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AXIOMA METERING UAB

# ULTRASONIC WATER METER QALCOSONIC W1

Instructions for successful LoRa connection

|                                | Document name<br>INSTRUCTIONS FO<br>LORA CONN | <br>Document №/ F<br>03 06 2019 | Release №    |
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#### 1. Check if radio signal is active

- 1. Place and hold the optical head on the meter, and connect it to the USB port.
- 2. Start the W1 Tool and enter the number of the virtual the serial port in the Com Port window (might be different depending on PC configuration) which can be seen under device manager section called "Ports". You will see COMxx, use only the number (second photo).

| File | Action View Help  |
|------|---|
| þ    | 🖬   🖾   🖬   💻   💺   |
| >    | Biometric devices   |
| >    | 😵 Bluetooth   |
| >    | Cameras     Cameras |
| >    | 💻 Computer  |
| >    | Disk drives   |
| >    | lisplay adaptors  |
| >    | Firmware  |
| >    | 🛺 Human Interface Devices   |
| >    | 📷 IDE ATA/ATAPI controllers   |
| >    | E Keyboards   |
| >    | Memory technology devices   |
| >    | Mice and other pointing devices   |
| >    | Monitors  |
| >    | 🚽 Network adapters  |
| >    | Other devices   |
| ~    | Ports (COM & LPT)   |
|      | USB Serial Port (COM3)  |
| >    | 🚍 Print queues  |
| >    | 🚍 Printers  |
| >    | Processors  |
| >    | Security devices  |

| Com Port             |                 | Time                   |
|----------------------|-----------------|------------------------|
| 3                    | Enter Test Mode |                        |
| 2400 bps ~           | Enter User Mode | Get Now Set            |
| Wake Up Meter        |                 | Curent Data            |
|                      |                 | Read ID                |
|                      |                 | Volume m <sup>3</sup>  |
|                      |                 | Flow m <sup>3</sup> /h |
|                      |                 | Temperature °C         |
| Read All             |                 |                        |
|                      |                 |                        |
| Write All            |                 |                        |
|                      |                 |                        |
|                      |                 |                        |
|                      |                 |                        |
|                      |                 | V 2019 03 15           |
| om Closed Exeption 6 |                 |                        |

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3. Press "Wake Up Meter" button, then "Enter Test Mode" button and "Read All". Yellow zone on "Enter Test Mode" and "Enter User Mode" section should apply.

| W1 TOOL                                      | - 🗆 X                 |
|--|-----------------------|
| Main Settings Radio Menu LORA WAN            |                       |
| Com Port                                     | Time                  |
| 3 Enter Test Mode                            |                       |
| 2400 bps   Enter User Mode                   | Get Now Set           |
| Wake Up Meter                                | Curent Data           |
|  | Read ID               |
|  | Volume m <sup>3</sup> |
|  | Flow m³/h             |
|  | Error Code            |
|  | Temperature °C        |
| Write Ali                                    | V 2019 03 15          |
| om Closed Exeption 6<br>om Closed<br>om Open |                       |

4. Go to "Radio" Tab and press "Get Radio State" button to see if radio is activated or not. If not, you can activate it by pressing "Activate Radio" button.

| Main Settings Radio Menu LOI  | RA WAN   |   |  |          |  |
|---|--|---|--|----------|--|
| Radio<br>wMBus T1<br>wMbus S1<br>Lora Wan<br>AES Enable<br>AES128 key   | (  | Activate Radio<br>Get Radio State<br>Radio State  | >  |          |  |
| Param Mask Volume Volume F Volume R R On Time Temperature Cut Volume F Cut Volume F Cut Volume F Cut Volume R Error Free Time | Month Mask<br>January<br>February<br>March<br>April<br>May<br>June<br>July<br>August<br>September<br>October<br>November<br>December | Week Day Mask       Monday       Tuesday       Wednesday       Thursday       Friday       Saturday       Sunday       Start       0       h       Stop       24       h       Period       600     s | Battery Life Time Calcula<br>Lora Settings<br>SF<br>Payload Len<br>Period, s<br>Self discharge,%<br>Meter cnsumption, uA | 12<br>51 |  |
|   |  |   | Calculate Battery Time   | е        |  |
| Status 16<br>Signature 0<br>SendCmd 00<br>JOB FIN   |  |   |  |          |  |

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5. To check if radio is activated now, press "Get Radio State" button one more time to show the status. You should see Radio Active if everything is correct.

| Main Settings Radio Menu LO   | RA WAN  |   |   |
|---|---|---|---|
| Radio<br>wMBus T1 //<br>wMbus S1 //<br>Lora Wan //<br>AES Enable //<br>AES128 key   |   | Activate Radio<br>Get Radio State<br>Radio Active<br>S1 Install   |   |
| Param Mask Volume Volume F Volume R R On Time Temperature Cut Volume C Cut Volume Cut Volume F Cut Volume R Error Free Time | Month Mask<br>January<br>February<br>March<br>Andl<br>May<br>June<br>July<br>August<br>September<br>October<br>November<br>December | Week Day Mask<br>✓ Monday<br>✓ Tuesday<br>✓ Wednesday<br>✓ Trursday<br>✓ Trursday<br>✓ Friday<br>✓ Saturday<br>✓ Sunday<br>Start 0 h<br>Stop 24 h<br>Period 600 s | Battery Life Time Calculator<br>Lora Settings<br>SF 12<br>Payload Len 51<br>Period. s 3600<br>Self discharge,% 3<br>Meter cnsumption, uA 10 |
|   |   |   | Calculate Battery Time  |
| Status 16<br>Signature 0<br>SendCmd 00<br>*** JOB FIN ***   |   |   |   |

6. If radio was active and this is not the case, please see further options.

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### 2. Check if Lora communication is active

 If you start here, follow 1 – 3 steps from chapter 1, then go to "Radio" Tab. Check if Lora Wan box is active (marked). If not, check the box to activate Lora communication on the meter.

| Main Settings Radio Menu LORA WAN<br>Radio<br>wMBus T1 🗹  |  |   |
|---|--|---|
|   |  |   |
| wMbus S1  Lora Wan  AES Enable AES 128 key  | Activate Radio<br>Get Radio State<br>Radio State<br>S1 Install |   |
| Param Mask     Month Mask       Yolume     January       Volume F     February       Volume R     March       Row     April       On Time     June       Cut Date     July       Cut Volume F     September       Cut Volume R     October       Error Free Time     November | Stop 24 h  | Battery Life Time Calculator<br>Lora Settings<br>SF 12<br>Payload Len 51<br>Period, s 3600<br>Self discharge,% 3<br>Meter cnsumption, uA 10 |
|   |  | Calculate Battery Time  |

8. If Lora was not activated and you checked it for activation, go to "Main Settings" Tab. Write new configuration data to the meter by pressing "Write All" button.

| lain Settings                        | Radio Menu | LORA WAN                           |   |  |  |
|--------------------------------------|------------|------------------------------------|---|--|--|
| Rea                                  | Up Meter   | Enter Test Mode<br>Enter User Mode | Activate Radio<br>Get Radio State<br>Radio Active<br>S1 Install | Time<br>Get Now<br>Curent Data<br>Read ID<br>Volume<br>Flow<br>Error Code<br>Temperature<br>V 2019 03 15 | Set<br>m <sup>3</sup><br>m <sup>3</sup> /h |
| om Closed Ex<br>om Closed<br>om Open | eption 6   |                                    |   |  |  |

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9. Next, it is recommended to follow chapter 5 and reinitialize Lora. Then the meter should start using Lora Wan communication and connect to the network. If it fails to respond during the process, please use "Wake Up Meter" button again. Before exit, remember to place meter back in User mode.

| W1 TOOL  | >  |
|--|--|
| Aain Settings Radio Menu LORA WAN Com Port 3 2400 bps Wake Up Meter Read All Write All | Time<br>Get Now Set<br>Curent Data<br>Read ID<br>Volume m <sup>3</sup><br>Flow m <sup>3</sup> /h<br>Error Code<br>Temperature 'C |
|  | V 2019 03 15   |
| Com Closed Exeption 6<br>com Closed<br>com Open  |  |

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### 3. Check Lora Network keys

10. If you start here, follow 1 – 3 steps from chapter 1. If radio signal is active, the next step should be to check if Lora keys are the same on the meter and server. To find meter's key, go to "LORA WAN" Tab and look for Network key section. Check if you see the same key in your server.

| Lora | a State                      |   |      |
|------|------------------------------|---|------|
|      | Parameter<br>Network key     | value 2ASF1ASF1FAF4AF4A9F4A9S8F4AF1AF89A4FA |      |
|      | App S key                    |   | <br> |
|      | Dev Eui                      | 00000000000000000011                        |      |
|      | App Eui                      | 810000000000000000000000000000000000000     |      |
|      | Арр Кеу                      | 2ASF1ASF1FAF4AF4A9F4A9S8F4AF1AF89A4FC       | <br> |
|      | Tx Duty Cycle(send period),s | 10800                                       |      |
|      | Network ID                   | 0   |      |
|      | OTAA enabled                 | 0   |      |
|      | App Tx duty cycle            | 1   |      |
|      | Default bitrate              | 0   |      |
|      | Region                       | 5   |      |
|      | Confirm MSG On               | 0   |      |

11. If keys are different, you should reinitialize Lora communication. Follow chapter 5 for further instructions.

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# 4. Check Lora settings

- 12. To make sure you get your telegrams, check if send period and store period are set to the ones you need. If you start here, follow 1 3 steps from chapter 1 and make sure Lora Wan is activated in "Radio" Tab.
- 13. To check settings, go to "LORA WAN" Tab and search for Tx Duty Cycle (send period) and Lora Store period areas. If these are not the ones you need, change them by writing time period in seconds.

| 🖳 W1 TOOL                |   |       |                              | -        |     | X | 7   |   |
|--------------------------|---|-------|------------------------------|----------|-----|---|-----|---|
| Main Settings Radio Menu |   |       |                              |          |     |   |     |   |
| LORA                     |   |       |                              |          |     |   |     |   |
|                          | LORA GetLoraStat                        |       |                              |          |     |   |     |   |
| Lora State               |   |       |                              |          |     |   |     |   |
| Parameter                | Value                                   |       |                              |          |     | ^ |     |   |
| Network key              | 2ASF1ASF1FAF4AF4A9F4A                   | ASSE. | 44F14F8944F4                 |          |     |   |     |   |
| AppSkey                  | 2ASF1ASF1FAF4AF4A9F4A                   |       |                              |          |     |   |     |   |
| Dev Eui                  | 000000000000000000000000000000000000000 |       | W1 TOOL                      |          |     |   | - 0 | × |
| App Eui                  | 810000000000000000000000000000000000000 |       | WI TOOL                      |          |     |   | - 0 | ~ |
| Арр Кеу                  | 24SE1ASF1FAF4AF4A9F4A                   | Ma    | ain Settings Radio Menu LORA | WAN      |     |   |     |   |
| Tx Duty Cycle(send pe    | erice),s 10800                          | -l    | LORA                         |          |     |   |     |   |
| Network ID               | 0                                       |       | Get Lora State Reinit LORA   | GetLoraS | tat |   |     |   |
| OTAA enabled             | 0                                       |       | Lora State                   |          |     |   |     |   |
| App Tx duty cycle        | 1                                       |       | Parameter                    | Value    |     |   |     | ^ |
| Default bitrate          | 0                                       |       | App Uplink Port              | 100      |     |   |     |   |
| Region                   | 5                                       |       | App Downlink Port            | 102      |     |   |     |   |
| Confirm MSG On           | 0                                       |       | Adress On                    | 1        |     |   |     |   |
|                          |   |       | Dutycycle On                 | 0        |     |   |     |   |
| Com Closed Exeption 6    |   |       | Rx2 bitrate                  | 0        |     |   |     |   |
|                          |   |       | Lora Store period,s          | 3600     | )   |   |     |   |
|                          |   |       | Lora Store Len               | 16       |     |   |     |   |
|                          |   |       | App VIF Uplink Port          | 101      |     |   |     |   |
|                          |   |       | App Alarm Uplink Port        | 103      |     |   |     |   |
|                          |   |       | DevAddr                      | 004C86BC |     |   |     | - |
|                          |   |       | T1 Tx Power                  | 15       |     |   |     |   |
|                          |   | L     | Lora Alarm Mask              | 15       |     |   |     | ~ |
|                          |   |       | C 15 8 0                     |          |     |   |     |   |
|                          |   | Co    | m Closed Exeption 6          |          |     |   |     |   |
|                          |   |       |                              |          |     |   |     |   |
|                          |   |       |                              |          |     |   |     |   |
|                          |   |       |                              |          |     |   |     |   |

14. Go to "Main Settings" Tab. Write new configuration data to the meter by pressing "Write All" button. Also you could follow chapter 5 instructions after pressing "Write All" button.

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## 5. Reinit Lora

15. After changing all settings, or just having no connection with the server, press "Reinit LORA" in "LORA WAN" Tab (make sure meter is in Test mode and 1 – 3 steps from chapter 1 is made). This will reinitialize the connection and reset meter's communication with the network.

| -      | t Lora State Reinit LORA<br>State | OrLore Stat                           |  |
|--------|-----------------------------------|---------------------------------------|--|
|        | Parameter                         | Value                                 |  |
|        | Network key                       | 2ASF1ASF1FAF4AF4A9F4A9S8F4AF1AF89A4FA |  |
|        | AppS key                          | 2ASF1ASF1FAF4AF4A9F4A9S8F4AF1AF89A4FA |  |
|        | Dev Eui                           | 0000000000000000011                   |  |
|        | App Eui                           | 81000000000000000001                  |  |
|        | App Key                           | 2ASF1ASF1FAF4AF4A9F4A9S8F4AF1AF89A4FC |  |
|        | Tx Duty Cycle(send period),s      | 10800                                 |  |
|        | Network ID                        | 0                                     |  |
|        | OTAA enabled                      | 0                                     |  |
|        | App Tx duty cycle                 | 1                                     |  |
|        | Default bitrate                   | 0                                     |  |
|        | Region                            | 5                                     |  |
|        | Confirm MSG On                    | 0                                     |  |
| m Clos | sed Exeption 6                    |                                       |  |

- 16. The meter should start using new configuration settings and reset connection with the network. If it fails to respond during the process, please use "Wake Up Meter" button again.
- 17. Before exit, remember to place meter back in User mode on "Main Settings" Tab .

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#### 6. ABP to OTAA or vice versa

18. If you start here, follow 1 – 3 steps from chapter 1. To change from ABP to OTAA or vice versa, go to "LORA WAN" Tab. Find "OTAA enabled" and enter 1 if you want to enable OTAA, or enter 0 if you want to disable OTAA and use ABP authentication.

|        | ettings Radio Menu LORA      | A WAN                                   |  |
|--------|------------------------------|---|--|
| LORA   |                              |   |  |
| -      | et Lora State Reinit LORA    | GetLoraStat                             |  |
| LUIA   | Jale                         |   |  |
|        | Parameter                    | Value                                   |  |
|        | Network key                  | 2ASF1ASF1FAF4AF4A9F4A9S8F4AF1AF89A4FA   |  |
|        | App S key                    | 2ASF1ASF1FAF4AF4A9F4A9S8F4AF1AF89A4FA   |  |
|        | Dev Eui                      | 0000000000000000011                     |  |
|        | App Eui                      | 810000000000000000000000000000000000000 |  |
|        | Арр Кеу                      | 2ASF1ASF1FAF4AF4A9F4A9S8F4AF1AF89A4FC   |  |
|        | Tx Duty Cycle(send period),s | 10800                                   |  |
|        | Network ID                   | 0                                       |  |
|        | OTAA enabled                 | 0                                       |  |
|        | App Tx duty cycle            | 1                                       |  |
|        | Default bitrate              | 0                                       |  |
|        | Region                       | 5                                       |  |
|        | Confirm MSG On               | 0                                       |  |
|        |                              |   |  |
| om Clo | osed Exeption 6              |   |  |
|        |                              |   |  |

19. Go to "Main Settings" Tab. Write new configuration data to the meter by pressing "Write All" button. Also you could follow chapter 5 instructions after pressing "Write All" button.