

Installation and Operating Instructions

EV20-630 Rotary Vane Vacuum Pumps Oil lubricated, air-cooled

<i>Item Description</i>	<i>Item Number</i>
EV20 dual frequency motor	A35010940
EV40 dual frequency motor	A35015940
EV70 dual frequency motor	A35020940
EV100 dual frequency motor	A35025940
EV160 dual frequency motor	A35030940
EV200 200 V, 50/60 Hz	A35035934
EV200 dual frequency motor	A35035940
EV300 200 V, 50/60Hz	A35040934
EV300 dual frequency motor	A35040940
EV400 200 V, 50/60Hz	A35045934
EV400 dual frequency motor	A35045940
EV630 200 V, 50/60Hz	A35050934
EV630 dual frequency motor	A35050940



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The abbreviations used throughout this manual are detailed in the table below:

Abbreviation	Description
DE	Oil Filter Access Cover
FA	Oil filter Element (Fine)
GA	Oil filter Element (Coarse)
LA	Pump Exhaust
MA	Inspection Glass (High)
MI	Inspection Glass (Low)
OA	Drain Screw
OD	Mist Filter Cover
OE	Oil Filler Cap
OG	Oil sight Glass
OL	Oil Pipeline
SA	Pump Inlet

Installation Instructions

To be used in conjunction with the operating instructions.

- 1 Install the pump on a sound level surface.
- 2 Use suitable lifting equipment to move the pump. Attach the lifting equipment to the lifting eyes provided on the pump.
- 3 Ensure the pump is installed for ease of maintenance, so that the filters, regulators and oil sight glass (if fitted) are accessible.
- 4 Ensure that the pump is sited in a position where adequate and suitable cooling air can circulate freely around the pump. Any restrictions in cooling air can cause premature failure of the pump. If necessary suitable forced air-cooling must be installed to protect the pump.
- 5 When connecting pipe work, provide flexible connection pipes so that the minimum diameter of the pipes corresponds to the connection thread size.
- 6 When pipes exceed 2M in length, increase the diameter to the next size. Narrow diameter pipes cause loss of pressure and poor efficiency.
- 7 Non-return valves must be fitted if there is a danger of reverse rotation when stopping the pump, due to the length of connection pipes.
- 8 Adequate and suitable filtration must be fitted to the pump to ensure long and trouble free life.
- 9 Ensure that no foreign bodies i.e. metal swarf, dust etc. are allowed to enter the intake and outlet of the pump.
- 10 Please ensure that the correct grade of oil is in the pump before use. (see operating instructions).
- 11 Any electrical connections must be made by a qualified electrician and conform to local and national safety requirements.
- 12 An isolator and a suitable motor rated circuit breaker rated for the size of motor must be installed to protect the motor. The pump must not restart automatically when electrical supply is restored. (Details of full load current can be found on the motor plate).
- 13 You must ensure that suitable emergency stop controls are used.



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- 14 Check the direction of rotation before use as a failure to run the pump in the correct direction can cause internal damage to the pump, invalidating the warranty.
- 15 If the pump is connected to an exhaust line, the maximum pressure at the pump outlet must not exceed 200mbar G.
- 16 The maximum inlet pressure must not exceed 1.5 bar A permissible for continuous running of the pump.
- 17 A PT100 is fitted on pumps EV70 and above, up to and including EV630. (Alarm set at 110°C, Trip set at 130°C).
- 18 Any maintenance must be carried out by a suitably qualified technician.
- 19 Apply suitable thread sealant or PTFE tape where applicable.
- 20 Ensure that the pump is installed in a well-ventilated area.

DO NOT EXPOSE ANY PART OF THE HUMAN BODY TO VACUUM.

FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS MAY INVALIDATE ANY WARRANTY CLAIM.

Order spares from your nearest Edwards company or distributor.

WARNING: DON'T THROTTLE OR BLOCK AIR DISCHARGE OR USE AS A COMPRESSED AIR OUTLET.



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Gas Ballast

The EV pumps are fitted with gas ballast valves. These are not depicted on the pump diagrams in this manual. The gas-ballast valve allows you to control the introduction of gas-ballast air when pumping high vapour loads. Gas-ballast is used to reduce condensation of the vapour carried by the pumped gases. This system reduces oil contamination and pump corrosion caused by vapour condensing into the oil.

Safety



You must ensure that the pump is suitable for your application. A suitably trained technician must perform the installation of the pump. The technician must be familiar with the safety procedures that relate to the pump oil and products processed by the pumping system. Obey the safety instructions and take note of appropriate precautions.

Wear the appropriate safety clothing when you come into contact with contaminated components.

The pumps can be used to generate a vacuum and will generate high pump temperatures, especially at the oil container:

- Install pumps/compressors in a position where hot surfaces cannot be touched
- Or protect the area around them
- Or install warning signs.

To prevent the pump heating up to values exceeding specifications it is absolutely necessary to execute each individual step of the maintenance procedures.

Application

These pumps can be used to create a vacuum.

The specification is valid up to a height of 800 m above sea level.

The pumps cannot be used for pumping of toxic or flammable materials.

Ensure that only non hazardous atmospheric air is taken in.

Transport and storage

Store pump in a dry area. Prevent condensation caused by vapour.

Lift and transport the pump using suitable lifting equipment and techniques. Use the lifting eyes provided on the pump.

Installation

It is recommended to install the pumps with easy access for maintenance.

Clearance between pumps and adjacent walls should be no less than 10 cm of free space in order to ensure sufficient airflow for cooling.

Ambient temperatures must not exceed 45 °C.

Please refer to the addendum sheet, which details further installation instructions.

Connection and installation

Ensure correct dimensions and clean pipelines (no weld spatter, chips or similar contamination). The diameter of the pipelines should at least equal that of the threads. For pipeline lengths of more than 2 m use the next larger line diameter. Keep connections free from oil, grease and water or other contaminations.

Fill the pump with oil



Use vacuum pump oil Ultragrade 20.

Screw-off oil inlet cover and fill-in oil up to the maximum of the inspection glass MA.

Remove protective caps at LA and SA. Don't connect to the pipelines yet.

See the table below for oil quantities:

Pump Type	Oil Capacity	
	Litre	
EV20	0.5	0.13
EV40	1	0.26
EV70	2	0.53
EV100	2	0.53
EV160	7	1.85
EV200	7	1.85
EV300	7	1.85
EV400	15	3.96
EV630	15	3.96

Motor connection

Ensure that the electrical installation of the pump conforms to your local and national safety requirements as required by EN 60402 Pt1.

Connect motor based on connecting diagram (in terminal box). An experienced electrician should carry out this work only. Check for connecting voltage, nominal current and frequency.

Install motor circuit breaker and set to nominal motor current. (For data see motor rating plate).



Briefly start motor and check rotation (arrow on casing). Exchange phases if rotation is incorrect.

Avoid switching on more than 10 times per hour.

The pump must not automatically restart when power is restored.

Commissioning

Connect intake line at SA.

WARNING: DON'T THROTTLE OR BLOCK AIR DISCHARGE LA OR USE AS A COMPRESSED AIR OUTLET.

Ensure the exhaust pipeline diameter is equal to or greater than the air discharge LA.

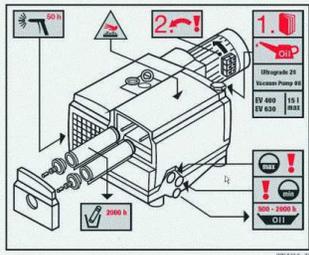


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Maintenance

Maintain pump regularly to achieve the best operating results. Maintenance intervals will depend on the pumps use and ambient conditions.

Refer to the maintenance label on the pump, a typical example can be seen below.



Before commencing maintenance switch off electricity to reliably avoid unintentional restarting. Dirty inlet filter or blocked air degrease elements will reduce air intake capacity.



Fan cover, fan grill, cooling ribs and surfaces of the compressor have to be cleaned to avoid overheating. Wear appropriate safety clothing.

Oil / Oil separation

Check oil level daily while the pump is switched off. The oil level must not sink below inspection glass middle MI.

Replace the oil:

- after first 100 hrs of operation.
- at least once every 6 months or 2000 hrs of operation whichever is greatest.
- or if too much water is taken in.



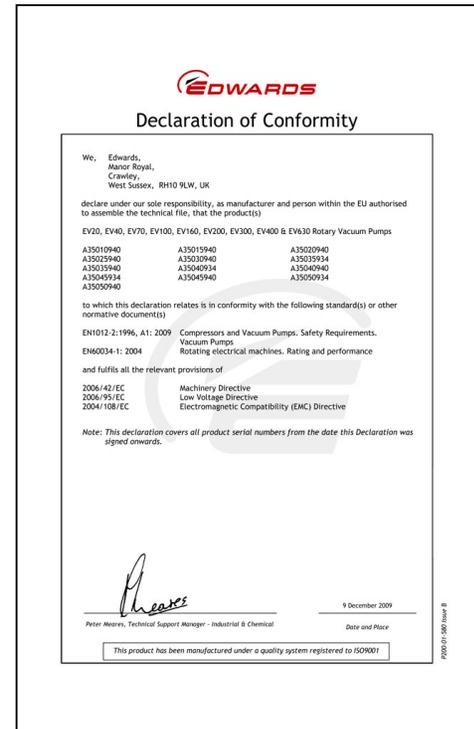
The old oil is to be drained at drainage screw OA while pump is switched off but still at operating temperature.

Check air degrease element FA when exchanging oil and replace if blocked. Insert with seam pointing downwards.



The filter cartridges are inserted behind the enclosure cover GD and are to be cleaned depending on the dust level. Loosen cover DE.

(EV160/300/400/630 Only) Check coarse material separator and wash out if contaminated: Loosen oil container cover OD and oil pipeline OL.





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Spare parts

The following spares kits are available from Edwards. When ordering your spares kit it is important to select the one that is appropriate for the age of your pump. This can be achieved by reading the index number at the beginning of the pump serial number, this will be, A, B, C, D, E, F or G.

Pump	Description	Index	Part Number
EV20	Filter Kit	A-B	A35010800
	Overhaul Kit	A	A35010820
		B	A35010821
	Service Kit	A	A35010810
B		A35010811	
EV40	Filter Kit	0-A	A35015800
		None	A35015800
	Overhaul Kit	A	A35015821
		None	A35015820
	Service Kit	A	A35015811
		None	A35015810
EV70	Filter Kit	D-G	A35020801
	Overhaul Kit	F	A35020822
		G	A35020823
	Service Kit	D-F	A35020811
		G	A35020812
EV100	Filter Kit	DEFG	A35025801
	Overhaul Kit	F	A35025822
		G	A35025823
	Service Kit	DEF	A35025811
		G	A35025812
EV160	Filter Kit	F	A35030802
	Overhaul Kit	F	A35030822
	Service Kit	F	A35030812
EV200	Filter Kit	E-F	A35035801
	Overhaul Kit	F	A35035822
	Service Kit	F	A35035812
EV300	Filter Kit	E-F	A35040801
	Overhaul Kit	F	A35040822
	Service Kit	F	A35040812
EV400	Filter Kit	A-D	A35045800
	Overhaul Kit	D	A35045821
	Service Kit	A-D	A35045810
EV630	Filter Kit	C-D	A35050800
	Overhaul Kit	C-D	A35050820
	Service Kit	C-D	A35050810

Disposal

Dispose of the pump and any components removed from it safely in accordance with all local and national safety and environmental requirements.

You must take particular care with components and waste oil, which have been contaminated with dangerous process substances. Do not incinerate Fluoroelastomer seals and 'o'rings.

Accessories

The following accessories are available:

A350 10 310	Inlet filter kit EV20
A350 15 310	Inlet filter kit EV40
A350 25 310	Inlet filter kit EV70 & EV100
A350 30 310	Inlet filter kit EV160, EV200 & EV300
A350 45 310	Inlet filter kit EV400 & EV630
A350 10 700	Inlet filter element EV20
A350 15 700	Inlet filter element EV40
A350 25 700	Inlet filter element EV70 & EV100
A350 30 700	Inlet filter element EV160, EV200 & EV300
A350 45 700	Inlet filter element EV400 & EV630
A350 10 300	Oil level switch EV20 & EV40
A350 20 300	Oil level switch EV70, EV100, EV160, EV200, EV300, EV400 & EV630

Install inlet filter in such a way that the filter cartridge is horizontal, thus no dirt will get into the pump during maintenance work.



Clean filter cartridges according to the amount of dust in the environment. Wearing the appropriate safety clothing, use pressurized air to blow through the filter from inside out. Washout filter on the inside or use vacuum. Make certain that blocked, oily or greasy cartridges are exchanged against new ones.

Set **vacuum control valve** to operational value.

Oil level switch: Check function during oil exchange;

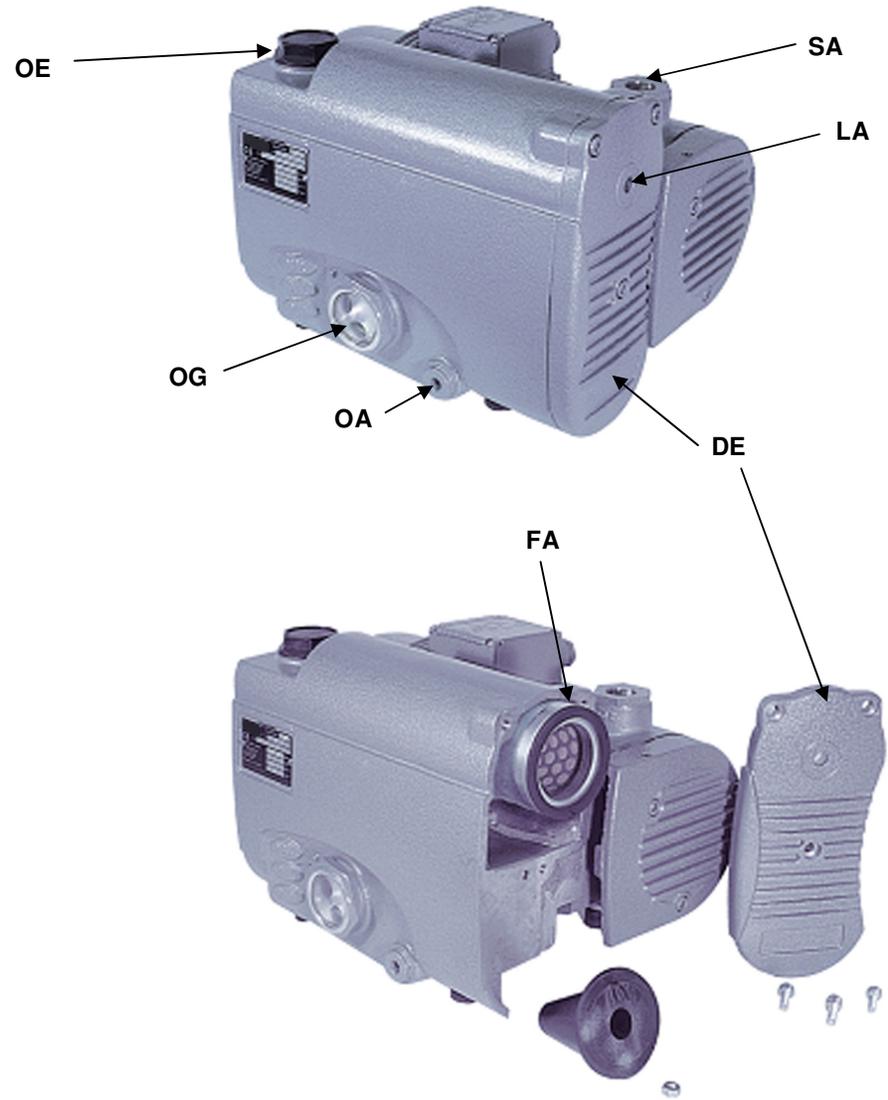
Gas ballast valve: Exchange contaminated valve.



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	EV20
Pipework up to 10m	3/4"
Width of vanes, min. [mm]	15
Air flow at 50/60 Hz [m ³ /h]	18,5/22
Length [mm]/Width [mm]	338/245
Height [mm]	219
Weight [kg]	20
Acoustic pressure level [db(A)]	63

Right of modifications reserved

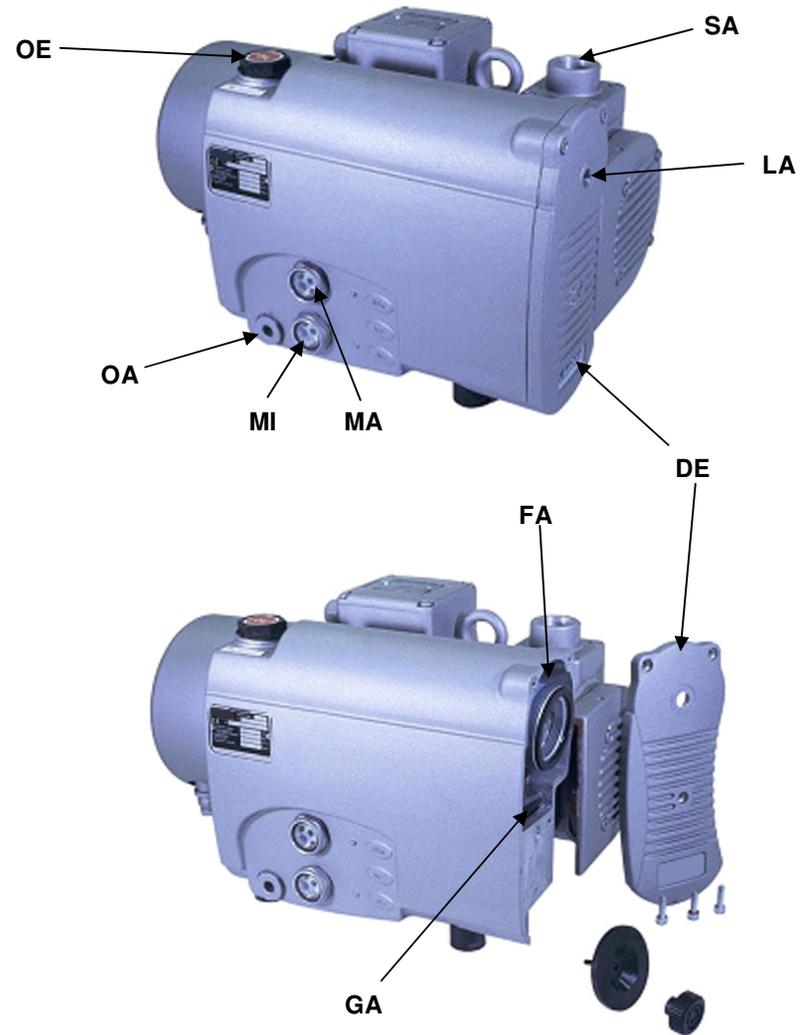




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EV40	
Pipework up to 2m / 2m up to 10m	1" / 1 1/2"
Width of vanes, min. [mm]	19
Air flow at 50/60 Hz [m ³ /h]	41/48
Length [mm]/Width [mm]	462/269
Height [mm]	268
Weight [kg]	38
Acoustic pressure level [db(A)]	69

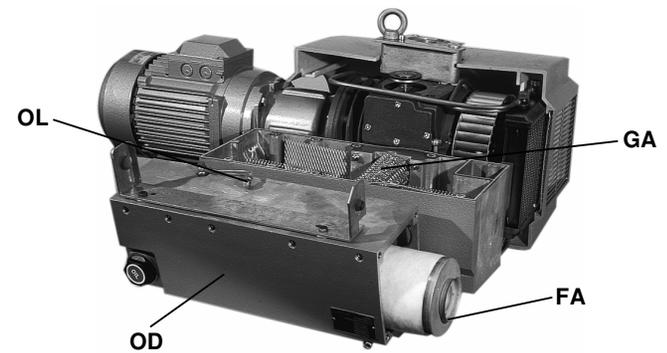
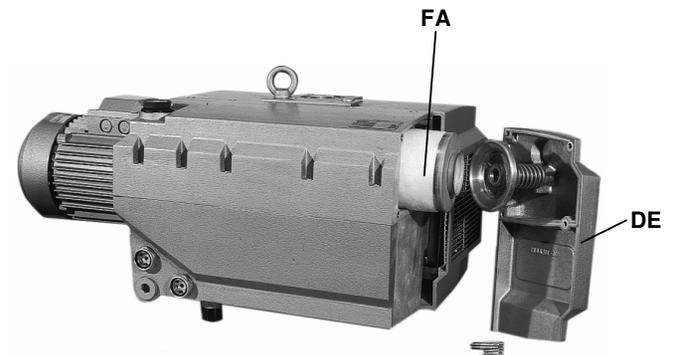
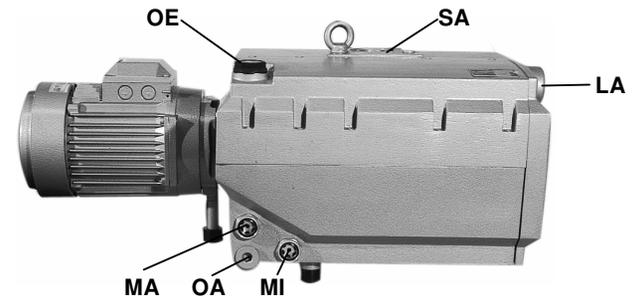
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	EV70	EV100
Pipework up to 2m / 2m up to 10m	1 1/4" / 1 3/4"	1 1/4" / 1 3/4"
Width of vanes, min. [mm]	34	34
Air flow at 50/60 Hz [m ³ /h]	70/84	100/120
Length [mm]/Width [mm]	688/374	799/374
Height [mm]	300	300
Weight [kg]	54	77
Acoustic pressure level [db(A)]	67	68



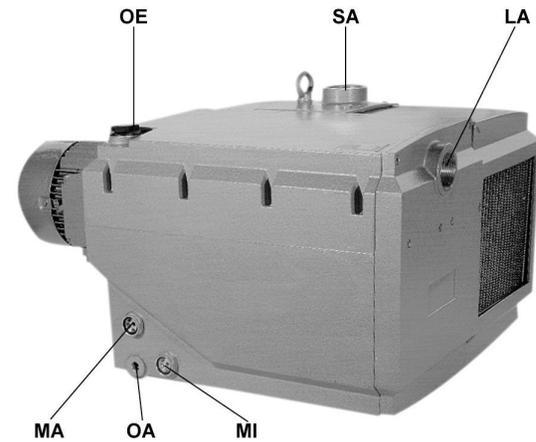
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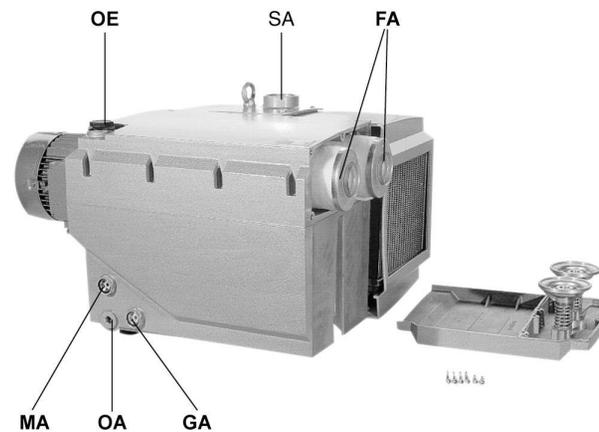
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	EV160	EV200	EV300
Pipework up to 2m / 2m up to 10m	2" / 2.1/2"	2" / 2.1/2"	2" / 2.1/2"
Width of vanes, min. [mm]	37	37	37
Air flow at 50/60 Hz [m ³ /h]	160/192	184/221	240/288
Length [mm]/Width [mm]	879/531	1016/531	1097/531
Height [mm]	415	415	415
Weight [kg]	155	177	193
Acoustic pressure level [db(A)]	71	73	73

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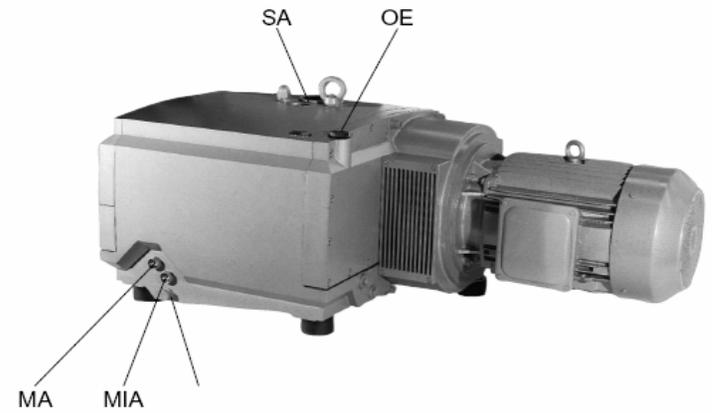




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	EV400	EV630
Pipework up to 2m / 2m up to 10m	3" / 4"	3" / 4"
Width of vanes, min. [mm]	59	59
Air flow at 50/60 Hz [m ³ /h]	400/480	630/750
Length [mm]/Width [mm]	1312/672	1540/672
Height [mm]	501	501
Weight [kg]	400	525
Acoustic pressure level [db(A)]	78	80

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