

OPERATION AND MAINTENANCE MANUAL

FOR THE IL-2000 STICKSHOOTER™

INSTALLATION TOOL

SERIAL NUMBER _____

NOTE: Your New IL-2000 StickShooter™ Installation Tool has been assigned a Serial Number as indicated above.

This Number Must Be Referenced
In all Correspondence



Model IL-2000

PennEngineering®
5190 OLD EASTON ROAD
DANBORO, PENNSYLVANIA 18916
1-800-523-5321 • 1-215-766-8853

PART NUMBER 8006120
Edition I (09/10)
English Version

STICKSCREW®
PRODUCTS 



Read Manual Before Operating Tool!

FOREWORD

Thank you for purchasing an IL-2000 or PG-2000 StickShooter™ installation tool. With proper care and maintenance, your tool will install millions of StickScrew® fasteners safely, quickly and consistently.

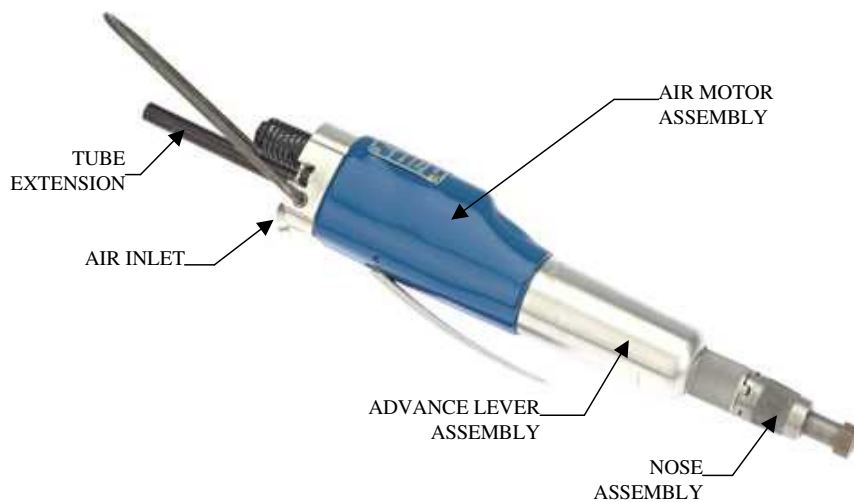
This installation tool is set up for use with a specific screw hex size. Do not attempt to use this tool with another hex size without obtaining and installing the appropriate Adjustable Nose Assembly (See page 13).

This tool requires a 1/4" (6mm) ID air line for proper operation. A coiled air hose should not be used because this can interfere with proper airflow.

SECIFICATIONS:

Air Requirements	90 PSI (6.2 BAR)
Sound Pressure Level	82.8 dbA
Sound Power Level	101.6 dbA
For Use	Indoor / Outdoor
Ambient Temperature.....	-20° F to 120° F (-29° C to 49° C)
Ambient Humidity	0% to 80% (Not reflective of inlet air)
Altitude	0 FT to 6,000 FT (0 km to 18.3 km)

MODEL IL-2000





SAFETY PRECAUTIONS

- ◆ Always use safety goggles when operating or maintaining the tool.
- ◆ Ear Protection is recommended.
- ◆ Before using tool, make sure that a shutoff device has been fitted on supply line and the location is easily accessible, so that the air supply to tool can be shut off in an emergency.
- ◆ Check the air hose and fittings regularly for wear.
- ◆ Always disconnect the air supply from the tool before performing any maintenance operations or making any adjustments to the tool.
- ◆ Use only approved parts for maintenance and repairs.
- ◆ Do not use chipped, cracked or damaged accessories.
- ◆ Attach air line securely.
- ◆ Keep body parts away from rotating parts. Unexpected tool movement or breakage of inserted tool may cause injuries to hand or feet.
- ◆ Never wear jewelry, loose clothing or anything that could get caught in rotating parts.
- ◆ Secure workpiece whenever possible.
- ◆ Do not overreach. Keep proper footing and balance at all times. Unsuitable postures may not allow counteracting of normal or unexpected movement of the power tool.
- ◆ Never point the exhaust air at anyone or near flame or hot surface.
- ◆ Power tools shall not be used in explosive atmosphere unless specifically designed for that purpose.
- ◆ Do not force tool.
- ◆ Never lay tool down until working attachment has stopped moving.
- ◆ Shut off air supply and press lever to relieve air pressure when tool is not in use. If tool is not used for a period of time, disconnect it from air supply line and store it in a dry place with moderate temperature.
- ◆ If tool is passed to a new user, be sure these instructions are readily available.
- ◆ Power tools are not generally insulated for coming into contact with electric power sources.

WARRANTY

PennEngineering® warrants that this product, when correctly used according to directions and under normal operating conditions, will be free from defects in material and workmanship for a period of one year from the date of purchase.

This warranty shall not apply to any product which has been altered, changed or repaired, normal maintenance excluded, except as authorized by PennEngineering®. This warranty shall not apply to any product that has been subject to misuse, negligence or accident.

The purchaser's exclusive and sole remedy shall be limited to repair, modification or replacement at the discretion of PennEngineering®. In no event shall PennEngineering® be liable for the cost of any indirect or consequential damage. In no case shall PennEngineering®'s liability exceed the purchase price of the product.

This warranty is exclusive and in lieu of all other warranties. No oral or written information by PennEngineering®, its employees, representatives, distributors or agents shall increase the scope of the above warranty or create any new warranty.

RETURN POLICY AND PROCEDURE

To return a tool for service, contact PennEngineering® Service Department at 1-800-523-5321 (In North America) or 215-766-8853. If necessary, a loaner driver may be arranged at the same time.

Carefully pack the tool and any accessories and ship prepaid and insured to:

For customers in USA: PennEngineering® Service Department 5190 Old Easton Road Danboro, PA 18916 USA	For International customers including Canada and Mexico: Contact your local distributor for return procedure.
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Please include the return authorization number, tool serial number, a contact name, return address and phone number along with a description of the problem and any other pertinent information. It is also required that a minimum of five sticks of screws appropriate for the driver be returned with the driver for proper evaluation.

Tools will be returned standard ground method unless otherwise requested. Next day delivery is available at an additional charge.



GENERAL OPERATION

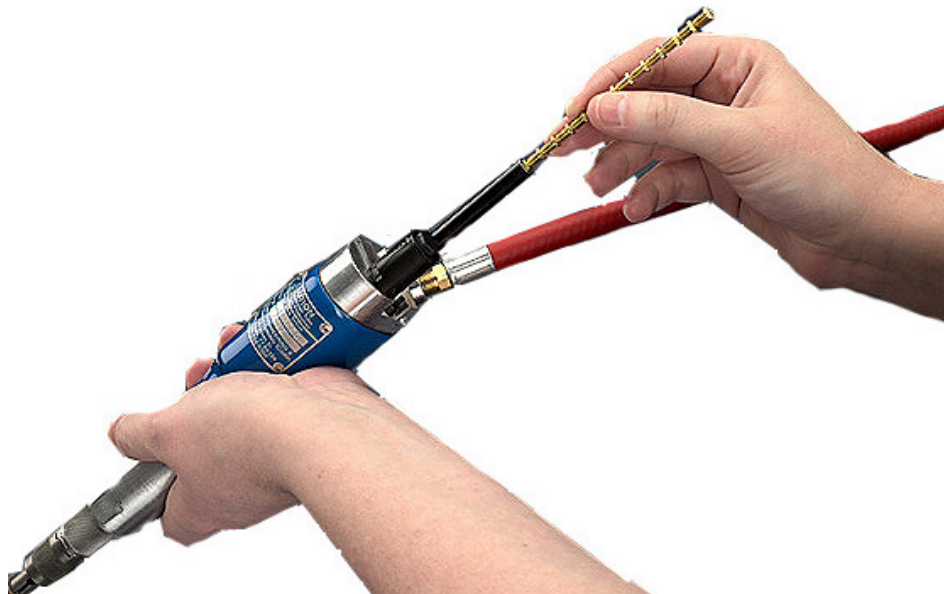
The stick of screws is inserted through the extension tube at the air-fitting end of the tool. The extension tube is designed to protect the operator from abrasion by the rotating screws and should not be removed during operation.

The stick must be inserted so that **ONE ENTIRE SCREW PROTRUDES FROM THE TOOL TIP**. This enables the tool to turn the head of the second screw. Proper positioning is critical for the proper torque to be transmitted to the screw. Improper positioning of the stick will cause the screw to strip out of the workpiece or the head of the screw to shear off. See the Screw Length Setup below.

The most efficient way to advance to the next screw is to drive each screw with enough downward force to cause the tool to index to the next screw after each screw is installed. An alternate method is to move the tool away from the workpiece and press down on the tip of the tool, causing the next screw to index into position.

Once $\frac{3}{4}$ of the stick has advanced through the tool, the screws will not feed automatically. When this happens, insert a new stick through the extension tube while holding the partial stick in place. The last two screws on each stick are not used and will fall out of the tool before the new stick indexes into place. Dispose of them before continuing the installations. **NOTE: Do not insert a short stick, it may jam in tool.**

**FIGURE 1
PROPER INSERTION OF STICK**



SCREW LENGTH SETUP

Prior to installing screws, the tool must be set up to accommodate the length of the screw to be installed. This ensures the correct functioning of the internal feed mechanism of the tool. The tool will install screws with total lengths in the range of .088" to .365" (2.25mm TO 9.25mm). Before proceeding, **DISCONNECT THE TOOL FROM THE AIR SUPPLY**. Set up the tool as follows:

RESET THE TOOL ADVANCE STROKE

1. Place the tool in your left hand with your thumb and forefinger lightly gripping the Detent Drive Nut. The Throttle Lever, 0D76758, should be facing upward.
2. Insert the Adjusting Pin, 0D50042, through the Extension Tube, 0D87747, by pressing the button at the top of the Adjusting Pin and inserting it into the tool until the shoulder of the Adjusting Pin rests against the top of the Extension Tube. (See Figure 2)
3. Gently rotate the Adjusting Pin until the ball detents on the Pin engage the grooves on the inside of the Stroke Adjusting Bow Corrector, 0D50043. The Detent Drive Nut will turn as the Adjusting Pin handle is turned when the grooves are engaged.
4. While holding the Detent Drive Nut in place, turn the T handle of the Adjusting Pin clockwise until it reaches the internal stop. At this point the tool should have zero stroke.

FIGURE 2
ADJUSTING TOOL STROKE FOR DIFFERENT LENGTH FASTENERS



5. Measure the total length of the screw to be installed. Measure from the top of the screw head to the top of the screw below it. **For unified screws**, multiply the total length $((TL) \times 32 \text{ (turns/inch)}) + 2 \text{ (turns)} = \text{Number of turns of Adjusting Pin T-handle}$ (Rounded to nearest $\frac{1}{2}$ turn) for unified fasteners. **For metric screws**, multiply $(TL \times 1.25 \text{ (turns/mm)}) + 2 \text{ (turns)} = \text{Number of turns of Adjusting Pin T-handle}$ (Rounded to nearest $\frac{1}{2}$ turn). Example: if the total length of the screw is .118" $\times 32 = 3.75 + 2 = 5.75$ or 6 turns of T-handle. If the total length is 3mm $\times 1.25 = 3.75 + 2 = 5.75$ or 6 turns of T-handle. If this calculation gives a value greater than 12 turns, use 12 turns, which is the maximum range of adjustment.
6. Turn the T-handle counterclockwise the number of turns determined by the above formula. As the adjustment is made, the Adjusting Pin will pass through a detent every half turn. Depress the button on the Adjusting Pin and withdraw it from the tool, when the adjustment is complete.

**FIGURE 3
ADJUSTABLE LEVER NOSE ASSEMBLY**

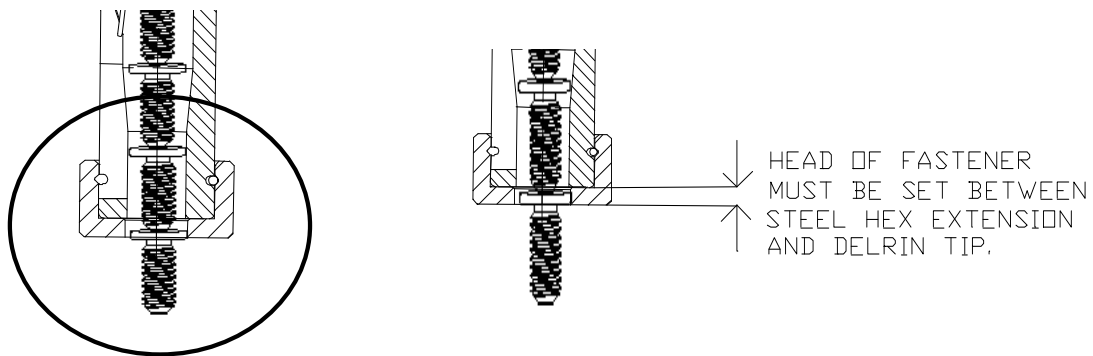


SET THE STARTING POSITION OF THE FIRST SCREW

7. Pull back the Detent Lock Collar, 0D50002, until it stops. Rotate the Detent Drive Nut, 0D50001, clockwise until it just contacts the Detent Lock Collar. Turn the Detent Drive Nut slightly in either direction until the mating surfaces engage.
8. Insert a full stick of the screws to be installed into the tool. Push it through until one full screw protrudes beyond the Extension Driver Tip. If more than one screw is pushed through, the entire stick must be removed by pulling it through the tool. **The stick cannot be pushed backward into the tool.**

9. The Detent Drive Nut must be adjusted so that underside of the head of the first screw is flush with the Extension Driver Tip. Pull back the Detent Lock Collar and rotate the Detent Drive Nut counterclockwise so that the underside of the head of the first screw is flush or slightly under flush with the Delrin Extension Tip. This will assure that the workpiece will not be marred or damaged by the following screw after the installed screw breaks off. When the adjustment is made, rotate the Detent Drive Nut so that the mating surfaces engage.
10. The tool is now ready to install that specific length screw.
11. If a different length screw needs to be used, the procedure steps 1 through 9 must be repeated.

**FIGURE 4
PROPER LOCATION OF LEAD SCREW**



NOSE ASSEMBLY CHANGEOVER

FIGURE 5
IL-2000 DRIVER ASSEMBLY SHOWN WITH SCREW LENGTH ADJUSTING PIN
TOOL AND INTERCHANGEABLE NOSE ASSEMBLIES



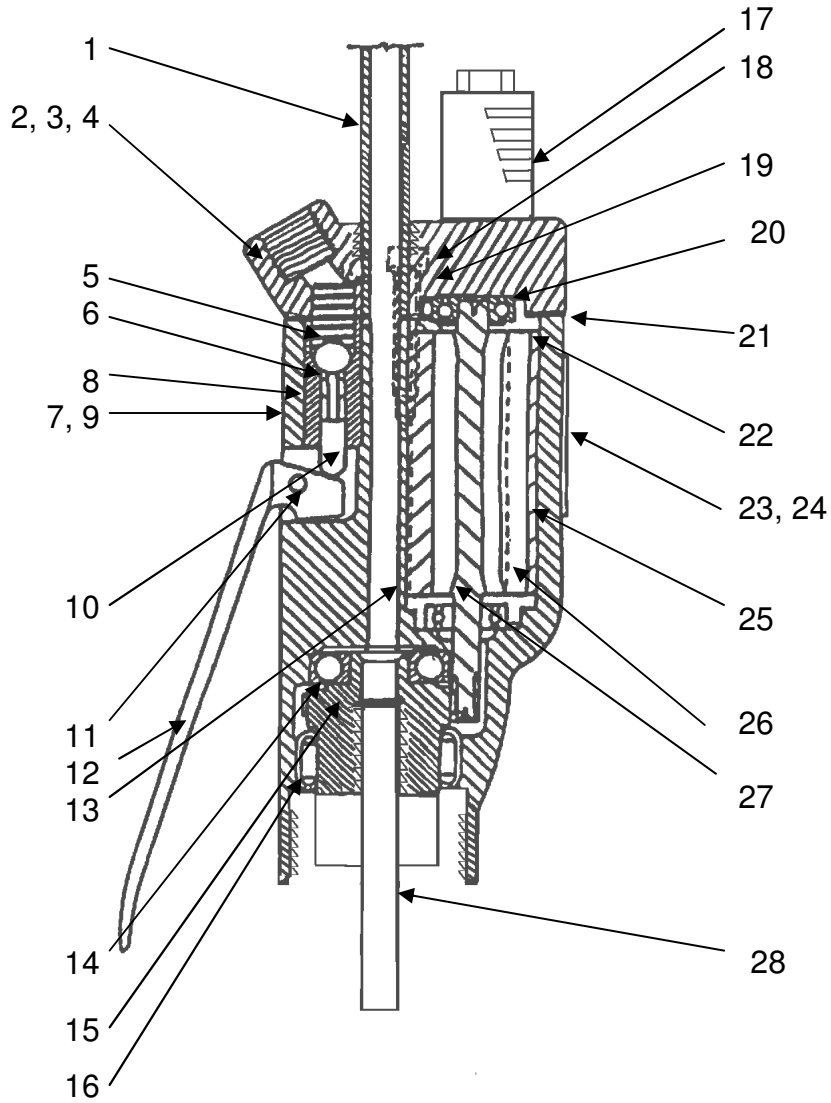
INSTRUCTIONS

To change the Nose Assembly, pull back on the Detent Lock Collar (0D50002) to disengage it from the Detent Drive Nut (0D50001). Unthread the Detent Drive Nut until the assembly is removed. Remove any accumulated wax or debris. (See Figure 3)

To attach the new Nose Assembly, position the Nose Assembly so that the slot in the Bushing is aligned with the slot in the Advance Lever Barrel. This will permit the Nose Assembly to clear the pawls inside of the Advance Lever Barrel. Pull back on the Detent Lock Collar to allow the nose assembly to be attached. Thread the Nose Assembly on until it touches the Detent Drive Nut. Turn one of these components slightly until the mating surfaces are engaged.

After installation, perform the Screw Length Setup procedure (Page 5) if any of the adjustments for the current application have changed.

Tool Part Identification
FIGURE 6
AIR MOTOR ASSEMBLY

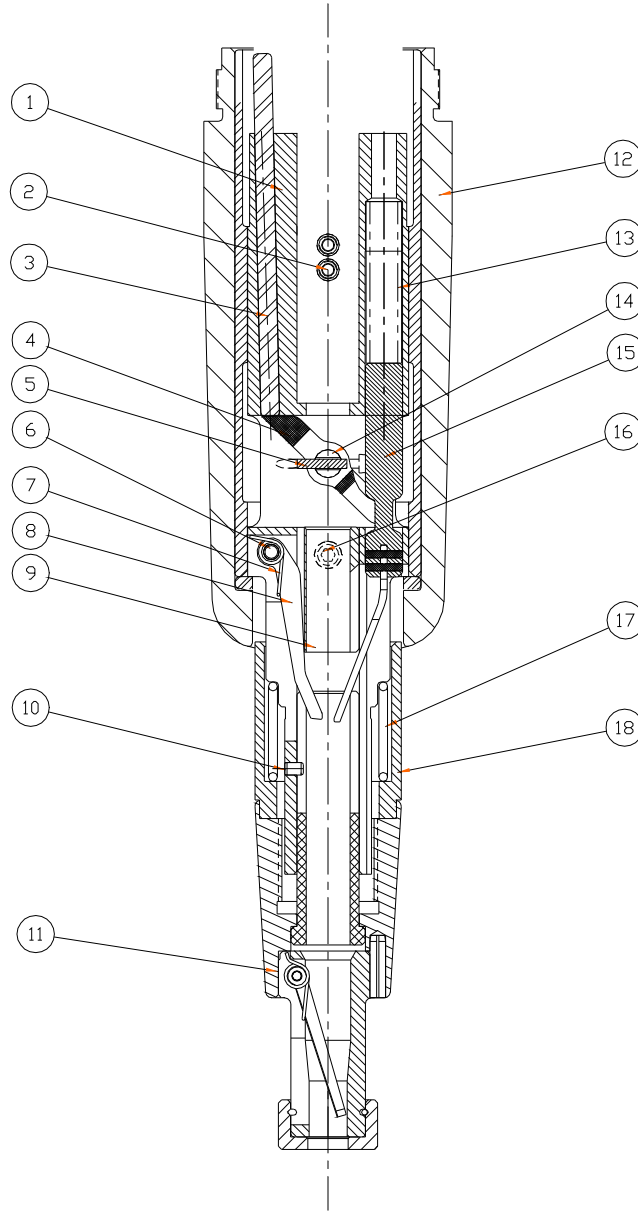


TOOL IDENTIFICATION AIR MOTOR ASSEMBLY		
ITEM NO.	PART NUMBER	DESCRIPTION
1	0D87747	GUIDE TUBE
2	0D87819	HOUSING CAP ASSEMBLY (IL-2000 Only)
3	0D39198	BAIL BUSHING (2) <i>(NOT SHOWN)</i>
4	0D47639 0DEL105	HOUSING CAP (IL-2000 Only) HOUSING CAP (EL-2000 Only)
5	0D71077 0DP0015	VALVE SPRING (IL-2000 Only) TRIGGER SPRING (PG-2000 Only)
6	0D75233	VALVE BALL
7	0D48000 0DP0017 0D50049	MOTOR UNIT HOUSING ASSEMBLY (IL-2000 Only) PG MOTOR UNIT HOUSING ASSEMBLY (PG-2000 Only) EL MOTOR UNIT HOUSING ASSEMBLY (EL-2000 Only)
8	0D76747	VALVE BUSHING
9	0D50049	MOTOR UNIT HOUSING
10	0D76754	VALVE ACTUATING PIN
11	0D76757	THROTTLE LEVER PIN
12	0D76758 0DP0023	THROTTLE LEVER (IL-2000 Only) TRIGGER ASSEMBLY (PG-2000 Only)
13	0D92796	KEY FOR CYLINDER BUSHING
14	0D71464	UPPER CLUTCH GEAR BEARING
15	0D50046	CLUTCH GEAR
16	0D76749	LOWER CLUTCH GEAR BEARING
17	0D50048	MUFFLER
18	980039903	MOTOR UNIT HOUSING SCREW (2)
19	980039804	LOCK WASHER (2)
20	0D76196	ROTOR BEARING (2)
21	0D76756	HOUSING CAP GASKET
22	0D76752	CENTER PLATE (2)
23	0D76759	NAMEPLATE
24	0D63296	NAMEPLATE SCREW (4)
25	0D81239	CYLINDER BUSHING
26	0D81240	ROTOR BLADES (4)
27	0D81241 0DEL104	ROTOR ROTOR (EL-2000 Only)
28	0D50043	STROKE ADJUSTING BOW CORRECTOR

Tool Part Identification

FIGURE 7

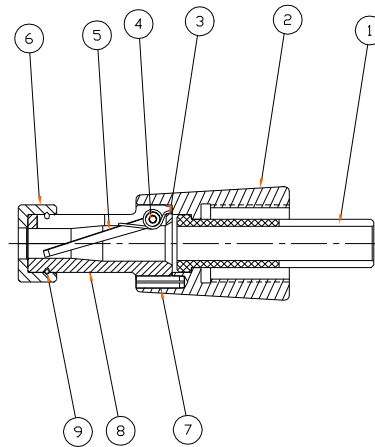
Advance Lever Assembly
(SHOWN WITH NOSE ASSEMBLY)



TOOL IDENTIFICATION ADVANCE LEVER ASSEMBLY		
ITEM NO.	PART NUMBER	DESCRIPTION
1	0D50032	ADJUSTABLE NOSE ADVANCE LEVER BARREL
2	0D50041	SPRING BALL PLUNGER (4)
3	0D50040	THRUST PIN
4	0D76736	ADVANCE PAWL LEVER
5	0D92840	RETAINING PIN (2)
6	0D76741	PIN FOR THRUST PAWL
7	0D76742	SPRING FOR THRUST PAWL
8	0D76735	THRUST PAWL
9	0D50003	ADVANCE LEVER BARREL BUSHING
10	0D50030	DOWEL PIN
11	See Below 0D50019 0D50020 0D50022 0D50023 0D50024 0D50025 0D50026 0D50027	ADJUSTABLE NOSE ASSEMBLY – PART NUMBER IS DETERMINED BY THE NOSE LENGTH AND HEX SIZE 1", 3/32 HEX 2", 3/32 HEX 1", 1/8 HEX 2", 1/8 HEX 1", 5/32 HEX 2", 5/32 HEX 1", 3/16 HEX 2", 3/16 HEX
12	0D50009	ADJUSTABLE NOSE ADVANCE LEVER BARREL ASSEMBLY
13	0D76737	ADVANCE PAWL SPRING
14	0D81244	ADVANCE LEVER PIN (2)
15	0D76720	ADVANCE PAWL ASSEMBLY
16	0D50028	SET SCREW
17	0D50031	COMPRESSION SPRING
18	0D50002	DETENT LOCK COLLAR

TOOL IDENTIFICATION

FIGURE 8
NOSE ASSEMBLY



DRAWING ITEM NO.		1	2	3	4	5	6	7	8	9
ADJUSTABLE NOSE ASSEMBLY NO.	LENGTH, HEX	BUSHING FOR ADVANCE LEVER BARREL	DETENT DRIVE NUT	SPRING FOR THRUST PAWL	HINGE PIN	HOLDING PAWL	EXTENSION DRIVER TIP	SPRING PIN	EXTENSION DRIVERS	ROUND SECTION RING
0D50019	1", 3/32	0D50004	0D50001	0D76742	0D80002	0D80396	0D50034	0D50029	0D50010	0D50038
0D50020	2", 3/32			0D50018		0D80401			0D50011	
0D50022	1", 1/8	0D76742		0D80396		0D50012				
0D50023	2", 1/8	0D50018		0D80401		0D50013				
0D50024	1", 5/32	0D50006		0D76742		0D80396	0D50014		0D50039	
0D50025	2", 5/32	0D50018		0D80401		0D50015				
0D50026	1", 3/16	0D50007		0D76742		0D80396	0D50016			
0D50027	2", 3/16			0D50018		0D80401	0D50017			

MAINTENANCE TIPS

The Advance Lever Barrel Assembly, 0D50032 (see page 11), should be removed from the tool periodically for cleaning. The chart below indicates the recommended cleaning intervals.

Type of Stickscrew® Screws	Number of Installations Between Cleanings
All Wax Coated Screws	5000
All Zinc Plated Screws	7500
All Unfinished or Stainless Steel Screws	10000

To remove the Advance Lever Barrel Assembly, gently secure the Motor Unit Housing Assembly in a vise with padded jaws. Using a 1-1/16" or an adjustable wrench, turn the Barrel Assembly clockwise (*it is a left-handed thread*). Remove the Advance Lever Barrel from the assembly.

Use an appropriate solvent to remove any accumulation of foreign matter, internal and external. Apply white lithium grease or equivalent to all moving parts and to the outside of the Advance Lever Barrel.

To reassemble, place the Advance Lever Barrel into the Barrel Assembly. Remove any excess grease. Align the legs of the Advance Lever Barrel so that they will engage with the legs of the Clutch Gear, 0D50046. Be sure that the Thrust Pin, 0D50040, is in place in the Advance Lever Barrel. Thread the Barrel Assembly **counterclockwise** until it is seated against the Motor Unit Housing Assembly.

The Adjustable Nose Assembly, 0D50019 through 0D50027, should be removed every two weeks or 5000 installations and cleaned of any accumulation of wax or dirt. To remove the assembly, pull back on the Detent Lock Collar, 0D50002, to disengage it from the Detent Drive Nut, 0D50001. Unthread the Detent Drive Nut until the assembly is removed. Remove any accumulated wax or debris.

To reassemble, position the Nose Assembly so that the slot in the Bushing is aligned with the slot in the Advance Lever Barrel. This will permit the Nose Assembly to clear the pawls inside of the Advance Lever Barrel. Pull back on the Detent Lock Collar to allow the nose assembly to be attached. Thread the Nose Assembly on until it touches the Detent Drive Nut. Turn one of these components slightly until the mating surfaces are engaged.

After any disassembly, perform the Screw Length Setup procedure if any of the adjustments for the current application have changed.

Troubleshooting Procedures

Symptom	Problem	Solution
Cannot load stick into tool:	The screw is the wrong hex size.	Use a tool with an Adjustable Nose Assembly matched to the hex size of the screw.
	The hex on the screw is not oriented to match the hex on the inside of the tool.	When inserting a stick into the tool, gently twist the stick as it is pushed down. This will permit the hex shoulders of the screw to engage the hex shape on the inside of the Adjustable Nose Assembly.
Tool will not feed properly:	The stick is inserted upside down.	Draw the stick out of the Adjustable Nose Assembly end of the tool and reinsert through the Extension Tube with the threaded side down.
	The operator is not pressing down fully on the tool to engage the advance mechanism.	Place the Adjustable Nose Assembly against a firm surface and press the tool down to manually advance the next screw into position.
	The stick is nearly used up.	Once $\frac{3}{4}$ of the stick has advanced through the tool, insert a new stick through the Extension Tube, allowing the partial stick to continue in the proper driving position. The last two screws on each stick are not used and will fall out of the tool before a new stick indexes into place.
	The sticks have been bent.	Carefully straighten the stick manually or by rolling the stick or pressing the stick on a flat work surface.
Screws will not seat or cannot be driven:	The screw hole is not deep enough.	Redrill the hole until its depth is at least the length of the screw body.
	The hole is too small.	Drill the hole to the diameter specified for the application.
	The tool is not being held perpendicular to the work surface.	Hold the tool as close to perpendicular as possible.
	The incorrect screw is being used.	Verify that the correct screw for the job is loaded into the tool.
	Insufficient air pressure.	Ensure that the air pressure is a constant 90 PSI (6.2 BAR). The air line should be free of leaks and should not be kinked or obstructed.
	“Lunging” at the work with the tool.	Maintain a smooth downward motion and let the tool do the work.

Symptom	Problem	Solution
Screws strip:	The hole is too big.	Relocate the hole, if possible. Bush the hole.
	The hole is too small.	Drill the hole to the diameter specified for the application.
	The incorrect screw is being used.	Verify that the correct screw for the job is loaded into the tool.
	When driving on the first screw.	The screws are not advancing properly. Be certain that when the stick is inserted into the tool, one complete screw is protruding from the tool. The head of the second screw does the actual driving. Be certain that the tool advances the next screw forward. This should happen automatically when the preceding screw is torqued off. If the next screw has not advanced, place the Adjustable Nose Assembly against a firm surface and press the tool down to manually advance the next screw into position. If the problem persists, a bent or broken pawl may be at fault.
Multiple screws break off:	Pulling up on the tool in anticipation of the screw breaking off.	Allow the driver to do the work by holding it in place until the screw being driven has torqued off.

Suggested Spares List

Part #	Description	Qty
0D76735	Thrust Pawl	3
0D76742 or 0D50018	Spring for Thrust Pawl	2
0D76741	Pin for Thrust Pawl	1
0D71077	Valve Spring	1
0D75233	Valve Ball	1
0D50034 or 0D50035 or 0D50036 or 0D50037	Extension Driver Tip	1 ea
0D50046	Clutch Gear	1
0D76720	Advance Pawl Assembly	2
0D76737	Advance Pawl Spring	2