

VERUS CHECKBOX IIIu

Instructions for calibrating wood moisture meters

PRINCIPLE OF OPERATION

The VERUS IIIu CHECKBOX electronically simulates 15 different specimens of timber at 5 different moisture contents over 3 main species groups. All makes of resistance meter can be checked and if the 3 different spacings for needles do not suit then conversion leads are available. It should be noted that the IIIu Checkbox is likely to demonstrate significant errors in some moisture meters in their 6 to 11% moisture content area. This is likely to be a meter design limitation not a fault in the meter itself, nevertheless it will be the Checkbox that is correct provided it is being used correctly. The reason there are errors at the dry end of some meters is that (a) it is difficult to engineer at the dry end and (b) there is no national or European standard covering species *settings* for any type of moisture meter. Manufacturers who design to BS EN 13183-2: 2002: *Moisture content of a piece of sawn timber - Estimation by electrical resistance method* are not limited to any traceable standard, nor obtain any guidance from the document. About all the document states that is of value is that only meters operating on the resistive principle meet the standard.



NOTES ON SPECIES

Resistance type meters measure various species according to their electrical resistance characteristics. Where similar characteristics occur, species are grouped for convenience, eg. Species group 'A', 'B', 'C', etc...

The popular Earlier Protimeter Timbermasters (68T, 71T, D375T, 377T) covered by this instruction sheet classify European redwood (*pinus sylvestris*) in a *different electrical grouping to later models*. Protimeter moved redwood from Scale B to Scale A on their meters from model number D378T (1978) onwards and this was subsequently endorsed by TRADA. VERUS follow this convention and *all redwood readings should be made on Scale A* on all Protimeter instruments new and old. The different grouping is due to experience that average samples of redwood relate more accurately to Scale group A, and not due to any variation in the circuitry of the meters themselves. We are aware of no other changes of this nature that affect either VERUS Checkboxes or Timbermasters.

CALIBRATE AS FOLLOWS:

1. Meters are affected by extremes of heat or cold, so, to ensure accurate calibration, meters should have been at room temperature for at least an hour before being checked with the Checkbox. The effects of temperature on VERUS are negligible compared with the considerable effects of high and low temperatures on wood.
2. Most modern meters self zero but with earlier Timbermaster models set meter to 'Reset R' on scale with centre bias switch and meter rotary control, or according to other manufacturer's instructions (some meters have no such rotary control in which case proceed to 3 below).

3. With meter switched to H₂O (measure wood) position insert hand (or hammer) probe into the VERUS Checkbox. Always take readings across 2 sockets horizontally from left to right (with exception * detailed next page). *At no time is pressure needed to obtain a reading*, if pressure is needed, it is likely that probe needles are corroded.
4. Hammer probe will give identical readings to hand probe, if this is not the case one probe or other may be faulty.
5. The appropriate true reading is given on the Checkbox in colours that relate to species groups. *Note that Timbermaster colours do not correspond with VERUS Calibrator colours, read the species and compare figures, do not compare colour with colour.*
6. At each reading observe the display for several seconds to detect any slight change in reading. Steady readings are obtained if the meter, lead and probe are operating correctly. If readings are within $\pm 0.4\%$ with analogue and digital displays, or $\pm 1\%$ with LED displays, of the percentage marked on the Checkbox, then the meter is satisfactory, the difference between the meter reading and the value printed on the calibrator is the percentage of error, no additional calculations are necessary. If fluctuation or excessive errors occur, refer to the 'Fault Diagnosis' section later in these instructions.

* Exception: Since 1984 the Protimeter (and some makes of overseas) hammer probe pins are too wide to fit the 25mm spacing. Check the wider hammer probe as follows: To check 14% value, probes go diagonally between the two sockets marked 'H1' as shown in Photo 2. To check 27% value, probes go between lower sockets marked 'H2'. For Universal Calibrator IIIu supplied after May 1992, **every value** from 14% to 27% is available using this diagonal technique.



BATTERY CHECK

Failing batteries in moisture meters can often be detected by the following test with the Calibrator: when taking the reading at 27%, leave the meter switched on and observe the pointer over a period of 15 seconds. Readings with a failing battery will often creep very slowly towards a lower reading. Even if almost imperceptible, this movement usually indicates that a battery should be replaced. (Fluctuation of reading normally means another type of fault, see 'Fault Diagnosis' overleaf.)

TEMPERATURE EFFECTS

It is important to ensure that wood being measured is at approximately 17 to 23EC if readings are to be meaningful. If the temperature of the *wood* deviates substantially from this range the meter reading can be corrected by adding 1% to scale reading for every drop of 10EC (and vice versa). Any adverse effects of temperature on *moisture meters themselves* will immediately be demonstrated by deviation from the Calibrator's marked values. For kiln drying operators a Protimeter temperature sensor is available from Verus to fit modern Timbermasters provided with a special 2.5mm socket. This automatically compensates for wood temperature.

ACCURACIES

Calibrator accuracy:	Better than $\pm 0.2\%$ over a 9-30% range
Effect of temperature:	Less than 100 ppm/EC

VERUS standards:

All models calibrated against a traceable reference maintained by a UKAS accredited electrical calibration laboratory. Basis of these is public domain work by Marconi and FPRL which until EN 13183-2 is revised to accommodate (or change) this, remains the best standard.

FAULT DIAGNOSIS

SYMPTOM	REASON/REMEDY
Meter reading creeps very slowly towards low end of scale.	Replace meter battery.
Sudden fluctuations in readings associated with movement of operator's hand.	Continuity fault in lead, plug, socket or connecting socket. Reconnect, repair or replace component if this is unsuccessful
Meter seems to operate but fails to give any reading either on the or on wood specimens.	Open circuit fault on lead, plug, socket, or probe, replace probe. If fault persists, meter socket is likely to be faulty.
Readings outside the tolerance band given under Clause 6.	Make manual allowance each time used. A recently externally calibrated Checkbox should always override internal meter checks.
Dry readings around the 9% (or lower) mark fluctuate.	Effect of small voltages induced in the lead by movement or presence of operator's hands. Keep hands perfectly still until reading is steady.
On digital meters a 1% reading.	Attempting to measure timber at less than 8% moisture content or a broken probe lead.

VERUS offers a calibration service for moisture meters and Checkboxes and also a repair service. Certificates meet requirements of UKAS an ISO 9000 quality schemes. For additional query, contact VERUS quoting the Checkbox serial number and the maker, model and serial number of your moisture meter.

The information contained in this leaflet is given in good faith. As the method of use of the instrument and accessories and the interpretation of the readings are beyond the control of the suppliers/manufacturers, they cannot accept responsibility for any loss consequential or otherwise, resulting from its use. JH/JN/5/04/07

VERUS INSTRUMENTS LTD



mail@verus.co.uk
www.verus.co.uk

JH/JW/03/14