

## Uranus Meteo Sensor

# COMMAND PROTOCOL

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COMPATIBLE WITH FIRMWARE  $\leq$  V1.6



DOCUMENT VERSION [1.2 - 2025-OCT-25](#)

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## VERSION HISTORY

| Version # | Implemented By         | Revision Date     | Reason                              |
|-----------|------------------------|-------------------|-------------------------------------|
| 1.1       | <i>Evans Souglakos</i> | <i>01/11/2022</i> | <i>Initial Document</i>             |
| 1.2       | <i>Evans Souglakos</i> | <i>25/10/2025</i> | <i>Harmonise with firmware v1.6</i> |
|           |                        |                   |                                     |
|           |                        |                   |                                     |

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## INTRODUCTION

Thank you for purchasing the Uranus Meteo Sensor. This pocket-sized device is an all-around astronomer, astro-imager companion. Smaller than the size of a cigarette box, and equipped with a variety of digital sensors, can precisely report the ambient temperature, humidity, pressure, cloud height, cloud coverage, astronomical dawn, twilight time, and the night sky brightness.

## COMMUNICATION CHANNEL

A USB to Serial interface allows communication with the device. Plug in the USB-C cable to discover the device.

*Note1: The device remains open and ignores any configured sleep time when the USB cable is plugged in.*

*Note 2: Display turns off during Sky Quality measurements.*

Device USB Name is: **Uranus MeteoSensor**

Device USB discovery ID is:

|     |      |
|-----|------|
| VID | 03EB |
| PID | 204A |

Serial connection parameters are:

|            |        |
|------------|--------|
| Speed      | 115200 |
| Data Bits  | 8      |
| Parity Bit | N      |
| Stop Bit   | 1      |

## COMMANDS

- All commands are case-sensitive.
- Each command is a string of characters. The beginning command string consists of two ASCII characters plus ‘:’ followed by the message.
- Command ends with a CRLF.

E.g.:

Send:           =>     **GO**

Receive:       <=     **GO:[value]:CRLF**

## UNIT SYSTEM

All units outputted from the USB to Serial channel are in the **metric system**.

## ABBREVIATIONS

|                |                  |
|----------------|------------------|
| integer        | n                |
| decimal number | n.n              |
| x              | Char             |
| b              | boolean (0 or 1) |

## COMMAND LIST

### 1.1 General

---

M#                      Get the health status of the device – Acknowledgment that the device is operational.  
Returns:  
MS\_OK

---

MV                      Get the firmware release  
Returns: (double)  
MV:n.n

---

MQ:                     Device MCU reset  
Returns:  
Nothing

---

SR                      Serial Number of the device  
Returns: (16 char hex string)  
SR:xxxxxxxxxxxxxxxx

### 1.2 Sensors

---

MA                      Combined sensor report  
Returns:  
MS\_OK:value:value:value:...

|    |                                                                                                                                   |      |
|----|-----------------------------------------------------------------------------------------------------------------------------------|------|
| 1  | Ambient temperature in °C                                                                                                         | n.n  |
| 2  | Relative Humidity %                                                                                                               | n    |
| 3  | Dew Point in °C                                                                                                                   | n.n  |
| 4  | Absolute (Station) Pressure (hPa)<br>[300-1250 hPa]                                                                               | n.n  |
| 5  | Relative (Sea Level) Pressure (hPa)<br>[300-1250 hPa]                                                                             | n.n  |
| 6  | Barometric Altitude (m)<br>When GPS fix is 0, altitude is barometric altitude<br>When GPS fix is 1, altitude is real GPS altitude | n.n  |
| 7  | Sky temperature in °C                                                                                                             | n.n  |
| 8  | Infrared sensor temperature in °C                                                                                                 | n.n  |
| 9  | Battery usage<br>0 is battery, 1 is USB cable<br>(As the device is on USB power it always reports 1)                              | b    |
| 10 | Battery voltage (in volts)<br>(e.g 4.60)<br>As the device is on USB power it reports USB channel voltage.                         | n.nn |

SQ:l            Initiates a Sky Quality Sensor Measurement  
Returns: (string)  
SQ:MSR

---

SQ            Reports last Sky Quality measurement values  
Returns:  
SQ:value:value...

|   |                                          |        |
|---|------------------------------------------|--------|
| 1 | MPSAS (mag/arcsec <sup>2</sup> )         | n.n    |
| 2 | Naked Eye Magnitude limit (NELM in mags) | n.n    |
| 3 | Full spectrum raw value                  | n      |
| 4 | Visual spectrum raw value                | n      |
| 5 | Infrared spectrum raw value              | N      |
| 6 | Lux units                                | n.nnnn |

---

BR            Reset Bosch BME Sensor  
Returns:  
Nothing

---

CI            Cloud Index Report  
Returns:  
CI:value:value...

|   |                                                                                                                                                                                                                                                                            |     |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1 | Temperature Difference [ambient – sky] in °C                                                                                                                                                                                                                               | n.n |
| 2 | Cloud Index %<br>[the higher the index, the more the clouds in the sky]                                                                                                                                                                                                    | n   |
| 3 | Sky temperature in °C                                                                                                                                                                                                                                                      | n.n |
| 4 | Ambient temperature in °C                                                                                                                                                                                                                                                  | n.n |
| 5 | Infrared emissivity calculation value in double format<br>[value from 0.00 to 1.00]<br>The default configured value is 1.00, Human Body is 0.98<br>The setting is saved in the sensor's memory<br>A device restart is recommended in case of wrong values from the sensor. | n.n |

### 1.3 GPS

---

GP                      GPS Information  
Returns:  
GP:value:value:value:...

|   |                                                                                                                |           |
|---|----------------------------------------------------------------------------------------------------------------|-----------|
| 1 | GPS fix status<br>0 = no fix<br>3 = 3d fix                                                                     | n         |
| 2 | GPS time (in UNIX time epoch)                                                                                  | n         |
| 3 | Timezone offset<br>(should include daylight savings)                                                           | n         |
| 4 | Latitude (in degrees)                                                                                          | n.n       |
| 5 | Longitude (in degrees)                                                                                         | n.n       |
| 6 | Satellite Number<br>[how many satellites are fixed]<br>[ requires at least 4 satellites for a 3d fix position] | n         |
| 7 | GPS speed (in kph)                                                                                             | n         |
| 8 | Bearing (in degrees)                                                                                           | n (0-359) |

---

GO                      GPS NMEA Output via RJ12 (Socket at the side of Uranus device).

Returns: (boolean)  
GO:n    [0 is disabled, 1 is disabled]

---

GS                      GPS NMEA Output via USB.  
This command enables continuous NMEA data output through the USB port, which disables communication with Unity while active.

Returns: (boolean)  
GS:n    [0 is disabled, 1 is disabled]

---

GR                      Reset GPS  
Perform a cold start of GPS module.

---

## 1.4 Astronomical Calculations

---

MP Moon information  
Returns:  
MP:value:value:value

|   |                                       |     |
|---|---------------------------------------|-----|
| 1 | Moon Phase                            | n.n |
| 2 | Moon Type<br>1 is waxing, 2 is waning | n   |
| 3 | Moon Visibility Percentage            | n.n |

AS Astro Sunrise and Sunset  
Returns:  
AS:value:value:value

|   |                                                                                                                    |      |
|---|--------------------------------------------------------------------------------------------------------------------|------|
| 1 | Sunrise time<br>astronomical sunrise in fractional minutes past midnight (in local time)                           | n.nn |
| 2 | Sunset time (in seconds after midnight)<br>astronomical sunset in fractional minutes past midnight (in local time) | n.nn |
| 3 | Moon Phase                                                                                                         | n    |

## 1.5 Config

---

CF Config Read  
Returns:  
CF:value:value..

|    |                                                                                              |   |
|----|----------------------------------------------------------------------------------------------|---|
| 1  | Units (metric = 0 or imperial = 1)                                                           | b |
| 2  | NMEA RJ12 output (0 is off, 1 is on)                                                         | b |
| 3  | Keep OLED ON during polling (0 is off, 1 is on)                                              | b |
| 4  | NMEA USB Output (0 is off, 1 is on)                                                          | b |
| 5  | Sleep after minutes                                                                          | n |
| 6  | SQM calibration offset                                                                       | n |
| 7  | Time zone offset (includes daylight savings hour)                                            | n |
| 8  | Cloud temperature clean value                                                                | n |
| 9  | Ignore – unique timezone offset for Unity App                                                | n |
| 10 | Temperature sensor offset                                                                    | n |
| 11 | Humidity sensor offset                                                                       | n |
| 12 | Timezone offset +mins (30 or 45). For countries that have +mins in their timezone than hour. | n |

---

C1 Config – Imperial Units  
This has an effect **only** to the device display, all serial units are metric  
Returns: (boolean)

---



|     |                                                                                                                                                                                                                                                                   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | C1:n    0 is metric, 1 is imperial                                                                                                                                                                                                                                |
| C2  | Config – Sleep after n minutes [0-30]<br>0 is disabled, any other value is in minutes<br>Returns: (int)<br>C2:n                                                                                                                                                   |
| C3  | Config – UTC offset<br>Shows the configured UTC offset. Offset is required for GPS local time calculation and astronomical calculations.<br>Always include extra daylight-saving hour when you set this offset.<br>Returns:<br>C3:n    0 is metric, 1 is imperial |
| C4  | Config – Sky Quality MPSAS Calibration offset<br>Returns:<br>C4:n    0 is metric, 1 is imperial                                                                                                                                                                   |
| C5  | Config – Time zone id<br>This is for the Unity Platform Dotnet time zone identification – ignore for any other usage<br>Returns:<br>C5:n    0 is metric, 1 is imperial                                                                                            |
| C6  | Config – OLED On / Off<br>Returns:<br>C6:n    0 is metric, 1 is imperial                                                                                                                                                                                          |
| C7  | Config – Cloud – Clear Sky Limit<br>Returns:<br>C7:n    integer in Celsius degrees                                                                                                                                                                                |
| C8  | Config – Extra Timezone minutes of 30 or 45<br>Returns:<br>C8:n    mins                                                                                                                                                                                           |
| CA  | Config – Temperature offset in milli-deg<br>Returns:<br>CA:n    mDeg (Celcius) , 1degree = 100 mdegrees. (positive or negative)                                                                                                                                   |
| CB  | Config – Humidity offset in %<br>Returns:<br>CB:nn   (positive or negative)                                                                                                                                                                                       |
| CE: | Get Infrared Sensor Emissivity<br>From 0-100.                                                                                                                                                                                                                     |

Returns: (integer)  
CE:n

---

CE:n      Set Infrared Sensor Emissivity  
            100 for sky measurement (default)  
            98 for human skin measurement  
Returns: (integer)  
CE:n

## 1.6 Memory Banks

---

MW          Memory Write  
            Stores latest sensor value readout to the next available memory bank  
Returns:  
MW:n    0 is fail, 1 is success

---

MN          Memory Number  
            Reads how many bank records are used and what is the increased (last) record since  
            the first operation of the Uranus device.  
Returns: (long)  
MN:n

---

MZ          Memory Banks Erase  
            This command practically erases all memory banks and starts from bank number 1  
Returns:  
MZ:n    0 is fail, 1 is success

---

MR          Memory Banks Read  
Returns:  
MR:value:value:value:....

|    |                                     |     |
|----|-------------------------------------|-----|
| 1  | Record count of readout list (long) | n   |
| 2  | Unique id (long)                    | n   |
| 3  | Timezone                            | n   |
| 4  | GPS fix                             | n   |
| 5  | Unix_time (epoc unixtime)           | n   |
| 6  | Latitude (in decimal format)        | n.n |
| 7  | Longitude (in decimal format)       | n.n |
| 8  | Temperature °C                      | n.n |
| 9  | Humidity %                          | n   |
| 10 | Altitude (m)                        | N   |
| 11 | Pressure (station) in hPa           | n.n |

|    |                                                |     |
|----|------------------------------------------------|-----|
| 12 | Sky quality (MPSAS) in mag/arcsec <sup>2</sup> | n.n |
| 13 | Cloud index %                                  | n   |