**WXT-WMT Field Test Sheet**

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| --- | --- | --- | --- |
| **Station Name:** |  | **File:** | STN |
| **Performed By:** |  | **Date:** |  |
| **System Type:** | Circle one… WXT\_\_\_\_\_ WMT\_\_\_\_\_ |  |  |

**After using this document at a station for a calibration or repair, it MUST be filed to the station file.**

**Communicating with a WXT/WMT:**

* Connect a laptop RS232 port to the WXT/WMT data port using the appropriate Sensor Cable (and adapter and/or null modem cable as appropriate).
* Use a terminal type program (e.g. HyperTerminal or ProComm) to communicate in ASCII character mode with the following serial port setup:

RS232 or RS485...

|  |
| --- |
| From 2013: 1200/9600, 8, N, 1 (1200 or 9600 baud, 8 data bits, No parity, 1 stop bit)  Pre 2013: 19200, 8, N, 1 (19200 baud, 8 data bits, No parity, 1 stop bit) |

SDI-12...

|  |
| --- |
| 1200, 7, E, 1 (1200 baud, 7 data bits, Even parity, 1 stop bit) |

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| **Test Equipment Used** | Model | Serial | Calibration Expires |
| Pressure Standard | PTB220 / PTB330 |  |  |
| RH/AT Standard | HMP155 |  |  |
| PRT Probe (Greisinger Digital Thermometer) |  |  |  |
| LI-COR Standard | LI-200Z / LI-200R | Serial  Cal uA/kW/m2 |  |
| Universal Calibrator |  |  |  |
| Multimeter |  |  |  |
| Druck Calibrator |  |  |  |
| Megger |  |  |  |
|  |  |  |  |
|  |  |  |  |

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| --- | --- | --- | --- |
| **Changed Units** | Model | Old Serial Number | New Serial Number |
| WXT-WMT |  |  |  |
| Rain gauge |  |  |  |
| Solar radiation sensor |  |  |  |
| External Temperature sensor |  |  |  |
| Battery |  |  |  |
| Solar regulator |  |  |  |
| Mains adaptor |  |  |  |
| Cellular modem |  |  |  |
| Radio modem |  |  |  |
| Short haul modem |  |  |  |
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|  |  |  |  |

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| --- | --- |
| **Wind Sensor Inspection** | Ok |
| Check orientation of sensor base within ±1 degree of True North |  |

Typical message example (the blue text Ta to Hc is included for the WXT and omitted for the WMT)... Ra, Sr and Tr are for analog external sensors on WXT536.

|  |
| --- |
| Ar0,Dn=189D,Dm=236D,Dx=298D,Sn=3.9M,Sm=8.5M,Sx=15.4M,Ta=11.3C,Tp=11.5C,Ua=65.9P,Pa=963.3H,  Tr=23.0C,Ra=1.2M,Sr=510.78V,Rc=0.01M,Hc=0.0M,Rt=131483.4R,Th=10.6C,Vh=0.0N,Vs=14.4V,Vr=3.513V,Id=NZTST\*Csm<cr><lf> |

Notes: Depending on the application messages will appear every 15 to 60 seconds.

"Item" is the data identifier in the WXT/WMT message.

### Before and After Readings

These checks must be performed with the sensor installed in-situ i.e. on the mast and the mast erected.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | Before | Ok | After | Ok |
| Description | Unit | Item | Value Units/Status |  | Value Units/Status |  |
| Sensor address character "A" then r0 |  | ...r0 | Ar0 — |  | Ar0 — |  |
| CCW 1 minute CCW 3 sec | ˚T | Dn= | D |  | D |  |
| Wind dir 1 minute avg | ˚T | Dm= | D |  | D |  |
| CW 1 minute CW 3 sec | ˚T | Dx= | D |  | D |  |
| Lull 1 minute min 3 sec speed | m/s | Sn= | M |  | M |  |
| Wind spd 1 minute avg | m/s | Sm= | M |  | M |  |
| Gust 1 minute max 3 sec speed | m/s | Sx= | M |  | M |  |
| Air temperature Instant | ˚C | Ta= | C |  | C |  |
| Internal temperature Instant | ˚C | Tp= | C |  | C |  |
| Relative humidity Instant | %rh | Ua= | P |  | P |  |
| Barometer pressure Instant | hPa | Pa= | H |  | H |  |
| Rainfall Accumulating | mm | Ra= | M |  | M |  |
| Solar Irradiance 1 minute avg  Note: read W/m2 = WXT Volts | W/m2 | Sr= | V |  | V |  |
| External temperature Instant  (5cm Road or 10cm Soil) | ˚C | Tr= | C |  | C |  |
| External PT1000 Resistance | Ω | Rt= | Ω |  | Ω |  |
| Rainfall Accumulated | Mm | Rc= | not used M |  | not used M | -- |
| Hail Accumulated | hit/cm2 | Hc= | not used M |  | not used M | -- |
| Heater temperature Instant | ˚C | Th= | C |  | C |  |
| Heater voltage & status^^ Instant | V | Vh= |  |  |  |  |
| Supply voltage Instant | V | Vs= | V |  | V |  |
| Reference voltage Instant  WXT520 3.5 ± 0.1 V  WXT53x 3.6 ± 0.1 V | V | Vr= | 3.\_\_\_\_\_\_\_ V |  | 3.\_\_\_\_\_\_\_ V |  |
| Station Id 5 characters then \* |  | Id= | NZ\_\_\_\_\_\_\_\_\* |  | NZ\_\_\_\_\_\_\_\_\* |  |
| Checksum 3 characters |  | Csm |  |  |  |  |
| End of message |  | crlf | <cr><lf> |  | <cr><lf> |  |
|  |  |  |  |  |  |  |

^^ Heating status character definitions are as follows:

# = heating option not available.

N = heating option available but disabled, or temperature over high control limit.

W = heating on 100% duty cycle, temperature between low-middle control limits.

V = heating on 50% duty cycle, temperature between high-middle control limits.

F = heating is on at 50% duty cycle, temperature below low control limit.

### Standard Checks

Use a Sensor Cable to connect a computer serial port to the WXT/WMT Sensor Cable port. Use Vaisala Online Monitor, select the appropriate port parameters and open a connection.

Do NOT check values while a WXT/WMT Service Cable is connected as some voltages are affected by it.

Internal rainfall (Rc) and Hail (Hc) are not used by MetService.

1. These checks must be performed with the sensor accessed i.e. the mast lowered.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **WXT/WMT Sensor Checks** | Acceptable | Unit | Item | Inspector  Value | WXT  Value | Difference | Ok |
| Air temperature Instant | ± 2 | ˚C | Ta= |  |  |  |  |
| Relative humidity Instant | ± 5 | %rh | Ua= |  |  |  |  |
| Pressure Instant |  | hPa |  |  |  |  |  |
| Pressure translated to WXT height & Instant | ± 1 | hPa | Pa= |  |  |  |  |
| Externl Rainfall (0.2 mm/tip) accumulating.  Pour water, 10 tips = 2.0 mm | ± 0.0 | mm | Ra= | Count 10  Rain 2.0 | Count =  Rain = | Count =  Rain = |  |
| External temperature (5cm Road or 10cm Soil) Instant | ± 0.5 | ˚C | Tr= |  |  |  |  |
| Sensor wiring polarity check (torch kit directly into sensor and adjust until data value is between 750 and 1500 Wm-2 for the system) # |  | W/m2 | Sr= |  |  |  |  |
| Solar - Sensor Connected - Live value 1 min avg  Ref Licor Cal Constant@ = \_\_\_\_\_\_\_\_ uAkW-1m-2  Calibrator output (1 min avg) = \_\_\_\_\_\_\_\_ uA  (Calibrator output / Sensor Cal Constant) x 1000 => | ± 100 | W/m2 | Sr= | \_\_\_\_\_\_\_ |  |  |  |
| Solar - Sensor Connected, End-to-End 1 min avg  Sensor dark value check (sensor covered) | ± 20 | W/m2 | Sr= | 0 |  |  |  |
| Internal Rainfall 1 minute accumulated | >0 | mm | Rc= |  | not used |  | -- |
| Hail 1 minute accumulated | >0 | hit/cm2 | Hc= |  | not used |  | -- |
|  |  |  |  |  |  |  |  |

Note #: If the sensor connection is polarity reversed then data may appear correct but will limit at about 500 W/m2.

& Use the spread sheet "Height-Pressure Transfer calculator.xls"

@ LI-COR testing with the Druck DPI620 CE:

The reference sensor must be level and oriented so that the sensor cable is aligned to True South.

Connect the reference sensor clear centre conductor to COM (common) terminal and shield to mA+ terminal of CH1 (channel 1).

* Use the Task menu on the Druck to select “Channel 1”, then change the Settings so that the function is “measure” “Current” then press the green tick to accept the change of function.
* Select “**Utility**” and change the channel setting to “**Max/Min/Avg**” then press the green tick to accept the change of function.
* Press the green tick again to accept the Task settings.
* Once the LICOR is set up in place and you are ready to take measurements - Press reset button.

Take the reading and divide it by the reference LI-COR cal constant, then compare this to the LI-COR under test.

2. These checks must be performed with the sensor installed in-situ i.e. on the mast and the mast erected.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **WXT/WMT Sensor Checks** | Acceptable | Unit | Item | Qualitative  Value | WXT/WMT  Value | Difference | Ok |
| Wind dir 1 minute avg | ± 20 | ˚T | Dm= |  |  |  |  |
| Wind spd 1 minute avg | ± 5 | m/s | Sm= |  |  |  |  |

Qualitative - Value: Wind speed should be estimated using the Beaufort scale.

Hint - to provide a wind direction and speed visual indicator tie a thin ribbon to the mast, in a non-obstructing location.

Acceptable - Value: Use standard instruments where possible. Otherwise estimate the value.

Acceptable - Status: The Before and After Status should be the same as this. If it's not then there is a fault.

### Additional Electrical Checks/Tests (use for fault finding if required)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **WXT/WMT Voltage Checks** | Acceptable | Unit | Item | Inspectors  Value | WXT/WMT  Value | Ok |
| Supply | 5.0 to 30.0 | V | Vs= |  |  |  |
| Heater | 9.6 to 14.4 | V | Vh= |  |  |  |
| Solar Panel Voltage (sun shining) | 15 to 22 | V |  |  |  |  |
| Mains Charger Voltage | 13.5 to 14.1 | V |  |  |  |  |

End