

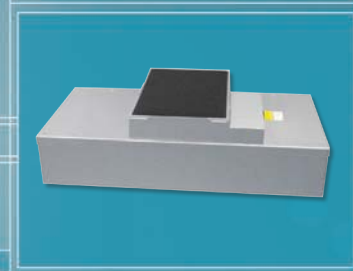


MAC IO Original & IQ

FAMILY OF FAN FILTER UNITS



FOR USE IN:
MICROELECTRONICS
MEDICAL DEVICE
SEMICONDUCTOR
DISK DRIVE
LABORATORY
PHARMACEUTICAL
MARKETS



W W W . C L E A N R O O M . N L

ENVIRCO MANUFACTURES A COMPLETE LINE
OF CLEAN AIR SYSTEMS FOR INDUSTRIES
REQUIRING ULTRA-CLEAN ENVIRONMENTS
FOR CRITICAL TECHNOLOGIES.



ENVIRCO
Innovators in clean air technology



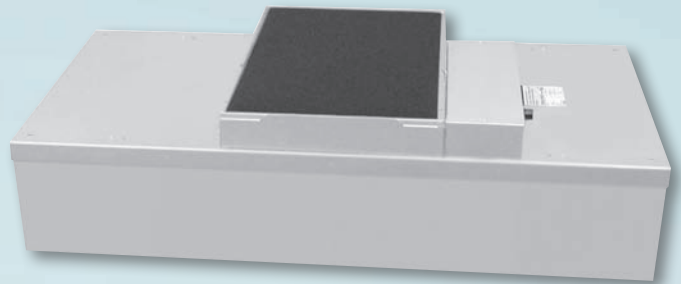
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■ Introduction

Extra low watts, sound, and profile.

As the newest addition to Envirco's MAC 10 Fan Filter Unit (FFU) family, the MAC 10 Original is the only FFU combining low sound, low watts and a low profile. Measuring only 51 dB (A), the MAC 10 Original Standard provides one of the lowest sound levels of any FFU in the industry. Running at only 200 Watts @ 0.45m/s (230V/1Ph/50Hz), the unit uses less energy than traditional FFUs, lowering operating costs. The MAC 10 Original maintains a low profile, measuring less than 320mm.



■ Features

- » Low Sound
- » Low Watts
- » Low Profile
- » Low Operating Costs
- » Three Speed Switch: Standard on all 2ft x 4ft (600mm x 1210mm) and 585mm x 1185mm units.
- » Variable Speed Controller: Standard on 2ft x 2ft (600mm x 600mm), 585mm x 585mm, 585mm x 885mm and 2ft x 3ft (600mm x 905mm) units.
- » Forward-inclined Centrifugal-type Fan
- » High Efficiency Particulate Air (HEPA) Filter: 99.99% efficient @ 0.3 micron.
- » Snap-In Prefilter: Allows for easy replacement and maintenance (406mm x 591mm x 13mm).
- » Walkable Plenum (Excluding Prefilter)
- » CE Marked

■ Options

- » Variable Speed Control: Available on 2ft x 4ft (600mm x 1210mm) and 585mm x 1185mm units; allows for a full range of settings.
- » Room-Side Replacement (RSR) Filter: Available with gel seal filter element (RSR and RSRE models).
- » Ultra Low Penetration Air (ULPA) Filter: 99.9995% efficient @ 0.12 micron (U15).
- » Airflow Indicator Light: Allows external monitoring of motor operation. Red indicator is on during normal operation.
- » Monitoring and Control System: On-site or remote monitoring and adjustment.
- » Spigot (305mm diameter): Allows direct connection to the air conditioning supply.
- » Exterior: Finishes available in powder coat or stainless steel.
- » Challenge Port: Offers convenient aerosol challenge and filter testing (RSR and RSRE units only).
- » Knife Edge: Permits easy placement in gel track ceiling grid system (RSR and RSRE units only).
- » Custom Sizes and Configurations: Perfect for mini-environment applications.

■ Introduction

The first FFU with a built-in brain.

The MAC 10 IQ is the world's first smart fan filter unit. With its microcomputer-controlled DC motor, the MAC 10 IQ dynamically adjusts itself to maintain the set airflow, compensating for changes in static pressure, filter loading or other local conditions. Competitively priced, the MAC 10 IQ offers low sound, low energy consumption, and a low profile with high performance and built-in intelligent control.

While Envirco has introduced a variety of proprietary products, one of its most successful continues to be the MAC 10 family of fan filter units (FFUs). MAC 10 FFUs are used worldwide for a variety of critical clean air applications.

The novel MAC 10 IQ FFU uses a combination of DC motor technology with Envirco's patented baffling system and forward curve fan to make it intelligent and energy-efficient. This unique combination takes advantage of Envirco's expertise in FFUs and energy efficiency of DC motors.

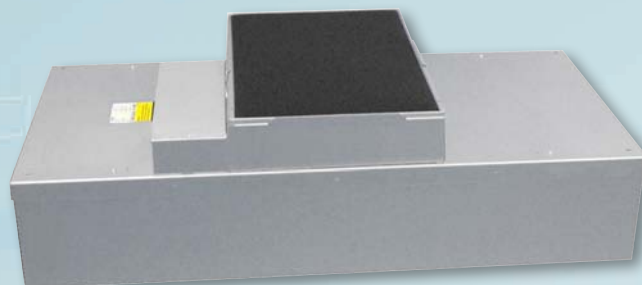
The electronically commutative (EC) motor with internal microcomputer provides low energy consumption (105W at 0.45m/s), high performance and long motor life. The IQ utilizes Envirco's patented VE5 baffling technology, offering low sound levels that are a MAC 10 family benchmark.

Constant airflow.

Unlike conventional induction motors, the EC motor regulates itself by automatically adjusting its torque and speed. Each MAC 10 IQ includes a visual control unit which provides a constant airflow of 0.26m/s – 0.66m/s over a wide range of static pressure.

The MAC 10 IQ maintains airflow so constantly and consistently that the need for future balancing is greatly reduced. The correlated velocity feature of the visual control unit provides infinite control and fine tuning capabilities for each FFU.

The MAC 10 IQ efficiently and easily maintains set clean room airflow velocities that meet IEST Recommended Practices. With its unique constant airflow feature, the MAC 10 IQ is also an ideal component for mini-environments.



■ Features

- » EC Brushless DC Motor with Internal Microprocessor
- » Visual Control Unit: Provides constant airflow over a wide range of external static pressures.
- » Low Power Consumption FFU at 105 Watts
- » Low Sound at Only 51 dB(A)
- » High Efficiency Particulate Air (HEPA) Filter: 99.99% @ 0.3 micron.
- » 150Pa of External Static Capability at 0.45m/s
- » Forward-inclined Centrifugal-type Fan
- » Walkable Plenum (Excluding Prefilter)
- » Snap-In Prefilter: Allows for easy replacement and maintenance (406mm x 591mm x 13mm).
- » CE Marked

■ Options

- » Room-Side Replacement (RSR) Filter: Available with gel seal filter element (RSR and RSRE models).
- » Controls: Include indicator lights, handheld Infrared control, 0-10Vdc (4-20mA) and monitoring and control system (on-site or remote monitoring and adjustment).
- » Spigot (305mm diameter): Direct connection to air conditioning supply.
- » Knife Edge: Easy placement in gel track ceiling grid systems (available on RSR and RSRE units only).
- » Ultra-Low Penetration Air Filter (ULPA): 99.9995% @ 0.12 micron (U15).
- » Exterior: Finishes available in powder coat or stainless steel.
- » Challenge Port: Offers convenient aerosol challenge and filter testing (RSR and RSRE units only).
- » Custom Sizes and Configurations: Perfect for mini-environment applications.
- » 585mm x 585mm, 600mm x 600mm, 585mm x 885mm, 600mm x 905mm, 585mm x 1185mm and 600mm x 1210mm sizes available.

■ Control Information

Control Console



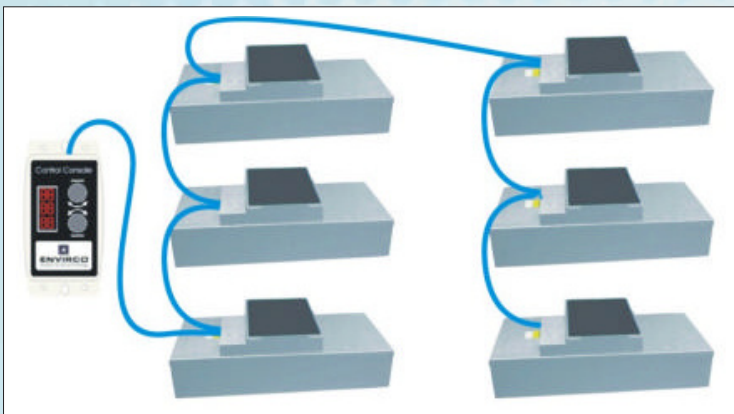
Control Console

The Enviroco Control Console allows for the monitoring and control of MAC 10 Fan Filter Units (FFU's). Control of individually addressed MAC 10 units allows the user to easily adjust the airflow on any given unit and monitor the system for errors indicating that a MAC 10 FFU is not operating correctly.

An easy to use menu allows the user to change to one of four access levels to prevent tampering. The menu also allows for global adjustment from a predetermined high speed or low speed set point. Individual control is as easy as dialing in the address you want to change and turning the other dial to the desired set-point.

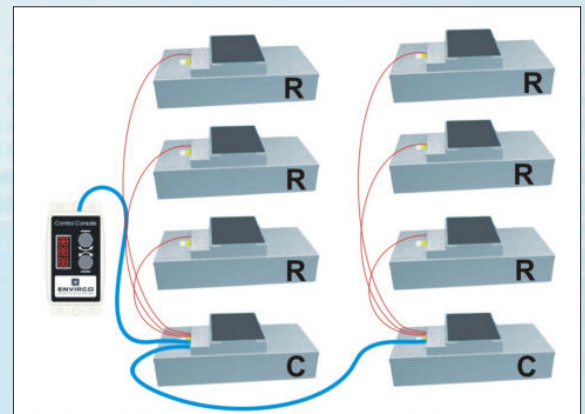
The Enviroco Control Console can be used for MAC 10 IQ and MAC 10 Original FFU's. A combination of both can be connected to the same console. A single daisy chain connection is made using CAT5 cables. Both systems, Original and IQ, are simple "plug and play" designs.

Connecting MAC 10 Original Units



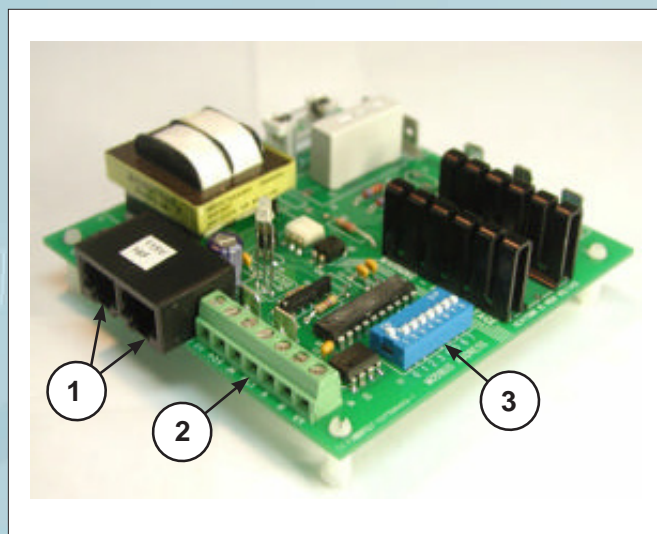
The MAC 10 Original can be supplied with a control board on each unit to allow individual addressing and control. The single CAT5 daisy chain is plugged into all units and the Enviroco Control Console.

Connecting MAC 10 IQ Units



The MAC 10 IQ does not have a control board on each unit. They are sorted out into two groups, Controller Units (C) and Receiver Units (R). Controller units have the control board mounted inside the electrical box. All connections can be made from the outside of the electrical box. The control board takes care of four separate addresses for individual control and monitoring of any FFU whether it is a Controller unit or a Receiver Unit. The Receiver Units come with a 4.57m communications cable to plug into the Controller Unit. The single CAT5 daisy chain is plugged into only the Controller Units and the Enviroco Control Console.

MAC 10 Original Control Board

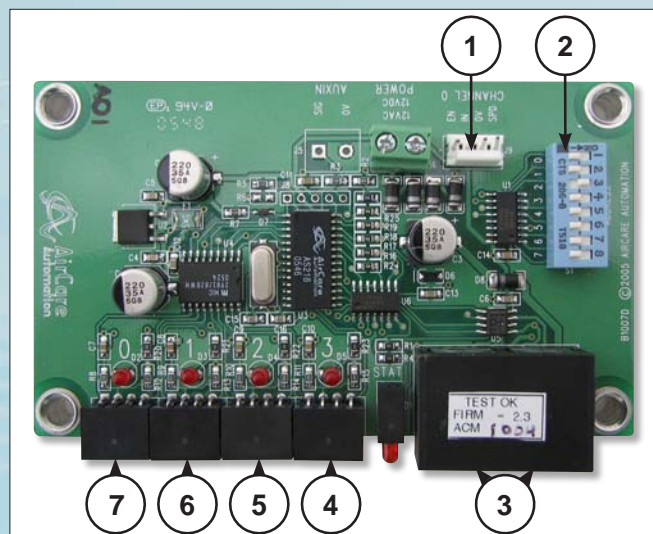


References:

- 1 - RJ45 connectors for use with CAT5 cables (in or out ports – not designated) Easily accessible from outside the electrical box. Both connection ports are bi-directional and allow the CAT5 cables (upstream and downstream) to be connected to either of the two ports.
- 2 - RS485 hardwire capabilities (Consult Technical Support for connection to Control Console). The electrical box cover must be removed to access screws. This connection is an alternative to the Cat5 cable connections.
- 3 - In order to address each MAC 10 FFU via the DIP switch, the electrical box cover must be removed.
- 4 - Fault switch connection (spade terminals behind connector #2) for use with optional FFU pressure switch. This switch is normally installed by the factory, but can be retrofitted in the field.

This board allows for the communication between the Enviroco Control Console and a MAC 10 Original FFU. The only connection made to MAC 10 Original FFU's is the CAT5 cable connection. However, the option to use standard RS485 communication wiring is available.

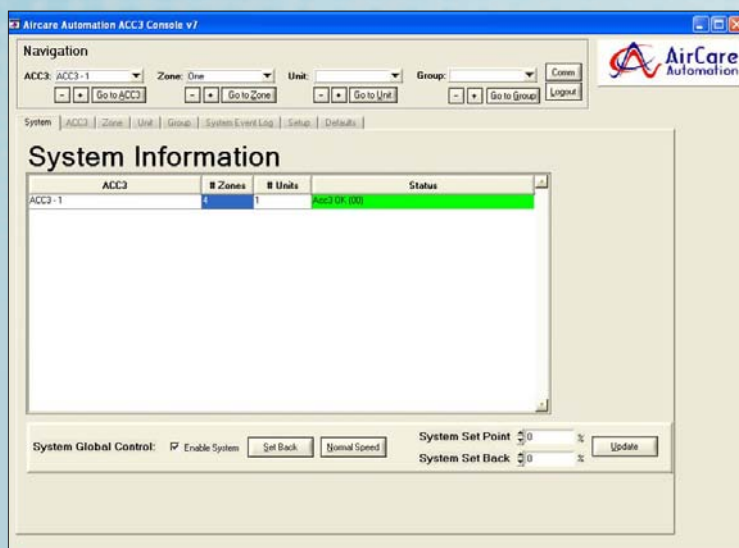
MAC 10 IQ Control Board



References:

- 1 - Channel 0, Used at Factory for Control Unit's Motor
- 2 - Addressable DIP Switch Control Unit (Channel 0)
Channels 1-3 are auto addressed in consecutive order. Jumpers are used for fewer addresses.
- 3 - CAT5 Daisy Chain Connections (In or Out. Either can be used for upstream or downstream daisy chain connection)
- 4 - Channel 3
- 5 - Channel 2
- 6 - Channel 1; Used for the next consecutive address (first receiver unit's motor connection)
- 7 - Channel 0 Alternate; Not to be Used.

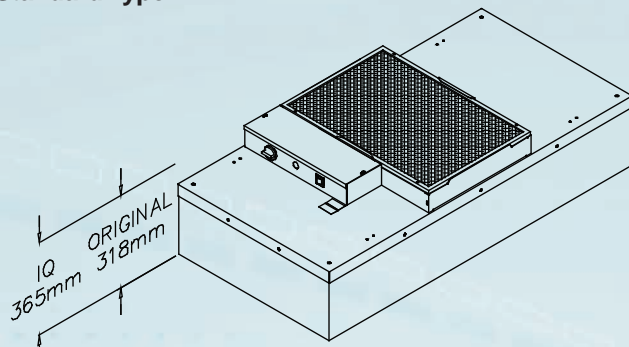
This board has two different types of connection. Channels 1 to 3 are for Receiver Unit connections. Standard RJ45 connectors are for the single CAT5 daisy chain connections. This control board is what makes MAC 10 IQ units Controller Units. A DIP switch makes for ease of addressing the boards individually.



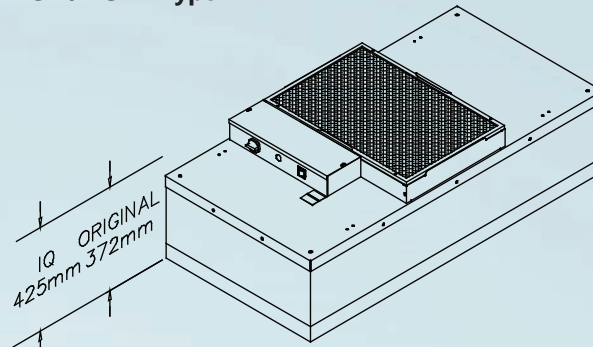
For clean rooms requiring PC control, Enviroco offers inexpensive and easy to use software for installation on the user's PC for small and large projects. The system uses industry standard Modbus protocol and allows MAC 10 FFUs to be organized securely individually or in zones with set-back (reduced operation for energy savings) and error reporting capabilities.

■ Dimensions

Standard Type



RSR / RSRE Type



■ Performance

Unit Size	MAC 10 ORIGINAL 1/5 Hp (0.15 kW) AC Motor			MAC 10 IQ 1/3 Hp (0.25 kW) ECM Motor		
	High Speed (Velocity/Watts)	0.45 m/s (Velocity/Watts)	Weight kg	High Speed (Velocity/Watts)	0.45 m/s (Velocity/Watts)	Weight kg
STANDARD 2x4 (600 x 1210mm) STANDARD 585 x 1185mm	0.68/340	0.45/200	30	0.65/220	0.45/105	30
STANDARD 2x3 (600 x 905mm) STANDARD 585 x 885mm	0.76/340	0.45/163	23.6	0.65/190	0.45/80	23.6
STANDARD 2x2 (600 x 600mm) STANDARD 585 x 585mm	1.02/340	0.45/120	18.6	0.65/190	0.45/80	18.6
RSR 2x4 (600 x 1210mm) RSR 585 x 1185mm	0.58/313	0.45/200	32.2	0.61/285	0.45/140	32.2
RSR 2x3 (600 x 905mm) RSR 585 x 885mm	0.69/313	0.45/148	24.5	0.61/250	0.45/110	24.5
RSR 2x2 (600 x 600mm) RSR 585 x 585mm	0.74/313	0.45/120	20	0.61/250	0.45/110	20

Notes:

All test data is measured at 0.45m/s with a HEPA filter. Units supplied to Europe, The Middle East and Africa are tested with a vane anemometer in 9 locations across the filter face.

MAC 10 Original:

Full-Load Current: 230V/1Ph/50Hz = 1.5A

MAC 10 IQ:

Full-Load Current: 230V/1Ph/50Hz = 1.9A



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