









252211001541-R14-S01 THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

INVENTORY NO.	SIGN. & DATE	HT
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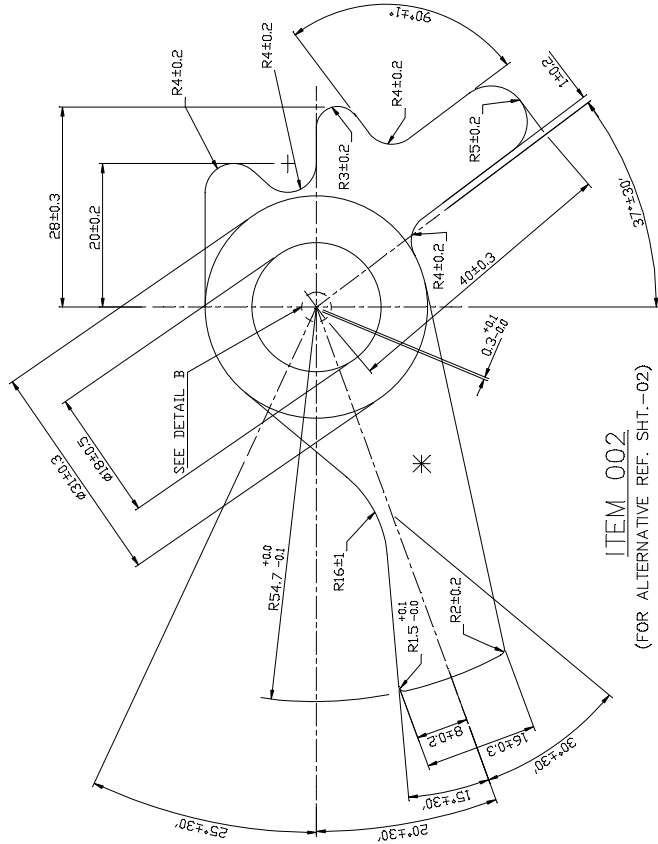
TOOL LIST
1498738 21 N 7 REAMER
1498739 21 N 7 PLUG GAUGE
1498762 CNC HOLDING FIXTURE
1498763 GRINDING FIXTURE
1498882 CNC HOLDING FIXTURE
1498951 CHECKING RADIUS GAUGE (R54.5)
1564103 DRILL JIG
1495949 CHECKING GAUGE

NOTE:-

1. FUR HARDENING ALTERNATIVELY CASE HARDENING PROCESS CAN BE USED.
2. AFTER CASE HARDENING AND GRINDING THE PAWL SHOULD BE PHOSPHATED TO PR. SPEC. AA 0673616
3. GRINDING ALLOWANCE AFTER HEAT TREATMENT SHALL NOT BE MORE THAN 0.05 MM.
4. HARDNESS AFTER GRINDING SHALL NOT BE LESS THAN 650 H.V.
5. SUPPLIER SHALL PROVIDE IDENTIFICATION AT LOCATION MARKED \* AS UNDER:-
  - DATE OF RECEIPT
  - DATE OF MANUFACTURE/BATCH NO.
  - PW IN.

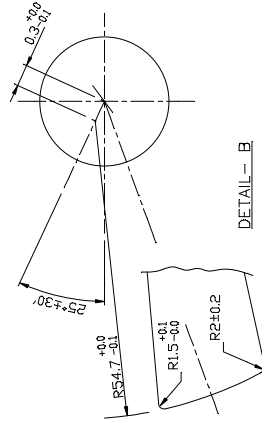
6. FOR MORE INFORMATION REFER SG 12728

	REV.	DATE	ALTERED	REV.
			CHECKED	
			APPROVED	
	ZONE			ZONE



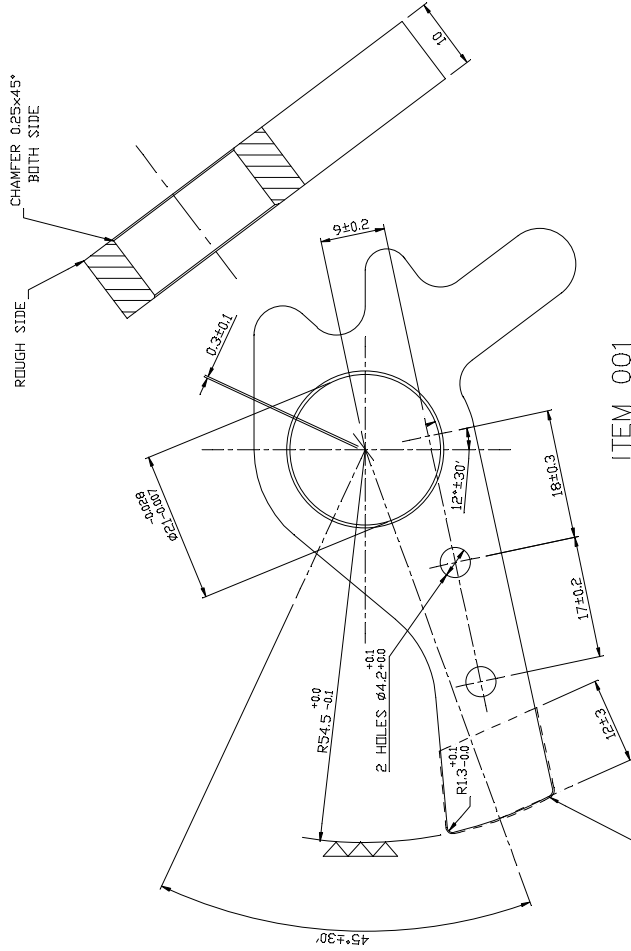
ITEM 002

(FOR ALTERNATIVE REF. SHT.-02)



DETAIL- B

1. HARDEN THIS PORTION TO  $690 \pm 30$  HV  
TK, BY CASE CARBURISING INDUCTION  
HARDENING PROCESS. THE REMAINING PORTION  
SHOULD BE COPPER PLATED (50 TO 70 MICRONS  
THICK (MASKING) BEFORE CASE HARDENING.



ITEM 001

[illegible]

ADDITIONAL INFORMATION	TYPE OF PRODUCT
------------------------	-----------------


STATUS OF DRAWING	OR NAME OF CUSTOMER / PROJECT
P	

DISTRIBUTION OF PRINTS	
D	

□/C - 1  
 BHARAT HEAVY ELECT

SWM-3 TCX BHOPAL

REV.	DATE	ALTERED	DEPT	UNTL.	DIMS.	GR.

14	05.10.01	CHECKED	CITDE	AA 0230208	M	
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14	COMMENTS APPROVED	403	DATE SIGNED
ZONE	DDA/PMC RECORDING	TITLE	

DRAWING REDRAWN.  
DETAIL 'B' ADDED  
PAWL

Journal Pre-proof

5	6
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7

05/05/2026 01:29 PM

File No. HEP-SCRoSWN(Misc)/98/2026+HEP-SWM20900<sup>2</sup> (Computer No. 30762)  
 ENGINEER(PKA)-MWX35702-HEP. ENGINEER. HEP-HEAVY ELECTRICALS PLANT (HEP) on 05/05/2026 01:29 pm  
 Generated from eOffice by Pradeep Kumar Agrawal

ENGINEER(PKA)-MWX35702-HEP. ENGINEER. HEP-HEAVY ELECTRICALS PLANT (HEP) on 05/05/2026 01:29 pm

File No. HEP-SCROSWM(Misc)19872026-HEP-SWM20900<sup>2</sup> (Computer No. 301762)

Generated from eOffice by Pradeep Kumar Agrawal  
ENGINEER(PKA)

100



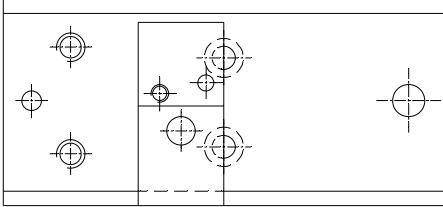
TOOL LIST :-

- 1498744 - BENDING TOOL
- 1498745 - BENDING TOOL
- 1492601 - 8 E 9 REAMER
- 1492602 - 8 E 9 PLUG GAUGE
- 1498769 - DRILL JIG

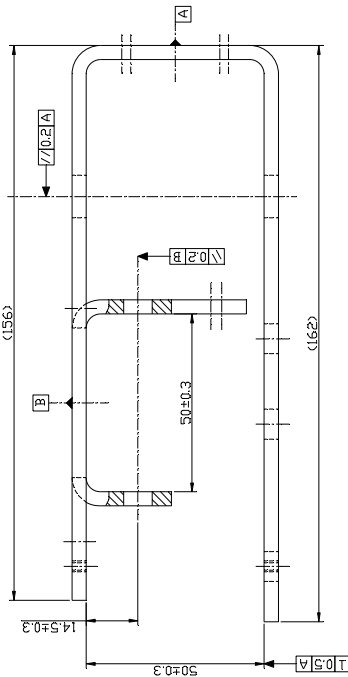
FINISH :- ZINC PLATE & PASSIVATE TO AA 0673603  
AND AA 0673604 (0.013 TK. MIN.)

PLATING AREA :- 505.00 SQ. CM.

BENDING RADIUS :- 4±0.5 MM.



ITEM\_001



VAR CD	REMARKS	VAR ITEM NO.	PLATE	2 25211001533	001	IT. NO	MATL. CODE	UNIT W.T.	QTY.

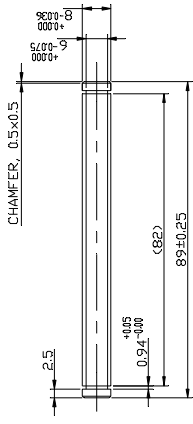
ADDITIONAL INFORMATION

STATUS OF DRAWING B

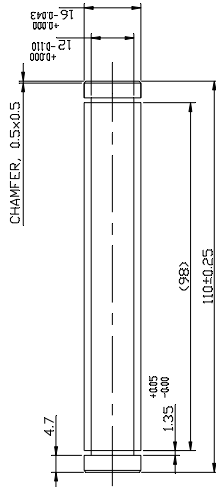
DISTRIBUTION OF PRINTS  
D/C -1 TCX -1  
SWM -3

REV. DATE ALTERED  
05 08.08.04  
APPROVED  
16

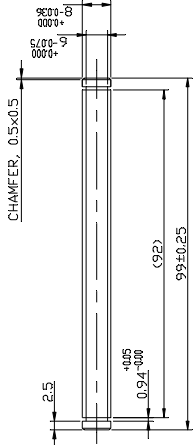




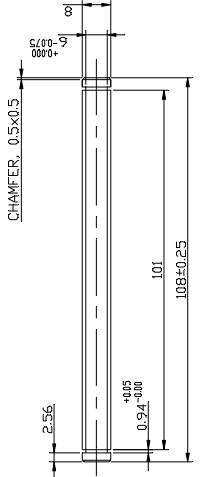
ITEM 001



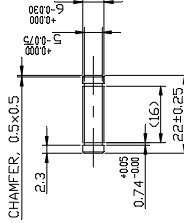
ITEM 004



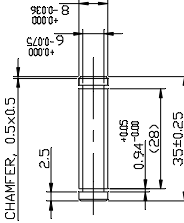
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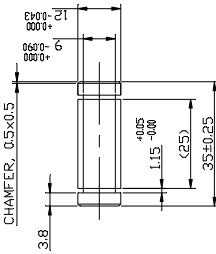
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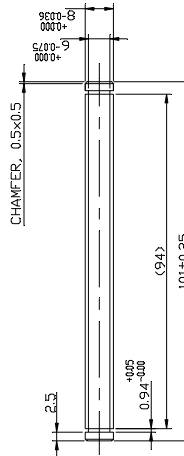
ITEM 007



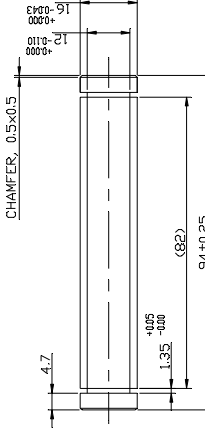
ITEM 008



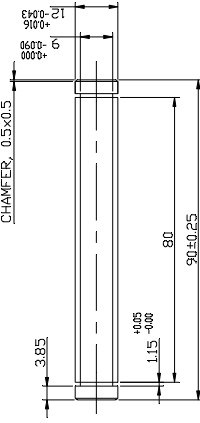
ITEM 010



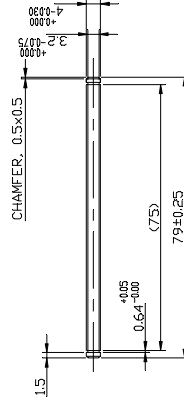
ITEM 011



ITEM 003



ITEM 006



ITEM 009

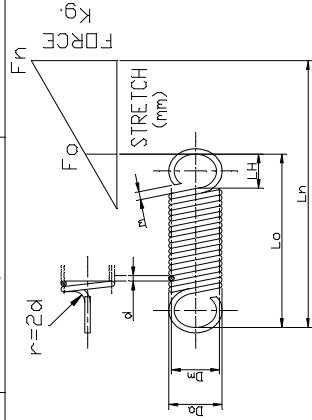
VAR ID	REMARKS	VAR ITEM NO.	DESCRIPTION	DRAWING NO.	IT. NO.	MATL. CODE	MATL. SPECN.	UNIT WT.	QTY.

ADDITIONAL INFORMATION									
STATUS OF DRAWING									
DISTRIBUTION OF PRINTS									
SWM -3									
REV. DATE									
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FINISH : - NATURAL



INDEX																
ITEM NO.	d	L <sub>n</sub>	F <sub>n</sub> (Kg)	D <sub>a</sub>	L <sub>o</sub>	F <sub>o</sub> (Kg)	SHEAR STRESS (Kg/mm <sup>2</sup> )	LH	NO. OF ACTIVE TURNS I <sub>r</sub>	STYLE NO.	DIRECTION OF WINDING	MODULUS OF RIGIDITY	WINDING RATIO = D <sub>m</sub> /d	SCALE N/mm*	SIEMENS REF.	REF. TO ASSY. DRG.
001	1.0	50	1.765	10	32.5	0.608	46.48	6.4	18½	BP9099432267	R.H.S.	7160 Kg./mm <sup>2</sup>	9	0.661	SV 660 1.0 B50	35211001530 ITEM 015
002	0.8	40	1.226	8	25	0.382	50.50	5.1	17½	BP9099432275	R.H.S.	7160 Kg./mm <sup>2</sup>	9	0.563	SV 660 0.8 B40	35211001543 ITEM 024
003	1.0	63	1.079	15	34.5	0.333	41.87	10.4	12½	BP9099432283	R.H.S.	7160 Kg./mm <sup>2</sup>	14	0.262	SV 660 1.0 C63	35211001543 ITEM 029
004	0.6	50	0.735	5.6	31	0.275	49.72	3.5	38½	BP9099432291	R.H.S.	7160 Kg./mm <sup>2</sup>	9	0.242	SV 660 0.6 B50	35211001556 ITEM 034
005	0.5	50	0.49	5	28.5	0.177	51.583	3.2	42½	BP9099434197	R.H.S.	7160 Kg./mm <sup>2</sup>	9	0.146	SV 660 0.5 B50	35211001549 ITEM 004
006	1.0	100	1.079	15	49.5	0.363	41.874	10.4	24½	BP9099460139	R.H.S.	7160 Kg./mm <sup>2</sup>	14	0.134	SV 660 1.0 IC 100	35211001531 ITEM 027
007	1.2	100	1.864	15.2	51	0.627	41.874	10.4	24½	-	R.H.S.	7160 Kg./mm <sup>2</sup>	11.6	0.231	-	35212001622 ITEM 009

## NOTE

1. PERMISSIBLE DEVIATION AS PER DIN 2097 GR2
2. TOLERANCE ON  $F_n \pm 10\%$   $L_H \pm 10\%$
3. CHARACTERISTICS TO BE MAINTAINED  
 $F_n$  ,  $L_n$  BY VARYING PARAMETERS  $L_oDa$ ,  $F_o$ .
4.  $F_o$  - IS THE INITIAL TENSION  
AS SPECIFIED IN FIG. 20 & CLAUSE NO. 5.2 OF DIN 2097
5. SCALE IN N/mm IS ONLY FOR REFERENCE PURPOSE.

[illegible]

#### ADDITIONAL INFORMATION

STATUS OF DRAWING	xk-gd@fj.kstuk.dk uke TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT
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DISTRIBUTION OF PRINTS

DISKNO  
P/C -1  
SWM -3

REV.	DATE	ALTERED	Sd/-
05	12.10.04	CHECKED	Sd/-

00	13.10.74	APPROVED	Sd/-
		DRG. RE-TRACED - MAT. SPC. WAS PS 10568 MAT CODE	

FOR ITS. 002,005 & 007  
ADDED NOTE 4 ADDED &  
NOTE 3 RESTRUCTURED

Generated from eOffice by Pradeep Kumar Agrawal, ENGINEER/PKA

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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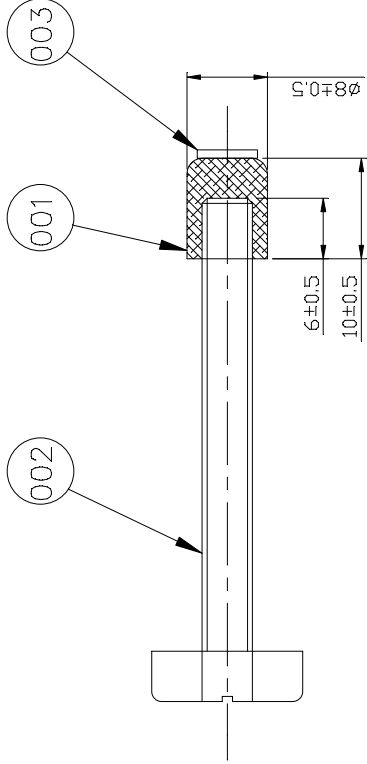
1







DRG. NO. 35211001565

NOTE  
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1. ITEM 003 GLUED WITH ITEM 001  
AS PER PROCESS TO AU 900 00240 0019
2. ITEM 001 VULCANISED ON ITEM 002
3. IMPACT ELASTICITY = < 10%
4. ASSY. SHALL BE SUITABLE FOR 2000 CYCLIC  
IMPACT OPERATION WITH PKG LOAD

VAR.00-BP9099432488

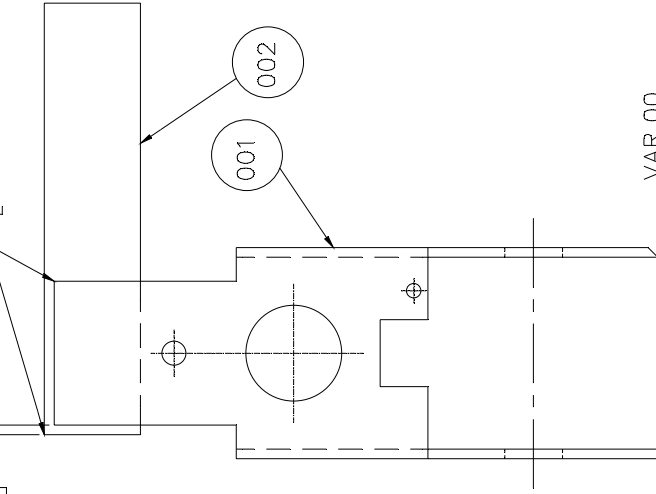
[illegible][illegible]

FIRST ANGLE PROJECTION

97905051255

ON 3RD

2 GAS WELDING



VAR-00 - BP 90B9446648.

NOTE : -

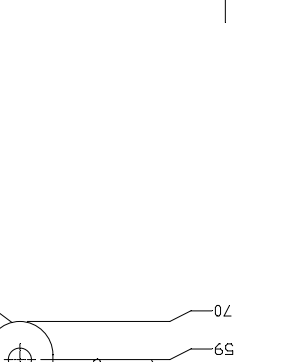
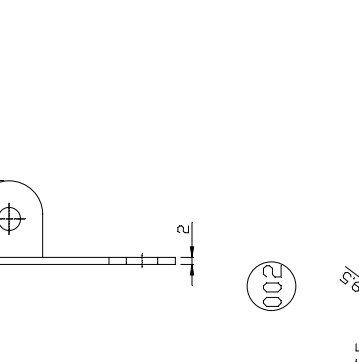
- 1) ANNEAL IN NITROGEN GAS AFTER BENDING AS PER BP 0640299. NITROGEN SUPPLY SHOULD BE INTRODUCED AT 400°C AND SHOULD BE MAINTAINED DURING HEATING ,SOAKING AND DURING COOLING. NITROGEN SUPPLY TO BE DISCONNECTED WHEN JOB COOLED TO 400°C
- 2) NITRIDE AS PER TF - 2 SG 15001
- 3) VAR00 FOR PVN36 (GES 409816021)
- 4) VAR01 FOR VM36 (GES 409580196)

VAR.00

001			003	2 TK-X20X90X LG. H.R. STEEL SHEET		AA1011713110 AA 10113			
	001		002	2 TK-X20X90X LG. H.R. STEEL SHEET		AA1011713110 AA 10113			-
001	001		001	LEVER	25211001502	001 ORDERED IN DRG. NL 3521001530 IT. 009.			-
VAR.01	VAR 00	REMARKS	VAR ITEM NO.	M	DESCRIPTION	IT NO	MATL. CODE	UNIT W.T.	ZONE
						VAR	MATL. SPECN.	QTY.	

ADDITIONAL INFORMATION				PVN-36					
STATUS OF DRAWING				TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT					
DISTRIBUTION OF PRINTS				HAKJr gsoh bysfDV&dYl tyfeVsMuekK HAKSiky BHARAT HEAVY ELECTRICALS LTD. BHOPAL					
1	3	1	1	TCX	SVW	TCX	SVW	TCX	SVW
REV. 07	DATE 26.10.12	REV. 06	DATE 20.02.09	REV. 05	DATE 26.12.01	REV. 04	DATE 26.12.01	REV. 03	DATE 26.12.01
CHECKED APPROVED		CHECKED APPROVED		CHECKED APPROVED		CHECKED APPROVED		CHECKED APPROVED	
VIEW CORRECTED WELDING SHOWS ALL ROUND FOR VAR 00.		VAR.01 SHT.02 & ITEM 003 ADDED. NOTE 3 & 4 ADDED.		BA CODE ADDED.		AA0230208		AA0230208	
INVENTORY NO.		26		W.A. OF LEVER (2 TRIP COILS)		35213030676		35213030676	
SIGN. & DATE		REF. DRG. NO.		MATERIAL		UNIT W.T.		ZONE	
FILE NO. HEP-SCROSWM00579878026HEP234023WMM20900 (Computer No. 507762)		ENGINEER(PKA)-MMX35702-HEP. ENGINEER, HEP-HEAVY ELECTRICALS PLANT (HEP) on 05/05/2026 01:29 pm		VAR.00		VAR.01		VAR.02	

DEVELOPMENT OF IT NO. 002



## DEVELOPMENT OF IT NO. 002

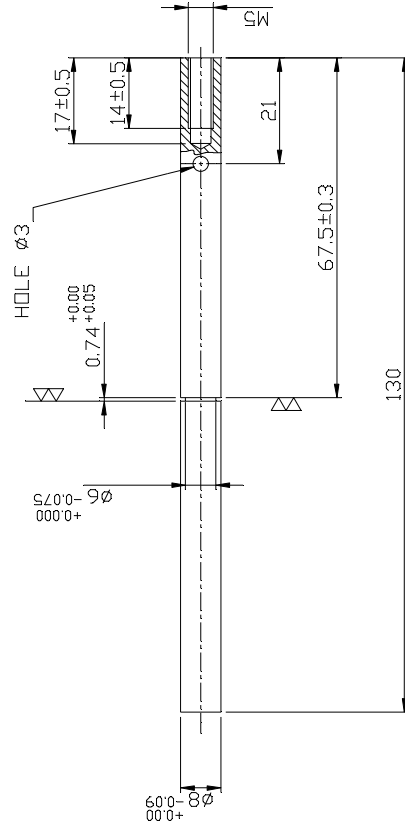
28  $\longrightarrow$  "CAR" TYPE-2

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REV.	DATE	ALTERED	SKG	REV.	DATE	ALTERED	SKG	ADDITIONAL INFORMATION
08	11.04.17	CHECKED	AKHIL	07	27.09.03	CHECKED		
		APPROVED	AD			APPROVED		
IT. 003 ADDED								
DRG. REDRAWN.								
SHEET 02 ADDED.								
DCA. NO.128399								
DCA. NO.-34728								
STATUS OF DRAWING								
B								
DISTRIBUTION								
D.C.-1								
TCX-1								
SWM-3								

TOOL LIST : -

1492657 - GROOVING TOOL



FINISH : - ITEM 001

ZINC PLATED & PASSIVATED TO AA 0673603 & AA 0673604 ( 0.013 TK MIN)

REMARKS	ITEM NO.	DESCRIPTION	QTY	UNIT	WT.
-	003	Ø8 x 162 LG. BRIGHT STEEL BAR	AA 1010212036		0.070
			AA 10112		001
BP9099430949	002	Ø8 x 152 LG. BRIGHT STEEL BAR	AA 1010212036		0.060
			AA 10112		001
BP9099430930	001	Ø8 x 130 LG. BRIGHT STEEL BAR	AA 1010212036		0.050
			AA 10112		001
7525 2129	ITEM NO.	DESCRIPTION	58 59 46	54 55	68
			QTY	UNIT	WT.
					QTY.

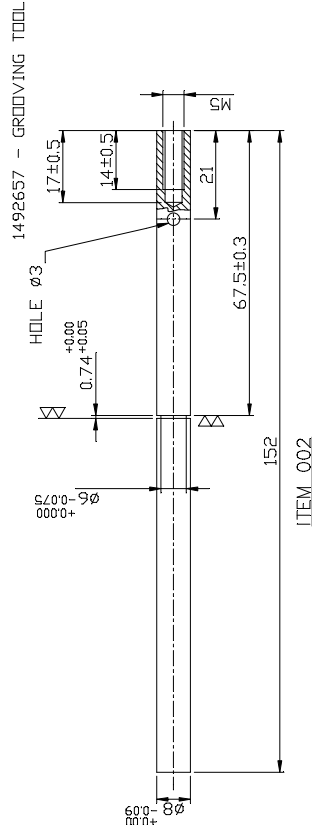
[illegible]

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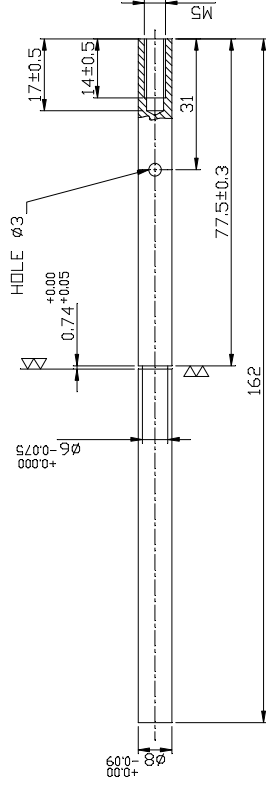
52110\45211001532-R07-S02

REV.	DATE	ALTERED	SKG	REV.	DATE	ALTERED	SKG	ADDITIONAL
08	11/04/17	CHECKED	AKH	07	27/09/03	CHECKED		INFORMATION
IT. 003 ADDED								STATUS OF
				DRG. REDAWN.				DRAWING
				SHEET 02 ADDED.				DISTRIBUTION
				(DCA: NO12839)				OF PRINTS
								D.C.-1
								TCX-1
								SWM-3

TOOL LIST :-


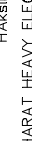


ITEM 002



ITEM 003

[illegible]

28 → CARD TYPE-3		28 → CARD TYPE-1		28 → CARD TYPE-2		offi. dh valKjR NEL DF VAR.		
<div><div>बीएसई एल</div><div></div></div>		HAKjR gsho bysDv&ndYI fy/eVaM HAKsaiky BHARAT HEAVY ELECTRICALS LTD. BHOPAL				NAME B.I.V.		BLK- SIGN -
forHAKX DEPT SVE		VAL - VVY - UKI dh JshKh UNITLEDHS. GR. -				HAJjR Id_xK- WEIGHT (KG)		valKjR ITEM NO. 008
GRAM GATE-409				valKjR SCALE 1:1		MZ.G. 27.08.82		003
						valKjR BPN/RKG 29.08.82		
						REF. TO ASSY. DRG 35211001530 35211001537		003
'A' AZQ@E				valKjR d-DRWING NO. 45211001532		08		08

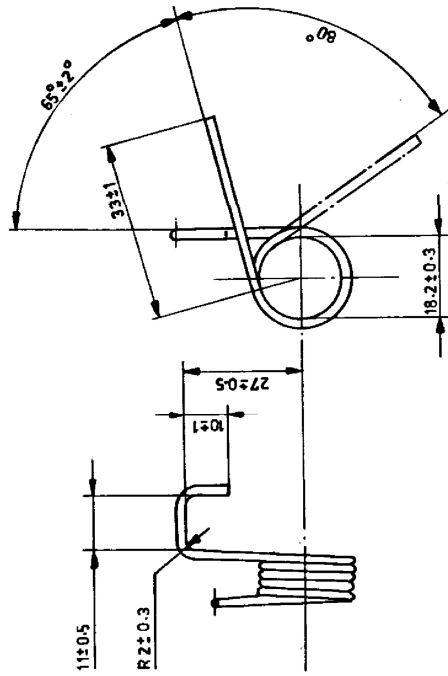
File No. HEP-SCROSWM(Misc)/98/2026-HEP-SWM20900 (Computer No. 301762)

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REV.	DATE	ALTERED	CHECKED
REV.	DATE	ALTERED	CHECKED

ADDITIONAL INFORMATION  
STATUS OF  
DRAWING  
DISTRIBUTION OC-1, SWM-4,  
OF PRINTS TCX -1

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1	NO. OF WINDINGS	4.7
2	DIRECTION OF WINDING	LEFT HAND
3	BALANCE OF MANUFACTURING EFFORT	BY C
4	MOMENT AT 80°	46 ± 2 Kg
5	MODULUS OF RIGIDITY	80 Kg/MM <sup>2</sup>

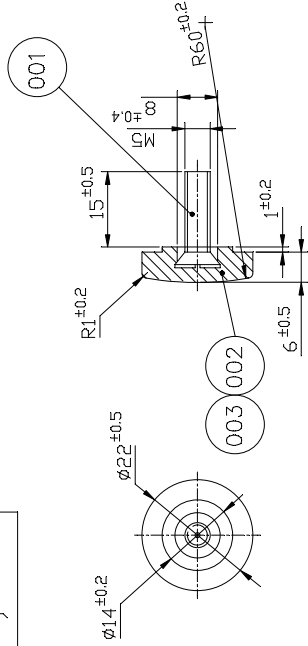
FINISH:- NATURAL

ST943139	001	1-8 DIA X 370 LG 18/8 GRADE STAINLESS STEEL WIRE BRIGHT DRAWN	PS 10568
75	25	27	29
ITEM NO.	DESCRIPTION	MATL. CODE	UNIT WT. 65
46	MATL. SPECN. 84	A 67	UNIT 68 QTY. 71
CARD TYPE 3	CARD TYPE 1	CARD TYPE 2	
NAME	SIGN	DATE	
TSE	MZG	12-9-82	
CHD	SMH	15-9-82	
APD	REF. TO ASSY. DRG.	ITEM 75	NO. OF ITEMS
SCALE	WEIGHT (Kg.)	3521100/530	021
GRADE OF UN.TOL. DIM. CIMIF	SCALE	1:1	
409			
TITLE	CARD CODE	DRAWING NO.	REV.
TORSION SPRING	4 521 10 01 582	4 521 10 01 582	30
SHEET NO. 1	NO. OF SHEETS 1		

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52110\45211001599-R03-S01

REV.	DATE	ALTERED CHECKED	Sd/- Sd/-	REV.	DATE	ALTERED CHECKED	Sd/- Sd/-	ADDITIONAL INFORMATION
02	09.02.99	APPROVED	Sd/-	01	03.05.95	APPROVED	Sd/-	
COLOUR FOR IT, 003 WAS BLACK				MATL. SPECN FOR ITS.002, 003 WAS TYPE 'GX'				STATUS OF DRAWING
(DCA NO. 09356)				(DCA NO. 06749)				DISTRICTION OF PRINTS
	DATE	ALTERED CHECKED						
03	27.09.03	APPROVED						
DRG. REDRAWN.								
(DCA NO. )								



VARIANT 00&amp;01

1. ITEM 001 TO BE MOULDED WITH ITEM 002 AND 003.
2. THE COMPONENTS SHALL HAVE A DEFECT FREE GLOSSY FINISH.

001	-	003	BAKELITE MOULDING (GREEN)	-	BS 771 TYPE/PF 2A1'	-
-	001	002	BAKELITE MOULDING (RED)	-	BS 771 TYPE/PF 2A1'	-
001	001	001	SCRU SLT CSK M5x20-4.8	AA 7122101126		-
VER. 01	VER. 00	ITEM NO.	DESCRIPTION	MATL. CODE	MATL. SPCN.	UNIT WT.
		7525 2729		58 59 46	54 55	63
					LINE	QTY.

[illegible]

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52110\45211001605-R03-S01

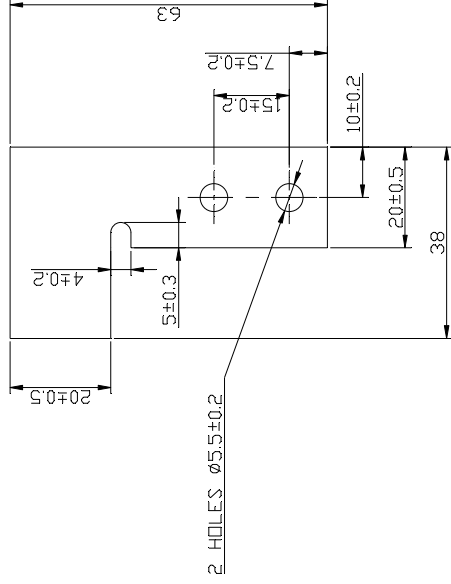
REV.	DATE	ALTERED CHECKED APPROVED	REV.	DATE	ALTERED CHECKED APPROVED	ADDITIONAL INFORMATION				
			03	05.06.03		STATUS OF DRAWING				
DRG. REDRAWN NOTE-2 ADDED. BEND TEST REMOVED FROM NOTE-1 (DCA NO. )										
						DISTRIBUTION	OF PRINTS	SWE	SVM	TCX
								1	3	1

TOOL LIST :-

1492661 - PIERCING &amp; BLANKING TOOL

NOTE

1-MATERIAL SHOULD BE TESTED FOR TENSILE & HARDNESS TEST.  
2-FOR DETAIL INFORMATION OF MATERIAL SPEC.REFER SG12753.



DEVELOPMENT VIEW

REMARKS	ITEM NO.	DESCRIPTION	15TK. x 38 x 63 HALF HARD PHOSPHOR BRONZE STRIP		K.G.	UNIT WT.	QTY.
			38 59 46	54 55 36			
	001		IS7814-1985				
			MATL. CODE				
			MATL. SPCN.				

28 —→ CARD TYPE-3	28 —→ CARD TYPE-1	28 —→ CARD TYPE-2
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[illegible]

fəHAKx C <sub>1</sub> /	wu- Vky- uki dh js.kh		HAY↑ fA vL=	vP Məbɬ7av dɛ ʃənHA7	en d—	en laf:k
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DEPT > WE	UNTIL DMS, GR. M	SCALE	WEIGHT (KG.)	REF. TO ASSY. DRG.	ITEM NO.	NCL. OF ITEM
						

dkSM CODE	409	AA 0230208		1:1	45211001552	001	001
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[illegible]

ALL AZURE  
CDBING CLIP  
1E311001C0E  
03

3	CN9100117C4	1173 ONLY IC
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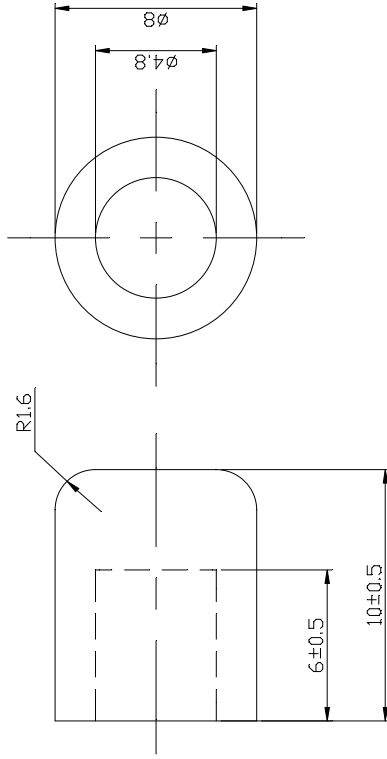
HEP-SCROSWM(Misc)/98/2026-HEP-SWM20900 (Computer No. 301762)

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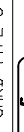

ON

REV.	DATE	ALTERED CHECKED	REV. 01	DATE	ALTERED CHECKED	ADDITIONAL INFORMATION
		APPROVED			APPROVED	
DRG. REDRAWN. <div style="float: right;">           STATUS OF DRAWING         </div>						
(DCA: NO.12851) <div style="float: right;">           DISTRIBUTION OF PRINTS         </div>						
SWM-3 TCX-1						



NOTE :- ALTERNATIVELY NEOLASTIC BUFFER  
TYPE NEOLASTIC 90063 CAN BE USED.

REMARKS	7/25 ITEM NO.	27/29	NITRILE RUBBER MOULDING		PS24806	K.G.	UNIT WT.	QTY.
		38	59	H6	54	55	68	71
					MATL. CODE	A	LIN	
					MATL. SPKN.	C		

28	→ CARD TYPE-3	28	→ CARD TYPE-1	28	→ CARD TYPE-2
	HAKjr gsoch bysDV&hdYl fyelvsM HAKsiky BHARAT HEAVY ELECTRICALS LTD. BHOPAL		HAKjr lg_dk- WEIGHT (KG)	HAKjr lg_dk- SCALE 5:1	HAKjr lg_dk- WEIGHT (KG)
gdHAKX DEPT SWE	wu - Vxy- uli dh lskth UNTILL DWS. GR.	wuqr SCALE	HAKjr lg_dk- WEIGHT (KG)	HAKjr lg_dk- SCALE	HAKjr lg_dk- WEIGHT (KG)
dnm/409	-	5:1	HAKjr lg_dk- WEIGHT (KG)	HAKjr lg_dk- SCALE	HAKjr lg_dk- WEIGHT (KG)

NEOLASTIC BUFFER.

File No. HEP-SCRoSWM(Misc)/98/2026-HEP-SWM20900 (Computer No. 301762)

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