

HALO[®] AMMETER

Operating & Instruction Manual



Model Numbers:
8280, 8281, 9390, 9391

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NOTE - PRIOR TO USE, THIS MANUAL SHOULD BE FULLY READ AND UNDERSTOOD.

GENERAL

HALO is a high-current, digital ammeter designed to be used on system voltages up to 69,000 volts AC. The HALO ammeter will sense and display current to 1,999 amps and will hold the maximum reading and/or track the reading for the user.

HALO was designed for the purpose of measuring current flow on overhead lines and/or underground systems. When using the HALO, a hotstick must be used at all times and rigorous hotstick work precautions must be followed. When used correctly, HALO can enable fast, accurate and safe load surveys and load balance investigations.

The instrument is constructed of durable materials and will require a minimum of maintenance. However, regular examinations are needed to ensure that no deep scratches or physical damage has occurred. If damage does occur, remove from service and arrange for repair.

The HALO has 4 models, HALO I HOOKHEAD and FORKHEAD has one mode (Hold). HALO II HOOKHEAD and FORKHEAD has two modes of operation (Track and Hold).

The opening in the head is large enough to accept all sizes of wire conductors.

SAFETY

As HALO is often used on and in the vicinity of high voltage equipment, please practice the following safety precautions.

1. Before use, make certain that:
 - A. Operating instructions are read, understood and questions answered.
 - B. Rigorous hotstick work precautions are followed.
 - C. Industry and/or company standard safety practices are followed.
 - D. All parts of the equipment are dry, clean, properly secured together & in working order.
 - E. The equipment set-up is correct for the voltage system to be monitored.
2. During the use of the unit, make certain that:
 - A. Correct hotsticks are installed for the system voltage being tested.
 - B. Hands are kept only on the insulated handle section of the hotstick & not on the HALO!
 - C. Electrically safe, insulated rubber gloves are used at all times on the hotstick.
 - D. The HALO is not an insulator. Do not bridge the HALO from energized line to ground or from line to line.

DESCRIPTION OF EQUIPMENT

See Page 7 for a brief overview of the HALO's features and operating procedures.

The HALO instrument has a molded sensing coil in the head and a 3.5 digit LCD display. The HALO measures current between 0 and 1,999 amperes. The HALO is autoranging, providing a reading between 0 to 199.9 on the low range and 200 to 1999 on the high range. When in the HOLD mode, the display will lock in at the highest current monitored on the conductor. If an over-range condition exists (above 1,999 amps), the display will show a 1. Reset display prior to using again.

The HALO I (models 8280/8281) has two pressure switches, one marked "ON/RESET" to switch on the display and to reset the display after testing. The second switch marked "OFF" turns the HALO off after use. The HALO II (models 9390/9391) has two pressure switches, one marked "OFF/ON" to switch the display off and on. The second switch of the HALO II is marked "TRACK/HOLD". In the TRACK mode the readings will follow the current and in the HOLD mode the reading will display and hold the highest current. When in TRACK mode, a sine wave appears in the lower left corner of the display.



Figure 1
Low battery indicator signal shown in upper lefthand corner of display.

The HALO units have an automatic shut off feature that will turn the unit off after approx. 10 minutes.

The HALO is powered by a replaceable, 9 volt lithium or alkaline battery. Under normal conditions, a battery will provide approximately 50 hours of continuous use. A low battery indicator is displayed on the left hand side of the display when the battery is low, as shown in Figure 1. Incorrect readings may be displayed if the HALO is operating with a low battery.

USING THE EQUIPMENT

1. Inspect HALO and hotstick for any damage, cleanliness and proper working order. If damage is suspected, remove from service and arrange for repair.
2. Attach the hotstick, which can be supplied by HDE as an accessory or by the user, to the universal spline located at the base of HALO.

NOTE - The load on the HALO should not exceed 22 lbs. (10kg) longitudinal or 11 lbs. (5kg) in any other direction.

3. Turn the HALO on by pressing the "ON/RESET" switch (HALO I) or "ON/OFF" switch (HALO II) for approximately 5 seconds. While the button is depressed a reading of 1888 will be displayed to indicate that all digits are functional. Note, the 1888 only appears momentarily with the HALO II. The display will come ON and should display 0 to 2 on the HALO I and 00.0 to 00.6 on the HALO II.

NOTE - It is very important that the "ON" switch is held down for the 5 seconds for the HALO I.

4. Place the HALO, using the hotstick, over the conductor to be monitored. Leave in place for 5 to 10 seconds.

WARNING - Do not bridge the HALO from energized line to ground or from line to line.

NOTE - For best accuracy, the opening of the sensing coil (hook) of the HALO should face away from any other energized conductors so as not to influence the reading. See Fig. 2.

NOTE - When conductors are spaced closely, raise the HALO with the core parallel to the conductors, then slip the coil over the desired conductor by rotating 90°. The sensing coil of the HALO may pick up external signals from conductors if it passes within 12 inches (0.3 meters) of a conductor while being lifted into position or lowered to the ground. Care should be taken to minimize this situation by avoiding contact or close proximity with conductors other than the conductor being tested.

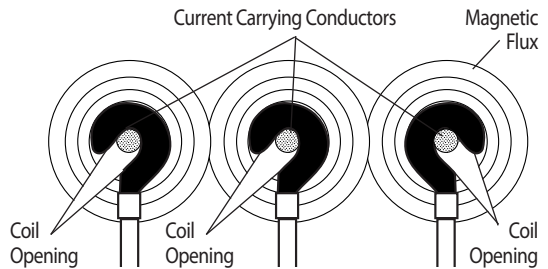
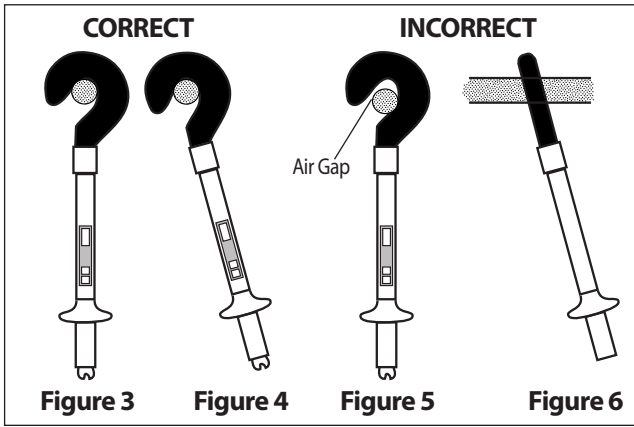


Figure 2

NOTE - To maintain maximum accuracy, the head must be perpendicular as seen in Figures 3 thru 6. Failure to do so may result in incorrect readings on the display.



5. HALO I will continue to lock on the maximum current reading during the time it is hanging on the conductor. HALO II can be switched between modes by pressing the "TRACK/HOLD" switch. When the sine wave symbol appears in the display, the ammeter is in the TRACK mode. When the sine wave does not appear, the ammeter is in HOLD mode. **WARNING** - Before switching modes, always remove HALO from the voltage source. **NOTE** - If HALO II is reset in either mode it will automatically revert to the other mode.
6. On completion of a monitoring period, the instrument should be removed from the voltage source, carefully lowered, and the reading on the display noted.
7. If another test is required, press the "ON/RESET" switch for HALO I to zero the display and test again and "TRACK/HOLD" switch for HALO II. Prior to retesting, make certain HALO II is in correct mode. Press and hold the "OFF" switch if testing is complete until the display is blank.

HALO - BATTERY REPLACEMENT

NOTE - Figure 7 shows a cross sectional view of the battery holder.

1. Place the HALO horizontally.
2. The Battery Holder is attached to the body by two brass screws (4 screws on some versions). Remove the screws.
3. When the brass screws have been removed, carefully slide the Battery Holder out beyond the end of the body.

CAUTION: The battery clip is attached to the circuit board and to the battery that is located inside the Battery Holder. IF THE BATTERY CLIP IS PULLED TOO FAR, THEN IT CAN BE DISCONNECTED FROM THE CIRCUIT BOARD AND THE HALO WILL NOT OPERATE.

4. Remove the old battery and disconnect from the battery clip.
5. Insert a new 9 volt lithium or alkaline battery in the battery clip and install back in the Battery Holder.
6. Slide the Battery Holder back into the HALO body and replace the brass screws that were removed in Step 2.

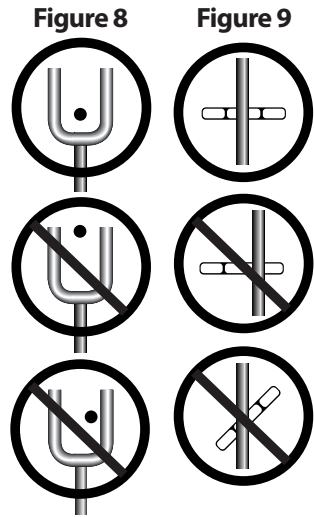


Figure 7

HALO FORKHEAD INSTRUCTIONS (Models 8281 and 9391)

The operational performance of the forkhead is the same as the hookhead, but offers a slightly different approach in obtaining current measurements. All safety concerns that apply to the hookhead apply to the forkhead. The positioning of the instrument with respect to the conductor and the positioning of the conductor within the forkhead is critical in obtaining an accurate reading. To obtain the most accurate reading, the following guidelines should be observed.

1. Be sure the HALO body is perpendicular (90°) to the conductor (reference Figures 3, 4, 5 and 6 on page 5).
2. If there are other conductors in close proximity, face the opening of the fork away from the other conductor(s) as much as possible.
3. Position the forkhead so the conductor is close to, or pressed against, the base of the fork and is centered between the legs of the fork (See Figure 8).
4. Keep the opening of the forkhead perpendicular to the conductor (See Figure 9).



WARNING - Do not bridge the HALO from energized line to ground or from line to line.

NOTE - When using the forkhead on underground systems near the elbow, the concentric neutral cannot be inside the forkhead for the unit to perform properly. Position the forkhead around the conductor where the concentric neutral is peeled back. This is usually high on the cable, just below the elbow or on the elbow below the pulling ground.

SPECIFICATIONS AND DIMENSIONS

Display:	3.5 digit LCD 1/2" (13mm) high characters
Measurement Range:	0.1 to 199.9 amps low range - 199.9 to 1,999 amps high range
Accuracy:	+/- 3% of reading +/- 3 counts
Operating Temperature:	0°F to 122°F (-18°C to 50°C)
Storage Temperature:	0°F to 122°F (-18°C to 50°C)
System Voltage:	Up to 69,000 volts AC
Operating Frequency:	25-1000Hz
Maximum Hook Opening:	2.3" (5.8cm)
Maximum Hook Depth:	3.7" (9.4cm)
Outside Fork Dimension:	5.5"W x 8.5"L x 1.1875"Thick (14cm x 22cm x 3cm)
Inside Fork Dimension:	2.75"W x 5.5" Deep (7cm x 14cm)
Overall Length:	28" (71cm)
Tube Dimensions:	18" x 1-3/4" (45.7cm x 4.5cm) diameter
Weight:	2lbs. 13oz. (1.28 kg)

*Specifications subject to change without notice



1. Inspect HALO. Turn on by pressing "On/Reset" button and check for "Low Battery" indication on Display. Replace battery if needed before using.



2. Attach to hotstick using universal spline.



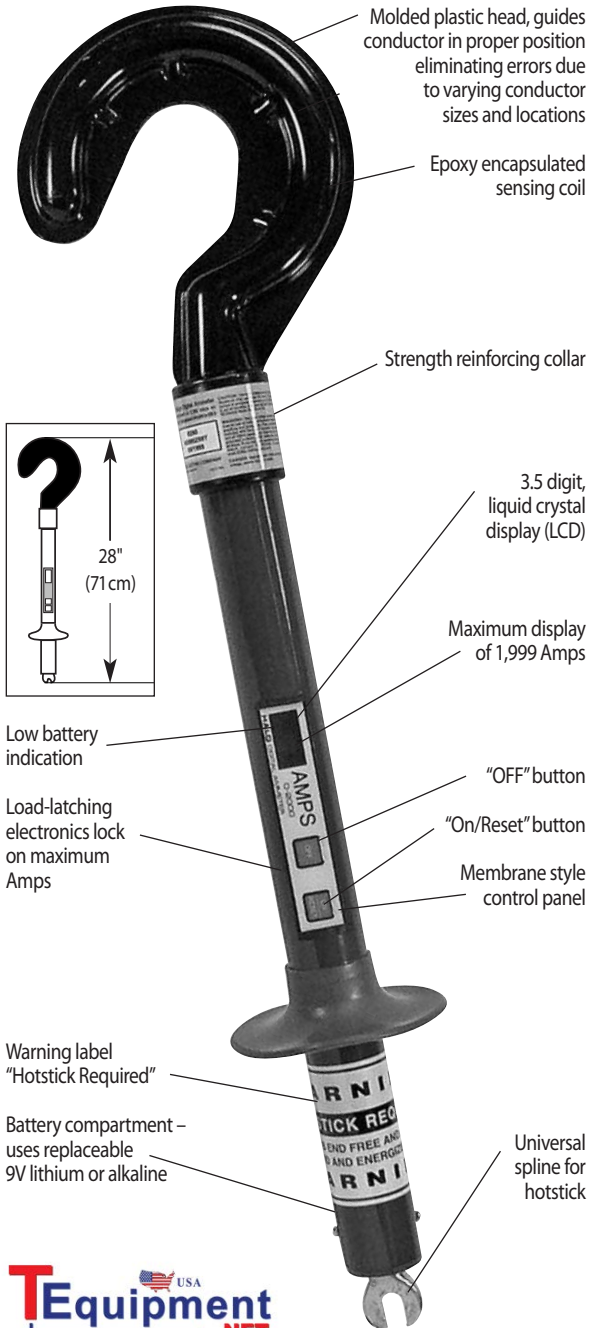
3. Hang on conductor for a minimum of 5-10 seconds.



4. Remove from conductor and read maximum amperes.



5. Reset display by depressing the "On/Reset" button down for a minimum of 2 seconds. HALO is ready to use again. When finished, turn HALO off by depressing "Off" button and return HALO to case.



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