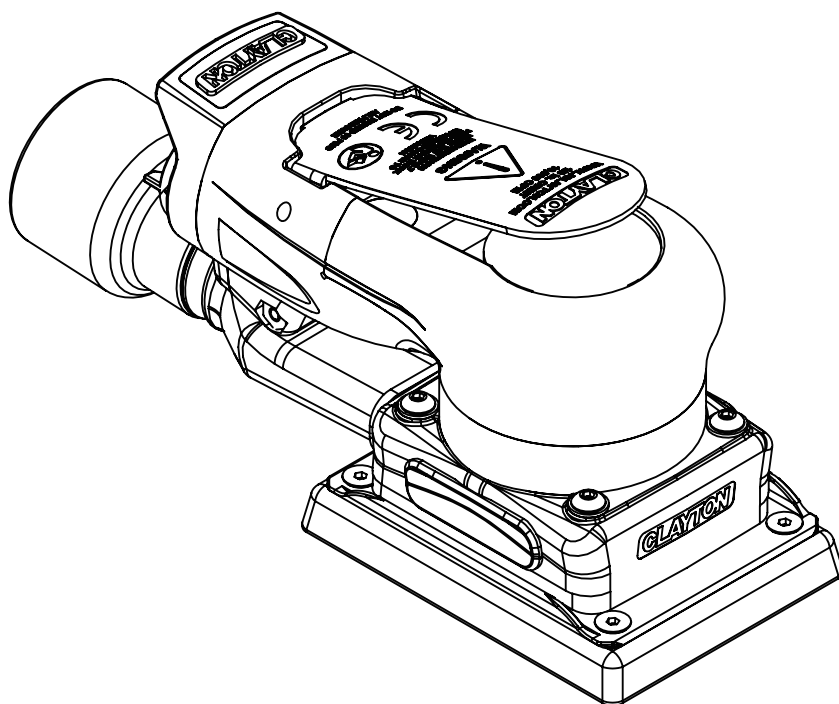


CLAYTON

Dustless Made Simple™

OPERATOR'S MANUAL FOR CLAYTON 10,000 OPM 3 x 4 in. (75 x 100 mm) ERGOLITE ORBITAL SANDERS



Declaration of Conformity

CLAYTON Associates, Inc. 1650 Oak Street Lakewood, NJ 08701 USA
declare on our sole responsibility that the products

3 x 4 in. (75 x 100 mm) Ergolite Orbital Sanders (See Product "Specifications" Table for particular Model) to which this declaration relates is in conformity with the following standard(s) or other normative document(s) EN ISO 15744:2008. Following the provisions of 89/392/EEC as amended by 91/368/EEC, 93/44/EEC & 93/68/EEC Directives and consolidating Directive 2006/42/EC

Lakewood, NJ 2019-04

Place and date of issue

James E. CLAYTON

Name

James E. Clayton
Signature or equivalent marking of authorized person

Operator Instructions

Includes –Parts Page, Parts List, Please Read and Comply, Proper Use of Tool, Work Stations, Putting the Tool Into Service, Operating Instructions and Compressor Layout, Service Tools and Accessories, Service Instructions, Back-Up Pads, Specifications Table and Trouble Shooting Guide.

Important

Read these instructions carefully before installing, operating, servicing or repairing this tool. Keep these instructions in a safe accessible location.



Manufacturer/Supplier

CLAYTON Associates, Inc.
TEL (732) 363-2100
www.VacuumSanding.com

Required Personal Safety Equipment



Safety Glasses



Safety Gloves



Breathing Masks



Ear Protection

Recommended Airline Size - Minimum

3/8 in 10 mm

Recommended Maximum Hose Length

25 feet 8 meters

Air Pressure

Maximum Working Pressure	90 psig	6.2 bar
Recommended Minimum	NA	NA



OPERATOR'S MANUAL FOR CLAYTON 10,000 OPM 3 x 4 in. (75 x 100 mm) ERGOLITE ORBITAL SANDERS

Please Read and Comply with

- 1) General Industry Safety & Health Regulations, Part 1910, OSHA 2206, available from: Superintendent of Documents; Government Printing Office; Washington DC 20402
- 2) Safety Code for Portable Air Tools, ANSI B186.1 available from: American National Standards Institute, Inc.; 1430 Broadway; New York, New York 10018
- 3) State and Local Regulations.

Proper Use of Tool

This sander is designed for sanding all types of materials i.e. metals, wood, stone, plastics, etc. using abrasive designed for this purpose. Do not use this sander for any other purpose than that specified without consulting the manufacturer or the manufacturer's authorized supplier.

Do not use back-up pads that have a working speed less than 10,000 OPM free speed. Never use back-up pads that have a weight and/or size different than the machine was specifically designed for.

Warranty

All CLAYTON Ergolite Orbital Sanders are warranted for defects in materials or workmanship for one year from the date of delivery to the user. Combined with the CLAYTON name, this Warranty expresses our total confidence in the superior quality, durability, and performance of the CLAYTON LP. To receive any expressed or implied warranty, tool must be repaired by an authorized CLAYTON Service Center. The "Service Instructions" section in this document is provided for use after completion of the warranty period. To receive warranty, tools must be operated under the conditions as described in the Putting the Tools into Service section of this document and be connected to an air supply system as shown in Figure 1. Tools that have been exposed to extreme conditions will be covered under warranty at the sole discretion of CLAYTON.

Safety Precautions

1. General safety rules:

- “Read and understand the safety instructions before installing, operating, repairing, maintaining, changing accessories on, or working near the sander or polisher. Failure to do so can result in serious bodily injury.”
- “Only qualified and trained operators should install, adjust or use the sander or polisher.”
- “Do not modify this tool. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.”
- “Do not discard the safety instructions; give them to the operator.”
- “Do not use a sander or polisher if the tool has been damaged.”
- “Tools shall be inspected periodically to verify that the ratings and markings are legibly marked on the tool. The employer/user shall contact the manufacturer to obtain replacement marking labels when necessary.”

2. Projectile hazards

- “Be aware that failure of the workpiece or accessories, or even of the inserted tool itself can generate high-velocity projectiles.
- “Always wear impact-resistant eye protection during operation of the sander or polisher. The grade of protection required should be assessed for each use.”
- “For overhead work, wear a safety helmet.”
- “Ensure that the workpiece is securely fixed.”

3. Entanglement hazards

- “Choking, scalping and/or lacerations can occur if loose clothing, personal jewellery, neck wear, hair or gloves are not kept away from the tool and its accessories.”

4. Operating hazards

- “Use of the tool can expose the operator's hands to hazards, including cuts and abrasions and heat. Wear suitable gloves to protect hands.”
- “Operators and maintenance personnel shall be physically able to handle the bulk, weight and power of the tool.”
- “Hold the tool correctly; be ready to counteract normal or sudden movements and have both hands available.”
- “Maintain a balanced body position and secure footing.”
- “Release the start-and-stop device in the case of an interruption of the energy supply.”
- “Use only lubricants recommended by the manufacturer.”
- “Personal protective safety glasses shall be used; suitable gloves and protective clothing are recommended.”
- “Inspect the backing pad before each use. Do not use if cracked or broken or if it has been dropped.”
- “Avoid direct contact with the moving sanding pad in order to prevent pinching or cutting of hands or other body parts. Wear suitable gloves to protect hands.”

- “Never run the tool unless abrasive is applied to the workpiece.”
- “There is a risk of electrostatic discharge if used on plastic and other non-conductive materials.”
- “Potentially explosive atmospheres can be caused by dust and fumes resulting from sanding or grinding. Always use dust extraction or suppression systems which are suitable for the material being processed.”

5. Repetitive motions hazards

- “While using a sander or polisher, the operator should adopt a comfortable posture whilst maintaining secure footing and avoiding awkward or off-balance postures. The operator should change posture during extended tasks; this can help avoid discomfort and fatigue.”
- “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.”

6. Accessory hazards

- “Disconnect the sander or polisher from the energy supply before fitting or changing the inserted tool or accessory.”
- “Avoid direct contact with the inserted tool during and after use, as it can be hot or sharp.”
- “Use only sizes and types of accessories and consumables that are recommended by the manufacturer of tool; do not use other types or sizes of accessories or consumables.
- “Grinding wheels and cutting-off tools shall not be used.”
- “Check that the maximum operating speed of the inserted tool (flap wheels, abrasive belts, fibre discs, backing pads, etc.), is higher than the rated speed of the tool.”
- “Self-fixing sander discs shall be placed concentrically on the supporting pad.”

7. Workplace hazards

- “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.”
- “The sander or polisher is not intended for use in potentially explosive atmospheres and is not insulated against contact with electric power.”
- “Ensure that there are no electrical cables, gas pipes, etc., which can cause a hazard if damaged by use of the tool.”

Safety Precautions

8. Dust and fume hazards

- "Dust and fumes generated when using tool can cause ill health (for example cancer, birth defects, asthma and/or dermatitis); risk assessment and implementation of appropriate controls for these hazards are essential."
- "Risk assessment should include dust created by the use of the tool and the potential for disturbing existing dust."
- "Operate and maintain the sander or polisher as recommended in these instructions, to minimize dust or fume emissions."
- "Direct the exhaust so as to minimize disturbance of dust in a dust-filled environment."
- "Where dust or fumes are created, the priority shall be to control them at the point of emission."
- "All integral features or accessories for the collection, extraction or suppression of airborne dust or fumes should be correctly used and maintained in accordance with the manufacturer's instructions."
- "Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in dust or fumes."
- "Use respiratory protection in accordance with employer's instructions and as required by occupational health and safety regulations."

9. Noise hazards

- "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 implementation of appropriate controls for these hazards are essential."
- "Appropriate controls to reduce the risk can include actions such as damping materials to prevent workpieces from "ringing"."
- "Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations."
- "Operate and maintain the sander or polisher as recommended in the instruction handbook, to prevent an unnecessary increase in the noise level."
- "Select, maintain and replace the consumable/inserted tool as recommended in the instruction handbook, to prevent an unnecessary increase in noise."
- "If the sander or polisher has a silencer, always ensure it is in place and in good working order when the tool is being operated."

10. Vibration hazards

- "Exposure to vibration can cause disabling damage to the nerves and blood supply of the hands and arms."
- "Wear warm clothing when working in cold conditions and keep your hands warm and dry."
- "If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the sander

or polisher, tell your employer and consult a physician."

- "Operate and maintain the sander or polisher as recommended in the instruction handbook, to prevent an unnecessary increase in vibration levels."

- "Hold the tool with a light but safe grip, taking account of the required hand reaction forces, because the risk from vibration is generally greater when the grip force is higher."

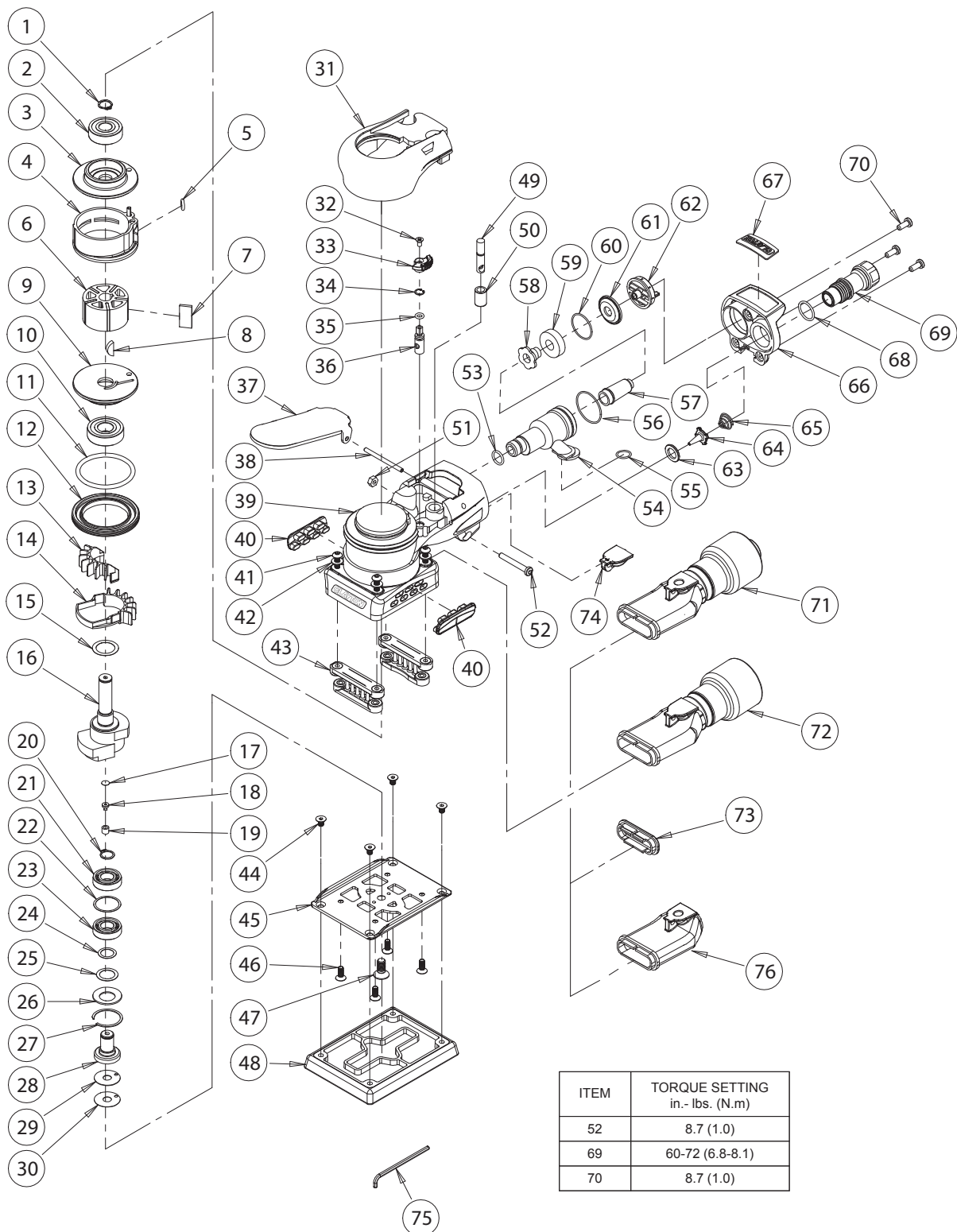
11. Additional safety instructions for pneumatic power tools:

- "Air under pressure can cause severe injury:
 - 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;
 - never direct air at yourself or anyone else;"
- "Whipping hoses can cause severe injury. Always check for damaged or loose hoses and fittings;"
- "Whenever universal twist couplings (claw couplings) are used, lock pins shall be installed and whipcheck safety cables shall be used to safeguard against possible hose-to-tool or hose-to-hose connection failure;"
- "Do not exceed the maximum air pressure stated on the tool;"
- "Never carry an air tool by the hose."

12. Operating instructions include, where appropriate:

- instructions for setting up or fixing tool in stable position as appropriate if type of tool can be mounted;
- assembly instructions, including recommended guards, accessories and inserted tools;
- an illustrated description of functions;
- limitations on tool use due to environmental conditions;
- instructions for setting and testing;
- general instructions for use, including changing inserted tools and limits on size and type of workpiece;
- instructions stating that a tool shall not be operated at a speed exceeding the rated speed

Parts Page



ITEM	TORQUE SETTING in.- lbs. (N.m)
52	8.7 (1.0)
69	60-72 (6.8-8.1)
70	8.7 (1.0)

Parts List

Item No.	Part No.	Description	Qty.
1	673-A0040	EXTERNAL RETAINING RING	1
2	673-A0021	BEARING - 6000ZZ	1
3	673-B0017	REAR ENDPLATE	1
4	673-B0011	CYLINDER ASSEMBLY	1
5	673-A0042	O-RING	1
6	673-B0005	MACHINED ROTOR	1
7	673-A0010-1	VANE	5
8	673-A0041	WOODRUFF KEY	1
9	673-B0016	FRONT ENDPLATE	1
10	673-A0019	BEARING	1
11.12	673-10	LOCK RING ASSEMBLY	1
13	673-41006	3x4 in. COOLING FAN	1
14	673-41007	3x4 in. COOLING FAN	1
15	673-A2541	FRONT BEARING DUST SHIELD	1
16	673-B0102	3x4"-1/8"ORBIT OS AirSHIELD PLUS SHAFT BALANCER	1
17	673-A0122	FILTER MATERIAL	1
18	673-A0121	DUCKBILL CHECK VALVE	1
19	673-A0120	VALVE RETAINER	1
20	673-A0107	RETAINING RING	1
21	673-A0161	BEARING	1
22	673-A0196	SPACER	1
23	673-A0162	BEARING	1
24	673-A0108	SPACER	1
25	673-A2543	SPINDLE BEARING DUST SHIELD	1
26	673-A0126	BELLEVILLE WASHER	1
27	673-A0177	RETAINING RING	1
28	673-B0063	SPINDLE	1
29	673-A0080	SPACER (0.4T)	1
30	673-A0079	SPACER (0.2T)	1
31	673-G0103	GRIP	1
32	S5-3006A	HEX SOCKET HEADLESS SET SCREW (M3x6)	1
33	673-F0103	SPEED CONTROL	1
34	IRTW-007	Inverted Retaining Ring (IN)	1
35	673-F0105	O-RING (4x1.5)	1
36	673-F0104	SPEED CONTROL	1
37	673-F0153	LEVER FOR CLAYTON (1/8in. ORBIT)	1
38	673-A0031	LEVER SPRING PIN	1
39	673-G0105	MACHINED HOUSING	1
40	673-F0106	3" x 4" SIDE COVER (Black)	2
41	673-A0768	HEX SOCKET BUTTON HEAD MACHINE SCREW (M4x12)	4
42	673-A0076	WASHER (M4)	4
43	673-C0018	MINI PAD SUPPORT ASSEMBLY (3" x 4")	2
44	673-A0766	HEX SOCKET COUNTERSUNK HEAD MACHINE SCREW (M4x6)	4
45	673-B0101	MACHINED 3x4" PAD BACKING FOR FASTENER MOUNTED PADS	1

Parts List

Item No.	Part No.	Description	Qty.
46	673-A0767	HEX SOCKET COUNTERSUNK HEAD MACHINE SCREW (M4x10)	4
47	673-A0078	SOCKET FLAT COUNTER SUNK MACHINE SCREW (M6x14)	1
48	NA	1 PAD SUPPLIED WITH EACH TOOL	OPT
49	673-A0008	VALVE STEM ASSEMBLY	1
50	673-A0015	VALVE SLEEVE	1
51	HN2-04CA	Hex. Nut (M4)	1
52	S6-0430A	HEX.SOCKET BUTTON HEAD SCREW (M4x30)	1
53	673-A0043	O-RING (9x1.5mm)	1
54	673-G0044	EXHAUST CHAMBER	1
55	673-A2204	O-RING (9.5x1mm)	1
56	673-A2484	O-RING (24x1mm)	1
57	673-F0013	MUFFLER	1
58	673-F0008	MUFFLER COVER	1
59	673-F0011	MUFFLER O8.5*O21*T6mm	1
60	673-F0012	O-RING(O/R 20*1 N70)	1
61	673-F0009	EXHAUST CAP,BUFFER	1
62	673-F0010	VARIABLE EXHAUST	1
63	673-A0009	VALVE SEAT	1
64	673-A0007	VALVE	1
65	673-F0094	VALVE SPRING	1
66	673-G0011	END CAP	1
67	673-F0086	LOGO INSERT - END CAP	1
68	673-A0044	14.0x1.5 O-RING	1
69	673-A2475	INLET BUSHING ASSEMBLY ELITE	1
70	S6-0410A	HEX.SOCKET BUTTON HEAD SCREW (M4x10)	3
71	673-G0067	3" x 4" SGV SWIVEL EXHAUST FITTING ASSEMBLY	OPT
72	673-G0066	3" x 4" CV SWIVEL EXHAUST FITTING ASSEMBLY	OPT
73	673-F0107	SNAP-IN VAC COVER PLATE	OPT
74	673-F0081	SNAP-IN VAC COVER PLATE (NV)	1
75	673-A0864	2.5mm HEX WRENCH	1
76	673-F0118	3" x 4" CV SWIVEL EXHAUST FITTING	OPT

Product Configuration/Specifications: 10,000 OPM 3 x 4 in. (75 x 100mm) Ergolite Orbital Sander

Note: All Self Generated Vacuum machines use Ø 1 in. Vacuum Hose Fittings Standard. Ø ¾ in. is available.
All Central Vacuum machines use Ø 1 in. Vacuum Hose Fittings Standard. Ø ¾ in. is available.

Orbit	Pad Face	Vacuum Type	Model Number	Pad Type	Product Net Weight Pound (kg)	Height in. (mm)	Length in. (mm)	Power HP (watts)	Air Consumption SCFM (LPM)	Noise Level dBA	Vibration Level m/s ²	Uncertainty K m/s ²
1/8 in. (3.0 mm)	Vinyl	Non-Vacuum	770-10340S	Standard	1.55 (0.70)	3.8 (96)	6.2 (158)	.24 (179)	17 (481)	72.5	3.88	0.88
		Central Vacuum	770-10341S	Standard	1.65 (0.75)	3.8 (96)	8.0 (204)	.24 (179)	17 (481)	74.0	3.79	0.87
		Self-Gen Vacuum	770-10343S	Standard	1.66 (0.77)	3.8 (96)	8.3 (212)	.24 (179)	17 (481)	83.5	3.94	0.88
	Hook	Non-Vacuum	770-10340J	Standard	1.55 (0.70)	3.8 (96)	6.2 (158)	.24 (179)	17 (481)	72.5	3.88	0.88
		Central Vacuum	770-10341J	Standard	1.65 (0.75)	3.8 (96)	8.0 (204)	.24 (179)	17 (481)	74.0	3.79	0.87
				Screen Vacuum	1.65 (0.75)	3.8 (96)	8.0 (204)	.24 (179)	17 (481)	74.0	3.79	0.87
		Self-Gen Vacuum	770-10343J	Standard	1.66 (0.77)	3.8 (96)	8.3 (212)	.24 (179)	17 (481)	83.5	3.94	0.88
				Screen Vacuum	1.66 (0.77)	3.8 (96)	8.3 (212)	.24 (179)	17 (481)	83.5	3.94	0.88

The noise test is carried out in accordance with EN ISO 15744:2008-Hand-held non-electric power tools-Noise Measurement Code-Engineering method (grade 2) and EN ISO 11203:2009 Acoustics-Noise emitted by machinery and equipment-Determination of emission sound pressure levels at a work station and other specified positions from the sound power level.

The vibration test is carried out in accordance with EN ISO 28927-3, Hand-held portable power tools-Test method for evaluation of vibration emission-Part3:Polishers and rotary, ergolite orbital and ergolite random orbital sanders.

Specifications subject to change without prior notice.

The values stated in the table are from laboratory testing in conformity with stated codes and standards and are not sufficient for risk evaluation. Values measured in a particular work place may be higher than the declared values. The actual exposure values and amount of risk or harm experienced to an individual is unique to each situation and depends upon the surrounding environment, the way in which the individual works, the particular material being worked, work station design as well as upon the exposure time and the physical condition of the user. CLAYTON cannot be held responsible for the consequences of using declared values instead of actual exposure values for any individual risk assessment.

Further occupational health and safety information can be obtained from the following websites:

<http://europe.osha.eu.int> (Europe)

<http://www.osha.gov> (USA)

Work Stations

The tool is intended to be operated as a hand held tool. It is always recommended that the tool be used when standing on a solid floor. It can be in any position but before any such use, the operator must be in a secure position having a firm grip and footing and be aware that the sander can develop a torque reaction. See the section "Operating Instructions".

Putting the Tool into Service

Use a clean lubricated air supply that will give a measured air pressure at the tool of 90 psig (6.2 bar) when the tool is running with the lever fully depressed. It is recommended to use an approved 3/8 in. (10 mm) x 25 ft (8 m) maximum length airline. It is recommended that the tool be connected to the air supply as shown in Figure 1.

Do not connect the tool to the airline system without incorporating an easy to reach and operate air shut off valve. The air supply should be lubricated. It is strongly recommended that an air filter, regulator and lubricator (FRL) be used as shown in Figure 1 as this will supply clean, lubricated air at the correct pressure to the tool. Details of such equipment can be obtained from your supplier. If such equipment is not used then the tool should be manually lubricated.

To manually lubricate the tool, disconnect the airline and put 2 to 3 drops of suitable pneumatic motor lubricating oil such as Fuji Kosan FK-20, Mobil ALMO 525 or Shell TORCULA® 32 into the hose end (inlet) of the machine. Reconnect tool to the air supply and run tool slowly for a few seconds to allow air to circulate the oil. If the tool is used frequently, lubricate it on a daily basis or lubricate it if the tool starts to slow or lose power.

It is recommended that the air pressure at the tool be 90 PSI (6.2 Bar) while the tool is running so the maximum RPM is not exceeded. The tool can be run at lower pressures but should never be run higher than 90 PSI (6.2 Bar). If run at lower pressure the performance of the tool is reduced.

Operating Instructions

- 1) Read all instructions before using this tool. All operators must be fully trained in its use and aware of these safety rules. All service and repair must be carried out by trained personnel.
- 2) Make sure the tool is disconnected from the air supply. Select a suitable abrasive and secure it to the back-up pad. Be careful and center the abrasive on the back-up pad.
- 3) Always wear required safety equipment when using this tool.
- 4) When sanding always place the tool on the work then start the tool. Always remove the tool from the work before stopping. This will prevent gouging of the work due to excess speed of the abrasive.
- 5) Always remove the air supply to the sander before fitting, adjusting or removing the abrasive or back-up pad.
- 6) Always adopt a firm footing and/or position and be aware of torque reaction developed by the sander.
- 7) Use only correct spare parts.
- 8) Always ensure that the material to be sanded is firmly fixed to prevent its movement.
- 9) Check hose and fittings regularly for wear. Do not carry the tool by its hose; always be careful to prevent the tool from being started when carrying the tool with the air supply connected.

- 10) Dust can be highly combustible. Vacuum dust collection bag should be cleaned or replaced daily. Cleaning or replacing of bag also assures optimum performance.
- 11) Do not exceed maximum recommended air pressure. Use safety equipment as recommended.
- 12) The tool is not electrically insulated. Do not use where there is a possibility of coming into contact with live electricity, gas pipes, water pipes, etc. Check the area of operation before operation.
- 13) Take care to avoid entanglement with the moving parts of the tool with clothing, ties, hair, cleaning rags, etc. If entangled, it will cause the body to be pulled towards the work and moving parts of the machine and can be very dangerous.
- 14) Keep hands clear of the spinning pad during use.
- 15) If the tool appears to malfunction, remove from use immediately and arrange for service and repair.
- 16) Do not allow the tool to free speed without taking precautions to protect any persons or objects from the loss of the abrasive or pad.

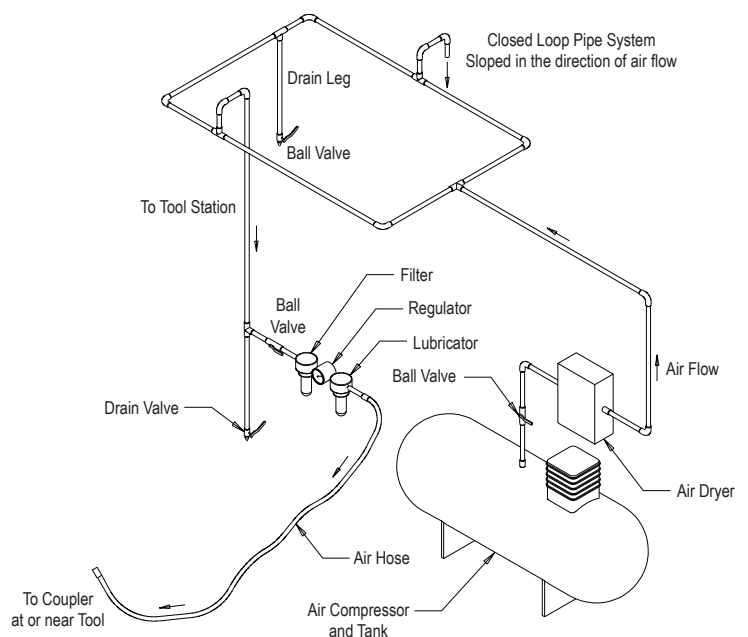


Figure 1

Back-Up Pads

CLAYTON 3 in. x 4 in. pads are perfectly mated for use on the Low Profile Ergolite Orbital Sander. The molded urethane pads are constructed from premium, industrial-quality materials for durability.

Description	Part #
screw-on, non-vacuum, vinyl face pad	675-400S
screw-on, non-vacuum, j-hook face pad	675-400H
screw-on, standard vacuum, vinyl face pad	675-402S
screw-on, standard vacuum, j-hook face pad	675-402J

3 in. x 4 in. (75 x 100 mm) Ergolite Orbital Sanders Service Instructions

NOTICE: To receive any expressed or implied warranty, the tool must be repaired by an authorized Service Center. The 3 x 4 in. (75 x 100 mm) Ergolite Orbital Sander Service Instructions section provided is for use after completion of the warranty period.

DISASSEMBLY INSTRUCTIONS

Changing Grips:

1. The Grip has two "tabs" that wrap around the body of the sander under the inlet and exhaust. With a small screwdriver pick out one of the "tabs" of the Grip, and then continue to go underneath the grip with the screwdriver and pry the Grip off the sander. To install a new Grip, hold the Grip by the tabs making them face outward, align the Grip and slide it under the Throttle Lever then press the Grip down until it seats onto the top of the sander. Make sure the two "tabs" seat under the inlet and exhaust.

Motor Disassembly:

1. Remove the Pad from the machine by removing the four Screws. Lightly secure tool in a vise using the T-7 Soft Collar (Included in 673-A0486 Kit - See "Service Tools and Accessories") or padded jaws with the bottom of the machine facing upward. Remove the four Screws and then the Screw. Remove the Pad Backing but be careful to observe and collect the optional Spacer(s) found between the Spindle Assembly and the Pad Backing.
2. Take the machine out of the vise and take off the Soft Collar. Remove the four Screws with the Washers from the Housing and remove the Mini Pad Supports. Lightly re-secure the tool in a vise using the T-7 Soft Collar (Included in 673-A0486 Kit - See "Service Tools and Accessories") or padded jaws with the Lock Ring facing upward.
3. Remove the Lock Ring with the T-6 Motor Lock Ring Wrench/ Spindle Puller Tool (Included in 673-A0486 Kit - See "Service Tools and Accessories"). Remove the O-Ring from the Lock Ring and set it aside. The motor assembly can now be lifted out of the Housing.
4. Remove the Retaining Ring from the groove in the Shaft Balancer and the O-Ring from the Cylinder.
5. Remove the Rear Endplate. This may require setting the Rear Endplate on a (673-A0416) Bearing Separator and lightly pressing the shaft through the Bearing and Rear Endplate. Remove the Cylinder and the Rotor with the five Vanes from the Shaft Balancer. Remove the Key then press off the Front Endplate with the Bearing. It may be necessary to remove the Bearing with a (673-A0416) Bearing Separator if it came out of the Front Endplate and stuck to the shaft of the Shaft Balancer.
6. Remove and discard Dust Shield from the Shaft Balancer.
7. Remove the Bearing(s) from the Endplates by using the T-8 Bearing Removal Tool (Included in 673-A0486 Kit - See "Service Tools and Accessories") to press out the Bearings.

Shaft Balancer and Spindle Disassembly:

1. Grip the shaft end of the Shaft Balancer in a padded vise. With a thin screwdriver pick out the slotted end of the Retaining Ring and peel out.
2. Screw the female end of the T-12 5/16-24 to M6 x 1P Adapter (Included in 673-A0491 Kit - See "Service Tools and Accessories") into the male end of the T-6 Motor Lock Ring Wrench/ Spindle Puller Tool (Included in 673-A0486 Kit - See "Service Tools and Accessories"). Screw the Service Wrench Assembly into the Spindle Assembly until hand tight. Apply a gentle heat from a propane torch or hot air gun to the large end of the Shaft Balancer shaft until it is about 100° C (212° F) to soften the adhesive. Do not over heat. Remove the Spindle Assembly by using the slider to give sharp outward blows to the Spindle. Allow the Spindle and Shaft Balancer to cool.
3. Remove the Retaining Ring from the Spindle Assembly. Use a (673-A0416) Bearing Separator to remove the Bearing, Shim, Bearing, Shim, Dust Shield and the Washer from the Spindle Assembly. Discard Dust Shield.
4. The AirSHIELD™ components are held in place by the light press fit of the Retainer. These components can be damaged

during removal and may need to be replaced if removed. To remove the Retainer, use an O-ring pick or a #8 sheet metal screw to grip and pull out the Retainer. Remove the Valve and Filter from the bore in the Shaft Balancer. If the Retainer and Valve were not damaged, they can be reused. However, the filter should be replaced on re-assembly.

Housing Disassembly:

1. For Non-Vacuum (NV) and Central Vacuum (CV) machines follow steps A – C below (unless otherwise noted). For Self Generated Vacuum (SGV) machines disregard steps A – F and move onto Step G below.
 - A. Unscrew the Muffler Housing from the Housing.
 - B. Remove the Muffler from the cavity of the Muffler Housing.
 - C. Remove the Plate and second Muffler from the exhaust port of the Housing.
- For Central Vacuum (CV) Exhaust machines:**
 - D. Remove the Screw, Washer and Nut.
 - E. Press downward on the swivel end of the Ø 1 in. (28 mm) SuperVAC™ CV Swivel Exhaust Assembly or the Ø ¾ in. (19 mm) SuperVAC™ CV Swivel Exhaust Assembly releasing the tab on the end of the exhaust assembly from the Snap-In Exhaust Adapter.
 - F. Work off the Snap-In Exhaust Adapter. Move on to step 2.

For Self Generated Vacuum (SGV) Exhaust machines:

- G. Unscrew the SGV Retainer Assembly with an 8 mm hex key. Remove the two O-rings. Take off the Ø 1 in. (28 mm) SGV Swivel Exhaust Assembly or the Ø ¾ in. (19 mm) Hose SGV Swivel Exhaust Assembly.
- H. Work off the Snap-In Exhaust Adapter.
2. Place the Speed Control to the midway position and remove the Retaining Ring. The Speed Control will now pull straight out. Remove the O-Ring.
3. Unscrew the Inlet Bushing Assembly from the Housing. Remove the Valve Spring, Valve, Valve Seat, Valve Stem with the O-Ring. Press out the Spring Pin from the Housing and remove the Lever.

ASSEMBLY INSTRUCTIONS

NOTE: All assembly must be done with clean dry parts and all bearings are to be pressed in place by the correct tools and procedures as outlined by the bearing manufacturers.

Housing Assembly:

1. Install the Throttle Lever into Housing with the Pin.
2. Lightly grease O-Ring and place it on Speed Control. Install Valve Stem, O-Ring (cleaned and lightly greased) and insert the Speed Control into Housing in the midway position. Install Retaining Ring.

CAUTION: Make sure the Retaining Ring is completely snapped into groove in the Housing.

3. Install the Valve Seat, the Valve and Valve Spring. Coat the threads of the Bushing Assembly with 1 or 2 drops of Loctite™ 222 or equivalent non-permanent pipe thread sealant. Screw the assembly into the Housing. See the "Parts Page" for torque settings. Place a clean Muffler and Plate into the exhaust port of the Housing. Be careful not to lose the Plate and Muffler out of the exhaust before it is secured in one of the following steps.

NOTE: If the machine is a CV/SGV model proceed with the appropriate vacuum exhaust assembly instructions, otherwise move onto step 4.

For CV (Central Vacuum) Exhaust machines:

- A. Attach the Snap-In Exhaust Adapter.
- B. Take the Ø 1 in. (28 mm) SuperVAC™ CV Swivel Exhaust Assembly or the Ø ¾ in. (19 mm) SuperVAC™ CV Swivel Exhaust Assembly and put the "tongue" on the male end of it

into the female end of the Snap-In Exhaust Adapter. With the swivel end of the SuperVAC™ Exhaust angled towards the ground work the “tongue” and male end into the female end of the Snap-In Exhaust Adapter by rotating the swivel end up and in at the same time until it seats.

- C. Thread the Screw into the mounting hole of the Ø 1 in. (28 mm) SuperVAC™ CV Swivel Exhaust Assembly or the Ø ¾ in. (19 mm) SuperVAC™ CV Swivel Exhaust Assembly and Housing until the end of it is flush with the inside surface of the Housing. Place the washer and Nut into the cavity of the Housing and thread the Screw into them until tight. Move onto step 4.

For SGV (Self Generated Vacuum) Exhaust machines:

- A. Attach the Snap-In Exhaust Adapter.
- B. Lightly grease two O-rings and place them over the two grooves in the SGV Retainer Assembly. Slide the SGV Retainer Assembly into the bore of the Ø 1 in. (28 mm) SGV Swivel Exhaust Assembly or the Ø ¾ in. (19 mm) Hose SGV Swivel Exhaust Assembly.
- C. Attach the SGV Swivel Exhaust Assembly to the exhaust port of the Housing by means of the SGV Retainer Assembly and by taking the male end of the SGV Swivel Exhaust Assembly and placing it into the female end of the Snap-In Exhaust Adapter. Screw the SGV Retainer Assembly into the threaded exhaust port on the Housing with an 8 mm hex key. See the “Parts Page” for torque settings. Move onto the section “Spindle, AirSHIELD™ and Balancer Shaft Assembly”.
4. Place a clean Muffler in the Muffler Housing and screw the Muffler Housing into the exhaust port of the Housing. See the “Parts Page” for torque settings.

Spindle, AirSHIELD™ and Balancer Shaft Assembly:

1. Place the T-2A Spindle Bearing Pressing Tool Base (Included in 673-A0491 Kit - See “Service Tools and Accessories”) onto a flat, clean surface of a small hand press or equivalent with the spindle pocket facing upward. Place the Spindle into the spindle pocket with the shaft facing upward.
2. Place the Washer on the Spindle shaft with the curve of washer facing out so that the outside diameter of the washer will contact the outer diameter of the Bearing. Place the Dust Shield onto the Spindle shaft. Lay the Shim on the shoulder of the Spindle. Note: Be sure that the Dust Shield is past the shoulder where Spacer rests. Place the Bearing (one seal) on the Spindle with the seal side toward the Washer. NOTE: Make sure that both the inner and outer races of the Bearings are supported by the Bearing Press Tool when pressing them into place. Press the Bearing onto the shoulder of Spindle using the T-2B Spindle Bearing Pressing Tool Top (Included in 673-A0491 Kit - See “Service Tools and Accessories”) as shown in Figure 3.
3. Place the Shim over the Spindle shaft and onto the face of

the Bearing making sure it is on center. Press the (no seals/shields) Bearing down using the T-2B Spindle Bearing Pressing Tool Top (Included in 673-A0491 Kit - See “Service Tools and Accessories”), being careful to make sure the Shim is still centered on the vertical axis of the Spindle shaft and Bearing. See Figure 4. When the Spindle Assembly is done correctly, the Bearings will rotate freely but not loosely and the Shim can be moved but will not slide or move by gravity.

4. Snap the Retaining Ring (not shown in Figure 3 or 4) onto the Spindle Assembly making sure it is completely snapped into the groove.
5. Take the Filter and center it on the small bore that the original Filter was in before removal. With a small diameter screwdriver or flat-ended rod, press the Filter into the bore until it is flat in the bottom of the bore. Place the Valve into the bore so it is oriented correctly, then press the Retainer into the bore until it is flush with the bottom of the Bearing bore.
6. Apply a pin head size drop of #271 Loctite® or equivalent to the outside diameter of each of the bearings on the spindle assembly. Spread the drop of bearing locker around the bearings until distributed evenly. CAUTION: Only a very small amount of bearing locker is needed to prevent rotation of the bearing OD. Any excess will make future removal difficult. Place the Spindle Assembly into the bore of the Shaft Balancer and secure with the Retaining Ring. CAUTION: Make sure that the Retaining Ring is completely snapped into the groove in the Balancer shaft. Allow the adhesive to cure.

Motor Assembly:

1. Place the Dust Shield onto the shaft of the Shaft Balancer.
2. Use the larger end of the T-13 Bearing Press Sleeve (Included in 673-A0486 Kit - See “Service Tools and Accessories”) to Press the front Bearing (with 2 Shields) onto the shaft of the Shaft Balancer.
3. Slide the Front Endplate with the bearing pocket facing down onto the Motor Shaft. Gently press the Front Endplate onto the front Bearing using the larger end of the T-13 Bearing Press Sleeve (Included in 673-A0486 Kit - See “Service Tools and Accessories”) until the front Bearing is seated in the bearing pocket of the Front Endplate. CAUTION: Only press just enough to seat the Bearing into the pocket. Over-pressing can damage the Bearing.
4. Place the Key into the groove on the Shaft Balancer. Place the Rotor on the Shaft Balancer, making sure that it is a tight slip fit.
5. Oil the Vanes with a quality pneumatic tool oil and place them in the slots in the Rotor. Place the Cylinder Assembly over the Rotor with the short end of the Spring Pin engaging the blind hole in the Front Endplate. NOTE: The Spring Pin must project .060 in. (1.5 mm) above the flanged side of the Cylinder.

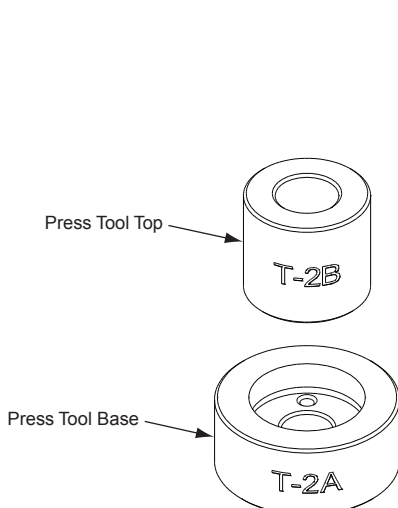


Figure 2

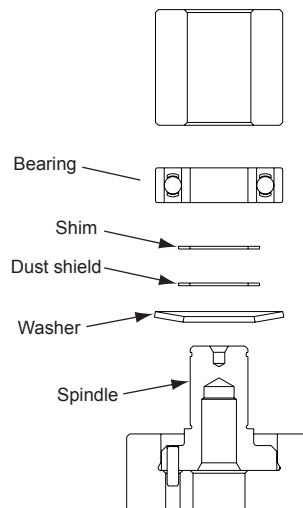


Figure 3

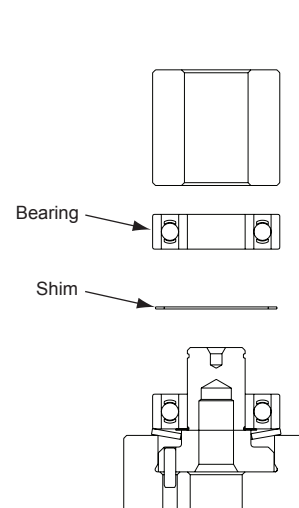


Figure 4

6. Press fit the rear Bearing (2 shields) into the Rear Endplate with the T-1B Bearing Press Tool Top (Included in 673-A0486 Kit - See "Service Tools and Accessories"). Make sure the T-1B Press Tool is centered on the O.D. of the outer race. Lightly press fit the Rear Endplate and Bearing over the Shaft Balancer using the small end of the T-13 Bearing Press Sleeve (Included in 673-A0486 Kit - See "Service Tools and Accessories"). The sleeve should press only the inner race of the bearing. **IMPORTANT:** The Rear Endplate and Bearing is pressed correctly when the Cylinder is squeezed just enough between the Endplates to stop it from moving freely under its own weight when the shaft is held horizontal, but be able to slide between the Endplates with a very light force. If the assembly is pressed to tightly the motor will not run freely. If the pressed assembly is to loose, the motor will not turn freely after assembly in the Housing. **CAUTION:** If the Rear Endplate assembly is "over-pressed" damage to the Front and Rear Endplate Bearings may result.
7. Secure the assembly by placing the Retaining Ring in the groove of the Shaft Balancer. **CAUTION:** The Retaining Ring must be placed so that the middle and two ends of the hoop touch the Bearing first. Both raised center portions must be securely "snapped" into the groove in the Shaft Balancer by pushing on the curved portions with a small screwdriver.
8. Lightly grease the O-Ring and place in the air inlet of the Cylinder Assembly.
9. Lightly grease or oil the inside diameter of the Housing, line up the Spring Pin with the marking on the Housing and slide the Motor Assembly into the Housing. Make sure the Pin engages the pocket in Housing.
10. Carefully screw the Lock Ring into the Housing with the T-6 Motor Lock Ring Wrench/Spindle Puller Tool (Included in 673-A0486 Kit - See "Service Tools and Accessories"). See the "Parts Page" for torque settings. **NOTE:** A simple technique to assure first thread engagement is to turn the lock ring counter clockwise with the T-6 Motor Lock Ring Wrench/Spindle Puller while applying light pressure. You will hear and feel a click when the lead thread of the lock ring drops into the lead thread of the housing.
11. Place one of the Mini Pad Support Assemblies into the Housing with the 45 degree chamfer of the base facing outward away from the center of the machine and the arc in the base of the pad support facing toward the center of the machine. Screw tight with the two Screws and Washers. Repeat for second pad support.
12. Using a straight edge placed across both bottom surfaces of the Mini Pad Support Assemblies, measure the distance from the surface of the Spindle Assembly to the straight edge. There should be approximately .010 in. (0.25 mm) of space, if not add supplied Spacers in the combination that most closely results in .010 in. (0.25 mm) of spacing. **NOTE:** Spindle face must be slightly below Mini Pad Supports for best function. Do not over shim. Apply a small amount of anti-seize compound in the 5-90° c'sink holes of the Pad Backing before assembly. Place the Pad Backing by orientating the Shims with the screw holes and placing the pad backing down onto the Spindle Assembly making sure the Pin goes through the Pad Backing. Add the Screw first and tighten firmly. In a circular rotation apply smaller Screws into the Pad Backing and Mini Pad Support Assemblies but leave them slightly loose until all are in place, and then tighten firmly.

13. Attach a new Pad on the Pad Backing with the four Screws.

Testing:

Place 3 drops of quality pneumatic air tool oil directly into the motor inlet and connect it to a 90 psig (6.2 Bar) air supply. The tool should run between 9,500 and 10,500 Orbits per Minute when the air pressure is 90 psig (6.2 Bar) at the inlet of the tool while the tool is running at free speed.

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Troubleshooting Guide

Symptom	Possible Cause	Solution
Low Power and/or Low Free Speed	Insufficient Air Pressure	Check air line pressure at the Inlet of the Sander while the tool is running at free speed. It must be 6.2 Bar (90 psig/620 kPa).
	Blocked Muffler(s)	See the "Housing Disassembly" section for Muffler removal. Replace Muffler Insert (See the "Housing Assembly" Section)..
	Plugged Inlet Screen	Clean the Inlet Screen with a clean, suitable cleaning solution. If Screen does not come clean replace it.
	Worn or Broken Vanes	Install a complete set of new Vanes (all vanes must be replaced for proper operation). Coat all vanes with quality pneumatic tool oil. See "Motor Disassembly" and "Motor Assembly".
	Internal air leakage in the Motor Housing indicated by higher than normal air consumption and lower than normal speed.	Check for proper Motor alignment and Lock Ring engagement. Check for damaged O-Ring in Lock Ring groove. Remove Motor Assembly and Re-Install the Motor Assembly. See "Motor Disassembly" and "Motor Assembly".
	Motor Parts Worn	Overhaul Motor. Contact authorized Service Center.
	Worn or broken Spindle Bearings	Replace the worn or broken Bearings. See "Shaft Balancer and Spindle Disassembly" and "Spindle Bearings, AirSHIELD™ and Shaft Balancer Assembly".
Air leakage through the Speed Control and/or Valve Stem.	Dirty, broken or bent Valve Spring, Valve or Valve Seat.	Disassemble, inspect and replace wore or damaged parts. See Steps 2 and 3 in "Housing Disassembly" and Steps 2 and 3 in "Housing Assembly".
Vibration/Rough Operation	Incorrect Pad	Only use Pad Sizes and Weights designed for the machine.
	Addition of interface pad or other material	Only use abrasive and/or interface designed for the machine. Do not attach anything to the Sanders Pad face that was not specifically designed to be used with the Pad and Sander.
	Improper lubrication or buildup of foreign debris.	Disassemble the Sander and clean in a suitable cleaning solution. Assemble the Sander. (See "Service Manual")
	Worn or broken Rear or Front Motor Bearing(s)	Replace the worn or broken Bearings. See "Motor Disassembly" and "Motor Assembly".
	For central vacuum machines it is possible to have too much vacuum while sanding on a flat surface causing the pad to stick to the sanding surface.	For CV machines reduce vacuum through the vacuum system.

