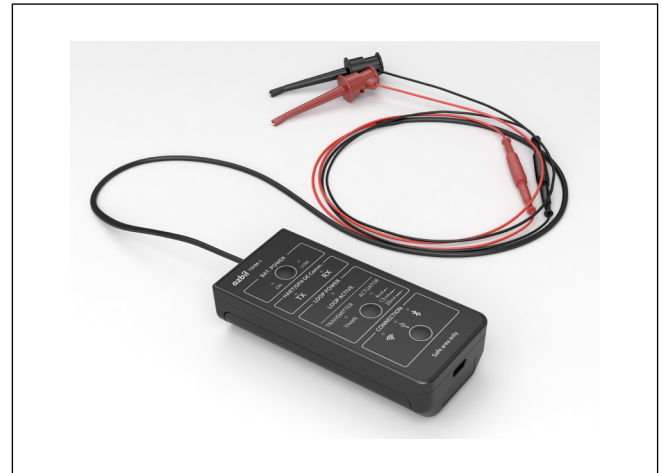**azbil**

Smart HART Modem

Model AZ-1SHM

Overview

The Smart HART Modem, model AZ-1SHM (referred to as "the 1SHM" below), is an innovative field service tool featuring various communication diagnostic functions that utilize installation and maintenance of HART communication-compatible field devices ("HART devices"), in addition to the usual HART communication interface function that is required of a HART modem.

The LEDs on this product show the communication and power supply status of the connected field device. In addition, by using the supplied software, a communication analysis function that is provided by an oscilloscope, protocol monitor, etc., can be added.

Furthermore, the 1SHM can connect to host systems from various manufacturers using USB or Bluetooth and supply power to a field device, providing the optimum communication means for various operation environments and situations.

Features

Quick check of HART communication status

- The 1SHM is equipped with a loop power checker and HART communication checker, allowing quick investigation of the cause of HART communication problems.

- The Support Tool (a Windows application) that is supplied with the 1SHM can display HART communication waveforms and details of the communication between the host and field devices, enabling more detailed analysis of the cause of various phenomena.

Support for wireless connection

The 1SHM can connect to a host system from various companies using USB or Bluetooth*. The user can select the optimum connection method according to the host PC and the environment at the site.

A Bluetooth connection is prohibited in countries where this device has not acquired wireless device certification. Please check the following website for the latest information on acquisition of certification.
https://www.azbil.com/products/factory/solution/equipment-asset-management/hart-foundation-fieldbus/hdfs-system/smart-hmodem/index.html

Supplying power to a field device

Since the 1SHM can supply power to a field device, the user can set parameters or do other operations without being affected by construction or maintenance work.

Support for Azbil's SFN (DE) communication

When used in combination with Azbil's field communication software model CFS100, SFN devices can be adjusted and set up.
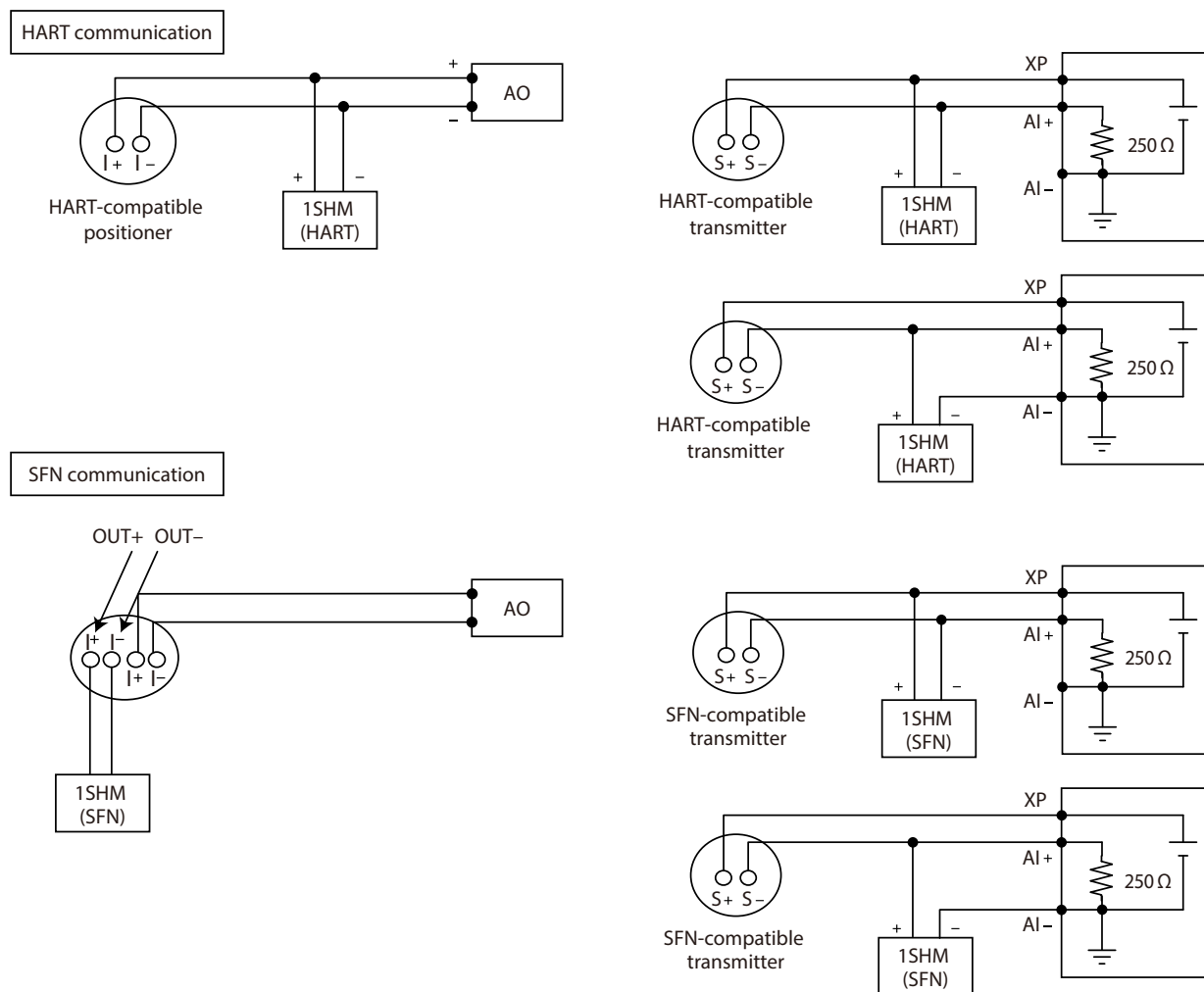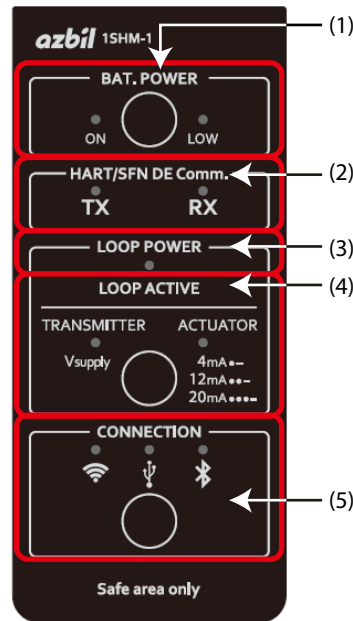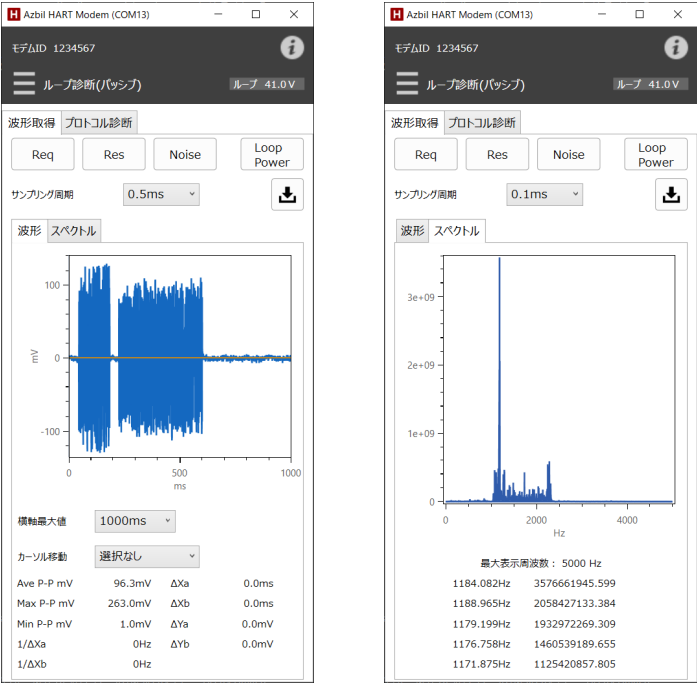
System Configuration

HART communication

HART-compatible positioner

1SHM (HART)

AO

+ −

XP

AI +

AI −

250 Ω

HART-compatible transmitter

1SHM (HART)

XP

AI +

AI −

250 Ω

HART-compatible transmitter

1SHM (HART)

SFN communication

OUT+ OUT−

I+ I−

AO

1SHM (SFN)

XP

AI +

AI −

250 Ω

SFN-compatible transmitter

1SHM (SFN)

XP

AI +

AI −

250 Ω

SFN-compatible transmitter

1SHM (SFN)

Figure 1.

Functions

Model AZ-1SHM

Figure 2.

Table 1.

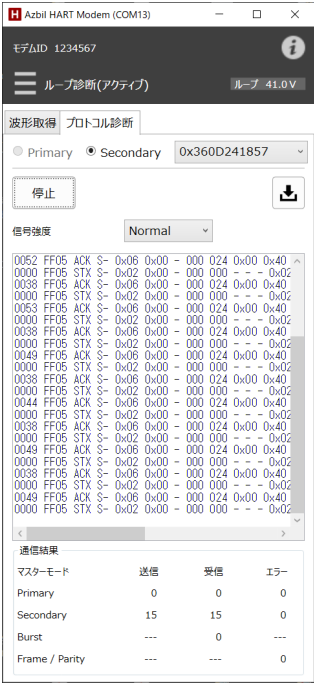| No.	Indicated item	Description
(1)	Power status and low battery voltage	Indicates the power status (ON/OFF) and low voltage of the built-in battery. ON is lit (green): the battery is in use. LOW is lit (orange): the battery voltage is low. Button: switches whether the battery is used or not. The battery can be used for connection methods other than a USB connection.
(2)	Communication status	Indicates the status of communication between the 1SHM and the field device (sending / receiving / not-communicating). TX is lit (green): the 1SHM is sending a signal. RX is lit (green): the 1SHM is receiving a signal.
(3)	Power supply status of the field device	Indicates that the connected field device is receiving power from this modem or another source. LOOP POWER is lit (green): the connected field device is receiving power.
(4)	Power from the 1SHM to the field device	The 1SHM can supply power to the transmitter or actuator. For safety, the 1SHM is designed so that it supplies power to the transmitter or actuator only when that device is not receiving power from another source. TRANSMITTER is lit (green): the 1SHM is supplying power (24 V DC) to the transmitter. ACTUATOR is lit (green): the 1SHM is supplying power (4 to 20 mA) to the actuator. Button: press this button to turn on/off the power supply function and to switch the device to be powered (transmitter or actuator).
(5)	Host PC connection method	Indicates the method of connection between the 1SHM and the host PC (Wi-Fi, USB, or Bluetooth). Wi-Fi is lit (green): connected to the host PC by Wi-Fi (in AP or STA mode). USB is lit (green): connected to the host PC by USB Bluetooth is lit (green): connected to the host PC by Bluetooth Button: press this button to switch connection methods.

Support Tool

HART communication waveform monitor

HART communication protocol monitor

The waveform and spectrum representing the transmission/reception status (command / response / no communication) of the sampled HART signal are displayed. Also, if there is noise that interferes with the HART waveform, the noise level is displayed.

The details of the HART signal sent between the host and the field device are displayed in real time. In addition, by analyzing the saved data, the user can investigate discrepancies between the host and field device specifications, etc.

Figure 3.

Note: The Support Tools can be downloaded from a special Azbil Corporation site.

Specifications

Smart HART Modem Model AZ-1SHM

Table 2. Specifications

Item		Description
Communication interface (1SHM and host)	USB	USB 2.0, Type-C connector The USB cable is not included in the product.
	Bluetooth*1	Bluetooth Classic v.4.2
	Wi-Fi*1	IEEE 802.11 b/g/n (AP/STA mode switching)
Communication interface (1SHM and field device)	HART	HART physical layer-compliant FSK modem, 2 mm banana plug (crocodile clip or test clip attached)
	SFN (DE)	SFN (DE) communication, 2 mm banana plug (crocodile clip or test clip attached)
Dimensions/weight	Dimensions (W × H × D)	49.2 × 106.9 × 27.3 (mm)
	Weight	90 (g)
Power (1SHM)	USB	Supplied via the USB port
	Battery	AAA batteries (3), alkaline or nickel metal hydride batteries recommended
	Continuous operation time (when batteries are used)	Alkaline batteries: approx. 3 hours*2 Nickel metal hydride batteries (750 mAh): approx. 4 hours 30 minutes*
Power supply from the 1SHM to the field device	Supplied voltage	Maximum rating: 25.2 V DC (24 V + 5 %)
	Supplied current	Maximum rating: 30 mA
Environmental conditions	Operating temperature range	−20 to 50 °C
	Transport/storage temperature range	−40 to +70 °C
	Operating humidity range	5 to 95 % RH
Other	Function to supply power to the field device	24 V max. for transmitter, 4 to 20 mA for actuator

*1 *A Bluetooth or Wi-Fi connection is prohibited in countries where this device has not acquired wireless device certification. Please check the following website for the latest information on acquisition of certification.*
https://www.azbil.com/products/factory/solution/equipment-asset-management/hart-foundation-fieldbus/hdfs-system/smart-hmodem/index.html

*2 *If the 1SHM uses Bluetooth connection and is not supplying power to the field device*

Table 3. Support Tool

Item	Description
Operating environment	Windows 10 or higher (operation on English/Japanese 64-bit Windows 10 Pro was verified)
HART signal sampling	Sampling cycle (ms): 0.02 / 0.1 / 0.5 / 1 Sampling count: 4096 points

Table 4. Included products

Item	Description
Smart HART Modem	Cable for connecting field device: 3.1 mm dia. 2-core round cable, 1 m Banana plugs (2) (for connecting the cable attachment described below)
Cable attachment	Crocodile clips (2) or test clips (2) with a 50 cm lead wire
Silicone jacket	Orange
Pouch	For carrying (all accessories except the silicone jacket are in the pouch at the time of shipment)
Quick Start Guide	−
License certificate	The utility software download site is shown on the certificate.

Table 5. Model No.

Basic model No.	AZ-1SHM-	Smart HART Modem Model AZ-1SHM
Selected model No.	1	The following are included with the product. Smart HART Modem Body (model AZ-1SHM-1B), accessories (cable attachment, USB 2.0 Type C-A cable (1 m, black), special pouch and silicone jacket, Quick Start Guide (Japanese/English), license certificate.

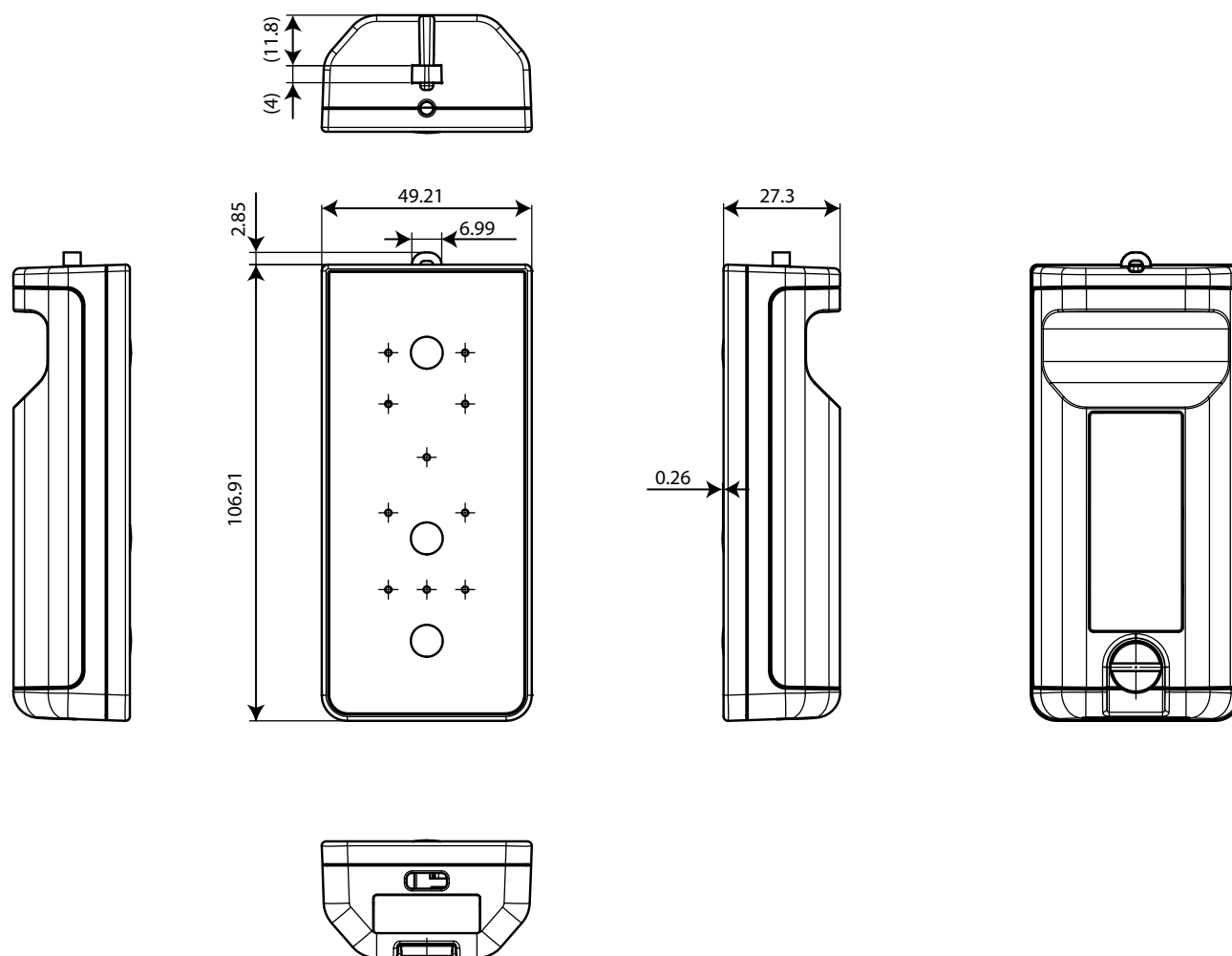*Note: This product cannot be used in hazardous areas.*

Dimensions

Unit: mm

Figure 4.

Compatible commercially available software

Table 6.

Company name	Product name	Version
USB connection (HART)		
Azbil	InnovativeField Organizer / PLUG-IN Valstaff	R50
	Model CFS100 field communication software	3.4
CodeWrights	HART CommDTM*1	1.0.55
Procomsol	ProComSol DevComDroid*2	2.2.4.3
Bluetooth connection (HART)		
Same as USB connection (HART)		
USB connection (SFN(DE))		
Azbil	Model CFS100 field communication software	3.4

*1. Operation was verified with PACTware 4.1^{TM}.

*2. Bluetooth Classic connection only

Note: The above table shows host systems from various companies that were confirmed to be connectable to Azbil's Smart HART Modem Model AZ-1SHM. The table is based on the results of connection check performed at Azil's integration center. The performance of each device is not guaranteed.

Handling Precautions

This manual uses the following symbol to promote the safe use of the product.

⚠️ **WARNING**	Warnings are indicated when mishandling this product may result in death or serious injury.
⚠️ **CAUTION**	Cautions are indicated when mishandling this product may result in minor injury or property damage only.

Symbol

🚫	The indicated action is prohibited.
❗	Be sure to follow the indicated instructions.

Safety Precautions

⚠️WARNING	
🚫	If an explosion-proof field device is used, never open its cover while it is running. There is a danger of an explosion. For the handling of this type of device, refer to the user's manual for the device.
❗	This device emits radio waves. Keep this device at least 20 cm away from a pacemaker. Otherwise, the pacemaker may malfunction. Radio wave emission can be stopped by changing the settings.

⚠️CAUTION	
🚫	Do not touch live terminals. Doing so may cause an electric shock.
❗	Use this device within the specified operating temperature range (−20 to 50 ºC) and humidity range (5 to 95 % RH). If used outside the above range, this device may malfunction, making communication with connected devices unreliable.
🚫	Do not use this device near a magnetic field. A magnetic field may cause a malfunction, making communication with connected devices unreliable.
🚫	Do not allow water or dust to enter this device. Doing so may cause an electric shock. The jacket cannot perfectly protect this device from water or dust.
❗	Remove the batteries if this device will not be used for a long time. Otherwise, battery fluid might leak and injure someone.
🚫	Connect only USB-compatible devices to the USB port. Otherwise, there is a danger of fire or damage to the device.
❗	Before sending a HART signal via the 1SHM, check to make sure that sending a HART signal to the connected system and field devices will not cause any problems. Communication may cause fluctuation in analog values (4–20 mA), leading to unexpected behavior of the equipment.
❗	If other HART hosts are connected at the same time, interference between the device and host primary or secondary HART communication may occur, resulting in a HART communication error. Monitor communication between the device and other hosts by using the Support Tool in passive mode before sending the HART signal from the 1SHM and, if needed, change the settings to avoid simultaneous communication.
❗	Before using SFN/DE communication from model CFS100 field communication software, make sure that the field device connected to it is not in operation. Communication may cause fluctuation in analog values (4–20 mA), leading to unexpected behavior of the equipment.
❗	Before using the Support Tool in HART master mode, check to make sure that sending a HART signal to the connected system and field devices will not cause any problems. Communication may cause fluctuation in analog values (4–20 mA), leading to unexpected behavior of the equipment.

· Bluetooth® word mark and logo are registered trademarks of Bluetooth SIG, Inc.
· HART® is a registered trademark of FieldComm Group.
· USB Type-C® is a registered trademark of USB Implementers Forum.
· Wi-Fi® is a registered trademark of Wi-Fi Alliance.

Please read "Terms and Conditions" from the following URL
before ordering and use.

https://aa-industrial.azbil.com/jp/en/order

Specifications are subject to change without notice.

Azbil Corporation
Advanced Automation Company

1-12-2 Kawana, Fujisawa
Kanagawa 251-8522 Japan
For our products and services for factories and plants, please visit:
URL: https://aa-industrial.azbil.com/jp/en

(15)