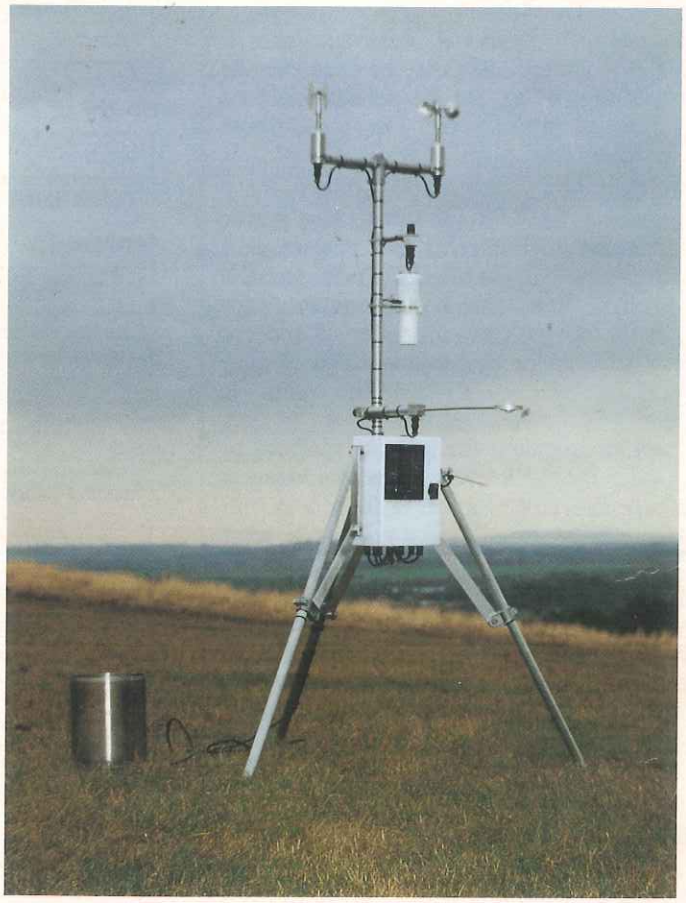
DIDCOT Transportable Weather Station

The DIDCOT Instrument Company has been designing meteorological equipment for over 20 years. This expertise has been applied to a completely new automatic weather station.

Using a tripod mast, a new data logger and range of sensors, this station is compact, light weight, easy to erect and low cost.

The fully equipped station has sensors for the measurement of the following meteorological parameters.

1. Wind Speed or Wind Run
2. Wind Direction
3. Global Radiation
4. Radiation Balance
5. Ambient Dry Temperature
6. Ambient Wet Temperature
7. Surface Wetness
8. Barometric Pressure
9. Rainfall
10. 2 Optional Analogue Sensors



Mast
The tripod mast is 2 metres high and is constructed from corrosion resistant aluminium alloy. It has mountings for the wind sensors and radiometers. The metal data logger enclosure is finished in a solar reflecting plastic coating and is integral with the mast. The folding legs allow the fully assembled station to be carried in a small estate car and provide adjustment for use on uneven terrain.

Anemometer
This is a small three cup instrument, constructed from anodised aluminium alloy and stainless steel. The cups rotate on stainless steel ball bearings, a rotating magnet closes a reed switch contact twice per revolution.

Wind Direction Sensor
This instrument uses many of the components of the anemometer. It has a self damping fin assembly. Which is connected via a magnetic coupling to a low torque potentiometer to resolve the angle of wind direction.

Global Radiometer
This instrument sensor uses a silicon photovoltaic cell below a polycarbonate diffuser. The cell is cosine corrected. The instrument is mounted on the mast by an integral clamp.

Net Radiometer
This instrument has the same sensor geometry as our well established DRN-301 but the thermopile has been replaced with a thermocouple and the overall design simplified to reduce the cost. The instrument is mounted on the mast by its integral drier tube. For transport it is swung up parallel to the mast.

Ambient Temperatures
The wet and dry thermometers are installed in a gill style radiation screen which has an integral water tank for the wet bulb wick. The screen is naturally aspirated. A fan aspirated version is under development.

Surface Wetness
The precipitation detector is a gold plated grid which lowers in resistance when wet, giving a simple wet / dry indication.

Barometer
A solid state silicon diaphragm straingauge transducer, connected directly to the data logger. A breather tube extends outside the logger enclosure to sample the pressure.

Rain-Gauge
The tipping bucket and casing are of stainless steel and the base of aluminium alloy. The mechanism is similar to our well established DRG-3 rain-gauge but with a smaller bucket and simpler construction to reduce the cost.

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Rain-gauge
The gauge should be fastened to a firm base, a 50cm square paving slab is ideal. 3 adjustable feet and an integral level indicator facilitate level adjustment.

Additional Sensors
Optionally 2 additional analogue and 1 contact / counter sensor may be connected to the data logger, eg. for the measurement of soil temperatures or an additional anemometer etc.

Data Logger
The data logger is a solid state low power device with both internal and plug-in card memory. A built-in RS232 port permits connection to most computers for programming and data collection. A modem interface is under development. The logger has advanced programmability and is extremely versatile. The memory cards may be used to augment the internal memory or may be removed to read elsewhere, using a separate interface. Power is from a 6 volt battery which may be charged by a solar panel.

Calibration
Each station is supplied with a logger program which holds the calibrations for the sensors. These are read every 10 seconds and data averages stored in engineering units at regular intervals e.g. hourly. Logger programs can be provided to the customers exact requirements at additional cost.

Computer Software
A software package is available for use with the station and an IBM PC compatible computer.
The software features a real time display, shown overleaf, and facilities for setting the logger real-time clock, downloading logger programs and collecting data. This is stored in a form suitable for import into most spreadsheets for report and graph production. The real time display requires at least a 12MHz 286 with VGA display, preferably colour.
Multiple stations are catered for. The data from each station being stored in a separate directory.

The manual supplied with the station gives full programming details using any text editor, a connection diagram for each sensor and full erection instructions.

Sensor Specifications

Anemometer
DWR-205

Range	0 to 50	ms^{-1}
Starting Speed	0.25	ms^{-1}
Accuracy	±2	%
Distance Constant	6.50	m
Output Frequency at 1.0 ms^{-1}	2.00	Hz

Wind Direction
DWD-205

Range	2 to 358	deg.
Starting Speed	0.30	ms^{-1}
Accuracy	±3	deg.
Resolution	1.00	deg.
Distance Constant	4.00	m
Potentiometer	pot. 1	k Ω

Solarimeter / Pyranometer
DRS-5

Spectral Range	350 to 1100	nm
Accuracy	±5	%
Resolution	1.00	Wm^{-2}
Output at 1kW/m^2	14.00	mV
Impedance	18.00	Ω

Net Radiometer
DRN-405

Spectral Range	300 to 80,000	nm
Accuracy	±5	%
Resolution	1.00	Wm^{-2}
Output at 1kW/m^2	1.40	mV
Impedance	10.00	Ω

Psycrometer (temperature wet & dry)
DTS-5

Range	-40 to +60	°C
Accuracy	±0.10	°C
Resolution	0.10	°C
Sensors	PT-100	Ω
Water Capacity	200.00	ml
Average Duration	40	days

Barometer
DBP-5

Range	800 to 1,100	mBar
Accuracy	±1	mBar
Resolution	0.10	mBar
Output at 1 Bar	14.00	mV

Rain-gauge
DRG-5

Accuracy	±1	%
Resolution	0.10	mm
Capacity	0 to 200	mmh^{-1}
Output Contact closure cycle	10 tips	mm^{-1}

Auxiliary Temperatures (2 optional)
DPS-405

Range	-40 to +60	°C
Accuracy	±0.10	°C
Resolution	0.10	°C
Sensor	PT-100	Ω

Data Logger Specification

Storage Capacity (DV= Data Values)

Internal Memory	13,500	DV
64K Card	16,000	DV
256K Card	81,500	DV
512K Card	169,000	DV

Inputs and Outputs

Voltage, Current & Resistance	10	inputs
Counters	3	inputs
Digital I/O	5	bits
RS232 I/O	1	port

Power Requirements

Battery	6 Volts	10Ah
Average Current at 10 S Scan Interval	2.00	mA
Standby Current	0.40	mA
Average Duration	40	days
(Solar Panel provides continuous use)		

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