

TTF300-W

As WirelessHART repeater



The WirelessHART transmitter TTF300-W is a suitable solution to act as a repeater within WirelessHART networks.

Measurement made easy

TTF300-W

Introduction

In a well-designed WirelessHART network, every device should have a minimum of 3 neighbors within its effective range. This ensures that there will be at least 2 redundant connection links. A WirelessHART network can only operate as meshed network if redundant paths are available. This is a prerequisite to ensure reliable communication.

Additional Information

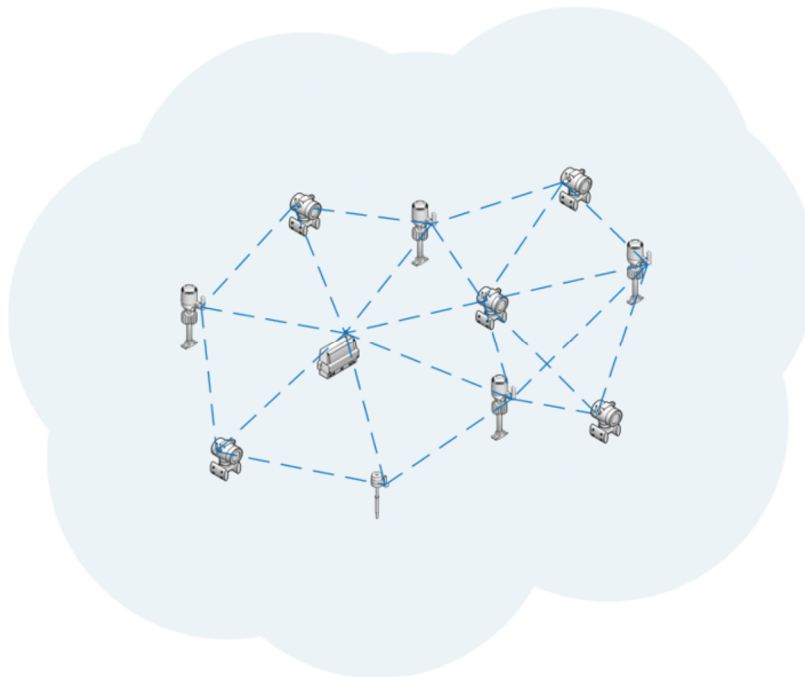
Additional documentation on TTF300-W is available for download free of charge at www.abb.com/wirelessmeasurement. Alternatively simply scan this code:



WirelessHART® network operation

01 Operating
WirelessHART® network
with full redundant paths

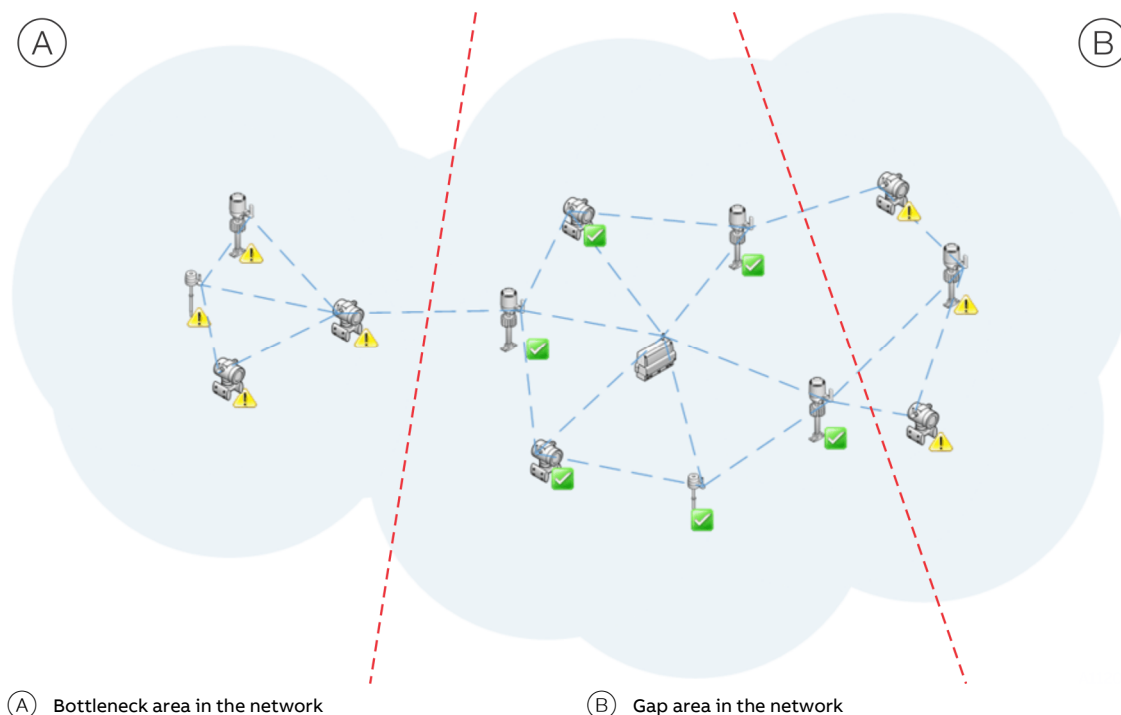
02 Operating
WirelessHART® network
with additional devices



01

Figure 01 shows a meshed network of this kind where every device has at least 3 communication links (blue lines).

Although this is the ideal layout, it is not always possible to design a network like this. Not all WirelessHART devices provide the same effective range and the effective range can also be limited by environmental influences. A wall (brick or concrete), metal structures and even trees may have an impact on possible communication links.



(A) Bottleneck area in the network

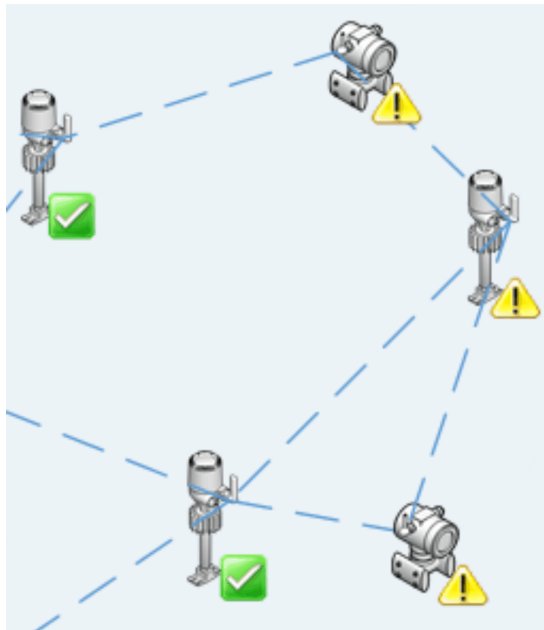
(B) Gap area in the network

02

— 03 Gap of WirelessHART network

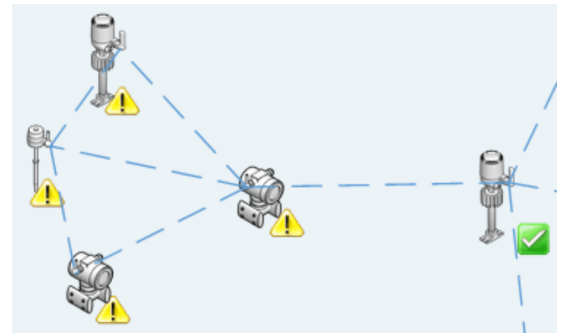
— 04 Bottle neck of WirelessHART network

— 05 Operating WirelessHART network with additional repeaters



03

While the gap in Figure 03 is not optimal, the bottle neck of the left part in Figure 04 is critical. If the only connection to the network fails, four measurement points are lost. Additionally, the battery lifetime of the routing device will be reduced by three times compared with the connected devices. This setup must be prevented wherever possible. To connect these four devices correctly, two repeaters are needed.

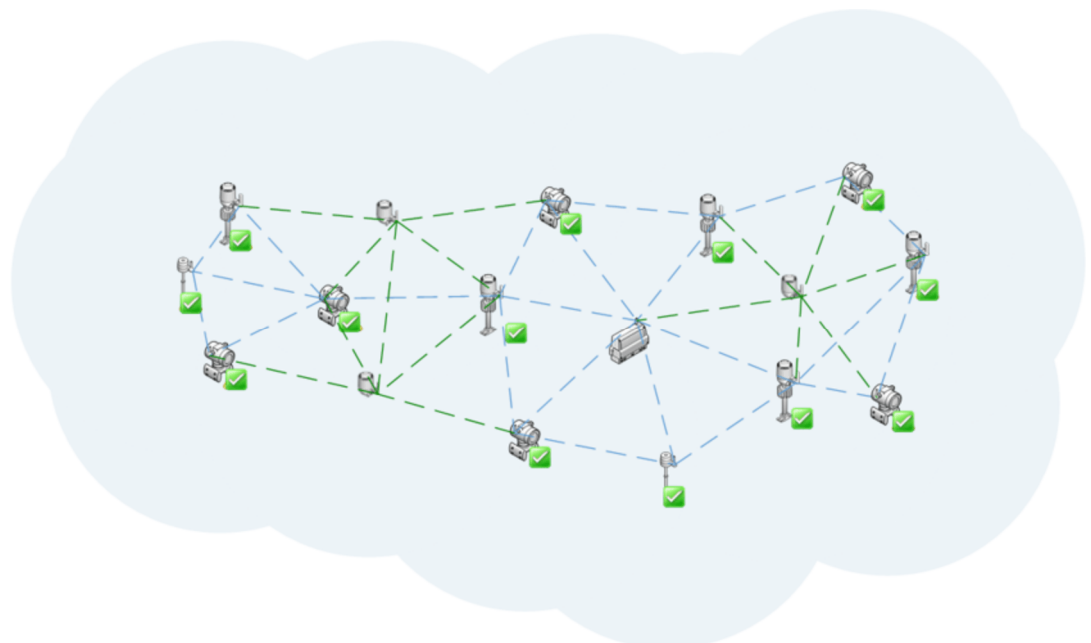


04

The right-hand area of the network has a gap where devices have only two communication links. This means that three devices are not connected with fully redundant paths as desired. A repeater can be installed to increase the redundancy for this area of the network. The way in which repeaters can be installed is very flexible and only depends on the required network coverage because they only work for the communication links.

The other devices need to be installed at the measurement point for which they will be transmitting.

Figure 05 below shows the same network but with three additional repeaters. One repeater closes the gap between the center and the devices on the right that only have two available paths. The other two repeaters eliminate the bottle neck seen before and provide a stable and redundant connection for these devices. In this way, all devices are now connected and fully redundant with three independent communication links.



05

- 06 Internal wire jumper
- 07 Electrical connections
- 08 Size of wire jumper

Network extension using a WirelessHART transmitter as a repeater

As all WirelessHART devices must support routing functionality, not all devices are suitable for this. Routing will consume more energy, so the lifetime of the battery will be affected. Hence a device with a long battery lifetime and a cheap battery that is easy to change would be suitable. Using a normal WirelessHART measuring device will result in higher costs than necessary due to the sensor included in the device.

Therefore a WirelessHART transmitter TTF300-W is suitable to operate as a repeater.

It is equipped only with the electronic needed for communication – no sensor is included.

The housing is small but robust and is proven in the field. It is also certified for ATEX zone 0 as well as FM class I Div. 1. The battery is easy to change and less expensive than other power supplies used by WirelessHART devices because it is a standard battery.

Thanks to the mounting accessories available, installation is also quite easy.

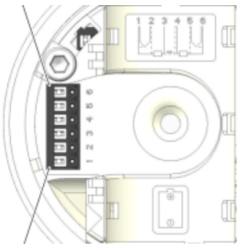
Although a TTF300-W can be used out of the box as a repeater, changing its setup can increase its performance.

Preparing the WirelessHART transmitter TTF300-W

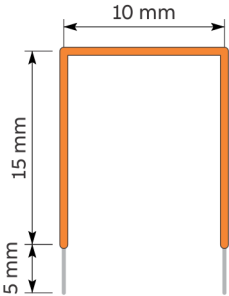


06

To avoid a diagnosis of a broken sensor, the device should be equipped with an internal wire link. This means a wire should be connected between sensor clamp 1 and 3.



07



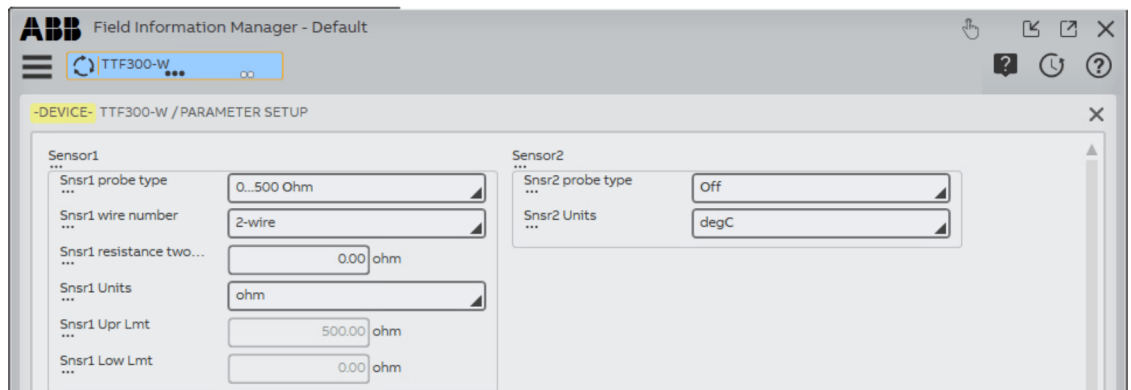
08

This wire can be between 0.13 to 1.5 mm² or AWG24 to AWG16. A length of at least 50 mm is sufficient, but a longer wire would also fit in the housing of the TTF300-W.

- 09 Sensor configuration
- 10 HART Mapping

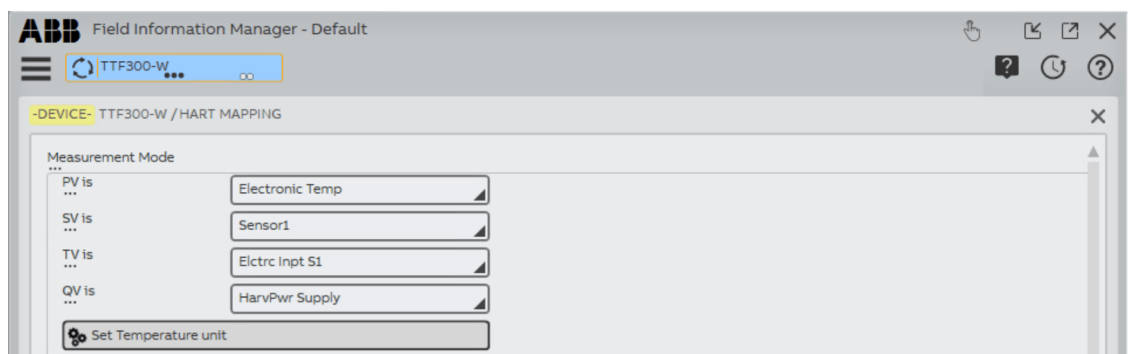
Device configuration

After the wire jumper is inserted, the TTF300-W needs to be configured. The sensor should be configured as follows:



09

Now the 'HART Mapping' needs to be configured as follows:



10

While a TTF300-W normally sends measurement values quite often, this is not necessary for a repeater. This means the 'Burst Configuration' should be adjusted to use less network bandwidth.

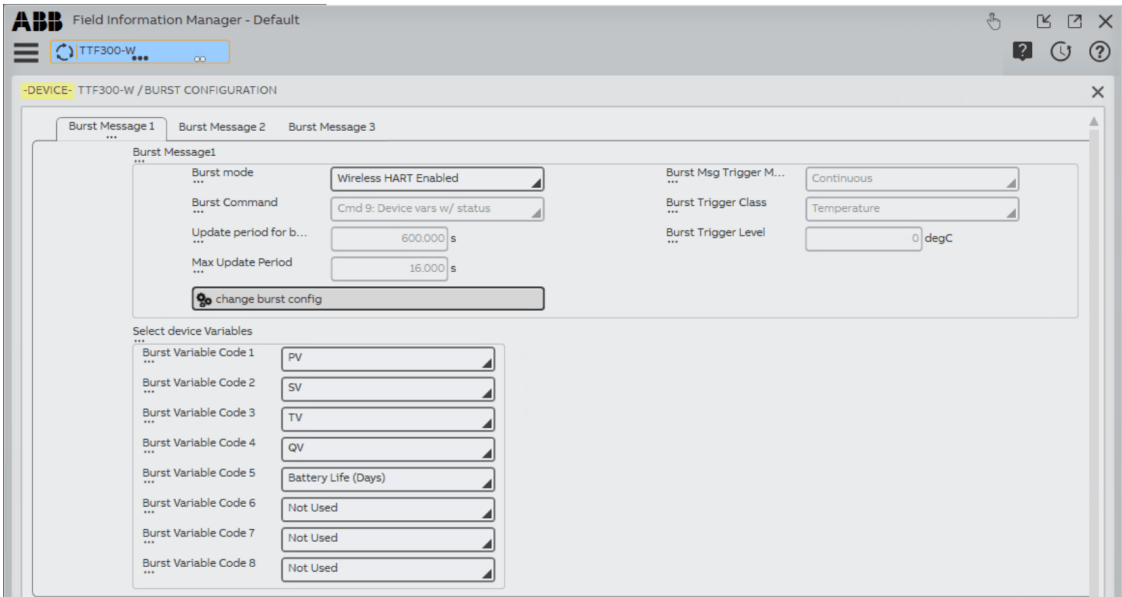
The burst configuration should be set to the default configuration but with an update periode of 600 seconds resp. 10 minutes.

In this way the remaining battery lifetime will be transmitted as well as all diagnosis of the TTF300-W.

11 Burst Configuration – Burst Message 1

12 Burst Configuration – Burst Message 2

13 Burst Configuration – Burst Message 3



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11



12



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Ordering information TTF300-W

Explosion protection	Transmitter housing	Order code
Without explosion protection	Aluminum with mounting bracket	TTF300-W.Y0.A.8.W.BS-...K2
	Stainless steel with mounting bracket	TTF300-W.Y0.B.8.W.BS-...K2
ATEX	Aluminum with mounting bracket	TTF300-W.A6.A.8.W.BS-...K2
	Stainless steel with mounting bracket	TTF300-W.A6.B.8.W.BS-...K2
IECEX	Aluminum with mounting bracket	TTF300-W.H6.A.8.W.BS-...K2
	Stainless steel with mounting bracket	TTF300-W.H6.B.8.W.BS-...K2

Trademarks

WirelessHART is a registered trademark of FieldComm Group, Austin, Texas, USA

ABB Measurement & Analytics

For your local ABB contact, visit:

www.abb.com/contacts

For more product information, visit:

www.abb.com/wirelessmeasurement

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