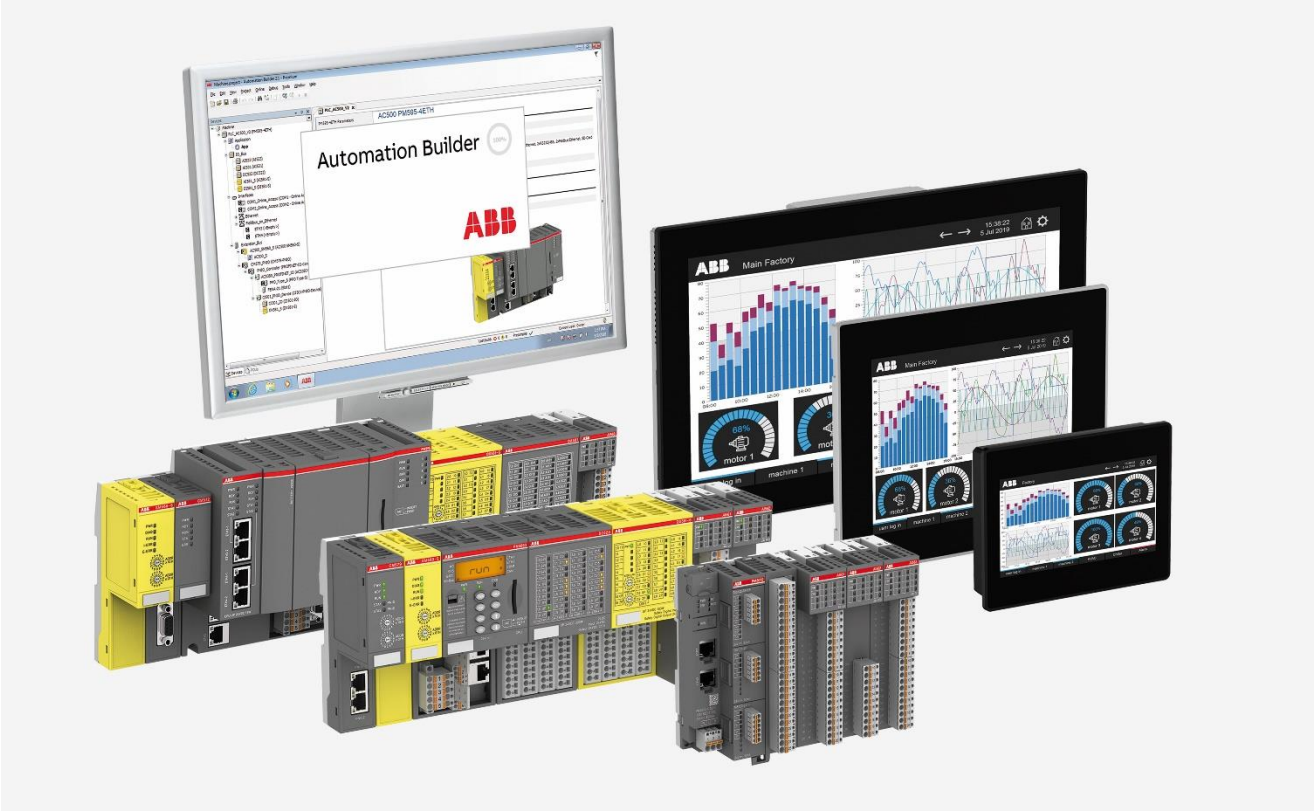
APPLICATION EXAMPLE

CP600 MQTT

FIRST STEPS AND CONFIGURATION



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2 Introduction

2.1 Scope of the document

This application example describes the possibility to connect with an CP600 HMI to a MQTT broker.

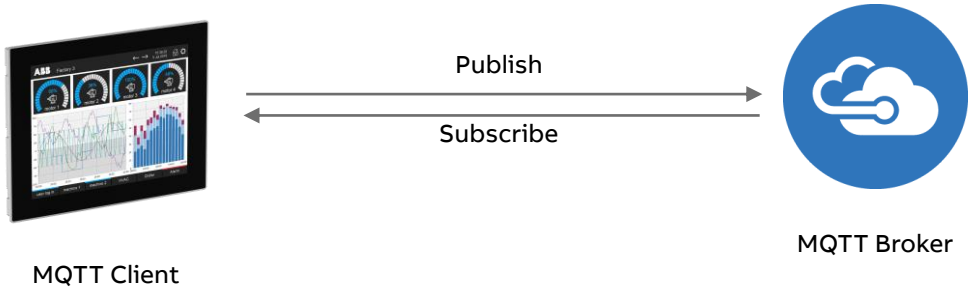
2.2 Compatibility

The application example explained in this document has been used with the below engineering system versions. They should also work with other versions, nevertheless some small adaptations may be necessary, for future versions.

- CP600
- Panel Builder V4.5.0 or newer

	Note: MQTT is supported only in Linux HMIs, not WinCE HMIs. MQTT is supported with Panel Builder V4.0.1 and above
	Note: The MQTT status and further debugging possibilities are only available with Panel Builder V4.5.0 and above.

2.3 Overview



3 Broker configuration

Mosquitto

A detailed description how to set up a Mosquitto broker can be found in the application example linked below.

AC 500 MQTT with Mosquitto

MS Azure

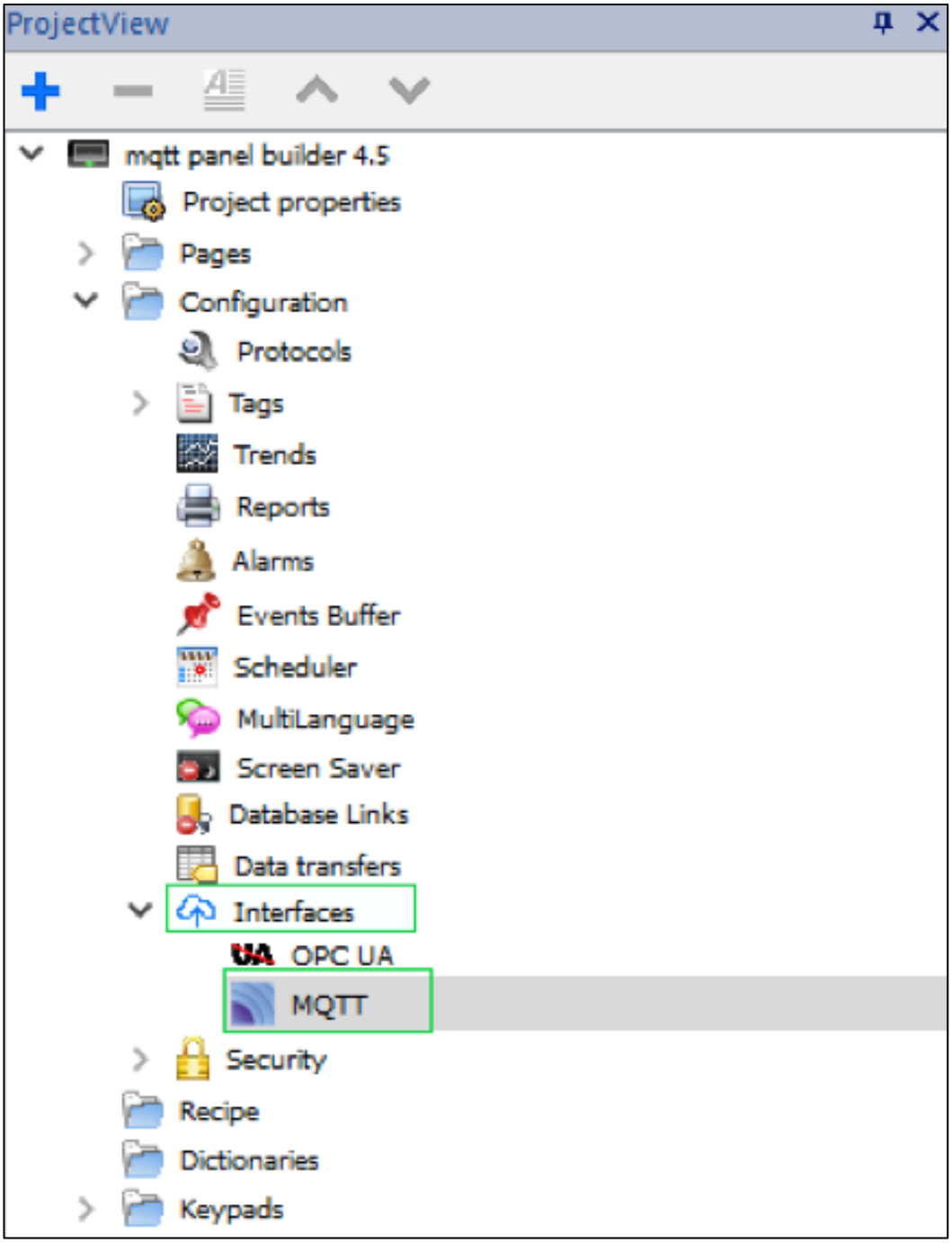
A detailed description how to set up a MS Azure broker can be found in the application example linked below.

AC500 MQTT & MS AZURE

4 Panel Builder MQTT Interface configuration

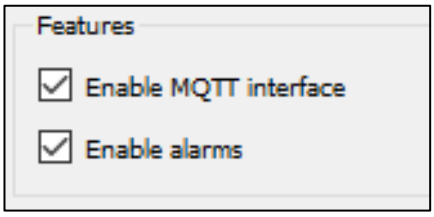
Open the MQTT interface in the “ProjectView” by clicking > Configuration > Interfaces > MQTT.

The interface will open with default settings.



4.1 Features

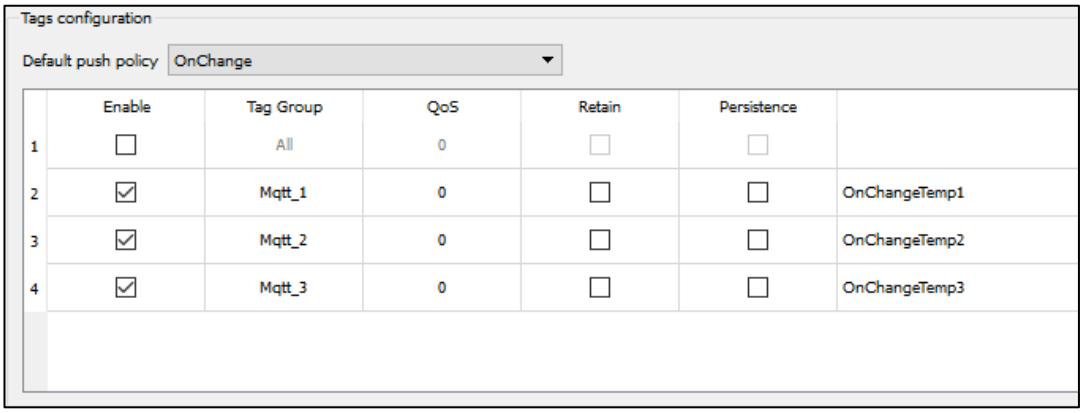
The following picture shows the “Features” inside the MQTT interface in Panel Builder.



- Enable the checkbox “Enable MQTT interface” to use the MQTT interface.
- Enable the checkbox “Enable alarms” if alarms should be sent to the MQTT Broker.

4.2 Tags configuration

The following picture shows the “Tags configuration”. The area “Tags configuration” allows the user to manage which tag groups should be published.



- Default push policy: Publishing of tags is possible either on change or on specified time interval.
- Select either all Tag Groups or required Tag Groups which shall be published.

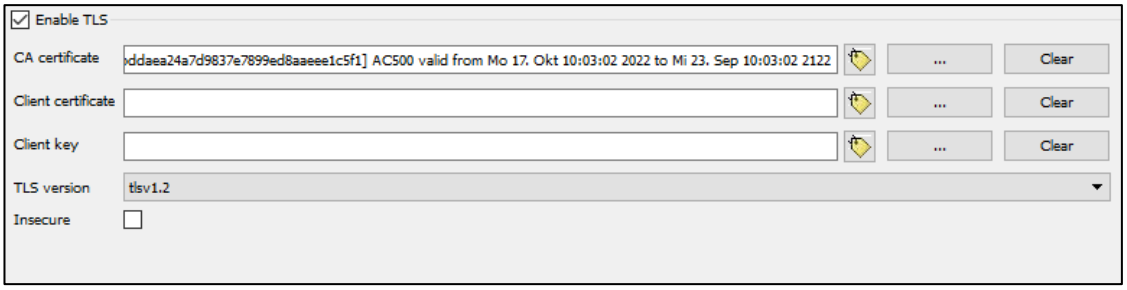
4.3 Broker settings

The following picture shows the “Broker settings”. In this area the communication settings for the required broker must be set, that the panel will be able to connect to the broker.

- Broker: Select required broker. Some communication settings for common brokers are predefined.
- Broker address: Enter the corresponding broker address and port number. Also, host-names like: *broker-IoTHub.azure-devices.net* are supported.
- Client ID: Enter desired name as Client ID.
- Username and Password is needed for Authentication, if Broker requires it.

4.4 TLS settings

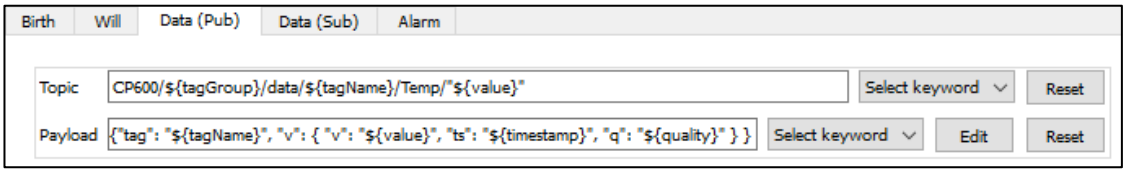
The following picture shows the “TLS settings” which enable the user to manage the encrypted communication.



- Enable the checkbox “Enable TLS” if encrypted communication is required.
- CA certificate: Enter CA certificate to certify communication.
- Client certificate and key: is needed for Authentication, if Broker requires it.
- Client certificate: Enter public certificate of the HMI Device. Must be signed from any CA.
- Client key: Enter private key associated with the client certificate.

4.5 Message settings

The following picture shows the “message settings”.



- Topic: Enter the required topic levels, where the message shall be published to.
- Payload: Change the payload format for each topic if required. The payload defines the structure of the associated value for each topic.
- Placeholders: Definitions can be used as placeholders.
- Birth: This topic is published only one time when the HMI device starts.
- Will: This topic is published when device starts but stored and kept hidden by the MQTT Broker. This Topic will be published by the MQTT Broker if it detects that the client has disconnected ungracefully.
- Data (Pub): This topic is used to publish the tags' values following the transmission policies associated with tag groups.
- Data (Sub): This topic is used to subscribe to tags. The payload is the template used to recognize the values of the received tags.
- Alarm: This topic is used to publish alarms.

	Note: Predefined placeholders can be found in the dropdown box “Select Keyword”.

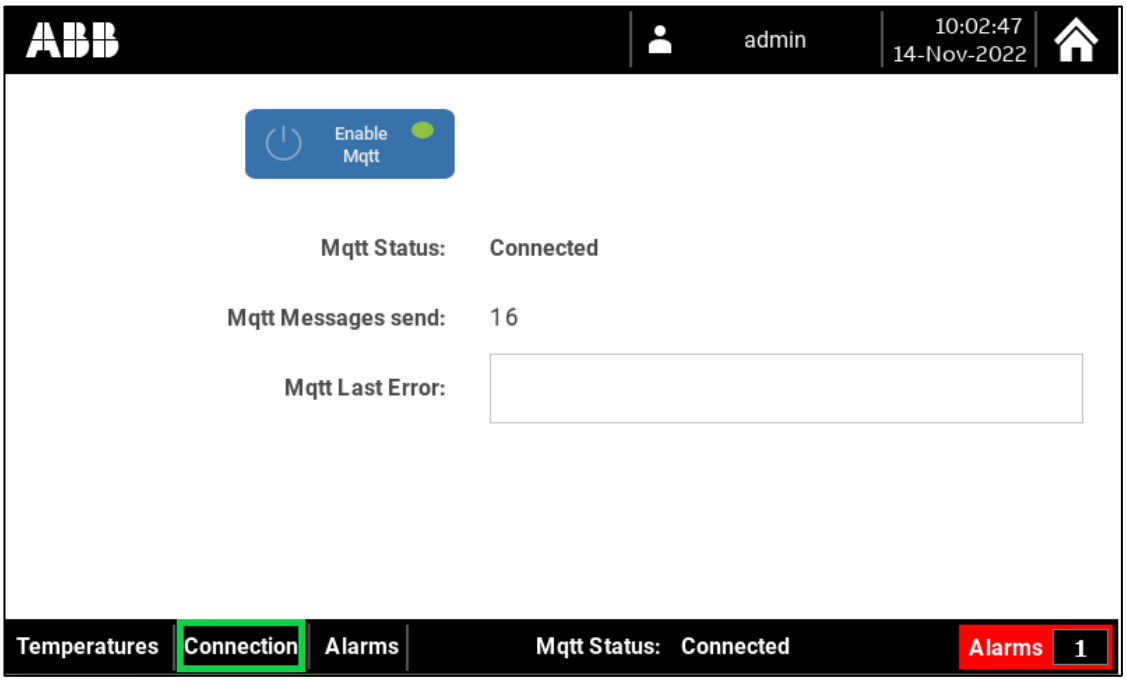
	Note: In this example the value is not only included inside the payload but also inside the Topic, this is used to see the changed values directly from the topic without the need to read the payload. In a regular application the topic will not contain the value itself.

5 CP600 MQTT project

- On the page “Temperatures” you can change the Temperature values. The MQTT interface will publish the values, if enabled.
- On the page “Connection” you can find the connection information.
- On the page “Alarms” you can find the active alarm table.

5.1 Connection

Navigate to “Connection”:

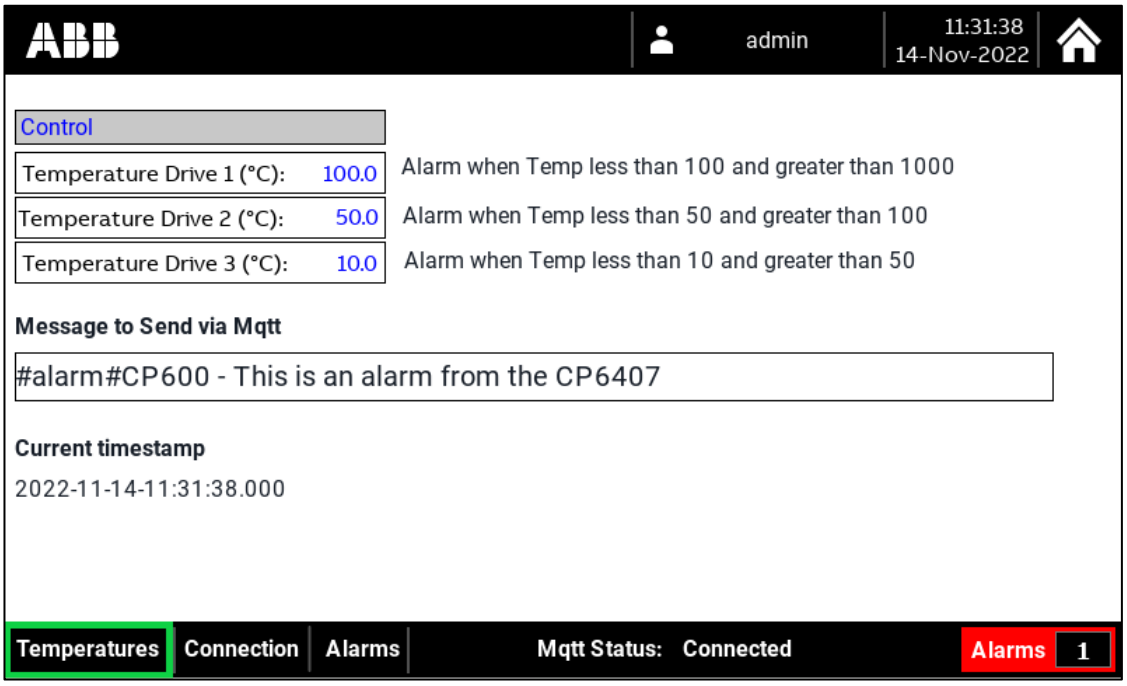


- Click the button “Enable MQTT” to enable the MQTT interface.
- “MQTT Status” shows the status of the MQTT connection: Connected, Disconnected, Connecting or Disconnecting.
- “MQTT Messages send” shows the number of messages that were sent.
- “MQTT Last Error” shows the way the connection got cut, or the reason why the connection cannot be established.

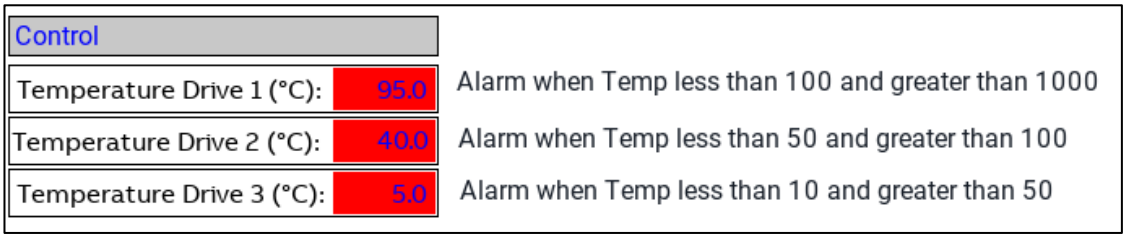
5.2 Data Publishing

Navigate to “Temperatures”:

Data will be published when values are changed.



Edit values as desired.



Data is published and received by the broker.

```
Received PUBLISH from CP600 (d0, q0, r0, m0, 'CP600/All/data/Temp_Drive_1/Temp/95',
Received PUBLISH from CP600 (d0, q0, r0, m0, 'CP600/All/data/Temp_Drive_2/Temp/40',
Received PUBLISH from CP600 (d0, q0, r0, m0, 'CP600/All/data/Temp_Drive_3/Temp/5',
```

5.3 Data Subscribing

If data shall be received by the panel from the broker, the data needs to be published according to the Topic and Payload syntax which is chosen in the MQTT interface of the panel.

Topic and Payload from “Data (Sub)” of the panel:

Topic: CP600/${tagGroup}/data/${tagName}

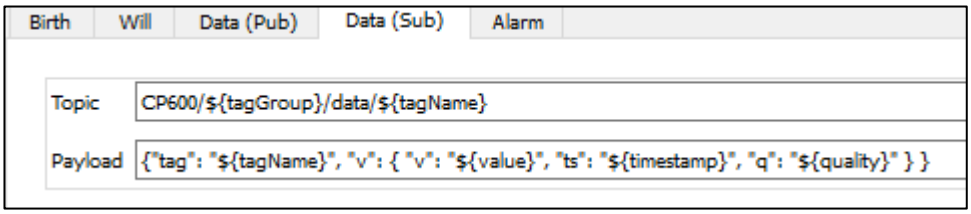
Payload: {"tag": "${tagName}", "v": { "v": "${value}", "ts": "${timestamp}", "q": "${quality}" } }

Topic and Payload published by the broker:

Topic: CP600/All/data/Tag1

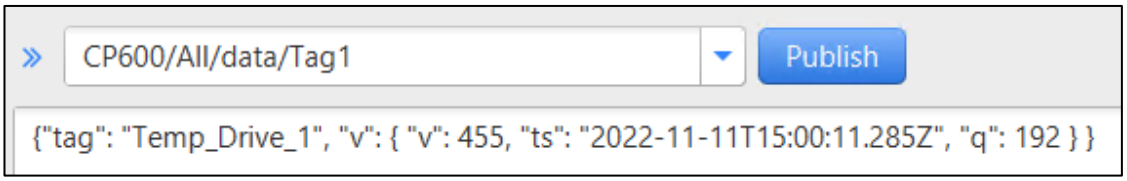
Payload: {“tag”: “Temp_Drive_1”, “v”: {“v”: 455, “ts”: “2022-11-11T15:00:11.285Z”, “q”:192} }

The following picture shows Topic and Payload from Data (Sub) of the panel.

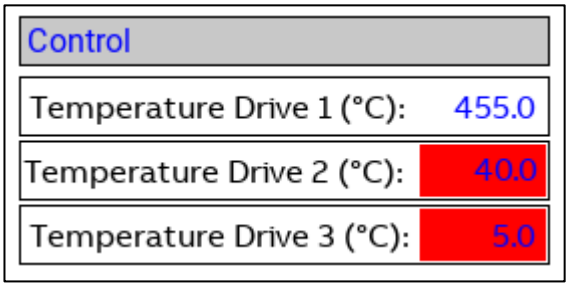


The following picture shows Topic and Payload published by the broker.

The value **455.0 °C** is the new value for the tag “Temp_Drive_1”.



The following picture shows the overwritten value on the panel on page “Temperatures”.



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