



AUTROL[®] Series DIN Rail Type **Smart Temperature Transmitter**



MODEL ATT 2200



Description of Product

The ATT2200 Smart Temperature Transmitter is a microprocessor-based high performance transmitter, which has flexible sensor input and output, automatic compensation of ambient temperature and process parameters, configuration of various parameters, communication with HART protocol. All Data of Sensor (Tag No., type, range etc.) is to be input, modified and stored in EEPROM.

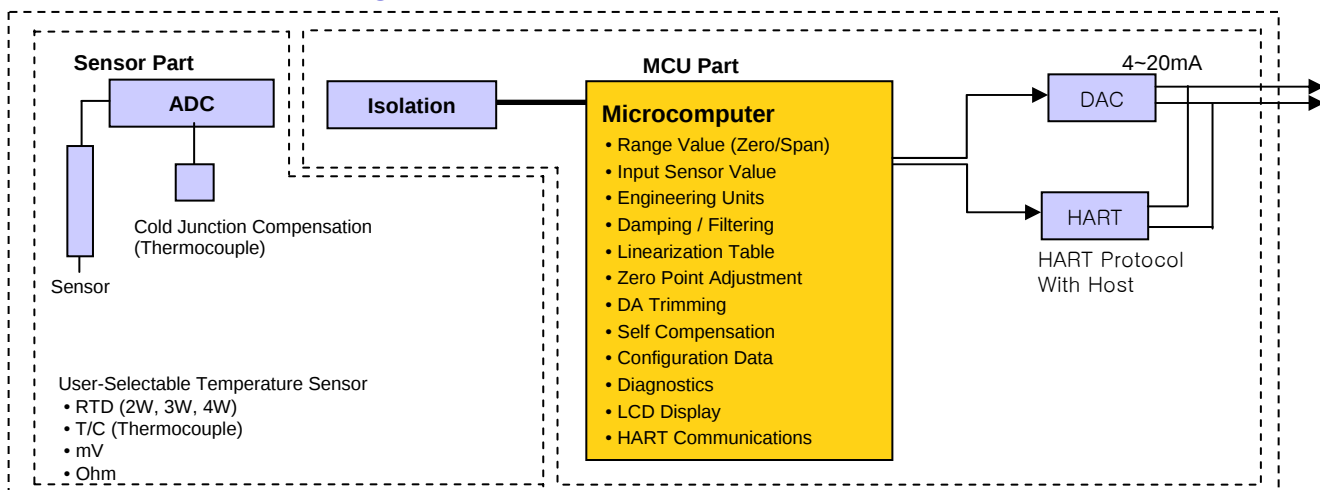
Function

- Flexible Sensor input : RTD, T/C, mV, Ohm
- Various output: 4 ~20mA(Analog), Digital Signals
- Automatic Compensation by Linearization table in which user can modify the various necessary values
- Automatic Compensation of Ambient Temperature
- Setting Various Parameters : Zero/Span, Unit, Fail-mode, Trim, etc.
- Self Diagnostic Function : Sensor, A/D Converter, Memory, Power, etc.
- Digital Communication with HART protocol
- Flameproof Approval and Intrinsic Safety Approval: KOSHA, KTL, CSA, ATEX

Features

- Superior Performance
 - Excellent Accuracy
 - Long-Term Stability
- Flexibility
 - Selection of various T/C, RTD, mV, Ohm
 - Data Configuration with HART configurator
- Reliability
 - Automatic Compensation : Linearization of sensor input, Ambient temperature compensation
 - Continuous Self Diagnostic
 - Fail-mode Process function
 - EEPROM Write Protection
 - I/O Isolation : Grounded Thermocouple
 - CE EMC Conformity Standards (EN50081-2, EN50082-2)

Functional Block Diagram



ATT2200

Smart Temperature Transmitter

Transmitter Description

Electronics Module

The Electronics module consists of a MCU part, a power part and an analog part in a transmitter.

The analog part digitize the input signal from the sensor.

The MCU part acquires the digital value from the analog part and apply correction coefficients selected from EEPROM.

The output section of the power part converts the digital signal to a 4~20mA output.

The MCU part communicates with the HART-based Configurator or Control Systems such as DCS.

Sensor Inputs

The model ATT 2200 is compatible with a various of temperature sensors, including 2W, 3W, 4Wire RTDs, thermocouples, and other resistance and millivolt inputs (see table 1).

< Input Sensor Types >

- . RTD : 2W, 3W, 4Wire
- . Thermocouple : B,E,J,K,N,R,S,T type
- . mV : -10 ~ 75mV
- . Ohm : 0 ~ 430 Ω
- . Dual Sensor Input (option)

Basic Setup

ATT2200 Transmitter can be easily configured from any host that support the HART protocol.

- Sensor Type
- Number of Sensor Input Wires
- Lower/Upper Range (Zero/Span))
- Engineering Units
- Sensor Linearization
- DAC Output Trimming
- Zero Point Adjustment
- Damping Time
- Tag : 8 Alphanumeric Characters

Self-Diagnosis and Others

- CPU & Analog Module Fault Detection
- Communication Error
- Fail-Mode Handling

Function Specifications

Range and Sensor Limits

(Refer to Table 1)

Zero and Span Adjustment Limits

- Zero and Span values can be set anywhere within the range limits stated in Table 1.
- Span must be greater than or equal to the minimum span stated in Table 1.

Output

(Analog Current and Digital Data)

Two wire 4~20mA , Digital process value superimposed on 4~20mA signal, available to any host that conforms to the HART protocol.

Power Supply & Load Requirements

External power supply required.

Transmitters operate on 11.9 to 45 V dc.

With 250 ohm load, 17.4 Vdc power supply is required

With 24 Vdc Supply, up to a 550 ohm load can be used

Max. Loop Resistance = $(E - 11.9) / 0.022$
(E = Power Supply Voltage)

Supply Voltage

11.9 to 45 Vdc for operation

17.4 to 45 Vdc for HART Communications

Loop Load

0 to 1500 Ω for Operation

250 to 550 Ω for HART Communications

Ambient Humidity Limits

5% to 95%RH (Relative Humidity)

Ambient Temperature Limits

- -20 $^{\circ}$ C to 85 $^{\circ}$ C (without condensing)

Storage Temperature

- -20 $^{\circ}$ C to 85 $^{\circ}$ C (without condensing)

Isolation

Input/output isolated to 500Vrms (707 Vdc)

Update Time and Turn-On Time

Update Time : 0.5 seconds

Turn-On Time : 5 seconds

Failure Mode

Fail High: Current $\geq$ 21.75mA

Fail Low : Current $\leq$ 3.75 mA

General Specifications

1. Temperature Sensor Range & Accuracy

<Table1>

Sensor Type	Sensor Reference	Input Range	Minimum Span	Digital Accuracy	D/A Accuracy Of Span
2W, 3W, 4Wire RTD					
Pt-100	KSC 1603-1991 (a=0.00385) DIN	-200 ~ 650 °C	15 °C	±0.17 °C	±0.03%
Pt-100	JISC 1604-1981 (a=0.00391)	-200 ~ 500 °C		±0.16 °C	
Thermocouple					
NIST Type B	KSC1602-1982	100 ~ 1,820 °C	25 °C	±0.77 °C	±0.03%
NIST Type E		-200 ~ 1,000 °C		±0.20 °C	
NIST Type J		-200 ~ 1,200 °C		±0.25 °C	
NIST Type K		-200 ~ 1,350 °C		±0.35 °C	
NIST Type N		-200 ~ 1,300 °C		±0.40 °C	
NIST Type R		0 ~ 1,760 °C		±0.60 °C	
NIST Type S		0 ~ 1,740 °C		±0.50 °C	
NIST Type T		-200 ~ 400 °C		±0.25 °C	
Millivolt Input		-10 ~ 75 mV	2 mV	± 0.012 mV	
Ohm Input		0 ~ 430 Ω	20 Ω	± 0.35 Ω	
< Note > 1) RTD input : a=0.00385 : KS, JIS, DIN, IEC, a=0.00391 : US. 2) Thermocouple input : KSC 1602-1982, JISC 1602-1981, ANSI MC96.1-1982					

Ambient Temperature Effects (per 1 °C change in Ambient temperature)

Sensor Type	Digital Accuracy	D/A effect per
RTD 2w, 3w, 4-Wire	Pt 100 (a=0.00385)	0.002% of Span
	Pt 100 (a=0.003916)	
Thermocouple	NIST Type B	
	NIST Type E, J, K, N	
	NIST Type R, S, T	
	0.003 °C	
	0.046 °C	
	0.005 °C + 0.00054% of reading	
	0.015 °C If reading	
	0.021 °C - 0.0032% of reading if not	

2. Electrical Specifications

Power Supply	11.9 ~ 45 Vdc	Output Signal	4~20 mA/HART
HART loop resistance	250 ~ 550 Ohm (24 Vdc)	Isolation	500 Vrms (707 DC)

3. Performance Specifications

Accuracy	Refer to item No.1	Repeatability	±0.05% of Span
Stability for 1 year	±0.1% of Reading or 0.1 °C whichever is greater	Ambient Temp.	-20 ~ +85 °C
		Humidity Limits	5% ~ 95% RH
Ambient Temp. Effect	±0.05% of Span/10 °C	Power Supply Effect	±0.005% of Span/V

4. Hazardous Location Certifications- Option

Korea Standards Approval	
K2 Code :	
Intrinsic Safety : Ex ia IIC T4	
Ambient Temperature : -20 to 60 °C	
Entity Parameter : Umax=40 Vdc, Imax=165mA, Pmax=0.9W, Ci=1.102uF, Li=0.94 mH	

ATT2200

Smart Temperature Transmitter

Ordering Information

MODEL NO.	Code	Description
ATT2200	-S	Single Element
	-D*	Dual Element (Special Order, Request to manufacturer if necessary)
Housing Materials	1	Plastic
	X	Special
Hazardous Locations Certifications	K0	Maker Standard
	*K2	KTL Intrinsic Safety Approval : Ex ia IIC T5
Connection Type	L2	Two Wires
	L3	Three Wires
	L4	Four Wires
Sensor Type	C1	Custom Calibration
	R1	RTD (Pt 100 ohm)
	R2	Resistor
	M1	Milli-volt
	TX	Thermocouple Type (X : B,E,J,K,N,R,S,T)
Sensor Fail Mode	D	Downscale
	U	Upscale

Ex) : ATT2200-S1-K0-W2-R1-D

Note : Request to manufacturer for item " * "

Default Configuration

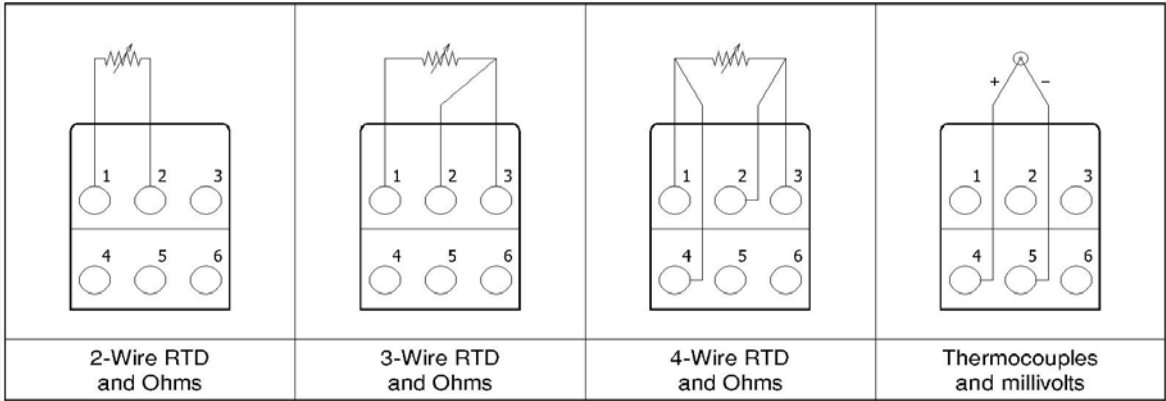
Sensor Type : RTD, Pt100 (a = 0.00385, 3-Wire), 4mA (at 0°C) / 20mA (at 100°C)

Output : Linear , Fail Mode : Low , EEPROM Write : Enable

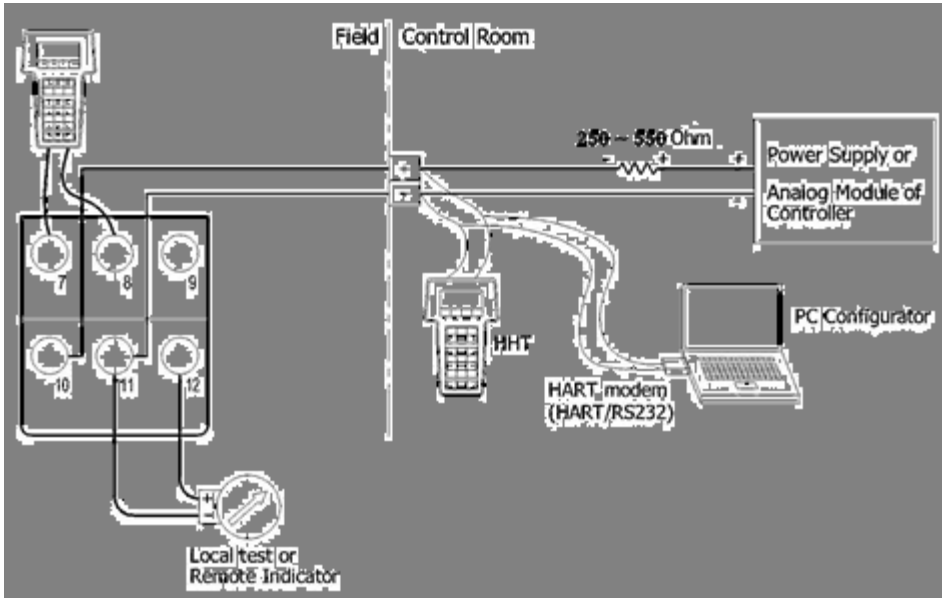
EMC Conformity Standards

a) EMI (Emission) – EN50081-2:1993				
	Test Item		Frequency Range	Basic Standard
1	Applicable Electromagnetic Radiation Disturbance		30 ~1000MHz	EN55011:1988 (Class A Group 1)
b) For EMS (Immunity) – EN50082-2:1995				
	Test Item	Test Specification	Basic Standard	Performance Criteria
1	Electrostatic Discharge	± 4 KV (contact) ± 8 KV (air)	EN61000-4-2 :1995 A +A1 :1998	A
2	Radio Frequency Electromagnetic Field Amplitude modulated	80 MHz ~ 1GHz 1 KV, 80% AM	EN61000-4-3 : 1996 A ENV 50204 : 1995	A
3	Radio Frequency Electromagnetic Field Pulse Modulated	900 MHz ±5MHz, A 10V/m , 200Hz, 50% Duty Cycle PM		A
4	Electrical Fast Transients / Burst Immunity	±2KV (power line) 5KHz / 15mS / 1 minute	EN61000-4-4:1995 A	A
5	Immunity to Conducted Disturbance Induced by Radio Frequency Fields	150KHz ~ 80MHz 10V/m, 80% AM (1KHz)	EN61000-4-6:1995 A	A

ATT2200 Transmitter Field Wiring and Sensor Wiring Diagrams



Connection Diagram of Signal, Power, HHT for Transmitter



may be connected at
between 250 and
transmitter terminal

- [Applied Power]
- * 11.9 ~ 45.0 Vdc (General Operation)
 - * 17.4 ~ 45.0 Vdc (Hart Communication)

Dimensions of Transmitter

