



## Universal Programmable Controller TCI2

The TCI2 is a programmable universal controller with communication capabilities. Each control loop may use 2 PI sequences and 2 binary stages. The TCI2 comes with a built-in RS485 communication interface that allows peer-to-peer communication with an operation terminal such as OPA2-(2TH)-VC. Complete parameter sets may be copied by use of an accessory called AEC-PM2 or exchanged with a PC using an RS485-USB converter and the Easyset program. The TCI2 uses the universal X2 operating system.

### Applications

- Refrigeration / air conditioning units
- Ventilators
- Humidifying / dehumidifying
- Pressure / pump systems
- and many more...

### Functions

- Two universally configurable control loops:
  - Functions for dehumidifying, set point shift and cascade control
  - Multiple auxiliary functions: heat-cool auto changeover, automatic enable, set point compensation
  - Free heating and cooling with economizer function based on enthalpy or temperature
  - Differential, averaging, min and max functions, enthalpy and dew point calculations
  - Transmitter function for inputs and set points
- 4 selectable universal inputs (VDC, mA, NTC, Pt1000) and 2 analog outputs (VDC, mA)
- 2 relays with each a normally open contact
- 8 freely assigned alarm conditions, selectable state of outputs on alarm condition
- Power Cap protected real-time clock with 48hr power backup
- 7-day programmable schedules, with options including change of set points and direct position of manual outputs
- Password protected programmable user and control parameters

### Ordering

Model	Item	Loop	UI	DO	AO	Functions
TCI2-204.202UC-OP	40-110115	2	4	2	2	Controller with display standalone
TCI2-204.202UC-OP-L	40-110114	2	4	2	2	Controller with display standalone with line voltage
AEC-PM2	40-500103					Plug-In memory module
AEX2-MOD	40-500105					Modbus RTU or ASCII communication
AEX2-BAC	40-500106					BACnet® MS/TP communication
AMM-1	40-510022					Accessory for cabinet door mounting

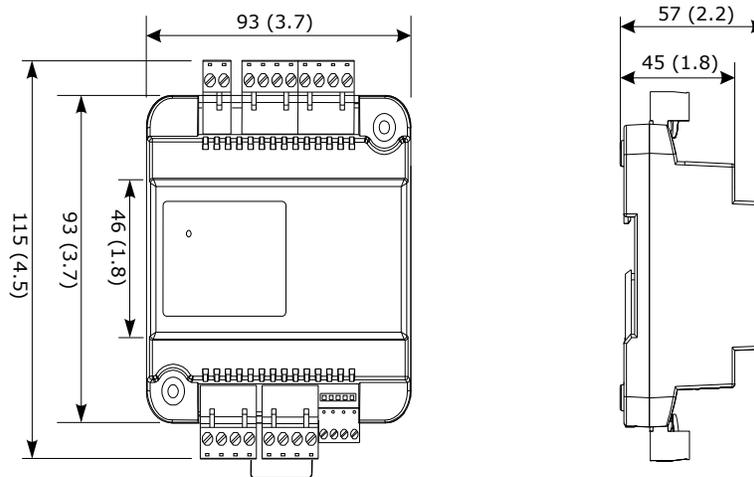
A large range of remote operation terminals may be found on our website. All -VC operation terminals work with this controller.

## Technical specifications

### Important notice and safety advice

This device is for use as an operating controller. It is not a safety device. Where a device failure could endanger human life and property, it is the responsibility of the client, installer and system designer to add additional safety devices to prevent such a device failure. Ignoring specifications and local regulations may cause equipment damage and endangers life and property. Tampering with the device and misapplication will void warranty.

<b>Power supply</b>	Power requirements	TCI2-204.202U	24 VAC $\pm$ 10%, 50/60 Hz, 15..34 VDC, SELV to HD 384, Class II, 48 VA max
		TCI2-204.202U-L	85..264 VAC, 50/60 Hz, 120..370 VDC
	Power consumption		Max. 5 VA
	Electrical connection		Removable terminal connectors, wire 0.34...2.5 mm <sup>2</sup> (AWG 24...12)
	Clock backup		Min. 48 hours
<b>Signal inputs</b>	Universal input		Input jumper set for voltage or current 0...10 V or 0...20 mA
	Input signal		9.76 mV or 0.019 mA (10 bit)
	Resolution		Voltage: 74.8k $\Omega$ Current: 158 $\Omega$
	Impedance		Input jumper set to temperature (RT) or digital input (DI)
	Passive input		NTC (Sxx-Tn10) 10k $\Omega$ , Type 2: -40...100 °C (-40...212 °F)
	Type & range:		PT1000 (Sxx-Tp2): -50...205 °C (-58...401 °F) NI1000 (Sxx-Tk5): -50...180 °C (-58...356 °F)
<b>Signal outputs</b>	Analogue outputs:	Output signal	DC 0...10 V or 0...20 mA
		Resolution	9.76 mV or 0.019 mA (10 bit)
		Maximum load	Voltage: $\geq$ 1k $\Omega$ Current: $\leq$ 250 $\Omega$
	Relay outputs:	AC Voltage	0...250 VAC, full-load current 3A, locked-rotor 18A.
		DC Voltage	0...30 VDC, full-load current 3A, locked-rotor 18A.
	Insulation strength between relays contacts and system electronics:		4000V AC to EN 60 730-1
	between neighbouring contacts:		1250V AC to EN 60 730-1
<b>Connection to remote terminal</b>	Hardware interface		RS485 in accordance with EIA/TIA 485
	Cabling		Twisted pair cable category 5 or 6
<b>Environment</b>	Operation		To IEC 721-3-3
	Climatic conditions		class 3K5
	Temperature		0...50 °C (32...122 °F)
	Humidity		<85 % RH non-condensing
	Transport & storage		To IEC 721-3-2 and IEC 721-3-1
	Climatic conditions		class 3K3 and class 1K3
	Temperature		-25...70 °C (-13...158 °F)
	Humidity		<95 % RH non-condensing
	Mechanical conditions		class 2M2
<b>Standards</b>		conformity	
		EMC directive	2014/30/EU
		Low voltage directive	2014/35/EU
	Product standards		
	Automatic electrical controls for household and similar use		EN 60 730 -1
	Special requirement on temperature dependent controls		EN 60 730 - 2 - 9
	Electromagnetic compatibility for industrial and domestic sector		Emissions: EN 60 730-1 Immunity: EN 60 730-1
	Degree of protection		IP00 to EN 60 529
	Pollution class		II (EN 60 730-1)
	Safety class:	TCI2-202.202U	III (IEC 60536) if SELV is connected to DO, else II
	TCI2-204.202U-L	II (IEC 60536)	
Overvoltage category		III (EN 60 730-1)	
<b>General</b>	Material		Fire proof ABS plastic (UL94 class V-0)
	Dimensions (H x W x D)		57 x 93 x 115 mm (2.4 x 3.7 x 4.5) inch
	Weight (including package)		
		TCI2 (24V) without display / with display	245g (8.6oz) / 290g (10.2oz)
		TCI2 (230V) without display / with display	275g (9.7oz) / 320g (11.3oz)

**Dimensions, mm (inch)****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**

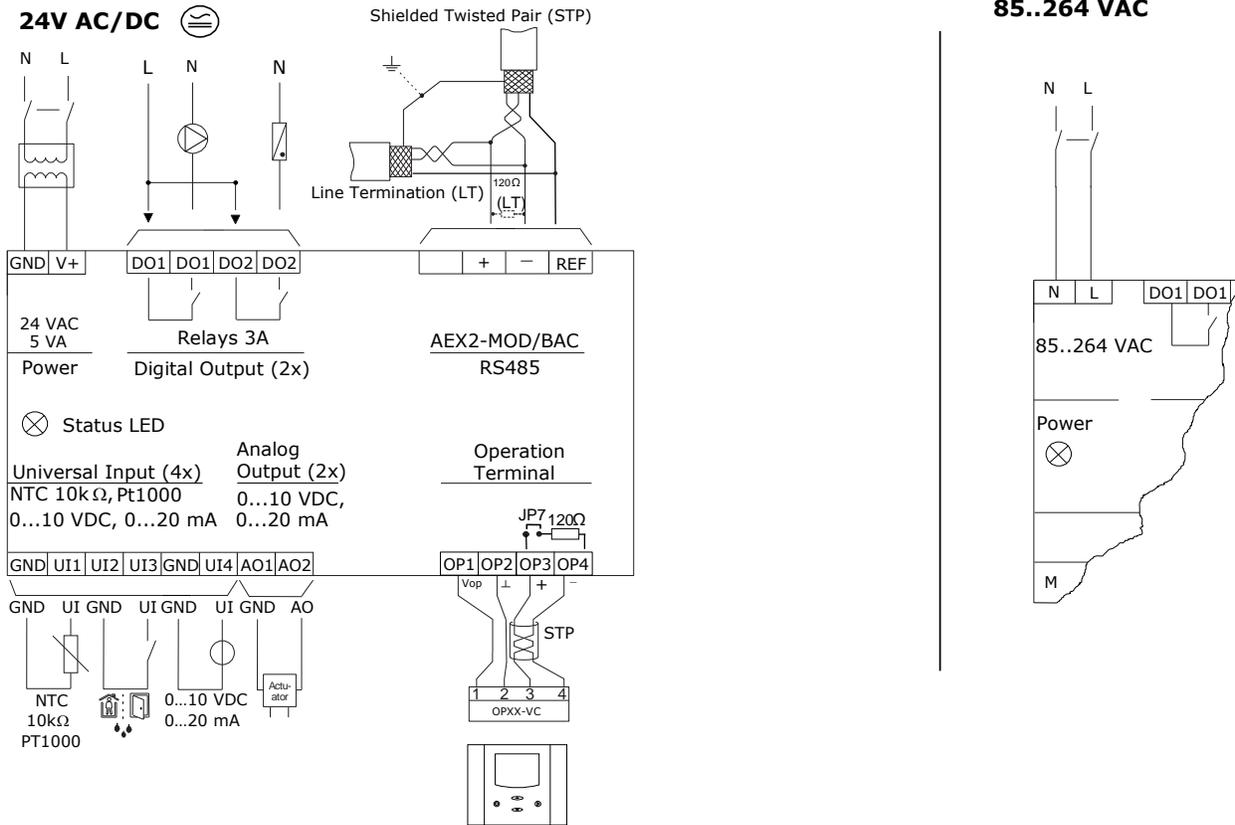
Choose modulating actuators with an input signal type of 0-10 V DC or 4-20 mA (Min. and max. signal limitations may be set with parameters).

3-point actuators with constant running time are recommended.

**Binary auxiliary devices** (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.

### Connection diagram



### Configuration Jumpers

The inputs and outputs are configured with jumpers. Jumpers are located underneath the controller.

#### AO: Selection of analog output type

Left position:  
voltage output (0... 10 V)  
*factory default*

Right position:  
current output (0... 20 mA)

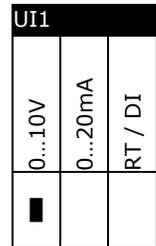


#### UI: Selection of universal input type

Left position:  
voltage output (0... 10 V)  
*factory default*

Middle position: current input (0... 20 mA)

Right position: RT or dry contact



### LED-indicators

A status LED is located on the upper left side of the controller housing. During normal operation the LED blinks briefly once every 5 seconds. If there is an alarm or fault condition it will blink every second. On devices with OP the LED display is omitted.

### Installation

See installation sheet no:

- TCI2 70-000688 ( [www.vectorcontrols.com](http://www.vectorcontrols.com) )

## X2 Functional Scope

The controller has the following X2 functions and elements:

Group	Modules	QTY	Description
UP			User and display parameters
UI	01U to 04U	4	Universal inputs, selectable with jumper: RT/DI, mA, VDC
	05U to 08U	4	Virtual inputs for operation terminals, bus modules or special functions
AL	1AL to 8AL	8	Alarm conditions
LP	1L to 2L	2	Control loops
Ao	1A to 2A	2	Analog outputs, selectable with jumper: mA, VDC
FAN	1F	1	Fan or lead lag modules, 1 to 3 fan speeds, up to 3 switching lead-lag stages each
do	1d to 2d	2	Binary outputs with a normally open (NO) relays contact
FU	1FU	1	<b>Remote Enable:</b> Activation of the controller based on signal and alarm conditions
	2FU	1	<b>Change Operation Mode:</b> Switching occupied and unoccupied with control signals
	3FU	1	<b>Heat/Cool Change:</b> Switching heating and cooling based on a control signal
	4FU	1	<b>Setpoint Compensation:</b> Summer/winter compensation of setpoint
	5FU	1	<b>Economizer</b> (free heating or cooling due to the condition of outside and room air)
Co			Communication (if a communication module is available)
COPY			Copying complete parameter sets between run, default and external memory with up to 4 memory locations (AEC-PM2)
RTC		1	Real time clock module with 48-hour power back up (keeps clock running during power failure)
PRO	Pr01 to Pr12	12	Time schedule programs for 7 days or annual switching events

### Operation manual and configuration

This controller uses the latest generation X2 operating system. Detailed operating instructions for all devices equipped with this operating system can be downloaded here

<http://www.vectorcontrols.com/products/x2>

Also available are programming instructions for technicians and an application database.

**The device can be fully configured using EasySet.**

**EasySet may be downloaded free of charge from [www.vectorcontrols.com](http://www.vectorcontrols.com).**

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