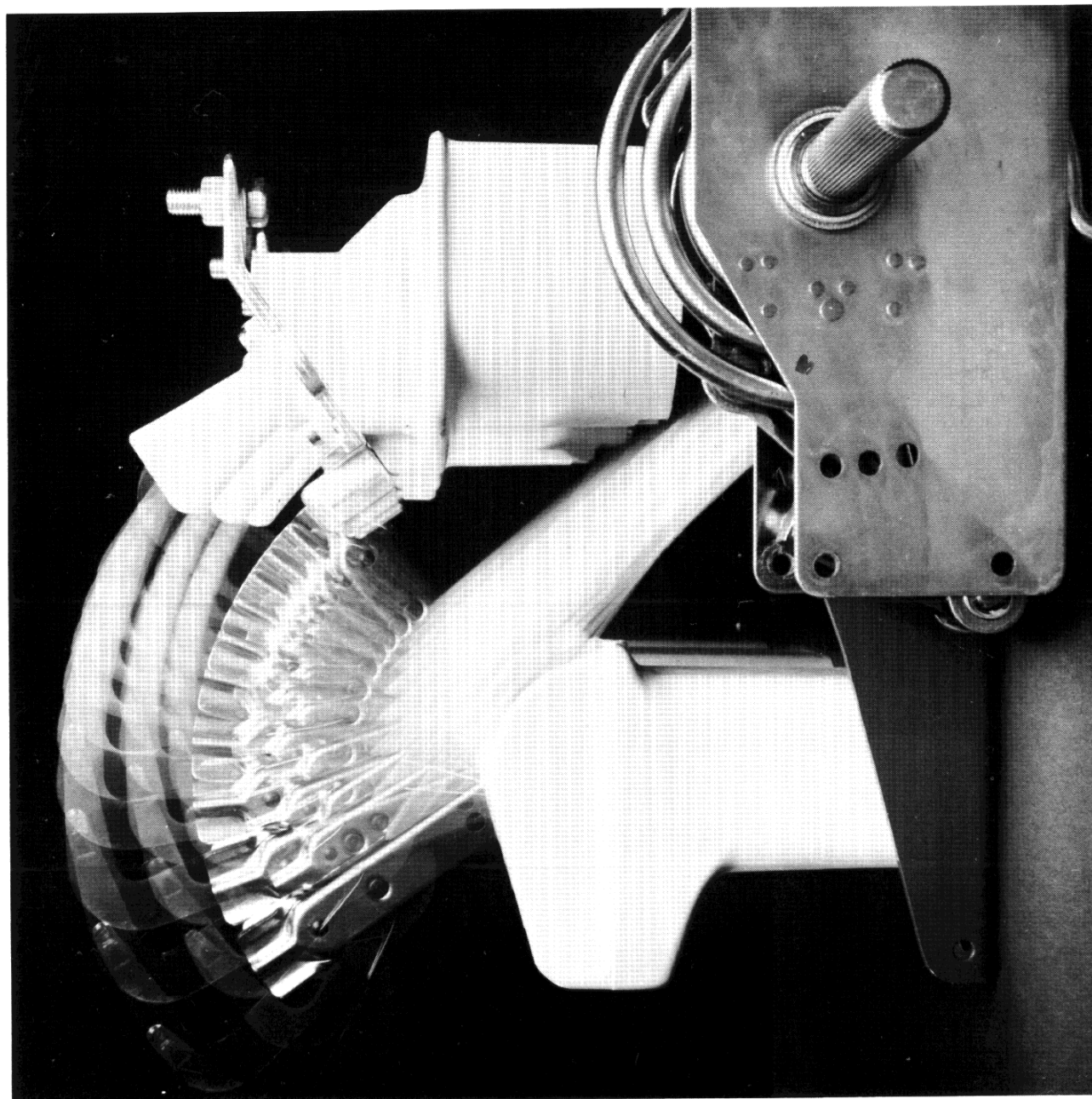


Mounting instruction

Triple-pole Switch Disconnecter type NAL and Fuse-Switch-Disconnecter Type NALF for indoor installation

12, 17,5 and 24 kV,
400 A, 630 A and 1250 A



7-15231

ABB Distribusjon AS

ABB
ASEA BROWN BOVERI

CONTENTS

1.0 Switch disconnecter type NAL, alternative assemblies.

2.0 Installation.

2.1 Assembly of the switch.

2.2 Mounting the hand operating mechanism type HE.

2.3 Mounting of fuse base.

3.0 Adjusting the hand operating mechanism type HE.

3.1 K-mechanism.

3.2 KS-mechanism.

3.3 A-mechanism.

4.0 Mounting the mechanisms.

4.1 Test operation of A-mechanism.

5.0 Mounting of quick-make earth switch type E.

5.1 Mounting on switch disconnecter type NAL.

5.2 Mounting on fuse switch disconnecter type NALF.

6.0 Mounting of mechanical interlock between switch disconnecter and earth switch.

7.0 Mounting the shunt release.

8.0 Mounting the auxiliary switch.

9.0 Cleaning

Switch disconnectors **MUST** be cleaned before they are put to service. Strong dissolvers or pure spirits must **NOT** be used.

1.0 SWITCH DISCONNECTOR TYPE NAL, ALTERNATIVE ASSEMBLIES.

The switch disconnecter NAL is supplied ex works as follows:

1.1 Fully assembled with mechanism and auxiliaries. See item 2.0.

1.2 Switch main frame, mechanism and auxiliaries as separate components, see item 4.0.

2.0 INSTALLATION.

2.1 Preparation of the switch for installation. Fig. 1. For switches with A-mechanisms, the contact knives must be fully opened by hand and the draw bars connected to the cranks. Before the switch is test operated, one has to check that the surfaces of the main contact are covered by contact grease.

(Recommended grease: ISOFLEX TOPAS NB 52.)

Test operations.

Switches with K-mechanism will **close** when the operating shaft is turned anti-clockwise. The switches **open** when the operation shaft is turned clockwise.

(Clockwise/anti-clockwise as seen from the mechanism side of the switch.)

When operating switches with A-mechanism the opening spring is first charged and latched by turning the operating shaft clockwise. Turning the shaft anti-clockwise charges the closing spring and the switch closes.

The switches open when the operating shaft is turned clockwise.

For KS-mechanism, see items 3.2.

CAUTION:

Keep well clear of contact knives when operating the switches.

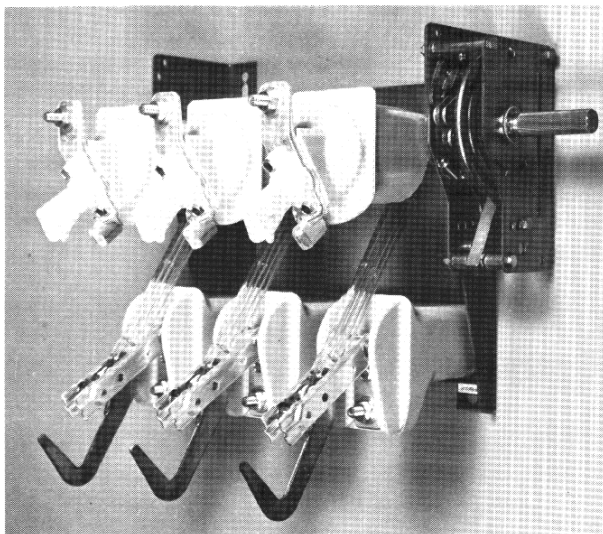


Fig. 1

R 559 B

2.2 Mounting the hand operating mechanism type HE.

The bevel gears are mounted with the switch in open position as shown in Fig. 2.

The inclination of the operating tube must not exceed 40°. Fig. 3.

Drilling of the operating tube. Fig. 4.

2.3 Mounting of fuse base.

2.3.1 The switch must be open and the main springs not charged.

When mounting a fuse base with three post insulators, one set of fuse contacts and possibly fuse trip accessories are mounted directly on the switch terminals. Fig. 4a or 4b.

2.3.2 Mounting of fuse tripping. Fig. 5a

- Lower part of bearing (8) is fixed to terminal (10) by one screw (9).
- The lever (13) together with the fuse trip flap (15) are placed in the lower bearing (8) and locked by means of upper part of bearing. (14).
- The release rod (11) is mounted in the lever (13).
- The drive ring (2) is mounted to the release shaft (1) on the RHS.
- The bearing (5) and washer (6) is mounted on the release shaft (1) on the LHS and secured by split-pin (7).
- Disc. (3) is mounted to the release shaft (4) of the mechanism.
- The release rods (11) are mounted onto the hooks (12) on the release shaft. (1).

2.3.3 Adjustment of the fuse tripping 5a

- The adjustment apply to switch disconnectors with fuse links and fuse tripping.
- The adjustment must be made with both operating springs in the mechanism in uncharged position, but the releasing spring in the mechanism has to be charged as mentioned under control point 2.3.4. point a.

- The split pin (7) is removed and the release shaft (1) together with the drive ring (2) is pushed in the direction of the arrow until the tapped connection is free from disc. (3).

- 2) The release rod (1) with the drive ring (2) is turned and adjusted to a hole in the disc (3), while the adjustment of the fuse trip flap (15) and its distance to the strike pin of the fuse link must be checked (Fig. 5.)

Remark:

- Adjusted according to above the fuse switch disconnector must open by tests in all phases.
- After fuse interruption the mechanism shall be blocked against another operation until the fuse link has been replaced.

2.3.4 Fuse tripping. Control

- a) Turn the operating shaft E - fig. 4a clockwise, max 60°, and return the operating handle back to the neutral position (Opening spring housing F, Fig.6, must not be latched).
- b) Mount a new fuse-link, or a test fuse which is in acc. with DIN 43625, in one of the phases. Dimensionally the fuse-link then will have the same dimensions as ABB - CEF fuse-links.
- c) If the distance between the fuse clips is longer than described - max $e + 8$ mm, the adjustment (point 2.3.3) must be made with the fuse-link resting on the fuse clips on the fuse base.

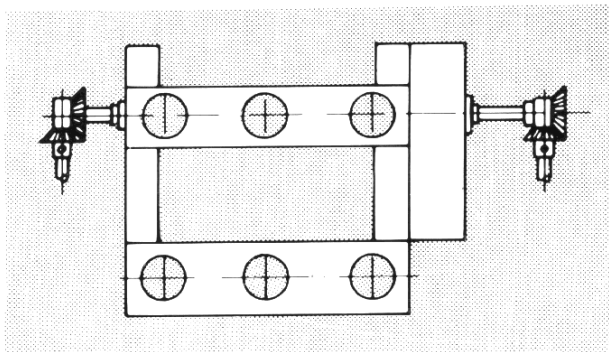


Fig. 2

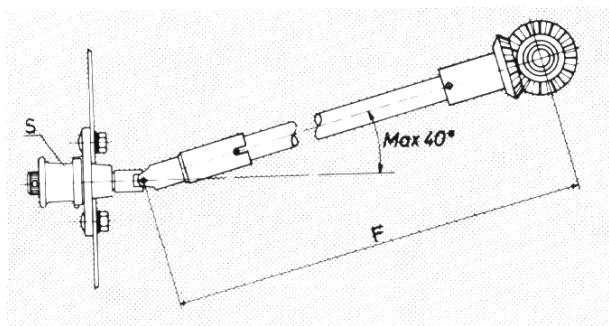


Fig. 3

NHP 240979

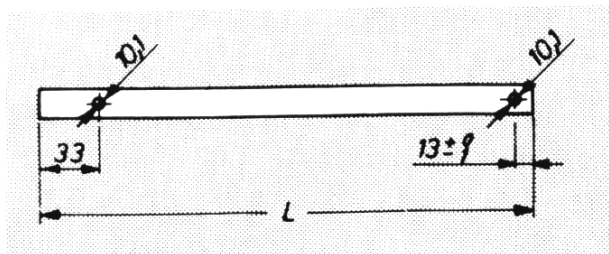


Fig. 4

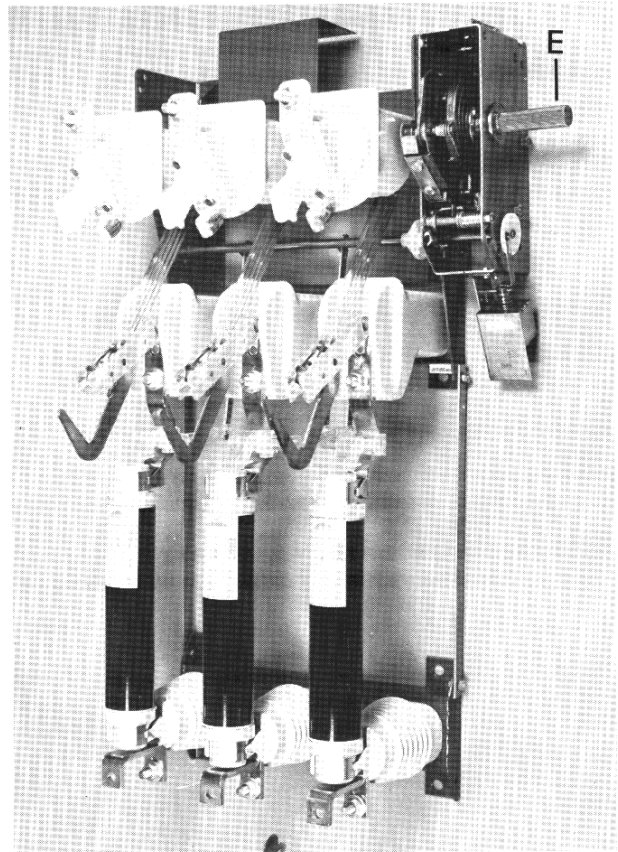


Fig. 4a

R 555 A

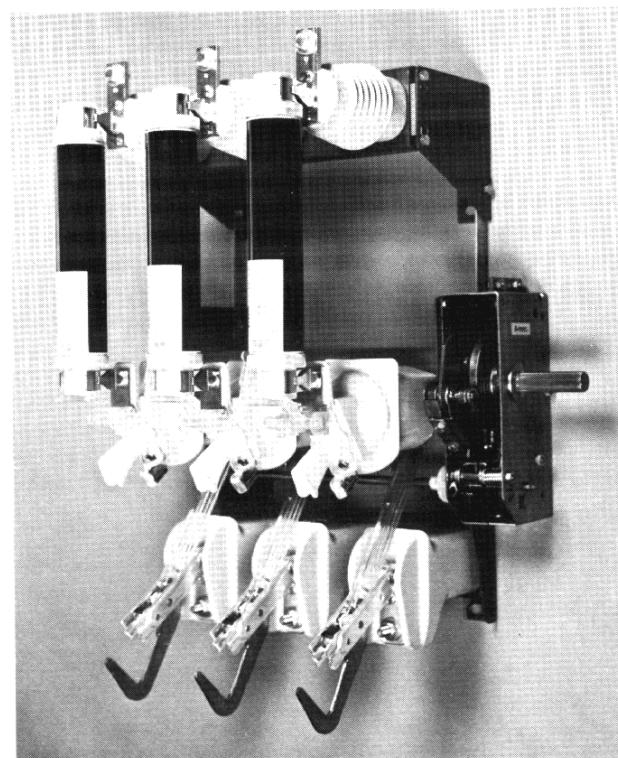


Fig. 4b

R 563 A

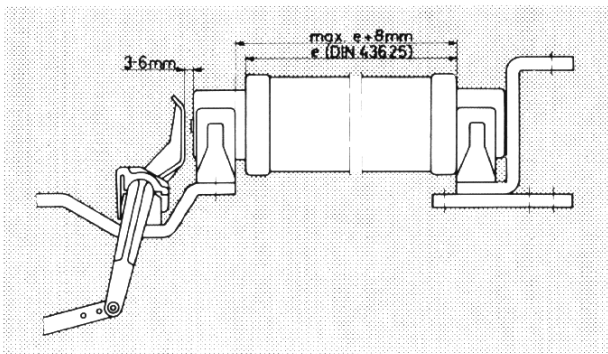


Fig. 5

NHP 300025

- d) The distance between the striker pin and the fuse trip flag (15) must be from 3-6 mm. By this adjustment the fuse link is allowed to sag, but the distance between the striker pin and the fuse trip flag must not exceed 12 mm.
- e) If the fuse switch disconnecter does not open when adjusted as mentioned above, the adjustment has to be checked and repeated.
- f) Remark: The hooks (12) on the release rod (1) ought to have the same position as shown on Fig. 5a - when the fuse switch disconnecter is in open position with both operating springs uncharged, but with the releasing spring charged (Ref. point a.)

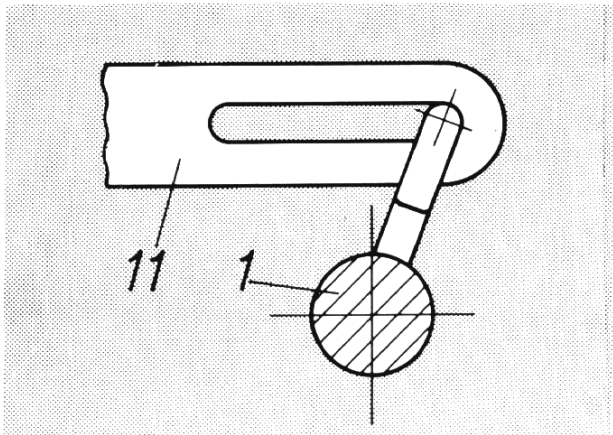
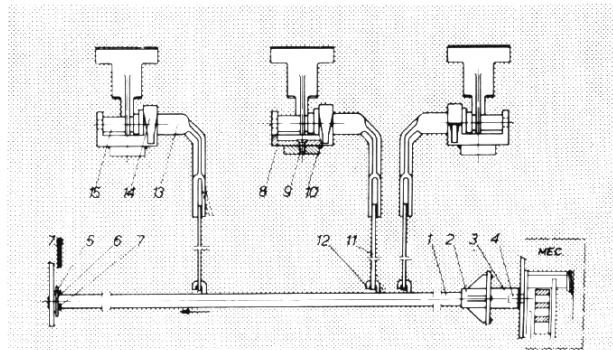


Fig. 5a

NHP 241427
NHP 401625

3.0 ADJUSTING THE HAND OPERATING, MECHANISM TYPE HE.

3.1 K-mechanism. Fig. 1.

(Switch in the open position.)

Closing.

Arrester ring, S, on the front shaft of the HE-mechanism is removed. Fig. 3.

The operating handle is turned clockwise until the switch closes. Mount the arrester ring.

Opening.

Turn the handle anti-clockwise and the switch opens. Test the arrester ring for correct functioning.

3.2 KS-mechanism. Fig. 7.

Closing.

The arrester ring on the front shaft of the HE-mechanism is removed and the operating handle is turned clockwise until it reaches the stop.

The switch is now prepared for closing by means of an operating coil or a pneumatic cylinder. Mount the arrester ring.

Opening.

The operating handle is turned anti-clockwise until it reaches the stop. The switch is now prepared for opening by means of an operating coil or a pneumatic cylinder. Test the arrester ring for correct functioning.

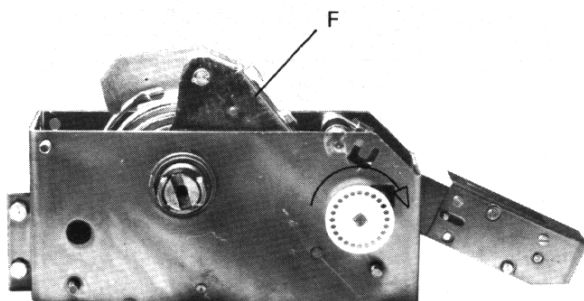


Fig. 6

R-249 B

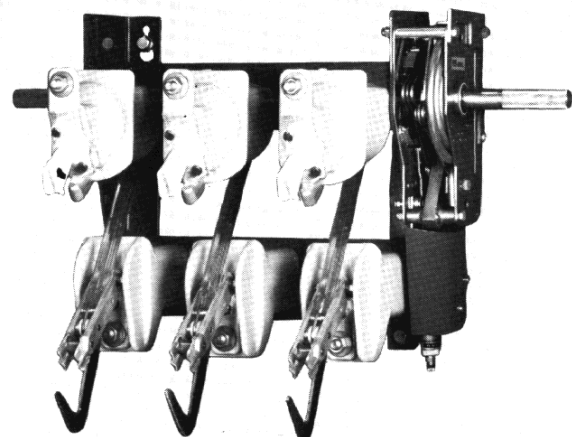


Fig. 7

R 384 A

Discharging the operating spring must only be done by operating the switch and not by returning the operating handle.

Caution:

The hand operating mechanism must be adjusted not to press on the latch on the KS-mechanism after charging the operating spring.

3.3 A-mechanism. Fig. 8.

Closing.

Remove the arrester ring on the front shaft of the hand operating mechanism. Fig. 3. Turn the operating handle anti-clockwise until the opening spring is charged and latched. Mount the arrester ring. Turn the operating handle clockwise until the switch closes. Test the arrester ring for correct functioning.

Opening.

After having pulled out the arrester ring, turn the operating handle anti-clockwise. The switch opens after approx. 20° rotation.

4.0 MOUNTING THE MECHANISMS ON THE SWITCH. FIG. 9.

The mechanisms are mounted on the right hand side of the switch main frame and the switch is normally operated from the same side. (Mechanism-side). When the switches have to be operated from the opposite side, an operating shaft must be connected. See Fig. 9a. The mechanism clutch is brought together with the clutch of the hollow main shaft and the mechanism is fixed to the switch frame. Note: **Contact knives in open position.**

Normally the switch disconnecter is delivered without shaft extension for left hand side operation.

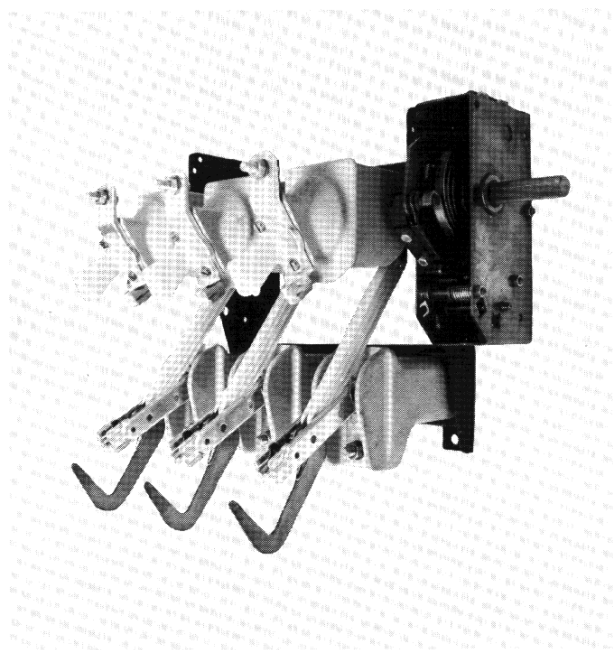


Fig. 8

R-160 A

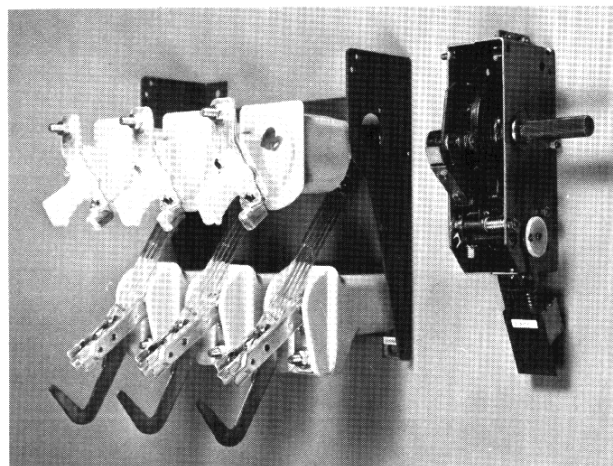


Fig. 9

R 559 A

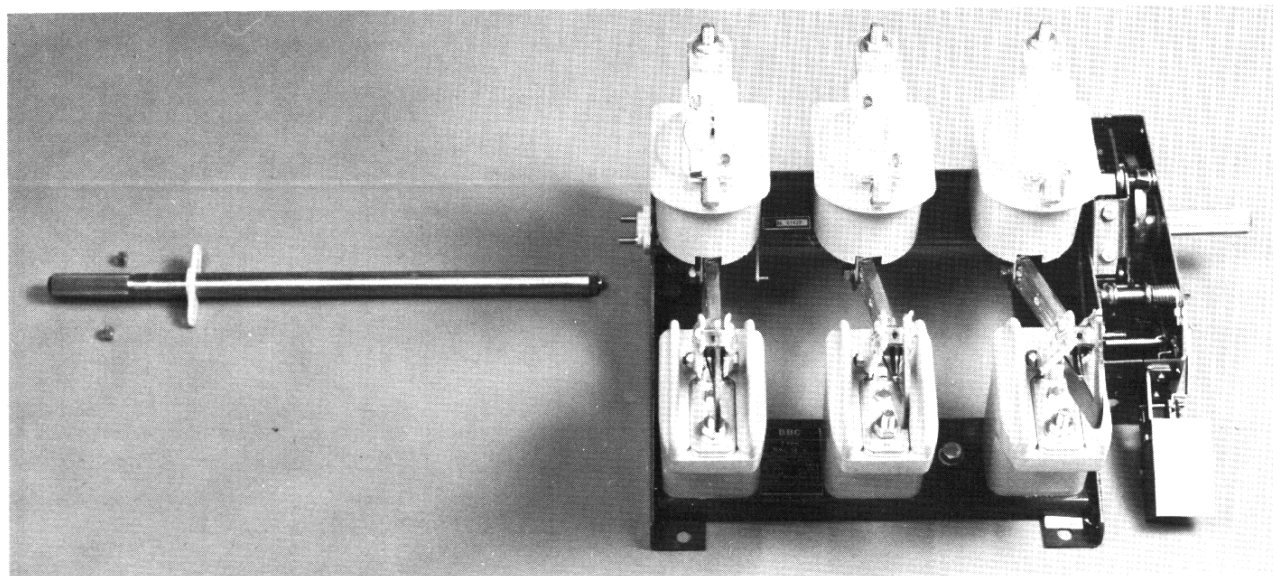


Fig. 9a

R 564 A

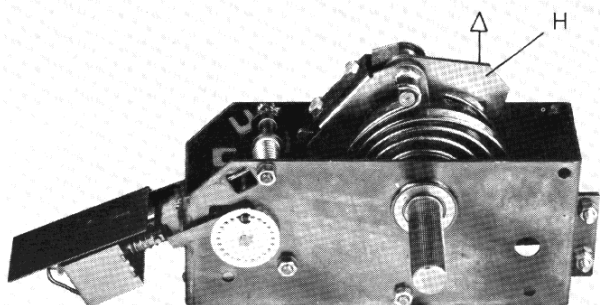


Fig. 9b

R-250 B

4.1 Test operation of A-mechanism.

After having mounted the mechanism to the switch-frame, check that the latch H is in the correct position by pulling it back to the outermost position. See Fig. 9b.

Test operation see item 2.1.

5.0 MOUNTING OF QUICK-MAKE EARTH SWITCH TYPE E.

The switch will normally be delivered for connection of the hand operating mechanism on the right hand side and any mechanical interlock on the left side. The splined extension intended for connection to the hand operating mechanism will have free travel.

The extension for the interlock will be bolted to the shaft. See Fig. 10.

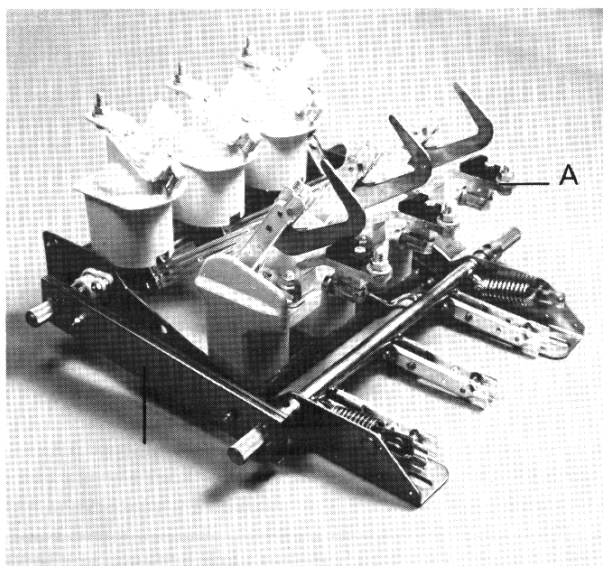


Fig. 10

R 561 A

5.1 Mounting the quick-make earth switch to the switch disconnector type NAL.

The contacts A are mounted on the terminals of the switch disconnector, and the surfaces of the main contacts are then covered by contact grease.

(Recommended grease: ISOFLEX TOPAS NB 52.)

Close the earth switch slowly and adjust the fixed contacts to line up correctly with the moving contacts.

Tighten the contact screws.

5.2 Mounting the quick-make earth switch to the fuse-switch disconnector type NALF.

Proceed as under item 5.1.

The contacts A must be mounted on the terminals of the fuse base, and secure the position with tension bushes.

6.0 MOUNTING THE MECHANICAL INTERLOCK BETWEEN SWITCH DISCONNECTOR AND QUICK-MAKE EARTH SWITCH. Fig. 10-11.

The switch disconnector must be in the open position (for NAL-A the opening spring must be charged before assembly of the interlock. See item 2.1.)

The quick-make earth switch must also be in the open position.

Put one half of the guide A (side plate) on to the operating shafts of the switches. Mount the interlock connection B. Mount the interlock rings C and D on the shafts with the flat part of the rings facing towards the interlock connection B. Fig. 11.

Testing the interlock.

It shall not be possible to close the switch disconnector when the earth switch is closed.

It shall not be possible to close the earth switch when the switch disconnector is closed.

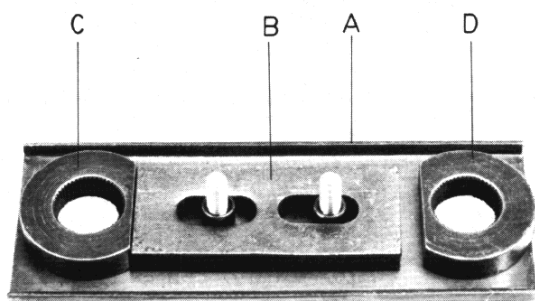
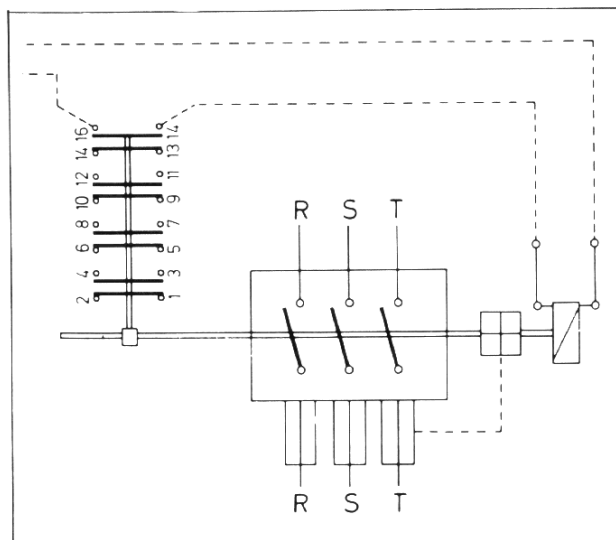


Fig. 11

R-148 B

7.0 MOUNTING THE SHUNT RELEASE. Fig. 12. Turn the operating shaft E (Fig. 4a) a maximum of 60° clockwise. **Opening spring housing F, Fig. 6, must not be latched.** Return the shaft to its neutral position. Connect the bar B to the perforated disc A.



Wiring diagram.

NHP 343650

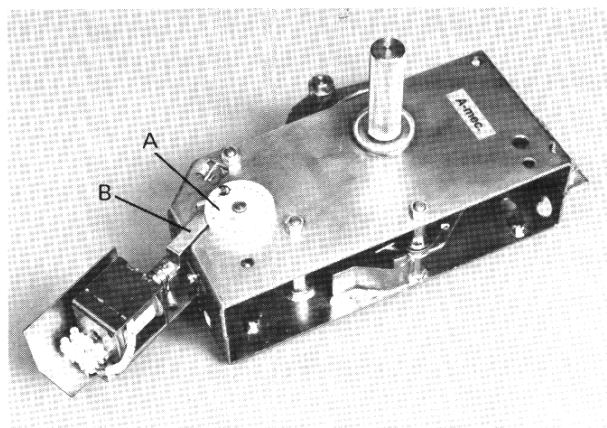
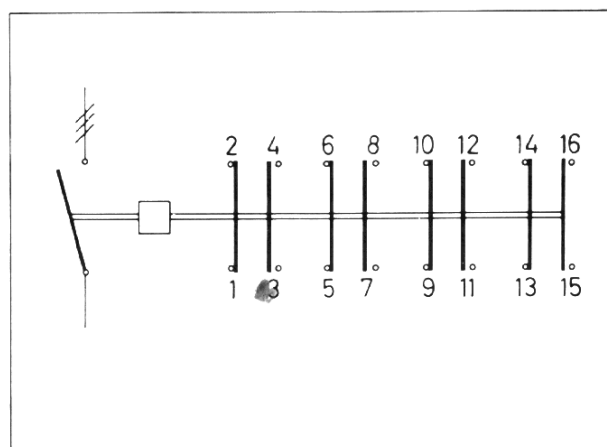


Fig. 12

R 562 C



Wiring diagram.

NHP 343651

8.0 MOUNTING THE AUXILIARY SWITCH.

FIG. 13.

The auxiliary switch is mounted to the frame on the opening side of the switch disconnecter and the bar connected to the crank on the hollow shaft.

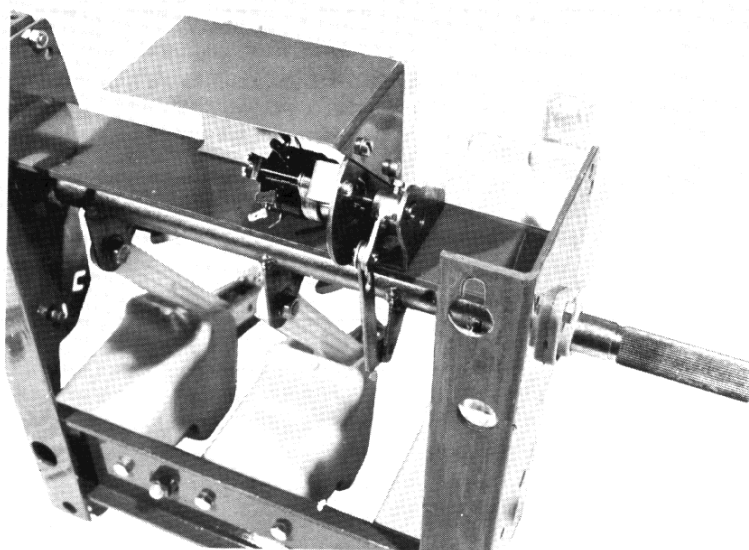


Fig. 13

R-157 A



ABB Distribusjon AS
P.O. Box 108 Sentrum,
3701 Skien, Norway
Tel.: + 47 3 58 20 00
Telefax: + 47 3 52 41 08
Telex: 21 524

Information given in this publication is generally applicable to equipment described. Changes may be made in future without notice.

N-H 5106 E
8309 - 2000 - 0
Reprint 7 - 9204 - 1 000