

BATo[®] ANS-120

60120 *Industrial Heavy-Duty*

PNEUMATIC-HYDRAULIC RIVET NUT TOOL

Quick Hand Spin In – Air Pull – Hand Spin Out Design
and robust Forged Aluminum Alloy Oil Cylinder

OPERATION MANUAL

CE



Original Instructions

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1. INTENDED USE

1. This pneumatic-hydraulic rivet nut tool is designed to be driven by the appropriate compressed air pressure for secure fastening a rivet nut containing enough female threads in the thin base metals and pipes with weldless, tapping-free and one-side work in order to fasten with a bolt or a screw. The applications are widely used in the production and repairs of aircraft, automobiles & vehicles, boats, construction, electric/electronic appliances, even the DIY work, etc.
2. This pneumatic-hydraulic rivet nut tool is designed and produced primarily for the professional users, the non-professional users must read the operation manual thoroughly, and consult the manufacturer, authorized local agent or distributor for real understanding. A half hour long hands-on training session with qualified personnel is essential and strongly recommended before using this tool.

2. GLOSSARY OF TERMS AND SYMBOLS



: READ MANUAL carefully prior to using this tool.



: HEARING PROTECTION IS REQUIRED when using this tool.



: EYE PROTECTION IS REQUIRED when using this tool.



: HAND PROTECTION IS REQUIRED when using this tool.

3. SAFETY PRECAUTIONS

3.1 SAFETY PRECAUTIONS

1. For multiple hazards, read and understand the safety instructions before installing, operating, repairing, maintaining, changing accessories, or working near the assembly power tool. Failure to do so can result in serious bodily injury.
2. Only qualified and trained operators should install, adjust or use the assembly power tool.
3. Do not modify this assembly power tool. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.
4. Do not discard the safety instructions; give them to the operator.
5. Do not use the assembly power tool if it has been damaged.
6. Tools shall be inspected periodically to verify that the ratings and markings required, by this part of ISO 11148 are legibly marked on the tool, and that listed in this manual. The employer/user shall contact the manufacturer to obtain replacement marking labels when necessary.

3.2 PROJECTILE HAZARDS

1. Disconnect the assembly power tool from the energy source when changing inserted tools or accessories.
2. Be aware that failure of the work piece or accessories, or even of the inserted tool itself can generate high-velocity projectiles.
3. Always wear impact-resistant eye protection during operation of the tool. The grade of protection required should be assessed for each use.
4. The risks to others should also be assessed at this time.
5. Ensure that the work piece is securely fixed.
6. Check that the means of protection from ejection of fastener and/or stem is in place and is operative.
7. There is possibly forcible ejection of installed nuts from the front of the assembly power tool.

3.3 OPERATING HAZARDS

1. Use of the tool can expose the operator's hands to hazards, including crushing, impacts, cuts and abrasions and heat. Wear suitable gloves to protect hands.
2. Operators and maintenance personnel shall be physically able to handle the bulk, weight and power of the tool.
3. Hold the tool correctly; be ready to counteract normal or sudden movements and have both hands available.
4. Maintain a balanced body position and secure footing.
5. Release the start-and-stop device in the case of an interruption of the energy supply.
6. Use only oils and lubricants recommended by the manufacturer.
7. Avoid unsuitable postures, as it is likely for these positions not to allow counteracting of normal or unexpected movement of the tool.
8. If the assembly power tool is fixed to a suspension device, make sure that the fixation is secure.
9. Beware of the risk of crushing or pinching if nose equipment is not fitted.

3.4 REPETITIVE MOTIONS HAZARDS

1. When using an assembly power tool, the operator can experience discomfort in the hands, arms, shoulders, neck or other parts of the body.
2. While using an assembly power tool, the operator should adopt a comfortable posture whilst maintaining a secure footing and avoiding awkward or off-balance postures. The operator should change posture during extended tasks; this can help avoid discomfort and fatigue.
3. If the operator experiences symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensations or stiffness, these warning signs should not be ignored. The operator should tell the employer and consult a qualified health professional.

3.5 ACCESSORY HAZARDS

1. Disconnect the assembly power tool from the energy supply before changing the inserted tool or accessory.
2. Use only sizes and types of accessories and consumables that are recommended by the manufacturer of assembly power tools; do not use other types or sizes of accessories or consumables.

3.6 WORKPLACE HAZARDS

1. Slips, trips and falls are major causes of workplace injury. Be aware of slippery surfaces caused by use of the tool and also of trip hazards caused by the air line or hydraulic hose.
2. Proceed with care in unfamiliar surroundings. There can be hidden hazards, such as electricity or other utility lines.
3. The assembly power tool is not intended for use in potentially explosive atmospheres and is not insulated against contact with electric power.
4. Ensure that there are no electrical cables, gas pipes, etc., which can cause a hazard if damaged by use of the tool.

3.7 NOISE HAZARDS

1. Exposure to high noise levels can cause permanent, disabling hearing loss and other problems, such as tinnitus (ringing, buzzing, whistling or humming in the ears). Therefore, risk assessment and the implementation of appropriate controls for these hazards are essential.
2. Appropriate controls to reduce the risk may include actions such as damping materials to prevent work piece from "ringing".
3. Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations.
4. Operate and maintain the assembly power tool for non-threaded mechanical fasteners as recommended in the instruction handbook, to prevent an unnecessary increase in the noise level.
5. Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in noise.
6. If the power tool has a silencer, always ensure that it is in place and in good working order when the power tool is being operated.

3.8 VIBRATION HAZARDS

1. Exposure to vibration can cause disabling damage to the nerves and blood supply of the hands and arms.
2. Wear warm clothing when working in cold conditions and keep your hands warm and dry.
3. If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the assembly power tool, tell your employer and consult a physician.
4. Support the weight of the tool in a stand, tensioner or balancer, because a lighter grip can then be used to support the tool.

3.9 SAFETY INSTRUCTIONS FOR PNEUMATIC-HYDRAULIC RIVET NUT POWER TOOLS

1. Air under pressure can cause severe injury:
 - (1) Always shut off air supply, drain hose of air pressure and disconnect tool from air supply when not in use, before changing accessories or when making repairs;
 - (2) Never direct air at yourself or anyone else.
2. Whipping hoses can cause severe injury. Always check for damaged or loose hoses and fittings.
3. Cold air shall be directed away from hands.
4. Whenever universal twist couplings (claw couplings) are used, lock pins shall be installed and Whip Check Safety Cables shall be used to safeguard against possible hose-to-tool or hose-to-hose connection failure.
5. Do not exceed the maximum air pressure stated on the tool.
6. Never carry an air tool by the hose.
7. The limitations of environmental conditions on Tool are the temperature 0-40°C (32-104°F), and Tool can not be used in the water.
8. Tool weight over 2.0 kg or 4.4 lb is suggested to be supported by two hands, one hand to hold handle grip and the other hand to support the bottom of Tool, whilst lifting or operating Tool.



4. SAFETY INSTRUCTIONS

1. The tool must be checked and maintained in a safe working condition at all times.
2. Do not use the tool outside the intent of design and use.
3. Do not dismantle the tool without prior reference to this manual.
4. Any modification to the tool and tool parts shall be prohibited.
5. Always use original spare parts to ensure safe operation and satisfactory performance.
6. Be sure to disconnect the tool from air supply before attempting to adjust, change nosepiece or dismantle tool's parts.
7. For safety work, the operator and other persons in the vicinity are always required to wear the safety goggles to protect against spent mandrel ejection.
8. Be sure to adopt a firm footing or stable position before and during operating the tool.
9. Do not point the tool towards any person(s) or operator.
10. Do not operate the tool without firmly installing and locking the threaded mandrel (1), nosepiece lock nut (4), stroke adjuster lock nut (6), front head (7), oil cylinder end cap (25), noise silencer lock nut (34), valve end cap (51), air cylinder end cap (59), air inlet end cap (61), and speed-adjust swivel air fitting (62).
11. Be sure to properly adjust the Stroke.
12. The Operating Air Pressure shall not exceed 7.0 bar or 100 psi.
13. Excessive priming of hydraulic oil in the tool should be avoided.
14. After setting each rivet nut, turn the rotation knob (26) counterclockwise to unscrew the threaded mandrel (1) from the fastened rivet nut, so that the same size rivet nut can be installed onto the threaded mandrel (1) by turning knob clockwise, and then to continue the next fastening work.
15. Take care to ensure the deformed Rivet Nut is not to create any hazards.
16. Ensure that noise silencer (33) and vent holes of noise silencer lock nut (34) do not become blocked or covered, and that air hose is always in good condition.
17. Always keep the tool and grip (64) dry and clean for the best possible grip and operation.
18. Take care to avoid entanglement of loose clothes, ties, long hair, cleaning rags, etc. In the moving parts of the tool.
19. When carrying the tool from place to place, always keep hands away from the trigger (35, 35L) to avoid inadvertent start up.
20. Take care to use the tool. Do not drop the tool. Do not use the tool as a hammer or other uses that will damage and wear the tool.
21. The tool should be examined at regular intervals for function and damage. Any question regarding the correct operation of tool and operator safety should consult the manufacturer, authorized local agent or distributor.

5. FEATURES

1. This pneumatic-hydraulic rivet nut tool features **powerful traction force** 21,000 N at 6.2 bar or 4,720 lbf at 90 psi, and 23,500 N at 7.0 bar or 5,280 lbf at 100 psi, and equips with interchangeable **6 or 7 threaded mandrels and 6 nosepieces** for setting M4 ~ M12 Rivet Nut or 8-32 ~ 1/2 Rivet Nut in all materials (aluminum, copper, steel and stainless steel), also can set M4 ~ M8 Rivet Bolt (Stud) or 8-32 ~ 5/16 Rivet Bolt (Stud) in all materials with 4 or 5 threaded sockets, and use same size nosepiece for both threaded mandrel and threaded socket.
2. **Unique Adjustable Fastening Speed Design** can control slow or fast fastening speed. **Slow speed is ideal for setting rivet nut in the repaired painted car body or thin work piece, and other same application purpose.**
3. **Special Hand Spin-Pull-Hand Spin Design** to screw rivet nut onto or unscrew fastened rivet nut from threaded mandrel by hand rotation that can prevent the repaired painted car body or thin work piece from being scratched. Straight Pulling can ensure nice fastening work.
4. **Adjustable Stroke Design** to prevent rivet nut from insufficient fastening or rivet nut from being stuck with threaded mandrel.
5. **Innovative Fix-Hole Design** to offer great solution to solve the headache problem of rivet nut stuck with threaded mandrel and great assistance of exchanging threaded mandrels.
6. **Shock-Free Design** to minimize hand fatigue.
7. **Innovative Noise Silencer Design** for working pleasure.
8. **Smart Twin Air Inlets** to meet individual operating hobby, such as the right-handed operators or left-handed operators.
9. **Oil Cylinder Body** are made of **super strength forged aluminum alloy** and Air Cylinder Body are made of high strength aluminum alloy, **Inner walls all have wear-resistant mirror finish** for durability.
10. **Oil Piston Rod and Air Piston Rod** all have **hard chrome plating and wear-resistant mirror finish** for speedy motion.
11. **High grade Steel Alloy Key Parts** (threaded mandrel, etc.) with advanced heat treatment for strength and durability.
12. Valuable **Hard Anodized finish on Forged Aluminum** Hydraulic Oil Cylinder Body and **Powder Coating** finish on Air Cylinder Body for nice looking and better scratch-resistant.
13. **PAHs-Free (non-toxic to hand skin) Soft Plastic Hand Grip** for comfortable and safe operation.

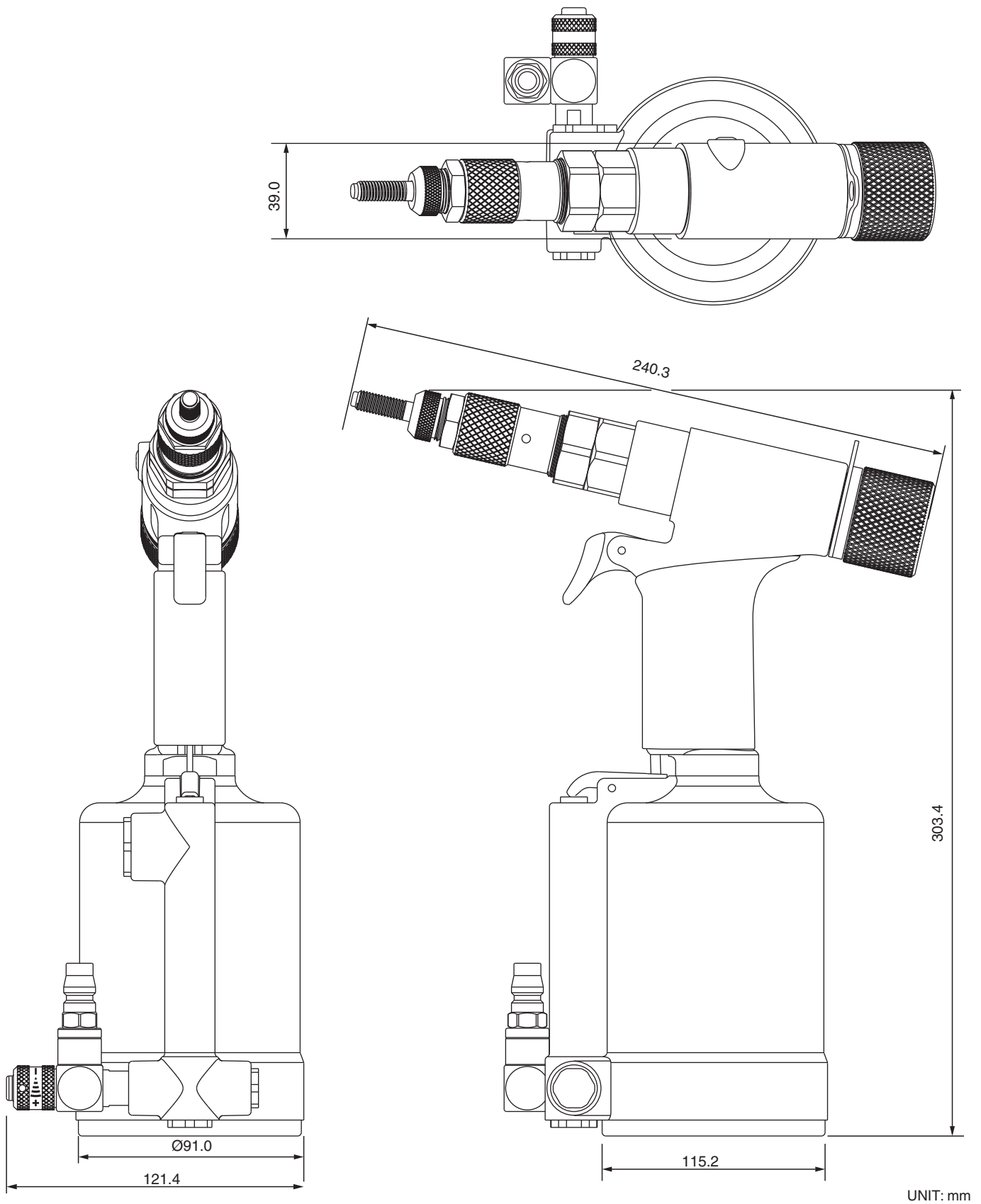
6. SPECIFICATIONS

1. **Traction Force:** 21,000 N at 6.2 bar or 4,720 lbf at 90 psi compressed air pressure, and 23,500 N at 7.0 bar or 5,280 lbf at 100 psi compressed air pressure.
2. **Stroke:** 0 ~ 9 mm or 0 ~ 0.36".
3. **Working Compressed Air Pressure:** 5.5 ~ 7.0 bar or 80 ~ 100 psi.
4. **Air Consumption:** Approx. 3.10 liter per rivet nut or 0.11 cuft per rivet nut.
5. **Hydraulic Oil, ISO VG-46 or VG-32:** Approx. 40 ml.
6. **Working Temperature:** 0 - 40 °C or 32 - 104 °F.
7. **Noise Level:**
Sound pressure level, L_{PA} : 72.5 dB(A)
Uncertainty : K_{PA} = 3.0 dB
Sound power level, L_{WA} : 83.5 dB(A)
Uncertainty : K_{WA} = 3.0 dB
8. **Vibration:**
Hand-arm vibration value: Less than 2.5 m/s²
Uncertainty : K = 1.5 m/s²
9. **Air Inlet:** 1/4" PT or 1/4" NPT or other specified thread.
10. **Hose Size:** Inner diameter 10 mm or 3/8".
11. **Net Weight:** Approx. 2.24 kg / 4.93 lb.
12. **Standard Parts:** 6 or 7 Threaded Mandrels (M4, M5, M6, M8, M10, M12 or 8-32, 10-24, 10-32, 1/4-20, 5/16-18, 3/8-16, 1/2-13) (1), 4 or 5 Threaded Sockets (M4, M5, M6, M8 or 8-32, 10-24, 10-32, 1/4-20, 5/16-18) (2), 6 Nosepieces (M4, M5, M6, M8, M10, M12 or #8, #10, 1/4, 5/16, 3/8, 1/2) (3), Speed-Adjust Swivel Air Fitting (62), Oil Bottle (63, without Oil), Service Wrench (65), Small Rule (66), Fixing-Hole Pin (67), Pin Retainer (68), Oil Injector (69, without Oil), Parts Plastic Box (70).
13. **RIVETING CAPACITY:**

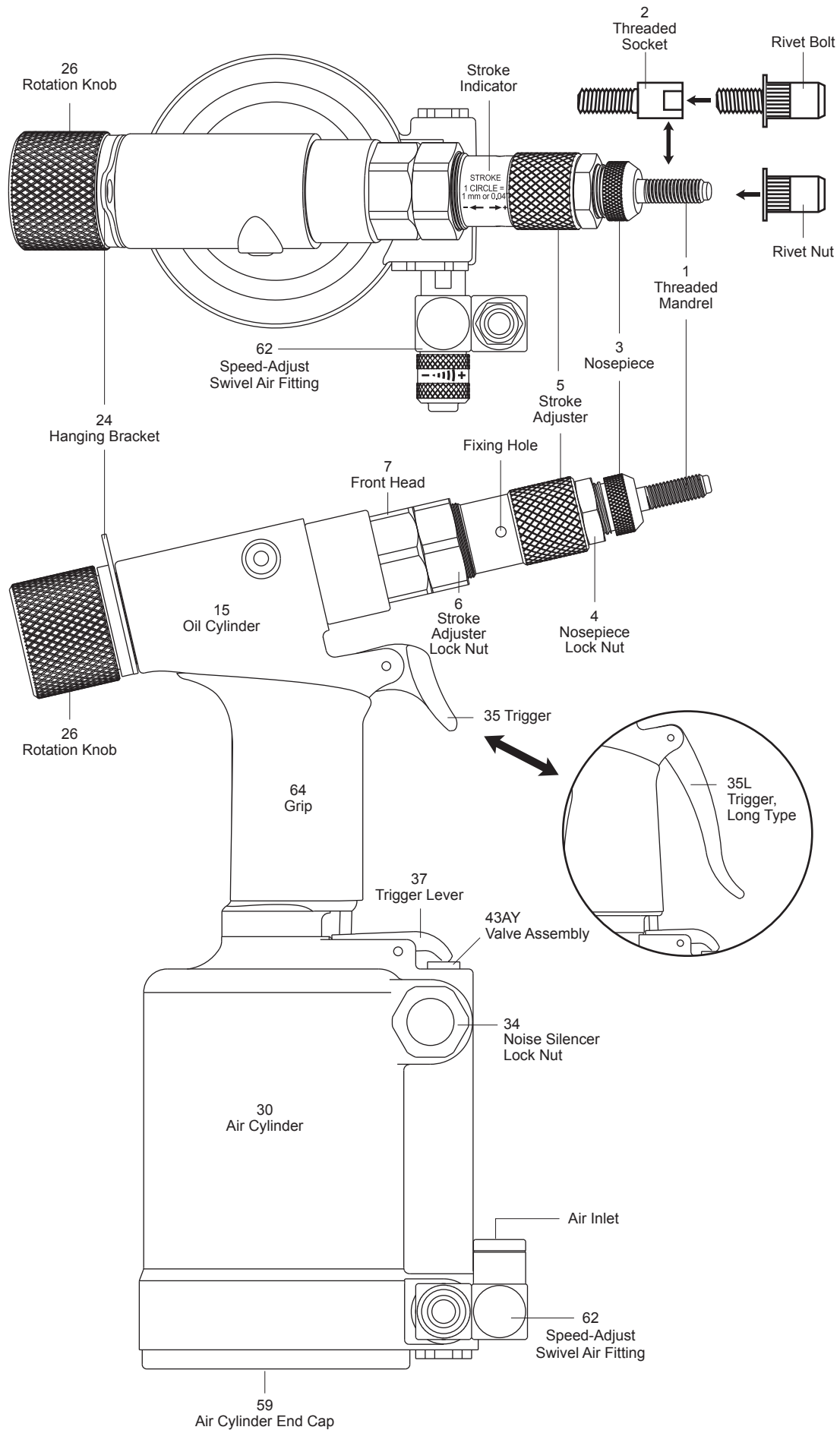
Thread Size \ Rivet Nut/Bolt Material	Aluminum	Steel	Stainless Steel/Inox
M4 x 0.7 or 8-32 Rivet Nut / Rivet Bolt (Stud)	●	●	●
M5 x 0.8 or 10-24, 10-32 Rivet Nut / Rivet Bolt (Stud)	●	●	●
M6 x 1.0 or 1/4-20 Rivet Nut / Rivet Bolt (Stud)	●	●	●
M8 x 1.25 or 5/16-18 Rivet Nut / Rivet Bolt (Stud)	●	●	●
M10 x 1.5 or 3/8-16 Rivet Nut	●	●	●
M12 x 1.75 or 1/2-13 Rivet Nut	●	●	●

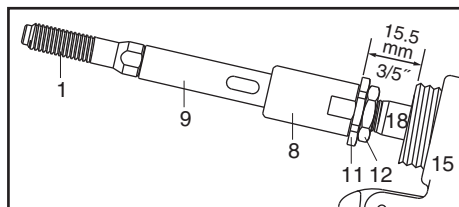
Remark: Work piece hole diameter should be 0.1 mm or 0.004" larger than rivet nut outer diameter.

7. DIMENSIONS

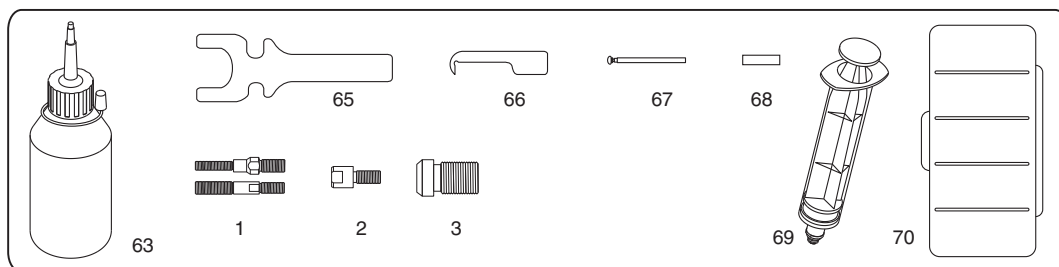
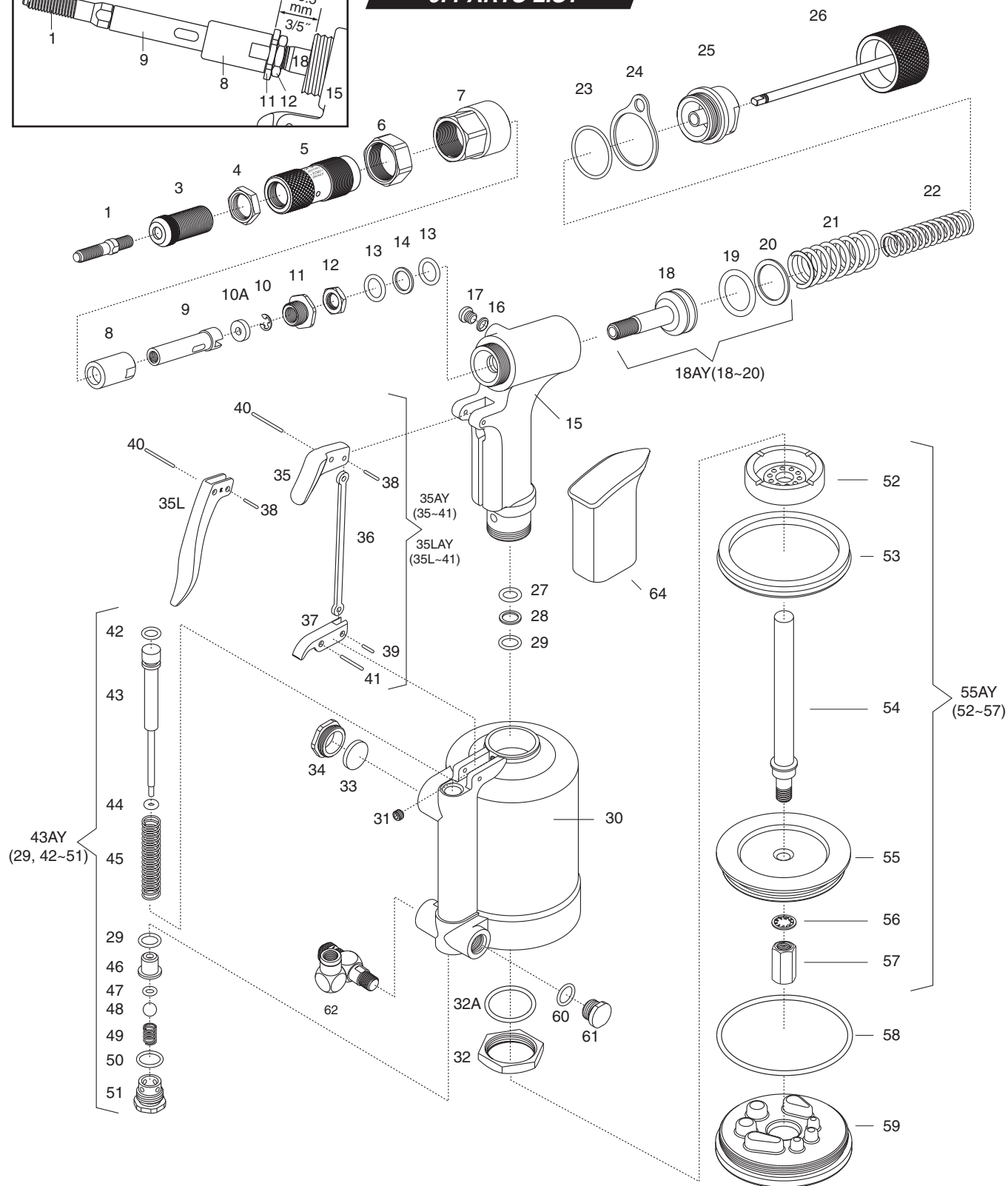


8. MAIN PARTS





9. PARTS LIST



No.	PART No.	PART NAME	No.	PART No.	PART NAME
● 1-M4	60120-01-M4	Threaded Mandrel, M4x0.7	● 23	60120-23	Hanging Bracket O-ring
● 1-M5	60120-01-M5	Threaded Mandrel, M5x0.8	24	60120-24	Hanging Bracket
● 1-M6	60120-01-M6	Threaded Mandrel, M6x1.0	25	60120-25	Oil Cylinder End Cap
● 1-M8	60120-01-M8	Threaded Mandrel, M8x1.25	26	60120-26	Rotation Knob
● 1-M10	60120-01-M10	Threaded Mandrel, M10x1.5	● 27	60120-27	Oil Cylinder Upper O-Ring
● 1-M12	60120-01-M12	Threaded Mandrel, M12x1.75	● 28	60120-28	Oil Cylinder Back-Up Ring
● 1-832	60120-01-832	Threaded Mandrel, 8-32 (Option)	● 29	60120-29	Oil Cylinder Lower O-ring
● 1-1024	60120-01-1024	Threaded Mandrel, 10-24 (Option)	30	60120-30	Air Cylinder
● 1-1032	60120-01-1032	Threaded Mandrel, 10-32 (Option)	● 31	60120-31	Lock Screw
● 1-1420	60120-01-1420	Threaded Mandrel, 1/4-20 (Option)	32	60120-32	Oil Cylinder Lock Nut
● 1-51618	60120-01-51618	Threaded Mandrel, 5/16-18 (Option)	● 32A	60120-32A	Lock Nut O-Ring
● 1-3816	60120-01-3816	Threaded Mandrel, 3/8-16 (Option)	● 33	60120-33	Noise Silencer
● 1-1213	60120-01-1213	Threaded Mandrel, 1/2-13 (Option)	34	60120-34	Noise Silencer Lock Nut
● 2-M4	60120-02-M4	Threaded Socket, M4x0.7	35	60120-35	Trigger
● 2-M5	60120-02-M5	Threaded Socket, M5x0.8	▲ 35L	60120-35L	Trigger, Long Type (Option)
● 2-M6	60120-02-M6	Threaded Socket, M6x1.0	36	60120-36	Trigger Link
● 2-M8	60120-02-M8	Threaded Socket, M8x1.25	37	60120-37	Trigger Lever
● 2-832	60120-02-832	Threaded Socket, 8-32 (Option)	● 38	60120-38	Upper Link Pin
● 2-1024	60120-02-1024	Threaded Socket, 10-24 (Option)	● 39	60120-39	Lower Link Pin
● 2-1032	60120-02-1032	Threaded Socket, 10-32 (Option)	● 40	60120-40	Trigger Pin
● 2-1420	60120-02-1420	Threaded Socket, 1/4-20 (Option)	● 41	60120-41	Lever Pin
● 2-51618	60120-02-51618	Threaded Socket, 5/16-18 (Option)	35AY	60120-35AY	Trigger Assembly (35~41)
● 3-M4	60120-03-M4	Nosepiece, for M4	▲ 35LAY	60120-35LAY	Trigger Assembly (35L~41), Long Type (Option)
● 3-M5	60120-03-M5	Nosepiece, for M5	● 42	60120-42	Valve Pusher Upper O-ring
● 3-M6	60120-03-M6	Nosepiece, for M6	43	60120-43	Valve Pusher
● 3-M8	60120-03-M8	Nosepiece, for M8	● 44	60120-44	Valve Pusher Lower O-ring
● 3-M10	60120-03-M10	Nosepiece, for M10	45	60120-45	Valve Pusher Spring
● 3-M12	60120-03-M12	Nosepiece, for M12	● 29	60120-29	Valve Sleeve O-Ring
● 3-8	60120-03-8	Nosepiece, for #8 (Option)	46	60120-46	Valve Sleeve
● 3-10	60120-03-10	Nosepiece, for #10 (Option)	● 47	60120-47	Valve Ball O-ring
● 3-14	60120-03-14	Nosepiece, for 1/4 (Option)	48	60120-48	Valve Ball
● 3-516	60120-03-516	Nosepiece, for 5/16 (Option)	49	60120-49	Valve Spring
● 3-38	60120-03-38	Nosepiece, for 3/8 (Option)	● 50	60120-50	Valve End Cap O-ring
● 3-12	60120-03-12	Nosepiece, for 1/2 (Option)	51	60120-51	Valve End Cap
● 4	60120-04	Nosepiece Lock Nut	43AY	60120-43AY	Valve Assembly (29, 42~51)
5	60120-05	Stroke Adjuster	● 52	60120-52	Buffer Ring
6	60120-06	Stroke Adjuster Lock Nut	● 53	60120-53	Air Piston Ring
7	60120-07	Front Head	54	60120-54	Air Piston Rod
8	60120-08	Collet Case	55	60120-55	Air Piston
9	60120-09	Mandrel Seat	56	60120-56	Lock Washer
10A	60120-10A	Snap Ring Washer	57	60120-57	Air Piston Lock Nut, Long Type
10	60120-10	Snap Ring	55AY	60120-55AY	Air Piston Assembly (52~57)
11	60120-11	Collet Case Lock Nut	● 58	60120-58	Air Cylinder End Cap O-ring
12	60120-12	Lock Nut	59	60120-59	Air Cylinder End Cap
● 13	60120-13	Oil Cylinder O-ring	● 60	60120-60	Air Inlet End Cap O-ring
● 14	60120-14	Oil Cylinder Back-up Ring	61	60120-61	Air Inlet End Cap
15	60120-15	Oil Cylinder	62	60120-62	Speed-Adjust Swivel Air Fitting
16	60120-16	Sealing Washer	63	60120-63	Oil Bottle (without Oil)
17	60120-17	Oil Screw Plug	64	60120-64	Grip
18	60120-18	Oil Piston	● 65	60120-65	Service Wrench
● 19	60120-19	Oil Piston O-ring	66	60120-66	Small Rule
● 20	60120-20	Oil Piston Back-up Ring	● 67	60120-67	Fixing-Hole Pin
18AY	60120-18AY	Oil Piston Assembly (18~20)	● 68	60120-68	Pin Retainer
● 21	60120-21	Large Return Spring	● 69	60120-69	Hydraulic Oil Injector (without Oil)
● 22	60120-22	Small Return Spring	70	60120-70	Parts Plastic Box

REMARKS: 1) ● Means wearing parts or possible missing parts.

2) Part No. 35 Trigger is the Standard Part, Part No. ▲35L Trigger Long Type is the Optional Part for choice.

3) Order Example: 60120-01-M6 Threaded Mandrel M6x1.0, 10 pcs.

4) Part No. 32 Oil Cylinder Lock Nut needs to replace a new one after repeated fastening 3 ~ 4 times.

5) Part No. 32A Lock Nut O-Ring needs to replace a **new one** when dismantling Part No. 32 Oil Cylinder Lock Nut.

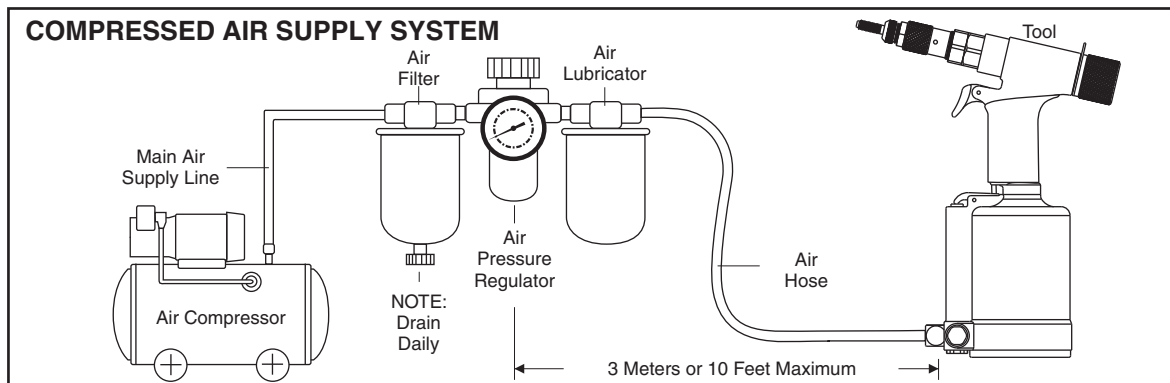
10. OPERATION INSTRUCTIONS

10.1 SETTING AND TESTING

1. The tool is well assembled and tested before delivery; however, the necessary setting and testing are still strongly suggested before operating tool. Carefully read this OPERATION INSTRUCTIONS 10.2 - 10.9 to check the setting of tool, follow the 10.8 OPERATION PROCEDURE to do the pilot test before operating tool.
2. The compressed air pressure should be in the suggested working range; tool's working threaded mandrel size, nosepiece size, rivet nut size and work piece's hole diameter must be well matched, so that the pilot test can verify the fastening work is firmed or not.

10.2 COMPRESSED AIR SUPPLY SYSTEM

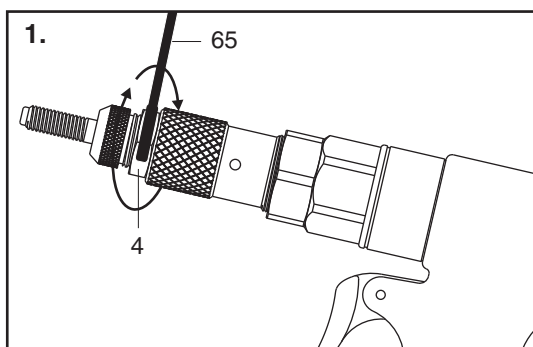
1. This pneumatic-hydraulic rivet nut tool is operated with compressed air at an optimum air pressure of 6.5 bar or 95 psi.
2. This pneumatic-hydraulic rivet nut tool is recommended to connect with COMPRESSED AIR SUPPLY SYSTEM including air compressor, main air supply line, air preparation unit (air filter, air pressure regulator with gauge, air lubricator) and air hose. These should be fitted within 3 meters or 10 feet from air pressure regulator to the tool to ensure maximum tool life and minimum tool maintenance.
3. The air pressure regulator is used to adjust the operating air pressure not to exceed the maximum operating air pressure 7.0 bar or 100 psi.
4. The air hose should resist a minimum 150% of maximum operating air pressure (7.0 bar or 100 psi) produced in the COMPRESSED AIR SUPPLY SYSTEM, that is to resist the highest air pressure 10.5 bar or 150 psi. The air hose should be oil resistant, and have an abrasion resistant exterior. The air hose must have a minimum inner diameter of 10 mm or 3/8" . Be sure to expel the accumulated dirt and water from air pipeline before connecting air hose to the tool.



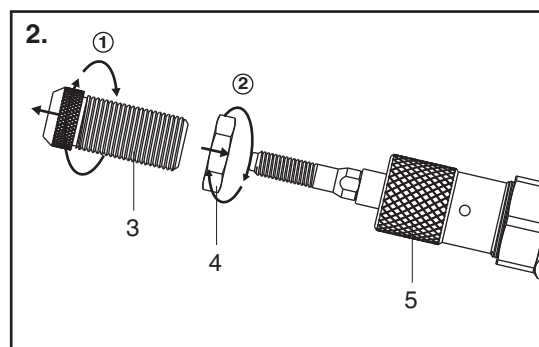
10.3 SELECT AND EXCHANGE THREADED MANDREL AND NOSEPIECE

[PRECAUTION]

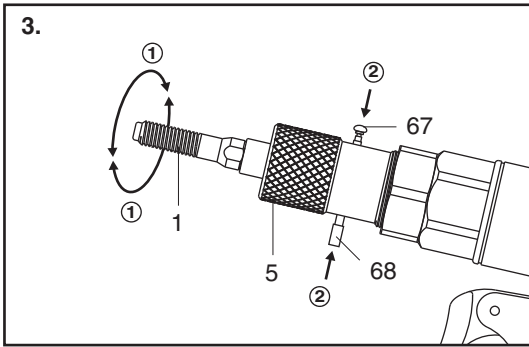
Check the thread size of bolt to be fastened and thickness of work piece to determine the thread size, grip range, material, and type of rivet nut, then drill or punch the correct size of hole in the work piece for fastening rivet nut. The working size of threaded mandrel and nosepiece should be same as the thread size of rivet nut.



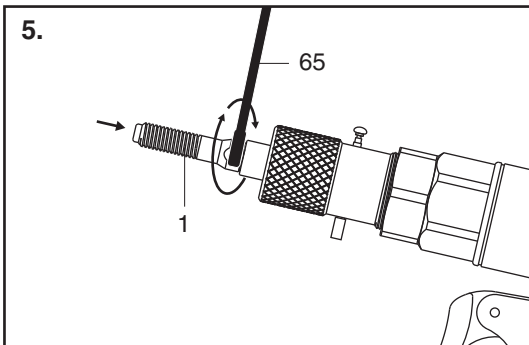
1. Disconnect the tool from the compressed air supply system. Use service wrench (65) to loosen nosepiece lock nut (4) by turning counter-clockwise.



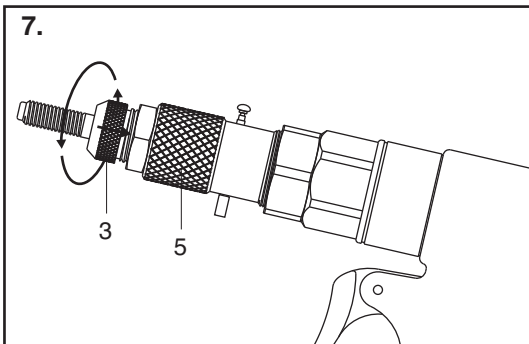
2. Unscrew nosepiece (3) and nosepiece lock nut (4) together from stroke adjuster (5) ①, then dismount nosepiece lock nut (4) from nosepiece (3) ②.



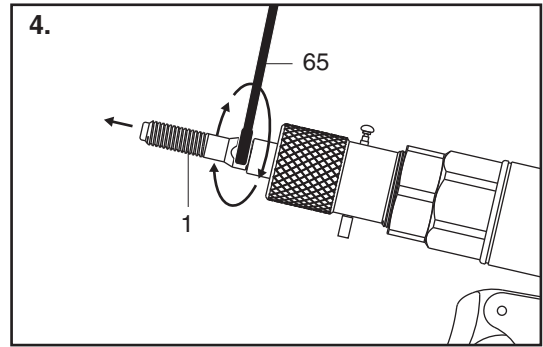
3. Slowly rotate threaded mandrel (1) to align 2 fixing-holes of stroke adjuster (5) with inside long fixing-hole of mandrel seat (9) ①, then insert fixing-hole pin (67) through the fixing-holes and put pin retainer (68) onto fixing-hole pin (67) end ②. The free rotation of mandrel seat (9) is locked.



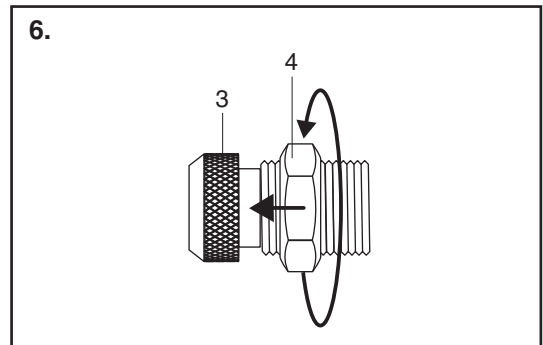
5. Use service wrench (65) to assemble and fasten the new working threaded mandrel (1) into mandrel seat (9) firmly by turning counter-clockwise (NOTE: Mandrel seat (9) has left-handed internal threads.).



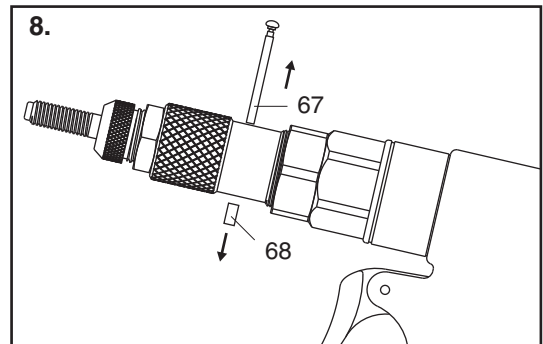
7. Screw nosepiece (3) into stroke adjuster (5) by turning clockwise.



4. Use service wrench (65) to loosen and disassemble threaded mandrel (1) from mandrel seat (9) by turning clockwise (NOTE: Mandrel seat (9) has left-handed internal threads.). Now the tool is ready for changing another size of threaded mandrel (1) and nosepiece (3).



6. Assemble nosepiece lock nut (4) onto the working nosepiece (3).



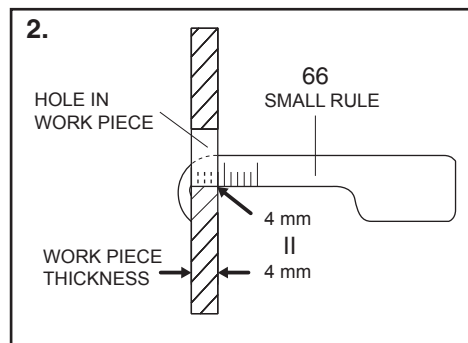
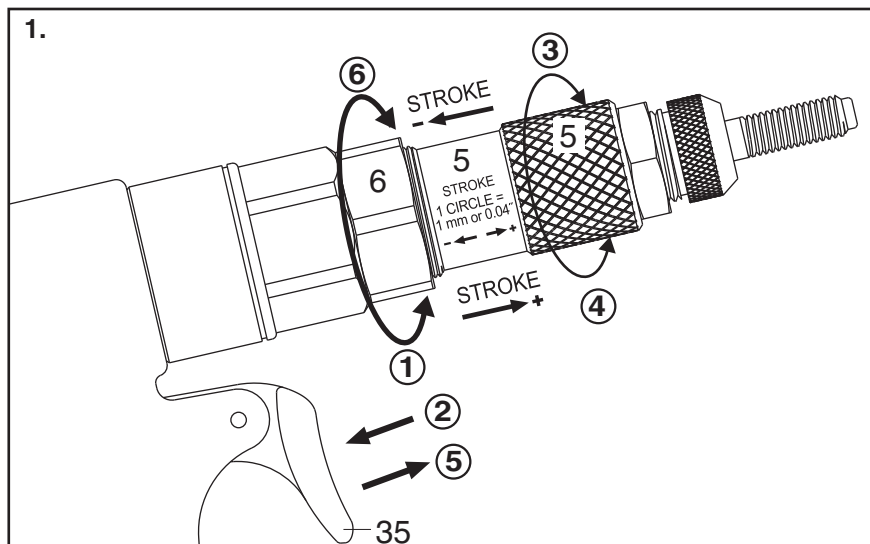
8. Finally, take off pin retainer (68) and pull fixing-hole pin (67) from the fixing-holes. Now the new working threaded mandrel (1) and nosepiece (3) are ready for application.

10.4 ADJUST THE PROPER STROKE DISTANCE

[WARNING]

- The proper stroke distance is decided as per the work piece thickness and the grip range of rivet nut. Each rivet nut has its own grip range, the maximum grip and minimum grip.
- The work piece thickness must be within the grip range of rivet nut or between the maximum grip and minimum grip of rivet nut for safe and firm installation.
- If the work piece thickness is larger than the maximum grip of rivet nut, the rivet nut threads or threaded mandrel might be damaged, and the rivet nut also cannot be well gripped in the work piece.
- If the work piece thickness is smaller than the minimum grip of rivet nut, the rivet nut cannot be gripped firmly in the work piece.
- Adjusting too long stroke distance might damage the rivet nut threads or threaded mandrel, while too short stroke distance cannot fasten rivet nut firmly in the work piece.

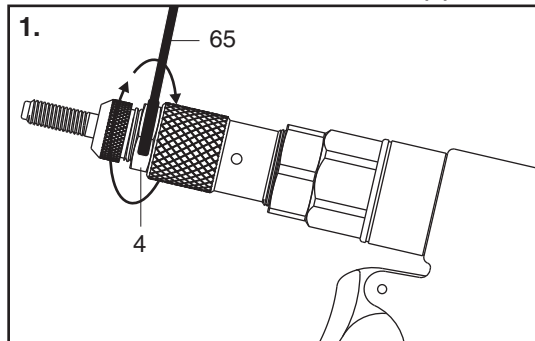
1. Use a wrench (30 mm) to loosen Stroke Adjuster Lock Nut (6) by turning counter-clockwise ①. Connect the Tool to the compressed air supply system. Depress trigger (35/35L) and hold it ②, then rotate stroke adjuster (5) clockwise all the way until cannot move it ③, now the stroke is 0 (zero).
2. Still hold Trigger (35/35L), then rotate stroke adjuster (5) counter-clockwise to increase and get the proper stroke distance ④.
NOTE: Rotate 1 circle of stroke adjuster (5) = 1 mm or 0.04" stroke. For example, rotate counter-clockwise 5 circles to increase 5 mm or 0.20" stroke.
3. Release Trigger (35/35L) ⑤ and use a wrench (30 mm) to fasten stroke adjuster lock nut (6) by turning clockwise ⑥. Now the stroke adjustment is completed.
4. Also can follow the above steps by depressing Trigger (35/35L) to adjust the stroke from the current stroke distance simply by rotating stroke adjuster (5) clockwise to decrease stroke ③ or counter-clockwise to increase stroke ④.
NOTE: 1 circle = 1 mm or 0.04" stroke.



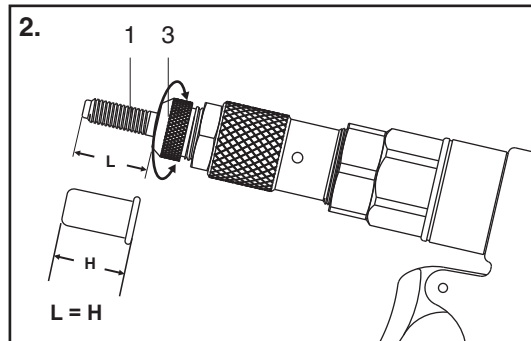
NOTE

The small rule (66) is specially designed to measure the work piece thickness.

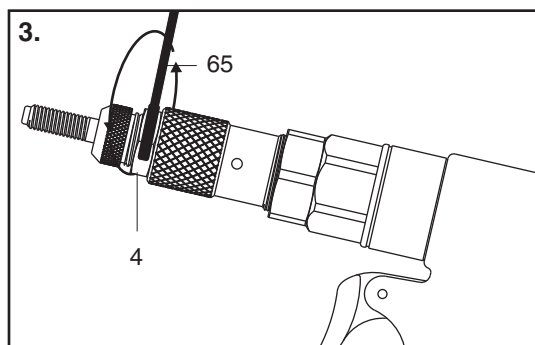
10.5 ADJUST THE PROTRUDING LENGTH (L) OF THREADED MANDREL



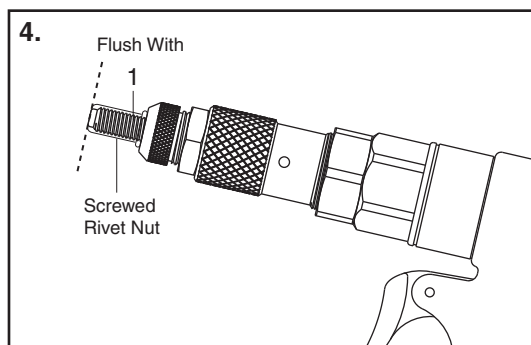
1. Disconnect the tool from the compressed air supply system. Use service wrench (65) to loosen nosepiece lock nut (4) by turning counter-clockwise.



2. Rotate nosepiece (3) to adjust the protruding length (L) of threaded mandrel (1) to be same as the rivet nut height (H), $L = H$.



3. Finally use service wrench (65) to fasten nosepiece lock nut (4) by turning clockwise.



4. After adjusting the protruding length (L) of threaded mandrel (1), the screwed rivet nut should be flush with the threaded mandrel (1).

10.6 ADJUST FASTENING SPEED

[PRECAUTION]

- The unique Speed-Adjust Swivel Air Fitting (62) can adjust slow or fast fastening speed. Slow speed is ideal for setting Rivet Nut in the repaired painted car body or thin work piece, and other same application purpose.
- The Pilot Test is always recommended before setting different sizes of rivet nut for perfect fastening work.

1. Install the Speed-Adjust Swivel Air Fitting (62) to the air inlet of tool, connect the tool to the compressed air supply system.
2. The fastening speed is adjusted to the “slow” speed in the tool assembly for nice installation of rivet nut in the repaired painted car body or thin work piece.
3. User can follow the “-” and “+” marks to decrease or increase speed for suitable fastening speed.

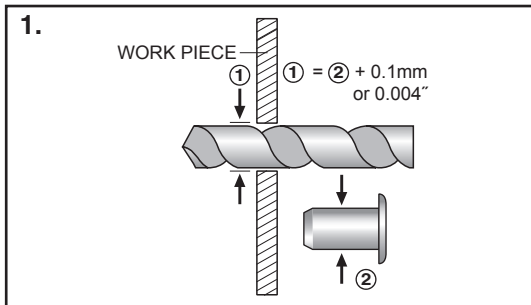
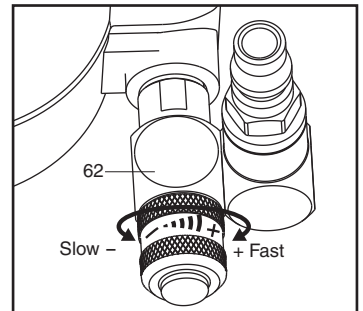
10.7 SUSPENSION DEVICE

The hanging bracket (24) is designed for hanging the tool to the suspension device of assembly line to decrease the physical strain placed on the operator by the weight of tool.

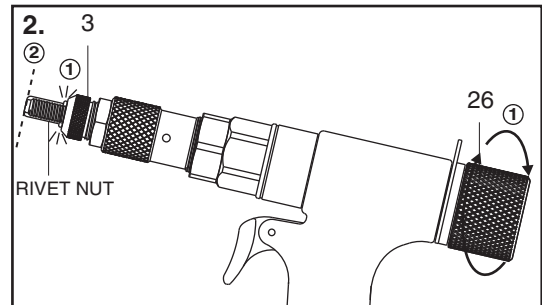
10.8 OPERATING PROCEDURE

[PRECAUTION]

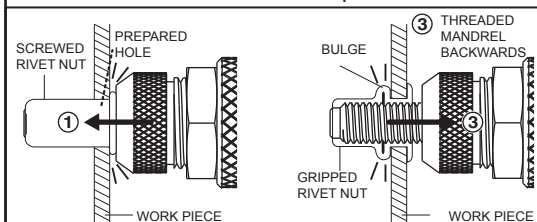
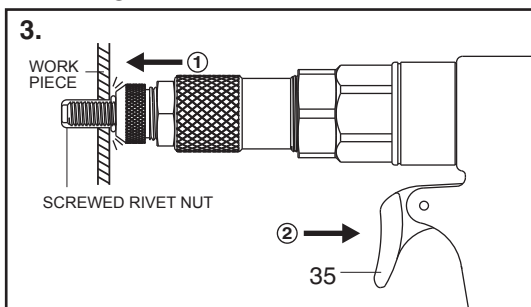
Before operating this tool, it is strongly requested to follow the above 10.3 to install the correct size of threaded mandrel and working nosepiece, the above 10.4 to adjust the proper stroke distance, the above 10.5 to adjust the protruding length (L) of threaded mandrel, and 10.6 to adjust the suitable fastening speed to ensure the perfect installation work.



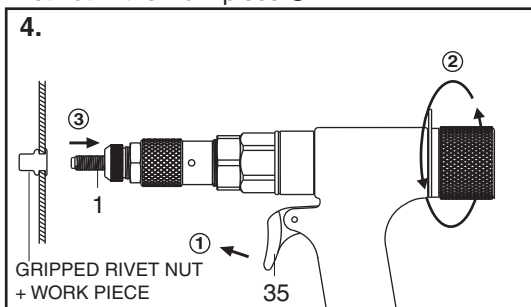
1. Drill or punch a hole on work piece, hole diameter ① should be 0.1 mm or 0.004" larger than rivet nut diameter ②.



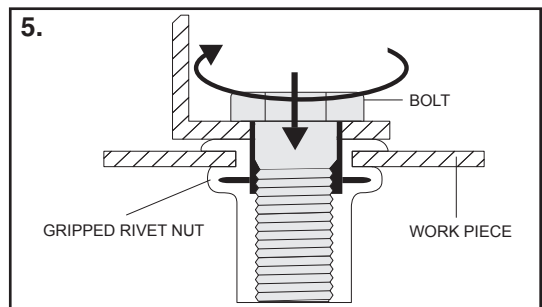
2. Connect the tool to the compressed air supply system. Screw rivet nut onto threaded mandrel (1) by turning rotation knob (26) clockwise ①. It is strongly suggested the rivet nut to touch the nosepiece (3) slightly, not heavily. The screwed rivet nut should be flush with the top of threaded mandrel (1) ②.



3. Insert the screwed rivet nut into the prepared hole of work piece to touch work piece ①. Fully depress the trigger (35/35L) ② to drive threaded mandrel (1) backward to deform rivet nut a bulge against the back of work piece to fasten rivet nut in the work piece ③.



4. Release the trigger (35/35L) ①. Turn rotation knob (26) counter-clockwise ② to unscrew threaded mandrel (1) from the gripped rivet nut completely ③.



5. The rivet nut is therefore gripped in the work piece firmly and the rivet nut thread is built up securely. Complete the fastening work with a bolt or a screw to the gripped rivet nut.

NOTES

- If the rivet nut is not fastened firmly, please refer to the TROUBLESHOOTING 12.1.
- If depress the trigger (35/35L) and fail the fastening work, please refer to the TROUBLESHOOTING 12.7.

10.9 FASTEN THE SAME SIZE OF RIVET NUT

If the next gripping rivet nut is same size as the previous one, just repeat the above 10.8 steps. Don't Need Any Adjustment!

NOTE

The PILOT TEST is always recommended before setting different sizes of rivet nut for perfect fastening work and protecting this precious Tool and Rivet Nut Thread from damage.

11. MAINTENANCE

[WARNING]

Always disconnect the tool from the COMPRESSED AIR SUPPLY SYSTEM before maintaining the tool.

11.1 DAILY CHECKS

1. Pour a few drops of the light lubricating oil to the threads of threaded mandrel (1) and nosepiece (3). If the tool is in continuous use, the thread of threaded mandrel (1) should be lubricated every two or three hours.
2. If no air lubricator is fitted on the compressed air supply system, it is suggested to pour a few drops of the light lubricating oil into the air inlet fitting of tool before daily operation. If the tool is in continuous use, the air inlet fitting should be lubricated every two or three hours.
3. Check for air leaks. If damaged, replace the air hoses and air couplings.
4. If there is no air filter on the compressed air supply system, bleed the air line to clear the accumulated dirt or water before connecting the air hose to the tool. If there is an air filter, drain it.
5. Carefully check and firmly tighten the threaded mandrel (1), nosepiece lock nut (4), stroke adjuster lock nut (6), oil cylinder end cap (25), noise silencer lock nut (34), valve end cap (51), air cylinder end cap (59), air inlet end cap (61) and speed-adjust swivel air fitting (62) before daily operation.
6. Check to ensure the trigger (35/35L) operation is normal.

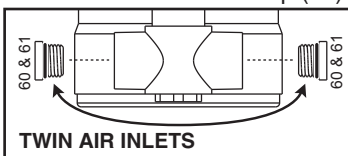
11.2 WEEKLY CHECKS

1. Check the thread of threaded mandrel (1). NOTE: If the tool is operated frequently, it is suggested to check and replace the threaded mandrel (1) daily.
2. Unscrew the noise silencer lock nut (34), and take out the noise silencer (33) to clean it. See 11.4 for detailed operation.
3. Check the oil leaks and the air leaks in the compressed air supply system.

11.3 EXCHANGE THE AIR INLET FITTING TO THE TWIN AIR INLETS

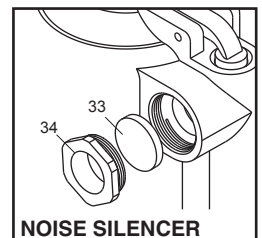
The Twin Air Inlets Design is offered to meet individual operating hobby, such as the right-handed operators or left-handed operators.

1. Disconnect the tool from the compressed air supply system.
2. Use the wrench to unscrew the speed-adjust swivel air fitting (62) and air inlet end cap (61) along with the o-ring (60), and then install the speed-adjust swivel air fitting (62) to the preferable air inlet.
3. Fasten the air inlet end cap (61) along with the o-ring (60) to the vacant air inlet firmly.



11.4 CLEAN AND REPLACE THE NOISE SILENCER

1. Disconnect the tool from the compressed air supply system.
2. Unscrew the noise silencer lock nut (34), and take out the noise silencer (33) to clean it. If the noise silencer (33) is blocked or covered badly, replace it.
3. Reverse the above step to reassemble these two parts. Ensure that the noise silencer lock nut (34) is fastened firmly.



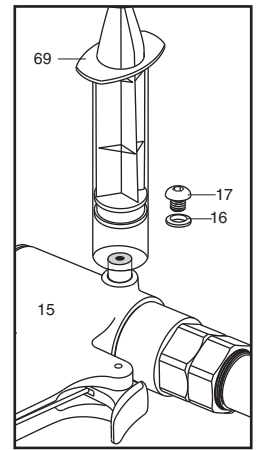
11.5 REFILL HYDRAULIC OIL THROUGH THE OIL REFILL HOLE

When the shortage of hydraulic oil causes the decrease of the stroke, the normal stroke can be recovered by filling the hydraulic oil into the oil refill hole on the side of oil cylinder (15).

[WARNING]

- Always wear the safety goggles during operation.
- Be sure to disconnect the tool from the compressed air supply system before unscrewing the oil screw plug (17).
- Make sure to tighten the oil screw plug (17) firmly after refilling oil.

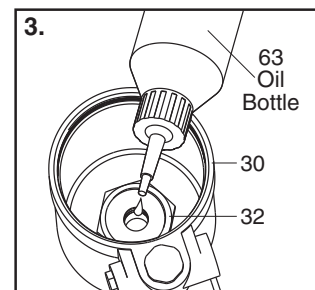
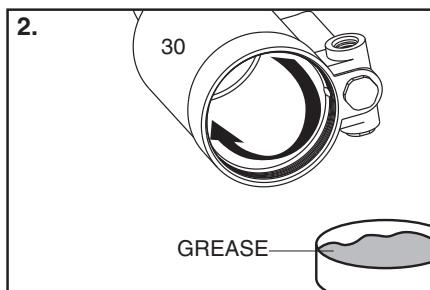
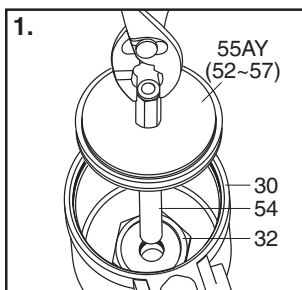
1. Connect the tool to the compressed air supply system, and depress the trigger (35/35L) twice to move the inner oil piston assembly (18AY) and air piston assembly (55AY).
2. **Disconnect the tool from the compressed air supply system.**
3. Push the piston of the hydraulic oil injector (69) forwards to the end, and then immerse the fitting of hydraulic oil injector (69) in the new hydraulic oil and slowly pull the piston backwards to suck the new hydraulic oil around 25 ml into the hydraulic oil injector (69). **Make sure that the hydraulic oil injector (69) contains no air bubbles in the oil.**
4. Carefully unscrew the oil screw plug (17) and remove the sealing washer (16).
5. Gently rotate to screw the fitting of hydraulic oil injector (69) into the oil refill hole of oil cylinder (15) firmly.
6. **Depress the piston of hydraulic oil injector (69) forwards to inject oil until the piston cannot move further.**
7. Gently unscrew to remove the fitting of hydraulic oil injector (69) from the oil refill hole of oil cylinder (15). Wipe away the spilt oil, if any.
8. **Restore the sealing washer (16), and carefully tighten the oil screw plug (17) firmly.**
9. Reconnect the tool to the compressed air supply system, and depress the trigger (35/35L) twice. Then, the normal stroke is recovered.



11.6 REPLACE THE HYDRAULIC OIL ONLY

- After considerable times of operation, the hydraulic oil should be replaced.
- The hydraulic oil is suggested to use ISO VG-46 or VG-32 that are popular in market.

1. **Disconnect the tool from the compressed air supply system.**
2. Use a wrench 27 mm to unscrew the air cylinder end cap (59) & o-ring (58), and use a pair of pliers to slowly pull out the air piston assembly (55AY) in a straight line (Fig. 1). **Be careful not to scratch the air piston rod (54) and the inner wall of air cylinder (30). Drain the dirty hydraulic oil out of the tool through the air cylinder (30).**
3. Clean and grease the inner wall of air cylinder (30) (Fig. 2), also clean and grease the air piston ring (53).
4. **Put the tool upside-down, and use the oil bottle (63) with new hydraulic oil to refill into the oil cylinder (15) through the air cylinder (30) until oil is flushed with the upper oil cylinder o-ring (29) (Fig. 3). Make sure not to overfill oil, and rest for a while until the oil stops releasing air bubbles.**
5. Use a pair of pliers to clamp the air piston lock nut (57), and slowly plug the air piston assembly (55AY) in a straight line into the oil cylinder (15) through the oil cylinder lock nut (32) (Fig. 1). Then, depress the air piston assembly (55AY) 2 ~ 3 times. Repeat above steps to check again the oil level, and add a little hydraulic oil if necessary, but not to add too much oil. Finally reassemble the air cylinder end cap (59) & o-ring (58) with a wrench 27 mm.

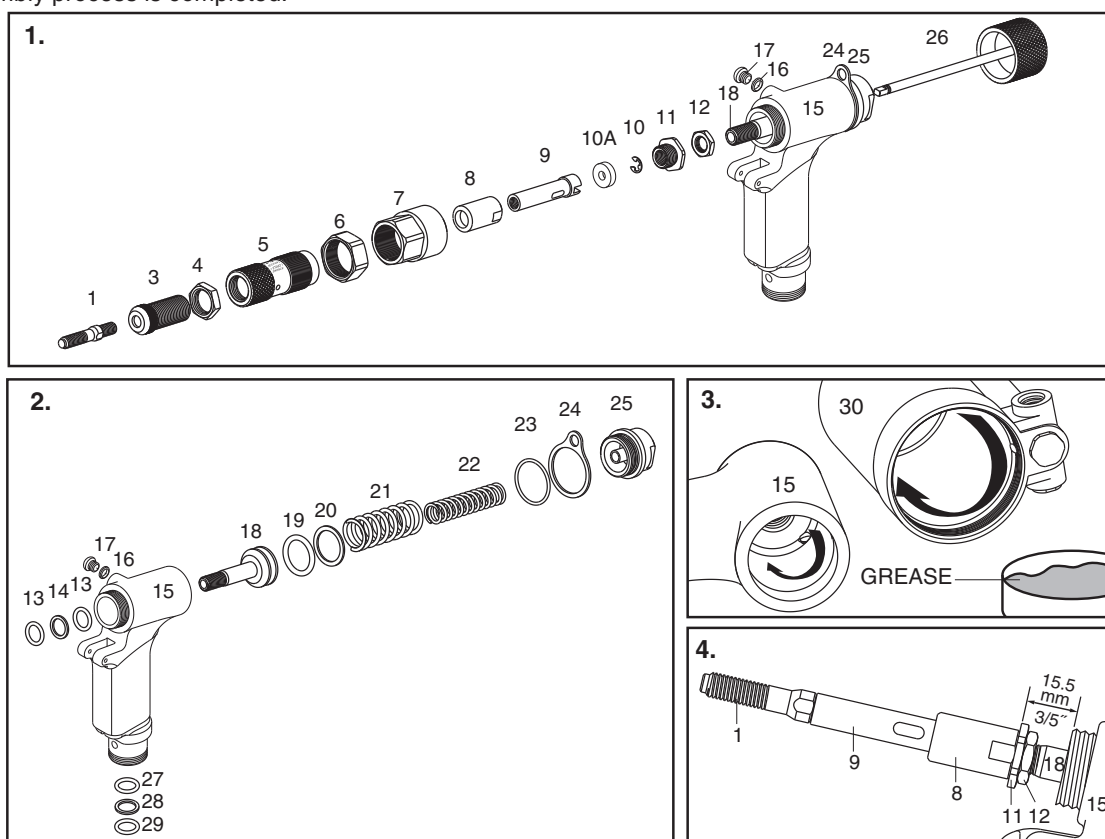


11.7 REPLACE THE OIL CYLINDER, AIR CYLINDER, O-RINGS, BACK-UP RINGS, RETURN SPRINGS AND HYDRAULIC OIL TOGETHER

- After considerable times of operation, oil cylinder (15) and air cylinder (30) as well as their o-rings and back-up rings, return springs (21 & 22), also the hydraulic oil should be replaced.
- The hydraulic oil is suggested to use ISO VG-46 or VG-32 that is popular in market.

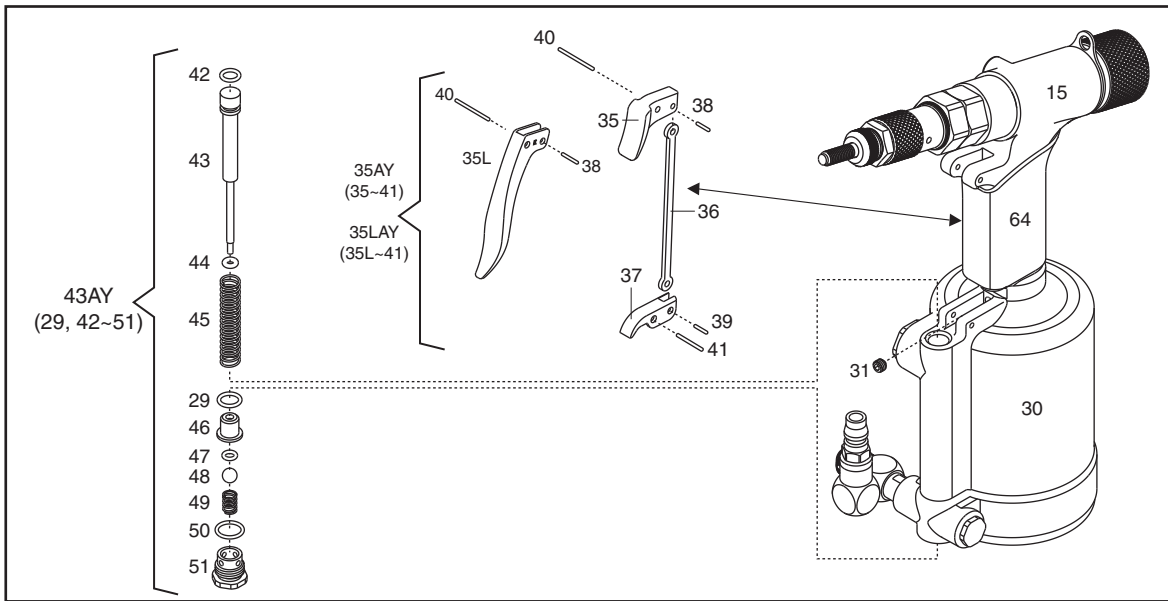
1. **Disconnect the tool from the compressed air supply system.**
2. Use a wrench 30 mm to unscrew the stroke adjuster lock nut (6) to separate part no. 3 ~ 6 together from front head (7), and use a wrench 30 mm to unscrew front head (7) from oil cylinder (15), and then use a wrench 17 mm and a wrench 22 mm to separate collet case (8) from the collet case lock nut (11), now the mandrel seat (9) connected with threaded mandrel (1) can be dismantled from rotation knob (26). Take out the snap ring washer (10A) and the snap ring (10), and then pull out the rotation knob (26) from the oil cylinder end cap (25). Use a wrench 17 mm and a wrench 22 mm to dismantle collet case lock nut (11) and lock nut (12) from oil piston (18) (Fig. 1).
3. Put the tool upside-down, use a wrench 27 mm to unscrew the air cylinder end cap (59) & o-ring (58) from air cylinder (30), and use a pair of pliers to slowly pull out the air piston assembly (55AY) in a straight line (See 11.6 Fig. 1). **Be careful not to scratch the air piston rod (54) and the inner wall of air cylinder (30). Drain the dirty hydraulic oil out of the tool through the air cylinder (30).**
4. **Check and replace the worn buffer ring (52), air piston ring (53), and air cylinder end cap o-ring (58). Also check and replace the worn or scratched air piston rod (54) and the damaged air piston (55). Finally, check and replace the worn air piston lock nut (57) and lock it firmly.**

5. Use a long stem socket wrench 35 mm to unscrew the oil cylinder lock nut (32), and then use a suitable diameter pin carefully to punch out the lever pin (41) to separate the trigger lever (37) from air cylinder (30). Carefully use a hex wrench 3 mm to unscrew the lock screw (31) behind the trigger lever (37) (See 11.6 Fig.1), and then vertically pull the oil cylinder (15) out of the air cylinder (30) with care, the lock nut o-ring (32A) is jumped out from the thread of oil cylinder (15). Check and replace the worn or scratched air cylinder (30) on the inner wall.
6. Carefully use a wrench 27 mm to dismantle the oil cylinder end cap (25), remove the hanging bracket (24) and hanging bracket o-ring (23), take out the large & small return springs (21 & 22), and slowly press the threaded end of oil piston (18) to take out the oil piston assembly (18AY). **Pay special attention to dismantle the oil cylinder end cap (25), do not let the strong force of large & small return springs (21 & 22) jump out to hurt people. Be careful not to scratch the rod of oil piston (18) and the inner wall of oil cylinder (15) (Fig.2).**
7. **Check and replace the worn oil cylinder o-rings (13, 27, 29) and oil cylinder back-up rings (14, 28) in the front part and lower part of oil cylinder (15), as well as the oil piston o-ring (19) and oil piston back-up ring (20). Check and replace the worn or scratched oil piston rod (18) and oil cylinder (15) on the inner wall. Also check and replace the weak or broken large & small return springs (21 & 22). Finally check and replace the worn hanging bracket o-ring (23).**
8. Clean and grease on the inner walls of oil cylinder (15) and air cylinder (30) (Fig. 3), the oil piston o-ring (19) and air piston ring (53).
9. Reverse above steps to reassemble the oil piston assembly (18AY), large & small return springs (21 & 22), oil cylinder end cap (25) along with hanging bracket (24) and hanging bracket o-ring (23). **Pay special attention to the strong force of large & small return springs (21 & 22) which might jump out to hurt people.**
10. Reverse above steps to reassemble the oil cylinder (15) and air cylinder (30) together by aligning and using a hex wrench 3 mm to fasten the lock screw (31) behind the trigger lever (37) carefully (See 11.6 Fig.1), put a **new lock nut o-ring (32A)** onto the thread of oil cylinder (15) and carefully move it (32A) down to touch the top of air cylinder (30), and then fasten the oil cylinder lock nut (32) with a long stem socket wrench 35 mm. Finally, reassemble the trigger lever (37) back to the air cylinder (30) by punching the lever pin (41) into the original pin holes carefully (See 11.7 Fig.1).
11. **Put the tool upside-down, and use the oil bottle (63) with new hydraulic oil to refill into the oil cylinder (15) through the air cylinder (30) until the oil is flushed with the upper oil cylinder o-ring (29) (See 11.6 Fig. 3). Make sure not to overfill oil, and rest for a while until the oil stops releasing air bubbles.**
12. Use a pair of pliers to clamp the air piston lock nut (57), and slowly plug the air piston assembly (55AY) in a straight line into the oil cylinder (15) through the oil cylinder lock nut (32) of air cylinder (30) (See 11.6 Fig. 1), then depress the air piston assembly (55AY) 2 ~ 3 times. Finally, use a wrench 27 mm to reassemble the air cylinder end cap (59) & o-ring (58).
13. Reverse above steps to reassemble the collet case lock nut (11) and lock nut (12) to the threaded end of oil piston (18), then use a ruler to measure distance 15.5 mm or 3/5" (Fig. 4) and fasten collet case lock nut (11) and lock nut (12) together. Insert the rotation knob (26) into the oil cylinder end cap (25) and lock rotation knob (26) with a snap ring washer (10A) and a snap ring (10), then insert the mandrel seat (9) connected with threaded mandrel (1) into collet case (8) from the rear end, then screw collet case (8) clockwise all the way to touch collet case lock nut (11), and fasten these 2 parts (8 & 11) firmly by using a 17 mm wrench and a 22 mm wrench (Fig.4). Screw front head (7) into oil cylinder (15) and fasten it firmly by using a 30 mm wrench. Finally screw part no. 3 ~ 6 together back to front head (7) and use a wrench 30 mm to fasten firmly. Now the reassembly process is completed.



11.8 DISMANTLE AND REPLACE THE PARTS OF THE TRIGGER ASSEMBLY (35AY/35LAY) AND THE VALVE ASSEMBLY (43AY)

1. **Disconnect the tool from the compressed air supply system.**
2. Firstly use a suitable diameter pin carefully to punch out the lever pin (41) to separate the trigger lever (37) from air cylinder (30), and use a suitable diameter pin carefully to punch out the trigger pin (40) to separate trigger (35/35L) from oil cylinder (15), and then to punch out the lower link pin (39) to separate trigger link (36) from trigger lever (37). Finally, pull out the trigger (35/35L) connected with trigger link (36) and upper link pin (38) from the upper side of grip (64). Check and replace any worn parts of the trigger assembly (35AY/35LAY).
3. Dismantle the valve assembly (43AY) by unscrewing valve end cap (51), and carefully take out valve assembly (43AY) from two ends. Check and replace any worn parts of the valve assembly (43AY), such as o-rings (42, 44, 47, 50), springs (45, 49), etc.
4. Reverse above steps, firstly reassemble the valve assembly (43AY), and then to reassemble the trigger assembly (35AY/35LAY) by plugging the trigger (35/35L) connected with trigger link (36) and upper link pin (38) into the upper side of grip (64), and punch the trigger pin (40) into the original pin holes of oil cylinder (15) and trigger (35/35L), then carefully punch the lower link pin (39) into the original pin holes of trigger link (36) and trigger lever (37).
5. Finally, reassemble the trigger lever (37) back to the air cylinder (30) by punching the lever pin (41) into the original pin holes of air cylinder (30) and trigger lever (37) carefully. Now the reassembly process is completed.



12. TROUBLESHOOTING

12.1 MALFUNCTION:

The rivet nut is not set firmly at the first fastening operation.

POSSIBLE CAUSES: Insufficient stroke distance.

SOLUTION: Increase stroke distance. Turn rotation knob (26) clockwise 1 circle and depress trigger (35, 35L) to check if the rivet nut is set firmly or not. If not, step by step to turn rotation knob (26) clockwise 1 circle and depress trigger (35, 35L) until the rivet nut is set firmly. Also can follow the above 10.4 instruction to re-adjust and increase the stroke.

12.2 MALFUNCTION:

The rivet nut thread is damaged or threaded mandrel is broken at the first fastening operation.

POSSIBLE CAUSES: Too long stroke distance.

SOLUTION: Decrease stroke distance. If rivet nut is stuck with threaded mandrel, follow the below 12.3 and 12.4 instructions to unscrew the stuck rivet nut and replace a new rivet nut. If the threaded mandrel is damaged, follow the above 10.3 instruction to replace a new threaded mandrel. Then follow the above 10.4 instruction to re-adjust and decrease the stroke.

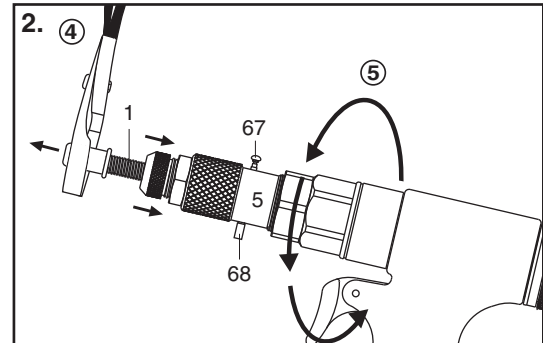
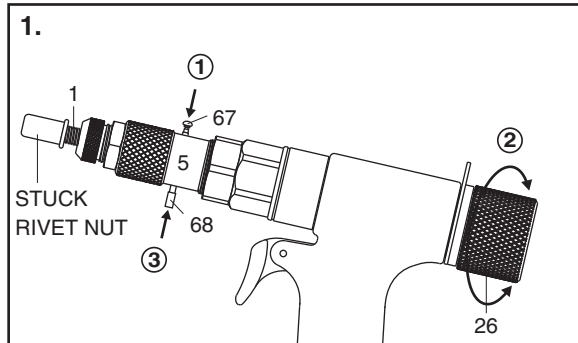
12.3 MALFUNCTION:

The rivet nut stuck on the threaded mandrel when screwing rivet nut onto the thread of threaded mandrel.

POSSIBLE CAUSES: Poor rivet nut thread or damaged threaded mandrel.

SOLUTION: Unscrew the stuck rivet nut from the threaded mandrel by using the patented Fixing-Hole Design.

Firstly insert the fixing-hole pin (67) into any hole of stroke adjuster (5) ① and turn the rotation knob (26) to align ② and let the fixing-hole pin (67) go through the holes, and then put the pin retainer (68) onto the end of the fixing-hole pin (67) ③. Now the free rotation of threaded mandrel (1) is stopped (Fig.1). Use a pair of pliers to clamp the stuck rivet nut ④, and then turn whole Tool counter-clockwise to unscrew the threaded mandrel (1) from the stuck rivet nut. ⑤ (Fig.2). Finally take off pin retainer (68) and pull fixing-hole pin (67) from the fixing holes.



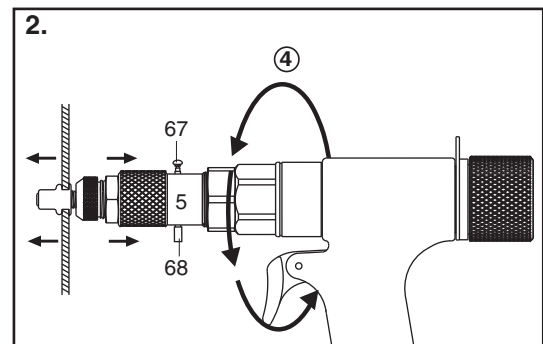
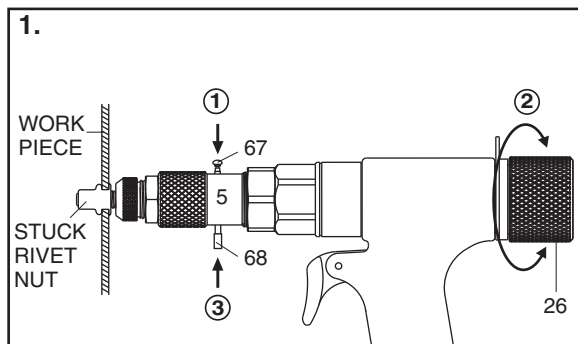
12.4 MALFUNCTION:

The rivet nut stuck on the threaded mandrel when fastening rivet nut in the work piece.

POSSIBLE CAUSES: Poor rivet nut thread or damaged threaded mandrel.

SOLUTION: Unscrew the stuck rivet nut from the threaded mandrel by using the patented Fixing-Hole Design.

Firstly insert the fixing-hole pin (67) into any hole of stroke adjuster (5) ① and turn the rotation knob (26) ② to align and let the fixing-hole pin (67) go through the holes, and then put the pin retainer (68) onto the end of the fixing-hole pin (67) ③. Now the free rotation of threaded mandrel (1) is stopped (Fig.1). Turn whole Tool counter-clockwise to unscrew the threaded mandrel (1) from the stuck rivet nut ④ (Fig.2). Finally take off pin retainer (68) and pull fixing-hole pin (67) from the fixing holes.



12.5 MALFUNCTION: Tool fails to fasten Rivet Nut

Possible Causes:	Solutions:
Low Air Pressure or Air Pressure lost	Check Compressed Air Supply System, adjust Air Pressure to in specification, check Air Cylinder (30) leak and replace it if necessary, clean Air Cylinder (30) inside, clean or replace O-Rings (53, 58, 60)
Hydraulic Oil Pressure lost	Insufficient Oil and refill Oil, check Oil Cylinder (15) leak and replace it if necessary, replace all O-rings (13, 19, 27, 29) and Back-Up Rings (14, 20, 28)
Exceed Tool's Capacity	Use more powerful Tool

12.6 MALFUNCTION: Slow Cycle

Possible Causes:	Solutions:
Low Air Pressure	Check Compressed Air Supply System, adjust Air Pressure to in specification, check Air Cylinder (30) leak and replace it if necessary, clean Air Cylinder (30) inside, clean or replace O-Rings (53, 58, 60)

12.7 MALFUNCTION: No operation after triggering (Stroke lost), or more than one operation of Trigger to fasten Rivet Nut (Stroke decreased)

Possible Causes:	Solutions:
Grip Range of Rivet Nut is too long	Check suitable Grip Range of Rivet Nut to match work piece's thickness. It is nothing to do with Stroke of Tool
Low Air Pressure	Check Compressed Air Supply System, adjust Air Pressure to in specification, check Air Cylinder (30) leak and replace it if necessary, clean Air Cylinder (30) inside, clean or replace O-Rings (53, 58, 60)
Insufficient Hydraulic Oil leads to Stroke decreased	Refill Hydraulic Oil through Oil Refill Hole, see 11.5 solutions
Air bubbles in Hydraulic Oil	Bleed Oil from Air Cylinder (30), and refill New Hydraulic Oil
Oil Cylinder (15) leaks	See below 12.9 solutions
Improper assembly of Valve Assembly (43AY)	Reassemble Valve Assembly (43AY)
Worn O-Rings in Valve Assembly (43AY)	Replace all O-Rings (42, 44, 29, 47, 50)

12.8 MALFUNCTION: Slow operation or no operation of Air Piston Assembly (55AY) in Air Cylinder (30)

Possible Causes:	Solutions:
Improper assembly of Valve Assembly (43AY)	Reassemble Valve Assembly (43AY)
Worn O-Rings in Valve Assembly (43AY)	Replace all O-Rings (42, 44, 29, 47, 50)
Improper assembly of Air Piston Assembly (55AY)	Reassemble Air Piston Assembly (55AY)
Worn Air Piston Ring (53) and Buffer Ring (52)	Replace Air Piston Ring (53) and Buffer Ring (52)
Low Air Pressure	Check Compressed Air Supply System, adjust Air Pressure to in specification, check Air Cylinder (30) leak and replace it if necessary, clean Air Cylinder (30) inside, clean or replace O-Rings (53, 58, 60)
Noise Silencer (33) blocks air exhaust	Clean or replace a new Noise Silencer (33)
Weak or broken Return Springs (21 & 22)	Replace new Return Springs (21 & 22)

12.9 MALFUNCTION: Oil Cylinder (15) leaks Hydraulic Oil

Possible Causes:	Solutions:
Oil Cylinder (15) damaged	Replace a new Oil Cylinder (15)
Improper assembly of O-Rings (13, 19, 27, 29) and Back-Up Rings (14, 20, 28) in front & rear ends of Oil Cylinder (15)	Reassemble O-Rings (13, 19, 27, 29) and Back-Up Rings (14, 20, 28) in front & rear ends of Oil Cylinder (15)
Worn O-Rings (13, 19, 27, 29) and Back-Up Rings (14, 20, 28) in front & rear ends of Oil Cylinder (15)	Replace new O-Rings (13, 19, 27, 29) and Back-Up Rings (14, 20, 28) in front & rear ends of Oil Cylinder (15)

12.10 MALFUNCTION: Air Cylinder (30) and Noise Silencer (33) leak Hydraulic Oil

Possible Causes:	Solutions:
Improper assembly of O-Rings (27, 29) and Back-Up Ring (28) in lower end of Oil Cylinder (15)	Reassemble O-Rings (27, 29) and Back-Up Ring (28) in lower end of Oil Cylinder (15)
Worn O-Rings (27, 29) and Back-Up Ring (28) in lower end of Oil Cylinder (15)	Replace new O-Rings (27, 29) and Back-Up Ring (28) in lower end of Oil Cylinder (15)
Worn Lock Nut O-Ring (32A)	Replace New Lock Nut O-Ring (32A)

12.11 MALFUNCTION: Valve Assembly (43AY) and Noise Silencer (33) leak Air

Possible Causes:	Solutions:
Improper assembly of Valve Assembly (43AY)	Reassemble Valve Assembly (43AY)
Worn O-Rings (42, 44, 29, 47, 50) in Valve Assembly (43AY)	Replace new O-Rings (42, 44, 29, 47, 50) in Valve Assembly (43AY)
Weak Springs (45, 49) in Valve Assembly (43AY)	Replace new Springs (45, 49) In Valve Assembly (43AY)

12.12 MALFUNCTION: Air Inlet and Air Inlet Fitting leak Air

Possible Causes:	Solutions:
Wrong thread size of Air Inlet Fitting	Change correct thread size of Air Inlet Fitting
Air Inlet thread damaged	Tap thread and wrap Tape Seal around Air Inlet Fitting's male thread

13. DISPOSAL

The disposal of tool and hydraulic oil shall be in accordance with local environmental regulations.