# TCI-W13, TCI-W23 Series wall mounted universal controller




## Features

- Universal PI and/or binary control for any analog input/output signal and range
- Multiple auxiliary functions: heat-cool auto changeover, automatic enable, set point compensation
- Differential, averaging, min and max functions
- Cascading of control loops (-W23 type)
- Alarm monitoring of low and high limits on all inputs
- Programmable reaction in case of alarm
- Feedback function for inputs and set points
- Functions for dehumidifying, set point shift, cascade control
- Password protected programmable user and control parameters

**TCI-W23 also includes**

- Power cap protected real-time clock with 48 hr power backup
- 7-day programmable schedules, with options including change of set points and direct position of manual outputs
- Blue backlight

## Applications

- Fan coil units
- Heat exchangers
- Zoning
- VAV
- Air handlers
- Fan, pump control
- Humidifiers
- Dehumidifiers
- Ventilation
- Radiant heating
- Radiant cooling
- Pressurization

## General

- TCI-W13: 1 independent control loop, 1 internal temperature sensor, 1 universal input (analog/binary/temp), 1 binary output, 2 analog outputs
- TCI-W23: 2 independent control loops, 1 internal temperature sensor, 1 universal input, 1 passive input, 1 binary output, 2 analog outputs.
- Internal temperature sensor standard. Add replaceable humidity element as required or order -H version: AES3-HT-A2 (2%), AES3-HT-A3 (3%) or AES3-HT-A5 (5%)
- Flexible application configuration is made with a parameter-setting routine using the standard operation terminal

## Name

**T C I - W 2 3 - U**

| | |
|---|---|
| Housing | Blank = square housing |
| In/Outputs: | See table below |
| Control loops: | 1 = 1 control loop, 2 = 2 control loops |
| Mounting: | W = Wall mounted |
| Series: | **TCI** |

## Ordering

| Model | Item code | Loop | Temperature input | Humidity input | UI | TI | Binary output | Analog output | Option |
|---|---|---|---|---|---|---|---|---|---|
| TCI-W13 | 40-10 0170 | 1 | 1 | 0 | 1 | 0 | 1 | 2 | Standard |
| TCI-W13-H | 40-10 0171 | | | 1 | | | | | RH sensor 3% acc. |
| TCI-W23 | 40-10 0172 | 2 | | 0 | 1 | 1 | | | 7-day programmable |
| TCI-W23-H | 40-10 0173 | | | 1 | | | | | RH sensor 3% acc. |
| AES3-HT-A2 | 40-50 0102 | | | 1 | | | | | RH sensor 2% acc. |
| AES3-HT-A3 | 40-50 0103 | | | 1 | | | | | RH sensor 3% acc. |
| AES3-HT-A5 | 40-50 0104 | | | 1 | | | | | RH sensor 5% acc. |


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# Technical specifications

Caution! This device is intended to be used for comfort applications. Where a device failure endangers human life and/or property, it is the responsibility of the owner, designer and installer to add additional safety devices to prevent or detect a system failure caused by such a device failure. Vector Controls or its affiliates cannot be held liable for any damage caused by such a failure. Failure to follow specifications and local regulations may endanger life, cause equipment damage and void warranty.

| | | |
|---|---|---|
| **Power Supply** | Power Requirements | 24 VAC ±10%, 50/60 Hz, Class 2, 2.0 A, 48 VA max.<br>24 VDC ±10% |
| | Power Consumption | max. 3 VA |
| | Electrical Connection | Terminal Connectors<br>0.34…2.5 mm² wire (AWG 22…13) |
| | Clock backup | min. 48 hours |
| **Signal inputs** | Universal Input<br>Input Signal<br>Resolution<br>Impedance | Setting for voltage or current<br>0…10 V or 0…20 mA<br>9.76 mV or 0.019 mA (10 bit)<br>Voltage: 98 kΩ  Current: 240 Ω |
| | Universal Input<br>Range<br>Accuracy | Input configured to remote temperature (RT) or digital input (DI)<br>NTC (Sxx-Tn10 sensor): -40…140 °C (-40…284 °F)<br>-40…0 °C (-40…32 °F): 0.5 K<br>0…50 °C (32…122 °F): 0.2 K<br>50…100 °C (122…212 °F): 0.5 K<br>> 100 °C (> 212 °F): 1 K |
| | Humidity Sensor AES3-HT-Ax:<br>Range<br>Measuring Accuracy<br>Hysteresis<br>Repeatability<br>Stability | Capacity sensor<br>0…100 % rH<br>See Figure to the right<br>± 1%<br>± 0.1%<br>< 0.5% / year |
| **Signal outputs** | Analog output<br>Output signal<br>Resolution<br>Maximum load | <br>DC 0…10 V / 0…20 mA<br>9.76 mV / 0.019 mA<br>Voltage: ⩾ 5 kΩ  Current: ⩽ 250 Ω |
| | Relays outputs<br>Type of disconnection<br>AC voltage<br>DC voltage | <br>Micro-interruption<br>0…48 VAC, 2(1.2) A max. (Observe local regulation)<br>0…30 VDC, 2 A max. |
| | Insulation strength<br>between relays contacts and system electronics | <br>2000 VAC to EN 60730-1 |
| **Environment** | Operation<br>Climatic conditions<br>Temperature<br>Humidity | To IEC 721-3-3<br>class 3K5<br>0…50 °C (32…122 °F)<br>< 95% RH non-condensing |
| | Transport & storage<br>Climatic conditions<br>Temperature<br>Humidity<br>Mechanical conditions | To IEC 721-3-2 and IEC 721-3-1<br>class 3K3 and class 1K3<br>-25…70 °C (-13…158 °F)<br>< 95% RH non-condensing<br>class 2M2 |
| **Standards** | Degree of protection | IP30 to EN 60529 |
| | Pollution class | II (EN 60730-1) |
| | Safety class | III (IEC60536) |
| | Overvoltage category | I (EN60730-1) |
| **General** | Material:  Cover, back part<br>Mounting plate | Fire proof ABS plastic (UL94 class V-0)<br>Aluminum |
| | Dimension (H x W x D) | Front part: 21 x 88 x 88 mm (0.8 x 3.5 x 3.5 in.)<br>Power case: ø 58 x 32 mm (ø 2.3” x 1.3”) |
| | Weight (including package) | TCI-W13 = 205g (7.2 oz.), TCI-W23 = 220g (7.8 oz) |

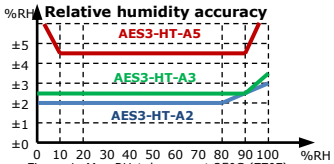


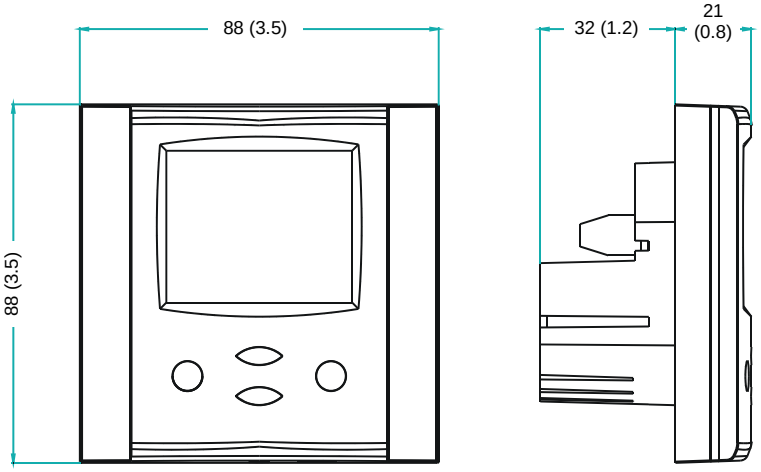
Figure 1: Max RH-tolerance at 25°C (77°F) per sensor type

## Product testing and certification

CE Declaration of conformity  Information about the conformity of our products can be found on our website www.vectorcontrols.com on the corresponding product page under "Downloads"


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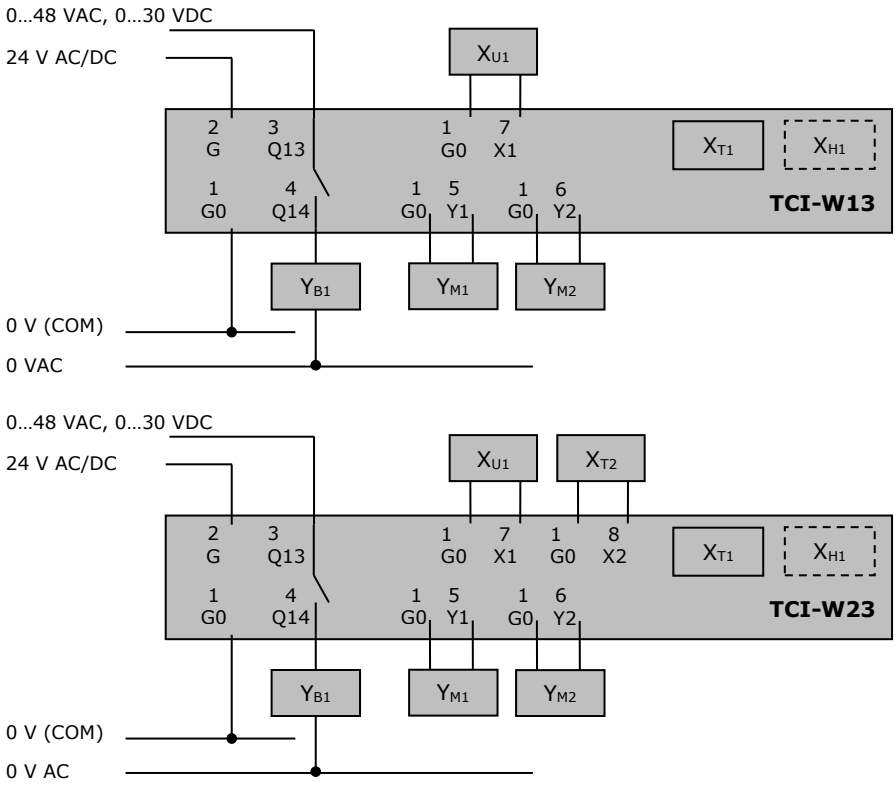
## Dimensions, mm (inch) and Installation




- Install the controller on an easy accessible interior wall, approx. 1.5 m above the floor in an area of average temperature.
- Avoid direct sunlight or other heat sources, e.g. the area above radiators and heat emitting equipment.
- Avoid locations behind doors, outside walls and below or above air discharge grills and diffusers.
- Location of mounting is less critical if external temperature sensors are used.
- Ensure adequate air circulation to dissipate heat generated during operation.
- Observe local regulations.

  Do not mount in a wet or condensation prone environments.

## Connection




**Warning:**
**Live electrical components!**
During installation, testing, servicing and troubleshooting of Vector Controls products, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

## Terminal Description

| | | |
|---|---|---|
| **G0** | Power supply: | 0 V, -24 VDC; common for power supply, analog in- and outputs |
| **G** | Power supply: | 24 VAC, +24 VDC |
| **$X_{U1}$** | Universal input: | NTC 10 kΩ @ 25 °C (77 °F) or open contact, 0…10 VDC or 0…20 mA (selectable by jumper) |
| **$X_{T2}$** | Passive input: | NTC 10 kΩ @ 25 °C (77 °F) or open contact |
| **$Y_{B1}$** | Binary output: | Potential free relays contacts (see technical specification) |
| **$Y_{M1}$, $X_{M2}$** | Analog outputs: | 0…10 V or 0…20 mA* |
| **$X_{T1}$** | Internal temperature input | |
| **$X_{H1}$** | Internal humidity input if AES3-HT is inserted | |

Use copper, twisted pair, conductors only. The operating voltage must comply with the requirements for safety extra-low voltage (SELV) as per EN 60730. Use safety insulating transformers class II with double insulation as per EN 60742; they must be designed for 100% ON-time. When using several transformers in one system, the connection terminal 1 must be galvanic connected. TCI is designed for operation of 24 VAC safety extra-low voltage and is short-circuit-proof. Supplying


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voltages above 24 VAC to low voltage connections may damage the controller or other devices. Connection to voltages exceeding 42 V endangers personnel safety.

## Selection of actuators and sensors

**Temperature sensors**: Use Vector Controls NTC sensors to achieve maximum accuracy: SDB-Tn10-20 (duct), SRA-Tn10 (room), SDB-Tn10-20 + AMI-S10 as immersion sensor.

**Actuators**: Choose modulating actuators with an input signal type of 0…10 V DC or 4…20 mA (min. and max. signal limitations may be set with parameters. 3-pointactuators with constant running time are recommended).

**Binary auxiliary device**s (e.g. pumps, fans, on/off valves, humidifiers, etc.): Do not directly connect devices that exceed specified limits in technical specifications – observe startup current on inductive loads.


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