
ULT Series Repair Manual



ISO 9001: 2015 Certified

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Recommend Tools

1. Set of Picks	13. Lap Plate
2. Standard Pliers	14. Parts Cleaning Tank
3. 6" Open-End Adjustable Wrench	15. Wire Wheel
4. 20" Open-End Adjustable Wrench	16. Service Removable Thread Locker (242 Blue Loctite®)
5. Hog Ring Pliers (250G Proto®)	17. PTRF-1-1 Universal Pulse Unit Repair Fixture
6. Set of Screwdrivers	18. VC-101-2A Vacuum Tank
7. Set of Punches	19. VCE-1-1 Vacuum Extractor
8. Dead Blow Hammer	20. 1cc Glass Syringe and 0.5cc Glass Syringe
9. 13 oz. Ball Peen Hammer	21. Pulstar Oil
10. Three Ton Arbor Press	
11. Set of V-Blocks	
12. Three Ton Hydraulic Press (only needed if you are not using the PTRF-1-1)	

Special Repair Fixtures for Repair of ULT Series Tools

Part Number	Tool Model
Disassembly and Reassembly of Valve Cover	
145-019-6-5	ULT-30D, 40, 50 & 60
147-019-6-5	ULT-70 & 80
147-019-8-5	ULT-90 & 100
130-019-2-5	ULT-130 & 150
128-019-2-5	ULT-180
Disassembly and Reassembly of Casing Connector	
144-036-0-5	ULT-30D
147-036-2-5	ULT-40, 50 & 60
143-036-8-5	ULT-70
115-036-3-5	ULT-80
147-036-8-5	ULT-90
148-036-2-5	ULT-100
130-036-2-5	ULT-130
130-036-4-5	ULT-150
Insert of the Driving Blades	
144-440-0-0 144-440-0-1	ULT-30D
190-440-6-0 190-440-6-1	ULT-40, 50 & 60
194-440-2-0 194-440-2-1	ULT-70
115-440-3-0 115-440-3-1	ULT-80
194-440-3-0 194-440-3-1	ULT-90
194-440-6-0 194-440-6-1	ULT-100
130-440-2-0 130-440-2-1	ULT-130
130-440-4-0 130-440-4-1	ULT-150
128-440-2-0 128-440-2-1	ULT-180

Special Repair Fixtures for Repair of ULT Series Tools

Part Number	Tool Model
Anvil Sleeve for Installation of SU-Ring	
178-319-8-1	ULT-40, 50, 60 & 70
194-319-3-1	ULT-90
178-350-9-1	ULT-40D, 50D & 60D

TM-Type Tools

Part Number	Tool Model
Disassembly and Reassembly of Valve Cover	
851-017-1-5	ULT-30D, 40, 50 & 60
851-007-1-5	ULT-70
851-011-1-5	ULT-90

Repairing with the PTRF

Part Number	Tool Model
Disassembly and Reassembly of Liner Casing Setter	
PTRF-039	ULT-40, 50, 60 & 70
PTRF-040 used with the PTRF-039	ULT-90
PTRF-041 used with the PTRF-039	ULT-100
PTRF-042 used with the PTRF-039	ULT-30D
PTRF-044 used with the PTRF-039	ULT-130
PTRF-045 used with the PTRF-039	ULT-150
PTRF-046, PTRF-047 used with the PTRF-039	ULT-180

Special Repair Fixtures for Repair of ULT Series Tools

Repairing Without the PTRF

Part Number	Tool Model
Stand to Hold the Pulse Unit	
144-905-0-3	ULT-30D
145-905-6-3	ULT-40, 50 & 60
194-905-0-3	ULT-70
194-905-3-3	ULT-80
147-905-8-3	ULT-90
148-905-2-3	ULT-100
194-905-4-3	ULT-130
130-905-4-3	ULT-150
128-905-2-3	ULT-180
Disassembly and Reassembly of Liner Casing Setter	
144-906-0-5	ULT-30D
147-906-2-5	ULT-40, 50 & 60
147-906-6-5	ULT-70
147-906-3-5	ULT-80
147-906-8-5	ULT-90
148-906-2-5	ULT-100
130-906-2-5	ULT-130
130-906-4-5	ULT-150
128-906-2-5	ULT-180
Press Bar for Rear Liner Plate	
197-901-7-9	ULT-30D
196-901-4-9	ULT-40, 50 & 60
190-901-6-9	ULT-70
143-901-9-9	ULT-80 & 90
194-901-2-9	ULT-100
194-901-6-9	ULT-130 & 150
195-901-9-9	ULT-180

Disassembly and Reassembly of Pulse Unit

Disassembly of Pulse Unit

1. Remove the Front Casing (left-hand thread) from the tool.
2. Remove the Purple Cushion from the Pulse Unit and the Pulse Unit from the Handle. Be sure not to lose the Adjustment Spacer, Spring, and/or Operating Rod that are between the Handle and Pulse Unit.
3. Remove the Oil Fill Plug and extract all of the oil with the VCE-1-1 from the Pulse Unit. **Note:** The Oil Fill Plug on the ULT-30D is in the Rear Liner Plate.
4. Place the Pulse Unit in the PTRF-1-1 or the Stand for Holding Pulse Unit and remove the Liner Casing Setter using the PTRF-039, PTRF-040, PTRF-041, PTRF-042 or Disassembly and Assembly of Liner Casing Setter (right-hand thread).
5. While holding the Pulse Unit with the Anvil up, tap on the Anvil with a Dead Blow Hammer to remove the Rear Liner Plate, Anvil, Driving Blades, Driving Blade Rollers, Relief Valve Spring, Relief Valve Ball, Check Valve Spring, and Check Valve Ball. Now remove the Piston from the Rear Liner Plate.
6. Remove the Front Liner Plate and Liner from the Liner Casing. You can use the Anvil with a set of V-Blocks on the Arbor Press by placing the Anvil driver end-first through the Front Liner Plate and pressing on the back of the Anvil to push the Front Liner Plate and Liner out of the Liner Casing. **Note:** Always make sure that the Front Liner Plate and Liner come out of the Liner Casing as one piece or you may cause serious damage to the Liner Casing. Never push too hard on the Arbor Press. Always push the Front Liner Plate and Liner back and forth in the Liner Casing until the Front Liner Plate and Liner move freely from the Liner Casing.
7. Separate the Front Liner Plate and Liner. **Note:** On the ULT-30D, 40, 50 & 60 series tools, the Front Liner Plate is made up of two pieces: the Front Liner Plate and the Liner Casing Spacer.
8. Remove the Relief Valve Spindle (left-hand thread), Relief Valve Pin, Relief Valve, Accumulator, Accumulator Spring, and Locator Pins from the Liner.
9. Remove all O-rings and Supporter Rings. Clean and inspect all parts. Resurface only those parts having burs on them. If any parts show deep grooving or surface wear, they will need to be replaced.

Disassembly and Reassembly of Pulse Unit

Assembly of Pulse Unit

1. You will find all O-rings, Supporter Rings, and Springs needed for rebuild of the Pulse Unit in a Pulse Unit Repair Kit (PRK). To order a PRK, you would order the model number of tool plus dash PRK (i.e., ULT-70-PRK).
2. Lubricate all O-rings with Pulstar Oil.
3. Install the O-ring on the Relief Valve using the O-ring Install Fixture and install the Relief Valve into the Liner lining up the slot in the Relief Valve with the hole in the Liner and install the Relief Valve Pin. **Note:** Be careful not to cut the O-ring on the Relief Valve.
4. Install the Accumulator O-ring and Supporter Ring onto the Accumulator using an O-ring Install Fixture and install the Accumulator Spring and Accumulator into the Liner.
5. Install the Relief Valve Spindle into the Relief Valve and install the O-ring on the Relief Valve Spindle (left-hand thread) and Supporter Ring into the Front Liner Plate. **Note:** The Supporter Ring is not used on the ULT-40, 50 & 60.
6. Install two Locator Pins into the front of the Liner.
7. Install the Anvil SU-ring and Supporter Ring into the Front Liner Plate and install the Front Liner Plate onto the Liner. **Note:** Make sure that you work the Relief Valve Spindle O-ring up into the Front Liner Plate by turning the Relief Valve Spindle back and forth. **Note:** On the ULT-30D, 40, 50 & 60 series, you install the Liner Casing Spacer onto the Liner. Install the Front Liner Plate after the Anvil and Driving Blades have been installed into the Liner.
8. Install the Driving Blade Springs, Driving Blades, and Driving Blade Rollers into the Anvil and into the Driving Blade Install Fixture.
9. Put the proper Anvil Sleeve Fixture over the drive end of the Anvil and install the Anvil into the Liner and through the Front Liner Plate removing the Driving Blade Install Fixture. As you do this, make sure to keep the Nylon piece of the Driving Blade Install Fixture tight against the Anvil.
10. Install two Locator Pins into the rear of the Liner, the Check Valve Spring and Check Valve Ball into the back of the Anvil and the Relief Valve Ball and Relief Valve Spring into the back of the Relief Valve in the Liner.

Disassembly and Reassembly of Pulse Unit

11. Install the O-ring onto the Rear Liner Plate and install the Rear Liner Plate onto the Liner. **Note:** If the Check Valve Cover was removed from the Rear Liner Plate when reinstalling the Check Valve Cover back into the Rear Liner Plate, make sure that the hole in the side of the Check Valve Cover is 180 degrees out from the hole inside of the Rear Liner Plate, 90 degrees out on the ULT-150 and ULT-180 only, and apply a light coat of Loctite 603 to the Check Valve Cover before installing.
12. Holding the hex end of the Rear Liner Plate in a vise, install the Front Liner Plate O-ring and now install the Liner Casing over the Anvil and onto the assembly.
13. Clean the threads on the Liner Casing and Liner Casing Setter with a degreaser or Isopropyl Alcohol. Put a small amount of thread locker (i.e., Loctite 242) on the Liner Casing Setter and install into Liner Casing. **Note:** If you use Isopropyl Alcohol to clean the threads, it will cause the thread locker to set-up in about 10-15 minutes.
14. Now, using the PTRF-1-1 and following the Fill and Draw sheet, apply the proper amount, press load to the Rear Liner Plate, and tighten the Liner Casing Setter to the proper torque. **Note:** Make sure that you use the proper Press Cap when applying the press load to the Pulse Unit.
15. Once you are sure that the thread locker has set-up: Make sure that the Torque Adjuster is turned all the way out counter-clockwise, fill the Rear Liner Plate with Pulstar oil, and insert the Piston stepped-end down into the Rear Liner Plate. Put the Pulse Unit into the VC-101-2A Vacuum Fill Tank, making sure that the Pulstar oil is about one-half of an inch below the oil fill hole on the Pulse Unit. **Note:** The ULT-30D goes into the Tank Anvil-side down.
16. Now, cycle the Vacuum Fill Tank. **Note:** The gauge on the tank should read 29 in.Hg. or above.
17. Now, pull the Pulse Unit out of the Vacuum Fill Tank. Tip the Pulse Unit on its side to remove the excess oil from the top of the Pulse Unit so that it is level with the top of the oil fill hole. Following the Fill & Draw sheet, remove the recommended cc's of oil from the Pulse Unit and install the Oil Fill Plug. **Note:** Make sure that you pull up lightly on the plunger of the syringe as you put the needle into the Pulse Unit. This will keep you from displacing the oil out of the Pulse Unit when you put the needle into the Pulse Unit.
18. Install the Purple Cushion onto the front of the Pulse Unit.

Disassembly and Reassembly of Pulse Unit

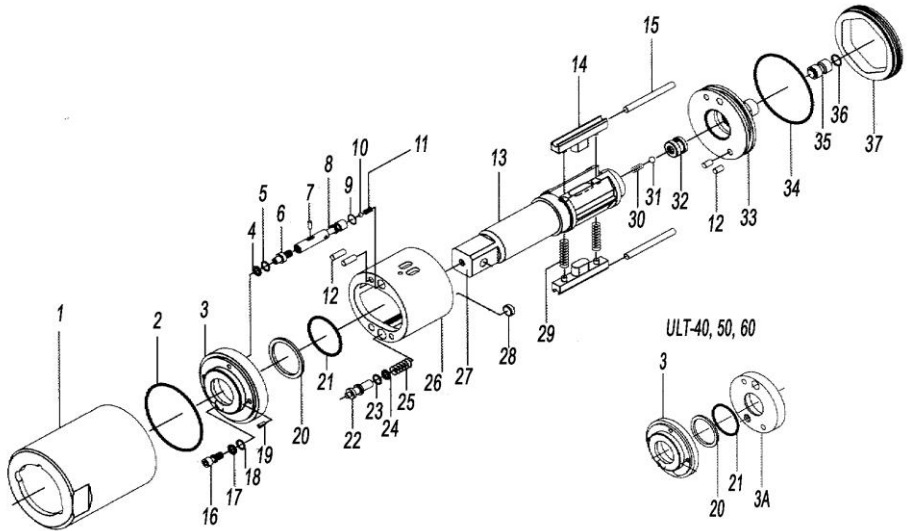
Make sure that the Adjusting Spacer, Spring, and Operating Rod are back in the Handle and install the Pulse Unit and Casing onto the Handle. **Note:** The torque for the Front Casing is 16-24 Nm for the ULT-30D ~ ULT-80, 25-38 Nm for the ULT-

90 ~ ULT-150 and 13-19 Nm for the ULT-180. Apply Loctite 222 to threads on the Casing Connector.

19. You are now ready to test the tool.

Disassembly and Reassembly of Pulse Unit

ULT-Pulse Unit



Part Number	Description	Part Number	Description
1	Liner Casing	19	Locator Pin
2	Front Liner Plate O-Ring	20	Anvil Supporter Ring
3	Front Liner Plate	21	Anvil SU-Ring
3A	Liner Casing Spacer	22	Accumulator
4	Torque Adjuster O-Ring	23	Accumulator O-Ring
5	Torque Adjuster Supporter Ring	24	Accumulator Supporter Ring
6	Torque Adjuster	25	Accumulator Spring
7	Relief Valve Pin	26	Liner
8	Relief Valve	27	Anvil
9	Relief Valve O-Ring	28	Accumulator Cover
10	Relief Valve Ball	29	Driving Blade Spring
11	Relief Valve Spring	30	Check Valve Spring
12	Locator Pins	31	Check Valve Ball
13	Anvil	32	Check Valve Cover
14	Driving Blade	33	Rear Liner Plate
15	Driving Blade Roller	34	Rear Liner Plate O-Ring
16	Oil Plug	35	Piston
17	Oil Plug Supporter Ring	36	Piston O-Ring
18	Oil Plug O-Ring	37	Liner Casing Setter

Disassembly and Reassembly of Air Motor

Disassembly of Air Motor

1. Remove the Casing (left-hand thread), Pulse Unit, Spacer, Spring, and Operating Rod from the Handle.
2. With the Casing Connector Fixture, remove the Casing Connector (left-hand thread) from the Handle.
3. Remove the Front Air Motor Plate, Rotor, Cylinder, Blades, Rear Air Motor Plate, O-ring, and Rear Plate Spacer from the Handle.
4. Remove the O-rings from inside of the Handle.
5. Remove the Bearings from the Front and Rear Air Motor Plates. The Bearing is a press fit into and over the Rotor on the Rear Air Motor Plate.
6. Clean and inspect all parts. Resurface only those parts having burrs on them. If any parts show deep grooving or surface wear, they will need to be replaced.

Assembly of Air Motor

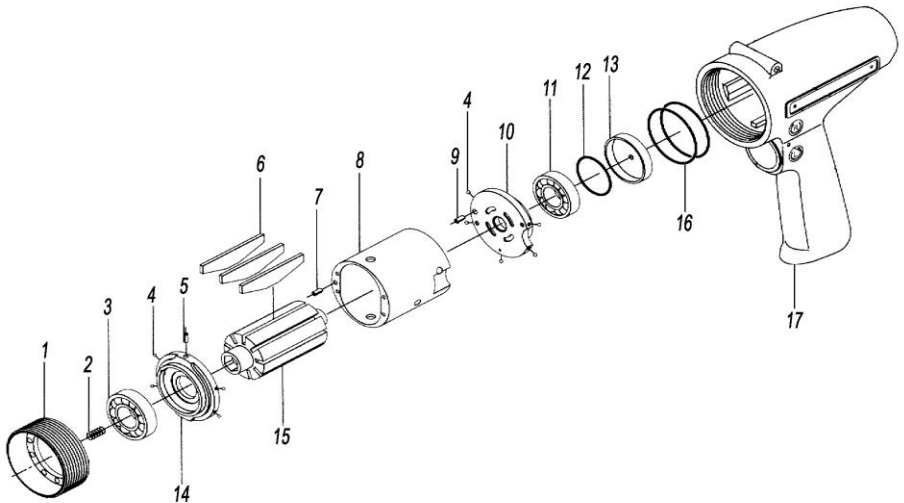
1. You will find all Bearings, O-rings, Blades, and Filter needed for rebuild of the Air Motor in an Air Motor Repair Kit (RK). To order an RK, you would order the model number of tool plus dash RK (i.e., ULT-70RK).
 2. Coat one-third of the Bearings with a good quality grease (i.e., Chevron Moly Grease EP NLG1 2).
 3. Press the Rear Plate Bearing into the Rear Plate and over the Rotor at the same time except on the ULT-150. The Bearings on the ULT-150 are Loctited into the Front and Rear Plate with Loctite 603 and the Rear Plate and Bearing are then pressed onto the Rotor. **Note:**
 4. Put a light coat of air motor oil on the Blades and install them in the Rotor.
 5. Put the Cylinder down over the Rotor and onto the Rear Plate with exhaust holes up.
 6. Press the Front Plate Bearing into the Front Plate and install the Front Plate onto the Cylinder and Rotor.
 7. Install the O-ring and Rear Plate Spacer onto the Rear Air Motor Plate.
 8. Lightly oil the O-rings and install them into the Handle.
- You should not be able to see any light between the Rear Plate and the Rotor and the Rotor should turn freely when you have it set right.

Disassembly and Reassembly of Air Motor

9. Line up the pin on the side of the Front Plate with the cut-out on the inside of the Handle and install the Air Motor into the Handle.
10. Install the Casing Connector into the Handle. The recommended torque for the ULT-30 - 80 is 45 Nm +/-5, for the ULT-90 is 50 Nm +/-5, for the ULT-100-130 is 60 Nm +/-5, and for the ULT-150 is 65 Nm +/-5. Make sure to use a good service removable thread locker on the Casing Connector.
11. Install the Operating Rod, Spring, Adjusting Spacer, Pulse Unit, and Casing on the Handle. Make sure to use a good service removable thread locker on the Casing Connector. **Note:** The torque for the Front Casing is 16-24 Nm for the ULT-30D ~ ULT-80, 25-38 Nm for the ULT-90 ~ ULT-150 and 13-19 Nm for the ULT-180. Apply Loctite 222 to threads on the Casing Connector.
12. The tool is ready to test.

Disassembly and Reassembly of Air Motor

ULT- Air Motor



Part Number	Description	Part Number	Description
1	Casing Connector	10	Rear Air Motor Plate
2	Piston Reset Spring	11	Rear Air Motor Bearing
3	Front Air Motor Bearing	12	O-Ring
4	Nylon Ball Plug	13	Rear Plate Spacer
5	Roll Pin	14	Front Air Motor Plate
6	Blade	15	Rotor
7	Roll Pin	16	Handle O-ring
8	Air Motor Cylinder	17	Handle
9	Front Air Motor Bearing		

Disassembly and Reassembly of the Shut-off Valve Section

Disassembly of Shut-Off Valve Section

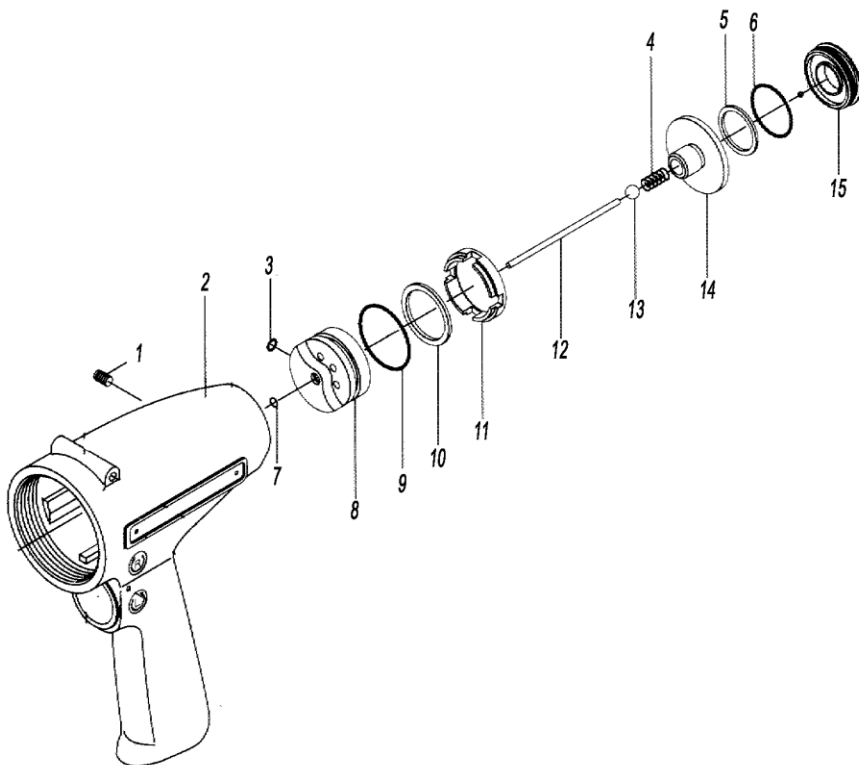
1. Remove the Valve Cover using the Valve Cover Fixture (right-hand thread) from the back of the Handle.
2. Remove the Supporter Ring, Cushion Spacer, Shut-off Valve, Supporter Ring, Shut-off Valve Spring, and Ball from the Handle.
3. Remove the Valve Plug from the side of the Handle and remove the Shut-off Valve Bushing from inside of the Handle.
4. Clean and inspect all parts. Replace all worn or damaged parts.

Assembly of Shut-Off Valve Section

1. Lightly lubricate all O-rings and install on Shut-off Valve Bushing.
2. Install the Shut-off Valve Bushing into the Handle. Make sure to line up the hole in the side of the Shut-off Valve Bushing with the hole on the side of the Handle.
3. Install the Valve Plug snugly into place, making sure not to over-tighten the Valve Plug or you could damage the O-ring and the tool will not shut-off. **Note:** The Valve Plug should be torqued to 1.0-1.5 Nm.
4. Install the Ball, Spring, Supporter Ring, Shut-off Valve, Cushion Spacer, Supporter Ring, and Valve Cover. **Note:** The Valve Cover should be torqued to 20-30 Nm for the ULT-30D ~ ULT-80 and 30-40 Nm for the ULT-90 ~ ULT-180.
5. You are ready to test the tool.

Disassembly and Reassembly of the Shut-off Valve Section

ULT-Shut-off Valve



Part Number	Description	Part Number	Description
1	Valve Plug	9	O-Ring
2	Handle	10	Supporter Ring
3	O-Ring	11	Cushion Spacer
4	Shut-off Valve Spring	12	Operating Rod
5	Supporter Ring	13	Shut-off Valve Ball
6	O-Ring	14	Shut-off Valve
7	O-Ring	15	Valve Cover
8	Shut-off Valve Bushing		

ULT Series Fill & Draw Sheet

Key Model of this Tool Group	Full Volume of Liner Oil in Pulse Unit (approx.)	Volume to be Removed from the Full Volume (approx.)	Torque to Tighten Liner Casing Setter (approx.)	Torque to Tighten Liner Casing Setter (approx.)	Load to Press on Rear Liner Plate	Load to Press on Rear Liner Plate
					Hydraulic Press	P.T.R.F.
Model	cc's	cc's	NM	Ft-Lbs	Tons	Ft-Lbs/ Nm
ULT-30 (D)(S)	5.0	0.30+/-0.01	85+/-5	63+/-4	1	20/27
ULT-40(S)(D) & 50(S)(D)(C),	5.6	0.35 -.04	85+/-5	63+/-4	1	20/27
ULT-60(S)(D)(C)	6.2	0.45+/-0.05	85+/-5	63+/-4	1	20/27
ULT-70(S)(C)(CH)	8.8	0.70+/-0.05	110+/-5	81+/-4	2	40/54
ULT-80	12.0	0.85+/-0.05	110+/-5	81+/-4	2	40/54
ULT-90	14.0	1.00+/-0.05	150+/-5	110+/-4	3	60/81
ULT-100	21.5	1.60+/-0.1	185+/-10	137+/-7	3	60/81
ULT-130	24.0	1.60+/-0.1	185+/-10	137+/-7	3	60/81
ULT-150	31.5	2.20+/-0.1	200+/-10	148+/-7	3.5	70/95
ULT-180	39.0	3.30+/-0.1	260+/-10	192+/-7	4	80/108

ULT Series Troubleshooting

Trouble	Cause	Solution
No Shut-off	Low Air Pressure	Make sure that you have 85 PSI at the tool while running the tool.
	Low Oil in the Pulse Unit	Add .10cc of oil and/or re-tank the Pulse Unit.
	Air Motor Dry; No Lubrication	Lubricate the Air Motor.
	Loss of Power in the Air Motor	Reset the Air Motor.
Premature Shut-off	Shut-off Valve Ball Pushed into Spring	Reset the Ball in the Shut-off Valve Bushing.
	Too Much Oil in the Pulse	Remove .10cc of oil from the Pulse Unit.
	Spring between the Pulse Unit and the Air Motor Weak or Missing	Replace Spring with new one or with a stronger one.
	Spacer between the Pulse Unit and the Air Motor Missing	Replace the Spacer. The Pulse Unit should only move .20mm in the Casing.
	Too Much Air Pressure	Air Pressure should be 85 PSI Dynamic.
Low Torque	Air Motor Dry; No Lubrication	Lubricate the Air Motor.
	Loss of Power in the Air Motor	Reset the Air Motor.
	Spring between the Pulse Unit and the Air Motor Weak or Missing	Replace Spring with new one or with a stronger one.
	Low Oil in the Pulse Unit	Add .10cc of oil and/or re-tank the Pulse Unit.
Low RPMs	Exhaust Filter Dirty	Replace the Filter in the Silencer.
	Air Motor Dry; No Lubrication	Lubricate the Air Motor.
	Loss of Power in the Air Motor	Reset the Air Motor.

Recommended Preventative Maintenance

It is recommended that after every 200,000 pulsing seconds or 180 days, the fluid in the tool's pulse unit be changed. At such time, it is also recommended to grease the bearings in the air motor. If the presence of water is noted, it is recommended that a small amount of oil be run through the air motor to wash out any rust residue in the air motor.

It is also recommended that after every 400,000 pulsing seconds or 365 days, that a Pulse Unit Repair Kit be installed in the pulse unit. This also allows the inspection of hard parts in the pulse unit.



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