EN

Movement by Perfection

The Royal League in **ventilation,** control and drive technology

Fans and control technology for clean rooms

Efficient, quiet, intelligent

ZIEHL-ABEGG

Content

Welcome to the world of ZIEHL-ABEGG

Top technology "Made by ZIEHL-ABEGG"

A pioneering spirit and the courage of innovation were the driving forces behind Emil Ziehl's development of his first external rotor motor over 100 years ago. With this he laid the cornerstone for the success story of ZIEHL-ABEGG in 1910. Today, the family company ZIEHL-ABEGG, with its headquarters in Künzelsau, develops, produces and sells high quality, high-tech components: Fans, special electric motors and their perfectly adapted, state-of-the-art control technology. Still today, Emil Ziehl's pioneering spirit is the motivator for making good even better and finding new, revolutionary solutions.

ZIEHL-ABEGG is based in Southern Germany but is at home all over the world. Thousands of employees develop, produce and sell the latest technological, economic and ecological developments at production sites and sales offices worldwide.

Welcome to the world of ventilation, control and drive technology.

Highest reliability and efficiency for your clean room

Fascination, innovation and always being one step ahead – these are the aspirations of our globally active company in the competence areas of ventilation systems, control engineering, drive and automotive technology. The company has been achieving great things since it was founded by Emil Ziehl in Berlin in 1910, and today has its headquarters based in Künzelsau, Baden-Württemberg.

ZIEHL-ABEGG has been active in the area of application of clean rooms for many years. With our extensive project experience, we always find the optimal solution together with our customers for the best energy efficiency and highest reliability, be it in semiconductor production, the microsystems industry or pharmaceutical industry.

1 Fan filter unit (FFU)

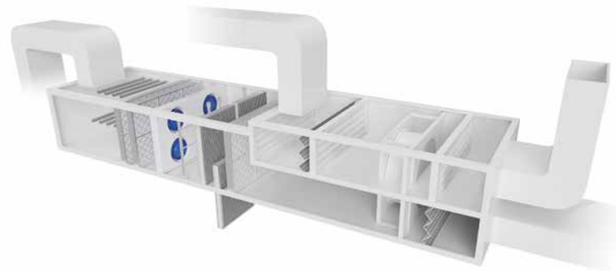
An FFU (fan filter unit) consists of a fan and a filter. The air is sucked in from above and blown into the room through a filter. The air flow is guided at the outlet side in a turbulent or laminar manner. As the key component which is often installed in large quantities in the clean room, the energy efficiency of the FFU plays a decisive role in reducing operating costs. In this respect, EC motors offer a clear advantage since the fans are designed for the maximum operating point, but are mostly operated at partial load. High reliability and permanent monitoring option of the operating status are also indispensable.

2 Control technology in the clean room

For networking the FFU (fan filter unit) as well as other devices, bus technology is used. MODBUS is a low-cost and widespread bus solution which is becoming increasingly prevalent in clean room applications. Depending on the size and distribution of the FFU network, either local control solutions (control device) or central monitoring system (PC) are implemented for monitoring and control.

3 Software monitoring

Highly reliable operation of a clean room requires permanent monitoring. In the case of a centrally controlled FFU network, PC-based monitoring software is often used.



Central air conditioning unit

The air in the clean room can also be prepared by means of air handling units. The new generation of fan drives contributes to drastically reducing energy consumption. Innovative EC motor technology is especially suitable for control applications; this is precisely where energy savings are particularly high.

Centrifugal fans – always the right impeller

Metal version

H

Product specification:
Free running H series with 6 backwards-curved blades in frame sizes 315, 355, 400. Impeller made of high-quality aluminium alloy. Version with inlet nozzle made of steel. Volume flow rate up to around 3,600 m³/h free blowing, max. static pressure increase up to 430 Pa possible. GR modules with integrated connection box available on request.

Characteristics and specific features:
Manufactured from high-quality aluminium alloy, no outgassing. Optimized aerodynamics and associated higher efficiency, and lower acoustic power level. Complete series fulfils ErP 2015.

Motor concepts:
External rotor motors:
- EC technology ECblue: with integrated controller matched to the fan
- AC technology

As the predecessor of the H impeller, the G impeller is still available for a transitional period

Universal application

Vpro

Product specification:
Free running Vpro impeller with 6 backwards-curved, fluted blades in frame sizes 190 to 630 mm. Impeller made of high-performance composite material. Version with inlet nozzle. Volume flow rate up to around 18,000 m³/h free blowing, max. static pressure increase up to 1,300 Pa possible. GR modules for compact installation in customer applications/devices for horizontal and vertical air feed.

Characteristics and specific features:
High volume flow rates, high efficiency, low acoustic power levels due to special three-dimensional blade geometry, reduced rotational tone. Ideally suited for low-pressure applications.

Motor concepts:
External rotor motors:
- EC technology ECblue: with integrated controller matched to the fan
- AC technology

High volume flow rate

ZAvblue

Product specification:
Free running ZAvblue impeller with 7 backwards-curved, fluted blades in frame sizes 175 to 630 mm. Impeller made of high-performance composite material. Version with inlet nozzle made of plastic. Volume flow rate up to around 19,000 m³/h free blowing, max. static pressure increase up to 800 Pa possible.

Characteristics and specific features:
High volume flow rates, high efficiency, low acoustic power levels due to special three-dimensional blade geometry with diagonal outflow, reduced rotational tone. Ideally suited for low-pressure applications in confined installation spaces. Entire series meets ErP 2015 including in AC technology.

Motor concepts:
External rotor motors:
- EC technology ECblue: with integrated controller matched to the fan
- AC technology

High pressure

Cpro

Product specification:
Free running Cpro impeller made of ZAmid high-performance composite material with 7 backwards-curved, fluted blades in frame sizes 250 to 630. Volume flow rates up to around 30,000 m³/h free blowing, static pressure increase up to 2,500 Pa possible.

Characteristics and specific features:
Impeller with rotating, non-fluted diffuser for high static pressure, extremely high efficiency levels and favourable acoustic characteristics. Reduced rotational tone as a result of special three-dimensional blade geometry. The high-quality plastic material allows for a wide temperature application range and also offers a high level of chemical resistance.

Motor concepts:
External rotor motors:
- EC technology ECblue: with integrated controller matched to the fan
- AC technology

Plug & Play

GR built-in module

On request, we also offer the fans in the GR module. The GR module consists of a fan and a nozzle, which are fully assembled and configured in a metal frame. The connection box and the wiring to the fan are also pre-installed and integrated in the module. The only work you have to do is install the module in your device housing and connect the power supply and bus. In this way, the production of your device is considerably accelerated. In case of repair, the whole module can be replaced.

ECblue high-efficiency motors – minimising operating costs, maximising success

ECblue motors are permanent magnet synchronous motors with integrated power electronics and intelligent control. With ECblue motors from ZIEHL-ABEGG, you can reduce your energy consumption to a minimum. At the same time, you ensure that your systems meet market and customer needs for environmentally friendly technology.

Naturally, ECblue motors fulfil all relevant EU energy efficiency directives. The efficiency levels of ECblue motors lie above the minimum efficiency levels required by the IE4 class (Super Premium Efficiency).

Major characteristics of the ECblue motor family

- Integrated motor contactor
- Continuously variable speed control
- Outstanding efficiency levels, even in the partial load range
- Active temperature management
- Power factor correction
- Easy configuration and reading out of data
- Highest EMC standard according to EN 61000-6-3 (domestic appliances)
- Interference immunity according to EN 61000-6-2 (industry)

EC090 IP20	EC116 IP20
Size EC090	Size EC116
Power supply 1~ 200...277 V 50/60 Hz	Power supply 1~ 200...277 V 50/60 Hz
Output up to 500 W	Output up to 850 W
Protection class IP20	Protection class IP20
Certification UL, CCC	Certification UL on request
Continuously variable speed control via MODBUS or LON with corresponding connection box	Continuously variable speed control via MODBUS or LON with corresponding connection box
MODBUS auto-addressing	MODBUS auto-addressing
Active PFC as standard in the case of EC090 as well as EC116	
Suitable for centrifugal fans: ▪ H 315 - 400 mm ▪ Vpro 250 - 450 mm ▪ ZAvblue 250 - 450 mm ▪ Cpro 250 - 315 mm	Suitable for centrifugal fans: ▪ Vpro 400 - 500 mm ▪ ZAvblue 400 - 500 mm ▪ Cpro 400 - 500 mm

AC motors – proven technology, familiar reliability

As they are easy to assemble, AC motors offer a robust and low-cost solution for small ventilation systems in the clean room. Energy efficiency can be significantly improved in partial load operation by activating a frequency inverter.

Characteristics and special features

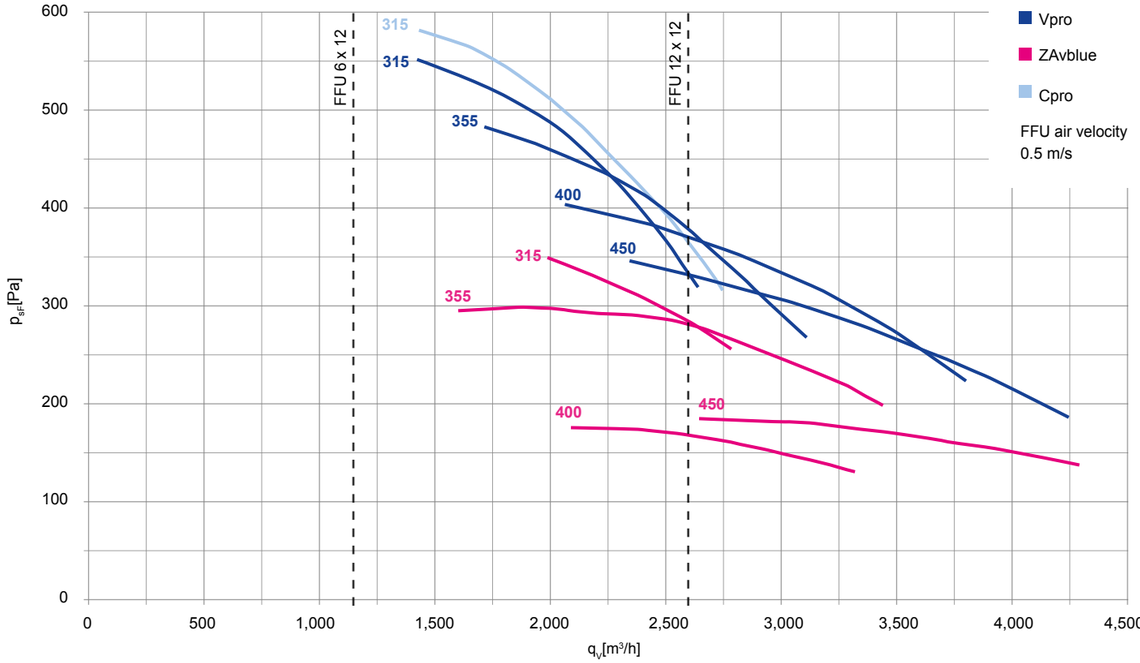
- Compact and space-saving due to external rotor design
- Proven drive concept of a wear-free squirrel cage motor

AC asynchronous external rotor motors
Frame size AC074, AC085 and AC106
Power supply Input voltage: 1~230 V 50 Hz, 3~230 V/400 V D/Y 50 Hz, non-standard voltage and 60 Hz solutions available on request
Output up to 850 W
Protection class IP44, IP54
Suitable for centrifugal fans: ▪ H on request

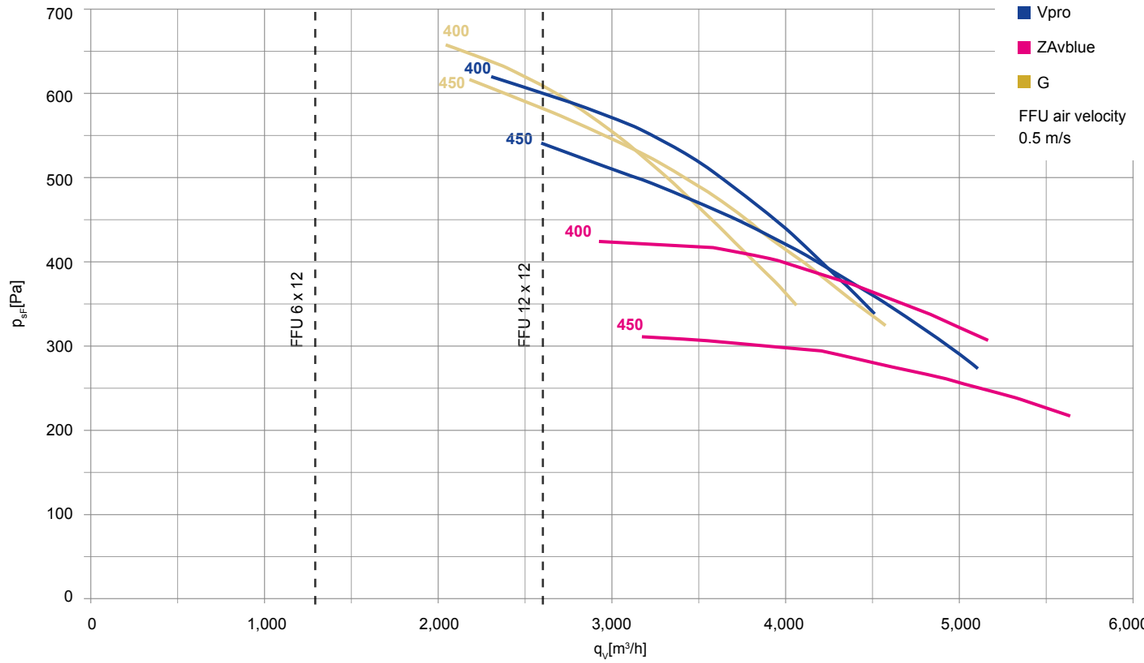
Efficient operating ranges

You can find efficient operating ranges below suitable for FFU clean room applications. Only the ranges are displayed with the highest efficiency. An extension of operating ranges is possible by reducing efficiency.

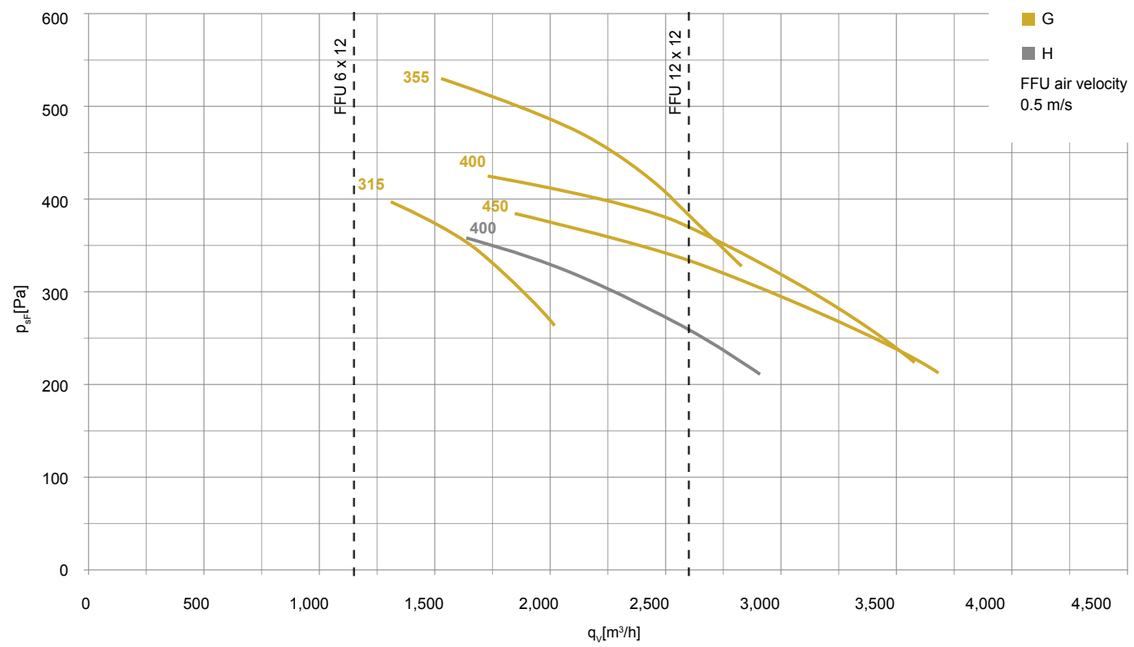
Overview of fans with EC090IP20 impeller made of composite material



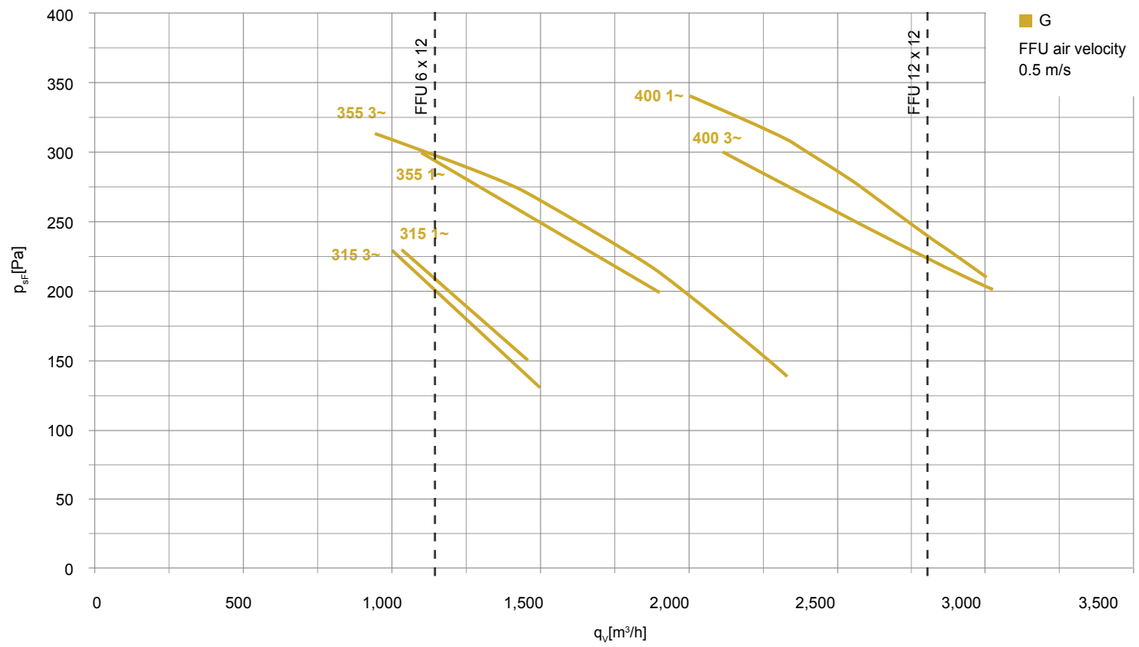
Overview of fans with EC116 IP20



Overview of fans with EC090 IP20 impeller made of aluminium



Overview of fans with AC motors



Overview matrix of fans

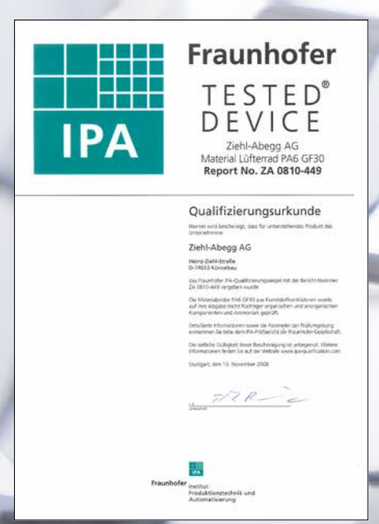
	Recommendation for FFU frame size	6X12	12x12	12x12 13x15	12x12 13x15
	Fan wheel Ø mm	315	355	400	450
EC090 IP20 500 W	Vpro	115081	115082	115083	115084
	G	115085	115086	115087	115088
	H	On request	On request	On request	
	ZAvblue	On request	171466	171468	On request
	Cpro	172022	On request	On request	On request
EC 116 IP20 850 W	Vpro			114739	114740
	G			114737	114738
	ZAvblue			On request	On request
	Cpro			173137	On request
AC motors	G	126309 (1~) 126358 (3~)	129070 (1~) 129074 (3~)	113027 (1~) 129253 (3~)	
	H	On request	On request	On request	

Good to know

- You can find more fans for clean room applications in FANselect under:
  Series => industrially specialised fans
- The article numbers are given as examples
- Cpro is often used in the case of higher differential pressure, while ZAvblue is optimized for increased volume flow rate or low noise
- Article numbers of H series on request

IPA certificates

The high-performance composite materials for Vpro, ZAvblue and Cpro fan wheels have been tested by Fraunhofer-Institut für Produktionstechnik und Automatisierung IPA with regard to outgassing.



Overview of the application situation of controllers and software

In order to control the fans efficiently, ZIEHL-ABEGG offers a wide range of electronic components for bus communication, sensor data recording and control.

	Individual FFUs	Small clean rooms (< 124 FFU)	Large clean rooms
Connection box 	X (depending on the bus type, connection box for Modbus RTU or for LON)	X	X
Control devices			
UNIcon control module 	X	X	X (as control for restricted areas)
UNIcon CXG-327 (A)NE-R 	X	X	
Gateway			
TGW-715 CR 	X	X	
NETcon DIG-9NE 			X
Repeater			
NETcon Z-G-1NE 		X	X
I/O module			
B-G-028NE 		X	X
Software			
Netconvis@ZAset 		X	X

For illustration of the system example, see presentation of the respective device

Connection box

For the connection between the connection box and the ECblue motor, you need the right cable set.

Power cable for EC090 and EC116 IP20:
Art. No. 00700612

Signal cable for MODBUS RTU connection box:
Art. No. 00700613

Signal cable for LON connection box:
Art. No. 00704185

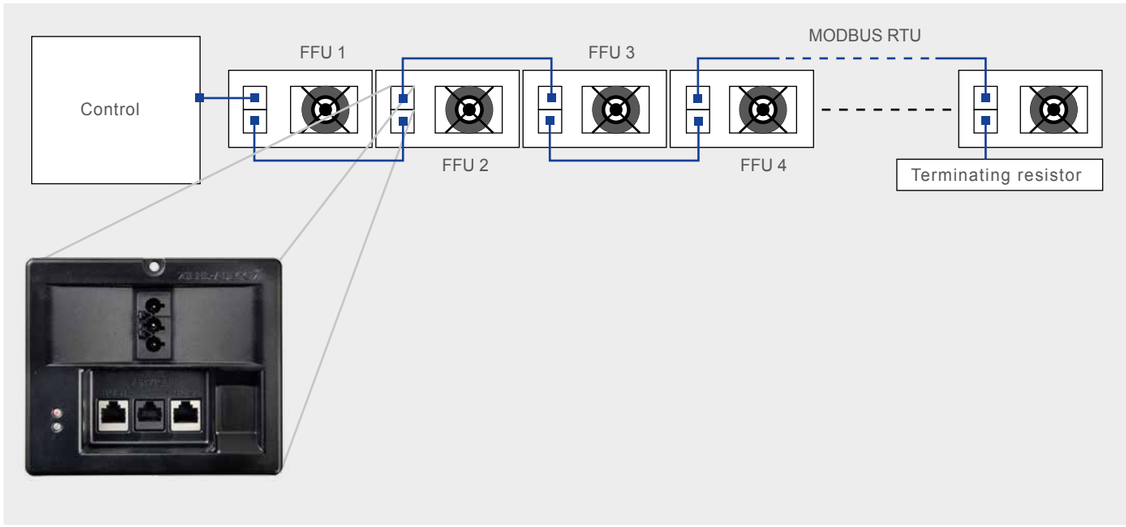
MODBUS RTU connection box (Art. No. 380085)

- Connection box for easy connection to power supply and bus on the FFU housing
- Supports MODBUS RTU
- Supports MODBUS auto-addressing
- Service socket (RJ45) for easy connection to diagnostic tool
- 2 LEDs display the status/error flashing code of the fan

LON connection box (Art. No. 380100)

- Connection box for easy connection to power supply and bus on the FFU housing
- Connection to LON Bus (LonWorks FT10A) via RJ45 patch cable
- Service socket (RJ45) for easy connection to diagnostic tool
- 2 LEDs display the status/error flashing code of the fan

Networking with RJ45 patch cable when using the connection box for ECblue:

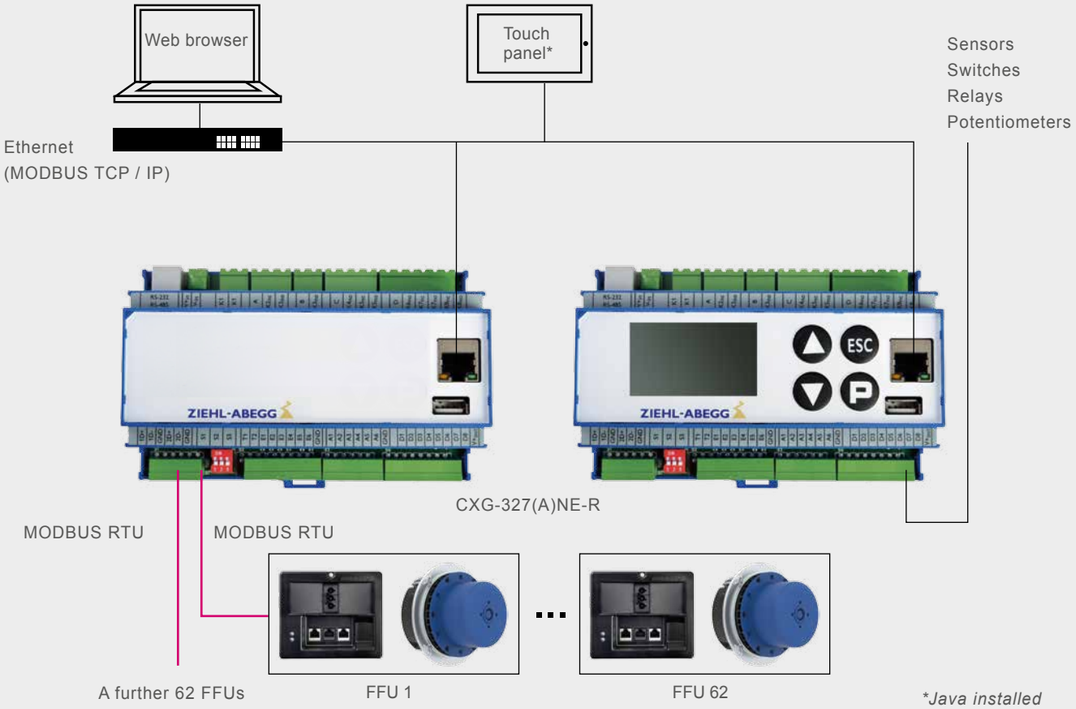


Control module
UNIcon CXG-327 (A)NE-R

Premium control module UNIcon CXG-327NE-R
(Art. No. with LCD: 320079
Art. No. without LCD: 320080)

- Connect up to 124 fans via MODBUS RTU (2 master channels)
- 6 PID controllers integrated
- Integrated real-time clock and timer
- I/Os for connection of sensors and other field components (6 analogue inputs, 8 digital inputs, 6 analogue outputs, 7 relays)
- Auto-addressing up to 62 fans per MODBUS channel (2 channels)
- Error log file via USB stick up to 4GB
- Embedded server in the control unit, operation via web browser on central control computer (PC) or locally via touch panel (as standard Microsoft Windows or microbrowser based)
- LED display and operating keys as standard
- Supply via 24VDC
- Mounting on DIN rail
- Connection via MODBUS-TCP to building control technology possible

Control of an FFU network with UNIcon CXG-327(A)NE-R:

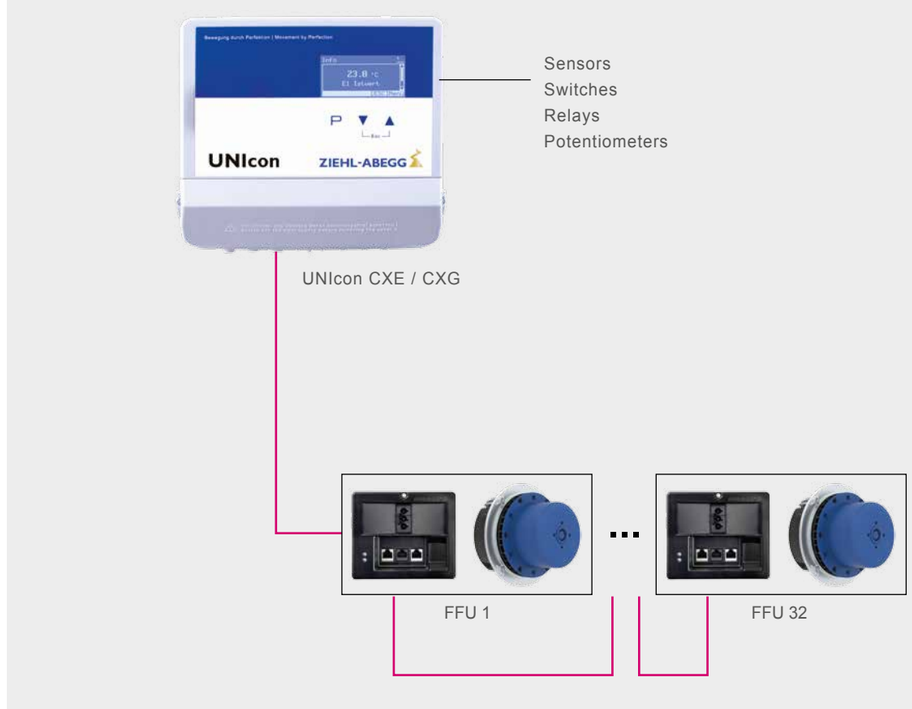


UNIcon control module

UNIcon control module
(Art. No. 320053, 320055, 320056, 320057, 320058)

- Connect and control up to 32 fans via MODBUS RTU (master channel)
- Supports MODBUS auto-addressing
- 2 PID controllers integrated
- Integrated real-time clock with timer
- I/Os for connection of sensors and other field components (2 analogue inputs, 2 analogue outputs, 2 digital inputs, 2 relays)
- LED display for status and parameters
- Event memory
- Supply via 24VDC, 1~230VAC, 2~400VAC possible
- Protection class IP54 or IP00
- Saves start-up settings with a backup on PC

Control of an FFU network with UNIcon

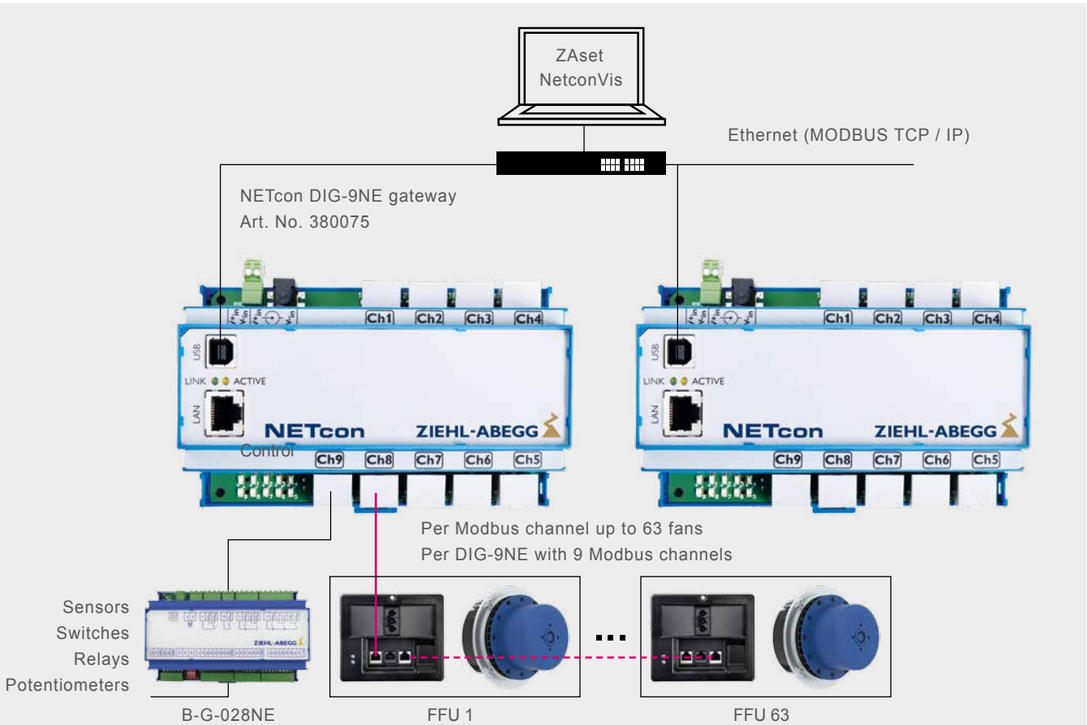


Modbus gateway NETcon DIG-9NE

MODBUS gateway NETcon DIG-9NE (Art. No. 380075)

- Gateway between MODBUS RTU (to fans) and MODBUS TCP/IP (to control)
- 9 RS485 channels, which can connect up to 63 MODBUS RTU nodes respectively, i.e. in total 567 MODBUS RTU addresses are possible
- Supports MODBUS auto-addressing
- 9 traffic LEDs display the activity of the 9 channels
- RJ45 sockets for MODBUS RTU channels, easy connection with connection box via Ethernet cable
- Mounting on DIN rail
- Power supply DC 24V (400 mA)

Networking of an FFU network via MODBUS gateway:



TGW-715 gateway

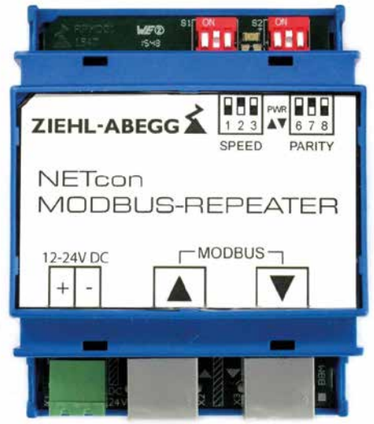
Modbus gateway TGW-715 (Art. No. 380091)

- Gateway between Modbus RTU (to fans) and Modbus TCP/IP (to control)
- Connection for up to 63 Modbus participants
- Supports MODBUS auto-addressing
- Mounting on DIN rail
- Power supply 24VDC

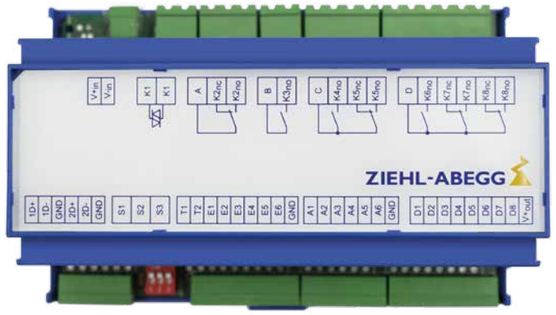
MODBUS repeater NETcon Z-G-1NE

MODBUS repeater NETcon Z-G-1NE (Art. No. 380097)

- Repeater for MODBUS RTU (amplifier with complete galvanic separation)
- Connection up to 63 MODBUS RTU nodes
- Supports MODBUS auto-addressing
- Supply via 24VDC
- Mounting on DIN rail



MODBUS I/O add-on module B-G-028NE



MODBUS I/O add-on module B-G-028NE (Art. No. 380078)

- 6 analogue inputs
- 6 analogue outputs
- 8 digital inputs
- 8 digital outputs (1 triac and 7 relays)
- RS485 interface for MODBUS RTU
- Analogue and digital input and output values can be read out or set via MODBUS RTU
- 24VDC power supply
- Mounting on DIN rail

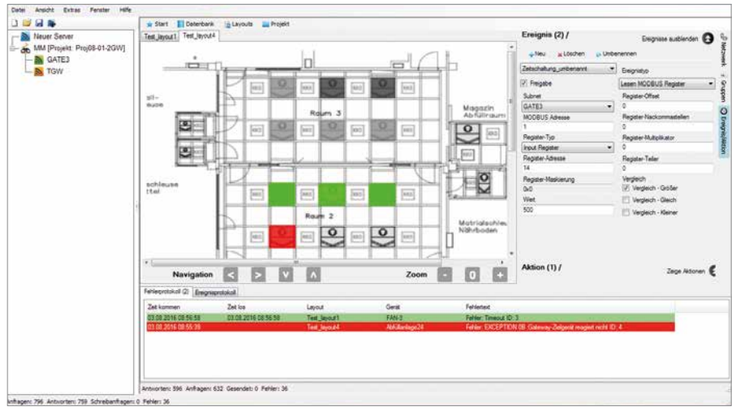
Handheld terminal A-G-247NW

Handheld terminal A-G-247NW (Art. No. 380090)

- Configuration of the ECblue motor via MODBUS RTU (RS485) interface
- Self-explanatory menu structure
- Robust housing, optimal for building site applications
- USB interface converter function on RS485
- Integrated storage of 1GB for data

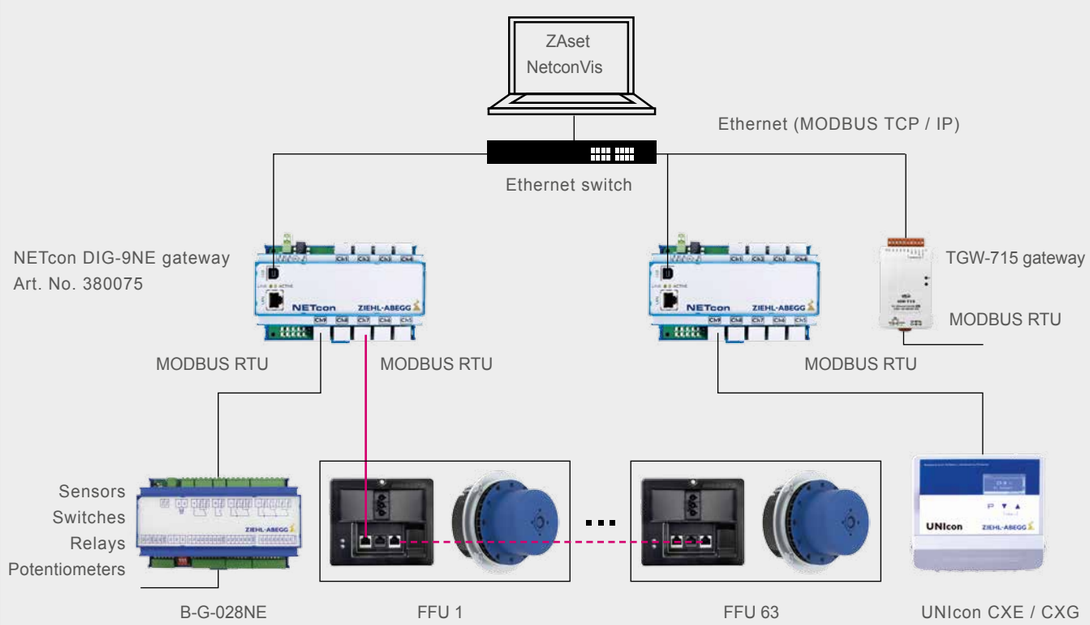
ZAset software

"ZAset" software, client: NetconVis
Our "ZAset" software tool offers the basic functions that you need for your clean room.
(Art.-Nr. 335011 for NetconVis License)



Key features:

- Graphic overview of FFUs spread over several field maps
- Control and configuration for fans directly via NETcon gateway
- Status monitoring via cyclic reading of fans or other MODBUS nodes
- Error alarm (visually, e-mail, error logging)
- Grouping and group control
- Timer
- Compatible with Windows 10



The Royal League

ZIEHL-ABEGG

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