



# UNIVERSAL MONITOR DO-1 FOR MODBUS

## GENERAL INFORMATION



SIMPLE MONITORING DEVICE  
FOR YOUR BUSINESS

The current Modbus standards dictate the use of Client-Server device terminology in favor of Master-Slave; However, common practice is still to use Master-Slave terms when referring to connected Modbus devices. For ease of use / integration of the **DO-1** device we have kept the current terminology with future plans to update to the new standard as it becomes more common place.

For now: Client = Master , Server = Slave and vice versa.

## **COPYRIGHT**

©2024 Altech Mexico, <https://www.altechmexico.com>

All rights reserved. Information in this document is subject to change without notice. Reproduction or transmission of all or any part of this document, in any form or by any means, electronic or printed, for any purpose, without the express written permission of Altech Mexico, is prohibited.

The latest electronic version of this guide is available for download here:  
<https://do-1.altechmexico.com/en>

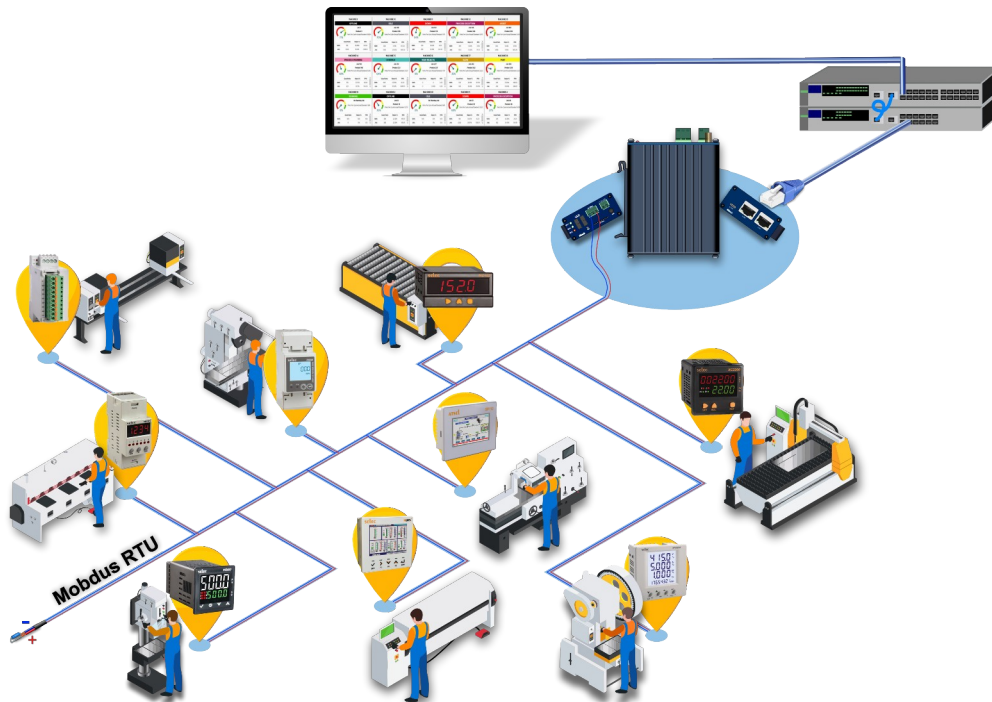
Altech Corp. is a registered trademark of Altech Corp. (USA)

## Universal Monitor DO-1 – General Information

The following section contains essential information about the development and application of the **DO-1** universal monitor, the main alarm functions and the additional options considered.

### Use and advantages of DO-1

**DO-1** was developed to help companies monitor their buildings, plants and machines in a simple and cost-effective way. By using **DO-1**, companies can monitor, alarm and evaluate their buildings, plants and machines themselves without having to resort to expensive and complex systems.



**DO-1** does not require any special technical requirements or IT specialists to be installed and operated. **DO-1** is easy to install and operate, making it an ideal solution for small and medium-sized businesses.

In addition, **DO-1** offers the ability to connect a variety of sensors and data logging devices that allow companies to monitor and analyze their buildings, facilities and machinery in a variety of ways. For example, **DO-1** also allows companies to collect a variety of data, including energy consumption, current, voltage, temperature, humidity, motion, and noise levels.

The special benefit: There are no monthly or annual license fees for **DO-1**. This makes **DO-1** a cost-effective solution for companies that want to monitor their buildings, plants and machines easily and cost-effectively.

## Communication protocol

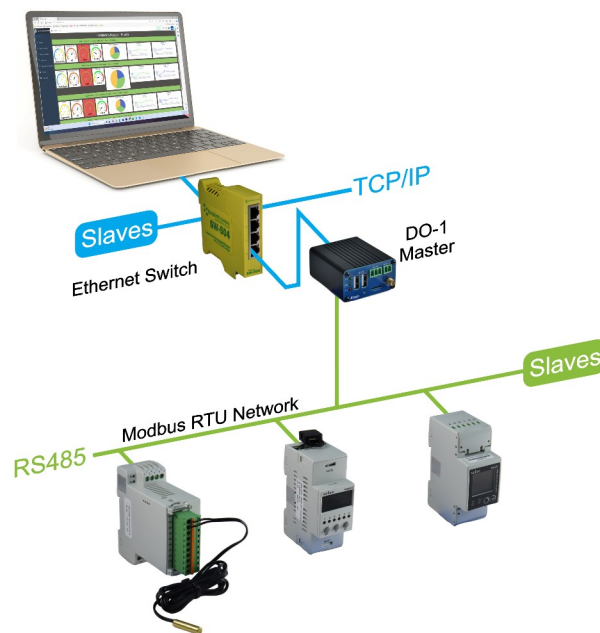
When selecting a communication protocol for industrial applications, various factors must be taken into account. One major challenge is the large number of protocols used by different manufacturers, which are often not compatible.

### Key selection criteria:

1. Use of a **simple, universal, stable and interference-resistant communication protocol** that is already being used successfully in industry
2. **Widely used** by almost all manufacturers for the myriad of PLCs, VFDs, HMIs, meters and sensors available on the market
3. **Compatibility problems should be avoided** and the integration of devices from different manufacturers should be facilitated.

For this reason, **Modbus RTU** was chosen for the development of the **DO-1**. Sensors and devices can be connected in series in a network, which is very popular for industrial control networks. The **Modbus RTU communication protocol** provides reliable and efficient communication over a **2-wire serial connection** (RS485). This connection is easy to set up and maintain, making it a suitable option for use with sensors and data acquisition devices.

This figure shows an example for a **Modbus RTU network**

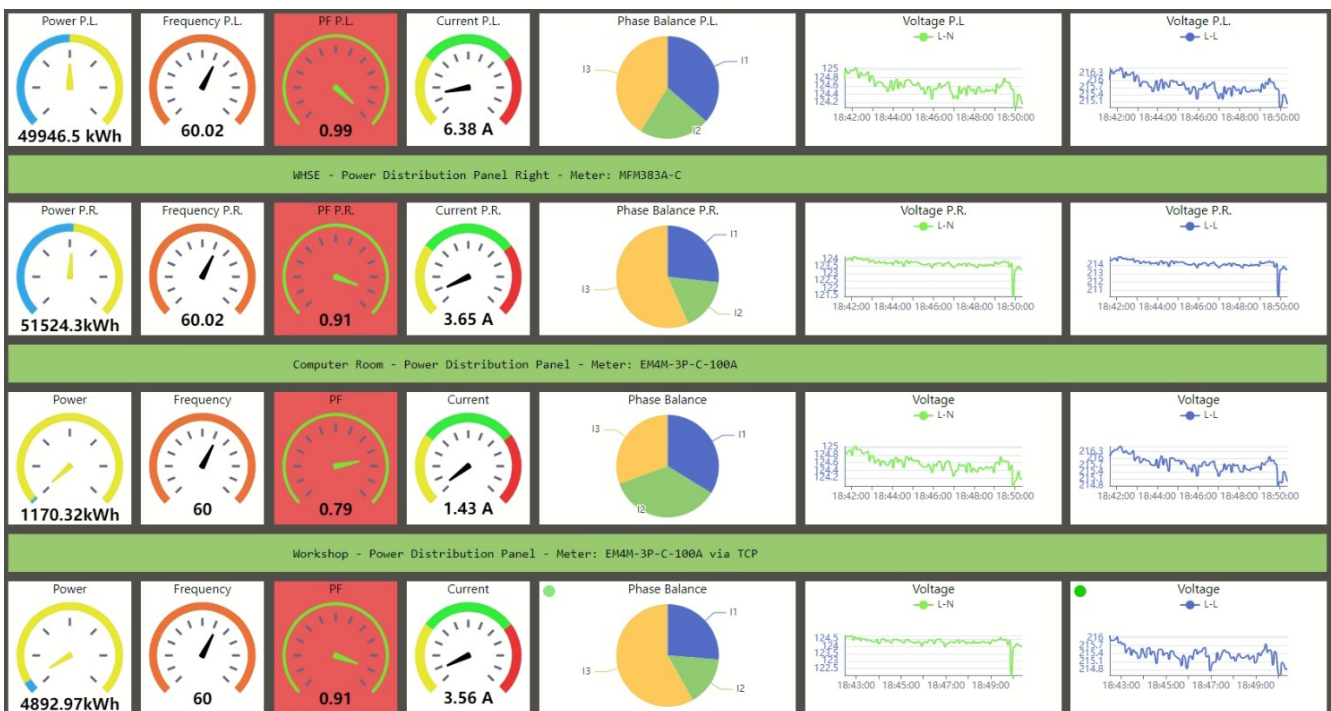


## Modbus TCP

Modbus TCP is an **Ethernet extension of Modbus**. If a local Ethernet network (LAN) already exists, the Modbus TCP communication protocol can be **used to connect sensors and data acquisition devices** that have an Ethernet port. If sensors and data acquisition devices only have a **2-wire serial connection**, they can still be connected using a **suitable RS485 serial converter**. This allows seamless integration into an existing network and provides greater installation flexibility.

## Display and data processing

The dashboard for displaying measurement data is easily customizable and user-friendly. It can be displayed on different devices such as desktops, laptops or tablets in the network (LAN), which allows flexible use.



Instead of having to learn and operate a complex analysis program, the measurement data can simply be transferred to Microsoft Excel or another spreadsheet program for evaluation. These powerful spreadsheet programs are widely available today and are easy to use.



## Alert functions

Alerts help to ensure the safety, efficiency and reliability of the monitored systems/devices by providing early warning of errors or malfunctions and enabling a rapid response. This function is therefore essential to quickly detect and visualize possible errors or malfunctions.

1. *Early failure detection:* To become aware of possible faults or malfunctions in the monitored equipment at an early stage. This allows action to be taken before problems worsen or lead to failures.
2. *Quick response time:* By creating alarms in the monitoring center, the responsible persons receive immediate notifications of any problems that occur. This allows them to react quickly to determine the cause of the problem and initiate appropriate measures to restore the operation of the equipment.
3. *Efficient error identification:* Alerts help to specifically identify errors or malfunctions in the monitored devices. By monitoring specific parameters or patterns, alarms can be triggered as soon as deviations from normal operating conditions are detected. This facilitates fault diagnosis and shortens the time to rectification.
4. *Reduction of downtime:* Timely detection of faults and rapid intervention can minimize downtime. Alarms allow potential problems to be addressed proactively before they lead to major disruptions or outages.
5. *Improvement of the overall performance:* By continuously monitoring and creating alarms, the overall performance of the monitored system can be improved. By identifying trends or recurring problems, appropriate action can be taken to increase equipment reliability, efficiency and longevity.

If the corresponding values are exceeded or not reached, an alarm is triggered, which leads to the automatic sending of an e-mail. This e-mail can contain a short message or a report about the situation. It can be specified in advance whether the alarm status should be reset automatically when the measured value is back within the tolerance range, or whether a manual reset is required. In this way, the user can adapt the settings to his specific requirements.

## Additional options

Beyond the basic version, the product offers a range of additional options to meet individual needs and requirements. These advanced features enable customized use and provide a higher level of flexibility and performance. These additional options ensure that the product meets individual requirements and provides a comprehensive solution for various business needs.



*WLAN/WiFi*

"Wireless" LAN or "Wireless Fidelity" is a wireless local area network that is also becoming more common in industry. Many data acquisition devices offer a WiFi option in addition to the wired connection, or even exclusively the WiFi option. However, it should be noted that this connection is more susceptible to external interference and the signal may not penetrate thicker walls or may be attenuated by other physical obstacles. Other disadvantages include lower network security and speed compared to the wired connection.



*Bluetooth*

Due to the physical limitation of the Bluetooth range, the measured value acquisition is spatially limited. Measurement value acquisition via Bluetooth is therefore more suitable for environmental monitoring.



*Remote Access*

Remote access to one or more **DO-1** may be required. In this case, a secure connection via VPN is recommended. However, it should be noted that direct access to a **DO-1** via VPN may cause connection problems due to the existing local network and its network security settings. In this case, an IT specialist would be required. To avoid these complications, an optional access option via a cloud connection was considered. This offers simple, multi-site and user-friendly management of one or more devices with secure encryption and no network configuration required.



Cloud storage is currently not provided. The decision whether cloud storage is necessary for local building or plant monitoring depends on various factors. On the one hand, cloud storage can offer the possibility of accessing the data from different locations and thus enable cross-site monitoring.

Other factors that speak against cloud storage:

- x data security
- x a necessary stable and fast internet connection
- x high costs

It is important to note that cloud storage requires an internet connection and slow connections and speed issues can lead to further problems. The dependency on the cloud provider and the monthly or annual costs must also be considered. Protection of stored data and potential data loss through the cloud are also important aspects to consider. In some cases, it may be necessary to call in an IT specialist. Against this background, cloud storage was initially dispensed with and added value was placed on internal and external data storage.



DATASHEET



**Features**

- Monitoring / alerting / data collecting / analyzing / diagnosing
- Universal application at low cost
- Monitors up to 128 Modbus RTU / TCP devices
- Web based software included
- Do-it-yourself - easy configuration
- Individual Dashboard creation
- Includes MODBUS addresses of Selec products
- Individual alert or event settings with email notifications
- Extract filters for data to Excel or csv files
- Real time clock with 30 days battery backup
- Dual power input
- 5GB internal data storage / 128GB external
- Compact design, with DIN rail adapter (optional)
- WiFi and Bluetooth connection (optional)
- Custom features or functions on request
- German engineered, assembled in Mexico

**Technical Specification**

**Supply Specifications**

Supply voltage	12-24V DC (polarity protection)
Back-up supply voltage	5V DC
Power consumption max	3W (12W max)

**Environmental Specifications**

Temperature	Operation	-20 °C to 50 °C
	Storage	-40 °C to 85 °C
Humidity (at 35 °C)	90 % (non-condensing)	

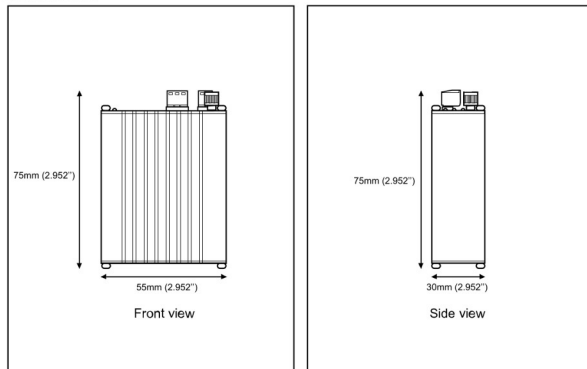
**Mechanical Specifications**

Housing	Aluminium
Weight	130g
Protection	IP20

**Optional Specifications**

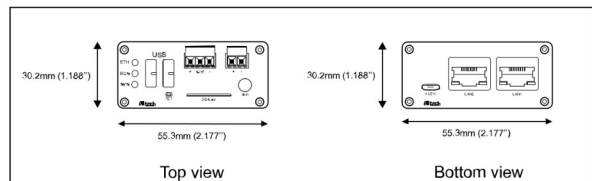
Version	Freestanding or DIN rail mount
Configuration	Via built-in Web Interface

**Dimensions**



**Terminal Connection**

Interfaces	1x RJ45 10/100 Ethernet (LAN1)
	1x RJ45 10/100/1000 Ethernet (LAN2)
	(LAN1 & LAN2 can be set in switch or 2port mode)
	1x WiFi 802.11 b/g/n with antenna
	2x 2.0 USB A (total current draw max. 1.5A)
Connectors	1x microSD card
	1x MODBUS (Master)
	2pole 3.5mm PCB plug, for main supply 12-24V DC
	USB Micro plug, for back-up supply 5V DC
	3pole 3.5mm PCB plug, for MODBUS RTU



**Funcional Specifications**

Communication protocol	RS485 - Modbus RTU / TCP
Memory	Data: 5 GB - internal
	MircoSD card: up to 128GB
Memory retention	Unlimited
RTC	Yes, with 30 days battery back-up

**Ordering Information**

Product code	Description
MX-DO-1	Freestanding version
MX-DO-1-DR	DIN rail mount version