## 4.2 Draw-in Operation

In order to push back the breaker body to CONNECTED position, follow steps below.

- Check that the breaker is open. Also, check draw-in/out indicator shows isolated.
- Check charged/discharged indicator.
  Indicator shows discharged 「」 .
- Lift up the breaker body or use a special lifter.
  Push in the breaker body until the body side rail hooks (Fig. 5. ①) are locked by the cradle side plate (Fig. 5. ②).

**⚠ CAUTION**

Never enter under the breaker.
The breaker may fall and cause serious injury.
Do not push hard the breaker.

- With position lock release button (Fig. 4. ⑤) pushed, connect drawing in/out handle to the shaft.
- Then, when position lock release button (Fig. 4. ⑤) is pushed, it maintains self holding and allows draw-in/out handle (Fig. 4. ①) operation.
- To move the breaker to CONNECTED or TEST position, rotate draw-in/out handle in a clockwise direction.
  With the breaker moving, if position indicator is accessing TEST position, position release button (Fig. 4. ⑤) is automatically pushed out and it locked draw-in/out handle.
  When the handle is locked, do not rotate excessively. This may cause damage to the breaker.
- In the TEST position, with the handle stick, PUSH position release button (Fig. 4. ⑤) again and release draw-in/out handles.
- With position lock release button pushed, it maintains self holding, rotate draw-in/out handle in a clockwise direction again.
- Main circuit connection starts just before CONNECTED position, draw-in/out handle operation will become heavy.
  But continue the rotating by adding force until, position indicator (Fig. 4. ⑥) of the breaker shows CONNECTED and, position release button (Fig. 4. ⑤) is automatically pushed out to lock the draw-in/out handle.
  Then, remove draw-in/out handle and fix it on the right side of draw-out cradle.
- In CONNECTED position, do not operate draw-in/out handle in a clockwise direction. This may cause damage to the breaker.
- When the breaker fixing block is fitted, tighten left and right fixing screw by draw-in/out handle.
- In order to control the breaker electrically, you should connect all circuit according to the diagram on page 44-45.

# 05 Periodic Inspection and Parts Replacement

### Period of periodic inspection

It is most appropriate that the user works out his or her own inspection plan for the breakers according to the switching frequency, the value of normal breaking and making currents, the magnitude of the fault current interrupted, service conditions, and environmental conditions.
It is recommended to perform a simplified inspection once every 6 months and a full inspection once every 12 months.
To perform an periodic inspection, draw out to ISOLATED position or move out of draw-out cradle.

### Mechanical durability life of the breaker

The following table shows the mechanical durability of the breaker for Maximum Warranty Life.
When accumulated counting number of switching cycles excees those shown, we recommend you check the breaker.
For renewal or thoroughout inspection, please contact us.

| Frame Size | Below 2,500 AF | Above 3,200 AF |
|---|---|---|
| of switching cycle | Total : 3,000 (Mechanical : 2,500, Electrical : 500) | Total : 2,000 (Mechanical : 1,500, Electrical : 500) |

### Frequency of inspection

Frequency of inspection is considered with service condition and switching numbers, breaking/making current value, but it is recommended to perform a simplified inspection once every 6 months and a full inspection once every 12 months.

### Inspection by switching numbers

| Switching Conditions of ACB | Inspection Interval Based on Switching Cycles | | |
|---|---|---|---|
| | Below 1,000 AF | 1,250-2,500 AF | Above 3,200 AF |
| Switching operation in the state of nearly no-carrying current | 1,000 | 1,000 | 1,000 |
| Switching operation in the rated current region | 500 | 500 | 100 |
| Switching operation in overload region (about 2-3 times the rated current) | 25 | 25 | 10 |
| Switching operation in current interruption region | each time | each time | each time |

**⚠ CAUTION**

Draw out the breaker to the ISOLATED position or remove the breaker body from the draw-out cradle for inspection or parts replacement purposes.
Make sure that residual heat of terminal should be cooled down before performing inspection work.
**Unless it may cause burn.**

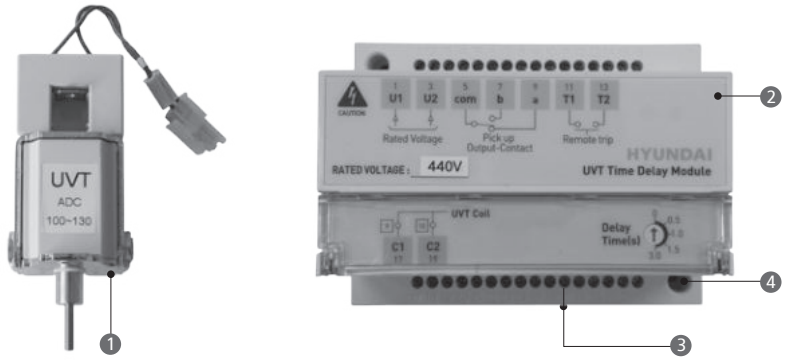
# 05 Periodic Inspection and Parts Replacement

2) Undervoltage trip device (UVT)

- UVT coil uses only DC rating.
- The under-voltage trip device includes instantaneous trip type and time delay trip type having 0.5 sec, 1 sec, 1.5 sec and 3 sec time delay characteristics.

(1) General view of undervoltage trip coil & controller (time delay trip type)

Fig. 11. UVT coil & UVT controller (only time delay type applied)




1. UVT coil
2. UVT controller
3. Wire terminal
4. UVT controller mounting hole

(2) Periodic inspection

| Inspection Items | Methods / Criteria / Dispositions | |
|---|---|---|
| Operation | - The breaker can not be closed when the UVT is de-energized. Because of this, if the breaker can be closed at more than 85 % of the rated voltage, moving core becomes pick-up, the result is acceptable.<br>- If the breaker can be tripped from 35 % to 70 % of the rated voltage after closing the breaker, the result is acceptable. | |
| Coil resistance | - Measure the coil resistance with an ohmmeter. If the measured resistance is much lower than the value shown in the right or there is no continuity, replace the UVT coil. | Coil resistance (Ω)<br>118 Ω ± 5 % |
| Terminals and mounting screws | - Check terminals and mounting screws for loosening. Retighten them if loose. | |

(3) Replacement of UVT controller

When it is necessary to replace the UVT controller, replace the whole UVT controller unit.

- Remove the UVT wire at the wire terminal (Fig. 11. ①).
- Remove UVT mounting bolt (2-M6x10) (Fig. 11. ④).
- Take out the UVT controller.
- Install new UVT controller as it was on the breaker with UVT mounting bolt (Fig. 11. ④).
- Connect the wire terminals with fasten terminals at the same time.
- Test the UVT both electrically and mechanically.

**⚠ CAUTION**

When inspecting the performance, rated voltage should be supplied unless ACB will not operate.

**⚠ CAUTION**

Recheck the wire terminal before suppling power.
Incorrect wiring may cause coil burning.

3) Latch release coil (LRC)
Coil resistance is same with SHT.

(1) General view of latch release coil (LRC)

Fig. 12


❶ Terminal
❷ Moving core
❸ LRC mounting bolt tap (M5 tap. 1ea)

(2) Periodic inspection

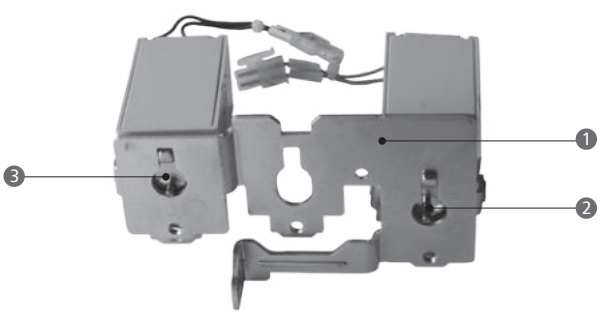
| Inspection Items | Methods / Criteria / Dispositions |
|---|---|
| Operation | - Push the moving core with a pointed tool, such as a screwdriver tip, then, slowly release the core. The result is acceptable if the core returns lightly.<br>- Charge the closing springs and push the moving core. The result is acceptable if the closing springs are discharged.<br>- If the breaker can be closed at 35 % of the rated voltage, the result is acceptable. |
| Coil resistance | - Measure the coil resistance with an ohmmeter. If resistance was much lower than the value shown in table.1 (page 19) or there is no continuity, replace the CC. |
| Terminals and mounting screws | - Check terminals and mounting screws for loosening. Tighten them if they are loose. |

(3) Replacement of LRC (unit replacement)
- Remove the pin terminal from the control jack terminals (Fig. 10. ④).
- Remove support mounting screw (Fig. 13. ②) M4, and take out the LRC-UVT-SHT support.
- Remove coil mounting screw (Fig. 13. ②).
- After checking the movement of the new LRC moving core, mount it in the breaker as it was.
- Connect the pin terminal to the control jack terminals (Fig. 10. ④).
- Test the device both electrically and mechanically for normal operation in the same manner described in periodic inspection table.

**⚠ CAUTION**

Take care when checking on/off operation by using mechanism manual button.
**Fingers may be pinched during operation.**

Fig. 13




❶ Shunt/CC mounting support
❷ LRC mounting (R/H M5)
❸ TRIP mounting (R/H M5)

# 05 Periodic Inspection and Parts Replacement

4) Auxiliary switch unit

(1) General view of auxiliary switch unit, connection circuit

Fig. 14. Aux. switch general view

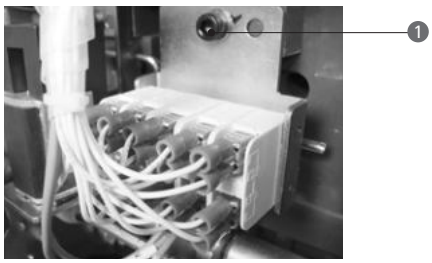
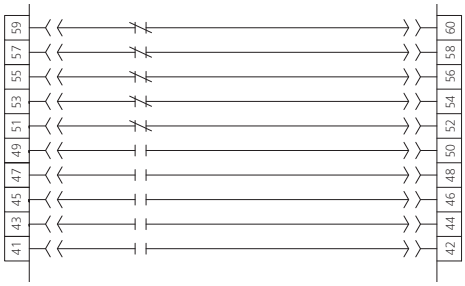



Fig. 15. Aux. switch connection circuit




(2) Periodic inspection

| Inspection Items | Methods / Criteria / Dispositions |
|---|---|
| Operation | - Take the breaker body out of the cradle.<br>- Connect the ohmmeter or alarm (buzzer) to each switch element.<br>- Check that a-contact is ON and b-contact is OFF when breaker is CLOSED, and that a-contact is OFF and b-contact is ON when breaker is OPEN. |
| Contact surface | - If contact is excessively worn or rough, replace whole switch unit. |
| Terminals and mounting screws | - Check terminals and mounting screws. Tighten them if loose. |

(3) Replacement of auxiliary switch unit (Fig. 17)

The auxiliary switch unit is an assembly of 10 circuits (5 a-contacts and 5 b-contacts).

Replace the whole switch unit even if there is a partial defect.

- Remove the auxiliary switch assembly bolt (1-M6 wrench bolt) (Fig. 14. ①).
- Change wire circuit.
- Tighten the auxiliary switch assembly bolt (1-M6 wrench bolt).
- Conduct periodic inspection mentioned in (2) above and make sure if the switch operates normally.

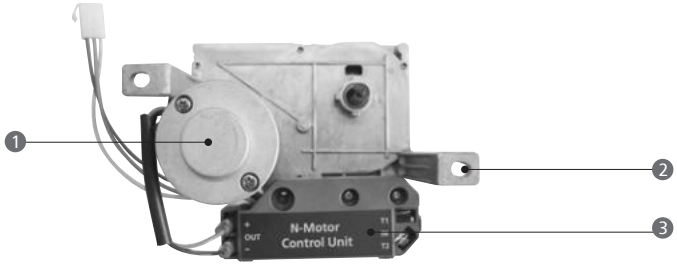
**⚠ CAUTION**

Replaced terminal must be properly connected before operating.

5) Motor unit

(1) Motor unit general view

Fig. 16




❶ Motor rotor
❷ Motor mounting hole
❸ Motor control unit

(2) Operation check

Open and close the breaker through electrical control to check the relay for normal operation.

Do this in the following procedure.

- After checking front-cover, with the push-button switch ON, close the breaker.
- Normal operation is when the breaker is closed, the motor is rotating and the charged/discharged indicator displays 「MWW-|」.

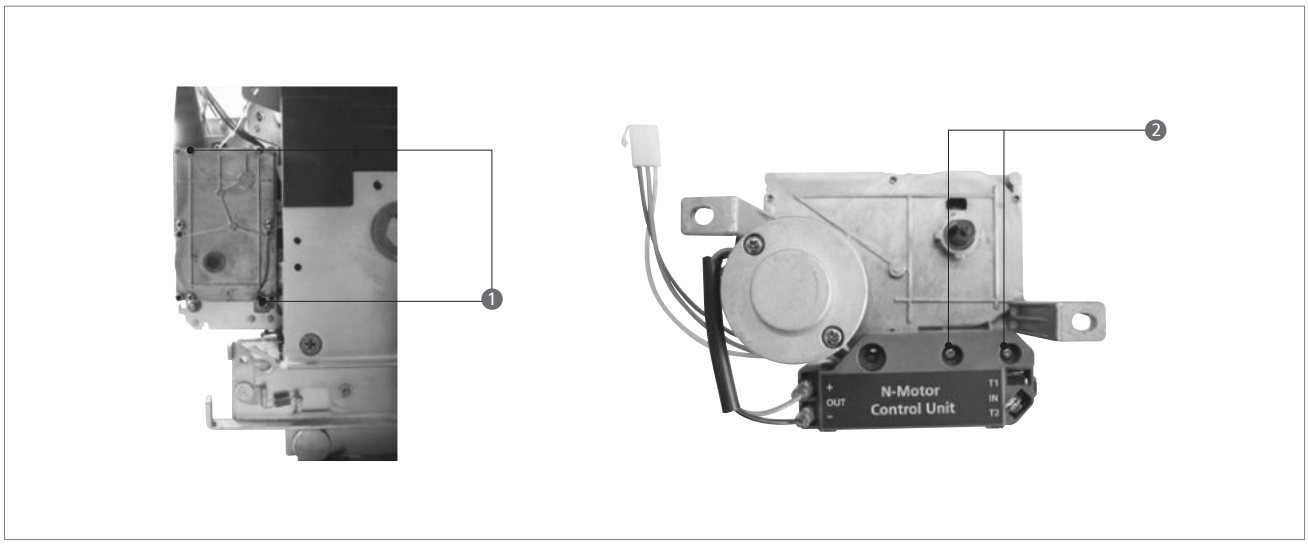
(3) Replacement of motor control unit

- Open the ACB.
- Draw-out the breaker body out of draw-out cradle.
- Remove front cover.
- Remove both motor cables (1, 2 terminal) and control jack terminal.
- Release motor fixing bolt (2-M6 wrench bolt, Fig. 17. ①).
- Remove motor from the breaker.
- Remove motor connection terminal (Fig. 17. ②).
- After checking new motor unit, replace, and follow steps 4-7 in reverse.
- Charging motor is originally placed position of the breaker.
- Attach front cover.
- Check the operation according to operation check (2).

**⚠ CAUTION**

Replaced line terminal must be properly connected before operation.

Fig. 17




6) Direction of ACB position padlock device

- Purpose: Position padlock device is designed for locking ACB body at three positions (ISOLATED, TEST, CONNECTED) by a shackle.
- Usage: At any position, pull out position padlock plate and attach the shackle (user supplied).

**⚠ DANGER**

Do not draw out ACB when it is in the service states.
Since main circuit is live, draw-out operation will cause fatal accident.
Check the breaker is opened before operating draw-in/out.