

iC9000 CONTROLLER SPECIFICATION DOCUMENT

Product specification

The iC9000 is Passivent's latest control system for complete control of natural ventilation systems utilising a combined room sensor with a Rotary user interface. The controller is supplied with preloaded software develop by Passivent. Night cooling and external temperature monitoring are supplied as standard.

The controller has been developed in a modular nature for simplicity of installation on site, saving hard wiring. It can be used as a standalone controller or part of a Building Management System (BMS) via the standard in-built native BACNET communications. The controller is typically supplied with a Portable Interface Display (PID) to allow a selection of set points to be altered with the appropriate pass codes.

Combining the room sensor with the override means that less space is required on the wall for sensors. Wiring diagrams, specification documents, installation guide and set point information are supplied by Passivent for the manufacture approval of this product. Passivent will undertake the commissioning process on site to ensure the system is operating as intended.

The controller has 2 outputs per zone to allow high level and low level control, or louvre and window actuator control. This allows window actuators to be removed from the night cooling strategy for security reasons.

Model Number	iC9000
Description	BACnet Enabled Multizone Controller
BACnet Compatible (MS/TP RS485) IP or MSTP to BMS panel	Yes (router by others)
Zonal Control	Up to 40 zones (on 1 Master)
Heating Interlock	Yes
Fire Alarm Interlock	Yes
Boost Fan Control *	Yes
Air Con Enable (Heating & Cooling) *	Yes (in place of fan boost output)
Portable Interface Display to adjust set points	Yes
3rd Party Fan Control (0-10V) **	Yes (in place of another output)
Window Actuator Control +	Yes (with WAC controller)
Window Actuator Disable during Night Cooling	Yes
Max Louvre actuators per Zone	5 (for 4 zone module) / 10 (for 2 zone module)
Power supply size VA	100VA for Panel Modules (20 Louvre actuators) 60VA for WAC-24v 24VA for Louvre/WAC Integrator (Max 5 Louvre actuators)
Override Timed Auto Return	30-180 minutes
External Temperature Sensor	Yes
Rain Sensor or Weather Station	Optional
In built calendar and time clock	Yes
Holiday Mode	Yes
Password Protected Screens (multilevel)	Yes

* Passivent relay is required to operate boost fan or air conditioning enable. The air conditioning unit will have its own temperature control once enabled.

** 3rd party fans with a 0-10v dc fan speed control can be controlled direct from the control panel.

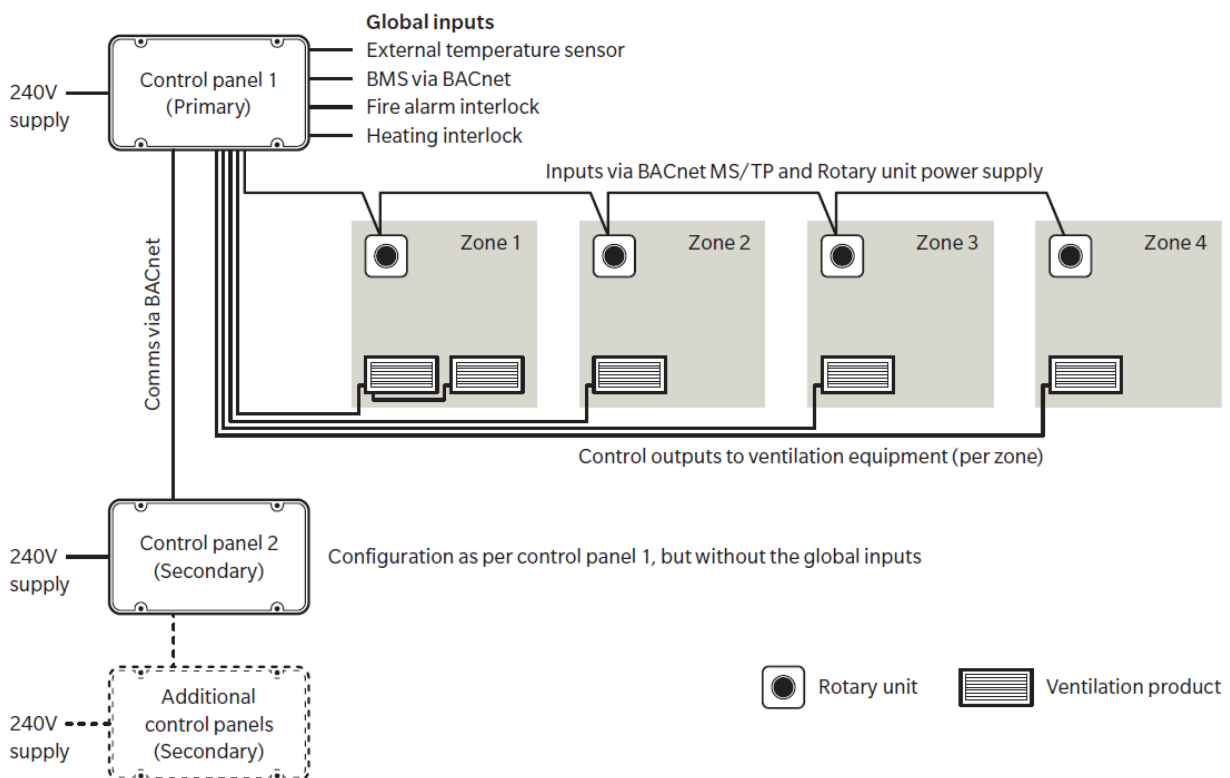
+ Passivent WAC (window actuator controller) is to operate window actuators.

Specification notes

- Modular design controller requires up to 70% less wiring than a central based control panel system.
- Portable Interface Display (PID) allows settings to be altered on site by the maintenance team. The portable unit is plugged into the bottom of the panel from outside of the unit. This means that the panel does not need to be opened and expose the power supply, improving safety. As the interface display is kept by the maintenance team the control system cannot be tampered with.
- Standard Passivent program software is loaded onto the system. Set points and the controller configuration is agreed with the client during order processing (prior to commissioning).
- Local room overrides with Close/Auto/Open functions allow the occupant to manually override the unit which returns to auto after a preset time, to save energy.
- Night cooling (as standard) enables operation of louvres to purge excess heat from the building at night.
- Fire Alarm Interlock signals close all ventilators as standard. It can be configured to open on fire, by request.
- Heating Interlock changes the control regime to CO₂ only (where CO₂ control present), otherwise to a maximum louvre opening position. Engineer configurable visual display of temperature and CO₂ as well as halo colour coded display i.e. Red = High above 1000ppm, Amber = Intermediate level 800-1000ppm, Green = Normal mode below 800ppm.
- External Temperature Sensor monitors outdoor temperature levels to provide suitable ventilation control.
- The internal temperature has a compensation adjustment profile based on both the internal and external Summer and Winter set points, to maximise occupant comfort.
- The holiday mode closes all products when selected.
- Window Actuators can be enabled/disabled for night cooling.
- Automatic staged control of window actuators when the *WAC* controller is also used to reduce possible noise disturbance and reducing operating time.
- BACnet enabled, allowing communication with the site BMS controller using MS/TP protocol.

Typical room schematic (not for wiring purposes)

Showing Temperature and CO₂ control, Primary and Secondary Panels.



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Rotary Room Sensor with User Interface

Monitors temperature and CO₂ conditions over BACnet and configures the display to show any combination of these parameters on the screen. The LED ring provides tri-colour visual indication of CO₂ levels. There is also an option of humidity sensing.

The CO₂ sensor employs Automatic Background Calibration (ABC logic) to continuously adjust the calibration base and correct changes in the background concentration levels and sensor drift. It continuously adjusts the sensor calibration over the lifetime accuracy of the product, which is expected to be 15 years.

The dial provides a great user experience for the end user, via its rotating dial, easy to navigate menus and push to select functions, within a sleek housing. This can monitor conditions in each zone and send the readings to the iC9000 controller.



The override function is simple to use, with Open/Auto/Close functions on the screen and a preset timed return to automatic control. The return to automatic control is after a pre-determined time (between 30 minutes and 3 hours), settable on commissioning. Our default setting is 1 hour.

Installation

The sensor should be positioned between 1.5m to 1.7m above FFL and away from any draughts or direct heat sources. Set up is fast and simple, with display options for setpoint and comfort modes easily configured via BACnet or directly on the device. This flexibility enables the interface to be configured for a wide range of applications from a simple BACnet setpoint adjuster to a complete control user interface. The cable from the control panel to the room sensor can travel on to the next room to minimise cable runs.

Dimensions

Surface mounted: 90(w) x 90(h) x 45(d) mm
Unit fits onto a standard circular conduit box or directly onto the wall.
Colour finish: White

Portable Interface Display (PID)

A PID is provided with each iC9000 controller as standard at the time of commissioning. It is plugged into the bottom of each panel to allow settings to be altered on site by the maintenance team. This means that the panel does not need to be opened and expose the power supply, improving safety. As the interface display is kept by the maintenance team the control system cannot be tampered with by occupants. Occupants have a local room override to allow them to manually override the system without the need to access the settings menus.



There are 3 different security levels accessible via the PID - maintenance, set-up and configuration. Each level has its own pass code to improve security. All buttons are touch sensitive, and the backlit display changes colour when different security levels are accessed.

A 1m cable is supplied as standard with the PID for connection to the panels' RJ11 socket.

Dimensions

Unit: 145(w) x 90(h) x 28(d)
Display: 50(w) x 30(h) mm

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Control Panels

The Panels are supplied in 2 or 4 zone variants, in Standard, Hybrid Plus Airstract or Hybrid Plus2 Aircool configurations. They are supplied as standard with 2 outputs per zone, plus a boost fan / AC enable output. They are supplied complete with power supply (240V to 24V), bottom mounted power supply access cable gland, internally mounted terminal strip for ease of wiring on site, DIN mounted network sockets, and top mounted cables glands. Plugs are located on the bottom of the panel for connecting the PID, without the need for accessing the internals of the Panel.

A single Panel is allocated as the Primary on networked systems, and connected to it are the global inputs; Fire and Heating Interlocks, External Temperature, optional Rain Sensor, and BMS communications, as applicable. The Primary is programmed to share the common information with the other Secondary Panels on the network. BACnet is also used to communicate with the room sensors.

Installation

A 240V 5 Amp fused spur is required adjacent to each Panel. Suggested Control Panel locations are in positions such as plant room, storeroom, cleaners' cupboard, etc. Easy access is required for wiring, commissioning / maintenance and adjustment of temperature set points by the client.

Mount the Panel with the back vertically to the wall and do not mount horizontally in a ceiling void.

Fasten the Panel to the wall through the recessed front cover screw holes using 1 ½" long No.8 Screws, or similar.



Options

2 and 4 Zone Panels

Standard, Hybrid Plus Airstract and Hybrid Plus2 Aircool configurations available.

Dimensions

2 Zone Primary Panel: 400 (w) x 320 (h) x 130 (d) mm

2 Zone Secondary Panel: 320 (w) x 240 (h) x 130 (d) mm

4 Zone Primary Panel: 480 (w) x 400 (h) x 130 (d) mm

4 Zone Secondary Panel: 400 (w) x 320 (h) x 130 (d) mm

Colour finish: Grey (RAL 7035)

Optional Services

Remote Access for control panels

You may want us to be able to connect remotely into your iC9000 control panel for a variety of reasons. It could be that you would like us to change a set point, carry out an annual review of the controller, or investigate a potential fault that may have occurred. The option of Passivent being able to remotely connect to your controller, either through a phone network or dedicated IP address will allow us to view the controller without having to wait for an engineer to travel to the site. This would mean that we can access your controller faster and more efficiently.

Data Logging on control panels

The optional inclusion of a data logger to the iC9000 allows us to record the data and assess it. We can log the room temperature; CO₂ level and the external temperature every 15 minutes. The longevity of how much data we can log is dependent on how many zones of data are also being stored in the controller.

If coupled with the Remote Access Service, we can access the controls remotely to monitor system performance or make adjustments.

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External Temperature Sensor

The External Temperature Sensor is provided as standard with the controller. This reading is used by the iC9000 software regimes to operate the natural ventilation and mixed mode profiles.

The sensor element is encapsulated to prevent the influence of condensation in low temperature conditions.

Installation

External sensor to be mounted on a North face of the building, where it is not influenced by direct sunlight and away from boiler flues and exhaust fan outlets.

Dimensions

65(w) x 60(h) x 36(d) mm



Optional Rain Sensor

The Rain Sensor is optional with the controller and is often used when window actuators are used on site.

The surface of the detector is heated to avoid false detection alarms resulting from dew forming.

Installation

Position the rain sensor so that it will be exposed to the weather elements, generally horizontally mounted on the roof with a slope of 5 to 10° to allow rain to drain off.

Dimensions

65(w) x 60(h) x 36(d) mm



Optional Weather Station (Wind & Rain)

The Weather Station sensor is optional with the controller and is often used for exposed locations or where window actuators are used on site. It measures both Wind Speed and Rain and replaces the need for a Rain sensor. The weather station must be connected to a Weather Station configured Primary Panel to allow communication.

Installation

The weather station is supplied with a combination wall / pole mount. The mount can be fastened vertically onto a wall or pole. There should be at least 600 mm of free space under the weather station to allow it to measure the wind correctly and to prevent it from being snowed in when it snows. The sensor should be mounted in an exposed location above the roof level, and on a pole as standard.

The unit can be façade mounted when used for measuring wind speed on the building façade, but multiple units (with multiple Primary Panels) would be required for this application.

Dimensions

Approx. 96(w) x 77(h) x 118(d) mm

The size of associated converter enclosure is 150(w) x 110(h) x 70(d) mm.

The Weather Station is supplied with an AC/DC converter, to allow it to connect with the Primary Panel.



Optional Ancillary Items

There are a range of ancillary items that allow the iC9000 controller to be an extremely flexible system, some of these are listed below. Some items require a local fused spur.

WAC (intelligent Window Actuator Controller)

The WAC is used for controlling 24V and 240V window actuators when they form part of the natural ventilation system. Each WAC controller can operate up to 3 No. windows in a single zone, multiple WAC controllers are used to operate additional windows in the same zone, depending on current load. The control is always by a 2-wire supply with reverse polarity. The control signal runs for a timed period to alter the position of the window actuator.

The controller uses a staged operation regime to reduce the operating time and reduce background noise disturbance from the actuators. The special sequencing nature of the WAC also reduces the local power usage, keeping the unit very compact.

WAC 24V controllers are supplied with a 24V DC internal power supply. The control output run time is 10-90 seconds.

Installation

The WAC controller requires a local 240V 5 Amp fused spur. It is typically mounted in a convenient position to the window actuators.

Dimensions

WAC 24V: 320(w) x 230(h) x 130(d) mm

WAC 240V: 190(w) x 140(h) x 90(d) mm

Fan / Air Conditioning Active Relay Enclosure

The Fan / AC Active Relay Enclosures are used to enable individual fans or Air-conditioning units. These are separated from the Panel by use of a volt free relay and operated via a signal to allow all field wiring to remain as low voltage. As standard the Panels are supplied with the capability to control Fans and AC units, the auxiliary terminals are allocated within the Control Panel to allow this flexibility.

Installation

The Fan / AC Relay requires a local 240V 5 Amp fused spur. It is typically mounted near the device being enabled, and one enclosure is required per fan or AC unit.

Dimensions

Fan / AC Relay Enclosure size 150(w) x 110(h) x 70(d) mm

Integrator for Ancillary Equipment

The Louvre / WAC Integrator Enclosure is used where a louvre or window actuated exhaust is controlled from more than a single room or zone. It is used to connect signals from multiple zones to provide a priority signal (highest signal takes priority) for up to a maximum of 8 zones. The highest 0-10V signal from any zone connected to the integrator modulates the louvre position. A local WAC controller is still required when used with this integrator.

The Fan Integrator Enclosure is used where a boost fan forms part of a mixed mode scheme, and again is controlled from more than a single room or zone. As above it prioritises the highest signal. A single 24V signal from any zone connected to the integrator enables the fan.

Installation

The Louvre and WAC 240V Integrator Enclosure is supplied with a 24VA (5 standard actuator limit) power supply and requires a local 240V 5 Amp fused spur. The WAC 24V Integrator Enclosure is not supplied with a power supply and does not require a fused spur. The enclosures are typically mounted near the device being controlled.

The Fan Integrator Enclosure requires a local 240V 5 Amp fused spur. It is typically mounted near the device being enabled, and one enclosure is required per fan. The integrator will supply the power supply to the fan and does not require an additional Fan Relay.

Dimensions

Integrator for Louvre and WAC Enclosure: 240(w) x 190(h) x 90(d) mm for 240V version (without power supply)
150(w) x 110(h) x 70(d) mm for 24V version (with power supply)
Integrator for Fan Enclosure: 240(w) x 190(h) x 90(d) mm (with power supply)

Booster Power Supply (with internal signal generator) Enclosure

The Booster Power Supply is used in larger applications with a high number of motorised louvres to control, beyond the limits of the power supply within the Panels. It is supplied with a 100VA Power Supply that can control up to 32 standard Passivent actuators on motorised louvres and ensures that the 0-10V modulating control signal is also maintained throughout.

Installation

Requires a 240V 5 Amp local fused spur power supply.

Dimensions

Enclosure: 320(w) x 230(h) x 130(d) mm