MULTIMET
Wind Speed and
Direction System
Users Handbook
HB3272-03
(For use with Online Pro
Application Software)

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1.   MULTIMET INSTALLATION

1.1   Introduction

The Multimet is designed as a professional, reliable and easy to use system satisfying the demands of industrial, meteorological, aviation and marine users. The system can display and record wind speed and direction data in a variety of clear and unambiguous formats ideally suited to many different applications.
        A high contrast, transflective LCD display with back light facility maintains crystal clarity in all lighting conditions. Multimet display units may be networked together to provide distributed multi-user access to real time wind data.
        A comprehensive PC software package, "Online Pro", supports the system and provides graphical presentation of real time and historical wind data. The software operates in the Windows^{TM} environment and may be user configured to suit specific monitoring requirements.

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1.2   System Installation

1.2.1 General

The Casella CEL Multimet is available in either a desktop enclosure or panel mount format:
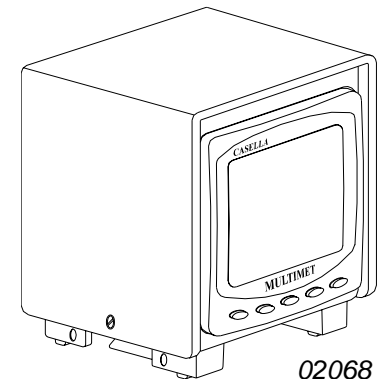
Desk Top Systems

The desk top version should be positioned in the desired location ensuring adequate clearance behind the unit for interconnecting cables.
        Simple connection of cables for sensors, data communications and power supply is achieved using connectors located on the rear of the instrument.

Panel Mounted Installation

For panel mounted applications, use the supplied template as a guide, cut out the hole for the back and drill the four 4.3 mm diameter holes for the studs.

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Overall size 110 mm X 110 mm

4 X 4.3 mm Mounting Holes
On 70 mm X 70 mm axis

Cutout for
Back Recess
60 mm diameter
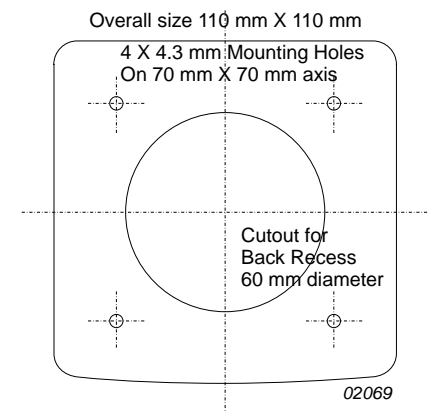
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Screw the studs into the rear of the instrument and secure to the panel using the supplied thumb nuts. A cable loom is supplied for the interconnection of sensors, power supply and communication cables.

Thumbnuts Bulkhead M4 Studs Cables & Connectors *02070*

¤ Try to keep cable runs as short as possible to reduce the risk of voltage drops and interference.

¤ Protect all exposed or buried cables from physical damage.

¤ Cable installation and connection to mains power should be performed
in accordance with local safety guidelines and legislation.

1.2.2 Sensor Installation and Wiring

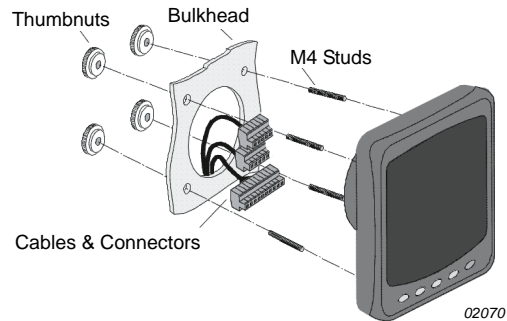The combined wind speed and direction sensor should be located in an exposed location free from sheltering effects or sources of air turbulence.
Guidance from Meteorological agencies typically recommends a measurement height of 10 m in a flat area, free from large buildings or trees within a 300 m radius.
Installations in industrial or urban environments will experience increased turbulence and a compromise in location may be inevitable. Try to select a location representative of the wind you wish to measure.

Wind Speed and Direction
Sensing Head 142000D

Wind Speed Sensor

Wind Direction Sensor

A

Terminal Box

A

Maximum distance available
200 m with RS 232
Data Transmission Cable.

"U" bolts

Up to 50 mm
diameter mast

02072

View on A - A
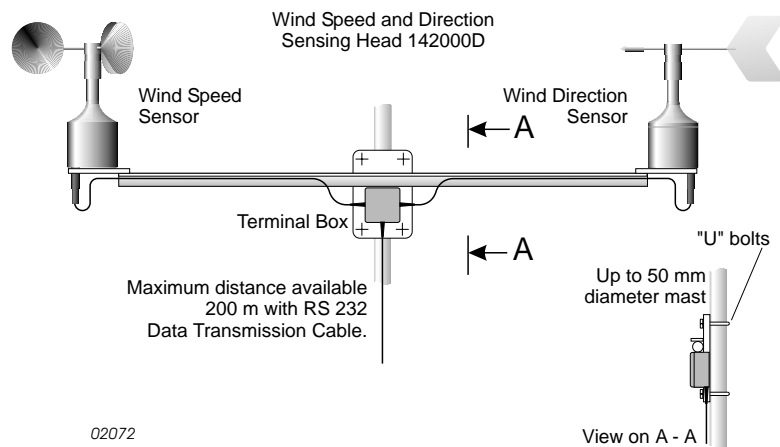
An optional mast mount kit enables the sensor to be fitted to circular masts up to 50 mm in diameter.

The wind direction sensor is factory set to point North when the cross arm supporting the sensors is aligned on a north - south axis.

Rotate the sensor head cross arm until the red "N" mark on the direction sensor (weather vane) is pointing directly north. Use a compass to confirm that the sensor head cross bar is now running due north - south. Once the cross arm is correctly aligned, clamp the extension tube securely in place.

The sensor arm should be fitted to the pre-wired connector. Ensure the connector is fully tightened to maintain prevent the ingress of water.

Sensors are supplied with a 25 m length of cable as standard pre-wired to a 5-way plug. Wiring details are as follows:

Sensor Connector Plug Wiring Details

5-way "Binder 680 series" plug fitted to end of sensor cable (View of plug solder buckets)

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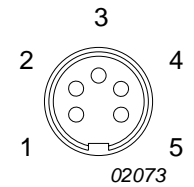
Function	Pin Number	Wire Colours (Standard 25 m length)	Wire Colours (Extended length)
Sensor Positive Supply	1	Brown	White / Red
Sensor Ground	3	Black+Screen	Black+Green+Screen
NMEA Digital Data Output	5	Blue	Blue

Power Supply

The Multimet system is delivered with a 12 VDC power supply that accepts mains input voltages between 90 and 260 VAC, and may be used throughout the world. For cable lengths less than 200 m, the sensors are powered directly from the display's power supply. For extended distances, a power supply located at the sensor position may be required. Details of any non-standard system configurations will be provided in a supplement to this handbook.

1.2.3 RS232 Socket

The RS232 serial communications socket is used to transfer recorded or real time data to a connected P.C. The system is delivered with a 9-way to 9-way' serial cable which is used to connect the Multimet RS232 socket to a free serial port on the P.C.

RS232 Socket (9 way 'D' type male) pinout

Function	Pin Number
Multimet RS232 Transmit Out	3
Multimet RS232 Receive in	2
Supply Ground	5

1.2.4 Expansion Socket

The Expansion socket provides signals used for CAN^{TM} bus display networking and interfacing to an external alarm circuit.

Expansion Socket (9 way "D" type female) pinout

Function	Pin Number
CAN Bus "A"	2
CAN Bus "B"	3
Cable screen connection	5
TTL alarm output	9
Alarm ground	8

1.2.5 Networking Multiple Displays

In a networked system, the master display unit (connected to the sensors) will automatically transmit real-time wind data to all interconnected displays. The CAN bus "A" and "B" signals on all networked displays should be interconnected using a twisted-pair cable. The maximum total cable length of the network should be <3 km.

1.2.6 Alarm Output

The alarm signal level is normally low (0 V) and will go high (5 V) whenever an alarm condition occurs. The maximum source or sink current available from this signal line is 5 mA. Suitable interface circuitry is required to control higher powered warning devices or systems. To avoid communication errors and conflicts, the "EXT Alarm" should be set to OFF whenever the RS232 connection is required.

1.2.7 Wiring Details for Panel Mounted Displays

Panel mounted displays are supplied with a basic cable loom for connecting sensors, power supply and communications. Modifications to the basic cable loom may be required to suit specific installation requirements. Connection details for the rear of the display are shown.
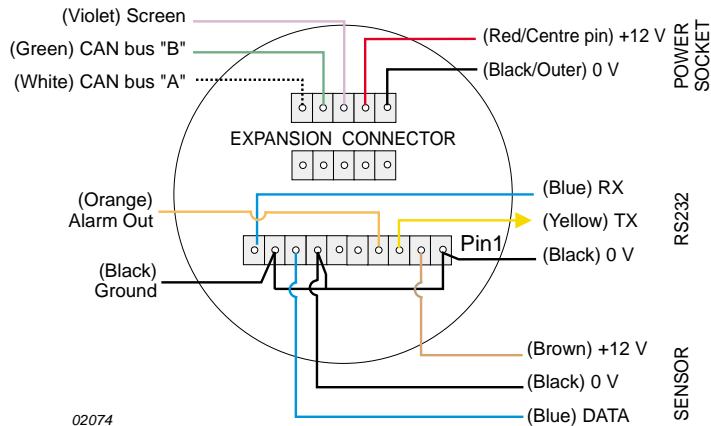
2.   OPERATING MULTIMET

2.1   Getting Started

When first switched on, the Multimet performs a series of self test routines and displays the currently installed software version. Following successful completion of these routines, a system prompt will request entry of the current time and date.

It is important to set the current time and date correctly whenever the internal data logging facility is used. This ensures that all recorded data is correctly marked with corresponding date and time markers.

2.2   Setting the Time and Date

Adjustment of the time and date is performed using the appropriate grey buttons located on the front of the instrument, immediately below each option shown on the display.

The internal clock may also be set automatically from the Online Pro P.C software, as described later.

It will be necessary to reset the clock whenever the power supply has been disconnected from the system.

Following the entry of time and date, the display will present the "Main" compass display containing 2 minute rolling average data.

2.2.1 Adjusting back light and contrast

Briefly press the blue button to gain access to the LCD lighting and contrast adjustment.

Adjust the settings to provide the most comfortable image by using the options shown on the display.
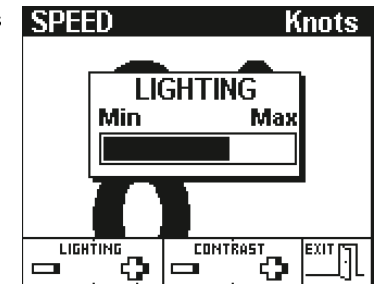
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2.2.2 Changing displayed information

The Multimet can display data in a variety of formats to suit the specific demands of industrial, meteorological, aviation and marine users. The averaging period for displayed data values may be selected as either instantaneous, 2 minute or 10 minute rolling averages.

Pressing any of the grey buttons will cause a menu to be displayed at the bottom of the screen. The menu shows the current function assigned to each button. If no button is pressed for 5 seconds, the menu will slowly scroll off the bottom of the screen.

INST | HIST | EXIT
MULTIMET

PRESS TO STEP
THROUGH DATA
AVERAGING PERIOD

PRESS TO STEP
THROUGH DIFFERENT
DISPLAY FORMATS

QUICK PRESS
Backlight / Contrast Menu

PRESS FOR 3 SECONDS
Enter Configuration Menu

Instantaneous Values

2 minute Average

10 minute Average

Main Compass Display

Historical Speed Graph

Format With Big Numbers

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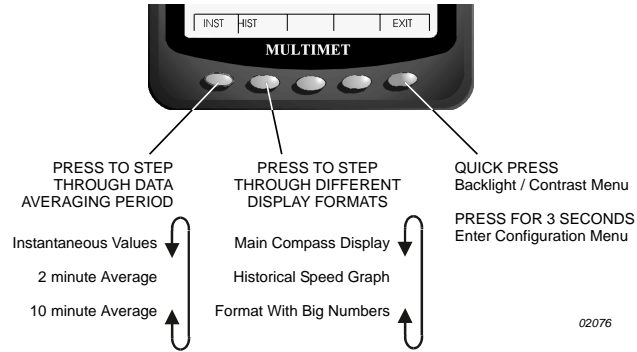
MAIN Wind Display

The Main display format uses a compass type display to show wind direction,
(The pointer shows where the wind is from). Displayed values are shown
below.

Variation Sector: the
limits of average direction
during averaging period

Averaged direction:
shown as both a value
and pointer position

CASELLA
2 Min
330 N 30
300
60
W 280° E
240 120
210 S 150
13:45
INST | HIST | EXIT
MULTIMET
12.6
Knots
Gust
Max 14.6
Min 10.6

Selected Averaging
period

Averaged wind speed
with measurement units

Wind Gust Warning
*(shown when instant speed exceeds
the average by a preset threshold)*

Max / Min Instantaneous speed
during averaging period
(ie, during last 2 minutes)

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BIG Display

This display presents data in a Big numerical format that remains clearly
visible at a distance.

Instantaneous or
averaged direction

Instantaneous or
averaged speed with
measurement units

CASELLA
280°
12.6
Knots
2 Min
Max 295°
Min 255°
Max 14.6
Min 10.6
MULTIMET

Averaging period

Max and Min value of
instantaneous direction
during averaging period

Max and Min value of
instantaneous speed
during averaging period

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HISTORIC Wind Graph
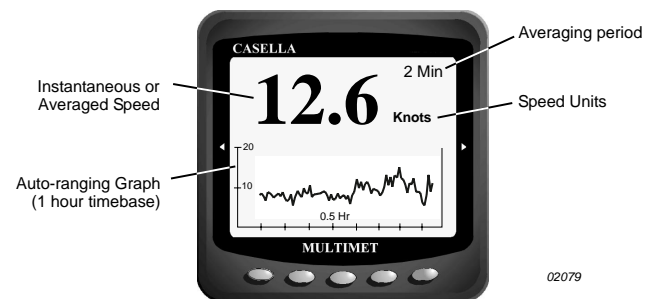
2.3   System Configuration Menu

Press the blue button for 3 seconds to access the configuration menu. The following parameters may be defined from this menu.

UNITS Select the desired wind speed units (m/s, knots, mph, kmh)

RESOLUTION
Used to select the resolution of direction values.
The following resolutions are available: 1°, 5° or 1°.

GUST Threshold
A gust warning message is displayed whenever the instantaneous speed exceeds the 2 or 10 minute average speed by more than the user set threshold.

For example, if the gust threshold is set for 10 knots and the average speed is currently 12 knots, the Gust warning message will be displayed whenever the instantaneous wind speed exceeds 22 knots. Large and sudden variations in wind speed may be hazardous in aviation or construction environments.

ALARM
The alarm sub-menu is used to define the following wind speed alarm parameters.

> **Data**   Allows the alarm to be triggered using the instantaneous or 2 minute average speed.

> **Speed**   Sets the trigger level of the alarm.

> **Duration**
> Sets the time duration of the audio warning signal.
> Adjustable from 0 to 60 seconds, Continuous or Off.

LOG   The logger sub-menu is used to define the data logging functions.

> **Log ON/OFF**
> Determines if data logging function is active.

Interval Allows the logging interval to be adjusted from 1 to
120 minutes.

Clear Used to erase any data saved within the internal memory.

A statistical summary of the logger's operating condition is shown at
the bottom of the screen. It is used to identify the number of
records saved in the memory, the remaining logging time available
(days, hours, minutes) before oldest data will be overwritten and also
the percentage of occupied memory space.

Once the memory becomes full of data, the logger will automatically
overwrite the oldest data records with new ones. This ensures the
most recent conditions are always being recorded.

SYSTEM

The System menu contains the following less frequently used
configuration parameters.

PC Port
Determines the RS232 communication speed (9600 default).

Reset All
Provides a complete system reset, which is used to clear
the memory and reset date and time.

Bleep ON/OFF
Determines if a bleep on keypress is required.

EXT Alarm ON/OFF
A logic level control signal is available for interfacing to
remote alarm circuitry. To avoid communication errors and
conflicts, the EXT Alarm should be set OFF whenever the
RS232 connection is required.

DEMO OFF
Creates random data for demonstration purposes only.

LANG English
Sets the user interface language.
The currently supported language is English.

2.4   Alarm Operation

The wind speed alarm is triggered whenever the selected speed value
(instaneous or 2 min average) exceeds the preset threshold. The system will
bleep for the programmed time period (0-2 minutes, continuous or Off).
To swwitch the alarm sound off, press any key to reveal the menu
bar.
Pressing the central grey button will switch the alarm sound off.
Should the wind speed pass through the threshold again, the sound
will be re-triggered. The ALARM warning message will remain visible whilst
the alarm condition remains.

3. ONLINE PRO PC SOFTWARE

3.1 Software Overview

The Casella Online Pro software package provides Multimet users with a powerful and versatile program for the accumulation, processing and presentation of wind data.

The program integrates the functions of real time data presentation, data archiving and historical presentation within one attractive and easy to use package.

The following features are provided by the software.

¤ Real time display indicating prevailing conditions and providing critical
   information for on site decision making.

¤ User configurable screen layout for customised real time displays.

¤ Tabular and graphical presentation of data.

¤ Dynamically changing screens including scrolling graphs and real time wind roses.

¤ Data logging to PC

¤ Networking capability, with multi user access and displays via a PC network.

3.2 Minimum PC Requirements

IBM^{TM} compatible PC with Pentium II or better processor,
At least 8 MB of free RAM space,
Microsoft Windows 98/ME/2000 and NT 4/95 with IE4 or later,
Hard drive with at least 5 MB of free space,
3 $^{1}/_{2}$ in. high density (1.4 MB) floppy disk drive for program installation,
Super VGA colour monitor (1024 x 768 16 M colours recommended),
Mouse or other Windows compatible pointing device,
Printer - optional.

3.3 Installation, Configuration and Operation

Please refer to the Online Pro User manual.

4.   MAINTENANCE AND SERVICE
4.1   Routine Maintenance

The Multimet is designed to provide many years of trouble free operation,
however, as with all mechanical systems, some regular maintenance and
inspection may be required.
  Periodically check the system for the following:
  Signs of physical damage   Inspect the anemometer cups,
  direction vane,
  cabling,
  connectors and mounting components
  for signs of damage or deterioration.
  Replace any damaged components as
  necessary.
  Ease of rotation   Ensure both the wind vane and cups are
  free to rotate.
  Excessive friction may indicate that
  bearing replacement is required.

4.1.1 The Multimet

The display should require no maintenance other than periodic cleaning using
a soft cloth. DO NOT USE solvents or other cleaning products.

4.1.2 The Wind Speed and Direction Sensors

Cleaning the sensors and cross arm may be carried out using a soft damp
cloth. DO NOT USE solvents or other cleaning products.
  Apart from cleaning, no other regular maintenance is required, as the
number of moving parts is so few and the bearings on the main spindle are
sealed against dust etc.
  If the average wind speed is low and weather conditions moderate,
it is estimated that six years life can be expected from the bearings. With a
higher than average wind velocity and a bad exposure, for example near the
sea, then 4 to 5 years might be expected. At the end of this time it is
recommended that the bearings be replaced with new ones. Consult Casella
CEL Service Department.

4.2   Service

CASELLA CEL's in house service department offers a comprehensive range
of repair and calibration services, designed to effect a fast and efficient
back-up for all our products. The Service Department is operated under the
scope of our BSI registration for products manufactured by us. We will
however, undertake the repair of other manufacturer's equipment.
  For further information please contact CASELLA CEL's Service
Department at our Bedford premises. We will be happy to provide quotations
for individual repairs or provide annual maintenance under contract.

5. SPECIFICATIONS

5.1 Anemometer Wind Speed Sensor

Transducer type:	Optical interrupter
Maximum wind speed:	75 m/s
Starting velocity:	Typically 0.3 m/s
Distance constant:	3.5 m/s
Time constant:	Typically <0.5 s
Output calibration:	12.75 Hz/m/s
Resolution:	7.84 cm
Output signal:	0 - 5 V pulses
Pulses/revolution:	20
Non-linearity:	<±0.6%
Accuracy:	±0.3 m/s below 3 m/s
	±1% over 3 m/s
Supply voltage:	6 to 28 V DC
Power consumption:	3 mA
Stabilisation time:	<1 s from power up
Operating temperature:	-20 to +70°C
Heater option:	24 V DC / AC, 82 Ω, 7 W
Connecting cable:	4.5 m without conduit
	3.25 m with conduit
Conduit:	2.55 m

5.2 Weathervane Wind Direction Sensor

Transducer type:	GMR solid state system with microcontroller
Maximum wind speed:	75 m/s
Resolution:	1°
Accuracy:	<±2°
Aligning threshold:	<0.8 m/s for a 10° offset
Damping ratio:	0.25
Distance constant:	Typically 3.0 m
Undamped natural wavelength:	
	2.2 m
Repeatability:	0.5% FSD
Electrical angle:	0 to 359° no deadband at North
Nominal output signal:	0 to 1.8 V DC for 0 to 359° representing a 1 s rolling average updated 5 times per second
NMEA serial output:	When anemometer is connected, 0 to 5 V level data containing both direction and speed information updated 4 times per second
Supply voltage:	6 to 28 V DC
Power consumption:	3 mA
Stabilisation time:	<1 s from power up
Operating temperature:	-20 to +70°C

Specifications
           MULTIMET Wind Speed and Direction System
           & OnlinePro Software - Users Handbook

Heater option:	24 V DC / AC, 82 Ω, 7 W
Connecting cable:	4.5 m without conduit
	3.25 m with conduit

Note that the design of this sensor does not allow electrical adjustment. Where the greatest accuracy is not demanded (better than ±2°), these sensors can be interchanged.

However where higher accuracy is required, the setting up procedure given in Appendix I can be followed.

5.3 Multimet Display

Power supply:	12 V DC
Power consumption:	Approximately 250 mA
Display:	160 x 128 transflective graphics LCD with CCFL backlight
Display units:	mph, km/h, m/s, knots
Sensor polling:	Approx. 5 readings per second
Processed data:	Instantaneous value updated every second
	2 and 10 minute rolling averages updated every 5 seconds
	2 and 10 minute maximum and minimum values updated every 5 seconds
	2 and 10 minute and 5 second direction variation sector
Datalogging interval:	1 to 120 minutes
Memory capacity:	4500 readings
Logged data:	Date,
	time,
	average maximum and minimum speed and direction over logging period
Alarms:	Instantaneous or 2 minute wind speed
	Loss of sensor data
Dimensions:	Panel mounting: 110 x 110 x 80 mm
	Desk top enclosure: 125 x 125 x 133 mm
Mains Power Supply:	Input: 90-260 V AC at less than 40 Watts
	Output: 12 V DC 1.2 Amps

5.4 Applications

¤ Industrial emissions monitoring

¤ Wind monitoring at harbours, airports and helipads

¤ Wind monitoring for bridge management

¤ Nuisance dust monitoring for construction sites

¤ Landfill and waste management sites

¤ Sports events