

Operation of the HDI in Totalise mode

Introduction

The Helium Depth Indicator (HDI) is capable of a compliance voltage of $50 \pm 5 \text{ V}$ at the probe output socket. Along with the resistivity of the wire used in the xS range probes ($0.167 \Omega \text{ mm}^{-1}$), this gives a maximum active length for a probe of 2000 mm. For xG range probes ($0.215 \Omega \text{ mm}^{-1}$), this gives a maximum active length of 1550 mm. However, in some situations, a greater depth than this limit is required. The way this is achieved is to manufacture a probe with two active lengths, one physically above the other.

A typical probe, manufactured from the xS- range, with this adaption in would have the part number SS-TL-(AL1+AL2)-7M-24; the two active lengths are of equal length, half the total active length required. Manufactured in this way, it is possible to achieve an apparent active length of 4000 mm, but practical considerations, such as transportation are more likely to set the upper limit on the maximum apparent active length.

In operating such a probe with an HDI, the controller first operates the lower section, then the upper section. The controller then adds the readings from the two probes together, finally showing this on the display with a prefix letter T, for Total.

Wiring of the probe

The two active lengths are wired with common I- and V- wires; for example pins D and F on the standard 7 pin connector, or the two short black PTFE (Teflon) sleeved wires on a wire terminated probe. For other types of probe, please refer to the probe test results sheet provided with the probe.

7 pin male connector (–7M–) probes

The table on page 3.1 of the manual shows the wiring of the standard probe cable (and therefore the standard 7 pin connector for normal probes). In the case of dual active length probes, all six pins (plus the earth) of the connector are used, but the designations are identical. Probe A refers to the lower section (AL_1) and Probe B refers to the upper section (AL_2).

Wire ended probes

Application note 14b, which is reproduced on the back of the probe test sheets for wire ended probes, give descriptions of all the wires used so as to unambiguously identify them.

Other probes

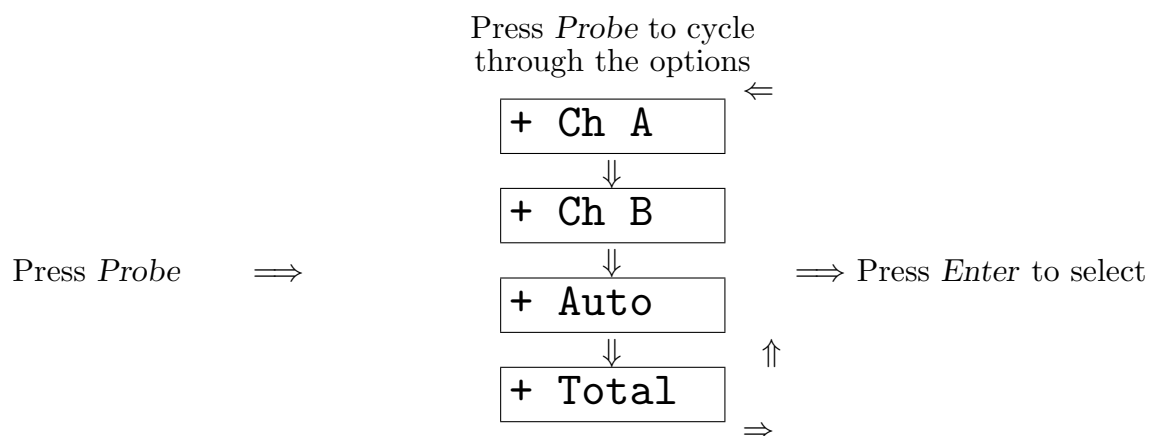
It is possible that there will be configurations where two separate probes are mounted in such a way as to perform the same function of generating a larger Active length than might otherwise be available. Such a system would involve further discussions with the staff at Twickenham.

Setting up the HDI*Setting the special option*

For the HDI to operate both elements of the probe, and to add the two readings together, the special configurations S25 INP2 and S27 TOT - should be selected, even though there will generally be only one probe input socket; see page 5.11 and onwards in the manual for the HDI as to how to set these parameters.

The Probe button

Once the special options have been set, the HDI unit should be set up in the Totalise probe mode. Once S27 TOT has been selected, the *Probe* menu changes to the following



Having selected the required mode of operation, and pressing *Enter*, the HDI returns to the normal mode of operation, working in the Totalise mode when + Total is selected

The result of this selection will be seen when a reading is taken. In the example shown here, the previous total reading was 1725mm. At the start of the reading cycle, the Lower (Channel A, AL₁) element is read. The display of the HDI will typically show:

A#1725mm

Following this, the Upper (Channel B, AL₂) element is read, during which the display of the HDI will typically show:

B*1725mm

Then, after the two readings have been taken, the total is shown on the display as typically shown below:

T.1724mm

Where the initial letter T shows that the reading is the total of the sum of the two Channel readings. Note that while taking the reading, and the showing of the letters A and B, the number shown after the letter still refers to the previous total reading, *not* to the reading from that half of the probe.

Detection of faults in the probe

Should there be a fault with one of the two probe elements, then the error message will appear on the display when the reading of that probe is being taken - the error message OPEN or HIGH will show. This will continue to show at the end of the measurement cycle. In order to obtain the reading from the working probe, it will be necessary to use the *Probe* button to select the single working probe.

Analogue output

As always, the analogue output reflects the total value of the depth as shown on the display. However, to ensure that analogue output value is accurate, the analogue signal trim value has to be set to a different value to that required for normal operation.

4 – 20 mA (A) option and 0 – 10 V (T) option

Normally, the probe active length is also set as the analogue signal trim value in the menus S1A and S1B (see page 5.8 of the manual). In the case of operating the HDI with S27 TOT set, the correct values are *double* the active length of the probe element connected to that channel.

Analogue voltage (V) option

In this case, the analogue signal trim values required for the menus S1A and S1B are *double* those that would be entered for the operation of the analogue voltage output for an HDI operating in normal mode.

Control and Alarm (C) option

The set points of the C option are set in the same manner as in a standard HDIc unit. Each relay, x and y, and the alarm are assigned to Channel A or B, and the set-points are set to work on that one channel; the setting of the parameters is the same as described in section C of the manual. Regard should be made to the fact that both the on and the off set point for a particular relay should lie in the range of the single Channel A or B, and cannot cross between the two channels.

By considered wiring of the two internal relays, and setting of the setpoints of the two relays it is still possible to operate the unit as if it has one relay with two set points which can be set over the entire range of a dual element probe.

If there are any problems, please do not hesitate to contact the staff of Twickenham.