~~**SPECIFICATION No. ETI/OHE/52 (10/84)**~~

GOVERNMENT OF INDIA

MINISTRY OF RAILWAYS

TECHNICAL SPECIFICATION FOR

INTERLOCKS FOR AC TRACTION SWITCHGEARS

DRAFT SPECIFICATION No. TI/SPC/PSI/INTRLK/0020

This Specification supersedes the Specification No. ETI/OHE/52 (10, 84).

ISSUED BY

TRACTION INSTALLATION DIRECTORATE
RESEARCH, DESIGNS & STANDARDS ORGANISATION
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	Prepared By	Checked By	Approved By
Signature			
Date			
Designation			

0 FOREWARD

0.1 Interlock are provided on electrical switchgear to prevent their inadvertent operation. Interlocks do not permit the operation of the switchgear unit the correct key is provided and trapped in the equipment.

0.2 Need for a specification for the interlocks was long felt. To ensure interchangeability of interlocks of different makes, some dimensions have been standardized.

0.3 This specification is issued under the fixed number system. Its future revisions shall also be issued under the same number. The month and year of issue are given the parentheses.

0.4 Reference has been made to the following Indian Standards and other specifications with latest amendments in this specification:

i	RDSO spec. No. ~~ETI/OHE/33 (4/84)~~ ETI/OHE/13(4/84) With A&C Slip No. 1 to 4.	Specification for hot dip galvanisation of steel masts (rolled and fabricated) tubes and fittings used on 25 kV ac OHE.
ii	IS: 2629~~-1966~~	Recommended practice for hot dip galvanising of iron and steel.
iii	IS: 2633~~-1972~~	Methods of testing uniformity of zinc coating on zinc coated articles.
iv	IS:6745~~-1972~~	Methods for determination of weight of zinc coating on zinc coated iron and steel articles.

1. SCOPE

1.1 This specification lays down requirements for the interlocks used for mechanical interlocking of operating mechanisms of the switchgears used in traction installations. It prevents the operation of the switchgear unless correct key is used. It also ensures their operation in correct sequence for ensuring their operation in correct sequence for ensuring safety of the equipment and personnel.

1.2 Each interlock shall be supplied with minimum two numbers of keys.

1.3 Any modification, alternative designs, or changes, calculated to improve the performance and reliability of interlocks shall be given due consideration if full particulars of the alternative design are furnished with full technical justification.

2.0 SERVICE CONDITIONS:

2.1 The looks are intended to be used out-doors with 25 kV and 132 k+V isolators. The locks, with some changes/extensions, are also sued with circuit breaker and interrupters. The locks are used in normally polluted atmosphere subjected to dust, amok and effluents from chemical plants etc.

2.2 Atmospheric conditions

SN	Description	Parameter
i.	Maximum temperature of air in the shade	45^0 C
ii.	Maximum temperature of air in the shade	0^0 C
iii.	Maximum temperature when object exposed to sun.	65^0 C
iv.	Daily ambient temperature	35^0 C
v.	Maximum relative humidity	100%
vi.	Maximum wind pressure	150 kgf/m-2
vii.	Average annual rainfall	1750 to 6250 mm
viii.	Number of thunder storm day per annum	85 days
ix.	Ice coating	Nil

3.0 DEFINITIONS

3.1 Bolt type interlock

Locks in which the rotation of key causes linear movement of a bolt, which may engage in a hole in the equipment, is called bolt type interlock and is provided on the isolator.

3.2 Castel type lock.

Lock in which the rotation of key causes rotation of the shaft, which may have a genove (s) or an extension to engage with the equipment, are called castel type interlocks.

4.0 GENERAL REQUIREMENTS:

4.1 construction

The construction of locks shall be as per clause 5.

4.2 Dimensions

The housing of the interlock shall be either hot dip galvanized or nickel-chromium plated. Other components shall also be corrosion resistant.

4.3 Protection against corrosion:

The housing of the interlock shall be either hot dip galvanized or nickel-chromium plate. Other components shall also be corrosion resistant.

4.4 Endurance test:

The locks shall be suitable for minimum of 10,000 operations without affecting their operating performance i.e. loss of stiffness of the springs, development of undue play and damage to the protective coating etc.

4.5 Application:

4.5.1 Bolt type interlocks are used on 25 kV isolators.

4.5.2 Castel type interlocks are used on 132 kV isolators.

4.5.3 Circuit breaker and interrupter manufacturers may use any type of lock with suitable modification, but keeping the key same as that of the lock for isolators. On circuit breakers an electrical contact (1 No+ 1NC) shall also be provided for electrical contacts shall be as per IS: 6875 (Pt. I)- 1973 or latest.

4.6 Drawings:

Manufacturers shall prepare detailed assembly and component drawings of the interlocks. The drawings shall show all dimensions and material specifications of all components. The material shall, as far as possible, be specified in accordance with the relevant Indian Standards specification. The drawings shall be got approved form Central Organization for Railway Electrification before taking up the manufacture of prototypes.

4.7 Prototypes:

Bulk manufacture shall be taken up only after successful completion of type tests, in the presence of representatives of Central Organization for Railway Electrification, before taking up the manufacture of prototypes.

5.0 CONSTRUCTION:

5.1 The construction of the locks shall be generally as per the drawing in Annexure-I (See Cl. 1.3).

5.2 The lock shall be of robust construction.

5.3 The keys shall be non-interchangeable.

5.4 Key-code shall be provided in relief on the key and shall match with similar embossing on the lock, to enable in interlocking. All keys codes shall be different in every lot.

5.5 The projection required to trap the key in the lock shall be of sufficient height and strength and shall not wear out after 5000 operations.

5.6 The complete housing as well as key shall be hot dip galvanized, or nickel- chromium plated.

5.7 All internal levers/mechanism shall be of non-ferrous material or of stainless steel.

5.8 The locks should be of rivetted construction.

6.0 TESTS

6.1 Type tests:

a)	Examination of assembly	-	(Cl. 7.1)
b)	Verification of dimensions	-	(Cl. 7.2)
c)	Endurance test	-	(Cl. 7.3)
d)	Galvanizing test	-	(Cl. 7.4)
e)	Non- interchangeability	-	(Cl. 7.5)

Each test shall be conducted on at least 3 samples. The tests shall be conducted by central organization for Railway Electrification.

6.2 Acceptance tests:

6.2.1 Sample size: Locks be offered for inspection in lots containing not more than 200 looks of one type. Samples for acceptance tests shall be selected at random form the lot offered for inspection in

accordance with the Table-1.

Table-1: SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVE LOCKS.

Lot Size	Sample size (N)	Permissible number of defectives.
Up to 100	15	1
101 to 200	20	2

6.2.2 The following tests shall be conducted on the samples:

SN	Name of Test	No. of Samples	Refer Clause No.
a)	Examination of assembly	All Samples	Cl. 7.1
b)	Verification of dimension	All Samples	Cl. 7.2
c)	Endurance test	On one Samples	Cl. 7.3
d)	Galvanizing Test/test on prototype coating	N/5 Samples	Cl. 7.4
e)	Non- interchangeability test	N/2 Samples	Cl. 7.5

6.3 Routine test (to be conducted by the purchaser's inspector).

Operation test----------(cl 7.6)

7.0 TEST METHODS.

7.1 Examination of assembly

The assembly shall be visually examined for proper galvanizing/ electroplating, key code, smooth operation and electrical contacts etc.

7.2 Verification of dimensions

The assembly shall be checked dimensionally. It shall conform to the manufacturer's drawings approved by CORE/RDSO.

7.3 Endurance test

The lock shall be subjected to 5000 operations. After 5000 operations, the assembly shall be functioning smoothly. The lock shall be dismantled and inspected. No excessive wear should take place on any

component.

NOTE: For acceptance test, only 1000 operations may be done.

7.4 Galvanizing test:

Adherence of zinc coating (IS 2629 ~~1966~~ or latest), uniformity of zinc coating (IS: 2633 ~~1966~~ or latest) & mass of zinc coating (IS; 6745 ~~1972~~ or latest) shall be tested. These shall conform to RDSO Specification No. ETI/OHE/13 (4/84) with A&C Slip No. 1 to 4 or latest.

On other types of protective coatings, the tests shall be made to the governing latest Indian specification, or as indicated in the approved drawings.

7.5 Non- interchangeability test:

Three locks from each lot shall be so selected that the codes of keys differed from each other only slightly. These locks shall then be tested for interchangeability. If key of any one of the locks operates any other lock. Out of the three locks, the whole lot shall be rejected.

7.6 Operational tests

This test is a routine test. 10 operations shall be performed on the lock to ensure smooth working of lock.

8.0 MARKING.

8.1 Following marking shall be provided on each lock.

i) Key-codes on the handle of the key and lock body.
ii) Manufacturer's name/emblem on the lock.
iii) Batch No. and year of manufacture on the lock.

9.0 PACKING

9.1 The locks shall be packed in the good quality wood castes with spacers to prevent collision between different pieces during transport.

The following things be mentioned on the packing cases:

i) Purchase order No. and coassignee.
ii) Date of inspection and inspecting authority.
iii) Total No. of pieces.

iv) "CONTENT FRAGINE"

Enclosure: Annexure – I.

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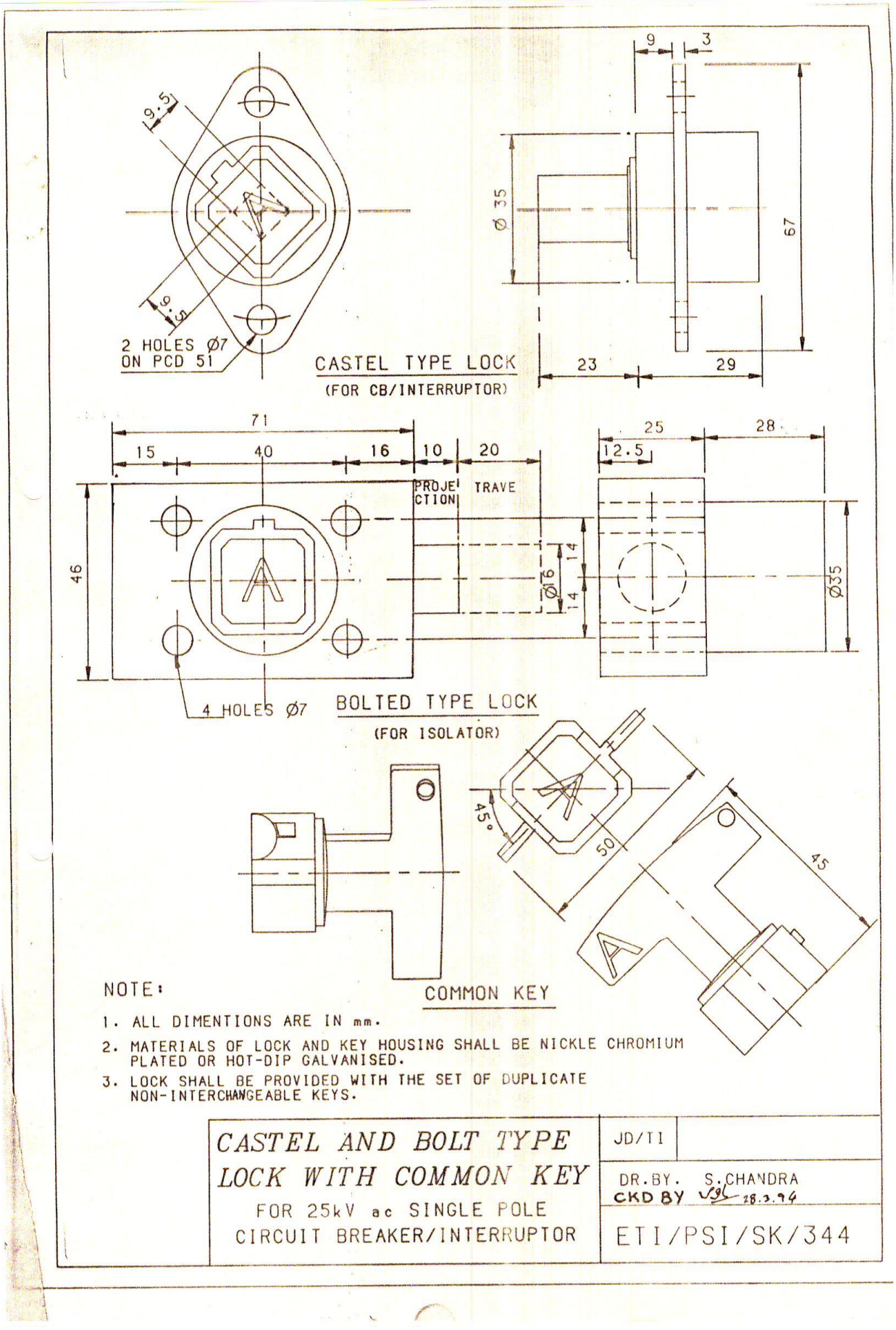
9
3
9.5
9.5
2 HOLES Ø7
ON PCD 51
Ø 35
67
CASTEL TYPE LOCK
(FOR CB/INTERRUPTOR)
23
29
71
15
40
16
10
20
PROJE CTION
TRAVE
25
28
12.5
46
Ø6
14
14
Ø35
4 HOLES Ø7
BOLTED TYPE LOCK
(FOR ISOLATOR)
45°
50
45
COMMON KEY
NOTE:
1. ALL DIMENTIONS ARE IN mm.
2. MATERIALS OF LOCK AND KEY HOUSING SHALL BE NICKLE CHROMIUM PLATED OR HOT-DIP GALVANISED.
3. LOCK SHALL BE PROVIDED WITH THE SET OF DUPLICATE NON-INTERCHANGEABLE KEYS.
CASTEL AND BOLT TYPE LOCK WITH COMMON KEY
FOR 25kV ac SINGLE POLE CIRCUIT BREAKER/INTERRUPTOR
JD/TI
DR.BY. S.CHANDRA
CKD BY 28.2.94
ETI/PSI/SK/344