Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

Automatic Weather Station User Manual

CAMPBELL AUTOMATIC WEATHER STATION

DOWNLOAD LOGGER

PLUG IN KEYPAD

TYPE IN * 0 DISPLAY WILL SHOW LOG12

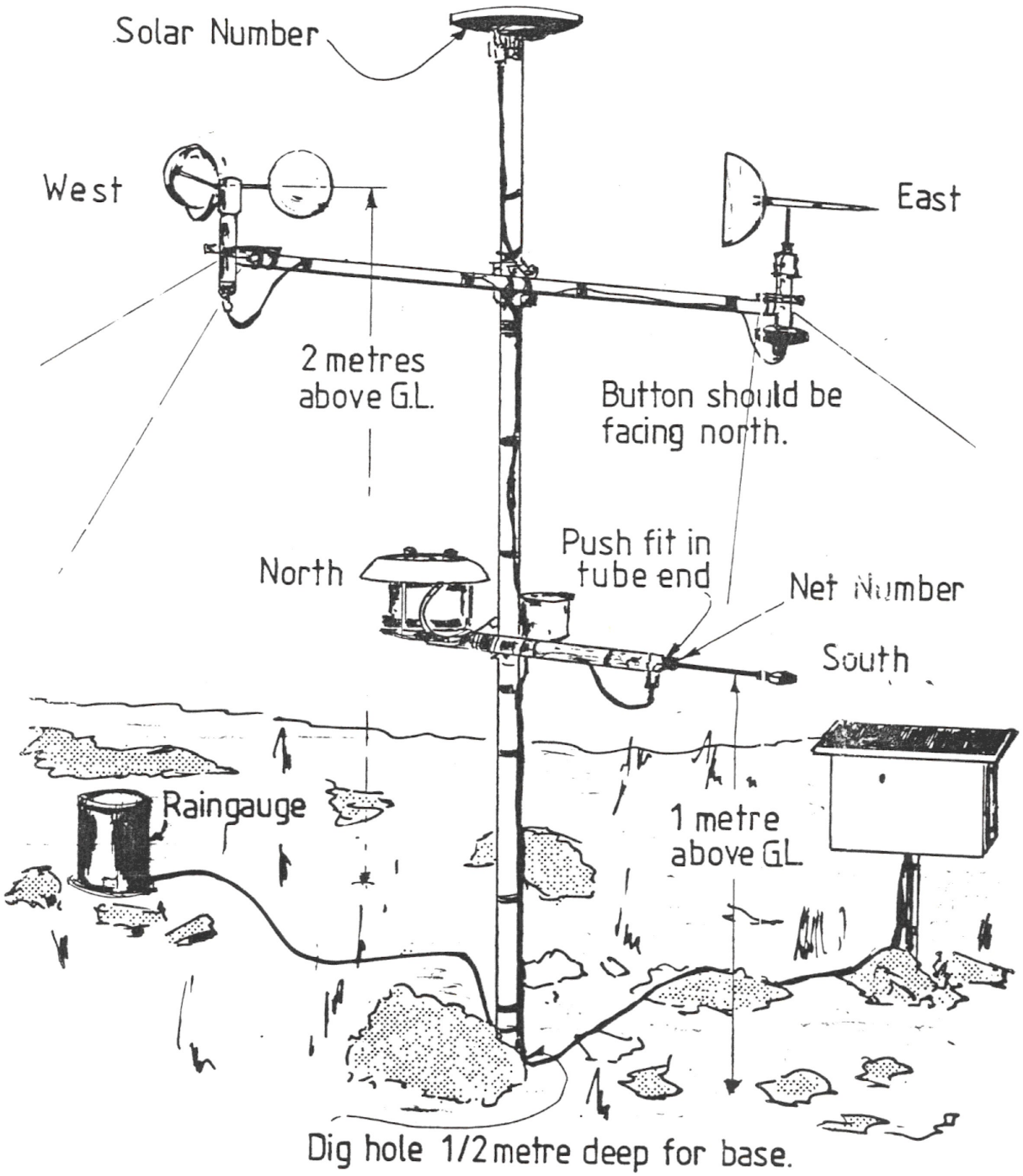
CHECK *5 TIME IN GMT
PRESS A
YEAR = 04
PRESS A
JULIAN DAY 10/9/04 = 254
PRESS A
TIME Hr Mn
PRESS *0 LOG 12.

TO CHECK DATA CHANNELS *6

PRESS A
SOLAR Watts/m²
PRESS A
NET Watts/m²
PRESS A carry on pressing A for next channel
WET BULB Deg C
DRY BULB Deg C
WIND RUN m/Sec
WIND DIRN DEGREES
RAIN mm
Soil Heat Flux Plate Watts/m²
BATTERY volts

To Start Logging press *(star) 0
Display will show LOG12

SCHEMATIC OF AUTOMATIC WEATHER STATION



AUTOMATIC WEATHER STATION

ASSEMBLY, INSTALLATION AND MAINTENANCE INSTRUCTIONS

Installation of the automatic weather station will be greatly assisted by referring to the drawing no. A400533.

A 30cm square paving slab will need to be purchased on which the raingauge is placed and leveled in.

Dig a hole large enough to accept the main pole base and approximately 45 centimeters deep. It is not necessary to concrete the base into the ground.

Affix the main pole base to the lower half of the main pole if it is not already fitted and lower into the hole. Refill the hole with the extracted soil and ensure that the lower half of the pole is vertical by using a spirit level.

Assemble the solarimeter to the upper half of the main pole using the captive bolt that is in the solarimeter housing, connect the solarimeter cable No2 and tape it to the pole at the top. At this point loosely position the bottom cross arm and top cross arm over the main pole base section. Place the top of the pole onto the lower half and fix in place. There are a number of different fixing methods depending on the age of the equipment.

Fix the top and lower cross arms at the right heights. Orient the top cross arm east west and lower cross arm north south with the net sensor end facing south. Hook the guy wires to the ground stakes provided, and hammer the stakes into the soil ensuring that the height of the cross arm ensures the anemometer cups are 2 metres above ground level and that the main pole is vertical. Fine adjustment can be carried out using the screw tensioners.

Fit all the sensors to the main pole and the cross arms using the drawing for guidance. Fit the temperature screen. Secure the main loom junction box to the main pole using the jubilee clips, strong cable ties or 1cm Lasso tape.

Connect all sensors to the main loom junction box using the cables provided. Ensure that the numbers on the cables agree with the numbers on the drawing.

Fit the wet bulb and the dry bulb sensors to the temperature screen. Fit the wick to the wet bulb sensor.

Secure the solar panel to the main pole in the position shown on the drawing. Secure all cables to the main pole and the cross arms including cable no.8 [raingauge]. Run the raingauge cable out to its full length. Ensure that the plug with the angled outlet is on the raingauge end.

Level in a suitable raingauge base e.g.. a 30cm (12 inch) square concrete paving slab and place the raingauge in position and level the gauge by adjusting the length of the feet and referring to the spirit level fixed to the raingauge base. Connect the lead to the raingauge.

Fit and level in the net sensor using the built in spirit level.

Align the wind direction sensor to north using the illustration for assistance.

Fill the reservoir in the temperature screen with distilled water.

Connect the main cable to the logger, having first fed it through the access hole in the logger box.

Hammer the earth rod into the ground and connect the earth lead to the earth terminal on the side of the logger box.

Connect the socket from the solar panel to the plug on the side of the logger.

The weather station is now ready to run, but before it is left the irrelevant data that has been logged whilst in transit should be removed from the logger. To do this, connect a storage module to the 9 pin plug with the lead provided and connect to the 9 pin socket on the inside of the clear plastic lid. The data will be downloaded into the storage module on the next scan which will be within the next 10 seconds. Whilst the data is being downloaded, a light will illuminate and a buzzer will sound. When this stops, the data has been downloaded. This data can be discarded later.

Download the data on a regular basis, we suggest a two week maximum, using the above procedure.

If you have a key pad and are competent to use it, then the data channels can be checked using the *6 mode.

The data can only be retrieved from the SM192 storage module using Campbell Scientific software. The preferred option is PC208w, and full instructions are available from the software provider. Campbell also supply simpler web based system which can be found at www.campbellsci.co.uk

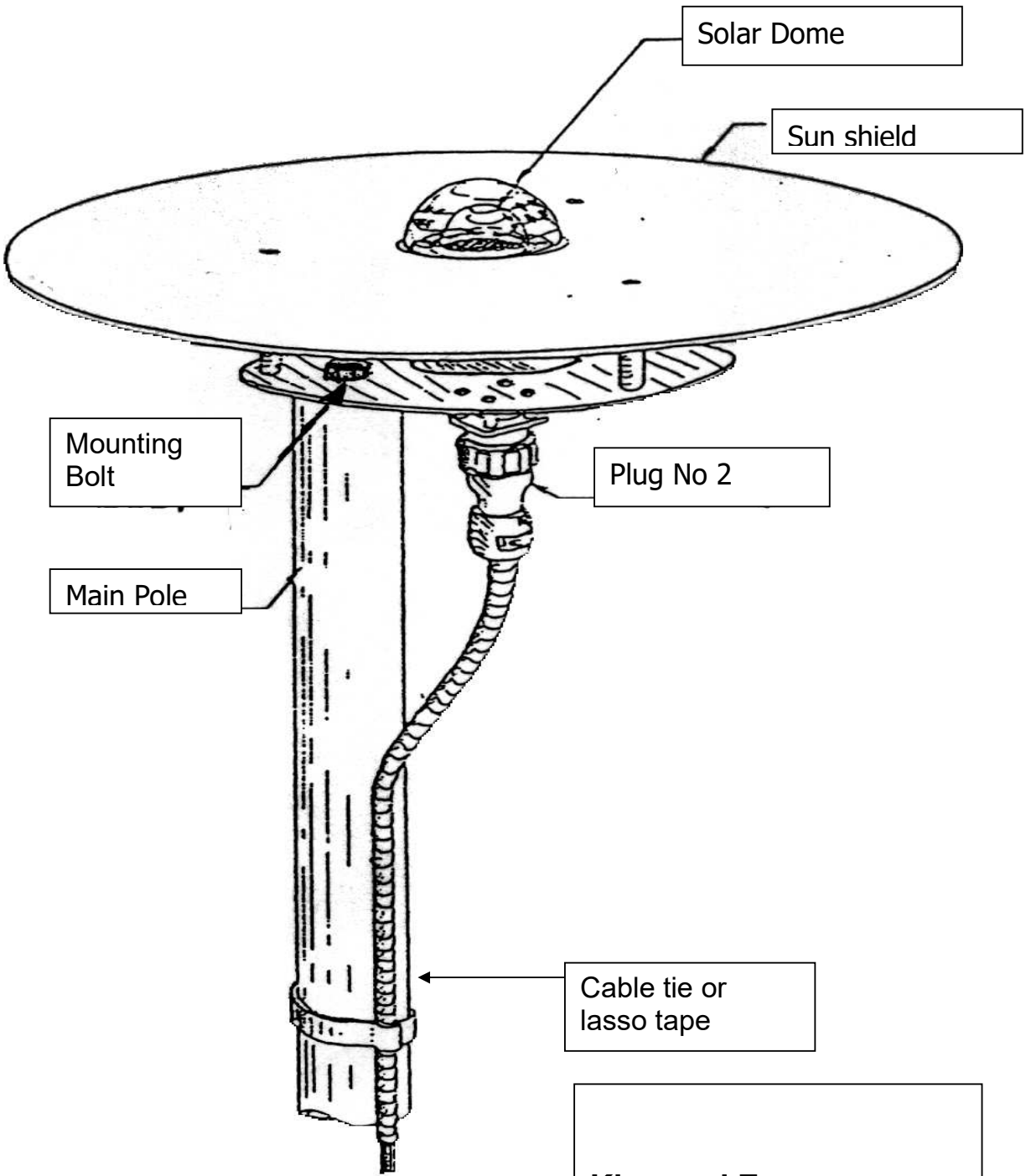
Once the data is in comma delimited format the *.Dat file can be analyzed in Excel. When producing data files we recommend that the file name includes some form of site indicator and the download date. Eg Site Wallingford Met Site = WM

Date 02/04/2002 = 2402 hence file name = WM2402.Dat

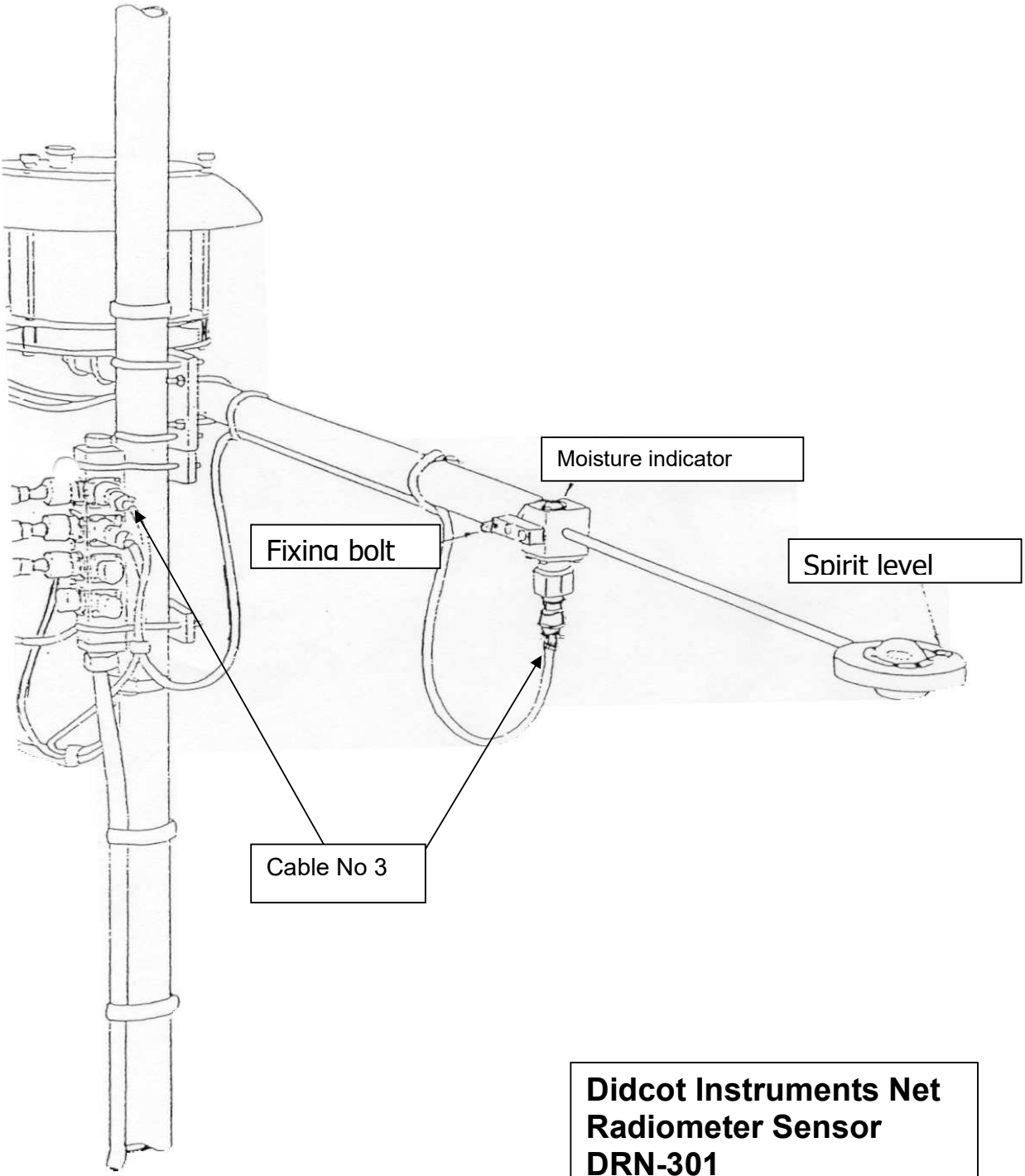
PC208w will increment each file automatically thus first file WM24021.dat

Next file in SM192 WM24021.dat

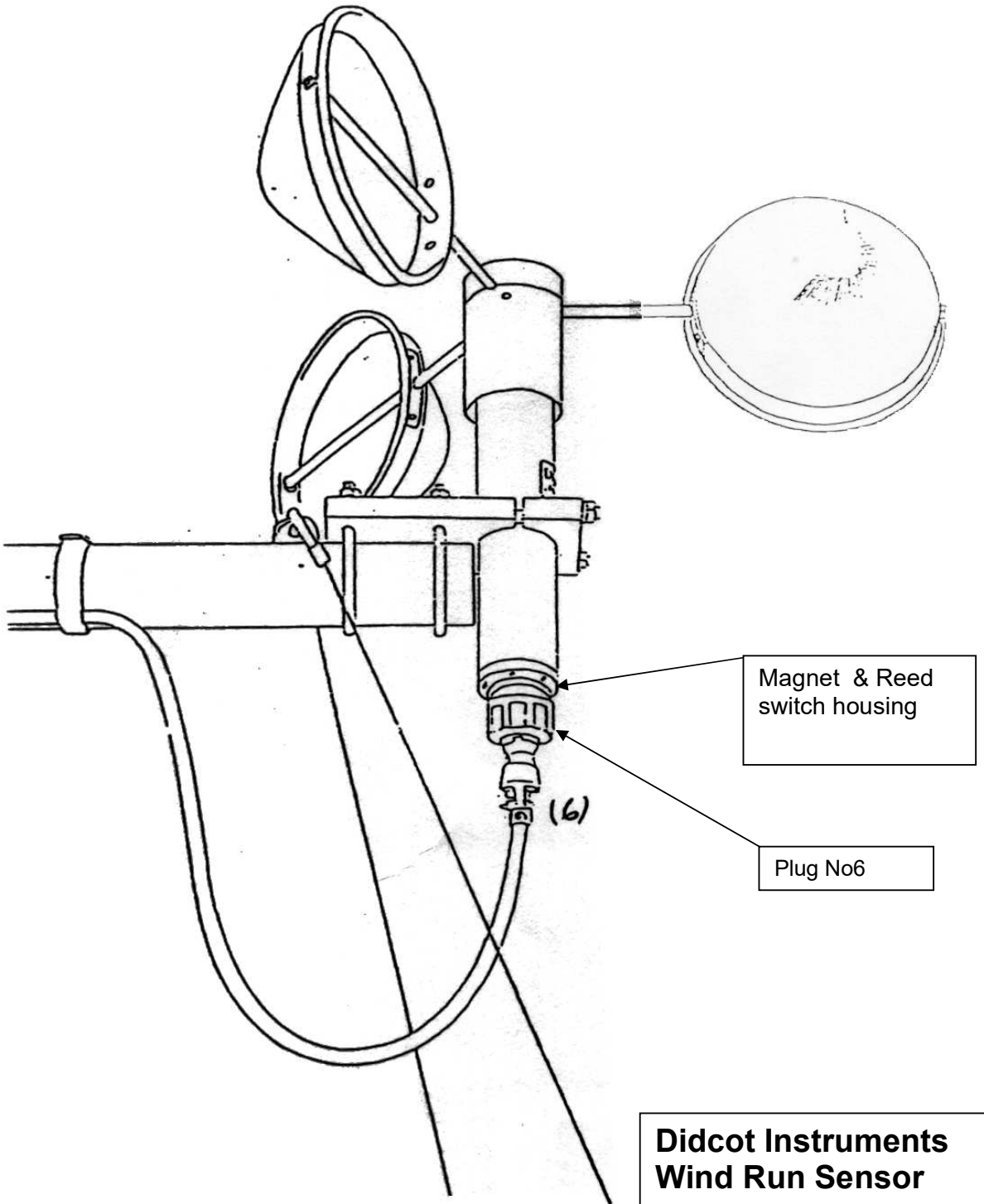
The file can be looked at by clicking view using the quick open route on the PC208 radio buttons or fed straight into Excel.



Kipp and Zonen Solarimeter with Didcot Instruments mounting.

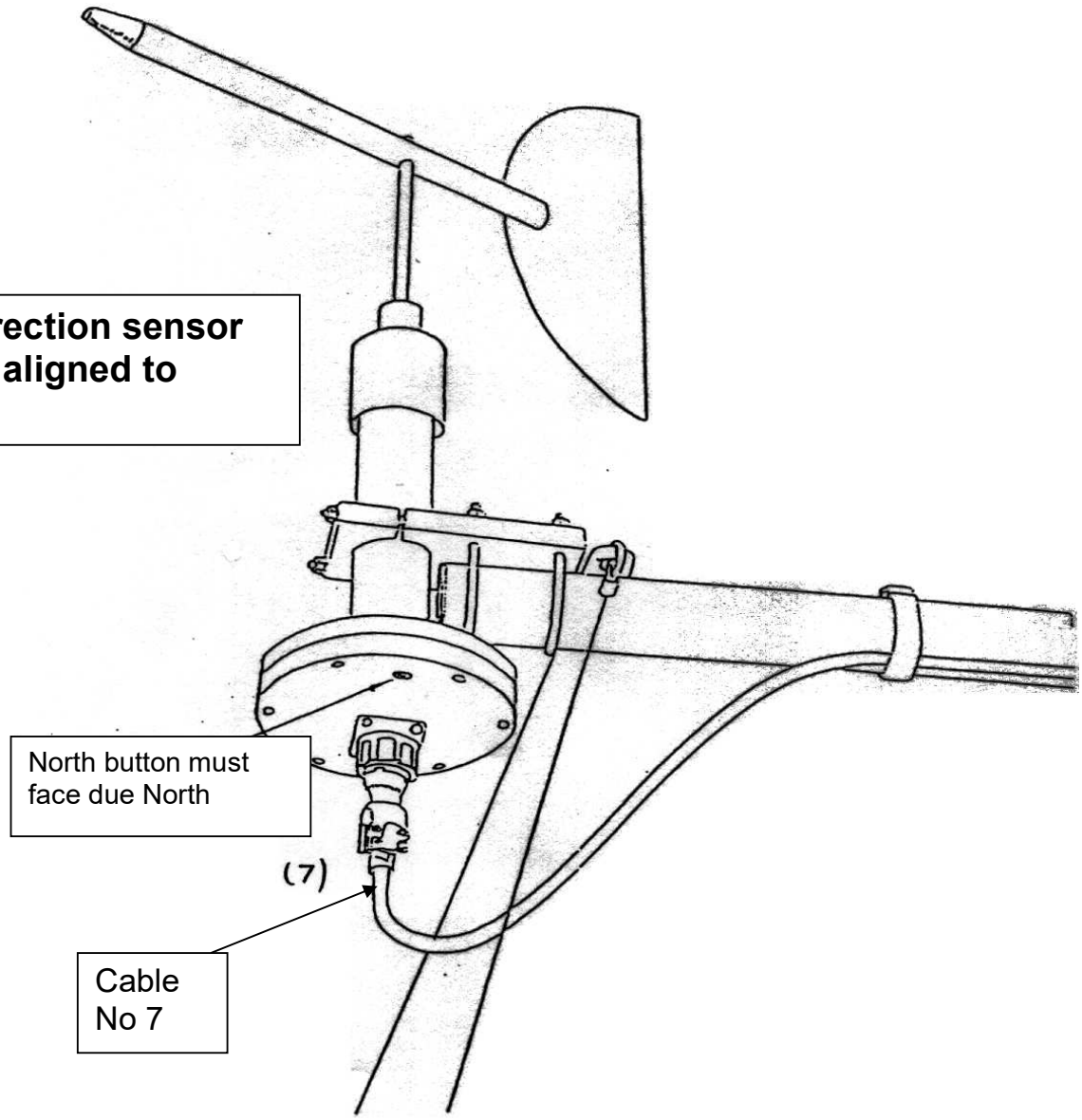


Didcot Instruments Net Radiometer Sensor DRN-301



Didcot Instruments
Wind Run Sensor

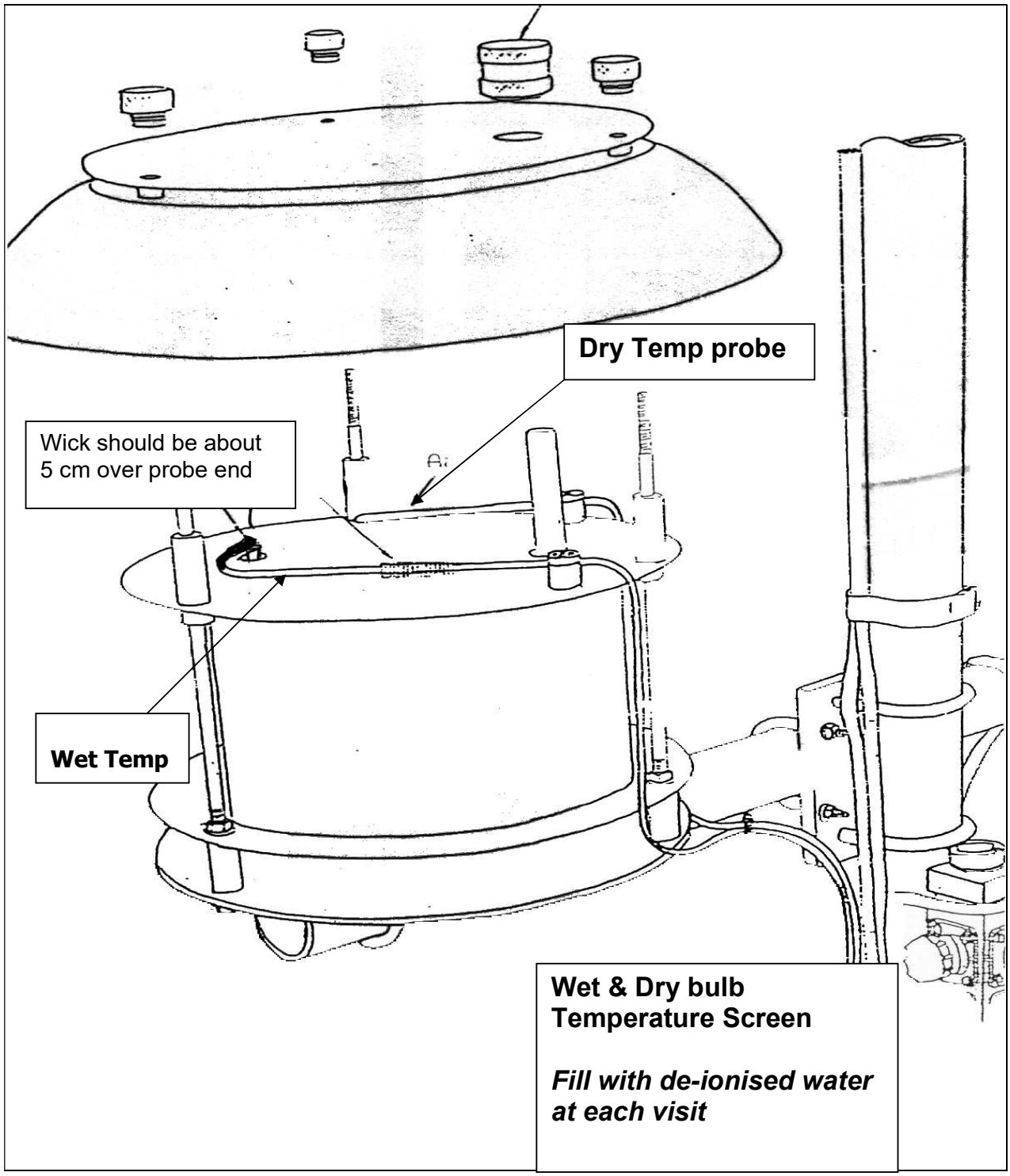
Wind Direction sensor must be aligned to North

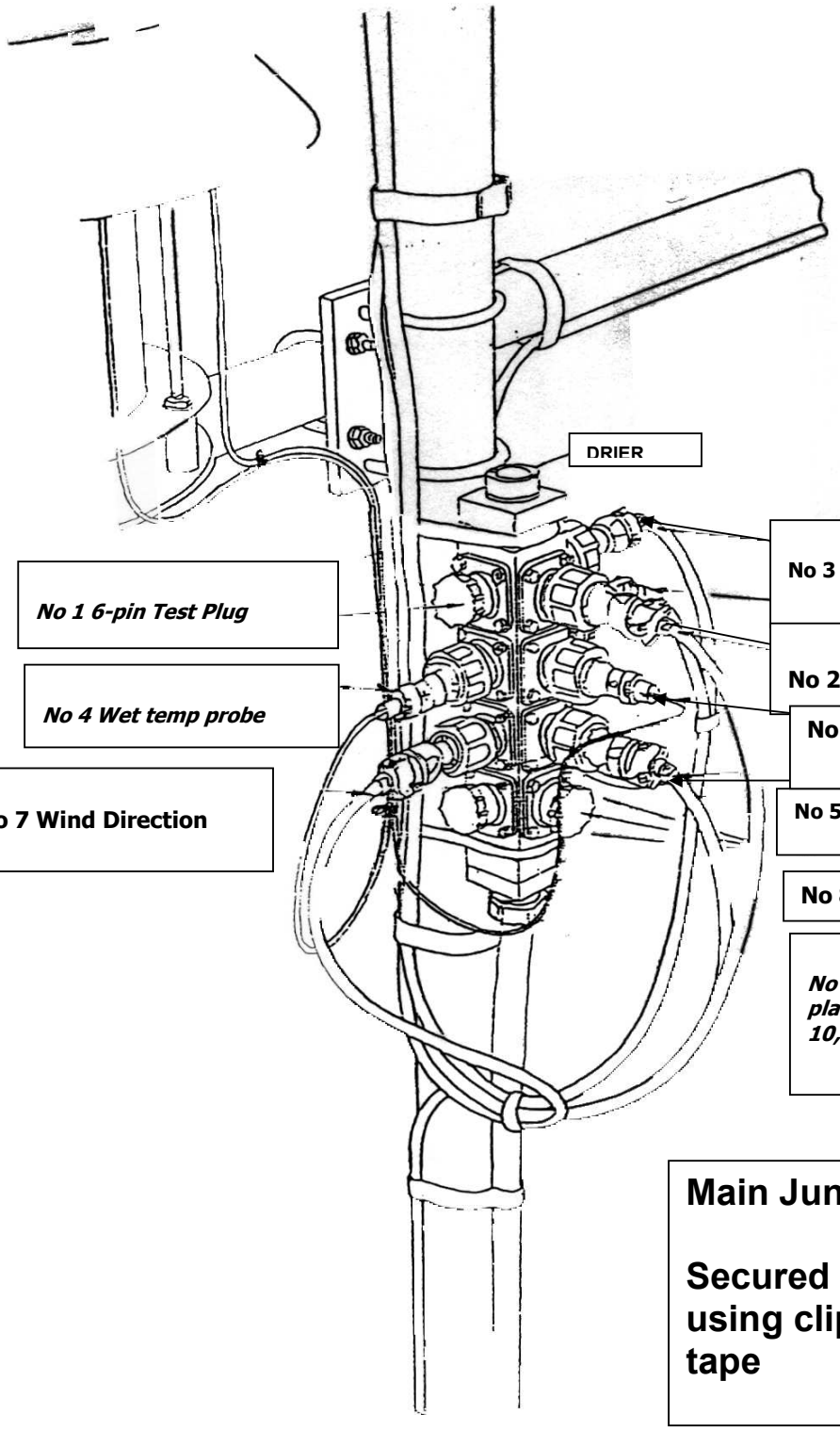


North button must face due North

Cable No 7

Cables must be secured using cable ties or tape


Dry Temp probe
Wick should be about
5 cm over probe end
Wet Temp
Wet & Dry bulb
Temperature Screen
Fill with de-ionised water at each visit


DRIER
No 3 net radiometer
No 1 6-pin Test Plug
No 2 Solar radiation
No 4 Wet temp probe
No 6 wind run
No 7 Wind Direction
No 5 Air Temp Probe
No 8 Rain Plug
No 9, Soil heat flux plate. Spare are No 10, 11, & 12
Main Junction Box
Secured to Main Pole using clips, ties or tape

IF IN DOUBT ASK			DIDCOT INSTRUMENTS ABINGDON OXON.	MATL.	FINISH	DRAWN	CHKD.	APPD.	SCALE
ISSUE	B	C					19/8	19/8	N.T.S
DATE	9/5/77	10/5/77	TOL. 3 DEC. PLACES ± 0·005 2 DEC. PLACES ± 0·010 FRACTIONS ± 0·015	TITLE CABLE DETAILS FOR AUTOMATIC WEATHER STATION			DRAWING No A400533		
APPD.									

Automatic Weather Station 12 monthly Service and Re-calibration Schedule

1. Solarimeter

Change silica gel.
Ensure that the domes are not damaged
Check that domes are clean and clear.
The optical matt black surface is in good condition
Check that the sensor is level
Compare the sensor with a reference sensor. In the event of an error, update the logger program to the correct reading.
If necessary replace the sensor and remove it from site for re-calibration.

2. Net Radiometer

If necessary change the domes and Silica gel, if one dome is damaged then replace both domes. Sensor may be wet internally if a dome has been cracked or broken for a long time. In this case it must be removed and dried overnight before replacing and filling with fresh BLUE silica gel crystals.

Compare the sensor with a reference sensor. In the event of an error, update the logger

If necessary, replace the net sensor and remove from site for re-calibration.

Check the optical surfaces are matt black and in good condition.
Check the sensor is straight and level

3. Temperature Probes

Remove both sensors from the temperature screen. Calibrate by immersing in a flask with iced water at zero degrees centigrade, and make adjustments to the offset of each sensor in the logger program.

Using a flask with water at around 35 degrees centigrade check the accuracy of both sensors. They must be within ± 0.1 degree centigrade of the CEH Wallingford electronic thermometer.
Check the condition of the temperature screen attending to any faults.
Replace the wick with a new one.
Refill with de-ionised water.

4. Rain gauge

Check that the filter is in place and clear of muck. Replace filter if necessary.
Clean syphon
Clean tipping bucket and make sure the mechanism is free
Check the gauge is level
Check calibration of the gauge, by running a fixed amount of water through the gauge and noting the number of tips. Adjust if necessary

5. Anemometer

Check cups and are in good condition and are not loose, dented, holed, etc and rotate freely.
Check for excessive play or end float.
Test using Key pad
Change reed switch only if necessary

6. Wind Direction

Check sensor for damage and that it moves freely.
Using a key pad check that all the reed switches are working and are within 5° of its normal operating position.
Check that the sensor is correctly orientated to north.

7. Soil Temperature Thermometer

Dig up the sensor and check the calibrate in a temperature flasks, first at 0 degrees C in iced water, and then the slope at approximately 20 degrees C. The sensors must be within ± 0.1 degrees C.

If either of the offset or slope readings are in error, then the test will have to be repeated with the logger program offsets, and multipliers re-calculated and updated.

8. Albedometer

Clean the diffusers and compare readings with the radiation standard. In the event of a discrepancy >10%, update the logger program to correct the readings. If necessary, remove the faulty sensor for repair.

9. General

Check over the AWS for visual signs of damage such as chewed electronic cables.

Ensure poles are straight and level.

Guy wires should be taught and free of debris.

Stakes must be secure and free of damage.

10. Box

The logger enclosure must be in good condition with no sign of

ingress of water into or around the logger.

The logger contains bags of silica gel, which must be changed yearly.

Replace Battery at cost if giving problems or after two years.

Mike Stroud
Instrument Engineer
CEH Wallingford