Operating and Service Manual

PL92-5011EN

07/19/2016

20802 Series

Advanced Drilling - Mini C Clamp

CORVAER

For additional product information visit our website at corvaer.com

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The original language of this manual is English.

1 Product Safety Information:

1.1 Intended Use:

⚠ WARNING

This positive feed drill is designed for fixtured drilling applications.

This equipment must not be modified in any manner unless approved in writing by Corvaer or Corvaer S.A.S. All safety devices must be properly installed and maintained in good working order.

Any abuse or misuse of this equipment can cause equipment damage, death, or serious injury.

Failure to observe all safety warnings could result in equipment failure or personnel injury.

1.2 General Safety Instructions:

For additional product safety information refer to Corvaer or Corvaer S.A.S. document CE-2009, General Safety Fixtured Drills.

These safety instructions must be accessible to the operator at all times. They must be shown and made available to all personnel involved in the operation of this equipment.

The operator must read and understand the safety instructions contained in this document before operating this equipment.

These safety instructions are not intended to be all inclusive. Study and comply with all applicable Federal, State and local regulations.

Do not remove any labels from this equipment. Replace any label that has been damaged and can not be easily read.

⚠ WARNING To avoid serious injury, keep hands free from rotating equipment.

Before operating this equipment, coordinate with your workplace safety professional to conduct a hazard assessment of the setup, operation, emergency shut down, start-up, and maintenance of this equipment prior to use. Always use identified safeguards, tooling, and safety procedures identified in the hazard assessment before operating this tool.

1.3 Product Installation:

⚠ WARNING

Only qualified and trained personnel should install, adjust, repair or use this equipment.

Do not exceed equipment ratings.

Never attempt to operate this equipment at more than it's rated capacity. Overloading will cause equipment failure and possible personnel injury.

Air Supply:

The positive feed drill 20802 type has been designed to be used at 91.3 psi (6.3 bar) air pressure (+/-10%). The inlet pressure must be regulated at +/-5%.

In order to get a correct automatic cycle and a maximum output, the minimum air pressure must not be lower than 80 psi (5.6 bar) and the inside diameter of the air supply hose must be 7/16” (11mm).

⚠ CAUTION

DO NOT LUBRICATE THE TURBINE MOTOR. LUBRICATING THE TURBINE MOTOR WILL CAUSE DAMAGE.

The compressed air must be clean and dry to maintain proper tool performance. Install a filter-regulator-lubricator in the air supply line. Improper lubrication can affect the performance and life of the equipment.

Install the filter-regulator-lubricator at the same height or higher than the work station and a maximum hose length of 16 feet (5m).

Compressed air quality according to ISO 8573-1: 2010 [2:4:3]:

Recommended oil (rotary vane motors only):

Airlube 533485 (1 US Gallon / 3L)
Airlube 540397 (1 US Quart / 0.9L)

Adjust the inline lubricator to dispense 2 drops of oil per minute at nominal flow.

Recommended grease (gear head and planetary):

Accrolube® High Efficiency Grease with PTFE (manufactured by Accro-Seal)

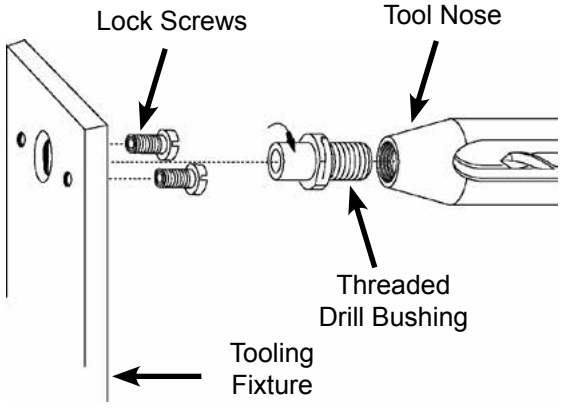
Any deviation of these instructions could generate abnormal operation on drill cycle of the tool, for which the manufacturer cannot be held responsible.

⚠ WARNING

Before mounting this equipment, check the lock screws in the tooling fixture and drill bushing. Make sure both are in good condition and securely tightened.

Positive feed drills can exert high torques and high thrust loads. If failure of the lock screws or drill bushing occurs, the drill may suddenly spin and back away from the drill fixture.

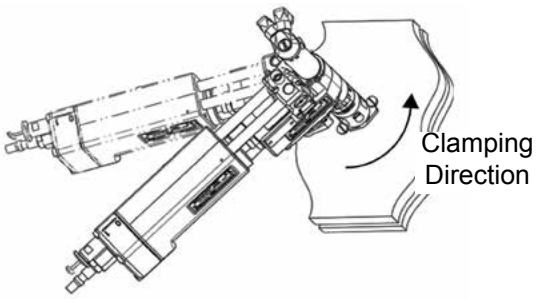
The cutting tools used with this equipment are very sharp. Handle with extreme caution to avoid injury.



Vertical Fixturing Applications:

Lock the tool in position by rotating 1/4 turn as illustrated. The body of the tool must be positioned to the left. This will allow the weight of the machine to assure a good grip on the fixture.

Before beginning the drilling cycle, run on non-cutting test cycle to assure the tool is functioning properly and is securely mounted.



1.4 Product Operation:

⚠ WARNING

Safety glasses or a face shield must be worn when operating this equipment. Wear hearing protection and other protective equipment, as required by the work environment and drilling application.

If the work environment or drilling application requires the use of protective gloves, avoid contact with the rotating parts of the tool.

Do not wear loose clothing, jewelry or rings and keep long hair away from the tool. Avoid direct skin contact with lubricants, grease or adhesives.

Make certain all personnel in the immediate area of the drilling operation are equipped with the appropriate personal protective equipment before operating the tool.

1.5 Operating Safety Considerations:

⚠ WARNING

- Do not remove any labels and replace any that are damaged or unreadable.
- Do not use this equipment in an explosive environment.
- Disconnect the air supply before performing any service or cutter changes.
- Make sure the air supply line is securely attached to the tool before operating.
- Keep hands away from the ejecting area near the nose unit.
- Use care when handling the sharp cutters.
- Keep clear of all moving parts during the tool's operating cycle.
- Before starting the drilling cycle, make sure the nose piece is securely mounted.
- Before operating this equipment, run one non-cutting work test cycle.

1.6 Storage Instructions:

This equipment should be stored at temperatures of +40° - +100° F (4° - 38°C) with a maximum relative humidity of 80%.

Note: The electronic cycle counter option contains a battery.

1.7 Disposal:

Observe all local disposal guidelines for all components of this equipment and its packaging.

1.8 Safety Signal Words:

DANGER

Indicates an imminent hazardous situation which, if not avoided, will result in serious injury or death.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

1.9 Equipment:

If the tool is supplied with dedicated equipment, adhere to the following instructions as well as all safety instructions:

The gaps should be checked periodically to insure proper tool performance. It is recommended for reaming/countersinking the maximum gap of 1.3 times (1.5 in drilling) of initial maximum gap (generally H7/g6) by design between the spindle and bushing.

Check that the jigs are clean without excessive gap and for concentric collet equipment without oil.

1.10 Cutters:

Cutters: For optimal results, the cutter should be checked regularly:

- The cutting edges should be clear of chips.
- The lubrication holes should be clean and the lubricant should flow to the tip of the cutter.
- In case of deviation on the hole geometry, check the concentricity between the cutter body and the edges as well as the concentricity between the spindle and cutter. The deviation must not exceed some thousands of inches.

1.11 Safety Maintenance Checklist:

Implement a comprehensive safety maintenance program to provide regular inspection for all phases of tool operation and air supply equipment. Replace worn or damaged parts using only genuine brand replacement parts manufactured by Corvaer or Corvaer SAS
The use of parts other than those provided by the manufacturer may result in a drop in output or increased maintenance and may cancel the manufacturer's warranty.

Never lubricate the tool with flammable or volatile liquid, gazoil, aircraft fuel, etc.

Disconnect the air supply before performing any maintenance on this equipment.

Daily:

- Visual inspection of air supply hose and connections.
- If lubrication is used, check the oil tank level and operation.
- Inspect all external tool components.
- Inspect the cutter for cracks or damage.
- Make sure lock screws and drill bushing are securely mounted.
- Inspect the tool for loose fasteners.
- Check the tool for excessive noise or vibration.

Weekly:

- Inspect the air supply hose for damage.
- Make sure the air inlet connection is securely tightened.
- Check the free speed of the tool.
- Make sure all tool fasteners are properly tightened.
- Inspect any guards (if equipped) for damage.

6 Months or sooner if needed:

- Check individual parts and replace as necessary.
- Replace all o-rings, seals and gaskets.

Only qualified and trained personnel should repair this equipment. Refer to the Sales and Service Center listing on the back of this document for authorized Corvaer or Corvaer SAS repair facilities.

1.12 Copyright protection:

1.13 EC Declaration of Conformity:

Refer to document CE-1009

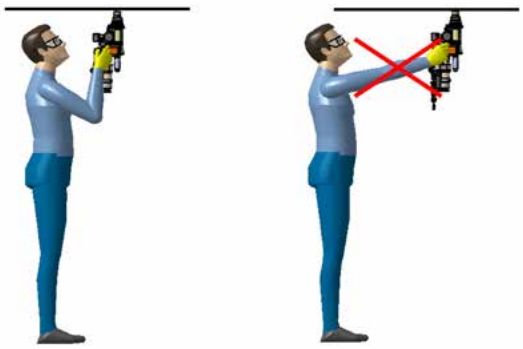
1.14 Noise and Vibration:

Sound Level = 78 dBA

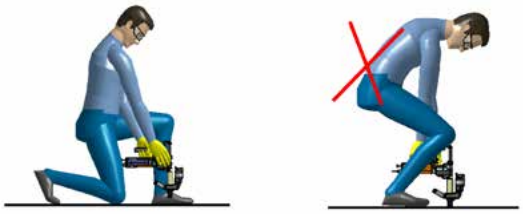
Vibration: < 2.5 m/s^2

2 Proper Working Positions:

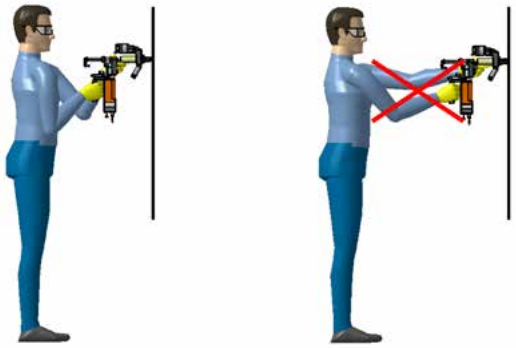
Proper working position for lower surface applications.



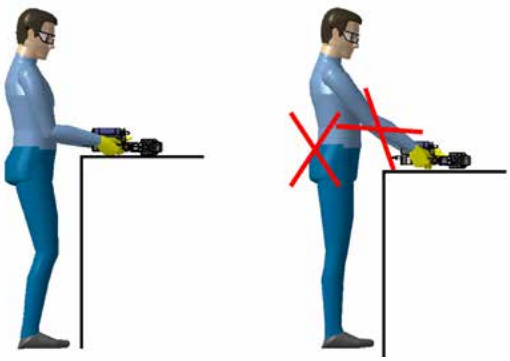
Proper working position for upper surface applications.



Proper working position for horizontal surface applications.



Proper working position for table top activities.



3 Product Specifications:

Base Tool	Weight		Spindle Feed		Gear Head	MITIS
	lbs.	kg	lpr	mm/rev		
20802450	8.2	3,7	0.001	0.025	Right Angle	Non-MITIS
20802452	8.2	3,7	0.003	0.080		
20802453			0.004	0.100		
20802454						

Tool Speed		
Motor Assembly	Speed Code	Spindle Speed (rpm)
15LN080-40T	0	24,000
15LN089-40T	9	10,000
15LN088-40T	8	6,900
15LN081-40T	1	5,500
15LN082-40T	2	3,600
15LN083-40T	3	2,100
15LN084-40T	4	1,850
15LN085-40T	5	1,450
15LN086-40T	6	900
15LN087-40T	7	550
15LN0855-40T	55	375

3.1 Product Description:

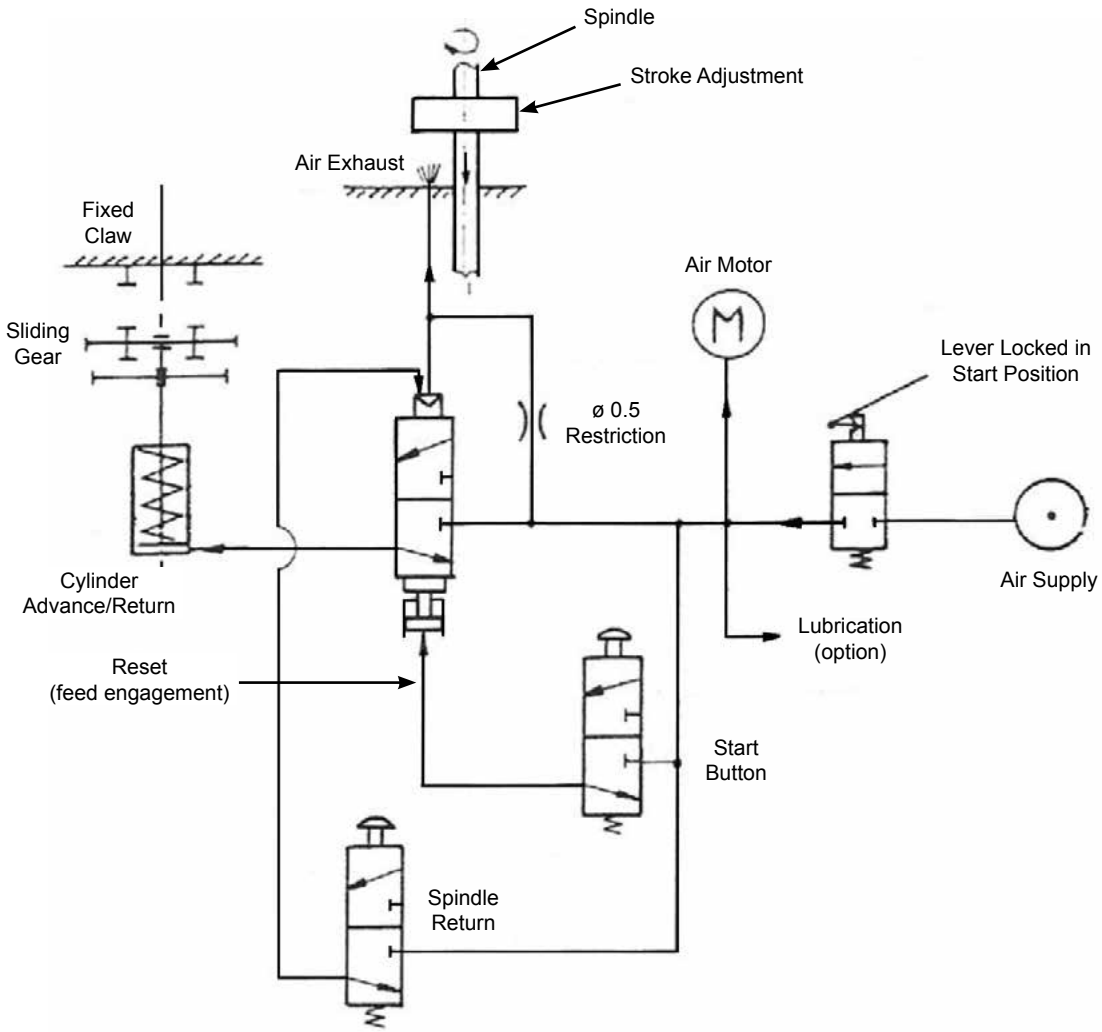
This portable, pneumatic powered machine is designed for drilling, boring or milling in aerospace manufacturing applications. This machine consists of the following components:

- Power supply assembly
- Geared motor unit
- Gear unit assembly for rotation and feed
- Logic components
- Spindle screw
- Cutting tool
- Nosepiece

4 Positive Feed Drill Operation:

4.1 Stopping the Tool:

When air is supplied to the tool and the locking lever is pressed, the red emergency stop will protrude above the surface of the motor housing and the motor will start and transmit power to the gear head. At any time during operation, the red emergency stop can be pushed by the operator and it will interrrupt the air supply to the tool and stop it immediately.



4.2 Non-Cutting Test Cycle (Bench Test):

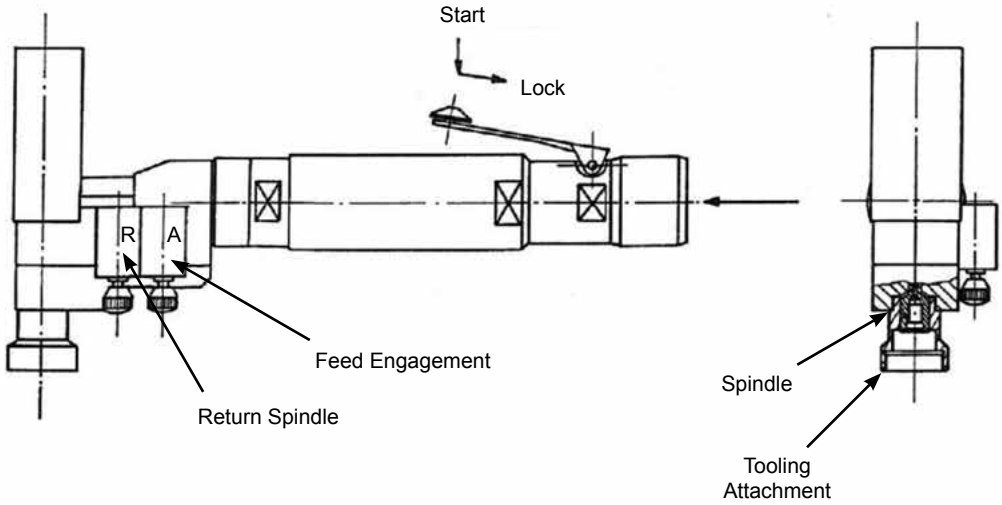
After installing a new cutter, changing tool configuration, or performing maintenance; a non-cutting test cycle should be performed to verify the tool functions correctly.

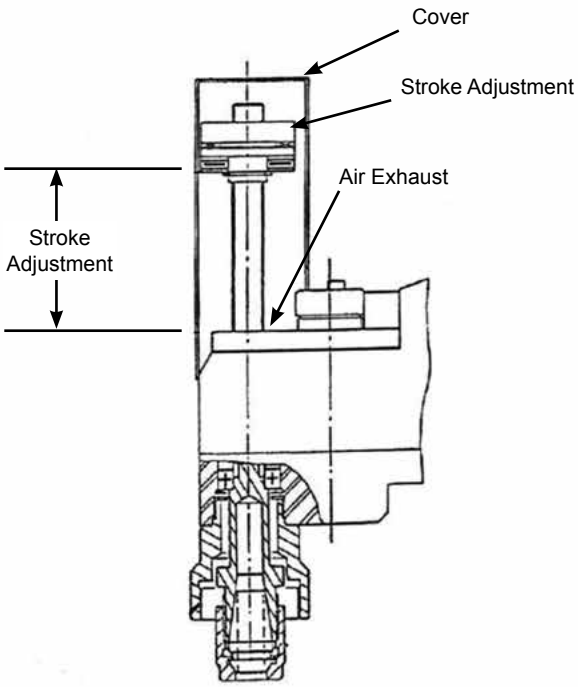
With the tool securely installed in a vise and the air supply is connected to the tool, press the Locking Lever. The spindle will begin rotating and advancing forward. The spindle will continue to advance forward until either: (a) the manual retract button is pressed by the operator or (b) the spindle travels full depth and the retract nut contacts its stop point. As a result of either of these conditions, the spindle will continue to turn but will travel backward to its retracted position. Once the spindle has fully retracted, the motor will turn off and the drill is ready to start another cycle.

4.3 Operation:

With the tool securely installed in the drill fixture, the air supply is connected to the tool, and the spindle is in the retracted position, the drill is ready to start a cycle.

After pressing the Locking Lever, the spindle begins rotating and advancing forward. The spindle will continue to advance forward until either: (a) the manual retract button is pressed by the operator, (b) the spindle travels full depth and the retract nut contacts its stop point; or (c) excessive thrust is generated due to a damaged cutter, incorrect drill configuration, etc.. As a result of any of these conditions, the spindle will continue to turn but will travel backward to its retracted position. Once the spindle has fully retracted, the motor will turn off and the drill is ready to start another cycle.





5 Maintenance:

General Notes:

Note: Intervals between inspection depend on a number of operation and use factors, most significant of which are:

- the operation frequency of the tool
- number of drilling cycles per use
- drilling torque and thrust required
- cycle time in use
- cleanliness of operation - lubricant/chip cleanup
- quality of air supply

The following recommendations are initial guidelines and should be adapted according to the tool utilization.

For additional information or guidance please contact your local Corvaer or Corvaer SAS representative.

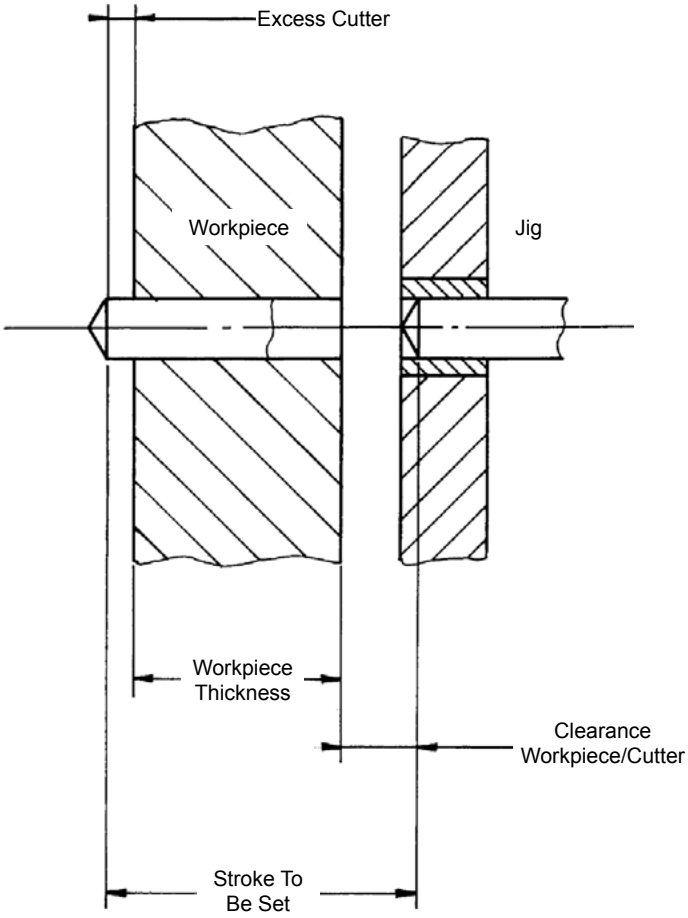
Recommended Minimum Service Intervals *

Calendar Time	Cycles	Run Time/hrs	Action
Daily **	NA	NA	Ensure tool is cleaned - all chips/debris removed
			Visually Inspect air supply hose, all pneumatic connections
			Inspect airline filter, regulator and lubricator for proper lubrication
			Check Air Supply Pressure (90psi dynamic)
			Check spindle stop nuts are securely mounted
			Check all guards are fitted
			Check the tool for excessive vibration/unusual noise
			Visual inspect all external components - Especially inder if fitted for wear
			Perform test drill before each shift
3 Months	100,000	500	Check Motor Speed - If Low Clean Inlet Screen and Clean or Change Muffler then check/replace Motor Blades as necessary
			Check for External Air Leaks - Replace O Rings as necessary
			Inspect Fluid Inducer End Seal/Tube for wear/leaks - replace if necessary
			Apply grease to Gear Head
			Check feed gear and top plane - replace if necessary
			Check operation of lubricator
6 Months	200,000	2,500	Inspect All O Rings/Seals - Replace as necessary
			Check spindle for wear on threads
1 Year	300,000	7,500	Replace All Bearings/Inspect Gears - refer to spare parts manualfor guidelines
			Check All springs

* Recommended Service Interval is based on 3 possible factors - Calendar Time, Run Time or Run Cycles - the number achieved first should be used to set maintenance schedule

** Alternatively Before or After Each Shift

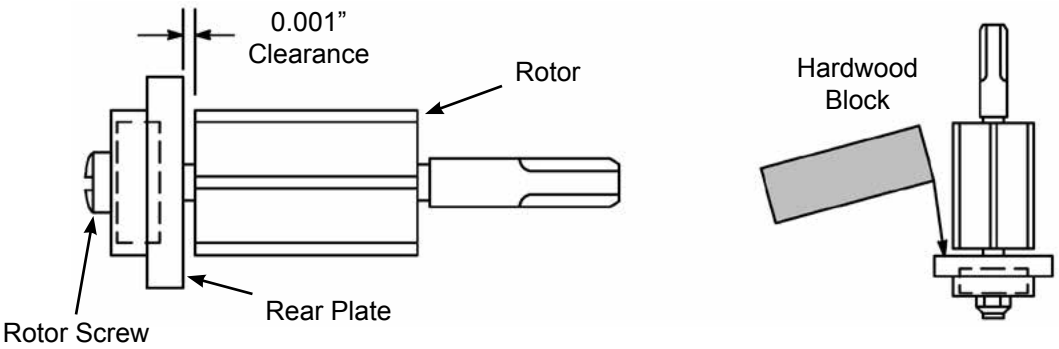
6 Stoke Setting:



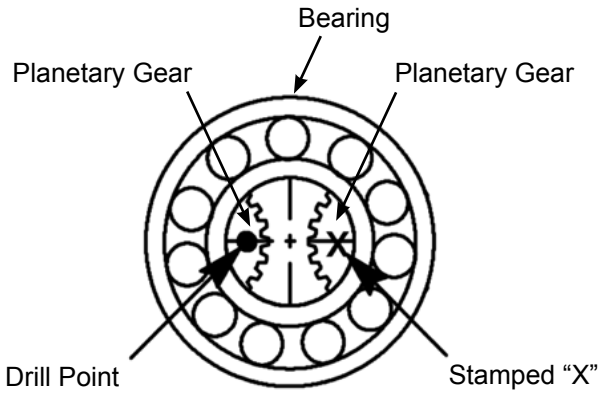
Stroke to be set = Clearance Workpiece / Cutter + Workpiece Thickness + Excess Cutter Length

7 Service:

7.1 Motor Assembly:

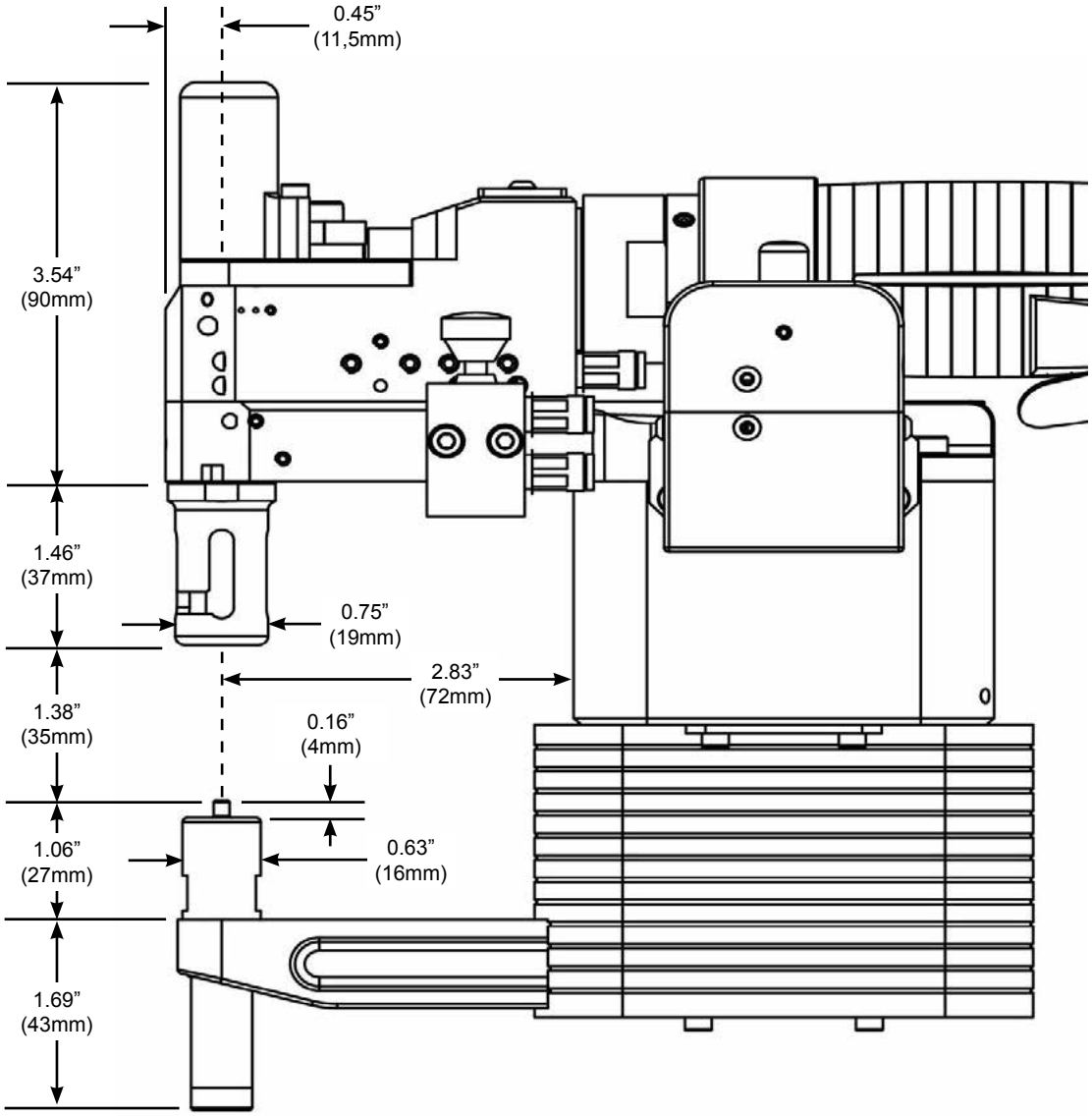


7.2 Planetary Gear Timing (Speed Codes 4 and 9):

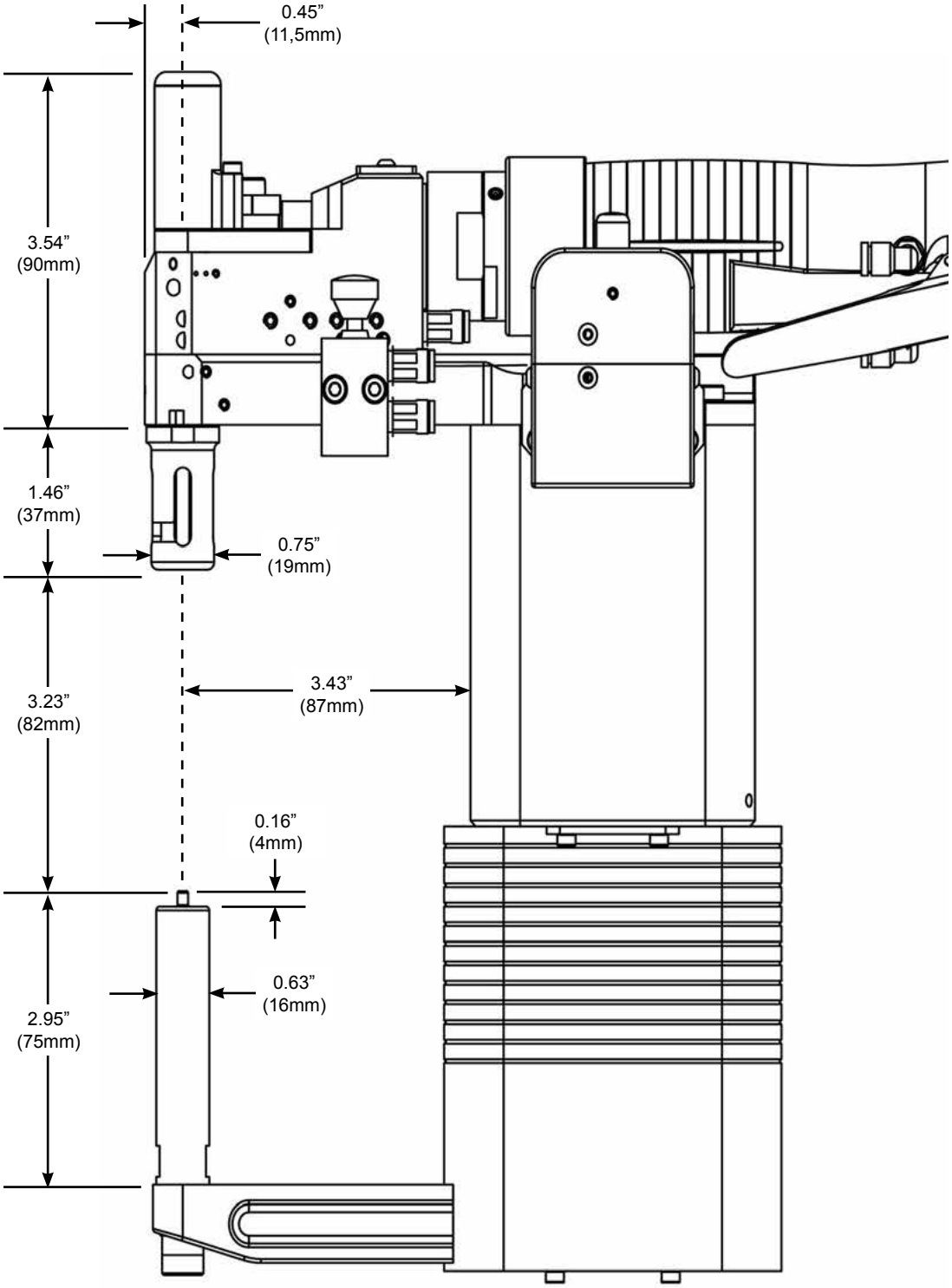


8 Dimensional Information:

8.1 Models 20802MCC-5000 and 20802MCC-5002:

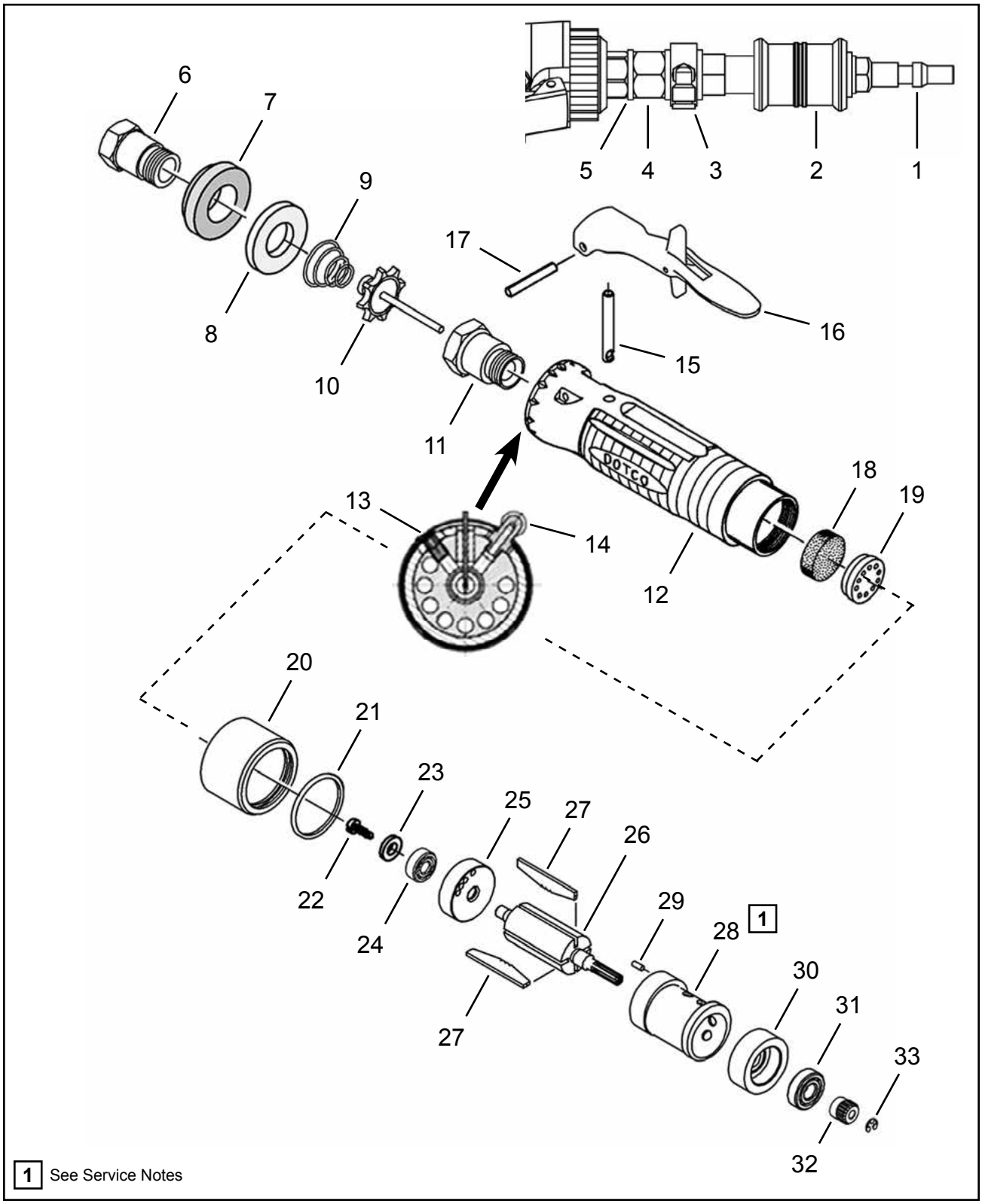


8.1 Model 20802MCC-5001:



9 Service Parts:

9.1 Rear Exhaust Housing and Motor Assembly



9.1: Rear Exhaust Housing and Motor Assembly

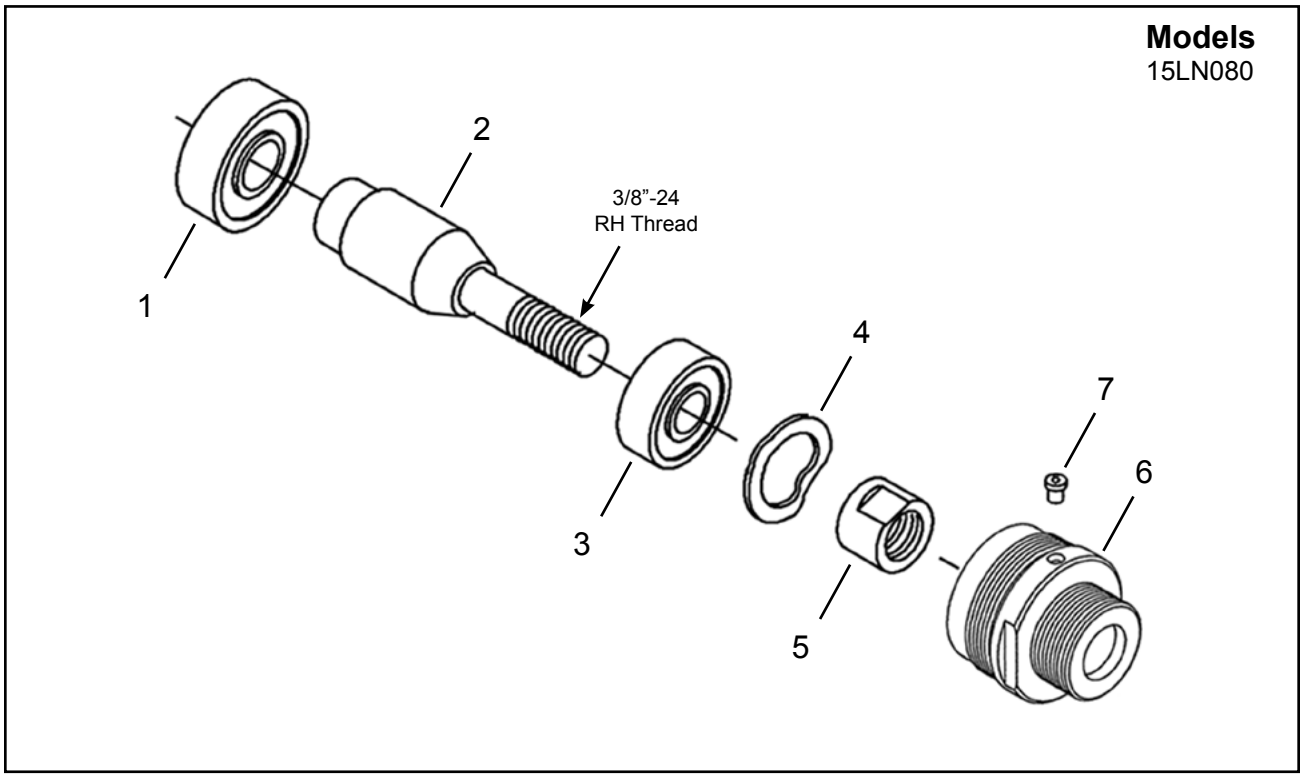
Ref	Number	#	X	EN Description
1	90002008	1	2	Air Supply Fitting
2	90626050	1		Control Valve
3	90474029PT	1		Air Collector
4	93415046	1		Fitting
5	90225001	1		Retaining Ring
6	01-2505	1	1	Air Inlet Adapter (1/4" NPT)
7	01-2520	1		Diffuser
8	1110134	1	3	Muffler
9	01-2519	1	3	Valve Spring
10	01-2518	1		Valve
11	01-2504	1		Valve Seat
12	01-2584MCC	1		Motor Housing (includes Ref. 13-14)
13	94220180	1		Plug (M5x8)
14	93405694	1	2	Air Fitting
15	01-2517	1		Push Rod
16	01-1267	1	1	Locking Lever Assembly
17	1042	1	1	Lever Pin
18	4293	1	3	Filter
19	01-2581	1		Filter Retainer
20	01-2063PT	1		Muffler
21	01-1169	1	3	O-Ring
--	9.1 Table	1		Motor Assembly (includes Ref. 22-26)
22	1011750	1	3	Rotor Screw
23	1012518	1	3	Rotor Washer
24	1010183	1	2	Ball Bearing
25	1110068	1		Rear Bearing Plate
26	9.1 Table	1		Rotor
27	1017119	4	12	Rotor Blade
28	1019667	1		Cylinder (includes Ref. 29)
29	1012584	1	2	Cylinder Locating Pin
30	1008260	1		Front Bearing Plate
31	1010770	1	2	Ball Bearing
32	9.1 Table	1	1	Detachable Pinion
33	9.1 Table	1	3	Retaining Ring

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

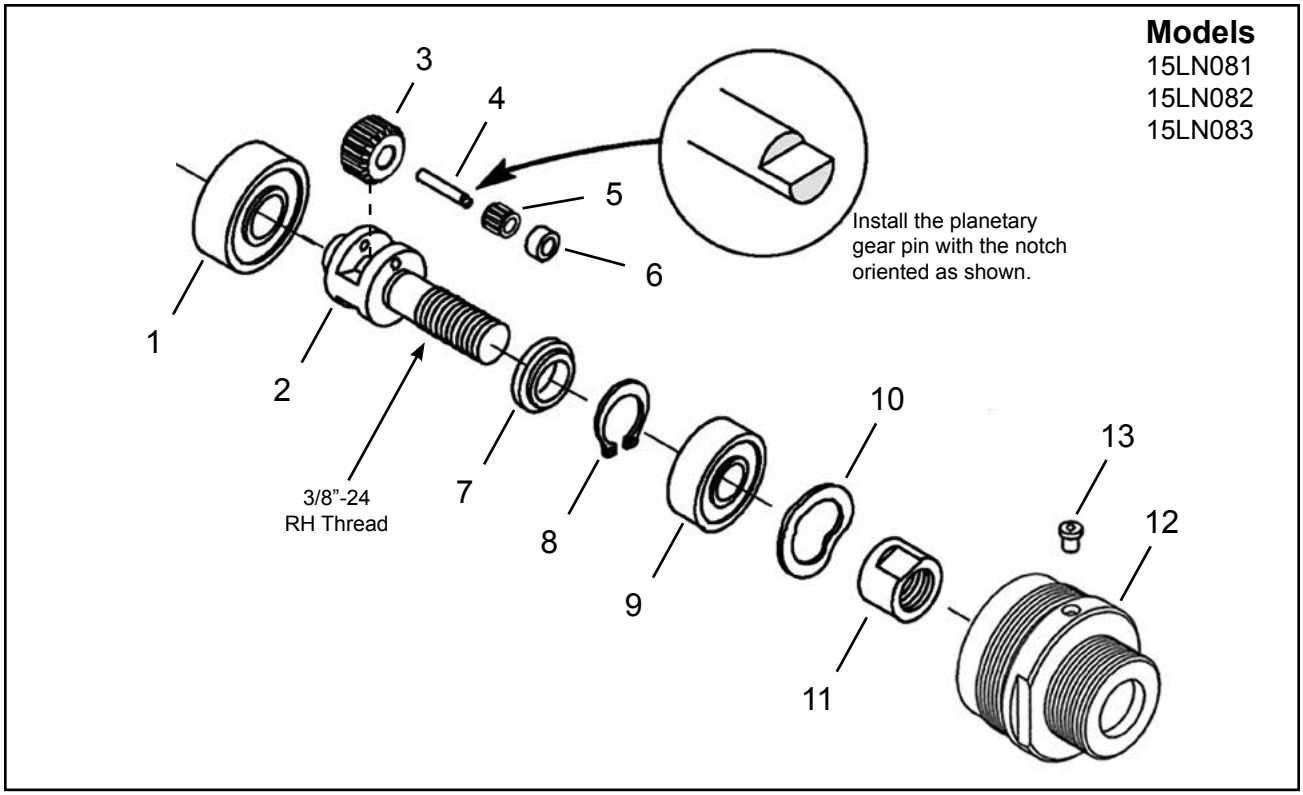
9.1 Table

Ref.	Description	#	15LN080	#	15LN081 15LN085 15LN0855	#	15LN082 15LN086 15LN089	#	15LN083 15LN084 15LN087	#	15LN088
--	Motor Assembly	1	1025616	1	1025570	1	1025571	1	1025572	1	1025639
26	Rotor	1	1110126	1	1017218	1	1017156	1	1017184	1	1017218
32	Detachable Pinion		--------	1	1021745		--------		--------	1	1017625
33	Retaining Ring		--------	1	1007548		--------		--------	1	1007548

9.2 Direct Drive Output Assembly - Speed Code 0



9.3 Single Reduction Gearing - Speed Codes 1 - 2 - 3



9.2: Direct Drive Output Assembly - Speed Code 0

Ref	Number	#	X	EN Description
--	1025597	1		Nose Assembly (includes Ref. 1-7)
1	1008262	1	2	Ball Bearing
2	1110124	1		Output Spindle (3/8"-24 Thread)
3	1008854	1	2	Ball Bearing
4	1110127	1	2	Wave Washer
5	1110185	1	1	Spindle Nut
6	1110118	1		Nosepiece (includes Ref. 7)
7	1463PT	1	1	Grease Fitting

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.3: Single Reduction Gearing - Speed Codes 1 - 2 - 3

Ref	Number	#	X	EN Description
--	9.3 Table	1		Gearing Assembly (includes Ref. 1-13)
1	1008262	1	2	Ball Bearing
2	9.3 Table	1		Planetary Gear Cage
3	9.3 Table	2	4	Planetary Gear
4	1004983	2	4	Planetary Gear Pin
5	7610PT	4	8	Planetary Gear Needle Bearing
6	1110066	4	8	Planetary Gear Washer
7	9.3 Table	1		Planetary Gear Cage Washer
8	1007964	1		Retaining Ring
9	506PT	1	2	Ball Bearing
10	1110127	1	2	Wave Washer
11	1110185	1	1	Spindle Nut
12	9.3 Table	1		Gear Housing (includes Ref. 13)
13	1463PT	1	1	Grease Fitting

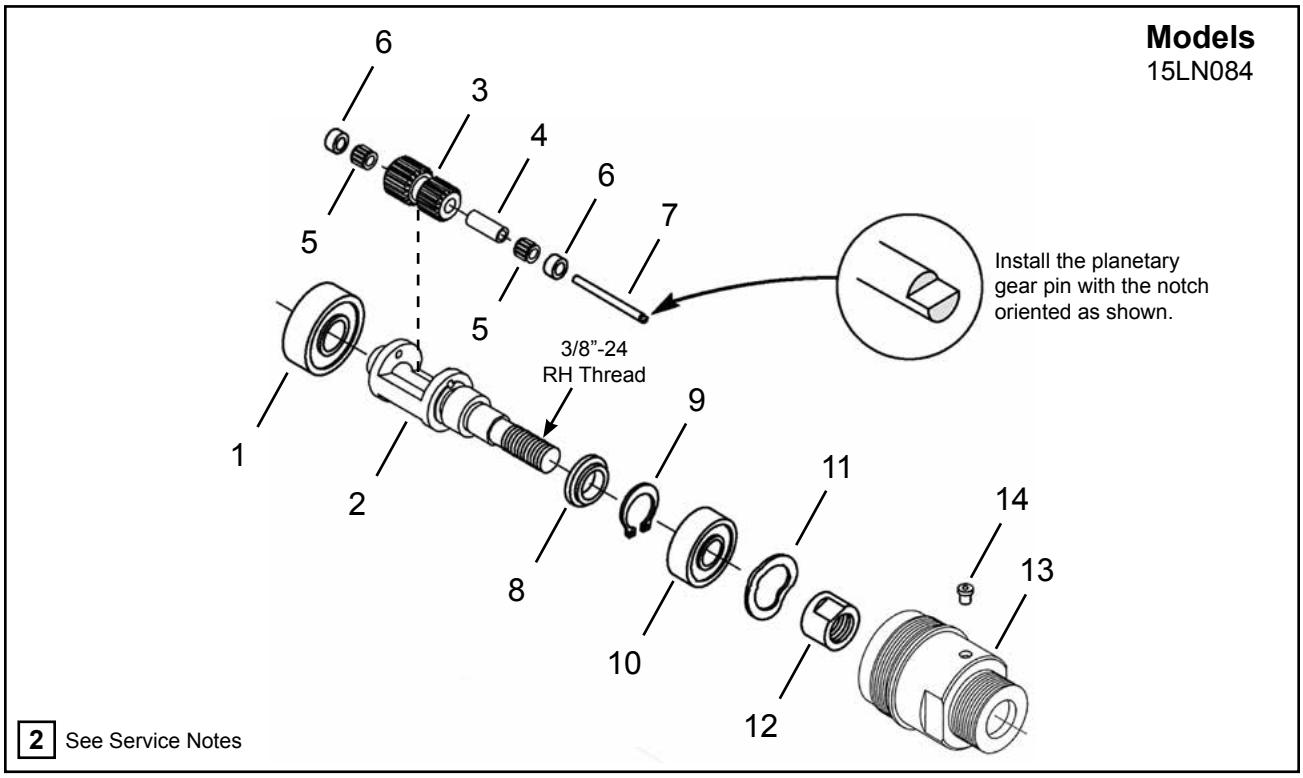
(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.3 Table

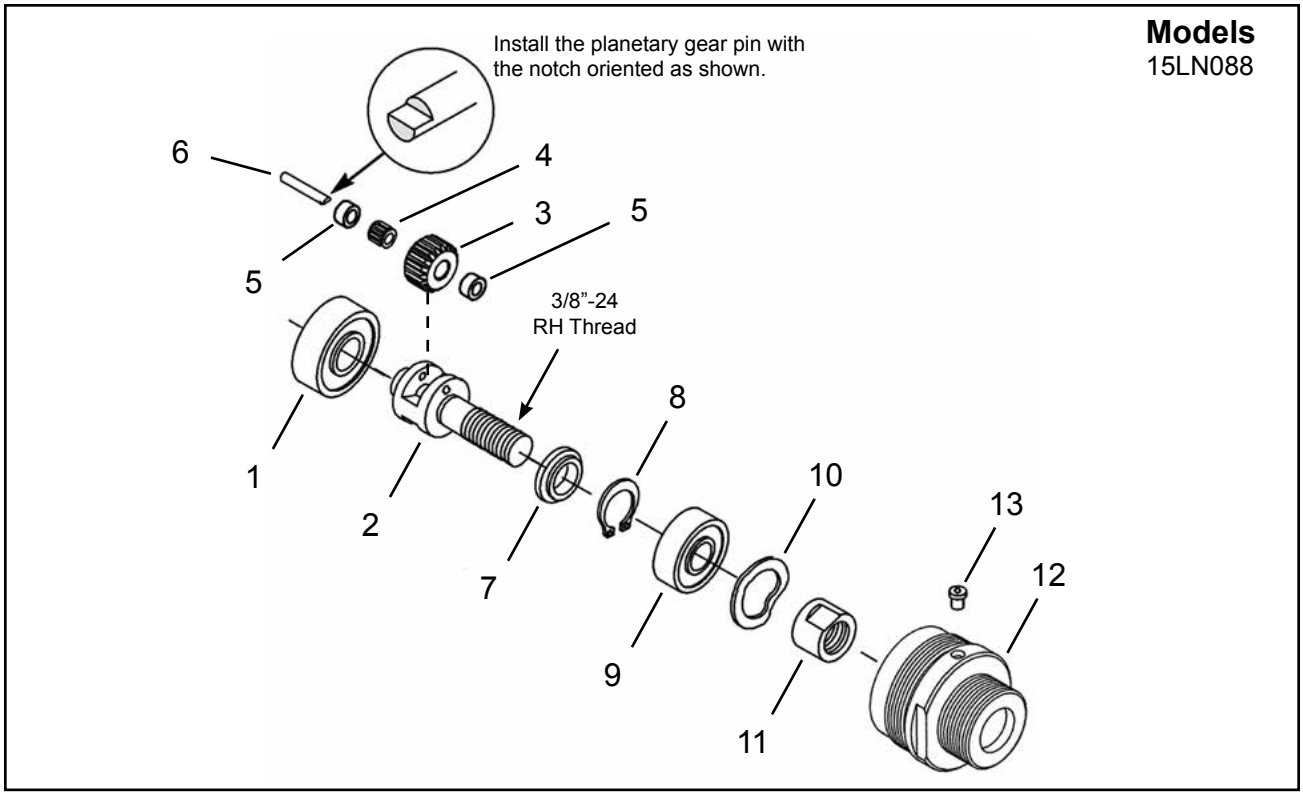
Ref.	Description	#	15LN081	#	15LN082	#	15LN083
--	Gearing Assembly	1	1025933	1	1025564	1	1025567
2	Planetary Gear Cage	1	1110043	1	1110044	1	1110045
3	Planetary Gear	2	1008250 (16T)	2	1008252 (19T)	2	1110139 (21T)
7	Planetary Cage Washer	1	1110069	1	1110070	1	1110071
12	Gear Housing	1	1110040	1	1110042	1	1110042

(T) Teeth

9.4 Single Reduction Gearing - Speed Code 4



9.5 Single Reduction Gearing - Speed Code - 8



9.4: Single Reduction Gearing - Speed Code 4

Ref	Number	#	X	EN Description
--	1025568	1		Gearing Assembly (includes Ref. 1-14)
1	1008262	1	2	Ball Bearing
2	1110060	1		Planetary Gear Cage
3	1008952PT	2	4	Planetary Gear (21/15T)
4	1110571	2	4	Planetary Gear Spacer
5	7610PT	4	8	Planetary Gear Needle Bearing
6	1110066	4	8	Planetary Gear Washer
7	1005010	2	4	Planetary Gear Pin
8	1110071	1		Planetary Gear Cage Washer
9	1007964	1	2	Retaining Ring
10	506PT	1	2	Ball Bearing
11	1110127	1	2	Wave Washer
12	1110185	1	1	Spindle Nut
13	1110063	1		Gear Housing (includes Ref. 14)
14	1463PT	1		Grease Fitting

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

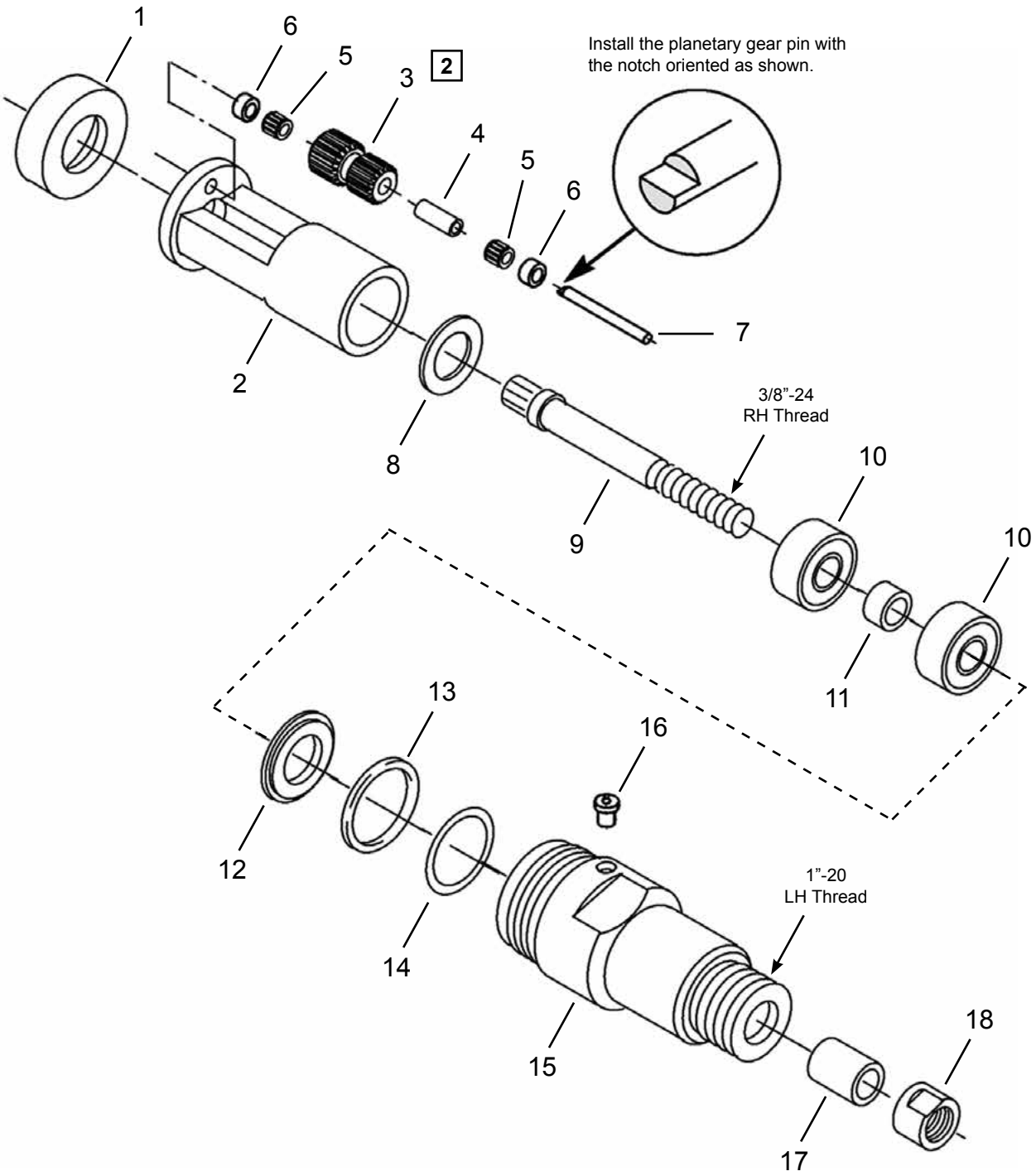
9.5: Single Reduction Gearing - Speed Code 8

Ref	Number	#	X	EN Description
--	1005598	1		Gearing Assembly (includes Ref. 1-13)
1	1008262	1	2	Ball Bearing
2	1110091	1		Planetary Gear Cage
3	1017621	2	4	Planetary Gear (15T)
4	7610PT	2	4	Planetary Gear Needle Bearing
5	1110066	4	8	Planetary Gear Washer
6	1004983	2	4	Planetary Gear Pin
7	1110094	1		Planetary Gear Cage Washer
8	1007964	1	2	Retaining Ring
9	1008854	1	2	Ball Bearing
10	1110127	1	2	Wave Washer
11	1110185	1	1	Spindle Nut
12	1110042	1		Gear Housing (includes Ref. 13)
13	1463PT	1	1	Grease Fitting

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.6 Single Reduction Gearing - Speed Code 9

Models
15LN089



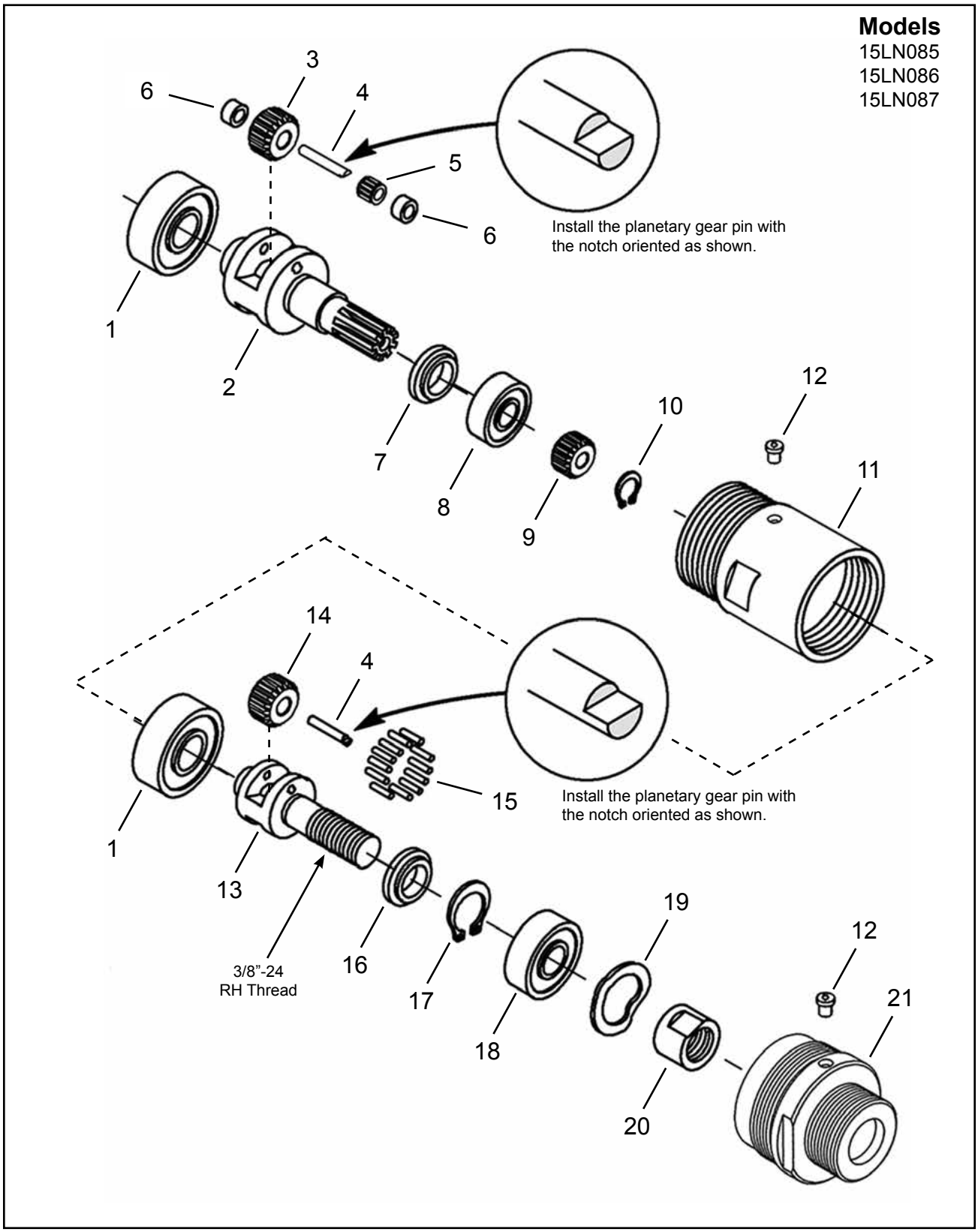
2 See Service Notes

9.6: Single Reduction Gearing - Speed Code 9

Ref	Number	#	X	EN Description
--	1025714	1		Gearing Assembly (includes Ref. 1-18)
1	1016785	1	2	Ball Bearing
2	1016788	1		Planetary Gear Carrier
3	1016837	2	4	Planetary Gear (15T/21T)
4	1110571	2	4	Planetary Gear Spacer
5	7610PT	4	8	Planetary Gear Bearing
6	1110066	4	8	Planetary Gear Washer
7	1005010	2	4	Planetary Gear Pin
8	1016827	1		Spacer
9	1110386	1		Spindle
10	19469	2	4	Ball Bearing
11	1016783	1		Spacer
12	1016784	1		Spacer
13	1016831	1	3	O-Ring
14	1015984	1	AR	Shim (0.002")
	1015983	1	AR	Shim (0.004")
	1008327	1	AR	Shim (0.008")
15	1110385	1		Nosepiece (includes Ref. 16)
16	1463PT	1	1	Grease Fitting
17	1110387	1		Spacer
18	1005071	1	1	Spindle Nut

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.7 Double Reduction Gearing - Speed Codes 5 - 6 - 7



9.7: Double Reduction Gearing - Speed Codes 5 - 6 - 7

Ref	Number	#	X	EN Description
--	9.7 Table	1		Primary Gearing Assembly (includes Ref. 1-12) Ref. 1(qty 1), Ref. 4(qty 2)
1	1008262	2	4	Ball Bearing
2	9.7 Table	1		Primary Planetary Gear Cage
3	9.7 Table	2	4	Primary Planetary Gear
4	1004983	4	8	Planetary Gear Pin
5	7610PT	2	4	Planetary Gear Needle Bearing
6	1110066	4	8	Planetary Gear Washer
7	9.7 Table	1	1	Primary Planetary Gear Cage Washer
8	1005062	1	2	Ball Bearing
9	1017856	1	2	Detachable Pinion Gear
10	1007548	1	2	Pinion Gear Retaining Ring
11	9.7 Table	1		Primary Gear Housing (includes 1 Ref. 12)
12	1463PT	2	2	Grease Fitting
--	1025559	1		Output Gearing Assembly (includes Ref. 13-21) Ref. 1(qty 1), Ref. 4(qty 2)
13	1110043	1		Output Planetary Gear Cage
14	1008250	2	4	Output Planetary Gear (16T)
15	1004984	22	44	Output Planetary Gear Roller
16	1110069	1	1	Output Planetary Gear Cage Washer
17	1007964	1	1	Retaining Ring
18	506PT	1	2	Ball Bearing
19	1110127	1	2	Wave Washer
20	1110185	1	1	Spindle Nut
21	1110040	1		Output Gear Housing (includes 1 Ref. 12)

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)
(T) Teeth

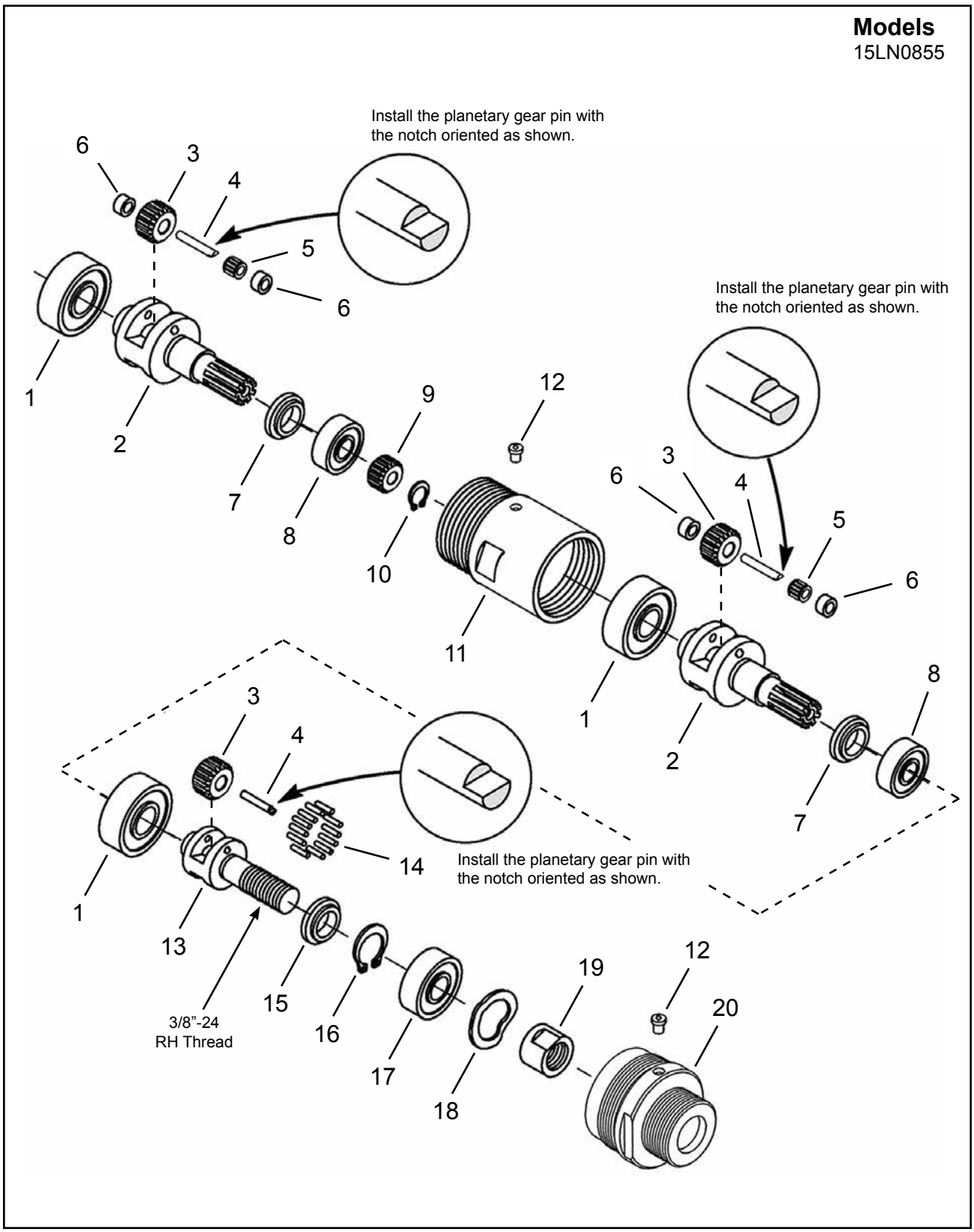
9.7 Table

Ref.	Description	#	15LN085	#	15LN086	#	15LN087
--	Primary Gear Assembly	1	1025583	1	1025584	1	1025605
2	Planetary Gear Cage	1	1017842	1	1017841	1	1110141
3	Primary Planetary Gear	2	1008250 (16T)	2	1008252 (19T)	2	1110139 (21T)
7	Gear Cage Washer	1	1017051	1	1017053	1	1110138
11	Primary Gear Housing	1	1008955	1	1008956	1	1008956

(T) Teeth

9.8 Triple Reduction Gearing - Speed Code 55

Models
15LN0855



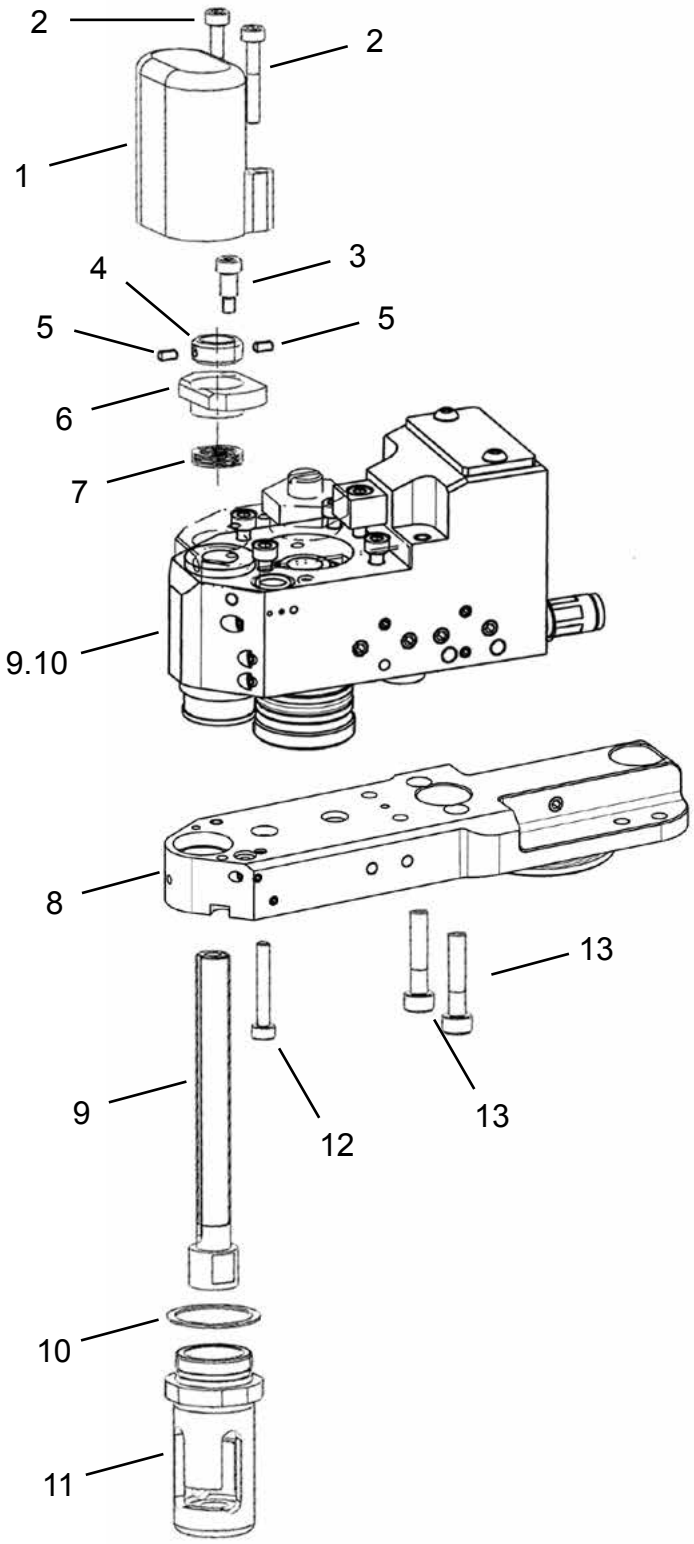
9.8: Triple Reduction Gearing - Speed Code 55

Ref	Number	#	X	EN Description
--	1025583	1		Primary Gearing Assembly (includes Ref. 1-12) Ref. 1(qty 2), Ref. 3(qty 4), Ref. 4(qty 4)
1	1008262	3	6	Ball Bearing
2	1017842	2		Primary Planetary Gear Cage
3	1008250	6	12	Primary Planetary Gear (16T)
4	1004983	6	12	Planetary Gear Pin
5	7610PT	4	8	Planetary Gear Needle Bearing
6	1110066	8	16	Planetary Gear Washer
7	1017051	2	2	Primary Planetary Gear Cage Washer
8	1005062	2	4	Ball Bearing
9	1017856	1	2	Detachable Pinion Gear
10	1007548	1	2	Pinion Gear Retaining Ring
11	1008955	1		Primary Gear Housing (includes 1 Ref. 12)
12	1463PT	2	2	Grease Fitting
--	1025559	1		Output Gearing Assembly (includes Ref. 13-21) Ref. 1(qty 1), Ref. 3(qty 2), Ref. 4(qty 2)
13	1110043	1		Output Planetary Gear Cage
14	1004984	22	44	Output Planetary Gear Roller
15	1110069	1	1	Output Planetary Gear Cage Washer
16	1007964	1	1	Retaining Ring
17	506PT	1	2	Ball Bearing
18	1110127	1	2	Wave Washer
19	1110185	1	1	Spindle Nut
20	1110040	1		Output Gear Housing (includes 1 Ref. 12)

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)
(T) Teeth

9.9 Spindle Assembly

Models
20802MCC-5000
20802MCC-5001
20802MCC-5002



9.9: Spindle Assembly

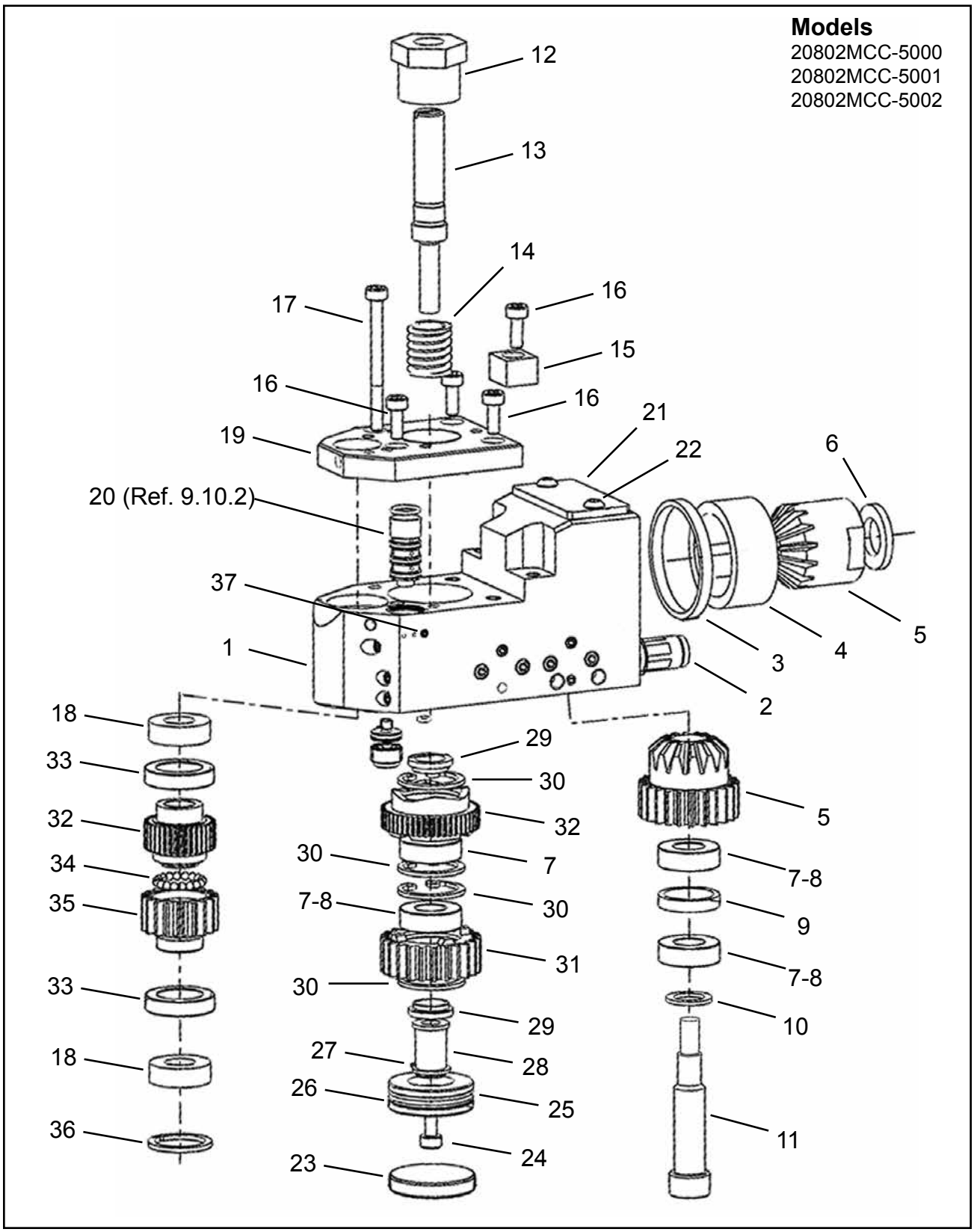
Ref	Number	#	X	EN Description
1	90420449PT	1		Spindle Cover
2	94234160	2	4	Spindle Cover Screw
3	94235393PT	1		Screw
4	90810018	1		Nut
5	94220090	2	4	Set Screw
6	90290539PT	1		Stop
7	93430976PT	1	3	Spring
8	9.9 Table	1		Gear Case Cover
9	90277940PT	1		Spindle
10	90410696	1	1	Shim
11	9.9 Table	1		Drill Bushing
12	94234160	1	1	Screw (M3 x 20)
13	94234200	2	4	Screw (M4 x 20)

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.9. Table

Ref.	Description	#	20802MCC-5000 20802MCC-5002	#	20802MCC-5001
8	Gear Case Cover	1	93620851PT	1	93620852PT
11	Drill Bushing	1	904181121PT	1	904181122PT

9.10.1 Gear Head Assembly



9.10.1: Gear Head Assembly

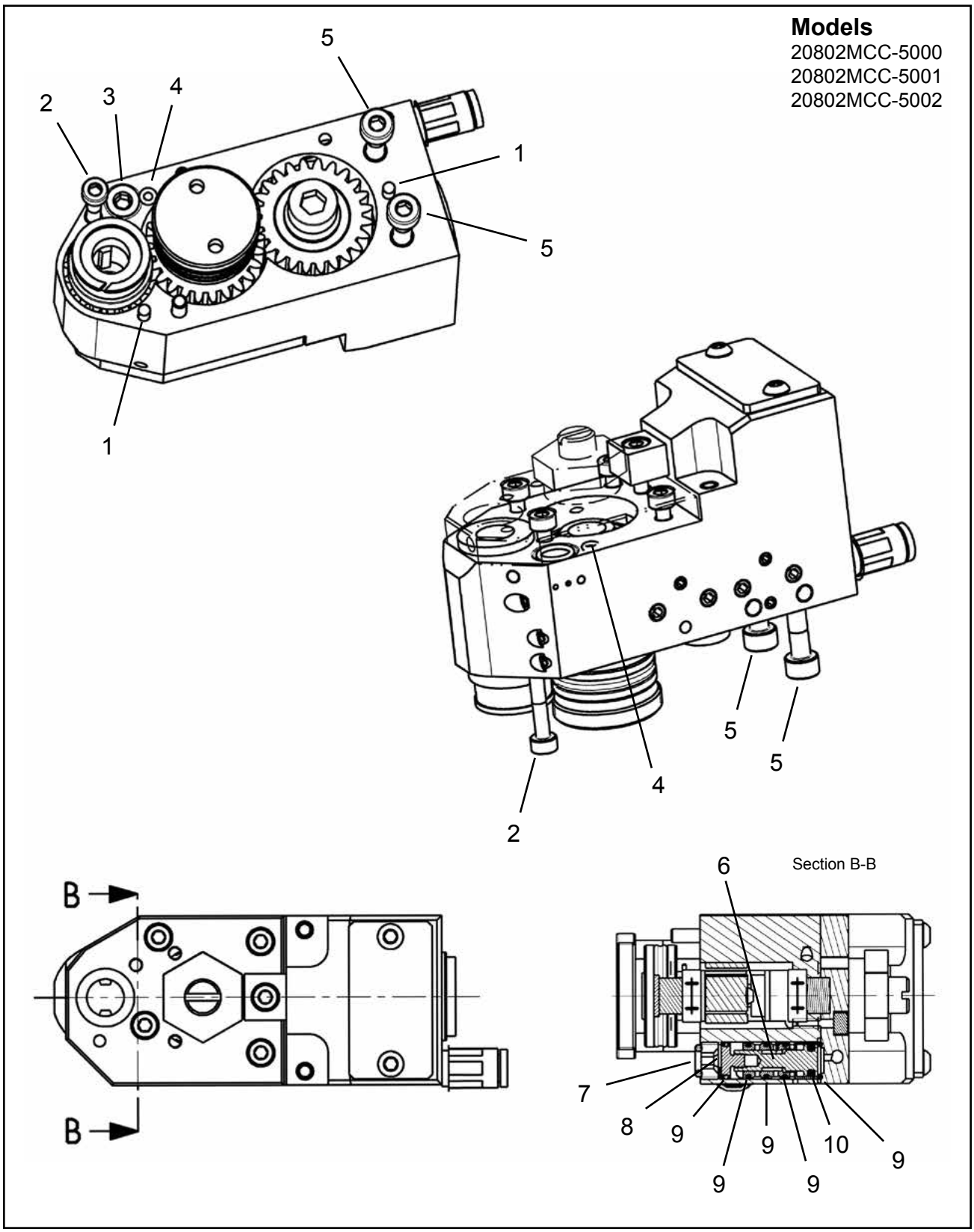
Ref	Number	#	X	EN Description
--	9.10.1 Table	1		Gear Head Assembly
1	90510579	1		Gear Head Body
2	93405480	1	1	Fitting
3	90410614	1		Shim
4	90615165	1	2	Needle Bearing
5	23000092PT	1	1	Pinion Gear Set
6	90410702	1		Shim
7	9.10.1 Table	1/4	2/8	Ball Bearing
8	9.10.1 Table	3	6	Ball Bearing
9	90835944	1		Spacer
10	93440759	1		Spacer
11	94235631	1		Sliding Pinion Screw
12	90270043	1		Calibration Button
13	90030881	1		Shaft
14	93430765	1	3	Spring
15	90290530	1		Thrust Adjustment Stop
16	94234140	4	4	Screw (M3 x 8)
17	94234163	1	1	Screw (M3 x 35)
18	90280008	2		Ball Thrust
19	90444237	1		Cover Plate
20	23000050PT	1		Slide Valve (9.9.2 Ilustration)
21	93055539	1		Identification Plate
22	94228000	2	4	Screw (M3 x 6)
23	90255366	1		Plug
24	94234135	1	1	Screw (M3 x 6)
25	93050539	1		Piston
26	90231110	1	3	O-Ring
27	90456025	1	2	Retaining Ring
28	90225406	1		Collar
29	90835895	2		Spacer
30	90455050	4	8	Retaining Ring
31	93030992	1		Pinion Gear
32	9.10.1 Table	1		Feed Gear Set
33	93450402	2	4	Ball Bearing
34	90245095	18	36	Steel Ball
35	93030061	1		Pinion Gear
36	93606045	1	2	Retaining Ring
37	9.10.1 Table	1	1	Screw

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.10.1 Table

Ref.	Description	#	20802MCC-5000	#	20802MCC-5001	#	20802MCC-5002
--	Gear Head Assembly	1	22500197PT	1	22500195PT	1	22500196PT
7	Ball Bearing	4	93450277	4	93450277	1	93450277
8	Ball Bearing		--------		--------	3	93452069
32	Feed Gear Set	1	22003228	1	22003234	1	22003226
37	Screw	1	94223035	1	94223035		--------

9.10.2 Gear Head Assembly

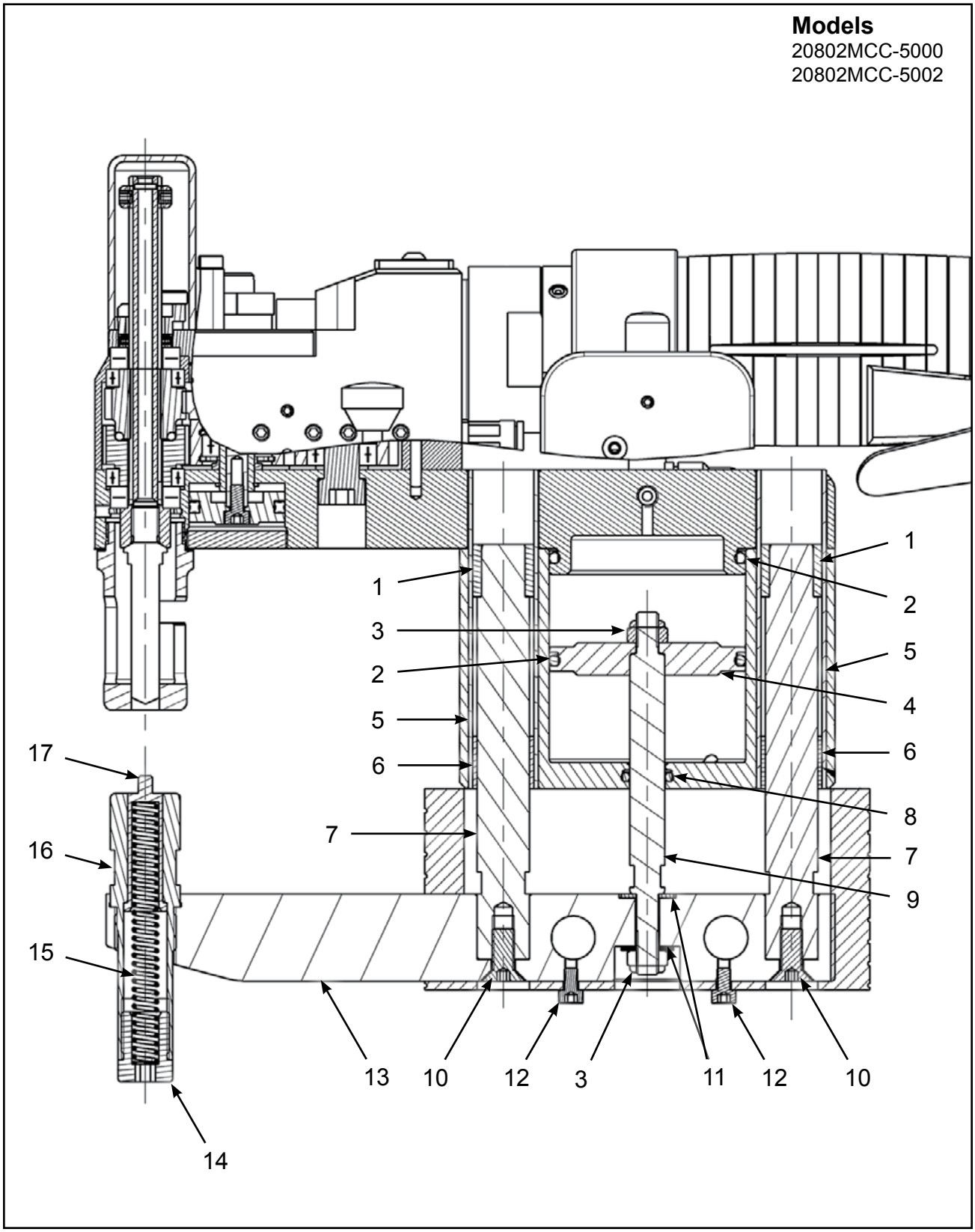


9.10.2: Gear Head Assembly

Ref	Number	#	X	EN Description
1	91216070	2	4	Locating Pin
2	94234160	1	1	Screw (M3 x 20)
3	91815089	1	3	O-Ring
4	91815025	2	6	O-Ring
5	94234200	2	4	Screw (M4 x 20)
6	23000050PT	1		Slide Valve
7	94235043	1		Screw
8	93050031	1		Piston
9	91815155	5	15	O-Ring
10	91815090	1	3	O-Ring

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.11.1 Lower C-Clamp Assembly



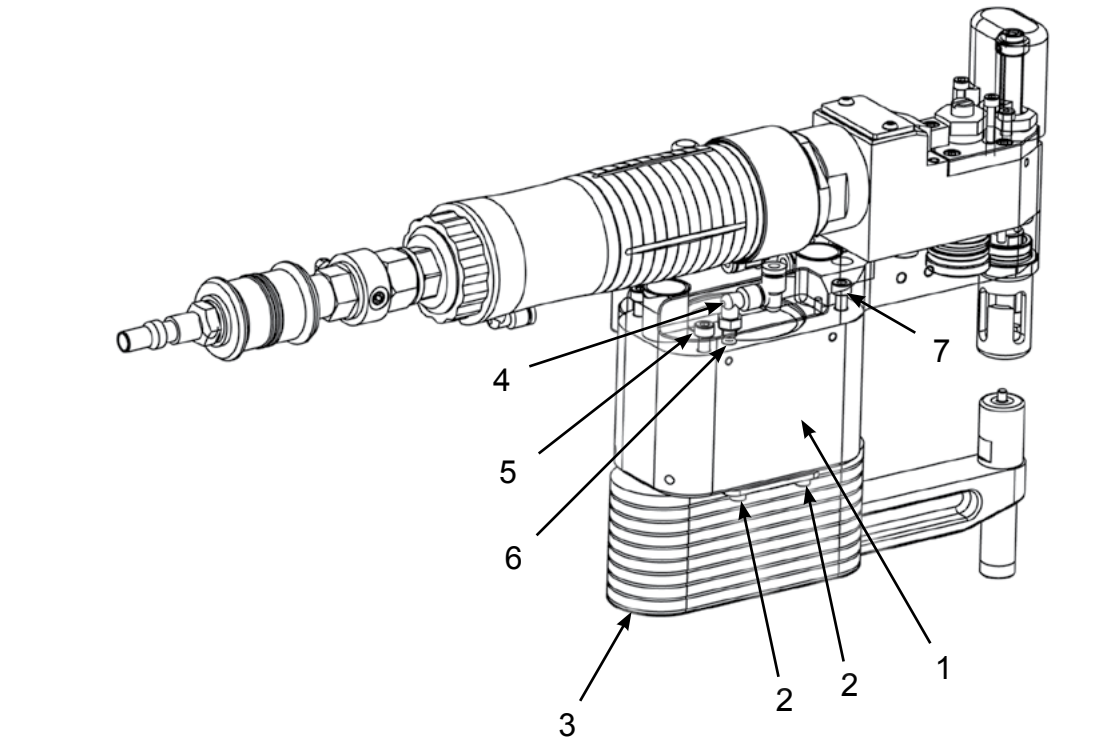
9.11.1: Lower C-Clamp Assembly

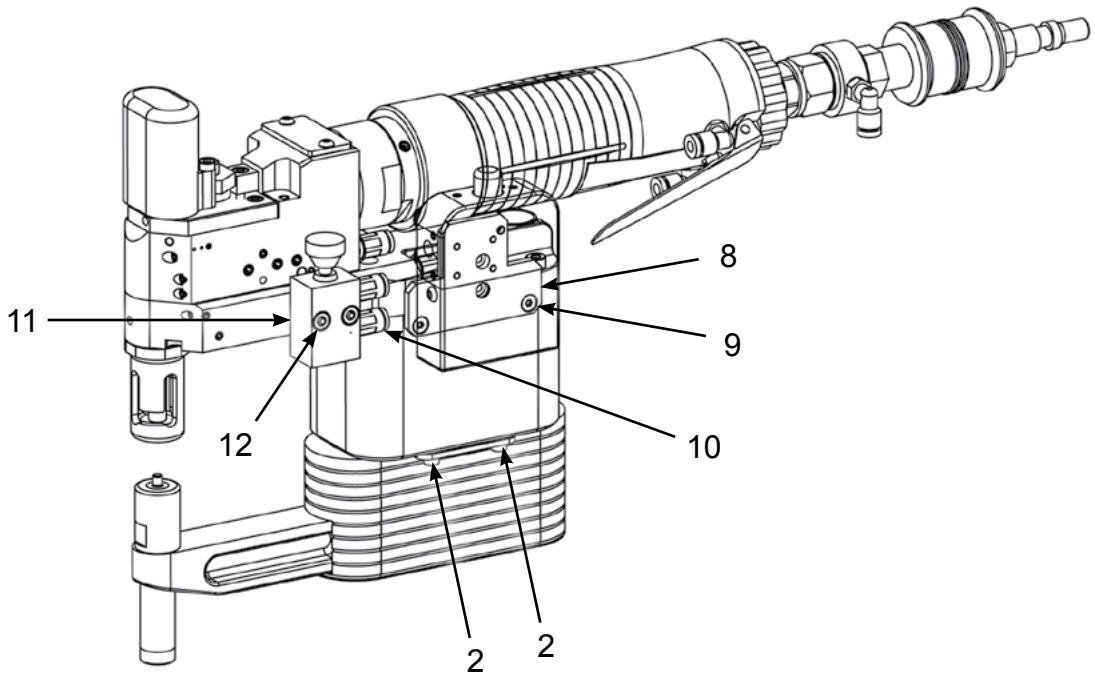
Ref	Number	#	X	EN Description
1	90226834PT	2		Ring
2	91816060	2	6	O-Ring
3	90810443PT	2	4	Nylon Stop Nut
4	93050103PT	1		C-Clamp Piston
5	91015247PT	2		Ring
6	90226421	2		Ring
7	90476044PT	2		Guiding Shaft
8	91815223	1	3	O-Ring
9	93805049PT	1		Piston Rod
10	94230145	2	2	Flat Head Cap Screw (M5 x 12)
11	93435010	2	2	Flat Washer
12	94234130	2	4	Screw (M3 x 5)
13	90275014PT	1		Movable Grip Arm
14	90255399PT	1		Support Cover
15	93430808PT	1	3	Spring
16	93620619PT	1		Support
17	93045037PT	1	3	Pin

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.11.2 Lower C-Clamp Assembly

Models
20802MCC-5000
20802MCC-5002





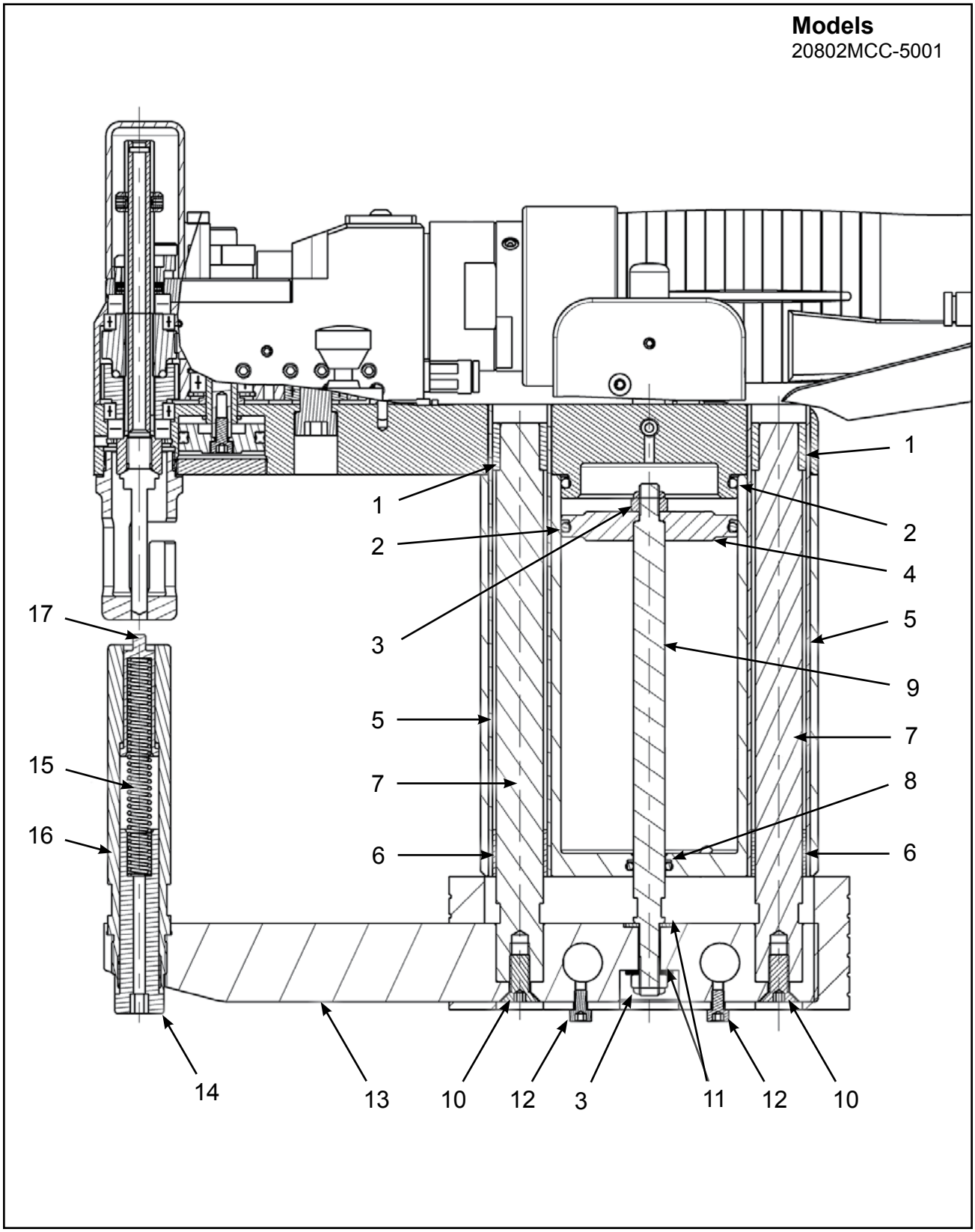
9.11.2: Lower C-Clamp Assembly

Ref	Number	#	X	EN Description
1	90510976PT	1		Body
2	94234130	4	8	Screw (M3 x 5)
3	93624015PT	1		Dust Boot
4	93405694	4	4	Fitting
5	94234185	4		Screw (M6 x 10)
6	91815042	2	6	O-Ring
7	91216070	1		Locating Pin
8	93620618PT	1		Support
9	RC-94230010	2	2	Screw (M3 x 6)
10	93405480	3		Fitting
11	90626103	1		Distributor
12	94234195	2	2	Screw (M4 x 16)

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.12.1 Lower C-Clamp Assembly

Models
20802MCC-5001



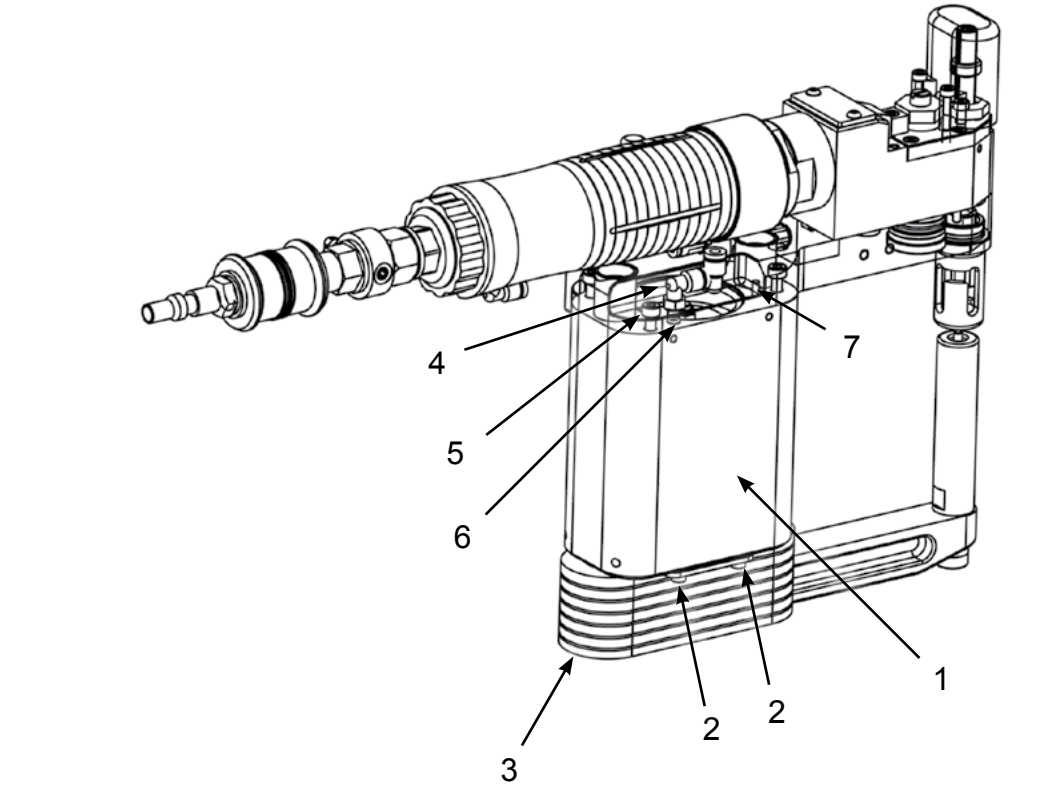
9.12.1: Lower C-Clamp Assembly

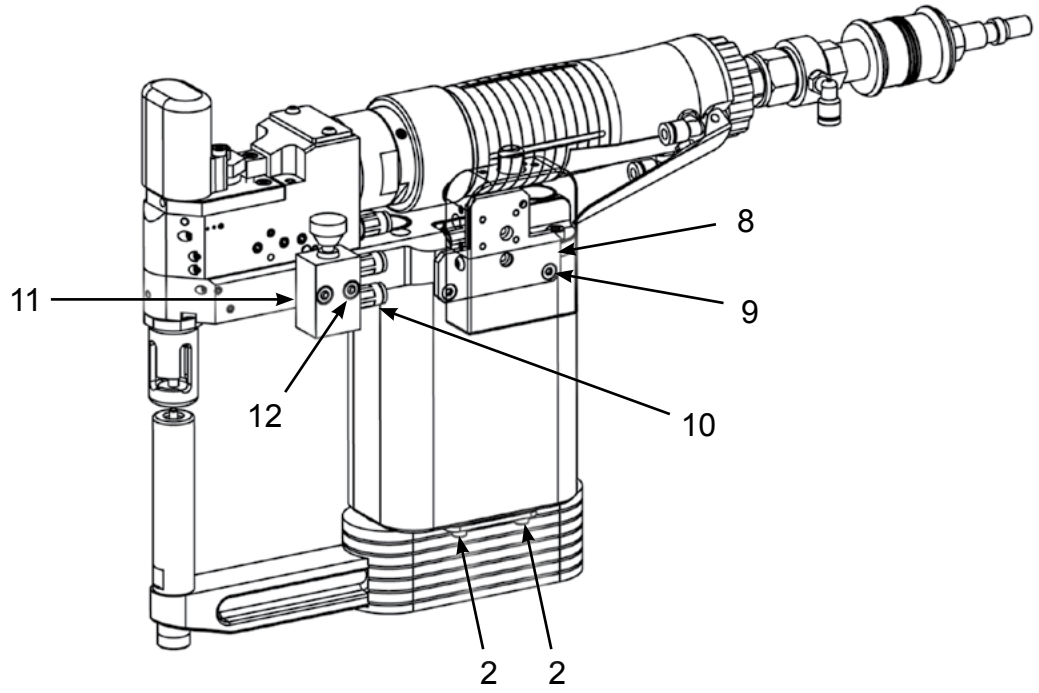
Ref	Number	#	X	EN Description
1	90226834PT	2		Ring
2	91816060	2	6	O-Ring
3	90810443PT	2	4	Nylon Stop Nut
4	93050103PT	1		C-Clamp Piston
5	91015248PT	2		Ring
6	90226421	2		Ring
7	90476045PT	2		Guiding Shaft
8	91815223	1	3	O-Ring
9	93805048PT	1		Piston Rod
10	94230145	2	2	Flat Head Cap Screw (M5 x 12)
11	93435010	2	2	Flat Washer
12	94234130	2	4	Screw (M3 x 5)
13	90275015PT	1		Movable Grip Arm
14	90255400PT	1		Support Cover
15	93430808PT	1	3	Spring
16	93620620PT	1		Support
17	93045037PT	1	3	Pin

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

9.12.2 Lower C-Clamp Assembly

Models
20802MCC-5001





9.12.2: Lower C-Clamp Assembly

Ref	Number	#	X	EN Description
1	90510975PT	1		Body
2	94234130	4	8	Screw (M3 x 5)
3	93624016PT	1		Dust Boot
4	93405694	4	4	Fitting
5	94234185	4		Screw (M6 x 10)
6	91815042	2	6	O-Ring
7	91216070	1		Locating Pin
8	93620618PT	1		Support
9	RC-94230010	2	2	Screw (M3 x 6)
10	93405480	3		Fitting
11	90626103	1		Distributor
12	94234195	2	2	Screw (M4 x 16)

(#) Quantity
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

Sales & Service Centers

Note: All locations may not service all products. Please contact the nearest Sales & Service Center for the appropriate facility to handle your service requirements.

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