

# CABLE TESTER



 **SAFTRONICS**  
A NEW GENERATION IN POWER

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## TRAILING CABLE TESTER

DATE: 15/09/03  
MODEL: AC MODEL 2007  
VERSION: 4.0

GENERAL INFORMATION

1. INTENDED USE

This machine is intended for use as a quality control measure to test weak spots and badly assembled joints on repaired cables.

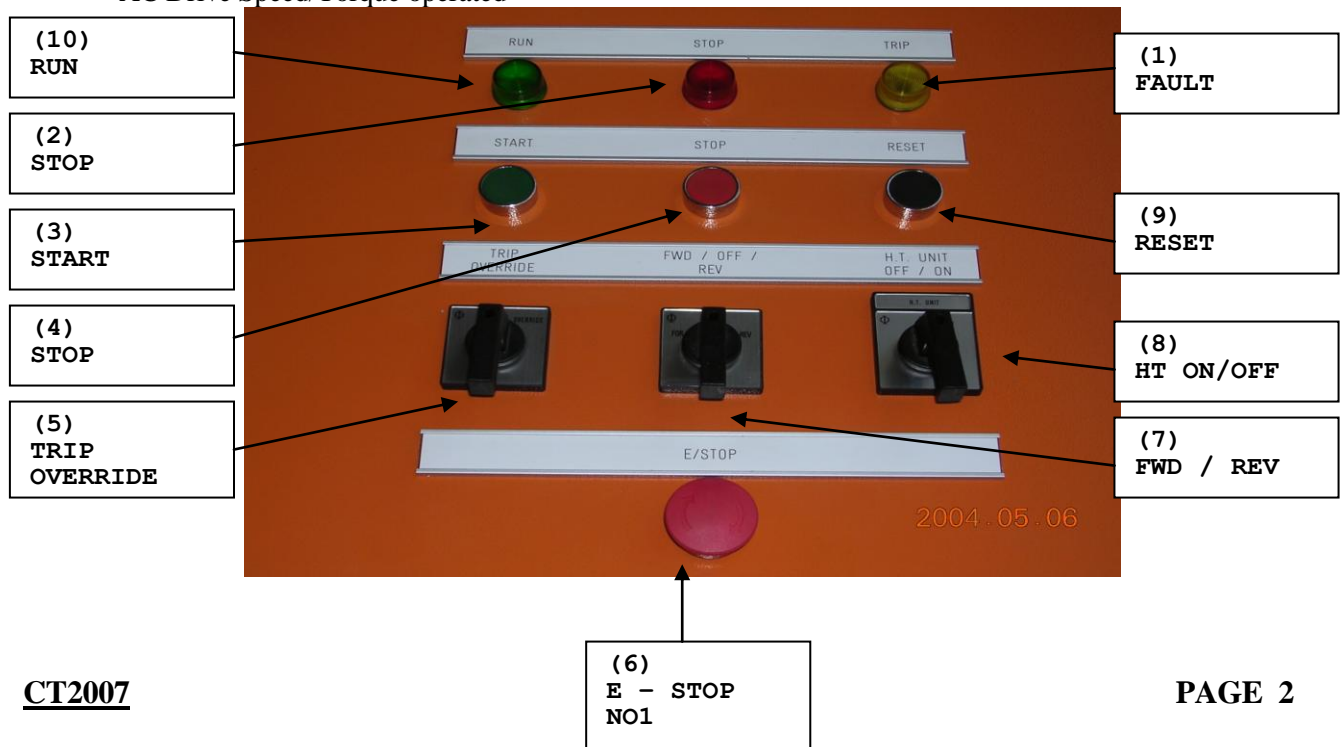
This machine should not be used as a fault locator, but should be used in conjunction with a surge tester e.g. JONFIL.

2. PRINCIPLE OF OPERATION

The machine uses two ac motors to pull the cable under an adjustable tension and bend it through three planes. When a weak spot or joint is located the machine will stop and display the type of fault.

3. FEATURES

- Open circuit - 5 possible faults.
- Short circuit - 5 possible faults.
- Leakage - 5 possible faults - 0-2k/phase displayed.
- Insulation - adjustable HT 0-20kV.
- Torque - 0-400nm (forward/reverse)
- Speed - 0-20m/min (forward/reverse)
- Leakage - 2-2k/phase
- Toshiba T2 PLC with DeviceNet inter-phase card.
- Counter display length of cable.
- 5.7" Touch Screen MMI inter-phase
- AC Drive Speed/Torque operated



#### 4. INSTALLATION

**NOTE:**

1.  
After receiving the unit please remove shipping supports on the electric motors and store for future shipping
2.  
Plug cables should be protected in trunking or cable tray.

##### 4.1 Mechanical

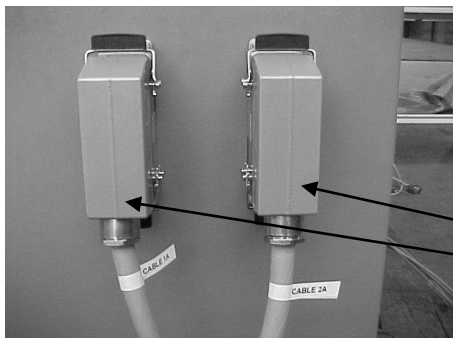
Check that the two gearboxes have been fitted to the indicated level with SEA 90 oil.

Grease the toothed wheels located behind the gearbox.

Set the springs on the shock absorbers to the required height.

##### 4.2 Electrical.

Two 10m long multi-core cables with plugs are supplied between the desk and the testing frame.

**CONTROL DESK**

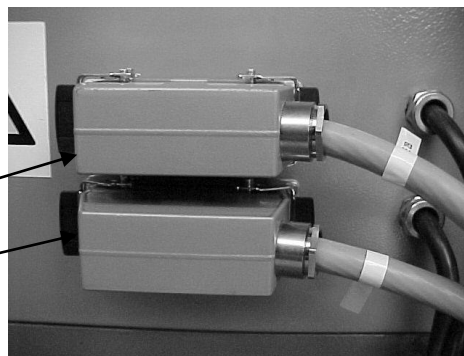
Cable 1A and 2A are plugged in as indicated on the plugs

1A                      2A

**TESTER FRAME**

Cable 1B and 2B are plugged in as indicated on the plugs

1B                      2B



## 5. OPERATION OF CABLE TESTER

- 5.1 With the Cable Tester off, connect the cable at the 2 x 5 terminal post-ends on the test frame.
- 5.2 Fit the cable into the pulleys as per the diagram.
- 5.3 Press the STOP, RESET and START pushbuttons in sequence.

**NOTE:** The first test is done when doing a START after STOP operation, this is a phase rotation test.

- 5.4 The phase rotation test is performed by the indication lamps. The RESET pushbutton is used to start the cycling after each stoppage. After the final RESET the phase rotation display comes on.
- 5.5 Once correct phasing is established by connecting the cable at the "B SIDE" to the correct terminals, testing can proceed.

Engage the HT by moving the HT switch in the ON position.

If there is any screen outside leakage via the HT sensing HT sense will trip out, thus switch off the HT supply and indicate HT fault.

**NOTE:** If the HT trips, it is necessary to re-engage the rest position on the HT switch to restore HT. Switch the HT off, press reset and then switch the HT on again

- 5.7 If all is satisfactory, continue with testing.
- 5.8 The drives can now be started. Move the FORWARD / REVERSE switch to the desired direction, and press start. (Tension will automatically adjust to engineering settings)
- 5.9 Any fault that occurs will halt cycling, indicating the location and type of fault.

**NOTE:** a. Any HT fault can be reset only by engaging the reset position of the HT switch and then pressing the RESET pushbutton.

b. Any other faults can be reset by pressing the RESET pushbutton.

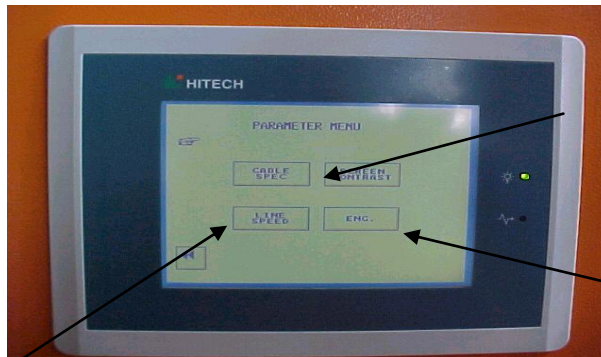
**IMPORTANT:** a. When re-occurring faults keep tripping the drives and it is not desired then trip them, then engage the STOP OVERRIDE into the OVERRIDE position.

This will prevent the drives tripping but not stop the "Halting to Indicate" action of the alarm scanning.

b. Each time the alarm is indicated, the RESET button must be pressed to recommence alarm scanning.

### 6. PARAMETER MENU

The PARAMETER menu is used to change the calibration information on the cable tester



To change cable spec or line speed press on the required function

Operating the numeric keys can change values.



Press ENTER  
to save  
values

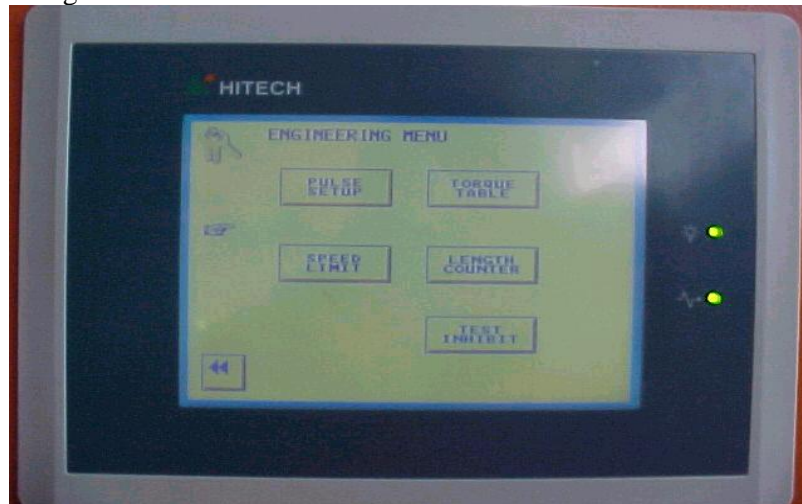
Numeric Keys

### 6.1 ENGINEERING MENU

In order to change the Eng Menu one of the following passwords must be entered:

- 19790915
- 19720113
- 19750625
- 19710730

The following screen will be visible



Select the item to be changed



**PULSE SETUP**

T1 = Pulse ON Time

T2 = Pulse OFF Time

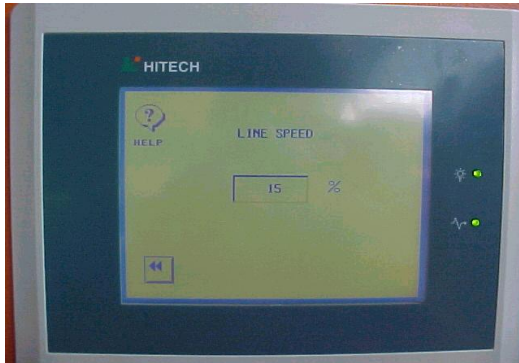
T3 = Pulse Wait Time

This timer is used to set the test time for the continuity test.



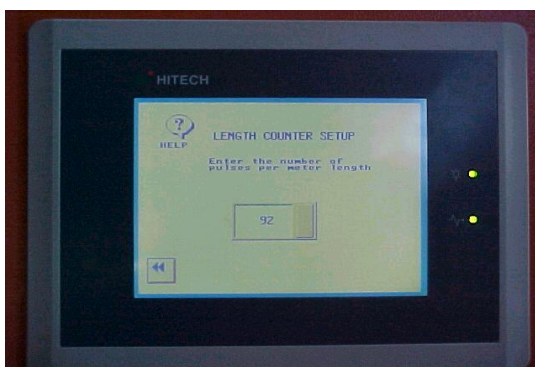
**TORQUE TABLE**

Table is used to select the max torque a cable is to be subjected to

**LINE SPEED LIMIT**

% Off max Line speed

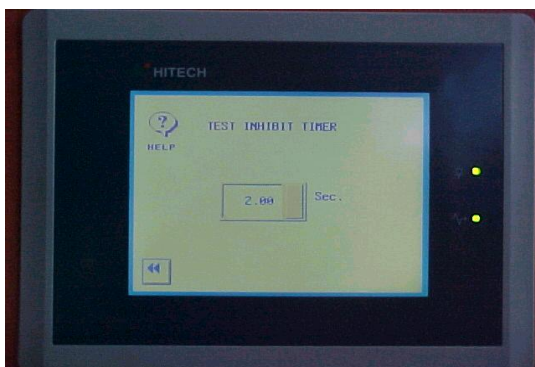
30 % = 20 m per Min

**LENGTH COUNTER SETUP**

Due to the changes in cable wrap. Different cables have different lengths through the cable tester.

This function may need to be adjusted if larger than 45mm OD cable is tested

45mm cable = 125 pulses/meter

**TEST INHIBIT TIMER**

This timer will bypass all trips for the period selected to prevent nuisance tripping

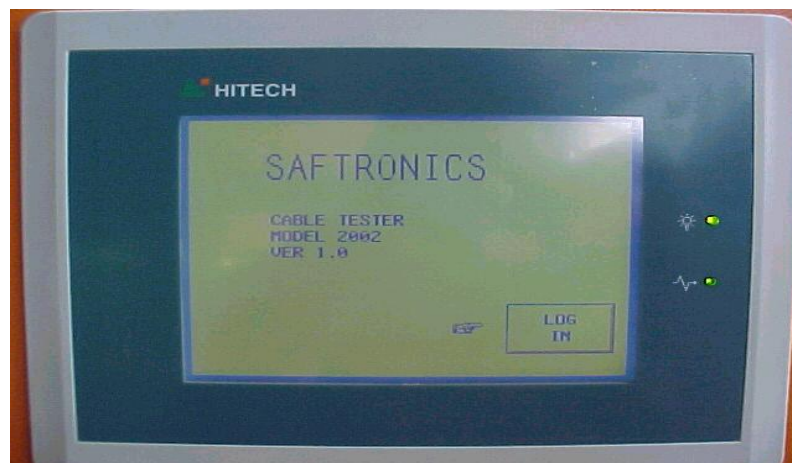
**7. COMMISSIONING**

- 7.1 Ensure that the gearboxes are filled with oil as per specification.
- 7.2 Ensure that all cables are installed and connected as per specification.
- 7.3 Connect 5 (five) jumper leads between the test plugs on the frame, ensuring R to R etc.

- 7.4 Check that Emergency Stops are released and HT cover closed.
- 7.5 Check that the HT switch (No 8 page 2) is in the OFF position.
- 7.6 Check that the FORWARD / REVERSE (No 7 page 2) switch is in the FWD position.
- 7.7 Check that the TRIP OVERRIDE (No 5 page 2) switch is in the clockwise position.
- 7.8 Make sure the Earth is connected in wire no55
- 7.9 Close the main circuit breaker

**THE FOLLOWING CONDITIONS SHOULD EXIST**

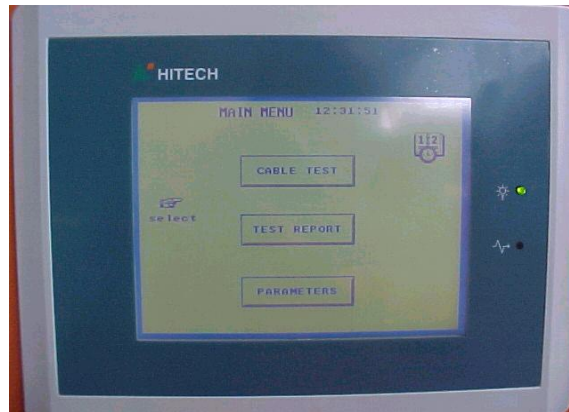
- a. Both motors standing still.
- b. Both fans running.
- c. Only the POWER light (No 2 page 2) on.
- d. LOG IN Screen Displayed



- 7.9 Switch the HT switch to the ON position. The lamp and beacon light on the HT box should be on and relay R1 energised.

Note : If HT unit does not energise ensure CB are switch on

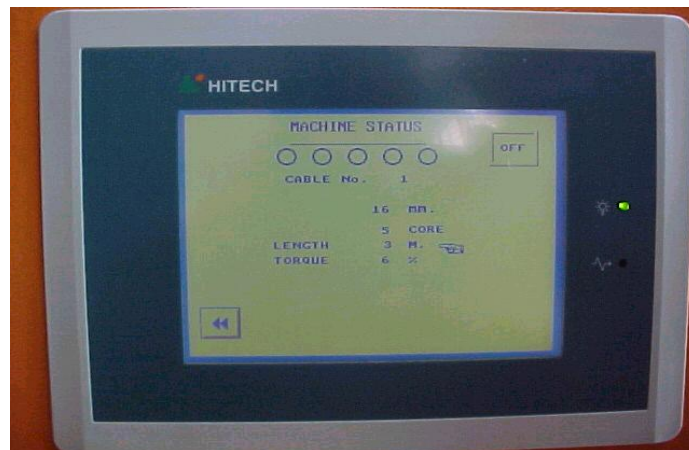
- 7.10 Press the following pushbuttons in sequence:



- a. LOG IN
- b. CABLE TEST
- c. RESET

**THE FOLLOWING CONDITIONS SHOULD NOW EXIST**

- a. The Touch Screen should display MACHINE STATUS



7.10 If all the above are satisfied, the following tests can be carried out.

**7.11 HT Test**

Switch ON the HT switch (No 8 page 2) and set the trip override (No 5 page 2) to position 1 (Disabled)

- On the display it would tell you to ensure there is a safe working distance. Please accept before the HT will switch on.
- The light should cycle and the lamp on the HT unit should indicate.
- If a fault is detected the unit will stop and the Fault light (No 1 page 2) will indicate.
- The Screen will display the HT Fault



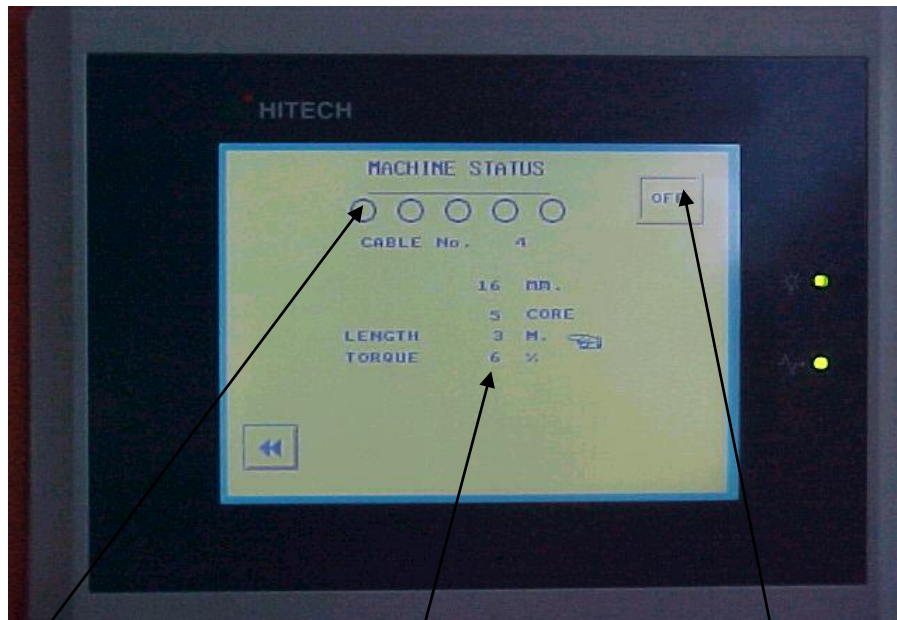
- Switch the Trip override to position 2
- Reset HT Fault by switching off the HT unit (No 8 page 2), pressing reset (No 9 page 2) and then switching the unit on again (No 8 page 2).



- Confirm logging of fault
- The section of cable can then be identified as having a problem.

7.13. CABLE TESTS

Select FWD or REV (No 7 page 2) Direction and press Start (No 3 page 2). The following screen will show.

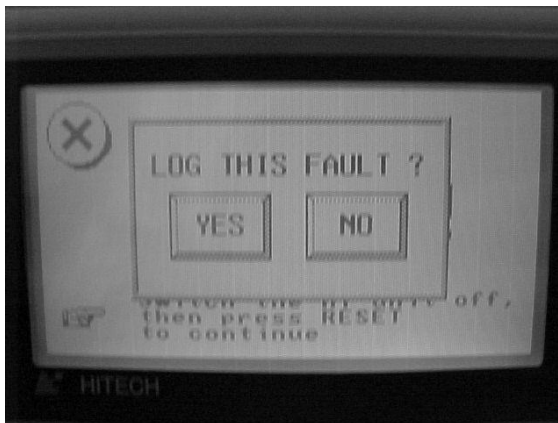


Indication showing test in progress

Cable Identification & Test Conditions

Machine Status

- Testing will commence at selected parameters
- All parameters can be changed during test operation for ease of set-up
- On Fault condition system will stop and display fault (No 1 page 2) e.g.



- Confirm if fault should be logged?
- Press Reset (No 9 page 2) and Restart (No 3 page 2).
- If immediate Failure, Set Trip override to position 2
- Press Reset (No 9 page 2) and Restart (No 3 page 2).
- Continue test for 5 meters
- Mark area
- Switch trip override (No 5 page 2) back on (Position 1)
- Press Reset and Restart.
- To stop system press stop (No 4 page 2)

**NOTE .**

**THE PLC SOFTWARE HAS BEEN LOCKED AND WILL NOT BE VISABLE WITHOUT THE CORRECT PASSWORD. THIS PASSWORD IS ONLY AVAILABLE TO SAFTRONICS TECHNICAL PERSONS AND WILL NOT BE MADE AVAILABLE UNDER ANY SURCUMSTANCE .**

8. HIGH TENSION OUTER INSULATION TEST

The cable is electrically connected at both ends to the terminals mounted on the sides of the motor frame. The cable passes through the first set of pulleys whose driving motor runs regenerative under torque control, then passes through the system of insulated rollers to which a high voltage (up to 20kV) is applied. The thruster's arrangement is provided to prevent the cable from slipping off the driving pulleys.

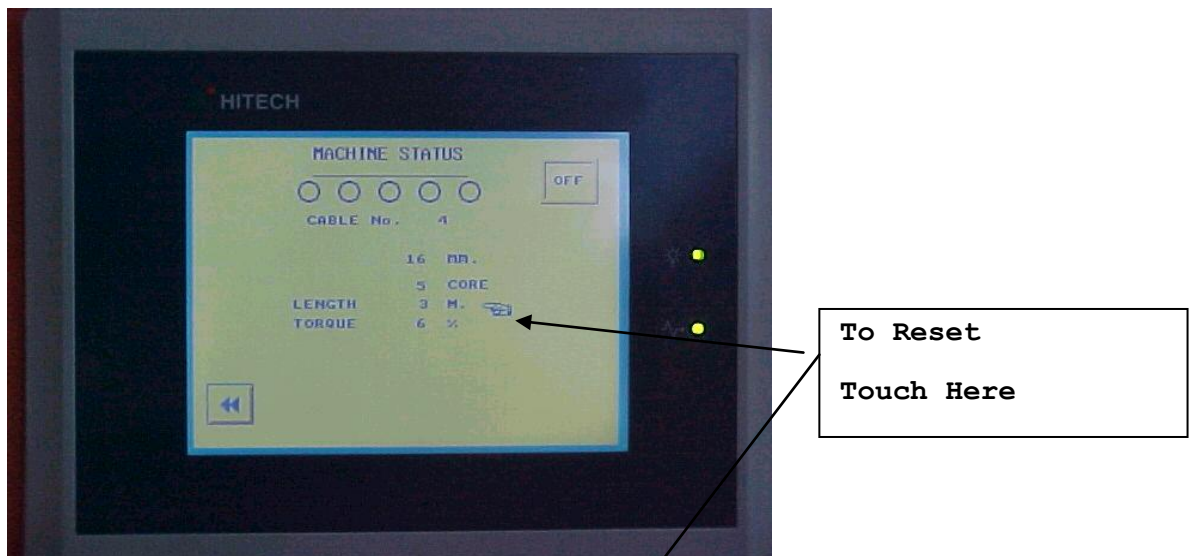
The function of the high voltage is to penetrate the outer insulation via cracks and cuts onto the screen around the conductors. In the case where the outer insulation is damaged the high voltage will break through and will be transmitted onto the screen from where the detecting circuit will operate and stop the machine as well as automatically disable the high voltage, till reset is pressed. The cable can now be marked for later repairs.

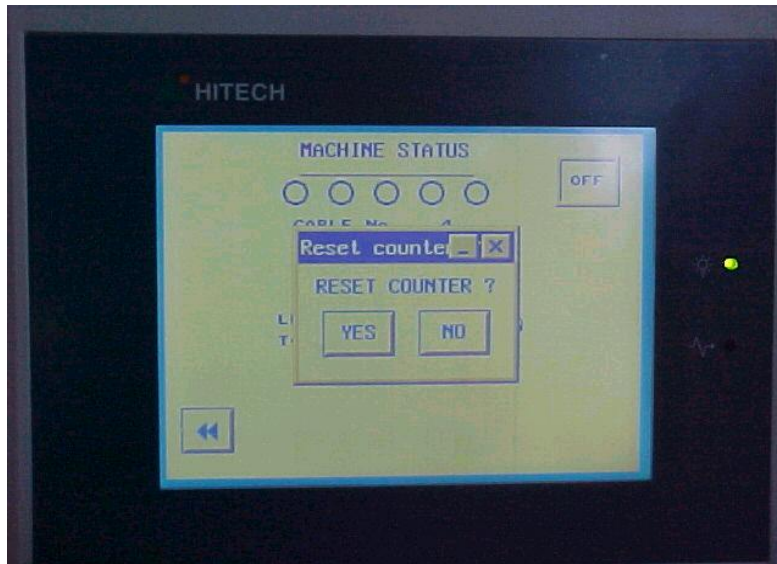
**NOTE:** Some cables do not have the insulation to withstand high voltage and the HT will have to be reduced. A voltage lower than 5kV will not jump the air-gap between the rubber and the screen.



9. LENGTH COUNTER

The length counter will be scaled according to the type of cable being used. This is required because different cables react differently to stretching and compression under being. Cable diameter is another factor requiring compensation the procedure is as follows. Scaling of the length counter can be done in the Eng Menu..





**CABLE TESTER**

**TEST PERFORMED**

(On Red, Yellow and Blue phases plus pilot and screen).

- a. Phase rotation. (Between Earth and phases and Pilot and Phases)
- b. Continuity (or open circuit).
- c. Connection to another (Short circuit or leakage).
- d. Fractures in outer insulation using high voltage.

**TEST VOLTAGE**

15 KV (adjustable) on Test D (above)  
30 KV (adjustable)

Note: 30KV is a destructive test and should only be used under close supervision.

**INDICATION**

- a. Power On
- b. Fault type
- c. Speed and torque (both directions - 4 meters)
- d. Accurate length counter

**CONTROLS**

- a. Main circuit breaker
- b. System start / stop
- c. Emergency stop
- d. Alarm reset
- e. Alarm trip override
- f. Drive off / forward / reverse

**TEST SPEED**

0 - 20 m / min

**TEST TORQUE**

0 to 400Nm

**TEST CABLE SIZE**

For trailing cable only.  
20 - 50mm OD dependent on pulley spacers



PLEASE ENSURE CORRECT PULLY SPACERS IN ACORDANCE WITH CABLE SIZE

(12 off Spacers supplied)

Also make sure the HT rollers are set for the correct cable size. If small cables are used use small wrap.

Normal setting large wrap.



**TENSION**

The tension and Height of the shocks can be adjusted by the nut shown above.

**SCAN SPEED**

Approximately 0,4 seconds per full scan.

**SUPPLY**

380V, 3 phase, 50Hz, 70A  
(Other voltages on request)

**NOTE:** A skilled operator can locate the position of the majority of faults.

