The following modifications with respect to Technical Specification for **Compressed Air System** BHEL's Technical specification no **PE-TS-410-555-A001** shall apply.

Bidder to note that existing clauses/details as appearing in the specification stands deleted and clauses/details as mentioned in "Modified to or Read as" column shall be applicable and complied by the bidder.

MODIFIED CLAUSES/PAGE NUMBERS.

Sl no.	Vol. No.	Section/ Description	Clause no	Page no	Existing clause/details	Modified to or Read as
1.	IIB	SECTION– C.1	1.1.5	12 of 311	Seven (7) Nos. Air Receivers of minimum fifteen (15) Cu.M capacity each with instruments, relief valve, drain connection with automatic trap stations and other accessories as specified	Eight (8) Nos. Air Receivers of minimum fifteen (15) Cu.M capacity each with instruments, relief valve, drain connection with automatic trap stations and other accessories as specified.
2.	IIB	SECTION – C.2	3.1	19 of 311	Six (6) nos. air receiver of 15 M3 (min.) capacity, i.e., one no. for each compressor near compressor house. One number of unit Air Receiver of capacity 15m3 located in TG building. The final size of the receivers shall be as per the calculation.	Eight (8) nos. air receivers of 15 M3 (min.) capacity near compressor house.
3.	IIB	SECTION – C.2	2.01.04	27 of 311	Instrument and Service Air Receiver of number equal to that of each instrument and service air compressor respectively shall be provided to store instrument and service air.	Eight (8) nos. air receivers of 15 M3 (min.) capacity near compressor house.
4.	IIB	SECTION – C.2	6.01.01	33 of 311	There shall be one (1) Air Receiver for each IA compressor and one (1) Air receiver for each SA compressor.	Eight (8) nos. air receivers of 15 M3 (min.) capacity near compressor house.
5.	IIB	SECTION – C.2	ANNEXURE-A- Point-H(b)	49 of 311	Air Receiver Numbers required: One (1) for each IA compressor + (1) for each SA compressor	Eight (8) nos. air receivers of 15 M3 (min.) capacity near compressor house.

6.	III	ANNEXURE – IV	ELECTRICAL LOAD DATA	267 of 311	Load Data Electrical (REV.00)	Load Data Electrical (REV.01) attached as ANNEXURE-A
7.	III	ANNEXURE – VI	P&ID	273 of 311	P&ID FOR COMPRESSED AIR SYSTEM (PE-DG-410-555-SK001 REV-1)	P&ID FOR COMPRESSED AIR SYSTEM (PE-DG-410-555-SK001 rev.2) attached as ANNEXURE-B
8.	III	ANNEXURE – XII	PRICE SCHEDULE Cl. 2.4.0	289 of 311	Air receiver at Compressor house of 15 M3 capacity with each having Pressure gauges, Temperature gauges, Relief valve, Drain connection with zero purge type automatic trap stations and other accessories as specified: Qty- 7 nos.	Refer Annexure-C of this document. All other sheets & clauses in the price schedule remains unchanged.
9.	IIB	SECTION – C.4		From page -140 to page-142	SPECIFIC TECHNICAL REQUIREMENTS (C&I)	The mentioned pages (Page 140 to 142) to be replaced by the pages given in ANNEXURE-D.
10.	III	ANNEXURE – XII	Sl.no.6 PE-DG-410-555-SK002	274 of 311	COMPRESSOR HOUSE LAYOUT (PE-DG-410-555-SK002 rev.1)	COMPRESSOR HOUSE LAYOUT (PE-DG-410-555-SK002 rev.2) attached as ANNEXURE-F
11.	General				GA drawings and datasheet of Motor for 2-Pole & 4-Pole are attached (Refer annexure –E) for reference and estimation purpose only. Final motor rating shall be as per the specification requirement and shall be decided during detail engineering. Further HT motors shall be supplied by BHEL-Bhopal at successful bidder's works for assembly & testing of each compressor.	

Note: The total no. of air receivers to be provided for the package shall be 8 Nos. In case any other quantity of air receiver has been specified elsewhere in the specification same shall be treated as VOID.

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LOAD TITLE	RATING (KW / A)		UNIT (U)/STN (S)	Nos.		VOLTAGE CODE*	FEEDER CODE**	EMER. LOAD (Y)	CONT.(C)/ INTT.(I)	STARTING TIME >5 SEC (Y)	LOCATION	BOARD NO.	CABLE		BLOCK CABLE DRG. No.	CONTROL CODE	REMARKS	LOAD No.
	NAME PLATE	MAX. CONT. DEMAND (MCR)		RUNNING	STANDBY								SIZE CODE	NOs				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Instrument air Compressors	300 KW		S	2	1	C	U	N	C		Compressor House							
Service air Compressors	300 KW		S	2	1	C	U	N	C		Compressor House							
Instrument air compressor fan motor (if required separate power supply)	2.2 KW		S	2	1	D	U	N	C		Compressor House							
Service air compressor fan motor (if required separate power supply)	2.2 KW		S	2	1	D	U	N	C		Compressor House							
Instrument air compressor panel	3 KW		S	2	1	E	S	N	C		Compressor House							
Service air compressor panel	3 KW		S	2	1	E	S	N	C		Compressor House							
Instrument air Compressors motor space heater	0.15 KW		S	2	1	E	D	N	I		Compressor House							
Instrument air Compressors motor space heater	0.15 KW		S	2	1	E	D	N	I		Compressor House							
AIR DRYER PLANT PANEL	2 KW		S	2	1	D	S	N	C		Compressor House							
AIR DRYER PLANT MOTOR	9 KW		S	2	1	D	U	N	C									
AUTO DRAIN TRAP	0.3 KW		S	8	-	E	S	N	I		8 nos. at Compressor House							

NOTES:
1. COLUMN 1 TO 12 & 18 SHALL BE FILLED BY THE REQUISITIONER (ORIGINATING AGENCY); REMAINING COLUMNS ARE TO BE FILLED UP BY PEM (ELECTRICAL)/ CUSTOMER
2. ABBREVIATIONS : * VOLTAGE CODE (7):- (ac) A=11 KV, B=6.6 KV, C=3.3 KV, D=415 V, E=240 V (1 PH), F=110 V (cc): G=220 V, H=110 V, J=48 V, K=+24V, L=-24 V
: ** FEEDER CODE (8):- U=UNIDIRECTIONAL STARTER, B=BI-DIRECTIONAL STARTER, S=SUPPLY FEEDER, D=SUPPLY FEEDER (CONTACTER CONTROLLED)

LOAD DATA (ELECTRICAL)	JOB NO.	410	ORIGINATING AGENCY		PEM (ELECTRICAL)
	PROJECT TITLE	1X800 MW KOTHAGUDEM TPS	NAME		DATA FILLED UP ON
	SYSTEM	COMPRESSED AIR SYSTEM	SIGN.		DATA ENTERED ON
	DEPTT. / SECTION	MAX 267 of 311	SHEET 1 OF 2	REV. 0 1	DE'S SIGN. & DATE

LOAD TITLE	RATING (KW / A)		UNIT (U)/STN (S)	Nos.		VOLTAGE CODE*	FEEDER CODE**	EMER. LOAD (Y)	CONT.(C)/ INTT.(I)	STARTING TIME >5 SEC (Y)	LOCATION	BOARD NO.	CABLE		BLOCK CABLE DRG. No.	CONTROL CODE	REMARKS	LOAD No.
	NAME PLATE	MAX. CONT. DEMAND (MCR)		RUNNING	STANDBY								SIZE CODE	NOs				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Any other power supply as required by bidder	To be filled by bidder																	

Note:

1. Bidder to confirm that the system provided by them would be catered by the above loads considered by BHEL. In case there is any variation, the same should be clearly stated in the technical offer. No changes would be admissible during detailed engineering stage.

2. Bidder to note that for the system being supplied by them, only the above loads will be provided. In case any other load is required the same would be derived / multiplied by bidder on their own from these feeders only.

NOTES: 1. COLUMN 1 TO 12 & 18 SHALL BE FILLED BY THE REQUISITIONER (ORIGINATING AGENCY); REMAINING COLUMNS ARE TO BE FILLED UP BY PEM (ELECTRICAL)/ CUSTOMER

2. ABBREVIATIONS : * VOLTAGE CODE (7):- (ac) A=11 KV, B=6.6 KV, C=3.3 KV, D=415 V, E=240 V (1 PH), F=110 V (cc): G=220 V, H=110 V, J=48 V, K=+24V, L=-24 V

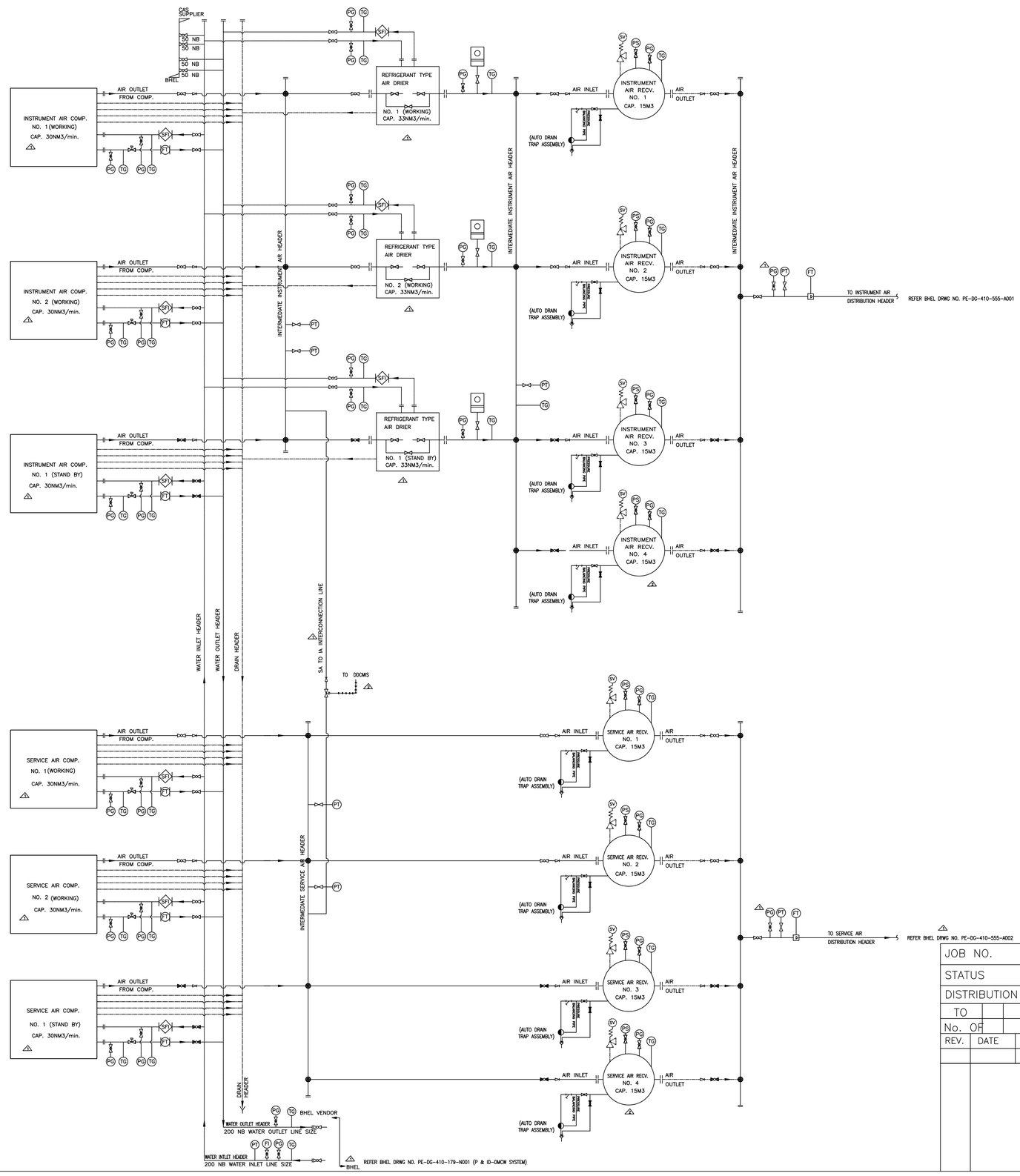
: ** FEEDER CODE (8):- U=UNIDIRECTIONAL STARTER, B=BI-DIRECTIONAL STARTER, S=SUPPLY FEEDER, D=SUPPLY FEEDER (CONTACTER CONTROLLED)

LOAD DATA (ELECTRICAL)	JOB NO.	410	ORIGINATING AGENCY		PEM (ELECTRICAL)	
	PROJECT TITLE	1X800 MW KOTHAGUDEM TPS	NAME		DATA FILLED UP ON	
	SYSTEM	COMPRESSED AIR SYSTEM	SIGN.		DATA ENTERED ON	
	DEPTT. / SECTION	MAX 268 of 311	SHEET 2 OF 2	REV. 0 1	DE'S SIGN. & DATE	

FIRST ANGLE PROJECTION ALL DIMENSIONS ARE IN MM

ANNEXURE-B

DRAWING NO. PE-DG-410-555-SK001



LEGEND

SYMBOL	DESCRIPTION
	NON RETURN VALVE
	BALL VALVE (OPEN)
	BALL VALVE (CLOSED)
	GLOBE VALVE (OPEN)
	GLOBE VALVE (CLOSED)
SV	RELIEF/SAFETY VALVE (OPEN)
	DOWN STREAM PRESSURE CONTROL VALVE
	SOLENOID VALVE
Y	'Y' TYPE FUNNEL
DP	DEW POINT METER.
	WATER LINE
	DRAIN LINE
	AIR LINE
FS	FLOW SWITCH
TG	TEMP. GAUGE
PG	PRESSURE GAUGE
PT	PRESSURE TRANSMITTER
FI	FLOW INDICATOR
FT	VORTEX TYPE FLOW TANSMITTER
SFI	SIGHT FLOW INDICATOR
FT	FLOW TRANSMITTER

NOTES :-

1. THE GIVEN P&I IS CONFINED TO INSTRUMENTS AND PIPING FOR COMPRESSOR HOUSE AREA ONLY.
2. ALL INTERCONNECTING COMPRESSED AIR PIPING SHALL BE STAINLESS STEEL.
3. ALL COOLING WATER PIPING WILL BE CONFORMING TO IS:1239 (PART-I, HEAVY GRADE).
4. FITTINGS FOR AIR PIPING SHALL BE CONFORMING TO RELEVANT BIS STANDARD AND GRADE.EQUIVALENT THAT OF PARENT PIPE GRADE.
5. COMPRESSED AIR PIPING HANDLING HOT AIR WILL BE SUITABLY INSULATED SO AS TO RESTRICT SURFACE TEMPERATURE TO 60 deg C.
6. DRAIN PIPING UPTO THE NEAREST DRAIN POINT WITHIN THE AIR COMPRESSOR ROOM SHALL BE PROVIDED.
7. ⚠ THE TIMING OF THE AUTO DRAIN TRAP TO BE ADJUSTED IN SUCH A WAY THAT ALL THE TRAPS WILL NOT OPERATE AT A TIME.
8. ⚠ DEW POINT METER SHALL HAVE OUTPUT 4-20 mA, FOR CONNECTING IT TO DCS.
9. ⚠ AIR DISTRIBUTION SHALL BE THROUGH SS MANIFOLDS ONLY

JOB NO.	410
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	

REV.	DATE	ALTD	CHD	APPD

CUSTOMER

TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA
1x800 MW KOTHAGUDAM TPS STAGE-VII UNIT#12, PALONCHA

CONSULTANT:
OWNER'S

DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHEL Maharatna Company

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	SKY	Sd/-	25.04.2015
	DESN	SKY	Sd/-	25.04.2015
	CHD	SR	Sd/-	25.04.2015
	APPD	HK	Sd/-	25.04.2015

TITLE: P & ID FOR COMPRESSED AIR SYSTEM WITH REFRIGERANT DRIER TYPE

DEPT. / SIGN / DATE / SCALE

DRAWING No. PE-DG-410-555-SK001

SHEET 01 OF 01 REV 02

FORMAT SIZE A3

ANNEXURE-C

PRICE SCHEDULE **Rev 01** **23.05.1**

1 X 800 MW KOTHAGUDAM TPP

ANNEXURE-I
MAIN SUPPLY - PRICE SCHEDULE FOR COMPRESSED AIR SYSTEM PACKAGE

				UNIT PRICE				TOTAL PRICE					
Sl.No	DESCRIPTION OF EQUIPMENT / ITEM	QUANTITY		Ex-works price	ED	CST / VAT	FREIGHT	Ex-works price	ED	CST / VAT	FREIGHT	FOR SITE	REMARKS
1	2	3		4	5	6	7	8	9	10	11	12 (8 to 11)	
1.0.0	**Total lumpsum firm prices for the supply of equipment & services as specified, Comprising Design, Engineering, Manufacture, Inspection & Testing at Manufacturer's Works, Painting at Manufacturer's Works, Duly packed for Transportation, Delivery to Site, loading, unloading & storage at site, supply of erection materials, consumables, start-up & commissioning spares, and mandatory spares as required to complete the compressed air system for the total scope defined in technical specification (spec.No. PE-TS-410-555-A001) and terms & conditions of tender, taking into account all clarifications, confirmations and agreements till date for Compressed Air System for 1 X 800 MW KOTHAGUDEM TPS.**													
2.0.0	**Break Up Prices**												
2.1.0	**Instrument Air Compressor (oil free Screw)** Each of 30 NM3/Minute capacity at 8.5 kg/cm2 (g) with accessories, Suction filter and silencer, Inter Cooler, After Cooler with moisture separators, automatic drain traps, instruments, Control panel etc. **(Electric motor to drive the compressor is excluded from bidders scope).**	3	Nos										**Coloumn (12) of this clause shall be within 30-33 % of Total price at coloumn 12 of 1.0.0**
2.2.0	**Service Air Compressor (oil free Screw)** Each of 30 NM3/Minute capacity at 8.5 kg/cm2 (g) with accessories, Suction filter and silencer Inter Cooler, After Cooler with moisture separators, automatic drain traps, instruments, Control panel etc. **(Electric motor to drive the compressor is excluded from bidders scope)**	3	Nos										**Coloumn (12) of this clause shall be within 30-33 % of Total price at coloumn 12 of 1.0.0**
2.3.0	**Air Dryer (Refrigerant Type)** Air Drying Plant of 33 NM^3/min and to match instrument air compressor with all instruments and controls including Electronic Dew point meter as specified.	3	Nos										**Coloumn (12) of this clause shall be within 8-12 % of Total price at coloumn 12 of 1.0.0**
2.4.0	**Air recievers** Air receiver at Compressor house of 15 M3 capacity with each having Pressure gauges, Temperature gauges, Relief valve, Drain connection with zero purge type automatic trap stations and other accessories as specified.	8	Nos										**Coloumn (12) of this clause shall be within 6-8 % of Total price at coloumn 12 of 1.0.0**
2.5.0	**Pipes & fittings** Inter connecting cooling water, compressed air piping & Drain piping up to the nearest common drain point outside compressor house as specified including fittings and valves, etc. for complete compressed air system	1	Lot										**Coloumn (12) of this clause shall be within 8-12 % of Total price at coloumn 12 of 1.0.0**
2.6.0	Field instruments as specified including temperature scanners as specified.	1	Lot										**Coloumn (12) of this clause shall be within 7-9 % of Total price at coloumn 12 of 1.0.0**
2.7.0	Cable, Cable lugs, glands, junction box etc for Compressed Air System equipment as required.	1	Lot										
2.8.0	Total lump sum prices for Start-Up & commissioning spares (as specified in the Annexure-VIII , Volume-III of the technical specification PE-TS-410-555-A001)	1	Lot										**Coloumn (12) of this clause shall be within 1-3 % of Total price at coloumn 12 of 1.0.0**
3.0.0	**Total of 2.0.0 (Total of 2.1.0 to 2.8.0) (should match with coloumn(12) of 1.0.0)**												**Coloumn (12) of this clause shall be 100 % of Total price at coloumn 12 of 1.0.0**
	Bidder's / bidder's representative signature										Company seal		

	Telangana State Power Generation Corporation Ltd. 1x800 MW Kothagudem TPS	SECTION: C SHEET 1 OF 3
	SPECIFIC TECHNICAL REQUIREMENTS (C&I) COMPRESSED AIR SYSTEM	

SPECIFIC TECHNICAL REQUIREMENTS (C&I)

1.0 **Complete C&I system** for Compressed Air System is in bidder scope of supply. Items not specifically mentioned however required for the completeness of the system shall be supplied by bidder.

2.0 Control, Protection & interlocking system for individual compressors shall be achieved through skid mounted **redundant microprocessor based controllers** with Graphic User Interface (GUI) with LCD screen based display unit, control switches and other operational keys. These individual controllers shall be hooked-up to Plant DDCMIS RTU through **dual two way redundant Ethernet soft link.** Air Dryer logics shall directly be implemented in DDCMIS RTU.

3.0 In addition to above Compressed Air System shall be controlled and monitored from plant DDCMIS. To achieve these operational & functional requirements, **hardwired signals** shall be provided/accepted for DCS use. Number of hardwired signal shall be decided during **detailed engineering**.

4.0 For realizing total loading/unloading cycles, standby start logic, remote start-up logic, Group control of air compressors, **bidder shall furnish the required logic, control write-up and HMI graphics for overall operation of the compressor from DCS, during detailed engineering.**

5.0 Integrated microprocessor based control system along with suitable operator interface shall be provided for each Instrument Air Compressor & Service Air Compressor. All PT, DPT, TE, and other instruments outside the compressor skid shall also be hooked-up to this system. Dual two way redundant Ethernet connectivity to DCS shall be provided through optical fiber link for information. In addition to the soft link, provision for hardwired START, STOP, LOAD & UNLOAD commands from DCS to all the compressors & their status feedbacks to DCS shall also be provided. Bidder to furnish the configuration diagram of control system of compressor showing communication with DCS along with the bid.

6.0 BHEL shall provide redundant 230V AC UPS supply feeder for compressor control system. Further distribution to various instruments shall be in Bidder's scope. Bidder to include necessary power distribution board in his scope. Any power supply other than the above, if required by any instrument/device, has to be derived by the Bidder and all necessary hardware/software for the same shall be in bidder's scope. Bidder to furnish UPS power requirement along with the bid.

7.0 Suitable servers / soft links (OPC) and time synchronization including all required software & hardware shall be provided for interfacing with plant Master Clock System (MCS) and DDCMIS for monitoring and limited control.

8.0 All H.T. motors shall have provision for VMS sensors on DE & NDE bearings of motors and fans/pumps/compressors. Each bearing shall have two vibration sensor, one in X direction and other in Y direction along with key phasor for online vibration monitoring and analysis.

9.0 Bidder to include all the instruments (PG, PS, LS, TS, Dew Point meter, etc.) required for the package along with fittings, accessories and valve manifold.

10.0 The solenoid operated valves shall have limit switches for open/ close feedback.

11.0 All motor operated valves/electric actuators shall be envisaged with integral starter.

12.0 In case of HT motors, winding temperature for each stator winding and bearing temperature of motors & driven equipment shall be monitored on LCP for abnormal rise.

13.0 All pneumatic operated regulating control valves shall be envisaged with smart positioner.

14.0 The junction boxes for termination of instruments /actuator limit switches/ solenoid valve limit switches etc. are in bidder's scope.

15.0 Bidder to delegate/depute their person/experts as per owner/consultant requirements.

16.0 Bidder shall provide Cable Schedule in BHEL excel format provided in Electrical portion of the specification. Also, Cable Interconnections details for Complete System shall be in Bidders' scope.

17.0 The scope of cable shall be referred in Electrical scope split sheet in Electrical portion of the specification.

18.0 The make/model of various instruments/items/systems shall be subject to approval of owner/purchaser during detailed engineering stage. No commercial implication in this regard shall be acceptable. In case of any conflict and repetition of clauses in the specification, the more stringent requirements among them are to be complied with. In case of any contradiction most stringent clause/condition shall prevail.

19.0 The design, manufacture, inspection, testing, site calibration and installation of all C&I equipment and systems covered under this specification shall conform to the latest editions of applicable codes and standards eg. ANSI, ASME, IEEE, ISO, IEC, IGCI, AWS, NFPA, AISC, IGS, SAMA, UBC, UL, NESC, NEMA, ISA, DIN, VDE, IS etc.

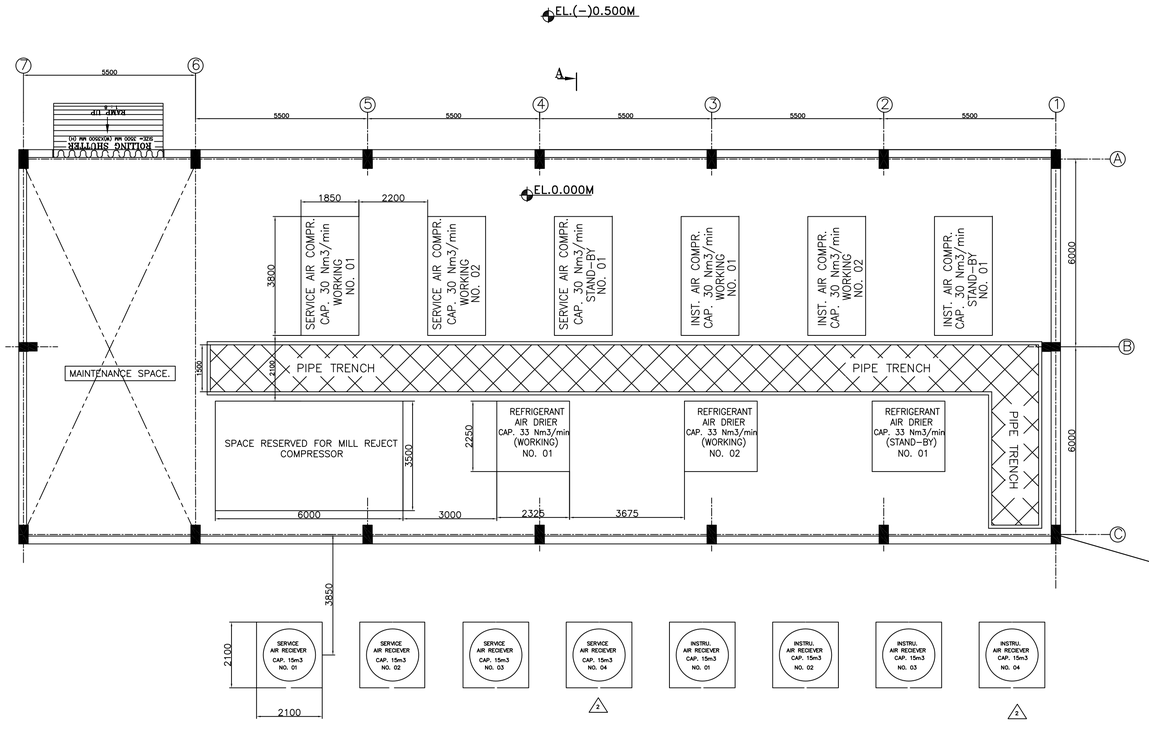
20.0 Bidder shall provide the signal exchange, to Plant DCS in BHEL prescribed format to be furnished during detailed engineering.

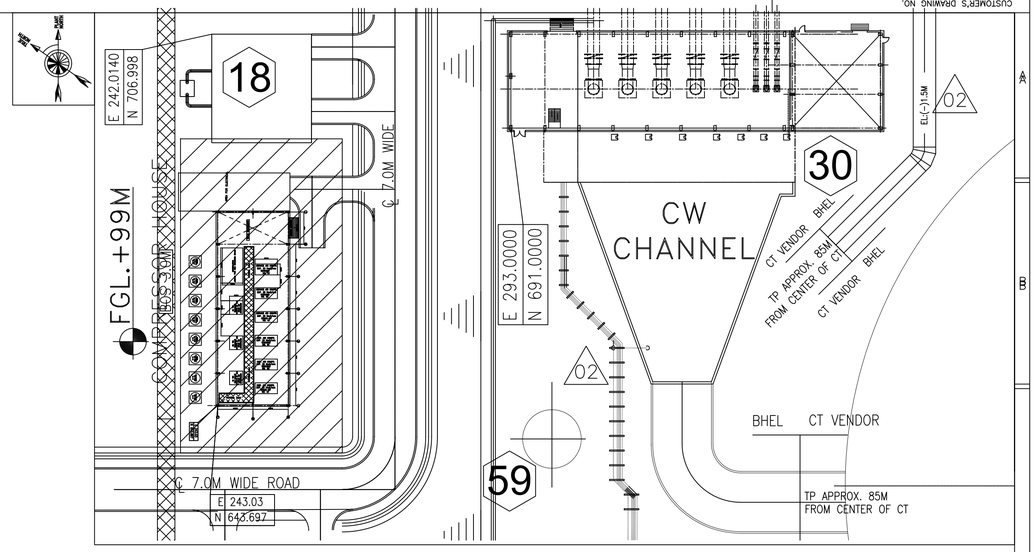
21.0 Drawings/Documents and data to be furnished after award of the contract.

- Control & operational write-up for the system
- Recommended control scheme/ logic diagram

- Configuration diagram of control system
- Process manuscript for implementation in DCS
- Drive List and I/O list
- Power requirement and grounding scheme.
- Field instruments quality plan.
- Instruments data sheet.
- JB/LIE/LIR Grouping document
- Cable schedule and cable interconnection drawing.
- Instrument schedule
- Any other document decided during detailed engineering.

ANNEXURE-F





KEY PLAN

SECTION −AA−

REFERENCE DRAWING :−

1) PLOT PLAN	PE−DG−410−100−M001

NOTES :−

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS. EL(+) 0.000 M CORRESPONDS TO RL(+) 99.5 M.
2) DIMENSION FOR EQUIPMENT LOCATED IN COMPRESSOR HOUSE HAVE BEEN CONSIDERED WORST/MAXIMUM WRT ALL PROSPECTIVE BIDDERS AND WILL NOT CHANGE BUILDING DIMENSIONS AT LATER DATE.
3) EQUIPMENT FOUNDATION, PIPING, VALVES, PIPE AND CABLE SLIT DETAILS SHALL BE INDICATED IN A SEPARATE DRAWING.

CUSTOMER
TELANGANA STATE POWER GENERATION CORPORATION LTD
(TSGENCO), HYDERABAD

CUSTOMER'S CONSULTANT
DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

JOB No. 410
STATUS CONTRACT
DISTRIBUTION
TO
No.OFF

1x800 MW KOTHAGUDAM TPS STAGE−VII UNIT#12, PALONCHA

REV	DATE	ALTD	CHD	APPD	REV	DATE	ALTD	CHD	APPD

DEPT CODE		NAME	SIGN	DATE
M	DRN	SKY		20.03.15
	DESN	SKY		20.03.15
	CHD	SR		20.03.15
	APPD	HK		20.03.15

TITLE
COMPRESSOR HOUSE LAYOUT

MPL	C&I	MSE	MAUX	ELEC.	CIVIL	DEPT.	SCALE 1:450	DRAWING No.
						SIGN		PE−V0−410−555−SK002
						DATE		SHEET 1 OF 1 REV 2

SIZE−A1

ANNEXURE-E

AME / 2001

A.C. Machine Engineering Division
Bhopal

Rev. 00

Induction Machine Technical Data

Enq. Ref: AME/O2015-1346AM **Customer: M/s TSGENCO th PSCM**

Note: Data furnished below is subject to IS:325 / IS/IEC:60034-1 tolerances unless stated otherwise.

No.	Description	Data
1	Application	COMPRESSOR
2	Machine Description	SCIM
3	Rating (KW) / F.L. RPM	300 / 1486
4	(a) Rated Voltage & Variation (b) Rated Frequency & Variation (c) Combined Variation	3300 / ±10% 50 / ±5% 10%
5	Frame Type / DOR (uni./bi.)	1LA4350-4 / Bi-Directional
6	Enclosure / Method of cooling / Protection Class	TEFC / IC411 / IP55
7	Insultaion Class / Type	F / Resin Poor VPI
8	Ambient / Temp. Rise (DEG.C) (By Res.)	50/70
9	Full Load Current (Amps.)	66.0
10	Efficiency (%) At 100% / 75% / 50% FL	95.0 / 94.8 / 93.8
11	Power Factor (%) At 100% / 75% / 50% FL	0.84 / 0.78 / 0.70
12	Locked Rotor Current (%FLC)	600
13	Full Load Torque (kg-m)	197
14	Locked Rotor Torque (% FLT)	74
15	Pull Out Torque (% FLT)	210
16	Stator Connection / Rotor Type	Star / CAGE
17	Starting Time (Sec.) At 100% RV / 80% RV	At Order Stage
18	LRW Time at 100% V(sec.) Hot/Cold	15 / 20
19	Motor GD Sq.(KG-M Sq.) / Weight (kG) (Approx.)	At Order Stage
20	Bearing Type / No.	Antifriction / 2
21	Lubrication type	Grease
22	Mounting / External Thrust	Horizontal / NA
23	Method of Starting	DOL

Name	Sign	Date
PRIYARANJAN		13-May-2015
B.ARORA		13-May-2015

List of Accessories/ Instrument

Enq. Ref: AME/O2015-1346AM **Customer: M/s TSGENCO th PSCM**

No.	Description	Qty.
1	Winding RTDs - PT100, Simplex, 3 Wire	12 Nos.
2	Bearing RTDs - PT100, Duplex, 3 Wire	2 Nos.
3	Air Circuit RTDs - PT100, Duplex, 3 Wire For **hot / cold** air	NA
4	DTTs for bearings- Mercury in Steel with Contacts (5A AT 240V AC/0.5A AT 220V DC)	2 Nos.
5	Space heater (240 V AC,1Ph)	1 Set
6	Current transformer: (As per customer specification)	NA
7	Stator Terminal Box: PSTB (Fault withstand capacity: 44kA for 0.25s)	1 No
8	Neutral Terminal Box (Non PSTB) - Not Suitable for mounting CTs	1
9	Rotor Terminal Box	NA
10	Speed Switch (240V,1ph AC)	NA
11	Auxiliary Terminal Box for RTDs & BTDs	1 No
12	Terminal Box for Space Heaters	YES
13	Grounding pad with 2 tapped holes for earthing conductor	
	(a) On M/C frame	2 Nos.
	(b) In Main Terminal Box	1 No
14	Vibration Pads on End shield	NO
15	Insulation of Bearing	NA
16	Force oil lubrication system (Not in BHEL scope of supply)	NA
17	Oil level indicators (For oil lubrication bearings)	NA
18	Water leakage detector (For water cooled machines)	NA
19	Water Flow Indicators (For water cooled machines)	NA
20	Holding down bolts	YES

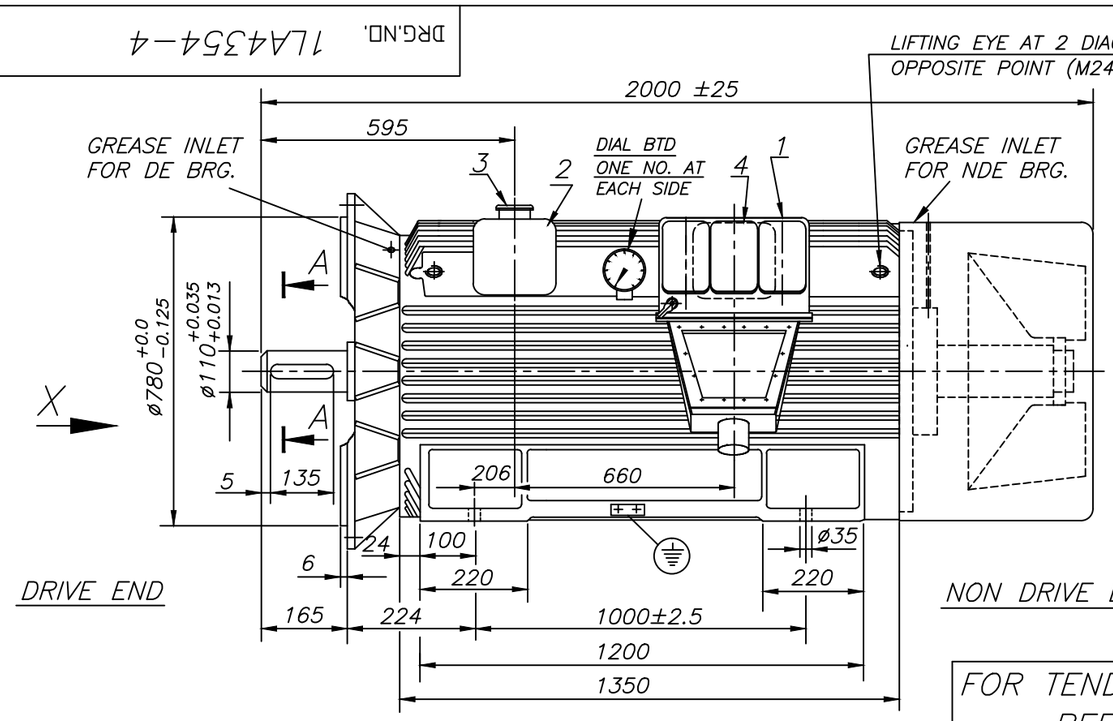
Name	Sign	Date
PRIYARANJAN		13-May-2015
B.ARORA		13-May-2015

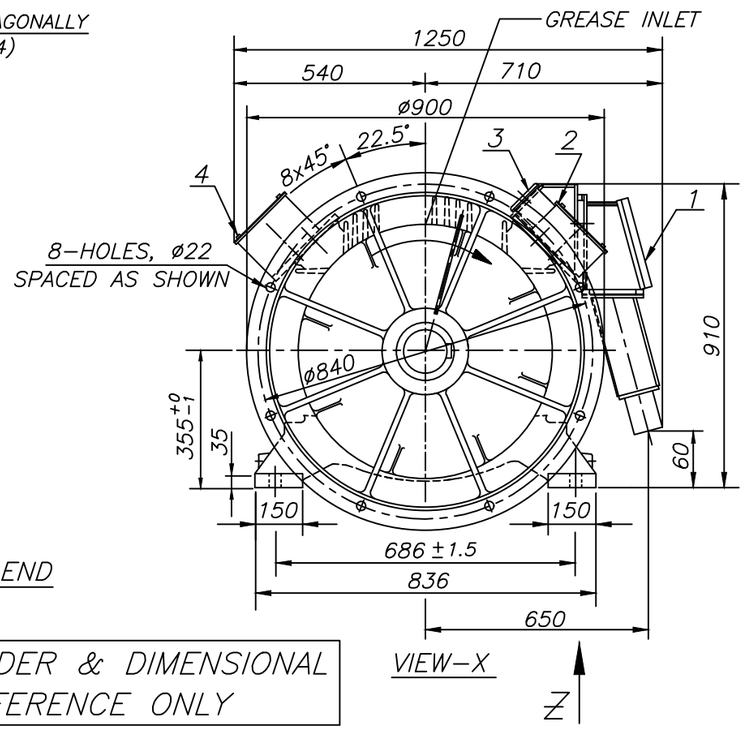
4 POLE motor

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm.)

DRG.NO. 1LA4354-4





FOR TENDER & DIMENSIONAL REFERENCE ONLY

MOTOR FITMENTS

(I) TERMINAL BOXES FOR :
1 – STATOR (PSTB TYPE)
2 – ETD'S+BTD'S
3 – SPACE HEATERS
4 – NEUTRAL POINT

(II) TEMPERATURE SENSORS
(A) WDG. ETD'S 12 Nos. 3-WIRES PT.TYPE, 100 Ω AT 0°C (SIMPLEX)
(B) BEARING RTD'S 2 Nos. 3-WIRES PT.TYPE, 100 Ω AT 0°C (DUPLEX)
(C) 2 -NOS. DIAL TYPE BTD. (1 EACH AT DE & NDE BRGS)

(III) OTHERS
SPACE HEATERS 2 NOS.
TOTAL POWER 315 WATTS
(630 WATTS EACH)
240 VOLTS, 50 Hz

(IV) FANS : BI-DIRECTIONAL

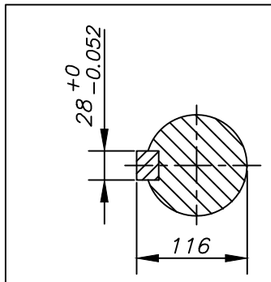
(V) HOLDING DOWN BOLTS:-
8xM24x100 LONG

(VI) CABLE DETAILS:-
STATOR:-1Rx3Cx240 SQ.MM MAX., XLPE CABLE

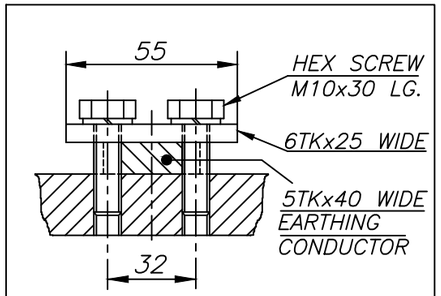
SPACE HEATER:-
1Rx3Cx2.5 SQ.MM, A2XFY.

TECHNICAL DATA

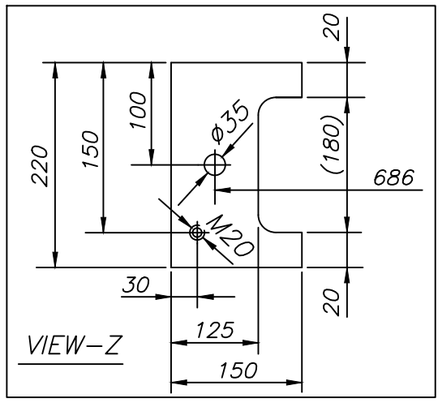
RATING			kW
SPEED (SYN)		1500	rpm
VOLTAGE 3 PHASE 50 Hz		3300	VOLTS
FULL LOAD AMP STATOR		–	AMP
APPROX. WEIGHT OF MOTOR		3400	kg
APPROX. WEIGHT OF ROTOR		950	kg
GD^2 OF ROTOR		32.4	kgm^2
MAX. FOUNDATION LOADING (ALTERNATING) PER MOTOR LONGITUDINAL SIDE		15 28	kN UPWARDS kN DNWARDS
BEARINGS	DE	6224C3	
	NDE	6220C3	
LUBRICATION: GREASE		SERVOGEM-3 OF IOC OR EQUIVALENT	
DIRECTION OF ROTATION VIEWED FROM DRIVE END		BI-DIRECTIONAL (CLOCKWISE)	
PAINT SHADE SPECIFICATION		SHADE NO. 631 OF IS-5 EPOXY PAINT-LIGHT GREY.	
TYPE OF ENCLOSURE		TEFC	



SECTION AT A-A



DETAIL OF EARTHING ARRGT.



VIEW-Z

TENDER/1LA4354-4
FOOT_CUM_FLAMGE
REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

ADDITIONAL INFORMATION
ENQUIRY-1605

DISTRIBUTION OF PRINTS
AME-1 , TEX(IMM)-1
IMM-3 , TFX-1

TYPE OF PRODUCT : SQ. CAGE INDUCTION MOTOR
NAME OF CUSTOMER : M/S NTPC
NAME OF PROJECT : –

DRIVE : COMPRESSOR

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

	NAME	SIGN.	DATE	NO. OF VAR.
DRN	P.K.DIVYA		31.08.13	
CHD.	A.K.M		31.08.13	
APPD	M.K.M.		31.08.13	

REV.	DATE	ALTERED. / CHECKED. / APPROVED.

DEPT. AME
CODE 404
GRADE OF UN. TOL.
DIM. C/M/F
SCALE NTS
WEIGHT(Kg.)
REF. TO ASSY. DRG.
ITEM NO.
NO. OF ITEMS

TITLE
OUTLINE GENERAL ARRGT.
1LA4354-4, TEFC, IP55, B35

1 3 CARD CODE

7 22 DRAWING NO.
1LA4354-4

23 24 REV 00

SHEET NO. 01 NO. OF SHEETS 01

Induction Machine Technical Data

Enq. Ref: AME/O2015-1346BM **Customer: M/s TSGENCO th PSCM**

Note: Data furnished below is subject to IS:325 / IS/IEC:60034-1 tolerances unless stated otherwise.

No.	Description	Data
1	Application	COMPRESSOR
2	Machine Description	SCIM
3	Rating (KW) / F.L. RPM	300 / 2978
4	(a) Rated Voltage & Variation (b) Rated Frequency & Variation (c) Combined Variation	3300 / ±10% 50 / ±5% 10%
5	Frame Type / DOR (uni./bi.)	1LA4350-2 / Uni-directional
6	Enclosure / Method of cooling / Protection Class	TEFC / IC411 / IP55
7	Insultaion Class / Type	F / Resin Poor VPI
8	Ambient / Temp. Rise (DEG.C) (By Res.)	50/70
9	Full Load Current (Amps.)	61.0
10	Efficiency (%) At 100% / 75% / 50% FL	95.0 / 94.8 / 93.8
11	Power Factor (%) At 100% / 75% / 50% FL	0.90 / 0.88 / 0.83
12	Locked Rotor Current (%FLC)	600 (inclusive of tolerance)
13	Full Load Torque (kg-m)	98
14	Locked Rotor Torque (% FLT)	75
15	Pull Out Torque (% FLT)	235
16	Stator Connection / Rotor Type	Star / CAGE
17	Starting Time (Sec.) At 100% RV / 80% RV	At Order Stage
18	LRW Time at 100% V(sec.) Hot/Cold	23 / 30
19	Motor GD Sq.(KG-M Sq.) / Weight (kG) (Approx.)	17.2 / 2900
20	Bearing Type / No.	Antifriction / 2
21	Lubrication type	Grease
22	Mounting / External Thrust	Horizontal / NA
23	Method of Starting	DOL
24	Service Factor	1.0
	NOTE: REF: O2014-1278AM	

Name	Sign	Date
PRIYARANJAN		20-May-2015
B.ARORA		20-May-2015

List of Accessories/ Instrument

Enq. Ref: AME/O2015-1346BM **Customer: M/s TSGENCO th PSCM**

No.	Description	Qty.
1	Winding RTDs - PT100, Simplex, 3 Wire	12 Nos.
2	Bearing RTDs - PT100, Duplex, 3 Wire	2 Nos.
3	Air Circuit RTDs - PT100, Duplex, 3 Wire For **hot / cold** air	NA
4	DTTs for bearings- Mercury in Steel with Contacts (5A AT 240V AC/0.5A AT 220V DC)	2 Nos.
5	Space heater (240 V AC,1Ph)	1 Set
6	Current transformer: (As per customer specification)	NA
7	Stator Terminal Box: PSTB (Fault withstand capacity: 250 MVA for 0.25s)	1 No
8	Neutral Terminal Box (Non PSTB) - Not Suitable for mounting CTs	1
9	Rotor Terminal Box	NA
10	Speed Switch (240V,1ph AC)	NA
11	Auxiliary Terminal Box for RTDs & BTDs	1 No
12	Terminal Box for Space Heaters	YES
13	Grounding pad with 2 tapped holes for earthing conductor	
	(a) On M/C frame	2 Nos.
	(b) In Main Terminal Box	1 No
14	Vibration Pads on End shield	NO
15	Insulation of Bearing	NA
16	Force oil lubrication system (Not in BHEL scope of supply)	NA
17	Oil level indicators (For oil lubrication bearings)	NA
18	Water leakage detector (For water cooled machines)	NA
19	Water Flow Indicators (For water cooled machines)	NA
20	Foundation bolts	YES

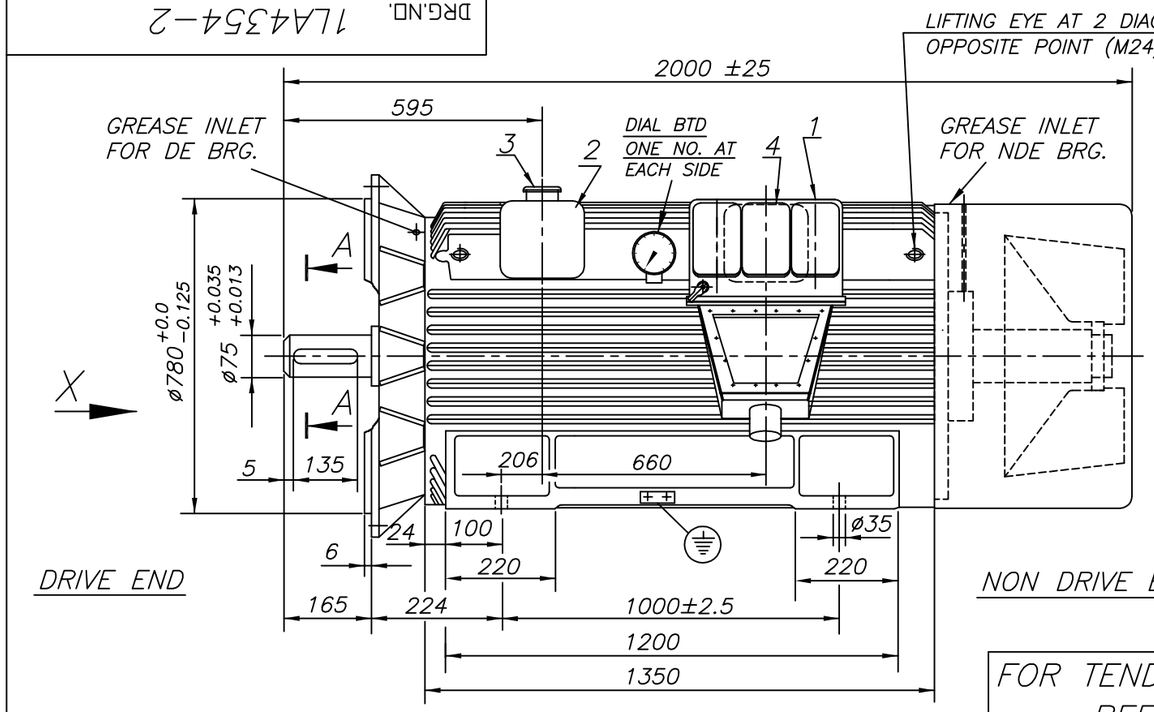
Name	Sign	Date
PRIYARANJAN		20-May-2015
B.ARORA		20-May-2015

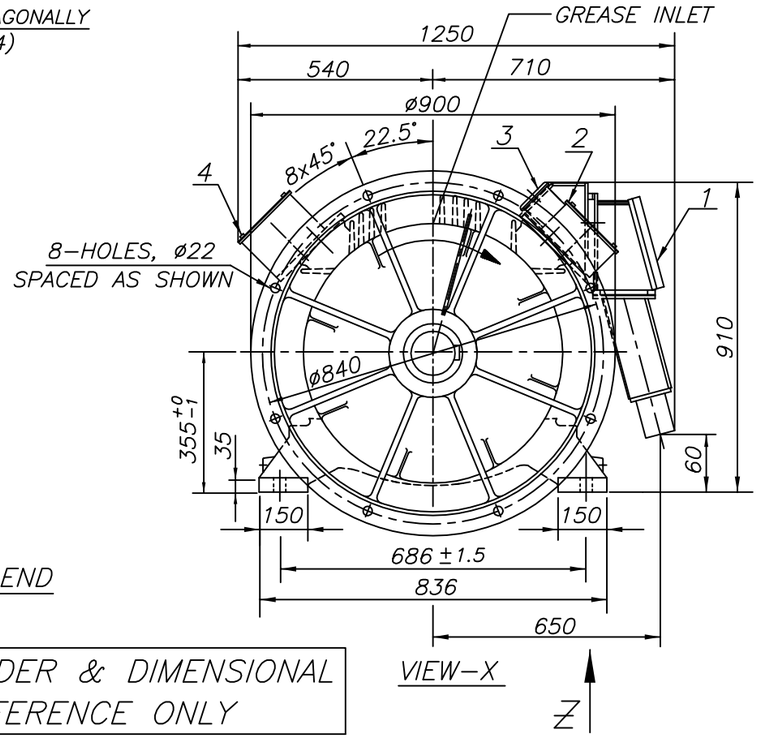
2 POLE motor

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm.)

DRG.NO. 1LA4354-2





FOR TENDER & DIMENSIONAL REFERENCE ONLY

MOTOR FITMENTS

(I) TERMINAL BOXES FOR :
1 – STATOR (PSTB TYPE)
2 – ETD'S+BTD'S
3 – SPACE HEATERS
4 – NEUTRAL POINT

(II) TEMPERATURE SENSORS
(A) WDG. ETD'S 12 Nos. 3-WIRES PT.TYPE, 100 Ω AT 0°C (SIMPLEX)
(B) BEARING RTD'S 2 Nos. 3-WIRES PT.TYPE, 100 Ω AT 0°C (DUPLEX)
(C) 2 -NOS. DIAL TYPE BTD. (1 EACH AT DE & NDE BRGS)

(III) OTHERS
SPACE HEATERS 2 NOS.
TOTAL POWER 315 WATTS
(630 WATTS EACH)
240 VOLTS, 50 Hz

(IV) FANS : UNI-DIRECTIONAL

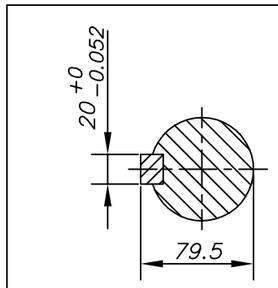
(V) HOLDING DOWN BOLTS:-
8xM24x100 LONG

(VI) CABLE DETAILS:-
STATOR:-1Rx3Cx240 SQ.MM MAX., XLPE CABLE

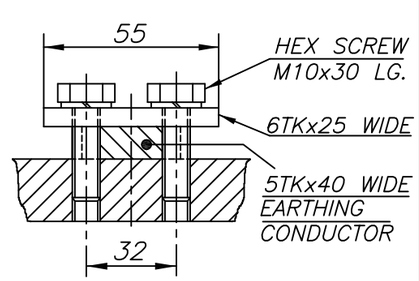
SPACE HEATER:-
1Rx3Cx2.5 SQ.MM, A2XFY.

TECHNICAL DATA

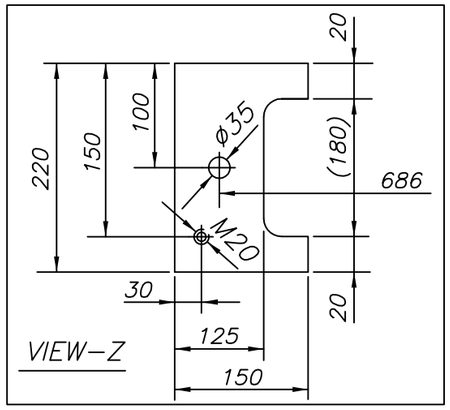
RATING	–	kW
SPEED (SYN)	–	rpm
VOLTAGE 3 PHASE 50 Hz	3300	VOLTS
FULL LOAD AMP STATOR	–	AMP
APPROX. WEIGHT OF MOTOR	3200	kg
APPROX. WEIGHT OF ROTOR	750	kg
GD² OF ROTOR	19.2	kgm²
MAX. FOUNDATION LOADING (ALTERNATING) PER MOTOR LONGITUDINAL SIDE	11.5 kN UPWARDS 19 kN DNWARDS	
BEARINGS DE	6216C3	
BEARINGS NDE	6216C3	
LUBRICATION: GREASE	SERVOGEM-3 OF IOC OR EQUIVALENT	
DIRECTION OF ROTATION VIEWED FROM DRIVE END	UNI-DIRECTIONAL (CLOCKWISE)	
PAINT SHADE SPECIFICATION	SHADE NO. 631 OF IS-5 EPOXY PAINT-LIGHT GREY.	
TYPE OF ENCLOSURE	TEFC	



SECTION AT A-A



DETAIL OF EARTHING ARRGT.



TENDER/1LA4354-2
FOOT_CUM_FLAMGE
REF. DRG. NO.

SIGN & DATE

INVENTORY NO.

ADDITIONAL INFORMATION
TENDER GA

DISTRIBUTION OF PRINTS
AME-1 , TEX(IMM)-1
IMM-3 , TFX-1

TYPE OF PRODUCT : SQ. CAGE INDUCTION MOTOR — DRIVE : –
NAME OF CUSTOMER : –
NAME OF PROJECT : –

BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

	NAME	SIGN.	DATE	NO. OF VAR.
DRN	KNP		20.05.15	
CHD.	JK		20.05.15	
APPD	JK		20.05.15	

REV.	DATE	ALTERED. / CHECKED. / APPROVED.

DEPT. AME
CODE 404
GRADE OF UN. TOL.
DIM. C/M/F
SCALE NTS
WEIGHT(Kg.)
REF. TO ASSY. DRG.
ITEM NO.
NO. OF ITEMS

TITLE
OUTLINE GENERAL ARRGT.
1LA4354-2, TEFC, IP55, B35

1 3 CARD CODE

7 DRAWING NO. 22
1LA4354-2

23 24 REV 00

SHEET NO. 01 NO. OF SHEETS 01