ENERGY INDUSTRIES

ABB Wireless Industrial Network
AWIN GW100
Bulk Configuration Guide – Using MS Excel
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Release: December 2018

Document Number: 3BNP102911

Document Revision: A
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1 About This Bulk Configuration Guide

1.1 Scope and Purpose

This guide provides an overview of the steps required to setup a WirelessHART network using a bulk configuration option supported by the AWIN GW100 WirelessHART gateway. The setup can be completed using Microsoft Excel based Configurator tool available for download from ABB website.

1.2 Document Conventions

Microsoft Windows conventions are normally used for the standard presentation of material when entering text, key sequences, prompts, messages, menu items, screen elements, and so on.

1.3 Terminology

Table 1 lists terms used in this document and associated with the ABB Wireless Industrial Network. The reader should be familiar with these terms before proceeding further in this bulk configuration guide.

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRS</td>
<td>Minimum Recommended Settings</td>
</tr>
<tr>
<td>TCP</td>
<td>Transmission Control Protocol</td>
</tr>
<tr>
<td>RTU</td>
<td>Remote Terminal Unit</td>
</tr>
<tr>
<td>PC</td>
<td>Personal Computer</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>DIN</td>
<td>DIN rails are standard mounting for equipment</td>
</tr>
<tr>
<td>AWIN GW100</td>
<td>WirelessHART Gateway</td>
</tr>
<tr>
<td>XML</td>
<td>Extensible Markup Language</td>
</tr>
<tr>
<td>ModbusTCP</td>
<td>Communication protocol</td>
</tr>
<tr>
<td>WirelessHART</td>
<td>It is IEC 62591 specified wireless communication protocol designed for HART protocol</td>
</tr>
</tbody>
</table>
1.4 **Related Documentation**

Table 2 lists the AWIN GW100 documents referenced in this bulk configuration guide.

<table>
<thead>
<tr>
<th>Document ID</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3BNP102906</td>
<td>AWIN GW100 Product Datasheet</td>
</tr>
<tr>
<td>3BNP102912</td>
<td>AWIN GW100 User Manual</td>
</tr>
</tbody>
</table>
1.5 Warning, Caution, Information, and Tip Icons

This document includes Warning, Caution, and Information if/where appropriate to point out safety related or other important information. It also includes Tip to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:

- **Electrical warning icon** indicates the presence of a hazard, which could result in electrical shock.
- **Warning icon** indicates the presence of a hazard, which could result in personal injury.
- **Caution icon** indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard, which could result in corruption of software or damage to equipment/property.
- **Information icon** alerts the reader to pertinent facts and conditions.
- **Tip icon** indicates advice on, for example, how to design your project or how to use a certain function.

Although Warning hazards are related to personal injury, and Caution hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all Warning and Caution notices.

1.6 Target Audience

This bulk configuration guide is primarily intended for product users. This bulk configuration guide does not contain last-minute product information and updates which might affect functionality and/or performance. For information on last revisions, late changes and restrictions, the user shall refer to the relevant release notes.
2 Overview of WirelessHART Network Setup Procedure

Building and operating a WirelessHART network is made easy with ABB's AWIN GW100 gateway. This guide provides a detailed procedure for setting up a WirelessHART network along with a list of minimum recommended settings that all projects should consider when establishing and operating a WirelessHART network.

2.1 Product overview

AWIN GW100 is a WirelessHART gateway that can connect up to 24 WirelessHART devices.

![Figure 1: WirelessHART AWIN GW100 Gateway](image)

It creates and manages WirelessHART network and converts HART data to Modbus data for easy integration to automation controllers, such as System 800xA and Totalflow's RTU, see, Figure 2.

To setup a WirelessHART network the following activities are to be conducted:

- Configure WirelessHART gateway (AWIN GW100).
- Configure WirelessHART field devices.
- Configure Modbus registers for the WirelessHART gateway.
- Configure Modbus registers for WirelessHART field devices.

AWIN GW100 Gateway provides two different options for the user to configure WirelessHART network:

**Option 1**: Use the in-built webserver of the gateway. Refer to 3BNP102912 and 3BNP102910 for further details.

**Option 2**: Use the MS Excel based configurator for bulk configuration.

This guide describes only Option#2, which is about bulk configuration of WirelessHART network using the Excel based configurator, referred to as, AWIN GW100 Configurator.

The detailed steps required to achieve them are presented in Figure 3. Once these steps are successfully completed, then host systems that support ModbusTCP protocol can read data from the WirelessHART network devices including the gateway.

The detailed description of these steps is provided in the following sections. Here they are presented for reference purpose only. The following sections should be executed in the order they are presented in this document.
Figure 2: WirelessHART integration to System 800xA via AC800M controller or Totalflow RTU
Figure 3: Workflow of WirelessHART network engineering
3 Pre-configuration Checklist

3.1 Hardware Required

Table 3 shows the hardware required.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Item</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>AWIN GW100 Gateway</td>
<td>1</td>
<td>WirelessHART Gateway.</td>
</tr>
<tr>
<td>H2</td>
<td>WirelessHART Devices</td>
<td>1 (minimum)</td>
<td>Up to 24 devices can be connected. Devices can be:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WirelessHART instruments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WirelessHART adapter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Note:</strong> Devices power supply should be available (for example, battery for battery-powered devices).</td>
</tr>
<tr>
<td>H3</td>
<td>Engineering Workstation</td>
<td>1</td>
<td>PC for network configuration.</td>
</tr>
<tr>
<td>H4</td>
<td>Modbus Host</td>
<td>1</td>
<td>Up to 4 hosts can be connected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>This can be a PLC or controller.</td>
</tr>
<tr>
<td>H5</td>
<td>Ethernet Cables</td>
<td>1 (minimum)</td>
<td>For connecting Ethernet devices.</td>
</tr>
<tr>
<td>H6</td>
<td>Power Supply</td>
<td>1</td>
<td>Power supply for AWIN GW100 gateway.</td>
</tr>
<tr>
<td>H7</td>
<td>Ethernet Switch with Power Supply</td>
<td>1</td>
<td>For connecting AWIN GW100 to the controller.</td>
</tr>
</tbody>
</table>

3.2 Setup Required

To configure a WirelessHART network, any one of the following two setups can be used (as shown in (Figure 3)):

Setup1 [Figure 3 (a)] - Direct connection of the AWIN GW100 to a PC.

Setup2 [Figure 3 (b)] - Connection of the AWIN GW100 to a PC via Ethernet Switch. This setup is required for communication to control systems and RTUs. Engineering workstation is only required for configuration and can be removed afterwards.

Figure 4: Engineering setup for configuring AWIN GW100 gateway
3.3 Software Required

Microsoft Excel based **AWIN GW100 Configurator** tool is required for bulk configuration of WirelessHART network and is supplied separately. It can be downloaded from ABB website.

The welcome page of this configurator tool is shown in **Figure 5**.

![AWIN GW100 Configurator Tool](image)

*Figure 5: AWIN GW100 configurator tool Home Page*

3.4 WirelessHART Devices Tag List Required

Every WirelessHART device on a WirelessHART network must have a Long Tag. It is up to the project to specify the Long Tag required for each device, this is to be supplied by the project team. Moreover, the long tag should be unique for each device. Long tag is used for binding WirelessHART devices data to Modbus registers. WirelessHART devices out of the box will have default Long Tag that should be changed to project specific tags.
4 AWIN GW100 Installation and Power up

4.1 Get Familiar with AWIN GW100

Figure 6 shows a depiction of the AWIN GW100 WirelessHART gateway.

![AWIN GW100 gateway and its interfaces](image)

**Figure 6: AWIN GW100 gateway and its interfaces**

Table 4 shows the LEDs information of AWIN GW100 gateway.

**Table 4: LEDs Information**

<table>
<thead>
<tr>
<th>LEDs Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST</td>
</tr>
<tr>
<td>MESH</td>
</tr>
<tr>
<td>LINK</td>
</tr>
<tr>
<td>DATA</td>
</tr>
<tr>
<td>ERR</td>
</tr>
</tbody>
</table>

For detailed description of LEDs color and status refer to the user manual.

HART maintenance port (i.e. HART programming tool connector) is available but this feature is currently not supported in this firmware release.

To save time, factory reset the gateway before proceeding if it is not a new gateway. It can be done via the hard reset button on the front panel or via the web browser. Details are available in the gateway’s user manual.
4.2 Install and Power Up AWIN GW100 Gateway

Follow the health and safety guidelines provided in the User Manual (3BNP102912) of AWIN GW100 gateway before installing, connecting and powering up the gateway.

Gateway should be installed on a DIN rail as shown in Figure 7.

![Figure 7: DIN mounting of the AWIN GW100 gateway](image)

AWIN GW100 is supplied with a test antenna, which should be mounted on the antenna connector. It should be installed vertically. Clearance around the antenna should be approximately 1-2 meters from major obstacles.

Connect power to AWIN GW100 Gateway, as shown in Figure 8. Recommended supply voltages are 12V DC or 24V DC. Refer to product datasheet (3BNP102906) or current ratings on the gateway's side panel for details. When powered-up, LEDs should blink, and ST LED should turn into solid green color after initialization. Power connectors are in the bottom of the unit whereas the power connection labels are printed on the front label.

![Figure 8: AWIN GW100 power connections and labels](image)

Electrical installation should be carried out only by qualified electricians.
5 Enable Connectivity of WirelessHART Devices

Some WirelessHART instruments go into sleep mode if left un-operated over a long period. To force them to join the WirelessHART network will require a trigger such as a battery power cycle. It is different for each device, for some devices when a battery is inserted the device initiates the joining procedure. In other devices, there is a menu option. Refer to individual device’s user manual for details.

Just as an Example:
For ABB WirelessHART temperature device (TTF300-W):
- Switch on the LCD display by “pressing down the button” on the backside of the transmitter.
- Select join now from the menu, Communication > Join now.

For ABB WirelessHART pressure instrument (2600T):
- Switch on the LCD display by pressing down the Z button on the top of the transmitter.
- Select join now from the menu, Network Setup > Join Mode > Join now.

This section does not contain last-minute product information and updates which might affect functionality. For information on last revisions, late changes and restrictions, the user shall refer to the relevant release notes and user manuals.

Default Network ID and Join Key of ABB WirelessHART Gateway (AWIN GW100) and ABB WirelessHART transmitters are same:
- **Network ID**: 0xABB (HEX)
- **Join Key**: 57495245 4C455353 4649454C 444B4559

The WirelessHART instruments should be in communication range of the WirelessHART gateway during this step.

In this section, the discussion is limited to ABB WirelessHART instruments only. For non-ABB WirelessHART instruments, the Network ID and Join Key should be changed accordingly.
6 Configure WirelessHART Devices and Gateway

6.1 Bulk Configuration Settings

Bulk configuration option supports the following parameters to be changed using the AWIN GW100 Configurator tool:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WirelessHART Gateway – AWIN GW100</td>
<td></td>
</tr>
<tr>
<td>Long Tag</td>
<td>WirelessHART uses the long tag for addressing devices.</td>
</tr>
<tr>
<td>WirelessHART Network ID</td>
<td>Each WirelessHART gateway creates a network ID to identify the WirelessHART</td>
</tr>
<tr>
<td>Network ID Format</td>
<td>Can be provided in either HEX or Decimal format.</td>
</tr>
<tr>
<td>WirelessHART Join Key</td>
<td>The WirelessHART join key is a common network password.</td>
</tr>
<tr>
<td>IP assignment</td>
<td>Can be set to either manual or DHCP.</td>
</tr>
<tr>
<td>IP address</td>
<td>Provide IP address if manual option is selected in IP assignment.</td>
</tr>
<tr>
<td>Subnet mask</td>
<td>Provide subnet mask if manual option is selected in IP assignment.</td>
</tr>
<tr>
<td>Active advertisement</td>
<td>WirelessHART network active advertisement can be enabled or disabled.</td>
</tr>
<tr>
<td>Advertisement period (min)</td>
<td>The period of time Active Advertising is enabled.</td>
</tr>
<tr>
<td>Gateway profile</td>
<td>Select amongst available gateway profiles.</td>
</tr>
<tr>
<td>Modbus port</td>
<td>ModbusTCP port can be provided.</td>
</tr>
<tr>
<td>WirelessHART Devices</td>
<td></td>
</tr>
<tr>
<td>Existing Long Tag</td>
<td>WirelessHART uses the long tag for addressing devices. Provide existing</td>
</tr>
<tr>
<td>New Long Tag</td>
<td>WirelessHART uses the long tag for addressing devices. Provide new required</td>
</tr>
<tr>
<td>Network ID Format</td>
<td>Can be provided in either HEX or Decimal format.</td>
</tr>
<tr>
<td>WirelessHART Join Key</td>
<td>The Join Key is used by devices to join the network.</td>
</tr>
<tr>
<td>Burst Period</td>
<td>It sets burst period of command 3. For this, burst command 3 should be</td>
</tr>
<tr>
<td>Routing Status</td>
<td>In addition to performing the primary function, WirelessHART device can</td>
</tr>
</tbody>
</table>

6.2 Export Devices Configuration from the Gateway

To save time in minimizing manual data entry follow these steps:

a) Log onto the AWIN GW100 gateway webpages by typing the following in the web-browser: https://172.16.16.1 (default IP address). You will only be able to do so if your workstation is also on the same subnet as the AWIN GW100 gateway.

b) When prompted provide **username** and **password**. If gateway is using default settings, then enter the following login details:
6.3 Change Devices Configuration including Gateway and Field Instruments

1. Open AWIN GW100 Configurator tool.
2. If prompted with “Security Warning. Macros have been disabled” then select “Enable content”.
   Select IO Schedule sheet. A screenshot is provided in Figure 10.
3. Select the Import IO Configuration button from top menu and load the “IOSchedule.xml” file. The cells in the sheet will be populated with the current configuration of the settings recorded in the gateway. Make the changes as required by project by typing in new values.

   Values should only be provided in highlighted cells.

   If you do not want to change the Existing Tag then leave the New Tag cell(s) empty.

   Network ID and Join Key should be same for all devices and the gateway.

4. Export the new configuration by selecting the Export IO Configuration button. Let us refer to this file as “newIOSchedule.xml”.
5. Log onto the AWIN GW100 gateway webpages by typing the gateway IP address in the browser.

   Go to the devices page: (Configuration > WirelessHART > Devices). Import new configuration file “newIOSchedule.xml” by selecting the Browse button. Afterwards, select Upload, see,
Figure 9(b). Follow the messages on the screen. If all WirelessHART devices were connected then the gateway will download new configuration to both the devices and the gateway and confirm back to the user of the process outcome.

If new static IP address was provided then the browser will automatically redirect you to the new IP address.

Figure 10. WirelessHART field devices and gateway configuration spreadsheet
7 Configure Modbus Map

The gateway provides two options for Modbus mapping: Automatic and Manual.

7.1 Automatic Modbus Mapping

If Automatic Mapping is to be used then no setting is required as it is the default setting. However, to view the generated Modbus map, browse to the webpage at:
Configuration > Modbus > Modbus Mappings.

7.2 Manual Modbus Mapping

Skip this section if Automatic mapping is used. Else, continue.
- Log onto the gateway as admin.
- Go to Configuration > Modbus > Modbus Configuration.
  - Select Auto Modbus mapping button.
  - Select Export Mappings button. Save the generated file as “ModbusMap.xml”.
- Launch the AWIN GW100 Configurator Tool.
- Select the ModbusMap sheet. A screenshot is provided in Figure 11.
- Select the Import Modbus Map button from top menu and load the “ModbusMap.xml” file. The cells in the sheet will be populated with the current mapped registers recorded in the gateway. Make the changes as required by the project by typing in new register values or use the other options available on the configurator, like “Assign Modbus Map (group by devices)”. 
- Export the new configured file by selecting Export Modbus Map button. Let us refer to this generated file as “newModbusMap.xml”.
- Log onto the AWIN GW100 gateway webpages by typing it’s IP address in the browser.
- Go to the devices page: (Configuration > Modbus > Modbus Configuration).
  - Select Manual option on top.
  - Import the new configuration file, “newModbusMap.xml”, by selecting the Browse button. Afterwards, select Submit. Follow the messages on the screen. If successfully uploaded then the new map is displayed on (Configuration > Modbus > Modbus Mapping) page.

Figure 11. Modbus mapping of WirelessHART devices and gateway spreadsheet
8 Test As-Built System

Before proceeding, it is recommended to disable webpages caching in the web-browser being used. This is to ensure that the web-browser shows the correct and current information from the gateway. The data is refreshed automatically approximately every 30s on the webpages.

8.1 Verify Connected Devices

After successful completion of previous sections, log onto the AWIN GW100 gateway’s webpage as “monitor” user. Default log in details are:

**User**: monitor  
**Password**: monitor

- Check that the gateway is operating as normal as indicated by the traffic lights on the Home page.
- Check that all devices have joined the network in Field Devices tab and communicating data.
- Check that the WirelessHART network statistics is available under Network Information tab.

**Note**: The user has to wait at least 15 minutes before the network statistics appear first time.

- Check if there are any alarms and warnings reported in the Logs tab. If so, address them. They can be found in Logs section.

![System Log](image)

**Figure 12: System Log**
9 Connect from Modbus Host System

Any ModbusTCP based host system, such as, Totalflow RTU or AC800M controller can now communicate with the AWIN GW100 gateway and connected devices.

The host system should also map Modbus registers as configured in AWIN GW100 gateway. See section Configure Modbus Map for procedure on how to view the registers mapped in the gateway.

- The gateway only supports holding registers and function code 3.
- Trying to read unmapped registers will result in exception notification.
10 Create Gateway Backup and Document As-Built System

10.1 Create System Backup

- Log onto the AWIN GW100 gateway’s webpage as admin user.
- Go to Configuration > Store Retrieve Settings.
- Type a Passphrase and Click the Save Configuration To File button. Store this generated gateway configuration file. Remember to note the passphrase, it is required when restoring gateway to backup configuration.

![Configuration - Store Retrieve Settings](image)

In this firmware release, the Gateway backup configuration file does not store Modbus map explicitly. It has to be backup separately. For this procedure, refer to the User Manual (3BNP102912).

10.2 Document As-Built System

- Log onto the AWIN GW100 gateway’s webpage as admin user.
- Go to Configuration > Store Retrieve Settings.
- Click the Export as Built button (See Figure 14) and store this generated file. It provides a text document with current setup details.
Figure 14: Export as Built functionality in the AWIN GW100 gateway
### 11 Complete Checklist for Project Execution

During actual project execution, use the following Table 5 to ensure that all required steps are implemented.

**Table 5: Steps required to setup a WirelessHART network with AWIN GW100**

<table>
<thead>
<tr>
<th>Step Number</th>
<th>Step Description</th>
<th>Reference Section</th>
<th>Status</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is pre-configuration checklist completed?</td>
<td>3 - Pre-configuration Checklist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Is AWIN GW100 installed and powered up?</td>
<td>4 - AWIN GW100 Installation and Power up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Are WirelessHART instruments connected?</td>
<td>5 - Enable Connectivity of WirelessHART Devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Are WirelessHART devices configured?</td>
<td>6 - Configure WirelessHART Devices and Gateway</td>
<td></td>
<td>Configuration of both WirelessHART instruments and gateway.</td>
</tr>
<tr>
<td>5</td>
<td>Is Modbus map configured?</td>
<td>7 - Configure Modbus Map</td>
<td></td>
<td>This step is optional if automatic Modbus mapping feature is used.</td>
</tr>
<tr>
<td>6</td>
<td>Is built WirelessHART system tested?</td>
<td>8 - Test As-Built System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Is built system documented and backup created?</td>
<td>10 - Create Gateway Backup and Document As-Built System</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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