1620x1918	1 no.	QSS
02.	MOTOR 45 KW/4POLE	F/S 225M	1 no.	STD.
01.	SUPPLY AIR FAN : FORM OF FAN : C2		1 no.	M.S.

PROJECT	2x660MW MATREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)		
OWNER CONSULTANT:	BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH		
M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA		
TITLE	DATA SHEET & GENERAL ARRANGEMENT FOR AIR DAMPER & LAP ALONG WITH FAN & PUMP FOUNDATION DETAILS FOR VENTILATION SYSTEM.		
SIZE:	PROJECT NO. 421	FILE NO.	SCALE: 1 : 60
ANNEK:	MATREE SPS NO : MATRES-01-040-04-11100-PEM-01	REV-02	SHEET 6 OF 8
BHEL SPS NO : PB-10-431-054-0000			

	TECHNICAL DATA SHEET		Rev. 00
	TECHNICAL DATA SHEET: Air Washer Pump		
S. No	Description		
General Information:			
1.	Application	Air Washer Pump	
2.	Duty	Continuous	
3.	Quantity	32 Nos.	
4.	Liquid	WATER	
5.	Specific Gravity of Liquid	1.0	
6.	Temperature (Deg. C)	Ambient	
Specifications:			
7.	Pump Make	FLOWMORE	
8.	Pump Type	Back Pullout Pump (END SUCTION)	
9.	Pump Model / Size	F5625 / 125 x 100 mm	
10.	No. of Stage	Single	
11.	Full Load Speed of Motor	1470 rpm	
12.	Capacity (M³/Hr.)	125 M³/Hr.	
13.	Total Differential Head (Mtr.)	30 M	
14.	Shut Off Head (Mtr.)	37.0 Mtr.	
15.	Pump Efficiency	73 %	
16.	Pump Input (BKW)	13.99 KW	
17.	Motor Rating	18.5 KW / 4P	
18.	Motor Type	TEFC / Horizontal Induction Motor /IE-3	
19.	Type of Bearing Lubrication	Grease	
20.	Type of Impeller / Rated Dia (mm)	Enclosed / 325	
21.	Type of Pump Motor Coupling	Flexible (Spacer Type)	
22.	Flange Drilling Standard	ANSI B 16.5, 150 LBS	
23.	NPSHR (At duty point)	3.0 Mtr.	
24.	Noise Level	85 dBA at 1 M	
25.	Vibration Level	75 Microns	
26.	Bearing No. (DE/NDE)	6310 Z-C3	
27.	Bearing Life (Hrs)	20000	
28.	Bearing Type / Make	Antifriction (SKF / FAG)	
29.	Max. power consumption in entire range of operation	17.89 kw	
30.	Direction of Rotation	CCW from DE	
31.	Type of coupling	Spacer Type	
32.	Painting Details	As per specification	

Material of Construction		
33.	Casing	2 % Ni Cl (ASTM A 48)
34.	Impeller	Bronze (ASTM A 62)
35.	Impeller Wearing Ring	Bronze (ASTM A 62)
36.	Casing Wearing Ring	Bronze (ASTM A 62)
37.	Pump Shaft	ASTM A 276 UNS S3803 (Duplex SS)
38.	Shaft Sleeve	ASTM A 276 ,S.S-410(H) (250-300 BHN)
39.	Gland Packing	Graph. Impregnated Cotton Yarn (Non - Asbestos)
40.	Gland	Cl ASTM A 48, CL 35 A
41.	Fasteners	ASTM A 193, Gr-B5/A 194 Gr-1
42.	Base Plate	Carbon Steel (IS 2062) ASTM A36

NOTE:

- 1) Inspection & Testing shall be as per approved QAP.

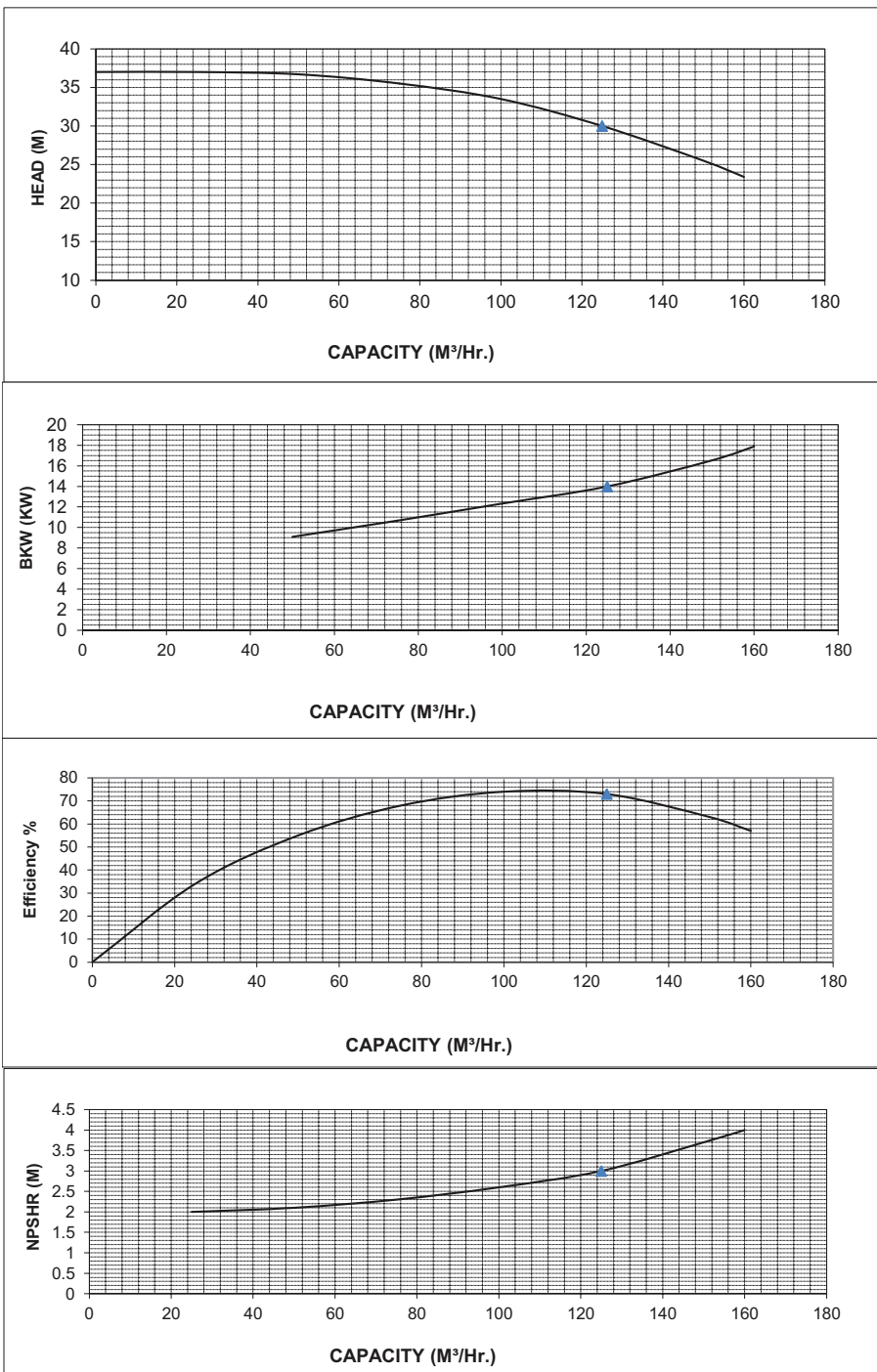
APPROVED
Checked and Approved

Date Mar

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FLOWMORE LIMITED

PERFORMANCE CURVE

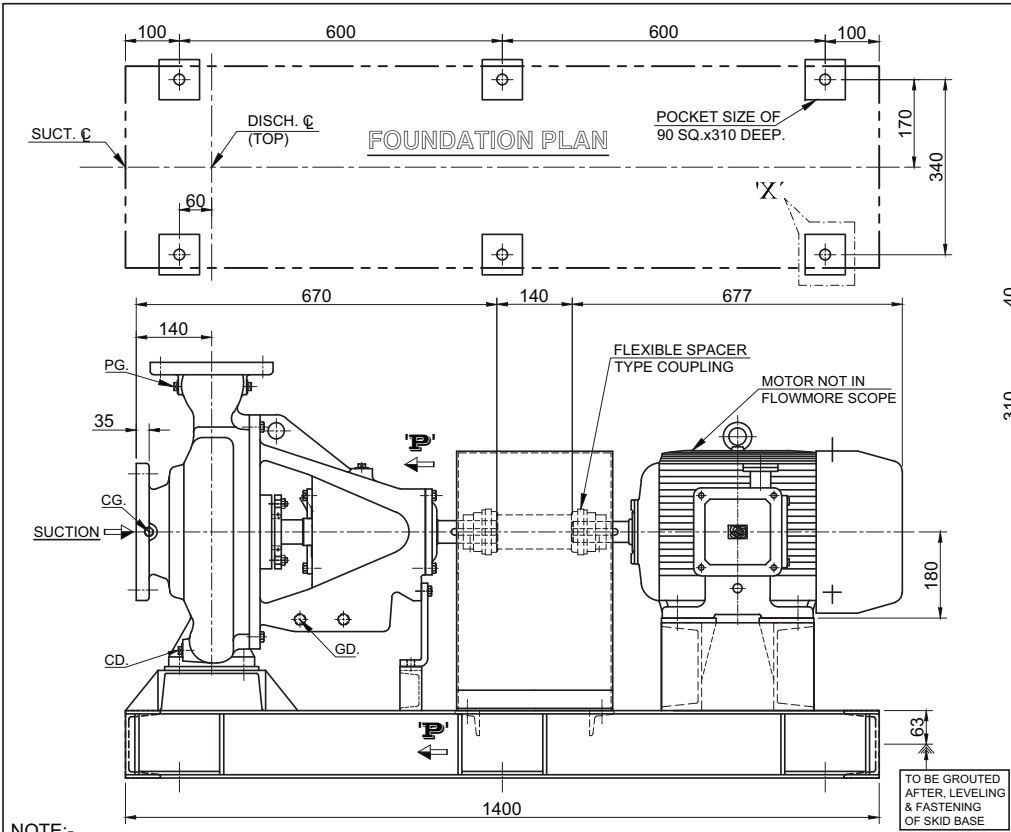


Project - 2X660 MW Maitry			MODEL	F5625 125X100	
CAPACITY	125	M³/Hr	TYPE	Endsuction	
HEAD	30	Mtrs	NPSHR	3.0 Mtrs	
EFFICIENCY	73	%	RPM	1470 rpm	
INPUT	13.99	KW	MOTOR RATING	18.5 KW	

APPROVED
Checked and Approved

Date Mar

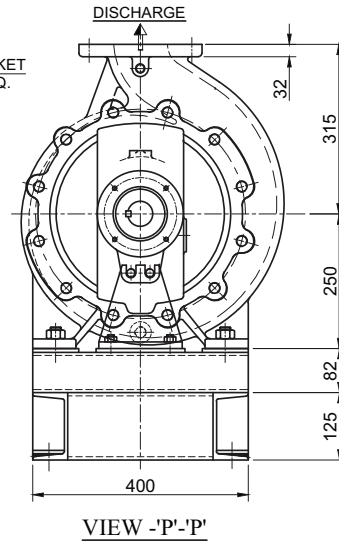
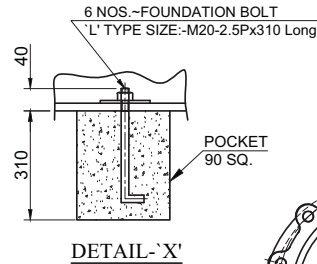
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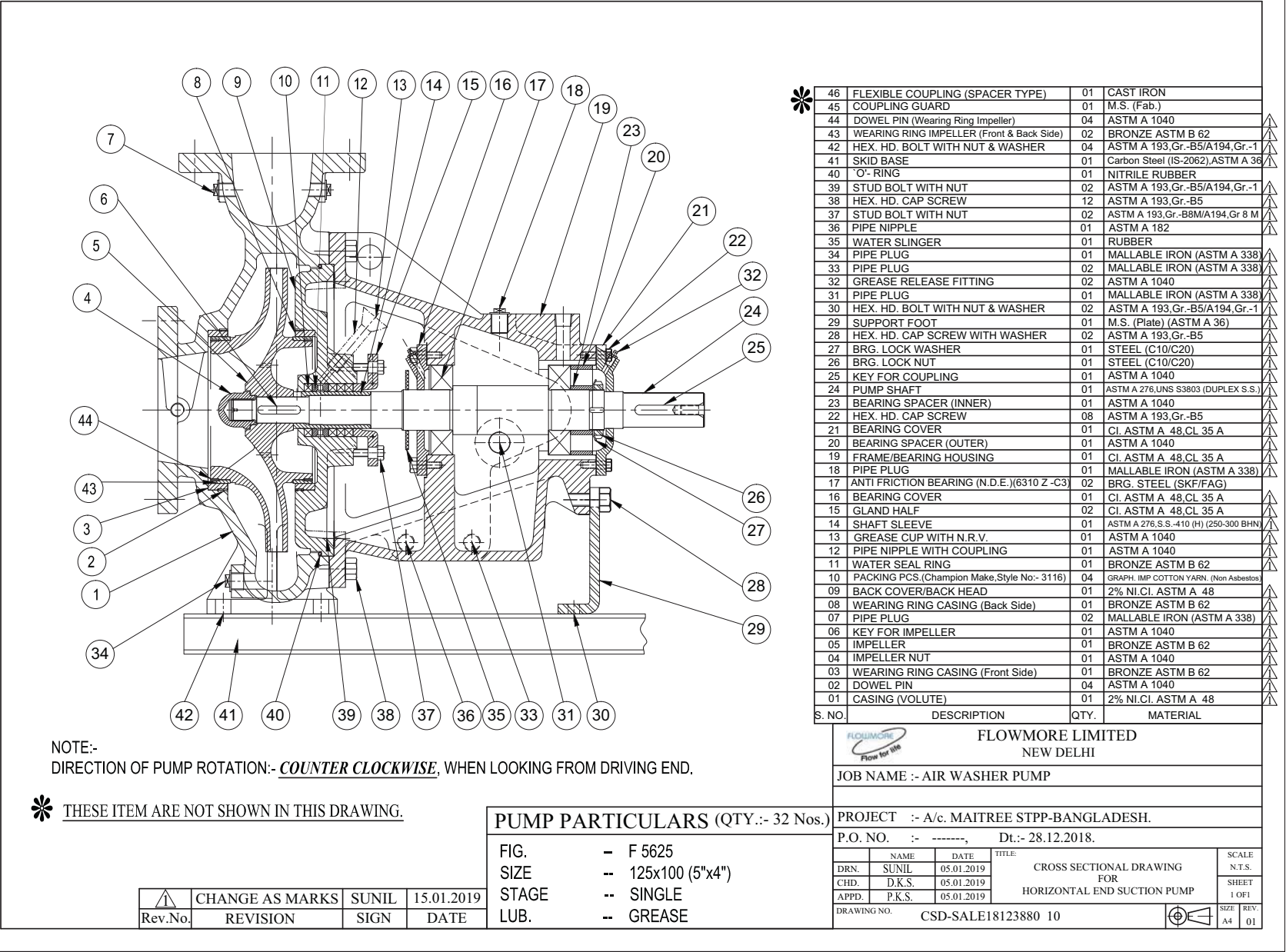
- NOTE:-
1. DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
 2. DIRECTION OF PUMP ROTATION:- **COUNTER CLOCKWISE** WHEN LOOKING FROM DRIVING END.
 3. STATIC LOAD (Pump Set With Motor) = 450 Kgs. (Approx.),
 4. DYNMIC LOAD (Pump Set With Motor) = 580 Kgs. (Approx.),

MOTOR PARTICULARS		PUMP PARTICULARS (QTY.- 32 Nos.)	
MAKE	-- CGL	FIG.	-- F 5625
FRAME	-- ND180M	SIZE	-- 125x100 (5"x4")
POWER	-- 18.5 K.W.	STAGE	-- SINGLE
SPEED	-- 1470 R.P.M.	SPEED	-- 1470 R.P.M.
VOLTS	-- 415	CAPACITY	-- 125 Cu. M/hr.
PHASES	-- THREE	HEAD	-- 30 Mtrs.
FREQUENCY	-- 50 Hz. ±5%	PUMP INPUT	-- 13.99 K.W.
TYPE OF CONS.	-- H.S.S.	(Sp. Gr. 1.0)	
		EFFICIENCY	-- 73%

FLANGE DETAIL AS PER ANSI B16.5, 150 LBS..			
SUCTION:----	125 N.B.	DISCHARGE:----	100 N.B.
FLANGE O.D.:--	254	FLANGE O.D.:--	228.6
P.C.D.:-----	215.9	P.C.D.:-----	190.5
NO. OF. HOLES:-	8	NO. OF. HOLES:-	8
DIA OF BOLTS:-	M20	DIA OF BOLTS:-	M16
PG PRESSURE GAUGE		3/8" B.S.P	
CG COMPOUND GAUGE		3/8" B.S.P	
CD CASING DRAIN		1/2" B.S.P	
GD GLAND DRAIN		1/2" B.S.P	



FLOWMORE LIMITED NEW DELHI			
JOB NAME :- AIR WASHER PUMP			
PROJECT :- A/c. MAITREE STPP-BANGLADESH.			
P.O. NO. :-		Dt.:- 28.12.2018.	
DRN.	NAME	DATE	TITLE
CHD.	SUNIL	05.01.2019	GENERAL ARRANGEMENT DRAWING FOR HORIZONTAL END SUCTION PUMP
APPD.	D.K.S.	05.01.2019	
	P.K.S.	05.01.2019	
DRAWING NO. GA-SALE18123880 10			SCALE N.T.S. SHEET 1 OF 1



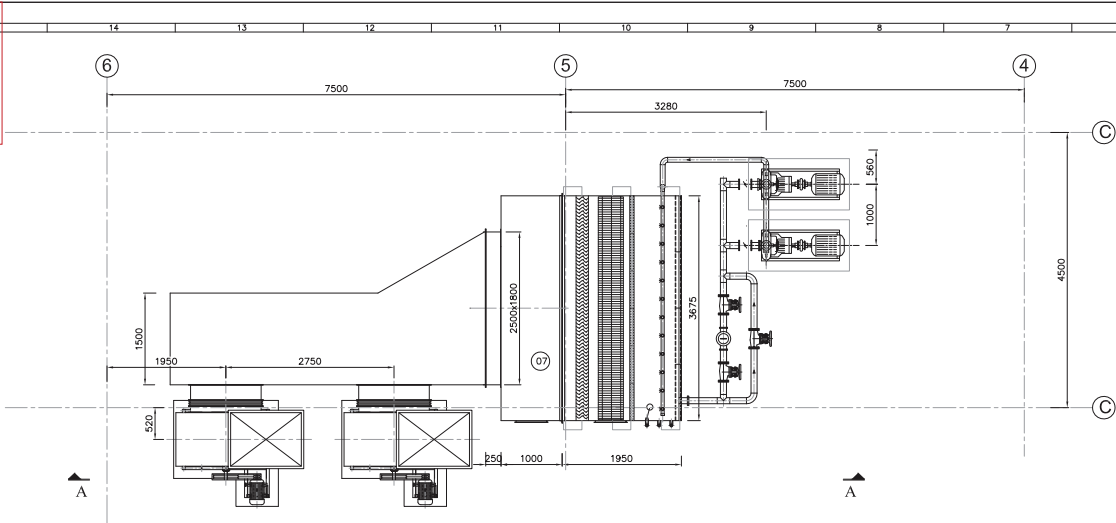
TECHNICAL DATA SHEET & GA DRAWING OF UAF

Sr. No.	ITEM	PARTICULARS
General Description		
1	Item	UAF
2	Manufacturer	
3	Model No.	
4	Type	Single bank spray nozzles with eliminators, louvers, distribution plate, Water repellent filters etc.
5	Air flow Capacity	80000 CMH
6	Recirculation water flow rate	56 CMH
7	Pressure drop in UAF	Across air intake louver2 mm WC
		Across filter7.5 mm WC
		Across distribution plate2 mm WC
		UAF chamber12 mm WC
		Across eliminators3 mm WC
		Fan outlet damper4 mm WC
		Duct & accessories12 mm WC
		Sub total42.5 mm WC
		Fan selected for60 mm WG
8	Quantity Offered	2 Nos.
9	Location	ESP Building
10	Overall Dimension	As per enclosed UAF GA drawing
11	Saturation Efficiency of UAF	70 % (min.)
12	Make up water requirement	2 CMH (max.)
13	Maximum face air velocity at air intake louver	2.5 m/s
Item Description		
1	Water repellent filter	Stainless steel mesh filters complete with SS/Al frame
2	No. of filter	30 Nos.
3	Av. Arrestance for air filter	65-80% as per BS:6540
4	Water Eliminator	2 mm thick PVC
5	No. of Nozzles	150 Nos.
6	Size of Nozzles	3/8"
7	Pressure drop through Nozzle	1.4 to 2.4 kg/cm2
8	Capacity of each Nozzle	6 lpm
9	Sump strainer	Yes, Brass
10	Inspection Window	Yes
11	Marine Light	Yes
12	Other Accessories	As per P & ID
Material of Construction		
1	Air Distribution Plate	18G GI sheet (50% free area)
2	Air Suction Screen	GI wire mesh of 10 mm square
3	UAF Casing/ Enclosure	MS 2mm thick (spray galvanized)
4	Water tank	MS Plate, 3 mm thick (epoxy painted)
5	Capacity of Tank	4.3 m³
6	Water Eliminator	100% virgin PVC, 2mm thick
7	Water Spray Nozzle	Brass self cleaning type
8	Internal & drain Piping	GI
9	External piping	Heavy grade upto 150 NB and MS for sizes above 200 NB (ASTM A-53 & ASTM A-105)
10	Support Structure	MS sections
Painting		
1	Casing/ Enclosure	As per specification
2	Water tank	
3	Support Structure	
Inspection & Testing		
1	Inspection & Testing	As per approved QAP

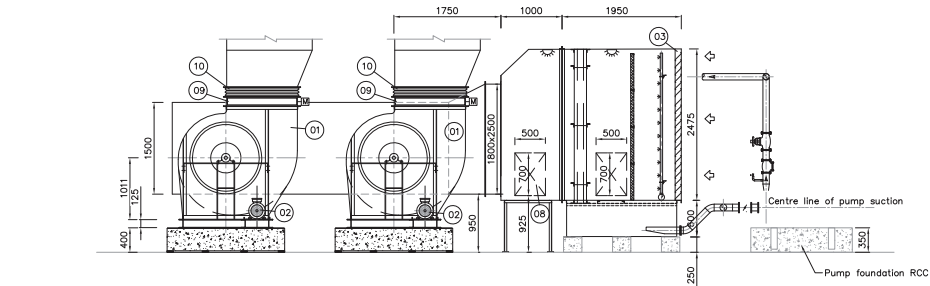
TECHNICAL DATA SHEET & GA DRAWING OF CENTRIFUGAL FAN FOR UAF

Sr. No.	ITEM	UNIT	PARTICULARS
1	Manufacturer		
2	Model No.		
3	Type of fan		Centrifugal (SISW)
4	Type of fan Blade		Backward Curved
5	Quantity	Nos.	4
6	Location		ESP Building
7	Selected Capacity	CMH	40000
8	Selected Weight of air at 20 °C temperature	Kg/m ³	1.2
9	Static pressure	mmWG	60
10	Outlet Velocity	m/s	10.53
11	Impeller Wheel Diameter	mm	1130
12	Rated Speed	RPM	657
13	Class of Construction		AMCA Class - I
14	Fan efficiency at rated speed	%	72
15	Bearing Type		Roller Bearing
16	Bearing Life		≥ 20,000 hours
17	Shaft bkW	bkW	9.44
18	Type of fan drive		Belt Drive
19	Recommended Motor Rating at 50 deg. C	kW/pole	11.0/4
20	Motor speed	RPM	1450
21	Performance curve (Enclosed/Not enclosed)		Enclosed
22	Material		
	a) Impeller		MS
	b) Casing		3 mm thick MS
	c) Shaft		EN-8
23	Sound Pressure level at 1 M distance from fan	dB (A)	≤85
24	Fan Balancing		Statically & Dynamically balanced
25	Painting		As per specification
26	Direction of Discharge		As per enclosed GA Drawing
27	Vibration limits		As per ISO-14694

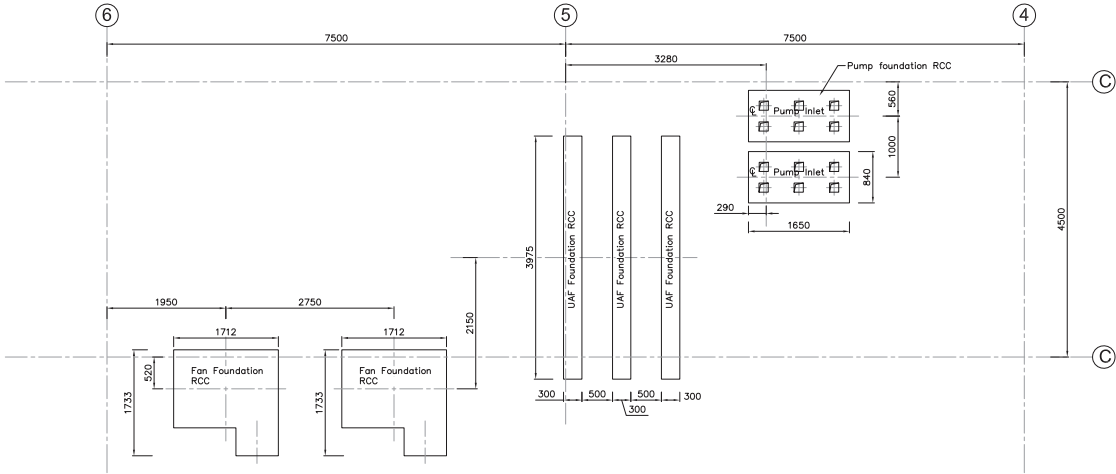
APPROVED
Checked and Approved
Date M Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



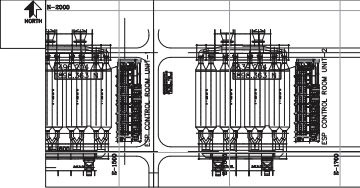
EQUIPMENT PLAN FOR UAF



SECTION - A A



FOUNDATION PLAN FOR UAF



KEY PLAN

BHEL REFERENCE DOCUMENTS / DRAWINGS
DOCUMENT / DRAWING NO. DOCUMENT / DRAWING TITLE

NOTES:
1. ALL EQUIPMENTS SHALL BE DESIGNED FOR CONTINUOUS DUTY.
2. ALL DIMENSIONS ARE IN MM, AND ELEVATIONS ARE IN MTRS, UNLESS OTHERWISE STATED.

EQUIPMENT LOAD DETAILS :
STATIC LOAD OF UAF INCLUDING FAN & MOTOR : 1725 Kg.
OPERATING LOAD OF UAF INCLUDING FAN & MOTOR : 5650 Kg.

SUPPLY AIR FAN (2 x 50% capacity)			
AIR FLOW CAPACITY	: 40,000 CMH		
FAN STATIC PRESSURE	: 60 mmWC		
WATER PUMP (2 x 100% capacity)			
WATER FLOW CAPACITY	: 56 CMH		
HEAD	: 30 Mtr.		

09	FAN OUTLET FLEXIBLE CONNECTION	1219x890	1 no.	CHNWS
09	FAN OUTLET DAMPER MOTORIZED	1219x890	1 no.	GSS
08	INSPECTION WINDOW	500x700	2 nos.	GSS
07	SUCTION DUCT WITH INSPECTION DOOR	3675x1950x2475 Ht.	1 no.	GSS
06	UAF ENCLOSURE	3675x1950x2475 Ht.	1 no.	GSS
05	WATER RE-CIRCULATION PUMP (END SUCTION)	5625/100x65	2 nos.	—
04	WATER REPELLENT FILTERS	610x610x50	24 nos.	HDPE WIREMESH
03	FRESH AIR WINE LOUVER WITH BRD MESH (door type)	3675x2475 Ht.	1 no.	GSS
02	MOTOR 11 KW/4P/4L	—	2 nos.	—
01	SUPPLY AIR FAN : FORM OF FAN : C3	—	2 nos.	—

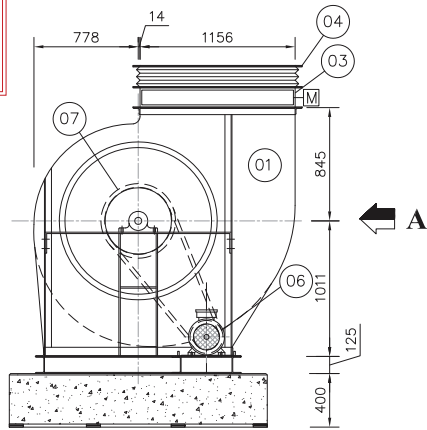
PART NO.	DESCRIPTION	SIZE	QTY.	MAT'L/MAKE
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PROJECT 2x660MW MATTHEE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

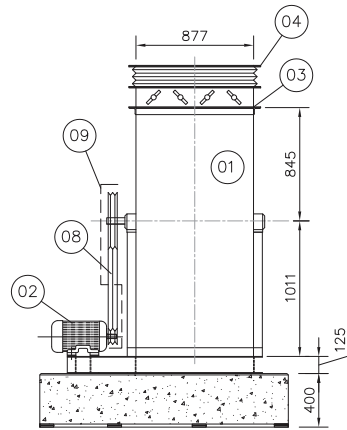
OWNER CONSULTANT:
M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY
OWNER:
BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH
BHARAT HEAVY ELECTRICALS LTD
PROJECTS ENGINEERING MANAGEMENT
NOIDA

TITLE DATA SHEET & GENERAL ARRANGEMENT FOR AIR RAISED & LAP ALONG WITH FAN & PUMP FOUNDATION DETAILS FOR VENTILATION SYSTEM.
SIZE: PROJECT NO. 421 FILE NO.
ANNE: MATTHEE SPS NO : MATTHEE-01-040-04-11100-04-04
BHEL SPS NO : PB-19-431-054-0000

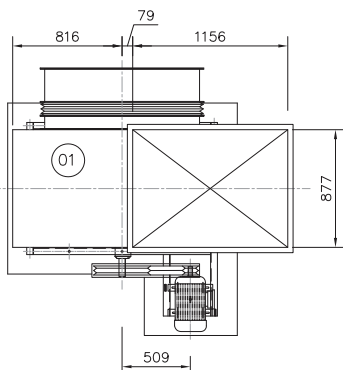
APPROVED
Checked and Approved
Date Mar
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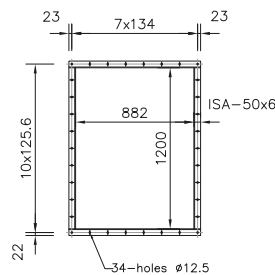
FRONT VIEW



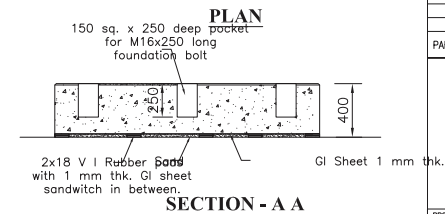
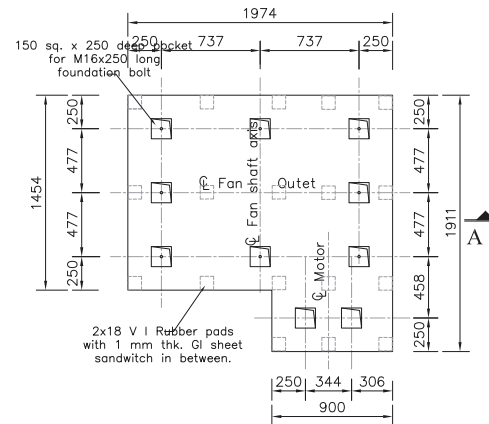
VIEW FROM - A



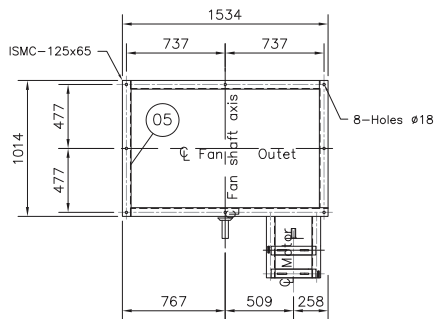
TOP VIEW



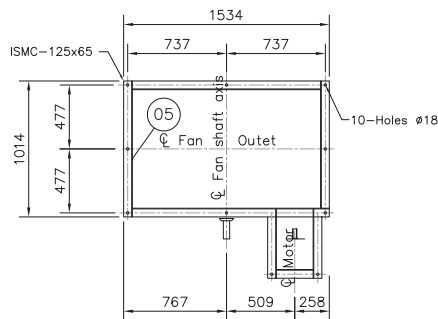
FAN OUTLET FLANGE DETAIL



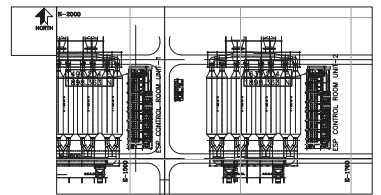
FLOATING FOUNDATION DETAILS



COMMON BASE FRAME
(TOP FLANGE)



COMMON BASE FRAME
(BOTTOM FLANGE)



KEY PLAN

BHEL REFERENCE DOCUMENTS / DRAWINGS
DOCUMENT / DRAWING NO. DOCUMENT / DRAWING TITLE

- NOTES:
- ALL EQUIPMENTS SHALL BE DESIGNED FOR CONTINUOUS DUTY.
 - ALL DIMENSIONS ARE IN MM. AND ELEVATIONS ARE IN METERS, UNLESS OTHERWISE STATED.
 - ITEM LISTED IN THE BBO ARE FOR ONE FAN ONLY. TOTAL NO OF FANS ARE FOUR (4) NOS.

EQUIPMENT LOAD DETAILS :
STATIC LOAD OF UAF INCLUDING FAN & MOTOR : 1875 Kg.
OPERATING LOAD OF UAF INCLUDING FAN & MOTOR : 2950 Kg.

SUPPLY AIR FAN (2 x 50% capacity)
AIR FLOW CAPACITY : 40,000 CMH
FAN STATIC PRESSURE : 60 mmWC

10.	FOUNDATION BOLT	M16/250 LONG	10 nos.	MS
09.	BELT GUARD	---	1 no.	MS
08.	V-BELT	SPB 2680	2 nos.	RUBBER
07.	FAN PULLEY	315x2 SPB	1 no.	C.I
06.	MOTOR PULLEY	150x2 SPB	1 no.	C.I
05.	COMMON BASE FRAME	ISM-125x65	1 no.	MS
04.	OUTLET DAMPER CORR.	1156x877	1 no.	MS
03.	OUTLET DAMPER MOTORIZED	1156x877	1 no.	MS
02.	MOTOR 11 KW/4POLE	---	1 no.	STD.
01.	SUPPLY AIR FAN : FORM OF FAN : A2	---	1 no.	MS
PART NO.	DESCRIPTION	SIZE	QTY.	MAT'L/MAKE

PROJECT	2x660MW MATREE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)		
OWNER CONSULTANT:	M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY		
OWNER:	BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH		
	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA		
TITLE	DATA SHEET & GENERAL ARRANGEMENT FOR AIR RAISED & LIFT ALONG WITH FAN & PUMP FOUNDATION DETAILS FOR VENTILATION SYSTEM.		
SIZE:	PROJECT NO. 421	FILE NO.	SCALE: 1 : 60
ANNEK:	MATREE SPS NO : MATRES-01-040-04-11000-PEN-01		SHEET 8 OF 8
	BHEL SPS NO : PB-19-431-004-0000		

	TECHNICAL DATA SHEET		Rev. 00
	TECHNICAL DATA SHEET: UAF Centrifugal Pump		
S. No	Description		
General Information:			
1.	Application	UAF Centrifugal Pump	
2.	Duty	Continuous	
3.	Quantity	04 Nos.	
4.	Liquid	WATER	
5.	Specific Gravity of Liquid	1.0	
6.	Temperature (Deg. C)	Ambient	
Specifications:			
7.	Pump Make	FLOWMORE	
8.	Pump Type	Back Pullout Pump (ENDSUCTION)	
9.	Pump Model / Size	5625 / 100 x 65 mm	
10.	No. of Stage	Single	
11.	Full Load Speed of Motor	1465 rpm	
12.	Capacity (M³/Hr.)	56 M³/Hr.	
13.	Total Differential Head (Mtr.)	30 M	
14.	Shut Off Head (Mtr.)	34.5 Mtr.	
15.	Pump Efficiency	66 %	
16.	Pump Input (BKW)	6.93 KW	
17.	Motor Rating	11 KW / 4P	
18.	Motor Type	TEFC / Horizontal Induction Motor /IE-3	
19.	Type of Bearing Lubrication	Grease	
20.	Type of Impeller / Rated Dia (mm)	Enclosed / 306	
21.	Type of Pump Motor Coupling	Flexible (Spacer type)	
22.	Flange Drilling Standard	ANSI B 16.5, 150 LBS	
23.	NPSHR (At duty point)	1.8 Mtr.	
24.	Noise Level	85 dBA at 1 M	
25.	Vibration Level	75 Microns	
26.	Bearing No. (DE/NDE)	6310 Z-C3	
27.	Bearing Life (Hrs)	20000	
28.	Bearing Type / Make	Antifriction (SKF / FAG)	
29.	Max. power consumption in entire range of operation	8.10 kw	
30.	Direction of Rotation	CCW from DE	
31.	Type of coupling	Spacer	
32.	Painting Details	As per specification	

Material of Construction		
33.	Casing	2 % Ni Cl (ASTM A 48)
34.	Impeller	Bronze (ASTM A 62)
35.	Impeller Wearing Ring	Bronze (ASTM A 62)
36.	Casing Wearing Ring	Bronze (ASTM A 62)
37.	Pump Shaft	ASTM A 276 UNS S3803 (Duplex SS)
38.	Shaft Sleeve	ASTM A 276 ,S.S-410(H) (250-300 BHN)
39.	Gland Packing	Graph. Impregnated Cotton Yarn (Non - Asbestos)
40.	Gland	Cl ASTM A 48, CL 35 A
41.	Fasteners	ASTM A 193, Gr-B5/A 194 Gr-1
42.	Base Plate	Carbon Steel (IS 2062) ASTM A36

NOTE:

- 1) Inspection & Testing shall be as per approved QAP.

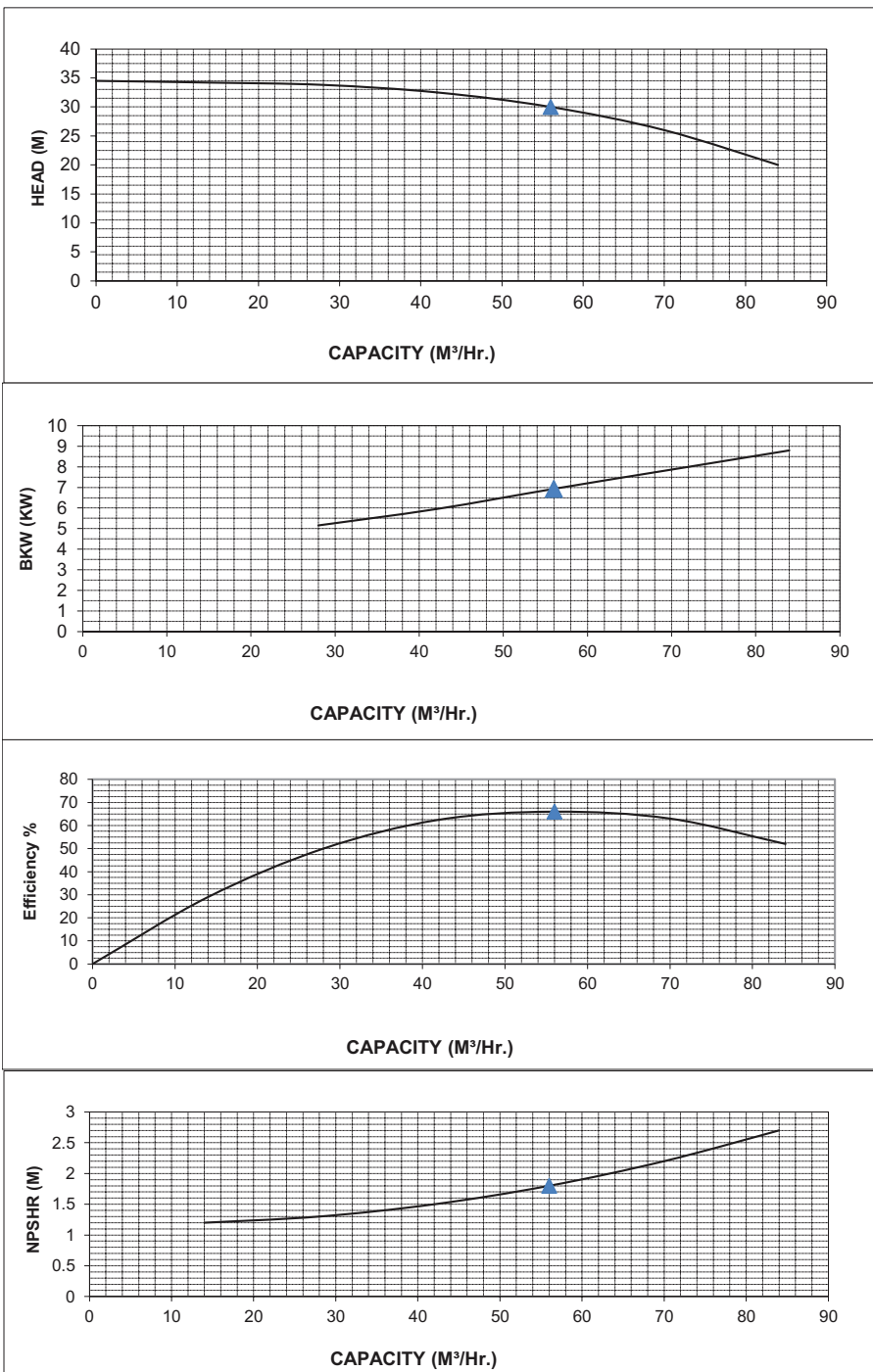
APPROVED
Checked and Approved

Date Mar

Approval doesn't absolve the contractor of its responsibility as specified in the Contract

FLOWMORE LIMITED

PERFORMANCE CURVE

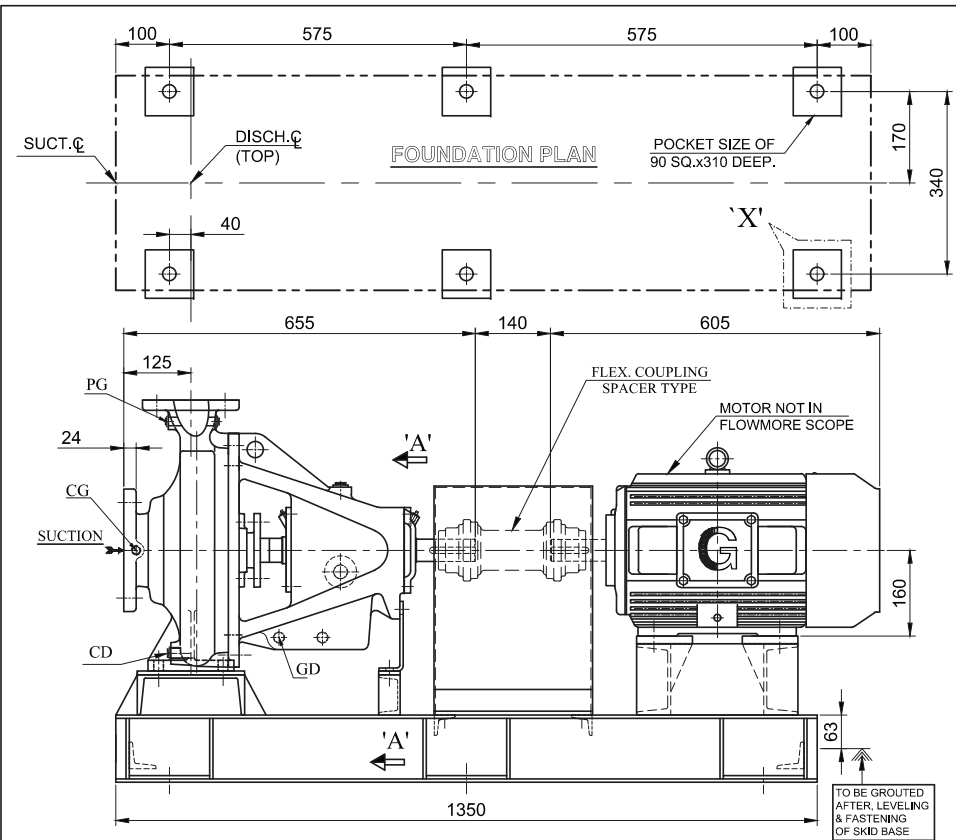


Project - 2X660 MW Maitry			MODEL	5625 100X65		
CAPACITY	56	M³/Hr	TYPE	Endsuction	Sp Gr	1
HEAD	30	Mtrs	NPSHR	1.8 Mtrs		
EFFICIENCY	66	%	RPM	1465 rpm		
INPUT	6.93	KW	MOTOR RATING	11 KW		

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Date Mar

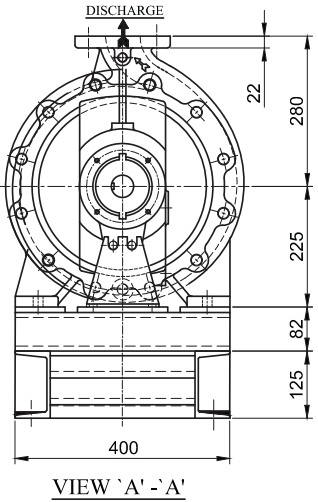
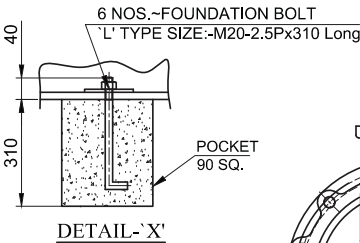
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



- NOTE:-
1. DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
 2. DIRECTION OF PUMP ROTATION:- **COUNTER CLOCKWISE** WHEN LOOKING FROM DRIVING END.
 3. STATIC LOAD (PUMP SET WITH MOTOR) = 370 Kgs. (Approx).
 4. DYNAMIC LOAD (PUMP SET WITH MOTOR) = 470 Kgs. (Approx)

MOTOR PARTICULARS		PUMP PARTICULARS (QTY.-:04 Nos.)	
MAKE	- CGL	FIG.	- 5625 Δ
FRAME	- ND 160 M	SIZE	- 100x65 (4"x2-1/2") Δ
POWER	- 11 K.W.	STAGE	- SINGLE
SPEED	- 1465 R.P.M.	SPEED	- 1465 R.P.M.
VOLTS	- 415 $\pm$ 10%	CAPACITY	- 56 Cu. M/hr.
PHASES	- THREE	HEAD	- 30 Mtrs.
FREQUENCY	- 50 Hz.	PUMP INPUT	- 6.93 K.W.
TYPE OF CONS.	- H.S.S.	(Sp. Gr. 1.0)	
		EFFICIENCY	- 66%

FLANGE DETAIL AS PER ANSI B16.5, 150 LBS.			
SUCTION:---	100 N.B.	DISCHARGE:---	65 N.B.
FLANGE O.D.:---	228.6	FLANGE O.D.:---	177.8
P.C.D.:---	190.5	P.C.D.:---	139.7
NO. OF. HOLES:-	8	NO. OF. HOLES:-	4
DIA OF BOLTS:-	M16	DIA OF BOLTS:-	M16
CD	CASING DRAIN	1/2" B.S.P.	
GD	GLAND DRAIN	1/2" B.S.P.	
CG	COMPOUND GAUGE	3/8" B.S.P.	
PG	PRESSURE GAUGE	3/8" B.S.P.	



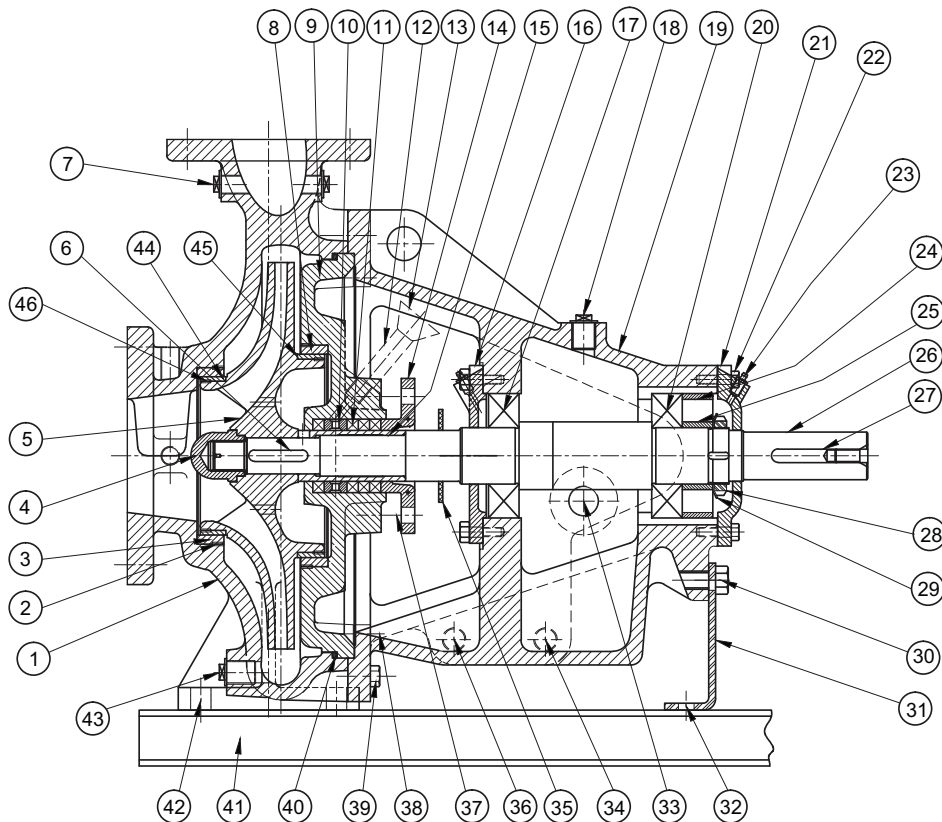
Rev.No	PUMP FIGURE & SIZE CHANGE AS MARKS	SUNIL	15.01.2019
	REVISION	SIGN	DATE

			FLOWMORE LIMITED NEW DELHI		
JOB NAME :- UAF CENTRIFUGAL PUMP					
PROJECT :- A/c. MAITREE STPP-BANGLADESH.					
P.O. NO. :- -----			Dt.:- 28.12.2018.		
NAME			DATE		TITLE: GENERAL ARRANGEMENT DRAWING FOR HORIZONTAL END SUCTION PUMP
DRN.	SUNIL	05.01.2019			
CHD.	D.K.S.	05.01.2019			
APPD.	P.K.S.	05.01.2019			
DRAWING NO. GA-SALE18123880 20					
					SCALE N.T.S.
					SHEET 1 OF 1
					SIZE A4
					REV. 01

APPROVED
Checked and Approved

Date Mar

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract



NOTE:-
DIRECTION OF PUMP ROTATION:- **COUNTER CLOCK WISE**, WHEN LOOKING FROM DRIVING END.

PUMP PARTICULARS (QTY.:- 04 Nos.)			
FIG.	--	5625	Δ
SIZE	--	100x65 (4"x2-½")	Δ
STAGE	--	SINGLE	
LUB.	--	GREASE	

Rev.No.	PUMP FIGURE & SIZE CHANGE AS MARKS	SUNIL	15.01.2019
	REVISION	SIGN	DATE

48	FLEXIBLE COUPLING (SPACER TYPE)	01	CAST IRON
47	COUPLING GUARD	01	M.S. (Fab.)
46	DOWEL PIN (For Imp. To Imp. W/Ring)	04	ASTM A 1040
45	WEARING RING IMPELLER (Back Side)	01	BRONZE ASTM B 62
44	WEARING RING IMPELLER (Front Side)	01	BRONZE ASTM B 62
43	PIPE PLUG	01	MALLABLE IRON (ASTM A 338)
42	HEX. HD. BOLT WITH NUT & WASHER	04	ASTM A 193, Gr.-B5/A194, Gr.-1
41	SKID BASE	01	Carbon Steel (IS-2062), ASTM A 36
40	'O' RING	01	NITRILE RUBBER
39	HEX. HD. CAP SCREW	12	ASTM A 193, Gr.-B5
38	STUD BOLT WITH NUT AND WASHER	02	ASTM A 193, Gr.-B5/A194, Gr.-1
37	STUD BOLT WITH NUT	02	ASTM A 193, Gr.-B8M/A194, Gr. 8 M
36	PIPE NIPPLE	01	ASTM A 182
35	WATER SLINGER	01	RUBBER
34	PIPE PLUG	01	MALLABLE IRON (ASTM A 338)
33	PIPE PLUG	01	MALLABLE IRON (ASTM A 338)
32	HEX. HD. BOLT WITH NUT & WASHER	02	ASTM A 193, Gr.-B5/A194, Gr.-1
31	SUPPORT FOOT	01	M.S. (Plate) (ASTM A 36)
30	HEX. HD. CAP SCREW WITH WASHER	02	ASTM A 193, Gr.-B5
29	BRG. LOCK WASHER	01	STEEL (C10/C20)
28	BRG. LOCK NUT	01	STEEL (C10/C20)
27	KEY FOR COUPLING	01	ASTM A 1040
26	PUMP SHAFT	01	ASTM A 276, S.S.-316
25	BEARING SPACER (Inner)	01	ASTM A 1040
24	BEARING SPACER (Outer)	01	ASTM A 1040
23	GREASE RELEASE FITTING	02	ASTM A 1040
22	HEX. HD. CAP SCREW	08	ASTM A 193, Gr.-B5
21	BEARING COVER (D.E.)	01	CI. ASTM A 48, CL 35 A
20	ANTI FRICTION BEARING (D.E.) (6310 Z-C3)	01	BRG. STEEL (SKF/FAG)
19	FRAME/BEARING HOUSING	01	CI. ASTM A 48, CL 35 A
18	PIPE PLUG	01	MALLABLE IRON (ASTM A 338)
17	ANTI FRICTION BEARING (N.D.E.) (6310 Z-C3)	01	BRG. STEEL (SKF/FAG)
16	BEARING COVER (N.D.E.)	01	CI. ASTM A 48, CL 35 A
15	SHAFT SLEEVE	01	ASTM A 276, S.S.-410 (H) (250-300 BHN)
14	GLAND ASSY.	01	CI. ASTM A 48, CL 35 A
13	GREASE CUP WITH N.R.V.	01	ASTM A 1040
12	PIPE NIPPLE WITH COUPLING	01	ASTM A 1040
11	PACKING PCS. (Champion Make, Style No:- 3116)	04	GRAPH. IMP. COTTON YARN (Non Asbestos)
10	WATER SEAL RING	01	BRONZE ASTM B 62
09	BACK COVER/BACK HEAD	01	2% NI. CI. ASTM A 48
08	WEARING RING CASING (Back Side)	01	BRONZE ASTM B 62
07	PIPE PLUG	02	MALLABLE IRON (ASTM A 338)
06	KEY FOR IMPELLER	01	ASTM A 1040
05	IMPELLER	01	BRONZE ASTM B 62
04	IMPELLER NUT	01	ASTM A 1040
03	WEARING RING CASING (Front Side)	01	BRONZE ASTM B 62
02	DOWEL PIN	04	ASTM A 1040
01	CASING (VOLUTE)	01	2% NI. CI. ASTM A 48
S. NO.	DESCRIPTION	QTY	MATERIAL

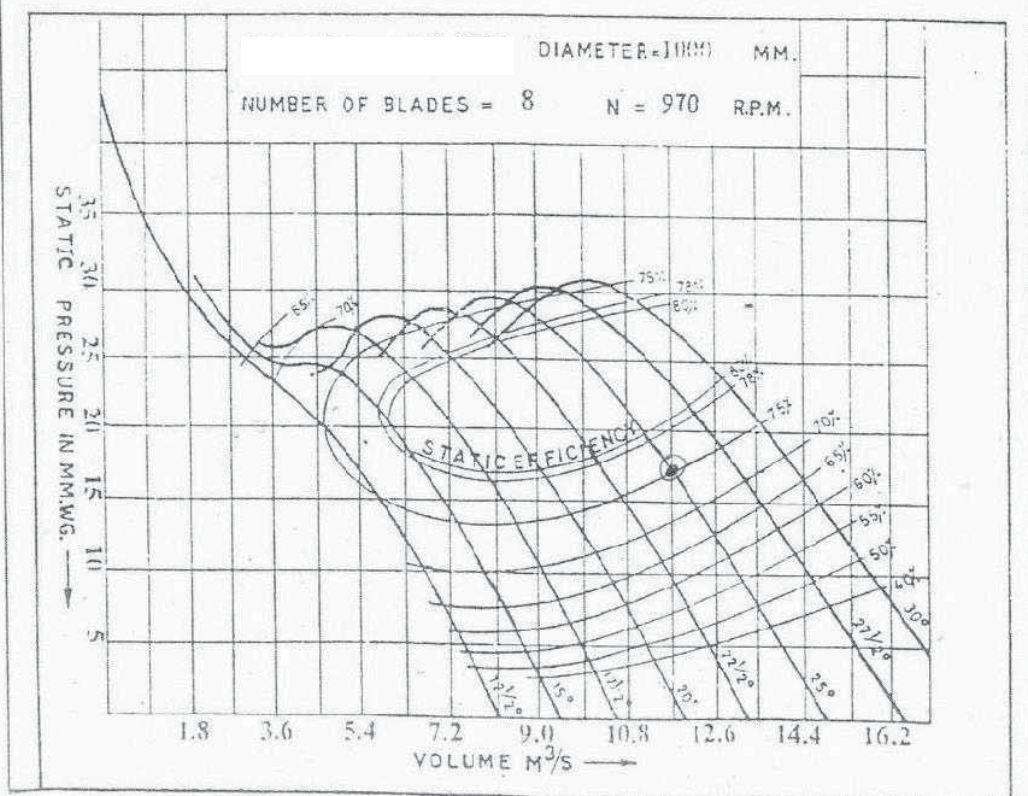
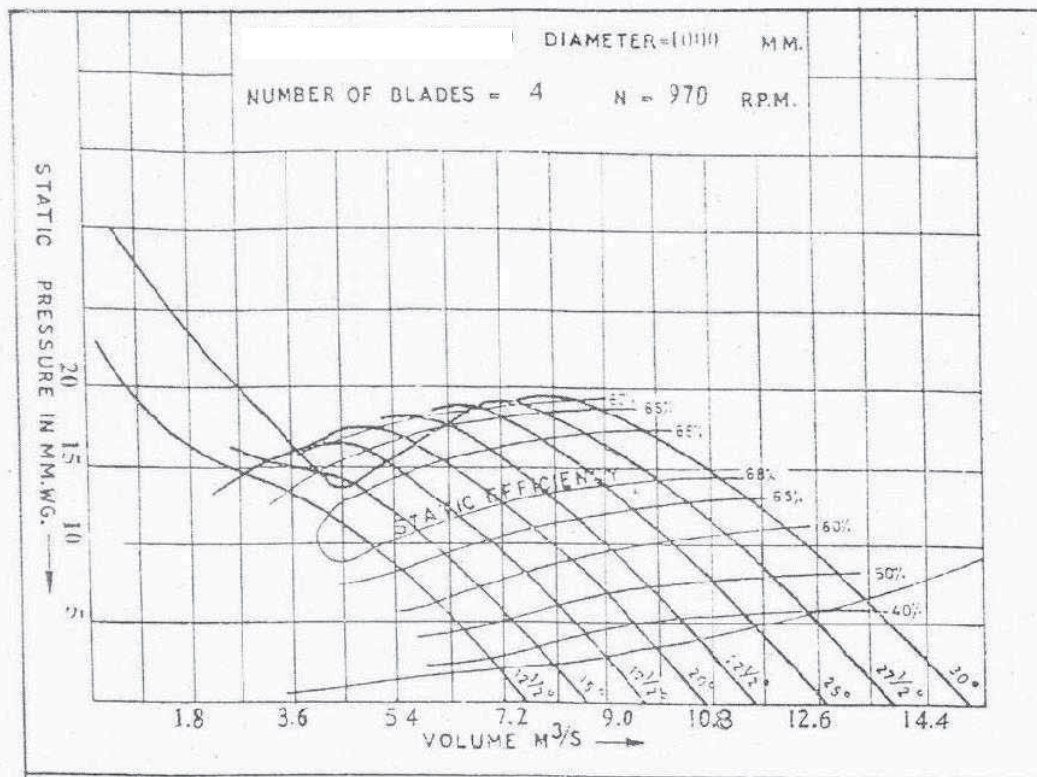
				FLOWMORE LIMITED NEW DELHI	
JOB NAME :- UAF CENTRIFUGAL PUMP					
PROJECT :- A/c. MAITREE STPP-BANGLADESH.					
P.O. NO. :- -----		Dt.:- 28.12.2018.			
DRN.	NAME	DATE	TITLE:		SCALE
CHD.	SUNIL	05.01.2019	CROSS SECTIONAL DRAWING		N.T.S.
APPD.	D.K.S.	05.01.2019	FOR		SHEET
	P.K.S.	05.01.2019	HORIZONTAL END SUCTION PUMP		1 OF 1
DRAWING NO.			CSD-SALE18123880 20		SIZE: REV.
					A4 01

TECHNICAL DATASHEET & GA DRAWING FOR ROOF EXTRACTOR ALONG WITH FIXING DETAILS					
Sr. No.	Description	Unit	Particulars		
1	Item		Roof Extractor (Axial flow fan)		
2	Manufacturer				
3	Model No.				
4	Impeller Speed	RPM	970	960	960
5	Capacity	CMH	20000	40000	50000
6	Quantity		As per fan schedule, MAITREE-00-SAD-PC-111907-PEM		
7	Static pressure at 20 °C	mmWG	15	15	15
8	Velocity pressure at 20 °C	mmWG	5	9	7
9	Total pressure	mmWG	20	24	22
10	Impeller Diameter	mm	800	1000	1200
11	No. of Blade	Nos.	8	8	8
12	Type of Blade		Variable pitch Cast Aluminium blade		
13	Blade Angle	Degree	27.5	25	17.5
14	Shaft Power at 20 °C	BkW	1.57	4.16	4.34
15	Fan Efficiency	%	70	70	70
16	Bearing Type & No.		Ball Bearing (6206 ZZ & 6205 ZZ)	Ball Bearing (6208 ZZ & 6305 ZZ)	
17	Weight of Fan				
	a) Static Load	Kg	105	185	225
	b) Dynamic Load		150	225	290
18	Performance curves enclosed (yes/No)		yes		
19	Motor Data				
	a) Rating at 50 °C ambient temperature	kW/Pole	2.2/6	5.5/6	5.5/6
	b) Speed	RPM	970	960	960
	c) Type of Mounting		Foot mounting shaft upward (V6)		
	e) Direction of Rotation		Clockwise / Anti - Clockwise		
20	Material				
	a) Impeller		Cast Aluminium		
	b) Casing		MS Sheet 5 mm thick		
	c) Shaft		Motor Shaft (EN-8)		
21	Painting		As per specification / Approved DM		
22	Galvanized Bird screen of 15 mm sq. with Cowl		Provided		
23	Vibration level		As per ISO: 14694		
24	Accessories		Fan mounting duct, Rain protection cowl, Protective screen at inlet: Min. 14 SWG Galvanized wire knitted in 1" square mesh		
25	Inspection & Testing		As per approved QAP, MAITREE-00-SAD-QA-111905-PEM		

Date Nov

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specified in the Contract

$$Q = 40,000 \text{ CMH}$$
$$P_{st} = 15 \text{ mm WG}$$



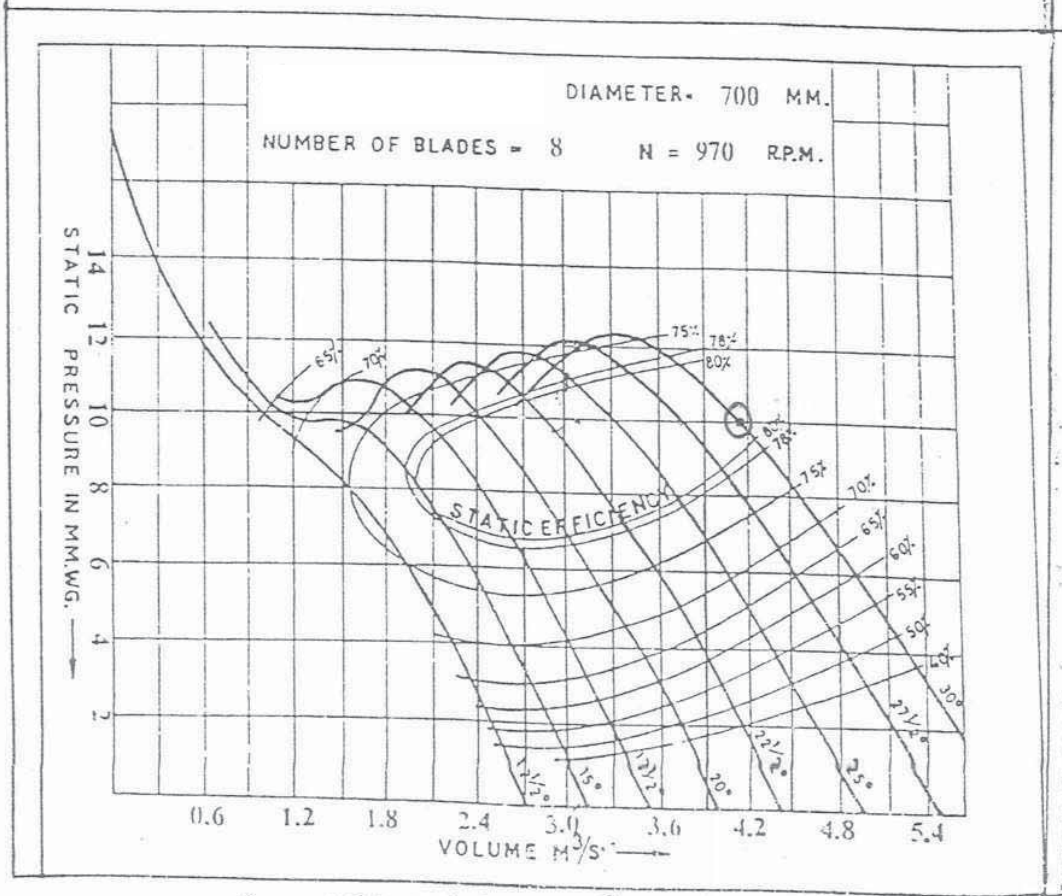
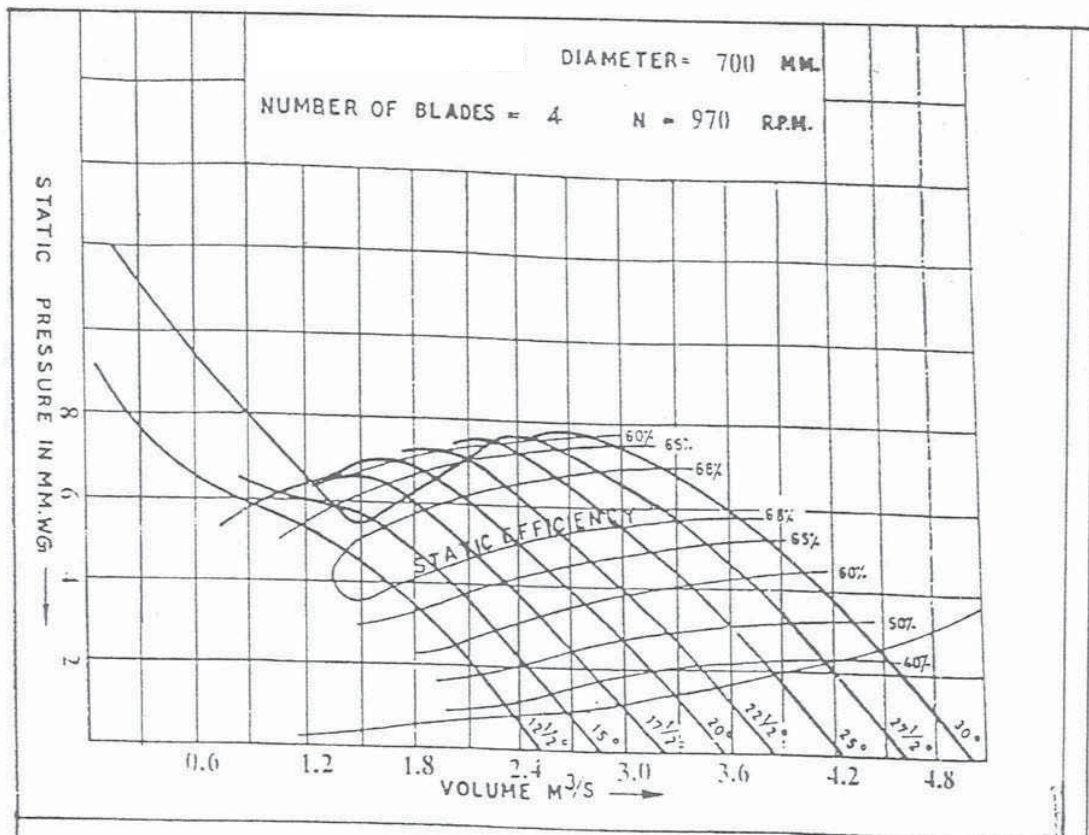


Air Capacity (CMH) – 40,000 CMH
Static Pressure – 15 MM
Fan Static Load – 185 Kg.
Fan Dynamic Load – 225 Kg.

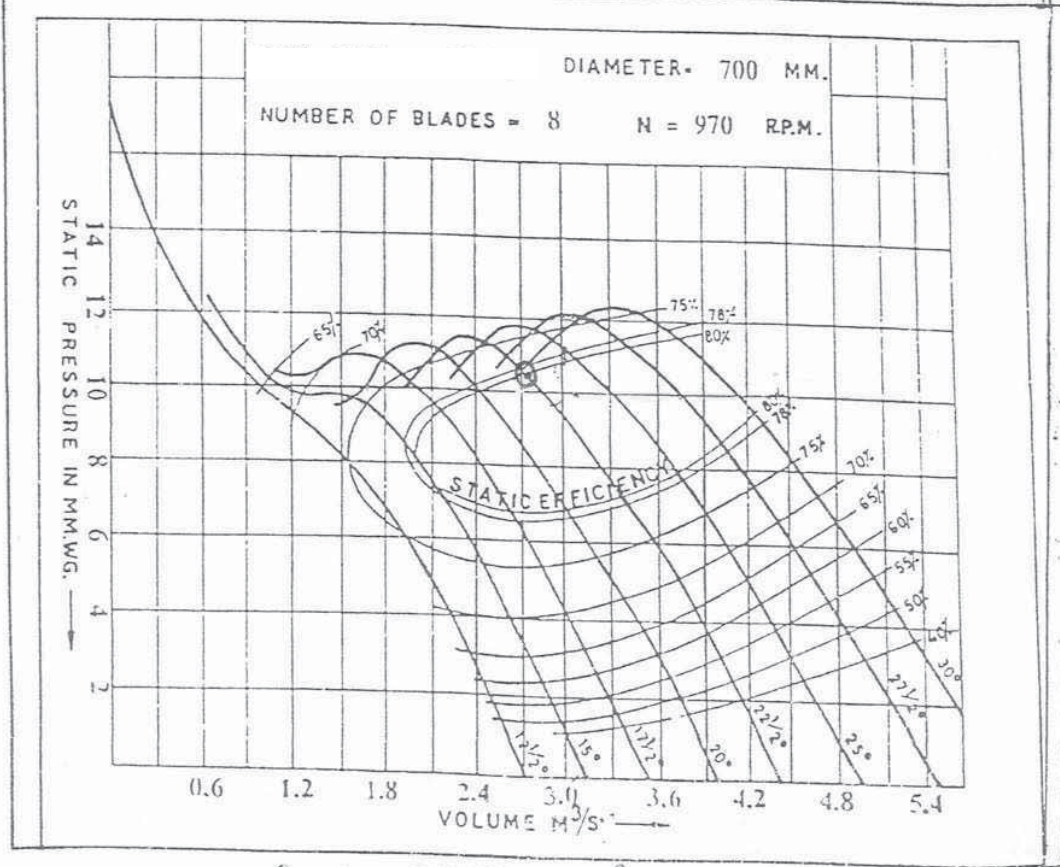
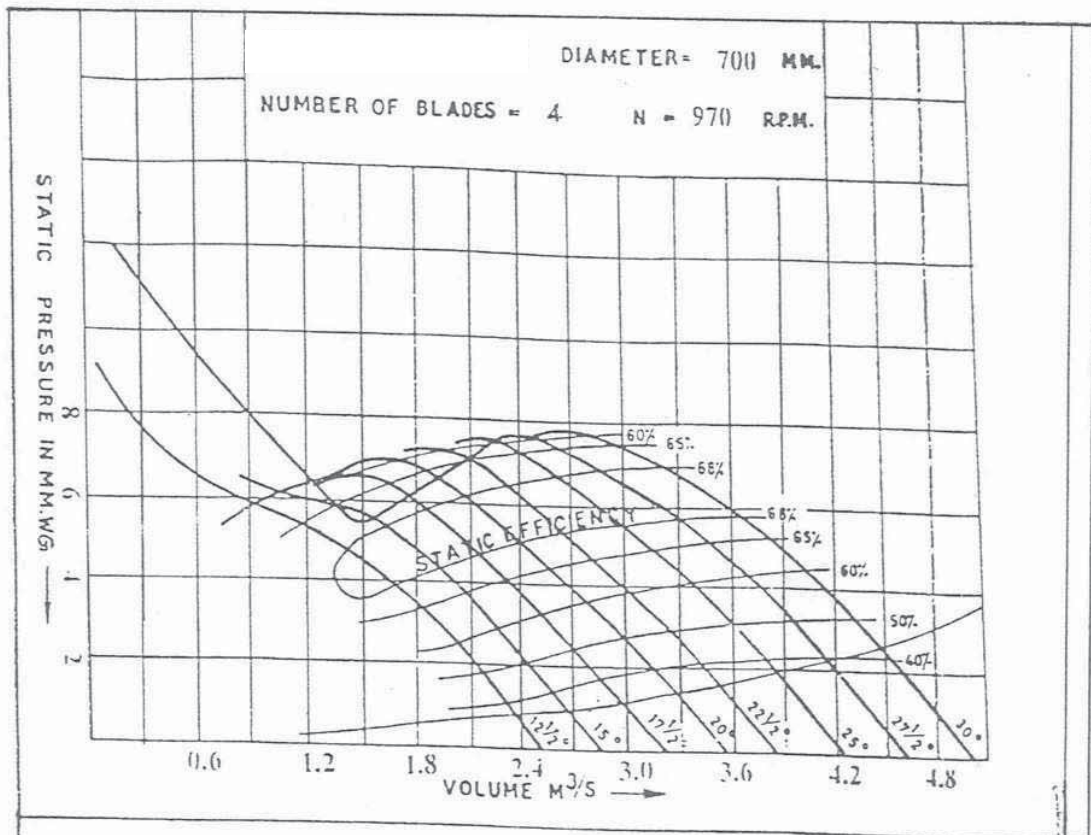
05.	WIRE MESH 25 SQMM	#1006	1	GI
04.	RAIN PROTECTION COWL	Ø1500x700 ht.	1	GSS
03.	FAN MOUNTING DUCT	1250x1250/Ø1006	1	MS
02.	MOTOR 5.5kw/6POLE	—	1	—
01.	ROOF EXHAUSTER FAN	AdTV-1000/BB	1	
PART NO.	DESCRIPTION	SIZE	QTY.	MAT'LS/MAKE

PROJECT	2x660MW MATTERH SUPER THERMAL POWER PROJECT, RAMPAI, BANGLADESH (EPC MAIN PLANT PACKAGE)		
OWNER CONSULTANT:	OWNER: BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH		
M/s FICHTNER GmbH & Co KG, Stuttgart,GERMANY	 BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA		
	TITLE: DATA SHEET & GENERAL ARRANGEMENT FOR ROOF EXTRACTOR, AXIAL EXHAUST AND SUPPLY AIR FANS WITH PILING ARRANGEMENT FOR VENTILATION SYSTEM		
	SIZE: PROJECT NO. 421	FILE NO.	
	ANNEX: BHEL DWG NO : PE-VO-481-004-A010		
	MATTERH DWG NO : XXXX-XXXX-XXXX		Rev-00

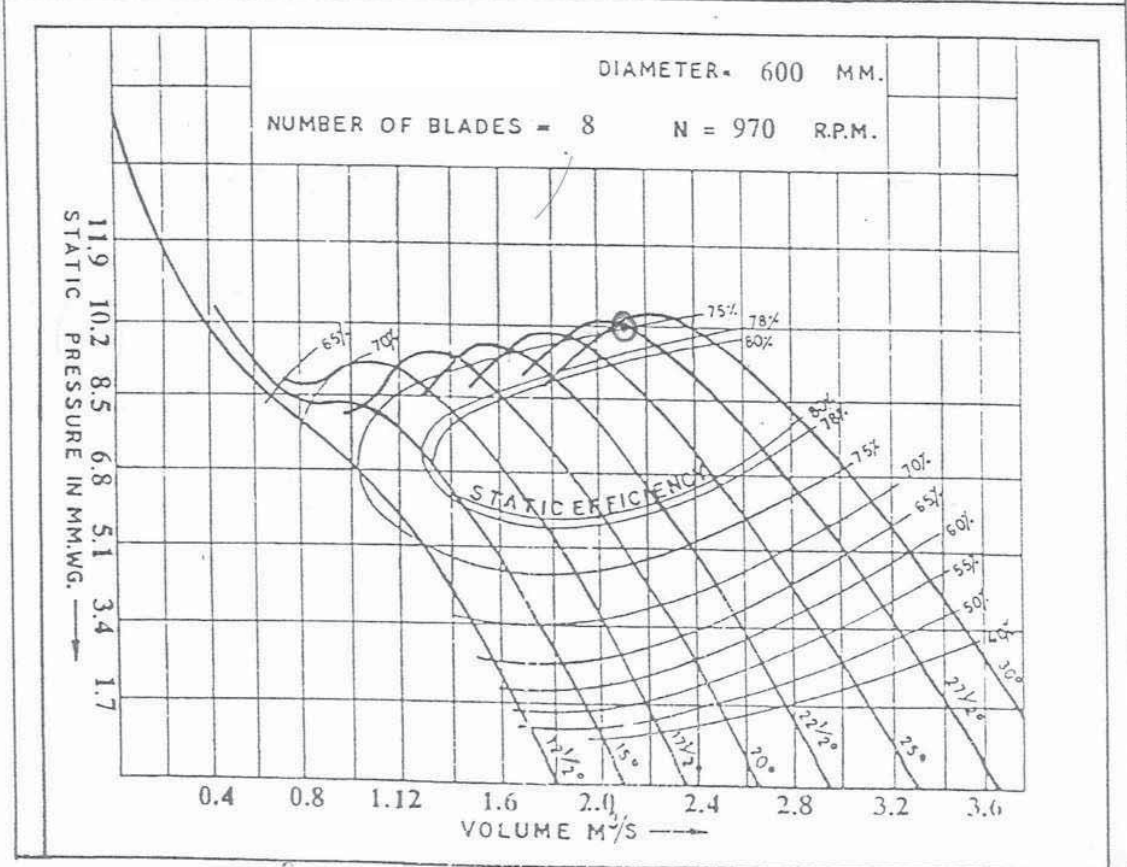
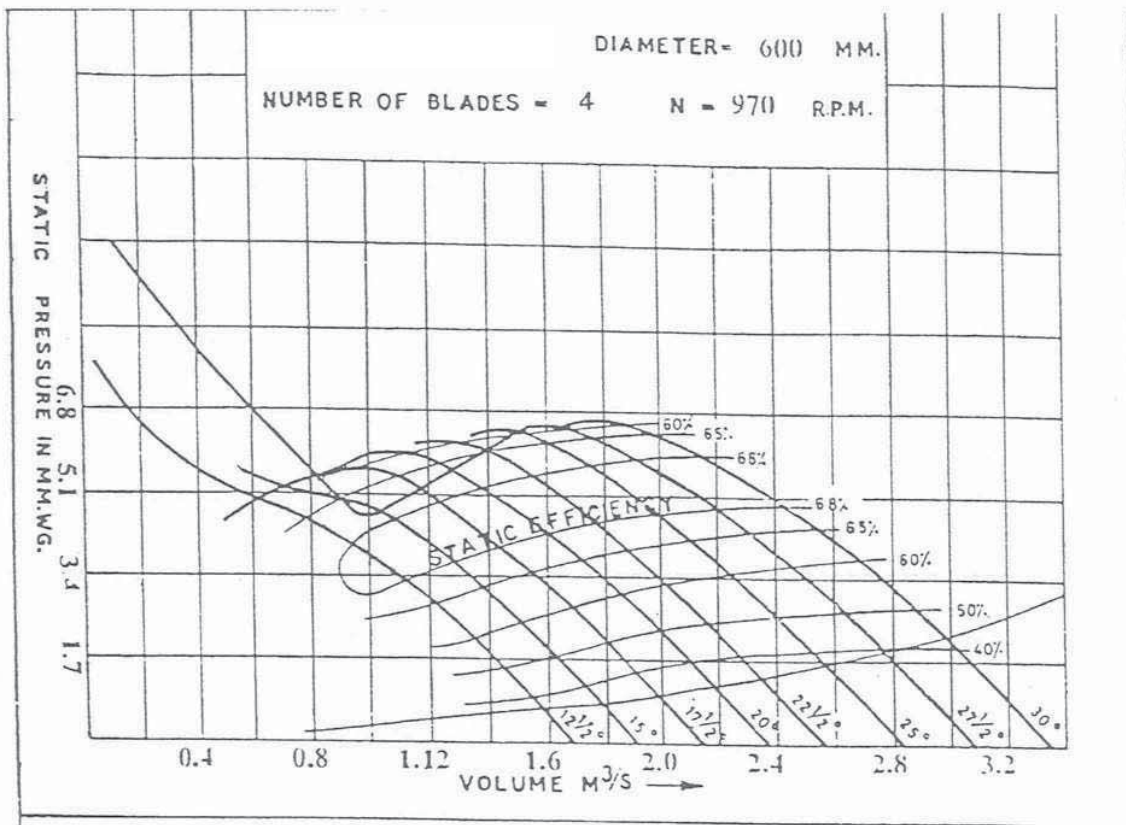
TECHNICAL DATA SHEET & GA DRAWING FOR AXIAL FLOW EXHAUST FANS 10 mm WC STATIC								
Sr. No.	Description	Unit	Particulars					
1	Manufacturer							
2	Model No.							
3	Type of Fan		Axial Flow Exhaust Fans with 10mm WC Static					
4	Capacity	CMH	15000	10000	7500	6000	4000	2000
5	Quantity		As per fan schedule, MAITREE-00-SAD-PC-111907-PEM					
6	Static pressure	mmWG	10	10	10	10	10	10
7	Total pressure	mmWG	14.8	12.5	12.5	11.6	13.5	11.5
8	Impeller Diameter	mm	700	700	600	600	450	450
9	Type of blade		Variable pitch Cast Aluminium blade					
10	No. of blade	Nos.	8	8	8	8	8	8
11	Blade angle	Degree	30	22.5	27.5	25	25	17.5
12	Drive Arrgt.		Impeller mounted directly on the motor shaft					
13	Fan/Impeller Speed	RPM	930	925	915	915	1405	1360
14	Shaft Power	BkW	0.96	0.58	0.43	0.32	0.25	0.11
15	Fan Efficiency	%	64	60	60	60	60	60
16	Bearing Type		Ball Bearing					
17	Selection curves enclosed (yes/No)		yes	yes	yes	yes	yes	yes
18	Motor Data							
	a) Rating	kW/Pole	1.1/6	0.75/6	0.55/6	0.55/6	0.55/4	0.37/4
	b) Speed	RPM	930	925	915	915	1405	1360
	c) Type of Mounting		B3					
	e) Direction of Rotation		Clockwise / Anti-clockwise					
19	Material							
	a) Impeller		Cast Aluminium					
	b) Casing		MS					
	c) Casing thickness (mm)		3					
	d) Shaft		Motor Shaft (EN-8)					
20	Accessories		Rain protection cowl, birdmesh					
21	Painting		As per specification					
22	Noise Level	dB(A)	≤ 85					
23	Inspection & Testing		As per approved QAP, MAITREE-00-SAD-QA-111905-PEM					



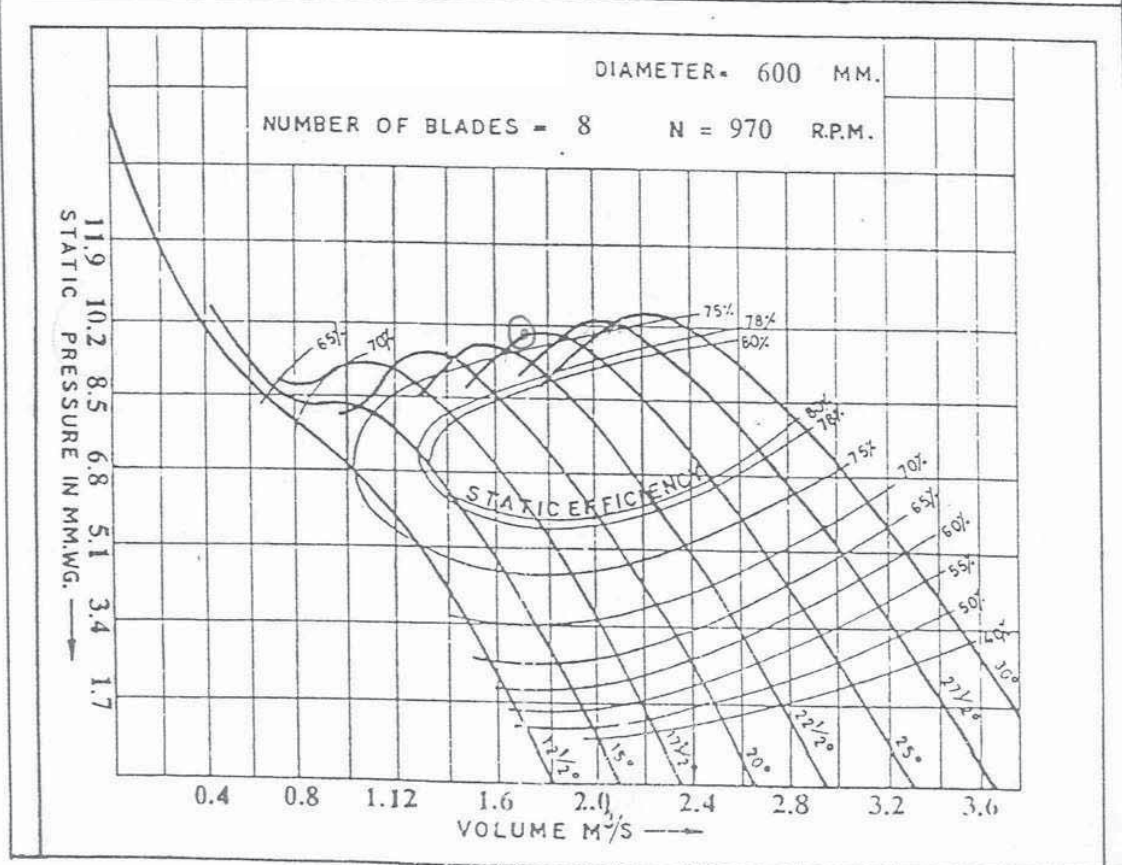
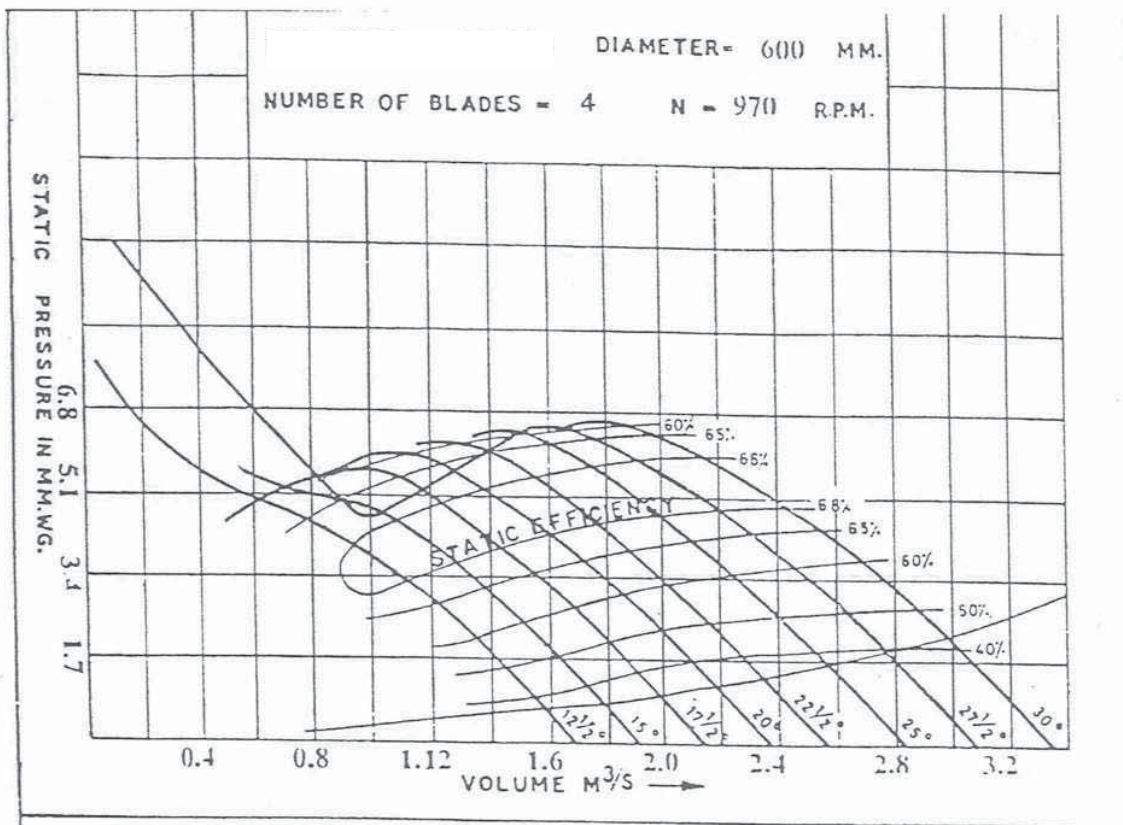
$Q = 15,000 \text{ CMH}$, $P_{st} = 10 \text{ mm}$



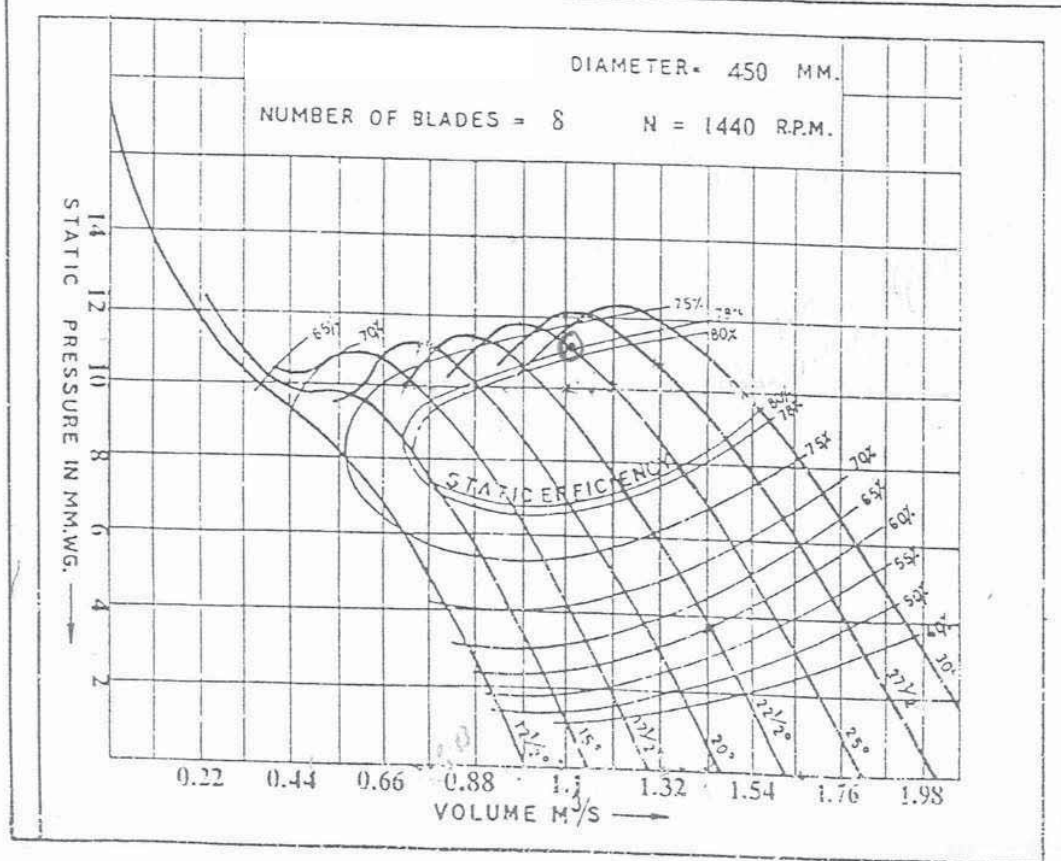
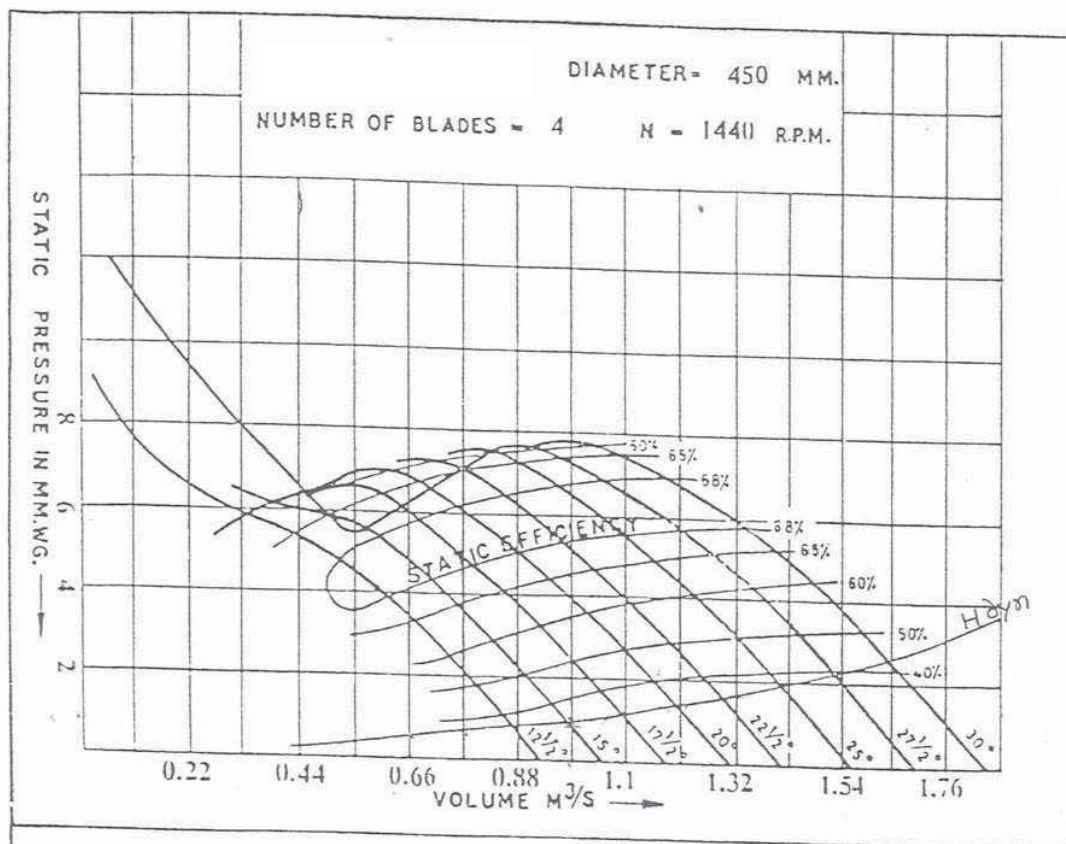
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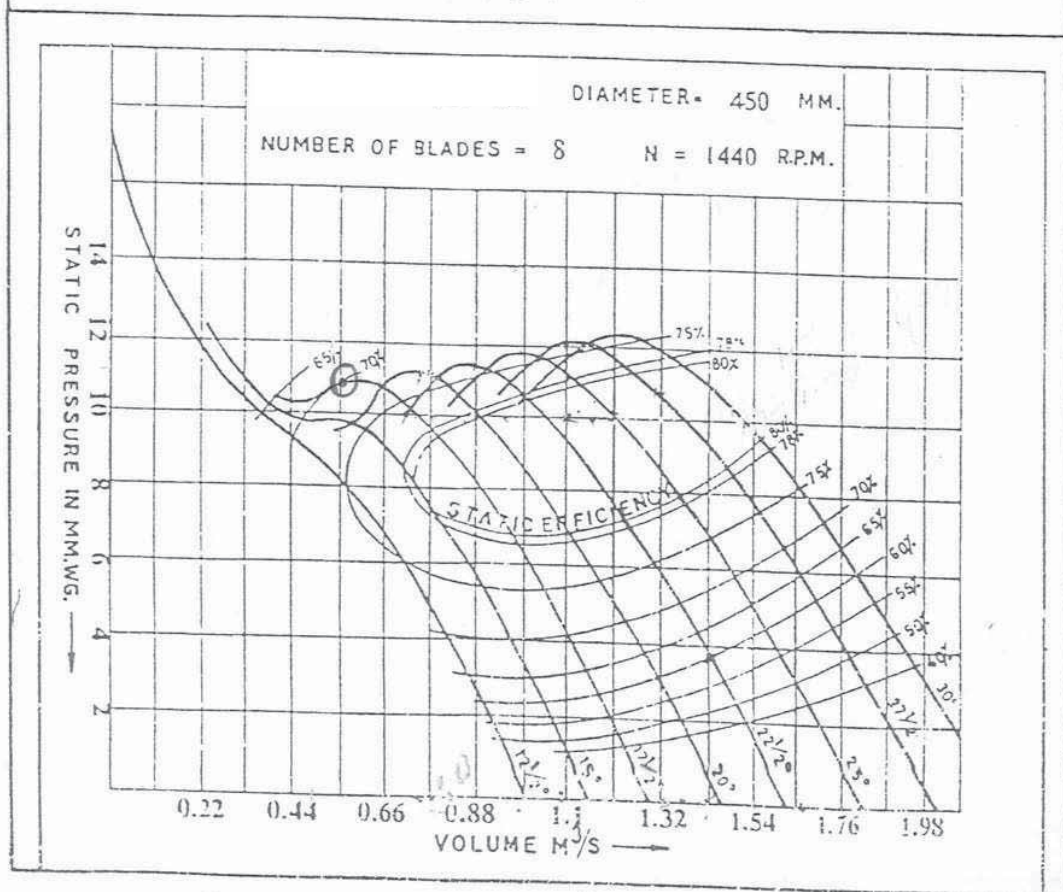
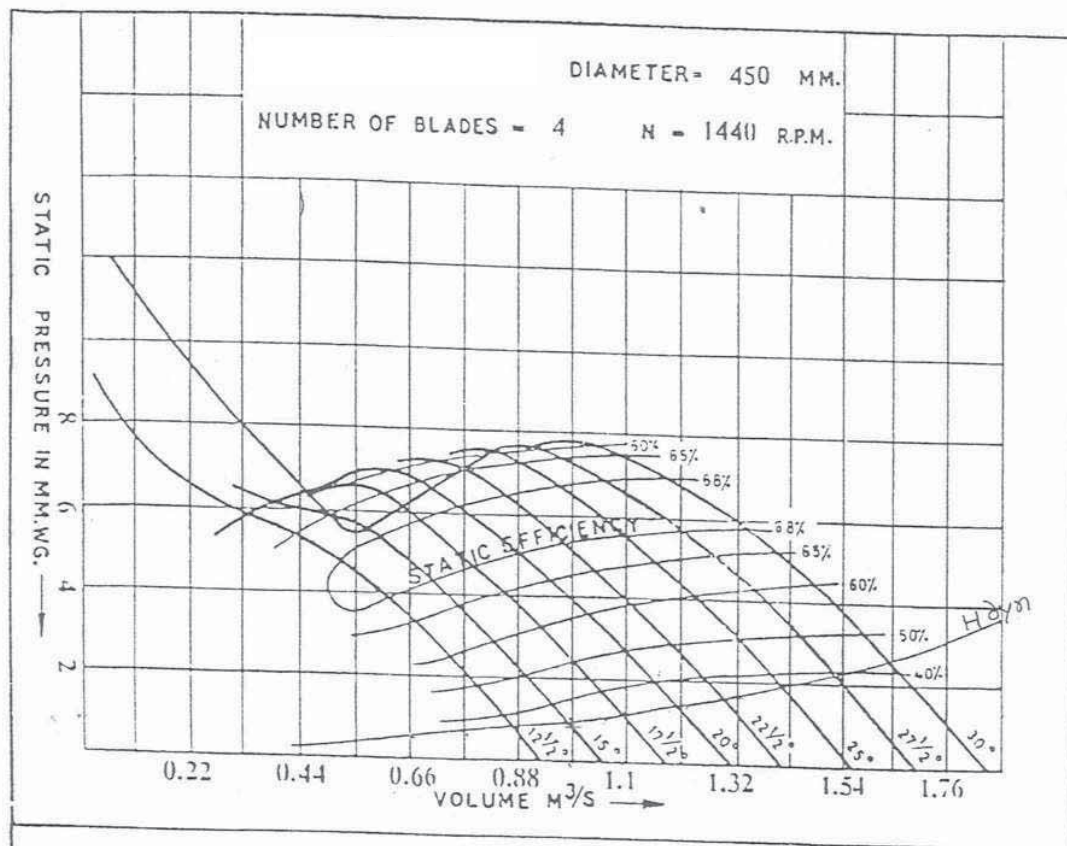
$Q = 7500 \text{ CMH}$, $P_{st} = 10 \text{ mm}$



$$Q = 6000 \text{ CMH}, P_{ST} = 10 \text{ mm}$$

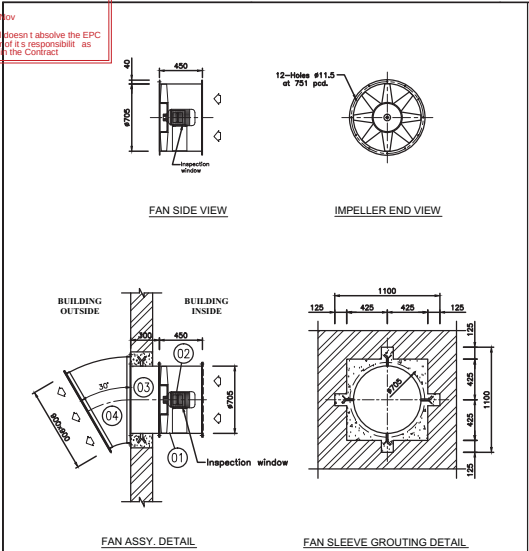


$Q = 4000$ CMH, $P_{st.} = 10$ mm

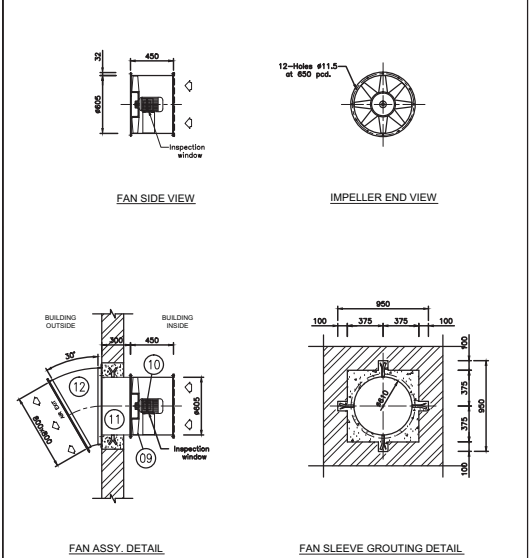


$Q = 2000 \text{ CMH}$, $P_{st} = 10 \text{ mm}$

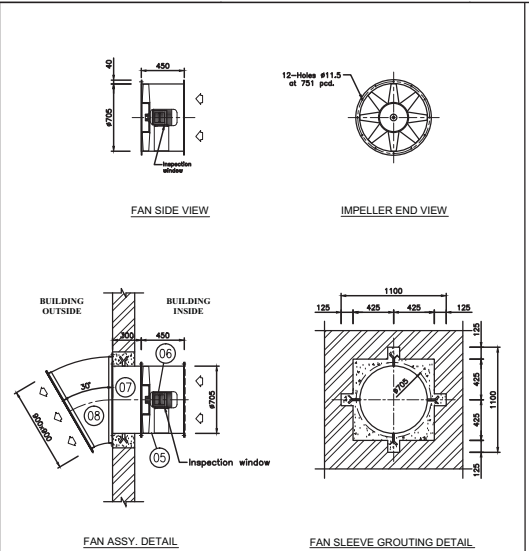
APPROVED
Checked and Approved
Date: 10/01/2019
Approved doesn't absolve the EPC contractor of it's responsibility as specified in the Contract



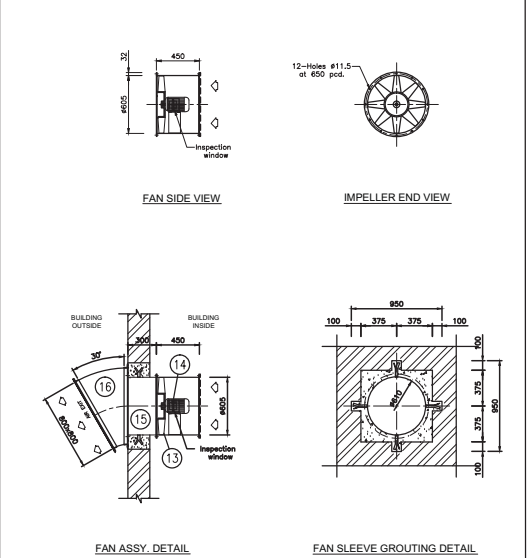
Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
15,000	10		930	*	1.1/6	150



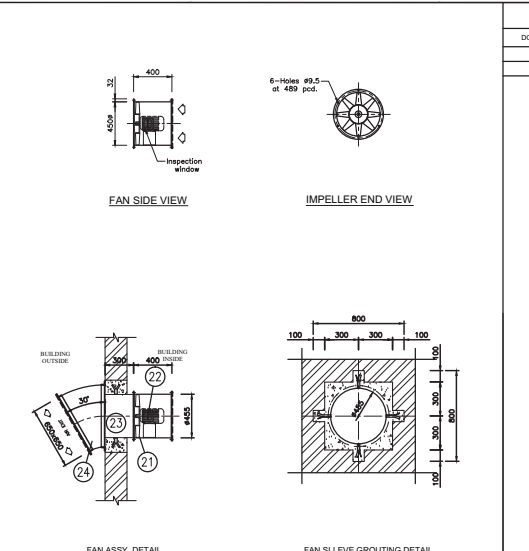
Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
7,500	10		915	*	0.55/6	125



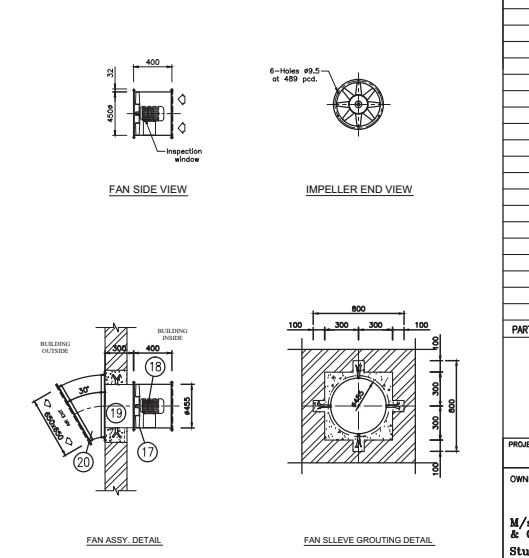
Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
10,000	10		925	*	0.75/6	150



Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
6,000	10		915	*	0.55/6	125



Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
4,000	10		1405	*	0.55/4	60



Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
2,000	10		1360	*	0.37/4	60

BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NO. DOCUMENT / DRAWING TITLE

NOTES:

1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METERS.

2. EXHAUST AIR FAN ASSEMBLY SUPPORTED ON THE ANGLE FRAME AND SAME IS BOLTED WITH FAN MOUNTING SLEEVE.

3. ITEM LISTED FOR ONE FAN ONLY.

* 4. FAN QTY. SHALL BE AS PER DOCUMENT NO # 4410-001-148-PVM-H-001 FOR FAN SCHEDULE.

24.	AR DISCHARGE COWL : 650x650x307	1	G
23.	FAN MOUNTING SLEEVE : 445x300 Long	1	M.S.
22.	MOTOR 0.55 KW/4 POLE	1	-
21.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
20.	AR DISCHARGE COWL : 650x650x307	1	G
19.	FAN MOUNTING SLEEVE : 445x300 Long	1	M.S.
18.	MOTOR 0.37 KW/4 POLE	1	-
17.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
16.	AR DISCHARGE COWL : 800x800x307	1	G
15.	FAN MOUNTING SLEEVE : 445x300 Long	1	M.S.
14.	MOTOR 0.55 KW/6 POLE	1	-
13.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
12.	AR DISCHARGE COWL : 800x800x307	1	G
11.	FAN MOUNTING SLEEVE : 445x300 Long	1	M.S.
10.	MOTOR 0.35 KW/6 POLE	1	-
09.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
08.	AR DISCHARGE COWL : 900x900x307	1	G
07.	FAN MOUNTING SLEEVE : 470x300 Long	1	M.S.
06.	MOTOR 0.75 KW/6 POLE	1	-
05.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
04.	AR DISCHARGE COWL : 900x900x307	1	G
03.	FAN MOUNTING SLEEVE : 470x300 Long	1	M.S.
02.	MOTOR 1.1 KW/6 POLE	1	-
01.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.

PART NO.	DESCRIPTION	QTY	MAT'L / MAKE
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PROJECT : 2x600MW MATTHEE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT: BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH

M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY

OWNER: BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA

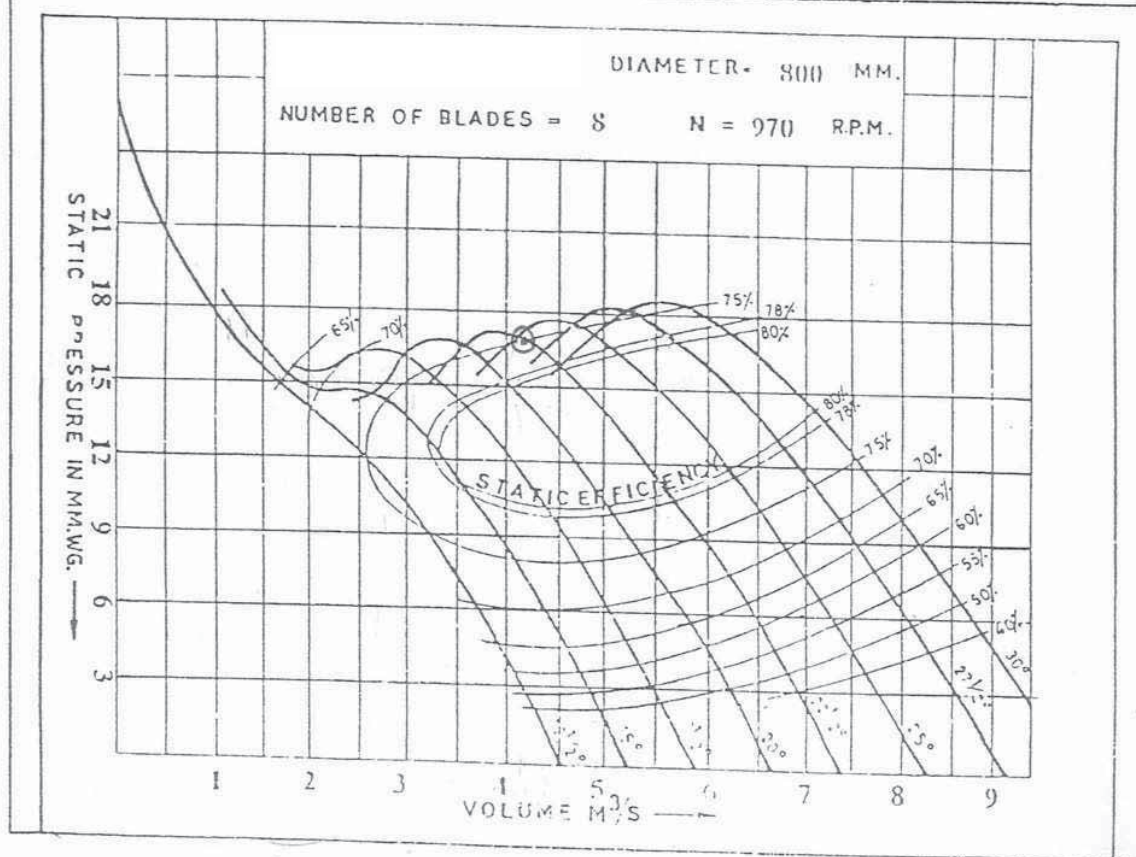
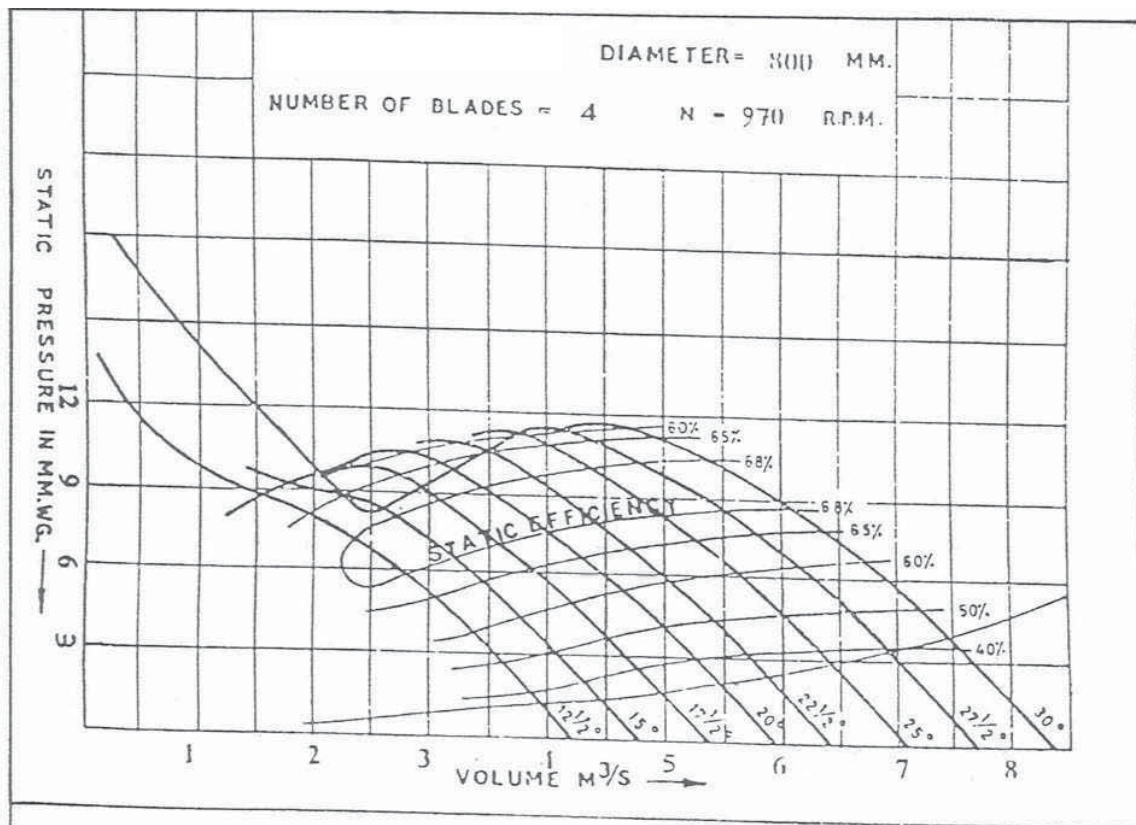
TITLE : DATA SHEET & GENERAL ARRANGEMENT FOR ROOF EXTRACTOR AXIAL EXHAUST AND SUPPLY AIR FANS WITH FIXING ARRANGEMENT FOR VENTILATION SYSTEM.

SUB: PROJECT NO. 421 FILE NO. ANNEX: MATTHEE DPG NO : MATTHEE-00-148-2A-111800-PVM-H-001

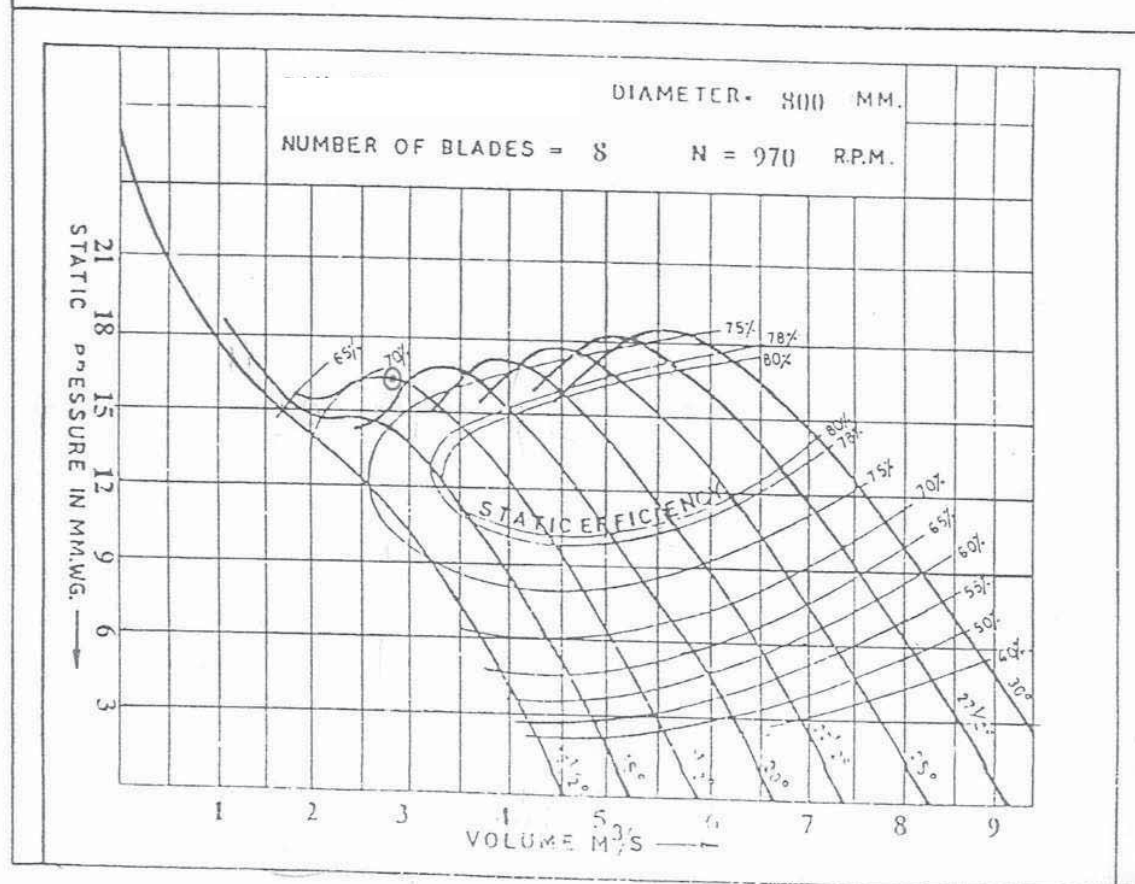
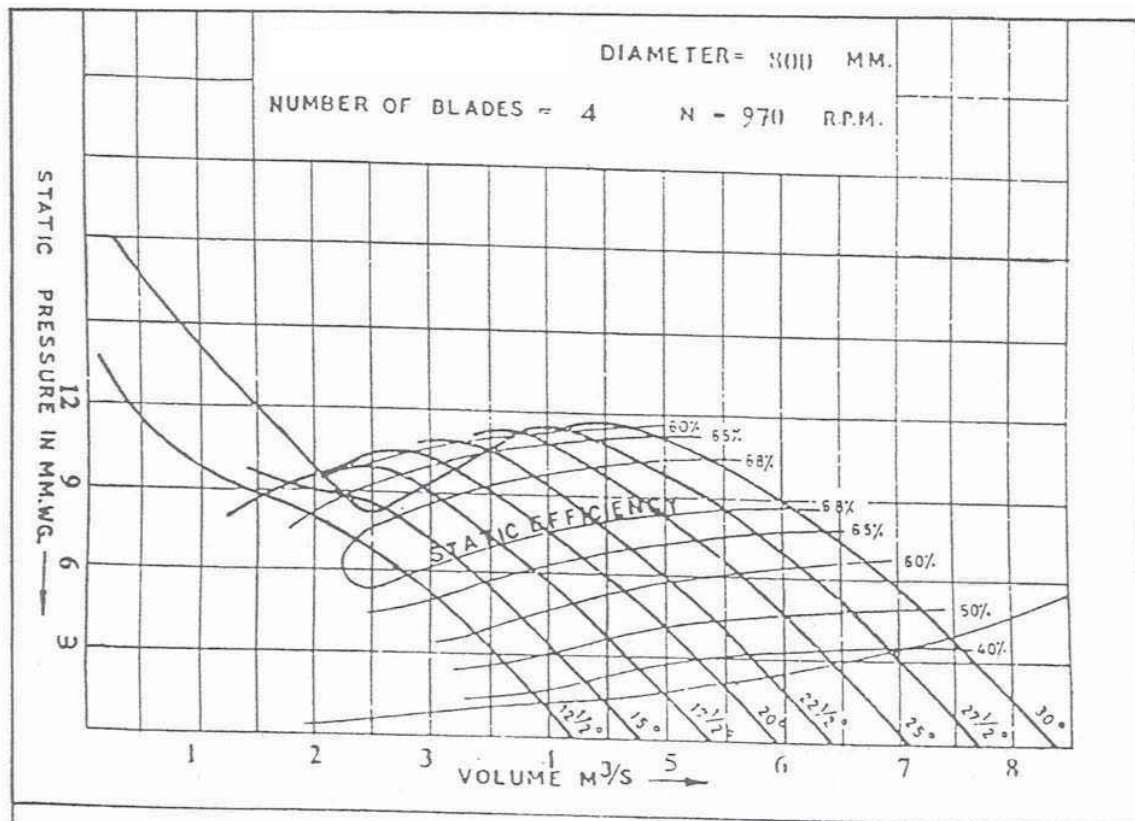
SCALE: 1 : 60 SHEET 1 OF 1

REVISION: BHEL DPG NO : PR-VO-481-084-A016

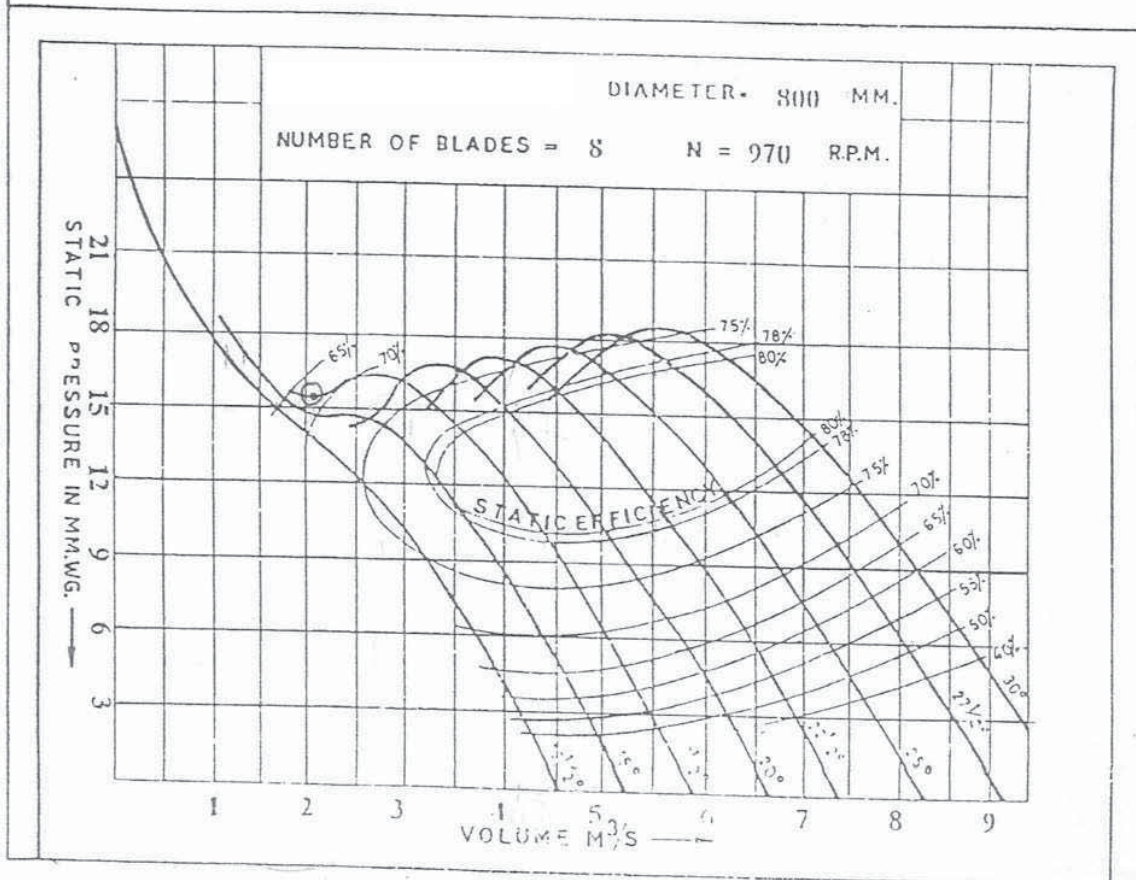
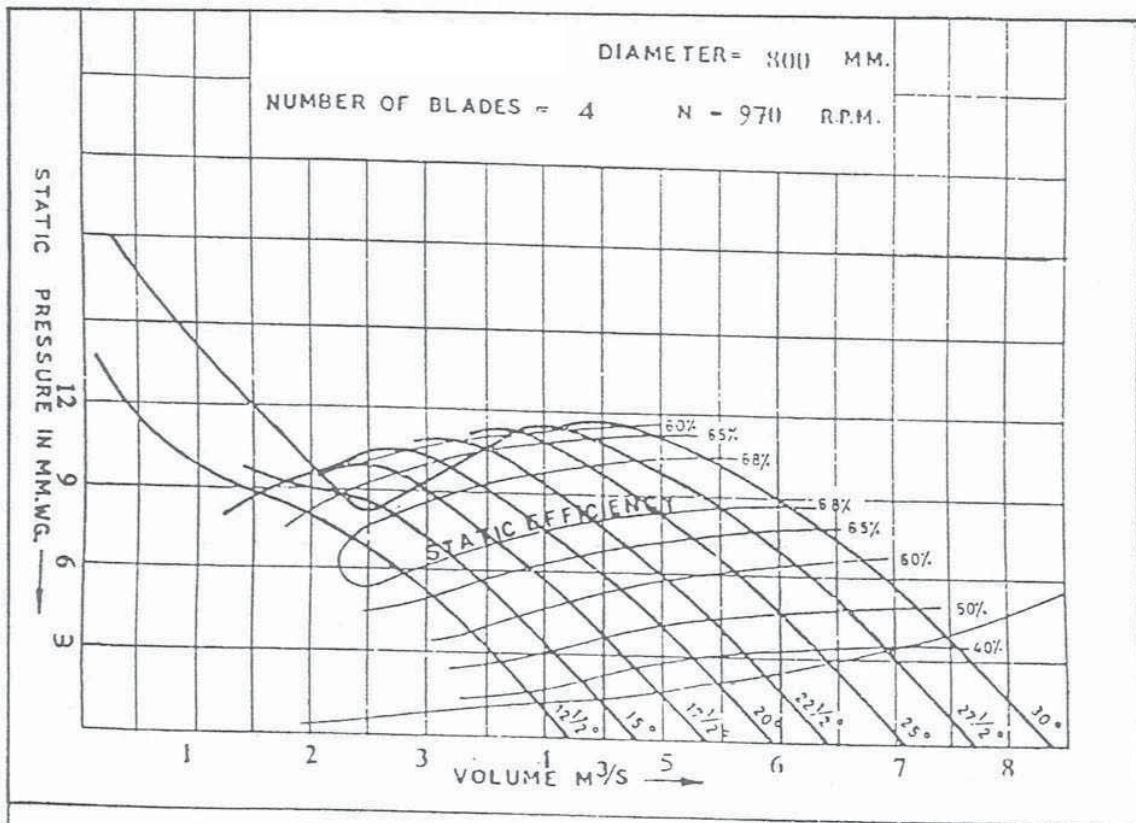
TECHNICAL DATA SHEET & GA DRAWING FOR AXIAL FLOW EXHAUST FANS (BIFURCATED TYPE) 15 mm WC STATIC							
Sr. No.	Description	Unit	Particulars				
1	Manufacturer						
2	Model No.						
3	Type of Fan		Axial Flow Exhaust Fans with 15mm WC Static				
4	Capacity	CMH	15000	10000	7500	4000	2000
5	Quantity		As per fan schedule, MAITREE-00-SAD-PC-111907-PEM				
6	Static pressure	mmWG	15	15	15	15	15
7	Total pressure	mmWG	19.5	18	16.5	17.8	16.1
8	Impeller Diameter	mm	800	800	800	450	450
9	Type of blade		Variable pitch Cast Aluminium blade				
10	No. of blade	Nos.	8	8	8	6	6
11	Blade angle	Degree	22.5	17.5	17.5	34	23.5
12	Drive Arrgt.		Bifurcated type				
13	Fan/Impeller Speed	RPM	1420	935	930	1405	1405
14	Shaft Power	BkW	1.35	0.83	0.60	0.37	0.20
15	Fan Efficiency	%	60	60	57	53	44
16	Bearing Type		Ball Bearing				
17	Selection curves enclosed (yes/No)		yes	yes	yes	yes	yes
18	Motor Data						
	a) Rating	kW/Pole	2.2/6 (FLP)	1.5/6 (FLP)	1.1/6 (FLP)	0.55/4 (FLP)	0.55/4 (FLP)
	b) Speed	RPM	1420	935	930	1405	1405
	c) Type of Mounting		B3				
	e) Direction of Rotation		Clockwise / Anti-clockwise				
19	Material						
	a) Impeller		Cast Aluminium				
	b) Casing		MS				
	c) Casing thickness (mm)		5			3	
	d) Shaft		Motor Shaft (EN-8)				
20	Accessories		Rain protection cowl, birdmesh				
21	Painting		As per specification				
22	Noise Level	dB(A)	≤ 85				
23	Inspection & Testing		As per approved QAP, MAITREE-00-SAD-QA-111905-PEM				



$$Q = 15,000 \text{ CMH}, \quad P_{st} = 15 \text{ mm}$$



$Q = 10,000 \text{ CMH}$, $P_{st} = 15 \text{ mm}$



$Q = 7,500 \text{ CMH}, P_{st} = 15 \text{ mm}$

Date Nov

Approval doesn't absolve the EPC
contractor of it's responsibility as
specified in the Contract

SAF - 4000 CMH @ 15 mmwc

Current Working Point

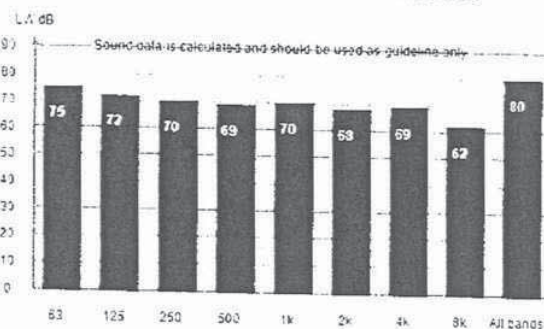
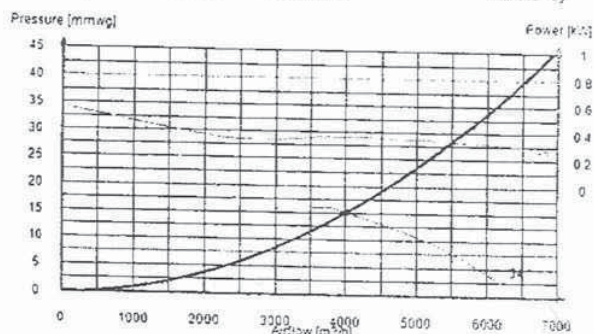
Airflow 4010 m³/h
Static Pres 15.1 mmwg
Dynamic Pressure 2.76 mmwg

Total Pres
Power
Efficiency

17.8 mmwg
0.364 kW
53 %

Propagation
Sound Power

Spherical
79.5 LW dB



Mechanical

Tip Speed 34 m/s
Air Velocity 7 m/s
Torque 2.44 Nm

Moment of Inertia 0.0388 kgm²
Blade Centrifugal force 867 N
Axial Force 27.8 N

IMPELLER INFORMATION:

Impeller Diameter: 450 mm
No of blades: 6
Pitch: 34 °
Blade Material: AL
Blade Type: 4Z
Impeller Rotation: R

Tests are carried out according to methods described in ANSI / AMCA
210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed: 1400 RPM
Tip Clearance: 0.5 %
Temperature: 40 °C
Altitude: 200 m
Density: 1.103 kg/m³

Disclaimer:

Load factors in Optimiser are based on static operation.
Impellers with AL blades are not recommended for applications
with dynamic loads (variable speed in mobile applications).
For this purpose we recommend plastic blades.

REMARKS:

-
-
-
-
-

Multi-Wing India Pvt. Ltd.
India

GATE NO. 94-100, High-Quality Industrial Estate
Waghodi Bazar Road, Village Resnans
Pune-412 207

8007700587 Telephone
020-26111000 Fax
020-26111000 E-Mail

sales@advancesimulation.com
http://www.multi-wing.com
INDIA 020-26111000

Date Nov

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract

CAF - 2000 CMH @ 15 mmwc

Current Working Point

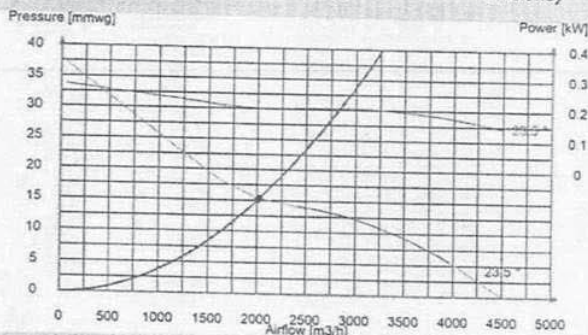
Airflow 2020 m³/h
Static Pres 15.4 mmwg
Dynamic Pressure 0.705 mmwg

Total Pres
Power
Efficiency

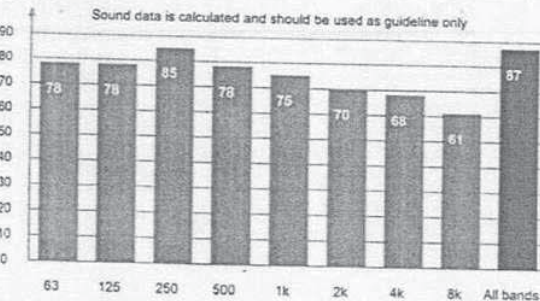
16.1 mmwg
0.202 kW
44 %

Propagation
Sound Power

Spherical
87.4 LW dB



LW dB



Mechanical

Tip Speed 34 m/s
Air Velocity 3.54 m/s
Torque 1.35 Nm

Moment of Inertia 0.0388 kgm²
Blade Centrifugal force 867 N
Axial Force 25.1 N

IMPELLER INFORMATION:

Impeller Diameter: 450 mm
No of blades: 6
Pitch: 23.5 °
Blade Material: AL
Blade Type: 4Z
Impeller Rotation: R

Tests are carried out according to methods described in ANSI / AMCA
210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed: 1425 RPM
Tip Clearance: 0.5 %
Temperature 40 °C
Altitude: 200 m
Density: 1.103 kg/m³

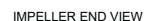
Disclaimer

Load factors in Optimiser are based on static operation.
Impellers with AL blades are not recommended for applications
with dynamic loads (variable speed in mobile applications).
For this purpose we recommend plastic blades.

REMARKS:



Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor (Kw/Pole)	Fan Dynamic Load (Kg.)	Motor Pulley	Fan Pulley	V-Belts
7.500	15		930	★	1.1/6P FLP	145	95 x 2 SPA	95 x 2 SPA	1500 x 2 SPA



Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor (Kw/Pole)	Fan Dynamic Load (Kg.)	Motor Pulley	Fan Pulley	V-Belts
4,000	15		1405	*	0.55/4P FLP	115	80 x 2 SPA	80 x 2 SPA	1000 x 2 SPA
2,000	15		1405	*	0.55/4P FLP	115	80 x 2 SPA	80 x 2 SPA	1000 x 2 SPA



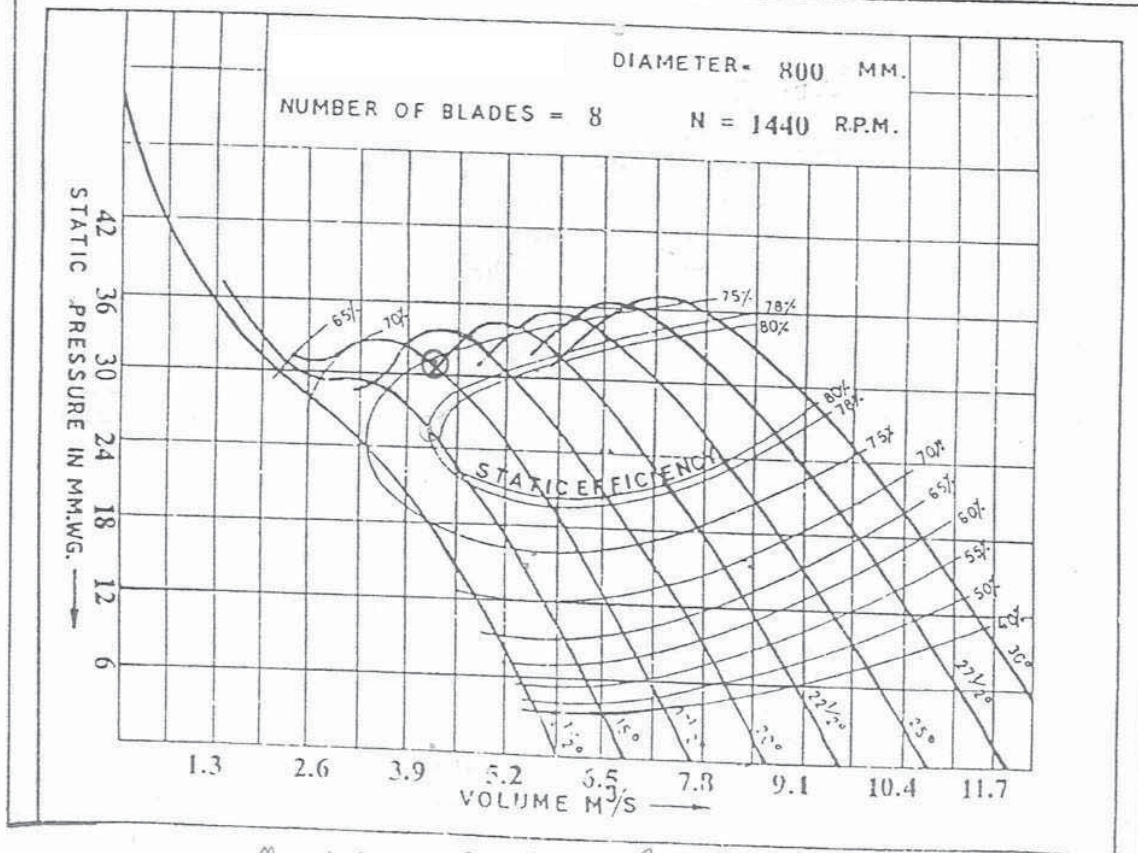
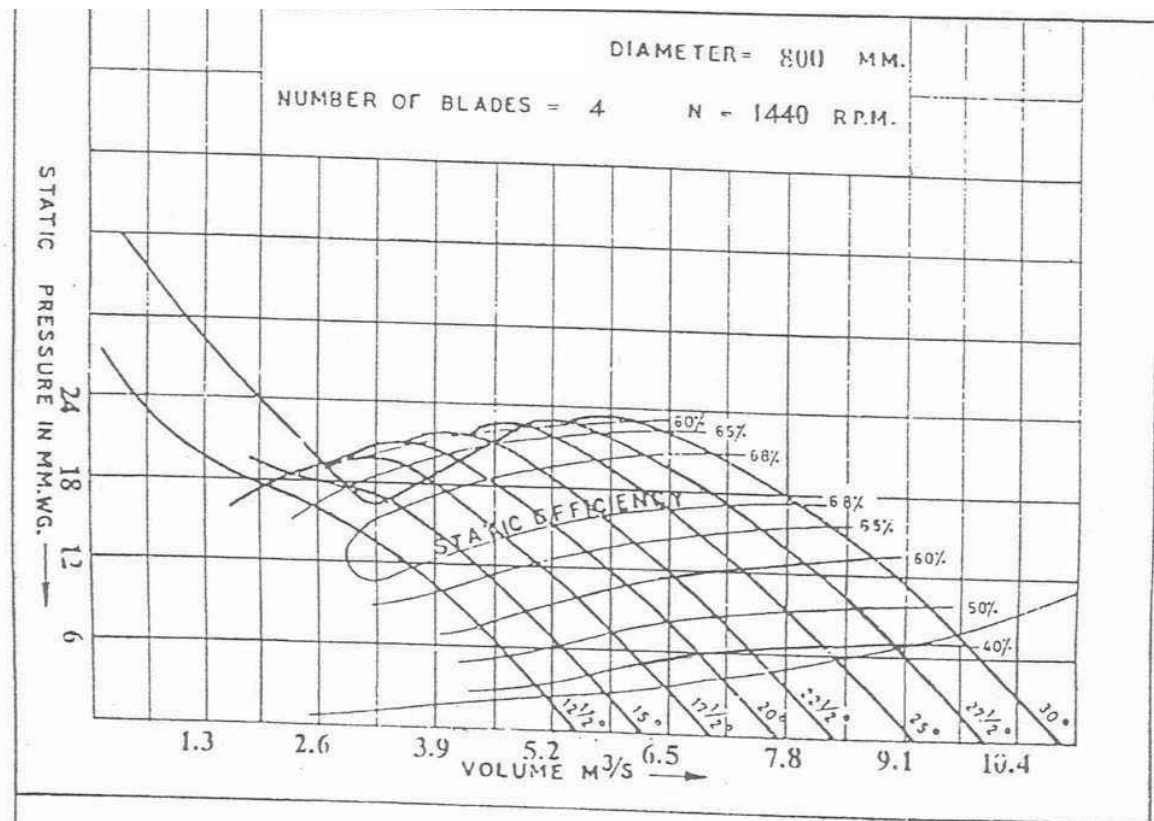
16.	EXHAUST AIR DUCT	550x550	1	GSS
15.	FAN MOUNTING SLEEVE	#450x300L	1	MS
14.	MOTOR 0.55kW/4POLE	-	1	LHP
13.	EXHAUST AIR FAN	800x800	1	LHP
12.	EXHAUST AIR DUCT	800x800	1	GSS
11.	FAN MOUNTING SLEEVE	#700x300L	1	MS
10.	MOTOR 1.1kW/6POLE	-	1	LHP
09.	EXHAUST AIR FAN	900x900	1	MS
08.	EXHAUST AIR DUCT	900x900	1	GSS
07.	FAN MOUNTING SLEEVE	#800x300L	1	MS
06.	MOTOR 1.5kW/6POLE	-	1	LHP
05.	EXHAUST AIR FAN	900x900	1	MS
04.	EXHAUST AIR DUCT	900x900	1	GSS
03.	FAN MOUNTING SLEEVE	#800x300L	1	MS
02.	MOTOR 2.2kW/6POLE	-	1	LHP
01.	EXHAUST AIR FAN	-	1	MS
PART NO.	DESCRIPTION	SIZE	QTY.	MAT'L5/NAME

FOR APPROVAL

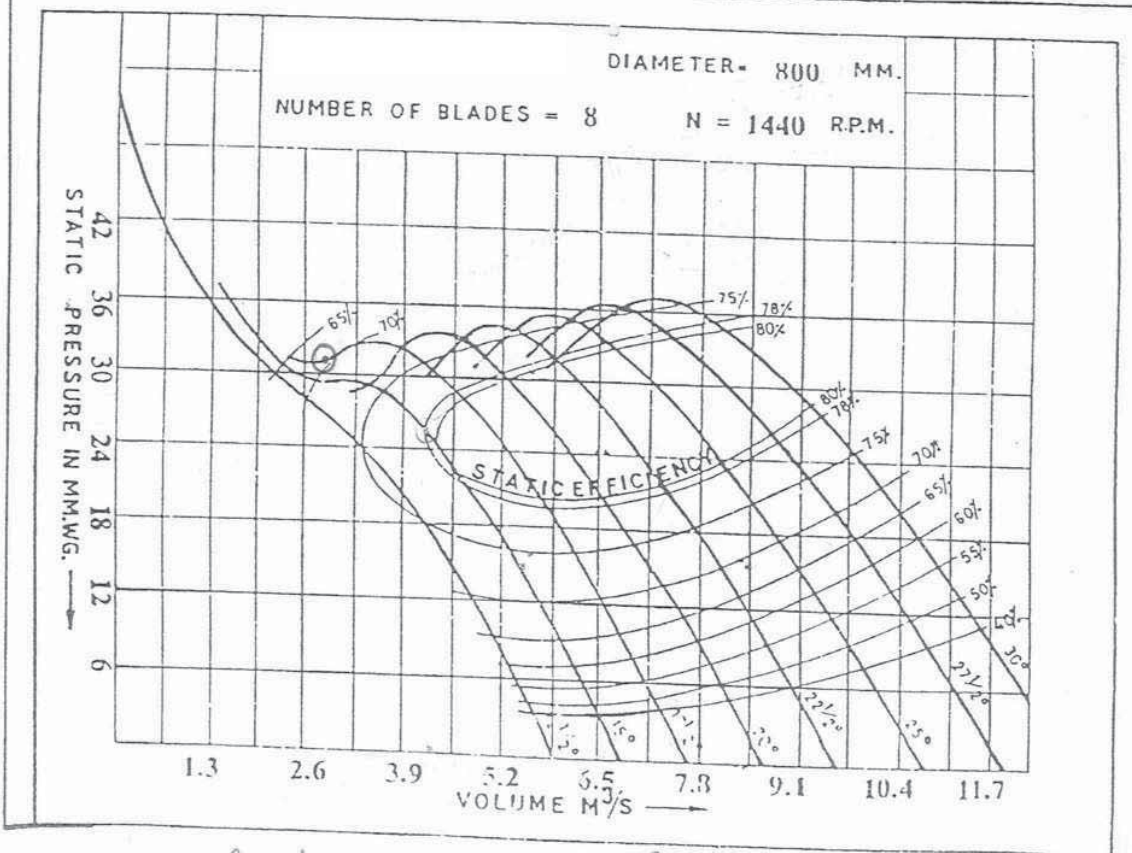
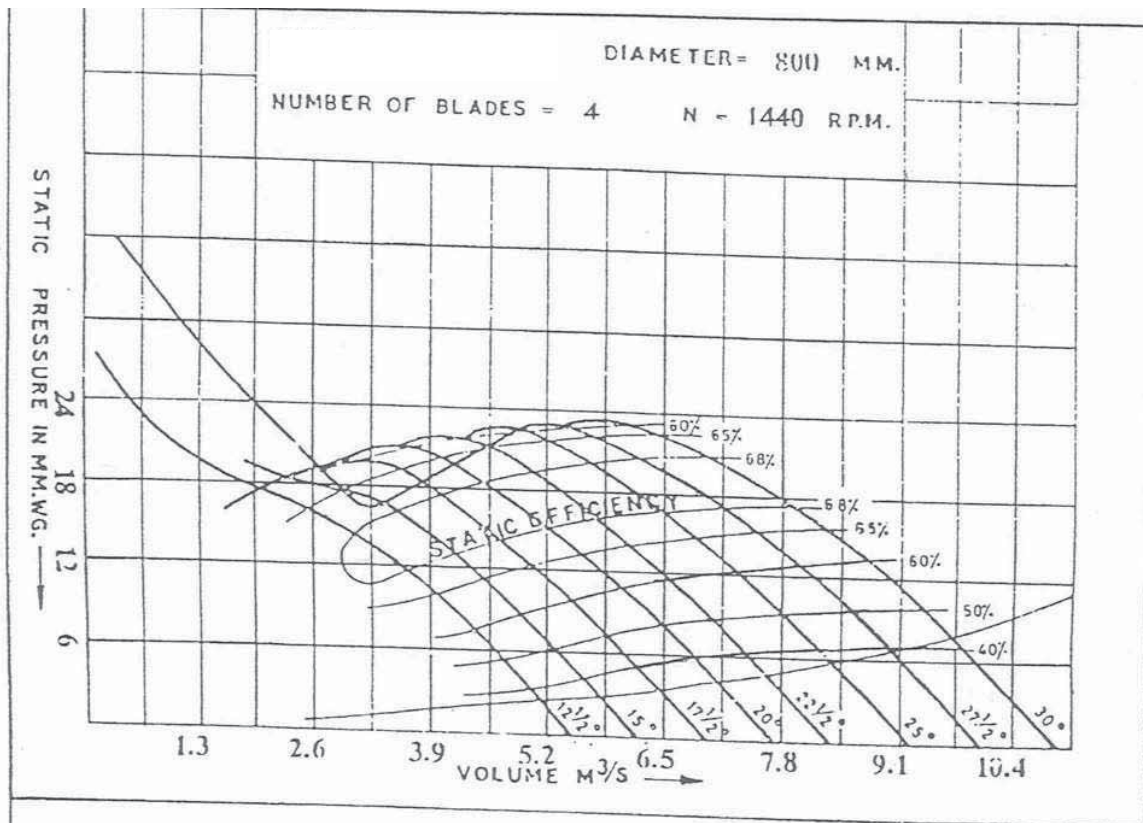
00	25.10.2018	A JAN	A GUR	D M	FOR APPROVAL
Rev.	Date (DD.MM.YYYY)	Prepared	Checked	Approved	Details of Revision

PROJECT: ROSHANI MATHEW SUPER THERMAL POWER PROJECT, BANPAL, BANGLADESH (50% EPC MAIN PLANT PACKAGE)	
OWNER CONSULTANT:	OWNER:  BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH
M/s FICHTNER GmbH & Co. KG, Stuttgart, GERMANY	 BHARAT HEAVY ELECTRICALS LTD POWER SECTOR

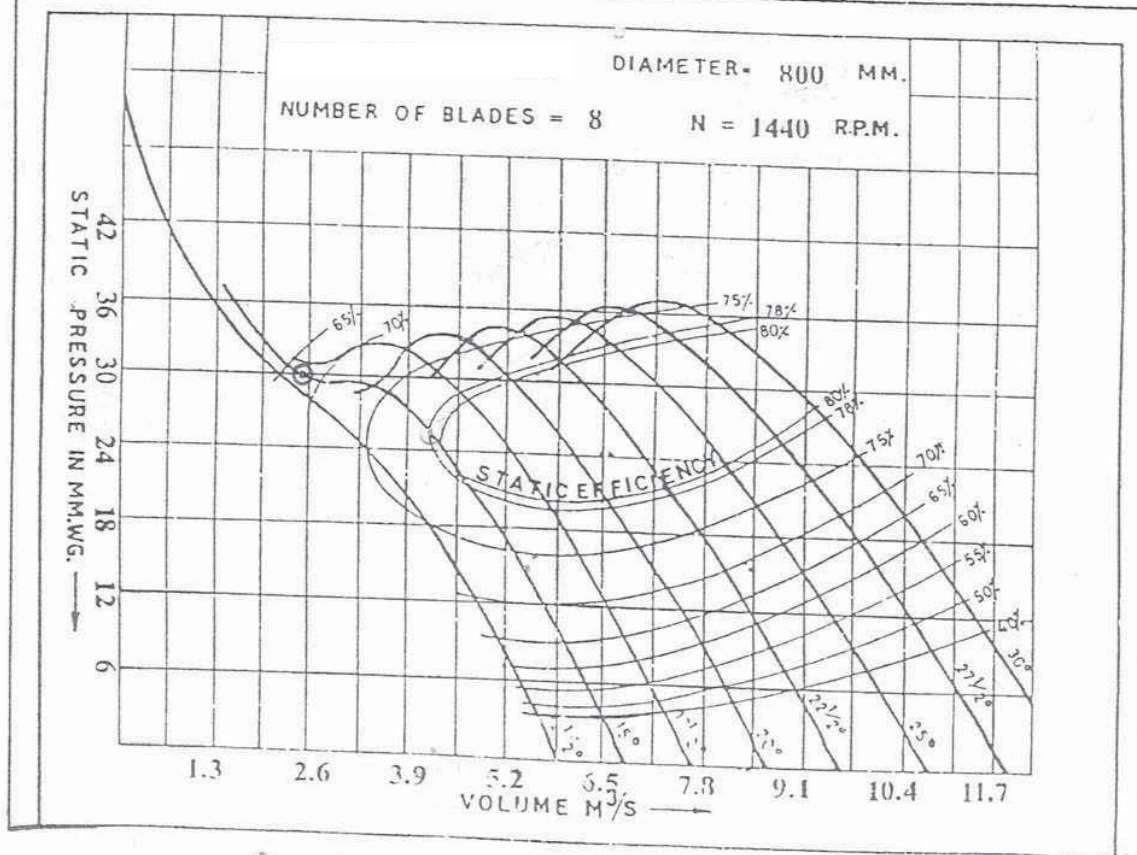
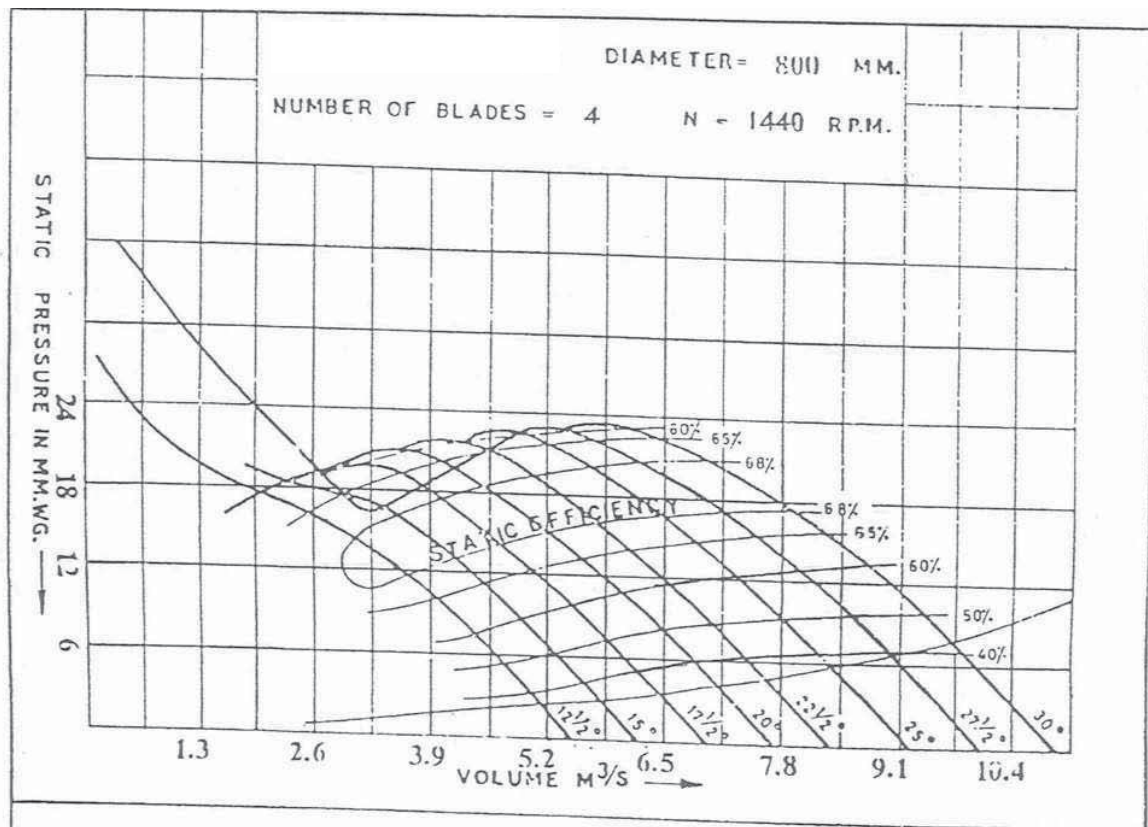
TECHNICAL DATA SHEET & GA DRAWING FOR SMOKE FANS 25 mm WC STATIC								
Sr. No.	Description	Unit	Particulars					
1	Manufacturer							
2	Model No.							
3	Type of Fan		Smoke Fans with 25mm WC Static					
4	Capacity	CMH	15000	10000	7500	6000	4000	2000
5	Quantity		As per fan schedule, MAITREE-00-SAD-PC-111907-PEM					
6	Static pressure	mmWG	30	30	30	30	30	30
7	Total pressure	mmWG	35.5	33.25	31.5	44.3	37.5	31.3
8	Impeller Diameter	mm	800	800	800	450	400	400
9	Type of blade		Variable pitch Cast Aluminium blade					
10	No. of blade	Nos.	8	8	8	8	8	8
11	Blade angle	Degree	17.5	17.5	15	20	20	15
12	Drive Arrgt.		Impeller mounted directly on the motor shaft					
13	Fan/Impeller Speed	RPM	1430	1430	1420	2825	2840	2805
14	Shaft Power	BkW	2.47	1.54	1.09	1.23	0.69	0.29
15	Fan Efficiency	%	60	60	60	60	60	60
16	Bearing Type		Ball Bearing					
17	Selection curves enclosed (yes/No)		yes	yes	yes	yes	yes	yes
18	Motor Data							
	a) Rating	kW/Pole	3.7/4	3.7/4	2.2/4	1.5/2	1.1/2	0.55/2
	b) Speed	RPM	1430	1430	1420	2825	2840	2805
	c) Type of Mounting		B3					
	e) Direction of Rotation		Clockwise / Anti-clockwise					
19	Material							
	a) Impeller		Cast Aluminium					
	b) Casing		MS					
	c) Casing thickness (mm)		5			3		
20	Accessories		Rain protection cowl, birdmesh					
21	Painting		As per specification					
22	Noise Level	dB(A)	≤ 85					
23	Inspection & Testing		As per approved QAP, MAITREE-00-SAD-QA-111905-PEM					



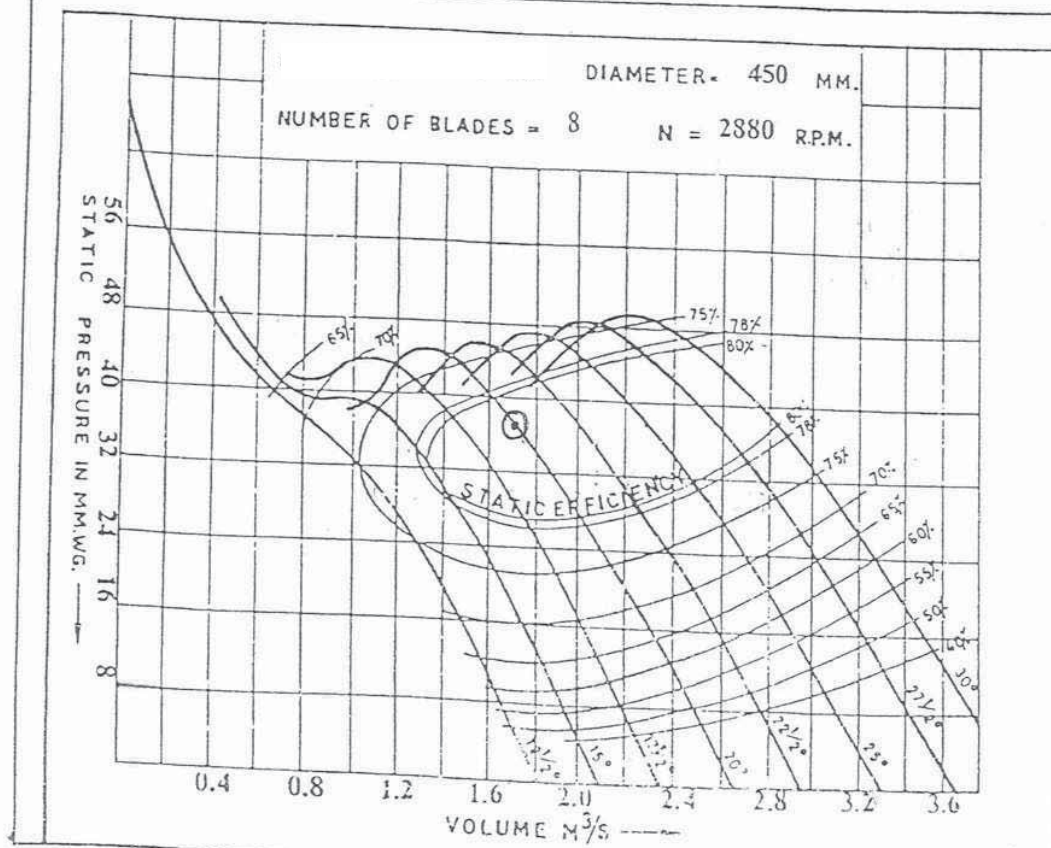
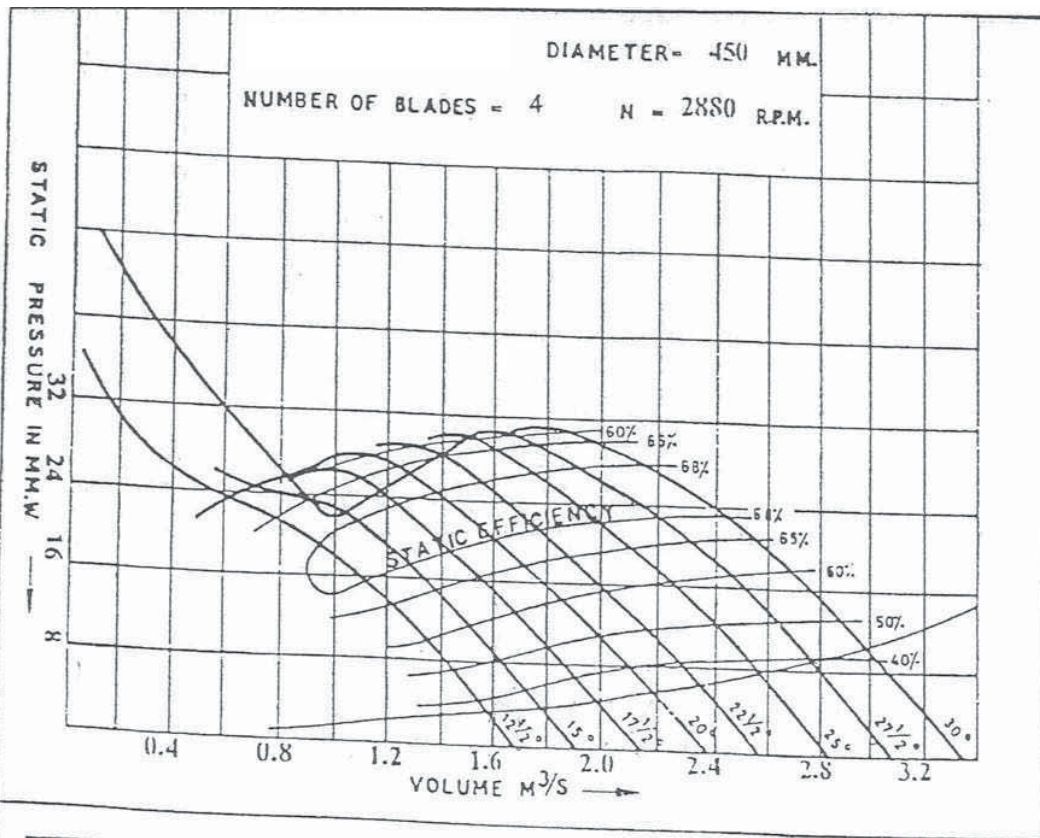
$Q = 15,000 \text{ CMH}, \quad P_{ST} = 30 \text{ mm}$



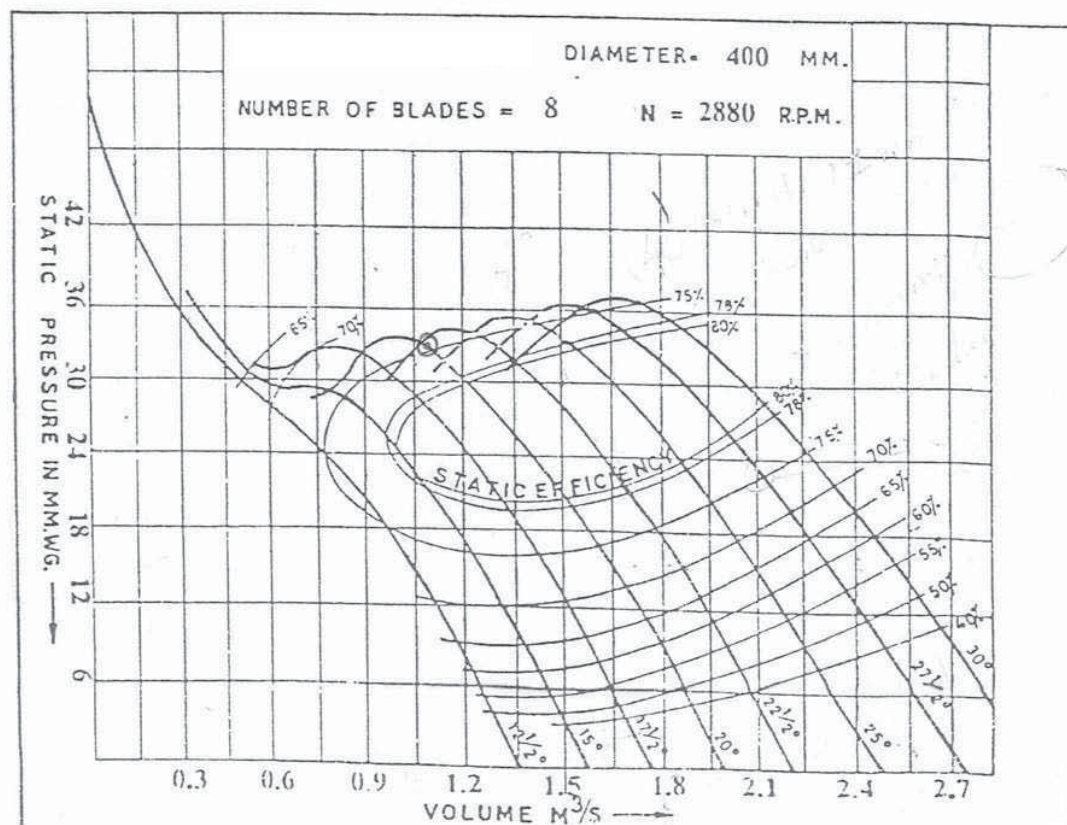
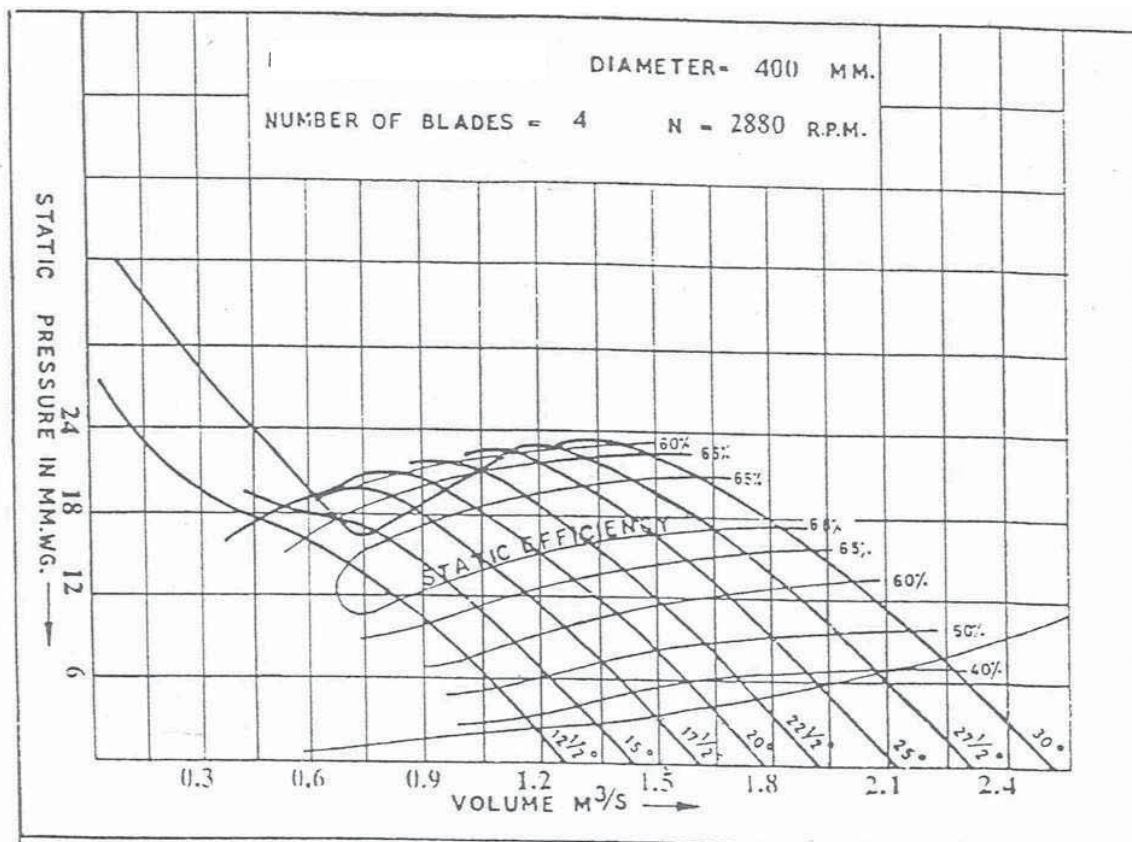
$Q = 10,000 \text{ CMH}$, $P_{st} = 30 \text{ mm}$



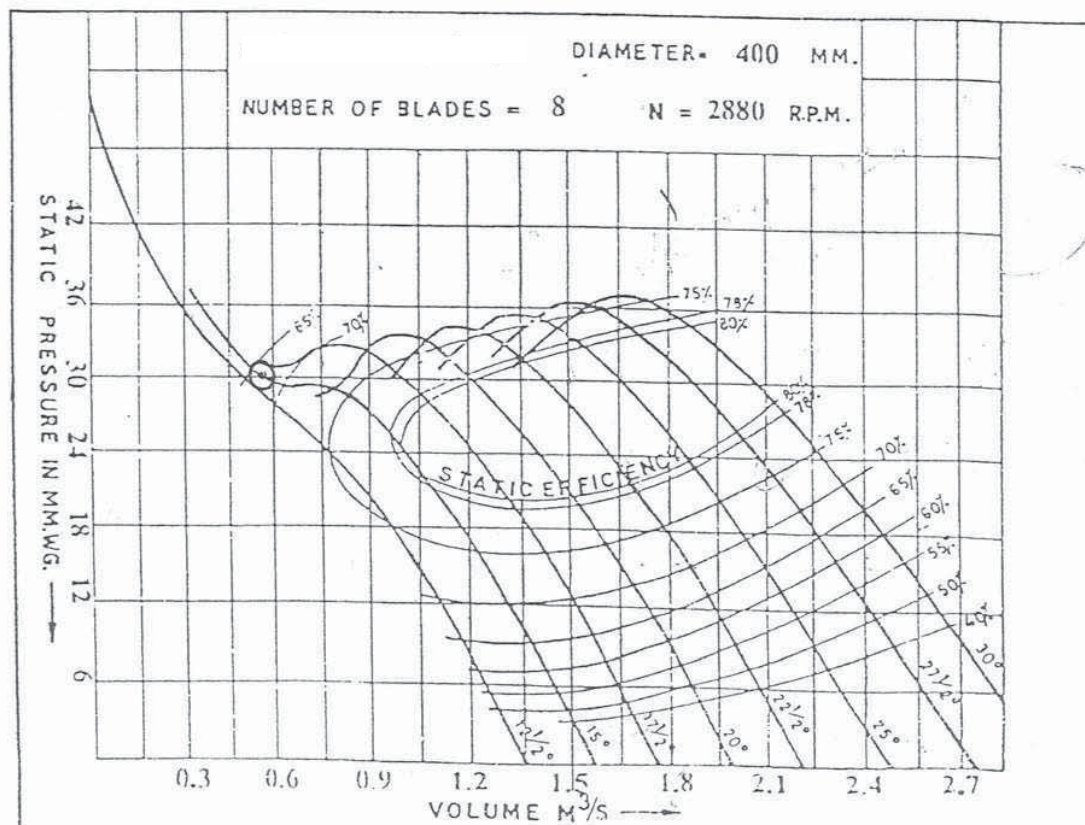
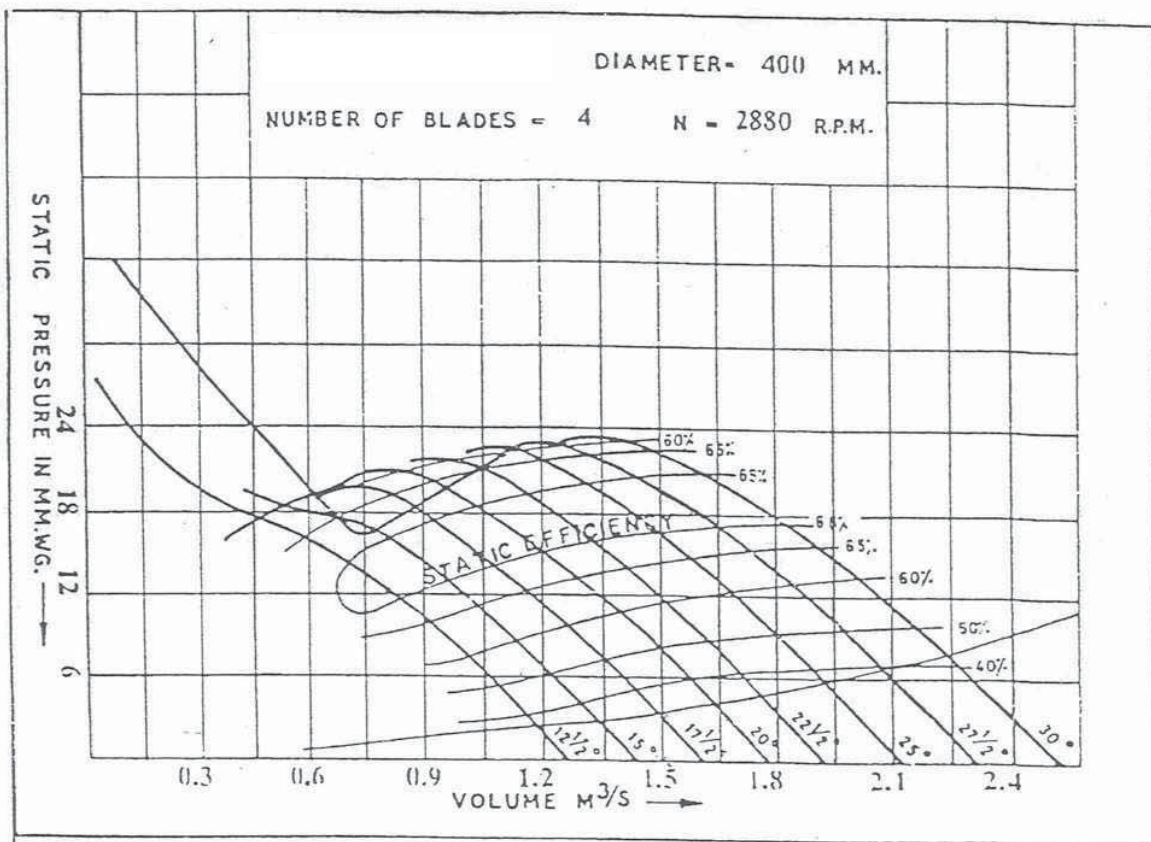
$Q = 7,500 \text{ CMH}, \quad L_{ST} = 30 \text{ mm}$



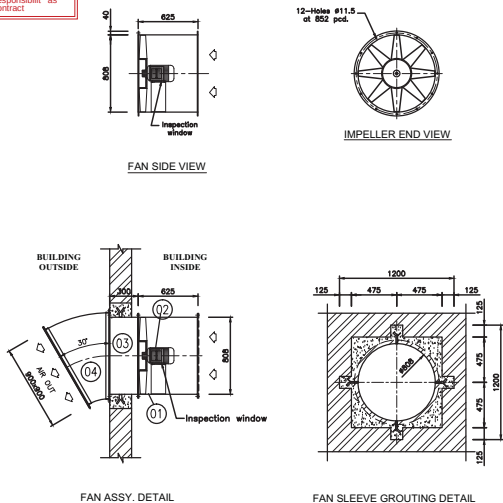
$Q = 6000$ CMH, $P_{st} = 30$ mm



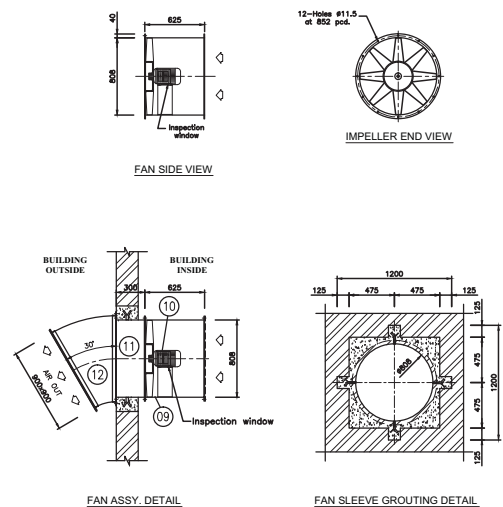
$Q = 4000 \text{ CMH}$, $P_{st} = 30 \text{ mm}$



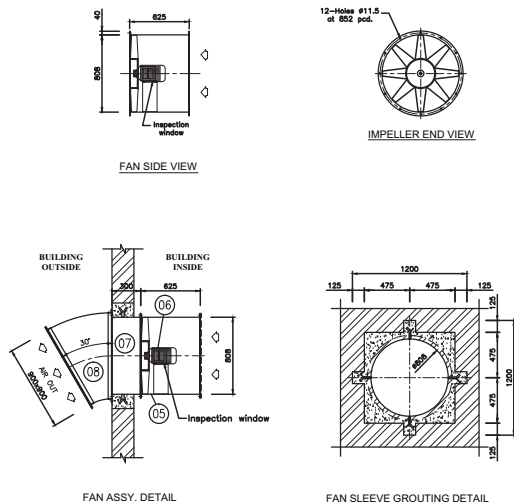
$Q = 2000 \text{ CMH}$, $r_{st} = 30 \text{ mm}$



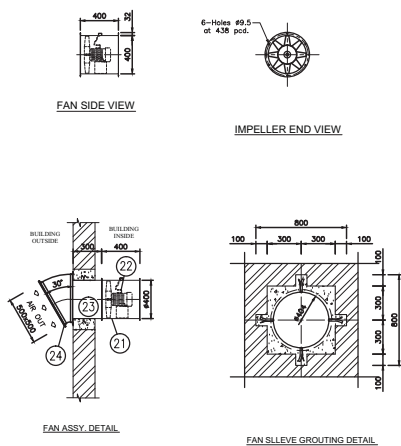
Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamical Load (Kg.)
15,000	25		1430	*	3.7/4	60



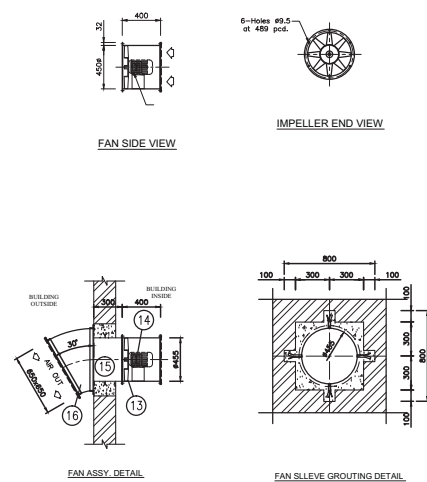
Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamical Load (Kg.)
10,000	25		1430	*	3.7/4	60



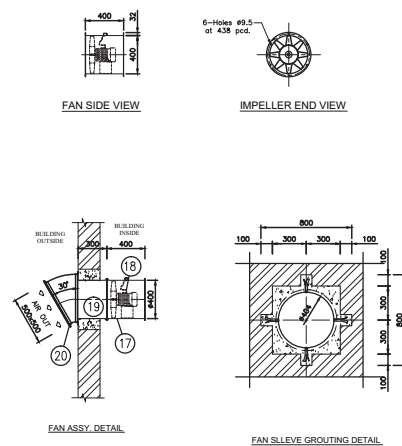
Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
7,500	25		1400	*	2.2/4	60



Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
4,000	25		2840	*	1.1/2	60



Fan Dynamic Load (Kg.)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
6,000	25		2825	*	1.5/2	60



Air Capacity (CMH)	S.P. (mmWC)	Fan Model	Fan Speed (RPM)	Qty. (Nos.)	Motor Kw/Pole	Fan Dynamic Load (Kg.)
2,000	25		2805	*	0.55/2	60

BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NO	DOCUMENT / DRAWING TITLE
-----------------------	--------------------------

NOTES:

1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METERS.
2. EXHAUST AIR FAN ASSEMBLY SUPPORTED ON THE ANGLE FRAME AND SAME IS BOLTED WITH FAN MOUNTING SLEEVE.
3. ITEM LISTED FOR ONE FAN ONLY.

* 4. FAN QTY. SHALL BE AS PER DOCUMENT NO # 4410-001-148-PVM-H-001 FOR FAN SCHEDULE.

23.	AIR DISCHARGE COWL : 500x000x30'	1	GI
24.	FAN MOUNTING SLEEVE : #400x300 Long	1	M.S.
22.	MOTOR 1.1 KW/2 POLE	1	-
21.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
20.	AIR DISCHARGE COWL : 500x000x30'	1	GI
19.	FAN MOUNTING SLEEVE : #400x300 Long	1	M.S.
18.	MOTOR 0.55 KW/2 POLE	1	-
17.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
16.	AIR DISCHARGE COWL : 650x650x30'	1	GI
15.	FAN MOUNTING SLEEVE : #450x300 Long	1	M.S.
14.	MOTOR 1.5 KW/2 POLE	1	-
13.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
12.	AIR DISCHARGE COWL : 900x000x30'	1	GI
11.	FAN MOUNTING SLEEVE : #800x300 Long	1	M.S.
10.	MOTOR 3.7 KW/4 POLE	1	-
09.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
08.	AIR DISCHARGE COWL : 900x000x30'	1	GI
07.	FAN MOUNTING SLEEVE : #800x300 Long	1	M.S.
06.	MOTOR 2.2 KW/4 POLE	1	-
05.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
04.	AIR DISCHARGE COWL : 900x000x30'	1	GI
03.	FAN MOUNTING SLEEVE : #800x300 Long	1	M.S.
02.	MOTOR 3.7 KW/4 POLE	1	-
01.	TUBE AXIAL EXHAUST AIR FAN	1	M.S.
PART NO.	DESCRIPTION	QTY	MAT'S/MAKE

PROJECT	2x660MW MATTAKE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (EPC MAIN PLANT PACKAGE)
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OWNER CONSULTANT:

M/s FICHTNER GmbH
& Co KG,
Stuttgart, GERMANY

OWNER:



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECTS ENGINEERING MANAGEMENT
NOIDA

TITLE	DATA SHEET & GENERAL ARRANGEMENT FOR ROOF EXTRACTOR AXIAL EXHAUST AND SUPPLY AIR FANS WITH FIXING ARRANGEMENT FOR VENTILATION SYSTEM.
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SIZE:	PROJECT NO.: 421	FILE NO:
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ANNEX:	MATTREX DTG NO : MATTREX-00-SAD-DA-111909-FEM-A
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SCALE:
1 : 60
SHEET
1 OF

TECHNICAL DATA SHEET & GA DRAWING FOR AXIAL FLOW SUPPLY FANS 20 mm WC STATIC						
Sr. No.	Description	Unit	Particulars			
1	Manufacturer					
2	Model No.					
3	Type of Fan		Axial Flow Supply Fans with 20mm WC Static			
4	Capacity	CMH	10000	7500	6000	4000
5	Quantity		As per fan schedule, MAITREE-00-SAD-PC-111907-PEM			
6	Static pressure	mmWG	20	20	20	20
7	Total pressure	mmWG	21.5	21	20.6	20.3
8	Impeller Diameter	mm	850	800	800	800
9	Type of blade		Variable pitch Cast Aluminium blade			
10	No. of blade	Nos.	12	9	9	9
11	Blade angle	Degree	29	30	28.5	21.5
12	Drive Arrgt.		Impeller mounted directly on the motor shaft			
13	Fan/Impeller Speed	RPM	935	930	930	925
14	Shaft Power	BkW	1.05	0.86	0.71	0.45
15	Fan Efficiency	%	57	50	47	50
16	Bearing Type		Ball Bearing			
17	Selection curves enclosed (yes/No)		yes	yes	yes	yes
18	Motor Data					
	a) Rating	kW/Pole	1.5/6	1.1/6	1.1/6	0.75/6
	b) Speed	RPM	935	930	930	925
	c) Type of Mounting		B3			
	e) Direction of Rotation		Clockwise / Anti-clockwise			
19	Material					
	a) Impeller		Cast Aluminium			
	b) Casing		MS			
	c) Casing thickness (mm)		5			
	d) Shaft		Motor Shaft (EN-8)			
20	Accessories		Rain protection cowl, birdmesh			
21	Filter					
	21.1 Filter type		Pre-filter			
	a) Filter size		610 X 610 X 50			
	b) No. of filters		4	3	3	2
	c) Filter efficiency		Average arrestance efficiency (65-80)%			
22	Painting		As per specification			
23	Noise Level	dB(A)	≤ 85			
24	Inspection & Testing		As per approved QAP, MAITREE-00-SAD-QA-111905-PEM			

10000 CMH / 20 MM S.P

Current Working Point

Airflow	10200 m ³ /h	Total Pres	21.5 mmwg	Propagation	Spherical
Static Pres	20 mmwg	Power	1.05 kW	Distance / Unit	1 m
Dynamic Pressure	1.43 mmwg	Efficiency	57 %	Sound Pressure	75.5 SPL dB

OPERATIONAL DATA:

Tip Speed:	41 m/s
Temperature:	40 °C
Air Velocity:	4.99 m/s
Torque:	10.8 Nm
Axial Force:	119 N

OPERATIONAL IMPELLER LIMITS:

Tip Speed:	118 m/s (2651 RPM)
Temperature:	-60 °C - 245 °C
Diameter range:	445 - 920 mm
Blade, load factor:	12.3 %
Hub, load factor:	8.17 %
Power, load factor:	N.A. %

Static impeller data:

Moment of Inertia:	0.379 kgm ²
Blade Centrifugal force:	1030 N
Solidity factor:	0.42
Mass with std. boss:	7.85 kg

IMPELLER INFORMATION:

Impeller Diameter:	850 mm
No of blades:	12
Pitch:	29 °
Blade Material:	AL
Blade Type:	4Z
Impeller Rotation:	R

Tests are carried out according to methods described in ANSI / AMCA
210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed:	930 RPM
Tip Clearance:	0.5 %
Temperature	40 °C
Altitude:	0 m
Density:	1.128 kg/m ³

Disclaimer

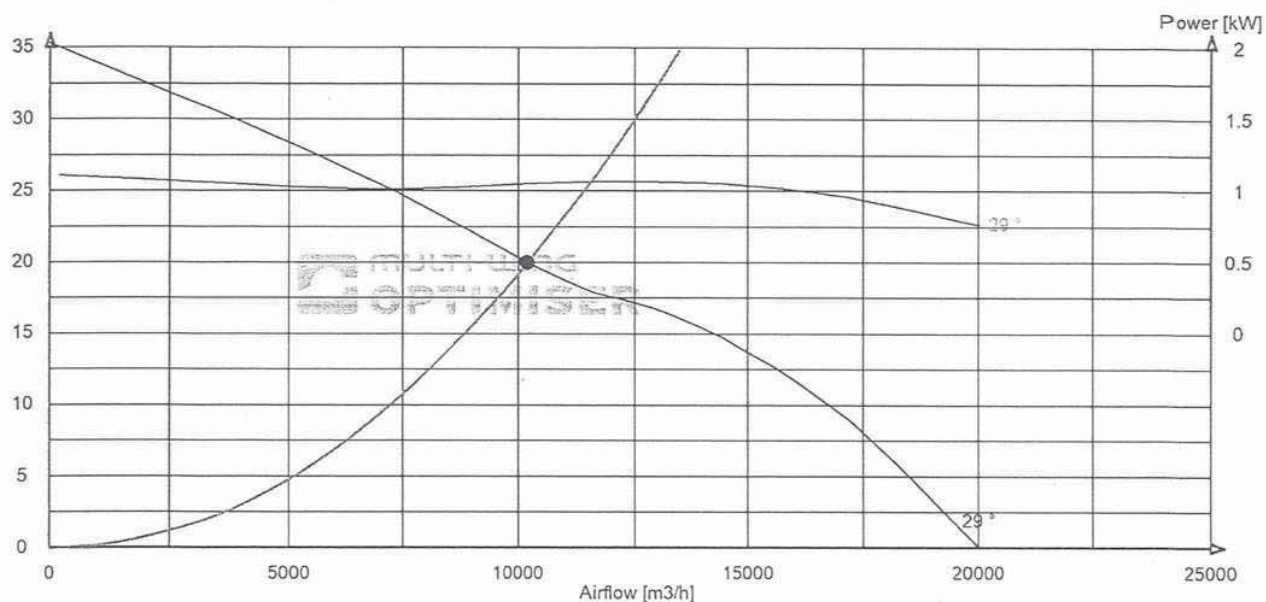
Load factors in Optimiser are based on static operation.

Impellers with AL blades are not recommended for applications
with dynamic loads (variable speed in mobile applications).

For this purpose we recommend plastic blades.

REMARKS:

-
-
-
-



IMPELLER INFORMATION:

Impeller Diameter: 850 mm
 No of blades: 12
 Pitch: 29 °
 Blade Material: AL
 Blade Type: 4Z
 Impeller Rotation: R

Tests are carried out according to methods described in ANSI / AMCA 210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed: 930 RPM
 Tip Clearance: 0.5 %
 Temperature: 40 °C
 Altitude: 0 m
 Density: 1.128 kg/m³

Disclaimer

Load factors in Optimiser are based on static operation.

Impellers with AL blades are not recommended for applications with dynamic loads (variable speed in mobile applications).

For this purpose we recommend plastic blades.

REMARKS:

-
-
-
-

$Q = 10,000 \text{ CMH}$, $P_{ST} = 20 \text{ mm}$

Current Working Point

Airflow	7500 m ³ /h	Total Pres	21 mmwg	Propagation	Spherical
Static Pres	20 mmwg	Power	0.861 kW	Distance / Unit	1 m
Dynamic Pressure	0.995 mmwg	Efficiency	50 %	Sound Pressure	75.3 SPL dB

OPERATIONAL DATA:

Tip Speed	40 m/s
Temperature	40 °C
Air Velocity	4.15 m/s
Torque	8.56 Nm
Axial Force	103 N

OPERATIONAL IMPELLER LIMITS:

Tip Speed	98 m/s (2340 RPM)
Temperature	-60°C - 245 °C
Diameter range	445 - 1070 mm
Blade, load factor	16.8 %
Hub, load factor	23.3 %
Power, load factor	N.A. %

Static impeller data:

Moment of Inertia	0.304 kgm ²
Blade Centrifugal force	1310 N
Solidity factor	0.39
Mass with std. boss	6.83 kg

IMPELLER INFORMATION:

Impeller Diameter	800 mm
No of blades	9
Pitch	30 °
Blade Material	AL
Blade Type	SZ
Impeller Rotation	R

Tests are carried out according to methods described in ANSI / AMCA 210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

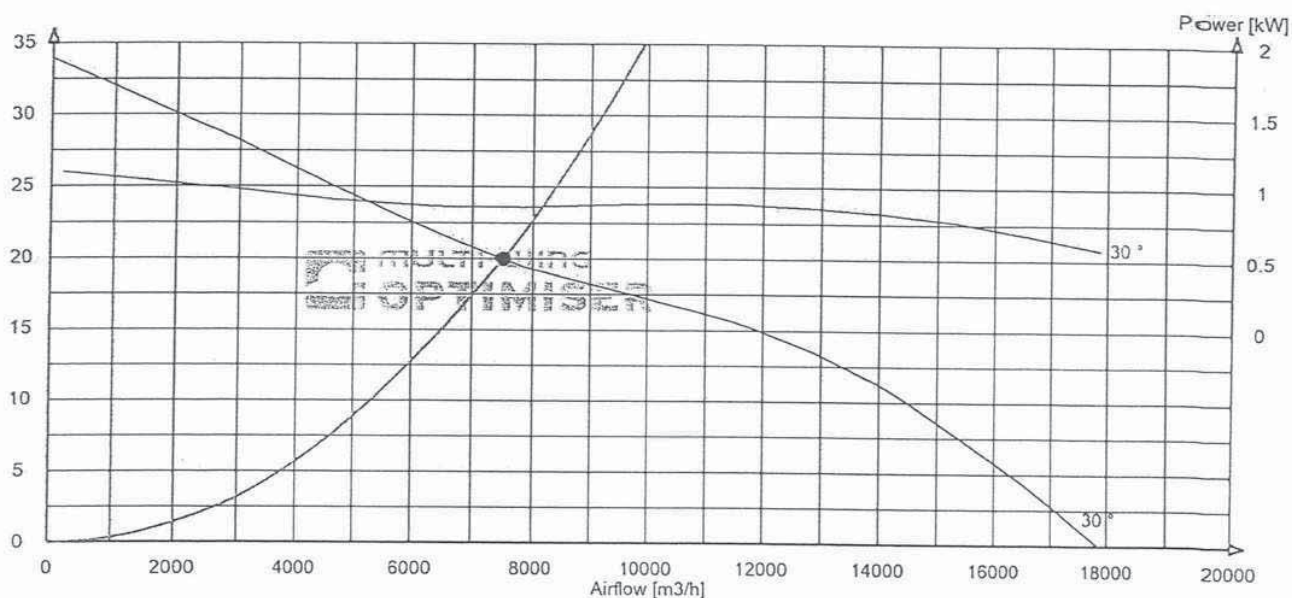
APPLICATION:

Speed	960 RPM
Tip Clearance	0.5 %
Temperature	40 °C
Altitude	0 m
Density	1.128 kg/m ³

Disclaimer

Load factors in Optimiser are based on static operation. Impellers with AL blades are not recommended for applications with dynamic loads (variable speed in mobile applications). For this purpose we recommend plastic blades.

REMARKS:



IMPELLER INFORMATION:

Impeller Diameter: 800 mm
 No of blades: 9
 Pitch: 30°
 Blade Material: AL
 Blade Type: 5Z
 Impeller Rotation: R

Tests are carried out according to methods described in ANSI / AMCA 210-99 (ISO 5801, DIN 24 163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed: 960 RPM
 Tip Clearance: 0.5 %
 Temperature: 40 °C
 Altitude: 0 m
 Density: 1.128 kg/m³

Disclaimer

Load factors in Optimiser are based on static operation.

Impellers with AL blades are not recommended for applications

with dynamic loads (variable speed in mobile applications).

For this purpose we recommend plastic blades.

Current Working Point

Airflow	6000 m ³ /h	Total Pres	20.6 mmwg	Propagation	Spherical
Static Pres	20 mmwg	Power	0.711 kW	Distance / Unit	1 m
Dynamic Pressure	0.635 mmwg	Efficiency	47 %	Sound Pressure	76 SPL dB

OPERATIONAL DATA:

Tip Speed:	39 m/s
Temperature:	40 °C
Air Velocity:	3.31 m/s
Torque:	7.3 Nm
Axial Force:	102 N

OPERATIONAL IMPELLER LIMITS:

Tip Speed:	98 m/s (2340 RPM)
Temperature:	-60 °C - 245 °C
Diameter range:	445 - 1070 mm
Blade, load factor:	15.7 %
Hub, load factor:	21.9 %
Power, load factor:	N.A. %

Static impeller data:

Moment of Inertia:	0.304 kgm ²
Blade Centrifugal force:	1230 N
Solidity factor:	0.39
Mass with std. boss:	6.83 kg

IMPELLER INFORMATION:

Impeller Diameter:	800 mm
No of blades:	9
Pitch:	28.5 °
Blade Material:	AL
Blade Type:	5Z
Impeller Rotation:	R

Tests are carried out according to methods described in ANSI / AMCA
210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed:	930 RPM
Tip Clearance:	0.5 %
Temperature:	40 °C
Altitude:	0 m
Density:	1.128 kg/m ³

Disclaimer

Load factors in Optimiser are based on static operation.
Impellers with AL blades are not recommended for applications
with dynamic loads (variable speed in mobile applications).
For this purpose we recommend plastic blades.

REMARKS:

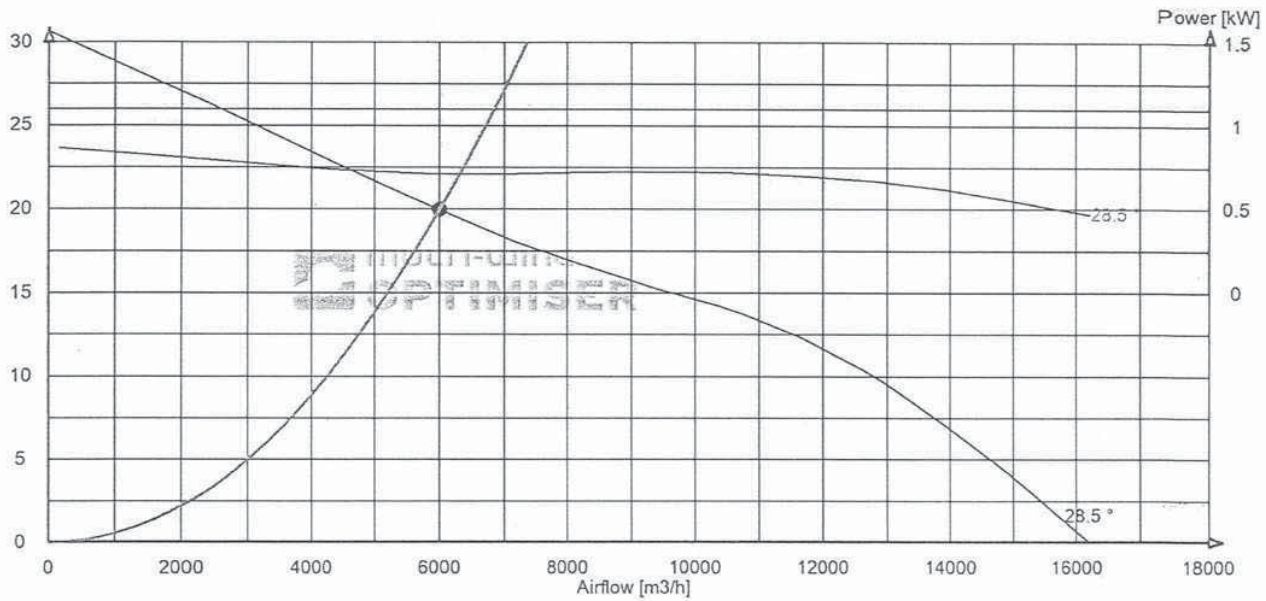
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$$Q = 6000 \text{ cmH} , P_{st} = 20 \text{ mm}$$

APPROVED
Checked and Approved

Date Nov

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract



IMPELLER INFORMATION:

Impeller Diameter: 800 mm
No of blades: 9
Pitch: 28.5 °
Blade Material: AL
Blade Type: 5Z
Impeller Rotation: R

Tests are carried out according to methods described in ANSI / AMCA
210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed: 930 RPM
Tip Clearance: 0.5 %
Temperature: 40 °C
Altitude: 0 m
Density: 1.128 kg/m3

Disclaimer

Load factors in Optimiser are based on static operation.
Impellers with AL blades are not recommended for applications
with dynamic loads (variable speed in mobile applications).
For this purpose we recommend plastic blades.

$Q = 6000 \text{ CMH}$, $L_{sc} = 20 \text{ mm}$

4000 CMH / 20 MM S.P

Current Working Point

Airflow	4060 m ³ /h	Total Pres	20.3 mmwg	Propagation	Spherical
Static Pres	20 mmwg	Power	0.448 kW	Distance / Unit	1 m
Dynamic Pressure	0.332 mmwg	Efficiency	50 %	Sound Pressure	86.6 SPL dB

OPERATIONAL DATA:

Tip Speed:	39 m/s
Temperature:	40 °C
Air Velocity:	2.39 m/s
Torque:	4.45 Nm
Axial Force:	94 N

OPERATIONAL IMPELLER LIMITS:

Tip Speed:	97 m/s (2390 RPM)
Temperature:	-60°C - 245 °C
Diameter range:	445 - 1070 mm
Blade, load factor:	16 %
Hub, load factor:	22.3 %
Power, load factor:	N.A. %

Static Impeller data:

Moment of Inertia:	0.282 kgm ²
Blade Centrifugal force:	1250 N
Solidity factor:	0.41
Mass with std. boss:	6.69 kg

IMPELLER INFORMATION:

Impeller Diameter:	775 mm
No of blades:	9
Pitch:	21.5 °
Blade Material:	AL
Blade Type:	5Z
Impeller Rotation:	R

Tests are carried out according to methods described in ANSI / AMCA
210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed:	960 RPM
Tip Clearance:	0.5 %
Temperature	40 °C
Altitude:	0 m
Density:	1.128 kg/m ³

Disclaimer

Load factors in Optimiser are based on static operation.

Impellers with AL blades are not recommended for applications
with dynamic loads (variable speed in mobile applications).

For this purpose we recommend plastic blades.

REMARKS:

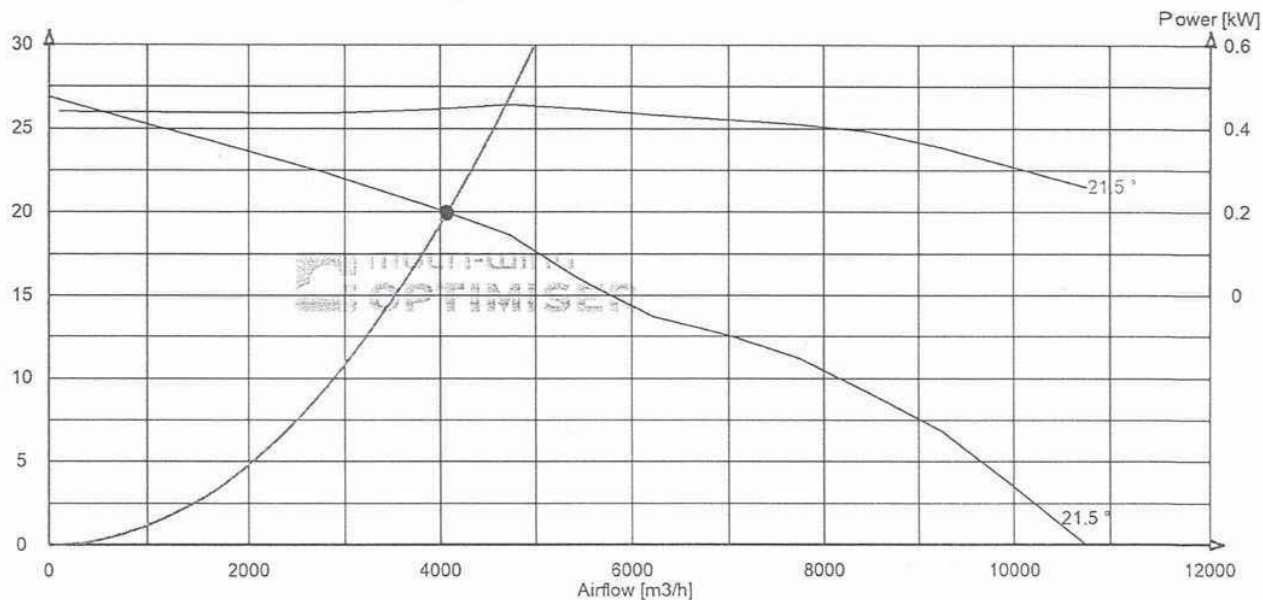
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APPROVED
Checked and Approved

Date Nov

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract

4000 CMH / 20 MM S.P



IMPELLER INFORMATION:

Impeller Diameter: 775 mm
No of blades: 9
Pitch: 21.5 °
Blade Material: AL
Blade Type: 5Z
Impeller Rotation: R

Tests are carried out according to methods described in ANSI / AMCA
210-99 (ISO 5801, DIN 24163)

Sound data is calculated and should be used as guideline only

APPLICATION:

Speed: 960 RPM
Tip Clearance: 0.5 %
Temperature: 40 °C
Altitude: 0 m
Density: 1.128 kg/m3

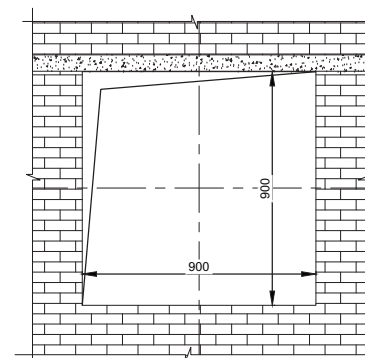
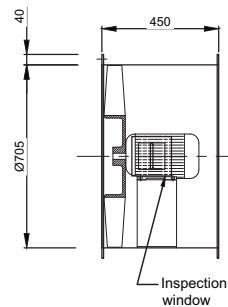
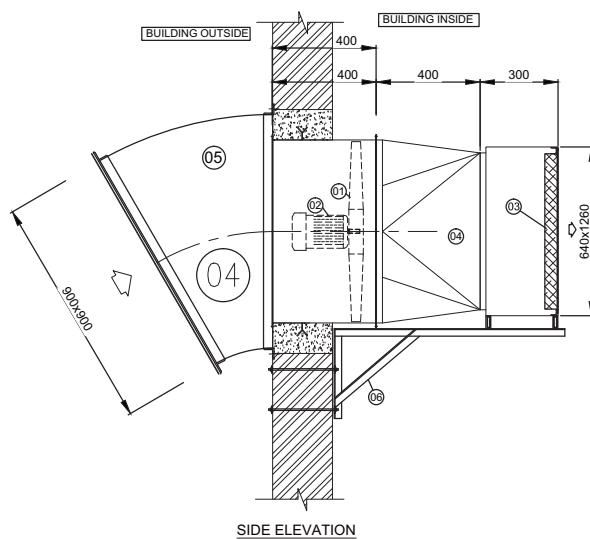
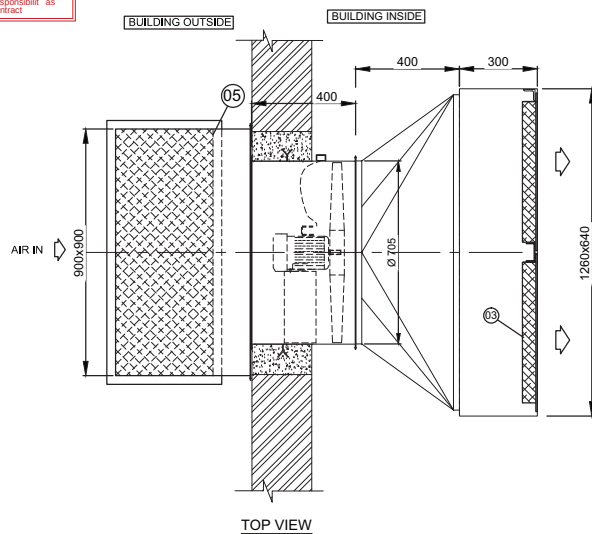
Disclaimer

Load factors in Optimiser are based on static operation.
Impellers with AL blades are not recommended for applications
with dynamic loads (variable speed in mobile applications).
For this purpose we recommend plastic blades.

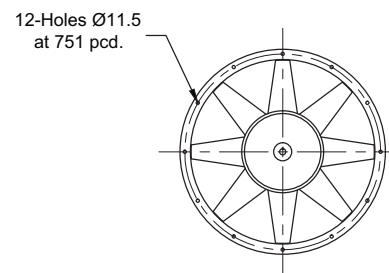
REMARKS:

$Q = 4000 \text{ CMH}$, $P_{ST} = 20 \text{ mm}$

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



WALL OPENING DETAILS



12-Holes Ø11.5
at 751 pcd.

BHEL REFERENCE DOCUMENTS / DRAWINGS	
	DOCUMENT / DRAWING TITLE

NOTES:

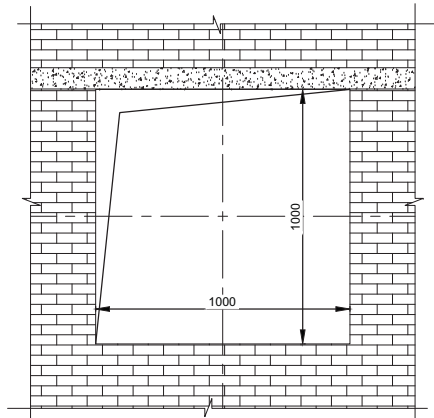
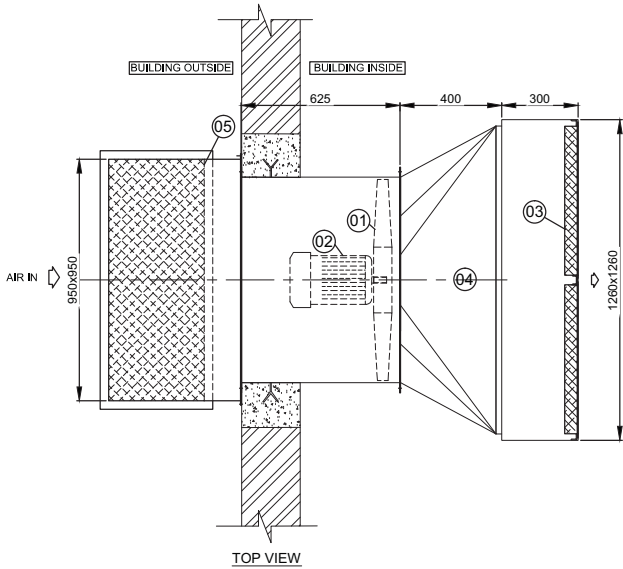
1. ALL DIMENSIONS ARE IN MM.

Air Capacity (CMH) - 4,000 CMH
Static Pressure - 20 MMWG
Fan Static Load - 120 Kg.
Fan Operating Load - 150 Kg.

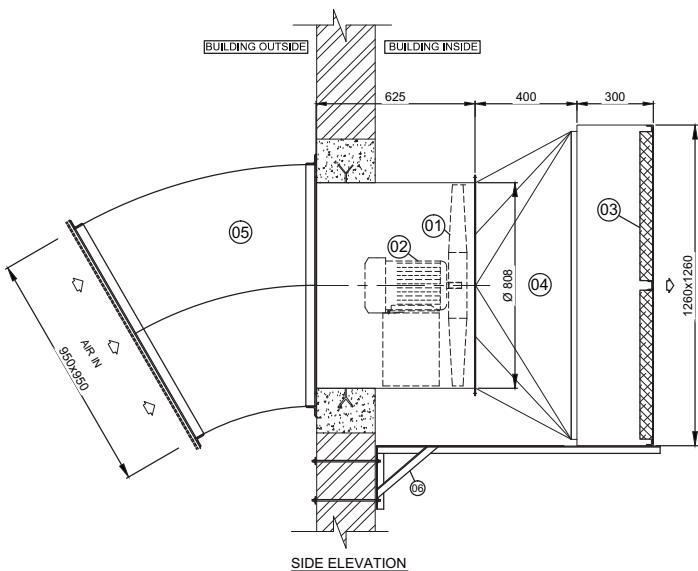
06.	FRESH AIR UNIT SUPPORT	ISA-40x5	1	MS
05.	COWL WITH BIRDMESH	900x900	1	GI
04.	CONNECTION DUCT	1260x1260/7000	1	GI
03.	PRE- FILTER (BOX TYPE)	610x610x50	2	-
02.	MOTOR 0.75kw/6POLE	-	1	-
01.	SUPPLY AIR FAN	-	1	-
PART NO.	DESCRIPTION	SIZE	QTY.	MAT'L/MAKE

PROJECT		2ndroom MATTER SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (BPC MAIN PAPER PACKAGE)	
OWNER CONSULTANT:		OWNER:	BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PTV) LIMITED, BANGLADESH
			POWER SECTOR
			BHARAT HEAVY ELECTRICALS LTD
		PROJECTS ENGINEERING MANAGEMENT Noida	
M/s FICHTNER GmbH & Co KG Stuttgart,GERMANY			SCALE: 1:100 SHEET 1 OF 1
TITLE	DATA SHEET & GENERAL ARRANGEMENT FOR ROOF EXTRACTOR FATAL EXHAUST AND SUPPLY AIR FANS WITH FLEXING ARRANGEMENT FOR VENTILATION SYSTEM.		
REV.	NO.	PROJECT NO.	FILE NO.
		BHEL DPO NO 1 PE-70-61-DA-1010	
		MATTHEWS DPO NO 1 00-SAD-DA-111000-FEM-A	

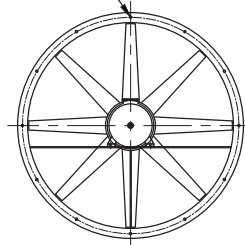
APPROVED
Checked and Approved
Date :
How :
Approved doesn't relieve the EPC
contractor of it's responsibility as
specified in the Contract



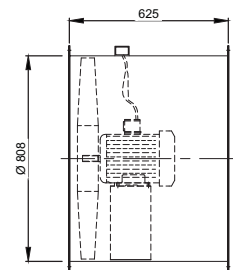
WALL OPENING DETAILS



12 NOS. 11.5 Ø hole
at 852 PCD.



FAN ASSEMBLY



BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NODOCUMENT / DRAWING TITLE

NOTES:
1. ALL DIMENSIONS ARE IN MM.

Air Capacity (CMH) - 10,000 CMH
Static Pressure - 20 MMWG
Fan Static Load - 120 Kg.
Fan Operating Load - 150 Kg.

06.	FRESH AIR UNIT SUPPORT	ISA-40x5	1	MS
05.	COWL WITH BIRDMENSH	750x750	1	GI
04.	CONNECTION DUCT	1260x1260/8000	1	GI
03.	PRE- FILTER (BOX TYPE)	610x610x50	4	-
02.	MOTOR 1.5kw/6POLE	-	1	-
01.	SUPPLY AIR FAN	-	1	-
PART NO.	DESCRIPTION	SIZE	QTY.	MATLS/MAKE

PROJECTS22000MW MATTHRE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH
(RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT:

M/s FICHTNER GmbH
& Co KG,
Stuttgart,GERMANY

OWNER:

BANGLADESH-INDIA FRIENDSHIP POWER
COMPANY (PVT.) LIMITED, BANGLADESH

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECTS ENGINEERING MANAGEMENT
NOIDA

TITLEDATA SHEET & GENERAL ARRANGEMENT FOR ROOF EXTRACTOR, A
ASIAL EXHAUST AND SUPPLY AIR FAN WITH FIXING
ARRANGEMENT FOR VENTILATION SYSTEM.

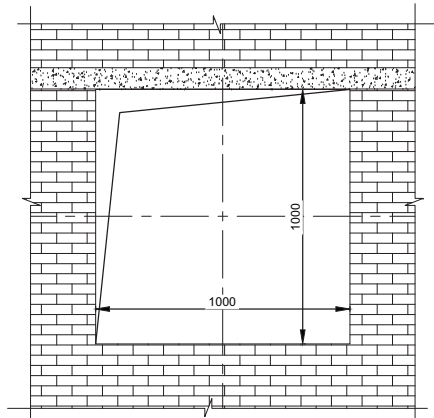
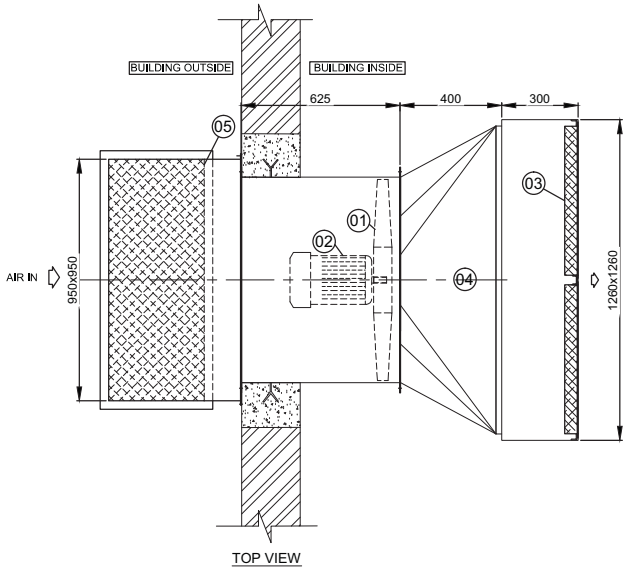
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SHEET1 OF 1

PROJECT NO. 001
BHEL PGC NO : PB-10-881-054-A018
MATTHRE PGC NO : 00-BAS-BA-111908-7PM-A

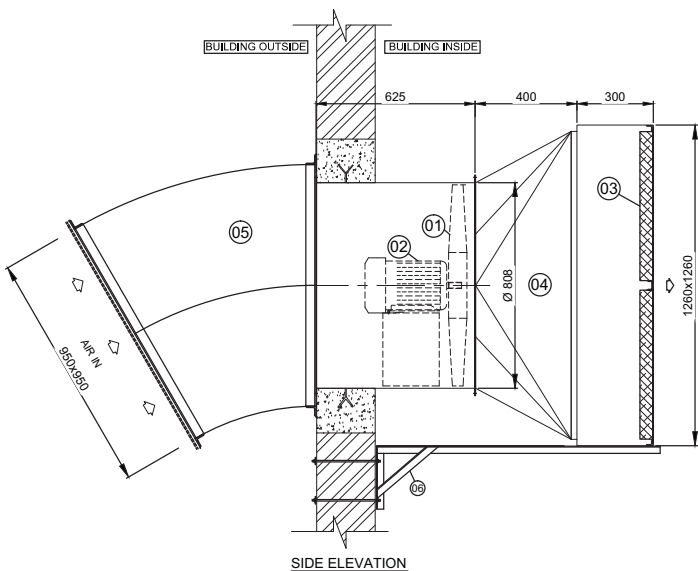
REV. 0

APPROVED
Checked and Approved

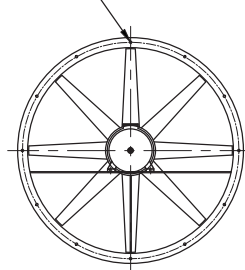
Date _____
Approved doesn't relieve the EPC
contractor of it's responsibility as
specified in the Contract



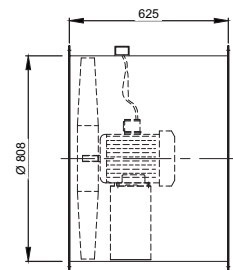
WALL OPENING DETAILS



12 NOS. 11.5 Ø hole
at 852 PCD.



FAN ASSEMBLY



BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NO. DOCUMENT / DRAWING TITLE

NOTES:
1. ALL DIMENSIONS ARE IN MM.

Air Capacity (CMH) - 7,500 CMH

Static Pressure - 20 MMWG

Fan Static Load - 120 Kg.

Fan Operating Load - 150 Kg.

06.	FRESH AIR UNIT SUPPORT	ISA-40x5	1	MS
05.	COWL WITH BIRDMENSH	750x750	1	GI
04.	CONNECTION DUCT	1260x1260/8000	1	GI
03.	PRE- FILTER (BOX TYPE)	610x610x50	4	-
02.	MOTOR 1.1kw/6POLE	-	1	-
01.	SUPPLY AIR FAN	-	1	-
PART NO.	DESCRIPTION	SIZE	QTY.	MATLS/MAKE

PROJECT: 22000MW MATIHAR SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT: M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY

OWNER: BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH

POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NORDIA

SCALE: 1:100 SHEET 1 OF 1

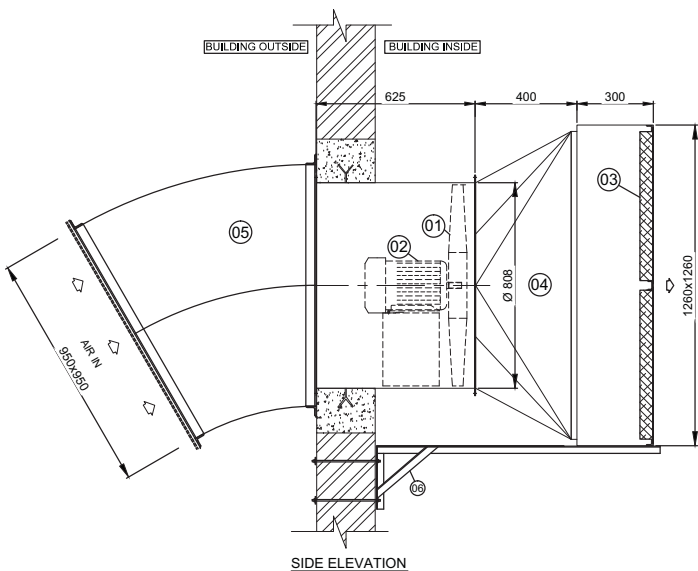
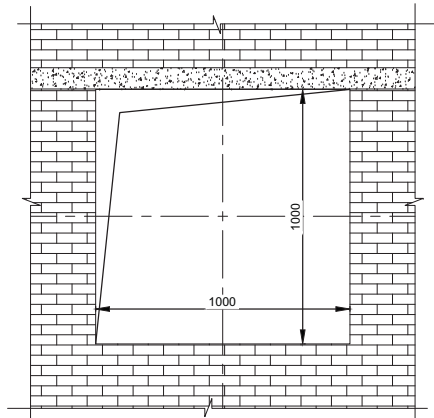
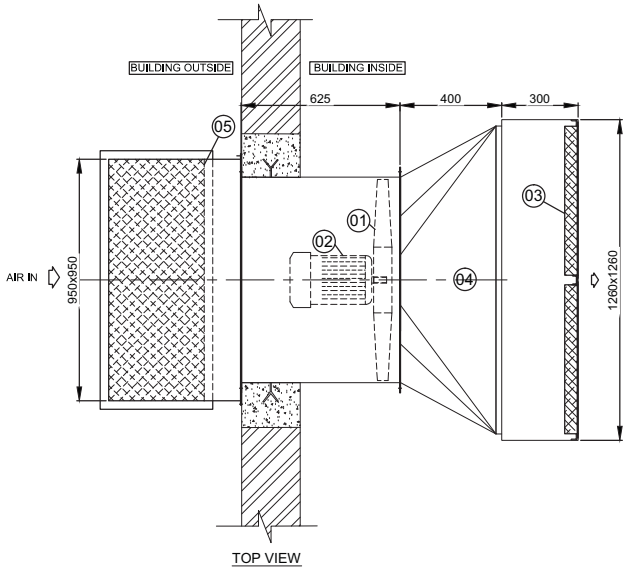
TITLE: DATA SHEET & GENERAL ARRANGEMENT FOR ROOF EXTRACTOR, ASIAL EXHAUST AND SUPPLY AIR FAN WITH FIXING ARRANGEMENT FOR VENTILATION SYSTEM.

REV. NO. 01

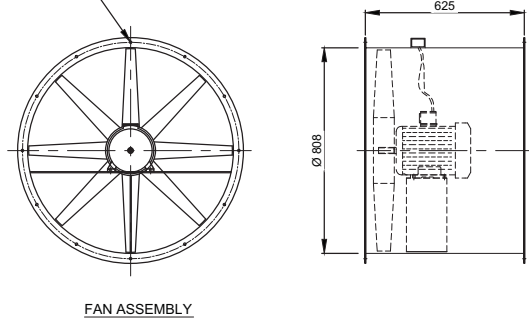
REV. 0

APPROVED
Checked and Approved

Date :
How :
Approved doesn't relieve the EPC
contractor of it's responsibility, as
specified in the Contract



12 NOS. 11.5 Ø hole
at 852 PCD.



BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NO.	DOCUMENT / DRAWING TITLE

NOTES:

1. ALL DIMENSIONS ARE IN MM.

Air Capacity (CMH) - 6,000 CMH				
Static Pressure - 20 MMWG				
Fan Static Load - 120 Kg.				
Fan Operating Load - 150 Kg.				

PART NO.	DESCRIPTION	SIZE	QTY.	MATLS/MAKE
06.	FRESH AIR UNIT SUPPORT	ISA-40x5	1	MS
05.	COWL WITH BIRD MESH	750x750	1	GI
04.	CONNECTION DUCT	1260x1260/8000	1	GI
03.	PRE-FILTER (BOX TYPE)	610x610x50	4	-
02.	MOTOR 1.1kW/6POLE	-	1	-
01.	SUPPLY AIR FAN	-	1	-

PROJECT: 22000MW MATRIS SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT: M/s FICHTNER GmbH & Co KG, Stuttgart, GERMANY

OWNER: BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH

POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NIODA

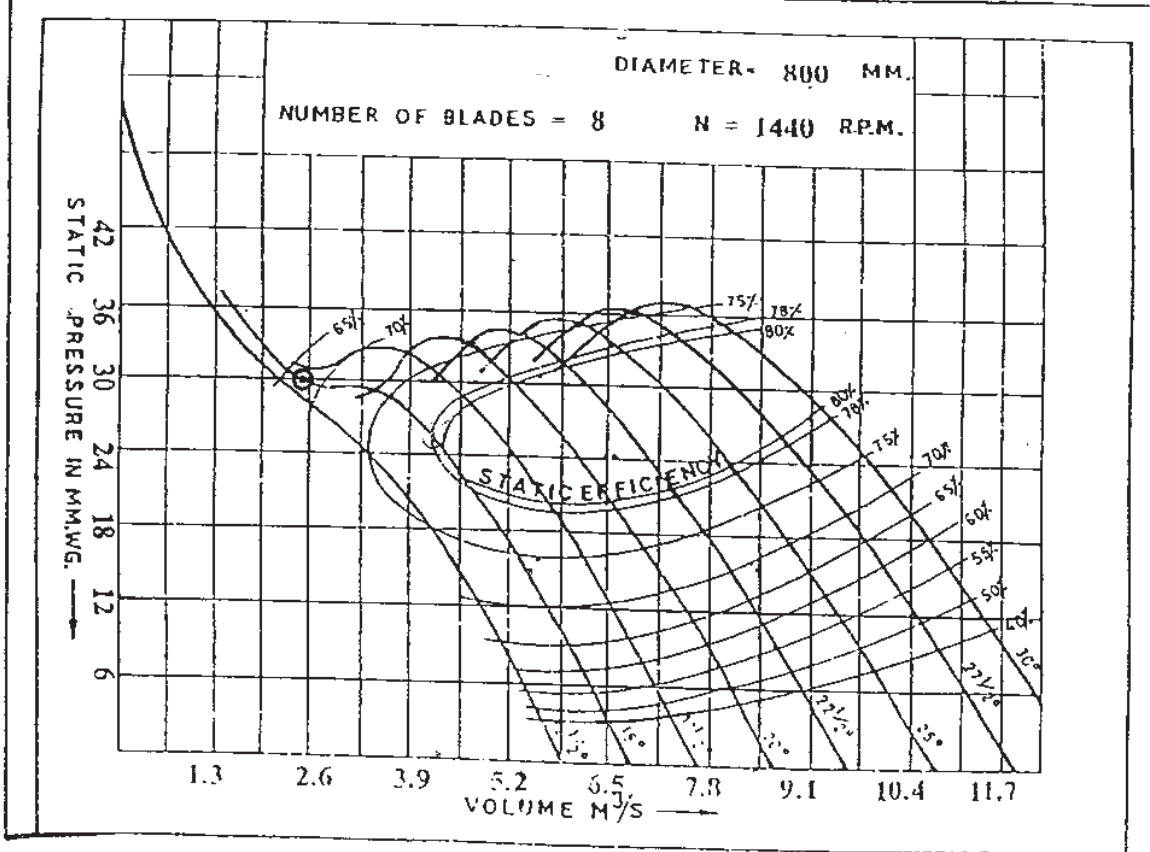
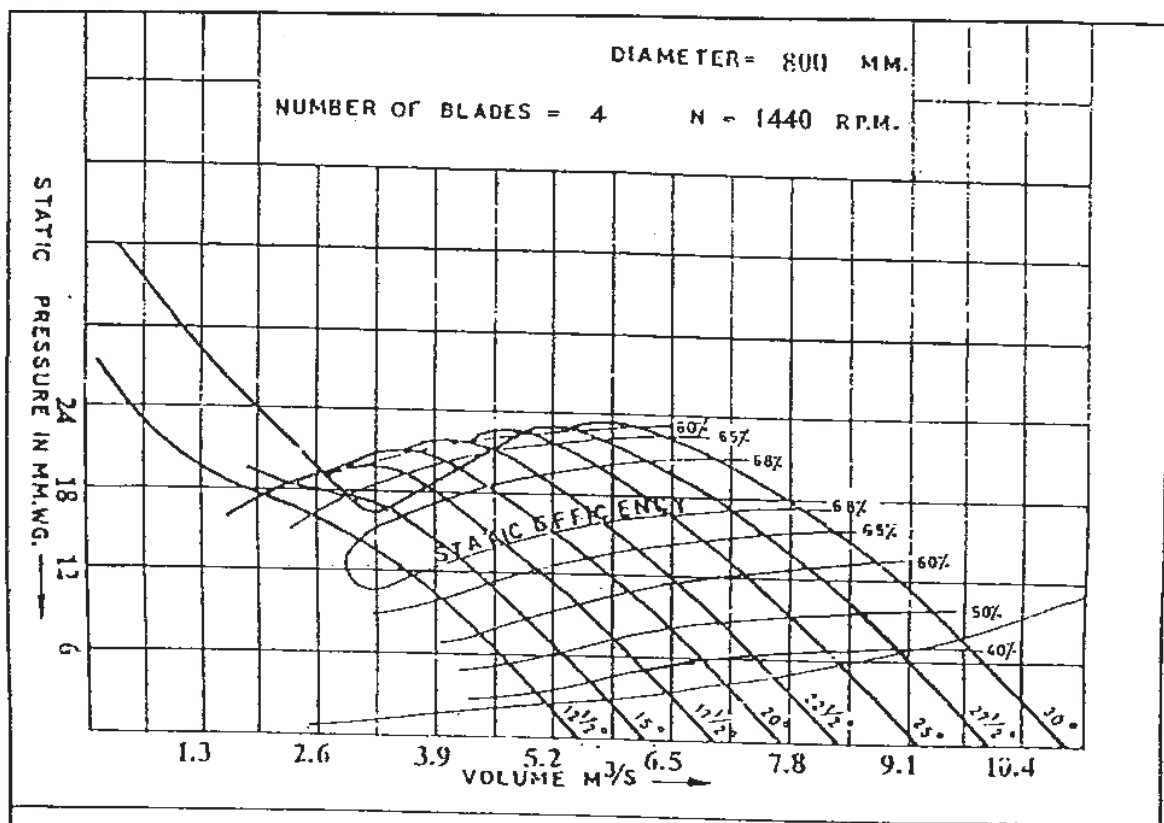
SCALE: 1:100
SHEET: 1 OF 1

TITLE: DATA SHEET & GENERAL ARRANGEMENT FOR ROOF EXTRACTOR, AIR EXHAUST AND SUPPLY AIR FAN WITH FIXING ARRANGEMENT FOR VENTILATION SYSTEM.

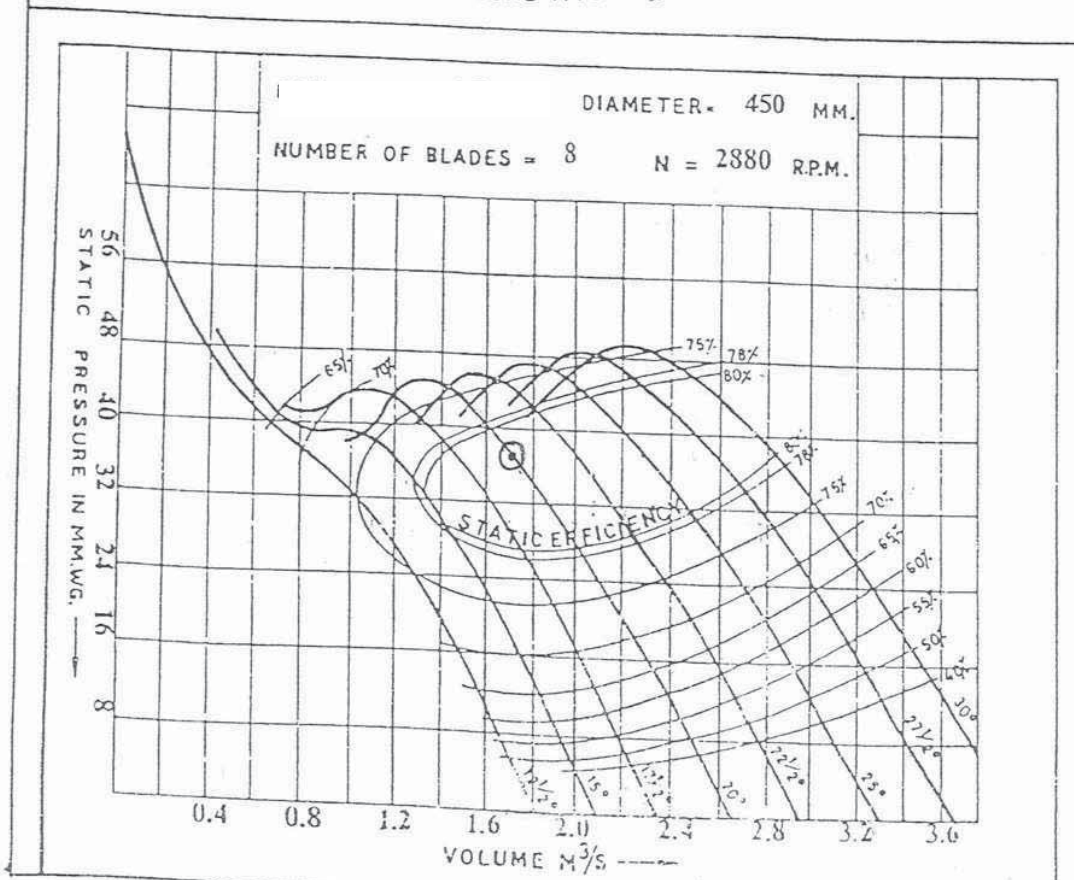
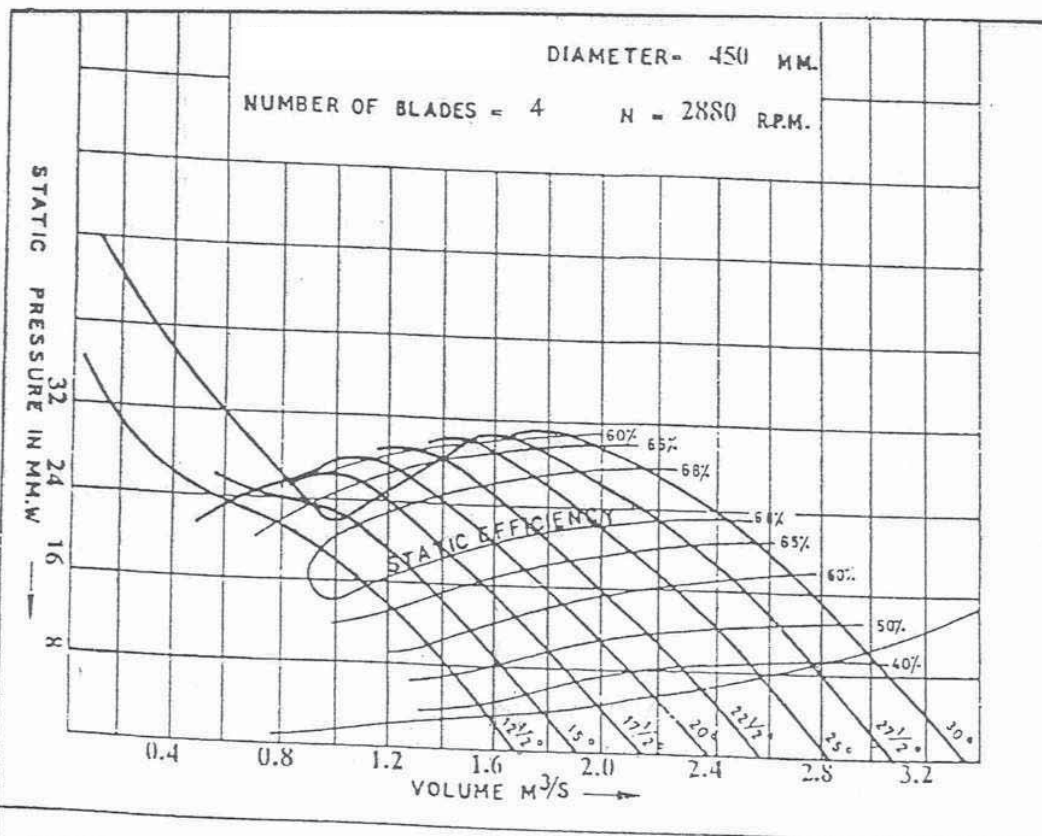
REV. 0

REV. 0

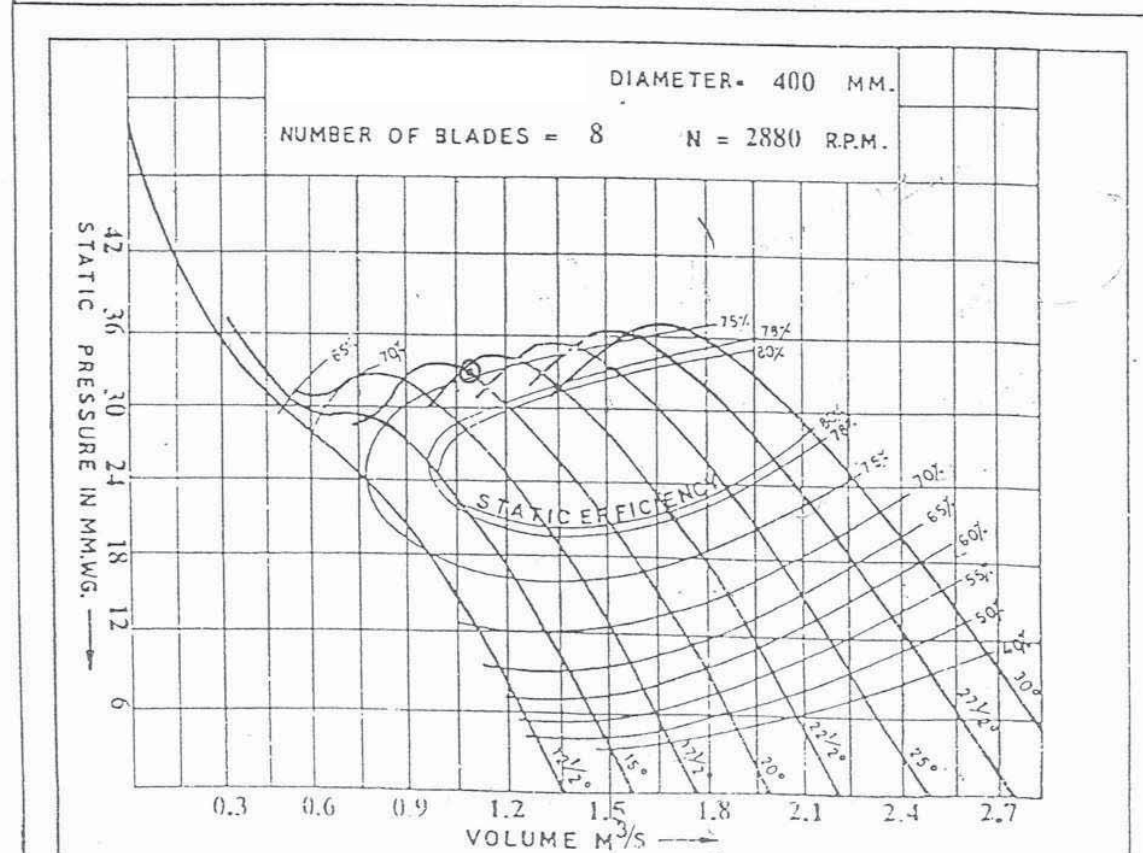
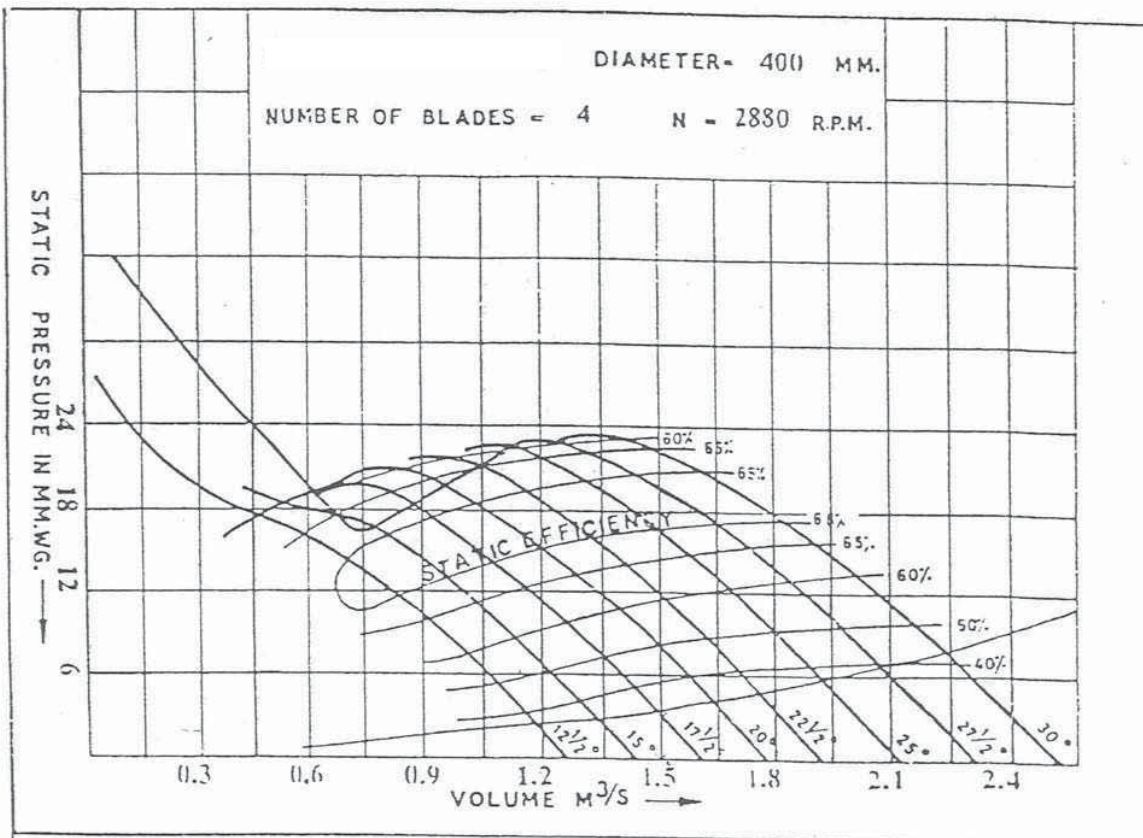
TECHNICAL DATA SHEET & GA DRAWING FOR AXIAL FLOW SUPPLY FANS 30 mm WC STATIC						
Sr. No.	Description	Unit	Particulars			
1	Manufacturer					
2	Model No.					
3	Type of Fan		Axial Flow Supply Fans with 30mm WC Static			
4	Capacity	CMH	10000	7500	6000	4000
5	Quantity		As per fan schedule, MAITREE-00-SAD-PC-111907-PEM			
6	Static pressure	mmWG	30	30	30	30
7	Total pressure	mmWG	33.25	31.5	37	37.5
8	Impeller Diameter	mm	800	800	450	400
9	Type of blade		Variable pitch Cast Aluminium blade			
10	No. of blade	Nos.	8	8	8	8
11	Blade angle	Degree	17.5	15	17.5	20
12	Drive Arrgt.		Impeller mounted directly on the motor shaft			
13	Fan/Impeller Speed	RPM	1420	1410	2840	2830
14	Shaft Power	BkW	1.54	1.09	1.03	0.69
15	Fan Efficiency	%	60	60	60	60
16	Bearing Type		Ball Bearing			
17	Selection curves enclosed (yes/No)		yes	yes	yes	yes
18	Motor Data					
	a) Rating	kW/Pole	2.2/4	1.5/4	1.1/2	0.75/2
	b) Speed	RPM	1420	1410	2840	2830
	c) Type of Mounting		B3			
	e) Direction of Rotation		Clockwise / Anti-clockwise			
20	Material					
	a) Impeller		Cast Aluminium			
	b) Casing		MS			
	c) Casing thickness (mm)		5		3	
	d) Shaft		Motor Shaft (EN-8)			
19	Accessories		Rain protection cowl, birdmesh			
20	Filter					
	20.1 Filter type		Pre-filter			
	a) Filter size		610 X 610 X 50			
	b) No. of filters		4	3	3	2
	c) Filter efficiency		Average arrestance efficiency (65-80)%			
	20.2 Filter type		Fine-filter			
	a) Filter size		610 X 610 X 305			
	b) No. of filters		4	3	3	2
	c) Filter efficiency		Average arrestance efficiency (80-90)%			
21	Painting		As per specification			
22	Noise Level	dB(A)	≤ 85			
23	Inspection & Testing		As per approved QAP, MAITREE-00-SAD-QA-111905-PEM			



$Q = 7,500 \text{ CMH}, \quad P_{st} = 30 \text{ mm}$



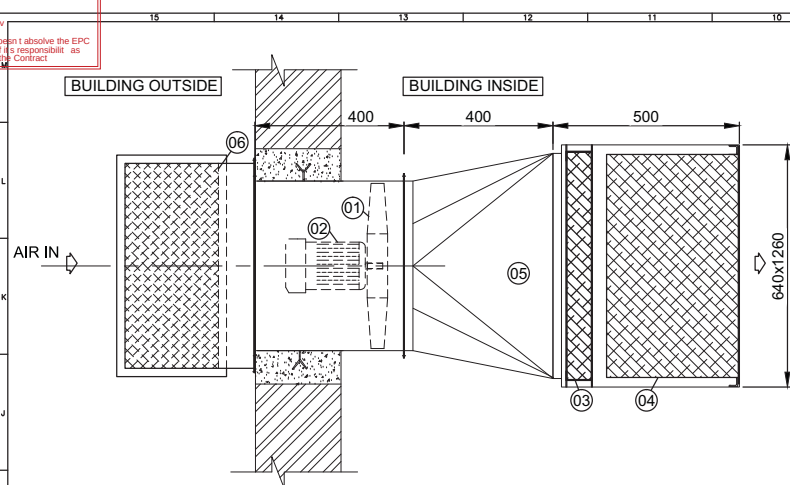
$\theta = 6000$ CMH, $P_{st} = 30$ mm



10. 4000 CMH, $P_{st} = 30 \text{ mm}$

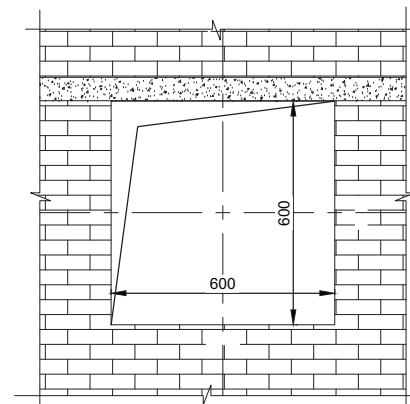
Date Nov

Approval doesn't absolve contractor of it's responsibilities specified in the Contract

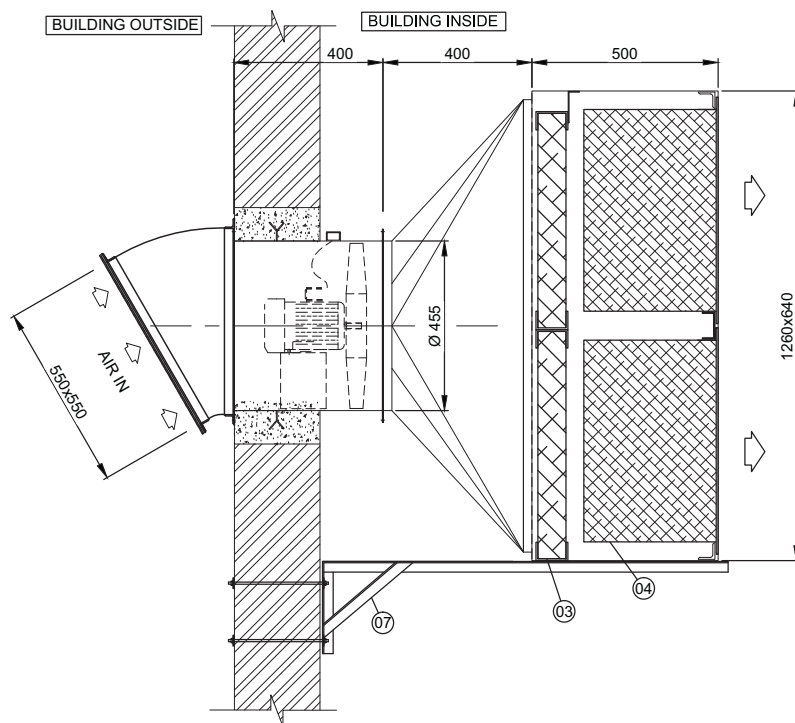


TOP VIEW

500

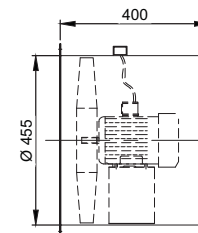
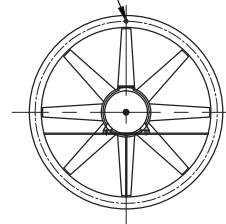


WALL OPENING DETAILS



SIDE ELEVATION

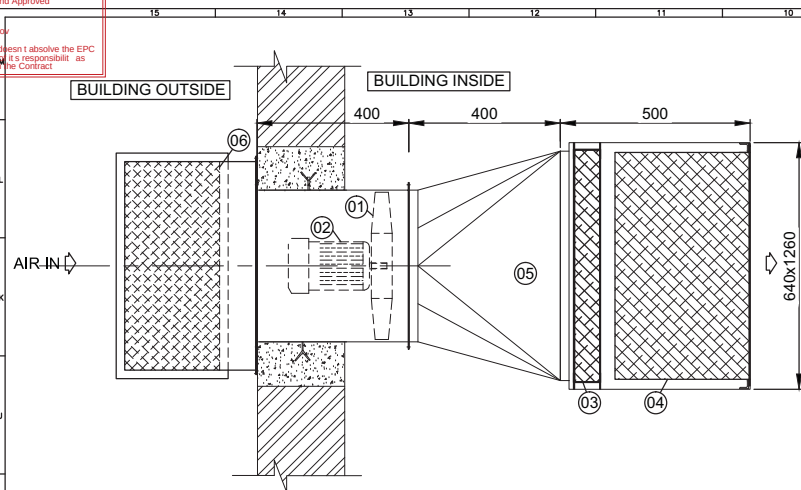
8 NOS. 9.5 Ø hole
at 489 PCD. —



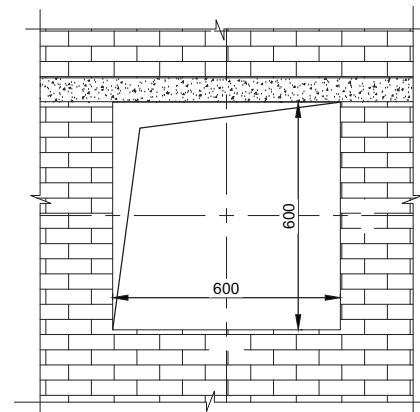
FAN ASSEMBLY

<

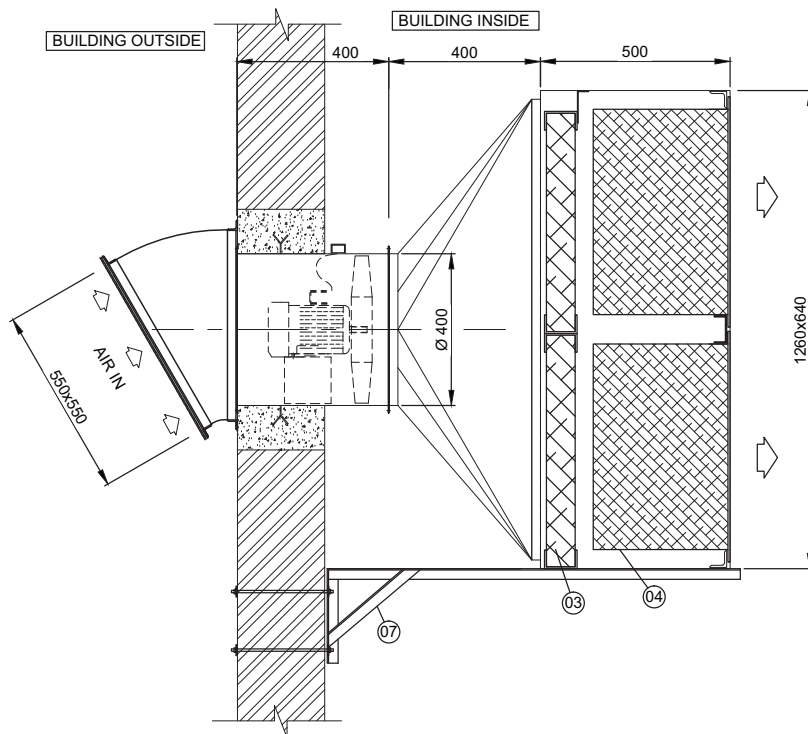
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



TOP VIEW

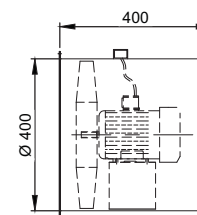
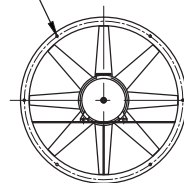


WALL OPENING DETAILS



SIDE ELEVATION

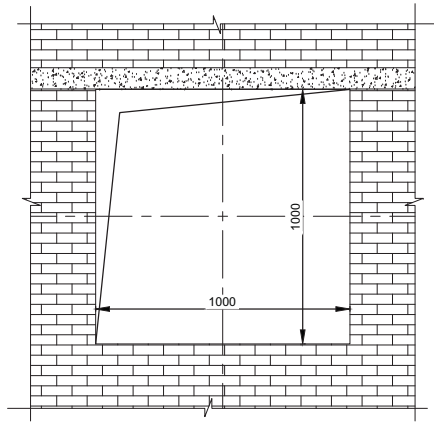
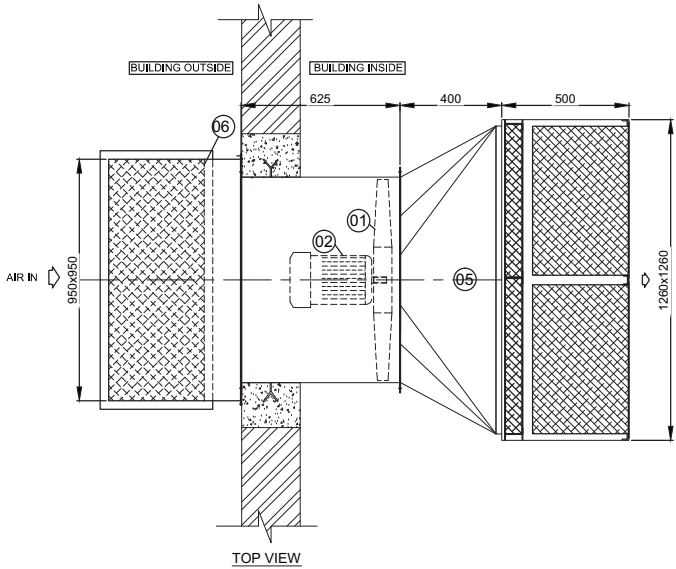
6 NOS. 9.5 Ø hole
at 438 PCD.



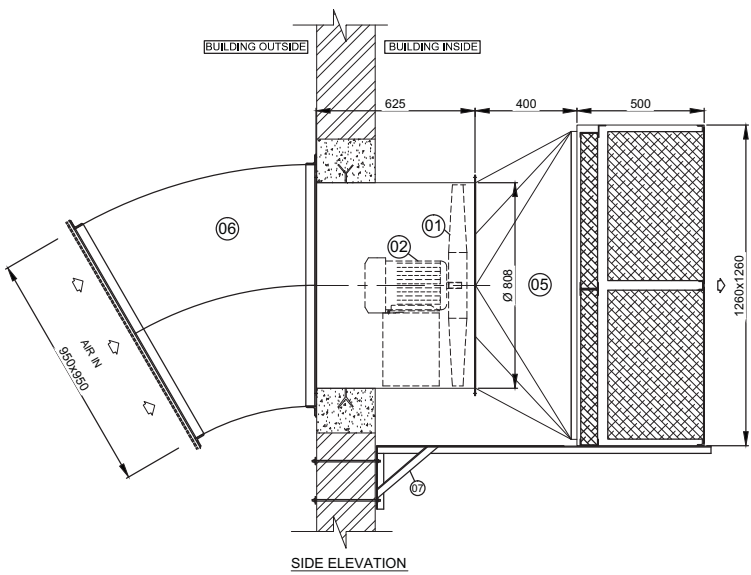
FAN ASSEMBLY

[illegible]

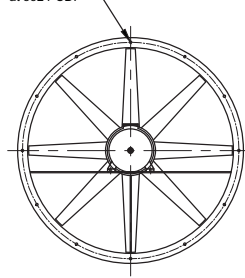
APPROVED
Checked and Approved
Date
How
Approved doesn't relieve the EPC
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specified in the Contract



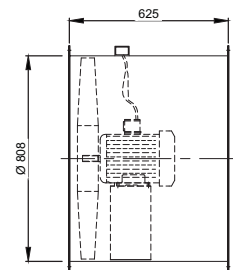
WALL OPENING DETAILS



12 NOS. 11.5 Ø hole
at 852 PCD.



FAN ASSEMBLY



BHEL REFERENCE DOCUMENTS / DRAWINGS

DOCUMENT / DRAWING NODOCUMENT / DRAWING TITLE

NOTES:
1. ALL DIMENSIONS ARE IN MM.

Air Capacity (CMH) - 7,500 CMH
Static Pressure - 30 MMWG
Fan Static Load - 120 Kg.
Fan Operating Load - 150 Kg.

07.	FRESH AIR UNIT SUPPORT	ISA-40x5	1	MS
06.	COWL WITH BIRDMENSH	750x750	1	GI
05.	CONNECTION DUCT	1260x1260/800Ø	1	GI
04.	FINE FILTER (FLANGE TYPE)	610x610x305	4	-
03.	PRE- FILTER (BOX TYPE)	610x610x50	4	-
02.	MOTOR 1.5kw/4POLE	-	1	LHP
01.	SUPPLY AIR FAN	-	1	-
PART NO.	DESCRIPTION	SIZE	QTY.	MATLS/MAKE

PROJECTS2006MW MATRRE SUPER THERMAL POWER PROJECT, RAMPAL, BANGLADESH (RPC MAIN PLANT PACKAGE)

OWNER CONSULTANT:

M/s FICHTNER GmbH & Co KG, Stuttgart,GERMANY

OWNER:

BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH

BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NODIA

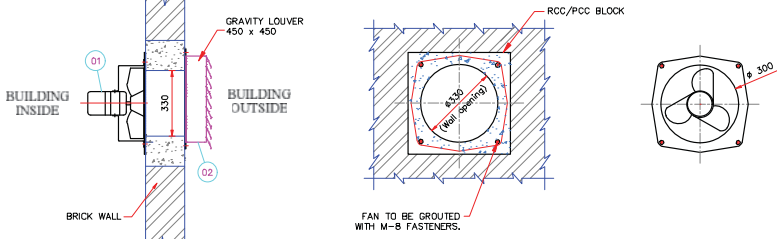
TITLEDATA SHEET & GENERAL ARRANGEMENT FOR ROOF EXTRACTOR, AXIAL EXHAUST AND SUPPLY AIR FAN WITH FIXING ARRANGEMENT FOR VENTILATION SYSTEM

SCALE1:100
SHEET1 OF 1

PROJECT NO. 001
BHEL DPG NO : PB-10-081-004-0018
MATRRE DPG NO : 00-049-0A-111900-PBM-A

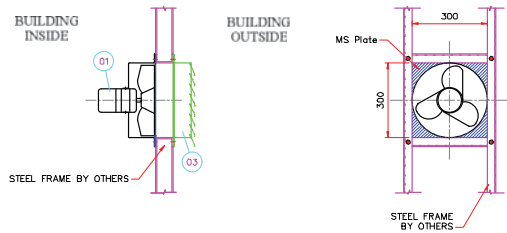
REV. 0

*Approval doesn't absolve the EPC
contractor of it's responsibility as
specified in the Contract.



FAN FIXING DETAIL WITH BRICK WALL

FRONT VIEW



FAN FIXING DETAIL WITH STEEL STRUCTURE

Capacity (CMH)	Fan dia	Phase	Power	Fan Speed (RPM)	Qty. (Nos.)	Static Pressure (mmWG)	Fan Dynamic Load (Kg.)	MOC
1200	ø300	Single	90 watts.	1400	*	5	5.5	MS epoxy powder coated

BUILD REFERENCE DOCUMENTS / DRAWINGS

DATE: 20-MAR-2019

BY: [Signature]

FOR: [Signature]

NOTES

1. ALL EQUIPMENTS SHALL BE DESIGNED FOR OUTDOOR USE.

2. ALL EQUIPMENTS ARE TO BE PROVIDED WITH 10% OVERHEADS.

Qty. of Exhaust Air Propeller Fan shall be as per approved fan schedule.

BILL OF QUANTITY (BQ) (NO)

NO	DESCRIPTION	UNIT	QTY	PRICE/UNIT
01	PROPELLER FAN	NO	1	AS PER SPEC/APP
02	BACK DRAFT DAMPER	NO	1	AS PER
03	BACK DRAFT DAMPER	NO	1	AS PER

OWNER CONSULTANTS

PROJECT: [Signature]

CLIENT: [Signature]

DESIGN: [Signature]

DATE: 20-MAR-2019

FILE

PROJECT: [Signature]

CLIENT: [Signature]

DESIGN: [Signature]

DATE: 20-MAR-2019

DateMar

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

Sr.No.	Application	KW Rating	Pole	Frame	Effi.	Mounting	T.Box Position.	TYPE	Voltage (+/- 10%)	Freq. (+/-5%)	Type of Cooling	IP	Duty.	GAD+TB+NP No	PAGE NO.	CABLE SIZE
1	SAF-4000 CMH@30 mmwc	0.75	2	80	IE3	B3	TOP	SA	415	50	TEFC	55	S1	MGAN080A0259	3-11	3C - 2.5mm2(Cu)
2	SAF-6000 CMH@30 mmwc	1.1	2	80	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN080A0258	12-20	3C - 2.5mm2(Cu)
3	EAF- 2000 CMH@ 10 mmwc	0.37	4	71	IE3	B3	TOP	SA	415	50	TEFC	55	S1	MGAN071A0192	21-28	3C - 2.5mm2(Cu)
4	EAF- 4000 CMH@ 10 mmwc	0.55	4	80	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN080A0258	29-36	3C - 2.5mm2(Cu)
5	EAF-2000 CMH & 4000 CMH @15 mmwc	0.55	4	80	IE3	B3	TOP	FLP	415	50	TEFC	55	S1	MGAF080A0199	37-44	3C - 2.5mm2(Cu)
6	SAF-7500 CMH@30 mmwc	1.5	4	90L	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN090A0478	45-53	3C - 2.5mm2(Cu)
7	SAF-10000 CMH@30 mmwc	2.2	4	100L	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN100A0359	54-62	3C - 2.5mm2(Cu)
8	CENTRIFUGAL FANS - 40000 CMH & PUMP FOR UAF	11	4	160M	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN160A0958	63-70	3C - 6mm2(Cu)
9	PUMP FOR AWU - 125000 CMH	18.5	4	180M	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN180A0523	71-78	3C - 16mm2(Cu)
10	CENTRIFUGAL FANS - 125000 CMH	45	4	225M	IE3	B3	TOP	SA	415	50	TEFC	55	S1	MGAN225A0553	79-87	3C - 35mm2(Cu)
11	EAF- 6000 CMH & 7500 CMH@ 10 mmwc	0.55	6	80	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN080A0258	88-96	3C - 2.5mm2(Cu)
12	SAF-4000 CMH@20 mmwc , EAF- 10000 CMH@ 10 mmwc	0.75	6	90S	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN090A0477	97-104	3C - 2.5mm2(Cu)
13	SAF-6000 CMH & 7500 CMH@20 mmwc , EAF- 15000 CMH@ 10 mmwc	1.1	6	90L	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN090A0478	105-112	3C - 2.5mm2(Cu)
14	EAF-7500 CMH@15 mmwc	1.1	6	90L	IE3	B3	TOP	FLP	415	50	TEFC	55	S1	MGAF090A0214	113-120	3C - 2.5mm2(Cu)
15	SAF-10000 CMH@20 mmwc	1.5	6	100L	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN100A0359	121-128	3C - 2.5mm2(Cu)
16	EAF-10000 CMH@15 mmwc	1.5	6	100L	IE3	B3	TOP	FLP	415	50	TEFC	55	S1	MGAF100A0153	129-136	3C - 2.5mm2(Cu)
17	Roof Extractor - 20000 CMH @ 15 mmwc	2.2	6	112M	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN112A0312	137-145	3C - 2.5mm2(Cu)
18	EAF-15000 CMH@15 mmwc	2.2	6	112M	IE3	B3	TOP	FLP	415	50	TEFC	55	S1	MGAF112A0161	146-153	3C - 2.5mm2(Cu)
19	Roof Extractor - 40000 CMH & 50000 CMH @ 15 mmwc	5.5	6	132M	IE3	B3	RHTB	SA	415	50	TEFC	55	S1	MGAN132A0692	154-161	3C - 2.5mm2(Cu)

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FANS	
1.1	Quantity	AS PER APPROVED BBU / FAN SCHEDULE	
2.0	Manufacturer	LHPL	
3.0	Type & Frame Size	Energy Efficient & Frame Size 80	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	0.75	
4.1	Rated Speed	2850	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	1.7	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	80.7	0.75
9.0	Efficiency & Power Factor at 75% Load	79	0.70
10.0	Efficiency & Power Factor at 50% Load	78	0.60
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	0.26	
13.0	Starting current (%)	650%	
14.0	No Load Current (With Mechanism Coupled)	1.0 A (Indicative)	
15.0	Starting torque in % of full load torque	0.49	
16.0	Pull up torque in % of full load torque	0.44	
17.0	Pull out torque in % of full load torque	0.56	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	10
		b) Cold	20
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	16
		b) Cold	31
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	8
		b) Cold	17
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	42/125	
26.0	Type & number of terminals broughtout	3 leads	
27.0	Stator winding connection	STAR	

28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	7.48 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kg m ²)	0.002	
42.0	Total weight of motor (kg)	11 KG APPROX	
43.0	Weight of stator (kg)	7 KG APPROX	
44.0	Weight of rotor (kg)	4 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	0.80	
51.0	Derated rating of motor at 50°C	0.75	
52.0	a) Locked Rotor KVA (Indicative)	8.1	
	b) Ratio of Locked rotor KVA / rated KW	10.7	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	1.0	
	b) Motor Static Load	11 KG	
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	
55	Noise Level	IEC 60034-9	

Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

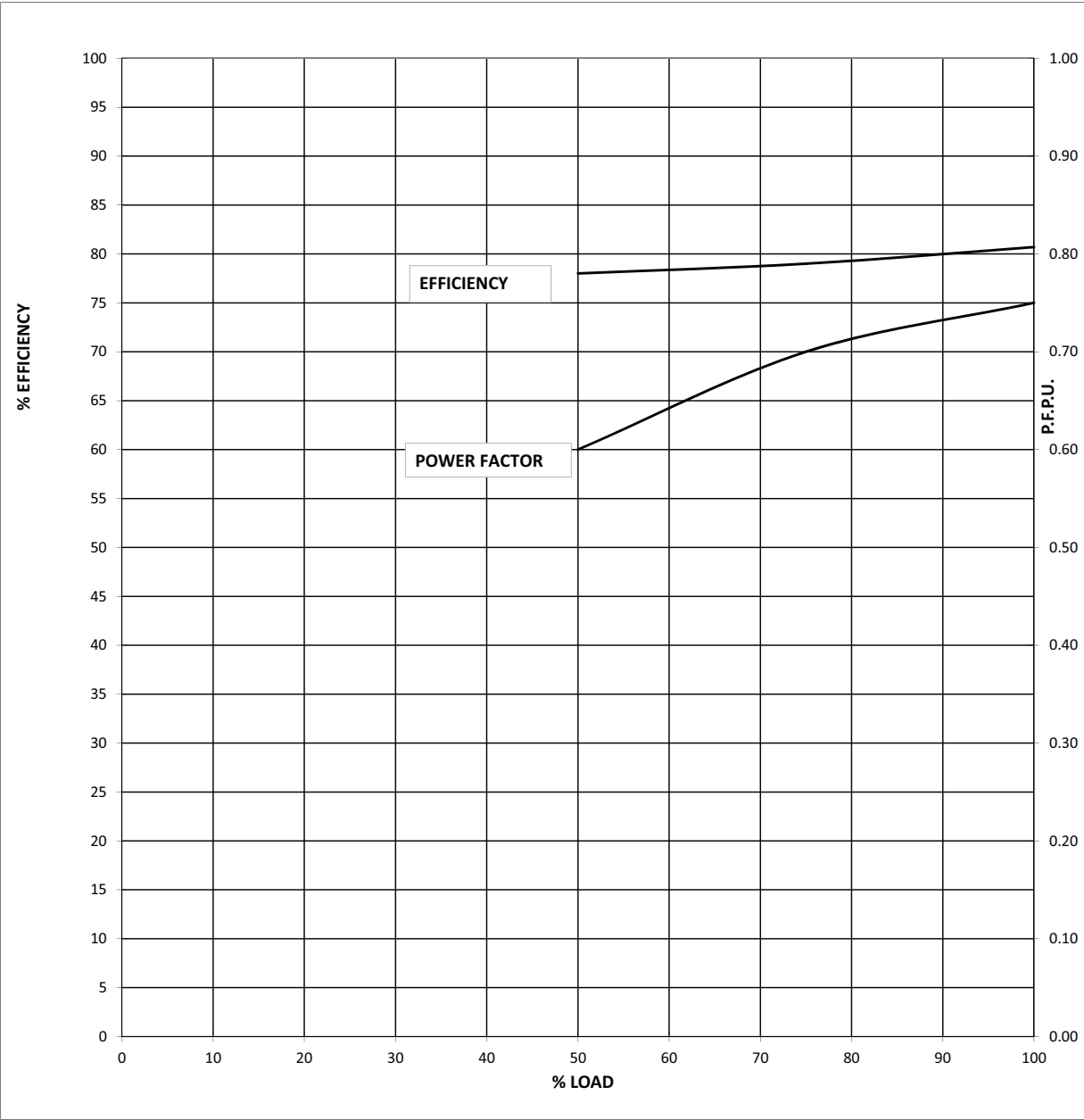
3) Insulation shall be VPI.

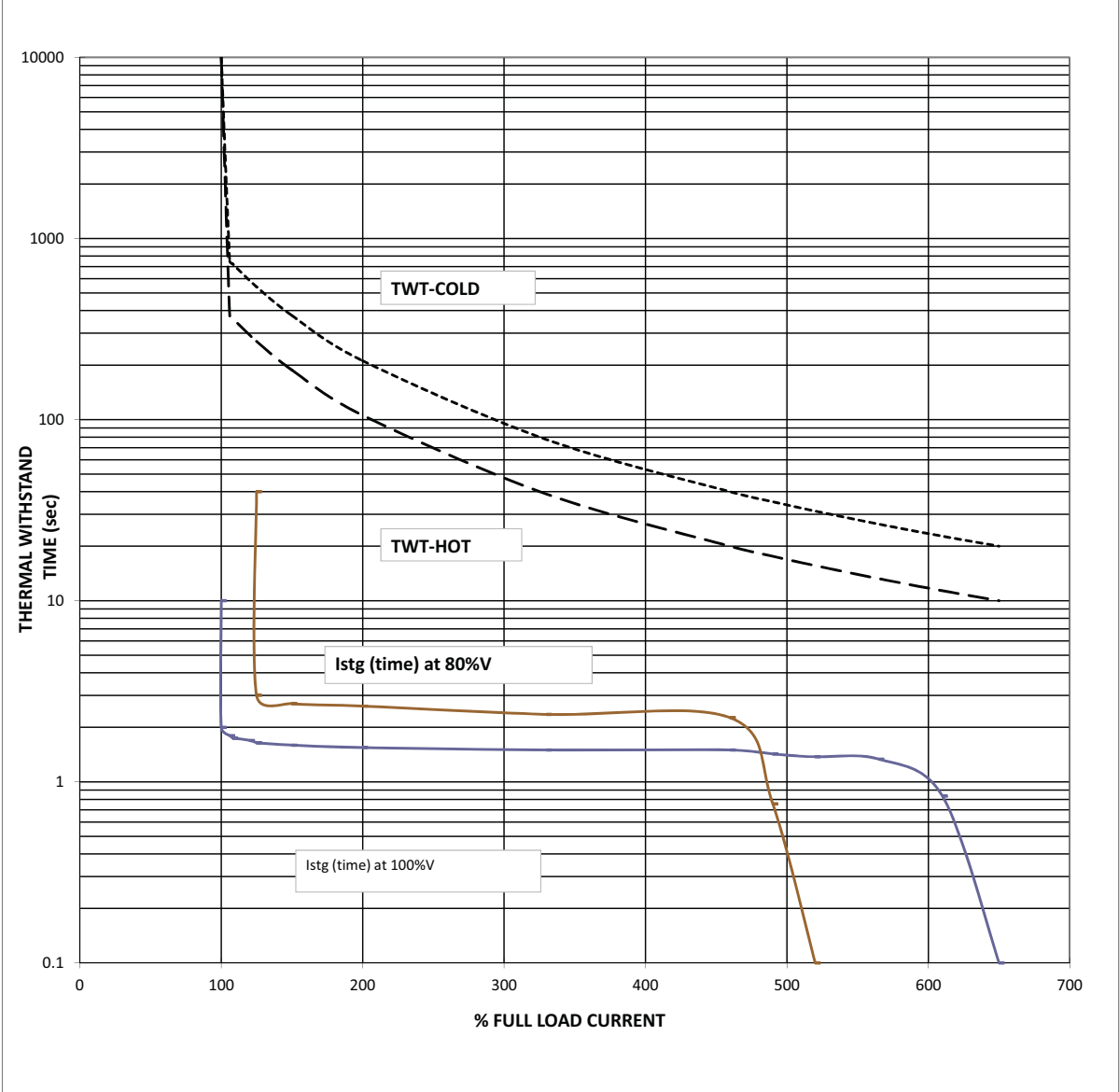
MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE		Lhp	
SPEED VS TORQUE & CURRENT CHARACTERISTICS									
INDENT NO. :		PO NO:		PO DATE:					
PROJECT NAME :									
kW : 0.75		POLE : 2		VOLTS : 415		QTY :		1	
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER. 2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1, 3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.									
				WDG NO					
2				GAD NO		Prepared By		SSG	
1				T BOX NO		Checked By		SNG	
NO		REVISION		SIGN		DATE		SIGN	
								DATE	

APPROVED
Checked and Approved

Date Mar

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract.

MKTG Ref No.:		D7HO2009026	LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
LOAD VS EFF. & P.F.						
INDENT NO. :		PO NO:		PO DATE:		
PROJECT NAME :						
kW : 0.75		POLE :	2	VOLTS :	415	QTY : 1
% EFFICIENCY  % LOAD						
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.						
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,						
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.						
		WDG NO				
2		GAD NO		Prepared By		SSG
1		T BOX NO		Checked By		SNG
NO	REVISION		SIGN	DATE	SIGN	DATE

MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
STARTING CURRENT VS STARTING TIME AND THERMAL WITHSTAND TIME.							
INDENT NO. :		PO NO:		PO DATE:		 	
PROJECT NAME :							
kW : 0.75		POLE : 2		VOLTS : 415		QTY : 1	
							
L. R.CURRENT at 100% voltage : 650 % OF FLA THERMAL WITHSTAND TIME(sec):							
Starting time at 100% voltage : 2 sec AT100% RATED VOLTAGE (HOT) : 10							
Starting time at 80% voltage : 3 sec AT100% RATED VOLTAGE (COLD): 20							
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.							
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,							
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.							
		WDG NO					
2		GAD NO		Prepared By		SSG	
1		T BOX NO		Checked By		SNG	
NO		REVISION		SIGN		DATE	

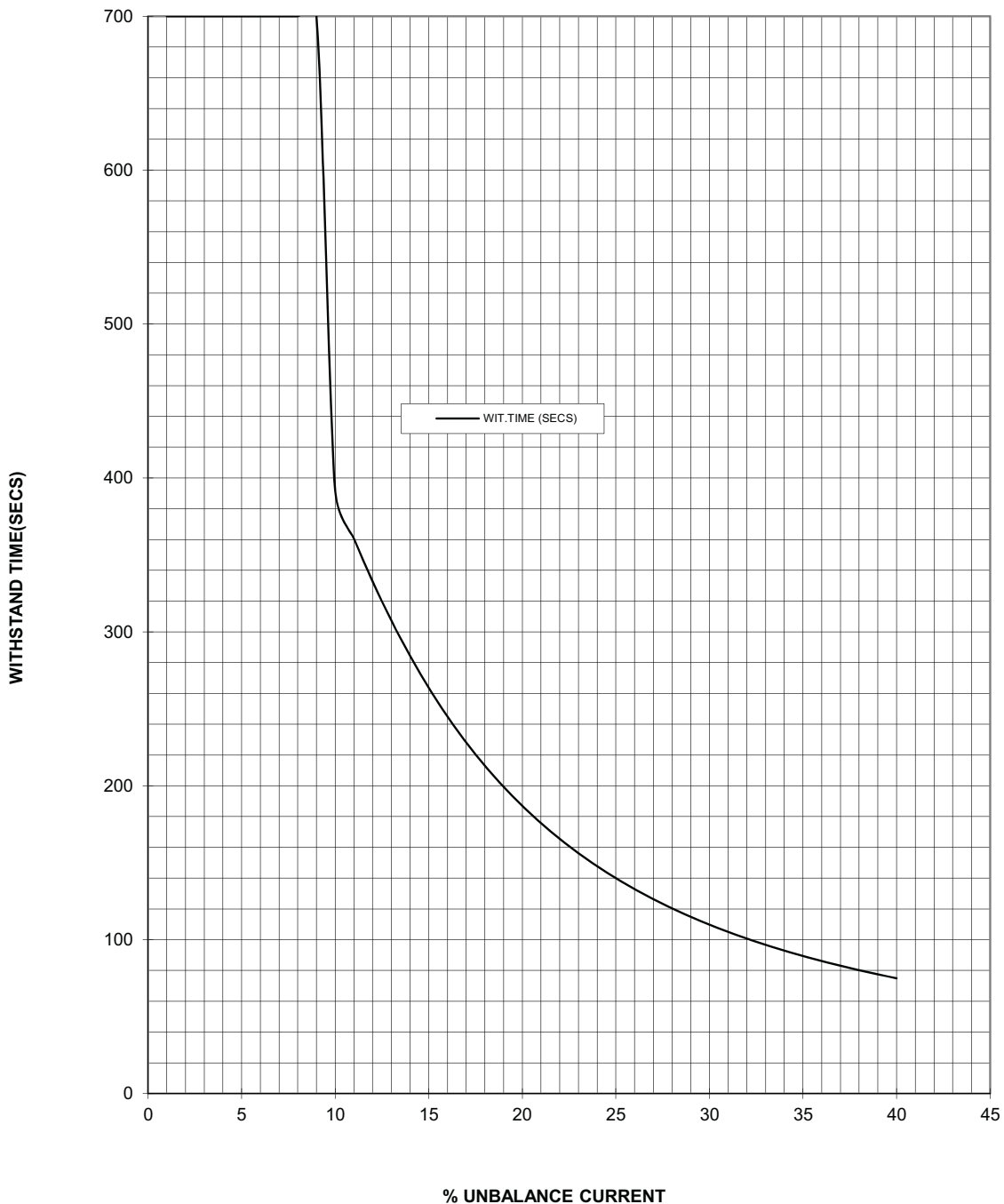
DRG. NO.- NEG.SEQ.



NEGATIVE SEQUENCE CHARACTERISTICS

CUSTOMER

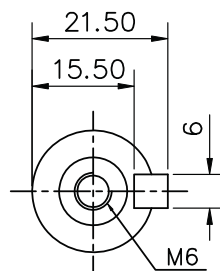
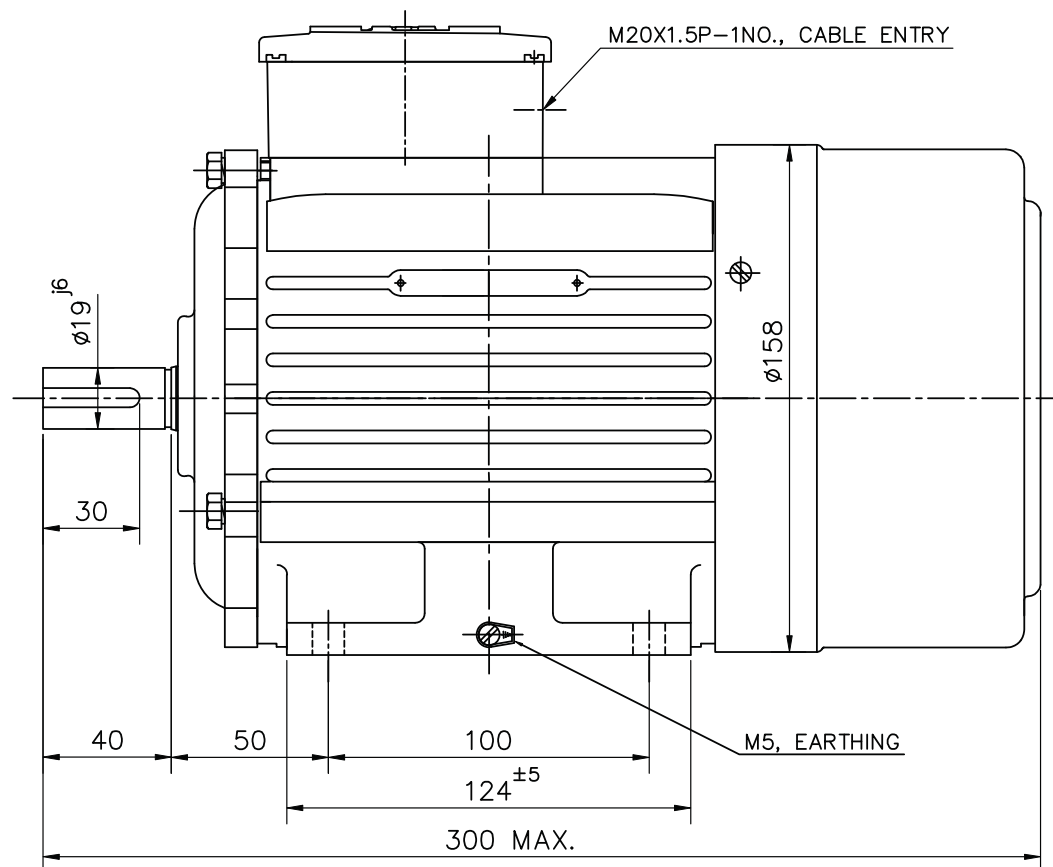
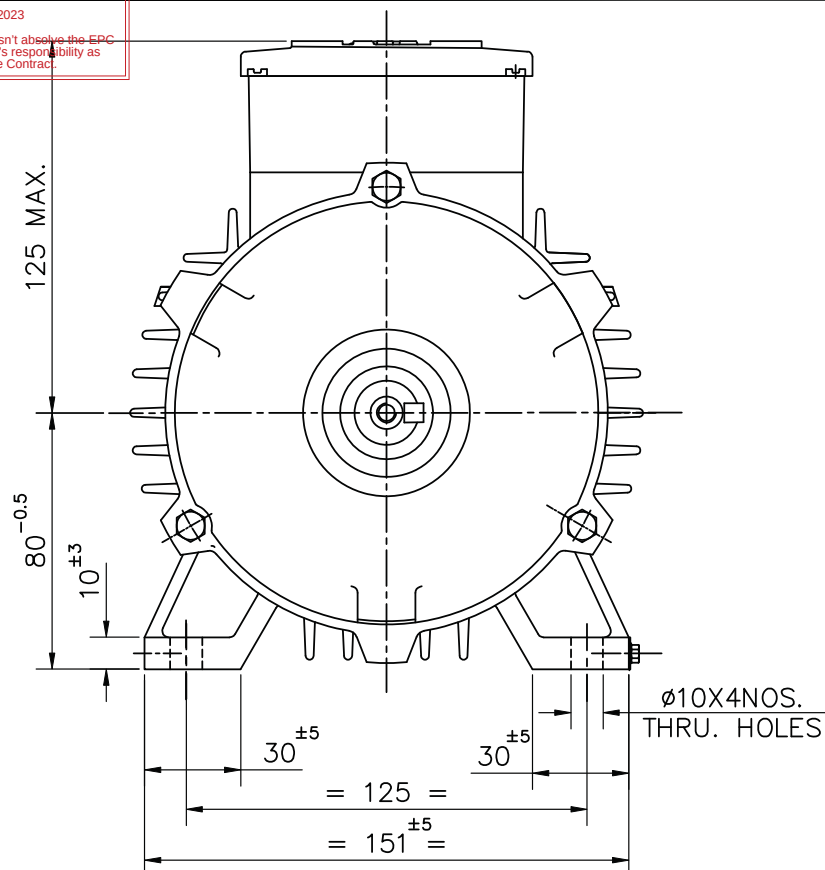
kW : 0.75 POLE : 2 VOLTS : 415 QTY : 1



2		PREP	SSG	9/7/2020
1		APPD	SNG	9/7/2020
NO	REVISION	SIGN/DATE		SIGN DATE

Date: 29-Mar-2023

*Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract.



SPECIFICATION:-

RATING	0.75KW/1.0HP	0.75KW/1.0HP
POLE	4 POLE	2 POLE
BEARING DE	6204 2Z	
BEARING NDE	6204 2Z/6203 2Z	

MATERIAL OF CONSTRUCTION:-

FRAME	CAST IRON
END COVER DE	CAST IRON
END COVER NDE	ALUMINUM
SHAFT	CARBON STEEL

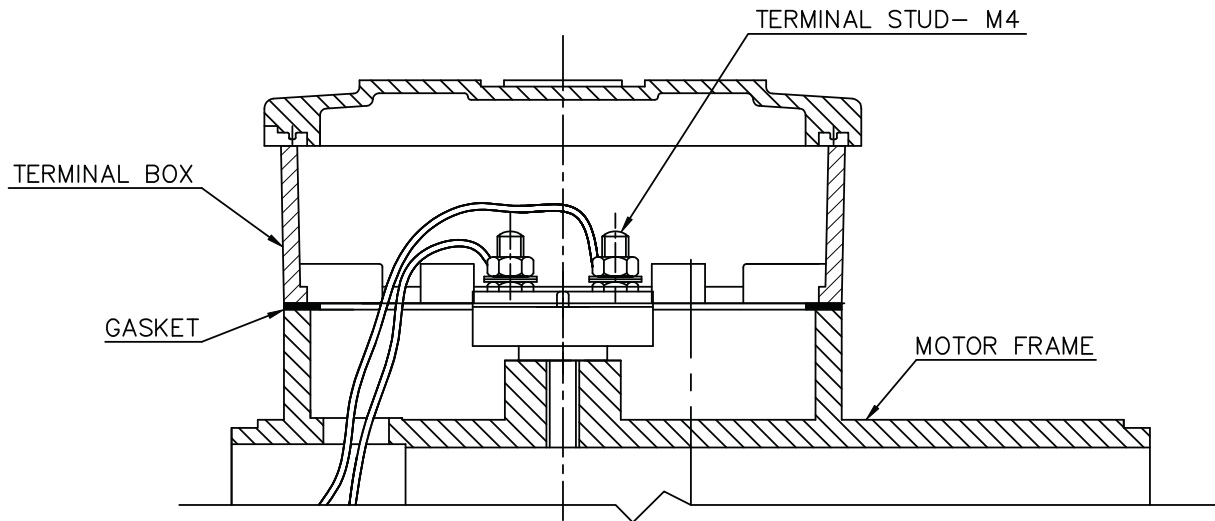
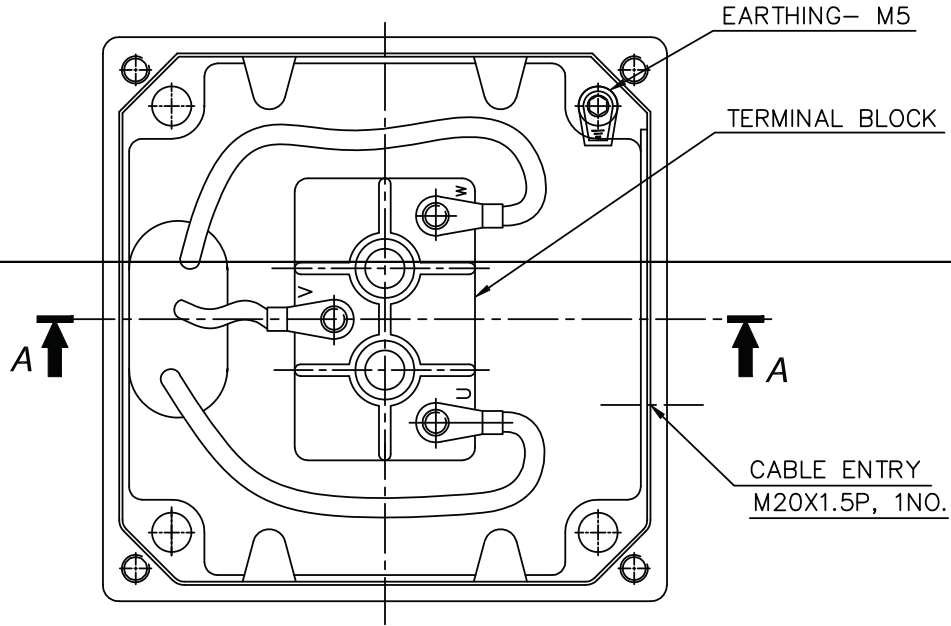
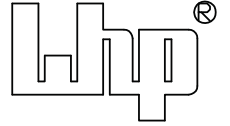
SHAFT END DETAIL

UNMENTIONED TOLERANCES ARE AS PER IS:2102-1/ ISO:2768-1	LINEAR DIMNS.	OVER & UPTO	0-53	3-6	6-30	30-120	120-400	400-1000	1000-2000		NAME	DATE	
		TOLERANCE	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	DGN			
	ANGULAR DIMNS.	PERMISSIBLE DEVIATIONS FOR LENGTHS OF THE SHORTER SIDE OF THE ANGLE											
		OVER & UPTO	0-10	10-50	50-120	120-400	400.....				DRN	POTDAR	15.09.2
		TOLERANCE	±1°	±0°30'	±0°20'	±0°10'	±0°5'				CHD		15.09.2
TITLE: <u>GENERAL ARRANGEMENT DRG. FOR</u> <u>80 FR. (B3) FOOT MOUNTED MOTOR</u>										APPD		15.09.2	
										SCALE: 1:1			
										SHEET:- 01 OF 03			
	Laxmi Hydraulics Pvt. Ltd.								DRG NO.				
	Website:- www.lhp.co.in								MGAN080A0259				
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM						DO NOT SCALE THE DRAWING				ISSUE NO. 01	REV. NO. 00		

LAXMI HYDRAULICS PVT. LTD, SOLAPUR

TERMINAL BOX ARRANGEMENT

FOR 80 FRAME



T. BOX ARRANGEMENT (SECTION A-A)

SHEET: - 02 OF 02

ISSUE.NO.- 01

REV.NO.- 00

DATE- 15.09.20

DRG.NO.- MGAN080A0259

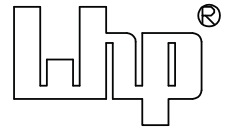
DRN.BY.- POTDAR

CHD.BY.-

APPD.BY.-

LAXMI HYDRAULICS PVT. LTD, SOLAPUR

NAMEPLATE DRAWING



IS: 12615		3 Ph. INDUCTION MOTOR			
CM/L-7500131009		IE MOTORS		IE3	
M/C.NO.		RPM:			
kW/HP:		FRM:			
V:		DUTY:		IP:	
Hz:		CONN.		A°C.	
AMP:		IN.CLS.		Ph.:	
EFF. IE3-		WT.:		Kg.	
COSØ:		REF.STD.: IS 12615 / IEC 60034-30			
MFD.BY: LAXMI HYDRAULICS PVT. LTD. SOLAPUR (INDIA) Website : www.lhp.co.in 047D19					

NOTE : -FOR DATA/SPECIFICATION IN NAMEPLATE REFER DATA SHEET/GAD.

SHEET: - 03 OF 03

ISSUE.NO.- 01

REV.NO.- 00

DATE- 15.09.20

DRG.NO.- MGAN080A0259

DRN.BY.- POTDAR

CHD.BY.-

APPD.BY.- GRM

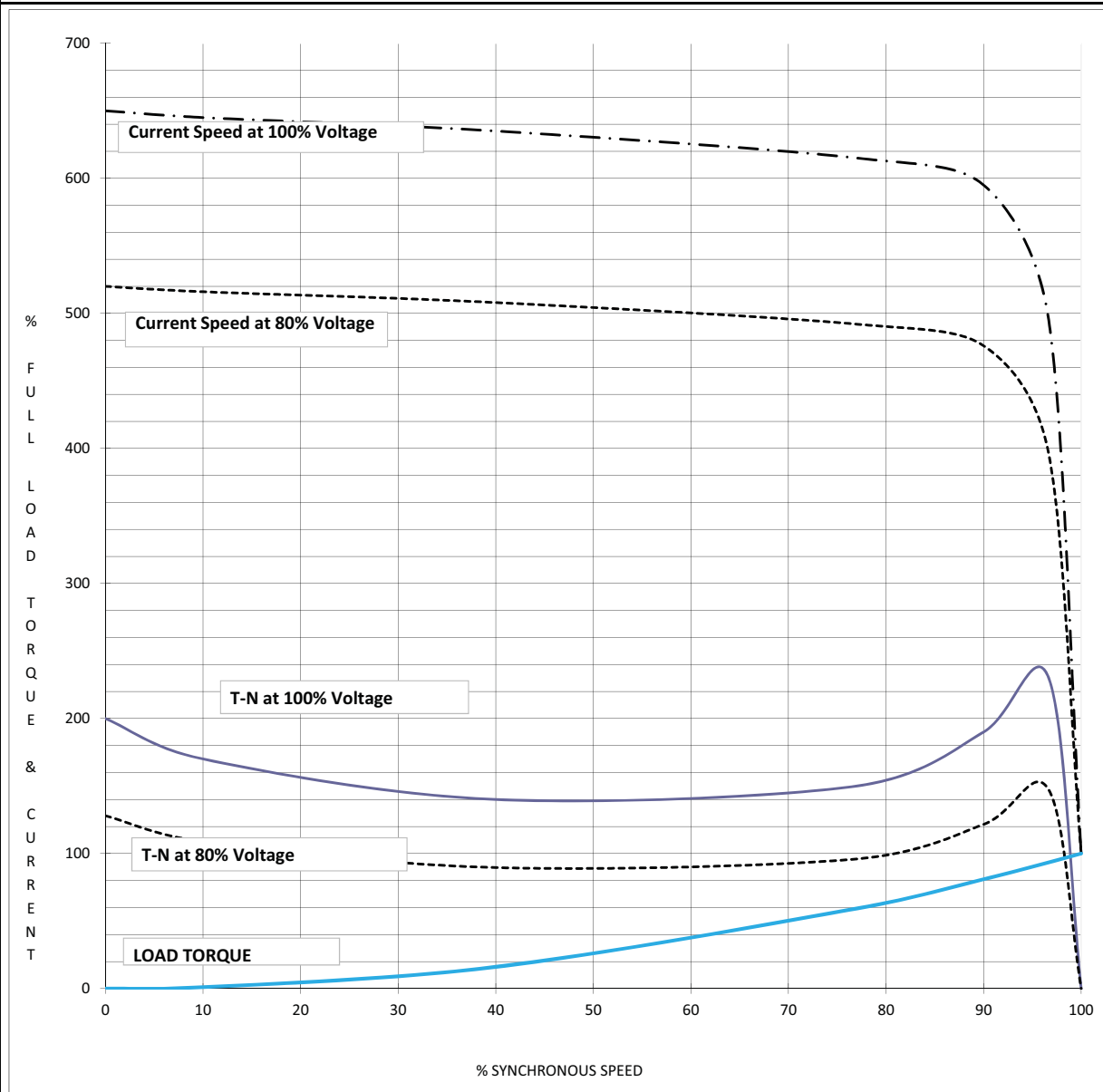
<u>DATASHEET</u>			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FANS	
1.1	Quantity	AS PER APPROVED BBU / FAN SCHEDULE	
2.0	Manufacturer	LHPL	
3.0	Type & Frame Size	Energy Efficient & Frame Size 80	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	1.1	
4.1	Rated Speed	2840	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm 10\%$; 50 Hz $\pm 5\%$;	
		10% absolute sum - 3 Phase	
6.0	Full load current	2.5	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	82.7	0.75
9.0	Efficiency & Power Factor at 75% Load	82	0.70
10.0	Efficiency & Power Factor at 50% Load	80	0.65
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	0.38	
13.0	Starting current (%)	650%	
14.0	No Load Current (With Mechanism Coupled)	1.2 A (Indicative)	
15.0	Starting torque in % of full load torque	0.75	
16.0	Pull up torque in % of full load torque	0.68	
17.0	Pull out torque in % of full load torque	0.87	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	10
		b) Cold	20
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	16
		b) Cold	31
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	8
		b) Cold	17
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	42/125	
26.0	Type & number of terminals broughtout	3 leads	
27.0	Stator winding connection	STAR	

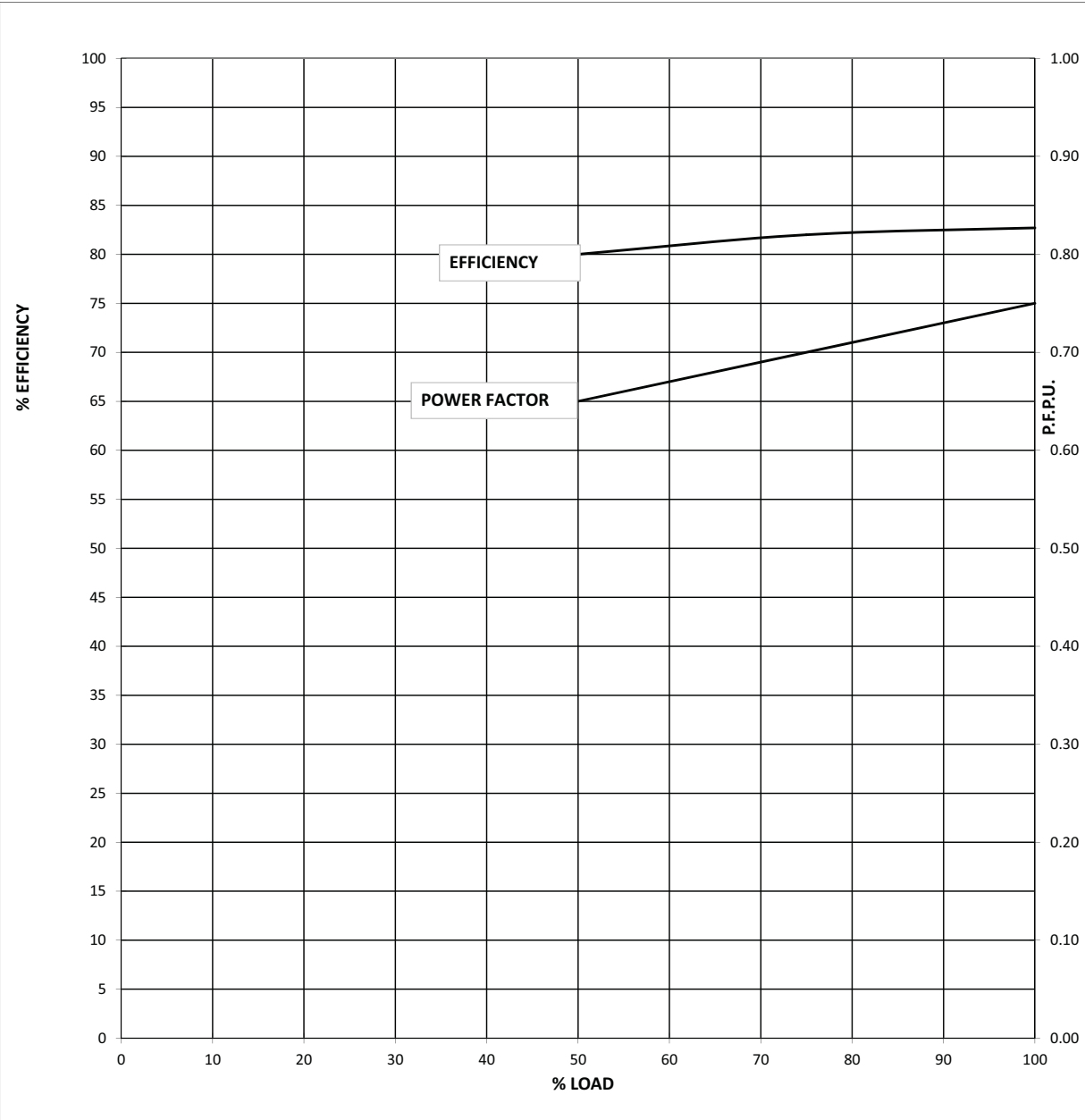
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	4.74 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kgm ²)	0.003	
42.0	Total weight of motor (kg)	12 KG APPROX	
43.0	Weight of stator (kg)	7 KG APPROX	
44.0	Weight of rotor (kg)	5 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	1.18	
51.0	Derated rating of motor at 50°C	1.1	
52.0	a) Locked Rotor KVA (Indicative)	11.5	
	b) Ratio of Locked rotor KVA / rated KW	10.5	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	1.4	
	b) Motor Static Load	12 KG	
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	
55	Noise Level	IEC 60034-9	

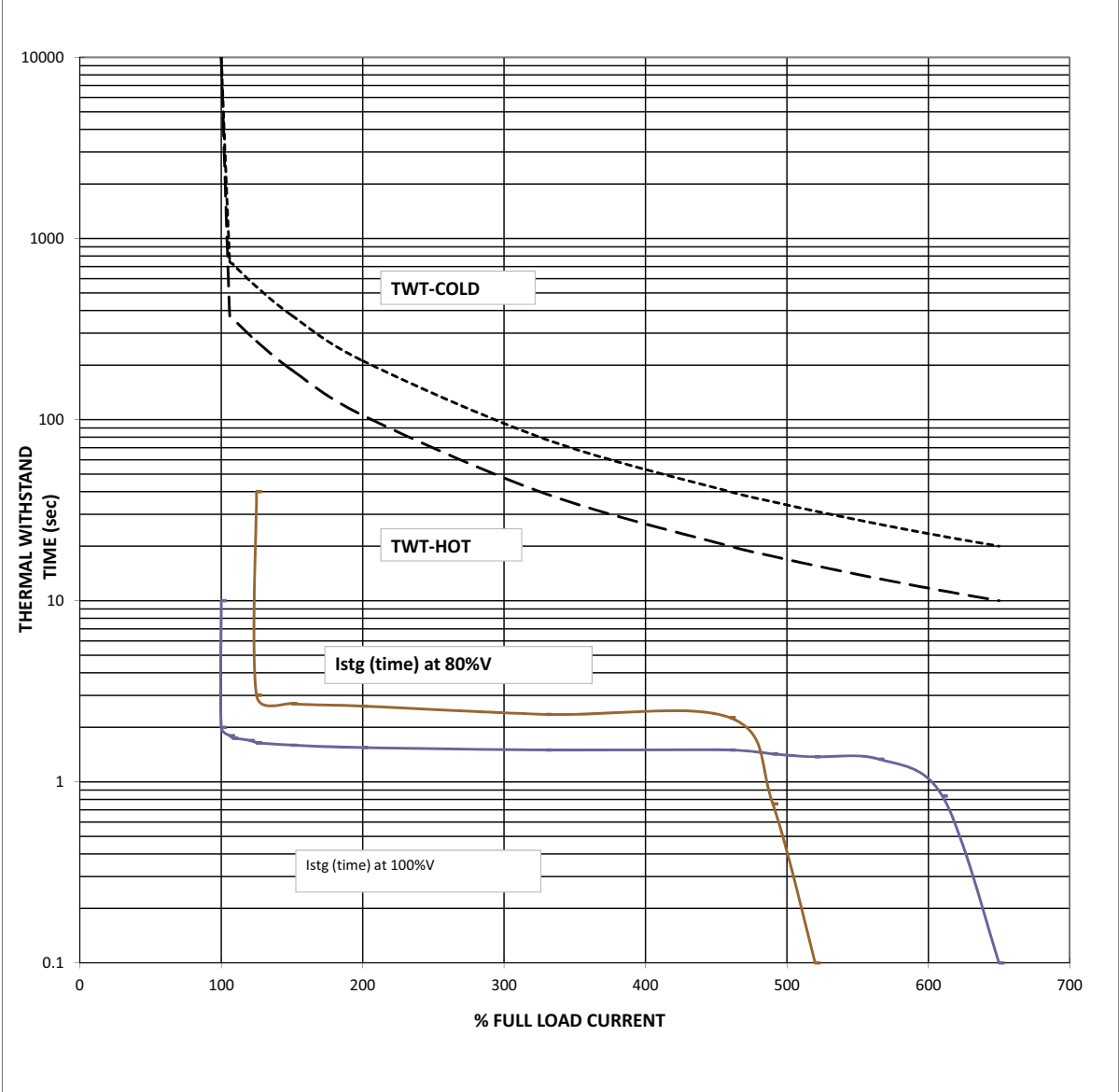
Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

3) Insulation shall be VPI.

MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE		Lhp	
SPEED VS TORQUE & CURRENT CHARACTERISTICS									
INDENT NO. :		PO NO:		PO DATE:					
PROJECT NAME :									
kW : 1.1		POLE : 2		VOLTS : 415		QTY : 1			
									
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.									
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,									
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.									
				WDG NO					
2				GAD NO		Prepared By		SSG 1/6/2021	
1				T BOX NO		Checked By		SNG 1/6/2021	
NO		REVISION		SIGN		DATE		SIGN DATE	

MKTG Ref No.:		D7HO2009026	LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
LOAD VS EFF. & P.F.						
INDENT NO. :		PO NO:		PO DATE:		
PROJECT NAME :						
kW : 1.1		POLE :	2	VOLTS :	415	QTY : 1
						
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.						
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,						
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.						
		WDG NO				
2		GAD NO		Prepared By		SSG
1		T BOX NO		Checked By		SNG
NO	REVISION		SIGN	DATE	SIGN	DATE

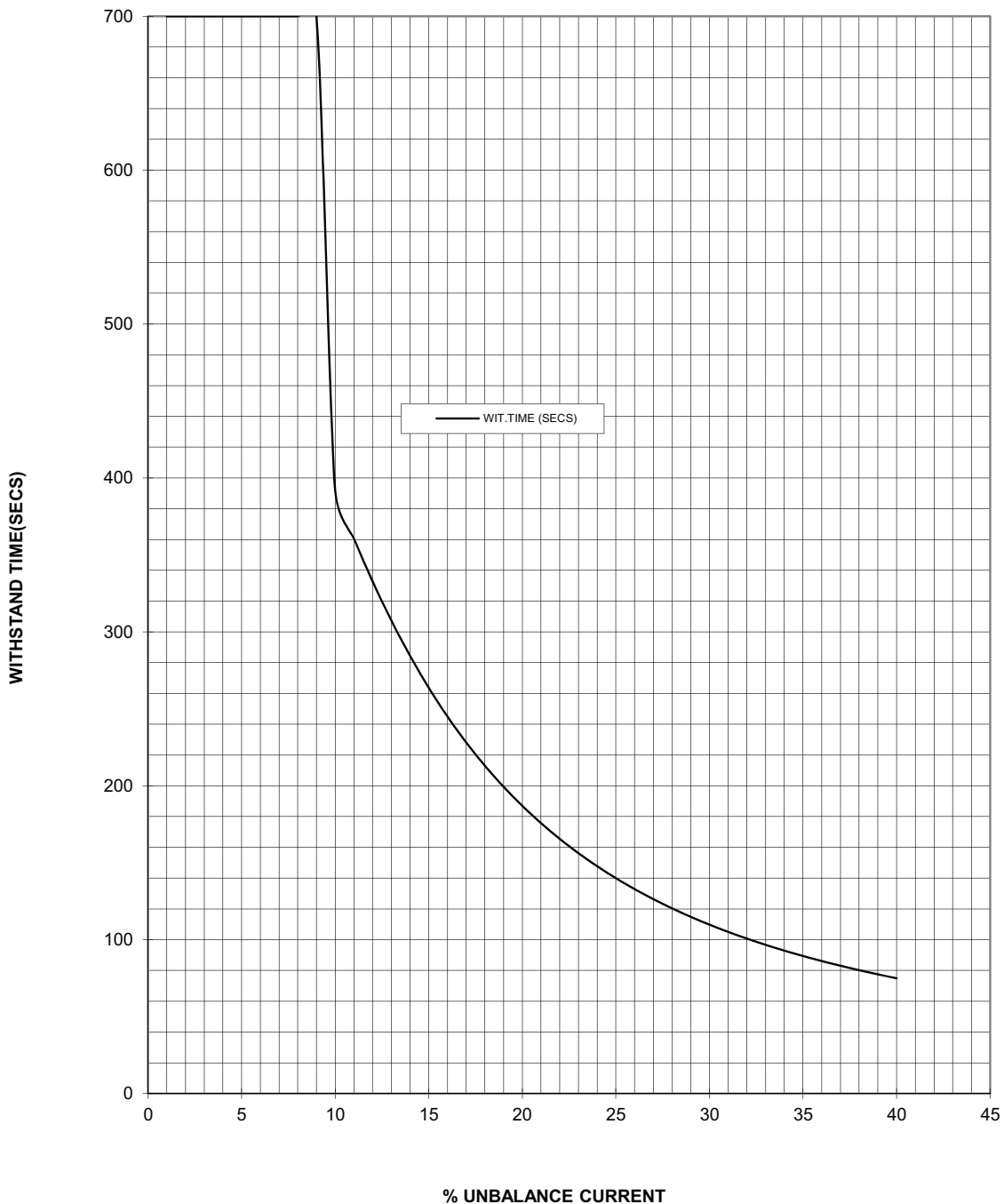
MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
STARTING CURRENT VS STARTING TIME AND THERMAL WITHSTAND TIME.							
INDENT NO. :		PO NO:		PO DATE:		 	
PROJECT NAME :							
kW : 1.1		POLE : 2		VOLTS : 415		QTY : 1	
							
L. R.CURRENT at 100% voltage : 650 % OF FLA THERMAL WITHSTAND TIME(sec):							
Starting time at 100% voltage : 2 sec AT100% RATED VOLTAGE (HOT) : 10							
Starting time at 80% voltage : 3 sec AT100% RATED VOLTAGE (COLD): 20							
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.							
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,							
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.							
		WDG NO					
2		GAD NO		Prepared By		SSG	
1		T BOX NO		Checked By		SNG	
NO		REVISION		SIGN		DATE	

DRG. NO.- NEG.SEQ.



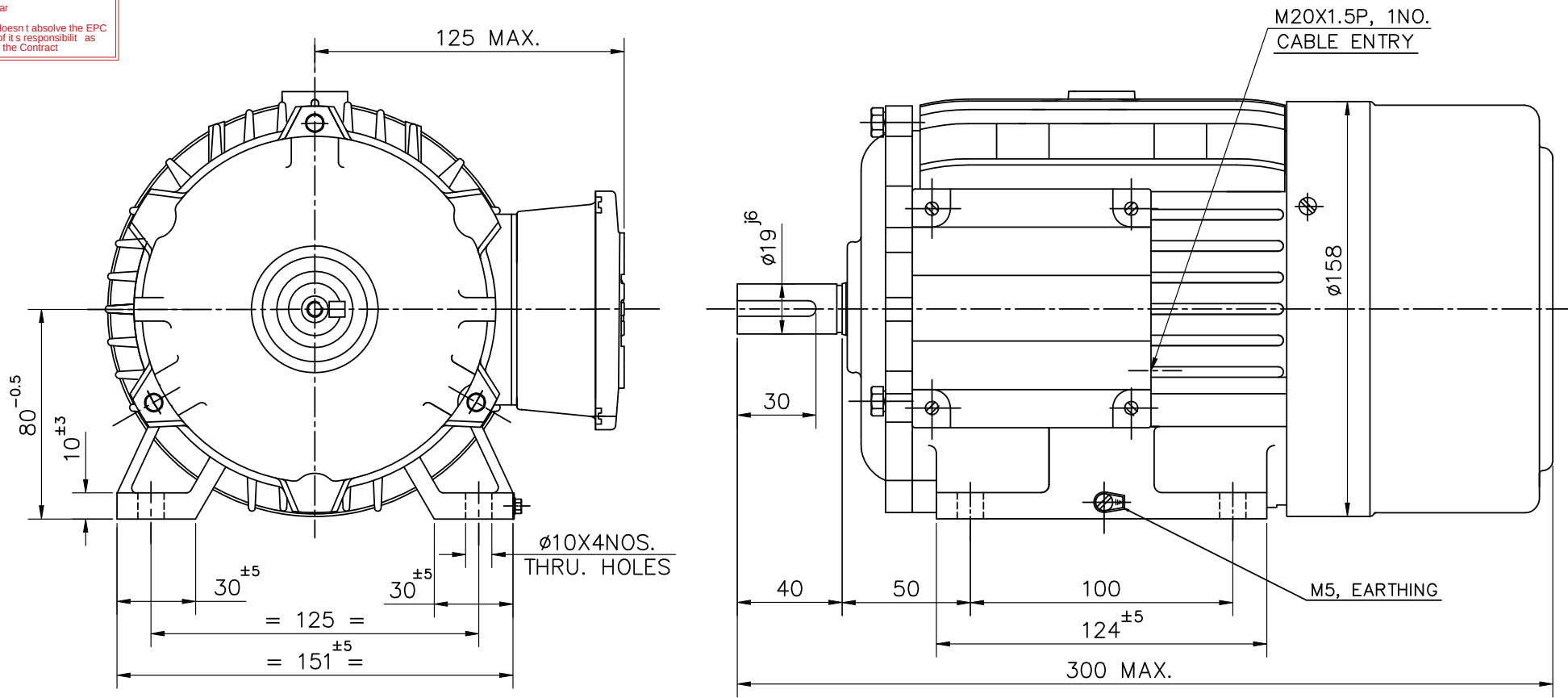
NEGATIVE SEQUENCE CHARACTERISTICS

kW : 1.1 POLE : 2 VOLTS : 415 QTY : 1



2		PREP	SSG	9/7/2020	
1		APPD	SNG	9/7/2020	
NO	REVISION	SIGN/DATE		SIGN	DATE

Approved doesn't absolve the EPC contractor of its responsibility as specified in the Contract

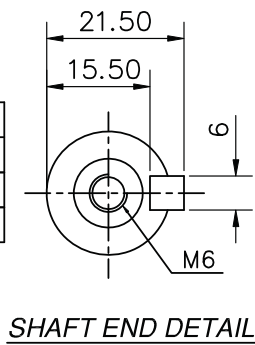


SPECIFICATION:-

RATING	0.55KW/0.75HP	0.55KW/0.75HP	1.1KW/1.5HP
POLE	6 POLE	4 POLE	2 POLE
BEARING DE	6204 2Z		
BEARING NDE	6204 2Z/6203 2Z		

MATERIAL OF CONSTRUCTION:-

FRAME	CAST IRON
END COVER (DE)	CAST IRON
END COVER (NDE)	ALUMINIUM
SHAFT	CARBON STEEL



UNMENTIONED TOLERANCES ARE AS PER IS:2102-1/ ISO:2768-1

LINEAR DIMNS.	OVER & UPTO	0.5-3	3-6	6-30	30-120	120-400	400-1000	1000-2000
	TOLERANCE	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3

ANGULAR DIMNS.

OVER & UPTO	0-10	10-50	50-120	120-400	400.....
TOLERANCE	±1°	±0°30'	±0°20'	±0°10'	±0°5'

TITLE: GENERAL ARRANGEMENT DRAWING FOR 80 FRAME (B3) FOOT MOUNTED MOTOR

LHP

Laxmi Hydraulics Pvt. Ltd.
Website:- www.lhp.co.in
SOLAPUR

DRG NO. 18
MGAN080A0258

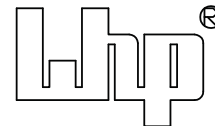
SCALE: 1:1
SHEET:- 01 OF 03
ISSUE NO. 01 REV. NO. 00

1	ECN DETAILS	DATE	INTL.
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UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM DO NOT SCALE THE DRAWING

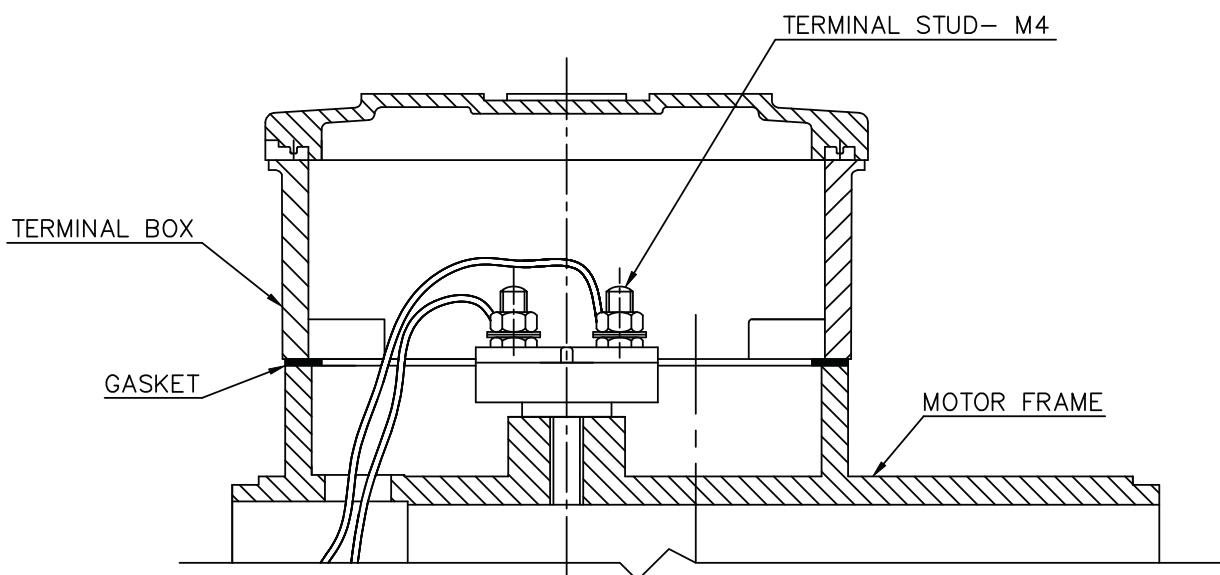
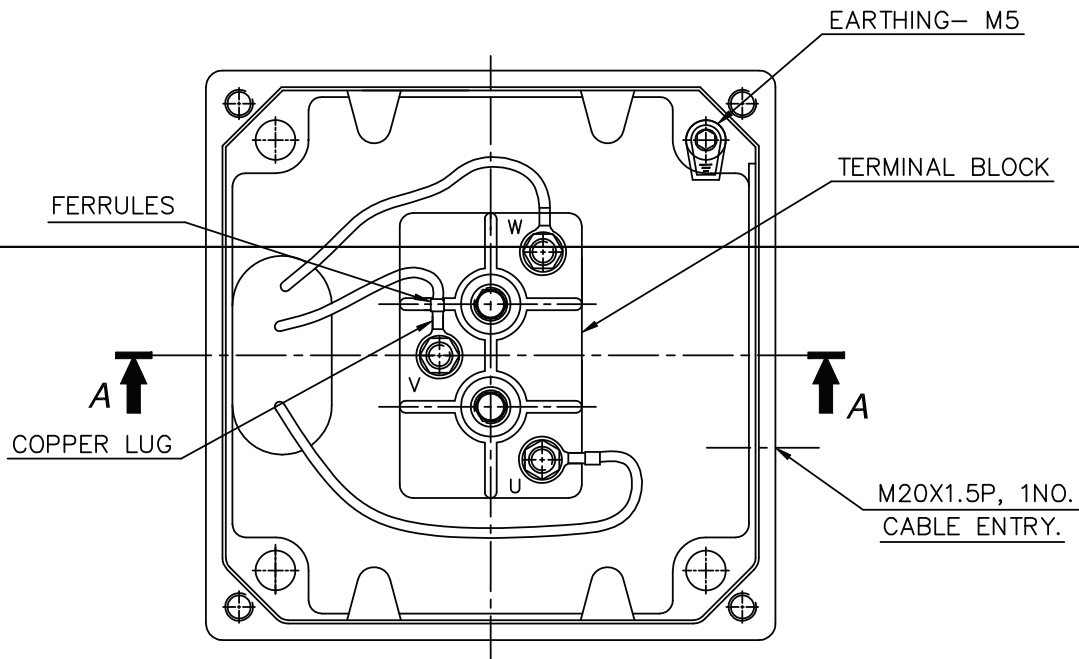
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LAXMI HYDRAULICS PVT. LTD, SOLAPUR



TERMINAL BOX ARRANGEMENT FOR 3 LEADS

FOR 80 FRAME



T. BOX ARRANGEMENT (SECTION A-A)

SHEET: - 02 OF 03

ISSUE.NO.- 01

REV.NO.- 00

DATE- 15.09.20

DRG.NO.- MGAN080A0258

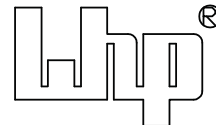
DRN.BY.- POTDAR

CHD.BY.-

APPD.BY.- GRM

LAXMI HYDRAULICS PVT. LTD, SOLAPUR

NAMEPLATE DRAWING



IS: 12615		3 Ph. INDUCTION MOTOR			
CM/L-7500131009		IE MOTORS		IE3	
M/C.NO.		RPM:			
KW/HP:		FRM:			
V:		DUTY:		IP:	
Hz:		CONN.		A°C.	
AMP:		IN.CLS.		Ph.:	
EFF.	IE3-			WT.:	Kg.
COSØ:		REF.STD.: IS 12615 / IEC 60034-30			
MFD.BY: LAXMI HYDRAULICS PVT. LTD. SOLAPUR (INDIA) Website : www.lhp.co.in 047D19					

NOTE : -FOR DATA/SPECIFICATION IN NAMEPLATE REFER DATA SHEET/GAD.

SHEET: - 03 OF 03

ISSUE.NO.- 01

REV.NO.- 00

DATE- 15.09.20

DRG.NO.- MGAN080A0258

DRN.BY.- POTDAR

CHD.BY.-

APPD.BY.- GRM

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FAN	
1.1	Quantity	As per BBU/approved Datasheet	
2.0	Manufacturer	HEM	
3.0	Type & Frame Size	Type Ref : 2HE3 073-0403 & Frame Size : 71	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	0.37	
4.1	Rated Speed	1420	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	1.0	
7.0	Energy Efficient	IE3	
8.0	Efficiency & Power Factor at Full Load	77.3%	0.67
9.0	Efficiency & Power Factor at 75% Load	77.3%	0.63
10.0	Efficiency & Power Factor at 50% Load	72%	0.50
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	0.25	
13.0	Starting current (%)	500%	
14.0	No Load Current (With Mechanism Coupled)	1 A (Approx.)	
15.0	Starting torque in % of full load torque	220%	
16.0	Pull up torque in % of full load torque	187%	
17.0	Pull out torque in % of full load torque	260%	
18.0	No load starting time (Without mechanism coupled)	< 1 sec.	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	8
		b) Cold	18
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	10
		b) Cold	23
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	7
		b) Cold	16
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)	
23.0	Starting time at rated voltage with		
	mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)	
24.0	Maximum permissible starting time	5	
25.0	Stator thermal time constant (Min)	45 min./120 min.	
26.0	Type & number of terminals broughtout	6 leads	
27.0	Stator winding connection	STAR	

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	22.61 Ohms (Approx.)	
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF & Deep Groove Ball Bearing	
	NDE:	SKF & Deep Groove Ball Bearing	
35.0	Lubricant quantity , grade & recommended	Prelubricated	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kgm ²)	0.0028	
42.0	Total weight of motor (kg)	12 KG (Approx.)	
43.0	Weight of stator (kg)	7 KG (Approx.)	
44.0	Weight of rotor (kg)	5 KG (Approx.)	
45.0	Anticipated bearing life in Hours	50000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	185°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016	
50.0	Standard continuous rating at 40°C ambient	0.38	
51.0	Derated rating of motor at 50°C	0.37	
52.0	a) Locked Rotor KVA (Indicative)	3.6	
	b) Ratio of Locked rotor KVA / rated KW	9.7	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	1.0	
	b) Motor Static Load	12 KG	
54.0	Paint Shade	RAL 6011	
55	Vibration Level	IS 12075	
55	Noise Level	IS 12065	

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.



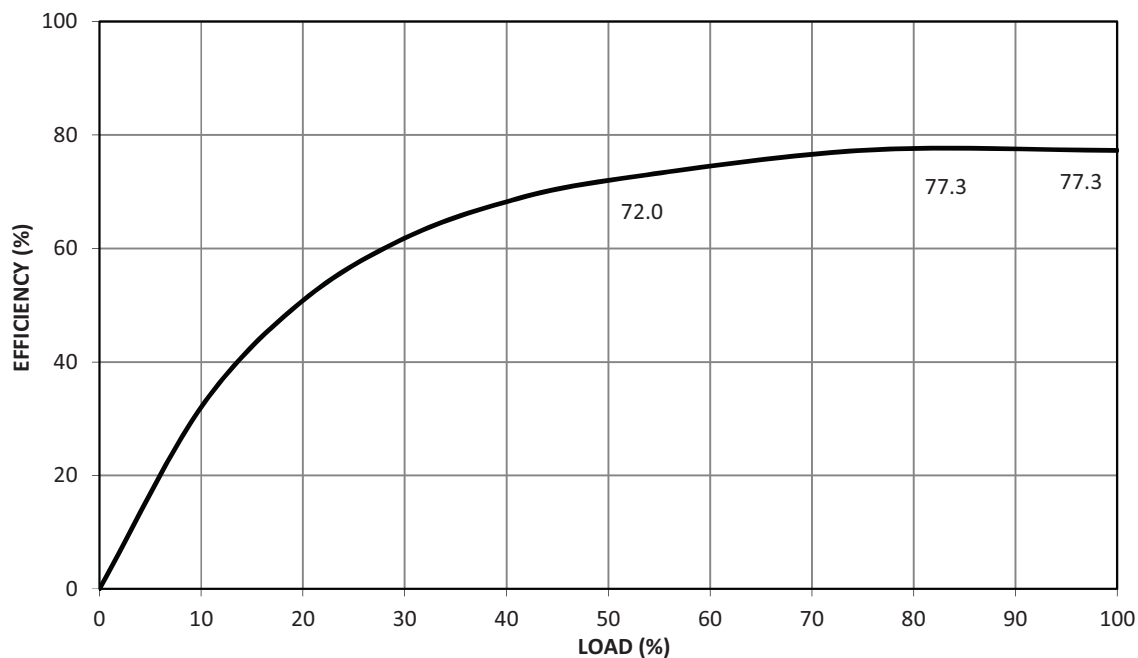
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.37/0.5

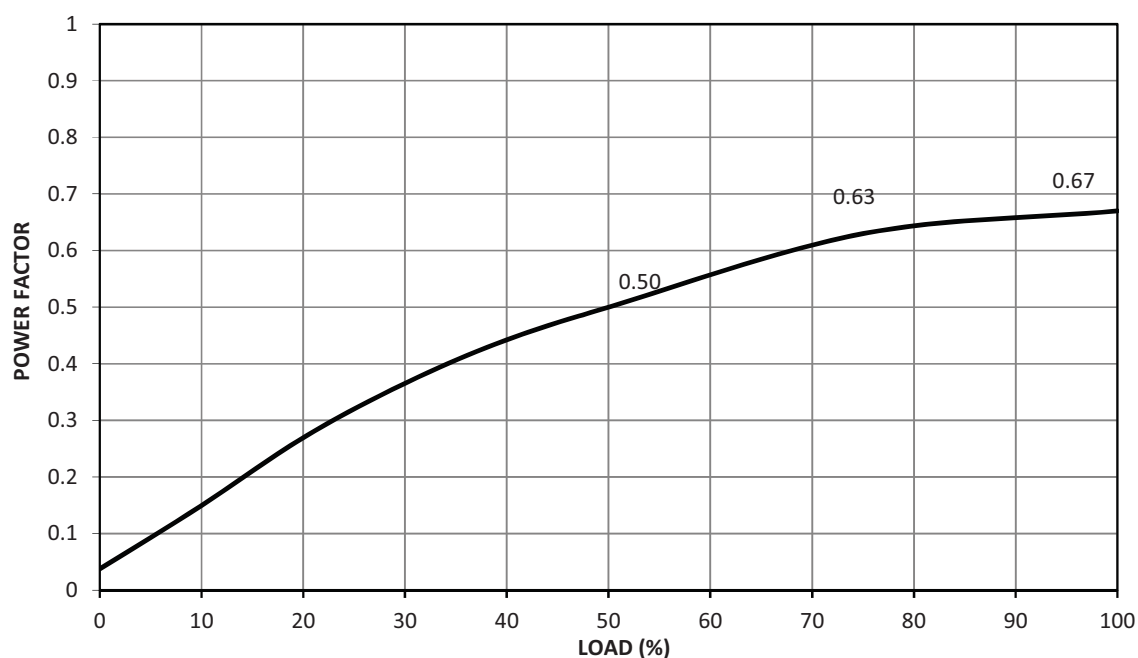
Poles : 4

Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

27/08/2020

Revision:

-



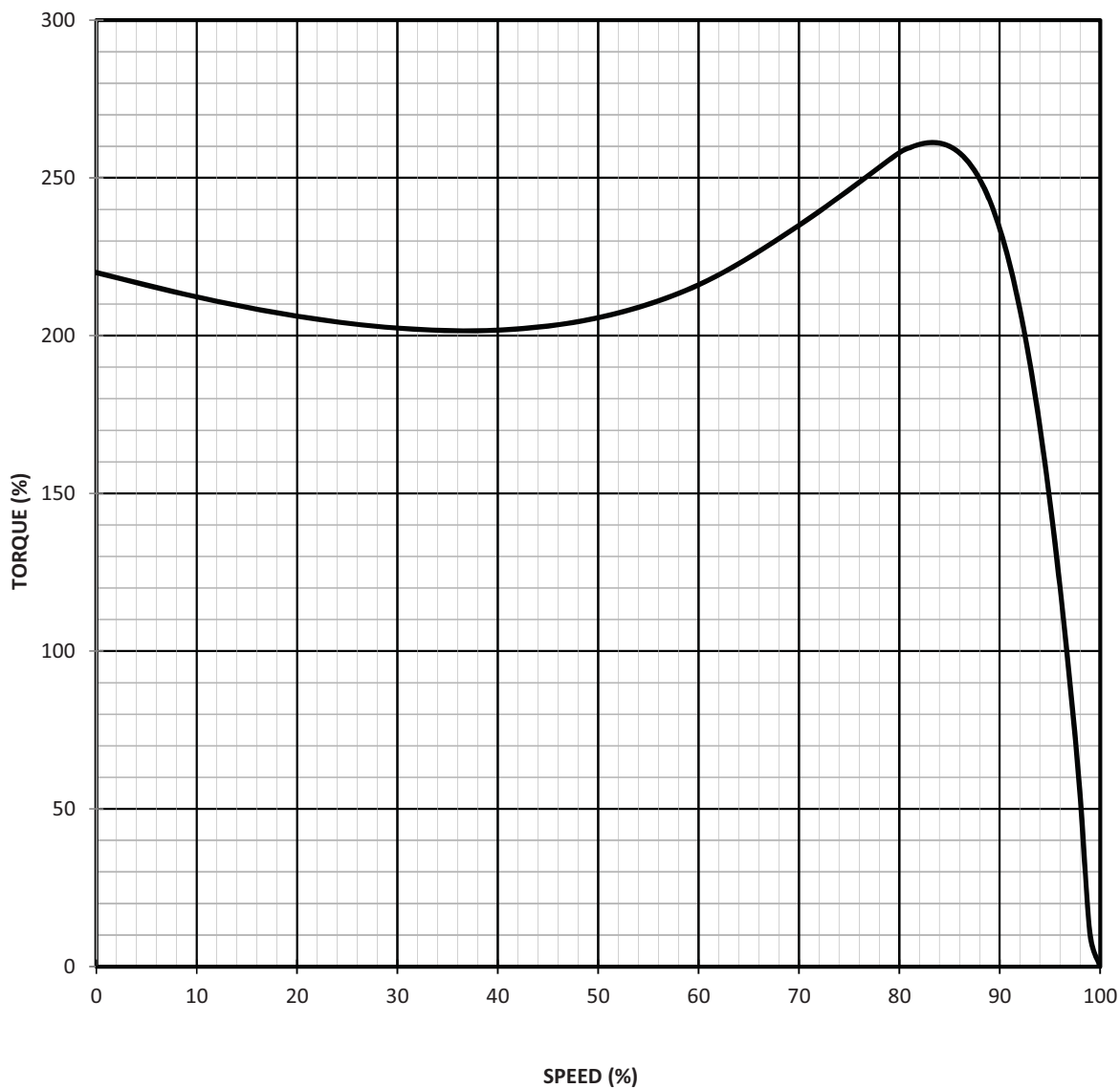
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.37/0.5

Poles : 4

Efficiency Class : IE3

TORQUE SPEED CURVE



Prep.: SK

Date: 27/08/2020

Revision: -



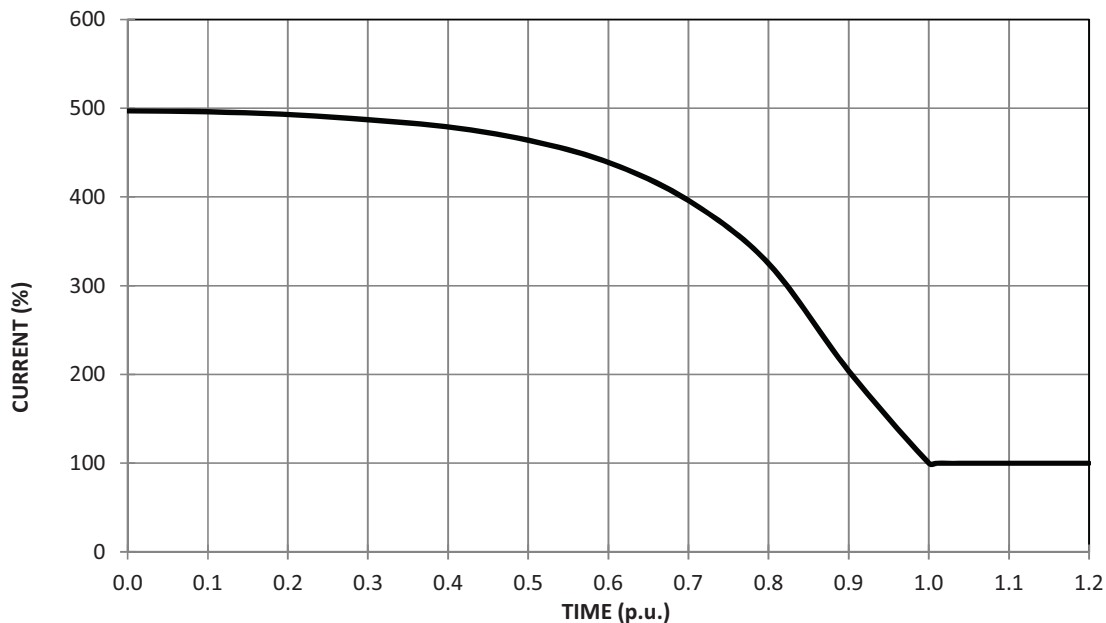
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.37/0.5

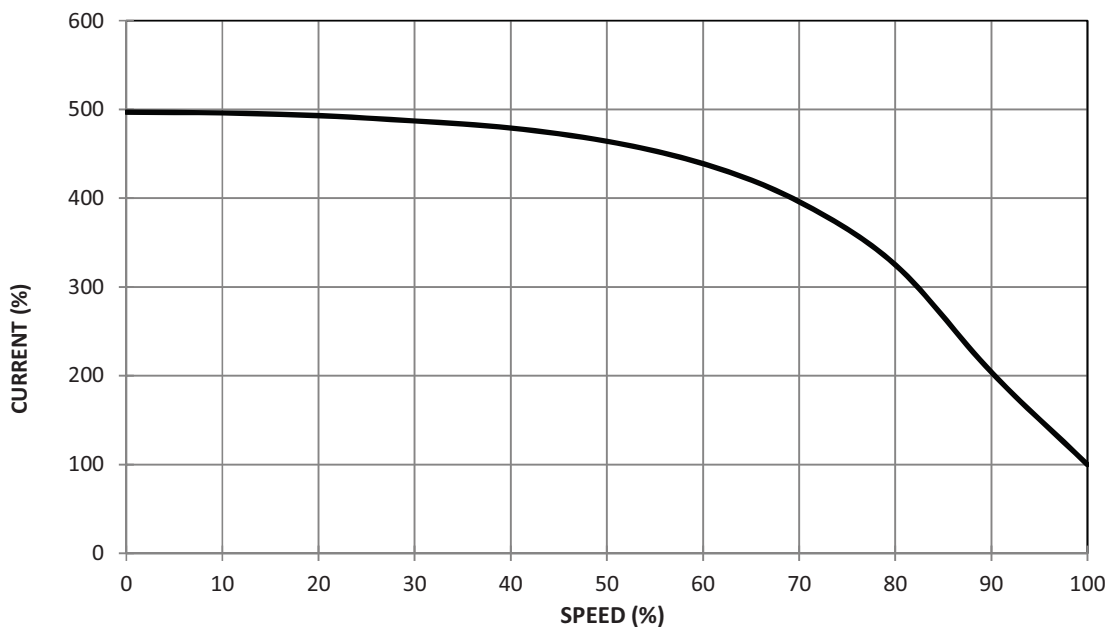
Poles : 4

Efficiency Class : IE3

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

27/08/2020

Revision:

-



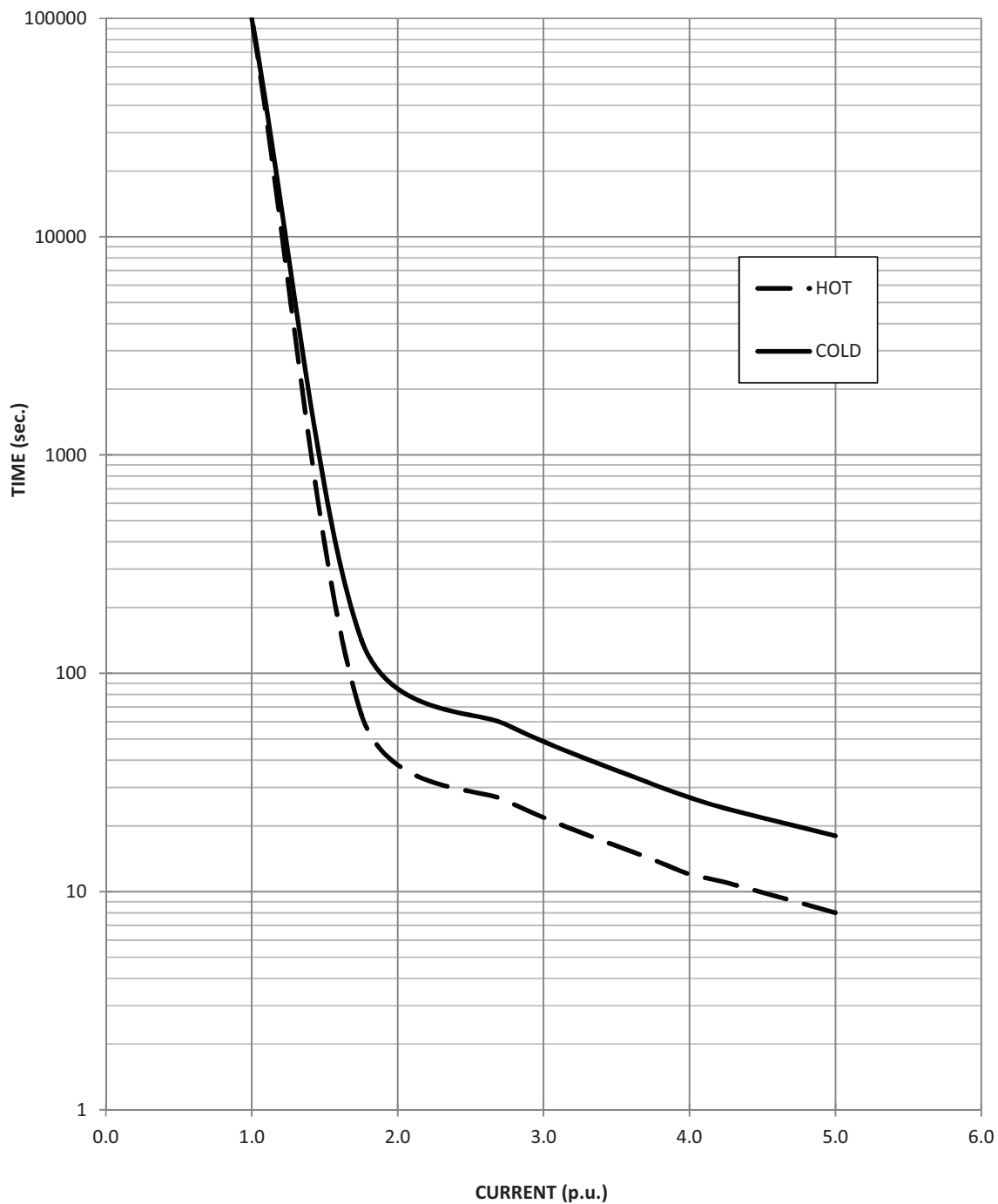
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.37/0.5

Poles : 4

Efficiency Class : IE3

THERMAL WITHSTAND CURVE

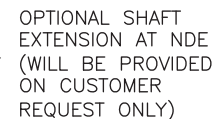
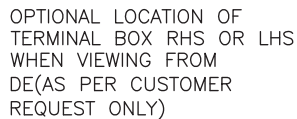


Prep.: SK

Date: 27/08/2020

Revision: 0

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



0.0
-0.030

5.0

0.0
-0.130

16.0

M5x12 DEEP

(ø14)

SHAFT EXTENSION DETAILS
DE SIDE

0.0
-0.030

4.0

0.0
-0.130

12.5

M4x10 DEEP

(ø11)

SHAFT EXTENSION DETAILS
NDE SIDE

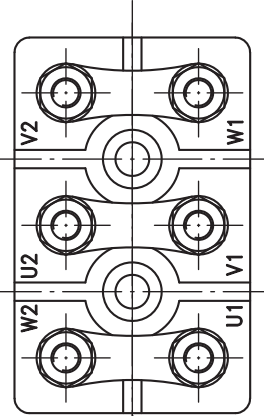
Dim. w as per
All dim unless
NO MACH
ROUGH M
SMOOTH
FINE MACH
POLISH/

Dim. without tolerance as per IS:2102, very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

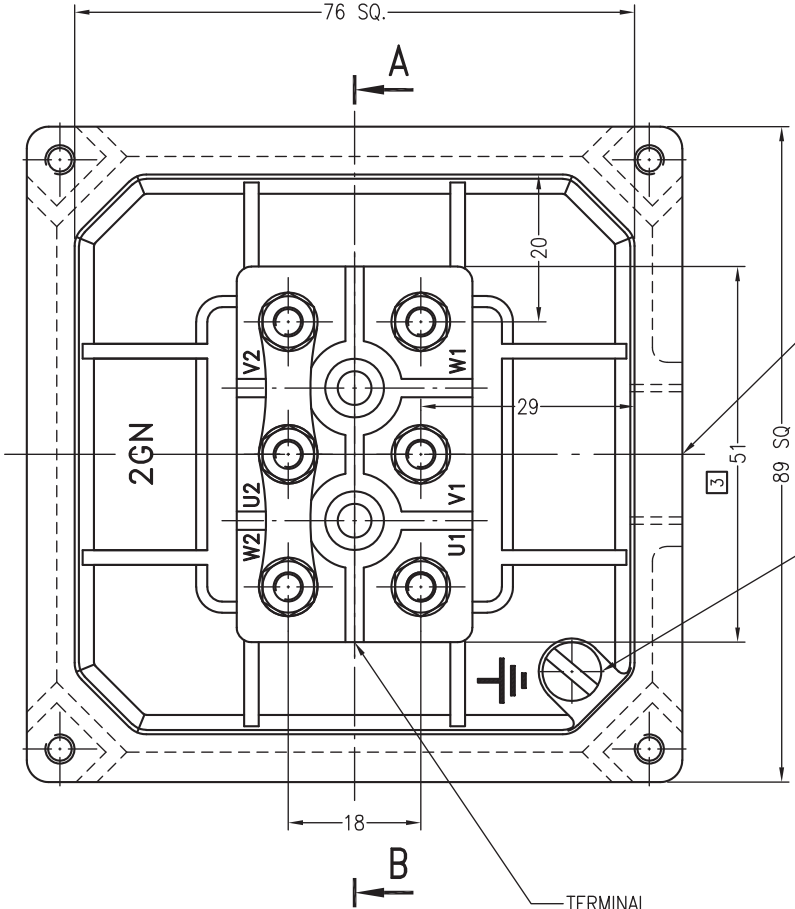
REV. STATUS	[3]	NDE SIDE SHAFT EXTN. DIA.11x23LG. WAS DIA.14x30LG. & DIMS 238, 265 WAS 240, 272 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE & TYPE DESIGNATION TABLE ADDED , TO UPLOAD THIS DRG. ON PORTAL			ARUN	28-08-19
	[2]	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES, DIMNS. 115, 186 WERE 105, 176. M4 WAS M5 EARTHING SCREW.			NIMKAR	16/11/13
			TITLE OVERALL DIMENSION DRAWING B3/STD. TEFC MOTOR			SCALE NTS
						SHT 1/1
	NAME	DATE	PROJECTION	DRG. NO.:	REV.	FRAME SIZE
DRN.	P.V.SHINDE	19/04/05		A1-71-49(GN)	3	71 (GN)
CHD.	S.P.JADIA	19/04/05				
APPD.	S.P.JADIA	19/04/05		REF. A1-71-OADIMNS-B3		

APPROVED
Checked and Approved

Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

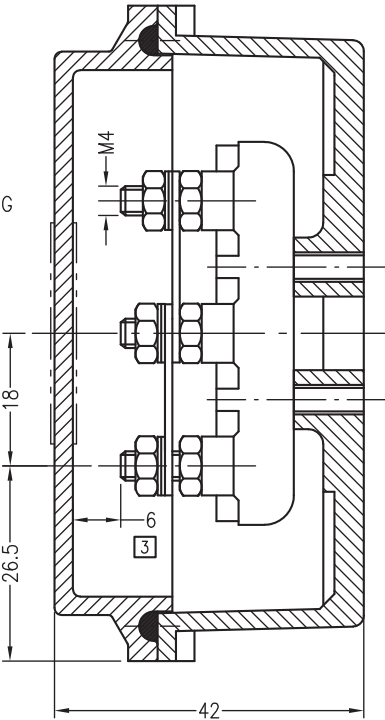


TERMINAL
BLOCK
OF DELTA
CONNECTED
MOTOR



TERMINAL
BLOCK
OF STAR
CONNECTED
MOTOR

Section AB



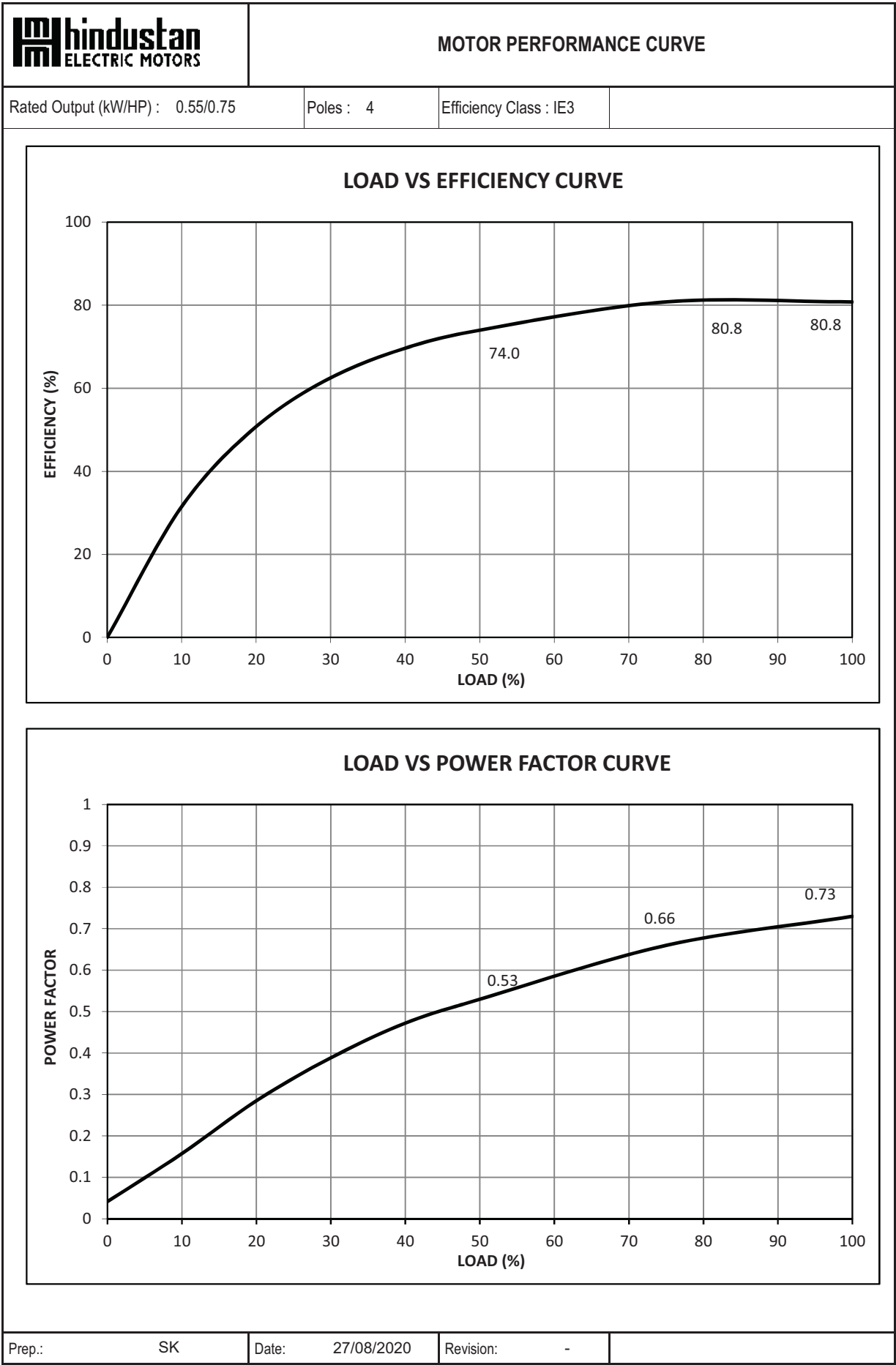
Dim. without tolerance as per IS:2102 very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS	3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5			NIMKAR	01/10/16
	2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.			NIMKAR	11/11/14
		TITLE		STD. TERMINAL BOX ASSEMBLY		
		NAME		PROJECTION	DRG. NO.:	REV.
		GANESH		16-07-11	A4-80/90-33(GN)	3
		DATE		REF.: TB-ASLY-63-90	SCALE NTS	
		APPD.			SHT 1/1	
					FRAME SIZE	
					63-90	
					(GN)	

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FAN	
1.1	Quantity	As per BBU/approved Datasheet	
2.0	Manufacturer	HEM	
3.0	Type & Frame Size	Type Ref : 2HE3 080-0403 & Frame Size : 80	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	0.55	
4.1	Rated Speed	1430	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	1.3	
7.0	Energy Efficient	IE3	
8.0	Efficiency & Power Factor at Full Load	80.8%	0.73
9.0	Efficiency & Power Factor at 75% Load	80.8%	0.66
10.0	Efficiency & Power Factor at 50% Load	74%	0.53
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	0.37	
13.0	Starting current (%)	600%	
14.0	No Load Current (With Mechanism Coupled)	1 A (Approx.)	
15.0	Starting torque in % of full load torque	220%	
16.0	Pull up torque in % of full load torque	187%	
17.0	Pull out torque in % of full load torque	260%	
18.0	No load starting time (Without mechanism coupled)	< 1 sec.	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	6
		b) Cold	14
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	8
		b) Cold	18
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	5
		b) Cold	13
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)	
23.0	Starting time at rated voltage with		
	mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)	
24.0	Maximum permissible starting time	3	
25.0	Stator thermal time constant (Min)	45 min./120 min.	
26.0	Type & number of terminals broughtout	6 leads	
27.0	Stator winding connection	STAR	

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)
30.0	Resistance per phase (indicative) at 20°C	13.3 Ohms (Approx.)
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold
32.0	Quantity and power consumption of space heater	NA
33.0	Direction of rotation	Bi - Directional
34.0	Bearing make & type	
	DE:	SKF & Deep Groove Ball Bearing
	NDE:	SKF & Deep Groove Ball Bearing
35.0	Lubricant quantity , grade & recommended	Prelubricated
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL
	Terminal Box	
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°
38.0	Gland size for stator winding	AS PER GAD
39.0	Gland size for space heater	NA
40.0	Cable entry	NA
41.0	GD ² (of motor (Kgm ²)	0.0049
42.0	Total weight of motor (kg)	16 KG (Approx.)
43.0	Weight of stator (kg)	9 KG (Approx.)
44.0	Weight of rotor (kg)	7 KG (Approx.)
45.0	Anticipated bearing life in Hours	50000 HOURS
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING
47.0	Limiting rotor temperature for determining	
	safe stall time	185°C
48.0	Thermistor for winding / Bearing	NA
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016
50.0	Standard continuous rating at 40°C ambient	0.57
51.0	Derated rating of motor at 50°C	0.55
52.0	a) Locked Rotor KVA (Indicative)	5.6
	b) Ratio of Locked rotor KVA / rated KW	10.2
53.0	a) Motor Dynamic Load Radial / Axial (kg)	1.4
	b) Motor Static Load	16 KG
54.0	Paint Shade	RAL 6011
55	Vibration Level	IS 12075
55	Noise Level	IS 12065

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.





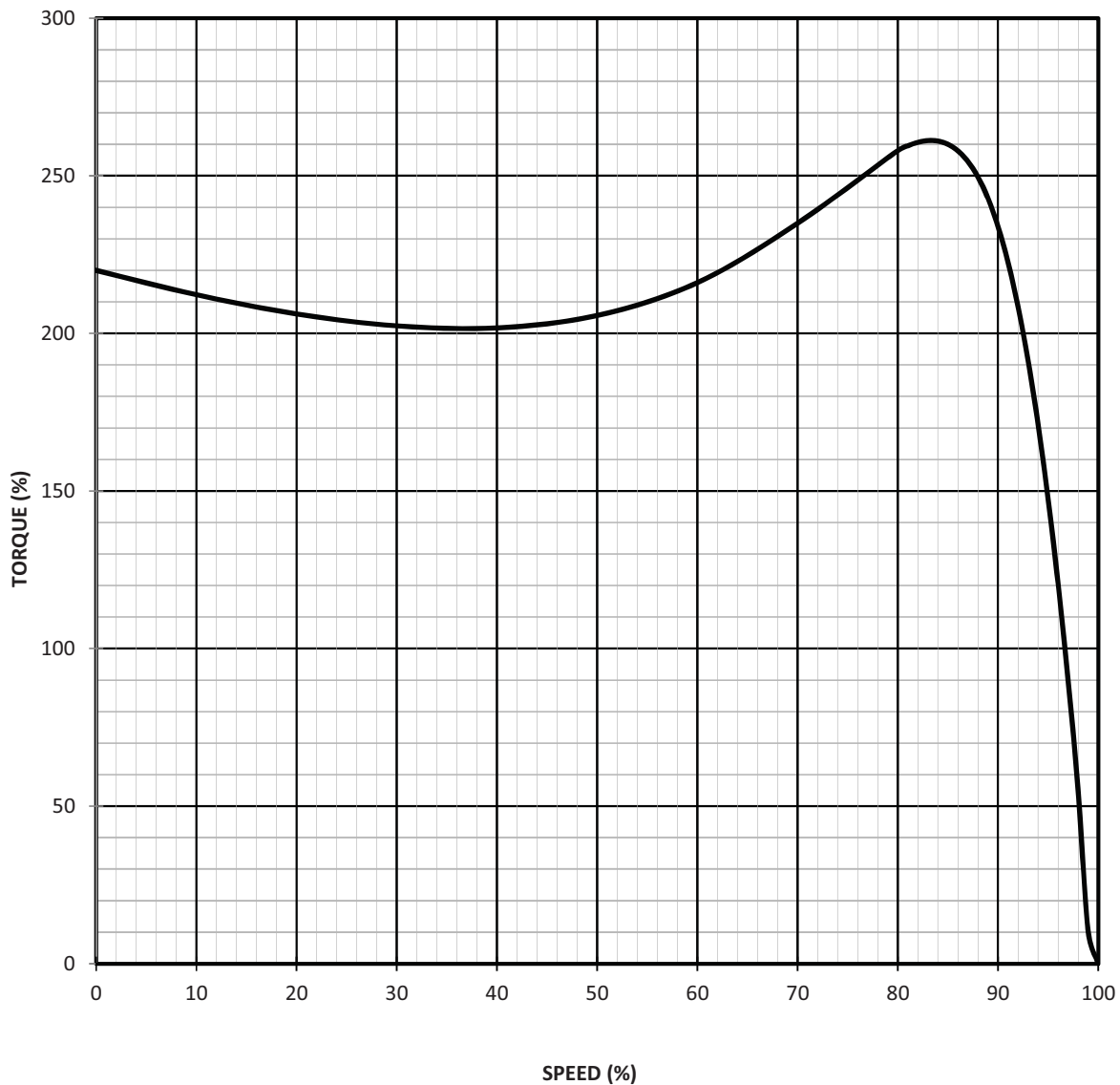
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75

Poles : 4

Efficiency Class : IE3

TORQUE SPEED CURVE



Prep.: SK

Date: 27/08/2020

Revision: -



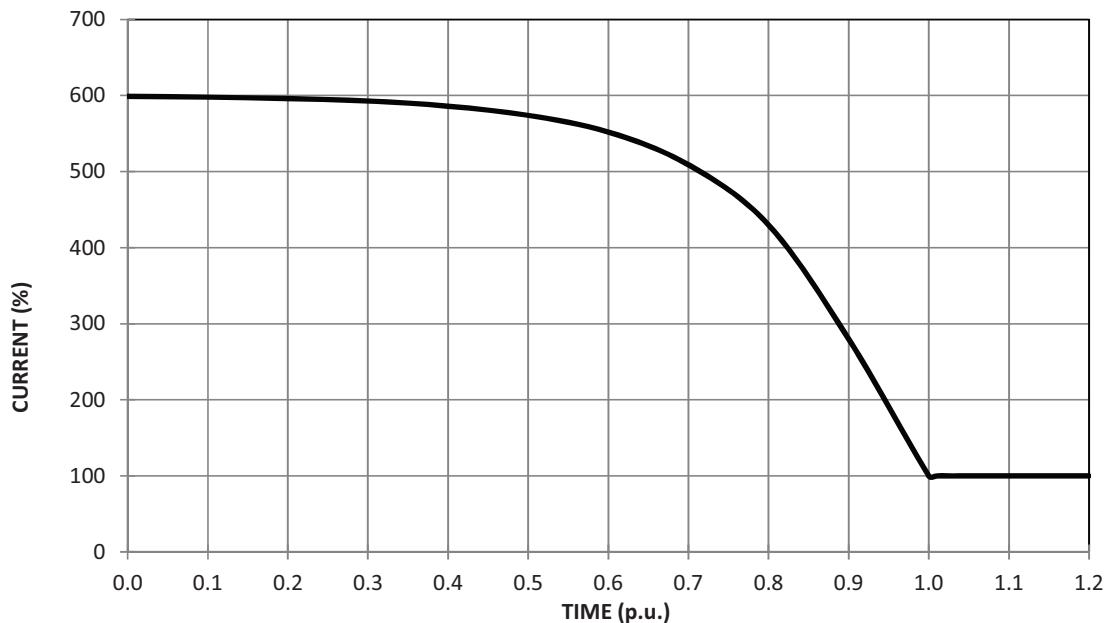
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75

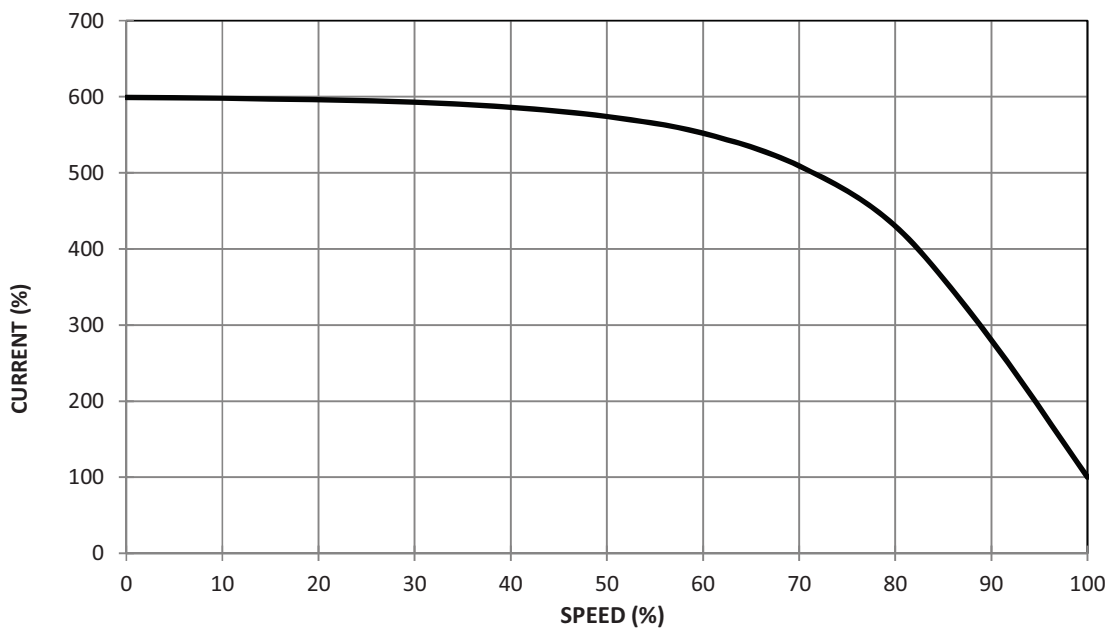
Poles : 4

Efficiency Class : IE3

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

27/08/2020

Revision:

-



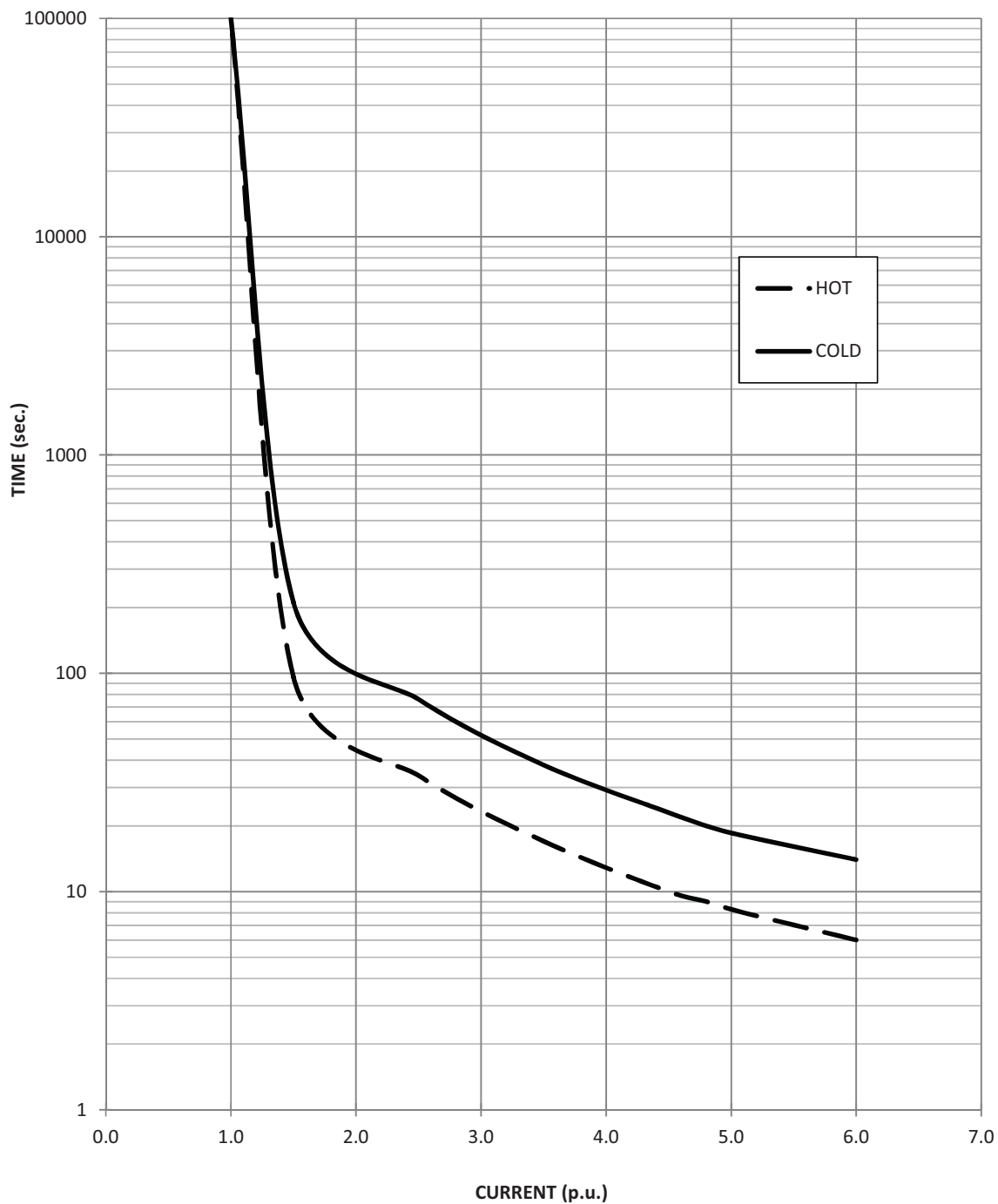
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75

Poles : 4

Efficiency Class : IE3

THERMAL WITHSTAND CURVE



Prep.: SK

Date: 27/08/2020

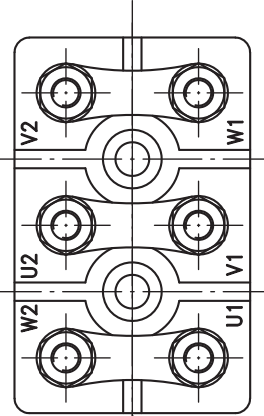
Revision: 0

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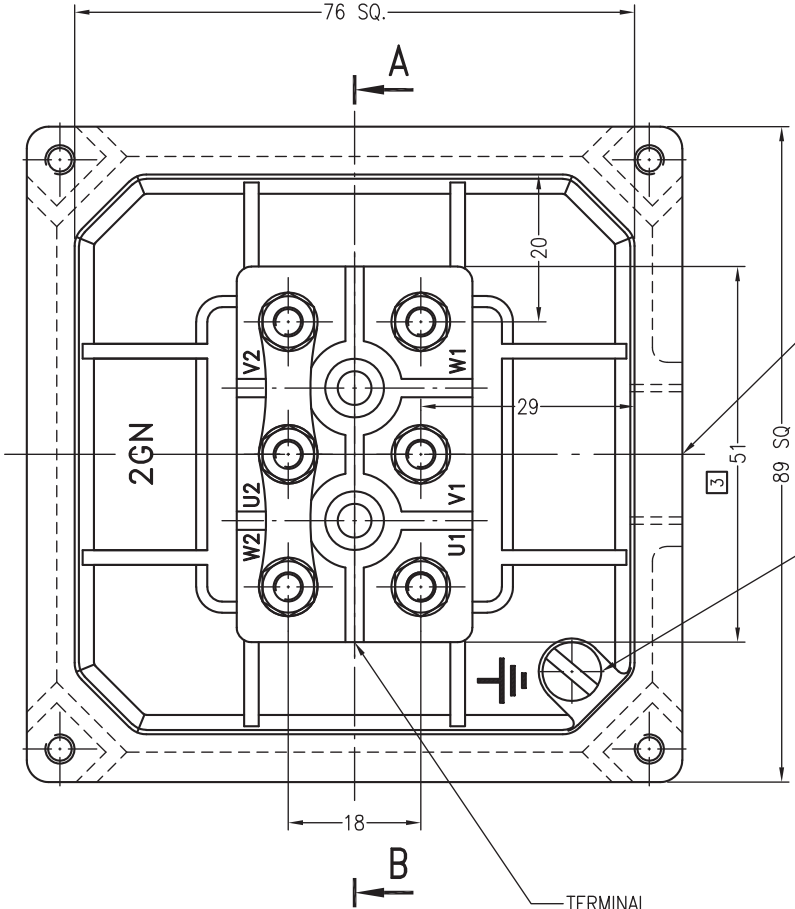
REV. STATUS	[6]	NDE SIDE SHAFT EXTN. DIA.14x30LG. WAS DIA.19x40LG. & DIMS 319, 359 WAS 329, 369 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	ARUN	16–09–19		
	[5]	TABLE UPDATED, TYPE DESIGNATION WAS P.No & 2HC1, 2HE2, 2HE3, 2HS5, 2HT1 WAS P.No1 & P.No. 2 & DIMS 302, 346 REMOVED FROM TABLE & ADDED 325, 369 DIMS IN TABLE & DIMS 285, 329 WAS 282, 326, TO UPLOAD THIS DRG. ON PORTAL	ARUN	23–11–18		
	[4]	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES & DIMS.302,282,125,205,WAS 301,281,122 ,202 & EARTHING SCREW SIZE M4 WAS M5, P.No.1,2 WAS EFFICIENCY EFF1, EFF2 & RATING PLATE ADDED	ARUN	12–12–16		
	SYM	REVISIONS		BY	DATE	
		TITLE OVERALL DIMENSION DRAWING STD./TEFC/B3 MOUNTED MOTOR		SCALE NTS		
				SHT 1/1		
	NAME	DATE	PROJECTION	DRG. NO.:	REV. 6	FRAME SIZE 80 (GN)
DRN.	P.V.SHINDE	19/04/05		A1–80–49(GN)		
CHD.	S.P.JADIA	19/04/05				
APPD.	S.P.JADIA	19/04/05				
			REF.: A1–80–OADI			

APPROVED
Checked and Approved

Date Mar
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TERMINAL BLOCK OF DELTA CONNECTED MOTOR

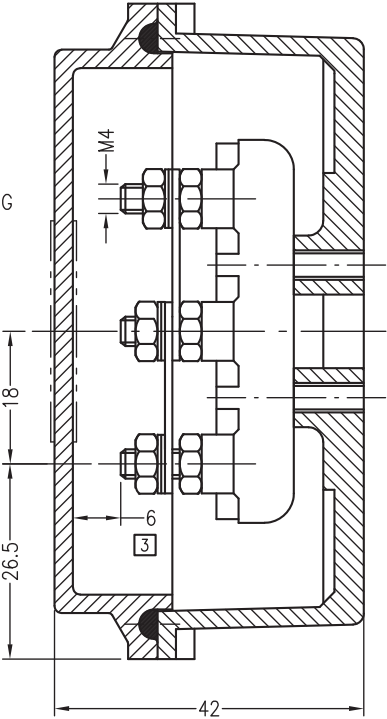


TERMINAL BLOCK OF STAR CONNECTED MOTOR

3/4" BSC CABLE ENTRY THREADING

1 No. M4 SCREW PROVIDED FOR EARTHING

Section AB



Dim. without tolerance as per IS:2102 very coarse

All dimensions in mm unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS	3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5		NIMKAR	01/10/16
	2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.		NIMKAR	11/11/14
		TITLE			
		STD. TERMINAL BOX ASSEMBLY		SCALE NTS	
				SHT 1/1	
		NAME	DATE	PROJECTION	DRG. NO.:
		GANESH	16-07-11		A4-80/90-33(GN)
		CHD.			REV. 3
		APPD.			REF.: TB-ASLY-63-90
				FRAME SIZE 63-90 (GN)	

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
1.0	Application	AXIAL FAN
1.1	Quantity	As per BBU/approved Datasheet
2.0	Manufacturer	HEM
3.0	Type & Frame Size	Type Ref : 2FE3 080-0403 & Frame Size : 80 FLP
3.1	Degree of Protection	IP:55
4.0	Rated Output in KW	0.55
4.1	Rated Speed	1430
5.0	Rated Voltage, Frequency & Phases	415 V AC ± 10% ; 50 Hz ± 5%;
		10% absolute sum - 3 Phase
6.0	Full load current	1.3
7.0	Energy Efficient	IE3
8.0	Efficiency & Power Factor at Full Load	80.8%0.73
9.0	Efficiency & Power Factor at 75% Load	80.8%0.66
10.0	Efficiency & Power Factor at 50% Load	74%0.53
11.0	Duty Cycle	S1
12.0	Rated torque (kg-m)	0.37
13.0	Starting current (%)	600%
14.0	No Load Current (With Mechanism Coupled)	1 A (Approx.)
15.0	Starting torque in % of full load torque	220%
16.0	Pull up torque in % of full load torque	187%
17.0	Pull out torque in % of full load torque	260%
18.0	No load starting time (Without mechanism coupled)	< 1 sec.
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot6
		b) Cold14
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot8
		b) Cold18
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot5
		b) Cold13
22.0	Starting time at minimum starting voltage	
	with mechanism coupled	< 1 sec. (Load GD² = Motor GD²)
23.0	Starting time at rated voltage with	
	mechanism coupled	< 1 sec. (Load GD² = Motor GD²)
24.0	Maximum permissible starting time	3
25.0	Stator thermal time constant (Min)	45 min./120 min.
26.0	Type & number of terminals broughtout	6 leads
27.0	Stator winding connection	STAR

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	13.3 Ohms (Approx.)	
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF & Deep Groove Ball Bearing	
	NDE:	SKF & Deep Groove Ball Bearing	
35.0	Lubricant quantity , grade & recommended	Prelubricated	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kgm ²)	0.0049	
42.0	Total weight of motor (kg)	29 KG (Approx.)	
43.0	Weight of stator (kg)	16 KG (Approx.)	
44.0	Weight of rotor (kg)	13 KG (Approx.)	
45.0	Anticipated bearing life in Hours	50000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	185°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016	
50.0	Standard continuous rating at 40°C ambient	0.57	
51.0	Derated rating of motor at 50°C	0.55	
52.0	a) Locked Rotor KVA (Indicative)	5.6	
	b) Ratio of Locked rotor KVA / rated KW	10.2	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	1.4	
	b) Motor Static Load	29 KG	
54.0	Paint Shade	RAL 6011	
55	Vibration Level	IS 12075	
55	Noise Level	IS 12065	

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.



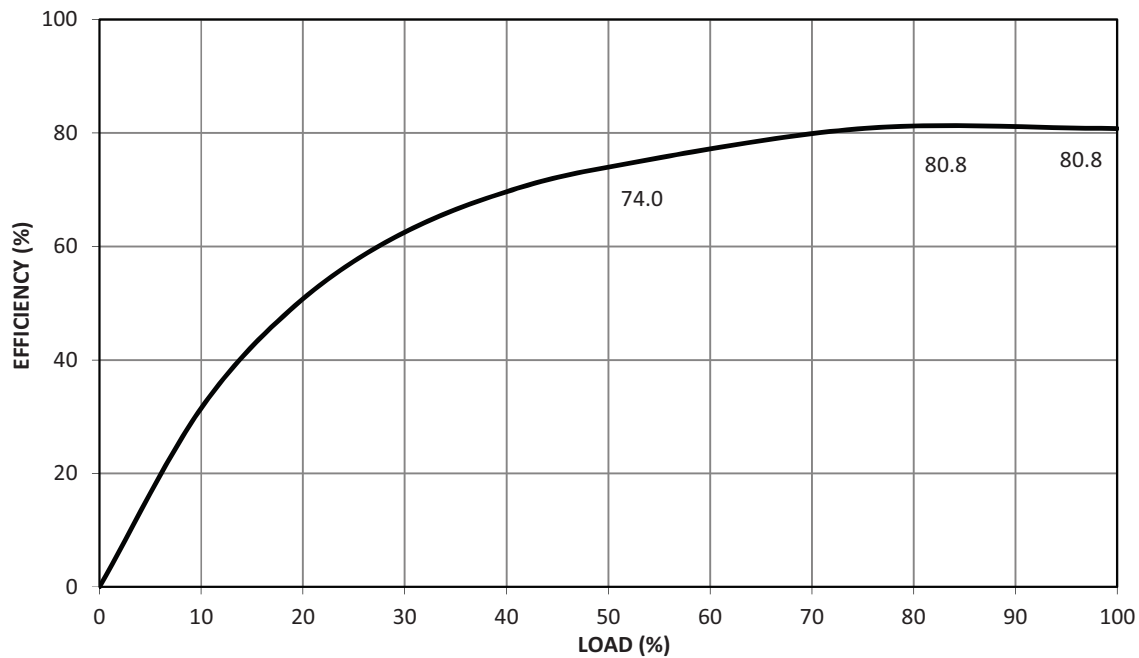
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75

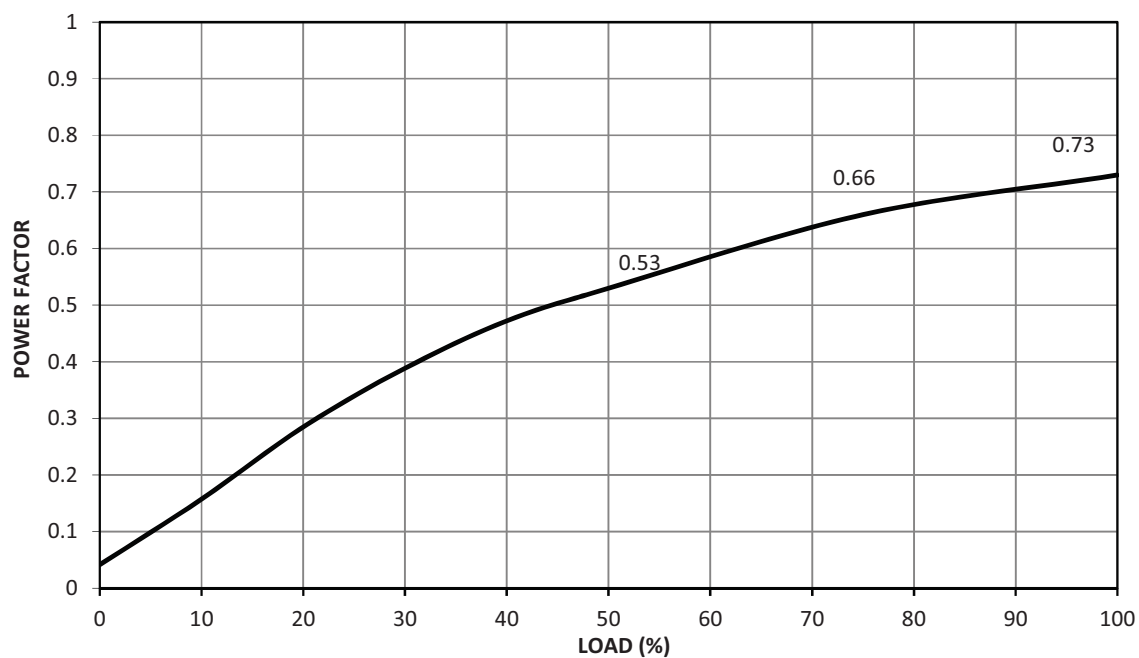
Poles : 4

Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

27/08/2020

Revision:

-



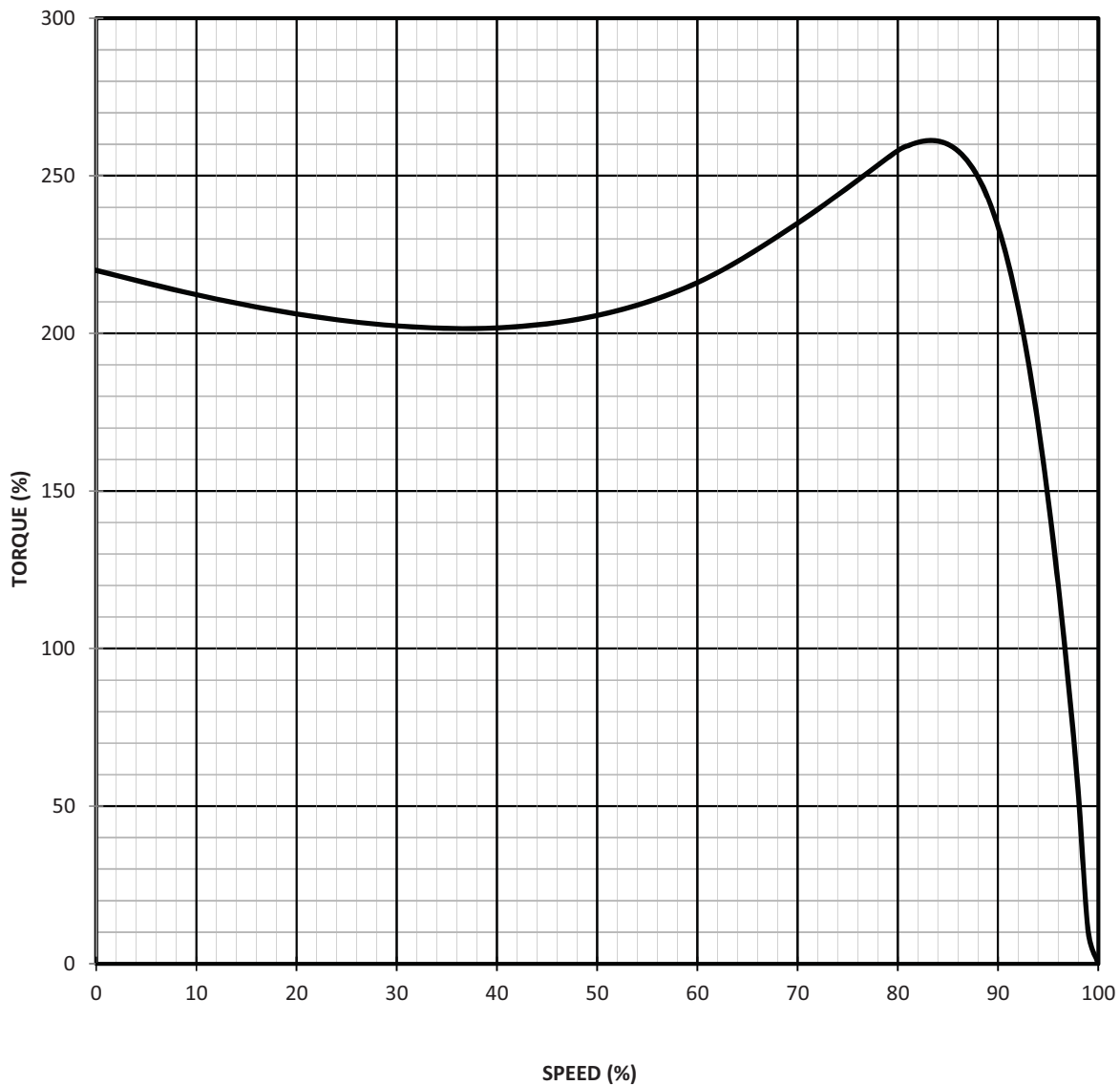
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75

Poles : 4

Efficiency Class : IE3

TORQUE SPEED CURVE



Prep.: SK

Date: 27/08/2020

Revision: -



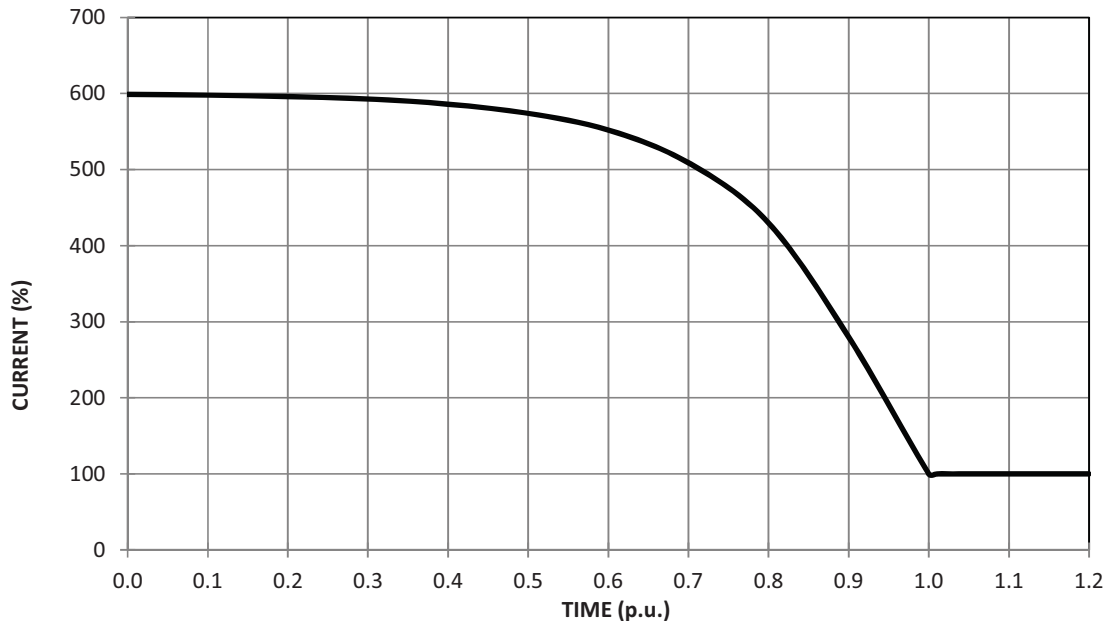
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75

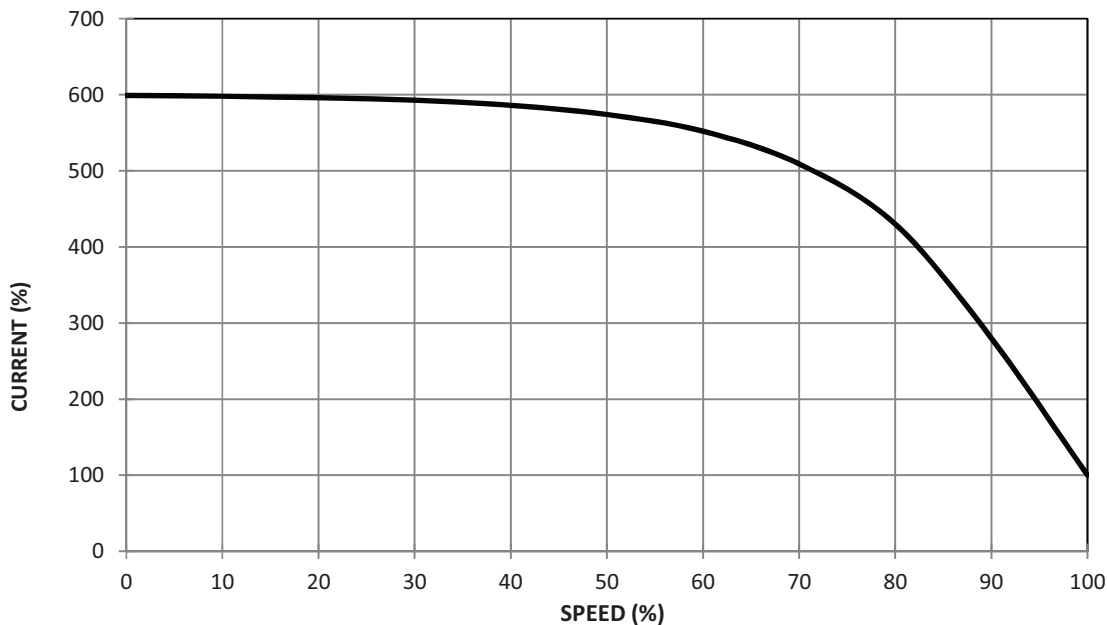
Poles : 4

Efficiency Class : IE3

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

27/08/2020

Revision:

-



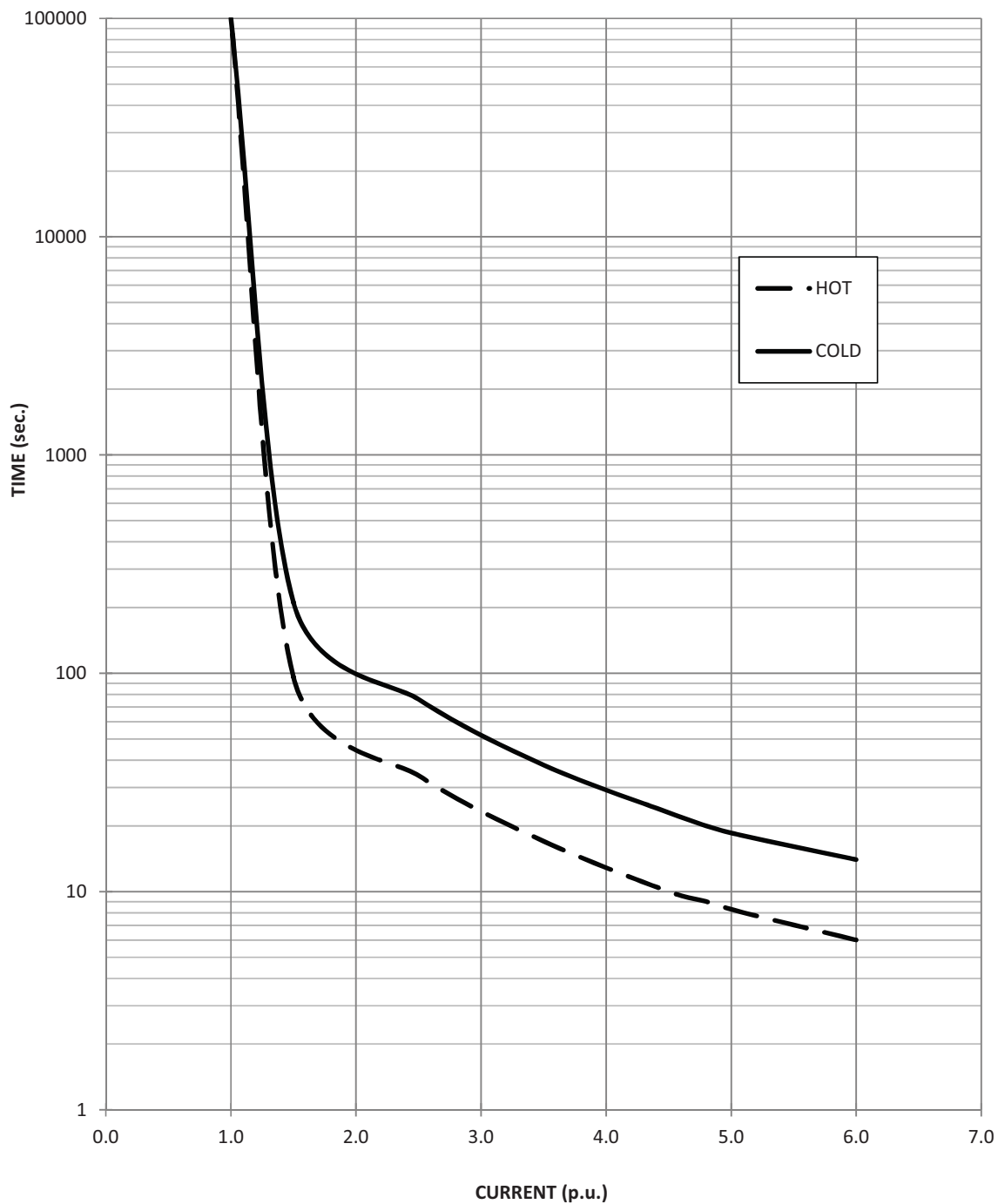
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.55/0.75

Poles : 4

Efficiency Class : IE3

THERMAL WITHSTAND CURVE

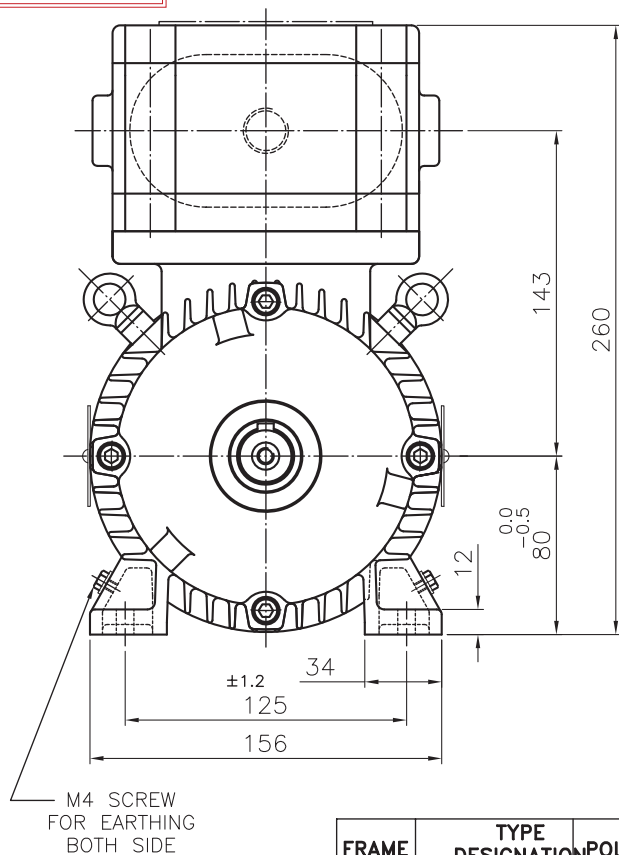


Prep.: SK

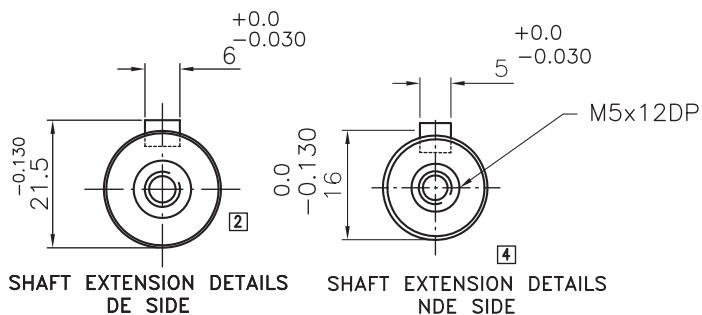
Date: 27/08/2020

Revision: 0

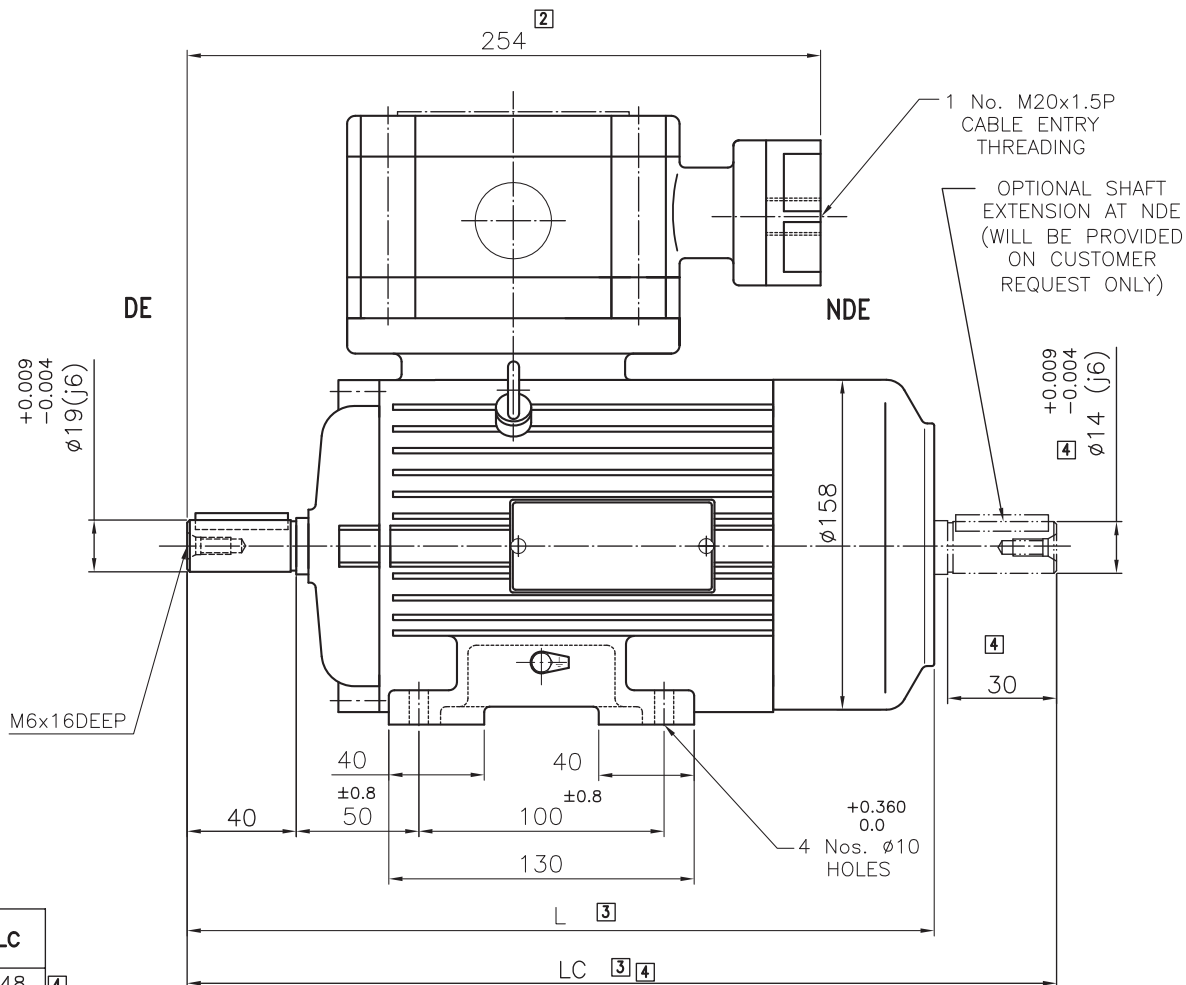
Approval doesn't absolve the EPC contractor of its responsibilities as specified in the Contract



FRAME	TYPE DESIGNATION	POLE	L	LC	
80	FD1,FE2,FE3	2,4,6,8	313	348	4
	FE2,FE3		359	394	4



Dim. without tolerance as per IS:2102, very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	



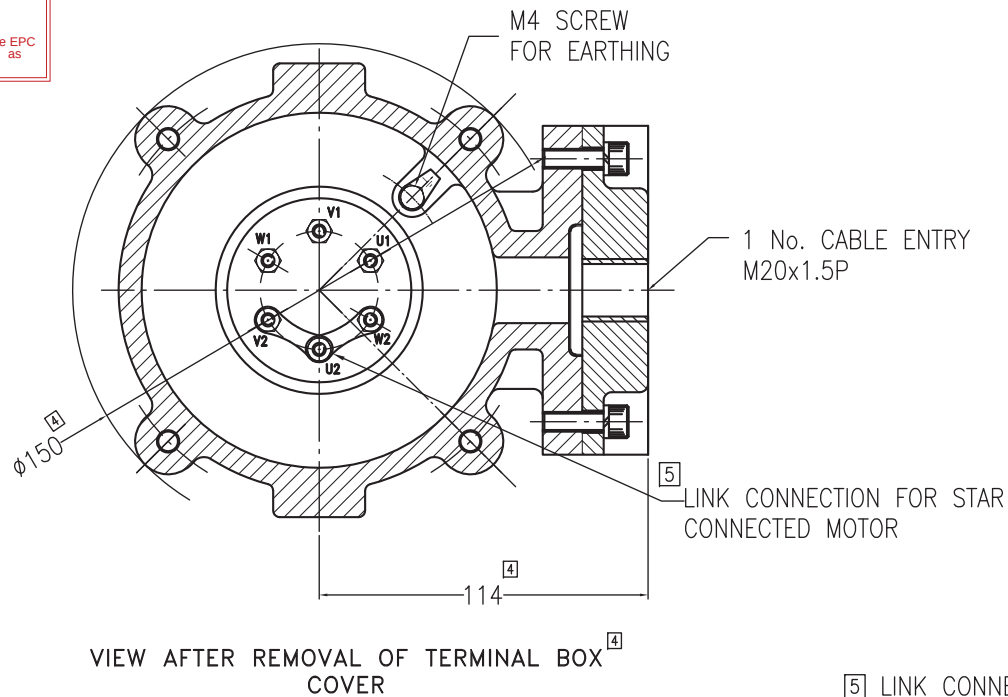
REV. STATUS	4	NDE SIDE SHAFT EXTN. DIA.14x30LG. WAS DIA.19x40LG. & DIMS 359,394,348 WAS 358 AS PER VERBAL INSTRUCTIONS RECD.FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART - IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE & TYPE DESIGNATION TABLE ADDED , TO UPLOAD THIS DRG. ON PORTAL				22-01-20	LANKESH
	3	DIMN. 313, 358 WAS 310, 355, TO SUIT PRESENT COWL LENGTH 80 WAS 77				27/10/18	ARUN
	2	DIMN. 254 WAS 240. TAPPING SHOWN IN SHAFT EXTN. DETAILS.				25/8/15	SAURABH
	1	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES				8/1/14	NIMKAR
	TITLE				OVERALL DIMENSIONS DRAWING FOR B3 MOUNTING, TEFC, FLAMEPROOF MOTOR		
				SCALE NTS			
				SHT 1/1			
	NAME	DATE	PROJECTION	DRG. NO.:	REV.	FRAME SIZE	
DRN.	P.N.RAOTE	18-01-07		F-80-0-10	4	80	
CHD.	S.P.JADIA	18-01-07					
APPD.	S.P.JADIA	18-01-07					
				REF : 80FLP-OADIM-B3			
				FLP			

APPROVED
Checked and Approved

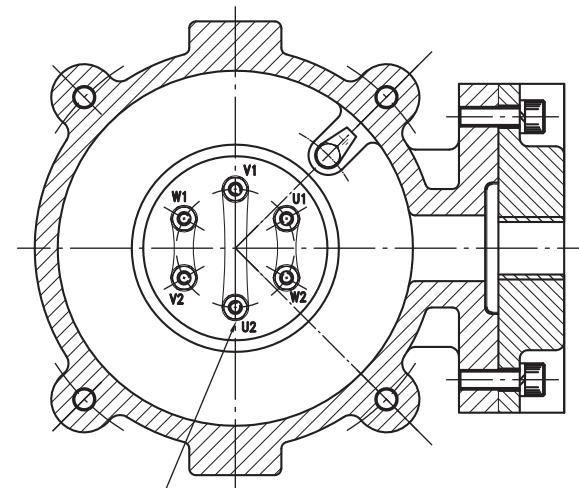
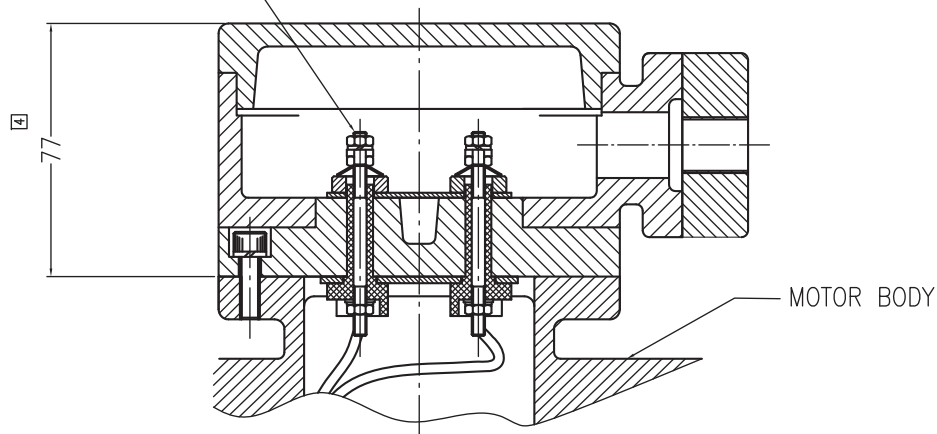
Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

Date Mar

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



M4 6 Nos. TERMINALS



NOTE:-
REFERENCE GENERAL CONSTRUCTION DETAILS DRG. No. 80F-HEM-GA-01 FOR 80 FLP & DRG. No. 90F-HEM-GA-01 FOR 90 FLP.

All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	



DRN.	NAME	DATE
CHD.	S.P.JADIA	28-11-12
APPD.	S.P.JADIA	28-11-12

TITLE STANDARD TERMINAL BOX ASSEMBLY
FLAMEPROOF MOTOR

PROJECTION	DRG. NO.:	REV.
1st Angle	33-06-044-0001	5
REF.: 63-71FLP-TBOX-ASSY		

SCALE	NTS
SHT	1/1
FRAME SIZE	80-90
FLP	5

REV. STATUS	REVISION	DATE	BY
5	FRAME SIZE 63-71 WAS 80-90 IN TITLE BLOCK, AND SEPERATE DRAWING MADE FOR 63-71FLP HAVING DRG. No. 24-06-044-0016 VIEW INCLUDED FOR DELTA CONNECTED MOTOR AND STAR CONNECTED SPECIFIED FOR EXISTING VIEW & NOTE ADDEED.	31-7-18	KIRAN
4	OVERALL DIMENSIONS, NOTE & STANDARD SPECIFIED IN TITLE	11-04-15	P.N.RAOTE
3	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. NO. & ALL THE FEATURES.	27-07-15	SAURABH
SYM.			

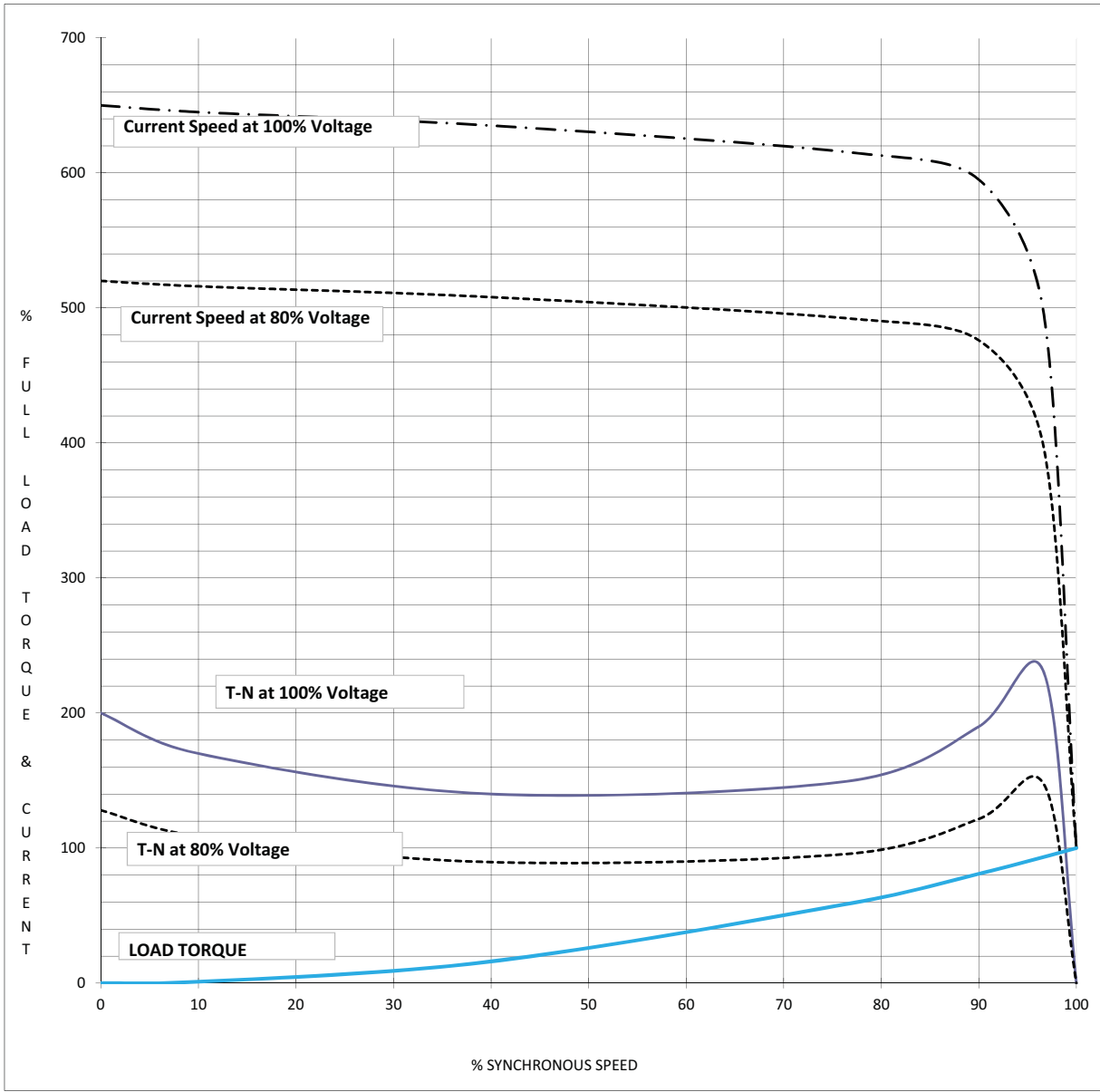
DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FANS	
1.1	Quantity	AS PER APPROVED BBU / FAN SCHEDULE	
2.0	Manufacturer	LHPL	
3.0	Type & Frame Size	Energy Efficient & Frame Size 90	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	1.5	
4.1	Rated Speed	1415	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	3.4	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	85.3	0.72
9.0	Efficiency & Power Factor at 75% Load	84.0	0.64
10.0	Efficiency & Power Factor at 50% Load	83.0	0.52
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	1.03	
13.0	Starting current (%)	650%	
14.0	No Load Current (With Mechanism Coupled)	2 A (Indicative)	
15.0	Starting torque in % of full load torque	2.07	
16.0	Pull up torque in % of full load torque	1.86	
17.0	Pull out torque in % of full load torque	2.37	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	10
		b) Cold	20
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	16
		b) Cold	31
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	8
		b) Cold	17
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	42/125	
26.0	Type & number of terminals broughtout	3 leads	
27.0	Stator winding connection	STAR	

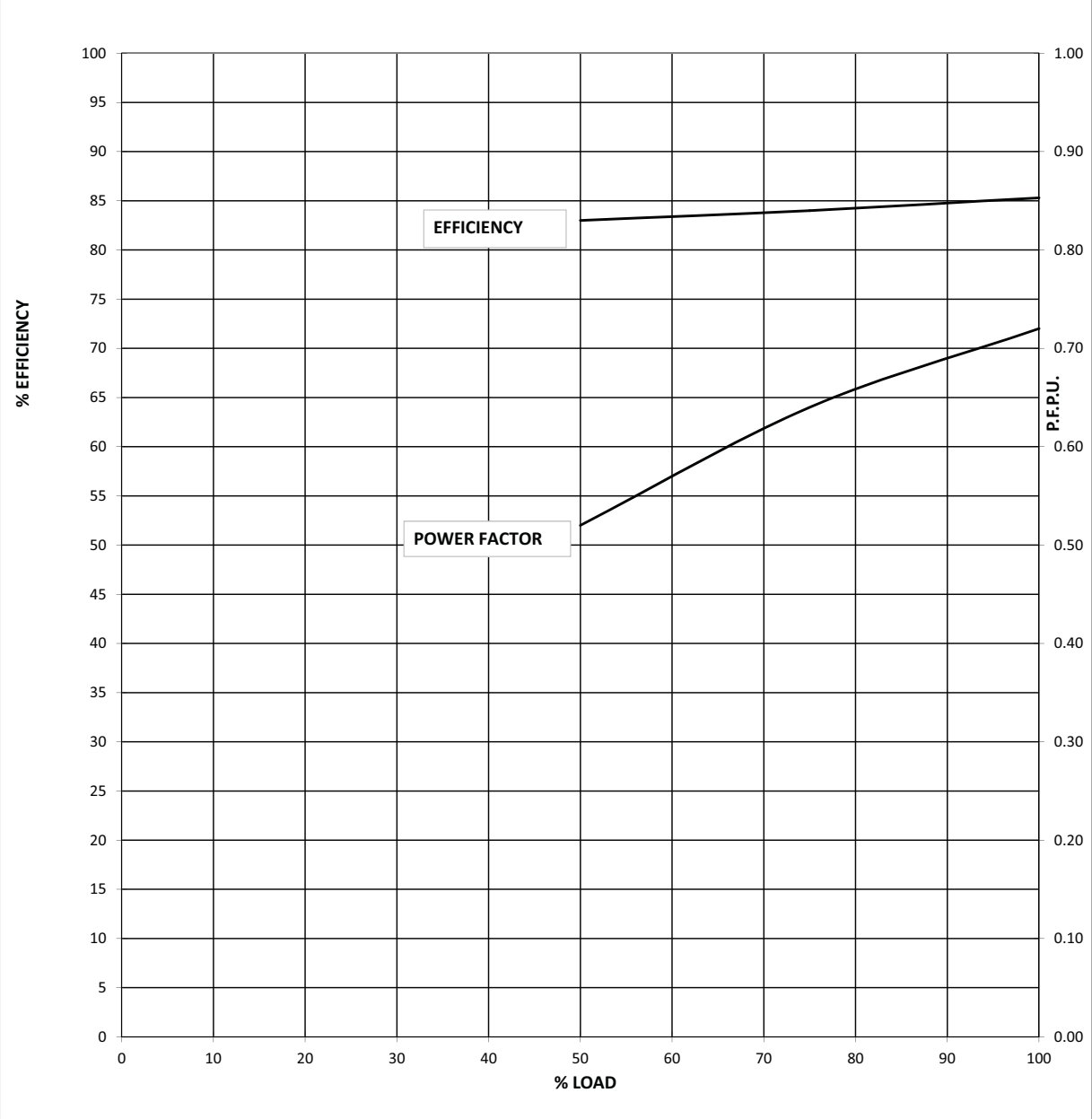
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	3.72 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kg·m ²)	0.002	
42.0	Total weight of motor (kg)	20 KG APPROX	
43.0	Weight of stator (kg)	12 KG APPROX	
44.0	Weight of rotor (kg)	8 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	1.60	
51.0	Derated rating of motor at 50°C	1.5	
52.0	a) Locked Rotor KVA (Indicative)	19.1	
	b) Ratio of Locked rotor KVA / rated KW	12.7	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	3.9	
	b) Motor Static Load	20 KG	
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	
55	Noise Level	IEC 60034-9	

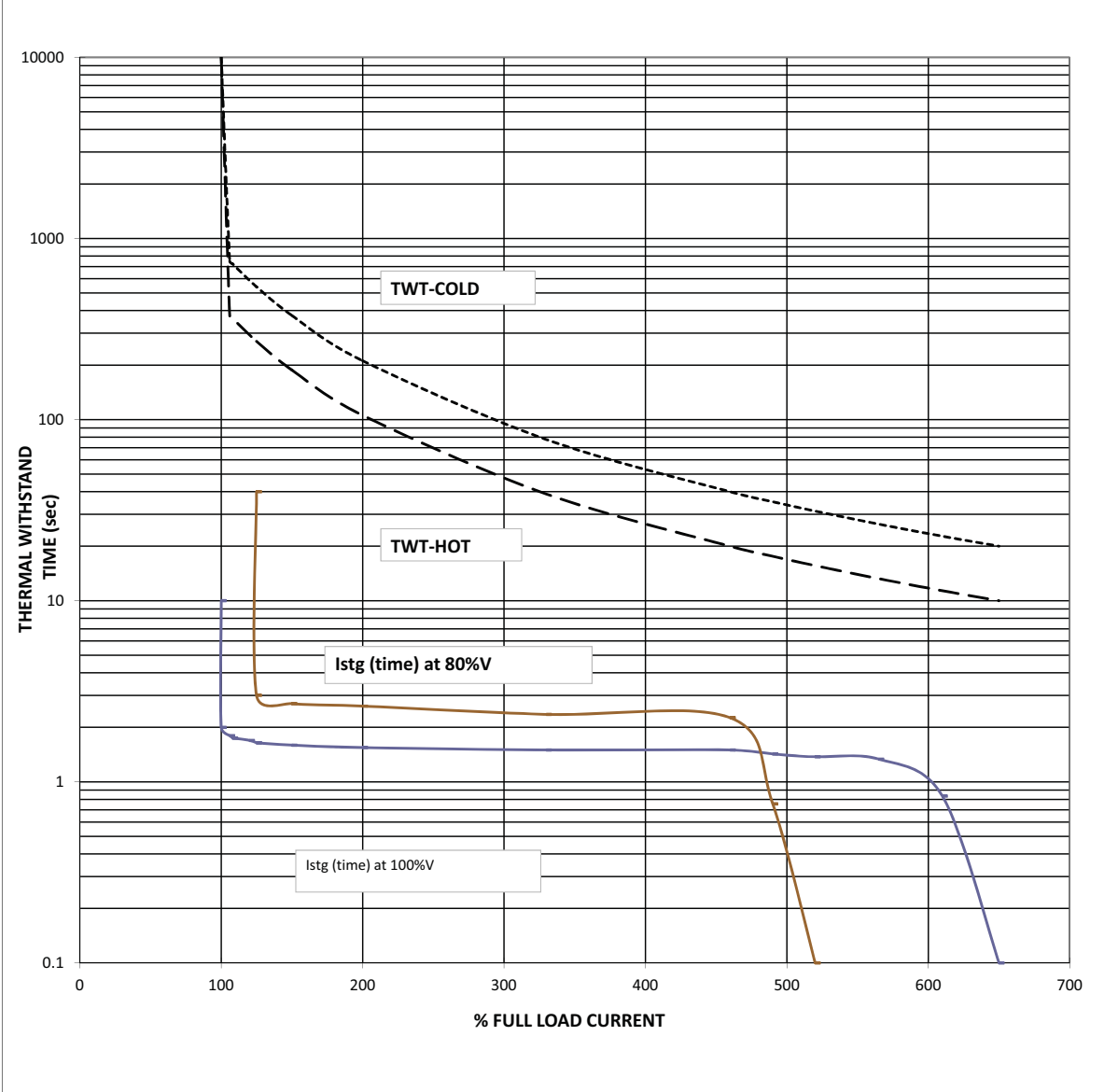
Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

3) Insulation shall be VPI.

MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.				CE		Lhp	
SPEED VS TORQUE & CURRENT CHARACTERISTICS											
INDENT NO. :		PO NO:		PO DATE:							
PROJECT NAME :											
kW : 1.5		POLE : 4		VOLTS : 415		QTY :				1	
											
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER. 2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1, 3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.											
				WDG NO				Prepared By		SSG	
2				GAD NO				Checked By		SNG	
1				T BOX NO						1/6/2021	
NO		REVISION		SIGN		DATE		SIGN		DATE	

MKTG Ref No.:		D7HO2009026	LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
LOAD VS EFF. & P.F.						
INDENT NO. :		PO NO:		PO DATE:		
PROJECT NAME :						
kW : 1.5		POLE :	4	VOLTS :	415	QTY : 1
						
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.						
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,						
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.						
		WDG NO				
2		GAD NO		Prepared By		SSG
1		T BOX NO		Checked By		SNG
NO	REVISION		SIGN	DATE	SIGN	DATE

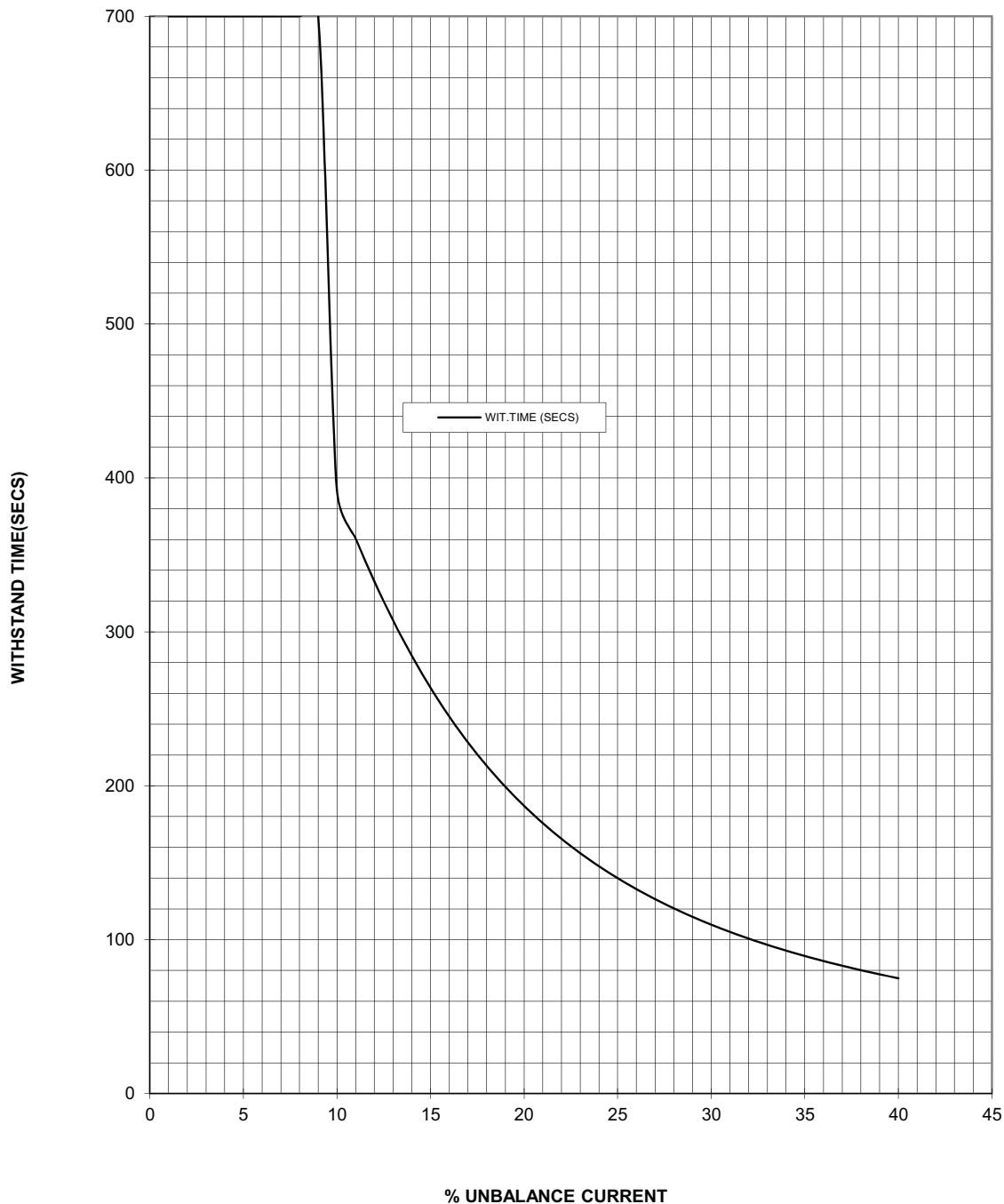
MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
STARTING CURRENT VS STARTING TIME AND THERMAL WITHSTAND TIME.							
INDENT NO. :		PO NO:		PO DATE:			
PROJECT NAME :							
kW : 1.5		POLE : 4		VOLTS : 415		QTY : 1	
							
L. R.CURRENT at 100% voltage : 650 % OF FLA THERMAL WITHSTAND TIME(sec):							
Starting time at 100% voltage : 2 sec AT100% RATED VOLTAGE (HOT) : 10							
Starting time at 80% voltage : 3 sec AT100% RATED VOLTAGE (COLD): 20							
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.							
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,							
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.							
		WDG NO					
2		GAD NO		Prepared By		SSG	
1		T BOX NO		Checked By		SNG	
NO		REVISION		SIGN		DATE	

DRG. NO.- NEG.SEQ.



NEGATIVE SEQUENCE CHARACTERISTICS

kW : 1.5 POLE : 4 VOLTS : 415 QTY : 1

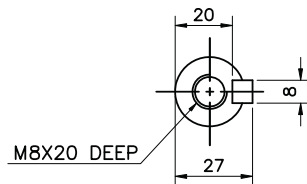
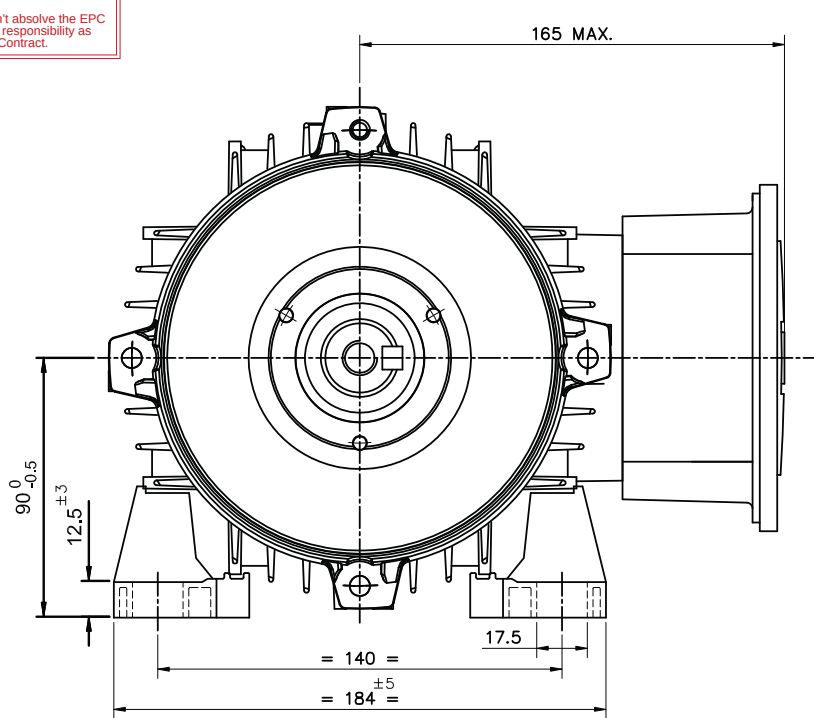


2		PREP	SSG	1/6/2021
1		APPD	SNG	1/6/2021
NO	REVISION	SIGN/DATE	SIGN	DATE

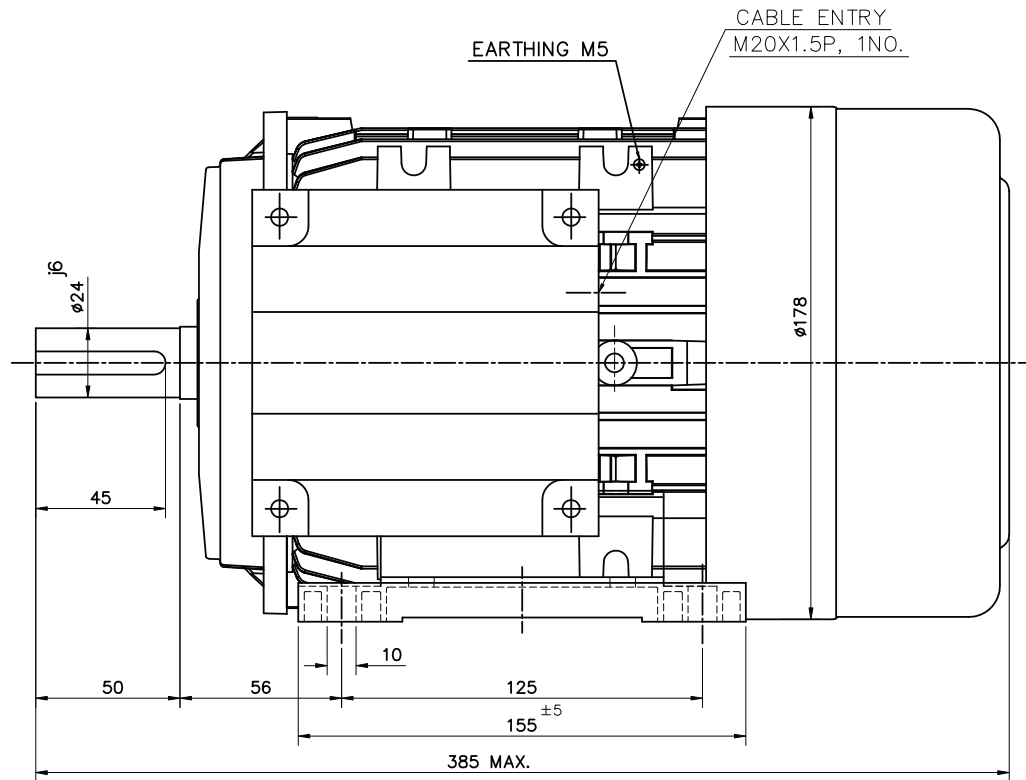
APPROVED
Checked and Approved.

Date: 29-Mar-2023

*Approval doesn't absolve the EPC
contractor of it's responsibility as
specified in the Contract.



SHAFT END DETAILS



SPECIFICATION:-

RATING	1.1KW/1.5HP	1.5KW/2.0HP
POLE	6 POLE	4 POLE
BEARING DE	6205 2Z	6205 2Z
BEARING NDE	6205 2Z	6205 2Z

MATERIAL OF CONSTRUCTION:-

FRAME	ALUMINIUM
END COVER (DE)	ALUMINIUM
END COVER (NDE)	ALUMINIUM/CAST IRON
SHAFT	CARBON STEEL

1			
REV NO.	ECN DETAILS	DATE	INTL.

UNMENTIONED TOLERANCES ARE AS PER IS2102-1/ IS2768-1	LINEAR DIMNS.	OVER & UPTO	0-5	3-6	6-30	30-120	120-400	400-1000	1000-2000		NAME	DATE
		TOLERANCE	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	DGN		
	ANGULAR DIMNS.	PERMISSIBLE DEVIATIONS FOR LENGTHS OF THE SHORTER SIDE OF THE ANGLE								DRN	POTDAR	15.09.20
		OVER & UPTO	0-10	10-50	50-120	120-400	400-1000	1000-2000		CHD		15.09.20
										APPD		15.09.20
										SHEET:- 01 OF 03		
										SCALE: 1:1		
										DRG NO.		
										MGAN090A0478		
										ISSUE. NO. 01 REV. NO. 00		

TITLE:- GENERAL ARRANGEMENT DRAWING FOR
90L FRAME FOOT MOUNTED MOTOR



Laxmi Hydraulics Pvt. Ltd.

Website:- www.lhp.co.in

SOLAPUR

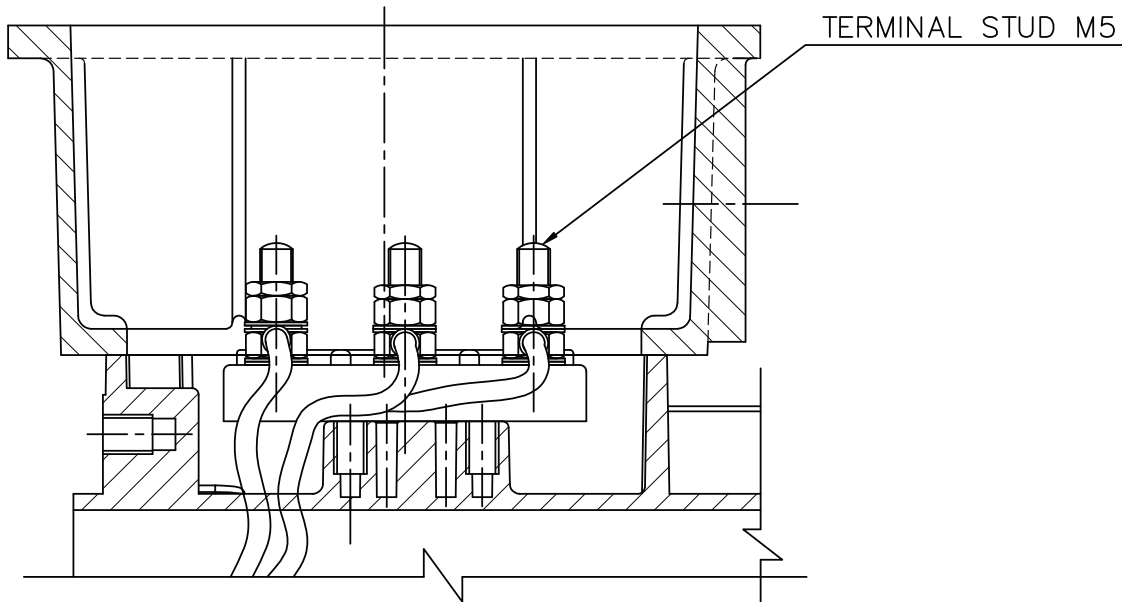
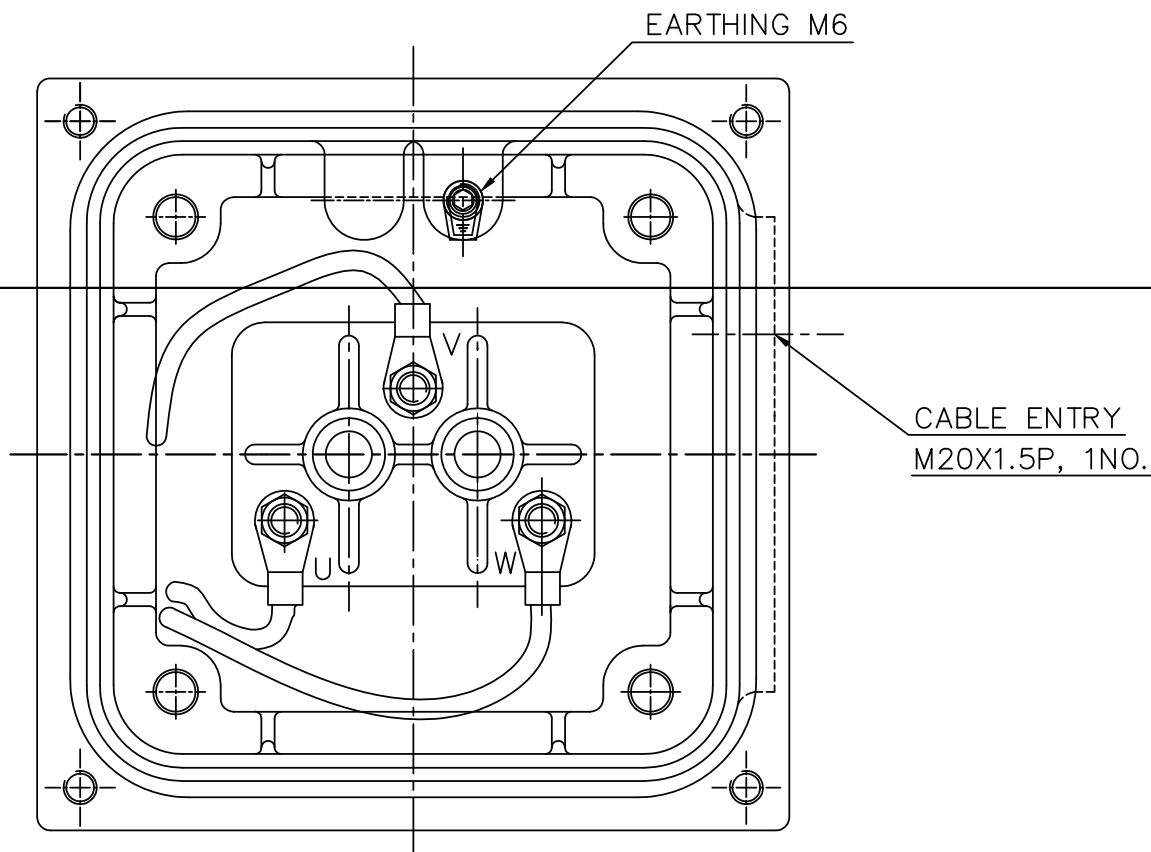
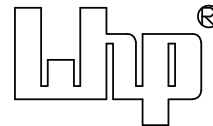


UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM | DO NOT SCALE THE DRAWING

LAXMI HYDRAULICS PVT. LTD, SOLAPUR

TERMINAL BOX ARRANGEMENT FOR 3 LEADS

FOR 90 FRAME



SHEET: - 02 OF 02

ISSUE.NO.- 01

REV.NO.- 00

DATE- 15.09.20

DRG.NO.- MGAN090A0478

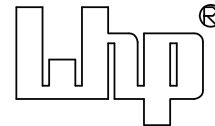
DRN.BY.- POTDAR

CHD.BY.-

APPD.BY.- GRM

LAXMI HYDRAULICS PVT. LTD, SOLAPUR

NAMEPLATE DRAWING



IS: 12615		3 Ph. INDUCTION MOTOR	
CM/L-7500131009		IE3	
M/C.NO.		RPM:	
kW/HP:		FRM:	
V:		DUTY:	
Hz:		CONN.	
AMP:		IN.CLS.	
EFF. IE3-	%	WT.:	Kg.
COSØ:		REF.STD.: IS 12615 / IEC 60034-30	
MFD.BY: LAXMI HYDRAULICS PVT. LTD. SOLAPUR (INDIA) Website : www.lhp.co.in 047D19			

NOTE : -FOR DATA/SPECIFICATION IN NAMEPLATE REFER DATA SHEET/GAD.

SHEET: - 03 OF 03

ISSUE.NO.- 01

REV.NO.- 00

DATE- 15.09.20

DRG.NO.- MGAN090A0478

DRN.BY.- POTDAR

CHD.BY.-

APPD.BY.- GRM

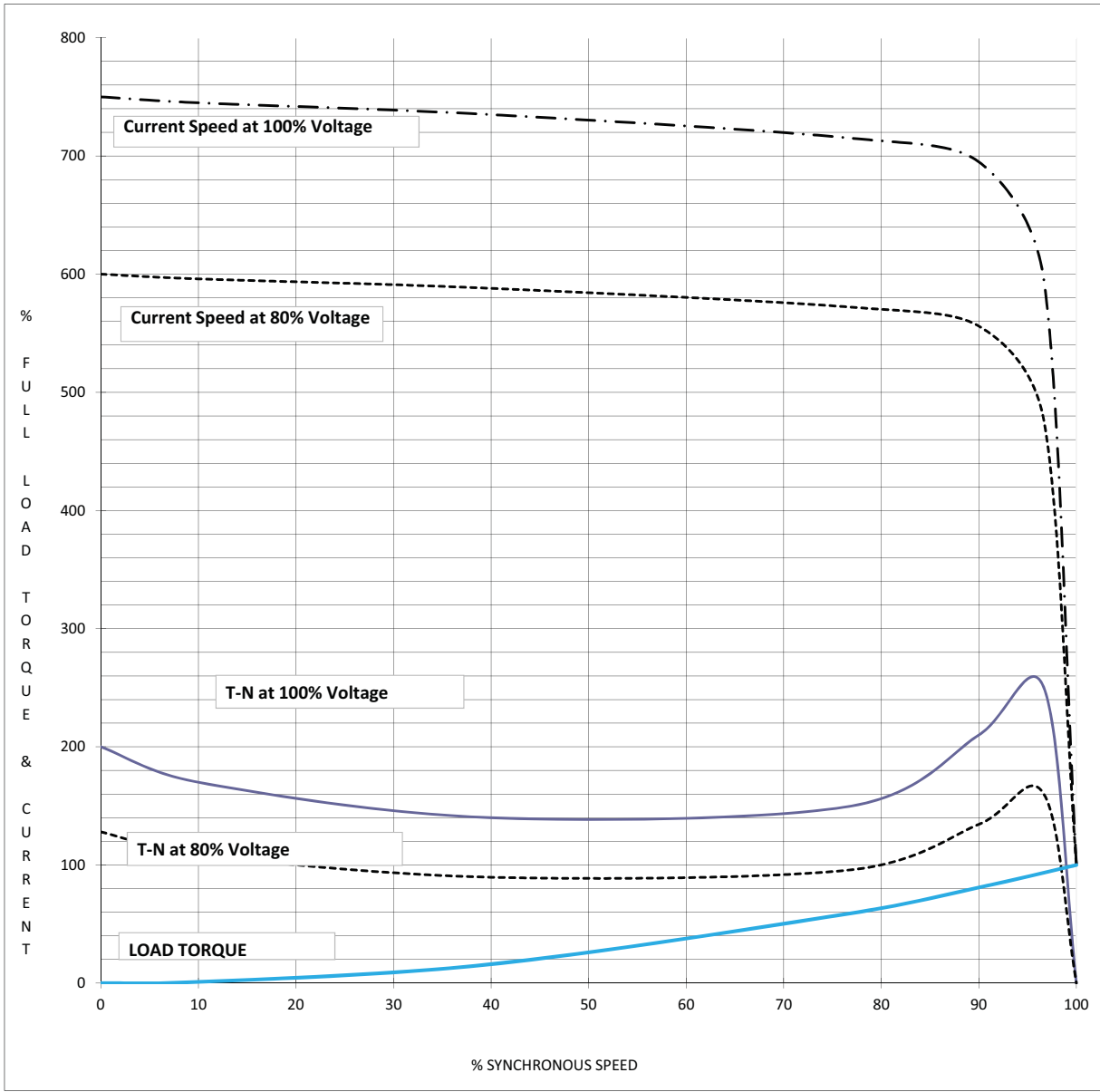
DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FANS	
1.1	Quantity	AS PER APPROVED BBU / FAN SCHEDULE	
2.0	Manufacturer	LHPL	
3.0	Type & Frame Size	Energy Efficient & Frame Size 100	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	2.2	
4.1	Rated Speed	1435	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	4.6	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	86.7	0.77
9.0	Efficiency & Power Factor at 75% Load	85.0	0.70
10.0	Efficiency & Power Factor at 50% Load	84.0	0.65
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	1.49	
13.0	Starting current (%)	750%	
14.0	No Load Current (With Mechanism Coupled)	2.3 A (Indicative)	
15.0	Starting torque in % of full load torque	2.99	
16.0	Pull up torque in % of full load torque	2.69	
17.0	Pull out torque in % of full load torque	3.73	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	10
		b) Cold	20
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	16
		b) Cold	31
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	8
		b) Cold	17
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	42/125	
26.0	Type & number of terminals broughtout	3 leads	
27.0	Stator winding connection	STAR	

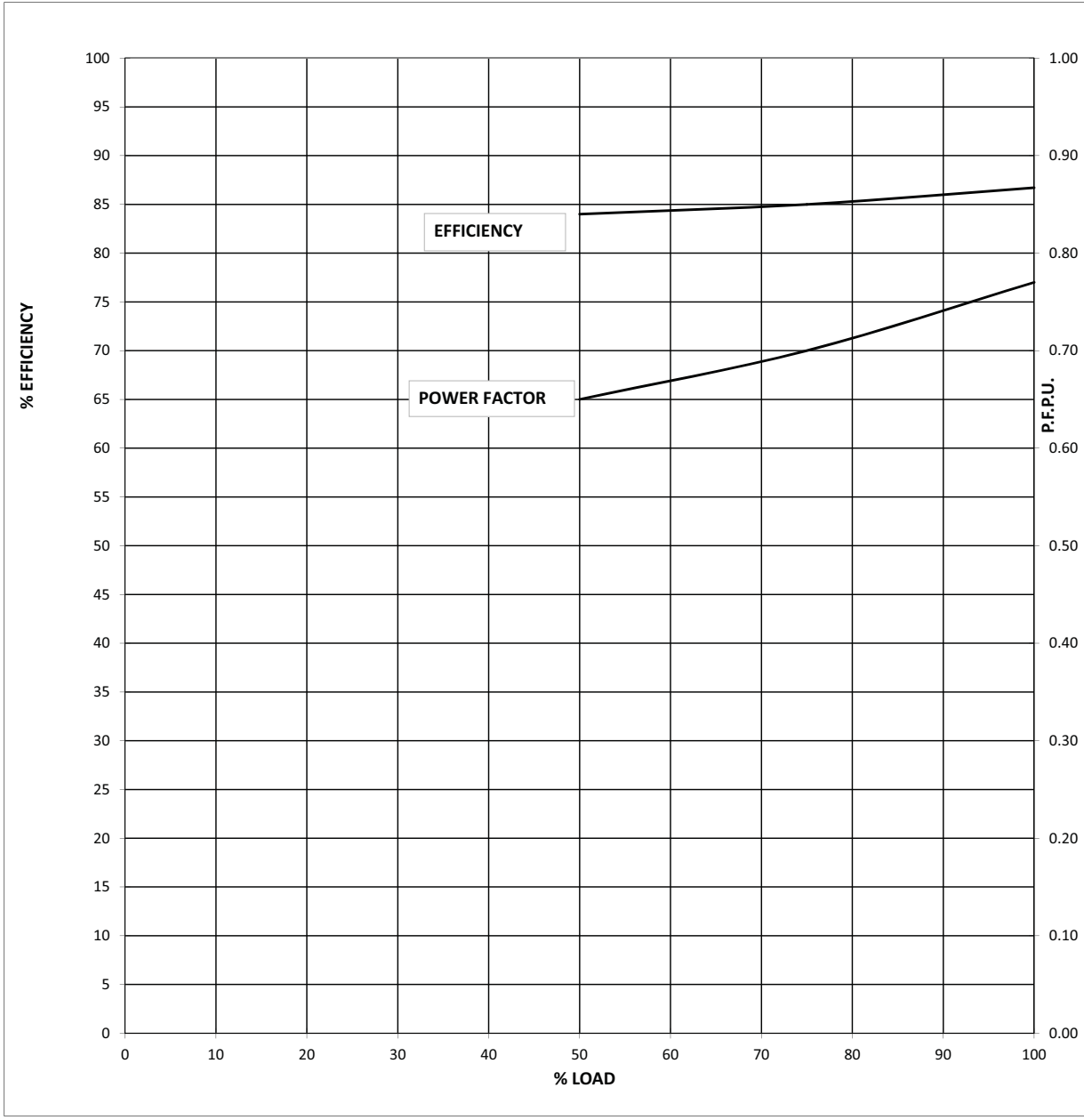
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	2.11 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kg.m ²)	0.02	
42.0	Total weight of motor (kg)	30 KG APPROX	
43.0	Weight of stator (kg)	18 KG APPROX	
44.0	Weight of rotor (kg)	12 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	2.35	
51.0	Derated rating of motor at 50°C	2.2	
52.0	a) Locked Rotor KVA (Indicative)	29.7	
	b) Ratio of Locked rotor KVA / rated KW	13.5	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	5.7	
	b) Motor Static Load	30 KG	
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	
55	Noise Level	IEC 60034-9	

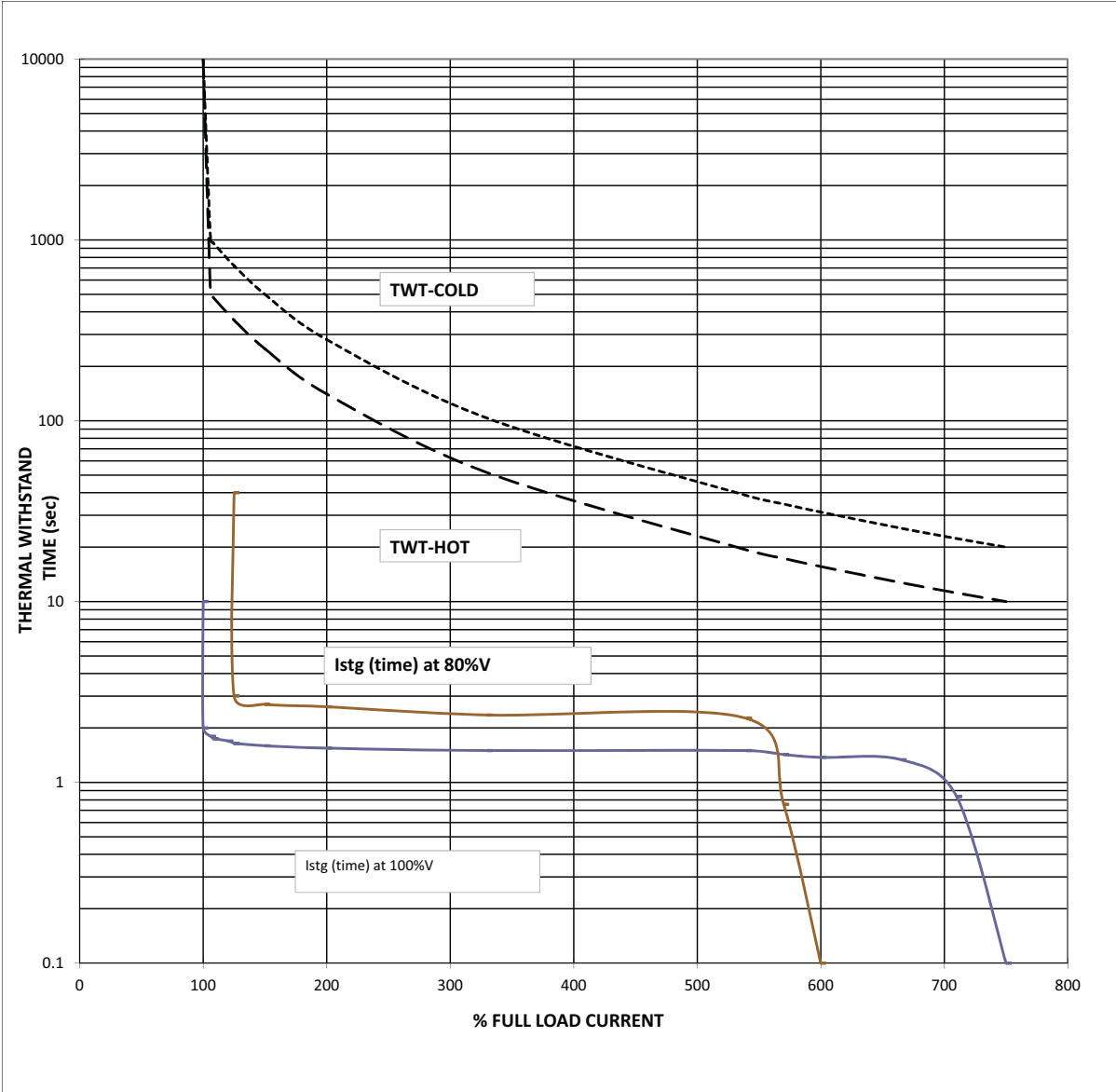
Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

3) Insulation shall be VPI.

MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.				CE Lhp	
SPEED VS TORQUE & CURRENT CHARACTERISTICS									
INDENT NO. :		PO NO:		PO DATE:		LS		IE3	
PROJECT NAME :									
kW : 2.2		POLE : 4		VOLTS : 415		QTY : 1			
									
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.									
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,									
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.									
				WDG NO				Prepared By SSG 1/6/2021	
2				GAD NO				Checked By SNG 1/6/2021	
1				T BOX NO					
NO		REVISION		SIGN		DATE		SIGN DATE	

MKTG Ref No.:		D7HO2009026	LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
LOAD VS EFF. & P.F.						
INDENT NO. :		PO NO:		PO DATE:		
PROJECT NAME :						
kW : 2.2		POLE :	4	VOLTS :	415	QTY : 1
						
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.						
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,						
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.						
		WDG NO				
2			GAD NO	Prepared By		SSG
1			T BOX NO	Checked By		SNG
NO	REVISION		SIGN	DATE	SIGN	DATE

MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
STARTING CURRENT VS STARTING TIME AND THERMAL WITHSTAND TIME.							
INDENT NO. :		PO NO:		PO DATE:		 	
PROJECT NAME :							
kW : 2.2		POLE : 4		VOLTS : 415		QTY : 1	
							
L. R.CURRENT at 100% voltage : 750 % OF FLA THERMAL WITHSTAND TIME(sec):							
Starting time at 100% voltage : 2 sec AT100% RATED VOLTAGE (HOT) : 10							
Starting time at 80% voltage : 3 sec AT100% RATED VOLTAGE (COLD): 20							
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.							
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,							
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.							
		WDG NO					
2		GAD NO		Prepared By		SSG	
1		T BOX NO		Checked By		SNG	
NO		REVISION		SIGN		DATE	

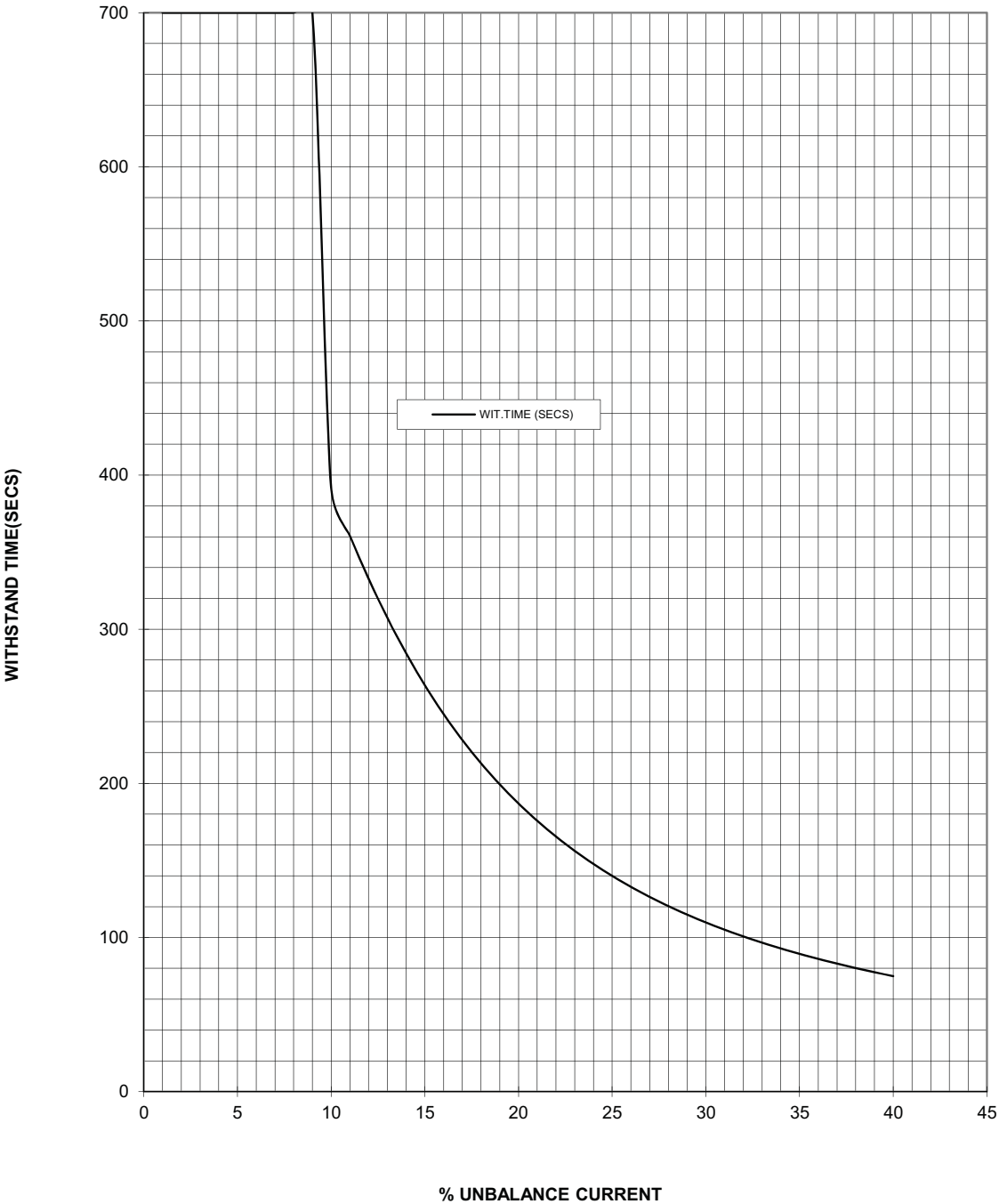
DRG. NO.- NEG.SEQ.



NEGATIVE SEQUENCE CHARACTERISTICS

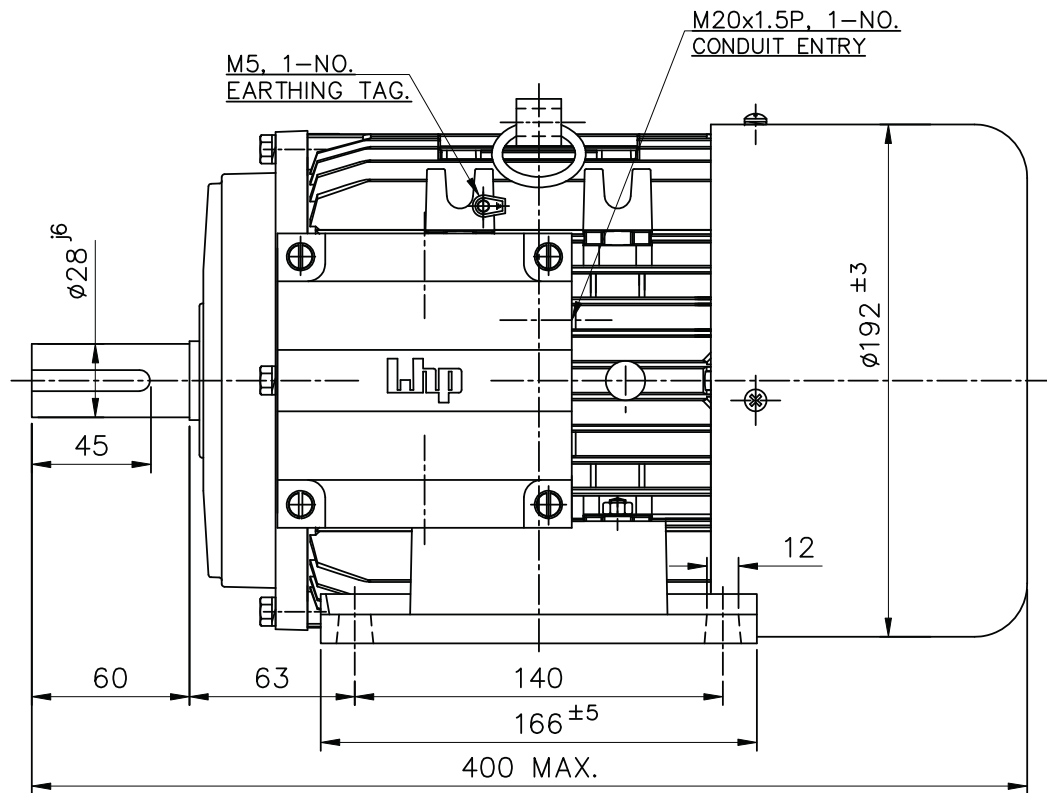
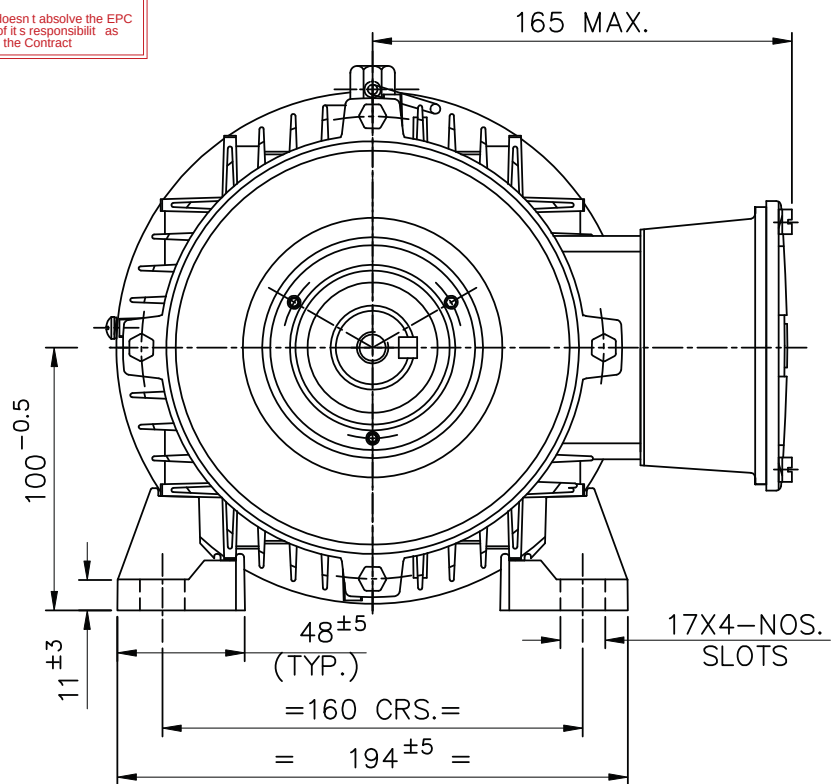
CUSTOMER

kW : 2.2
POLE : 4
VOLTS : 415
QTY : 1



2		PREP	SSG	1/6/2021
1		APPD	SNG	1/6/2021
NO	REVISION	SIGN/DATE	SIGN	DATE

APPROVED
Checked and Approved
Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

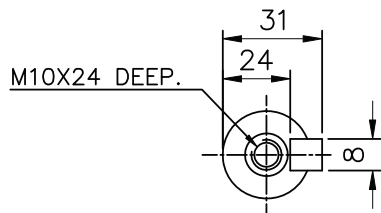


SPECIFICATIONS:-

RATING (kW/HP)	1.5/2.0	2.2/3.0
POLE	6	4
BEARING DE SIDE	6206 2Z	
BEARING NDE SIDE	6206 2Z	

MATERIAL OF CONSTRUCTION:-

FRAME	ALUMINIUM
END COVER (DE)	ALUMINIUM
END COVER (NDE)	ALUMINIUM/CI
T. BOX	ALUMINIUM
T. BOX COVER	ALUMINIUM
SHAFT	CARBON STEEL



SHAFT END DETAILS

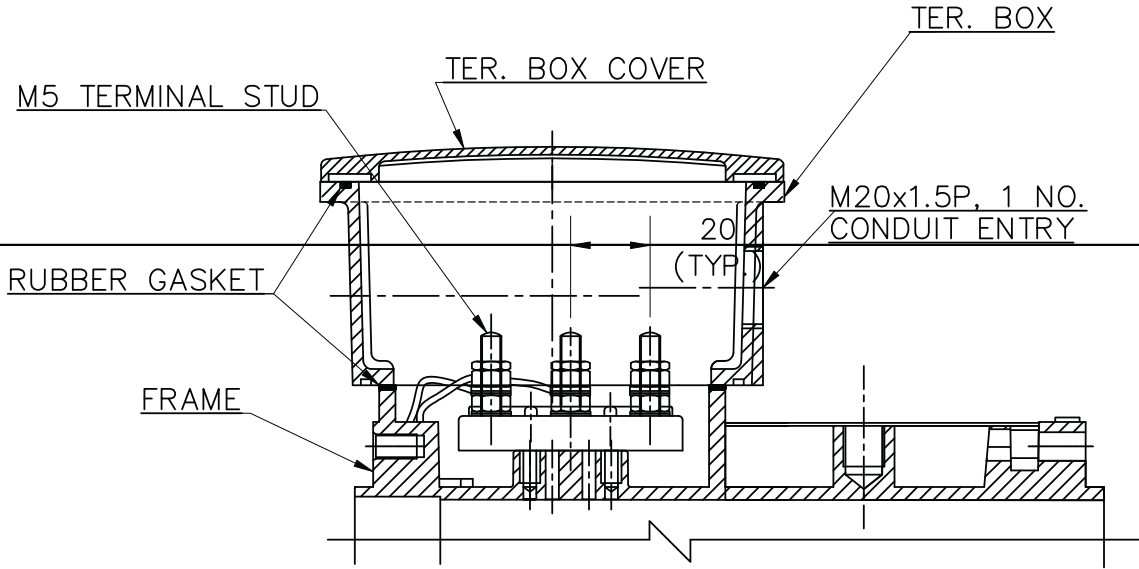
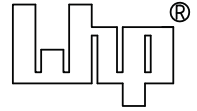
PRODUCT CODE:-

UNMENTIONED TOLERANCES ARE AS PER IS:2102-1/ ISO 2768-1	LINEAR DIMNS.	OVER & UPTO TOLERANCE	0.5-3 ±0.2	3-6 ±0.3	6-30 ±0.5	30-120 ±0.8	120-400 ±1.2	400-1000 ±2	1000-2000 ±3	DGN.	NAME.	DATE.	
	PERMISSIBLE DEVIATIONS FOR LENGTHS OF THE SHORTER SIDE OF THE ANGLE.												
	ANGULAR DIMNS.	OVER & UPTO TOLERANCE	0-10 ±1°	10-50 ±0°30'	50-120 ±0°20'	120-400 ±0°10'	400 ±0°5'						
TITLE:-											DRN.	TAMBULE	20.09.20
<u>GENERAL ARRANGEMENT. DRG. FOR</u>													
<u>100L FRAME FOOT (B3) MOUNTED MOTOR</u>													
											APPD.	GRM	20.09.20
											SCALE --- 1:1 SHEET --- 01 OF 03		
	Laxmi Hydraulics Pvt.Ltd.									DRG. NO. MGAN100A0359			
	Website : www.lhp.co.in												
UNLESS OTHERWISE SPECIFIED ALL DIMNS. ARE IN MM.							DO NOT SCALE THE DRAWING.		ISSUE NO. 01 REV.NO. 00				

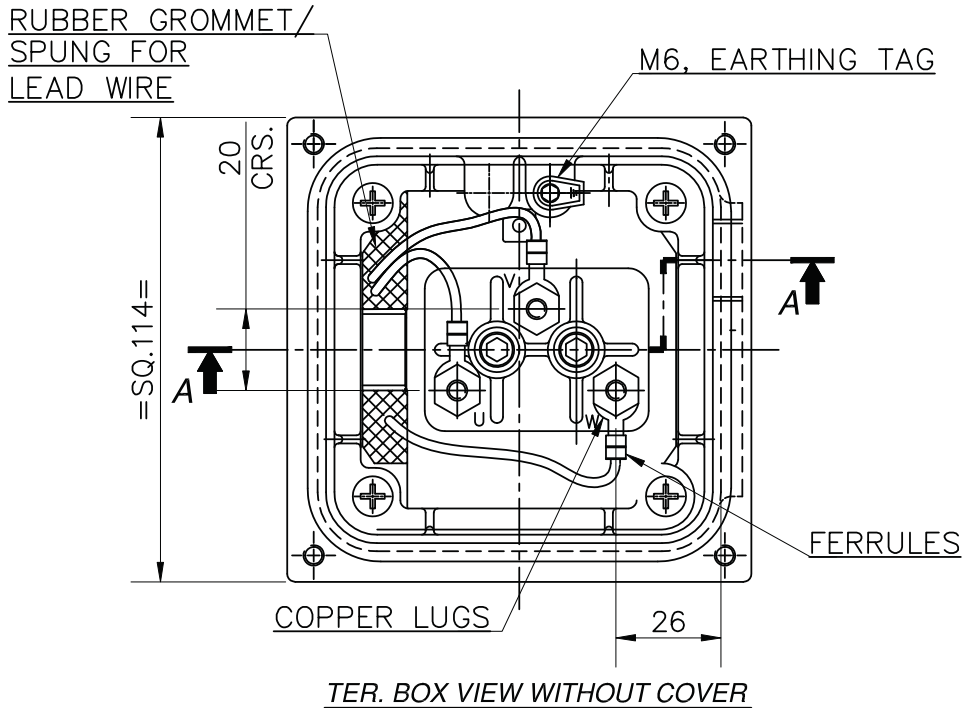
REV. NO.	DETAILS OF CHANGE	DATE	INTL.
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LAXMI HYDRAULICS PVT. LTD, SOLAPUR

TERMINAL BOX ARRANGEMENT FOR 100 ALPDC.FRAME



SECTION A-A

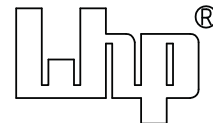


TER. BOX VIEW WITHOUT COVER

ISSUE.NO.-01	REV.NO.-00	DATE:- 20.09.20	DRG.NO.: -MGAN100A0359
SHEET-2 OF 3	DRN.BY:- TAMBULE	CHD BY:-	APPD. BY:- GRM

LAXMI HYDRAULICS PVT. LTD, SOLAPUR

NAMEPLATE DRAWING



IS: 12615		3 Ph. INDUCTION MOTOR			
CM/L-7500131009		IE MOTORS		IE3	
M/C.NO.		RPM:			
kW/HP:		FRM:			
V:		DUTY:		IP:	
Hz:		CONN.		A°C.	
AMP:		IN.CLS.		Ph.:	
EFF. IE3-		WT.:		Kg.	
COSØ:		REF.STD.: IS 12615 / IEC 60034-30			
MFD.BY: LAXMI HYDRAULICS PVT. LTD. SOLAPUR (INDIA) Website : www.lhp.co.in 047D19					

NOTE :—FOR DATA/SPECIFICATION IN NAMEPLATE REFER DATA SHEET/GAD.

SHEET:— 03 OF 03

ISSUE.NO.— 01

REV.NO.— 00

DATE— 20.09.20

DRG.NO.— MGAN100A0359

DRN.BY.— TAMBULE

CHD.BY.—

APPD.BY.— GRM

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	CENTRIFUGAL FANS & PUMPS	
1.1	Quantity	AS PER APPROVED BBU	
2.0	Manufacturer	HEM	
3.0	Type & Frame Size	2HE2 164-0403 & Frame Size 160M	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	11	
4.1	Rated Speed	1450	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	20.4	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	91.4	0.82
9.0	Efficiency & Power Factor at 75% Load	90.0	0.78
10.0	Efficiency & Power Factor at 50% Load	89.0	0.75
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	7.39	
13.0	Starting current (%)	750%	
14.0	No Load Current (With Mechanism Coupled)	6.5 A (Indicative)	
15.0	Starting torque in % of full load torque	14.78	
16.0	Pull up torque in % of full load torque	13.30	
17.0	Pull out torque in % of full load torque	18.47	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	10
		b) Cold	22
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	16
		b) Cold	34
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	8
		b) Cold	18
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	42/125	
26.0	Type & number of terminals broughtout	6 leads	
27.0	Stator winding connection	DELTA	

28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	0.86 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kg.m ²)	0.208	
42.0	Total weight of motor (kg)	137 KG APPROX	
43.0	Weight of stator (kg)	80 KG APPROX	
44.0	Weight of rotor (kg)	57 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	11.76	
51.0	Derated rating of motor at 50°C	11	
52.0	a) Locked Rotor KVA (Indicative)	110.1	
	b) Ratio of Locked rotor KVA / rated KW	10.0	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	28.1	
	b) Motor Static Load	132 KG	
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	
55	Noise Level	IEC 60034-9	

Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

3) Insulation shall be VPI.



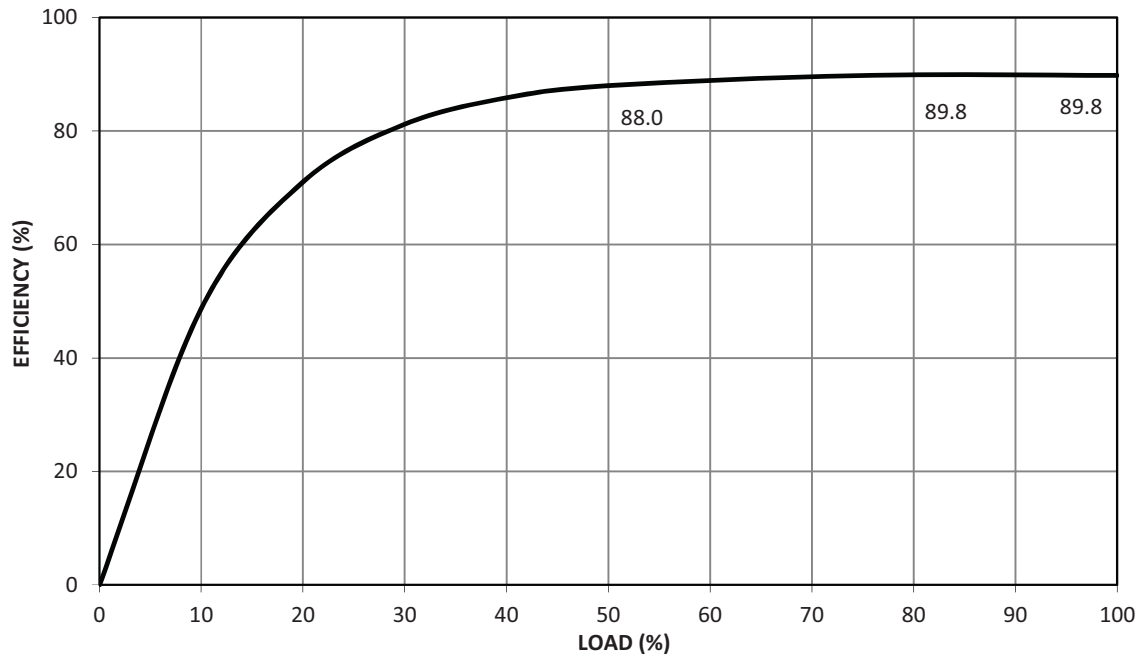
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 11.0/15.0

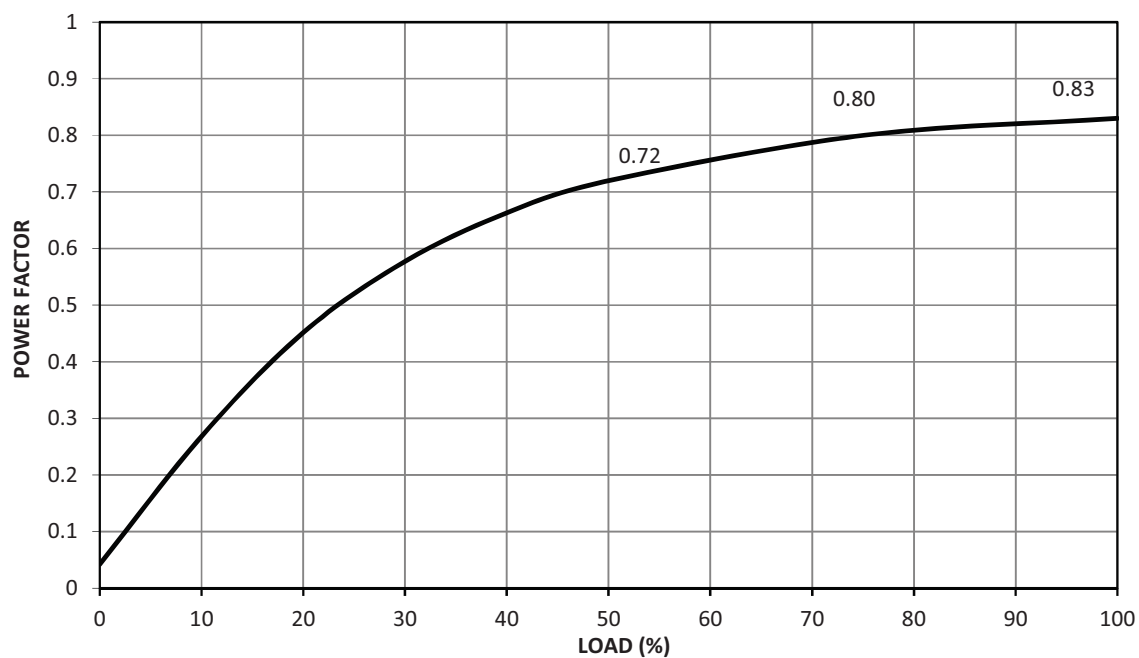
Poles : 4

Efficiency Class : IE2

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

25/08/2020

Revision:

-



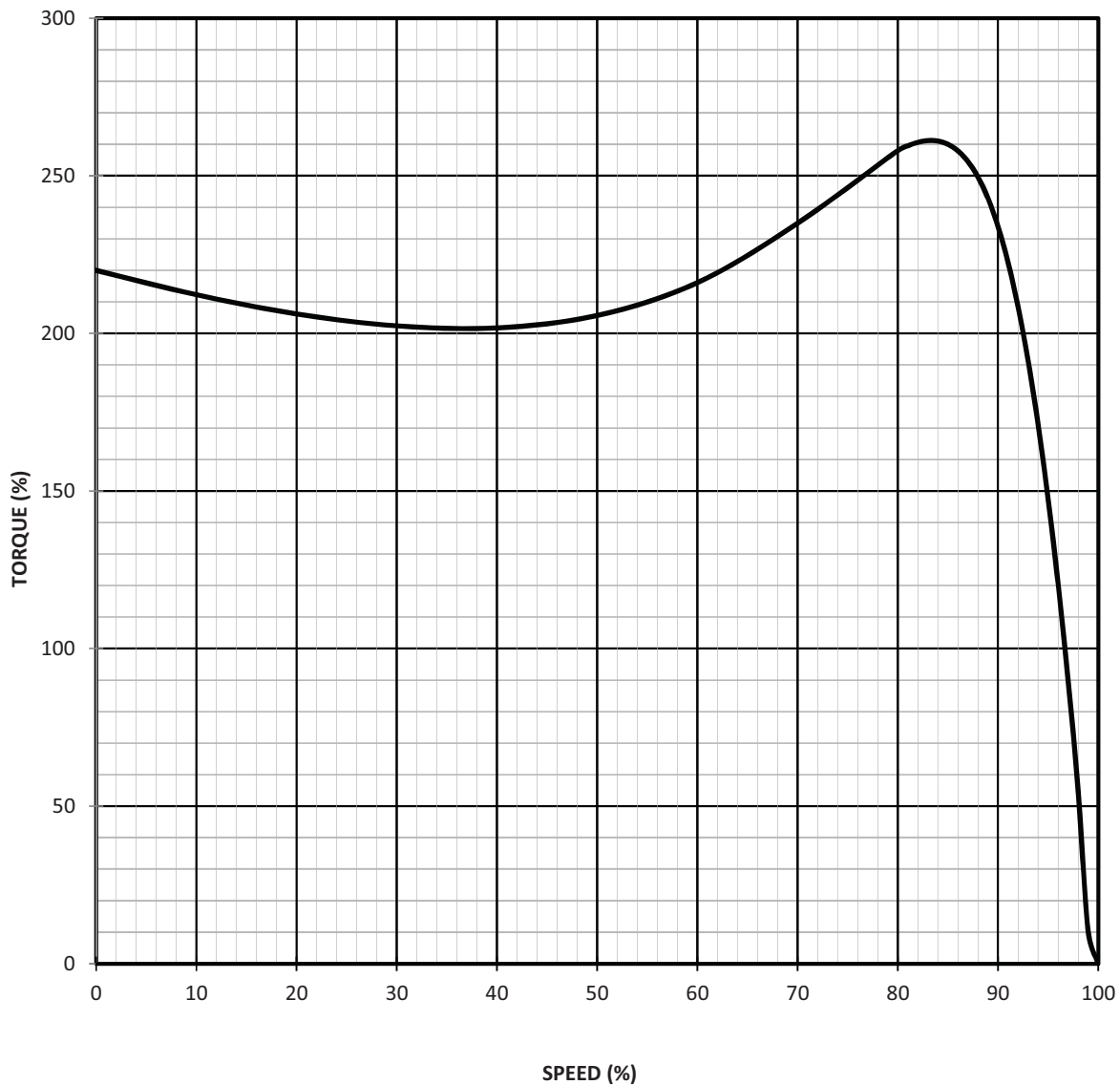
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 11.0/15.0

Poles : 4

Efficiency Class : IE2

TORQUE SPEED CURVE



Prep.:

SK

Date:

25/08/2020

Revision:

-



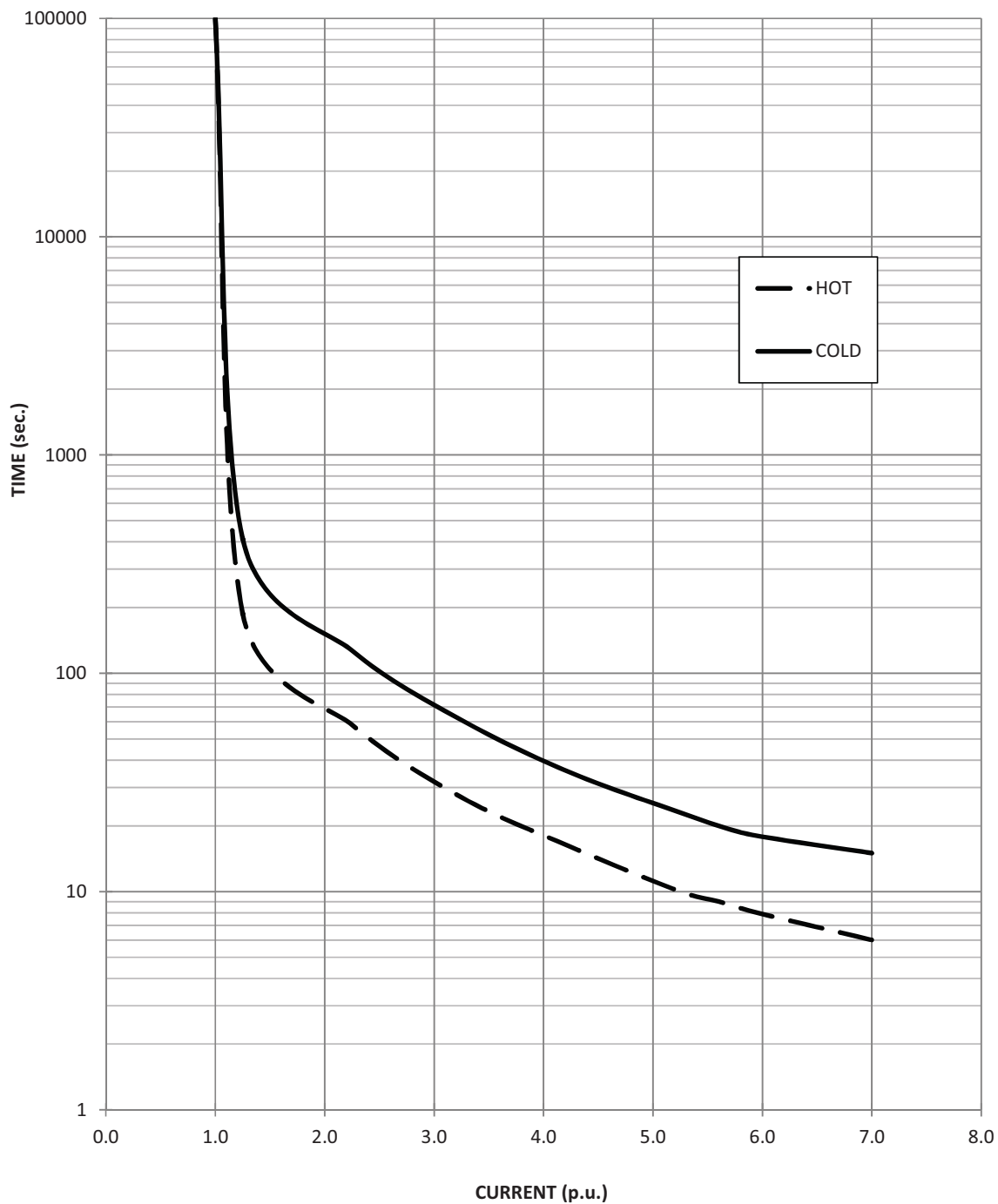
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 11.0/15.0

Poles : 4

Efficiency Class : IE2

THERMAL WITHSTAND CURVE



Prep.: SK

Date: 25/08/2020

Revision: 0



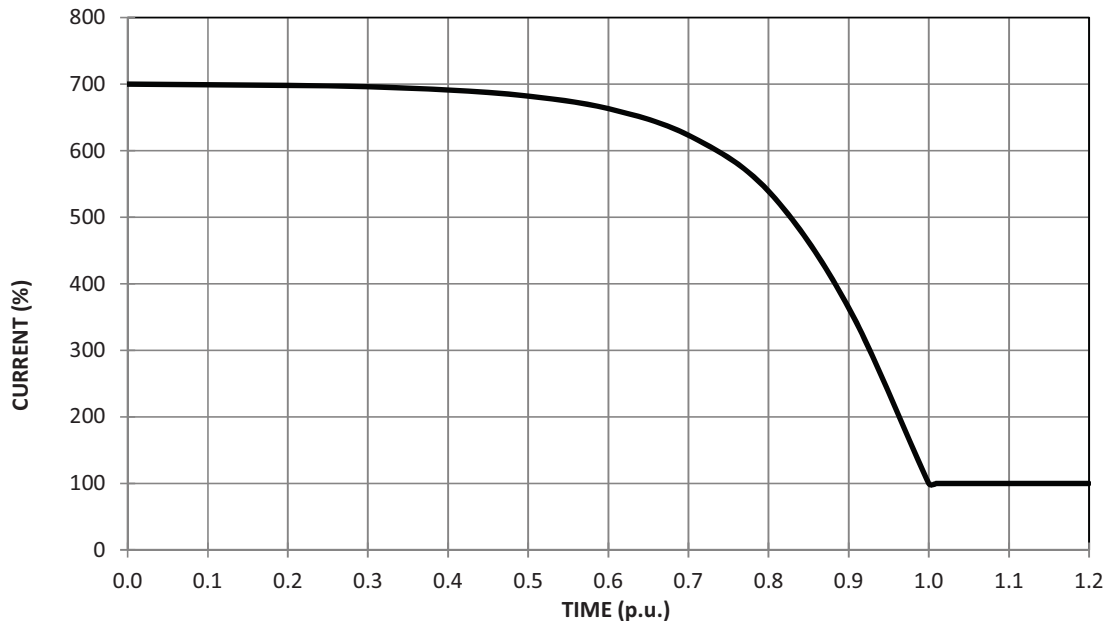
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 11.0/15.0

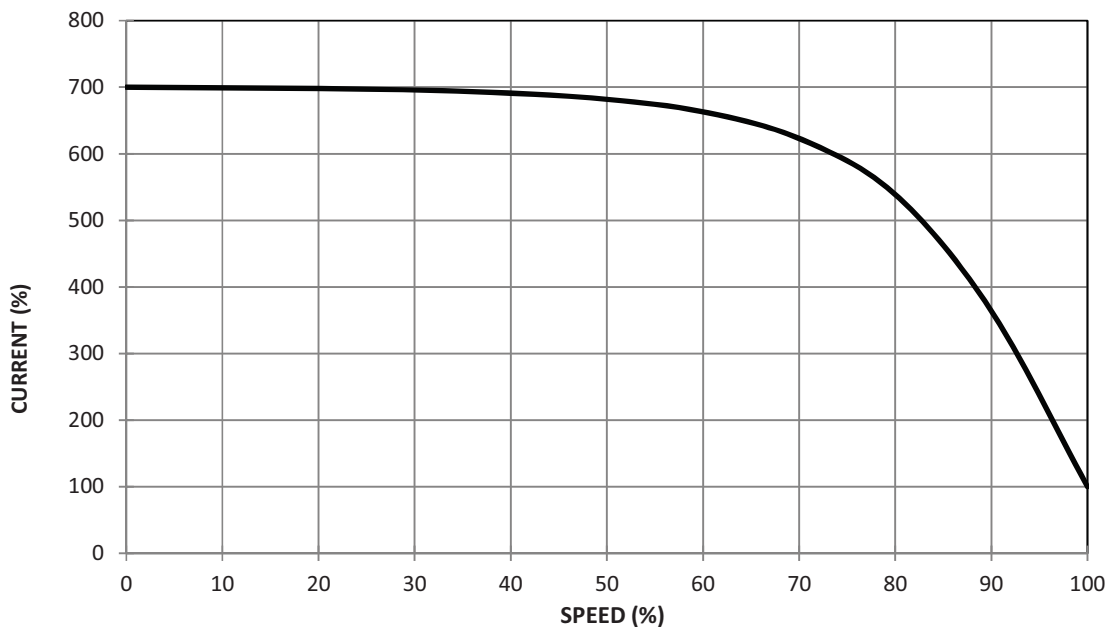
Poles : 4

Efficiency Class : IE2

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

25/08/2020

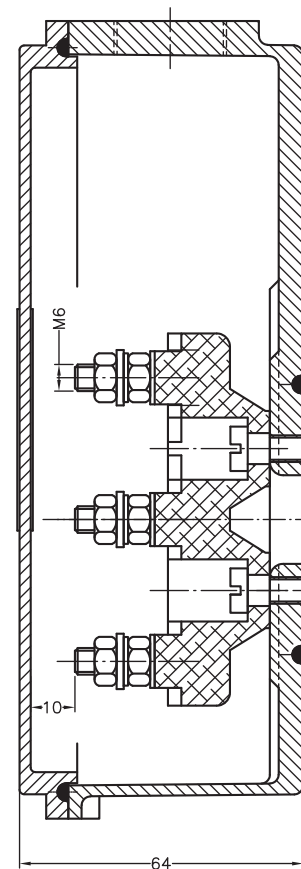
Revision:

-

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

REV. STATUS	[5]	NDE SIDE SHAFT EXTN. DIA.38x80LG. WAS DIA.42x110LG. & DIMS 676 WAS 706 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMENS. CHART - IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	LANKESH	06-01-20	
	[4]	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES,	NIMKAR	18/11/13	
		TITLE OVERALL DIMENSION DRAWING B3/STD/TEFC MOTOR	SCALE NTS		
			SHT 1/1		
	NAME	DATE	 DRG. NO.: A1-160M-49(GN) REF. :- A1-OADIM-160M(GN)	REV. 5	FRAME SIZE 160M (GN)
DRN.	P.V.SHINDE	07/08/03			
CHD.	S.P.JADIA	07/08/03			
APPD.	S.P.JADIA	07/08/03			

Approval doesn't absolve the EPC contractor of its responsibilities as specified in the Contract



REV. STATUS										
	2	DIMN. 73 ADDED.							SAURABH	03/06/15
	1	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.							NIMKAR	05/07/13
			TITLE TERMINAL BOX ASSEMBLY						SCALE NTS	
									SHT 1/1	
	NAME	DATE	PROJECTION	DRG. NO.:				REV.	FRAME SIZE	
DRN.	GANESH	05/08/11		A3-160/180-33(GN)				2	160-180 (GN)	
CHD.	S.P.JADIA	05/08/11								
APPD.	S.P.JADIA	05/08/11		REF. 3-tbassy						

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	Pump	
1.1	Quantity	AS PER APPROVED BBU	
2.0	Manufacturer	HEM	
3.0	Type & Frame Size	2HE2 183-0403& Frame Size 180M	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	18.5	
4.1	Rated Speed	1460	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	33.1	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	92.6	0.84
9.0	Efficiency & Power Factor at 75% Load	91.5	0.80
10.0	Efficiency & Power Factor at 50% Load	90.0	0.75
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	12.34	
13.0	Starting current (%)	750%	
14.0	No Load Current (With Mechanism Coupled)	10 A (Indicative)	
15.0	Starting torque in % of full load torque	24.68	
16.0	Pull up torque in % of full load torque	22.22	
17.0	Pull out torque in % of full load torque	30.85	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	10
		b) Cold	22
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	16
		b) Cold	34
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	8
		b) Cold	18
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	42/125	
26.0	Type & number of terminals broughtout	6 leads	
27.0	Stator winding connection	DELTA	

28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	0.43 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kg·m ²)	0.208	
42.0	Total weight of motor (kg)	183 KG APPROX	
43.0	Weight of stator (kg)	113 KG APPROX	
44.0	Weight of rotor (kg)	70 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	19.78	
51.0	Derated rating of motor at 50°C	18.5	
52.0	a) Locked Rotor KVA (Indicative)	178.4	
	b) Ratio of Locked rotor KVA / rated KW	9.6	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	46.9	
	b) Motor Static Load	182 KG	
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	
55	Noise Level	IEC 60034-9	

Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

3) Insulation shall be VPI.



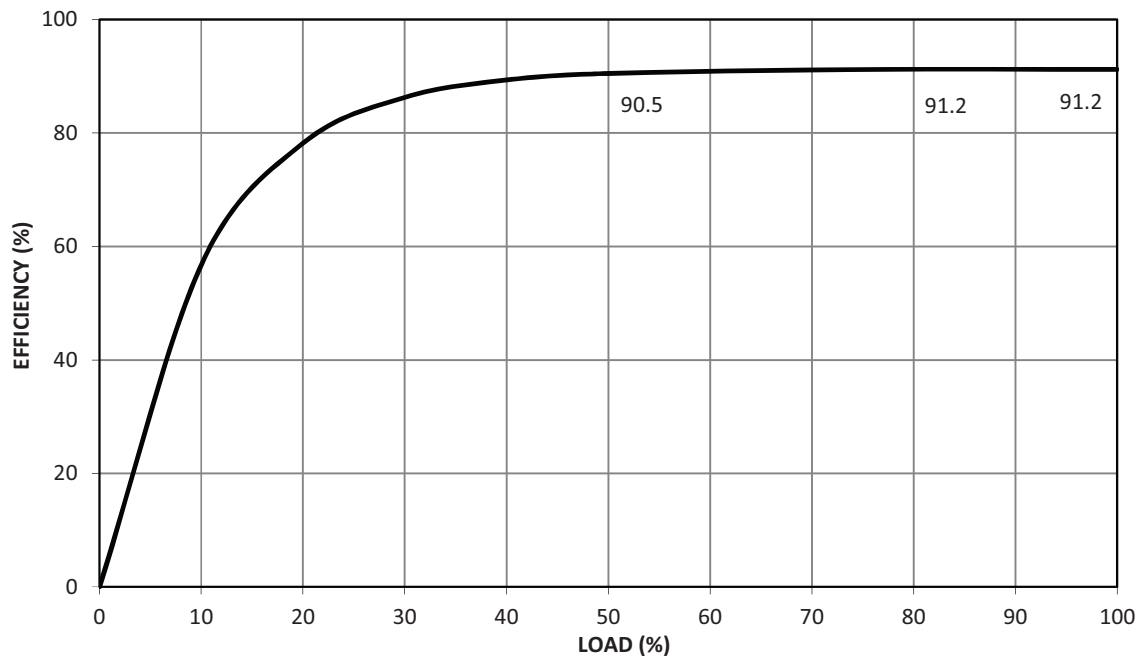
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 18.5/25.0

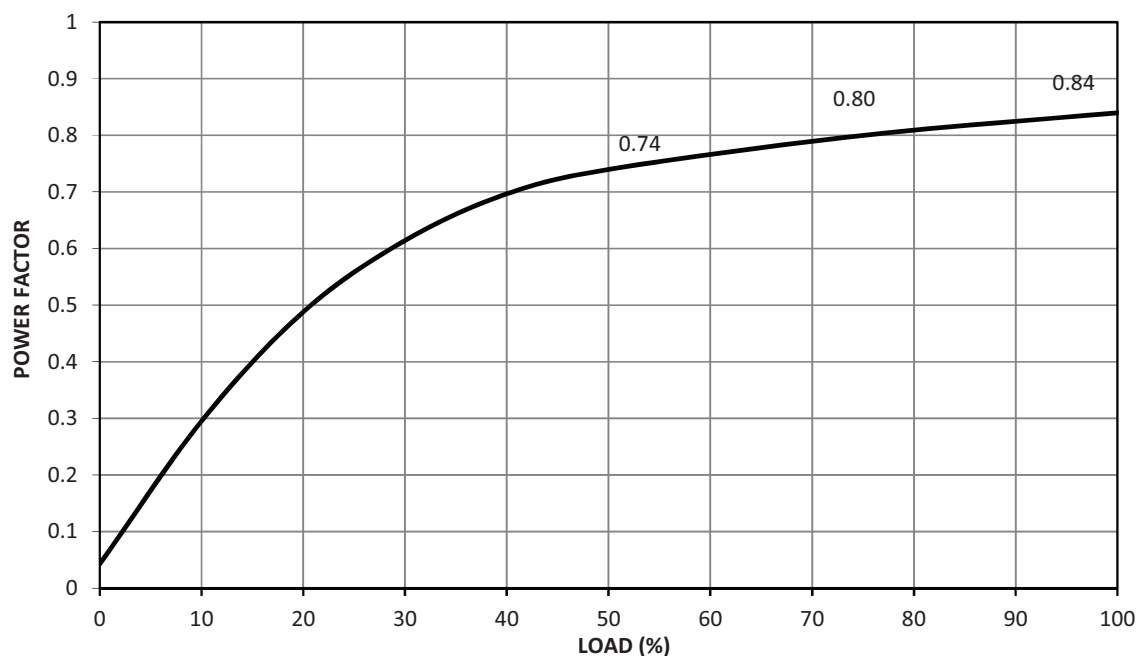
Poles : 4

Efficiency Class : IE2

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

10/8/2020

Revision:

-



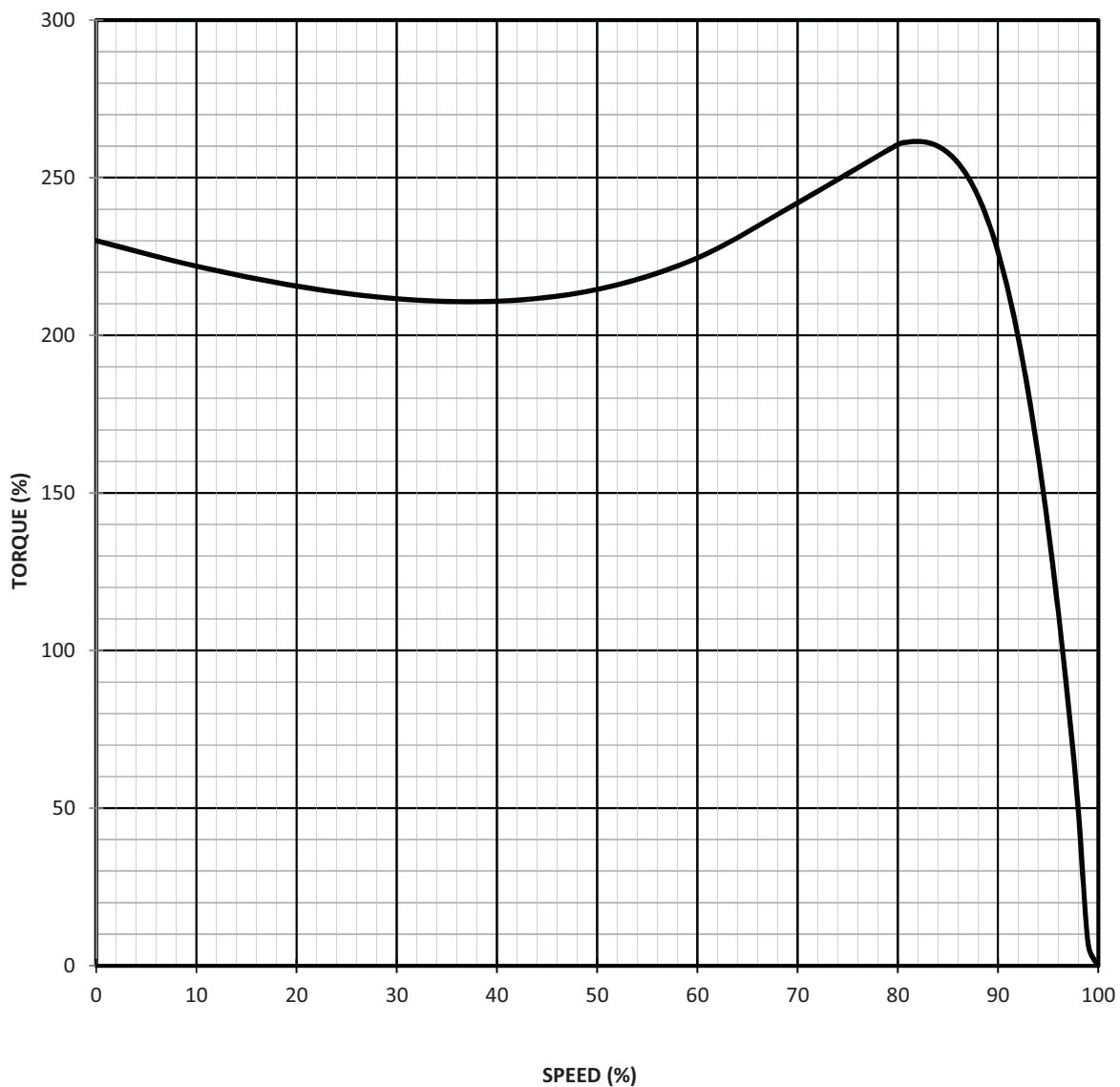
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 18.5/25.0

Poles : 4

Efficiency Class : IE2

TORQUE SPEED CURVE



Prep.: SK

Date: 10/8/2020

Revision: -



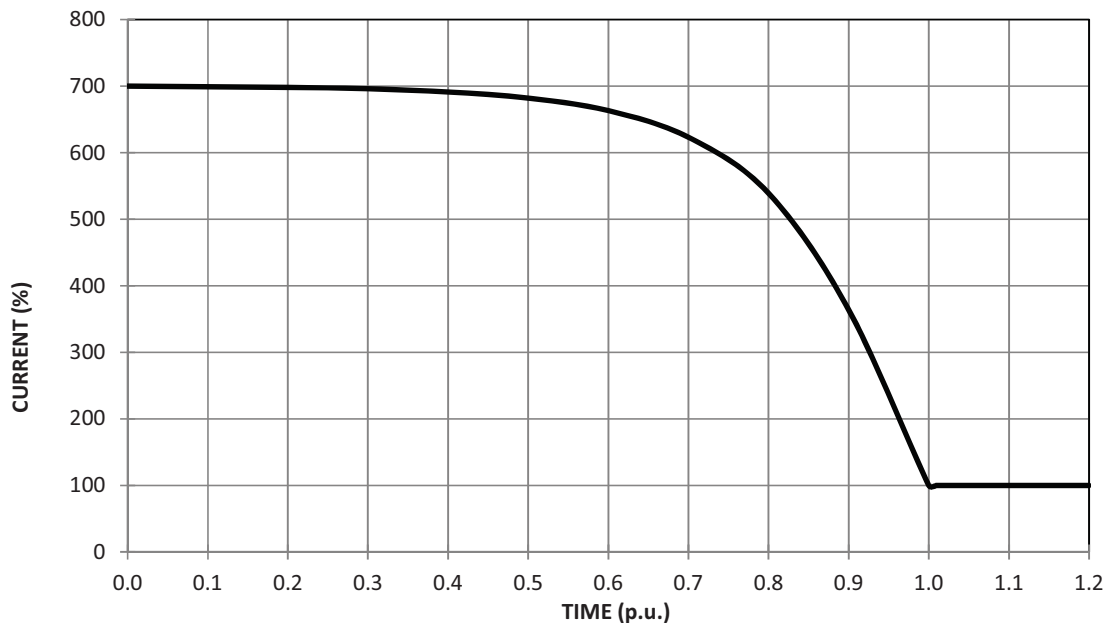
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 18.5/25.0

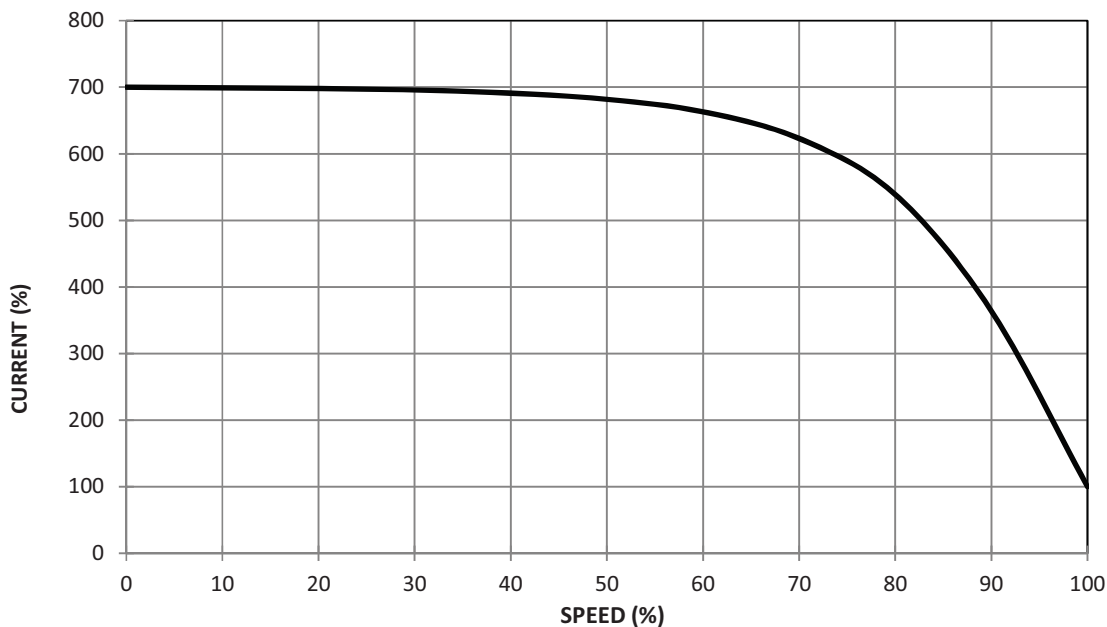
Poles : 4

Efficiency Class : IE2

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

10/8/2020

Revision:

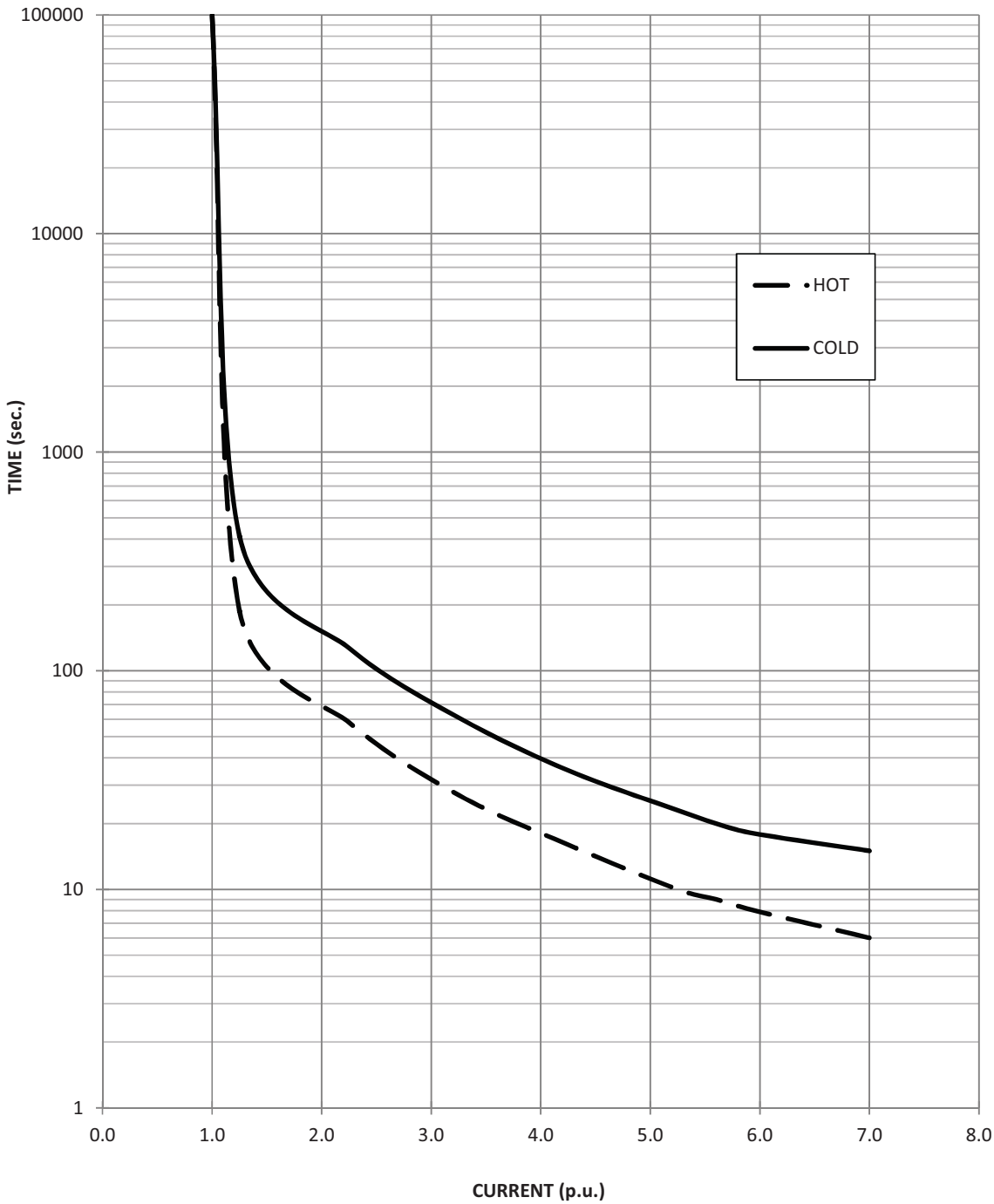
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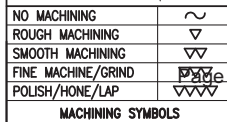
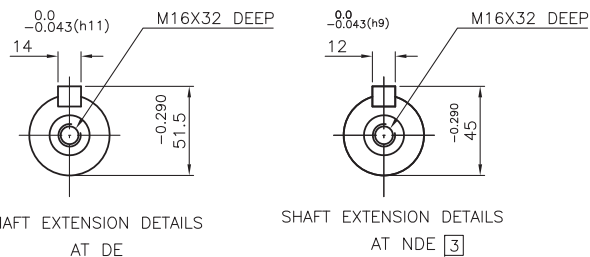
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 18.5/25.0	Poles : 4	Efficiency Class : IE2	
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THERMAL WITHSTAND CURVE



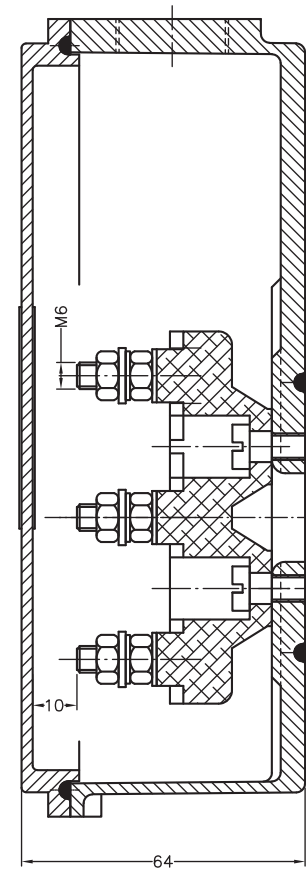
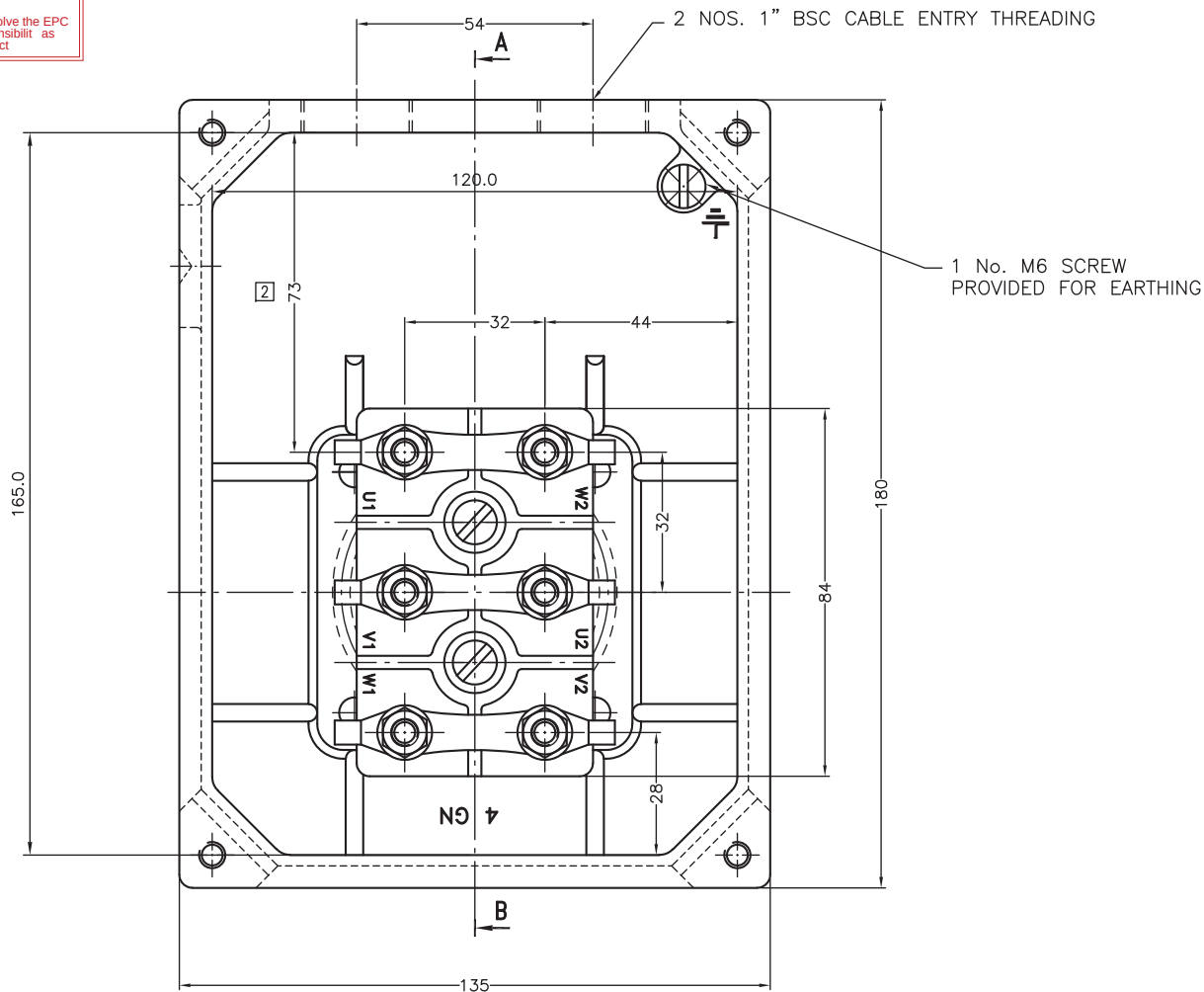
Approval doesn't absolve the EPC contractor of its responsibilities as specified in the Contract



REV. STATUS	[3]	NDE SIDE SHAFT EXTN. DIA.42x110LG. WAS DIA.48x110LG. & AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART – IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	10-01-20	LANKESH
	[2]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. AND ALL THE FEATURES, EARTHING NOTE ADDED, DIMN. 236, ø354 WAS 233, ø336. DIMN. 381 ADDED.	23-2-15	NIMKAR
		TITLE OVERALL DIMENSION DRAWING		SCALE NTS SHT 1/1
DRN. CHD.	NAME P.N.RAOTE	DATE 17-06-06	PROJECTION 	DRG. NO.: A1-180M-49(GN)
APPD.	S.P.JADIA	17-06-06		
REF : A1-OADIM-B3-180M(GN)			REV. 3	FRAME SIZE 180M (GN)

APPROVED
Checked and Approved

Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



All dimensions in mm unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS									
	2	DIMN. 73 ADDED.						SAURABH	03/06/15
	1	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.						NIMKAR	05/07/13
			TITLE TERMINAL BOX ASSEMBLY					SCALE NTS	
								SHT 1/1	
	NAME	DATE	PROJECTION	DRG. NO.:			REV.	FRAME SIZE	
DRN.	GANESH	05/08/11		A3-160/180-33(GN)			2	160-180 (GN)	
CHD.	S.P.JADIA	05/08/11							
APPD.	S.P.JADIA	05/08/11		REF. 3-tbassy					

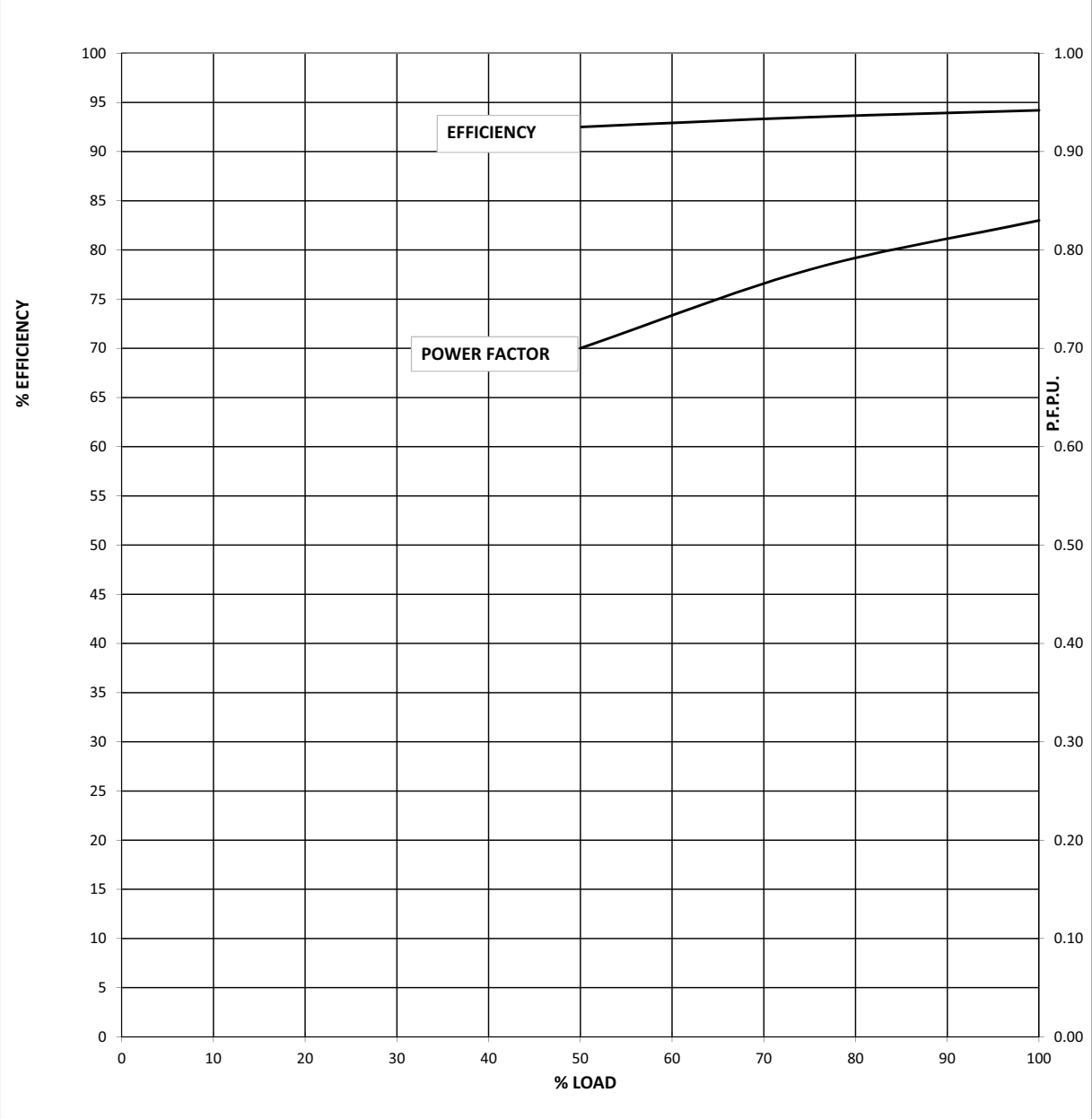
DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	CENTRIFUGAL FANS	
1.1	Quantity	AS PER APPROVED BBU	
2.0	Manufacturer	LHPL	
3.0	Type & Frame Size	Energy Efficient & Frame Size 225M	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	45	
4.1	Rated Speed	1480	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	80.1	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	94.2	0.83
9.0	Efficiency & Power Factor at 75% Load	93.5	0.78
10.0	Efficiency & Power Factor at 50% Load	92.5	0.70
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	29.61	
13.0	Starting current (%)	770%	
14.0	No Load Current (With Mechanism Coupled)	34 A (Indicative)	
15.0	Starting torque in % of full load torque	62.19	
16.0	Pull up torque in % of full load torque	59.23	
17.0	Pull out torque in % of full load torque	74.04	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	12
		b) Cold	27
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	19
		b) Cold	42
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	10
		b) Cold	22
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	50/150	
26.0	Type & number of terminals broughtout	6 leads	
27.0	Stator winding connection	DELTA	

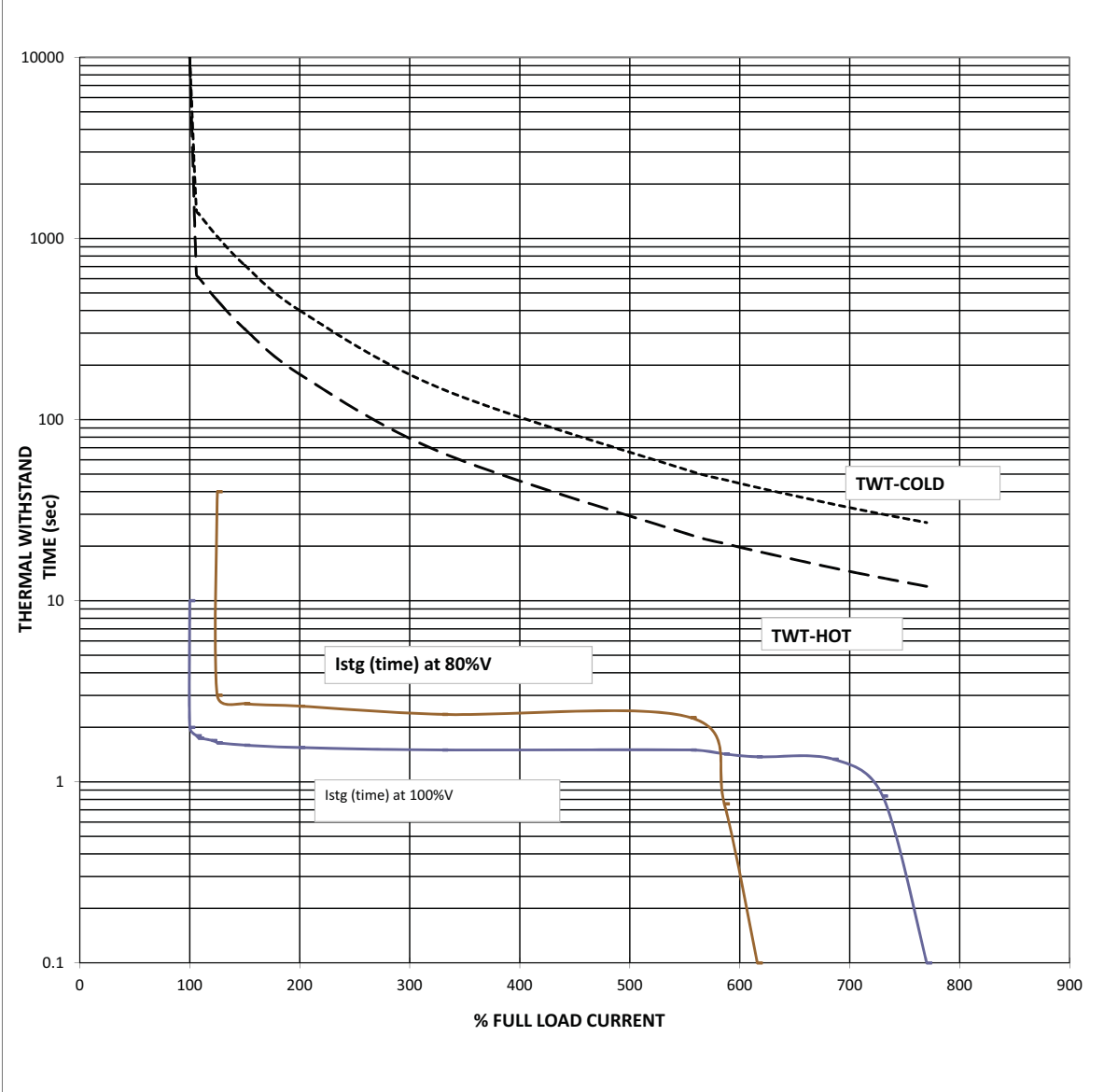
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	0.115 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kg·m ²)	1.68	
42.0	Total weight of motor (kg)	372 KG APPROX	
43.0	Weight of stator (kg)	222 KG APPROX	
44.0	Weight of rotor (kg)	150 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	48.11	
51.0	Derated rating of motor at 50°C	45	
52.0	a) Locked Rotor KVA (Indicative)	443.2	
	b) Ratio of Locked rotor KVA / rated KW	9.8	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	112.5	
	b) Motor Static Load	372 KG	
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	
55	Noise Level	IEC 60034-9	

Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

3) Insulation shall be VPI.

MKTG Ref No.:		D7HO2009026	LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
LOAD VS EFF. & P.F.						
CUSTOMER						
INDENT NO. :		PO NO:		PO DATE:		 
PROJECT NAME :						
kW : 45		POLE :	4	VOLTS :	415	QTY : 1
						
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.						
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,						
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.						
		WDG NO				
2		GAD NO		Prepared By		SSG 1/6/2021
1		T BOX NO		Checked By		SNG 1/6/2021
NO	REVISION		SIGN	DATE	SIGN	DATE

MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
STARTING CURRENT VS STARTING TIME AND THERMAL WITHSTAND TIME.							
CUSTOMER							
INDENT NO. :		PO NO:		PO DATE:		 	
PROJECT NAME :							
kW : 45		POLE : 4		VOLTS : 415		QTY : 1	
							
L. R.CURRENT at 100% voltage : 770 % OF FLA THERMAL WITHSTAND TIME(sec):							
Starting time at 100% voltage :		2 sec		AT100% RATED VOLTAGE (HOT) :		12	
Starting time at 80% voltage :		3 sec		AT100% RATED VOLTAGE (COLD):		27	
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.							
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,							
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.							
		WDG NO					
2		GAD NO		Prepared By		SSG	
1		T BOX NO		Checked By		SNG	
NO		REVISION		SIGN		DATE	

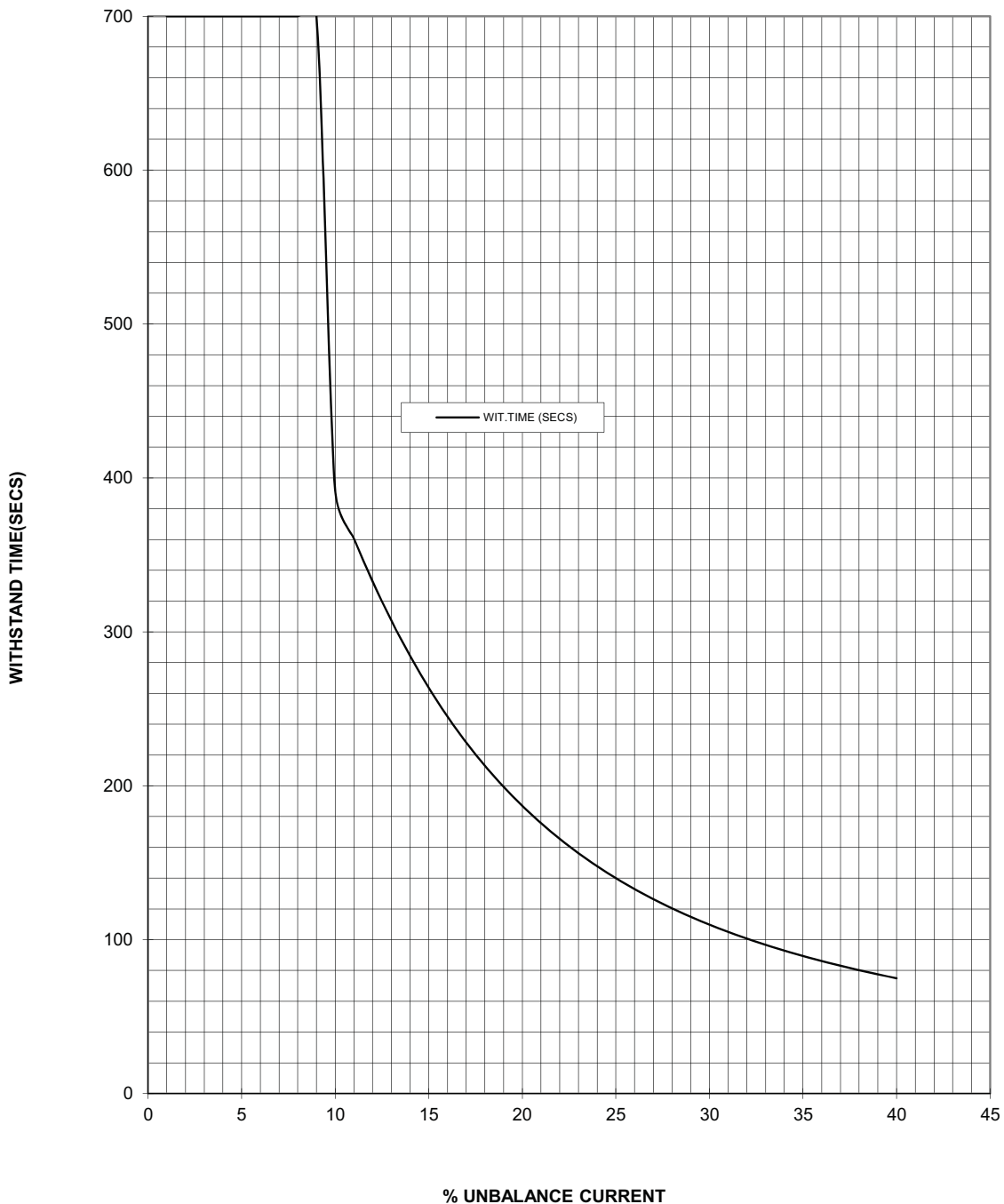
DRG. NO.- NEG.SEQ.



NEGATIVE SEQUENCE CHARACTERISTICS

CUSTOMER

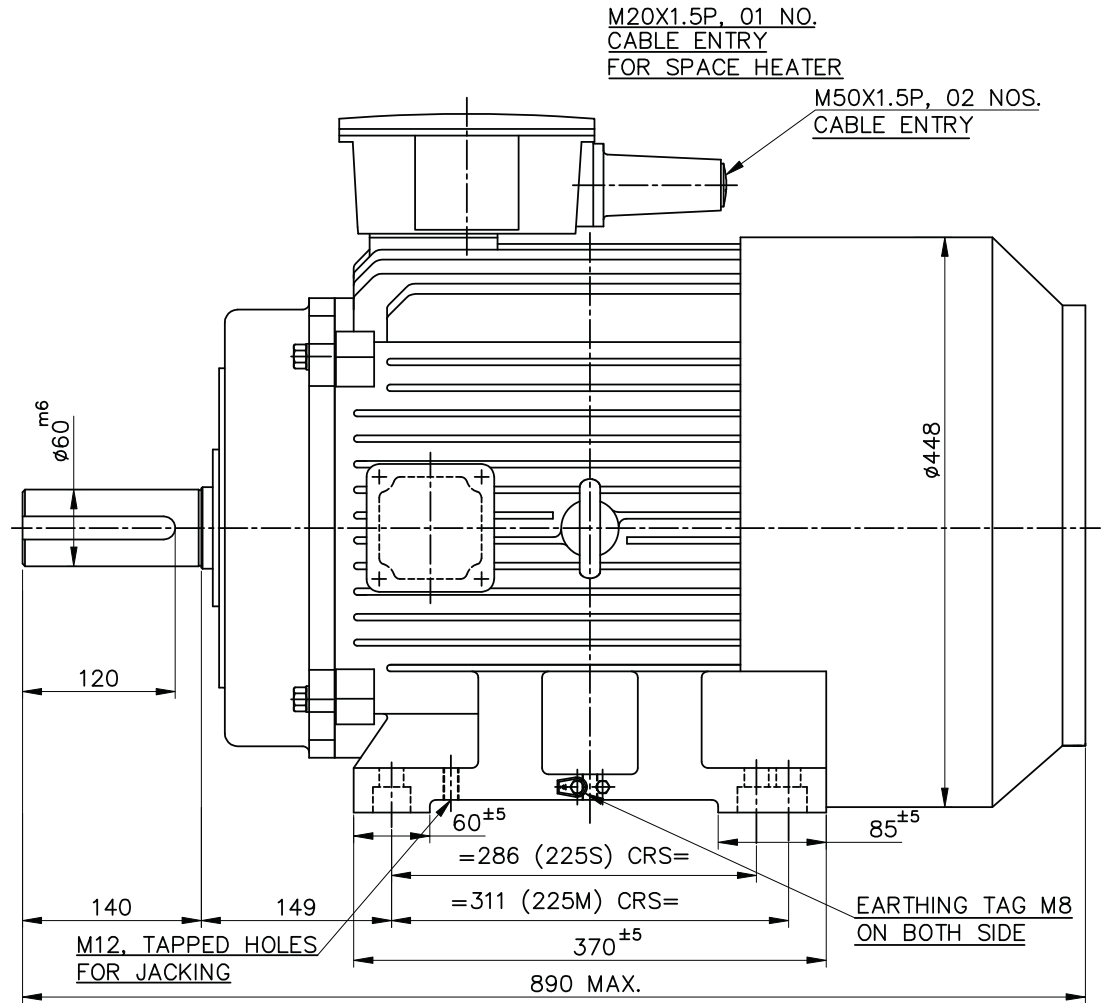
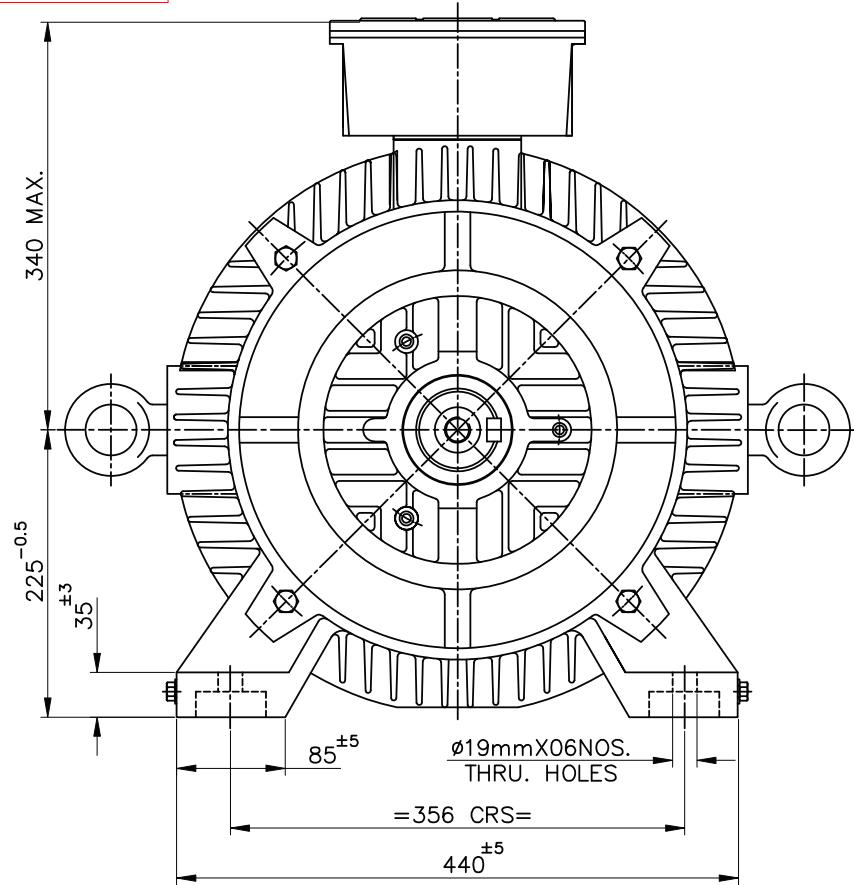
kW : 45 POLE : 4 VOLTS : 415 QTY : 1



2		PREP	SSG	1/6/2021
1		APPD	SNG	1/6/2021
NO	REVISION	SIGN/DATE	SIGN	DATE

APPROVED
Checked and Approved:

Date: 29-Mar-2023
*Approval doesn't absolve the EPC
contractor of it's responsibility as
specified in the Contract.

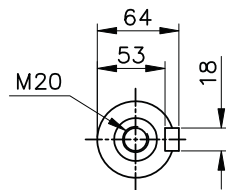


SPECIFICATION:-

RATING (KW/HP)	45/60
POLE	4
BEARING DE SIDE	6313 ZZ C3
BEARING NDE SIDE	6312 ZZ C3

MATERIAL OF CONSTRUCTION:-

FRAME	CAST IRON
END COVER (DE)	CAST IRON
END COVER (NDE)	CAST IRON
T.BOX & COVER	CAST IRON
SHAFT	CARBON STEEL

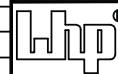


SHAFT END DETAILS

3			
2			
1			
REV. NO.	ECN DETAILS	DATE.	INTL.

UNMENTIONED TOLERANCES ARE AS PER IS:2102-1/ISO 2768-1	LINEAR DIMNS.	OVER & UPTO TOLERANCE	0.5-3 ±0.2	3-6 ±0.3	6-30 ±0.5	30-120 ±0.8	120-400 ±1.2	400-1000 ±2	1000-2000 ±3		NAME.	DATE.
	ANGULAR DIMNS.	OVER & UPTO TOLERANCE	0-10 ±1°	10-50 ±0°30'	50-120 ±0°20'	120-400 ±0°10'	400 ±0°5'			DGN.		
										DRN.	NVM	19.09.20
										CHD.		19.09.20
										APPD.		19.09.20
										SCALE :- 1:1		
										SHEET NO.:- 01 OF 03		
										DRG. NO.		
										MGAN225A0553		
										ISSUE NO. 01	REV.NO. 00	

TITLE GENERAL ARRANGEMENT DRG.OF
225S/M FRAME FOOT MTG (B3) MOTOR
(WITH CONDUIT ADAPTOR)



Laxmi Hydraulics Pvt.Ltd.

Website : www.lhp.co.in

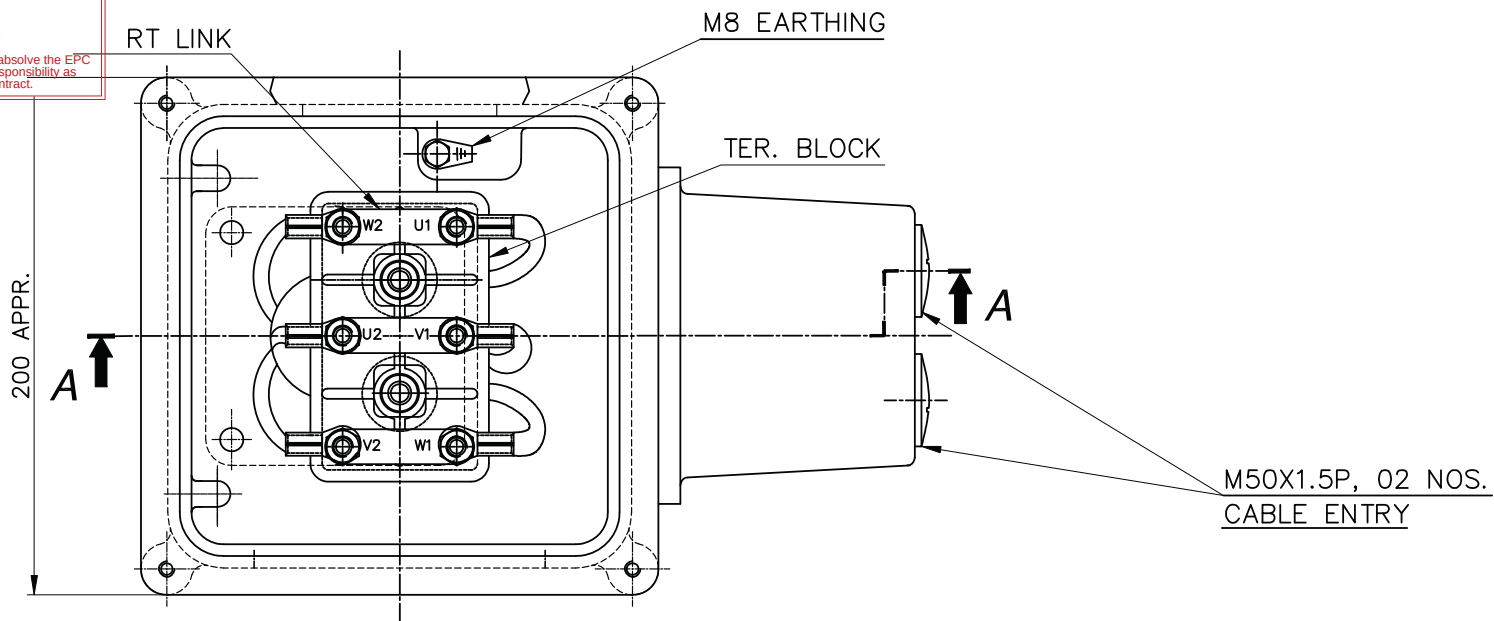
SOLAPUR



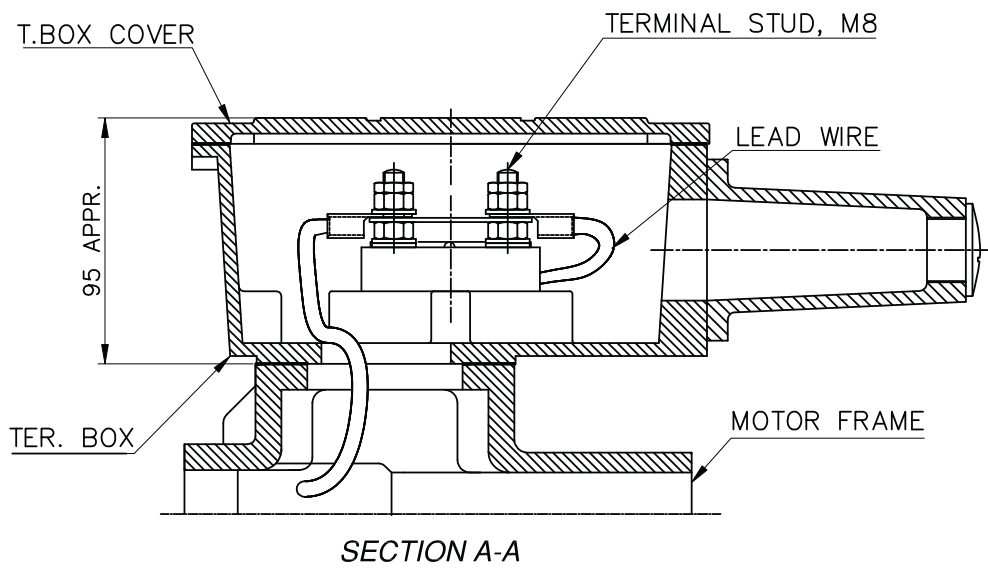
UNLESS OTHERWISE SPECIFIED ALL DIMNS. ARE IN MM. DO NOT SCALE THE DRAWING.

APPROVED
Checked and Approved:

Date: 29-Mar-2023
*Approval doesn't absolve the EPC
contractor of it's responsibility as
specified in the Contract.



TOP VIEW SHOWING TERMINAL BOX WITHOUT COVER



UNMENTIONED TOLERANCES ARE AS PER IS:2102-1/ ISO 2768-1	LINEAR DIMNS.	OVER & UPTO	0.5-3	3-6	6-30	30-120	120-400	400-1000	1000-2000	DGN.	NAME.	DATE.
	TOLERANCE	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3				
	PERMISSIBLE DEVIATIONS FOR LENGTHS OF THE SHORTER SIDE OF THE ANGLE.											
ANGULAR DIMNS.	OVER & UPTO	0-10	10-50	50-120	120-400	400.....						
	TOLERANCE	±1°	±0°30'	±0°20'	±0°10'	±0°5'						
TITLE <u>TERMINAL BOX ARRANGEMENT DRG.OF</u> <u>225S/M FRAME MOTOR</u> <u>(WITH CONDUIT ADAPTOR)</u>										DRN.	NVM	19.09.20
										CHD.		19.09.20
										APPD.		19.09.20
										SCALE :-- 2: 1		
										SHEET NO.-- 02 OF 03		
 Laxmi Hydraulics Pvt.Ltd. Website : www.lhp.co.in SOLAPUR 										DRG. NO.	MGAN225A0553	
										ISSUE NO. 01 REV.NO. 00		
UNLESS OTHERWISE SPECIFIED ALL DIMS. ARE IN MM. DO NOT SCALE THE DRAWING.												

IS: 12615		3 Ph. INDUCTION MOTOR			
 CM/L-7500131009					
M/C.NO.:		RPM:			
kW/HP:		FRAME:			
$\oplus$ V:		DUTY:		IP: $\oplus$	
Hz:		CONN.:		A°C.:	
AMP:		IN.CLS.:		Ph.:	
EFF. IE3- %		WT.:		Kg.	
COSØ:		REF.STD.:IS 12615 / IEC 60034-30			
MFD.BY: LAXMI HYDRAULICS PVT. LTD. SOLAPUR (INDIA) Website : www.lhp.co.in 047D20					

NOTE :—FOR DATA/SPECIFICATION IN NAMEPLATE REFER DATA SHEET/GAD.

NAME PLATE DETAILS

SHEET NO:—3 OF 3

ISSUE.NO.—01

REV.NO.—00

DATE—19.09.20

DRG.NO.—MGAN225A0553

DRN. BY.— NVM

CHD. BY.—

APPD.BY.—

<u>DATASHEET</u>			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FANS	
1.1	Quantity	AS PER APPROVED BBU / FAN SCHEDULE	
2.0	Manufacturer	LHP	
3.0	Type & Frame Size	Energy Efficient & Frame Size 80	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	0.55	
4.1	Rated Speed	930	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	1.5	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	77.2	0.66
9.0	Efficiency & Power Factor at 75% Load	76.0	0.60
10.0	Efficiency & Power Factor at 50% Load	74.0	0.50
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	0.58	
13.0	Starting current (%)	500%	
14.0	No Load Current (With Mechanism Coupled)	1.1 A (Indicative)	
15.0	Starting torque in % of full load torque	1.09	
16.0	Pull up torque in % of full load torque	0.92	
17.0	Pull out torque in % of full load torque	1.38	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	10
		b) Cold	20
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	16
		b) Cold	31
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	8
		b) Cold	17
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	42/125	
26.0	Type & number of terminals broughtout	3 leads	
27.0	Stator winding connection	STAR	

28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	13.20 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kg·m ²)	0.008	
42.0	Total weight of motor (kg)	12 KG APPROX	
43.0	Weight of stator (kg)	7 KG APPROX	
44.0	Weight of rotor (kg)	5 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	0.59	
51.0	Derated rating of motor at 50°C	0.55	
52.0	a) Locked Rotor KVA (Indicative)	6.5	
	b) Ratio of Locked rotor KVA / rated KW	11.8	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	2.2	
	b) Motor Static Load		
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	
55	Noise Level	IEC 60034-9	

Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

3) Insulation shall be VPI.

MKTG Ref No.:		D7HO2009026	LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
LOAD VS EFF. & P.F.						
CUSTOMER : ADVANCE VERIFICATION						
INDENT NO. :		PO NO:		PO DATE:		 
PROJECT NAME :						
kW : 0.55		POLE :	6	VOLTS :	415	QTY : 1
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.						
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,						
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.						
		WDG NO				
2			GAD NO	Prepared By		SSG 1/6/2021
1			T BOX NO	Checked By		SNG 1/6/2021
NO	REVISION		SIGN	DATE	SIGN	DATE

MKTG Ref No.:

D7HO2009026

LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.



STARTING CURRENT VS STARTING TIME AND THERMAL WITHSTAND TIME.

CUSTOMER

INDENT NO. :

PO NO:

PO DATE:



IE3

PROJECT NAME :

kW :

0.55

POLE :

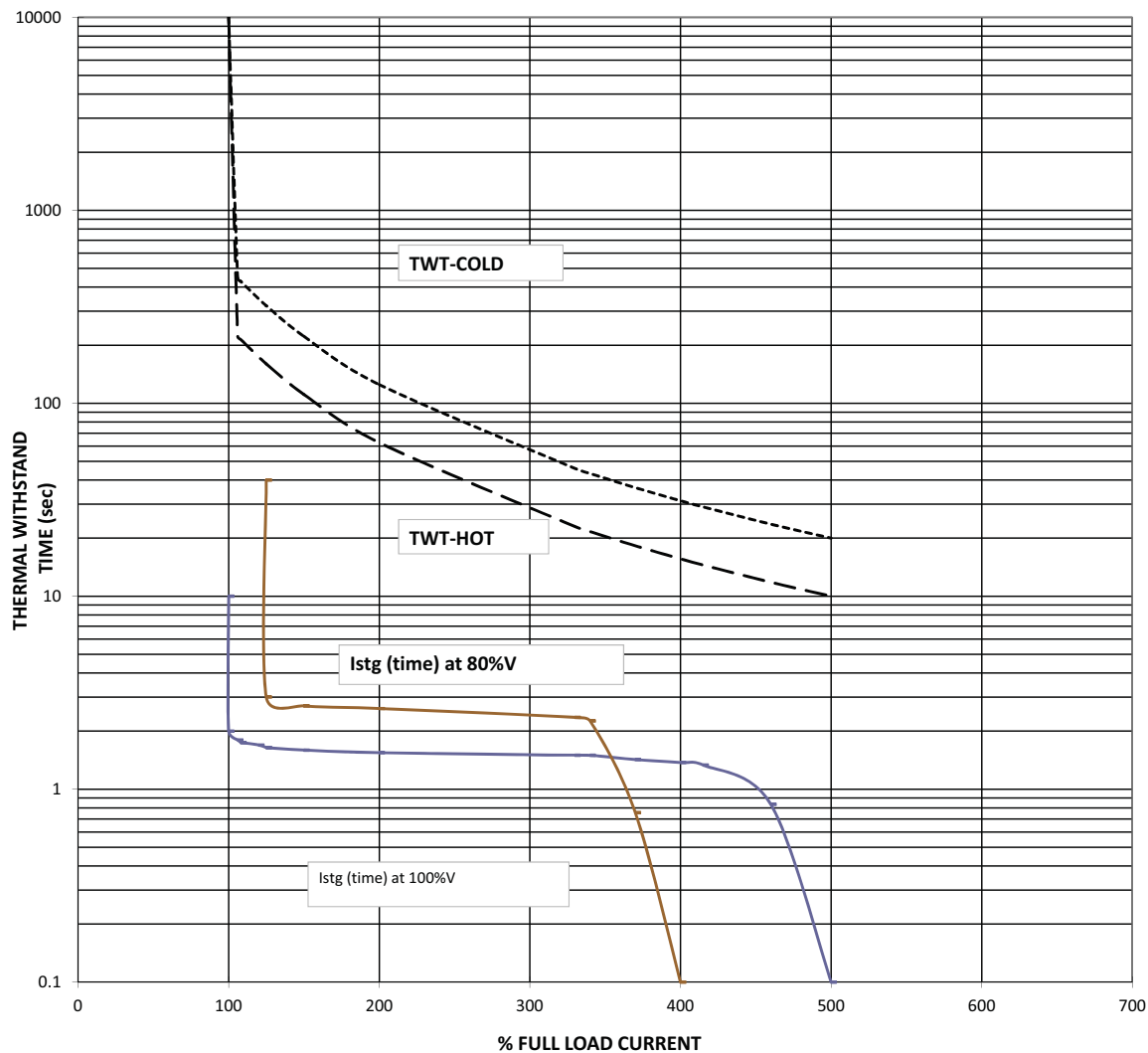
6

VOLTS :

415

QTY :

1



L. R.CURRENT at 100% voltage :

500

% OF FLA

THERMAL WITHSTAND TIME(sec):

Starting time at 100% voltage :

2

sec

AT100% RATED VOLTAGE (HOT) :

10

Starting time at 80% voltage :

3

sec

AT100% RATED VOLTAGE (COLD):

20

NOTE 1

ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.

2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,

3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.

			WDG NO				
2			GAD NO		Prepared By	SSG	
1			T BOX NO		Checked By	SNG	
NO	REVISION	SIGN	DATE		SIGN	DATE	

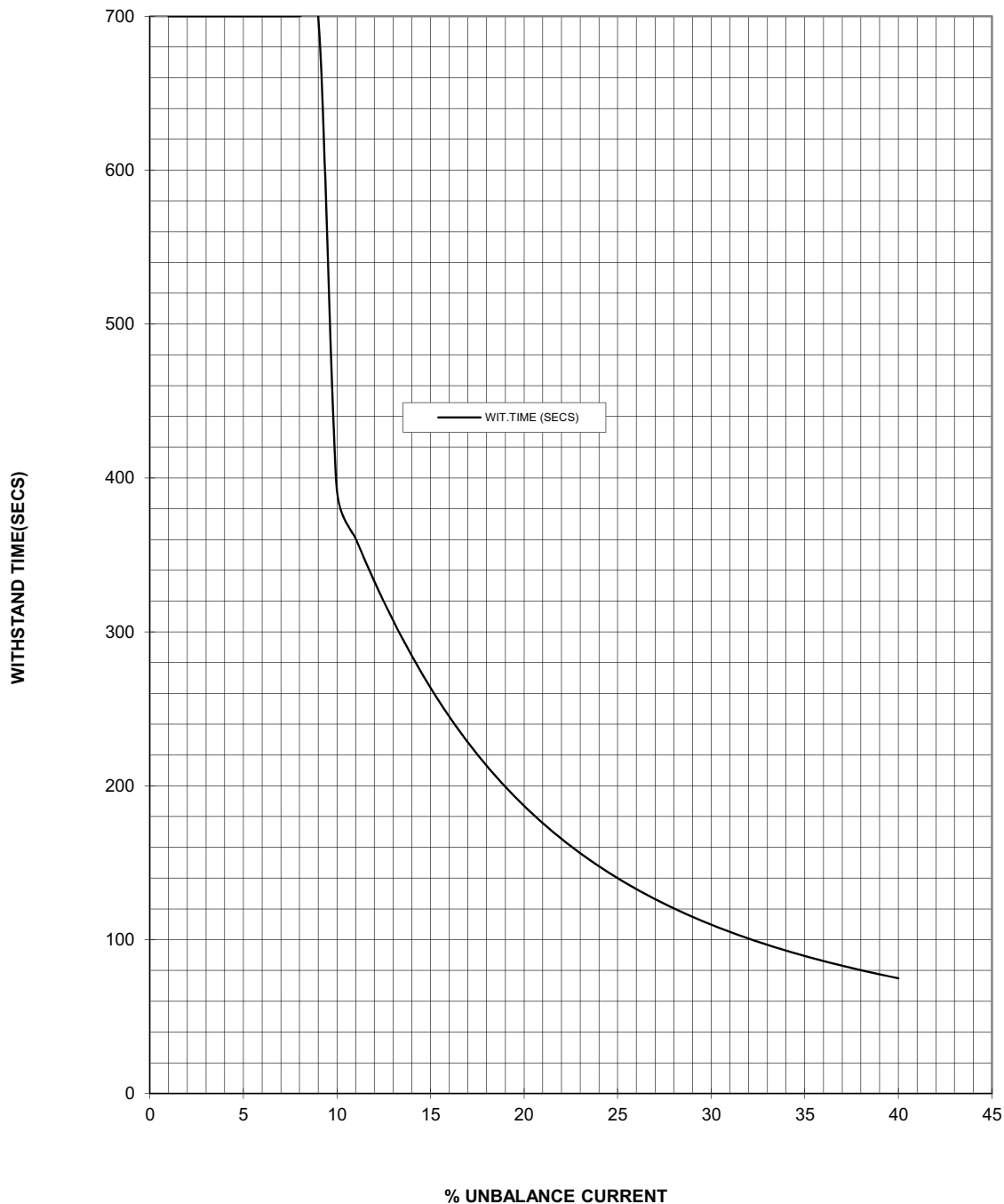
DRG. NO.- NEG.SEQ.



NEGATIVE SEQUENCE CHARACTERISTICS

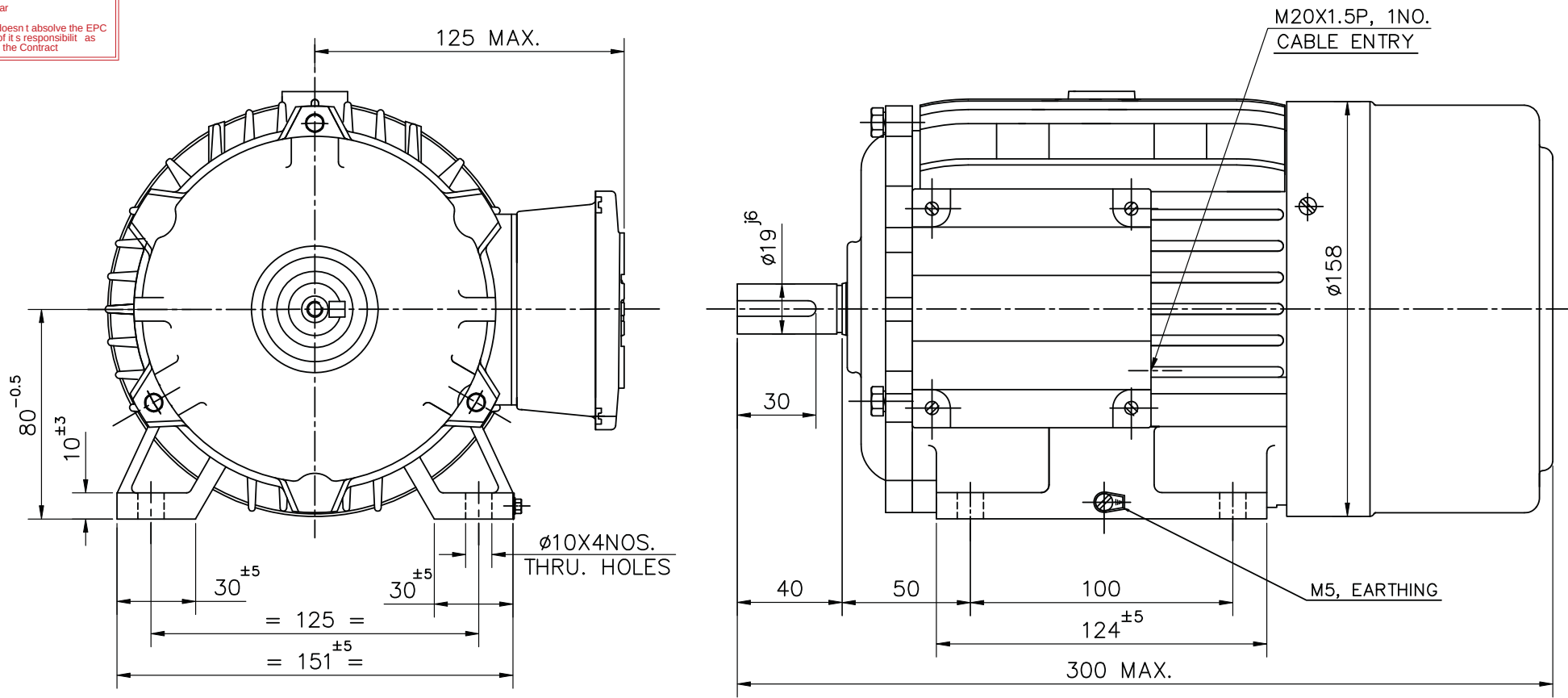
CUSTOMER

kW : 0.55 POLE : 6 VOLTS : 415 QTY : 1



2		PREP	SSG	1/6/2021
1		APPD	SNG	1/6/2021
NO	REVISION	SIGN/DATE	SIGN	DATE

Date: Mar
Approved doesn't absolve the EPC contractor of its responsibility as specified in the Contract

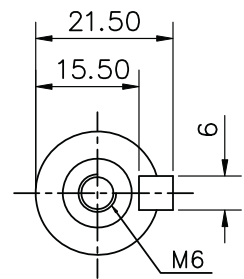


SPECIFICATION:-

RATING	0.55KW/0.75HP	0.55KW/0.75HP	1.1KW/1.5HP
POLE	6 POLE	4 POLE	2 POLE
BEARING DE	6204 2Z		
BEARING NDE	6204 2Z/6203 2Z		

MATERIAL OF CONSTRUCTION:-

FRAME	CAST IRON
END COVER (DE)	CAST IRON
END COVER (NDE)	ALUMINIUM
SHAFT	CARBON STEEL



SHAFT END DETAIL

UNMENTIONED TOLERANCES ARE AS PER IS:2102-1/ISO:2768-1

LINEAR DIMNS.	OVER & UPTO	0.5-3	3-6	6-30	30-120	120-400	400-1000	1000-2000
	TOLERANCE	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3

ANGULAR DIMNS.

OVER & UPTO	0-10	10-50	50-120	120-400	400.....
TOLERANCE	±1°	±0°30'	±0°20'	±0°10'	±0°5'

DGN	NAME	DATE
DRN	POTDAR	15.09.20
CHD		15.09.20
APPD		15.09.20

SCALE: 1:1
SHEET:- 01 OF 03

DRG NO. **MGAN080A0258**

ISSUE NO. 01 REV. NO. 00

TITLE: **GENERAL ARRANGEMENT DRAWING FOR 80 FRAME (B3) FOOT MOUNTED MOTOR**

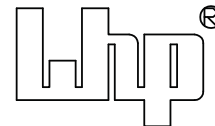
Laxmi Hydraulics Pvt. Ltd.
Website:- www.lhp.co.in

SOLAPUR

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MM DO NOT SCALE THE DRAWING

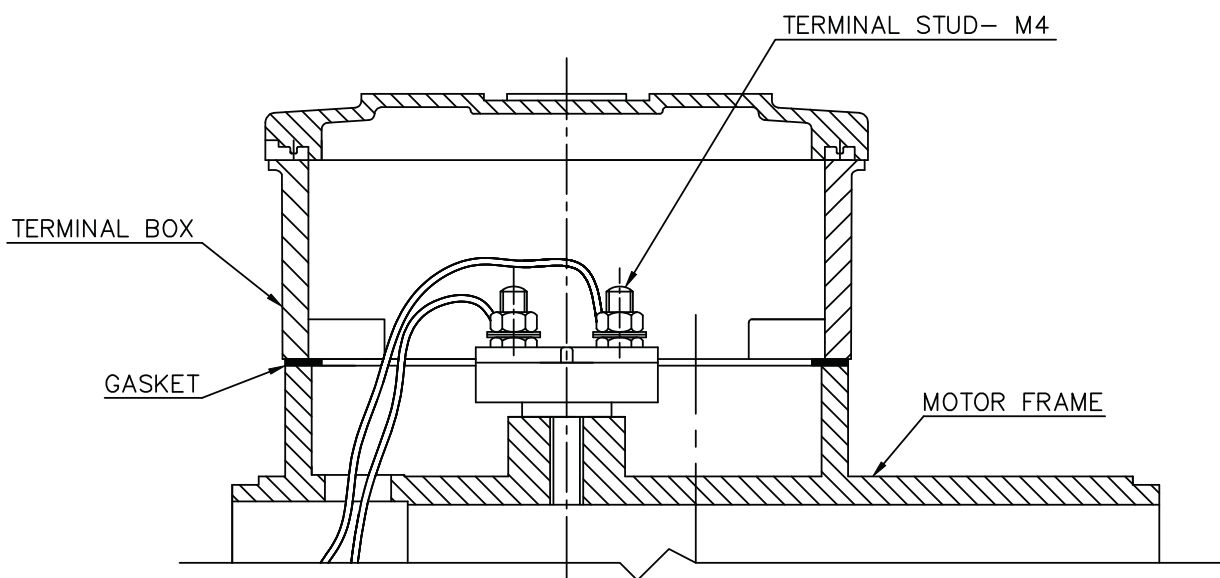
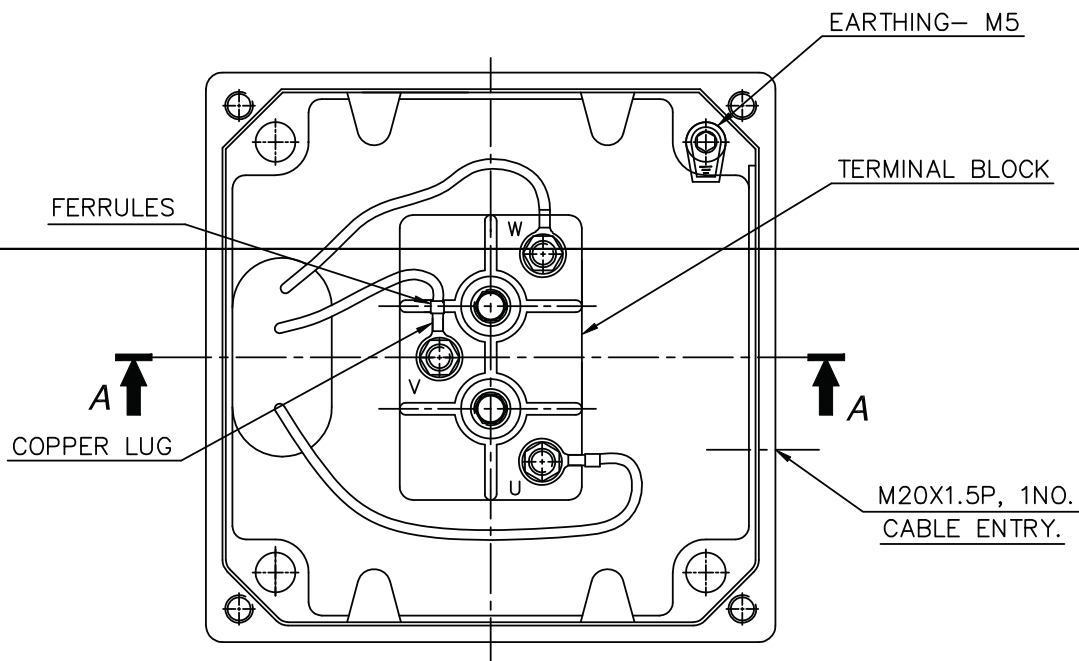
\\Ppk\l\HPL DRAWING FILES\DRGS 3\G.A.DWG\MGAN\080\B3\MGAN080A0258.dwg

LAXMI HYDRAULICS PVT. LTD, SOLAPUR



TERMINAL BOX ARRANGEMENT FOR 3 LEADS

FOR 80 FRAME



T. BOX ARRANGEMENT (SECTION A-A)

SHEET: - 02 OF 03

ISSUE.NO.- 01

REV.NO.- 00

DATE- 15.09.20

DRG.NO.- MGAN080A0258

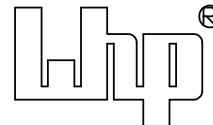
DRN.BY.- POTDAR

CHD.BY.-

APPD.BY.- GRM

LAXMI HYDRAULICS PVT. LTD, SOLAPUR

NAMEPLATE DRAWING



IS: 12615		3 Ph. INDUCTION MOTOR			
CM/L-7500131009		IE MOTORS		IE3	
M/C.NO.		RPM:			
KW/HP:		FRM:			
V:		DUTY:		IP:	
Hz:		CONN.		A°C.	
AMP:		IN.CLS.		Ph.:	
EFF.	IE3-			WT.:	Kg.
COSØ:		REF.STD.: IS 12615 / IEC 60034-30			
MFD.BY: LAXMI HYDRAULICS PVT. LTD. SOLAPUR (INDIA) Website : www.lhp.co.in 047D19					

NOTE : -FOR DATA/SPECIFICATION IN NAMEPLATE REFER DATA SHEET/GAD.

SHEET: - 03 OF 03

ISSUE.NO.- 01

REV.NO.- 00

DATE- 15.09.20

DRG.NO.- MGAN080A0258

DRN.BY.- POTDAR

CHD.BY.-

APPD.BY.- GRM

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	Axial fan	
1.1	Quantity	As per BBU/ Approved Datasheet	
2.0	Manufacturer	HEM	
3.0	Type & Frame Size	Type Ref : 2HE3 090-0603 & Frame Size : 90S	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	0.75	
4.1	Rated Speed	930	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	1.9	
7.0	Energy Efficient	IE3	
8.0	Efficiency & Power Factor at Full Load	78.9%	0.70
9.0	Efficiency & Power Factor at 75% Load	78.9%	0.62
10.0	Efficiency & Power Factor at 50% Load	74%	0.50
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	0.79	
13.0	Starting current (%)	500%	
14.0	No Load Current (With Mechanism Coupled)	1 A (Approx.)	
15.0	Starting torque in % of full load torque	220%	
16.0	Pull up torque in % of full load torque	187%	
17.0	Pull out torque in % of full load torque	260%	
18.0	No load starting time (Without mechanism coupled)	< 1 sec.	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	15
		b) Cold	34
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	19
		b) Cold	43
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	14
		b) Cold	31
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)	
23.0	Starting time at rated voltage with		
	mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)	
24.0	Maximum permissible starting time	12	
25.0	Stator thermal time constant (Min)	45 min./120 min.	
26.0	Type & number of terminals broughtout	6 leads	
27.0	Stator winding connection	STAR	

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)
30.0	Resistance per phase (indicative) at 20°C	8.32 Ohms (Approx.)
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold
32.0	Quantity and power consumption of space heater	NA
33.0	Direction of rotation	Bi - Directional
34.0	Bearing make & type	
	DE:	SKF & Deep Groove Ball Bearing
	NDE:	SKF & Deep Groove Ball Bearing
35.0	Lubricant quantity , grade & recommended	Prelubricated
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL
	Terminal Box	
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°
38.0	Gland size for stator winding	AS PER GAD
39.0	Gland size for space heater	NA
40.0	Cable entry	NA
41.0	GD ² (of motor (Kgm ²)	0.0135
42.0	Total weight of motor (kg)	26 KG (Approx.)
43.0	Weight of stator (kg)	14 KG (Approx.)
44.0	Weight of rotor (kg)	12 KG (Approx.)
45.0	Anticipated bearing life in Hours	50000 HOURS
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING
47.0	Limiting rotor temperature for determining	
	safe stall time	185°C
48.0	Thermistor for winding / Bearing	NA
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016
50.0	Standard continuous rating at 40°C ambient	0.78
51.0	Derated rating of motor at 50°C	0.75
52.0	a) Locked Rotor KVA (Indicative)	6.8
	b) Ratio of Locked rotor KVA / rated KW	9.1
53.0	a) Motor Dynamic Load Radial / Axial (kg)	3.0
	b) Motor Static Load	26 KG
54.0	Paint Shade	RAL 6011
55	Vibration Level	IS 12075
55	Noise Level	IS 12065

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.



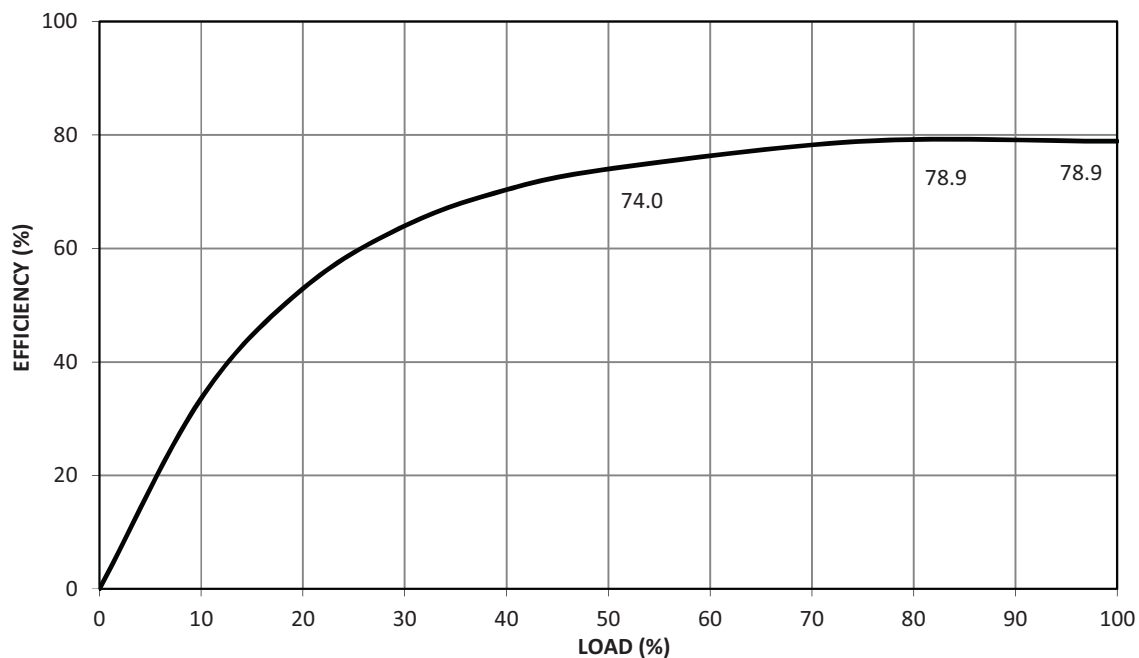
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0

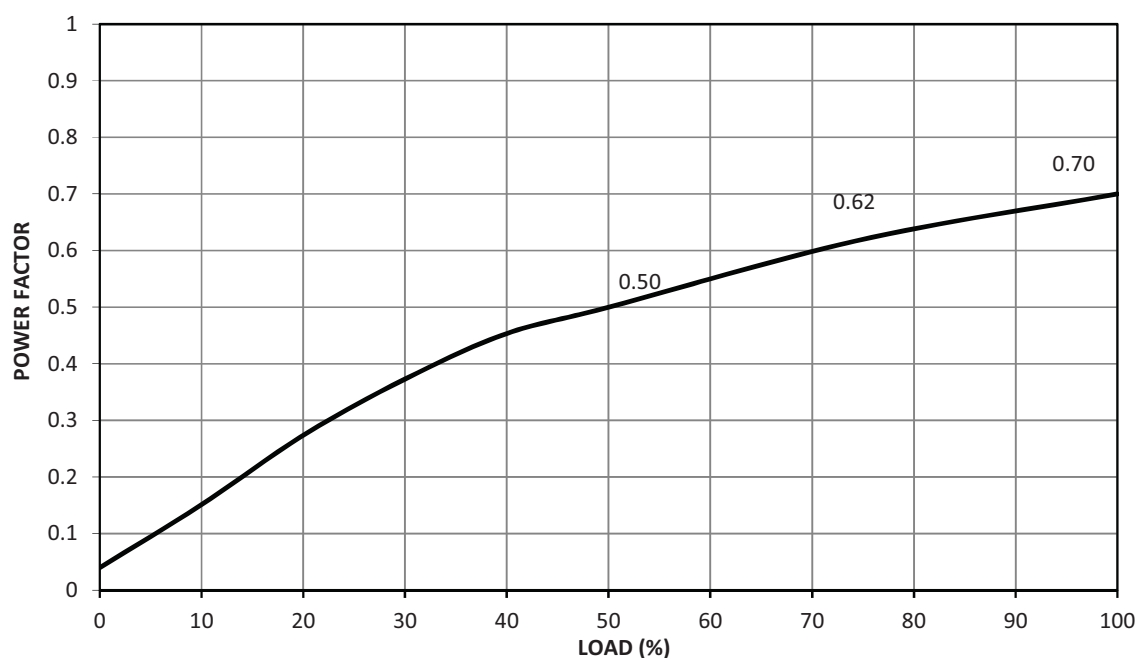
Poles : 6

Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

3/26/2021

Revision:

-



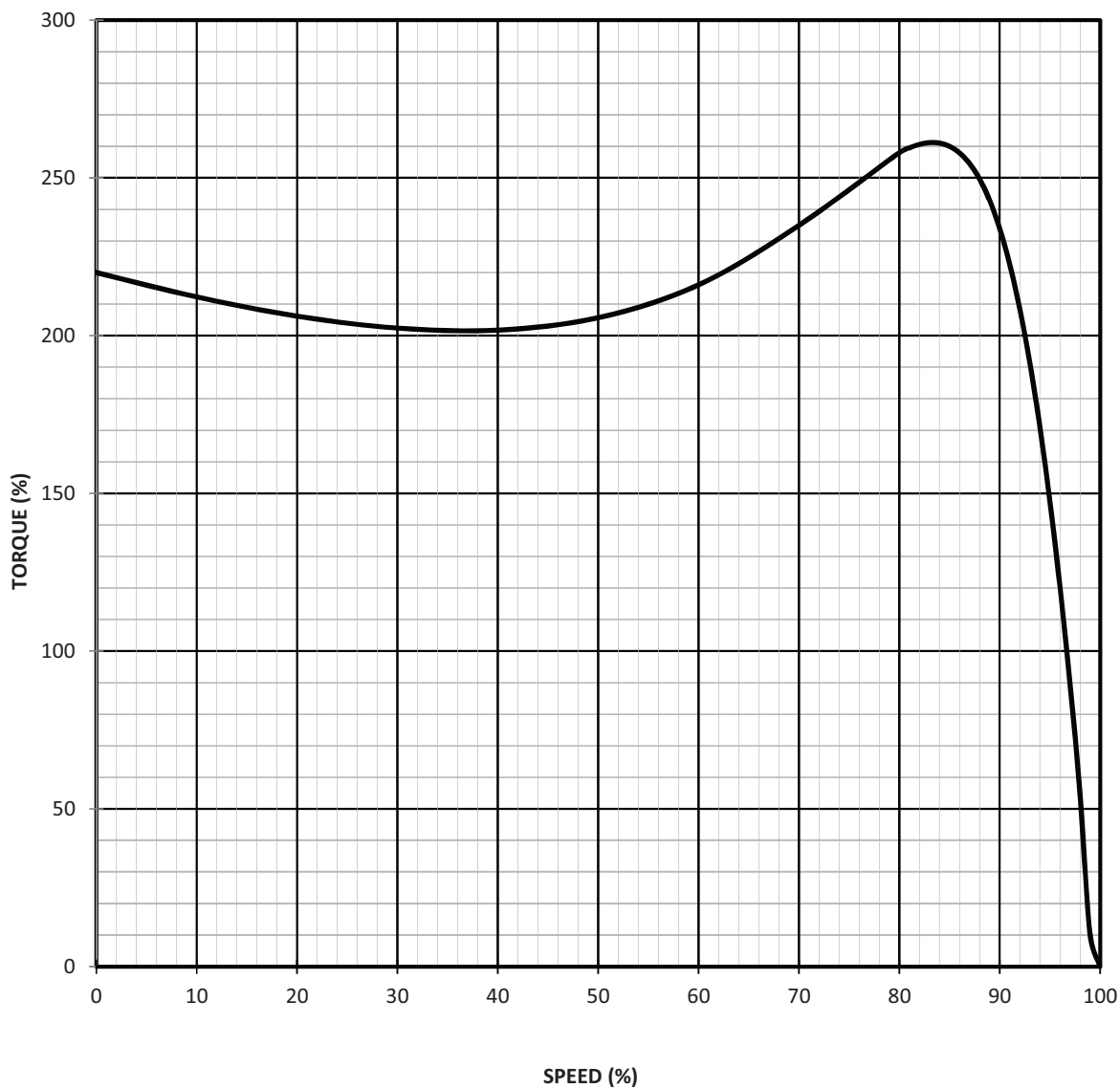
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0

Poles : 6

Efficiency Class : IE3

TORQUE SPEED CURVE



Prep.:

SK

Date:

3/26/2021

Revision:

-



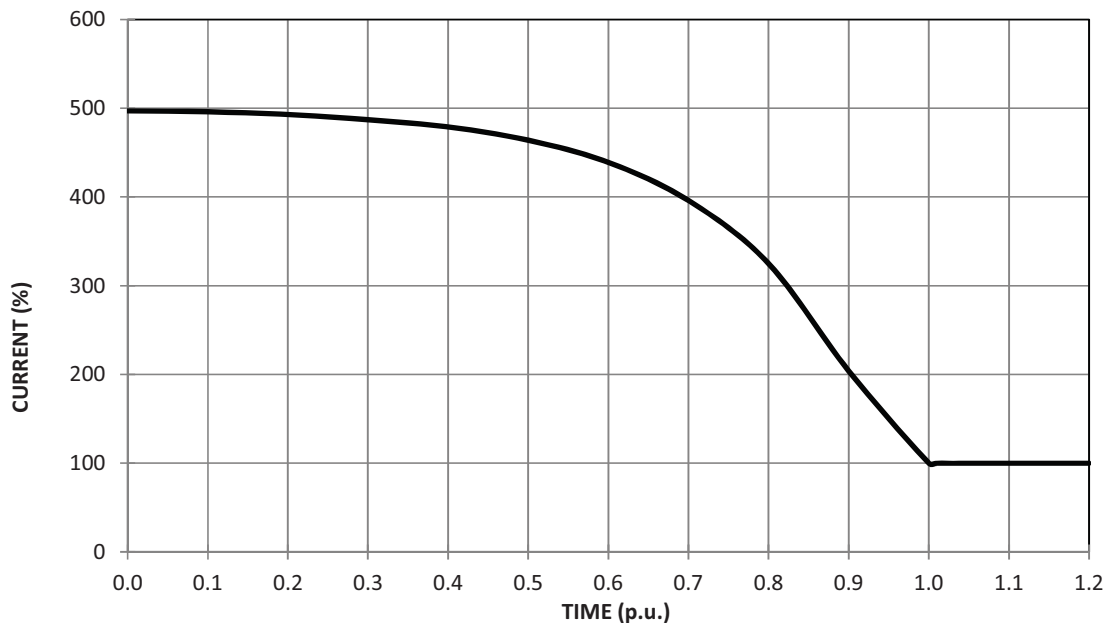
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0

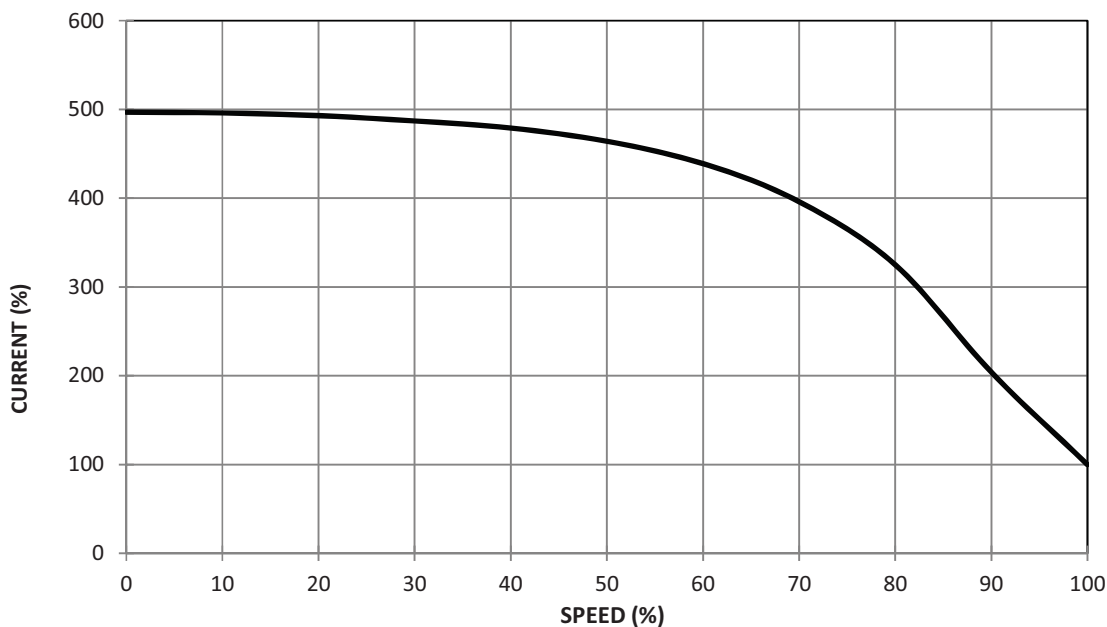
Poles : 6

Efficiency Class : IE3

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

3/26/2021

Revision:

-



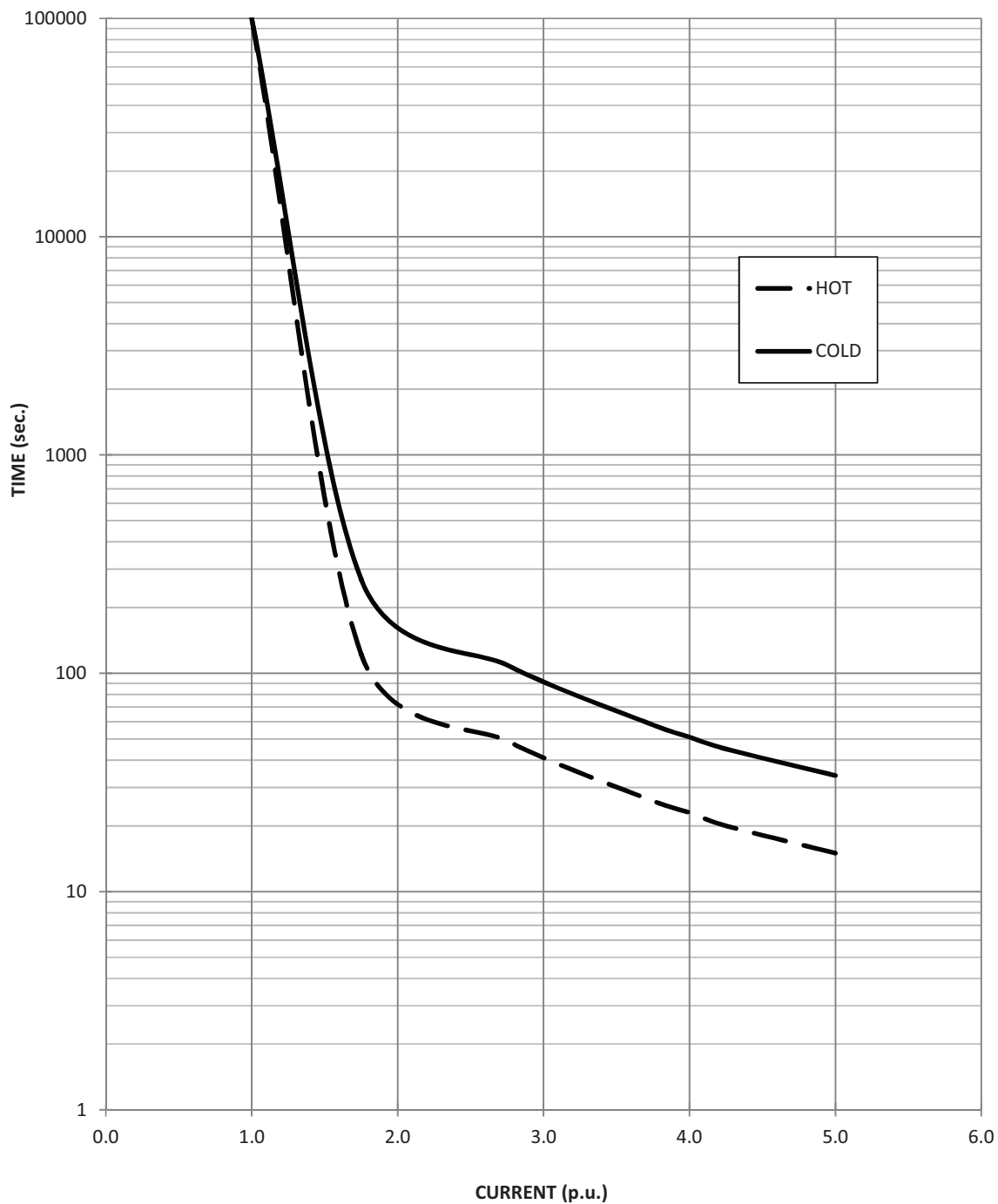
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 0.75/1.0

Poles : 6

Efficiency Class : IE3

THERMAL WITHSTAND CURVE



Prep.: SK

Date: 3/26/2021

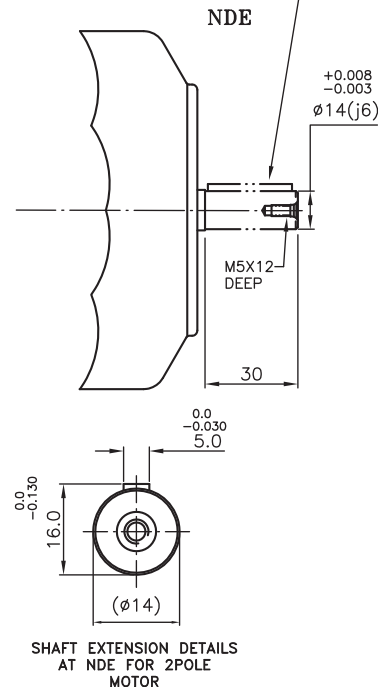
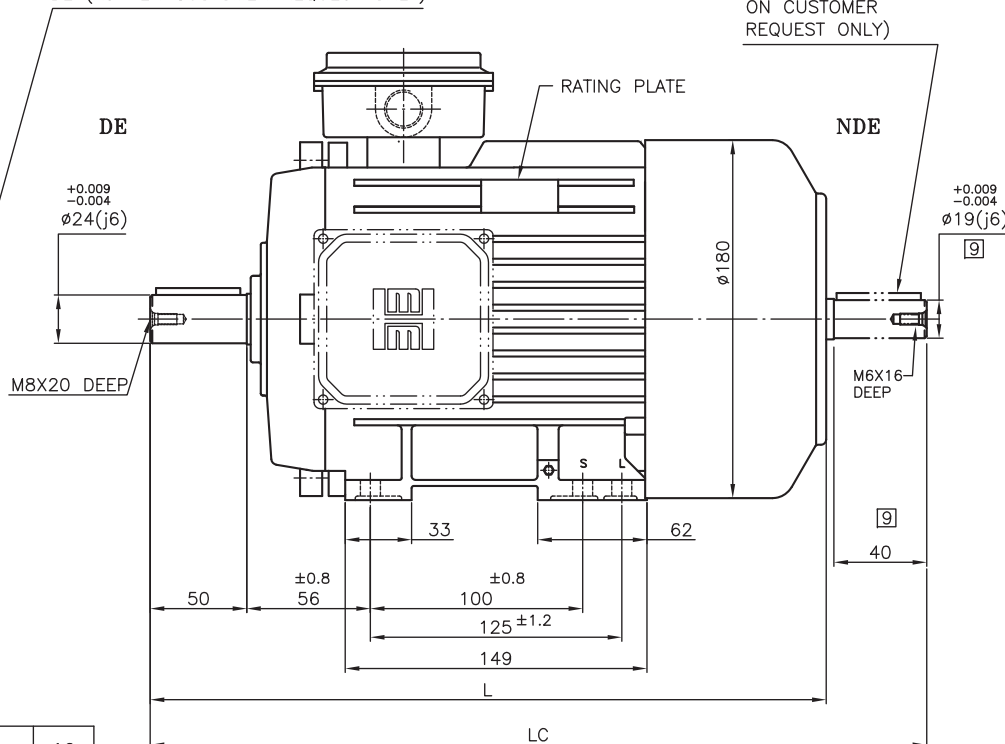
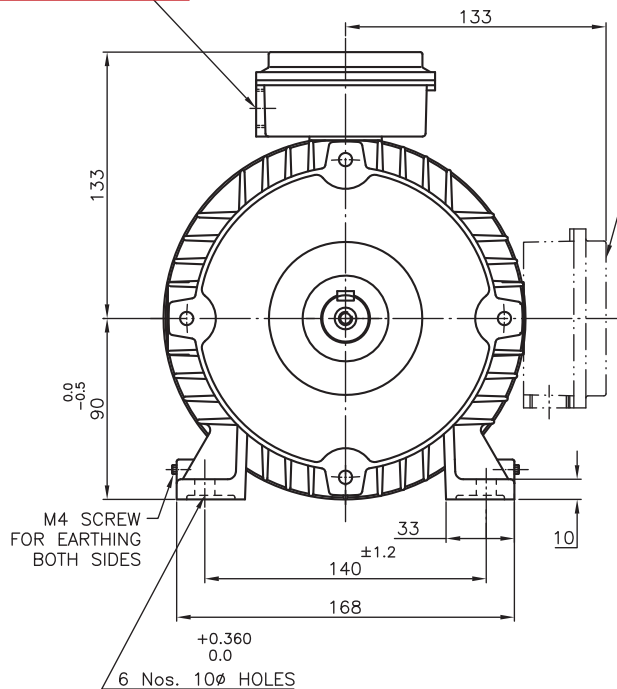
Revision: 0

Approval doesn't absolve the contractor of its responsibilities as specified in the Contract

OPTIONAL LOCATION OF
TERMINAL BOX ON RHS OR LHS
WHEN VIEWING FROM
DE (AS PER CUSTOMER REQUEST ONLY)

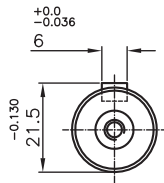
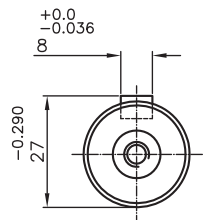
OPTIONAL SHAFT
EXTENSION AT NDE
(WILL BE PROVIDED
ON CUSTOMER
REQUEST ONLY)

SHAFT EXTN. DETAILS
AT NDE FOR 2 POLE MOTOR



FRAME	TYPE DESIGNATION	POLE	L	LC
90S	2HE2-2HE3	2	344	381
		4,6,8		391

FRAME	TYPE DESIGNATION	POLE	L	LC
90L	2HE2	2	344	381
	2HE3		375	412
	2HE2	4,8	344	391
	2HE3	4,6,8	375	422
	2HE2	6		



SHAFT EXTENSION DETAILS AT DE

SHAFT EXTENSION DETAILS
AT NDE [9]

NOTE : THIS DRAWING SUPERSEDES DRG. No. A1-90S-49(GN)

REV. STATUS	11	L DIM 319 & LC 356, 366 REMOVED FROM 90S IN TABLE OF 90S AS PER MAIL RECD FROM CUSTOMER CARE DT- 9-03-22/15-03-22 & NOTE ADDED	LANKESH	19-03-22
	10	4 POLE ADDED IN 90L FRAME FOR TYPE DESIGNATION 2HE2 AS PER MAIL RECD FROM Mr. SANJAY JADIA DT. 21-06-21 & 4 POLE REMOVED FROM TYPE DESIGNATION- 2HE2 TABLE FOR MOTOR LENGTH L-375, LC- 422	ARUN	14-09-21
	9	NDE SIDE SHAFT EXTN. DIA.19x40LG. WAS DIA.24x50LG. & DIMS 391 WAS 401 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART - IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE & 2 POLE MOTOR VIEW ADDED	LANKESH	23-09-19
	8	TYPE DESIGNATION TABLE ADDED TO UPLOAD THIS DRG. ON PORTAL	ARUN	30-10-18
	7	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. AND ALL THE FEATURES.	NIMKAR	24-1-14

Dim. without tolerance
as per IS:2102, very coarse

All dimensions in mm
unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽



TITLE

OVERALL DIMENSIONS DRAWING
B3/TEFC STD. MOTOR

SCALE NTS

SHT 1/1

PROJECTION

DRG. NO.:

A1-90L-49(GN)

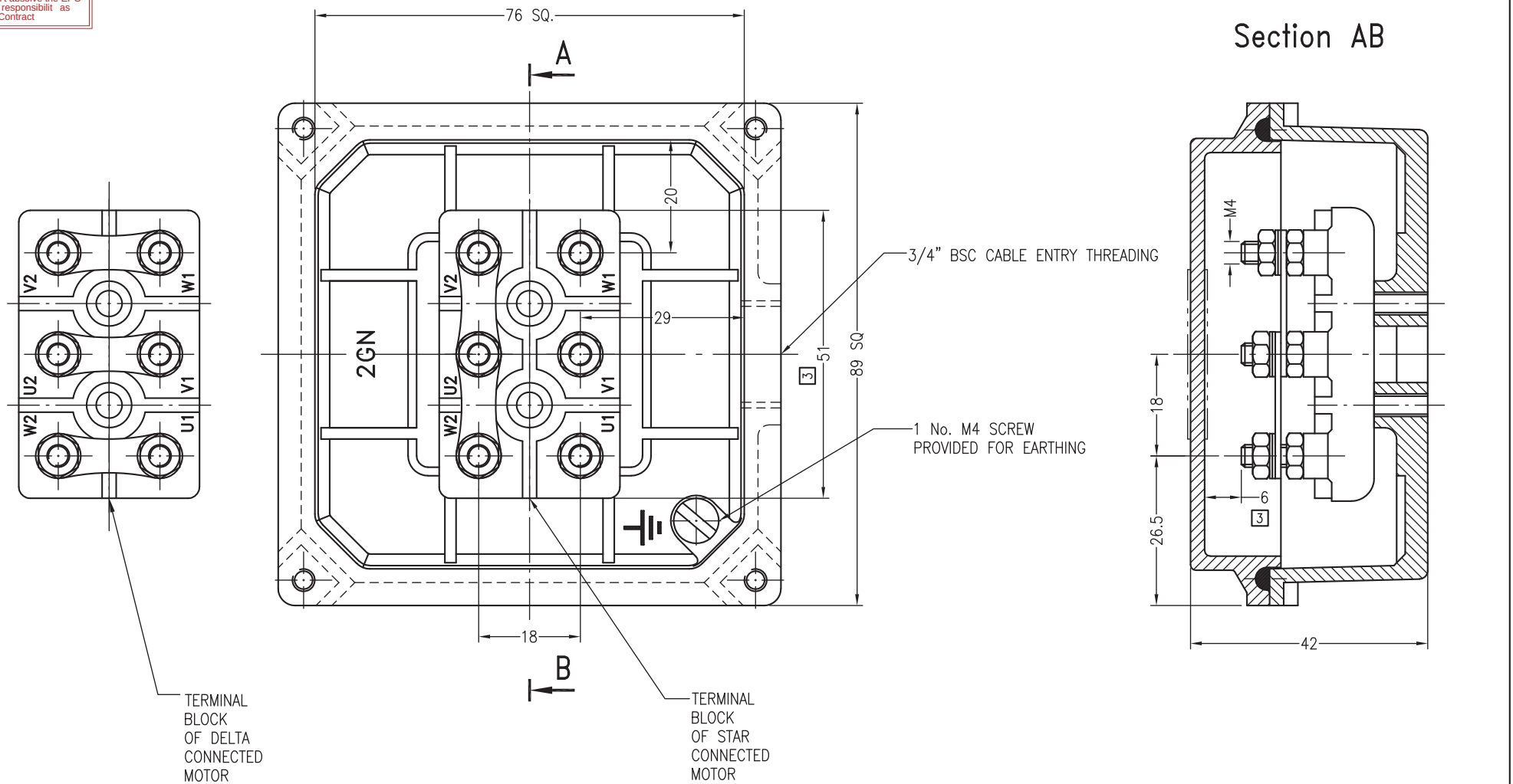
REV.	1 1
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FRAME SIZE
90S/L
(GN)



REF. 90SL-OADIM-B3

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



REV. STATUS		3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5			NIMKAR	01/10/16	
		2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.			NIMKAR	11/11/14	
Dim. without tolerance as per IS:2102 very coarse				TITLE STD. TERMINAL BOX ASSEMBLY		SCALE	NTS	
All dimensions in mm unless otherwise specified.						SHT	1/1	
NO MACHINING	~	DRN.	NAME	DATE	PROJECTION	DRG. NO.:	REV.	FRAME SIZE
ROUGH MACHINING	▽		GANESH	16-07-11				
SMOOTH MACHINING	▽▽	CHD.		REF.: TB-ASLY-63-90				
FINE MACHINE/GRIND	▽▽▽	APPD.						
POLISH/HONE/LAP	▽▽▽▽							
MACHINING SYMBOLS								

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
1.0	Application	AXIAL FAN
1.1	Quantity	As
2.0	Manufacturer	HEM
3.0	Type & Frame Size	Type Ref : 2HE3 096-0603 & Frame Size : 90L
3.1	Degree of Protection	IP:55
4.0	Rated Output in KW	1.10
4.1	Rated Speed	940
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;
		10% absolute sum - 3 Phase
6.0	Full load current	2.7
7.0	Energy Efficient	IE3
8.0	Efficiency & Power Factor at Full Load	81%0.70
9.0	Efficiency & Power Factor at 75% Load	81%0.62
10.0	Efficiency & Power Factor at 50% Load	76%0.50
11.0	Duty Cycle	S1
12.0	Rated torque (kg-m)	1.14
13.0	Starting current (%)	550%
14.0	No Load Current (With Mechanism Coupled)	8 A (Approx.)
15.0	Starting torque in % of full load torque	220%
16.0	Pull up torque in % of full load torque	187%
17.0	Pull out torque in % of full load torque	260%
18.0	No load starting time (Without mechanism coupled)	< 1 sec.
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot12
		b) Cold25
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot15
		b) Cold31
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot11
		b) Cold23
22.0	Starting time at minimum starting voltage	
	with mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)
23.0	Starting time at rated voltage with	
	mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)
24.0	Maximum permissible starting time	9
25.0	Stator thermal time constant (Min)	45 min./120 min.
26.0	Type & number of terminals broughtout	6 leads
27.0	Stator winding connection	STAR

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	17.5 Ohms (Approx.)	
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF & Deep Groove Ball Bearing	
	NDE:	SKF & Deep Groove Ball Bearing	
35.0	Lubricant quantity , grade & recommended	Prelubricated	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kgm ²)	0.019	
42.0	Total weight of motor (kg)	30 KG (Approx.)	
43.0	Weight of stator (kg)	17 KG (Approx.)	
44.0	Weight of rotor (kg)	14 KG (Approx.)	
45.0	Anticipated bearing life in Hours	50000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	185°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016	
50.0	Standard continuous rating at 40°C ambient	1.14	
51.0	Derated rating of motor at 50°C	1.10	
52.0	a) Locked Rotor KVA (Indicative)	10.7	
	b) Ratio of Locked rotor KVA / rated KW	9.7	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	4.3	
	b) Motor Static Load	30 KG	
54.0	Paint Shade	RAL 6011	
55	Vibration Level	IS 12075	
55	Noise Level	IS 12065	

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.



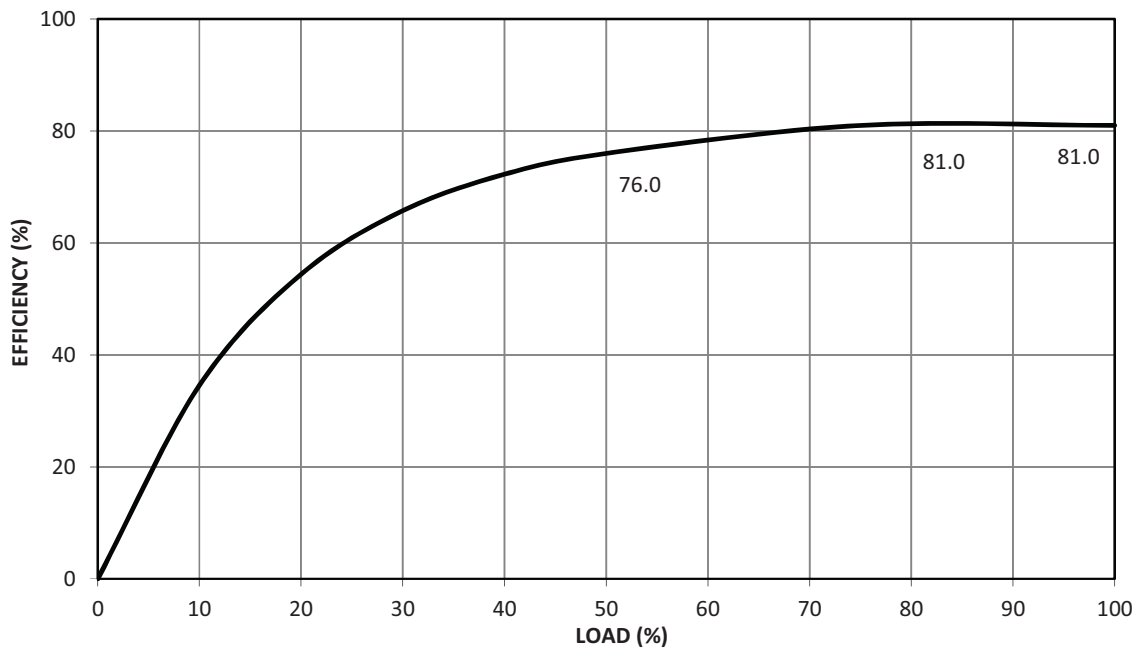
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5

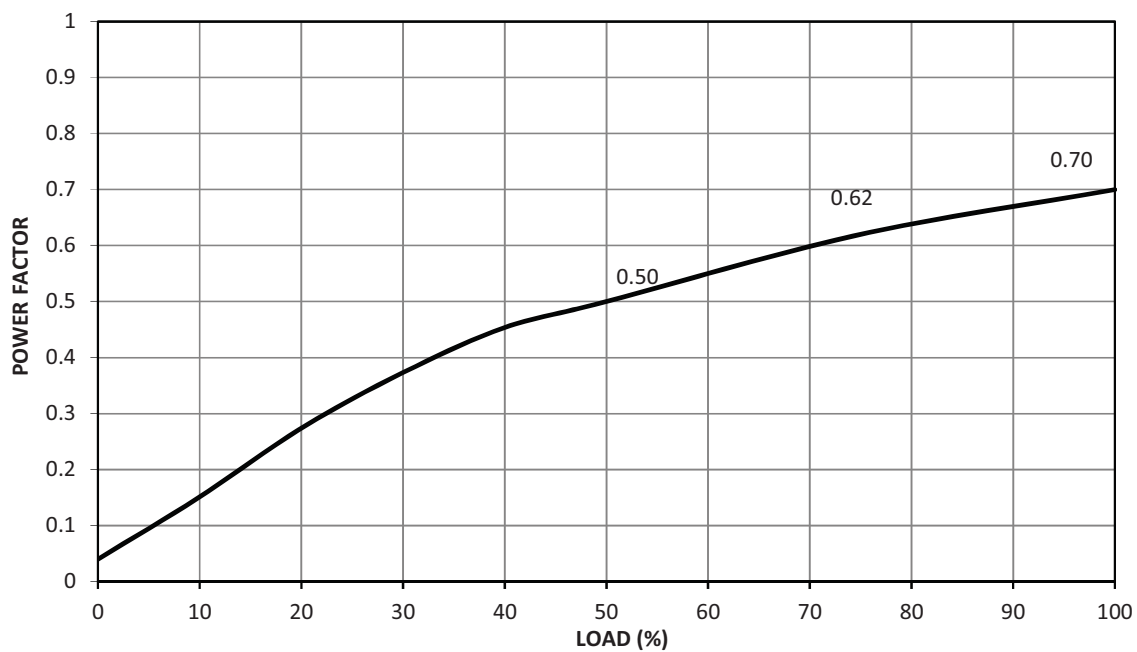
Poles : 6

Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

14/07/2022

Revision:

-



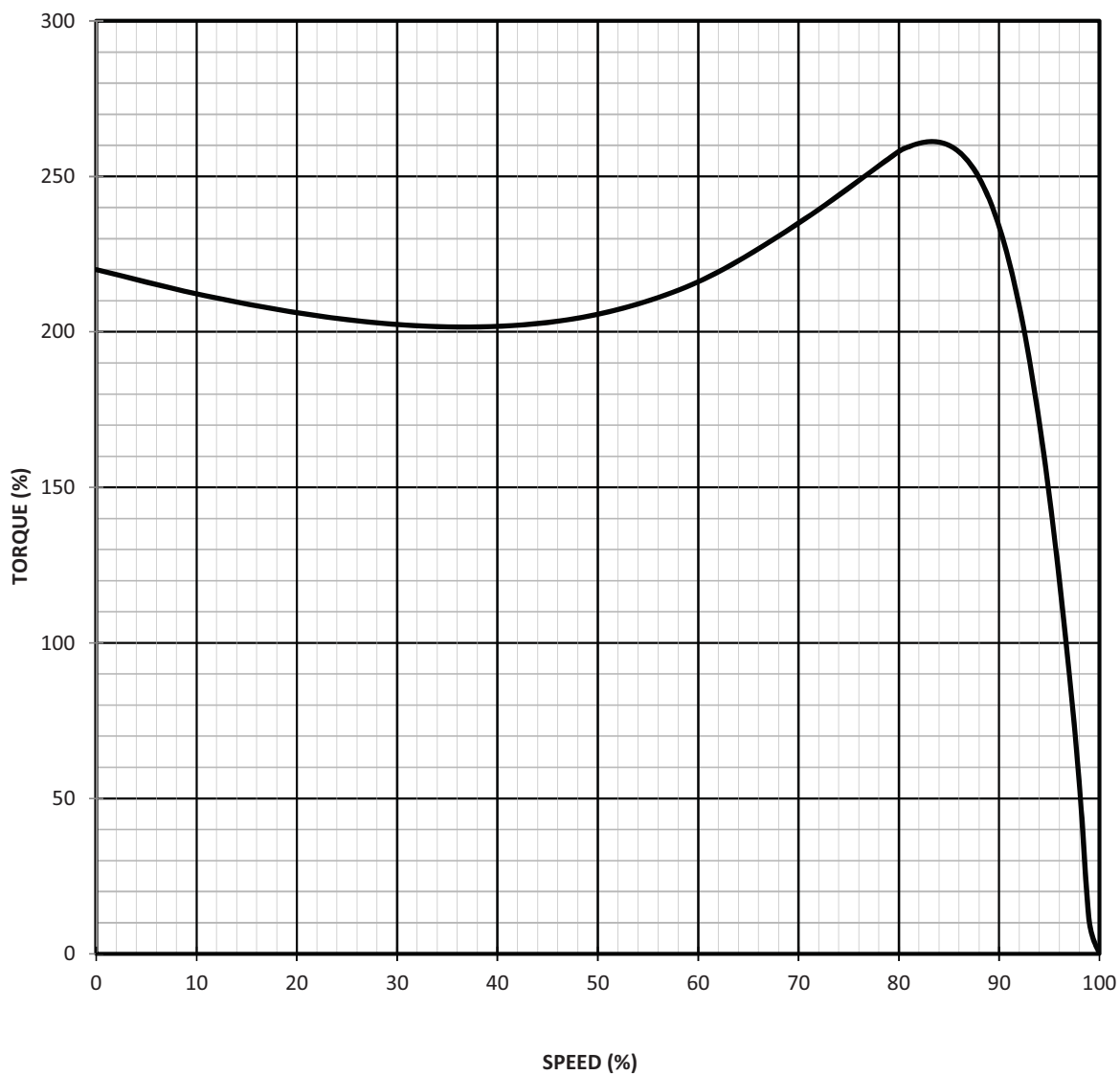
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5

Poles : 6

Efficiency Class : IE3

TORQUE SPEED CURVE



Prep.: SK

Date: 14/07/2022

Revision: -



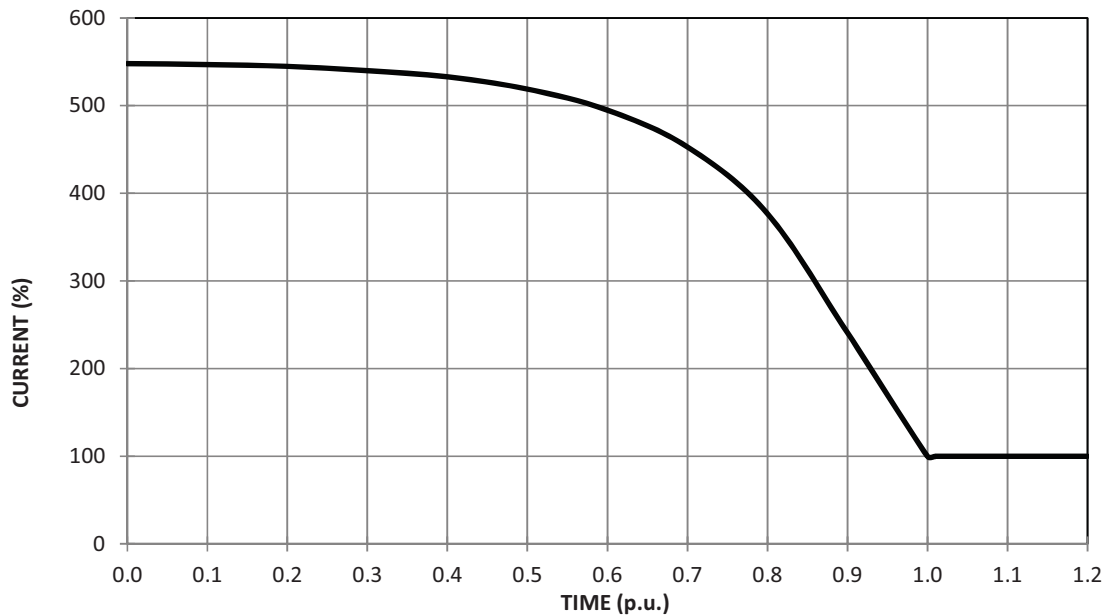
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5

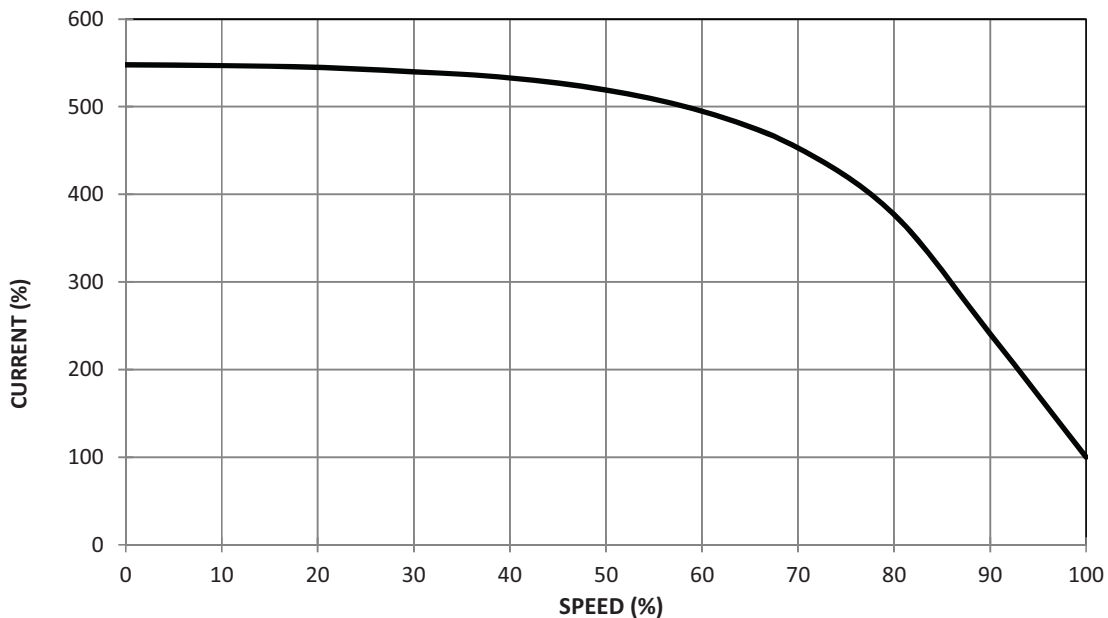
Poles : 6

Efficiency Class : IE3

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

14/07/2022

Revision:

-



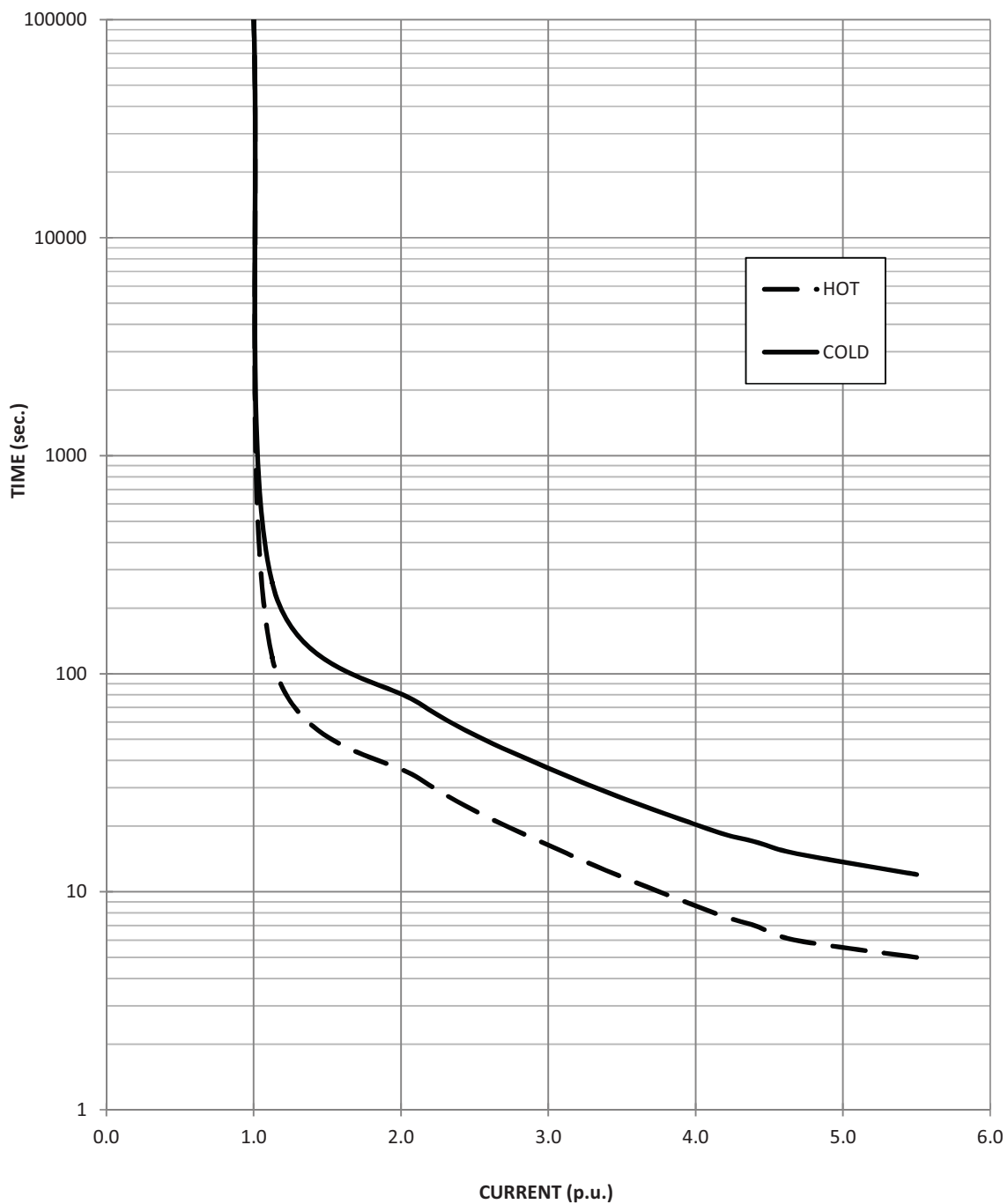
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5

Poles : 6

Efficiency Class : IE3

THERMAL WITHSTAND CURVE



Prep.:

SK

Date:

14/07/2022

Revision:

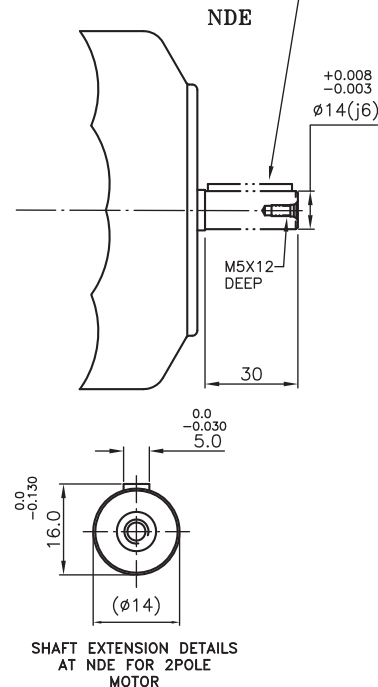
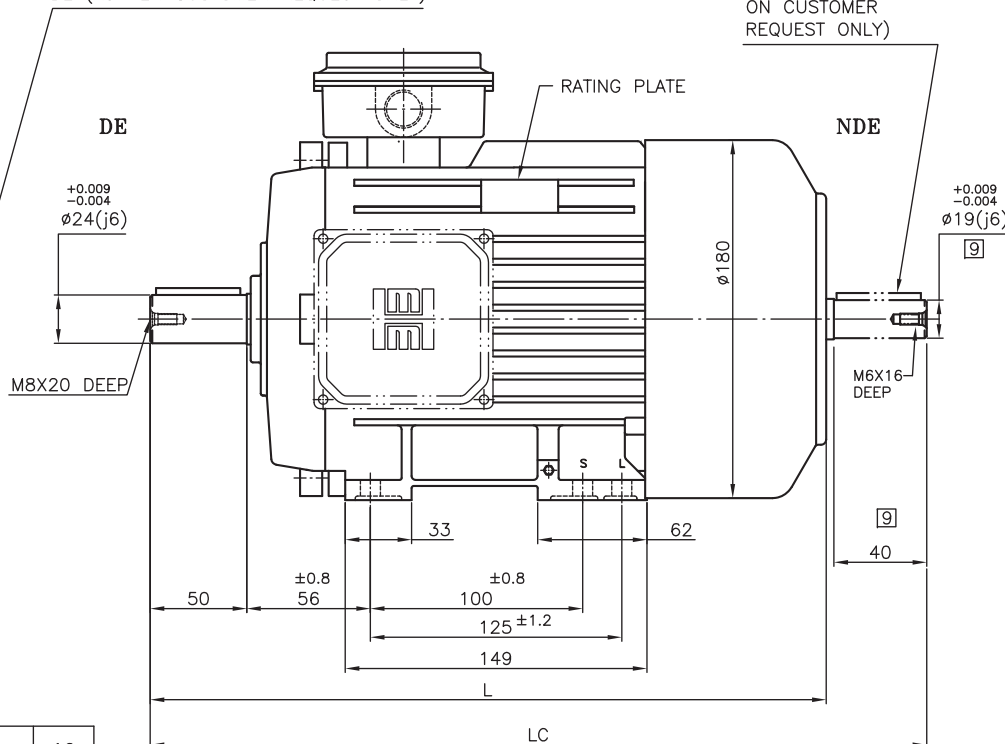
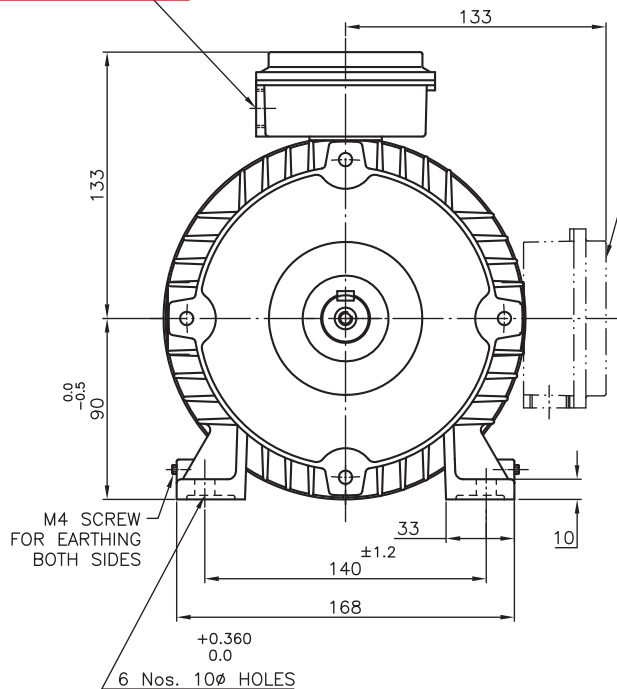
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Approval doesn't absolve the contractor of its responsibilities as specified in the Contract

OPTIONAL LOCATION OF
TERMINAL BOX ON RHS OR LHS
WHEN VIEWING FROM
DE (AS PER CUSTOMER REQUEST ONLY)

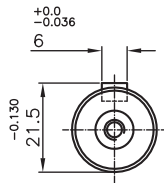
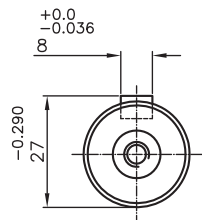
OPTIONAL SHAFT
EXTENSION AT NDE
(WILL BE PROVIDED
ON CUSTOMER
REQUEST ONLY)

SHAFT EXTN. DETAILS
AT NDE FOR 2 POLE MOTOR



FRAME	TYPE DESIGNATION	POLE	L	LC
90S	2HE2-2HE3	2	344	381
		4,6,8		391

FRAME	TYPE DESIGNATION	POLE	L	LC
90L	2HE2	2	344	381
	2HE3		375	412
	2HE2	4,8	344	391
	2HE3	4,6,8	375	422
	2HE2	6		



SHAFT EXTENSION DETAILS AT DE

SHAFT EXTENSION DETAILS
AT NDE [9]

NOTE : THIS DRAWING SUPERSEDES DRG. No. A1-90S-49(GN)

REV. STATUS	11	L DIM 319 & LC 356, 366 REMOVED FROM 90S IN TABLE OF 90S AS PER MAIL RECD FROM CUSTOMER CARE DT- 9-03-22/15-03-22 & NOTE ADDED	LANKESH	19-03-22
	10	4 POLE ADDED IN 90L FRAME FOR TYPE DESIGNATION 2HE2 AS PER MAIL RECD FROM Mr. SANJAY JADIA DT. 21-06-21 & 4 POLE REMOVED FROM TYPE DESIGNATION- 2HE2 TABLE FOR MOTOR LENGTH L-375, LC- 422	ARUN	14-09-21
	9	NDE SIDE SHAFT EXTN. DIA.19x40LG. WAS DIA.24x50LG. & DIMS 391 WAS 401 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART - IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE & 2 POLE MOTOR VIEW ADDED	LANKESH	23-09-19
	8	TYPE DESIGNATION TABLE ADDED TO UPLOAD THIS DRG. ON PORTAL	ARUN	30-10-18
	7	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. AND ALL THE FEATURES.	NIMKAR	24-1-14

Dim. without tolerance
as per IS:2102, very coarse

All dimensions in mm
unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽



TITLE

OVERALL DIMENSIONS DRAWING
B3/TEFC STD. MOTOR

SCALE NTS

SHT 1/1

PROJECTION

DRG. NO.:	
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A1-90L-49(GN)

REV.	11
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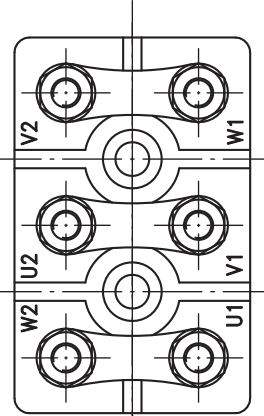
FRAME SIZE
90S/L
(GN)



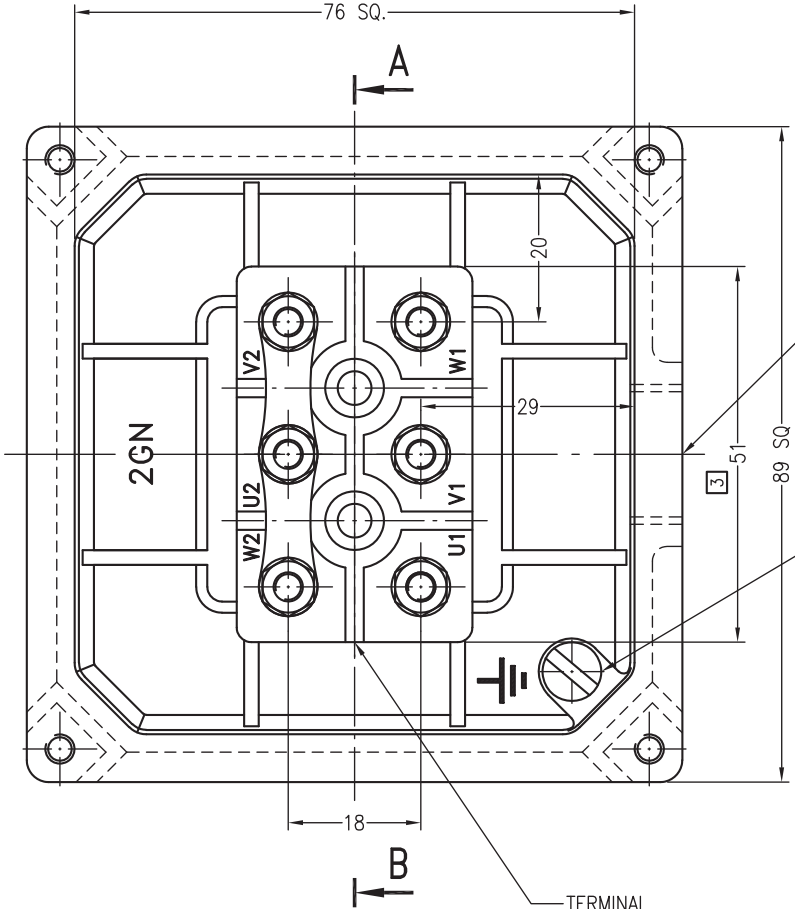
REF. 90SL-OADIM-B3

APPROVED
Checked and Approved

Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

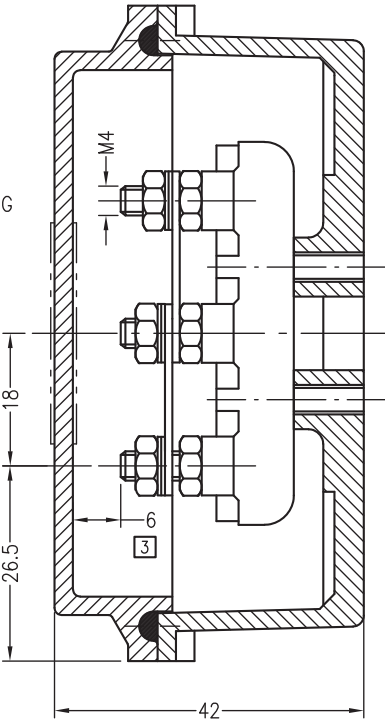


TERMINAL
BLOCK
OF DELTA
CONNECTED
MOTOR



TERMINAL
BLOCK
OF STAR
CONNECTED
MOTOR

Section AB



Dim. without tolerance as per IS:2102 very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS	3	TERMINAL BLOCK DIMN. 51 WAS 68 LG. [TERMINAL BLOCK AS PER DRG. No. A4-56/100-17(3G) WAS TERMINAL BLOCK DRG. No. A4-56T090-17] DIMN. 29 REMOVED & DIMN. 6 WAS 6.5			NIMKAR	01/10/16
	2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.			NIMKAR	11/11/14
		TITLE				
		STD. TERMINAL BOX ASSEMBLY		SCALE NTS		
				SHT 1/1		
		NAME	DATE	PROJECTION	DRG. NO.:	REV.
		GANESH	16-07-11		A4-80/90-33(GN)	3
		CHD.			REF.: TB-ASLY-63-90	
		APPD.				
				FRAME SIZE 63-90 (GN)		

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
1.0	Application	AXIAL FAN
1.1	Quantity	As per BBU/Datasheet approved
2.0	Manufacturer	HEM
3.0	Type & Frame Size	Type Ref : 2FE3 096-0603 & Frame Size : 90L FLP
3.1	Degree of Protection	IP:55
4.0	Rated Output in KW	1.10
4.1	Rated Speed	940
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;
		10% absolute sum - 3 Phase
6.0	Full load current	2.7
7.0	Energy Efficient	IE3
8.0	Efficiency & Power Factor at Full Load	81%0.70
9.0	Efficiency & Power Factor at 75% Load	81%0.62
10.0	Efficiency & Power Factor at 50% Load	76%0.50
11.0	Duty Cycle	S1
12.0	Rated torque (kg-m)	1.14
13.0	Starting current (%)	550%
14.0	No Load Current (With Mechanism Coupled)	8 A (Approx.)
15.0	Starting torque in % of full load torque	220%
16.0	Pull up torque in % of full load torque	187%
17.0	Pull out torque in % of full load torque	260%
18.0	No load starting time (Without mechanism coupled)	< 1 sec.
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot12
		b) Cold25
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot15
		b) Cold31
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot11
		b) Cold23
22.0	Starting time at minimum starting voltage	
	with mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)
23.0	Starting time at rated voltage with	
	mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)
24.0	Maximum permissible starting time	9
25.0	Stator thermal time constant (Min)	45 min./120 min.
26.0	Type & number of terminals broughtout	6 leads
27.0	Stator winding connection	STAR

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)
30.0	Resistance per phase (indicative) at 20°C	17.5 Ohms (Approx.)
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold
32.0	Quantity and power consumption of space heater	NA
33.0	Direction of rotation	Bi - Directional
34.0	Bearing make & type	
	DE:	SKF & Deep Groove Ball Bearing
	NDE:	SKF & Deep Groove Ball Bearing
35.0	Lubricant quantity , grade & recommended	Prelubricated
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL
	Terminal Box	
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°
38.0	Gland size for stator winding	AS PER GAD
39.0	Gland size for space heater	NA
40.0	Cable entry	NA
41.0	GD ² (of motor (Kgm ²)	0.019
42.0	Total weight of motor (kg)	30 KG (Approx.)
43.0	Weight of stator (kg)	17 KG (Approx.)
44.0	Weight of rotor (kg)	14 KG (Approx.)
45.0	Anticipated bearing life in Hours	50000 HOURS
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING
47.0	Limiting rotor temperature for determining	
	safe stall time	185°C
48.0	Thermistor for winding / Bearing	NA
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016
50.0	Standard continuous rating at 40°C ambient	1.14
51.0	Derated rating of motor at 50°C	1.10
52.0	a) Locked Rotor KVA (Indicative)	10.7
	b) Ratio of Locked rotor KVA / rated KW	9.7
53.0	a) Motor Dynamic Load Radial / Axial (kg)	4.3
	b) Motor Static Load	30 KG
54.0	Paint Shade	RAL 6011
55	Vibration Level	IS 12075
55	Noise Level	IS 12065

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.

PREP BY:
DG

APPD BY:
SK



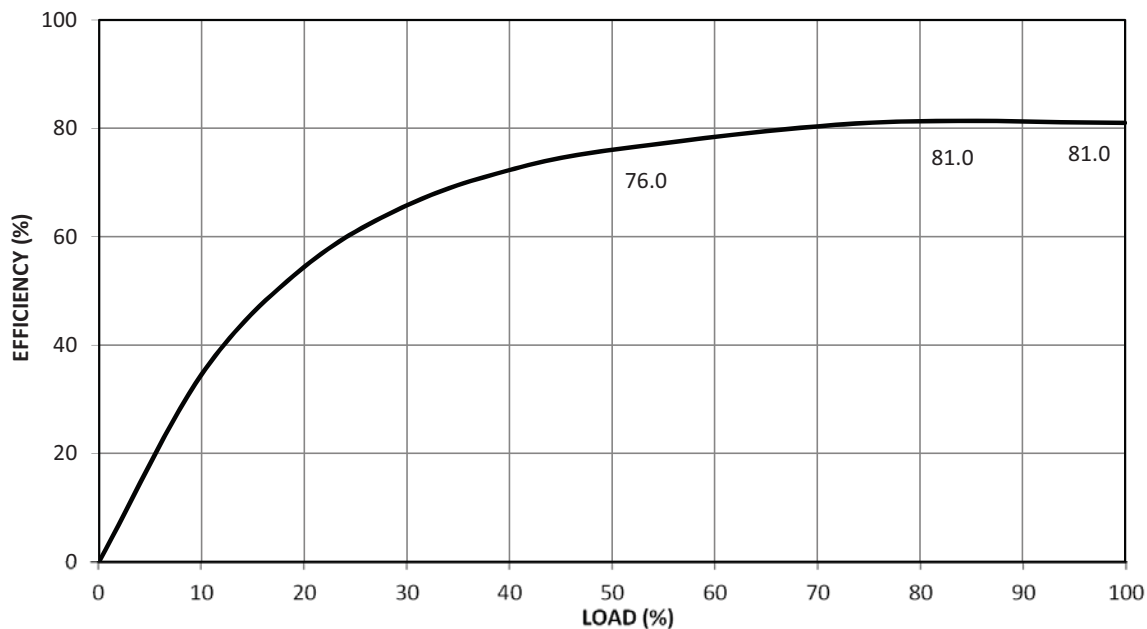
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5

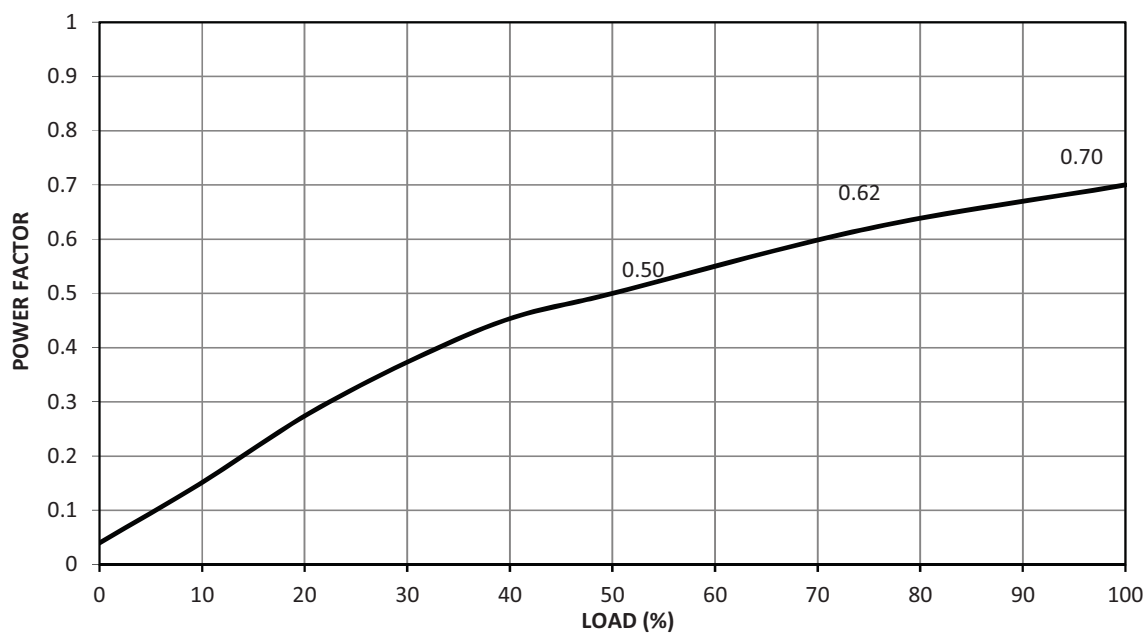
Poles : 6

Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

14-01-2023

Revision:

-



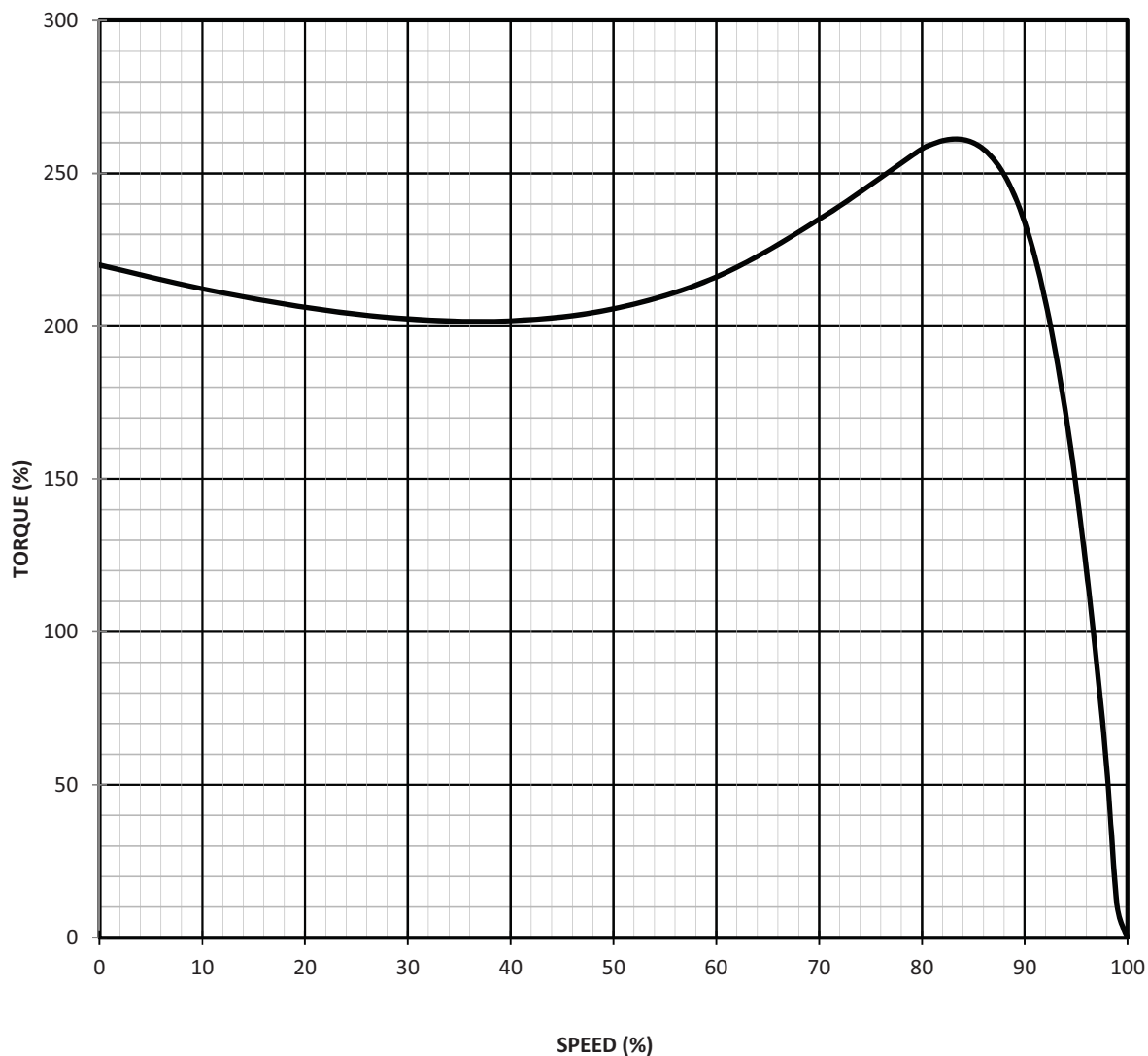
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5

Poles : 6

Efficiency Class : IE3

TORQUE SPEED CURVE



Prep.:

SK

Date:

14-01-2023

Revision:

-

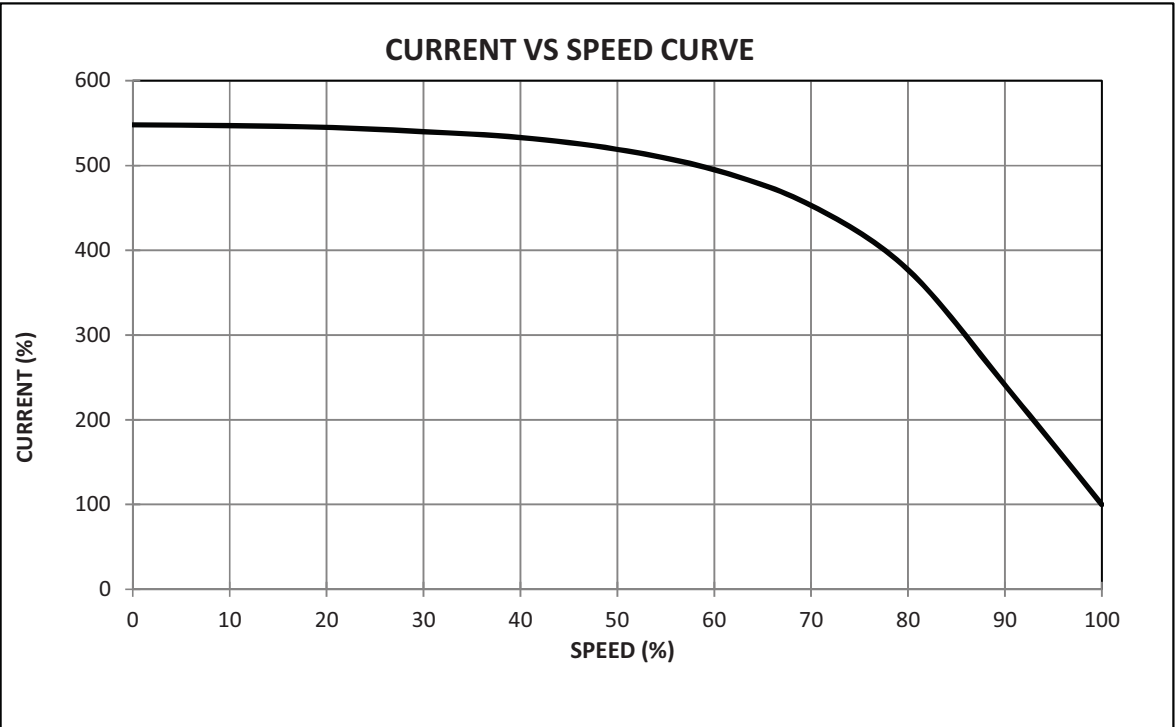
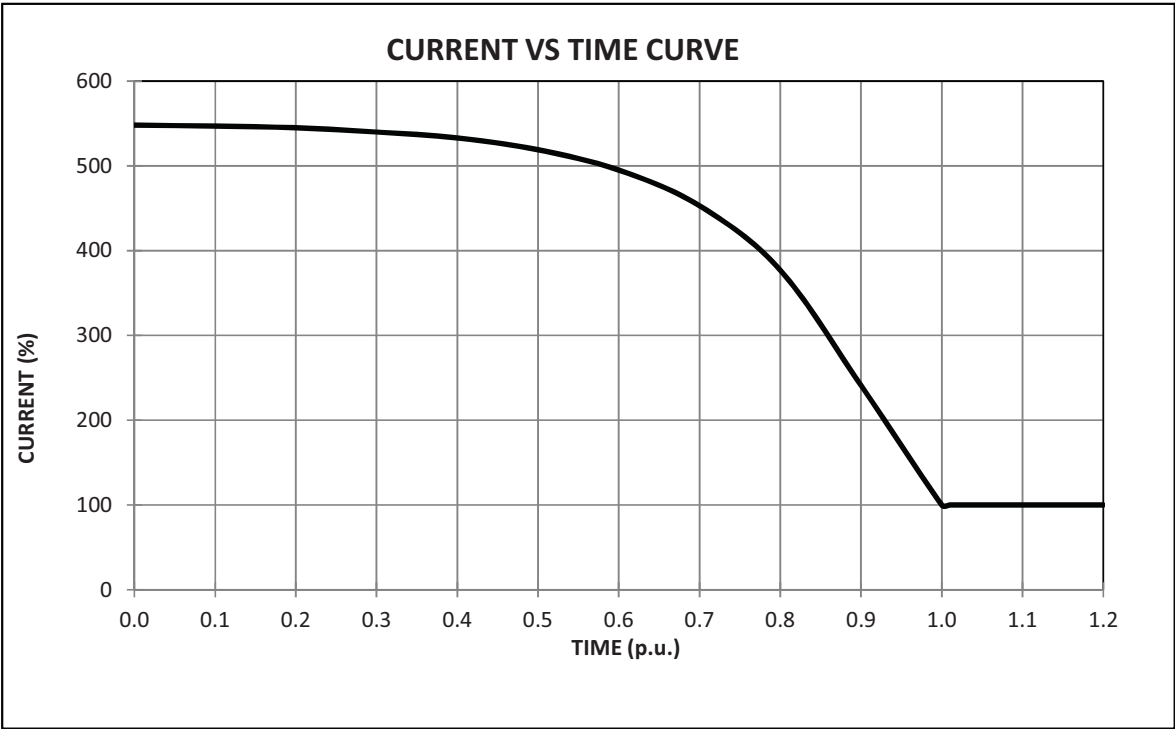


MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.1/1.5

Poles : 6

Efficiency Class : IE3





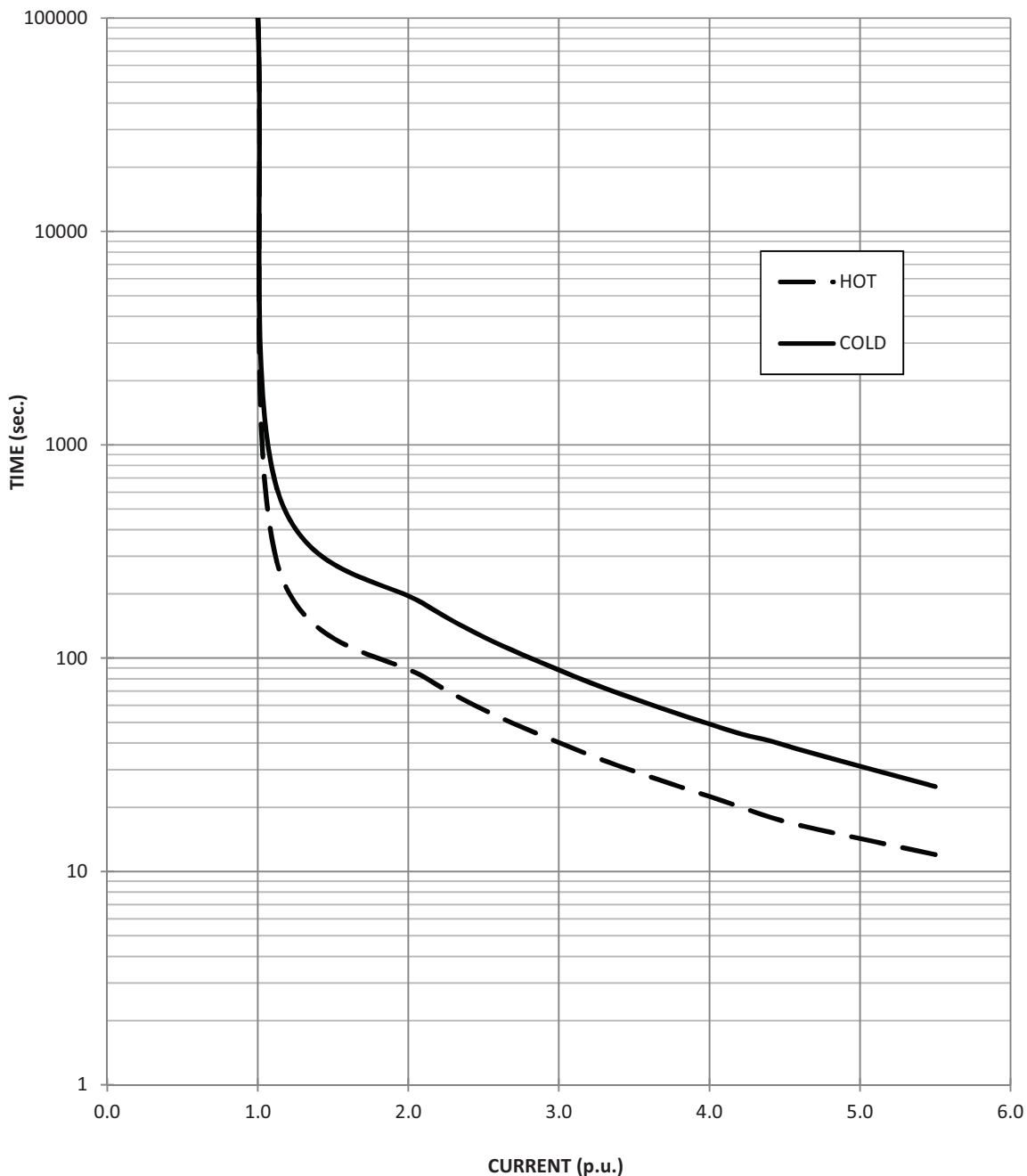
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP): 1.1/1.5

Poles: 6

Efficiency Class: IE3

THERMAL WITHSTAND CURVE



Prep.:

SK

Date:

14-01-2023

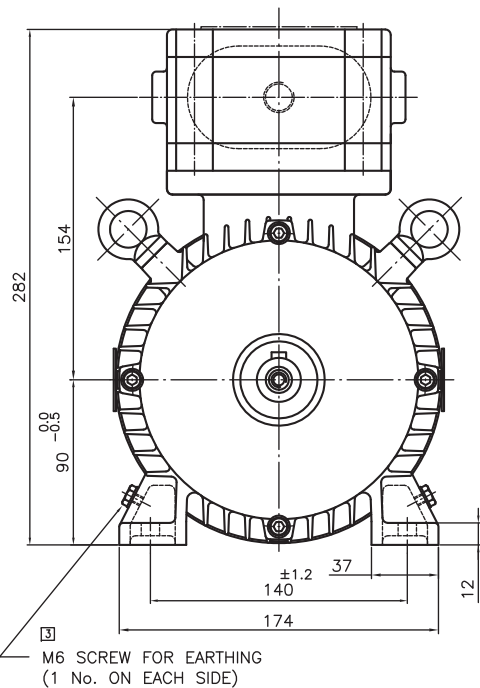
Revision:

0

APPROVED
Checked and Approved

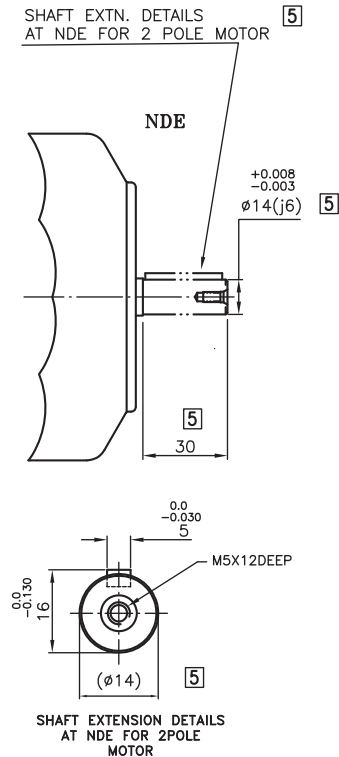
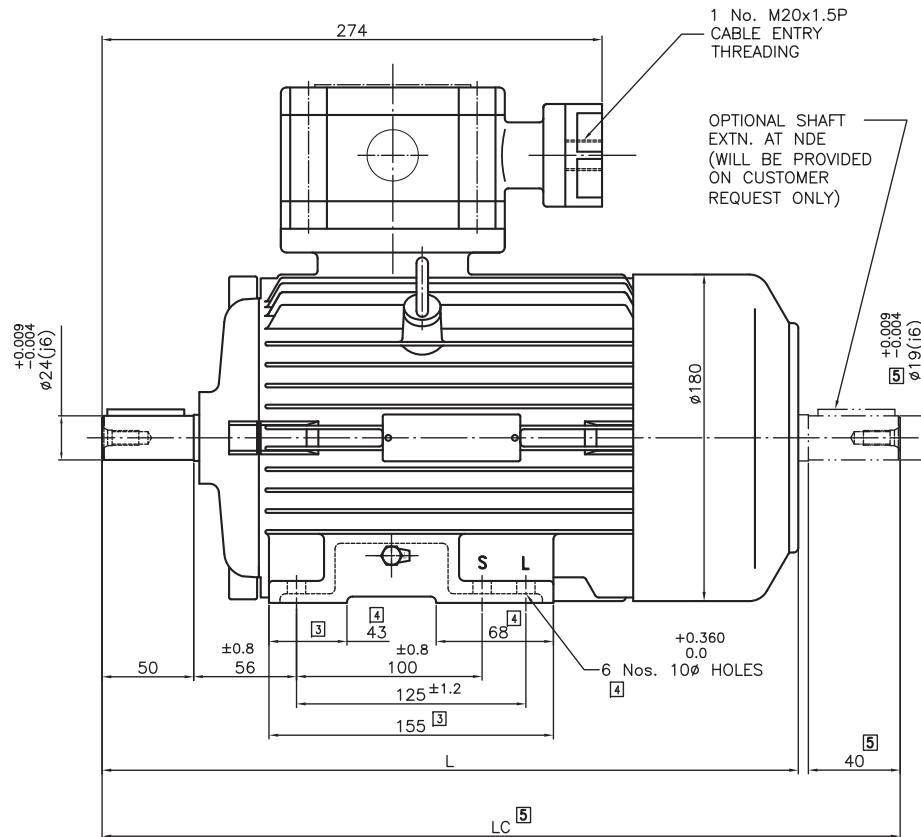
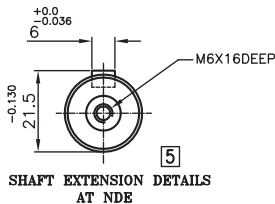
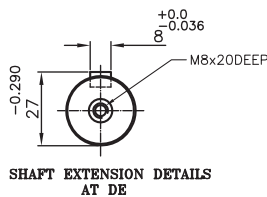
Date Mar

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FRAME	MOTOR TYPE	POLE	L	LC
90S	FD1,FE2,FE3	2	380	415
		4,6,8		425

FRAME	MOTOR TYPE	POLE	L	LC
90L	FD1,FE2,FE3	2	380	415
		4,6,8		425
	FE3	2(2.2KW)	410	445
	FE2, FE3	4,6,8		455



Dim. without tolerance as per IS:2102, very coarse

All dimensions in mm unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽

MACHINING SYMBOLS

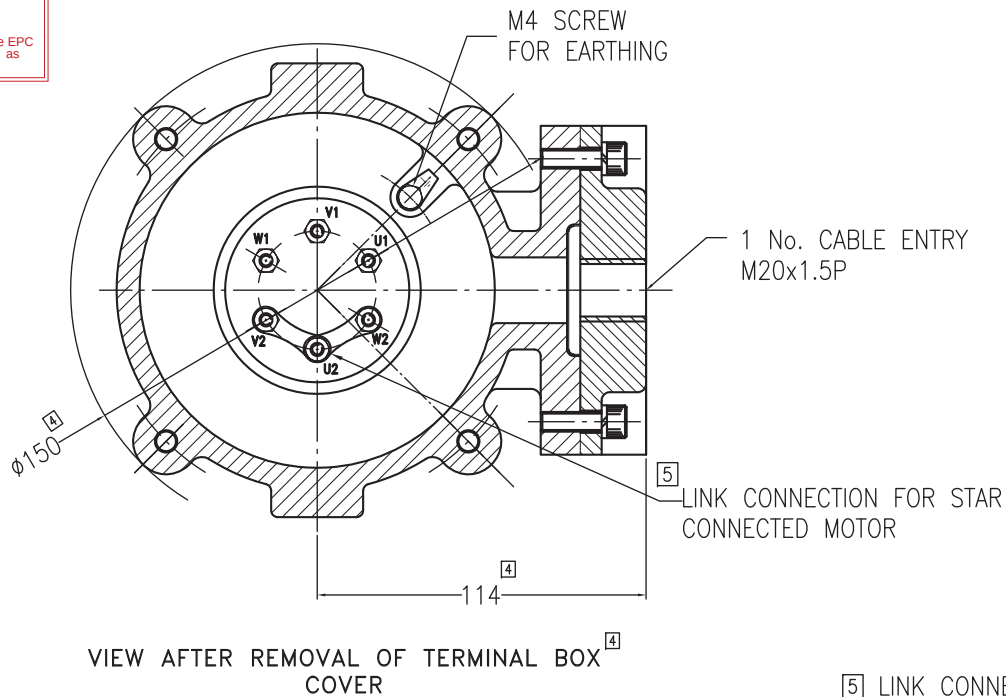
REV. STATUS	5	NDE SIDE SHAFT EXTN. DIA.19x40LG. WAS DIA.24x50LG. & DIMS 410,415,425,445,455 WAS 435 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART - IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE & 2 POLE MOTOR VIEW ADDED			LANKESH	30-01-20
	4	PROVISION FOR 90S FRAME HOLES MADE ON FEET AT DIMN. 100, 6 HOLES WAS 4 HOLES DIMN. 68 WAS 43, FRAME 90S/L FLP WAS 90FLP IN TITLE.			NIMKAR	25-3-16
	3	DIMN. 274 WAS 260. M6 EARTHING SCREW INDICATED. DIMN. 43 & 155 ADDED.			SAURABH	27-8-15
	2	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES			NIMKAR	25-9-14
		TITLE OVERALL DIMENSIONS DRAWING B3 MOUNTING/TEFC/STD. FLAMEPROOF MOTOR			SCALE NTS	
					SHT 1/1	
DRN.	NAME	DATE		DRG. NO.:	REV.	FRAME SIZE
CHD.	P.N.RAOTE	02-01-07		F-90-0-10	5	90S/L
APPD.	S.P.JADIA	02-01-07		REF. : 90FLP-OADIM-B3		FLP

APPROVED
Checked and Approved

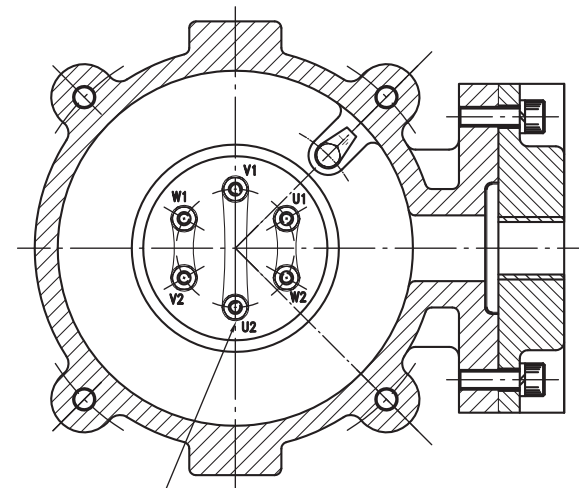
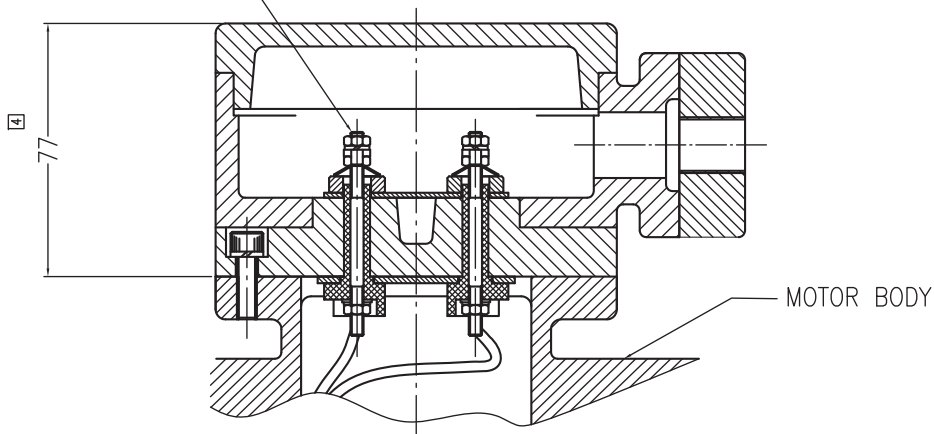
Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

Date Mar

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



M4 6 Nos. TERMINALS



NOTE:-
REFERENCE GENERAL CONSTRUCTION DETAILS DRG. No. 80F-HEM-GA-01 FOR 80 FLP & DRG. No. 90F-HEM-GA-01 FOR 90 FLP.

All dimensions in mm unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	



DRN.	NAME	DATE
CHD.	S.P.JADIA	28-11-12
APPD.	S.P.JADIA	28-11-12

TITLE		SCALE	NTS
STANDARD TERMINAL BOX ASSEMBLY		SHT	1/1
FLAMEPROOF MOTOR		REV.	5
FRAME SIZE 63-71 WAS 80-90 IN TITLE BLOCK, AND SEPERATE DRAWING MADE FOR 63-71FLP HAVING DRG. No. 24-06-044-0016 VIEW INCLUDED FOR DELTA CONNECTED MOTOR AND STAR CONNECTED SPECIFIED FOR EXISTING VIEW & NOTE ADDEED.		FRAME SIZE	80-90
OVERALL DIMENSIONS, NOTE & STANDARD SPECIFIED IN TITLE		FLP	5
DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. NO. & ALL THE FEATURES.			
SYM.			
REVISION			
DATE			
BY			
KIRAN			
P.N.RAOTE			
SAURABH			
31-7-18			
11-04-15			
27-07-15			
33-06-044-0001			
REF.: 63-71FLP-TBOX-ASSY			

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
1.0	Application	AXIAL FAN
1.1	Quantity	As per BBU/approved datasheet
2.0	Manufacturer	HEM
3.0	Type & Frame Size	Type Ref : 2HE3 106-0603 & Frame Size : 100L
3.1	Degree of Protection	IP:55
4.0	Rated Output in KW	1.50
4.1	Rated Speed	945
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm$ 10% ; 50 Hz $\pm$ 5%;
		10% absolute sum - 3 Phase
6.0	Full load current	3.3
7.0	Energy Efficient	IE3
8.0	Efficiency & Power Factor at Full Load	82.5%0.77
9.0	Efficiency & Power Factor at 75% Load	82.5%0.71
10.0	Efficiency & Power Factor at 50% Load	80%0.60
11.0	Duty Cycle	S1
12.0	Rated torque (kg-m)	1.55
13.0	Starting current (%)	550%
14.0	No Load Current (With Mechanism Coupled)	2 A (Approx.)
15.0	Starting torque in % of full load torque	220%
16.0	Pull up torque in % of full load torque	187%
17.0	Pull out torque in % of full load torque	260%
18.0	No load starting time (Without mechanism coupled)	< 1 sec.
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot10
		b) Cold23
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot13
		b) Cold29
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot9
		b) Cold21
22.0	Starting time at minimum starting voltage	
	with mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)
23.0	Starting time at rated voltage with	
	mechanism coupled	< 1 sec. (Load GD ² = Motor GD ²)
24.0	Maximum permissible starting time	7
25.0	Stator thermal time constant (Min)	45 min./120 min.
26.0	Type & number of terminals broughtout	6 leads
27.0	Stator winding connection	STAR

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)
30.0	Resistance per phase (indicative) at 20°C	4.48 Ohms (Approx.)
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold
32.0	Quantity and power consumption of space heater	NA
33.0	Direction of rotation	Bi - Directional
34.0	Bearing make & type	
	DE:	SKF & Deep Groove Ball Bearing
	NDE:	SKF & Deep Groove Ball Bearing
35.0	Lubricant quantity , grade & recommended	Prelubricated
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL
	Terminal Box	
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°
38.0	Gland size for stator winding	AS PER GAD
39.0	Gland size for space heater	NA
40.0	Cable entry	NA
41.0	GD ² (of motor (Kgm ²)	0.0336
42.0	Total weight of motor (kg)	35 KG (Approx.)
43.0	Weight of stator (kg)	19 KG (Approx.)
44.0	Weight of rotor (kg)	16 KG (Approx.)
45.0	Anticipated bearing life in Hours	50000 HOURS
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING
47.0	Limiting rotor temperature for determining	
	safe stall time	185°C
48.0	Thermistor for winding / Bearing	NA
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016
50.0	Standard continuous rating at 40°C ambient	1.56
51.0	Derated rating of motor at 50°C	1.50
52.0	a) Locked Rotor KVA (Indicative)	13.0
	b) Ratio of Locked rotor KVA / rated KW	8.7
53.0	a) Motor Dynamic Load Radial / Axial (kg)	5.9
	b) Motor Static Load	35 KG
54.0	Paint Shade	RAL 6011
55	Vibration Level	IS 12075
55	Noise Level	IS 12065

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.



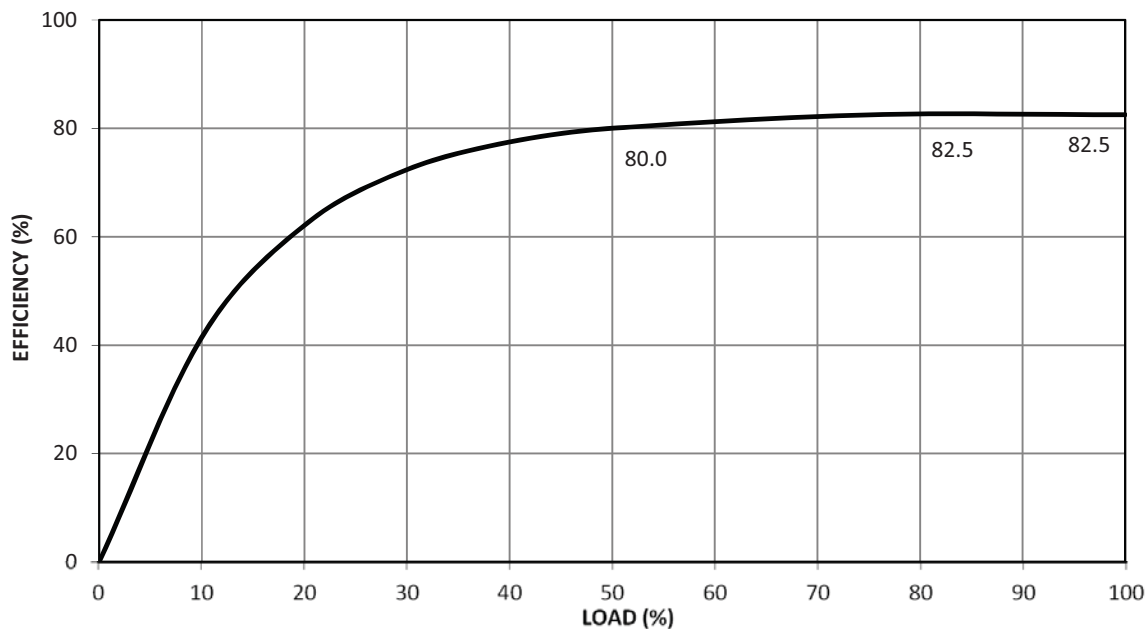
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0

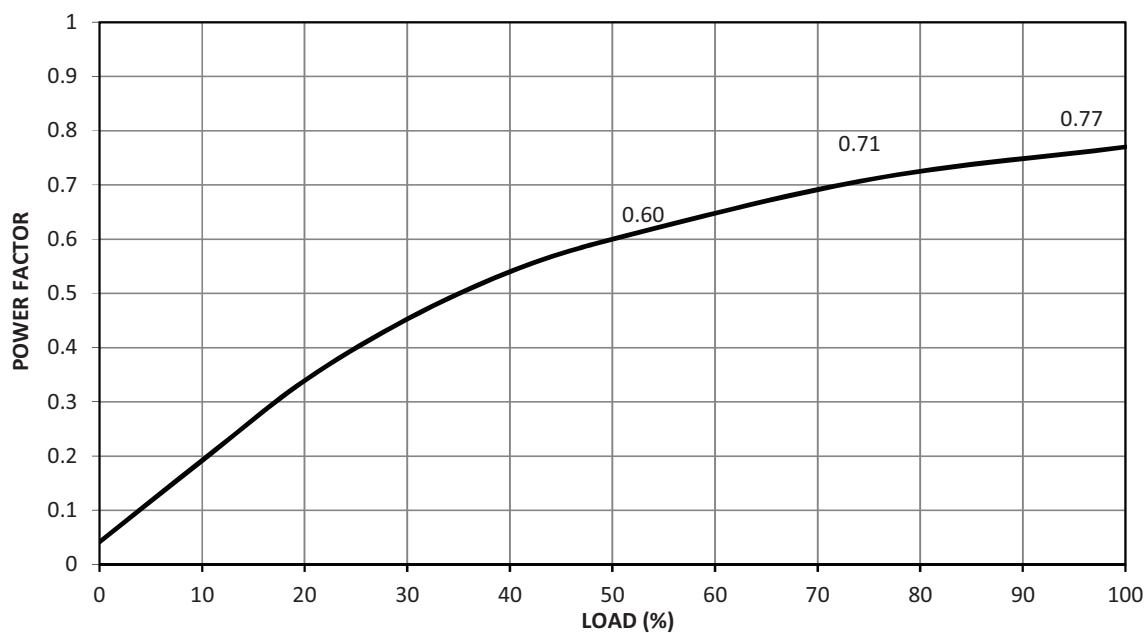
Poles : 6

Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

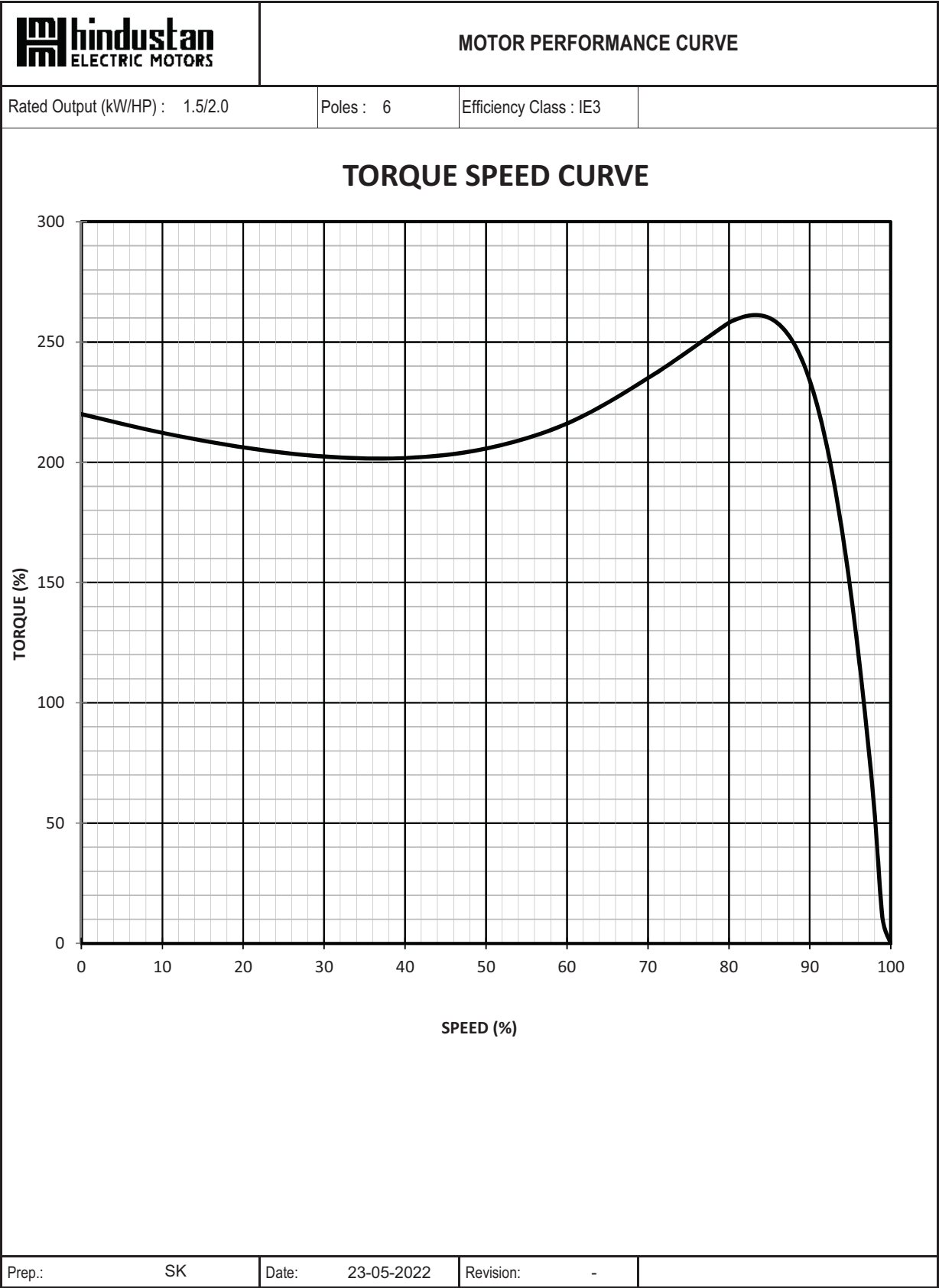
SK

Date:

23-05-2022

Revision:

-





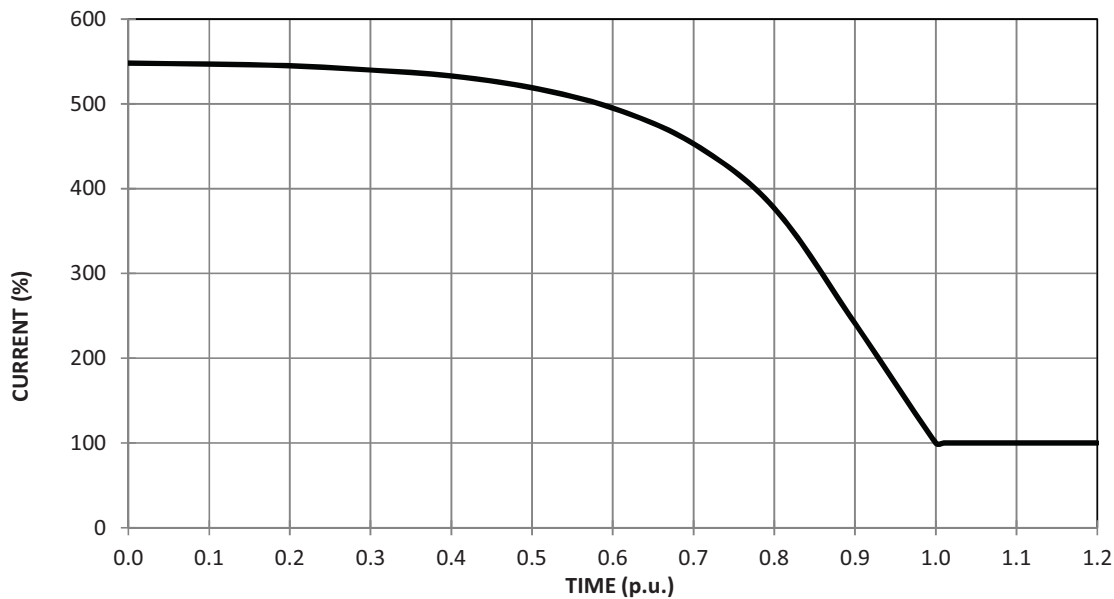
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0

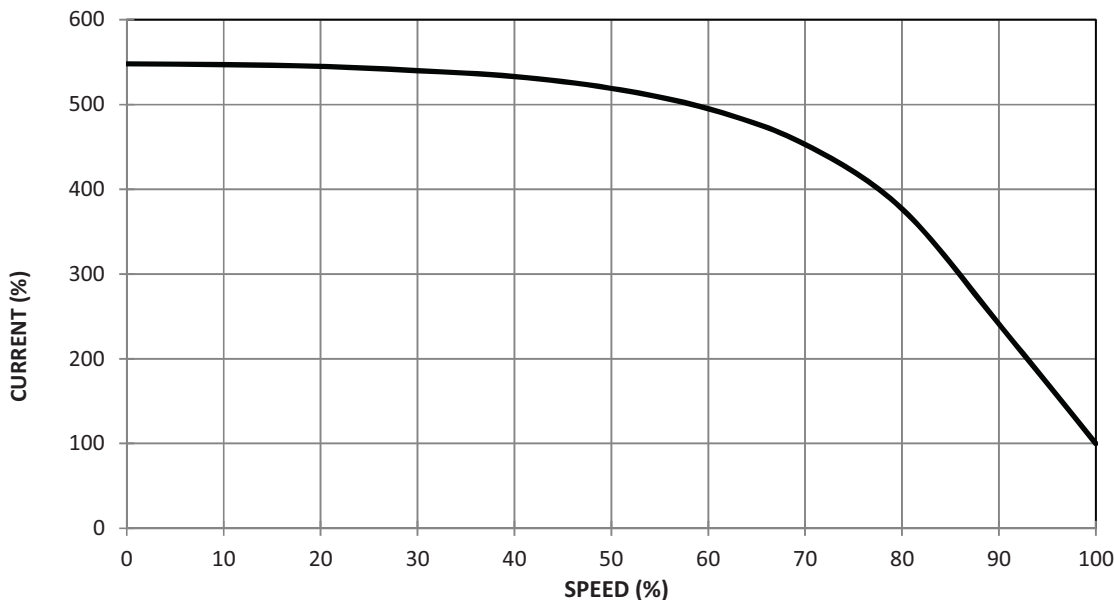
Poles : 6

Efficiency Class : IE3

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

23-05-2022

Revision:

-



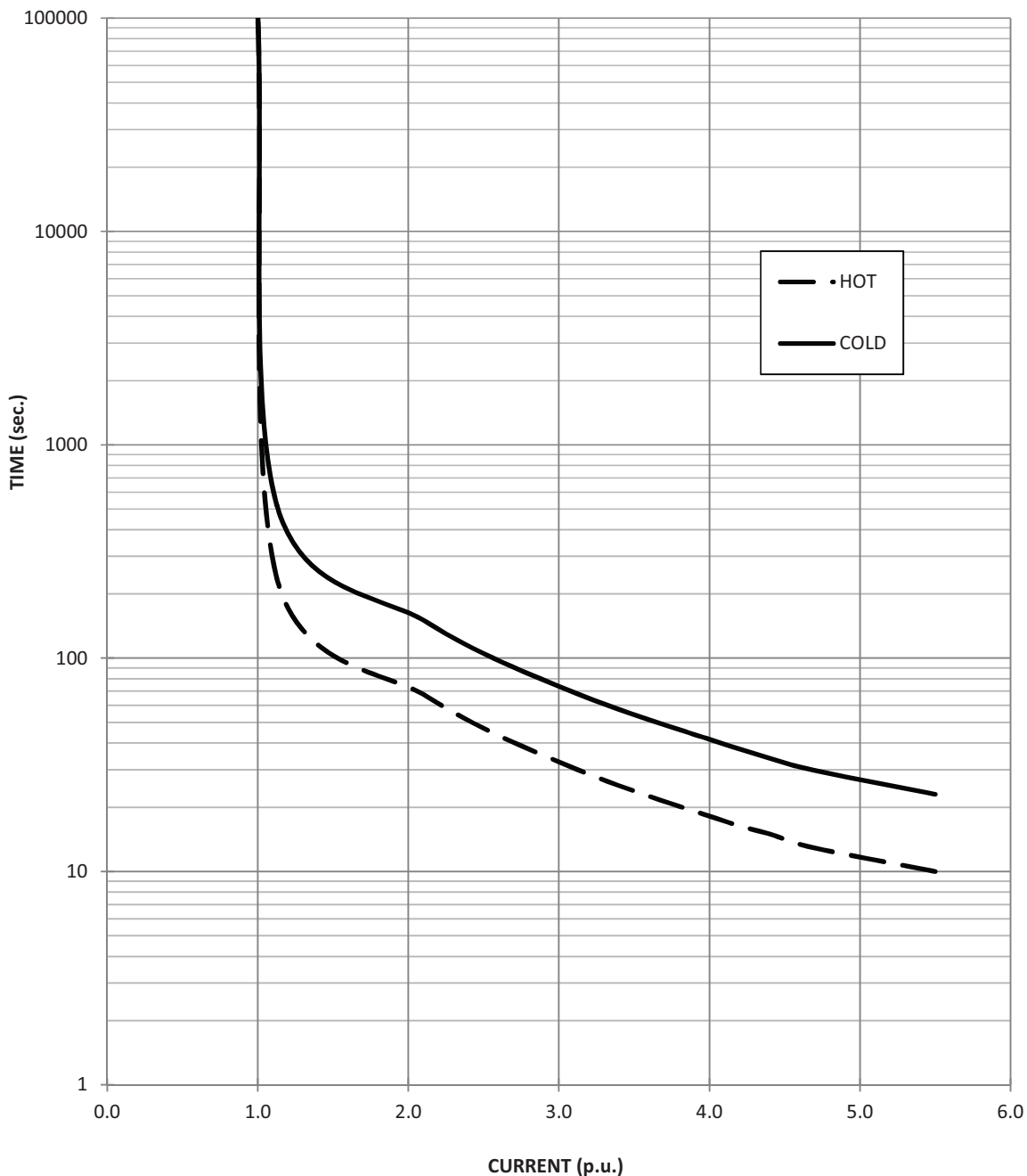
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0

Poles : 6

Efficiency Class : IE3

THERMAL WITHSTAND CURVE



Prep.: SK

Date: 23-05-2022

Revision: 0

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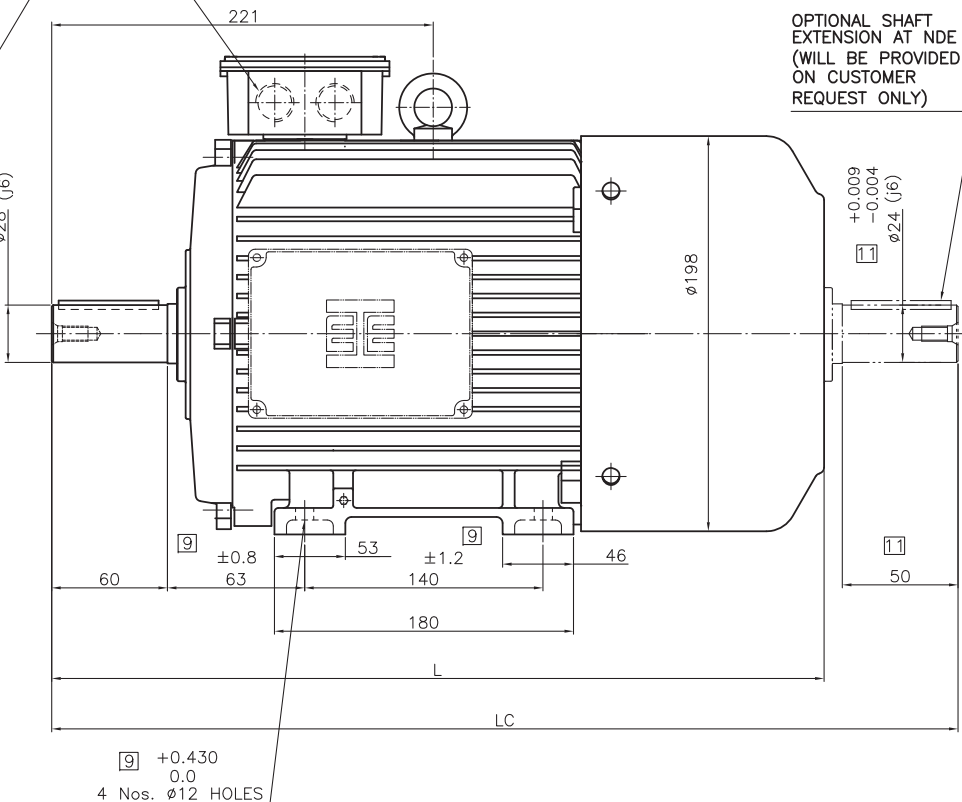
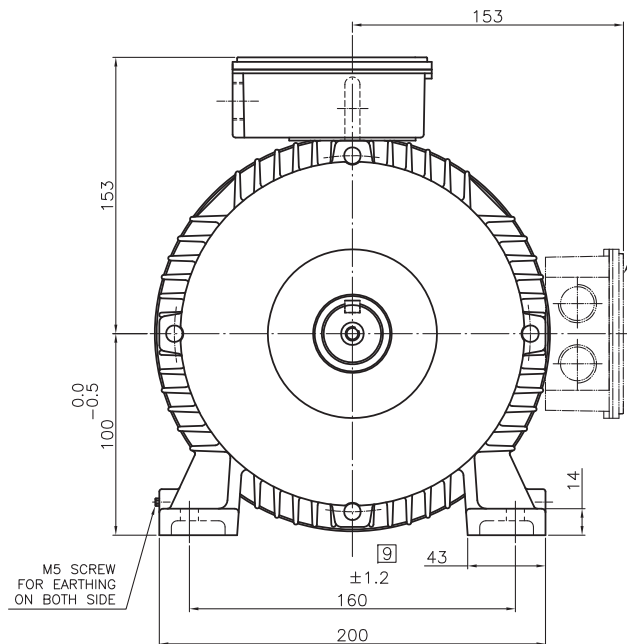
OPTIONAL LOCATION OF
TERMINAL BOX RHS OR LHS
WHEN VIEWING FROM
DE(AS PER CUSTOMER REQUEST ONLY)

DE

2 Nos. 1" B.S.C. CABLE ENTRY THREADING

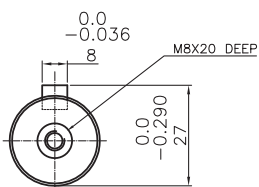
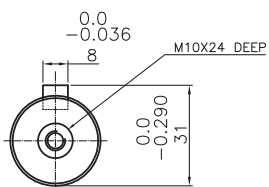
NDE

OPTIONAL SHAFT
EXTENSION AT NDE
(WILL BE PROVIDED
ON CUSTOMER
REQUEST ONLY)



	TYPE DESIGNATION	POLE	L	LC	HP
11	2HE2	2,4,6,8	384	440	—
11	2HE3	2,4	418	474	—
11	2HE3	6,8	384	440	—

	TYPE DESIGNATION	POLE	L	LC	HP	{#}
12	2HE2	4	418	474	4	



SHAFT EXTENSION DETAILS AT DE

SHAFT EXTENSION DETAILS AT NDE 11

NOTE :- {#} HIGHER NON STD. RATING 4HP/4P/IE2 WIL BE PROVIDED ON CUSTOMER REQUEST ONLY

REV. STATUS	12	HP COLUMN ADDED BY ADDING HIGHER NON STD. RATING 4HP/4P/IE2	LANKESH	01-07-22
	11	NDE SIDE SHAFT EXTN. DIA.24x50LG. WAS DIA.28x60LG. & DIMS 384, 440, 418, 474 WAS 374, 440, 384,450 & AS PER Cat. : D08, Print : 01/2020 TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE	LANKESH	30-12-19
	10	TABLE UPDATED, TYPE DESIGNATION WAS P.No & 2HC1, 2HE2, 2HE3, 2HS1, 2HS5, 2HT1 WAS P.No1, P.No2, P.No.3 TO UPLOAD THIS DRG. ON PORTAL	ARUN	19-11-18
	9	TOLERANCE AT HOLE CENTRES & STD ADDED IN TITLE & IE3 , IE2 WAS EFF1 ,EFF2	LANKESH	08-08-18
	8	P. No. 3 AND EFFICIENCY COLUMN ADDED	ARUN	08-9-17
	7	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. AND ALL THE FEATURES. P.No. SPECIFIED WAS EFFICIENCY.	NIMKAR	27-1-14

Dim. without tolerance
as per IS:2102, very coarse

All dimensions in mm
unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	



TITLE

OVERALL DIMENSIONS DRAWING
B3 FOOT MOUNTED/TEFC/STD. MOTOR

SCALE NTS

SHT 1/1

	NAME	DATE
DRN.	P.V.SHINDE	28/02/04
CHD.	S.P.JADIA	28/02/04
APPD.	S.P.JADIA	28/02/04



DRG. NO.:

A1-100L-49(GN)

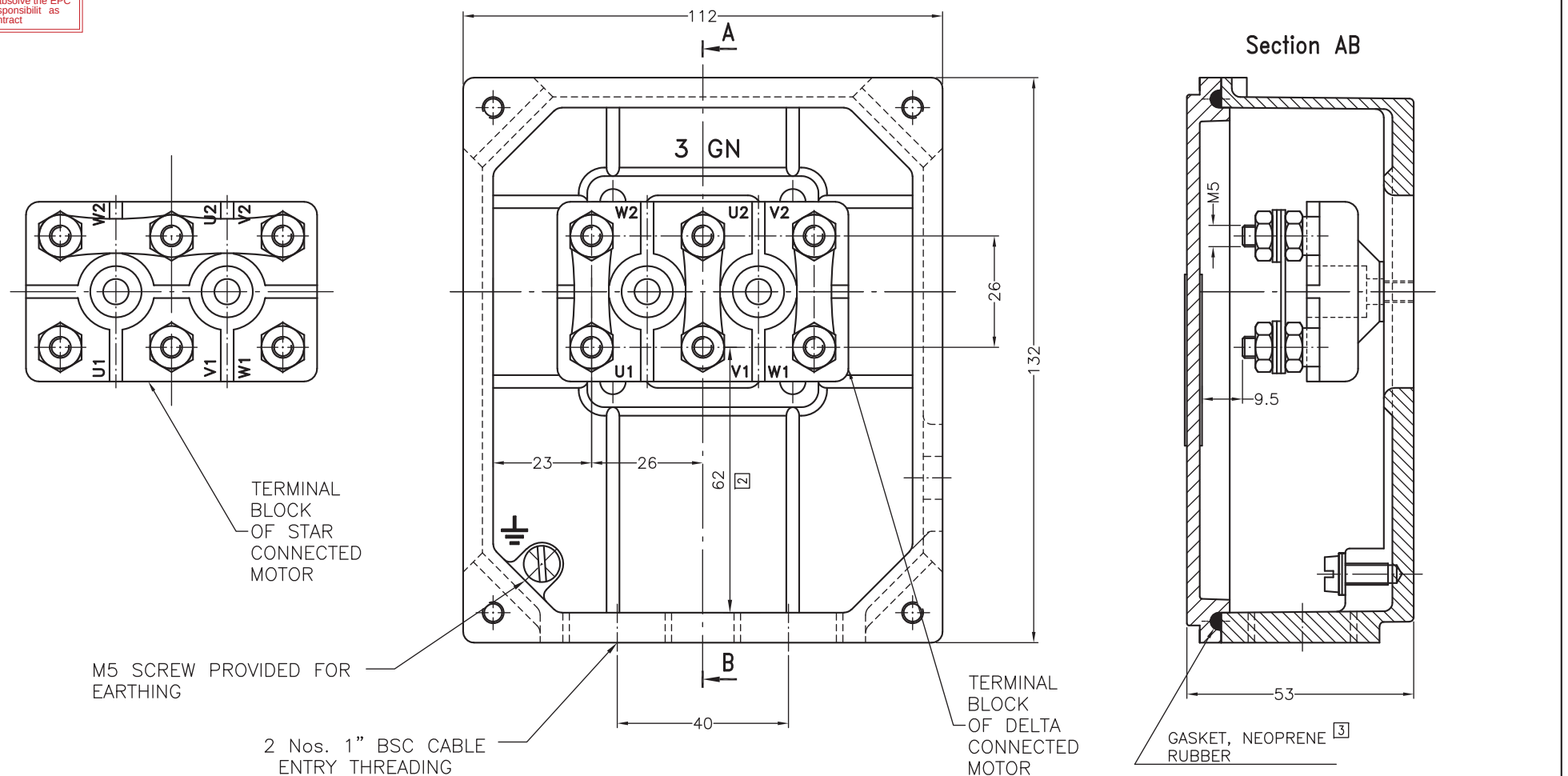
REF. A1-100L-OADIMN

REV.	12
------	----

FRAME SIZE
100L
(GN)

APPROVED
Checked and Approved

Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



Dim. without tolerance as per IS:2102 very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS									
	[3]	GASKET INDICATED IN SECTION AB					ARUN	07/12/16	
	[2]	DIMN. 62 SPECIFIED, STANDARD ADDED IN TITLE					P.N.RAO TE	21/02/15	
	[1]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.					NIMKAR	05/07/13	
			TITLE STANDARD ^[2] TERMINAL BOX ASSEMBLY					SCALE	NTS
								SHT	1/1
			NAME	DATE	PROJECTION	DRG. NO.:	REV.	FRAME SIZE	
DRN.	GANESH	02/08/11		A3-100/132-33(GN)	3	100-132			
CHD.	S.P.JADIA	02/08/11							
APPD.	S.P.JADIA	02/08/11							
			REF. 10-13-TBOX-ASSLY			(GN)			

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
1.0	Application	AXIAL FAN
1.1	Quantity	As per BBU/ Approved Datasheet
2.0	Manufacturer	HEM
3.0	Type & Frame Size	Type Ref : 2FE3 106-0603 & Frame Size : 100L FLP
3.1	Degree of Protection	IP:55
4.0	Rated Output in KW	1.50
4.1	Rated Speed	945
5.0	Rated Voltage, Frequency & Phases	415 V AC ± 10% ; 50 Hz ± 5%;
		10% absolute sum - 3 Phase
6.0	Full load current	3.3
7.0	Energy Efficient	IE3
8.0	Efficiency & Power Factor at Full Load	82.5%0.77
9.0	Efficiency & Power Factor at 75% Load	82.5%0.71
10.0	Efficiency & Power Factor at 50% Load	80%0.60
11.0	Duty Cycle	S1
12.0	Rated torque (kg-m)	1.55
13.0	Starting current (%)	550%
14.0	No Load Current (With Mechanism Coupled)	2 A (Approx.)
15.0	Starting torque in % of full load torque	220%
16.0	Pull up torque in % of full load torque	187%
17.0	Pull out torque in % of full load torque	260%
18.0	No load starting time (Without mechanism coupled)	< 1 sec.
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot10
		b) Cold23
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot13
		b) Cold29
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot9
		b) Cold21
22.0	Starting time at minimum starting voltage	
	with mechanism coupled	< 1 sec. (Load GD² = Motor GD²)
23.0	Starting time at rated voltage with	
	mechanism coupled	< 1 sec. (Load GD² = Motor GD²)
24.0	Maximum permissible starting time	7
25.0	Stator thermal time constant (Min)	45 min./120 min.
26.0	Type & number of terminals broughtout	6 leads
27.0	Stator winding connection	STAR

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)
30.0	Resistance per phase (indicative) at 20°C	4.48 Ohms (Approx.)
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold
32.0	Quantity and power consumption of space heater	NA
33.0	Direction of rotation	Bi - Directional
34.0	Bearing make & type	
	DE:	SKF & Deep Groove Ball Bearing
	NDE:	SKF & Deep Groove Ball Bearing
35.0	Lubricant quantity , grade & recommended	Prelubricated
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL
	Terminal Box	
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°
38.0	Gland size for stator winding	AS PER GAD
39.0	Gland size for space heater	NA
40.0	Cable entry	NA
41.0	GD ² (of motor (Kgm ²)	0.0336
42.0	Total weight of motor (kg)	35 KG (Approx.)
43.0	Weight of stator (kg)	19 KG (Approx.)
44.0	Weight of rotor (kg)	16 KG (Approx.)
45.0	Anticipated bearing life in Hours	50000 HOURS
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING
47.0	Limiting rotor temperature for determining	
	safe stall time	185°C
48.0	Thermistor for winding / Bearing	NA
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016
50.0	Standard continuous rating at 40°C ambient	1.56
51.0	Derated rating of motor at 50°C	1.50
52.0	a) Locked Rotor KVA (Indicative)	13.0
	b) Ratio of Locked rotor KVA / rated KW	8.7
53.0	a) Motor Dynamic Load Radial / Axial (kg)	5.9
	b) Motor Static Load	35 KG
54.0	Paint Shade	RAL 6011
55	Vibration Level	IS 12075
55	Noise Level	IS 12065

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.

PREP BY:
DG

APPD BY:
SK



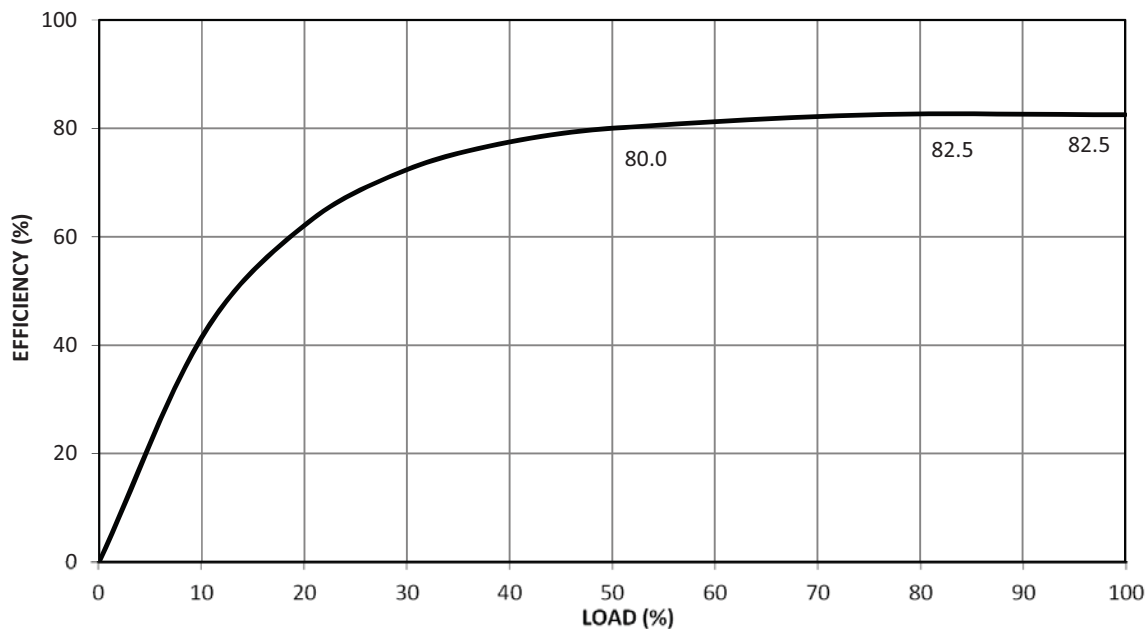
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0

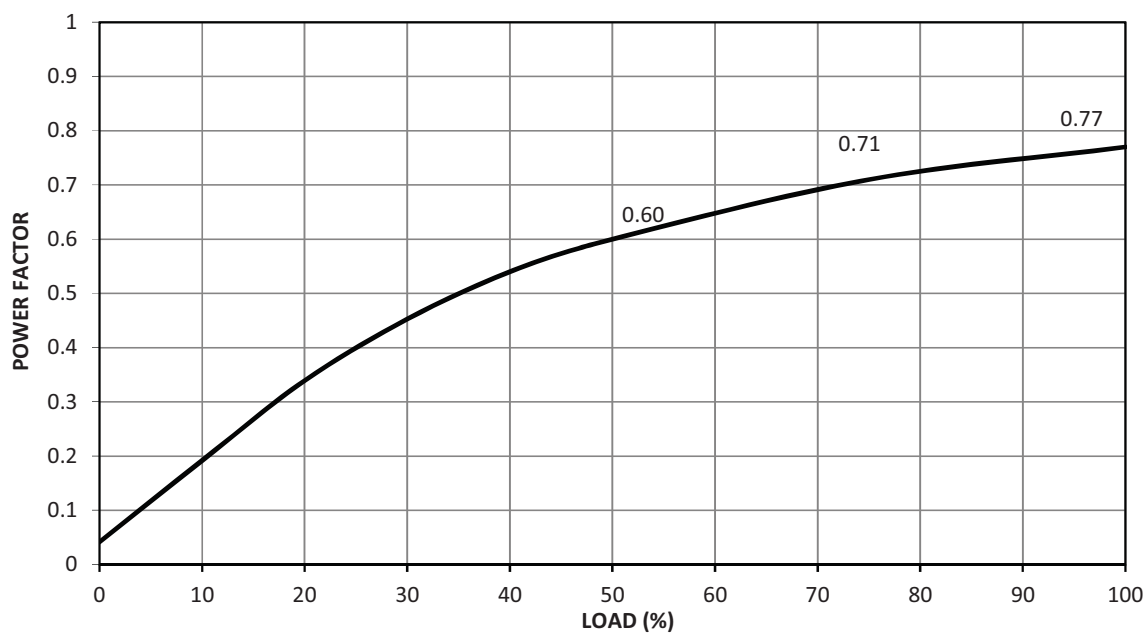
Poles : 6

Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

23-05-2022

Revision:

-



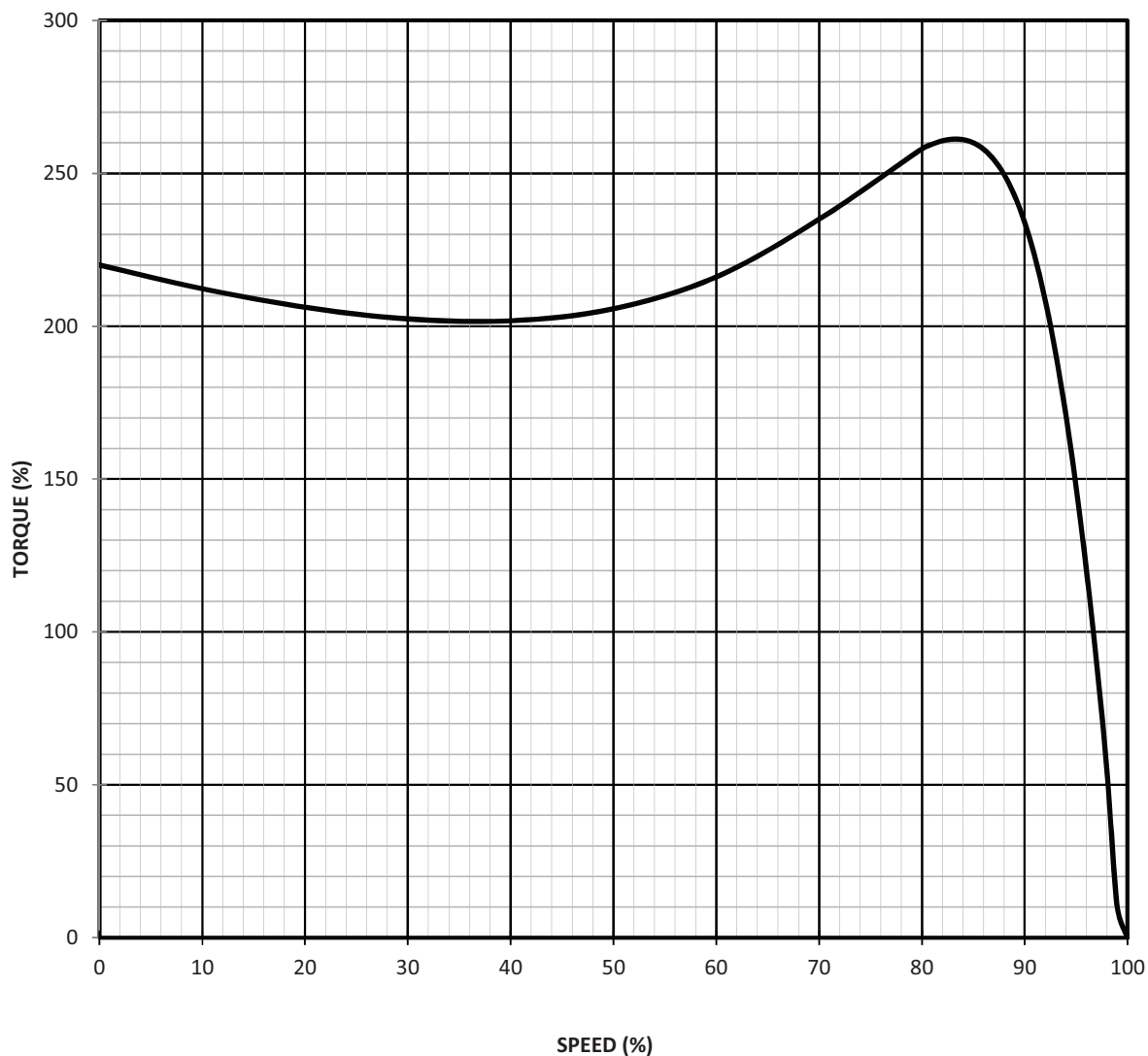
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0

Poles : 6

Efficiency Class : IE3

TORQUE SPEED CURVE



Prep.:

SK

Date:

23-05-2022

Revision:

-



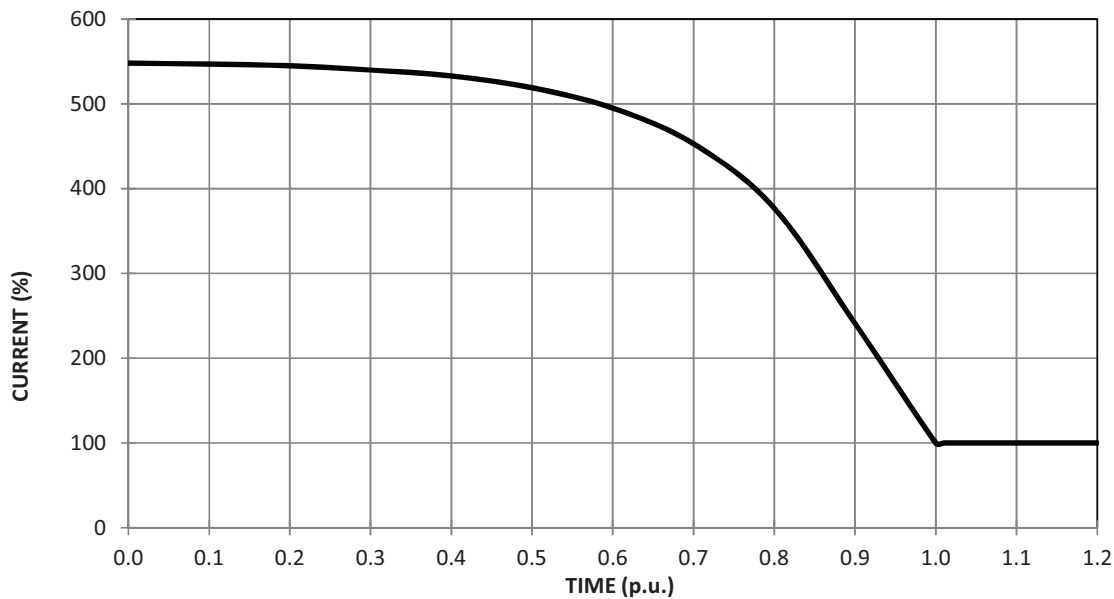
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0

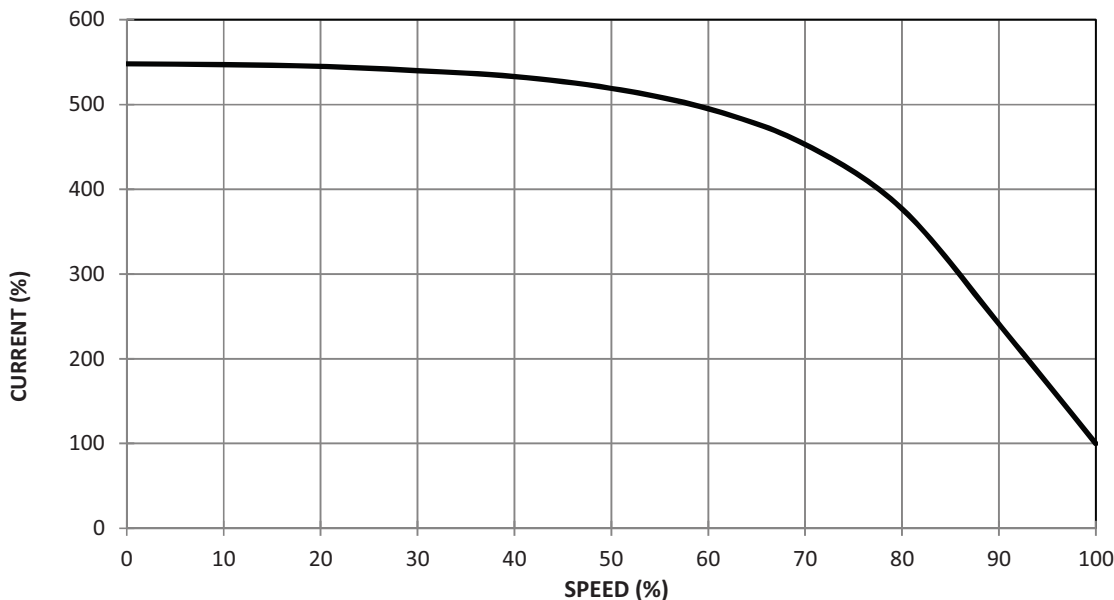
Poles : 6

Efficiency Class : IE3

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

23-05-2022

Revision:

-



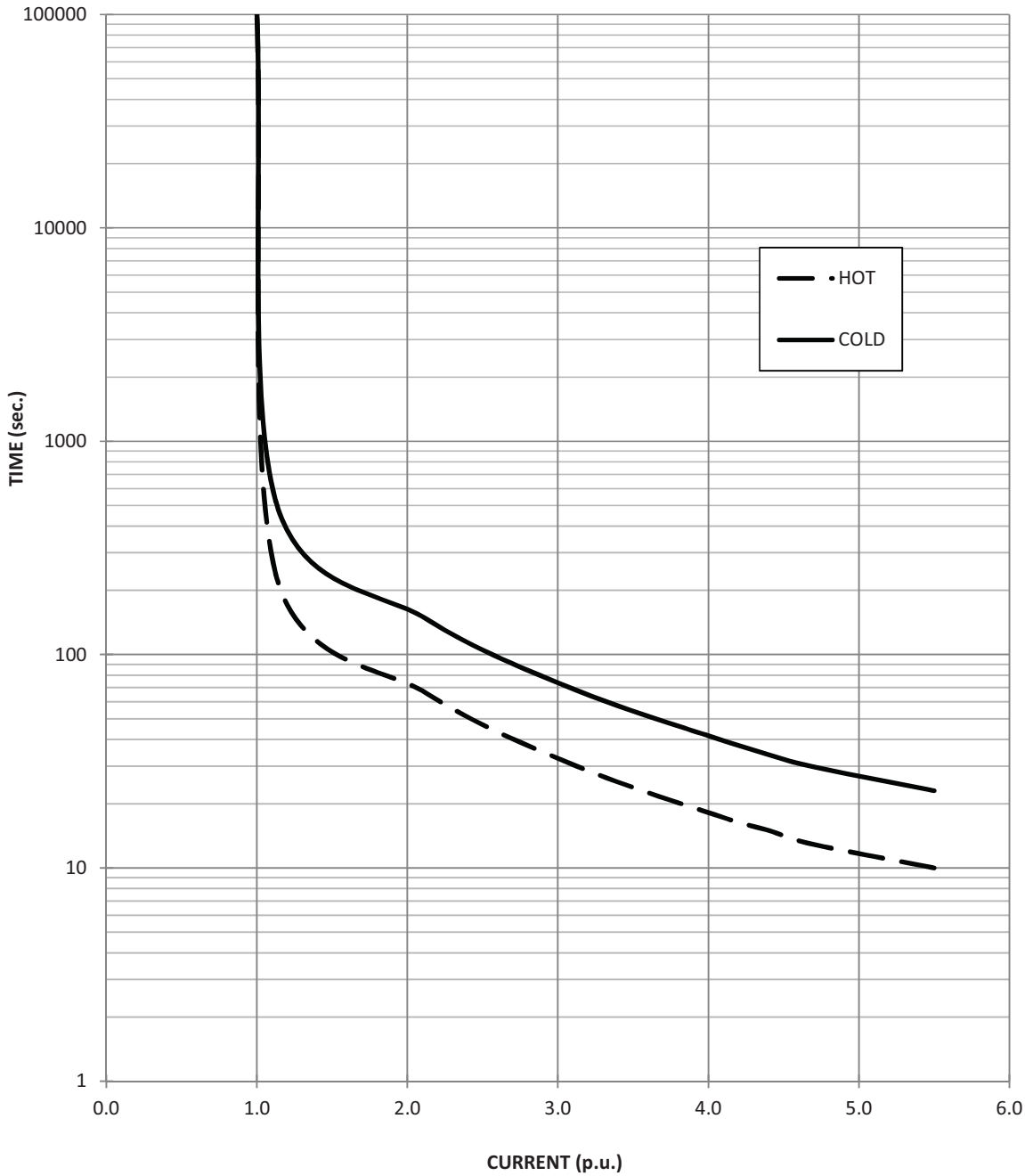
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 1.5/2.0

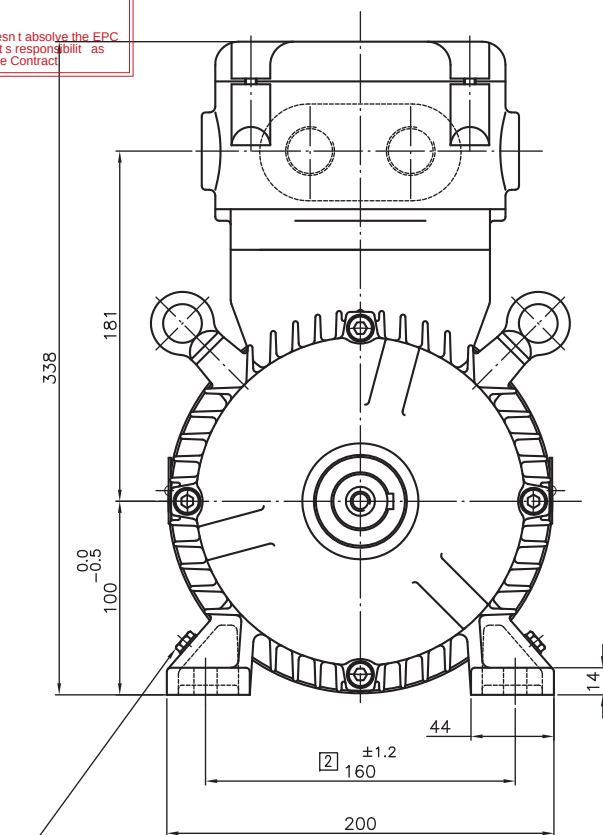
Poles : 6

Efficiency Class : IE3

THERMAL WITHSTAND CURVE

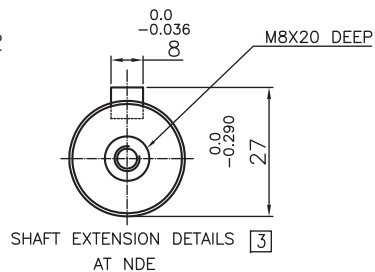
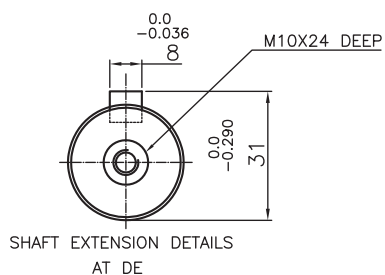
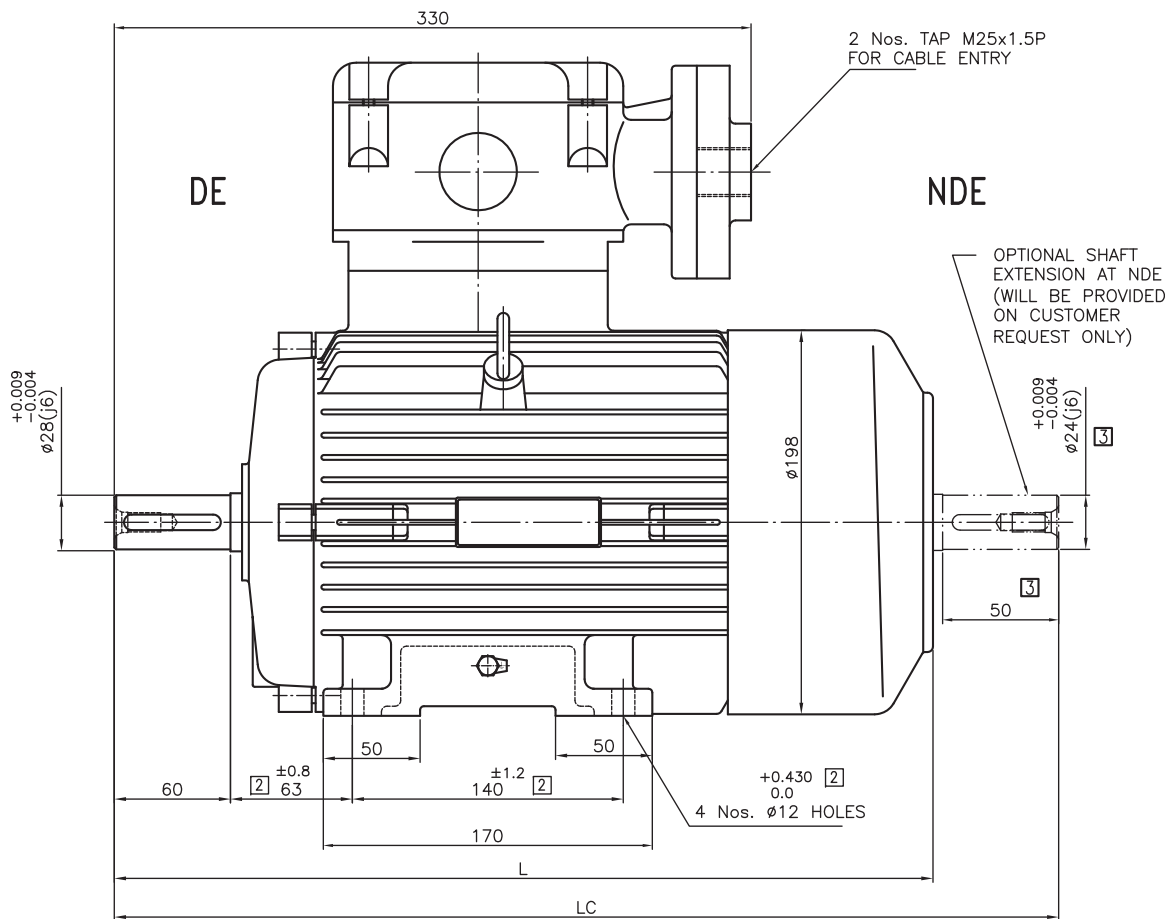


Approval doesn't absolve the EPC contractor of its responsibilities as specified in the Contract



M6 SCREW
FOR EARTHING
BOTH SIDE

MOTOR TYPE	POLE	L	LC
FD1,FE2	2,4,6,8	423	478
FE3	6,8		

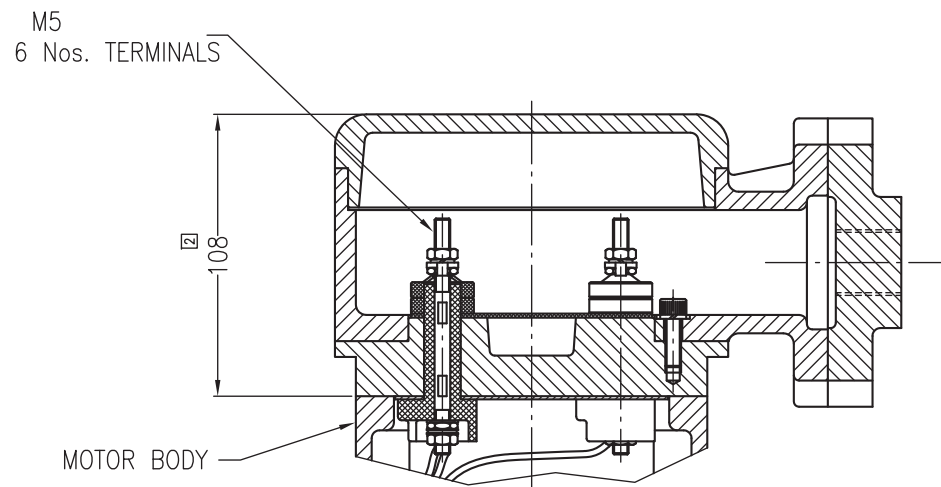
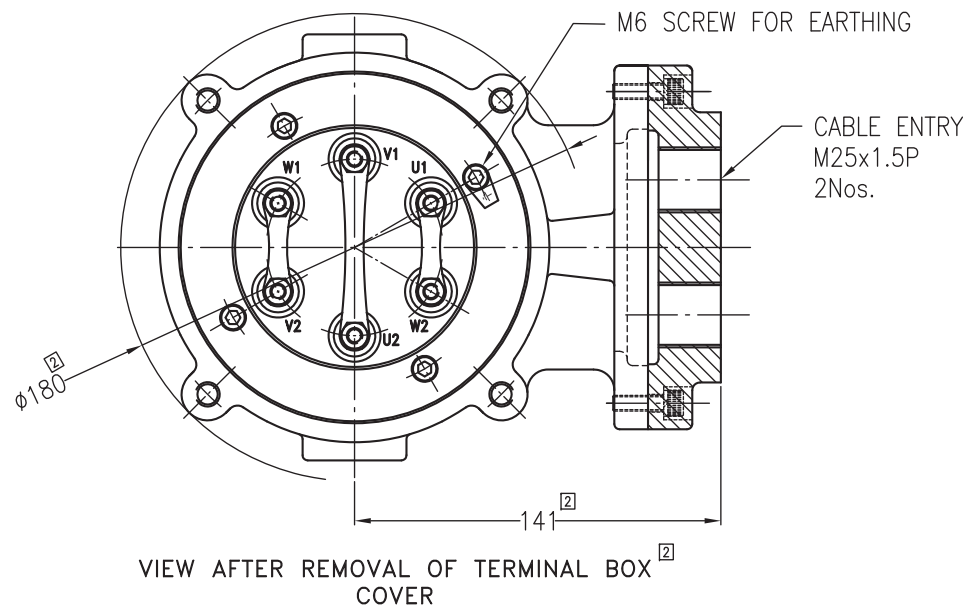


Dim. without tolerance as per IS:2102, very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS	[4]	LENGTH TABLE ADDED	23/09/20	PRAFUL		
	[3]	NOTE : SIDE SHAFT EXTN. DIA.24x50LG. WAS DIA.28x60LG. & DIMS 478 WAS 488 AS PER Cat. : D08, PNT : 01/2020 TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE	4/3/20	lanakesh		
	[2]	TOL. ADDED ±0.8 FOR DIMS. 63 & TOL. ±1.2 FOR DIMS. 140, 160 AS PER IS:2102 PART:1-COARSE & +0.430/0.0 ADDED FOR Ø12 HOLE AS PER IS: 1231	01/11/18	ARUN		
	[1]	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.	8/1/14	NIMKAR		
			TITLE		SCALE	NTS
			OVERALL DIMENSIONS DRAWING FOR B3/TEFC/STD. FLAMEPROOF MOTOR		SHT	1/1
	NAME	DATE	PROJECTION	DRG. NO.:	REV.	FRAME SIZE
DRN.	P.N.RAOTE	26-12-06		F-100-0-10	4	100L FLP
CHD.	S.P.JADIA	26-12-06				
APPD.	S.P.JADIA	26-12-06		REF. : 100FLP-OADIM-B3		

APPROVED
Checked and Approved

Date Mar
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



All dimensions in mm
unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS	[2]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. NO. & ALL THE FEATURES, OVERALL DIMENSIONS, NOTE SPECIFIED				11-04-15		P.N.RAOTE	
						DATE	BY		
SYM.		REVISION							
 hindustan ELECTRIC MOTORS			TITLE [2] STANDARD TERMINAL BOX ASSEMBLY FLAMEPROOF MOTOR					SCALE	NTS
								SHT	1/1
	NAME	DATE	PROJECTION	DRG. NO.:	33-10-044-0002		REV. 2	FRAME SIZE 100-132 FLP	
DRN.	NIMKAR	03-12-13							
CHD.	S.P.JADIA	03-12-13							
APPD.	S.P.JADIA	03-12-13			REF. : 100-132FLP-TBOX-ASSY				

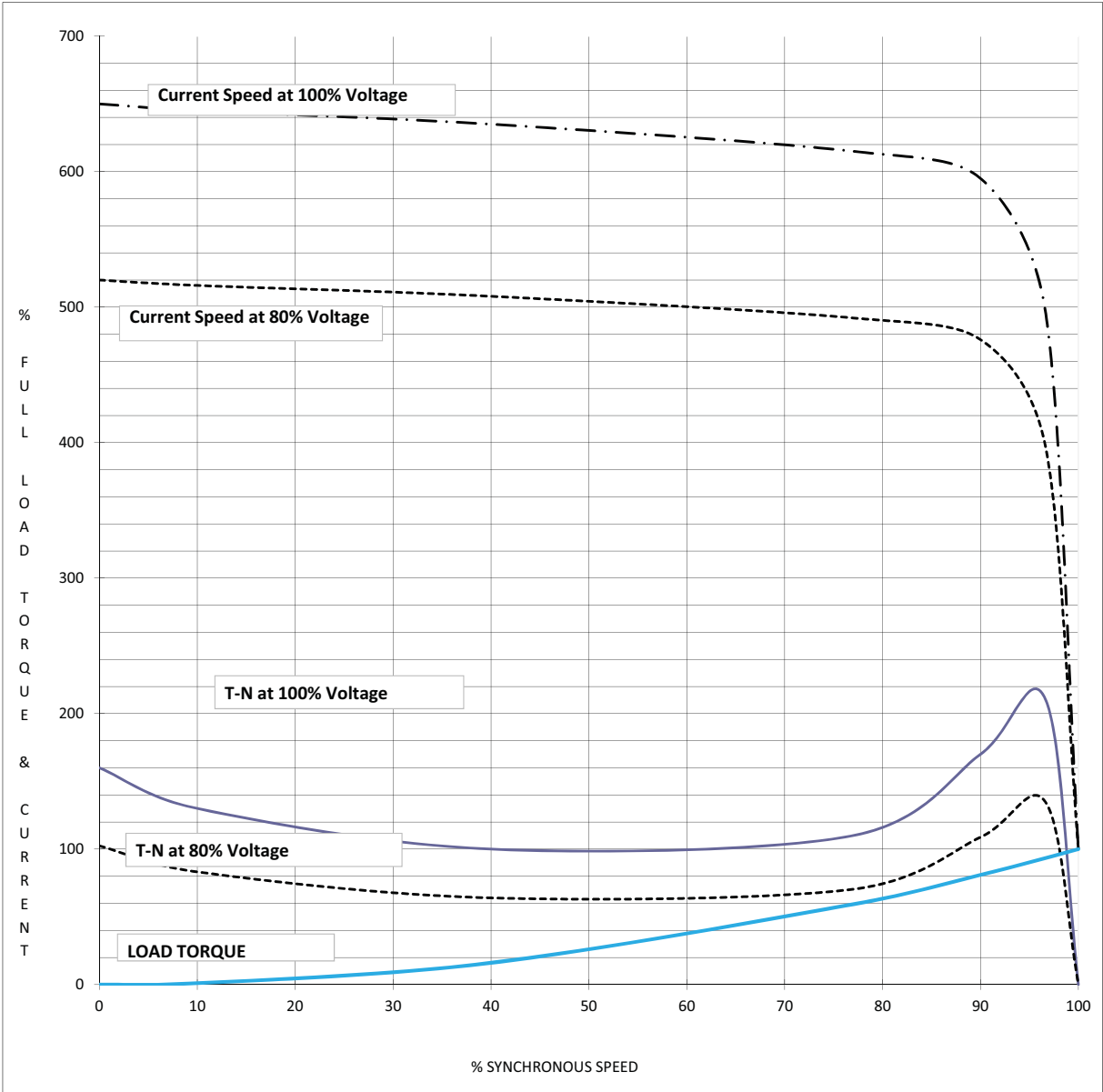
DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FANS	
1.1	Quantity	AS PER APPROVED BBU / FAN SCHEDULE	
2.0	Manufacturer	LHPL	
3.0	Type & Frame Size	Energy Efficient & Frame Size 112M	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	2.2	
4.1	Rated Speed	950	
5.0	Rated Voltage, Frequency & Phases	415 V AC $\pm 10\%$; 50 Hz $\pm 5\%$;	
		10% absolute sum - 3 Phase	
6.0	Full load current	4.8	
7.0	Energy Efficient	As per IEC60034 (IE3)	
8.0	Efficiency & Power Factor at Full Load	84.3	0.76
9.0	Efficiency & Power Factor at 75% Load	83.8	0.70
10.0	Efficiency & Power Factor at 50% Load	83.0	0.65
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	2.26	
13.0	Starting current (%)	650%	
14.0	No Load Current (With Mechanism Coupled)	2.7 A (Indicative)	
15.0	Starting torque in % of full load torque	3.61	
16.0	Pull up torque in % of full load torque	3.38	
17.0	Pull out torque in % of full load torque	4.74	
18.0	No load starting time (Without mechanism coupled)	3 sec	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	10
		b) Cold	20
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	16
		b) Cold	31
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	8
		b) Cold	17
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	3 sec	
23.0	Starting time at rated voltage with		
	mechanism coupled	2 sec	
24.0	Maximum permissible starting time	3 sec	
25.0	Stator thermal time constant (Min)	42/125	
26.0	Type & number of terminals broughtout	3 leads	
27.0	Stator winding connection	STAR	

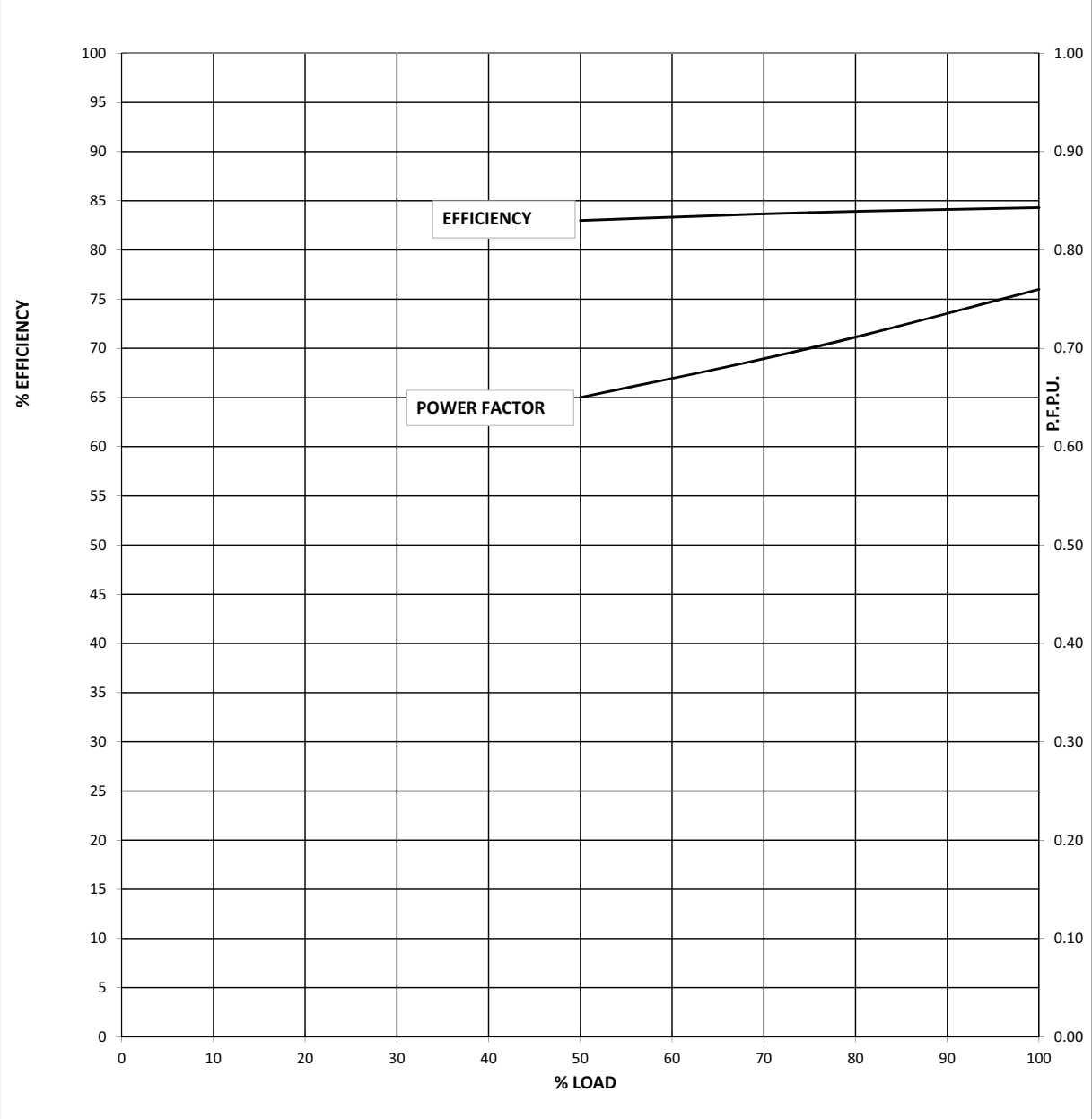
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.	
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)	
30.0	Resistance per phase (indicative) at 20°C	3.33 (INDICATIVE)	
31.0	No. of Successive Starts in hot Condition	3 HOT 4 COLD	
32.0	Quantity and power consumption of space heater	NA	
33.0	Direction of rotation	Bi - Directional	
34.0	Bearing make & type		
	DE:	SKF/FAG/EQUIVALENT & DGBB	
	NDE:	SKF/FAG/EQUIVALENT & DGBB	
35.0	Lubricant quantity , grade & recommended	PRELUBRICATED	
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL	
	Terminal Box		
37.0	Location & angle of rotation	AS PER GAD	
38.0	Gland size for stator winding	AS PER GAD	
39.0	Gland size for space heater	NA	
40.0	Cable entry	NA	
41.0	GD ² (of motor (Kgm ²)	0.015	
42.0	Total weight of motor (kg)	35 KG APPROX	
43.0	Weight of stator (kg)	20 KG APPROX	
44.0	Weight of rotor (kg)	15 KG APPROX	
45.0	Anticipated bearing life in Hours	40000 HOURS	
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING	
47.0	Limiting rotor temperature for determining		
	safe stall time	270°C	
48.0	Thermistor for winding / Bearing	NA	
49.0	Grade of balance of motor	2.5 OF ISO:1940	
50.0	Standard continuous rating at 40°C ambient	2.35	
51.0	Derated rating of motor at 50°C	2.2	
52.0	a) Locked Rotor KVA (Indicative)	26.8	
	b) Ratio of Locked rotor KVA / rated KW	12.2	
53.0	a) Motor Dynamic Load Radial / Axial (kg)	8.6	
	b) Motor Static Load	36 KG	
54.0	Paint Shade	RAL 5012	
55	Vibration Level	IEC 60034-14	IEC 60034-14
55	Noise Level	IEC 60034-9	IEC 60034-9

Note : - 1) All performance figure are subjected to IEC:60034-1 tolerance.

2) Terminal box is rotatable in steps of 90 Deg. C provided arrangement of canopy.

3) Insulation shall be VPI.

MKTG Ref No.:		D7HO2009026		LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		 	
SPEED VS TORQUE & CURRENT CHARACTERISTICS							
CUSTOMER							
INDENT NO. :		PO NO:		PO DATE:		 	
PROJECT NAME :							
kW : 2.2		POLE : 6		VOLTS : 415		QTY : 1	
							
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.							
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,							
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.							
		WDG NO					
2		GAD NO		Prepared By		SSG 1/6/2021	
1		T BOX NO		Checked By		SNG 1/6/2021	
NO		REVISION		SIGN		DATE	

MKTG Ref No.:		D7HO2009026	LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.		CE Lhp	
LOAD VS EFF. & P.F.						
CUSTOMER						
INDENT NO. :		PO NO:		PO DATE:		
PROJECT NAME :						
kW : 2.2		POLE :	6	VOLTS :	415	QTY : 1
						
NOTE 1 ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.						
2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,						
3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.						
		WDG NO				
2		GAD NO		Prepared By		SSG
1		T BOX NO		Checked By		SNG
NO	REVISION		SIGN	DATE	SIGN	DATE

MKTG Ref No.:

D7HO2009026

LAXMI HYDRAULICS PVT LTD. , B-11- MIDC CHINCHOLI , SOLAPUR.



STARTING CURRENT VS STARTING TIME AND THERMAL WITHSTAND TIME.

CUSTOMER

INDENT NO. :

PO NO:

PO DATE:



IE3

PROJECT NAME :

kW :

2.2

POLE :

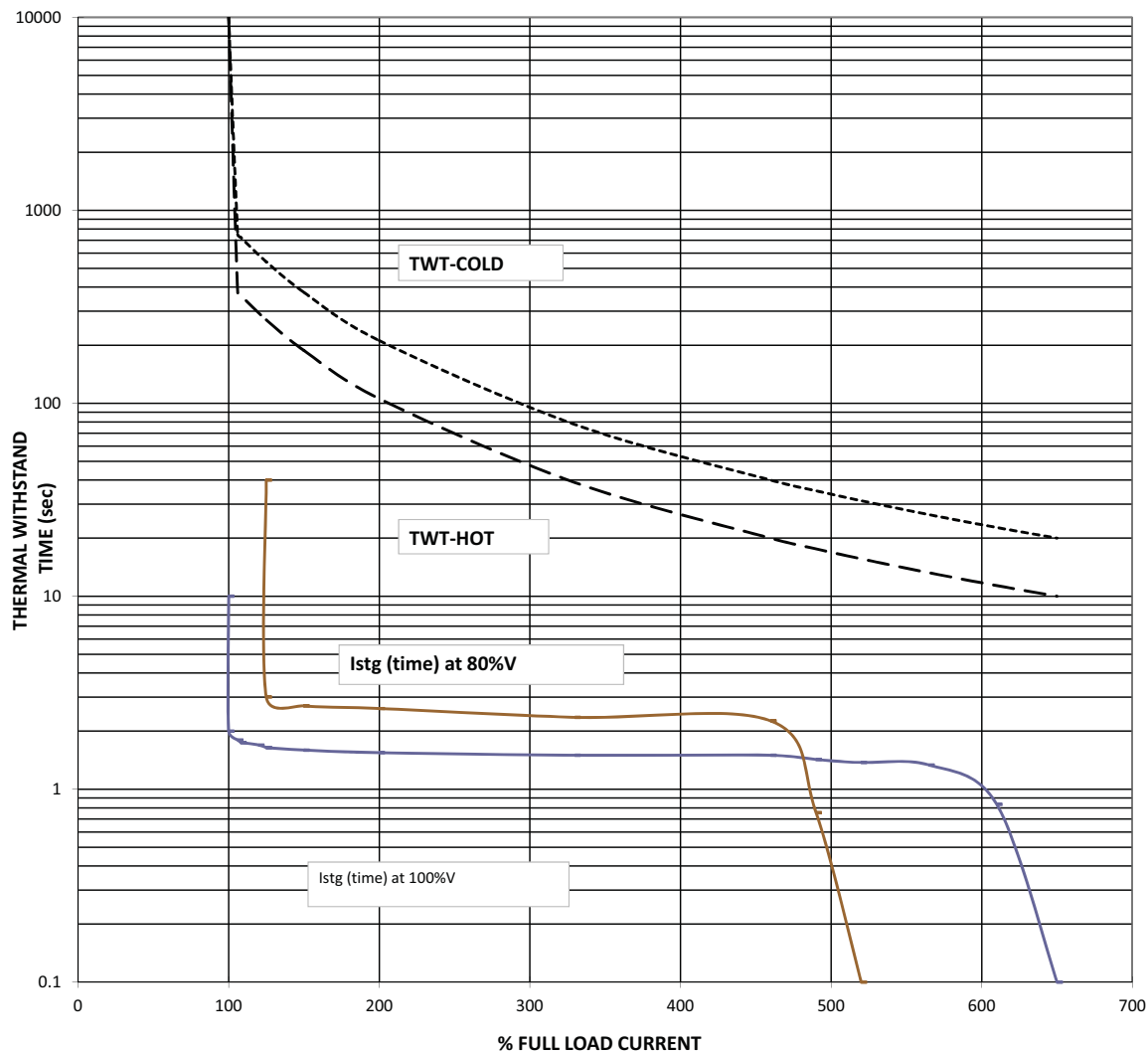
6

VOLTS :

415

QTY :

1



L. R.CURRENT at 100% voltage :

650

% OF FLA

THERMAL WITHSTAND TIME(sec):

Starting time at 100% voltage :

2

sec

AT100% RATED VOLTAGE (HOT) :

10

Starting time at 80% voltage :

3

sec

AT100% RATED VOLTAGE (COLD):

20

NOTE 1

ALL PERFORMANCE FIGURES ARE SUBJECT TO IS/IEC 60034-1 TOLERANCES,PARAMETERS MAY CHANGE DURING FINAL SUBMISSION OF DATASHEET AFTER GETTING THE ORDER.

2 STARTING CURRENT MEASUREMENT AS PER IS 12615 : 2018 CLAUSE NO 16.2.2.3.1,

3 PERFORMANCE CURVES ARE FOR DOL OPERATION ONLY.

			WDG NO				
2			GAD NO		Prepared By	SSG	
1			T BOX NO		Checked By	SNG	
NO	REVISION	SIGN	DATE		SIGN	DATE	

DRG. NO.- NEG.SEQ.



NEGATIVE SEQUENCE CHARACTERISTICS

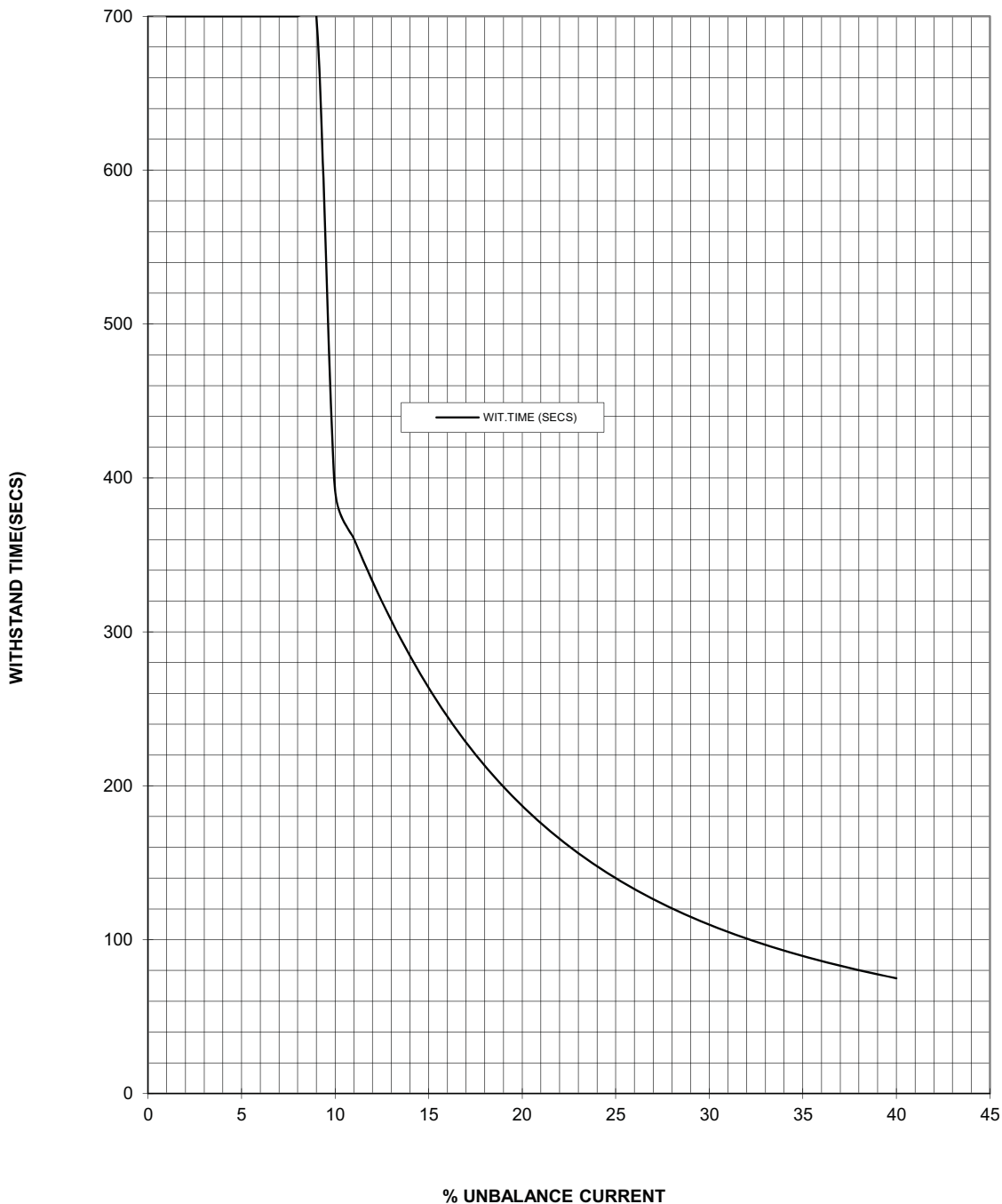
CUSTOMER

kW : 2.2

POLE : 6

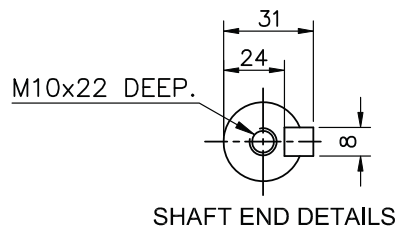
VOLTS : 415

QTY : 1



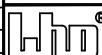
2		PREP	SSG	1/6/2021
1		APPD	SNG	1/6/2021
NO	REVISION	SIGN/DATE	SIGN	DATE

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.



FRAME	ALUMINIUM
END COVER (DE)	ALUMINIUM
END COVER (NDE)	ALUMINIUM
T. BOX	ALUMINIUM
T. BOX COVER	ALUMINIUM
SHAFT	CARBON STEEL

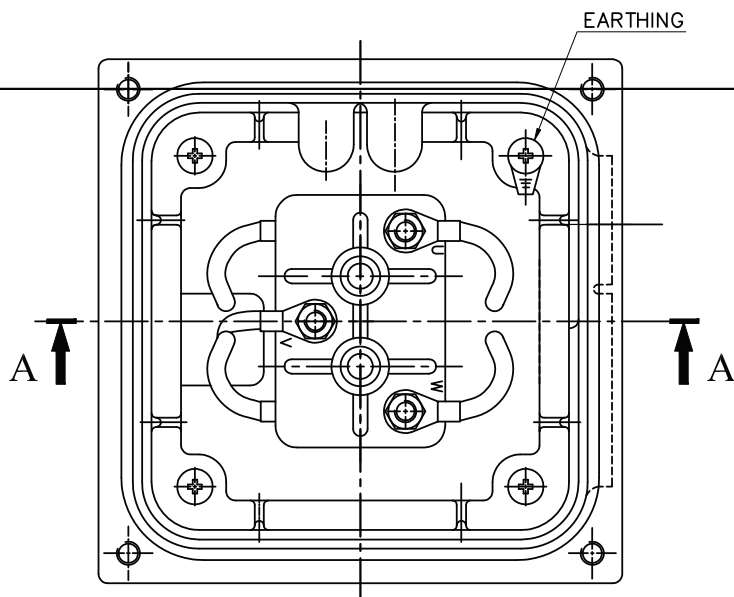
2			
1	-	-	-
REV. NO.	DETAIL OF CHANGE	DATE.	INTL.

UNMENTIONED TOLERANCES ARE AS PER ISO 2102-1/ ISO 2768-1	LINEAR DIMNS.	OVER & UPTO	0.5-3	3-6	6-30	30-120	120-400	400-1000	1000-2000	DGN.	NAME.	DATE.		
	TOLERANCE		±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3					
	ANGULAR DIMNS.	PERMISSIBLE DEVIATIONS FOR LENGTHS OF THE SHORTER SIDE OF THE ANGLE.												
	OVER & UPTO	0-10	10-50	50-120	120-400	400.....								
	TOLERANCE		±1°	±0°30'	±0°20'	±0°10'	±0°05'	±0°05'		DRN.	VALSANGE	14.09.20		
TITLE										CHD.		14.09.20		
GENERAL ARRANGEMENT. DRG. FOR										APPD.		14.09.20		
112M FRAME FOOT MOUNTED MOTOR										SCALE :-- 1:1				
										SHEET :-- 1 OF 3				
 Laxmi Hydraulics Pvt.Ltd.										 SOLAPUR				DRG. NO.
Website : www.lhp.co.in												MGAN112A0312		1 of 2
UNLESS OTHERWISE SPECIFIED ALL DIMNS. ARE IN MM. DO NOT SCALE THE DRAWING.												ISSUE NO. 01		REV.NO. 00

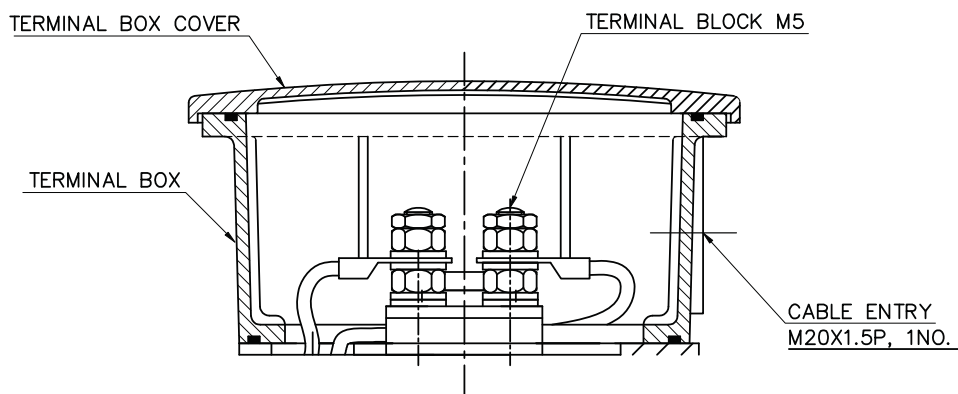
LAXMI HYDRAULICS PVT. LTD, SOLAPUR

TERMINAL BOX ARRANGEMENT

OF 112 FRAME MOTOR



TOP VIEW WITHOUT COVER



ISSUE.NO.-01

REV.NO.-00

DATE- 14.09.20

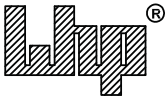
DRG.NO.-MGAN112A0312

CHD.BY.-VALSANGE

CHD. BY.-

APPD.BY.-

SHEET- 2/3

IS: 12615		3 Ph. INDUCTION MOTOR			
					
CM/L-7500131009					
M/C.NO.:		RPM:			
kW/HP:		FRAME:			
 V:		DUTY:		IP:	
Hz:		CONN.:		A°C.:	
AMP:		IN.CLS.:		Ph.:	
EFF.	IE3- %	WT.:		Kg.	
COSØ:		REF.STD.: IS 12615 / IEC 60034-30			
MFD.BY: LAXMI HYDRAULICS PVT. LTD. SOLAPUR (INDIA)				Website : www.lhp.co.in 047D20	

NOTE :-FOR DATA/SPECIFICATION IN NAMEPLATE REFER DATA SHEET/GAD.

NAME PLATE DETAILS

SHEET NO: - 3 OF 3

2			
1			
REV. NO.	DETAIL OF CHANGE	DATE.	INTL.

ISSUE.NO.-01	REV.NO.-01	DATE-14.09.20	DRG.NO.-MGAN112A0312
CHD.BY.- VALSANGE	CHD. BY.-	APPD.BY.-	

DATASHEET			
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)	
1.0	Application	AXIAL FAN	
1.1	Quantity	As per approved BBU/ Approved datasheet	
2.0	Manufacturer	HEM	
3.0	Type & Frame Size	Type Ref : 2FE3 123-0603 & Frame Size : 112M FLP	
3.1	Degree of Protection	IP:55	
4.0	Rated Output in KW	2.20	
4.1	Rated Speed	955	
5.0	Rated Voltage, Frequency & Phases	415 V AC ± 10% ; 50 Hz ± 5%;	
		10% absolute sum - 3 Phase	
6.0	Full load current	4.7	
7.0	Energy Efficient	IE3	
8.0	Efficiency & Power Factor at Full Load	84.3%	0.77
9.0	Efficiency & Power Factor at 75% Load	84.3%	0.71
10.0	Efficiency & Power Factor at 50% Load	82%	0.60
11.0	Duty Cycle	S1	
12.0	Rated torque (kg-m)	2.24	
13.0	Starting current (%)	600%	
14.0	No Load Current (With Mechanism Coupled)	3 A (Approx.)	
15.0	Starting torque in % of full load torque	220%	
16.0	Pull up torque in % of full load torque	187%	
17.0	Pull out torque in % of full load torque	260%	
18.0	No load starting time (Without mechanism coupled)	< 1 sec.	
19.0	Locked rotor withstand time at rated voltage (Secs)	a) Hot	8
		b) Cold	18
20.0	Locked rotor withstand time at minimum starting voltage (Secs)	a) Hot	10
		b) Cold	23
21.0	Locked rotor withstand time at 110% rated voltage	a) Hot	7
		b) Cold	16
22.0	Starting time at minimum starting voltage		
	with mechanism coupled	< 1 sec. (Load GD² = Motor GD²)	
23.0	Starting time at rated voltage with		
	mechanism coupled	< 1 sec. (Load GD² = Motor GD²)	
24.0	Maximum permissible starting time	5	
25.0	Stator thermal time constant (Min)	45 min./120 min.	
26.0	Type & number of terminals broughtout	6 leads	
27.0	Stator winding connection	DELTA	

DATASHEET		
CL.NO	CHARACTERISTIC	Vendor Data (To be Filled by vendor)
28.0	Class of insulation & temperature rise	Class F & Class B temp rise.
29.0	Minimum Permissible Starting Voltage	332 Volts (80%)
30.0	Resistance per phase (indicative) at 20°C	9.04 Ohms (Approx.)
31.0	No. of Successive Starts in hot Condition	2 Hot & 3 Cold
32.0	Quantity and power consumption of space heater	NA
33.0	Direction of rotation	Bi - Directional
34.0	Bearing make & type	
	DE:	SKF & Deep Groove Ball Bearing
	NDE:	SKF & Deep Groove Ball Bearing
35.0	Lubricant quantity , grade & recommended	Prelubricated
36.0	type of mounting & shaft orientation	B3 - HORIZONTAL
	Terminal Box	
37.0	Location & angle of rotation	TOP & 360° rotatable in steps of 90°
38.0	Gland size for stator winding	AS PER GAD
39.0	Gland size for space heater	NA
40.0	Cable entry	NA
41.0	GD ² (of motor (Kgm ²)	0.063
42.0	Total weight of motor (kg)	45 KG (Approx.)
43.0	Weight of stator (kg)	25 KG (Approx.)
44.0	Weight of rotor (kg)	20 KG (Approx.)
45.0	Anticipated bearing life in Hours	50000 HOURS
46.0	Method of connection of driven equipment	FLEXIBLE COUPLING
47.0	Limiting rotor temperature for determining	
	safe stall time	185°C
48.0	Thermistor for winding / Bearing	NA
49.0	Grade of balance of motor	G2.5 as per IS/ISO 21940-11 : 2016
50.0	Standard continuous rating at 40°C ambient	2.29
51.0	Derated rating of motor at 50°C	2.20
52.0	a) Locked Rotor KVA (Indicative)	20.3
	b) Ratio of Locked rotor KVA / rated KW	9.2
53.0	a) Motor Dynamic Load Radial / Axial (kg)	8.5
	b) Motor Static Load	45 KG
54.0	Paint Shade	RAL 6011
55	Vibration Level	IS 12075
55	Noise Level	IS 12065

Note : - 1) All performance figure are subjected to IS 12065:2011 tolerance.

PREP BY:
DG

APPD BY:
SK



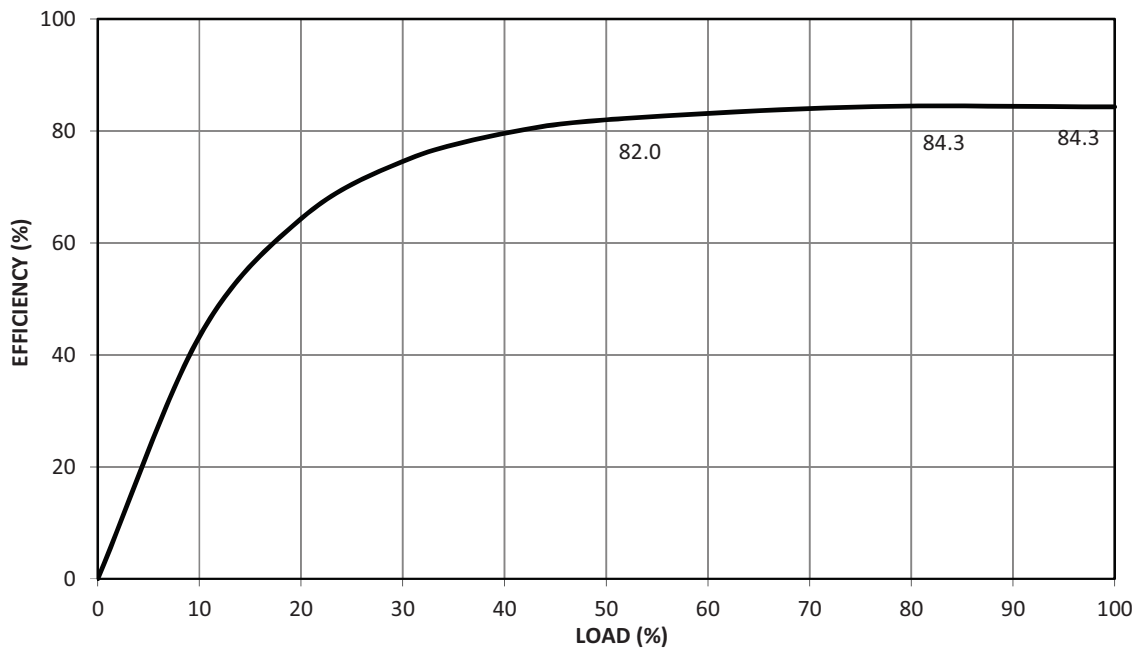
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 2.2/3.0

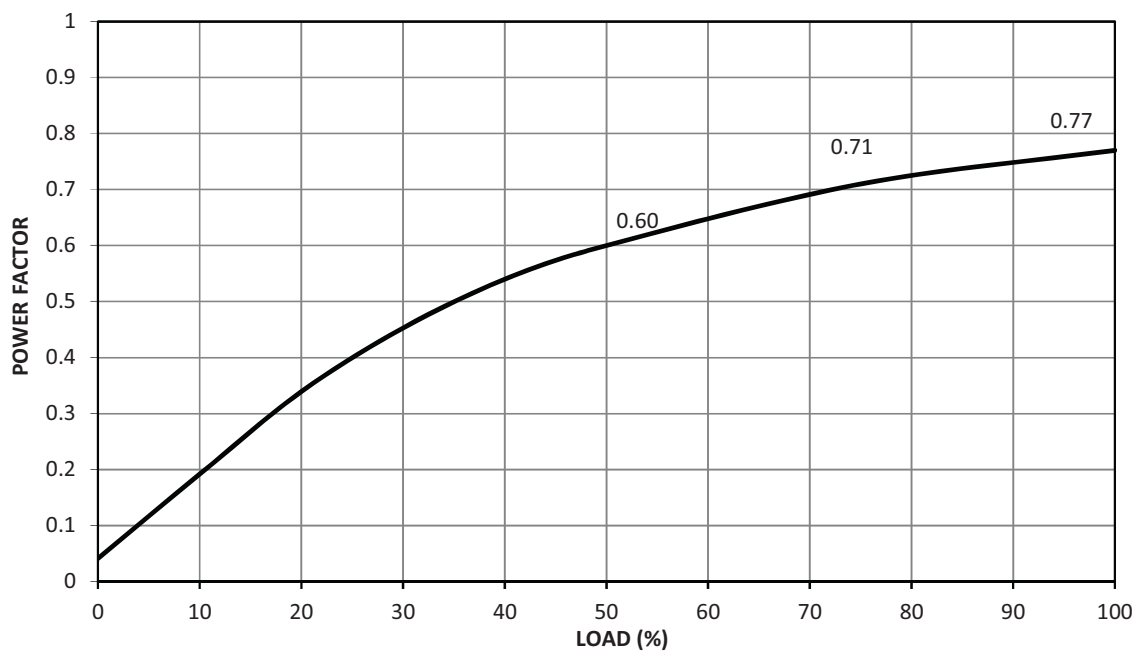
Poles : 6

Efficiency Class : IE3

LOAD VS EFFICIENCY CURVE



LOAD VS POWER FACTOR CURVE



Prep.:

SK

Date:

14/07/2022

Revision:

-



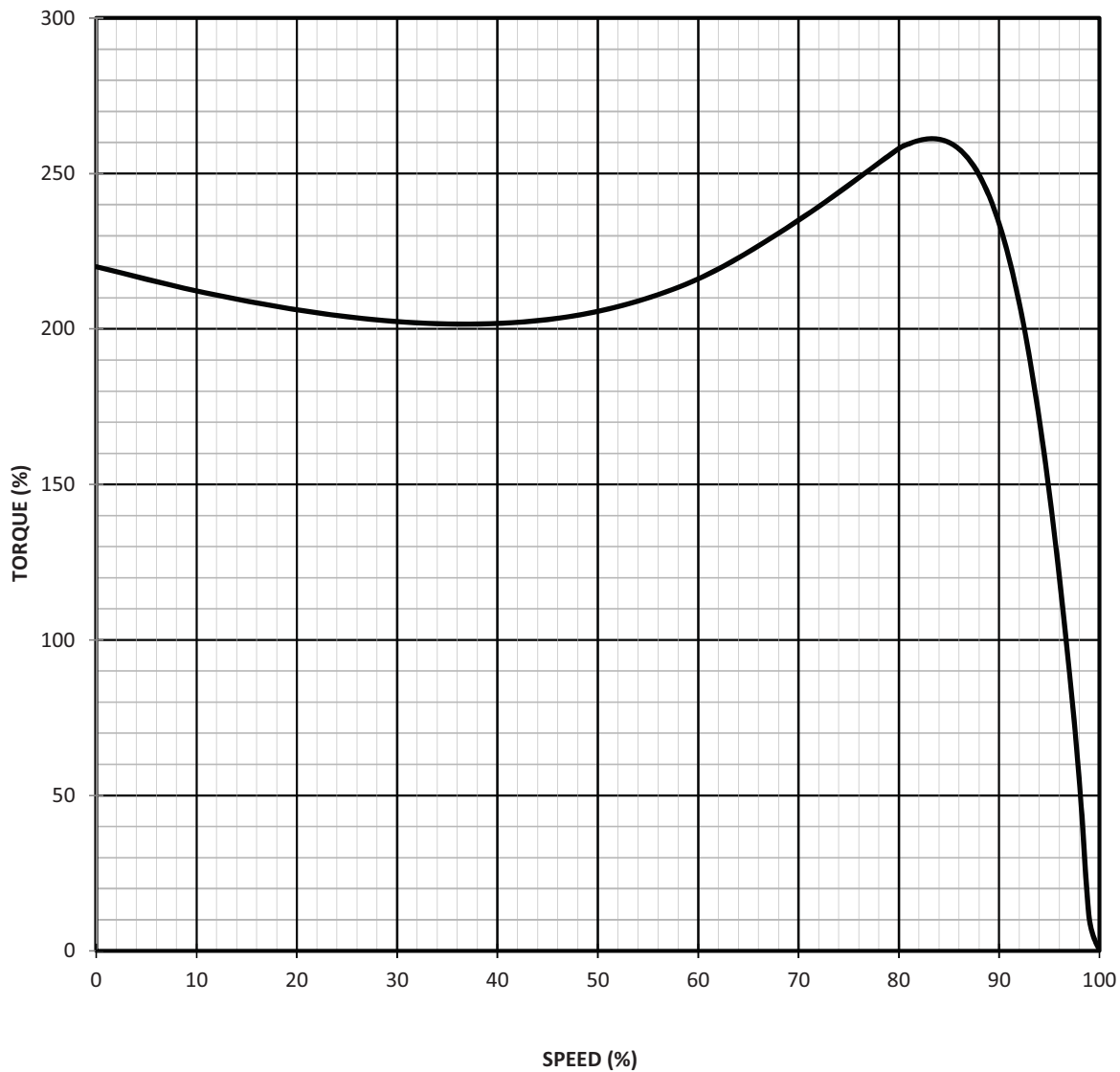
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 2.2/3.0

Poles : 6

Efficiency Class : IE3

TORQUE SPEED CURVE



Prep.: SK

Date: 14/07/2022

Revision: -



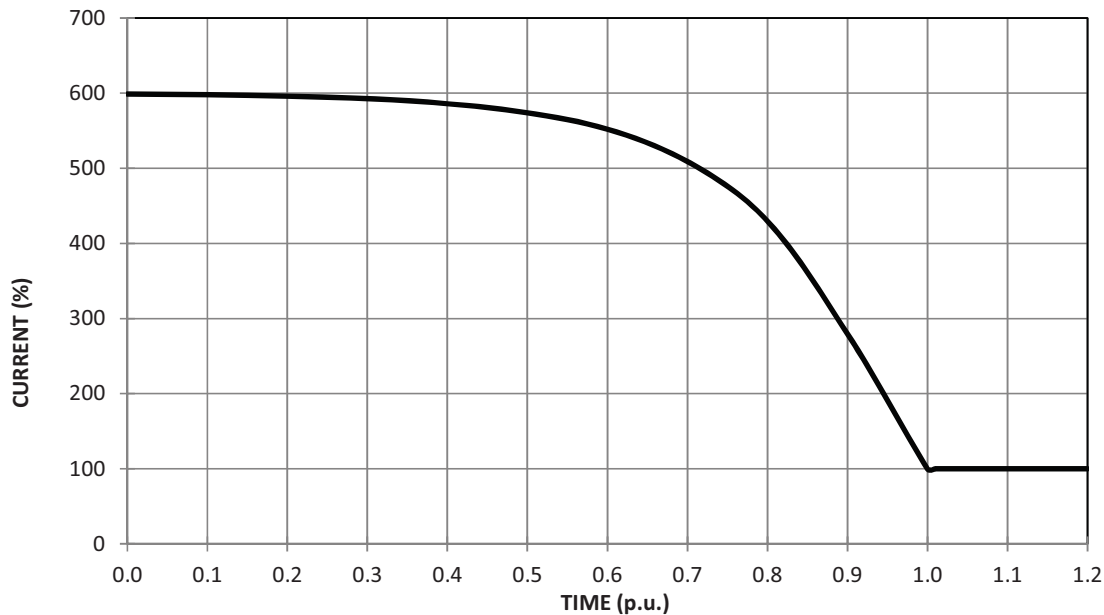
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 2.2/3.0

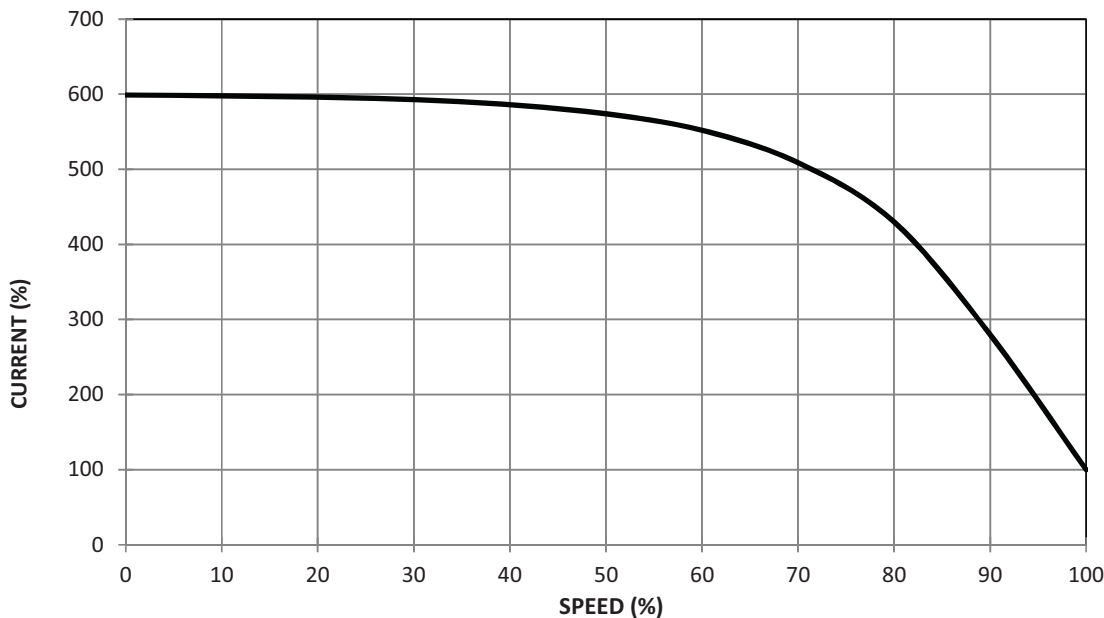
Poles : 6

Efficiency Class : IE3

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

14/07/2022

Revision:

-



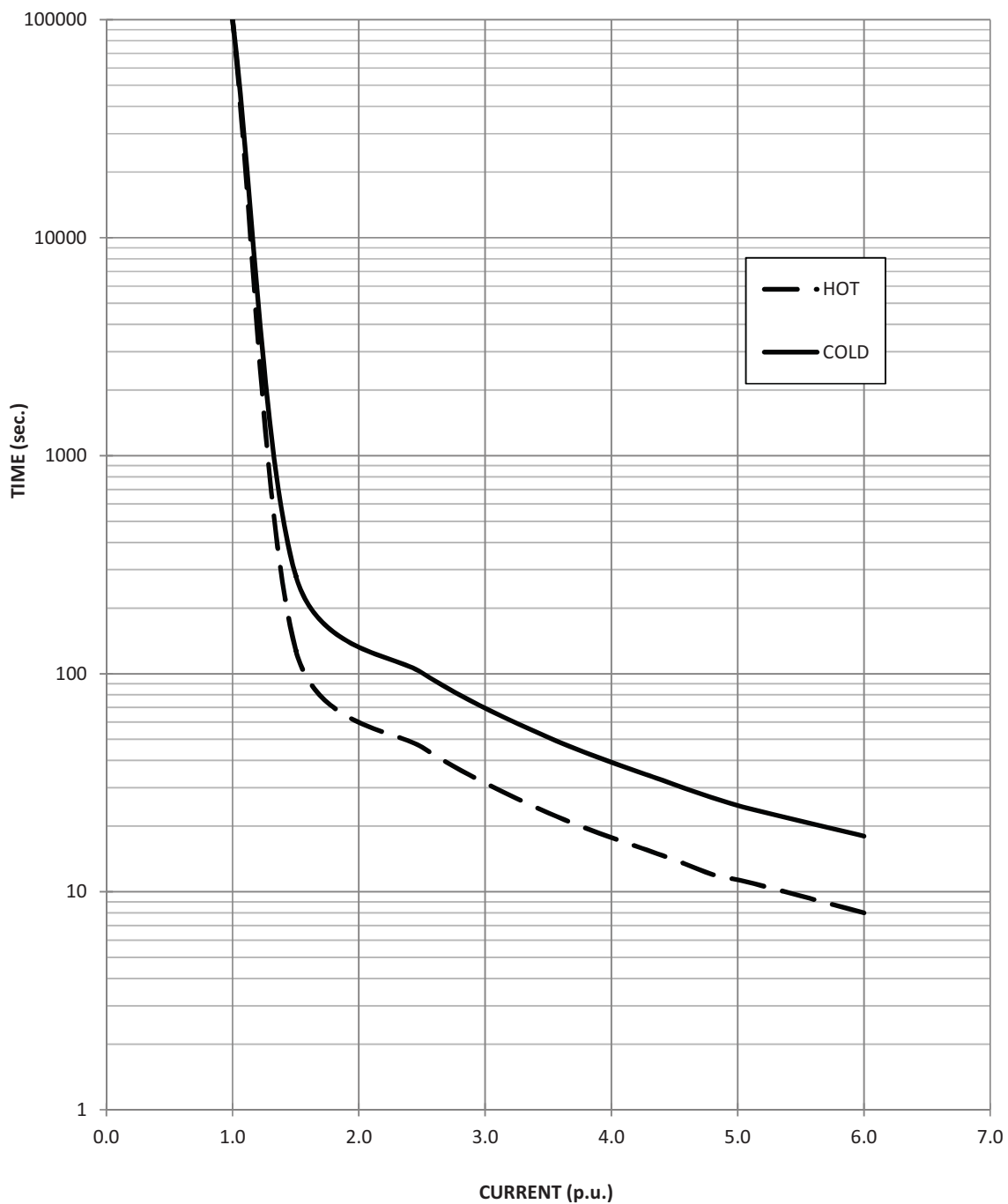
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 2.2/3.0

Poles : 6

Efficiency Class : IE3

THERMAL WITHSTAND CURVE



Prep.:

SK

Date:

14/07/2022

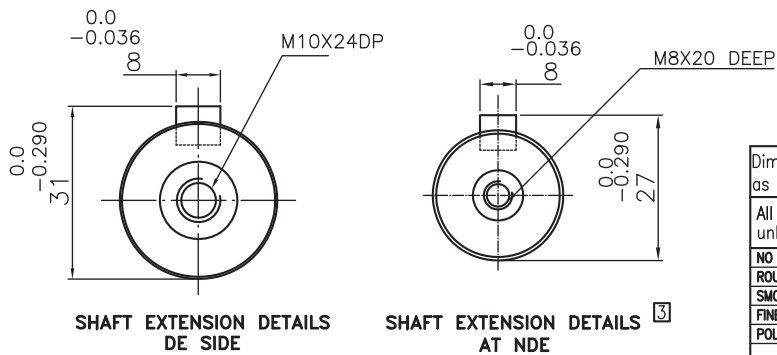
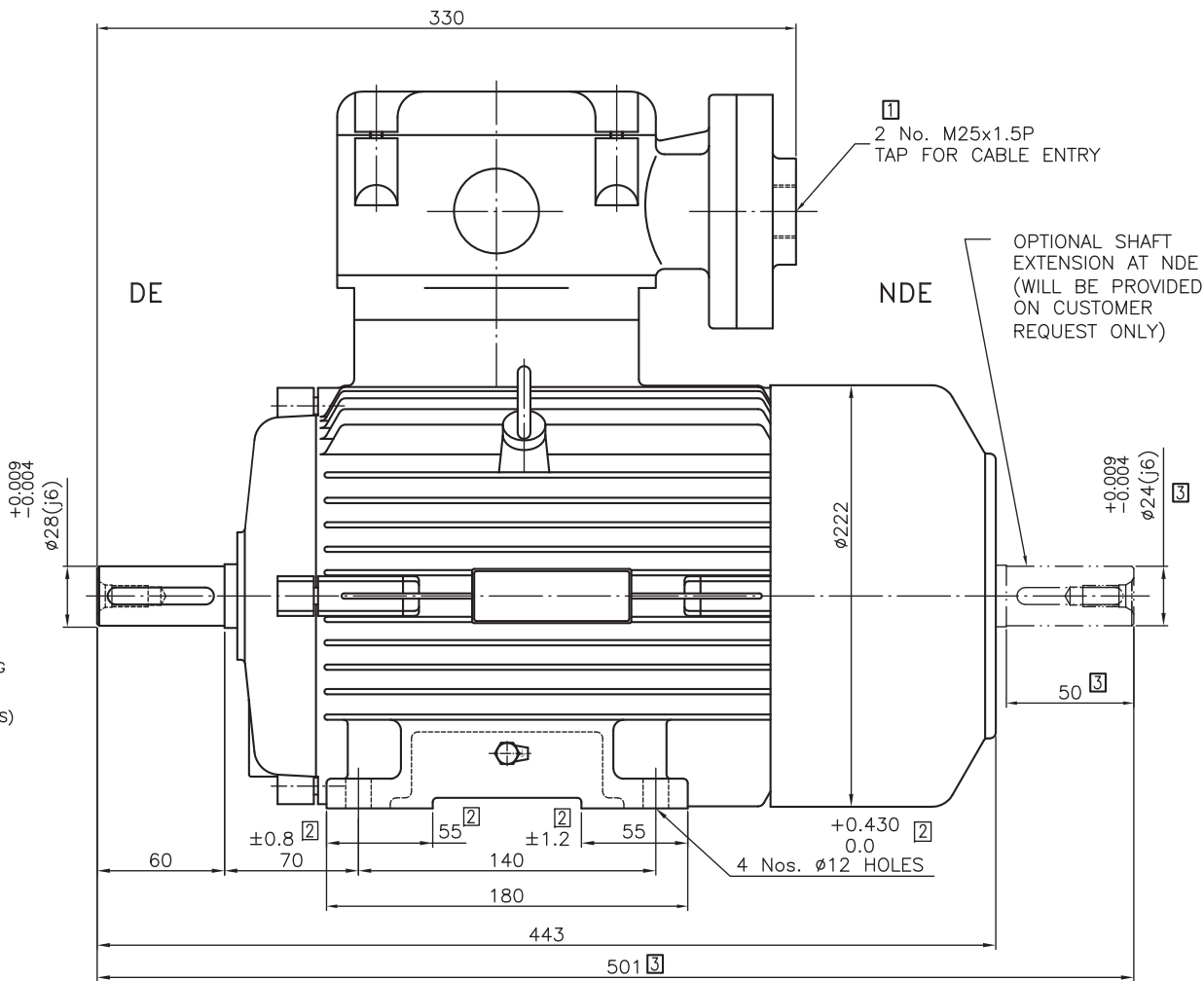
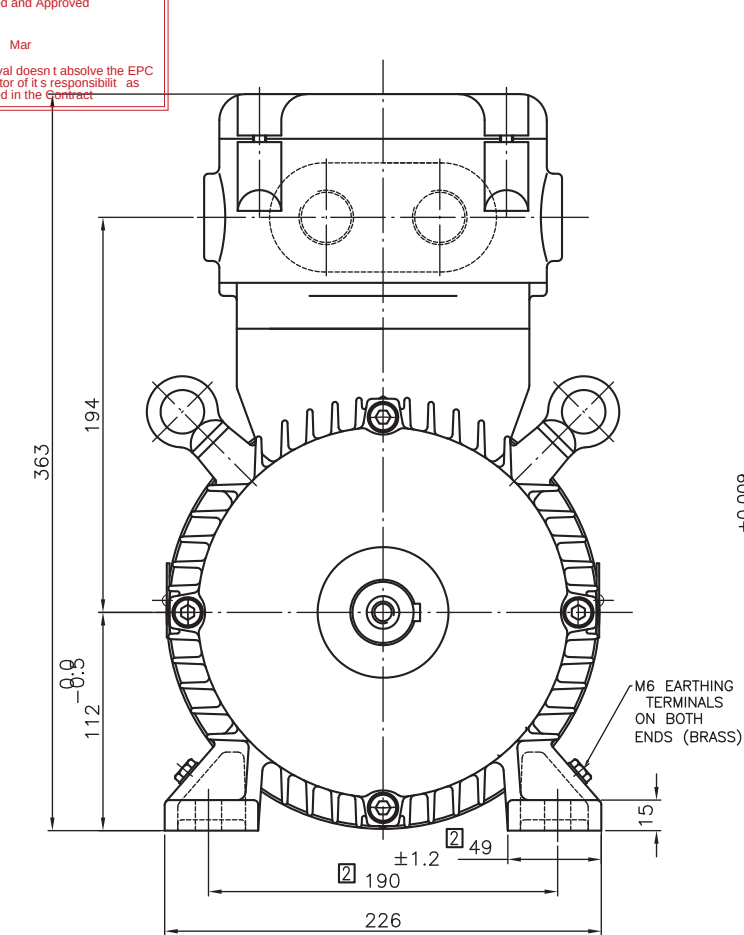
Revision:

0

APPROVED
Checked and Approved

Date: Mar

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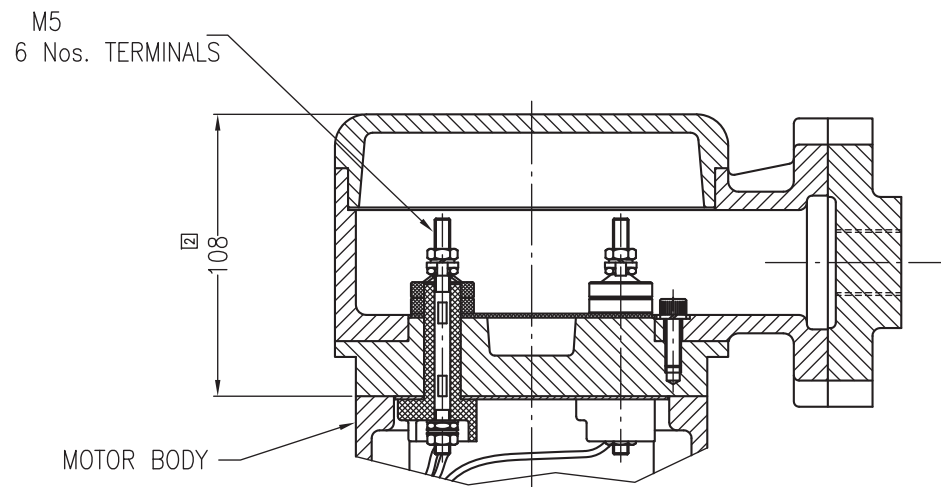
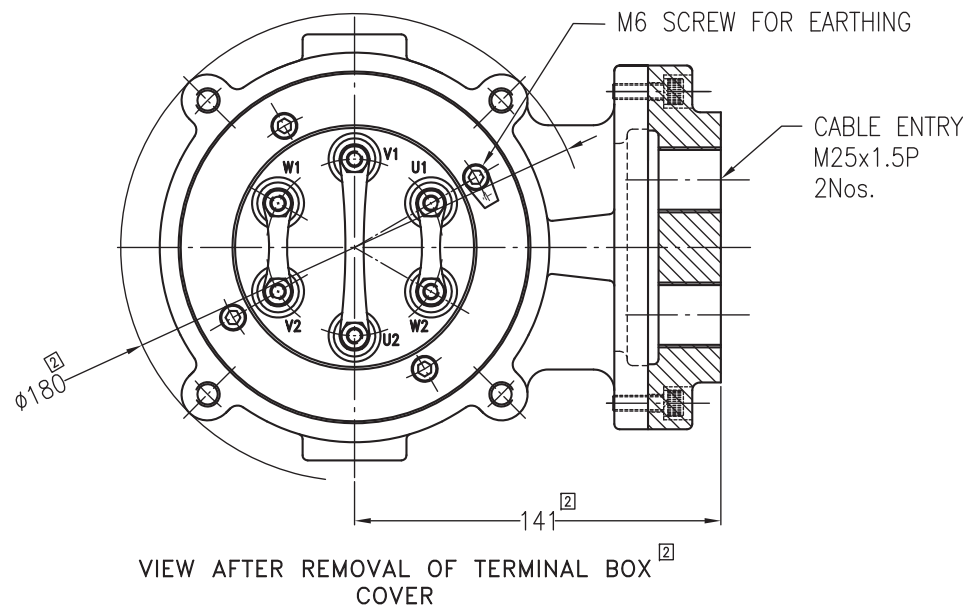


Dim. without tolerance as per IS:2102, very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS	3	DIMN. 501 WAS 511, NDE SIDE DIMN. 24X50L WAS 28X60L & NDE SIDE SHAFT EXTN. VIEW ADDED		PRAFUL	26-09-20	
	2	TOL. ADDED ±0.8 FOR DIMS. 70 & TOL. ±1.2 FOR DIMS. 140, 190 AS PER IS:2102 PART:1-COARSE & +0.430/0.0 ADDED FOR Ø12 HOLE AS PER IS: 1231 & DIMS. 49, 55 WAS 53, 70		ARUN	28-11-18	
	1	DRG. REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES. AND CABLE ENTRY HOLES ADDED.		NIMKAR	06-12-13	
		TITLE OVERALL DIMENSIONS DRAWING FOR B3/TEFC/STD. FLAMEPROOF MOTOR			SCALE NTS	
					SHT 1/1	
DRN.	NAME	DATE		DRG. NO.: F-112-0-10	REV. 3	FRAME SIZE 112M FLP
CHD.	S.P.JADIA	29-12-09				
APPD.	S.P.JADIA	29-12-09				

APPROVED
Checked and Approved

Date Mar
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All dimensions in mm
unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS	[2]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. NO. & ALL THE FEATURES, OVERALL DIMENSIONS, NOTE SPECIFIED				11-04-15		P.N.RAOTE
						DATE	BY	
SYM.		REVISION						
		TITLE [2] STANDARD TERMINAL BOX ASSEMBLY FLAMEPROOF MOTOR					SCALE NTS	
							SHT 1/1	
			NAME	DATE	PROJECTION	DRG. NO.:	REV.	FRAME SIZE
DRN.	NIMKAR	03-12-13		33-10-044-0002	2	100-132 FLP		
CHD.	S.P.JADIA	03-12-13						
APPD.	S.P.JADIA	03-12-13						
			REF. : 100-132FLP-TBOX-ASSY					

S. No.	Description		Data to be filled by successful bidder
A.	General		
1	Manufacturer & country of origin		Hindustan Electric Motors & India
2	Motor type		Squirrel Cage Induction Motor
3	Type of starting		DOL/Star-Delta
4	Name of the equipment driven by motor & Quantity		AHU FAN (2 nos)
5	Maximum Power requirement of driven equipment		4.05
6	Rated speed of Driven Equipment		1490
7	Design ambient temperature		50 deg. C
B.	Design and Performance Data		
1	Frame size & type designation		2HE2 130-0403 & 132S
2	Type of duty		S1
3	Rated Voltage		415V
4	Permissible variation for		
5	a	Voltage	± 10%
6	b	Frequency	± 5%
7	c)	Combined voltage & frequency	10%
8	Rated output at design ambient temp (by resistance method)		5.5kW/7.5HP
9	Synchronous speed & Rated slip		1500RPM & 1450RPM
10	Minimum permissible starting voltage		332V
11	Starting time in sec with mechanism coupled		
12	a) At rated voltage		< 1 sec. (Load GD2 = Motor GD2)
13	b) At min starting voltage		< 1 sec. (Load GD2 = Motor GD2)
14	Locked rotor current as percentage of FLC (including IS tolerance)		840%
15	Torque		
	a) Starting		240% of rated torque
	b) Maximum		280% of rated torque
16	Permissible temp rise at rated output over ambient temp & method		70 deg. C
17	Noise level at 1.0 m (dB)		85dB
18	Amplitude of vibration		1.8 mm/s
19	Efficiency & P.F. at rated voltage & frequency		
	a) At 100% load		Efficiency = 87.7% / P.F. = 0.83
	c) At 75% load		Efficiency = 87.7% / P.F. = 0.79

MANUFACTURER :HINDUSTAN ELECTRIC MOTOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

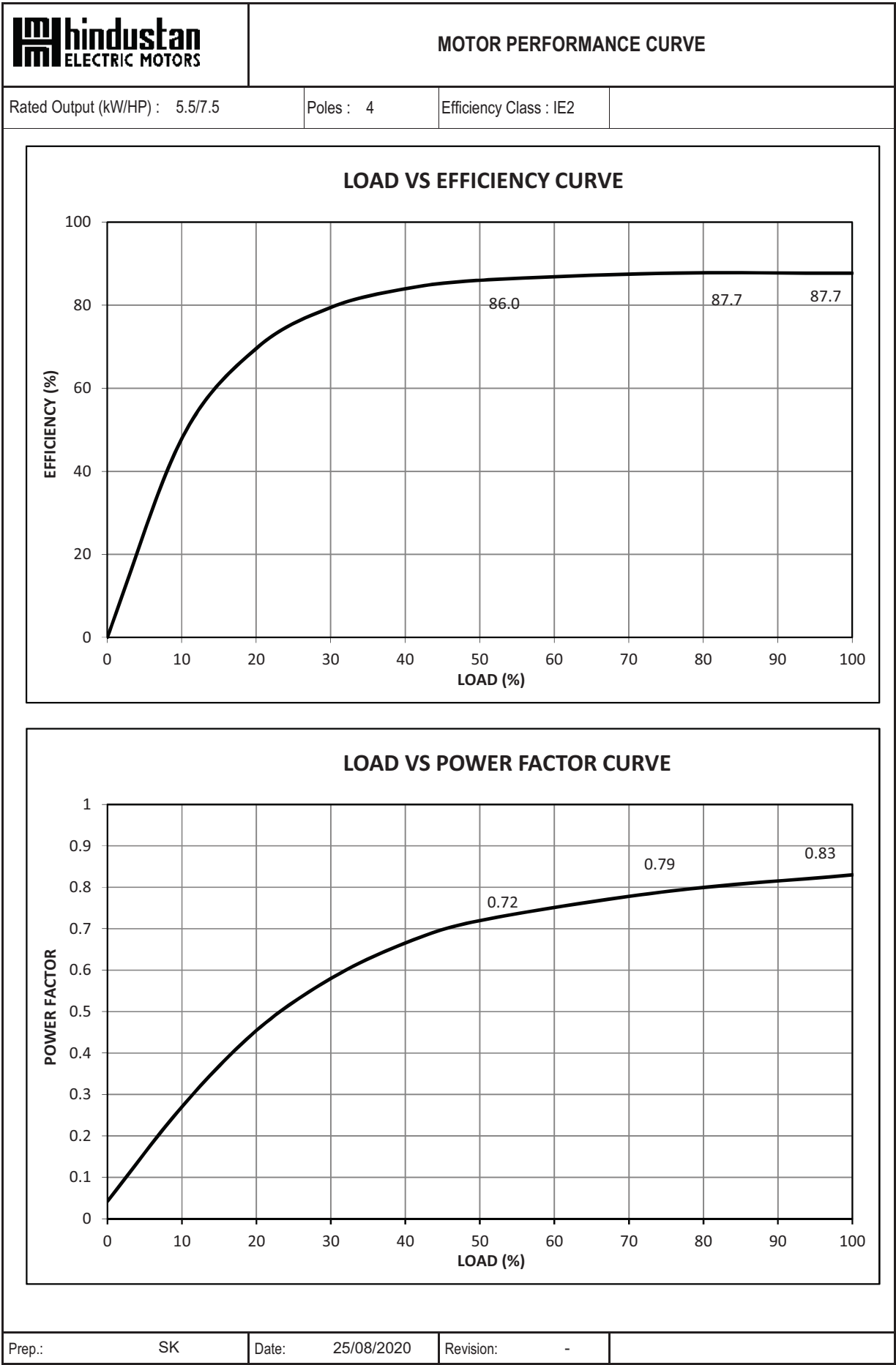
S. No.	Description	Data to be filled by successful bidder
	c) At starting	Efficiency = N.A. / P.F. = 0.5
C.	Constructional Features	
1	Method of connection of motor driven equipment	Belt Driven
2	Applicable Standard	IS 12615, IS 12065, IS 12075
3	DOP of Enclosure	IP 55
4	Method of cooling	IC 411
5	Class of insulation	Class F with Tem. rise limited to class B
6	Main terminal box	
	a) Type	Stud type
	b) Power Cable details (Conductor, size, armour/unarmour)	3Cx16 sqmm, Al
	c) Cable Gland & lugs details (Size, type & material)	Client Scope
	d) Permissible Fault level (kArms & duration in sec)	50kA / 0.25sec.
7	Space heater details (Voltage & watts)	
8	Flame proof motor details (if applicable)	
	a) Enclosure	N.A.
	b) suitability for hazardous area	
	i Zone	-
	ii Group	-
9	No. of Stator winding	6
10	Winding connection	Delta
11	Kind of rotor winding	Die cast aluminium rotor
12	Kind of bearings & Bearing Temp	Deep groove ball bearing & 120 degree C
13	Direction of rotation when viewed from NDE	Bi-directional
14	Paint Shade & type	RAL 7032 (Siemens grey)
15	Net weight of motor	59 kg
16	Outline mounting drawing No (To be enclosed as annexure)	Attached
D.	Characteristic curves/ drawings	
	(To be enclosed for motors of rating ≥ 55 KW)	
	a) Torque speed characteristic	-
	b) Thermal withstand characteristic	-
	c) Current vs time	-
	d) Speed vs time	-

MANUFACTURER : HINDUSTAN ELECTRIC MOTOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

APPROVED
Checked and Approved

Date Mar

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract





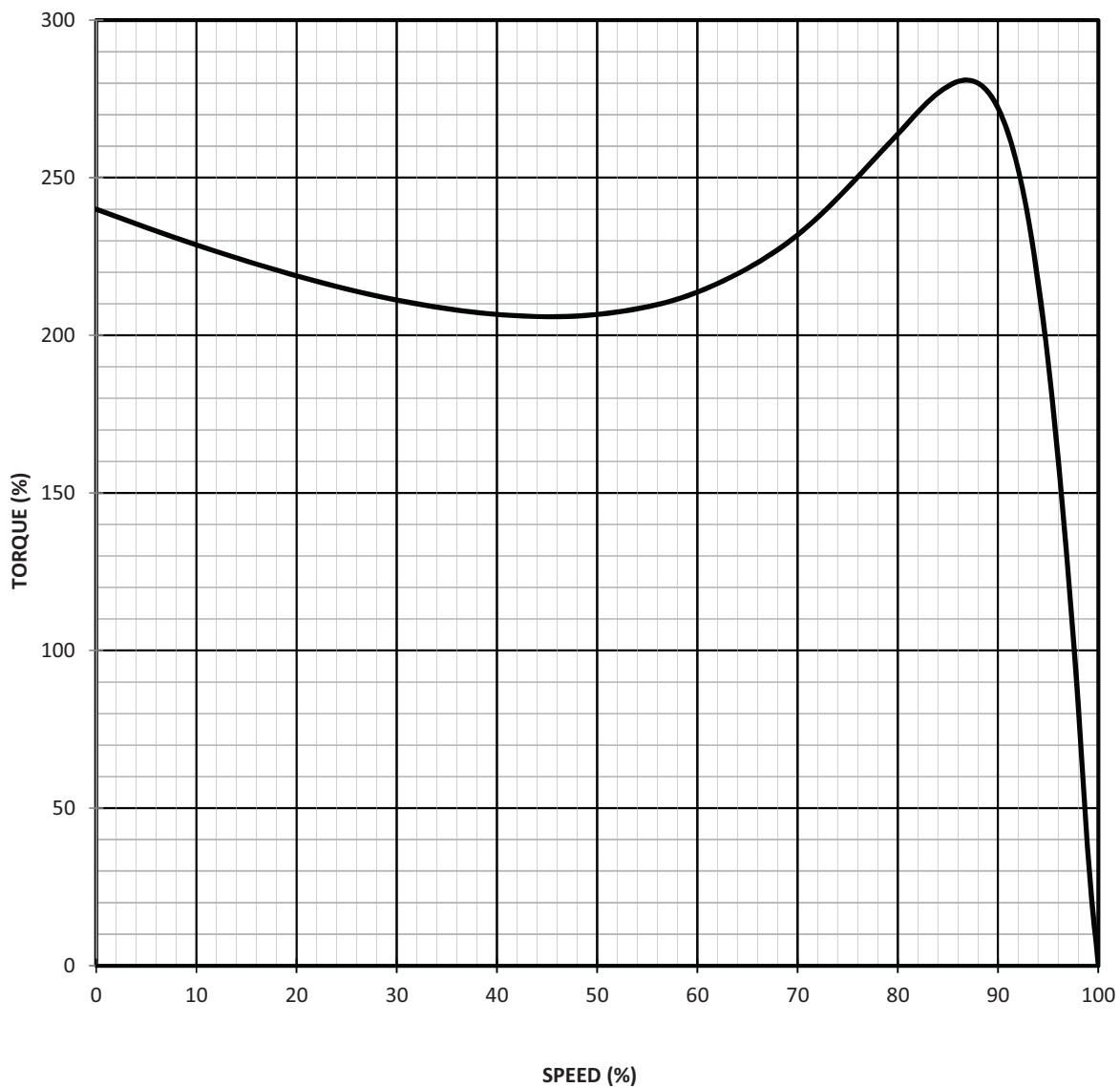
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 5.5/7.5

Poles : 4

Efficiency Class : IE2

TORQUE SPEED CURVE



Prep.: SK

Date: 25/08/2020

Revision: -



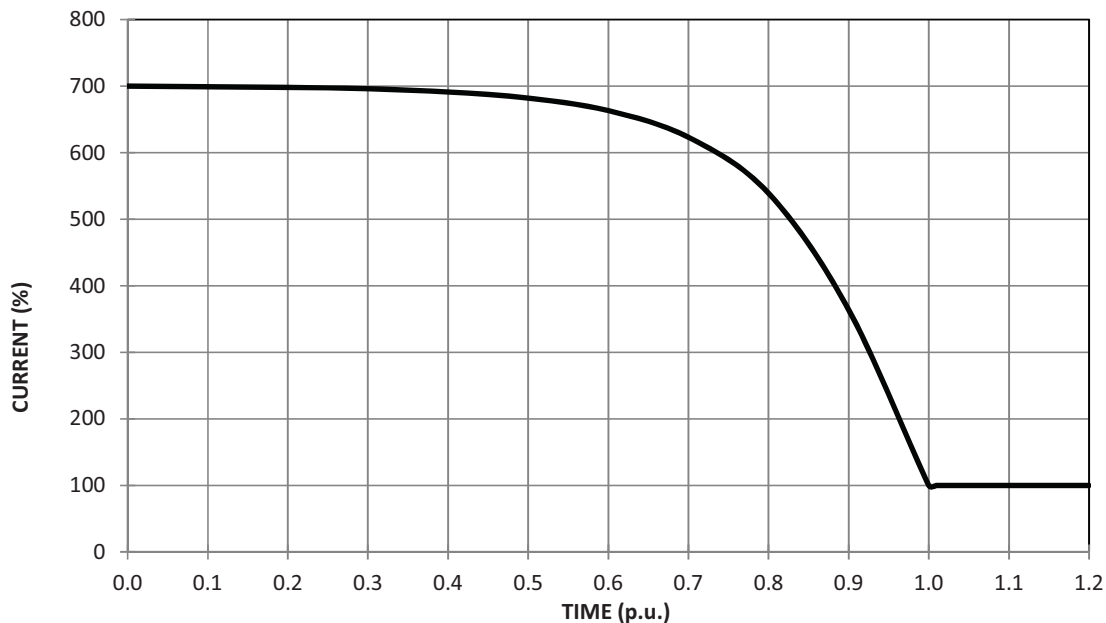
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 5.5/7.5

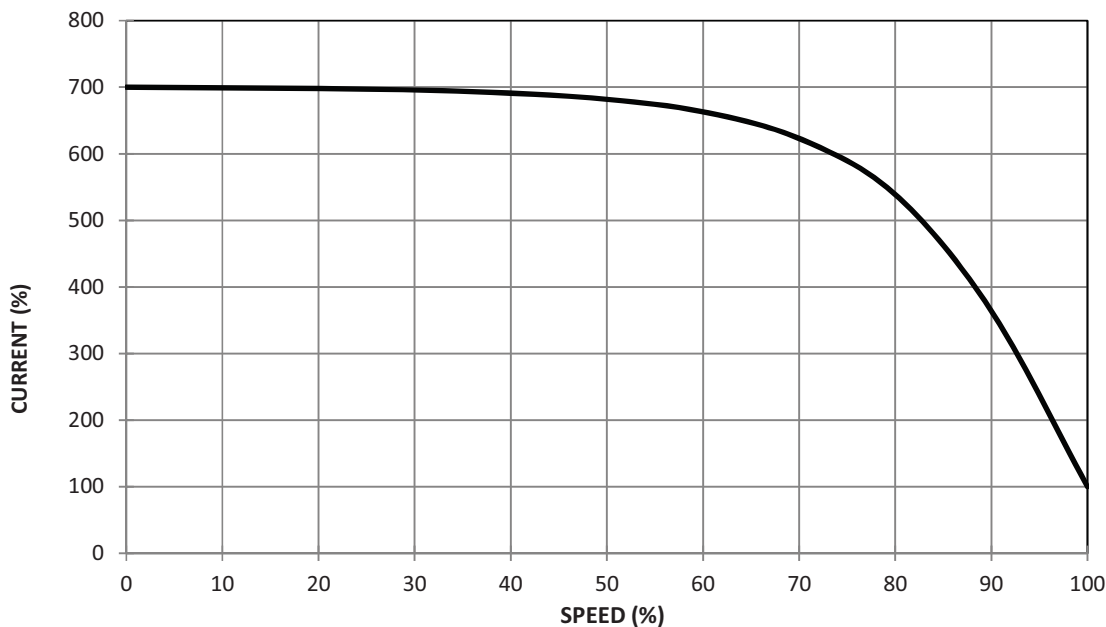
Poles : 4

Efficiency Class : IE2

CURRENT VS TIME CURVE



CURRENT VS SPEED CURVE



Prep.:

SK

Date:

25/08/2020

Revision:

-



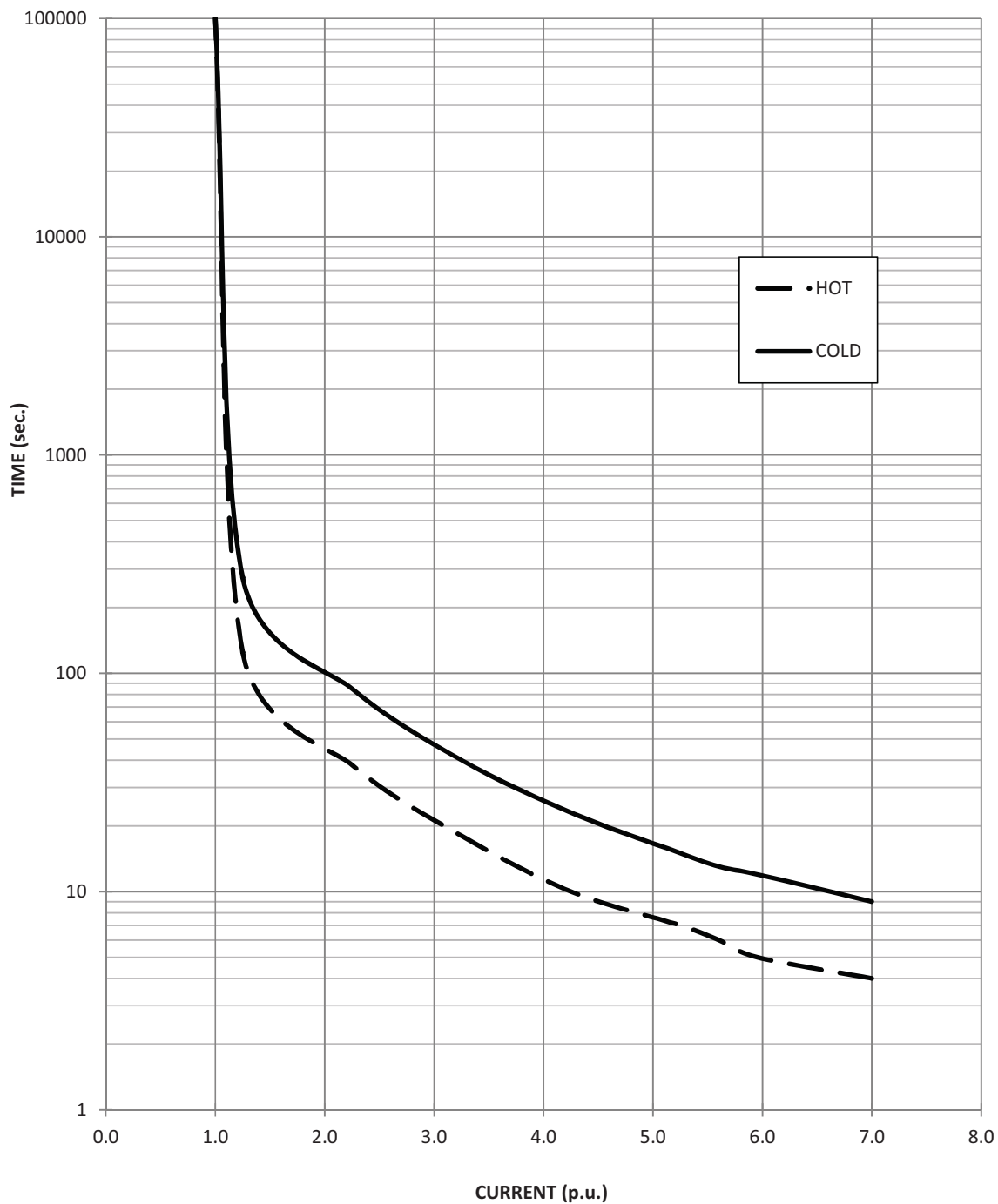
MOTOR PERFORMANCE CURVE

Rated Output (kW/HP) : 5.5/7.5

Poles : 4

Efficiency Class : IE2

THERMAL WITHSTAND CURVE



Prep.: SK

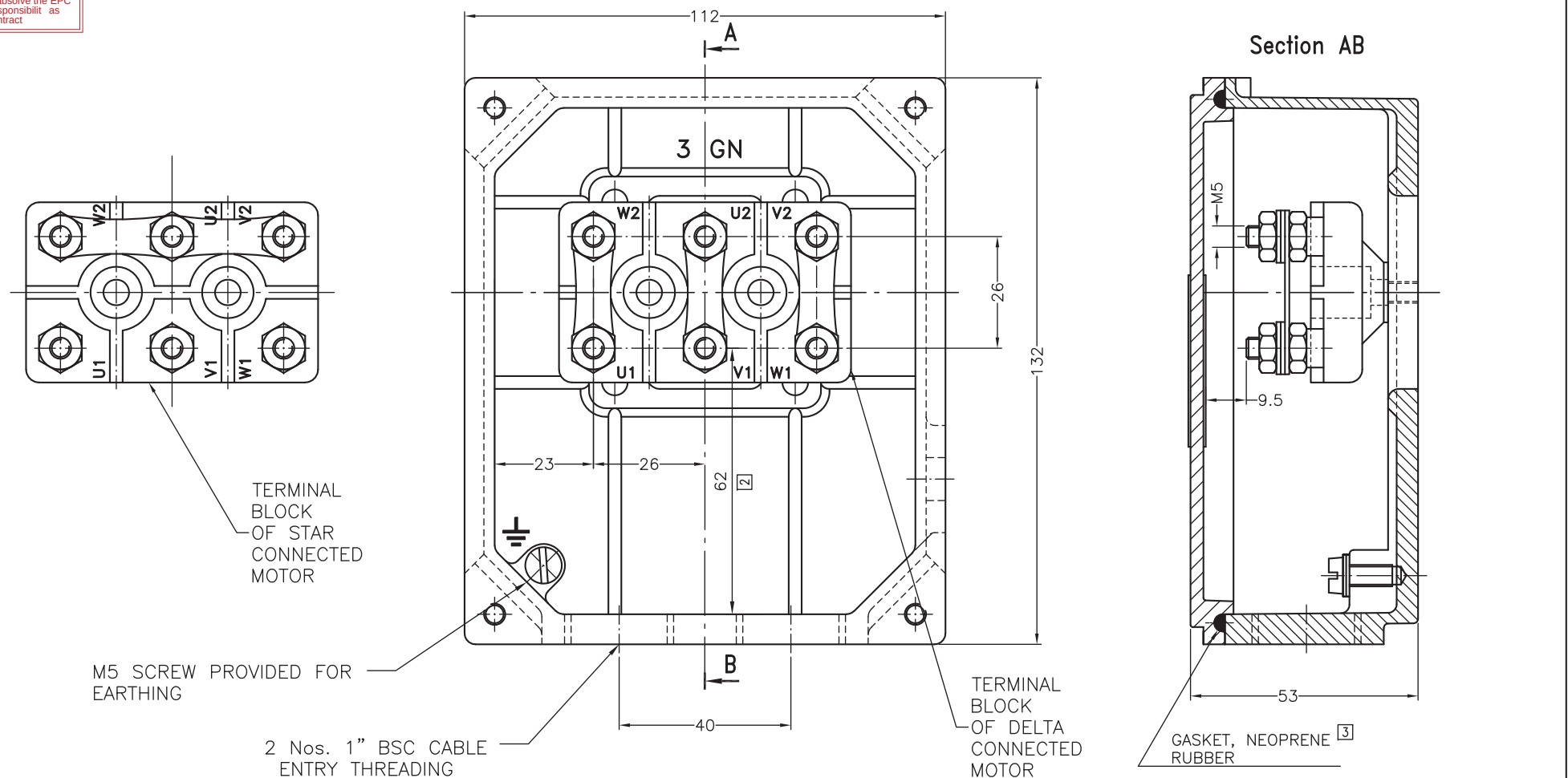
Date: 25/08/2020

Revision: 0

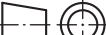
APPROVED
Checked and Approved

Date Mar

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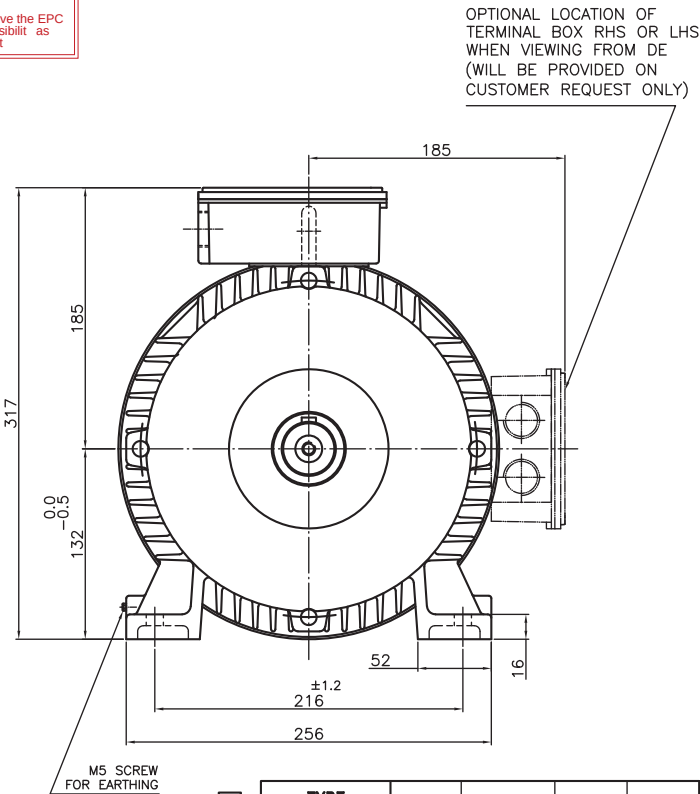
Dim. without tolerance as per IS:2102 very coarse	
All dimensions in mm unless otherwise specified.	
NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS						
	[3]	GASKET INDICATED IN SECTION AB			ARUN 07/12/16	
	[2]	DIMN. 62 SPECIFIED, STANDARD ADDED IN TITLE			P.N.RAOTE 21/02/15	
	[1]	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. No. & ALL THE FEATURES.			NIMKAR 05/07/13	
		TITLE STANDARD ^[2] TERMINAL BOX ASSEMBLY			SCALE NTS	
					SHT 1/1	
DRN.	NAME	DATE	PROJECTION	DRG. NO.:	REV.	FRAME SIZE
CHD.	GANESH	02/08/11		A3-100/132-33(GN)	3	100-132
	S.P.JADIA	02/08/11				
APPD.	S.P.JADIA	02/08/11				
						(GN)

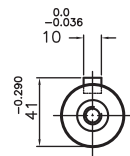
APPROVED
Checked and Approved

Date Mar

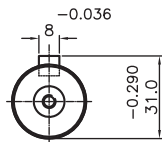
Approval doesn't absolve the EPC contractor of his responsibility as specified in the Contract



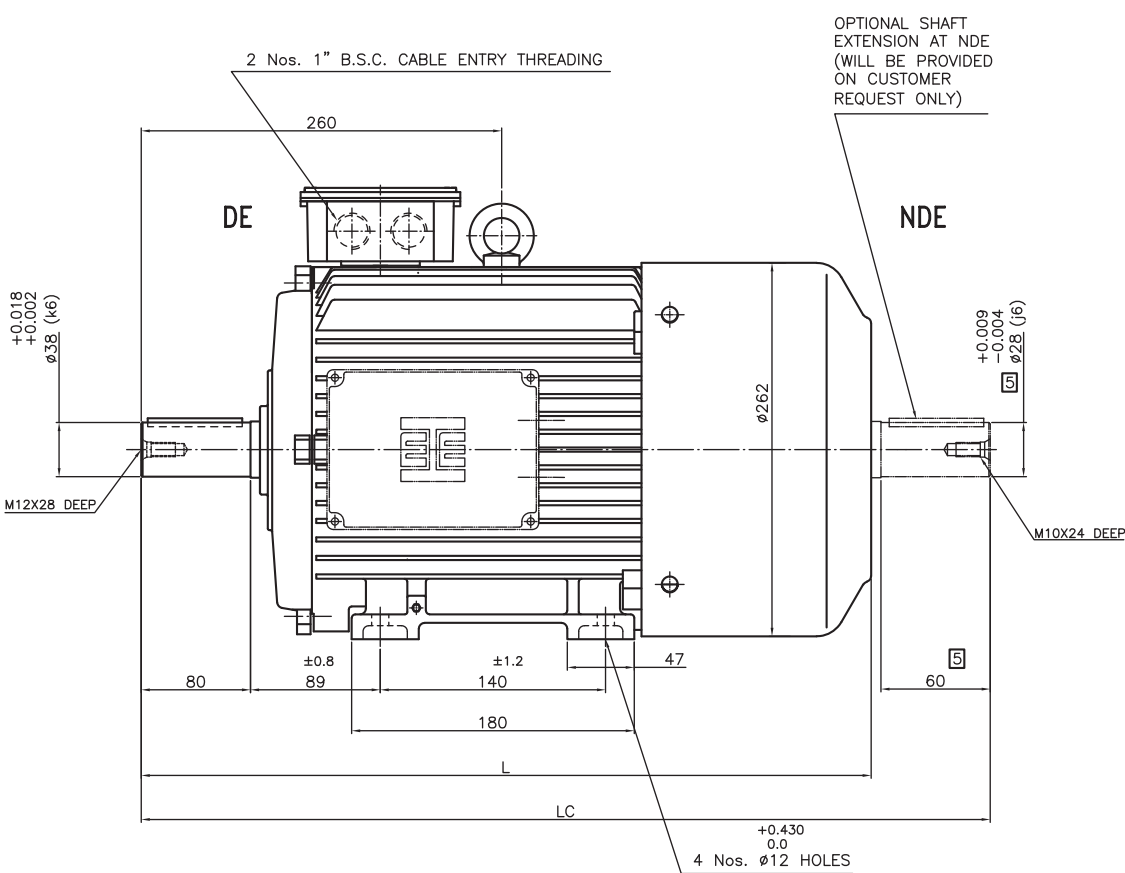
TYPE DESIGNATION	HP	POLE	L	LC
2HE2		2,4,6	453	520
2HE3		2,4		
	10	2	491	558
	5	6		
2HS5		4/2 6/4 8/4	453	520
2HT1		4,6,8		



SHAFT EXTENSION DETAILS
AT DE



SHAFT EXTENSION DETAILS
AT NDE



Dim. without tolerance
as per IS:2102, very coarse

All dimensions in mm
unless otherwise specified.

NO MACHINING	~
ROUGH MACHINING	▽
SMOOTH MACHINING	▽▽
FINE MACHINE/GRIND	▽▽▽
POLISH/HONE/LAP	▽▽▽▽
MACHINING SYMBOLS	

REV. STATUS	5	NDE SIDE SHAFT EXTN. DIA.28x60LG. WAS DIA.38x80LG. & DIMS 520, 491, 558, WAS 538, 489, 576 AS PER VERBAL INSTRUCTIONS RECD. FROM Mr. SANJAY JADIA CONSIDERING TO PROPOSED MECHANICAL DIMNS. CHART - IE2 AND IE3 MOTORS FOR TECHNICAL SPECIFICATION CATALOGUE & SHAFT EXTN. DETAILS VIEW ADDED FOR NDE SIDE	01-01-20	LANKESH
	4	TYPE DESIGNATION TABLE ADDED TO UPLOAD ON PORTAL	09-04-19	ARUN
	3	DRAWING REDRAWN ON NEW GAD DRG. SHEET FORMAT BY KEEPING THE SAME DRG. NO. & ALL THE FEATURES.	08-04-14	AKSHAY
	No.	REVISIONS	DATE	BY
TITLE		OVERALL DIMENSION DRAWING B3/TEFC STD MOTOR		
NAME		DATE	PROJECTION	DRG. NO.:
P.V. SHINDE		28-02-04		A1-132S-49(GN)
S.P.JADIA		28-02-04		
APPD.		S.P.JADIA	28-02-04	REF.: A1-132S-OADIMN
SCALE		NTS	SHT	1/1
FRAME SIZE		132S	(GN)	

Date Aug

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

DATA SHEET FOR INSTRUMENTS (PRESSURE GAUGE, TEMP GAUGE, LEVEL GAUGE, PRESSURE SWITCH, LEVEL SWITCH) FOR VENTILATION SYSTEM

LEVEL SWITCH

Date Aug

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract

ANNEXURE OF LEVEL SWITCH

S.NO	DESCRIPTION	KKS TAG	PROCESS RANGE	INSTRUMENT RANGE	LOCATION	P&ID No.
	LEVEL SWITCH					
1	LS AT TANK OF AWU-1	01SAA04CF201	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
2	HLS AT TANK OF AWU-1	01SAA04CF202	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
3	LS AT TANK OF AWU-2	01SAA04CF203	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
4	HLS AT TANK OF AWU-2	01SAA04CF204	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
5	LS AT TANK OF AWU-3	01SAA04CF205	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
6	HLS AT TANK OF AWU-3	01SAA04CF206	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
7	LS AT TANK OF AWU-4	01SAA04CF207	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
8	HLS AT TANK OF AWU-4	01SAA04CF208	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
9	LS AT TANK OF AWU-5	01SAA03CF209	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
10	HLS AT TANK OF AWU-5	01SAA03CF210	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
11	LS AT TANK OF AWU-6	01SAA03CF211	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
12	HLS AT TANK OF AWU-6	01SAA03CF212	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
13	LS AT TANK OF AWU-7	01SAA03CF213	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
14	HLS AT TANK OF AWU-7	01SAA03CF214	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
15	LS AT TANK OF AWU-8	01SAA02CF215	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
16	HLS AT TANK OF AWU-8	01SAA02CF216	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
17	LS AT TANK OF AWU-1	02SAA04CF217	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
18	HLS AT TANK OF AWU-1	02SAA04CF218	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
19	LS AT TANK OF AWU-2	02SAA04CF219	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
20	HLS AT TANK OF AWU-2	02SAA04CF220	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
21	LS AT TANK OF AWU-3	02SAA04CF221	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
22	HLS AT TANK OF AWU-3	02SAA04CF222	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
23	LS AT TANK OF AWU-4	02SAA04CF223	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
24	HLS AT TANK OF AWU-4	02SAA04CF224	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
25	LS AT TANK OF AWU-5	02SAA03CF225	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
26	HLS AT TANK OF AWU-5	02SAA03CF226	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
27	LS AT TANK OF AWU-6	02SAA03CF227	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
28	HLS AT TANK OF AWU-6	02SAA03CF228	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
29	LS AT TANK OF AWU-7	02SAA03CF229	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
30	HLS AT TANK OF AWU-7	02SAA03CF230	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
31	LS AT TANK OF AWU-8	02SAA02CF231	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
32	HLS AT TANK OF AWU-8	02SAA02CF202	0 - 600 mmWC	0 - 600 mmWC	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
33	LS AT TANK OF UAF-1	01SAB01CF201	0 - 600mmWC	0 - 600mmWC	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
34	LS AT TANK OF UAF-2	02SAB01CF201	0 - 600mmWC	0 - 600mmWC	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM

Date Aug

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

TECHNICAL DATA SHEET FOR LEVEL SWITCH

SR. NO.	DESCRIPTION	TECHNICAL SPECIFICATION
1	Item	Level Switch
2	Manufacturer	V Automat, New Delhi
3	Type	Float type
4	Model No.	40Y1W4D8BEAV
5	Quantity	As per P&ID
6	Application area	For water application in Expansion tank
7	Operating Temp.	50 °C
8	Operating Pressure	0.1 kg/cm ²
9	Hydro test Pressure	5 kg/cm ²
10	Process Connection	Flange
11	Process Connection size	2" x 150# RF
12	Process Connection MOC	S.S 316
13	Switch Enclosure	Aluminium
14	Protection class for Enclosure	IP-66
15	Level Sensing element	Magnetic Float
16	Float Material	S.S 316
17	Magnetic Housing Pipe	S.S316
18	Electrical connection	Plug & Socket type
19	Switch /Contact Type	DPDT
20	Switch Rating	60 V DC, 6A
21	Differential	15 ± 3mm

Liquid Level Switch



... the level & gas people

ISO-9001 : 2008 CERTIFIED COMPANY

Bulletin No. 500

Effective : Oct. 2011

Supersedes : Nov. 2009

Side Mounted Liquid Level Switch (Magnetic Coupling) Series 40Y

Introduction

Side Mounted Level Switches are suitable for fitting into Tank or similar Vessels for indicating or Controlling the Level of a Liquid. These switches can either be supplied in Weather Proof Housing or Explosion Proof Housing certified by CIMFR DHANBAD

Principal Of Operation

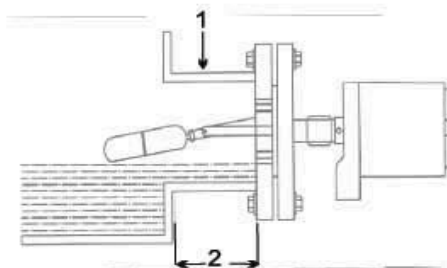
A change of liquid level correspondingly travels the float to extreme level UP and DOWN. This movement of float in turn causes a magnet to move into the proximity of Micro Switch, resulting in switch actuation.



Fig.1

Technical Specifications

- Maximum Switching Differential : Within 18mm of level change of liquid at S.G.1
- Minimum S.G. : 0.5
- Switch Housing : Aluminum Alloy
- Electrical Connection : 1/2" NPT (Other optional)
- Maximum Repeatability : +/- 1.5mm
- Float & Linkage : 316SS / 304SS
- Max. Pressure : a) 15kg/cm² for AUTOMAT 'A' & 'G' Flanges
b) 100 kg/cm² for Standard ANSI / BS / DIN Flanges.
- Max Temperature : a) Upto 150°C without Coolin Fins
b) Above 150° with Cooling fins



- 1). Minimum ID of Nozzle should be more than 50mm to enable the float to pass.
- 2). Maximum 160mm

Fig.2

Side Mounted Liquid Level Switch with External Cage

We can also provide the side mounted Liquid level switch with cage (fig.3) with different Mounting styles (Fig.4).



Fig.3

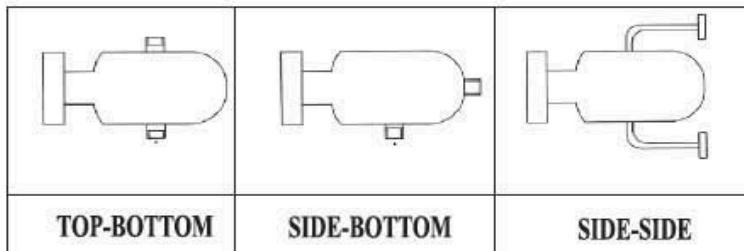


Fig.4

Date Aug

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... the level & gas people

Model Description

40Y

Switch Classification

Side Internal..... 1
External Mounted..... 3

Enclosure Classification

Weatherproof W
Explosion Proof..... E

Magnetic Switch Type

Standard Micro Switch..... 4

Contact Type

SPDT..... S
DPDT..... D

Temp.

0 to 150°C 8
Above 150°C (Cooling fins provided)..... 9

Mounting Style (cage)

Side Bottom..... D
Side-Side..... C
Top-Bottom..... F
Side Internal..... B
Others..... A

Size of Process Connection

For Internal Mounting	For External Mounting
Square flange of 92mm PCD - V	1" NPT - 9
Round flange of 98mm PCD - T	1" SW - 8
2½" 150# - R	1" 150# - 7
2½" 300# - P	1" 300# - 6
3" 150# - H	1½" 150# - 4
3" 300# - G	1½" 300# - 3
Others - E	Others - 1

Please Specify

Cage & Process Connection

Carbon Steel..... M
SS304..... L
SS316..... K
Others..... A

Material of Construction for Flange of Instrument

SS304..... V
SS 316..... R
Aluminium..... T
Others (Teflon, PP)..... P

Model No. Decodification

40YW4S9BGR Define a side internal level switch model in weatherproof enclosure with standard micro switch of SPDT contact. The flange material is of SS316 with 3", 300# connection size.

V. AUTOMAT & INSTRUMENTS (P) LTD.

AUTOMAT HOUSE, F-61, Okhla Industrial Area, Phase-I, New Delhi - 110 020, INDIA

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E-mail : vautomat@airtelmail.in ; vautomat@vsnl.com, vautomatho@gmail.com

Website : www.vautomat.com

BRANCHES IN BARODA, MUMBAI, KOLKATA, JAMSHEDPUR, SECUNDERABAD & CHENNAI

(See Website for address)

Specifications Subject to change without prior notice

Date Aug

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract

DIFFERENTIAL PRESSURE GAUGE

Date Aug

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

ANNEXURE OF DIFFERENTIAL PRESSURE GAUGE (DPG)

S.NO	DESCRIPTION	KKS TAG	PROCESS RANGE	INSTRUMENT RANGE	LOCATION	P&ID No.
	DIFF PRESSURE GAUGE					
1	DPG ACROSS Y-STRAINER OF UAF-1	01SAB01CP504	0 - 0.5 Kg/cm2	1 Kg/Cm2	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
2	DPG ACROSS Y-STRAINER OF UAF-2	02SAB01CP504	0 - 0.5 Kg/cm2	1 Kg/Cm2	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM

TECHNICAL DATA SHEET OF DIFFERENTIAL PRESSURE GAUGE

SR.NO.	DESCRIPTION	SPECIFICATION
1	Item	Differential Pressure Gauge
2	Model	6PDPGSD
3	Manufacturer	‘A.N. INSTRUMENTS’
4	Dial size	160mm
5	Accuracy	$\pm 1\%$ of F S D
6	Mounting	Direct mounting bottom entry
7	Process Connection	$\frac{1}{2}$ " NPT
8	Element Material	Diaphragm SS 316
9	Case	SS 304
10	Manifold	5-Way Manifold
11	Zero Adjustment	Available
12	IP protection	IP -65

Decodofication: 6PDPGSD :- 6" dia Plain type Differential Pressure Gauge Stainless casing Direct mounting bottom entry (on 2"OD pipe)

Date: 02-Aug-2019

*Approval doesn't absolve the EPC
contractor of it's responsibility as
specified in the Contract.

PRESSURE GAUGE

ANNEXURE OF PRESSURE GAUGE						
S.NO	DESCRIPTION	KKS TAG	PROCESS RANGE	INSTRUMENT RANGE	LOCATION	P&ID No.
	PRESSURE GAUGE					
1	PG AT INLET OF PUMP-1 OF AWU-1	01SAA04CP501	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
2	PG AT OUTLET OF PUMP-1 OF AWU-1	01SAA04CP502	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
3	PG AT INLET OF PUMP-2 OF AWU-1	01SAA04CP503	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
4	PG AT OUTLET OF PUMP-2 OF AWU-1	01SAA04CP504	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
5	PG AT INLET OF PUMP-1 OF AWU-2	01SAA04CP505	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
6	PG AT OUTLET OF PUMP-1 OF AWU-2	01SAA04CP506	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
7	PG AT INLET OF PUMP-2 OF AWU-2	01SAA04CP507	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
8	PG AT OUTLET OF PUMP-2 OF AWU-2	01SAA04CP508	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
9	PG AT INLET OF PUMP-1 OF AWU-3	01SAA04CP509	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
10	PG AT OUTLET OF PUMP-1 OF AWU-3	01SAA04CP510	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
11	PG AT INLET OF PUMP-2 OF AWU-3	01SAA04CP511	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
12	PG AT OUTLET OF PUMP-2 OF AWU-3	01SAA04CP512	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
13	PG AT INLET OF PUMP-1 OF AWU-4	01SAA04CP513	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
14	PG AT OUTLET OF PUMP-1 OF AWU-4	01SAA04CP514	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
15	PG AT INLET OF PUMP-2 OF AWU-4	01SAA04CP515	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
16	PG AT OUTLET OF PUMP-2 OF AWU-4	01SAA04CP516	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
17	PG AT INLET OF PUMP-1 OF AWU-5	01SAA03CP501	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
18	PG AT OUTLET OF PUMP-1 OF AWU-5	01SAA03CP502	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
19	PG AT INLET OF PUMP-2 OF AWU-5	01SAA03CP503	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
20	PG AT OUTLET OF PUMP-2 OF AWU-5	01SAA03CP504	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
21	PG AT INLET OF PUMP-1 OF AWU-6	01SAA03CP505	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
22	PG AT OUTLET OF PUMP-1 OF AWU-6	01SAA03CP506	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
23	PG AT INLET OF PUMP-2 OF AWU-6	01SAA03CP507	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
24	PG AT OUTLET OF PUMP-2 OF AWU-6	01SAA03CP508	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
25	PG AT INLET OF PUMP-1 OF AWU-7	01SAA03CP509	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
26	PG AT OUTLET OF PUMP-1 OF AWU-7	01SAA03CP510	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
27	PG AT INLET OF PUMP-2 OF AWU-7	01SAA03CP511	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
28	PG AT OUTLET OF PUMP-2 OF AWU-7	01SAA03CP512	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
29	PG AT INLET OF PUMP-1 OF AWU-8	01SAA02CP501	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
30	PG AT OUTLET OF PUMP-1 OF AWU-8	01SAA02CP502	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
31	PG AT INLET OF PUMP-2 OF AWU-8	01SAA02CP503	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
32	PG AT OUTLET OF PUMP-2 OF AWU-8	01SAA02CP504	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
33	PG AT INLET OF PUMP-1 OF AWU-1	02SAA04CP501	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
34	PG AT OUTLET OF PUMP-1 OF AWU-1	02SAA04CP502	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
35	PG AT INLET OF PUMP-2 OF AWU-1	02SAA04CP503	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
36	PG AT OUTLET OF PUMP-2 OF AWU-1	02SAA04CP504	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
37	PG AT INLET OF PUMP-1 OF AWU-2	02SAA04CP505	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
38	PG AT OUTLET OF PUMP-1 OF AWU-2	02SAA04CP506	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
39	PG AT INLET OF PUMP-2 OF AWU-2	02SAA04CP507	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
40	PG AT OUTLET OF PUMP-2 OF AWU-2	02SAA04CP508	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
41	PG AT INLET OF PUMP-1 OF AWU-3	02SAA04CP509	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
42	PG AT OUTLET OF PUMP-1 OF AWU-3	02SAA04CP510	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
43	PG AT INLET OF PUMP-2 OF AWU-3	02SAA04CP511	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
44	PG AT OUTLET OF PUMP-2 OF AWU-3	02SAA04CP512	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
45	PG AT INLET OF PUMP-1 OF AWU-4	02SAA04CP513	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
46	PG AT OUTLET OF PUMP-1 OF AWU-4	02SAA04CP514	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
47	PG AT INLET OF PUMP-2 OF AWU-4	02SAA04CP515	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
48	PG AT OUTLET OF PUMP-2 OF AWU-4	02SAA04CP516	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
49	PG AT INLET OF PUMP-1 OF AWU-5	02SAA03CP501	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
50	PG AT OUTLET OF PUMP-1 OF AWU-5	02SAA03CP502	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
51	PG AT INLET OF PUMP-2 OF AWU-5	02SAA03CP503	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
52	PG AT OUTLET OF PUMP-2 OF AWU-5	02SAA03CP504	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM

Date: 02-Aug-2019

*Approval doesn't absolve the EPC
contractor of it's responsibility as
specified in the Contract

53	PG AT INLET OF PUMP-1 OF AWU-6	02SAA03CP505	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
54	PG AT OUTLET OF PUMP-1 OF AWU-6	02SAA03CP506	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
55	PG AT INLET OF PUMP-2 OF AWU-6	02SAA03CP507	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
56	PG AT OUTLET OF PUMP-2 OF AWU-6	02SAA03CP508	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
57	PG AT INLET OF PUMP-1 OF AWU-7	02SAA03CP509	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
58	PG AT OUTLET OF PUMP-1 OF AWU-7	02SAA03CP510	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
59	PG AT INLET OF PUMP-2 OF AWU-7	02SAA03CP511	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
60	PG AT OUTLET OF PUMP-2 OF AWU-7	02SAA03CP512	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
61	PG AT INLET OF PUMP-1 OF AWU-8	02SAA02CP501	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
62	PG AT OUTLET OF PUMP-1 OF AWU-8	02SAA02CP502	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
63	PG AT INLET OF PUMP-2 OF AWU-8	02SAA02CP503	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
64	PG AT OUTLET OF PUMP-2 OF AWU-8	02SAA02CP504	0 - 3Kg/cm2	0 - 6 Kg/cm2	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
65	PG AT COMMON INLET OF PUMP-1&2 OF UAF-1	01SAB01CP501	0 - 3 Kg/Cm2	0 - 6 Kg/Cm2	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
66	PG AT OUTLET OF PUMP-1 OF UAF-1	01SAB01CP502	0 - 3 Kg/Cm2	0 - 6 Kg/Cm2	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
67	PG AT OUTLET OF PUMP-2 OF UAF-1	01SAB01CP503	0 - 3 Kg/Cm2	0 - 6 Kg/Cm2	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
68	PG AT COMMON INLET OF PUMP-1&2 OF UAF-2	02SAB01CP501	0 - 3 Kg/Cm2	0 - 6 Kg/Cm2	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
69	PG AT OUTLET OF PUMP-1 OF UAF-2	02SAB01CP502	0 - 3 Kg/Cm2	0 - 6 Kg/Cm2	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
70	PG AT OUTLET OF PUMP-2 OF UAF-2	02SAB01CP503	0 - 3 Kg/Cm2	0 - 6 Kg/Cm2	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM

TECHNICAL DATA SHEET OF PRESSURE Gauge		
S.no	Description	Technical Specification
1	Item	Stainless Steel Pressure Gauge
2	Model	LFBS PG
3	Quantity	As per P&ID
4	Application	For Water Application
5	Manufacture	GIC
6	Dial size	160mm
7	Accuracy	± 1% of FSD
8	Sensing element	AISI 316 SS Bourdon
9	Movement material	AISI304 SS
10	Shank material	AISI 316 SS
11	Enclosure	Pressed AISI 304 SS case with Bayonet type bezel, Weather proof as per IP-65. self colour finish
12	Mounting	Direct with bottom entry
13	Connection size	1/2 "NPT(M)
14	Standard fitment	1.Blow out disc 2.Zero adjustable pointer
15	Over range protection	130% of FSD
16	Window material	Shatter proof glass
17	Accessories	2-way manifold

--

Bourdon Sensing Pressure Gauges

General

MODEL : BSPG (Dry Case)

LFBSPG (Liquid Filled Case)

Features

- Compliance to latest EN-837 standard
 - Range : (-)1 to 1600 kg/cm²
 - Bourdon in SS316 Ti as standard providing better mechanical properties guaranteeing repeatability and accuracy
 - Accuracy $\pm 1\%$ FSD (Standard), $\pm 0.5\%$ FSD on request
 - Unit of measurement - kg/cm², bar, psi, kPa, MPa
-
- Pressure Gauges intended for Process Industries such as Chemicals, Petro-chemicals, Energy or Gas industry, Food processing, Nuclear etc.
 - These pressure gauges have been designed to satisfy requirements to operate in aggressive environment.



Specifications

Ref. Standard	EN-837
Dial	Aluminium, white background, black markings
Nominal Size	160 mm
Case	SS304 / SS316 with bayonet bezel
	Phenol with screwed bezel
Protection	IP-68 (IS:13947 part I / IEC:60529)
Window	Safety glass (Shatter proof / Toughened glass)
Bourdon	SS316, SS316 Ti, SS316L, Monel
Socket	22mm Square in SS316, SS316 Ti, SS316L, Monel
Movement	SS304, SS316
Range	As per EN 837 (refer table) minimum span 0.6 kg/cm ² , maximum 1600 kg/cm ²
Connection	1/2" NPT (M) as standard* (other optional**)
Accuracy	$\pm 1\%$ FSD (0.5% on request)
Over range	As per EN 837
Zero adjustment	Micrometer Pointer
Blow out disc	Provided (on top)
Temperature suitability	Ambient (-)20°C to 60°C, Media 200°C
Temperature Effect	Within $\pm 0.4\%$ FSD/10°C, when temperature changes from reference temperature of 20°C (as per EN-837 standard)
Optional	IBR certification Maxima pointer NACE compliance External Knob for zero setting Built in Snubber Built in Gauge Saver Liquid filled Case (SS case only) Vacuum Protection CE Atex

* For ranges above 1000 bar, connection shall be 1/2"BSP(M) with Bottom Entry only

** Autoclave connection available on request

Ranges

Gauge	bar, kg/cm ²	Least count
Vacuum	(-)1 to 0	0.02
	-760 to 0mmHg	20
Compound	(-)1 to 0.6	0.05
	(-)1 to 1.5	0.05
	(-)1 to 3	0.10
	(-)1 to 5	0.10
	(-)1 to 9	0.20
	(-)1 to 15	0.50
	(-)1 to 24	0.50
	(-)1 to 39	1.0
Pressure	0 to 0.6	0.01
Gauge	0 to 1	0.02
('C' shaped Bourdon)	0 to 1.6	0.05
	0 to 2.5	0.05
	0 to 4	0.10
	0 to 6	0.10
	0 to 10	0.20
	0 to 16	0.50
	0 to 25	0.50
	0 to 40	1.0
	0 to 60	1.0
Pressure	0 to 100	2.0
Gauge	0 to 160	5.0
Coil type	0 to 250	5.0
Bourdon	0 to 400	10.0
	0 to 600	10.0
	0 to 800	20.0
	0 to 1000	20.0
	0 to 1600	50.0
	0 to 2000	50.0
	0 to 2500	50.0

For range other than above please contact our design dept.

The parameters mentioned here are the standard specifications / values generally used for most of the process applications. Any other specification not appearing here also can be provided as per customer requirement. For higher temperature services above 100°C, we recommend to provide suitable cooling arrangement (Syphon, Cooling Tower, Impulse Tubing, Diaphragm Seal etc.)

Under Technical Collaboration with M/s. Gauges Bourdon, France

Ordering Information

MODEL

BASIC MODEL CODE								OPTION							
BSPG Dry Case LFBSPG Liquid Filled Case								A05 Accuracy $\pm 0.5\%$ FSD ATX Atex BGS Built In Gauge Saver BOB Blow out disc at back BSN Built In Snubber CLB Colour Band CEM CE marking DC2 Silicone Oil Filled Case DUS Dual Scale EXZ External Knob for Zero Adjustment FLG Flanged Process Conn GLY Glycerine filled Case IBR IBR MXP Maxima pointer with Acrylic Window NAC NACE OXY O2 Cleaning OR5 150% FSD Over range PHD Phenolic / Plastic Dial S4D SS DIAL (SS304) S6D SS DIAL (SS316) VCP Vacuum Protection L Nil CSU Chemical Seal ACC Accessory XXX Other							
MOUNTING V Bottom Entry, Local Mounting S Bottom Entry, Surface Mounting Y Bottom Entry, 2" Pipe Mounting C Back Entry, Local Mounting P Back Entry, Flush Panel Mounting (with front Flange having 3 holes) B Back Entry, Flush Panel Mounting (with Bracket from back side)															
NOMINAL SIZE 160 - 160 mm															
CASE S4S SS 304 S6S SS 316 PHN Phenolic															
BOURDON S6S SS 316 S6L SS 316L S6T SS 316Ti MN4 Monel															
SOCKET S6S SS 316 S6L SS 316L S6T SS 316Ti MN4 Monel															
MOVEMENT S4S SS 304 S6S SS 316															
CONNECTION *								UNIT							
Conn	Code	Size	Code	Type	Code	Male/ Female	Code	KSC	kg/cm2(g)						
Thread	T	1/4"	06	NPS	NS	Male Female	M F	BAR	bar(g)						
		3/8"	10	NPT	NT			PSI	psi(g)						
		1/2"	15	BSP	BP			KPA	kPa(g)						
		3/4"	20	BSPT	BT			MPA	MPa(g)						
		1"	25	JIS-PF	PF			MBR	mbar(g)						
		M20	M20	JIS-PT	PT			MMW	mm WC(g)						
				Gas	GS			CMW	cm WC(g)						
				R	RR			MWC	m WC(g)						
				Rp	RP			INW	inch WC(g)						
				Pitch 1.5	C					MMH	mm Hg(g)				
						CMH	cm Hg(g)								
						INH	inch Hg(g)								
						XXX	Other (Please specify)								
RANGE								FLG - FLANGE							
Please select from Table								Conn	Code	Size	Code	Rating#	Code	Facing	Code
Flange	F	1/2"	15	150	A	RF	RF								
		3/4"	20	300	B	FF	FF								
		1"	25	600	C	RTJ	RJ								
		1-1/2"	40	900	D	LT	LT								
		2"	50	1500	E	LG	LG								
		3"	80	2500	F										

e.g. For 1/2"NPT(M), Code: **T15NTM**

For M20x1.5 (F), Code: **TM20CF**

* For Autoclave connection, please contact our design department

Sample Model Code: **BSPG-V-160-S4S-S6S-S6S-S4S-T15NTM-(0-10)-BAR-BOB**

e.g. For 40 NB 300# RF flange, Model Code: **F40BRF**

Gas Filled Dial Thermometer

General

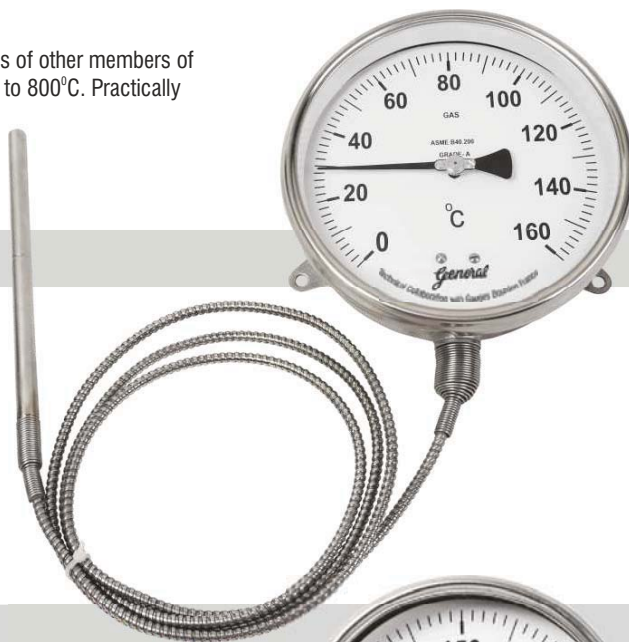
Gas filled Temperature Gauge overcomes most of the limitations of other members of family. It is offered in a very wide temperature range i.e. (-)200 to 800°C. Practically any stem length can be offered and capillary length as long as 30 mtr, without any loss of accuracy. Inert, non hazardous, non toxic nature of the filled system makes it virtually ideal choice of cross section of industries.

Features

- Use of inert gas - N₂
- Suitable for sanitary application
- All SS construction
- Rigid stem or capillary type
- Fast response
- Non-polluting, environment friendly
- Non-hazardous for the service
- High reliability
- IP-68 protection
- Accuracy $\pm 1\%$ FSD

Specifications

Ref. Standard	ASME B 40.200, EN 13190
System	Gas (N ₂) filled, case compensated in accordance with SAMA Cl. III B
Dial	aluminium, white background, black marking
Case	SS304 / SS316 with bayonet bezel
Protection	Weatherproof to IP-68 (IS/IEC : 60947 / IEC : 60529)
Window	Shatterproof glass
Pointer	Aluminium, black with micrometer adjustment
Stem	SS316 in 6 mm, 8 mm, 10 mm, 12 mm dia as standard
Capillary	SS316 with SS304 / SS316 armouring or SS316 with SS304 / SS316 armouring, with PVC covering
Connection	1/2"NPT (M) adjustable three piece compression fitting in SS304 or SS316
Range	(-) 200°C to 800°C with minimum span of 80°C
Accuracy	$\pm 1\%$ FSD
Overrange	125% FSD
Reset	Micrometer Pointer
Nominal Size	160 mm
Optional	Silicon Oil Filled Case
Note	1) For minimum insertion length essential for proper sensing, contact our design department. 2) Three point calibration certificate accompanies each thermometer. 3) For operating temp > 600°C; stem of SS310 / Inconel 600 shall be recommended.

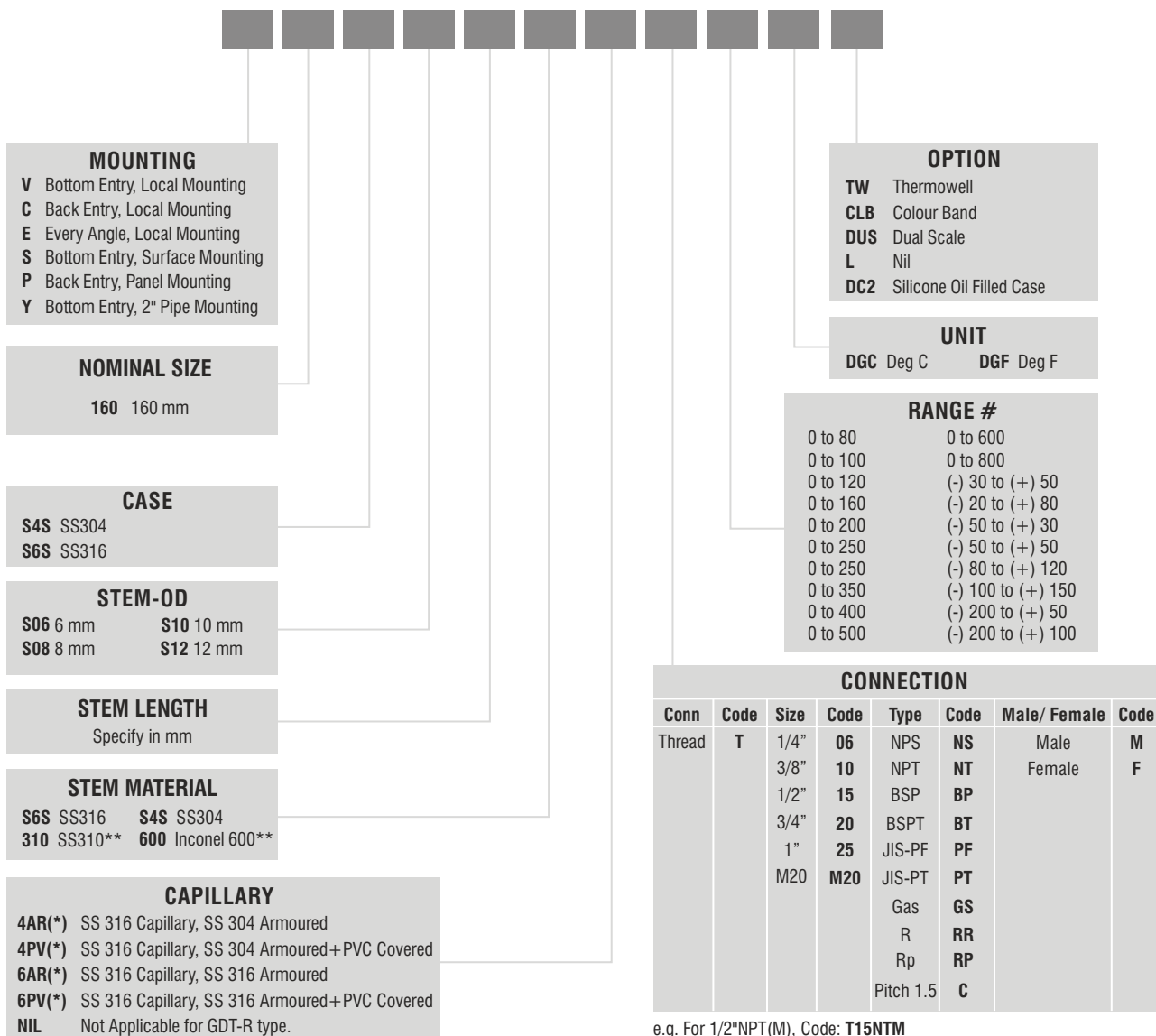


Ordering Information

GDT-R - Rigid Stem

GDT-C - Capillary Type

MODEL : GDT-R / GDT-C



* Specify the length of Capillary in Meters.

**Note: Stem material of SS310 is recommended for Temperature 600 Deg. C and Inconel 600 for temperature above 600 Deg.C

e.g. For 1/2"NPT(M), Code: **T15NTM**
For M20x1.5 (F), Code: **TM20CF**

#Ranges mentioned are in °C. Equivalent unit in °F can be provided on request.

Sample Model Code: **GDT-C-P-160-S4S-S10-400-S6S-4AR(5)-T15NTM-(0-250)-DGC-TW**

The recommendations made in this catalogue are to be used as intended guide. No guarantee of material can be undertaken since other factors may affect the performance. We reserve the right to change the specifications mentioned in this catalogue without any notice as improvements & development is a continuous process at "General". Responsibility of typographical errors is specifically disclaimed.

Date Aug

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract

PRESSURE SWITCH

Date Aug

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

ANNEXURE OF PRESSURE SWITCH

S.NO	DESCRIPTION	KKS TAG	PROCESS RANGE	INSTRUMENT RANGE	LOCATION	P&ID No.
	PRESSURE SWITCH					
1	PS AT OUTLET OF PUMP-1 OF AWU-1	01SAA04CP201	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
2	PS AT OUTLET OF PUMP-2 OF AWU-1	01SAA04CP202	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
3	PS AT OUTLET OF PUMP-1 OF AWU-2	01SAA04CP203	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
4	PS AT OUTLET OF PUMP-2 OF AWU-2	01SAA04CP204	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
5	PS AT OUTLET OF PUMP-1 OF AWU-3	01SAA04CP205	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
6	PS AT OUTLET OF PUMP-2 OF AWU-3	01SAA04CP206	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
7	PS AT OUTLET OF PUMP-1 OF AWU-4	01SAA04CP207	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
8	PS AT OUTLET OF PUMP-2 OF AWU-4	01SAA04CP208	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
9	PS AT OUTLET OF PUMP-1 OF AWU-5	01SAA03CP201	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
10	PS AT OUTLET OF PUMP-2 OF AWU-5	01SAA03CP202	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
11	PS AT OUTLET OF PUMP-1 OF AWU-6	01SAA03CP203	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
12	PS AT OUTLET OF PUMP-2 OF AWU-6	01SAA03CP204	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
13	PS AT OUTLET OF PUMP-1 OF AWU-7	01SAA03CP205	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
14	PS AT OUTLET OF PUMP-2 OF AWU-7	01SAA03CP206	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
15	PS AT OUTLET OF PUMP-1 OF AWU-8	01SAA02CP201	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
16	PS AT OUTLET OF PUMP-2 OF AWU-8	01SAA02CP202	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
17	PS AT OUTLET OF PUMP-1 OF AWU-1	02SAA04CP201	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
18	PS AT OUTLET OF PUMP-2 OF AWU-1	02SAA04CP202	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
19	PS AT OUTLET OF PUMP-1 OF AWU-2	02SAA04CP203	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
20	PS AT OUTLET OF PUMP-2 OF AWU-2	02SAA04CP204	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
21	PS AT OUTLET OF PUMP-1 OF AWU-3	02SAA04CP205	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
22	PS AT OUTLET OF PUMP-2 OF AWU-3	02SAA04CP206	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
23	PS AT OUTLET OF PUMP-1 OF AWU-4	02SAA04CP207	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
24	PS AT OUTLET OF PUMP-2 OF AWU-4	02SAA04CP208	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
25	PS AT OUTLET OF PUMP-1 OF AWU-5	02SAA03CP201	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
26	PS AT OUTLET OF PUMP-2 OF AWU-5	02SAA03CP202	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
27	PS AT OUTLET OF PUMP-1 OF AWU-6	02SAA03CP203	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
28	PS AT OUTLET OF PUMP-2 OF AWU-6	02SAA03CP204	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
29	PS AT OUTLET OF PUMP-1 OF AWU-7	02SAA03CP205	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
30	PS AT OUTLET OF PUMP-2 OF AWU-7	02SAA03CP206	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
31	PS AT OUTLET OF PUMP-1 OF AWU-8	02SAA02CP201	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
32	PS AT OUTLET OF PUMP-2 OF AWU-8	02SAA02CP202	0 - 3Kg/cm2	0.7 - 7 Bar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
33	PS AT OUTLET OF PUMP-1 OF UAF-1	01SAB01CP201	0 - 3 Kg/Cm2	0.7 - 7 Bar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
34	PS AT OUTLET OF PUMP-2 OF UAF-1	01SAB01CP202	0 - 3 Kg/Cm2	0.7 - 7 Bar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
35	PS AT OUTLET OF PUMP-1 OF UAF-2	02SAB01CP201	0 - 3 Kg/Cm2	0.7 - 7 Bar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
36	PS AT OUTLET OF PUMP-2 OF UAF-2	02SAB01CP202	0 - 3 Kg/Cm2	0.7 - 7 Bar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM

TECHNICAL SPECIFICATION FOR PRESSURE SWITCH (WATER)

BRAND	SWITZER
Qty.	As per P&ID
Model No	DM 602 B32 S2 33 C Z
Range	0.7 to 7 Bar
SENSOR DETAILS	
Type & Material	316L SS Diaphragm
Wetted parts	316SS
Max. Working Pressure	60 Bar
Max. Working Temperature	170 Deg. C
Ambient Temperature	(-)10 to 60 Deg C
SWITCHING	
Switch Type	Snap acting Micro switch
Contact Type & Rating	2 X SPDT (for DPDT action) & 15A 250V AC
No of Set point	One
Set point	Please Specify
On off Differential	Narrowband adjustable between 20 – 35 % FSR
Repeatability	+/- 1% of FSR
GENERAL	
Access to Setting	External
Enclosure	Pressure Die Cast Aluminium
Protection Category	Weatherproof to IP: 66
Paint Finish	Epoxy powder coated
Process Connection / Location	1/2" NPTF / Bottom
Electrical connection	7 Pin plug in connector
Mounting	Online
Accessories	SS Tag plate

For SWITZER PROCESS INSTRUMENTS PVT LTD



Pressure Switch 600 Series



Switzer data sheet PS-DM600-01

Applications

- Hydraulics
- Pneumatics
- Fire Fighting
- Pumps Control
- Compressors Control
- Power
- Special Purpose Machine

Special Features

- Stainless Steel Diaphragm
- High Repeatability
- Weatherproof Enclosure
- Very Compact
- Tamper Proof Range Setting

Description

This compact version of Switzer 600 Series Pressure Switches using components of high reliability is specifically designed for OEMs such as Fire fighting, Boilers, Power Plants, SPMs.

The sensing Stainless Steel Diaphragm is welded to a Stainless Steel housing mounted external to the weatherproof instrument housing.

The mechanical movements are restricted to absolute minimum using a diaphragm which ensures long term stability.



DM 600

The instrument is in Pressure Die Cast Aluminium housing which is best suited for harsh and outdoor installations.

The sensing element and wetted part of 316 Stainless Steel is compatible for use in process applications with air, gas, water, steam, oil and other chemicals.

General Specifications

Enclosure

Aluminium pressure die cast weatherproof to IP:66

Repeatability (Note 1)

±1% FSR (Standard)

For special repeatability consult sales department

Range Setting

External with lock

Ranges

Refer Ordering Matrix (Note 2 & 3)

Differential

Fixed

1 × SPDT (Notes 4 & 5) : within 6 – 10% of FSR

2 × SPDT (Notes 4, 5 & 6) : within 10 – 15% of FSR

Adjustable (applicable for Range Codes **B32 & B33** only)

1 × SPDT (Notes 4 & 5) : between 15 & 30% of FSR

2 × SPDT (Notes 4, 5 & 6) : between 20 & 35% of FSR

Switching

Instrument quality snap acting microswitch.

Switch Rating

AC Rating — 15A, 250V

DC Rating — *Resistive* : 0.5A 110V / 0.25A 220V / 8A 24V

— *Inductive* : 0.2A 110V / 0.10A 220V / 7A 24V

Sensor / Wetted Parts

316L SS Diaphragm with 316 SS wetted parts

Max. Working Pressure

60 bar (all ranges)

Max. Fluid Temperature

170°C

Ambient Temperature

(–)10 to 60°C

Process Connection

1/4" NPT(F) or 1/2 " NPT(F) standard.

Adaptors for other threads optional

Electrical Connection

1/2" NPTF Nylon Cable gland for 8 mm OD cable
(standard)

Mounting

On-line / Wall / Panel

Weight

600 Gms. approx.

Confirmity

BS 6134 : 1991

Ordering Matrix

SENSOR					
Diaphragm	DM				
ON-OFF DIFFERENTIAL					
Fixed		601			
Narrowband Adjustable (applicable for Range Codes 'B32' & 'B33' only)		602			
RANGE CODE					
Refer Range Table					
PROCESS CONNECTION					
1/4" NPTF			S1		
1/2 " NPTF			S2		
Others through adaptors			S3		
SWITCH CODE					
1 × SPDT				3	
2 × SPDT				33	
ELECTRICAL ENTRY					
1/2 " NPTF					A
7 PIN Connector					C

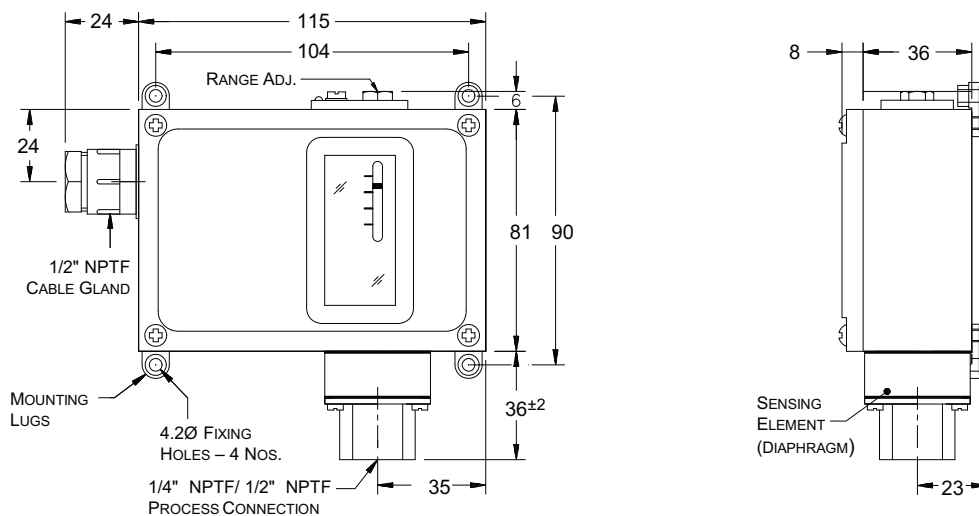
Range Table

RANGE CODE	RANGE (in bar)	Max. Working Pressure (in bar)
B26	0.2 to 1.6	60
B30	0.4 to 4	60
B32	0.7 to 7	60
B33	1 to 10	60
B35	1.6 to 16	60

Notes

1. Accuracy and repeatability are same for a Pressure Switch, which is a switching device and not a measuring instrument.
2. Select working range of the instrument such that the set pressure lies between 35% to 70% of range span.
3. On and off settings should not exceed the upper or lower range value.
4. Switching differentials are at midscale and will vary with range setting and operating conditions.
5. A pressure switch is a switching device and not a measuring instrument — even though it has a scale to assist setting. For this reason, Test Certificates will not contain individual ON-OFF switching values at different scale readings. Maximum differential obtained alone will be declared, besides other specifications.
6. DPDT action is achieved by $2 \times$ SPDT switches synchronised to practical limits i.e., $\pm 2\%$ of FSR.
7. Contact life of microswitches are 5×10^5 switching cycles for nominal load. To quench DC sparks, use diode in parallel with inductance, ensuring polarity. A 'R-C' network is also recommended with 'R' value in Ohms equal to coil resistance and 'C' value in micro Farads equal to holding current in Amps.
8. Higher process temperatures can be brought down by using longer pressure piping. Ask for piping nomogram # 441184-4.
Ensure that impulse pipework applies no stress on sensing element housing and use spanners to hold pressure port / housing when connections are made.
9. DM 600 is weatherproof only if all entries and joint faces are properly sealed.
10. A more versatile and wide range of Pressure & Differential Pressure Switches are available in Series 200, 020, 300, 931 & S20/920 Series upto 700 bar.
11. **Accuracy figures are exclusive of test equipment tolerance on the claimed values.**

Mounting Dimensions



All dimensions are in mm

The specifications given in this document represent the state of engineering at the time of publishing. We reserve the right to make modifications to the specifications and materials.



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Date Aug

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract

AIR FLOW SWITCH

DPS TYPE

Date Aug

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

ANNEXURE OF AIR FLOW SWITCH (DPS TYPE)

S.NO	DESCRIPTION	KKS TAG	PROCESS RANGE	INSTRUMENT RANGE	LOCATION	P&ID No.
	AIR FLOW SWITCH					
1	AFS-1 AT OUTLET OF FAN OF AWU-1	01SAA04CF101	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
2	AFS-2 AT OUTLET OF FAN OF AWU-1	01SAA04CF102	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
3	AFS-1 AT OUTLET OF FAN OF AWU-2	01SAA04CF103	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
4	AFS-2 AT OUTLET OF FAN OF AWU-2	01SAA04CF104	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
5	AFS-1 AT OUTLET OF FAN OF AWU-3	01SAA04CF105	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
6	AFS-2 AT OUTLET OF FAN OF AWU-3	01SAA04CF106	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
7	AFS-1 AT OUTLET OF FAN OF AWU-4	01SAA04CF107	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
8	AFS-2 AT OUTLET OF FAN OF AWU-4	01SAA04CF108	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
9	AFS-1 AT OUTLET OF FAN OF AWU-5	01SAA03CF101	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
10	AFS-2 AT OUTLET OF FAN OF AWU-5	01SAA03CF102	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
11	AFS-1 AT OUTLET OF FAN OF AWU-6	01SAA03CF103	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
12	AFS-2 AT OUTLET OF FAN OF AWU-6	01SAA03CF104	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
13	AFS-1 AT OUTLET OF FAN OF AWU-7	01SAA03CF105	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
14	AFS-2 AT OUTLET OF FAN OF AWU-7	01SAA03CF106	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
15	AFS-1 AT OUTLET OF FAN OF AWU-8	01SAA02CF101	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
16	AFS-2 AT OUTLET OF FAN OF AWU-8	01SAA02CF102	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
17	AFS-1 AT OUTLET OF FAN OF AWU-1	02SAA04CF101	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
18	AFS-2 AT OUTLET OF FAN OF AWU-1	02SAA04CF102	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
19	AFS-1 AT OUTLET OF FAN OF AWU-2	02SAA04CF103	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
20	AFS-2 AT OUTLET OF FAN OF AWU-2	02SAA04CF104	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
21	AFS-1 AT OUTLET OF FAN OF AWU-3	02SAA04CF105	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
22	AFS-2 AT OUTLET OF FAN OF AWU-3	02SAA04CF106	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
23	AFS-1 AT OUTLET OF FAN OF AWU-4	02SAA04CF107	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
24	AFS-2 AT OUTLET OF FAN OF AWU-4	02SAA04CF108	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)24.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
25	AFS-1 AT OUTLET OF FAN OF AWU-5	02SAA03CF101	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
26	AFS-2 AT OUTLET OF FAN OF AWU-5	02SAA03CF102	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
27	AFS-1 AT OUTLET OF FAN OF AWU-6	02SAA03CF103	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
28	AFS-2 AT OUTLET OF FAN OF AWU-6	02SAA03CF104	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
29	AFS-1 AT OUTLET OF FAN OF AWU-7	02SAA03CF105	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
30	AFS-2 AT OUTLET OF FAN OF AWU-7	02SAA03CF106	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)17.0M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
31	AFS-1 AT OUTLET OF FAN OF AWU-8	02SAA02CF101	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
32	AFS-2 AT OUTLET OF FAN OF AWU-8	02SAA02CF102	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
33	AFS-1 AT OUTLET OF FAN-1 OF UAF-1	01SAB01CF101	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
34	AFS-2 AT OUTLET OF FAN-1 OF UAF-1	01SAB01CF102	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
35	AFS-1 AT OUTLET OF FAN-2 OF UAF-1	01SAB01CF103	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
36	AFS-2 AT OUTLET OF FAN-2 OF UAF-1	01SAB01CF104	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#1	MAITREE-00-SAD-FB-111920-PEM
37	AFS-1 AT OUTLET OF FAN-1 OF UAF-1	02SAB01CF101	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
38	AFS-2 AT OUTLET OF FAN-1 OF UAF-1	02SAB01CF102	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
39	AFS-1 AT OUTLET OF FAN-2 OF UAF-1	02SAB01CF103	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM
40	AFS-2 AT OUTLET OF FAN-2 OF UAF-1	02SAB01CF104	0 - 0.7 mbar	0 - 2.5 mbar	AT EL(+)8.5M OF TG BUILDING UNIT#2	MAITREE-00-SAD-FB-111920-PEM

TECHNICAL SPECIFICATION FOR AIR FLOW SWITCH (DPS)

Brand	SWITZER
QTY.	As Per Annexure
Model No.	GM 310 N5 B3X 22 3 Z
Range	0 to 2.5 mbar
SENSOR DETAILS	
Type & Material	Diaphragm & Neoprene
Wetted Parts	Aluminium
Max. Working Pressure	0.5 Bar
Max. Working Temp.	95° C
SWITCHING	
Switch Type	Snap Acting Micro switch
Contact Type & Rating	2 x SPDT (for DPDT action) & 5A 250V AC
No. of Set Point	One
Set Pressure / Switch actuation on	Please Specify
On-Off Differential	Fixed within 0.66 mbar
Repeatability	±2% FSR
GENERAL	
Access to Setting	Internal
Paint Finish	Epoxy Powder Coated
Electrical Connection	7 Pin Plug in connector
Enclosure	Pressure Die Cast Aluminium
Protection Category	Weatherproof to IP:66
Mounting	Surface
Process Connection / Location	½" NPTF through adaptor / Sides
Accessories / Specials	a) ¼" NPTM x ½" NPTF Brass Adaptor b) SS Tag Plate

For **SWITZER PROCESS INSTRUMENTS PVT LTD**



DIFFERENTIAL PRESSURE SWITCHES

DIAPHRAGM SENSOR WEATHERPROOF FLAMEPROOF

SERIES 310

- VERY LOW RANGES ● CLEAN ROOMS ● FILTER BLOCKAGE ●
- AIR PURGE SYSTEMS ● FAN FAILURE ● FAN EXHAUST ●
- REFRIGERATION COILS ● DRYING OVENS ●



MODEL 310 IN GN WEATHERPROOF ENCLOSURE



MODEL 310 IN GK FLAMEPROOF ENCLOSURE

SWITZER Series 310 differential pressure switches are specially designed for sensing very low differential pressure in mmWC / mbar ranges for reliable setting in varied applications.

A precision contoured synthetic elastomer diaphragm senses low differential pressures applied to either side of it and actuates a snap-acting microswitch when the input differential pressure is slightly above or below the pre-set value.

The switch mechanism and the set point adjustment are external to the sensing chamber and completely isolated from contact with the process medium.

While Style GN housing offers limited very low ranges and microswitches to meet OEM requirements, Style GM & GK versions offer more ranges, microswitch options and wideband adjustment facility.

A scale is provided for approximate switch setting.

GENERAL SPECIFICATIONS

Enclosure		Max. Working Temp.	95°C for Neoprene, 110°C for Nitrile, 130°C for EPDM and 200°C for Silicone (Note 13)
GN	Aluminium die cast weatherproof to IP : 66	Switching	Instrument quality snap-acting SPDT microswitch (Note 10)
GM	Aluminium pressure die cast weatherproof to IP : 67		
GK	Aluminium die cast weatherproof to IP : 66 & flameproof to Gr.IIA, IIB & IIC (Note 1)		
Ranges	Refer Table	Differential	
Sensor	Neoprene Diaphragm std. Nitrile, EPDM & Silicone are optional	GN-310	Fixed, 1 SPDT switch only
Wetted Parts	Aluminum std.	GM / GK-310	Fixed
Mounting	Vertical only	GM / GK-313	Wideband adjustable. Refer tables A, B & C for values
Repeatability	± 2 % FSR (Note 4)	Connection	1/4" NPTF Std. Others through Adaptors.
Scale Accuracy	± 5 % FSR (Note 6)		
Ambient Temp.	- 10°C to + 60°C (Note 12)	Electrical	3/4" ETF std., 1/2" NPTF optional Dual entry on request.
Max. Working Pr.	0.5 bar for all ranges	Conformity	Generally to BS:6134:1991

ORDERING MATRIX

ENCLOSURE

Aluminium die cast weatherproof
to IP:66. _____ GN

Aluminium pressure die cast weather-proof to IP:67 with Nitrile gasket. ——— **GM**

Aluminium die cast flameproof cum weatherproof. CIMFR approved to Gr.IIA, IIB & IIC of IS/IEC 60079-1:2007 for flameproofness and IP:66 for weatherproofness **GK**

MODEL

This is the basic Differential Pressure Switch meant for low / ultra low range spans having very low fixed switching differential. ————— **310**

Same as 310 but with auxiliary mechanism providing adjustment of switching differential between 6 to 10% minimum to 60% maximum of FSR (not available in GN enclosure). _____ **313**

SENSORS AND WETTED PARTS

Neoprene diaphragm and cast Aluminium
wetted parts _____ N5

Silicone diaphragm and cast Aluminium
wetted parts _____ \$5

EPDM diaphragm and cast Aluminium
wetted parts _____ E5

Nitrile diaphragm and cast Aluminium
wetted parts _____ **B5**

RANGE CODE : Refer Table-1 _____

SWITCH CODE AND RATING : Refer Table-2 _____

ELECTRICAL ENTRY CODE : Refer Table-3 _____

PRESSURE CONVERSION TABLE

bar	Kgf / Cm ²	lbf / in ²	atm.	in H ₂ O	m H ₂ O	ln Hg	torr (mm Hg)
1	1.01972	14.5038	0.9869	401.864	10.1972	29.530	750.062
0.98067	1	14.2233	0.96784	394.094	10	28.959	735.56
0.06895	0.07031	1	0.06805	27.71	0.70307	2.0360	51.715
1.01325	1.03323	14.6959	1	407.189	10.3323	29.9213	760
0.00249	0.00254	0.0361	0.00246	1	0.0254	0.0734	1.87
0.09807	0.1	1.422	0.0968	39.41	1	2.896	73.356
0.03386	0.03453	0.4911	0.03342	13.609	0.3453	1	25.4
0.00133	0.00136	0.01934	0.00132	0.5358	0.0136	0.03937	1

Table-1 : RANGE CODE & AVAILABILITY

RANGE CODE	RANGE mbar	MWP bar	310		313
			GN	GM/GK	GM/GK
B3D	-2.5 to +2.5	0.5	✓	✓	×
B3X	0 to 2.5	0.5	×	✓	×
B5D	0.5 to 5	0.5	✓	✓	✓
B7D	1 to 10	0.5	×	✓	✓
C2D	2.5 to 15	0.5	✓	✓	✓
D3B	2.5 to 25	0.5	✓	✓	✓
D4C	5 to 50	0.5	×	✓	✓
D5C	7.5 to 75	0.5	✓	✓	✓
D8D	10 to 100	0.5	×	✓	✓

Table-2 : SWITCH CODE, RATING & AVAILABILITY (Note 8)

SWITCH CODE (SPDT)	AC RATING	DC RATING IN AMPS						AVAILABILITY OF SPDT IN MODELS		AVAILABILITY OF DPDT IN MODELS	
		RESISTIVE			INDUCTIVE						
		220V	110V	24V	220V	110V	24V	GN	GM / GK	GN	GM / GK
2 *	5A 250 / 125V	0.25	0.5	5.0	0.1	0.25	3.0	N.A.	310	↑ N O A V A I L A B L E ↓	310
D	15A 250 / 125V	0.2	0.4	2.0	0.02	0.03	1.0	310	310		310
3	15A 250 / 125V	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	310	310		310
W	15A 250 / 125V	0.3	0.5	6.0	0.05	0.1	4.0	N.A.	313		313
4	1A 125V	N.A.	0.5	0.5	N.A.	0.25	0.25	310	310		310
5	5A 250 / 125V	0.2	0.4	4.0	0.2	0.4	3.0	N.A.	310		310
6	0.1A 125V	N.R.	N.R.	0.1	N.R.	N.R.	N.A.	310	310		310
S	5A 250 / 125V	0.25	0.5	3.0	0.1	0.2	2.0	N.A.	310		310
J	5A 250V	N.A.	N.A.	5.0	N.A.	N.A.	3.0	N.A.	310	310	
K	1A 125V	N.A.	N.A.	1.0	N.A.	N.A.	0.5	N.A.	310	310	
Codes 2, 3, D & W – For General purpose usages.							Code S – IP:67 sealed microswitch with silver Nickel contact.				
Code 4 – Gold Alloy contact.							Code J – Hermetically sealed, inert gas filled with Silver alloy contact.				
Code 5 – For General purpose with good DC rating.							Code K – Hermetically sealed, inert gas filled with Gold plated contact.				
Code 6 – Gold Alloy contact (Low Rating)											
* For Code '2' Microswitch DPDT option available in selected ranges only – Consult factory											
For DPDT, change switch code '3' to '33', '4' to '44', etc., while ordering											
N.A. – Not Available N.R. – Not Recommended											

Table 3 : ELECTRICAL ENTRY CODE

Size *	Single Entry			Dual Entry		
	GN	GM	GK	GN	GM	GK
3/4" ETF	A	A	---	---	M	---
1/2" NPTF	B	B	B	---	N	N
3/4" NPTF	---	C	---	---	O	---
M20 × 1.5 **	---	D	D	---	P	P
M16 × 1.5	---	E	---	---	Q	---
Through Connector						
3 pin plug	---	2	---	---	---	---
7 pin plug	---	3	---	---	---	---
9 pin plug	---	4	---	---	---	---

* Cable gland available on request.

** Cable Entry is optional. Available on request.

SWITCHING DIFFERENTIAL DATA**TABLE – A : MODEL GN 310 — FIXED DIFFERENTIAL**

Range Code	Range mbar	On-off Differentials in mbar	
		GN 310	
		3 / D / 6	4
B3D	± 2.5	0.5 +Ve 0.8 –Ve	0.5 +Ve 0.8 –Ve
B5D	0.5 to 5	0.8	0.4
C2D	2.5 to 15	1.0	0.5
D3B	2.5 to 25	1.0	0.5
D5C	7.5 to 75	5.0	2.5
DPCO not possible			

TABLE – B : MODEL GM / GK 313 — WIDEBAND DIFFERENTIAL

Range Code	Range mbar	On-off Differentials in mbar	
		GM 313	GK 313
		W	W
B3X	0 to 2.5	×	×
B5D	0.5 to 5	1.7 to 3	2.4 to 3
B7D	1 to 10	1.7 to 6	2.4 to 6
C2D	2.5 to 15	2.0 to 9	2.8 to 9
D3B	2.5 to 25	2.3 to 15	3.1 to 15
D4C	5 to 50	3.5 to 30	4.0 to 30
D5C	7.5 to 75	4.0 to 45	4.6 to 45
D8D	10 to 100	5.5 to 60	6.3 to 60

TABLE – C : MODEL GM / GK 310 — FIXED DIFFERENTIAL

Range Code	Range mbar	On-off Differentials in mbar							
		GM 310				GK 310			
		2	3 / D / 6	4	5	2	3 / D / 6	4	5
B3D	± 2.5	×	0.9 –Ve 0.7 +Ve	0.9 –Ve 0.7 +Ve	×	×	1.6 –Ve 1.1 +Ve	1.6 –Ve 1.1 +Ve	×
B3X	0 to 2.5	0.6	0.4	0.6	0.7	1.0	0.7	1.1	1.3
B5D	0.5 to 5	0.8	0.6	0.8	0.9	1.4	1.1	1.4	1.6
B7D	1 to 10	0.8	0.6	0.8	0.9	1.5	1.2	1.6	1.6
C2D	2.5 to 15	1.5	0.8	1.0	1.3	2.7	1.4	1.8	2.3
D3B	2.5 to 25	1.6	0.9	1.2	1.5	2.7	1.6	2.1	2.7
D4C	5 to 50	3.0	1.3	1.5	2.2	5.4	2.3	2.7	3.9
D5C	7.5 to 75	3.2	1.5	1.7	2.5	5.8	2.7	3.0	4.5
D8D	10 to 100	3.5	2.0	2.2	2.8	6.3	3.6	3.9	5.0

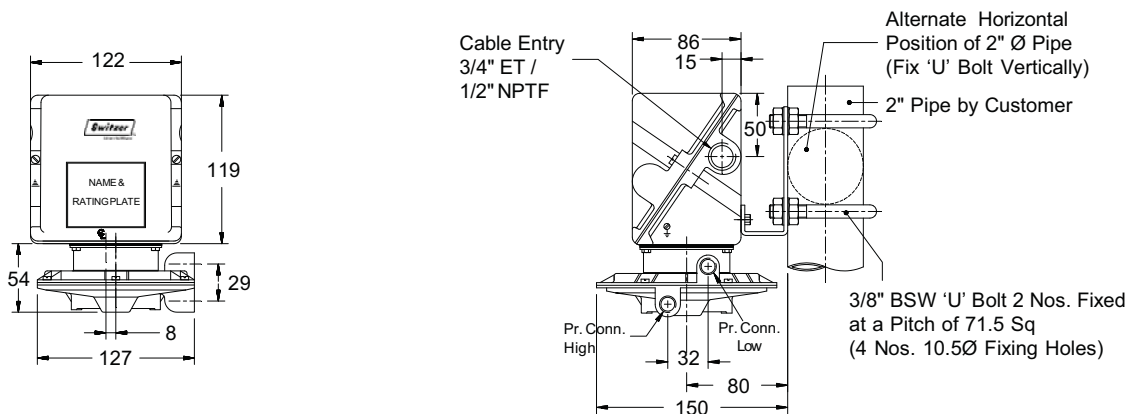
- Notes :**
- Codes other than '3', 'D', '4' & '6' are not available in GN310.
 - DPDT not available in Model GN 310.
 - For on-off differential values with switch codes 'S', 'J' & 'K' consult factory.
 - To arrive at differentials for DPDT switching, apply multiplication factor of 1.1 to the above values.

NOTES

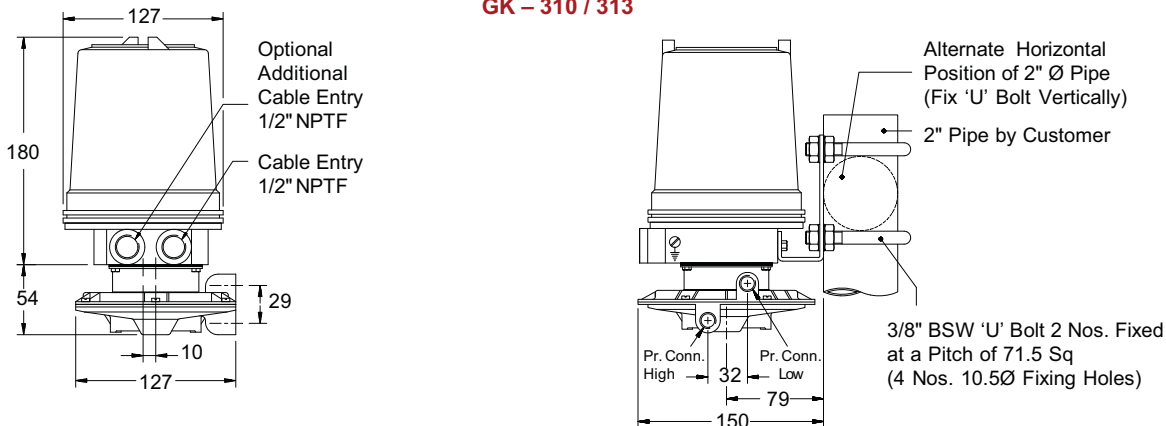
- Gr.IIA & IIB of IS/IEC 60079–1:2007 is equivalent to NEC CL.1, Gr.C & D. Gr.IIC of IS/IEC 60079–1:2007 is equivalent to NEC CL.1, DIV.1, Gr.A & B.
- Style GM / GN is weatherproof only if all entries and joint faces are properly sealed. Style GK is weatherproof only if cover 'O' ring is retained in position and flameproof only if proper FLP cable gland is used. It is recommended to procure cable glands along with GK instruments to avoid neglect of it while installation.
- Intrinsic Safety (Exi) — Differential Pressure switches are classified as simple apparatus as they neither generate nor store energy. Hence differential pressure switches in weatherproof (GM / GA) enclosures also may be used in intrinsically safe systems without certification provided the power source is certified Intrinsically Safe. Because of the low voltages and currents it is recommended to use gold contact and / or sealed contacts.
- Accuracy & Repeatability are not different for all blind differential pressure switches. A shift of ±2% may be observed in setpoint when pressure falls from full static pressure. Settings will also shift with varying temperature.
- The instrument is calibrated in the mounting position depicted in the drawing. Mounting in any other direction will cause a minor range shift, especially in low and compound ranges.
- A differential pressure switch is a switching device and not a measuring instrument — eventhough it has a scale to assist setting. For this reason, Test Certificates will not contain individual ON-OFF switching values at different scale readings. Maximum differential obtained alone will be declared, besides other specifications.
- Select working range of the instrument such that the set value lies in the mid 35% of the range i.e., between 35% and 70% of range span.
- For switching differential values please refer respective Differential Table. Switching differentials furnished are nominal values under test conditions at mid-scale and will vary with range settings and operating conditions.
- On and off settings should not exceed the upper or lower range value.
- DPDT action is achieved by two SPDT switches synchronised to practical limits i.e., ±2% of FSR. Deadband for DPDT contacts are higher than that of SPDT as force required to actuate the contacts are more.
- Contact life of microswitches are 5×10^5 switching cycles for nominal load. To quench DC sparks, use diode in parallel with inductance, ensuring polarity. A 'R–C' network is also recommended with 'R' value in Ohms equal to coil resistance and 'C' value in micro Farads equal to holding current in Amps.
- Ambient temperature range: All models are suitable for operating within a range of ambient temperature from (–) 10°C to (+) 60°C provided the process does not freeze within this range. Below 0°C, precautions should be taken in humid atmospheres to prevent frost formation inside the instrument from jamming the mechanism. Occasional excursions beyond this range are possible but accuracy might be impaired. The microswitch is the limiting factor which should never exceed the limits (–) 25°C to (+) 80°C.
- Fluid Temperature: A differential pressure switch when connected to the process is not subjected to through flow and therefore is not fully exposed to the fluid temperature. Use of adequate length of impulse piping will greatly reduce excessive heating of the sensing element. For e.g., connection of 7.5 cm of 12 mm dia impulse piping will reduce water temperature of 100°C to 65°C at an ambient temperature of 50°C. Ask factory for piping nomogram #441184–4 for different temperatures.
- Ensure that impulse pipework applies no stress on sensing element housing and use spanners to hold pressure port / housing when connections are made.
- Accuracy figures are exclusive of test equipment tolerance on the claimed values.**
- All performance data are guaranteed to ±5%.**

MOUNTING DIMENSIONS

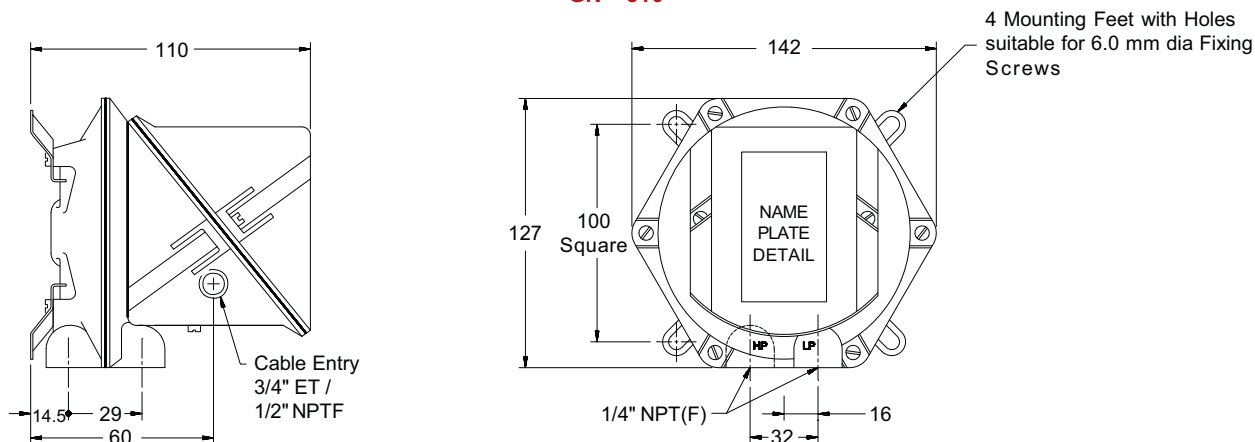
GM – 310 / 313



GK – 310 / 313



GN – 310



All dimensions are in mm

This is not a contractual document. Prior notification of changes in specifications is impracticable due to continuous improvement



Switzer Process Instruments Pvt. Ltd.

REGD. OFFICE : 128, SIDCO North Phase, Ambattur Estates, Chennai 600 098 CIN : U29255TN2014PTC095662

www.switzerprocess.co.in

WORKS & SALES OFFICE

128, SIDCO North Phase, Ambattur Estates, Chennai 600 050
Ph : 044-2625 2017 / 2018 / 4324 / 4991 Fax : 044-2624 8849
e-mail : works@switzerprocess.co.in; sales@switzerprocess.co.in

SALES OFFICES

Bangalore Phone: 080-22262613 Fax : 080-22257392
e-mail : bangalorebr@switzerprocess.co.in

Chennai Phone: 044-2625 2017 / 2018 / 4324 / 4991 Fax : 044-2624 8849
e-mail : chennaibr@switzerprocess.co.in

Hyderabad Phone: 040-2781 1082 Fax : 040-2781 1082
e-mail : hyderabadbr@switzerprocess.co.in

Kolkata Phone: 033-68888819
e-mail : kolkatabr@switzerprocess.co.in

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e-mail : mumbaibr@switzerprocess.co.in

New Delhi Phone: 011-42331470 / 42331478
e-mail : delhibr@switzerprocess.co.in

Pune Mobile: 020-66293361 to 3367
e-mail : punebr@switzerprocess.co.in

Vadodara (Agent) Phone: 0265-2322906 Fax : 0265-2331649
e-mail : vadodara.ag@switzerprocess.co.in

Technical Data Sheet

ITEM	PRE FILTER CASSETTE TYPE	ANNEXURE	Page 1 of 8
CUSTOMER		REF:	
PROJECT	BIFPCL MAITREE KHULNA STPP	DATE	07.12.2018
PACKAGE	VENTILATION SYSTEMS		

S.No.	Description	Specification	
1	Manufacturer	Puromatic Filters Pvt Ltd.	
2	Frame type	Cassette	
3	Frame material	GI sheet 18 G (1.25 ± 0.12 mm)	
4	Spacers	Al sheet 20 G (0.91 ± 0.08 mm)	
5	Filter Media	Synthetic non woven(fire retardant and resistant to moisture, fungi ,bacteria & frost) progressive density filter media having high dust holding capacity at lesser pressure drop with HDPE mesh on air entry side & Al expanded mesh on air exit side.	
6	Filter Media Basic Weight/ Thickness	120 ± 10% GSM / > 4 mm	
7	Media sealing	Epoxy	
8	Test standard	BS:6540/ASHRAE-52-76/EN779	
9	Face velocity	2.5 m/sec	
10	Initial pressure drop	≤ 5 mm of WC	
11	Final pressure drop	7.5 mm of WC	
12	Average synthetic dust wt. arrestance	65% to 80%	
13	Aesthetics	Clean external surface, No adhesive on frame	
14	Filter cleaning	By compressed air/ water	
15	Inspection & Testing	As per approved QAP	
S.No.	Overall dimensions (mm) (H X W X D)	Rated air flow (CMH)	Remarks
1	610 X 610 X 50	3350	
Prepared By		Approved By	



Puromatic Filters Pvt. Ltd

Telefax: +91-11-26388013, 14, 26389158

Email: sales.puromatic@gmail.com

filters@ndb.vsnl.net.in

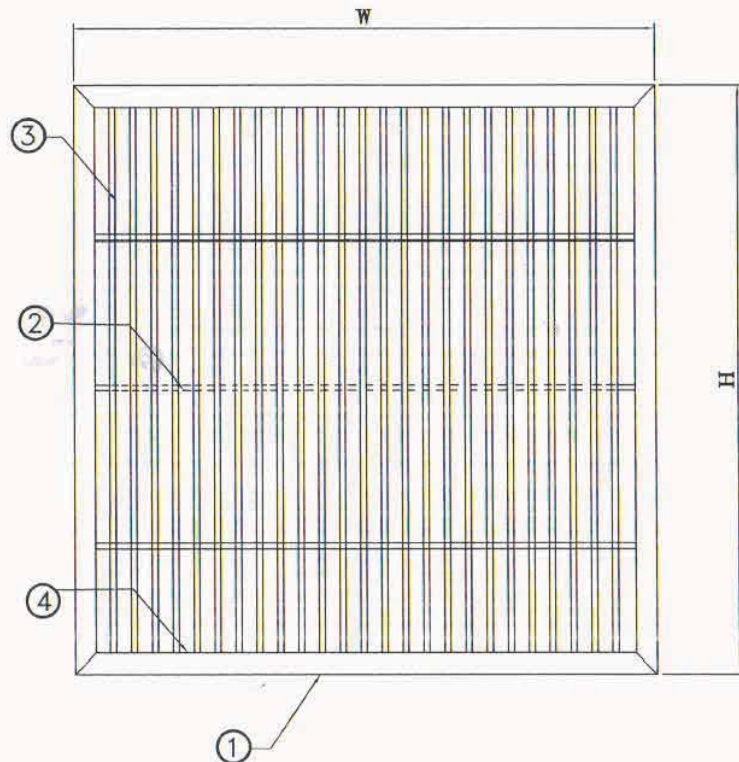
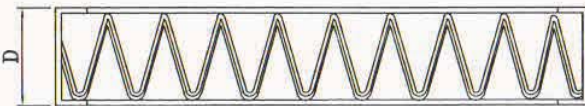
website: www.puromaticfilters.com

CIN:U74899DL1992PTCO48328

APPROVED
Checked and Approved

Date: Aug

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



4.	MEDIA SEALING	EPOXY		
3.	FILTER MEDIA	SYN. NONWOVEN	1 Set	
2.	SPACERS	AL. SHEET 20G		
1.	FILTER FRAME	GI SHEET 18G	1 No.	
S.No	ITEM	MATERIAL	QTY.	REMARKS
BILL OF MATERIAL				

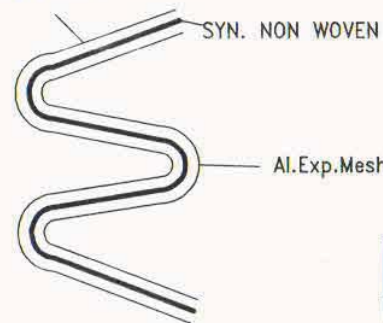
NOTE:-

FILTER MEDIA : Basic Weight -120 ± 10 % GSM
Thickness > 4 mm

Sheet Thickness: GI Sheet 18 G (1.25 ± 0.12mm)

Al Sheet 20 G (0.91 ± 0.08 mm)

HDPE MESH



Filter Media (3)

DIMENSIONS

H + 0 / - 3	W + 0 / - 3	D + 2 / - 2	No. of Spacers	No. of Media Pleats (± 1)
610	610	50	03	22

Project: BIFPCL MAITREE KHULNA STPP

Package: Ventilation Systems

ITEM: PRE FILTER

TYPE: CASSETTE

ALL DIMENSIONS ARE IN MM.

DRWN. BY MD DATE: 07.12.18

CHKD. BY AM

DRG NO. T-1812479A

SHEET 2 OF 8

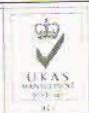
REV.:00

PUROMATIC FILTERS PVT.LTD.
12,DSIDC,Scheme-2,Okhla Industrial Area
Phase-2,New Delhi-110020,India
Telefax:+91-11-26388013,14,26389158
Email:sales.puromatic@gmail.com
filters@ndb.vsnl.net.in
web:www.puromaticfilters.com

Technical Data Sheet

ITEM	PRE FILTER FLANGE TYPE	ANNEXURE	Page 3 of 8
CUSTOMER		REF:	
PROJECT	BIFPCL MAITTREE KHULNA STPP	DATE	07.12.2018
PACKAGE	VENTILATION SYSTEMS		

S.No.	Description	Specification	
1	Manufacturer	Puromatic Filters Pvt Ltd.	
2	Frame type	Flange	
3	Frame material	GI sheet 18 G (1.25 ± 0.12 mm)	
4	Spacers	Al sheet 20 G (0.91 ± 0.08 mm)	
5	Filter Media	Synthetic non woven(fire retardant and resistant to moisture, fungi ,bacteria & frost) progressive density filter media having high dust holding capacity at lesser pressure drop with HDPE mesh on air entry side & Al expanded mesh on air exit side.	
6	Filter Media Basic Weight/ Thickness	120 ± 10% GSM / > 4 mm	
7	Media sealing	Epoxy	
8	Test standard	BS:6540/ASHRAE-52-76/EN779	
9	Face velocity	2.5 m/sec	
10	Initial pressure drop	≤ 5 mm of WC	
11	Final pressure drop	7.5 mm of WC	
12	Average synthetic dust wt. arrestance	65% to 80%	
13	Aesthetics	Clean external surface, No adhesive on frame	
14	Filter cleaning	By compressed air/ water	
15	Inspection & Testing	As per approved QAP	
S.No.	Overall dimensions (mm) (H X W X D)	Face Area (mm)	Rated air flow (CMH)
1	610 X 610 X 50	550 X 550	2720
Prepared By		Approved By	



Puromatic Filters Pvt. Ltd

Telefax: +91-11-26388013, 14, 26389158

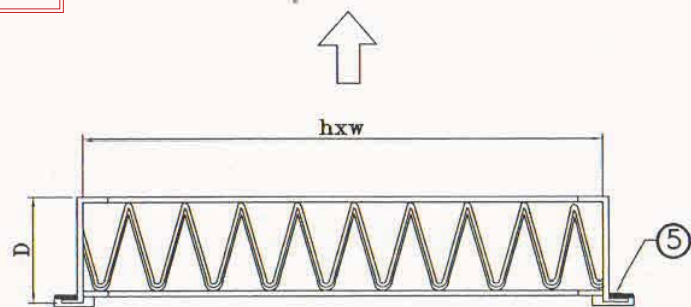
Email: sales.puromatic@gmail.com

filters@ndb.vsnl.net.in

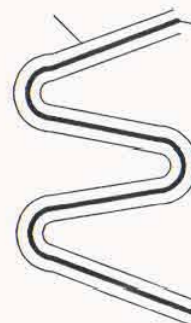
website: www.puromaticfilters.com

CIN:U74899DL1992PTCO48328

APPROVED
Checked and Approved
Date: Aug
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



HDPE MESH



SYN. NON WOVEN

Al.Exp.Mesh

Filter Media

NOTE:-

FILTER MEDIA : Basic Weight -120 ± 10 % GSM

Thickness > 4 mm

Sheet Thickness: GI Sheet 18 G (1.25 ± 0.12mm)

Al Sheet 20 G (0.91 ± 0.08 mm)

DIMENSIONS

H + 0 / - 3	W + 0 / - 3	D + 2 / - 2	h + 0 / - 3	w + 0 / - 3	No. of Spacers	No. of Media Pleats (± 1)
610	610	50	550	550	03	20

Project: BIFPCL MAITREE KHULNA STPP

PAackage: Ventilation Systems

Customer:

PUROMATIC FILTERS PVT.LTD.

12,DSIDC,Scheme-2,Okhla Industrial Area

Phase-2,New Delhi-110020,India

Telefax:+91-11-26388013,14,26389158

Email:sales.puromatic@gmail.com

filters@ndb.vsnl.net.in

web:www.puromaticfilters.com

ITEM: PRE FILTER

TYPE: SINGLE FLANGE

ALL DIMENSIONS ARE IN MM.

DRWN. BY MD DATE:07.12.18

CHKD. BY AM

DWG No.T-1812479B

SHEET 4 OF 10 REV.: 0

Technical Data Sheet

ITEM	FINE FILTER CASSETTE TYPE	ANNEXURE	Page 5 of 8
CUSTOMER		REF:	
PROJECT	BIFPCL MAITREE KHULNA STPP	DATE	07.12.2018
PACKAGE	VENTILATION SYSTEMS		

S.No.	Description	Specification	
1	Manufacturer	Puromatic Filters Pvt.Ltd.	
2	Frame type	Cassette	
3	Frame material	GI sheet 18 G (1.25 ± 0.12 mm)	
4	Spacers	Al sheet 20 G (0.91 ± 0.08 mm)	
5	Filter Media	Synthetic non woven(fire retardant and resistant to moisture, fungi ,bacteria & frost) progressive density filter media having high dust holding capacity at lesser pressure drop with HDPE mesh on air entry side & Al expanded mesh on air exit side.	
6	Filter Media Basic Weight/ Thickness	200 ± 10% GSM / > 1.5 mm	
7	Media sealing	Epoxy	
8	Test standard	BS:6540/ASHRAE-52-76/EN779	
9	Face velocity	2.5 m/sec	
10	Initial pressure drop	6 mm of WC	
11	Final pressure drop	12 mm of WC	
12	Average synthetic dust wt. arrestance	80-90%	
13	Aesthetics	Clean external surface, No adhesive on frame	
14	Filter cleaning	By compressed air/ water	
15	Inspection & Testing	As per approved QAP	
S.No.	Overall dimensions (mm) (H X W X D)	Rated air flow (CMH)	Remarks
1	610 X 610 X 305	3350	
Prepared By		Approved By	



Puromatic Filters Pvt. Ltd

Telefax: +91-11-26388013,14,26389158

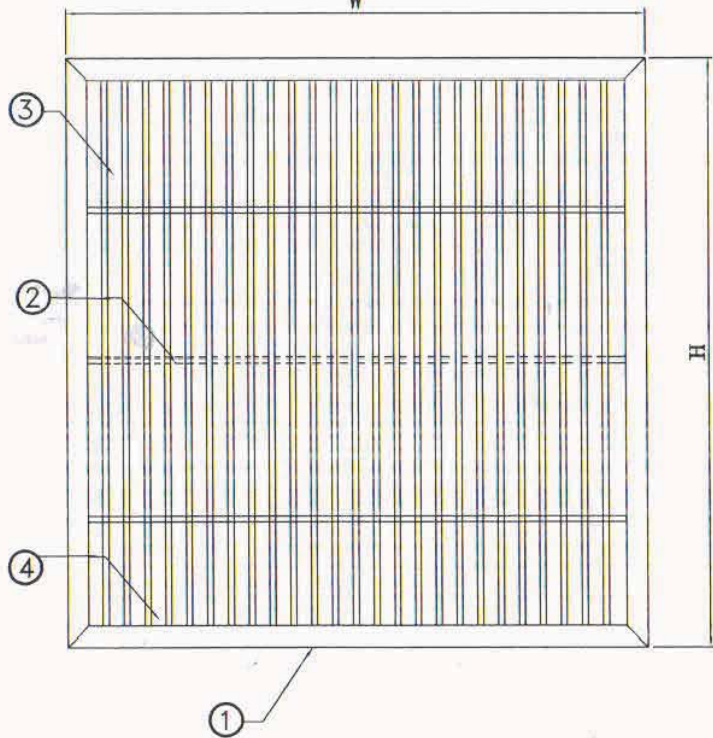
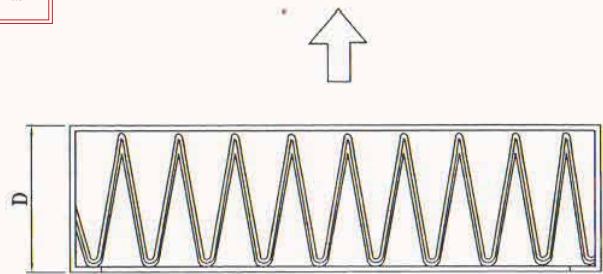
Email: sales.puromatic@gmail.com

filters@ndb.vsnl.net.in

website: www.puromaticfilters.com

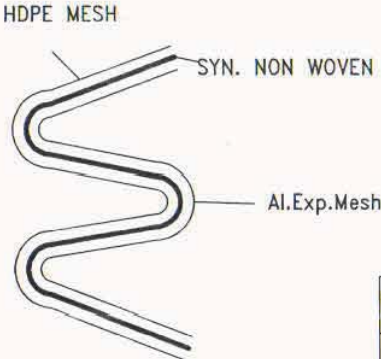
CIN:U74899DL1992PTCO48328

APPROVED
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Date: Aug
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4.	MEDIA SEALING	EPOXY		
3.	FILTER MEDIA	SYN. NONWOVEN	1 Set	
2.	SPACERS	AL. SHEET 20G		
1.	FILTER FRAME	GI. SHEET 18G	1 No.	
S.No	ITEM	MATERIAL	QTY.	REMARKS

BILL OF MATERIAL



Filter Media (3)

NOTE:-
FILTER MEDIA : Basic Weight -200 ± 10 % GSM
Thickness > 1.5 mm
Sheet Thickness: GI Sheet 18 G (1.25 ± 0.12mm)
Al Sheet 20 G (0.91 ± 0.08 mm)

DIMENSIONS

H + 0 / - 3	W + 0 / - 3	D + 2 / - 2	No. of Spacers	No. of Media Pleats (±1)
610	610	305	03	22

Project: BIFPCL MAITREE KHULNA STPP	ITEM: FINE FILTER
PAackage: Ventilation Systems	TYPE: CASSETTE (Box)
Customer:	ALL DIMENSIONS ARE IN MM.
PUROMATIC FILTERS PVT.LTD. 12,DSIDC, Scheme-2, Okhla Industrial Area Phase-2, New Delhi-110020, India Telefax: +91-11-26388013, 14, 26389158 Email: sales.puromatic@gmail.com filters@ndb.vsnl.net.in web: www.puromaticfilters.com	DRWN. BY MD DATE: 07.12.18
	CHKD. BY AM
	DRG NO. T-1812479C
	SHEET 5 OF 8 REV.: 00

Technical Data Sheet

ITEM	FINE FILTER FLANGE TYPE	ANNEXURE	Page 7 of 8
CUSTOMER		REF:	
PROJECT	BIFPCL MAITREE KHULNA STPP	DATE	07.12.2018
PACKAGE	VENTILATION SYSTEMS		

S.No.	Description	Specification	
1	Manufacturer	Puromatic Filters Pvt Ltd.	
2	Frame type	Flange	
3	Frame material	GI sheet 18 G (1.25 ± 0.12 mm)	
4	Spacers	Al sheet 20 G (0.91 ± 0.08 mm)	
5	Filter Media	Synthetic non woven(fire retardant and resistant to moisture, fungi ,bacteria & frost) progressive density filter media having high dust holding capacity at lesser pressure drop with HDPE mesh on air entry side & Al expanded mesh on air exit side.	
6	Filter Media Basic Weight/ Thickness	200 ± 10% GSM / > 1.5 mm	
7	Media sealing	Epoxy	
8	Test standard	BS:6540/ASHRAE-52-76/EN779	
9	Face velocity	2.5 m/sec	
10	Initial pressure drop	6 mm of WC	
11	Final pressure drop	12 mm of WC	
12	Average synthetic dust wt. arrestance	80-90%	
13	Aesthetics	Clean external surface, No adhesive on frame	
14	Filter cleaning	By compressed air/ water	
15	Inspection & Testing	As per approved QAP	
S.No.	Overall dimensions (mm) (H X W X D)	Face Area (mm)	Rated air flow (CMH)
1	610 X 610 X 305	550 X 550	2720
Prepared By		Approved By	



Puromatic Filters Pvt. Ltd

Telefax: +91-11-26388013, 14, 26389158

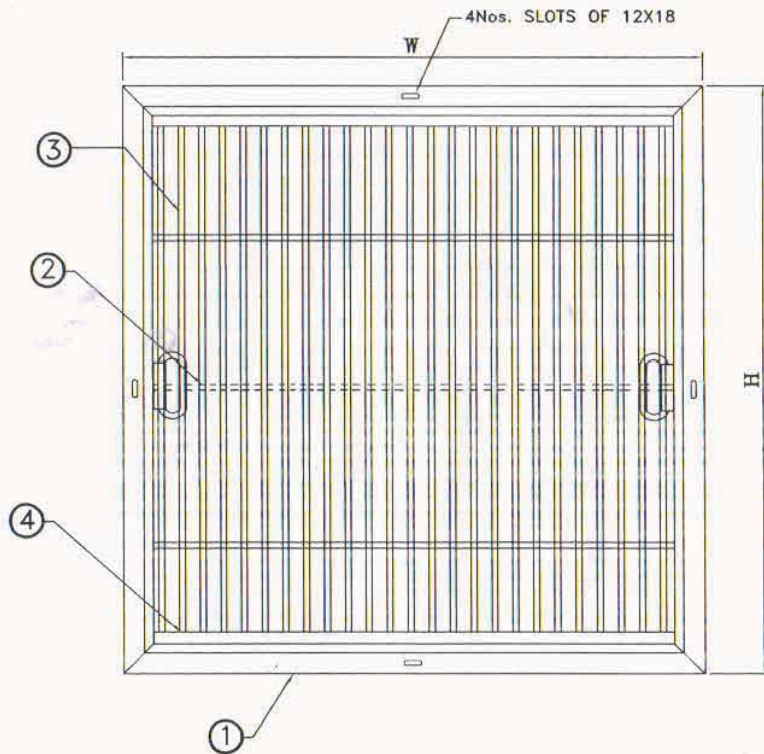
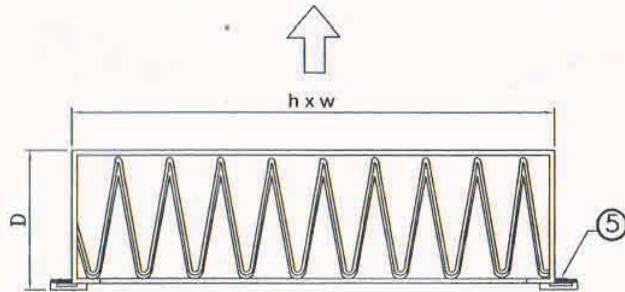
Email: sales.puromatic@gmail.com

filters@ndb.vsnl.net.in

website: www.puromaticfilters.com

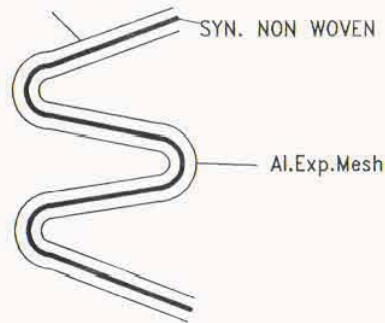
CIN:U74899DL1992PTCO48328

APPROVED
Checked and Approved
Date: Aug
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



5.	GASKET	SPONGE FOAM		
4.	MEDIA SEALING	EPOXY		
3.	FILTER MEDIA	SYN. NONWOVEN	1 Set	
2.	SPACERS	Al. SHEET 20G		
1.	FILTER FRAME	GI. SHEET 18G	1 No.	
S.No	ITEM	MATERIAL	QTY.	REMARKS
BILL OF MATERIAL				

HDPE MESH



Filter Media (3)

NOTE:-

FILTER MEDIA : Basic Weight -200 ± 10 % GSM
Thickness > 1.5 mm
Sheet Thickness: GI Sheet 18 G (1.25 ± 0.12mm)
Al Sheet 20 G (0.91 ± 0.08 mm)

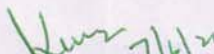
DIMENSIONS

H + 0 / - 3	W + 0 / - 3	D + 2 / - 2	h + 0 / - 3	w + 0 / - 3	No. of Spacers	No. of Media Pleats (± 1)
610	610	305	550	550	03	20

Project: BIFPCL MAITREE KHULNA STPP	ITEM: FINE FILTER		
PAackage: Ventilation Systems	TYPE: FLANGE		
Customer:	ALL DIMENSIONS ARE IN MM.		
PUROMATIC FILTERS PVT.LTD. 12,DSIDC,Scheme-2,Okhla Industrial Area Phase-2,New Delhi-110020,India Telefax:+91-11-26388013,14,26389158 Email:sales.puromatic@gmail.com filters@ndb.vsnl.net.in web:www.puromaticfilters.com	DRWN. BY	MD	DATE: 07.12.18
	CHKD. BY	AM	
	DRG NO. 1812479D		
	SHEET 8 OF 8		REV.:00

Technical Data Sheet

ITEM	PRE FILTER CASSETTE TYPE	ANNEXURE	Page 1 of 4
CUSTOMER		REF:	
PROJECT	BIFPCL MAITTREE KHULNA STPP	DATE	07.12.2018
PACKAGE	VENTILATION SYSTEMS	REV	02/Dt. 05.06.2021

S.No.	Description	Specification	
1	Manufacturer	Puromatic Filters Pvt Ltd.	
2	Frame type	Cassette	
3	Frame material	GI sheet 18 G (1.25 ± 0.12 mm)	
4	Spacers	Al sheet 20 G (0.91 ± 0.08 mm)	
5	Filter Media	Synthetic non woven(fire retardant and resistant to moisture, fungi ,bacteria & frost) progressive density filter media having high dust holding capacity at lesser pressure drop with HDPE mesh on air entry side & Al expanded mesh on air exit side.	
6	Filter Media Basic Weight/ Thickness	120 ± 10% GSM / > 4 mm	
7	Media sealing	Epoxy	
8	Test standard	BS:6540/ASHRAE-52-76/EN779	
9	Face velocity	2.5 m/sec	
10	Initial pressure drop	≤ 5 mm of WC	
11	Final pressure drop	7.5 mm of WC	
12	Average synthetic dust wt. arrestance	65% to 80%	
13	Aesthetics	Clean external surface, No adhesive on frame	
14	Filter cleaning	By compressed air/ water	
15	Inspection & Testing	As per approved QAP	
S.No.	Overall dimensions (mm) (H X W X D)	Rated air flow (CMH)	Remarks
1	610 X 610 X 50	3350	
2	610 X 305 X 50	1675	
Prepared By		Approved By 	



Puromatic Filters Pvt. Ltd

Telefax: +91-11-26388013, 14, 26389158

Email: sales.puromatic@gmail.com

filters@ndb.vsnl.net.in

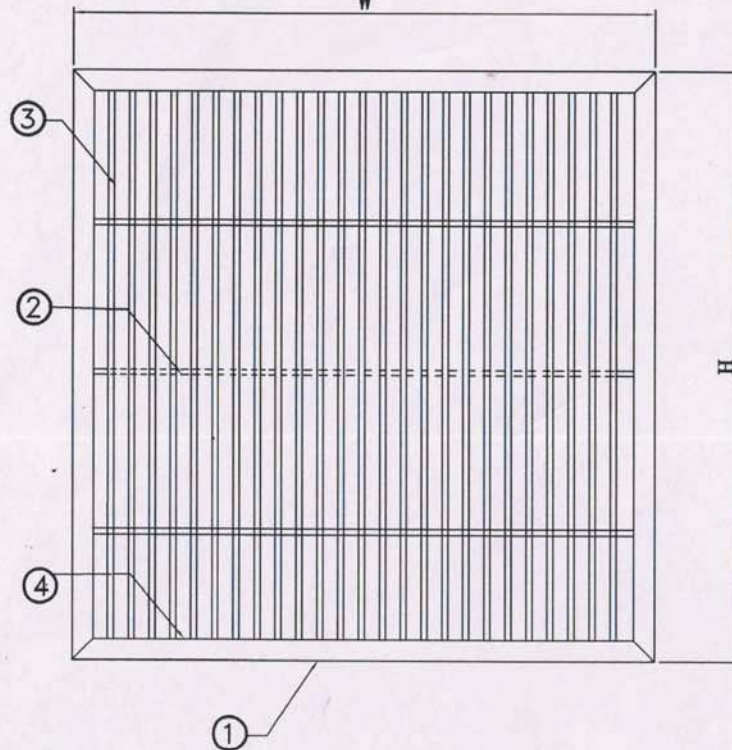
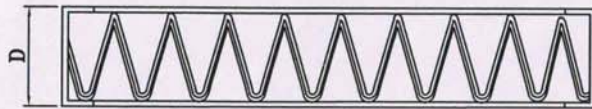
website: www.puromaticfilters.com

CIN: U74899DL1992PTCO48328

APPROVED
Checked and Approved

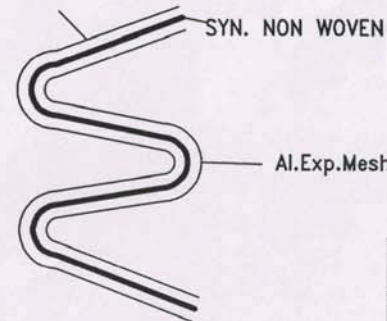
Date: Aug

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



4.	MEDIA SEALING	EPOXY		
3.	FILTER MEDIA	SYN. NONWOVEN	1 Set	
2.	SPACERS	AL. SHEET 20G		
1.	FILTER FRAME	GI SHEET 18G	1 No.	
S.No	ITEM	MATERIAL	QTY.	REMARKS
BILL OF MATERIAL				

HDPE MESH



Filter Media (3)

NOTE:-

FILTER MEDIA : Basic Weight -120 $\pm$ 10 % GSM
Thickness > 4 mm

Sheet Thickness: GI Sheet 18 G (1.25 $\pm$ 0.12mm)

Al Sheet 20 G (0.91 $\pm$ 0.08 mm)

DIMENSIONS

H + 0 / - 3	W + 0 / - 3	D + 2 / - 2	No. of Spacers	No. of Media Pleats ($\pm$ 1)
610	610	50	03	22
610	305	50	03	11



Project: BIFPCL MAITREE KHULNA STPP

Package: Ventilation Systems

Customer:

ITEM: PRE FILTER

TYPE: CASSETTE

ALL DIMENSIONS ARE IN MM.

DRWN. BY MD DATE: 07.12.18

CHKD. BY AM

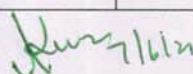
DRG NO. T-1812479A

SHEET 2-4 REV.:01
DATE.: 05.06.2021

PUROMATIC FILTERS PVT.LTD.
12,DSIDC, Scheme-2, Okhla Industrial Area
Phase-2, New Delhi-110020, India
Telefax: +91-11-26388013, 14, 26389158
Email: sales.puromatic@gmail.com
filters@ndb.vsnl.net.in
web: www.puromaticfilters.com

Technical Data Sheet

ITEM	WATER REPELLENT FILTER CASSETTE TYPE	ANNEXURE	Page 3 of 4
CUSTOMER		REF:	
PROJECT	BIFPCL MAITREE KHULNA STPP	DATE	05.06.2021
PACKAGE	VENTILATION SYSTEMS	REV	00/Dt..

S.No.	Description	Specification	
1	Manufacturer	Puromatic Filters Pvt Ltd.	
2	Frame type	Cassette	
3	Frame material	GI sheet 18 G (1.25 ± 0.12 mm)	
4	Spacers	Al sheet 20 G (0.91 ± 0.08 mm)	
5	Filter Media	Multiple layers of HDPE / Nylon mesh supported by Aluminium expanded mesh on air exit side.	
6	Media sealing	Epoxy	
7	Test standard	BS:6540/ASHRAE-52-76/EN779	
8	Face velocity	2.5 m/sec	
9	Initial pressure drop	≤ 5 mm of WC	
10	Final pressure drop	7.5 mm of WC	
11	Average synthetic dust wt. arrestance	65% to 80%	
12	Aesthetics	Clean external surface, No adhesive on frame	
13	Filter cleaning	By compressed air/ water	
14	Inspection & Testing	As per approved QAP	
S.No.	Overall dimensions (mm) (H X W X D)	Rated air flow (CMH)	Remarks
1	610 X 610 X 50	3350	
Prepared By		Approved By 	
			



Puromatic Filters Pvt. Ltd

Telefax: +91-11-26388013,14,26389158

Email: sales.puromatic@gmail.com

filters@ndb.vsnl.net.in

website: www.puromaticfilters.com

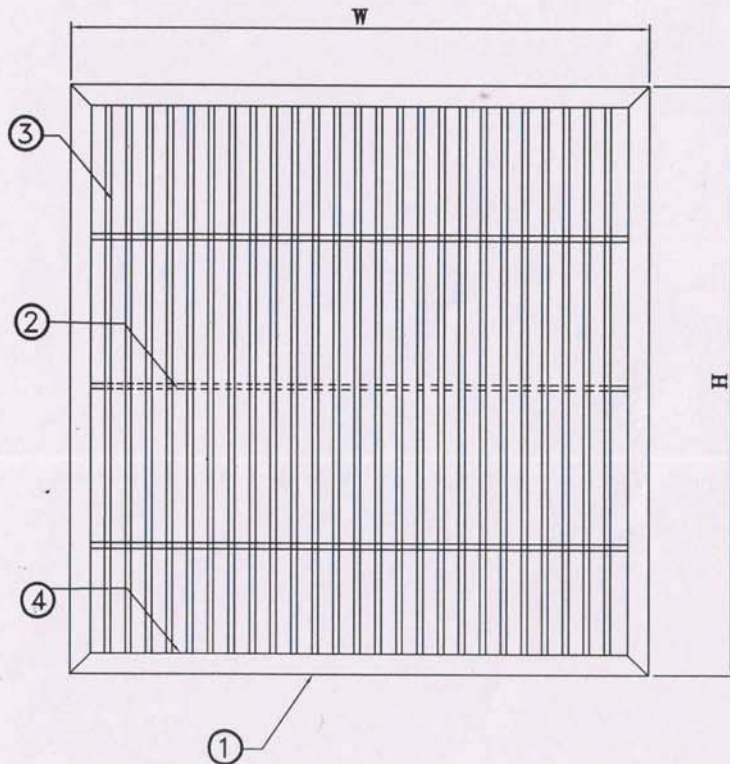
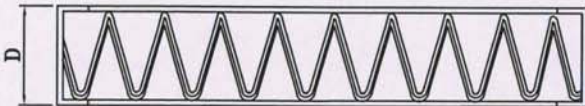
CIN:U74899DL1992PTCO48328



APPROVED
Checked and Approved

Date: Aug

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



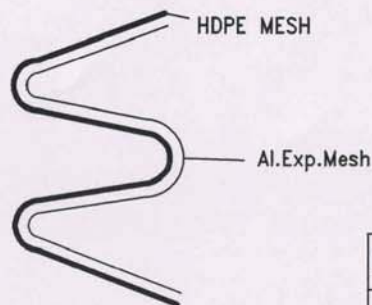
4.	MEDIA SEALING	EPOXY		
3.	FILTER MEDIA	HDPE MESH/ NYLON	1 Set	
2.	SPACERS	AL. SHEET 20G		
1.	FILTER FRAME	GI SHEET 18G	1 No.	
S.No	ITEM	MATERIAL	QTY.	REMARKS

BILL OF MATERIAL

NOTE:-

Sheet Thickness: GI Sheet 18 G (1.25 ± 0.12 mm)

Al Sheet 20 G (0.91 ± 0.08 mm)



Filter Media (3)

DIMENSIONS

H + 0 / - 3	W + 0 / - 3	D + 2 / - 2	No. of Spacers	No. of Media Pleats (± 1)
610	610	50	03	22



Project: BIFPCL MAITREE KHULNA STPP

Package: Ventilation Systems

Customer:

ITEM: WATER REPELLENT
FILTER

TYPE: CASSETTE

ALL DIMENSIONS ARE IN MM.

DRWN. BY MD DATE: 05.06.21

CHKD. BY AM

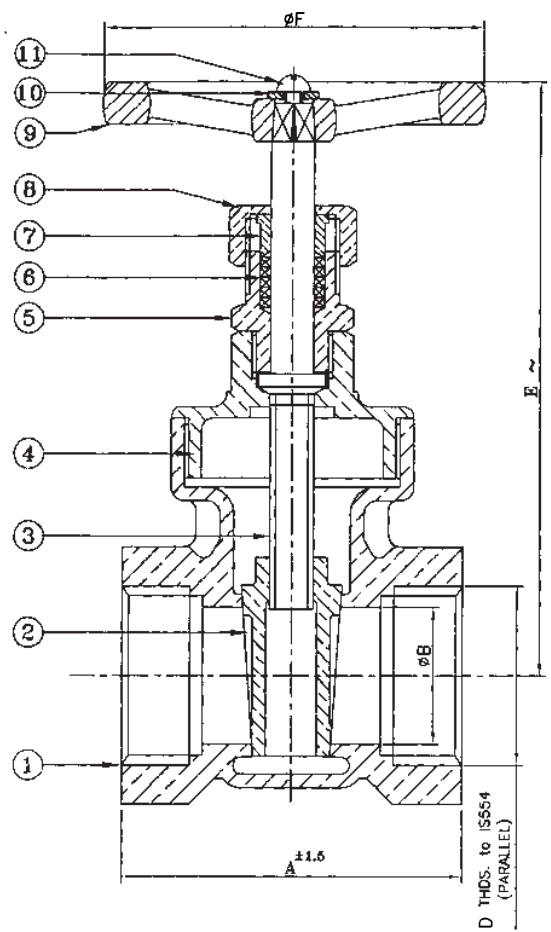
DRG NO. 2106227-GAD-A

SHEET 4-4 REV.:00
DATE:..

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filters@ndb.vsnl.net.in
web:www.puromaticfilters.com

BOQ OF FILTERS FOR 2 X 660 MW MAITREE VENTILATION STPP (M19 / DEL-71.BHEL)				
SR. NO.	DESCRIPTION	QTY. (NOS.)	TYPE	REMARKS
1	AIR PRE-FILTERS 610 X 610 X 50 MM	576	BOX TYPE	FOR 16 NOS. AWU
2	AIR PRE-FILTERS 610 X 305 X 50 MM	96		
3	AIR PRE-FILTERS 610 X 610 X 50 MM	48	BOX TYPE, WATER REPELLANT TYPE	FOR 2 NOS. UAF
4	AIR PRE-FILTERS 610 X 610 X 50 MM	12	BOX TYPE	FOR 6 NOS. SAF 4000 CMH@20 MMWC
5	AIR PRE-FILTERS 610 X 610 X 50 MM	296	BOX TYPE	FOR 74 NOS. SAF 10000 CMH@20 MMWC
6	AIR PRE-FILTERS 610 X 610 X 50 MM	12	BOX TYPE	FOR 3 NOS. SAF 7500 CMH@20 MMWC
7	AIR PRE-FILTERS 610 X 610 X 50 MM	60	BOX TYPE	FOR 15 NOS. SAF 10000 CMH@30 MMWC
8	FINE-FILTERS 610 X 610 X 305 MM	60	FLANGE TYPE	
9	AIR PRE-FILTERS 610 X 610 X 50 MM	56	BOX TYPE	FOR 14 NOS. SAF 7500 CMH@30 MMWC
10	FINE-FILTERS 610 X 610 X 305 MM	56	FLANGE TYPE	
11	AIR PRE-FILTERS 610 X 610 X 50 MM	34	BOX TYPE	FOR 17 NOS. SAF 6000 CMH@30 MMWC
12	FINE-FILTERS 610 X 610 X 305 MM	34	FLANGE TYPE	
13	AIR PRE-FILTERS 610 X 610 X 50 MM	8	BOX TYPE	FOR 4 NOS. SAF 4000 CMH@30 MMWC
14	FINE-FILTERS 610 X 610 X 305 MM	8	FLANGE TYPE	

Data sheet for GM Gate Valve				
Sr. No.	Description	Material		Specification/ Standard
1	Manufacturer	Leader Valves Ltd		
2	Type	Screwed in Bonnet, Integral Seat, Non Rising stem.		
3	Size/Qty.	As per approved P&ID. DOC. NO.:~ MAITREE-00-SAD-FB-111920-PEM		
4	Body	G.M		BSEN 1982 Gr.CC491K
5	Wedge	GM		BSEN 1982 Gr.CC491K
6	Stem	Brass Rod		BS 2874/2874 CZ122
7	Bonnet	GM		BS 1400 LG2/BS2874 CZ122
8	End Connection	Screwed type		
9	Grand	Brass Rod		BS 2874/2874 CZ122
10	Packing	PTFE		
11	Gland Nut	Brass Rod /GM		DIN EN 12165 CW617N
12	Hand Wheel	M.S		
13	Washer	BRASS (15MM To 50 MM)		BS 2874/2874 CZ122
14	Set Screw	BRASS (15MM To 50 MM)		BS 2874/2874 CZ122
15	Inspection & Testing	As per QAP		
16	Working Pressure	1 - 2 Kg/Cm2		
17	Working Liquid	Water		
18	Design or max. working pressure	10 Kg/Cm2		
19	Max. working temp.	60 Deg.C		
20	Leakage test Std.	BS-12266		
21	Painting	AS per technical Specs.		



VALVE SIZE	DIMENSIONAL DATA				
	A	ØB	D	E	ØF
15mm	60	15	1/2"	96	60
25mm	70	25	1"	118	70
40mm	90	40	1 1/2"	147	92
50mm	100	50	2"	164	103

STANDARD MATERIAL COMBINATION				
11	SET SCREW	1	BRASS (15MM TO 50MM)	B.S 2874 CZ122
10	WASHER	1	BRASS (15MM TO 50MM)	B.S 2874 CZ122
9	HAND WHEEL	1	M.S	DIN EN 12165 CW
8	GLAND NUT	1	G.M/ BRASS ROD	DIN EN 617N
7	GLAND	1	BRASS ROD	DIN EN 12165 CW 617 N
6	PACKING	-	PTFE	
5	STUFFING BOX	1	BRASS ROD	DIN EN 12165 CW 617 N
4	BONNET	1	G.M	BS 1400 LG2/BS2874 CZ122
3	STEM	1	BRASS ROD	BS 2874/2874 CZ122
2	WEDGE	1	G.M	BSEN 1982 Gr. CC491K
1	BODY	1	G.M	BSEN 1982 Gr. CC491K
P.NO.	Name of Parts	No.Off	Material	Specification/Standard

All Dimensions in mm
Unless otherwise specified

COPPER ALLOY GATE VALVE.

IN BONNET, INTEGRAL SEAT, NON RISING STEM.
SCREWED FEMALE ENDS

SCALE

Test Pressure:

BODY :- 1.5 MPa g (Hyd)
BACK SEAT & SEAT :- 1.0 MPa g (Hyd)

3

3

3

DRG.No.

941 SDJ-1300D/G

Issue Status 01

SHEET 1 OF 1

TECHNICAL DATA SHEET

CAST IRON GATE VALVE

- | | | |
|---|---|--|
| 1. Manufacturer | - | Bankim & Company. |
| 2. Type of Valve. | - | C.I. Gate Valve, Outside Screwed,
Rising Type Stem. |
| | | |
| 3. <u>Construction Details</u> :- | | |
| a. Bonnet | - | Yoke Type, Bolted. |
| b. Spindle | - | Outside Screwed, Rising Type. |
| c. Wedge | - | Solid. |
| d. Seat | - | Renewable. |
| e. End Connection. | - | Flanged. |
| | | |
| 4. <u>Materials of Construction</u> :- | | |
| a. Body, Bonnet, Wedge, Gland &
Handwheel. | - | Cast Iron to IS-210, FG-260. |
| b. Spindle | - | S.S. to ASTM-A-276, TYPE-410. |
| c. Body Seat Ring | - | S.S. to ASTM-A-351, CF-8 |
| d. Wedge Seat Ring | - | S.S. to ASTM-A-351, CF-8 |
| e. Yoke Bush | - | Gun Metal to IS:318, LTB-2 |
| f. Back Seat Bush | - | S.S. to ASTM-A-351, CF-8 |
| g. Gasket | - | C.A.F. to IS:2712, Gr.C. |
| h. Gland Packing | - | Graphited Asbestos. |
| i. Bolts, Nuts & Studs. | - | Carbon Steel to IS:1367, Cl. 4.6/4.0 |
| | | |
| 5. Flange to Flange distance. | - | As per ANSI B 16.10, Class-125 |
| 6. Flange dimension and drilling | - | As per ANSI-B-16.5, Class-150, Flat Face. |
| 7. Design Code | - | As per IS:14846 |
| 8. Rating of Valve | - | PN-1.0 |
| | | |
| 9. Hydrostatic Test Pressure :- | | |
| a. Body | - | 15 Kg/Cm ² |
| b. Seat & Back Seat | - | 10 Kg/Cm ² |

Note : 1)The Valves will be provided with Back Seat, Indicator & Locking Arrangement.

QTY.	NOMINAL SIZE OF VALVE NB. (MIN)	FACE TO FACE A	FLANGE DIMENSIONS					HEIGHT. 'H' (MAX)		HYD.TEST PRESSURE kg / Cm ²		STEM DIA d ± 1	HAND WHEEL DIA w ± 5
			DIA B	THICK C	P.C.D.	NO. OF HOLES	HOLE DIA D	CLOSED	OPEN	BODY	BACK SEAT & SEAT		
04	100	229±3	229	23.8 ⁺³ ₋₀	190.5	8	19	570	690	15	10	27	320
10	125	254±3	254	23.8 ⁺³ ₋₀	216	8	22.2	625	755	15	10	27	320
16	150	267±3	279.5	25.4 ⁺³ ₋₀	241.3	8	22.2	690	860	15	10	27	320
32	200	292±3	343	28.6 ⁺³ ₋₀	298.4	8	22.2	885	1100	15	10	32	360

ALL DIMENSIONS ARE IN MILLIMETRES

18	INDICATOR PLATE	M.S. GALVANISED	IS : 2062, GRADE - A.
17	INDICATOR RING	GUN METAL	IS:318, LTB-2.
16	BOLTS & NUTS	CARBON STEEL	IS:1367; CL-4,6/4,0
15	GLAND PACKING	GRAPHITED ASBESTOS	
14	GASKET	C.A.F.	IS:2712,GR-C.
13	HEX NUT	MILD STEEL	IS : 2062, GRADE - A.
12	KEY	CARBON STEEL	IS : 2048 - 62
11	YOKE SLEEVE	GUN METAL	IS:318, LTB-2.
10	BACK SEAT BUSH	STAINLESS STEEL	ASTM-A-351, CF- 8
9	WEDGE SEAT RING	STAINLESS STEEL	ASTM-A-351, CF- 8
8	BODY SEAT RING	STAINLESS STEEL	ASTM-A-351, CF- 8
7	STEM	STAINLESS STEEL	ASTM-A-276,TYPE- 410
6	HAND WHEEL	CAST IRON	IS:210,FG-260
5	GLAND	CAST IRON	IS:210,FG-260
4	YOKE (INTEGRAL)	CAST IRON	IS:210,FG-260
3	BONNET	CAST IRON	IS:210,FG-260
2	WEDGE	CAST IRON	IS:210,FG-260
1	BODY	CAST IRON	IS:210,FG-260

REV. NO.	DATE	NAME
1		

PART NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1			

	NAME	DATE
DRAWN	P. DAS	10.05.21.
CHECKED	S. DAS.	10.05.21.
APPROVED	P. K. DAS.	10.05.21.

REVISION TABLE		PART NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1					

TITLE	"BANKIM" CAST IRON GATE VALVE OUTSIDE SCREWED RISING SPINDLE WITH INDICATOR ARRANGEMENT.		
MANUFACTURER:-			
BANKIM & COMPANY			
JOB.NO.			
SCALE - N. T. S.			
REV. 0			

NOTES

1. MANUFACTURING STANDARD : AS PER IS: 14846

2. PRESSURE RATING : PN-1.0

3. FACE TO FACE AS PER : ANSI B 16.10, CLASS - 125

4. FLANGE DIMENSIONS & DRILLING : ANSI-B-16.5, CLASS-150, FLAT FACE.

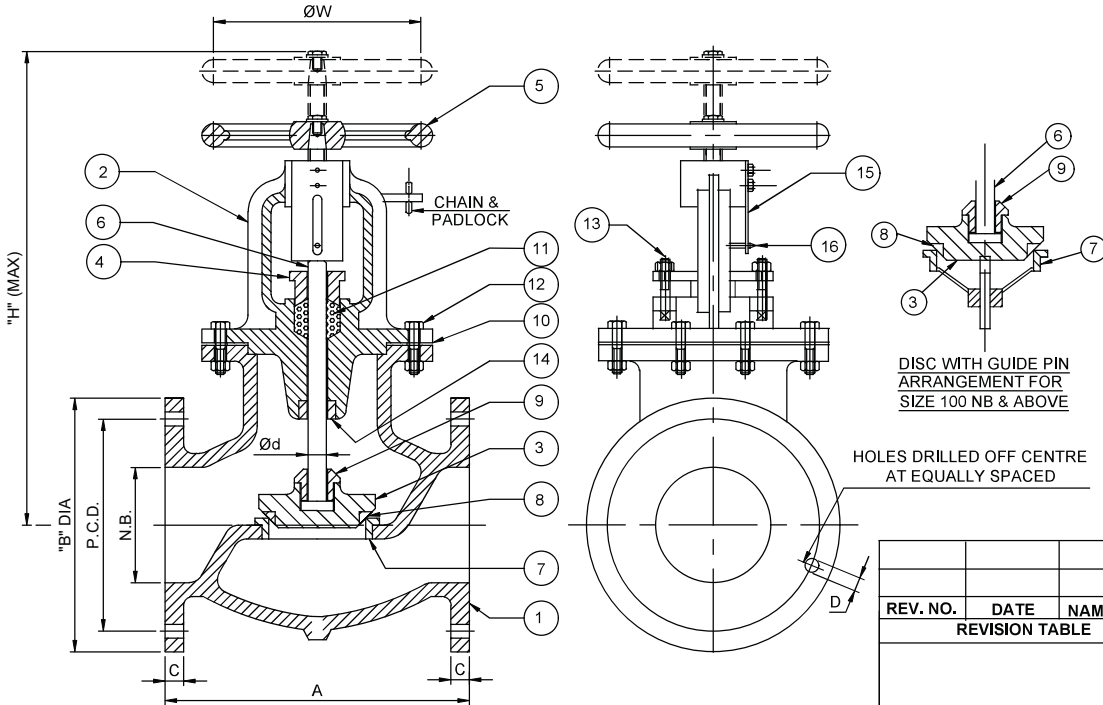
5. THE VALVES WILL BE PROVIDED WITH BACK SEAT, INDICATOR, AND LOCKING ARRANGEMENT.

TECHNICAL DATA SHEET **CAST IRON GLOBE VALVE**

- | | | |
|--|---|---|
| 1. Manufacturer | - | Bankim & Company. |
| 2. Type of Valve. | - | C.I. Globe Valve, Outside Screwed,
Rising Type Stem. |
| 3. <u>Construction Details</u> :- | | |
| f. Bonnet | - | Yoke Type, Bolted. |
| g. Spindle | - | Outside Screwed, Rising Type. |
| h. Disc | - | Solid Renewable Loose Plug Type. |
| i. Seat | - | Renewable. |
| j. End Connection. | - | Flanged. |
| 4. <u>Materials of Construction</u> :- | | |
| j. Body, Bonnet, Disc, Gland &
Handwheel. | - | Cast Iron to IS-210, FG-260. |
| k. Spindle | - | S.S. to ASTM-A-276, TYPE-410. |
| l. Body Seat Ring | - | S.S. to ASTM-A-351, CF-8 |
| m. Disc Seat Ring | - | S.S. to ASTM-A-351, CF-8 |
| n. Disc Nut | - | Gun Metal to IS:318, LTB-2 |
| o. Back Seat Bush | - | S.S. to ASTM-A-351, CF-8 |
| p. Gasket | - | C.A.F. to IS:2712, Gr.C. |
| q. Gland Packing | - | Graphited Asbestos. |
| r. Bolts, Nuts & Studs. | - | Carbon Steel to IS:1367, Cl. 4.6/4.0 |
| 5. Flange to Flange distance. | - | As per ANSI B 16.10, Class-125 |
| 6. Flange dimension and drilling | - | As per ANSI-B-16.5, Class-150, Flat Face. |
| 7. Design Code | - | As per IS:9338 |
| 8. Rating of Valve | - | PN-1.0 |
| 9. Hydrostatic Test Pressure :- | | |
| c. Body | - | 15 Kg/Cm ² |
| d. Seat & Back Seat | - | 10 Kg/Cm ² |

Note : 1)The Valves will be provided with Back Seat, Indicator & Locking Arrangement.

QTY.	NOMINAL SIZE OF VALVE NB. (MIN)	FACE TO FACE A	FLANGE DIMENSIONS					HEIGHT. 'H' (MAX)		HYD.TEST PRESSURE kg / Cm ²		STEM DIA d ±1	HAND WHEEL DIA w ± 5
			DIA B	THICK C	P.C.D.	NO. OF HOLES	HOLE DIA D	CLOSED	OPEN	BODY	BACK SEAT & SEAT		
02	100 MM	292±3	229	23.8 ⁺³ ₀	190.5	8	19	430	455	15	10	24	250
32	200 MM	495±3	343	28.6 ⁺³ ₀	298.4	8	22.2	600	650	15	10	32	400



ALL DIMENSIONS ARE IN MILLIMETRES

NOTES

1. MANUFACTURING STANDARD : AS PER IS: 9338
2. PRESSURE RATING : PN-1.0
3. FACE TO FACE AS PER : ANSI B 16.10, CLASS - 125
4. FLANGE DIMENSIONS & DRILLING : ANSI-B-16.5, CLASS-150, FLAT FACE.
5. THE VALVES WILL BE PROVIDED WITH BACK SEAT, INDICATOR & LOCKING ARRANGEMENT.

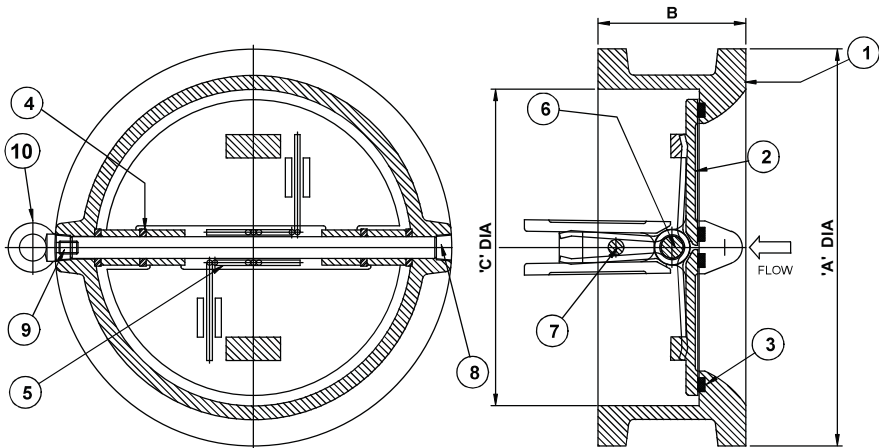
16	INDICATOR PLATE	M.S. (GALVANISED)	IS : 2062 GR. A
15	INDICATOR RING	GUN METAL	IS : 318 ; LTB - 2
14	BACK SEAT BUSH	STAINLESS STEEL	ASTM-A-351, CF- 8
13	GLAND STUS & NUTS	CARBON STEEL	IS:1367, CL-4.6/4.0
12	BONNET BOLTS & NUTS	CARBON STEEL	IS:1367, CL-4.6/4.0
11	GLAND PACKING	GRAPHITED ASBESTOS	-
10	GASKET	C A F	IS : 2712, GR.'C'
9	DISK NUT	GUN METAL	IS : 318 ; LTB - 2
8	DISK FACING RING	STAINLESS STEEL	ASTM-A-351, CF- 8
7	BODY SEAT RING	STAINLESS STEEL	ASTM-A-351, CF- 8
6	STEM	STAINLESS STEEL	ASTM-A-276, TYPE-410
5	HAND WHEEL	CAST IRON	IS : 210 ; FG - 260
4	GLAND	CAST IRON	IS : 210 ; FG - 260
3	DISC	CAST IRON	IS : 210 ; FG - 260
2	BONNET	CAST IRON	IS : 210 ; FG - 260
1	BODY	CAST IRON	IS : 210 ; FG - 260

REV. NO.	DATE	NAME	PT. NO.	DESCRIPTION	MATERIAL	SPECN
REVISION TABLE						
				TITLE		
DRAWN				P. DAS		
CHECKED				S. DAS		
APPROVED				P. K. DAS		
MANUFACTURER:-				MANUFACTURER:-		
JOB.NO.				BANKIM & COMPANY		
SCALE - N. T. S.				REV. 0		

TECHNICAL DATA SHEET
CAST IRON DUAL PLATE, WAFFER TYPE CHECK VALVE

1. Manufacturer - Bankim & Company.
2. Type of Valve. - Cast Iron Dual Plate, Wafer Type Check Valve.
3. Construction Details :-
 - a) End Connection. - Wafer.
4. Materials of Construction :-
 - a) Body - Cast Iron to IS:210, FG-260
 - b) Disc - S. S. to ASTM-A-276, TYPE-304.
 - c) Disc Lug Bearing - P.T.F.E.
 - d) Body Seat (Seal) - Nitrile Rubber.
 - e) Spring - S.S. to AISI-304.
 - f) Hinge Pin - S.S. to AISI-410
 - g) Hinge Pin Retainer - S.S. to AISI-410
 - h) Stop Pin - S.S. to AISI-316
 - i) Stop Pin Retainer - S.S. to AISI-316
 - j) Lifting Eye Bolt - Mild Steel.
5. Flange to Flange distance. - As per Manufacturer's Standard.
6. Design Code - As per API – 594
7. Rating of Valve - Class-125
8. Hydrostatic Test Pressure :-
 - a) Body - 25 Kg/Cm2.
 - b) Seat - 15 Kg/Cm2

QTY.	NOMINAL SIZE OF VALVE NB	A	B	C	HYD. TEST PRESSURE Kg / Cm ²	
		± 1	± 1	± 2	BODY	SEAT
--	100	172	73	114	25	15
--	200	276	127	219	25	15



ALL DIMENSIONS ARE IN MILLIMETRES

NOTES

1. DESIGN STANDARD : AS PER API - 594.
2. PRESSURE RATING : CLASS-125
3. FACE TO FACE AS PER : MANUFACTURER'S STANDARD
4. SUITABLE FOR INSTALLATION : BETWEEN SLIP ON FLANGES DIMENSION AS PER ANSI-B-16.5, CLASS-150
5. VALVE FLOW DIRECTION SHALL BE IMPREGNATED ON THE BODY.

10	LIFTING EYE BOLT	MILD STEEL	
9	STOP PIN RETAINER	STAINLESS STEEL	AISI-316
8	HINGE PIN RETAINER	STAINLESS STEEL	AISI-410
7	STOP PIN	STAINLESS STEEL	AISI-316
6	HINGE PIN	STAINLESS STEEL	AISI-410
5	SPRING	SPRING STEEL / S.S.	AISI-304
4	DISC LUG BEARING	PTFE	

			3	BODY SEAT (SEAL)	NITRILE RUBBER.	
			2	DISC	STAINLESS STEEL	ASTM-A-276,TYPE-304
REV. NO.	DATE	NAME	1	BODY	CAST IRON	IS : 210, FG - 260
REVISION TABLE			PT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

	NAME	DATE
DRAWN	P. DAS.	15.05.21.
CHECKED	S. DAS	15.05.21.
APPROVED	P. K. DAS.	15.05.21.

MANUFACTURER:-
JOB. NO.

SCALE - N. T. S.

TITLE

"BANKIM" CAST IRON DUAL PLATE,
CHECK VALVE, WAFER TYPE

MANUFACTURER:-

BANKIM & COMPANY

REV- 0

Date: 15-Jun-2021

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

Data Sheet for POT TYPE STRAINER

S. NO	DESCRIPTION	PARTICULARS
1.	Item	Pot Strainer
2.	Make	Sant Industrial Controls PVT .LTD
3.	Location/size/quantity	As per approved P&ID. DOC. NO.:- MAITREE-00-SAD-FB-111920-PEM
4.	Maximum permissible Pressure Drop at 50% clogging	0.25 kg/cm ²
5.	Material of Construction	
a	Body	MILD STEEL (ASTM A36)
b	Bonnet	CAST IRON (DIN 1691 (GG25))
c	Body/Bonnet Bolts	A – 307 Gr B
d	Basket (Filter Screen)	SS-304 Filter Screen of 3 mm perforation X 24G thickness
e	Body Cover Gasket	Black Rubber Gasket
f	Drain Plug	Stainless Steel-410
g	End Connection	Flanged
6	Working Pressure of Body	3 kg/cm ²
7.	Hydrostatic Test Pressure of Body	15 kg/cm ²
8.	Dimensions	As per our standard drawing
9.	Painting	As per specification
10.	Inspection & Testing	As Per COC

POT STRAINER

Pot-11

Series : SI/PN-10. Mild Steel Body.
Flanged End Connection.

TESTING OF POT STRAINER AS PER

BS - 6755 : PART-1

Hydro Testing Only

SHELL

150 PSIG

10 BAR

- STRAINER SHALL BE TESTED HYDROSTATICALLY UPTO 150 PSIG.
- PRESSURE CLASSIFICATION SHALL BE AS PER PN-10 RATING.
-

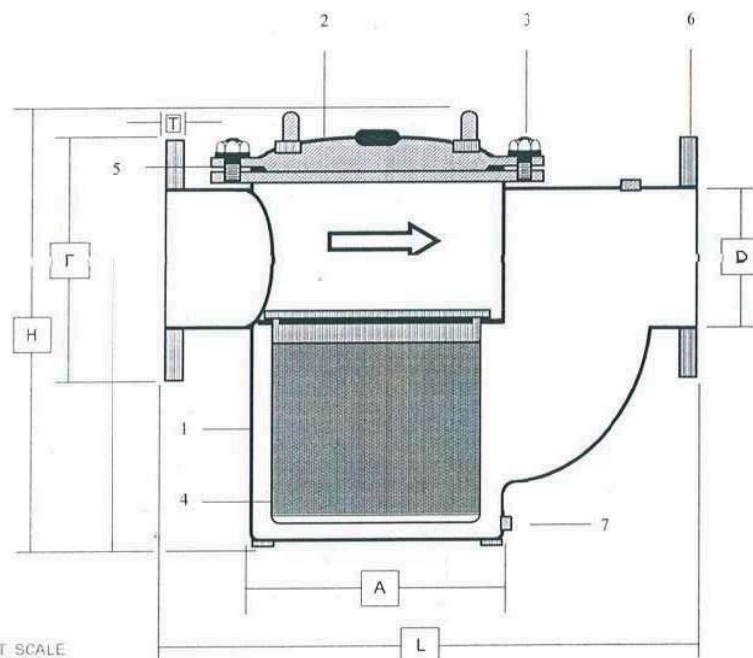
TECHNICAL SPECIFICATIONS

NOMINAL SIZE	DN	L	H	F	B	A	T	No of Holes (Side Flanges)
200	MM	635	660	330	200	-- --	18	8 No's
250	MM	762	812	406	250	-- --	20	8 No's

Dimensional Tolerance : $\pm 5-10$ mm

MATERIAL SPECIFICATIONS

1	BODY	: Heavy Duty Mild Steel.
2	BONNET	: Cast Iron.
3	PAINT FINISH.	: Synthetic Enamel - D.A. GREY SHADE.
4	BODY / BONNET BOLTS	: A 307 Gr B.
5	BASKET (Screen)	: SS-304 Perforated Filter Screen of 3mm Perforation X 24G Thickness .
6	BODY / BONNET GASKET	: Black Rubber Gasket.
7	SIDE FLANGES.	: Dimensions & Drilling As per BS.10, Table :E. Specifications.
8	DRAIN PLUG	: SS - 410.
9	TEST PRESSURE.	: 10 Kg/cm ² PN-10 RATING



DO NOT SCALE
THE DRAWING



Pot Strainer



SANT INDUSTRIAL CONTROLS PVT. LTD.

Engineers Manufacturers & Traders

Block 'A'-94/1 Sudershan Park, Moti Nagar, New Delhi - 110 015, India.
Phone : 91-11-25419419, 91-11-25448444, E-mail :info@sant.co.in.

DATE :

Drg. No : SI/PN-16

Pot Strainer

Series : SI/PN-10

POT STRAINER

Pot-11B

Series : SI/PN-10 / 125 & 250 mm NB
M.S. Fabricated. Flanged End Connection.

TESTING OF POT STRAINER AS PER

BS - 6755 : PART-1

Hydro Testing Only

SHELL

150 PSIG

- STRAINER SHALL BE TESTED HYDROSTATICALLY UPTO 150 PSIG.
- PRESSURE CLASSIFICATION SHALL BE AS PER **PN-10 RATING**.
-
-

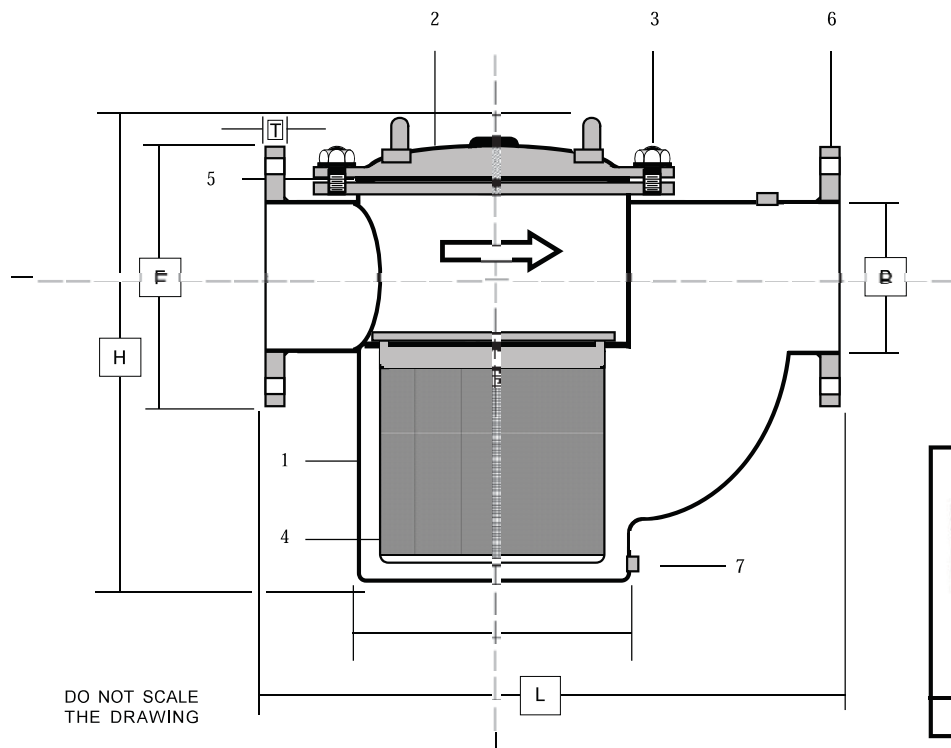
TECHNICAL SPECIFICATIONS

NOMINAL SIZE	DN	L	H	F	B	T
125	MM	482	495	245	125	12
250	MM	762	812	400	250	17

Dimensional Error $\pm$ 5-7mm

MATERIAL SPECIFICATIONS

1	BODY & FLANGES	: Heavy Duty Mild Steel.
2	BONNET	: Cast Iron
3	BODY / BONNET BOLTS	: A 307 Gr B.
4	BASKET (Screen)	: Stainless Steel-304 Screen of 3mm Perforation X 24 G Thickness .
5	BODY / BONNET GASKET	: Black Rubber Gasket.
6	SIDE FLANGES.	: As Per BS-10 TABLE : D Specifications.
7	DRAIN PLUG	: SS - 410.
8	TEST PRESSURE.	: 10 Kg/cm ² PN-10 RATING



DO NOT SCALE
THE DRAWING



Pot Strainer



SANT INDUSTRIAL CONTROLS PVT. LTD.

Engineers Manufacturers & Traders

Block 'A'-94/1 Sudershan Park, Moti Nagar, New Delhi - 110 015, India.
Phone : 91-11-25419419, Fax : 91-11-25448444, E-mail : info@sant.co.in.

DATE : 27-09-2014.

Drg. No : SI/PN-10

Pot Strainer

Series : SI/PN-10

Approval doesn't absolve the contractor of its responsibility as specified in the Contract.
Date: 15-Jun-2014
FOR INFORMATION ONLY

Date: 15-Jun-2021

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract

Valves and instruments schedule for 16 air washers

S.No.	Item	Diameter (in mm)		
		50	150	200
1	Gate Valve	112	16	32
2	Globe Valve		32	
3	Pot strainer			32
4	Non-return valve		32	
5	Air flow switch	32		
6	Pressure switch	32		
7	Low Level switch	16		
8	High level switch	16		
9	limit switch	16		
10	pressure gauge	64		
11	DPG	32 Nos.		

Valves and instruments schedule for 2 UAFs

S.No.	Item	Diameter (in mm)		
		50	100	125
1	Gate Valve	10	4	10
2	Globe Valve		2	
3	Pot strainer			2
4	Non-return valve		4	
5	Air flow switch	8		
6	Pressure switch	4		
7	Level switch	2		
8	DP Gauge	2		
9	pressure gauge	6		

Datasheet of Air Distribution Items		
Sr. No.	Description	Data
A	Supply Air Grille	
1	Grille Casing	MS
2	Louvers Blade	MS
3	Type	Double Louver double deflection with collar damper
4	Damper	MS / GI
5	Operated	Front key operated
6	Finish	Powder Coated
7	Make	Air flow / TSC / Air Master / Caryaire / Ravistar (Systemair)
8	Quantity / size	As per approved layout
B	Return Air Grille	
1	Grille Casing	MS
2	Louvers Blade	MS
3	Type	Single Louver without damper
4	Finish	Powder Coated
5	Make	Air flow / TSC / Air Master / Caryaire / Ravistar (Systemair)
6	Quantity/ Size	As per approved layout
C	Pressure relief damper	
1	Frame	20G GI
2	Louvers Blade	22G AI
3	Type	Exhaust Gravity operated backdraft dampers
4	Make	Main contractor approved resources
5	Quantity/ size	As per approved layout

Sr. No.	Description	Data
D	Fan outlet damper	
1	Frame	GI 14G
2	Louvers Blade	GI 16G
3	Type	Motorized Fan Outlet damper
4	Damper Make	Air flow / TSC / Air Master / Caryaie / Ravistar (Systemair)
5	Actuator Make	Belimo
6	Quantity/ size	As per approved layout
E	Volume control damper	
1	Frame	GI 16G
2	Louvers Blade	GI 18G
3	Type	Manual Volume Control damper
4	Damper Make	Air flow / TSC / Air Master / Caryaie / Ravistar (Systemair)
5	Quantity/ size	As per approved layout
F	Fresh air intake louver	
1	Frame	GI 18G
2	Louvers Blade	GI 20G
4	Louver Make	Main contractor approved resources
5	Quantity/ size	As per approved layout

Date: 15-Jun-2021

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TECHNICAL DATA SHEET FOR FLOAT VALVE		
Sr. No.	Description	Float Valves
1	Manufacturer	DRP
2	Size	50 mm
3	Quantity	18 Nos.
4	Material of Construction	
a)	Body	Brass
b)	Piston	Brass
c)	Rod	Forged Brass
d)	Rubber Washer	Nitril Rubber
e)	Nut	Brass
5	Hydrostatic test Pressure	
a)	Body	24 kg/cm ²
b)	Seat	16 kg/cm ²
6	Dimension	As per GA Drawing enclosed
7	Inspection	It is inspection Cat-III. As per approved Item Categorisation List. Maitree - 00-SAD-BA-111901-REM

Date: 15-Jun-2021

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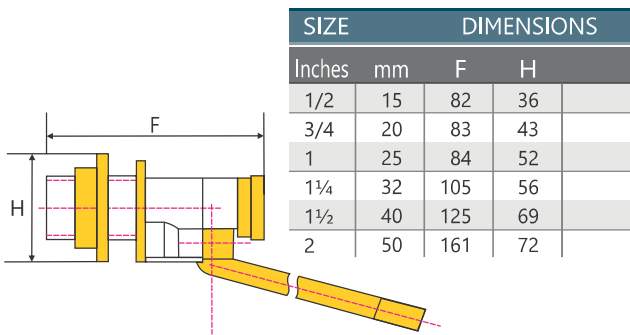
BRASS FLOAT VALVE
Full Flow (Screwed)

Item Code **BFV**

FEATURES : Screwed male ends to BSP
Full bore design, with Nitrile rubber seat



Specially Designed For:



MATERIALS		
Name of Part	Material	Specification
Body	Brass	IS : 1264 Gr. DCB 2
Piston	Brass	IS : 1264 Gr. DCB 2
Rod	Forged Brass	IS : 6912 Gr. FLB
Rubber Washer	Nitrile Rubber	IS : 5192-1
Check Nut	Brass	IS : 1264 Gr. DCB 2
Lever	Brass	IS : 1264 Gr. DCB 2
Nut	Forged Brass	IS : 6912 Gr. FLB



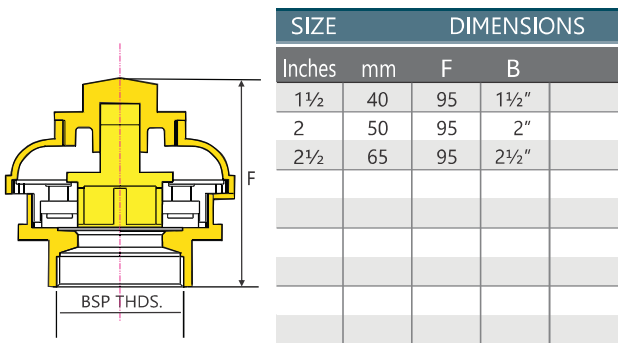
BRONZE TERRACE VALVE
(Screwed)

Item Code **TC**

FEATURES : Screwed female ends (BSP) to IS:554-1985,
with light spring and alluminium disc, Specially design to
exhaust the gas of petrol tanks, Working temp. from 10° C
to 200°C.



Specially Designed For:



MATERIALS		
Name of Part	Material	Specification
Body	Bronze	IS : 318 Gr. LTB 2
Cap	Bronze	IS : 318 Gr. LTB 2
Disc	Alluminium Alloy	BS EN 10154
Spring	Spring Steel	EN 47 Gr. B

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Date Sep

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LOCAL CONTROL PANEL
DRAWING OF VENTILATION SYSTEM

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE	COVER SHEET			
		ITEM	VENTILATION LOCAL CONTROL PANEL VENTILATION UNIT -1			
		SCALE : N.T.S.	REV. 00			SHEET : 1 OF 1

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Date Sep

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contractor of responsibility as
specified in the Contract

HVAC SYSTEM LCP (RELAY CONTROL PANEL) INDEX

MPH BUILDING

SNO	SYSTEM	PANEL	PANEL QTY	PANEL LOCATION	INCOMING POWER	DRIVE DETAILS	DRIVE QTY	VTG
1	UNIT-1 VENTILATION	LCP-1	1	EL.24.5M BC BAY AIR WAHER ROOM	230 VAC	FIRE DAMPER	12	230 VAC
						VCD	8	230 VAC
2	UNIT-1 VENTILATION	LCP-2	1	EL.17.0M A-ROW SIDE AIR WASHER	230 VAC	FIRE DAMPER	3	230 VAC
						VCD	4	230 VAC
3	UNIT-1 VENTILATION	LCP-3	1	EL.17.0M A ROW	230 VAC	FIRE DAMPER	3	230 VAC
						VCD	2	230 VAC
4	UNIT-1 VENTILATION	LCP-4	1	EL.8.5M A ROW	230 VAC	FIRE DAMPER	2	230 VAC
						VCD	2	230 VAC
5	UNIT-2 VENTILATION	LCP-5	1	EL.24.5M BC BAY AIR WASHER ROOM	230 VAC	FIRE DAMPER	12	230 VAC
						VCD	8	230 VAC
6	UNIT-2 VENTILATION	LCP-6	1	EL.17.0M A ROW	230 VAC	FIRE DAMPER	3	230 VAC
						VCD	4	230 VAC
7	UNIT-2 VENTILATION	LCP-7	1	EL.17.0M A ROW	230 VAC	FIRE DAMPER	3	230 VAC
						VCD	2	230 VAC
8	UNIT-2 VENTILATION	LCP-8	1	EL.8.5M A ROW	230 VAC	FIRE DAMPER	2	230 VAC
						VCD	2	230 VAC

ESP-1 BUILDING

SNO	SYSTEM	PANEL	PANEL QTY	PANEL LOCATION	INCOMING POWER	DRIVE DETAILS	DRIVE QTY	VTG
9	VENTILATION	LCP-9	1	ESP1 BUILDING, EL(+) 8.4 M	230 VAC	FIRE DAMPER	3	230 VAC
						VCD	2	230 VAC

ESP-2 BUILDING

SNO	SYSTEM	PANEL	PANEL QTY	PANEL LOCATION	INCOMING POWER	DRIVE DETAILS	DRIVE QTY	VTG
10	VENTILATION	LCP-10	1	ESP2 BUILDING, EL(+) 8.4 M	230 VAC	FIRE DAMPER	3	230 VAC
						VCD	2	230 VAC

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		01	02	03	04	05	06	07	08
Resolve the EPC possibility as tract									
A	LOCAL CONTROL PANEL-01 EL.24.0M UNIT-1 BC BAY AIR WASHER ROOM								A
B									B
C									C
D									D
CUSTOMER BIFPCL		DOC.NO.-Maitree-00-SAD-DA-111939-PEM							
PROJECT 2X660MW MAITREEE STPP									
CONTRACTOR BHEL		TITLE COVER SHEET							
		ITEM VENTILATION LOCAL CONTROL PANEL VENTILATION UNIT –1		SCALE : N.T.S.		REV. 00			SHEET : 1 OF 1

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Date Sep

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Date Sep

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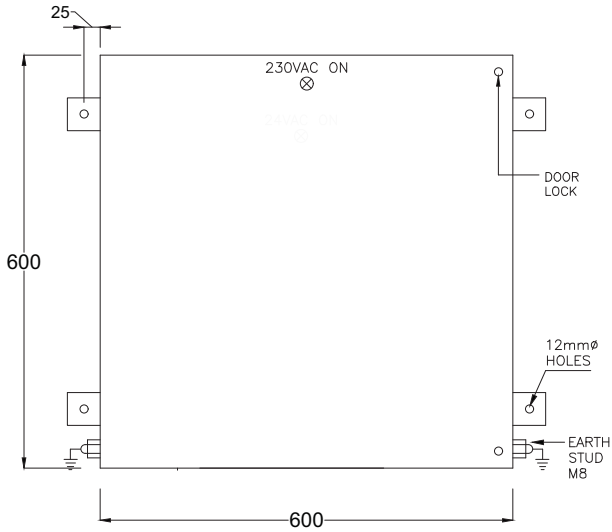
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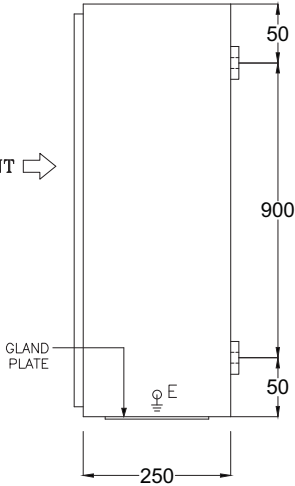
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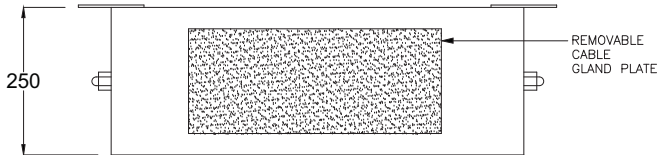


FRONT VIEW

FRONT →



SIDE VIEW



BOTTOM VIEW

S.No.	NOTES
1.	QTY. : 1 No.
2.	WALL MOUNTING TYPE
3.	CABLE ENTRY : BOTTOM

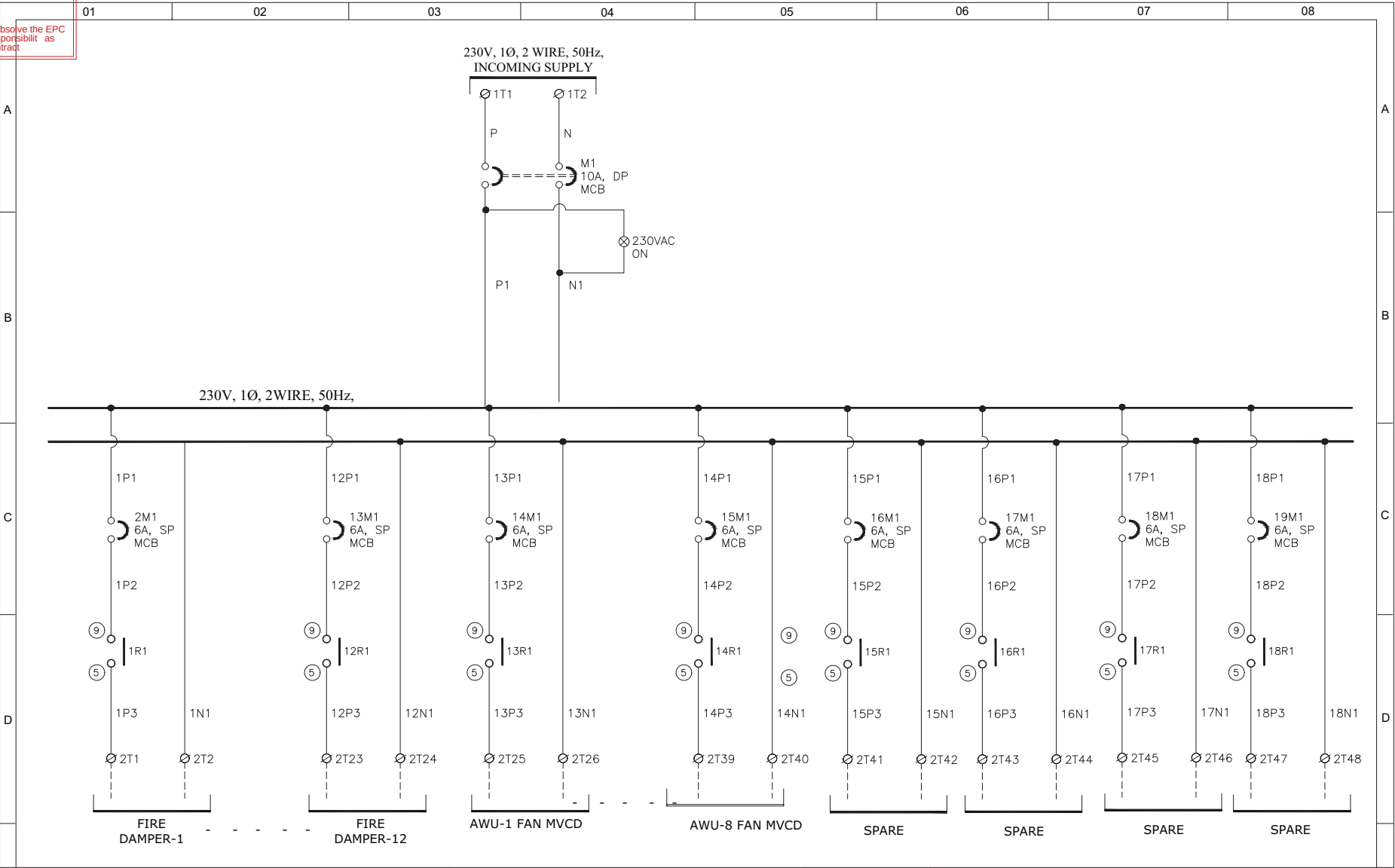
****PANEL DIMENSION IS TENTATIVE . IT MAY VARY DURING MANUFACTURING**

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREE STPP					
CONTRACTOR	BHEL	TITLE	GA DRAWING			
CONSULTANT		ITEM	LOCAL CONTROL PANEL-1 (EL 24.0M MPH)UNIT-1			
			SCALE : N.T.S.	REV. 00		SHEET : 2 OF 13

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Date Sep

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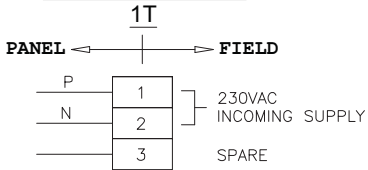
CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	SCHEMATIC DIAGRAM				
CONSULTANT		ITEM	LOCAL CONTROL PANEL-1 (EL 24.0M MPH)UNIT-1				
				SCALE : N.T.S.	REV. 00		SHEET : 3 OF 13

FIO
FOR INFORMATION ONLY

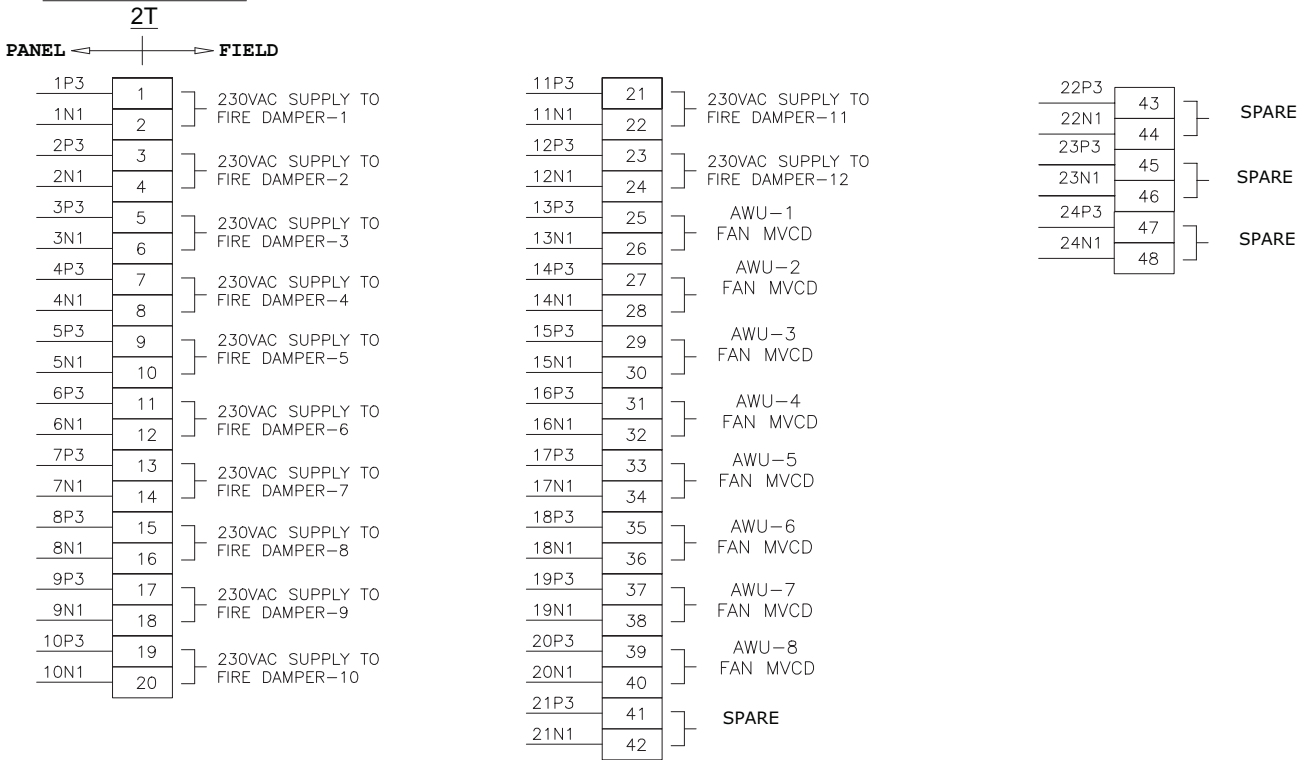
Date Sep

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TERMINAL DETAIL



TERMINAL DETAIL

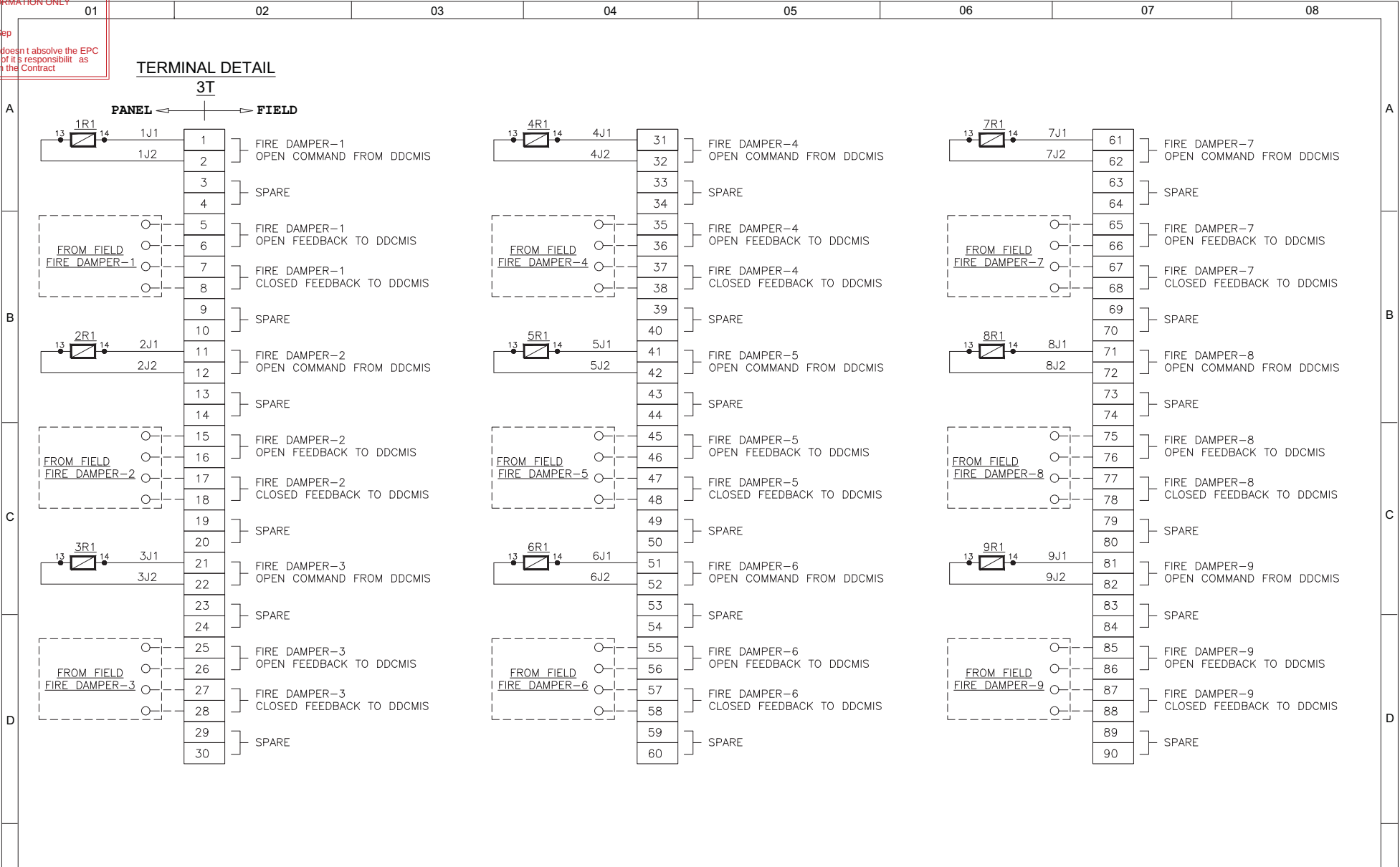


CUSTOMER	BHPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE	TB DETAILS			
CONSULTANT		ITEM	LOCAL CONTROL PANEL-1 (EL 24.0M, MPH)			
		SCALE : N.T.S.	REV. 00			SHEET : 5 OF 13

FIO
FOR INFORMATION ONLY

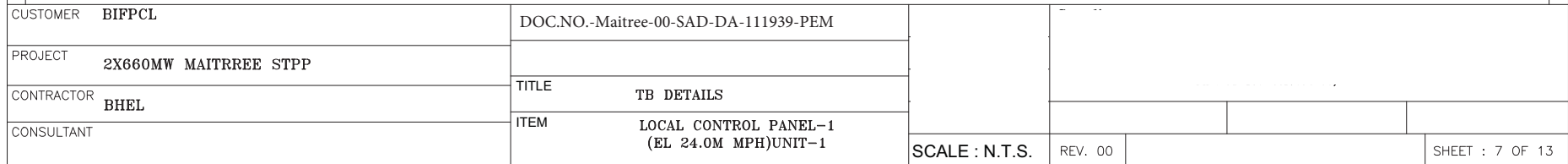
Date Sep

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CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	TB DETAILS		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-1 (EL 24.0M MPH)UNIT-1	1	
		SCALE : N.T.S.		REV. 00	SHEET : 6 OF 13

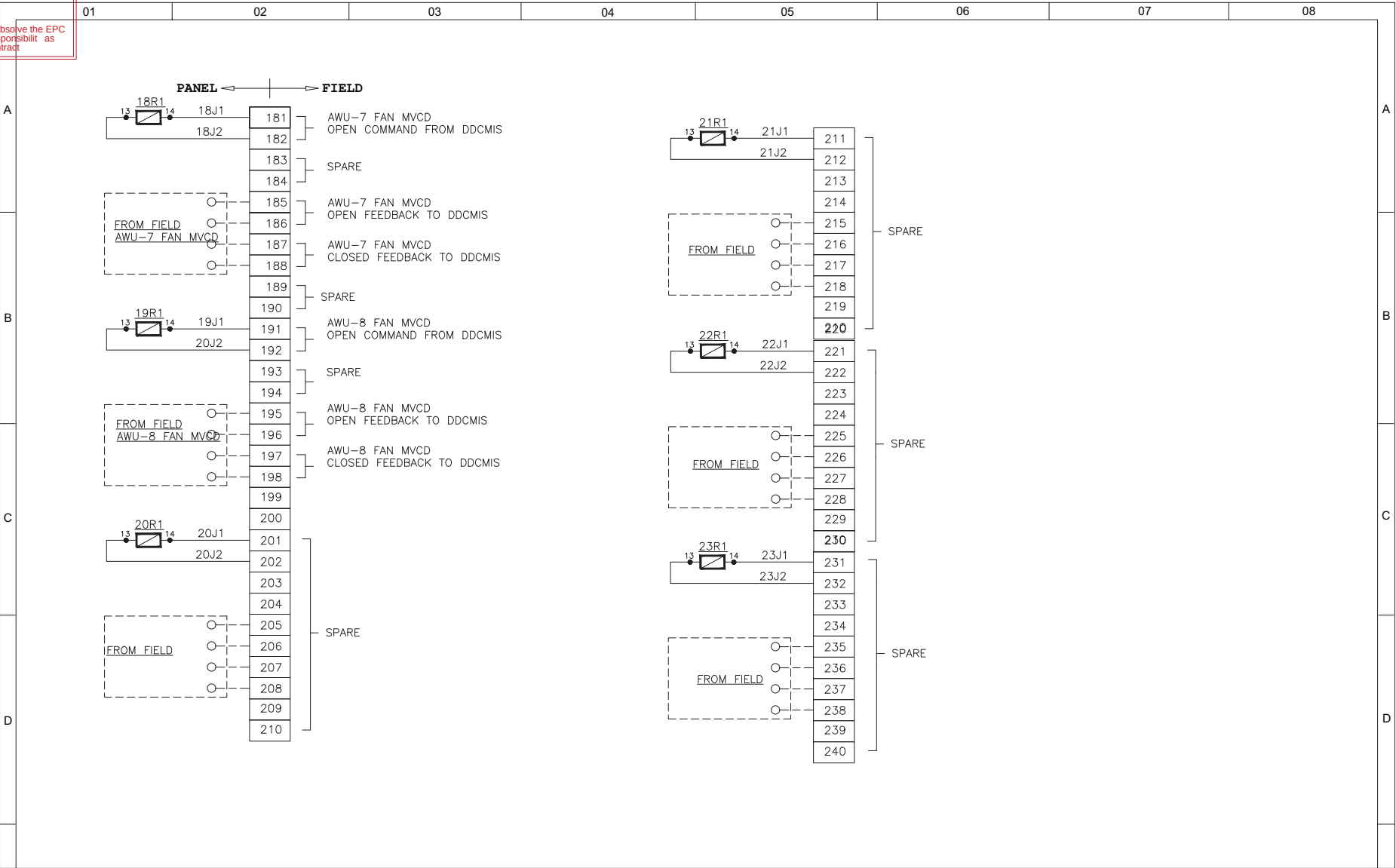
Approval doesn't absolve the EPC contractor of its responsibilities as specified in the Contract



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CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	TB DETAILS		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-1 (EL, 24.0M MPH)UNIT-1	SCALE : N.T.S.	REV. 00
					SHEET : 7 OF 13

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VENTILATION
LOCAL CONTROL
PANEL-02
EL.17.0M A ROW

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE	COVER SHEET			
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-02 EL.17.0M A ROW	SCALE : N.T.S.	REV. 00	SHEET : 1 OF 5

FIO
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Date Sep

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GENERAL NOTES

:

(1) ALL DIMENSION ARE IN MM.

(2) PANEL IS FIXED TYPE WALL MOUNTED INDOOR SINGLE FRONT NON-COMPARTMENTALIZED

(3) SYSTEM VOLTAGE 230VAC 1Ph 2WIRE.

(4) FABRICATION DETAIL

LOAD BEARING MEMBERS : 2.0MM CRCA

NON-LOAD BEARING MEMBERS : 1.6MM CRCA

DOOR & COVERS : 1.6 MM CRCA

GLAND PLATE : 3.0MM CRCA

(5) GASKET SHALL BE PROVIDED ON ALL OPENING AND JOINTS

(6) PAINT SHADE : RAL 7035.

(7) THE DEGREE OF PROTECTION OF PANEL WILL BE IP-54.

(8) PVC INSULATED COPPER FLEXIBLE WIRE SHALL BE USED FOR POWER & CONTROL WIRING.

(9) LOCATION : AS PER LCP SHEDULE.

(10) CABLE ENTRY : BOTTOM

(11) FIRE DAMPER JUNCTION BOX SHALL BE PROVIDED AS LOOSE ITEM ALONG WITH SUFFICIENT SPARES.

(12) 20% SPARE CONTROL TERMINALS SHALL BE PROVIDED.

(13) ANCHOR/FASTENER FOR LCP MOUNTING SHALL BE PROVIDED A LOOSE ITEM.

WIRING

(i) DC CIRCUIT - 1.5sqmm CU. WIRE BROWN (+), GREY (-)

(ii) AC CIRCUIT - 1.5sqmm CU. WIRE (RED & BLACK COLOUR)

(iii) ALL DOORS SHALL BE EARTHED WITH 2.5sqmm GREEN CU. WIRE.

CUSTOMER

BIFPCL

PROJECT

2X660MW MAITREEE STPP

CONTRACTOR

BHEL

DOC.NO.-Maitree-00-SAD-DA-111939-DEM

DRN : RAHUL

CHKD : RAHUL

TITLE

GA NOTES

ITEM

VENTILATION LOCAL CONTROL
PANEL-02 EL.17.0M A ROW

SCALE : N.T.S.

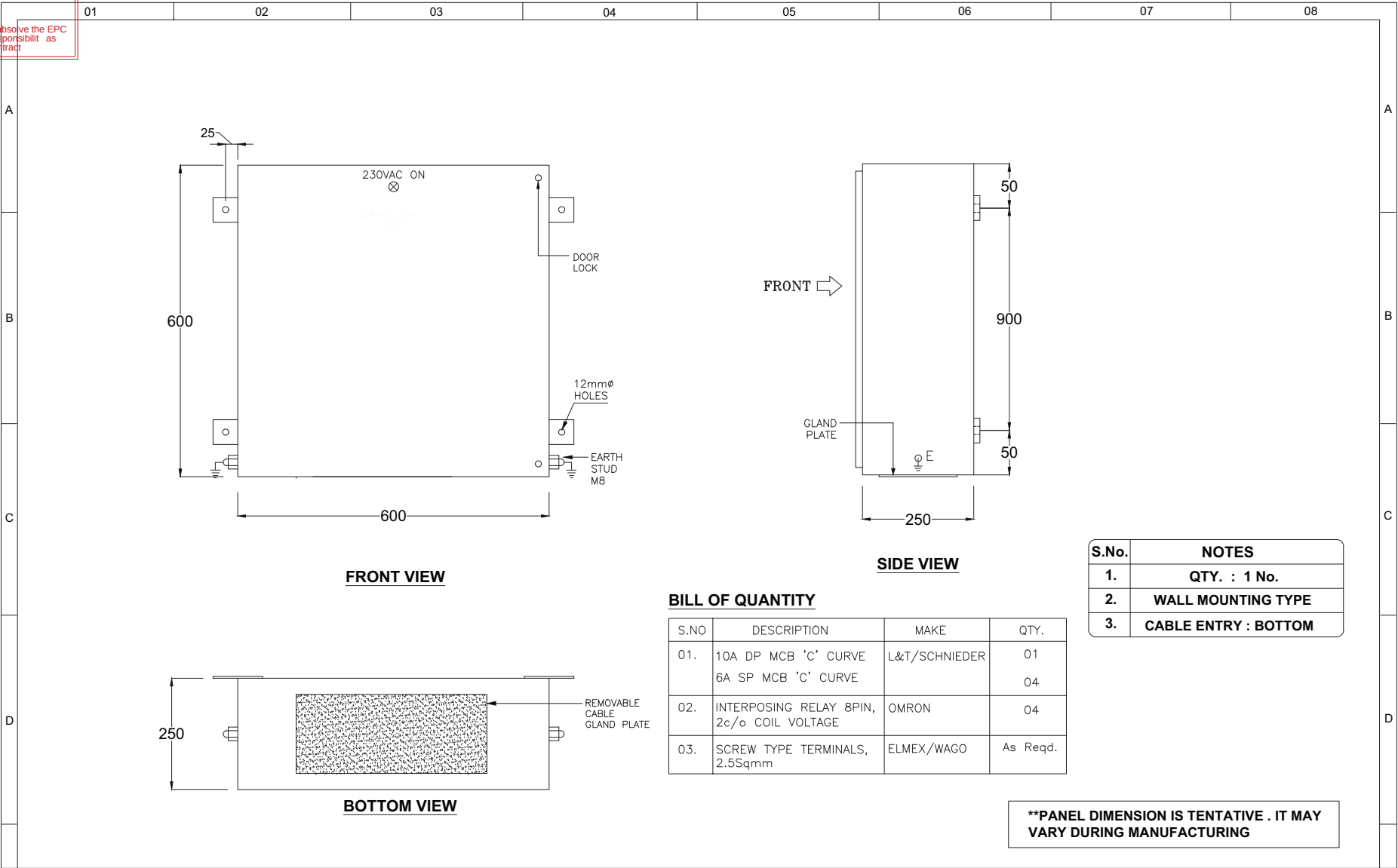
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SHEET : 2 OF 5

FIO
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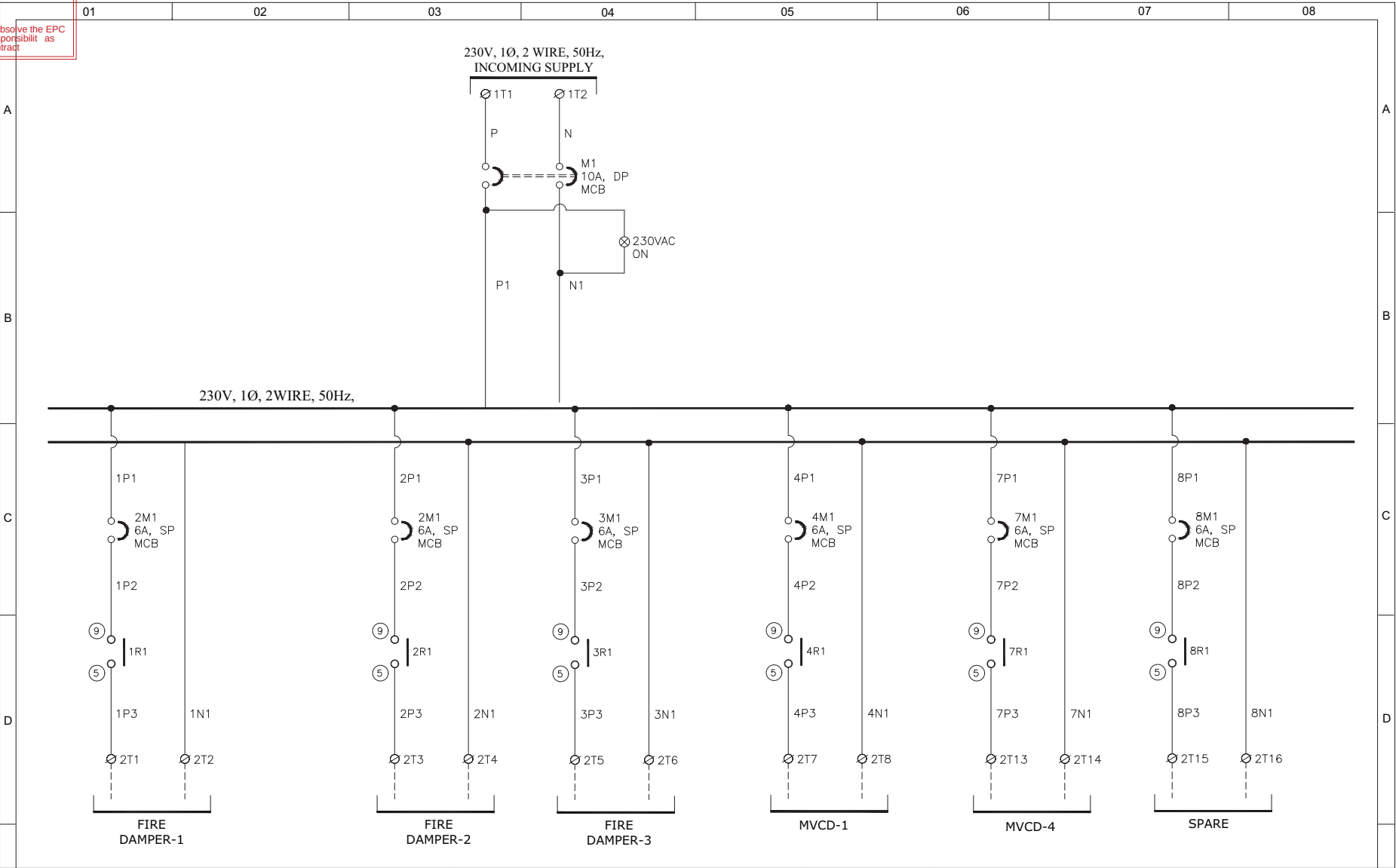


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-11939-DEM				
PROJECT	2X660MW MAITREE STPP	CHKD : RAHUL				
CONTRACTOR	BHEL	TITLE	GA DRAWING			
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-02 EL.17.0M A ROW			
		SCALE : N.T.S.	REV. 00			SHEET : 3 OF 5

FIO
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Date Sep

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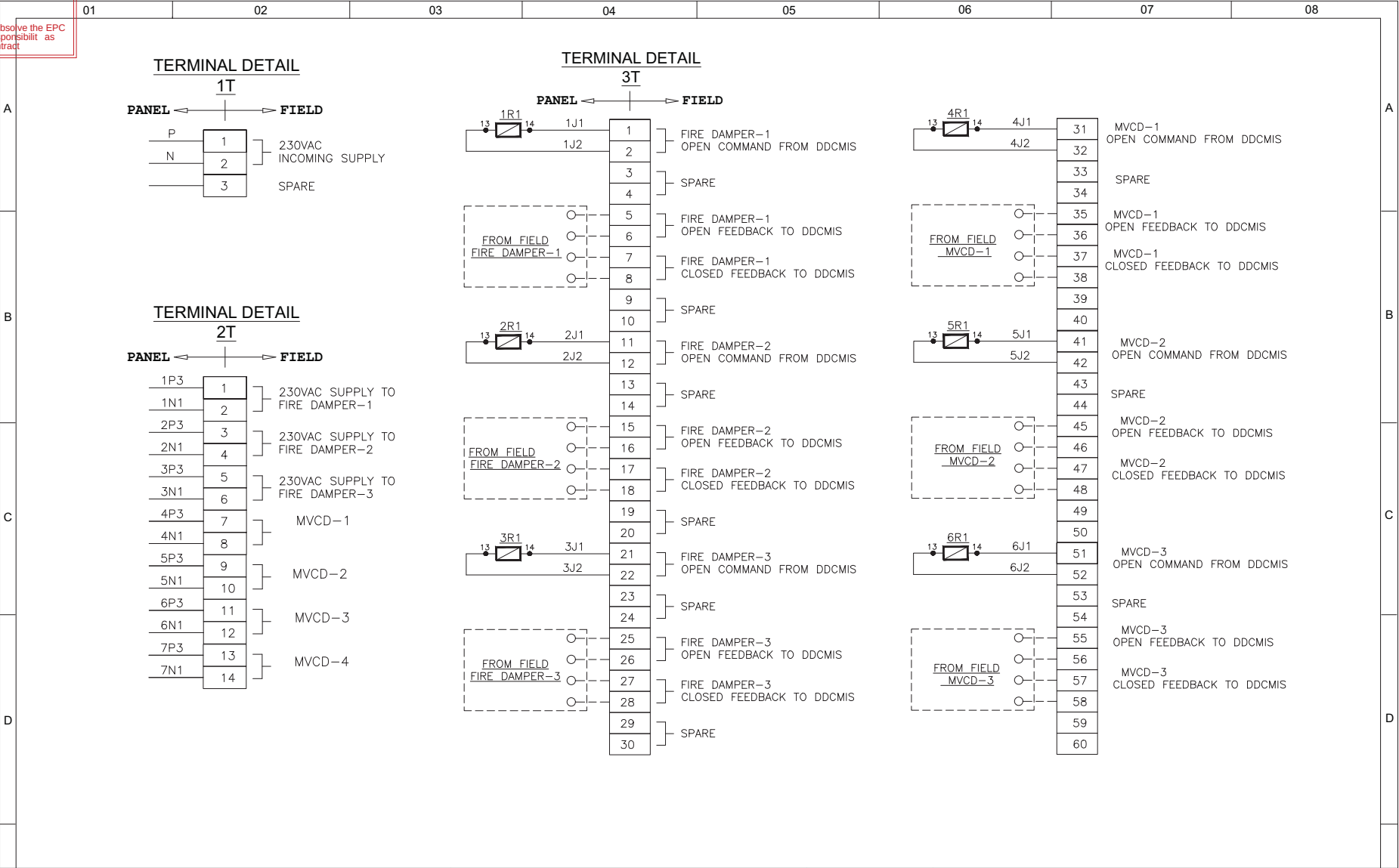


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	SCHEMATIC DIAGRAM				
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-02 EL.17.0M A ROW				
				SCALE : N.T.S.	REV. 00		SHEET : 4 OF 5

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CUSTOMER	-BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	TB DETAILS				
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-02 EL.17.0M A ROW	1			
		SCALE : N.T.S.	REV. 00				SHEET : 5 OF 5

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Date Sep

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specified in the Contract

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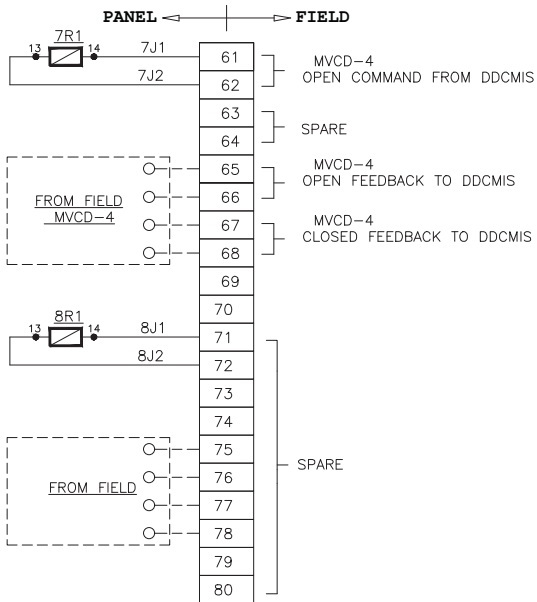
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CUSTOMER **-BIFPCL**

DOC.NO.-Maitree-00-SAD-DA-111939-PEM

PROJECT **2X660MW MAITREE STPP**

CONTRACTOR **BHEL**

TITLE **TB DETAILS**

CONSULTANT

ITEM **VENTILATION LOCAL CONTROL
PANEL-02 EL.17.0M A ROW**

SCALE : N.T.S.

REV. 00

SHEET : 5 OF 5

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FOR INFORMATION ONLY

Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

01	02	03	04	05	06	07	08
A	VENTILATION LOCAL CONTROL PANEL -03 EL.17.0M A ROW						A
B							B
C							C
D							D

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE COVER SHEET					
CONSULTANT		ITEM VENTILATION LOCAL CONTROL PANEL-03 EL.17.0M A ROW	SCALE : N.T.S.	REV. 00			SHEET : 1 OF 5

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Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

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GENERAL NOTES

:

(1) ALL DIMENSION ARE IN MM.

(2) PANEL IS FIXED TYPE WALL MOUNTED INDOOR SINGLE FRONT NON-COMPARTMENTALIZED

(3) SYSTEM VOLTAGE 230VAC 1Ph 2WIRE.

(4) FABRICATION DETAIL

LOAD BEARING MEMBERS : 2.0MM CRCA

NON-LOAD BEARING MEMBERS : 1.6MM CRCA

DOOR & COVERS : 1.6 MM CRCA

GLAND PLATE : 3.0MM CRCA

(5) GASKET SHALL BE PROVIDED ON ALL OPENING AND JOINTS

(6) PAINT SHADE : RAL 7035.

(7) THE DEGREE OF PROTECTION OF PANEL WILL BE IP-54.

(8) PVC INSULATED COPPER FLEXIBLE WIRE SHALL BE USED FOR POWER & CONTROL WIRING.

(9) LOCATION : AS PER LCP SHEDULE.

(10) CABLE ENTRY : BOTTOM

(11) FIRE DAMPER JUNCTION BOX SHALL BE PROVIDED AS LOOSE ITEM ALONG WITH SUFFICIENT SPARES.

(12) 20% SPARE CONTROL TERMINALS SHALL BE PROVIDED.

(13) ANCHOR/FASTENER FOR LCP MOUNTING SHALL BE PROVIDED A LOOSE ITEM.

WIRING

(i) DC CIRCUIT - 1.5sqmm CU. WIRE BROWN (+), GREY (-)

(ii) AC CIRCUIT - 1.5sqmm CU. WIRE (RED & BLACK COLOUR)

(iii) ALL DOORS SHALL BE EARTHED WITH 2.5sqmm GREEN CU. WIRE.

CUSTOMER

BIFPCL

PROJECT

2X660MW MAITREEE STPP

CONTRACTOR

BHEL

DOC.NO.-Maitree-00-SAD-DA-111939-PEM

TITLE

GA NOTES

ITEM

VENTILATION LOCAL CONTROL PANEL-03

EL.17.0M A ROW

SCALE : N.T.S.

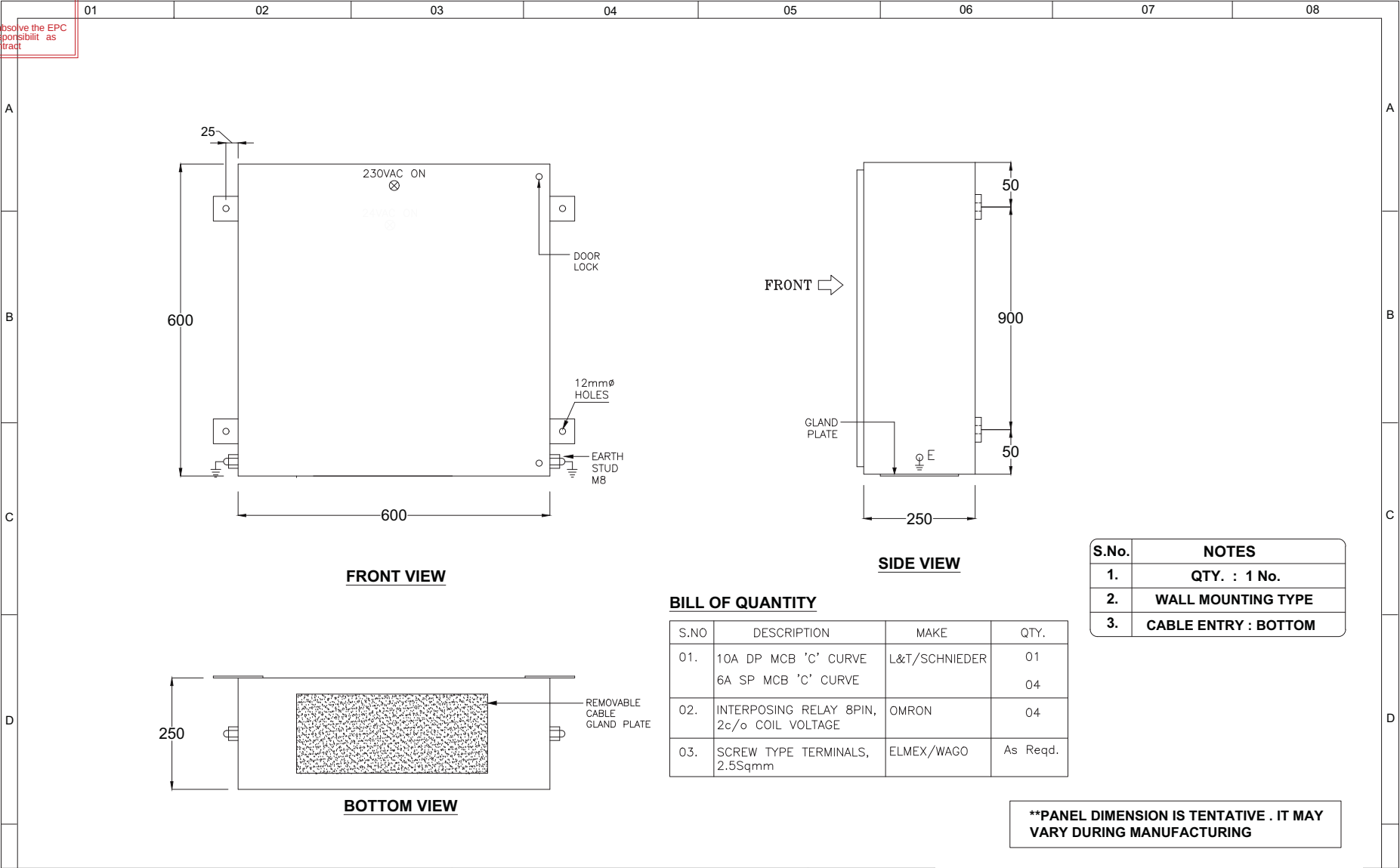
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SHEET : 2 OF 5

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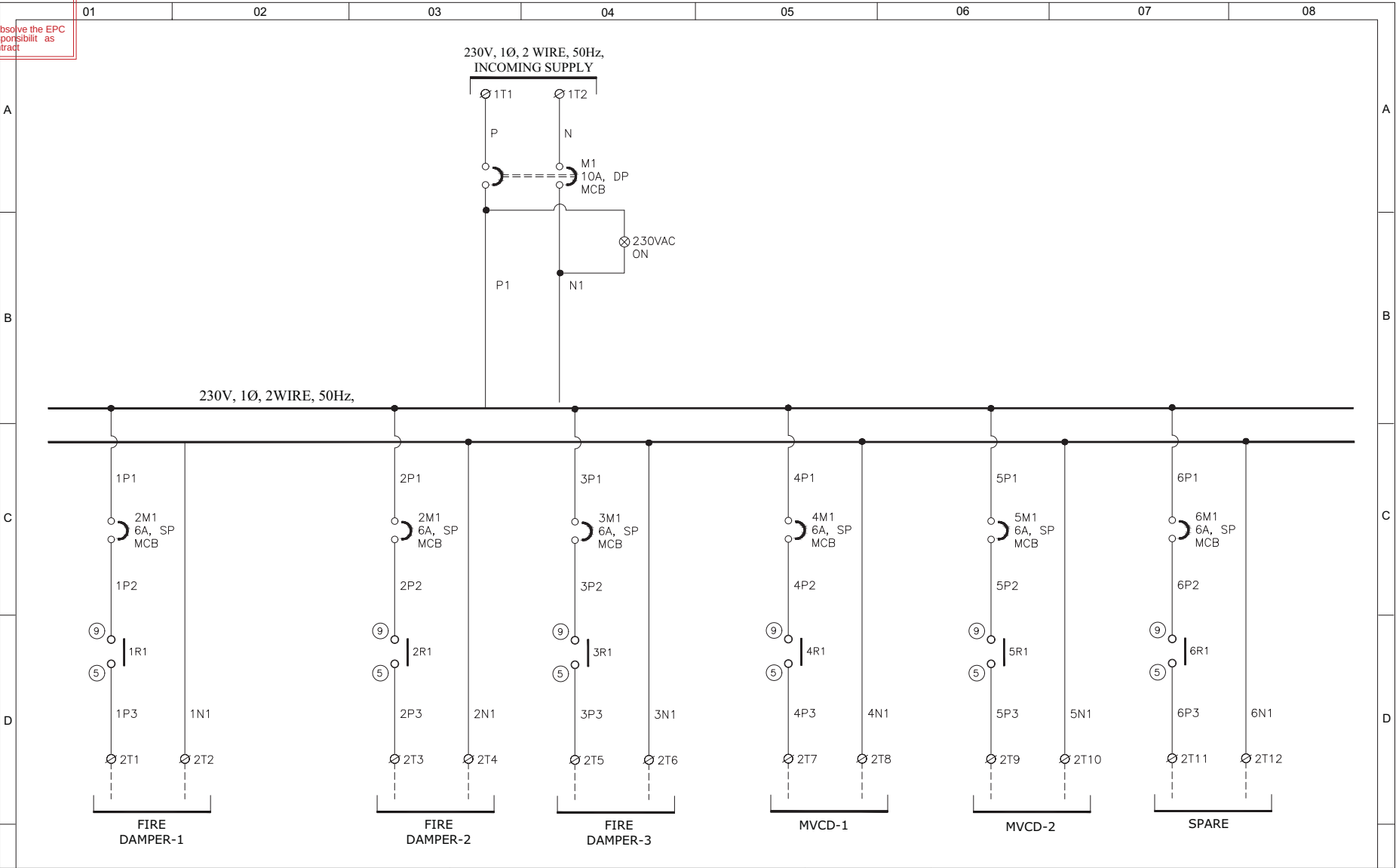


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREE STPP					
CONTRACTOR	BHEL	TITLE	GA DRAWING			
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-03 EL.17.0M A ROW	SCALE : N.T.S.	REV. 00	SHEET : 3 OF 5

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FOR INFORMATION ONLY

Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

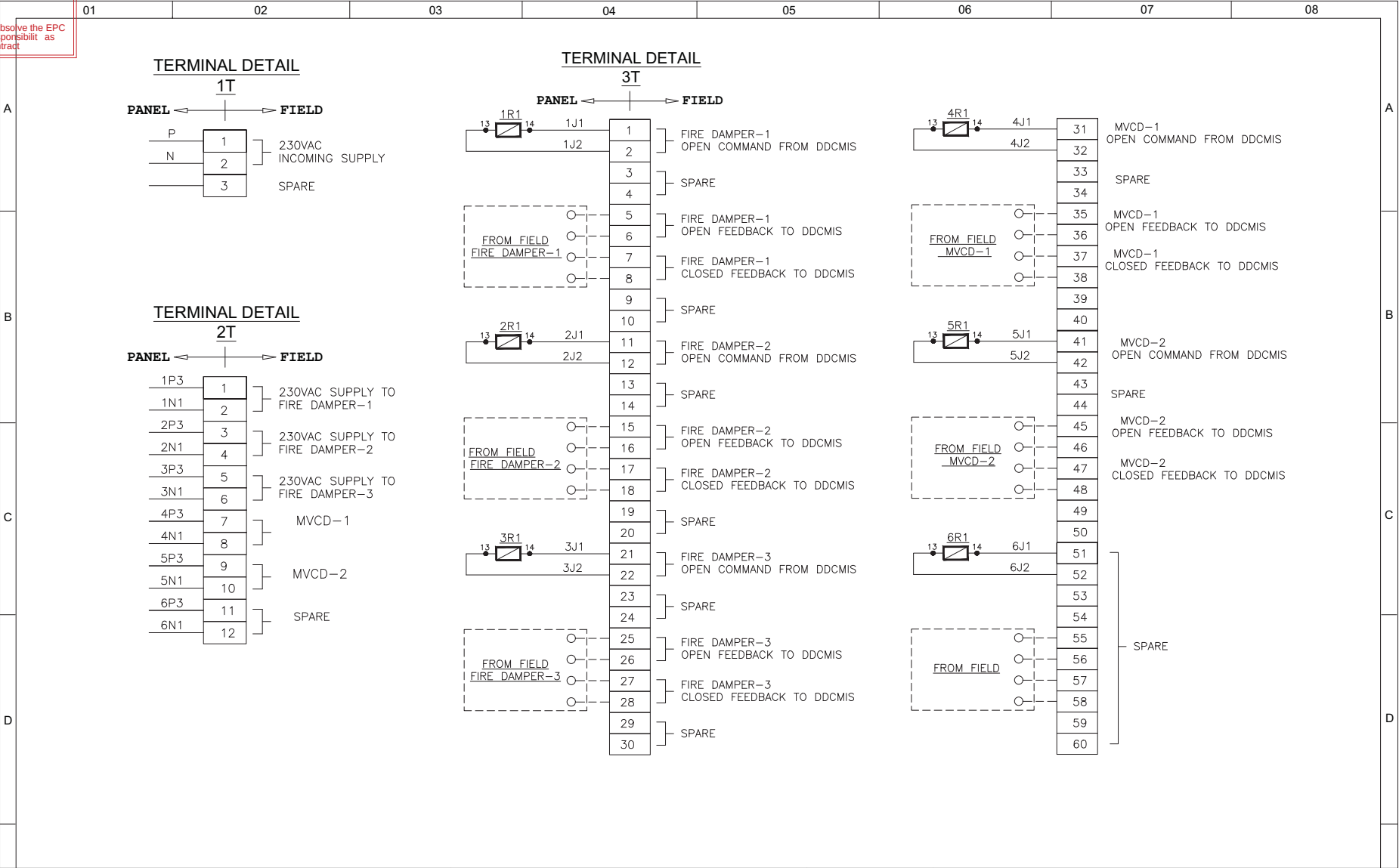


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	SCHEMATIC DIAGRAM		
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-03 EL.17.0M A ROW		
		SCALE : N.T.S.	REV. 00		
				SHEET : 4 OF 5	

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CUSTOMER	-BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	TB DETAILS		
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-03 EL.17.0M A ROW		
		SCALE : N.T.S.	REV. 00		SHEET : 5 OF 5

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Date Sep

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VENTILATION LOCAL CONTROL PANEL-04
EL.8.5M A ROW UNIT-1

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	COVER SHEET	A			
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-04 EL.8.5M A ROW UNIT -1	D			
		SCALE : N.T.S.		REV. 00			SHEET : 1 OF 5

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GENERAL NOTES

:

(1) ALL DIMENSION ARE IN MM.

(2) PANEL IS FIXED TYPE WALL MOUNTED INDOOR SINGLE FRONT NON-COMPARTMENTALIZED

(3) SYSTEM VOLTAGE 230VAC 1Ph 2WIRE.

(4) FABRICATION DETAIL

LOAD BEARING MEMBERS : 2.0MM CRCA

NON-LOAD BEARING MEMBERS : 1.6MM CRCA

DOOR & COVERS : 1.6 MM CRCA

GLAND PLATE : 3.0MM CRCA

(5) GASKET SHALL BE PROVIDED ON ALL OPENING AND JOINTS

(6) PAINT SHADE : RAL 7035.

(7) THE DEGREE OF PROTECTION OF PANEL WILL BE IP-54.

(8) PVC INSULATED COPPER FLEXIBLE WIRE SHALL BE USED FOR POWER & CONTROL WIRING.

(9) LOCATION : AS PER LCP SHEDULE.

(10) CABLE ENTRY : BOTTOM

(11) FIRE DAMPER JUNCTION BOX SHALL BE PROVIDED AS LOOSE ITEM ALONG WITH SUFFICIENT SPARES.

(12) 20% SPARE CONTROL TERMINALS SHALL BE PROVIDED.

(13) ANCHOR/FASTENER FOR LCP MOUNTING SHALL BE PROVIDED A LOOSE ITEM.

WIRING

(i) DC CIRCUIT - 1.5sqmm CU. WIRE BROWN (+), GREY (-)

(ii) AC CIRCUIT - 1.5sqmm CU. WIRE (RED & BLACK COLOUR)

(iii) ALL DOORS SHALL BE EARTHED WITH 2.5sqmm GREEN CU. WIRE.

CUSTOMER

BIFPCL

PROJECT

2X660MW MAITREEE STPP

CONTRACTOR

BHEL

DOC.NO.-Maitree-00-SAD-DA-111939-PEM

TITLE

GA NOTES

ITEM VENTILATION LOCAL CONTROL PANEL-04

EL.8.5M A ROW UNIT -1

SCALE : N.T.S.

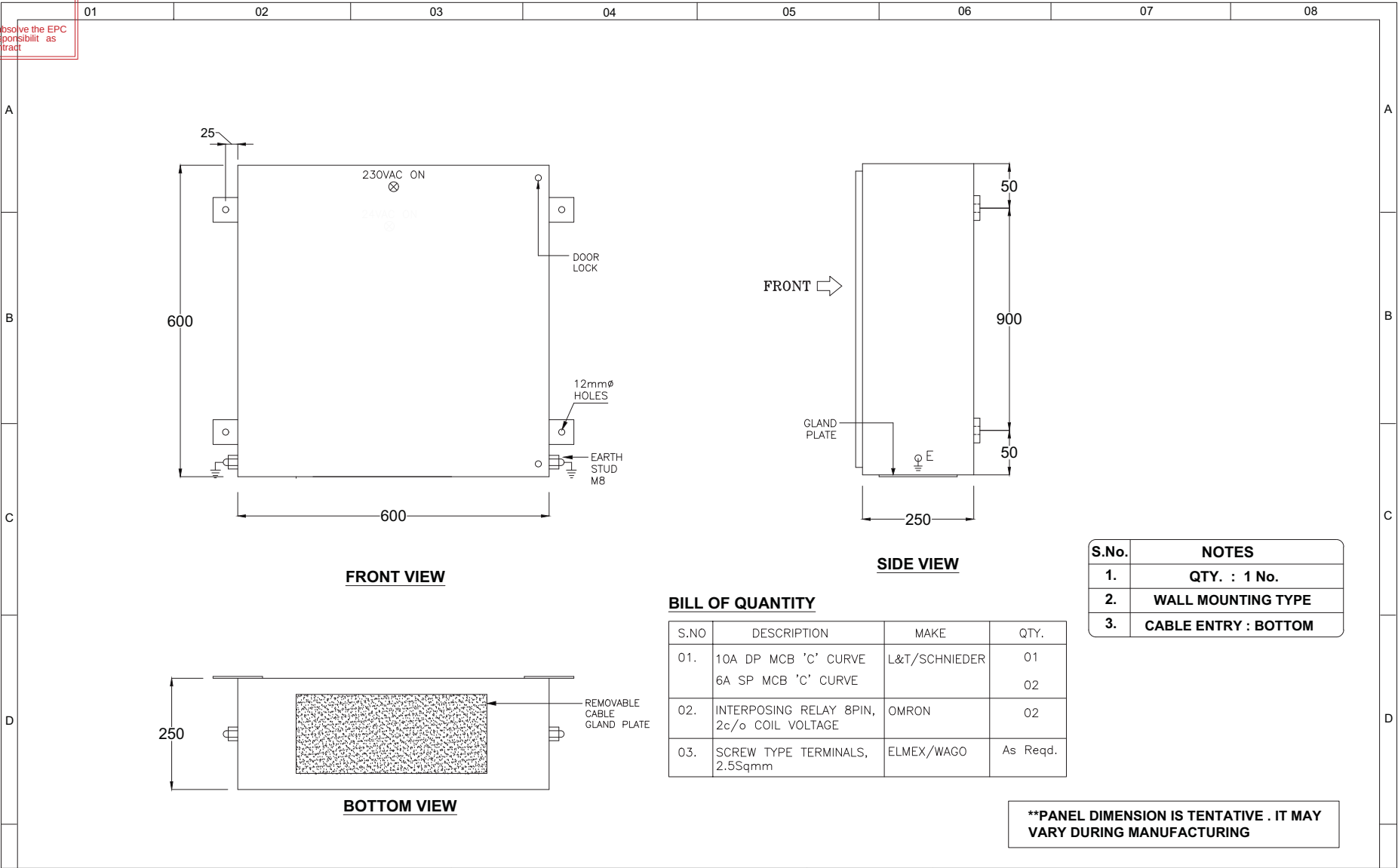
REV. 00

SHEET : 2 OF 5

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Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



BILL OF QUANTITY

S.NO	DESCRIPTION	MAKE	QTY.
01.	10A DP MCB 'C' CURVE	L&T/SCHNIEDER	01
	6A SP MCB 'C' CURVE		02
02.	INTERPOSING RELAY 8PIN, 2c/o COIL VOLTAGE	OMRON	02
03.	SCREW TYPE TERMINALS, 2.5Sqmm	ELMEX/WAGO	As Reqd.

S.No.	NOTES
1.	QTY. : 1 No.
2.	WALL MOUNTING TYPE
3.	CABLE ENTRY : BOTTOM

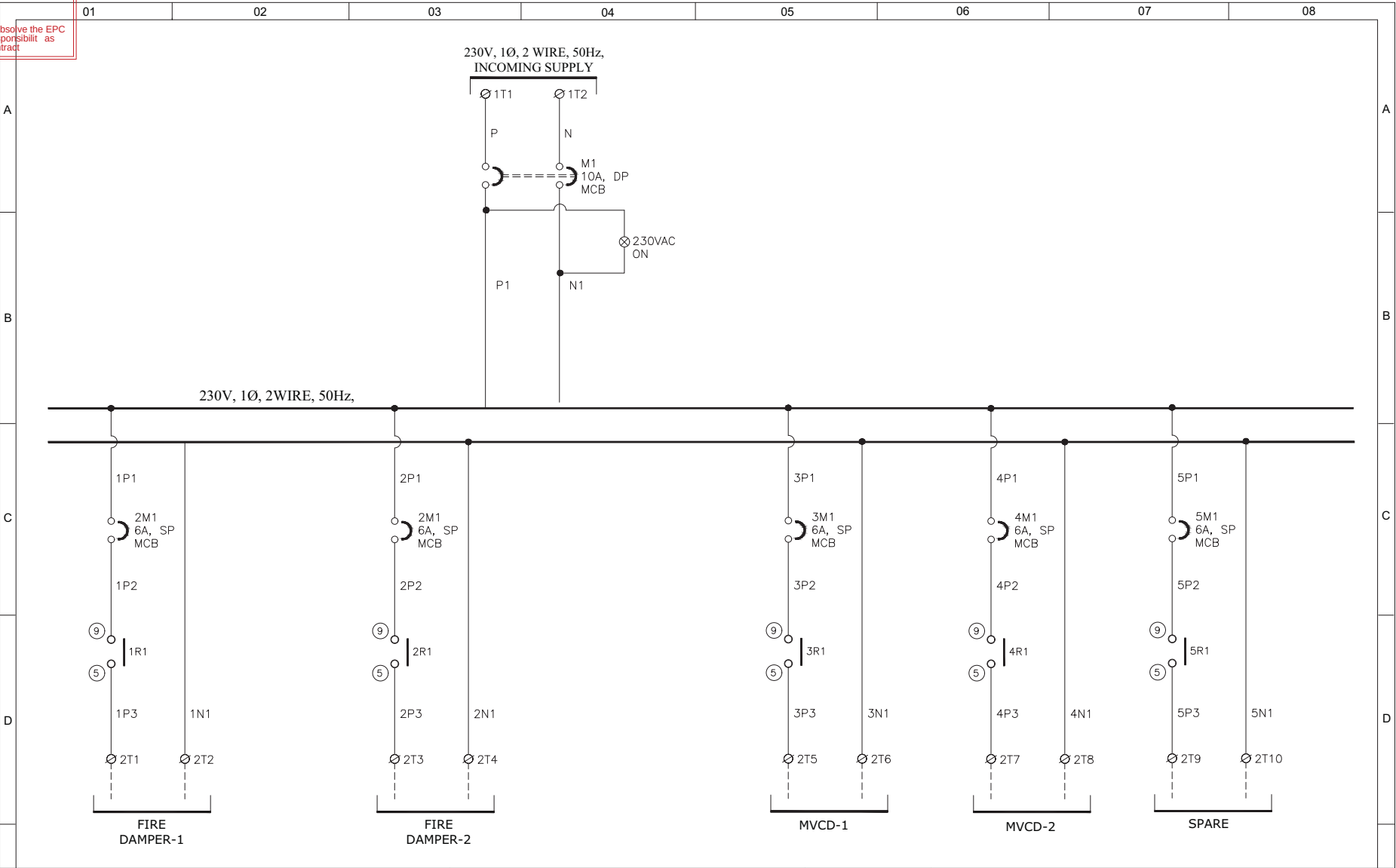
**PANEL DIMENSION IS TENTATIVE . IT MAY VARY DURING MANUFACTURING

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	GA DRAWING		
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-04 EL.8.5M A ROW UNIT -1		
		SCALE : N.T.S.	REV. 00		SHEET : 3 OF 5

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Date Sep

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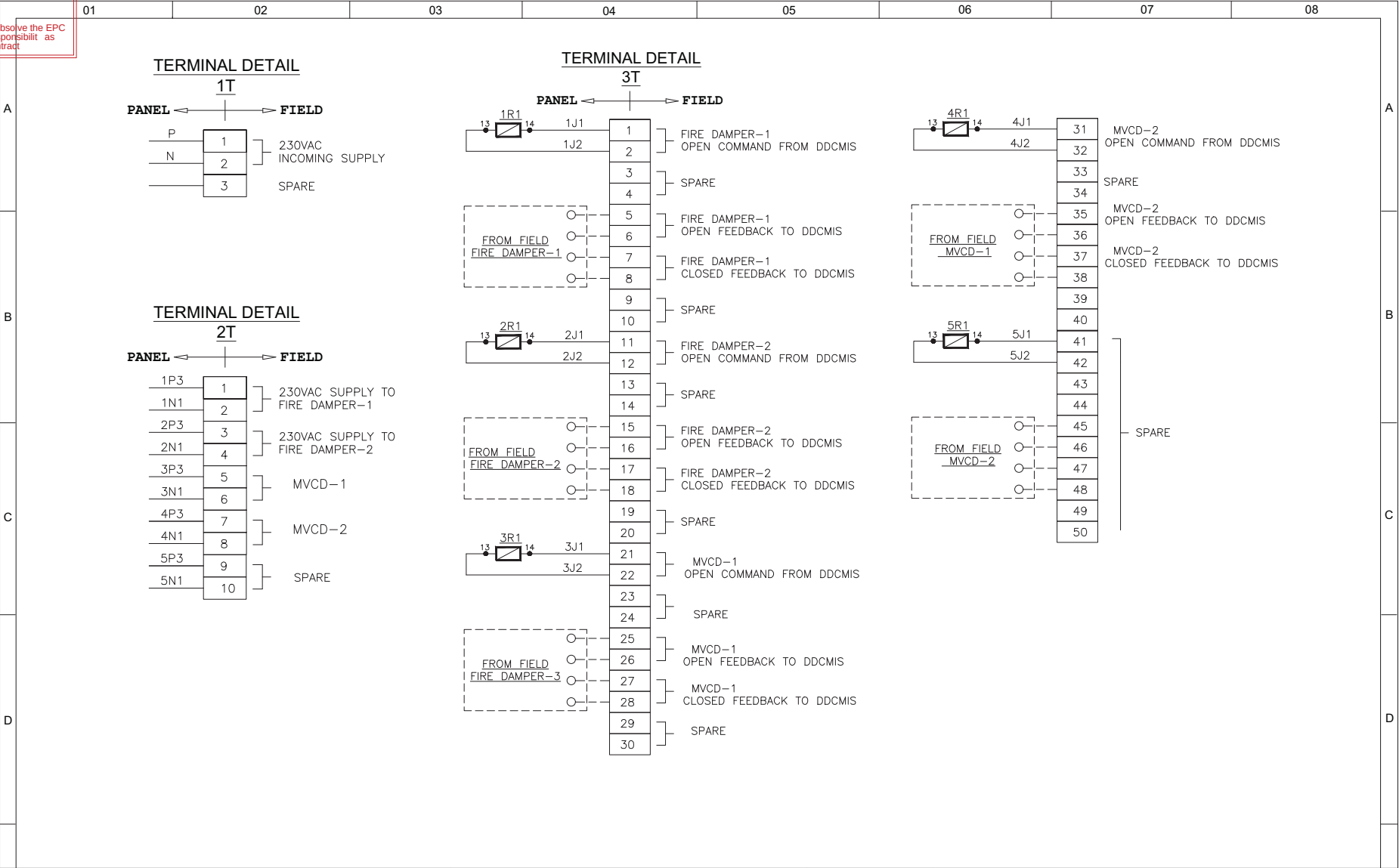


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREE STPP				
CONTRACTOR	BHEL	TITLE	SCHEMATIC DIAGRAM		
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-04 EL.8.5M A ROW UNIT -1	1	
		SCALE : N.T.S.		REV. 00	SHEET : 4 OF 5

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FOR INFORMATION ONLY

Date Sep

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CUSTOMER	-BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREE STPP						
CONTRACTOR	BHEL	TITLE	TB DETAILS				
CONSULTANT		ITEM	VENTILATION LOCAL CONTROL PANEL-04 EL.8.5M A ROW UNIT -1				
		SCALE : N.T.S.	REV. 00				SHEET : 5 OF 5

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Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

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LOCAL CONTROL PANEL-05

EL.24.5M UNIT -2

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	COVER SHEET				
		ITEM	VENTILATION LOCAL CONTROL PANEL EL.24.5M AIR WASHER ROOM UNIT-2				
			SCALE : N.T.S.	REV. 00			SHEET : 1 OF 1

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GENERAL NOTES

:

(1) ALL DIMENSION ARE IN MM.

(2) PANEL IS FIXED TYPE WALL MOUNTED INDOOR SINGLE FRONT NON-COMPARTMENTALIZED

(3) SYSTEM VOLTAGE 230VAC 1Ph 2WIRE.

(4) FABRICATION DETAIL

LOAD BEARING MEMBERS : 2.0MM CRCA

NON-LOAD BEARING MEMBERS : 1.6MM CRCA

DOOR & COVERS : 1.6 MM CRCA

GLAND PLATE : 3.0MM CRCA

(5) GASKET SHALL BE PROVIDED ON ALL OPENING AND JOINTS

(6) PAINT SHADE : RAL 7035.

(7) THE DEGREE OF PROTECTION OF PANEL WILL BE IP-54.

(8) PVC INSULATED COPPER FLEXIBLE WIRE SHALL BE USED FOR POWER & CONTROL WIRING.

(9) LOCATION : AS PER LCP SHEDULE.

(10) CABLE ENTRY : BOTTOM

(11) FIRE DAMPER JUNCTION BOX SHALL BE PROVIDED AS LOOSE ITEM ALONG WITH SUFFICIENT SPARES.

(12) 20% SPARE CONTROL TERMINALS SHALL BE PROVIDED.

(13) ANCHOR/FASTENER FOR LCP MOUNTING SHALL BE PROVIDED A LOOSE ITEM.

WIRING

(i) DC CIRCUIT - 1.5sqmm CU. WIRE BROWN (+), GREY (-)

(ii) AC CIRCUIT - 1.5sqmm CU. WIRE (RED & BLACK COLOUR)

(iii) ALL DOORS SHALL BE EARTHED WITH 2.5sqmm GREEN CU. WIRE.

CUSTOMER

BIFPCL

PROJECT

2X660MW MAITREEE STPP

CONTRACTOR

BHEL

DOC.NO.-Maitree-00-SAD-DA-111939-PEM

TITLE

GA NOTES

ITEM

LOCAL CONTROL PANEL-5
(EL.24.5M MPH) UNIT-2

SCALE : N.T.S.

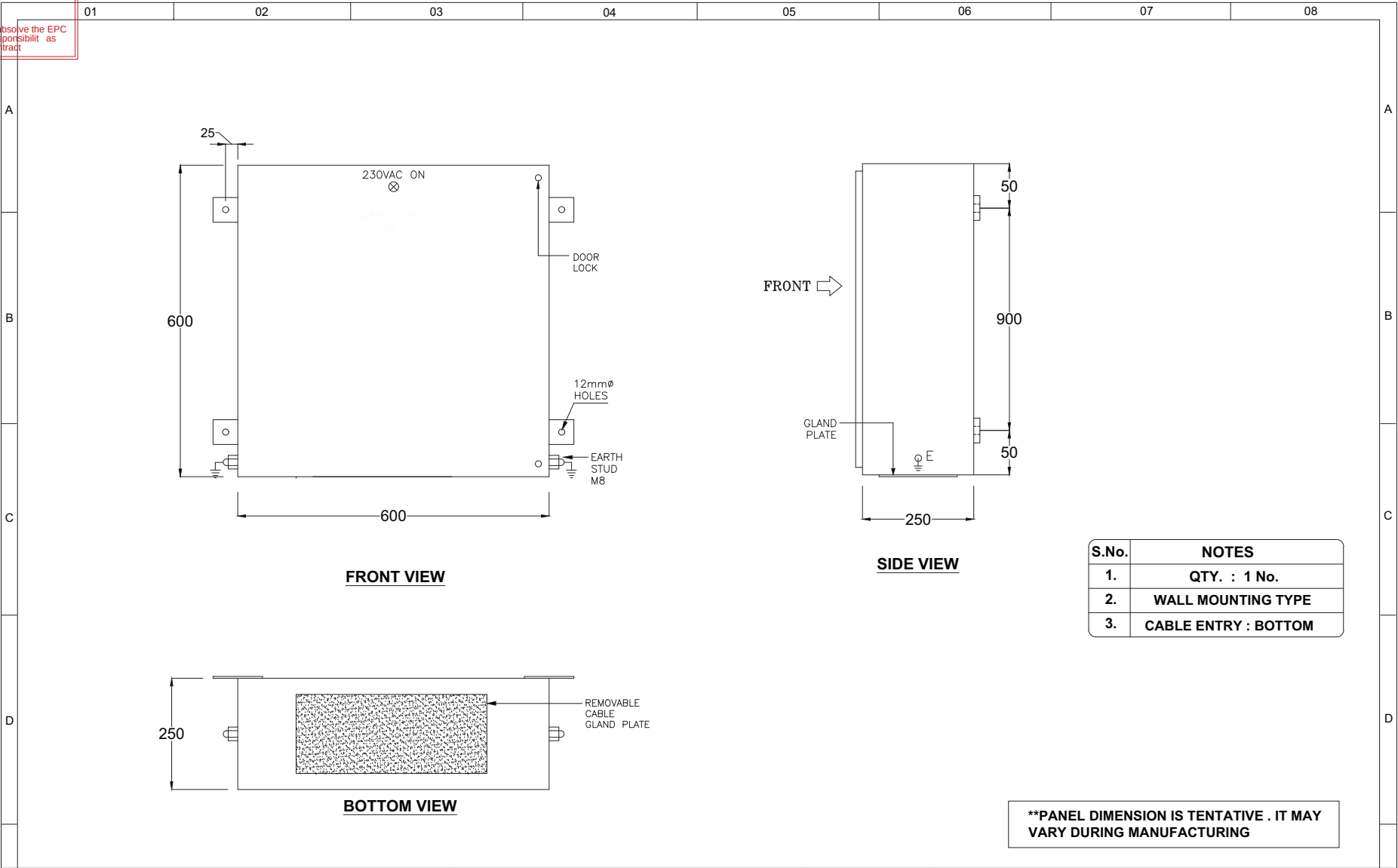
REV. 00

SHEET : 1 OF 1

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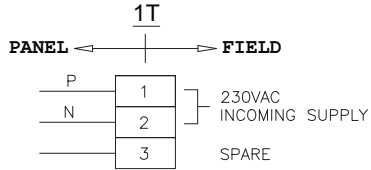
CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE	GA DRAWING			
CONSULTANT		ITEM	LOCAL CONTROL PANEL-5 (EL.24.5M MPH) UNIT-2			
		SCALE : N.T.S.	REV. 00			SHEET : 2 OF 13

FIO
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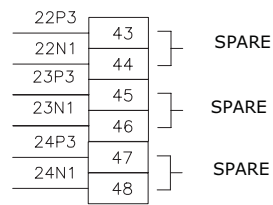
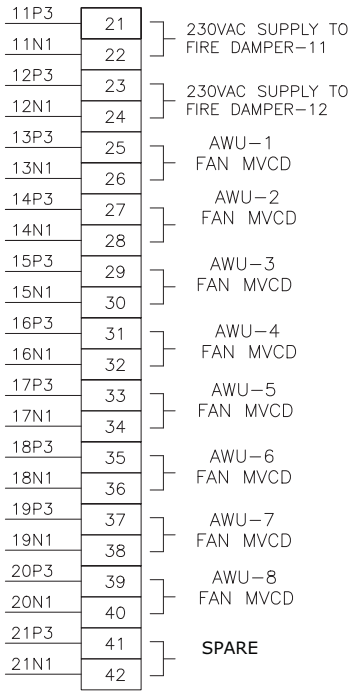
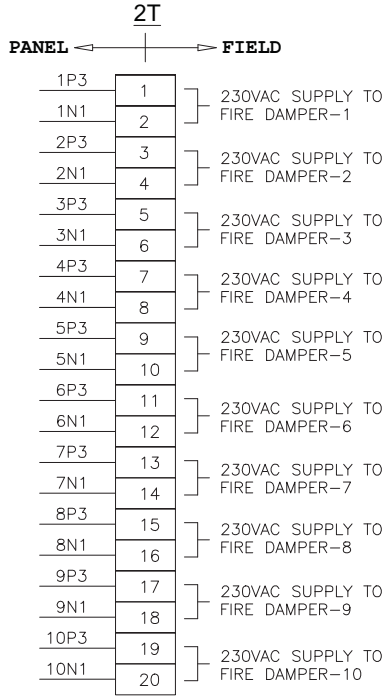
Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

TERMINAL DETAIL



TERMINAL DETAIL

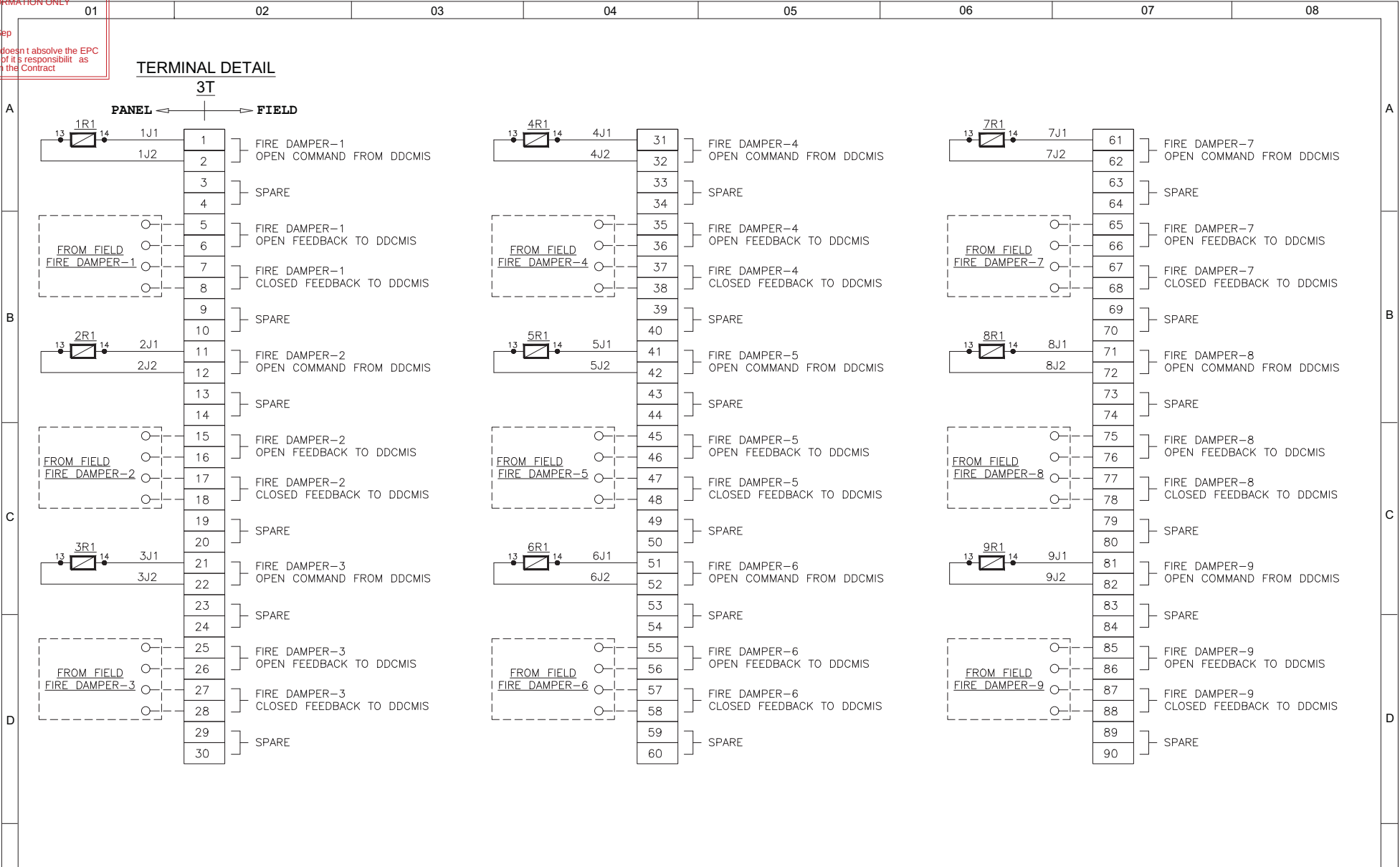


CUSTOMER	BHPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE	TB DETAILS			
CONSULTANT		ITEM	LOCAL CONTROL PANEL-5 (EL.24.5M MPH) UNIT-2			
		SCALE : N.T.S.	REV. 00			SHEET : 5 OF 13

FIO
FOR INFORMATION ONLY

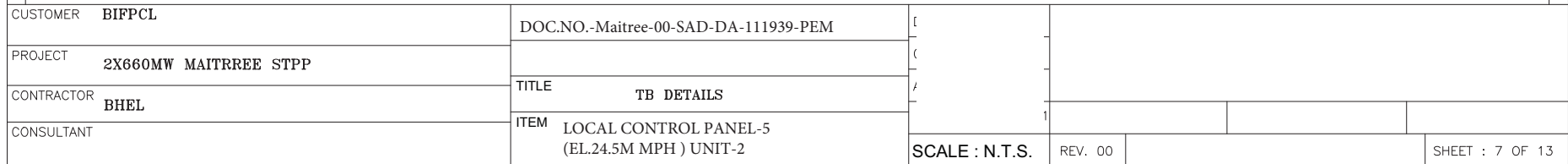
Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	TB DETAILS				
CONSULTANT		ITEM	LOCAL CONTROL PANEL-5 (EL.24.5M MPH) UNIT-2				
		SCALE : N.T.S.	REV. 00				SHEET : 6 OF 13

Approval doesn't absolve the EPC contractor of its responsibilities as specified in the Contract

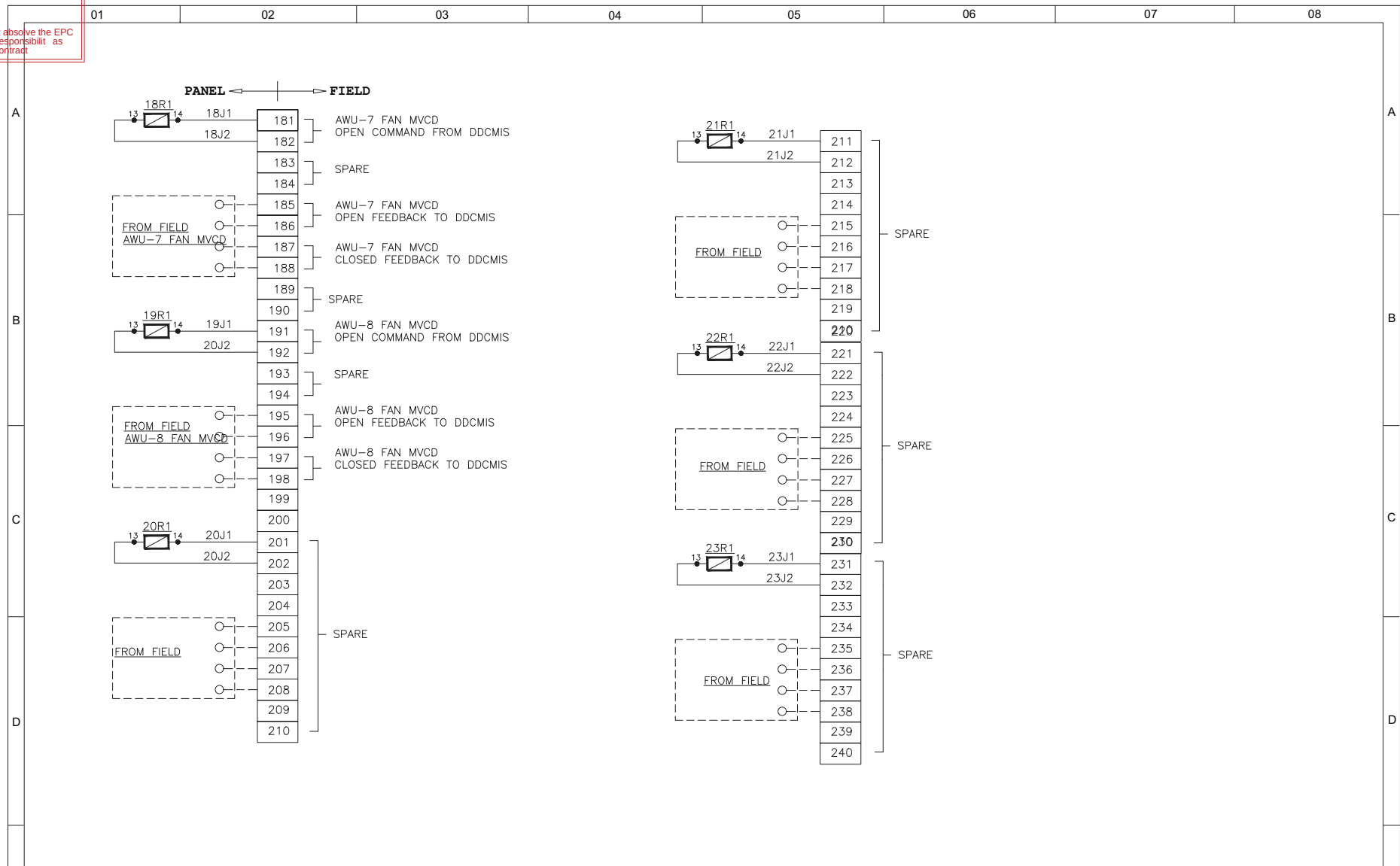


SHEET : 7 OF 13

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CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE TB DETAILS				
CONSULTANT		ITEM LOCAL CONTROL PANEL-5 (EL.24.5M MPH) UNIT-2		SCALE : N.T.S.	REV. 00	

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Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

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VENTILATION LOCAL CONTROL PANEL-06
EL.17.0M A ROW UNIT-2

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE COVER SHEET					
CONSULTANT		ITEM LOCAL CONTROL PANEL-06 EL.17.0M A ROW UNIT-2	SCALE : N.T.S.	REV. 00			SHEET : 1 OF 5

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Date Sep

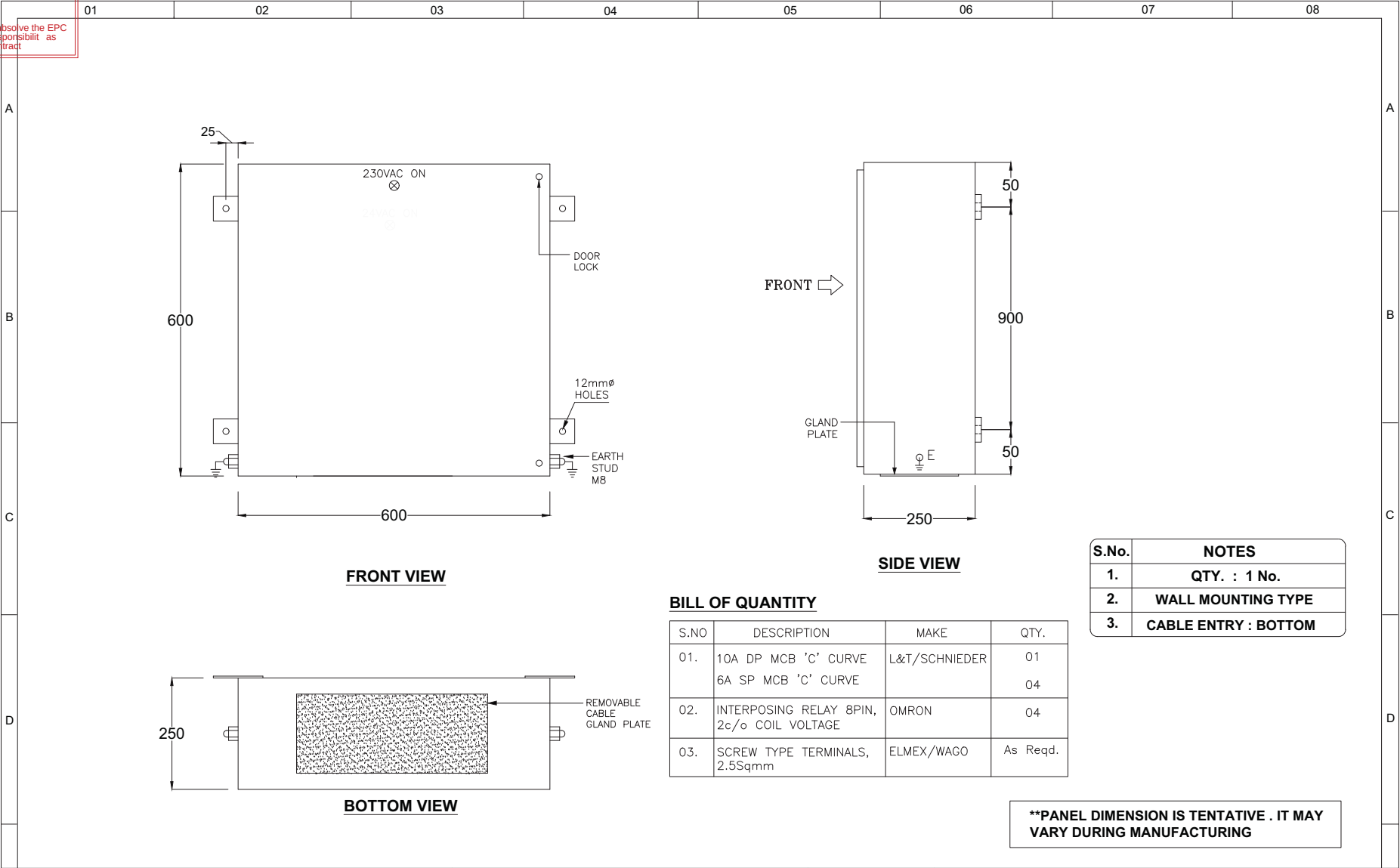
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

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Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

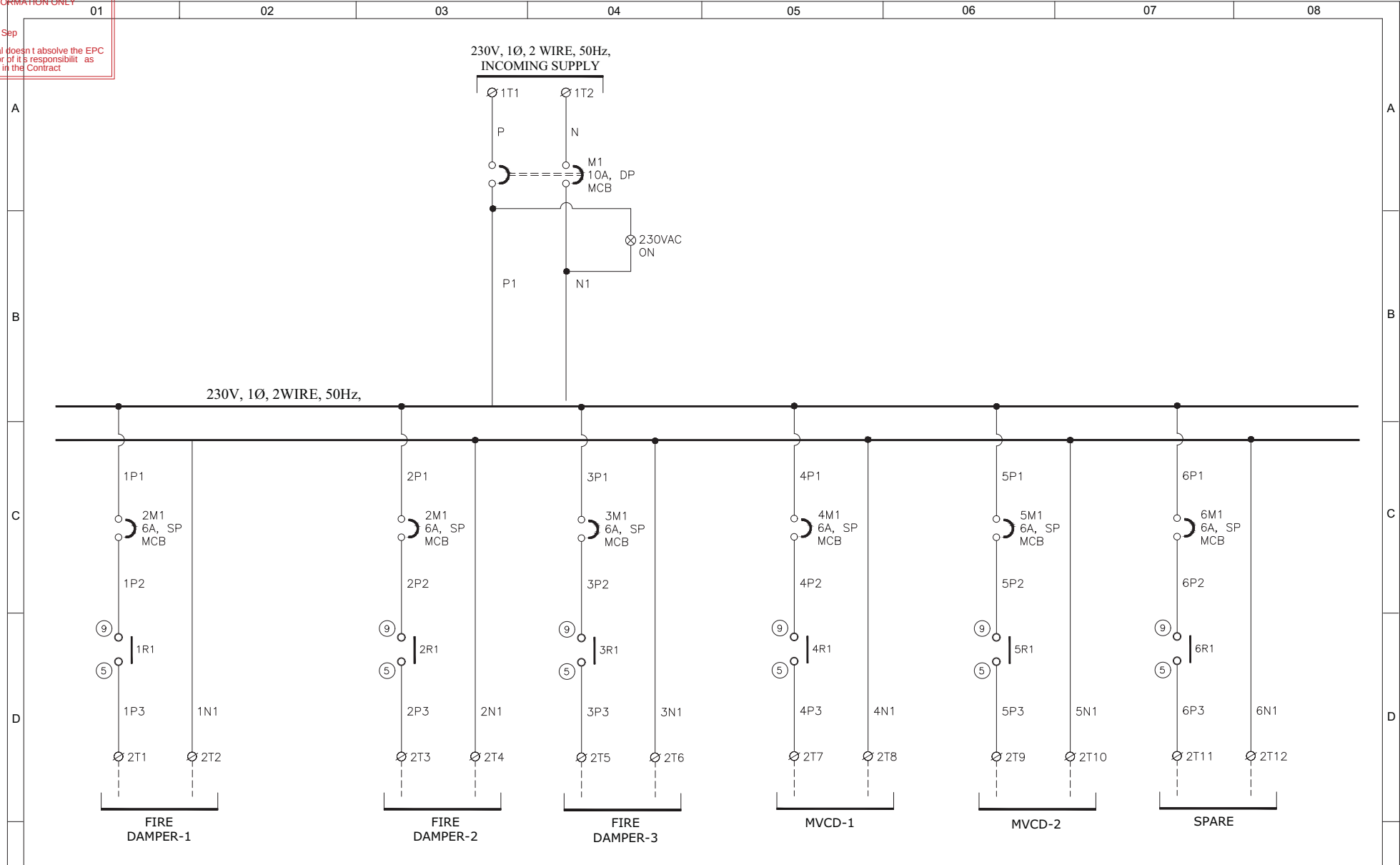


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	GA DRAWING		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-06 EL.17.0M A ROW UNIT-2		
			SCALE : N.T.S.	REV. 00	SHEET : 3 OF 5

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Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

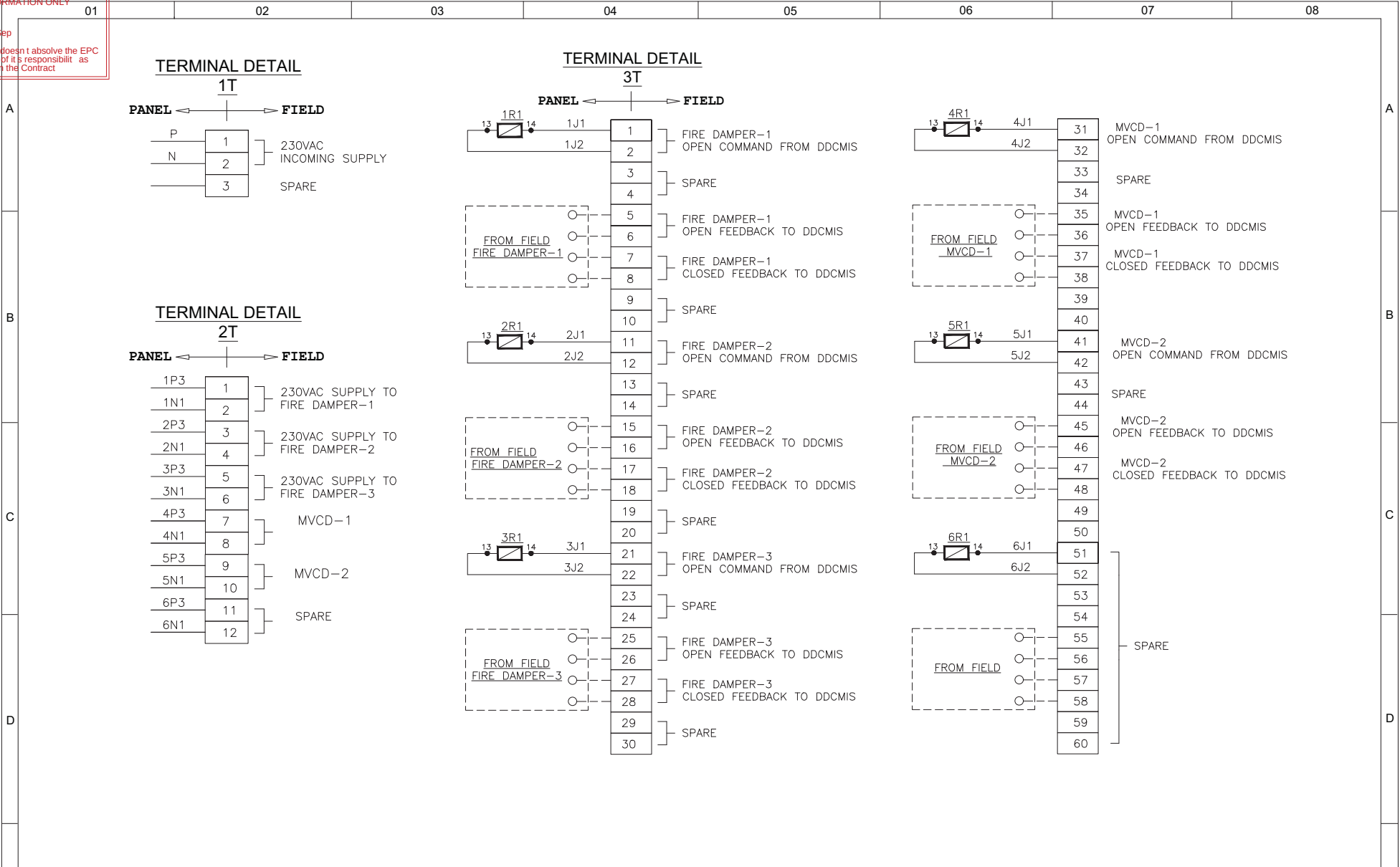


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE	SCHEMATIC DIAGRAM			
CONSULTANT		ITEM	LOCAL CONTROL PANEL-06 EL.17.0M A ROW UNIT-2			
		SCALE : N.T.S.	REV. 00			SHEET : 4 OF 5

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FOR INFORMATION ONLY

Date Sep

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CUSTOMER	BHPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	TB DETAILS				
CONSULTANT		ITEM	LOCAL CONTROL PANEL-06 EL.17.0M A ROW UNIT-2				
			SCALE : N.T.S.	REV. 00			SHEET : 5 OF 5

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VENTILATION LOCAL CONTROL PANEL -07
EL.17.0M A ROW UNIT-2

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	COVER SHEET				
CONSULTANT		ITEM	LOCAL CONTROL PANEL-07 EL.17.0M A ROW UNIT-2				
		SCALE : N.T.S.	REV. 00				SHEET : 1 OF 5

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FOR INFORMATION ONLY

Date Sep

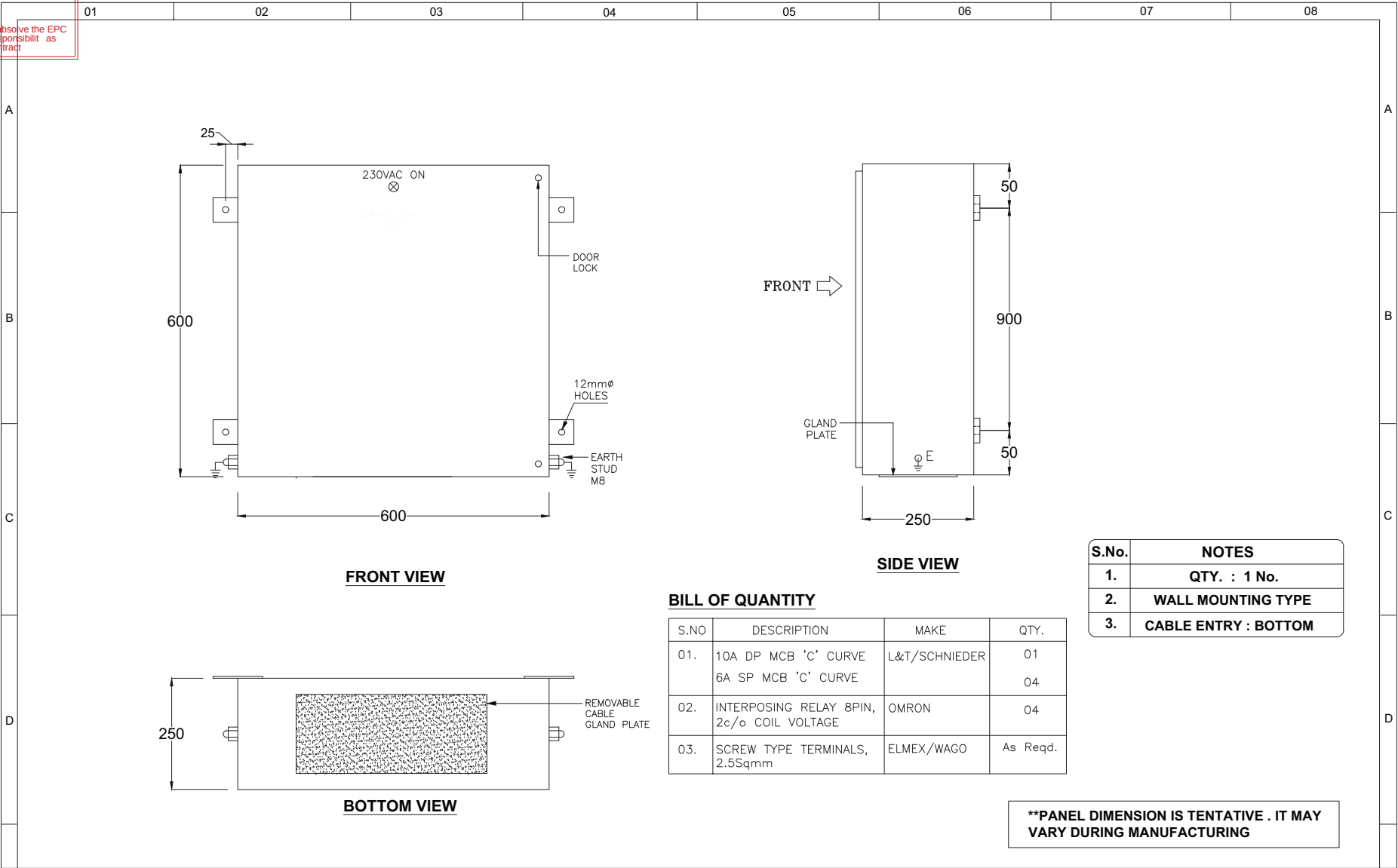
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

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Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

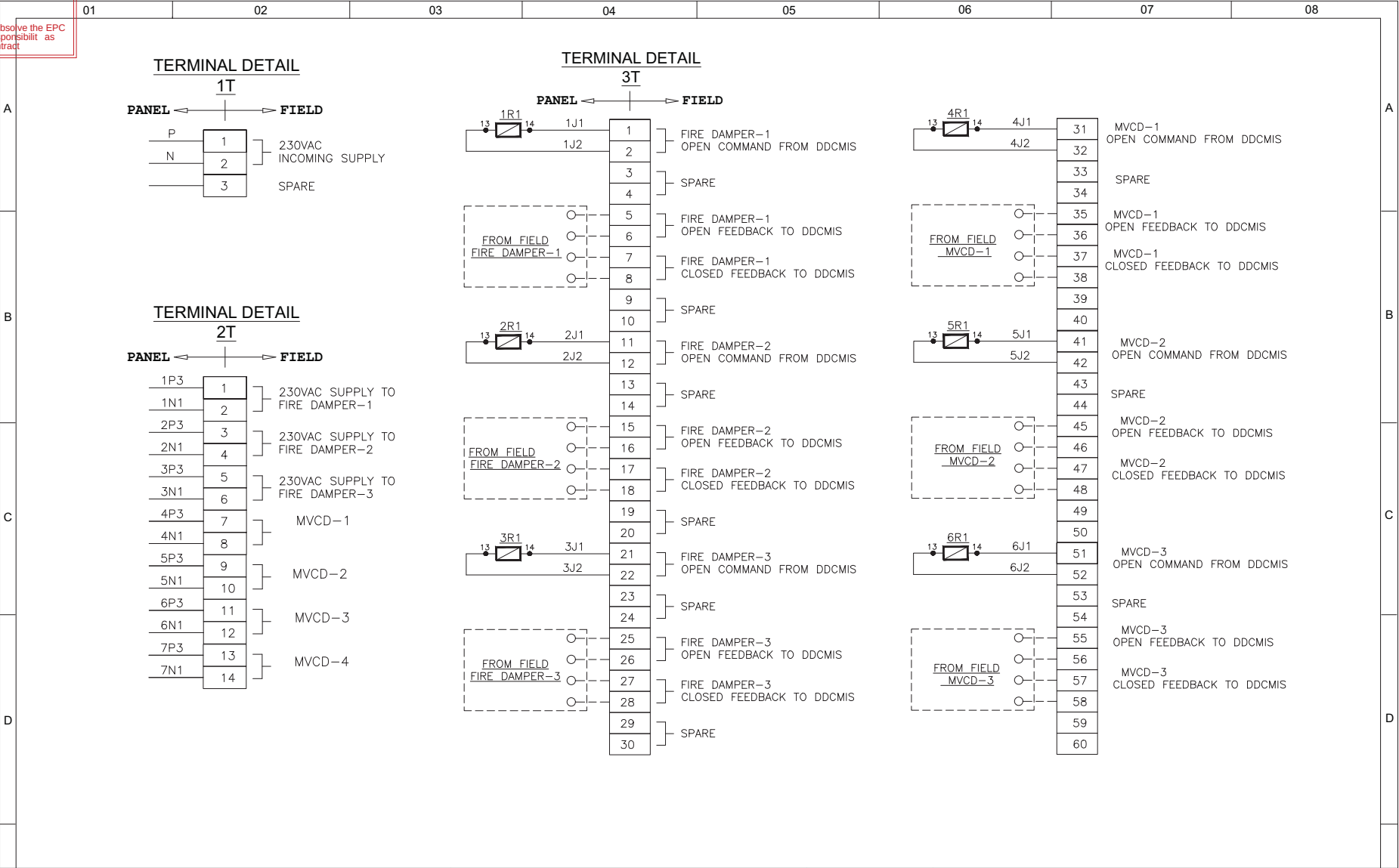


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DAB-1939-REM				
PROJECT	2X660MW MAITREE STPP	CHKD : RAHUL				
CONTRACTOR	BHEL	TITLE GA DRAWING				
CONSULTANT		ITEM LOCAL CONTROL PANEL-07 EL.17.0M A ROW UNIT-2				
			SCALE : N.T.S.	REV. 00		SHEET : 3 OF 5

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Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



CUSTOMER	-BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	TB DETAILS		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-07 EL.17.0M A ROW UNIT-2	SCALE : N.T.S.	REV. 00
					SHEET : 5 OF 5

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FOR INFORMATION ONLY

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Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract

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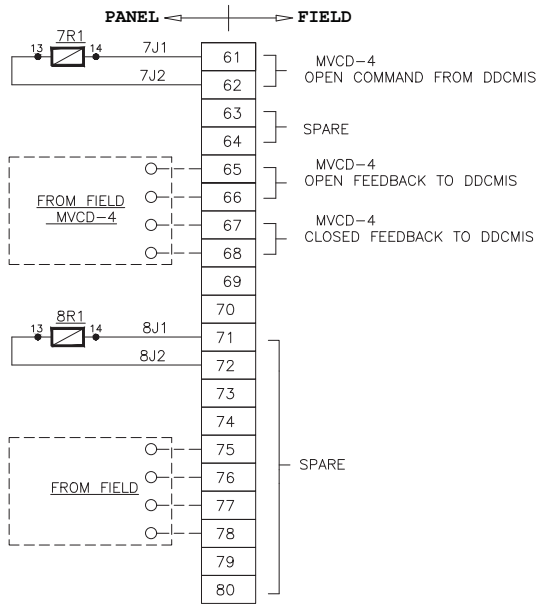
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CUSTOMER **-BIFPCL**

DOC.NO.-Maitree-00-SAD-DA-111939-PEM

PROJECT **2X660MW MAITREE STPP**

CONTRACTOR **BHEL**

TITLE **TB DETAILS**

CONSULTANT

ITEM **LOCAL CONTROL PANEL-07
EL.17.0M A ROW UNIT-2**

SCALE : N.T.S.

REV. 00

SHEET : 5 OF 5

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Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

01	02	03	04	05	06	07	08
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VENTILATION LOCAL CONTROL PANEL-8
EL.8.5M A ROW UNIT-2

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE	COVER SHEET				
CONSULTANT		ITEM	LOCAL CONTROL PANEL-8 EL.8.5 M A ROW UNIT-2	1			
		SCALE : N.T.S.		REV. 00			SHEET : 1 OF 5

FIO
FOR INFORMATION ONLY

Date Sep

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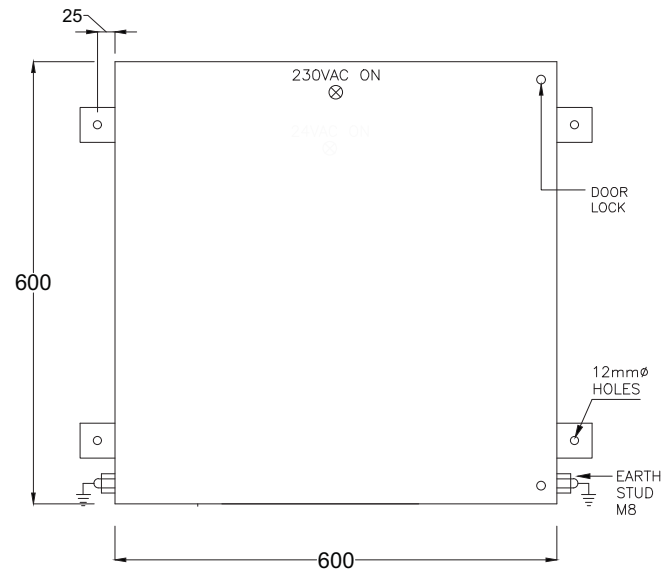
INFORMATION ONLY								
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ep doesn't absolve the EPC of its responsibility as the Contractor								
A	GENERAL NOTES : (1) ALL DIMENSION ARE IN MM. (2) PANEL IS FIXED TYPE WALL MOUNTED INDOOR SINGLE FRONT NON-COMPARTMENTALIZED (3) SYSTEM VOLTAGE 230VAC 1Ph 2WIRE. (4) FABRICATION DETAIL LOAD BEARING MEMBERS : 2.0MM CRCA NON-LOAD BEARING MEMBERS : 1.6MM CRCA DOOR & COVERS : 1.6 MM CRCA GLAND PLATE : 3.0MM CRCA (5) GASKET SHALL BE PROVIDED ON ALL OPENING AND JOINTS (6) PAINT SHADE : RAL 7035. (7) THE DEGREE OF PROTECTION OF PANEL WILL BE IP-54. (8) PVC INSULATED COPPER FLEXIBLE WIRE SHALL BE USED FOR POWER & CONTROL WIRING. (9) LOCATION : AS PER LCP SHEDULE. (10) CABLE ENTRY : BOTTOM (11) FIRE DAMPER JUNCTION BOX SHALL BE PROVIDED AS LOOSE ITEM ALONG WITH SUFFICIENT SPARES. (12) 20% SPARE CONTROL TERMINALS SHALL BE PROVIDED. (13) ANCHOR/FASTENER FOR LCP MOUNTING SHALL BE PROVIDED A LOOSE ITEM. WIRING (i) DC CIRCUIT - 1.5sqmm CU. WIRE BROWN (+), GREY (-) (ii) AC CIRCUIT - 1.5sqmm CU. WIRE (RED & BLACK COLOUR) (iii) ALL DOORS SHALL BE EARTHED WITH 2.5sqmm GREEN CU. WIRE.							A
B								B
C								C
D								D

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM	/				
PROJECT	2X660MW MAITRREE STPP	CHKD : RAHUL					
CONTRACTOR	BHEL	TITLE GA NOTES					
		ITEM LOCAL CONTROL PANEL-8 EL.8.5 M A ROW UNIT-2	SCALE : N.T.S.	REV. 00			SHEET : 2 OF 5

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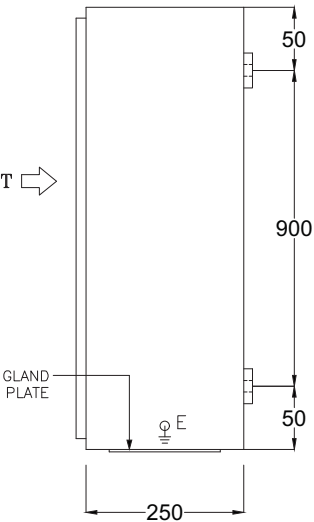
Date Sep

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

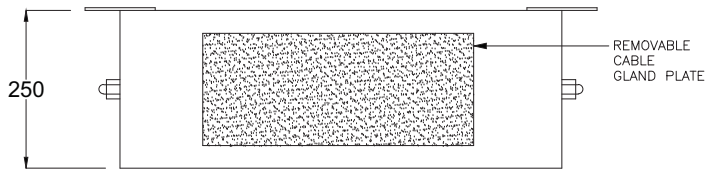


FRONT VIEW

FRONT →



SIDE VIEW



BOTTOM VIEW

BILL OF QUANTITY

S.NO	DESCRIPTION	MAKE	QTY.
01.	10A DP MCB 'C' CURVE	L&T/SCHNIEDER	01
	6A SP MCB 'C' CURVE		02
02.	INTERPOSING RELAY 8PIN, 2c/o COIL VOLTAGE	OMRON	02
03.	SCREW TYPE TERMINALS, 2.5Sqmm	ELMEX/WAGO	As Reqd.

S.No.	NOTES
1.	QTY. : 1 No.
2.	WALL MOUNTING TYPE
3.	CABLE ENTRY : BOTTOM

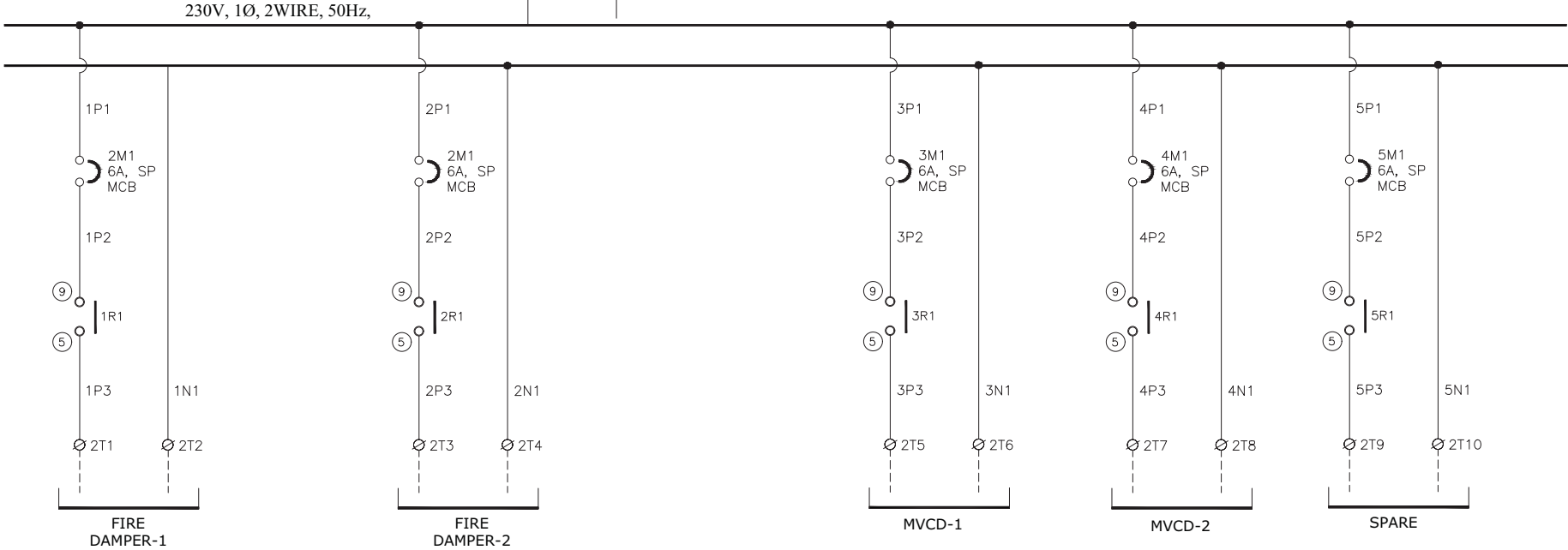
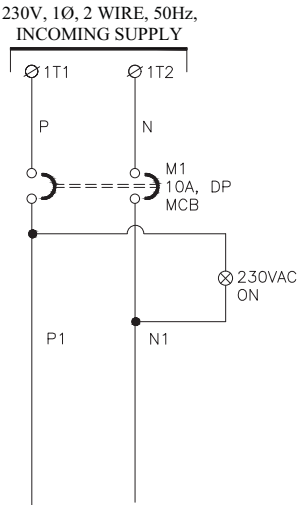
****PANEL DIMENSION IS TENTATIVE . IT MAY VARY DURING MANUFACTURING**

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREE STPP				
CONTRACTOR	BHEL	TITLE	GA DRAWING		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-8 EL.8.5 M A ROW UNIT-2		
			SCALE : N.T.S.	REV. 00	SHEET : 3 OF 5

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FOR INFORMATION ONLY

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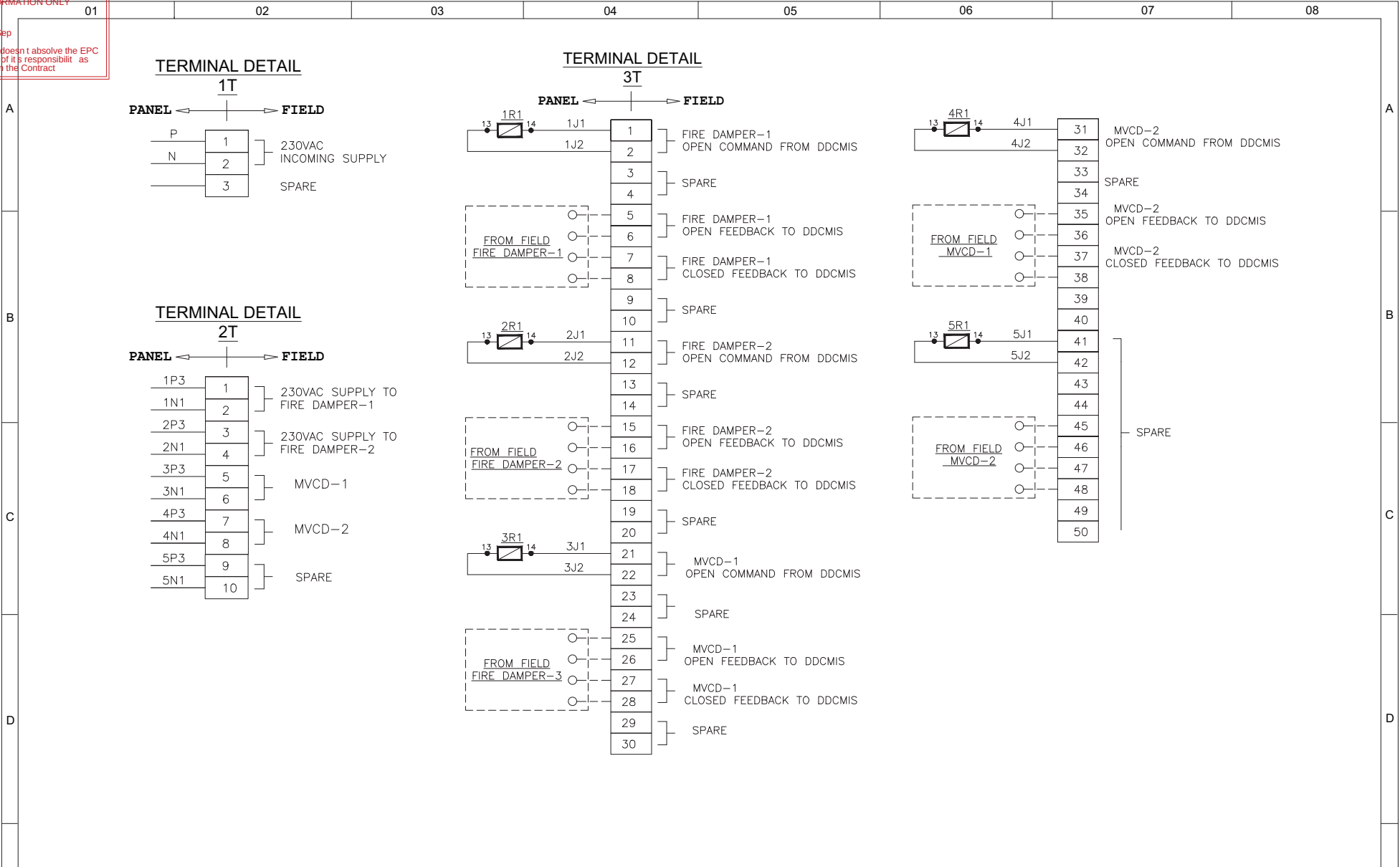


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREE STPP					
CONTRACTOR	BHEL	TITLE	SCHEMATIC DIAGRAM			
CONSULTANT		ITEM	LOCAL CONTROL PANEL-8 EL.8.5 M A ROW UNIT-2			
		SCALE : N.T.S.	REV. 00			SHEET : 4 OF 5

FIO
FOR INFORMATION ONLY

Date Sep

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CUSTOMER	BHPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	TB DETAILS		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-8 EL.8.5 M A ROW UNIT-2		
		SCALE : N.T.S.	REV. 00		SHEET : 5 OF 5

FIO
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Date Sep

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		01	02	03	04	05	06	07	08
A									A
B									B
C									C
D									D
CUSTOMER BIFPCL		DOC.NO.-Maitree-00-SAD-DA-111939-PEM							
PROJECT 2X660MW MAITREEE STPP									
CONTRACTOR BHEL		TITLE COVER SHEET							
CONSULTANT		ITEM LOCAL CONTROL PANEL-9 ESP-1 BUILDING EL.8.4M							
		SCALE : N.T.S.		REV. 00					SHEET : 1 OF 5

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GENERAL NOTES :

(1) ALL DIMENSION ARE IN MM.

(2) PANEL IS FIXED TYPE WALL MOUNTED INDOOR SINGLE FRONT NON-COMPARTMENTALIZED

(3) SYSTEM VOLTAGE 230VAC 1Ph 2WIRE.

(4) FABRICATION DETAIL

LOAD BEARING MEMBERS : 2.0MM CRCA

NON-LOAD BEARING MEMBERS : 1.6MM CRCA

DOOR & COVERS : 1.6 MM CRCA

GLAND PLATE : 3.0MM CRCA

(5) GASKET SHALL BE PROVIDED ON ALL OPENING AND JOINTS

(6) PAINT SHADE : RAL 7035.

(7) THE DEGREE OF PROTECTION OF PANEL WILL BE IP-54.

(8) PVC INSULATED COPPER FLEXIBLE WIRE SHALL BE USED FOR POWER & CONTROL WIRING.

(9) LOCATION : AS PER LCP SHEDULE.

(10) CABLE ENTRY : BOTTOM

(11) FIRE DAMPER JUNCTION BOX SHALL BE PROVIDED AS LOOSE ITEM ALONG WITH SUFFICIENT SPARES.

(12) 20% SPARE CONTROL TERMINALS SHALL BE PROVIDED.

(13) ANCHOR/FASTENER FOR LCP MOUNTING SHALL BE PROVIDED A LOOSE ITEM.

WIRING

(i) DC CIRCUIT - 1.5sqmm CU. WIRE BROWN (+), GREY (-)

(ii) AC CIRCUIT - 1.5sqmm CU. WIRE (RED & BLACK COLOUR)

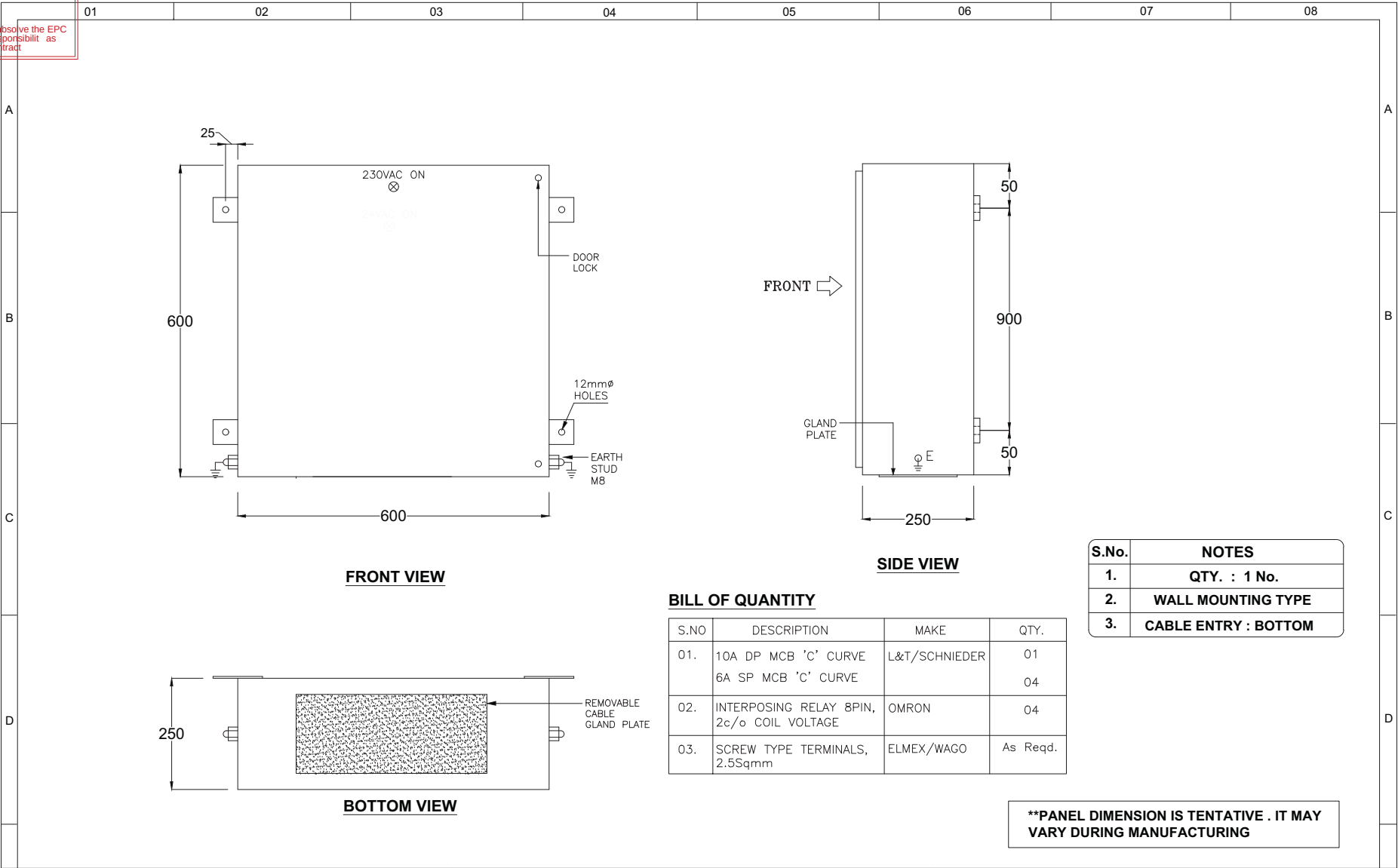
(iii) ALL DOORS SHALL BE EARTHED WITH 2.5sqmm GREEN CU. WIRE.

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE GA NOTES				
		ITEM LOCAL CONTROL PANEL-9 ESP-1 BUILDING EL.8.4M	SCALE : N.T.S.	REV. 00	SHEET : 2 OF 5	

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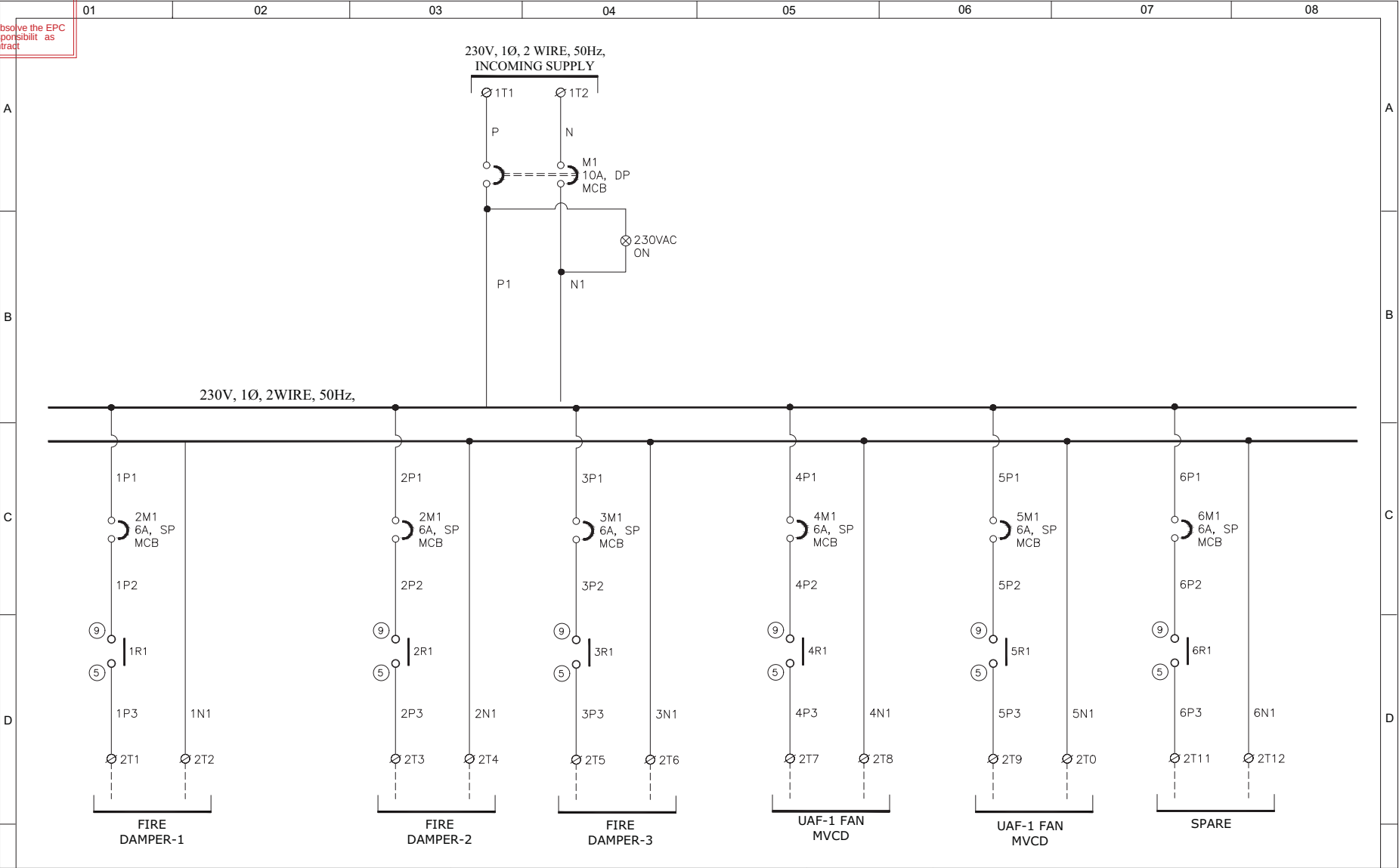


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	GA DRAWING		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-9 ESP-1 BUILDING EL.8.4M		
			SCALE : N.T.S.	REV. 00	SHEET : 3 OF 5

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Date Sep

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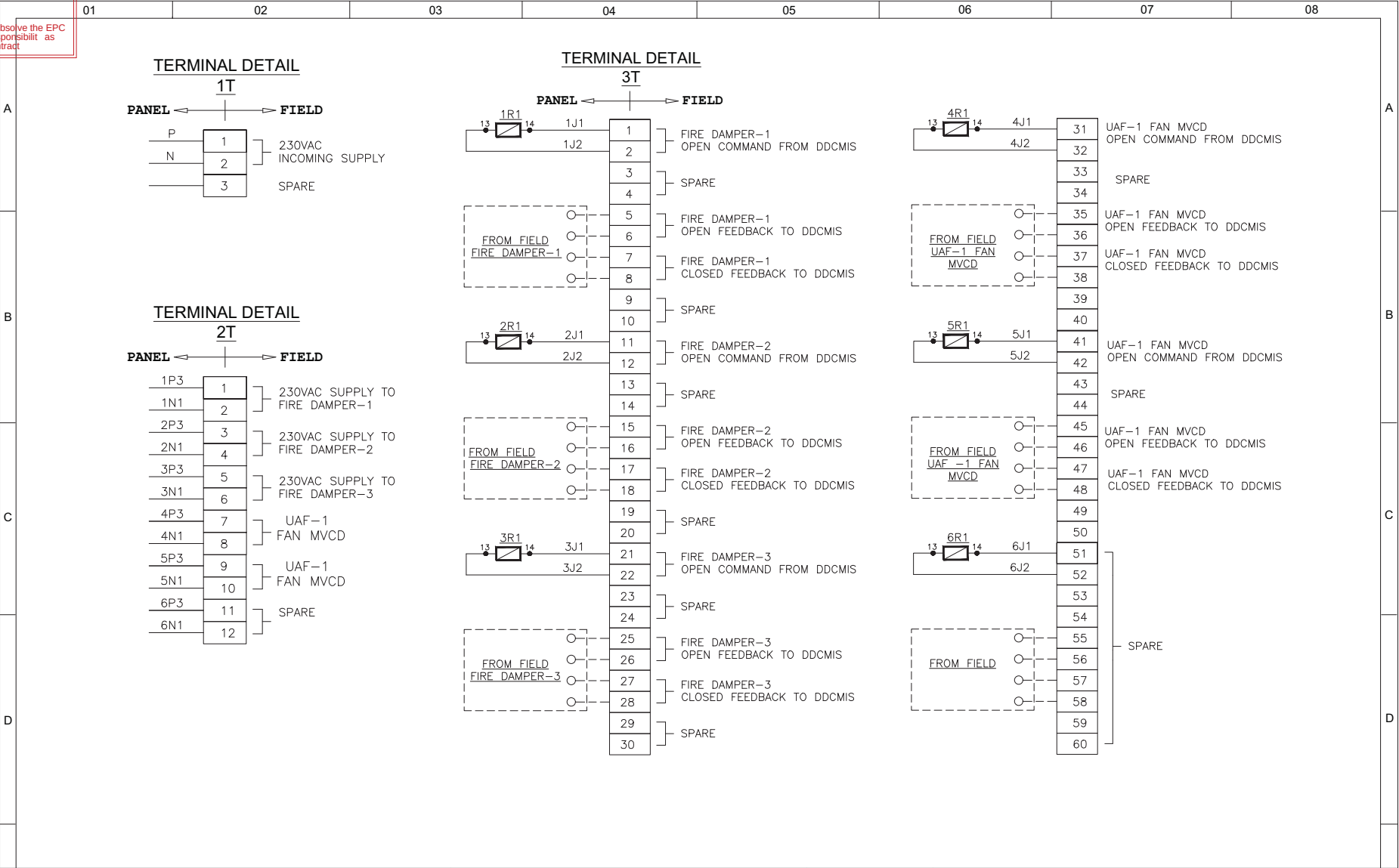


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREE STPP				
CONTRACTOR	BHEL	TITLE	SCHEMATIC DIAGRAM		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-9 ESP-1 BUILDING EL.8.4M	SCALE : N.T.S.	REV. 00
					SHEET : 4 OF 5

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CUSTOMER	-BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM				
PROJECT	2X660MW MAITREEE STPP					
CONTRACTOR	BHEL	TITLE	TB DETAILS			
CONSULTANT		ITEM	LOCAL CONTROL PANEL-9 ESP-1 BUILDING EL.8.4M	SCALE : N.T.S.	REV. 00	SHEET : 5 OF 5

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		01	02	03	04	05	06	07	08	
A		LOCAL CONTROL PANEL-10 ESP-2 BUILDING EL.8.4M								A
B										B
C										C
D										D
CUSTOMER		BIFPCL			DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT		2X660MW MAITREEE STPP								
CONTRACTOR		BHEL			TITLE COVER SHEET					
CONSULTANT		ITEM LOCAL CONTROL PANEL-10 ESP-2 BUILDING EL.8.4M			SCALE : N.T.S.		REV. 00	SHEET : 1 OF 5		

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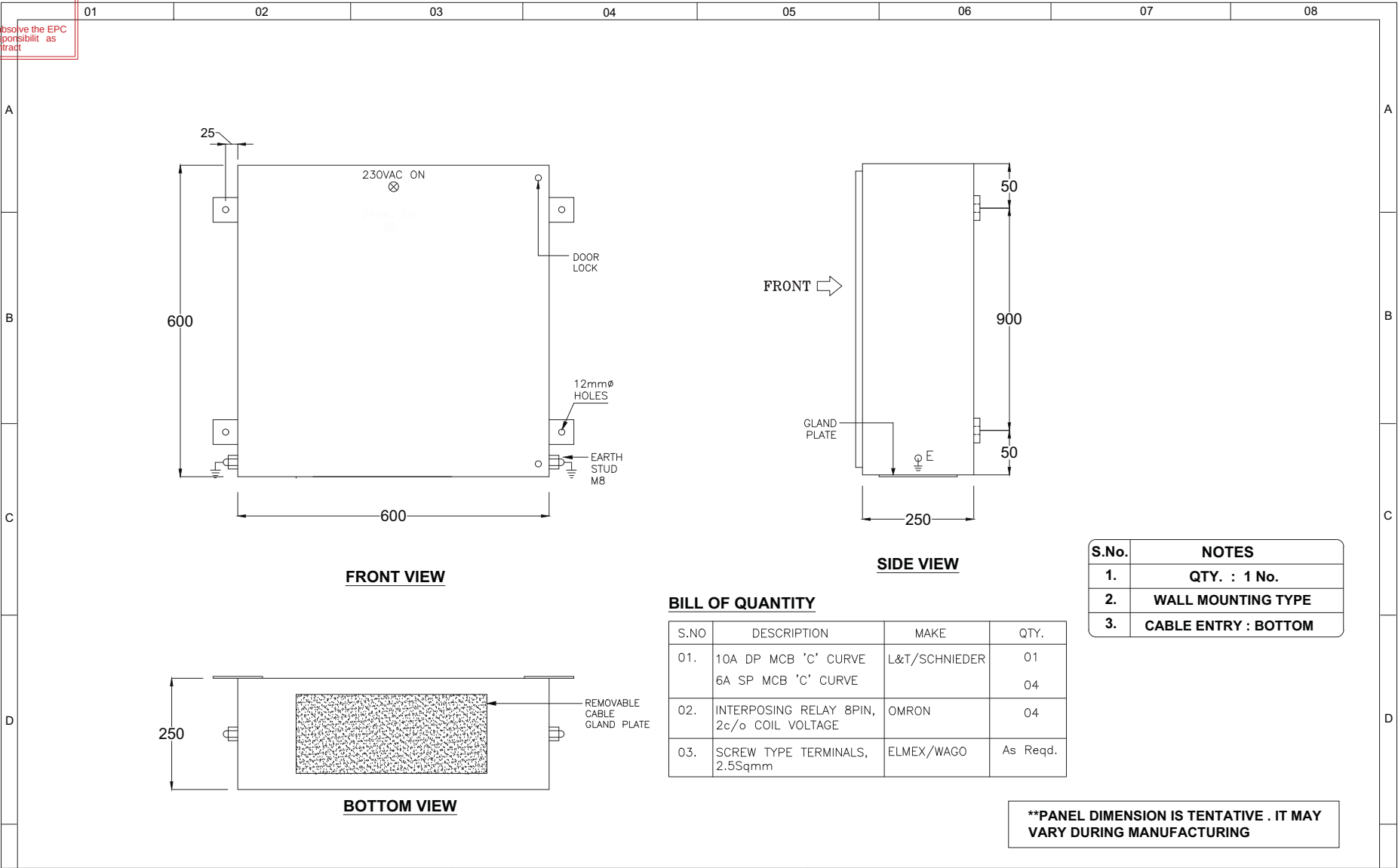
	01	02	03	04	05	06	07	08	
A	GENERAL NOTES : (1) ALL DIMENSION ARE IN MM. (2) PANEL IS FIXED TYPE WALL MOUNTED INDOOR SINGLE FRONT NON-COMPARTMENTALIZED (3) SYSTEM VOLTAGE 230VAC 1Ph 2WIRE. (4) FABRICATION DETAIL LOAD BEARING MEMBERS : 2.0MM CRCA NON-LOAD BEARING MEMBERS : 1.6MM CRCA DOOR & COVERS : 1.6 MM CRCA GLAND PLATE : 3.0MM CRCA (5) GASKET SHALL BE PROVIDED ON ALL OPENING AND JOINTS (6) PAINT SHADE : RAL 7035. (7) THE DEGREE OF PROTECTION OF PANEL WILL BE IP-54. (8) PVC INSULATED COPPER FLEXIBLE WIRE SHALL BE USED FOR POWER & CONTROL WIRING. (9) LOCATION : AS PER LCP SHEDULE. (10) CABLE ENTRY : BOTTOM (11) FIRE DAMPER JUNCTION BOX SHALL BE PROVIDED AS LOOSE ITEM ALONG WITH SUFFICIENT SPARES. (12) 20% SPARE CONTROL TERMINALS SHALL BE PROVIDED. (13) ANCHOR/FASTENER FOR LCP MOUNTING SHALL BE PROVIDED A LOOSE ITEM. WIRING (i) DC CIRCUIT - 1.5sqmm CU. WIRE BROWN (+), GREY (-) (ii) AC CIRCUIT - 1.5sqmm CU. WIRE (RED & BLACK COLOUR) (iii) ALL DOORS SHALL BE EARTHED WITH 2.5sqmm GREEN CU. WIRE.								A
B									B
C									C
D	D								

CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM					
PROJECT	2X660MW MAITREEE STPP						
CONTRACTOR	BHEL	TITLE GA NOTES					
		ITEM LOCAL CONTROL PANEL-10 ESP-2 BUILDING EL.8.4M	SCALE : N.T.S.	REV. 00			SHEET : 2 OF 5

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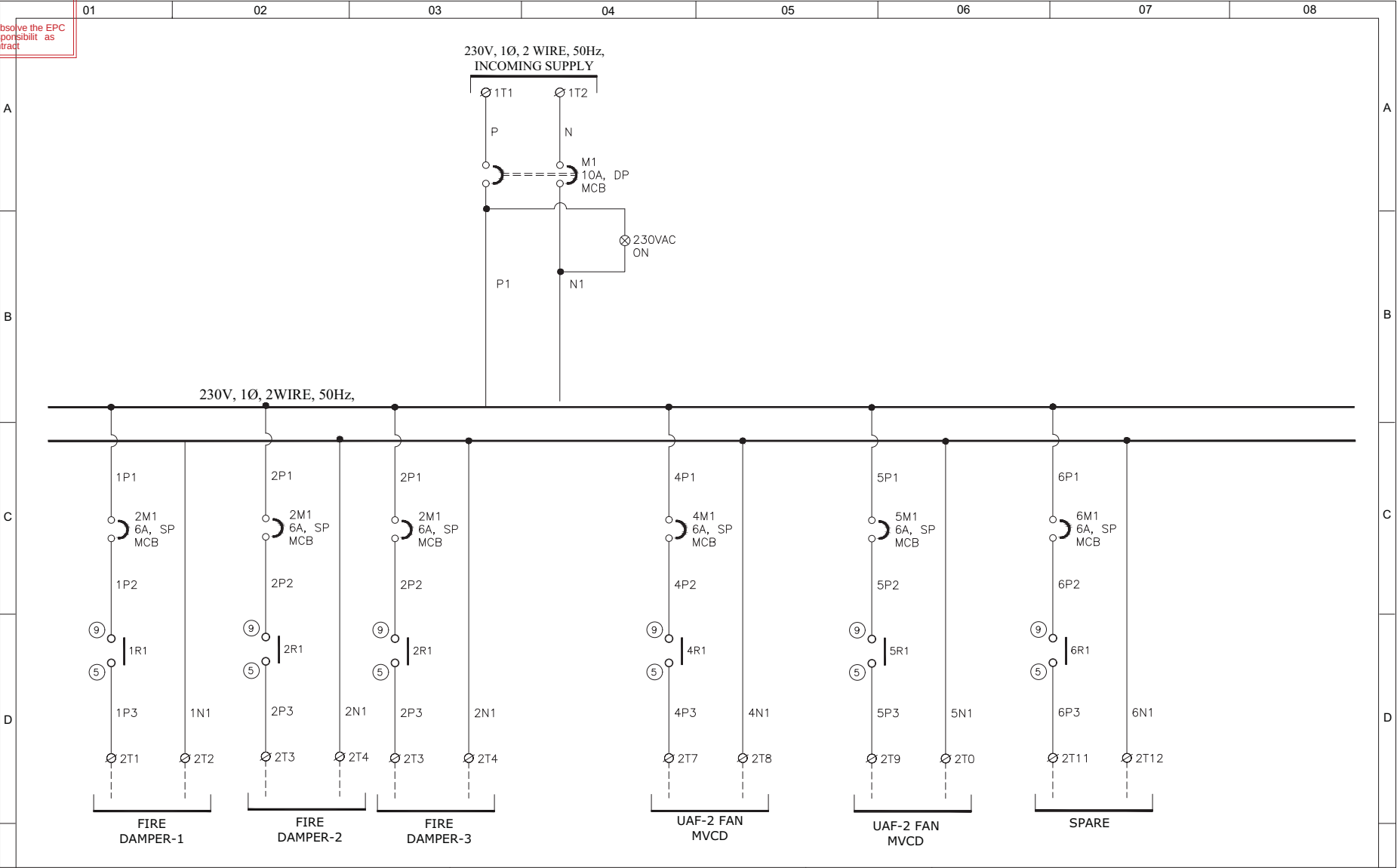


CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STPP				
CONTRACTOR	BHEL	TITLE	GA DRAWING		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-10 ESP-2 BUILDING EL.8.4M		
			SCALE : N.T.S.	REV. 00	SHEET : 3 OF 5

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CUSTOMER	BIFPCL	DOC.NO.-Maitree-00-SAD-DA-111939-PEM			
PROJECT	2X660MW MAITREEE STTP				
CONTRACTOR	BHEL	TITLE	SCHEMATIC DIAGRAM		
CONSULTANT		ITEM	LOCAL CONTROL PANEL-10 ESP-2 BUILDING EL.8.4M		
			SCALE : N.T.S.	REV. 00	SHEET : 4 OF 5

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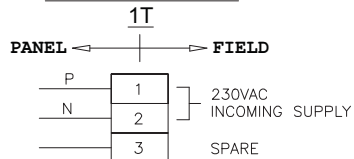
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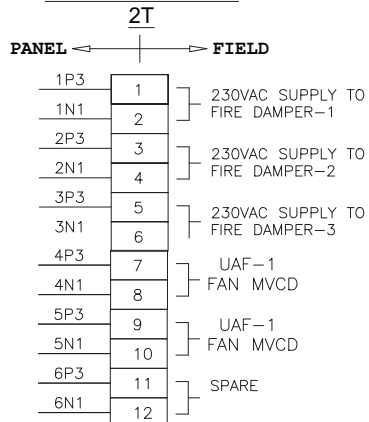
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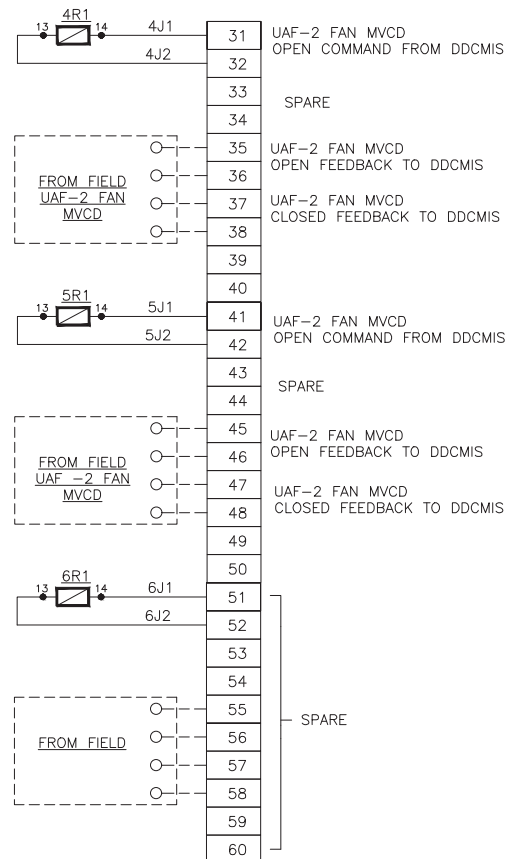
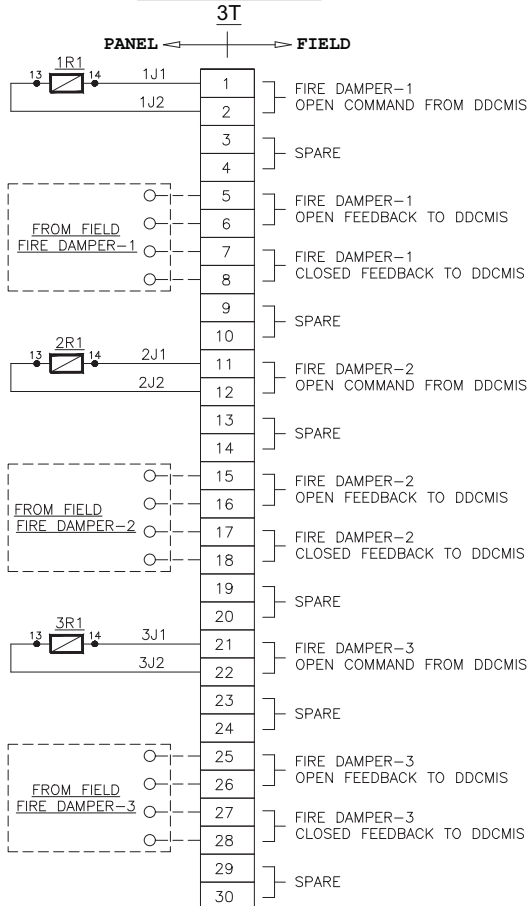
TERMINAL DETAIL



TERMINAL DETAIL



TERMINAL DETAIL



CUSTOMER -BIFPCL

PROJECT 2X660MW MAITREE STPP

CONTRACTOR BHEL

CONSULTANT

DOC.NO.-Maitree-00-SAD-DA-111939-PEM

TITLE TB DETAILS

ITEM LOCAL CONTROL PANEL-10
ESP-2 BUILDING EL.8.4M

SCALE : N.T.S.

REV. 00

SHEET : 5 OF 5

DATA SHEET OF PIPE FOR VENTILATION SYSTEM

Sr.No.	DESCRIPTION	SPECIFICATION FOR VENTILATION SYSTEM		
1	MAKE	As per Approved Item categorisation list		
2	Material	Piping		
3	Conforming to	<u>Piping shall be ERW, Black and heavy class.</u> AWU & UAF Water Piping: Heavy grade EN 10255 or Equivalent up to 150 NB & ASTM A-53, Grade B or equivalent beyond 200 NB. Drain Water Piping: Heavy grade EN 10255 or Equivalent up to 150 NB galvanised As per EN 10240 & ASTM A-53, Grade B or equivalent beyond 200 NB. Fittings: 1) The Steel fitting shall conform to ASTM A234 Gr WPB and Dimensional Standard to ANSI B 16.9/ANSI B 16.11 /equivalent for Sizes 65 NB and above. 2) For Sizes 50 NB and below, the material shall confirm to ASTM A-105. 3) For pipe sizes above 350 NB, fabricated fittings from sheets of adequate thickness may be used. The bend Radius in case of mitre bends shall be minimum 1.5 times the Normal Pipe diameter and angle between two adjacent sections shall not be more than 22.5 deg and shall be As per BS: 2633/BS:534. 4) PIPE for Sizes 200 NB & Above shall confirm to ASTM A-53 Grade -B		
4	Thickness	Nominal Pipe (mm)	Specified Outside Diameter (mm)	Wall Thickness (mm)
		50 NB	60.3	4.5
		65 NB	76.1	4.5
		80 NB	88.9	5.0
		100 NB	114.3	5.4
		125 NB	139.7	5.4
		150 NB	165.1	5.4
		200 NB	219.1	4.78
		250 NB	273.0	5.16
		300 NB	323.8	5.16
		400 NB	406.4	6.35
5	Density of Pipe	7850 kg/m3		

6	Pipe Sizes	As per approved P&ID
7	Quantity	As per Approved Item categorisation list
8	Random Length of Pipe	Approx. 6 metre
9	Inspection	As per Approved Item categorisation list
10	Hydrostatic pressure	As per EN 10255 or Equivalent up to 150 NB & As per ASTM A-53, Grade B or equivalent beyond 200 NB.
11	Pipe end details	AWU & UAF Water Piping – Bevel end for sizes 65 NB and above & Plain end for sizes 50 NB and below. Drain Water Piping - Screwed

Note : - Tolerance shall be as per EN 10255 and ASTM A-53

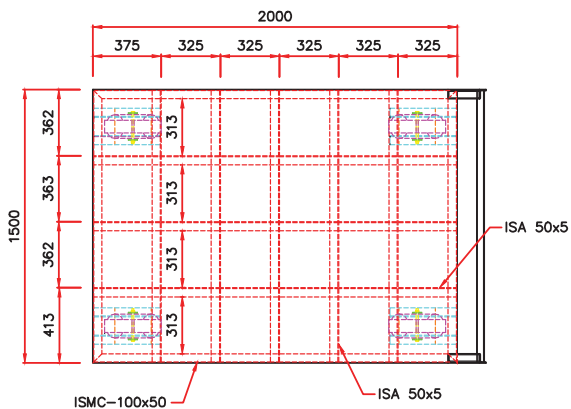
DATASHEET OF GI AND MS SHEET FOR VENTILATION SYSTEM

TDS of MS Epoxy painted duct (if applicable)		
S.No.	Item	Description
1	Application	Exhaust air ducting (if applicable)
2	MOC	CS sheet
3	Thickness	20/22/24 GAUGE
4	Make	TATA steel/ SAIL
5	Painting	Duly epoxy painted
6	Design	As per approved drawing

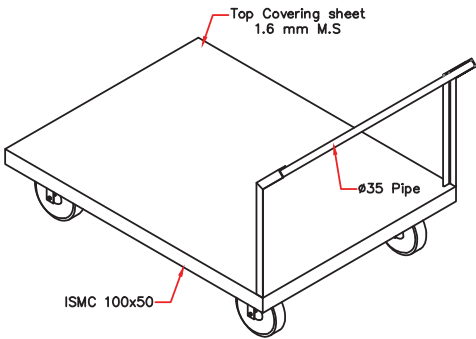
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Date Jan

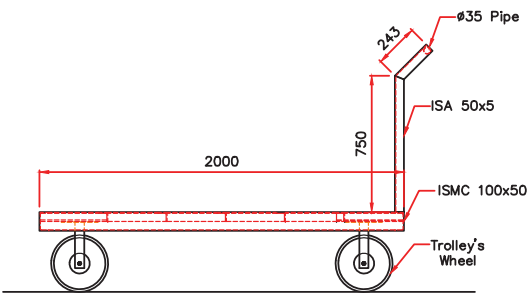
Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract



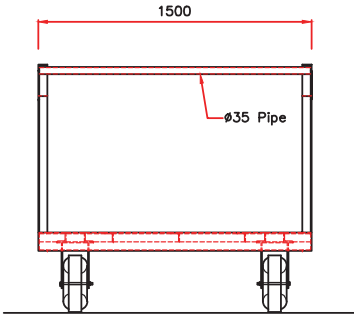
TOP VIEW



ISOMETRIC VIEW



FRONT VIEW



SIDE VIEW

BHEL REFERENCE DOCUMENTS / DRAWINGS	
DOCUMENT / DRAWING NO	DOCUMENT / DRAWING TITLE
NOTES:	
1) ALL DIMENSIONS ARE IN MILLIMETERS & ELEVATIONS ARE IN METERS .	
2) CAPACITY OF TROLLEY IS 1 TON	
3) QUANTITY IS 1 NO.	
CUSTOMER:- BANGLADESH INDIA FRIENDSHIP POWER CORPORATION LTD.	
PROJECT:- MAITREE SUPER THERMAL POWER PROJECT (2x660 MW)	
PACKAGE:- VENTILATION SYSTEM	
EPC CONTRACTOR	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA
TITLE	
GA DRAWING OF MANUAL TROLLEY.	
MAITREE OPS.NO:- MAITREE-00-SAD-DA-1110340-REM	
SHEET : 1 OF 1	REV-01
DRAWING SIZE : A3	

PROJECT: 2 X 660 Maitree STPP , Bangladesh PACKAGE: VENTILATION SYSTEM	OPERATION & CONTROL PHILOSOPHY FOR VENTILATION SYSTEM

1.1) THE AIR WASHER & UAF SYSTEM CONSIST OF FOLLOWING AREAS.

- AWU 1 system at EL.8.5M for TG bdlg.Unit-1
- AWU 3, 4 & 5 system at EL.17.0M for TG bdlg.Unit-1
- AWU 9, 10, 11& 12 system at EL.24.0M for TG bdlg.Unit-1
- AWU 2 system at EL.8.5M for TG bdlg.Unit-2
- AWU 6, 7 & 8 system at EL.17.0M for TG bdlg.Unit-2
- AWU 13, 14, 15 & 16 system at EL.24.0M for TG bdlg.Unit-2
- UAF 1 system at EL.8.5M for ESP bdlg.Unit-1
- UAF 2 system at EL.8.5M for ESP bdlg.Unit-2

2.1) VENTILATION SYSTEM EQUIPMENT FOR TG & ESP BUILDING FOR UNIT 1 & 2

16nos. Air Washer Units in TG Building and 2 no. UAF Unit in ESP Building will be controlled & monitored by DDCMIS. Each Air Washer Unit consists of the following major equipment:

- Supply Air Fan 1 no. with motorized outlet damper
- Water re-circulating Pump 2 nos.(1W+1S)

Each UAF Unit consists of the following major equipment:

- Supply Air Fan 2 nos. (2W) with motorized outlet damper
- Water re-circulating Pump 2 nos.(1W+1S)

Roof Exhaust Fan / Supply Air Fan / Exhaust Air Fan in TG Building will be controlled by individual local starter and will be located nearby equipment

2.2) VENTILATION SYSTEM EQUIPMENT FOR AUXILIARY BUILDING

- Supply Air Fan / Exhaust Air Fan in auxiliary building will be controlled by individual local starter and will be located nearby equipment.

3) DETAILS OF AIR WASHER & UAF SYSTEM

3.1) AIR WASHER & UAF SYSTEM DETAILS

TG Building has total 16 nos. Air washer units & 2 nos. UAF Unit at ESP Building

The above all system will be operated & controlled by DDCMIS. In DDCMIS there shall be provided 4 Graphics for above Air washer & UAF system through which respective Air Washer & UAF System will be operated either in Auto & Manual mode.

3.1.1) OPERATION & CONTROL OF VENTILATION SYSTEM

3.1.1A) Operation & Control of Ventilation System at TG Building & ESP Building

- System (Customer's scope) shall consist of following Graphics pages in which P & I diagram are

PROJECT: 2 X 660 Maitree STPP , Bangladesh PACKAGE: VENTILATION SYSTEM	OPERATION & CONTROL PHILOSOPHY FOR VENTILATION SYSTEM

to be prepared with all necessary POP, Display parameters & Alarm Configuration.

- Graphics for AWU 1 - 2 System at 8.5 meters TG Unit 1 & Unit 2
- Graphics for AWU 3 – 8 System at 17.0 meters TG Unit 1 & unit 2
- Graphics for AWU 9 – 16 System at 24.0 meters TG Unit 1 & Unit 2
- Graphics for UAF 1 – 2 system at 8.5 meters ESP Bdlg.
- Each Graphics page shall have **Auto & Manual** selection by which operator is to decide in which mode system will run.

When **Manual** mode is selected in respective Graphics then individual equipment of that particular area can be operated by actuation of start & stop PB (sift button available in POP of respective drive) from Graphics. When **Auto** mode operation is selected for any particular Graphics then total system of that particular area operates automatically in sequence as per the preset program in DDCMIS provided that “**Auto start**” Command is given from Graphics.

3.2 THE DETAIL OPERATION IN DIFFERENT MODES (AIR WASHER & UAF SYSTEM)

3.2.1 MANUAL MODE OPERATION

When Manual mode is selected in Graphics, the system can be started / operated in the following steps:

STEP-1

(AWU Fan operation)

“**Start**” command for AWU can be given from the Pop-Up Windows of respective drive after found following **permissive interlock** signal healthy.

- ✓ No **trip signal** from MCC.
- ✓ No fire signal.
- ✓ Fan Outlet damper open feedback
- ✓ Fire damper open feedback

At least minimum one no or required nos. Fire Damper are open. This will be ensured by each damper Limit switch. Normally all Fire Dampers will remain open until main power supply is switched off or there is no fire signal in DDCMIS from Fire Alarm panel. All Dampers will be closed if fire signal is received in DDCMIS from Fire Fighting system.

Following indications will be available at Graphics.

ON, OFF & Trip indication of the AWU fan
Fan outlet Damper open/close indications

Following **protection features** have been considered to trip the running AWU Fan.

- ✓ Fan will be immediately tripped if on feedback signal does not come from MCC within 10 seconds after start command is issued.
- ✓ Fan will be tripped as soon as received of trip signal from MCC.

PROJECT: 2 X 660 Maitree STPP , Bangladesh PACKAGE: VENTILATION SYSTEM	OPERATION & CONTROL PHILOSOPHY FOR VENTILATION SYSTEM

- ✓ Fan will be tripped immediately if fire signal exist.

STEP-2

(AWU Pump operation)

After starting of AWU fan, Pump “**Start**” command to AWU Pump can be given from the Graphics if following interlocks are found ok.

- ✓ No **trip signal** from MCC.
- ✓ Off signal feedback is available from MCC
- ✓ Tank water level is Healthy.

Now if all above permissive signals are available then selected Pump can be started from respective popup windows from graphics.

Following **protection features** have been considered to trip the running Pump.

- ✓ Pump will be immediately tripped if on feedback signal does not come from MCC within 10 seconds after start command is issued.
- ✓ Pump will be tripped if pump discharge pressure is not developed within 15 sec after running of Pump.
- ✓ Pump will be tripped as soon as received of trip signal from MCC.
- ✓ Pump will be tripped immediately if tank water level becomes low during running.

Pump ON, OFF & Trip indication will be available at Graphics. Also Alarm will be generated for tank low level.

3.2.2 AUTO MODE OPERATION

When Auto mode of operation is selected from Graphics, the respective AWU system operates automatically in sequence as per the preset program in DDCMIS.

In Auto mode, the AWU Fan will be started first & then pump will be started provided that safety interlock of pump is ok as explained for Manual mode.

3.3 DETAILS OF SHUT DOWN SEQUENCE

3.3.1 MANUAL MODE SHUT DOWN

When manual mode is selected shut down sequence will be as under.

STEP-1

- Give the Stop command to the AWU pump from Graphics and pump will be stopped.

STEP-2

- Stop AWU Fan from Graphics after stopping the Pump.

3.3.2 AUTO MODE SHUT DOWN

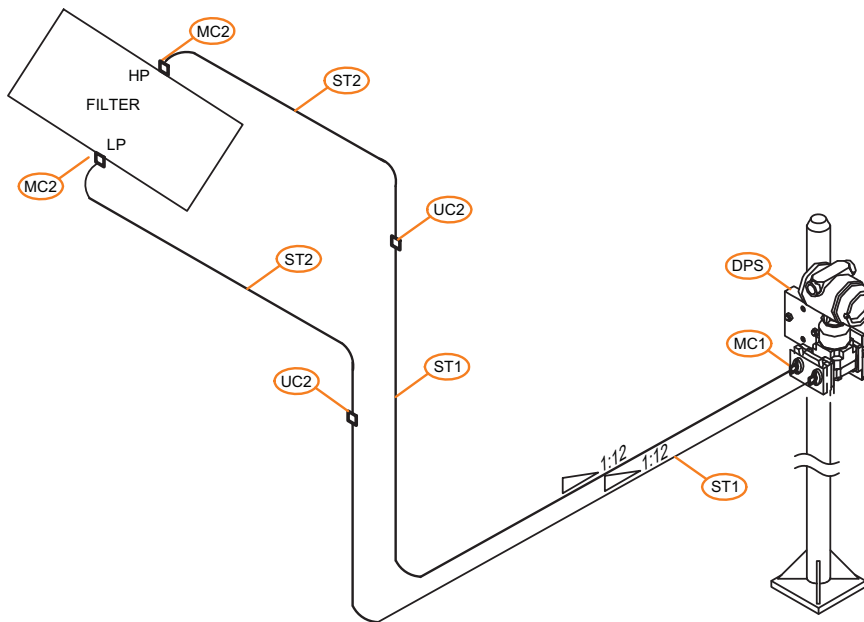
PROJECT: 2 X 660 Maitree STPP , Bangladesh PACKAGE: VENTILATION SYSTEM	OPERATION & CONTROL PHILOSOPHY FOR VENTILATION SYSTEM

When system “**Auto Stop**” command is selected from Graphics then respective AWU system will stop sequentially in steps as explained in case of manual mode operation. The same will also be displayed in Graphics.

Detail operation of the **UAF ventilation** system for ESP will be same as explained for Air Washer system.

DIFFERENTIAL PRESSURE SWITCH - ACROSS FILTERS

3.	03SAC01CP205 & 03SAC01CP206
2.	02SAC01CP205 & 02SAC01CP206
1.	01SAC01CP205 & 01SAC01CP206
SR. NO.	TAG NO.

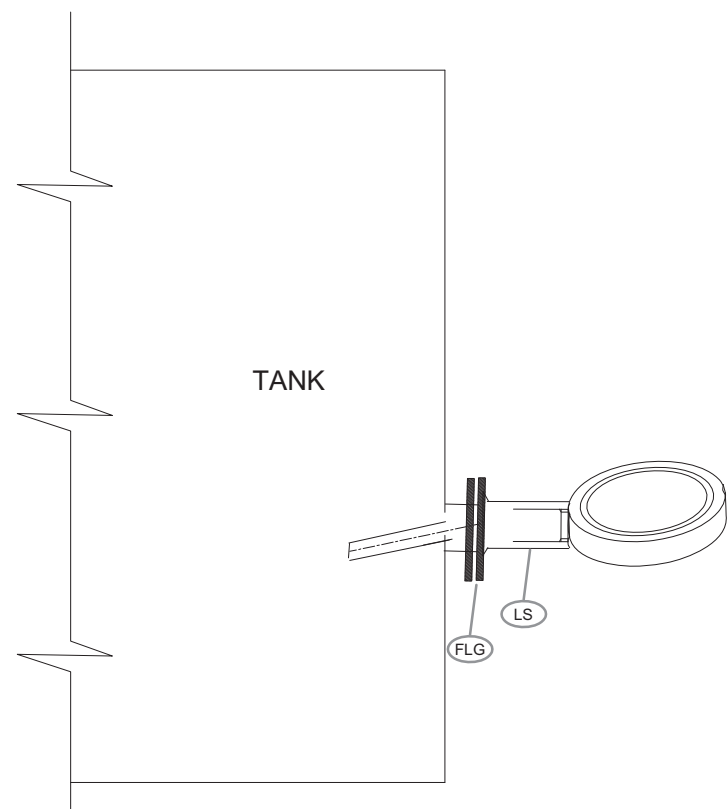


NOTES :

1. THE APPLICABLE INSTRUMENT TAGS WILL BE AS PER P&ID's AND INSTRUMENT SCHEDULE.
2. THE INSTRUMENT MOUNTING CAN BE ON NEAREST WALL AS PER SITE CONDITION INSTEAD OF STANCHION SUPPORT.

PART NO.	QTY	DESCRIPTION	DIMENSIONS
DPS	1	DIFFERENTIAL PRESSURE SWITCH	-
ST1	AS REQD	SEAMLESS TUBE SS316L	1/4" OD x 6000L, Seamless
MC1	2	MALE CONNECTOR SS304	1/4" NPTM x 1/4" OD
UC2	2	TUBE UNION SS304	1/2" OD x 1/4" OD
MC2	2	MALE CONNECTOR SS304	1/2" NPTM x 1/2" OD
ST2	AS REQD	SEAMLESS TUBE SS316L	1/2" OD x 6000L, Seamless

LEVEL SWITCH- TANK



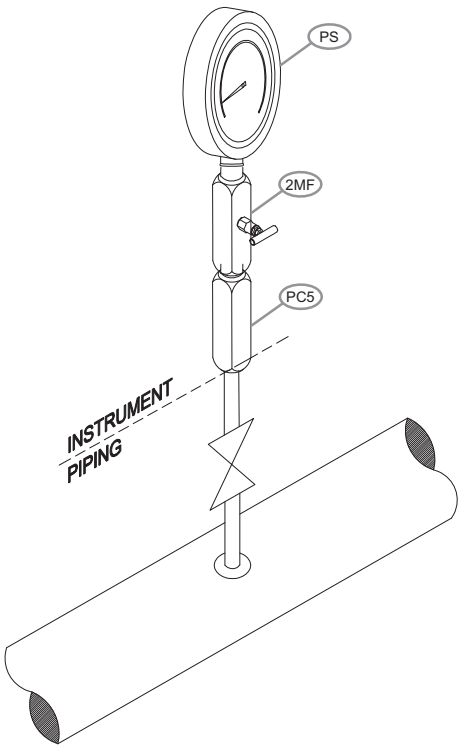
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2.	02SAC01CL203, 02SAC01CL204
1.	01SAC01CL203, 01SAC01CL204
SR. NO.	TAG NO.

NOTES :

1. THE APPLICABLE INSTRUMENT TAGS WILL BE AS PER P&ID's AND INSTRUMENT SCHEDULE.

LS	1	LEVEL SWITCH	-
FLG	1	FLANGE	2" 150# FLANGE
PART NO.	QTY	DESCRIPTION	DIMENSIONS

PRESSURE SWITCH- WATER



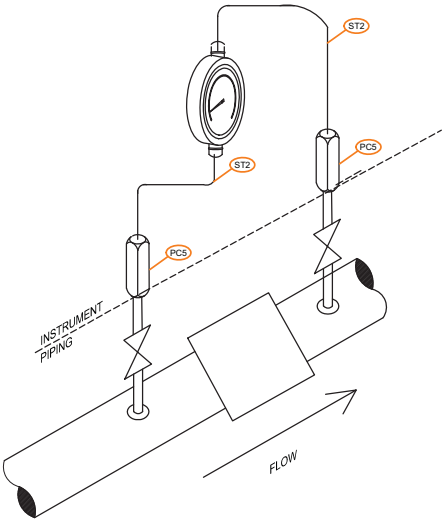
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SR. NO.	TAG NO.

NOTES :

1. THE APPLICABLE INSTRUMENT TAGS WILL BE AS PER P&ID's AND INSTRUMENT SCHEDULE.

PS	1	PRESSURE SWITCH	-
2MF	1	2 WAY MANIFOLD	-
PC5	1	COUPLING	1/2" NPTF x 1/2" NPTF
PART NO.	QTY	DESCRIPTION	DIMENSIONS

DIFFERENTIAL PRESSURE GAUGE- ACROSS STRAINER



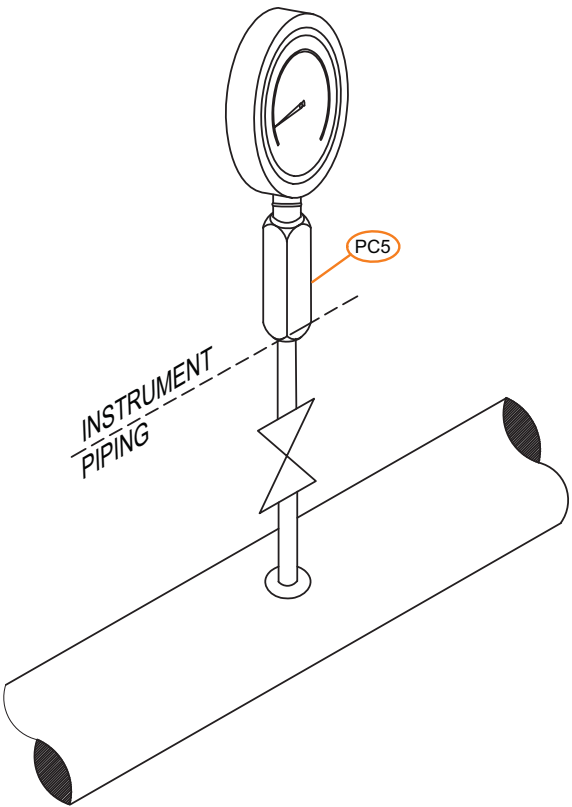
- NOTES:
1. THE APPLICABLE INSTRUMENT TAGS WILL BE AS PER P&ID's AND INSTRUMENT SCHEDULE.

PG	1	DIFFERENTIAL PRESSURE GAUGE	-
ST2	AS REQD	SEAMLESS TUBE SS316L	1/2" OD x 6000L, Seamless
PC5	1	COUPLING	1/2" NPTF x 1/2" NPTF
PART NO.	QTY	DESCRIPTION	DIMENSIONS

FIO
FOR INFORMATION ONLY

Date Sep

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract



NOTES :

1. THE APPLICABLE INSTRUMENT TAGS WILL BE AS PER P&ID's AND INSTRUMENT SCHEDULE.

PG	1	PRESSURE GAUGE	-
PC5	1	COUPLING	1/2" NPTF x 1/2" NPTF
PART NO.	QTY	DESCRIPTION	DIMENSIONS

JB BOQ OF MAITREE VENTILATION SYSTEM SYSTEM				
SNO.	JB description	Terminals	QTY	Area
1	VENT-MPH-JBB-1, VENT-MPH-JBB-2, VENT-MPH-JBB-3, VENT-MPH-JBB-04, VENT-MPH-JBB-05, VENT-MPH-JBB-6, VENT-MPH-JBB-7, VENT-MPH-JBB-08, VENT-MPH-JBB-09, VENT-MPH-JBB-10, VENT-MPH-JBB-11, VENT-MPH-JBB-13, VENT-MPH-JBB-14,VENT-MPH-JBB-15, VENT-MPH-JBB-16	72	15	MAIN PLANT BUILDING
2	VENT-MPH-JBB-12,ESP1-VENT-JBB-01, ESP2-VENT-JBB-01,	96	3	MAIN PLANT BUILDING-1 Nos. ESP1 BLDG- 1 NOS. ESP2-1 NOS.

JB SCHEDULE OF MAITREE (2x660 mw) VENTILATION STPP				
SNO.	JB description	Terminals	Incoming cables	Outgoing cables
1	VENT-MPH-JBB-1, 72 WAYS, MPH BUILDING, 17.0 Mtr	72	VT-JBB-01-C01, VT-JBB-01-C02, VT-JBB-01-C03, VT-JBB-01-C04, VT-JBB-01-C05, VT-JBB-01-C06 (6 NOS.)	CVP66-VT-MPH-01-C001
2	VENT-MPH-JBB-2, 72 WAYS, MPH BUILDING, 17.0 Mtr	72	VT-JBB-02-C01, VT-JBB-02-C02, VT-JBB-02-C03, VT-JBB-02-C04, VT-JBB-02-C05, VT-JBB-02-C06 (6 NOS.)	CVP66-VT-MPH-02-C001
3	VENT-MPH-JBB-3, 72 WAYS, MPH BUILDING, 17.0 Mtr	72	VT-JBB-03-C01, VT-JBB-03-C02, VT-JBB-03-C03, VT-JBB-03-C04, VT-JBB-03-C05, VT-JBB-03-C06 (6 NOS.)	CVP66-VT-MPH-03-C001
4	VENT-MPH-JBB-04, 72 WAYS, MPH BUILDING, 8.5 Mtr	72	VT-JBB-04-C01, VT-JBB-04-C02, VT-JBB-04-C03, VT-JBB-04-C04, VT-JBB-04-C05, VT-JBB-04-C06 (6 NOS.)	CVP66-VT-MPH-04-C001
5	VENT-MPH-JBB-05, 72 WAYS, MPH BUILDING, 24.0 Mtr	72	VT-JBB-05-C01, VT-JBB-05-C02, VT-JBB-05-C03, VT-JBB-05-C04, VT-JBB-05-C05, VT-JBB-05-C06 (6 NOS.)	CVP66-VT-MPH-05-C001
6	VENT-MPH-JBB-6, 72 WAYS, MPH BUILDING, 24.0 Mtr	72	VT-JBB-06-C01, VT-JBB-06-C02, VT-JBB-06-C03, VT-JBB-06-C04, VT-JBB-06-C05, VT-JBB-06-C06 (6 NOS.)	CVP66-VT-MPH-06-C001
7	VENT-MPH-JBB-7, 72 WAYS, MPH BUILDING, 24.0 Mtr	72	VT-JBB-07-C01, VT-JBB-07-C02, VT-JBB-07-C03, VT-JBB-07-C04, VT-JBB-07-C05, VT-JBB-07-C06 (6 NOS.)	CVP66-VT-MPH-07-C001
8	VENT-MPH-JBB-08, 72 WAYS, MPH BUILDING, 24.0 Mtr	72	VT-JBB-08-C01, VT-JBB-08-C02, VT-JBB-08-C03, VT-JBB-08-C04, VT-JBB-08-C05, VT-JBB-08-C06 (6 NOS.)	CVP66-VT-MPH-08-C001

JB SCHEDULE OF MAITREE (2x660 mw) VENTILATION STPP				
SNO.	JB description	Terminals	Incoming cables	Outgoing cables
9	VENT-MPH-JBB-09, 72 WAYS, MPH BUILDING, 8.5 Mtr (UNIT-2)	72	VT-JBB-09-C01, VT-JBB-09-C02, VT-JBB-09-C03, VT-JBB-09-C04, VT-JBB-09-C05, VT-JBB-09-C06 (6 NOS.)	CVP66-VT-MPH-09-C001
10	VENT-MPH-JBB-10, 72 WAYS, MPH BUILDING, 17.0 Mtr (UNIT-2)	72	VT-JBB-10-C01, VT-JBB-10-C02, VT-JBB-10-C03, VT-JBB-10-C04, VT-JBB-10-C05, VT-JBB-10-C06 (6 NOS.)	CVP66-VT-MPH-10-C001
11	VENT-MPH-JBB-11, 72 WAYS, MPH BUILDING, 17.0 Mtr (UNIT-2)	72	VT-JBB-11-C01, VT-JBB-11-C02, VT-JBB-11-C03, VT-JBB-11-C04, VT-JBB-11-C05, VT-JBB-11-C06 (6 NOS.)	CVP66-VT-MPH-11-C001
12	VENT-MPH-JBB-12, 96 WAYS, MPH BUILDING, 17.0 Mtr (UNIT-2)	96	VT-JBB-12-C01, VT-JBB-12-C02, VT-JBB-12-C03, VT-JBB-12-C04, VT-JBB-12-C05, VT-JBB-12-C06, VT-JBB-12-C07, (7 NOS.)	CVP66-VT-MPH-12-C001
13	VENT-MPH-JBB-13, 72 WAYS, MPH BUILDING, 24.0 Mtr (UNIT-2)	72	VT-JBB-13-C01, VT-JBB-13-C02, VT-JBB-13-C03, VT-JBB-13-C04, VT-JBB-13-C05, VT-JBB-13-C06 (6 NOS.)	CVP66-VT-MPH-13-C001
14	VENT-MPH-JBB-14, 72 WAYS, MPH BUILDING, 24.0 Mtr (UNIT-2)	72	VT-JBB-14-C01, VT-JBB-14-C02, VT-JBB-14-C03, VT-JBB-14-C04, VT-JBB-14-C05, VT-JBB-14-C06 (6 NOS.)	CVP66-VT-MPH-14-C001
15	VENT-MPH-JBB-15, 72 WAYS, MPH BUILDING, 24.0 Mtr (UNIT-2)	72	VT-JBB-15-C01, VT-JBB-15-C02, VT-JBB-15-C03, VT-JBB-15-C04, VT-JBB-15-C05, VT-JBB-15-C06 (6 NOS.)	CVP66-VT-MPH-15-C001
16	VENT-MPH-JBB-16, 72 WAYS, MPH BUILDING, 24.0 Mtr (UNIT-2)	72	VT-JBB-16-C01, VT-JBB-16-C02, VT-JBB-16-C03, VT-JBB-16-C04, VT-JBB-16-C05, VT-JBB-16-C06 (6 NOS.)	CVP66-VT-MPH-16-C001

JB SCHEDULE OF MAITREE (2x660 mw) VENTILATION STPP				
SNO.	JB description	Terminals	Incoming cables	Outgoing cables
17	ESP1-VENT-JBB-01, ESP1 BLDG, 8.5 Mtr	96	ESP1-VENT-JBB-01-C01, ESP1-VENT-JBB-01-C02, ESP1-VENT-JBB-01-C03, ESP1-VENT-JBB-01-C04, ESP1-VENT-JBB-01-C05, ESP1-VENT-JBB-01-C06, ESP1-VENT-JBB-01-C07 (7 NOS.)	ESP1-CVP67-JBB1-C001
18	ESP2-VENT-JBB-01, ESP1 BLDG, 8.5 Mtr	96	ESP1-VENT-JBB-02-C01, ESP1-VENT-JBB-02-C02, ESP1-VENT-JBB-02-C03, ESP1-VENT-JBB-02-C04, ESP1-VENT-JBB-02-C05, ESP1-VENT-JBB-02-C06, ESP1-VENT-JBB-02-C07 (7 NOS.)	ESP2-CVP68-JBB1-C001

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

QAP OF FILTERS

 Committed to Excellence		Manufacturer's Name & Address Puromatic Filters (P) Ltd 12 DSIDC Scheme-2 Okhla Industrial Area Phase II New Delhi-110020			Manufacturing Quality Plan Item: Pre & Fine Filter QP No:----- Rev No-00 Date-05.11.2020 Page- 1 of 1				PROJECT: BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH									
									PACKAGE: VENTILATION SYSTEM PACKAGE									
									MAIN CONTRACTOR : BHARAT HEAVY ELECTRICALS LIMITED									
SL.NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY			REMARKS					
					M	C/B					M	C			B			
1	2	3	4	5	6		7	8	9	D	10			11				
1.0	Materials																	
1.1	Frame & Spacer	Visual & Thick-ness of Sheet	Major	Visual & Measurement	Random	Random	App.Drg. & Datasheet	App.Drg. & Datasheet	IIR	Y	P	V	V	Material TC shall be Furnished by Manufacturer				
1.2	Filter Media	Media Width	Do	Measurement	DO	DO	Do	Do	Do	Y	P	V	V	Material TC shall be Furnished by Manufacturer				
		Basic Wt.	Do	Weight	DO	DO	Do	Do	Do	Y	P	V	V					
2.0	Process Inspection																	
2.1	Filter Frame	Dimensional & Visual	Major	Visual & Measurement	100%	Random	Do	Do	Do	Y	P	V	V					
2.2	Filter Media	Stiching & No of Pleats	Do	Visual/ Counting	Do	Random	Do	Do	Do		P	V	V					
3.0	Final Inspection																	
3.1	Assembly	Dimensional & Visual	Do	Measurement	100%	Random 5%	Do	Do	Do	Y	P	W	W	BHEL/BIFPCL witnessed 5% at random (Minimum 2 Nos per visit)				
3.2	End Seal	Tightness	Do	Physical	Do	Do	Do	Do	Do	Y	P	W	W					
3.3	Aesthetics	Visual	Major	Visual	Do	Do	Do	Do	Do		P	V	V					
4.0	Performance Sheet																	
4.1	Flow rate v/s Pessure Drop	Flow Rate v/s Pressure Drop	Critical	Performance Test	One filter/Lot/ Type	One filter/Lot/ Type	As Per EN779/ASHRAE 52.76 Approved Data Sheet	Do	Test Report	Y	P	W	W	* Minimum One Filter /Type/ Lot will be tested irrespective of size of Filters. * Type means Pre/Fine Filter.				
4.2	Average Synthetic Dust Weight. Arrestance	Efficiency	Do	Do	Do	Do	Do	Do	Do	Y	P	W	W	* Lot Size shall be max 500 nos. Filters or part there of offered per visit				
5.0	Review of TC/IIR as per approved QAP as per above						As Per Appd. QAP					V	V					
		LEGEND: D: Records Identified with "Y" shall be essentially included by Manufacturer in QA Documentation M: Manufacturer or Sub Supplier/ C: Main Supplier/ Nominated Agency /B: BIFPCL/ Nominated Agency P: Perform W: Witness V: Verification As Appropriate, CHP: BIFPCL Shall Identified in Column "B" "W" IIR: Internal Inspection Report							DOC.No.		REV-00 CAT...01							
									Vivek Kumar									
MANUFACTURER		MAIN - SUPPLIER					Digitally signed by Vivek Kumar DN: cn=Vivek Kumar, o=BHEL, ou=PEM/MAUX, email=vivekkr@bhel.in, c=US Date: 2021.06.16 16:26:42 +05'30'		APPROVED			APPROVAL SEAL						

*Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract.

QAP FOR PIPES

MANUFACTURING QUALITY ASSURANCE PLAN OF PIPE

		M/S JINDAL INDUSTRIES PVT. LTD., O.P.JINDAL MARG, MODEL TOWN, HISAR, HARYANA		ITEM: QAP of Pipe		QP NO;		PROJECT : BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED, BANGLADESH						
						REV No.;		MAITREE DOCUMENT NO.:MAITREE-00-SAC-QA-112105-PEM-A						
						DATE: 07.11.2020		PACKAGE : VENTILATION SYSTEM PACKAGE						
				AVPL JOB No.:		Page 1 of 1		MAIN CONTRACATOR : BHARAT HEAVY ELECTRICALS LIMITED						
S. NO.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		Agency			REMARKS
					M	C/B					M	C	B	
1	2	3	4	5	6		7	8	9	D*	10			11
1.0 Raw Materials														
	Plate/Sheet/Strip	Thickness & Width	Major	Measurement	100%	100%	IS 10748/EN 10255 / ASTM A53/ BIFPCLTech Spec	IR	√	P	V	V		
		Visual	Major	Visual check	100%	-	IS 10748/EN 10255 / ASTM A53/ BIFPCLTech Spec	IR		P	-	-		
		Chemical & Mechanical properties	Major	Chemical & Mechanical Test	I/ Heat	I/ Heat	IS 10748/EN 10255 / ASTM A53/ BIFPCLTech Spec	Mill TC	√	P	V	V		
2.0 Final Inspection														
2.1	Pipe	Dimensions, Straightness, Ovality & End Connections	Major	Measurement	Sampling as per EN 10255 / ASTM A53		EN 10255 / ASTM A53 / BIFPCL Tech Spec	IR	√	P	W	W		
2.2		Visual Inspection, Appearance, workmanship & Bead Removal	Major	Verification			EN 10255 / ASTM A53 / BIFPCL Tech Spec	IR	√	P	W	W		
2.3		Mechanical Properties	Major	Tensile Strength, Yield strength & % Elongation, Flattening test/ Bend Test for ERW pipe/ Guided bend test for SAW pipe			EN 10255 / ASTM A53 / BIFPCL Tech Spec	IR	√	P	W	W		
2.4	Galvanizing (if applicable)	Finish/ Surface condition	Major	Visual check	100%	100%	EN 10240 / ASTM A53 / BIFPCL Tech Spec	IR	√	P	W	W		
		Uniformity of Zinc Coating	Major	Dip Test	Sampling as per EN 10240 / ASTM A53		EN 10240 / ASTM A53 / BIFPCL Tech Spec	IR	√	P	W	W		
		Thickness of coating/ Mass of Zn Coating, Adhesion of Zinc Coating, Free Bore Test	Major	Measurement & Verification			EN 10240 / ASTM A53 / BIFPCL Tech Spec	IR	√	P	W	W	Selected at random	
2.5	Hydro Test	Leakage	Critical	Hydraulic Pressure Test	100%	5% (See Note 3)	EN 10255 / ASTM A53 / BIFPCL Tech Spec	IR	√	P	W	W		
2.6	Finished Pipe	Identification & Marking	Major	Visual	100%	5%	EN 10255 / ASTM A53 / BIFPCL Tech Spec	IR	√	P	W	W		
			Legend: * Records, identified with "Tick" (V) shall be essentially included by SUPPLIER in QA documentation. ** M : Manufacturer/Sub-SUPPLIER C: Supplier / Nominated Inspection Agency, B: BIFPCL/Nominated Agency P : Perform W: Witness and V: record verification. As Appropriate , CHP : BIFPCL shall identified in Column " B " As " W"							DOC. NO. REV B. CAT				
								Vivek Kumar						
		MANUFACTURER / SUB SUPPLIER	MAIN- SUPPLIER						REVIEWED BY		APPROVED BY		APPROVAL SEAL	
		SIGNATURE					FOR THE OWNER USE							

Vivek Kumar
Vivek Kumar
QAP-001
our=PEM/Maux,
email=vivek@phs
lin, c=US
Date:2021/06/10
10:21:20 +05'30'

QAP FOR VALVES

		MANUFACTURER NAME & ADDRESS BANKIM & COMPANY, HOWRAH AMTA ROAD, BANKRA KABAR PARA, BANKRA, HOWRAH.		MANUFACTURING QUALITY PLAN				PROJECT: 2X660 MW MAITREE STPP PACKAGE: VENTILATION SYSTEM MAIN CONTRACTOR : BHEL SUB CONTRACTOR :					
				ITEM: CAST IRON VALVES 1) Gate Valve- 50 NB (Handwheel Operated) PN-10 2) Globe Valve- 80 NB to 150 NB(Hadnwheel operated) PN-10 3) Check Valve- 80 NB to 150 NB - PN-10								Q.P.NO.: 116 / CIV Rev. 0 DATE: 24.05.2021 PAGE: 1 OF 3	
SL. NO.	COMPONENTS & OPERATIONS	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS	
					M C / N				D	M	C	N	
1	2	3	4	5	6	7	8	9		10		11	
A RAW MATERIALS													
1.0	Body / Bonnet / Yoke / Cover / Wedge / Disc / Gland / Hinge Bracket / Handwheel.	i) Tensile & Hardness. ii) Dimensional iii) Surface Defects.	Critical Major Major	Mechanical Measurement Visual	One per charge. 100% 100%	Approved Data Sheet / Drawing. ..do.. / Mfg. Drawing. Should be free from defects	Same as Col.7 ..do.. No Surface Defects.	Test Report Insp.Report. ..do..	√ 	P P P	V V V	V	Heat numbers will be cast on Body, Bonnet / Cover, Wedge for identification. Correlated Test Reports are to be reviewed by Inspection Authority.
2.0	Body Seat Ring / Wedge Seat Ring / Flap Seat Ring / Yoke Sleeve	i) Mechanical ii) Chemical iii) Dimensional iv) Surface Defects.	Critical Critical Major Major	Mechanical Chemical Analysis Measurement Visual	One per charge One per charge 100% 100%	Approved Data Sheet / Drawing. ..do.. ..do.. Should be free from defects	Same as Col. 7 ..do.. ..do.. No Surface Defects.	Test Report ..do.. Insp.Report. ..do..	√ 	P P P	V V V	V	
3.0	Stem / Hinge Pin.	i) Mechanical ii) Chemical iii) UT on Shaft for dia 50mm & above. iv) Dimensional v) Surface Finish.	Critical Critical Critical Major Major	Mechanical Chemical Analysis UT Measurement Visual	1 / Batch. ..do.. 100% 100% 100%	Approved Data Sheet / Drawing. ..do.. ASTM A 388 Approved Data Sheet / Drawing. Should be free from defects	Same as Col.7 ..do.. NOTE-1 Same as Col.7 No Surface Defects.	Test Report. Test Report. Test Report. Insp. Report. ..do..	√ 	P P P P P	V V V V V	V V V	
NOTE -1 : When BWE set to 100% FSH, a defect echo >= 20% FSH is not acceptable, also loss of BWE >=20% is not acceptable.													
		LEGEND RECORDS IDENTIFIED WITH (√) SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M . MANUFACTURER / SUB CONTRACTOR C . MAIN CONTRACTOR / NOMINATED AGENCY N . BIFPCL / NOMINATED AGENCY							DOC. NO.: REV..... CAT.....				
MANUFACTURER		SUPPLIER					FOR NTPC USE		Vivek Kumar Digitally signed by Vivek Kumar, DN: cn=Vivek Kumar, o=BHEL, ou=PEM/Mauu, email=vivek@bhel.in, c=US Date: 2021.06.10 10:21:59 +05'30'				
SIGNATURE		INDICATE "P" PERFORM "W" WITNESS & "V" VERIFICATION AS APPROPRIATE "CHP" NTPC SHALL IDENTIFY IN COLUMN "N"							REVIEWED BY APPROVED BY APPROVAL SEAL				

		MANUFACTURER NAME & ADDRESS BANKIM & COMPANY, HOWRAH AMTA ROAD, BANKRA KABAR PARA, BANKRA, HOWRAH.		MANUFACTURING QUALITY PLAN				PROJECT: 2X660 MW MAITREE STPP PACKAGE: VENTILATION SYSTEM MAIN CONTRACTOR : BHEL SUB CONTRACTOR :									
				ITEM: CAST IRON VALVES 1) Gate Valve- 50 NB (Handwheel Operated) PN-10 2) Globe Valve- 80 NB to 150 NB(Hadnwheel operated) PN-10 3) Check Valve- 80 NB to 150 NB - PN-10								Q.P.NO.: 116 / CIV Rev. 0 DATE: 24.05.2021 PAGE: 2 OF 3					
SL. NO.	COMPONENTS & OPERATIONS	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS				
					M	C / N				D	M	C	N				
1	2	3	4	5	6		7	8	9		10			11			
B	IN-PROCESS																
1.0	Machining of components above.	i) Machined Dimensions incl. Body thickness.	Major	Measurement	100%	----	Approved Data Sheet / Drawing / Mfg. Drawing.	Same as Col.7	Ins. Report.		P	V	V				
		ii) Surface Defects.	Major	Visual.	100%	----	MFG.STD.	Should be defect free.	..do..		P	V	..				
2.0	Lapping of Body & Seat Rings.	Blue Matching.	Major	Visual	100%	----	MFG.DRG.	Min.80% area contact & continuous line contact.	..do..	√	P	V	V				
3.0	Stem Forging Machining Threading.	i) Dimension	Major	Measurement	100%	----	Mfg.Drg.	Same as Col.7	..do..		P	V	..				
		ii) Surface Defects.	Major	D.P.Test.	100%	----	IS:3658	No defect/flip	..do..	√	P	V	V				
		LEGEND RECORDS IDENTIFIED WITH (√) SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M . MANUFACTURER / SUB CONTRACTOR C . MAIN CONTRACTOR / NOMINATED AGENCY N . BIFPCL / NOMINATED AGENCY								DOC. NO.: REV..... CAT.....							
		VIVEK KUMAR Digitally signed by Vivek Kumar DN: cn=Vivek Kumar, o=BHEL, ou=PEM/Maux, email=vivek@bhel.in, c=US Date: 2021.06.10 10:22:23 +05'30'															
MANUFACTURER		SUPPLIER								FOR NTPC USE		REVIEWED BY		APPROVED BY		APPROVAL SEAL	
SIGNATURE				INDICATE "P" PERFORM "W" WITNESS & "V" VERIFICATION AS APPROPRIATE "CHP" NTPC SHALL IDENTIFY IN COLUMN "N"													

		MANUFACTURER NAME & ADDRESS BANKIM & COMPANY, HOWRAH AMTA ROAD, BANKRA KABAR PARA, BANKRA, HOWRAH.		MANUFACTURING QUALITY PLAN				PROJECT: 2X660 MW MAITREE STPP PACKAGE: VENTILATION SYSTEM MAIN CONTRACTOR : BHEL SUB CONTRACTOR :						
				ITEM: CAST IRON VALVES 1) Gate Valve- 50 NB (Handwheel Operated) PN-10 2) Globe Valve- 80 NB to 150 NB(Hadnwheel operated) PN-10 3) Check Valve- 80 NB to 150 NB - PN-10		Q.P.NO.: 116 / CIV Rev. 0 DATE: 24.05.2021 PAGE: 3 OF 3								
SL. NO.	COMPONENTS & OPERATIONS	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS	
					M	C / N				D	M	C	N	
1	2	3	4	5	6		7	8	9		10			11
C	FINAL INSPECTION													
1.0	Valve movement Test to be operated 3 times in each direction.	Performance	Critical	a) Smooth movement b) Full travel. c) Proper position.	100%	10%	P.O. / Approved Drawing.	Smooth & satisfactory operation.	Ins.Report.	√	P	W	V	
2.0	Overall dimension	Dimensional	Major	Measurement	100%	10%	Approved drawing.	Same as Col.7	..do..	√	P	W	V	
3.0	Wear Travel for Gate Valve. Valve lift for Globe Valve.	Dimensional.	Major	Measurement	100%	10%	Approved Data Sheet / Drawing.	Same as Col.7	..do..	√	P	W	V	
4.0	LEAKAGE TEST													
	i) Body	Leakage.	Major	Hydraulic	100%	10%	Approved Data Sheet / Drawing.	No Leakage.	Ins.Report.	√	P	W	V	
	ii) Seat	a) Leakage. b) Leakage.	Major Major	Hydraulic Pneumatic	100% 100%	10% 10%	..do.. Test At 90 PSI	No Leakage. No Leakage	..do.. ..do..	√ √	P P	W W	V V	
	iii) Seat leakage at reduced pressure for Check Valve.	Leakage.	Major	Hydraulic at 25% of Seat Test Pressure.	100%	10%	IS:6157 / BS:6755 / Appvd. Data Sheet.	No Leakage.	..do..	√	P	W	V	
	iv) Back Seat test at seat test pressure to be done in case of Gate & Globe Valve having Back seat provision.									√	P	W	V	
5.0	Strip Down test.	Inner parts examination including Check for Wear & Tear.	Major	Visual Checking.	100%	20% in case of doubt	MFG.STD./Appd.Drg.	No Wear, Tear & Damage of Internals.	..DO..	√	P	V	V	
6.0	PRESHIPMENT	Drying, Cleaning, Finishing, Painting & Marking etc.	Major	Visual & DFT Measurement, Paint Shade.	100%	----	MFG.STD./P.O./ Tech.Spec. / Approved Painting Schedule.	Same as Col.7	Ins.Report.		P	V	--	
				LEGEND RECORDS IDENTIFIED WITH (√) SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M . MANUFACTURER / SUB CONTRACTOR C . MAIN CONTRACTOR / NOMINATED AGENCY N . BIFPCL / NOMINATED AGENCY						DOC. NO.: REV..... CAT.....				
MANUFACTURER		SUPPLIER						FOR NTPC USE						
SIGNATURE				INDICATE "P" PERFORM "W" WITNESS & "V" VERIFICATION AS APPROPRIATE "CHP" NTPC SHALL IDENTIFY IN COLUMN "N"						REVIEWED BY		APPROVED BY		APPROVAL SEAL

APPROVED
Checked and Approved

Date Mar

Approval doesn't absolve the EPC
contractor of its responsibility as
specified in the Contract

QUALITY PLAN OF MOTOR FOR VENTILATION SYSTEM

LHP			MANUFACTURING QUALITY PLAN				PROJECT : 2 X 660 MW MAITREE STPP					
AS PER APPROVED SUB-VENDOR LIST MAITREE-00-SAD-BA-111901-PEM			Doc. No.: MAITREE-00-SAD-QA-111906-PEM		Rev.: 00		PACKAGE : VENTILATION SYSTEM					
			QUALITY PLAN OF MOTORS (FOR MOTOR 30- 50 KW)						CUSTOMER: BIFPCL, BANGLADESH			
									CONSULTANT: FICHTNER , GERMANY			
									EPC CONTRACTOR : BHARAT HEAVY ELECTRICALS LIMITED			
			VENDOR :									
S. No.	COMPONENT & OPERATION	CHARACTERISTICS CHECKED	CATEGORY	TYPE / METHOD OF CHECK	QUANTAM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE DOCUMENT	FORMAT OF RECORD	INSPECTIO AUTHORITY			REMARKS
								D	P	W	V	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)			(11)
1	Assembly	Workmanship	Major	Visual	100%	Manufacturer Spec	Manufacturer Spec	Insp. Report	4	-	1,2,3	
		Dimensions	Major	Visual	1/Rating/Type	Manufacturer Spec / Approved Drawing / Data Sheet	Manufacturer Spec / Approved Drawing / Data Sheet	Insp. Report	4	-	1,2,3	
		Correctness completeness terminations / marking / color code	Major	Visual	100%	Manufacturer Spec / Approved Drawing / Data Sheet	Manufacturer Spec / Approved Drawing / Data Sheet	Insp. Report	4	-	1,2,3	
2	Painting	Shade	Major	Visual	Sample	Manufacturer Spec / Approved Drawing / Data Sheet	Manufacturer Spec / Approved Drawing / Data Sheet	Insp. Report	4	-	1,2,3	
3	Tests	Routine test	Major	Measurement	100%	IS 12615 / Approved Drawing / Datasheet	IS 12615 / Approved Drawing / Datasheet	Insp. Report	4	2*,3	1	Refer Note no. 2
		Type Test	Major	Measurement	100%	IS 12615 / Approved Drawing / Datasheet	IS 12615 / Approved Drawing / Datasheet	Insp. Report	4	-	1,2,3	Refer Note no. 3
		Dimensions and Operations	Major	Measurement	1/Rating/Type	Approved Drawing / Data Sheet	Approved Drawing / Data Sheet	Insp. Report	4	2*,3	1	Refer Note no. 2
		Nameplate details	Major	Visual	100%	IS 12615 / Approved Drawing / Datasheet	IS 12615 / Approved Drawing / Datasheet	Insp. Report	4	-	1,2,3	
Notes-												
1. Routine tests on 100% motors shall be done by the vendor.												
2. As per Approved Sub-vendor list with Inspection Categorization list, MAITREE-00-SAD-BA-111901-PEM, BHEL shall review Routine test and Type test report for Motor rating equal and less than 30 KW. For motor rating above 30KW, BHEL shall witness the routine test. Quantum of check shall be 10% of each type and motor rating.												
3. Type test certificate of the motor inspected shall not be older than 5 years from date of inspection, otherwise type test shall be conducted without any price implication.												
4. Wherever customer is involved in inspection, 1 shall mean BHEL and customers both together.												
5. For fan motors of rating up to 1.5 kw, only routine test certificates shall be furnished for scrutiny.												
6. List of routine and type test given at the end of this document to be followed												

APPROVED
Checked and Approved

Date Mar

Approval doesn't absolve the EPC contractor of its responsibility as specified in the Contract

LHP			MANUFACTURING QUALITY PLAN				PROJECT : 2 X 660 MW MAITREE STPP					
AS PER APPROVED SUB-VENDOR LIST MAITREE-00-SAD-BA-111901-PEM			Doc. No.: MAITREE-00-SAD-QA-111906-PEM		Rev.: 00		PACKAGE : VENTILATION SYSTEM					
			QUALITY PLAN OF MOTORS (FOR MOTOR 30- 50 KW)				CUSTOMER: BIFPCL, BANGLADESH					
							CONSULTANT: FICHTNER , GERMANY					
							EPC CONTRACTOR : BHARAT HEAVY ELECTRICALS LIMITED					
							VENDOR :					
S. No.	COMPONENT & OPERATION	CHARACTERISTICS CHECKED	CATEGORY	TYPE / METHOD OF CHECK	QUANTAM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE DOCUMENT	FORMAT OF RECORD	INSPECTIO AUTHORITY			REMARKS
								D	P	W	V	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)			(11)

Routine Test including Test as per BHEL Specification	Type Test
a) Visual inspection for Nameplate & Terminal box location. b) Insulation resistance test (before and after HV) c) Measurement of resistance of wdg. of stator, rotor, space heater, thermistor, RTD, BTD as applicable d) No load test at rated voltage to determine input current power and speed & direction of rotation e) Locked rotor readings of voltage, power input, starting current and starting torque at a suitable reduce voltage. f) Reduced voltage running up test g) High voltage test h) Noise level as per IS 12065. ✖ i) Vibration test as per IS 12075. ✖ j) Over speed test @ 120% for 2 minute. ✖	a) Dimensions; b) Measurement of resistance of wdg. of stator, rotor, space heater, thermistor, RTD, BTD as applicable c) No load test at rated voltage to determine input current power and speed d) Reduced voltage running up test at no load (for squirrel cage motors up to 37 kW only); e) Locked rotor readings of voltage, power input, starting current and starting torque at a suitable reduce voltage. f) Full load test to determine full load Voltage, Current, Power, Speed & Slip, Efficiency, Power factor & torque. g) Performance at part load (at 100%, 75%, 50% load). h) Pull Out Torque Test i) Temperature rise test. j) Momentary overload test. k) Insulation resistance test. l) High voltage test. m) IP 55 test (LAB report).

✖ These are to be performed on 1 type / Rating. motors.

Date: 16-Jan-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

			MANUFACTURING QUALITY PLAN				PROJECT :BIFPCL (MAITREE KHULNA STPP BANGLADESH (2x660 MW))							
			Item : Air-Washer & Unitary air Filtration for VENTILATION SYSTEM		BHEL DOC. NO: PE-VO-421-554-A002		MAITREE Doc. No.							
					Rev No. : 1		PACKAGE :VENTILATION SYSTEM							
							LOI. NO. :PSER:SCT:KLN-M1876:18:LOI-S(PKG-B)7020 OF 29.8.19							
					Date : 18.12.2018		MAIN- SUPPLIER :BHARAT HEAVY ELECTRICALS LTD.							
S.NO.	COMPONENT/ OPERATION	CHARACTERISTICS	CATE-GORY	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORM	FORMAT OF RECORD	INSPECTION AGENCY				REMARKS
					M	C					M	C	B	
(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)	(9)	D*	(10)			(11)
1.0 RAW MATERIAL & BOUGHT OUT CONTROL														
1.1	M.S sheets, Plates, Flats, Angles, Sections,GI sheet Double skin puf insulated panel	Visual & Chemical, Mechanical Test	Major	Visual Measurement & Chemical test	One Sample / heat	One Sample / heat	Appr. drg./ Appr. Data sheet	Appr. drg./ Appr. Data sheet	Manf.Test Certificate	√	P	V	V	
1.2	Pipes and fittings	Mechanical, Dimension	Major	TC Verification	One Sample / heat	One Sample / heat	Appr. drg./ Appr. Data sheet	Appr. drg./ Appr. Data sheet	Manf.Test Certificate	√	P	V	V	Pipe as per approved makes
1.3	Air filter (HDPE/synthetic non oven) & Metallic mesh filters for UAF (Approved make)	Visual, dimension	Minor	TC Verification	One / Lot	One / Lot	Appr. drg./ Appr. Data sheet	Appr. drg./ Appr. Data sheet	Inspection Report	√	P	V	V	
1.4	Mist(Moisture) Eliminators (PVC)	Visual, dimension	Minor	TC Verification	One / Lot	One / Lot	Appr. drg./ Appr. Data sheet	Appr. drg./ Appr. Data sheet	Inspection Report	√	P	V	V	
1.5	Nozzle for Spray	Visual	Minor	Visual	At random	At random	Appr. drg./ Appr. Data sheet	Appr. drg./ Appr. Data sheet	Inspection Report	-	P	V	V	
1.6	Valves (Approved make)	Dimension, Visual & Material	Minor	Visual	At random	At random	Appr. drg./ Appr. Data sheet	Appr. drg./ Appr. Data sheet	Manf.Test Certificate	-	P	V	V	
1.7	Pumps, Motors and Instruments	Separate QAPs												
2.0 IN PROGRESS INSPECTION														
2.1	Tank marking , cutting , forming, Casing & pipe fabrication	Visual & measurement	Major	Visual	100%	—	Approved GA drg	Approved GA drg	Fabrication drg.	-	P	V	V	
2.2	Welding /Weldament check	DPT of weld	Major	NDT	20%	—	ASTME 165	No relevant indication	Inspection Report	√	P	V	V	
3.0 IN ASSEMBLY INSPECTION														
3.1	Overall dimension	Visual & measurement	Major	Measurement	Random	Random	Approved GA drg	Approved GA drg	Inspection report	√	P	V	V	
3.2	Water fill test of Sump (Leak test)	Visual	Major	visual	100%	One of each type	Approved GA drg	No leakage	Inspection Report	√	P	W	W	
3.3	Assembly --Tank internals & casing.	Visual, final dimension	Major	Visual & Measurement	One of each type	One of each type	Approved GA drg	Approved GA drg	Inspection Report	√	P	W	W	

APPROVED
Checked and Approved.

Date: 16-Jan-2019

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4.0	FINAL INSPECTION													
4.1	Final Painting	Visual & measurement	Minor	Visual	Random	Random	Technical spec	Technical spec	Inspection Report	-	P	V	V	
Notes :														
1. Latest revision of Standards & Specification shall apply. Only International Standards are applicable. Indian & Chinese Standards are not applicable.														
2. Materials shall be procured in compliance to Functional Technical Specification.														
3. Welding shall be carried out by Qualified Welders, with traceable WPQ, in line with Approved WPS and Qualified PQR, as per ASME Section IX														
4. Only approved welding consumables shall be used, as per Approved Welding Consumable list														
5. NDT shall be carried out by Qualified Personnel with compliance to Approved NDT Procedures and Acceptance Norms, as per ASME Section V.														
6. Gauges and measuring Instruments, with valid calibration only shall be used														
7. Cleaning and Painting of products shall be carried out as per Approved Painting Schedule.														
8. Finished Products shall be packed to comply with Approved Packing Schedule.														
9. Inspection shall be in compliance with Approved Quality Control Procedure for the Product.														
LEGENDS:- RECORDS, IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOC.. **M: MANUFACTURER C: MAIN SUPPLIER, B: BIFPCL, P: PERFORM, W: WITNESS, V: VERIFICATION. AS APPROPRIATE CHP. BIFPCL SHALL IDENTIFY IN COLUMN "B" AS "W".									Doc. No. PE-VO-421-554-A002 Rev : 1 CAT.: 2					
							FOR BIFPCL USE							
									REVIEWED BY	APPROVED BY		APPROVAL SEAL		

Date: 08-Apr-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

			MANUFACTURING QUALITY PLAN				PROJECT : BIFPCL/MAITREE KHULNA STPP,BANGLADESH(2X660 MW)							
Item : Centrifugal fan (DIDW and SISW)					BHEL doc. No PE-V0-421-554-A004		MAITREE Doc. No.:							
					Rev No. R2		PACKAGE : VENTILATION SYSTEM							
							LOI NO:PSER:SCT:KLN-M1876:18:LOI-S(PKG-B)7020 OF 29.08.19							
							MAIN- CONTRACTOR/SUPPLIER :BHARAT HEAVY ELECTRICAL LIMITED							
S.N 0.	COMPONENT/ OPERATION	CHARACTERISTICS	CATEGORY OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORM	FORMAT OF RECORD		INSPECTION AGENCY		REMARKS	
(1)	(2)	(3)	(4)	(5)	M	C	(7)	(6)	(9)	D*	M	C	B	(11)
1.0	RAW MATERIAL & BOUGHT OUT CONTROL													
1.1	M.S sheets/Plates for Casing & Impeller	Visual & cimenson	Major	Visual & measure	100%		No defect..... Approved drawing/ data sheet			—	P	—	—	
		Chemical & Physical	Major	physica & Chemical test	1 Sample / heat or lot		Relevant material standard as par Appr. drg/ Data sheet		Material Test report	√	P	V	V	
1.2	Bar Stock for shaft & shaft sleeve	Visual & dimensicn	Major	Visual & measure	100%		No defect..... Approved drawing/ data sheet			—	P	—	—	
		Chemical & Physical	Major	physica & Chemical test	1 Sample / heat or lot		Relevant material standard as par Appr. drg/ Data sheet		Material Test report	√	P	V	V	
		UT OF SHAFT	Major	NDT	100%		ASTM A-388	Refer note-1	JT Report	√	P	V	V	If shaft dia. is 50 mm. or above.
1.3	Bearing	Make, number visual	Major	Vsual	100%		Apr. drg./ Data sheet	Appr. drg./ Data sheet	COC	√	P	V	V	
1.4	Pulleys	Visual	Major	Vsual	100%		Mfr. Std.	No Defect	COC	—	P	V	—	
2.0	IN PROCESS INSPECTION													
2.1	Casing & Impeller fabrication	DPT of butt welding as applicable	Major	DP test	20%		ASME SEC-V ARTICLE V / ASTM E '65	No relevant Indication	DP Test report	√	P	V	V	
2.2	Shaft	DPT of machined surface	Major	DP test	100%		ASME SEC-V ARTICLE V / ASTM E '65	No relevant Indication	DP Test report	√	P	V	V	
2.3	Impeller dynamic balancing	Residual Un-balance	Critical	Dynamic Balancing test	100%		ISO 1940 - Gr. 6.3	ISO 1940 - Gr. 6.3	Dynamic Balancing report	√	P	V	V	
3.0	FINAL INSPECTION													
3.1	Assembly of fans	Overall Cimenson	Major	Measurement	100%	Random One fan per size	Approved drg	Approved drg	Inspection report	√	P	W	W	

Date: 08-Apr-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

		MANUFACTURING QUALITY PLAN					PROJECT : BIFPCL(MAITREE KHULNA STPP,BANGLADESH(2X660 MW)							
		Item : Centrifugal fan (DIDW and SISW)		BHEL doc. No.PE-V0-421-554-A004		MAITREE Doc. No.:								
Rev. No. R2				PACKAGE : VENTILATION SYSTEM										
				LOI NO:PSER:SCT:KLN-M1876:18:LOI-S(PKG-B)7020 OF 29.08.19										
				MAIN- CONTRACTOR/SUPPLIER :BHARAT HEAVY ELECTRICAL LIMITED										
S.N O.	COMPONENT/ OPERATION	CHARACTERISTICS	CATEGORY OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORM	FORMAT OF RECORD		INSPECTION AGENCY		REMARKS	
(1)	(2)	(3)	(4)	(5)	M	C	(7)	(8)	(9)	D*	(10)		(11)	
3.2	Run test of fan for four hours or till stabilisation or temperature rise whichever is earlier.	RPM, CURRENT, Vibration, Noise and Temp.rise	Critical	Measurement	100%	Random One fan per size per visit from offered lot	Approved TDS / GA drg.	Appd. TDS/GA drg.,Vibration - satisfactory level as per VDI-2056 Gr.T., Temp. rise 40 deg. C max. above ambient temp., noise 85 db at 1 mtr.	Run test report	v	P	W	W	Noise , Vibration are for reference purpose only, guaranteed values are to be shown at site.
3.3	Performance test with job motor/shop motor (as applicable in tech. specs.) (refer note 3,4,5 for motors)	Flow, RPM, Static Pressure, power consumption, static efficiency, Noise level, Vibration & temp. rise	Critical	Measurement	One of each type and size (to be randomly selected from complete lot)		Testing procedure - AMCA 210	Appd. TDS/GA drg.,Vibration - satisfactory level as per VDI-2056 Gr.T., Temp. rise 40 deg. C max. above ambient temp., noise 85 db at 1 mtr.	Performance Test report	v	P	W	W	
3.4	Spray galvanizing/ Painting	Visual / DFT	Major	Visual, Measurement	100%	100%	BIFPCL painting schedule	BIFPCL painting schedule	Painting/Spray Galv. Report	v	P	V	V	
3.5	Review of QA documentation	Compliances	Major	Review	100%	100%	As per QAP	As per QAP	Test reports		P	V	V	
Notes :														
1. Latest revision of Standards & Specification shall apply. Only International Standards are applicable. Indian & Chinese Standards are not applicable.														
2. Materials shall be procured in compliance to Functional Technical Specification.														
3. Welding shall be carried out by Qualified Welders, with traceable WPO, in line with Approved WPS and Qualified PQR, as per ASME Section IX.														
4. Only approved welding consumables shall be used, as per Approved Welding Consumable list.														
5. NDT shall be carried out by Qualified Personnel with compliance to Approved NDT Procedures and Acceptance Norms, as per ASME Section V.														
6. Gauges and measuring Instruments, with valid calibration only shall be used.														
7. Cleaning and Painting of products shall be carried out as per Approved Painting Schedule.														
8. Finished Products shall be packed to comply with Approved Packing Schedule.														
NOTE: 1. When back wall echo set to 100% of FSH in sound area of material, defects echo shall not exceed 20% of FSH and cr back wall echo shall not fall to less than 80% of FSH.														
2. Material of construction shall be as per approved drawing/ data sheet/ tech. specs.. If MOC is not mentioned in approved drawing/ data sheet/ tech. specs. then MOC as per manufacturer standard will be applied.														
3. For motors less than 30 KW : Acceptance of motors is based on COC of the manufacturer and the main contractor confirming as follows, "It is hereby confirmed that the above mentioned motor was/were manufactured taking care of specific requirements regarding ambient temp., voltage, frequency variation, hot starts, pull out torque, starting KVA/KW, temp. rise, distance between center of stud & gland plate and tested in accordance with approved drawing/ data sheet".														
4. For motors 30 KW to less than 50 KW : Acceptance of motors is based on review of routine test inspection report as per applicable standard duly witnessed by main contractor along with COC of the manufacturer and the main contractor confirming as follows, "It is hereby confirmed that the above mentioned motor was/were manufactured taking care of specific requirements regarding ambient temp., voltage, frequency variation, hot starts, pull out torque, starting KVA/KW, temp. rise, distance between center of stud & gland plate, space heater, and tested in accordance with approved drawing/ data sheet.														
5. For motors above 50 KW and above : As per BIFPCL approved quality plan (to be submitted separately for BIFPCL review and approval).														
LEGENDS: RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOC., M : MANUFACTURER/SUB SUPPLIER C: BHEL, B: BIFPCL, P :PERFORM, W: WITNESS, V: VERIFICATION.														
							Doc. PE-V0-421-554-A004	Rev. 2	Cat. I					
MAIN CONTRACTOR (BHEL)							BIFPCL							

Date: 08-Apr-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

	ITEM (material, class, grade, rating, range, size etc.)		STANDARD QUALITY PLAN CONFORMING TO CODE: IS 4894				QP NO.: 0000-999-QOM - S - 091		REVIEWED BY:		APPROVED BY	
	CENTRIFUGAL FAN (DIDW/SISW) (Capacity AS per Manufacturer Approval Range)						Rev. No. 00	Date	30.03.2017	H S MAURYA		K K OJHA
			Page 1 Of 2		RAJEEV GARG		K J RAO					
			VALID UPTO : 19.03.2020									
SN	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M C / N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	M	C	N	REMARKS
1.	2.	3.	4.	5.	6.	7.	8.	9.	D*	10		11.

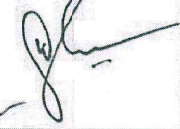
1	MATERIAL OF CONSTRUCTION & BOUGHT OUT ITEMS													
1.1	MS Sheet/ Plates for Casing & Impeller	Visual & Dimension	Major	Visual & measure	100%	-----No defect----- Approved drawing / data sheet			-	P	-	-		
		Chemical & Physical	Major	Physical & Chemical test	1 Sample/ heat or lot	Relevant Material standard as per approved drawing/ data sheet		Material test report	√	P	V	V		
1.2	Bar Stock for Shaft & Shaft Sleeve	Visual & Dimension	Major	Visual & measure	100%	-----No defect----- Approved drawing / data sheet			-	P	-	-		
		Chemical & Physical	Major	Physical & Chemical test	1 Sample/ heat or lot	Relevant Material standard as per approved drawing/ data sheet		Material test report	√	P	V	V		
		UT OF SHAFT	Major	NDT	100%	ASTMA 388	Refer Note-1	UT Report	√	P	V	V	If shaft Dia is 50mm dia. & above	
1.3	Bearing	Make, Number, Visual	Major	Visual	100%	Approved Drawing/Datasheet	Approved Drawing/Datasheet	COC	√	P	V	V		
1.4	Pulley	Visual	-do-	Visual	100%	Mfr Standard	No defect	COC		P	V	-		
2.0	IN PROCESS INSPECTION													
2.1	Casing / Impeller fabrication	DPT of butt welding as applicable	Major	DP Test	20%	ASME SEC-V, Article-V / ASTM E 165	No Relevant Indication	DP test report	√	P	V	V		
2.2	Shaft	DPT of machined surface	Major	DP Test	100%	ASME SEC-V, Article -VI / ASTM E 165	No Relevant Indication	DP test report	√	P	V	V		
2.3	Impeller dynamic balancing	Residual Un-balance	Critical	Dynamic Balancing test	100%	ISO-1940, GR-6.3	ISO-1940, GR-6.3	Dynamic Balancing report	√	P	V	V		
3.0	Final Inspection													
3.1	Assembly of Fans	Overall Dimension	Major	Measurement	100 %	Random one fan per size	Approved Drawing	Approved Drawing	Inspection report	√	P	W	W	

LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (☒) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
 ** M: MANUFACTURER/SUB-SUPPLIER, C: MAIN SUPPLIER N: NTPC, P: PERFORM, W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHIP: NTPC SHALL IDENTIFY IN COLUM "N" AS "W"

NOTE: # NTPC INSPECTION ENGINEER TO CHECK, APPROVAL DATE / REVISION NO. OF REFERENCE DOCUMENTS AT THE TIME OF INSPECTION.

Date: 08-Apr-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

	ITEM (material, class, grade, rating, range, size etc.)		STANDARD QUALITY PLAN CONFORMING TO CODE: IS 4894				QP NO.: 0000-999-QOM – S - 091			REVIEWED BY:			APPROVED BY	
	CENTRIFUGAL FAN (DIDW/SISW) (Capacity AS per Manufacturer Approval Range)						Rev. No. 00			Date 30.03.2017			H S MAURYA	
						Page 2 Of 2			RAJEEV GARG					
						VALID UPTO : 19.03.2020			K J RAO					
SN	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M C / N		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	10			11.

3.2	Run test of fan for Four hours or till stabilization or temperature rise whichever is earlier.	RPM, Current, Vibration, Noise and Temperature rise	Critical	Measure ment	100%	Random one fan per size per visit from offered lot	Approved TDS/ GA Drg	Approved TDS/ GA Drg / Vibration - Satisfactory level as per VDI-2056. Gr. - T. Temperature rise - 40-degree C. maximum above ambient temp. Noise- 85 Db at 1 mtr	Run test Report	√	P	W	W	Noise and vibrations are for reference purpose at shop, Guaranteed value to be shown at site
3.3	Performance test with Job Motor / shop Motor (as applicable in technical specification) (refer note 3 for motor)	Flow, RPM, Static Pressure, Power consumption , Static Efficiency, Noise level, Vibration & Temperature rise	Critical	Measure ment	One of each type and size (To be randomly selected from complete lot)		IS 13368 / 4894/ AMCA 210 for DIDW and	Approved TDS/ GAD / Vibration - Satisfactory level as per VDI-2056. Gr T Temperature rise - 40-degree C. maximum above ambient temp. Noise- 85 Db at 1 mtr	Performance test report	√	P	W	W	
3.4	Spray Galvanizing / Painting	Visual, DFT	Major	Visual, Measure ment	100%	100%	NTPC painting Schedule	NTPC painting Schedule	Painting / Spray Galv report	√	P	V	V	
3.5	Review of QA Documentation	Compliances	Major	Review	100%	100%	As per AQP	As per AQP	Test reports		P	V	V	

NOTE-

- . When back wall echo set to 100% of FSH in sound area of material, defects echo shall not exceed 20% of FSH and or back wall echo shall not fall to less than 80% of FSH.
- .Material of construction shall be as per approved drawing /data sheet/ technical specification. If MOC is not mentioned in approved drawing /data sheet/ technical specification, then MOC s per manufacturer standard will be applicable.
- i) For Motors less than 30 KW: Acceptance of Motor less than 30 KW is based on COC of the Manufacturer and the Main Contractor confirming as follows: "It is hereby confirmed that the above mentioned motor /motors was/ were manufactured taking care of NTPC specific requirements regarding ambient temp., voltage & frequency variation, hot starts, pull out torque, starting VA/KW, temp. rise, distance between center of stud & gland plate and tested in accordance with approved drawing /data sheets".
- ii) For Motors 30 KW and less than 50 KW : Acceptance of Motor rating from 30 KW & up to 50 KW is based on NTPC review of Routine Test inspection report as per IS: 3225/applicable andards duly witnessed by main contractor along with COC of the Manufacturer and the Main Contractor confirming as follows: "It is hereby confirmed that the above mentioned motor notors was/ were manufactured taking care of NTPC specific requirements regarding ambient temp., voltage & frequency variation, hot starts, pull out torque, starting KVA/KW, temp. rise, istance between center of stud & gland plate, space heater and tested in accordance with approved drawing /data sheets".
- iii) For Motors 50 KW & above: AS PER NTPC APPROVED QUALITY PLAN (To be submitted separately for NTPC review & approval).

LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (☐) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.

** M: MANUFACTURER/SUB-SUPPLIER, C: MAIN SUPPLIER N: NTPC, P: PERFORM, W: WITNESS AND V: VERIFICATION. AS APPROPRIATE. CHP: NTPC SHALL IDENTIFY IN COLUM "N" AS "W"

NOTE: # NTPC INSPECTION ENGINEER TO CHECK, APPROVAL DATE / REVISION NO. OF REFERENCE DOCUMENTS AT THE TIME OF INSPECTION.

Date: 24-Sep-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.



Manufacturer Name & Address:
Flowmore Limited
Unit-I & Unit-II
Sahibabad -
1210101, Disst-
Ghaziabad (UP)

MANUFACTURING QUALITY PLAN

ITEM: QAP of pumps for ventilation system

QP No.: MAITREE-00-SAD
-QA-111903-PEM
REV. NO: 02
DATE: 18/05/2019
Page 1 of 4

PROJECT : 2 x 660 MW MAITREE
PACKAGE: VENTILATION SYSTEM

S. NO.	COMPONENT S & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORM AT OF RECORDS	AGENCY			REMARKS
					M	C/B				M	C	B	
1	2	3	4	5	6		7	8	9	D*	**10		11

RAW MATERIAL INSPECTION:

1	CASING	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V	NO REPAIR WELDING IS PERMITTED ON CI. AS CAST / PUNCHED HEAT NO SHALL BE PROVIDED FOR CORRELATION.
		MECHANICAL PROPERTIES	MAJOR	TENSILE TEST	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V	
		SURFACE EXAMINATION	MAJOR	VISUAL INSPECTION	100%	CASTING WILL BE FREE FROM CRACKS, SHRINKAGE, COLD SHUT, INJURIOUS POROSITY, SAND FUSION ETC.	IR		P	V	V	
2	IMPELLER	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1SAMPLE /HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V	
		MECHANICAL PROPERTIES	MAJOR	TENSILE TEST & HARDNESS	1SAMPLE/HEAT/ HT BATCH	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V	
		HEAT TREATMENT (AS APPLICABLE)	CRITICAL	REVIEW OF TIME TEMP CHART	100%	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	HT CHART	✓	P	V	V	
		SURFACE EXAMINATION	MAJOR	VISUAL INSPECTION	100%	CASTING WILL BE FREE FROM CRACKS, SHRINKAGE, COLD SHUT, INJURIOUS POROSITY, SAND FUSION ETC.	IR		P	V	V	
3	BARS (ROLLED / FORGED) FOR SHAFT & SHAFT SLEEVES	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1SAMPLE /HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V	
		MECHANICAL PROPERTIES	MAJOR	TENSILE TEST	1SAMPLE /HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V	
		SOUNDNESS	CRITICAL	ULTRASONIC TEST	100%	FLOWMORE PROCEDURE QCP/NDT/JUT/01	UT REPORT	✓	P	V	V	FOR BAR DIA. ≥ 50 MM ONLY.
4	WEARING RINGS	CHEMICAL PROPERTIES	MAJOR	CHEMICAL ANALYSIS,	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V	
		MECHANICAL PROPERTIES	MAJOR	TENSILE TEST & HARDNESS	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTR	✓	P	V	V	

LEGEND :

* RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION
** M MANUFACTURER / SUB- SUPPLIER C: MAIN SUPPLIER, B: BIFPCL P PERFORM W : WITNESS AND V: VERIFICATION AS APPROPRIATE ,

NOTE#

Inspection engineer to check approval date / revision documents at the time

Date: 24-Sep-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

S. NO.		COMPONENT S & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORM AT OF RECORDS	AGENCY	REMARKS	
						M	C/B				M	C	B
1		2	3	4	5	6		7	8	9	10		11
		MANUFACTURING QUALITY PLAN ITEM: QAP of pumps for ventilation system QP No.: MAITREE-00-SAD-QA-111903-PEM REV. NO: 02 DATE: 18/05/2019 Page 2 of 4 PROJECT : 2 x 660 MW MAITREE STPP PACKAGE: VENTILATION SYSTEM											
		Manufacturer Name & Address: Flowmore Limited Unit-I & Unit-II Sahibabad - 1210101, Disst-Ghaziabad (UP)											
IN PROCESS INSPECTION:													
5	CASING & WEAR RINGS	DIMENSIONAL	MAJOR	MEASURE	100%			MANUFACTURING DRAWING	IR	/	P	V	-
		HYDROSTATIC TEST OF CASING	CRITICAL	PRESSURE TEST	100%	20%		SEE NOTE 2	NO LEAKAGE	IR	/	P	W
6	IMPELLER	DIMENSIONAL	MAJOR	MEASURE	100%			MANUFACTURING DRAWING	IR	/	P	V	-
		DYNAMIC BALANCING	CRITICAL	MEASURE	100%	20%		ISO 1940, GR, 6.3	IR	/	P	W	-
7	DPT OF MACHINED AREA OF CASINGS & IMPELLER	SOUNDNESS OF CASTINGS	MAJOR	NDT - DPT	100%			FLOWMORE PROCEDURE FMP/NDT/PRO/PT/01	DPT REPORT	/	P	V	-
8	SHAFT & SLEEVES	DIMENSIONAL	MAJOR	VISUAL	100%			MANUFACTURING DRAWING	IR	/	P	V	-
		SOUNDNESS	CRITICAL	ULTRASONIC TEST	100%			FLOWMORE PROCEDURE QCP/NDT/UT/01	UT REPORT	/	P	W	-
		DP TEST ON MACHINED AREA	MAJOR	DP TEST	100%			FLOWMORE PROCEDURE FMP/NDT/PRO/PT/01	DPT REPORT	/	P	V	-
FINAL INSPECTION :													
9	PUMP ASSEMBLY	DIMENSIONAL	MAJOR	MEASURE	100%	100%		APPROVED G.A DRAWING	IR	/	P	V	V
10	PERFORMANCE TEST WITH JOB MOTOR/SHOP MOTOR	Q VS H Q VS P Q VS I/J	CRITICAL	MEASURE	100%	100%		APPROVED PERFORMANCE TEST PROCEDURE & APPROVED DATA SHEET	IR	/	P	W	W
		NOISE LEVEL	MAJOR	MEASURE					IR	/	P	W	W
		VIBRATION	MAJOR	MEASURE					IR	/	P	W	W
		BEARING TEMP	MAJOR	MEASURE					IR	/	P	W	W
11	NPSHR TEST	NPSHR TEST	CRITICAL	MEASURE	100%	1 NO./MODEL		APPROVED NPSHR TEST PROCEDURE	IR	/	P	W	W
12	PAINTING AND PACKING	TYPE OF PAINT, APPEARANCE, DFT	MAJOR	VISUAL & MEASURE	100%			TECHNICAL SPECIFICATION/PAINTING SCHEDULE	IR		P	V	V
LEGEND : * RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION ** M MANUFACTURER / SUB- SUPPLIER C: MAIN SUPPLIER, B: BIFPCL P PERFORM W : WITNESS AND V: VERIFICATION AS APPROPRIATE ,										NOTE# Inspection engineer to check documents at the time of inspection			
1/1													

Date: 24-Sep-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

		Manufacturer Name & Address: Flowmore Limited Unit-I & Unit-II Sahibabad - 1210101, Disst- Ghaziabad (UP)		MANUFACTURING QUALITY PLAN									
				ITEM: QAP of pumps for Ventilation System				QP No.: MAITREE-00-SAD -QA-111903-PEM REV. NO: 02 DATE: 18/05/2019 Page 3 of 4			PROJECT : 2 x 660 MW MAITREE STPP PACKAGE: VENTILATION SYSTEM		
S. NO.	COMPONENT S & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORM AT OF RECORDS	AGENCY	REMARKS		
					M	C/B							
1	2	3	4	5	6		7	8	9	D*	M C B **10		
		CONFORMANCE TO PACKING SPECIFICATION	MAJOR	VISUAL	100%		MANUFACTURE STANDARD PRACTICE	IR		P	V V		

NOTES:

1	For these checks, Witness (W) by BHEL and BIFPCL, shall be based on the following criteria; - For Pump Motor rating less than or equal to 60 KW, both BHEL & BIFPCL shall only verify the Test Reports of the check by M/s Flowmore. - For Pump Motor rating more than 60 KW, BHEL shall witness the check & BIFPCL shall verify the Test Reports
2	Test pressure shall be 1.5 times the shut off head or twice the duty point whichever is higher. Holding time will be 30 minutes.
3	For Performance Test of Pumps, Witness (W) by BHEL/BIFPCL, shall be based on the following criteria; - For Pump Motor rating less than or equal to 60 KW, the performance test of 1 pump per type (min.1) offered for inspection, per visit shall be randomly selected for witness by main supplier. - For Pump Motor rating more than 60 KW but less than or equal to 110 KW, the Performance Test of 20% of Total numbers of pumps of each type (Min. 1) offered for inspection, per visit, shall be randomly selected for witness by BHEL as well as BIFPCL. - For Pump Motor rating more than to 110 KW and pumps for fire fighting applications, the performance test of 50% of the pumps of each type offered for inspection per visit, shall be randomly selected for witness by BHEL as well as BIFPCL.
4	Noise & Vibration level shall be recorded during shop test for reference purpose only. However values as per approved data sheet/ technical specification/ IS/ HIS to be guaranteed at site.
5	In case of abnormal noise, Pump shall be tripped and shall be re-offered for Performance Test after correction.
6	- For Pump Motor rating less than or equal to 110 KW, both BHEL/ BIFPCL shall review the Test Reports of the NPSH test witnessed by M/s FLOWMORE/ Third Party Agency, during Final inspection. - For Pump Motor rating more than 110 KW, both BHEL/BIFPCL shall witness NPSH test. However, in Case NPSH test has been carried out previously on the same Model as of the offered Pump, and was witnessed by BIFPCL, then retest of the NPSH Test is not required & BIFPCL shall only review such NPSH Test Report, during final inspection.

LEGEND :
 * RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION
 ** M MANUFACTURER / SUB- SUPPLIER C: MAIN SUPPLIER, B: BIFPCL P PERFORM W : WITNESS AND V: VERIFICATION AS APPROPRIATE ,

NOTE#
 Inspection engineer to check , approval date / revision documents at the time of inspection

Date: 24-Sep-2019

*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

		Manufacturer Name & Address: Flowmore Limited Unit-I & Unit-II Sahibabad - 1210101, Disst- Ghaziabad (UP)		MANUFACTURING QUALITY PLAN							
				ITEM: QAP of pumps for Ventilation System		QP No.: MAITREE-00-SAD-QA-111903-PEM REV. NO: 02 DATE: 18/05/2019 Page 4 of 4		PROJECT : 2 x 660 MW MAITREE STPP PACKAGE: VENTILATION SYSTEM			
S. NO.	COMPONENT S & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORM AT OF RECORDS	AGENCY	REMARKS
1	2	3	4	5	M	C/B	6	7	8	9	10

NOTES:

1. Latest revision of Standards & Specification shall apply. Only International Standards are applicable. Indian & Chinese Standards are not applicable Materials shall be procured in compliance to Functional Technical Specification.
2. Inspection shall be in compliance with Approved Quality Control Procedure for the Product.
3. Welding shall be carried out by Qualified Welders, with traceable WPD, in line with Approved WPS and Qualified PQR, as per ASME Section IX.
4. Only approved welding consumables shall be used, as per Approved Welding Consumable list.
5. NDT shall be carried out by Qualified Personnel with compliance to Approved NDT Procedures and Acceptance Norms, as per ASME Section V Gauge Instruments, with valid calibration only shall be used Cleaning and Painting of products shall be carried out as per Approved Painting Schedule.
6. Finished Products shall be packed to comply with Approved Packing Schedule.

LEGEND : * RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION ** M MANUFACTURER / SUB- SUPPLIER C: MAIN SUPPLIER, B: BIFPCL P PERFORM W : WITNESS AND V: VERIFICATION AS APPROPRIATE ,	NOTE# Inspection engineer to check , approval date / revision documents at the time of inspection
1/1	

REFERENCE NTPC QUALITY PLAN (THIS
REFERENCE QUALITY PLAN IS NOT PART
OF THIS MAITREE PUMPS QUALITY PLAN)



NTPC LTD.
(ENGINEERING DIVISION)
ENGINEERING OFFICE COMPLEX
A-8A, SEC-24, NOIDA, U.P. 201301
PH.: 0120-4946298 FAX 0120-2410208

TRANSMITTAL FOR DOCUMENTS**FROM : AGM (QA-SPL)****REF. : 01/CQA/0000-SPL/2016****DATE : 13/10/2016****TO : M/s. Flowmore Limited**

Unit-1, AT 9th Milestone G.T.Road
Mohan Nagar, Sahibabad, GHAZIABAD
Unit-II AT 28 A Site-IV, Industrial Area
SAHIBABAD GHAZIABAD (UP)

RIO: NTPC - DELHI

Please find enclosed following documents for necessary action at your end as indicated in purpose code

	Item	RQP No	Rev No	No. of Copies	Purpose code	Remarks
01	HORIZONTAL CENTRIFUGAL PUMP	0000-999-QOMQP-455	01	1	11	

- 1.Approved in CAT-I
- 2.Approved in CAT-II With comments resubmit
- 3.Not APPROVED- CAT-III
- 4.Approved in CAT-IV(For information only)
- 5Released for Fabrication/Construction

- 6.for your comments
- 7.Revised as per your comments
8. For your approval
- 9.for your information
- 10.As-built
- 11.Approved for Reference subject to approval of Endorsement sheet

SIGNATURE :

NAME :

K. J. RAO
(K. J. RAO)

FORMAT NO. : QS-01-DIV-P-02/F2-

ENGINEERING DIVISION

APPROVED
Checked and Approved.
Date: 24-Sep-2019
*Approval doesn't absolve the EPC contractor of it's responsibility as specified in the Contract.

MANUFACTURER'S NAME AND ADDRESS				REFERENCE QUALITY PLAN						TO BE FILLED BY NTPC			
ITEM				SIGN OF MFR.		NTPC RCP NO		REVIEWED BY		APPROVED BY			
FLOWMORE LIMITED				END SUCTION, HORIZONTAL SPLIT CASE, SUMP & MULTISTAGE PUMP, FIRE FIGHTING PUMPS		FL/HSC/01		01		SATYA NARAYAN			
UNIT-I 9 th MILESTONE G.T ROAD MOHAN NAGAR, SAHIBABAD, GHAZIABAD				HIS /IS		RCP NO.		DATE		RAJEEV GARG			
UNIT-II 28 A SITE -IV INDUSTRIAL AREA SAHIBABAD GHAZIABAD U.P				UNIT I & II UP TO 300 KW		REV NO.		VALID UP TO		K J RAO			
CLASS				TYPE OF CHECK		REFERENCE DOCUMENT		ACCEPTANCE NORMS		REMARK			
SN		COMPONENT & OPERATIONS	CHARACTERISTICS	4	5	6	7	8	9	D*	11		
1		2	3	4	5	6	7	8	9	D*	11		

RAW MATERIAL INSPECTION:											
1	CASING	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V
		MECHANICAL PROPERTIES	MAJOR	TENSILE TEST	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V
		SURFACE EXAMINATION	MAJOR	VISUAL INSPECTION	100%	CASTING WILL BE FREE FROM CRACKS, SHRINKAGE, COLD SHUT, INJURIOUS POROSITY, SAND FUSION ETC.	IR		P	V	V
2	IMPELLER	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V
		MECHANICAL PROPERTIES	MAJOR	TENSILE TEST & HARDNESS	1 SAMPLE / HEAT / HT BATCH	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V
		HEAT TREATMENT (AS APPLICABLE)	CRITICAL	REVIEW OF TIME TEMP CHART	100%	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	HT CHART	✓	P	V	V
		SURFACE EXAMINATION	MAJOR	VISUAL INSPECTION	100%	CASTING WILL BE FREE FROM CRACKS, SHRINKAGE, COLD SHUT, INJURIOUS POROSITY, SAND FUSION ETC.	IR		P	V	V
3	BARS (ROLLED / FORGED) FOR SHAFT & SHAFT SLEEVES	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V
		MECHANICAL PROPERTIES	MAJOR	TENSILE TEST	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V
		SOUNDNESS	CRITICAL	ULTRASONIC TEST	100%	FLOWMORE PROCEDURE QCP/NDT/UT/01	UT REPORT	✓	P	V	V
4	WEARING RINGS	CHEMICAL PROPERTIES	MAJOR	CHEMICAL ANALYSIS	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTC	✓	P	V	V
		MECHANICAL PROPERTIES	MAJOR	TENSILE TEST & HARDNESS	1 SAMPLE / HEAT	RELEVANT MATERIAL SPECS AS PER APPD. DRG./ DATA SHEETS	MTR	✓	P	V	V

LEGEND :		NOTE#	
* RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION		NTPC Inspection engineer to check , approval date /	
** M MANUFACTURER / SUB- SUPPLIER C: MAIN SUPPLIER, N: NTPC P PERFORM W : WITNESS AND V: VERIFICATION AS APPROPRIATE ,CHP: NTPC SHALL IDENTIFY IN COLUMN 'N' AS 'W'		revision documents at the time of inspection	
FORMAT NO. - QS-01-QAIP-10/F3 - R1		1/1	
		ENGG. DIV / QA&I	

MANUFACTURER'S NAME AND ADDRESS				REFERENCE QUALITY PLAN				TO BE FILLED BY NTPC			
FLOWMORE PUMPS UNIT-I 9TH MILESTONE G.T ROAD MOHAN NAGAR, SAHIBABAD, GHAZIABAD UNIT-II 28 A SITE -IV INDUSTRIAL AREA SAHIBABAD GHAZIABAD U.P				ITEM	SIGN OF MFR			NTPC ROP NO	REVIEWED BY	APPROVED BY	
				TYPE	END SUCTION, HORIZONTAL SPLIT CASE, SUMP & MULTISTAGE PUMP, FIRE FIGHTING PUMPS			FLHSC/01	01	SATYA NARAYAN	
				DESIGN STANDARD	HIS /IS			ROP NO.		RAJEEV	
				POWER RATING	UNIT I & II UP TO 300 KW			REV NO.		GARGAN	
								DATE :		K J RAO	
SN	COMPONENT & OPERATIONS	CHARACTERISTI CS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARK	
					M C/N				M C N		
1	2	3	4	5	6	7	8	9	D*	11	

IN PROCESS INSPECTION:													
5	CASING & WEAR RINGS	DIMENSIONAL	MAJOR	MEASURE	100%			MANUFACTURING DRAWING	IR	✓	P	V	SEE NOTE -1
		HYDROSTATIC TEST OF CASING	CRITICAL	PRESSURE TEST	100%	20%		SEE NOTE 2	IR	✓	P	W	
6	IMPELLER	DIMENSIONAL	MAJOR	MEASURE	100%			MANUFACTURING DRAWING	IR	✓	P	V	V
		DYNAMIC BALANCING	CRITICAL	MEASURE	100%	20%		ISO 1940, GR. 6.3	IR	✓	P	W	V
7	DPT OF MACHINED AREA OF CASINGS & IMPELLER	SOUNDNESS OF CASTINGS	MAJOR	NDT - DPT	100%			FLOWMORE PROCEDURE FMP/NDT/PROIPT/01	DPT REPORT	✓	P	V	V
8	SHAFT & SLEEVES	DIMENSIONAL	MAJOR	VISUAL	100%			MANUFACTURING DRAWING	IR	✓	P	V	V
		SOUNDNESS	CRITICAL	ULTRASONIC TEST	100%			FLOWMORE PROCEDURE QCP/NDT/UT/01	UT REPORT	✓	P	W	V
		DP TEST ON MACHINED AREA	MAJOR	DP TEST	100%			FLOWMORE PROCEDURE FMP/NDT/PROIPT/01	DPT REPORT	✓	P	V	V

FINAL INSPECTION :																
9	PUMP ASSEMBLY	DIMENSIONAL	MAJOR	MEASURE	100%	100%	APPROVED G.A. DRAWING	IR	✓	P	V	V				
10	PERFORMANCE TEST WITH JOB MOTOR	Q VS H	CRITICAL	MEASURE	100%	100%	APPROVED PERFORMANCE TEST PROCEDURE (ENCLOSED) & APPROVED DATA SHEET	IR	✓	P	W	REFER NOTE - 3				
		Q VS P														
		Q VS η	MAJOR	MEASURE	✓	P							W	W		
		NOISE LEVEL	MAJOR	MEASURE	✓	P							W	W		
		VIBRATION	MAJOR	MEASURE				IR	✓	P	W	REFER NOTE - 4				
		BEARING TEMP	MAJOR	MEASURE									✓	P	W	W
11	NPSHR TEST	NPSHR TEST	CRITICAL	MEASURE	100%	1 NO./ MODEL	APPROVED NPSHR TEST PROCEDURE (ENCLOSED)	IR	✓	P	W	W	REFER NOTE - 6			
12	PAINTING AND PACKING	TYPE OF PAINT, APPEARANCE, DFT	MAJOR	VISUAL & MEASURE	100%		NTPC TECHNICAL SPECIFICATION	IR		P	V	-				

LEGEND :		NOTE#
* RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION		NTPC Inspection engineer to check , approval date /
** M MANUFACTURER / SUB- SUPPLIER C: MAIN SUPPLIER N: NTPC P PERFORM W : WITNESS AND V: VERIFICATION AS APPROPRIATE ,CHP: NTPC SHALL IDENTIFY IN COLUMN 'N' AS 'W'.		revision documents at the time of inspection
FORMAT NO. - QS-01-QAIP-10/F3 - R1		ENG. DIV / QA&I

MANUFACTURER'S NAME AND ADDRESS				REFERENCE QUALITY PLAN				TO BE FILLED BY NTPC							
ITEM				SIGN OF MFCR				NTPC ROP NO							
TYPE				END SUCTION, HORIZONTAL SPLIT CASE, SUMP & MULTISTAGE PUMP, FIRE FIGHTING PUMPS				FLHSC/01							
DESIGN STANDARD				HIS /IS				REV NO.							
POWER RATING				UNIT I & II				DATE :							
FLOWMORE LIMITED				UP TO 300 KW				DATE							
UNIT-I				9 th MILESTONE G.T ROAD				VALID UP TO							
UNIT-II				MOHAN NAGAR, SAHIBABAD, GHAZIABAD				PAGE NO.							
28 A SITE -IV INDUSTRIAL AREA				SAHIBABAD GHAZIABAD U.P				3 of 3							
CLASS				TYPE OF CHECK				REFERENCE DOCUMENT							
SN				COMPONENT & OPERATIONS				CHARACTERISTI CS							
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1.0	SCOPE		
	This procedure is applicable for NPSH testing of Horizontal Centrifugal Pumps to establish Nett Positive Suction Head requirement of the pump, without reference to the final installation conditions.		
2.0	REFERENCE STANDARD / ACCEPTANCE STANDARDS		
	HIS / Technical Specifications/Approved Data Sheet/QAP		
3.0	THE TEST LAYOUT.		
	The flow circuit will be in accordance with the layout drawing enclosed herewith.		
4.0	MEASURING INSTRUMENTS DETAILS		
	Quantity	Instrument	Accuracy
	Flow Capacity	Electromagnetic Flow meter	± 1.5%
	Head	Bourdon Tube Pressure Gauge / Manometer	± 0.5 % FSD
	Speed	Non – Contact Digital Tachometer	± 1 RPM
	Temperature	Digital Temp. Indicator	± 0.1° C
	All the instruments will have valid calibration certificates from appropriate authorities.		
5.0	TEST PROCEDURE		
5.1	The pump will be tested with job motor in accordance with Technical Specifications/Approved Data Sheet, at the works of Flowmore Ltd., Mohan Nagar, Sahibabad, Ghaziabad (U.P)		
5.2	Pump operating conditions will be varied with the help of throttle valves in the delivery and suction pipes.		
5.3	Prior to starting of the test, the pump shall run for sufficient time till the flow conditions are stabilized.		
5.4	With Suction valve in full open condition, the discharge valve will be gradually opened to obtain head and discharge readings as near to the duty conditions as possible. Sufficient time will be allowed for flow conditions to stabilize. The Flowmeter, Discharge Pressure Gauge, Suction Monometer and water Temperature readings will be taken and recorded.		
6.0	TEST CALCULATIONS		
6.1	Capacity (Q) is measured directly in cubic meters per hr with the help of an Electromagnetic Flowmeter.		
6.2	Under the above operating conditions, NPSH available at pump Suction = NPSH _R = $H_a \pm H_s - \frac{V_s^2}{2g} \pm Z - h_{vp}$		

	PREPARED BY	REVIEWED BY	APPROVED BY
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DATE	14/01/13	14/01/13	14/01/13

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	Where H_a = Atmospheric Pressure in MWC H_s = Suction Manometer reading converted to MWC h_{vp} = Vapour pressure in MWC. To be calculated/measured using water data/ charts. V_s = Velocity of water in Suction Pipe in Mtr/sec $= 4Q/(3600 \times 3.14 \times D_s^2)$ D_s = Suction pipe ID in Meters Z = Difference between Pump Centre line & Suction Manometer connection g = Acceleration due to gravity $= 9.81 \text{ m/s}^2$
7.0	PERFORMANCE AT SPECIFIED SPEED
	The $NPSH_R$ calculated above pertains to the actual speed of rotation (N) during test which may be in deviation from the specified speed of rotation. Following formulae will be used to calculate $NPSH_R$ at the specified speed $NPSH_{RS} = NPSH_R (N_s/N)^2$ Where a. Suffix 's' implies quantity at specified conditions. b. $NPSH_R$ = Nett Positive Suction Head required in MWC c. N= Speed of rotation in RPM during the Test
8	ACCEPTANCE NORMS
	The observed $NPSH_R$ at specified speed with Pump operating at near duty conditions shall be compared with the value given in Approved Datasheet.

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