

MAC 10[®] Original & IQ

FAMILY OF FAN FILTER UNITS

USED IN:

MICROELECTRONICS

MEDICAL DEVICE

SEMICONDUCTOR

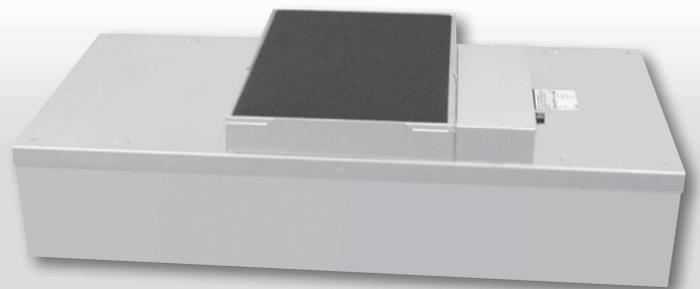
DISK DRIVE

LABORATORY

PHARMACEUTICAL
MARKETS

HOSPITALS

CLEAN ROOMS



 **ENVIRCO**[®]
Innovators in clean air technology

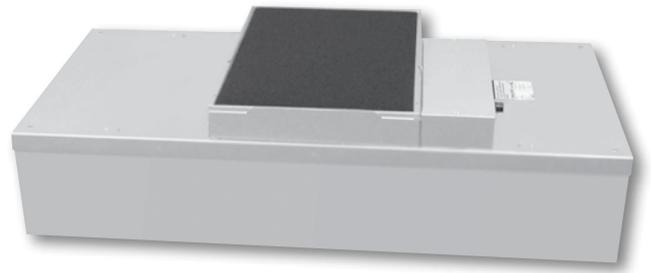
■ Table of Contents

MAC 10 Original Introduction.....	1
MAC 10 IQ Introduction.....	4
MAC 10 Controls.....	6
MAC 10 Dimensional & Performance Data.....	7

■ MAC 10® Introduction

Extra low watts, sound, and profile.

The Envirco® MAC 10® Fan Filter Unit was the first (FFU) to combine low sound, low watts and a low profile. Measuring only 51 dBA, the MAC 10® Original Standard (2 ft. x 4 ft. [600mm x 1,210mm]) provides one of the lowest sound levels of any FFU in the industry. Running at only 220 watts at 90fpm (0.45m/s) +/- 20% outlet velocity (measured with a vane anemometer in clean un-loaded conditions) the unit uses less energy than traditional FFUs, while lowering total operating costs. The MAC 10® Original maintains a low profile, measuring 318 mm. The MAC 10® Original Standard (STD) version comes with the filter integrated with the unit housing, requiring the unit to be removed from the ceiling grid to replace the filter.



MAC 10® Original

■ Features

- » Low sound, low watts, low profile, and low operating costs.
- » Three speed switch features low, medium and high settings; standard on all 2 ft. x 4 ft. (600mm x 1,210mm) and 585mm x 1,185mm units.
- » Variable triac speed controller is a standard feature on 585mm x 585mm, 2 ft. x 2 ft. (600mm x 600mm) and 2 ft. x 3 ft. (600mm x 905mm) units.
- » Forward-inclined centrifugal-type fan.
- » High Efficiency Particulate Air (HEPA) - H13 filter.
- » Snap-in pre-filter allows for easy replacement and maintenance (must be removed when ducting directly to the unit).
- » Walkable plenum (excluding pre-filter), rated to 113.40 kg.
- » Mill finished aluminium exterior.
- » CE Marked 230V units stocked extensively in Hamburg, Germany.

■ Options

- » Variable triac speed controller: Available on 2 ft. x 4 ft. (600mm x 1,210mm) and 585mm x 1,185mm units; allows for more precise control particularly where the MAC 10® are accessible in soft-wall and hard-wall clean rooms and customised LAF benches.
- » Remote triac speed controllers to control a maximum of six MAC 10® simultaneously.
- » Ultra-low Penetration Air (ULPA) – U15 filter.
- » Monitoring and Control System: On-site or remote monitoring and adjustment via ModBus® network via Console or PLC (stand-alone or with BMS interface)
- » Custom sizes and configurations available; perfect for mini-environment applications.

■ MAC 10® IQ 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.

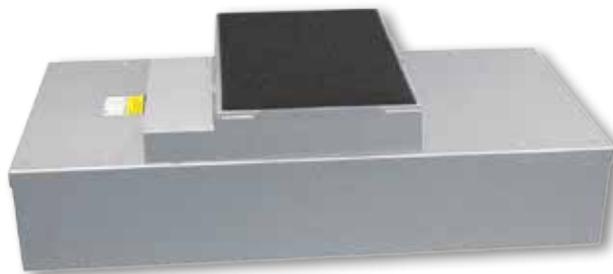
The electronically commutative (EC) motor with internal micro-computer provides low energy consumption (105W at 0.45m/s), high performance and long motor life. The IQ utilizes Envirco's patented VE5 baffling technology, offering low sound levels that are a MAC 10 family benchmark.

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.



MAC 10® IQ

■ Features

- » EC Brushless DC Motor with Internal Microprocessor.
- » Universal control card allows manual control via the integral potentiometer.
- » Remote speed control via 0-10V analog signal.
- » Network control via ModBus® compatible RTU network protocol.
- » 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 (H13).
- » 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 230V units.
- » Mill finished aluminium.

■ Options

- » Room-Side Replacement (RSR) Filter: Available with gel seal filter element (RSR and RSRE models).
- » Controls: A range of console and PLC options are available for stand-alone or integrated BMS network control.
- » Ultra-Low Penetration Air Filter (ULPA): 99.9995% @ 0.12 micron (U15).
- » Challenge Port: Offers convenient aerosol challenge and filter testing (RSR and RSRE units come as a standard feature).
- » 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

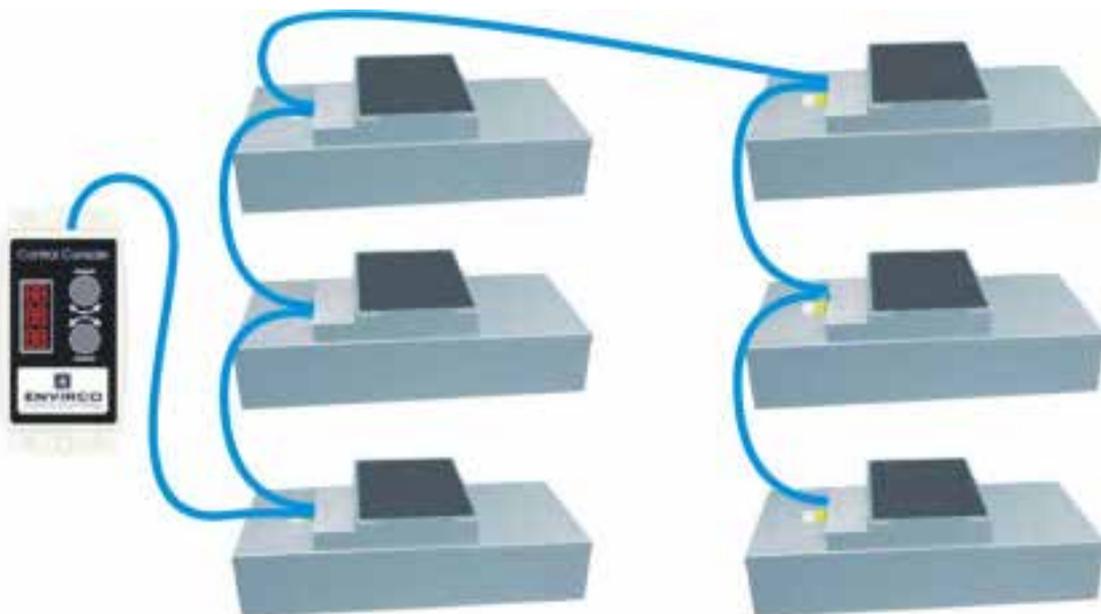
The Envirco Control Console allows for the monitoring and control of MAC 10 Fan Filter Units (FFU's). Control of individually addressed MAC 10 units allows the user to easily adjust the airflow on any given unit and monitor the system for errors indicating that a MAC 10 FFU is not operating correctly.

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 Envirco Control Console can be used for MAC 10 IQ, MAC 10 Original, and MAC 10 LE-DC FFUs. Any combination of these can be connected to the same Console. A single daisy chain connection is made using CAT5 cables. Original, IQ and LE-DC are simple "plug and play" designs.



Connecting MAC 10 Original, MAC 10 IQ, or MAC 10 LE-DC Units



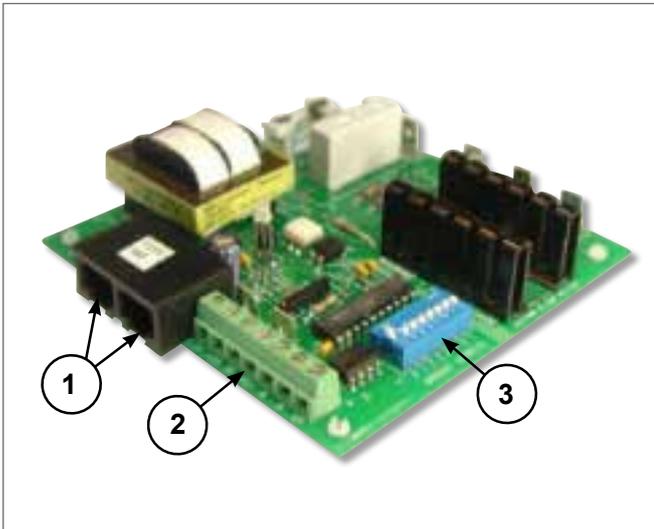
The MAC 10 Original can be supplied with a control board on each unit to allow individual addressing and control. The single CAT5 daisy chain is plugged into all units and the Envirco Control Console.

The MAC 10 IQ is now supplied with a Universal Control Card, which allows:

- » Manual control via the integral potentiometer.
- » Remote speed control via 0-10V analog signal.
- » Network control via ModBus® compatible RTU network protocol.

■ **Control Information**

MAC 10 Original Control Board

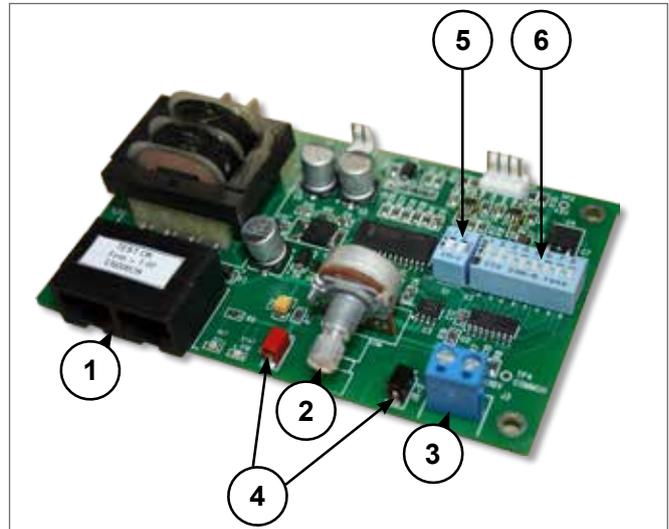


References:

- 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.

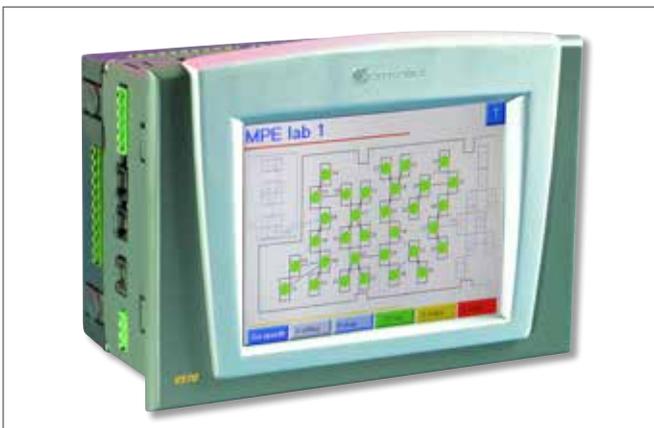
MAC 10 IQ Control Board



References:

- 1 - CAT5 Daisy Chain Connections (In or Out. Either can be used for upstream or downstream daisy chain connection.)
- 2 - Potentiometer for Manual Speed Control
- 3 - 0-10V Analog Input
- 4 - RPM Test Probes
- 5 - Control Modes
- 6 - Address DIP Switches

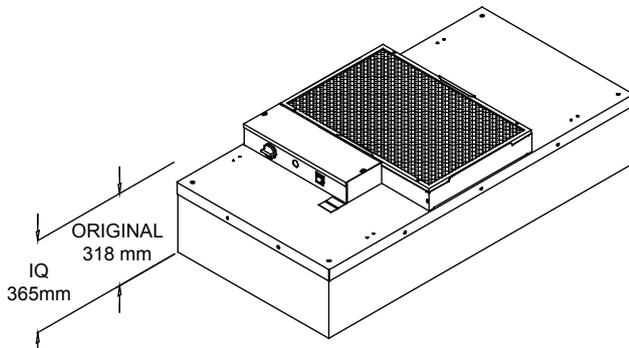
ACC7050 Control Interface



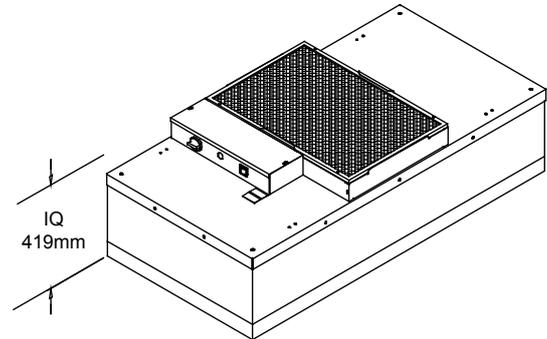
For clean rooms requiring a more sophisticated control system, Enviroco offers a range of robust and inexpensive ACC7 PLC Control Systems. These range from stand-alone Consoles controlling small numbers of FFUs through to touch-screen PLCs with BMS interface controlling and monitoring hundreds of FFUs with special software customisation.

■ Dimensions

Standard Type



RSR / RSRE Type



■ Performance

Unit Size	MAC 10 ORIGINAL 1/5 Hp (0.15 kW) AC Motor		MAC 10 IQ 1/2 Hp (0.37 kW) ECM Motor	
	0.45 m/s (Watts)	Weight kg	0.45 m/s (Velocity/Watts)	Weight kg
STANDARD 2x4 (600 x 1210mm) STANDARD 585 x 1185mm	220	30	105	30
STANDARD 2x3 (600 x 905mm) STANDARD 585 x 885mm	163	23.6	80	23.6
STANDARD 2x2 (600 x 600mm) STANDARD 585 x 585mm	120	18.6	65	18.6
RSR 2x4 (600 x 1210mm) RSR 585 x 1185mm	-	-	85	34.5
RSR 2x3 (600 x 905mm) RSR 585 x 885mm	-	-	70	24.5
RSR 2x2 (600 x 600mm) RSR 585 x 585mm	-	-	50	20

Notes: All test data is measured at 90fpm (0.45m/s) +/- 20% with a HEPA (H13) filter. Units supplied to Europe, The Middle East and Africa are tested with a vane anemometer in 9 locations across the filter face in clean, un-loaded conditions (OPA ESP).

MAC 10 Original: Full-Load Current: 230V/1Ph/50Hz = 1.5A

MAC 10 IQ: Full-Load Current: 230V/1Ph/50Hz = 3.0A

The initial current exceeds 1.5A and 3.0A momentarily; suitable circuit breakers should be installed.



Clean air solutions built for you.

MORE INFORMATION AVAILABLE AT WWW.ENVIRCO.COM

■ Industrial

Cleanroom Products

- » MAC 10® Original
- » MAC 10® IQ™
- » Ducted Ceiling Module:
DCM
- » AC or DC Control
Systems

■ Hospital & Healthcare

Hospital & Healthcare

- » IsoClean® and IsoClean
with Ultraviolet Light
- » IsoClean® CM
- » AirCeil®

Envirco® MAC 10® and VE5 are registered trademarks of Envirco®, USA. Specifications subject to modifications or changes without notice. US patents 4,560,395 and 5,470,363. Other patents issued and pending in foreign countries. Special thanks to Connect2Cleanrooms for cleanroom photography.

Provided by Your Local Envirco® Representative:

Envirco® Europe, Middle East and Africa

The Cavendish Centre, Winnall Close | Winchester, Hampshire; S023 OLB, UK
tel: +44(0)1962.840465 | fax: +44(0)1962.828619
www.envirco-emea.com | email: TrionEMEAService@airsysco.com