

## AR1/AR1-H Panel Thermostat/Hygrostat

The AR1 Panel Thermostat and AR1-H Panel Hygrostat have been designed for the distributed process control environment with the following user-oriented characteristics:

- Simple, stand-alone, unattended operation by non-specialist personnel,
- Fully, field programmable parameters for each output,
- Complete, "seamless" integration as a slave to an external master or network, and
- Standard panel cut-out dimensions (per DIN 43700).



AR1 Panel Thermostat

Typical applications for the AR1 and AR1-H are (without any other components):

- Direct control of independent cooling and heating circuits,
- Control of three-way valves,
- Control of single cooling or heating circuit selected by external command signal, and
- Thermostatic control and simultaneously driving alarms (optical or acoustic) or defrosting devices.

Both controllers use a common hardware platform with the following resources:

<b>AR1 and AR1-H Resources</b>	
<b>Pt100 3-conductor input</b>	Compensates the effect of practically unlimited cable length.
<b>2 solid-state 230 VAC outputs</b>	The outputs directly drive solenoids, contactors, vanes, heaters and actuators with integral cycle, low noise AC voltage.
<b>12-bit A/D</b>	Fast conversion and running average processing.
<b>4 optoisolated bit inputs</b>	These inputs offer versatile local control capabilities.
<b>Serial port</b>	Local (RS232) and Quamatic or Modbus network (RS485) connection.
<b>Display</b>	4-digit-plus-sign LED display.
<b>Front panel</b>	IP54 protected polyester membrane 4 tactile switches.

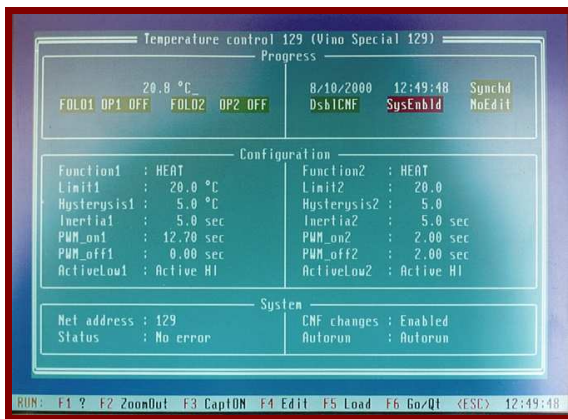
The AR1 Panel Thermostat is parametrically programmable for each output in the following:

<b>AR1 Programmable Parameters</b>	
<b>Output functions</b>	The output can be "Always ON", "Always OFF", "Heat", "Cool", "Time" and "Period". The "Time" and "Period" functions are very effective in implementing timing tasks such as defrosting and self-cleaning cycles.
<b>Reference temperature</b>	Specifies the reference point for the heating and cooling functions.
<b>Reference hysteresis</b>	Specifies the activation and de-activation points above and below the temperature reference.
<b>Inertia</b>	Inertia duration to maintain the output state after changing (to typically control a pump).
<b>Turn On/Off times or duration</b>	Specify the turn-on and turn-off time or duration for the "Time" and "Period" functions.
<b>Output PWM</b>	Output PWM mark/space duration. Each output on-state can be a PWM signal of programmable mark/space duration (to typically drive alarms).
<b>Logic complement of each output</b>	Each output can be logically active-low or active-high, enabling the use of all types of actuators (e.g. normally-open and normally-closed valves).
<b>Autorun enable</b>	Enables the unattended, automatic start of operation.
<b>Parameter change enable</b>	Enables the alteration of programmed parameters by the operator.
<b>Ignore operator enable</b>	Ignores all front panel commands, typically for remote, unattended operation.
<b>Serial port</b>	Serial port baud rate and net address.
<b>Display index</b>	Defines the magnitude/state to be displayed from the panel front.

The AR1-H Panel Hygrostat uses our humidity sensors and in addition to the AR1 features offer:

<b>Additional AR1-H Features</b>	
<b>Output functions</b>	"Dry" and "Wet"
<b>Reference limit and hysteresis</b>	Humidity control limit and hysteresis for the "Dry" and "Wet" functions"
<b>Calibration table</b>	Humidity calibration table to convert to user units

All parameters are programmable (separately or in groups) at all times (including during normal operation) via the serial port. This enables the Thermostat to be used as a slave to a master which dynamically alters set-points or performs fuzzy control.



Detailed projection screen of AR1 data

The four bit inputs enable control by local hardware. Each output function can be individually reversed (between “Heat” and “Cool”, “Dry” and “Wet”), parameter changes can be enabled and disable the outputs. (Output disabling is not available at the AR1-H, as the respective input is used for the humidity signal).

The measured values (temperature and humidity) are the result of internal DSP filtering.

The AR1 and AR1-H are automatically detected when in a Quamatic network. In this case, all its data, parameters, settings etc. are available on-line in hard real time.

## Humidity Sensors for the Processing Industry

Our humidity/moisture sensors address the problem of measuring humidity in-line production and without interfering chemically, physically or mechanically with the processes taking place. They are the result of a recent FAIR project (IMPROLIVE, EU funded) involving the processing of olive oil production wastes.



Humidity and Pt100 Temperature Sensor

The features of this technology are:

- **Robust, no moving parts, inert.** Being based on the capacitive principle, our sensor is robust, has no moving parts and is chemically, physically and mechanically inert.
- **Sensor shape.** Detecting capacitance does not react in any way with the monitored process, so the sensor can be of any physical shape.
- **State of monitored mass.** The absolute quantity of water in the monitored mass is detected, which can be in any substance, form or phase.
- **Electronics.** The specialist electronics are part of the sensor.



In-line Humidity Sensor

Ordering Information	
Model	Description
AR1	Panel Thermostat
AR1-H	Panel Hygrostat and Thermostat
HumPt100	Humidity and Pt100 Temperature Sensor
HumSns	Humidity only Sensor
XFR400230	Control Voltage Supply Transformer, 90VA, 400/230 VAC

Supplied by