

Press Release

Q & A – Air Motors – Installation and Assembly

Air motor operation at the highest energy efficiency

Do you plan on using a high-torque stainless-steel motor in an agitator system to mix paint and coatings, or as a compact power pack for an innovative roller transport device? If so, then an air motor is in many ways the right choice when it comes to specifying a drive system, whether it is used for a manual device or a complex industrial system. Because of its compact size and low weight an air-motor offers an outstanding power density, since it represents only 1/3rd of the size and 1/5th of the mass of a standard electric motor having a comparable power output. Air motors can be used in many applications, due to a variety of available models, the simple construction, favorable performance-to-weight ratios, extensive speed ranges, and the inherent combustion safety feature. A rugged design and durable performance is combined with simple form of installation, service and assembly.



Air motors operate based upon a simple principle. Compressed air, generated by a compressor, induces the motor to rotate. The different designs include air-vane motors, turbines and tooth gear motors. The efficiency of the respective model depends largely upon the air-volume and the correct air-pressure.

DEPRAG, based in Amberg, Bavaria, has been - for decades - a reliable consultant in regards to air motors and air tools and has become an industry leader with new innovations and a continuous optimization of existing product lines. A high priority is placed upon providing competent consultation and unparalleled advice. Below, DEPRAG Product Manager, Dagmar Dübbelde, gives answers to basic questions from customers about the installation of air motors and their energy-efficient application. "With a little basic knowledge about the functionality of air motors, an installation can be a simple thing".

Question: "I would like to install a reversible ADVANCED LINE air-motor. It provides one air connection each for right hand and left hand rotation. There is also a connection for the exhaust of the air motor. How do I connect this air motor?"

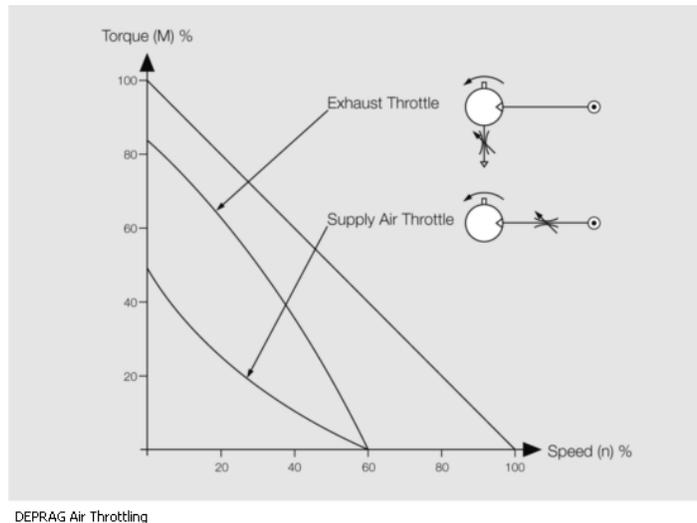
Answer: "The air inlet connection which is named R (for right-hand rotation) should be connected to the main air supply. It is important that both the air connection for the left-hand rotation (named L) and the exhaust port remain open or are at maximum covered with a filter. This is the only way for the motor to start without problems and achieve its full power capability".



DEPRAG motor port description

Question: "I have installed a 900 W BASIC LINE motor. However, it has not achieved the desired power level. What can be the problem?"

Answer: "Please check the compressed air-supply connections. Air distributors, pneumatic valves, quick-connect couplers and air hoses are often used with too small an ID. The minimum required tube and port diameter for the 900 W air motor is 13-mm, this specification can be found in the product catalog. This minimum requirement will not be kept if the air supply is regulated or throttled anywhere in the system. This also applies to the air-pressure. Only with a sustained pressure of 6-bar (85 PSI) is piped directly into the inlet port, can the air motor deliver the specified power. A pressure drop of 1-bar causes a performance loss of 23%."



Question: "Air Motors are controlled by air-pressure or the regulation of the air-supply. What valve models should be used?"

Answer: "To control an air motor in one direction a simple 2/2-way valve is all that is needed. Reversible motors require either two 3/2-way valves or one 5/3-way valve in order to provide the necessary exhaust for the unused incoming air."

Question: "If the air motor requires oil, what type and how much oil should be applied by the oiler of an air-maintenance unit? Can any motor oil be used?"

Answer: "With proper preventative maintenance, the maximum life expectancy and optimum performance of the air motor can be achieved. Only acid- and resin-free oil is suitable. One to two drops of oil per cubic-meter of compressed air is all that is required. The specific air-volume requirements can be found in the product catalog or the air-motor operating instruction booklet."

Question: "For applications in the food-processing or chemical industries, an air motor has to be operated without lubrication due to hygiene reasons. Is that possible? What issues are important?"

Answer: "The stainless steel and fully sealed ADVANCED LINE motor series is specifically designed for applications in a clean room environment and may be operated oil free. It is important to remember that a non-lubricated air-motor will have a power loss of approximately 15%."

Question: "Air motors are very robust, but the motor vanes must be replaced periodically following a preventative maintenance schedule. How much effort is required for this?"

Answer: "It can be fast and easy. For example, our BASIC LINE vane motors, are equipped with a rugged cast-iron housing and operate with a power range of 200 W, 400 W, 600 W, 900 W and 1.2 kW. The motor design allows the exchange of the vanes **without the need to remove the air motor** or to disassemble the housing. With its unique and patented 'Vane exchange system', a direct replacement of the vanes is possible in minutes. After loosening the cap screws and removal of a cover, the worker only requires a pair of tweezers to pull the old vanes and exchange them with new one. Highly trained personnel is not required."

Question: "Air motors can be seamlessly adjusted by regulating the air-volume. What is the best way to do this?"

Answer: "Basically the air-motor is very flexible. The speed automatically adapts to the load changes on the drive shaft. This means that at low load (low torque) the speed of the motor will be close to the specified idle speed and with increased load (increased torque) the speed decreases. If you wish to reduce the speed of the motor without reducing the torque output, then it is recommended to regulate the motor exhaust outlet. If you wish to regulate both the speed and the torque then it is recommended to regulate the inlet air-supply."

Question: "Can I also regulate the air motor by manipulating the air-pressure?"

Answer: "The optimal performance of Deprag air-motors is based upon 6-bars (85 PSI) of air-pressure. By adjusting the air-pressure between 3 to 6.3-bars (43 – 90 psi) it is possible to manipulate the speed, power, torque and air-consumption of the motor without a problem. In practice or from experience, both the control of air and pressure is possible. Respective performance data can be obtained from DEPRAG."

Question: "Today energy savings are more important than ever. How can I make my air motor operate at its peak efficiency?"

Answer: "You should consider the following rule: An air motor achieves its maximum power when it is operating as close as possible to its rated speed (50% of the idle speed). The energy balances best in that area, the compressed air is used efficiently and the motor makes optimal use of the energy supplied. Theoretical power curves are available for all DEPRAG air motors. It is also very important to select the correct size air motor for the application already during the planning stages. Our design consultants will be very happy to support you in selecting the best motor for your application."

DEPRAG SCHULZ GMBH & CO. in Bavaria is a leading international supplier of air-motors. A wide range of air-motors is available with the motors in the BASIC LINE (cast-iron housing), the ADVANCED LINE (stainless-steel housing), the INDIVIDUAL LINE (custom built for a specific customer) and the POWER LINE (extreme high-torque). DEPRAG is known for its outstanding customer support, its service oriented highly-qualified staff and the exceptional product offered. Turbine- and gear motors are also part of the product line, especially where there are special applications. DEPRAG operate in over 50 countries worldwide with more than 600 employees.

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