technical datasheet

FBT-5

accurate characterisation of fieldbus wiring

- fieldbus wiring
- Operates with wiring blocks installed
- Use with FBT-6 to measure signal and noise levels
- Test fieldbus wiring before the control system is installed

The Fieldbus Wiring Validator, FBT-5, is used in combination with the Relcom Fieldbus Monitor, FBT-6, to test new or existing field wiring to determine its suitability for use in a Foundation fieldbus™ network. The FBT-5 acts as a signal generator, supplying DC power and a simulated fieldbus signal to the wire pair being tested. The FBT-6 is then used to take power, signal, and noise measurements. Testing can be performed on existing instrumentation wiring, multi-pair cables, newly installed fieldbus cable, or a complete fieldbus wiring system with wiring blocks and terminators already installed.

Connection

Using the clip leads, connect the FBT-5 to one end of the cable. To the other end, attach the Test Terminator. Connect the FBT-6 to the Test Terminator. Be sure to attach the red clips to the positive fieldbus wires and the black clips to the negative. If the wires are reversed, the Monitor will not function.

Caution

The FBT-5 must not be used in a hazardous area without a gas clearance certificate. If connected to an IS trunk, even in a safe area, the gas clearance must cover the whole system.

Operation

The Wiring Validator has a push-button Power switch to turn it on or off. If the Wiring Validator is turned on with a single click of the Power button, it will stay on for about 5 minutes and then automatically turn itself off to conserve battery power. If the Wiring Validator needs to be powered on indefinitely, such as when wire testing is being performed by a single person, press and hold the Power button for about 3 seconds. The green Power On light shows that the Wiring Validator is on.

If the Power On light blinks rapidly (about three times per second), the Wiring Validator or Fieldbus Monitor is not attached to the wire pair or the connection is reversed.

If the Power On blinks slowly (about once a second), there is a good connection to the wire pair and Fieldbus Monitor, and the Wiring Validator is in battery save mode (and will automatically power down in about five minutes).

If the Power On indicator lights continuously, all connections have been made properly and the Wiring Validator will stay on until it is manually powered off. When the Wiring Validator is turned on, the Fieldbus Monitor powers up and displays the following readings:

Voltage should be between 9 and 10V.

(continued overleaf)

Typical connection details

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- Push the Monitor's Mode button once to get the LAS function. The LAS signal level reading wshould say "OK" and show the signal level in millivolts:

LAS Signal (mV)	Wire Condition
350 or more	Excellent
200-350	Good
150-200	Marginal
150 or less	Not Good

- Push the Monitor's Mode button three times to get the NOISE Average reading. It should say "OK" and display the average noise level:

Noise Level (mV)	Wire Condition
25 or less	Excellent
25-50	Good
50-75	Marginal
75 or more	Not Good

Wire System Testing

A complete fieldbus wire system, with two terminators and other wiring blocks installed, can be tested before field devices are connected. This is done in the same way as the wire testing described previously except that the Test Terminator is not used.

Note: The wiring system cannot have fieldbus devices attached to it during testing. The Wiring Validator is not capable of providing power to the fieldbus devices and its signal generator will interfere with any data transmission that the fieldbus devices attempt to initiate.

If the wiring system has two terminators installed (as required for proper fieldbus operation), test results will be comparable to the results of the wire by itself. However, if too few or too many terminators have been installed, the measured signal levels will be inaccurate. The chart below shows the relative values of LAS signal level that will be observed:

Terminators	LAS Signal (mV)
0	999
1	961
2	(correct number) 760
3	637

Error Conditions

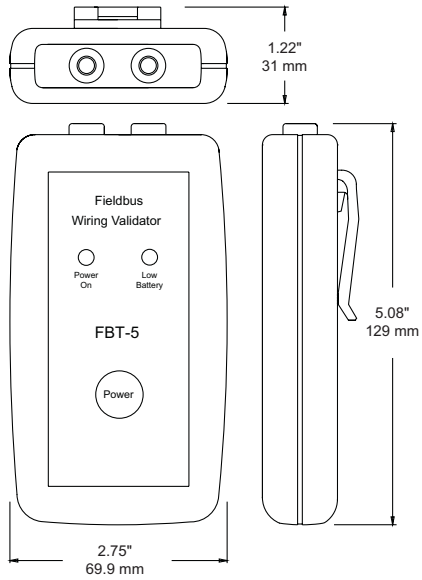
A blinking Low Battery light indicates that the outputs of the Wiring Validator are shorted. The Low Battery light may also flash briefly as the Wiring Validator is first attached to a wire pair. A continuously lit Low Battery light indicates that the batteries need to be replaced.

Self Test

To verify that the Wiring Validator and the Fieldbus Monitor are working correctly, connect them to each other through the Test Terminator. Observe the power, signal, and noise values and verify that they are within the following ranges:

Measurement	Acceptable Range
Power	9 to 10V
LAS Signal	700 to 800mV
Noise Average	less than 25mV

If the observed values fall outside of these ranges, replace the batteries as described below. If the problem persists, contact Relcom for assistance. The unit contains no user serviceable parts.



Additional Wiring Tests

To get a complete characterization of the fieldbus wiring, measure the resistance between the individual conductors in the cable using a standard ohmmeter.

Suggested measurements include:

- The resistance between the twisted-pair wires
- The resistance between each of the twisted pair wires and the shield/drain (if present)
- The resistance between the shield/drain and instrument ground bar.

Readings of 100K ohms or higher are acceptable.

Additional System Requirements

A Relcom Fieldbus Monitor, FBT-6, is required to obtain signal and noise measurements as described in these instructions.

Batteries

The FBT-5 requires four (4) AA Alkaline batteries which are not included. These must be installed prior to using the FBT-5. Access to the battery compartment is obtained by unscrewing the four screws on the back of the unit and removing the battery cover.

As a guide, the batteries will last about 12 hours with continuous use.

Specifications

The FBT-5 includes soft case, Test Terminator, clip leads, and operating instructions.

Operating temperature range
0 to 50°C

Dimensions
12.9 × 7.0 × 3.1cm (5.1 × 2.8 × 1.2”)

Weight
600g

ORDERING INFORMATION

Description	Part Number
Fieldbus Wiring Validator	FBT-5
Fieldbus Monitor	FBT-6