

TU1073 - User Instructions for GenII TMET weather transmitter



The TMET is part of the Eltek GenII family of transmitters.

The TMET transmitter is designed to be used with the new Vaisala WMT530 weather monitor. WXT530 is a series of monitors, refer to Page 2 for details. A pyranometer and additional temperature (thermistor) input is included. It provides comprehensive local weather channels at the receiver/logger (referred to hereafter as RX250AL).

TMET accessories include an outdoor pole mounting enclosure, pole mounting solar panel or AC power supply and additional air temperature sensor.

The TMET provides inputs for:

1 x RS232 plus power for the Vaisala WXT530 series weather sensors.

1 x 0-50mV range with scaling for use with Kipp and Zonen CMP3 pyranometer or Skye Instruments SKS1110 pyranometer.

1 x Thermistor temperature input for use with a ground temp or radiant air temp sensor.

TMET channel assignment:

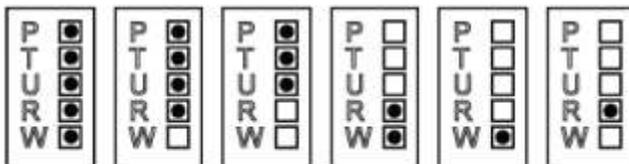
Channels are presented at the RX250AL together with those from any other GenII transmitter and can be reordered during TX Set-up or when configuring the RX250AL. Channels can only be renamed when configuring the RX250AL with Darca software. Note: RX250AL channels are numbers 1 through 247. TMET channels are labelled A through H.

TMET Channel	Vaisala *WXT530 connected	Note	Range
A	Wind direction		0°- 360°
B	Wind speed		0-60m/s
C	Rainfall	see page 8	0.0 to 6500.0mm
D	Temperature		-52.0 to 60.0°C
E	Relative humidity		0 to 100%
F	Barometric pressure		600 to 1100hPa
G	Thermistor temperature probe		-50.0 to 150.0°C
H	If Kipp & Zonen CMP3 connected, range is typically 0-5000w/m2 and is a function of CMP3 calibration value.	If Skye SKS1110 connected range is 0-5000w/m2	See page 5 "setting up channel H"

Note: Channels C to H are the instantaneous sensor values at the time of transmission. Channels A and B are averaged values at the point of transmission.

★ The WXT530 product family offers a variety of weather parameters. The measurement combinations of each model are listed below.

WXT536 WXT535 WXT534 WXT533 WXT532 WXT531

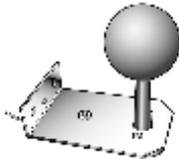


- P = Pressure
- T = Temperature
- U = Humidity
- R = Rain
- W = Wind

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Sensors that can be used with TMET

<p>Vaisala WXT530: For operation and mounting, refer to the User Guide supplied with the product. Ensure the WXT530 is pointing north (refer to N← moulded into base - see P147).</p> <p>WXT530 supplied by Eltek is preconfigured and includes a 26.7mm or 30mm diameter pole top adaptor (see P148) and 3M connecting lead. TMET powers the WXT530. Note: TMET cannot provide wind gust data</p>	 A white, cylindrical sensor with a series of horizontal ridges and a small blue label on the side.
<p>Vaisala WXT533 and WXT532: For operation and mounting, refer to the User Guide supplied with the product. Ensure the WMT52 is pointing north (refer to N← moulded into base).</p> <p>WMT530 supplied by Eltek is preconfigured and includes a 26.7mm or 30mm diameter pole top adaptor and 3m connecting lead. TMET powers the WMT530 Note: TMET cannot provide wind gust data</p>	 A white sensor with a flat top and a small blue label, mounted on a silver pole.
<p>Kipp and Zonen CMP3: Refer to the instruction sheet for correct orientation and to the calibration certificate for SENSITIVITY value, which will be required when setting the H channel range. A mounting bracket/base may be required. (e.g PyroBkt below). CMP3 does not require power. Note: TMET cannot provide sunshine hours.</p>	 A white, dome-shaped sensor with a clear lens on top and a red cable on the side.
<p>Skye SKS1110: Refer to manual and product specification. SKM221 levelling unit and SKM226 mounting bracket may be required. SKS1110 does not require power. Note: TMET cannot provide sunshine hours</p>	 A cylindrical sensor with a yellow top section and a black bottom section.
<p>PyroBkt: This is a pole mount robust bracket pre-drilled for use with the Kipp and Zonen CMP3 and the SKS1110. The mounting bracket positions the centre of the CMP3 approximately 155mm from the mounting pole. A stainless steel U bracket with securing nuts is included. Ensure that the CMP3 sensor is not in the path of the shadow cast by the pole.</p>	 A white, L-shaped mounting bracket with a green label and a black cable.

<p>Ground temperature probe: Eltek supplied thermistor probes with U type sensors are rated $\pm 0.1^{\circ}\text{C}$ for 0 to 70°C. See the Eltek website for probe specification and cable styles.</p>	
<p>Radiant air temperature probe: Grant Instruments type AG. Refer to the Eltek website for additional information.</p>	

Accessories for TMET

<p>WBT</p>	<p>Outdoor 25mm dia pole mounting enclosure, 200 x 300 x 132mm Weight (excludes TMET): TBA WBT is supplied with 2 x 12mm and 2 x 16mm compression glands at the base of the enclosure for external antenna, solar panel or 12VDC power, pyranometer or temperature probe cable access.</p>	
<p>SPTMET (if using any other panel ensure max charge current is < 1A to prevent failure of FU2)</p>	<p>10W solar panel supplied with 25mm dia pole mounting bracket and lead. Charge rate is 1A max. For northern hemisphere locations the SPTMET should be facing due south. The bracket fitted provides fixed inclination of 30 degrees and is optimised for latitude 52 degrees north. For extremes of latitude an alternative bracket may be required.</p>	
<p>MP12U/TMET</p>	<p>100/250AC to 12VDC power supply. This is the standard MP12U re-terminated with bare ends. The +/positive lead is indicated by a red sleeve.</p>	

TMET Connections

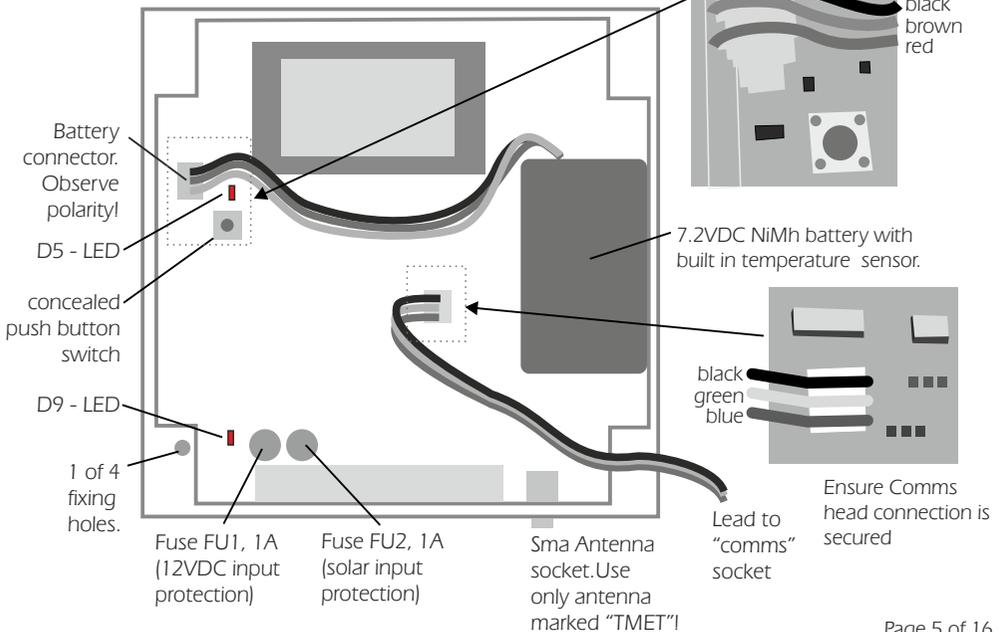


Comms socket

Connections strip



Location of key components (panel removed):



Powering the TMET

TMET is supplied with a 2Ah NiMh battery partially charged and disconnected. TMET can be charged from a solar panel, Eltek type SPTMET or external 12VDC supply e.g. Eltek type MP12U.

Caution: do not use a panel rated greater than 10W

Charging using SPTMET solar panel

Connect solar panel to “Solar panel” inputs. Observe polarity. Maximum current (1A max) from the solar panel is connected directly to the battery. If the battery pack temperature sensor exceeds 50°C a charge current limiter prevents overheating of the battery. Reversing the solar panel connections could cause fuse FU2 to fail.

Charging using the MP12U

Connect MP12U to 7-12VDC inputs. Observe polarity. The input is reverse polarity protected; refer to protection fuse FU1. D9 will illuminate. With MP12U connected the fast charge rate is approx. 350mA. Battery temperature detection at 50°C will cause charging current to reduce. Fast charge is reduced if the DC voltage is less than 12VDC.

Battery

The battery should be disconnected if the TMET is to be stored or not used for more than 5 days. This is to prevent deep discharge of the battery which can degrade battery capacity and life.

To disconnect:

- Release the semi captive 4 x screws retaining the clear front cover
- Remove the 4 screws retaining information plate
- Carefully withdraw battery lead from header (this is the black/brown/red cable form).

To reconnect, reverse disconnect procedure. Ensure the lead is refitted correctly (see P5).

Caution!

Do not attempt to connect the solar panel and a 12VDC supply simultaneously as damage to the TMET can result!

With a Vaisala sensor connected, battery capacity is rated for 5 days operation (once fully charged) in the event of no charging source – i.e. complete cloud cover or 12VDC failure.

Locating the TMET

TMET is rated for indoor use only. If used outdoors, TMET must be housed in a secondary enclosure e.g. outdoor unit type WBT from Eltek. The WBT is for mounting on a 25mm lightweight aluminium pole.

TMET is supplied with a compressed antenna; to extend the range an external antenna can be used e.g. a light weight dipole antenna with lead, type LWANT/sma. Alternatively a Yagi antenna, available from other suppliers can be used. Do not exceed 10mW ERP.

TMET range can also be extended by using the RP250GD repeater unit.

Refer to the information supplied by Vaisala for siting and mounting the weather/wind monitor sensor. A 25mm pole top bayonet fitment is available from Vaisala.

Be aware that high power transmitters are frequently sited on top of buildings and could interfere with either TMET or Vaisala sensors. As a precaution, site TMET and Vaisala devices clear of such transmitter antennae.

Indicators and concealed switch (located behind the fascia)

Red LED (D9) indicates external DC power is connected to the "7-12VDC" input.

Red LED (D5) cadence due to activation of the concealed switch (SW1):

Function	Activate switch for	LED cadence	LCD
Tx disable	5 seconds	5 x fast flashes	After 5 seconds displays OFF
Tx enable	5 seconds	1 continuous 5 sec flash	After 5 seconds displays sensor information
Test transmissions approximately every 5 sec for 2 minutes.	2 seconds	Short flash at time of transmission	No change

Red LED (D5) due to TMET being configured or not configured:

TMET condition	LED	Note	LCD
TMET not configured	"Blink" every 8 seconds		Battery gauge displayed only
TMET configured	Short flash at time of a transmission	A transmission occurs at a random time within the set TX interval	See Display below

LCD

The LCD includes a battery condition gauge, active at all times (Battery gauge will flash if battery failure imminent). Only configured channels are displayed.

If a channel is configured but not connected to the sensor the LCD shows:

A	OPEN	E	OPEN %
B	OPEN	F	OPEN
C	0.0	G	Lo °C
D	OPEN °C	H	Lo

Note: If the TMET is to be stored or will not be connected to a charging source for more than 5 days, it should be disabled (put into hibernate mode) to prevent total battery drain and possible loss of settings. To do this, first remove the clear front cover, and then remove the label panel. Press the concealed switch (SW1) for 5 seconds. The LCD will now read OFF.

TMET configuration using Darca software

Refer to the Quick start guide (ref TU1008).

This is supplied with the RX250AI or can be downloaded from

<http://www.eltekdataloggers.co.uk/literature.shtml>

Connect the LCTX3 to the "Comms" socket. Don't forget to set up the logger interval first! (Note that the TMET cannot be configured by the logger only.)

Before setting Tx channels please set the TX Interval:

Tx Chan:	Range:	Sc Chan:				Match:	Alarms:
A	Wind Direction [w/NT510 Digital] (0.0 to 360.0 °)	3	Set Channel	Delete Channel	Meter	<input checked="" type="checkbox"/>	Edit Alarm
B	Wind Speed [w/NT510 Digital] (0.0 to 60.0 m/s)	4	Set Channel	Delete Channel	Meter	<input checked="" type="checkbox"/>	Edit Alarm
C	Rain/Fall [w/NT510 Digital] (0.0 to 6500.0 mm)	5	Set Channel	Delete Channel	Meter	<input checked="" type="checkbox"/>	Edit Alarm
D	Temperature [w/NT510 Digital] (-52.0 to 60.0 °C)	6	Set Channel	Delete Channel	Meter	<input checked="" type="checkbox"/>	Edit Alarm
E	Humidity [w/NT510 Digital] (0 to 100 %)	7	Set Channel	Delete Channel	Meter	<input checked="" type="checkbox"/>	Edit Alarm
F	Pressure [w/NT510 Digital] (600 to 1100 hPa)	8	Set Channel	Delete Channel	Meter	<input checked="" type="checkbox"/>	Edit Alarm
G	U type Thermistor (-50.0 to 150.0 °C)	9	Set Channel	Delete Channel	Meter	<input checked="" type="checkbox"/>	Edit Alarm
H	Voltage (0.00 to 50.00 mV)	10	Set Channel	Delete Channel	Meter	<input checked="" type="checkbox"/>	Edit Alarm

Note: Tx channels A to G are pre-set. Select as appropriate, set channel and then meter to check. Do not attempt to set alarms!

Configuring the Rain parameter in Darca Heritage for Tx Channel C (precipitation)

The value of rainfall recorded by the logger is the total measured during each logging interval. It is important to consider the maximum expected value of rain during this time period in order to optimise the range of the rain parameter.

In Darca Heritage, open the **Parameters** window by clicking **Site Settings > Parameters**.

As an example, if the maximum rainfall expected at the location is 5mm during a logging interval of 5 minutes, set the **Range** of the parameter to:

Add to defaults Delete from defaults

Name: Rain Type: Physical

Range

From: 0 To: 5 Units: mm

Setting / scaling Channel H for the Skye SKS1110 Pyranometer

- Connect the SKS1110 to the TMET: green to pyro +, red and blue to pyro 0.
- In **Range** for channel H, select **EU Range** from the drop down list. Click **Set channel** and then **Edit Eu Range** (hardware range is 0.00 to 50.00mV).

EU range configuration:

- SKS1110 output is 10uV/Wm²

Assuming a typical UK day, clear and sunny equates to a solar radiation value of 1000W/m² or more. Therefore, an SKS1110 will deliver 10mV at 1000W/m² (SKS1110 usable to 5000W/m²)

TMET range is 0-50mV. Therefore 50mV equates to 5000W/m²

In the EU Range Selector: Channel H window (Do not click on Helper!)

Set Maximum to 50000

Set units to Wm²

Set DP Position to 1 then click OK

- Now check in Range for channel H that the text reads (EU Range) Voltage (0 to 5000.0Wm²)

Setting / scaling Channel H for the Kipp and Zonen CMP3 pyranometer

- Connect the CMP3 to the TMET: red to pyro +, black (screen) and blue to pyro 0.
- In **Range** for channel H, select **EU Range** from the drop down list. Click **Set channel** and then **Edit Eu Range** (hardware range is 0.00 to 50.00mV).

EU range configuration:

- Refer to the CMP3 Calibration Certificate for SENSITIVITY value in uV /Wm. Let's say for example that the CMP3 output is 10.32uV/Wm²
- Assuming a typical UK day, clear and sunny equates to a solar radiation value of 1000W/m² or more. Therefore, a CMP3 will deliver 10.32mV at 1000W/m²
- TMET range is 0-50mV. Therefore 50mV equates to 5000W/m²
- In the EU Range Selector: Channel H window (Do not click on Helper!)
- Set **Maximum** to 48450
- Set **units** to Wm²
- Set **DP Position** to 1 then click **OK**
- Now check in **Range** for channel H that the text reads **(EU Range) Voltage (0 to 4845.0Wm²)**

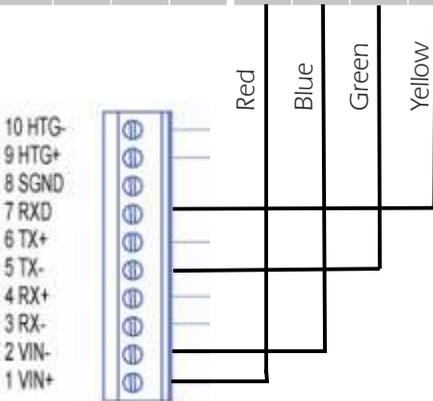
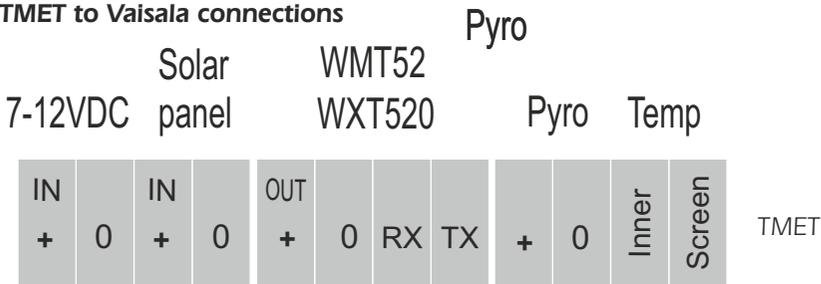
Now Close Transmitter Connections and follow the instructions, ending the routine by clicking **Send to Squirrel** and then **OK**, and close the Window.

TMET specification

Frequency:	Default is 434.225Mhz (other frequencies are available)
Tx compliance:	To EN300 220 -1
Tx output power:	10mW ERP
Useable Tx interval:	typically 10 seconds to 15 minutes
On air duration:	typically <200mS
Environment:	Indoor only, rated IP40
Temperature Range:	-10 to +55°C compliant to EN300 220-1, operational -30 to +60°C
Humidity:	95% non condensing (TMET PCB is conformal coated)
Size:	120 x 120 x 55mm (excluding antenna)
Weight:	560g
Connection strip:	Standard 5mm pitch rising cage connector (included)
Antenna "TMET":	Supplied compressed spring, L=70mm, modified SMA base Gain -3db
Antenna connector:	SMA socket is mounted on the TMET
Fixing:	4 x 4mm dia holes (fixing screws are NOT provided)
Battery type:	customised (7.2v) 2.3Ah Ni-mH with built in temperature sensor
Battery endurance:	typically > 5 days if battery fully charged and with Vaisala connected
Charging time:	Using MP12U: typically 8 hours from discharged Using SPTMET typically from discharged 1 day of full sun.

Max lead length to any connected sensor is 10M.

TMET to Vaisala connections



WXT530

Vaisala notes and configuration

Note: The Vaisala device is set to take readings from the wind speed and wind direction sensors every 5 seconds to create a rolling average value for every 12 readings (1 minute). Therefore averaged values are sent at the time of a TMET transmission.

RH, temp, precipitation and barometric pressure are instantaneous values at the time of a TMET transmission.

Detailed setting information (if Vaisala software and USB configuration lead available):

The configuration of the WXT530 can be checked using the Vaisala Configuration Software.

- Connect the Vaisala device to the PC using the Vaisala USB configuration lead.
(Warning: Do not connect the Vaisala device to TMET and USB simultaneously!)
- Launch the software.

For WXT530:

- In **File > Connection Setup**, ensure the correct port is selected. To find the correct port, open **Control Panel > Device manager > Ports (COM & LPT)** and note the COM Port number allocated to "Vaisala USB Instrument".
- Check or change values to be as shown, ensuring the correct port allocation in **Connect using** drop down is selected. (allocation used is for illustration only):



For WXT530 general: (For WMT532 go to page 14)

In **Settings > Device Settings**, set check boxes as below:

Device Settings

Device

Model: [Redacted] Serial number: [Redacted]
Version: [Redacted] PTU src: [Redacted]
Calibration date: [Redacted] Order code: [Redacted]
Info: [Info] Address: [0]

Enhancements

Enable heating
 Error messaging
 Composite message auto transmission

Supervision interval (1 s ... 60 min): [15 s]
Auto composite interval (1 s ... 60 min): [1 s]

Communication protocol

SDI-12 v1.3
 Continuous measurements
 NMEA v3.0
 Query only
 Use XDR for wind message
 ASCII
 Polling only
 Response with CRC

User port settings

Port type: [RS-232]
Bits per second: [19200]
Data bits: [8]
Parity: [None]
Stop bits: [1]
RS-485 line delay (ms): [25]

OK Cancel Defaults

In **Settings** > **Message Settings**, set check boxes as below:

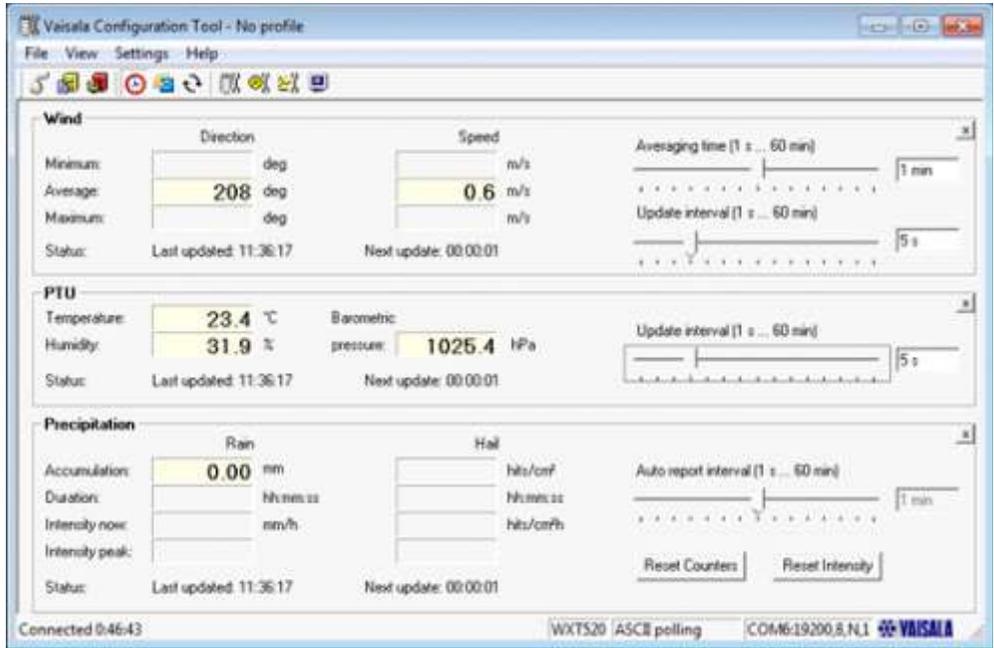
The screenshot shows a 'Message Settings' dialog box with the following sections and options:

- Wind message**
 - Direction minimum
 - Speed minimum
 - Direction average
 - Speed average
 - Direction maximum
 - Speed maximum
- PTU message**
 - Barometric pressure
 - Pressure ref. temp
 - Air temperature
 - Relative humidity
- Precipitation message**
 - Rain accumulation
 - Hail accumulation
 - Rain duration
 - Hail duration
 - Rain intensity
 - Hail intensity
 - Rain peak
 - Hail peak
- Self diagnostic**
 - Heating temp.
 - 3.5 V reference
 - Heating voltage
 - Info
 - Supply voltage
- Composite message**
 - Direction minimum
 - Speed minimum
 - Direction average
 - Speed average
 - Direction maximum
 - Speed maximum
 - Barometric pressure
 - Pressure ref. temp
 - Air temperature
 - Relative humidity
 - Rain accumulation
 - Hail accumulation
 - Rain duration
 - Hail duration
 - Rain intensity
 - Hail intensity
 - Rain peak
 - Hail peak
 - Heating temp.
 - 3.5 V reference
 - Heating voltage
 - Info
 - Supply voltage

Buttons:

For WMT532:

In **Vaisala Configuration Tool – No profile** (Default Screen) adjust **Averaging** and 2 lots of **Update interval** as below:



Message settings:

Message Settings [?] [X]

Wind message

<input type="checkbox"/> Direction minimum	<input type="checkbox"/> Speed minimum
<input checked="" type="checkbox"/> Direction average	<input checked="" type="checkbox"/> Speed average
<input type="checkbox"/> Direction maximum	<input type="checkbox"/> Speed maximum

PTU message

<input type="checkbox"/> Barometric pressure	<input type="checkbox"/> Pressure ref. temp
<input type="checkbox"/> Air temperature	<input type="checkbox"/> Relative humidity

Precipitation message

<input type="checkbox"/> Rain accumulation	<input type="checkbox"/> Hail accumulation
<input type="checkbox"/> Rain duration	<input type="checkbox"/> Hail duration
<input type="checkbox"/> Rain intensity	<input type="checkbox"/> Hail intensity
<input type="checkbox"/> Rain peak	<input type="checkbox"/> Hail peak

Self diagnostic

<input checked="" type="checkbox"/> Heating temp.	<input checked="" type="checkbox"/> Supply voltage
<input checked="" type="checkbox"/> Heating voltage	<input checked="" type="checkbox"/> 3.5 V reference

Composite message

<input type="checkbox"/> Direction minimum	<input type="checkbox"/> Speed minimum
<input checked="" type="checkbox"/> Direction average	<input checked="" type="checkbox"/> Speed average
<input type="checkbox"/> Direction maximum	<input type="checkbox"/> Speed maximum

<input type="checkbox"/> Barometric pressure	<input type="checkbox"/> Pressure ref. temp
<input type="checkbox"/> Air temperature	<input type="checkbox"/> Relative humidity

<input type="checkbox"/> Rain accumulation	<input type="checkbox"/> Hail accumulation
<input type="checkbox"/> Rain duration	<input type="checkbox"/> Hail duration
<input type="checkbox"/> Rain intensity	<input type="checkbox"/> Hail intensity
<input type="checkbox"/> Rain peak	<input type="checkbox"/> Hail peak

<input checked="" type="checkbox"/> Heating temp.	<input type="checkbox"/> Supply voltage
<input checked="" type="checkbox"/> Heating voltage	<input type="checkbox"/> 3.5 V reference

OK Cancel Defaults

Routine Maintenance

TMET:	No routine maintenance required. Battery packs should be replaced after 36 months.
Vaisala WXT530:	Vaisala (UK) advise there is no statement for calibration period but suggest every year/18 months is best practice. Vaisala, where applicable, offer test and replacement of the PTU (RH, temp and barometric pressure) with test report (no calibration). For costs refer Eltek or Vaisala direct.
Skye Instruments SKS1110:	Skye Instruments recommend calibration every 2 years. For costs refer Eltek or Skye instruments direct.
Kipp and Zonen CMP3:	Kipp and Zonen recommend calibration every 2 years. For costs refer Eltek or if in UK Equinox (UK distributor) direct.
Grant Instruments AG probe:	None required, calibration every 2 years.
Eltek probes e.g. type ELCM:	None required, calibration every 2 years.

Guarantee

TMET and WBT are guaranteed for three years against faulty materials or workmanship. The guarantee given for equipment supplied by us, but not manufactured by Eltek (this includes all devices detailed in the "Sensors that can be used with TMET" (refer P 2) is limited to the guarantee given by the manufacturer of the particular product as follows:

Vaisala WXT530:	One year (extended warranty is available from Vaisala at time of purchase only)
Skye Instruments SKS1110:	One year (extended warranty is available from Skye Instruments at time of purchase only)
Kipp and Zonen CMP3:	Two years standard
Grant Instruments AG probe:	One year
Eltek probes e.g. type ELCM:	One year

Guarantee repairs to TMET or WBT are free of charge for labour, materials and return carriage.

Associated information available from Eltek:
TN109 – GenII basic principles of operation.
TN110 – Receiver/Logger Alarm management.