

# Fan Filter Units

Efficient solutions for clean rooms

# Fan Filter Units (FFU)

The future has begun – you need to build it in.

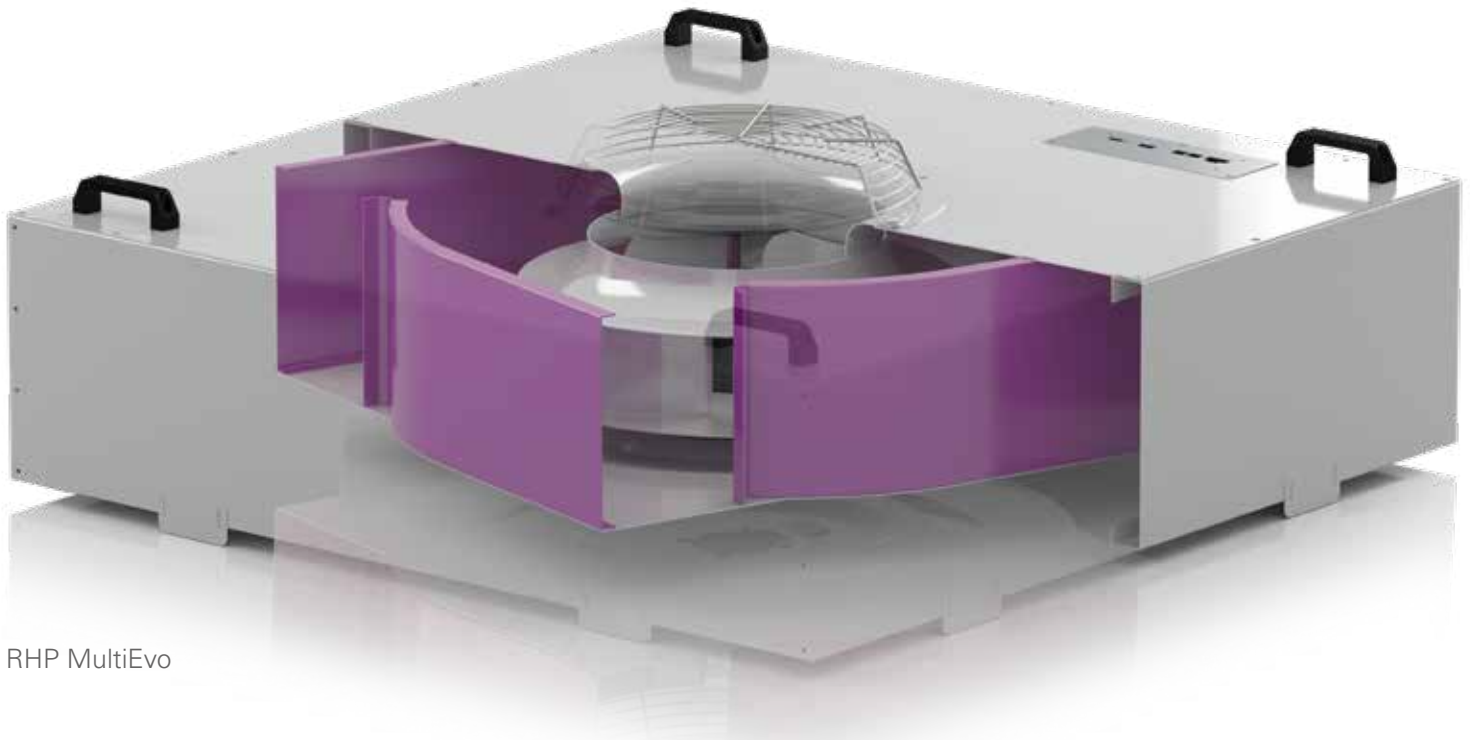
We have designed and developed our FFU precisely so that they match the requirements in clean rooms perfectly.

The “heart” of the FFU is the motor impeller unit. All components, such as, for example, inlet nozzles, impellers, motors and the corresponding commutation units to control the motor are adapted to each other as precisely as possible – and work together in perfect interaction in an exemplary manner.

And another important aspect: Tailored solutions for the control and monitoring of the FFU networks ensure ease of use.

Nicotra Gebhardt FFU's are available:

- as standard or customer-specific versions
- for standard and customer-specific ceiling grids
- for different filter and grid sizes
- as top load or bottom load version
- for fluid or dry seal systems
- for different volume flows and pressure losses
- with minimal vibration and noise emissions
- with a flush-mount external rotor motor
- Change in rotational speed using BUS or control voltage
- for different control systems



RHP MultiEvo

## Simple handling: Controlling and monitoring of your FFU networks

The core element of the system solutions we developed are the control centres for parameterisation and monitoring of your FFU networks on the basis of various RS485 interfaces (G-bus/Modbus RTU).

We can optionally offer you three different components for actuation according to requirements:

- Handheld FANCommander 100 for actuation of up to 100 FFUs.
- Mini control centre FANCommander 200 for actuation of up to 200 FFUs.
- PC control centre for actuation of up to 500 FFUs per Ethernet RS485 gateway.

# RHP MultiEvo Technology

As simple as it is ingenious: The new RHP MultiEvo technology houses new, unique outlet guide systems with spiral geometries. Designed for perfect interaction, with the impeller, motor, and integrated electronic components all adapted to each other, the RHP with MultiEvo technology exceeds the energy savings of any other traditional EC filter fan unit, for example.



## The practical advantages of MultiEvo technology:

- **New technology:** Aerodynamic air guides optimise flow conditions
- **Excellent energy savings:** Over 60% efficiency thanks to the interaction of the best components
- **Optimised performance range:** Considerable increase to pressure for the same maximum speed and power requirements than a standard FFU without MultiEvo technology
- **Considerably quieter:** Noise levels up to 4 dB lower than a standard FFU without MultiEvo technology
- **Air distribution:** Maintained high level of uniformity

\* Up to 14% more efficient than standard FFU without MultiEvo technology.

## Brushless-DC-Motor (EC)

- High level of efficiency across a large rotational speed range
- BUS compatible
- Regardless of the mains frequency
- Integrated rotational speed control
- Flexible when the location of installation changes
- Excellent efficiency through permanent magnets
- High torque across a large rotational speed range
- High performance factor ( $> 0.9$ )
- Low harmonised distortion of the mains power through PFC
- Compact control device



## Numerous customers across the world trust in our experience and expertise

- Research institutes
- Composites industry
- Precision optical industry
- Health and Research
- Research and measuring technology
- Pharmaceutical industry
- Electronics industry
- Semiconductor industry



# The slim FFU

The clever combination of different standard sizes guarantees that any building shape can be catered for - whilst ensuring the highest possible level of energy efficiency.

## RHP Slim FFU

- Flat and space-saving
- Easy to operate



## Use of standard sizes to adapt to special building requirements

Type of device	Standard dimensions in mm	feet	Output in kW max.	Power consumption in A (max.)	Voltage in V	Frequency in Hz	Rotational speed max.	Volume flow at 0.35 m/s m³/h	Volume flow at 0.45 m/s m³/h	Type
RHP 0606-222-EC03-A	572 x 572	-	0.26	1.10	230	50	1850	453	583	non UL
RHP 0609-222-EC03-A	572 x 872	-	0.24	1.10	230	50	1850	680	875	non UL
RHP 0612-331-EC04-A	572 x 1172	-	0.33	1.45	230	50	1750	907	1166	non UL
RHP 0612-335-EC00-SL	572 x 1172	-	0.34	1.50	230	50	1700	907	1166	non UL
RHP 0909-335-EC00-A	872 x 872	-	0.34	1.50	230	50	1700	1020	1312	non UL
RHP 0912-231-EC01-A	872 x 1172	-	0.365	1.60	230	50	1350	1360	1749	non UL
RHP 1212-240-EC00-A	1172 x 1172	-	0.37	1.62	230	50	1070	1814	2333	non UL
RHP 1212-240-EC00-ME	1172 x 1172	-	0.37	1.64	230	50	1070	1814	2333	non UL
RHP 0606-222-EC90-A	-	2" x 2"	0.24	1.06	277	60	1850	453	583	UL
RHP 0609-222-EC90-A	-	2" x 3"	0.33	1.45	277	60	1850	680	875	UL
RHP 0612-331-EC90-A	-	2" x 4"	0.34	1.5	277	60	1750	907	1166	UL
RHP 0612-335-EC90-SL	-	2" x 4"	0.34	1.5	277	60	1700	907	1166	UL
RHP 0909-335-EC90-A	-	3" x 3"	0.365	1.6	277	60	1700	1020	1312	UL
RHP 0912-231-EC90-A	-	3" x 4"	0.37	1.62	277	60	1350	1360	1749	UL
RHP 1212-240-EC90-A	-	4" x 4"	0.37	1.64	277	60	1010	1814	2333	UL

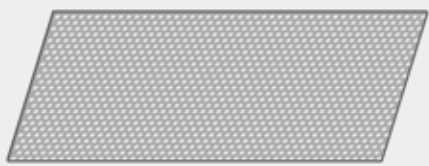


# General accessories , extensive and flexible

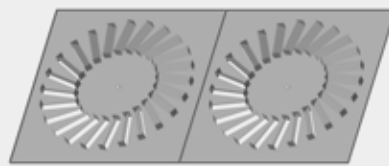
The FFU becomes a system once the necessary accessories are added. In the standard system, an extensive range of accessories is available and these will be delivered or fitted, in accordance with your requirements.



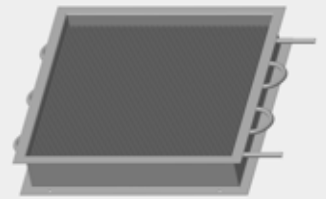
Prefilter



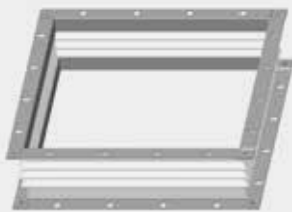
Baffle plate with holes



Swirl diffuser



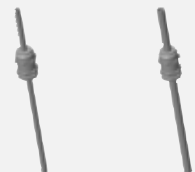
Heat exchanger



Connecting pieces, square



Connecting flange, square



Measuring connectors



Connecting pieces, round



Connecting flange, round



Suspension bracket

Ceiling grid



# Fan Filter Units (FFU)

## Motor controller and control system



### Modbus based systems

- Low system costs
- Easy, quick commissioning on site
- Rapid reaction to multiple commands
- Rapid response to multiple commands
- Complete project engineering and programming in the design phase
- Minimum effort to replace components
- Through standardised interface (RTU) easy integration into the customer's network is possible

### LONWORKS based systems

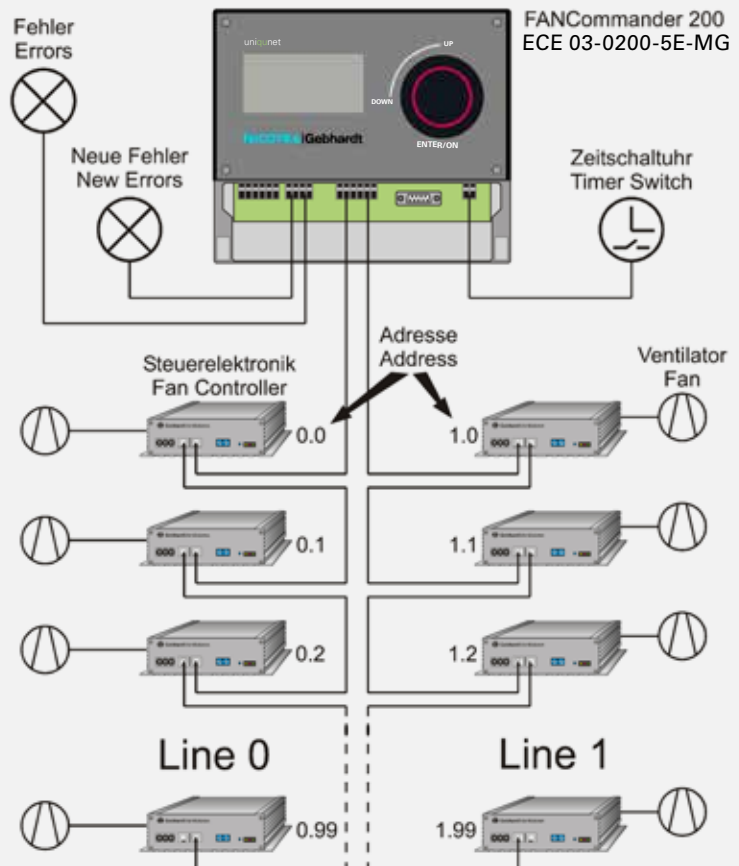
- Rapid reaction to individual commands
- Rapid reaction to individual faults
- FFU calibration from the clean room
- Hand service tool
- Free network topology
- Digital input modules available
- Temperature sensors available
- Expandable system

### Analogue

- Analogue interface available (0-5V, 0-10V,  $n_{min}$ ,  $n_{max}$ , fault contact)

### FANCommander 200 (ECE 03-0200-5E-MG)

Stationary mini control centre for the control and monitoring of up to 200 FFUs.



### Compare the systems with one another

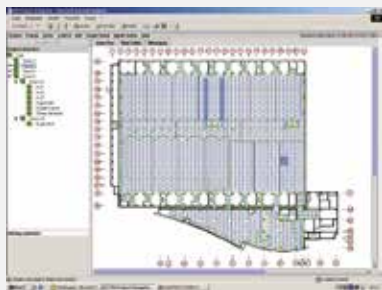
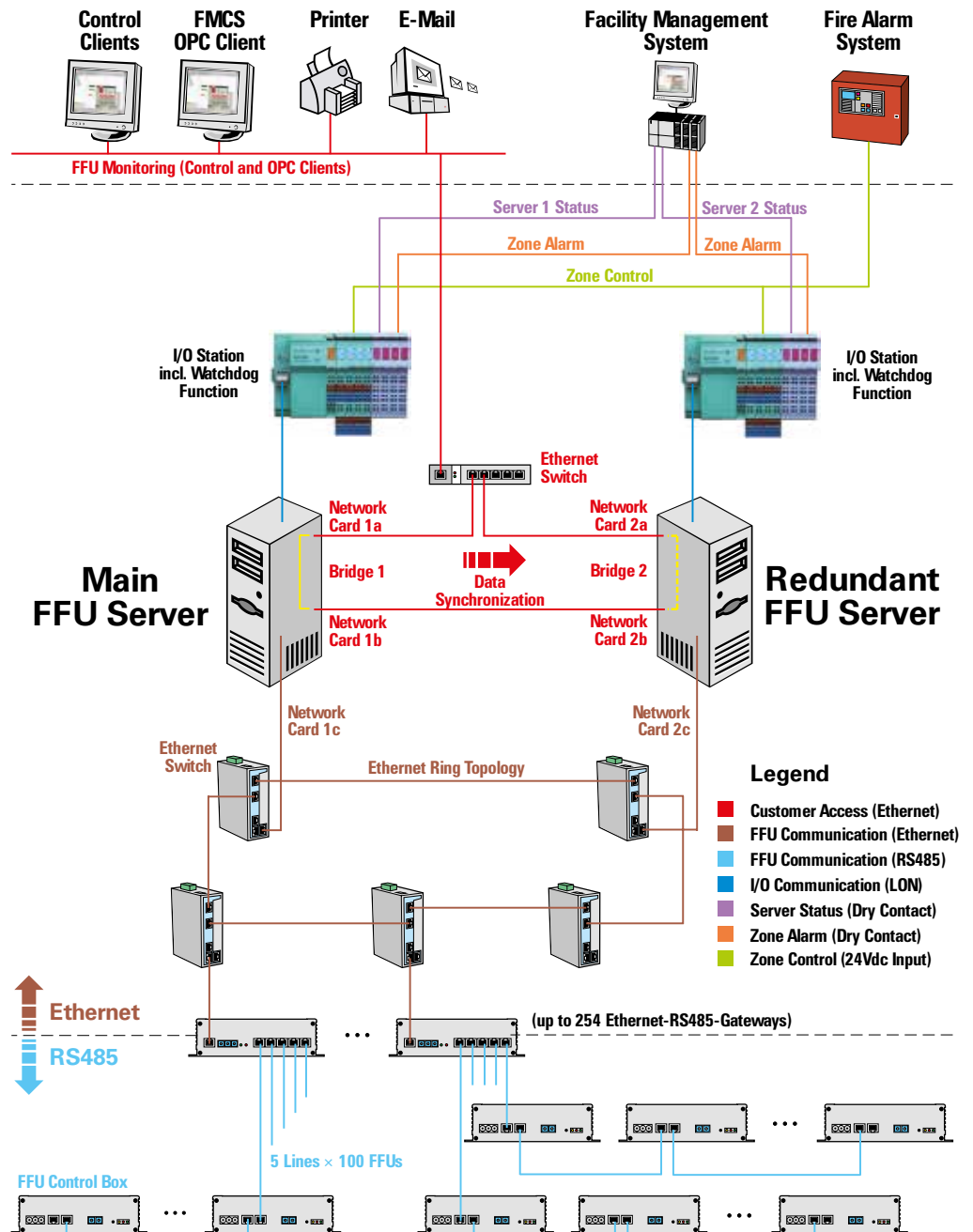
System features	Modbus RTU	LONWORKS	ANALOGUE
<b>Hardware</b>			
FFU Server PC	+	+	
User Client, local or remote through Ethernet	+	+	
Several clients	+	+	
Network topology	Line topology	Free topology	
Fieldbus	RS485	FTT-10A	
Physical repeater/ Ethernet Gateway	5 lines	2 or 3 way	
Nodes per segment	100	60	
Maximum number of FFUs in the network	127000	32000	
Network termination	not required	+	
<b>Communication</b>			
Communication principle	Master-Slave	Multi-Master	0-10V signal
Addressing	Hardware	Neuron - ID	

## Topology overview

Regardless of whether it's Modbus, a Modbus integration based on Gbus or a combination of both, we will support the network topology you need, taking the requirements into account.

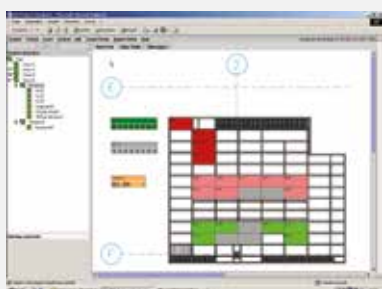
This figure shows the recommended complete FFU Modbus control network topology. The field bus uses Modbus technology in ring topology for the Ethernet part and line topology for the RS485 part.

The Modbus is structured with Gateways with a redundant Ethernet backbone and several FFU lines. Further I/O modules are available for the server connection. The FFU server can be delivered with a redundant server in Hot-standby configuration.



### User interfaces:

Example of a background image with a large number of FFUs

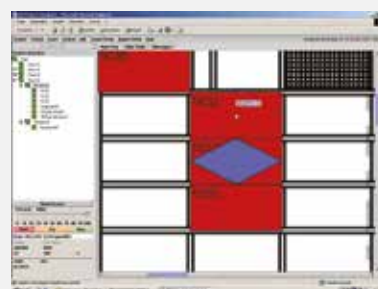


### User interface overview with:

- Main level with back-ground image
- Icons for FFUs, digital input and temperature sensor
- Navigation tree

### Compatibility of the software using WIN10 Professional 64 Bit

- Ethernet, IP network, HTTP protocol, HTML/XML, Internet Browser (Microsoft® Internet Explorer®\*)
- Registering the run time for each FFU for preventative filter maintenance
- Remote maintenance and configuration using internet connection
- Freely-programmable automatic timer for automatic FFU control (reduction or increase of rotational speed for individual FFUs or groups)
- Event logging (log file for status and changes)



### Zoom view with:

- A selected FFU
- Navigation tree
- Control panel
- Status panel

# Characteristics: RHP 0606-222-EC03-A

## For your invitation to tender:

Nicotra Gebhardt® FFU from the RHP range

Type: RHP 0606-222-EC03-A

Housing made of aluminium (optionally sheet steel or stainless steel). Sound-insulated version with mineral wool coated with fibreglass matting (fire class A1).

Motor impeller unit consisting of a high-performance centrifugal impeller with backward curved blades (impeller made of galvanised steel sheet with aluminium blades, riveted) fitted on the rotor of a BLDC external rotor motor (230 V/50 Hz, Protection class IP 44, designed in accordance with Class F, but classified in accordance with Class B (non UL) and Class A (UL). Direction of rotation RD. statically and dynamically balanced according to DIN ISO 1940, G = 2.5.

The rotational speed of the motor is infinitely adjustable through the EKE05/EKE06 commutation unit which is integrated into the housing, with different communication interfaces, Protection Class IP 20 (Modbus, alternatively LONWORKS/ANALOGUE possible). Scope of delivery including GST i18 Wieland plug for power supply, attached ready to plug in, without any connecting cable.

Control and monitoring of the FFU is possible through different control systems, for example, FANCommander 200 Modbus mini control centre, Modbus PC visualisation or Modbus handheld (as an option, on-site actuation using analogue input 0-10 VDC/LONWORKS interface is also possible).

Terminal filter of HEPA H14 class (filtration efficiency: 99.995%) with fan guard grille coated in RAL 9010 on the clean room side incl. Scan Test (other filter classes are possible as an option).

Maintenance or removal of the filter with a fluid seal on the clean room side (optionally removal of the filter with dry sealing is possible on the plenum side).

Further accessories are available as options.

The delivery does not include any incidentals, fixing materials or cabling materials. Installation and commissioning are not included in the scope of delivery. Suitable for ceiling grid provided by the customer.

Manufacturer: Nicotra Gebhardt GmbH

Type: RHP 0606-222-EC03-A

## SPECIFICATION

### Fan Filter Unit (FFU)

#### FFU type:

RHP 0606-222-EC03-A

#### FFU size:

600 x 600 mm

#### Dimensions (L x W x H):

572 x 572 x 365 mm (incl. Filter, without accessories)

#### Housing material:

Aluminium/steel plate/stainless steel

#### Sound insulation:

Mineral wool

#### Coating:

according to RAL/no coating

### Drive

#### Type of drive:

BLDC motor (brushless DC)

#### Voltage:

208 - 277V, 1~

#### Frequency:

50/60 Hz

#### Rotational speed (max.):

1850 1/min

#### Output (max):

0.26 kW

#### Current (max):

1.13 A

#### Electronics:

Modbus RTU/LON/Analogue 0-10V

#### Maintenance of the MLE:

Maintenance on the clean room side/maintenance on the plenum side

### Filter

#### Maintenance of the filter:

Filter change on the clean room side/plenum side

#### Types of seal:

Fluid seal/dry seal

#### Others:

fan guard grille coated in RAL 9010 on the clean room side

#### Filter classes:

E10 (filtration efficiency 85% – permeability 15%)

E11 (filtration efficiency 95% – permeability 5%)

E12 (filtration efficiency 99.5% – permeability 0.5%)

H13 (filtration efficiency 99.95% – permeability 0.05%)

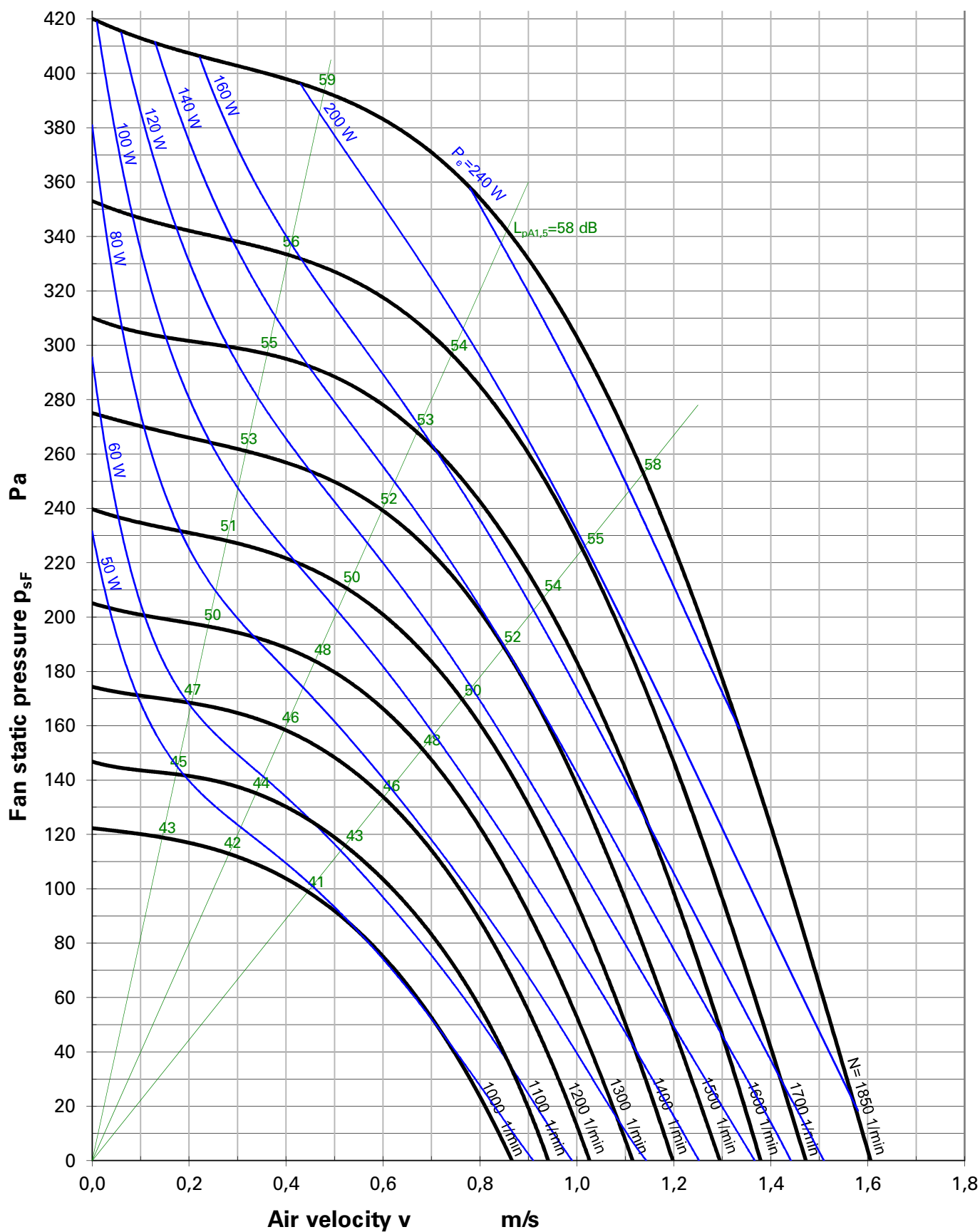
H14 (filtration efficiency 99.995% – permeability 0.005%)

U15 (filtration efficiency 99.9995% – permeability 0.0005%)

U16 (filtration efficiency 99.99995% – permeability 0.00005%)

U17 (filtration efficiency 99.999995% – permeability 0.000005%)





Air Velocity	m/s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Volume flowrate	m <sup>3</sup> /h	129.6	259.2	388.8	518.4	648.0	777.6	907.2	1036.8	1166.4	1296.0	1425.6	1555.2
Volume flowrate	ft <sup>3</sup> /min	76,3	152,6	228,8	305,1	381,4	457,7	534,0	610,2	686,5	762,8	839,1	915,4

# Characteristics: RHP 0609-222-EC03-A

## For your invitation to tender:

Nicotra Gebhardt® FFU from the RHP range

Type: RHP 0609-222-EC03-A

Housing made of aluminium (optionally sheet steel or stainless steel). Sound-insulated version with mineral wool coated with fibreglass matting (fire class A1).

Motor impeller unit consisting of a high-performance centrifugal impeller with backward curved blades (impeller made of galvanised steel sheet with aluminium blades, riveted) fitted on the rotor of a BLDC external rotor motor (230 V/50 Hz, Protection class IP 44, designed in accordance with Class F, but classified in accordance with Class B (non UL) and Class A (UL). Direction of rotation RD. statically and dynamically balanced according to DIN ISO 1940, G = 2.5.

The rotational speed of the motor is infinitely adjustable through the EKE05/EKE06 commutation unit which is integrated into the housing, with different communication interfaces, Protection Class IP 20 (Modbus, alternatively LONWORKS/ANALOGUE possible). Scope of delivery including GST i18 Wieland plug for power supply, attached ready to plug in, without any connecting cable.

Control and monitoring of the FFU is possible through different control systems, for example, FANCommander 200 Modbus mini control centre, Modbus PC visualisation or Modbus handheld (as an option, on-site actuation using analogue input 0-10 VDC/LONWORKS interface is also possible).

Terminal filter of HEPA/ULPA class, frame made of extruded, anodised aluminium, with fan guarded coated in RAL 9010 on the clean room side, including Scan test (other filter classes are possible as an option).

Maintenance or removal of the filter with a fluid seal on the clean room side (optionally removal of the filter with dry sealing is possible on the plenum side).

Further accessories are available as options.

The delivery does not include any incidentals, fixing materials or cabling materials. Installation and commissioning are not included in the scope of delivery. Suitable for ceiling grid provided by the customer.

Manufacturer: Nicotra Gebhardt GmbH

Type: RHP 0609-222-EC03-A

## SPECIFICATION

### Fan Filter Unit (FFU)

#### FFU type:

RHP 0609-222-EC03-A

#### FFU size:

600 x 900 mm

#### Dimensions (L x W x H):

572 x 872 x 365 mm (incl. Filter, without accessories)

#### Housing material:

Aluminium/steel plate/stainless steel

#### Sound insulation:

Mineral wool

#### Coating:

according to RAL/no coating

#### Drive

#### Type of drive:

BLDC motor (brushless DC)

#### Voltage:

208 - 277 V, 1~

#### Frequency:

50/60 Hz

#### Rotational speed (max.):

1850 1/min

#### Output (max):

0.24 kW

#### Current (max):

1.05 A

#### Electronics:

Modbus RTU/LON/Analogue 0-10V

#### Maintenance of the MLE:

Maintenance on the clean room side/maintenance on the plenum side

#### Filter

#### Maintenance of the filter:

Filter change on the clean room side/plenum side

#### Types of seal:

Fluid seal/dry seal

#### Frames:

Frame made of extruded, anodised aluminium, uncoated

#### Others:

fan guard grille coated in RAL 9010 on the clean room side

#### Filter classes:

E10 (filtration efficiency 85% – permeability 15%)

E11 (filtration efficiency 95% – permeability 5%)

E12 (filtration efficiency 99.5% – permeability 0.5%)

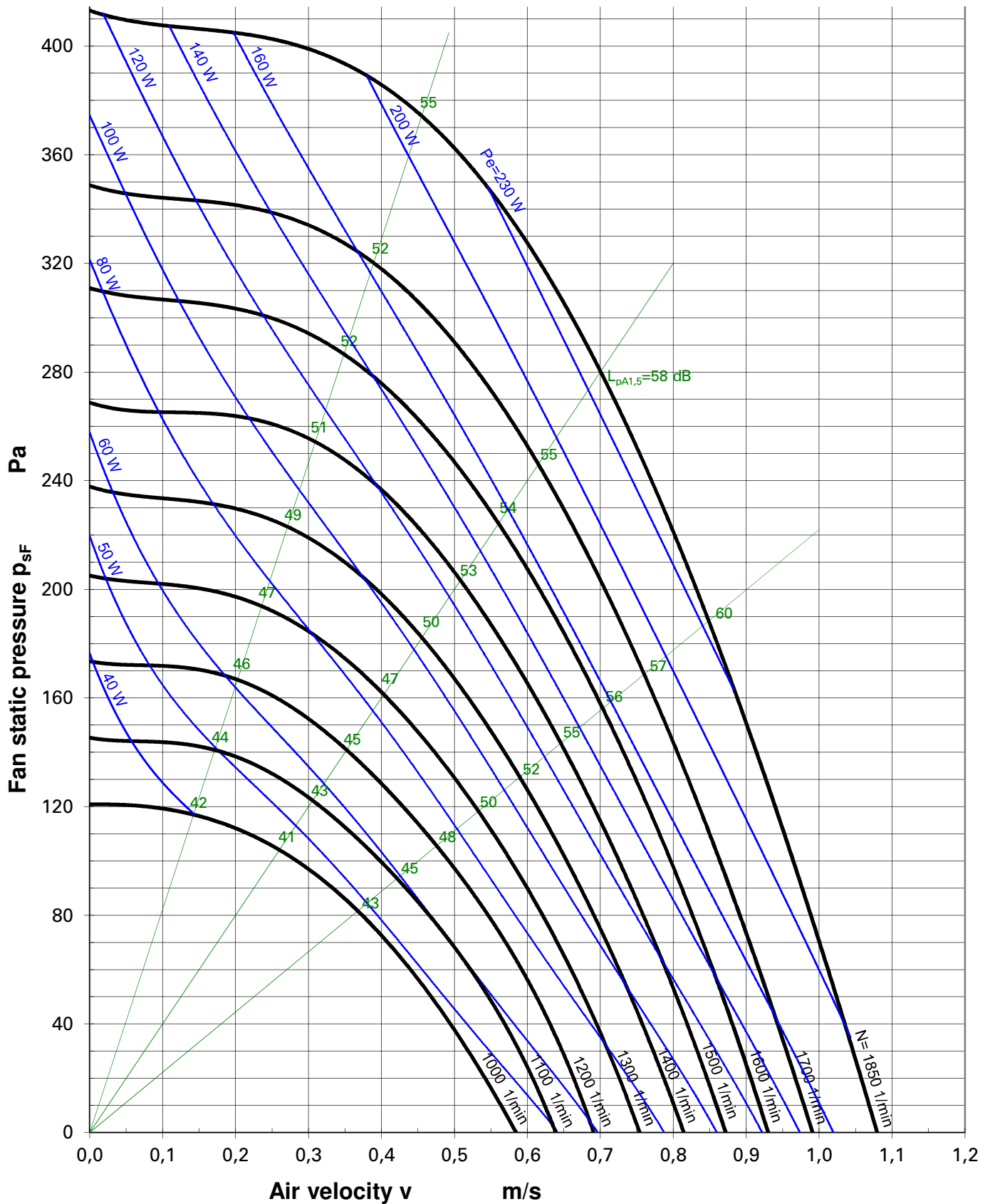
H13 (filtration efficiency 99.95% – permeability 0.05%)

H14 (filtration efficiency 99.995% – permeability 0.005%)

U15 (filtration efficiency 99.9995% – permeability 0.0005%)

U16 (filtration efficiency 99.99995% – permeability 0.00005%)

U17 (filtration efficiency 99.999995% – permeability 0.000005%)



Air Velocity	m/s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Volume flowrate	m <sup>3</sup> /h	194.4	388.8	583.2	777.6	972.0	1166.4	1360.8	1555.2	1749.6	1944.0	2138.4	2332.8
Volume flowrate	ft <sup>3</sup> /min	114,4	228,8	343,3	457,7	572,1	686,5	800,9	915,4	1029,8	1144,2	1258,6	1373,0

# Characteristics: RHP 0612-331-EC04-A

## For your invitation to tender:

Nicotra Gebhardt® FFU from the RHP range

Type: RHP 0612-331-EC04-A

Housing made of aluminium (optionally sheet steel or stainless steel). Sound-insulated version with mineral wool coated with fibreglass matting (fire class A1).

Motor impeller unit consisting of a high-performance centrifugal impeller with backward curved blades (impeller made of galvanised steel sheet with aluminium blades, riveted) fitted on the rotor of a BLDC external rotor motor (230 V/50 Hz, Protection class IP 44, designed in accordance with Class F, but classified in accordance with Class B (non UL) and Class A (UL). Direction of rotation RD. statically and dynamically balanced according to DIN ISO 1940, G = 2.5.

The rotational speed of the motor is infinitely adjustable through the EKE05/EKE06 commutation unit which is integrated into the housing, with different communication interfaces, Protection Class IP 20 (Modbus, alternatively LONWORKS/ANALOGUE possible). Scope of delivery including GST i18 Wieland plug for power supply, attached ready to plug in, without any connecting cable.

Control and monitoring of the FFU is possible through different control systems, for example, FANCommander 200 Modbus mini control centre, Modbus PC visualisation or Modbus handheld (as an option, on-site actuation using analogue input 0-10 VDC/LONWORKS interface is also possible).

Terminal filter of HEPA/ULPA class, frame made of extruded, anodised aluminium, with fan guarded coated in RAL 9010 on the clean room side, including Scan test (other filter classes are possible as an option).

Maintenance or removal of the filter with a fluid seal on the clean room side (optionally removal of the filter with dry sealing is possible on the plenum side).

Further accessories are available as options.

The delivery does not include any incidentals, fixing materials or cabling materials. Installation and commissioning are not included in the scope of delivery. Suitable for ceiling grid provided by the customer.

Manufacturer: Nicotra Gebhardt GmbH

Type: RHP 0612-331-EC04-A

## SPECIFICATION

Fan Filter Unit (FFU)

FFU type:

RHP 0612-331-EC04-A

FFU size:

600 x 1200 mm

Dimensions (L x W x H):

572 x 1172 x 445 mm (incl. Filter, without accessories)

Housing material:

Aluminium/steel plate/stainless steel

Sound insulation:

Mineral wool

Coating:

according to RAL/no coating

Drive

Type of drive:

BLDC motor (brushless DC)

Voltage:

208 - 277 V, 1~

Frequency:

50/60 Hz

Rotational speed (max.):

1750 1/min

Output (max):

0.33 kW

Current (max):

1.45 A

Electronics:

Modbus RTU/LON/Analogue 0-10V

Maintenance of the MLE:

Maintenance on the clean room side/maintenance on the plenum side

Filter

Maintenance of the filter:

Filter change on the clean room side/plenum side

Types of seal:

Fluid seal/dry seal

Frames:

Frame made of extruded, anodised aluminium, uncoated

Others:

fan guard grille coated in RAL 9010 on the clean room side

Filter classes:

E10 (filtration efficiency 85% – permeability 15%)

E11 (filtration efficiency 95% – permeability 5%)

E12 (filtration efficiency 99.5% – permeability 0.5%)

H13 (filtration efficiency 99.95% – permeability 0.05%)

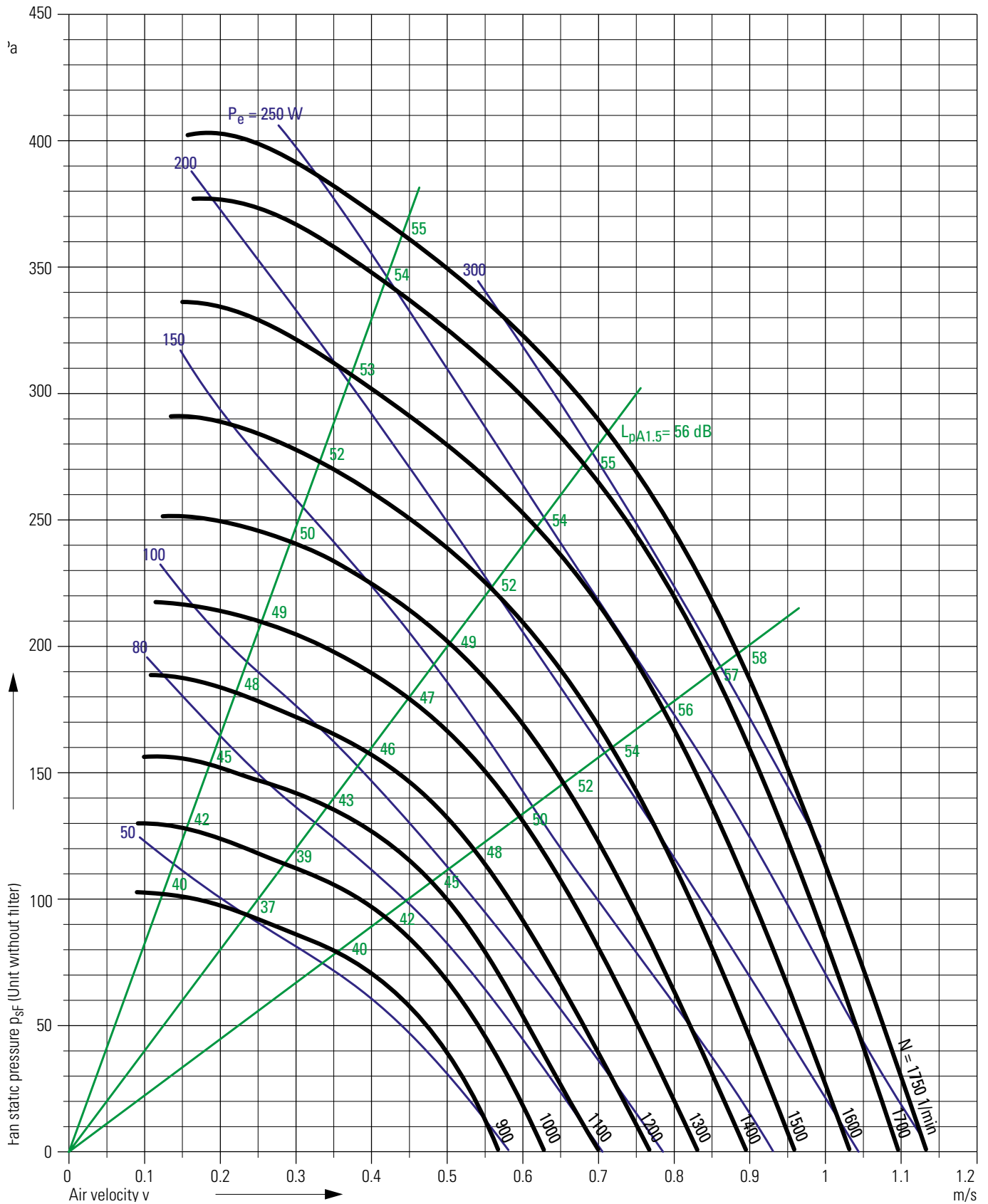
H14 (filtration efficiency 99.995% – permeability 0.005%)

U15 (filtration efficiency 99.9995% – permeability 0.0005%)

U16 (filtration efficiency 99.99995% – permeability 0.00005%)

U17 (filtration efficiency 99.999995% – permeability 0.000005%)





Air Velocity	m/s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Volume flowrate	m <sup>3</sup> /h	259.2	518.4	777.6	1036.8	1296.0	1555.2	1814.4	2073.6	2332.8	2592.0	2851.2	3110.4
Volume flowrate	ft <sup>3</sup> /min	152,6	305,1	457,7	610,2	762,8	915,4	1067,9	1220,5	1373,0	1525,6	1678,2	1830,7

# Characteristics: RHP 0612-335-EC00-SL

## For your invitation to tender:

Nicotra Gebhardt® FFU from the RHP range

SLIM type: RHP 0612-335-EC00-SL

Consisting of a particularly slim housing which is easy to install. Ideally suited for installation in extremely low plenums.

Housing made of aluminium (optionally sheet steel or stainless steel). Sound-insulated version with mineral wool coated with fibreglass matting (fire class A1).

Motor impeller unit consisting of a high-performance centrifugal impeller with backward curved blades (impeller made of galvanised steel sheet with aluminium blades, riveted) fitted on the rotor of a BLDC external rotor motor (230 V/50 Hz, Protection class IP 44, designed in accordance with F, but classified in accordance with Class B (non UL) and Class A (UL). Direction of rotation RD. statically and dynamically balanced according to DIN ISO 1940, G = 2.5.

The rotational speed of the motor is infinitely adjustable through the EKE05/EKE06 commutation unit which is integrated into the housing, with different communication interfaces, Protection Class IP 20 (Modbus, alternatively LONWORKS/ANALOGUE possible). Scope of delivery including GST i18 Wieland plug for power supply, attached ready to plug in, without any connecting cable.

Control and monitoring of the FFU is possible through different control systems, for example, FANCommander 200 Modbus mini control centre, Modbus PC visualisation or Modbus handheld (as an option, on-site actuation using analogue input 0-10 VDC/LONWORKS interface is also possible).

Terminal filter of HEPA/ULPA class, frame made of extruded, anodised aluminium, with fan guarded coated in RAL 9010 on the clean room side, including Scan test (other filter classes are possible as an option).

Maintenance or removal of the filter with a fluid seal on the clean room side (optionally removal of the filter with dry sealing is possible on the plenum side).

Further accessories are available as options.

The delivery does not include any incidentals, fixing materials or cabling materials. Installation and commissioning are not included in the scope of delivery. Suitable for ceiling grid provided by the customer.

Manufacturer: Nicotra Gebhardt GmbH

Type: RHP 0612-335-EC00-SL

## SPECIFICATION

### Fan Filter Unit (FFU)

#### FFU type:

RHP 0612-335-EC00-SL

#### FFU size:

600 x 1200 mm

#### Dimensions (L x W x H):

572 x 1172 x 385 mm (incl. Filter, without accessories)

#### Housing material:

Aluminium/steel plate/stainless steel

#### Sound insulation:

Mineral wool

#### Coating:

according to RAL/no coating

#### Drive

#### Type of drive:

BLDC motor (brushless DC)

#### Voltage:

208 - 277 V, 1 ~

#### Frequency:

50/60 Hz

#### Rotational speed (max.):

1700 1/min

#### Output (max):

0.34 kW

#### Current (max):

1.5 A

#### Electronics:

Modbus RTU/LON/Analogue 0-10V

#### Maintenance of the MLE:

Maintenance on the clean room side/maintenance on the plenum side

#### Filter

#### Maintenance of the filter:

Filter change on the clean room side/plenum side

#### Types of seal:

Fluid seal/dry seal

#### Frames:

Frame made of extruded, anodised aluminium, uncoated

#### Others:

fan guard grille coated in RAL 9010 on the clean room side

#### Filter classes:

E10 (filtration efficiency 85% – permeability 15%)

E11 (filtration efficiency 95% – permeability 5%)

E12 (filtration efficiency 99.5% – permeability 0.5%)

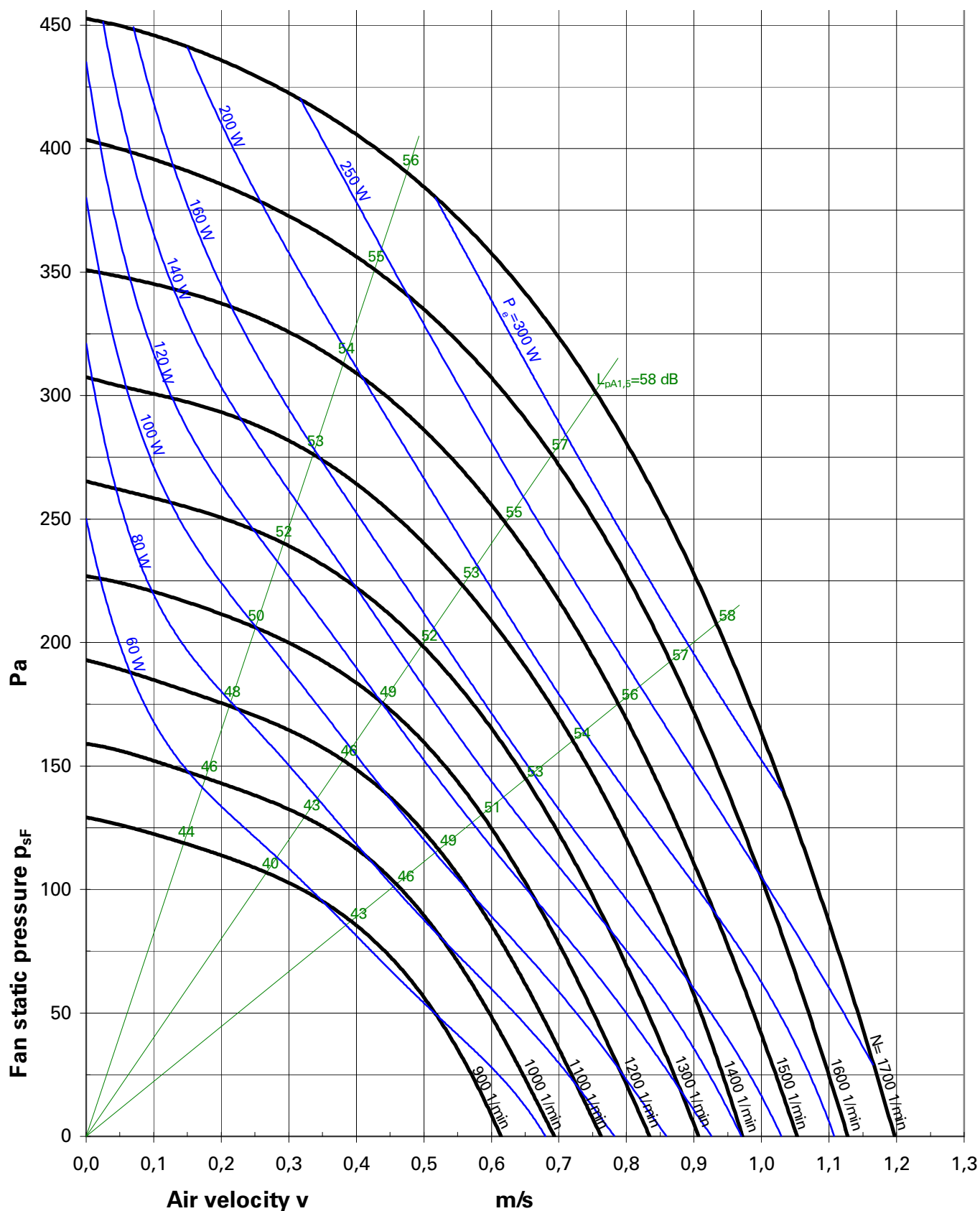
H13 (filtration efficiency 99.95% – permeability 0.05%)

H14 (filtration efficiency 99.995% – permeability 0.005%)

U15 (filtration efficiency 99.9995% – permeability 0.0005%)

U16 (filtration efficiency 99.99995% – permeability 0.00005%)

U17 (filtration efficiency 99.999995% – permeability 0.000005%)



Air Velocity	m/s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Volume flowrate	m <sup>3</sup> /h	259.2	518.4	777.6	1036.8	1296.0	1555.2	1814.4	2073.6	2332.8	2592.0	2851.2	3110.4
Volume flowrate	ft <sup>3</sup> /min	152,6	305,1	457,7	610,2	762,8	915,4	1067,9	1220,5	1373,0	1525,6	1678,2	1830,7

# Characteristics: Type: RHP 0909-335-EC00-A

## For your invitation to tender:

Nicotra Gebhardt® FFU from the RHP range

Type: RHP 0909-335-EC00-A

Housing made of aluminium (optionally sheet steel or stainless steel). Sound-insulated version with mineral wool coated with fibreglass matting (fire class A1).

Motor impeller unit consisting of a high-performance centrifugal impeller with backward curved blades (impeller made of galvanised steel sheet with aluminium blades, riveted) fitted on the rotor of a BLDC external rotor motor (230 V/50 Hz, Protection class IP 44, designed in accordance with Class F, but classified in accordance with Class B (non UL) and Class A (UL). Direction of rotation RD. statically and dynamically balanced according to DIN ISO 1940, G = 2.5.

The rotational speed of the motor is infinitely adjustable through the EKE05/EKE06 commutation unit which is integrated into the housing, with different communication interfaces, Protection Class IP 20 (Modbus, alternatively LONWORKS/ANALOGUE possible). Scope of delivery including GST i18 Wieland plug for power supply, attached ready to plug in, without any connecting cable.

Control and monitoring of the FFU is possible through different control systems, for example, FANCommander 200 Modbus mini control centre, Modbus PC visualisation or Modbus handheld (as an option, on-site actuation using analogue input 0-10 VDC/LONWORKS interface is also possible).

Terminal filter of HEPA/ULPA class, frame made of extruded, anodised aluminium, with fan guarded coated in RAL 9010 on the clean room side, including Scan test (other filter classes are possible as an option).

Maintenance or removal of the filter with a fluid seal on the clean room side (optionally removal of the filter with dry sealing is possible on the plenum side).

Further accessories are available as options.

The delivery does not include any incidentals, fixing materials or cabling materials. Installation and commissioning are not included in the scope of delivery. Suitable for ceiling grid provided by the customer.

Manufacturer: Nicotra Gebhardt GmbH

Type: RHP 0909-335-EC00-A

## SPECIFICATION

Fan Filter Unit (FFU)

FFU type:

RHP 0909-335-EC00-A

FFU size:

900 x 900 mm

Dimensions (L x W x H):

872 x 872 x 385 mm (incl. Filter, without accessories)

Housing material:

Aluminium/steel plate/stainless steel

Sound insulation:

Mineral wool

Coating:

according to RAL/no coating

Drive

Type of drive:

BLDC motor (brushless DC)

Voltage:

208 - 277 V, 1~

Frequency:

50/60 Hz

Rotational speed (max.):

1700 1/min

Output (max):

0.34 kW

Current (max):

1.50 A

Electronics:

Modbus RTU/LON/Analogue 0-10V

Maintenance of the MLE:

Maintenance on the clean room side/maintenance on the plenum side

Filter

Maintenance of the filter:

Filter change on the clean room side/plenum side

Types of seal:

Fluid seal/dry seal

Frames:

Frame made of extruded, anodised aluminium, uncoated

Others:

fan guard grille coated in RAL 9010 on the clean room side

Filter classes:

E10 (filtration efficiency 85% – permeability 15%)

E11 (filtration efficiency 95% – permeability 5%)

E12 (filtration efficiency 99.5% – permeability 0.5%)

H13 (filtration efficiency 99.95% – permeability 0.05%)

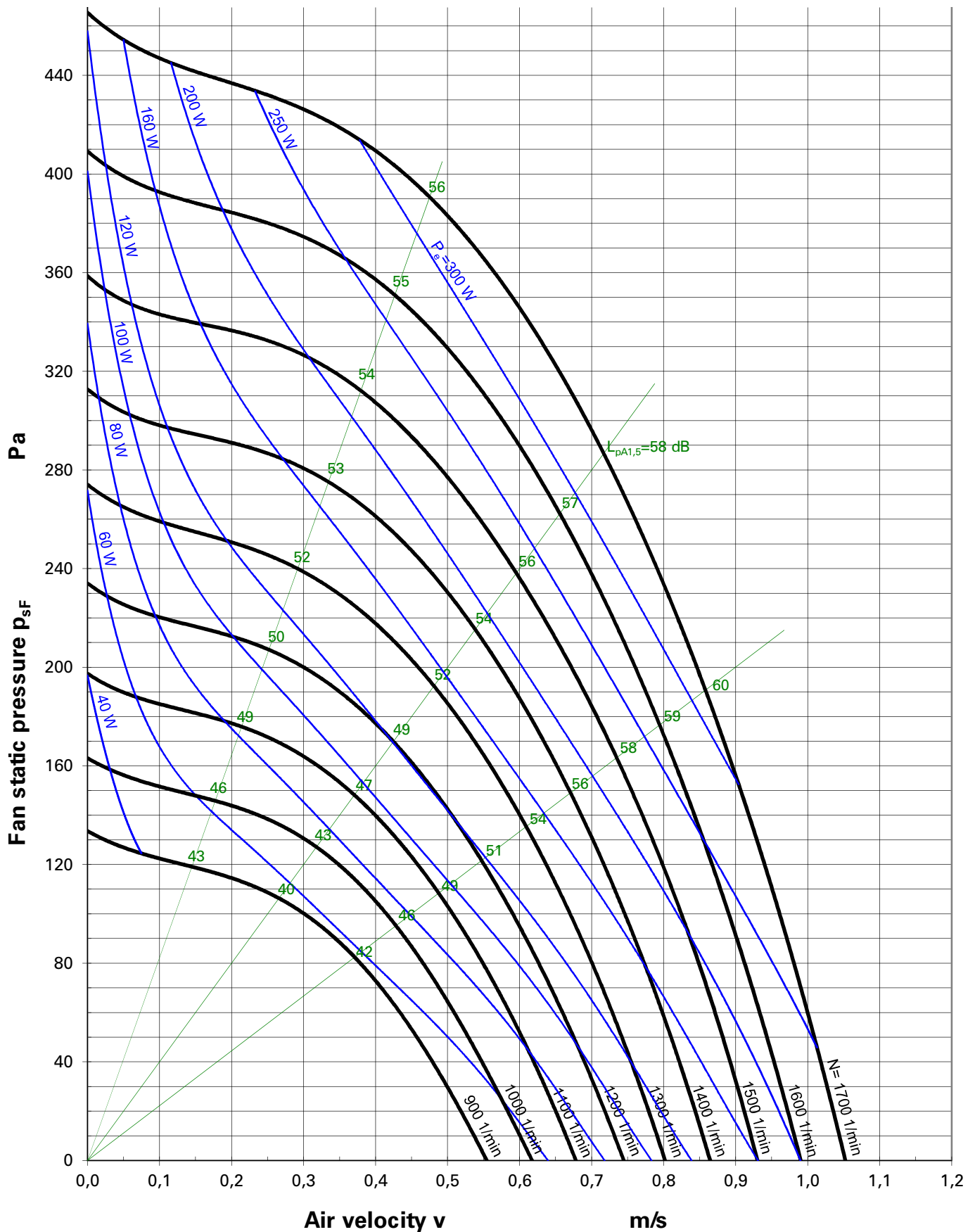
H14 (filtration efficiency 99.995% – permeability 0.005%)

U15 (filtration efficiency 99.9995% – permeability 0.0005%)

U16 (filtration efficiency 99.99995% – permeability 0.00005%)

U17 (filtration efficiency 99.999995% – permeability 0.000005%)





Air Velocity	m/s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Volume flowrate	m <sup>3</sup> /h	291.6	583.2	874.8	1166.4	1458.0	1749.6	2041.2	2332.8	2624.4	2916.0	3207.6	3499.2
Volume flowrate	ft <sup>3</sup> /min	171,6	343,3	514,9	686,5	858,1	1029,8	1201,4	1373,0	1544,7	1716,3	1887,9	2059,6

# Characteristics: RHP 0912-231-EC01-A

## For your invitation to tender:

Nicotra Gebhardt® FFU from the RHP range

Type: RHP 0912-231-EC01-A

Housing made of aluminium (optionally sheet steel or stainless steel). Sound-insulated version with mineral wool coated with fibreglass matting (fire class A1).

Motor impeller unit consisting of a high-performance centrifugal impeller with backward curved blades (impeller made of galvanised steel sheet with aluminium blades, riveted) fitted on the rotor of a BLDC external rotor motor (230 V/50 Hz, Protection class IP 44, designed in accordance with Class F, but classified in accordance with Class B (non UL) and Class A (UL). Direction of rotation RD. statically and dynamically balanced according to DIN ISO 1940, G = 2.5.

The rotational speed of the motor is infinitely adjustable through the EKE05/EKE06 commutation unit which is integrated into the housing, with different communication interfaces, Protection Class IP 20 (Modbus, alternatively LONWORKS/ANALOGUE possible). Scope of delivery including GST i18 Wieland plug for power supply, attached ready to plug in, without any connecting cable.

Control and monitoring of the FFU is possible through different control systems, for example, FANCommander 200 Modbus mini control centre, Modbus PC visualisation or Modbus handheld (as an option, on-site actuation using analogue input 0-10 VDC/LONWORKS interface is also possible).

Terminal filter of HEPA/ULPA class, frame made of extruded, anodised aluminium, with fan guarded coated in RAL 9010 on the clean room side, including Scan test (other filter classes are possible as an option).

Maintenance or removal of the filter with a fluid seal on the clean room side (optionally removal of the filter with dry sealing is possible on the plenum side).

Further accessories are available as options.

The delivery does not include any incidentals, fixing materials or cabling materials. Installation and commissioning are not included in the scope of delivery. Suitable for ceiling grid provided by the customer.

Manufacturer: Nicotra Gebhardt GmbH

Type: RHP 0912-231-EC01-A

## SPECIFICATION

### Fan Filter Unit (FFU)

#### FFU type:

RHP 0912-231-EC01-A

#### FFU size:

900 x 1200 mm

#### Dimensions (L x W x H):

872 x 1172 x 445 (incl. Filter, without accessories)

#### Housing material:

Aluminium/steel plate/stainless steel

#### Sound insulation:

Mineral wool

#### Coating:

according to RAL/no coating

#### Drive

##### Type of drive:

BLDC motor (brushless DC)

##### Voltage:

208 - 277 V, 1~

##### Frequency:

50/60 Hz

##### Rotational speed (max.):

1350 1/min

##### Output (max):

0.365 kW

##### Current (max):

1.60 A

##### Electronics:

Modbus RTU/LON/Analogue 0-10V

##### Maintenance of the MLE:

Maintenance on the clean room side/maintenance on the plenum side

##### Filter

##### Maintenance of the filter:

Filter change on the clean room side/plenum side

##### Types of seal:

Fluid seal/dry seal

##### Frames:

Frame made of extruded, anodised aluminium, uncoated

##### Others:

fan guard grille coated in RAL 9010 on the clean room side

##### Filter classes:

E10 (filtration efficiency 85% – permeability 15%)

E11 (filtration efficiency 95% – permeability 5%)

E12 (filtration efficiency 99.5% – permeability 0.5%)

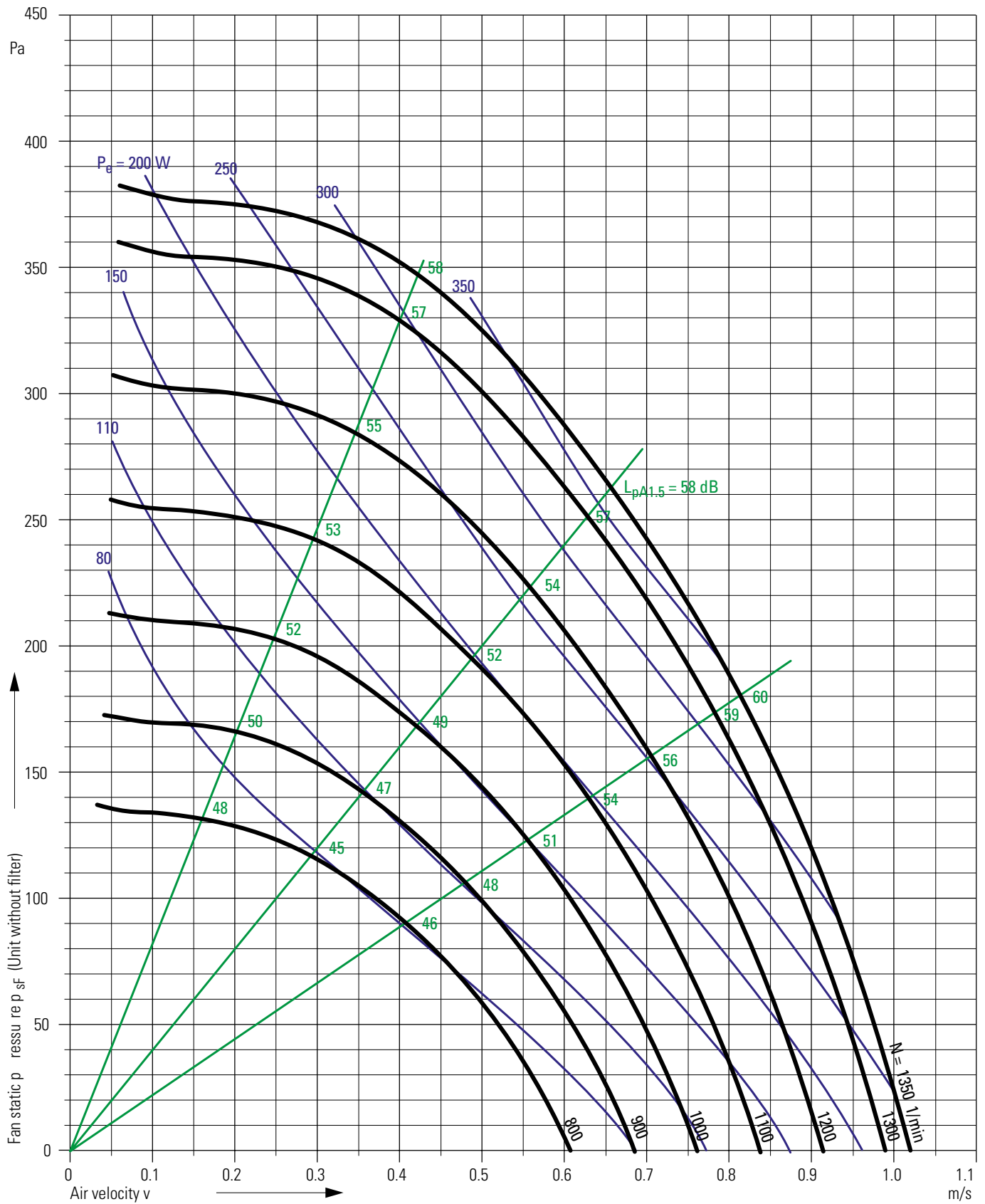
H13 (filtration efficiency 99.95% – permeability 0.05%)

H14 (filtration efficiency 99.995% – permeability 0.005%)

U15 (filtration efficiency 99.9995% – permeability 0.0005%)

U16 (filtration efficiency 99.99995% – permeability 0.00005%)

U17 (filtration efficiency 99.999995% – permeability 0.000005%)



Air Velocity	m/s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Volume flowrate	m <sup>3</sup> /h	388.8	777.6	1166.4	1555.2	1944.0	2332.8	2721.6	3110.4	3499.2	3888.0	4276.8	4665.6
Volume flowrate	ft <sup>3</sup> /min	228,8	457,7	686,5	915,4	1144,2	1373,0	1601,9	1830,7	2059,6	2288,4	2517,2	2746,1

# Characteristics: RHP 1212-240-EC00-A

## For your invitation to tender:

Nicotra Gebhardt® FFU from the RHP range

Type: RHP 1212-240-EC00-A

Housing made of aluminium (optionally sheet steel or stainless steel). Sound-insulated version with mineral wool coated with fibreglass matting (fire class A1).

Motor impeller unit consisting of a high-performance centrifugal impeller with backward curved blades (impeller made of galvanised steel sheet with aluminium blades, riveted) fitted on the rotor of a BLDC external rotor motor (230 V/50 Hz, Protection class IP 44, designed in accordance with Class F, but classified in accordance with Class B (non UL) and Class A (UL). Direction of rotation RD. statically and dynamically balanced according to DIN ISO 1940, G = 2.5.

The rotational speed of the motor is infinitely adjustable through the EKE05/EKE06 commutation unit which is integrated into the housing, with different communication interfaces, Protection Class IP 20 (Modbus, alternatively LONWORKS/ANALOGUE possible). Scope of delivery including GST i18 Wieland plug for power supply, attached ready to plug in, without any connecting cable.

Control and monitoring of the FFU is possible through different control systems, for example, FANCommander 200 Modbus mini control centre, Modbus PC visualisation or Modbus handheld (as an option, on-site actuation using analogue input 0-10 VDC/LONWORKS interface is also possible).

Terminal filter of HEPA/ULPA class, frame made of extruded, anodised aluminium, with fan guarded coated in RAL 9010 on the clean room side, including Scan test (other filter classes are possible as an option).

Maintenance or removal of the filter with a fluid seal on the clean room side (optionally removal of the filter with dry sealing is possible on the plenum side).

Further accessories are available as options.

The delivery does not include any incidentals, fixing materials or cabling materials. Installation and commissioning are not included in the scope of delivery. Suitable for ceiling grid provided by the customer.

Manufacturer: Nicotra Gebhardt GmbH

Type: RHP 1212-240-EC00-A

## SPECIFICATION

Fan Filter Unit (FFU)

FFU type:

RHP 1212-240-EC00-A

FFU size:

1200 x 1200 mm

Dimensions (L x W x H):

1172 x 1172 x 445 mm (incl. filter, without accessories)

Housing material:

Aluminium/steel plate/stainless steel

Sound insulation:

Mineral wool

Coating:

according to RAL/no coating

Drive

Type of drive:

BLDC motor (brushless DC)

Voltage:

208 - 277 V, 1~

Frequency:

50/60 Hz

Rotational speed (max.):

1070 1/min (nonUL)

1010 1/min (UL)

Output (max):

0.37 kW

Current (max):

1.62 A

Electronics:

Modbus RTU/LON/Analogue 0-10V

Maintenance of the MLE:

Maintenance on the clean room side/maintenance on the plenum side

Filter

Maintenance of the filter:

Filter change on the clean room side/plenum side

Types of seal:

Fluid seal/dry seal

Frames:

Frame made of extruded, anodised aluminium, uncoated

Others:

fan guard grille coated in RAL 9010 on the clean room side

Filter classes:

E10 (filtration efficiency 85% – permeability 15%)

E11 (filtration efficiency 95% – permeability 5%)

E12 (filtration efficiency 99.5% – permeability 0.5%)

H13 (filtration efficiency 99.95% – permeability 0.05%)

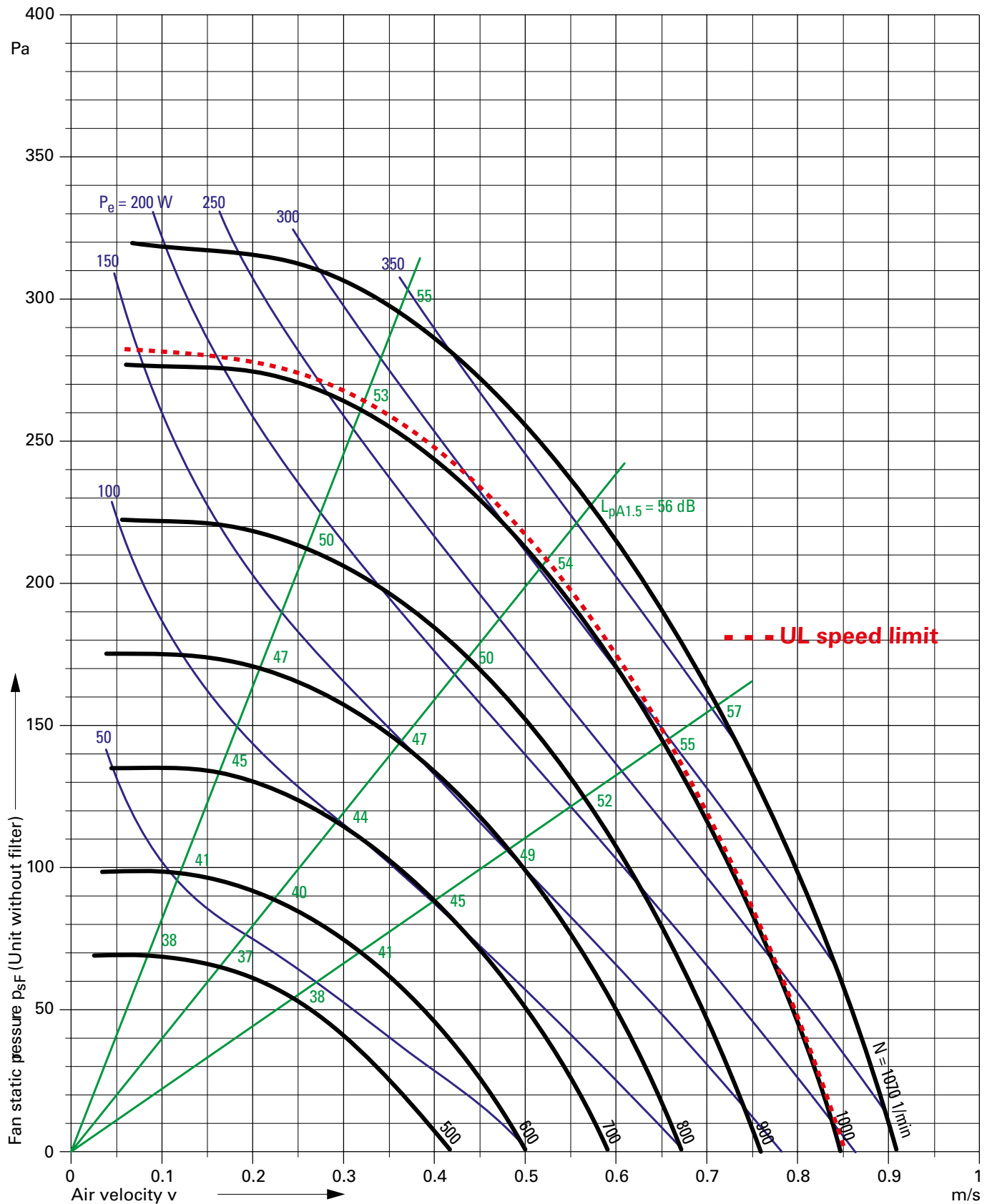
H14 (filtration efficiency 99.995% – permeability 0.005%)

U15 (filtration efficiency 99.9995% – permeability 0.0005%)

U16 (filtration efficiency 99.99995% – permeability 0.00005%)

U17 (filtration efficiency 99.999995% – permeability 0.000005%)





Air Velocity	m/s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Volume flowrate	m <sup>3</sup> /h	518.4	1036.8	1555.2	2073.6	2592.0	3110.4	3628.8	4147.2	4665.6	5184.0	5702.4	6220.8
Volume flowrate	ft <sup>3</sup> /min	305,1	610,2	915,4	1220,5	1525,6	1830,7	2135,8	2440,9	2746,1	3051,2	3356,3	3661,4

# Characteristics: RHP MultiEvo 1212-240-EC00-ME

## For your invitation to tender:

Nicotra Gebhardt® FFU from the RHP range

Type: RHP 1212-240-EC00-ME

**FFU with energy-saving MultiEvo guide spirals.  
Patented technology for optimised flow conditions.**

**Higher efficiency in comparison with traditional housing concepts.**

**Maximum pressure increase in comparison with a standard FFU at constant motor speed for greater power reserves.**

**Noise levels reduced by up to 4 dB for considerably quieter running.**

**High uniformity of air distribution.**

Housing made of aluminium (optionally sheet steel or stainless steel) in sound-insulated version.

Motor impeller unit consisting of a high-performance centrifugal impeller with backward curved blades (impeller made of galvanised steel sheet with aluminium blades, riveted) fitted on the rotor of an EC external rotor motor (230 V/50 Hz, Protection class IP 44, designed in accordance with Class F, but classified in accordance with Class B (non UL) and Class A (UL), infinitely variable rotational speed by means of electronic commutation, direction of rotation RD, statically and dynamically balanced according to DIN ISO 1940, G = 2.5.

Actuation through Modbus-Controller (IP 20, with GST i18 Wieland plug, attached ready to plug in, without any connecting cable) through Modbus control system, e.g. Modbus-Controller mini control centre FANCommander 200 or Modbus PC visualisation (optionally customer's actuation solution through analogue input 0-10V/ LONWORKS interface possible).

Terminal filter of HEPA/ULPA class, frame made of extruded, anodised aluminium, with fan guarded coated in RAL 9010 on the clean room side, including Scan test (other filter classes are possible as an option).

Maintenance or removal of the filter with a fluid seal on the clean room side (optionally removal of the filter with dry sealing is possible on the plenum side).

Accessories such as pipe connecting flange, prefilter, heat exchanger attachment, aerosol measuring connectors, pressure measuring connectors, swirl diffusers, and many more are available as options.

The delivery does not include any incidentals, fixing materials or cabling materials. Installation and commissioning are not included in the scope of delivery. Suitable for T-profile provided by the customer; ceiling grid.

Manufacturer: Nicotra Gebhardt GmbH

Type: RHP 1212-240-EC00-ME

## SPECIFICATION

Fan Filter Unit (FFU)

FFU type:

RHP 1212-240-EC00-ME

FFU size:

1200 x 1200 mm

Dimensions (L x W x H):

1172 x 1172 x 420 mm (incl. filter, without accessories)

Housing material:

Aluminium/steel plate/stainless steel

Sound insulation:

Mineral wool,

Fire class A1

Coating:

according to RAL/no coating

Drive

Type of drive:

BLDC motor (brushless DC)

Voltage:

208 - 277 V, 1~

Frequency:

50/60 Hz

Rotational speed (max.):

1070 1/min

Output (max):

0.37 kW

Current (max):

1.64 A

Electronics:

Modbus RTU/LON/Analogue 0-10V

Maintenance of the MLE:

Maintenance on the clean room side/maintenance on the plenum side

Filter

Maintenance of the filter:

Filter change on the clean room side/plenum side

Types of seal:

Fluid seal/dry seal

Frames:

Frame made of extruded, anodised aluminium, uncoated

Others:

fan guard grille coated in RAL 9010 on the clean room side

Filter classes

E10 (filtration efficiency 85% – permeability 15%)

E11 (filtration efficiency 95% – permeability 5%)

E12 (filtration efficiency 99.5% – permeability 0.5%)

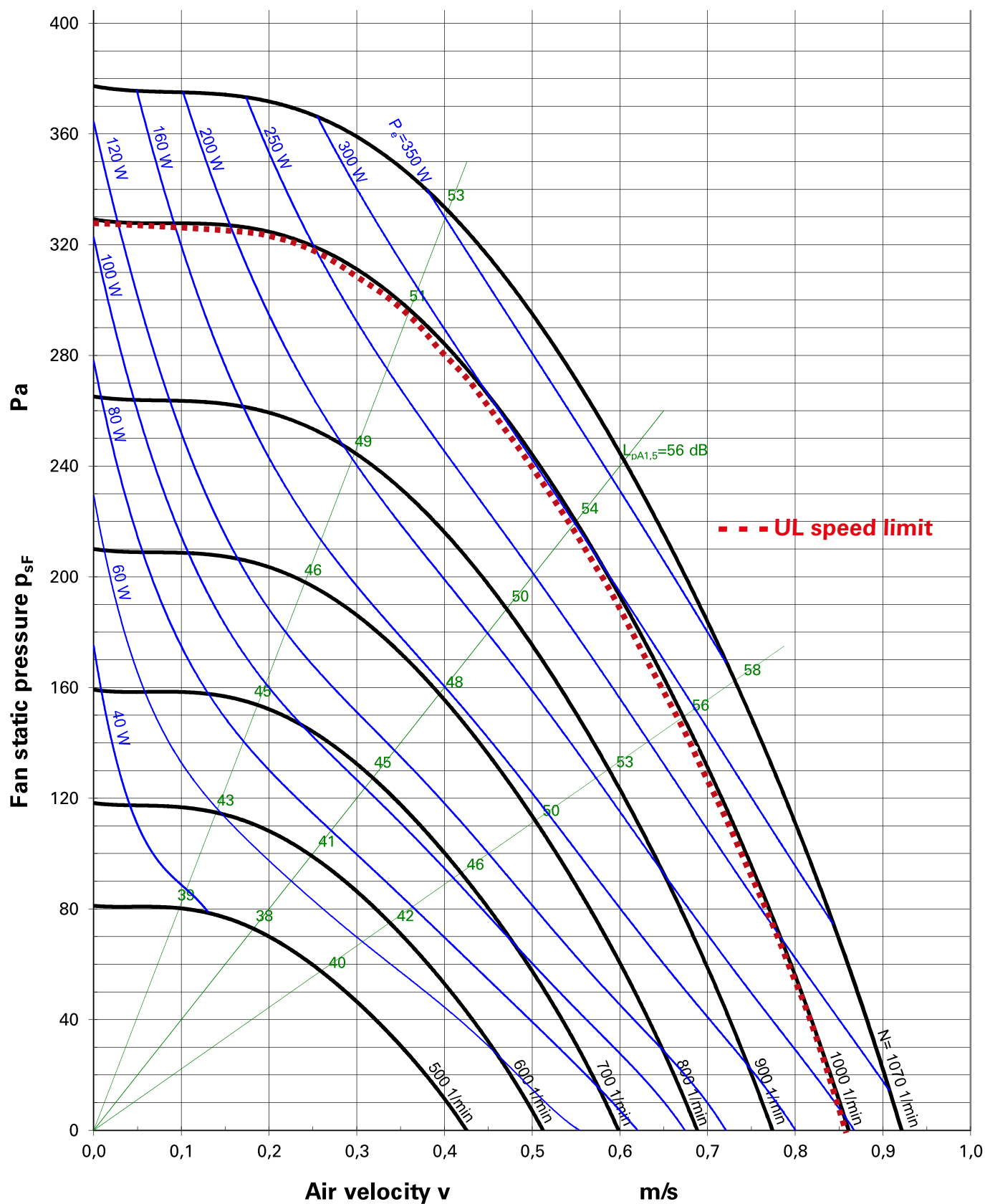
H13 (filtration efficiency 99.95% – permeability 0.05%)

H14 (filtration efficiency 99.995% – permeability 0.005%)

U15 (filtration efficiency 99.9995% – permeability 0.0005%)

U16 (filtration efficiency 99.99995% – permeability 0.00005%)

U17 (filtration efficiency 99.999995% – permeability 0.000005%)



Air Velocity	m/s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Volume flowrate	m <sup>3</sup> /h	518.4	1036.8	1555.2	2073.6	2592.0	3110.4	3628.8	4147.2	4665.6	5184.0	5702.4	6220.8
Volume flowrate	ft <sup>3</sup> /min	305,1	610,2	915,4	1220,5	1525,6	1830,7	2135,8	2440,9	2746,1	3051,2	3356,3	3661,4

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Web www.nicotra-gebhardt.com

## APPLICATION CONSIDERATIONS

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