

VTT01-H

4-20 mA TEMPERATURE TRANSMITTER

head model



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NOTE

We have reviewed this manual with great care to maintain compliance with the hardware and software versions described herein. However, due to the dynamic development and version upgrades, the possibility of technical deviations cannot be ruled out. We cannot accept any responsibility for the full compliance of this material.

Vivace reserves the right to, without notice, make modifications and improvements of any kind in its products without incurring in any circumstances, the obligation to make those same modifications to products sold previously.

The information in this manual is frequently updated. Therefore, when using a new product, please check the latest version of the manual on the Internet through our website www.vivaceinstruments.com, where it can be downloaded.

You customer is very important for us. We will always be grateful for any suggestions for improvements as well as new ideas, which can be sent to the e-mail: contato@vivaceinstruments.com preferably with the title "Suggestions".

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WARNING

It is extremely important that all the safety instructions, installation and operation in this manual are followed faithfully. The manufacturer is not liable for damage or malfunction caused by improper use of this equipment.

It is recommended to strictly following the rules and good practice relating to installation, ensuring correct grounding, noise insulation and good quality cables and connections in order to provide the best performance and durability to the equipment.

Special attention must be considered in relation to installations in hazardous areas, where applicable.

SAFETY PROCEDURES

- *Appoint only skilled people, trained with process and equipment;*
- *Install equipment only in operation compatible areas, with the proper connections and protections;*
- *Use proper safety equipment for any handling device in field;*
- *Turn area power off before equipment installation.*

SYMBOLOLOGY



Caution - indicates risk or error source



Important Information



General or Specific Risk



Electric Shock Danger

GENERAL INFORMATION



Vivace Process Instruments ensures the operation of this equipment, according to the descriptions contained in its manual, as well as technical characteristics, not guaranteeing its full performance in particular applications.



The operator of this equipment is responsible for observing all aspects of safety and prevention of accidents applicable during the execution of the tasks in this manual.



Failures that might occur in the system, causing damage to property or injury to persons, shall additionally be prevented by external means to a safe outlet for the system.



This equipment must be used only for the purposes and methods proposed in this manual.

1 EQUIPMENT DESCRIPTION

VTT01-H, 4-20 mA Temperature Transmitter Head Model, is a member of the Vivace Process Instruments family of temperature transmitters, designed for installation in heads of various types of sensors, such as thermocouples and RTDs, as well as resistance signals and millivoltage.

The transmitter is powered by a voltage of 12 to 45 Vdc and generates an output current of 4-20 mA according to NAMUR NE43.

Via VUI10 (USB communication) configuration interface and VTT01 Tool software, user can configure the sensor type, measuring scales, work units and calibration, monitor the measurement variables and check the equipment status.

Prioritizing high performance and robustness, it was designed with the latest electronics and materials technologies, ensuring long-term reliability for systems of any scale.

1.1. BLOCK DIAGRAM

The modularization of VTT01-H components is described in the block diagram of Figure 1.1.

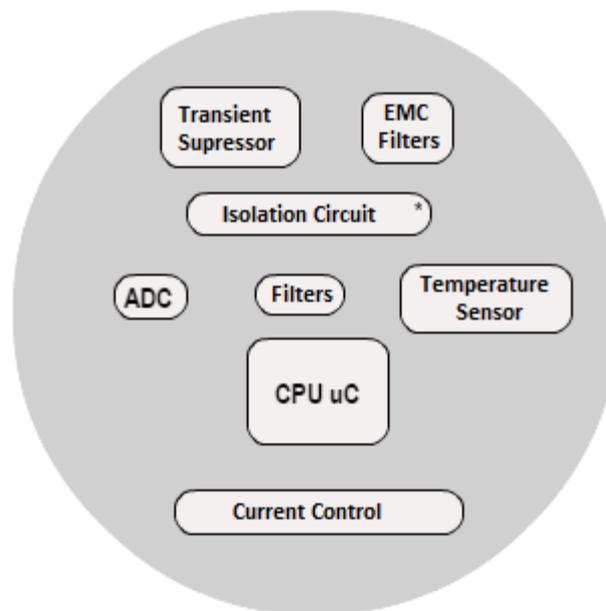


Figure 1.1 – Block diagram for VTT01-H.

Sensor signals pass through RF filter and follow to ADC converter, where they are converted into digital values. These values are converted to temperature according to selected sensor. The temperature value is finally converted to current, proportional to the calibrated range, by the CPU block.

**The sensor signal is galvanically isolated from the output signal avoiding ground loop (isolated model only).*

Finally, the microcontroller block can be related to the transmitter's brain, where all the time controls, besides the routines common to the transmitters are managed, such as configuration, calibration and generation of digital output value for the current, proportional to the variable PV.

2 INSTALLATION

2.1. MECHANICAL ASSEMBLY

VTT01-H Temperature Transmitter is designed for installation in a standard DIN-shape B-head. Its enclosure is made of injected plastic, which houses electronic boards that are wrapped with a Silicon-based resin.

The temperature transmitter is attached to the head using two M3 screws. After attaching the sensor wires to the respective terminals of the transmitter, connect the power cables. Figure 2.1 shows an installation diagram of the VTT01-H on the head.

In Figure 2.2 several types of heads are shown.

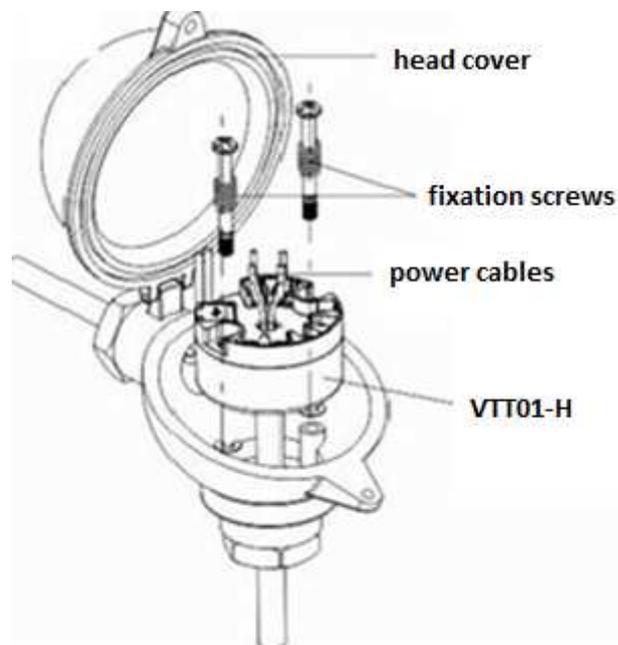


Figure 2.1 – VTT01-H head mounting.



Figure 2.2 – Head mounting types.

VTT01-H dimensions are shown in Figure 2.3. VTT01-H approximate weight is 50 g.

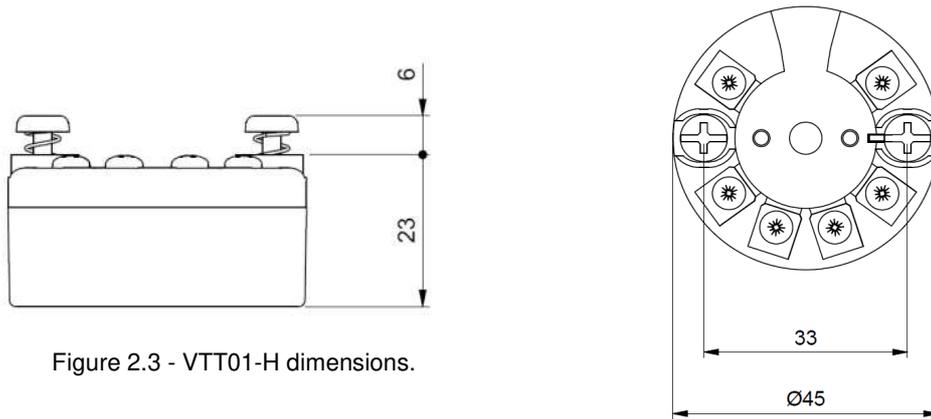
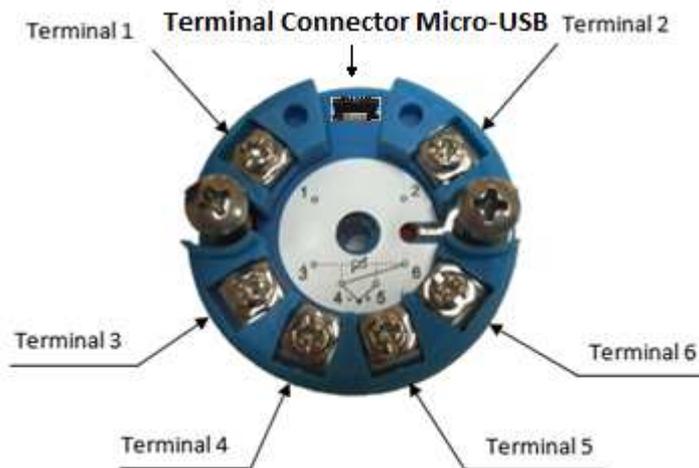


Figure 2.3 - VTT01-H dimensions.

2.2. ELECTRICAL CONNECTION

Figure 2.4 shows the terminals for electrical and sensor connections on VTT01-H.



Terminal	Description
1	Power Supply 24 Vdc (+)
2	Power Supply 24 Vdc (-)
3	Sensor Terminal
4	Sensor Terminal
5	Sensor Terminal
6	Sensor Terminal

Figure 2.4 – Terminal connection and description for VTT01-H.

NOTE



All cables used to connect the VTT01-H to the sensor should be shielded to avoid interference and noise.

2.3. PROCESS CONNECTION

Following are the connections of VTT01-H with the different types of possible sensors:



Figure 2.5 - RTD or resistive 2-wire connection.



Figure 2.6 - RTD or resistive 3-wire connection.



Figure 2.7 - RTD or resistive 4-wire connection.

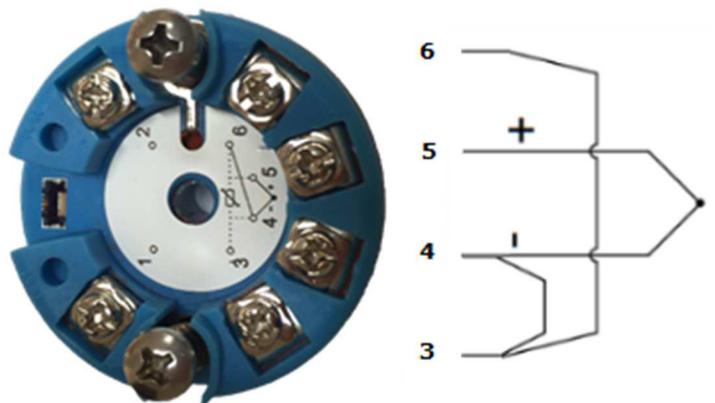


Figure 2.8 –Thermocouple or mV connection.

3 CONFIGURATION

VTT01-H temperature transmitter can be configured using VUI10 (USB) interface and VTT01 Tool software in Windows® environment.

3.1. VTT01 TOOL

The configuration of the equipment can be done using VTT01 Tool software, running on Windows® platform. The connection between PC and transmitter must be made using the VUI10 interface exclusively.

Figure 3.1 shows the connection of the equipment to a PC and a supply voltage source (the interface does not power the transmitter).

Attention! The equipment must be powered by the power supply before being connected to the PC for configuration.



Figure 3.1 - Connecting VUI10 interface to VTT01-H with external power supply.

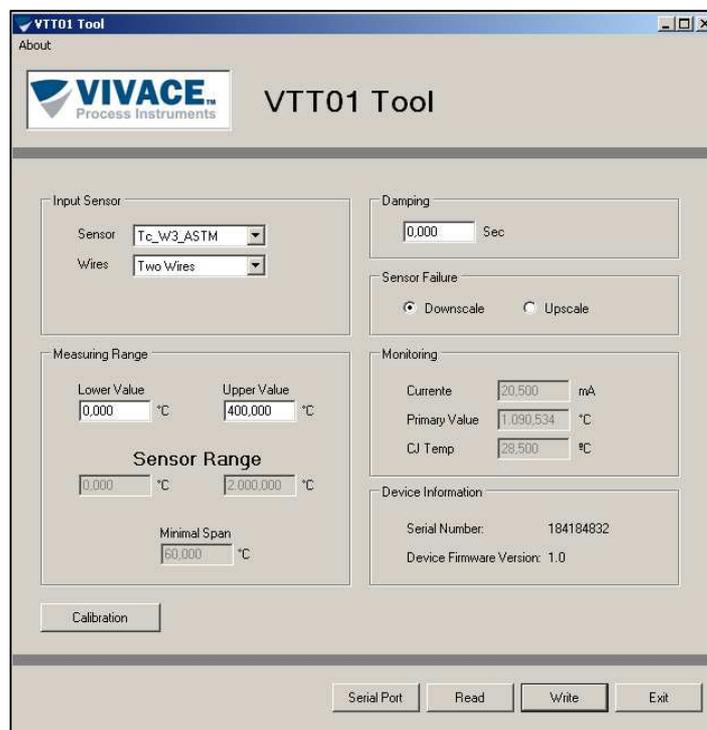


Figure 3.2 – VTT01 Tool configuration screen.

4 CERTIFICATION

VTT01-H is designed to meet national and international standards for intrinsic safety. Certificates are pending.

5 TECHNICAL CHARACTERISTICS

5.1. IDENTIFICATION

VTT01-H has a side label informing transmitter model, equipment serial number, technical data and tag. The upper label identifies the power and connection terminals of the sensor. Both labels are illustrated in Figure 5.1.

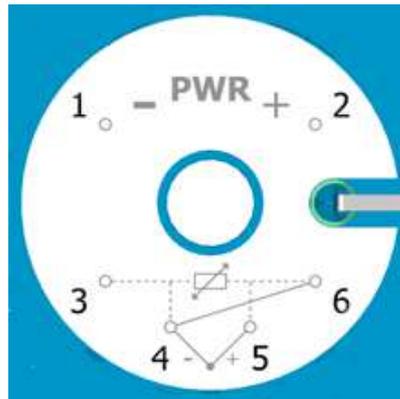
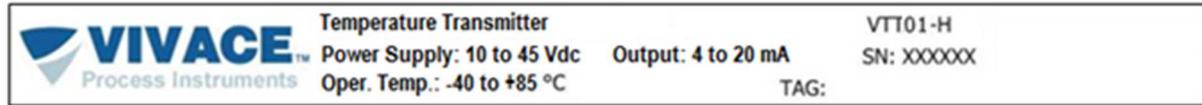


Figure 5.1 – VTT01-H identification labels.

5.2. TECHNICAL SPECIFICATIONS

Table below shows the technical specifications for VTT01-H:

Accuracy	As the tables above
Power Supply / Output Current	12 to 35 Vdc / 4-20 mA according to NAMUR-NE43
Communication Protocol	Proprietary, via USB
Ambient Temperature Limits	- 40 to 85°C
Configuration	VTT01 Tool and VUI10 Interface (USB)
Process Connection	Head Mounting according to DIN 43729 Form B
Protection Degree	IP00 / IP66 (Installed)
Electrical Isolation	Galvanic Isolation, 1,5 kVAC
Housing Material	ABS Plastic
Dimension / Approximate Weight	Ø 45 x 23 mm / 90 g

Table 5.1 – Technical specifications for VTT01-H.

In case of failure the NAMUR NE43 standard sends current output to 3.6 or 21 mA according to user's specification and to 3.8 or 20.5 mA in case of saturation.

5.3. COMPATIBLE SENSORS

The following tables list the types of sensors and their proper working ranges, plus the minimum range for correct operation and accuracy.

RTD - Temperature sensor based on resistance with 2, 3 or 4 wires connection.

RTD Accuracy: $\pm 0.1\%$ of minimum span.

SENSOR OPTION	REFERENCE	INPUT RANGE (°C)	MINIMUM SPAN (°C)
Pt100 ($\alpha=0.00385$)	IEC751	-200 to 850	10
Pt100 ($\alpha=0.003916$)	JIS1604	-200 to 645	10
Ni120	Edison Curve #7	-70 to 300	10

Table 6.2 – Technical characteristics for RTDs.

TC - Temperature sensor based on mV with 2 wires connection.

TC Accuracy: $\pm 0.2\%$ of minimum span.

SENSOR OPTION	REFERENCE	INPUT RANGES (°C)	MINIMUM SPAN(°C)
Thermocouple E	IEC584	-50 to 1000	25
Thermocouple J	IEC584	-180 to 760	25
Thermocouple K	IEC584	-180 to 1372	25
Thermocouple N	IEC584	-200 to 1300	25
Thermocouple R	IEC584	0 to 1768	25
Thermocouple S	IEC584	0 to 1768	25
Thermocouple T	IEC584	-200 to 450	25
Thermocouple L	DIN43710	-200 to 900	25
Thermocouple U	DIN43710	-200 to 600	25
Thermocouple W3	ASTM E988-96	0 to 2000	25
Thermocouple W5	ASTM E988-96	0 to 2000	25

Table 6.3 – Technical characteristics for TCs.

Ohm or mV - Linear resistive sensor or mV with 2, 3 or 4 wires.

SENSOR OPTION	INPUT RANGE	MINIMUM SPAN	ACCURACY
Entrada mV	-10 mV a 100 mV	2 mV	0,2 mV
Entrada Ohm	0 Ohm a 400 Ohm	4 Ohm	0,8 Ohm

Table 6.4 – Technical characteristics for resistive or mV sensors.

5.4. ORDERING CODE

VTT01 4-20 mA Temperature Transmitter

Model	H	HEAD
	P	PANEL

Ordering Code Example:

VTT01-	H
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6 WARRANTY

6.1. GENERAL CONDITIONS

Vivace ensures its equipment from any defect on manufacturing or component quality. Problems caused by misuse, improper installation or exposure to extreme conditions are not covered by this warranty.

The user can repair some equipment by replacing spare parts, but it is strongly recommended to forward it to *Vivace* for diagnosis and maintenance in cases of doubt or impossibility of correction by the user.

For details about the product warranty, see the general term warranty on *Vivace* website: www.vivaceinstruments.com.br.

6.2. WARRANTY PERIOD

Vivace ensures the ideal operating conditions of their equipment by a period of two years, with full customer support regarding to installation, operation and maintenance for the best use of the equipment.

It is important to note that even after warranty period expires, *Vivace* assistance team is ready to assist customer with the best support service, offering the best solutions for the installed system.

APPENDIX

		FSAT Technical Analysis Solicitation Form		
		Company:	Unit/Department:	Shipping Invoice n°:
Standard Warranty: ()Yes ()No		Extended Warranty: ()Yes ()No		Buying Invoice n°:
COMMERCIAL CONTACT				
Complete Name:			Position:	
Phone and Extension:			Fax:	
e-mail:				
TECHNICAL CONTACT				
Complete Name:			Position:	
Phone and Extension:			Fax:	
e-mail:				
EQUIPMENT DATA				
Model:			Serial Num.:	
PROCESS INFORMATION				
Environment Temperature (°C)			Work Temperature (°C)	
Min:	Max:		Min:	Max:
Operation Time:			Fail Date:	
FAIL DESCRIPTION: Here user should describe in detail the observed behaviour of product, frequency of fail occurrence and repeatability. Also, should inform operational system version and a quick description of control system architecture where the equipment was installed.				
ADDITIONAL OBSERVATION:				

