

Section-IV

TECHNICAL SPECIFICATIONS OF “COMPOUND DIE” FOR THE MANUFACTURING OF STAMPINGS OF 600 MW TG

1.0 PURPOSE:

This specification is applicable for the procurement of “Compound Die” (Double segment-Punching of two component per stroke) for the manufacturing of Stator Core Stampings of 600 MW Turbogenerator, at CSU, Jagdishpur.

2.0 SCOPE OF SUPPLY:

Scope of supply includes design, manufacturing and proving (at BHEL) of “Compound Die”.

3.0 STAMPING DATA:

- Stamping dimensions as per the enclosed drawing no. 0-135-03-40115 (Rev– 02)
- Material of Stamping – ETS (pre coated with Varnish)
- Stamping Thickness – 0.50 mm
- Blank size: Roll of width 730 mm, 0.5 mm Thick

4.0 DIE SPECIFICATIONS:

“Compound Die” should be suitable to punch two components per stroke with a stroke rate of 25 Stroke / Minute (50 components / Minute) or more.

Die should have 5 Guide Columns (3-Columns on rear side & 2-Columns in front) & Ball Cage set.

- | | |
|---------------------------|-------------------------------------|
| a) Top Plate | 100 mm thick of mild steel. |
| b) Bottom Plate | 100 mm thick of mild steel. |
| c) Base Plate Pads | 50 mm (min.) thick of mild steel. |
| d) Guide Column | Dia 100 mm. |
| e) Parallelity of Die Set | should be within 0.04 mm per meter. |

Note: Die should have suitable arrangement for disposal of scrap.

4.1 CUTTING ELEMENTS

Cutting elements should have minimum thickness of 37 mm, with die life of minimum 17 mm. Material of cutting elements should be imported XT215Cr12 (IS: 3748).

4.2 SPRINGS

Only rectangular cross section wire heavy duty imported springs of reputed make should be used. Party must mention the source of supply of springs.

4.3 HOLDERS

Die Holder and Punch Holder to be assembled with Top / Bottom Plate using hardened Bushes and Dowel pins of minimum diameter 20 mm for easy repair and sharpening of Die / Punch sub assembly. Both Punch sub-assemblies shall be assembled on single Punch Holder.

4.4 STRIPPER PLATE

Hardened inserts of 40Cr1 / EN24 / T-90 (or any better material) to be used all around the profile in both Stripper/ Ejector Plates.

5.0 EQUIPMENT FOR MANUFACTURING:

“Compound Die” shall be used on “Fully Automatic CNC Blanking Line”, capacity 500 Tonne, as per the enclosed broad specifications.

6.0 CONCURRENCE OF DESIGN DRAWINGS:

Prior to start of manufacturing, vendor shall get the design drawings of “Compound Die” concurred from BHEL, within 4 weeks after the receipt of PO / LOI. Along with Die design, party must submit quality plan and schedule of manufacturing of Die by the vendor.

7.0 OTHER TERMS AND CONDITIONS:-

1. Vendor will have to supply soft copy of complete set of design drawings of “Compound Die” on CD (AutoCAD) at time of Die delivery.
2. Under normal working condition the Die must produce 100000 (One Lac.) components per sharpening of Die and Punch and burr level should not exceed more than 20 microns.
3. Party shall supply the test certificate of chemical composition, hardness and crack testing of materials used in manufacturing of i) Cutting elements (Die & Punch) ii) Guide column & Bushes iii) Other hardened components.
4. Guarantee will be for a period of 12 months from the date of final acceptance of Die at BHEL Jagdishpur.

8.0 PROCEDURE FOR INSPECTION:

“Compound Die” shall be inspected / tested as follows prior to its final acceptance by BHEL:

1. After completing the sub assembly of Die & Punch, vendor shall send their complete observation sheet to BHEL along with inspection call.
2. If found acceptable, BHEL will depute their representative to Vendor's works for inspecting the sub assembly of the Die Punch. Vendor shall provide all facilities of checking including that of checking the co-ordinates of the contour on their machine. Vendor shall also provide test certificate for chemical composition of the material used for manufacturing Die, Die Punch segments (cutting elements), Guide Columns, Guide Bushes and the hardness achieved of the items.
3. The above observation will be studied further by BHEL. If found acceptable, clearance shall be given to the vendor to despatch the Die.
4. After the receipt of the Die at BHEL, vendor shall have to depute their technical representative to BHEL, Jagdishpur, for the actual job trial of the “Compound Die” on the “Blanking Line” and its final acceptance by BHEL.

9.0 PACKING

Rigid packing/fixing for all items including complete Die & Punch, all Accessories and other supplied items, to avoid any damage/loss in transit.

Broad Technical Specifications of 500 T “Fully automatic CNC Blanking Line”

S. No.	Parameter	Specifications
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	220 mm
7.	Bed opening of 500 T Blanking Line is 500 x 1660 mm for scrap	The tool should be designed for easy removal of scrap

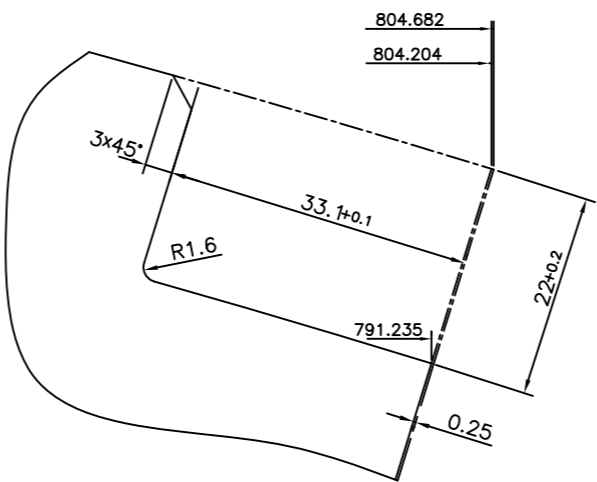
Note: Drawing no. CSU/BL/MD/04.12 dated 04.02.08 of mounting dimensions for the Die is enclosed.

10.0 Qualification requirement:

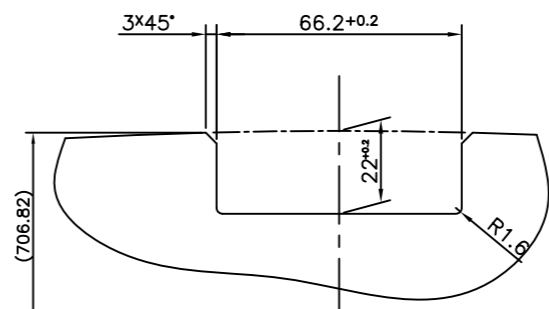
Only those vendors, who have supplied at least one stamping die for minimum 150 MW generator Stampings or more in the past ten years and such die is presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender), should quote.

Performance certificate from the customers regarding satisfactory performance of die supplied to them should be sent along with technical offer.

BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.

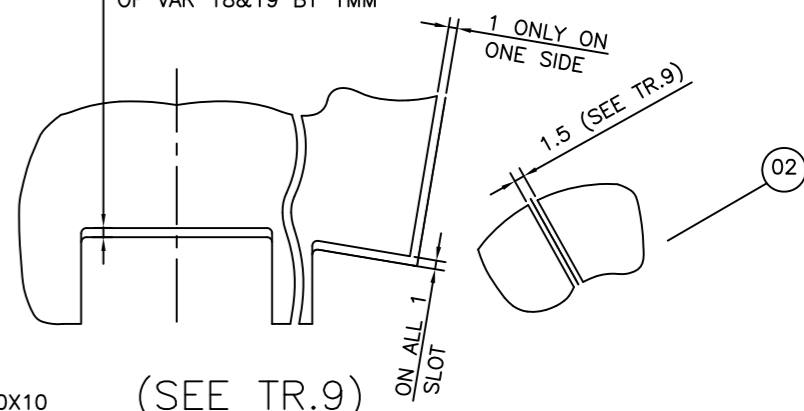


DETAIL
(K10)



DETAIL Z
(L12)

FILE OFF SLOT BOTTOM OF VAR. 12&15
BY 1MM.BEFORE VARNISHING.REMOVE
BURRS CAREFULLY. CUT SLOT BOTTOM
OF VAR 18&19 BY 1MM



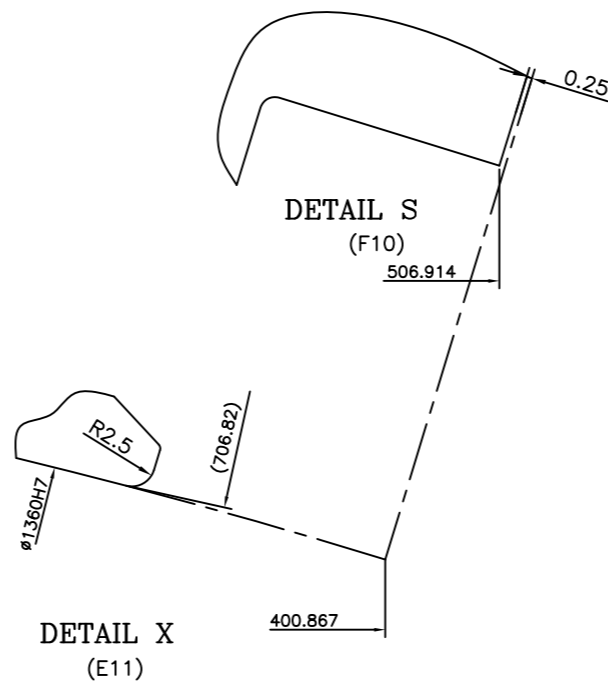
(SEE TR.9)

NOTE:

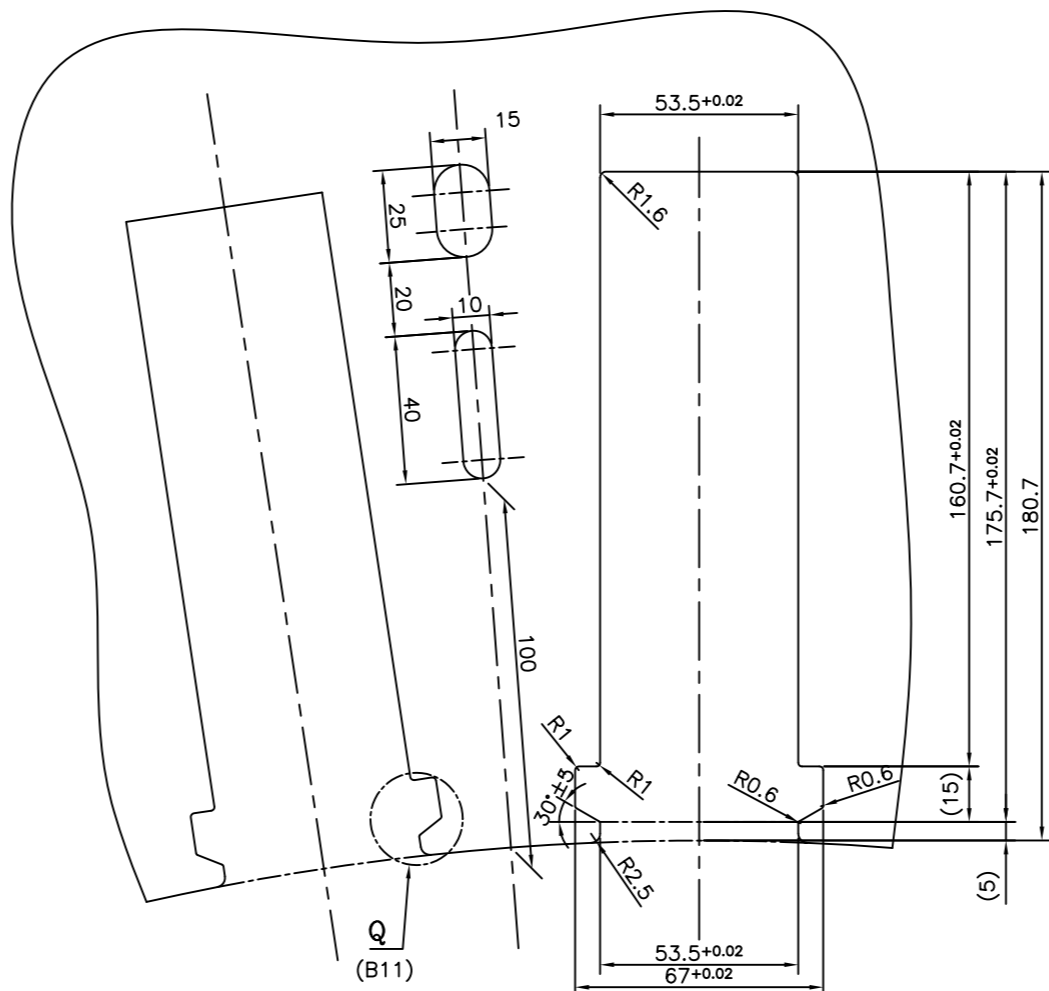
1. 42 SLOTS ON CIRCUMFERENCE
2. 4 SLOTS PER SEGMENT
3. 10.5 SEGMENTS ON CIRCUMFERENCE
4. 36 HOLES Ø20
5. 4 ELONGATED HOLES 25X15, 4 ELONGATED HOLES 40X10
6. AREA OF GAS PENETRATION 14125 SQ. MM
7. SEGMENT AREA 359967 SQ. MM

TECHNICAL REQUIREMENT

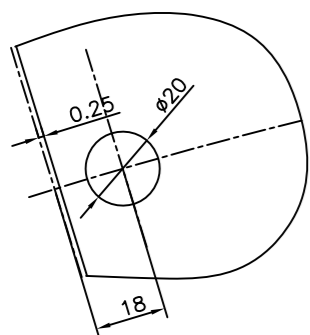
1. MARK IDENTIFICATION ACCORDING TO HW 0400397.
2. ALL DIMENSIONS HAVING NO TOLERANCE SHALL BE THEORETICAL DIMENSIONS FOR THE PRODUCTION OF THE RELEVANT CUTTING TOOL.
3. DIMENSIONS IN BRACKET ARE TO DETERMINE BLANK SHEET SIZE ONLY.
4. SEGMENTS TO BE VARNISHED ON BOTH SIDES WITH VARNISH TO SPEC. A27541 . OR ITS EQVT. TO ACHIEVE AN AVERAGE FILM THICKNESS OF 8-12 µm ON EACH SIDE. INSULATION THICKNESS OF ANY INDIVIDUAL POINT SHALL BE ≥5 OR ≤20 µm.
5. VARNISHING OF SEGMENTS TO BE DONE IN ACCORDANCE WITH TECH. INSTRUCTIONS NO HW 0980628
6. ACCEPTANCE NORMS FOR VARNISHED SEGMENTS SHALL BE AS PER TG 40009.
7. ACCEPTANCE NORMS FOR BURR LEVEL SHALL BE AS PER TG 40143.
8. POSITION OF NOTCH R1.6 IS FOR REFERENCE. IT SHOULD BE CHANGED IN CASE OF DUPLICATE DIE / MORE THAN ONE DIE.
9. ALL THE SEGMENTS VAR.12,15,18&19 TO BE FURTHER SHEARED BY 1MM. ON ONE SIDE TO ACHIEVE A GAP OF APPROX. 1.5MM. BETWEEN THE ADJACENT SEGMENTS.



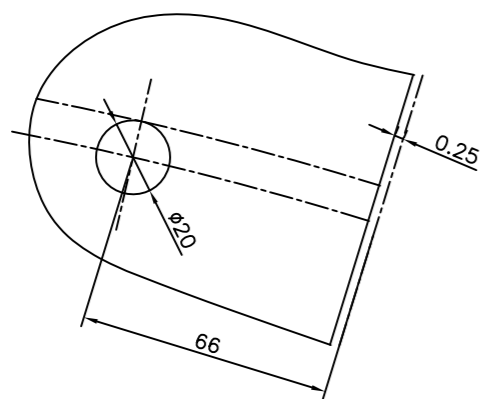
DETAIL X
(E11)



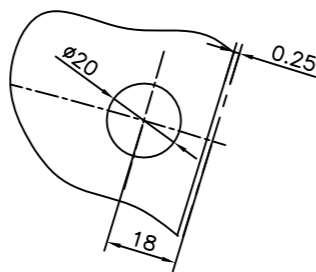
DETAIL Y
(G14)



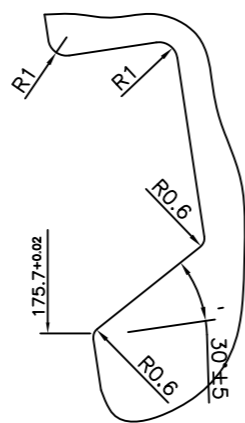
DETAIL U
(J15)



DETAIL P
(G10)

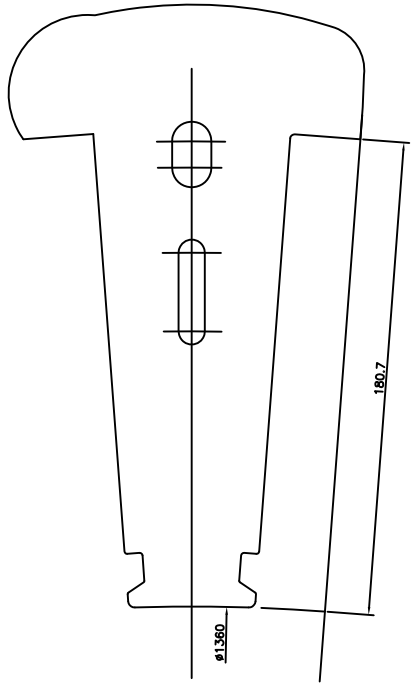


DETAIL Q1
(H10)

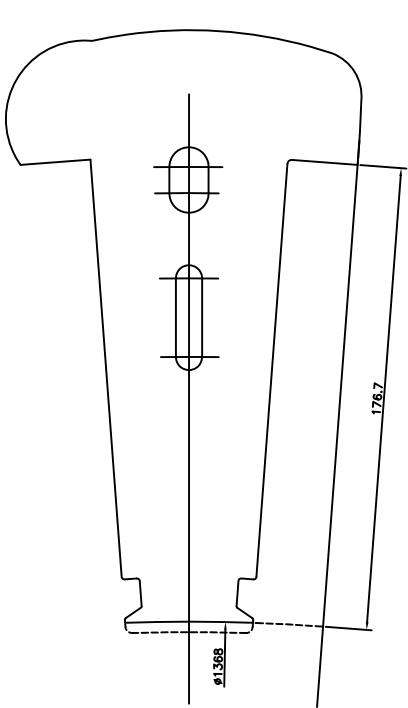


DETAIL Q
(C9)

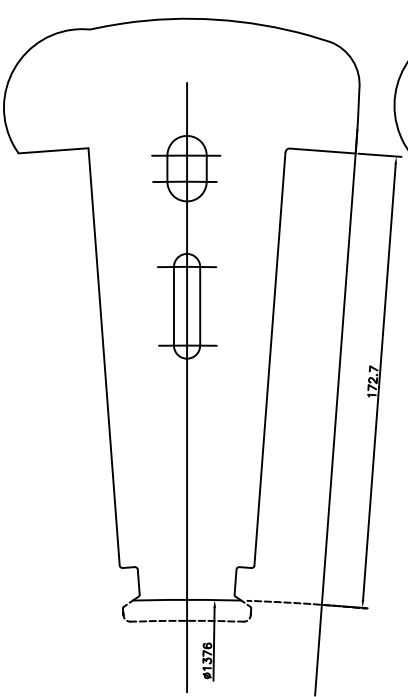
VAR	REF. TO ASSY. DRG.	ITEM NO	QTY.	THK.	MAT.
00	0-135-04-01114	011	12966	0.5	AA10915
01	0-135-04-01116	012	756	0.5	AA10915
02	0-135-04-01116	013	1092	0.5	AA10915
03	0-135-04-01116	014	966	0.5	AA10915
04	0-135-04-01116	015	966	0.5	AA10915
05	0-135-04-01116	016	777	0.5	AA10915
06	0-135-04-01116	017	441	0.5	AA10915
07	0-135-04-01116	018	441	0.5	AA10915
08	0-135-04-01116	019	441	0.5	AA10915
09	0-135-04-01116	020	336	0.5	AA10915
10	0-135-04-01116	021	315	0.5	AA10915
11	0-135-04-01116	022	315	0.5	AA10915
12	0-135-04-01116	023	40	1	HW10998
13	1-135-04-01076	001	10	1	HW10998
14	0-135-04-01116	027	10	1	HW10998
15	0-135-04-01116	024	20	1	HW10998
16	0-135-04-01116	031	11	0.15	HW23799
18	0-135-04-01116	032	22	0.15	HW23799
19	0-135-04-01116	033	22	0.15	HW23799



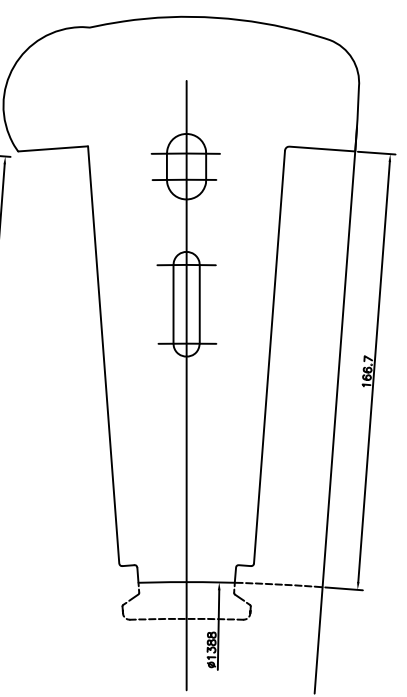
VAR . 00



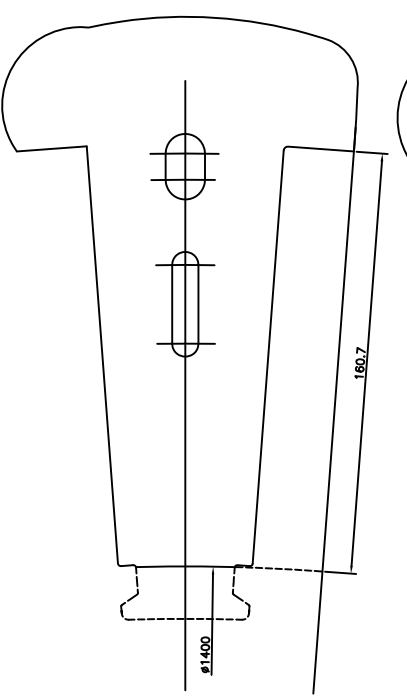
VAR . 01



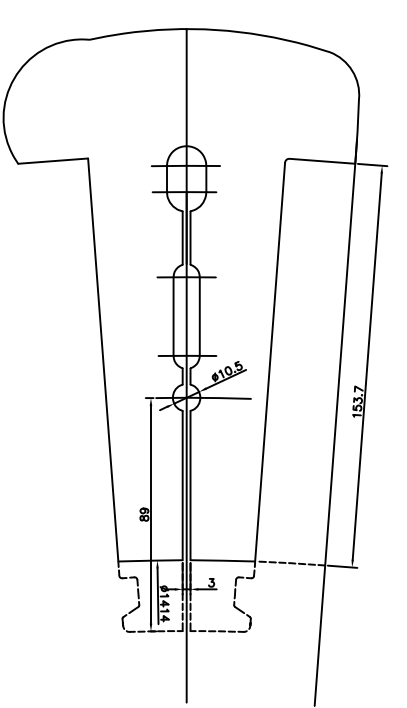
VAR . 02



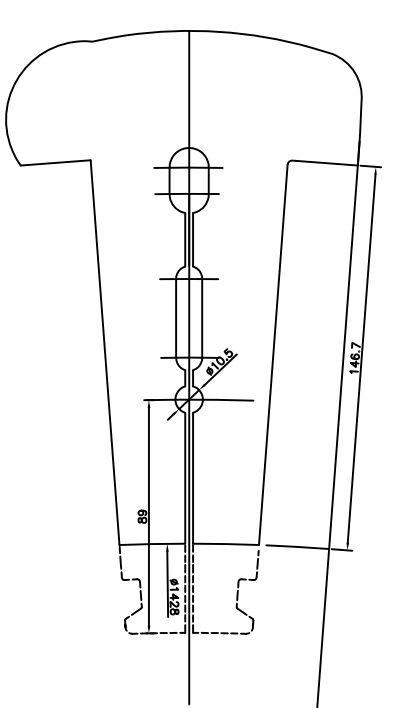
VAR . 03



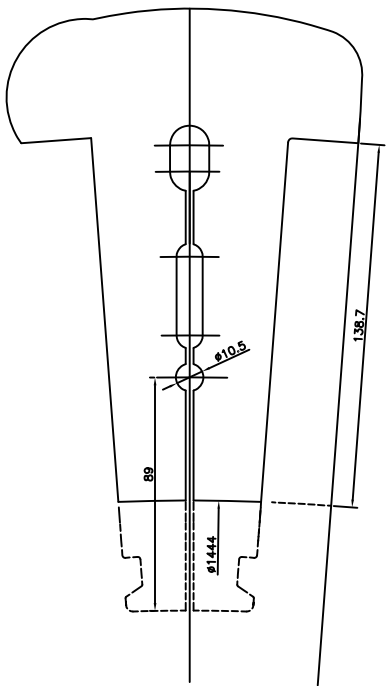
VAR . 04



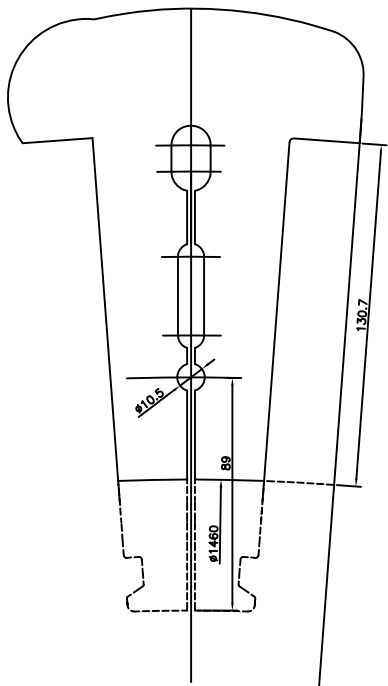
VAR . 05



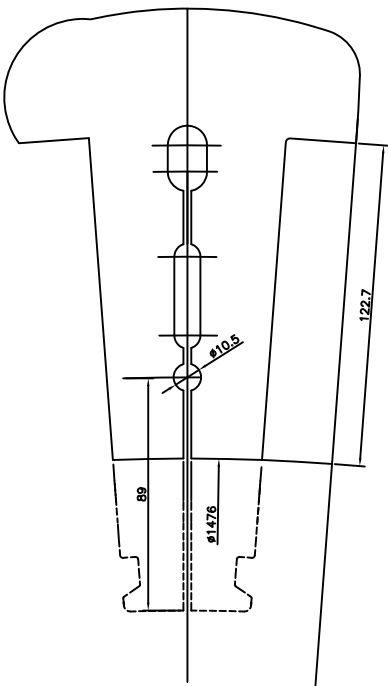
VAR . 06



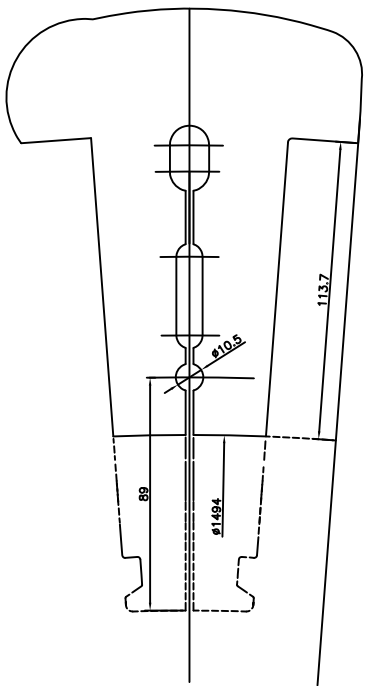
VAR . 07



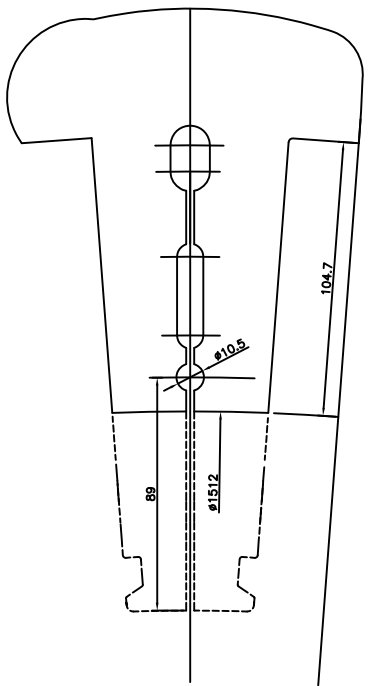
VAR . 08



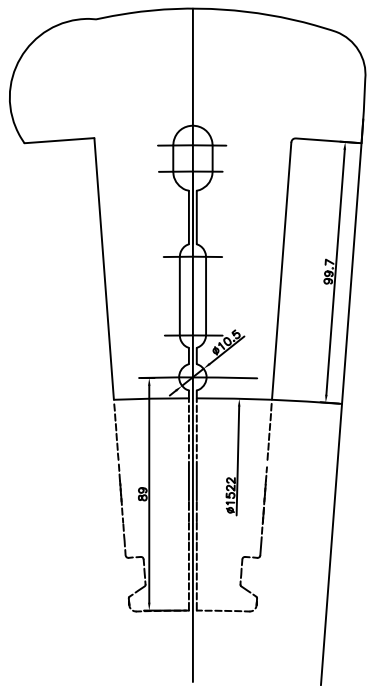
VAR . 09,13,16



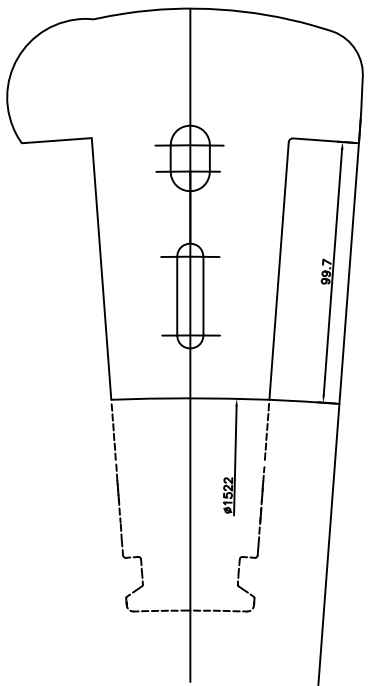
VAR . 10,14



VAR . 11



VAR . 12,18



VAR . 15,19

