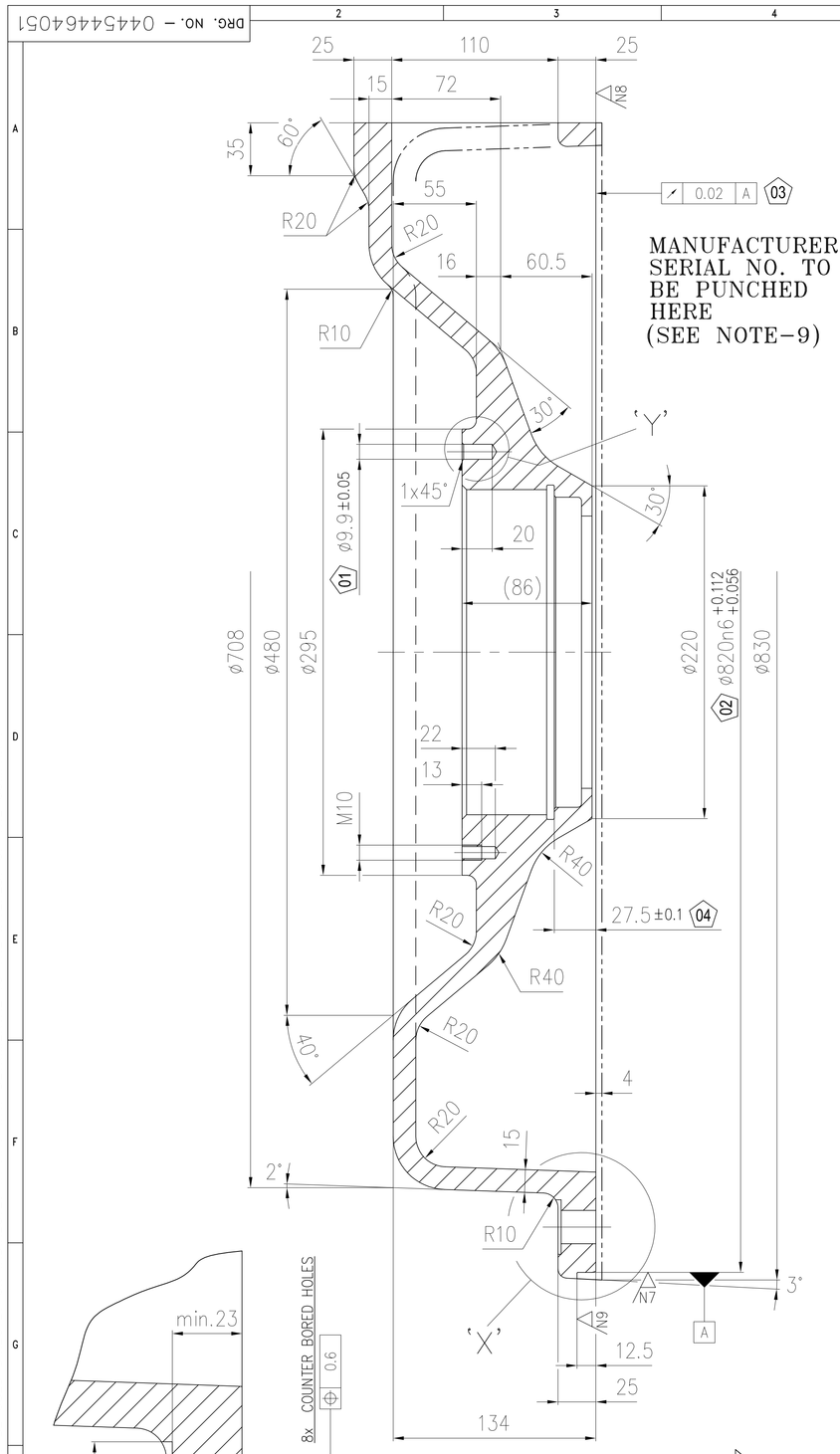
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. – 04454464051



NOTES:–

1. CASTING SHALL BE DELIVERED WITHOUT REF. –2,6 & 4.
2. ~~MATERIAL – CARBON STEEL CASTING Gr–230–450W TO IS : 1030'89.~~
3. ~~METALLURGICAL TESTS TO BE CARRIED OUT BY BHEL.~~
4. ITEM NO. 003 ie EXPANDING DOWEL DELETED, IN LIEU OF, A PIN SIZE ⌀10X11.5 L. TO BE PLUGGED & WELDED AT LOCATION MARKED "Z"
5. ~~MATERIAL : – SPHEROIDAL GRAPHITE CAST IRON (SGCI) TO DIN–1693 PART–1, GR–GGG–40 OR GR–400/18 OF IS : 1865–1991/(LATEST VERSION).~~
6. FIRM SHOULD HAVE THEIR OWN FOUNDRY DULY APPROVED BY RDSO AS CLASS – A FOUNDRY FOR CASTING THE RAW MATERIAL OF SPECIFIED GRADE SGCI FOR ITEM END FRAME/DE & NDE OR THEY HAVE TO SUBMIT ADEQUATE DOCUMENTARY EVIDENCE REGARDING SOURCING OF RAW MATERIAL (CASTING) FROM RDSO APPROVED CLASS–A FOUNDRY ONLY.
7. ALL 13 NOS. "⬡" MARKED DIMENSIONS ARE CRITICAL TO QUALITY (CTQ) & SL. NO. OF CTQ DIMENSIONS ARE INSCRIBED IN ⬠e.g.⑬.
8. ~~SUPPLIER'S INITIAL/TRADE MARK, MANUFACTURERS SERIAL NO. BHEL PO NO. BATCH NO. & DATE OF MFG. IN MM–YY FORMAT TO BE PUNCHED/ETCHED AT THE SHOWN LOCATION. SIZE OF PUNCH SHOULD BE 5–15mm.~~
9. EMBOSSING & PUNCHING TO BE DONE AT THE SHOWN LOCATION BY CASTING SUPPLIER. SIZE OF EMBOSSING/ PUNCHING TO BE 5–20mm. EMBOSSING & PUNCHING SHOULD NOT BE MACHINED/DAMAGED DURING MACHINING AND SHALL BE RETAINED.
10. MACHINING ALLOWANCE ON EACH TOOL POINT TO BE 5–7 MM IN CASE CASTING IS SUPPLIED AND 3–5 MM IN CASE ROUGH MACHINED CASTING IS SUPPLIED.
11. FOR OTHER QUALITY REQUIREMENT WHICH ARE NOT CALLED IN DRAWING SPECIFICATION TM12545 TO BE REFERRED.
12. QAP FOR CASTING TO BE AS PER QTM/QAP/VENDOR/13–14/001 (LATEST REV.).
13. ADDITIONAL MATERIAL SHALL NOT BE PROVIDED ON SURFACES WHERE MACHINING SYMBOL IS NOT INDICATED. TOLERANCES ON UNTOLERATED CASTING SURFACES SHALL BE AS PER IS: 4897, CLASS–2.
14. ~~DIMENSIONS TO BE CHECKED ON SAMPLE BASIS. QUANTUM IF CTQ DIMENSION IS CHECKED BY GAUGE ON 100% JOBS, SAME SHALL OF INSPECTION SHALL BE AS GIVEN BELOW (AT LEAST ONE NUMBER).~~

CONTD.

CONTD.

SL.NO.	CHECKING PARAMETER		BHEL Q.C.
001	CTQ DIMS.	DIMENSIONAL TOLERANCE	20%
		GEOMETRICAL TOLERANCE	20%
002	REMAINING DIMS.		5%

15. COMPONENT TO BE PRIMER PAINTED WITH INORGANIC ETHYL ZINC SILICATE PRIMER (AA56113) AS PER SCHEME NO. 8 OF TABLE–II(a) OF SPECIFICATION AA0674123 (PAGE NO. 22 OF 30).
16. AFTER FINISH MACHINING PAINT INTERNAL SURFACE WITH INSULATING ENAMEL PAINT BP27595/CIT064 TO PROCESS SPEC. TM94217, CL.5.
17. GREASE HOLE DIA. 9MM TO BE THOROUGHLY CLEANED & FREE FROM CHIPS. SAME IS TO BE ENSURED BY CHECKING WITH A STEEL BAR OF DIA. 8 MM AND MINIUMUM 505 MM LENGTH.
18. ALL MACHINED/ R.MACHINED SURFACES TO BE PROTECTED WITH TRP.

	1577866	PIN GAUGE 213.50/213.55 (S/F)
	1577869	PIN GAUGE 205+0.040/0.010
	1577871	CALIPER GAUGE $820^{+0.112}_{+0.056}$
	~~1577872~~	~~PIN GAUGE $215^{-0.006}_{-0.024}$~~
	1605001	PIN GAUGE $181^{+0.185}_{0}$
	1605060	PIN GAUGE $215^{-0.040}_{-0.052}$
	1605065	BORE AND ALL ROUND MACHINING FIXTURE
	1605085	TURNING FIXTURE FOR THE SECOND OPERATION

TOOL LIST

IT.NO.	TOOL NO.	DESCRIPTION
	1577867	STEP GAUGE 61–8.2
	1577870	STEP GAUGE 140.5
	1577873	GRINDING FIXTURE WITH POT CHUCK 820+0.112/+0.056
	1577874	HOLDING FIXTURE & REF. BLOCK FOR 350MM
	1577875	DRILL JIG FOR 8x22⌀,2xM20 1x17.5⌀
	1577876	DRILL JIG FOR 6xM8,2xM6 AND 6xM10
	1577877	DRILL PLATE FOR 8xM10
	1577878	DRILL JIG FOR 1xM10 & 1x9 DIA. AT 60° IN SEC.'CC'
	1605068	FABRICATED DEPTH GAUGE 27.5±0.1

REV.	DATE	ALTERED / CHECKED / APPROVED	
15	02.08.17	ALTERED SDB; CHECKED ABHIJIT; APPROVED ABHIJIT	IN DETAIL–'X' DIM. 45° WAS 15°.
14	11.07.17	ALTERED SDB; CHECKED ABHIJIT; APPROVED ABHIJIT	DIM. $350^{+0.25}_{0}$ WAS 350. (REF. B/4).
13	20.06.17	ALTERED SDB; CHECKED AS; APPROVED AS	IN TOOL LIST, TOOL NO. 1605068 ADDED. (TCM–350)
12	08.06.17	ALTERED SDB; CHECKED AS; APPROVED ABHIJIT	NOTES–15 & 16 ADDED. NOTE–3 & 11 MODIFIED.
11	30.05.17	ALTERED SDB; CHECKED AS; APPROVED AS	IN TOOL LIST, TOOL NO. 1605065 ADDED. (TCM–350)
10	22.05.17	ALTERED SDB; CHECKED ABHIJIT; APPROVED ABHIJIT	NOTE–8 DELETED, NOTE–9 MODIFIED & NOTES–12 TO 14 ADDED.
09	04.03.17	ALTERED SDB; CHECKED ABHIJIT; APPROVED ABHIJIT	EMBOSSING LOCATION ADDED (B/10).
08	06.10.16	ALTERED SDB; CHECKED AS; APPROVED AS	TOOL NO. 1577872 DELETED & 1605060 ADDED. (TCM–349)
07	08.07.13	ALTERED; CHECKED; APPROVED	CRITICAL TO QUALITY DIMENSIONS ARE "⬡" MARKED & NUMBERED. NOTE–7, 8, 9, 10 & 11 ADDED.
06	13.03.13	ALTERED; CHECKED DK; APPROVED DK	IN TOOL LIST PIN GAUGE $215^{-0.006}_{-0.024}$ WAS $215^{-0.040}_{-0.052}$ (TCM–341)
05	22.11.12	ALTERED; CHECKED; APPROVED	ZONE: DIM. $\varnothing205^{+0.040}_{+0.010}$ & $\varnothing215^{-0.006}_{-0.024}$ CHANGED TO $\varnothing205^{+0.040}_{+0.010}$ & $\varnothing215^{-0.040}_{-0.052}$ AS PER REQUIREMENT OF RDSO MODIFICATION SHEET NO. RDSO/2012/ELRS/MS/0415 DATED 03.10.12 DRG. DIGITIZED & UPLOADED.
04	03/8/12	ALTERED; CHECKED; APPROVED	ZONE: TM–11491 WAS ON 4TMS.096.06B. VIEW MODIFIED. DIM. $\varnothing251N6^{-0.022}_{-0.052}$ WAS DIM. $\varnothing251N6^{+0.022}_{+0.003}$
03	27.12.11	ALTERED –sd–; CHECKED –sd–; APPROVED –sd–	ZONE: BOM IT.002 R.W.T. 123KG. & IT.005 WT. 102KG. WERE NOT ON.
02	19.4.11	ALTERED –sd–; CHECKED –sd–; APPROVED –sd–	ZONE: TOOL NO. 1605001 WAS 1578301. (TCM 332)
01	21.3.11	ALTERED –sd–; CHECKED –sd–; APPROVED –sd–	ZONE: TOO LIST WAS NOT ON. (TCM 332)
18	24.07.19	ALT. SDB; CHK. ABHIJIT; APPD. ABHIJIT	DIM. ⌀180 WAS ⌀181 (CLW LETTER REF. CLW/TM/18059/PART–I/1 DATED 12/07/19). NOTE 1 & 15 MODIFIED. NOTE 3 & 16 DELETED. DIM. $\varnothing215^{-0.030}_{-0.052}$ WAS $\varnothing215^{-0.040}_{-0.052}$ (RDSO LETTER REF. EL/3.2.182 DATED 02.07.19). NOTE 17 & 18 ADDED.
17	18.10.18	ALT. SDB; CHK. ABHIJIT; APPD. ABHIJIT	NOTE–5 DELETED. NOTE–14 MODIFIED.
16	19.05.18	ALT. VK; CHK. AS; APPD. AS	TOOL NO. 1605085 ADDED. (TCM–352)

QTY VAR 00	REMARKS	VAR. NO.	ITEM NO.	DESCRIPTION	DRAWING NO.	IT.NO.	MATL. CODE	UNIT WT.	KG
001			006	PIN ⌀10x11.5			IS : 2062 '92 Gr'B'		
001			005	END FRAME NDE(MACH.)			TM–11491	102.00	KG
001			004	CYLINDRICAL PIN ⌀10x25					
~~001~~			~~003~~	~~EXPANDING DOWEL DIA10~~					
001			002	LUBRICTING NIPPLE 21 M10X1	44454364054	001			
001	R.W.T. 123 KG.		001	END FRAME NDE(CAST.)			TM–11491		
				END FRAME NDE(ASSY)					

ADDITIONAL INFORMATION: OTWD.096.063. (ALT–7)

STATUS OF DRAWING

DISTRIBUTION OF PRINTS: TME–1, TXM–3, TNX–1

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: **TRACTION MOTOR 6FRA-6068**

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

	NAME	SIGN	DATE	NO. OF VAR.
DRN.	ASWINI	–sd–	03.09.10	
CHD.	D.K.	–sd–	03.09.10	
APPD.	A.S.	–sd–	03.09.10	01

DEPT. TME; CODE 405; UNTOL. DIMS. GR. AA02.302/08 GR.'M'; SCALE NTS; WEIGHT (K.G.)

TITLE: **END FRAME (NDE) ASSY. (CNC MACHINED)**

REF. DRG. NO.; DRAWING NO. 04454464051; ITEM NO. 008; NO. OF ITEM 006; REV. 18; SHT. NO. 01; NO. OF SHT. 01

SIZE A0

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INVENTORY NO. | SIGN. & DATE