

3.3.16 IIoT

Use the IIoT (MQTT) Publish to send data to an IIoT (MQTT) Broker. The IIoT (MQTT) Publish allows you to publish data for the Industrial Internet of Things (IIoT). For more information about IIoT and how it works please see *Chapter 8*.

Adding the Log IIoT (MQTT) Publish Instruction:

To configure the IIoT (MQTT) Publish instruction, perform the following steps:

1. Click on the IIoT (MQTT) Publish icon on the right side of the screen.
2. Position the mouse over the Ladder Tags diagram and click the mouse to place the instruction.

The screenshot shows the 'IIoT (MQTT) Publish Instruction' dialog box. It is divided into several sections:

- Instruction Details:** Includes 'Broker and Topic' with a text field for 'Publish to Broker: 192.168.0.1:1883' and an 'MQTT Setup' button. Below is a 'Topic' dropdown menu and a 'Retain Message: No, QoS: At Most Once' option.
- Publish:** Contains a 'Publish Type' dropdown set to 'At Regular Time Intervals (When Enable Tag is High)'. Below it are 'Event/Enable Tag' (ENABLE), 'Publish Time Interval' (1 Minute), and 'Publish Status Tag' (STATUS). A 'Status value definitions:' section lists: 00: Normal operation (No Errors), 02: Connect failure, 04: Publish failure, 64: Done.
- Select Tags:** Features a 'Decimal Places for Floating Point Tags' field set to 5. Below are two tables: 'Available Tags' and 'Selected Tags: (2/10)'. The 'Selected Tags' table contains:

Name	Address	Type
MOTOR SPEED	R1	UNSIGNED_INT_16
MOTOR	S1	DISCRETE

3. Double click the instruction to open its dialog box.

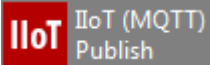
4. Select a topic from the dropdown. If you would like to create a topic use the MQTT Setup to create topics and configure your MQTT Broker. Please see *Section 2.5.8* and *Chapter 8* for more information.

5. Select of Add a tag for Event/Enable and Status.

6. Select the Publish Type from the drop down. Descriptions are on next page.
7. Enter Publish Time Interval for time Tags based data publishing and select time base using the drop down options.
8. Finally select up to 10 tags to publish. Each tag will be published as its own separate topic with the previously selected topic put in front (example from above Topic/Motor).

Adding tags:

- a. If need be you can add a new tag by entering a new Tag Name.
- b. Now either press enter or right click on the Tag Name and the Add New Tag Details dialogue will appear.
- c. Enter the Tag Address in this screen.



IIoT (MQTT) Publish

When power flows through this instruction, the IIoT (MQTT) Publish instruction will send the current value of up to 10 tags to an MQTT Broker. For more information on how IIoT works and how to setup your broker please see *Chapter 8*. You can use up to a maximum of 8 of these instructions.



IIoT (MQTT) Publish Instruction

Instruction Details

Broker and Topic

Publish to Broker: 192.168.0.1:1883 MQTT Setup

Topic

Retain Message: No, QoS: At Most Once

Publish

Publish Type: At Regular Time Intervals (When Enable Tag is High)

Event/Enable Tag: Event/Enable Tag (Aaaaa)

Publish Time-interval: 1 Minute

Publish Status Tag: Data Log Status (Bbbbb)

Status value definitions:
 00: Normal operation (No Errors)
 02: Connect failure
 04: Publish failure
 64: Done

Select Tags

Tag Names are used as column headers.

Available Tags:

Name	Address	Type
Value 2	Ddddd	DISCRETE
Value 3	Eeeee	UNSIGNED_INT_16

Decimal Places for Floating Point Tags: 5

Selected Tags: (1/10)

Name	Address	Type
Value	Ccccc	UNSIGNED_INT_16

Buttons: >>, <<, Delete Tag(s), Move Tag Up, Move Tag Down

Buttons: OK, Cancel, Help

Topic (MQTT Setup)

Please use the MQTT Setup to configure your broker and add topics. For more information on how to do this please see *Section 2.5.8* and *Chapter 8*. Use the dropdown to select any configured topic here in the Publish Instruction.

Publish Type:

There are four types of selectable options for data type:

- **On Rising Edge of Event Tag**
This options allows for **Event Based** only publishing. This options looks at the discrete Event/Enable tag stored at memory location Ddddd and only publishes if this tag goes from OFF (0) to ON (1).
- **On Falling Edge of Event Tag**
This options allows for **Event Based** only publishing. This options looks at the discrete Event/Enable tag stored at memory location Ddddd and only publishes if this tag goes from ON (1) to OFF (0).
- **On Both Edges of Event Tag**
This options allows for **Event Based** only publishing. This options looks at the discrete Event/Enable tag stored at memory location Ddddd and only publishes if this tag goes from ON (1) to OFF (0) or if it goes OFF (1) to ON (1). Combined other two options.
- **At Regular Time Intervals (When Enable Tag is High)**
This options allows for **Time Based** only publishing and **Event/Time Based** combined publishing. This options looks at the discrete Event/Enable tag stored at memory location Ddddd and publishes at the specified Log Time-interval if this tag is ON.
 - **Time Based:** To do Time Based only publishing just either turn ON (1) the Event/Enable tag or set the Event/Enable tag to have an initial value of 1 (ON).
 - **Event/Time Based:** To do Event/Time Based only publishing just use the Event/Enable tag as the event control. As soon as the Event/Enable tag is ON (1) the instruction will publish at specified Log Time-interval until this tag is turned OFF (0).

Publish Time-interval

The IIoT (MQTT) Publish instruction will publish based on the Log Time-interval if the Publish Type is **Time Based** or **Event/Time Based**. Use the time base dropdown to set the units and enter the amount of time between each publish.

Time Base:

The Time Base is user selectable and allows one of the following time bases:

- Minute
- Hour

e.g. If Publish Time Interval = 15 and Time Base = Minute, then the instruction will publish every 15 Minutes. Similarly, if Publish Time Interval =11 and Time Base = Hour, then the instruction will publish every 11 hours.

Publish Status:

The publish instruction will display current status of the instruction in this tag stored at memory location Bbbbb. More than 1 status can be true at a time so if status is 66 then it is status 2 and 64. Please see below for the available statuses:

Status Value	Description	Explanation
00	Currently Data Logging (Normal Operation)	This means the data log instruction is currently writing to the .csv file.
02	File Open Error	Cannot open .csv file. USB drive may not be plugged in.
04	File Write Error	Cannot write to .csv file. USB driver might be full. Or the .csv file may be read only.
64	Done Data Logging	Have finished writing to the .csv file. Happens if the instruction no longer has power or when it is data logging only at set time intervals.

Selected Tags for Publishing:

The available tags field will have all the currently created discretives and registers for the project. To add a tag to be data, just select the tag and press the >> button to move it over to the selected tags. Tag from any location can be published. If publishing floating point tags the Decimal Places for Floating Point field will give how many decimals are logged (if 5 selected then number will be #.#####).

Note: All tags will be published in the format timestamp, value. Therefore if not using EZAutomation's EZ-IIoT Subscriber Utility then will see values like "1499424774,3218" where 3218 is the value of the tag and 1499424774 is the timestamp in seconds.

Memory Type	Syntax (A)	Range (aaaa)
Discrete		
Discrete Outputs	O	1-128
Discrete Internals	S	1-1024
System Discretives	SD	1-16
Register Discretives		
Bit Access Registers*	R	1-16384 / 0-15
<small>*Bit level access to registers is possible. You will be accessing bits of certain register (only 16 bit registers are allowed) for example for R1 you can access bit 1 using R1/0. See section 3.3.1 for more information.</small>		

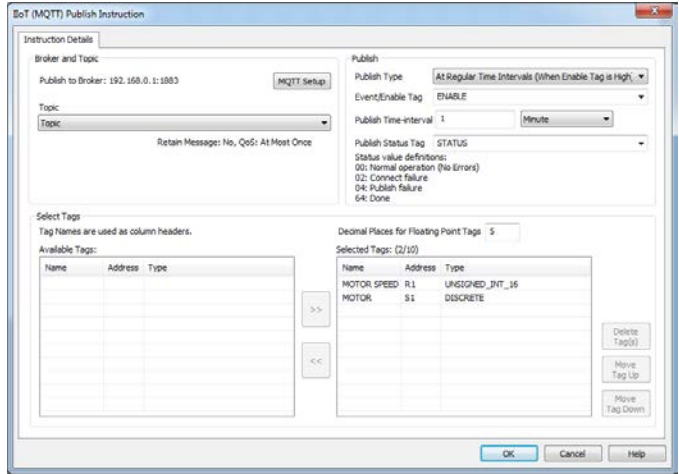
Memory Type	Syntax (B)	Range (bbbb)
Registers		
Output Registers	OR	1-64
Registers Internals	R	1-16384
System Registers	SR	1-20

Note: Memory table for C, D and E pertains to all 10 tags that can be added to Publish Instruction.

Memory Type	Syntax (C, D, E)	Range (cccc)	Range (dddd)	Range (eeee)
Discrete				
Discrete Inputs	I	1-128	1-128	1-128
Discrete Outputs	O	1-128	1-128	1-128
Discrete Internals	S	1-1024	1-1024	1-1024
System Discretes	SD	1-16	1-16	1-16
Bit Access Registers*	R	1-16384 / 0-15	1-16384 / 0-15	1-16384 / 0-15
Registers				
Input Registers	IR	1-64	1-64	1-64
Output Registers	OR	1-64	1-64	1-64
Registers Internals	R	1-16384	1-16384	1-16384
System Registers	SR	1-20	1-20	1-20

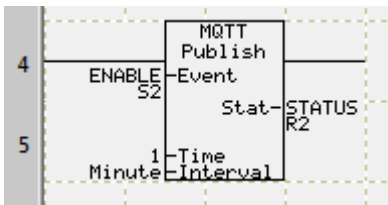
*Bit level access to registers is possible. You will be accessing bits of certain register (only 16 bit registers are allowed) for example for R1 you can access bit 1 using R1/0. See section 3.3.1 for more information.

Allowed Data Formats: Discrete and all Register data types except BCD.



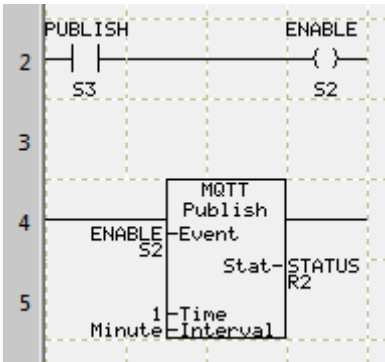
All examples use the above settings except the Publish Type is changed.

Example Time Based:



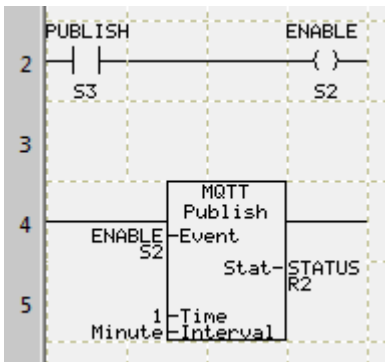
In this example, Publish Type is **At Regular Time Intervals (When Enable Tag is High)**. The instruction will publish at 1 minute intervals if the Enable tag (S2) is ON (1).

Example Event Based:



In this example, Publish Type is **On Both Edges of Event Tag**. The instruction will publish when the state of the Enable tag (S2) is changed (from ON to OFF or OFF to ON).

Example Both Event and Time Based:



In this example, Publish Type is **At Regular Time Intervals (When Enable Tag is High)**. The instruction will publish at 1 minute intervals if the Enable tag (S2) is ON (1). The S3 bit will therefore control the data log instructions.