



INUX Modbus Master Pro

User Guide

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Application overview

INUX Modbus Master Pro is an application for Android-powered smart-phones that enables Modbus communication with Modbus slave devices. The application supports reading and writing of values, supports a number of extended data types and allows for saving and loading of configured workspaces for easy access to different types of devices. These features makes it an ideal tool for testing and diagnostics.

Supported features

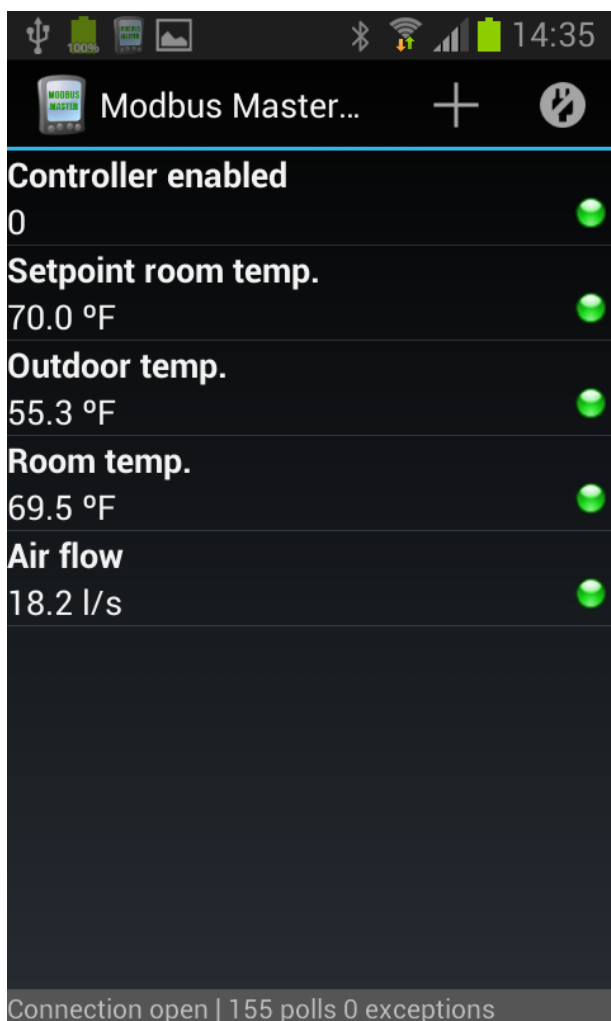
- Modbus TCP and RTU-over-TCP.
- Modbus RTU over Bluetooth (SPP).
- Discrete inputs, coils, input registers and holding registers.
- Boolean, signed and unsigned integer, long integer, single and double precision float and BCD data types.
- Inverse interpretation of registers.
- Decimal, hexadecimal, binary and custom scale display formats.
- Good/bad status indication of all active polls.
- Optimized poll mode (adjacent data addresses in one Modbus request) and single poll test mode (individual polling for all addresses).
- Automatic polling with a configurable scan rate.
- Automatic reconnect of dropped TCP-connections.
- Possibility to arrange polls into custom workspaces that can be saved and loaded for easy access to different types of devices.

Summary

Modbus Master Pro is a Modbus master. Its main work routine consists of processing poll definitions and putting out Modbus requests for corresponding data points on the network. This is carried out in a regular repeated fashion for as long as the application is connected to a Modbus device.

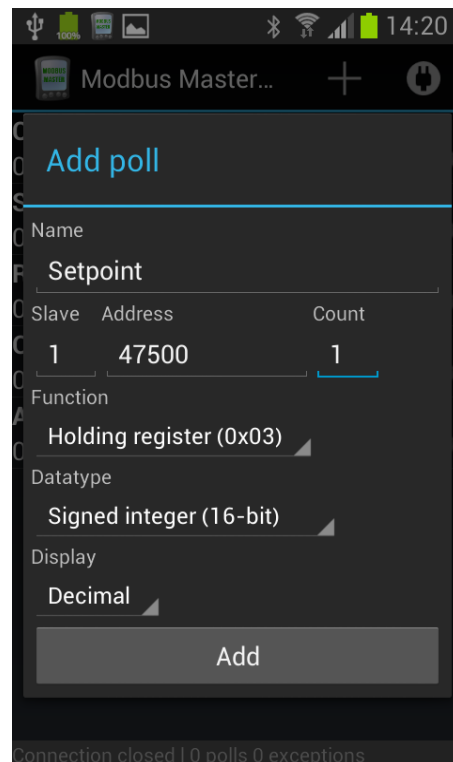
Poll definitions

A poll definition describes a data point and is composed of a slave identifier, an address (or address range), a function code and a data type. In addition it is possible to associate an alias name and a display format to a poll definition. All defined polls are listed in the main screen of the application where each row represents one poll. This view is called the workspace.



Adding polls

- From the action bar use the + button to select **Add poll** and bring up the dialog for adding a new poll. For pre-Android 3.0 devices use the **menu** key to access this function.
- Enter a name for the poll. This is an alias name that will show in the list of polls to help identification.
- Enter slave id number 0-247. This is usually only significant when using Modbus RTU or when communicating through a Modbus gateway.
- Enter data address 1-65535. Base 1 (i.e. PLC-addressing).
- Choose a value for count greater than one to create multiple polls in consecutive order of address. These polls will all share the same settings, but may be edited afterwards.
- Select Modbus function code. Discrete inputs and input registers are read-only. Coils and holding registers are read/write.
- Select data type. For coils and discrete inputs only boolean data type is possible.
- Choose desired display format decimal, hexadecimal, binary or scaled.
- For scaled display format enter the number of decimal places, scale quota and offset. Optionally also select a data unit for the scaled value.
- Press **Add** to add the selected poll(s) to the workspace.

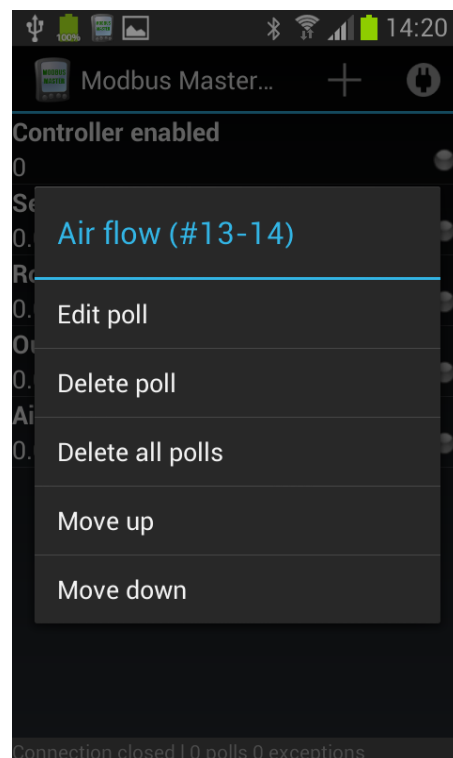


Editing polls

- Long press (i.e. press and hold) the row of a poll definition. This will bring up a context menu.
- Press **Edit poll** to bring up the edit dialog.
- Make the desired changes then click **OK**.
- If desired use the *Move up/down* from the context menu to arrange the poll up or down in the workspace.

Erasing polls

- Click and hold the row of a poll definition. This will bring up a context menu.
- Click **Delete poll**. Alternatively select **Delete all polls** to delete all polls in the workspace.



Connection setup

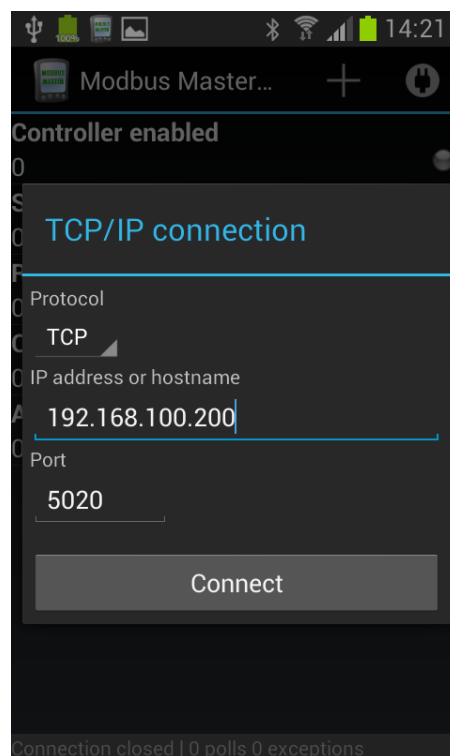
Modbus Master Pro supports both TCP/IP and Bluetooth connections for communication with the Modbus devices. Follow these instructions to establish a connection.

TCP/IP (Modbus TCP/RTU)

- From the action bar or the application menu select **Connect** to bring up the Connect dialog for choosing the type of connection.
- Choose **TCP/IP**.
- Choose the appropriate Modbus protocol: TCP or RTU.
- Enter IP address or host name.
- Enter TCP port number. 502 is the default Modbus TCP port.

Bluetooth (Modbus RTU)

- From the action bar or the application menu select **Connect** to bring up the Connect dialog for choosing type of connection.
- Choose **Bluetooth**.
- Choose serial device to connect to. Both the Android and the target device must support Bluetooth SPP (serial port profile). Paired devices will show automatically. Start a new search by clicking **Search for devices**.



Basic operation

When connected to a slave the application periodically (according to the selected scan rate) puts out Modbus requests on the network. The responses are received and interpreted as defined in the corresponding polls. The results are presented in main application view with one value per row and poll.

The status of every poll is indicated by the symbol at the far right of the workspace. For successful polls the symbol is green and for unsuccessful polls (exception received) the symbol turns red. When disconnected this poll status indication is grey. For troubleshooting it is recommended to enable *Individual* polling mode from the settings dialog to be able to determine the poll status for each individual poll. By default an optimized poll algorithm is enabled that will try to fit as many registers in one Modbus request as possible.

Writing values

- Short press the row of a poll definition that should be written to. Note that only coils and holding registers are writable. Discrete inputs and input registers are read-only.
- Enter value and then press **Set**.

Workspaces

The main application view containing the poll definitions is called the workspace. This can be saved and retrieved later for quick access to a certain configuration. For instance it is a good idea to store one workspace configuration for every type of PLC device occurring frequently in the day-to-day work.

Saving

- From the action bar or the application menu select **Archive** to bring up the archive options.
- Press **Save workspace to show the file dialog**.
- Enter a name for the workspace and press **Save**.

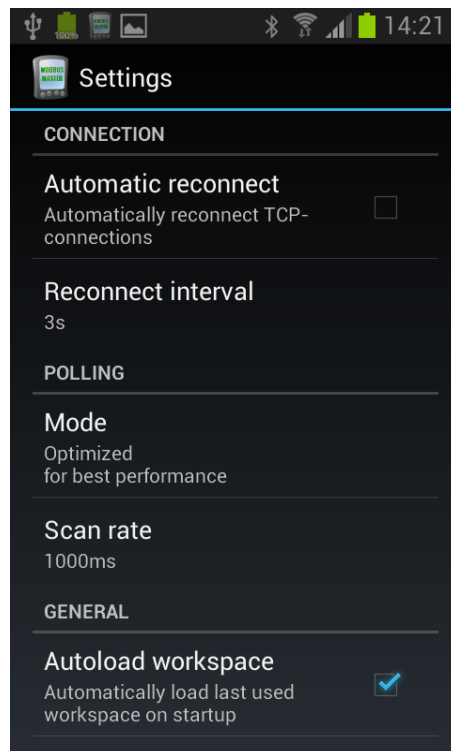
Loading

- From the action bar or the application menu select **Archive** to bring up the archive options.
- Press **Load workspace to show the file dialog**.
- Press on a file name to open it.

Settings

From the action bar or the application menu select **Settings** to bring up the general application settings dialog.

- **Connection**
 - **Automatic reconnect** – automatically reconnect when TCP-connection is dropped.
 - **Reconnect interval** – number of seconds to wait before automatically reconnecting (only applicable when automatic reconnect is activated).
- **Polling**
 - **Mode** – determines if optimized or individual poll mode is used. In optimized mode, adjacent data addresses having the same function code, are aggregated into one Modbus request. Thus, minimizing overhead cost in terms of network bandwidth required. Contrarily the individual poll mode forces every data address to be polled individually. This can be useful for instance when troubleshooting and trying to find the origin of an exception.
 - **Scan rate** – the interval in ms by which the application polls the devices.
- **General**
 - **Autoload workspace** – Automatically loads the last used workspace on application start.
 - **Text size** – sets the text size for the main poll workspace.
 - **Inactivity shutdown time** – number of seconds to wait, after the Modbus Master activity has been closed or put into the background, before the polling background service is stopped and closed.



Frequently asked questions

Q: Which Bluetooth serial adapter should I use for Modbus RTU?

A: Any Bluetooth serial adapter supporting the SPP profile should work. We have used the IOGEAR GBS301 without any problems at all. We've also heard the Parani SD1000 works very well. Also make sure the Android device has Bluetooth SPP support (most modern devices have).

Q: Where are my workspaces stored on my device?

A: The workspaces are stored in the external memory location in a subdirectory called *mmpro*. The external memory location is usually located in the file system at */sdcard*.

Q: I'm having problems with dropped connections. What can I do?

A: If possible try connecting using WiFi instead of the Mobile data connection. If this does not work, lowering the scan rate may also prevent connection problems.

Supported data types

The Modbus protocol standard only specifies single bit and 16-bit word data types. Almost all implementations, however, have variations on this standard. Modbus Master Pro implements the following data types.

Name	Length	Signedness	Range
Boolean	1-bit	-	True/false
Signed integer	16-bit	Signed	-32,768 to 32,767
Unsigned integer	16-bit	Unsigned	0 to 65,535
Long	32-bit	Signed	-2,147,483,648 to 2,147,483,647
Float	32-bit	Signed	1.40129846432481707e-45 to 3.40282346638528860e+38 (positive or negative)
Double	64-bit	Signed	4.94065645841246544e-324d to 1.79769313486231570e+308d (positive or negative)
BCD16	16-bit	Unsigned	0 to 9999
BCD32	32-bit	Unsigned	0 to 99,999,999
BCD64	64-bit	Unsigned	0 to 9,999,999,999,999,999

In addition to these some of the long types (>16-bit) have word-swapped equivalents. These are called inverse.