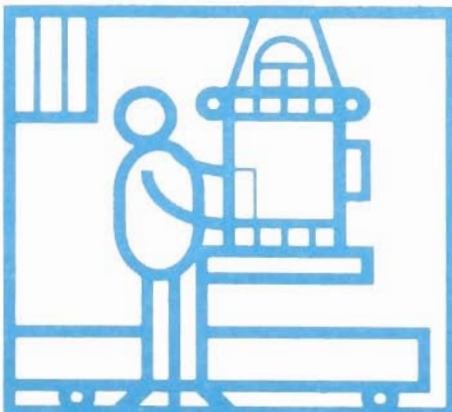
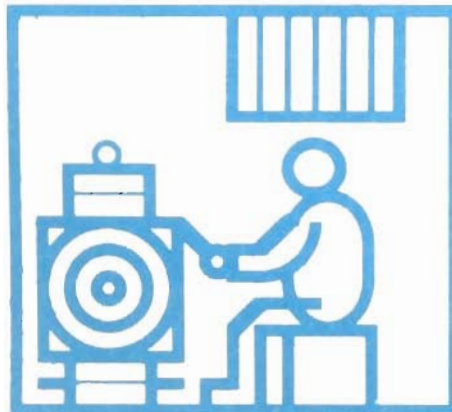
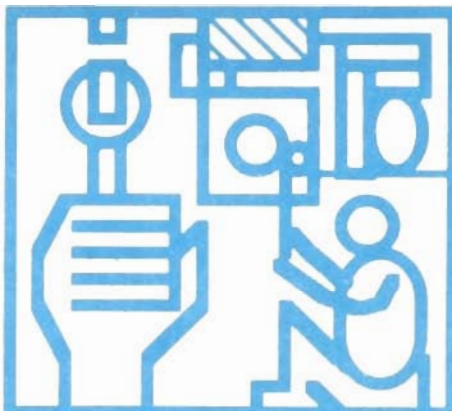
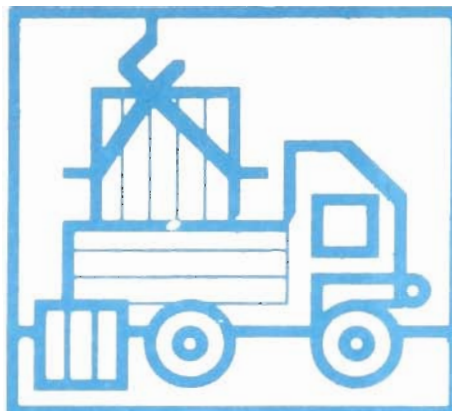




Jyoti Ltd.

**'Jyoti'
Vacuum
Contactor
(Type : JVE1-604
&JVM1-604)**

Installation, Operation
and Maintenance
Manual





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INSTRUCTION MANUAL FOR VACUUM CONTACTOR

TYPE : JVE1-604 & JVM1-604

1.0 RATINGS AND SPECIFICATIONS

Type	JVE1-604	JVM1-604
Rated Voltage	7.2 Kv	7.2Kv
Rated Current	400A	400A
Rated frequency	50Hz	50Hz
The contactor complies with	IS: 9046 IEC	: 470-1974
Control voltage	220/110V DC	
Electrical Duty	AC4	AC4

2.0 GENERAL DESCRIPTION

The vacuum contactor is of a compact unit construction comprising 3 numbers of vacuum switches and an operating mechanism containing operating coils, springs, economy resistors and auxiliary contacts (Fig. 1).

The main frame consists of a rigid steel assembly suitable for mounting on earthed structures. It contains operating mechanism and auxiliary switches. All these components are isolated from high tension live parts by epoxy resin moulded components.

The vacuum contactor has a natural tendency to close its contacts due to differential atmospheric pressure acting on the metal bellows. This tendency is overcome by means of two springs which act against the atmospheric pressure. The armature is closed electro-magnetically, this compresses the two operating springs and allow the contacts to close with an adequate pressure and be held in this state electro-magnetically. This is called electrical latching type of contactor. On breaking the control supply to the operating coil, the armature is opened by the opening springs against the force due to atmospheric pressure acting on the bellows.

The applications where switching frequency is low, mechanical latching device can be provided. In this design, the armature is held in close position by means of a mechanical device during working and detached by means of a shunt trip coil (Fig.-2). This design economises the operating power of the coil, in addition to the contactor remaining closed during momentary supply failure.

3.0 INSTALLATION

The vacuum contactor should be mounted in upright position with the axis of vacuum bottles vertical. While fixing the contactors on the side metal plates, care should be taken not warp the mechanism frame. Otherwise, the mechanism may be caused to bind slowing operation. A sufficient clearance should be provided between the main circuit and grounded structure. The connecting link or cable should be of sufficient size that heat is not injected from them to the contactor.

4.0 CONTROLS

The contactor may be operated with nominal control voltages of 110V or 220V(DC). The power requirements are shown in the following table.

Table : CONTROL POWER REQUIREMENTS

Sr. No.	Particulars	220 V (DC)		110 V (DC)	
		W	I	W	I
1.	Pick up	660 W	5 A	660 W	6 A
2.	Holding	170 W	0.8 A	170 W	1.6 A
3.	Tripping (for mechanically latched contactor)	400 W	1.8 A	400 W	3.6 A

5.0 PRE-COMMISSIONING TESTS

It is advisable to subject the contactor to the following pre-commissioning tests.

5.1 Measurement of pick-up and drop-off voltage

- a) The pick up voltage shall be less than 85% of the rated control voltage.
- b) Drop-off voltage shall lie between 10% and 75% of the rated control voltage.
- c) For mechanically latched contactors, the pick up voltage of shunt trip coil shall be less than 70% of rated control voltage.

5.2 Measurement of closing and opening time

- a) The closing time should lie between 80 and 100 ms. range of 15 to 40 milli seconds.
- b) The opening time shall be in the range of 15 to 40 milliseconds.

5.3 High voltage test

The contactor should be subjected to high voltage test at 10KV for 3.3KV rating and 20KV for 6.6 KV rating. The voltage should be applied across the open gap of the switches and duration of this test should be one minute. There should not be any sparkover across the contacts.

5.4 Measurement of contact resistance

The contact resistance of individual phases from terminal should be less than 220 micro ohms.

6.0 ROUTINE CHECK-UP

Eventhough, the vacuum contactor is maintenance-free, it is advisable to conduct the following routine check up for reliable performance.

6.1 Check for Vacuum

The best method to check for desired degree of vacuum in the bottles is by conducting high voltage test across the open gap of the vacuum switches. Test voltage should be 20Kv for 6.6/3.3V vacuum contactor. The volatage should be kept for one minute. There should not be any glow or spark discharge between the contacts.

6.2 Check for Contact Wear (Refer figure : 3)

Following procedure shall be adopted to decide whether the contact erosion limit of butt contacts of vacuum switches has been reached.

- a) Isolate the vacuum contactor from the HT Power circuit.
- b) Close the vacuum contactor.
- c) Insert the forked end of wear gauge in the snatch gap which occurs between nylon nut and nylon washer.

Check whether the gauge can be inserted in the snatch gaps in all the three poles.

The vacuum switches are to be replaced if the gauge can not be inserted in any or all of the snatch gaps.

The contactor can be put in service if (i) gauge can be inserted in snatch gaps and (ii) there is electrical continuity between fixed and moving contacts of each vacuum switch when contactor is closed. The wear gauge must be removed when it is to be put in service.

7.0 MAINTENANCE

The contactor needs very little maintenance. The following steps should be followed for routine maintenance of some of the components.

7.1 Replacement of closing coils (Ref. Fig.1)

Only one coil should be replaced at a time. The steps are outlined below.

1. Switch off vacuum contactors.
2. Disconnect leads of the coil (7) from the terminal strip (8)
3. Unscrew the M10 screws (A) and remove the coil assembly alongwith plunger.
4. Insert the new coil on the plunger (26). It should be ensured that terminating wire side of the coil is towards rear end of the contactor and rubber ring (38) and steel washer (38) are not disturbed.
5. Replace this assembly back in the contactor and tighten the screws. Following points should be ensured.
 - a) The copper washer (27) is kept in its place between plunger and magnet angle.
 - b) The paint mark on the plunger is aligned with that on the magnet plate. This ensures that the plunger is put back in its original position and maintains satisfactory matching between the magnet plunger and magnet plate when the contactors is closed.
6. Reconnect the coil terminations to the terminal strip.
7. Replace the other coil also in the same way, if required.

7.2 Replacement of Trip Coil (Ref. Fig.2)

1. Disconnect leads of the tripping coil (35) from the terminal strip.

2. Loosen the M4 screw (H) and remove the brass angle (40). Remove the plunger (41) with compression spring (42).
3. Remove the circlip (44) and remove the tube (45) from the coil. Remove the coil.
4. Insert the new trip coil in the clamp (50). Insert the tube (45) and fasten it with circlip (44).
5. Place the plunger (41) back with compression spring (42). Fix the brass angle (40) on the clamp (50) as shown in Fig.2.
6. Reconnect the leads of the coil to the terminal strip.

NOTE : During the above operations, do not disturb the set screw (10) setting as well as the mounting position of the coil assembly on the base channel (14).

7.3 Replacement of Auxiliary Switches

During replacement of auxiliary switches care should be taken to ensure that when vacuum contactor is closed, the armature of the auxiliary switches makes its full travel freely. Otherwise, the location of the auxiliary switch is to be adjusted.

NOTE : Do not disturb any parts other than those specified for replacement of closing coil, tripping coil and auxiliary switches.

7.4 Replacement of Vacuum Switch

Do not attempt to replace vacuum switches. Contact the manufacturer (Jyoti Limited) for this purpose, because it requires use of special gauges and systematic procedure of assembly and setting.

7.5 V.C. Mounted on a Withdrawable Truck

Truck mounted vacuum contactor is fitted with back up high voltage H.R.C. fuses. The resistance of the fuses is to be measured and it should not be more or less than 20% of the value indicated on the fuses.

8.0 RECOMMENDED SPARE PARTS

Sr. No.	Item	Rating	Part No.	Qty per Unit
1.	Closing Coil	220V DC 110 V DC	J369-006/02	2
2.	Tripping Coil	220 V DC 110 V DC	J469-088	1
3.	Auxiliary Switch	---	J309-022/03	2

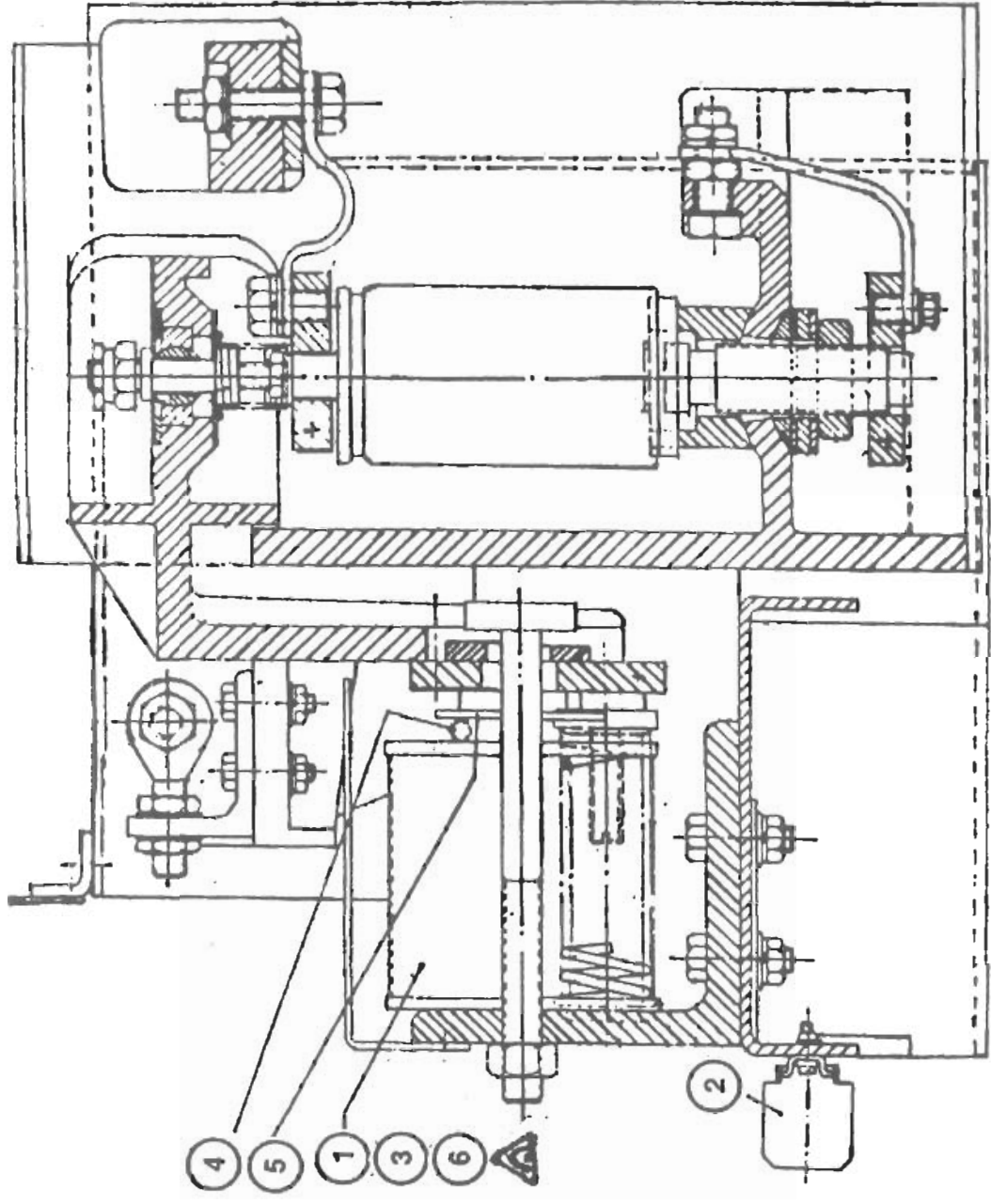


FIG.: 1

**ASSEMBLY OF LATCH MECHANISM
AND TRIP-COIL**

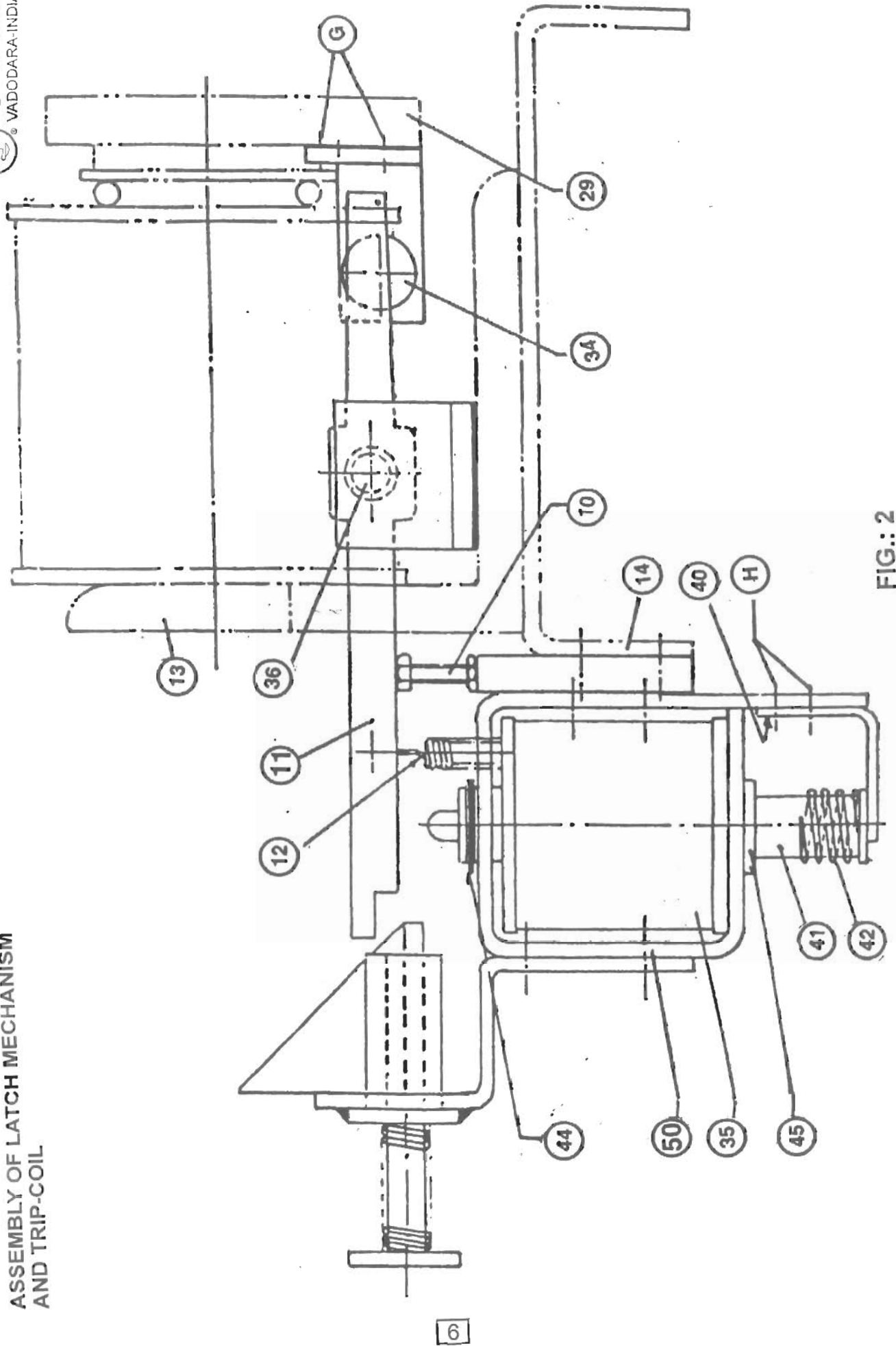
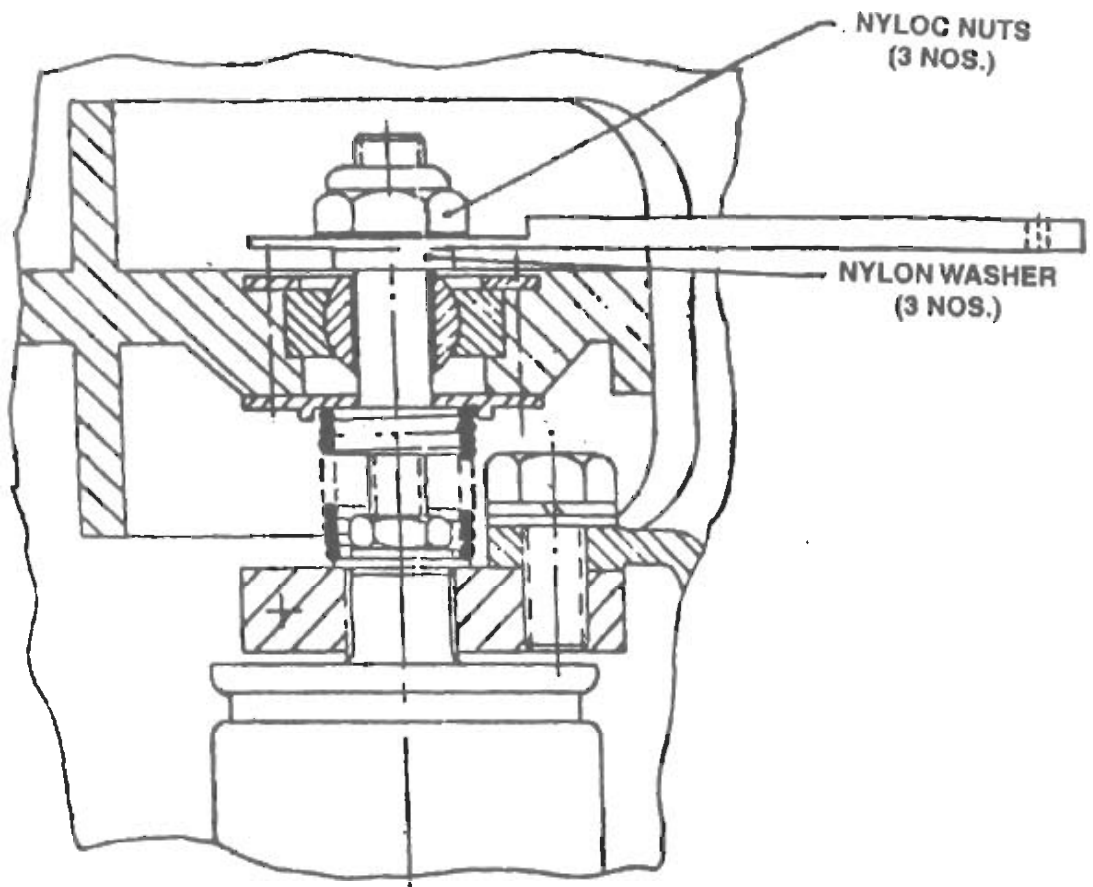
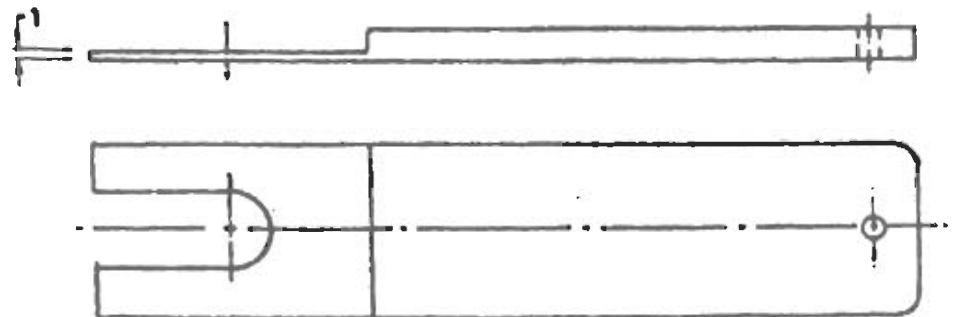


FIG.: 2



**VIEW ILLUSTRATING USE OF WEAR LIMIT GAUGE
FIG.: 3**

THE WEAR LIMIT GAUGE IS SHOWN INSERTED IN THE SNATCH GAP WHICH IS PRESENT BETWEEN NYLOC NUT AND NYLON WASHER WHEN THE CONTACTOR IS CLOSED.





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60 Years of Engineering Excellence

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