

nel

(11)

Specification No. 07-ABR-92
UPDATED UPTO JULY, 1995

INDIAN RAILWAYS

SPECIFICATION

FOR IRSA-600, IRSA-600J AND IRSA-450 BRAKE SLACK ADJUSTER
FOR FREIGHT STOCK AND COACHING STOCK OF INDIAN RAILWAYS

Amendment No.4 of July 2000
Amendment No.5 of Sept. 2016

Issued by:-

RESEARCH DESIGNS & STANDARDS ORGANISATION

MINISTRY OF RAILWAYS

MANAK NAGAR, LUCKNOW-226011

JUNE.92

PRICE RS:-

Amendment No.5 of September 2016, to specification 07-ABR-1992 for 1RSA-600,IRSA-600J and IRSA-450 Brake Adjuster for Fright Stock and Coaching Stock of Indian Railways.

Add the following paragraph after clause 1 “**Scope**”

“All the provisions contained in RDSO’s ISO procedures laid down in document No. QO-D-7.1-11 dated 19/07/2016 (Titled “Vendor – Changes in approved status”) and subsequent version/ amendments thereof, shall be binding and applicable on the successful vendor/ vendors in the contracts floated by Railways to maintain quality of products supplied to Railways”

Amendment No.4 of July,2000 of specification No.07-ABR-92 for IRSA -600/IRSA-600J and IRSA 450 slack adjuster

Add new para 9.2 and renumber existing para 9.2, 9.3 and 9.4 as 9.3, 9.4 and 9.5 respectively.

The list of items indicating the components to be manufactured in house by the supplier and components which can be manufactured by sublet vendors is enclosed as Annexure VI. The original equipment manufacturer shall procure the below mentioned item with RDSO Inspection from the vendors approved by RDSO.

1. Rubber gasket Drg.No.WD -82064-S-09-RC item 1
2. Take up spring Drg.No.WD-82064-S-04-RC item 1,2 and 3 and 4
3. Pay out spring
4. Clutch spring
5. Barrel spring
6. Bearing 45TA (complete) 1S:2513 and 5932
7. Bearing 45 TA(without shaft 1S:2513 and 5932
Washer)

ANNEXURE - VI.

LIST APPLICABLE FOR MANUFACTURER

S.No	Description	Drg.No.	To be manufactured In House	May be manufactured by Sublet Vendor
1.	Sealing ring	WD-82064-S-08-RC (Item -5)		<input checked="" type="checkbox"/>
2.	Rubber gasket	WD-82064-S-09-RC (Item -1)		<input checked="" type="checkbox"/>
3.	Seal ring	WD-82064-S-08-RC (Item -6)		<input checked="" type="checkbox"/>
4.	Circlip 45x 1.75 N	WD-82064-S-08-RC (Item -8)		<input checked="" type="checkbox"/>
5.	Dog pin	WD-82064-S-05-RC (Item -3)	<input checked="" type="checkbox"/>	
6.	Circlip 85x4H	WD-82064-S-09-RC (Item -4)		<input checked="" type="checkbox"/>
7.	Pay out spring	WD-82064-S-04-RC (Item -2)		<input checked="" type="checkbox"/>
8.	Spring dowel sleeve 6x 10	WD-82064-S-10-RC (Item -4)		<input checked="" type="checkbox"/>
9.	Barrel spring IRSA 600/450	WD-82064-S-04-RC (Item -4) / Sk-85065		<input checked="" type="checkbox"/>
10.	Spring dowel sleeve 5x24	WD-82064-S-10-RC (Item -3)		<input checked="" type="checkbox"/>
11.	Circlip 40x 2.5 H	WD-82064-S-08-RC (Item -3)		<input checked="" type="checkbox"/>
12.	Take up spring	WD-82064-S-04-RC (Item -1)		<input checked="" type="checkbox"/>
13.	Clutch spring	WD-82064-S-04-RC (Item -3)		<input checked="" type="checkbox"/>
14.	Circlip 45x 2.5 H	WD-82064-S-08RC (Item -9)		<input checked="" type="checkbox"/>
15.	Multi tooth lock washer B 31/ B28 IRSA 600/600J	WD-82064-S-08-RC (Item -7) / WD-90002-S-02 -RC (Item 6)		<input checked="" type="checkbox"/>
16.	Bearing 45 TA II (complete)	IS-2513 & 5932		<input checked="" type="checkbox"/>
17.	Bearing 45 TA II	IS-2513 & 5932		<input checked="" type="checkbox"/>

18.	Leader nut casing	WD-82064-S-07-RC (Item -1)	<input checked="" type="checkbox"/>	
19.	Clutch sleeve	WD-82064-S-03-RC (Item -4)	<input checked="" type="checkbox"/>	
20.	Leader nut	WD-82064-S-02-RC (Item -1)	<input checked="" type="checkbox"/>	
21.	Adjusting nut	WD-82064-S-02-RC (Item -2)	<input checked="" type="checkbox"/>	
22.	Actuating sleeve	WD-82064-S-06-RC (Item -1)	<input checked="" type="checkbox"/>	
23.	Barrel head	WD-82064-S-03-RC (Item -2)	<input checked="" type="checkbox"/>	
24.	Control rod head IRSA 600/600J	WD-82064-S-05-RC (Item -2) / WD-90002- S-02-RC (Item-3)	<input checked="" type="checkbox"/>	
25.	Adjuster ear IRSA 600/600J	WD-82064-S-10-RC (Item -1) / WD-90002- S-02-RC (Item-1)	<input checked="" type="checkbox"/>	
26.	Control rod IRSA 600/600J/450	WD-82064-S-10-RC (Item -2) / WD-90002- S-02-RC (Item -2) / Sk.85069	<input checked="" type="checkbox"/>	
27.	Dust bushing	WD-82064-S-09-RC (Item -2)	<input checked="" type="checkbox"/>	
28.	Spindle sleeve IRSA 600/600J/450	WD-82064-S-09-RC (Item -6) / Sk.-85067	<input checked="" type="checkbox"/>	
29.	Spring sleeve	WD-82064-S-09-RC (Item -3)	<input checked="" type="checkbox"/>	
30.	Transaction sleeve	WD-82064-S-03-RC (Item -3)	<input checked="" type="checkbox"/>	
31.	Guide bushing	WD-82064-S-05-RC (Item -4)	<input checked="" type="checkbox"/>	
32.	Guide pin	WD-82064-S-03-RC (Item -1)	<input checked="" type="checkbox"/>	
33.	Wire ring	WD-82064-S-07-RC (Item -3)	<input checked="" type="checkbox"/>	
34.	Friction washer	WD-82064-S-07-RC (Item -2)	<input checked="" type="checkbox"/>	
35.	Adjuster tube socket	WD-82064-S-06-RC (Item -2)	<input checked="" type="checkbox"/>	
36.	Clutch ring	WD-82064-S-06-RC (Item -3)	<input checked="" type="checkbox"/>	
37.	Barrel IRSA 600/450	WD-82064-S-02-RC (Item -3) / Sk.-85063	<input checked="" type="checkbox"/>	
38.	Adjuster spindle IRSA 600/450	WD-82064-S-02-RC (Item -4) / Sk.-85064	<input checked="" type="checkbox"/>	

2558529/2026/O/o SSE/STORE/PCME/O/SWR

39.	Safety collar	WD-82064-S-10-RC (Item -5)	<input checked="" type="checkbox"/>	
40.	Lock washer	WD-82064-S-08-RC (Item -1)	<input checked="" type="checkbox"/>	
41.	Ear bushing IRSA 600/600J /450	WD-82064-S-10-RC (Item -6) / WD-90002 -S-02 RC (Item 4) / Sk.-85068	<input checked="" type="checkbox"/>	
42.	Leader nut flange	WD-82064-S-05-RC (Item -1)	<input checked="" type="checkbox"/>	
43.	Lock scrw	WD-82064-S-09-RC (Item -5)		<input checked="" type="checkbox"/>
44.	Tab washer	WD-82064-S-08-RC (Item -4)		<input checked="" type="checkbox"/>
45.	Adjuster tube IRSA 600/450	WD-82064-S-05-RC (Item -5) / Sk. 85066	<input checked="" type="checkbox"/>	
46.	Lock nut	WD-82064-S-08-RC (Item -2)		<input checked="" type="checkbox"/>
47.	Name plate	WD-82064-S-07-RC (Item -4)		<input checked="" type="checkbox"/>
48.	Rivet	WD-82064-S-07-RC (Item -5)		<input checked="" type="checkbox"/>
49.	Nut IRSA 600J	WD-90002-S-02-RC (Item 5)		<input checked="" type="checkbox"/>
50	Punched Washer M- 20 IRSA600J	IS:2016		<input checked="" type="checkbox"/>

**AMENDMENT NO. 3 OF AUGUST, 1998 OF SPECIFICATION NO.07-ABR-92
FOR IRSA 600/IRSA-600J AND IRSA 450 SLACK ADJUSTERS**

FOR FREIGHT STOCK AND COACHES OF INDIAN RAILWAYS

Delete existing paras 13.1. and 13.2 and substitute the following.

- 13.1 The following methods should be used for packing the complete slack adjuster.
- 13.1.1 Slack adjuster (without spindle and control rod assembly) should be kept in a polythene sheet tube of thickness of 0.16 mm (minimum) and sealed to arrest ingress of water and dust.
- 13.1.2 Adjuster spindle assembly and control rod assembly should be kept separately in a polythene sheet tube of thickness of 0.16 mm (minimum) after protecting the threaded portion by means of card board tubes and sealed to arrest ingress of water and dust.
- 13.1.3 For local despatch, slack adjuster, adjuster spindle assembly and control rod assembly packed as per para 13.1.1 & 13.1.2 above may be despatched further covering all items with polythene sheet.
- 13.1.4 For outside despatch, 3 slack adjuster assemblies indicated in para 13.1.1 should be strapped with wire rope/jute to avoid further movement. The assembly should be kept in a wooden box and then firmly wrapped with steel tape.
- Adjuster spindle assembly and control rod assembly after protection as mentioned in para 13.1.2 should be tied with wire rope/jute rope 10 nos at a time and then to be kept in wooden box. The wooden box to be firmly secured with steel tape.
- 13.2 The following methods should be used for packing the spares of slack adjuster.
- 13.2.1 Small individual spares should be kept in a polythene packet of thickness of 0.16mm (minimum) after taking due protection against corrosion and rust and sealed to arrest ingress of water and dust. The spares after such packing should be kept in a wooden box in groups and secured with steel tape.

13.2.2 The bigger spares should be packed as below.

13.2.2.1 Control rod, adjuster spindle, barrel head etc. should be packed as mentioned at para 13.1.2 and then tied with wire rope or jute rope as indicated in para 13.1.4 and kept in wooden box and secured with steel tape.

13.2.2.2 Other big spares shall be individually packed with polythene sheet packet of 0.16 mm sheet thickness and sealed. Required quantity shall be kept in a wooden box and secured with steel tape.

**AMENDMENT NO. 2 OF MAY '96 OF SPECIFICATION NO. 07-ABR-92
FOR IRSA-600/IRSA-600J AND IRSA-450 SLACK ADJUSTER**

1. Add new para 6.3.5 after Para 6.3.4

6.3.5 Suitable test machine for conducting endurance test as per Annexure-IV".
2. Add para 1.4.5 in Annexure-I after para 1.4.4

1.4.5 Endurance test

One slack adjuster shall be subjected to endurance test as per procedure given in Annexure-IV.
3. Replace the existing para-2 of Annexure-I by the following:

"2. After completion of tests detailed in para 1.4.3, 1.4.4 and 1.4.5 of Annexure-I, both the samples shall be tested for pay-in and pay-out as per para 1.4.1 again to ensure that there is no adverse effect on the slack adjuster and that it performs satisfactorily."
4. Replace the existing para 1 of Annexure-II by the following:

"1. Purchase inspection shall be carried out as follows:

The inspecting official will carry out the Audit checks of the manufacturing procedure and manufacturer's Quality Assurance Programme to ensure that the slack adjusters offered for inspection have been manufactured strictly as per the laid down Quality Assurance Programme. The inspecting official will ensure that the slack adjusters offered has been manufactured by the manufacturing process and at the manufacturing place from where the slack adjuster components were manufactured and tested successfully in endurance test as per procedure given in Annexure-IV. After ensuring these requirements of Quality Assurance Programme and endurance tests the purchase inspection shall be carried out as follows:"
5. Replace the existing para 3 of Annexure-II by the following:

One slack adjuster per two thousand assemblies or once in six months shall be subjected to vibration test, tension test as per procedure given at para 1.4.3 and 1.4.4 respectively of Annexure-I and endurance test as per procedure given at Annexure-IV.

ANNEXURE-IV
Amendment No.2

PROCEDURE FOR ENDURANCE TEST OF SLACK ADJUSTERS

TEST SET-UP

- 1.1 The slack adjuster shall be secured in the test machine in a manner similar to the manner of installation on the brake rigging on a wagon/truck.
- 1.2 Timers which will shut off the test machine if a slack adjuster malfunction occurs which will alter the pressure rate, load rate, applied load, release load, index, hold load or index cut off will be set one second if needed above the minimum required for a normally operating slack adjuster.
- 1.3 Timers which will shut off the test machine if the pay-in or pay-out time are altered will be set 2 minutes above that required for normal operation of slack adjuster.
- 1.4 The load application and control system of test machine should be hydraulic and load application piston velocity should be 60 cm/min.
- 1.5 The indexing increment should be 2 mm and hold time should be one and half second.

2. TEST PROCEDURE

- 2.1 The 3650 kg tensile load will be applied and released ten(10) times after which the 2 mm adjustment will be made by the test machine and a corresponding adjustment made by a normal functioning slack adjuster. This cyclic action will be repeated for 100,000 load-release applications or to failure as the case may be. For the duration of the test, the slack adjuster is caused to shorten (pay-in) and extend (pay-out) in the 2 mm increments for each ten(10) applications of load over a range of approximately 550 mm for IRSA-600 and 400 mm for IRSA-450.
- 2.2 After completion of the 100,000 cycles and the slack adjuster passing the test, it will be disassembled to determine the interior condition. Examination will be done in the presence of RDSO inspecting officials.

AMENDMENT NO. 1 OF AUGUST-92 OF STR No. 07-ASR-92
FOR IRSA-600/IRSA-450 SLACK ADJUSTER.

....

1. Delete existing Para 9.4 and substitute the following:

"Slack Adjuster and its components shall be free from injurious defects that may impair their strength. The suppliers shall also ensure that all components are greased with SERVOGEM-RR3 or BALMEROL MULTI GREASE LL3. The approximate requirement of lubricant for IRSA-450 is 1 Kg. and for IRSA-600/IRSA-600J 1.5 Kg."

2. Replace existing Annexure-III-B by revised Annexure-III-B attached.

.....

**Trial Scheme for monitoring performance of IRSA-450
Slack Adjusters fitted on coaching stock**

Object:- To determine the performance of IRSA-450 Slack Adjuster fitted on coaching stock.

INSTRUCTIONS:

1. Trial Slack Adjusters shall be fitted on coaching stock running on specified rake and performance monitored along with Slack Adjusters manufactured by M/S Stone India Ltd. On each coach one Slack Adjuster shall be from those under trial and other slack adjuster shall be of M/S Stone India Ltd. which is presently under use. Coaches fitted with trial slack adjuster shall have the following marking stencilled in 25 mm letters in white on both end wall panels.

**"FITTED WITH IR SLACK ADJUSTER
MAKE.....ON TRIAL"**

2. Coach numbers, slack adjuster numbers, manufacturers' name, date of fitment of both slack adjusters shall be noted by PU/Workshop who fit these slack adjuster on trial and circulate to zonal Riys. The concerned depot and Rly. workshop shall note the particulars of coach and slack adjusters where the coach is inspected / PDHed.
3. Performance of "both slack adjusters" shall be monitored for a period of one PDHs (18 months) on following lines:-

3.1 Open Line

- 3.1.1 During the primary and secondary maintenance, the TXRs shall ascertain the correct functioning of both slack adjusters in the following manners:-

- a) The piston stroke and dimension 'A' should be checked and should be as specified for air-brake/vacuum brake coaches.
- b) Rotate the slack adjuster 2 or 3 times in clockwise direction facing the control rod. Clearance between brake block and wheel tread will increase (pull rod comes out of the slack adjuster).
- c) Apply brake. Initially Higher piston stroke will be observed at first application. If piston stroke is normal after 2 or 3 applications the Pay-in is satisfactory.
- d) Rotate the slack adjuster 2 or 3 times in anti-

07-ABR-92

ANNEXURE-III-B (Contd.)

clockwise direction facing the control rod. Clearance between brake block and wheel tread will decrease (pull rod goes inside the slack adjuster).

- e) Apply brake. Initially short piston stroke will be observed at first application. If the piston stroke is normal after 2 or 3 applications, the pay-out is satisfactory.
- f) If the slack adjuster is found defective during the examination it shall be removed from the coach and shall be sent to base workshop for detailed examination and testing on the rig. A detailed report shall be sent to manufacturer and RDSO. The slack adjuster once removed due to defective performance will be considered off from the trial and no further trials will be carried out on the same.

3.2 Workshops

- 3.2.1 During PDH, both slack adjusters under trial shall be removed from the coach and mounted on the performance test rig (as indicated in Annexure- IV) and tested.
- 3.2.2 Attach the adjuster ear to the free end of the cylinder lever of the test rig.
- 3.2.3 Screw the test rig spindle in to the slack adjuster until the entire length of threads is covered by protection tube and attach the free end of the spindle to the test rig. After fixing the slack adjuster in the test rig. 'pay-in' and 'pay-out' test should be carried out in the following manner:-

Pay-in Test

- a) Let down the control rod, so that the fork of the rod clasps the adjuster tube of the slack adjuster.
- b) Apply and release the brake a few times letting the slack adjuster pay-in until the correct piston stroke is obtained (until the indicator is within ± 5 mm tolerance field of the scale).

Notes The slack adjuster pays-in upto max. 100 mm per braking.

Pay-out Test

- a) Turn up the control rod and make two brake applications letting the slack adjuster pay out.

ANNEXURE-III-B (Contd.)

NOTE: The slack adjuster pays out max. 30 mm per braking.

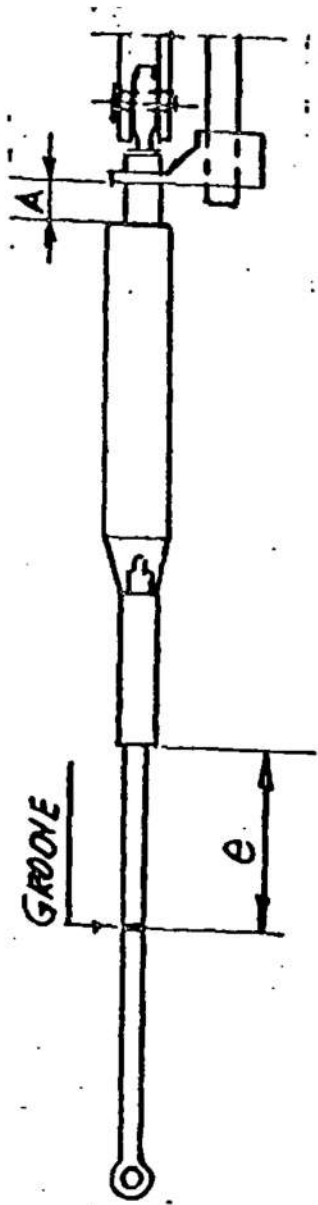
The above Pay-in and Pay-out tests should be repeated twice. If the performance of slack adjuster is found satisfactory, the adjuster should be fitted back in the same coach from which it was removed.

- 3.2.4 In case the slack adjuster does not pass the above tests, a detailed note is to be sent to the manufacturer with a copy endorsed to RDSO and the coach number and that slack adjuster shall have to be deleted from the further trials.
- 3.2.5 The workshops shall submit performance report of all the slack adjusters on trial as per the proforma enclosed as annexure to RDSO.

ANNEXURE-III

PROFORMA FOR WORKSHOP

Sl. No.	Whether received from open line/re-moved from coach	Coach particulars		Slack Adjuster	Month & Year of manufacture of slack adjuster S.A.	Date of fitment of S.A.	Date of check	Desired piston stroke		Dimensions				Nature of defect	Remarks
		No.	Type	No.				Vac. Brake	Air Brake	Air-braked coaches	Vac. braked coaches	e	A		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					SIL SCL GREY GR5C			125 ± 15 mm	65-100 mm						



'A' - Dimension between control rod head and slack adjuster barrel which should be 20 ± 2 mm for vacuum braked coaches and 22 ± 0 mm for air-braked coaches.

'e' - Distance between the groove on adjuster spindle and the end of spindle sleeves as shown above.

NOTE: This Proforma to be submitted by workshop after testing the Slack Adjuster during FCH.

Specification for IRSA-600,IRSA-600J and IRSA-450
Brake Slack Adjuster for freight and
coaching stock of Indian Railways.

0. Forward

- .1 This specification was originally issued as specification No.07-ABR-88(Rev.).
- .2 This schedule is intended to cover the technical requirement/provision relating to material, construction and tests and does not include all necessary provisions of the contracts.
- .3 This schedule draws reference to some of the relevant IS Specification. Latest versions of these specifications shall be taken as reference.
- .4 For the purpose of deciding whether a particular requirements of this schedule is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960. The number of significant places retained in the rounded off value should be the same as that of the specified value in this schedule.
- .5 In this revision the material and dimension of some of the component such as circlips, spring dowel sleeve, friction washer etc. has been revised/ updated.

1. Scope

This specification covers performance, developmental and purchase requirements for IRSA-600 and IRSA-600J Brake Slack Adjusters for freight stock and IRSA-450 for coaching stock designed for automatic controlling of brake block clearance and brake cylinder piston travel.

2. General requirements

- .1 Shall operate in harmony with power and hand brakes.
- .2 Shall be able to operate without maintenance for a minimum period of six years.

3. Performance requirements

- .1 Shall be capable of adjusting the brake block clearance quickly either way, i.e. when it is large or small as compared to the pre-determined value.

07-ABR-92

- .2 Shall have a total pay-in and pay-out capacity of 600mm for freight stock and 450mm for coaching stock.
- .3 Loss of brake force for Slack Adjuster type IRSA-600, IRSA-600J and IRSA-450 shall not be more than 310 Kgs.
- .4 Shall not falsely pay-out slack due to heavy brake rigging resistance. Also, normal train shocks shall not cause false pay-in or pay-out of slack adjuster.

4. Design and material

- .1 The supplier shall be responsible for maintaining quality and workmanship so that the Slack Adjuster supplied shall meet all requirements mentioned against para 3 above and shall be in line with the latest RDSO Drg. WD-82064-S-01-RC and 90002-S-01-RC for freight stock and SK-85062 for coaching stock.
- .2 The dimensions and material composition of the various components of the slack adjuster shall conform to the latest RDSO drawings as mentioned in annexures VA,VB and VC unless otherwise specified.

5. Manufacturing facilities

- .1 Supplier shall have adequate facilities for manufacture of slack adjuster conforming to RDSO drawings mentioned above.
- .2 Following facilities, however, shall be essential:
 - .1 A special purpose multi start thread milling machine / Thread rolling machine for generating threads on Adjuster Spindle and a special purpose tapping machine for generating threads on Adjuster nut and Leader nut.
 - .2 Other machines such as Centre Lathe, Turret Lathe, Milling machine, Grinding machine, Drilling machine etc. for machining of components like Adjuster nut, Leader nut, Traction Sleeve, Clutch ring, Adjuster tube socket, Leader nut casing etc. shall be of reputed makes and of adequate capacity.
 - .3 Self regulating furnaces for the heat treatment of components i.e. Leader nut flange, Guide bushing, Clutch ring, Adjuster tube socket, Ear Bushing and Dog pin.
- .3 Following facilities shall be optional but manufacturer shall have their own arrangement with the firms having facilities with proper quality control.

- .1 Facilities for surface treatment like phosphating, zinc plating etc., of the various components of slack adjuster.

6. Testing facilities

- .1 Supplier shall have adequate facilities for checking of slack adjuster components according to the dimensional tolerances and surface finish shown on the RDSO drawings and also facilities for testing of complete Slack Adjuster assembly.
- .2 Following facilities, however, shall be essential:
 - .1 Performance Test Rig for testing of pay-in and pay-out capacity of complete Slack Adjuster assembly.
 - .2 Rig for testing loss of force in the Slack Adjuster.
 - .3 Suitable ring, plug and thread gauges for checking the threaded components viz. Adjuster spindle, Adjuster nut and Leader nut.
 - .4 Suitable gauges for checking the dimensions of the components.
 - .5 Suitable testing machine for checking calibration of springs.
 - .6 Suitable testing machines for conducting tests on Circlip and Spring dowel sleeves.
 - .7 Suitable testing machines for conducting hardness tests.
- .3 following facilities shall be optional:
 - .1 Vibration Test Rig for subjecting the Slack Adjuster to 5 million cycles at a frequency range of 30-60 cycles/sec.
 - .2 Tension Test Rig for subjecting the Slack Adjuster to a tensile load of 10 tonnes.
 - .3 Suitable shadowgraph machine with sufficient magnification (30 times minimum) for detailed checking of threaded profile of Adjuster Spindle, Adjuster nut and Leader nut.
 - .4 Physical and chemical properties of the components.

Note: In case the above facilities are not available

07-ABR-92

with the manufactures, they shall have their own arrangement for conducting test from reputed institution or test houses and test reports submitted to inspecting officials.

7. Quality Assurance Programme (QAP)

The supplier shall submit to RDSO in house Quality Assurance programme which will be followed by them to ensure that the Slack Adjuster supplied shall meet all the requirement and shall maintain quality and workmanship. Following points shall be covered in QAP:-

- .1 Inspection procedure of raw material and the tests carried out.
- .2 Inspection procedure for the items manufactured in-house.
- .3 Procedure of selecting sublet venders for springs, semi-finished & finished items.
- .4 Inspection procedure for bought out hardware items.
- .5 Inspection procedure for springs.
- .6 Inspection procedure for semi-finished items procured from sub-venders.
- .7 Inspection procedure for finished items procured from sub-venders.
- .8 Inspection procedure at the assembly stage.
- .9 Agency and frequency of test for which facilities are not available with them and are optional.

8. Testing of Slack Adjuster for development order:-

When RDSO is satisfied that manufacturing / testing facilities and other technical staff back-up etc. necessary for successful and regular manufacture and supply of Slack Adjusters are available with the suppliers, two samples each of slack adjuster type IRSA-600/IRSA-600J and IRSA-450 as the case may be obtained from the supplier for testing in RDSO in terms of paras 1.4.1 and 1.4.2 of annexure-I. If RDSO is satisfied with the test results of both these samples, arrangements would be made to place a developmental order for IRSA-600/IRSA-600J for freight stock and IRSA-450 slack adjusters for coaching stock on the firm.

9. Manufacture:-

- .1 Manufacture of Slack Adjuster shall commence only after the supplier has been duly approved by RDSO and specific permission granted for the same.
- .2 Supplier shall ensure that all components not manufactured by him are procured from sublet vendors having adequate facilities. For such items, manufacturers shall have a well defined procedure for the selection of sublet vendors and method of quality checks.
- .3 Supplier shall take care to see that finished components of Slack Adjuster conform strictly to the dimensional tolerances and the standard of surface finish identified on the RDSO drawings so that complete interchangeability could be achieved.
- .4 Slack Adjuster and its components shall be free from injurious defects that may impair their strength. Supplier shall also ensure that all components are greased with lithium base MP-2 grease or equivalent. The approximate requirement of lubricant for IRSA-450 is 1 kg and for IRSA-600 & IRSA-600J is 1.2 kg.

10. Inspection:

.1 General

- .1 Complete Slack Adjuster assembly shall be inspected and accepted by the inspecting authority of RDSO.
- .2 The Inspecting Authority shall have access to all manufacturing and testing facilities available with the supplier. Supplier shall be obliged to table any information to the Inspecting Authority as and when called for.
- .3 Inspecting Authority may deviate from the agreed procedure if and when found necessary to re-assure that the material is being furnished in accordance with the specification. In this regard, supplier shall not be entitled to object on any ground what so ever on the nature and procedure of testing that may be followed by the Inspecting Authority.

.2 Developmental Inspection:

- .1 Developmental inspection shall be carried out by RDSO at the supplier's premises. Procedure for developmental inspection shall be as listed in Annexure-I. When the development inspection

07-ABR-92

including field trials is found satisfactory and meeting with all requirements, then the concerned firm shall be considered for regular production of Slack Adjuster.

.3 Purchase Inspection:

- .1 Purchase inspection procedure as listed in Annexure II shall be applicable for the firms who have been cleared for regular production of IRSA Slack Adjusters. This shall be carried out by the Inspecting Authority of RDSO at the supplier's premises for which necessary testing facilities shall be made available by the supplier at his own cost.

11. Service Trial

- .1 Service performance of the IRSA-600/IRSA-600J Slack Adjuster for freight stock shall be monitored for 18 months and one PDH cycle (18 months) for coaching stock. Service Trials with IRSA-450 Slack Adjuster under trial would be conducted on 100 coaches. These 100 coaches would have one slack adjuster of Stone India make and the second one which is under trial for the purpose of comparison.
- .2 Coaches fitted with these trial Slack Adjusters shall have the following marking stencilled in 25 mm letters in white on the end wall of the coaches.

"FITTED WITH IR SLACK ADJUSTER MAKE..... ON TRIAL"

Similar marking shall be made on the centre panels on both sides of the wagon.

- .3 The trial performance of IR Slack Adjusters shall be monitored by the Railways and information furnished to RDSO, Lucknow as per the proforma. The detailed instructions are given in Annexure-IIIA for freight stock and ANNEXURE-IIIB for coaching stock.

12. Marking and painting

- .1 Supplier shall ensure that his initials are marked on the various components at location as shown in the relevant drawings. Complete Slack Adjuster assembly shall also carry the suppliers' name and address plate as shown in the RDSO Assembly drawing.
- .2 Complete Slack Adjuster shall be painted as per requirements mentioned in the RDSO Assembly Drawing to prevent corrosion.

13. Packing

- .1 The assembled Slack Adjuster shall be fully shortened and packed in suitable wooden crates alongwith their control rods.
- .2 The supplier shall ensure that the Slack Adjuster assemblies are packed tight in the crates to prevent any damage during transport and handling.

14. Guarantee

Supplier shall guarantee to replace at his own expense any part of Slack Adjuster which fails or proves unsatisfactory in service due to defective material or workmanship within 36 months from the date of supply or 24 months after putting into service whichever is earlier.

15. Deviation

No deviation from this specification shall be normally permitted. However, in case any deviation is unavoidable the supplier shall furnish details of such deviation clausewise with technical reasons for the same so that they could be considered.

ANNEXURE-I

Procedure for Developmental Inspection

1. The inspection official shall make out audit check in the premises of manufacturer to find out that the firm has followed their quality assurance programme in manufacturing samples for developmental inspection. Two numbers out of lot of 20 Slack Adjusters offered for inspection shall be selected for developmental inspection in the first instance. These two samples shall be checked as per procedure given below.
 - 1.1 These two samples shall be dis-assembled and all components checked for dimensional accuracy, surface finish, general workmanship and marking with respect to RDSO detailed drawings.
 - 1.2 Components i.e. Rubber gasket, Barrel, Barrel head, Traction sleeve, Adjuster tube, Adjuster tube socket, Clutch ring, Actuating sleeve, Spring sleeve, Leader nut casing, Spindle sleeve, Dust bushing, Safety collar, Control rod head, Adjuster ear, Adjuster spindle, Guide pin, Ear bushing, Control rod, Guide bush, Leader nut flange & Dog pin shall be checked with relevant gauges wherever necessary. The thread profile of Adjuster spindle, adjuster nut and leader nut shall be checked on the shadowgraph against enlarged master profile.
 - 1.3 Springs, circlips and spring dowel sleeves shall be tested as per procedure given in relevant IS specification given in the drgs.. Clutch ring, Leader nut flange, Guide bushing & Dog pin to be tested for hardness.
 - 1.4 After welding of 'Eye' on the Adjuster Spindle, these samples shall be reassembled, checked for dimensional accuracy with respect to RDSO assembly drawing and subjected to the following tests:-
 - 1.4.1 Pay-in and pay-out for complete range
 This test shall be performed on the performance Test Rig (See Annexure-IV). Pay-in and pay-out capacity shall be tested for the complete range i.e. 600mm for freight stock slack adjuster and 450mm for coaching stock slack adjuster as per procedure given below:-
 - .1 The Slack Adjuster sample shall be fitted on the Test Rig and extended to its maximum length. Brakes shall be applied a few times so that brake cylinder piston stroke is stabilised.

07-ABR-92

ANNEXURE-I (Contd.)

- .2 Brake Block clearance shall be increased. Brake shall be applied a few times till brake cylinder piston stroke is again stabilised. Permissible variation on piston stroke shall not exceed $\pm 3\text{mm}$. Similar procedure shall be repeated at two other locations to cover the entire range of Slack Adjuster pay-in.
- .3 After sample is fully contracted and brake cylinder piston stroke stabilised, brake block clearance shall be reduced to zero. Brake shall be applied a few times till brake cylinder piston stroke is again stabilised. Permissible variation on piston stroke shall not exceed $\pm 3\text{mm}$. Similar procedure shall be repeated at two other locations to cover entire range of Slack Adjuster pay-out. After testing on the test rig, the Slack Adjuster shall be removed and the Adjuster Spindle shall be rotated back to the desired length.

1.4.2 Loss of Force

This test shall be done on the rig for checking loss of force. The loss of force as recorded on the rig at a barrel movement of 40 mm for freight and 25 mm for coaching stock with respect to adjuster tube shall not be more than 310 Kgs.

1.4.3 Vibration

This test shall be done with Vibration Test Rig to determine that internal parts will not be seriously affected or worn sufficiently to prevent satisfactory operation when Slack Adjuster is subjected to 5 million cycles of vibration at a frequency rate as below:-

Frequency HZ	Cycles Millions
30	1
40	1
50	1
60	2

	5 million

1.4.4 Tension

This test shall be done on the Tension Test Rig to see the yield point of the weakest member of Slack Adjuster shall not exceed when subjected to a tensile load of 10 tonnes.

07-ABR-92

ANNEXURE-I-(Contd.)

2. After completion of tests detailed in paras 1.4.3 and 1.4.4 of Annexure-I on both the samples, test as per para.1.4.1 shall be repeated to ensure that there is no adverse effect on the Slack Adjuster and that it performs satisfactorily.
3. If both the samples selected out of lot of 20 are found satisfactory in all respects, then the remaining slack adjusters to be purchased through developmental order shall be inspected in terms of procedure for purchase inspection as given in annexure-II. If both the samples fail in any of the tests, then performance of the firm shall be considered unsatisfactory and developmental order placed on the firm shall be cancelled. If one of the two slack adjusters passes then two more slack adjusters shall be selected from the same lot and both should pass the tests mentioned in Annexure-I, otherwise developmental order shall stand cancelled.

07-ABR-92

ANNEXURE-IIProcedure for Purchase Inspection

1. Purchase inspection shall be carried out as follows.
 - 1.1 Two slack adjusters per 200 assemblies shall be checked as per procedure given below. For smaller lots also two nos. shall be selected.
 - 1.2 The slack adjuster samples shall be first checked for dimensional accuracy with respect to RDSO assembly drawing.
 - 1.3 The slack adjusters shall then be dis-assembled and all components shall be checked for general workmanship. Components i.e. Rubber gasket, Barrel, Barrel head, Traction sleeve, Adjuster tube socket, Clutch ring, Actuating sleeve, Spring sleeve, Leader nut casing, Spindle sleeve, Dust bushing, Safety collar, Control rod head, Adjuster ear, Adjuster spindle, Guide pin, Ear bushing, Control rod, Guide bush, Leader nut flange & Dog pin shall be checked for dimensional accuracy with relevant gauges wherever necessary. Adjuster spindle, Adjuster nut and leader nut shall be checked by actual application of nuts on spindle held vertically. The nuts shall move smoothly with uniform speed without any jarring.
 - 1.4 Springs, Circlips & spring dowel sleeve shall be tested as per procedure given in relevant IS specifications given in drgs.
 - 1.5 Clutch ring, Leader nut flange, Guide bushing & Dog pin shall be tested for hardness.
 - 1.6 All components shall be checked for surface finish and marking with respect to RDSO detailed drawings wherever specified.
 - 1.7 The slack adjusters shall then be assembled back and their performance tested as per para 1.4.1 of Annexure-I. After testing on the test rig, the slack adjusters shall be removed and the adjuster spindles shall be rotated back to the desired length.
 - 1.8 If both the slack adjusters pass all these tests, further tests shall be carried as per para 2 of annexure-II, If any one of the samples fail, the lot shall be rejected.

+

07-ABR-32

ANNEXURE-II (Contd.)

2% of the slack adjusters subjected to minimum of two assemblies shall be checked for pay - in and pay - out characteristics and loss of brake force in terms of para. 1.4.1 and 1.4.2 of Annexure - I. If all the samples pass the lot shall be considered to have passed these tests. If any one or more samples fail the lot shall stand rejected.

One Slack Adjuster per two thousand assemblies or once in six months shall be subjected to vibration test and tension test as per procedure given at paras 1.4.3 and 1.4.4 respectively of Annexure-I.

Inspection official shall carry out audit check to find out that firm has followed generally their QAP in manufacture of slack adjuster offered for inspection.

07-ABR-92

ANNEXURE-III-A

Trial Scheme for monitoring performance of IRSA-600/IRSA-600J
Slack Adjusters supplied by various manufacturers

Object:- To determine the performance of IRSA-600/IRSA-600J
Slack Adjuster fitted on wagon stock.

INSTRUCTIONS

1. Trial Slack Adjuster shall be fitted on BOXN wagons running in closed circuit and performance monitored along with Slack Adjusters manufactured by M/S Stone India Ltd. Wagons fitted with trial Slack Adjuster shall have the following marking stencilled in 25mm letters in white on the centre panels on both sides of the wagon.

"FITTED WITH IR SLACK ADJUSTER
MAKE.....ON TRIAL"

2. Wagon numbers, Slack Adjusters, manufacturers' name, date of fitment of Slack Adjuster shall be noted by the concerned depot where the wagon is subjected to RDH.
3. Performance of Slack Adjuster shall be monitored for a period of 18 months on the following lines:-
 - 3.1 During the train examination, the TXRs shall ascertain the correct functioning of the Slack Adjuster in the following manner:-
 - a) The piston stroke and dimension 'A' should be checked and should be as specified.
 - b) Rotate the Slack Adjuster 2 or 3 times in clockwise direction facing the control rod. Clearance between brake block and wheel tread will increase. (pull rod comes out of the Slack Adjuster.)
 - c) Apply brake. Notice higher piston stroke at first application. If the piston stroke is normal after 2 or 3 application the 'Pay-in' is satisfactory.
 - d) Rotate the Slack Adjuster 2 or 3 times in anti-clockwise direction facing the control rod. Clearance between brake block and wheel tread will decrease. (pull rod goes inside the Slack Adjuster).
 - e) Apply brake. Notice short piston stroke at first application. If piston stroke is normal after 2 or 3 application the 'Pay-out' is satisfactory.

07-ABR-92

ANNEXURE-III-A (Contd.)

- f) If the Slack Adjuster is found defective during the examination the wagon shall be marked sick.

3.2 Wagon marked sick due to defective Slack Adjuster as indicated above shall be attended at sick line/ROH depot on the following lines:-

- 3.2.1 The Slack Adjuster shall be removed from the wagon and mounted on the performance test rig (as indicated in Annexure IV).
- 3.2.2 Attach the adjuster ear to the free end of the cylinder lever of the test rig.
- 3.2.3 Screw the test rig spindle in to the Slack adjuster until the entire length of thread is covered by protection tube and attach the free end of the spindle to the test rig. After fixing the slack adjuster in the test rig 'pay-in' and 'pay-out' test should be carried out in the following manner:-

Pay-in Test

- a) Let down the control rod, so that the fork of the rod clasps the adjuster tube of the slack adjuster.
- b) Apply and release the brake a few times letting the slack adjuster pay-in until the correct piston stroke is obtained (until the indicator is within ± 5 mm tolerance field of the scale).

Note: The slack adjuster pays-in up to max. 100mm per braking.

Pay-out Test

- a) Turn up the control rod and make two brake applications letting the slack adjuster pay-out.

Note: The slack adjuster pays out max. 30mm per braking.

The above 'pay-in' and 'pay-out' tests should be repeated twice. If the performance of slack adjuster is found satisfactory, the original adjuster spindle should be fitted back in the slack adjuster. The slack adjuster shall be fitted on the same wagon from which it was removed and performance checked as per para 3.1

07-APR-92

ANNEXURE-III-A (Contd.)

- 3.2.4 In case the slack adjuster does not pass the above test, a detailed note has to be sent to the manufacturer with a copy endorsed to RDSO and the wagon number and that slack adjuster shall have to be deleted from further trials.
- 3.2.5 The Depot shall give performance report of the slack adjusters on trial quarterly as per proforma enclosed.
- 3.2.6 Extent of wear on critical components shall be checked by RDSO on trial slack adjusters.

ANNEXURE-III-B

**Trial Scheme for monitoring performance of IRSA-450
Slack Adjusters fitted on coaching stock**

Object:- To determine the performance of IRSA-450 Slack Adjuster fitted on coaching stock.

INSTRUCTIONS:

1. Trial Slack Adjusters shall be fitted on coaching stock running on specified rake and performance monitored along with Slack Adjusters manufactured by M/S Stone India Ltd. On each coach one Slack Adjuster shall be from those under trial and other slack adjuster shall be of M/S Stone India Ltd. which is presently under use. Coaches fitted with trial slack adjuster shall have the following marking stencilled in 25 mm letters in white on both end wall panels.

"FITTED WITH IR SLACK ADJUSTER
MAKE.....ON TRIAL"

2. Coach numbers, slack adjuster numbers, manufacturers' name, date of fitment of both slack adjusters shall be noted by the concerned depot and Rly. workshop where the coach is subjected to POH.
3. Performance of both slack adjusters shall be monitored for a period of one POHs (18 months) on following lines:-

3.1 Workshops

- 3.1.1 During POH, the slack adjusters under trial shall be removed from the coach and mounted on the performance test rig (as indicated in Annexure- IV) and tested.
- 3.1.2 Attach the adjuster ear to the free end of the cylinder lever of the test rig.
- 3.1.3 Screw the test rig spindle in to the slack adjuster until the entire length of threads is covered by protection tube and attach the free end of the spindle to the test rig. After fixing the slack adjuster in the test rig. 'pay-in' and 'pay-out' test should be carried out in the following manner:-

Pay-in Test

- a) Let down the control rod, so that the fork of the rod clasps the adjuster tube of the slack adjuster.

07-ABR-92

ANNEXURE-III-B (Contd.)

- b) Apply and release the brake a few times letting the slack adjuster pay-in until the correct piston stroke is obtained (until the indicator is within ± 5 mm tolerance field of the scale).

Note: the slack adjuster pays-in upto max. 100 mm per braking.

Pay-out Test

- a) Turn up the control rod and make two brake applications letting the slack adjuster pay out.

Note: The slack adjuster pays out max. 30 mm per braking.

The above Pay-in and Pay-out tests should be repeated twice. If the performance of slack adjuster is found satisfactory, the original adjuster spindle should be fitted back in the slack adjuster. The slack adjuster shall be fitted on the same coach from which it was removed and performance checked as per para 3.2.

- 3.1.4 In case the slack adjuster does not pass the above tests, a detailed note is to be sent to the manufacturer with a copy endorsed to RDSO and the coach number and that slack adjuster shall have to be deleted from the further trials.
- 3.1.5 The workshops shall give performance report of all the slack adjusters on trial as per the proforma enclosed as annexure.

3.2 Open Line

- 3.2.1 During the primary and secondary maintenance, the TXRs shall ascertain the correct functioning of both slack adjuster in the following manner:-
 - a) The piston stroke and dimension 'A' should be checked and should be as specified for air-brake/vacuum brake coaches.
 - b) Rotate the slack adjuster 2 or 3 times in clockwise direction facing the control rod. Clearance between brake block and wheel tread will increase (pull rod comes out of the slack adjuster).
 - c) Apply brake. Notice higher piston stroke at first application. If piston stroke is normal after 2 or 3 applications the Pay-in is satisfactory.

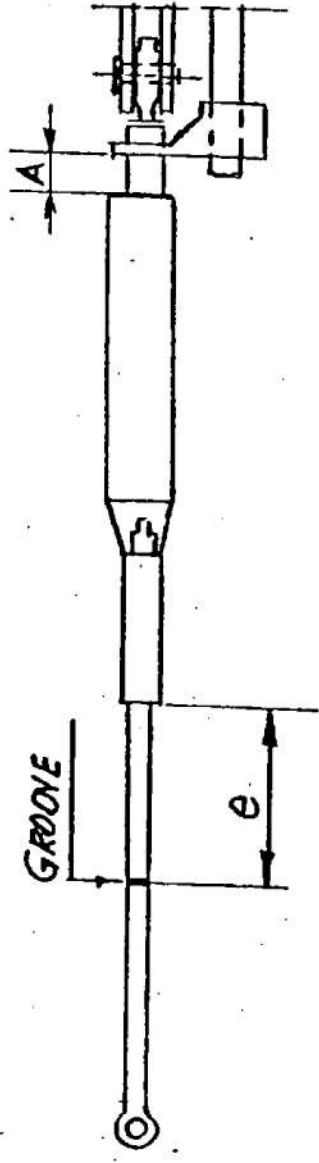
ANNEXURE-III-B (Contd.)

- d) Rotate the slack adjuster 2 or 3 times in anti-clockwise direction facing the control rod clearance between brake block and wheel tread will decrease (pull rod goes inside the slack adjuster).
- e) Apply brake. Notice short piston stroke at first application. If the piston stroke is normal after 2 or 3 applications, the pay-out is satisfactory.
- f) If the slack adjuster is found defective during the examination it shall be removed from the coach and shall be sent to base workshop for testing on the rig. A detailed report shall be sent to manufacturer / RDSO. The slack adjuster once removed due to defective performance will be considered off from the trial and no further trials will be carried out on the same.

ANNEXURE III

PROFORMA

Sl No	Whether received from Open line/re-moved from coach	Coach particulars		Slack Adjuster No.	Make	Month & Year of manufacture of slack adjuster	Date of fitment of S.A.	Date of check	Desired piston stroke		Dimensions				Nature of defect	Remarks
		No.	Type						Vac. Brake	Air Brake	Air-braked coaches	Vac. braked coaches	e			
													A	e		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
									125 \pm 15 mm	65-100 mm	A	e	A	e		

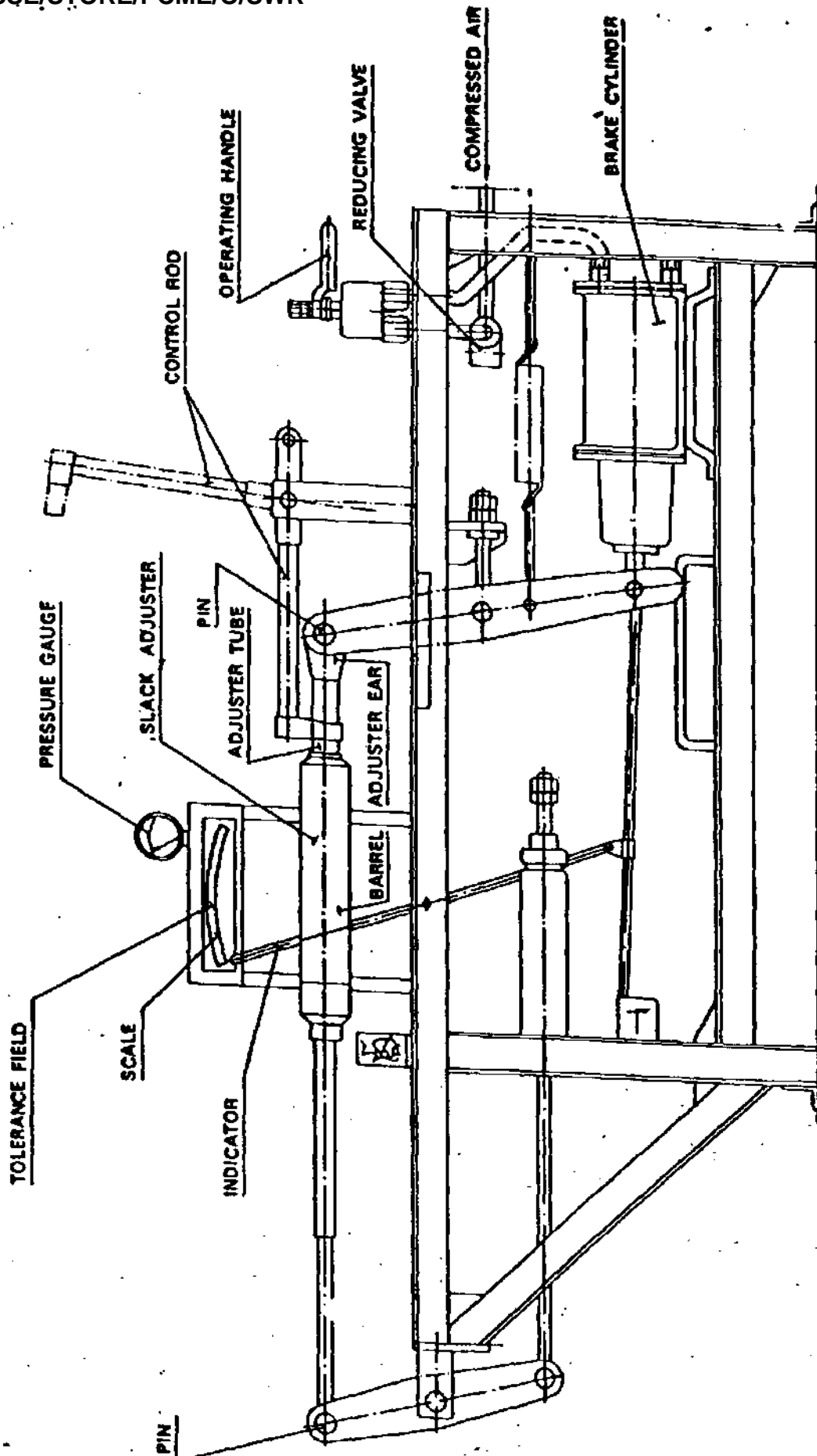


33

'A' - Dimension between control rod head and slack adjuster barrel which should be 20 \pm 2 mm for vacuum braked coaches and 22 \pm 4 mm for air-braked coaches.

'e' - Distance between the groove on adjuster spindle and the end of spindle sleeve as shown above.

ANNEXURE - IV



PERFORMANCE TEST RIG

07-ABR-92

ANNEXURE-V-A

LIST OF DRAWINGS FOR IRGA-600 SLACK ADJUSTER

S.No.	Drawing No.	Description	Alt
1.	WD-B2064-S-01-RC	General Arrangement	8
2.	WD-B2064-S-02-RC	Slack Adjuster details sheet-1	6
3.	WD-B2064-S-03-RC	Slack Adjuster details sheet-2	6
4.	WD-B2064-S-04-RC	Slack Adjuster details sheet-3	5
5.	WD-B2064-S-05-RC	Slack Adjuster details sheet-4	6
6.	WD-B2064-S-06-RC	Slack Adjuster details sheet-5	4
7.	WD-B2064-S-07-RC	Slack Adjuster details sheet-6	6
8.	WD-B2064-S-08-RC	Slack Adjuster details sheet-7	8
9.	WD-B2064-S-09-RC	Slack Adjuster details sheet-8	5
10.	WD-B2064-S-10-RC	Slack Adjuster details sheet-9	9
11.	WD-B2064-S-11-RC	Enlarged profile of threads.	2

07-ABR-92

ANNEXURE-V-B

LIST OF DRAWINGS FOR IRSA-450 SLACK ADJUSTER

S.No.	Drawing No.	Description	Item	Alt.No.
1.	SK.85062	General Arrangement	-	4
2.	SK.85063	Barrel for slack adjuster	-	1
3.	SK.85064	Adjuster spindle for slack adjuster	-	2
4.	SK.85065	Barrel spring	-	1
5.	SK.85066	Adjuster tube	-	1
6.	SK.85067	Spindle sleeves	-	1
7.	SK.85068	Ear bushing	-	1
8.	SK.85069	Control rod	-	3
9.	WD-82064-S-02-RC	Slack Adjuster details sheet-1	1 & 2	6
10.	WD-82064-S-03-RC	Slack Adjuster details sheet-2	1 to 4	6
11.	WD-82064-S-04-RC	Slack Adjuster details sheet-3	1 to 3	5
12.	WD-82064-S-05-RC	Slack Adjuster details sheet-4	1 to 4	6
13.	WD-82064-S-06-RC	Slack Adjuster details sheet-5	1 to 3	4
14.	WD-82064-S-07-RC	Slack Adjuster details sheet-6	1 to 5	6
15.	WD-82064-S-08-RC	Slack Adjuster details sheet-7	1 to 9	8
16.	WD-82064-S-09-RC	Slack Adjuster details sheet-8	1 to 5	5
17.	WD-82064-S-10-RC	Slack Adjuster details sheet-9	1, 3, 4 & 5	9
18.	WD-82064-S-11-RC	Enlarged profile of threads.	-	2

#

07-ABR-92

ANNEXURE-V-C

LIST OF DRAWINGS FOR IRSA-600J SLACK ADJUSTER

S.NO.	DRAWING NO.	DESCRIPTION	ITEM NOS.	ALT.NO.
1.	WD-90002-S-01-RC	General Arrangement	-	2
✓2.	WD-90002-S-02-RC	Slack Adjuster details	All Items	1
✓3.	WD-82064-S-02-RC	Slack Adjuster details sheet-1	All Items	6
✓4.	WD-82064-S-03-RC	Slack Adjuster details sheet-2	All Items	6
5.	WD-82064-S-04-RC	Slack Adjuster details sheet-3	All Items	5
✓6.	WD-82064-S-05-RC	Slack Adjuster details sheet-4	1,3,4 & 5	6
✓7.	WD-82064-S-06-RC	Slack Adjuster details sheet-5	All Items	4
✓8.	WD-82064-S-07-RC	Slack Adjuster details sheet-6	All Items	6
✓9.	WD-82064-S-08-RC	Slack Adjuster details sheet-7	All Items	8
✓10.	WD-82064-S-09-RC	Slack Adjuster details sheet-8	All Items	5
11.	WD-82064-S-10-RC	Slack Adjuster details sheet-9	3,4 & 5	9
✓12.	WD-82064-S-11-RC	Enlarged profile of threads.	-	2