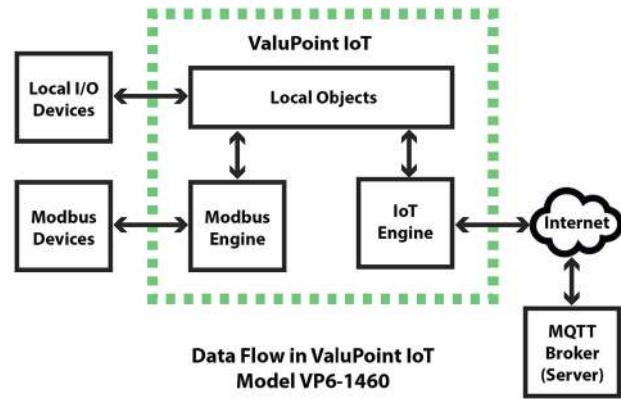


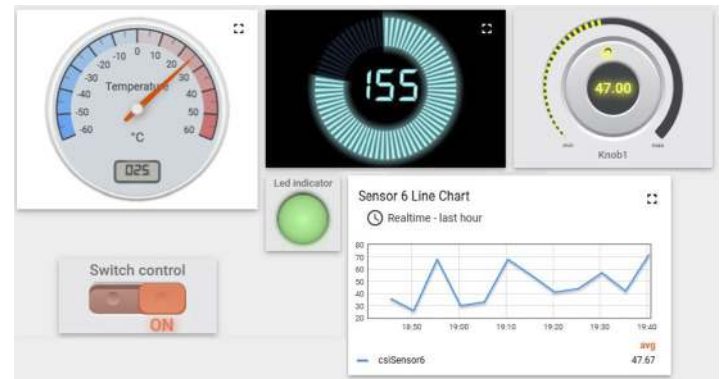
MQTT Cloud Based or Stand Alone Remote Monitoring Using Local I/O or Modbus



Control Solutions' ValuPoint® VP6-1460 IoT Edge Server connects physical I/O, e.g. sensors, to the Internet. In addition, the VP6-1460 turns any Modbus device into a Thing on the Internet of Things. The VP6-1460 features 12 universal inputs that may be configured as analog or discrete, and 2 Form A relay outputs. The VP6-1460 will use its communication ports to poll one or more Modbus RTU and/or Modbus TCP devices, collecting data from the list of registers you provide. Based on rules you create for local or remote I/O, the VP6-1460 will decide if and when to publish that data to the MQTT broker (server). You can also configure the VP6-1460 to subscribe to data coming from the MQTT broker, which can operate the relay outputs, or you can write to remote Modbus devices to manage setpoints and the like.

One of the many things you can do with data that has been published to the AWS server by the ValuPoint VP6-1460 is analyze and visualize the data, and generate text messages automatically sent to your smart phone. Any data related service offered by Amazon Web Services is available once the VP6-1460 has published your data to the AWS server.

The MQTT “publish” action, in controls terms, is most closely associated with sensors. Your hardware has collected sensor data, and you want to send that sensor data to a server or to other control devices. To send that data, you “publish” it.



The MQTT “subscribe” action, in controls terms, is most closely associated with actuators. The “subscribe” action would also be associated with control setpoints. You can never force data into a device via MQTT. The device, in our case the VP6-1460, must subscribe to the source of data effectively asking to be informed of changes. Once you have subscribed to an MQTT source of data, then when received, you can use that data to control actuators or update setpoints.

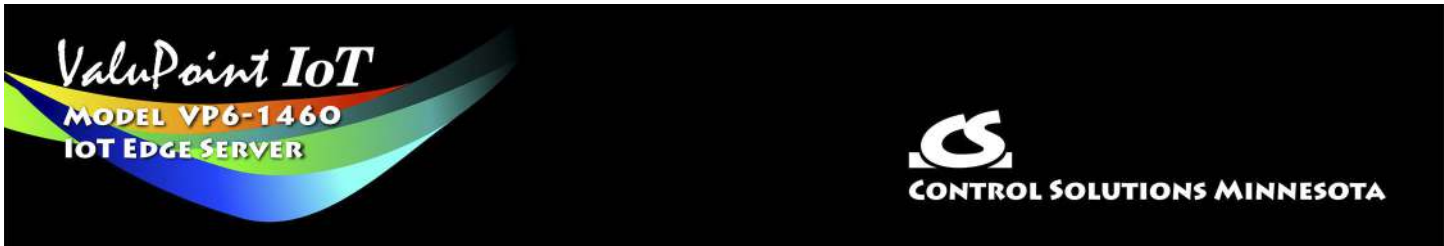
The VP6-1460 also supports interactive dashboards using ThingsBoard. The VP6-1460 includes features specific to ThingsBoard that allow MQTT interaction with graphic widgets on the dashboard. Data published by the VP6-1460 can show up as real-time gauge indications or charts. Input from the dashboard such as knob adjustments or switch changes will be immediately reported to the VP6-1460 and those changes are immediately accessible as Modbus data.

The VP6-1460 is capable of more than just transferring data between local I/O or Modbus devices and the MQTT brokers. It includes Script Basic built in to provide easy-to-use local programming for data analysis and local decision making. This capability is referred to as Edge Computing in IoT terminology.

Convert Proprietary Serial Protocols

The VP6-1460 supports the open source industry standard Mosquitto MQTT broker. The VP6-1460 includes additional features to support Amazon's AWS IoT Core as well as ThingsBoard.

The VP6-1460 allows the serial port to be used for a proprietary serial protocol instead of Modbus RTU. This effectively makes it a proprietary protocol to MQTT converter. When used for interpreting a proprietary protocol, a Script Basic program would be written to send and receive via the serial port as applicable, and interact with the local Modbus registers under user program control.



VP6-1460 Stand-Alone Remote Monitoring

The VP6-1460 includes a secure local email client that will directly email you notifications of alarm events. The event rule template has all of the same power and flexibility as the MQTT publish template. The email message template lets you fully customize the message that is sent. The template includes variables which insert real time data from the VP6-1460 as the email is sent.

The VP6-1460 includes local data logging capability that can be used instead of sending data to the cloud. You select which data points are logged to a local CSV file. This file is then emailed to you periodically. You select logging rate and when files should be sent. You also have the option of logging at a slower rate most of the time, but then log faster when an event of interest is in progress.

| Local Register# | Header Label/Register Name | Include in CSV File |
|-----------------|----------------------------|-------------------------------------|
| 1 | Data Value 1 | <input checked="" type="checkbox"/> |
| 3 | Data Value 2 | <input checked="" type="checkbox"/> |
| 5 | Data Value 3 | <input type="checkbox"/> |
| 7 | | |
| 9 | Timestamp | |
| 11 | 2021-09-21T16:01:41-05:00 | 8052 6913 -1562 5472 |
| 13 | 2021-09-21T16:01:59-05:00 | 7958 6819 -1658 5448 |
| 15 | 2021-09-21T16:02:59-05:00 | 8023 6859 -1641 5538 |
| 17 | 2021-09-21T16:03:59-05:00 | 8119 6952 -1545 5591 |
| 19 | 2021-09-21T16:04:59-05:00 | 8158 7002 -1445 5668 |
| 21 | 2021-09-21T16:05:59-05:00 | 8183 7041 -1418 5669 |
| 23 | 2021-09-21T16:06:59-05:00 | 8196 7125 -1370 5689 |

The VP6-1460 includes a real time scheduler for scheduling daily events or one time events on a given date and time. The scheduler also includes exceptions for holidays.

Associate local register # 1 named `csiSensor1` with this IoT attribute.

Publish: Using QoS Ack not required Ack required Publish as Reported Desired

MQTT Topic: Default Other: `$aws/things/myFirstThing/shadow/update`

Publish if register value is this value: this local register:

Qualified by this hysteresis value: this minimum On Time: this minimum OFF Time:

Publish at least every minutes. Publish no more than every minutes.

Follow above rule only if local register is set to a value of

Publish message on true:

Publish message on false:

Publish as part of dataset number: Include timestamp

Subscribe: To topic index: `$aws/things/myFirstThing/shadow/update`

Apply this default value: after minutes without any update from the cloud.

The MQTT publish and subscribe “rules” are created with an easy to use template. A diagnostic page is also provided where you may view the most recently published data, and publish arbitrary JSON formatted data for testing purposes. The entire configuration is saved in the internal Flash file system in XML format. This file may be exported to replicate additional copies of the configured device, or for backup.

FEATURES

- 12 Analog/universal inputs, software selectable types
 - 0-10VDC, thermistor, discrete, dry contact, pulse
 - 0.1% reference, 12-bit resolution
 - Non-volatile totalizing count inputs (to 2Hz on all channels, to 1kHz on 4 channels)
- 2 Discrete outputs
 - Form A relay
 - 2A @ 120VAC
 - 2A @ 30VDC
- Battery backed real time clock/calendar
- MQTT Client supports AWS IoT Core, Mosquitto MQTT, ThingsBoard
- Simple template based setup of MQTT Publish and Subscribe
- Secure local email client for local alarm notifications
- Local data logging for remote monitoring without any cloud
- Real time event scheduler
- Modbus RTU RS-485 Master or Slave
- Modbus TCP Client and Server
- Modbus TCP over Ethernet 10/100BaseT
- Up to 2000 local registers, up to 100 points mapped to IoT
- 16, 32, 64-bit integer, 32 or 64-bit IEEE 754 floating point, Mod10
- ASCII character string support (UTF-8)
- Supports Modbus “coils”, input registers, holding registers
- Modbus register mapping configured via web interface
- Modbus (master) polling interval configurable per point
- Configure via web pages, HTTP and/or HTTPS
- Flash file system for XML configuration files, SSL certificates
- Online help, Quick Help section at bottom of every web page
- Password protection for web log-on and ftp
- Field upgradeable firmware upload via ftp
- DHCP or static IP address, IPv4 and IPv6 support
- Isolated RS-485 port, Modbus RTU at 1200 to 115200 baud
- Powered by 18-30VDC or 24VAC 50/60 Hz Class 2, 0.3A max.
- DIN rail mounting, 100mm H x 70mm W x 60mm D
- Pluggable screw terminal block for power & RTU network
- Operating temperature -40°C to +80°C; Humidity 5% to 90%
- FCC Class A, CE Mark
- Listed to UL 916 and (Canadian) C22.2 No. 205-M1983

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