Government of India
Ministry of Railways
Research, Designs & Standards Organisation
Manak Nagar, Lucknow - 226 011

No. EL/3.2.172 Dated Feb.1998

Modification Sheet No. RDSO/WAG 5/28 (New No. WAG5/241)

1. TITLE : Adoption of modified brush holder insulator assembly insulating rod and brush box along with the provision for arcing studs on BHRR assembly of Traction Motor type HS-15250A.

2. APPLICATION : Traction Motor type HS 15250A.

3. OBJECT : Railways have reported a number of cases of looseness of brush holder insulator assembly on Hitachi Traction Motor type HS 15250A. The complete brush holder and insulator assembly is mounted on the rocker ring with the help of M24 nut having a thickness of 12 mm in the present arrangement. The nut is welded with the stud of the insulator to avoid looseness of the same. However, the insulator assembly is getting loosened from the M24 nut even if the nut is welded with the insulator stud. This is virtually a type defect on this Traction Motor.

This type defect has been discussed during the meeting held at CLW/Chittaranjan on 23/24 Dec.'1997 on the performance of WAG7 locomotives and Hitachi Traction Motors.

The arrangements of insulator rod and brush holder assembly on the rocker ring was studied by RDSO of different types of Traction Motors. It was seen that in almost all the Traction Motors, the insulators are mounted with the help of a bolt on the rocker ring. Therefore similar arrangements has been developed for Hitachi Traction type HS 15250A by providing a bolt size M24X30 with a spring washer for mounting the modified insulator rod on the rocker ring. The brush holder for mounting bolt has a bolt of M20x45 has been provided along with a serrated washer and spring washer. The insulating rod has been modified to suit fitment of bolt from both sides by suitably serrated to avoid slipping of brush holder box during service when the same has been fully tightened. The weight of the brush holder box has also been reduced from 2.8 kg to 2.3 kg by suitable reduction of sections as can be seen from the Drg. No.SKEL.-4441 attached.

Further there have been no arcing stud on the original Hitachi Traction Motor. Subsequently M/s BHEL and CLW have introduced arcing studs by providing one arcing tip on brush box and another tip in the CE bracket. Sheds have been complaining about difficulty in replacement of arcing studs mounted on the CE bracket in the assembled Traction Motors. Therefore, in the modified arrangement, this mounting stud has been shifted from CE bracket to the rocker ring with the help of V fixing bracket. It will now be easier to replace both the arcing studs in assembled Traction Motor while the same is mounted in the locomotives. Both the arcing studs are a part of BHRR assembly.

The above modification has been carried out in consultation with M/s Mica Mold Jamshedpur who have developed the modified BHRR assembly and the same has been tried at electric loco sheds, Kanpur recently. The modified insulator has also been tested by the firm for requisite test parameters as per CLW specification and the drawing.

All the maintenance features of the existing BHRR assembly have been retained in the modified arrangement, that is the brush holder box and the insulators can be insitu.

Therefore, Railways and Traction Motor manufacturers are advised to adopt the modified arrangement of brush holder and insulator assembly on the BHRR ring in line with the subject modification. This modification may also be carried out on existing Hitachi Traction Motor type HS 15250A by changing the insulating rod assembly along with the bolts and serrated washer and spring washer etc. The existing brush holder can be reused by providing seration in its arms. The details of the modification are furnished in this modification sheet.

4. <u>MATERIAL REQUIRED :</u>

- Brush holder case as per RDSO DRG, No. SKEL-4441
- Brush holder assembly as per RDSO DRg. No. SKEL- 4442.
- Insulating rod for brush holder as per RDSO Drg. NO. SKEL-4440.
- Hex head bolt size M20 for brush holder assembly as per RDSO DRG. NO. SKEL-4443.
- Hex head bolt size M24 for brush holder assembly as per RDSO Drg. No. SKEL-4444.
- Serrated washer as per RDSO Drg. No. SKEL-4445
- Cleat as per RDSO Drg. No. SKEL-4447
- Arcing stud a fixing bracket for rocker ring as per RDSO Drg. No. SKEL-4448.

5. <u>REFERENCE DRAWINGS</u> :

RDSO Drag. Nos. SKEL.-4440, 4441, 4442, 4443, 4444, 4445, 4446, 4447 & 4448 = 9 nos (copy enclosed)

6. WORK TO BE CARRIED OUT :

i) Take out commutator end and shield and remove the arcing stud provided on it. **Modify this commutator end shield as per RDSO modification sheet No. RDSO WAG 5/24 dated 29.1.98**

ii) Take out BHRR assembly. Remove existing insulating rods and brush boxes. Modify existing BHRR by drilling and tapping 6 numbers of Mx20 holes each on PCD 509 and 571 respectively as per RDSO DRG. NO. SKEL. 4446. These holes are for the fixation of six arcing stud fixation brackets to RDSO Drg. No. SKEL. 4448 on BHRR

iii) Mount the brush holder, insulating rod (Brush holder insulator along with Hex Head Bolts M24x30 and M20x45, spring washer and serrated washer procured as per above Drg. on the BHRR as per usual process. Refer assembly Drg. No.SKEL. 4442.

iv) Assemble the arcing stud and its fixing bracket procured as per drawing No.SK. EL. 4448 on the BHRR as per DRg. No. SKEL - 4446.

v) Keep the arcing stud gap 12.5 $\pm$ 1mm adjusting the arcing stud.

vi) Tightening torqrue M24x30 bolt - 35kg-m

M24x45 bolt - 20kg-m

vii) Adopt modified cleat as per RDSO Drg. No. SKEL.-4447 on rocker ring in place of old cleats.

viii) Follow the usual practice for assembly of interconnectors. Follow RDSO modification sheet No.WAG-5/27.

ix) Check the magnetic neutral axis by kick method as per RDSO SMI-ELRS/SMI/181.

7. PERIODICITY OF IMPLEMENTATION :

- On new Traction Motors.
- During rehabilitation/overhaul of Traction Motors.
- During IOH/POH
- Whenever existing brush holder insulator are found damaged/loose.
- Tightness of M24x30 and M20x45 bolts may be ensured during IC inspections.

8. AGENCY OF IMPLEMENTATION :

- Traction Motor manufacturers.
- Traction Motor shops
- POH/Repair shops.
- Electric loco sheds

9. LIKELY SOURCES

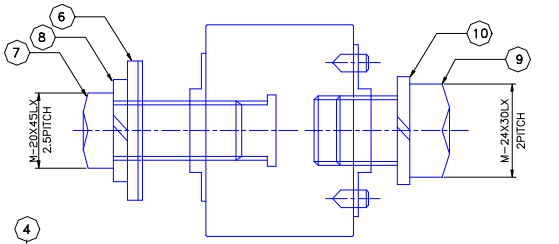
- Mica-Mold , Jamshedpur

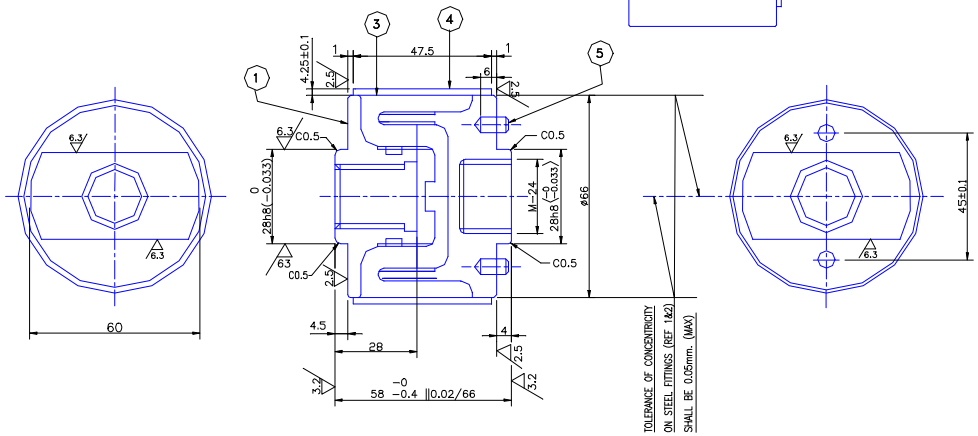
- CLW
- ARCO/Mumbai (Under development)

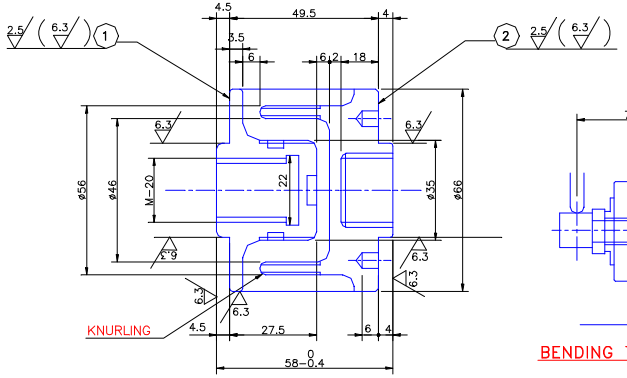
10. <u>Distribution :</u> As per enclosed list.

(R. K. Kulshrestha)
for Director General/Electrical

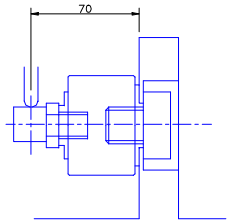
Encl: As Above.







DETAIL OF INSERT 1 2



BENDING TEST PROCEDURES

NOTE:-

1. DIMENSION OF TEFLON SLEEVE REF. 4 BEFORE ASSEMBLY O/D=73mm AND I/D=64.5mm.HEAT THE SLEEVE AT 250°C TO 280°C FOR ASSEMBLY.
2. THE INSULATOR (SPECIALLY THE BINDER) SHALL BE SUITABLE FOR CONTINUOUS WORKING TEMPERATURE OF 150°C AND ALSO OCCASIONAL OVER HEATING AT 200°C FOR LONG DURATION FOR 16 TO 24 HOURS WITHOUT LOSS OF PROPERTIES. THEY SHOULD ALSO COMPLY WITH THE MECHANICAL AND ELECTRICAL REQUIREMENTS MENTIONED BELOW.
3. TOLERANCE ±0.2 WHERE NOT SPECIFIED
4. ACCEPTANCE TESTS :-
   a) ULTIMATE TENSION NOT LESS THAN 6000Kgs.(TYPE TEST FOR EACH LOT)
   b) ROUTINE TENSILE TEST 2500 Kgs.
   C) BENDING STRENGTH TEST SHOULD BE MORE THAN 1000Kgs>X70mm
   d) TORSIONAL STRENGTH SHOULD BE MORE THAN 40Kgf.-m(AT FRACTURE)
   e) COMPRESSIVE STRENGTH SHOULD BE MORE THANE 7000 Kgs
   f) INSULATION RESISTANCE SHOULD BE MORE THAN 2000 MEGAOHM.
   g) ALL INSULATORS SHOULD WITHSTAND 15 KV, 50 c/s FOR ONE MINUTE IN AIR
   h) ONE NO. INSULATOR FROM EACH LOT SHALL WITHSTAND 32 KV.50c/s FOR ONE MINUTE IN OIL.
   i) ALL SHARP CORNERS ARE TO BE ROUNDED OFF.
   j) PARALLELLISM OF DIMENSION 28h8X4mm OF REF-2 WITH RESPECT TO DIMENSION 28h8X4.5mm OF REF-1 SHALL NOT EXCEED 0.05mm.

REF. No.	PART/DRG. No.	DESCRIPTION	DETAIL DRG.	No./EMU	MATERIAL SPEC.
10	——	SPRING WASHER M-24B		6NOS.	IS:3063'72(PHOSPHETED)
9	SKEL-4444	HEX.HEAD BOLT M-24X30L		6NOS.	IS:1364 Pt. 1,1983, A-8.8P-6G
8	——	SPRING WASHER M-20B		6NOS.	IS:3063'72(PHOSPHETED)
7	SKEL-4443	HEX.HEAD BOLT M-20X45LX2.5PITCH		6NOS.	IS:1364 Pt. 1,1983, A-8.8P-6G
6	SKEL-4445	SERRATED WASHER		6NOS.	STEEL IS:2062-92 Gr A
5	——	DOWEL PIN ø6,L10		12NOS.	SS 410
4	——	TEFLON SLEEVE		6NOS.	P.T.F.E.
3	——	INSULATION		6NOS.	GLASS BONDED MICA
2	——	ROD (INSERT)		6NOS.	SS 410
1	——	ROD (INSERT)		6NOS.	SS 410
	——	INSULATING ROD FOR BRUSH HOLDER		6NOS.	——

REF:- | SCALE:- NTS. | APPD. BY (FOR DG.)

TRACTION MOTOR HS- 15250A
INSULATING ROD FOR BRUSH HOLDER

FIRST ISSUED

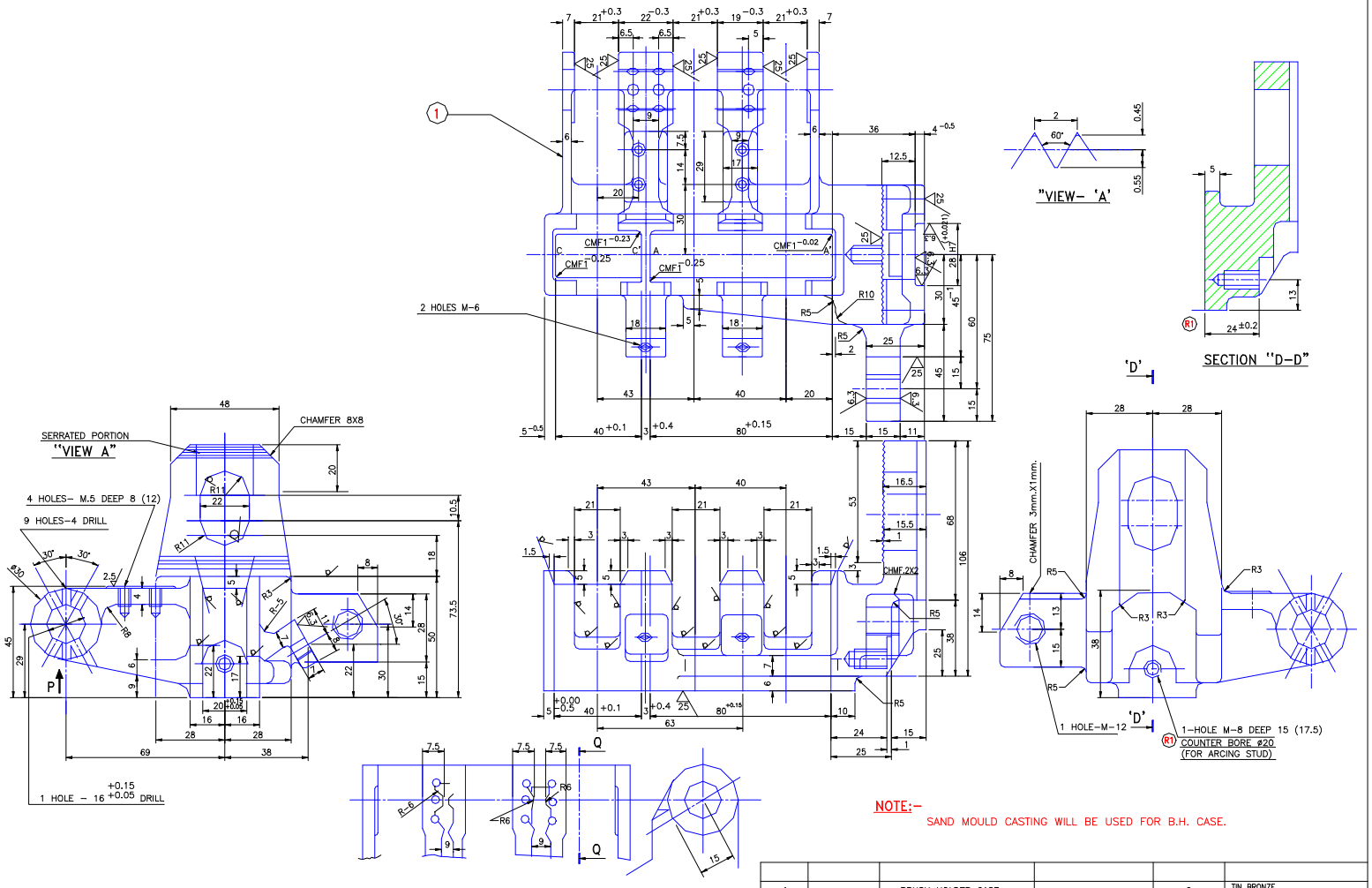
SUPERSEDES

SUPERSEDED BY

R.D.S.O. ELECT. DTE. SKEL - 4440

STATUS	ALT.	REF.No.	DESCRIPTION	APPD.BY	DATE

Dt.	20.2.98
D	S.CHANDRA
T	
C	CHILLON



NOTE:-

SAND MOULD CASTING WILL BE USED FOR B.H. CASE.

1		BRUSH HOLDER CASE		6	TIN BRONZE JIS H-5111' 88 GR. BC-3/7
REF. No.	PART No.	DESCRIPTION	DETAIL DRG.	No./EMU	MATL/SPEC.
REF.		SCALE:- NTS.	APPD. BY	(FOR DG.)	

TRACTION MOTOR HS 15250A
BRUSH HOLDER CASE

FIRST ISSUED

SUPERSEDES

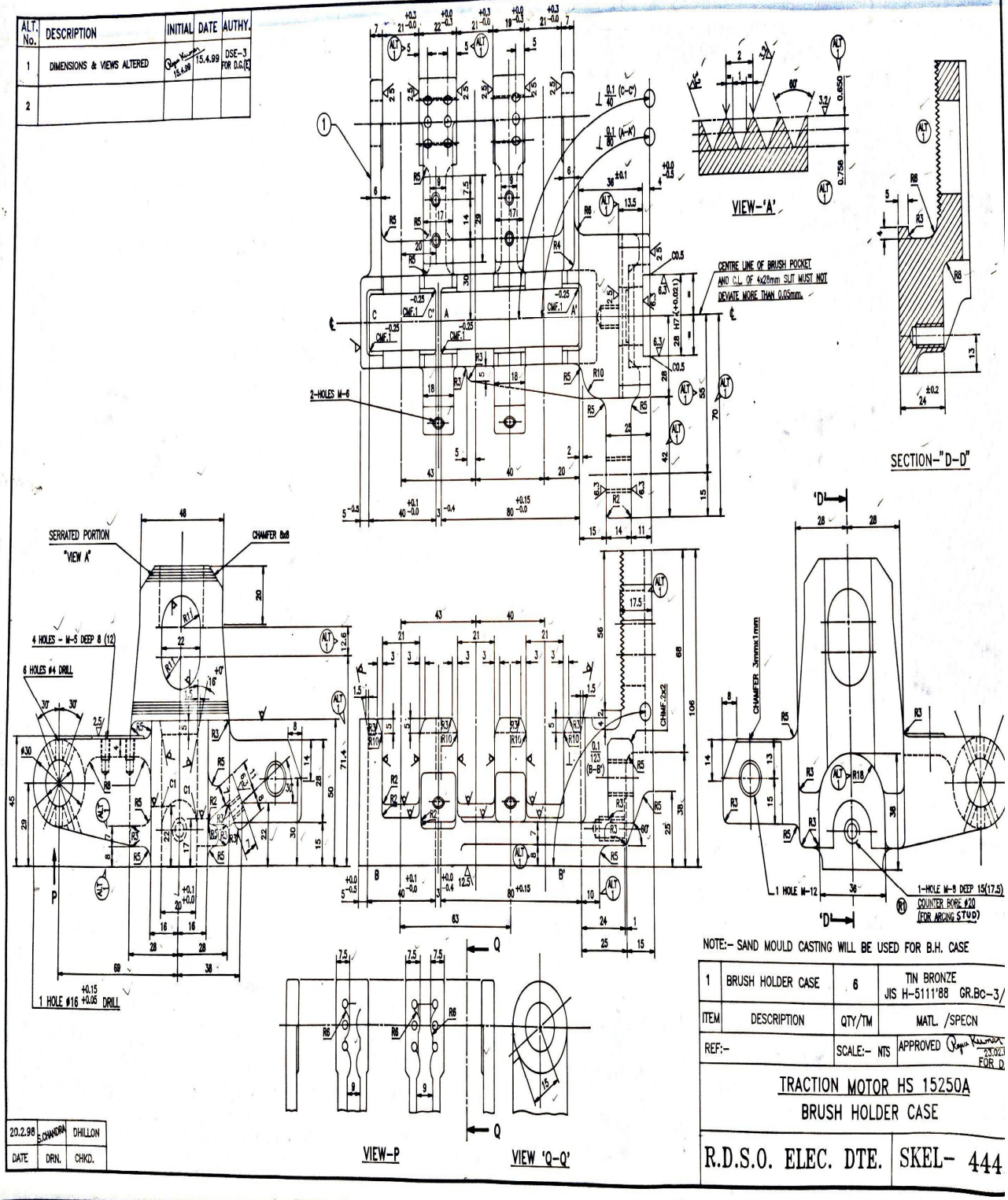
SUPERSEDED BY

R.D.S.O.ELECT.DTE. SKEL - 4440

Dt.	20.02.98
D	S. CHANDRA
C	DHILLON
T	

STATUS	ALT.	REF.No.	DESCRIPTION	APPD.BY	DATE

ALT. No.	DESCRIPTION	INITIAL	DATE	AUTHY.
1	DIMENSIONS & VIEWS ALTERED		15.4.99	DSE-3 FOR D.G.(E)
2				



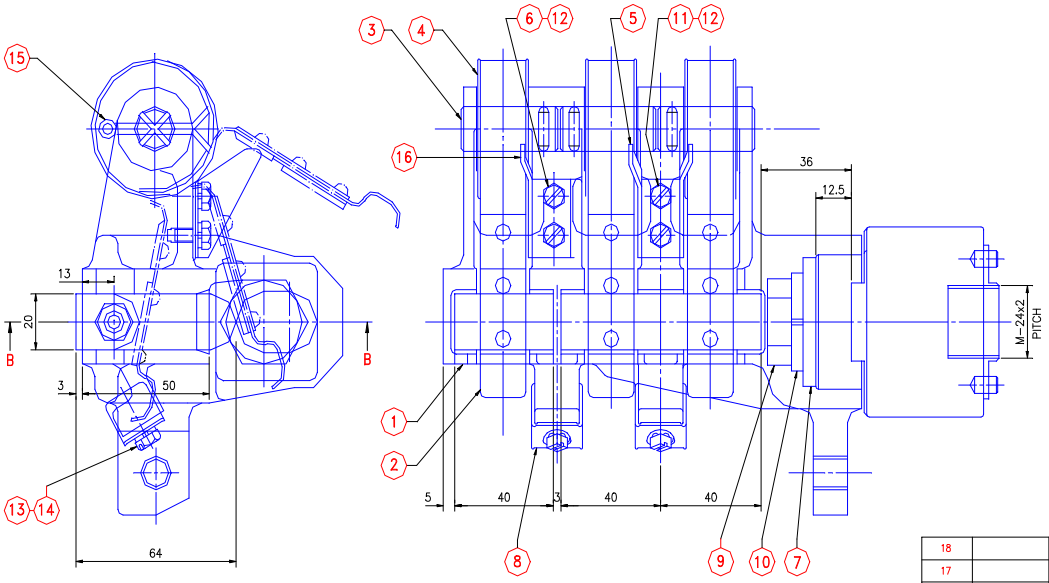
NOTE:- SAND MOULD CASTING WILL BE USED FOR B.H. CASE

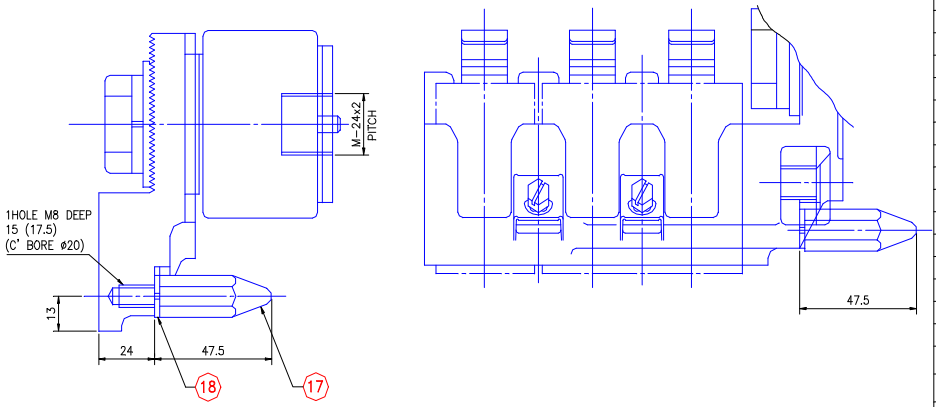
1	BRUSH HOLDER CASE	6	TIN BRONZE JIS H-5111'88 GR.BC-3/
ITEM	DESCRIPTION	QTY/TM	MATL /SPECN
REF:-		SCALE:- NTS	APPROVED FOR D

TRACTION MOTOR HS 15250A
BRUSH HOLDER CASE

R.D.S.O. ELEC. DTE.	SKEL- 444

20.2.98	S.CHANDRA	DHILLON
DATE	DRN.	CHKD.





SECTION-BB

REF. No.	PART No.	DESCRIPTION	DETAIL DRG.	No./EMU QTY./TM	MATL/SPEC.
18		SPRING WASHER M-8 B		6	IS:3063'72 (PHOSPHETED)
17		ARCING STUD		6	STEEL-IS:226'69 ST 42S.
16		SPRING SUPPORT		6	
15		SPLIT PIN 4L 40		18	JIS:B 1351'87
14		SPRING WASHER M-6		12	IS:3063'72 (PHOSPHETED)
13		HEX.HD. SLOTTED BOLT M-6 L-18		12	JIS:B 1180'94
12		SPRING WASHER M-5		24	IS:3063'72 (PHOSPHETED)
11		HEX.HD. SLOTTED BOLT M-5 L-10		12	JIS:B 1180'94
10		SPRING WASHER M-20		6	IS:3063'72 (PHOSPHETED)
9		BOLT M-20x45L	SKEL-4443	6	IS:1364 Pt. 1, 1983, A-8.8P-6G.
8		SPECIAL WASHER		12	
7		SERRATED WASHER	6KEL-4445	6	STEEL, IS:2062-92 Gr A
6		HEX.HD. SLOTTED BOLT M-5 L-10		12	
5		SPRING SUPPORT		6	
4		SPACER		36	
3		ADJUSTING PIN		18	
2		BRUSH SPRING		18	
1		BRUSH HOLDER CASE		6	

REF. | SCALE NTS. | APPD. BY (FOR DG.)

TRACTION MOTOR HS 15250A
BRUSH HOLDER ASSEMBLY

FIRST ISSUED

SUPERSEDES

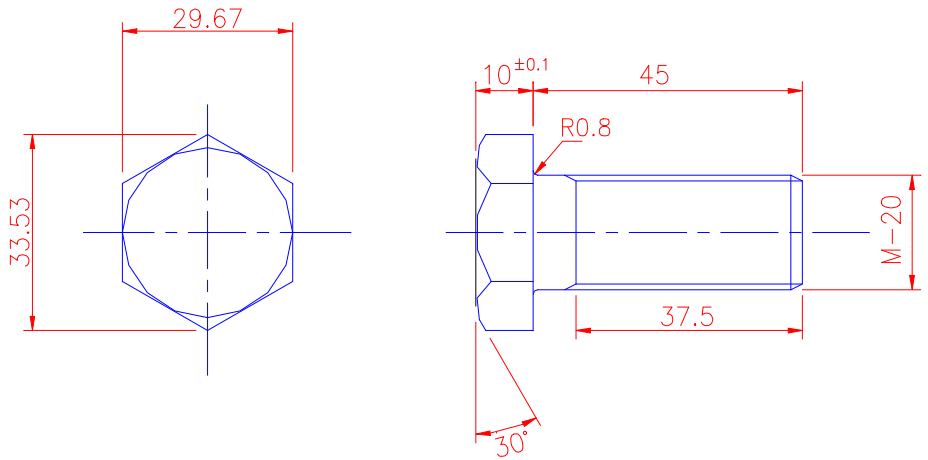
SUPERSEDED BY

R.D.S.O. ELECT. DTE. | SKEL - 4442

Dt.	20.02.98
D	S. CHANDRA
C	DHILLON
T	

STATUS	ALT.	REF.No.	DESCRIPTION	APPD.BY	DATE

Zn PLATING



1.	HEX. HEAD BOLT SIZE M20x45L,2.5P	6	STEEL	IS:1346 Pt1, 1983 A-8 8P-6G
ITEM	DESCRIPTION	QTY/TM	MATL.	SPECIFICATION
REF:		SCALE:- NTS	APPDROVED	Rajiv Kumar FOR DG

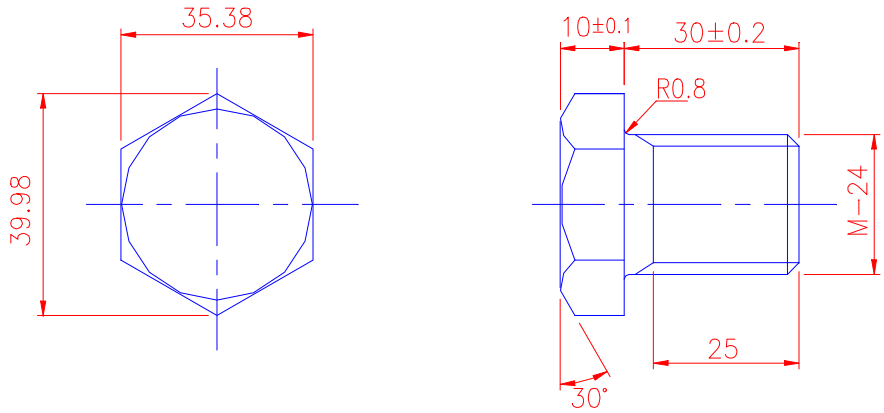
TRACTION MOTOR TYPE HS. 15250 A
HEX. HD. BOLT FOR BRUSH HOLDER ASSEMBLY

18.2.98	S.CHANDRA	DHILLON
DATE	DRN.	CHKD.

R.D.S.O. ELEC. DTE.

SKEL - 4443

Zn PLATING



1.	HEX. HEAD BOLT SIZE M24x30L,2PITCH	6	STEEL	IS:1346 Pt.1, 1983, A-8 8P-6G
ITEM	DESCRIPTION	QTY/TM	MATL.	SPECIFICATION

REF:	SCALE:- NTS	APPROVED Raju Kumar FOR DG

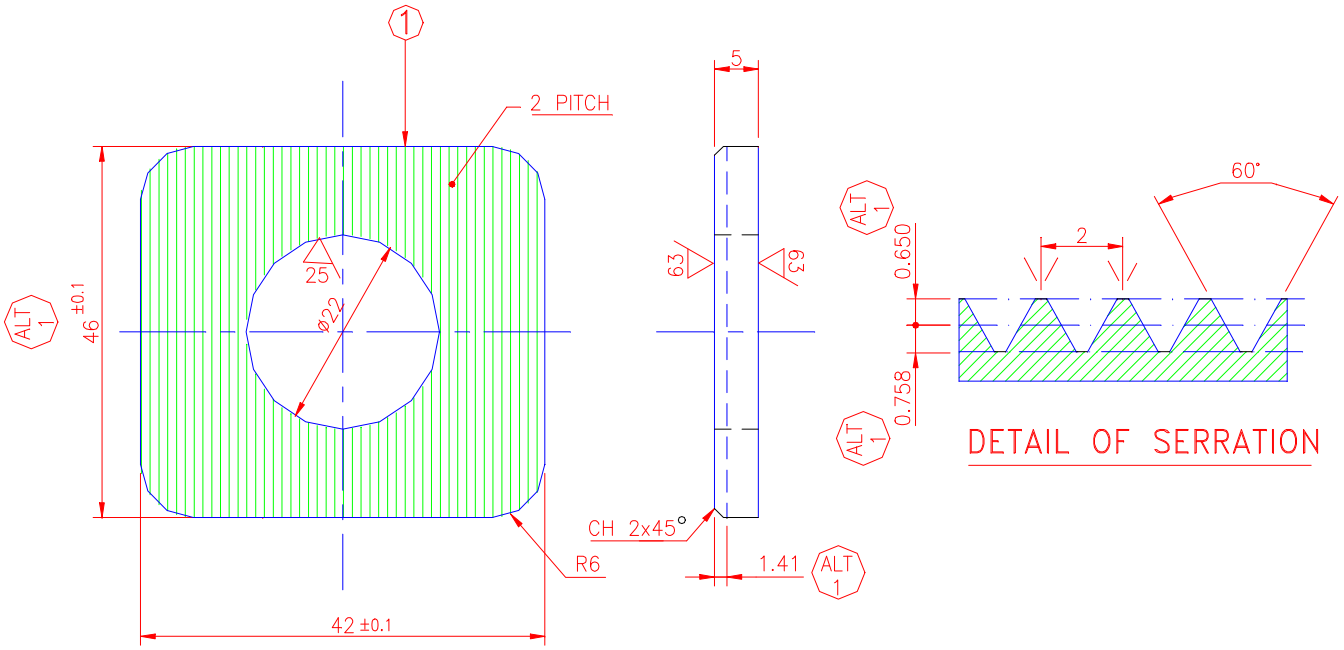
TRACTION MOTOR TYPE HS. 15250 A
HEX. HD. BOLT FOR BRUSH HOLDER ASSEMBLY

18.2.98	S.CHANDRA	DHILLON
DATE	DRN.	CHKD.

R.D.S.O. ELEC. DTE.

SKEL - 4444

NO.	DESCRIPTION	DATE	SIGNATURE
1.	DIMENSIONS & VIEWS ALTERED	30.3.98	Raju Kumar
2.			



ITEM	DESCRIPTION	QTY/TM	MATL / SPECIFICATION
1.	SERRATED WASHER (Zn PLATED)	6	STEEL IS:2062–92 Gr A

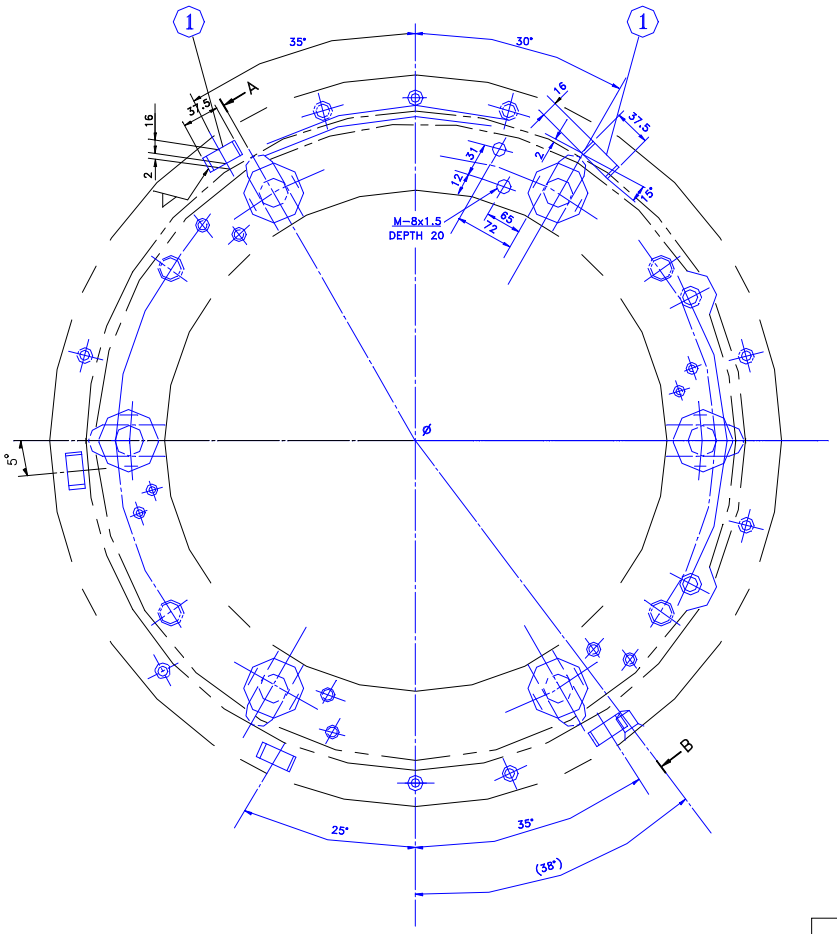
REF:	SCALE:– NTS	APPDROVED Raju Kumar FOR DG

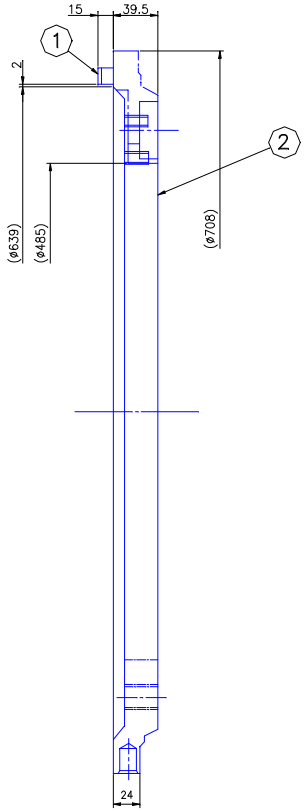
TRACTION MOTOR HS. 15250
SERRATED WASHER (Zn PLATED)

DATE	DRN.	CHKD.
21.2.98		DHILLON

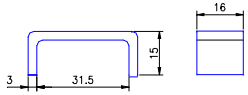
R.D.S.O. ELEC. DTE.

SKEL – 4445





SECTION–A–Ø–B



CLEAT

REF. No.	PART No.	DESCRIPTION	DETAIL DRG.	No./EMU QTY./TM	MATL. SPEC.
2	ROCKER	100–750–317Rev.C		(1)	SS41–45T,JIS–G 3101
1	CLEAT	SKEL – 4447		5	STEEL–IS:1079'79'73 ST 42S.

REF. | SCALE:– NTS | APPD. BY (FOR DG.)

TRACTION MOTOR HS 15250
CLEAT ARRANGEMENT AND
SPARKING TIP HOLE FOR ROCKER RING

FIRST ISSUED

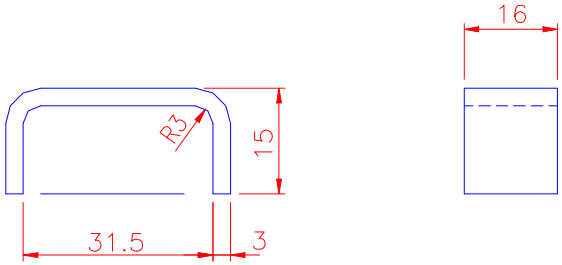
SUPERSEDES

SUPERSEDED BY

RDSO. ELECT. DTE. SKEL–4446

Dt.	21.02.98
D	S. CHANDRA
C	DHILLON
T	

STATUS	ALT.	REF.No.	DESCRIPTION	APPD.BY	DATE



1.	CLEAT	5	STEEL IS:1079'73 St 42S
ITEM	DESCRIPTION	QTY/TM	MATL. / SPECIFICATION
REF:		SCALE:- NTS	APPDROVED Rajiv Kumar FOR DG

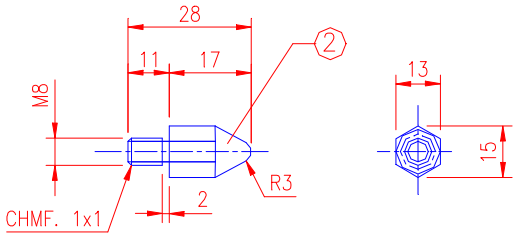
TRACTION MOTOR HS. 15250
CLEAT (Zn PLATED)

20.2.98	S.CHANDRA	DHILLON
DATE	DRN.	CHKD.

R.D.S.O. ELEC. DTE.

SKEL - 4447

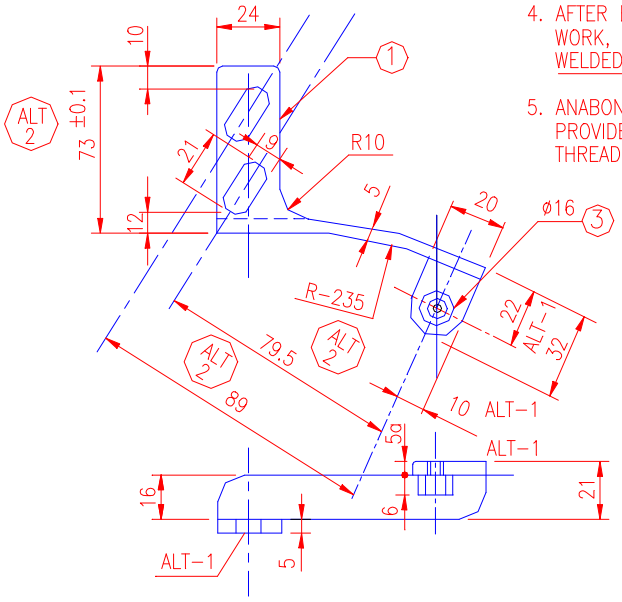
ALT. NO.	DESCRIPTION	DATE	SIGN.
1	DIMENSIONS & VIEWS ALTERED	30.03.98	
2	DIMENSIONS & VIEWS ALTERED	15.04.99	

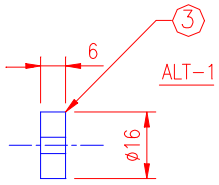


ARCING STUD

NOTE:-

1. IT SHALL BE SINGLE PIECE CONSTRUCTION.
2. AFTER BENDING OPERATIONS STRESS RELIEVING MAY BE DONE.
3. ARCING STUD & FIXING BRACKET TO BE Zn PLATED.
4. AFTER BLANKING & FEBRICATION WORK, WASHER ITEM NO. 3 TO BE . WELDED.
5. ANABOND SOLUTION TO BE PROVIDED ON SPARKING TIP THREAD BEFORE TIGHTENING.





WASHER M16

FIXING BRACKET

3.	WASHER M16	6	STEEL- IS : 2062
2.	ARCING STUD	6	STEEL- IS : 2062
1.	FIXING BRACKET	6	STEEL- IS : 1079'73 ST 4S
ITEM	DESCRIPTION	QTY./TM	MATL./SPEC

REF:-	SCALE:- NTS	APPROVED BY:- FOR DG

TRACTION MOTOR PS 15250A ARCING STUD & FIXING BRACKET FOR ROCKER RING

RDSO.ELEC.DTE.	SK.EL-4448

Dt.	16.2.79
D	
T	
C	