Movement by Perfection



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

Product documentation

Type
FC091-SDS.7Q.V7P2

Article number
57241388

ZIEHL-ABEGG

Product documentation

Customer
enter here

Project
enter here

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1. Recitals

The Product Specifications contained in this document are final, unless otherwise stated by a separate provision in the "ZIEHL-ABEGG deviation list document" with respect to information provided by the customer (cp. separate Chapter: Attachment).

Other regulations between the parties, regardless of time, form or content, are not part of the subject matter of the contract and the agreement on characteristics/of features (Product Specifications) between the parties.

Compliance with the following specifications is mandatory to ensure the functionality and safety of the product. If the following specifications given especially but not limited for operating conditions, transport, storage, mounting, start-up, maintenance and repair are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

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2. Product specification - Technical data

Article number	57241388	
Type	FC091-SDS.7Q.V7P2	
Designation	Axial fan with diecast blades	
Rated values	3~400V ±10% D/Y 50Hz P_1 3.70/2.4kW 7.6/4.3A ΔI=5% 880/680/min COSY 0,70 60°C	
Electrical connection	Terminal box K07	
ErP Data	Measurement category ErP: A Air flow q_v on Eta opt: 23757 m3/h Pressure increase p_{fs} on Eta opt: 210 Pa Input power P_1 on Eta opt: 3738 W Efficiency η_{statA}: 38.0 % Efficiency grade: N_{actual} = 40.7 / N_{target} = 40* *ErP 2015	
Type of protection	IP54	
Thermal class	THCL155	
Mounting type terminal box	Mounted on Stator	
Connection diagram	1360-108XA	
Rating plate	1x fixed	
Fitting position	H/Vu	
Motor protection	Thermal contact	
Impregnation	Moisture and hot climate protection	
Condensation drain holes	Condensation drain holes stator/rotor open	
Quality of bearings	Ball bearing with long-time lubrication	
Material Rotor	Aluminium	
Painting rotor	Rotor unpainted	
painting stator	Stator unpainted	
Material blades	Aluminium	
Painting blades	Blades unpainted	
Guard grille type	Ring grill	
Painting mot.suspens	Motor suspension powder-coated resistance class 2 (L-TI-0585)	
colour suspension	RAL 9005 (jet black)	
Operating manual	L-BAL-001	www.ziehl-abegg.com/bal
Weight	55	kg
Min. operating temperature °C	-40°C***	

*** Operation mode:
Continuous operation with occasional starts (S1) according to DIN EN 60034-1:2011-02.
Occasional starting between -40 °C and -25 °C is permissible. Continuous operation below -25 °C only with special bearings for refrigeration applications on request.

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3. Product specification – Applicable technical standards

Environmental Conditions:

EN 60721-3-4: 1995 „Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 4: Stationary use at non-weatherprotected locations" (IEC 104/799/CDV:2018)
Climatic environmental conditions: class 4K2
Biological environmental conditions: 4B1
Chemical active substances: 4C1
Mechanical active substances: 4S1
Mechanical environmental conditions: 4M1

Corrosion protection:

Powder coating thickness

The total thickness of the standard powder coating as an average value of 10 measurements, distributed evenly over the whole part must be between at least 80 and 160 µm (or 260 µm with double powder coating) and may not drop below 60 µm at any measuring point. A total coating thickness of 160 µm (or 260 µm with double powder coating) must not be exceeded.
The total thickness of a coating may not, however, be used as a measure of corrosion protection. The corrosion protection of a coated part is composed of the pretreatment (e.g. zinc phosphatising), the type of powder (e.g. mixed powder), the coating (single or dual layer), the material (bright / galvanised steel) and the correct execution of the powder coating (cleaning/degreasing of the part)..

Properties of the powder coating

The ZIEHL-ABEGG standard powder coating uses a polyester-epoxy mixed powder.
Due to the polyester component in the mixed powder a medium UV resistance is given.
Generally the functional surfaces of all parts with threads, nuts and bolts or predefined functional surfaces are uncoated to ensure the smooth running of the thread or the function (for example the grounding of the part).

Classification powder-coated components according to L-TI-0585

Resistance class	Exposure time of the salt spray test acc. to ISO 9227	Evaluation	Maximum premissible degree of damage
RC 1	336 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	m0 / g0 Ri0 0 Gt0 none
RC 2	504 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	m0 / g0 Ri1 1 Gt0 none
RC 3	750 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	m1 / g1 Ri1 2 Gt1 slight
RC 4	1000 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	m2 / g2 Ri2 3 Gt2 slight
RC 5	2000 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	m2 / g2 Ri2 3 Gt2 slight

ZA uses various powder coating systems from different manufacturers qualified by ZA to meet the above-mentioned resistance classes with their corrosion protection requirements.

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Painting thickness

Depending on the component or the design of the components, there may be deviations in the minimum coating thickness or flaws. As a general rule, however, the total coating thickness should not fall below 20 µm at any point.
The total coating thickness of the standard wet painting as an average value of 10 measurements distributed evenly over the whole component must be between the values specified in the following table.
However, the total coating thickness of wet painting may not be used as a measure of corrosion protection. The corrosion protection of a coated component is made up of the pretreatment (e.g. FEph) of the paint type/paint quality, the coating (one or two coat), the material (bright/galvanized steel) and the correct application of the wet painting (cleaning/degreasing of the component).

Classification wet painted components according to L-TI-0596e

Resistance class	Exposure time of the salt spray test acc. to ISO 9227	Evaluation	Maximum premissible degree of damage
RC 1	336 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	0 (S0) Ri0-1 0 Gt0-1 none
RC 2	504 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	0 (S0) Ri0-1 1-2 Gt0-1 none
RC 3	750 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	1 (S1) Ri1 1-2 Gt0-1 slight
RC 4	1000 h	Degree of blistering DIN EN ISO 4628-2 Degree of rusting DIN EN ISO 4628-3 Release of bonding DIN EN ISO 4628-8 Mesh cut DIN EN ISO 2409 Edge rust	2 (S2) Ri1 2 Gt2 slight

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4. Product specification – Lifetime

The maximum fan lifetime is determined by the following factors primarily:

1. Service life of the motor winding
   The insulation material inside the winding is aging due to thermal and electrical stress. This aging is determined by the maximum winding temperatures, duration and amount of the temperature cycles and the type of voltage supply (e.g. grid supply, inverter supply) and thus amplitude, steepness and frequency of the voltage pulses at the motor connection point. It is therefore very difficult to quantify the winding service lifetime. Based on long time tests with internal rotor motors with grid supply, an average statistical lifetime of 50,000 – 60,000 operating hours can be assumed.
2. Service lifetime of the motor bearing
   The according to standard calculation methods determined bearing service life expectation of the motor-integrated ball bearings is mainly determined by the grease service life F10h and amounts for standard application taking into account a temperature and load spectrum to approx. 30,000 – 40,000 operating hours.
   The fan is maintenance-free due to the use of ball bearings with "lifetime lubrication". Once the grease operating life F10h has been reached, it may be necessary to replace the bearing.
   The bearing service life expectation may change compared to the specified value, if operating conditions such as increased vibrations or shocks, increased or too low temperatures, humidity, dirt in the ball bearing or unfavourable control modes are present.
   A service life calculation for special applications can be provided on request.

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5. Product Specification - General product and handling description

Operating conditions:

The product is designed for conveying non-aggressive, non-explosive, non-fluid, non-adherent, non-abrasive, dust and particle-free gaseous media, air-like mixtures und air.
The fans/motors are not ready-to-use products, but are designed as components for refrigeration, air conditioning and ventilation systems. The fans may not be operated until they are installed according to their intended purpose.
Operating conditions, including the installation position of the fan, must be clearly specified by the customer, especially in the case of special operating conditions such as a higher risk of condensate formation and higher humidity or for outdoor use. These customer specifications form the basis for product design including selection and assignment of suitable motors. ZIEHL-ABEGG cannot accept any liability for applications and operating conditions not specified to us; the customer is then responsible for taking precautionary measures against failure or damage to the fan.
To provide error-free operation and prevent damage to the product, the product may only be operated in the admissible operating area according to the mentioned data sheets and air performance curves respectively may only be used for the intended application.
The formation of small rusty spots during usage in accordance with the product specification and this general product and handling description can occur. These do not affect the functionality of the product. In case of sendzimir-galvanized components, corrosion at the cutting edges is possible.
The product must never be used in obviously damaged condition.
External magnetic fields are not allowed if their induced eddy currents would decelerate the fan respectively these may lead to an increase in power consumption or to malfunctions in the electronics.
Temperature change speeds of a maximum of 1 K/min are permissible.
When used below -10 °C, it is a prerequisite that the fans are not subjected to any unusual external influences such as impact-like mechanical loads.

The admissibility of operating the fan near of strong heat radiation sources must be checked and approved by the device manufacturer. It must be ensured that the peak temperature of the radiant heat source does not exceed the maximum ambient temperature of the fan (see rating plate). This applies in particular in the event of a fault or when the fan is at a standstill.
The permissible relative humidity is indicated in the assembly and operating instructions.
Condensation in the drive must be excluded.
In case of longer downtimes in a humid atmosphere, the fans must be put into operation monthly for at least 2 hours, at least 80% of the rated speed, to allow any moisture that may have penetrated them or condensation that has formed inside, to evaporate and to redistribute the bearing grease or to avoid standstill markings / bearing rust respectively.
Applications in which the fan runs through several temperature and humidity phases at intervals must be checked and released by the device manufacturer on a case-by-case basis.

Not permissible:

Blocking or slowing down the fan by inserting objects. The impeller may become unbalanced, be damaged and may burst. Danger to life!
Loosening of the impeller and/or balance weights. The impeller becomes unbalanced and the motor bearing life time decreases. Danger to life!
Continuous intentional change of direction of rotation. The motor and the impeller are overloaded.
Reverse current braking. The motor and impeller are overloaded.

AC fans on mains:
The fan is designed for continuous operation S1 according to DIN EN 60034-1:2011-02.
If switching operation (multiple switching per hour) is required, consult ZIEHL-ABEGG stating the planned switching frequency.
Occasional starting between -40 °C and -25 °C is permissible.
Continuous operation below -25 °C only with special bearings for refrigeration applications on request.
The fan may only be operated within the permissible temperature range. Please refer to the technical documentation of the product for the minimum and maximum ambient temperature valid for the respective

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fan.
The maximum permissible ambient temperature is also indicated on the fan rating plate, with the following exception: If special ball bearings with “cold grease” lubrication are installed in the fan, the maximum permissible ambient temperature in continuous operation is + 20 °C.
Operation below -25 °C and partial load operation on frequency inverters for cold applications is only possible with special bearings for refrigeration applications on request.
Permissible minimum ambient temperature for operation of 1~ fans with built-in operating capacitor: -25 °C.
For fans with protection class IP55 or higher (protection class according to DIN EN 60529 or DIN EN 60034-4), the existing condensation drain hole must be opened at least every six months.

AC standard fans with frequency converter:
The product only works properly with a suitable frequency converter with integrated all-pole active sine filter. The product can be damaged if it´s used without an all-pole sine filter between the motor and the frequency converter. Voltage peaks and voltage fluctuations can destroy the product. Bearing currents must be avoided.
AC-fans with voltaqe-controllers/phase-cut-controllers: For voltage-regulated motors, note the additional information for the possible current increase with voltage control. With voltage-regulated fans, which are operated at phase cut controllers, an additional current increase occurs due to phase cut control in addition to the current increase due to voltage control. This additional current increase can amount to up to 30% of the rated current and must be added to the normal current increase due to voltage control when selecting and dimensioning the phase cut controller.

EC fans:
The fan is designed for continuous operation S1 according to DIN EN 60034-1:2011-02.
Occasional starting between -35 °C and -25 °C is permissible.
Continuous operation below -25 °C only with special bearings for refrigeration applications on request.
The fan may only be operated within the permissible temperature range. Please refer to the technical documentation of the product for the minimum and maximum ambient temperature valid for the respective fan.
Operation below -25 °C as well as partial load operation for refrigeration applications is only possible with special bearings for refrigeration applications on request. If special bearings for refrigeration applications are installed in the fan, please observe the permissible maximum temperatures in the technical documentation of the product.
For safe operation up to the minimum permissible ambient temperature and to avoid condensation, a continuous power supply must be ensured in refrigeration applications so that the condensation point does not occur due to cooling-down.

Motor protection:

Implement the thermal motor protection depending on the design of the motor and observe the attached wiring diagram.
A) For EC fans:
Relay: Please note the minimum switching voltage of 5 V as well as the minimum current of 100 mA at the relay contact to ensure a reliable switching change.
The maximum voltage at the relay contact must not exceed 380 V AC / 220 V DC. The maximum switching current is 5 A.
B) For AC fans:
The motors can be equipped with temperature sensors "TP" (PTC thermistor), internally connected thermostat switches "TB", outgoing thermostat switches "TB" or can be delivered without thermal protection.
B1) Thermostat switch: Please observe the minimum current of approx. 50 mA at the thermostat switch so that the contact switches permanently and safely. The maximum voltage at the thermostat switch must not exceed 250 V AC or 60 V DC
(Note: all values and especially the maximum switching current of the TB depend on system parameters as cycle of operation and the output current of the monitoring unit. For specific parameters contact our technical support).
B2) PTC thermistor (PTC):
Standard internal rotor motors: Please observe the specifications and application limits, such as maximum voltage, in the operating instructions of the respective motor manufacturer.

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External rotor motors: The maximum voltage at the PTC thermistor must not exceed 2.5 V per PTC element. Thermal motor protection is ensured exclusively by the use of temperature monitors, thermostat switches or PTC thermistors. These motor protection devices must be connected.
If there are no temperature monitors, thermostat switches or PTC thermistors, a motor protection switch must be used. However, motor protection switches do not provide temperature protection for the motors.

Assembly:

The assembly has to meet the requirements of the assembly instructions to enable error-free operation. The fans may not be operated until they are installed according to their intended use. The included or supplied guard grille of ZIEHL-ABEGG fans is usually designed according to EN ISO 13857 Table 4 (for persons with a minimum age of 14 years). If the grilles are of a different design, the device manufacturer must take further structural protective measures to ensure safe operation.

Commissioning:

Commissioning must be done by appropriately qualified technical personnel according to the specifications in the operating and assembly instructions.
During start-up check the following:
1. Check the direction of rotation (see rotation direction arrow on the fan blade, impeller base plate or support plates on suction side or rating plate).
2. Inspect the motor bearings for proper operation prior to installation. Check smooth, noiseless running during commissioning, replace motor bearings if necessary.
3. Check for quiet, low vibration operation. Strong vibrations due to uneven running (imbalance), e.g. caused by transportation damage or improper use, can lead to failure.
4. For variable speed fans: If resonance vibrations occur, it is possible to hide certain speed ranges.
5. A-rated sound power levels of over 80 dB(A) are possible.
6. Fans from ZIEHL-ABEGG SE are delivered balanced in accordance with DIN ISO 21940-11 for the appropriate fan category in accordance with ISO 14694. Check the fan for mechanical vibrations after installation. If the limit values of the corresponding fan category are exceeded in start-up, you must have the motor/impeller unit checked by an expert and rebalanced if necessary before continuous operation is permitted.
During commissioning, unexpected and hazardous conditions can arise in the entire installation due to defective adjustments, defective components or incorrect electrical connections. Remove all persons and objects from the hazardous area.
Do not start up the fan until you have read and understood all the safety instructions (DIN EN 50110, IEC 364), safety distances are observed (DIN EN ISO 13857 / EN 60335) and a hazard is excluded.
Acclimatize the fan to the permissible operating temperature range.
The device manufacturer must ensure low-vibration operation. The relevant standards must be observed e.g. DIN ISO 10816.
In the case of applications with external vibrations, the device manufacturer must decouple the fan from the vibration source.
The complete assembly must be checked for resonance by the device manufacturer when installed. For variable-speed applications, the assembly must be checked for resonances over the entire speed range. If excessive vibrations are detected, it must be avoided that the unit and the fan is operated in this resonance. If the fan is operated with increased vibrations, service life will be considerably reduced or a failure can occur.

Temporary decommissioning and longer downtimes:

The fan may only be decommissioned by qualified personnel who, due to their training, experience and instruction, have sufficient knowledge of the safety regulations, the accident prevention regulations and the recognized rules of technology (e.g. VDE regulations, IEC, EN, DIN standards).The fan should be protected from the weather.
In case of longer downtimes in a humid atmosphere, the fans must be put into operation monthly for at least 2 hours, at least 80% of the rated speed, to allow any moisture that may have penetrated them or condensation that has formed inside, to evaporate and to redistribute the bearing grease or to avoid standstill markings / bearing rust respectively.

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Only for AC fans: For fans with protection class IP55 or higher (protection class according to DIN EN 60529 or DIN EN 60034-4), the existing condensation drain hole must be opened at least every six months.

Documentation:

In case of defective parts or products or in case of any warranty, it may be necessary to analyses the root cause of the defect.
Therefore, ZIEHL-ABEGG may ask for documentation of proper life-cycle handling according to the operating and assembly instructions and the general product and handling description. ZIEHL-ABEGG may ask for appropriate documentation records in order to assess root cause of the defect.

Maintenance and inspection:

Any maintenance and inspection has to be carried out in accordance with the operating and assembly instructions.
Taking the above mentioned lifetime values into consideration, the fan has to be inspected regularly (see assembly and operating instructions).
The inspection has to include, but is not limited to:

- Inspection for vibration that has not occurred in the past
- Dirt / dust / deposits on the impeller and on the motor
- Integrity of the impeller, firm fixation of the impeller.

If service (e.g. bearing change) is necessary, it has to be considered that the motor-impeller-combination has to be balanced dynamically in two planes according DIN ISO 21940-11.

Packaging, storage and transport:

Packaging, storage and transport must be carried out in accordance with the operating and assembly instructions to avoid product damage.
Avoid impacts and shocks during transport and storage to avoid product damage.
The limit values of ISTA 3E resp. ISTA 3B must be observed during transport. Improper transport can cause damage to fan components such as the motor bearings and accessories which leads to a reduction in product service life and / or functional restrictions.
Observe the weight specifications (see rating plate) and the permissible payloads of the transportation means.
Fans may only be transported protected from the weather, unprotected transport is not permitted. Moisture ingress into the packaging is not permitted.
Transport the fans either originally packed or larger fans using the transport devices provided: holes in support arms, wall ring plates and motor supports.
Pay attention to possible packaging or fan damages.
Store the product in its original packaging and protect it from dirt and weather until final assembly.
When storing, ensure a dry, vibration-free and condensation-free environment. Avoid extreme exposure to heat, cold or humidity. Temperature range for storage and transport see technical data in the assembly instructions. Recommended values: temperature 0 °C to 40 °C, max. relative humidity 60%. Condensate formation inside the product and / or the packaging can lead to product deterioration and must be prevented.
In case of longer storage in a humid atmosphere, the fans must be put into operation monthly for at least 2 hours, at least 80% of the rated speed, to allow any moisture that may have penetrated them or condensation that has formed inside, to evaporate and to redistribute the bearing grease or to avoid standstill markings / bearing rust respectively.
Only for AC fans: For fans with protection class IP55 or higher (protection class according to DIN EN 60529 or DIN EN 60034-4), the existing condensation drain hole must be opened at least every six months. Fans may be stored for a maximum of 1 year. For longer storage periods, the fans must be turned by hand at least 30 revolutions per month to avoid damage to the motor bearing. If this has not been done, a pre-damage of the ball bearings must be expected. In this case ZIEHL-ABEGG cannot assume any warranty for the function of the motor bearings. After 2 years storage at the latest, the ball bearings must be replaced before commissioning.

Spare parts:

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In all warranty cases repairs have to be carried out by ZIEHL-ABEGG. In all other cases spare parts shall meet the specifications of the original installed parts to ensure error-free operation. Use of original ZIEHL-ABEGG spare parts is recommended.

Specific application/Intended purpose:

This product was designed with the above-mentioned features.
Suitability of the product for specific application is beyond the control of ZIEHL-ABEGG.
ZIEHL-ABEGG can therefore neither guarantee nor prove the suitability of this product for the specific application or customer's intended purpose.
The customer is responsible for testing and releasing the product for his intended application.

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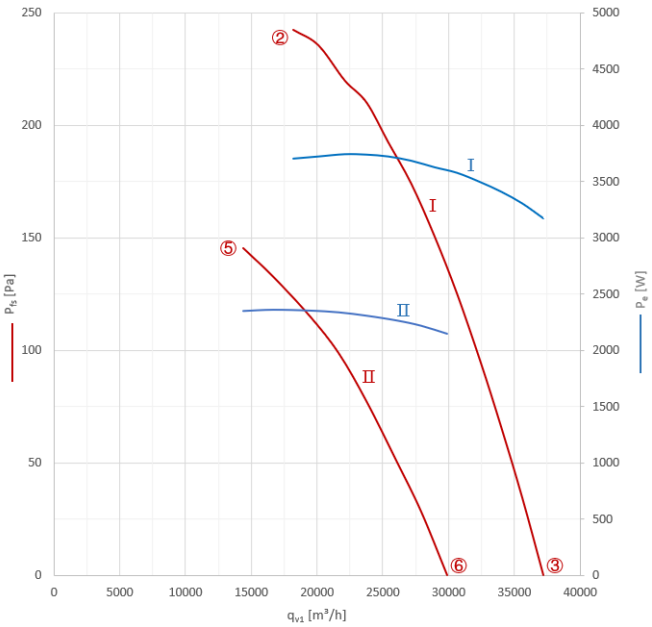
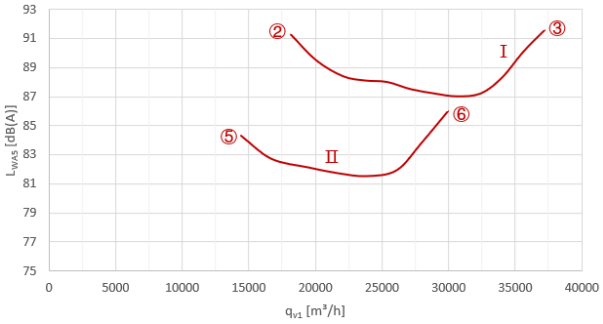
6. Characteristic curve

FC091-SDS.7Q.V7P2	Measured in full nozzle without guard grille in air flow direction V in installation type A according to ISO5801
3~ 400V 50Hz D/Y	measurement density 1.16 kg/m³

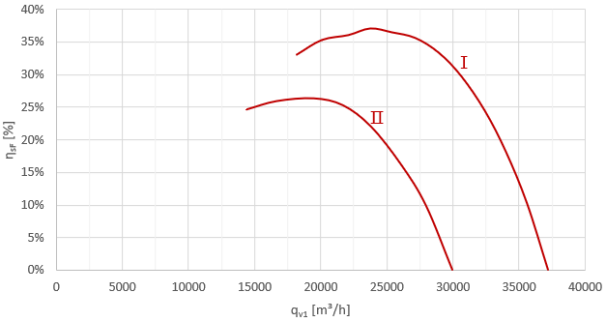
Air performance & Power input



Acoustics



Efficiency



I = 3~400 V D, II = 3~400 V Y

Operating point		②	③	⑤	⑥
Characteristic curve		I	I	II	II
Connection		Δ	Δ	Y	Y
Voltage	V	400	400	400	400
Input power	W	3700	3200	2400	2200
Current	A	7.6	7.0	4.3	3.90
Speed	min^{-1}	880	900	680	730
Suction side sound power level	dB(A)	91	92	84	86

Please note: It's not allowed to use this fan in the stall area!*

*In doubt please ask your responsible ZIEHL-ABEGG sales contact.

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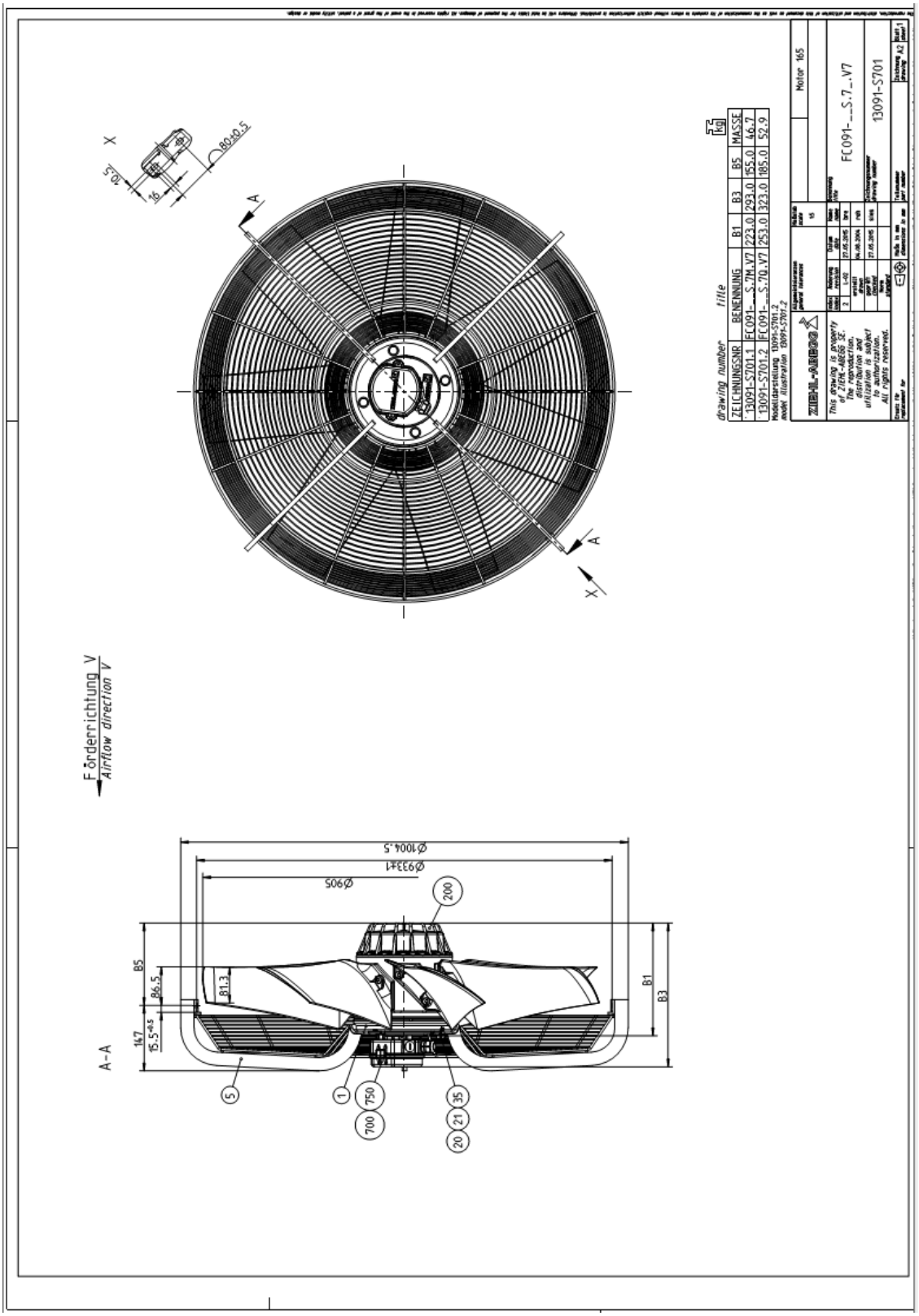
7. Drawing



Dimensions in mm

The illustrations shown make no claim to completeness and are for orientation purposes only.

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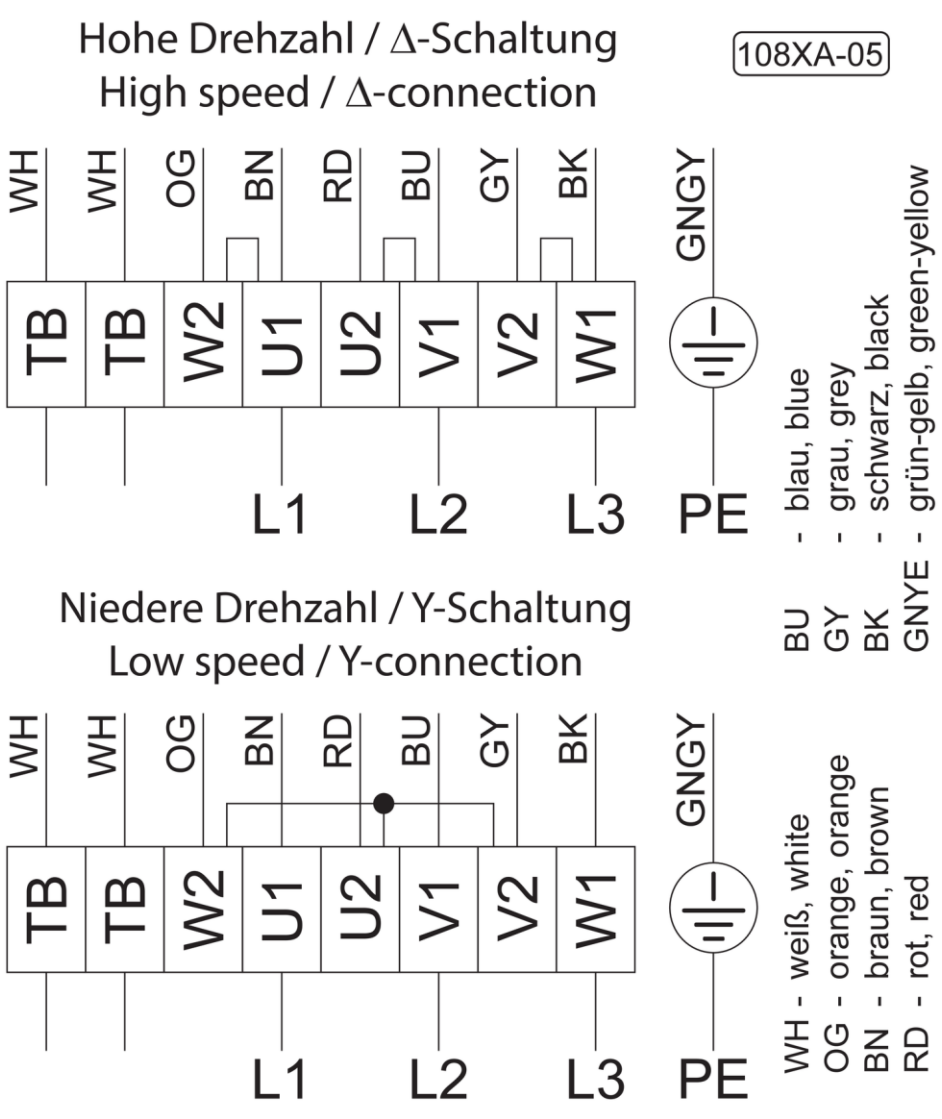
8. Connection diagram

3~ Motor mit 2 Drehzahlen (Δ/Y-Umschaltung) und Thermostatschalter (falls eingebaut). Ohne Brücke bei Verwendung von Drehzahlumschalter.

3~ motor, 2 speeds (Δ/Y switch over) with thermostatic switch (if built in). Without bridge when using speed change-over switch.



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9. Aerodynamics and Acoustics

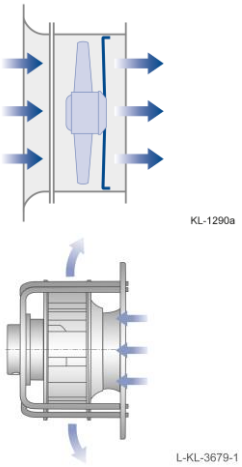
Measurement method

The characteristic map display shows the pressure increase Δp_{sF} in Pa as a function of the volume flow rate q_V in m^3/h.

Technical conditions of supply

The specified performance data meet the respective requirements for accuracy
- AN2 for centrifugal impellers without motor
- AN3 for centrifugal fans with standard motors
- AN2 for centrifugal impellers with ECblue motors (except EC055)
- AN3 for centrifugal impellers with ECblue motor EC055 (see type key)
- AN3 for axial fans with ECblue motors
- AN4 for axial fans with AC external rotor motors

in line with **ISO 13348** and apply to the rated data and air performance curves at the rated voltage. The continuous line in the characteristic curve represents the optimum reliable operating range for fans.



Installation type A according to ISO 5801

Fan test bench

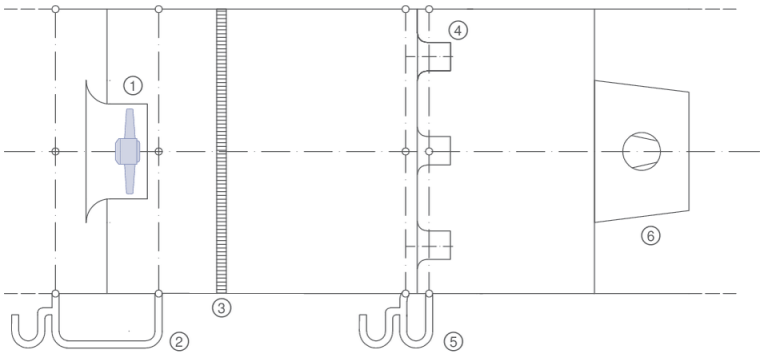
The fan characteristic curves are determined on a combined ventilation and sound test bench.
The characteristic curves are measured in compliance with **DIN EN ISO 5801** and **AMCA 210-99**. The sound power levels are measured in compliance with **DIN EN ISO 3745** and **ISO 13347-3** using the enveloping surface measuring method.

The figure below shows an example of the measuring setup. The fan is installed in the measuring chamber at free inlet and free exhaust (installation type A as per **DIN EN ISO 5801** or **AMCA 210-99**).


Technology Centre (InVent)

Air density

The air density and humidity are conditioned during the measurement using heat exchangers and kept largely constant. The characteristic curves shown refer to the measuring density. The mean measuring density is 1.16 kg/m^3.



① Test fan
② p_{fs}
③ Flow straightener
④ Nozzles
⑤ Δp Differential pressure
⑥ Auxiliary fan

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Noise level data

The sound power levels are determined by using the enveloping surface method in compliance with **ISO 13347-3**, accuracy class **1** and/or **DIN EN ISO 3745**.

This is done by measuring the sound pressure level L_p of the individual third-octave bands at 12 points on the enveloping surface (Fig. Ia). The measured sound pressure levels for the third-octave bands are initially used to calculate the sound power level for the third-octave bands and then the suction side sound power level L_{W5}. To do this, the fans are installed with a free inlet (from the measuring chamber) and free exhaust (into the surrounding area). The standard measurements are carried out without the need for additional parts, e.g. guard grille. The measuring equipment used complies with **DIN EN 61672**.

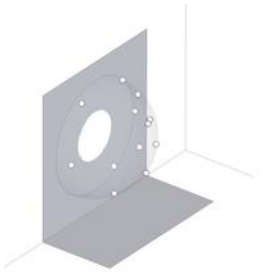

Fig.Ia: Position of microphones



Fig. Ib: Fan test-bench

Because of the different weighting of the third-octave sound power level, the A-evaluation, which is typically carried out, takes into account the subjective nature of human sound perception. The A-tested sound power level is the standard variable used to assess the sound characteristics of technical equipment.

Calculation of pressure side sound power level and total sound power level

For axial fans, the pressure side sound power level is approximately equal to the suction side level. The total sound power level is calculated by adding up the power from the sound power levels of both the suction and the pressure side (see **DIN 45 635 Part 1, Appendix F, DIN EN ISO 3745**). Thus, it is approximately 3 dB higher than the suction side sound power level specified.
For centrifugal fans, as a rule, the A-weighted pressure side sound power level LW, DS is about 5 dB higher than for the suction side. The overall sound power level LW, ges is therefore about 6.5 dB higher than the suction side sound power level.

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Determination of total sound power level during the interaction of several sound sources

The total sound power level of several individual sound sources operating concurrently is calculated by adding the power of the individual levels in compliance with **DIN EN ISO 3745**. This equation is the basis for the diagrams in Fig. II and III.

To add up several sound sources with the same level, please see diagram (Fig. II) for complete level information; e.g. 6 identical sound sources operating concurrently results in a total level that is approx. 8 dB higher.

The total sound power level of two sound sources with different levels can be seen in diagram Fig. III. For example, two sound sources whose sound power levels differ by 4 dB produce a total sound power level that is around 1.5 dB higher than that of the louder sound source.

Determination of sound pressure level

The A-tested sound pressure level LpA for rooms with average absorption capacity for a distance of 1m from the fan axle is calculated by subtracting 7 dB from the A sound power level L_{WA}. In most cases, this assumption is correct and provides a sufficient level of accuracy. However, the sound characteristics can be hugely influenced by the individual installation situation.

Absorption of the sound pressure level, depending on the distance with partial reflection, is shown in Fig. IV.

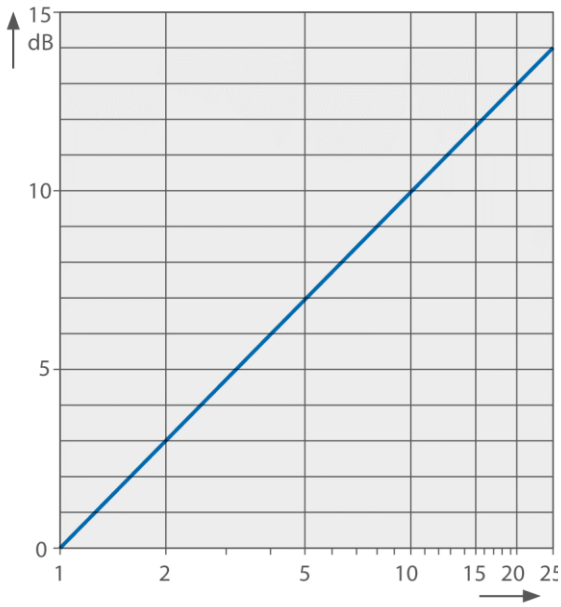

Fig. II: Addition of several sound sources

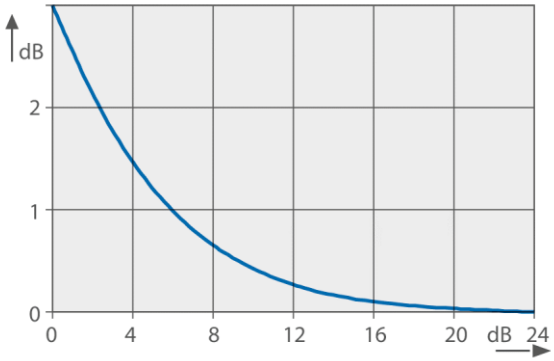

Fig. III: Sound sources of different levels

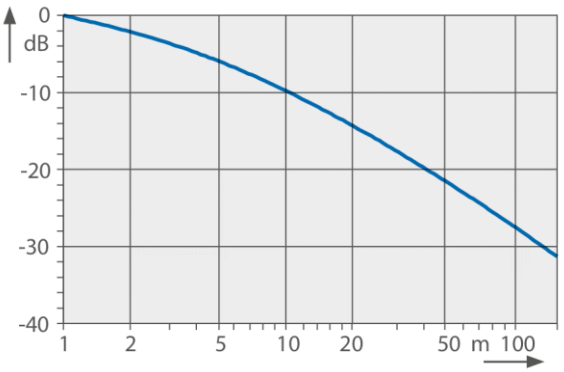

Fig. IV: Reduction of sound pressure level

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ISO-Zertifikate
Zertifikat DIN EN ISO 9001:2008
Zulassung gemäß DIN EN ISO 3834-2

Environmental guideline
Umweltrichtlinie
Environmental guideline

10. Deviation list

No customer specification was available. Please note that ZIEHL-ABEGG does not confirm technical requirements beyond this specification if they are not listed in a list of deviations.

In case of special requests/application notes/application notes in the customer order, edit or delete if necessary:

The suitability of the product for sea atmosphere/dishwasher/offshore is beyond the influence of ZIEHL-ABEGG.
ZIEHL-ABEGG can therefore neither guarantee nor prove the suitability of this product for this specific application or the customer's intended use. The customer is responsible for testing and approving the product for its intended use.

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11. Deviation list

ZIEHL-ABEGG has commented the given requirements of the customer specification Number XXXX version YYYY dated ZZZZ in the deviation list below. Deviations must be made transparent.
Technical requirements of the customer specification mentioned above are accepted by ZIEHL-ABEGG unless they are not commented in the following deviation list. In that case, the version included in the deviation list shall supersede the customer specification.
In case of doubt between the above mentioned customer specification and this technical product specification, the technical product specification is considered as agreed.

Customer specification no.:	
Customer part no.:	
No.	
Remarks	

12. Attachments

- Customer specification
- Deviation list ZIEHL-ABEGG

ZIEHL-ABEGG has commented the given requirements of the customer specification Number XXXX version YYYY dated ZZZZ in the deviation list below. Deviations must be made transparent.
Technical requirements of the customer specification mentioned above are accepted by ZIEHL-ABEGG unless they are not commented in the following deviation list. In that case, the version included in the deviation list shall supersede the customer specification.
In case of doubt between the above mentioned customer specification and this technical product specification, the technical product specification is considered as agreed.

Deviation list see appendix

13. Attachments

- Customer specification
- Deviation list ZIEHL-ABEGG

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