

REFTEKK
INTEGRATED PIPING SOLUTIONS

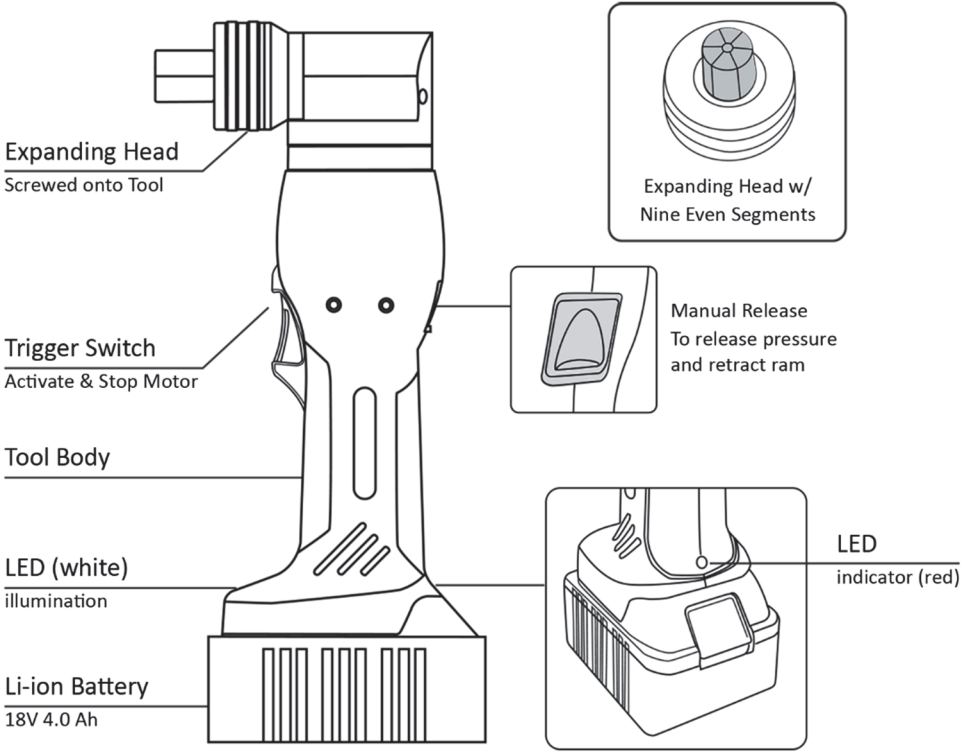
SWAGE^X

OPERATIONS MANUAL



Version: 170831

FUNCTIONAL DESCRIPTION



CONTENTS OF EXPANDER TOOL KIT

Swage-X Tool	Reftekk Expanding Heads: 3/8", 1/2", 5/8", 3/4", 7/8", 1-1/8", 1-3/8", 1-5/8"
18V, 4.0 Ah, Li-ion Makita Battery	
Makita Charger	
Carrying Case	Operations Manual

TECHNICAL DATA

Weight	5.5 lbs
Battery Voltage	18 V
Battery Capacity	4.0 Ah
Charging Time	36 Minutes

GENERAL SAFETY INSTRUCTIONS



WARNING! Read all safety warnings and all instructions. Failure to follow the warnings and instructions may result in

electric shock, fire, and/or serious injury.

Save all warnings and instructions for future reference. The term “power tool” in the warnings refers to your battery-operated Swage-X power tool.

1) WORK AREA SAFETY

- a. **Keep work area clean and well lit.** Cluttered or dark areas invite accidents.
- b. **Do not operate power tools in explosive or corrosive environments, such as in the presence of flammable liquids, gases, or dust.** Power tools create sparks which may ignite the dust or fumes.
- c. **Keep children and bystanders away while operating a power tool.** Distractions can cause you to lose control.

2) ELECTRICAL SAFETY

- a. **Do not expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock.
- b. **Use a proper battery for the application.** Ensure the battery specifications are equivalent to the original battery specifications.

3) PERSONAL SAFETY

- a. **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol, or medication.** A moment of inattention while operating power tools may result in serious personal injury.
- b. **Use personal protective equipment. Always wear eye protection.** Protective equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.

- c. **Prevent unintentional starting.** Carrying power tools with your finger on the trigger can cause accidents.
- d. **Do not overreach. Keep proper footing and balance at all times.** This enables better control of the power tool in unexpected situations.
- e. **Dress properly. Do not wear loose clothing or jewelry. Keep your hair, clothing, and gloves away from moving parts.** Loose clothes, jewelry or long hair can be caught in moving parts.

4) POWER TOOL USE AND CARE

- a. **This tool should only be used by trained personnel. Keep out of reach of children.** Power tools are dangerous in the hands of untrained users.
- b. **Do not force the power tool. Use the correct power tool for your application.** The correct power tool will do the job better and safer at the rate for which it was designed.
- c. **Do not use the power tool if the trigger does not turn it on and off.** Any power tool that cannot be controlled with the trigger is dangerous and must be repaired.
- d. **Avoid operating the tool in an inverted position.** The tool operates on hydraulic pressure.
- e. **Disconnect the battery from the power tool before making any adjustments, changing accessories, or storing the power tool.** Such preventive safety measures reduce the risk of fire or starting the power tool accidentally.
- f. **Always store the tool inside the protective tool case for storage or transport.**
- g. **Maintain power tools.** Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use. Many accidents are caused by poorly maintained power tools. Do not use if something looks damaged.
- h. **Keep tubing cutter tools sharp and clean.** Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.
- i. **Clean and remove any debris collected on or between the expander head segments.**

- j. **Use the power tool, accessories, and tool bits etc., in accordance with these instructions, considering the working conditions and the work to be performed.** Use of the power tool for operations different from those intended could result in a hazardous situation.
- k. **Tool is not field-serviceable.** Send tool to an authorized service agent for repair.
- l. **Keep all safety information and instructions for future use.** Only pass the devices on to others together with the Operations Manual and instructions.

5) SPECIFIC SAFETY RULES

- a. **Keep the working area clear for the swaging process.** Obstructions could cause a hazard and interfere with the swaging process.
- b. **Only for use on H55 Half-Hard or O60 Soft/Annealed ACR-L copper tubing.** Use of other materials or wall thicknesses may cause a safety hazard, compromise tubing integrity, and/or cause damage to the machine.
- c. **Keep hands, hair, and loose articles away from all moving parts during the swaging process.** Tremendous forces occur during the swaging process which could cause serious injury.

MAINTENANCE

The reliable performance of the tool is dependent on careful treatment and regular service. Do not attempt self-repair unless otherwise advised. Do not attempt to field disassemble or service.

- a. Clean and apply a thin coat of lithium grease to the expander cone at a regular interval.
- b. Keep the machine clean and free of dust. Every 50 hours of operation blow compressed air through the motor to clean out accumulated dust. (If operating in especially dusty conditions, perform this operation more often.)
- c. Ensure that the ventilation slots are clear so that motor can be cooled normally. Blow low pressure compressed air through the ventilation slots with the motor running to keep motor clean.
- d. Inspect the tool, the expanding heads, and the battery for any sign of unusual wear or damage before each use.
- e. Check for loose fittings and tighten as needed.
- f. Replace worn tool and/or devices.

SERVICE

Have your power tool serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the power tool is maintained.

SYMBOLS USED IN THIS MANUAL

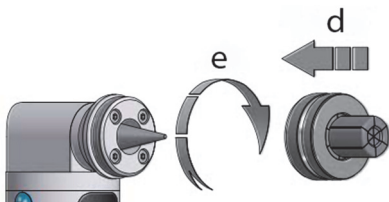
	Volts
	Amp-hour
	Warning of general danger.
	Read these instructions.
	Always wear eye protection.
	Always wear a dust mask.
	Always wear hearing protection.
	Wear safety-approved hard hat.
	Keep hands clear – pinching hazard.
	Moving parts – entanglement hazard. Keep hands, loose clothing, and long hair away from moving parts.
	Do not dispose of electrical tools, accessories, or packaging with other household waste material.
	Risk of electric shock. Do not use in or expose to wet conditions.

OPERATING INSTRUCTIONS

Please read entire operations manual before operating. Always follow proper operating and safety instructions.

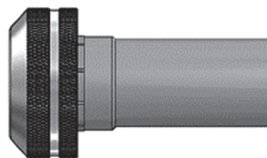
1) SET UP

- Inspect the tool, the expanding heads, and the battery for any sign of unusual wear or damage before each use. Do not use if damaged.
- Check and make sure that the central cone is in the fully retracted position.
- Install the battery by sliding it into position until it locks into place. Take care not to press the trigger switch while installing the battery. The battery should be fully charged for sufficient working force.
- Select proper expanding head according to the size of tube (refer to the size marked on the expanding head).
- Screw the expanding head on to the tool head by rotating the expanding head clockwise until it is finger tight against the head.



- Test cycle the tool to check for proper function prior to using.
- Ensure the tube to be expanded is clean and round.
- Cut tube end to desired length using a sharp tubing cutter. Make sure the tube end is cut square.
- Make sure the tube end is de-burred on both the inside and outside edges.

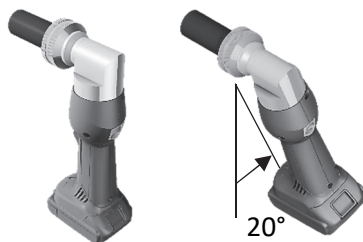
- Activate the tool by pressing and holding the trigger switch. The tube end will be evenly expanded with the opening of the segments. The expanding head segments will automatically retract when the expanding operation is complete and the factory pressure set point is reached.



- Test the fitment of the swaged socket with a non-swaged piece of tubing. The fitment should be snug but not so tight that force is required to insert.



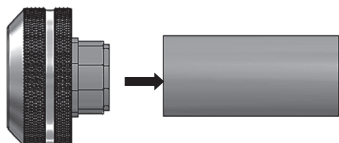
- If the fitment is too tight, the swaged socket will need to be expanded slightly. To do so, rotate the tool 20 degrees from the previous position and perform a second swage operation by repeating steps a and b.



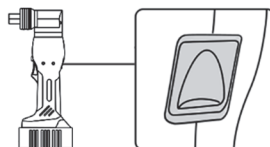
- Ensure that both ends of the tubing are deburred, cut squarely, and cleaned such that the layer of oxidation is removed. The tubing is now ready for brazing.

2) OPERATION

- Insert the closed segments of the expanding head into the tube end until it is fully seated against the stop. If the expanding head does not fit into the tube after deburring, the step on the nose of the head will expand the tube to nominal tube size.



NOTE: If the expanding operation gets stuck or is interrupted for any reason, press down on the manual release switch located on the back of the tool to manually return the expander segments back to its retracted position.



WARNING! DO NOT USE the swaged socket if the fitment appears too loose. Brazing requires a snug fit with tight tolerances.

PROPER USE

The Swage-X is a battery-powered hand tool to expand annealed (O60) (soft) and light-drawn (H55) (half-hard) copper tubing ends to form brazing sockets conforming to ASME B16.5. Brazing sockets created with the Reftekk expander tool are strictly for brazed joints. **IT IS STRICTLY PROHIBITED TO SOLDER USING THESE EXPANDED SOCKETS.**

The expander tool is intended solely for use with the appropriate Reftekk expander heads manufactured exclusively to expand annealed or light-drawn temper, Type-L copper tube, manufactured to ASTM B75 or ASTM B280. **Do NOT use on General Purpose Drawn (H58) (hard) copper tubing.**

Any use beyond or different than that described shall be regarded as improper use. Improper use of this tool may lead to damage to the tool, expander heads, accessories, and/or the tubing. Leaks, and/or injury may result. **Improper use will void the product warranty.**

Proper use also includes full compliance with this Operation Manual, adherence to the inspection and maintenance conditions, compliance with the latest versions of all relevant safety regulation, as well as all related industry best practices.

WARRANTY

Reftekk provides a one-time full twelve (12) month warranty from the date of purchase for the Swage-X Expander Toolkit. The warranty shall cover the repair of the tool for any malfunction from the result of material or production faults. Repair services can be provided beyond this warranty.

The warranty does not cover the following:

- Damage caused by improper use or inadequate servicing.
- Damaged caused by the use of products not approved by Reftekk for use with its tools.
- Damage caused by dropping or other physical abuse.
- Damage caused by expanding unsuitable tubing.

TROUBLESHOOTING

Problems	Possible Causes	Remedies
Tool does not retract after operation, gets stuck, and will not come out of the tubing.	The expander cone is not properly greased.	Press the manual release switch to retract the expander head segments.
		If the tool does not retract with the manual release switch, use a rubber mallet to gently tap the outside wall of the tubing at the tube-end where the tool is stuck.
		Apply a thin coat of lithium grease to the expander cone at a regular interval.
Tool does not operate. Red LED lit solid for 20 seconds.	Low battery.	Insert fully charged battery.
Tool stopped. Red LED 3 flashes.	Operator interrupted operation sequence.	Press the manual release switch to retract the expander head segments. Resume operation.
	Pressure not reached while motor was running.	If error code occurs extensively, return tool to Reftekk for service.
The red LED flashes 2 times per second for 20 seconds.	Tool service required indicator	Send tool to service center for repair.
Expander head does not fit inside the tube end.	Tube is not fully de-burred.	De-burr tube.
	Tube is out-of-round.	Cut tube end back till a round tube end is obtained.
	Mismatched tube and expander head sizes.	Select correct tube or expander head size.
Tube end is not fully expanded.	Low battery.	Insert fully charged battery.
	Attempted to swage tubing of a non-approved material, OD, or thickness.	Only for use on Half-Hard (H55) or Soft Annealed (O60) ACR-L copper.
	Wrong expander head was used.	Use correct expander head size.
	Expander head had rotated loose from the tool head.	Re-tighten the expander head to the tool (finger tight) and expand the tube end a second time.
	Natural rebound of the tube wall. Not a mechanical fault.	Perform a second operation with a 20-degree rotation as necessary.