Knx PID control system on water

**General**

The V3000 is a networked electronic control designed by CIAT to control non-independent air conditioning comfort units (UTA and cassette-type fan coil units, etc.) operating in 2-pipe, 4-pipe, 2-pipe/2-wire systems using recirculated air.

It actuates 24 V three-position valves to control the water supply and thus ensures optimum control of ambient temperature conditions.

Unlike a thermoelectric motor, this type of motor can stabilise any valve opening from 0 to 100% in accordance with the control system requirements.

The V3000 controller is available as a flush-mounted version, factory-fitted to still-mounted fan coils, and a wall-mounted version requiring connection by the installer.

A radio-frequency remote control is available for cases where wiring is not possible (renovations, etc.)

The V3000 communicates over the international open KNX protocol (ISO 14543-3), allowing it to be completely interoperable with all other devices on your site.

**Description**

The V3000 uses Proportional-Integral-Derivative (PID) control to simultaneously operate an air conditioner’s valves, electric heater and fan speeds. It comes with display or dial terminals to optimally adjust indoor comfort conditions.

The factory-set control parameters (PID, deadband ventilation, etc.) can be adjusted on the display terminal.

The V3000 can manage the Master/Slave functions via a Konnex bus (bus supply optional) if it is not connected to a BAS.

The V3000 automatically controls CIAT’s HEE concept to improve the energy efficiency of CIAT’s fan coil units:

- Modulating output for adjusting the fan speed to room needs.
- Automatic control of condensation-free operation for limiting losses caused by latent heat, etc.

As an option, the V3000 can control the amount of incoming fresh air for 2-pipe and 4-pipe applications.

For further information on how this control operates and the many configuration possibilities, please consult our documentation.
**Main Advantages**

**Comparative adjustable valves**

**Thermal**  
(Time-proportional signal)

A 3-point actuator ensures a valve management close to the control needs, by the control of its stationary position between 0 and 100% (control of the water flow rate). The blowing temperature of the comfort unit will be more stable, and the office temperature will get less variations (discomfort source).

This temperature stability not only permits to maintain optimal comfort but also to save energy too.

The electricity consumption of the 3-point actuator is null when thermal balance is found contrary to the thermal valve. (Return on investment on energy saved: 2 to 3 years).

The life span of a three-point motor is approximately 2 times higher than that of a thermic motor.

To facilitate its servicing, the valve actuator is equipped with a plug-in connector.

**3 Points**  
(V3000 PID signal)

**Electric coil management**

- 2-pipe/2-wire control algorithm (cooling + electrical heating or heating/cooling + electrical heating)

- If hot water is present, the electric heater operates as shown by (a).
- If hot water is not present, the electric heater operates as shown by (b).

The controller simultaneously adjusts:

- progressive opening or closing of the regulation valve,
- time-proportional operation of the electric heater (max. 2800 Watt direct),
- the three fan speeds or the fan stop.

Priority is given to operation at low speed (medium speed is activated if the valve opening is greater than 80%). In Heating / Cooling + electric heater configuration, the electric heater only acts as a complement. If there is no hot water, the electric heater is triggered as soon as heating is needed.

Note: the algorithm above assumes that the ventilation speed selector is in the automatic position and that ventilation is stopped in the dead zone. It only shows the proportional aspect. In reality Proportional Integral Differential control is used.

The variation of the duty cycle permits modulating the electrical energy and thus having an operation mode, similar to the one of a progressive valve. If the user selects low speed manually, the electrical heating duty cycle is limited to 50%. If the medium speed is selected, the duty cycle limit will be 80%. This limitation allows to prevent overheating of the comfort unit. The controller can limit the duty cycle in function of the outside temperature.

**Timer**

The V3000 control integrates in standard a timer, adjustable from 30mn to 24:00 (by step of 30mn). This function gives the user possibility to switch on the comfort unit when he enters in his office. In that case, the switch off will be automatic (e.g.: 4 hours to manage morning and afternoon periods).
**KNX PID control system on water**

**Recirculated air only**

<table>
<thead>
<tr>
<th>Kvs values = 2.5 max - G 1/2&quot; max.</th>
<th>MAJOR LINE</th>
<th>MELODY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum water flow rate: 1800 l/h</td>
<td>MAJOR 2 NCH - COADIS 2</td>
<td>cassette</td>
</tr>
<tr>
<td></td>
<td>UTA Standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UTA Compact</td>
<td></td>
</tr>
</tbody>
</table>

**CONTROL UNIT**

Factory-set and wired electronic PID controller
Display terminal

**Terminal**
- V: flush-mounted, factory fitted
- H: wall-mounted, to be wired by fitter
- SH: wall-mounted, to be wired by fitter + supply

**Fittings not included**

**MAXIMUM WATER FLOW RATE:** 1800 l/h

**WATER CONTROL (24 V/3-POS. ACTUATOR)**

**2-pipe system**

- Heating only

  - > 1 four-way valve
    - E3000V
      - Code: E3000H
      - Code: E3000SH
      - Code: E3040V
      - Code: E3040H
      - Code: E3040SH
      - Code: E3041V
      - Code: E3041H
      - Code: E3041SH

- Cooling only

  - > 1 four-way valve
    - E3000V
      - Code: E3000H
      - Code: E3000SH
      - Code: E3040V
      - Code: E3040H
      - Code: E3040SH
      - Code: E3041V
      - Code: E3041H
      - Code: E3041SH

**Automatic heating/cooling with changeover sensor fitted**

- > 1 four-way valve
  - E3005V
    - Code: E3005H
    - Code: E3005SH
  - E3006V
    - Code: E3006H
    - Code: E3006SH
  - E3007V
    - Code: E3007H
    - Code: E3007SH

**2-pipe system with electric heater (2300 W max.)**

- Cooling only + electric with dead band

  - > 1 four-way valve
    - E3001V
      - Code: E3001H
      - Code: E3001SH
      - Code: E3041V
      - Code: E3041H
      - Code: E3041SH

**- Automatic heating/cooling + electric heater with changeover sensor fitted**

  - > 1 four-way valve
    - E3003V
      - Code: E3003H
      - Code: E3003SH

**4-pipe system**

- Additional charge for a capacity of 2000 W to 4600 W.

**Mandatory additional charges for valves with Kvs > 2.5**

- 3-way valve(s) with by-pass.

**ALL-ELECTRIC AND RECIRCULATED AIR ONLY OPERATION**

**CONTROL UNIT:**

V3000 controller set for all-electric and recirculated air only operation

**UTA STANDARD**

6R or 9R

**Terminal**

H: wall-mounted, to be wired by installation technician

- 2 power supplies / ventilation (1-ph, 230 V, 50 Hz)
- Electric heater (3-ph, 400 V, 50 Hz, 2000-16800 W max.)

**V3000 KNX**

HEAT PUMPS - AIR CONDITIONING - REFRIGERATION - AIR HANDLING - HEAT EXCHANGE - NA 13.635 A

3

**Note:** the prices for a dial room terminal are the same as those for a display terminal. Please specify the desired type of terminal at time of order. Dial terminal available in wall-mounted version only.

**(1) Power limited to 16800 W: all sizes of UTA Standard with 6 rows and size 370-22 UTA Standard with 9 rows**
## KNX PID control system on water

**V3000 KNX**

### RECIRCULATED AIR ONLY

<table>
<thead>
<tr>
<th>MAJOR LINE</th>
<th>MELODY Cassette</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major 1</td>
<td></td>
</tr>
<tr>
<td>Major 2</td>
<td></td>
</tr>
<tr>
<td>NCH</td>
<td></td>
</tr>
<tr>
<td>COADIS 2</td>
<td></td>
</tr>
<tr>
<td>UTA Compact</td>
<td></td>
</tr>
<tr>
<td>UTA Standard</td>
<td></td>
</tr>
</tbody>
</table>

### LESS COST FOR ROOM TERMINAL

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E039097</td>
<td>Less cost for display room terminal</td>
</tr>
</tbody>
</table>

### OPTIONS and ACCESSORIES

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7161243</td>
<td>Wall-mounted room terminal with dial</td>
</tr>
<tr>
<td>7161242</td>
<td>Blank terminal with sensor</td>
</tr>
<tr>
<td>7161247</td>
<td>Radio-frequency remote control (controls up to 8 V3000)</td>
</tr>
<tr>
<td>E038550</td>
<td>Radio-frequency receiver (one receiver per unit required)</td>
</tr>
<tr>
<td>7222279</td>
<td>Konnex bus power supply 320 mA for 64 x V3000 max.</td>
</tr>
<tr>
<td>7242362</td>
<td>KNX timer for 60 x V3000 control in comfort/economy mode in 4 zones in accordance with manual N09.38</td>
</tr>
</tbody>
</table>
The purpose of this control is to prepare fresh air at a constant temperature and introduce it through a network of ducts of comfort units operating on recycled air and controlling the room’s ambient temperature and treating the losses of the room. Inspired by a recycled air system, the controller also operates the fresh air inlet valve on the comfort unit UTA STANDARD with air box and servo-motor diffusing prepared fresh air on Coadis Line cassettes.

The unit operates at a single speed (to be specified when ordering), corresponding to the fresh air flow rate to be introduced. The controller works progressively depending on the blown air temperature using a proportional algorithm. A heating or cooling cycle is triggered based on the heating and cooling setpoints.

In comfort mode, the inlet flap is open. If stop mode is activated, or in the event of a power cut, the flap is closed.

The risk of freezing is determined either by a signal from the frost protection thermostat or if the valve is fully open (insufficient thermal capacity and thus risk of freezing). If a risk of freezing is detected, the flap is closed, the fan stops immediately and the valve remains open.

Note that air extraction must correspond to air intake in the room to be conditioned.

Note: not compatible with electrical application.

See our manuals for further details about the operation and multiple possible parameter settings of these controllers.

**FRESH AIR**

**CONTROL UNIT:**
- Configured V3000 controller
- Display terminal / 3-position 4-way valve (NP: 16 bar) / Ancillary pan and fuse disconnect switch
- Control relay for air blade actuator and frost protection thermostat

**UTA Standard**

**CONSTANT SUPPLY AIR TEMPERATURE CONTROL**

<table>
<thead>
<tr>
<th>Room terminal:</th>
<th>H</th>
<th>code</th>
<th>E047701</th>
</tr>
</thead>
<tbody>
<tr>
<td>- H: wall-mounted, to be wired by installation technician</td>
<td>H</td>
<td>code</td>
<td>E047701</td>
</tr>
<tr>
<td>2-pipe system</td>
<td>ANB3001H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 1 four-way valve</td>
<td>code</td>
<td>E047711</td>
<td></td>
</tr>
<tr>
<td>- Heating only</td>
<td>ANB3005H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 1 four-way valve</td>
<td>code</td>
<td>E047711</td>
<td></td>
</tr>
<tr>
<td>- Heating/cooling with changeover sensor fitted</td>
<td>ANB3041H</td>
<td>code</td>
<td>E047721</td>
</tr>
<tr>
<td>&gt; 2 four-way valves</td>
<td>code</td>
<td>E047721</td>
<td></td>
</tr>
</tbody>
</table>

**4-pipe system**

- > 2 four-way valves

**Mandatory additional charges for valves with Kvs greater than 2.5**

<table>
<thead>
<tr>
<th>Additional charge for 1 x 4-way valve, 3/4&quot; with Kvs of 4</th>
<th>code</th>
<th>E038571</th>
</tr>
</thead>
</table>

Note: a damper and a damper actuator are needed in addition to the comfort unit.
The purpose of this control is to introduce fresh air and control the ambient temperature in a room.

Inspired by a recycled air system, the controller also operates the fresh air inlet valve on the comfort unit (UTA STANDARD with air box and servo-motor in the example shown).

The unit operates at two speeds, and the controller works depending on the ambient sensor using a Proportional Integral algorithm. In automatic ventilation, the controller progressively controls the valve while simultaneously adjusting the fan speed. With a manual speed setting, the controller controls the valve only.

In heating mode, if the blown air temperature is lower than the blown air setpoint, the controller gives priority to the blown air sensor.

In cooling mode, the controller operates depending on the ambient sensor only.

In comfort mode, the intake flap is open.

In economy or frost protection mode, or if power is cut, the intake flap is closed and the controller maintains the setpoint temperature in total air recycling. In stop mode, the room is protected against frost.

The risk of freezing is determined either by a signal from the frost protection thermostat or if the valve is fully open (insufficient thermal capacity and thus risk of freezing). If a risk of freezing is detected, the flap is closed, the fan stops immediately and the valve remains open.

Note that air extraction must correspond to air intake in the room to be conditioned.

Consult our manuals for further details about the operation and multiple possible parameter settings of these controllers.

**FRESH AIR**

**CONTROL UNIT:**
- Configured V3000 controller
- Display terminal / 3-position 4-way valve (NP: 16 bar) / Ancilliary pan and fuse disconnect switch
- Control relay for air blade actuator and frost protection thermostat

**MAJOR LINE**

**UTA Standard**

**TEMPERATURE CONTROL WITH ROOM/SUPPLY AIR CASCADE CONTROL**

<table>
<thead>
<tr>
<th>Room terminal: H</th>
<th>Wall-mounted, to be wired by fitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-pipe system</td>
<td></td>
</tr>
<tr>
<td>- Heating only</td>
<td></td>
</tr>
<tr>
<td>&gt; 1 four-way valve</td>
<td>ANA3001H</td>
</tr>
<tr>
<td>- Heating/cooling with changeover sensor fitted</td>
<td>ANA3041H</td>
</tr>
<tr>
<td>&gt; 1 four-way valve</td>
<td>ANA3005H</td>
</tr>
<tr>
<td>4-pipe system</td>
<td></td>
</tr>
<tr>
<td>&gt; 2 four-way valves - Major Line &quot;_04Y&quot; size only</td>
<td>Special heater</td>
</tr>
</tbody>
</table>

Mandatory additional charges for valves with Kvs greater than 2.5

For size 370/66 UTA

Additional charge for 1 x 4-way valve, 3/4" with Kvs of 4

Note: a damper and damper actuator are needed in addition to the comfort unit.
This document is non-contractual. As part of its policy of continual product improvement, CIAT reserves the right to make any technical modification it feels appropriate without prior notification.