# Condensing boiler technology

Issue 2017-03

ebmpapst

The engineer's choice

GREEN TECH

# Content

# About ebm-papst.

*As technological leader for ventilation and drive engineering, ebm-papst is in demand as an engineering partner in many industries. With over 15,000 different products, we provide the right solution for just about any challenge. Our fans and drives are reliable, quiet and energy-efficient.*


**Six reasons that make us the ideal partner:**

**Our systems expertise.**
You want the best solution for every project. The entire ventilation system must thus be considered as a whole. And that's what we do – with motor technology that sets standards, sophisticated electronics and aerodynamic designs – all from a single source and perfectly matched.

**Our spirit of invention.**
We are also always able to develop customized solutions for you with our versatile team of over 600 engineers and technicians.

**Our lead in technology.**
We are pioneers and leaders in the development of high-efficiency EC technology. Already today almost all our products are also available with GreenTech EC technology. The list of benefits is long: higher efficiency, low maintenance, longer service life, sound reduction, intelligent control characteristics and unrivalled energy efficiency.

**Closeness to our customers.**
ebm-papst has 25 production locations worldwide (including facilities in Germany, China and the USA), together with 49 sales offices, each of which has a dense network of sales representatives. You will always have a local contact, someone who speaks your language and knows your market.

**Our standard of quality.**
Our quality management is uncompromising, at every step in every process. This is underscored by our certification according to international standards including DIN EN ISO 9001 and DIN EN ISO 14001.

**Our sustainable approach.**
Assuming responsibility for the environment, for our employees and for society is an integral part of our corporate philosophy. We develop products with an eye to maximum environmental compatibility, in particular resource-preserving production methods. We promote environmental awareness among our young staff and are actively involved in sports, culture and education. That's what makes us a leading company – and an ideal partner for you.

# Gas condensing technology: That's ebm-papst

*Since creating the world's first gas blower for condensing technology, we have been the market leader for efficient components and complete, perfectly matched systems. To date we are the only company in the world to develop blowers, venturis, valves and burner controls together with our customers and supply everything as a full package. Enjoy the benefits of our well-established and constantly updated technology combined with unique system expertise.*

**More than just combustion.**

Modern gas condensing units are known for their good energy utilization. They have to be supplied with exactly the right amount of gas and air in an ideal ratio for every operating status and under all ambient conditions. Only then is hygienic and efficient combustion guaranteed. Compact dimensions keep the installation space to a minimum and at the same time provide better accessibility.

ebm-papst offers the world's most extensive product range for condensing technology. From just a few kilowatts for use in private households to several megawatts for supplying entire residential areas: We will always find the right solution. Our portfolio contains efficient EC radial blowers, gas valves and perfectly matched system solutions for every application.

**Advantages at a glance.**

– System and development expertise from the market leader
– Unrivaled power and modulation spectrum
– Well-established technology guarantees a long service life
– High power density thanks to compact design
– Outstanding efficiency levels
– Extremely smooth operation with a low noise level
– Pre-matched components for easy adaptation to the respective application
– Future-proof thanks to BUS connection option

# Ideally suited for all applications

## Residential technology

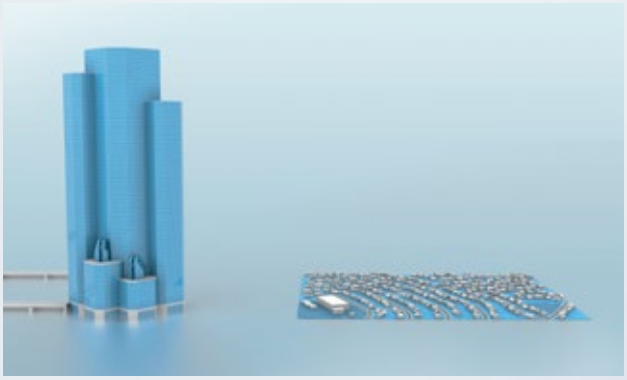
- Gas condensing heating systems for private households
- Use as heating unit only, as combi boiler or in conjunction with regenerative energies

2 kW

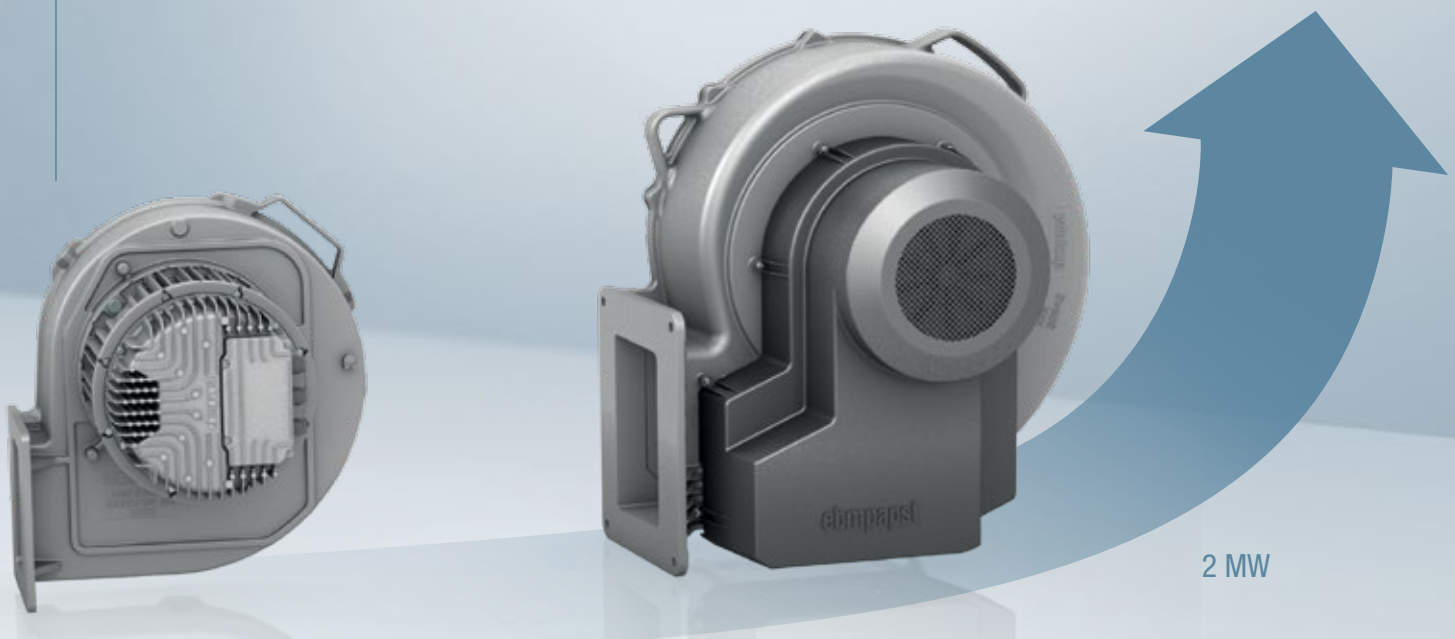
## Commercial technology

- Gas condensing heating systems for applications ranging from small trade businesses to heating installations in large industrial plants
- From single boiler to cascade system installations

## Apartment blocks / residential areas



- The first condensing blower for heat outputs of up to 2MW rounds off our extensive product portfolio
- For decentralized heating solutions keeping construction work and heat loss from long pipes to a minimum compared to large Combined Heat and Power stations



# Laboratory equipment

As market and technology leaders, we are constantly endeavoring to improve our performance and provide our customers with the best possible complete solution. Our engineers and technicians assist our customers with the development of their applications right from the start and help with the further process of improvement. Before series launch we conduct extensive tests to ensure compliance with legal requirements and customer specifications. We have a wide range of measuring equipment at our disposal for this purpose.

For example our checks include examining design influences such as modifications to the gas-air mixing device, the backflow flaps or the venturi. All these factors can affect the efficiency, noise level and functionality of a condensing heating system. We take measurements on gas-air composite systems directly in the heating unit and ensure ideal matching of the individual components and motor performances. This is accompanied by numerical flow simulation with direct incorporation of the results obtained.

**Gas laboratory:**
- Highly advanced measuring equipment with all the standard test and limit gases used in Europe, America and Asia
- Exhaust gas measurements ($CO_2$, CO, air ratio), measurements with variable aerodynamic parameters (venturi pressure, mass flow, exhaust gas back pressure) to increase and optimize the modulation range
- Measurement of thermal and electrical performance data
- Simulation of wind and turbulence in the exhaust gas area, e. g. for electronic gas-air composite systems
- Communication with all standard bus systems, e. g. CANbus, Modbus, ebus, OpenTherm

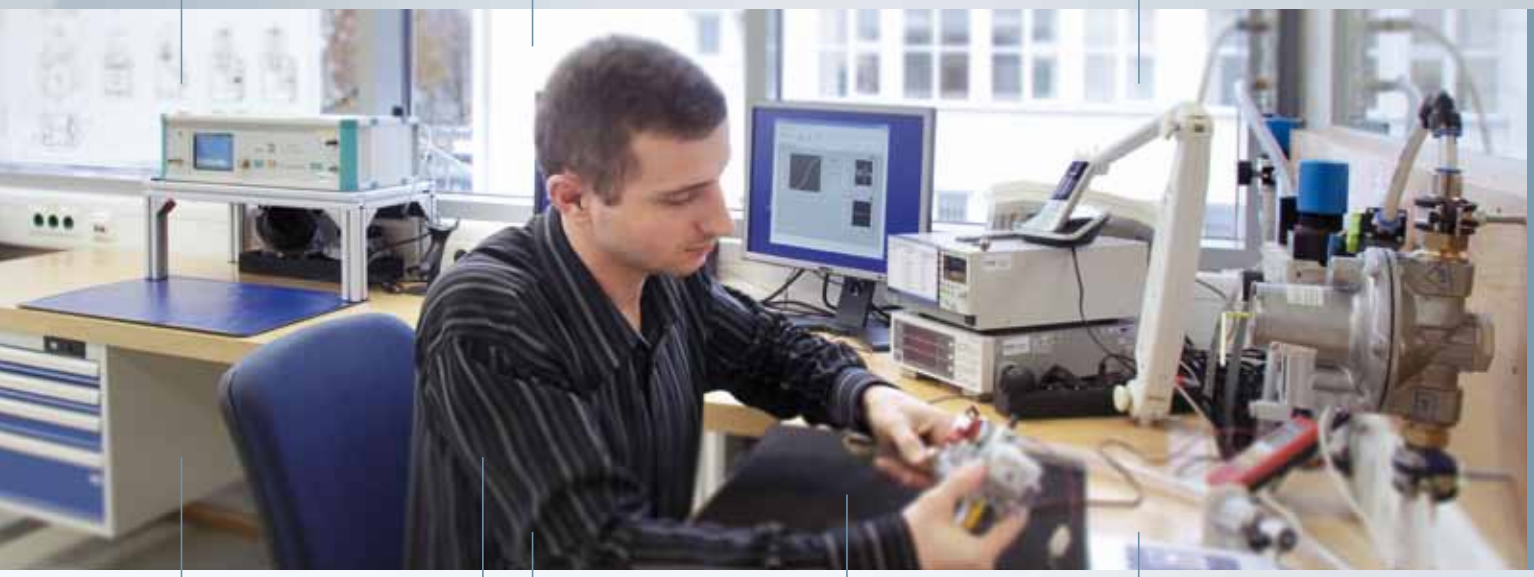
**Climate chambers:**
- Environmental simulation and service life tests with more than 30 climatic, cold and warm chambers
- Simulation of temperature range from 70°C to 300°C possible

**Air performance test stands:**
- Checking of the operating characteristics of blowers and systems with recording of the air performance curves

**Endurance test rooms:**
– About 150 different endurance tests with over 700 specimens in progress

**Sound measurement laboratory:**
– Precise sound power and gas measurement technology with incorporation of real conditions

**Vibration test:**
– For simulation of transportation and operation with different vibration profiles



**EMC measurement room:**
– Emission and immission measurements

**Approvals:**
– AGA, CCC, CSA, DVGW, EAC, KIWA, TÜV, UL, VDE

**Standards and Directives:**
– Low-Voltage Directive
– Machinery Directive
– Gas Appliance Directive
– EMC Directive

**Additional equipment:**
– 3D microscope
– 3D plotter

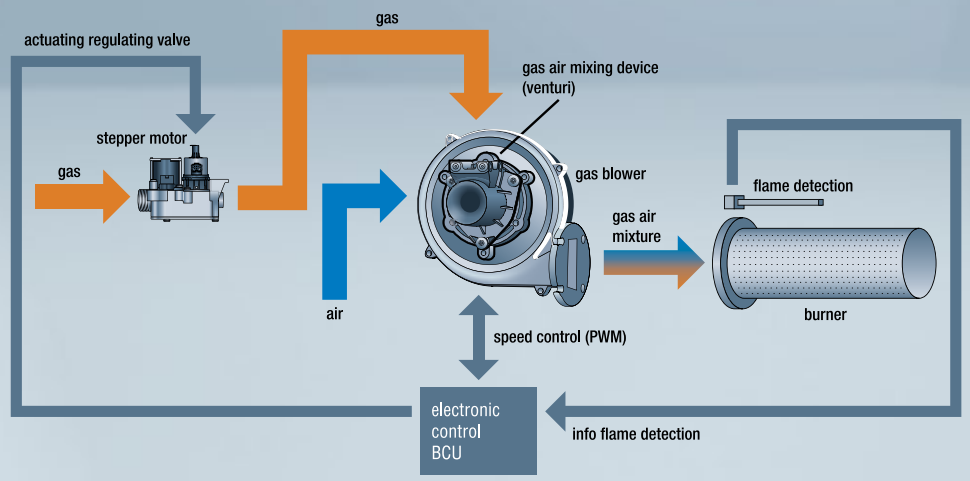
**Gas valve test stands:**
– For gas valves with pneumatic and electronic modulation

# Systems for condensing boiler technology

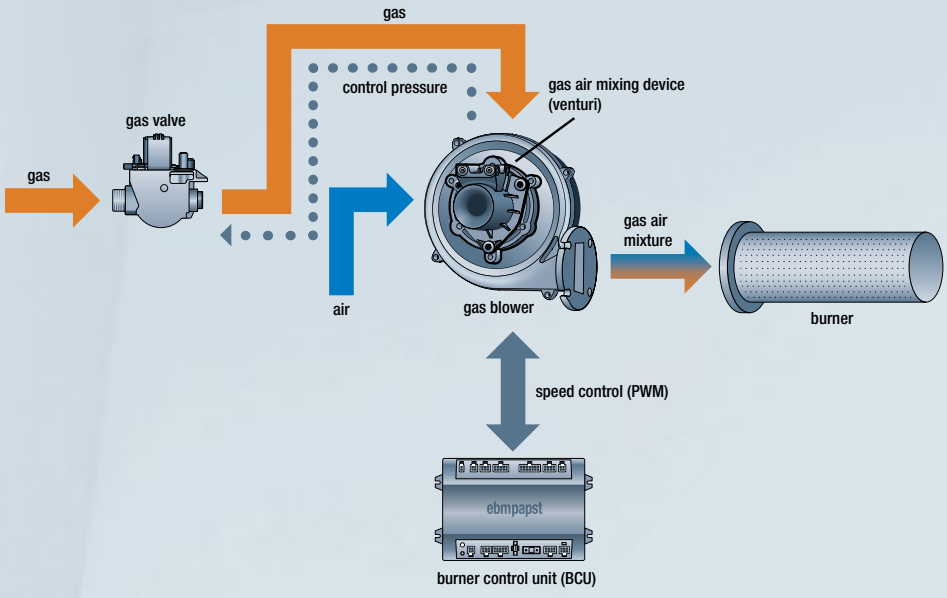
An optimum gas-air mixing ratio is crucial to the energy yield realized during combustion. The mixing ratio needs to be exactly adjusted to the heating value of the gases being used (e.g. natural gas, LPG or biogas). An additional challenge is the flexibility of heat output. The greater the modulation range of a heating system, the better its heating output can be adjusted to actual needs. The limits of the modulation level are determined among others by the minimum and maximum output of the premixing blower. This means its components need to be perfectly matched. That's why we offer complete heating systems including gas blowers, venturis, gas valves and burner control units from a single source.

**Ideally suited for pneumatic and electronic gas air ratio control systems**

Electronic gas air ratio control system




Pneumatic gas air ratio control system



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**Gas blower**
State-of-the-art blower technology for modulating operation with low noise and a long service life.

**Venturi**
The pressure generated by the venturi effect provides an optimum mixture of gas and air in the pneumatic gas-air ratio control.

**Gas valve**
The device required for the secure supply and the correct quantity of gas has a particularly compact design.

**Burner control with display**
The electronic control is matched precisely to the system. Signals from the burner controls can be read out and evaluated in the lab using LabVision software.

# Systems at a glance

**Our system solutions at a glance.**

All heating technology components must be perfectly harmonized in order to achieve optimum performance and efficiency. This is why we offer complete heating systems, including gas blower, venturi and gas valve, from a single source.

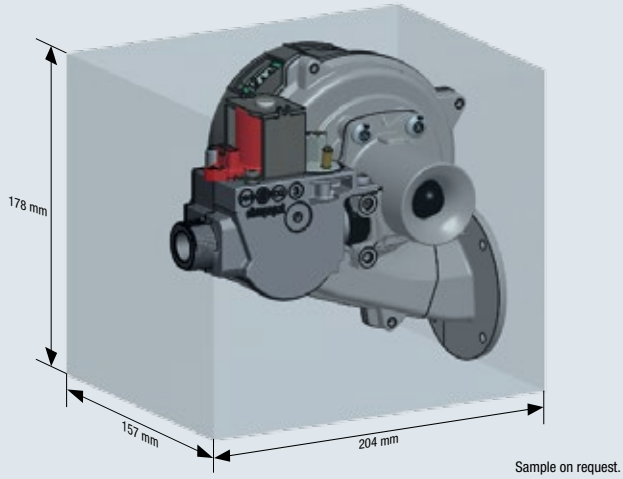
A key benefit of our gas-air composite systems is their optimal mixing ratio with simultaneously high modulation ranges. To achieve this high level of efficiency, we provide different venturi elements for multi-venturis, depending on the heat output range. Our multi-venturi solutions provide you with a wide variety of motor performances and options for assigning our systems to your devices. This gives you the benefit of flexible integration into compact spaces.

We supply our systems as completely tested, harmonized units with optimized interfaces to minimize your effort.

**Mounting positions:**

– With horizontal shaft or vertical shaft with motor positioned at top

Illustration examples




Sample on request.

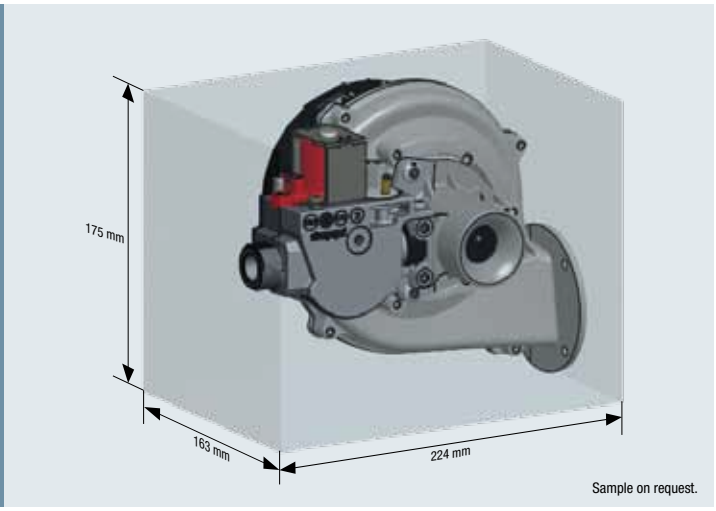
**NRV 77 The system for heat outputs from 2 to 35 kW**

– Gas blower NRG 77 with multi-venturi
– Gas valve GB-ND 055 E01
– Operating voltage 230 V, option of 120 V
– 24 V gas valve on request

**Nominal data**

| Type | Heating range [kW] * | Part number |
|---|---|---|
| Venturi 1 | 2 – 15 | 55734.33000 |
| Venturi 2 | 5 – 28 | 55734.33010 |
| Venturi 3 | 7 – 35 | 55734.33020 |

* Approximate figures. Heat output range depending on type of gas concerned and system conditions.



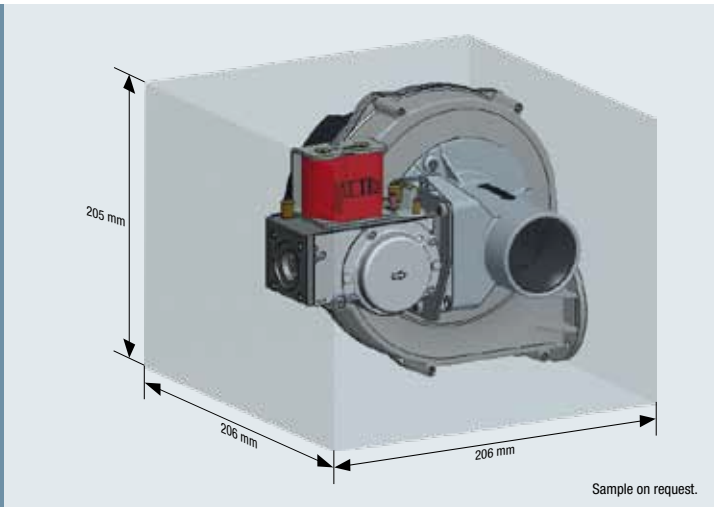
Sample on request.

**NRV 118 The system for heat outputs from 3 to 42 kW**

– Gas blower NRG 118 with multi-venturi
– Gas valve GB-ND 055 E01
– Operating voltage 230 V, option of 120 V
– 24 V gas valve on request

**Nominal data**

| Type | Heating range [kW] * | Part number |
|---|---|---|
| Venturi 1 | 3 – 23 | 55734.32010 |
| Venturi 2 | 5 – 28 | 55734.32020 |
| Venturi 3 | 7 – 42 | 55734.32030 |



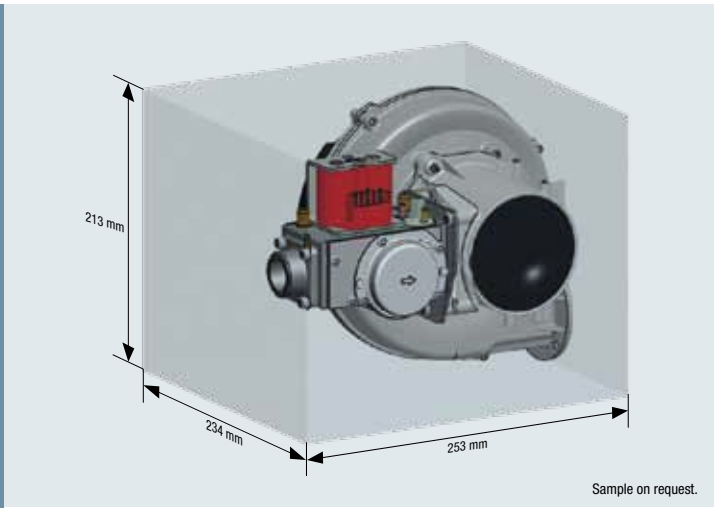
Sample on request.

**NRV 148 The system for heat outputs from 13 to 115 kW**

– Gas blower RG 148 with multi-venturi
– Gas valve GB-ND 055 D01 (Venturi 1); GB-ND 057 D01 (Venturi 2)
– Operating voltage 230 V, option of 120 V
– 24 V gas valve on request

**Nominal data**

| Type | Heating range [kW] * | Part number |
|---|---|---|
| Venturi 1 | 13 – 80 | 55714.50000 |
| Venturi 2 | 20 – 115 | 55724.50000 |



Sample on request.

**NRV 137 The system for heat outputs from 15 to 145 kW**

– Gas blower NRG 137 with multi-venturi
– Gas valve GB-ND 057 D01
– Operating voltage 230 V, option of 120 V
– 24 V gas valve on request

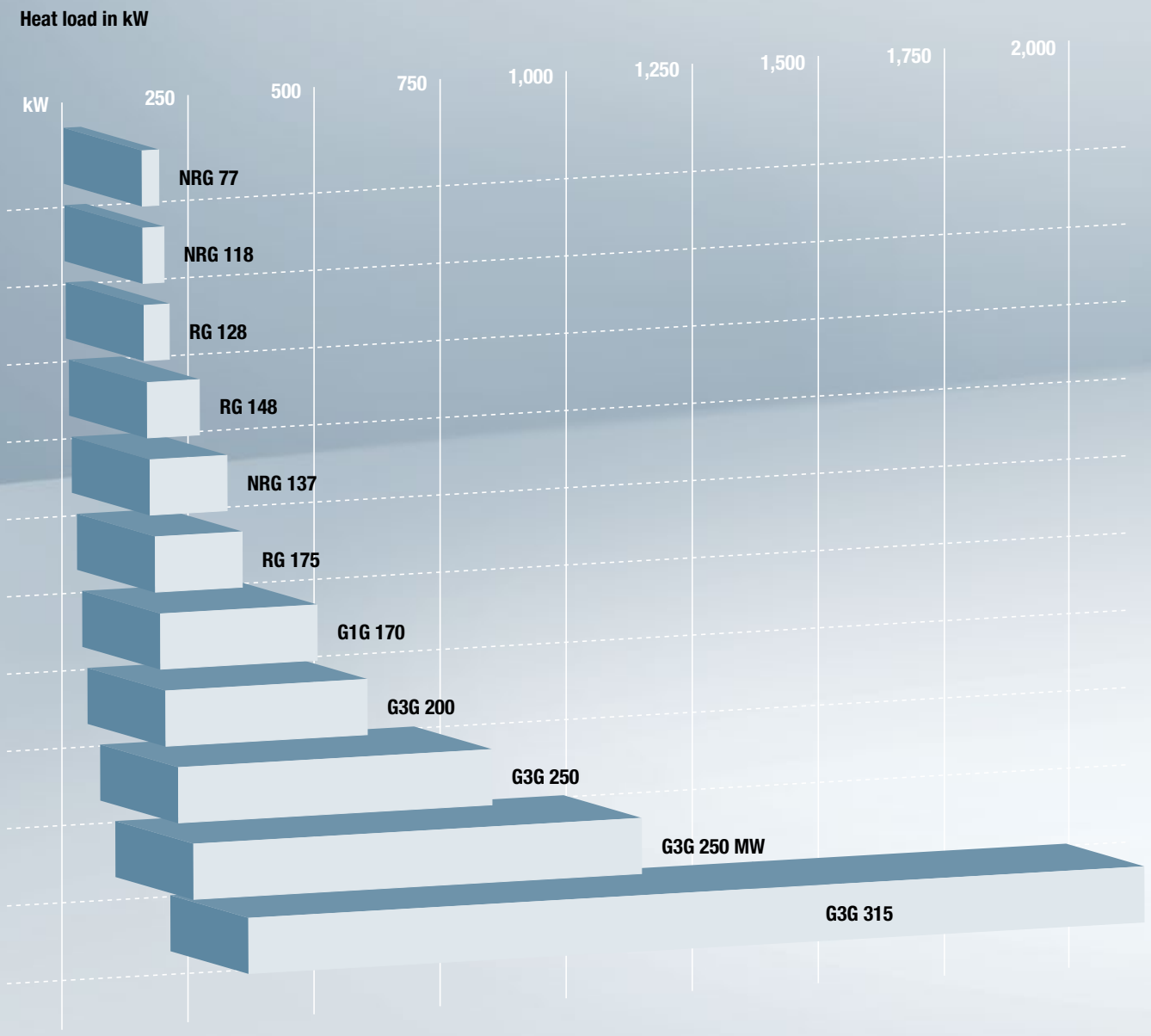
**Nominal data**

| Type | Heating range [kW] * | Part number |
|---|---|---|
| Venturi 1 | 15 – 90 | 55724.10000 |
| Venturi 2 | 24 – 145 | 55724.10020 |

* Approximate figures. Heat output range depending on type of gas concerned and system conditions.

# Radial blowers

Modern gas-fired modulated condensing units have to be supplied with the optimum volume and mixture of air and fuel in all operating modes and ambient conditions. They require adjustable blowers with steep pressure/air flow characteristic curves and high maximum pressures. ebm-papst played a significant role in developing EC blowers for this purpose and now offers the widest range of solutions for this application area. However, the special properties of these blowers make them suitable for many other applications as well. Examples include gas-powered cooking appliances for the food service industry or gas-powered deep fryers for commercial use.




Heat output range depending on type of gas concerned and system conditions.

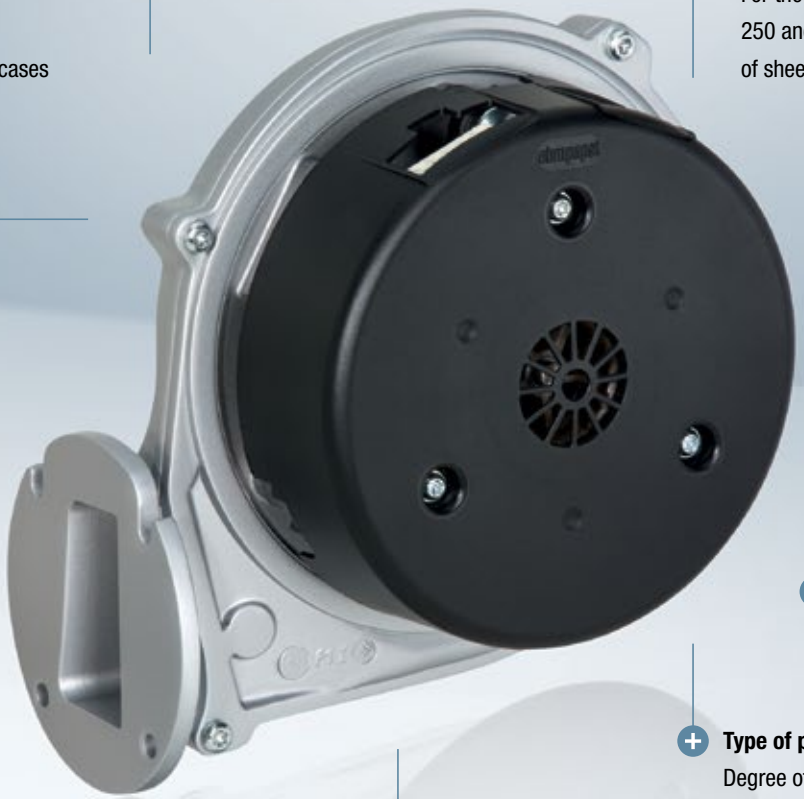
**Drive**
– Brushless DC (EC) motors with integrated electronics
– Vibration-free mounting to minimize structure-borne sound
– Adjustment of motor power on an individual basis

**Commutation electronics**
– Integrated into the blower unit and perfectly harmonized with the motor
– Integrated blockage switch-off and overheating protection as per EN 60335
– Various standard interfaces available for the respective burner control
– Optimized in accordance with EMC emissions and pollution

**Housing**
– Made of die-cast aluminum
– Required density thanks to special seal for housing halves and drive shaft conduit
– Outlet flange adjustable to many designs

**Impellers**
– For type NRG and RG blowers made of pentane-resistant plastic: dynamically fine balanced
– For the G1G 170, G3G 200, G3G 250 and G3G 315 models made of sheet aluminum

**Speed controls**
– Adjustment required in individual cases
– Controlled via PWM signal
– 0–10 V input optional
– CANbus communication optional



**Bearings**
– Maintenance-free ball bearings covered on both sides for long service life and smooth operation
– Use of lubricants suited for the particular application

**Protection class**
Protection class I

**Type of protection**
Degree of protection IP20 with cover, depending on the mounting position

**Mounting positions**
– With horizontal shaft or vertical shaft with motor positioned at top
– For vibration-cushioned motor installation, the motor's weight is additionally supported by a flexible element.

**Speed output**
– With Hall IC signal output; in case of motors for line voltage operation, speed signal output is galvanically isolated
– NRG and RG blowers, each with two pulses per revolution
– G1G and G3G blowers, each with three pulses per revolution
– G3G 250 MW blower with four pulses per revolution
– G3G 315 blower with five pulses per revolution

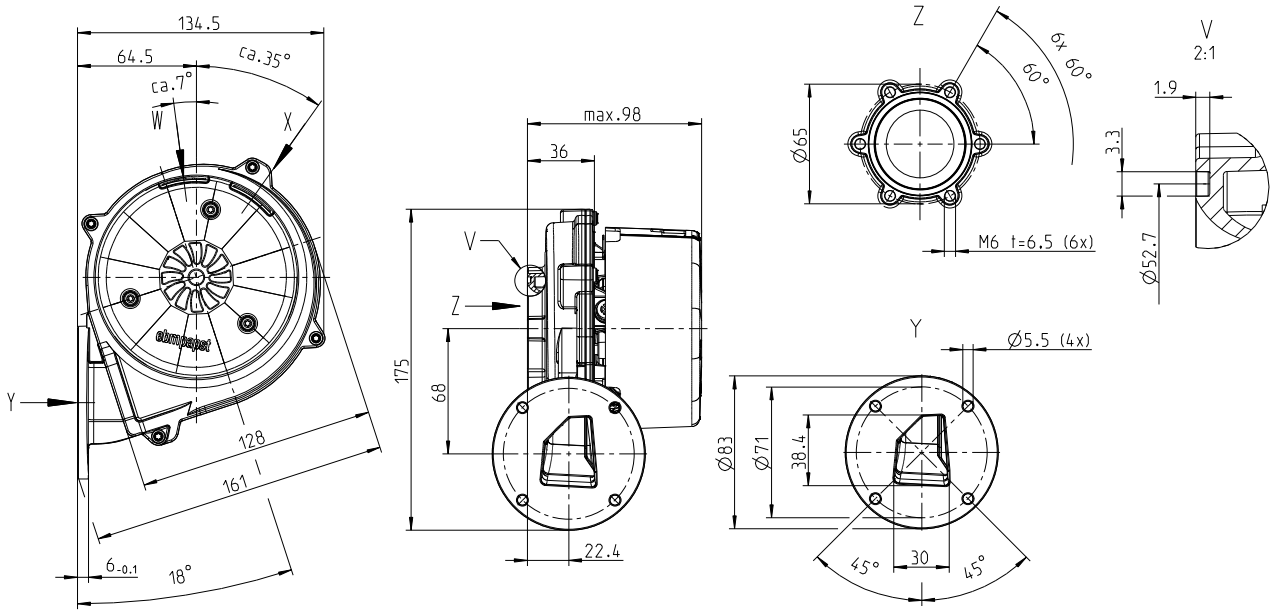
# NRG 77

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Multi-venturi available**
– **Mains connector X, interface connector W and interface see page 27 ff.**

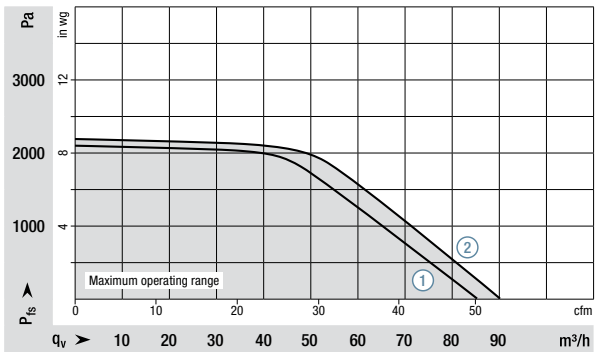
| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **NRG 77** | ① | 230 | 50/60 | 87 | 51 | 2,100 | 8.4 | 62 | 14,000 | 60 | 80 | 55667.70030 |
| | ② | 120 | 60 | 90 | 53 | 2,200 | 8.8 | 72 | 14,000 | 60 | 80 | on request |

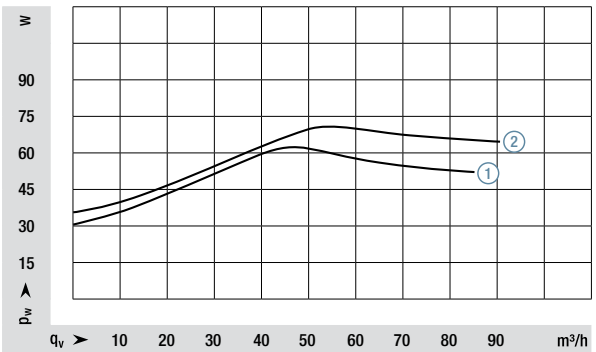
Subject to change.

Dimensions in mm. Drawing valid for part number 55667.70030.




## Curves



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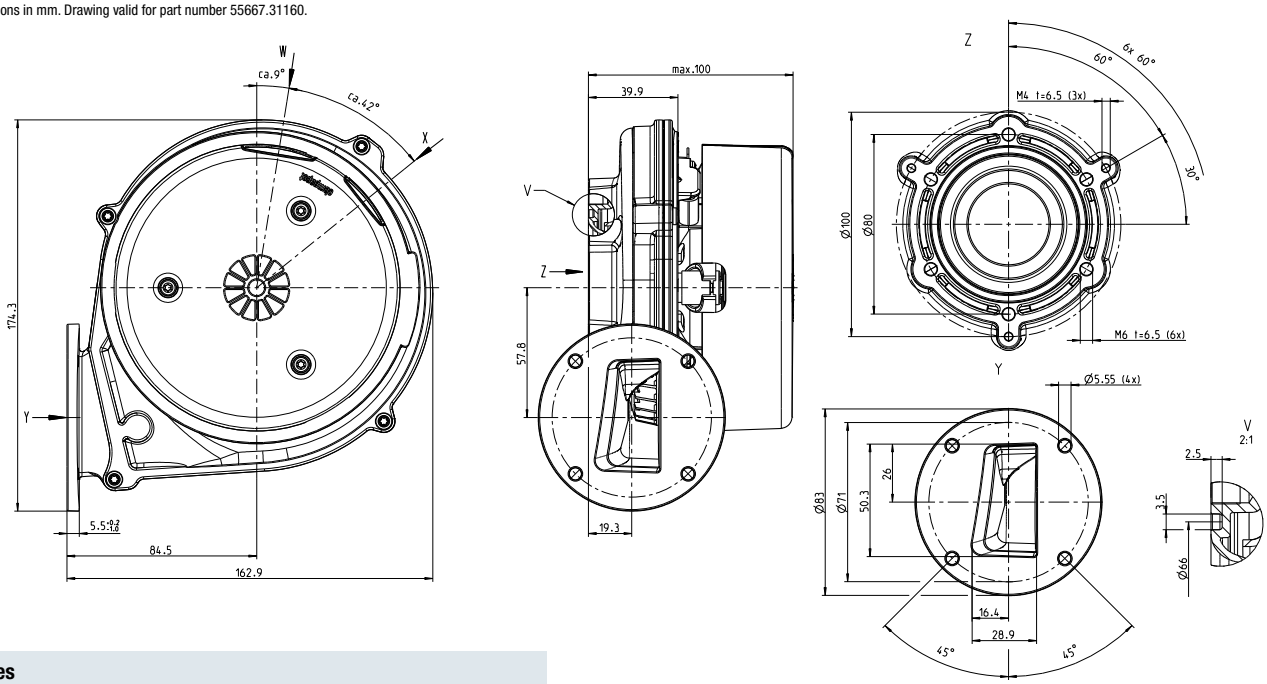
# NRG 118

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Multi-venturi available**
– **Mains connector X, interface connector W and interface see page 27 ff.**

| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **NRG 118** | ① | 230 | 50/60 | 98 | 58 | 3,000 | 12 | 72 | 9,000 | 60 | 80 | 55667.31160 |
| | ② | 120 | 60 | 97 | 57 | 2,800 | 11.2 | 70 | 9,000 | 60 | 80 | 55667.30030 |

Subject to change. More powerful motor optional.

Dimensions in mm. Drawing valid for part number 55667.31160.

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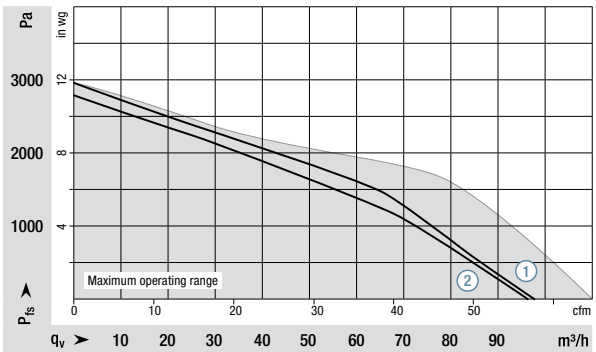
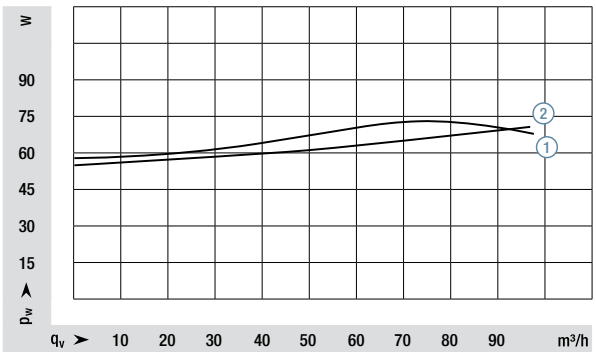


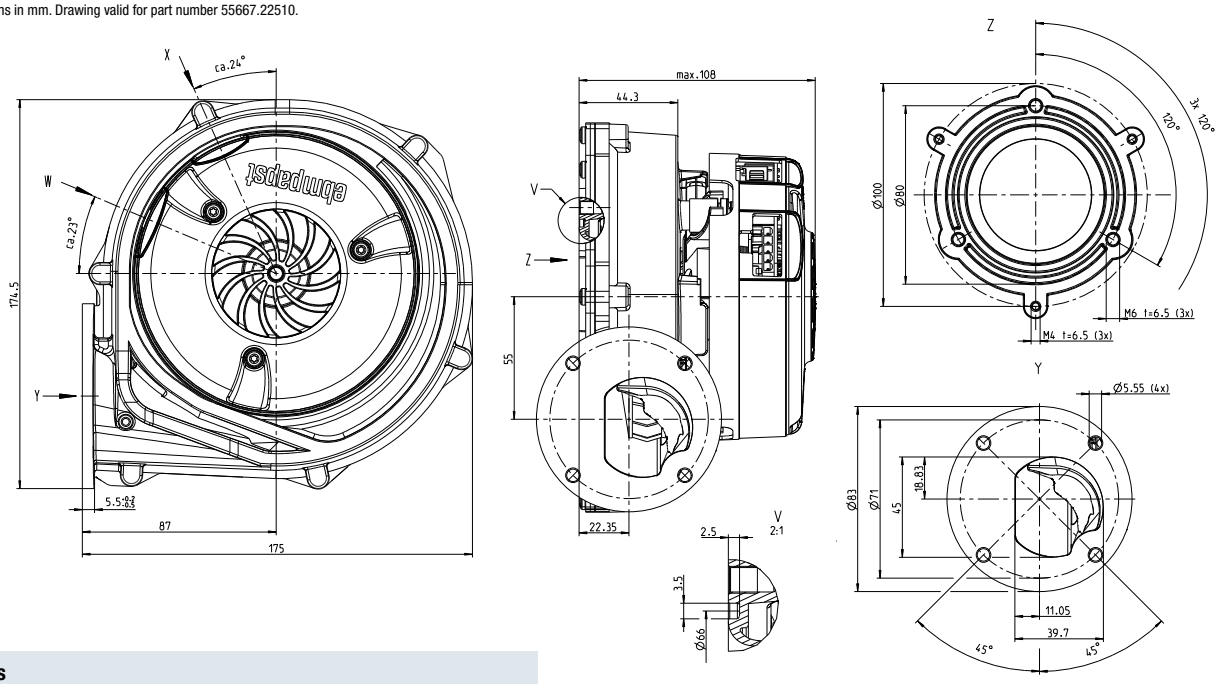
# RG 128

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Mains connector X, interface connector W and interface see page 27 ff.**

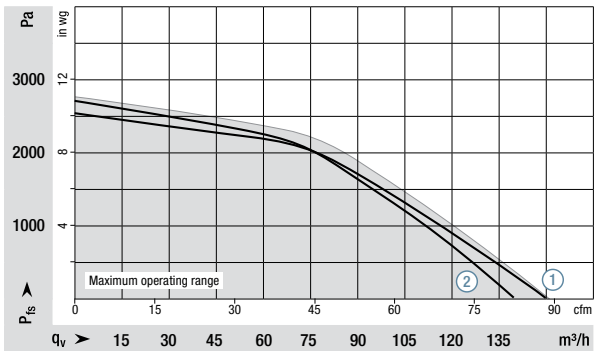
| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **RG 128** | ① | 230 | 50/60 | 150 | 88 | 2,550 | 10.2 | 120 | 7,500 | 60 | 80 | 55667.22510 |
| | ② | 120 | 60 | 145 | 85 | 2,700 | 10.8 | 115 | 7,500 | 60 | 80 | 55667.11840 |

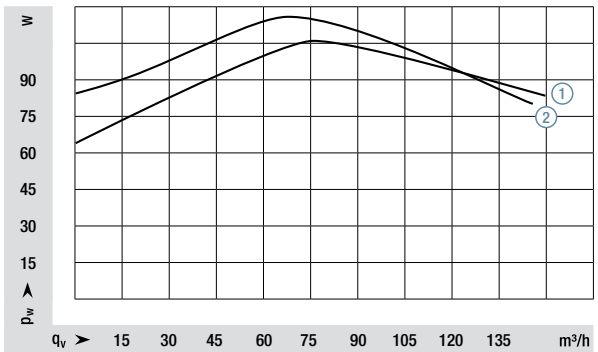
Subject to change.

Dimensions in mm. Drawing valid for part number 55667.22510.




## Curves



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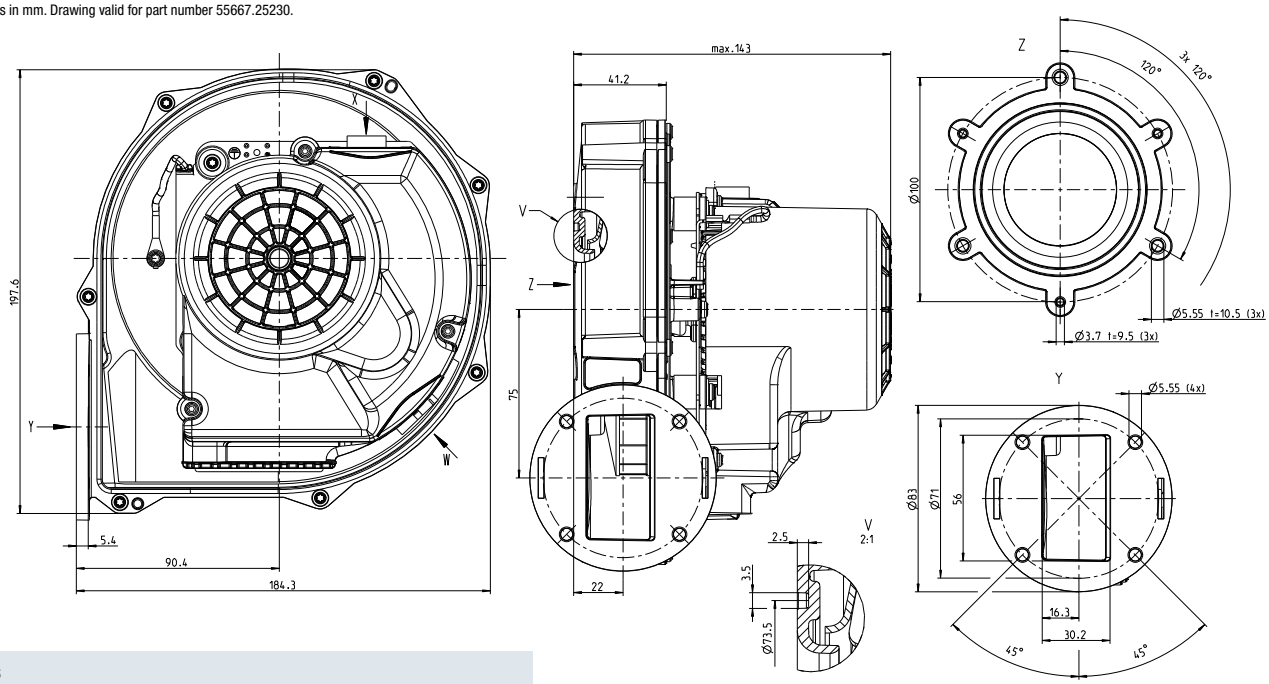
# RG 148

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Mains connector X, interface connector W and interface see page 27 ff.**

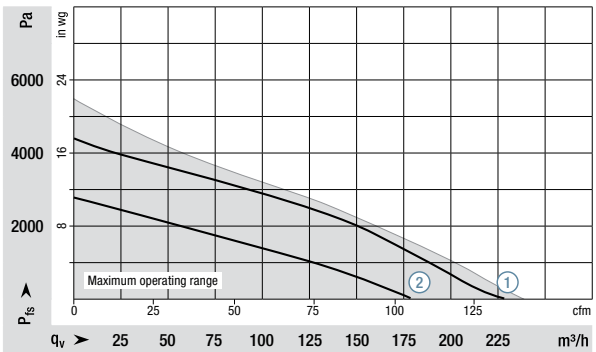
| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **RG 148** | ① | 230 | 50/60 | 230 | 135 | 4,400 | 17.6 | 200 | 8,500 | 60 | 80 | 55667.25230 |
| | ② | 120 | 60 | 180 | 106 | 2,800 | 11.2 | 130 | 8,500 | 60 | 8 | on request |

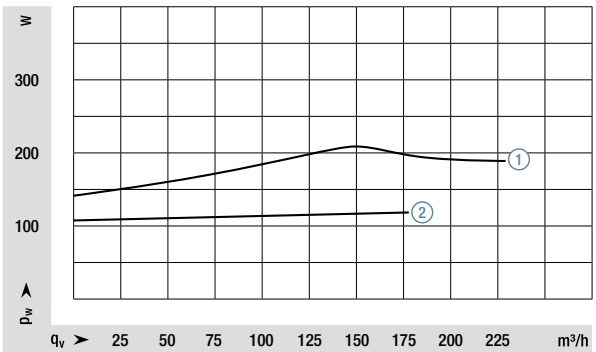
Subject to change.

Dimensions in mm. Drawing valid for part number 55667.25230.




## Curves



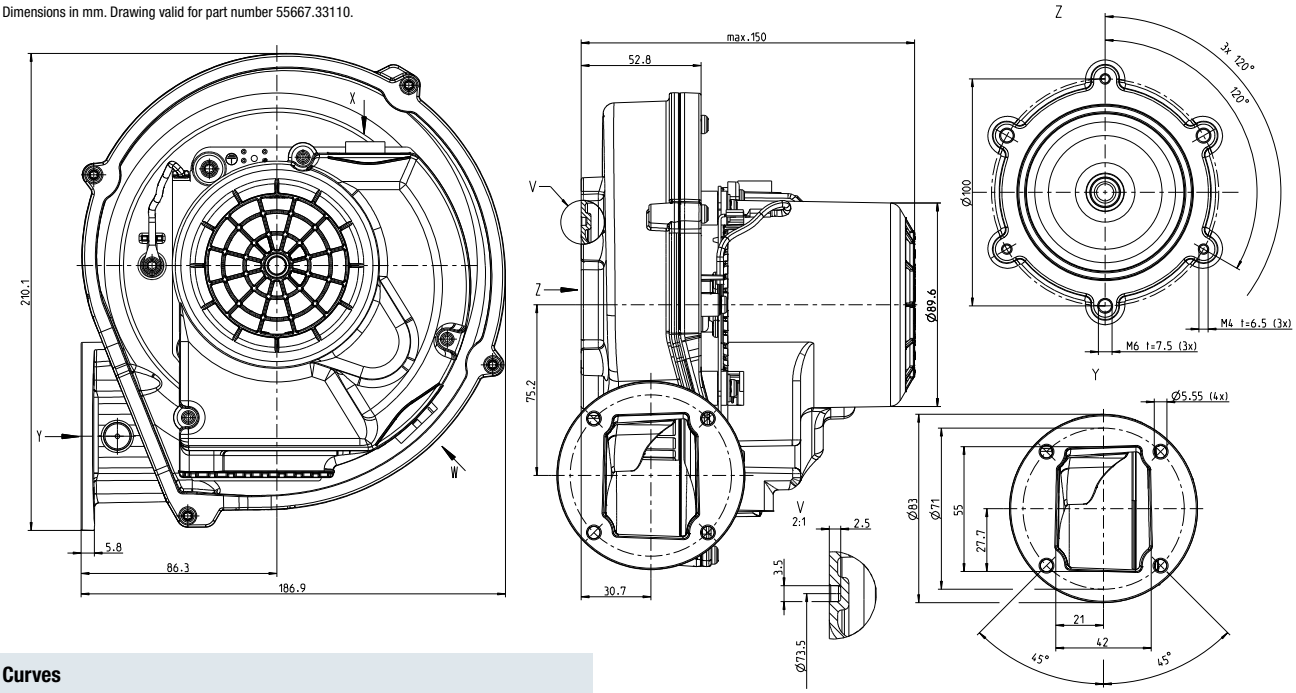
# NRG 137

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Multi-venturi available**
– **Mains connector X, interface connector W and interface see page 27 ff.**

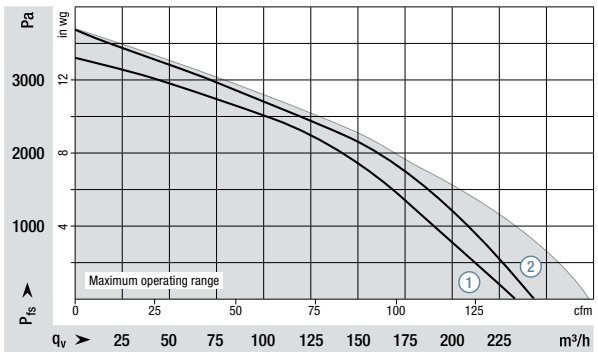
| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **NRG 137** | ① | 230 | 50/60 | 235 | 138 | 3,500 | 14 | 190 | 8,500 | 60 | 80 | 55667.33110 |
| | ② | 120 | 60 | 250 | 147 | 3,800 | 15.2 | 250 | 8,500 | 60 | 80 | 55667.33040 |

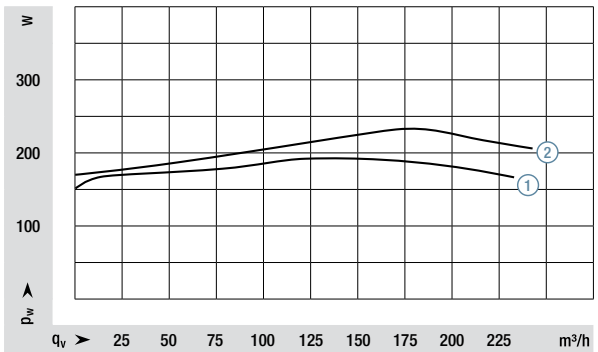
Subject to change.

Dimensions in mm. Drawing valid for part number 55667.33110.




## Curves






ebmpapst

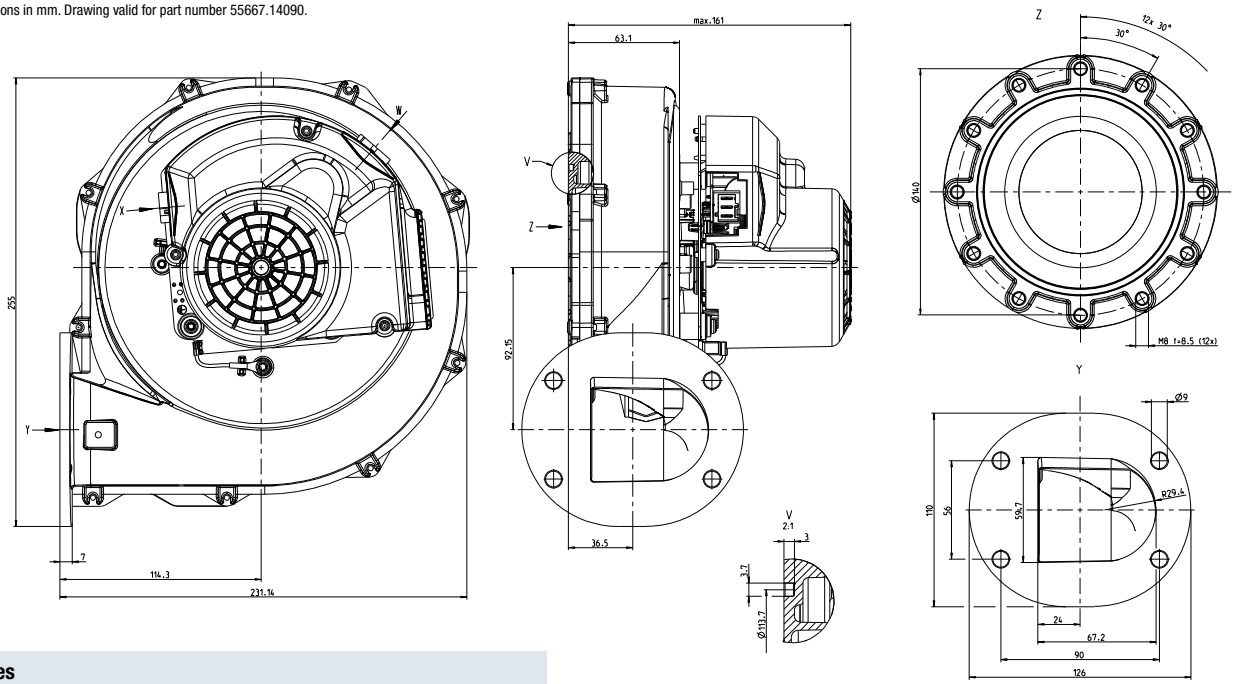
# RG 175

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Mains connector X, interface connector W and interface see page 27 ff.**

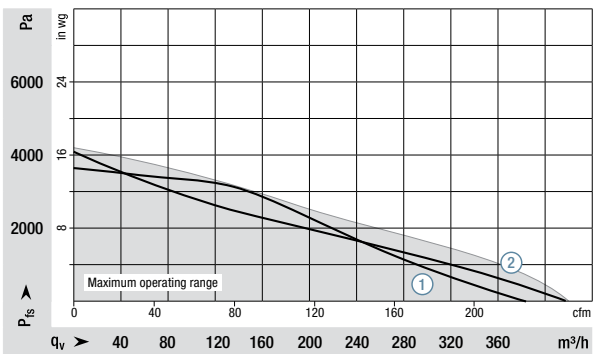
| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **RG 175** | ① | 230 | 50/60 | 390 | 230 | 3,700 | 14.8 | 300 | 8,500 | 60 | 80 | 55667.14090 |
| | ② | 120 | 60 | 420 | 247 | 4,100 | 16.4 | 300 | 8,500 | 60 | 80 | 55667.14002 |

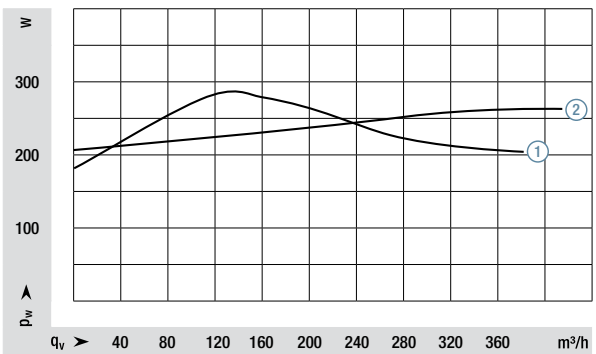
Subject to change.

Dimensions in mm. Drawing valid for part number 55667.14090.




## Curves



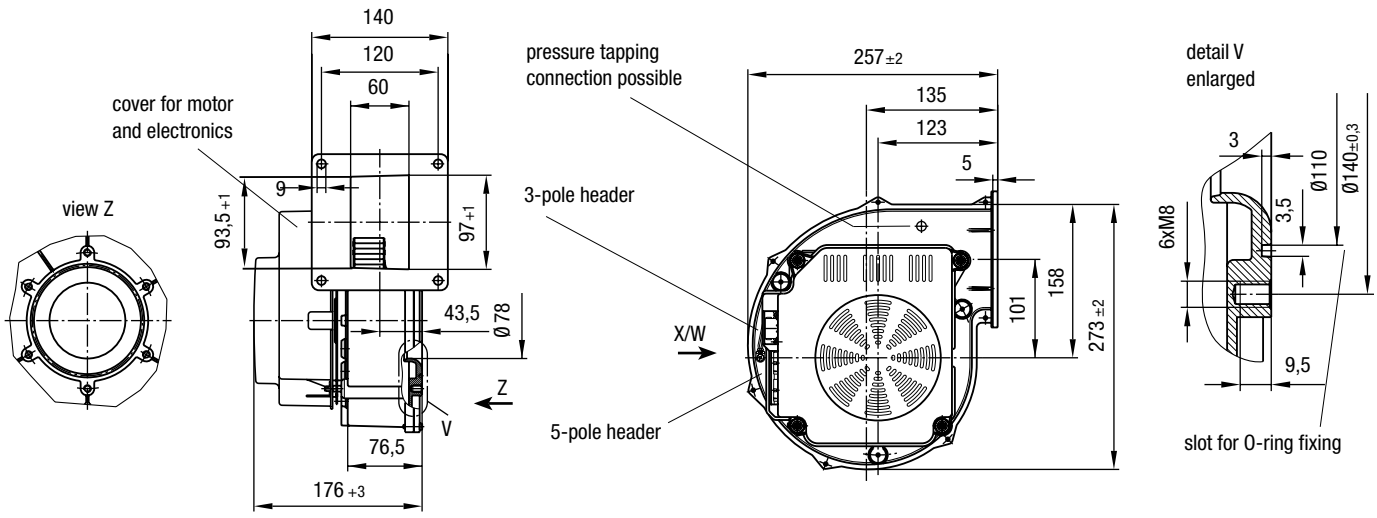
# G1G 170

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Mains connector X, interface connector W and interface see page 27 ff.**

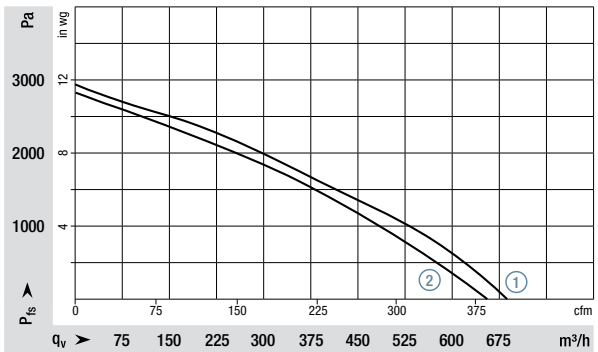
| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **G1G 170** -AB53-01 | ① | 230 | 50/60 | 645 | 380 | 3,000 | 12 | 360 | 7,200 | 55 | 80 | 55600.01270 |
| **G1G 170** -AB05-20 | ② | 115 | 50/60 | 645 | 380 | 3,000 | 12 | 345 | 7,100 | 55 | 80 | 55600.01010 |
| **G1G 170** -AB53-80[1] | ① | 230 | 50/60 | 645 | 380 | 3,000 | 12 | 360 | 7,200 | 55 | 80 | 55600.01350 |
| **G1G 170** -AB05-81[1] | ② | 115 | 50/60 | 645 | 380 | 3,000 | 12 | 345 | 7,100 | 55 | 80 | 55600.01040 |

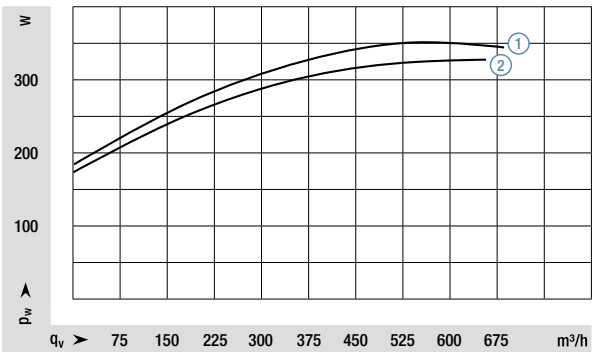
Subject to change. Technical data valid at free air flow. 1) With linear input (0–10 VDC).

Dimensions in mm. Drawing valid for part number 55600.01270.




## Curves






ebmpapst

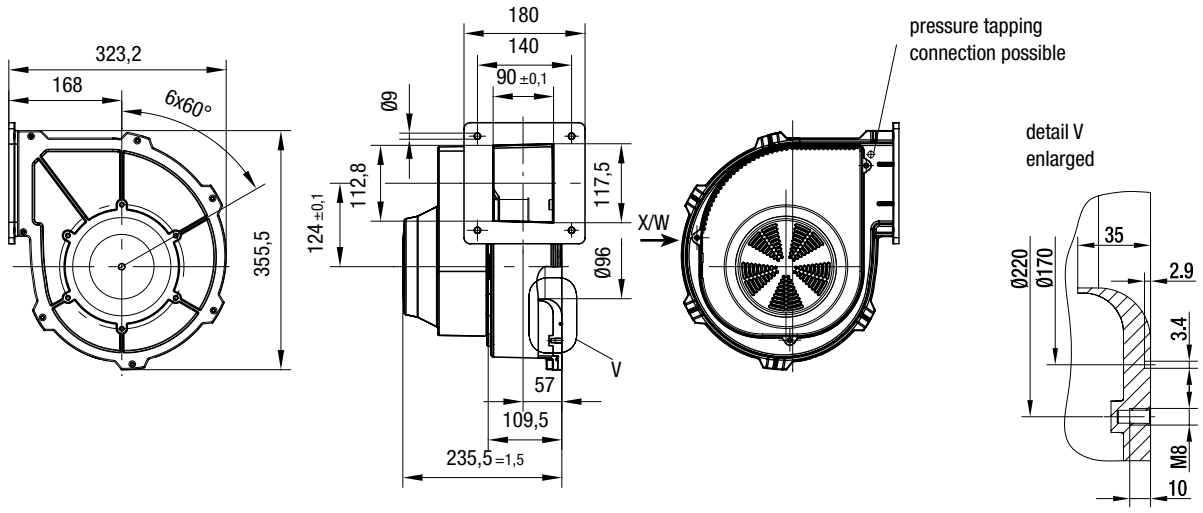
# G3G 200

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Mains connector X, interface connector W and interface see page 27 ff.**

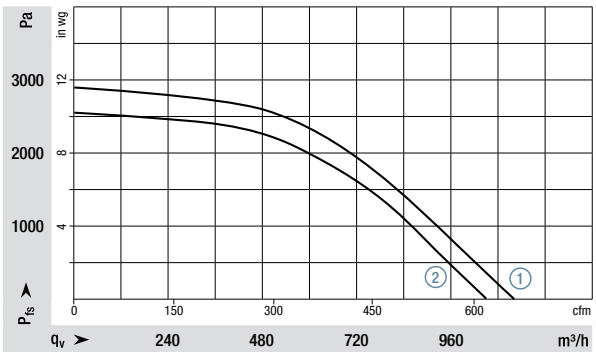
| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **G3G 200** -GN20-01 | ① | 230 | 50/60 | 1,150 | 677 | 2,900 | 11.6 | 890 | 6,100 | 60 | 60 | 55600.03030 |
| **G3G 200** -GN26-01 | ② | 115 | 50/60 | 1,050 | 618 | 2,700 | 10.8 | 800 | 5,700 | 60 | 60 | 55600.03051 |

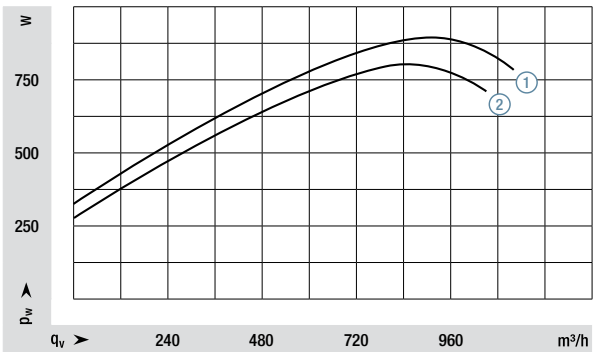
Subject to change.

Dimensions in mm. Drawing valid for part number 55600.03030.




## Curves



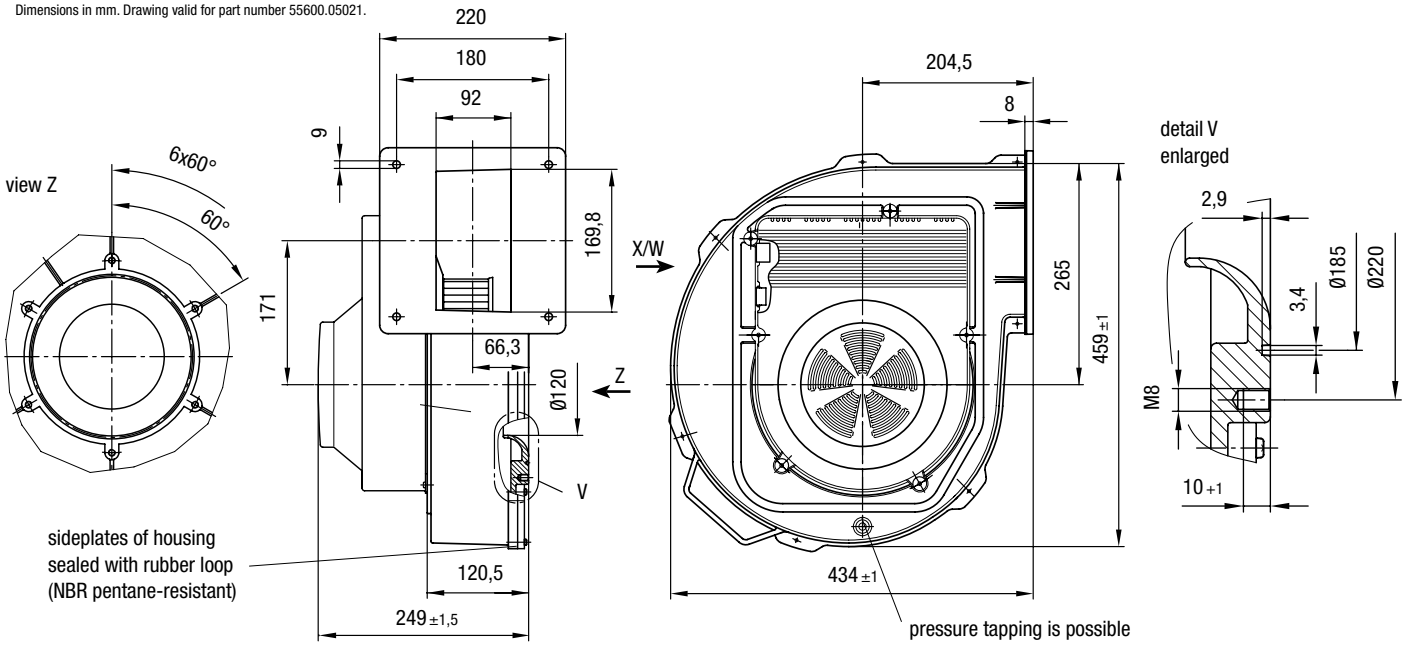
# G3G 250

– **Material:** Housing: Aluminum
Impeller: Plastic
Motor protection cap: Plastic
– **For potential mounting positions, page 15**
– **Mains connector X, interface connector W and interface see page 27 ff.**

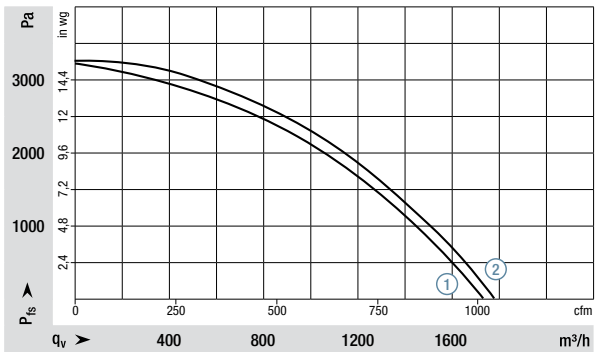
| Nominal data | Curve | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **G3G 250** -GN17-01 | ① | 230 | 50/60 | 1,735 | 1,022 | 3,300 | 13.2 | 1,150 | 5,200 | 60 | 60 | 55600.05021 |
| **G3G 250** -GN39-01 | ② | 115 | 50/60 | 1,780 | 1,048 | 3,400 | 13.6 | 1,200 | 5,200 | 60 | 60 | 55600.05051 |

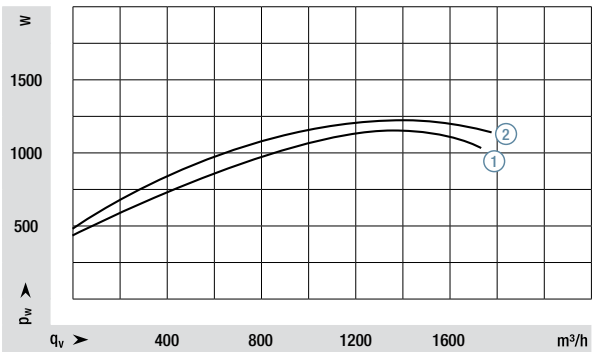
Subject to change.

Dimensions in mm. Drawing valid for part number 55600.05021.




## Curves






ebmpapst

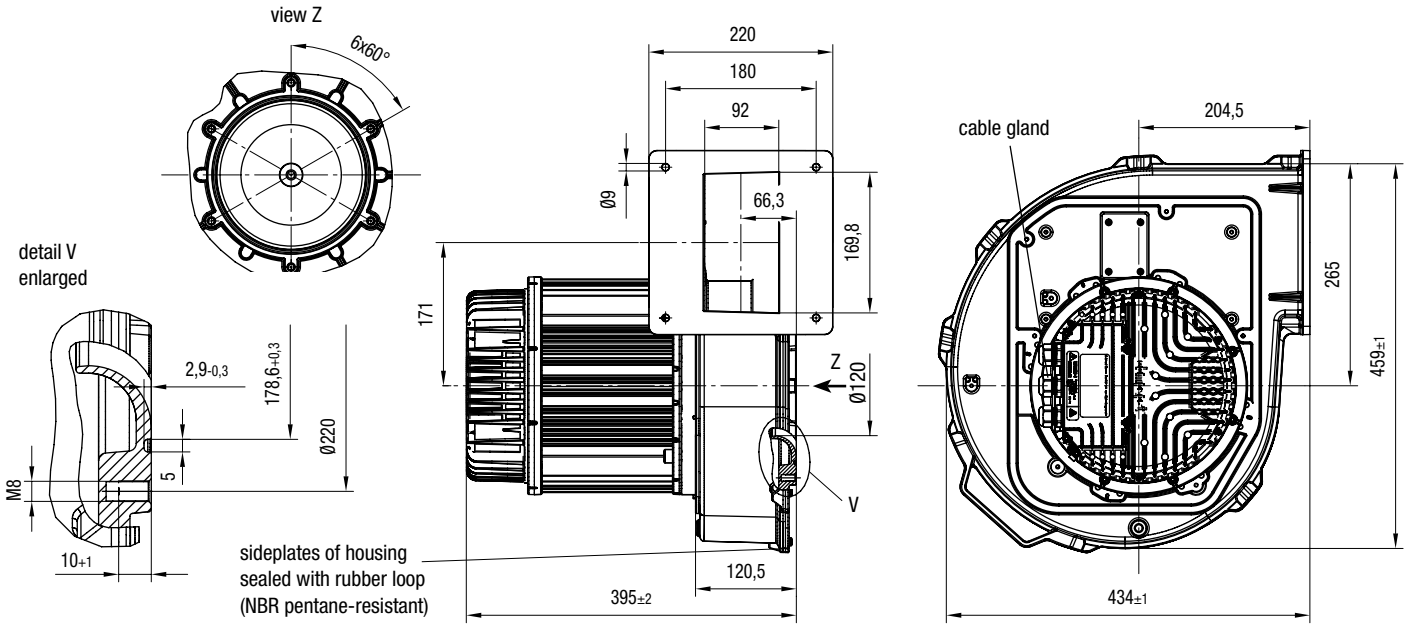
# G3G 250 MW

– **Material:** Housing: Die-cast aluminum
Impeller: Sheet aluminum
Rotor: Coated in black
Electronics enclosure: Die-cast aluminum
– **For mains connector see operating instructions**

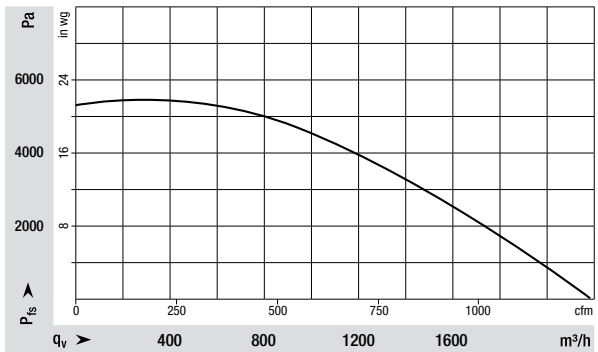
| Nominal data | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **G3G 250 -MW**50-01 | 380-480 | 50/60 | 2,200 | 1,296 | 5,400 | 21.6 | 2,500 | 6,400 | 50 | 50 | G3G 250 -MW50-01 |

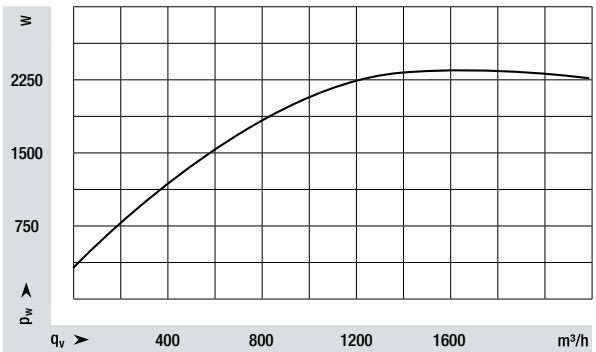
Subject to change.

Dimensions in mm.




## Curves



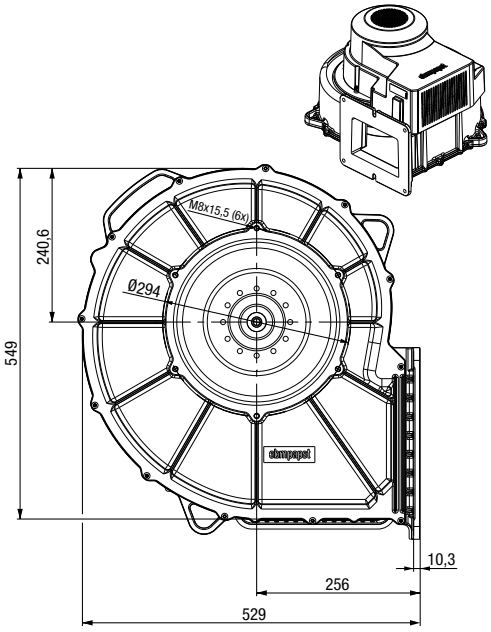
# G3G 315

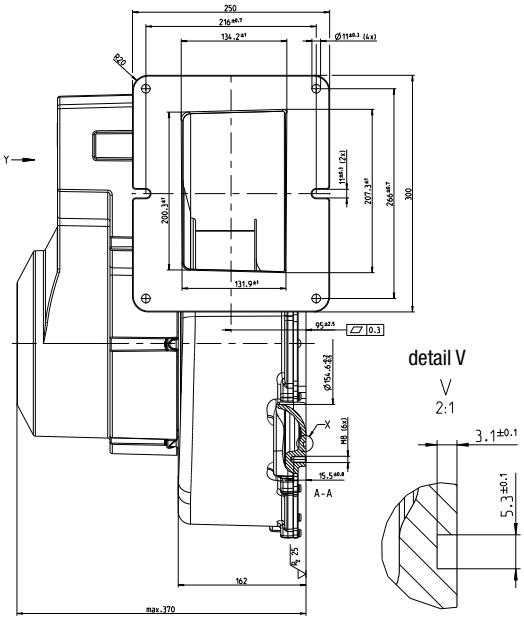
– **Material:** Housing: Die-cast aluminum
Impeller: Sheet aluminum
Rotor: Coated in black
– **For mains connector see operating instructions**

| Nominal data | Rated voltage | Frequency | Max. air flow | Max. air flow | Max. pressure increase | Max. pressure increase | Max. input power | Max. speed | Perm. amb. motor temp. | Perm. temp. of medium | Part number |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Typ** | **V** | **Hz** | **m³/h** | **cfm** | **Pa** | **wg** | **W** | **min⁻¹** | **°C** | **°C** | |
| **G3G 315–M3G 150FF** | 3~380-480 | 50/60 | 4,600 | 2,710 | 6,500 | 26 | 8,000 | 6,000 | 60 | 50 | 55600.07000 |

200–240 V version in development. Data sheets available upon request. Subject to change.

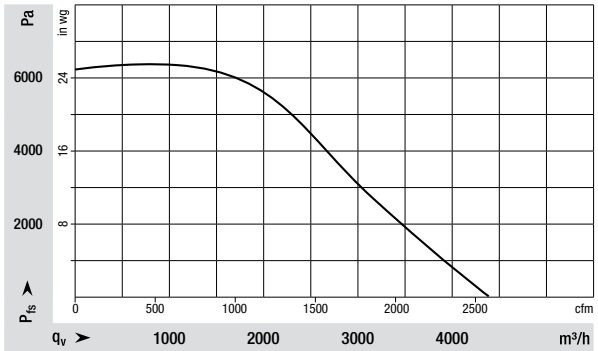
Dimensions in mm. Blower must be adequately supported.

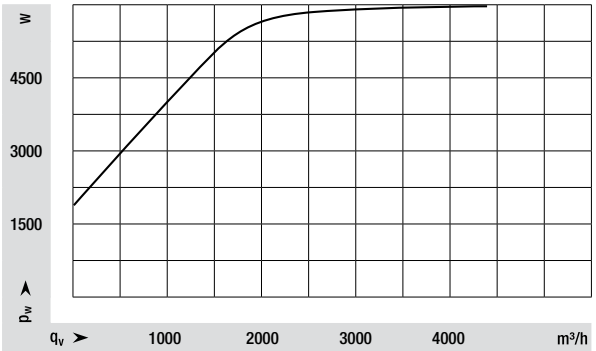



**Integrated RS485 MODBUS RTU interface**
This open standard has established itself as the standard for openloop control of actuators and sensors. With three data records per EC device, in addition to storing different configurations, it can also be used to implement backup functionality. The RS485 MODBUS RTU features both outstanding ease of use and reliability.

## Curves






ebmpapst

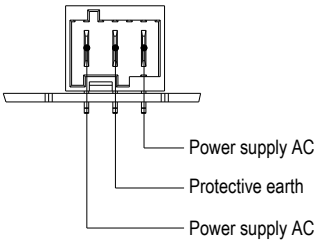
# Connectors

| Connectors | | NRG 77 | NRG 118 | RG 128 | RG 148 | NRG 137 | RG 175 | G1G 170 -AB53-01 | G1G 170 -AB53-80 | G3G 200 | G3G 250 | G3G 250 MW | G3G 315 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | Mains connector X | × | × | × | × | × | × | | | | | see operating instructions | see operating instructions |
| **2** | Mains connector X | | | | | | | × | × | × | × | | |
| **3** | Interface connector W | × | | | | | | | | | | | |
| **4** | Interface connector W | | × | × | × | × | × | × | | | | | |
| **5** | Interface connector W | | | | | | | | | × | × | | |
| **6** | Interface connector W | | | | | | | | × | | | | |
| | Interface 04600.451… | 31 | 04 | 04 | 04 | 04 | 04 | 38 | 41 | 39 | 39 | | |

Connectors refer to 230 V versions. Further connector types on request.

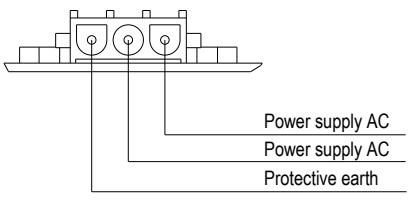
## 1 Mains connector X

3-pin pin-connector with coding type 0A according to RAST 5
in 90° angled / horizontal design
with locking feature on top or down for locking device
suitable for mating connector according to RAST 5
with coding type 0A as e. g.
CoHaMo YY-A5002-H03-K01 or Lumberg 3623 03 K01
Part number for mating connector: 24310.45025



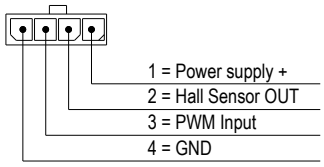

## 2 Mains connector X

3-pin pin-connector according RAST 6.35
in 90° angled / horizontal design
suitable for mating connector according to RAST 6.35
e. g. Tyco Universal MATE-N-LOK
order number: 1586847-1 and 3 x socket 926882-1
Part number for mating connector:
Connector shell 24309.45012; Crimp socket 24307.45002/3



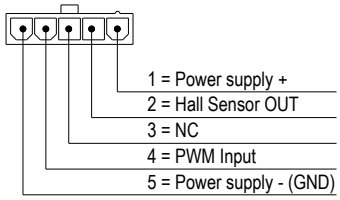

## 3 Interface connector W

4-pin pin-connector according RAST 3.0
in 90° angled / horizontal design
suitable for mating connector according to RAST 3.0
e. g. Molex Micro-Fit 3.0
order number: 43645-0408
and 4 x socket 43030-0001
Part number for mating connector:
Connector shell 24310.45133;
Crimp socket 24300.45128



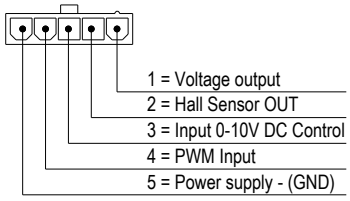

## 4 Interface connector W

5-pin pin-connector according RAST 4.2
in 90° angled / horizontal design
suitable for mating connector according to RAST 4.2
e. g. Stocko STO-FIT, CoHaMo
order number: Stocko EH 705-005-004-960
and 5 x socket RBB 8230.120
order number: CoHaMo YY-5700-H05AS-GW
Part number for mating connector:
Connector shell 24309.45035;
Crimp socket 24308.45065



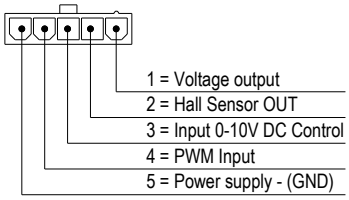

## 5 Interface connector W

5-pin pin-connector according RAST 4.2
in 90° angled / horizontal design
suitable for mating connector according to RAST 4.2
e. g. Stocko STO-FIT, CoHaMo
order number: Stocko EH 705-005-004-960
and 5 x socket RBB 8230.120
order number: CoHaMo YY-5700-H05AS-GW
Part number for mating connector:
Connector shell 24309.45035;
Crimp socket 24308.45065




## 6 Interface connector W

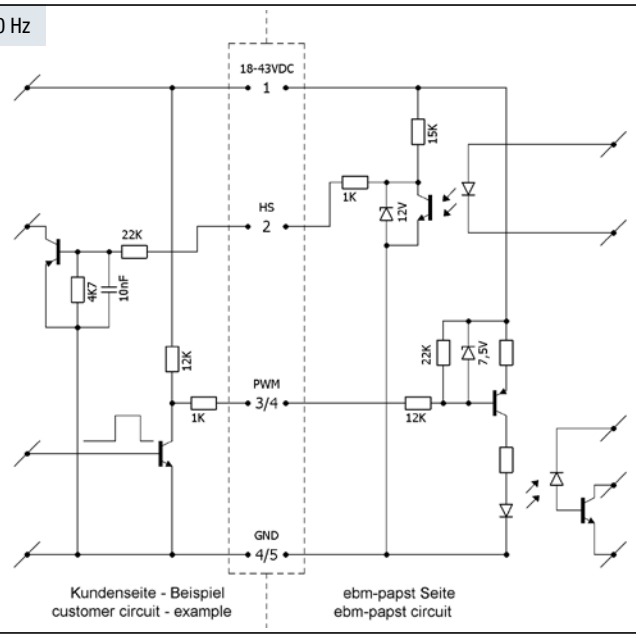
5-pin pin-connector according RAST 4.2
in 90° angled / horizontal design
suitable for mating connector according to RAST 4.2
e. g. Stocko STO-FIT, CoHaMo
order number: Stocko EH 705-005-004-960
and 5 x socket RBB 8230.120
order number: CoHaMo YY-5700-H05AS-GW
Part number for mating connector:
Connector shell 24309.45035;
Crimp socket 24308.45065



# Electrical interfaces

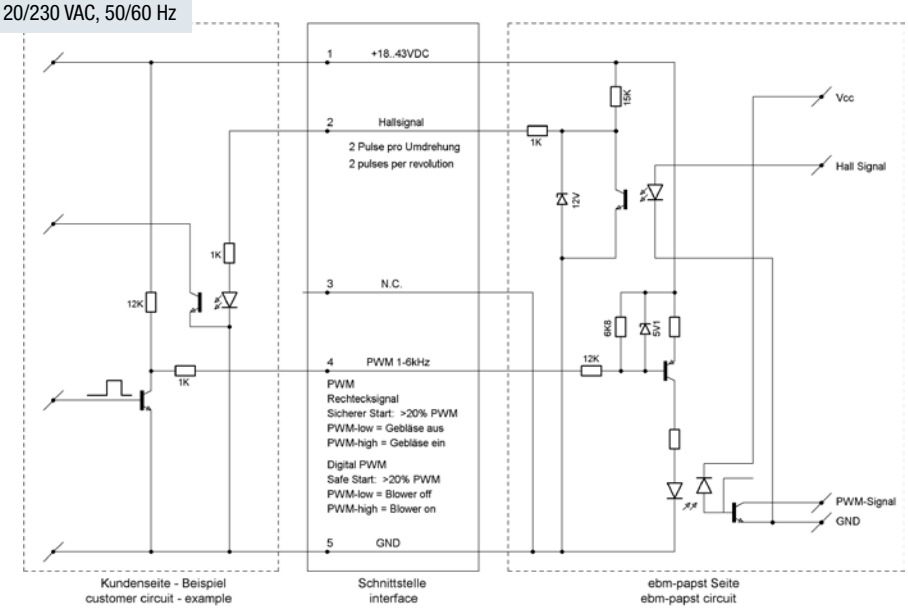
Further types available on request.

## Interface 31 120/230 VAC, 50/60 Hz




- Safe start PWM >20%
- Hallsignal: 2 pulses per revolution
- PWM "HIGH" = blower ON
- PWM "LOW" = blower OFF

## Interface 04 120/230 VAC, 50/60 Hz



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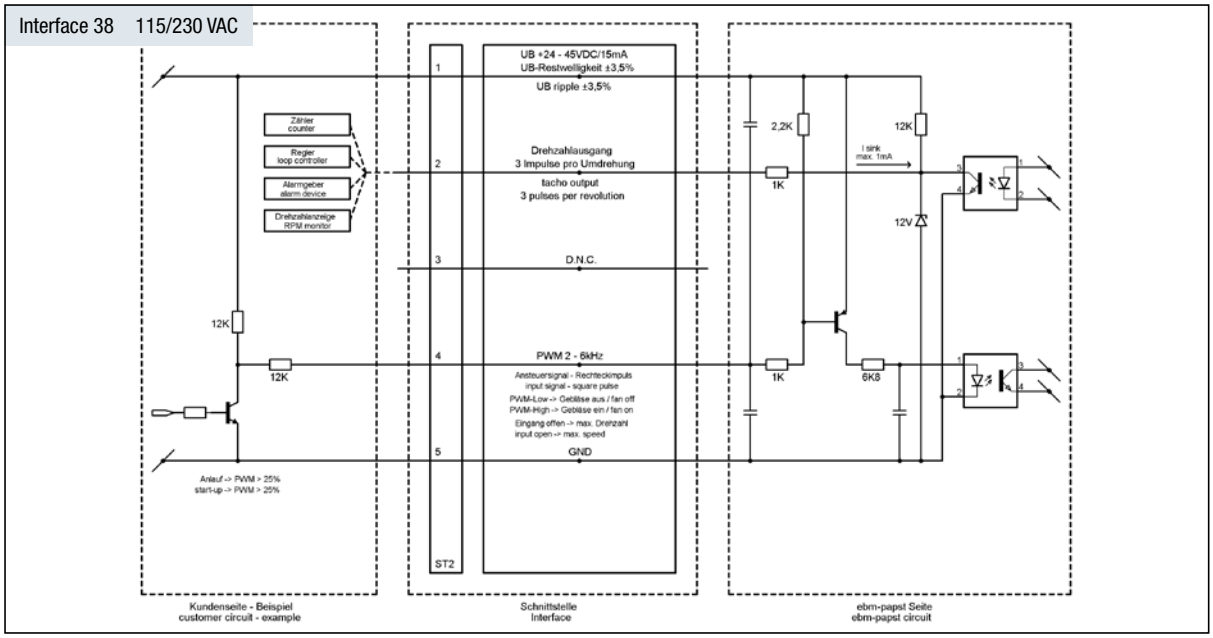
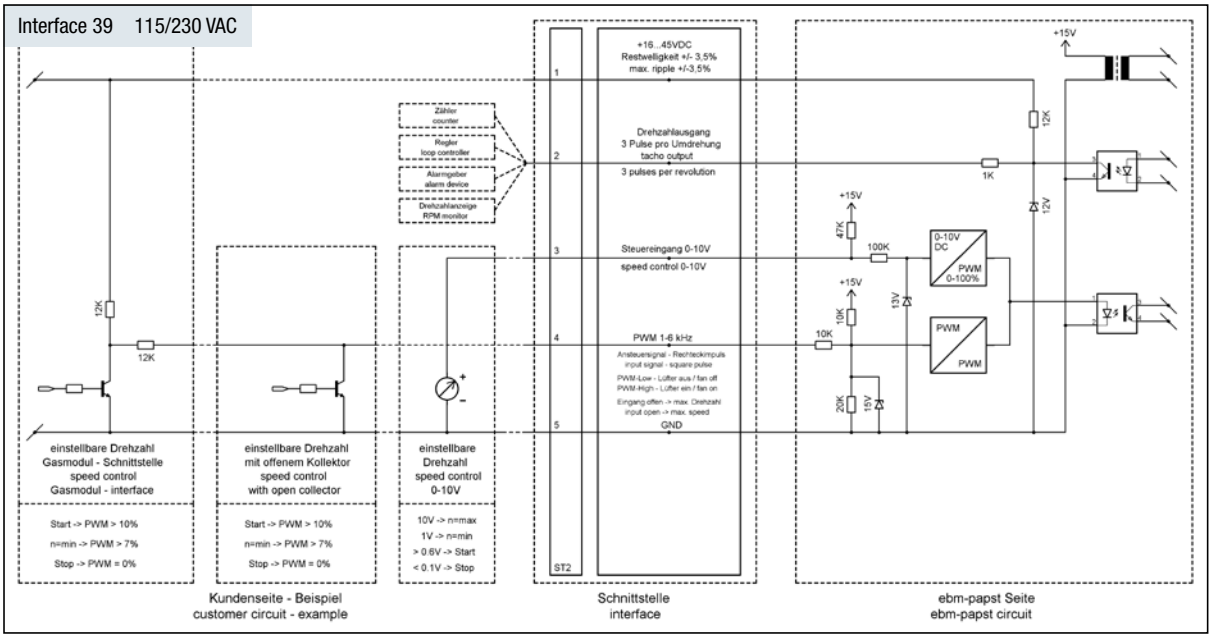
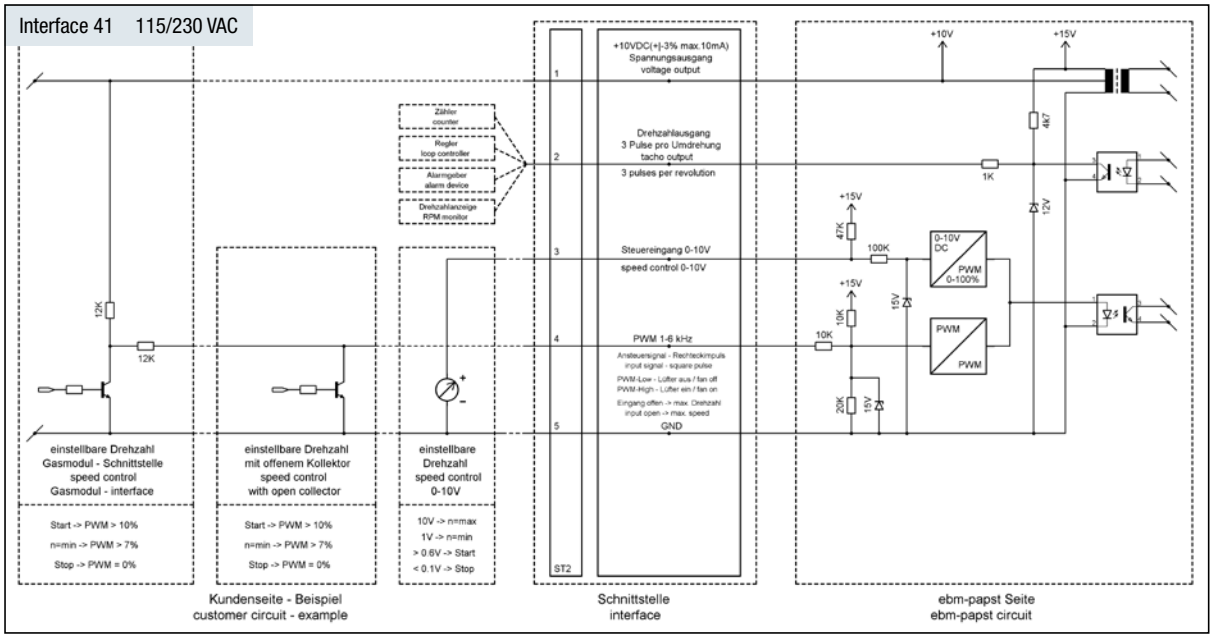
## Interface 38 115/230 VAC




## Interface 39 115/230 VAC




## Interface 41 115/230 VAC



# Gas valves

Our gas valves are mainly used in condensing unit applications for domestic heating technology in the low-to-medium output range. They ensure precise air-gas ratio adjustment.

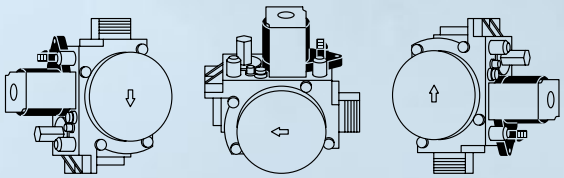
The D01 and E01 gas valves are suitable for condensing units with pneumatic composite controls. Regardless of the suction pressure generated by the premix blower, these gas valves always keep the offset pressure at zero and compensate for pressure fluctuations in the supply network as well.

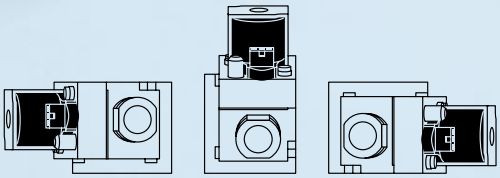
The offset (zero point shift) can be configured at the servo controller. At the same time, the desired gas quantity is adjusted using an integrated flow control element. Depending on the design, reference pressure can be connected to the servo controller if required.

The F01 gas valve is suitable for condensing units with electronic composite controls. Regardless of gas quality and any pressure fluctuations in the supply network, this gas valve automatically regulates the constant air-gas ratio without relying on mechanical gas valve settings.

## Mounting position

Solenoid at any position between vertical and horizontal –
**but not upside down**





## Type examination certificate for North America (USA and Canada): Master Contract No. 172723

**Applicable standards**

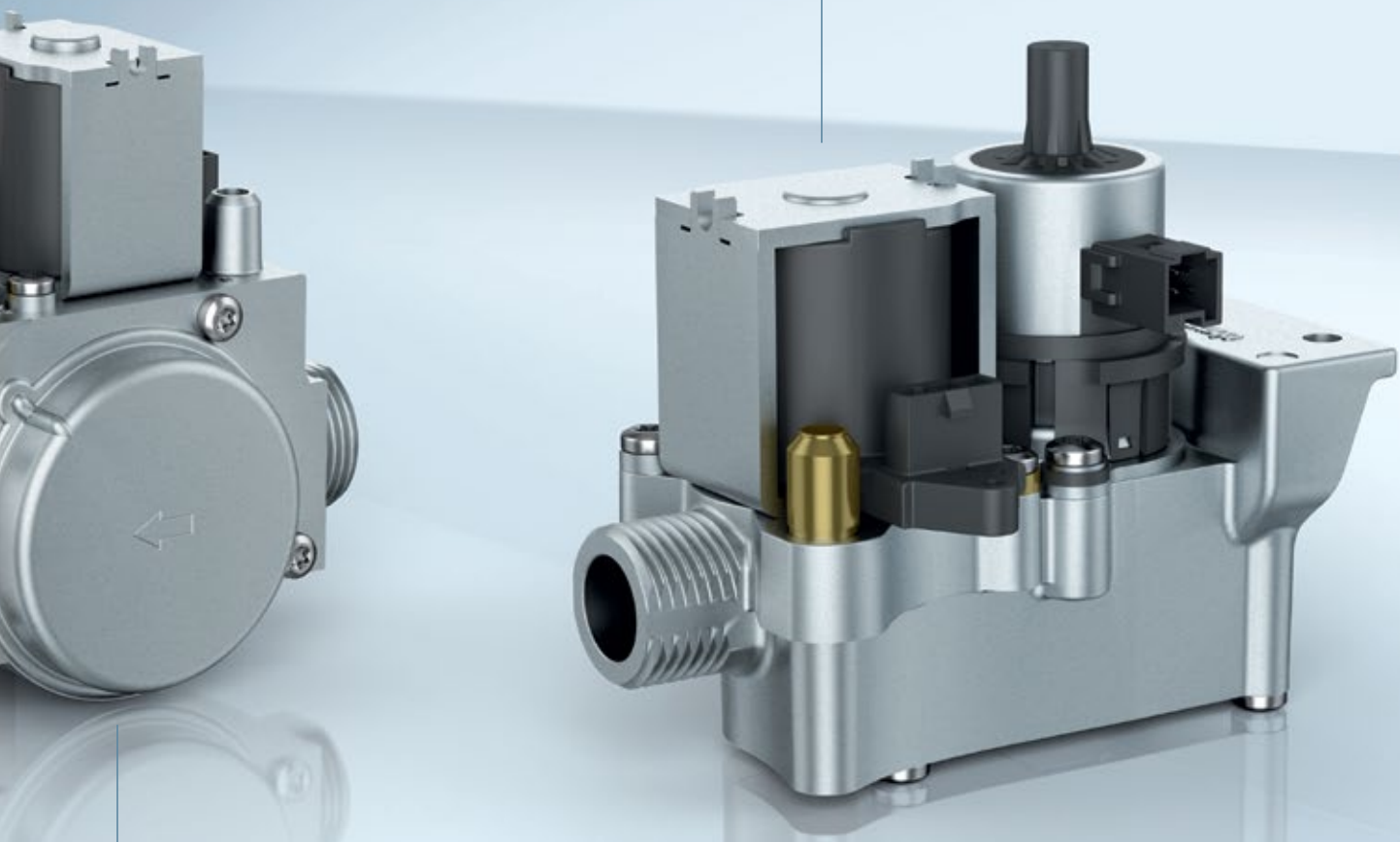
– **ANSI Z21.78 2010 / CSA 6.20 2010:**
Combination Gas Controls for gas appliances

**Approvals exist for the chief gas consuming countries.**

## Type examination certificate in accordance with EC Gas Appliances Directive: CE 0085CM0036 (product ID number)

**Applicable standards**

– **EN126:2012 06:** Multifunctional controls for gas burning appliances
– **EN13611:2007 + A2:2011:** Safety and control devices for gas burners and gas burning appliances – General requirements
– **EN161:2012 08:** Automatic shut-off valves for gas burners and gas appliances
– **EN88-1:2011:** Pressure regulators and associated safety devices for gas appliances – Part 1: Pressure regulators for inlet pressures up to and including 50 kPa



## Additional notes

– Work on the gas valve may be performed by authorised specialists only.
– Please be sure to observe the corresponding installation instructions.
– Corresponding documents with safety instructions are available upon request or on the Internet.

# E01
## Size GB055

– **Housing:** Aluminum
– **Electrical connection:** Connector shell with 4.20mm grid
– **Inlet (gas connection):** External thread G3/4 or G1/2 (DIN EN ISO 228) or 4 × M4 mounting holes (optional)
– **Outlet:** ebm-papst specific quick-connector
– **Safety valves:** Coaxial design: valve class B/C in accordance with EN161

**Technical information:**

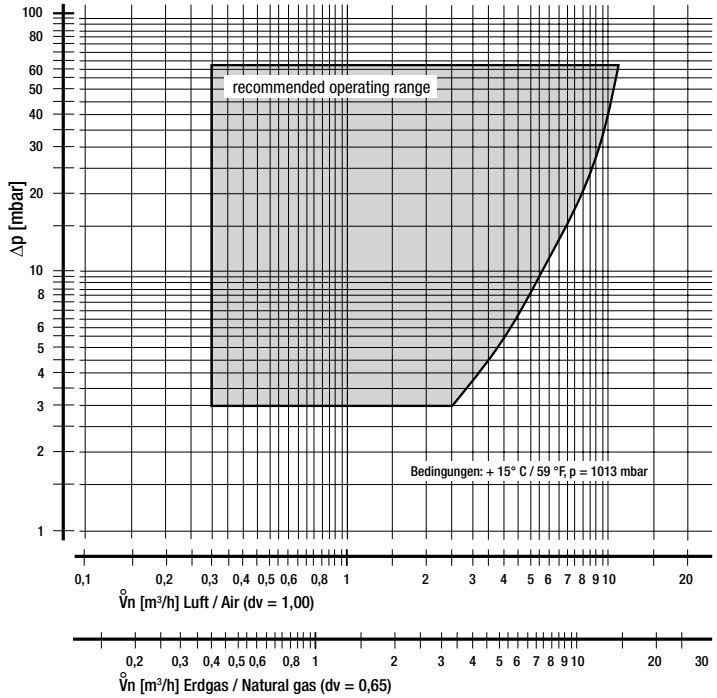
– **Permitted gas families:** II + III (in accordance with EN 437)
– **Maximum inlet pressure:** 65mbar (CE), 0,5 psi (CSA)
– **Permitted ambient temperature:** 0°C to 70°C
– **Permitted storage temperature:** -25°C to 70°C
– **Type of protection:** IP40 in combination with a suitable plug
– **Offset correction:** +/- 20Pa

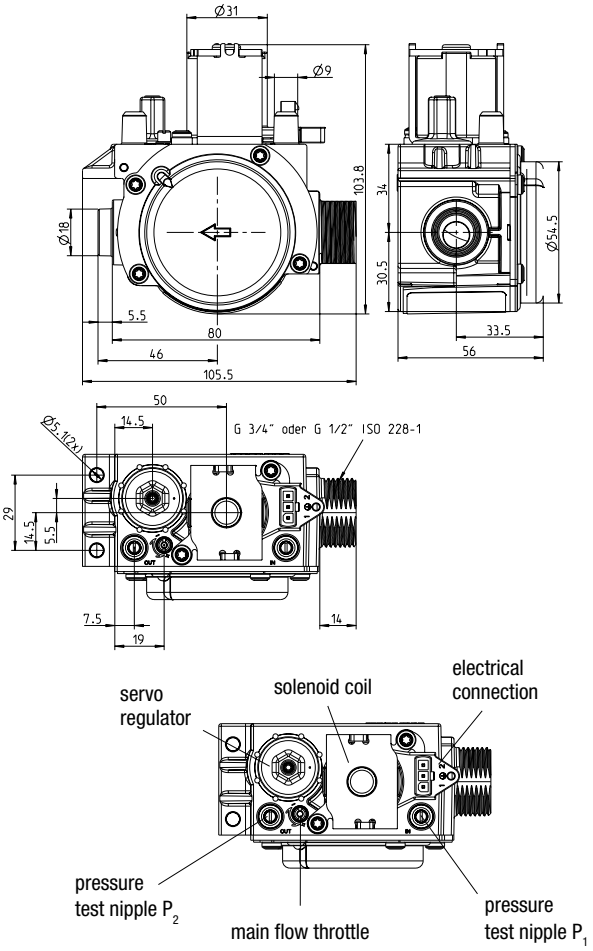
| Nominal data | Rated voltage | Max. input power | Nominal diameter | Maximum inlet pressure | Flow rate (at Δp = 5mbar) | Automatic shutoff valves (EN161) | Minimum signal pressure | Opening and closing time |
|---|---|---|---|---|---|---|---|---|
| **Type** | **V** | **VA** | | **mbar** | **m³/h** | | **Pa** | **s** |
| **GB-ND 055 E01** | 230 RAC | 9.8 | DN15/20 | 65 | 3.4 | Class B/C | -40 | < 1 |
| | 120 RAC | 9.8 | DN15/20 | 65 | 3.4 | Class B/C | -40 | < 1 |
| | 24 RAC | 9.8 | DN15/20 | 65 | 3.4 | Class B/C | -40 | < 1 |
| | 24 DC | 9.8 | DN15/20 | 65 | 3.4 | Class B/C | -40 | < 1 |
| | 22 DC | 9.8 | DN15/20 | 65 | 3.4 | Class B/C | -40 | < 1 |

Subject to change.

Dimensions in mm.

**Capacity curve – GB055**



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# D01
## Size GB057

– **Housing:** Aluminum
– **Electrical connection:** Connector shell with 5.08mm grid
– **Inlet (gas connection):** 4 × M5 mounting holes (36mm hole spacing)
– **Outlet:** 4 × M5 mounting holes (36mm hole spacing)
– **Safety valves:** Valve class B/B in accordance with EN161

**Technical information:**

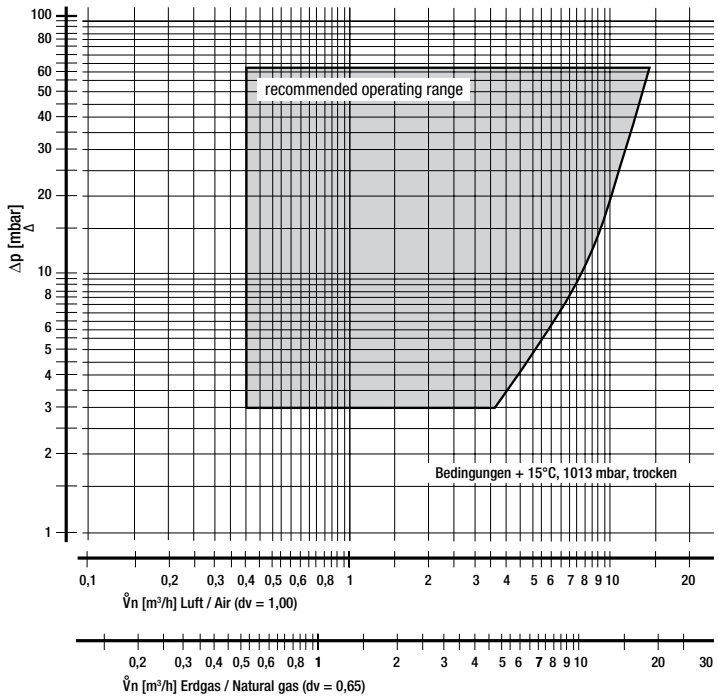
– **Permitted gas families:** II + III (in accordance with EN 437)
– **Maximum inlet pressure:** 65mbar (CE), 0,5 psi (CSA)
– **Permitted ambient temperature:** 0°C to 70°C
– **Permitted storage temperature:** -25°C to 70°C
– **Type of protection:** IP40 in combination with a suitable plug
– **Offset correction:** +/- 20Pa

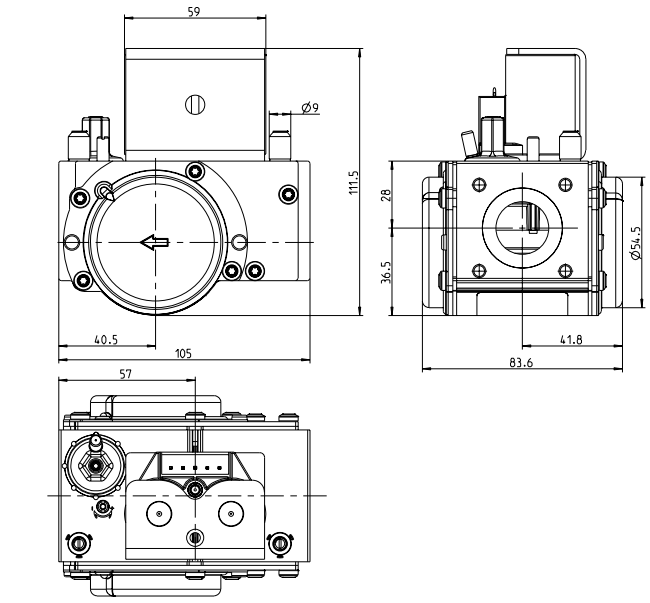
| Nominal data | Rated voltage | Max. input power | Nominal diameter | Maximum inlet pressure | Flow rate (at Δp = 5mbar) | Automatic shutoff valves (EN161) | Minimum signal pressure | Opening and closing time |
|---|---|---|---|---|---|---|---|---|
| **Type** | **V** | **VA** | | **mbar** | **m³/h** | | **Pa** | **s** |
| **GB-ND 057 D01** | 230 RAC | 2×12.5 | DN20 | 65 | 5.3 | Class B/B | -40 | < 1 |
| | 120 RAC | 2×12.5 | DN20 | 65 | 5.3 | Class B/B | -40 | < 1 |
| | 24 RAC | 2×12.5 | DN20 | 65 | 5.3 | Class B/B | -40 | < 1 |
| | 24 DC | 2×12.5 | DN20 | 65 | 5.3 | Class B/B | -40 | < 1 |

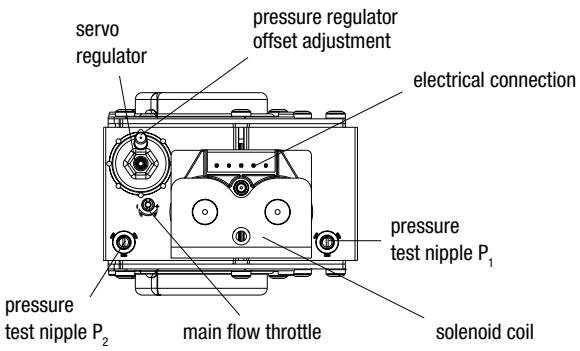
Subject to change.

Dimensions in mm.

**Capacity curve – GB057**



# F01

– **Housing:** Aluminum
– **Electrical connection:** Connector shell with 4.20mm grid
– **Inlet (gas connection):** External thread G3/4 or G1/2 (DIN EN ISO 228)
– **Outlet:** ebm-papst specific quick-connector
– **Safety valves:** Coaxial design: valve class B/C in accordance with EN161

**Technical information:**

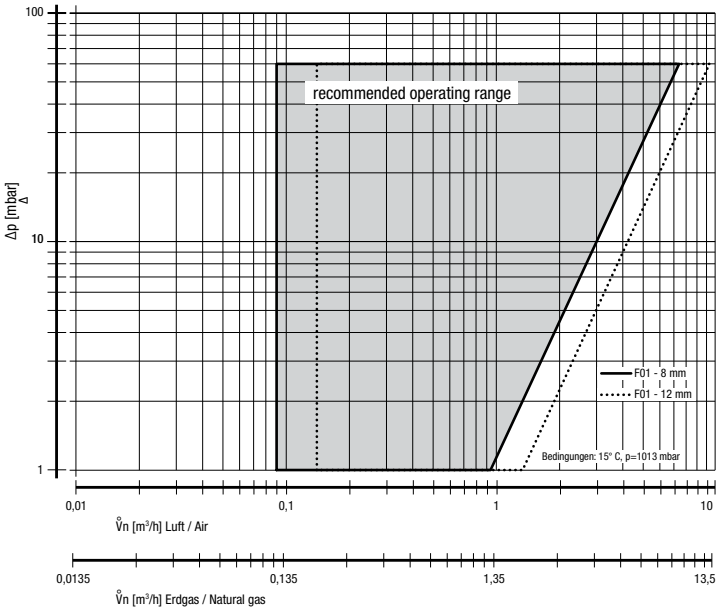
– **Permitted gas families:** II + III (in accordance with EN 437)
– **Maximum inlet pressure:** 60mbar (CE), 0.5 psi (CSA)
– **Permitted ambient temperature:** 0°C to 70°C
– **Permitted storage temperature:** -25°C to 70°C
– **Type of protection:** IP40 in combination with a suitable plug

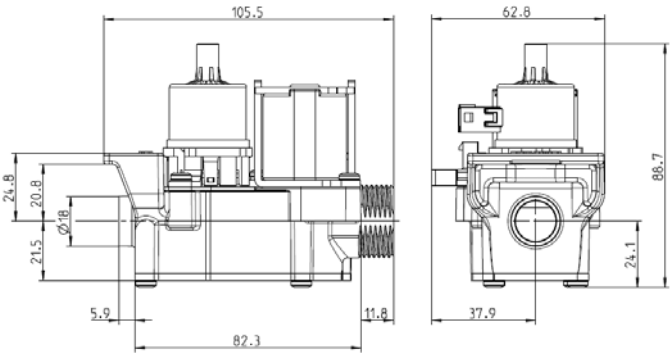
| Nominal data | Rated voltage | Max. input power | Nominal diameter | Maximum inlet pressure | Flow rate (at Δp = 5 mbar) Stepper motor module with nominal diameter 8mm | Flow rate (at Δp = 5 mbar) Stepper motor module with nominal diameter 12mm | Automatic shutoff valves (EN161) | Opening and closing time |
|---|---|---|---|---|---|---|---|---|
| **Type** | **V** | **VA** | | **mbar** | **m³/h** | **m³/h** | | **s** |
| **GB-SXX 06X F01** | 230 RAC | 9.8 | DN15/20 | 60 | 2.1 | 2.9 | Class B/C | < 1 |
| | 120 RAC | 9.8 | DN15/20 | 60 | 2.1 | 2.9 | Class B/C | < 1 |
| | 24 RAC | 9.8 | DN15/20 | 60 | 2.1 | 2.9 | Class B/C | < 1 |
| | 24 DC | 9.8 | DN15/20 | 60 | 2.1 | 2.9 | Class B/C | < 1 |
| | 22 DC | 9.8 | DN15/20 | 60 | 2.1 | 2.9 | Class B/C | < 1 |

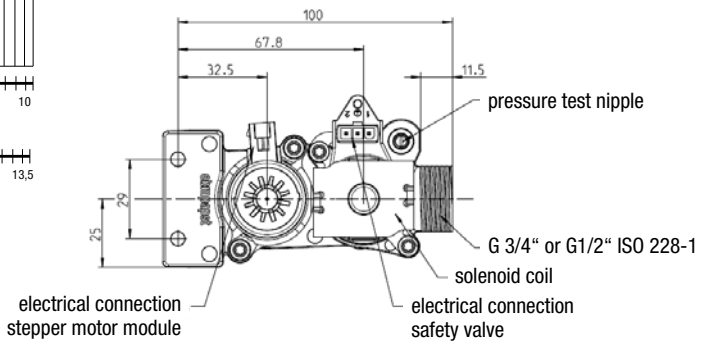
Subject to change.

Dimensions in mm.

**Capacity curve – F01**



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# Burner control units

We supply the right electronics for controlling ignition, performance regulation and monitoring the function of the condensing boiler as well as user interfaces needed for conveniently controlling central heating and DHW. The burner control can also be combined with other modules and provide control for system regulation, for example cascade operation.

Our product range, consisting of tried-and-tested hardware and software, enables reliable operating performance and short development cycles. The versatile software architecture enables easy interface integration. In addition, as with our blowers, we value having the lowest possible energy consumption.

## For Commercial Applications

– For commercial boilers up to 2MW
– Integrated cascade control
– Flexibility to configure many systems: preset appliance types
– Configurable inputs and outputs
– Integrated low water cutoff
– Many modes for CH and DHW


## User Interface

– Touch screen: communication with boiler control via Modbus
– Ethernet connection to web server
– Graphical LCD interface for boiler status, operation and configuration
– Password-protected user levels
– Includes diagnostics software and a smart app

## For Residential Applications

– Smart control for various appliances up to 50kW:
  water heaters (with/without tank) and residential combi boilers
– Also applicable as general burner control
– Optional Modbus communication
– Available as all-in-one kit

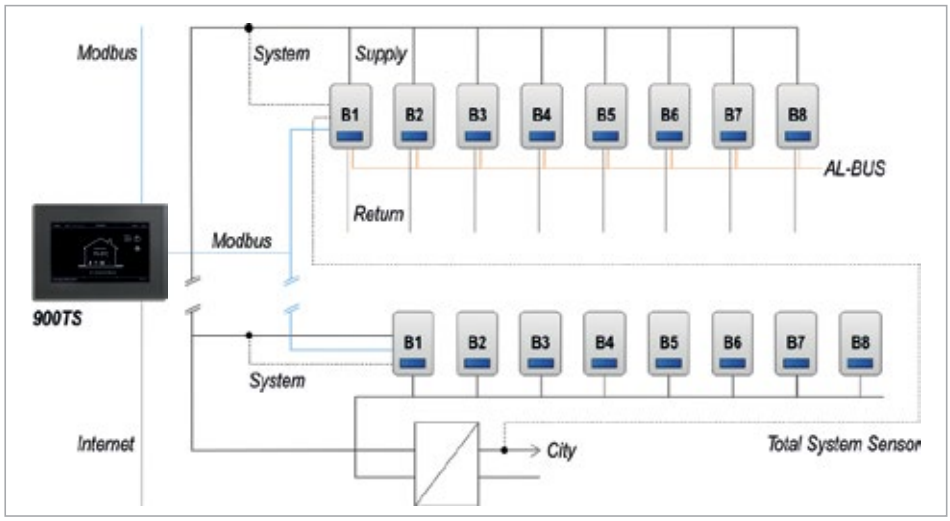
## User Interface

– On-board HMI: Reset button and status LED
– Advanced external display options

# Commercial range
## Packages

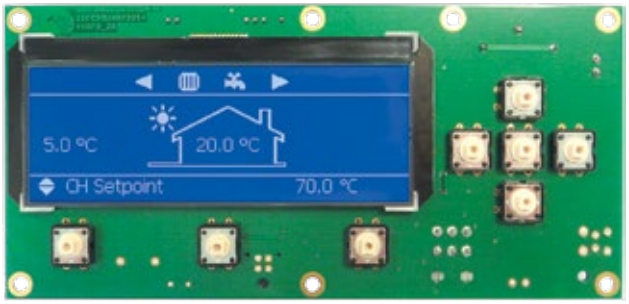

– Applicable for commercial boilers up to 2MW
– Configurable input/output functions
– Multiple heat demand options (on/off, OpenTherm, 0-10V)
– Internal/external spark igniter or hot-surface igniter
– Primary safeguard functions
– Extra safety- and smart control functions

| | Power supply | Dimensions control | Cascade operation | Touch screen | User interface | AL-BUS | Modbus | Ethernet | Diagnostics software | Smart app |
|---|---|---|---|---|---|---|---|---|---|---|
| **Package** | **VAC** | **mm** | | | | | | | | |
| **Commercial Plus** | 120/230 | 212×152×49 | 8 boilers × 8 moduls | Y | 900PB Display | Y | Y | Y | Y | Y |
| **Commercial** | 120/230 | 212×152×49 | max. 16 boilers | N | 900PB Display | Y | Y | optional | Y | Y |
| **Residential Plus** | 120/230 | 212×152×49 | settings only | N | 900LB Display | Y | N | N | Y | Y |




**Commercial Plus with integrated cascade control:** Cascade operation up to 8 boilers × 8 modules. Each group is connected via Modbus to the advanced 900TS Touch screen.


900TS Touch screen




900PB Display

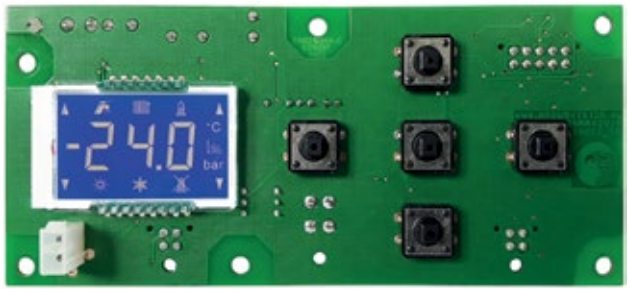


ebmpapst

# Residential range
## Packages


– Smart control for various appliances:
  water heaters (with/without tank) and residential combi boilers
– Also applicable as general burner control
– Flexible mounting options
– On-board user interface or advanced external display
– Optional Modbus communication

| Package | Power supply VAC | Dimensions control mm | On-board HMI | User interface | AL-BUS | Modbus | Diagnostics software | Smart app |
|---|---|---|---|---|---|---|---|---|
| **Tankless Water Heater** | 120/230 | 203×114×50 | N | 900DI Display | Y | N | Y | Y |
| **Water Heater** | 120/230 | 203×114×50 | N | 900DI Display | Y | optional | Y | Y |
| **Residential Combi Boiler** | 120/230 | 203×114×50 | N | 900LB Display | Y | N | Y | Y |
| **Smart Burner Control** | 120/230 | 203×114×50 | Y | | Y | Y | Y | Y |




900DI Display


900LB Display

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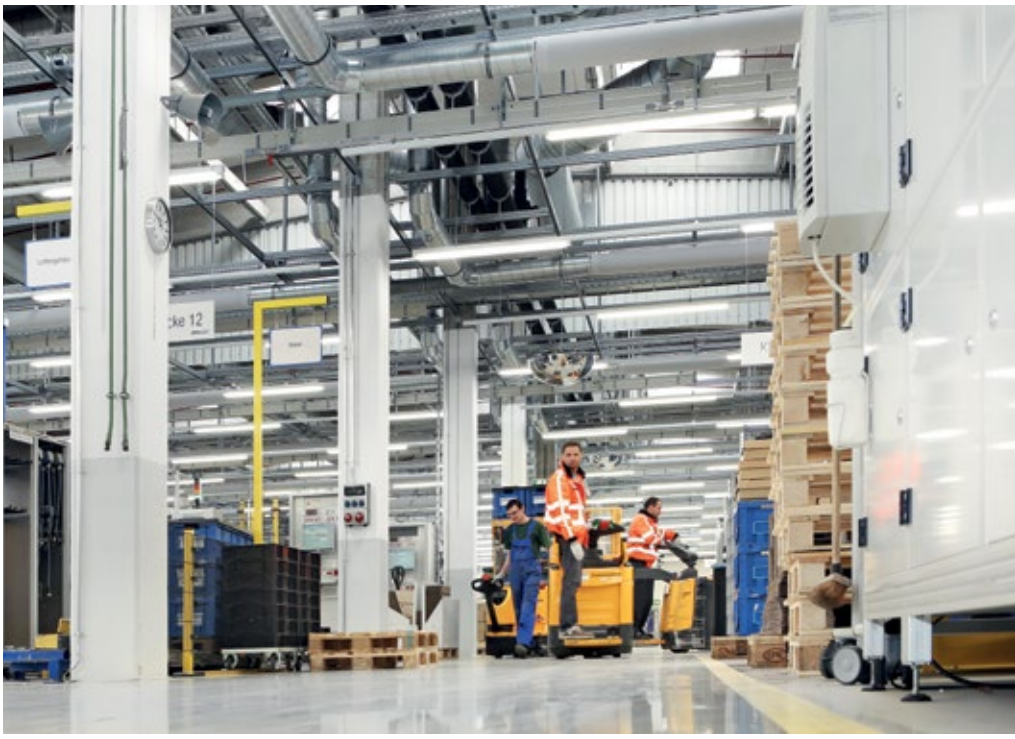

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