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भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226011
Government of India - Ministry of
Railways
Research, Designs & Standards
Organization, LUCKNOW - 226011

Dated 01.7.2003

No.EL/3.2.100

Distribution as per enclosed list

Amendment No. 5

Sub: Amendment to RDSO's Modification Sheet No. RDSO/
ELRS/MS/WAM4/0216 of Feb., 99 regarding Brush
Holder assembly on Traction Motor type TAO 659.

1. Above modification was issued to change brush spring material from spring steel for TAO-659 TM on lines of Hitachi Traction Motors type HS 15250A. However, based on feedback from Central Railway and approval of RDSO, CLW vide letter No.EL/TM/4106 dated 05.12.2002 have deleted alternate spring material to IS 6911/72 Gr 10 Cr 17 Ni 7 from Drg./Specification of Hitachi TM and retained only OEM specified material. This amendment is issued to incorporate similar alteration in respect of brush springs of TAO-659 TMs.
2. Brush holder assembly manufacturers have approached RDSO and proposed to use stainless steel material as per IS 6911 '92 Grade 304S2 for items of finger, lifting hook, spring lever and washer of assembly. Matter has been examined and it has been decided to allow use of above material as alternative material for these items, i.e. finger, lifting hook, spring lever and washer.
3. In view of the above, following drawings mentioned in Clause 5 of RDSO's Modification Sheet mentioned above have been modified as under -

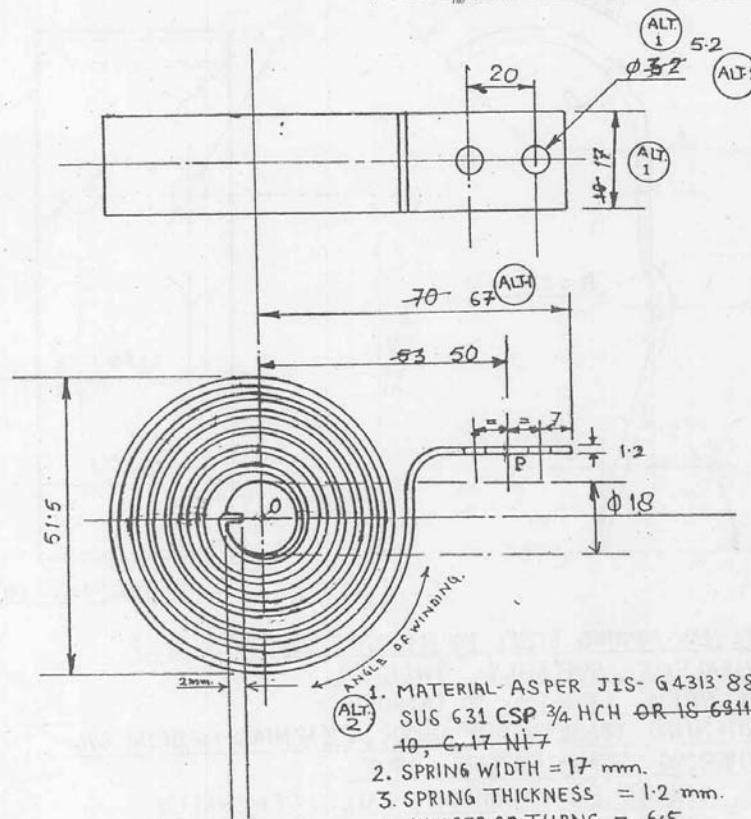
S. No.	Description	RDSO's Modified Drawing Nos.
1.	Spring	SKEL-4498 Alt.2
2.	Lifting hook	SKEL-4499 Alt.1
3.	Finger	SKEL-4501 Alt.1
4.	Spring Lever	SKEL-4503 Alt.1
5.	Brush Holder Finger Assembly	SKEL-4504 Alt.3
6.	Brush Holder Assembly	SKEL-4505 Alt.3
7.	Washer	SKEL-4506 Alt.3

One copy each of the above-modified drawings are enclosed herewith for your ready reference and necessary action.

Encl: RDSO's Drgs. No. SKEL-4498 Alt.2,
4499Alt. 1, 4501 Alt. 1, 4503 Alt. 1,
4504Alt.3, 4505 Alt. 3 & 4506 Alt. 3
(Total 7 nos.)


(M K Singhal)
for Director General (Elec.)

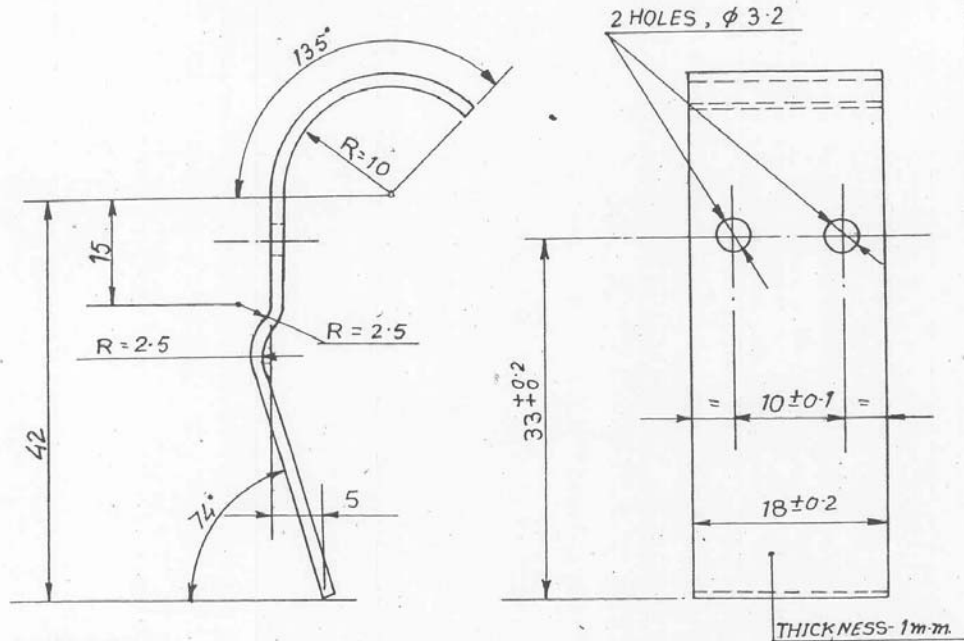
ALT	DESCRIPTION	DATE	SIGNATURE
1	DIMENSIONS ALTERED	26.4.99	Rajin Kumar
2	ALTERNATE MATL. DELETED	24.06.03	



1. MATERIAL-ASPER JIS- G 4313' 88, GRADE SUS 631 CSP $\frac{3}{4}$ HCH OR IS 6911' 72 GRADE 10, Cr 17 Ni 7
2. SPRING WIDTH = 17 mm.
3. SPRING THICKNESS = 1.2 mm.
4. NUMBER OF TURNS = 6.5
5. CLEARANCE BETWEEN TURNS = 2.2 mm. (App) (FREE STATE)
6. DEVELOPED LENGTH = 670 mm (Approx.) OF SPRING.
7. WHEN THE SPRING IS TURNED 173° IN ARROW DIRECTION FIXING A POINT 'O'; FORCE OF 340 ± 0.2 Kg. MUST BE PRODUCED A POINT 'P' (3.6)

Y	BRUSH SPRING	18 Nos.	SEE NOTE	
ITEM NO	DESCRIPTION	QTY/TM	MATL./SPECN.	REMARKS
REF:-	HITACHI DRG No. 10S 778-713 REV'S	SCALE ~ NTS.	APPROVED: Rajin Kumar 29.1.99 FOR DG.	
TRACTION MOTOR TAO 659 SPRING (FOR BRUSH HOLDER)				
R.D.S.O. ELEC. DTE.			SKEL 4498	

ALT.	DESCRIPTION	DATE	SIGNATURE
1.	ALTERNATE MATL. STAINLESS STEEL MENTIONED.	24.06.03	<i>[Signature]</i>



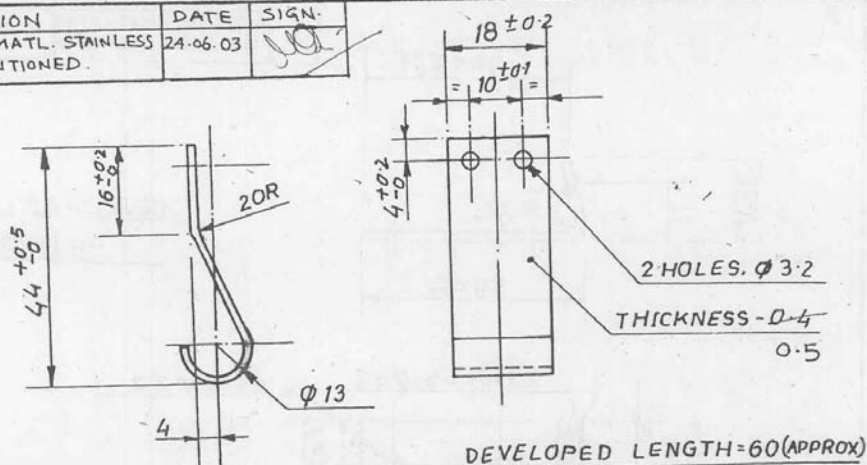
NOTES:-

1. MATERIAL-SPRING STEEL TO B.S.970'72 Gr.070 A 78 OR EQUIVALENT, SUITABLY TREATED.
2. DEVELOPED LENGTH = 70 (APPROX.)
3. HARDENING TEMPERATURE = 800°C, QUENCHING MEDIUM-OIL TEMPERING TEMPERATURE = 350°C.
4. THIS SHOULD BE CADMIUM PLATED GENERALLY TO IS: 1572'68- CL. NO. Cd8.
5. ALT. 1 ALTERNATE MATERIAL - STAINLESS STEEL TO IS 6911: 1992 Grade 304 S2 (Gr 02 Cr 19 Ni 10).

1	LIFTING HOOK	18	SEE-NOTE	
ITEM-NO.	DESCRIPTION	QTY.	MATL./SPECN	REMARKS
REF: CLW DRG NO. 4TWD.092.240ALT1	SCALE: NTS	APPROVED <i>[Signature]</i> FOR DG		
TRACTION MOTOR TAO-659				
LIFTING HOOK				
(B.H.FINGER ASSEMBLY)				
R.D.S.O.ELEC.DTE.SKEL-4499				

Dr.	7.1.99
DES.	S.KUMAR
CHD.	<i>[Signature]</i>
FILE	

ALT.	DESCRIPTION	DATE	SIGN.
1.	ALTERNATE MATL. STAINLESS STEEL MENTIONED.	24.06.03	<i>[Signature]</i>



NOTES:-

1. MATL. = SPRING STEEL TO BS 970 '72, Gr. 735 A 50 OR EQUIVALENT SUITABLY HEAT TREATED.
2. HARDENING TEMP. = 830°C.
QUENCHING MEDIUM - OIL, TEMPERING TEMP. = 520°C.
TENSILE STRENGTH = 140 KG./mm.² AND ELONGATION = 10%.
3. THICKNESS = 0.5 mm.
4. CHARACTERISTICS AFTER TREATMENT:-
ROCKWELL HARDNESS NO. (DIAMOND CONE UNDER 150 KG.)
FROM 41 TO 45.
5. THIS SHOULD BE CADMIUM PLATED GENERALLY TO
IS: 1572 '68 - CL. NO. Cd 8 AND PASSIVATED AFTER
MACHINING.
6. ALTERNATE MATERIAL - STAINLESS STEEL TO IS: 6911: 1992
GRADE 304 S2 (Gr 02 Cr 19 Ni 10).

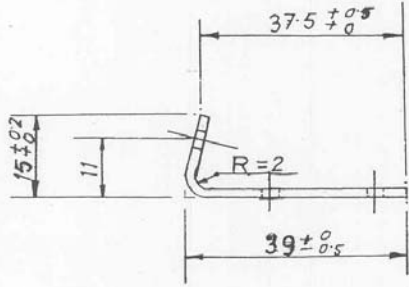
(ALT. 1)

Dt	7.1.99
DRN	S. KUMAR
CHD	<i>[Signature]</i>
FILE	

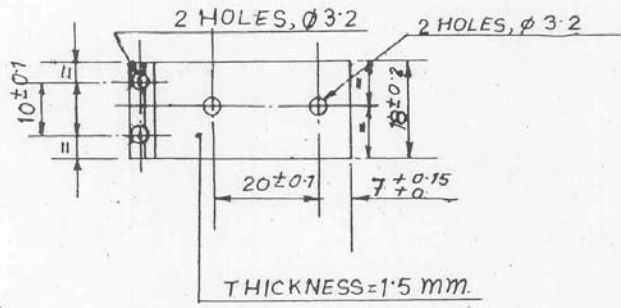
1	FINGER	18	SEE-NOTE	
ITEM. NO.	DESCRIPTION	QTY.	MATL. / SPECN.	REMARKS.
REF: CLW DRG. NO. 4TWD.092.235 ALT.1		SCALE: NTS	APPROVE <i>Rajin</i>	Kuman FOR D.G.
<u>TRACTION MOTOR TAO-659</u>				
<u>FINGER</u>				
(B.H. FINGER ASSEMBLY)				
R.D.S.O-ELEC. DTE.		SKEL- 4501		

8

ALT.	DESCRIPTION	DATE	SIGN.
1.	ALTERNATE MATL. STAINLESS STEEL MENTIONED	24.06.03	JAL



DEVELOPED LENGTH
= 55 (APPROX).



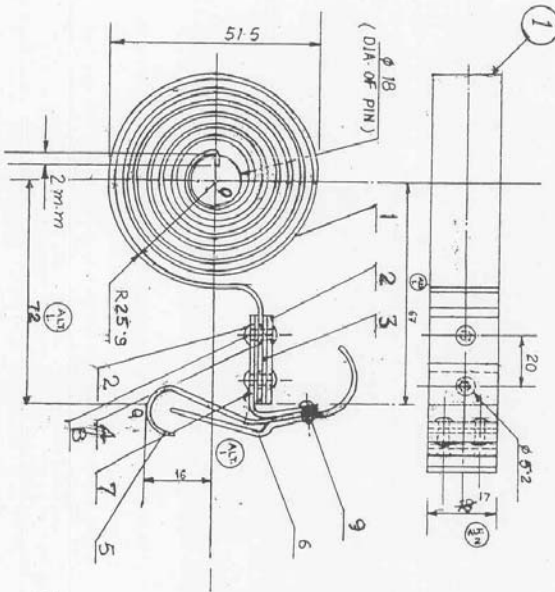
NOTES:-

1. THIS IS TO BE CADMIUM PLATED GENERALLY TO IS: 1572 '68 CL. NO. cd 8 AND PASSIVATED.
2. MATERIAL:- SPRING STEEL TO B.S.S. 970 '72 GR. 070 A 78. OR EQUIVALENT, SUITABLY HEAT TREATED.
3. EXPECTED MECHANICAL PROPERTIES:-
U.T.S. $\geq 100 \text{ KG./mm}^2$ ELONGATION = 10% (MIN.)
HARDENING TEMP. 800°C , QUENCHING MEDIUM - OIL,
TEMPERING TEMP. = 350°C

- ALT. 1 4. ALTERNATE MATERIAL - STAINLESS STEEL TO IS 6911: 1992 GRADE 304 S2 (G1 02 Cr 19 Ni 10)

DL	
DRN	
CHB	
FILE	

1	SPRING LEVER	18	SEE NOTE-2	
ITEM NO.	DESCRIPTION	QTY	MATL. / SPECN	REMARKS
REF:-	CLW DRG. No. 4TWD. 092. 242 Alt-1	SCALE ~ NTS	APPROVED	Ray Kumar FOR DG
TRACTION MOTOR TAO-659				
SPRING LEVER				
(B.H. FINGER ASSEMBLY)				
R.D.S.O. ELEC. DTE. SKEL-4503				



- NOTE:-**
1. THE ASSEMBLY SHOULD BE ABLE TO WITHSTAND A TEST OF 500 VOLTS APPLIED BETWEEN BRUSH SPRING (ITEM.1) AND SPRING LEVER (ITEM.7).
 2. THE PRESSURE DROP FROM NEW TO THE CONDEMNING SIZE OF CARBON BRUSH IS THE DEFLECTION OF 23 mm. SHOULD NOT BE MORE THAN 300 gm. AT A P REPEATED FULL MOVEMENT LIMITED BY LIFTING HOOK (ITEM.6) NOR SHALL IT CRACK.

3	ALTERATION INCORPORATED	APPROVED BY	DATE
2	IN PART DRG.		
1	DIMENSION CHANGED		
	FINISH VIEW ALTERED & SIMENS- ION BOARD		
	STATUS	ALT	REF NO

ITEM	DESCRIPTION	QTY/TM	UNIT	SPEC	REMARKS
9	RIVET, SIZE $\phi 3 \times 6L$	36 NOS			
8	RIVET, SIZE $\phi 3 \times 12L$	36 NOS			
7	SPRING LEVER	18 NOS		SKEL-4503	ALT-1
6	LIFTING HOOK	18 NOS		SKEL-4459	ALT-1
5	FINGER	18 NOS		SKEL-4501	ALT-1
4	INSULATING TUBE	36 NOS		SKEL-4502	
3	INSULATING PLATE	36 NOS		SKEL-4500	
2	PLATE	18 NOS			
1	BRUSH SPRING	18 NOS		SKEL-4498	ALT-1

REF: HITACHI DRG. NO. 105 778713 REV. C. SCALE: 1:1

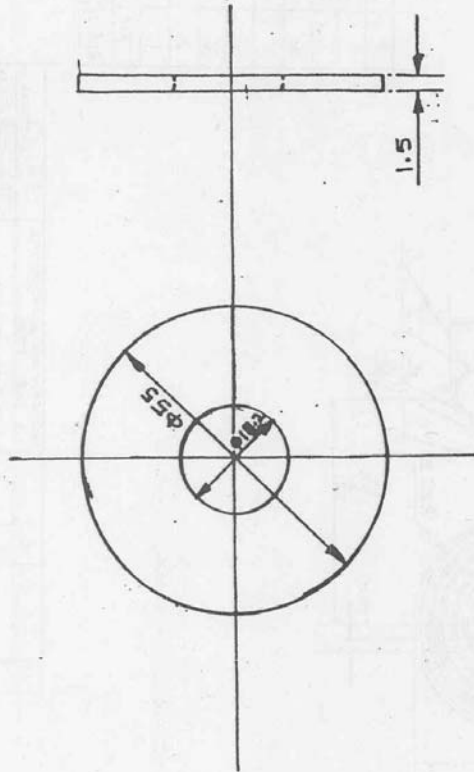
TRACTION MOTOR

1AO-659

BRUSH HOLDER FINGER ASSEMBLY

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

SKEL-4504



NOTE:-

1. ~~MATERIAL = Stainless Steel~~
- ~~at pgs 18: 6811722 Grade~~
- ~~04 Cr 10 Ni 10~~

ALT 3

~~REPROVED MATERIAL -~~

STAINLESS STEEL TO IS 6911:
1992 GRADE 304 S2 (GY 02
Cr 19 Ni 10).

3.	GRADE OF MATL (STAINLESS STEEL) ALTERED	24 5/8
2.	MATL CHANGED AS PER NOTE	13
1.	MATL: CHD. TO PTFE (BS: 6564 R: 2.91)	3819 1/2
STATUS	ALT.	REF. NO.

DESCRIPTION	APPD. DATE
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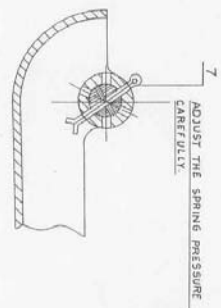
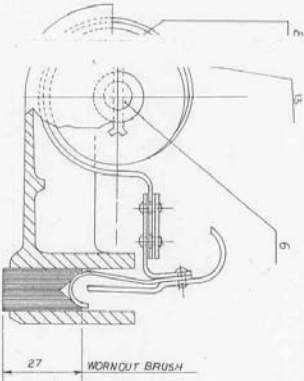
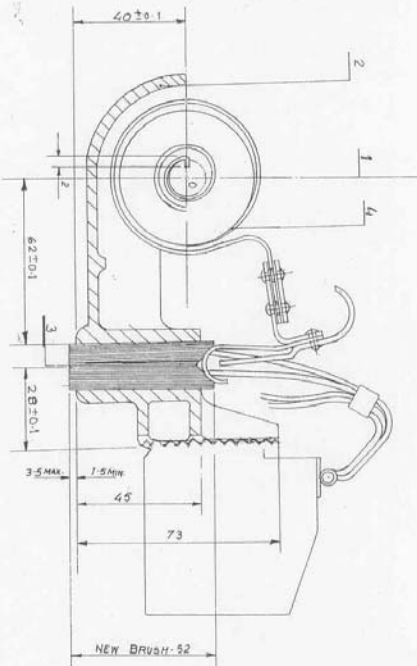
REF.	SCALE: NTS	APPD. BY	DATE
1.	WASHER	36	SEE NO.
2.	DESCRIPTION	DETAIL NO.	MATL. SPEC.

TRACTION MOTOR TYPE TAO-659

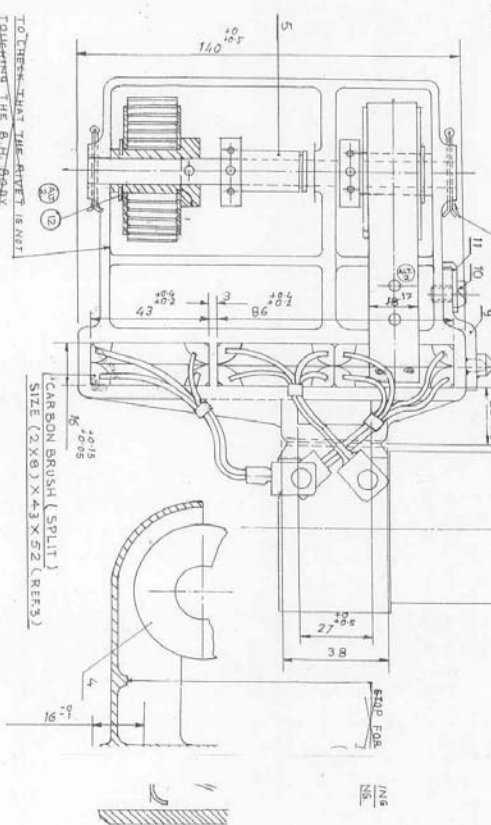
WASHER
(FOR B.H. ASSEMBLY)

R.D.S.O. ELEC. DTE. SKEL-4506
8y.

FILED/13.5



DRILL AND BURN 3 HOLES FOR 3mm DIA. SPLIT SPRING REF. 6 WITH STAINLESS STEEL AXLE REF. 6 IN POSITION



ADJUSTMENT OF SPRINGS
EFFORT ON NEW BRUSH - 2.6 KG ± 5%, PRESSURE = 0.350 KG/CM²
EFFORT ON WORN OUT BRUSH - 1.4 KG ± 5%, PRESSURE = 0.320 KG/CM²
HEIGHT OF WORN OUT BRUSH = 27mm

NOTE:
1 AFTER MOUNTING THE SPRING ASSEMBLY, CHECK THAT THE FINGER IS NOT TOUCHING THE BRUSH HOLDER BODY, BE SURE THAT THE POSITIONS OF THE PIG - TAILS FOR CARBON BRUSHES ARE AS PER DRAWING.
2 ALL DIMENSIONS ARE IN mm.

1.	PLATTER DELETED & 26-4-93	26-4-93
2.	DRAWING ALTERED	28-5-2002
3.	ALTERATIONS INCORPORATED	24-06-03
IN PART BRG		

ITEM	DESCRIPTION	QTY/PM	MATL. /SPEC
1.	BRUSH HOLDER FINGER ASSEMBLY	18	1800004, IN. SPEC.
2.	B. H. BODY	18	1800004, IN. SPEC.
3.	DUPLEX CARBON BRUSH - SPLIT	18	1800004, IN. SPEC.
4.	WASHER	18	1800004, IN. SPEC.
5.	SPRING BRUSH (CAB PLATED)	18	1800004, IN. SPEC.
6.	AXLE	6	1800004, IN. SPEC.
7.	SPLIT PIN (CAB PLATED)	18	1800004, IN. SPEC.
8.	GRIT PIN (ZINC/CAD PLATED)	12	1800004, IN. SPEC.
9.	SPRINGING TIP ASSEMBLY (CAB PLATED)	6	1800004, IN. SPEC.
10.	BRASS SCREW M6 X 8	6	1800004, IN. SPEC.
11.	LOCKING PLATE	6	1800004, IN. SPEC.
12.	E-TYPE EXTENSION CLIP	18	1800004, IN. SPEC.

R.D.S.O. ELEC. DIE. BRUSH HOLDER ASSEMBLY SKEL - 4505