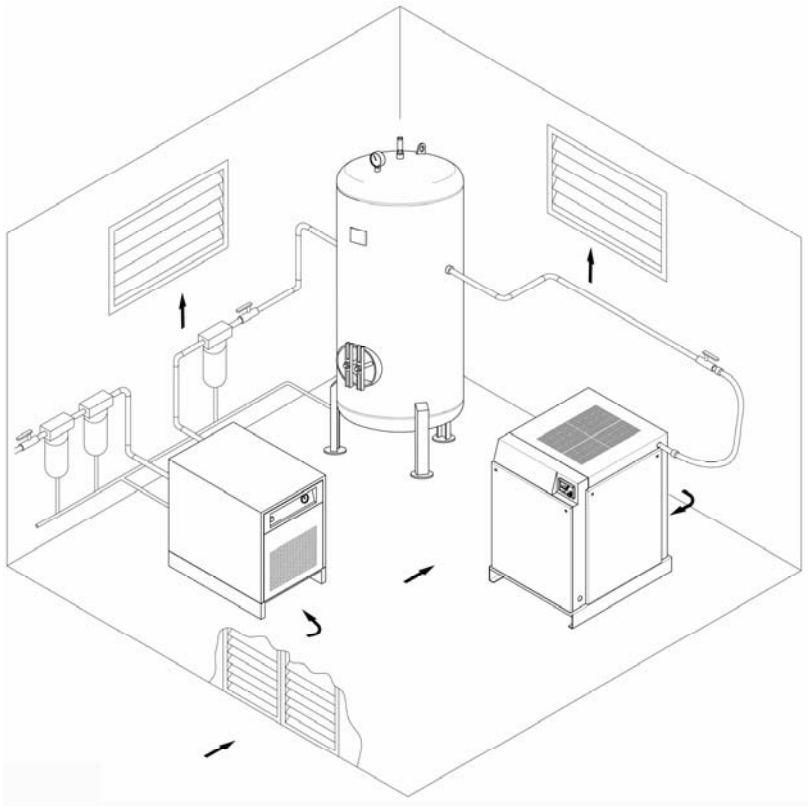
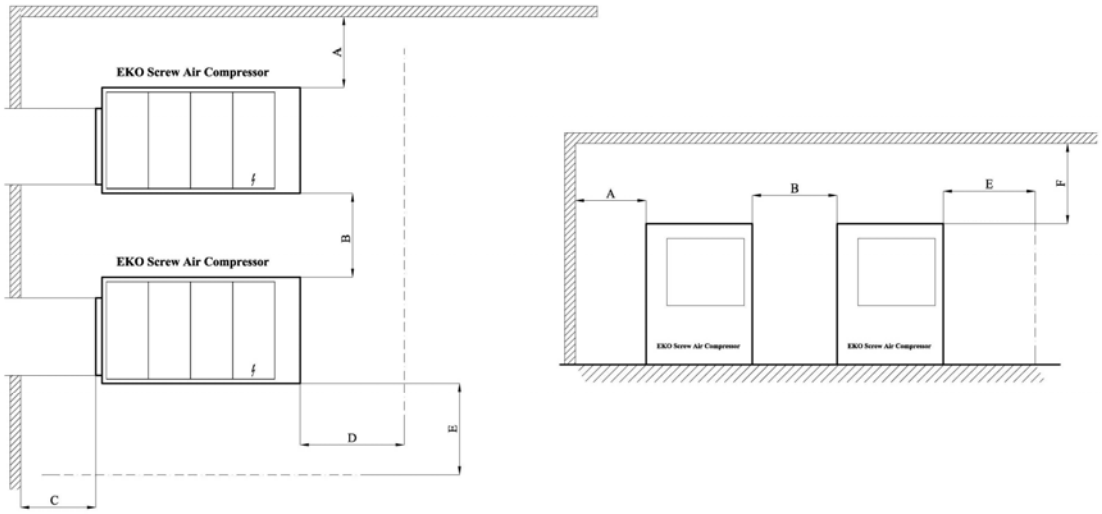
EKOMAK Screw Compressors Installation Principles



Compressor Room

- The Compressor must be located in a proper closed or open room (installation area) which has enough ventilation and also must be protected by roof against rain and direct sun light. Room temperature must be higher than 0ºC and must not be higher than 35ºC if it is possible. Room/Ambient temperature above 40ºC is improper for operating, if the compressor has not been specially designed for above 40ºC. (Specically designed Ekomak screw air compressors will be able to run up to 50ºC ambient temperature but as a common rule, room/ambient temperatures above 40ºC are not proper for operating standard screw compressors.) Root heating or (optional) heat tracing in the compressor is needed if the compressor will be exposed to ambient temperature under 0ºC. The location must be clean and also suction and ventilation air must not be dusty; otherwise, filters of the compressor (and room if applicable) will be obstructed early.
- Main power supply lines must be proper to compressor power rate (as kW, amper & volt), and power connection must pass through magnetic main switch or proper rated fuses before power input terminals of the compressor. (Wiring/Cable sizes and current rates of fuses must be selected and connected according to EKOMAK's power supply recommendations and wiring diagram of the compressor.)
- Compressed air line between the compressor and the air receiver must be flexible. For example: 1 meter compressed air hose with 1 ½" inside diameter is proper for a compressor with 1 11/2" outlet connection. Which must be also proper for working pressure and temperature range.
- A ball valve must be at the outlet of the compressor (downstream of the compressor, upstream of the air receiver and the customer's pipework) for using it as shut-off valve during maintenance works.
- Compressed air pipework size and design pressure must be proper for compressor capacity and working pressure.
- As a guide line, compressed air supply system design can be based on max. (less than) 0.5 bar pressure drop op in compressed air line from the compressor to the consumption end point. (0.5 bar total pressure loss iincludes pipe, valve, filtre and compressed air dryer losses) Or, in worst conditions (when filters are blocked/choked) total pressure loss in the compressed air supply system must be less than 10% of the working pressure of the compressor. The pipework must be constructed and pipe size must be selected according to this principle. For example: if compressor is designed for 8 bar working pressure, even if filters are blocked, pressure drop at the most far consume/end point must be less then 0.8 bar.
- Compressed air dryer and filters must be selected according to requester air quality class.
  When requesting an offer from or giving an order ro EKOMAK, required compressed air flow rate, working pressure and air quality class (or filtering level) must be specified correctly. Upper limit of ambient temperature affects compressed air dryer capacity. Thus, ambient temperature and ventilaton of compressor r-oom/location is important. Inadequate ventilation causes problems as results of working temperature raising.

- Total compressed air storage in the system (compressed air receiver plus pipework volume) must not be less than a capacity which equals compressor capacity (flow) for 10 seconds. As a suggestion, proper value/size of total compressed air storage volume is about a quarter (15 seconds) of compressor capacity per minute. Maximum 30 seconds is preferable but larger volume is unneccesary. Smaller (less than 15 seconds capacity) receiver volume may be inadequate to prevent pressure variations/surge and short time unloading-loading cycles which are unwanted.
- Air quality (as kind of compressor capacity) is equal to multiply of air receiver volume and absulte air pressure (gauge pressure plus atmosphere pressure, 1 bar). For example: 2 m^3 air receiver with 7 barg air pressure inside, contains 2*8= 16 m^3 air as kind of compressor capacity (FAD, Free Air Delivery). That is a quarter capacity (15 seconds) of a compressor with 8 m^3/min (FAD) capacity. But, to raising air pressure from 0 to 7 barg (gauge pressure) takes 2 minutes. It is almost proper to accept longer durations than 2 minutes are unneccessary.
- After deciding the location of the compressor room/installation area, a principle laying plan/diagram may be drawn which shows compressed air supply system lines (pipework) and components as simplified then the system may be installed by using it. If you (your company) can not practise laying plan/diagram, you may request help/support from Ekomak. (Limit/Border dimensions of installation area/location, air receiver, dryer, filters and compressor dimensions and inlet/outlet connection sizes are specified. Also, cooling air exhaust duct must be speficied if it is used and other factors which are limiting/restricting the area must bhe specified. When it is requested by the customer, Ekomak can give an installation laying plan/diagram which for it's own delivery/sales scope, only. NOTE: Top prevent an unneccessary affixment on details, please, examine sample plans/diagrams which are given. Sample installation drawings, plans/diagrams, room volume and distance considerations are common usable for mostly sitiuations.)
- Enough distances arounf of a compressor are required to permite easy maintenance/service. Those distances must be proper to move and lift out bigger components of compressor package, as motor, cooler and air-end. (Distances from walls, from roof and from other machines/equipment.). If there is not a crane or hoist on a position above the compressor, longer distances are needed around of the compressor for forklift movement.
- Distances around of the compressor must be enough to remove/open panels and doors of the compressor.
- For heating the workshop/factory or for exhausting warm/hot air from the compressor room/location, cooling air outlet of the compressor may be directed to another room/location or to outside by using a duct. If a duct will be installed to exhaust cooling air, inside section area of duct must not be less than the cooler (of the compressor) air flow section area and side dimensions of duct must not be less than cooler outlet frame dimensions of the compressor. A duct with 1 elbow/bend and with max. 3 meters length can be used/intalled without an auxilary fan. If longer duct length is necessary, cooling air pressure drop must be under of (less than) following upper limits for Ekomak compressors: 10-20 Pascal upto 15 kW, 20-40 Pa for 15-55 kW, 40-60 Pa above 55 kW compressors. Or an auxiliary fan must be used to help exhausting cooling air (with same or more flow rate of the compressor's cooling fan). Or. Consult to Ekomak about air extahust duct. If exhaust duct restricts cooling air flow that causes abnormal temperature raising in the compressor and can cause malfunctions.
- Floor under the compressor must carry 500 kg/m^2 weigth/load properly. Elevated concrete base and/or vibration inserts are not needed. Flat concrete floor/ground is is enough.
- It is required to drain condensate (waste water-oil mix) from compressor, dryer and air receiver, periodically. For that, a waste water drain channel with grille is useful for removing collected condensate and also cleaning water from floor. (The channel must be close to walls of the compressor room.)



Distances from walls and other machines

Recommended distances:

Compressor power	A	B	C	D	E	F
Up to 15 kW	Min. 0.5 m	Min. 0.8 m	Min. 0.2 m	Min. 0.5 m	Min. 0.5 m	Min. 1 m
Between 15-45 kW	Min. 0.8 m	Min. 1 m	Min. 0.2 m	Min. 1 m	Min. 1 m	Min. 1 m
Between 55-110 kW	Min. 1 m	Min. 1.5 m	Min. 0.5 m	Min. 1 m	Min. 1 m	Min. 1 m
Between 132-250 kW	Min. 1.5 m	Min. 2 m	Min. 0.8 m	Min. 1 m	Min. 1.5 m	Min. 1.5 m

Note: *Distances around the compressor must be enough to open doors and remove panels, and the largest component of the compressor, and permit to forklift movement. The distance between the compressor and the roof must be proper to interfere in the compressor from the top of it.*

Room volume:

Room volume >= Total Compressor Power * 1.35 m^3 (1.35 m^3 per 1 kW)
Example: Two of 75 kW compressors, 2*75*1.35 = 202.5 ➔ 200 m^3 or larger compressor room is needed.

Ventilation openings:

Ventilation opening >= Total Compressor Power * 0.016 m^2 (0.016 m^2 inlet per 1 kW and same outlet/exhaust)
Example: Two of 75 kW compressors, 2*75*0.016 = 2.4 m^2
or larger compressor room inlet/suction section area and also (with same section area) exhaust/outlet openings are needed. That opening must be on cooling air inlet wall and also must be opened on cooling air outlet wall (for above example, 2.4 m^2 + 2.4 m^2). As a guideline, Suction openings side may be near to floor and exhaust opening may be near to roof. Total exhaust openings may be larger than total suction/inlet openings. Suction opening can be louver on a door or window. For preventing dust in compressor room and suction line, a panel filter is useful on suction opening if it will not restrict air flow. Vacuum is unwanted in compressor room which may be caused by panel filter restriction or inadequate opening section.

If volume of the compressor room is not enough or room ventilation is not enough, that will cause performance defect and malfunctions for compressor as running temperature raising causes service life shortening.