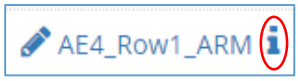
TN-0001 – Water Level Sensor Calibration and Error

Guardian Grow Manager (GGM) v4.2.5.3 and later provide 2-point calibration for water level sensor and several new error messages. In order to have a complete 2-point calibration using GGM, PDU and WSE on all AEtrium devices need to upgrade firmware to revisions listed (or later) in table 1.

Table 1 – Firmware Revisions

Product	PDU	WSE
AE4	PDU v3.1.3	v2.3.3
AE2.1	PDU 1.1.25	
A4DD	ARM v1.0.12	

You can check firmware revisions in *Device Information* by clicking ℹ icon next to device name.



2-Point Calibration – To calibrate water level sensor, go to *Calibration* page of the device and select *Water Level* tab as shown in picture below and follow the instructions.



1. For *Low* point, take water level sensor out of water and leave it in air for at least 30 seconds. Enter 0.6 (or 15mm) in *Value* field and click *Set* button. You can set *Low* point with actual water too but it must be greater than 40mm. Enter the actual water level in *Value* field instead and click *Set* button.
2. For *High* point, fill up 10" filter housing with water and put water level sensor in for at least 30 seconds. Enter 10 (or 254mm) in *Value* field and click *Set* button. If delta between *Low* and *High* is less than required, GGM will display "Failed to set calibration: Sensitivity out of range" and will not set *High* point. You may need to replace it with a new sensor.

New water level sensors* (PN: 300-00304-01 for AE4 and PN: 300-00305-01 for AE2.1 and A4DD) are all calibrated and tested at factory. You can get factory calibration data (Low point at 40mm/1.57" and High point at 255mm/10") by scanning QR code on the label. For example, the sample QR code below stores information that is listed to the right of label.



PN: 300-00305-01
SN: SS042C0162
40mm: 3550381
255mm: 6290511
10/26/2020

You can also use the raw data embedded in QR code for 2-point calibration without using actual water. However, the raw data in QR code is acquired using high resolution hardware at factory and requires conversion to appropriate resolution for actual board water level sensor connected to. Please see table 2 for details.

HW	Conversion Rate	Adjusted Raw Data (Use 40mm: 3550381 as example)
PDU	1	3,550,381
ARM	503.3	7,054
WSE r09	1	3,550,381
WSE r10+	16384	217

Table 2 – Adjusted Raw Data

WSE conversion is only needed if the water level sensor is connected directly to WSE box that has WSE r10 or later (PN: 113-31186-1x). Most of



Tech Note

AEtrium system have water level sensor connected to PDU. Users can check PCBA part number of WSE in *Device Information*.

You can use adjusted raw data for calibration by following the steps below.



1. Enable *Raw Data* field of *Low* point and *High* point for editing by checking the box in front of each *Raw Data* field.
2. For *Low* point, enter 1.57 (or 40mm) in *Value* field and enter adjusted raw count of 40mm in *Raw Data* field. Click *Set* button.
3. For *High* point, enter 10 (or 255mm) in *Value* field and enter adjusted raw count of 255mm in *Raw Data* field. Click *Set* button.

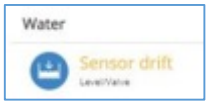
Error Messages – Three new error messages, including sensor not connected, sensor drift, and sensor over-range, for water level sensor are available on GGM v4.2.5.3 or later. When one of 3 errors occurs, the corresponding message instead of sensor reading will be shown at sensor location.

Sensor not connected – When system failed to detect water level sensor, GGM displays "-" at sensor reading location and changes to message "Sensor not connected" after three minutes. GGM prior to 4.2.5.3 only shows "-" for the same error.



Connecting a good water level sensor will fix the issue.

Sensor drift – GGM displays 0 whenever the calculated readings are less than 30mm (1.18") and displays "Sensor drift" when the calculated readings are less than 5mm. Most likely you can fix the issue by calibrating the sensor with actual water.



Sensor over-range – Water level sensors used in AEtrium system measure water depth from 0m to 1m and generate current output from 4mA** (0m) to 20mA (1m) correspondingly. There are three situations causing over-range alarm.

- Current output is less than 3.6mA
- Current output is greater than 20.45mA
- Calculated reading is greater than 1050mm.

The over-range error usually indicates that the water level sensor is broken and needs to replace with new one.



*Old water level sensors (PN: 310-71033-01 for AE4 and PN: 310-71034 for AE2.1) will be obsolete after Q4 2020. Old sensors don't have calibration data embedded in QR code but users can still use 2-point calibration function with old sensors.

** The spec of current output at zero for water level sensor is 3.9mA~4.1mA. Incoming QC will reject any sensor not meeting the spec.