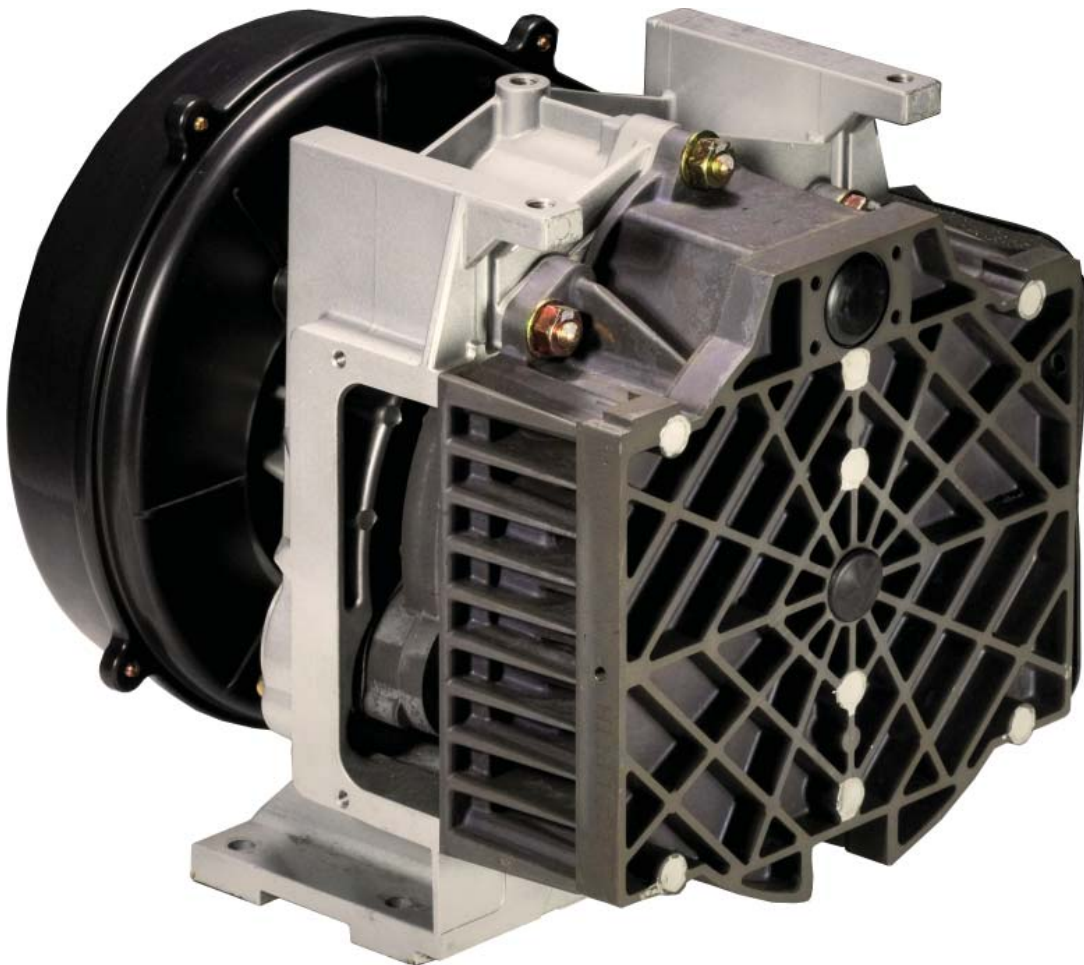




Authorized Distributor Only

OILLESS SCROLL AIR END MAINTENANCE MANUAL AND PARTS LIST



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For proper and safe use of the compressor, please follow all instructions and safety precautions as identified in this manual, along with general safety regulations and practices.

Printed in U.S.A.

SAFETY AND PRECAUTIONS

Before you install the air compressor you should take the time to carefully read all the instructions contained in this manual. Electricity and compressed air have the potential to cause severe personal injury or property damage. Before installing, wiring, starting, operating or making any adjustments, identify the components of the air compressor using this manual as a guide. The operator should use common sense and good working practices while operating and maintaining this unit. Follow all procedures and piping accurately. Understand the starting and stopping sequences. Check the safety devices in accordance with the following procedures contained in this manual. Maintenance should be done by qualified personnel, accurately with proper tools. Follow the maintenance schedule as outlined in the manual to ensure problem free operation after start up.

SAFETY PRECAUTIONS BEFORE INSTALLING THE COMPRESSOR OR PERFORMING ANY MAINTENANCE READ THIS MANUAL CAREFULLY.

WARNINGS

COMPRESSED AIR AND ELECTRICITY ARE DANGEROUS. BEFORE DOING ANY WORK ON THIS UNIT, BE SURE THE ELECTRICAL SUPPLY HAS BEEN SHUT OFF (LOCKED AND TAGGED) AND THE ENTIRE COMPRESSOR SYSTEM HAS BEEN VENTED OF ALL PRESSURE.

1. Do not remove the cover, loosen or remove any fittings, connections or devices when this unit is operating or in operation. Hot liquid and air that are contained within this unit under pressure can cause severe injury or death.
2. The compressor has high and dangerous voltage in the motor, the starter and control box. All installations must be in accordance with recognized electrical procedure. Before working on the electrical system, ensure that the system's power has been shut off by use of a manual disconnect switch. A circuit breaker or fuse switch must be provided in the electrical supply line to be connected to the compressor. The preparation work for installation of this unit must be done on suitable ground, maintenance clearance and lightning arrestors for all electrical components.
3. Do not operate the compressor at a higher discharge pressure than those specified on the compressor nameplate. If so an overload will occur. This condition will result in electric motor compressor shutdown.
4. Use only safety solvent for cleaning the compressor and auxiliary equipment.
5. Install a manual shut off valve (isolation type) in the discharge line for service work.
6. Whenever pressure is released through the safety valve during operation, it is due to excessive pressure in the system. The cause of excessive pressure should be checked and immediately corrected.
7. Before doing any mechanical work on the compressor,
 - a) Shut down the unit.
 - b) Electrically isolate the compressor by use of the manual disconnect switch in the power line to the unit. Lock and tag the switch so that it cannot be operated.
 - c) Release all compressed air within the system and isolate the unit from any other sources of air.
8. Allowing the unit lubricants to enter into the plant air system must be avoided at all times. Air line separators, which are properly selected and installed, can reduce any liquid carry-over close to zero.
9. Before starting the compressor, the maintenance instructions should be thoroughly read and understood.
10. After maintenance work is completed, covers must be securely closed.
11. For questions contact your distributor before proceeding.

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1. BASIC MAINTENANCE TABLE

Item	Check	Run Time (3.51 KL/H)		Run Time (3.51 KL/H)	
		Regular Maintenance	Disassembly Maintenance	Regular Maintenance	Disassembly Maintenance
		5,000 Hr. or 2 years	15,000 Hr. or 6 years	10,000 Hr. or 4 years	20,000 Hr. or 8 years
Bearing Grease	Re-grease	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OS Center Bearing	check exchange	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pin Crank Bearing	check exchange	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Bearing Cover	check exchange	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Crank Shaft Bearing	check exchange	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Tip Seal	check exchange	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Basic Pully	check exchange	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sirocco Fan	check exchange	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Os, Fs Fin	cleaning				
Fan Duct, Cover	cleaning				
Sirocco	cleaning				
Housing	cleaning				

☐ : check, ☒ : exchange or check

CAUTION

1. Routine maintenance and disassembly maintenance, must be applied when the hourly or time schedule comes due, which ever comes first.
2. Regular maintenance, disassembly maintenance standard: It is applied when the standard use condition and installation environment are satisfactory and when the surrounding environment or operation condition is weak, the period or time for regular maintenance and disassembly maintenance must be shortened.
3. The regular maintenance and disassembly maintenance are not part of the guarantee.
4. Cleaning: When the surrounding environment or operation condition are service(high heat or dirty environment), the cleaning time or periodic maintenance intervals must be shortened. (3,51KL/H) per 2,500 hours)

2. REGULAR MAINTENANCE

2.1 Preparation

1) Tools

A) screw driver (+ cross-tip)



B) 17mm hand socket, extension, ratchet handle



C) Holding Spanner

D) Low pressure compressed air

E) Torque wrench, in-lbs

2.2 Disassembly order and method

1) Fan duct

A) Loosen the 3 upset type M6 bolts and separate the fan duct.



2) Fan cover (external)

A) Loosen the 5 tapping screw M6 bolts and separate the fan cover.



3) Basic pulley

- A) Take off the hexagon socket head cap screws with a spanner in the balance weight of pulley rotation direction and remove the pulley/fan assembly.



4) Fan cover (internal)

- A) Separate the fan cover by loosening the 3 screws.



5) Fixed scroll set

- A) Separate the fixed scroll by removing six(6) self locking nuts.



2.3 Cleaning

1) Orbiting scroll cooling fin

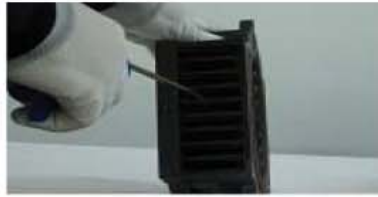
- A) Remove dust and dirt attached to the cooling fin using compressed air gun.



- B) Do not clean the orbiting scroll set with organic solvent (thinner, solvent)

2) Fixed scroll cooling fin

A) Remove dust and dirt attached to the cooling fin using compressed air gun.



B) Do not clean the orbiting scroll set with organic solvent (thinner, solvent).

NOTE

Damage may occur to special protective coating.

3) Fan cover & duct

A) Remove dust and dirt attached to the fan cover and duct using air gun.



4) Sirocco fan

A) Remove dust and dirt attached to the sirocco fan using air gun.



2.4 Maintenance

NOTE

Conduct maintenance in a clean location to prevent pollution and damage to the scroll maintenance parts. Use only recommended high temperature grease. (Consult your distributor)

- 1) Injecting grease into orbiting scroll center bearing
A) Remove the dust cap on the top rib or left of housing.



- B) The crank shaft key must be in 7 o'clock direction when seen from the front.



- C) Insert the nozzle connected to the grease gun into the housing dust cap hole and connect to the grease nipple attached to the crank.



NOTE

Move the crank shaft from left to right and check the joint state of the grease nozzle and nipple. Bearing should rotate smoothly and quietly.

- D) Press the grease gun button and inject grease.



NOTE

Keep the nipple securely on the grease gun nozzle so that grease does not leak between the grease gun nozzle and nipple. Rotate the crank so the grease is applied evenly within the bearing, do not over grease.

E) After injecting the grease, fit the housing with the dust cap.



2) Injecting grease into pin crank bearing

A) Use a flat screw driver to remove the 3 bearing grease caps behind the housing.



B) Apply grease onto the pin crank orbiting scroll shaft bearing. Use a needle grease nozzle, apply grease evenly within the bearings, do not over grease.



C) Stick the grease gun nozzle closely into the pin crank bolt nipple and press the grease gun button about 3 to 4 times to supply grease to the housing bearing.



CAUTION

Stick closely so that grease does not leak between the grease gun and pin crank nipple when injecting the grease.

- D) Re-assemble the 3 bearing grease caps into their original position, do not force them, hand pressure is adequate.



3) Tip seal set exchange

- A) Separate the high pressure and low pressure tip seal from the top seal by using drill in the fixed scroll set.



- B) Using the same method, separate the dust seal and back up tube.



- C) Using the same method, separate tip seal from the orbiting scroll set.



- D) Lift about 2mm from the high pressure central tip seal and insert into the high pressure tip seal vertical hem and fix with finger tips



CAUTION

LIP formed on the tip seal floor, insert for the front V groove to face the wrap center.

- E) Insert high pressure tip seal using the same method.
- F) Insert low pressure tip seal into the end of the high pressure tip seal and press down with finger tip and insert and cut according to tip seal groove with a knife.



- G) Insert low pressure tip seal using the same method.
- H) When fixing a backup tube to the fixed scroll set, the joint must face 6 o'clock direction.



- I) Fit the dust seal on top of the back up tube and make the joint face 3 o'clock direction.



CAUTION

The top and bottom are not distinguishable when assembling dust seal.

2.5 Assembly

1) Fixed scroll set

A) Assemble the fixed scroll set according to the housing parallel pin location.



B) Temporarily assemble self-locking nuts then tighten with cross pattern sequence using a torque wrench.



[TORQUE] 260 lbf .inch(30Qkgf .cm)

2) Sirocco fan & fan cover, duct

A) Fit three belts onto the fan cover (internal)



- B) Tighten the hexagon socket head cap screws with a spanner in the balance weight of pulley reverse-rotation direction to assemble the pulley sirocco fan assembly.



Torque : 14.5 foot-pounds (200kgf.cm)

- C) Close the fan cover (external) with tapping screw.



CAUTION

When tightening tapping screw, please be careful so that the screw thread does not get damaged.

3. DISASSEMBLING MAINTENANCE (OVERHAUL)

3.1 Maintenance jig and tool

A) Orbiting scroll center bearing disassembling jig.

B) Orbiting scroll set axial direction gap adjusting jig.



C) Crank shaft set injection press 1 TON.

D) Torque wrench (1): 0 - 87 lbf.inch (0 - 100 kgf.cm), Torque wrench (2): 0 - 347 lbf.inch (0 - 400 kgf.cm).



E) Socket Wrench: M5, M6, M8, M10.



F) Hand Socket: 17mm & extension.



G) Phillips Screwdriver.



3.2 Exchange Parts

A) Orbiting scroll pin crank bearing cover set.



B) Housing pin crank bearing cover set.



C) Pin crank set.



D) Crank shaft set.



E) Orbiting scroll center bearing.



F) Orbiting scroll center bearing grease seal



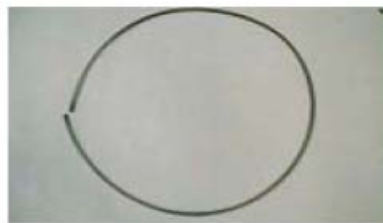
G) Fixed scroll tip seal set.



H) Orbiting scroll tip seal set, left photo below.



I) Dust seal, backup tube, right photo below.



3.3 Disassembly order and method.

1) Fan Duct

A) Loosen the 3 type M6 bolts and separate the fan duct.



2) Fan Cover (External)

A) Loosen the 5 tapping screws M6 bolts and separate the fan cover.



3) Basic Pulley

A) Take off the hexagon socket head cap screws with a spanner in the balance weight of the pulley rotation direction and separate the basic pulley, sirocco fan assembly.



4) Fan Cover (internal)

A) Separate the fan cover by loosening the 3 upset bolts.



5) Fixed Scroll Set

A) Loosen the 6 self-locking nuts and separate the fixed scroll set.



6) Orbiting Scroll Set

- A) Remove the 3 bearing covers behind the housing assembly using a M6 socket wrench, and remove the 3 pin crank bolts using a 12mm hand socket by placing the wrench in the pulley balance weight rotating counter-clockwise.



- B) Holding the orbiting scroll set with the hand and remove from the housing assembly.



CAUTION

Do not remove the orbiting scroll rear plate fit M5 hexagon socket head cap screws and orbiting scroll of the orbiting scroll set.

- C) Remove the crank bearing assembly cover hexagon socket head cap screws of the orbiting scroll rear plate and remove the pin crank set by pulling.



- D) Remove the O-ring using an O-ring pick,



7) Crank Shaft Set

- A) remove the hexagon socket head cap screws of the bearing cover attached to the housing.



- B) Support the housing set with a jig and remove the crank shaft with a press.



- ☑ Directly press the crank shaft set with a press.
- ☑ Apply the press load gradually, and when the crank shaft assembly starts to move, work at a minimum load.

☞ **Press Load: 694 lbf.inch (800 kgf.cm)**

8) Ball Bearing

- A) Using a jig, remove the ball bearings of housing with a press

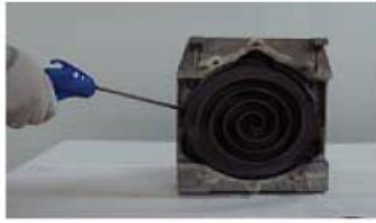


<p style="text-align: center;">WARNING BE CAREFUL NOT TO DAMAGE THE HOUSING WHEN USING A JIG.</p>

3.4 Cleaning

1) Orbiting scroll cooling fin.

A) Remove dust and dirt attached to the cooling fin using compressed air.

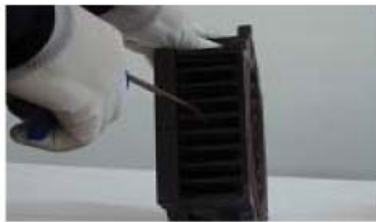


B) Do not clean the orbiting scroll with organic solvent (thinner, solvent).

CAUTION
Damage may occur to protective coating on metal components.

2) Fixed scroll cooling fin.

A) Remove dust and dirt attached to the cooling fin using air gun.



B) Do not clean the orbiting scroll set with organic solvent (thinner, solvent).

3) Fan Cover & Duct

A) Remove dust and dirt attached to the fan cover and duct using air gun.



4) Sirocco Fan

A) Remove dust and dirt attached to the sirocco fan using air gun.



3.4.5) Remove dust inside the housing using an air gun. What does not get removed with an air gun, use a brush or a dry cloth.



CAUTION
Do not use organic solvent.
Damage may occur to protective coating on metal components.

3.5 Assembly

- 1) Ball Bearing Housing Assembly
 - A) Check whether the part is the correct part.



- B) Before installing the bearing, apply some grease to the bearing contact area of the housing.

- C) Support the inside of the housing using 3 jigs, and inject the ball bearing using a jig, with a press.



CAUTION
Use caution on the installation of ball bearing.

- D) Bearing installation load: 1100 lbf (500 kgf)
- E) Remove the bearing from inside of the bearing to the opposite side.



2) Bearing Cover Assembly

- A) Screw in the bearing cover with hexagon socket head cap screws using proper torque.



☞ **Tightening torque: 61 lbf.inch (70 kgf.cm)**

3) Crank Shaft Housing Assembly

- A) Support the housing set with a jig and install the crank set with a press.



- B) Before installing the crank shaft, apply some grease to the bearing contact surface in the housing installation.

☞ **Press injection load: 694 lbf.inch (800 kgf.cm)**

C) Screw in the bearing cover with hexagon socket head cap screws using proper torque.



☞ **Tightening torque: 61 lbf.inch (70 kgf.cm)**

4) Orbiting Scroll Center Bearing Assembly

A) Put the orbiting scroll center bearing on top of the orbiting scroll set and install using a jig with a press.



B) Before installing the bearing, apply some grease to the orbiting scroll center bearing contact area.

C) Place the oil seal on top of the orbiting scroll center bearing and install using a jig, with a press.



CAUTION

The oil seal must be on the same side with the top boss of the orbiting scroll set.

5) Pin Crank Set Assembly

- A) Apply grease from the cartridge onto the 6 O-rings and insert into the O-ring groove of orbiting scroll set.



- B) Apply grease to the rest of the O-rings and insert into the crank set.



- C) Insert the crank set into the orbiting scroll set and tighten the bearing cover with hexagon socket head cap screws once, then a second time with a torque wrench.



- ☞ **1st torque: 17.4 lbf.inch (20 kgf.cm)**
☞ **2nd torque: 34.7 lbf.inch (40 kgf.cm)**

- D) Turn the pin crank set by hand and check whether it rotates smoothly.



6) Assembling Orbiting Scroll Set in the Housing

A) Maintain the location of crank shaft balance weight horizontally.



B) Determine the location of pin crank of orbiting scroll set.

C) Adjust the location so that the eccentric part of the pin crank is at the 6 o'clock position.



D) When assembling orbiting scroll set in the housing, press in evenly top, bottom, right and left.



CAUTION

Do not apply excessive force.

E) Place a flat washer on the housing set back orbiting scroll bearing side and assemble crank bolt then use the spanner to close the pin crank bolt with 26 lbf.inch (30 kgf.cm) in the state the crank shaft is supported and tighten with a torque wrench.



F) Tighten the bearing cover with 35 lbf.inch (40 kgf.cm) with 3 hexagon socket head cap screws.



NOTE

In order to prevent loosening of the bolt, apply Loctite 242, 542

G) Check the gap in the assembled fixed scroll on the orbiting wrap floor and housing plan surface.



☞ **Gap: 0.2 mm**

7) Adjusting axial direction gap.

A) Fix the jig onto the housing plan surface.

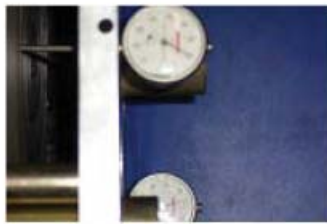


☞ **Fix 4 parts**

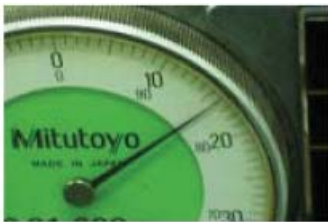
- 2) Turn the 3 inch dial gauge number adjusting board by hand so the long hand of the dial gauge points at "0" location.



- 3) When the small hand of the dial gauge reads the "0" location, tighten the 3 bearing cover hexagon socket head cap screws behind the housing gradually with evenly distributed force.



- 4) Adjusting method with the 3 inch dial gauge scales indicates A: -16mm, B: -18mm or C: -21mm



"A"



"B"



"C"

- 5) Stage 1: Tighten the hexagon socket head cap screws of "C" equally and adjust at -16mm of "A"



- 6) Stage 2: Tighten the hexagon socket head cap screws of "B" equally and adjust at -16mm of "A".

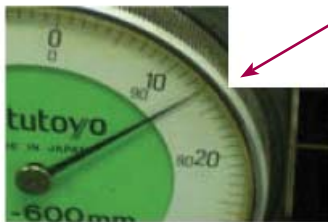


- 7) Stage 3: Tighten the hexagon socket head cap screws of "A", "B" and "C" equally and adjust at -0.13mm.



☞ **Adjustment standard: -0.13 to -0.14**

- 8) After adjusting, rotate the crank shaft once and check that the dial gauge scale amplitude is within 0.02mm.



- 9) Assemble the grease cap on the bearing cover.



8) Tip Seal Set assembly

- A) Separate the high pressure and low pressure tip seals from the top seal by using a drill in the fixed scroll set.



- B) Using the same method, separate the dust seal and back up tube.



- C) Using the same method, separate tip seal from the orbiting scroll set.
D) Lift about 2mm from the high pressure central tip seal and insert into the high pressure tip seal vertical hem and fix with finger tips



CAUTION

LIP formed on the tip seal floor, insert for the front V groove to face the wrap center.

- E) Insert high pressure tip seal using the same method.
F) Insert low pressure tip seal into the end of the high pressure tip seal and press down with finger tip and insert and cut according to tip seal groove with knife.



F) Insert low pressure tip seal using the same method.

G) When fixing a backup tube to the fix scroll set, the joint must face 6 o'clock direction.



H) Fit the dust seal on top of the back up tube and make the joint face the 3 o'clock position.



CAUTION

The top and bottom is not distinguishable when assembling dust seal.

9) Fixed Scroll Set assembly

A) Assemble the fixed scroll set according to the housing parallel pin location.



- 2) Assemble with 6 self-locking nuts then tighten with regulated torque by using torque wrench using cross pattern sequence.



☞ **Tightening torque: 260 lbf.inch (300 kgf.cm)**

10) Sirocco Fan & Fan Cover, Duct

- A) Fit 3 upset bolts onto the fan cover (internal).



- B) Close the hexagon socket head cap screws with a spanner in the balance weight of pulley (reverse rotation direction) to assemble the basic pulley with attached sirocco fan.



☞ **Tightening torque: 174 lbf.inch (200 kgf.cm)**

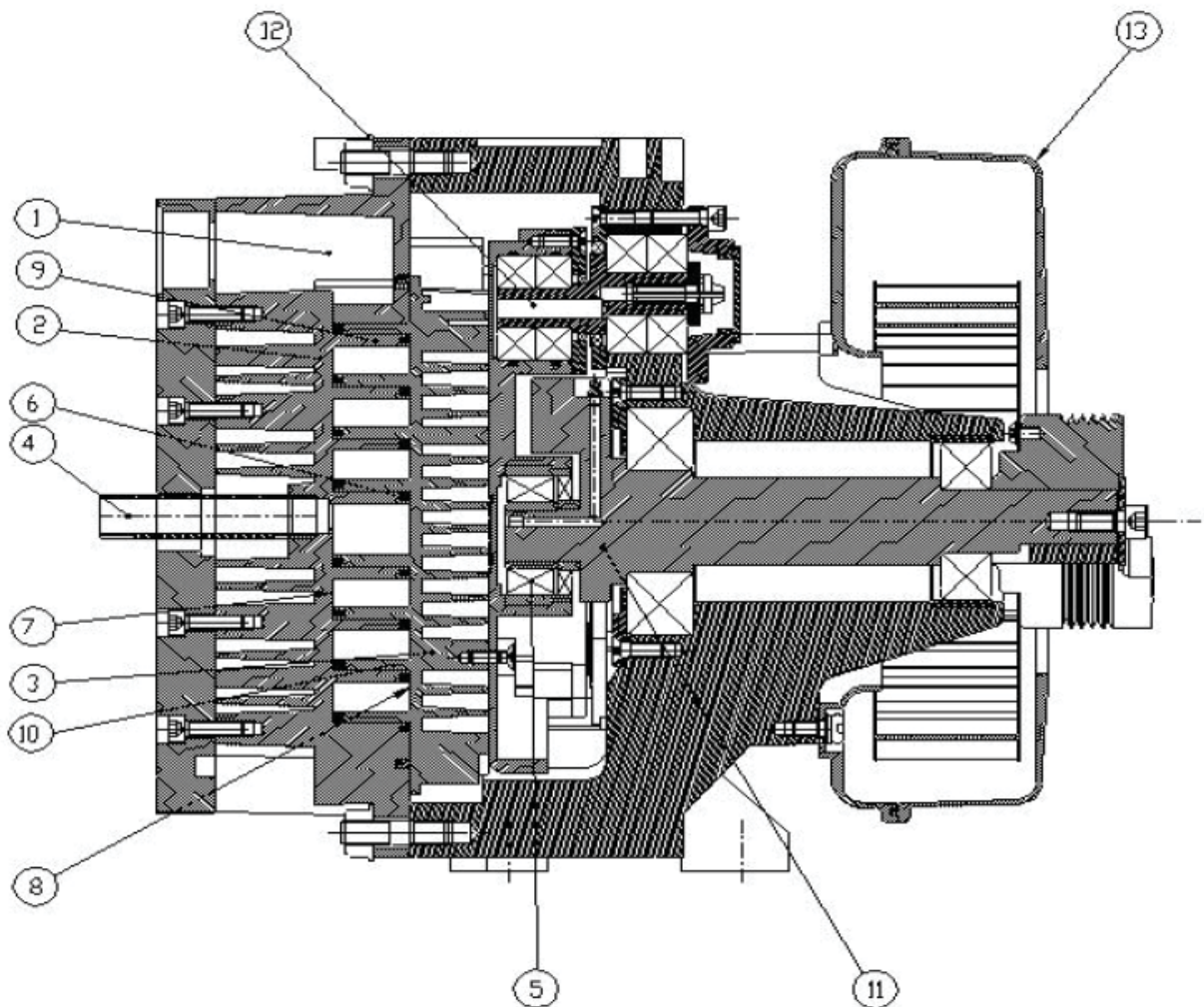
- C) Attach the fan cover (external) with tapping screws.



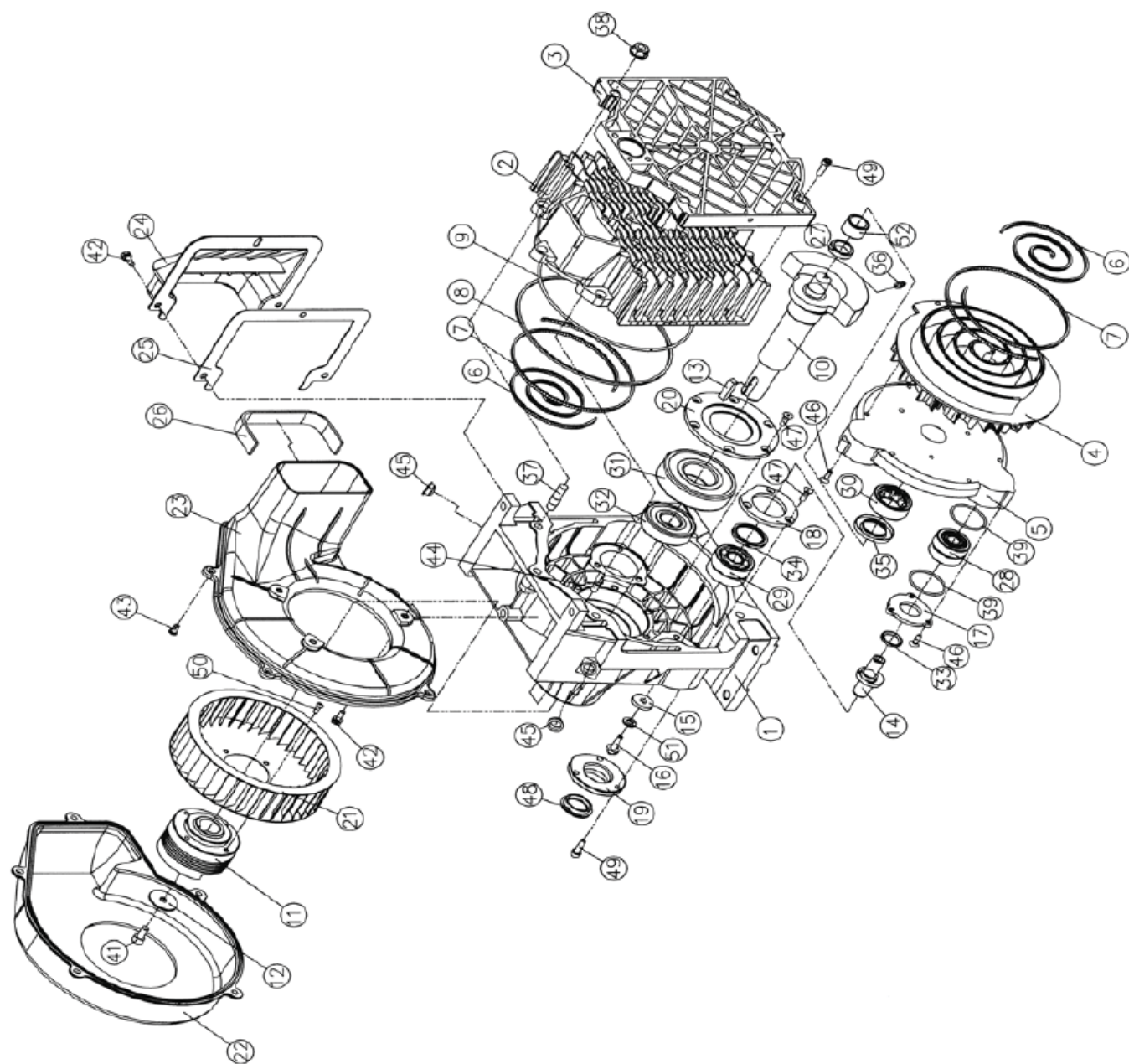
CAUTION
When tightening tapping screws, please be careful so that the screw thread does not get damaged.

4 Basic Section View

- ①: Intake Port
- ②: Fixed Scroll
- ③: Orbiting Scroll
- ④: Discharge Pipe
- ⑤: Orbiting Scroll Center Bearing
- ⑥: Tip Seal
- ⑦: Fixed Scroll Driving Surface
- ⑧: Orbiting Scroll Driving Surface
- ⑨: Fixed Scroll Wrap
- ⑩: Orbiting Scroll Wrap
- ⑪: Crank Shaft
- ⑫: Pin Crank
- ⑬: Fan Cover



5 Basic Exploded View



5.1 Parts List

Part No.	Part Name	Qty	Part No.	Part Name	Qty	Part No.	Part Name	Qty
1	Housing	1	18	Bearing Cover (2)	3	35	Oil Seal	1
2	FS (Fixed Scroll)	1	19	Bearing Cover (3)	3	36	Grease Nipple	1
3	FS Rear Plate	1	20	Bearing Cover (4)	1	37	Stud Bolt	6
4	OS (Orbiting Scroll)	1	21	Sirocco Fan	1	38	Washer Nut	6
5	OS Rear Plate	1	22	Fan Cover (1)	1	39	O-Ring	6
6	HP Tip Seal	2	23	Fan Cover (2)	1	41	Hex Socket Head Bolt	1
7	LP Tip Seal	2	24	Fan Duct	1	42	Upset Bolt	6
8	Backup Tube	1	25	Duct Packing (1)	1	43	Tapping Screw	5
9	Dust Seal	1	26	Duct Packing (2)	1	44	Dowel Pin	2
10	Crank Shaft	1	27	Oil Seal Race	1	45	Dust Proof Cap	2
11	Comp. Pulley	1	28	Angular Bearing	3	46	Socket Plate Head Bolt	18
12	Pulley Washer	1	29	Angular Bearing	3	47	Socket Plate Head Bolt	15
13	Key	1	30	OS Driving Bearing	1	48	Grease Cap	3
14	Pin Crank	3	31	Ball Bearing	1	49	Hex Socket Head Bolt	17
15	Pin Crank Holder	3	32	Ball Bearing	1	50	Button Bolt	4
16	Pin Crank Holder	3	33	G Seal	3	51	Spring Washer	3
17	Bearing Cover (1)	3	34	G Seal	3	52	OS Driving Bearing Inner Race	1

6. Assembling Torque Table

Item	Part	Standard	Torque (kgf.cm)
① Bearing support Area	Hexagon Socket Head Cap Screws	M5	40
② Bearing support Area	Hexagon Socket Head Cap Screws	M6	40
③ Bearing support Area	Hexagon Socket Head Cap Screws	M6	70
④ Bearing support Area	Hexagon Socket Head Cap Screws	M6	70
⑤ Pin Crank	Hexagon Socket Head Cap Screws	M8	200
⑥ Basic Pulley	Hexagon Socket Head Cap Screws	M8	200
⑦ Fixed Scroll Set	Nut	M10	300
⑧ Sirocco Fan	Bolt	M5	60

CAUTION
WHEN TIGHTENING BOLTS AND NUTS, USE A TORQUE WRENCH.

Maintenance Parts List			
Bearing Grease	230200	Orbiting Scroll Set - low Pressure	230205
Grease Gun	230201	Crank Shaft	230206
Tip Seal Repair Kit - Low Pressure	230202	After Cooler	230207
Tip Seal Repair Kit - High Pressure	230203	V-Belt, 3 HP	230208
Fixed Scroll Set	230204	V-Belt, 5 HP	230209

For 24/7 Technical Support,
Call 847-855-6234 For Assistance



Ohio Medical®

1111 Lakeside Drive, Gurnee, IL 60031-4099

Phone: 800-488-0770 or 847-855-0500

Fax: 847-855-6300

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