



Air Motor

AM-300 • 310

OPERATION MANUAL

Thank you for purchasing the Air Motor "AM-300/AM-310". This can be connected to any of the 30,000mm³ (ppm) spindles. The spindle and reducer, balancer / regulator, Air Line Kit are required to drive the Air Motor. Read this Operation Manual carefully before using. Always keep this Operation Manual in a place where a user can refer to for reference at any time.

1. CAUTIONS FOR HANDLING AND OPERATION

- Read these warnings and cautions carefully and only use in the manner intended.
- These warnings and cautions are intended to avoid potential hazards that could result in personal injury to the operator or damage to the device. These are classified as follows in accordance with the seriousness of the risk.

Class	Degree of Risk
△ WARNING	A safety hazard could result in bodily injury or damage to the device if the safety instructions are not properly followed.
△ CAUTION	A hazard that could result in light or moderate bodily injury or damage to the device if the safety instructions are not followed.

△ WARNING

- This Air Motor is not a hand tool. It is designed to be used on CNC machines or special purpose machines.
- Do not touch the cutting tool while it is running. It is very dangerous.
- Wear safety glasses, dust mask, and use a protective cover around the Air Motor whenever the spindle is rotating.
- Never operate or handle the Air Motor and spindle until you have thoroughly read the Operation Manual and safe operation has been confirmed.
- To prevent injuries / damages, check the Air Motor, spindle and cutting tool for proper operation before use.
 - Before connecting the Air Motor and spindle, always turn the control power off and turn the compressed air supply off. Then it is safe to remove the Air Motor and spindle.

△ CAUTION

- Do not drop or hit this Air Motor, as shock can damage to the internal components.
- Do not use the Air Motor for anything other than the intended use regarding the correct connection, operation and caution when using the Air Line Kit.
- When cleaning an Air Motor, stop the Air Motor and remove debris with a soft brush or a cloth. Do not blow air into the Air Motor with compressed air as foreign particles or cutting debris may get into the ball bearing.
- When the Air Motor is in operation, the lubricant condition, this may cause low rotation speed, damage to the internal components with short life of the Air Motor.
- Be sure to drain moisture and condensation from the Air Line Kit (air filter bowl) regularly to avoid moisture being carried to the Air Motor. This may cause damage to the Air Motor.
- Do not touch the Air Motor when it is in operation. The Air Motor will become very hot during operation. Removing the air pressure from the Air Motor and spindle causes a less of purging, allowing the Air Motor and spindle to ingest coolant. This will cause damage to the Air Motor and spindle.
- Stop working immediately when abnormal rotation or unusual vibration are observed.
- Immediately, please check the content of section "9. TROUBLESHOOTING" if the Air Motor does not break - n as follows. Start rotating slowly and over a short period of 15 ~ 20 minutes, increase speed gradually until allowable maximum speed.
- Do not disassemble, modify or attempt to repair this Air Motor. Additional damage will occur to the Air Motor if it is disassembled, modified or repaired.
- When using this Air Motor for mass production, please consider the purchase of an additional Air Motor to be used as a back-up in case of emergency.
- Securely connect the compressor supply connection hose and the air / oil supply hose to the Air Line Kit and the Air Motor to avoid accidental disconnection during use.

2. BASIC PACKAGE

When opening the package, check if it includes all items listed in "Table 1 Packing List Contents". In the event of any shortage, please contact either NAKANISHI (see the "4. CONTACT US" section) or your local dealer.

Table 1. Packing List Contents

Air Motor	• • 1pc	Wrench (20 x 24)	• 1pc	Spacers (R4 or R1, 1pc only)	Inspection Card	• 1pc
Supply Air / Oil Hose (with Filter Joint), Exhaust Air / Oil Hose (with Silencer)						
Operation Manual	• 1set					

< Supply Air / Oil Hose, Exhaust Air / Oil Hose, Filter Joint and Silencer suitable for Model >

Supply Air / Oil Hose	K-204	AM-310R/AM-310L
Exhaust Air / Oil Hose	K-221	AM-300R/AM-300L
Filter Joint	FJ-01	AM-300RA/AM-300LA, AM-310RA/AM-310LA
Silencer	K-208	AM-310R/AM-310L, AM-310RA/AM-310LA
	K-209	AM-300R/AM-300L

3. WARRANTY

- We provide a limited warranty for our products. We will repair or replace the products if the cause of failure is due to the following manufacturing defects. Please contact us or your local distributor for details.
- Defect in manufacturing.
 - Any shortage of components in the package.
 - Damage to the product caused by inappropriate use or handling.
 - This shall not apply if the damage was caused by the negligence of a customer.

4. CONTACT US

For the safety and convenience when purchasing our products, we welcome your questions. If you have any questions about operation, maintenance and repair of the product, please contact us.

● CONTACT US

- For U.S. Market
- Company Name : **NSK America Corp**
- Business Hours : 9:30am to 17:00pm (CST)
- (closed Saturday, Sunday and Public Holidays)
- U.S. Toll Free No. : 800-555-4975
- Telephone No. : 817-562-7904
- Fax No. : 817-562-7904
- Web Address : www.nskamericacorp.com
- For Other Markets
- Company Name : **NAKANISHI INC.**
- Business Hours : 9:00am to 17:00pm
- (closed Saturday, Sunday and Public Holidays)
- Telephone No. : +81 (0) 28845-5250
- E-mail Address : nskinfo@nsk-america.com

5. FEATURE

- The Air Motor housing is made from precision ground, hardened, stainless steel (SUS) with an outside diameter of $\phi 22$ mm.
- No heat is generated for long continuous use due to air driven operation.
- By mounting a silencer on the back exhaust air / oil hose, the quiet operation of air turbine is remarkably improved.
- Air consumption is 220 Nl / min and can be used with air compressor of 91P (2.2 kV).

6. SPECIFICATIONS AND DIMENSIONS

6 - 1 Specifications					
Model	AM-300R	AM-310L	AM-310RA	AM-310LA	AM-300LA
Maximum Motor Rotation Speed	30,000min ⁻¹ (rpm) (at 0.4MPa (59psi) Air Pressure)				
Appropriate Air Pressure	0.3 ~ 0.5MPa (43.5 ~ 72.5psi)				
Max. Output Power	57W				
Supply and Exhaust Air / Oil Hose Dimensions	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 65.0mm Length: 1m	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 65.0mm Length: 1m	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 65.0mm Length: 1m	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 65.0mm Length: 1m	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 65.0mm Length: 1m
Weight	135g	170g	170g	170g	170g
Notes (Level of fit defined)	Less than 700B (A) (at 0.4MPa (59psi) Air Pressure)				
Model	AM-310R	AM-310L	AM-310RA	AM-310LA	
Maximum Motor Rotation Speed	30,000min ⁻¹ (rpm) (at 0.5MPa (72.5psi) Air Pressure)				
Appropriate Air Pressure	0.3 ~ 0.5MPa (43.5 ~ 72.5psi)				
Max. Output Power	108W				
Supply and Exhaust Air / Oil Hose Dimensions	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 67.0mm Length: 1m	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 67.0mm Length: 1m	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 67.0mm Length: 1m	Supply : $\phi 4.5$ mm O.D. 45.7mm Length: 2m Exhaust : $\phi 4.5$ mm O.D. 67.0mm Length: 1m	
Weight	203g	244g	244g	244g	
Notes (Level of fit defined)	Less than 750B (A) (at 0.5MPa (72.5psi) Air Pressure)				
Operation Environment	Temperature : 0 ~ 40°C Humidity : MAX.75% (No condensation)				
Storage Environment	-10 ~ 50°C 10 ~ 85%				
Atmospheric Pressure	800 ~ 1,060hPa				

△ CAUTION
The standard length of supply air / oil hose is 2m, and exhaust air / oil hose is 1m. When the supply and exhaust air / oil hose is longer than the standard length, the rotating speed is decreased.

6-2 Outside View

① AM-300R / AM-300L

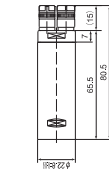


Fig. 1

② AM-310R / AM-310L

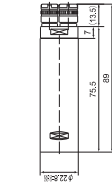


Fig. 3

③ AM-310RA / AM-310LA

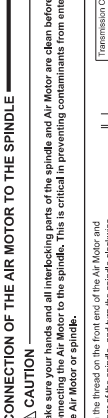
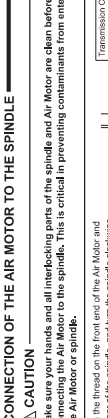


Fig. 4

Fig. 5



8. CONNECTION OF AIR LINE KIT

△ CAUTION
Make sure to turn the compressed air supply to the Air Line Kit OFF, before replacing the Air Line Kit or changing the water in Lubricating Oil.

- Connect the Filter Joint of the supply air / oil hose to the Secondary Joint ($\phi 6$ Dia. - Touch Joint) of the Air Line Kit. (Fig. 6 (1)).
- Connect the Filter Joint of the exhaust air / oil hose to the Secondary Joint ($\phi 6$ Dia. - Touch Joint) of the Air Line Kit. Standard Accessories to Upper Limit. Disconnect from air supply prior to opening Oil Filter Cap. Do not over or under fill.
- Connect the Connection Hose (Air Line Kits Standard Accessories) to the Primary Joint of the Air Line Kit and connect the other end to the compressor and turn the Regulator Knob (In direction : air pressure is increased) to set air pressure between 0.3 ~ 0.5 MPa (4.3 ~ 7.2 Sps).
- Turn the ON / OFF Valve and rotate the Air Motor with recommended proper air pressure.
- Adjust the Oil Drop Rate to the recommended volume which is 1 to 3 drops / min. (Commercially Air Line Kit is same as ISO VG15 Liquid Paraffin (Shell Octina Oil #15) in the Air Line Kit.
- Be sure to adjust to proper Oil Drop Rate before using the Air Motor.

Lubricating Oil

Use ISO VG15 Liquid Paraffin (Shell Octina Oil #15) in the Air Line Kit.
lubricator bowl. (For U.S.A. specification, use Chevron Selenia #2).

* Lubricating Oil (K-211) 70cc
* Lubricating Oil (K-202) 19

△ CAUTIONS IN USING AIR LINE KIT

- When connecting the Compressor and Air Line Kit, recommended install the air filter or air dryer to between Compressor and Air Line Kit in order to supply clean dry air to the Air Motor. Using the Air Line Kit without an air filter or air dryer may cause damage to the Air Motor. If the Air Motor is damaged, the manufacturer will not be responsible for the damage.
- Before use, carefully read "Air Line Kit Operation Manual" regarding the correct connection, operation and cautions when using the Air Line Kit.
- Make sure operation air pressure is less than 1.0MPa (145psi) before connecting the input supply hose to the Air Motor. If the operation air pressure is 1.0MPa (145psi) or more, it may cause damage to the Air Motor. If the Air Motor is damaged, the manufacturer will not be responsible for the damage.
- Before use, carefully read "Air Line Kit Operation Manual" regarding the correct connection, operation and cautions when using the Air Line Kit.

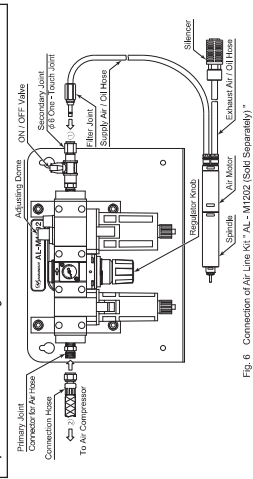


Fig. 6 Connector of Air Line Kit (AL - M1202 (Sold Separately))

9. TROUBLESHOOTING

If a problem or concern occur, please check the following items prior to consulting your dealer.

Trouble	Cause	Inspection / Corrective Action
Air Motor does not rotate or rotate irregularly.	Air flow does not reach the Air Motor. The connection of the input supply connection and air / oil supply hose is disconnected. The connection of the input supply connection and air / oil supply hose is disconnected.	Check if input supply connection hose or air / oil supply hose is broken, bent or disconnected. Check the connection of the input supply connection and air / oil supply hose. Check the connection of the input supply connection and air / oil supply hose.
The spindle ball bearings have been damaged.	The spindle ball bearings have been damaged by the input supply connection and air / oil supply hose. (Return to NAKANISHI dealer service.)	Check the compressor power supply and the air compressor output. Check all connections input supply and air / oil supply hose. Replace the ball bearings. (Return to NAKANISHI dealer service.)
Motor speed decrease.	The connection hose or air / oil supply hose have been damaged. Poor connection of input supply and air / oil supply hose. Low air pressure. Low lubricating oil.	Check the input supply and air / oil supply hoses. Repair the connection of input supply and air / oil supply hoses. Check all threaded joints and re-tighten if necessary. Check the Compressor, Air Control, and Regulator. Check the oil level in the oil reservoir. Set the Oil Drop Rate from 1 to 3 drops / min.
Unequal motor rotation.	Water, dirt and debris are collected in the Air Filter. Water in Lubricating Oil reservoir. Lubricator undried or upside down. Excessive Oil Drop Rate flooding the bearings. Over filled lubricator.	Drain water from Lubricating Oil reservoir and replace with clean Lubricating Oil. Undried or upside down Lubricator will flood spindle with lubricating oil. Oil drop rate exceeds the recommended amount. Adjust for the proper Oil Drop Rate. Excess Lubricant will flood spindle. → Drawing the Lubricating Oil Unit upper limit below by opening the Drain Valve.

10. DISPOSAL OF THE AIR MOTOR

When disposal of an Air Motor is necessary, follow the instructions from your local government agency for proper disposal of industrial components.

NAKANISHI INC. | www.nskamericacorp.com

1800 East 19th Avenue, Aurora, CO 80011, USA

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