The YTA510 is the high performance temperature transmitter that accepts Thermocouple, RTD, ohms or DC millivolt inputs. The dual input type independently measures and calculates process values for Sensor 1 and Sensor 2. YTA510 transmit not only process variables but also the setting parameters using wireless signal. The transmitters run on internal batteries, and the installation cost can be decreased since hard-wiring is not required. The communication is compliant with ISA100.11a protocol specifications.

**FEATURES**

- **Long Life Battery Design**
  Ultra low current consumption design using two high capacity lithium-thionyl chloride batteries provide wireless operation for years.

- **Security Assured Wireless Network Joining**
  Infrared communication between the devices for wireless network configuration and parameter setting.

- **Quick Update Time**
  Selectable from 1 second to 60 minutes for measured process value to publish wirelessly.

**STANDARD SPECIFICATIONS**

- **WIRELESS SPECIFICATIONS**
  Communication protocol: ISA100.11a protocol
  Data rate: 250 kbps
  Frequency: 2400 - 2483.5 MHz license free ISM band
  Radio security: AES 128 bit codified
  RF Transmitter power: Max. 11.6 dBm (fixed)
  Antenna: +2 dBi Omni directional monopole type
  Separately sold remote antenna and antenna cables can be used.

- **POWER SUPPLY SPECIFICATIONS**
  Battery:
  Use the dedicated battery pack.
  Rated voltage: 7.2 V
  Rated capacity: 19 Ah

- **PERFORMANCE SPECIFICATIONS**
  Accuracy
  See Table 1.
  Cold Junction Compensation Accuracy
  For T/C only
  $±0.5°C (±0.9°F)$
  Ambient Temperature Effect (per 1.0°C change)
  See Table 2.

**FUNCTIONAL SPECIFICATIONS**

- **Battery Characteristic**
  Battery pack with long life lithium-thionyl chloride batteries. With the intrinsically safe type, the battery pack is replaceable in hazardous area. Typical battery life is 10 years at 30 seconds update time or 6 years at 10 seconds update time in the following conditions.*
  - Ambient temperature: $23±2°C$
  - Device role: IO mode
  - LCD display: off
  *For amplifier housing code 8 and 9, typical battery life is 8 years at 5 seconds update time with power saving mode. Environmental condition such as vibration may affect the battery life.

- **Input**
  Single input: Amplifier housing code 7
  Dual input: Amplifier housing code 8 and 9
  Input type is selectable: Thermocouples, 2-, 3-, and 4-wire RTDs, ohms and DC millivolts. See Table 1.
  4-wire is available for Sensor 1 input.

- **Input Signal Source Resistance (for T/C, mV)**
  1 kΩ or lower

- **Input Lead Wire Resistance (for RTD, Ohm)**
  10 Ω per wire or lower

- **Output**
  Wireless (ISA100.11a protocol) 2.4 GHz signal.

- **Range**
  See Table 1.

- **Update Period**
  1 to 3600 s selectable.*
  - Minimum update time is 2 s at dual input sensor use.
Zero-gain Adjustment
Set the amount of zero-gain point adjustment.

Integral Indicator (LCD display)
5-digit numerical display, unit display and bar graph.
The indicator is configurable to display the following variables periodically.
°C, K, °F, °R, mV and ohm, 0 to 100 % bar graph,
and alternate display of Sensor 1 and Sensor 2 process value.
See also "Factory Setting."

Sensor Burnout
Select either HIGH or LOW as the configuration.

Self Diagnostics
Amplifier failure, sensor failure, configuration error,
battery alarm, wireless communication alarm and
over-range error for process variables.

Software Download Function
Software download function permits to update
wireless field device software via ISA100.11a
wireless communication.

Battery Pack
2x primary lithium-thionyl chloride batteries
With battery case (batteries sold separately)

NORMAL OPERATING CONDITION
(Optional features or approval codes may affect limits.)

Ambient Temperature Limits
-40 to 85°C (-40 to 185°F)
-30 to 80°C (-22 to 176°F) LCD visible range

Ambient Humidity Limits
0 to 100% RH

REGULATORY COMPLIANCE STATEMENTS
This device contains the wireless module which satisfies the following standards.
* The specific radio equipment (Approval Number:007WWCUL0480) which received the
technical standard satisfied certification based on the Radio Law is used for this product.
* Please confirm that an installation region fulfills an applicable standard. If additional regulatory
information and approvals are required, contact a Yokogawa representative.

EMC Conformity Standards
EN61326-1 Class A, Table 2 (For use in industrial locations), EN61326-2-3

Radio Equipment Directive (RE)
ETSI EN 300 328, ETSI EN 301 489-1,
ETSI EN 301 489-17, EN61010-1, EN61010-2-030,
EN62311
  • Indoor/Outdoor use

EU RoHS Directive
EN50581

Safety Requirement Standards
EN61010-1, EN61010-2-030
  • Installation category: I
  • Pollution degree: 2
  • Indoor/Outdoor use

Regulation Conformity of the Wireless Module
  • FCC Approval
  • IC Approval

PHYSICAL SPECIFICATIONS

Enclosure
  Housing
  Low copper cast aluminum alloy

Coating of housing
  [for aluminum housing]
  Urethane curing type polyester resin powder coating
  Mint-green paint (Munsell 5.6BG 3.3/2.9 or its equivalent)
  [for option code /P or /X2]
  Epoxy and polyurethane resin solvent coating

Degrees of Protection
  IP66/IP67, NEMA4X

Name plate and tag
  316 SST tag plate wired onto transmitter.

Weight
  2.8 kg (6.2 lb)
  Without battery pack and mounting bracket.

Connections
  Refer to "MODEL AND SUFFIX CODE."

Related Instruments
  Field Wireless System:
  Refer to GS 01W01A01-01EN
  Field Wireless Management Station YFGW410:
  GS 01W02D01-01EN
  Field Wireless Access Point YFGW510:
  GS 01W02E01-01EN
  Field Wireless Media Converter YFGW610:
  GS 01W02D02-01EN
## Table 1. Sensor type, measurement range, and accuracy

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Standard</th>
<th>Measurement Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>T/C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>100 to 300°C (212 to 572°F)</td>
<td>± 5.0°C (± 9.0°F)</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>300 to 400°C (572 to 752°F)</td>
<td>± 2.0°C (± 3.6°F)</td>
</tr>
<tr>
<td></td>
<td>IEC584</td>
<td>400 to 1820°C (752 to 3308°F)</td>
<td>± 1.5°C (± 2.7°F)</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td>200 to 1000°C (-328 to 1832°F)</td>
<td>± 0.4°C (± 0.8°F)</td>
</tr>
<tr>
<td>K</td>
<td></td>
<td>200 to 1200°C (-328 to 2192°F)</td>
<td>± 0.5°C (± 0.9°F)</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>200 to 1300°C (-328 to 2372°F)</td>
<td>± 0.6°C (± 1.1°F)</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>200 to 1372°C (-328 to 2502°F)</td>
<td>± 0.6°C (± 1.1°F)</td>
</tr>
<tr>
<td>S</td>
<td></td>
<td>200 to 100°C (-58 to 212°F)</td>
<td>± 1.7°C (± 3.1°F)</td>
</tr>
<tr>
<td>T</td>
<td></td>
<td>100 to 1768°C (212 to 3214°F)</td>
<td>± 0.8°C (± 1.5°F)</td>
</tr>
<tr>
<td>RTD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pt100</td>
<td>IEC751</td>
<td>200 to 850°C (-328 to 1562°F)</td>
<td>± 0.3°C (± 0.6°F)</td>
</tr>
<tr>
<td>Pt200</td>
<td></td>
<td>200 to 850°C (-328 to 1562°F)</td>
<td>± 0.6°C (± 1.1°F)</td>
</tr>
<tr>
<td>Pt500</td>
<td></td>
<td>200 to 850°C (-328 to 1562°F)</td>
<td>± 0.5°C (± 0.9°F)</td>
</tr>
<tr>
<td>mV</td>
<td></td>
<td>-10 to 220 [mV]</td>
<td>± 0.03 [mV]</td>
</tr>
<tr>
<td>Ohm</td>
<td></td>
<td>0 to 2000 [Ω]</td>
<td>± 1 [Ω]</td>
</tr>
</tbody>
</table>

Note: For T/C input, add Cold Junction Compensation Accuracy (± 0.5°C) to the total accuracy. For RTD input of the 2-wire connection, add a corrected value (± 0.1°C) to the total accuracy.

## Table 2. Effects of ambient temperature

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Temperature Effects per 1.0°C Change in Ambient Temperature</th>
<th>Measurement Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>T/C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.2°C - (0.066% of (t - 100))</td>
<td>100°C ≤ t &lt; 300°C</td>
</tr>
<tr>
<td>E</td>
<td>0.07°C - (0.0049% of (100 - t))</td>
<td>300°C ≤ t &lt; 1000°C</td>
</tr>
<tr>
<td>J</td>
<td>0.035°C - (0.002% of t)</td>
<td>t &lt; 0°C</td>
</tr>
<tr>
<td>K</td>
<td>0.035°C + (0.002% of t)</td>
<td>t ≥ 0°C</td>
</tr>
<tr>
<td>N</td>
<td>0.039°C - (0.003% of t)</td>
<td>t &lt; 0°C</td>
</tr>
<tr>
<td>R</td>
<td>0.039°C + (0.003% of t)</td>
<td>t ≥ 0°C</td>
</tr>
<tr>
<td>S</td>
<td>0.0521°C - (0.0007% of t)</td>
<td>t &lt; 0°C</td>
</tr>
<tr>
<td>T</td>
<td>0.0521°C + (0.0008% of t)</td>
<td>t ≥ 0°C</td>
</tr>
<tr>
<td>RTD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pt100</td>
<td>0.004°C - (0.0016% of absolute value t)</td>
<td>Entire Sensor Input Range</td>
</tr>
<tr>
<td>Pt200</td>
<td>0.0038°C - (0.0015% of absolute value t)</td>
<td>t &lt; 650°C</td>
</tr>
<tr>
<td>Pt500</td>
<td>0.003°C - (0.0014% of absolute value t)</td>
<td>t &lt; 650°C</td>
</tr>
<tr>
<td>mV</td>
<td>0.2μV + (0.0015% of reading)</td>
<td>Entire Sensor Input Range</td>
</tr>
<tr>
<td>Ohm</td>
<td>0.001Ω + (0.0011% of reading)</td>
<td>Entire Sensor Input Range</td>
</tr>
</tbody>
</table>

Note1: The "t" on Table 2 means the value of the reading in °C. The "absolute value t" on Table 2 means the absolute value of the reading in °C.

Note2: When the temperature value is 250 Kelvin, abs reading is 23.15, absolute (250 - 273.15).
### MODEL AND SUFFIX CODES

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Codes</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>YTA510</td>
<td></td>
<td>Temperature Transmitter</td>
</tr>
<tr>
<td>Output Signal</td>
<td>-L</td>
<td>Wireless communication (ISA100.11a)</td>
</tr>
<tr>
<td>Amplifier Housing</td>
<td>8</td>
<td>Dual input type, cast aluminum alloy with detachable antenna (2 dBi)³</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Dual input type, cast aluminum alloy without antenna (N connector)²²³</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>0</td>
<td>G 1/2 female, two electrical connections without blind plugs</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1/2 NPT female, two electrical connections without blind plugs</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>M20 female, two electrical connections without blind plugs</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>G 1/2 female, two electrical connections with a blind plug</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>1/2 NPT female, two electrical connections with a blind plug</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>M20 female, two electrical connections with a blind plug</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>G 1/2 female, two electrical connections with a 316SST blind plug</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>1/2 NPT female, two electrical connections with a 316SST blind plug</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>M20 female, two electrical connections with a 316SST blind plug</td>
</tr>
<tr>
<td>Integral Indicator</td>
<td>D</td>
<td>with digital indicator</td>
</tr>
<tr>
<td>Mounting Bracket</td>
<td>A</td>
<td>Always A</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>Always A</td>
</tr>
</tbody>
</table>

Option codes:

- **A**: Always A

---

*1: For flat-panel mounting, please prepare bolts and nuts.
*2: Order the antenna separately from accessory option.
*3: Remote antenna cables can be attached. Order separately from accessory option.

### OPTIONAL SPECIFICATION

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painting</td>
<td>Color change</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Amplifier cover only Munsell code: N1.5, black</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Coating change</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>High anti-corrosion coating</td>
<td>X2</td>
</tr>
<tr>
<td>Calibration unit</td>
<td>°F or °R</td>
<td>D</td>
</tr>
</tbody>
</table>

All Rights Reserved. Copyright © 2010, Yokogawa Electric Corporation

GS 01C50E01-01EN   Feb. 1, 2017-00
### OPTIONAL SPECIFICATION (For Explosion Protected type)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory Mutual (FM)</td>
<td>FM Intrinsically safe Approval&lt;br&gt;Applicable Standard: Class 3600, Class 3610, Class 3611, Class 3810, NEMA 250, ANSI/ISA-60079-0, ANSI/ISA-60079-11&lt;br&gt;Intrinsically Safe for Class I, Division 1, Groups A, B, C &amp; D, Class II, Division 1, Groups E, F &amp; G and&lt;br&gt;Class III, Division 1, Class I, Zone 0, in Hazardous Locations, AEx ia IIC&lt;br&gt;Nonincendive for Class I, Division 2, Groups A, B, C &amp; D, Class II, Division 2, Groups F &amp; G and&lt;br&gt;Class III, Division 1, Class I, Zone 2, Group IIIC, in Hazardous Locations&lt;br&gt;Enclosure: &quot;NEMA 4X&quot;, Temp. Class: T4, Amb. Temp.: –50 to 70°C (–58 to 158°F)&lt;br&gt;Sensor Circuit Parameter: Voc=6.6 V, Isc=66 mA, Po=109 mW, Ca=22 uF, La=8.1 mH</td>
<td>FS17</td>
</tr>
<tr>
<td>Canadian Standards Association (CSA)</td>
<td>CSA Intrinsically safe Approval&lt;br&gt;Certificate: 2328785&lt;br&gt;Applicable standard: CAN/CSA-C22.2 No.0, CAN/CSA-C22.2 No.0.4, C22.2 No.25, CAN/CSA-C22.2 No.94, CAN/CSA-C22.2 No.157, C22.2 No.213, CAN/CSA-C22.2 No.61010-1, CAN/CSA-C22.2 No.60079-0, CAN/CSA-E60079-11, IEC60529&lt;br&gt;Ex ia IIC T4&lt;br&gt;Intrinsically Safe for Class I, Division 1, Groups A, B, C &amp; D, Class II, Division 1, Groups E, F &amp; G, Class III, Division 1, Nonincendive for Class I, Division 2, Groups A, B, C &amp; D, Class II, Division 2, Groups F &amp; G, Class III, Division 1&lt;br&gt;Enclosure: IP66/IP67 and Type 4X, Temperature Code: T4&lt;br&gt;Amb. Temp(Tamb): –50 to 70°C (–58 to 158°F)&lt;br&gt;Sensor Circuit Parameter: Uo=6.6 V, Io=66 mA, Po=109 mW, Co=22 uF, Lo=8.1 mH</td>
<td>CS17</td>
</tr>
</tbody>
</table>
## OPTIONAL ACCESSORIES

<table>
<thead>
<tr>
<th>Product</th>
<th>Part number</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery pack assembly</td>
<td>F9915NQ*1</td>
<td>Battery case, Lithium-thionyl chloride batteries 2 pieces</td>
</tr>
<tr>
<td>Batteries*2</td>
<td>F9915NR</td>
<td>Lithium-thionyl chloride batteries, 2 pieces</td>
</tr>
<tr>
<td>Battery case</td>
<td>F9915NK*3</td>
<td>Battery case only</td>
</tr>
<tr>
<td>Remote antenna cable</td>
<td>F9915KU</td>
<td>3 m with mounting bracket</td>
</tr>
<tr>
<td></td>
<td>F9915KV</td>
<td>13 m (3 m+10 m), with arrester and mounting bracket</td>
</tr>
<tr>
<td>Antenna</td>
<td>F9915KW</td>
<td>2 dBi standard antenna</td>
</tr>
<tr>
<td></td>
<td>F9915KY</td>
<td>6 dBi high gain antenna*4</td>
</tr>
</tbody>
</table>

*1: If you need F9915MA, please purchase F9915NQ. F9915NQ is a set of F9915MA and instruction manual.
*2: Alternatively, Tadiran SL-2780/S or TL-5930/S batteries can be purchased from your local distributor.
*3: If you need F9915NS, please purchase F9915NK. F9915NK is a set of F9915NS and instruction manual.
*4: Use of high gain antenna is limited by local regulation of radio and telecommunication law. Consult Yokogawa for details.

## DIMENSIONS

- 2-inch horizontal pipe mounting (Amplifier housing code 8)

*1: When amplifier housing code 9 is selected, the value is 187 mm (7.36 inch). In this case, the figure is shown as A.
● 2-inch vertical pipe mounting (Amplifier housing code 8)

*1: When amplifier housing code 9 is selected, the value is 187 mm (7.36 inch). In this case, the figure is shown as A.

● Infrared Configuration

● Terminal Configuration
**Antenna/Cable**

- **Non-directional antenna**
  - Gain: 2 dBi
  - Part number: F9915KW

- **Antenna cable**
  - Gain: 6 dBi
  - Sheath diameter: 11.2 mm
  - < Without arrester >
    - Part number: F9915KY
  - < With arrester >
    - Part number: F9915KV

- **Antenna mounting bracket**

*1: When 6 dBi antenna is selected, the value is 642 mm (25.28 inch).
### Input Wiring

#### Single input

- **T/C or DC milivolts**
- **two-wire RTD or ohm**
- **three-wire RTD or ohm**
- **four-wire RTD**

#### Dual input

- **T/C or DC milivolts**
- **three-wire RTD or ohm**
- **T/C and three-wire RTD or ohm**
- **two-wire RTD or ohm**

### Ordering Information

Specify the following when ordering:

1. **Model, suffix codes, and option codes**
2. **Sensor type**
   - For RTD and resistance input, specify the number of wire as well. (Example: RTD Pt100 3-wire system)
   - When Sensor 2 is not used, select "NON-CONNECTION" for Sensor 2.
   - When "4-WIRE" is selected for Sensor 1, select "NON-CONNECTION" for Sensor 2.
3. **Calibration range and unit:**
   - Calibration range can be specified within the measurement range shown in Table 1. Also, set the upper limit is larger than the lower limit.
   - When both Sensor 1 and Sensor 2 are used, specify Range 1 and Range 2, respectively.
   - Specify °C or K for Calibration unit except for the following cases:
     - When "mV" or "Ohm" is specified for Sensor type, select "mV" or "Ohm" for Calibration unit respectively.
     - When option code D2 is specified, °F and °R are available.
4. **Tag Number (if required)**
   - Specify Tag number (up to 16 letters) to be engraved on the tag plate. The specified letters are written on TAG_Name (16 letters) in the amplifier memory.
5. **Software tag (if required)**
   - Specify this software tag when tag number which is different from the tag number specified in the "TAG NUMBER" is required. The tag number specified in "SOFTWARE TAG" will be entered on "TAG" (up to 16 letters) in the amplifier memory.
6. **Network ID (if required)**
   - Specify the number from 2 to 65535. When not specified, it will use 1 as the default.

### Factory Setting

**Table A. Settings upon shipment**

| Calibration range lower limit | As specified or lower range value for the specified sensor type otherwise specified in order. See Table 1. |
| Calibration range upper limit | As specified or lower range value for the specified sensor type otherwise specified in order. See Table 1. |
| Calibration unit | Unit used for specified sensor type |
| Tag No. | Blank unless otherwise specified in order |
| Software tag | Blank unless otherwise specified in order |
| Network ID | "1" unless otherwise specified in order |