

YAMATAKE

**ThermoPLUS
Model ATT60/70
Advanced Temperature Transmitter**

**Supplement Manual for
HART[®] Communication Option**

Yamatake Corporation

About This Publication

This manual is intended as a detailed “how to” reference for operating Yamatake’s ThermoPLUS Advance Temperature Transmitters with HART® communication option. It is based on using the HART® Communicator as the operator interface for the transmitter.

Note that this manual does not include a detailed reference for installing, piping the transmitter or detail operations of the HART® Communicator. Refer the user’s manuals of ThermoPLUS Advance Temperature Transmitters (CM2-ATT100-2001) and the HART® Communicator.

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Section 1 – Starting Communications

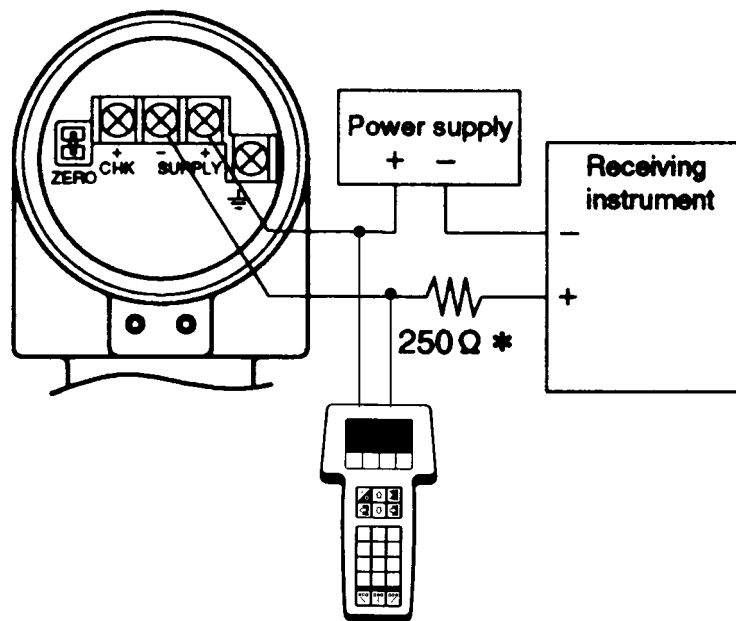
Overview of Section 1

Instructions for connecting HART® Communicator to this transmitter.

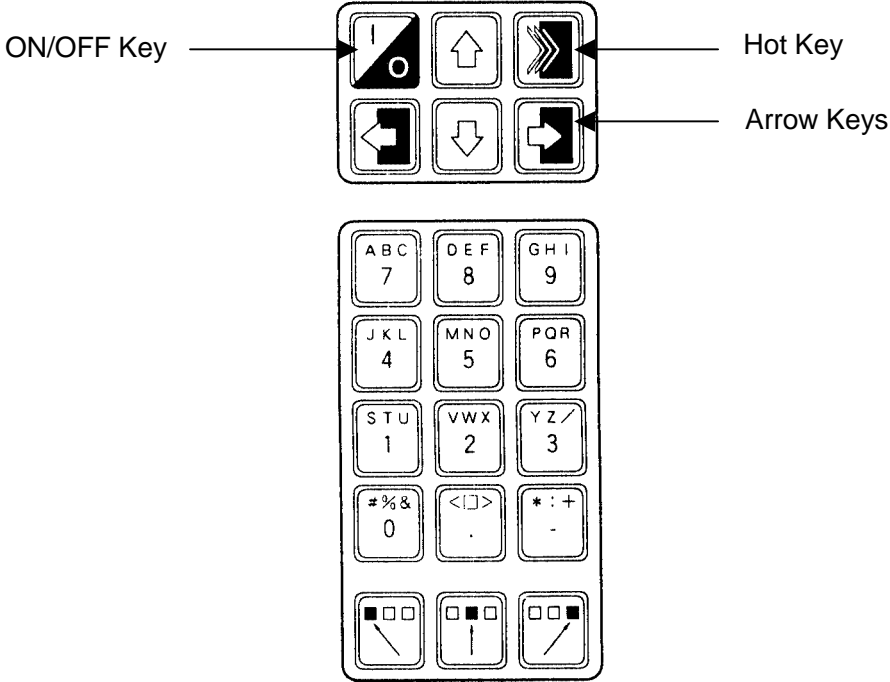
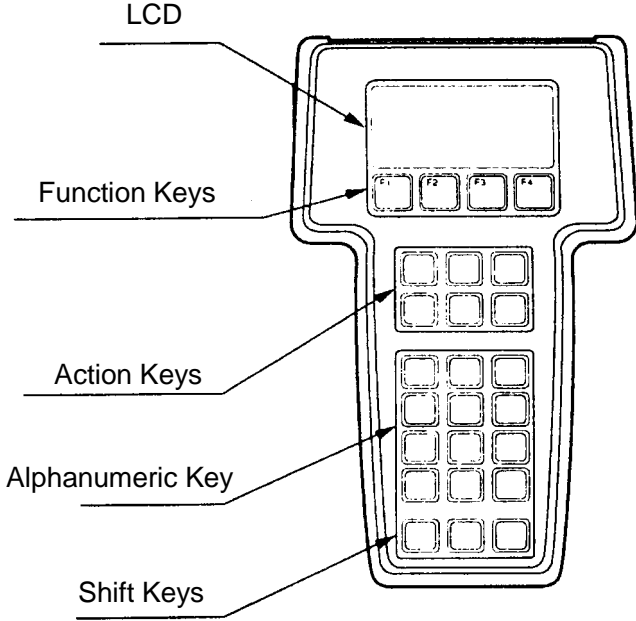
Basic instructions for Key-pad operation.

1.1 Connecting Communicator

You connect the communicator directly to signal terminals on the transmitter's terminal block or at any location in the 4 to 20 mA loop. (Polarity of the communicator connection does not matter)



1.2 HART® Communicator Keyboard



1.3 Symbols on Communicator Screen

♥ Flashing heart icon in the upper right corner indicates that the transmitter and communicator are communicating.

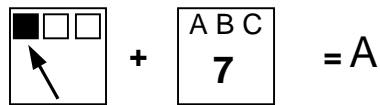
← This left arrow symbol indicates that the left arrow on the keypad brings you back to previous menu.

↑ or ↓ These arrows indicate there is more column to scroll though, using the indicated arrow on the keypad.

→ This right arrow indicates a menu item has menu option.

1.4 Keying in Alphanumeric Characters

To key in an alphabet at the top of a key, press the arrow key indicating the position of the character on the key, then press the alphanumeric key.



1.5 Establishing Communications

This procedure starts communications between the transmitter and the communicator:

STEP	Action and/or Description
1	Turn on communicator. The communicator runs a self-test check then determines if it is connected to a transmitter.
2	<p data-bbox="533 445 1323 506">If you receive a communication error message (No Device Found), check the following:</p> <ul data-bbox="515 539 1323 667" style="list-style-type: none"> <li data-bbox="515 539 1323 600">• Loop resistance: Is there a minimum of 250 ohms resistance between the communicator and the power supply? <li data-bbox="515 607 1323 667">• Power supply: Is power applied? Is there greater than 11 volts at the transmitter? <p data-bbox="533 701 1323 734">Correct any problems, then try communicating again.</p> <p data-bbox="533 768 1323 824">If the message, or any other error message, appears again, refer to Section 7 – Trouble shooting for probable cause.</p>
3	<p data-bbox="533 831 1323 891">When the “Online” display – shown below – appears, you have established communication with the transmitter.</p> <div data-bbox="684 931 1046 1196" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <pre data-bbox="708 943 1023 1184"> ATT : TAG001 Online 1 → Device setup 2 PV 135.79 degC 3 AO 7.838 mA 4 LRV -200.00 degC 5 URV 1200.00 degC HELP SAVE </pre> </div> <p data-bbox="533 1218 1323 1281">The flashing heart icon in the upper right corner indicates the communicator and the transmitter are communicating.</p>

1.6 Checking Basic Data

This procedure checks the transmitter's factory-set configuration parameters:

STEP	Action and/or Description
1	From the "Online" menu, enter "Device setup" by pressing the right arrow (→) key on the communicator keypad.
2	<p>Press the down arrow (↓) key to scroll down to menu-item "5 Review". When highlighted press the right arrow (→) key to enter review function.</p> <div data-bbox="715 613 1080 878" style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <pre>ATT : TAG001 REVIEW Model ATT HELP PREV SAVE EXIT</pre> </div>
3	<p>Press PREV and/or NEXT to scroll through the configuration data including:</p> <ul style="list-style-type: none"> • Model • Manufacturer • Sensor type • Linearizer form • CJC • CJC Temp • PV Unit • PV URL: Upper Range Limit • PV LRL: Lower Range Limit • PV Damp • PV % Range • Transfer function (linear or square root) • PV URV: Upper Range Value • PV LRV: Lower Range Value • PV AO: Analog output (in mA) • Fail safe • PV Snsr s/m: Serial Number • Dev id: Device ID • Tag: Tag name • Message • Universal rev: Universal revision number • Fld dev rev: Field device revision number • Software rev: Software revision number • Poll addr: Polling address • Num req preams: Number of required preambles
4	Press EXIT to go back to the "Device setup" menu.

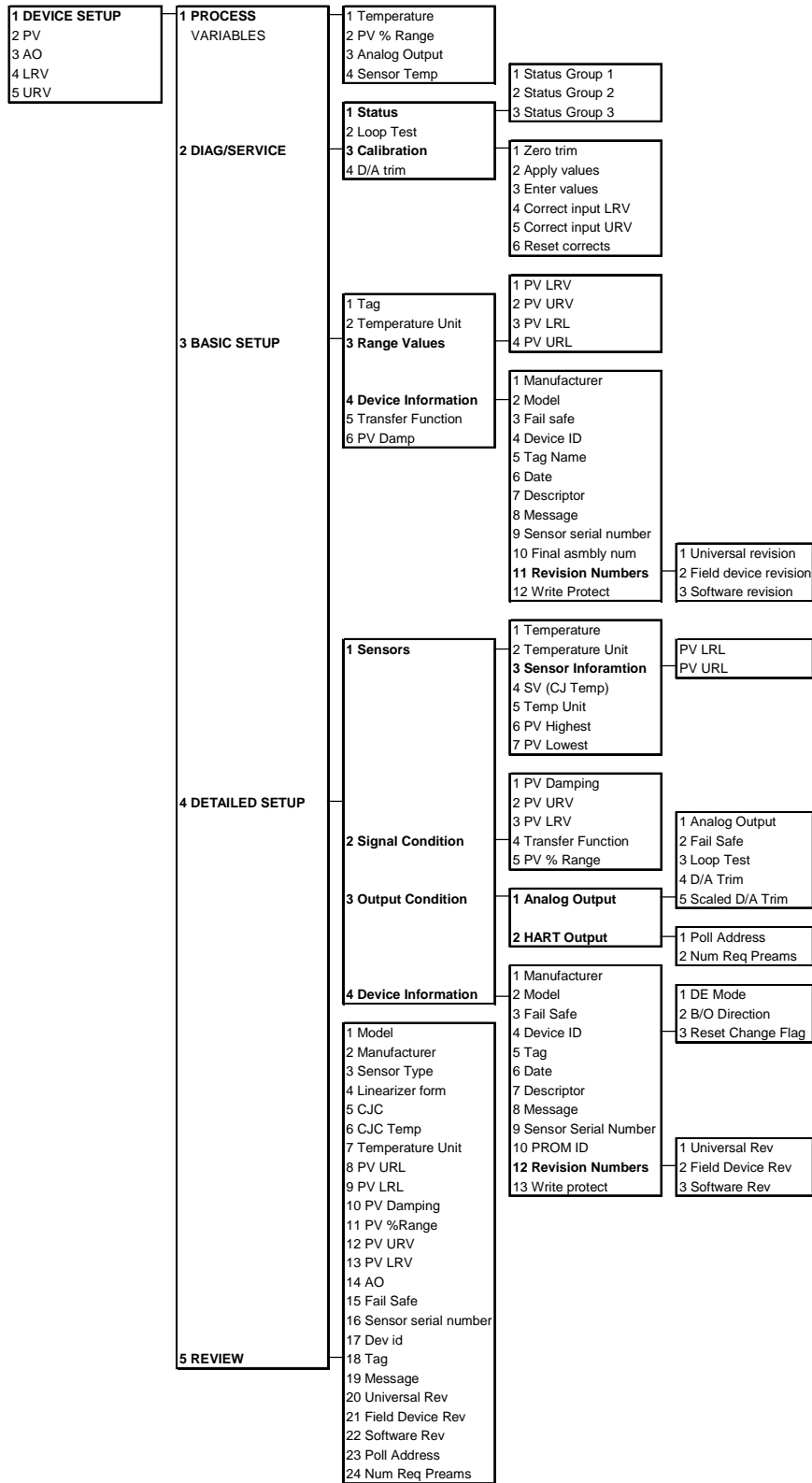
Section 2 – Configuration

Overview of Section 2

This section introduces you configuration of ThermoPLUS Model ATT60/70 with HART® option using the HART® Communicator.

This section also provides an overview of the HART® Communicator, including menus and keyboards.

2.1 HART® Communicator Menu Summary



2.2 Changing Tag No.

This shows how to change or enter tag number.

(Device setup) – (Basic setup) – (Tag)

```
ATT : *****
Tag
*****
*****
HELP DEL ESC ENTER
```

Enter a tag number (up to 8 characters) in the highlighted part.

```
ATT : *****
Tag
*****
TAG001
HELP DEL ESC ENTER
```

After entering a tag number with pressing ENTER, press SEND to download the change to the transmitter.

2.3 Selecting Sensor Type

This shows how to configure display format and/or its ranges.

(Device setup) – (Basic setup) – (Sensor Setup) –(Sensor type)

```
ATT : TAG001
Sensor Type
T/C - J
  T/C - J
  T/C - K
  T/C - T
  ↓ T/C - S
ESC ENTER
```

Select the sensor type from the menu and press ENTER key.

Selectable sensor types are as follows;

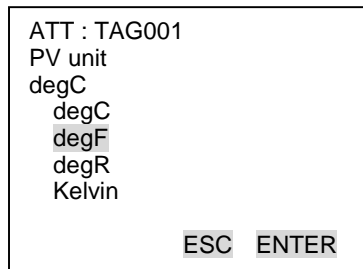
T/C – J	Thermocouple type J
T/C – K	Thermocouple type K
T/C – T	Thermocouple type T
T/C – S	Thermocouple type S
T/C – R	Thermocouple type R

T/C – E	Thermocouple type E
T/C – B	Thermocouple type B
T/C – J	Thermocouple type J
Milivolts	mV input
RTD – Pt100D	RTD Pt100 (IEC Pub.75 ITS-90)

2.4 Selecting unit of Measurement

This function is to select a temperature unit of the transmitter.

(Device setup) – (Basic setup) – (PV unit)



To select the unit, highlight the desired unit using the arrow keys and press ENTER.

A temperature unit is able to be selected from the following;

deg C

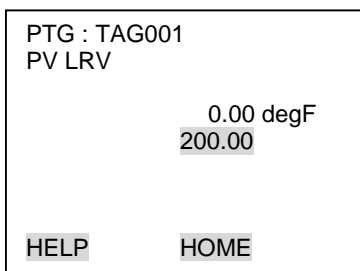
deg F

deg R

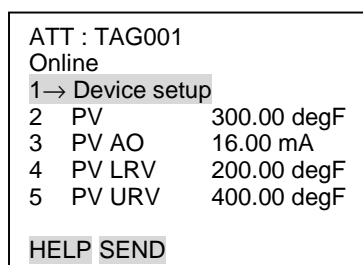
Kelvin (K)

2.5 Setting Range Values

This is to configure the measuring range of the transmitter.



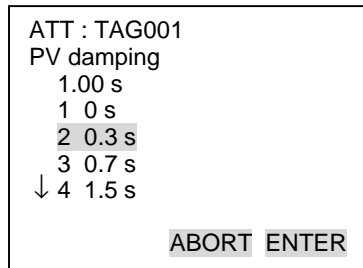
- Select PV LRV or PV URV from the initial menu display to key in the desired setting. The measuring range can be set from –105% to +105% of URL.
- Press ENTER. This takes you back to the initial menu display.
- Press SEND to download change to transmitter.



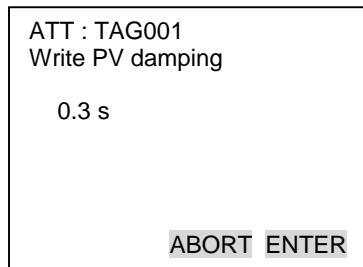
2.6 Adjusting Damping Time

You can adjust the damping time to reduce the output noise.

(Device setup) – (Basic setup) – (PV damping)



On PV damping menu, highlight appropriate damping time from the menu, and press ENTER.



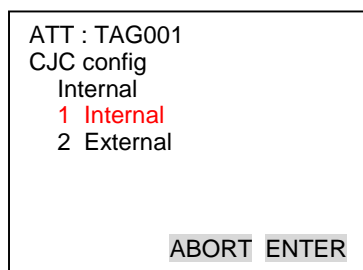
Press ENTER to write the selected PV damping or press ABORT to cancel the selection.

2.7 Setting CJC (Cold Junction Compensation)

This is to set CJC (Cold Junction Compensation) mode as Internal or External.

Internal:

(Device setup) – (Basic setup) – (Sensor setup) – (CJC config)



2.8 Setting Burnout Function

2.9 Setting Linearization Function

Section 3 - Start-up and Operation

Overview of Section 3

This section identifies how to access typical data associated with the start-up and the operation of PTG with HART® communication option. It includes the procedure for

- running an analog output check

3.1 Running Analog Output Check

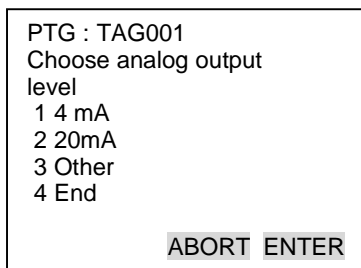
You can put the transmitter into a constant-current source mode, which maintains the output that is set between 4 mA (0%) and 20 mA (100%).

This shows how to configure the transmitter in a constant-current source mode and to return to its original output.

(Device setup) – (Detailed setup) – (Output condition) – (Analog output) – (Loop test)

You will be prompted to put the loop into manual mode. After doing so, press ENTER.

Then, the following screen is appeared.



- Select 4mA to set the output signal level to 4mA (0%).
- Select 20mA to set the output signal level to 20mA (100%).
- Select Other and press ENTER, then use communicator's keyboard to enter other values.
- When the transmitter has the display, the PV which is set will flash.
- Select End and press ENTER. The communicator will notify you that it is returning transmitter to its original output.

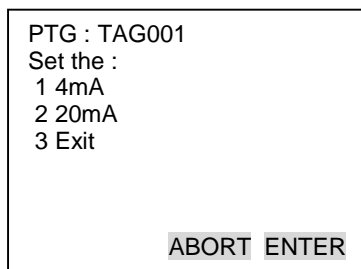
3.2 Configuring Ranges with Applying Pressure

This shows how to configure ranges with applying 4mA/20mA input pressure.

(Device setup) – (Diag/Service) – (Calibration) – (Rerange) – (Apply Values)

You will be warned to remove the loop from automatic control. After doing so, press ENTER.

Then the following screen will be appeared.



- Choose 4mA then press ENTER.

A display will prompt you to apply new 4 mA input.

When “Current applied process value” display appears, choose “Set as 4mA value” then press ENTER.

Return the loop to automatic.

Section 4 - Calibration

Overview of Section 4

This section provides information about calibrating the transmitter's analog output and measuring range. It also covers the procedure for resetting calibration to default values.

4.1 Calibrating Analog Output Signal

You can calibrate the transmitter's analog output circuit at its 0% and 100% levels by using the transmitter in its constant current source mode.

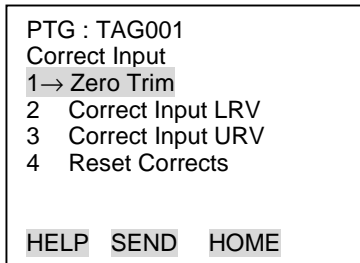
(device setup) – (Detailed setup) – (Output Condition) – (Analog output) – (D/A trim)

STEP	Action/Description
1	<p>You will be warned to remove the loop from automatic control. After doing so, press OK.</p> <p>When prompt appears, connect a precision milliammeter or volt meter (0.03% accuracy or better) in loop to check readings. Press OK.</p>
2	<p>The following display prompts will appear:</p> <ul style="list-style-type: none"> • Setting field device output to 4 mA. Press OK. • Enter meter value . Key in meter value, then press OK. • Field device output 4.000 mA equal to reference meter? <ul style="list-style-type: none"> 1 Yes 2 No <p>If not equal, select No, press ENTER, then key in new meter value. (returns to "Enter meter value" prompt until field device output equals reference meter.)</p> <p>If equal, select Yes, press ENTER.</p>
3	<p>The following display prompts will appear:</p> <ul style="list-style-type: none"> • Setting field device output to 20 mA. Press OK. • Enter meter value. Key in meter value, then press ENTER. • Filed device output 20.000 mA equal to reference meter? <ul style="list-style-type: none"> 1 Yes 2 No <p>If not equal, select No, press ENTER, then key in new meter value. (Returns to "Enter meter value" prompt until field device output equals reference meter.)</p> <p>If equal, select Yes, press ENTER.</p> <p>Prompt notifies you that the field device will be returned to its original output.</p>

4.2 Calibrating Range

The ST3000 Smart Transmitter has two-point calibration. This means when you calibrate two points in the range, all the points in that range adjust to that calibration.

(Device setup) – (Diag/Service) – (Calibration) – (Correct Input)



- Select “Correct Input LRV” or “Correct Input URV”.
- You will be warned to remove the loop from automatic control. After doing so, press OK.
- When prompted, adjust pressure source to apply pressure equal to LRV (0%) or URV (100%), then press OK.
- When pressure is stable, press OK.
- When prompted, remove pressure.

4.3 Resetting Calibration

A Corrects Rest returns the zero and span calibration factors to their default values. The transmitter calculates its output based on the characterization equation alone, without any compensation for the residual errors.

(Device setup) – (Diag/Service) – (Calibration) – (Reset Corrects)

- When prompted, remove the loop from automatic control. Press OK.
- Prompt notifies you that a Reset Corrects is about to occur. Press OK.
- When message “Reset Corrects OK” appears, press OK.
- Calibration is reset to default values.
- When prompted, return the loop to automatic control and press OK.

