User's Guide

ACI400

IIoT Edge Device

METTLER TOLEDO

ACI400 IIoT Edge Device

METTLER TOLEDO Service

Essential Services for Dependable Performance of Your ACI400 IIoT Edge Device

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use of your new equipment according to this Manual and regular calibration and maintenance by our factory-trained service team ensures dependable and accurate operation, protecting your investment. Contact us about a service agreement tailored to your needs and budget. Further information is available at www.mt.com/service.

There are several important ways to ensure you maximize the performance of your investment:

1. **Register your product**: We invite you to register your product at www.mt.com/productregistration so we can contact you about enhancements, updates and important notifications concerning your product.
2. **Contact METTLER TOLEDO for service**: The value of a measurement is proportional to its accuracy – an out of specification scale can diminish quality, reduce profits and increase liability. Timely service from METTLER TOLEDO will ensure accuracy and optimize uptime and equipment life.
    a. **Installation, Configuration, Integration and Training**: Our service representatives are factory-trained, weighing equipment experts. We make certain that your weighing equipment is ready for production in a cost effective and timely fashion and that personnel are trained for success.
    b. **Initial Calibration Documentation**: The installation environment and application requirements are unique for every industrial scale so performance must be tested and certified. Our calibration services and certificates document accuracy to ensure production quality and provide a quality system record of performance.
    c. **Periodic Calibration Maintenance**: A Calibration Service Agreement provides on-going confidence in your weighing process and documentation of compliance with requirements. We offer a variety of service plans that are scheduled to meet your needs and designed to fit your budget.
    d. **GWP® Verification**: A risk-based approach for managing weighing equipment allows for control and improvement of the entire measuring process, which ensures reproducible product quality and minimizes process costs. GWP (Good Weighing Practice), the science-based standard for efficient life-cycle management of weighing equipment, gives clear answers about how to specify, calibrate and ensure accuracy of weighing equipment, independent of make or brand.
    e. **InTouch℠ Remote Services**: Confidently and securely improve the performance and uptime of your weighing systems, with InTouch Remote Service, only available from METTLER TOLEDO. Working within your existing IT security policies, IND570 with embedded InTouch connectivity actively monitors system performance. Proactive alerts to remote service technicians allow a real-time response to performance issues, increasing uptime, overall asset utilization and reduction of unforeseen expenses.

FCC Notice

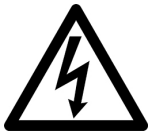
This device complies with Part 15 of the FCC Rules and the Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her expense.

- Declaration of Conformity is available at http://glo.mt.com/global/en/home/search/compliance.html/compliance/.

Warnings and Cautions

- READ this manual BEFORE operating or servicing this equipment and FOLLOW these instructions carefully.
- SAVE this manual for future reference.

<table>
<tr><td rowspan="2">  </td><td>⚠ WARNING</td></tr>
<tr><td>PERMIT ONLY QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS, AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.</td></tr>
<tr><td colspan="2">NOTICE</td></tr>
<tr><td colspan="2">DO NOT OPEN OR MODIFY THE DEVICE. THE DEVICE USES COMPONENTS THAT COMPLY WITH FCC AND CE REGULATIONS. MODIFICATION OF THE DEVICE WILL VOID THESE CERTIFICATIONS.</td></tr>
<tr><td colspan="2">NOTICE</td></tr>
<tr><td colspan="2">DO NOT CLEAN THE DEVICE WITH LIQUIDS.</td></tr>
<tr><td rowspan="2">  </td><td>NOTICE</td></tr>
<tr><td>OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.</td></tr>
</table>

Disposal of Electrical and Electronic Equipment

In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

Contents

1 Introduction

1.1. Overview

Figure 1-1: ACI400 IIoT Edge

The METTLER TOLEDO ACI400 IIoT Edge device functions as a secure gateway that allows a user to connect an array of METTLER TOLEDO weighing devices to ERP/MES systems and Cloud services. The ACI400 has an OPC UA server and MQTT Clients for connection to Azure and AWS (Amazon Web Services). A generic MQTT broker is also available.

1.2. Getting Started

The ACI400 hardware connection layout is shown in Figure 1-2, Figure 1-3 and Figure 1-4.

The D/C input is for connecting included power supply to the ACI400. The ACI400 is designed to start automatically when power is connected. The power button can be used to turn the device OFF and ON manually, however, this is not recommended.

Other connections include:

- Three USB ports which can be used with serial converters for serial devices or other USB hardware (keyboard, mouse) when configuring or updating the ACI400
- One dedicated serial (COM) port for a serial device
- Two LAN connections, 1 intended for the Ethernet device network and 1 intended for an external Cloud network
- The audio connection, MicroSD card slot and mini-Display ports are not used

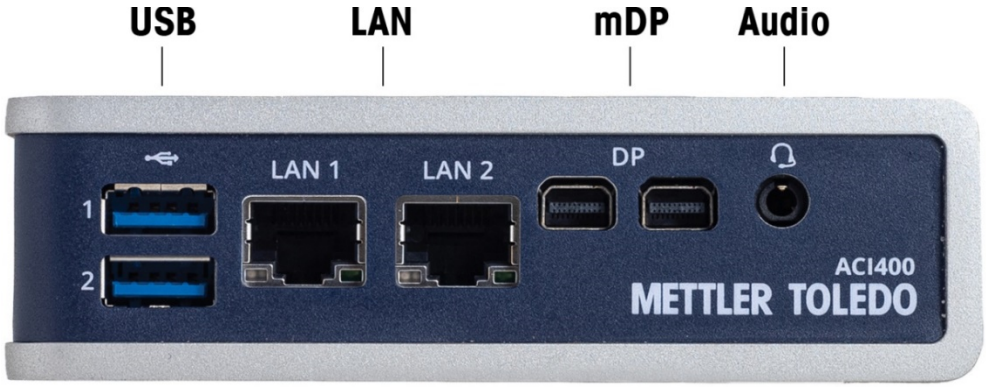


Figure 1-2: ACI400 Fascia, Front

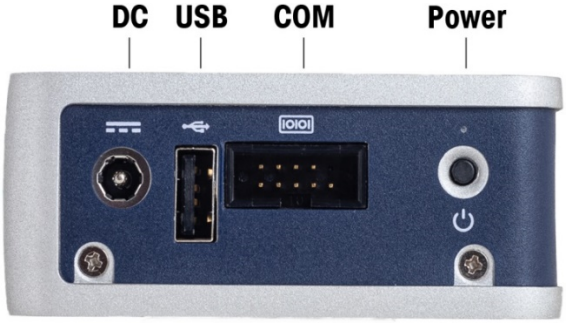


Figure 1-3: ACI400 Fascia, Side

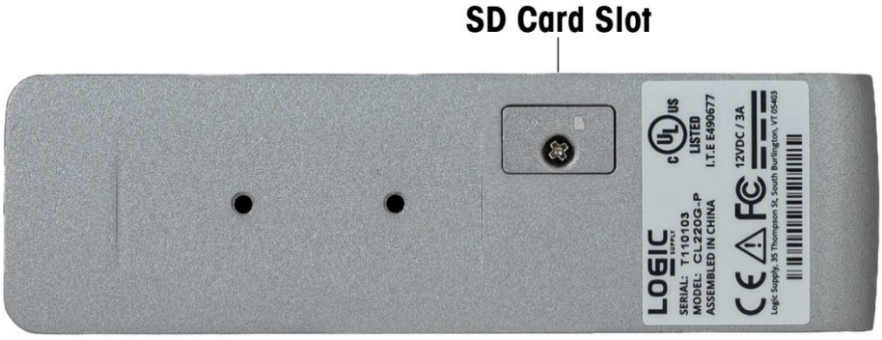


Figure 1-4: ACI400, Back

1.3. Device Connections

The ACI400 uses serial/USB and Ethernet connections to communicate with load cells, scales, and weighing terminals. Each ACI400 IIoT Edge can connect up to four unique weighing channels in any combination of Ethernet or serial connections. This can mean four scale channels from a single terminal, four single-scale terminals, four intelligent weigh modules, or any combination of such devices.

1.3.1. System Layout Examples

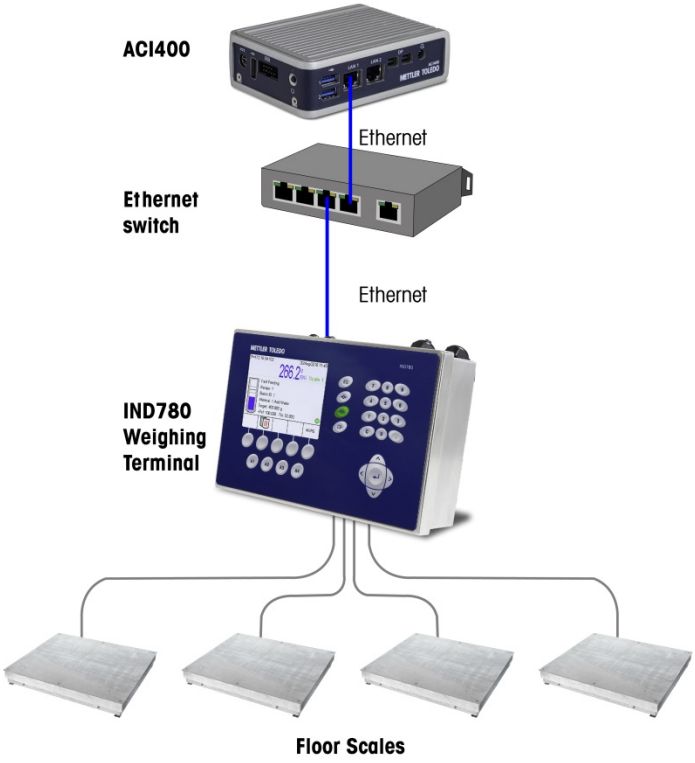


Figure 1-5: ACI400 with Ethernet Switch, IND780, and Floor Scales

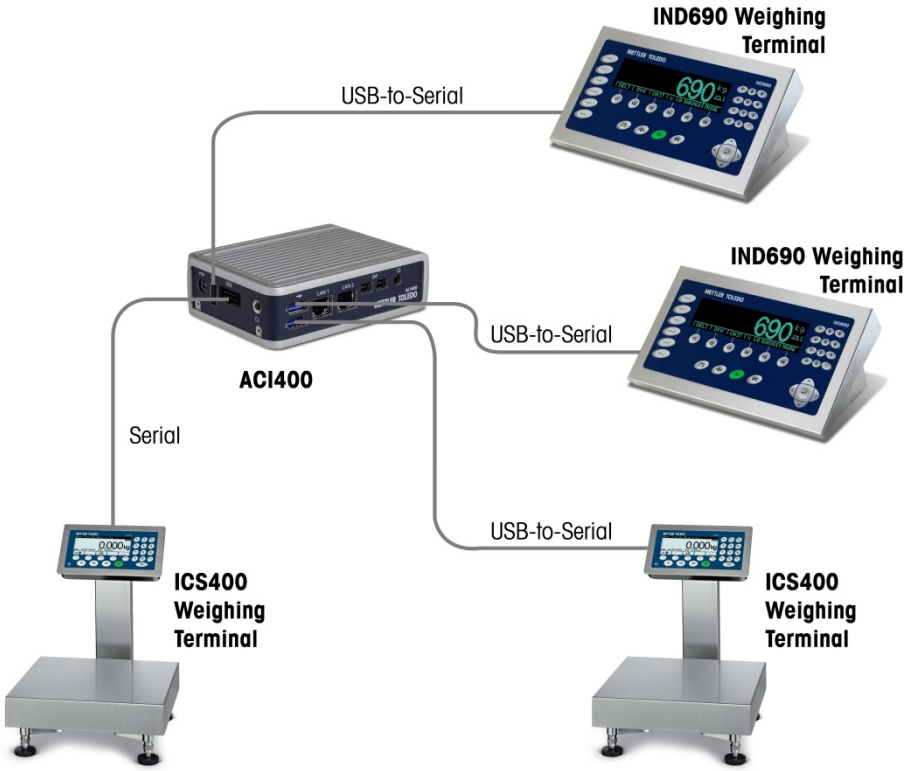


Figure 1-6: ACI400 with IND590s and ICS400s

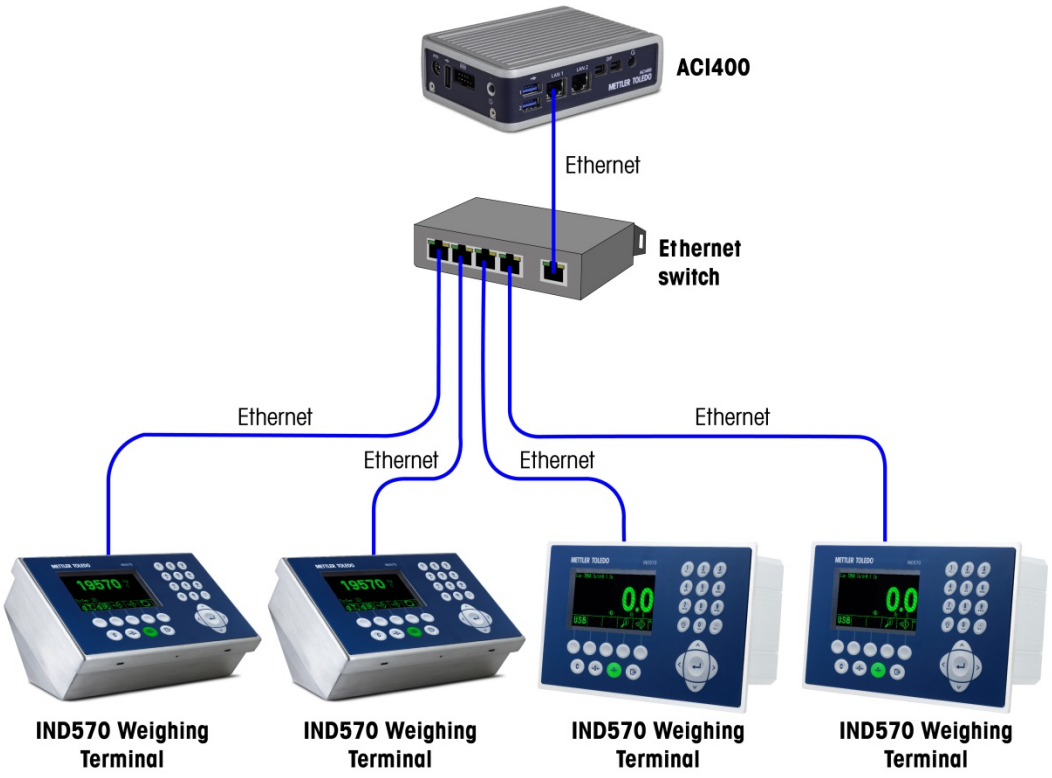


Figure 1-7: ACI400 with Ethernet Switch and IND570s

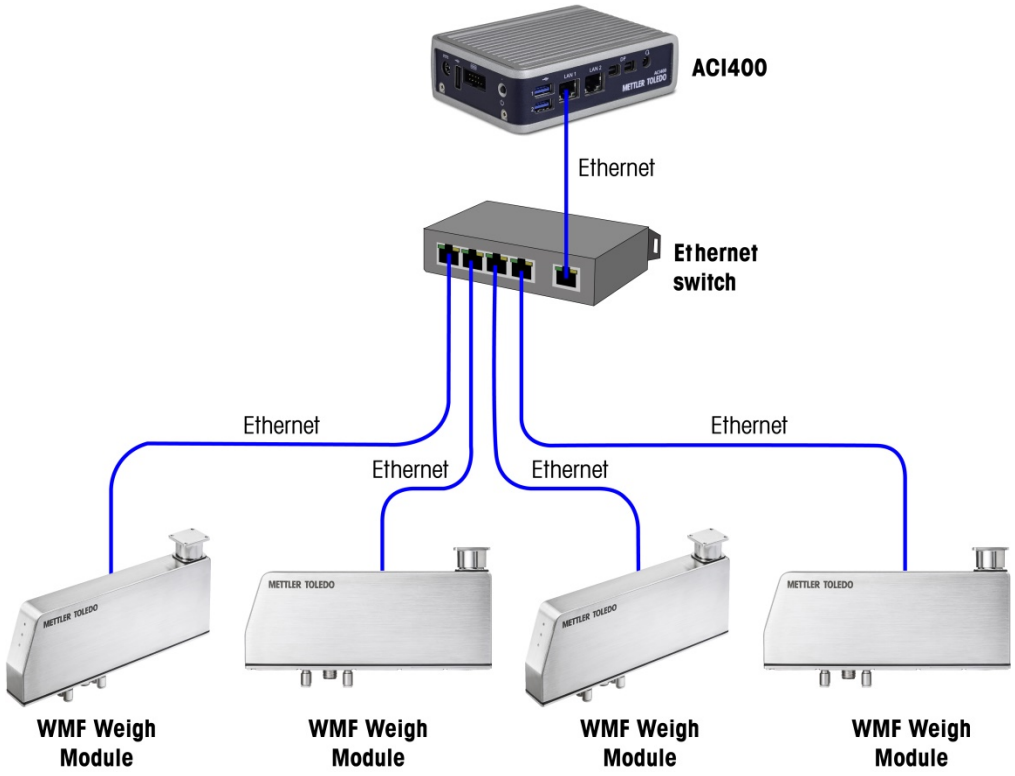


Figure 1-8: ACI400 with Ethernet Switch and WMF Weigh Modules

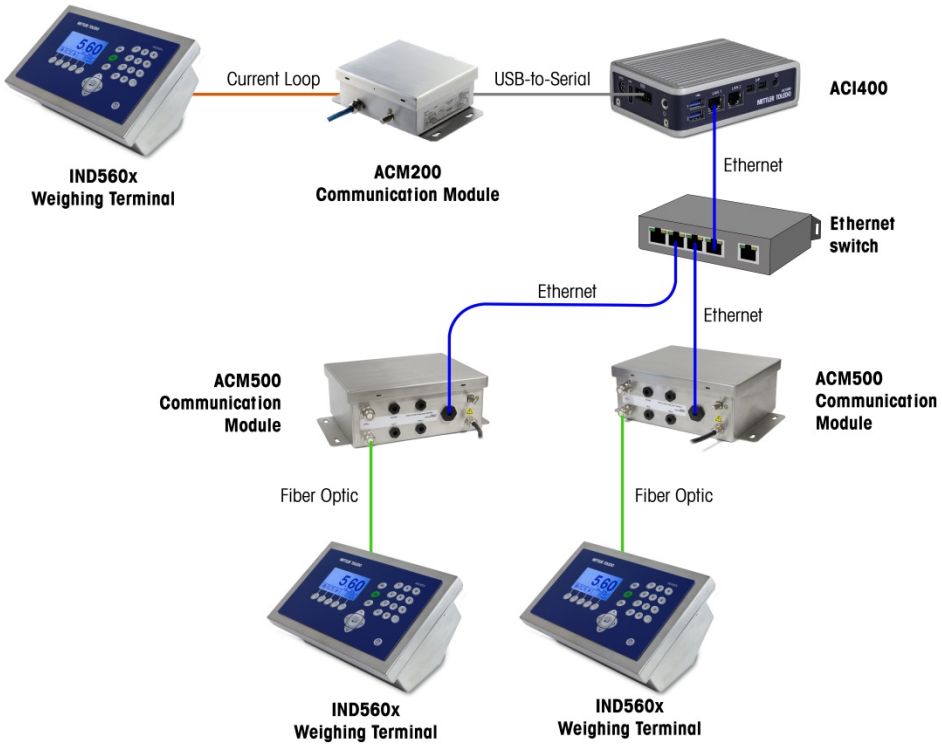


Figure 1-9: ACI400 with Communication Modules and IND560x Hazardous Area Terminal

USB to Serial Converter Cable

The recommended USB to Serial converter cable, part number 64088427, has been tested with the ACI400.

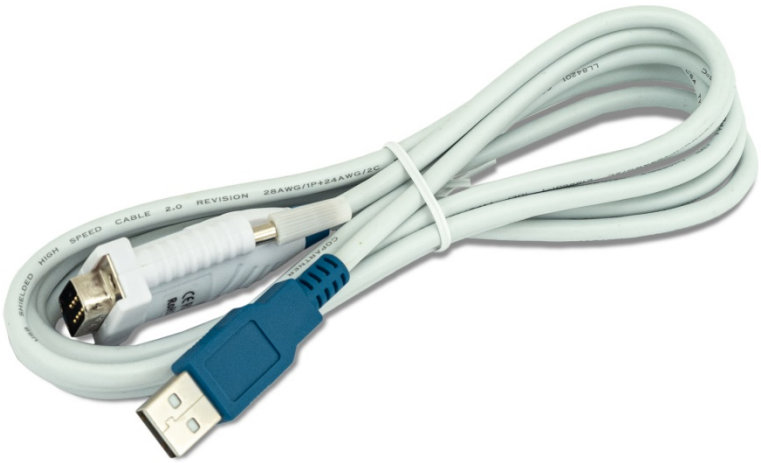


Figure 1-10: USB to Serial Converter Cable

2 Connecting for Configuration

2.1. ACI400 Configuration Interface

The ACI400 runs the Windows 10 IoT Enterprise LTSC operating system, which supplies an internal web service used for configuring the device. When accessing the configuration web service, a user will always be directed to the Home page.

2.2. Accessing the ACI400 Web Service

The ACI400 configuration web service is accessed through an Ethernet connection between the ACI400 and a user PC on the same network.

The ACI400 has two physical LAN connections that correspond to two internal Ethernet ports. LAN1 is pre-configured with a static IP address to simplify initial access for configuration. The settings of both Ethernet ports are fully configurable once in the configuration web service. Table 2-1 lists the initial characteristics of each network port.

Physical Connection	Internal Ethernet Port	Default IP Address
LAN 1	Ethernet 2	192.168.0.100
LAN 2	Ethernet 1	DHCP

Table 2-1: ACI400 Network Ports

To access the ACI400 web service, the internal network interface of the accessing PC must be configured to match that of the ACI400 LAN1 (Ethernet 2) settings:

1. Set the IP Address of the PC network interface to match the ACI400 network settings; for example – IP: 192.168.0.10, subnet: 255.255.255.0.

2. Physically connect the accessing PC to the ACI400 using the LAN1 port on the ACI400. This connection can be made through a network or through a switch. It does not have to be a direct connection between PC and ACI400.

3. The ACI400 configuration web service is found at default IP address, **https://192.168.0.100**, **port 23491**. Use a Chrome or Microsoft Edge browser on the accessing PC to navigate to https://192.168.0.100:23491.

4. Because the ACI400 uses a self-signed certificate, a warning screen will appear. Accept the warning. Click **Advanced** (Chrome) or **Details** (Edge), and proceed to IP address 192.168.0.100.

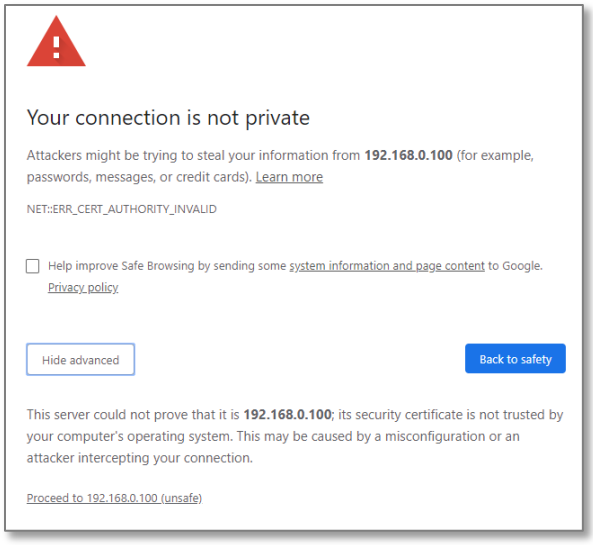


Figure 2-1: Certificate Warning Screen (Google Chrome)

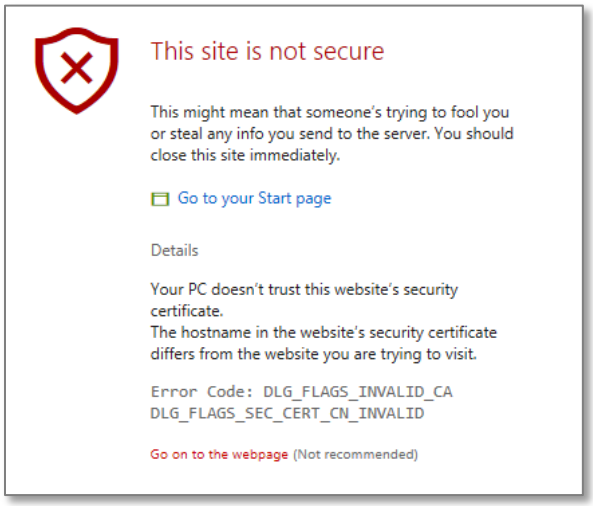


Figure 2-2: Certificate Warning Screen (Microsoft Edge)

2.3. ACI400 IIoT Edge Home Page

Once the user has clicked through the security warnings, the ACI400 IIoT Edge home screen will appear. The configuration web pages consist of tabs, each of which displays configurable parameters and default settings for the ACI400.

When the ACI400 configuration web pages are accessed, the Home page appears first. There, a configuration quick guide lists the minimum areas of configuration the user must program to set up the ACI400 for successful OPC UA or MQTT communication.

Figure 2-3: ACI400 Home Page with Communication Status Display (Upper Right)

- **ATTENTION!** When a user accesses certain tabs of the configuration web pages, the ACI400 IIoT Edge device will stop all communication functions. Current communication status of the ACI400 is always displayed in the upper right corner of each web page (Figure 2-4:) – either **Running** or **Stopped**.

Device connections, MQTT Clients, Publishers, OPC UA Server, Admin and Communication functions will all restart automatically once the user returns to the Home page.

- **CRITICAL! Always close the ACI400 web browser from the Home page.**

If the ACI400 configuration web browser closes from any other page other than the Home page, all communication functions will remain stopped. All ACI400 communication functions will automatically restart when the web browser is accessed again, and the user is directed to the Home page by default.

2.4. Login

When faced with a login challenge, the following default login information provides access to the web pages:

- LOGIN: **mettler**
- PASSWORD: **mettlertoledo**

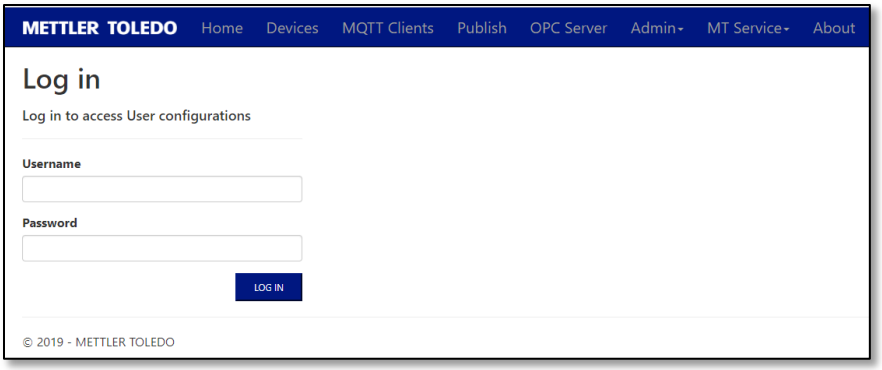


Figure 2-4: Login Challenge

3 MQTT Communication Configuration

The ACI400 can use MQTT Clients and the OPC UA server simultaneously.

To configure MQTT Client communication in the ACI400, navigate to the following web browser tabs in the order listed:

1. Devices
2. MQTT Clients
3. Publish

3.1. Devices

The **Devices** tab is used to identify the weighing device(s) with which the ACI400 will communicate, and to configure communication details such as protocol and connection types.

1. Click the ADD button (shown in Figure 3-3) to begin setup of a new device.

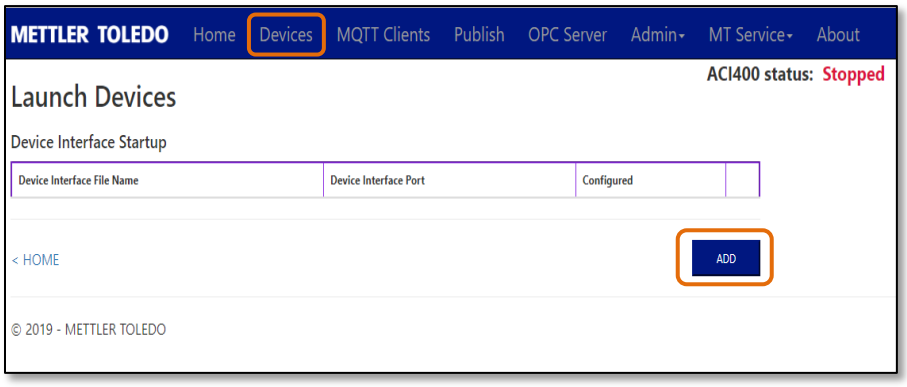


Figure 3-1: Device Interface File – Add

2. Type in a descriptive name for the **Device Interface File Name** – for example, **IND570_1** – and click CREATE.

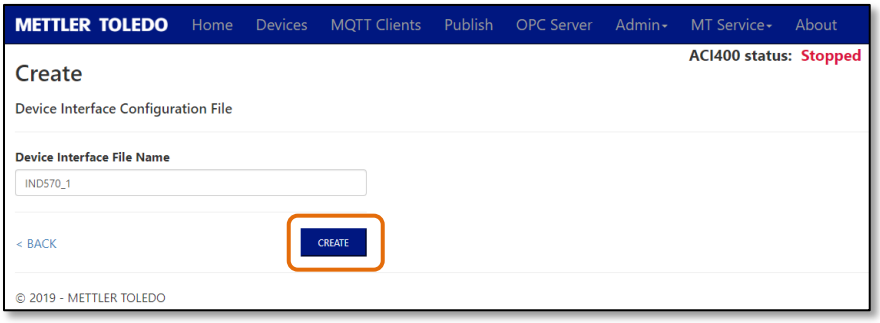


Figure 3-2: Device Interface File –Create

3. The browser will return to the main (**Launch Devices**) screen of the **Devices** tab.
4. Once the **Device Interface Configuration File** has been created, click on the **EditFile** option to the right of the file name. The Device Interface Configuration parameters page will display.

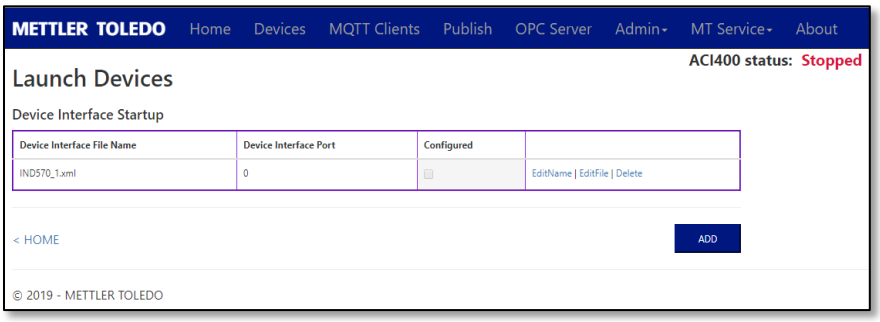


Figure 3-3: Device Interface File Configuration-Edit File

- NOTE: The **Configured** checkbox visible in Figure 3-3 is a visual aid, and is not selectable. Once a Device Interface file has been created, it must be configured in order to be functional. The **Configured** checkbox will be blank until all required parameters are set in the Device Interface file.

3.1.1. Device Connection Type

Figure 3-4: Device Interface Configuration Parameters

The **Device Interface** type determines the physical connection that the ACI400 will use to communicate with the weighing device. There are two options for Device Connection Type: **Ethernet** [the default] or **Serial**.

Select the connection type to use. The screen will update with a set of properties appropriate for the selected connection type.

3.1.1.1. Device Connection Type – Ethernet

Figure 3-5: Device Connection Type - Ethernet Selected

When Device Connection Type is **Ethernet**, the following parameters must be configured:

- Device Interface Port
- Device Protocol
- Device IP Address
- Device Port

3.1.1.1.1. Device Interface Port

The ACI400 will use the **Device Interface Port** to identify and route communication to the correct connected device.

The port must be unique between connected devices, and outside the range of well-known restricted port numbers used by networking features or software. Restricted port numbers generally fall between 0 and 1024, so the range of Device Interface Port settings for ACI400 can be 1025 to 65535.

Port number 4840 should **not** be used as it is the default TCP/IP port on the ACI400, and is dedicated to communication with the OPC UA server.

5555 is the default **Device Interface Port**, which is in a safe range for assigning multiple ports.

3.1.1.1.2. Device Protocol

The **Device Protocol** is the communication protocol the ACI400 will use to communicate with the weighing device. Options are **SDS** (Shared Data Server) or **SICS**.

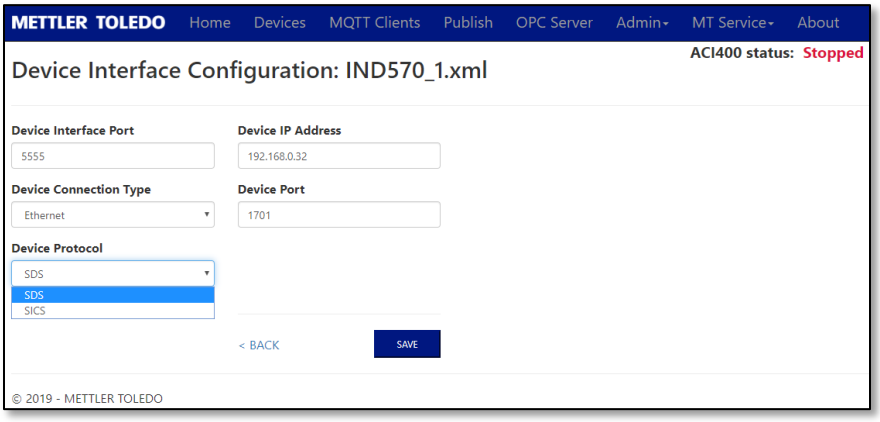


Figure 3-6: Device Protocol Selections

3.1.1.1.3. Device IP Address

The **Device IP Address** is the IP address of the weighing device with which the ACI400 will communicate. The default setting for this address is 192.168.0.1.

Enter the IP address for the weighing device, keeping in mind that the ACI400 and weighing device must have similar network interface settings (IP address, subnet) in order to communicate.

3.1.1.1.4. Device IP Port

The **Device IP Port** is the TCP/IP port on the weighing device that will be used to communicate with the ACI400. Enter the appropriate TCP/IP port number.

When SDS (Shared Data Server) is used as the **Device Protocol over Ethernet**, the **Device Port** will always be 1701.

When the **Device Connection Protocol** is **SICS over Ethernet**, the port will vary.

3.1.1.1.5. Saving Changes

After entering the required Ethernet settings, click SAVE. Click < BACK to return to the **Launch Devices** screen on the **Devices** tab.

3.1.1.2. Device Connection Type – Serial

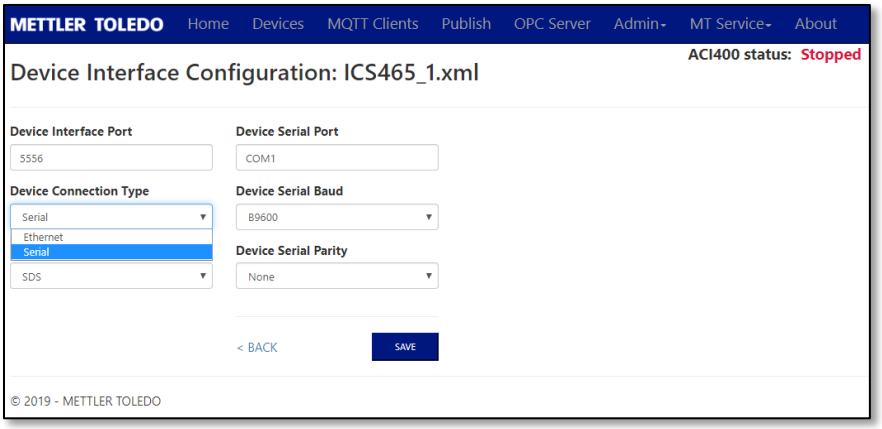


Figure 3-7: Device Connection Type – Serial Selected

When Device Connection Type is **Serial**, the following parameters must be configured:

- Device Interface Port
- Device Protocol
- Device Serial Port
- Device Serial Baud
- Device Serial Parity

3.1.1.2.1. Device Interface Port

The ACI400 uses the **Device Interface Port** to identify and route communication to the correct connected device.

The port must be unique between connected devices, and outside the range of well-known restricted port numbers used by networking features or software. Restricted port numbers generally fall between 0 and 1024, so the range of Device Interface Port setting for ACI400 can be 1025 to 65535.

3.1.1.2.2. Device Protocol

The **Device Protocol** is the communication protocol that the ACI400 will use to communicate with the weighing device. Options are **SDS** (Shared Data Server) or **SICS**.

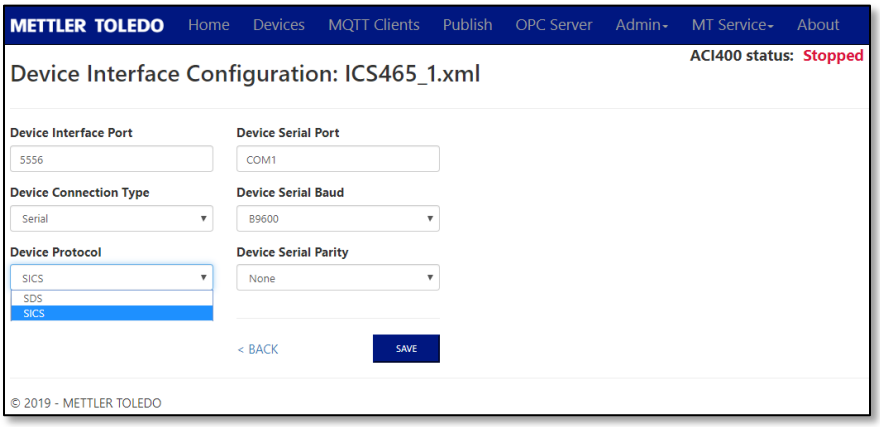


Figure 3-8: Device Protocol Selection

3.1.1.2.3. Device Serial Port

The **Device Serial Port** setting identifies the serial/COM port on the weighing device used to communicate with the ACI400. Enter the appropriate serial port ID.

3.1.1.2.4. Device Serial Baud

Use the **Device Serial Baud** setting to enter the baud rate of the serial port identified in the Device Serial Port setting.

Options are **B9600** [default], **B19200**, **B38400**, **B57600** and **B115200**. When using SICS as the Device Protocol, recommended settings are B9600 or B19200.

When using SDS (Shared Data Server) as the Device Protocol, B115200 is required.

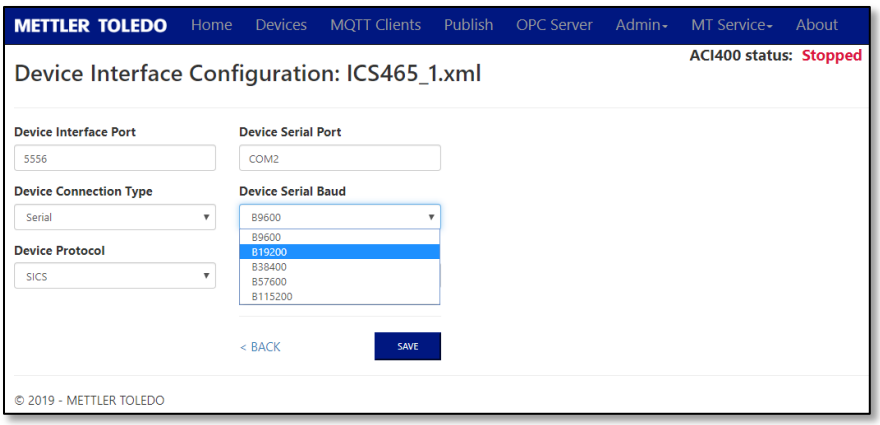


Figure 3-9: Device Serial Port Baud Options

3.1.1.2.5. Device Serial Parity

Enter the parity setting of the serial port identified in the **Device Serial Port** setting.

Options are **None** [default], **Odd**, **Even**, **Mark** and **Space**.

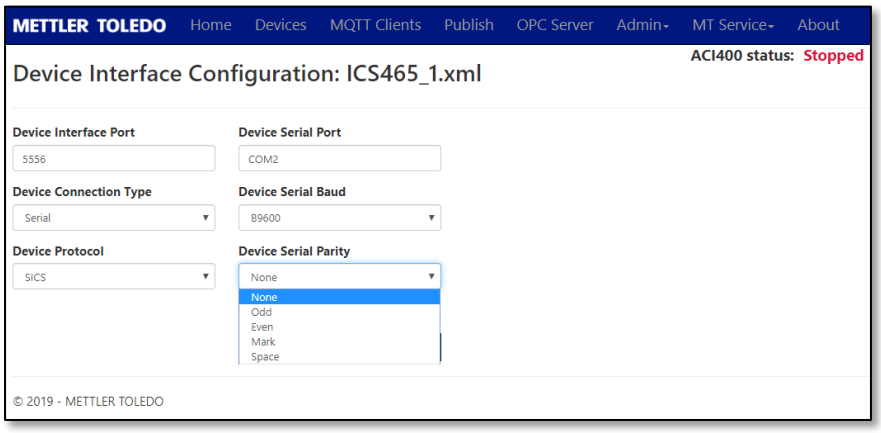


Figure 3-10: Device Serial Port Parity Options

3.1.1.2.6. Saving Changes

After entering the required serial settings, click SAVE. Click < BACK to return to the **Launch Devices** screen on the **Devices** tab.

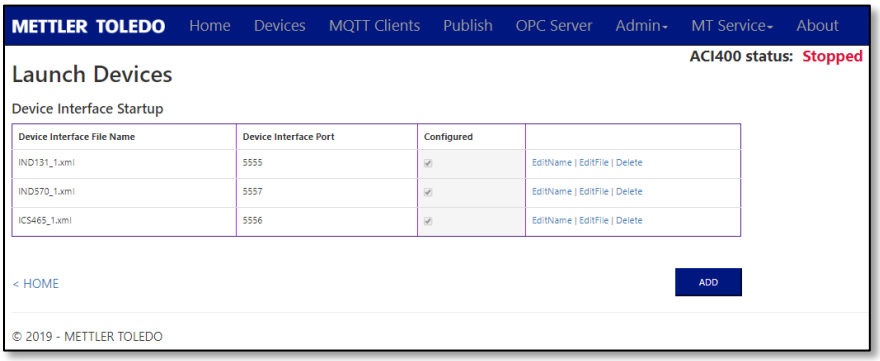


Figure 3-11: Launch Devices – Configured Devices List

3.2. MQTT Clients

In order for the ACI400 to send (publish) data collected from a connected Device to an MQTT broker (receiver of published client data), an MQTT Client Configuration file must be created and configured.

1. To begin configuration of an MQTT client connection, navigate to the **MQTT Clients** tab. On the **Launch MQTT Clients** screen, click ADD to create a new MQTT **Client Configuration File**.

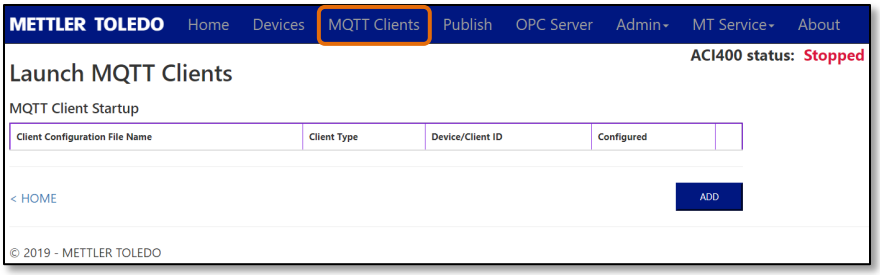


Figure 3-12: MQTT Client Configuration File - Add

2. Type in a descriptive name for the MQTT Client Configuration File – for example, **MQTT_Config_1_Azure** – and click CREATE. The browser will return to the main (**Launch MQTT Clients**) screen of the **MQTT Clients** tab.

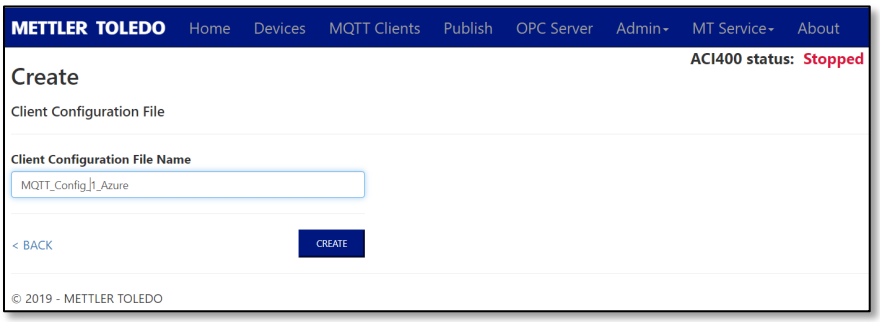


Figure 3-13: MQTT Client Configuration File-Create

3. After creating an MQTT Client Configuration file, click on the **EditFile** option (Figure 3-14) to the right of the file name. The MQTT Configuration page will display.

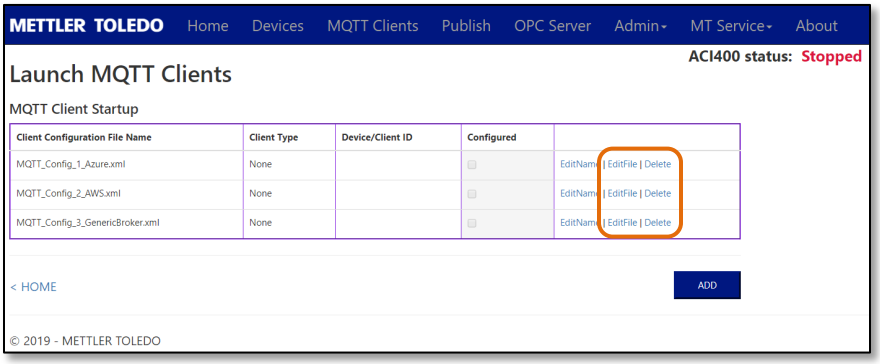


Figure 3-14: MQTT Client Configuration File – Edit File

4. To remove a file, select **Delete** (Figure 3-14).

- **Important**: Note that deleting a file from the configuration web pages does **not** remove the file from the ACI400 internal file directory. If an MQTT **Client Configuration File** is created again and given the same naming scheme, it will point to the previous file still available in the internal file directory.

- Note that the **Configured** checkbox (shown in Figure 3-14) is a visual aid, and is not selectable. After an MQTT **Client Configuration File** is created, it must be configured in order for it to be functional. The **Configured** checkbox will be blank until all required parameters within the file are edited.

3.2.1. MQTT Client Configuration File

The information required to edit an MQTT Client Configuration file is generated by end user's chosen MQTT broker (cloud service).

Section 3.2.1.1 lists basic descriptions of the MQTT Client Configuration parameters required for each MQTT Client type supported in the ACI400. Please refer to Chapter 5, **Data Services,** for examples of cloud service connections.

3.2.1.1. Client Type

The first setup step in the MQTT Configuration file is to select the Client Type. Selections include:

None	The default setting
MQTTBroker	For connection to a generic MQTT broker
Amazon	For connection to Amazon Web Services (AWS) MQTT broker
Azure	For connection to Microsoft MQTT broker
IBM	For connection to IBM MQTT broker

3.2.1.2. MQTT Configuration File Parameters – MQTTBroker Client Type

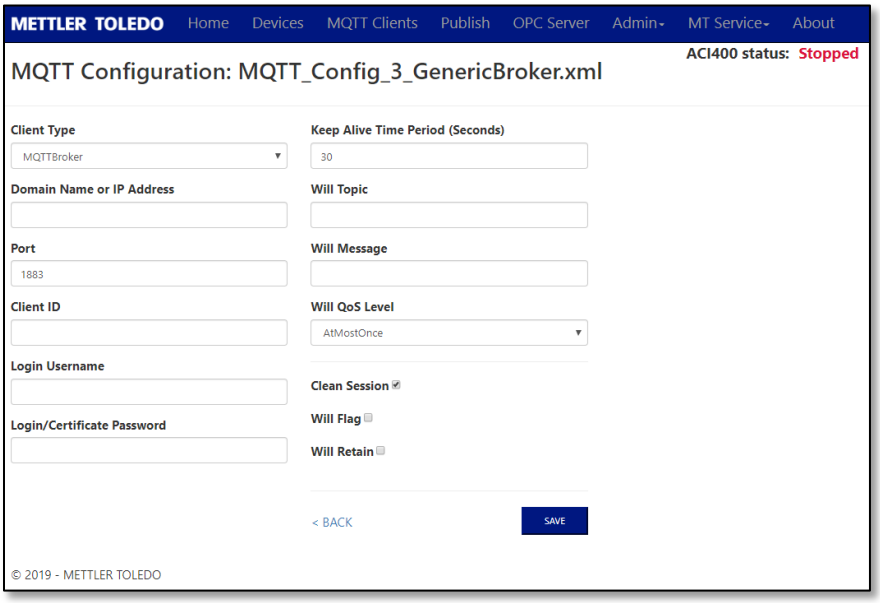


Figure 3-15: MQTT Configuration File – MQTTBroker Client Type

Table 3-1: MQTTBroker Client Configuration Parameters

Parameter	Explanation
Client Type	MQTT Broker.
Domain Name or IP Address	Endpoint/web address of MQTT broker.
Port	Broker access port.
Client ID	Unique device name assigned to the ACI400 by the broker for identification purposes. Must match Client ID stored in the broker.
Login Username	Login key required by the broker.
Login/Certificate Password	Security key required by the broker.
Keep Alive Time Period	Frequency of a generic message sent to the broker if there are no other active messages to be sent.
Will Topic	In MQTT, the word **topic** refers to a string that the broker uses to filter messages for each client connection. The topic can have one or multiple levels.
Will Message	
Will QoS Level	Quality of Service Level determines the reliability of message delivery between the MQTT client and the MQTT broker. • **AtMostOnce** – ACI400 MQTT client will send message 1 time only with no dependence on acknowledgment from the broker. • **AtLeastOnce** – If broker does not acknowledge receipt of a message, the ACI400 MQTT client will send a message multiple times with no indication that it is a repeat message. • **ExactlyOnce** – If broker does not acknowledge receipt of a message, the ACI400 MQTT client will send a message multiple times with an indication that a message is a repeat of a previous message.
Clean Session	In a Clean Session, when the MQTT client disconnects from a session, the MQTT broker will delete any subscriptions the client has with the broker. The client must re-create the subscriptions the next time it connects to the broker. The client will not receive any messages that were published while disconnected.
Will Flag	If the **Will Flag** is **enabled**, the **Will QoS** and **Will Retain** fields are used during connection and the **Will Topic** and **Will Message** fields MUST be present in the payload. If the **Will Flag** is **disabled**, the **Will QoS** and **Will Retain** field must also be disabled and the **Will Topic** and **Will Message** fields must not be present in the published payload.
Will Retain	Normally if a publisher publishes a message to a topic, and there are no subscriptions to that topic, the message is simply discarded by the broker. Enabling the **Will Retain** selection tells the broker to keep the last **Will Message** on a topic even is there are no active subscriptions.

3.2.1.3. MQTT Configuration File Parameters – Amazon Client Type

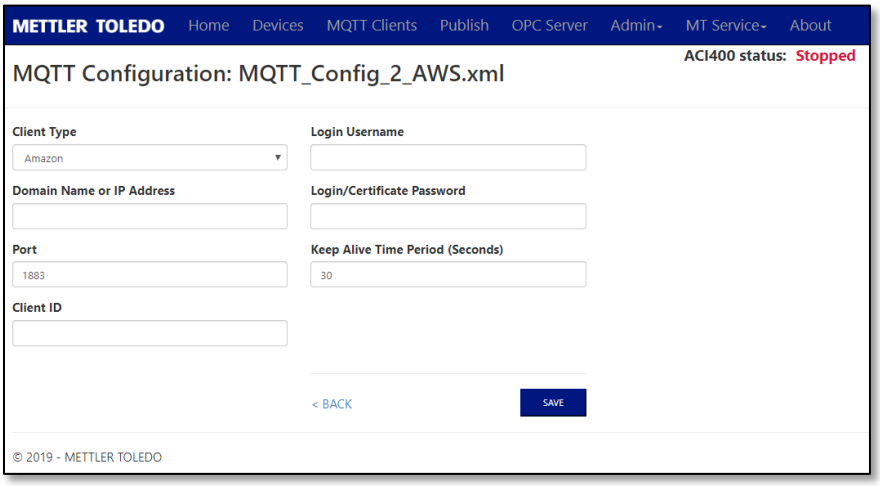


Figure 3-16: MQTT Configuration File – Amazon Client Type

Table 3-2: Amazon Client Configuration Parameters

Parameter	Explanation
Client Type	Amazon (AWS).
Domain Name or IP Address	Amazon Host endpoint/web address.
Port	AWS access port.
Client ID	Unique device name assigned to the ACI400 client by the broker for identification purposes.
Login Username	Login key required by AWS.
Login/Certificate Password	Security key required by AWS.
Keep Alive Time Period	Frequency of a generic message sent to AWS if there are no other active messages to be sent.

3.2.1.4. MQTT Configuration File Parameters – Azure Client Type

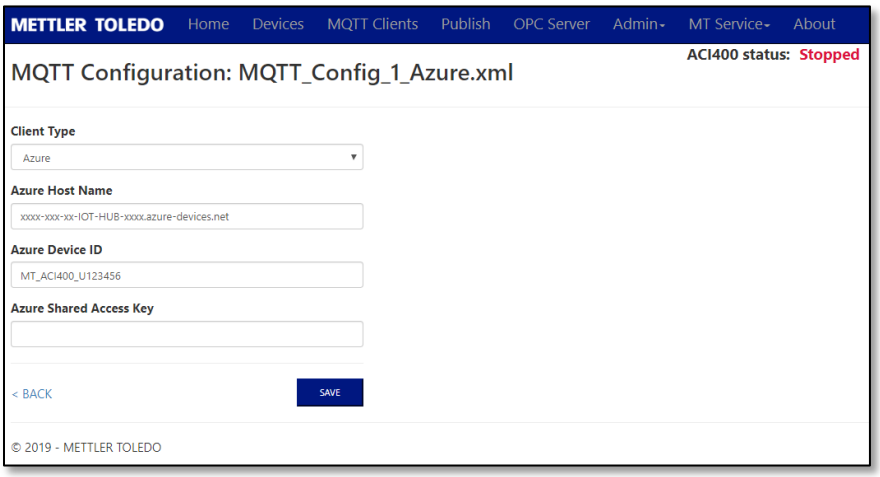


Figure 3-17: MQTT Configuration File – Azure Client Type

Table 3-3: Azure Client Configuration Parameters

Parameter	Explanation
Client Type	Azure.
Azure Host Name	Endpoint/web address of Azure.
Azure Device ID	Unique device name assigned to the ACI400 client by Azure for identification purposes.
Azure Shared Access Key	Security key required by Azure.

3.2.1.5. Saving Changes

After modifying the required settings for the specific MQTT **Client Configuration File**, click SAVE. Click < BACK to return to the **Launch MQTT Clients** screen on the **MQTT Clients** tab.

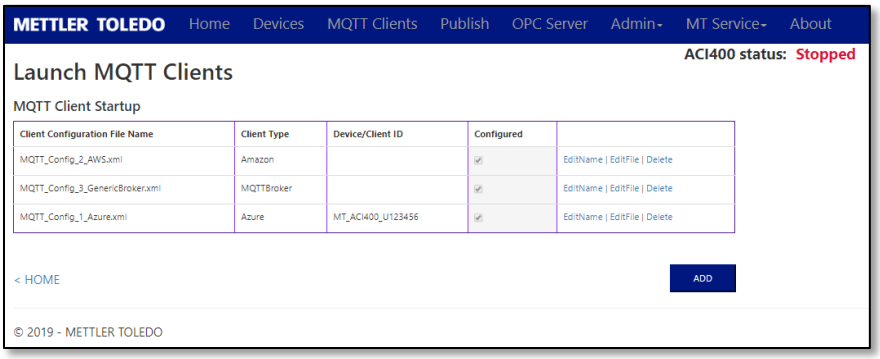


Figure 3-18: Launch MQTT Clients – MQTT Client Configuration Files List

3.3. Publish

The next step in configuring MQTT communication in the ACI400 is selecting payloads to publish. MQTT payloads are the desired data points for monitoring and viewing.

To begin payload selection, navigate to the **Publish** tab. On the **Publish Configuration** screen, click ADD to create a new Publish Item.

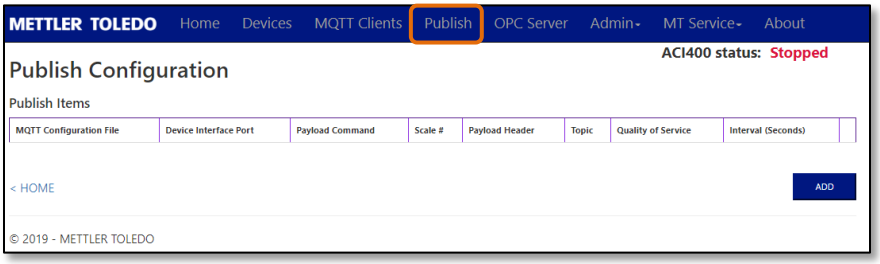


Figure 3-19: Publish Configuration – Add

3.3.1. Create Publish Item

The **Published Item** file combines device configurations with MQTT Client configurations, creating the secure path for data from specific weighing devices to travel to targeted cloud services.

3.3.1.1. MQTT Configuration File

The **MQTT Configuration File** selection identifies the MQTT broker to which a payload will be sent/published (Figure 3-18).

Select the appropriate **MQTT Configuration File**.

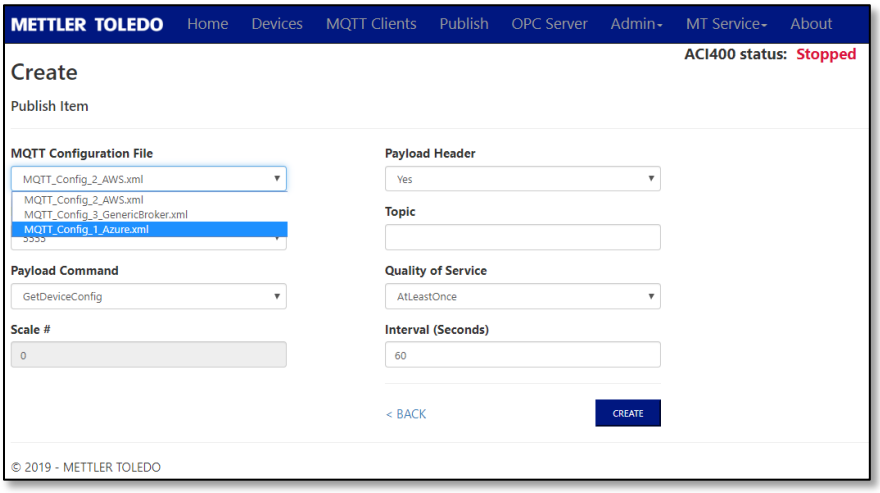


Figure 3-20: MQTT Client Configuration File Selection

3.3.1.2. Device Interface Port

A unique **Device Interface Port** was assigned to each connected weighing device during **Device** configuration (Figure 3-11). This port determines which weighing device populates a published payload.

Select the appropriate **Device Interface Port** from the dropdown list.

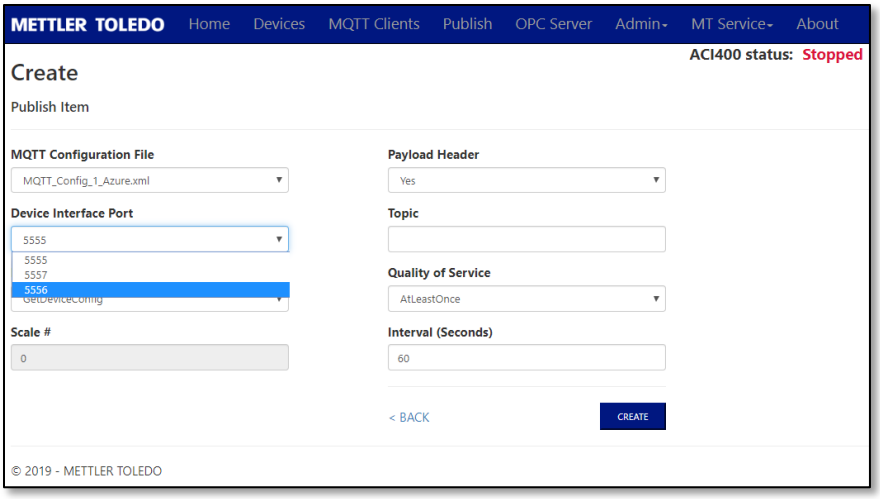


Figure 3-21: Device Interface Port Selection

3.3.1.3. Payload Command

Payloads are data sets published by the ACI400 to MQTT brokers. Cloud data services can then subscribe to this data for monitoring and viewing.

Available payload selections are:

- GetDeviceConfig
- GetSingleWeigh
- GetScaleWeight
- SetGatewayConfiguration
- GetTerminalDataItem

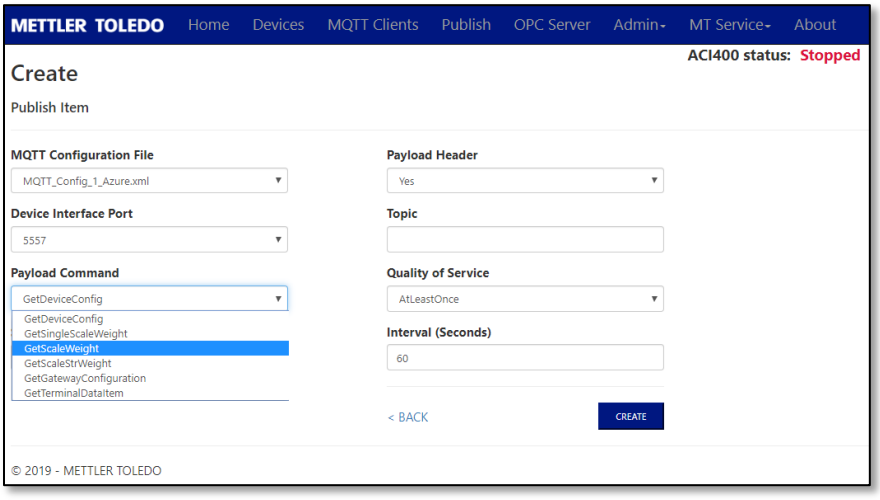


Figure 3-22: Payload Command Selection

3.3.1.4. Scale

The **Scale #** determines the scale channel on a connected weighing device that populates the data fields of a published payload.

This field is only active when the **GetSingleScaleWeight** payload is selected. The **GetSingleScaleWeight** payload only applies when a connected device supports multiple scale channels. The IND780 terminal is an example of a multi-scale device.

If appropriate, enter the **Scale #**.

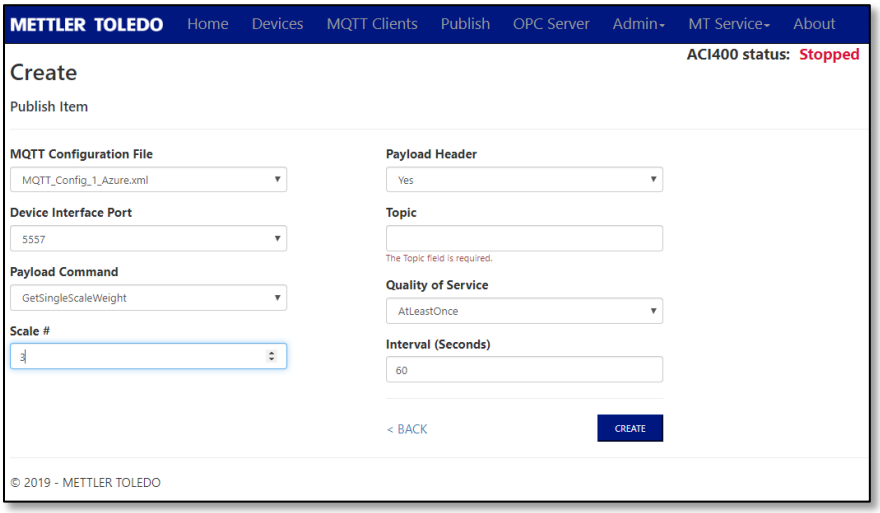


Figure 3-23: Scale # Selection

3.3.1.5. Payload Header

The Payload Header setting determines whether the published payload will include header information.

3.3.1.6. Topic

The topic field is required in order to publish a payload.

In MQTT, the word "topic" refers to a text string that the MQTT broker uses to filter messages for each client connection.

3.3.1.7. Quality of Service

There are three qualities of service for payload message delivery:

AtMostOnce Messages are delivered according to the best efforts of the underlying TCP/IP network. Message loss or duplication can occur.
This level could be used where it does not matter if an individual reading is lost as the next one will be published soon after.

AtLeastOnce Messages are assured to arrive but duplicates may occur.

ExactlyOnce Messages are assured to arrive exactly once. This level could be used in instances where duplicate or lost messages would lead to critical data loss.

3.3.1.8. Interval

Interval (Seconds) is the time period at which the payload is published. For example, if 60 is selected, the payload will be sent once per minute.

3.3.1.9. Saving Changes

After the required settings for each Publish Item have been modified, click SAVE. Click < BACK to return to **Publish Configuration** screen on the **Publish** tab.

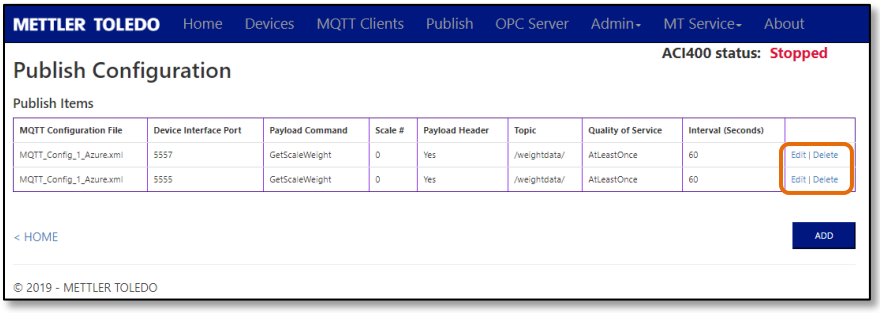


Figure 3-24: Publish Items – Published Payloads List

To edit an existing **Publish Item**, select **Edit** from the right of the table. To remove an existing Publish Item, select **Delete**.

3.4. Viewing MQTT Client Data

Refer to Chapter 5, **Data Services,** for examples of viewing the ACI400 MQTT Client data in various cloud services.

4 OPC UA Server Configuration

The ACI400 has the ability to use MQTT Clients and the OPC UA server simultaneously.

To enable communication via the OPC UA Server in the ACI400, navigate to the following web browser tabs in the order listed:

1. Devices
2. OPCServer

4.1. Devices

The Devices tab is where the user identifies the weighing device(s) with which the ACI400 will communicate, and configures communication details such as protocol and connection types.

Click the ADD button to begin setup of a new device (Figure 4-1).

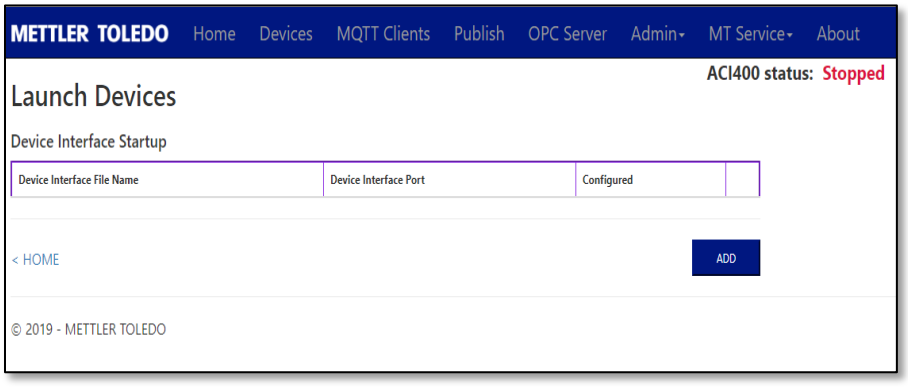


Figure 4-1: Device Interface File - Add

Type in a descriptive name for the Device Interface file name – for example, **IND570_1** – and click CREATE. The browser will return to the main screen of the Devices tab (Launch Devices).

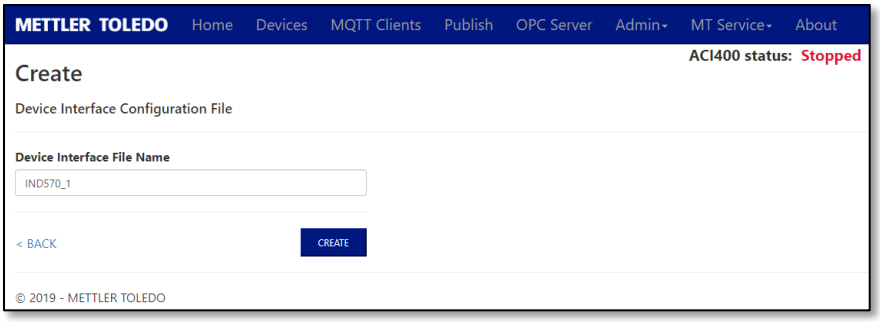


Figure 4-2: Device Interface File - Create

After creating the Device Interface file, click on the **EditFile** option to the right of the file name. The Device Interface Configuration parameters page will display.

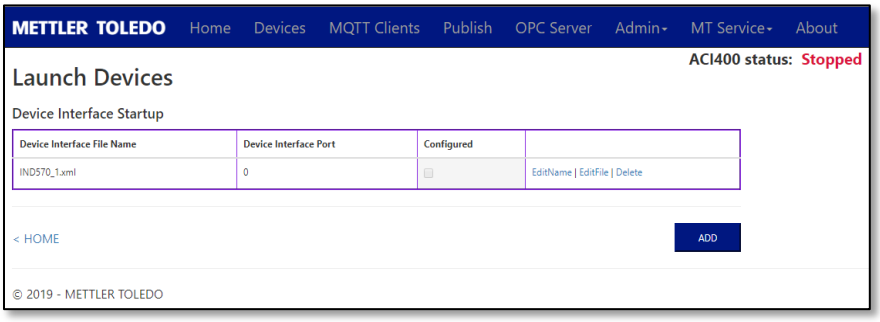


Figure 4-3: Device Interface File Configuration-Edit File

- NOTE: The **Configured** checkbox (visible in Figure 4-3) is a visual aid, and is not selectable. After creating a Device Interface file, it requires configuration in order to be functional. The **Configured** checkbox will be blank until all required parameters within the Device Interface file are set.

4.1.1. Device Connection Type

Figure 4-4: Device Interface Configuration Parameters

The Device Connection Type determines the physical connection that the ACI400 will use to communicate with the weighing device. There are two options for Device Connection Type, Ethernet [default] or Serial.

Select the appropriate connection type. The screen will update with a set of properties appropriate for the selected connection type.

4.1.2. Device Connection Type – Ethernet

Figure 4-5: Device Connection Type - Ethernet Selected

When Device Connection Type is **Ethernet**, the following parameters require configuration:

- Device Interface Port
- Device Protocol
- Device IP Address
- Device Port

4.1.2.1. Device Interface Port

The ACI400 will use the Device Interface port to identify and route communication to the correct connected device.

The Device Interface Port must be unique between connected devices and outside the range of well-known restricted port numbers used by networking features or software. Restricted port numbers generally fall between 0-1024, so the range of Device Interface Port setting for ACI400 can be 1025-65535.

5555 is the default Device Interface Port wich is a safe range for assigning multiple ports.

4.1.2.2. Device Protocol

Device Protocol is the communication protocol that the ACI400 will use to communicate to the weighing device. Options are SDS (Shared Data Server) or SICS.

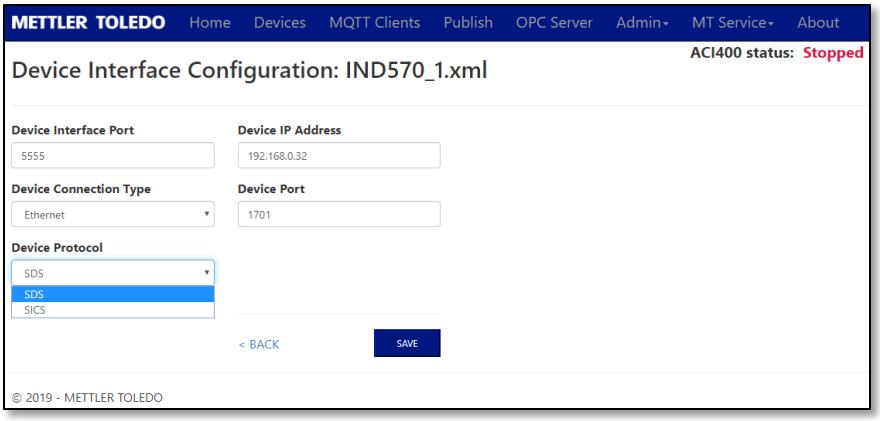


Figure 4-6: Device Protocol Selections

4.1.2.3. Device IP Address

Device IP Address is the IP address of the weighing device with which the ACI400 will communicate. The default setting for the Device IP Address is 192.168.0.1.

Enter the IP address for the weighing device, keeping in mind that the ACI400 and weighing device must have similar network interface settings (IP address, subnet) in order to communicate.

4.1.2.4. Device IP Port

The Device IP Port is the TCP/IP port on the weighing device that will be used to communicate with the ACI400. Enter the appropriate TCP/IP port number.

When using SDS (Shared Data Server) as the Device Protocol over Ethernet, the Device Port will always be 1701.

The Device Port will vary if the Device Connection Protocol is SICS over Ethernet. Refer to Appendix C, for guidance on communication topographies by device type.

4.1.2.5. Saving Changes

After entering the required Ethernet settings, click SAVE. Click < BACK to return to Launch Devices screen on the Devices tab.

4.1.3. Device Connection Type – Serial

Figure 4-7: Device Connection Type - Serial Selected

When Device Connection Type is **Serial**, the following parameters require configuration:

- Device Interface Port
- Device Protocol
- Device Serial Port
- Device Serial Baud
- Device Serial Parity

4.1.3.1. Device Interface Port

The ACI400 uses the Device Interface port to identify and route communication to the correct connected device.

The Device Interface Port must be unique between connected devices and outside the range of well-known restricted port numbers. Restricted port numbers generally fall between 0-1024, so the range of Device Interface Port setting for ACI400 can be 1025-65535.

Port number 4840 should not be used as this is the default TCP/IP port on the ACI400 that is dedicated to communication with the OPC UA server.

5555 is the default Device Interface Port which is in a safe range for assigning multiple ports.

4.1.3.2. Device Protocol

Device Protocol is the communication protocol that the ACI400 will use to communicate to the weighing device. Options are SDS (Shared Data Server) or SICS.

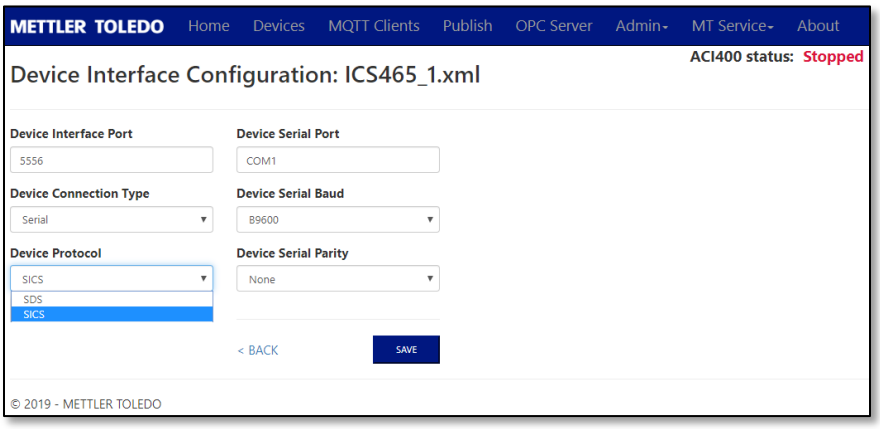


Figure 4-8: Device Protocol Selection

4.1.3.3. Device Serial Port

The Device Serial Port setting identifies the serial/COM port on the weighing device used to communicate with the ACI400. Enter the appropriate serial port ID.

4.1.3.4. Device Serial Baud

Use the Device Serial Baud setting to enter the baud rate of the serial port identified in the Device Serial Port setting.

Options are B9600 [default], B19200, B38400, B57600 and B115200. When using SICS as the Device Protocol, recommended settings are B9600 or B19200.

When using SDS (Shared Data Server) as the Device Protocol, B115200 is required.

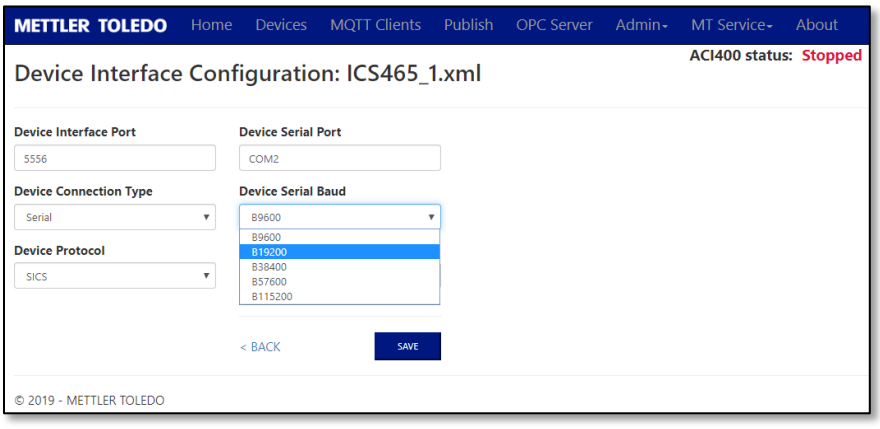


Figure 4-9: Device Serial Port Baud Options

4.1.3.5. Device Serial Parity

Enter the parity setting of the serial port identified in the Device Serial Port setting.

Options are None [default], Odd, Even, Mark and Space.

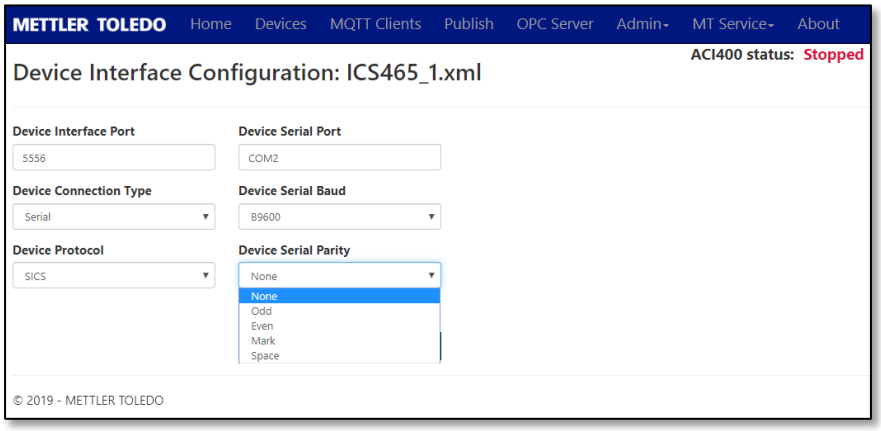


Figure 4-10: Device Serial Port Parity Options

4.1.3.6. Saving Changes

After entering the required Serial settings, click SAVE. Click < BACK to return to Launch Devices screen on the Devices tab.

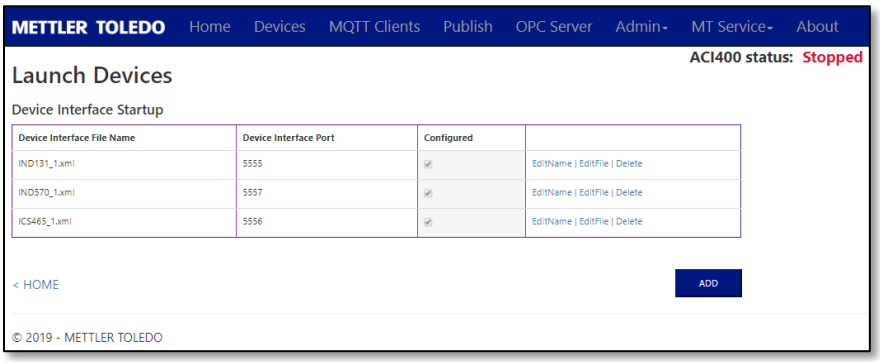


Figure 4-11: Launch Devices – Configured Devices List

4.2. OPC Server

After configuring at least one Device, navigate to the OPC Server tab.

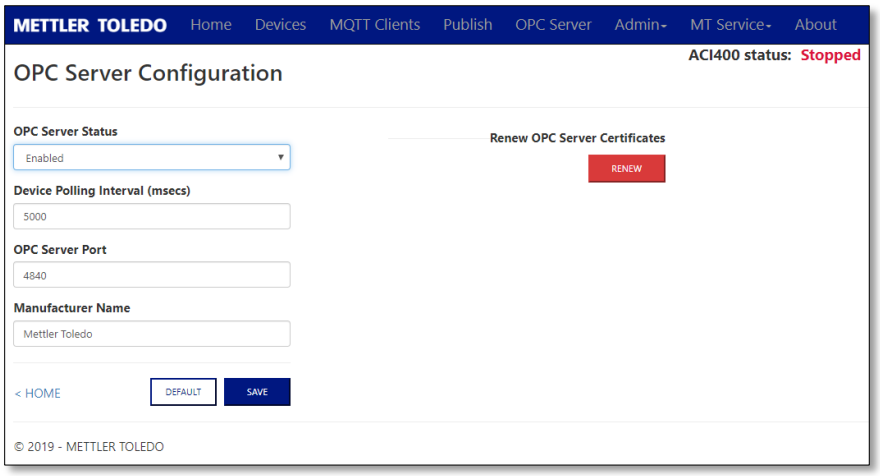


Figure 4-12: OPC Server Configuration

4.2.1.1. OPC Server Status

This parameter turns the OPC UA server on or off.

Set OPC Server Status to Enabled [default] to run the OPC UA server. This allows an OPC client to communicate with the OPC UA server of the ACI400.

4.2.1.2. Device Polling Interval

The Device Polling Interval determines the frequency, in milliseconds, that the OPC UA server:

- Requests data from connected devices
- Refreshes the output data to an OPC client

4.2.1.3. OPC Server Port

The TCP/IP port # on the ACI400 dedicated to communication with the OPC UA server. Default port is 4840.

4.2.1.4. Manufacturer Name

Manufacturer ID that will appear in the OPC UA object 'Manufacturer'. Mettler Toledo is the default entry.

4.2.1.5. Saving Changes

After entering the required OPC Server Configuration settings, click SAVE. Click < BACK to return to the Home page.

4.2.1.6. Default

Clicking on the Default button will return all OPC Server Configuration settings to the factory default settings.

4.2.1.7. Renew OPC Server Certificates

When **Renew Certificates** RENEW is selected, the ACI400 deletes the current certificates, then accesses a certificates server to acquire a new certificate.

An internet connection is required to execute the Renew Certificates action.

A Installation

A.1. Installation Notes

- Do not open or modify the ACI400 IIoT Edge device. The device uses components that comply with FCC and CE regulations. Modification of the device will void these certifications.
- Install the device securely. Be careful handling the device to prevent injury and do not drop.
- Keep the device away from liquids and flammable materials.
- Do not clean the device with liquids. The chassis can be cleaned with a cloth.
- This device is intended for indoor operation only.
- Install the device only with shielded network cables.
- Service and repair of the device must be performed by qualified METTLER TOLEDO service personnel.

A.2. Operating Environment

Operating temperature must be between 0 and 50°C with a non-condensing relative humidity of 10-90%. The device can be stored at temperatures between 0-60°C.

A.3. Power

Only use the ACI400 IIoT Edge device with the provided UL-Listed external power supply . This external power supply has a rated output of 12 VDC, min. 3A min.

A.4. Kit Contents

A.5. Dimensions

A.5.1. ACI400

The dimensions of the ACI400 are shown in Figure A-1.

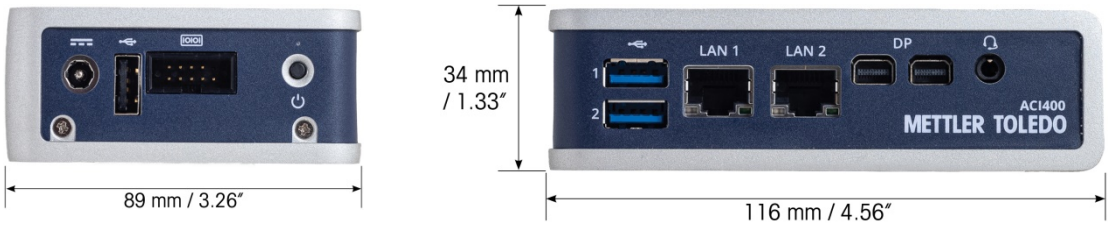


Figure A-1: ACI400 Dimensions

A.5.2. ACI400 with Brackets

A.5.2.1. Wall/Ceiling Mounting Bracket

Figure A-2: ACI400 Dimensions with Wall/Ceiling Bracket

A.5.2.2. DIN Rail Mounting Bracket

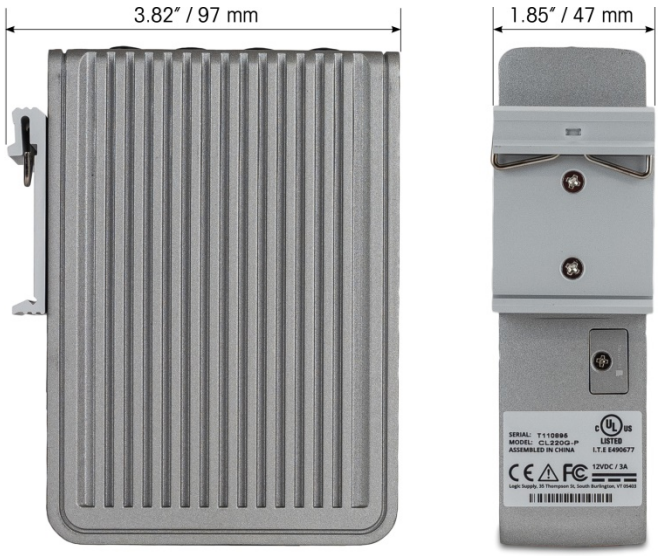


Figure A-3: ACI400 Dimensions with DIN Rail Bracket

A.6. Mounting

- Allow at least 2 inches of space around all sides of the device for proper cooling. If device is mounted to vertical surface, the heatsink fins should allow air to rise unobstructed. Alternative orientations may result in reduced operational temperature range.

Two mounting options are available for the ACI400 IIoT Edge device: wall-mount or DIN-rail mount. Each ACI400 IIoT Edge kit includes the required mounting hardware for one of or the two mounting options.

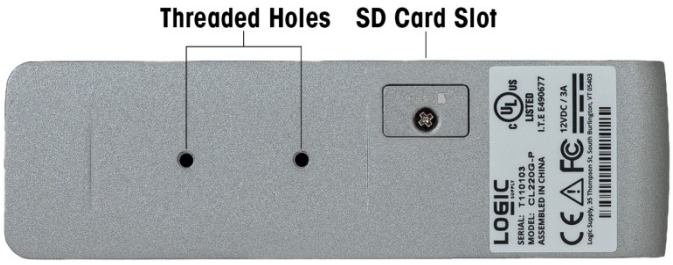


Figure A-4: Threaded Holes for Mounting

A.6.1. Wall/Ceiling Bracket

To mount the ACI400 on a wall or ceiling:

1. Use the mounting bracket included in the ACI400 kit as a template to mark screw holes in the mounting location. Figure A-5 shows holes marking for vertical and horizontal mounting.

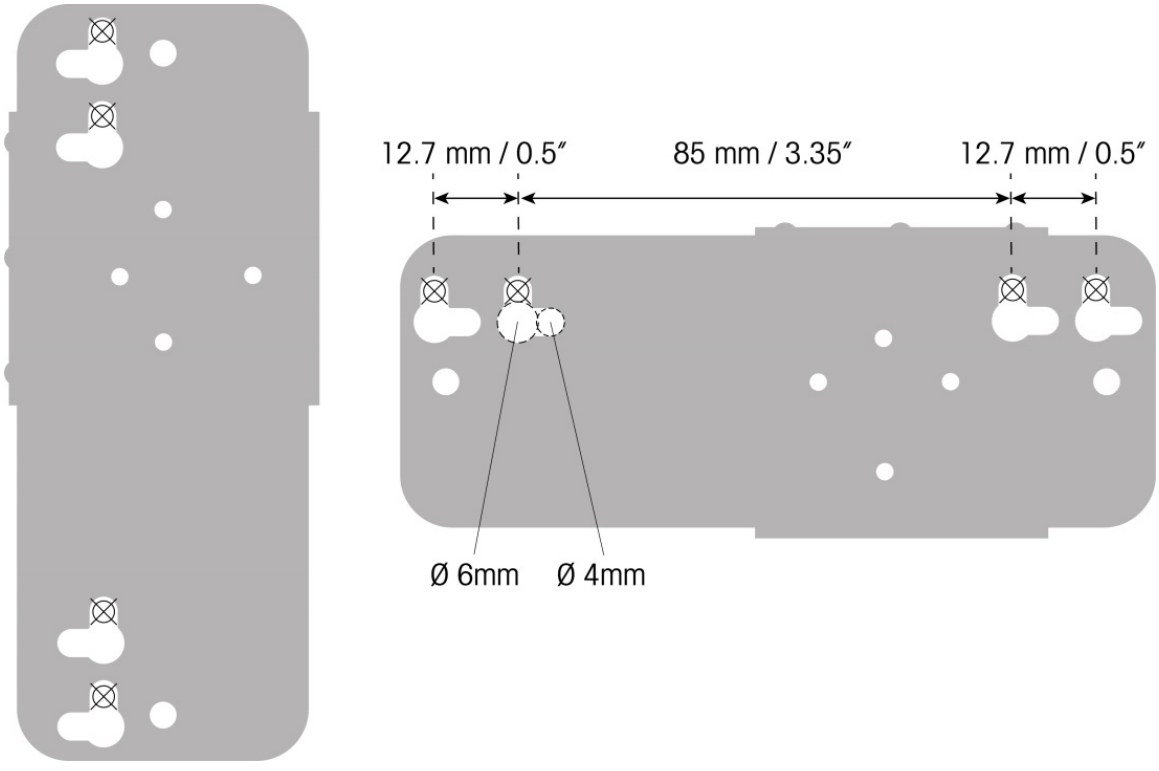


Figure A-5: Marking Mounting Holes

2. Mount the device in the desired location using appropriate fasteners. The mounting surface should be of metal construction and have a minimum thickness of 1mm. Use mounting screws of at least 4mm length, and add an additional 1mm of screw length for each millimeter of plate or bracket thickness beyond 1.5mm.

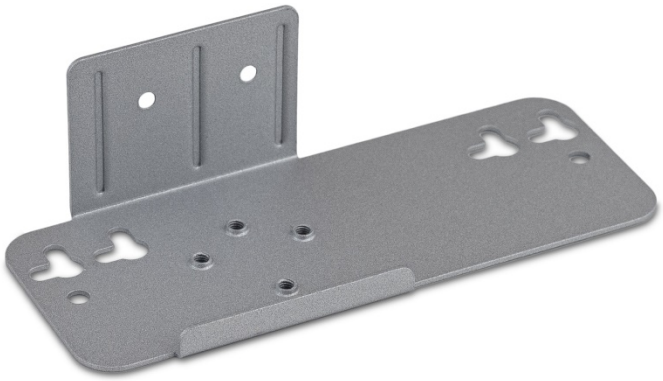


Figure A-6: ACI400 Mounting Bracket

3. Next, use the provided M3 x 0.5 mm screws to attach the ACI400 to the mounting bracket, using the threaded holes on the back of the chassis (Figure A-4). Figure A-7 shows the ACI400 attached to a bracket in the preferred orientation for optimum cooling.

Figure A-7: Mounting Bracket Attached to ACI400

A.6.2. DIN Bracket

1. Attach the DIN rail bracket to the ACI400 chassis using the provided M3 x 0.5 screws.

Figure A-8: ACI400 DIN Bracket

Figure A-9: DIN Bracket Attachment

2. Clip the device securely onto the DIN rail.

Figure A-10: ACI400 Installed on DIN Rail

A.7. Connections

With the ACI400 mounted in position, make the required connections. The device has the following external connections on its front and bottom (or side depending on mounting orientation) surfaces:

A.7.1. Front Connections

- 2 USB 3.0 ports
- 2 RJ45 LAN ports
- 2 Mini-Display Ports (not used)
- 1 Combo Audio jack (not used)

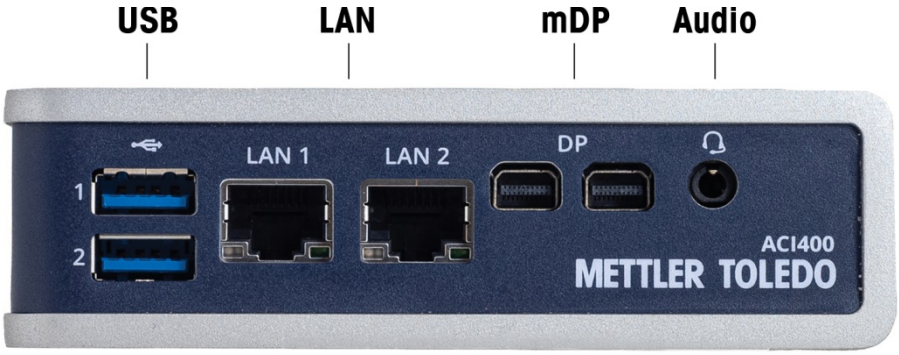


Figure A-11: Front Connections

A.7.2. Bottom/Side Connections

- 1 USB 2.0 port
- 1 9-pin RS232 serial COM port
- 1 DC in power jack

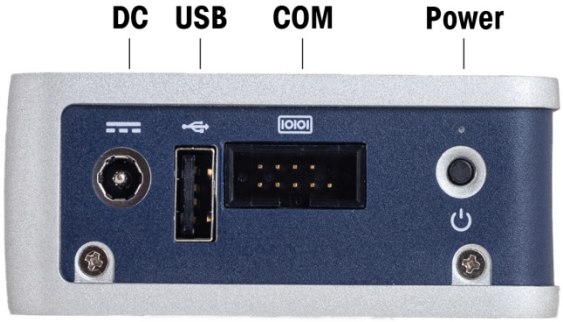


Figure A-12: Bottom Connections

METTLER TOLEDO Service

To protect your product's future:

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use according to these instructions and regular calibration and maintenance by our factory-trained service team ensure dependable and accurate operation, protecting your investment. Contact us about a service agreement tailored to your needs and budget.

We invite you to register your product at www.mt.com/productregistration so we can contact you about enhancements, updates and important notifications concerning your product.

www.mt.com
For more information

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