VAISALA

USER'S GUIDE

Vaisala HydroMet™ Data Collection Platform Volume 1

M210784EN-E

PUBLISHED BY

Vaisala Oyj	Phone (int.):	+358 9 8949 1
P.O. Box 26	Fax:	+358 9 8949 2227
FIN-00421 Helsinki		
Finland		

Visit our Internet pages at http://www.vaisala.com/

Table of Contents

CHAPTER 1
GENERAL INFORMATION 9
About This Manual 9
Structure of the Data Collection Platform Documentation . 10
Contents of This Manual 10
Version Information 11
Related Manuals 11
Documentation Conventions 12
Product-Related Safety Precautions 13
ESD Protection 14
Recycling 15
Regulatory Compliances 15
Trademarks 15
License Agreement 15
Redistribution License Agreement 16
Warranty 17

CHAPTER 2
PRODUCT OVERVIEW 19
Data Collection Hardware 19
QML Logger 19
QML Logger Connector Block 22
Accessories 25
Sensor Multiplexer 25
Digital I/O Module 26
Transient Protection Devices 27
Communication Modules 28
RS-232 Module 28
Isolated RS-485 Communication Module 28
Dual-Isolated RS-485 Communication Module 29
Fixed Line Modem Module 30
Ethernet Communication Module DSE101 31
Data Collection Software 32
Operating Software 32
AWS Client Software 32
Setup Software 33
Lizard Setup Software 33
Updating QML Software 34

CHAPTER 3

AWS CLIENT SOFTWARE 35
Product Overview 35
Installing AWS Client 36
Minimum System Requirements 36
Installation Procedure 37
Establishing Terminal Connection 41
Using AWS Client Software 43
Starting and Exiting AWS Client 43
AWS Client Main Window 44
Defining AWS Client Settings 45
Read Only Mode 45
Address Book. 45
Serial Line Connections 46
TCP/IP Socket Connections 48
Server Socket with SMS 50
Dial-Up Connections 53
Options Window. 55
Number Format 57
Opening Service Connection 57
Giving Commands 59
Closing Service Connection 60
Managing User Levels 61
Modifying Station Settings 63
Setting the QML Logger Clock 64
Setting Static Parameters 65
Station Parameter Backup and Restore. 67
Calibrating Sensors 69
Sensor Status List 72
Offset Calibration 73
Manual Calibration 74
Entering Values for Manual Sensors 76
Viewing Manual Sensors in AWS Client 76
Entering Values for Manual Sensors 78
Setup File 79
Selecting Setup File 79
Uploading Setup File 80
Secure Setup Upload 82
Downloading Setup Files from QML Logger 83
AWS Settings Cleanup 84
Data Logging 85
Log Data Format 86
Controlling Logging 87
Measurement Enable or Disable 88
Freeing Up Logging Space 90
Working with Data Log Files 90
Downloading Log Files. 91
Converting Downloaded Log Files to CSV Format . . . 94
Auto Downloading Log Files 96
Viewing the Status of Auto Downloads 101

Using External Memory Card 102
Automatic Erase from External Memory Card 103
Resetting the QML Logger 103
Reset Using the Reset Button 104
Sleep Command 105
Wakeup Command 105
Command Reference for Terminal Connection 106

CHAPTER 4
TROUBLESHOOTING 111
Troubleshooting Procedure 111
Visual Check 117
Determining QML Logger Operation Mode 119
Establishing Terminal Connection for Troubleshooting . 119
Recording Terminal Connection Text 119
Opening a Service Connection through QML Logger . . . 120
Connection Problems 122
Error Messages 122
Resetting QML Logger 123
Determining Sensor Status 124
Using External Memory Card 128
Automatic Erase from External Memory Card 129
Commands for Troubleshooting Purposes 129
LASTVAL Command 130
Warnings and Errors 131
System Information 133
Battery Status 135
Measurement Enable or Disable 136
Technical Support 138

CHAPTER 5
TECHNICAL DATA 139
Wiring Instructions 139
RS-232 Module DSU232 140
Isolated RS-485 Module DSI485 142
Dual RS-485 Module DSI486, Version A 143
Dual RS-485 Module DSI486, Version B 146
Digital I/O Module QMI118 147
Fixed Line Modem DMX501 148
Ethernet Communication Module DSE101 149
Specifications 150
QML201 Logger, Version C 150

APPENDIX A
GLOSSARY 153

List of Figures

Figure 1 QML Logger 19
Figure 2 QML Logger without Cover 21
Figure 3 CompactFlash Memory Card Reader 22
Figure 4 Connector Blocks 24
Figure 5 Sensor Multiplexer QMU101 25
Figure 6 Digital I/O Module QMI118 26
Figure 7 Surge Protector for Serial Lines 27
Figure 8 RS-232 Communication Module DSU232 28
Figure 9 Isolated RS-485 Communication Module DSI485 28
Figure 10 Dual-Isolated RS-485 Communication Module DSI486 29
Figure 11 Fixed Line Modem Module DMX501 30
Figure 12 Ethernet Communication Module DSE101 31
Figure 13 Installation Wizard Welcome Window 37
Figure 14 License Agreement Window 38
Figure 15 Select Installation Folder Window 39
Figure 16 Ready to Install Window 39
Figure 17 Installation Complete Window 40
Figure 18 Connecting Terminal Cable 41
Figure 19 Terminal Connector COM0 Pins 42
Figure 20 Terminal Main Window 43
Figure 21 Terminal Showing Report 44
Figure 22 Address Book Window 46
Figure 23 Creating Serial Line Address Book Entry 47
Figure 24 Creating TCP/IP Socket Connection Address Book Entry 49
Figure 25 Creating Server Socket with SMS Address Book Entry 51
Figure 26 Creating Dial-up Connection Address Book Entry 53
Figure 27 Options Window 55
Figure 28 Address Book Window 58
Figure 29 Common Parameters Window 63
Figure 30 Set Logger Time Window 64
Figure 31 Static Parameters Window 66
Figure 32 Selecting File for Station Settings Backup 67
Figure 33 Parameter Backup Completed 67
Figure 34 Selecting File for Station Settings Restore 68
Figure 35 Parameter Restore Complete 68
Figure 36 Calibration Window 70
Figure 37 Offset Calibration Window 73
Figure 38 Manual Calibration Window 75
Figure 39 Manual Sensor Details 77
Figure 40 Entering Values for Manual Sensor 78
Figure 41 Selecting an Upload Configuration File 81
Figure 42 Setup Uplodad in Progress 81
Figure 43 Enabling Secure Setup Upload 82
Figure 44 Setup File Download Progress View 84
Figure 45 Starting Logger Content Cleanup 84

Figure 46 Output of Logshow Command 86
Figure 47 Output of the Logstatus Command 88
Figure 48 List of Log Files Available for Downloading 91
Figure 49 Log File Download Settings Window 92
Figure 50 Log File Download Progress View 94
Figure 51 List of Log Files Available for Conversion 95
Figure 52 Log File Conversion Settings 96
Figure 53 Auto Download Settings Window 97
Figure 54 Auto Download in Progress 100
Figure 55 Auto Download Status Window 101
Figure 56 Delayed Reset Prompt 103
Figure 57 Reset Button on QML Logger 104
Figure 58 QML Logger without Cover 118
Figure 59 Reset Button on QML Logger 123
Figure 60 Settings Menu: Calibration Window 125
Figure 61 RS-232 Wiring Diagram 140
Figure 62 Suggested T-Connection in Dual Port Mode 140
Figure 63 SDI-12 Jumper of DSU232-C. 141
Figure 64 Isolated RS-485 Module Wiring Diagram. 142
Figure 65 Dual RS-485 Module Wiring Diagram 143
Figure 66 Dual RS-485 Module Default Jumper Locations 144
Figure 67 Dual RS-485 Wiring Diagram for RS-485 and RS-232 144
Figure 68 Dual RS-485 Wiring Diagram for SDI-12 and 12 VDC Power Supply 145
Figure 69 RS-232 Jumper Settings 146
Figure 70 Digital I/O Module Wiring Diagram (Digital Outputs) 148
Figure 71 Fixed Line Modem Wiring Diagram 148
Figure 72 Ethernet Communication Module DSE101 Wiring Diagram. . .149

List of Tables

Table 1 Structure of the DCP Manual Set 10
Table 2 Manual Versions 11
Table 3 Related Manuals 11
Table 4 Analog Measurement Channels 23
Table 5 Power Channels 23
Table 6 Minimum System Requirements 36
Table 7 Toolbar Icons and Functions 44
Table 8 Settings in AWS Client Options Window 55
Table 9 Interpreting Help Texts (the Correct Syntax) 59
Table 10 Accessible Commands in Different User Levels 62
Table 11 Common Parameters Window 63
Table 12 Fields in the Calibration Windows 71
Table 13 Sensor Status List 72
Table 14 Fields in Manual Sensors Window 77
Table 15 Log Memory Capacity 86
Table 16 Log Entry Status 87
Table 17 Log File Download Options 93
Table 18 Log File Conversion Options 96
Table 19 Settings in Auto Download Settings Window 98
Table 20 Fields in Auto Download Status Window 101
Table 21 LED Blinking Sequences and Card Status Options 102
Table 22 Command Set 106
Table 23 Recommended Tools for Troubleshooting 112
Table 24 Test Commands for GSM Modems 116
Table 25 Determining Operation Mode by LED Flashing 119
Table 26 Parameters for the Open Command 121
Table 27 Some Common Connection Problems and Their Remedies 122
Table 28 Error Messages 122
Table 29 Columns in the Sensor Calibration Tab 126
Table 30 Sensor Status List 127
Table 31 LED Blinking Sequences and Card Status Options 128
Table 32 DSU232-C Jumper Settings 141
Table 33 Jumper Settings for Channel B in the RS-485 Mode 143
Table 34 Jumper Settings for Channel B in the RS-232 Mode 144
Table 35 Jumper Settings for DSI486-B 146
Table 36 Technical Data QMI108/118 147
Table 37 Ethernet Communication Module DSE101 Specifications 149
Table 38 QML201C Logger General Specifications 150
Table 39 QML201C Logger Accuracy Specifications 151
Table 40 QML201C Logger Regulatory Compliances 152

CHAPTER 1

GENERAL INFORMATION

This chapter provides general notes for the product(s) and this manual.

About This Manual

This manual provides information on the basic data collection hardware and software, namely, the QML logger and its accessories, and the software applications that are used for operating the QML logger and viewing the logged data.

This manual is applicable for data logger QML201C and AWS Client software version 7.00.

For more detailed and advanced information on data collection software and telemetry, refer to the supplementary user manuals Vaisala HydroMet™ Data Collection Platform User's Guide, Volumes 2 and 3.

Structure of the Data Collection Platform Documentation

The information in the Vaisala HydroMet™ Data Collection Platform manual set is divided between the different manuals in the documentation set as outlined in Table 1 on page 10.

Table 1 Structure of the DCP Manual Set

Manual	Code	Content
User's Guide, Volume 1	M210784EN	Overview of the data collection platform, the QML logger, and related accessories. Operating instructions for AWS Client software.
User's Guide, Volume 2	M210785EN	Operating instructions for Lizard Setup Software.
User's Guide, Volume 3	M210933EN	Telemetry and sensor configuration in Lizard Setup Software.
Installation Manual (Field Equipment)	M210786EN	Installation information on the Data Collection Platform with meteorological and/or hydrological sensors.

Contents of This Manual

This manual consists of the following chapters:

- Chapter 1, General Information: This chapter provides general notes for the product(s) and this manual.
- Chapter 2, Product Overview: This chapter introduces the basic data collection hardware and software.
- Chapter 3, AWS Client Software: This chapter provides information on using Vaisala HydroMet™ Automatic Weather Station Client, or AWS Client for short, for working with the QML logger.
- Chapter 4, Troubleshooting: This chapter contains information on some common problems, their probable causes and remedies.
- Chapter 5, Technical Data: This chapter provides the technical data of the QML logger and accessory modules.

- Appendix A, Glossary: This appendix contains a glossary with explanations of some general meteorological and technical terms and terms used in specifications.

Version Information

Table 2 Manual Versions

Manual Code	Description
M210784EN-E	This manual. For MAWS system release 8.00, AWS Client 7.00, and data logger QML201C.
M210784EN-D	Previous version. For MAWS system release 7.00, AWS Client 7.00, and data logger QML201B.
M210784EN-C	Previous version.
M210784EN-B	Previous version.
M210784EN-A	First version of this manual.

Related Manuals

Table 3 Related Manuals

Manual Code	Manual Name
M210785EN	Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 2
M210933EN	Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3
M210786EN	Vaisala HydroMet™ Data Collection Platform Installation Manual
M210629EN	Automatic Weather Station MAWS101 User's Guide
M210630EN	Automatic Weather Station MAWS201 User's Guide
M210681EN	Real-time Display Software YourVIEW 2000 YVU2000 User’s Guide
M210743EN	Voice Option for MAWS Technical Reference
M211022EN	Configuring BUFR Reports MAWS Technical Note

Documentation Conventions

Throughout this manual, important safety considerations are highlighted as follows:

WARNING	Warning alerts you to a serious hazard. If you do not read and follow instructions very carefully at this point, there is a risk of injury or even death.

CAUTION	Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.

NOTE	Note highlights important information on using the product.

Product-Related Safety Precautions

The product has been tested for safety and approved as shipped from the factory. The following safety precautions are not related to any specific procedures and therefore do not appear elsewhere in this manual. They are recommended precautions that personnel must understand and apply during different phases of operation and maintenance.

WARNING Keep away from live circuits. Operating personnel must observe safety regulations at all times. Component replacement or internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist for some time even with the power cable disconnected. To avoid injuries, disconnect power and discharge circuits before touching them.

WARNING Do not service alone. Under no circumstances should any person reach into parts and assemblies that are mains powered and alive, for the purpose of servicing, except in the presence of someone who is capable of rendering aid.

WARNING Personnel working with or near high voltages should be familiar with modern methods of resuscitation.

WARNING Do not service a live system outdoors. Do not open units outdoors when the enclosure used contains line voltage levels.

WARNING Do not operate in an explosive atmosphere, for example, when flammable gases or fumes are present. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

WARNING Do not substitute parts or modify the instrument. Because of the danger of introducing additional hazards, do not install unsuitable parts in the instrument. Contact Vaisala or its authorized representative for repairs to ensure that safety features are maintained.

WARNING	Use only batteries of the same type as originally installed on the system.

CAUTION	Do not make changes to the wiring. Incorrect wiring can damage the device and prevent it from operating correctly.

CAUTION	Risk of damage to the equipment if the battery is replaced with an incorrect type.

ESD Protection

Electrostatic Discharge (ESD) can cause immediate or latent damage to electronic circuits. Vaisala products are adequately protected against ESD for their intended use. However, it is possible to damage the product by delivering electrostatic discharges when touching, removing, or inserting any objects inside the equipment housing.

To make sure you are not delivering high static voltages yourself:

- Handle ESD sensitive components on a properly grounded and protected ESD workbench. When this is not possible, ground yourself with a wrist strap and a resistive connection cord to the equipment chassis before touching the boards. When neither of the above is possible, at least touch a conductive part of the equipment chassis with your other hand before touching the boards.
- Always hold the boards by the edges and avoid touching the component contacts.

Recycling

Recycle all applicable material.

Dispose of batteries and the unit according to statutory regulations. Do not dispose of with regular household refuse.

Regulatory Compliances

The Vaisala HydroMet™ Data Collection Platform complies with the following EU directives:

- Low Voltage Directive (2006/95/EC)
- EMC-Directive (2004/108/EC)

CE N17728

Trademarks

Vaisala HydroMet™ Data Collection Platform is a trademark of Vaisala Oyj.

Windows® is a registered trademark of Microsoft Corporation in the United States and/or other countries.

License Agreement

All rights to any software are held by Vaisala or third parties. The customer is allowed to use the software only to the extent that is provided by the applicable supply contract or Software License Agreement.

Redistribution License Agreement

The QML logger software uses the TCP/IP stack produced by the "lwIP Lightweight TCP/IP stack" -project with the following copyright and license:

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Warranty

For certain products Vaisala normally gives a limited one-year warranty. Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or Conditions of Sale for details of the warranty for each product.

CHAPTER 2

PRODUCT OVERVIEW

This chapter introduces the basic data collection hardware and software.

Data Collection Hardware

QML Logger

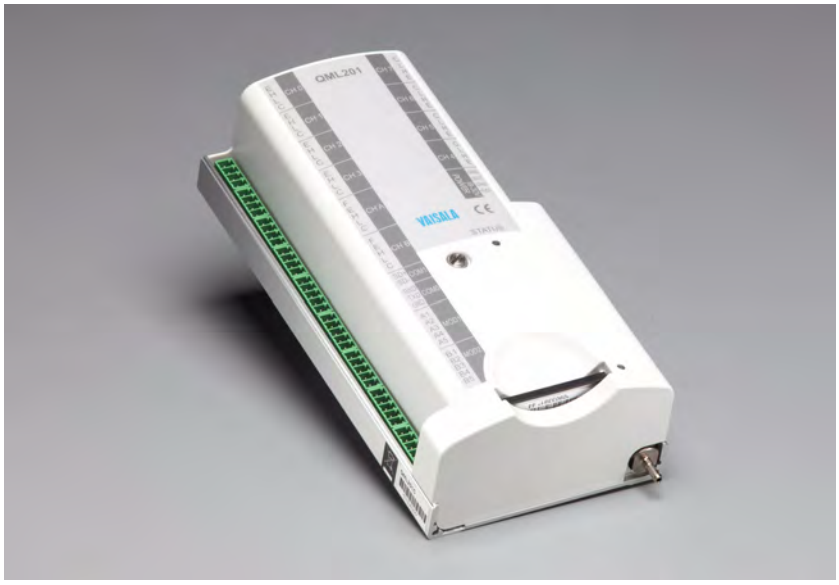


Figure 1 QML Logger

The QML logger is a complete AWS data logger designed on one printed board only. This board contains a 32-bit Motorola CPU for data processing and 10 differential (20 single-ended) analog sensor inputs (these can also be used as digital inputs). Moreover, there are two frequency sensor interfaces, a 24-bit A/D converter, 3.3 MB of secure Flash memory for data logging, as well as an excitation power supply for sensors and a charger for the internal backup battery. The last item mentioned is not needed in systems where a backup battery with higher capacity is used.

The board uses the latest SMD (Surface Mount Device) technology and is conformal-coated for improved protection also in high humidity. Each sensor input has a varistor (VDR) protection against induced transients. The serial line connections, that is, RS-232 labeled as COM0 and RS-485 labeled as COM1, have two level ESD protection circuits with VDRs directly at input pins.

The cover of the logger can be removed for installing the battery and for resetting the weather station. In Figure 2 on page 21, the logger is shown without the cover and the optional communication modules.

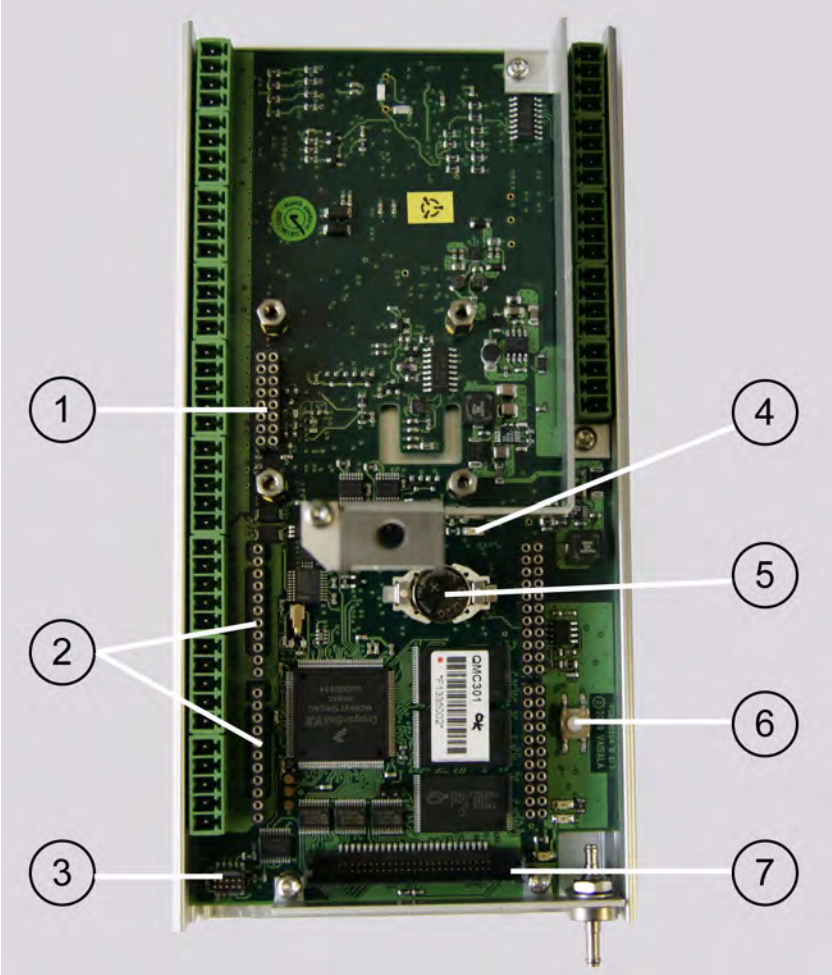


Figure 2 QML Logger without Cover

The following numbers refer to Figure 2 on page 21:

1 = Pressure sensor connector
2 = Communication module places MOD1 and MOD2
3 = SPI connector
4 = Status LED (green)
5 = Lithium battery for RTC
6 = Reset button
7 = CF Card connector

When long signal cables are needed, these will be equipped with optional surge voltage protection devices. These surge protectors consist of a combination of VDRs, gas-filled discharge tubes, transzorb diodes, and coils, thus providing excellent protection. These DIN-rail mountable devices are easy to change without any special tools.

The QML logger is equipped with a CF card slot for logging a large amount of data. The data is logged into daily files making it easy to locate any particular data set for further analysis. The QML logger supports CF cards of up to 2 GB. These cards can be read directly in the PC. Several different types of readers are commercially available: internal PCMCIA reader as well as external readers to be connected to USB or parallel port of a PC. You are recommended to only use cards purchased from Vaisala that have been tested to function in harsh environments.

Figure 3 CompactFlash Memory Card Reader

Optional modules include, for example, various communication modules and a built-in pressure transducer.

QML Logger Connector Block

The QML logger includes:

1. Ten measurement channels and one internal channel for pressure measurement.
2. One connector block for power supplies.

3. One connector block for communication channels.
4. Two blocks for optional communication modules.

Single-ended (H-C or L-C) or differential (H-L) measurements can be performed in the 10 measurement channels.

NOTE Each sensor in a basic setup has its own dedicated channel. Table 4 on page 23 is to be used for reference purposes only.

Table 4 Analog Measurement Channels

Channels	Pin Name	Description
CH0, CH1, CH2, CH3 24-bit ADC	E	12 V/25 mA voltage excitation ON/OFF, voltage can be measured. OR: 100 µA/1mA current excitation.
	H	Analog input (High)
	L	Analog input (Low)
	C	The pin has been connected to ground (GND) via a 10 Ω resistor so that the current can be measured.
CH4, CH5, CH6, CH7 24-bit ADC	E	100 µA/1 mA current excitation
	H	Analog input (High)
	L	Analog input (Low)
	C	Common return and reference level for voltage measurements via the channel's own E-, H-, and L-pins. The pin has been connected directly to ground.
CHA, CHB Suitable for fast-changing input signals 12-bit ADC	F	Frequency input
	E	0 ... 12 V/20 mA adjustable excitation voltage, can be measured.
	H	Fast analog input (High)
	L	Fast analog input (Low)
	C	Common return (Analog ground)

Table 5 Power Channels

Pin Name	Description
GND	Ground
SDI-12	SDI-12
GND	Ground
+ExtDC	8 ... 30 VDC

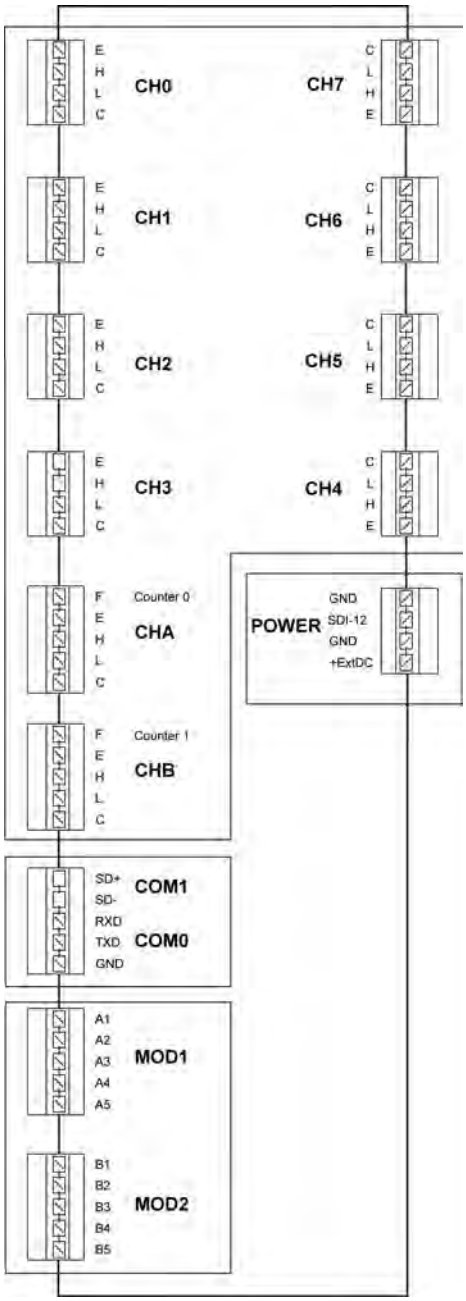


Figure 4 Connector Blocks

Accessories

Sensor Multiplexer

Figure 5 Sensor Multiplexer QMU101

The QML logger provides the possibility to extend the measuring capacity with the optional QMU sensor multiplexer. It is designed to increase the number of analog measurement channels with eight 16-bit analog channels and two 12-bit analog channels. The unit increases the measuring capacity with ten differential measurements or alternatively with 20 single-ended measurements.

The unit interfaces to the logger via the RS-485 line, and is also located inside the enclosure. The unit conforms to the same environmental immunity and emission standards as the logger.

NOTE	The multiplexer unit makes only analog measurements.

NOTE	The multiplexer unit can only be connected to the QML201 logger or newer. The type of the logger can be checked with the **VER** command.

Digital I/O Module

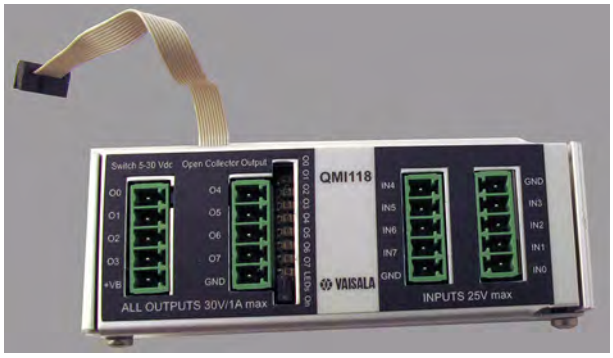


Figure 6 Digital I/O Module QMI118

The QML logger provides the possibility to extend the I/O capacity with the optional digital I/O module (QMI) equipped with eight inputs and eight outputs. The digital I/O module interfaces to the logger via the SPI connector. The module is located inside the enclosure beside the logger and it conforms to the same environmental immunity and emission standards as the logger.

The module has eight open collector outputs with 30 VDC/1 A continuous drive capability and LED indicators. The eight inputs of the module tolerate voltages from 0 to 25 VDC (the absolute maximum 30 VDC) and they have 40 ms (typical) contact debouncing circuitry. The module allows connection of slow pulse inputs, for example, with tipping bucket rain gauges.

NOTE	The digital I/O module can only be connected to the QML201 logger or newer. The type of the logger can be checked with the **VER** command.

Transient Protection Devices

Each sensor input in the logger has a varistor (VDR) protection against induced transients. The maintenance terminal I/O ports have transzorb diodes in their inputs.

In case of long signal cables, additional transient protectors can be installed on the DIN rail. These surge protectors consist of a combination of VDR, transzorb diodes, and coils, thus providing excellent protection. These are easy to change in the field without tools.

Figure 7 Surge Protector for Serial Lines

Optional coaxial surge protectors can be used for UHF and VHF antennas as well as for the RF signal input when radio or satellite equipment is used.

Communication Modules

RS-232 Module

The RS-232 communication module is unisolated, providing either a double serial channel without handshaking (dual RS-232 module) or a single RS-232 with handshaking (single RS-232 module). The power consumption is less than 15 mA when communicating, less than 5 mA at standby.

The later version of the module (DSU232C) adds a separate SDI-12 interface that can be taken into use by jumper selection. Wiring for the SDI-12 is similar to the dual RS-485 module described in section Dual-Isolated RS-485 Communication Module on page 29.

In other aspects, the later version is compatible with the old one and can thus be used as a spare part without modifications to the system.

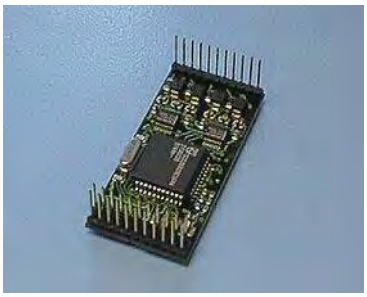


Figure 8 RS-232 Communication Module DSU232

Isolated RS-485 Communication Module

Figure 9 Isolated RS-485 Communication Module DSI485

The RS-485 isolated communication module provides a 2-wire or 4-wire RS-485-communication link between two devices with a similar interface. This module is used, for example, for connecting displays and terminals to the data logger when the distance is longer than 15 meters. The maximum distance for the isolated RS-485 module is approximately 1500 meters at full speed. The module must be configured before use.

Dual-Isolated RS-485 Communication Module

Figure 10 Dual-Isolated RS-485 Communication Module DSI486

The RS-485 dual communication module is dual-isolated and can be used in the RS-232, RS-485, or SDI-12 mode. The communication mode is selected by the correct wiring of the I/O pins and with the correct jumper settings on the board. The dual RS-485 communication module is used, for example, for connecting displays, terminals, and the data logger together when the distance is longer than 15 meters. The maximum distance is approximately 1500 meters at full speed. The module must be configured before use.

The RS-485/422 channels A and B are galvanically isolated from the host board's electronics. The +5 VDC power supplies of channels A and B are also isolated from each other with capacitors. Thus, it is possible to wire these two channels to separate locations.

The RS-232 mode utilizes channel B. When channel B is used in the RS-232 mode, it is possible to use channel A as a galvanically isolated two-wire RS-485 channel. The RS-232 channel is galvanically connected to the host board's GND potential.

The SDI-12 channel has its own connecting point on the board. It does not use channel A or B for the communication. SDI-12 is galvanically connected to the host board's GND potential.

There is a later version of this module, DSI486-B, that widens the operating range and usable RS-485 line speed. The later version has the same functionality as the original one and can be used as a drop-in replacement without changes to the system configuration. Note that its jumper locations and settings are slightly different.

Fixed Line Modem Module

The fixed line modem module is used for providing a long-distance fixed line connection between two Vaisala devices with a similar interface. It is used when the distance is up to 10 km, for example, between the QML logger and a digital display, or between a ceilometer and the logger. Through this I/O port, a remote location can send reports and data or the host can poll them. The fixed line modem module must be configured before use.

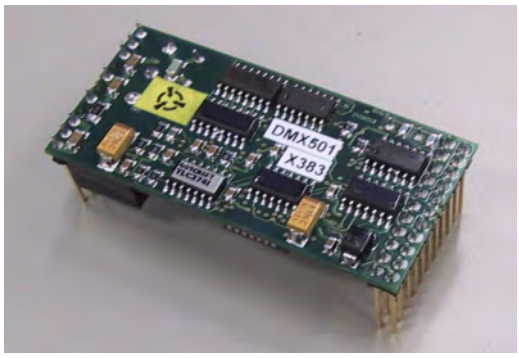


Figure 11 Fixed Line Modem Module DMX501

The fixed line modem module supports the following communication standards:

- V.21, 300 bps FSK
- V.23, 1200 / 75 bps FSK
- V.22, 1200 bps DPSK

Ethernet Communication Module DSE101

Figure 12 Ethernet Communication Module DSE101

Ethernet Communication Module DSE101 is a single, compact, printed circuit board. It provides a 10Base-T Ethernet interface for the QML logger, thus allowing the logger to be accessed, for instance, directly from a LAN environment. DSE101 supports 10/100/1000 Mbps switches and routers, full/half duplex operation, and autonegotiation. Because DSE101 always transmits data at 10 Mbps, the connecting switch or router must not be locked to 100 Mbps or faster speed. DSE101 requires version 6.01 of MAWS software or higher to operate.

Data Collection Software

The QML logger works based on what is known as a setup. A setup is a set of parameters that tells the logger what to measure, log, calculate, and report. Measured data is stored in the daily log files that can be downloaded to a PC and viewed using display software. The delivery/ project-specific data reports can be configured to collect data from weather stations by data collection systems.

Usually, a delivery-specific setup has been loaded in the QML logger program memory at the factory. Therefore you simply need to connect the sensors, connect communication lines, and supply power. Your station will then start operating, that is, making measurements, doing calculations, and sending reports. Normally, the provided example setups, such as the Basic setup, need to be modified according to delivery-specific requirements. The setups are modified using Lizard Setup Software.

On the delivery CD-ROM, you will find several setup examples. The delivered setups will suit typical needs, but you may want to make changes to them. For reconfiguring the setup files or making entirely new ones, refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volumes 2 and 3.

The log files downloaded to a PC can be viewed using AWS Client software. Alternatively, the data values can be viewed with YourVIEW Basic Display Software or Vaisala Digital Displays.

Operating Software

The embedded operating software runs in the QML logger. Access to the operating software commands can be gained using AWS Client software.

AWS Client Software

Vaisala AWS Client software is used for downloading data log files, issuing QML logger commands and setting its parameters, and performing maintenance tasks on the QML logger. The supported connection types to the QML logger are serial line, dial-up connections using a modem, and TCP/IP socket connections. The logger measures sensor data and stores it in log files. With AWS Client, you can download these files to your PC and view them.

When you start using the QML logger, the first thing you need to do is to define what parameters you want to measure and at what frequency. You can do this by creating the setup file using Lizard Setup Software. With AWS Client, you can upload the setup file from your PC to the logger.

AWS Client is also used for setting station-specific parameters such as the station name, altitude, pressure sensor height, and sensor-specific calibration coefficients. In addition, the QML logger date and time can be either set manually or synchronized with the PC clock.

After you have uploaded the setup files to the QML logger, you can browse the data files by downloading them from the logger to your PC. With AWS Client, you can convert the data log files into CSV format for viewing in other applications, such as Microsoft Excel. You can define several download settings, such as an automatic download schedule, where you want to save the downloaded files and what operations the program performs automatically at each download.

For more detailed information, refer to Chapter 3, AWS Client Software, on page 35.

Setup Software

Lizard Setup Software

Lizard Setup Software is used to configure the software parameters and operation of the QML logger. With the Lizard Setup Software, you can create or modify a QML logger setup file.

Creating a setup with Lizard Setup Software is divided into several stages. First, you define an assembly for your system. Next, you define the necessary measurements and the calculations derived from them. Finally, you define reports and log groups from the measurement results.

When your configuration is complete with Lizard Setup Software, use the Generate functionality to create a setup file that contains all the information. The setup file is then transferred into the logger using AWS Client software.

For more detailed information, refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volumes 2 and 3.

Updating QML Software

The QML logger software may need to be updated in order for you to utilize new features published by Vaisala.

CAUTION	Update the QML logger software only when requested by Vaisala. Please contact Vaisala for further instructions.

CHAPTER 3

AWS CLIENT SOFTWARE

This chapter provides information on using Vaisala HydroMet™ Automatic Weather Station Client, or AWS Client for short, for working with the QML logger.

Product Overview

Vaisala AWS Client is used for downloading data log files, issuing QML logger commands and setting its parameters, and performing maintenance tasks on the QML logger. The supported connection types to the QML logger are serial line, dial-up connections using a modem, and TCP/IP socket connections. The logger measures sensor data and stores it in log files. With AWS Client, you can download these files to your PC and view them.

When you start using the QML logger, the first thing you need to do is to define what parameters you want to measure and at what frequency. You can do this by creating the setup file using Lizard Setup Software. With AWS Client, you can upload the setup file from your PC to the logger.

AWS Client is also used for setting station-specific parameters such as the station name, altitude, pressure sensor height, and sensor-specific calibration coefficients. In addition, the QML logger date and time can be either set manually or synchronized with the PC clock.

After you have uploaded the setup files to the QML logger, you can browse the data files by downloading them from the logger to your PC.

With AWS Client, you can convert the data log files into CSV format for viewing in other applications, such as Microsoft Excel. You can define several download settings, such as an automatic download schedule, where you want to save the downloaded files, and what operations the program performs automatically at each download.

Installing AWS Client

AWS Client is installed from the MAWS software CD using an installation wizard.

Minimum System Requirements

Minimum system requirements for the AWS Client software are listed in Table 6 on page 36.

Table 6 Minimum System Requirements

Component	Minimum Requirement
PC	500 MHz
Operating System	Windows® XP[1] or Windows® 2000[2]
Memory	256 MB RAM
Hard Disk Space	100 MB
Drives	CD-ROM Drive

1. With Service Pack 1 or later
2. With Service Pack 4 or later

Installation Procedure

NOTE	All installation procedures must be performed logged in as an administrator.

AWS Client software is installed from the MAWS software installation CD.

To install AWS Client, proceed as follows:

1. Insert the installation CD-ROM disc into your CD drive and select **setup.exe**.
2. The AWS Client installation wizard starts, and the **Welcome** window shown in Figure 13 on page 37 is displayed. Begin the installation by selecting **Next**.

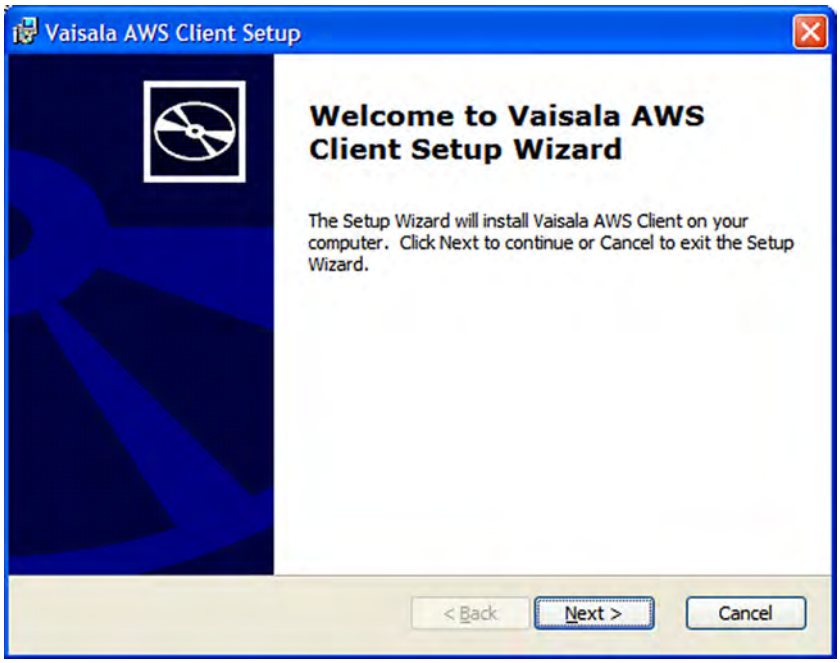


Figure 13 Installation Wizard Welcome Window

3. The **License Agreement** window shown in Figure 14 on page 38 is displayed next. Read the license agreement and accept it. Select **Next** to continue the installation.

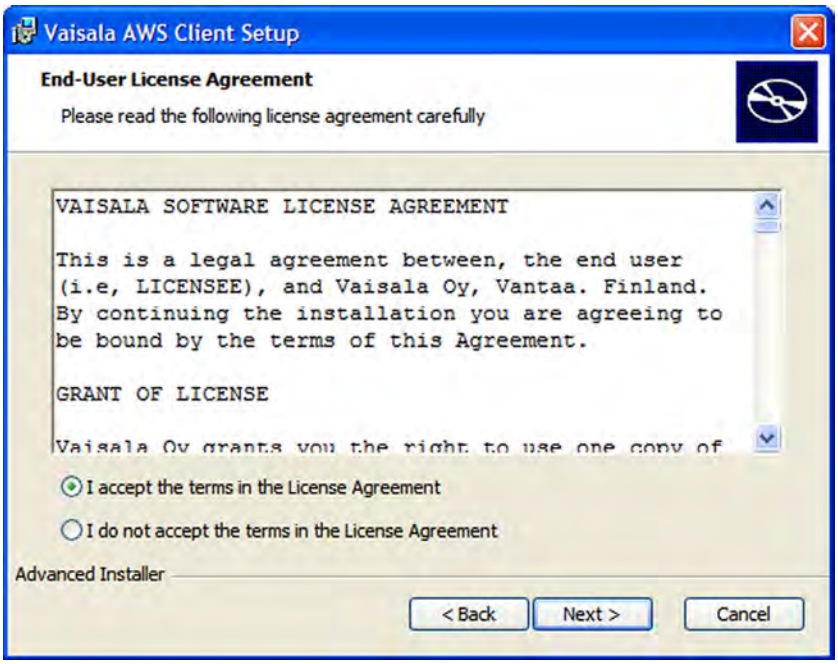


Figure 14 License Agreement Window

4. The **Select Installation Folder** window is displayed next as shown in Figure 15 on page 39. To install the AWS Client software in the default installation folder, select **Next**. You can also change the installation folder on your desktop computer by selecting **Browse** and then browsing for the folder you want or by entering the installation folder path in the **Folder** field.

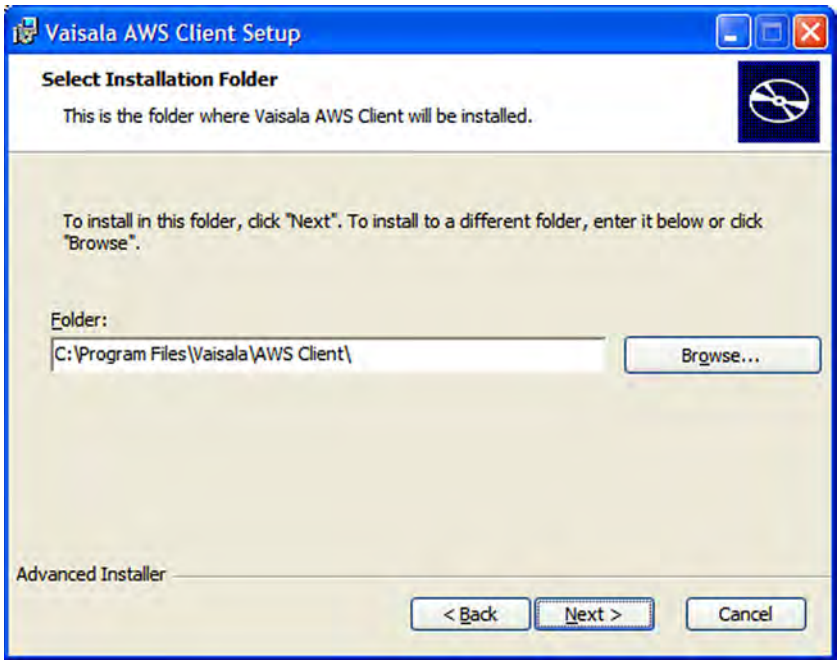


Figure 15 Select Installation Folder Window

5. The **Ready to Install** window is displayed as shown in Figure 16 on page 39. Start the installation by selecting **Install**.

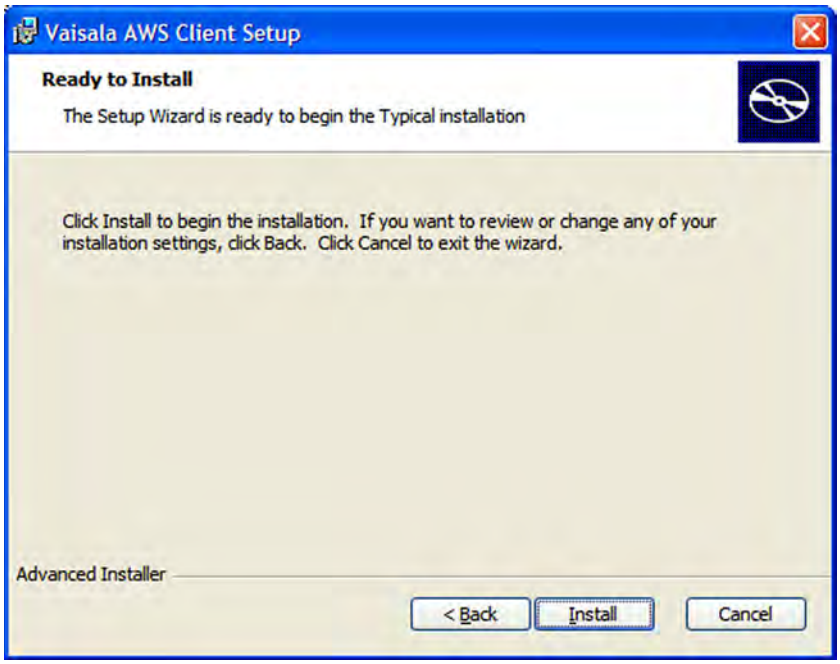


Figure 16 Ready to Install Window

6. Once the installation is complete, the **Installation Complete** window presented in Figure 17 on page 40 is displayed. Exit the installation wizard by selecting **Finish**.

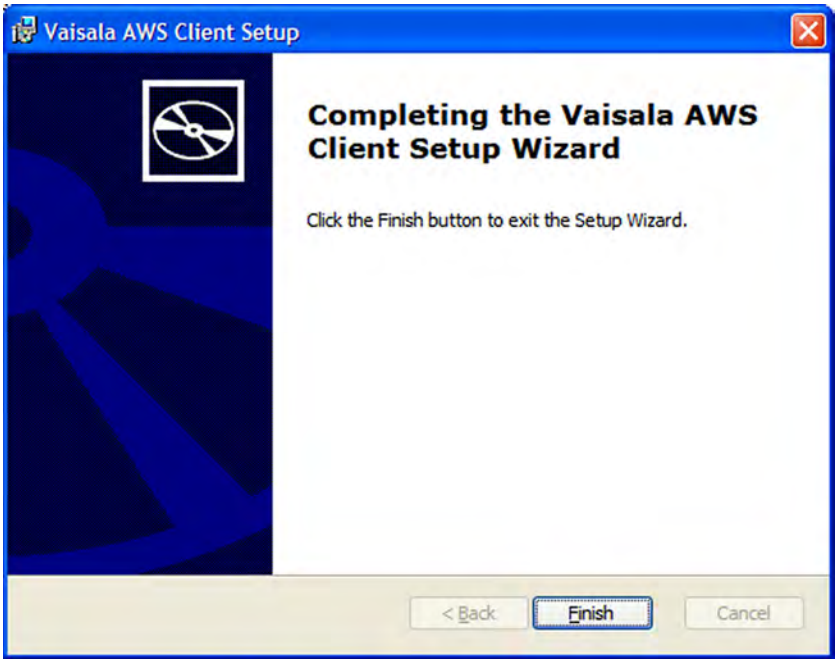


Figure 17 Installation Complete Window

7. After installation, you can access the AWS Client software via the Vaisala program group in the **All Programs** list in the Windows Start menu.

Establishing Terminal Connection

To connect your computer to the QML logger serial port, proceed as follows:

1. Connect the provided terminal cable to the **Maintenance terminal** connector on the bottom flange of the enclosure and to an available COM port on your PC, or, with an additional cable, to the USB port on your PC. See Figure 18 on page 41.

Figure 18 Connecting Terminal Cable

2. Start the AWS Client software on your PC, as instructed in section Using AWS Client Software on page 43.
3. Set the communication parameters: *9600, N, 8, 1*. For more information, see section Opening Service Connection on page 57.
4. Open the service connection by selecting **Terminal Connect** on the **Maintenance** menu or by clicking the **Open command mode** button on the toolbar.

Figure 19 on page 42 shows the pin order for the terminal connector.

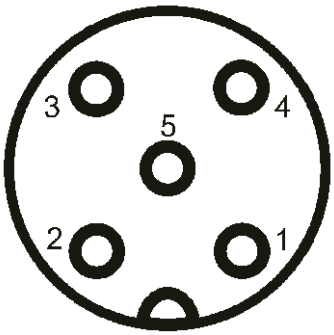


Figure 19 Terminal Connector COM0 Pins

The following numbers refer to Figure 19 on page 42.

1 = Not connected

2 = RxD

3 = GND

4 = TxD

5 = Not connected

Using AWS Client Software

Starting and Exiting AWS Client

You can start AWS Client by clicking the **Start** button and then selecting **Programs - Vaisala - AWS Client**. AWS Client is opened with the terminal main window shown in Figure 20 on page 43.

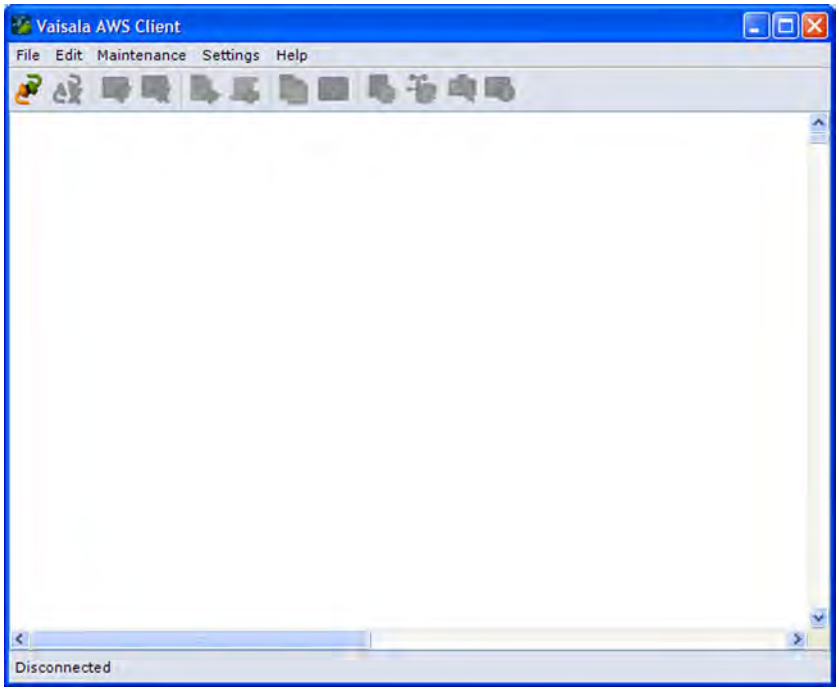


Figure 20 Terminal Main Window

When the service connection is closed, the messages and reports appear on the main window as shown in Figure 21 on page 44. Some values are shown as slashes because they will be calculated from the measured values later.

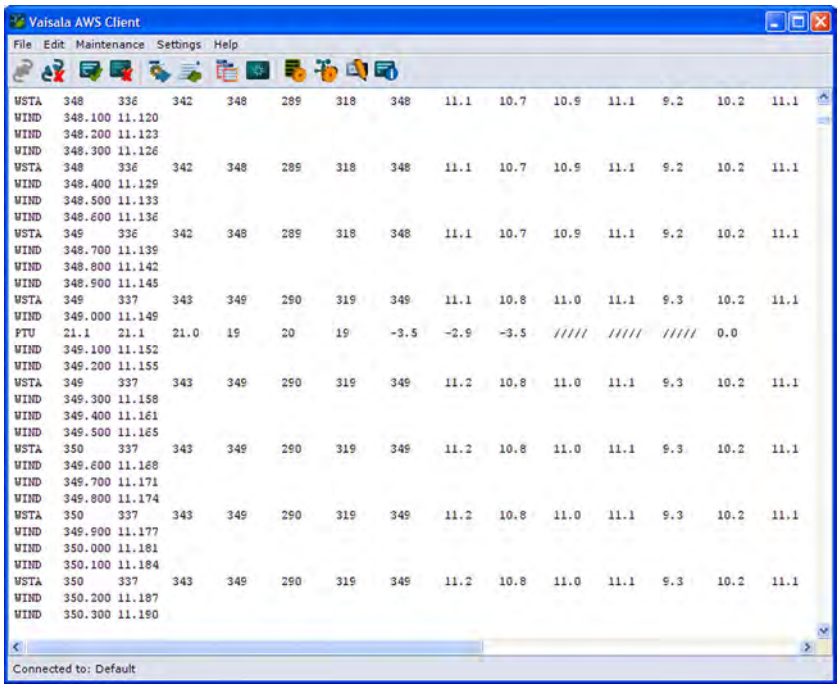


Figure 21 Terminal Showing Report

NOTE	The report type and appearance shown in Figure 21 on page 44 depend on your setup.

You can exit AWS client by selecting the **Exit** option from the **File** menu.

AWS Client Main Window

On top of the main window, you can find the AWS Client toolbar. The toolbar is the quickest way to select functions.

Table 7 Toolbar Icons and Functions

Icon	Function	Description
	Open connection	Opens the address book for selecting the weather station to connect to.
	Close current connection	Closes the connection to the QML logger.
	Open command mode	Opens the service connection for issuing commands to the QML logger.

Table 7 Toolbar Icons and Functions (Continued)

Icon	Function	Description
	Close command mode	Closes the service connection. The terminal window begins to show the messages and reports configured in the QML logger.
	Upload setup file	Selects the new configuration (setup) file you want to upload and starts uploading.
	Download log files	Selects the data log files you want to download and starts downloading.
	Copy selected text from terminal window	Copies the selected text from the terminal window to Windows Clipboard.
	Clear terminal window	Clears the commands and responses in the terminal window.
	Set common parameters	Opens the **Common Parameters** window for editing and viewing the parameter values.
	Set static parameters	Opens the **Static Parameters** window for editing and viewing the parameter values.
	Set manual sensor values	Opens the **Manual Sensors** window for viewing and setting manual sensor measurements.
	Show system information	Displays information on the QML logger with which the connection has been established.

Defining AWS Client Settings

When you start the software for the first time, you need to define the settings to be used during download. Use the **Settings** menu options for this purpose.

Read Only Mode

Multiple instances of AWS Client can be open simultaneously. However, changes to the AWS Client settings can be permanently saved only from the instance that was started first; all subsequent instances run in read only mode, and cannot be used for changing settings.

Address Book

The AWS Client Address Book, shown in Figure 22 on page 46, is used for storing and maintaining information on connections and their

parameters. The connection parameters to be configured depend on the connection type: serial line, dial-up connection, or TCP/IP socket connection. The following sections describe the parameters for each connection type.

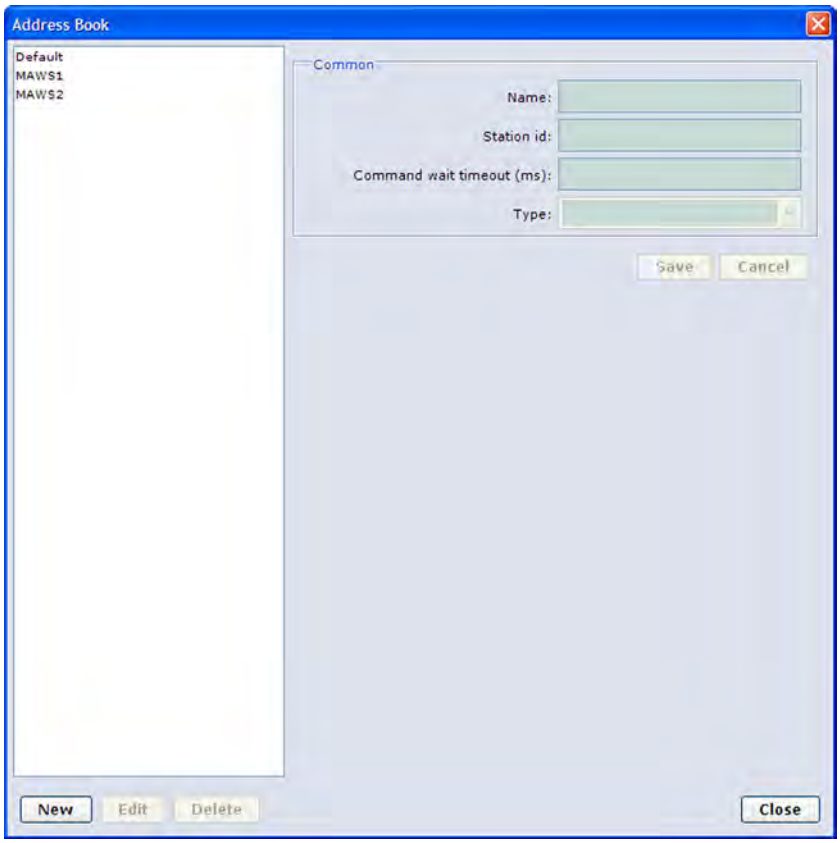


Figure 22 Address Book Window

Serial Line Connections

To add an Address Book entry for a serial line connection, proceed as follows:

1. On the **Settings** menu, select **Address Book**.
2. Select **New**. The fields for selecting new connection parameters are displayed.
3. From the **Type** list, select the type of the connection; that is, select **Serial Port.** The fields for selecting a serial port connection, shown in Figure 23 on page 47, are displayed.

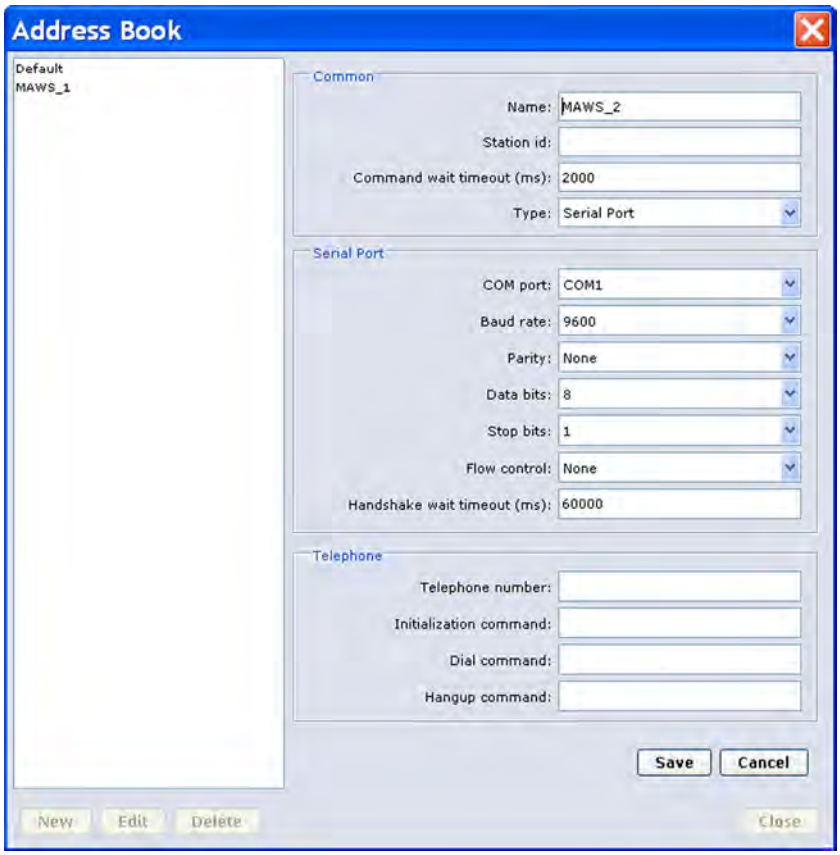


Figure 23 Creating Serial Line Address Book Entry

4. In the **Name** field, enter an alphanumeric string that uniquely identifies the connection you are creating in the Address Book.
5. If you have multiple QML loggers on the same network, and you are going to access them over the same serial connection, you will need a unique identifier for each logger. To uniquely identify the logger for which you are creating an Address Book entry, enter a unique alphanumeric string in the **Station id** field. If you only have a single logger on the network, you can leave the Station id entry blank.
6. In the **Command wait timeout (ms)** field, enter a value in milliseconds that specifies for how long AWS Client will wait for the logger to respond when AWS Client sends a requests over the serial line connection. If the request, for instance, a log file download, succeeds within the timeout, a success message is displayed. If the request fails, a failure message is displayed instead, and you have the option to try again at a later time. Factors such as the current load on the logger, delays in the connection, and

the response length affect whether or not the timeout will expire during a request.

7. From the **COM port** field, select the serial port to be used on your computer and the line parameters. The default line parameters for the QML logger are 9600 bps, No parity bit, 8 data bits, 1 stop bit, No flow control.
8. If you are using a modem to connect to the QML logger, enter also the **Telephone number** to dial, the modem **Initialization** and **Dial commands**, and the **Hangup command**. For instance, in the **Initialization command** field, you could enter "**ATE\rATX1**"; that is, multiple AT commands separated by a "**\r**". Likewise, in the **Dial-up command** field, you could enter **ATDT123456**; that is, an AT command immediately followed by a phone number.
9. Save your settings and return to the **Address Book** window by selecting **Save**.

TCP/IP Socket Connections

Using TCP/IP socket to connect to the QML logger requires that the logger setup contains a virtual COM port with matching configuration:

- Service connection is enabled
- Incoming connection is enabled (client socket only)
- Port setting matches with AWS Client (client socket only)
- Target IP and port settings match with AWS Client (server socket only)

For further information, see section Virtual COM Port in Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

If QML logger with DSE101 Ethernet piggyback does not have a valid setup but its IP address is known, it can be connected with a client socket connection to port 50000.

To add an Address Book entry for a TCP/IP socket connection, proceed as follows:

1. On the **Settings** menu, select **Address Book**.
2. Select **New**. The fields for selecting new connection parameters are displayed.

3. From the **Type** list, select **Client socket** or **Server socket** as the connection type. The fields for selecting the TCP/IP connection parameters, shown in Figure 24 on page 49, are displayed.

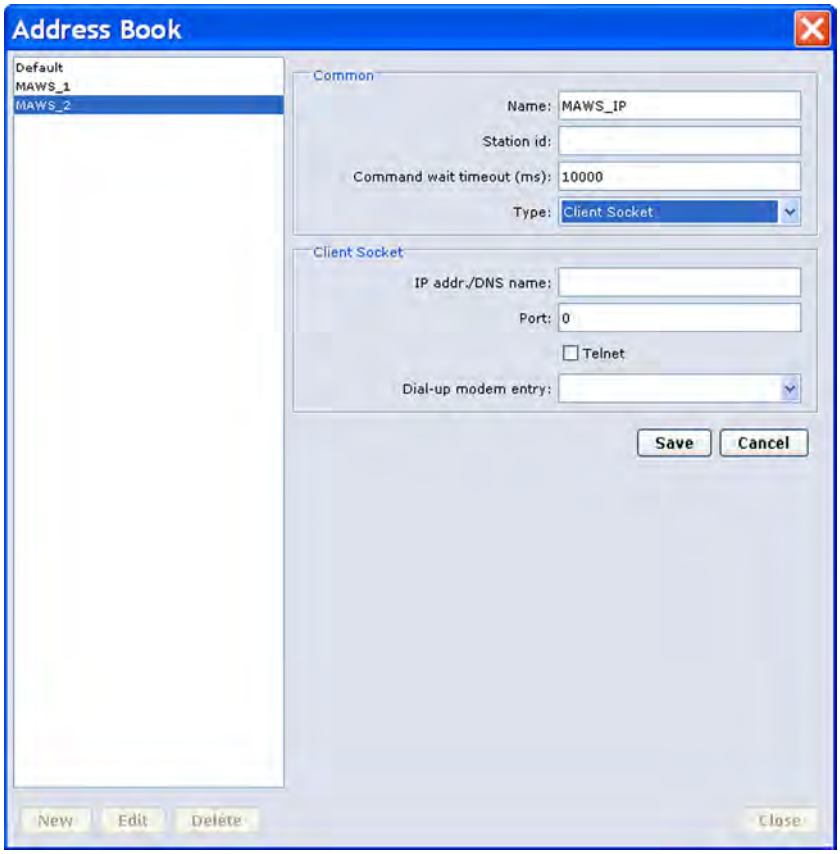


Figure 24 Creating TCP/IP Socket Connection Address Book Entry

4. In the **Name** field, enter an alphanumeric string that uniquely identifies the connection you are creating in the Address Book.
5. If you have multiple QML loggers on the same network, and you are going to access them over the same TCP/IP connection, you will need a unique identifier for each logger. To uniquely identify the logger for which you are creating an Address Book entry, enter a unique alphanumeric string in the **Station id** field. However, if you only have a single logger on the network, you can leave the Station id entry blank.
6. In the **Command wait timeout (ms)** field, enter a value in milliseconds that specifies for how long AWS Client will wait for the logger to respond when AWS Client sends a requests over the TCP/IP connection. If the request, for instance, a log file download, succeeds within the timeout, a success message is

displayed. If the request fails, a failure message is displayed instead, and you have the option to try again at a later time. Factors such as the current load on the logger, delays in the connection, and the response length affect whether or not the timeout will expire during a request.

7. In the **IP addr./DNS name** field, enter the destination IP address or DNS name.

NOTE In order to use the DNS name, must have access to a DNS server to be able to resolve the DNS name to the IP address of the destination host.

NOTE For **Server socket**, the target **IP addr./DNS name** is not available in the user interface.

8. Enter the port to be used in the **Port** field. Note that for **Client socket**, this must match the port set for incoming connections in the interface configuration in the QML logger. For **Server socket**, Host address and port defined for virtual COM port must match the AWS Client IP address and port.
9. If support for Telnet escape sequences for binary file transfer is required, select the **Telnet** option.
10. Save your settings and return to the **Address Book** window by selecting **Save**.

Server Socket with SMS

It is possible to trigger server socket connection open from logger to AWS Client by sending an SMS to the logger. This mode of connection requires advanced configuration on the logger and a GSM modem connected to the PC running the AWS Client software. For further information, see section IP Service Connectivity with GSM in Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

To add an Address Book entry for a server socket connection with SMS, proceed as follows:

1. On the **Settings** menu, select **Address Book**.
2. Select **New**. The fields for selecting new connection parameters are displayed.

3. From the **Type** list, select **Server Socket with SMS** as the connection type. The fields for selecting the TCP/IP connection parameters are displayed, as shown in Figure 25 on page 51.

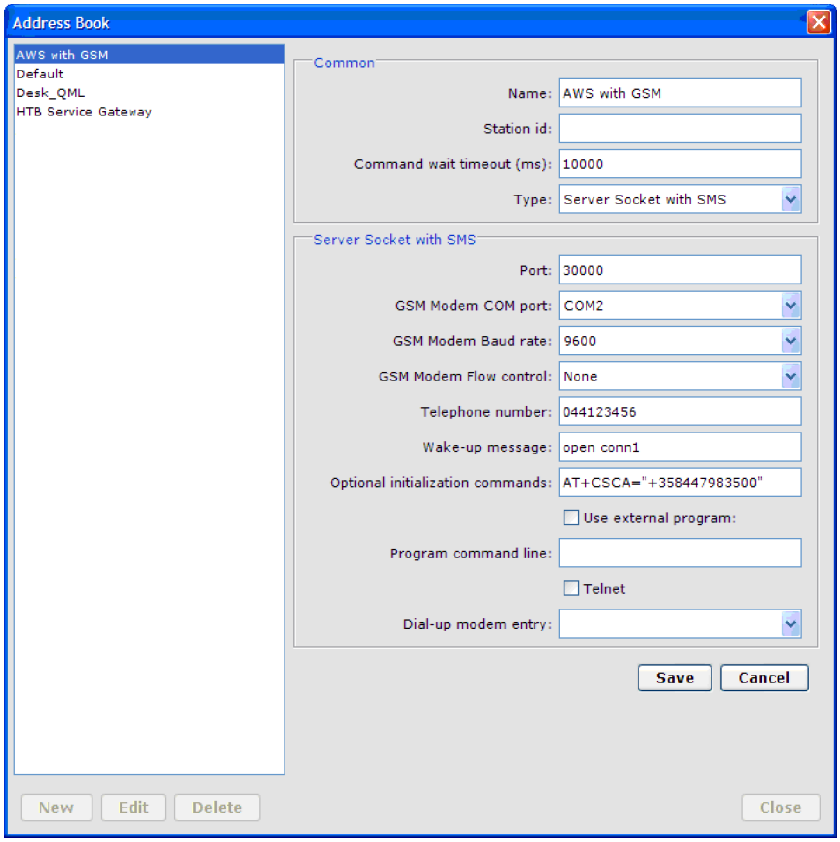


Figure 25 Creating Server Socket with SMS Address Book Entry

4. In the **Name** field, enter an alphanumeric string that uniquely identifies the connection you are creating in the Address Book.
5. If you have multiple QML loggers on the same network, and you are going to access them over the same serial connection, you will need a unique identifier for each logger. To uniquely identify the logger for which you are creating an Address Book entry, enter a unique alphanumeric string in the **Station id** field. If you only have a single logger on the network, you can leave the Station id entry blank.
6. In the **Command wait timeout (ms)** field, enter a value in milliseconds that specifies for how long AWS Client will wait for the logger to respond when AWS Client sends a requests over the serial line connection. If the request, for instance, a log file download, succeeds within the timeout, a success message is

displayed. If the request fails, a failure message is displayed instead, and you have the option to try again at a later time. Factors such as the current load on the logger, delays in the connection, and the response length affect whether or not the timeout will expire during a request.

7. In the **Port** field, enter the port where the logger is configured to connect to. For further information, see section IP Service Connectivity with GSM in Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.
8. In the **GSM Modem COM Port** field, select the PC COM port where the GSM modem is connected to.
9. In the **GSM Modem Baud rate** field, select the baud rate for the GSM modem.
10. In the **GSM Modem Flow control** field, select the flow control mode for the GSM modem.
11. In the **Telephone number** field, enter the telephone number of the logger's GSM modem.
12. In the **Wake-up message** field, enter **open** <*connX*>, where <connX> refers to the logger SMS handler configuration. For further information, see section IP Service Connectivity with GSM in Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.
13. In the **Optional initialization commands** field, enter additional initialization commands for the modem. For example:

    AT+CPIN="XXXX"

    AT+CSCA="<sms central number>"
14. Save your settings and return to the Address Book window by clicking **Save**.

It is also possible to use an external program to execute the SMS sending. In this case, select the **Use external command** option and enter startup command and parameters for launching the external program in the **Program command line** field. In this case, neither the modem settings nor the wake-up message are used.

NOTE	Connecting to the logger with this method can involve significant delays, which depend on how fast the SMS gets through and the logger manages to establish a GSM connection for IP.

Dial-Up Connections

The dial-up connections are based on Windows Dial-Up Networking entries, so you first need to create the connection in Windows. For information on creating Windows Dial-Up Networking connections, please see the Windows online help. To add an Address Book entry for the dial-up connection, proceed as follows:

1. On the **Settings** menu, select **Address Book**.
2. Select **New**. The fields for selecting new connection parameters are displayed.
3. From the **Type** list, first select **Socket**. The field for selecting Windows Dial-Up Networking entries is available in the window shown in Figure 26 on page 53.

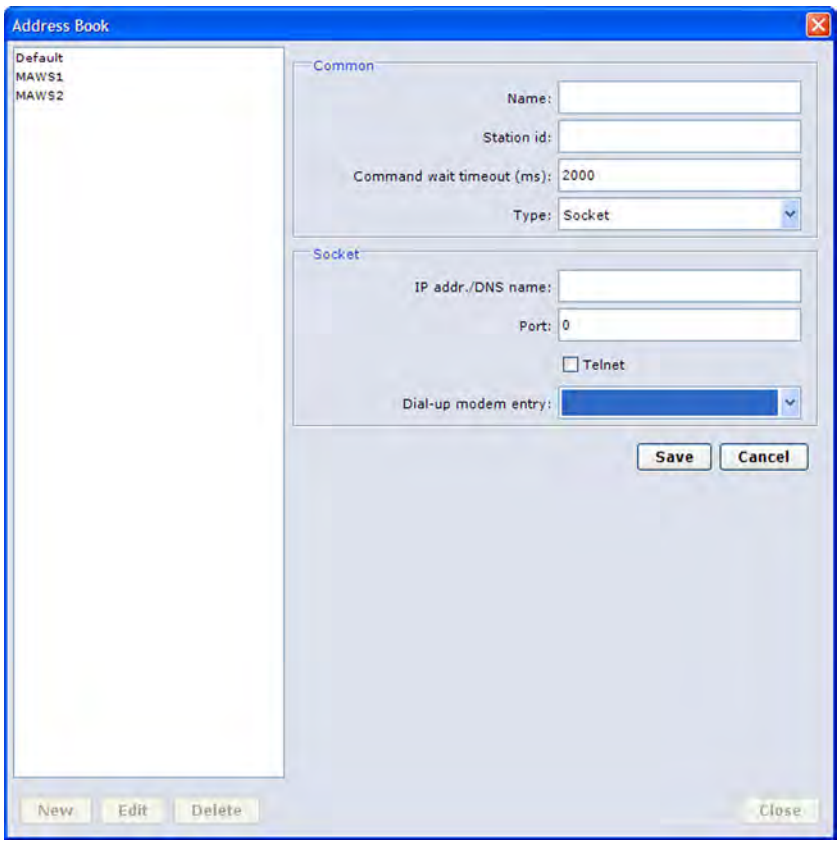


Figure 26 Creating Dial-up Connection Address Book Entry

4. In the **Name** field, enter an alphanumeric string that uniquely identifies the connection you are creating in the Address Book.

5. If you have multiple QML loggers on the same network and you are going to access them over the same dial-up connection, you need a unique identifier for each logger. To uniquely identify the logger for which you are creating an Address Book entry, enter a unique alphanumeric string in the **Station id** field. However, if you only have a single logger on the network, you can leave the Station id entry blank.
6. In the **Command wait timeout (ms)** field, enter a value in milliseconds that specifies for how long AWS Client will wait for the logger to respond when AWS Client sends a requests over the dial-up connection. If the request, for instance, a log file download, succeeds within the timeout, a success message is displayed. If the request fails, a failure message is displayed instead, and you have the option to try again at a later time. Factors such as the current load on the logger, delays in the connection, and the response length affect whether or not the timeout will expire during a request. In case the system has a large amount of static parameters, the set static parameters command can require a long command wait timeout.
7. From the **Dial-up modem entry** pull-down menu, select an ISP Name, that is, a Windows Dial-up Networking entry, that you created as a prerequisite for this address book entry.
8. Save your settings and return to the **Address Book** window by selecting **Save**.

Options Window

The **Options** window contains general settings for AWS Client. To open the window, select **Options** on the **Settings** menu. The Options window, shown in Figure 27 on page 55, contains the items listed in Table 8 on page 55:

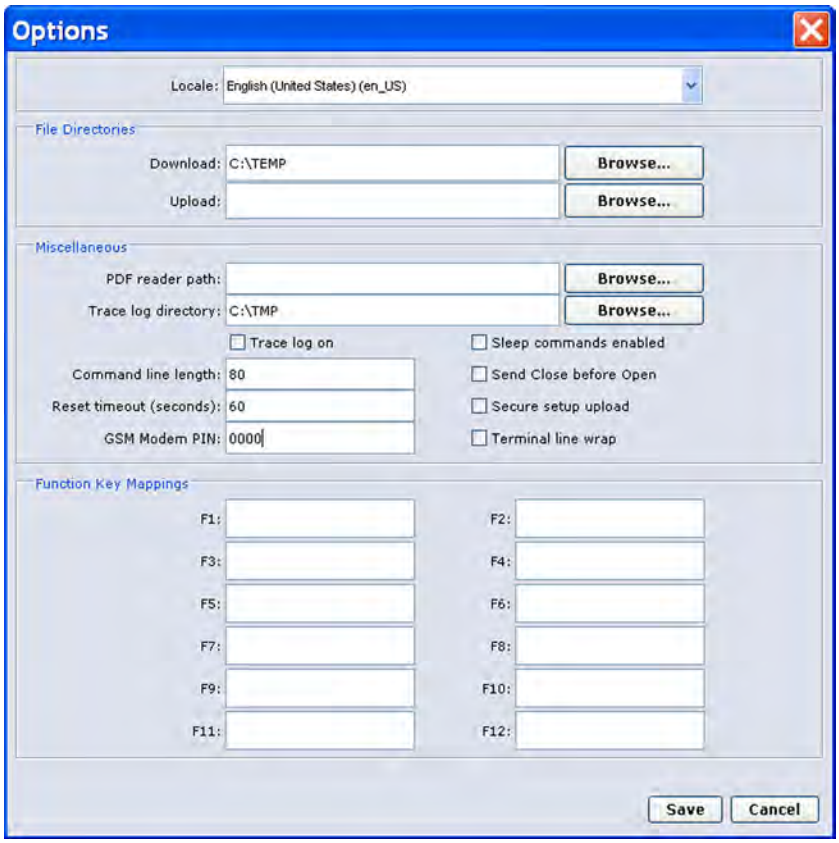


Figure 27 Options Window

Table 8 Settings in AWS Client Options Window

Setting	Description
Locale	User interface language used in AWS Client. If AWS Client has not been localized for the selected language, the user interface will remain in English.
Setup file download directory	Default download directory for QML logger setup files. You can either enter the path for your directory or select **Browse** and browse for the directory.

Table 8 Settings in AWS Client Options Window (Continued)

Setting	Description
Setup file upload directory	Default upload directory for QML logger setup files. You can either enter the path for your directory or select **Browse** and browse for the directory.
PDF reader path	Location of the PDF reader on the workstation on which the AWS Client is installed. The AWS Client help file is in PDF format and needs a reader.
Trace log directory	AWS Client logs the information sent by the QML logger during the terminal session to a file. The trace log directory specifies the location of the trace log.
Trace log on	When selected, the **Trace log on** option causes a trace log to be created. For troubleshooting purposes, you can, for example, log your commands and the responses given by the QML logger.
Sleep commands enabled	Enables the **Sleep** command for setting the QML logger to a power-saving mode as well as the **Wakeup** command for powering up the logger after it is put to sleep.
Send close before open	Always send the **Close** command before attempting to open terminal connection.
Secure setup upload	Use secure setup upload procedure when uploading the setup. Using this option will cause the setup upload to take more time, but using the option is recommended especially when uploading setups over an unreliable connection.
Terminal line wrap	Folds overlong lines in the terminal window onto the next line.
Command line length	Maximum length for a command sent from the command line to the QML logger. The default value is 80 characters. This can be set to a smaller value, which, however, must match the value specified in the setup file on the logger. For URL settings, this 80 characters might not be long enough, and the value has to be set higher.
Reset timeout (seconds)	Maximum time to wait for the logger to execute reset.
GSM Modem PIN	The PIN code for the GSM modem SIM card.
Function Key Mappings	The function key mappings can be used for mapping frequently used QML logger shell commands to the function keys on your keyboard. Example (note that the command ends in a carriage return): **SYSINFO<CR>**

Number Format

The number format used in AWS Client and QML logger configuration changes depends on the number format selected in the Windows regional settings.

CAUTION	Using the incorrect decimal symbol when changing QML logger parameters, for example, in sensor calibration or setting parameters, may result in errors. Always use the decimal symbol defined in the Windows regional settings.

You can change the Windows regional settings and the decimal symbol using the Windows Control Panel. For instructions, please refer to the Windows online help.

Opening Service Connection

Before you can download files or upload the setup file, you need to open a service connection to the QML logger.

The supported connection types are serial port, TCP/IP socket, and dial-up using a modem.

AWS Client supports any number of serial ports available in the computer. The software reads from the registry of the Windows® operating system which serial ports are installed.

This feature also enables the use of USB to RS-232 converter cables that are usually installed above any other COM ports installed on a computer. The COM port number of a converter cable depends on the system configuration. For example, in a desktop computer with only two physical COM ports (COM1 and COM2), a converter cable is installed as COM3.

When reassigning the COM ports after installation, for example, when changing COM5 to COM4 afterwards, you need to recreate the address book entry for the modified COM port manually.

To establish a connection to the QML logger, select **Connect** from the **File** menu. You can also click the **Open connection** icon. The **Address Book** window is displayed as shown in Figure 28 on page 58.

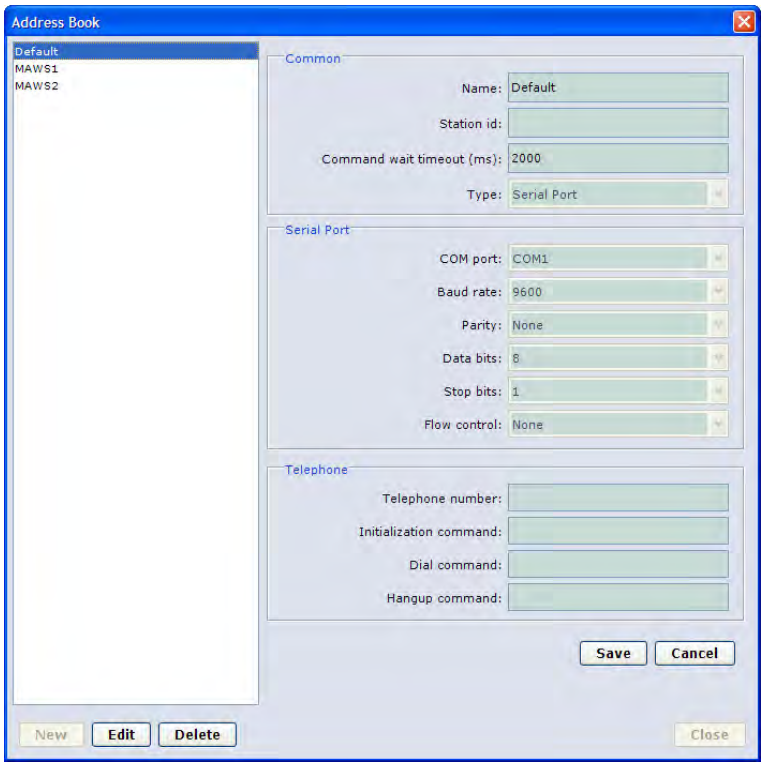


Figure 28 Address Book Window

In the **Address Book** window, select the address book entry for the QML logger and click **OK**. To open the service connection, select **Terminal Connect** on the **Maintenance** menu or click the **Open command mode** button on the toolbar.

NOTE	Before connecting, the **Password Entry** window opens in case you have set the user level. For more information on setting the user levels, see section Managing User Levels on page 61.

When the connection is opened, the following text appears on your screen:

```
Service connection opened
/>
```

Giving Commands

When you have established the connection to the QML logger, you can use the commands described in Table 22 on page 106 to communicate with the QML logger. Commands are text strings sent from the PC or terminal to the logger. Most commands can be used for both setting a value for a parameter and viewing the set value of a parameter.

To open the connection, select **Terminal Connect** on the **Maintenance** menu or click the **Open command mode** button on the toolbar. To close the terminal connection, select **Terminal Disconnect** on the **Maintenance** menu or click the **Close command mode** button on the toolbar. Logging is not affected unless it is stopped using the **logstop** command. In the closed mode, the serial line will be available for report sending.

NOTE Both **open** and **close** commands have to be typed exactly correctly before they can be executed. This means that you cannot use the BACKSPACE key to correct your typing. Simply retype the command and press **ENTER** to give the command again.

Type **help** to get a list of the available commands. Each command must be entered using the correct syntax. You do not have to memorize complex commands since you can view a help text that shows the correct syntax at any time. Simply type **help** and the command name.

Table 9 Interpreting Help Texts (the Correct Syntax)

Generic Representation	Example		Note
Use the parameter name	**warnings** [*clear*]	To see the warnings, type: **warnings**	Parameters shown in [ ] can be omitted.
		To remove warnings, type: **warnings** *clear*	
Replace parameter symbols with values	**time** [*HH MM SS YY MM DD*]	To see current time, type: **time**	
		To set new time, type for example: **time** *15 45 00*	
		To set new time and date, for example: **time** *15 45 00 07 06 18*	
	loggo <*group_id*>		Parameters shown in < > cannot be omitted.

NOTE	Commands have to be typed in the same case as indicated in the help texts, usually in lower case.

The command name and the following parameters are always separated by a space. Pressing **ENTER** (return) will execute the command so that the QML logger reads the typed command.

You can use BACKSPACE to delete the last typed character.

Use **CTRL+P** (hold down the CTRL key and press P) to repeat the previously typed command. Use **CTRL+P** (Previous) and **CTRL+N** (Next) to scroll through the list of previously typed commands. When you find the command you would like to repeat, simply press **ENTER**. File commands (**dir**, **del**, **copy**, **move**, **verify**) can be aborted with **CTRL+C**.

Closing Service Connection

If your connection to the QML logger works via a modem, remember to close the line after you finish working with the logger. To close the connection, choose **Disconnect** from the **File** menu.

If your connection to the QML logger is direct, you are recommended to close the service connection by entering the **close** command or selecting **Terminal Disconnect** on the **Maintenance** menu. The program closes the service connection automatically after 5 minutes.

Managing User Levels

You can use the **userlevel** command to protect the system from unauthorized use. The system provides three password-protected access levels to the shell commands as well as to the visibility of system data. By default, the user levels are not in use.

CAUTION	Improper use of the **userlevel** command may lead to a malfunction of the QML logger.

You can manage user levels with the **userlevel** command when the service connection is open. The command has the following syntax:

userlevel [*level <set/clear>*]

where

level	=	1, 3, or 5
set	=	Sets the password for a level
clear	=	Clears the password from a level

To check the current setting, give the command alone, without parameters. When you want to change the level, give the command with parameters. When you change the level to a higher one, a password is required. When you change the level to a lower one, a password is not required.

To change the password for the level, give the command with the appropriate level and the *set* parameter. For this operation, the user level has to be the highest, that is, *5*. The new password is effective immediately.

To remove the password for the level, give the command with the appropriate level and the *clear* parameter. For this operation, the effective user level has to be the highest, that is, *5*. The new password is effective immediately.

CAUTION	Setting a new or clearing an existing user level is effective only after a reset. When setting a new level or clearing an existing one, be sure to reset the system before closing the service connection. Otherwise, you may not be able to access the system without a cold reset.

To check the allowed commands at a specific level, give the **help** command. Table 10 on page 62 lists the accessible commands in the different user levels. Level *1* provides access to the minimum set of commands and visibility of system parameters. Level *3* provides access to all commands needed for normal administration and commissioning. Level *5* provides access to all commands. For command reference, see Table 22 on page 106.

Table 10 Accessible Commands in Different User Levels

User Level	Commands
Userlevel 1	cd, copy, dir, errors, help, logshow, logshownext, logshowprev, logstatus, rep, warnings, and zs
Userlevel 3	EXTFS, LOGFS, altitude, battery, cd, chmod, copy, del, dir, errors, ftp, help, ipconfig, logdel, loggo, logshow, logshownext, logshowprev, logstatus, logstop, md, move, net, netif, ntp, paramset, paramsetclear, ping, pslevel, rd, rep, reset, serial, sname, spclear, spset, time, timezone, verify, warnings, winddircal0, zr, and zs
Userlevel 5	All the userlevel 3 commands and the userlevel administrator rights

Modifying Station Settings

With AWS Client, you can modify the station settings. From the **Settings** menu, when you select the **Parameters - Common** option, the **Common Parameters** window is displayed as shown in Figure 29 on page 63. Table 11 on page 63 lists the items that can be changed.

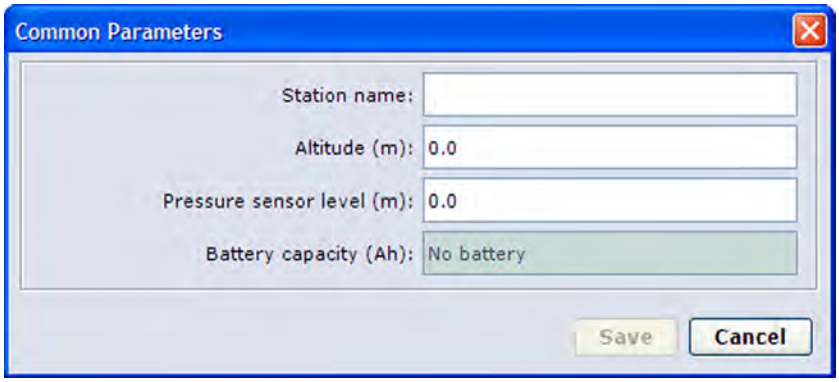


Figure 29 Common Parameters Window

The fields displayed in the **Station Setting** window and their uses are outlined in Table 11 on page 63.

Table 11 Common Parameters Window

Parameter	Description
Station name	You can define a name for your weather station.
Altitude (m)	Enter the altitude of the weather station from sea level in meters.
Pressure sensor level (m)	Height of the pressure sensor on the mast in meters.
Battery capacity (Ah)	Enter the capacity of the optional internal battery QMB101 in Ah. Note that this value is set to zero when high capacity backup batteries are included in the delivery, which normally is the case with the HydroMet™ systems. If your QML logger does not include an internal battery, this field displays the text **No battery**.

Setting the QML Logger Clock

With AWS Client, you can either set the clock and time zone of the QML logger manually, or you can synchronize the logger clock with the clock on your PC. To set the QML logger clock, proceed as follows:

1. On the **Maintenance** menu, select **Synchronize Clock**. The **Set Logger Time** window, shown in Figure 30 on page 64, is displayed.

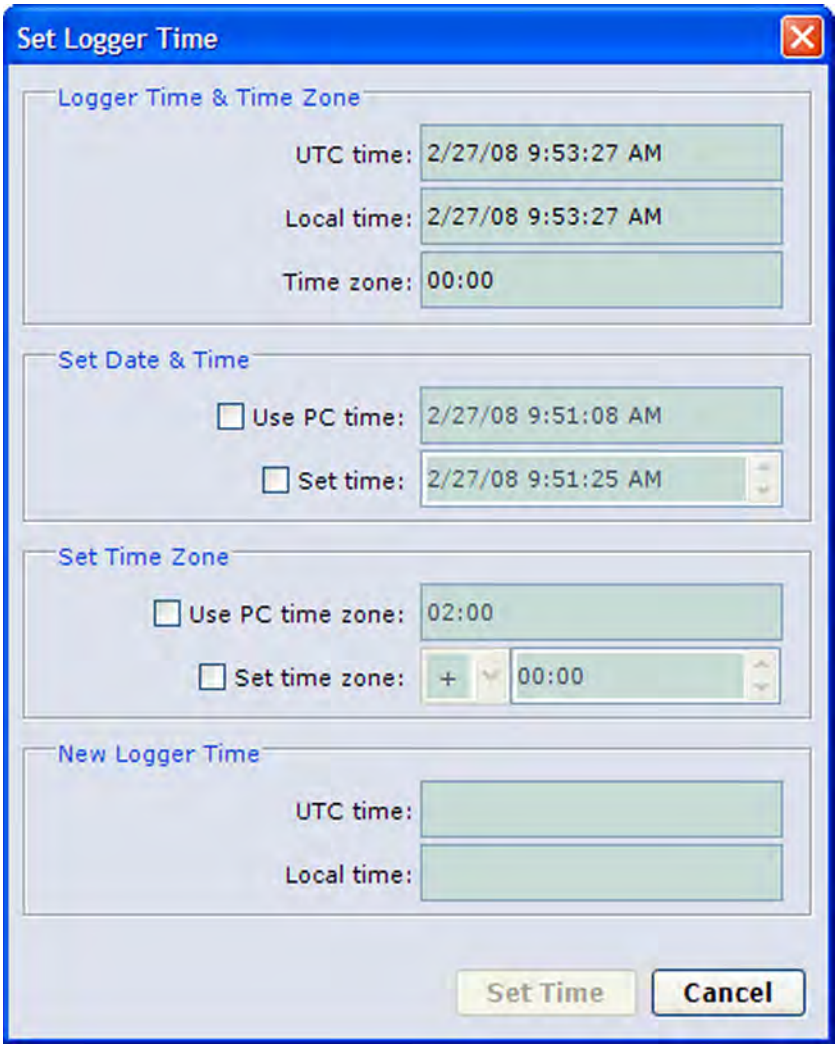


Figure 30 Set Logger Time Window

2. If you want to set the time manually, select the **Set time** option and enter the new time in that field; to synchronize the QML logger clock with your PC, select **Use PC time**.

3. If you want to set the time zone manually, select the **Set time zone** option and select your time zone; to synchronize the QML logger time zone with your PC, select **Use PC time zone**. The time zone is defined as a difference from UTC time; for example, for eastern United States in the winter, the time zone would be **-05:00**.
4. Set the QML logger clock by selecting **Set Time**.

It is possible to configure the logger to use daylight saving time. This configuration is done using MAWS Lizard. For instructions on how to configure daylight saving time, see HydroMet™ Data Collection Platform User's Guide, Volume 2, Chapter 4, Advanced Use of Lizard Setup Software, section Daylight Saving.

Setting Static Parameters

To be able to use static parameters in the QML logger, you must first create them in Lizard Setup Software, and then either use the default values given in Lizard or change the values in the AWS Client software.

Lizard Setup Software provides an interface for creating setup-specific static parameters to be used, for example, as station-dependent parameters or as calculation factors. This interface is in the **Setup** view and it is only available on the Advanced user level.

QML logger static parameters can also be grouped into parameter sets. With parameter sets, you can group parameters belonging to a certain functionality together to be handled as a single entity. For more information on parameter sets, refer to the Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

NOTE	All parameters are automatically created on the QML logger when the setup is uploaded.

The value of a static parameter, which can be a default value given in Lizard Setup Software, can be changed in the AWS Client **Static Parameters** window. The window shows a hierarchical list of all parameters and their values, also those that have been set directly with AWS Client software; see Figure 31 on page 66.

To change the value of a static parameter, proceed as follows:

1. Start AWS Client and connect to the QML logger.
2. On the **Settings** menu, select **Parameters - Static**.
3. Expand the list for the parameter set whose parameters you want to change by clicking the plus sign next to the parameter set name.

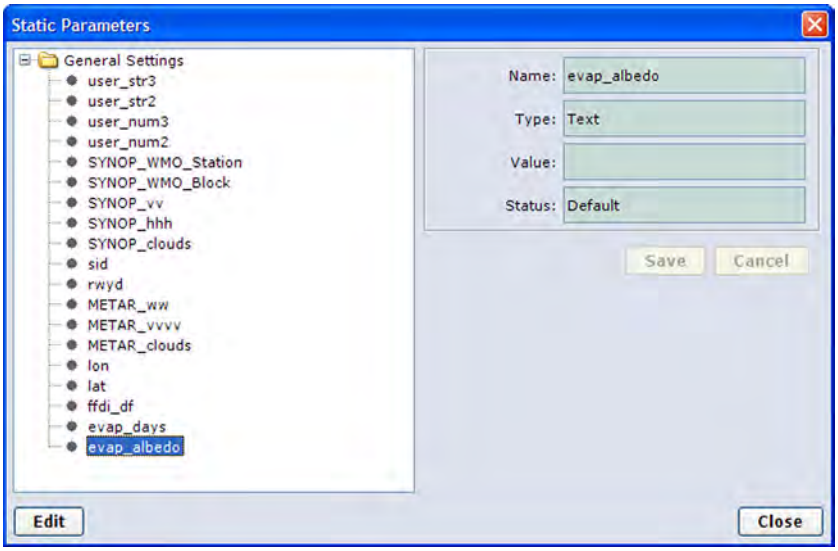


Figure 31 Static Parameters Window

4. Select the parameter whose value you want to change. For the selected parameter, AWS Client displays the name, type, value, and status of the parameter.
5. To change the parameter value, select **Edit**
6. Enter the new parameter value in the **Value** field.
7. Click **Save** to store the new parameter value. You can change the values of further parameters in the same manner.

Station Parameter Backup and Restore

AWS Client can be used to create a backup of station-specific settings from logger, and to restore a backup file to logger. To create a station settings backup with AWS Client, proceed as follows:

1. Establish connection to the data logger.
2. Open the **Settings** menu and choose **Parameters** and **Backup from Logger**.
3. In the file dialog, select the destination file where the parameters are to be stored to. The file has XML format, so using extension *.xml* is preferred.

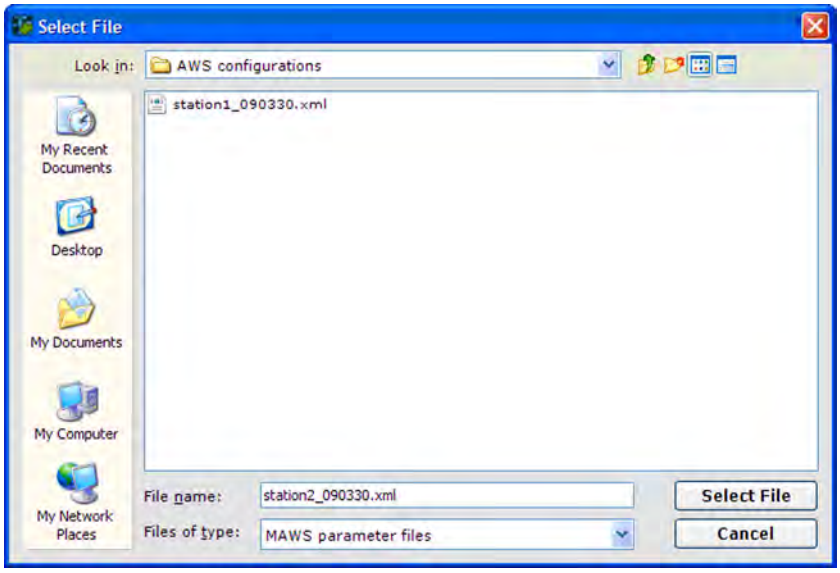


Figure 32 Selecting File for Station Settings Backup

4. Click **Select File** to start the backup.
5. A file download progress dialog appears, and the backup is complete when AWS Client displays the following window:

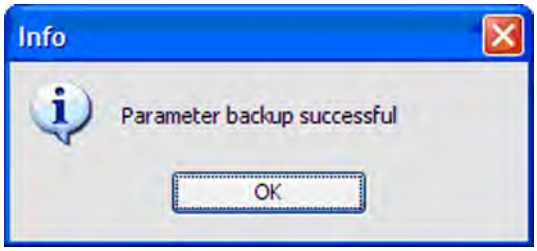


Figure 33 Parameter Backup Completed

To restore station settings backup with AWS Client, proceed as follows:

1. Establish connection to the data logger.
2. Open the **Settings** menu and choose **Parameters** and **Restore to logger**.
3. In the file dialog, select the file containing the backup.

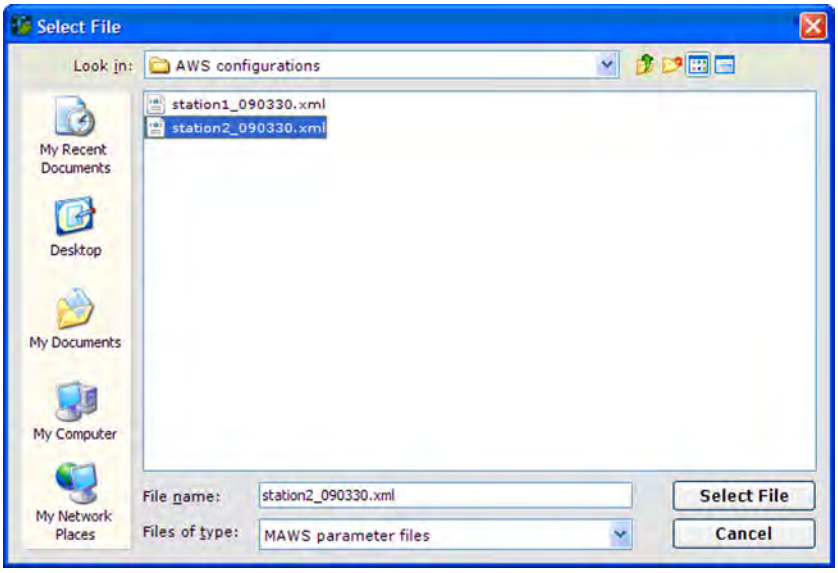


Figure 34 Selecting File for Station Settings Restore

4. Click **Select File** to start the restoring.
5. A file upload progress dialog appears, and the restoring is complete when AWS Client displays the following message:

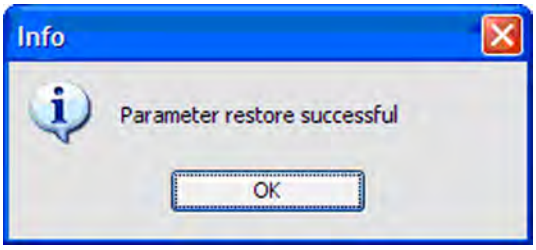


Figure 35 Parameter Restore Complete

Calibrating Sensors

For calibrating the sensors with the AWS Client software, use the **Calibration** window shown in Figure 36 on page 70. The window shows a list of measurements available for calibration.

CAUTION Improper changes to sensor calibration may cause the system to malfunction. Changing the values requires a profound knowledge of calibrating sensors.

CAUTION When you upgrade a previous QML logger software version to 3.06 or above, the following sensors will not operate correctly in the **Sensor Calibration** tab until they are removed from the setup and then re-created: CM6B, CM11, QMS101, QMS102, and QMN101.

NOTE There are two ways to calibrate a sensor with AWS Client: either via the graphical or the command line interface. While the command line option is available for all sensors, the graphical user interface is limited to the following sensors: wind sensor WMS302, solar radiation sensors CM6B/CM11 (older models), CMP6/CMP11 (current models with enhanced sensitivity), QMS101, QMS102, QMN101, and LI200.

NOTE You must load an appropriate setup to the QML logger before you are able to use the **Calibration** window.

NOTE The **Calibration** window has no content for setups made with QML logger software versions prior to 3.06. With old setups, sensors need to be calibrated through the terminal connection with the appropriate calibration commands.

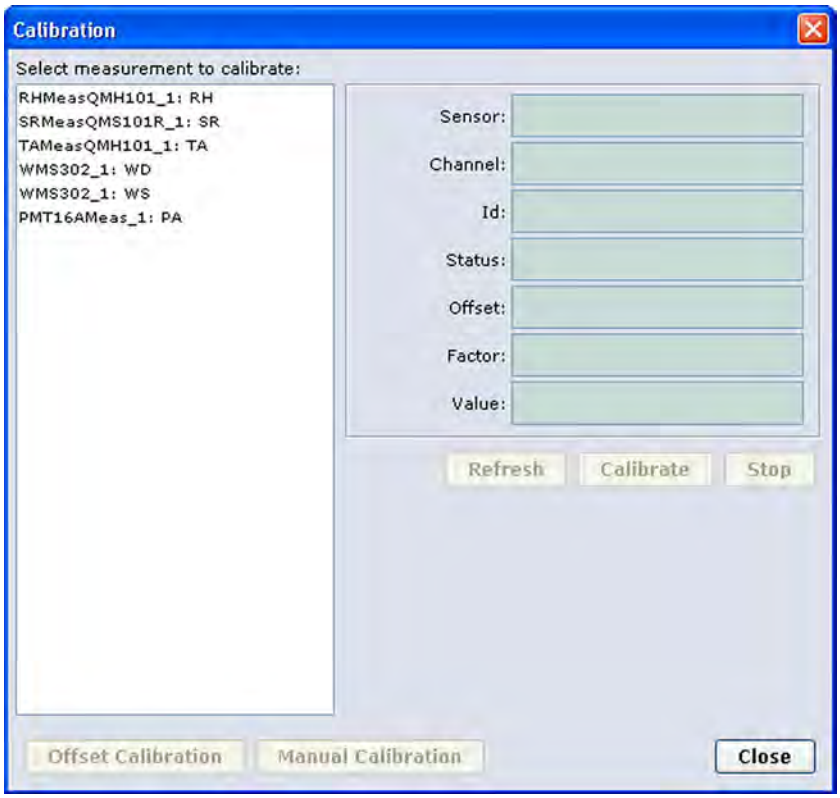


Figure 36 Calibration Window

The available calibration methods are offset calibration and manual calibration. In offset calibration, you can change the offset value of the measurement by entering a new value for the sensor reading, and the offset value is changed accordingly. Offset calibration may be useful, for example, if you have a reference sensor providing a measurement based on which you want to calibrate the sensor connected to your weather station. In manual calibration, you can change the offset and gain values directly by entering the new values to be used for the measurement.

NOTE Sensors with their own measurement interfaces and algorithms, for example, ceilometers, lightning detectors, or present weather detectors, and manual and counter-type sensors do not appear in the sensor list in the **Calibration** view.

The windows for offset and manual calibration are shown in Figure 37 on page 73 and Figure 38 on page 75, respectively.

The fields displayed in the calibration windows and their uses are outlined in Table 12 on page 71.

Table 12 Fields in the Calibration Windows

Field	Description	Input
Sensor	Sensor name as defined in the QML logger setup	n/a
Channel	Measurement channel of the sensor	n/a
ID	Measurement identifier	n/a
Status	Sensor status	n/a; see Table 13 on page 72.
Offset	Offset for the sensors	Overwrites the old offset value with the new one.
Value	Last measured sensor reading shown in physical units	Overwrites the sensor reading with the entered value, that is, changes the offset of the measurement.
Factor	Measurement gain for the sensors.	Overwrites the old gain value with the new one.

NOTE New sensor calibration values are taken into use in the QML logger after a reset with, for example, the **Reset** command. For further information on resetting the QML logger, see section Resetting the QML Logger on page 103.

Sensor Status List

Table 13 Sensor Status List

Value	Description	Notes
0	Sensor is working properly (OK).	
1	Not measured yet.	
2	Interface is not initialized.	1
3	Communication timeout has occurred.	1
4	Unknown data is received.	1
5	Communication is functioning, but the sensor reports errors. Use sensor's own service interface to find out the cause.	1
6	Sensor communication is paused because service connection is opened.	1
7	Message sequence numbers are overlapping in the Autotrac satellite transceiver interface.	1
8 ... 19	Not available.	
20	Excitation failure is caused by overload in the excitation output.	2
21	The input voltage is out of range or the A/D conversion has failed due to an internal error.	2
22	Sensor is disconnected or the connection cables are broken.	2
23	Sensor output exceeds the min/max limits defined in the **Measurements** view.	2
24	Change in sensor output has exceeded the maximum step defined in the **Measurements** view.	2
25	An internal configuration error has occurred.	2
26	Error in reference measurement, which is usually caused by damaged sensor/logger or electrical interference.	2
27	Internal voltage error occurred or the logger is damaged.	2
28	PMT16 calibration data error.	2
29	Data is invalid for unspecified reason.	2
30	The measurement or the sensor has been manually disabled.	
99	Sensor status is not supported.	

1. Value is available only for sensors with a serial interface.
2. Value is available only for sensors with a conventional, that is, analog or counter/frequency, interface.

Offset Calibration

1. On the **Settings** menu, select **Calibration**. The list of measurements available for calibration is displayed.
2. Select the measurement you want to calibrate from the list.
3. Click **Offset Calibration**.
4. The **Offset Calibration** view shown in Figure 37 on page 73 is displayed with information on the measurement and its calibration. The **Value** field shows the latest measurement value obtained from the sensor.

   Figure 37 on page 73 illustrates wind sensor calibration, a typical offset calibration situation: unless the weather station is properly aligned in a north–south direction during installation in the field, the wind sensor needs to be calibrated.

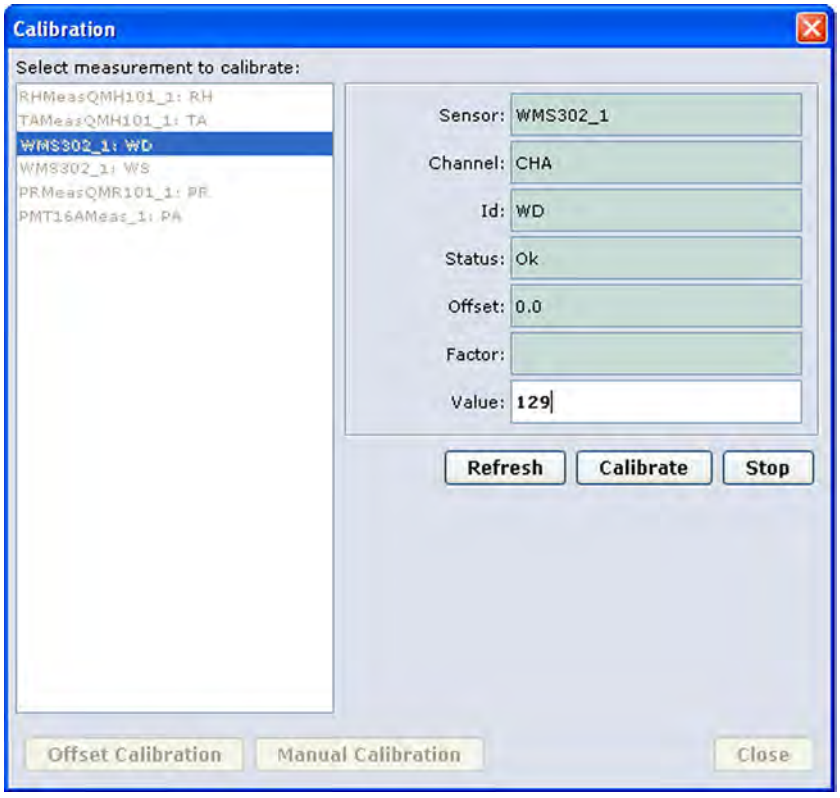


Figure 37 Offset Calibration Window

5. Enter the new value for the measurement in the **Value** field and select **Calibrate**. The offset value for the measurement is adjusted accordingly: if, for example, you are calibrating a temperature measurement, and the value obtained from the sensor is 23 °C,

entering *24* in the **Value** field will change the offset of the measurement to be 1 °C.

NOTE

The measurement values obtained from the sensors in the **Offset Calibration** view are not updated automatically. To get the latest measurement values, select the **Refresh** button.

The values you have changed in the **Offset Calibration** view but have not yet sent to the QML logger by selecting **Calibrate** are displayed in **bold**.

Manual Calibration

1. On the **Settings** menu, select **Calibration**.
2. The list of measurements available for calibration is displayed. Select the measurement you want to calibrate from the list.
3. Select **Manual Calibration**. The **Manual Calibration** window shown in Figure 38 on page 75 is displayed with information on the measurement and its calibration. The **Offset** field shows the offset for the measurement. The **Factor** field shows the gain of the measurement; that is, the slope of the conversion curve.

   Figure 38 on page 75 illustrates radiation calibration. Radiation sensors tend to have individual characteristics; therefore, they always need to be calibrated prior to operation.

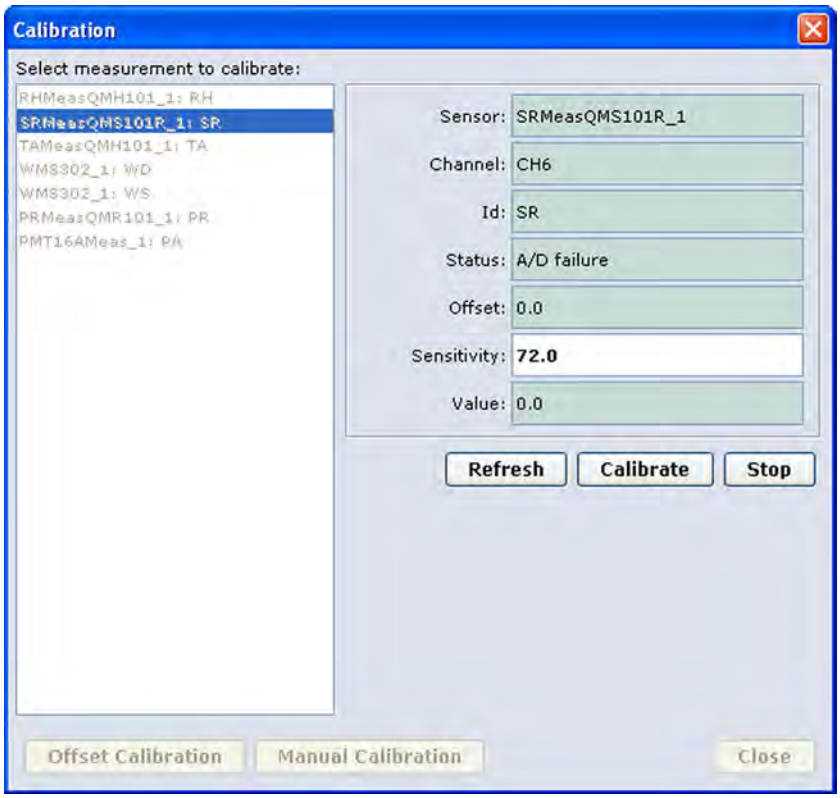


Figure 38 Manual Calibration Window

4. Enter the new value for the offset in the **Offset** field and the new value for the calibration factor (gain) in the **Factor** field. If you do not want to change either the offset or the gain, leave that field unchanged.

   The **Factor** parameter has sensor-dependent use. It affects the gain of the measurement or the sensitivity of the radiation sensors. To calibrate radiation sensors QMN10x and QMS10x with the QML logger, enter the sensor-dependent sensitivity factor [V/Wm^{-2}], which is given in the type sticker or calibration sheet of the particular sensor. To calibrate other listed sensors, enter the gain of the measurement, that is, the slope of the conversion curve.

5. Calibrate the sensor by selecting **Calibrate**.

NOTE	The values you have changed in the **Manual Calibration** window but have not yet sent to the QML logger by selecting **Calibrate** are displayed in bold. You can obtain the current **Offset** and **Factor** values again from the QML logger by selecting the **Refresh** button.

NOTE New sensor calibration values are taken into use in the QML logger after a reset with, for example, the **Reset** command. For further information on resetting the QML logger, see section Resetting the QML Logger on page 103.

Entering Values for Manual Sensors

Before you can manually enter data to the QML logger using the AWS Client software, you must create and configure manual sensor(s) in Lizard Setup Software. For instructions on creating a manual sensor, see Chapter 3, Configuring Modules and Sensors, in Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 3.

Viewing Manual Sensors in AWS Client

For each manual sensor included in your setup, you can view information on the sensor's status, the type of values for which the sensor is used, and the range of valid values for the sensor. To view the manual sensor information, proceed as follows:

1. On the **Settings** menu, select **Manual Sensors**. The list of configured manual sensors is displayed.
2. Select the sensor on which you want to view information from the list.
3. Select **Edit**. The information on the sensor is displayed as shown in Figure 39 on page 77.

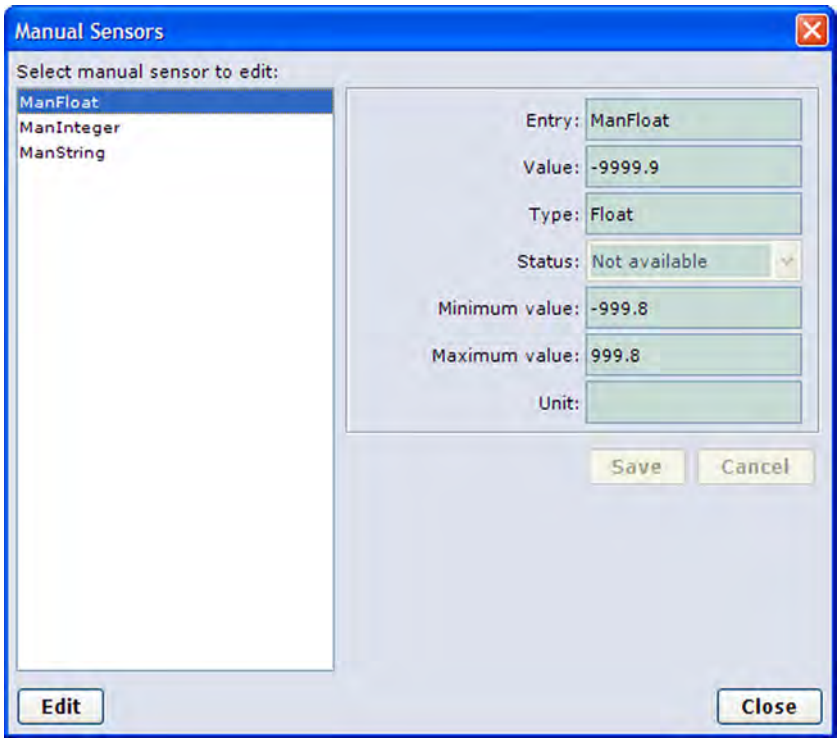


Figure 39 Manual Sensor Details

The fields in the **Manual Sensors** window are described in Table 14 on page 77.

Table 14 Fields in Manual Sensors Window

Field	Description
Entry	Name of the manual sensor as configured in the QML logger setup
Value	Field for entering the value of the manual sensor.
Type	Type of the manual sensor as configured in the QML logger setup. Possible values: **Integer**, **Float**, and **Text**
Status	Status of the manual sensor as reported by the QML logger
Minimum value	Minimum accepted value for the manual sensor reading as configured in the QML logger setup
Maximum value	Maximum accepted value for the manual sensor reading as configured in the QML logger setup
Unit	Unit for the manual sensor value

You can close the manual sensor window by selecting **Close**.

Entering Values for Manual Sensors

With AWS Client, you can enter values for each manual sensor included in your QML logger setup.

NOTE	The values you enter for the manual sensors must match the manual sensor value type: **Integer**, **Float**, or **Text**. The **Save** button is disabled in the **Manual Sensor** window if the entered value is not of the correct type.

To enter values for manual sensors, proceed as follows:

1. On the **Settings** menu, select **Manual Sensors**. The list of configured manual sensors is displayed (see Figure 39 on page 77).
2. Select the sensor for which you want to enter values from the list.
3. Select **Edit**. The information on the sensor is displayed (see Figure 40 on page 78).

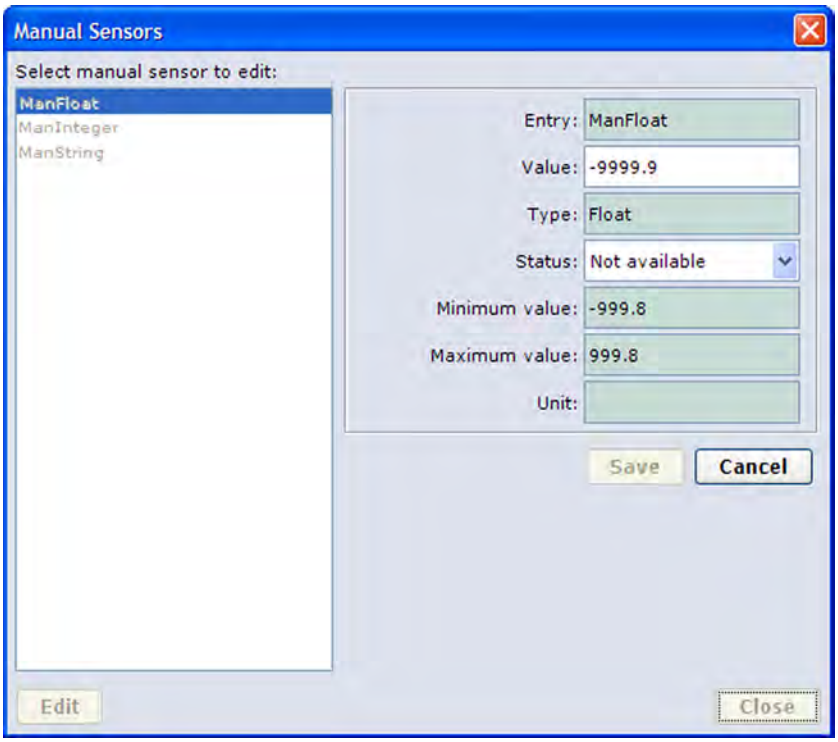


Figure 40 Entering Values for Manual Sensor

4. Enter the value for the manual sensor in the **Value** field.

5. Select the status of the measurement from the **Status** list.
6. Select **Save**. The value stored in the manual sensor is updated. You can cancel your changes by selecting **Cancel**. To close the **Manual Sensors** view, select **Close**.

Setup File

When you start using the QML logger for the first time, you need to upload a setup file from your PC to the logger.

This setup file includes all details required for the system to function properly: which sensors the system contains, which settings they use, to which QML logger channels they are connected, and how often they measure weather parameters. The setup file also defines the frequency at which QML logs data in a file and the number of days for which data log files are kept in the logger memory.

For archiving the setup files, save them as *.dtg* files in a folder on a reliable backup device. For further information, refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 2.

Selecting Setup File

Lizard Setup Software comes with some ready-made setup files from which you can choose the one to be used. You can select the file that best suits your system. The main difference between the setups is that with some of them, the system measures weather data more frequently, logs more variables by having more sensors, and produces more reports than with others.

You can modify one of the setup files with Lizard Setup Software to produce exactly the setup you want. However, this requires a thorough understanding of the system. For further information, refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volumes 2 and 3.

CAUTION	If you create a setup of your own by modifying the ready-made files, store the new file under a different name. This way, you can go back to the original setup in case the new one does not work.

CAUTION Also notice that the settings you define in the setup file must match the communication settings you make in the AWS Client Address Book and the station-specific settings for common and static parameters.

Uploading Setup File

CAUTION When you upload a new setup, the system erases all data log files from the QML logger. Make sure you download the files you want to save before uploading the new setup. For more information on downloading data log files, see section Downloading Log Files on page 91. You are also recommended to download the current QML logger setup file to your PC before uploading a new one. For instructions, see section Downloading Setup Files from QML Logger on page 83.

You need to upload the setup file in two situations:

- When you start using the QML logger for the first time.
- When your system has been updated, for example, when new sensors have been added.

After a system update, the setup file needs to be updated to match the changes. Normally, you need to modify the setup file yourself with Lizard Setup Software. After you have finalized with Lizard, you have to open the AWS Client terminal software in order to be able to upload the setup file as follows:

NOTE It is recommended that you use the **Secure setup upload** option, described in Table 8 on page 55.

NOTE If a completely new setup is loaded onto a logger that contains an existing setup, follow the procedure described in section AWS Settings Cleanup on page 84.

1. On the **Maintenance** menu, select **Setup File - Upload to Logger**.
2. The **Select File** window is displayed as shown in Figure 41 on page 81. Select the appropriate setup file and click **Select File**. Note that the default folder for uploading setup files is defined in the AWS Client **Options** window.

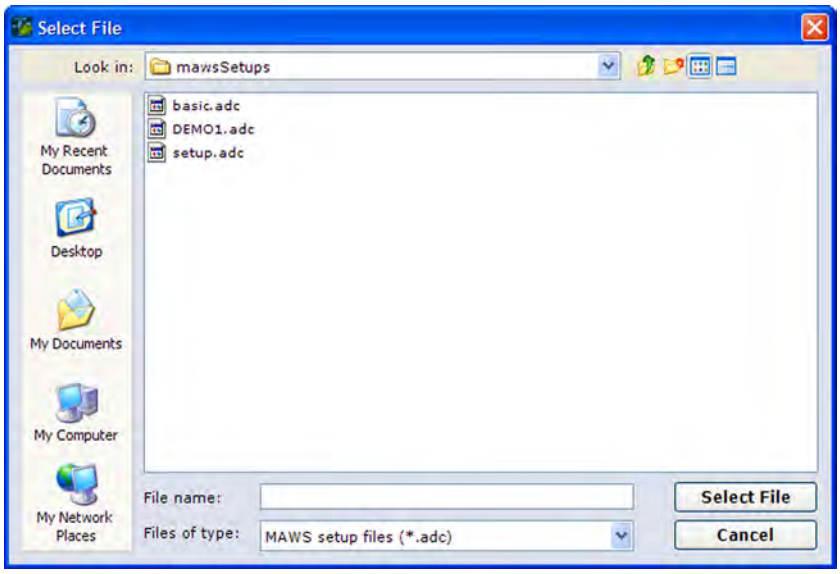


Figure 41 Selecting an Upload Configuration File

3. Uploading the setup file to the QML logger starts; you can follow the upload progress in the **Setup File Upload Progress** window displayed.

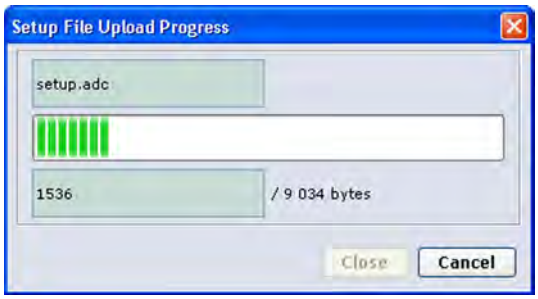


Figure 42 Setup Uplodad in Progress

4. When the file has been transferred, the QML logger starts executing the new setup according to the settings in the setup file.

Secure Setup Upload

AWS Client can be configured to perform a secure setup upload sequence. This function attempts to keep a valid setup in the logger at all times, which minimizes the risk of the logger becoming inaccessible for remote maintenance if an error occurs while updating the setup.

NOTE	Secure setup upload works with limitations also with older logger firmware. The fully featured functionality is available only when using firmware 7.00 or later.

Secure setup upload is taken into use from the **Settings** menu in **Options**.

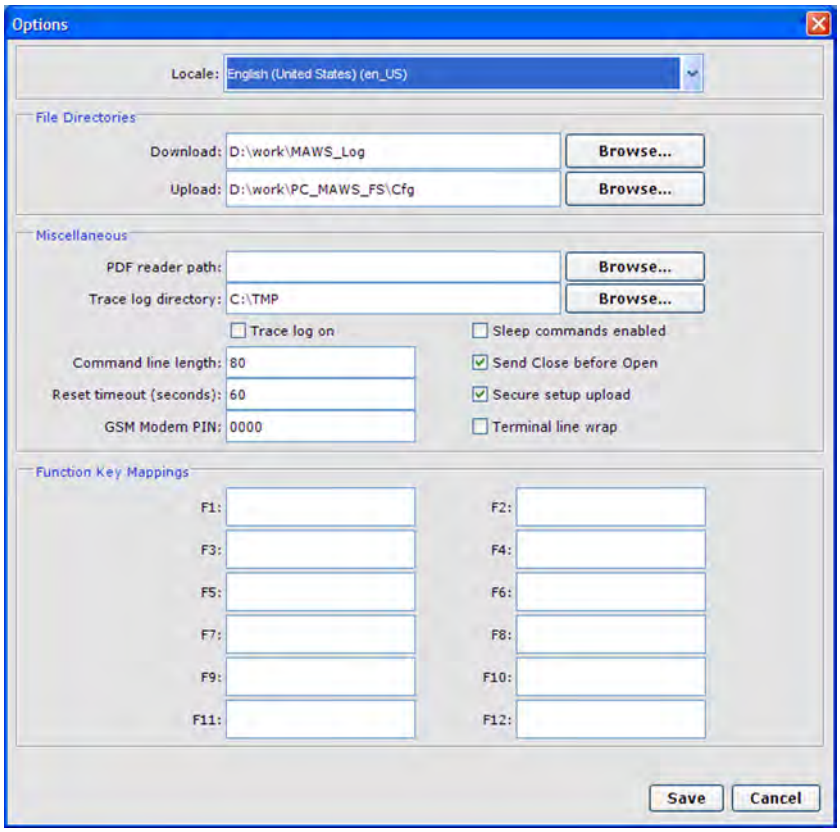


Figure 43 Enabling Secure Setup Upload

The following describes the main principles of the secure setup upload procedure:

- AWS Client verifies that there is sufficient disk space in the logger.
- AWS Client loads the new setup to a temporary location in the logger, that is, */Ext* or */Log*, depending on whether an external CF card is available.
- The logger validates the integrity and target firmware version of the new setup file.
- The logger attempts to start the new setup from the temporary location.
- If the startup is successful, the logger replaces the previous setup with a new one.
- If the startup fails, the logger restarts once again using the previous setup. After restart, failure is indicated by the error message **Startup Failed (setup name)**, which is shown always at the logger command prompt, and by AWS Client in dialog if possible (depends on the service connection used).

Downloading Setup Files from QML Logger

With AWS Client, you can download the setup file currently in use in the QML logger. This can be useful for troubleshooting purposes. To download the setup file currently in use in the QML logger, proceed as follows:

1. In the **Maintenance** menu, select **Setup File** and then **Download from Logger**.
2. Select the folder to which the setup file is downloaded. The default folder is the one specified in the AWS Client **Options** window.
3. Downloading the setup file from the QML logger starts; you can follow the download process in the window displayed (see Figure 44 on page 84).

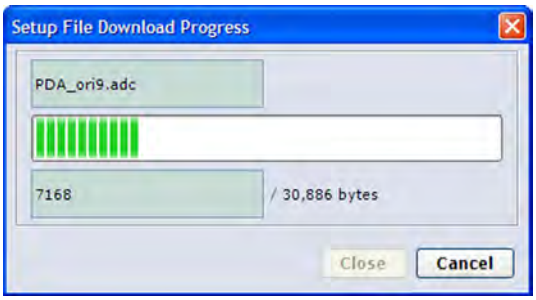


Figure 44 Setup File Download Progress View

AWS Settings Cleanup

To remove the settings of an earlier setup from the logger completely, AWS Client provides an automated function that performs a typical cleanup procedure.

The function is available from menu **Maintenance - AWS Cleanup**. When started, the message in Figure 45 on page 84 is displayed. Start the cleanup by clicking **Yes**.

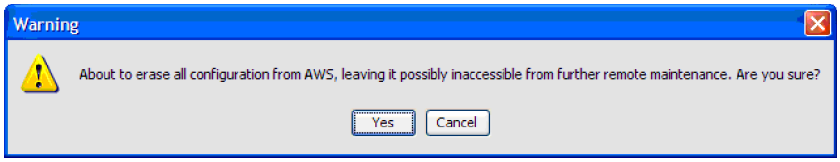


Figure 45 Starting Logger Content Cleanup

CAUTION	Erasing station settings from remotely managed logger may render it inaccessible for further remote maintenance. Use with caution.

NOTE	This procedure does not delete the logger setup file, which, after reset, will restore defaults for station settings used by it. If this is not desired, delete or replace the setup file before executing the logger content cleanup.

The procedure includes multiple steps, and takes a while to execute. The following content is erased from the logger:

- Static parameters and parameter sets
  - Factory settings and calibration values are preserved.
- Log files from */Log*
- Queued content for FTP, SMTP, and HTTP services

Data Logging

Logging means storing the measured and calculated data in the QML logger internal memory, that is, to a Flash chip with a data storage capacity of 3.3 MB. Additionally, you can use an external memory card. For more information, see section Using External Memory Card on page 102. From the internal and external memory, logged data can be retrieved later, for example, via a serial line.

Logged data is stored in daily files, for example, *L2070326.dat*, which is a binary file. The naming convention is as follows:

- All log files begin with the name of the log group. The log group name consists of a letter followed by a number, that is, L0, L1, L2, L3, and so on.
- The log group name is followed by the date in the YYMMDD format.

NOTE	The QML logger uses UTC time in data logging and managing log files, not the local time.

In its Flash memory, the QML logger can log everything it measures and calculates. The approximate log memory capacity can be checked and also printed in the **Setup information** window in Lizard Setup Software when a setup is created.

Log files are automatically deleted after a given period, so that there is always a certain amount of logged data saved in the Flash memory. The period is adjustable in the setup and can vary from 0 (= at midnight, the previous day's file will be deleted to free up memory) to never delete (= log memory will be filled up completely). To ensure some data backup, for example, a value of 4 days is feasible. If the delete interval

is set negative with Lizard Setup Software, the old log files will not be deleted automatically.

The approximate maximum logging period for a setup where 10 measured values are logged is shown in Table 15 on page 86.

Table 15 Log Memory Capacity

Logging Interval	Maximum Logging Period
1 second	5 hours
10 seconds	Over 2 days
1 minute	2 weeks
10 minutes	Over 4 months
1 hour	Almost 2 years

Log Data Format

A log entry is generated at the time defined in the setup file. When entries are retrieved with the **logshow** command, the produced output includes two parts: the header and the log entry information.

In Figure 46 on page 86, the example of a log query shows 10 entries of logged items 1 and 2 starting at midnight on February 27, 2008.

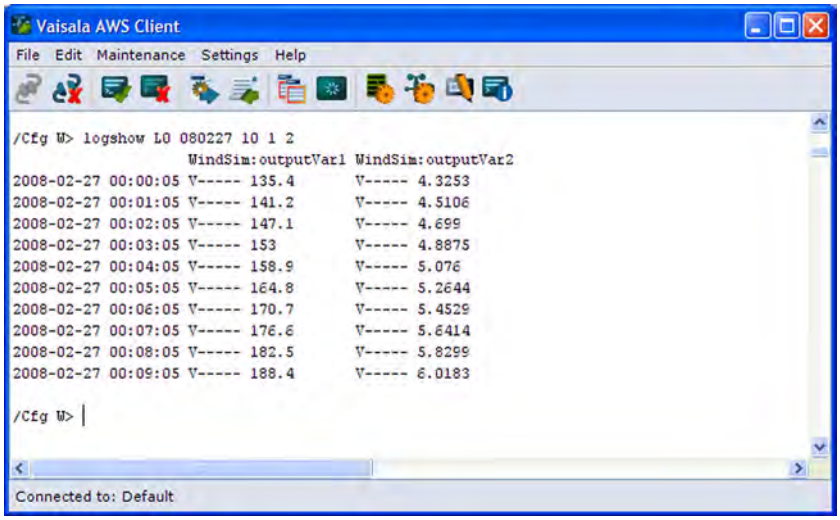


Figure 46 Output of Logshow Command

The header information shows the variable name (WindSim:outputVar1 and WindSim:outputVar2).

The log entry information includes the time tag, that is, date and time of the entry, the status, and the value of the logged measurement or calculation.

Table 16 Log Entry Status

Status Indicator	Status	Description
-I-----	Invalid	Value may be outside the set scale; that is, the set climatological limits or step change validation.
-I--N-	Invalid; not available	No measurements done yet
V-----	Valid (normal)	Measurement or calculated value available normally

Controlling Logging

Logging is automatically on if it has been defined in the setup and if it has not been stopped. Logging is automatically stopped when the log file is retrieved with AWS Client software. When the download is completed, logging is activated again automatically.

When a sensor is replaced, stopping is not necessary if some invalid log items can be tolerated. Alternatively, instead of stopping logging, you can manually disable a measurement or a sensor. For detailed information, see section Measurement Enable or Disable on page 88.

To see the logging groups, type **logstatus**. To see the current logging status of a certain group, type **logstatus** <*group_id*>. To stop or start the logging of a certain group, type **logstop/loggo** <*group_id*>. For the output of the commands, see Figure 47 on page 88.

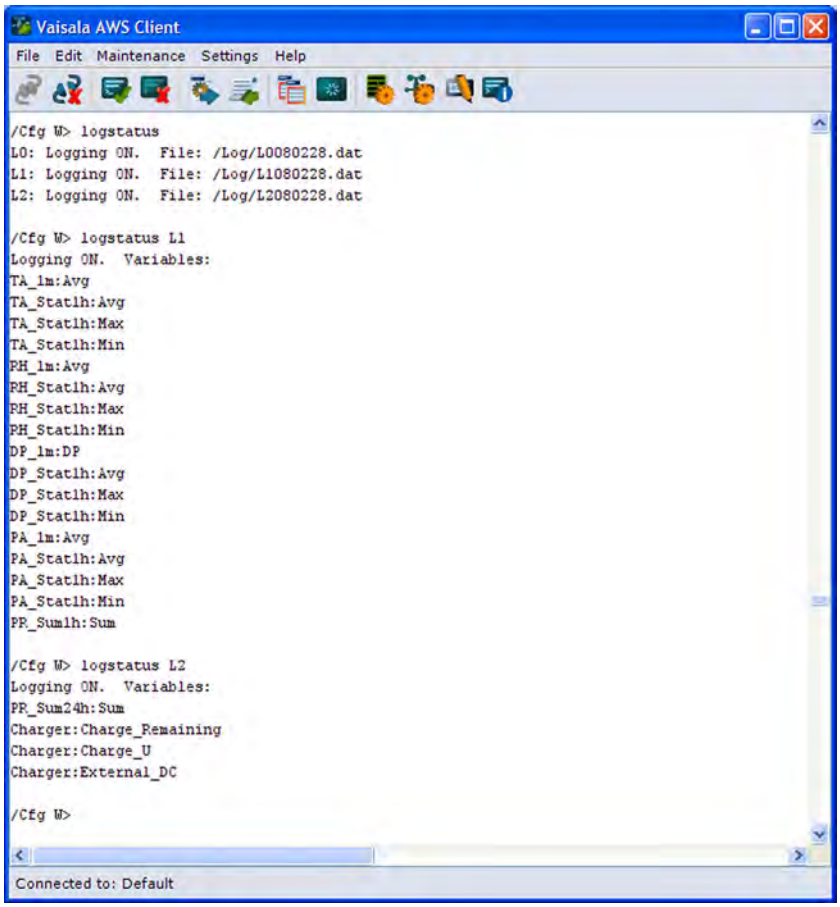


Figure 47 Output of the Logstatus Command

Measurement Enable or Disable

You can manually enable or disable all measurement inputs and sensors. You can use this feature, for example, for the following purposes:

- Remotely changing the readings of a faulty sensor to be flagged as invalid.
- Marking all sensor readings invalid during a maintenance operation.

Use the following commands in the service connection to change the flagging:

enable <*Measurement name*>

disable <*Measurement name*>

where

enable	=	Enables the measurement inputs or sensors
disable	=	Disables the measurement inputs or sensors
Measurement name	=	Measurement name in Lizard

NOTE For sensors that use more than one input channel, you need to enter separate commands for each measurement. For example, you need to control separately the TA and RH measurements of the QMH air temperature and relative humidity sensor.

Examples:

```
>\ disable RHMeasQMH102_1
>\ disable TAMeasQMH102_1
>\ disable WMS302_1
>\ enable PWD22_1
```

Upon successful completion of the commands, the response is as follows:

```
Successfully disabled
```

or

```
Successfully enabled
```

Any other returned values indicate an error.

When the measurement input is disabled:

- All output values other than status have undefined values.
- Sensor status shows `disabled`; refer to the list of the sensor statuses in Table 13 on page 72.
- Value status shows `INVALID` and `NOT AVAILABLE`.

Freeing Up Logging Space

A log file can be deleted with the **logdel** command:

logdel <*group_id*> <*lastdate (YYMMDD)*>

where

logdel	=	Command to delete log files belonging to certain log group
group_id	=	Name of the log group, that is, L0, L1, L2, or so on
YYMMDD	=	Date until which the log files will be deleted

Example:

```
/ > logdel L2 d070910
```

To erase all data in the log system, type **LOGFS** *ERASE*. This command erases the whole Flash memory and resets the QML logger. The command **LOGFS** *ERASE* is necessary to free space for new log data.

CAUTION Erasing the log memory with **LOGFS** *ERASE* command is strongly recommended when changing a setup. First, load a new setup and make sure it is operating correctly. Check that you have retrieved all the necessary information from the log memory, and then erase the log memory.

Working with Data Log Files

The most convenient way to view the logged data is to use the AWS Client software. To do this, you need to open the service connection, download the files from the QML logger to your PC and convert them to CSV (Comma Separated Value) format. After the conversion, you can view the files directly in the AWS Client software or, for example, in Microsoft Excel.

Before you start downloading files, you need to open a connection to the QML logger by selecting the **Connect** option from the **File** menu or clicking the **Open connection** button on the toolbar. For more information on opening the connection, see section Opening Service Connection on page 57.

Downloading Log Files

To download log files from the QML logger, proceed as follows:

1. On the **Maintenance** menu, select **Log File** and then **Download from Logger**. The list of log files available for downloading in the QML logger is displayed (see Figure 48 on page 91). The files are arranged by log group. Each log group includes specific parameters as defined in the setup file. If you use an external memory card, select the **External** option and, if required, enter the directory to use on the external memory card.

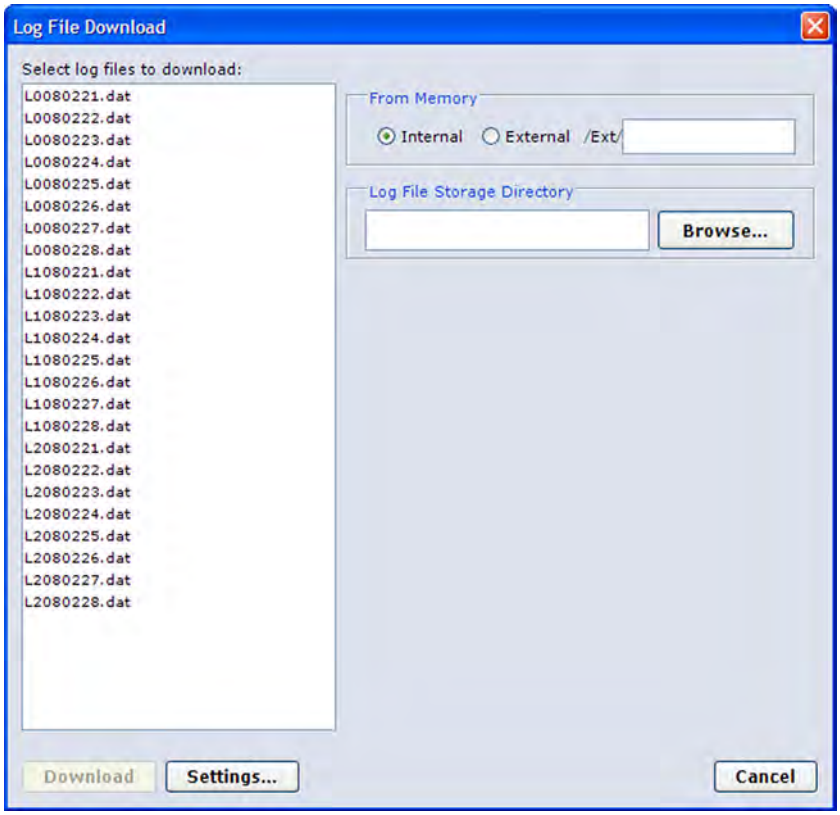


Figure 48 List of Log Files Available for Downloading

2. Select the files you want to download by clicking them on the list. To select multiple consecutive files, click the first file in the list, press and hold down the SHIFT key, and then click the last item. To select files that are not consecutive, press and hold down the CTRL key, and then click each item. To select all files on the list, press CTRL+A. Select the files you want to download by selecting the file name in the **Select files to download** list. If you decide not to download a file after all, you can remove its selection by clicking on the file name.

3. Select the folder for storing the downloaded log files by entering the path in the **Log File Storage Directory** field. You can also select **Browse** and then browse for the folder for storing the downloaded log files.
4. To set your download options, select **Settings**. The **Log File Download Settings** window shown in Figure 49 on page 92 is displayed.

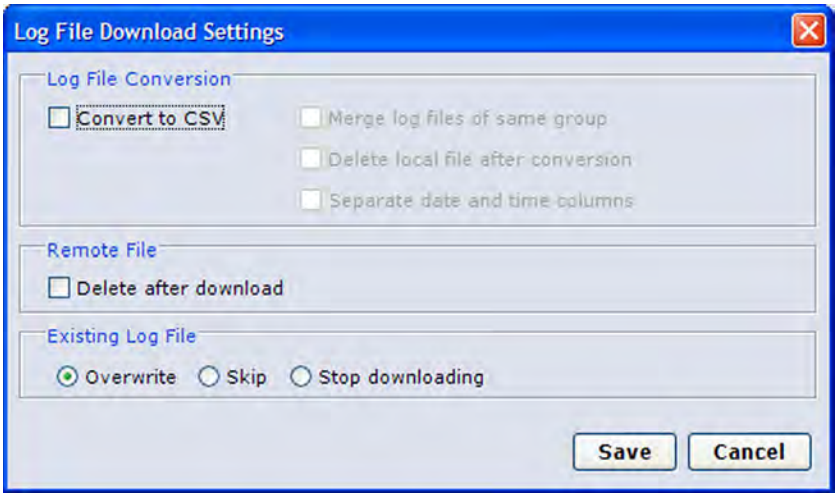


Figure 49 Log File Download Settings Window

NOTE	The date and time formats in the converted log files depend on the date and time formats specified in the AWS Client language options.

The options available in the window and their uses are described in Table 17 on page 93.

Table 17 Log File Download Options

Option	Description
Convert to CSV	Converts downloaded log files to CSV format.
Merge log files of same group	Merges log files from different dates belonging to the same log group. In order to use this option, the **Convert to CSV** option must be selected.
Delete local file after conversion	Deletes downloaded binary log files after they have been converted to CSV format. In order to use this option, the **Convert to CSV** option must be selected.
Separate date and time columns	Converts the date and time string in the log file into separate columns for the date and time of the log entries. In order to use this option, the **Convert to CSV** option must be selected.
Remote File - Delete after conversion	Deletes the downloaded log file from the QML logger after it has been downloaded. Selecting this option will conserve storage space on the QML logger.
Overwrite	If a log file with the same name already exists in the log file download folder on your PC, overwrites the existing file with the new file.
Skip	If a log file with the same name already exists in the log file download folder on your PC, skips the new file with the same name when downloading.
Stop downloading	Stops downloading the selected log files if a log file with the same name already exists in the log file download folder on your PC.

NOTE Download settings are stored on your PC, so any future downloads will automatically use the same settings.

5. Save your download options and return to the log file selection window by selecting **Save**.
6. Start downloading the log files by selecting **Download**. A download progress dialog is displayed (see Figure 50 on page 94). If you want to cancel the download, select **Cancel**. When the files have been downloaded, you can close the download progress window and return to the main menu window by selecting **Close**. The downloaded log files are located in the folder defined in the **Log File Storage Directory** field.

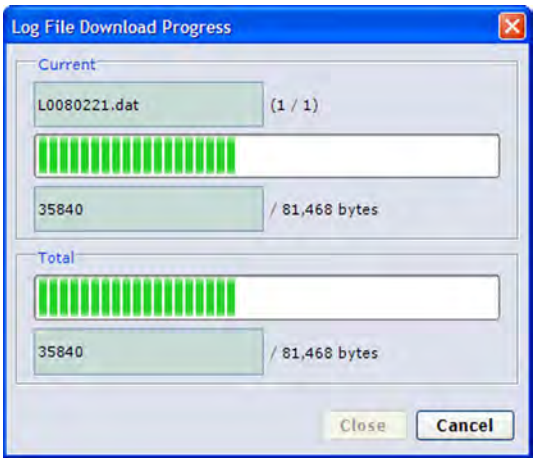


Figure 50 Log File Download Progress View

Converting Downloaded Log Files to CSV Format

You can use the CSV conversion functionality to convert log files downloaded to AWS Client in binary format to CSV format.

NOTE	The date and time formats in the converted log files depend on the date and time formats specified in the AWS Client language options.

To convert downloaded log files, proceed as follows:

1. On the **Maintenance** menu, select **Log File** and then **Convert**. The list of log files downloaded to AWS Client is displayed as shown in Figure 51 on page 95.

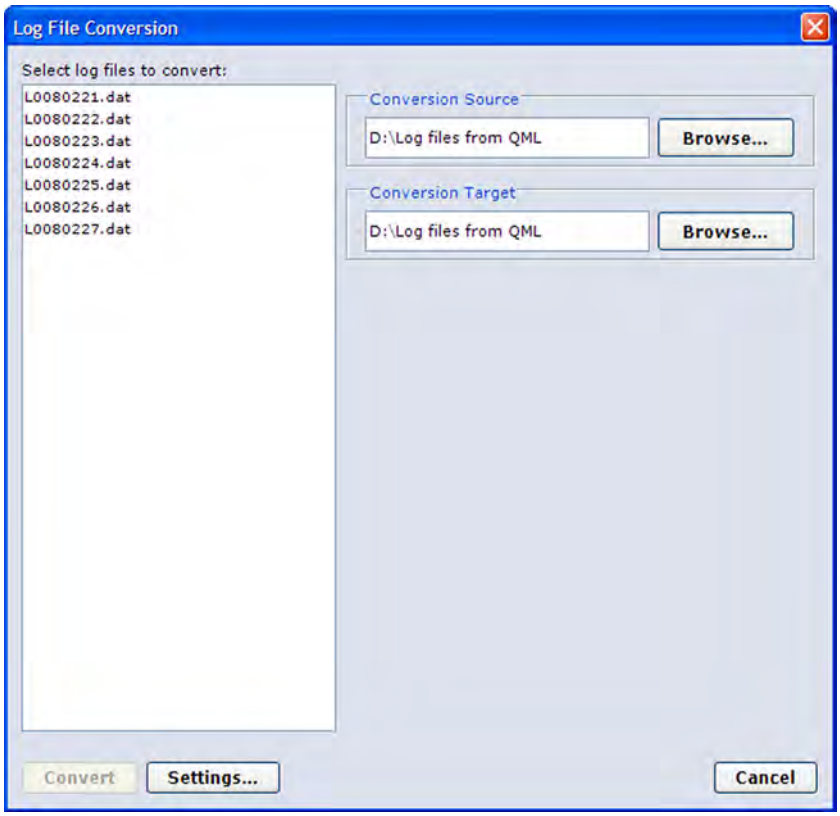


Figure 51 List of Log Files Available for Conversion

2. Select the log file conversion source folder by selecting **Browse** in the **Conversion Source** frame and then browsing for the folder containing the log files to convert.
3. Select the log file conversion target folder by entering the path in the **Conversion Target** field. You can also select **Browse** and then browse for the target folder.
4. Select the files you want to convert by clicking them on the list. To select multiple consecutive files, click the first file in the list, press and hold down the SHIFT key, and then click the last file. To select files that are not consecutive, press and hold down the CTRL key, and then click each item. To select all files on the list, press CTRL+A. If you decide not to convert a file after all, you can remove its selection by clicking on the file name.
5. To set your conversion options, select **Settings**. The **Log File Conversion Settings** window shown in Figure 52 on page 96 is displayed.

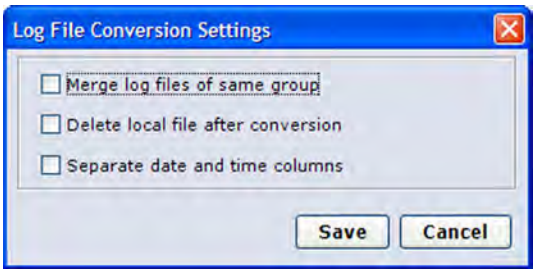


Figure 52 Log File Conversion Settings

The options available in the window and their use are described in Table 18 on page 96.

Table 18 Log File Conversion Options

Option	Description
Merge log files of same group	Merges log files from different dates belonging to the same log group.
Delete local file after conversion	Deletes downloaded binary log files after they have been converted to CSV format.
Separate date and time columns	Converts the date and time string in the log file into separate columns for the date and time of the log entries.

NOTE CSV conversion settings are stored on your PC, so any future CSV conversions will automatically use the same settings.

6. Save your conversion options and return to the log file selection window by selecting **Save**.
7. Convert the selected files to CSV format by selecting **Convert**. The converted log files are located in the folder specified in the **Conversion Target** field.

Auto Downloading Log Files

You can run the AWS Client software in auto-download mode. This mode allows you to download log files automatically according to a user-defined schedule.

Before you change the application to the auto-download mode, a schedule must be defined. This is done in the window that appears when you select **Settings - Auto Download**. The **Auto Download Settings** window is shown in Figure 53 on page 97.

In the **Auto Download Settings** window, you can define which stations to connect to, when, and which log files to download, and where to store them.

NOTE	To enable auto-downloading, you must have AWS Client running continuously. In addition, if you are using a serial line connection, the COM port must be free and assigned for AWS Client.

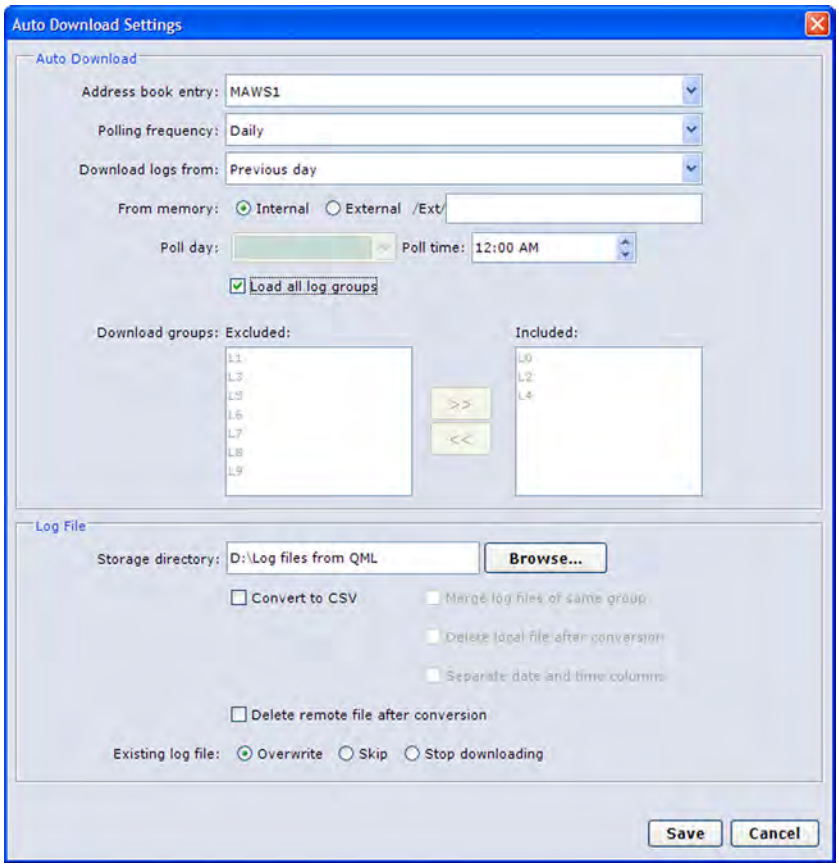


Figure 53 Auto Download Settings Window

The options available in the window and their use are described in Table 19 on page 98.

Table 19 Settings in Auto Download Settings Window

Option	Description
Address book entry	Specifies the QML logger from which log files are to be downloaded.
Polling frequency	Specified the frequency at which log files are to be downloaded. The mutually exclusive options are: **Never**. AWS Client will never attempt to download log files. **Daily**. Logs are downloaded daily at a certain time from the selected station. **Weekly**. Logs are downloaded weekly at a certain time on a certain day of the week from the selected station. Selecting this option will activate the **Poll day** field, which accepts values from **Sun** to **Sat.** **Monthly.** Logs are downloaded monthly at a certain time of a day of a month from the selected station. Selecting this option will activate the **Poll day** field, which accepts values from **1** to **28** with **Last day of month** being the ending value of the range.
Download Logs from	Specifies the period of time from which logs are to be downloaded. The options are: **Current day**. **Previous day**. **Last week**. **All files**.
From memory	Specifies the storage medium on the QML logger from which logs are to be downloaded. The options are: **Internal**. Logs are downloaded from the internal memory of the QML logger. **External**. Logs are downloaded from the external memory card inserted in the logger. **/Ext/**. Specifies the directory on the external memory card from which logs are to be downloaded.
Poll day	Specifies the day of the week on which logs are to be downloaded if **Weekly** is selected for **Polling frequency**, or the day of the month if **Monthly** is selected for **Polling frequency**.
Poll time	Specifies the time of the day at which logs are to be downloaded. The time format is determined by the **Locale** parameter in the **Options** window. Hours and minutes can be separately highlighted, then adjusted with the up and down arrows.

Table 19 Settings in Auto Download Settings Window (Continued)

Option	Description
Load all log groups	Selecting this check box will cause all log groups from the period selected for the **Download logs from** field to be downloaded.
Download groups	Allows you to include and exclude log groups to be downloaded.
Storage directory	Specifies the directory on your PC in which logs are to be downloaded.
Convert to CSV	Converts downloaded log files to CSV (Comma Separated Value), which allows the logs to be viewed, for instance, in Microsoft Excel. The options are: **Merge log files of the same group**. Merges log files from different dates belonging to the same log group. **Delete local files after conversion**. Deletes downloaded binary log files after they have been converted to CSV format. **Separate date and time columns**. Converts the date and time string in the log file into separate columns for the date and time of the log entries.
Delete remote file after download	Deletes the downloaded log file from the QML logger after it has been downloaded. Selecting this option will converse storage space on the logger.
Existing log file	Specifies how existing log files are to be treated. The options are: **Overwrite**: If a log file with the same name already exists in the log file download folder on your PC, overwrites the existing file with the new file. **Skip**: If a log file with the same name already exists in the log file download folder on your PC, skips the new file with the same name when downloading. **Stop downloading**: Stops downloading the selected log files if a log file with the same name already exists in the log file download directory on your PC.

Once you have set the schedule and other parameters, select **Save**.

The application waits in idle mode until polling is triggered. When polling, the application automatically opens a service connection to a station and downloads log files as defined by the user. During the download process, a progress dialog is displayed; see Figure 54 on page 100.

NOTE

In order for auto download to succeed, AWS Client must either have no open connection with any QML logger at the time of polling or, if there is an open connection, it must only be with the logger specified in the **Auto Download Settings** window. Note that if there is an open connection with another logger, the connection will not be closed and the auto download will not succeed.

NOTE

Auto download will not be performed if, at the time of polling, AWS Client is occupied with something else that requires commands to be sent to the logger, for instance, calibration.

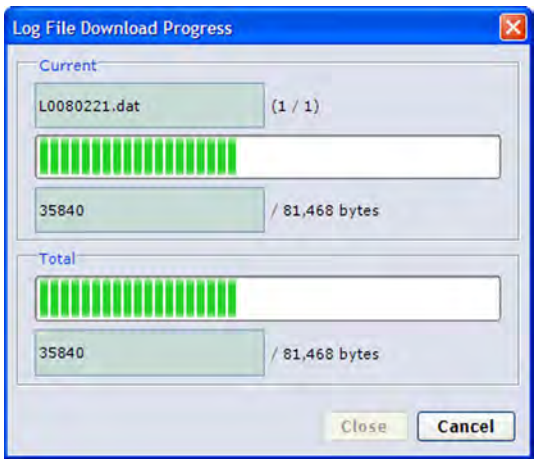


Figure 54 Auto Download in Progress

When the log files are downloaded, the connection is closed and the application continues to wait in idle mode until a new prescheduled polling event is triggered.

Viewing the Status of Auto Downloads

You can keep track on your auto downloads by viewing the **Auto Download Status** window. When you select the **Log files - Auto Download Status** from the **Maintenance** menu, the **Auto Download Status** window is displayed, as shown in Figure 55 on page 101.

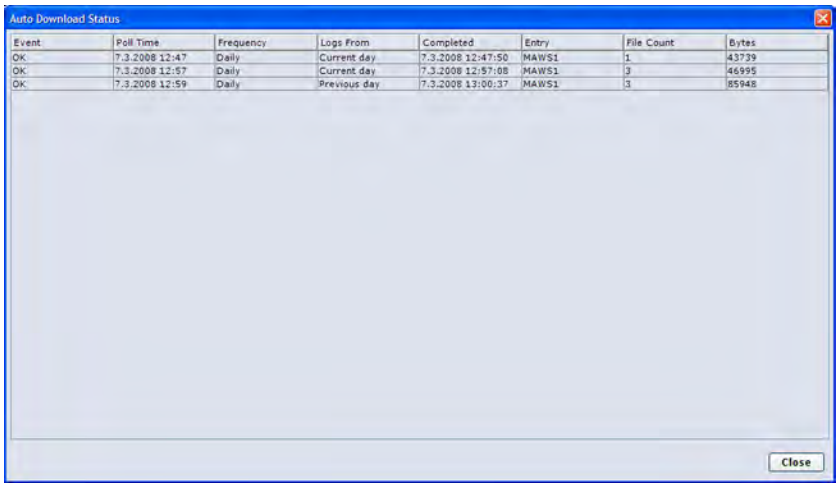


Figure 55 Auto Download Status Window

For each download triggered by the auto download settings, the following information is displayed, as described in Table 20 on page 101.

Table 20 Fields in Auto Download Status Window

Option	Description
Event	Status of the download. The options are: **OK**: Auto download was successfully completed. **Failed**: Auto download failed. **Cancelled**: Auto download was canceled.
Poll Time	Time the auto download started
Frequency	**Polling frequency** value set for the download
Logs From	Time period from which logs are downloaded
Completed	Time of completion for the download
Entry	Station from which logs are downloaded
File Count	Number of log files downloaded
Bytes	Size of the download

Using External Memory Card

The external memory card is used to store log files that have been copied or moved from the internal log directory. The data can be retrieved from the external memory card via terminal connection or by switching the memory card with an empty one.

NOTE

If the CompactFlash memory card has not been formatted, it must be formatted before use.

In MAWS versions 6.00 and later, you are recommended to format the card in a Windows PC. The file system to use is FAT (not FAT32). Also, do not select the quick format option.

To format the CF card in the QML logger, insert it into the CF slot of the QML logger. Give the **EXTFS** *ERASE* command. After the card has been formatted, you can remove it from the slot.

The external memory card can be removed from the QML logger for data retrieval without interruptions to operations. The logger copies data from the internal log directory to the memory card daily at midnight, the default time is 00:00:30. Data is being written when the LED on the logger cover to the left of the external memory card is constantly on.

CAUTION

The memory card must not be removed from the QML logger while data is being written, or the data may be lost. By default, data is transmitted to the memory card each day at 00:00:30.

When a new memory card is inserted into the QML logger, the software checks that the card is ready for use. The status of the memory card is indicated by a LED. Table 21 on page 102 describes the different blinking sequences and the card conditions they indicate.

Table 21 LED Blinking Sequences and Card Status Options

Blinking Sequence	Card Status
Long-long	Card is OK.
Constantly on	Data is being written.
Short-short-short for 5 seconds	Card is unformatted or corrupted.

Automatic Erase from External Memory Card

The log group -specific setting **Number of days to preserve log files**, specified in Lizard setup software, also affects the files stored to the external memory card. The functionality is the same as for internal log memory:

- Files older than the selected value [*days*] will be deleted automatically.
- Files are not erased, that is, the automatic cleanup is disabled.

When files are stored to the external memory card, the internal memory is used as the working memory for storing the log files of the current day. These working files are moved to the external card each day just after midnight when the new files have been created for writing.

Resetting the QML Logger

The **Reset** command is used for resetting the QML logger. You can either reset the logger immediately or after a specified delay. To reset the logger, proceed as follows:

1. On the **Maintenance** menu, select **Reset**.
2. The **Reset** menu includes two options for resetting the logger:
   a. To reset the logger immediately, select **Immediate**. The logger reset begins.
   b. To reset the logger after a specified delay, select **Delayed**. The **Delayed Reset** prompt is displayed.

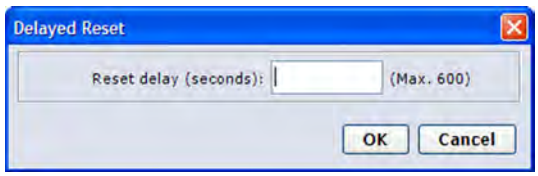


Figure 56 Delayed Reset Prompt

1. In the **Reset delay (s)** field, enter the delay (in seconds) after which you want the logger to be reset. The logger reset will begin after the specified delay has elapsed.

2. Select **OK**. The logger reset will start after the delay specified in the previous step.

Once the reset is complete and the setup is running without problems, the AWS Client terminal window displays the text **Setup running ok**, and the logger is again ready for use.

Reset Using the Reset Button

As an alternative to resetting the QML logger using AWS Client, you can also press the reset button, indicated by number 1 in Figure 57 on page 104.

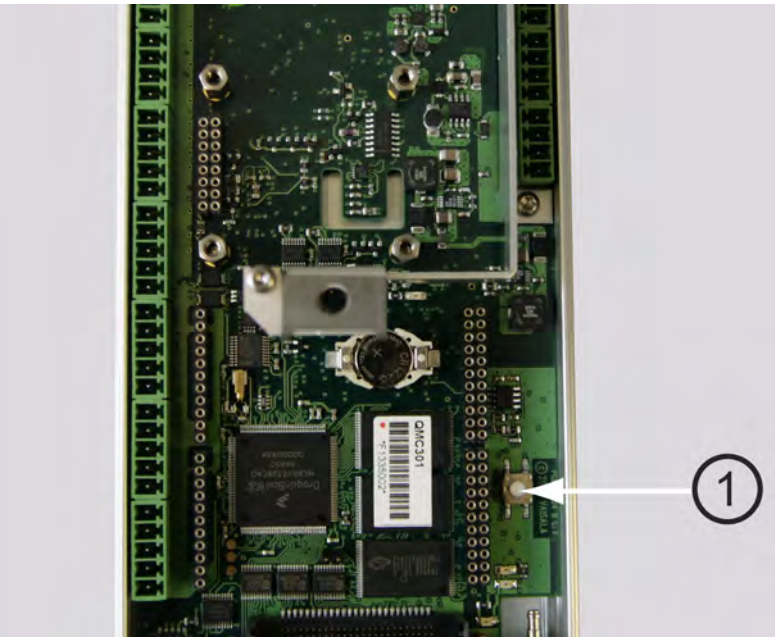


Figure 57 Reset Button on QML Logger

A short reset (pressing the reset button quickly) performs the same reset as giving the command and starts the program again. A long reset (pressing the reset button and keeping it down for a few seconds) restarts the program with a so-called blank setup. A blank setup does not run a setup file.

Blank setup may be useful if the setup is somehow defective and does not allow the opening of a terminal connection. When blank setup is run, the QML logger communication parameters are restored to their defaults: *COM0, 9600, N, 8, N, 1*.

Sleep Command

The **Sleep** command is used for powering down the QML logger (in order to use the **Sleep** command, first select the **Sleep command enabled** check box in the **Options** menu). There are two options for powering down the logger: powering it down completely or powering it down but leaving the battery charging function active. To power down the logger, proceed as follows:

1. On the **Maintenance** menu, select **Sleep**.
   a. To power the logger down completely, select **Total**.
   b. To power the logger down leaving the battery charging function active, select **Charge**.

The logger is powered down; to power it up again, use the **Wakeup** command (see section Wakeup Command on page 105).

Wakeup Command

The **Wakeup** command is used for powering the QML logger up after it has been set to a power-saving mode.

To issue the **Wakeup** command to the logger, select **Wakeup** on the **Maintenance** menu.

Command Reference for Terminal Connection

Table 22 Command Set

Command	Description
altitude	**altitude** [*meters*]. To see the current station altitude, type **altitude**. To change the altitude, type **altitude** and the new station altitude in meters from sea level.
battery	**battery** [*capacity*] sets the capacity of the internal battery, needed for QML logger internal control. Accepted capacity values are 1.2 ... 24 Ah. To see the battery status, type **battery**. Note that the **battery** command applies only to the internal battery up to QML201B.
cd	**cd** <*directory*> changes the current directory. **cd /** gets you back to the root directory. Use the command **cd ..** to move up one directory level.
chmod	**chmod** <*filename*> <*r/w/x*> changes the file access attributes: read (r), write (w) or execute (x). The setup file "Basic/Advanced/Lowpower" needs to have the attributes rwx.
close	Closes the terminal connection.
copy	**copy** <*source file*> [*destination file*] copies a file to another location.
del	**del** <*filename*> [*filename*] deletes a specified file. Only files that have (w)rite access attribute can be deleted (see the **chmod** command).
dir	**dir** [*file/path*] [*/F*] displays a list of a directory's files and subdirectories, used and free disk space. The file information includes name, access_attributes, time, date, and size.
disable	**disable** <*Measurement name*> disables the measurement input or sensor.
enable	**enable** <*Measurement name*> enables the measurement input or sensor.
errors	**errors** [*clear*]. To see active errors, type **errors**. To clear active errors, type **errors** *clear*. Errors indicate that there is something wrong in the software.
EXTFS	**EXTFS** <*INFO* | *ERASE* | *HELP*>. To format a CompactFlash card, type **EXTFS** *ERASE*. To show card info, type **EXTFS** *INFO*. Note that the command must be written in upper case.
ftp	**ftp** <*get* | *put* | *test*> <*user:password*> <*source*> [*destination*] [*interface*] [*options*]. Transfers files to or from the QML logger or tests the connection to the FTP server. To download a file to the QML logger, type **ftp** *get* <*user:password*> <*source*>. To upload a file from the QML logger to the FTP server, type **ftp** *put* <*user:password*> <*source*>. To test the connection to the FTP server, type **ftp** *test* <*user:password*> <*destination*>. The parameters *user:password* are the user name and password for the FTP server. The parameter *source* is the name of the source file on the QML logger or the FTP server. The optional parameter *destination* is the name of the destination file. The optional parameter *interface* is the name of the interface to use for the FTP connection.
help	**help** [*command...*] displays a command syntax. To list all the available commands, type **help**.
ipconfig	**ipconfig**. Shows the IP configuration of all open network interfaces. The command has no parameters.

Table 22 Command Set (Continued)

Command	Description
LASTVAL	**LASTVAL** <*Component*> <*ID*> [*F(orce id*)] [*S(ensor status*)] shows the measured value before any validation and the status produced during validation. The validated value is shown when you give the signal name that is defined in Lizard.
logdel	**logdel** <*group_id*> <*lastdate (YYMMDD)*> deletes a log file/files dated earlier than the last given date.
LOGFS	**LOGFS** <*ERASE/DEFRAGD/SAT*> erases all data in the log system and resets the QML logger. Note that the command must be written in upper case.
loggo	**loggo** <*group_id*> starts logging of the defined log group.
logshow	**logshow** <*group_id*> [*start (YYMMDDHH)*] [*count*] [*itemno1 itemno2 ...*] **logshow** *L1* shows one line of current day; **logshow** *L1 40* shows 40 lines; **logshow** *L1 40 3* shows 40 lines of item 3; **logshow** *L1 050618 10* shows 10 lines starting from 18.06.2005.
logshownext	**logshownext** <*group_id*> [*count*]. After the **logshow** command, this command can be used to show the immediately following (later) log entries.
logshowprev	**logshowprev** <*group_id*> [*count*]. After the **logshow** command, this command can be used to show the immediately preceding (earlier) log entries.
logstatus	**logstatus** <*group_id*> shows logging state and variables of the defined log group. The command without parameters shows statuses of all log groups.
logstop	**logstop** <*group_id*> stops logging of the defined log group.
md	**md** <*directory*> creates a directory. For example: **md** */Ext/logdata*.
move	**move** <*source file*> [*destination file*] copies a file to another location and removes the source file.
net	**net** <*warnings* | *statistics* [*clear*]>. Shows network statistics or warnings and optionally clears them. To show network statistics or warnings, type **net** *statistics* or **net** *warnings*. To clear the statistics or warnings, type **net** *statistics clear* or **net** *warnings clear*.
netif	**netif** [*open* <*ifname*> | *close* <*ifname*>]. To show the status of all configured network interfaces, type **netif** without any parameters. To open a given interface, type **netif** *open* <*ifname*> where ifname is the name of the interface. To close a given interface, type **netif** *close* <*ifname*>.
ntp	**ntp** <*set* | *show* | *test* > <*server*[*:port*]> [*maxroundtrip*] [*interface*]. Sets the QML logger clock based on remote NTP server clock or tests the connection to the NTP server. To set the QML logger time, type **ntp** *set* <*server*>. To show the time of the NTP server clock, type **ntp** *show* <*server*>. To test the connection, type **ntp** *test* <*server*>. The optional port parameter specifies the port to use for the connection; the default port is 123. The optional roundtrip parameter specifies the maximum time in milliseconds allowed between requesting the server time and its reception. The optional parameter *interface* is the name of the interface to use for the NTP connection.
open	Opens a terminal connection.

Table 22 Command Set (Continued)

Command	Description
paramset	**paramset** [<*set*> <*parameter*> [<*value*>]]. To list all parameter sets, type **paramset** without any parameters. To show the values of all parameters in a given set, type **paramset** <*set*>. To show the value of a parameter in a set, type **paramset** <*set*> <*parameter*>. To set the value of a parameter in a set, type **paramset** <*set*> <*parameter*> <*value*>.
ping	**ping** <*destination IP address of host name*>. Tests access to a host based on its IP address or DNS name.
pslevel	**pslevel** [*meters*]. To see the current pressure sensor level, type **pslevel**. To change the pressure sensor level, type **pslevel** and the new pressure sensor level in meters from the station altitude.
rd	**rd** <*directory*> removes a directory.
rep	**rep** <*report_name*> shows the contents of a report. For example: **rep** *MyRep0*.
reset	**reset** [*delay (seconds)*] resets the QML logger (warm boot). If the delay time is not given, the logger resets immediately.
serial	**serial** <*port*> [<*speed*> <*parity*> <*bits*> <*stop*>]. To see the settings of the port number 0, type **serial** *0*. To change the settings, type **serial** *0* and the new parameters. For example: **serial** *0 9600 N 8 1*. Available ranges/ options: Speed 300-19200, Parity N/O/E, Bits 7/8, Stop 0/1.
SLEEP	Sets the system in low power-state. Use the **SLEEP** command to reduce power consumption when storing the station for a few days (maximum period 1 month). Tip the spoon of the rain gauge to awaken the system. It can also be awakened by pressing the reset button. Note that the **SLEEP** command must be written in upper case.
sname	**sname** [*station_name*]. To see the current station name, type **sname**. To change the name, type **sname** and the new name. If the station name begins with a digit or contains a space, the name must be in quotes, for example, **sname** *"Vaisala MAWS*".
spclear	**spclear** <*parameter* | *ALL*> clears a static parameter or all parameters. Note that this command clears QMS101 and QMN101 sensitivity settings and is usually not needed.
spset	**spset** [*parameter*] [*value*] sets a value to a static parameter. To see a list of static parameters, type **spset**. NOTE! This command is not usually needed.
SYSINFO	**SYSINFO** gives information on the system. Note that the command must be written in upper case.
time	**time** [*HH MM SS YY MM DD*]. To see the current time, type **time**. To change the current time, type time and the new time. For example: **time** *14 10 00*. To change the current date, type time and the new time and date. For example: **time** *14 10 00 98 12 31*.
timezone	**timezone** [*hours*] sets the time difference from UTC. To see the time zone, type **timezone**. To set the time zone, type, for example, **timezone** *2*.
userlevel	**userlevel** [*level <set/clear>*] command is used to protect system from unauthorized use. It provides three password protected access levels to shell commands as well as to the visibility of system data. By default, the user levels are not in use.
verify	**verify** <*source file*> [*destination file*] compares two files. If they are different, the response is: `Error: Files are different.`

Table 22 Command Set (Continued)

Command	Description
warnings	**warnings** [*clear*]. To see active warnings, type **warnings**. To clear active warnings, type **warnings** *clear*. Warnings indicate that there are some problems in the software. See Chapter 4, Troubleshooting, on page 111 for more information.
winddircal0	**winddircal0** [*direction*]. Set the direction in degrees to align the wind vane. Type, for example, **winddircal0** *360* (north).
zr	Zmodem receive command is needed when transferring the setup file to the QML logger.
zs	**zs** <*file_name*>. Sends a file from the QML logger using Zmodem protocol (used instead of AWS Client function).

NOTE The following commands allow the use of wild cards: **chmod**, **dir**, **del**, **copy**, **move**, **verify**, and **zs**.

Example:

```
copy /log/L2*.* /Ext/log_L2copy
```

NOTE File commands (**dir**, **del**, **copy**, **move**, and **verify**) can be aborted by typing **CTRL+C**.

CHAPTER 4
TROUBLESHOOTING

This chapter contains information on some common problems, their probable causes and remedies.

Troubleshooting Procedure

When troubleshooting the QML logger, write a failure notice consisting of the following issues:

- What failed (what worked/did not work)?
- Where did it fail (location and environment)?
- When did it fail (date, immediately/after a while/periodically/ randomly)?
- How many failed (only one defect/other same or similar defects/ several failures in one unit)?
- What was connected to the product and to which connectors?
- Input power source type, voltage and list of other items (lighting, heaters, motors, et cetera) that were connected to the same power output.
- What was done when the failure was noticed?

When troubleshooting the QML logger, make sure you have the tools listed in Table 23 on page 112 available.

Table 23 Recommended Tools for Troubleshooting

Tools List
Terminal cable and a laptop computer with the applicable versions of the setup files and the AWS Client software
Keys for the enclosures
Multimeter
Flat head screwdrivers, especially small ones
Phillips screwdrivers, especially small ones
Set of open-end wrenches, different sizes
Set of Allen keys
Applicable spare parts, for example, a new QML logger
Safety helmet when tilting the mast

Follow the procedure below to troubleshoot the QML logger. Refer to the applicable sections of this chapter for details when requested. The basic procedure for troubleshooting assumes that the person has weather station operating experience.

1. Check the cabling and mechanical structure visually for indications of vandalism, dirt, lightning strike damage, or other visible cause for the problem. Also check that all the connectors are properly attached. For visual check of the enclosure and the logger, refer to section Visual Check on page 117.
2. The system appears to be completely down.
   a. Is the green LED on the QML logger blinking? Refer to section Determining QML Logger Operation Mode on page 119. If not, check the following:
      - Is there sufficient voltage (8 ... 16 VDC) present in the EXT-DC input of the logger?
      - Is there an internal battery present? If there is, check its voltage. Completely discharged or otherwise damaged battery can prevent the logger from operating. Refer also to section Battery Status on page 135.

b. The QML logger has power but it is not functioning.

- Connect the terminal cable and start the AWS Client software. To establish the terminal connection, refer to section Establishing Terminal Connection for Troubleshooting on page 119.
- Open the logger cover and press the reset button. Refer to section Resetting QML Logger on page 123. After a few seconds, the terminal should start to display logger startup messages.

c. The QML logger is not sending any data (nothing is seen on the screen).

- After the system has been without power, for example, when you start it for the first time, check the time and date. Timed operations will not work if the correct time is not set.
- The setup is faulty. Press and keep down the reset button for a few seconds. The QML logger will restart and display the text `Using blank configuration`.

d. The QML logger starts up normally, but sends error messages during startup, for example, `!Erroneous setup file`.

- Reload the setup.
- Set the station parameters.
- Restart the system.

e. After uploading a new setup file, the AWS Client software displays `Unhandled exception number: 39`.

- The setup might include too many calculations; consider removing some calculations.
- The interval between the statistical calculations is too short, consider executing the calculations less frequently. You might, for example, avoid calculations which are executed more frequently than the results are reported or logged.

f. If there are communication modules present, disconnect the power and replace the modules.

- Replace one module at a time and try to restart the system to find out the damaged one.
- Restart the system.

3. The QML logger does not receive commands entered in the AWS Client software.

a. Check the terminal cable connection and that you have the correct terminal cable (101) in use.

b. The terminal connection is not open.

Type **open** and press ENTER. Note that the command must be typed exactly correctly before it can be executed and that the command is not echoed on the screen.

c. The port settings are not synchronous.

Synchronize PC COM port and the QML logger COM port settings.

4. Has someone made any software or hardware changes to the station prior to malfunction? If so, could those changes have an effect on the operation? You can capture the content shown in the AWS Client software; refer to section Recording Terminal Connection Text on page 119.

a. When you have loaded a new setup:

- Make sure you have the original setup and the new setup saved as a .dtg file.
- Reload the original setup and verify that the system starts and runs with the original setup.
- Check the new setup once again with Lizard Setup Software, reload it, and verify that the system starts and runs.

b. When you have installed new hardware:

- Disconnect the new hardware.
- Reload the original setup and verify that the system starts and runs.
- Check the new setup once again with Lizard Setup Software.

- Connect the new hardware.
- Reload the new setup and verify that the system starts and runs.

5. Sensor(s) are not working properly.
   a. Are there one or multiple malfunctioning sensors? Multiple simultaneous sensor malfunctions in the same QML logger often indicate a damaged logger.
   b. Check the output of the **warnings** and **errors** commands for indication of the probable cause.
      - Connect the terminal cable and start the AWS Client software. Type commands **warnings** and **errors**. For details, see section Warnings and Errors on page 131.
      - Pay also attention to the message related to the excitation voltages. If the damaged sensor is powered by the logger, it may cause an overload.
   c. If the malfunctioning sensor is measured by the logger:
      - Open the sensor calibration view in the AWS Client software; see section Determining Sensor Status on page 124.
      - Check the sensor status and compare the value against the sensor status list in Table 30 on page 127.
   d. If the malfunctioning sensor is a so-called intelligent sensor, for example, Vaisala Ceilometer or Vaisala Present Weather Detector, use its own diagnostic features.
      - Connect the terminal cable and start the AWS Client software.
      - Service interface for the intelligent sensors can be accessed through the QML logger as explained in section Opening a Service Connection through QML Logger on page 120.

6. Communication is not working properly.

   a. Whenever possible, use an external device to verify that the communication infrastructure is working properly. For example, use a cellular phone to verify that the signal strength in the site is sufficient or that the system SIM card has access to the network.

   b. Troubleshoot the modems as instructed below.

      To test the GSM modems with the AT commands, refer to Table 24 on page 116. The faulty GSM modems are not serviceable in the field; if they do not operate correctly, you must return them to Vaisala for repairs.

Table 24 Test Commands for GSM Modems

Parameter	Command	Value
Network registration	AT+CREG=?	Registration status: <n>, <stat>, where <stat> 0 = Not registered 1 = Registered to home network 2 = Searching 3 = Registration denied 5 = Registered, roaming
Available operator	AT+COPS?	Returns the used operator
	AT+COPS=?	Queries all available operators, can be used to refresh the connection
Operator selection	AT+COPS=0/1	0 = Automatic 1 = Manual
Signal quality	AT+CSQ	Receive level 31 = Best 0 = Worst 99 = Not known Under normal conditions, value should be 10 or above.

      To monitor different command sequences, check the **Extra op. Info to COM0** option in modem configuration. This enables the modem control software to output status information to the fixed RS-232 port, that is, COM0. For example, you can monitor what is sent to the modem and how it responds. The printout includes additional internal debug data. Note that the output is sent only when the service connection is closed.

   c. If the communication device supports ASCII commands, for example, AT commands for modems, this command interface

can be accessed as explained in section Opening a Service Connection through QML Logger on page 120.

d. For troubleshooting instructions on IP-based communications, refer to the Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 2.

7. Data is not stored to a memory card.

   a. Check the status of the memory card. It is indicated by a LED. Table 31 on page 128 describes the different blinking sequences and the card conditions they indicate.

   b. Check that the memory card has been formatted before use. For more information, refer to section Using External Memory Card on page 128.

Is the QML logger still not functioning? Replace the logger and return the damaged one to Vaisala for repair. For return instructions, refer to section Technical Support on page 138.

Visual Check

Open the enclosure and check that all the equipment is present. Check that the QML logger, power supply, and communication devices are connected properly.

Remove the cover of the logger for visually checking the CPU board and other components located under the cover. In Figure 58 on page 118, the logger is shown without the cover and the optional communication modules.

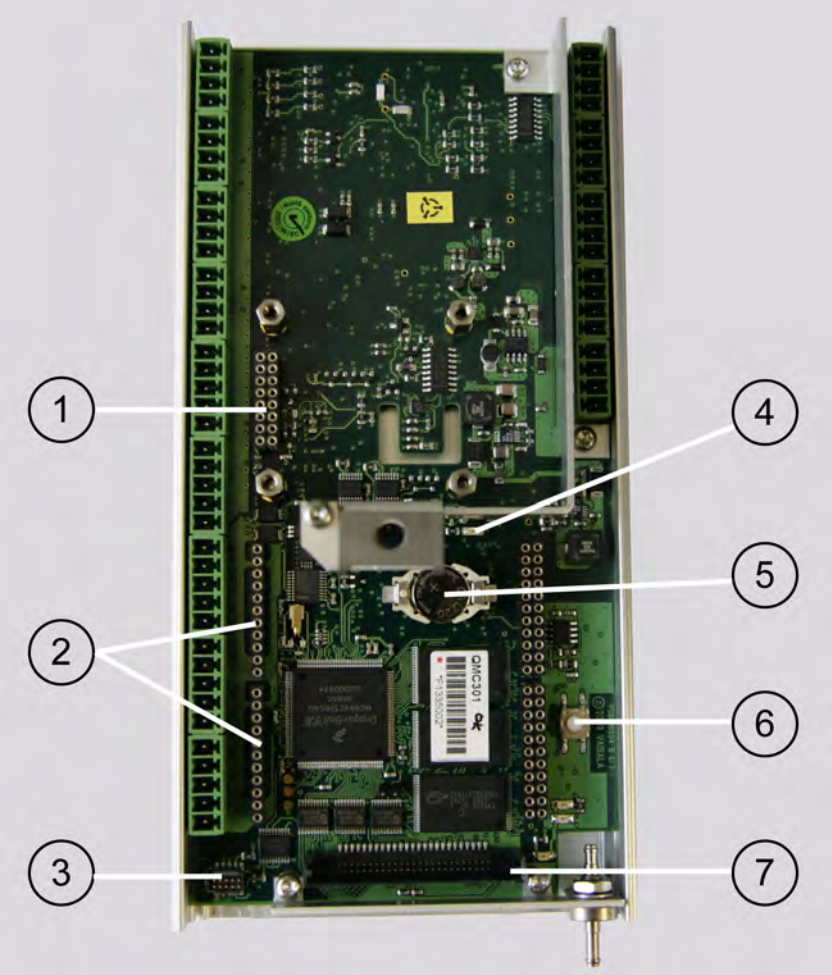


Figure 58 QML Logger without Cover

The following numbers refer to Figure 58 on page 118:

1 = Pressure sensor connector

2 = Communication module places MOD1 and MOD2

3 = SPI connector

4 = Status LED (green)

5 = Lithium battery for RTC

6 = Reset button

7 = CF Card connector

Determining QML Logger Operation Mode

You can watch the status LED to determine the operation mode. The LED is located on the QML logger board and it is visible through the logger cover.

Table 25 Determining Operation Mode by LED Flashing

LED Flashing Interval	Operation Mode	Note
All the time	QML logger has been reset but setup has not been examined yet.	
Once per 5 seconds	Setup is running.	
Once per 10 seconds	Blank boot or configuration cannot be run.	
Quickly 2 times	Setup is running but there are warnings.	Interval determined by setup
Quickly 3 times	Setup is running but there are errors.	
Not at all	None	Check power supply.

Establishing Terminal Connection for Troubleshooting

See section Establishing Terminal Connection on page 41 and Opening Service Connection on page 57.

Recording Terminal Connection Text

In problem situations, you can save the commands and program responses that you see in the AWS Client terminal connection window.

To capture all the text shown in the terminal window into a file, first select **Settings**, then **Options**, then select the **Trace log on** option. The program starts saving all text into a file of format *yyMMddHHmmSS.log*, where *yy* stands for year, *MM* for month, *dd* for day, and so on. The file is stored in the **Trace log directory** you have defined in the **Options** window.

NOTE	AWS Client software keeps recording terminal connection history until the **Trace log on** option is cleared. Do not neglect to clear this option once you have recorded enough messages; otherwise, log files will accumulate over time and unnecessarily reserve your disk space.

When you no longer need the capture files, you can delete them from your PC. The capture file is format *yyMMddHHmmSS.log*, which name is a time stamp of the file's creation. The file is saved in the **Trace log directory** you have defined in the **Options** window.

In problem situations, give the following commands: **battery**, **errors**, **spset**, **SYSINFO**, and **warnings**. When **Capture all** is selected, the results are saved into a file for future use.

Opening a Service Connection through QML Logger

The command interface of the modem or a serial sensor can be accessed through the QML logger, for example, to send the AT commands manually. To control the modem or sensor directly, open the service connection to the logger, and, for example, when the device is connected to the DSU232's first communication port at the module place **MOD1**, type **open** *DSU232_0_0*. To terminate this operation, type **close**. While the direct connection to the modem or sensor is open, any automatic operation through the connected port is blocked.

Parameters for the **open** command are presented in Table 26 on page 121. The parameter in column "Parameter" identifies the serial connector and can be used with all MAWS versions. In MAWS version 8.00 and later, the parameter in column "Alias" can be used, as well. Information concerning the correct connector can be obtained in Lizard Setup Software under **I/O Connections** in the **Devices**, **Equipment**, and **Additional sensors** views.

Table 26 Parameters for the Open Command

Connector in Lizard	Parameter	Alias
COM0	COM0	COM0
COM1	COM1	COM1
DMX501 (MOD1/1)	DMX501_0	MOD1
DMX501 (MOD2/1)	DMX501_1	MOD2
DSI485A (MOD1/1)	DSI485_0	MOD1
DSI485A (MOD2/1)	DSI485_1	MOD2
DSI486 (MOD1/1)	DSI485_0_0	MOD1_2
DSI486 (MOD1/2)	DSI486_0_1[1]	MOD1_1
DSI486 (MOD2/1)	DSI486_1_0	MOD2_2
DSI486 (MOD2/2)	DSI486_1_1[1]	MOD2_1
DSI486SDI (MOD1/3)	DSI486SDI_0	MOD1_3
DSI486SDI (MOD2/3)	DSI486SDI_1	MOD2_3
DSU232 (MOD1/1)	DSU232_0_0[2]	MOD1_1
DSU232 (MOD1/2)	DSU232_0_1	MOD1_2
DSU232 (MOD2/1)	DSU232_1_0	MOD2_1
DSU232 (MOD2/2)	DSU232_1_1	MOD2_2
DSU232SDI (MOD1/3)	DSU232SDI_0	MOD1_3
DSU232SDI (MOD2/3)	DSU232SDI_1	MOD2_3

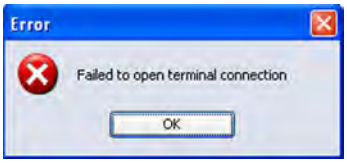
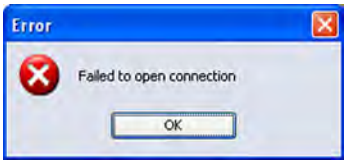
1. With the dual RS-485 module, the RS-232 connection is possible only to the channel B on the module, and thus the last number is 1.
2. With the RS-232 and dual RS-485 modules, the number between the underline characters stands for the module place, that is, MOD1 or MOD2, and the last number for the channel on that particular module.

NOTE Use the **SYSINFO PORTS** command to find out which connectors to use.

Connection Problems

If you cannot connect to the QML logger, the service connection is not opened and you cannot work with the logger. In case of connection problems, check the possible problems as instructed in Table 27 on page 122.

Table 27 Some Common Connection Problems and Their Remedies

Problem	Probable Cause	Remedy
You receive the following message: 	You are trying to connect to the wrong port.	Select the **Address book** option from the **Settings** menu to check the port numbers.
	Cables are not connected.	Check that the modem cable is connected properly.
You receive the following message: 	You are trying to connect to a port that does not exist in your computer.	Check the port settings.
	The port is reserved (some other program is connected to it).	It is possible that you have already opened the terminal program, minimized the window and forgotten you have already opened it, and then tried to open the program again.
You do not receive any messages.	Cables are not connected.	Connect the cables as shown in section Establishing Terminal Connection on page 41.

Error Messages

When typing commands, you may encounter some error messages. Table 28 on page 122 explains the most typical error messages.

Table 28 Error Messages

Error Message	Probable Cause	Remedy
Error: Executable not found	Typing error	Correct typing.
Syntax error!	Typing error: non-acceptable characters, for example, +	
Error: Directory not found	Typing error in directory name	
Error: Wrong number of parameters	A missing or an extra parameter	Check the command syntax (**help** *command*) and give the command again.
Error: Missing parameter	A missing parameter	

Resetting QML Logger

To reset the QML logger, enter the **reset** command (recommended) or press the reset button indicated by the number 1 in Figure 59 on page 123.

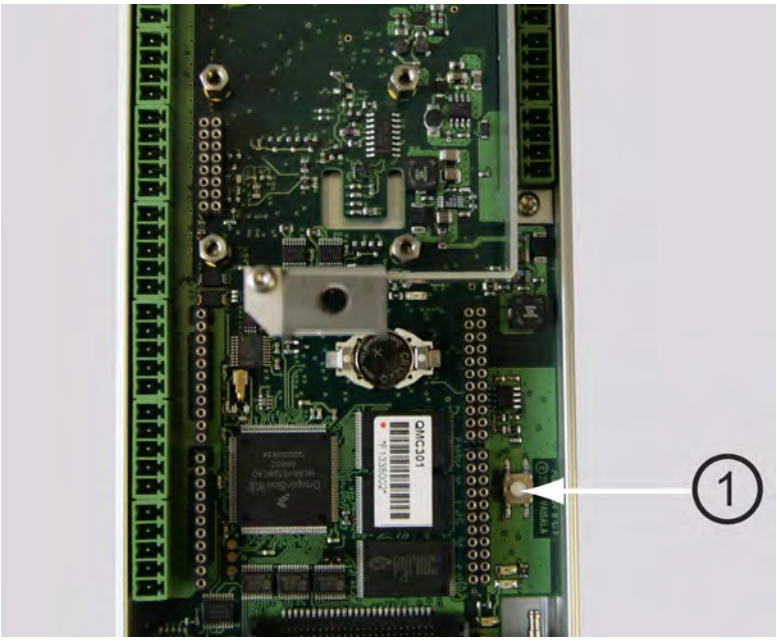


Figure 59 Reset Button on QML Logger

A short reset (pressing the reset button quickly) performs the same reset as giving the command and starts the program again. A long reset (pressing the reset button and keeping it down for a few seconds) restarts the program with a so-called blank setup. A blank setup does not run a setup file.

A blank setup may be useful if the setup is somehow defective and does not allow the opening of a terminal connection. When the blank setup is run, the QML logger communication parameters are restored to their defaults: *COM0, 9600, N, 8, N, 1*.

Determining Sensor Status

Sensor status values give indication about the general status of the sensor interfaces. You have two alternatives to view the status value for a sensor:

NOTE	Sensors with their own measurement interfaces and algorithms, for example, Vaisala Ceilometer or Vaisala Present Weather Detector, do not appear in the sensor list of the **Sensor Calibration** tab.

1. For any sensor, enter the following service terminal command:

   LASTVAL <*measurement_name*> *status*

   For example:

   ```
   / > LASTVAL TAMeasQMH101_1 status
   Status:1 Value:0
   ```

   where

   Status:1 = **Status** field in the output is the value status.

   Value:0 = **Value** field shows the sensor status value.

   For details on the **LASTVAL** command, refer to section LASTVAL Command on page 130.

2. For conventional sensors, open the **Calibration** window from the **Settings** menu in the AWS Client software; see Figure 60 on page 125. The sensor list is displayed on the left side of the window. The **Status** field shows the status of the selected sensor. To read the latest sensor status and measurement values, click the **Refresh** button. Table 29 on page 126 describes the other fields in the **Calibration** window.

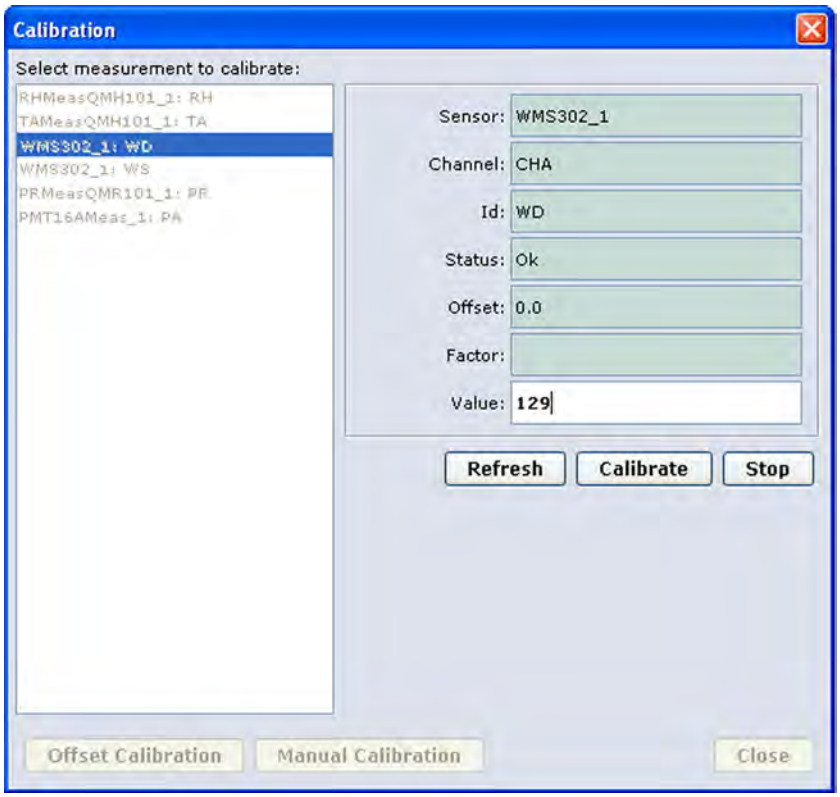


Figure 60 Settings Menu: Calibration Window

CAUTION	When an early QML logger version is updated to above 3.06, the following sensors will not operate correctly in the **Sensor Calibration** tab until they are removed from the setup and then re-created: CM6B, CM11, QMS101, QMS102, and QMN101.

NOTE	You must load an appropriate setup to the QML logger before you are able to use the **Sensor Calibration** tab.

NOTE	The **Sensor Calibration** tab is not visible for setups made with the software versions prior to 3.06. With old setups, the **MAWS common parameters** frame only shows the calibration values for the wind direction and solar radiation sensors. Other sensors need to be calibrated through the terminal connection with the appropriate calibration commands.

NOTE When **Value** is expressed as `N/A`, it indicates that the calibration factor has been altered but not saved, the sensor has not been measured or its measurement channel has failed, or the sensor is disabled. Further information about the possible reason can be obtained by comparing the value in the **Status** column against the values listed in Table 30 on page 127.

Table 29 Columns in the Sensor Calibration Tab

Column	Description	Input
Sensor	The sensor name as defined in the setup	n/a
Channel	The measurement channel of the sensor	n/a
ID	The measurement identifier	n/a
Status	The sensor status	n/a
Offset	Offset for the sensors	Overwrites the old offset value with the new one.
Sensitivity	The sensitivity value for the radiation sensors (QMN10x and QMS10x)	Overwrites the sensor sensitivity value for the radiation sensors.
Factor	Measurement gain for the sensors other than radiation sensors	Overwrites the old gain value with the new one.
Value	The last measured sensor reading shown in physical units	Overwrites the sensor reading with the entered value, that is, changes the offset of the measurement.

Table 30 Sensor Status List

Value	Meaning	Notes
0	The sensor is working properly (OK).	
1	Not measured yet	
2	Interface is not initialized.	1
3	Communication time out has occurred.	1
4	Unknown data is received.	1
5	Communication is functioning, but the sensor reports errors. Use sensor's own service interface to find out cause.	1
6	Sensor communication is paused because service connection is opened through QML logger.	1
7	Message sequence numbers are overlapping in the Autotrac satellite transceiver interface.	1
8 ... 19	Not available	
20	Excitation failure is caused by the overload in the excitation output.	2
21	The input voltage is out of range or the A/D conversion has failed due to an internal error.	2
22	Sensor is disconnected or the connection cables are broken.	2
23	Sensor output exceeds the min/max limits defined in the **Measurements** view.	2
24	Change in sensor output has exceeded the maximum step defined in the **Measurements** view.	2
25	An internal configuration error has occurred.	2
26	Error in reference measurement, which is usually caused by damaged sensor/logger or electrical interference.	2
27	Internal voltage error occurred or the logger is damaged.	2
28	PMT16 calibration data error	2
29	Data is invalid for unspecified reason.	2
30	Measurement or sensor has been manually disabled.	
99	Sensor status is not supported.	

1. Value is available only for the sensors with the serial interface.
2. Value is available only for the sensors with a conventional, that is, analog or counter/frequency interface.

Using External Memory Card

The external memory card is used to store log files that have been copied or moved from the internal log directory. The data can be retrieved from the external memory card via terminal connection or by switching the memory card with an empty one.

NOTE

If the CompactFlash memory card has not been formatted, it must be formatted before use.

In MAWS versions 6.00 and later, you are recommended to format the card in a Windows PC. The file system to use is FAT (not FAT32). Also, do not select the quick format option.

To format the CF card in the QML logger, insert it into the CF slot of the QML logger. Give the **EXTFS** *ERASE* command. After the card has been formatted, you can remove it from the slot.

When a new memory card is inserted into the QML logger, the software checks that the card is ready for use. The status of the memory card is indicated by a LED. Table 31 on page 128 describes the different blinking sequences and the card conditions they indicate.

Table 31 LED Blinking Sequences and Card Status Options

Blinking Sequence	Card Status
Long-long	Card is OK.
Constantly on	Data is being written.
Short-short-short for 5 seconds	Card is unformatted or corrupted.

The external memory card can be removed from the QML logger for data retrieval without interruptions to operations. The logger copies data from the internal log directory to the memory card daily at midnight; the default time is 00:00:30. Data is being written when the LED on the logger cover next to the external memory card is constantly on.

CAUTION

The memory card must not be removed from the QML logger while data is being written or the data may be lost. By default, data is transmitted to the memory card every day at 00:00:30.

Automatic Erase from External Memory Card

The log group -specific setting **Number of days to preserve log files** also affects the files stored to the external memory card. The functionality is the same as for internal log memory, that is, the following:

- Files older than the selected value [*days*] will be deleted automatically.
- Files are not erased, that is, the automatic clean up is disabled.

When files are stored to the external memory card, the internal memory is used as the working memory for storing the log files of the current day. These working files are moved to the external card each day just after midnight when the new files have been created for writing.

Commands for Troubleshooting Purposes

For most of the sensor inputs, there are data validation parameters to check the following quality parameters for the measurement:

- Maximum value: the maximum climatological value for the sensor measurement.
- Minimum value: the minimum climatological value for the sensor measurement.
- Step change: the maximum step change for the sensor value between two consecutive measurements.

You can set all of these parameters with Lizard Setup Software. For more information, refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volumes 2 and 3.

If the sensor value is outside the maximum or minimum values, or it has altered more than the maximum step change allowed, then data will be flagged as INVALID. Invalid data is typically displayed as ///// (this is a parameter that you can set). If a sensor displays invalid data, this is an indication that the sensor is faulty or out of calibration, or there is a problem in powering or measuring the sensor.

LASTVAL Command

If the value in the report changes to ////, you can check the measurement's/sensor's value with the **LASTVAL** command. Give the command in the terminal connection. When you use the raw parameter, the measured value before any validation and the status produced during validation are shown. When you use the corresponding signal name, the validated value is shown.

LASTVAL [*Measurement*] [*unconv* | *Signal name*]

where

Measurement	=	Name of the measurement as it is defined in the setup file
unconv	=	Parameter that gives the status and the electrical value of the measurement signal before conversion
Signal name	=	Parameter that gives the validated value of the measurement

Examples:

The command with the signal name parameter (in the following case, `TA`) produces the following response:

```
/ > LASTVAL TAMeasQMH101_1 TA
Status:1  Value:20.490570
```

where

Status:1	=	Value is valid.
Value:20.490570	=	Validated value for the temperature measurement is 20.49xxxx.

The measurement TAMeasQMH101_1 is defined in the setup file. The command with the raw parameter produces the following response:

```
/ > LASTVAL TAMeasQMH101_1 unconv
Status:1  Value:109.508383
```

where

Status:1	=	Value is valid.
Value:109.508xxx	=	Unconverted value [ohms] of PT100 measurement

When the value in the report changes to ////, you can check the value. In the following case, the probe is not connected:

```
/ > LASTVAL TAMeasQMH101_1 TA
Status:2  Value:-231.156481
```

where

Status:2	=	Value is invalid.
Value:-231.15xxxx	=	Temperature measurement indicating that the probe is not connected

When the value is invalid, check the sensor status value and refer to Table 13 on page 72:

```
/ > LASTVAL TAMeasQMH101_1 status
Status:1 Value:0
```

where

Status:1	=	**Status** field in the output is the value status.
Value:0	=	**Value** field shows the sensor status.

Warnings and Errors

There may be some problems if you see either of the following prompts:

```
/ E>
/ W>
```

`/ E>` means that there are errors, and `/ W>` means that there are warnings.

It is normal to have one or two warnings after the serial connection to the QML logger has been reset; for example, if you have turned your PC off, you can ignore these warnings.

To see active warnings, type **warnings**. To clear active warnings, type **warnings** *clear*. Warnings indicate that there are some problems in the software.

Example:

```
/ W> warnings
Warning: Break
  occurred 9 times first in uart.cpp[84]
  during thread: 00019F60 [AbsTimerT]
  object pointer: 106C [component: COM0]
Warning: Frame
  occurred 14 times first in uart.cpp[83]
  during thread: 00019F60 [AbsTimerT]
  object pointer: 106C [component: COM0]
```

The `Break` and `Frame` warnings mean that most likely you have turned your PC off and on again. This causes no trouble and you can clear the warnings.

```
Warning: Device reset
  occurred 1 times first in c:/libs/MAWS/adcl/kernel/
idle.cpp[52]
  during thread: 00001694 [Idle]
  object pointer: 163C [component: Idle]
```

The above warning means that you have reset the QML logger. This causes no trouble and you can clear the warning. If you have not reset the QML logger and the warning still occurs, contact Vaisala technical support (see section Technical Support on page 138).

```
Warning: Data missing
  occurred 2 times first in h:/MAWS/software/adcl/report/
confrep.cpp[414]
  during thread: 00019C0C [AbsTimerT]
  object pointer: 33A94 [component: MyRep1]
```

If you receive the above warning, check that the parameters **sname**, **pslevel**, and **altitude** are set.

To see active errors, type **errors**. To clear active errors, type **errors** *clear*. Errors indicate that there is something wrong with the sensors or configuration. Write down the error information and contact Vaisala technical support as described in section Technical Support on page 138.

System Information

You can acquire a report that contains system information by using the **SYSINFO** terminal command. The command lists parameters that are useful especially when troubleshooting the system or when contacting Vaisala HelpDesk.

Example:

```
/ > sysinfo
Serial #         : E091041
Hardware         : Rev B-003
Software         : 7.00b
Checksum         : 0ABACAB0
Boot sw version  : 8.00
Program flash    : 4096kB
System RAM       : 2048kB
Free memory      : 1297kB
Internal temp.   : 25.50'C
Active errors    : NO
Active warnings  : NO
Piggyback - 0    : N/A
Piggyback - 1    : DSE101 rev: B serial no: 904460
Setup file       : /Cfg/m120_425.adc
Setup for sw     : 7.00
Setup creator    : JI
Setup created    : 2010-04-16T14:21:36+00:00
Setup CRC        : EE848764
Lizard version   : 7.00
System uptime    : 168h 33min 51sec since Tue Apr 27
12:44:11 2010
```

where

Serial #	=	Serial number of the logger PCB
Hardware	=	Hardware revision of the logger PCB
Software	=	Software version for the operating software and its checksum
Boot sw version	=	Version of the QML logger boot software
Program flash	=	Total amount of program memory
System RAM	=	Total amount of memory on the logger
Free memory	=	Amount of free memory on the logger
Internal temp.	=	Internal temperature of the logger

Active errors	=	Existence of active errors: YES/NO
Active warnings	=	Existence of active warnings: YES/NO
Piggyback - 0	=	Type and serial number of the additional module installed in the module slot 1
Piggyback - 1	=	Type and serial number of the additional module installed in the module slot 2
Setup file	=	Filepath of the running setup
Setup for sw	=	Minimum logger firmware version required for running the current setup
Setup creator	=	Setup created by
Setup created	=	Setup creation time
Setup CRC	=	Setup checksum
Lizard version	=	Lizard version used to create the setup
System uptime	=	Total time that the system has been running, calculated from the last reset

The versions of installed communication modules can be seen from SYSINFO output or in the startup message if, for example, you need to find out the version of a DSI486 module.

Example startup message from the logger:

```
COM0: QML201C Startup - Cold Boot


Serial #        : F1335009
Hardware        : QML201C-003
Software        : 8.00 Alpha 4 (Apr 30 2010)
Checksum        : 815AED36
Boot sw version : 8.00
Program flash   : 4096kB
System RAM      : 2048kB
Free memory     : 1626kB
Internal temp.  : 24.65'C
Active errors   : NO
Active warnings : NO
Piggyback - 0   : DSI486 rev: D serial no: 932365
Piggyback - 1   : DSI486 rev: A serial no: 023212

Program flash checksum (815AED36) verification...Passed
```

When the logger output gives communication module DSI486 version as "D", the version of the communication module is DSI486-B. If the

logger output gives the DSI486 version as "A", the communication module used is the earlier version, DSI486.

NOTE	If Program flash checksum returns an error, reload the software. If reloading the software doesn't work, contact Vaisala.

Battery Status

You can view battery status information by giving the command **battery** without parameters.

NOTE	The **battery** command applies only to the internal battery of the QML logger up to QML201B.

Example:

```
/ > battery
Remaining=100
State=FLOAT_CHARGE
U=6.850195
I=2.685547
Type=PB_BATTERY
Capacity=1.200000
Ext.DC=13.132420
Internal temperature=23.511668
```

Battery voltage (U) and voltage at the +ExtDC terminal are given as volts, charging current (I) as milliamperes, and capacity as ampere-hours. The remaining percentage shows how much energy is left in the battery.

If you suspect that the internal battery or the charging circuitry is defective, try the following:

- Check that the battery capacity is correct and change it with **battery** [*capacity*] command, if necessary. If the capacity setting is too low, the battery simply charges slowly. In the opposite case, the battery may be damaged due to too high charging.
- Check the battery voltage, ExtDC voltage, and charging current. ExtDC should be higher than battery voltage for charging. If it is lower, the battery is discharging and the charging current shows negative value. Normally, battery voltage should vary between 5.8 and 7.0 volts and it may rise as high as 7.5 volts during quick charge (for lead batteries).

Measurement Enable or Disable

You can manually enable or disable all measurement inputs and sensors. You can use this feature, for example, for the following purposes:

- Remotely change the readings of a faulty sensor to be flagged as invalid.
- Mark all sensor readings invalid during maintenance operation.

Use the following commands in the service connection to change the flagging:

enable <*Measurement Name*>

disable <*Measurement Name*>

where

enable	=	Enables the measurement inputs or sensors.
disable	=	Disables the measurement inputs or sensors.
Measurement Name	=	The measurement name from the **Configuration** view of Lizard Setup Software.

NOTE For sensors that use more than one input channel, you need to enter separate commands for each measurement. For example, you need to control separately the TA and RH measurements of the air temperature and relative humidity sensor.

Examples:

```
>\ disable RHMeasQMH101_1
>\ disable TAMeasQMH101_1
>\ disable WMS302_1
>\ enable PWD22_1
```

Upon successful completion of the commands, the response is as follows:

```
Successfully disabled
```

or

```
Successfully enabled
```

Any other returned values indicate an error.

When the measurement input is disabled:

- All other output values than status have undefined values.
- Sensor status shows `disabled`; refer to the updated list of the sensor statuses in Table 13 on page 72.
- Value status shows `INVALID` and `NOT AVAILABLE`.

Technical Support

When contacting Vaisala technical support, please send the following information with your technical enquiry or description of a fault:

- Serial number of the QML logger.
- The captured text of the **SYSINFO** command.
- If you have modified the setup file, and the setup is possibly defected, please send also the captured *yyMMddHHmmSS.log* file and the setup file (.dtg). Please refer to Vaisala HydroMet™ Data Collection Platform User's Guide, Volume 2, for instructions on how to export a setup file.

For technical questions, contact the Vaisala technical support:

E-mail helpdesk@vaisala.com

Fax +358 9 8949 2790

If the product needs repair, please follow the instructions below to speed up the process and to avoid extra costs to you.

1. Read the warranty information.
2. Contact Vaisala technical support via e-mail or fax and request for RMA (Return Material Authorization) and shipping instructions.
3. Proceed as instructed by Vaisala technical support.

NOTE	RMA must always be requested from Vaisala technical support before returning any faulty material.

CHAPTER 5

TECHNICAL DATA

This chapter provides the technical data of the QML logger and accessory modules.

Wiring Instructions

NOTE	All wiring diagrams in this manual are examples only. Refer to the appropriate delivery documents for the actual wiring.

Do not change the wiring between the connectors and the logger pins. For special deliveries or with some sensors, a separate wiring diagram is supplied in order to help you connect the sensor wires to correct connectors.

RS-232 Module DSU232

The unisolated RS-232 module provides either a double serial channel without handshaking or a single RS-232 with handshaking. In addition, an optional SDI-12 interface is available.

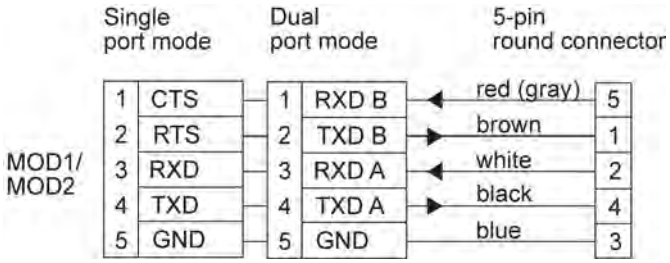


Figure 61 RS-232 Wiring Diagram

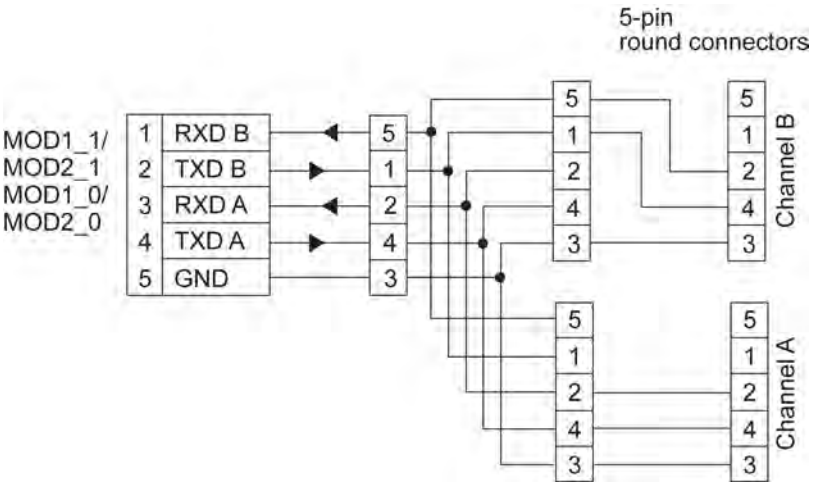


Figure 62 Suggested T-Connection in Dual Port Mode

For the SDI-12 wiring with the later version, see Figure 68 on page 145. The SDI-12 data pin is the same as in the dual RS-485 module, and the same wiring method can be used as in Figure 68 on page 145.

See Figure 68 on page 145 and Table 32 on page 141 for the SDI-12 jumper of DSU232-C.

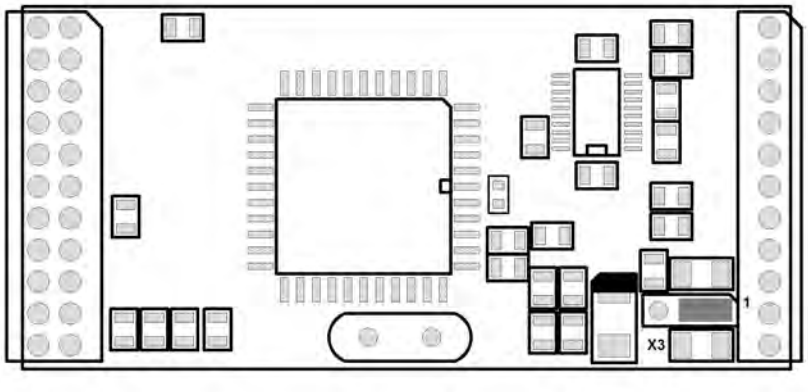


Figure 63 SDI-12 Jumper of DSU232-C

Table 32 DSU232-C Jumper Settings

Jumper	Connected Pins	Function
X3	1-2	Pin 5 is GND (default, compatible with the old DSU232)
	2-3	SDI-12 connected to pin 5

Isolated RS-485 Module DSI485

The isolated RS-485 communication module can be configured either for a 2-wire line or for a 4-wire line when the receive and transmit lines are separated. If the module is configured for a 2-wire line, the transmitter is enabled only during the transmission. Normally, the 2-wire connection is used to connect several devices to the same communication line. The 4-wire mode is the default mode.

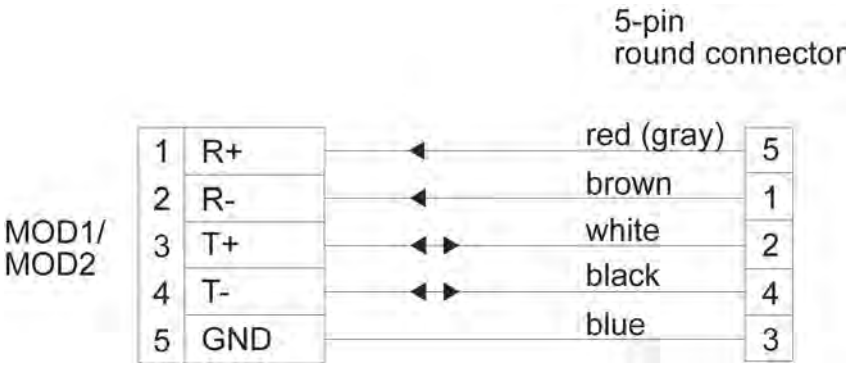


Figure 64 Isolated RS-485 Module Wiring Diagram

NOTE	In 2-wire mode, only T+ and T- pins are used.

Dual RS-485 Module DSI486, Version A

Channel A is always used in the RS-485 mode. In 2-wire RS-485, both transmitted and received data is sent via this channel. In 4-wire RS-485, this channel can either transmit or receive depending on the configuration. Jumper X4 defines the line terminating resistor for the data channel A. Remove the jumper X4 if you do not need the terminating resistor of the dual RS-485 module. Figure 65 on page 143 provides a schematic wiring diagram for dual RS-485.

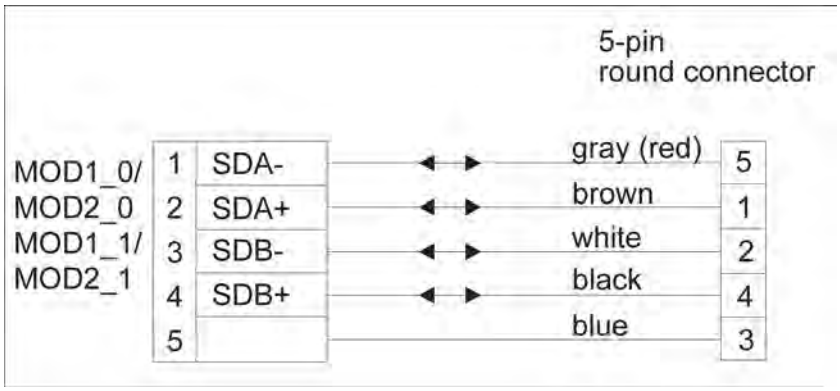


Figure 65 Dual RS-485 Module Wiring Diagram

Channel B can be used either in the RS-485 mode or in the RS-232 mode. In 2-wire RS-485, both transmitted and received data is sent via this channel. In 4-wire RS-485, this channel can either transmit or receive depending on the configuration.

Figure 65 on page 143 provides a schematic wiring diagram for the dual RS-485 connection, the dual 2-wire connection utilizing both channels. The correct jumper settings for the channel B are listed in Table 33 on page 143. The jumpers are located on the module as illustrated in Figure 66 on page 144.

Table 33 Jumper Settings for Channel B in the RS-485 Mode

Jumper	Connected Pins	Function
X3	1-2	Sets the RS-485 mode active for the channel B.
	3-4	
X6	1-2	
X5	1-2	The line terminating resistor is in use with RS-485.

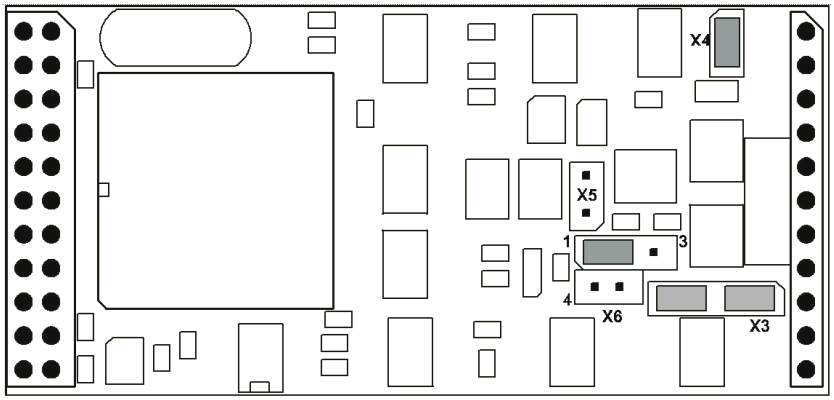


Figure 66 Dual RS-485 Module Default Jumper Locations

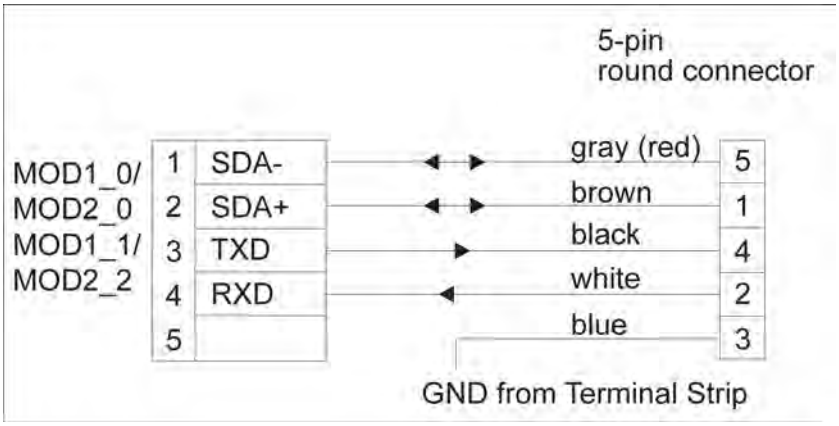


Figure 67 Dual RS-485 Wiring Diagram for RS-485 and RS-232

Figure 67 on page 144 provides a schematic wiring diagram for the combination of the RS-485 and RS-232 connection. The correct jumper settings for the channel B are listed in Table 34 on page 144.

Table 34 Jumper Settings for Channel B in the RS-232 Mode

Jumper	Connected Pins	Function
X3	2-3	Sets the RS-232 mode active for the channel B.
X6	1-4	
	2-5	
X5	None	The line terminating resistor is not in use at all.

The dual RS-485 module also provides an SDI-12 connection. The SDI-12 line uses one wire for data and is limited to a maximum length of 60 meters. Figure 68 on page 145 provides a schematic wiring diagram for the SDI-12 connection and the 12 VDC power supply for a sensor. The jumper settings should be as shown in Figure 66 on page 144.

Simultaneously with the SDI-12, you can connect channels A and B in the 2-wire RS-485 mode. If you take all three channels in use, you either need three free connectors in the flange or an optional junction box.

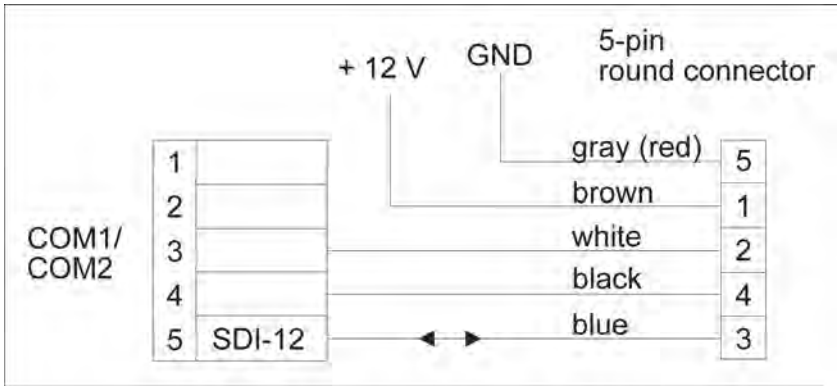


Figure 68 Dual RS-485 Wiring Diagram for SDI-12 and 12 VDC Power Supply

Dual RS-485 Module DSI486, Version B

The later module version, DSI486-B, has otherwise the same features as module DSI486-A, but its jumper settings are slightly different. The settings have been simplified to make the module easier to use. Notably, jumpers X4 and X5 still select the termination resistors for channels A and B, respectively, only their locations have been moved a bit (see Figure 69 on page 146).

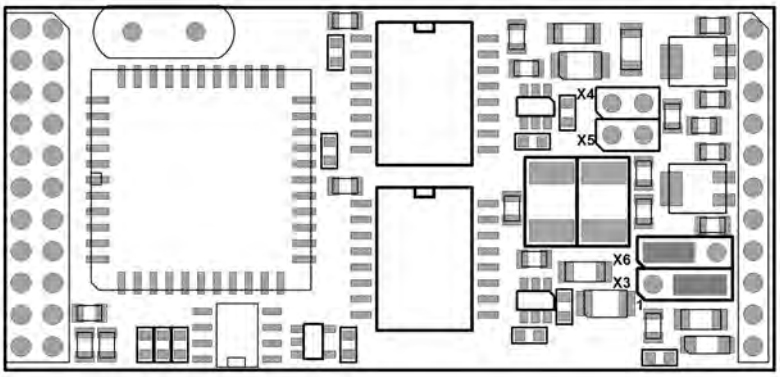


Figure 69 RS-232 Jumper Settings

Jumpers X3 and X6 are used to select between the RS-485 and RS-232 modes for channel B, but their settings have been simplified. The jumper positions are described in Table 35 on page 146.

Table 35 Jumper Settings for DSI486-B

Jumper	Connected Pins	Function
X3	1-2	Channel B RS-232 mode
	2-3	Channel B RS-485 mode (default)
X6	1-2	Channel B RS-485 mode (default)
	2-3	Channel B RS-232 mode
X4	1-2	Channel A RS-485 line terminating resistor active
X5	1-2	Channel B RS-485 line terming resistor active. Do not use in RS-232 mode

Digital I/O Module QMI118

The QML logger provides the possibility to extend the I/O capacity with the optional digital I/O module (QMI108 or QMI118) equipped with eight inputs and eight outputs. The digital I/O module interfaces to the logger via the SPI connector. The module is located inside the enclosure beside the logger, and it conforms to the same environmental immunity and emission standards as the logger.

The module has eight open collector outputs with 30 VDC / 1 A continuous drive capability and LED indicators. The eight inputs of the module tolerate voltages from 0 to 25 VDC (the absolute maximum 30 VDC), and they have 40 ms (typical) contact debouncing circuitry. The module allows connection of slow pulse inputs, for example, with tipping bucket rain gauges.

The later version, QMI118, is otherwise the same as QMI108 except there are four open collector outputs and four outputs with high side switching capability. This means the module can switch, for example, +VB directly to the peripheral that needs it without additional relays. The rating of the high side outputs is the same as open collector outputs, 30 VDC / 1 A. They have a common positive terminal labeled +VB. The voltage does not have to be system battery voltage but can vary from 3.3 V to 30 V.

Note that the GND pin associated with the output block of O4 ... O7 (both blocks in QMI108) should always be wired to the system GND if any of the outputs are used to switch currents that exceed 10 mA.

Table 36 Technical Data QMI108/118

Property	Description/Value
Max. voltage all outputs, +VB	30 VDC
Max. current all outputs	1 A
Max. voltage all inputs	±25 V
Input default state	ON (max. 100 k weak pull up to 3.3 V built in)
Input debounce duration	40 ms typ., 60 ms max.
Input threshold	2 V
Input hysteresis	300 mV

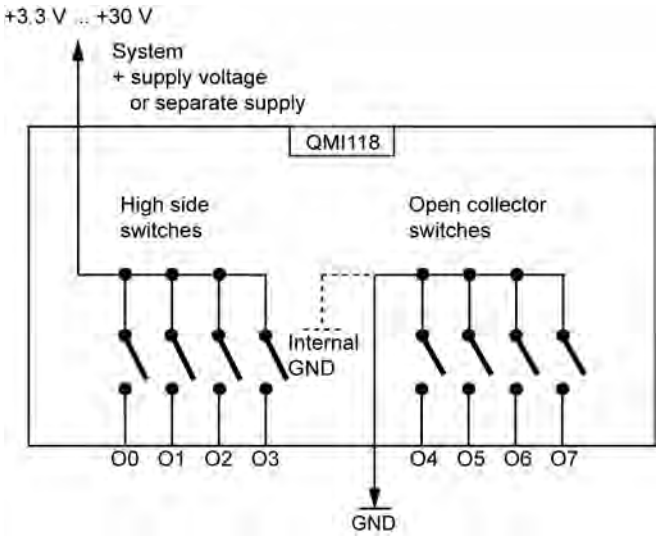


Figure 70 Digital I/O Module Wiring Diagram (Digital Outputs)

NOTE	The digital I/O module can only be connected to the QML201 logger or newer. The type of the logger can be checked with the **VER** command.

Fixed Line Modem DMX501

The fixed line modem module can be configured for a point-to-point line or for a multidrop modem network. If a modem is configured for multidrop use, the outgoing carrier is valid only during transmission. If the QML logger is the master in the multidrop network, the fixed line modem can be normally configured for point-to-point use.

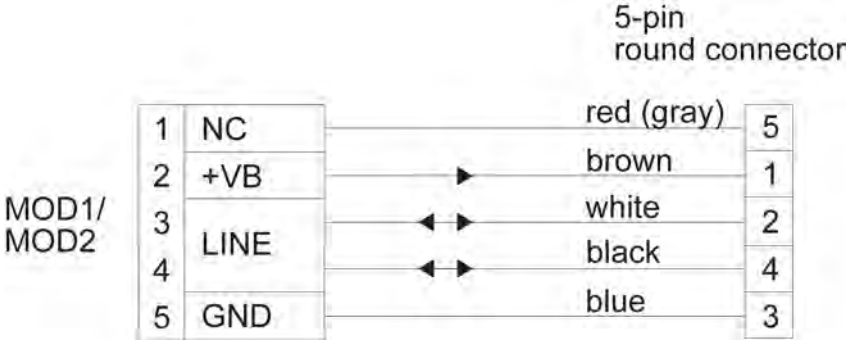


Figure 71 Fixed Line Modem Wiring Diagram

Ethernet Communication Module DSE101

The Ethernet communication module DSE101 provides a 10base-T connection, which is compatible with 100 Mbps and 1 G switches; DSE101, however, operates at 10 Mbps. Supported by software, the module allows virtual serial port connections and socket connections to be established to the logger.

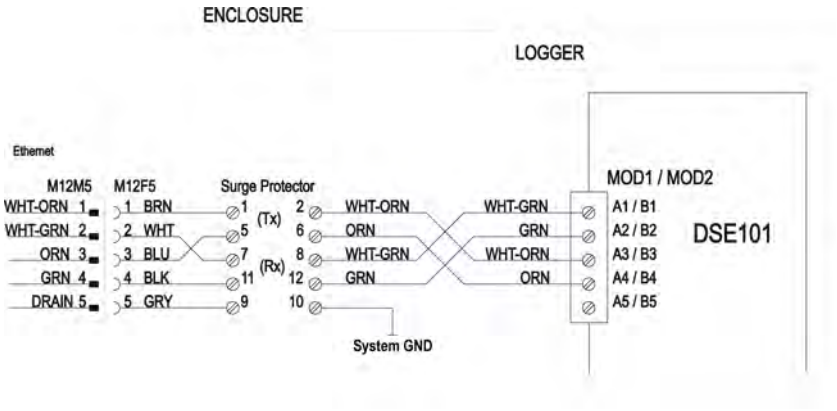


Figure 72 Ethernet Communication Module DSE101 Wiring Diagram

Table 37 Ethernet Communication Module DSE101 Specifications

Property	Description/value
Operating mode	10Base-T
Power consumption (transmitting)	50 mA at 12V
Temperature	Normal: -40 ... +70 °C (-76 ... +158 °F) Extended: -60 ... +70 °C (-76 ... +158 °F)
Humidity	0 ... 100% RH

Specifications

QML201 Logger, Version C

Table 38 QML201C Logger General Specifications

Property	Description/Value
Processor	33 MHz, 32-bit Motorola
Memory	4 MB RAM and 4 MB program
A/D conversion	24-bit
Data logging memory	3.3 MB internal Flash memory
	Up to 2 GB on optional CompactFlash memory card
Sensor inputs	10 analog inputs (20 single-ended inputs)
	2 counter/frequency inputs
	Internal channel for BARO-1 pressure transducer
Serial communication	
Standard	One RS-232 and one RS-485 (two wire); one SDI-12
Optional	Two optional plug-in slots for communication modules to increase the number of the serial I/O channels up to 9 pcs
	Fast serial expansion bus for connecting, for example, digital I/O module
Speed	300 ... 38400 bps
Parameters	Configurable speed, start bits, data bits, stop bits, parity, XON/XOFF, and checksum
Ethernet communication	
Standard	IEE 802.3 Two plug-in slots for Ethernet modules DSE101
Speed	10 Mbs (10 BASE-T) Can also be connected to 100/1000 Mbps (100/1000 BASE-T) networks with 10 Mbps
Parameters	Full/half duplex with auto-negotiation
TCP/IP communication	
Supported protocols	ARP, UDP/IP, TCP/IP, FTP, SMTP, PPP (with PAP or CHAP authentication), HTTP (get), Telnet, ICMP Echo, DHCP, NTP, DNS, serial port tunneling over TCP/IP
Voltage (external powering)	8 ... 30 VDC
Power consumption	<10 mA (typically with basic 5 sensors)

Table 38 QML201C Logger General Specifications (Continued)

Property	Description/Value
Temperature (operating)	-50 ... +60 °C (-58 ... 140 °F); extended -60 ... +70 °C (-76 ... 158 °F)
Temperature (storage)	-60 ... +70 °C (-76 ... 158 °F); extended -60 ... +70 °C (-76 ... 158 °F)
Humidity	0 ... 100 %RH

Table 39 QML201C Logger Accuracy Specifications

Property	Description/Value
All data for ambient temperature range -50 ... +60 °C unless otherwise specified	
Temperature measurement (Pt100 sensor, measurement range -50 ... +80 °C)	
Typical uncertainty over temperature range -50 ... +60 °C	<±0.04 °C
Typical uncertainty over temperature range -60 ... +70 °C	<±0.08 °C
Maximum error over temperature range -40 ... +50 °C	Less than ±0.10 °C
Maximum error at 0 °C	Less than ±0.04 °C
Voltage measurement uncertainty temperature range: -50 ... +60 °C	
±5.0 V range	<0.06% of reading ±100 µV
±250 mV range	<0.04% of reading ±50 µV
±250 mV range	<0.06% of reading ±6 µV
±25 mV range	<0.06% of reading ±5 µV
Voltage measurement uncertainty temperature range: -60 ... +70 °C	
±5.0 V range	<0.10% of reading ±150 µV
±250 mV range	<0.08% of reading ±80 µV
±250 mV range	<0.10% of reading ±10 µV
±25 mV range	<0.10% of reading ±10 µV
Frequency measurements	±0.003% + resolution up to 20 kHz
Common mode range	+7 V/-3 V

Table 39 QML201C Logger Accuracy Specifications (Continued)

Property	Description/Value
Real-time-clock (standard)	
accuracy	Better than 20 s/month
backup time	5 years with CR1220 Lithium cell

Table 40 QML201C Logger Regulatory Compliances

Property	Description/Value
Emissions	CISPR 22 class B (EN55022)
ESD immunity	IEC 61000-4-2
RF field immunity	IEC 61000-4-3
EFT immunity	IEC 61000-4-4
Surge (lightning pulse)	IEC 61000-4-5
Conducted RF immunity	IEC 61000-4-6

APPENDIX A
GLOSSARY

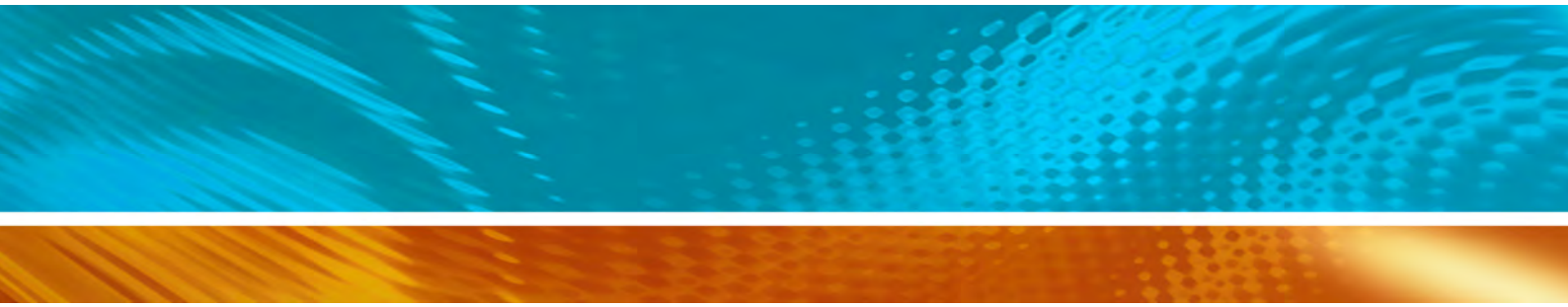
This appendix contains a glossary with explanations of some general meteorological and technical terms and terms used in specifications.

Accuracy	The degree of conformity of a measured or calculated value to its actual or specified value.
Altitude	The station altitude in meters from sea level.
Atmospheric pressure	The pressure at a given point due to the gravitational force on the column of air above it. The official unit of pressure is Pascal (Pa = newton/m^2). The unit hectopascal (hPa) has been chosen to be used in meteorological barometric pressure measurement. 1 hPa = 100 Pa = 1 mbar.
Barometer	Instrument for measuring atmospheric pressure.
Barometric pressure	See Atmospheric pressure.
Baud	The unit of signaling speed of a line, which is the number of transitions (voltage or frequency changes) that are made per second. The term has often been erroneously used to specify bits per second. However, only at very low speeds is baud equal to bps; for example, 300 baud is the same as 300 bps. Beyond that, one baud can be made to represent more than one bit. For example, a V.22bis modem generates 1200 bps at 600 baud.

Celsius scale	Temperature scale having the freezing point of pure water at 0 °C and the boiling point at 100 °C under standard sea level pressure. All the temperatures measured with the QML logger are given in Celsius degrees.
Configuration	Set of instructions for the QML logger. The compiled setup (a script) is in fact a program that runs in the logger.
Crosswind	The wind blowing perpendicular to the course of a moving object.
Damping ratio	Describes the response of a wind vane to a sudden change in wind direction. It is defined as the ratio of the actual damping to the critical damping. Critical damping is that value of damping which gives the fastest transient response without overshoot.
Delay distance	The passage of air necessary over a wind vane to cause the vane to respond to 50% of a step function change in wind direction.
Dew point (temperature)	The temperature at which the air, if cooled, would reach saturation, and at which dew would therefore begin to condense out on a solid surface.
Global radiation	The total of direct solar radiation and diffuse sky radiation received by a horizontal surface. Global radiation is measured by pyranometers.
Gust	The peak momentary wind velocity within a given interval of time, for example, 10 minutes.
Hexadecimal	Numbering system using the base number 16 and including the ten decimal digits (0 to 9) along with six alpha digits (A to F).
Humidity	The water vapor content of the air. Weather station sensors commonly measure relative humidity. Relative humidity is the ratio of water vapor pressure present in a gas to the maximum pressure of water vapor that could be present in the gas in that temperature.
LED	Light-Emitting Diode
Logger	The processing unit of the system. The electronics of the QML logger take care of measuring, storing, and processing of the measured parameters.
Logging	The process of storing the measured and calculated values in the logger's memory.
Lull	The minimum of wind speed during a certain time interval.

Modem	A device that allows a terminal or computer at one location to communicate with a terminal or computer at a distant location via wire or telephone lines.
Precipitation	Term that refers to all forms of water particles that fall upon the earth. This includes rain, snow, and hail. It is the universal practice to distinguish between rain, snow, and total precipitation. Snow is sometimes measured as such and sometimes it is melted and measured as water.
Pslevel	The pressure sensor level in meters from the station altitude.
Pyranometer	An instrument that measures solar energy received from the entire hemisphere (180 degrees field of view). The output is expressed in Watts per square meter (W/m^2).
QFE	The actual atmospheric pressure at the level of station altitude or at the height of the runway threshold. The difference of the pressure sensor level and the station altitude (or runway threshold) is indicated by the pressure sensor (pslevel) setting in the QML logger. QFE is normally used for aviation purposes.
QFF	The sea level pressure as QNH, but the value is corrected by the actual air temperature (or in some cases by virtual temperature, that is, temperature 12 hours ago). QFF is used in synoptical observations.
QNH (altimeter setting)	The atmospheric pressure at sea level in the standard atmosphere. The station altitude is indicated by the station altitude setting in the QML logger (difference of mean sea level and station altitude). QNH is used for aviation purposes.
Rain gauge	Measures precipitation based on depth, that is, the depth to which a flat surface would be covered if no water were lost by run-off or evaporation.
RS-232	Standard serial transmission protocol. A standard interface between a computer input/output port and a peripheral device.
RS-485	Standard serial transmission protocol. This protocol permits multi-drop networks (up to 32 nodes) using a single twisted pair cable.
Solar radiation	The solar energy received from the entire hemisphere. It is measured with a pyranometer.
Synchronizing time	Ties the operation to the clock for software operations. For instance, if an operation is always to be performed twenty minutes to the hour, the synchronizing time should be set to 00:40:00.
WMO	The World Meteorological Organization.

ZModem	File transfer protocol that is used when transferring files between the QML logger and a terminal program.



www.vaisala.com

M210784EN