BHARAT HEAVY ELECTRICAL LIMITED: FSIP JAGDISHPUR 227817, INDIA

Design Manufacture & Supply of: Compound Die (T.No.1578280-04) for manufacturing 6FRA Blanks with all the features except rotor slots as per Drawing No. 04453164055 Rev17* (Stator slot Item#001) suitable for 500T B/L (M&W) and 500T HMT Press of BHEL, FSIP, Jagdishpur.

SUPPLIER:

CONTACT PERSONS:	
ADDRESS:	
TELEPHONE NOs:	
MOBILE NOs:	
FAX NOs:	
E-MAIL ADDRESS:	

1. Supplier must submit complete information against all clauses.
2. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Supplier and submitted along with the offer, Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/ requirements shall be treated as non-compliance.

SPECIFICATIONS:

Sl.No.	Description for BHEL Requirement	Offered	Deviations	Remarks
1.0	Material of die and punch shall only be D2 (or its equivalent standard) make preferable Bohler / Hitachi/Daido. The height of cutting segments (Die & Punch Steeling) shall be minimum 40 mm.			
1.1	Hardness of cutting elements shall be 60-62 HRC. Heat treatment charts and hardness values shall be sent to BHEL along with the tool inspection report.			
1.2	All the cutting elements shall be subjected to NDT Examination and it shall be ensured that no surface cracks are present in the assembled stage.			
1.3	Extra heavy duty springs of M/S Danley international, UK or equivalent preferably with OD=20/32/40/50mm and free length 51mm shall be used in the stripper and ejector mechanisms. It is recommended to use one size of springs in all places.			

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1.4	The clearance between punch and stripper, Die and ejector should be 0.1mm per side. A thru free movement shall be ensured between punch and die while penetrating into each other. Tool shall have hardened Stripper & Ejector plates. In case where it is not possible to make them in one piece owing to their large size, provide hardened inserts all along the component profile.			
1.5	Top and Bottom bolsters, Punch and Die plate shall be Boiler Quality mild steel.			
1.6	If the manufacture is contemplating to provide arrester keys for the die segments, their heights shall be minimized as far as possible and also the exposed edges of the keys shall be well chamfered to facilitate easy removal of scrap by operator.			
1.7	The tool to be supplied in ready to use condition along with all the required : 1. Clamping arrangements-T-nut/studs/washer/nut etc. 2. Scrap disposal arrangement – both for inner and outer scrap 3. Die protection system 4. Adopter plate (500T M&W CNC B/L) 5. Lifting Hooks			
1.8	Use only "Pull Out" type Dowels (Dowels with threaded holes at one end). The dowel holes should be properly reamed. Datum Holes & Tooling holes are to be jig grinded.			
1.9	Supplier must mention the Tool Name and No. painted in black with yellow background on the front and back side faces of upper die, for proper identification.			

2.0	**SCOPE:**			
	A) Design, Manufacture and Supply of a Compound Die (T.No.1578280-04) for manufacturing 6FRA Blanks with all the features (except rotor slots) as per Drawing No. 04453164055 Rev17* (Stator slot Item#001) suitable for 500T B/L (M&W) (Main press) and 500T HMT Press (Stand by use) of BHEL, FSIP, Jagdishpur. **B) All the steeling segments of bottom die to be supplied in addition to compound tool in spares. These includes all cutting profiles on bottom die steeling (i.e 4 bottom die steeling segments & center unit. Also mentioned in Cl no. 6.3 of the Specification.** Important Considerations for compound die :			

	➢ Except the rotor slots, die shall be able to produce stampings with all the features (i.e. all round holes, 72 stator slots with inner radius 1mm less than that specified in the drawing, building notch, 3 keyways etc.). ➢ For maintaining 90° disorientation of stampings, the die shall have provision of clamping slots, scrap cutters/choppers, V-groove locaters and dowel holes present on all its four sides, so that it can be mounted from any direction on the press. Keep pillar/bush assembly sufficiently apart on each side, for non-hindered feed movement of the coil. Check Annex 1 ➢ All the generated piercing scrap must drop thru the machine bolster, regardless of which side of the mounted die is kept at press front (Refer Annexure1) ➢ Check for any partial overlapping of Idle knock out pin relieve holes (mentioned later, at clause 3.5) in CAD by copying and pasting the top plan of the die at 90°on its parent view. Any of such conflicting holes can be machined to oval or "8" shape to avoid any fouling of the idle pins when the die is mounted in transverse direction. ➢ The die will work on knock out system in both type of presses. ➢ Ensure that the die does not have any slug pulling during operations. Refer Annexure1 for schematic die layout and for the expected component from this die. Refer Annexure2 for providing *interchangeable spare upper & lower die cutting steel segments (1each) without the Ø8 building notch profile*, so that when required they can be replaced with the corresponding segments (containing building notch) of the supplied tool. Similar spare inserts (1each) without building notch profile shall be required for lower stripper & upper ejector plates Raw material grade TM10472 with tensile strength of 430N/mm² (min.). Raw Material (sheet) size for CNC 500T Blanking line(B/L): 0.5X710mm wide (Roll) Raw Material (sheet) size for 500T press: 0.5 mm thick X 710 Sq. mm For press technical details refer attached sheet & the provided press drawings.			

Other Important Notes (where applicable):

- Ignore the tolerance given on the "slot width for winding" dimension (if mentioned in the technical requirement of the engineering drawing), as it does not represents the actual stamping slot tolerance.

- Refer the following engineering standards (√) for any un-tolerance dimensions

Std. Name	Description	Applicable to this Product
AM54193	LEM stator & rotors (including stamping slots) of A.C. M/c's (AM)	
TM20060	Armature, Mainpole and Compole of Traction Motors(TM)	
TM20079	General Tolerance on Un-tolerance Dimensions (TME)	
AA0230208	General Tolerances-Tolerances for linear and angular dimensions without individual tolerance indications	
Drawing No.32530201001	Dimension Tolerances for Pole Punchings(HG)	
Drawing No.22510601001	Tolerance Limit of Stator Punching Dimensions(HG)	
Drawing No.22520301002	Tolerance Limit of Rotor Rim Punching Dimensions(HG)	

* Drawings are subject to revision change. Confirm for the latest revisions before wire cutting component's profile on any die part.

3.0	TECHNICAL PARAMETERS:			
3.1	The design of press tool shall be suitable for operation on both 500T B/L & 500 HMT Presses of FSIP, Jagdishpur.			
3.2	Helical ball cage type guide pillars shall be of detachable type with bottom taper fit in a hardened retainer bush for facilitating quick assembly & disassembly. The level of guide bushes shall be minimum 20mm less than shearing strips height to facilitate ease of re-sharpening. Fool-proofing to prevent wrong assembly of upper half with the lower half, is a must.			

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3.3	The important point to be followed by supplier while designing are-			
3.3.1	The blanked lamination burr level shall be a maximum of 50 microns, before the die is taken for surface grinding operation to re-sharpen the die cutting edges. The tool shall be able to produce approx. 50000 No. of laminations per re-sharpening.			
3.3.2	Pillar sizes shall be suitably selected to punching load and size of tool (preferably pillar size should be minimum 70mm diameter). The interference fit between ball cage, bush & pillar shall be around 10-15 microns. Minimum Top and bottom plate thickness for the tools shall be 100mm for all the presses except for 500T B/L dies in which case it shall be minimum 115mm and100mm resp.)			
3.3.3	All the stripper plate retainer bolts shall be assembled from top side only for tool's maintenance point of view (Refer fig7-Notes present in it are also be adhered to)			
3.4	Unless & until mentioned, the design should suit the scrap falling thru the press bed opening. Pocket / canals* for collection of scrap from the press bolster are not recommended and can only be provided in rare cases (where it is not possible to dispose the scrap thru the bed). *Prior Consent of BHEL, before manufacturing pockets/canals is necessary.			
3.5	For 500T B/L, the tool shall be a "all Knock out (K/O) pin design" i.e. it shall have Ø40X15(±0.5)mm Deep relieve/clearance holes (Blind holes made by End mill only) in the top plate for the 10mm movement of non functional (inactive/idle) knock out pins** of the Blanking line press during component ejection stroke. The tool mounting dowel positions on the front and back side of the press bolster shall be taken as datums for positioning the relieve holes. Refer Fig1-3 for some important minimum dimensions of the top plate structure and 500T B/L press slide drawing for K/O pin positions. Keeping in mind the strength of the tool's top plate, its edges should extend min 45mm from the edge of the last k/o pin clearance hole rows in all the four directions. **Those pins that are not coming directly above the tool knock out plate.			
3.6	For piercing holes of any shape & size, suitable number of ejector (kicker) pins must be used in the punches to push the scrap to fall thru the die (Refer Fig5). **V.IMP*: Ensure the die design to have no slug pulling during operations.*** Piercing punches with standard shapes (e.g. round, rectangular, oval etc.) shall be of "Shoulder Head" type design only.			
3.7	The maximum die size of either upper or lower half shall not exceed 3000mm (Length) X1750mm(Width)X700mm(Height without Guide Pillars), so that it can be loaded on FSIP's Surface Grinding M/C (Favretto, MH-300) for re-sharpening. Further the weight of any of the die half assembly, shall also not exceed 3.5T. Inform & discuss, if it is inevitable to keep the die weight within this specified value.			

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3.8	The dimensions shown in fig-6, showing cross-section of a piercing hole are to be strictly followed in manufacturing these holes irrespective of their shape & size.			
3.9	The height of back up plates for die cutting segments must be 20mm lower than that of segment's height itself.			
4.0	DOCUMENTS / DOCUMENTATION:			
4.1	The supplier shall submit the tool design drawings to BHEL within two weeks from the date of placement of purchase order. The drawings shall include assembly & part drawings containing dimensional details, material specification, weight etc. The tool design drawings should be in standard format sizes. Note: That the tool suppliers are solely responsible for their designed, manufactured & finally supplied dies. The onus of proving the dies for their design, quality, machine /press fitment features, proper functioning & their life cycle performance, lies with the suppliers only. Hence seeking approval from FSIP for designs, made by vendors, remains informal & is not required with the submission of design drawings. It is expected from the die suppliers, that they will do the detailed study of the machine features, similar proven dies etc, if required, at FSIP, Jagdishpur for clarifying any design/concept related issues/doubts.			
4.2	Tooling hole coordinates around the punch segment for checking the profile, are to be submitted before inspection call for our approval. BHEL inspector will check the tool with reference to these coordinates.			
4.3	The supplier should submit the original of all design drawings in AutoCAD Mechanical 2009 format on CD + hardcopy on polyester along with the tool.			
4.4	**The supplier should submit test certificate of chemical composition, hardness, NDT and crack testing of materials used in manufacturing of** • **Cutting elements (Die & Punch)** • **Guide Pillar & Bushes** • **Other Hardened components.** **Ensure that all the test certificates are from a Material Testing Laboratory which is accredited by NABL and Bureau of Indian Standards (BIS).**			
4.5	Along with Die design manufacture must submit quality plan and PERT CHART without which the approval of die design may not be considered. The PERT CHART should indicating major milestones. Subsequently regular weekly progress reports are required to be furnished indicating corrective actions required if any.			

5.0	**GUARANTEE:** Performance guarantee of the tool for 1 year against manufacturing defects and defective materials.			
6.0	**SPARES:**			
6.1	**SPRINGS** – 50% Qty. of each size used			
6.2	**PIERCING PUNCHES & DIE BUTTONS**-30% Qty. of each round/square/Rectangular/profile punches & die buttons (subject to a minimum of 1No, where the qty. of the same size of punches/die buttons is less or equal to three per die. For calculation of spare punch/die button quantity, rounding off in the next higher 'whole no.' is allowed only) The above is applicable to those punches & die buttons with diametrical/diagonal dimension less or equal to 100mm.			
6.3	**BOTTOM STEELING:** All steeling segments of bottom die in spare. These includes all cutting profiles on bottom steeling that is all 4 bottom die steeling segments & center unit.			
6.4	**GUIDE PILLAR& BUSH SET** -1Set			
6.5	**PILLAR BALL CAGE**-4No's			
7.0	**INSPECTION**: BHEL Engineers will inspect the Press tool at supplier's works. The vendor shall demonstrate the Press tool for proper functioning.			
8.0	**TRY OUT:**			
8.1	For final acceptance of the tool, trial shall be done on corresponding FSIP, Jagdishpur presses. The tool under normal working condition must produce 50,000 components with burr level on the punching not exceeding 50 microns to the satisfaction of BHEL before qualifying for final acceptance.			
9.0	**Quotation:** Along with technical offer one copy of specification furnishing details against each clause to be submitted.			
10.0	**Packing** : Rigid packing/fixing for all the items including complete die & punch, all accessories and other supplied items, to avoid any damage/ loss in transit			

The vendor if he so desires may see the nearest similar tool/its tool drawing if available in at FSIP, Jagdishpur. For any technical clarification please contact the undersigned.

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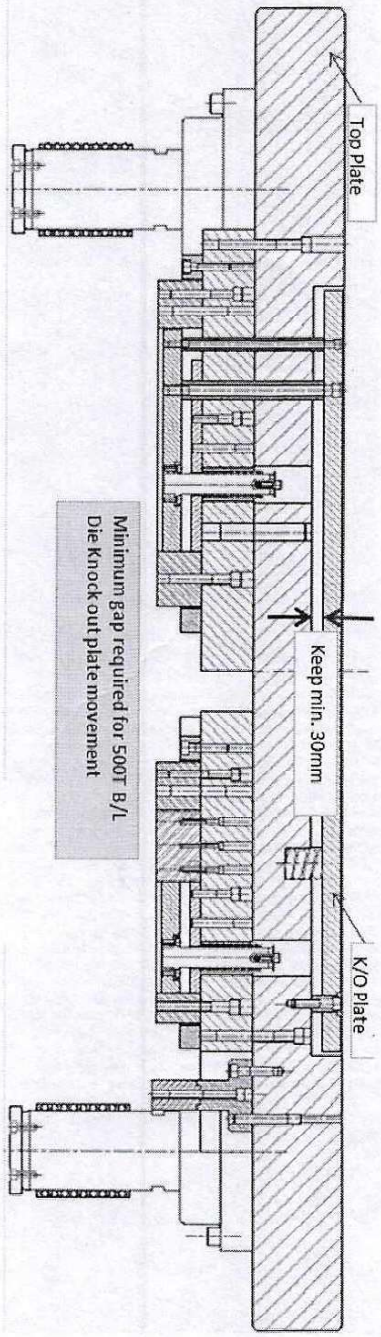
Broad Technical Specifications of 500T (HMT) " Mechanical press"

Sl. No.	Parameter	Specification
1	Press capacity	500T
2	Maximum shut height	560 mm
3	Slide stroke	125 mm
4	Slide adjustment	300 mm
5	Stroke per minute	Continuous : 30 & intermittent : 10
6	Bolster size (LRXFB)	2500mm X 1500mm
7	Slide Size	2700mmX 1500mm
8	Bolster thickness	232 mm
9	Bed Opening for Adapter plate	1600 mm X 650mm
10	Bed Opening for Scrap Disposal	1500 mm X 550mm

Broad Technical Specifications of 500T B/L (M&W) "Fully Automatic CNC Blanking Line"

Sl. No.	Parameter	Specification
1	Capacity (Tonne)	500
2	Strokes/Minute	25
3	Die Space	450 mm (Max.) 230 mm (Min.)
4	Bolster Dimensions	2400 mm X 1600 mm
5	Slide Dimensions	2400 mm X 1600 mm
6	Stroke	320 mm
7	Bed opening of 500 T Blanking Line	500 x 1660 mm for scrap

Fig1


Top Plate
Minimum gap required for 500T B/L
Die Knock out plate movement
Keep min. 30mm
K/O Plate

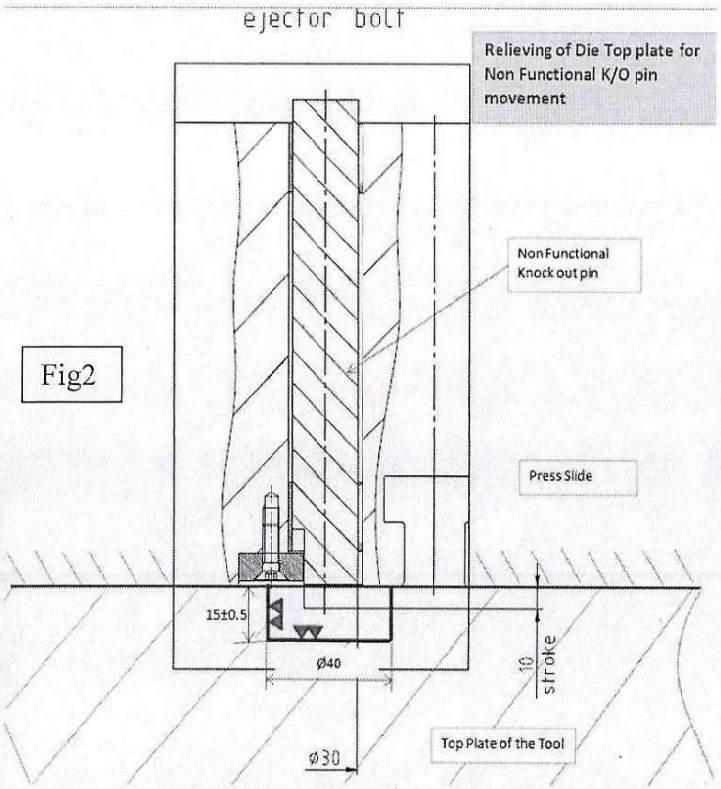

ejector bolt
Relieving of Die Top plate for Non Functional K/O pin movement
Non Functional Knock out pin
Press Slide
15±0.5
Ø40
10 stroke
Ø30
Top Plate of the Tool

Fig2

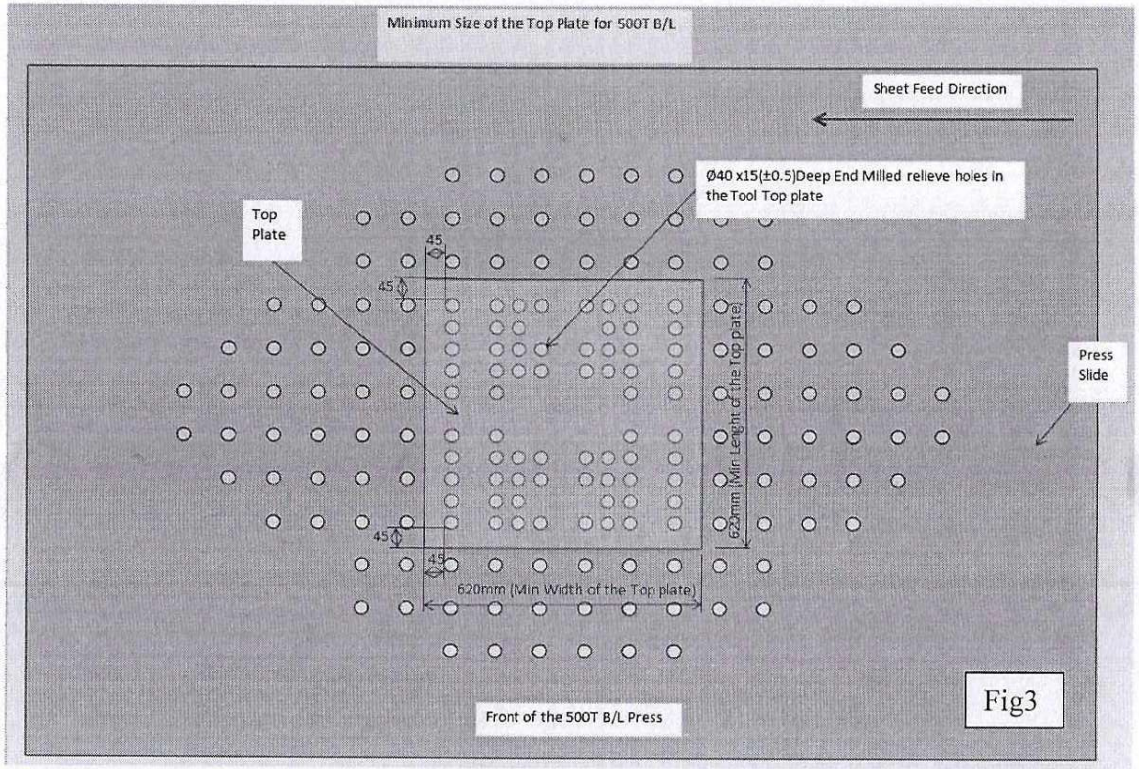

Minimum Size of the Top Plate for 500T B/L
Sheet Feed Direction
Ø40 x15(±0.5)Deep End Milled relieve holes in the Tool Top plate
Top Plate
45
45
45
45
620mm (Min Lenght of the Top plate)
620mm (Min Width of the Top plate)
Press Slide
Front of the 500T B/L Press

Fig3

Fig4

K/O Pin positions on 500T B/L Press Slide

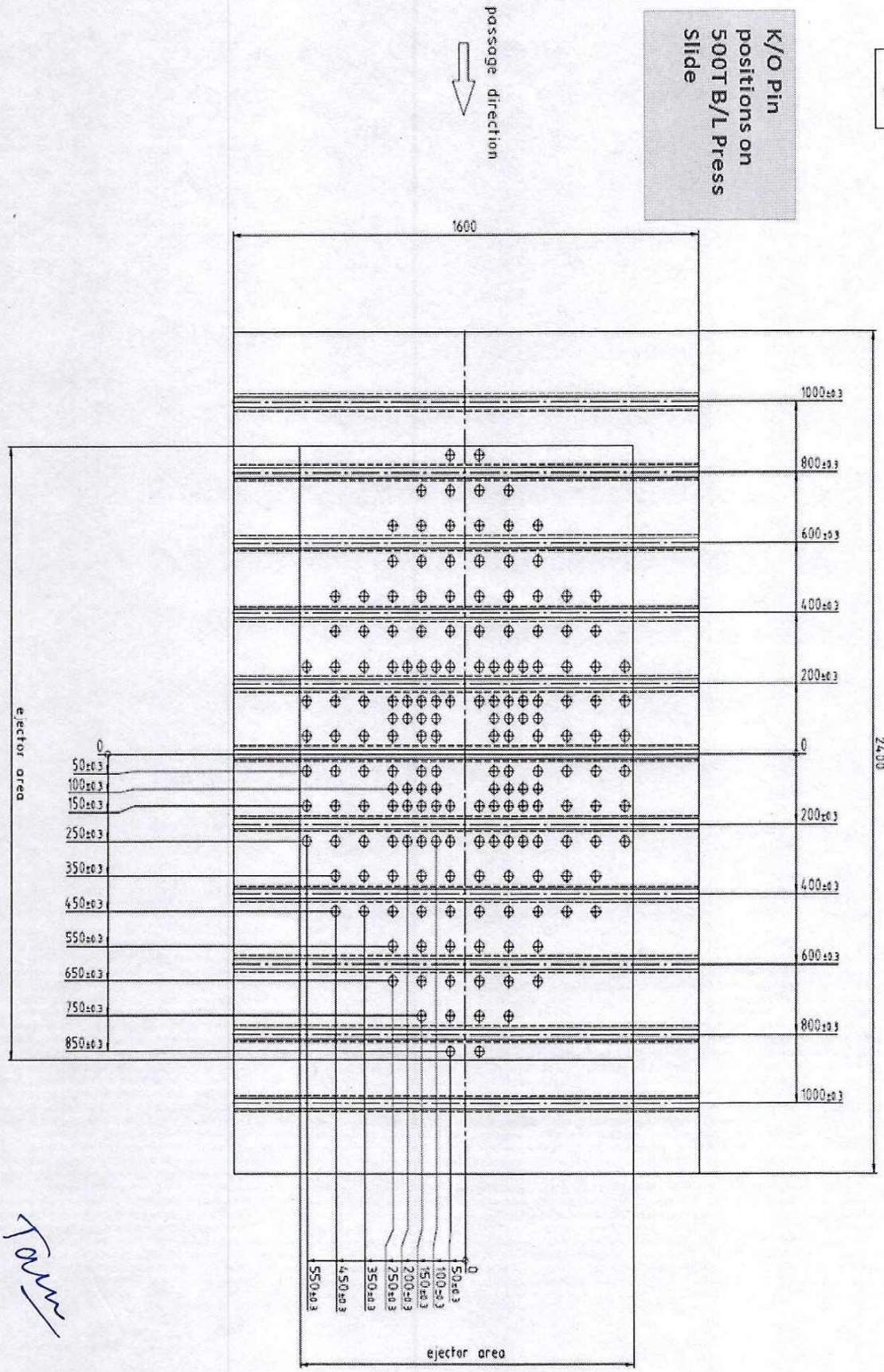
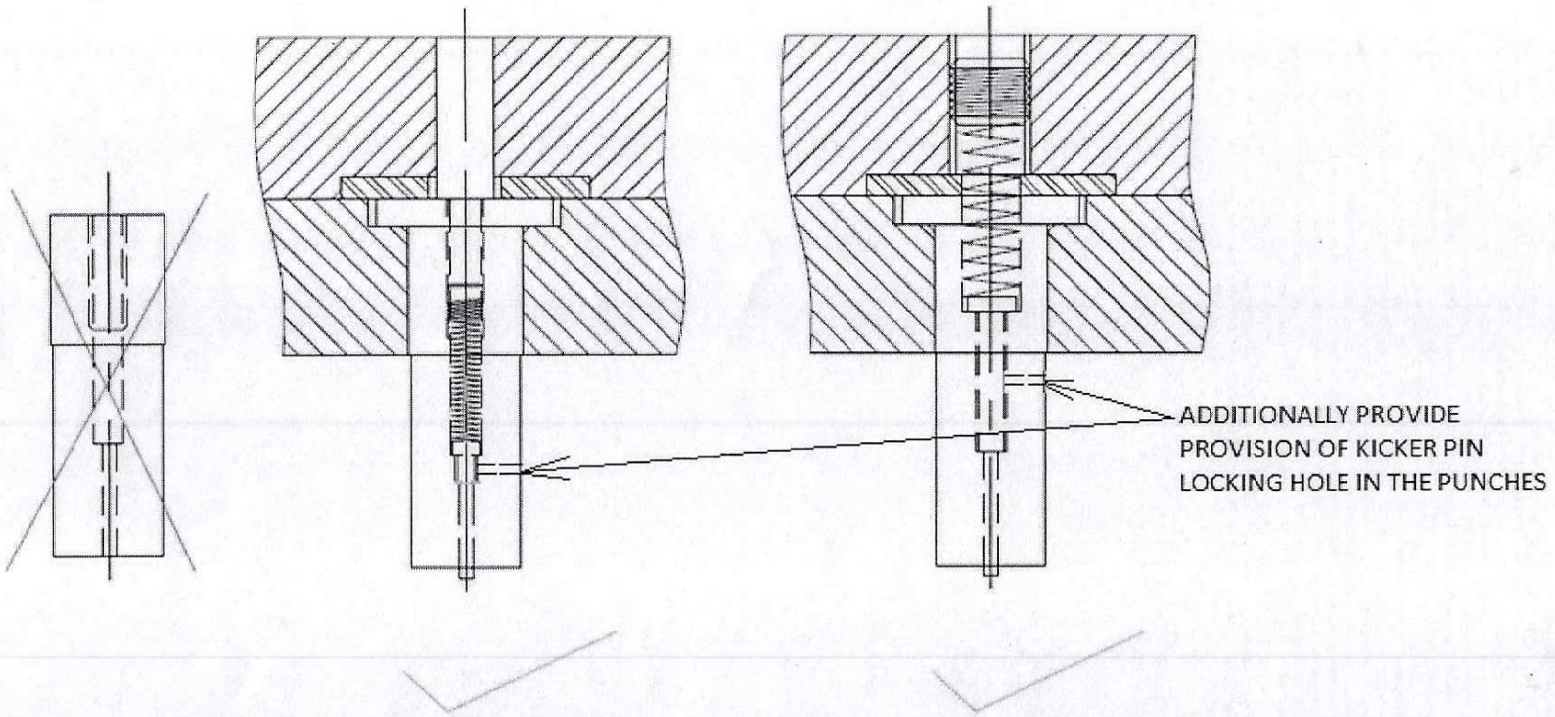


Fig5



#ONLY ROUND SHOULDER PUNCHES WITH EJECTOR PINS ARE ACCEPTABLE.
##THE DESIGN OF THESE PUNCHES SHALL ALLOW THE REMOVAL AND ASSEMBLY OF THE RESP.EJECTOR PINS FROM THE DIE TOP PLATE WITHOUT DISMANTLING THE PUNCHES THEMSELVES.

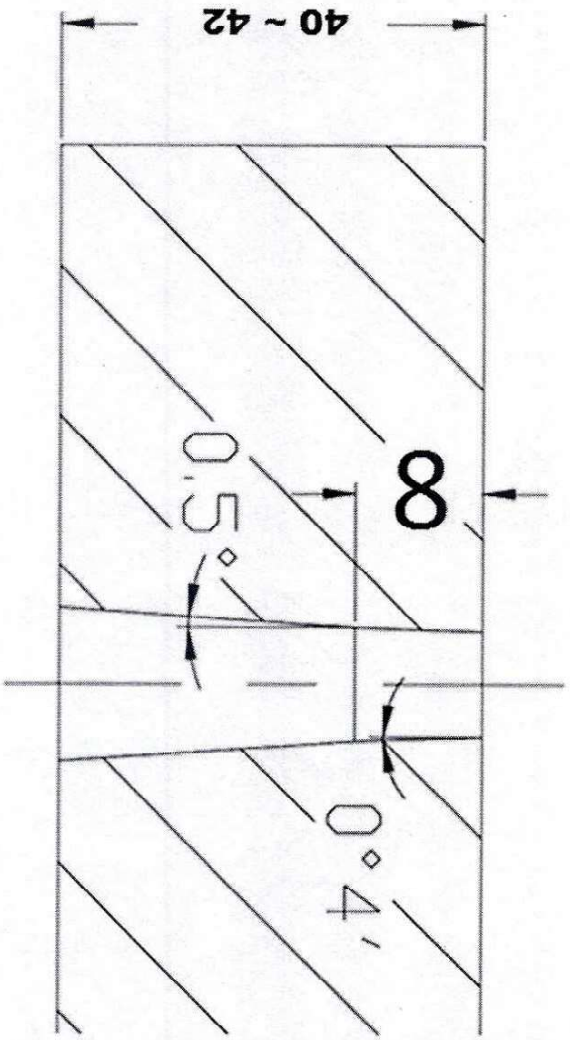
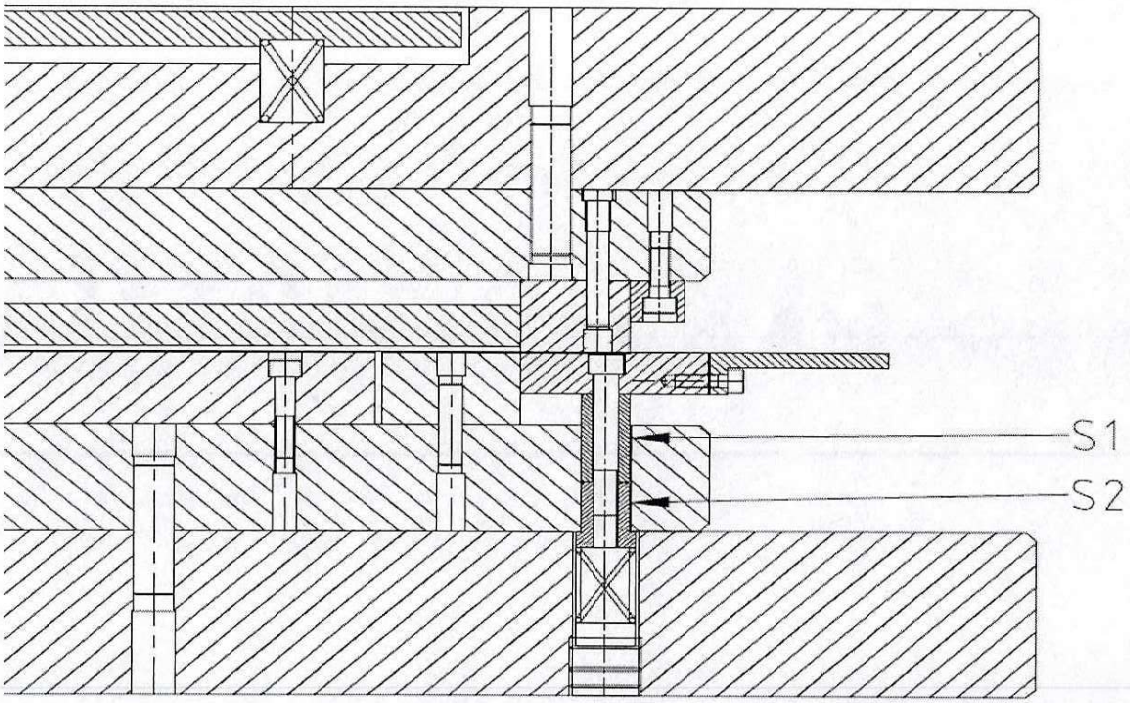


Fig 6 Piercing Hole Design

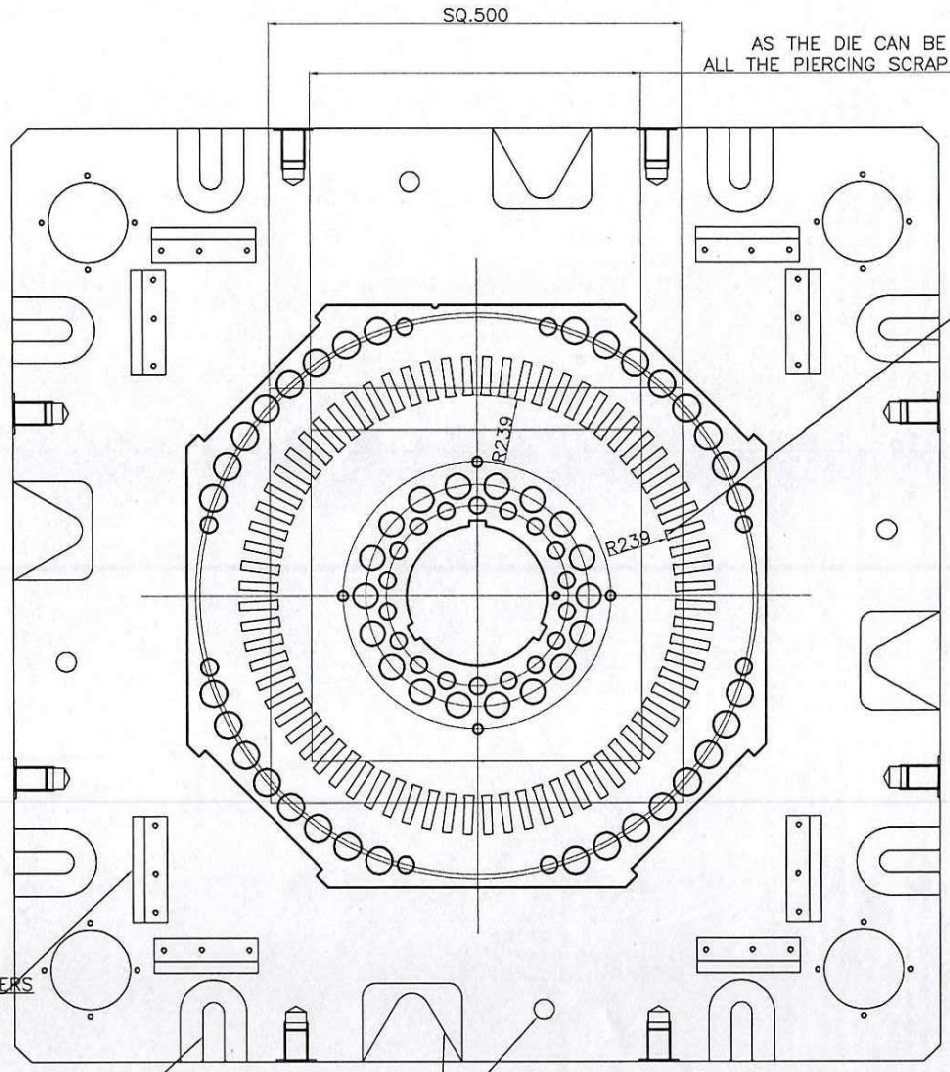
Fig 7 NOTES FOR STRIPPER & BOTTOM PLATE BOLTS



1) USE TWO SPACERS S1&S2 BETWEEN STRIPPER & ITS SPRING
2) TAKE HEIGHT OF S1 GREATER OR EQUAL TO 50mm FOR EASE OF HOLDING THEM IN GRINDING FIXTURE FOR HEIGHT ADJUSTMENT OF STRIPPER REQUIRED AFTER EACH RESHARPENING OF THE TOOL
3) USE A LOCKING SCREW BENEATH THE MAIN GRUB SCREW THAT IS RETAINING THE STRIPPER SPRINGS. BOTH THE SCREWS SHALL BE OF ALLEN HEAD TYPE. THE HEAD OF LOCKING GRUB SCREW MUST BE SUFFICIENTLY INSIDE THE BOTTOM PLATE INORDER TO AVOID ACCIDENTAL RUBBING/SCRATCHING THE PRESS BOLSTER DURING TOOL'S LOADING/UNLOADING. THIS PROVISION OF LOCKING IS ALSO APPLICABLE TO OTHER BOTOOM PLATE BOLTS.

Tarun
16/02/24

ANNEX–1

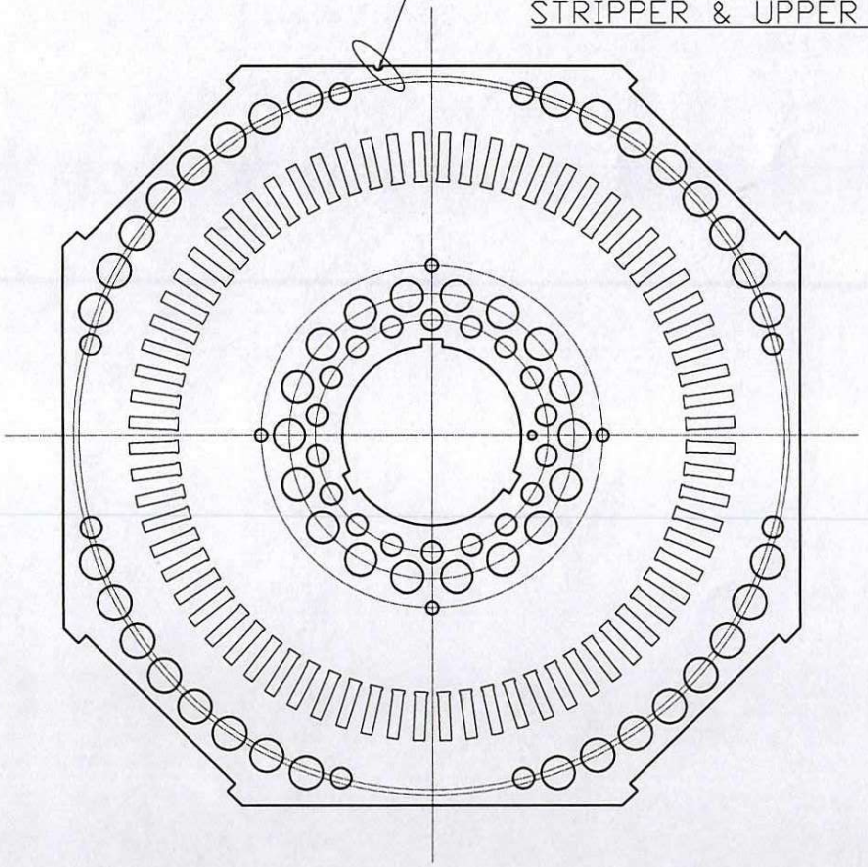


NOT TO SCALE

ANNEX–2

NOTE FOR MANUFACTURING STAMPINGS WITH & WITHOUT BUILDING NOTCH:

PROVIDE INTERCHANGEABLE SPARE UPPER & LOWER DIE CUTTING STEEL SEGMENTS (1EACH) WITHOUT THE ø8 BUILDING NOTCH PROFILE, SO THAT WHEN REQUIRED THEY CAN BE REPLACED WITH THE CORRESPONDING SEGMENTS CONTAINING BUILDING NOTCH. SIMILAR SPARE INSERTS (1EACH) WITHOUT BUILDING NOTCH PROFILE SHALL BE REQUIRED FOR LOWER STRIPPER & UPPER EJECTOR PLATES



FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 0 445 31 64 055

NOTES :–

(1) DIMENSIONS OF ITEM 001 & 002 ARE SAME EXCEPT FOR SLOT AND ID DIMENSIONS AS SHOWN.
(2) DIMENSIONS OF ITEM 003, 004, 005 ARE SAME EXCEPT FOR SLOT DIMENSIONS AS SHOWN DIMENSIONS OF ITEM 004 & 005 ARE IDENTICAL EXCEPT THICKNESS.
(3) ITEM 003 AND 005 TO BE MADE FROM INCUTS OF ITEM 001, ITEM 004 TO BE MADE FROM INCUTS OF ITEM 002.
~~(4) MATERIAL SPEC ABB ARE AS FOLLOWS.~~

~~ITEM 001, 003 & 005 PUR SPEC NBT 200174 P 0810.~~
~~DESIGNATION EBL BD 810 V 530-50A 16.~~

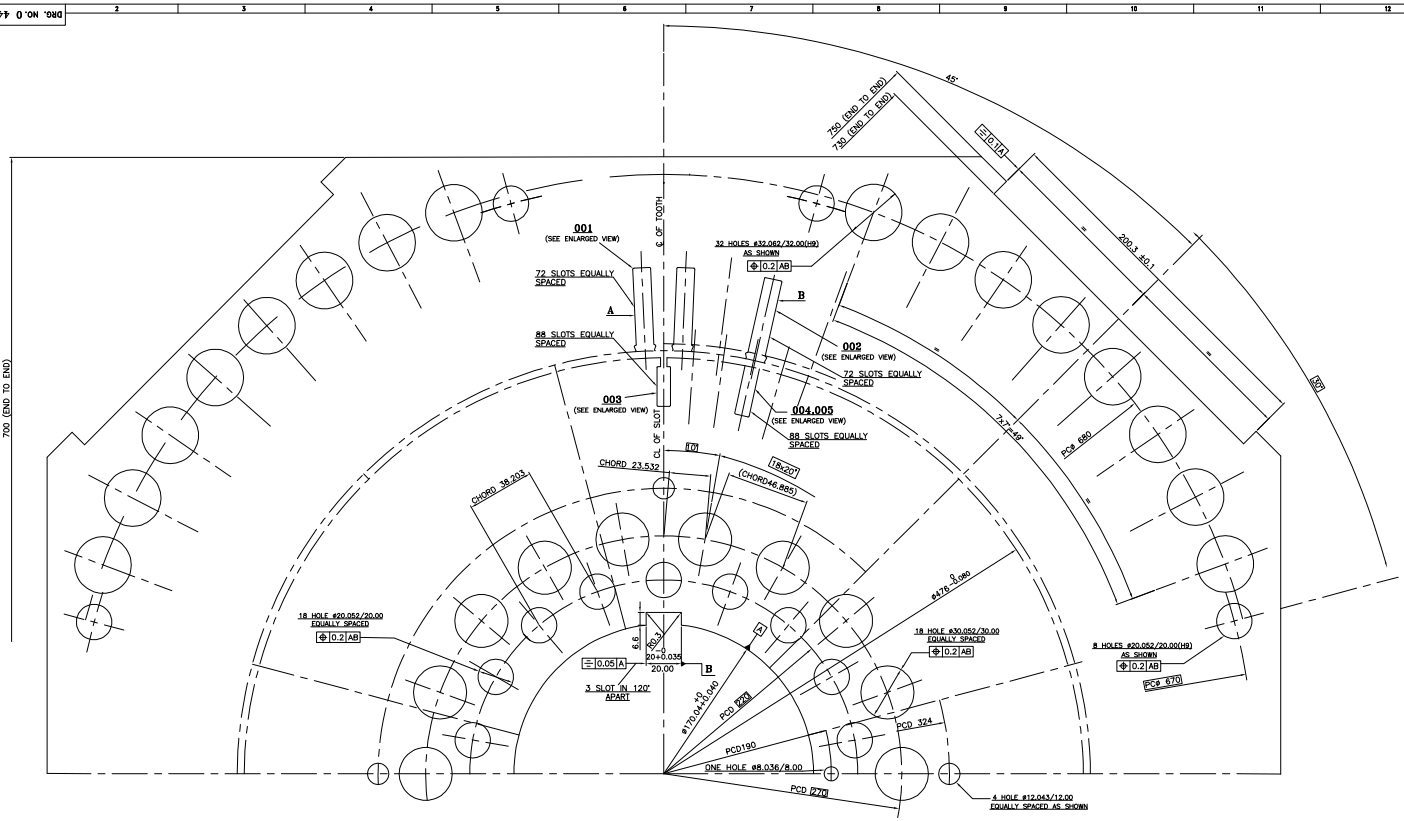
~~ITEM 002, 004 PUR SPEC NBT 402929 P 0810.~~
~~DESIGNATION BD 810 N 1 UST 1203.~~

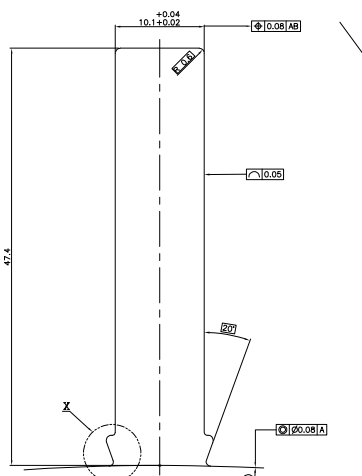
(5) NO OF SLOTS IN STATOR – 72.
NO OF SLOTS IN ROTOR – 88.

(6) BEFORE PUNCHING THE SLOTS, ORIENT THE DIRECTIONS OF ROLLING BY 90° DEGREES.
~~(7) SURFACE COATING TO BE AS FOLLOWS.~~
~~a) TYPE OF COATING SYNTHETIC RESIN VARNISH IMPREGENATED.~~
~~b) MAX PERMISSIBLE CONSTANT TEMP – 155°C.~~
~~c) SURFACE CONDITION OF SHEET UNPICKEED SCALE FREE.~~
~~d) ONE SIDE COATING THICKNESS (2 MICRONS (8 MICRONS) MIN.~~
~~e) COATING TO BE ONLY ON ONE SIDE.~~
~~(8) STATOR & ROTOR STAMPING TO BE DEBURRED AFTER PUNCHINGS ALL DETAILS.~~
(9) 4 HOLES ⌀12.043/12.00 ON PCD 324 AND HOLE ⌀8.036/8.00 ON PCD 190 ARE FOR TOOLING PURPOSE ONLY.
~~(10) FOR ITS 002 & 004 ALTERNATE THICKNESS MAY BE OF 0.75.~~
~~(11) THE REQUIREMENT OF SLOT DIMENSION TOLERANCE IN PUNCHING DRG. IS 0.0/0.0 BUT SINCE THIS CAN NOT BE ACHIEVED PRACTICALLY THE MINIMUM POSSIBLE TOOLING TOLERANCE IS TO BE FOLLOWED WHICH IS NOT MORE THAN +0.02/+0.04.~~
(12) THIS DRG IS SIMILAR TO CLW DRG. NO. 1TWD.96.015, ALT–7 FOR STATOR PUNCHING & CLW DRG. NO. 1TWD.096.010, ALT–10 ROTOR PUNCHING.
(13) MATERIAL FOR IT.002 & 004. COLD ROLLED CARBON ST. SHEET TO IS:513–94 Gr '0' TEMPER–SP (SKIN PASSED) SURFACE FINISH BRIGHT SURFACE TYPE BEST SURFACE.
(14) BURR LEVEL SHOULD NOT BE MORE THAN 50 MICRON.
(15) SHARP CORNERS OF SLOT PORTION TO BE ROUND OFF.

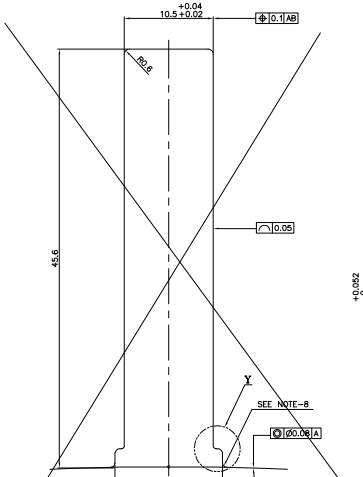
TOOL LIST

IT. NO.	TOOL NO.	DESCRIPTION
001 TO 005	1578280	COMPOUND BLANKING TOOL
001	1578281	NOTCHING AND AIR GAP TOOL (MAIN)
002	1578282	NOTCHING AND AIR GAP TOOL (WIDER)
001,002	1577804	SUPPORT CENTERING PLATE
~~001~~	~~1578059~~	~~STACK CHECKING BAR~~
~~001~~	~~1578060~~	~~SLOT CHECKING BAR~~
003	1577805	NOTCHING TOOL (MAIN)
004,005	1577806	NOTCHING TOOL (WIDER)
003,004	1577807	SUPPORT CENTER PLATE
003	1451767	STACK CHECKING BAR
003	1577808	SLOT CHECKING BAR
	~~1578080~~	~~SPOT WELDING FIXTURE (ROTOR).~~
	~~1578146~~	~~SPOT WELDING FIXTURE (STATOR)~~
	~~1578231~~	~~NOTCHING & AIR GAP TOOL (MAIN)~~
	~~1578269~~	TRIMMING TOOL FOR FINISH STAMPING 045008 FROM AFFECT.
	1578263	KEYWAY DIE
	1578264	VENT HOLE DIE
	1578265	NOTCH & TRIMMING DIE
	~~1578266~~	NOTCH & TRIM TOOL WIDER FOR END PUNCHING
	~~1578272~~	~~SUPPORT CENTERING PLATE~~
	~~1578802~~	~~BUILDING NOTCH DIE~~
	~~1578302~~	~~KEYWAY DIE~~
	~~1508304~~	~~SUPPORT CENTERING PLATE~~
	~~1508760~~	~~SHAFT HOLE DIE~~
	~~1578273~~	~~NOTCHING & AIR GAP TOOL (WIDER)~~
001	1445871	STACK CHECKING BAR
001	1567991	SLOT CHECKING GAUGE
003	1605034	NOTCH & AIRGAP TOOL
	1605035	GANG SLOT DIE FOR
	1605062	BLANKING TOOL (OUTER PROFILE+STATOR VENT+3 PIN)
003	1605067	NOTCH & TRIM TOOL
003	1605071	SUPPORT CENTERING PLATE FOR CSU FOR ROTOR PUNCHING (MAIN)
001	1605072	SUPPORT CENTERING PLATE FOR CSU FOR STATOR PUNCHING (MAIN)
	1605089	NOTCHING AND AIR GAP TOOL SUITABLE TO WORK WITH STATOR DIE SET SET FOR 32T SEGMENTAL NOTCHING MACHINE
	1605090	COMPOUND TOOL (3 KEY WAY)
	1605091	NOTCH & AIR–GAP TOOL FOR 12.5 T IMPACT
	1605143	NOTCH & TRIM TOOL FOR ROTOR FOR 4 TON
	1605144	TRIMMING TOOL FOR ROTOR BLANK FROM TOOL 1605035
	1605145	LOCATION PLATE 13/A/32

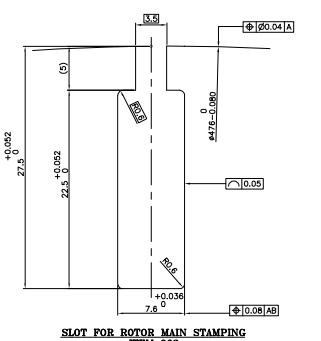




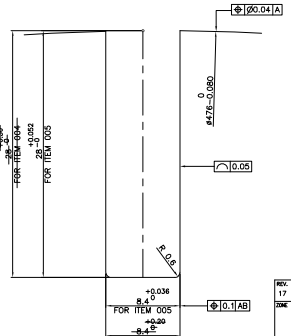
SLOT FOR STATOR MAIN STAMPING
ITEM 001



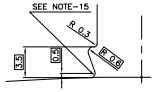
SLOT STATOR END STAMPING
ITEM 002



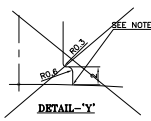
SLOT FOR ROTOR MAIN STAMPING
ITEM 003



ROTOR MID STAMPING
ITEM 005



DETAIL–'Y'



DETAIL–'Y'

REV.	DATE	ALTERED / CHECKED / APPROVED	SDB / AS / AS	ZONE	DESCRIPTION
17	02.12.19				IN TOOL LIST TOOL NO. 1605145 ADDED. (TCM–356)
16	28.11.18				IN TOOL LIST TOOL NO. 1605143 & 1605144 ADDED. (TCM–356)
15	17.01.18				IN TOOL LIST TOOL NO. 1605091 ADDED. (TCM–353)
14	23.10.18				IN TOOL LIST, TOOL NO. 1605090 ADDED. (TCM–353)
13	15.10.18				IN TOOL LIST, TOOL NO. 1605089 ADDED. (TCM–353)
12	06.01.18	VK / PT / VR		5/6	STATOR PUNCHING BUILDING NOTCH'S DIA CHANGED AS PER DRAWING REVISED & LINE WITH CLW DRAWING & MINUTES OF MEETING REGARDING DIMENSION "F" ON STATOR & ROTOR PUNCHING "F" ON STATOR TYPE ⌀1960MM DATED 06/12/2017
11	29.11.17				IN TOOL LIST, TOOL NOS. 1605071 & 1605072 ADDED. (TCM–351)
10	15.06.17				IN TOOL LIST, TOOL NO. 1605067 ADDED. (TCM–350)
09	18.03.17				IN TOOL LIST, TOOL NO. 1605062 ADDED. (TCM–349)
08	20.02.17			4/5	IN ROTOR 88 SLOTS WERE 72 SLOTS.
07	26.12.16			4/5	AS PER SHOP FEEDBACK BUILDING NOTCH ADDED.
06	24.03.16				TOOL NO. 1605035 DESCRIPTION GANG SLOT DIE WAS COMPOUND BLANKING TOOL.
05	28.12.13				TOOL NO. 1605035 WAS NOT ON. (TCM–340)
04	21.7.12				TOOL NO. 1605034 WAS NOT ON.
03	1.02.11				DRG. DIGITIZED & UPDATED.
02	1.11.10				MAT. SPEC. OF IT.001,003 & 005 TM 10472 WAS AA10917
01	8.10.10				TOOL LIST UPDATED & DIM DIM R 392.0 DELETED

		005	ROTOR MID STAMPING 0.5x476x476		TM 10472	KG	0.445	
–	~~SEE NOTE 13~~	~~004~~	~~ROTOR END STAMPING 1.0x476x476~~			KG	~~0.91~~	
–		003	ROTOR STAMPING(MAIN) 0.5x476x476		TM 10472	KG	0.465	
–	~~SEE NOTE 13~~	~~002~~	~~STATOR END STAMPING 1.0x700x700~~			KG	~~1.39~~	
–		001	STATOR STAMPING (MAIN) 0.5x700x700		TM 10472	KG	0.69	
QTY. / VAR. 00		REMARKS / VAR.	ITEM NO.	DESCRIPTION	DRAWING NO.	T.MO. / VAR.	MATL. CODE	MATL. SPCN.

ADDITIONAL INFORMATION SIMILAR DRG NO. 3EHM112016
STATUS OF DRAWING
DISTRIBUTION OF PRINTS
TME–1, TXM–3, PRM–3.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: 6FRA 6066 INDUCTION MOTOR FOR A.C. LOCO

BHARAT HEAVY ELECTRICALS LTD. BHOPAL

	NAME	SIGN	DATE	NO. OF WDR.
DRN.	R.BV	–SD–	6.9.10	
CHD.	D.K.	–SD–	6.9.10	
APPD.	VIKAS R.	–SD–	6.9.10	–

DEPT.	UNDL. DMG. GR.	SCALE	WEIGHT (KG.)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEM
CODE	406	NTS	–	0 445 31 64 052 1 445 45 64 052	05 03,07,08	005

TITLE: STATOR AND ROTOR STAMPING

DRAWING NO. 0 445 31 64 055 REV. 17
SHT. NO. 01 NO. OF SHT. 01

SIZE A0