User's Manual

YTA Series

YTA70
Temperature Transmitter

IM 01C50C03-02EN

YOKOGAWA ◆

IM 01C50C03-02EN
5th Edition

Yokogawa Electric Corporation

YOKOGAWA ◆

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Jan. '20

SAFETY INSTRUCTIONS

Ex/I.S. installation:

- For correct use and installation the manufacturer's manual must be followed. When programming the Transmitter by PC and communication interface or a HART® terminal the intrinsically safe data shall be observed.
- The designation galvanic isolation between the transducer input and the loop supply indicates signal isolation only. It shall not be interpreted as an Intrinsically Safe galvanic isolation like an isolating barrier. Therefore ordinary care in selecting barrier and grounding shall be considered.
- The apparatus must be installed in an enclosure with an Ingress Protection of at least IP 20.
- The terminals 1 and 2 of the equipment have to be electrically connected to a linear barrier located in the non hazardous area.
- For Ex/I.S. data, see chapter 7. Approvals Options.

The YTA70 is a head mount type of temperature transmitter that accepts thermocouple or RTD input and converts it to a 4 to 20 mA DC signal for transmission. The YTA70 specifies HART communication protocol for remote configuration.
It is imperative that usres observe the instructions in this manual to ensure the protection and safety of operators.

Control of Pollution Caused by the Product

This is an explanation for the product based on "Control of Pollution caused by Electronic Information Products" in the People's Republic of China.

电子情报製品汚染制御管理弁法（中国版RoHS）

产品中有害物质或元素的名称及含量

型号	部件名称	有害物质					
		铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
YTA70 温度变送器	壳体	×	○	○	○	○	○
	基板组件	○	○	○	○	○	○
	电源连接线	×	○	○	○	○	○

○：表示该部件的所有均质材料中的有害物质的含量均在 GB/T26572 标准中所规定的限量以下。

×：表示至少该部件的某些均质材料中的有害物质的含量均在 GB/T26572 标准中所规定的限量以上。

⑳ 环保使用期限：
该标识适用于 SJ /T11364 中所述，在中华人民共和国销售的电子电气产品的环保使用期限。

注) 该年数为 "环保使用期限"，并非产品的质量保证期。

1. Model and Suffix Codes

Model	Suffix code	Descriptions
YTA70	. . . .	Temperature Transmitter
Output Signal	- J	4 to 20mA DC with digital communication (HART 5/HART 7 protocol)
Optional Specifications	/KS2	ATEX intrinsically safe approval
	/SS2	IECEx intrinsically safe, FM intrinsically safe/ Nonincendive, and ATEX intrinsically safe approval combination

2. Warranty

The warranty period of the instrument is as of condition shown when purchasing. Any trouble arising during the warranty period shall be replaced at free of charge. The following problems or troubles shall not be eligible of charge-exempt repair.

- Caused by improper usage or storage of the customer which exceeds the specification requirements.
- Caused by mishandling or modification.
- Caused by fire, earthquake or other acts of God that are not directly a result of problems of the instrument.

3. Handling Precautions

(1) This manual and the identification tag attached on packing box are essential parts of the product; keep them in a safe place for future reference.
(2) Read this manual throughly and carefully before handling the instruments. Observe the instructions.
(3) This product is designed to be used by a person with specialized knowledge.
(4) Store the product in location that meets the following requirements.
   - No exposure to rain or water
   - No major mechanical vibration or shock
   - Humidity and Temperature limitations
   - Ordinary conditions(25°C, 65%) is preferable.
   Otherwise, as of specified in "Standard Specifications."
(5) Avoid corrosive atmosphere for storage and installation.
(6) For safe installation of the transmitter in hazardous area, the following must be observed. The module must only be installed by qualified personnels who are familiar with the national and international laws, directives, and standards that apply to this area.
(7) Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this instrument by the customer.
(8) Product Disposal
   The instrument should be disposed of in accordance with local and national legislation/regulations.
(9) Authorized Representative in EEA
   In relation to the CE Marking, The authorized representative for this product in the EEA (European Economic Area) is:
   Yokogawa Europe B.V.
   Euroweg 2, 3825 HD Amersfoort,The Netherlands

● **Printed Manual**

Document No.	Title
IM 01C50C03-02EN	YTA70 Temperature Transmitter

● **Electronic Manual**

Document No.	Title
IM 01C50C03-02EN	YTA70 Temperature Transmitter

You can download the latest manual from the following website:
Website address: http://www.yokogawa.com/fld/

Note: When products whose suffix code or optional codes contain code "Z" and an exclusive document is attached, please read it along with this manual.

● **General Specifications**

Document No.	Title
GS 01C50C03-00EN	YTA70 Temperature Transmitter

4. Standard Specifications

Accuracy (see table below)

Sensor type	Standard	Input ranges		Minimum span		Accuracy (value whichever is greater)
		°C	°F	°C	°F	
<T/C>						
B *1	IEC60584	400 to 1820	752 to 3308	200	360	±0.1% of span or ±1.0°C
E		-100 to 1000	-148 to 1832	50	90	±0.1% of span or ±0.5°C
J		-100 to 1200	-148 to 2192	50	90	
K		-180 to 1372	-292 to 2502	50	90	
N		-180 to 1300	-292 to 2372	100	180	
R		-50 to 1760	-58 to 3200	200	360	±0.1% of span or ±1.0°C
S		-50 to 1760	-58 to 3200	200	360	
T		-200 to 400	-328 to 752	50	90	±0.1% of span or ±0.5°C
L	DIN43710	-100 to 900	-148 to 1652	50	90	
U		-200 to 600	-328 to 1112	75	135	
Lr *2	GOST 3044-84	-200 to 800	-328 to 1472	50	90	±0.1% of span or ±1.0°C
W3	ASTM E988-90	0 to 2300	32 to 4172	200	360	
W5		0 to 2300	32 to 4172	200	360	
<RTD>						
Pt100	IEC60751	-200 to 850	-328 to 1562	10	18	±0.1% of span or ±0.1°C
Ni100	DIN43760	-60 to 250	-76 to 482	10	18	±0.1% of span or ±0.2°C
DC Voltage		-800 to 800 [mV]		2.5 [mV]		±0.1% of span or ±0.01mV
Resistance		0 to 7000 [Ω]		25 [Ω]		±0.1% of span or ±0.1Ω

*1: In T/C type B for output signal code J, the minimum range value can be set from 0. However, the accuracy between 0 to 400 is not specified.

*2: Applicable for protocol revision of HART 7.

Cold Junction Compensation Accuracy(For T/C only)
±1°C (±1.8°F)

Ambient Temperature Effects (per 10°C Change)
For E, J, K, L, N, T and U thermocouple inputs:
±0.05% of span or ±0.25°C, whichever is greater
For R, S, B, Lr, W3 and W5 thermocouple inputs:
±0.05% of span or ±1°C, whichever is greater
For Pt100 and Ni100 RTD inputs:
±0.05% of span or ±0.05°C, whichever is greater
For DC voltage input:
±0.05% of span or ±5μV, whichever is greater
For Resistance(ohm) input:
±0.05% of span or ±0.05Ω, whichever is greater

Power Supply Effects
±0.005% of FS per Volt

EMC Conformity
EN 61326-1 Class A, Table2
EN 61326-2-3

⚠ CAUTION

This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

EU RoHS Directive
Applicable standard: EN IEC 63000
- Applicable production sites are shown below.
  The condition of the RoHS compliant production sites are as follows:
  Singapore, China
  The production sites can be confirmed by the serial number shown in the frame of "NO." in the name plate of the product.
  Serial numbers (9 letters): AAnnnnnnn
    AA: Identification code of production site
    Singapore: Use "C2" or "C0" China: Use "S5"
- Serial Number Label (affixed on the bottom side)

Serial Number

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Maximum Zero Offset
±50% of selected maximum value

Input Signal Source Resistance (for T/C, mv)
10 MΩ, or 3 kΩ at power-off

Input Lead Wire Resistance (for RTD, ohm)
5 Ω per wire or lower
(up to 50 Ω per wire is configurable with reduced measurement accuracy)

Burnout
High(NAMUR NE43 upscale) , Low(NAMUR NE43 downscale) or value within 3.5 to 20 mA

Output
Two wire 4 to 20 mA DC

Response Time
1 to 60 sec programmable

Ambient Temperature Limits (Option code may affect limit)
−40 to 85°C (−40 to 185°F)

Ambient Humidity Limits
0% to 95% RH (non-condensation)

Supply Voltage
8 to 35 V DC
8 to 30 V DC for Intrinsically safe type
13.8 to 35 V DC for digital communication

Load Resistance
Limitation: 0 to (E−8)/0.0236 [Ω], where E is power supply voltage.
250 to 600 Ω, for digital communication

Isolation
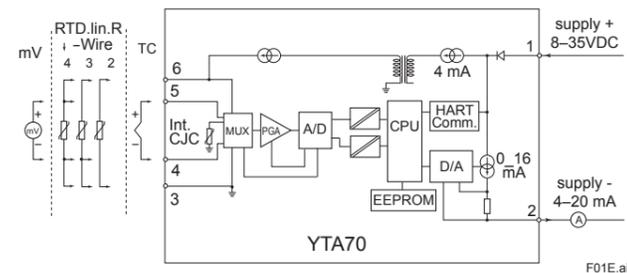Input/output isolated to 1500 V AC.
Mounting
DIN form B head mounting
Terminals
M3 screws
Weight
50 g (0.11 lb)

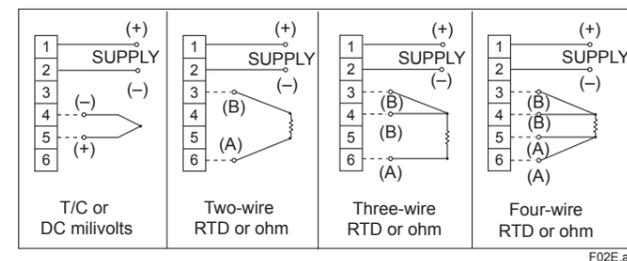## 5. Block Diagram

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6. Wiring

See wiring diagram. For output signal, use twisted pair or cables with performance equivalent to 600V vinyl insulate cable. For wiring in high or low temperature, use a wire or cable suitable for such temperature. Use cables and wires which meet atmospheric conditions. Take necessary measure to avoid corrosion or damage of cables and wires.
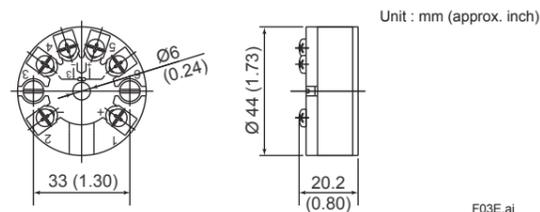
⚠ IMPORTANT

When mounting on a sensor head, do not overtighten the screws.

■ Wiring Diagram

| T/C or DC millivolts | Two-wire RTD or ohm | Three-wire RTD or ohm | Four-wire RTD or ohm |

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■ Dimensions

Unit : mm (approx. inch)

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7. Approvals Options

7.1 ATEX Intrinsically safe model (/KS2, /SS2)

ATEX
Installation drawing YTA70QA01

For safe installation the following must be observed. The module shall only be Installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.
Year of manufacture can be taken from the first two digits in the serial number.
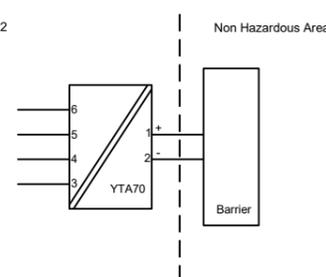
ATEX Certificate   KEMA 10ATEX 0027X

Marking   ⟨Ex⟩ II 1 G Ex ia IIC T6 ...T4 Ga
                       II 2 D Ex ia IIIC Db

Standards: EN IEC 60079-0: 2018, EN 60079-11: 2012

Hazardous area
Zone 0, 1, 2, 21, 22   Non Hazardous Area

Terminal: 3,4,5,6
Uo: 9.6 VDC
Io: 28 mA
Po: 67.2 mW
Lo: 35 mH
Co: 3.5µF

Terminal: 1,2
Ui: 30 VDC
Ii: 120 mA
Pi: 0.84 W or Pi: 0.75 W
Li: 0 µH
Ci: 1.0 nF

ATEX
Installation drawing YTA70QA01

Temperature Class	Ambient temperature range	
	Pi: 0.84W	Pi: 0.75W
T6	-40 °C to +47 °C	-40 °C to +50 °C
T5	-40 °C to +62 °C	-40 °C to +65 °C
T4	-40 °C to +85 °C	-40 °C to +85 °C

Installation notes.

If the enclosure is made of non-metallic plastic materials, electrostatic charges on the transmitter enclosure shall be avoided.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ga, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP20 according to EN 60529, and that is suitable for the application and correctly installed.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ga, and if the enclosure is made of aluminum, it must be installed such, that ignition sources due to impact and friction sparks are excluded.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Db, the transmitter shall be mounted in a separately certified enclosure that provides a degree of protection of at least IP5X according to EN IEC 60079-0, and that is suitable for the application and correctly installed. The surface temperature of the outer enclosure is +20 K above the ambient temperature, determined without a dust layer.
Ambient temperature range: -40 °C to +85 °C

Cable entries and blanking elements shall be used that are suitable for the application and correctly installed.

For an ambient temperature ≥ 60ºC, heat resistant cables shall be used with a rating of at least 20 K above the ambient temperature.

The sensor circuit is not infallibly galvanic isolated from the input circuit. However, the galvanic isolation between the circuits is capable of withstanding a test voltage of 500Vac for 1 minute.
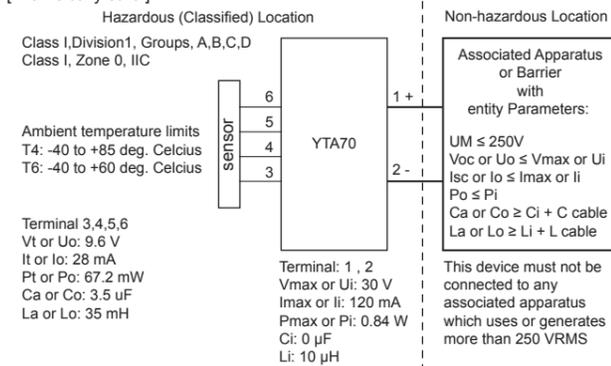

7.2 FM Intrinsically safe/Nonincendive model (/SS2)

Applicable Standard: Class 3600, Class 3610, Class 3611, Class 3810, ANSI/ISA-60079-0, and ANSI/ISA-60079-11
Installation diagram

[Intrinsically safe]

Hazardous (Classified) Location   Non-hazardous Location
Class I,Division1, Groups, A,B,C,D
Class I, Zone 0, IIC

Ambient temperature limits
T4: -40 to +85 deg. Celcius
T6: -40 to +60 deg. Celcius

Terminal 3,4,5,6
Vt or Uo: 9.6 V
It or Io: 28 mA
Pt or Po: 67.2 mW
Ca or Co: 3.5 uF
La or Lo: 35 mH

Terminal: 1 , 2
Vmax or Ui: 30 V
Imax or Ii: 120 mA
Pmax or Pi: 0.84 W
Ci: 0 µF
Li: 10 µH

Associated Apparatus or Barrier with entity Parameters:
UM ≤ 250V
Voc or Uo ≤ Vmax or Ui
Isc or Io ≤ Imax or Ii
Po ≤ Pi
Ca or Co ≥ Ci + C cable
La or Lo ≥ Li + L cable

This device must not be connected to any associated apparatus which uses or generates more than 250 VRMS

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The entity concept

The Transmitter must be installed according to National Electrical Code (ANSI-NFPA 70) and shall be installed with the enclosure, mounting, and spacing segregation requirement of the ultimate application.

Equipment that is FM-approved for intrinsic safety may be connected to barriers based on the ENTITY CONCEPT. This concept permits interconnection of approved transmitters, meters and other devices in combinations which have not been specifically examined by FM, provided that the agency's criteria are met. The combination is then intrinsically safe, if the entity concept is acceptable to the authority having jurisdiction over the installation.

The entity concept criteria are as follows:
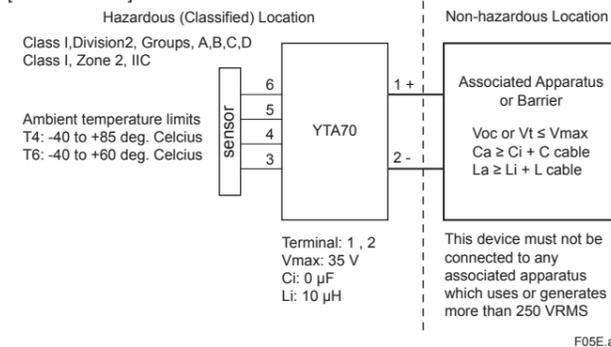The intrinsically safe devices, other than barriers, must not be a source of power.
The maximum voltage $Ui(V_{MAX})$ and current $Ii(I_{MAX})$, and maximum power $Pi(Pmax)$, which the device can receive and remain intrinsically safe, must be equal to or greater than the voltage (Uo or V_{OC} or V_t) and current (Io or I_{SC} or I_t) and the power Po which can be delivered by the barrier.

The sum of the maximum unprotected capacitance (C_i) for each intrinsically safe device and the interconnecting wiring must be less than the capacitance (C_a) which can be safely connected to the barrier.

The sum of the maximum unprotected inductance (L_i) for each intrinsically safe device and the interconnecting wiring must be less than the inductance (L_a) which can be safely connected to the barrier.

The entity parameters Uo,V_{OC} or V_t and Io,I_{SC} or I_t, and C_a and L_a for barriers are provided by the barrier manufacturer.

[Nonincendive]

Hazardous (Classified) Location   Non-hazardous Location
Class I,Division2, Groups, A,B,C,D
Class I, Zone 2, IIC

Ambient temperature limits
T4: -40 to +85 deg. Celcius
T6: -40 to +60 deg. Celcius

Terminal: 1 , 2
Vmax: 35 V
Ci: 0 µF
Li: 10 µH

Associated Apparatus or Barrier
Voc or Vt ≤ Vmax
Ca ≥ Ci + C cable
La ≥ Li + L cable

This device must not be connected to any associated apparatus which uses or generates more than 250 VRMS

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7.3 IECEx Scheme Intrinsically safe model (/SS2)

IECEx
Installation drawing YTA70QI01

⚠ For safe installation of the YTA70 the following must be observed. The module shall only be Installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.
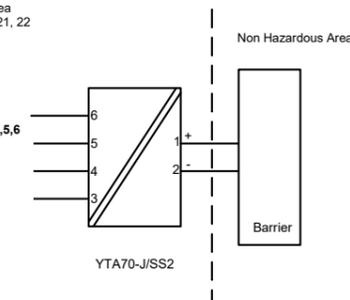
IECEx Certificate   IECEx KEM 10.0086X

                       Ex ia IIC T6...T4 Ga
                       Ex ia IIIC Db

Standards   IEC 60079-11:2011, IEC 60079-0:2017

Hazardous area
Zone 0, 1, 2, 21, 22   Non Hazardous Area

Terminal: 3,4,5,6
Uo: 9.6 VDC
Io: 28 mA
Po: 67.2 mW
Lo: 35 mH
Co: 3.5µF

YTA70-J/SS2

Terminal: 1,2
Ui: 30 VDC
Ii: 120 mA
Pi: 0.84 W or Pi: 0.75 W
Li: 0 µH
Ci: 1.0nF

Temperature Class	Ambient temperature range	
	Pi: 0.84W	Pi: 0.75W
T6	-40 °C to +47 °C	-40 °C to +50 °C
T5	-40 °C to +62 °C	-40 °C to +65 °C
T4	-40 °C to +85 °C	-40 °C to +85 °C

Installation notes.

If the enclosure is made of non-metallic plastic materials, electrostatic charges on the transmitter enclosure shall be avoided.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ga, the transmitter shall be mounted in an enclosure that provides a degree of protection of at least IP20 according to IEC 60529, and that is suitable for the application and correctly installed.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Ga, and if the enclosure is made of aluminum, it must be installed such, that ignition sources due to impact and friction sparks are excluded.

If the transmitter is installed in an explosive atmosphere requiring the use of equipment protection level Db, the transmitter shall be mounted in a separately certified enclosure that provides a degree of protection of at least IP5X according to IEC 60079-0, and that is suitable for the application and correctly installed. The surface temperature of the outer enclosure is +20 K above the ambient temperature, determined without a dust layer.
Ambient temperature range: -40 °C to +85 °C

Cable entries and blanking elements shall be used that are suitable for the application and correctly installed.

For an ambient temperature ≥ 60ºC, heat resistant cables shall be used with a rating of at least 20 K above the ambient temperature.

The sensor circuit is not infallibly galvanic isolated from the input circuit. However, the galvanic isolation between the circuits is capable of withstanding a test voltage of 500Vac for 1 minute.

Marking:

7.4 Name Plate

[/KS2]

YOKOGAWA ◆ MODEL-SUFFIX: YTA70-J/KS2 CE
Yokogawa Electric Corporation PO:000000
2-9-32, Nakacho, Musashino-shi SN:0000000000
Tokyo, 180-8750 JAPAN ⚠ Read/Lisez IM 01C50C03-02
Ⓔ II 1 GⒺEx ia IIC T4..T4 Ga
Ⓔ II 2 DⒺEx ia IIC Db
0344 KEMA 10 ATEX 0027X
Made in Denmark, Label no.:YTA70-S603

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8. HART Communication

8.1 Connection and Requirements

A standard HART communicator can be used for programming the YTA70. The HART communicator must be loaded with the appropriate DDL driver for YTA70.

Minimum loop resistance is 250Ω. If the receiving equipment has a lower resistance, a serial resistor must be inserted to communicate with the HART communicator.

[Connection]

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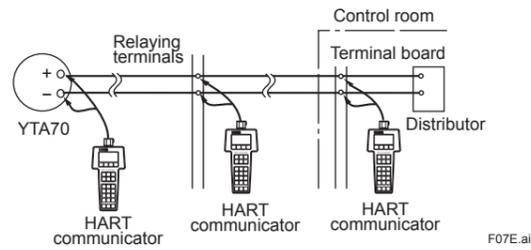
[Communication requirement]

$$R = \frac{E-8}{0.0236}$$

F08E.ai
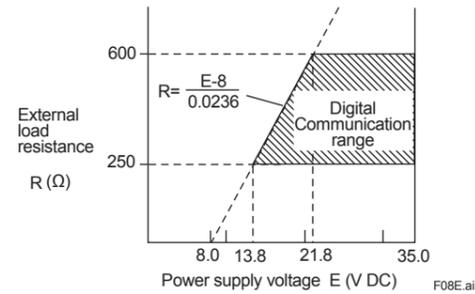
8.2 Switching HART Protocol Revision

HART protocol revision of the transmitter can be selectable from 5 or 7. The HART protocol revision is set and shipped as specified in the order. To change the HART protocol revision after shipment, follow the procedure shown below. Please note that selecting HART 5 will change the model code of YTA70-J to YTA70-E on the configuration tool.

1) Call up the parameter for protocol revision change.
   Device setup -> Detailed setup -> Device information -> Revision numbers -> Chng universal rev

2) Activate the "Chg universal rev" method.

3) Select OK for confirmation message screen twice.

4) Select a HART protocol revision 5 or 7.

5) Enter a write protect password. The default password is "********", eight asterisks.

6) The device will automatically restarts with a new HART protocol revision. Restart the HART configuration tool for parameter settings.

8.3 Parameters

YTA70 HART 7 DTM Menu Tree

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YTA70 HART 7 DD Menu Tree

Device setup — Process variables — Sensor: EI/CJC, Dev var status, Time stamp → Sensor data quality, Sensor limit status, EI/CJC data quality, EI/CJC limit status

PV
Loop current
PV LRV
PV URV

Dynamic variables: PV, PV % rnge, Loop current, SV, TV, QV, Dyn var status, Dyn var assign, Time stamp → Sensor errors, ADC errors, Misc. errors, Cfg chng count, Reset cfg chng flag, Ext device status

Diag/Service — Status; Loop test; Calibration → Apply values, D/A trim, Override D/A trim; Simulate → Enable dev var simulation, Disable dev var simulation; Dev var logging → Read dev var max/min log, Reset dev var max/min log; Trend; Master reset → Num trends support, Current date, Current time, Control, Dev var code, Sample interval, Date latest result, Time latest result, Result

Basic setup — Tag, Long Tag, Range values → Range configuration, PV unit, PV LRV, PV URV, PV LSL, PV USL, PV min span

Sensor config, Sensor s/n → Snsr config, Snsr type, Snsr wire, Snsr unit, Snsr damping → Snsr value, Snsr limit status, Snsr data quality, Snsr probe break detect, Snsr config, Snsr input trim, Snsr info.

Detailed setup — Sensors → Process sensor; EI/CJC → EI/CJC, EI/CJC limit status, EI/CJC data Quality, EI/CJC probe break detect, EI/CJC config, EI/CJC trim, EI/CJC Info.

Error detection → No test performed, broken sensor, shorted sensor, broken and shorted sensor

Signal condition: PV % rnge, PV LRV, PV URV, Apply values, PV LSL, PV USL, PV min span

Output condition: Loop current, Loop current 0%, Loop current 100%, Loop current lower limit, Loop current upper limit, Set limit = NAMUR, Loop test, D/A trim, Override D/A trim, Broken sensor, Shorted sensor → Broken snsr value, NAMUR down, NAMUR up / Shorted sensor value, NAMUR down, NAMUR up

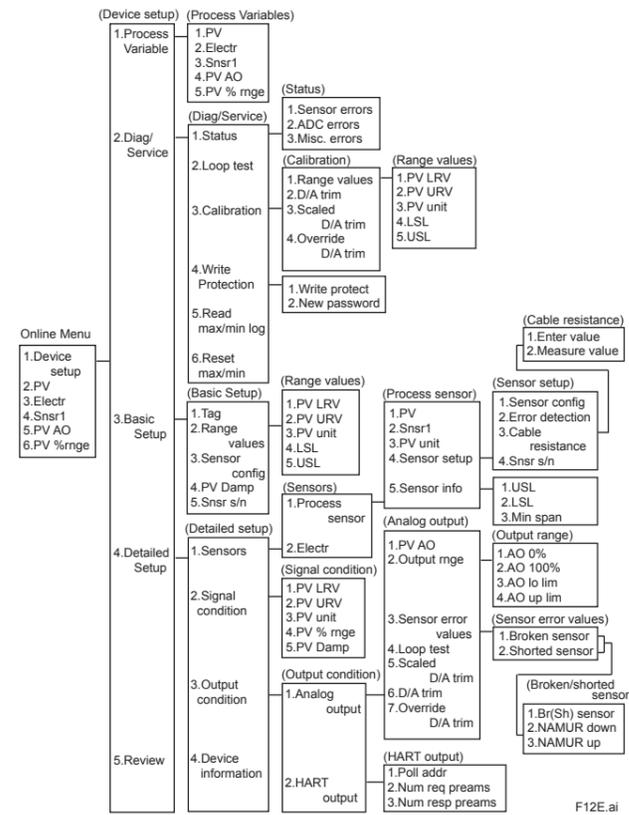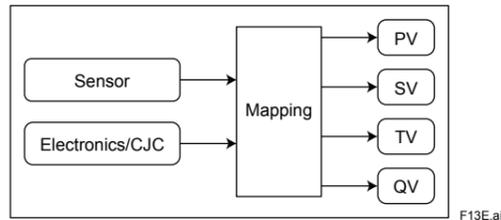Analog output → HART output → Poll addr, Loop current mode, Num req preams, Num resp preams, Set real-time clock, Dyn var assignment, Burst condition → Burst mode, Burst command, Burst dev var, Burst trigger mode, Burst trigger level, Burst units, Update period, Max update period, Classification → Total burst msgs, Burst message 1, Burst message 2, Burst message 3

Device information: Manufacturer, Tag, Long Tag, Descriptor, Message, Date, Write protect, Write enable, New password, Revision numbers, Max dev vars, Device profile → Universal rev, Fld dev rev, Software rev, Hardware rev, Final asmbly num, Dev id, Dev ser nr, Chng universal rev

Event notification → Num events support, Event notif control, Event mask, Event notif retry time, Max update time, Event debounce interval, Knowledge → Event status, Time first unack event triggered

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YTA70 HART 5 DD Menu Tree

(Device setup) — (Process Variable) 1.Process Variable → 1.PV, 2.Electr, 3.Snsr1, 4.PV AO, 5.PV % rnge

2.Diag/Service → (Status) 1.Status → 1.Sensor errors, 2.ADC errors, 3.Misc. errors; 2.Loop test; 3.Calibration → (Calibration) 1.Range values, 2.D/A trim, 3.Scaled D/A trim, 4.Override D/A trim → (Range values) 1.PV LRV, 2.PV URV, 3.PV unit, 4.LSL, 5.USL; 4.Write Protection → 1.Write protect, 2.New password; 5.Read max/min log; 6.Reset max/min

Online Menu:
1.Device setup
2.PV
3.Electr
4.Snsr1
5.PV AO
6.PV %rnge

3.Basic Setup → (Basic Setup) 1.Tag, 2.Range values, 3.Sensor config, 4.PV Damp, 5.Snsr s/n → (Range values) 1.PV LRV, 2.PV URV, 3.PV unit, 4.LSL, 5.USL

(Process sensor) → (Process sensor) 1.PV, 2.Snsr1, 3.PV unit, 4.Sensor setup → (Sensor setup) 1.Sensor config, 2.Error detection, 3.Cable resistance, 4.Snsr s/n → (Cable resistance) 1.Enter value, 2.Measure value

(Sensor info) 5.Sensor info → 1.USL, 2.LSL, 3.Min span

4.Detailed Setup → (Detailed setup) 1.Sensors → (Sensors) 1.Process sensor, 2.Electr; 2.Signal condition → (Signal condition) 1.PV LRV, 2.PV URV, 3.PV unit, 4.PV % rnge, 5.PV Damp; 3.Output condition → (Output condition) 1.Analog output, 2.HART output

(Analog output) → (Analog output) 1.PV AO, 2.Output rnge; 3.Sensor error values; 4.Loop test; 5.Scaled D/A trim; 6.D/A trim; 7.Override D/A trim → (Output range) 1.AO 0%, 2.AO 100%, 3.AO lo lim, 4.AO up lim → (Sensor error values) 1.Broken sensor, 2.Shorted sensor → (Broken/shorted sensor) 1.Br(Sh) sensor, 2.NAMUR down, 3.NAMUR up

(HART output) 1.Poll addr, 2.Num req preams, 3.Num resp preams

5.Review — 4.Device information

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Device Variables Mapping (HART 7)

There are two device variables available.

1) Sensor
2) Electronics/CJC (EI/CJC)

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Burst Parameters (HART 7)

Command Parameter	Burst Command	Burst Msg Trigger Mode	Burst Trigger Source	Burst Trigger Units
PV Temperature value assigned to PV	Cmd1: PV	Continuous / Window / Rising / Falling / On-change	PV	Depend on PV assignment
% range/Loop current	Cmd2: % range/ Current	Continuous / Window / Rising / Falling / On-change	% range	%
Process variables/ Loop current	Cmd3: Dyanamic variables/Current	Continuous / Window / Rising / Falling / On-change	PV	Depend on PV assignment
Process vars/% range/Loop current with status	Cmd9: Device variables with status	Continuous / Window / Rising / Falling / On-change	Sensor, EI/CJC, PV, SV, TV, QV(*1)	Depend on burst trigger source
Process vars/% range/Loop Current	Cmd33: Device variables	Continuous / Window / Rising / Falling / On-change	Sensor, EI/CJC, PV, SV, TV, QV(*1)	Depend on burst trigger source
Self diagnosis information	Cmd48: Additional device status	Continuous	-	-

(*1)Loop current and % range are selectable from menu but not available.

Parameters List

Item		Parameter name	Protocol revision	Descriptions	Initial setting
Process variables	Process variable	Snsr <PV>	7 <5>	Measured variables in engineering unit	-
		EI/CJC <Electr>	7 <5>	Terminal temperature	-
		Dev var status	7	Display data quality and limit status of Snsr and EI/CJC	-
	Dynamic variable	PV/SV/TV/QV	7	Display dynamic variables	-
		Dyn var status	7	Display data quality and limit status of PV/SV/TV/QV	-
		Dyn var assign	7	Setting an assignment for PV/SV/TV/QV	PV=Sensor, SV=EI/CJC, TV=QV=None
	Output value	Loop current <PV AO>	7 <5>	Output value in mA	-
		PV % rnge	7, 5	Output value with respect to the range in %	-
	PV Log	Read max/min log	5	Reads the maximum/minimum PV stored in the memory	-
		Reset max/min	5	Clears the PV maximum/minimum log and restart logging	-
Signal Condition	Range value	Range configuration	7	Range setting for PV LRV/PV URV	-
		PV LRV/PV URV	7, 5	Lower/upper range value to defines the 0%/100% value of the measurement	0°C/150°C
		Apply values	7	Rerange by actual input	-
	Range Limit	Snsr LSL/USL	7	Maximum/minimum values for range setting	-
		EI/CJC LSL/USL	7	Maximum/minimum values for EI/CJC range	-40°C, 135°C
		PV LSL/PV USL <LSL/USL>	7 <5>	Shows the max./min. usable value for upper/lower range value	-
	Unit	Snsr unit	7	Unit of sensor	°C
		EI/CJC unit	7	Unit of EI/CJC	°C
		PV unit	7, 5	Unit of PV	°C
	Damping	Snsr damping <PV Damp>	7 <5>	Damping time constant in seconds: 0.4 to 60.0s	0.4s
		EI/CJC damping	7	Damping time constant in seconds: 0.4 to 60.0s	0.4s
Sensor Setup	Sensor config	Snsr config	7	Sensor type and related settings.	-
		Snsr type	7, 5	Sensor type and related settings. [When T/C or millivolts is selected] Always select "single" for a measurement type. [When RTD or ohm is selected] Always select 2-, 3- or 4-wire but others for the number of sensor wires.	Pt100, 3-wire, °C *1
		Snsr wire	7	Display the number of sensor	3-wire
		Snsr EI/CJC type	7	Display Internal CJC or Fixed CJC	Internal sensor
		Snsr s/n	7	Setting of serial number for connected sensor	0
		RTD factor	5	For RTD only. Leave it to "1."	1
		Cold junction compensation	5	For T/C only. Always select to "1.internal sensor."	Internal sensor
	Cable resistance	Snsr cable resist	7	Display resistance of sensor cable	5.0Ω
		Cable resist measurement <Measure value>	7 <5>	Actually measure the cable resistance of 2-wire RTD/ohm for compensation	-
		Enter value	5	Enter new value of the RTD/ohm cable resistance for compensation	5.0Ω
	Minimum span limit	PV min span	7	Display PV minimum span	10°C
		Snsr min span <Min. span>	7 <5>	Minimum settable span	10°C
		EI/CJC min span	7	EI/CJC minimum span	10°C
	Sensor errors	Error detection	5	Type of sensor errors to be detected for burnout operation. (1)No test performed, (2) broken sensor, (3)shorted sensor*3, or (4)broken & shorted*3	broken sensor
Output Condition	Analog output range	Loop cur 0%(100%) <AO 0%(100%)>	7 <5>	Output value for 0%(100%) in mA.	4mA(20mA)
		Loop cur lower(upper) limit <AO lo(up) lim>	7 <5>	Output lower(upper) limit in mA. NAMUR, or 3.8 to 23mA	3.8mA(20.5mA)
		Set limit = NAMUR	7	Setting for loop cur lower limit = 3.8mA, loop cur upper limit = 20.5mA	-
		Loop test	7, 5	Change the output manually for testing the loop. 4mA, 20mA, or value within 3.5 to 23mA	-
	Sensor error value	Broken snsr value	7	Setting for analog output value when sensor broken	23.0mA
		Shorted snsr value	7	Setting for analog output value when sensor shorted	3.6mA
		NAMUR down	7	Set analog output value to 3.5mA	-
		NAMUR up	7	Set analog output value to 23mA	-
		Sensor error values	5	Enter or select the output value when sensor error is detected. NAMUR upscale, NAMUR downscale, or value within 3.5 to 23mA	NAMUR upscale [high]*1
Diagnostics	Status	Sensor errors	7, 5	Show error status related to a sensor. When any one of the errors turns "ON", check the sensor and wiring	-
		ADC errors	7, 5	Show error status related to analog to digital conversion. When any one of the errors turns "ON", restart the device. If error remains, replace the device	-
		Misc. errors	7, 5	Show error status related to a device. When any one of the errors turns "ON", restart the device. If error remains, replace the device.	-
		Ext device status	7	This bit is set if any Device Variable is in an Alarm or Warning State	Device Variable Alert (0x02)
		Cfg chng count	7	Configuration change counter	-
		Reset cfg chng flag	7	Reset configuration change counter	-
	Error detection	Snsr error detection	7	Type of sensor errors to be detected for burnout operation	broken and shorted sensor
		Snsr probe break detect	7	Display "Snsr probe break detect" when sensor error	None

Item	Parameter name	Protocol revision	Descriptions	Initial setting
Service	Device variable logging	Read dev var max/min log	7	Reads the maximum/minimum PV stored in the memory	-
		Reset dev var max/min log	7	Clears the PV maximum/minimum log and restart logging	-
	Data trending	Trend	7	Data trending support function	-
	Simulation	Simulate	7	Execution of device variable simulation	-
	Device reset	Master reset	7	Software reset	-
Calibration	Analog output trim	D/A trim	7, 5	Allows the calibration of a selected analog output with an external reference at the operating endpoint	-
		Clear D/A trim <Override D/A trim>	7 <5>	Overrides any previous D/A trimming by restoring factory calibration values	-
		Scaled D/A trim	5	Allows the calibration of the analog output with the external reference which is scaled at 0 to 100%	-
	Sensor trim	Snsr trim	7	Trimming	-
		Snsr zero trim	7	Zeroing	-
		Snsr trim reset	7	Reset sensor trim for factory setting	-
		Snsr L trim	7	Display lower point of sensor trim	200.0°C
		Snsr U trim	7	Display upper point of sensor trim	850.0°C
HART output	Time stamp	Time stamp	7	date and the time information which the transmitter maintains from the time of the power on	1900/1/1 0:00
	Polling address	Poll addr	7	Display and setting for multidrop (0 to 63)	0
		Loop current mode	7	Loop current setting at multidrop	Off
	Preambles	Num req preams	7	Number of requested preambles	5
		Num resp preams	7	Number of response preambles	5
	Set real-time clock	Set real-time clock	7	Setting for date and time	1900/1/1 0:00
	Burst mode	Total burst msgs	7	The number of burst mode functions	3
		Burst mode	7	Setting for burst mode	Off
		Burst command	7	Setting for burst command	cmd1
		Burst dev var	7	Setting for device variable of cmd9 or cmd33	First slot: DV0, the rest not used
		Burst trigger mode	7	Burst trigger mode selection from "Continuous", "Window", "Rising", "Falling", or "On change"	Continuous
		Burst trigger level	7	Setting for burst trigger level	0°C
		Burst units	7	Setting for unit of burst trigger level	°C
		Update period	7	Update period for burst message	8s
		Max update period	7	Maximum update period for burst message	60s
	Event notification	Num events support	7	Maximum number of event support	1
		Notif control	7	Enable event notification on token-passing data link layer	Off
		Event mask	7	Even masking	Off
		Retry time	7	Event notification retry time	8s
		Max update time	7	Maximum update time for event notification	60s
		Debounce interval	7	Debounce Interval to detect an event	8s
		Event status	7	Display event status	-
		First unack evt tgr	7	Display event time	-
Device information	Manufacturer		7, 5	Manufacturer identification code	YOKOGAWA
	Model		7, 5	Model name	YTA70-J
	Tag		7, 5	Tag number, up to 8 alphanumerical characters	-
	Long Tag		7, 5	Tag number, up to 32 alphanumerical characters.	-
	Descriptor		7, 5	Text which can be used by user in any way. Up to 16 alphanumerical characters	-
	Message		7, 5	Text which can be used by user in any way. Up to 32 alphanumerical characters	-
	Date		7, 5	Date information. MM/DD/YY. Not incremented. The date is updated whenever changing on figuration via configuration tool	Factory calibration date
	Write protect		7, 5	Enable write protect if correct password is entered*2	Not protected
	Write enable		7	Disable write protect	-
	New password		7, 5	Sets a new password for write protection, if correct password is entered	-
	Revision numbers		7, 5	Revision information for software and hardware	-
	Chng universal rev		7	HART protocol revision switch function	As specified in order
Review	Input info		7, 5	List of input variables	-
	Output info		7, 5	List of output variables	-
	Device info		7, 5	See "Device information" in this table	-

*1: Or as specified upon ordering.
*2: The initial setting of password upon shipment is "*********".
*3: With T/C or milivolts for sensor type, the alarm is generated when the input signal drops down below 2.5 mV.