

102813A TACMET WEATHER STATION OPERATION MANUAL



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Safety Notice

The contents of this manual have been checked against the hardware and software described herein. Since deviations cannot be prevented entirely, we cannot guarantee full agreement. However, the data in this manual is reviewed regularly and any necessary corrections are included in subsequent editions.

Faultless and safe operation of the product presupposes proper transportation, storage, and installation as well as careful operation and maintenance. The seller of this equipment cannot foresee all possible modes of operation in which the user may attempt to utilize this instrumentation. The user assumes all liability associated with the use of this instrumentation. The seller further disclaims any responsibility for consequential damages.

Electrical & Safety Conformity

The manufacturer certifies that this product operates in compliance with the following standards and regulations:

FDA/CDRH This product is tested and complies with 21 CFR, Subchapter J, of the Health and Safety Act of 1968

US 21 CFR 1040.10

Warranty

All instruments are warranted against defects in parts or workmanship for a period of one (1) year from the date of shipment. Should any instrument or part prove to be defective within the warranty period, upon written notice and return of the unit (freight prepaid), Met One Instruments, Inc. will, at its option, repair or replace the defective unit, and return it, transportation prepaid via UPS.

Equipment abused, modified, or altered may cause cancellation of this warranty.

The above warranty applies only to items manufactured by Met One Instruments, Inc. Items not manufactured by Met One Instruments, Inc. are warranted only to the extent and in the manner warranted by the manufacturer of such items. Should emergency warranty repair be required at a customer's facility, Met One will provide such repairs and charge only the portal-to-portal Field Service rates and actual expenses in accordance with our published rates then in effect. Expendable supplies and wear items, such as bearings and lightning- related damages, are not covered under this warranty.

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1.0 Safety

1.1 Safety

This manual may include a **CAUTION** and a **WARNING** indication. Familiarize yourself with the following definitions for the meanings of these indicators.

A **CAUTION** indicates a hazard and calls attention to a procedure that if not correctly followed could result in damage to the instrument. Do not proceed beyond a caution indicator without understanding the hazard.

A **WARNING** indicates a hazard to you and calls attention to a procedure that if not correctly followed could result in injury or even death. Do not proceed beyond a warning without understanding the hazard.

2.0 Introduction & Overview – 102813A TACMET 2010 Weather Station

2.1 Overview

Met One's 102813A TACMET 2010 weather station is designed as a stand-alone weather station to provide accurate measurements of wind speed, wind direction, temperature and relative humidity. The unit has no moving parts and is ideally suited for use wherever reliable, maintenance free operation over a wide operating range under adverse operating conditions is required. The unit is built with a metal housing and filtering on all input and output lines to offer some protection from electromagnetic interference.

2.2 Specifications

PERFORMANCE

WS Range:		0-234 kph (0-65 m/s, 0-145 mph)
Accuracy:	WS	1.8 kph (0.5 m/s, 1.1 mph) \pm 5%
	WD	\pm 5° @ wind speeds > 2.2 m/s (5 mph)
Resolution:		0.1 m/s (.22 mph)
Temperature:		
Range:		-40° to +60°C (-22° to 131°F)
Accuracy:		\pm 2°C (\pm 3.6°F) when wind > 2 m/s
Relative Humidity:		
Range:		0 to 100%
Accuracy:		\pm 3%

MTBF: 80,000 hours

ELECTRICAL

Measurement Format:	Two orthogonal axis, North-South and East-West
Measurement Rate:	Approx. 2 Hz each axis
Operating Frequency:	40 kHz
Signal Output:	RS232 @ 9600 baud
Power Requirements:	9 - 36 Vdc: 100 mA draw @ 12 Vdc

PHYSICAL

Size:	12.25 inches (31.1 cm) x 4 inches (10.15 cm) dia.
Weight:	4.0 lb. (1.8 kg.)
Mounting:	MS3106F18-1S Connector

3.0 Installation

Be sure to mount the sensor in a clear, open area to minimize any turbulent effects caused by local obstructions (e.g., trees, buildings, etc.). The sensor is typically installed on Met One's P/N 102656-G pre-wired sensor mounts. The keyway in the connector on the base of the sensor is matched to the keyway on the mount.

Attach the sensor to the 102656-G QuickMount by inserting the sensor into the top of the mount, attaching the latch springs to the clips on the bottom of the sensor and snapping them down to lock the sensor in place. It may be necessary to rotate the sensor 180° to allow the keyway to seat properly.

4.0 Input/Output Connections

The sensors' pin designations are as follows:

<u>PIN</u>	<u>FUNCTION</u>
A	Power Ground
B	9 - 36 Vdc
C	N/C
D	Chassis Ground
E	RS232 Ground
F	AUX RS232 USEND
G	RS232 RXD (RS485 B(+))
H	RS232 TXD (RS485 A(-))
J	N/C
K	N/C

5.0 User Interface

The 102813A TACMET 2010 has two serial outputs. The main serial port output (pin H on the connector) is in a special format to send data to digital displays. This string contains only Wind Speed and Wind Direction and is transmitted approximately once per second at 9600 baud (N/8/1). The data is easily viewed and can be displayed and captured using Windows HyperTerminal that is supplied on most Windows operating systems. To find HyperTerminal click Start, Programs, Accessories, Communications, HyperTerminal. An **example** of the main output format is shown below:

```
S01T006.8S02T063[CR/LF]
```


The auxiliary serial port output (pin F on the connector) is set for 19,200 baud (N/8/1) and outputs a complete data string approximately once per second. The data is easily viewed and can be displayed and captured using Met One's WeatherView Software or Windows HyperTerminal. An **example** of the aux output format is shown below:

```
01+H0012 02+006.8 03+063.2 04+022.2 05+045.1 06+12.12 [CR/LF]
```

The first parameter is the serial number of the sensor (H0012), the second parameter is the wind speed (in m/s), the third parameter is the wind direction, the fourth parameter is the temperature (in Deg C), the fifth parameter is the relative humidity, and the sixth parameter is the power supply voltage.

6.0 Calibration

The sensor requires a wind tunnel for calibration. Met One can provide NIST traceable calibration in our wind tunnel. Please contact the factory for further details.

7.0 Maintenance

The sensor was designed to require minimal maintenance. Unless there is indication of a problem, it is recommended to return the unit to the factory every two years for routine maintenance/calibration. In extremely corrosive environments, the condition of the connector used to mount the sensor should be checked. There are no adjustments or user repairable parts located inside the sensor.

Appendix A

Theory of Operation

Winds

Met One's sonic anemometer operates on the principal that the speed of the wind affects the time it takes for sound to travel from one point to a second point. If the sound is traveling in the direction of the wind then the transit time is decreased. If the sound is traveling in a direction opposite the wind then the transit time is increased. This principal is well known and is the basis of most sonic anemometers.

Temperature/Humidity

The temperature sensor in the P/N 102813A TACMET 2010 uses a precision single-element thermistor. This provides a highly accurate and stable temperature reading. The resistance value is 10K ohms at 77°F (25°C). This allows the TACMET 2010 to directly interface with the temperature sensor without additional electronics; sensor compensation is handled through software.

The relative humidity sensor is a capacitive element sensor. It has a linear voltage output, which allows it to be connected directly to the TACMET 2010 microprocessor. The humidity sensor element's construction provides excellent resistance to wetting, dust, dirt, oils, and common environmental chemicals. A heavy contaminant layer of dirt will slow down the sensor's response time because it will take longer for water vapor to equilibrate in the sensor.

Fluxgate Compass

The P/N 11709 internal compass is low power and compact, and is a complete compass or magnetic sensor module that integrates easily into the TACMET 2010. The internal compass uses two magneto-inductive sensors, which change inductance with different applied magnetic field strengths, to sense magnetic fields.

The TACMET 2010 microprocessor measures the output of the internal compass and then corrects the wind direction data for the orientation of the sensor. The output of the TACMET wind direction is relative to magnetic North.