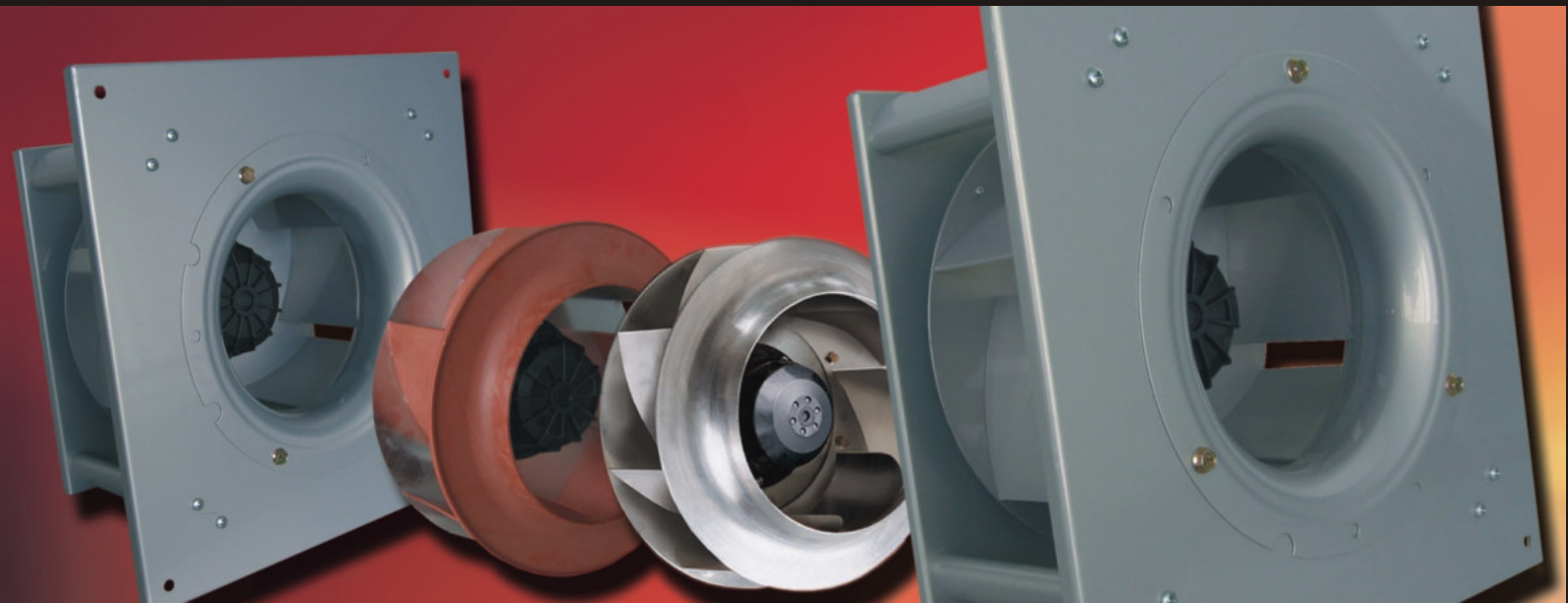


# Backward Curved Motorized Impellers

with external rotor motor

## H-SERIES/W-SERIES



### Rosenberg USA

1503 Rocky River Road North  
Monroe, NC 28110

Ph: (704)289-5423

Fax: (704)283-7170

[www.rosenbergusa.com](http://www.rosenbergusa.com)  
[sales@rosenbergusa.com](mailto:sales@rosenbergusa.com)

## Serving North America with the highest quality **MOTORIZED IMPELLERS, FANS and BLOWERS**

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ETRI  
Paris, France

Our family of companies is supported by over 900 employees with state-of-the art R&D and manufacturing throughout the world. Rosenberg USA, with offices and warehouse in Monroe, NC, is uniquely qualified to service all your air handling applications:

- Technical Expertise & Application Engineering
- Outstanding Customer Service
- Design Flexibility & Custom Fan/Motor Equipment
- Stock Fans for Immediate Shipment
- Full Line of Accessory Products & Controls
- Value Added Manufacturing & Fabrication



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**Reference Code**

**D K H R 355 - 4 S H . 127 . 4 FF - 001**

**Current**

- D = Three phase A.C.
- E = Single phase A.C.

- KH = Free running impeller with external rotor motor

**Type**

- R = Motor impeller without inlet cone
- M = Fan module for assembly

**Impeller diameter**

- 355 = 355mm (14 inches)

**No. of poles**

- 2=2 F=2-2
- 4=4 G=4-4
- 6=6 H=6-6

**Cable outlet**

- S = Flying leads

**Type of impeller**

- H = Backward curved High performance impeller with 6 blades
- W = Backward curved High performance impeller with 8 blades

**Impeller width**

in mm

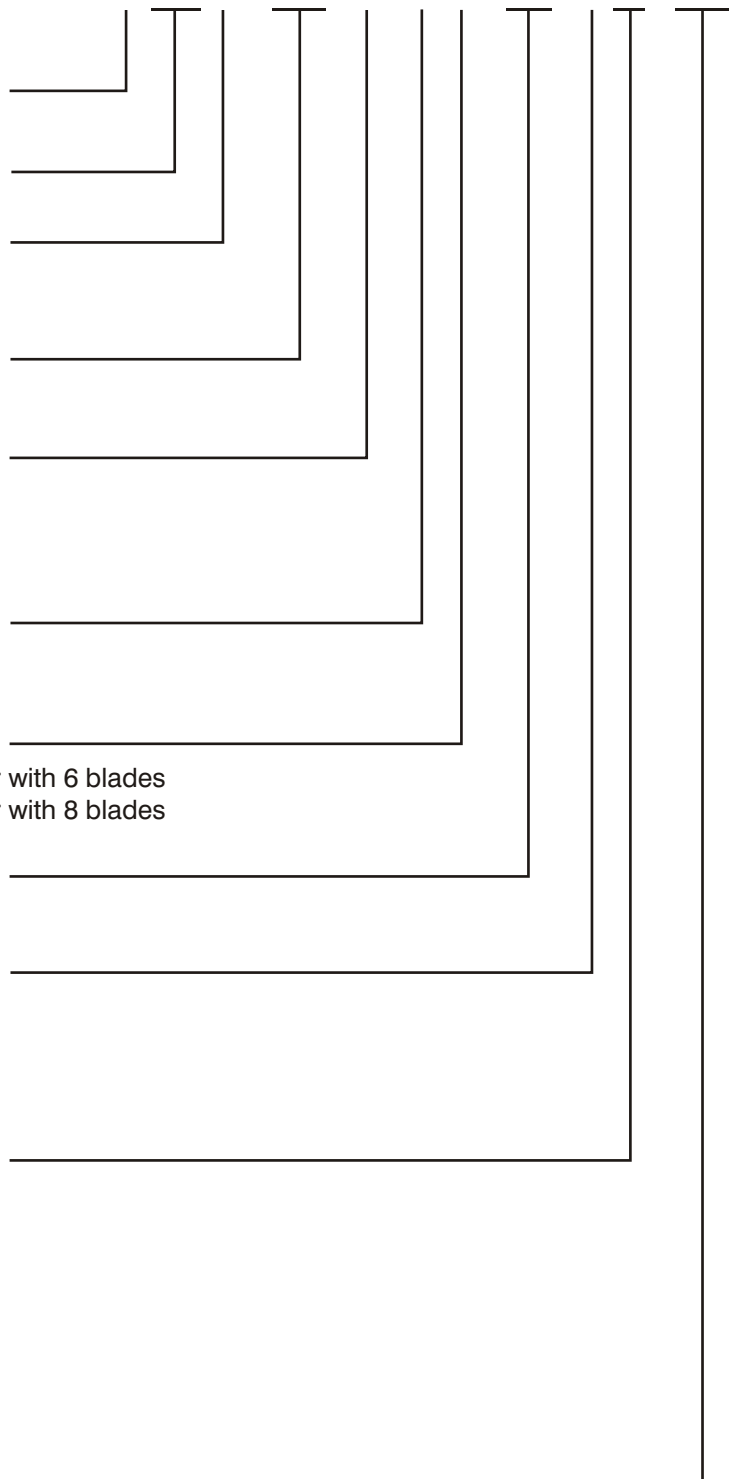
**Motor size (Internal Data)**

- 4 = External rotor motor type 080
- 5 = External rotor motor type 106
- 6 = External rotor motor type 137
- 7 = External rotor motor type 165

**Package length (Internal Data)**

- A=0
- D=3 e.g. FF = 55 mm
- E=4
- F=5
- H=7
- K=9
- L=10
- N=12

**Consecutive number**



## Characteristics and Construction

**Rosenberg Radial Fans with free-running impeller type E/DKHR** form a compact and constructively optimal fan unit by combining an external rotor motor and a backward-curved impeller.

During development of the backward curved impeller, Rosenberg attached great importance to high efficiency and at the same time a most optimal sound level.

Fans of this construction are designed for installation in appliances such as air handling units, hygienic units, clean room filter units and air conditioning units.

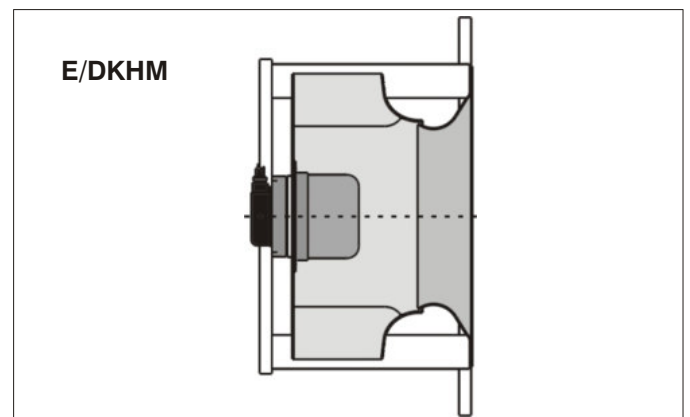
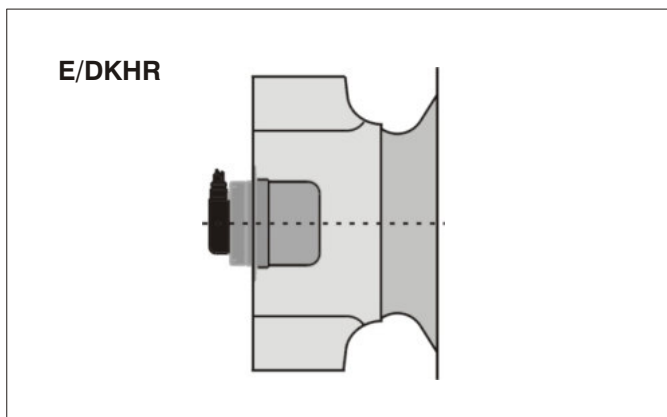
The fans are for clean air application and ventilation of non-aggressive vapors and fumes.

The standard execution is the construction:

- **\_KHR**: Motorized impeller without inlet cone (inlet cone as an option)

Available on request:

- **\_KHM**: Fan module
- Special solutions according to customer requirements (OEM)



## Impeller



### H-series:

The impellers with 6 backward curved blades are made of polyamid 6.6 with 30% fiber glass. The back plate of the impeller is galvanized steel. Aluminum impellers are available as an option.



### W-series:

The impellers with 8 backward curved blades are made of Aluminum sheet (AlMg3). Steel impellers with epoxy coating can also be supplied if requested.

The impellers are statically and dynamically balanced with external rotor motor according to quality level G2,5 DIN ISO 1940

## Direction of rotation

The direction of rotation of the impeller viewed from the inlet side is clockwise. Wrong direction of rotation can overload the motor. It is essential to check the direction of rotation prior to operation.

## Inlet cones

The inlet cones are made of galvanized steel. They are fluidic optimized to supply a good airflow towards the impeller. The optimal immersion depth of the impeller is described on each dimensional sheet.

## Motors



Rosenberg external rotor motors are in protection class IP54.

The winding insulation corresponds to insulation Class F.

Ball bearings, closed on both sides are used. Special grease lubrication provides maintenance-free operation, low-noise and extended life.

## Motor protection

All motors are equipped with thermal contacts, wired in series. Thermal contacts are temperature dependent control elements, sensing the winding temperature of the motor. These contacts protect the motor windings from overload, failure of a mains phase, locking of the motor and from too high temperatures of the medium to be ventilated.

In addition to the mounted thermal contacts we recommend the use of our motor protection control units.

Rosenberg also offers 5-step voltage controls, RTE and RTD types.

By use of this controllers an additional motor protection switch is not required.



**Electrical connection**      The nominal voltage given on the nameplate provides maximum allowable voltage tolerance of  $\pm 10\%$ .  
 Flying leads are standard.  
 The connection ends are 10 cm (4 inches) dismantled and equipped with end splices.  
 Standard cable length is 68 cm (27 inches)  
 Special cable lengths are available on request.

**Voltages types**                      For single phase operation, motors are available for 115V, 208/230V and 277V.  
 All 230V motors could also be used at 1~230V, 50Hz.  
 For three phase operation, motors are available for 208V / 230V $\Delta$  // 460V Y.  
 575V and other special voltages are available on request.

Please reference 60Hz-curves:  
 - Standard three phase motor can be used at 460V (Star connection) **and** 230V (Delta connection). In Delta connection the motors are also suitable for 208V 3~ power supplies).  
 - The performance curves show that the 230V $\Delta$  performance is a little less than the 460VY performance.  
 The standard three phase motors could also be used at 400V Y, 50Hz.

**Speed control**                      Speed control can be provided for fans that demand optimal adjustment of the operation point. Speed control is obtained by “Voltage Control” and “Frequency Control”, as described below.

**Voltage control**  
 The speed control is provided by reduction of the terminal voltage. If the voltage will be reduced the speed of the motor decreases and the air volume flow sinks in proportion with the speed. The matching voltage controllers can be provided on request.

**Frequency control**  
 All voltage controllable fans for three-phase power supplies can also be speed controlled by frequency converter from 60Hz downwards. The speed control is realized by reduction of the power supply frequency. At higher frequencies than 60Hz the motor will be thermally overloaded.

With operation of the motors on a frequency controller the maximum speed of voltage increase of 500V / $\mu$ s must not be exceeded. According to the frequency converter type and the length of the cable between motor and frequency converter additional components must be planned. Please refer to the operation manual of the frequency converter.

**Volume flow monitor / control**                      A simple volume flow determination and monitoring in an installed condition is possible with ring testing wire on the inlet cone. For this the manufacturer places the relevant gauging performance curves at one's disposal.

**Protection against accidental contact**

The fans are constructed for installation within customer provided casing. We do not include guards of any kind as a part of our standard product offering. Please contact your Rosenberg representative for accessory information.

Before initial operation all required protection components must be installed and connected. Adherence to all electrical and safety codes, including National Electric Codes (NEC), National Fire Protection Association (NFPA) standards and Occupational Safety and Health Act (OSHA) should be followed and are responsibility of the customer. All electrical connections should be performed only by qualified personnel.

**Information on safety of machinery**

Rosenberg radial fans with free running impeller are usable machines according to the EC Council Directive on Machinery. They are marked with a CE label and delivered with a declaration of conformity.

The dangers of the fan as well as necessary technical measures of safety are judged according to the VDMA standard sheet number 24167: Fans, demands of safety.

The operation manual contains additional measures of safety to be realized on site to make the fan match the EC Council Directive on Machinery 98/37/EC.

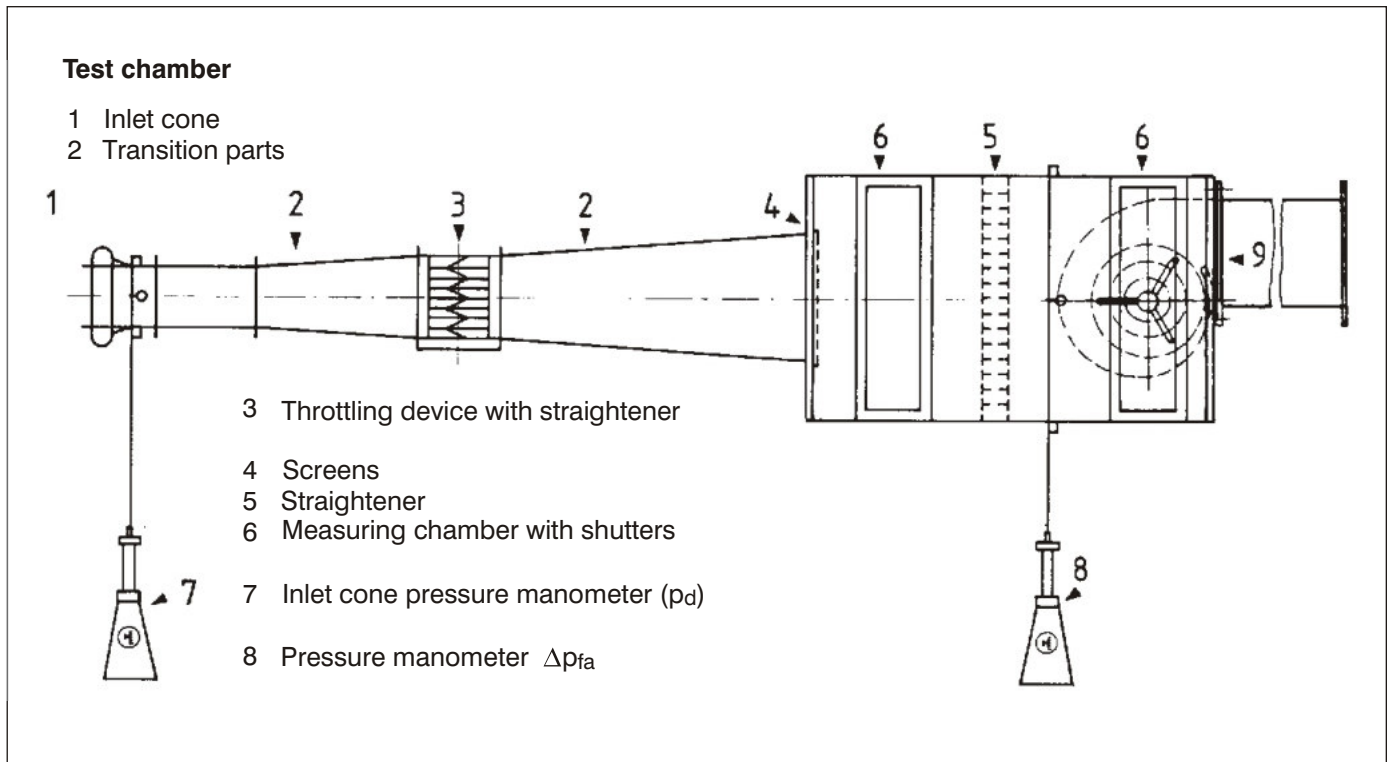
**Advantages of radial fans with free-running impeller:**

- Easy to install due to installation of the complete fan module
- Low for maintenance direct drive fans (no belt wear or belt replacement necessary)
- Hygienic, easy to clean
- Compact, space-saving ventilation units with external rotor motor drive and high performance backward curved impeller.
- Various control possibilities
- Easy determination of the airflow with measuring device
- Customers requirements can be met without problems
- High economic efficiency



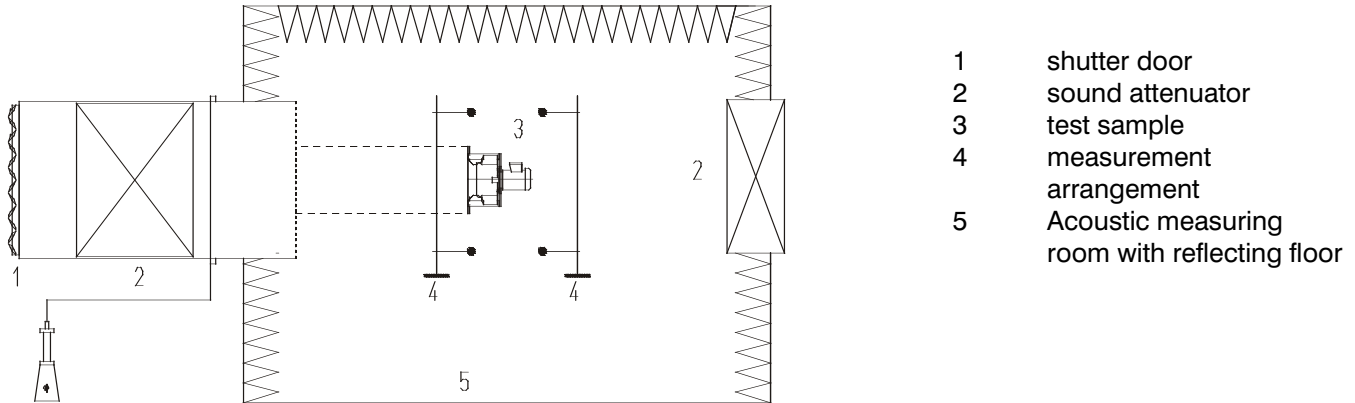
**Air Performance Curves**

The air performance curves have been established using the inlet test method in the test chamber as shown below according to German standard DIN 24163. They are valid for air with a density of 0.075#/ft<sup>3</sup> with a temperature of 68°F. The performance curves were made in mounting position A (free inlet, free outlet) and show the pressure increase, available on inlet side,  $p_{fa}$  as a function of the volume



### Noise levels

The tests and their performance curves were made according to DIN 45635, part 38, according to the envelope surface method, after collection several test points by a cube shaped test area.



- 1 shutter door
- 2 sound attenuator
- 3 test sample
- 4 measurement arrangement
- 5 Acoustic measuring room with reflecting floor

The characteristic diagram shows the “A” decibel Sound Power level  $L_{W(A)}$ . This corresponds to the free-outlet sound power level  $L_{W(A)B}$ .

The free inlet sound power level  $L_{W(A)S}$  can be obtained by the relative sound power level or according to following calculation:

$$L_{W(A)S} = L_{W(A)} - 6 \text{ dB(A)}$$

For the exact determination of the sound protection measures the sound power level of the octave bands are important.

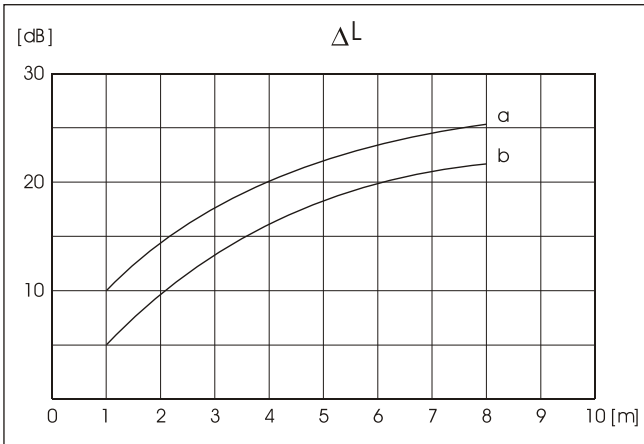
$$L_{Woct} = L_{W(A)} + L_{wrel}$$

### H-series:

_KH_H inlet side	relative sound power level $L_{wrel}$ [dB] at octave medium frequencies fm [Hz]								
	63	125	250	500	1000	2000	4000	8000	Hz
size	63	125	250	500	1000	2000	4000	8000	Hz
315 / 355	-4	-7	-2	-2	-7	-8	-10	-15	dB
400 / 450	-4	-7	-2	-3	-6	-7	-10	-13	dB
_KH_H outlet side									
315 / 355	-3	-4	-2	-3	-4	-8	-15	-18	dB
400 / 450	-2	0	0	-3	-5	-7	-14	-20	dB

### W-series:

_KH_W inlet side	relative sound power level $L_{wrel}$ [dB] at octave medium frequencies fm [Hz]								
	63	125	250	500	1000	2000	4000	8000	Hz
size	63	125	250	500	1000	2000	4000	8000	Hz
250 / 280	-1	-4	-1	-2	-5	-10	-11	-14	dB
315 / 355	-4	-4	-1	-2	-6	-8	-12	-15	dB
400 / 450	-4	-3	0	-3	-6	-7	-12	-15	dB
500 / 560	-3	-4	0	-3	-6	-7	-12	-15	dB
630	-2	-2	0	-3	-6	-7	-12	-15	dB
710	-2	-1	-1	-3	-5	-8	-12	-17	dB
_KH_W outlet side									
250 / 280	-4	-6	-2	-3	-5	-7	-13	-14	dB
315 / 355	-3	-4	-2	-3	-4	-8	-15	-18	dB
400 / 450	-2	0	0	-3	-5	-7	-14	-20	dB
500 / 560	-2	0	1	-3	-5	-9	-16	-22	dB
630	-4	0	0	-1	-5	-9	-15	-19	dB
710	-2	0	-2	-2	-4	-10	-16	-20	dB



The expected sound pressure level on the outlet side can only be approximately determined as the ambient influences can lead to strong deviations.

$$L_{P(A)} = L_{W(A)} - \Delta L$$

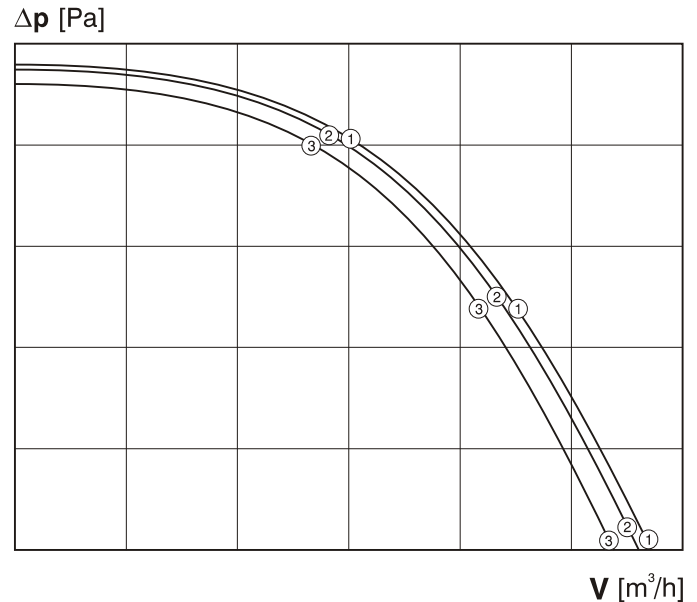
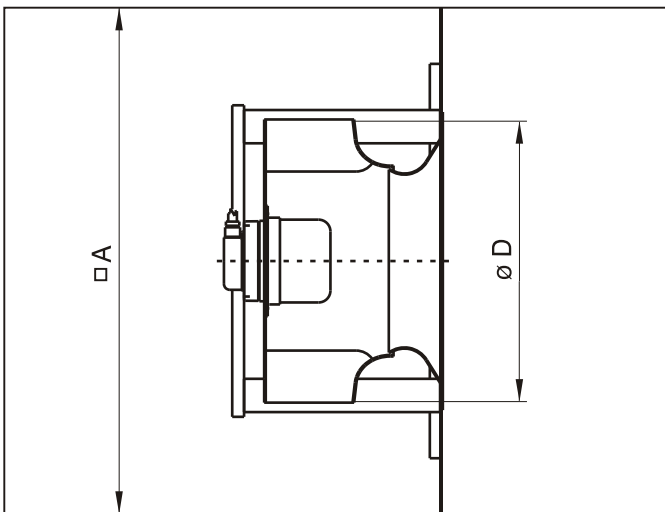
a= without reflections  
b= with reflections

### Installation in casings or air handling units

We recommend to use the installation ratio

$$\frac{\text{Internal dimension of casing A}}{\text{external dimension of impeller D}} > 1.6$$

when installing a radial fan with free-running impeller into a casing. The following diagram shows installation losses with recommended and too small installation ratio.



- 1 Catalogue performance curve without casing: 100% nominal air performance
- 2 Performance curve with A/D = 1.6: 98% nominal air performance
- 3 Performance curve with A/D = 1.2: 92% nominal air performance

On the inlet side a minimum distance of 0.5 x D to adjoining parts has to be kept. So losses on pressure side must not be taken in consideration.

## Performance Curves

The performance curves indicate the static pressure increase  $\Delta p_{fa}$  as a function of the volume flow. The performance curves refer to an air density of  $0.075 \text{ #/ft}^3$ .

Fan performance curve at rated voltage 60Hz:

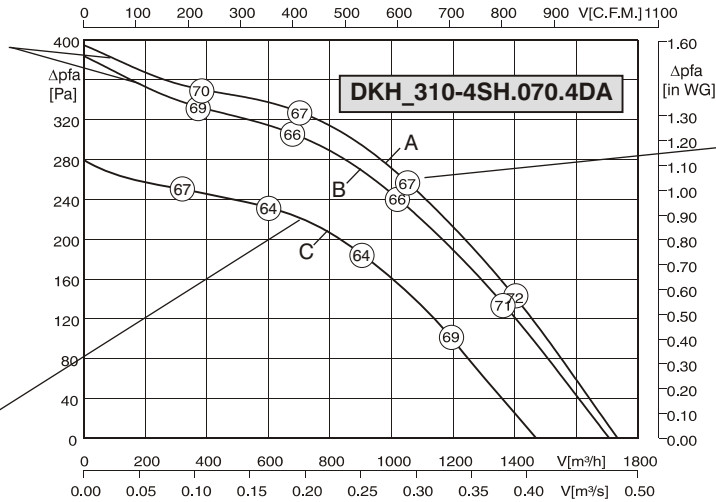
### Single phase motors:

Curve A=rated voltage (115 V or 230 V ; depends on motor execution)

### Three phase motors:

Curve A=460 V Y-connection  
Curve B=230 V D-connection

Fan performance curve at rated voltage 50 Hz



### Information:

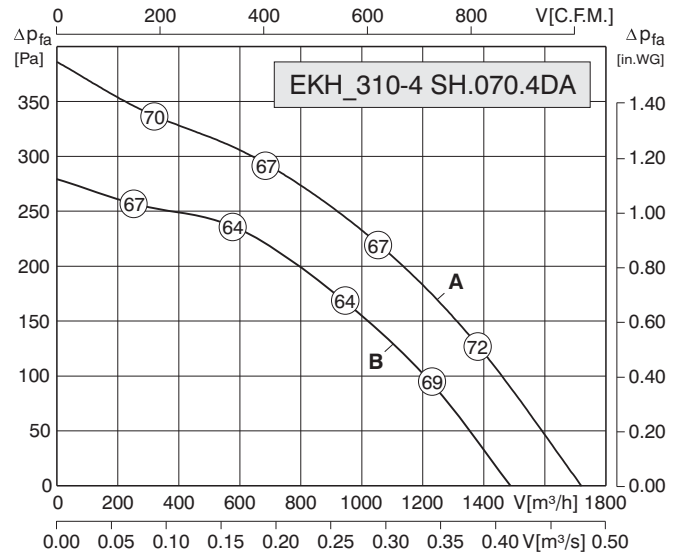
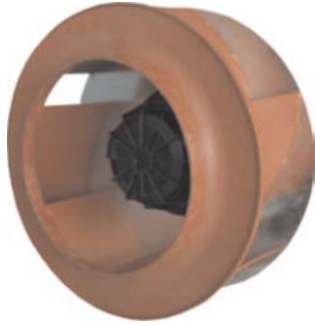
Every three phase motor can be used at 460 V (Star connection) and 230 V (Delta connection). The performance curves show that the  $230V\Delta$  (curve B) performance is a little less than the  $460VY$  (curve A) performance. In Delta connection the motors are also suitable for 208V 3~ power supplies.

Type	U [Volt]	f [Hz]	Curve	$P_1$ [kW]	$I_N$ [A]	n [ $\text{min}^{-1}$ ]	$t_r$ [ $^{\circ}\text{F}$ ]	$t_r$ [ $^{\circ}\text{C}$ ]	C [ $\mu\text{F}$ ]	$\Delta I$ [%]	$I_A/I_N$	$\triangle$	$\star$	$\text{kg}$
DKH_310-4SH70.4DA	3~460Y	60	A	0.195	0.34	1630	158	70	-	-	2.9	54	01.005	$\begin{matrix} 4 \\ 12 \end{matrix}$
DKH_310-4SH70.4DA	3~230 $\Delta$	60	B	0.195	0.55	1575	158	70	-	-	2.9	54	01.006	$\begin{matrix} 4 \\ 12 \end{matrix}$
DKH_310-4SH70.4DA	3~400Y	50	C	0.135	0.33	1390	140	60	-	-	2.8	54	01.005	$\begin{matrix} 4 \\ 12 \end{matrix}$

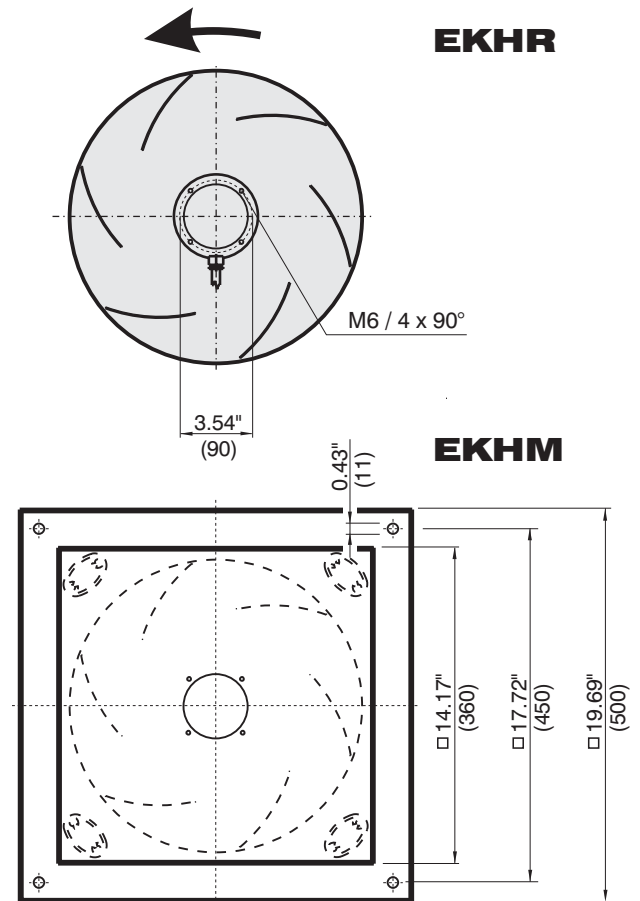
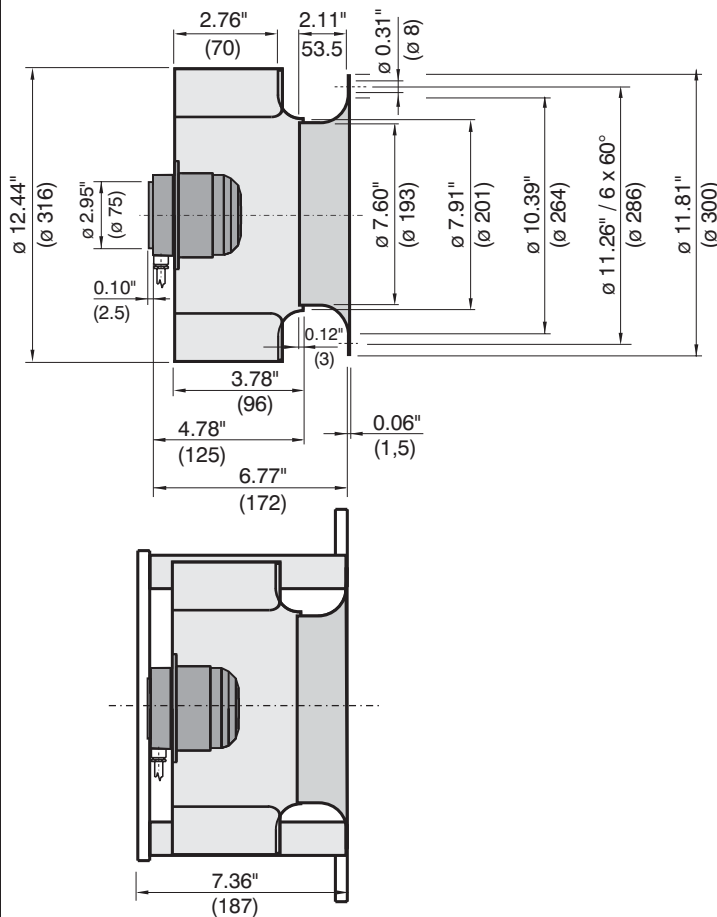
## Technical Information

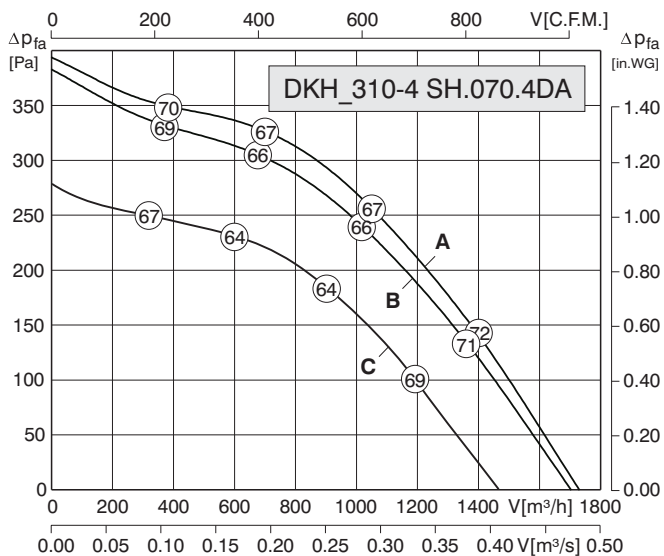
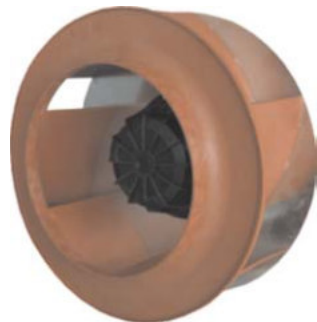
	Designation	Unit
U	Rated voltage	V
$P_1$	Motor input power consumption	kW
$I_N$	Rated current	A
n	Fan speed	$\text{min}^{-1}$
$t_r$	Max. permissible medium temperature	$^{\circ}\text{C} / ^{\circ}\text{F}$
$L_{W(A)}$	A-rated sound power level	dB(A)
$\Delta I$	Current increase in component voltage	%
$I_A/I_N$	Ratio of starting current to rated current	-

## Information of the dimensions in inch and mm!

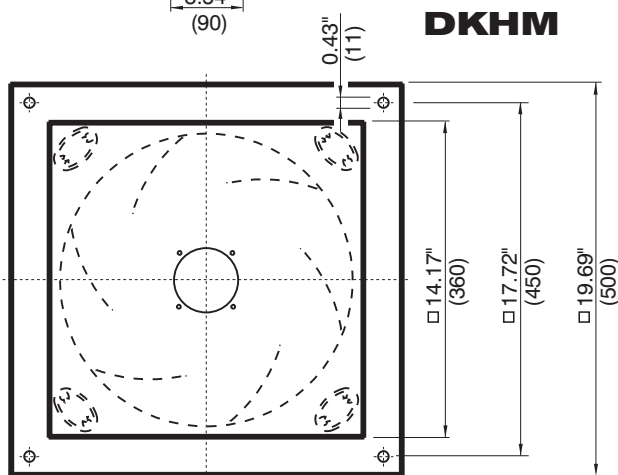
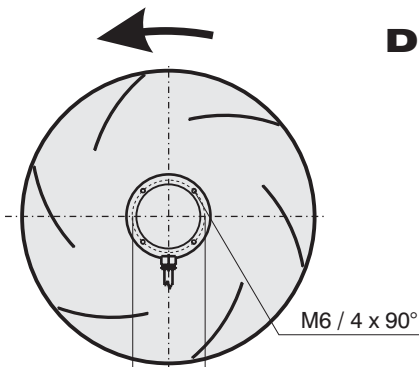
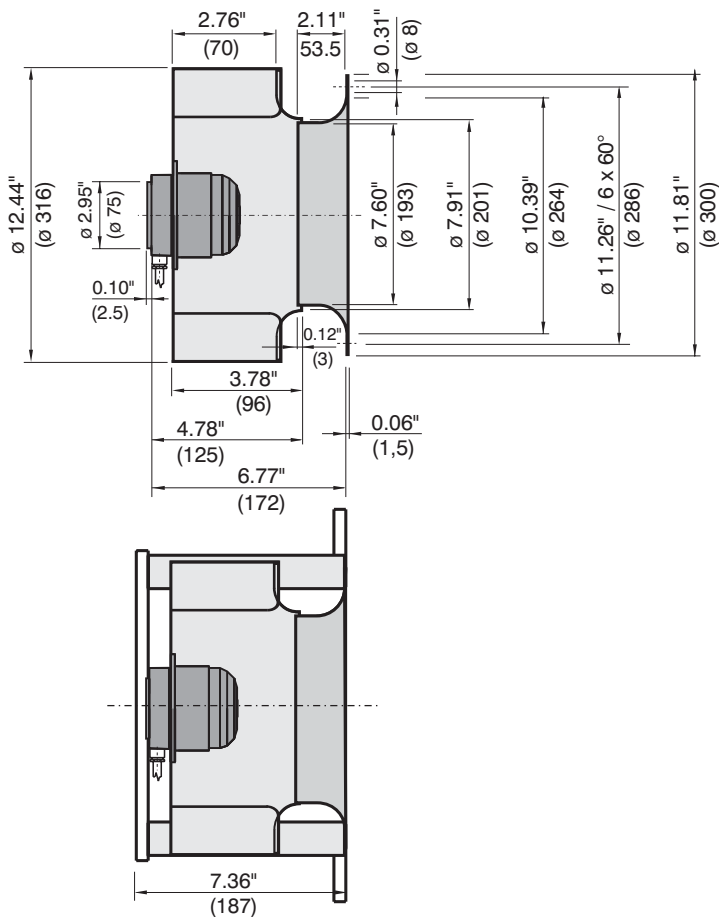


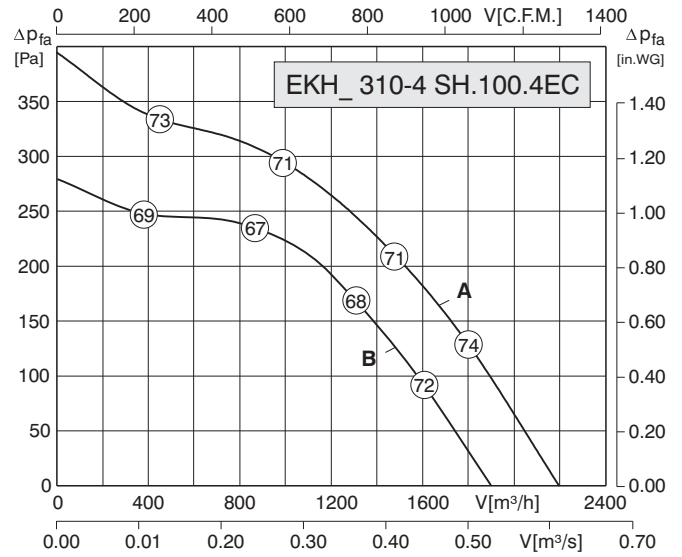
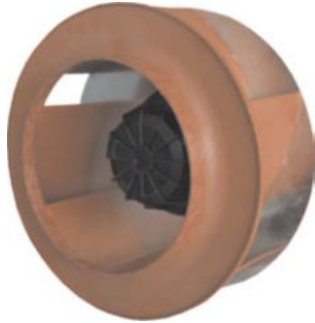
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	▲	★	⊞ [kg]
1 ~ 115	60	A	0.19	1.54	1550	158	70	12	3	1.9	54	01.024	4 / 12
1 ~ 230	60	A	0.19	0.77	1550	158	70	3	3	1.9	54	01.024	4 / 12
1 ~ 230	50	B	0.13	0.60	1380	158	70	3	8	2.5	54	01.024	4 / 12



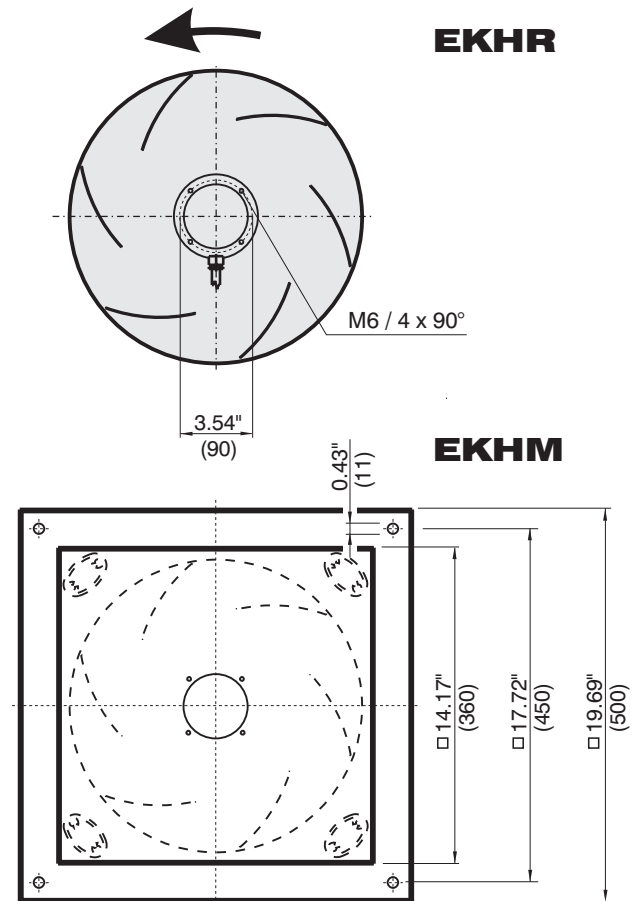
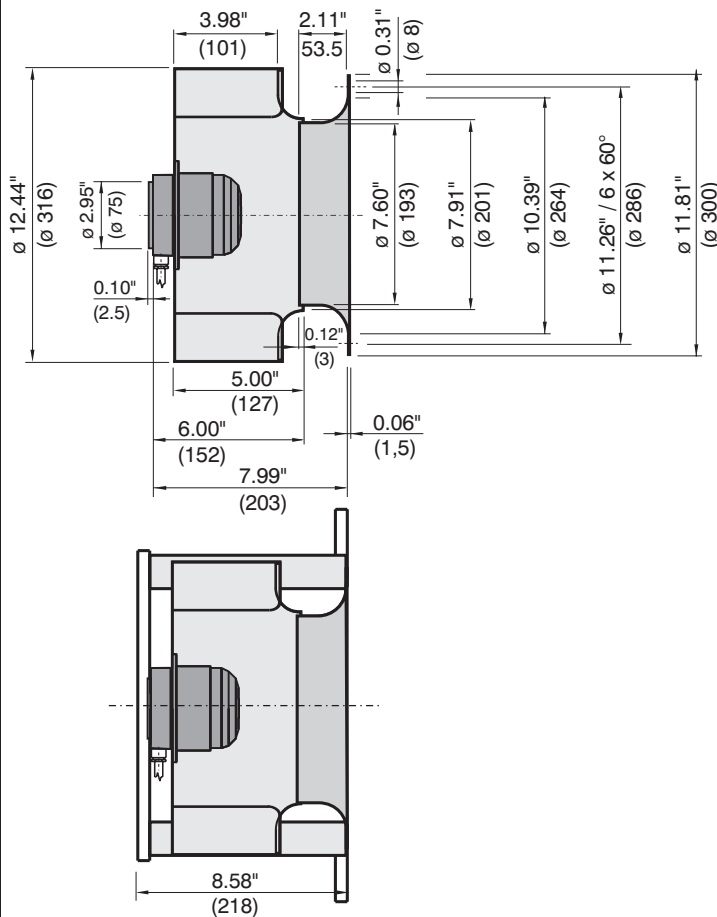


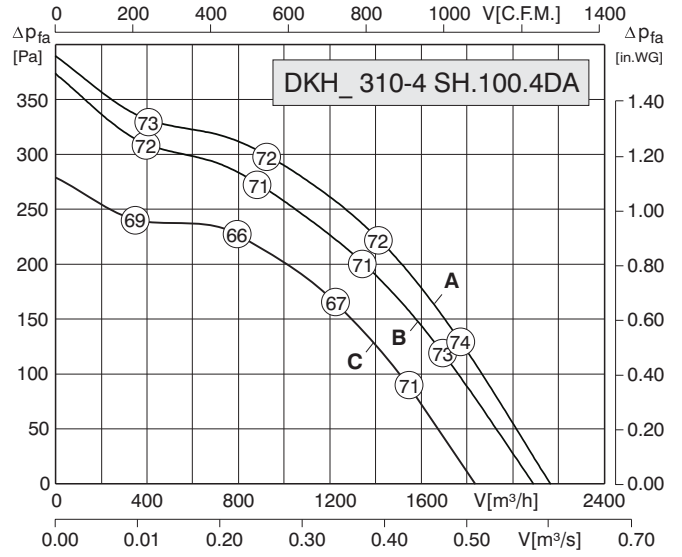
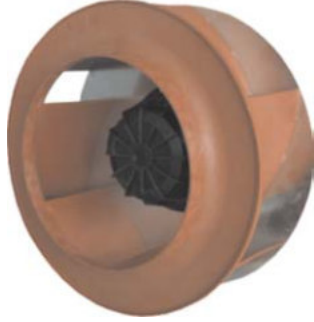
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	0.195	0.34	1630	158	70	-	-	2.9	54	01.005	4 / 12
3 ~230 Δ	60	B	0.195	0.55	1575	158	70	-	-	2.9	54	01.006	4 / 12
3 ~400 Y	50	C	0.135	0.33	1390	140	60	-	-	2.8	54	01.005	4 / 12



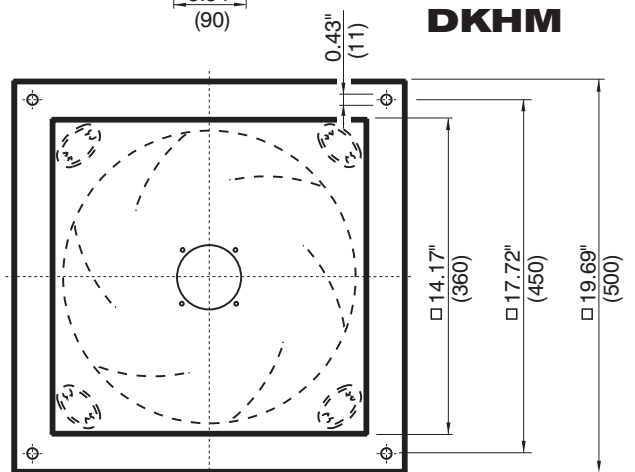
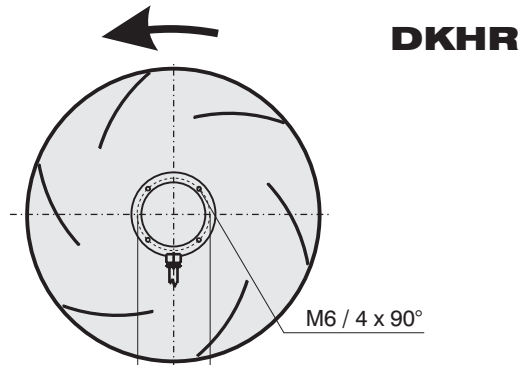
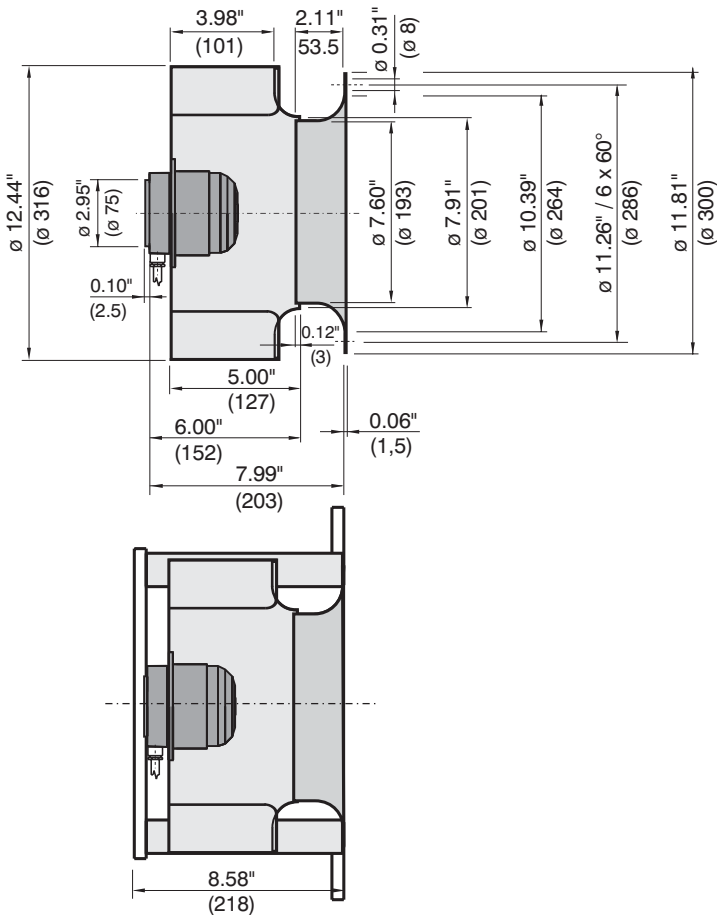


U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	▲	★	⊞ [kg]
1 ~ 115	60	A	0.235	2.10	1560	140	60	16	-	1.9	54	01.024	5 / 13
1 ~ 230	60	A	0.235	1.05	1560	140	60	4	-	1.9	54	01.024	5 / 13
1 ~ 230	50	B	0.180	0.87	1390	158	70	4	23	2.6	54	01.024	5 / 13

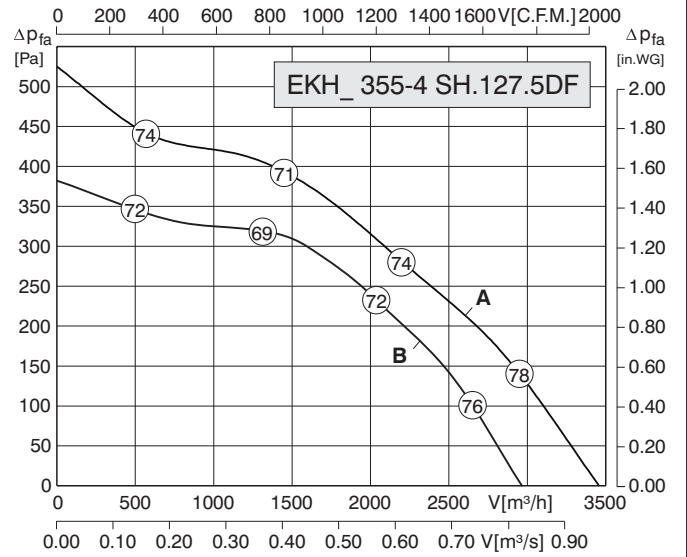
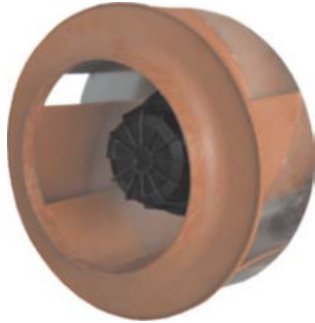




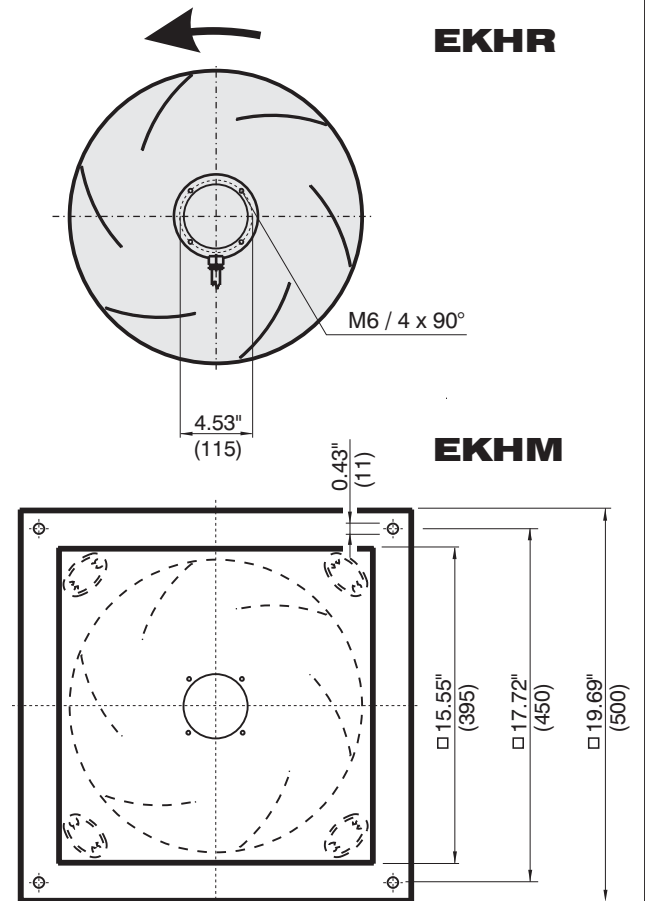
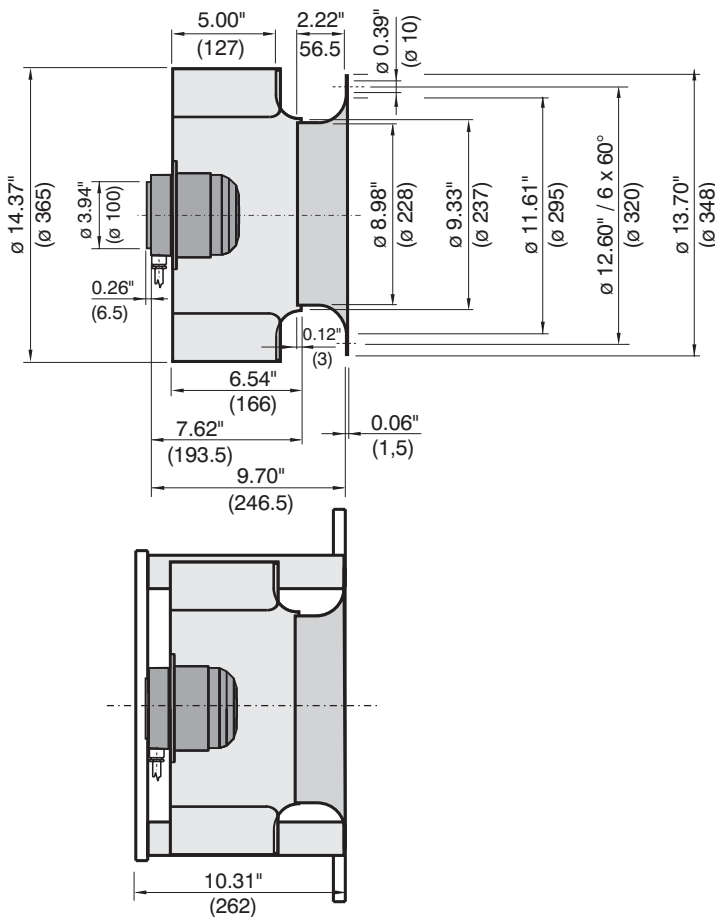
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	0.24	0.38	1560	131	55	-	-	2.5	54	01.005	4 / 12
3 ~230 Δ	60	B	0.22	0.64	1490	149	65	-	-	2.5	54	01.006	4 / 12
3 ~400 Y	50	C	0.16	0.35	1355	149	65	-	-	2.6	54	01.005	4 / 12

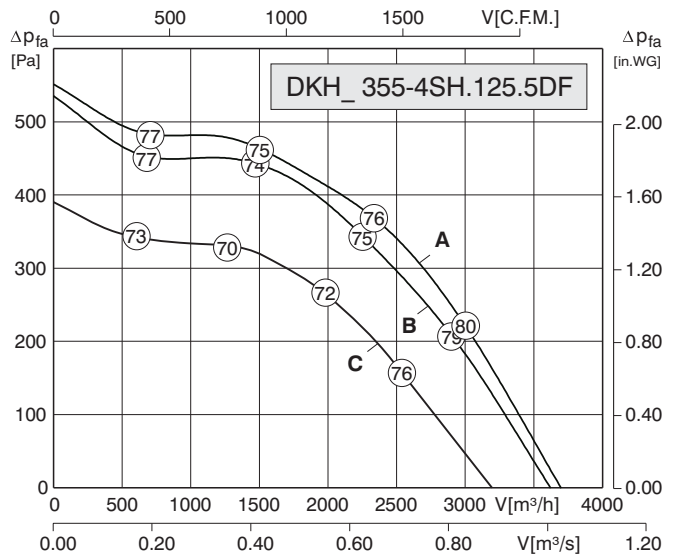
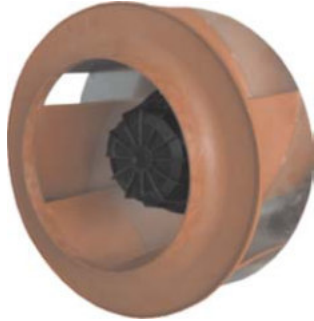




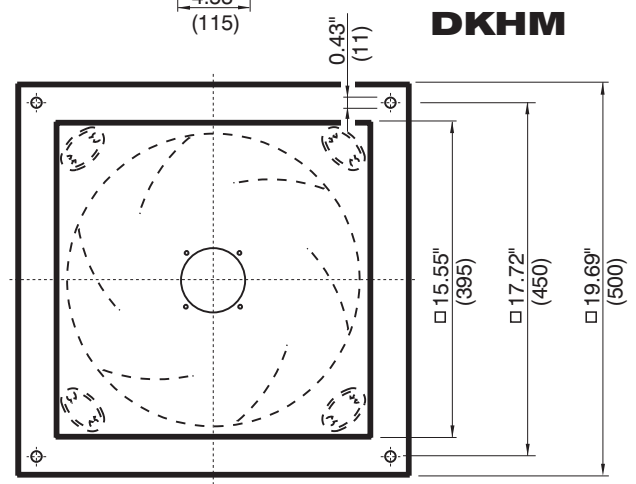
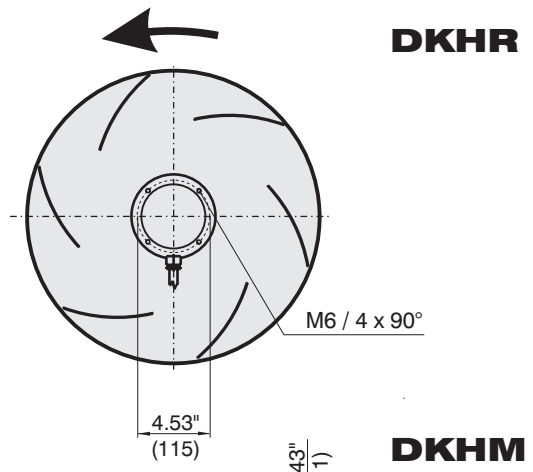
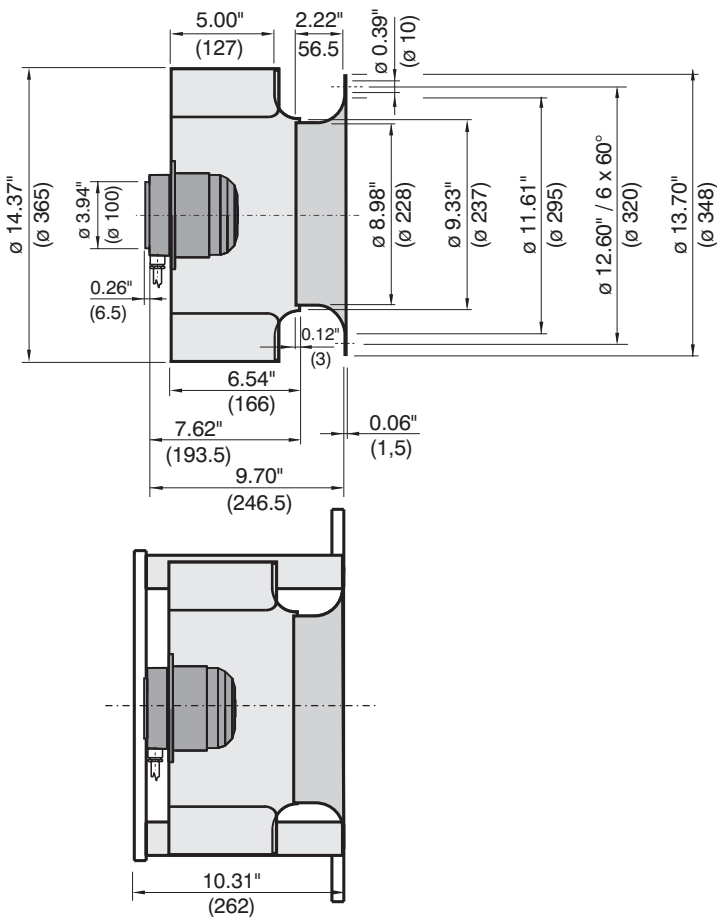


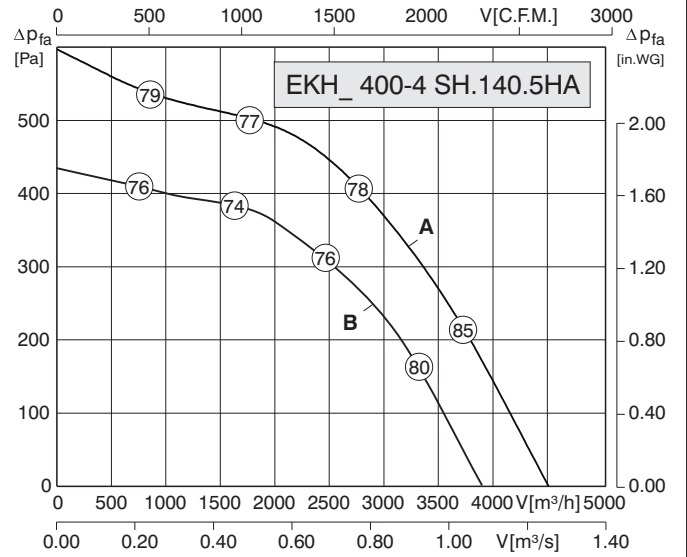
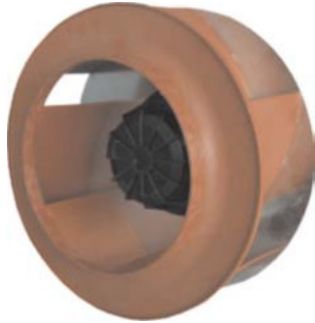
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	▲	★	⊞ [kg]
1 ~ 115	60	A	0.49	4.30	1480	113	45	30	-	1.6	54	01.024	8 / 17
1 ~ 230	60	A	0.49	2.15	1480	113	45	8	-	1.6	54	01.024	8 / 17
1 ~ 230	50	B	0.34	1.50	1360	140	60	8	15	2.5	54	01.024	8 / 17



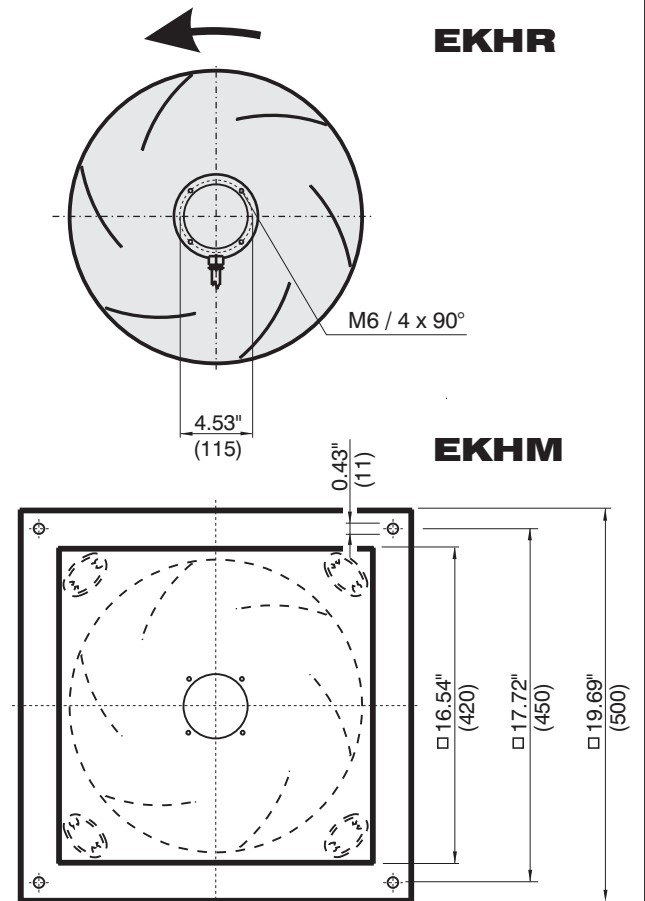
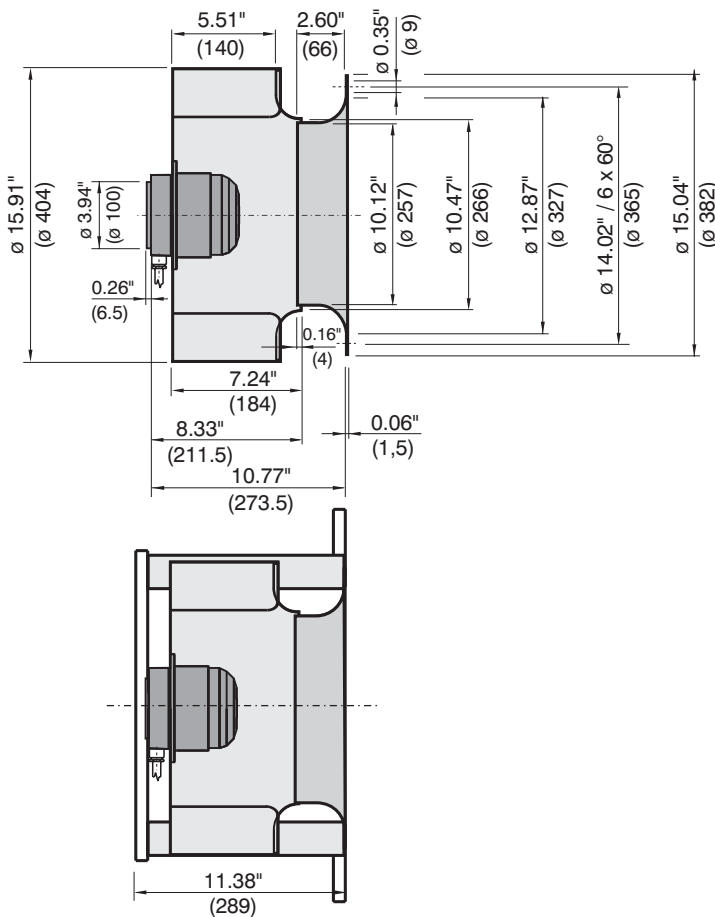


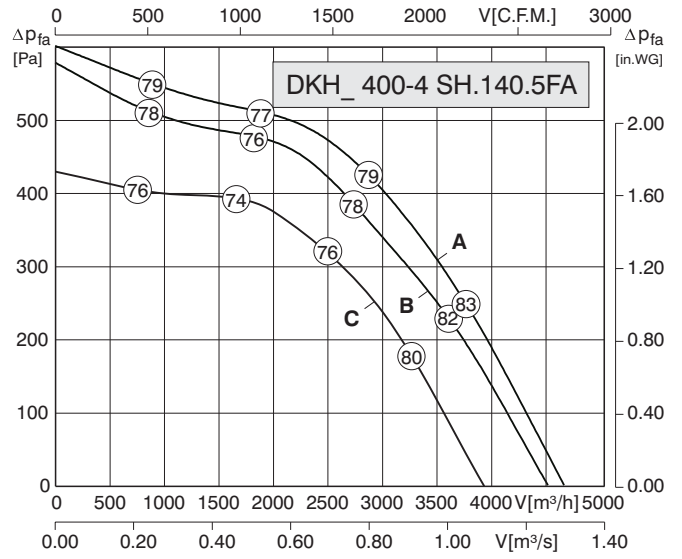
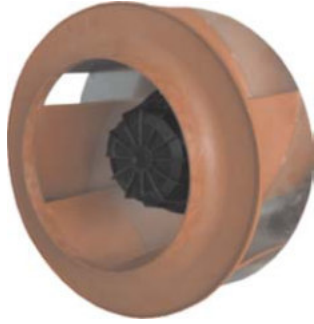
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	0.53	0.88	1620	113	45	-	10	3.5	54	01.005	8 / 17
3 ~230 Δ	60	B	0.51	1.52	1580	113	45	-	10	3.5	54	01.006	8 / 17
3 ~400 Y	50	C	0.34	0.78	1400	140	60	-	3	3.8	54	01.005	8 / 17



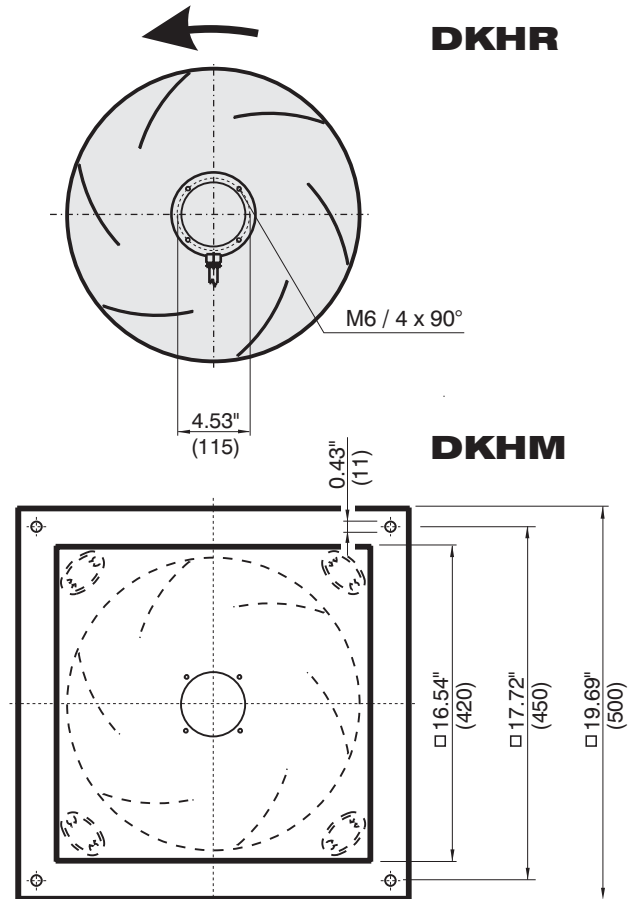
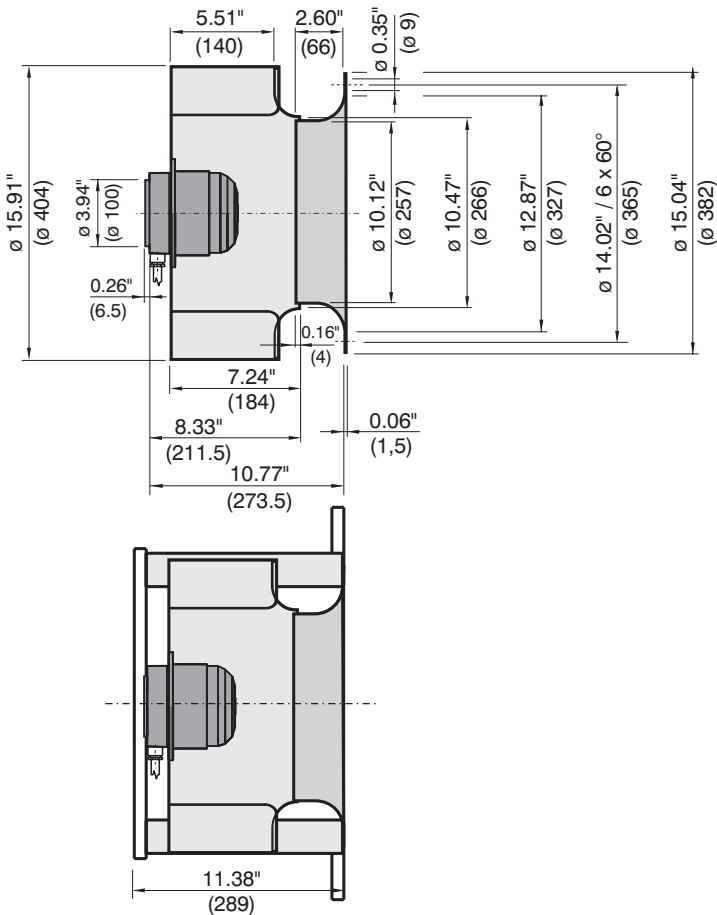


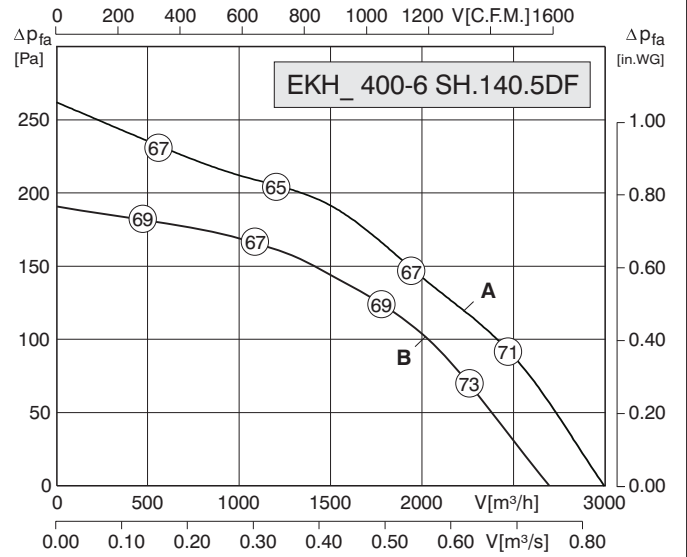
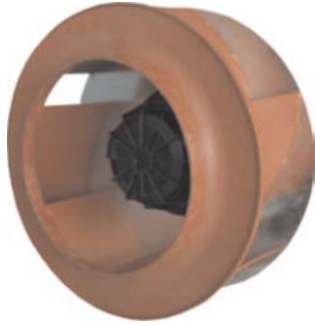
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	▲	★	⊞ [kg]
1 ~ 115	60	A	0.79	6.60	1570	122	50	50	7	2.2	54	01.024	12 / 21
1 ~ 230	60	A	0.79	3.30	1570	122	50	14	7	2.2	54	01.024	12 / 21
1 ~ 230	50	B	0.54	2.80	1356	140	60	14	20	2.9	54	01.024	12 / 21



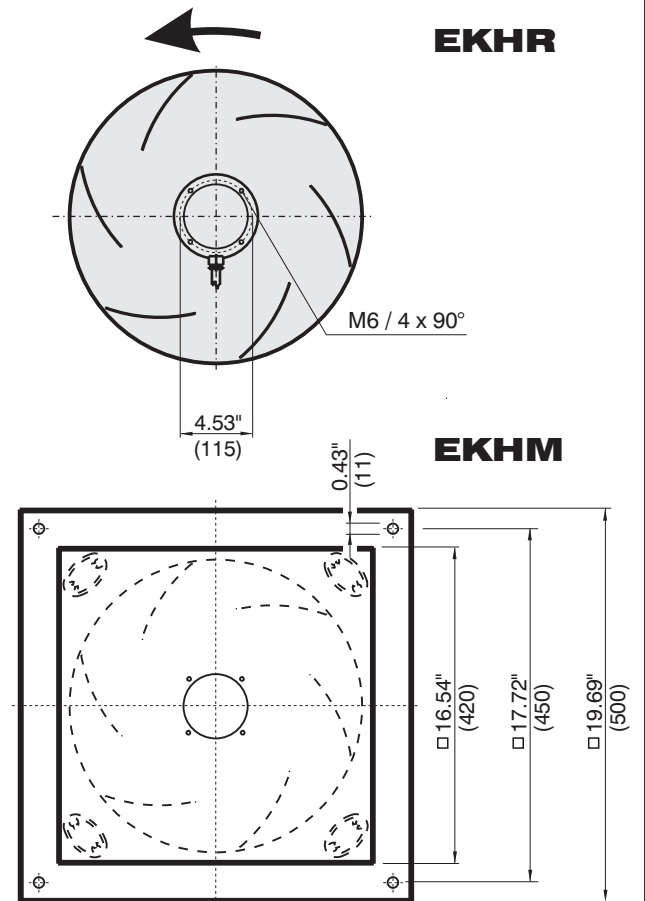
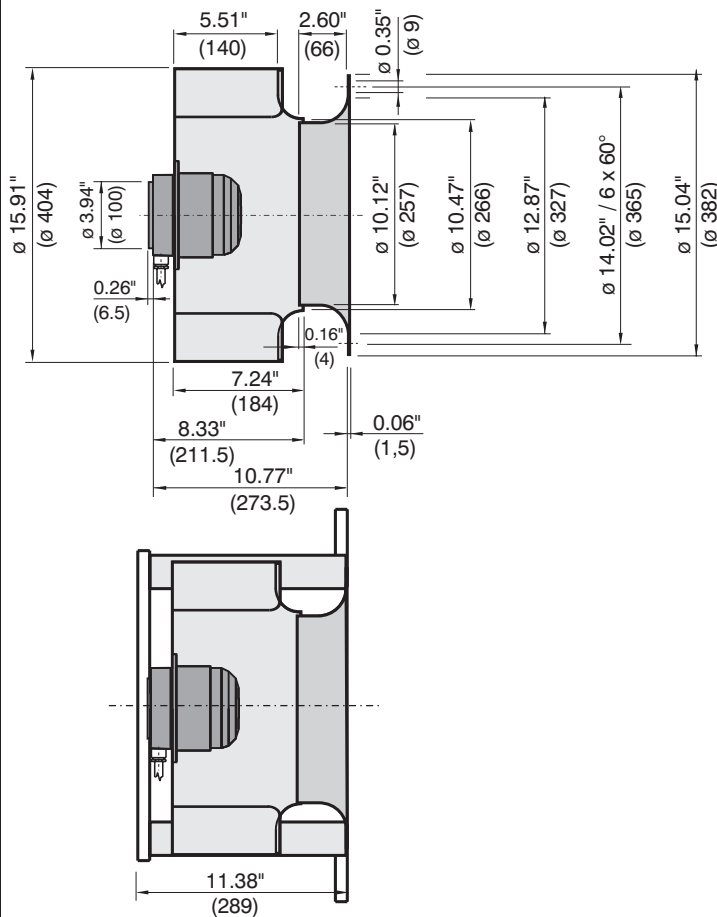


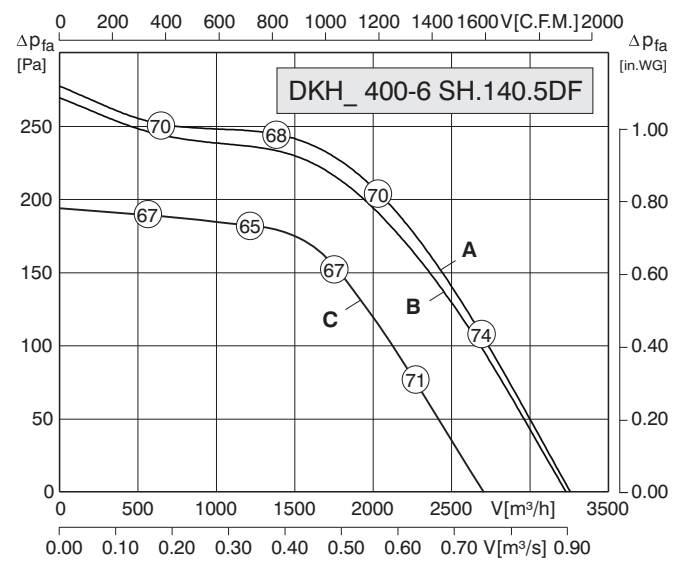
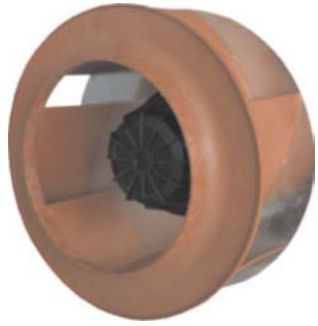
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	0.725	1.27	1565	140	60	-	-	2.9	54	01.005	10 / 19
3 ~230 Δ	60	B	0.665	2.16	1495	149	65	-	-	2.9	54	01.006	10 / 19
3 ~400 Y	50	C	0.470	1.10	1355	158	70	-	-	3.2	54	01.005	10 / 19



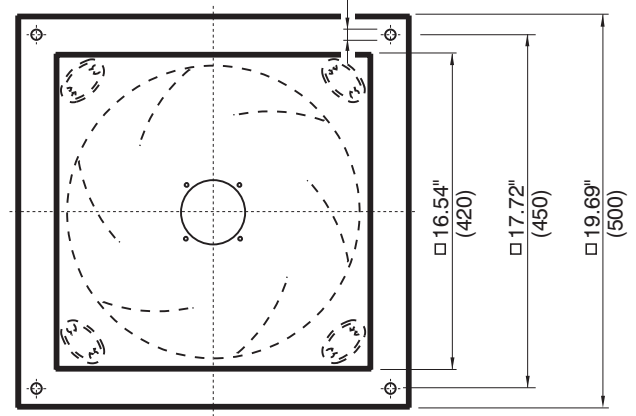
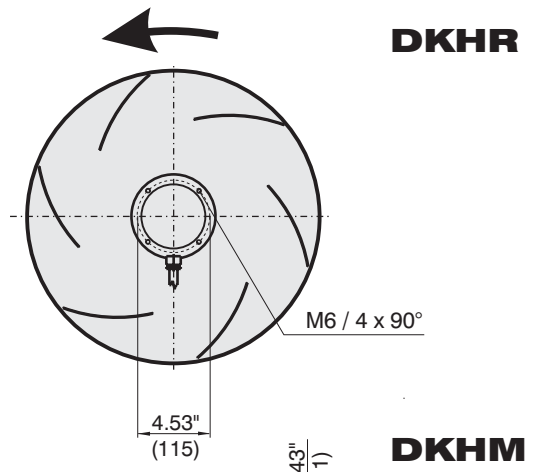
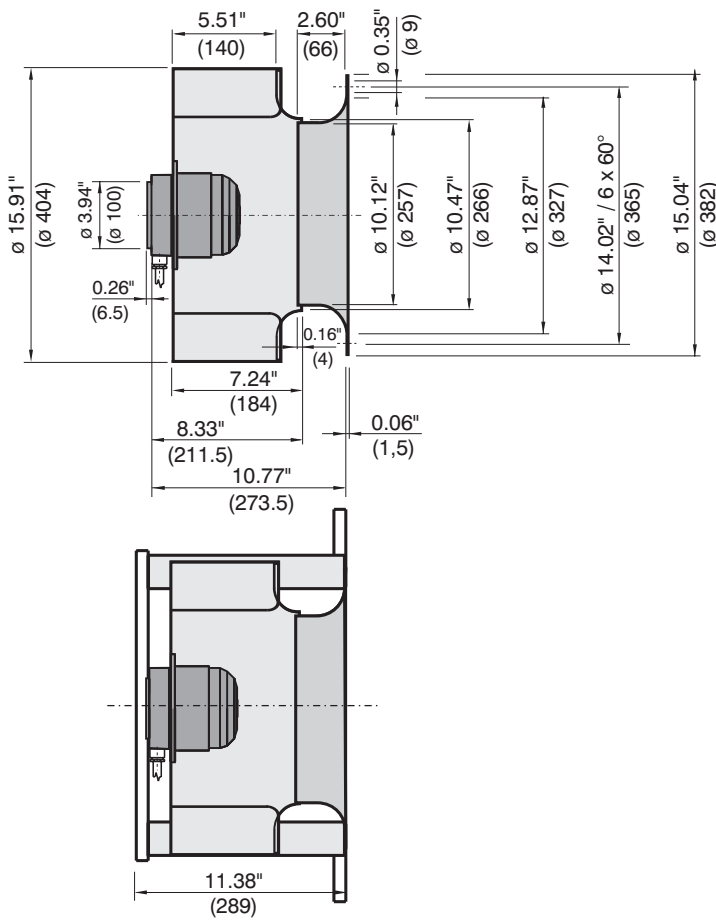


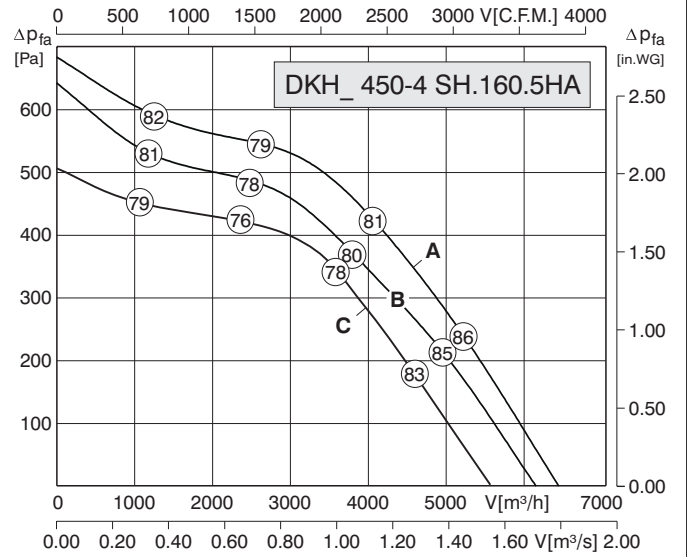
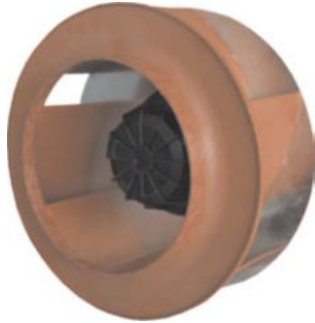
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	▲	★	⊞ [kg]
1 ~115	60	A	0.24	2.20	975	158	70	16	-	1.5	54	01.024	8 / 17
1 ~230	60	A	0.24	1.10	975	158	70	4	-	1.5	54	01.024	8 / 17
1 ~230	50	B	0.18	0.90	890	158	70	4	9	2.5	54	01.024	8 / 17



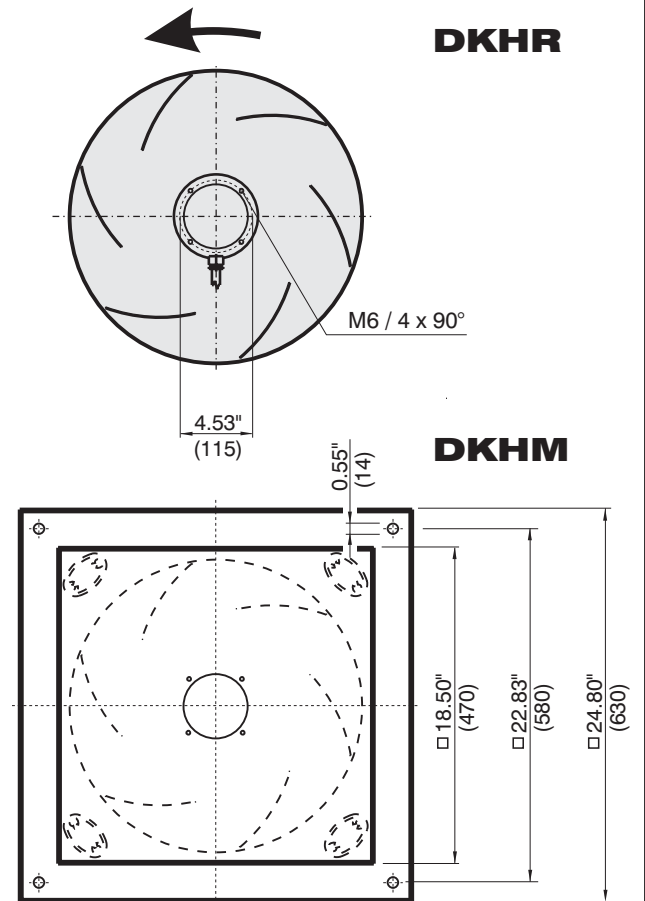
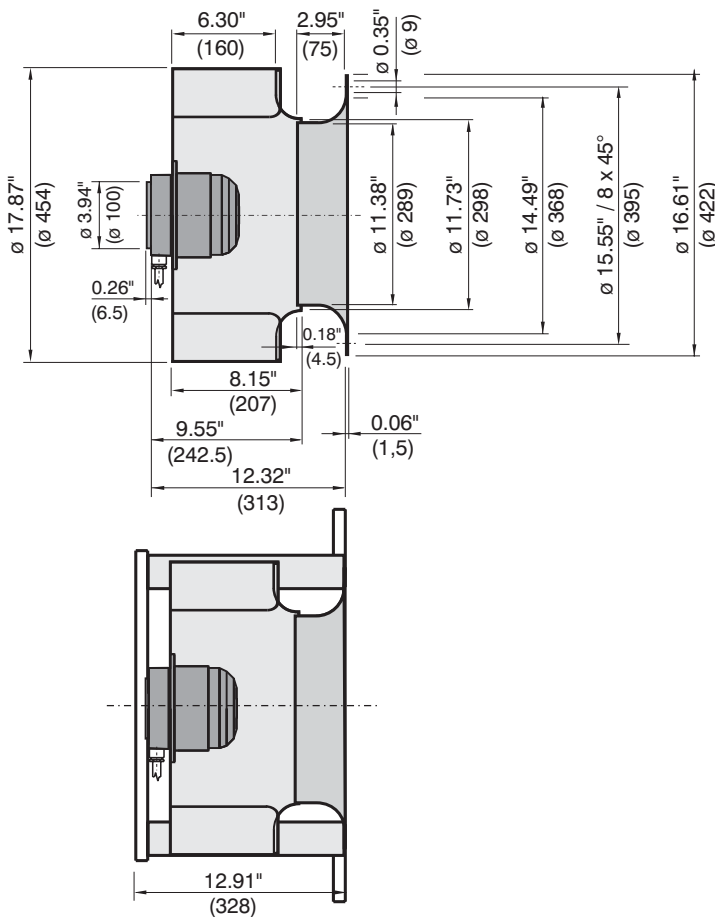


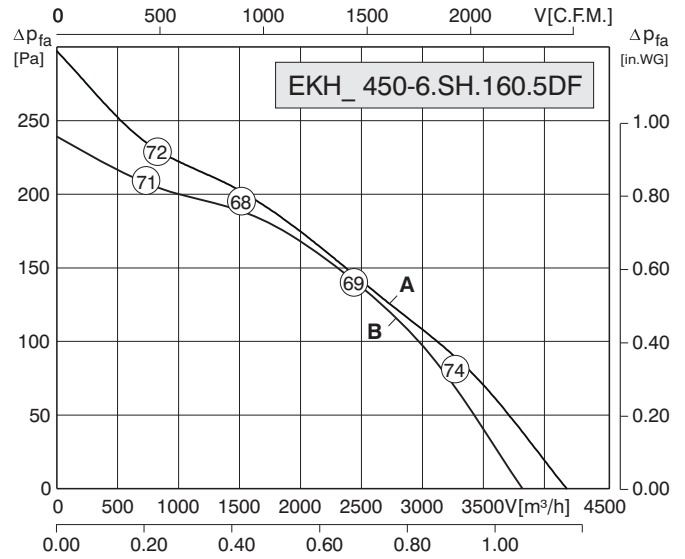
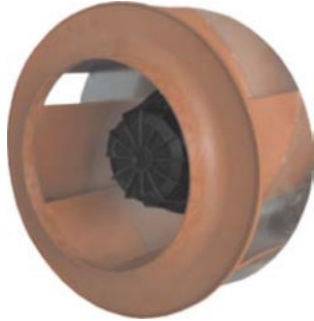
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	0.28	0.56	1100	158	70	-	-	3.7	54	01.005	8 / 17
3 ~230 Δ	60	B	0.24	0.90	1075	158	70	-	-	3.7	54	01.006	8 / 17
3 ~400 Y	50	C	0.20	0.56	935	158	70	-	-	3.2	54	01.005	8 / 17



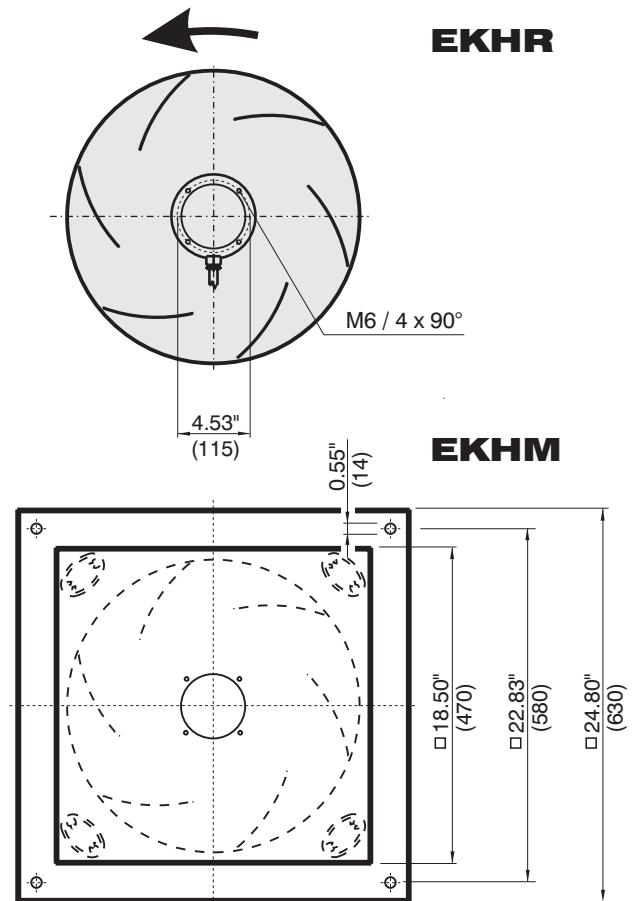
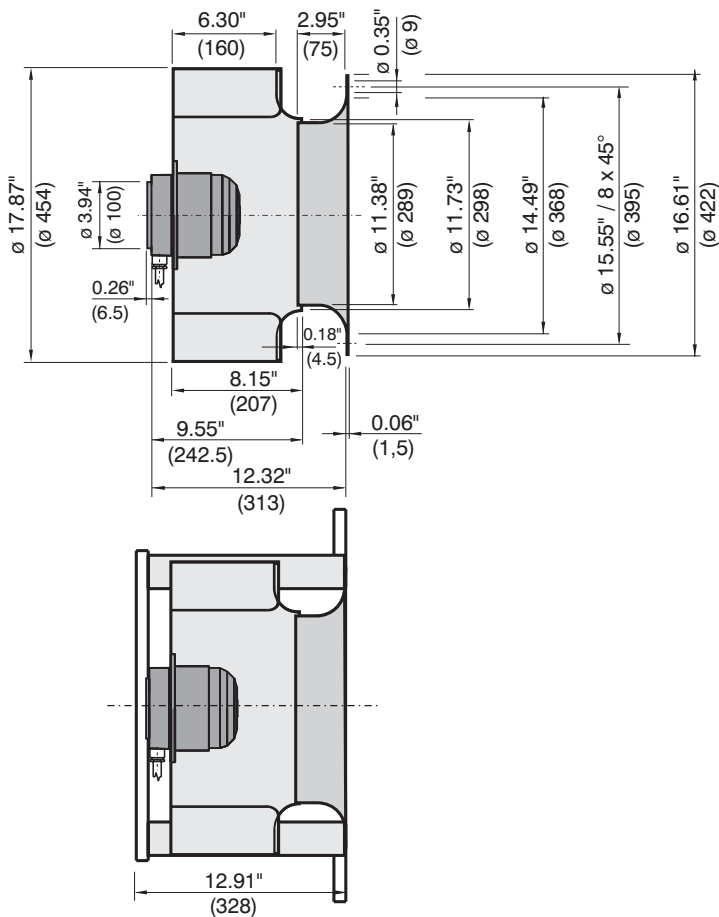


U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	1.09	1.80	1440	113	45	-	-	2.7	54	01.005	13 / 28
3 ~230 Δ	60	B	0.96	3.00	1360	113	45	-	-	2.7	54	01.006	13 / 28
3 ~400 Y	50	C	0.71	1.50	1270	140	60	-	-	3.0	54	01.005	13 / 28

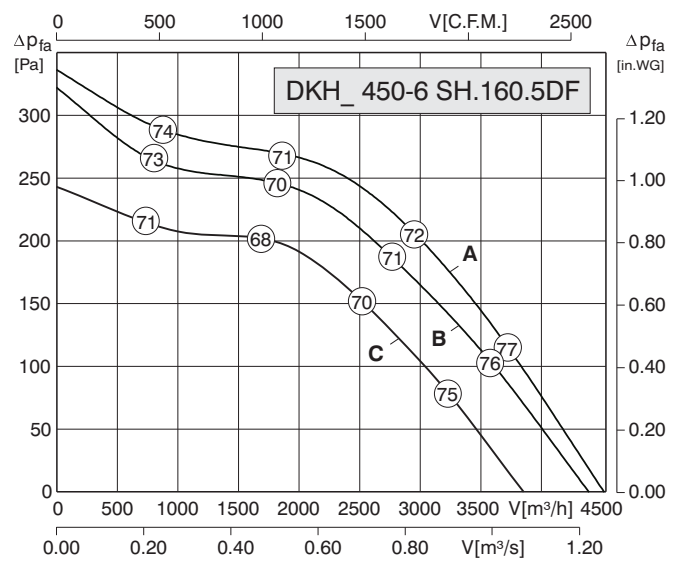
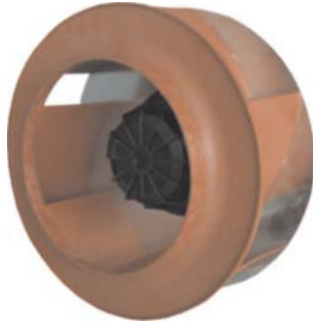




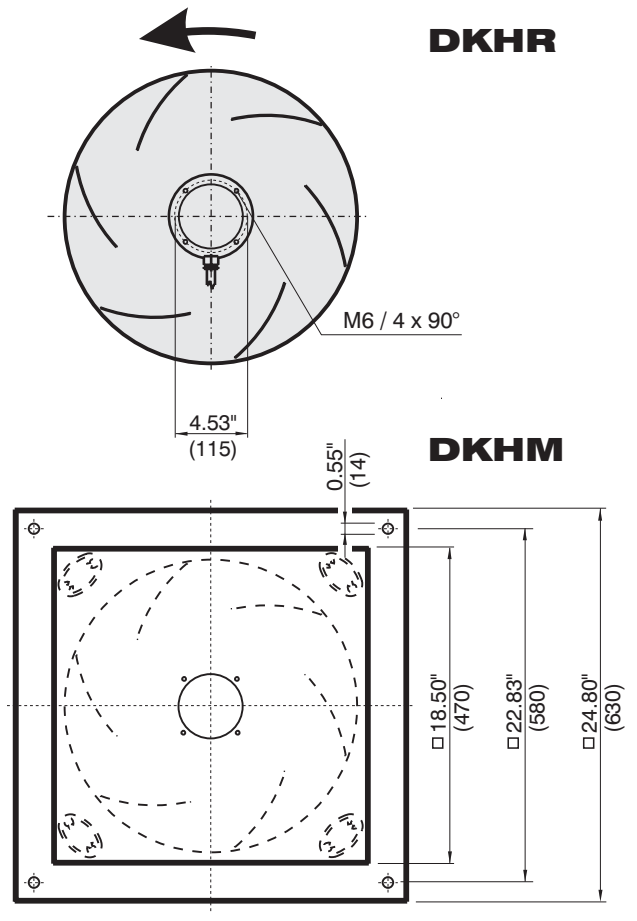
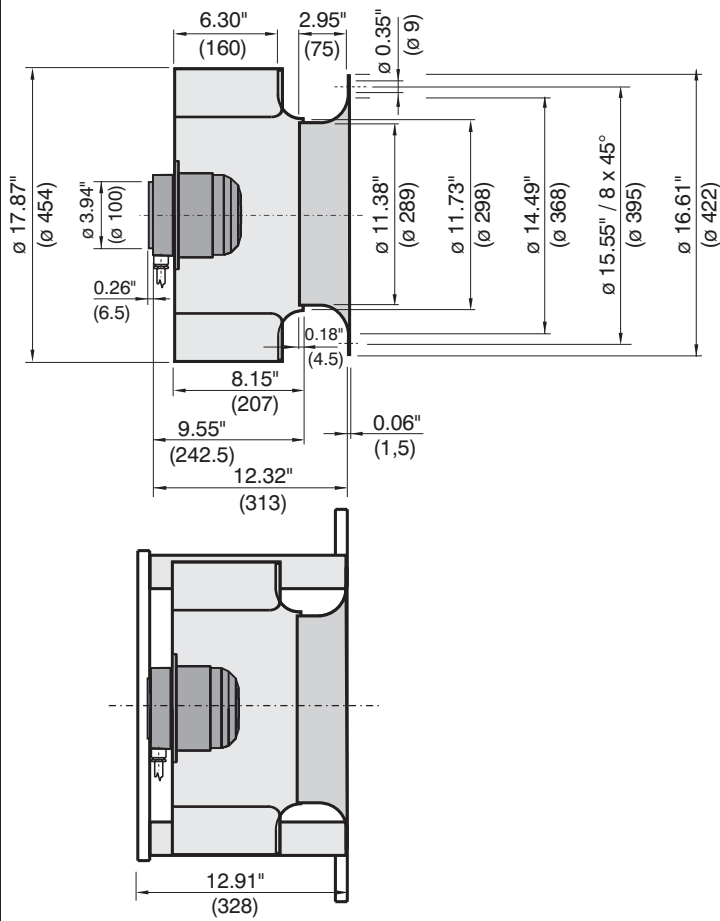
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
1 ~115	60	A	0.35	3.00	855	158	70	20	-	1.5	54	01.024	9 / 24
1 ~230	60	A	0.35	1.50	855	158	70	5	-	1.5	54	01.024	9 / 24
1 ~230	50	B	0.26	1.16	850	158	70	5	10	1.9	54	01.024	9 / 24

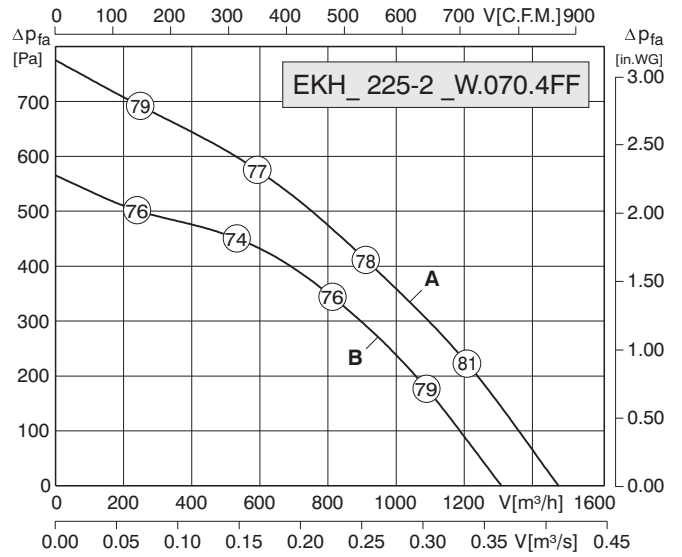




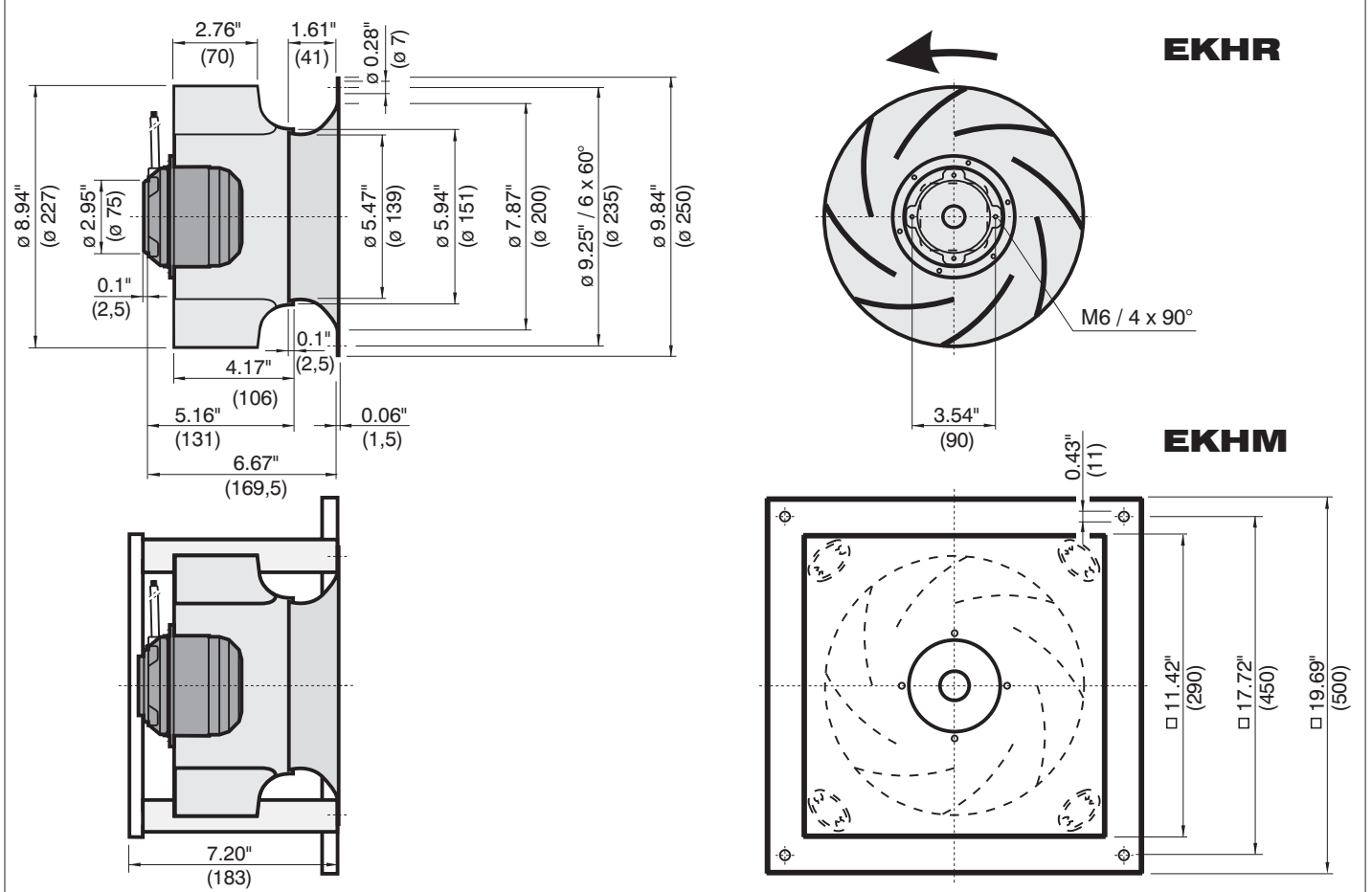


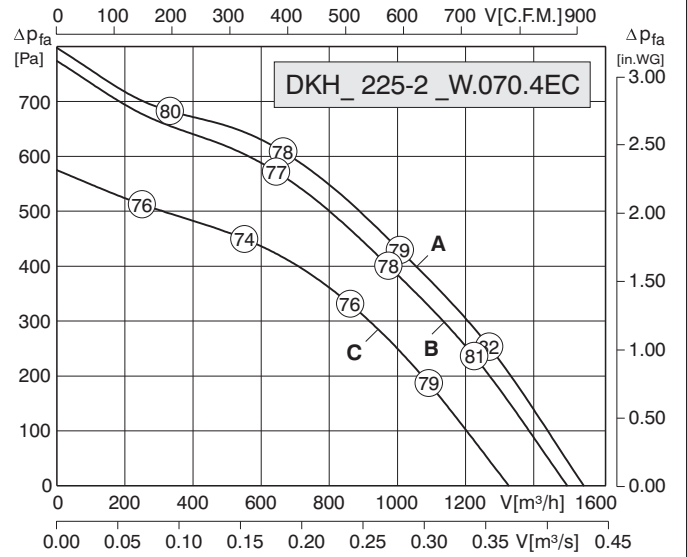
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	0.41	0.68	1030	140	60	-	-	2.6	54	01.005	9 / 24
3 ~230 Δ	60	B	0.37	1.16	980	140	60	-	-	2.6	54	01.006	9 / 24
3 ~400 Y	50	C	0.42	0.60	890	158	70	-	-	3.0	54	01.005	9 / 24



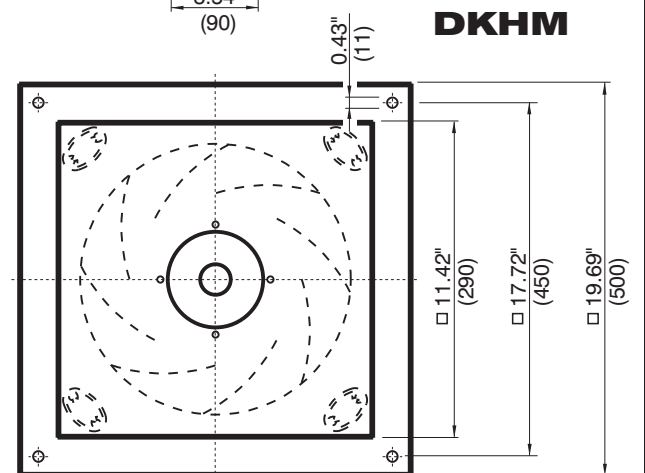
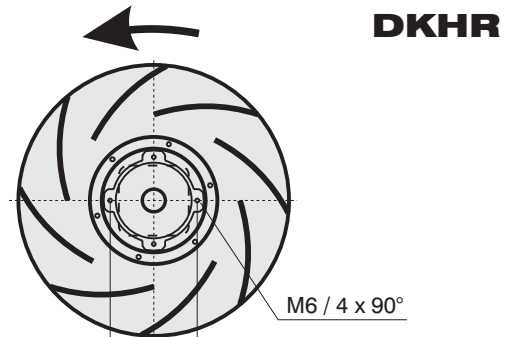
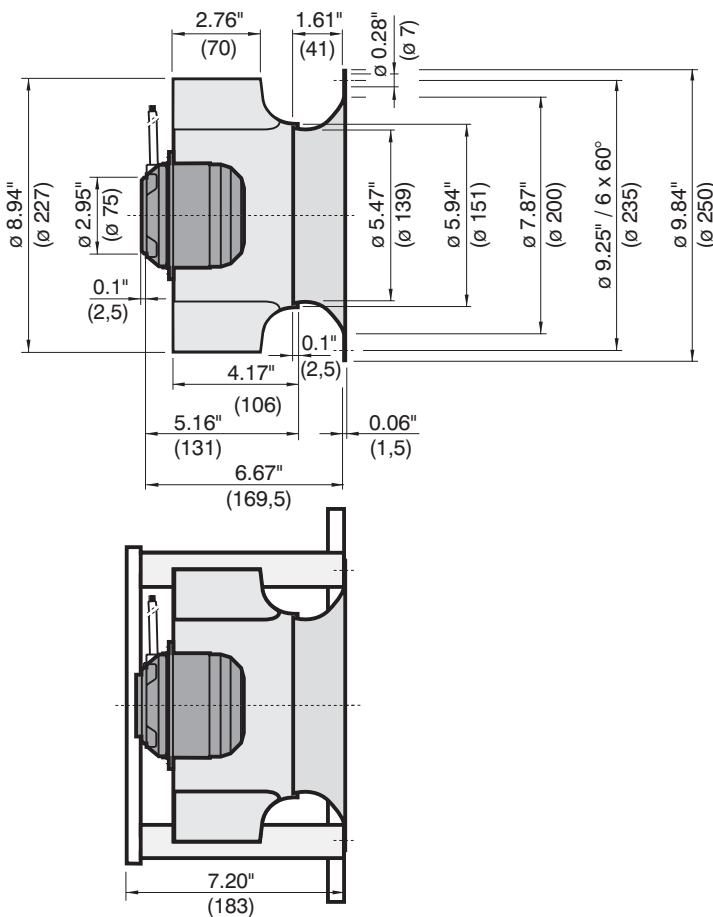


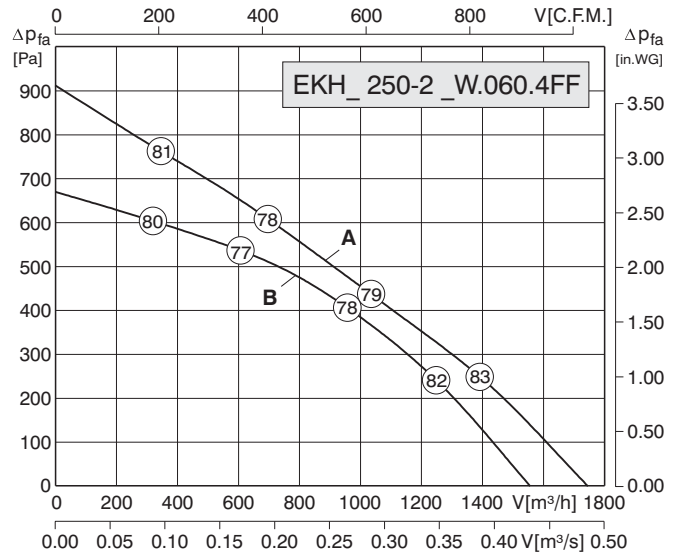
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
1 ~115	60	A	0.38	3.30	3000	158	70	20	2.5	1.7	54	01.024	4.5/ 10.5
1 ~230	60	A	0.38	1.65	3000	158	70	6	2.5	1.7	54	01.024	4.5/ 10.5
1 ~230	50	B	0.27	1.2	2710	158	70	6	30	2.6	54	01.024	4.5/ 10.5



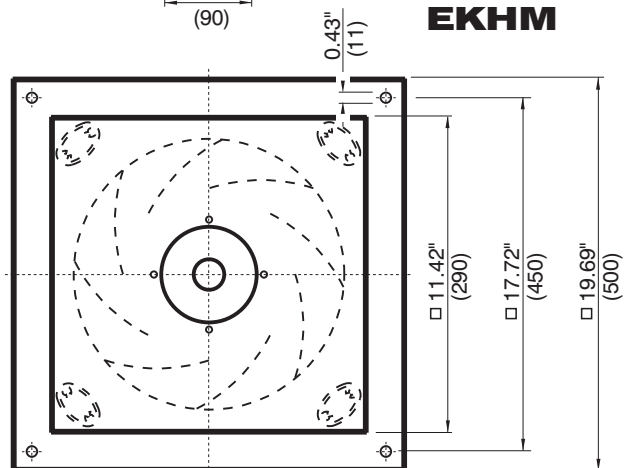
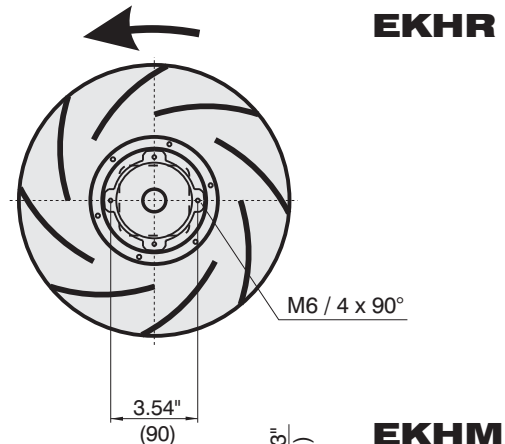
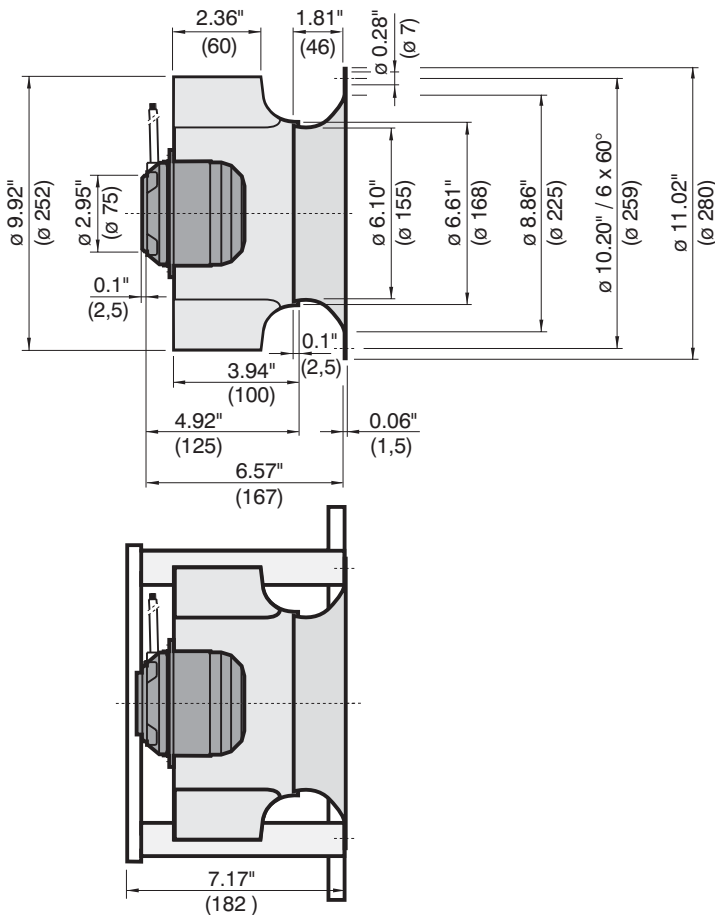


U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	0.41	0.64	3160	122	50	-	-	3.1	54	01.005	4 / 10
3 ~230 Δ	60	B	0.37	1.04	3040	140	60	-	-	3.1	54	01.006	4 / 10
3 ~400 Y	50	C	0.28	0.58	2710	122	50	-	-	3.1	54	01.005	4 / 10

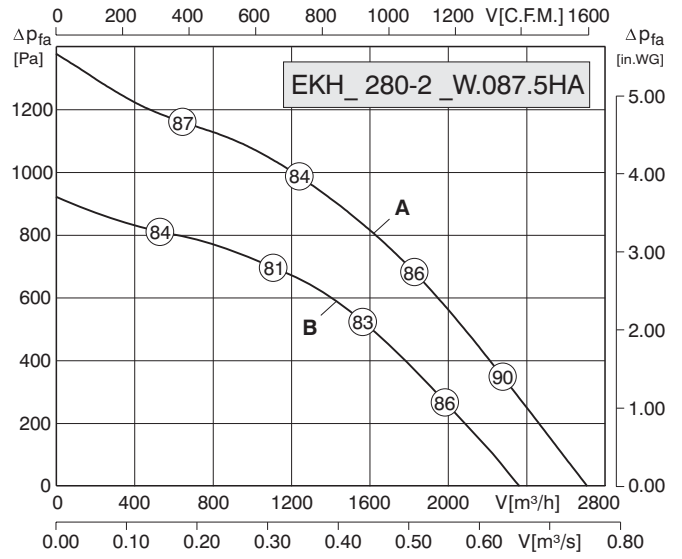




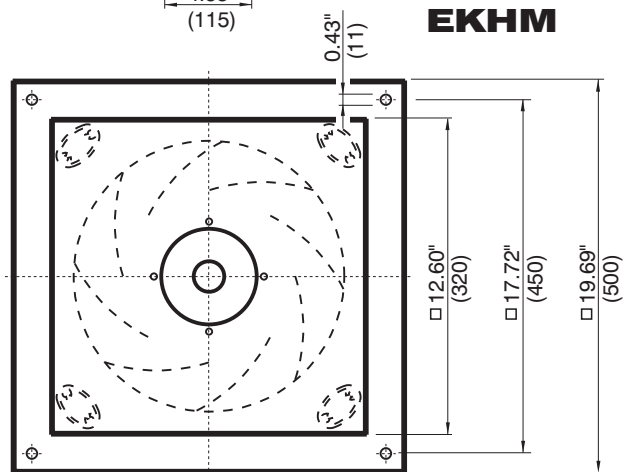
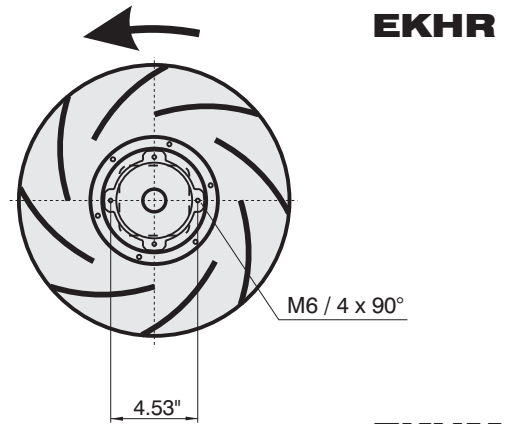
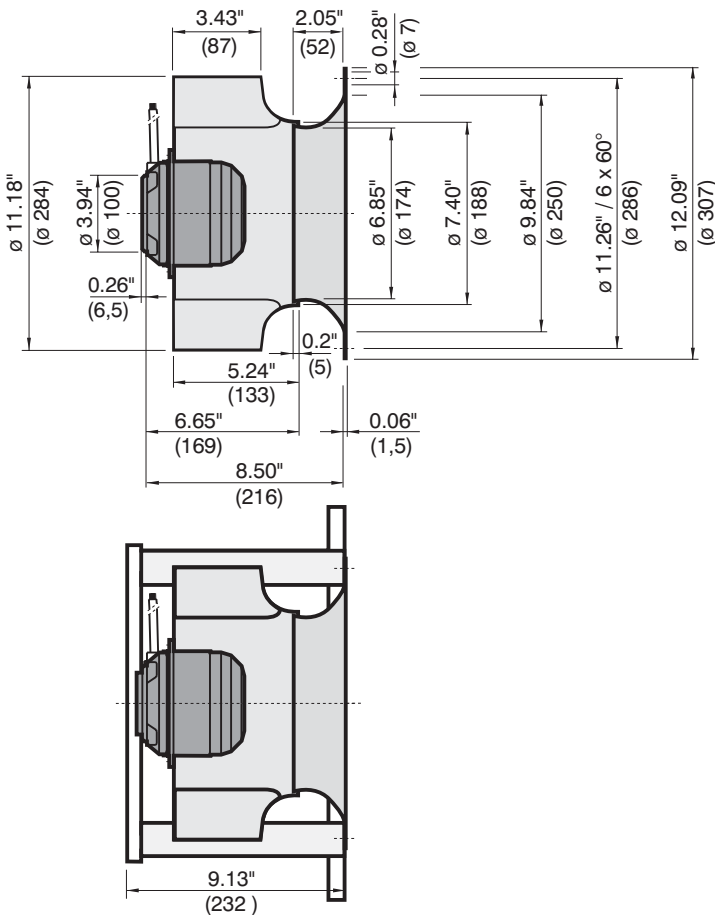
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
1 ~115	60	A	0.44	3.80	2760	113	45	20	2.0	1.5	54	01.024	4.5/10.5
1 ~230	60	A	0.44	1.90	2760	113	45	6	2.0	1.5	54	01.024	4.5/10.5
1 ~230	50	B	0.31	1.38	2630	140	60	6	24	2.3	54	01.024	4.5/10.5

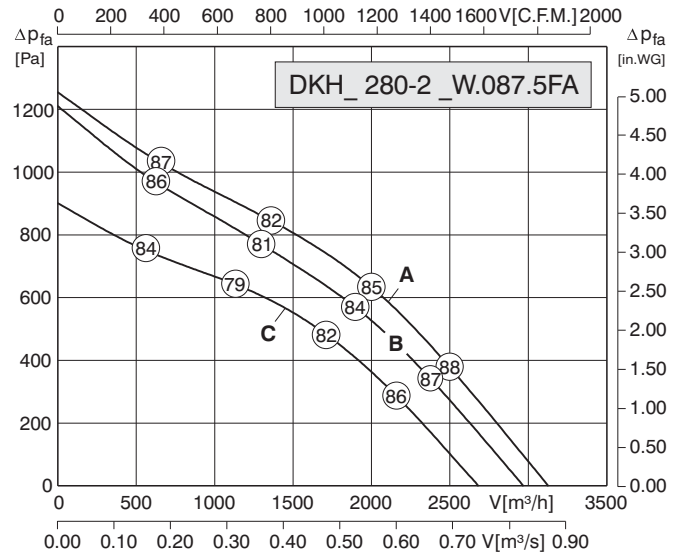




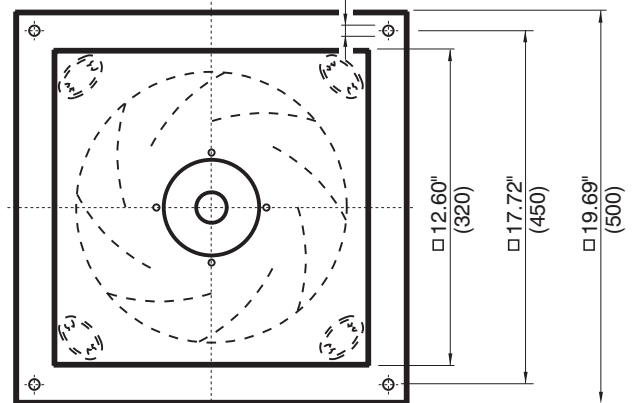
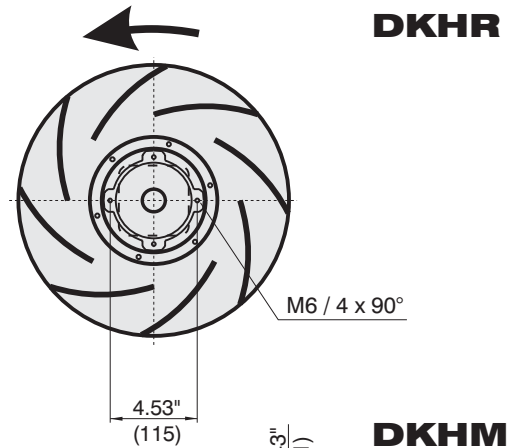
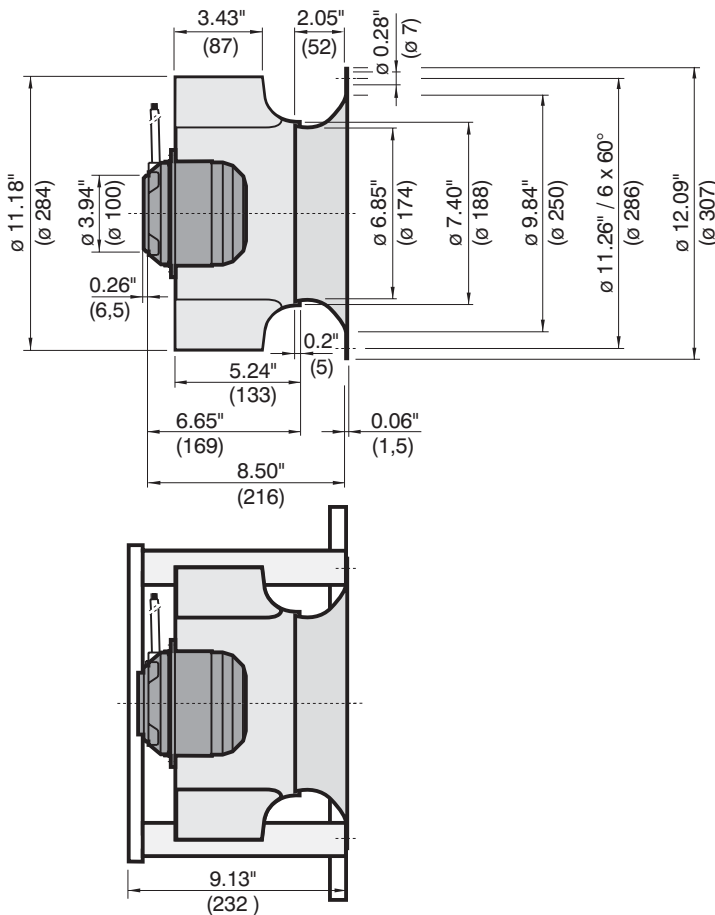


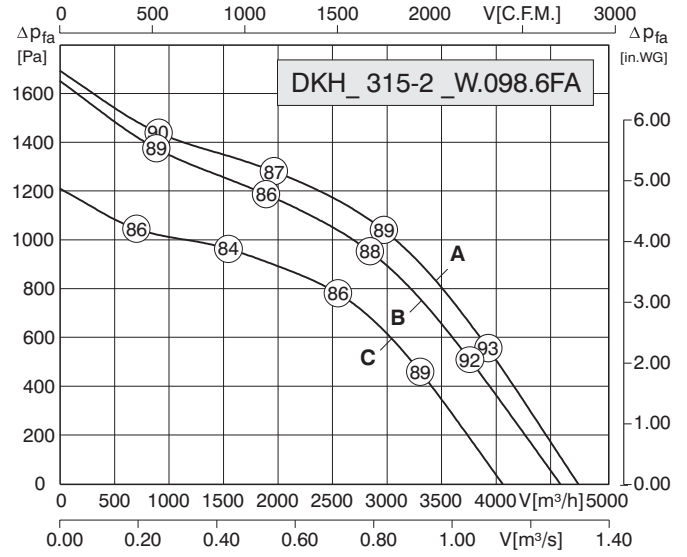
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
1 ~115	60	A	1.08	9.40	3110	122	50	60	16	2.2	54	01.024	9.5/17.5
1 ~230	60	A	1.08	4.70	3110	122	50	16	16	2.2	54	01.024	9.5/17.5
1 ~230	50	B	0.79	3.80	2740	122	50	16	13	3.0	54	01.024	9.5/17.5



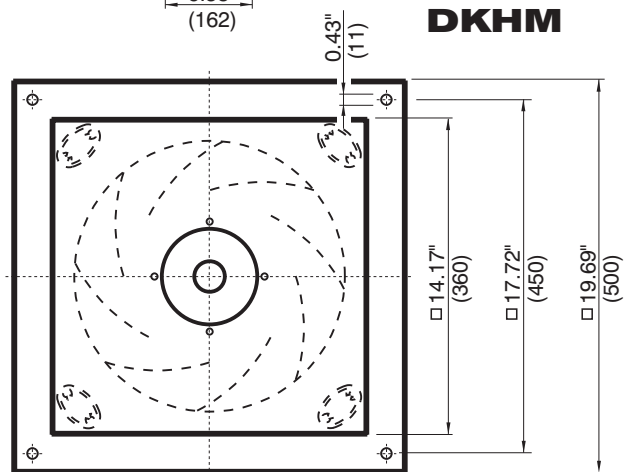
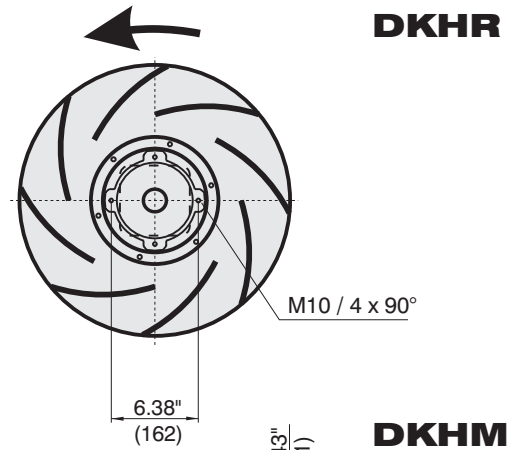
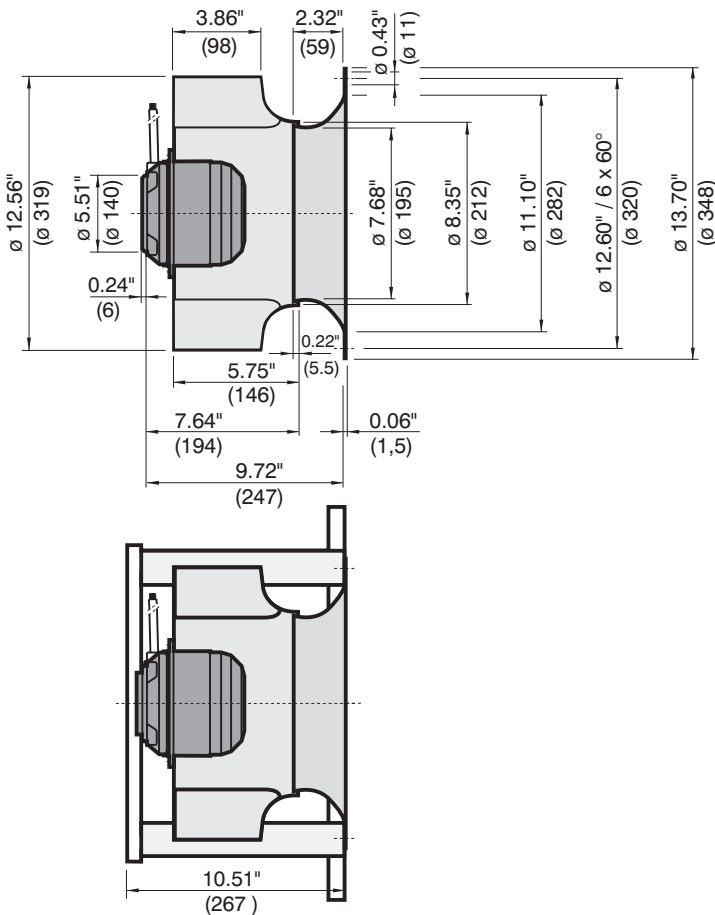


U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	1.10	1.60	2990	113	45	-	-	3.2	54	01.005	7.5/15.5
3 ~230 Δ	60	B	1.00	2.80	2840	113	45	-	-	3.2	54	01.006	7.5/15.5
3 ~400 Y	50	C	0.71	1.30	2610	140	60	-	-	3.6	54	01.005	7.5/15.5

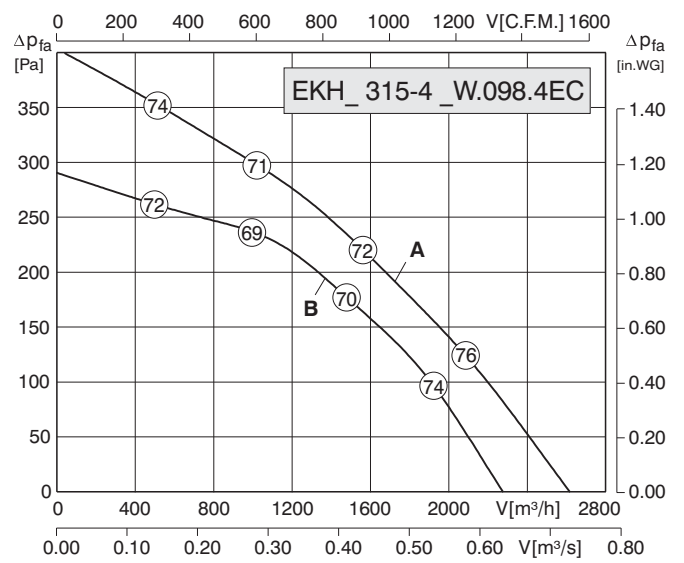




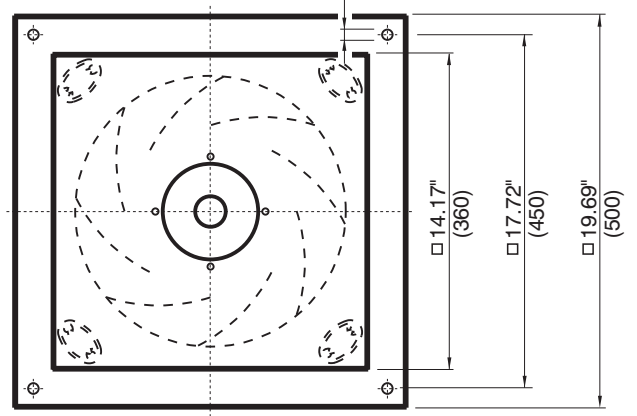
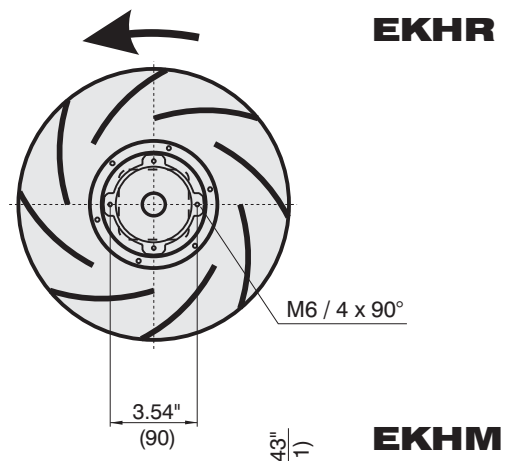
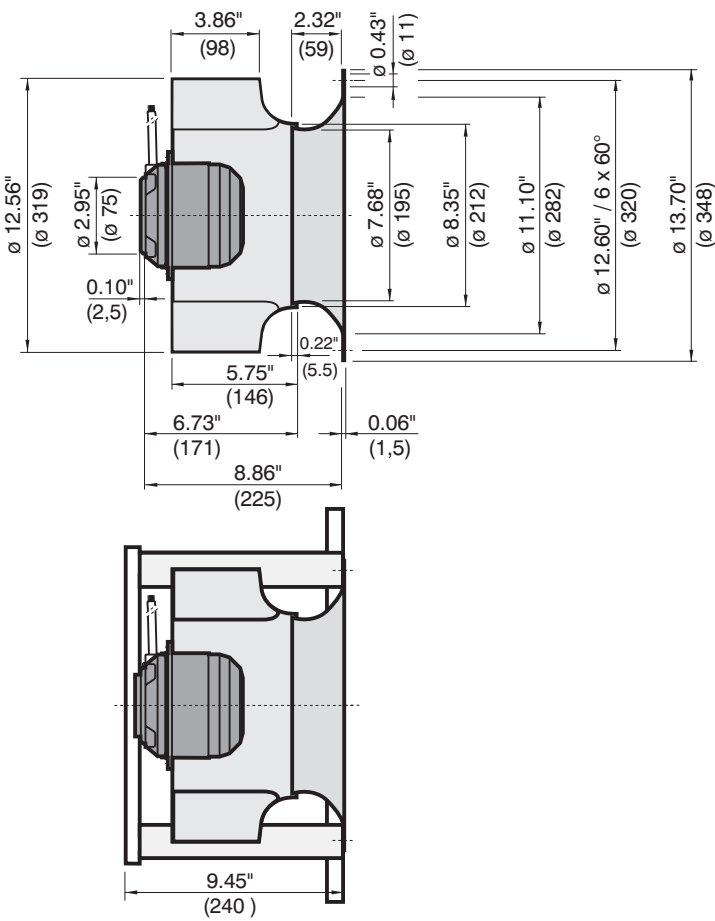
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	2.33	3.30	3185	104	40	-	12	3.4	54	01.005	15 / 23.5
3 ~230 Δ	60	B	2.10	6.00	3040	104	40	-	7	3.4	54	01.006	15 / 23.5
3 ~400 Y	50	C	1.52	2.55	2750	158	70	-	18	4.2	54	01.005	15 / 23.5

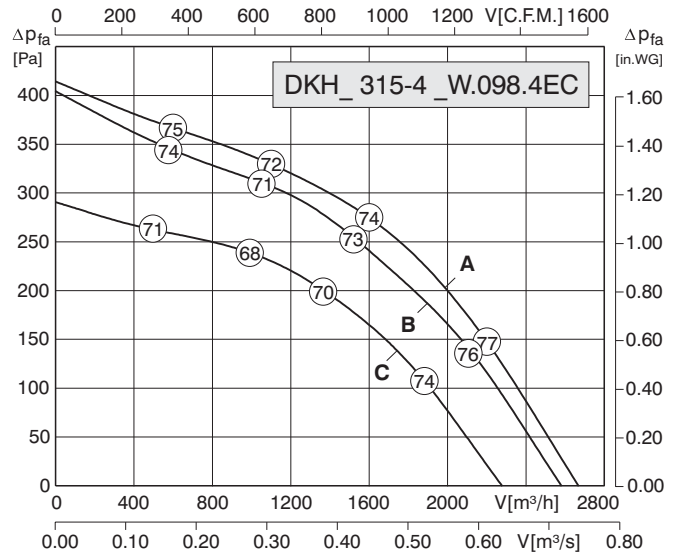




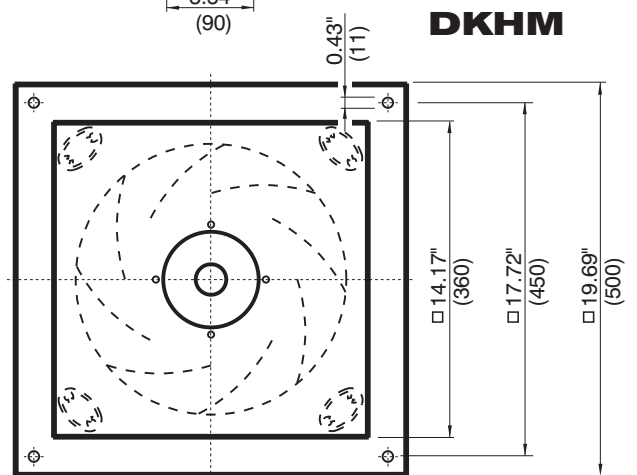
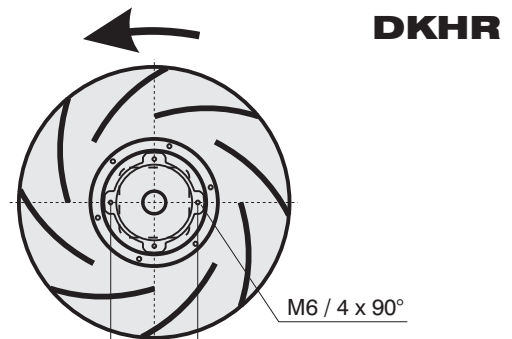
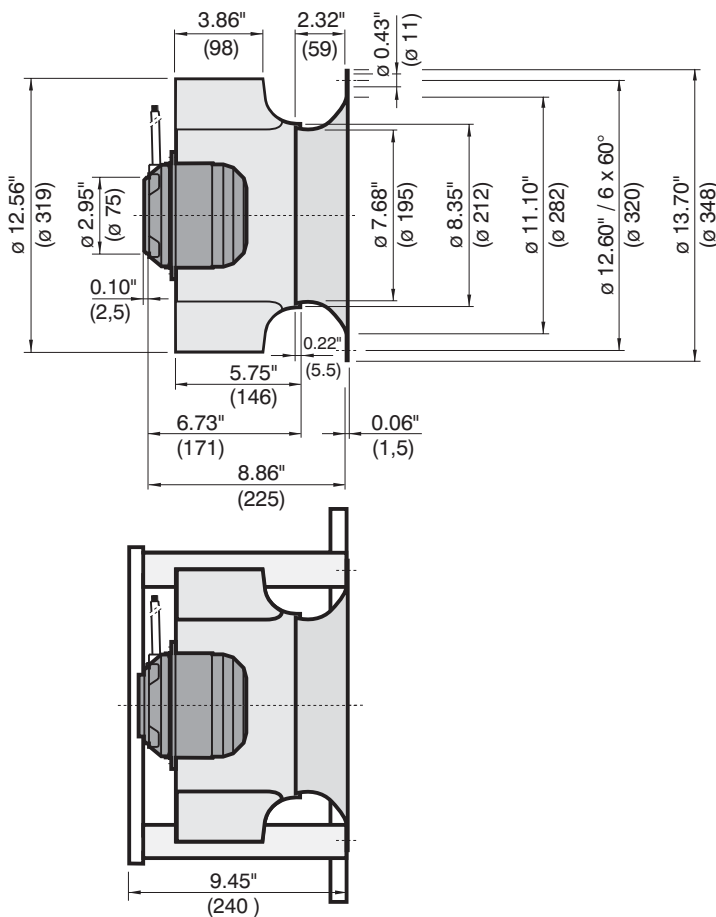


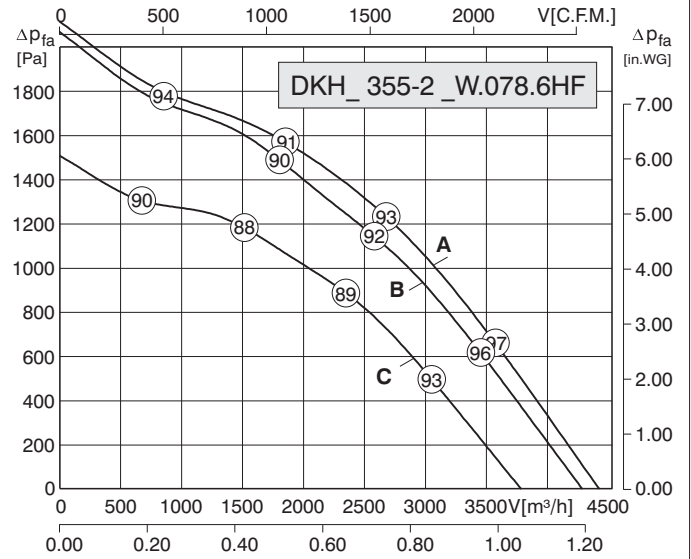
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	▲	★	⊞ [kg]
1 ~ 115	60	A	0.29	2.60	1480	113	50	20	-	1.6	54	01.024	5 / 12.5
1 ~ 230	60	A	0.29	1.30	1480	113	50	5	-	1.6	54	01.024	5 / 12.5
1 ~ 230	50	B	0.22	1.00	1350	140	60	5	18	1.6	54	01.024	5 / 12.5



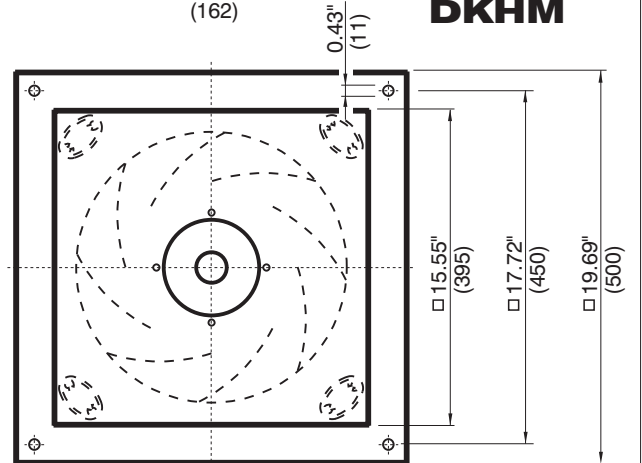
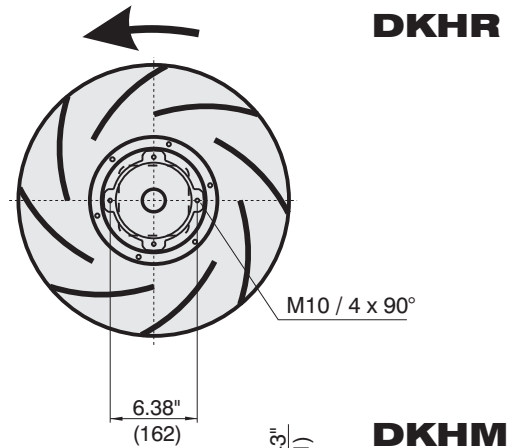
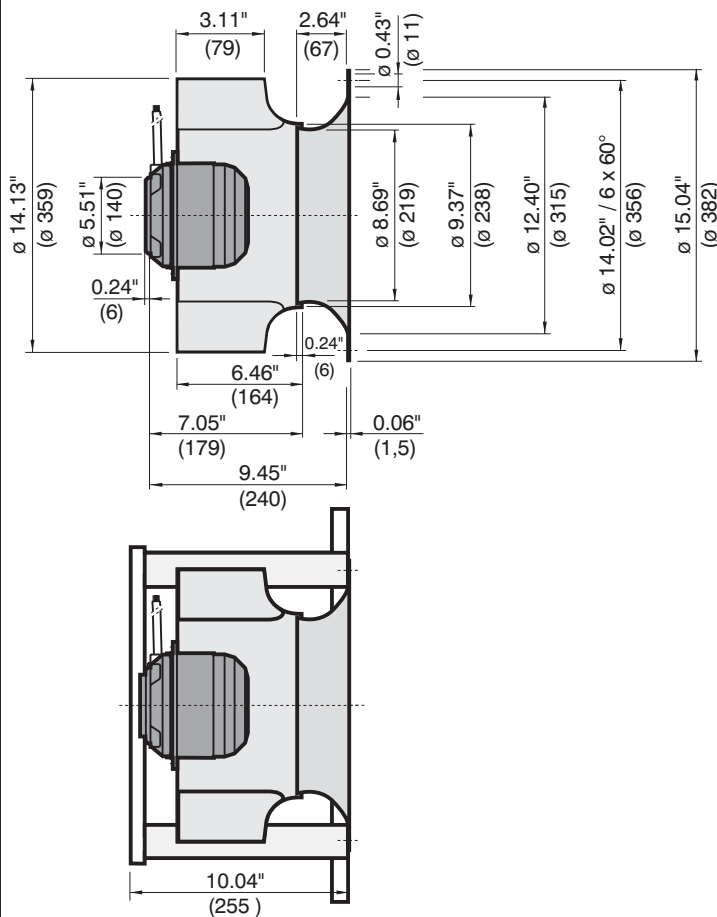


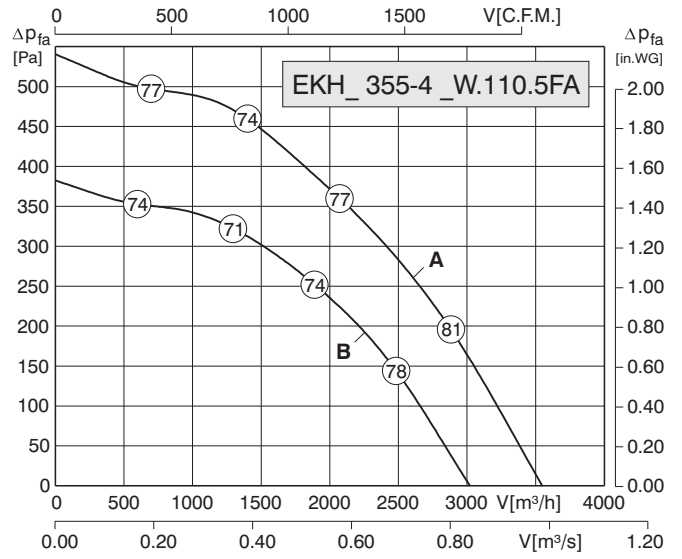
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	0.32	0.55	1600	140	60	-	-	3.0	54	01.005	5 / 12.5
3 ~230 Δ	60	B	0.29	0.92	1530	158	70	-	-	3.0	54	01.006	5 / 12.5
3 ~400 Y	50	C	0.21	0.48	1370	140	60	-	-	3.0	54	01.005	5 / 12.5



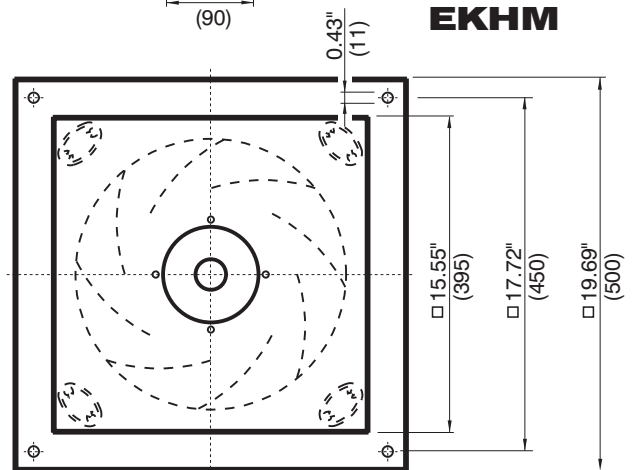
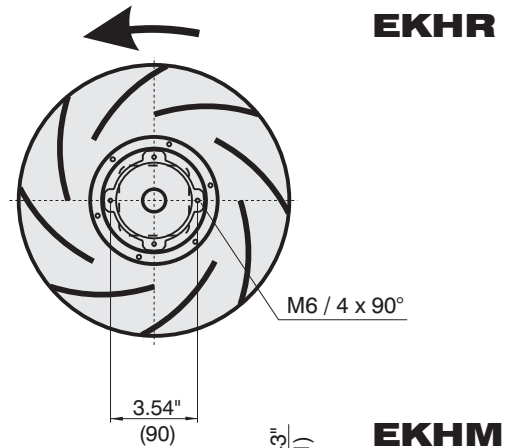
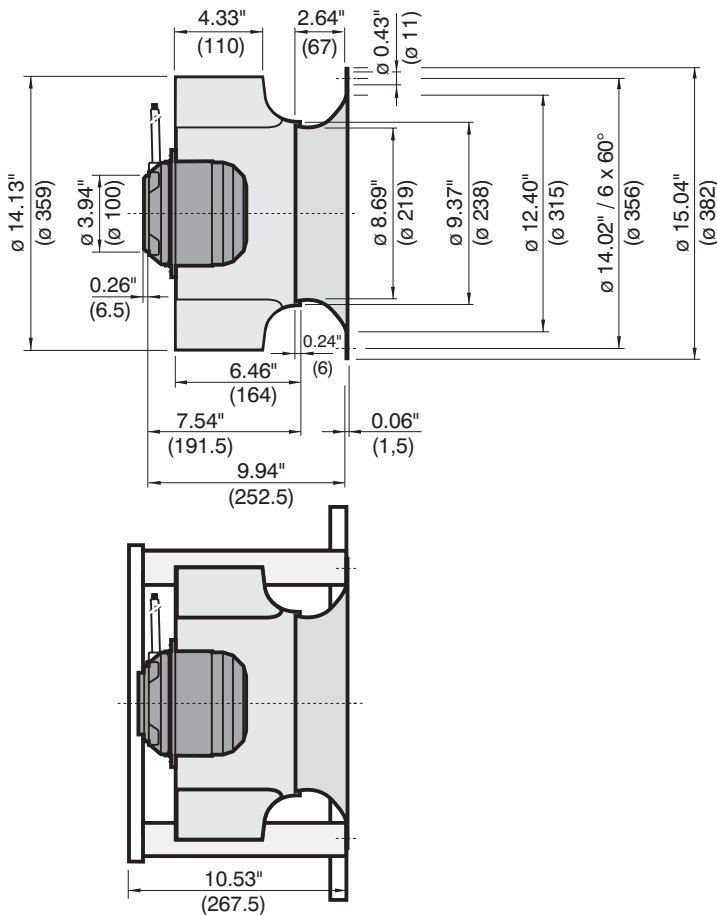


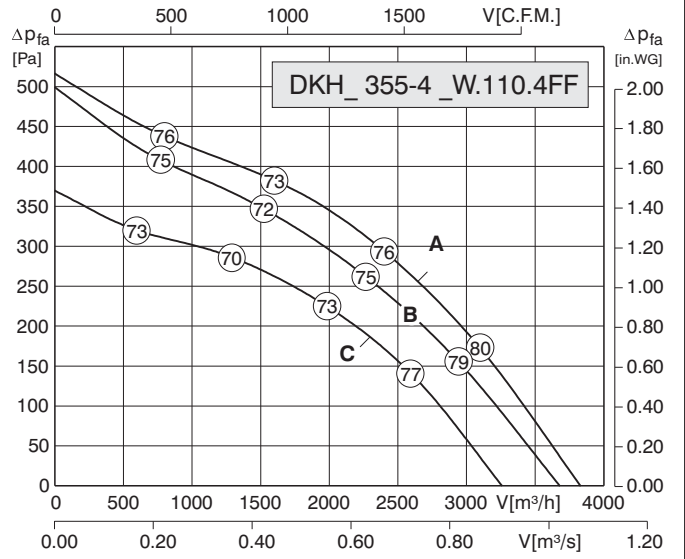
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	2.65	3.85	3260	122	50	-	13	4.1	54	01.005	18 / 27
3 ~230 Δ	60	B	2.45	6.90	3150	122	50	-	10	4.1	54	01.006	18 / 27
3 ~400 Y	50	C	1.60	3.00	2800	158	70	-	23	5.1	54	01.005	18 / 27



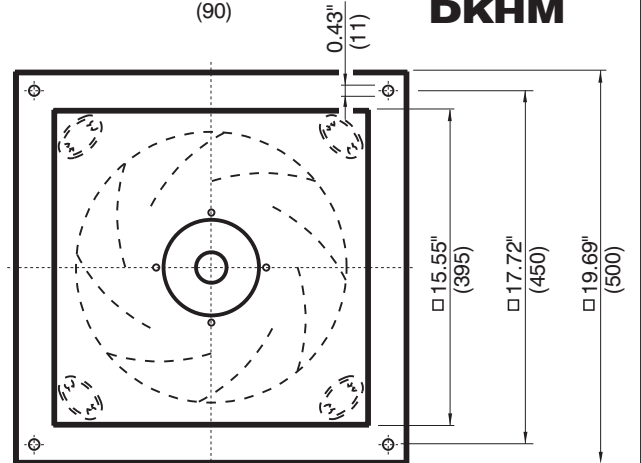
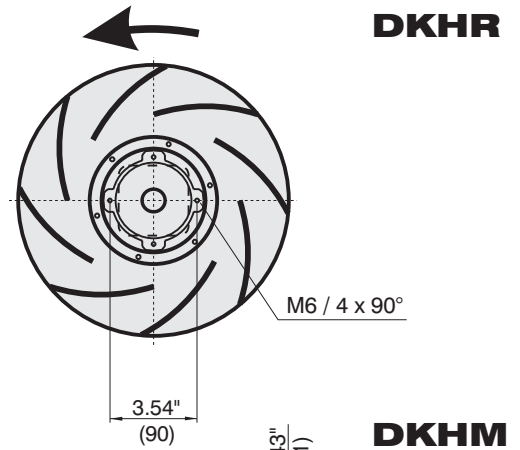
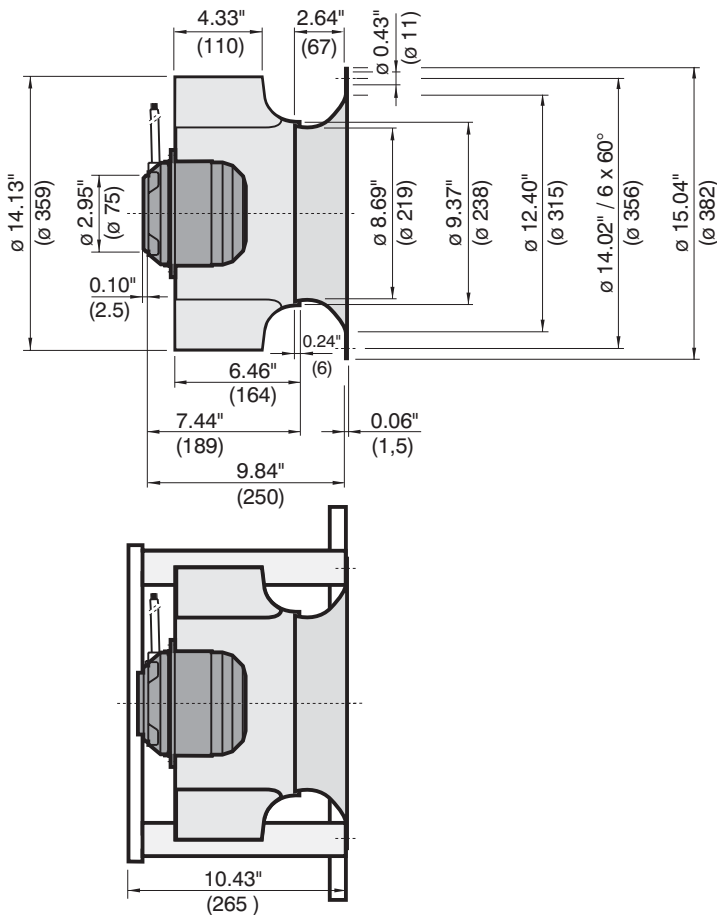


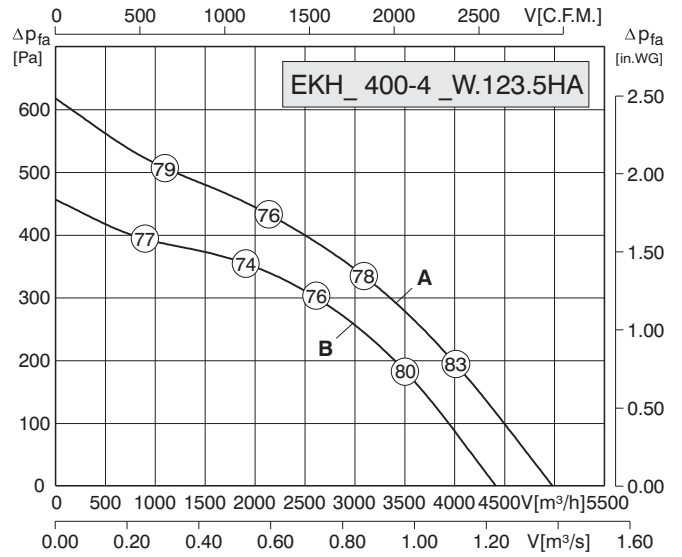
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	▲	✱	⊞ [kg]
1 ~115	60	A	0.57	5.00	1640	140	60	40	17	2.2	54	01.024	8 / 16.5
1 ~230	60	A	0.57	2.50	1640	140	60	10	17	2.2	54	01.024	8 / 16.5
1 ~230	50	B	0.40	2.10	1410	140	60	10	22	3.0	54	01.024	8 / 16.5



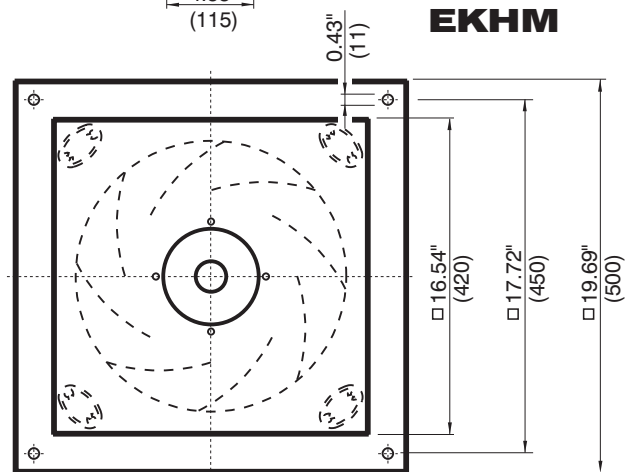
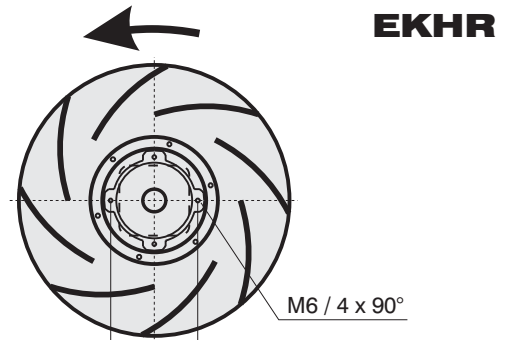
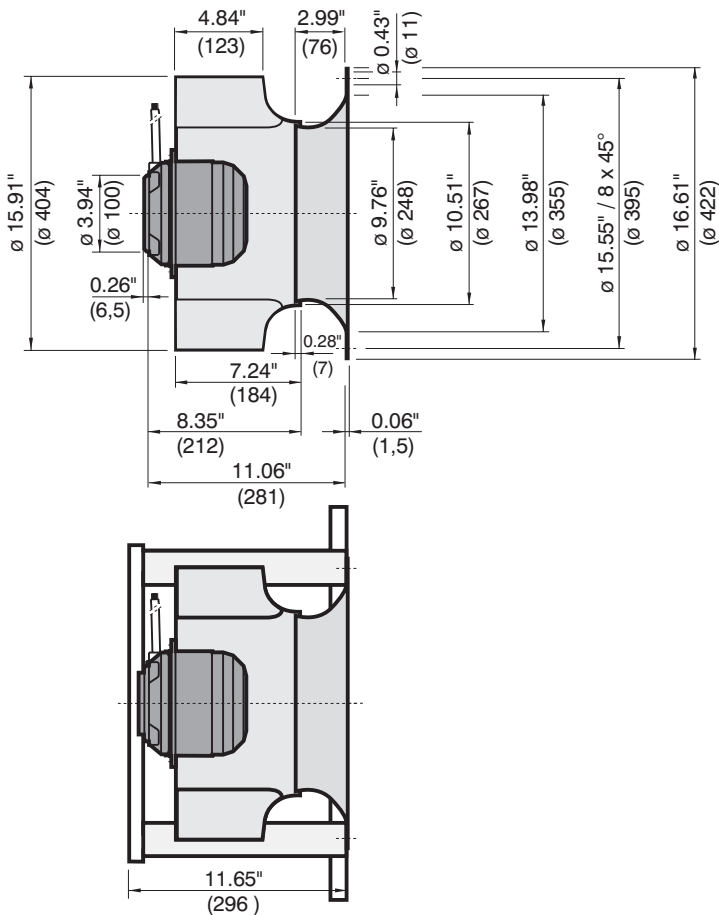


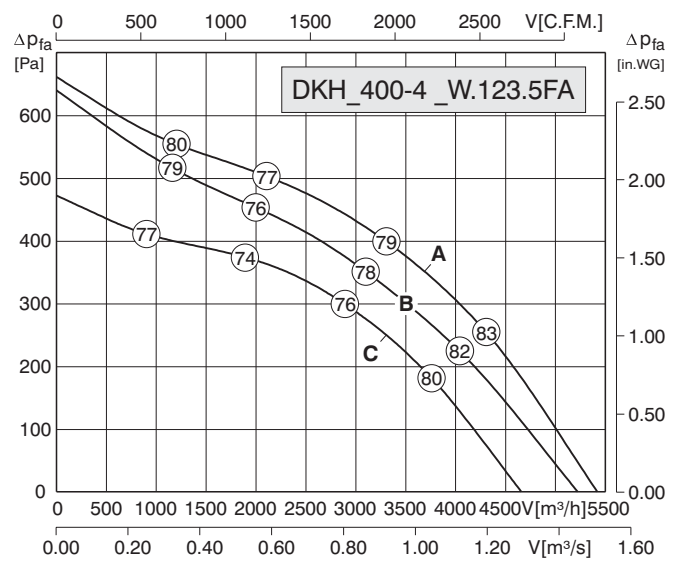
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	0.51	0.82	1540	104	40	-	-	2.5	54	01.005	5.5 / 14
3 ~230 Δ	60	B	0.47	1.40	1420	122	50	-	-	2.5	54	01.006	5.5 / 14
3 ~400 Y	50	C	0.33	0.70	1340	122	50	-	-	2.6	54	01.005	5.5 / 14



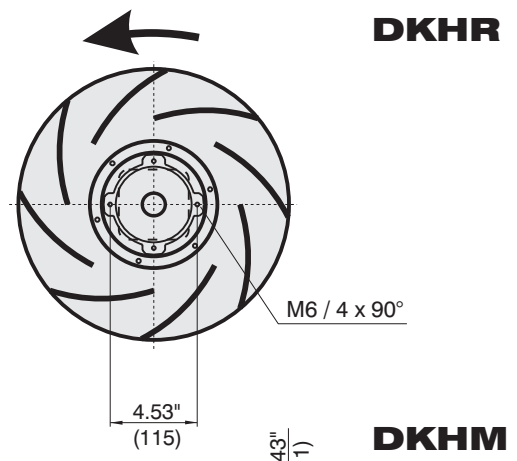
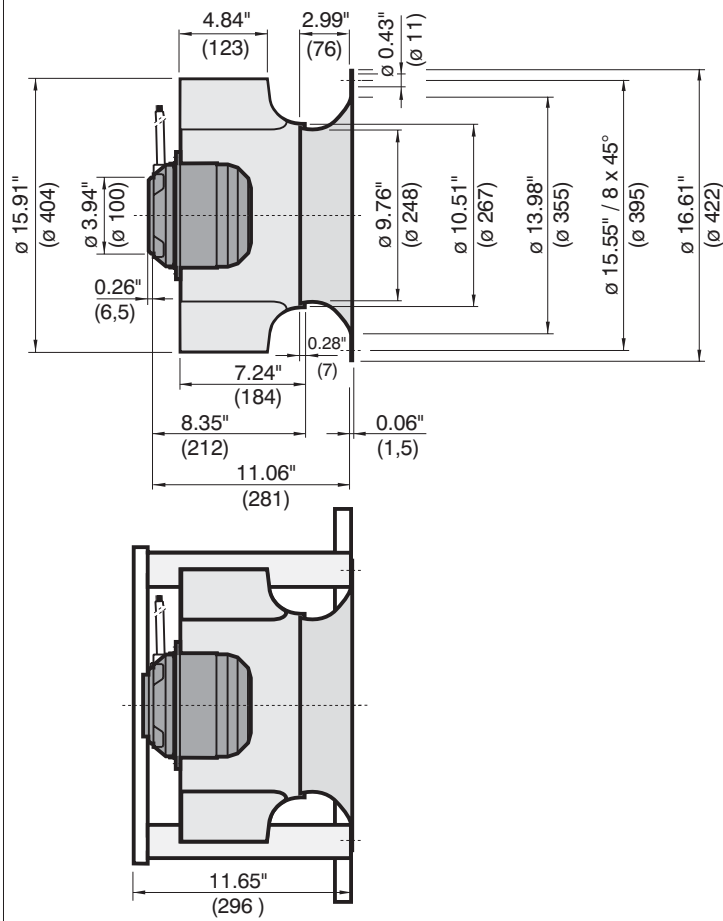


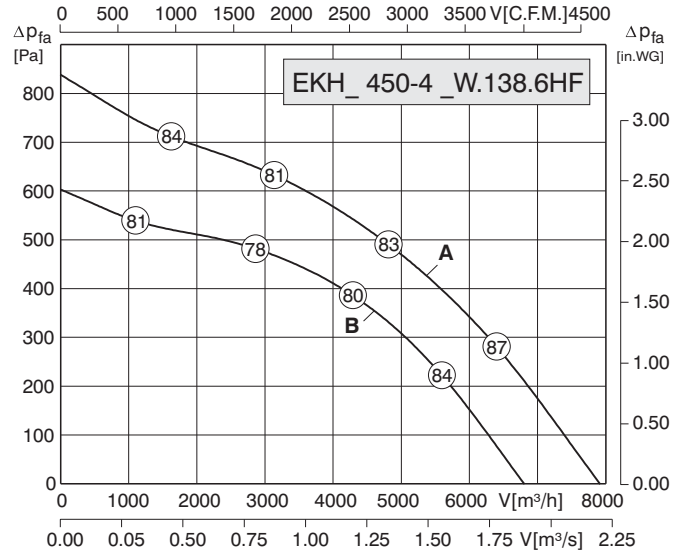
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
1 ~115	60	A	0.81	7.00	1460	122	50	50	-	1.8	54	01.024	11 / 20
1 ~230	60	A	0.81	3.50	1460	122	50	14	-	1.8	54	01.024	11 / 20
1 ~230	50	B	0.57	2.70	1320	167	75		-	2.5	54	01.024	11 / 20



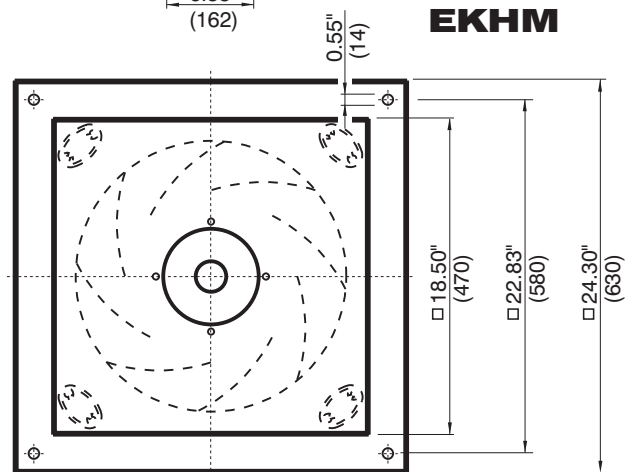
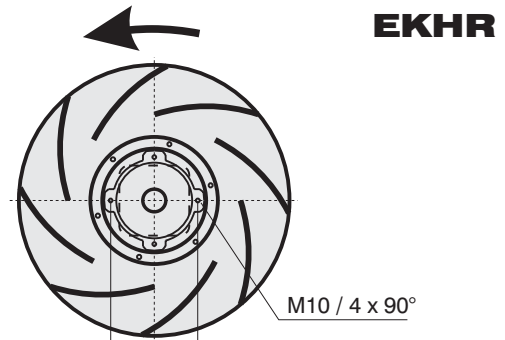
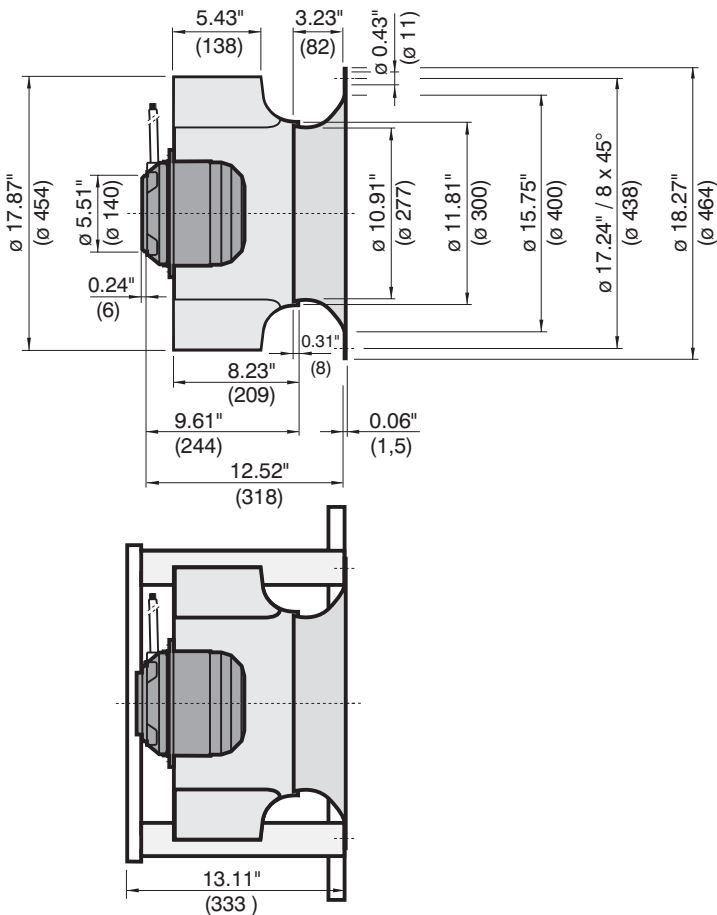


U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	0.86	1.45	1530	104	40	-	-	2.7	54	01.005	9 / 18
3 ~230 Δ	60	B	0.77	2.50	1445	104	40	-	-	2.7	54	01.006	9 / 18
3 ~400 Y	50	C	0.54	1.15	1340	140	60	-	-	3.1	54	01.005	9 / 18

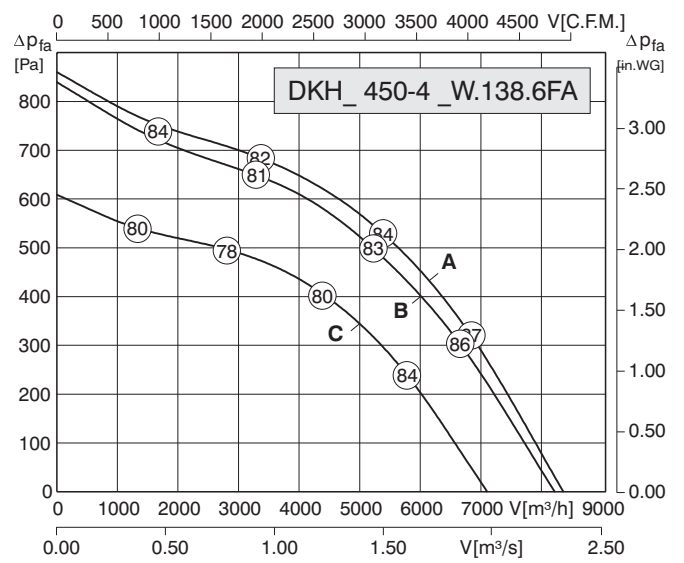




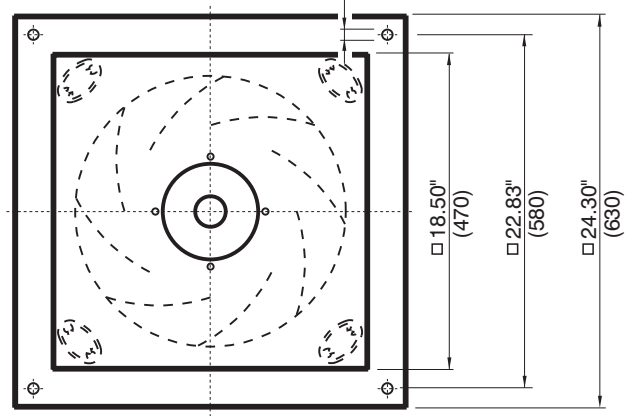
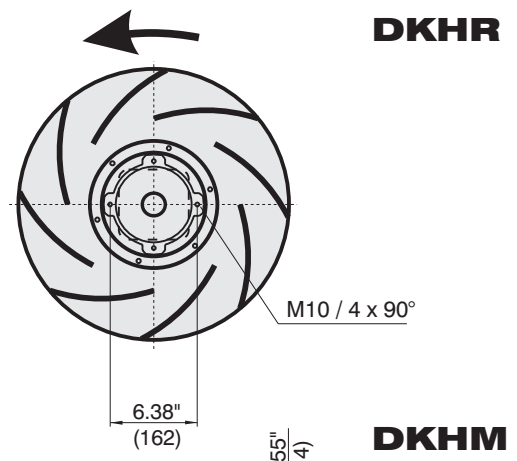
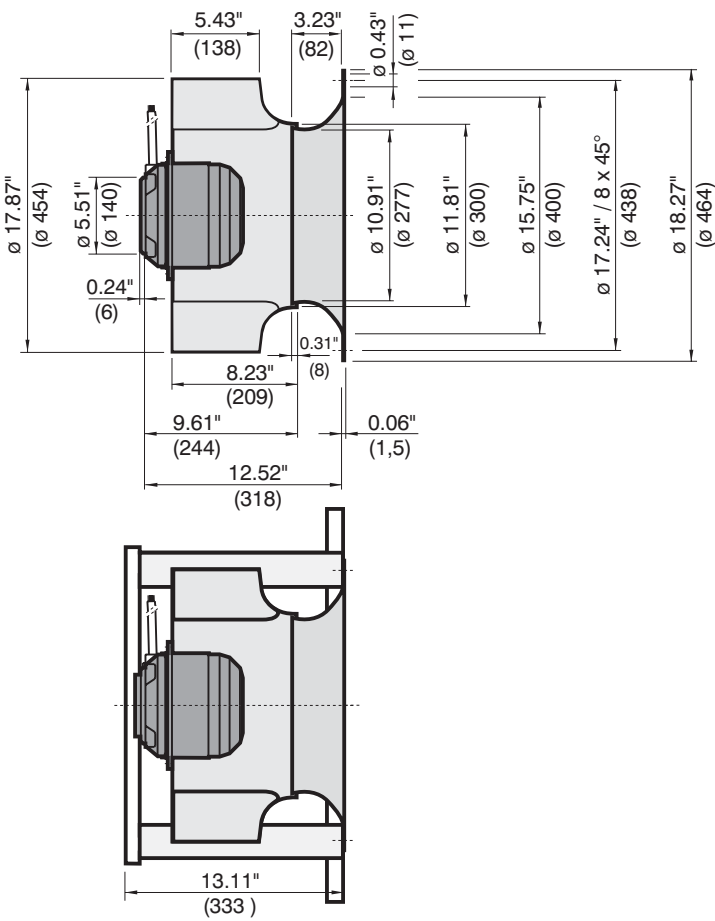
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
1 ~115	60	A	1.57	13.80	1545	122	50	100	7	2.0	54	01.024	21 / 35
1 ~230	60	A	1.57	6.90	1545	122	50	25	7	2.0	54	01.024	21 / 35
1 ~230	50	B	1.10	5.40	1380	149	65	25	29	2.7	54	01.024	21 / 35

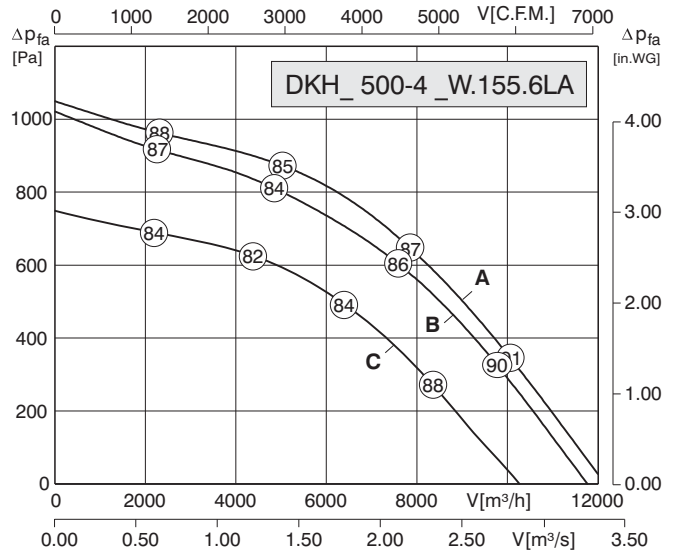




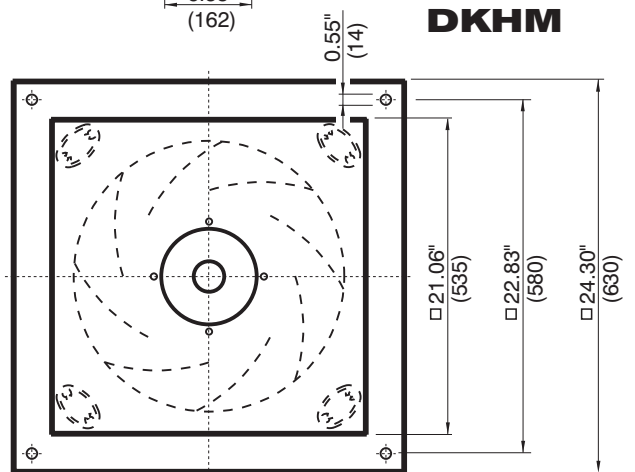
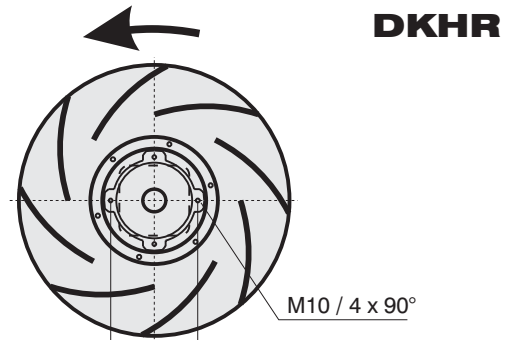
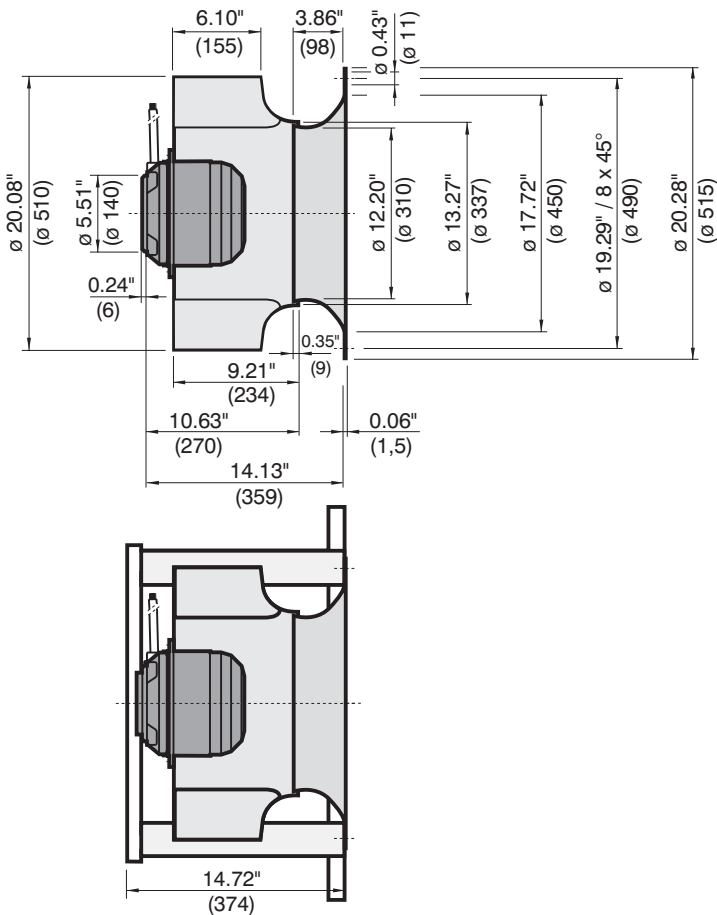


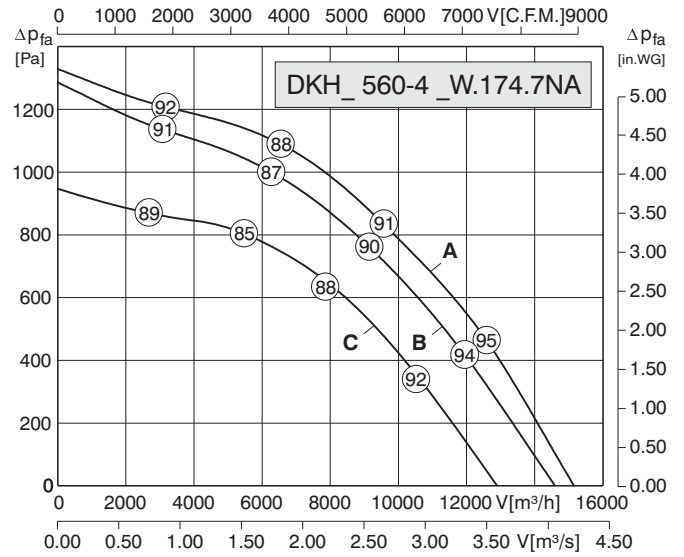
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	1.65	2.70	1630	131	55	-	-	4.2	54	01.005	17.5/31.5
3 ~230 Δ	60	B	1.52	4.60	1580	131	55	-	-	4.2	54	01.006	17.5/31.5
3 ~400 Y	50	C	1.05	2.40	1390	140	60	-	-	4.7	54	01.005	17.5/31.5



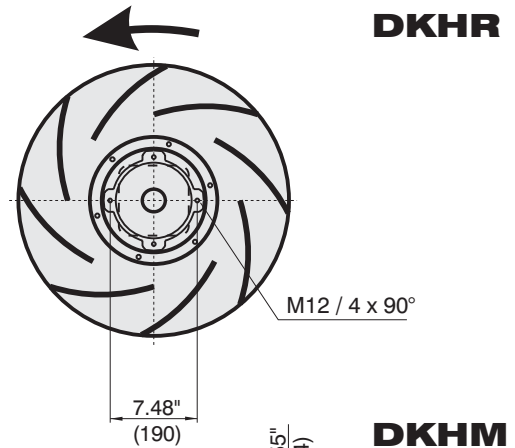
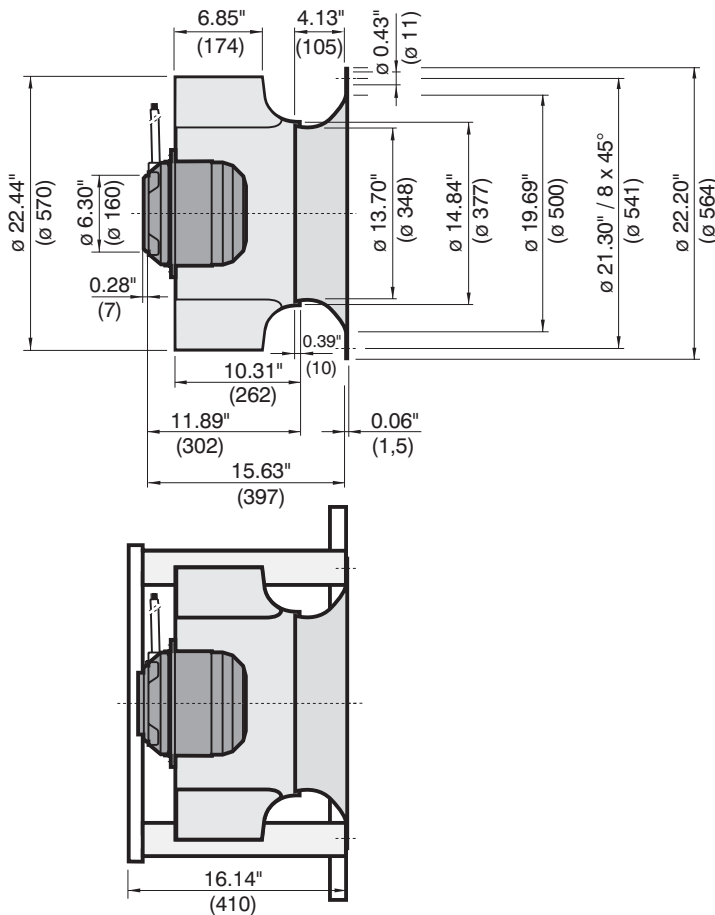


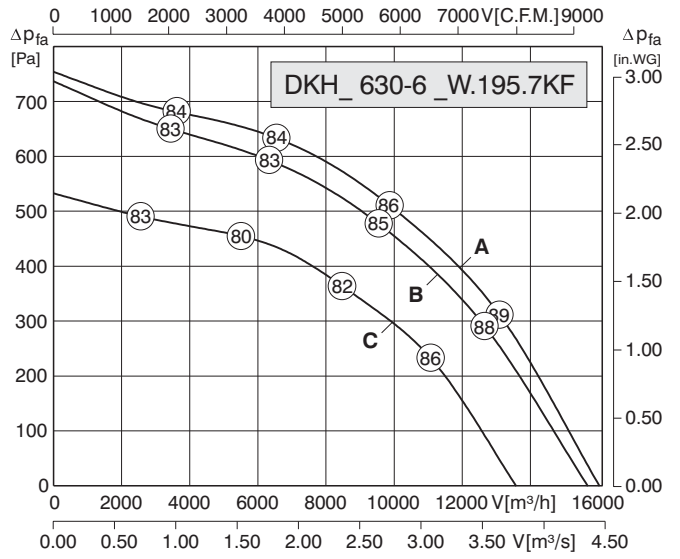
U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	2.78	4.65	1625	131	55	-	-	4.6	54	01.005	27 / 45.5
3 ~230 Δ	60	B	2.57	8.00	1550	131	55	-	-	4.6	54	01.006	27 / 45.5
3 ~400 Y	50	C	1.72	3.95	1390	158	70	-	-	4.8	54	01.005	27 / 45.5



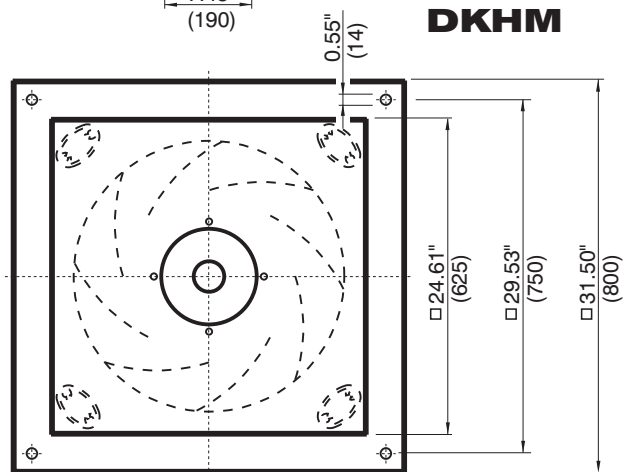
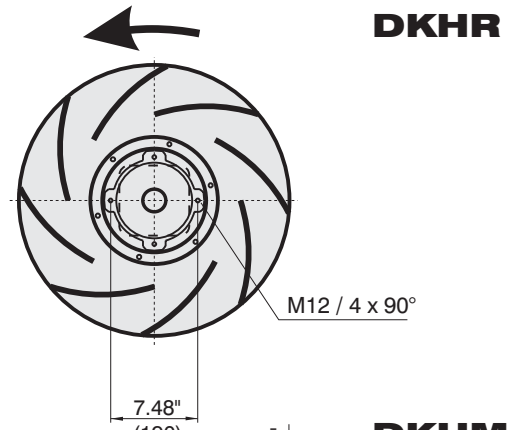
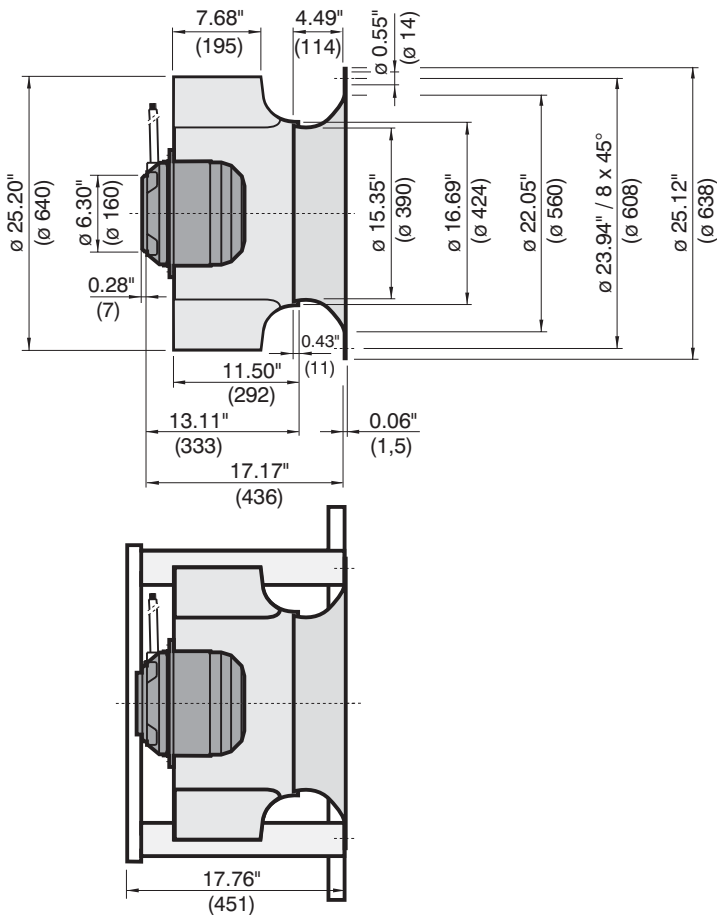


U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	✳	🔋 [kg]
3 ~460 Y	60	A	4.80	7.20	1630	104	40	-	20	4.2	54	01.005	42/ 68.5
3 ~230 Δ	60	B	4.50	13.30	1520	104	40	-	13	4.2	54	01.006	42/ 68.5
3 ~400 Y	50	C	2.90	5.30	1400	122	50	-	25	4.8	54	01.005	42/ 68.5



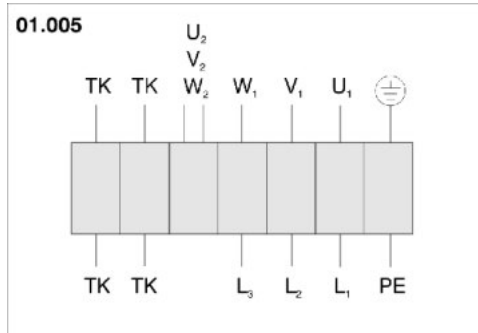


U [V]	f [Hz]	Curve	P <sub>1</sub> [kW]	I <sub>N</sub> [A]	n [min <sup>-1</sup> ]	t <sub>R</sub> [°F]	t <sub>R</sub> [°C]	C [μF]	ΔI [%]	I <sub>A</sub> / I <sub>N</sub>	⚠	★	🔋 [kg]
3 ~460 Y	60	A	2.60	4.30	1090	131	55	-	16	3.9	54	01.005	38.5 / 69
3 ~230 Δ	60	B	2.50	7.90	1050	131	55	-	8	3.9	54	01.006	38.5 / 69
3 ~400 Y	50	C	1.60	3.50	930	158	70	-	-	5.1	54	01.005	38.5 / 69



**No. 01.005**

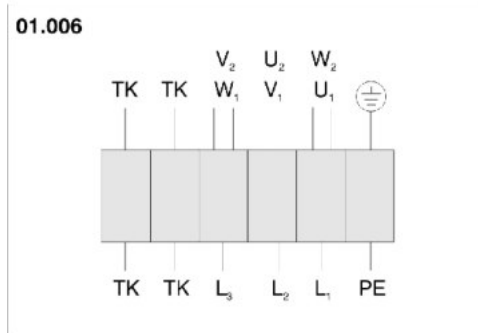
Three phase motor in Y connection with thermal contacts. Changing of rotation direction by interchanging of 2 phases.



- U<sub>1</sub> brown
- V<sub>1</sub> blue
- W<sub>1</sub> black
- U<sub>2</sub> red
- V<sub>2</sub> grey
- W<sub>2</sub> orange
- TK white
- PE yellow-green

**No. 01.006**

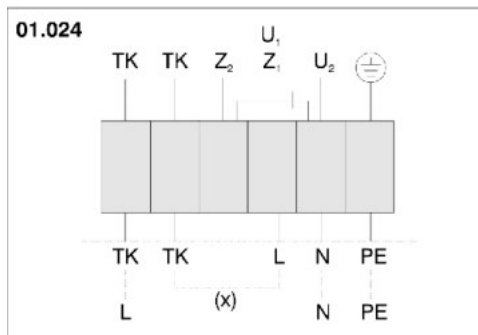
Three phase motor in delta connection with thermal contacts. Changing of rotation direction by interchanging of 2 phases.



- U<sub>1</sub> brown
- V<sub>1</sub> blue
- W<sub>1</sub> black
- U<sub>2</sub> red
- V<sub>2</sub> grey
- W<sub>2</sub> orange
- TK white
- PE yellow-green

**No. 01.024 clockwise**

Single phase A.C. motor with operating capacitor and thermal contact. Thermal contact wired in series with windings, if RE controllers are used. Insert bridge (x) and wire connections shown as dash-line on the drawing.



- U<sub>1</sub> brown
- U<sub>2</sub> blue
- Z<sub>1</sub> black
- Z<sub>2</sub> orange
- TK white
- PE yellow-green



**Please contact us:**

