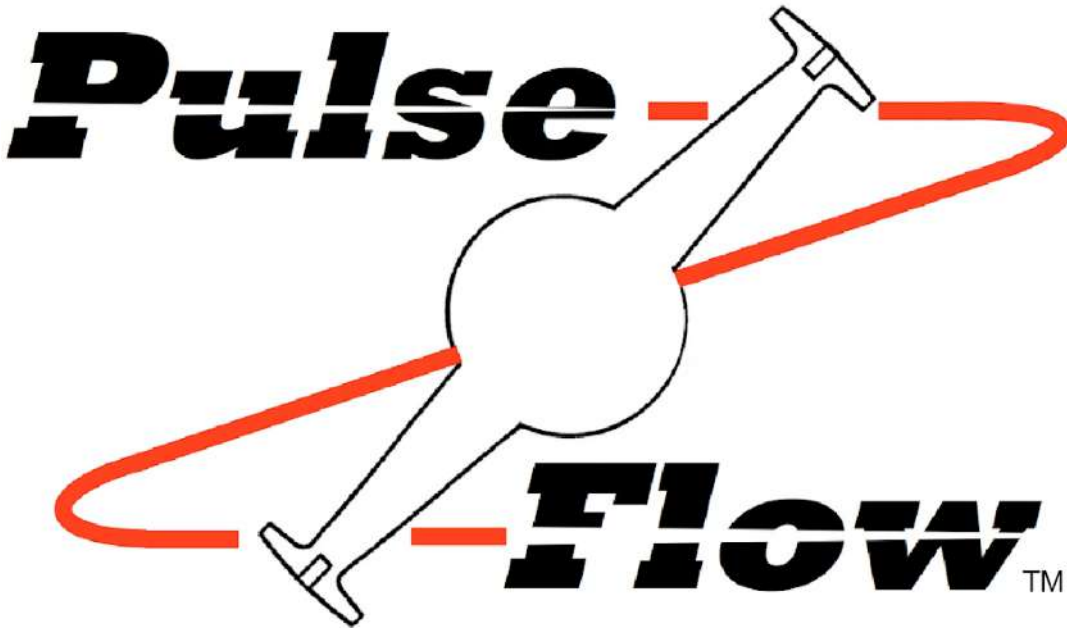


# Dry Bulk Blower Installation Manual

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**WARNING**  
**DO NOT OPERATE**  
**MACHINERY**  
**BEFORE READING**  
**MANUAL FULLY**

Model	603FF 603RF	Drivers Side Passenger Side
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603 Blower Installation Manual 09/17/2019



Table of Contents	Page
Safety Precautions .....	2
Safety Check List .....	2
Blower Specifications .....	3-4
Mounting the Blower .....	4-6
Lubrication / Operation Instructions .....	7
Electric Blower Package .....	9-10
Spare Parts .....	11-15
Warranty .....	16

**SAFETY INSTRUCTIONS**

1. Do not operate before reading the enclosed instruction manual.
2. Use adequate protection, wearing any safety equipment necessary to protect against the hazards involved in installation and operation of this equipment

**DANGER**

Keep body and clothing away from drive shaft

**WARNING**

Keep body and clothing away from machine openings

**WARNING**

Do not touch hot surfaces

**WARNING**

Hearing and Eye Protection Required

# Safety Precautions

- Rotating shafts can be dangerous. You can snag clothes, skin, hair, and hands. This can cause serious injury or death.
- Do not work under the vehicle when the engine is running.
- Do not work on a shaft (with or without guard) when the engine is running.
- In order to avoid becoming entangled, install the power take off and/or shaft behind the frame rail, tanks, or battery box.
- If the power take off and/or shaft are still exposed after installation, install a guard.
- Install a support strap when servicing a drive shaft to prevent personal injury.
- A serious or fatal injury can occur...
  - If you lack proper training.
  - if you fail to follow proper procedures.
  - if you do not use proper tools and safety equipment.
  - if you assemble driveline components improperly.
  - if you use incompatible driveline components.
  - if you use worn-out or damaged driveline components.
  - if you use driveline components in a non-approved application.

- This manual contains safety instructions.

Read, understand and follow this manual.

- Get proper training.
- Learn and follow safe operating procedures.
- Use proper tools and safety equipment.
- Use proper components in good condition.

# Safety Check List

## Complete prior to blower operation

Truck # \_\_\_\_\_

Transmission # \_\_\_\_\_

P.T.O. # \_\_\_\_\_

(Use only SH P.T.O. or heavier duty)

P.T.O. Ratio \_\_\_\_\_

603 FF - Driver Side /

RF - Passenger Side

Blower  
(Circle One)

Blower serial # \_\_\_\_\_

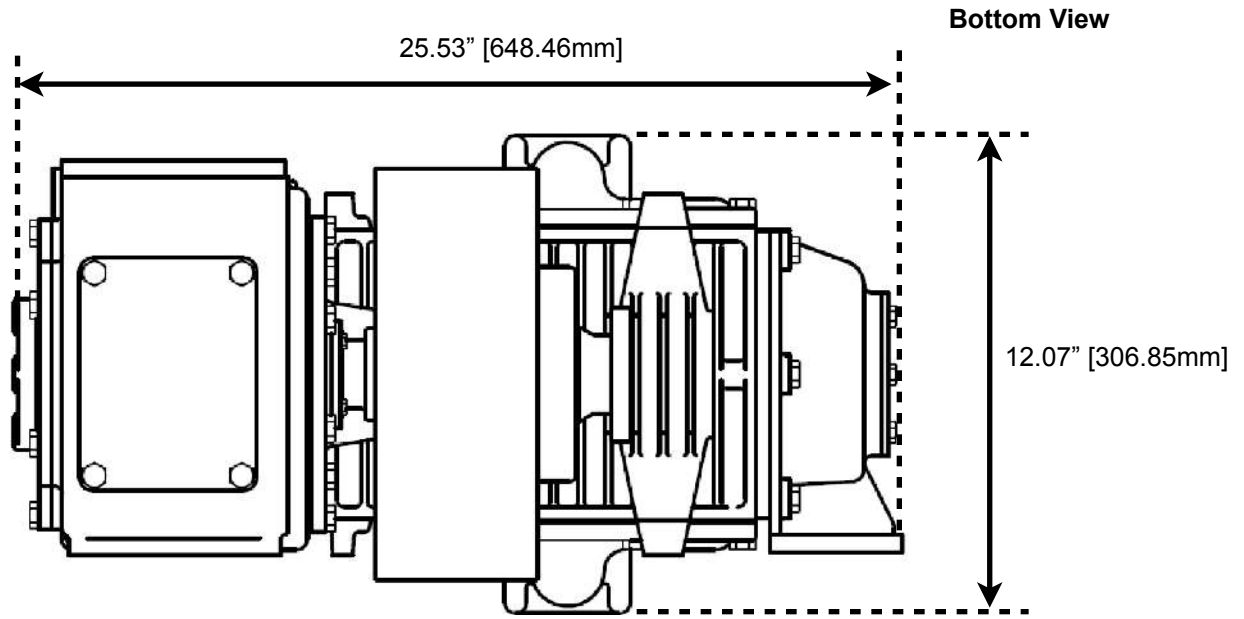
Date \_\_\_\_\_

Inspected by \_\_\_\_\_

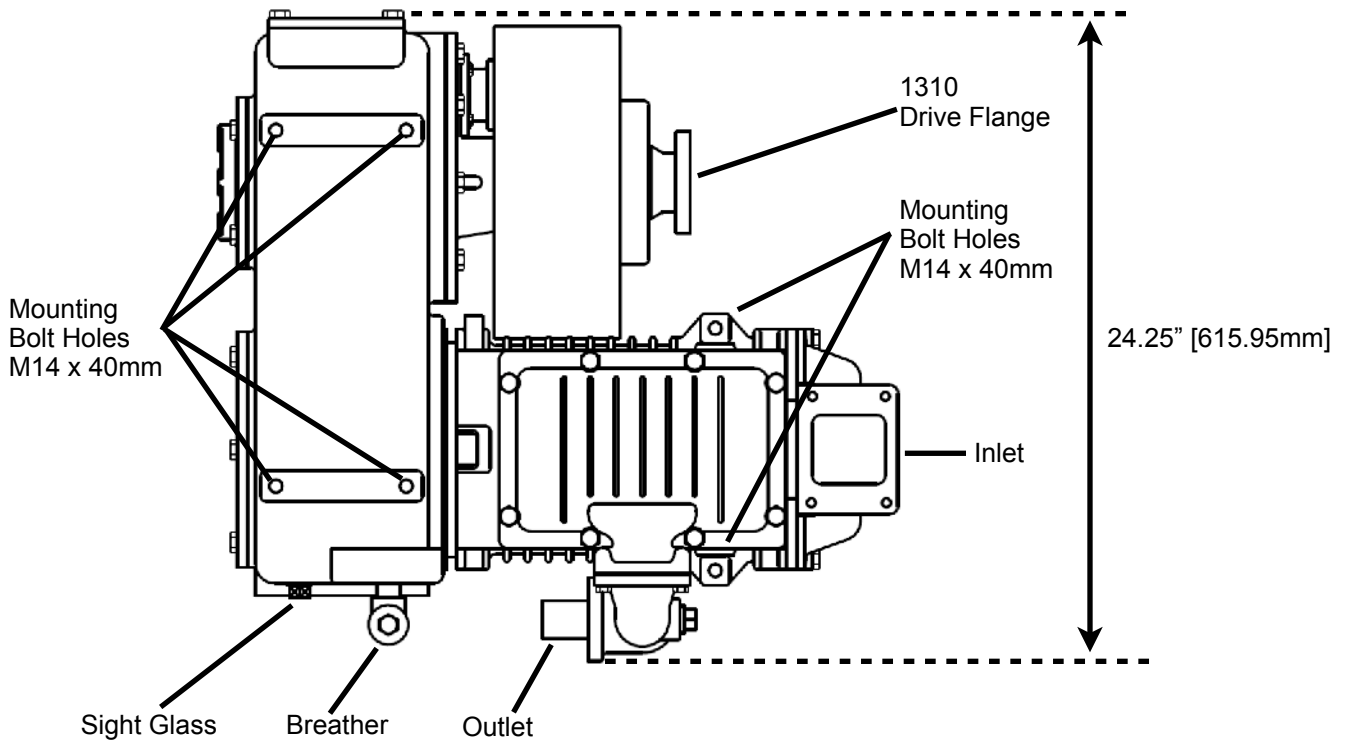
- Is P.T.O. ratio, for 1050 Blower RPM correct?
- Mount P.T.O. as per manufacturer's recommendations and refill transmission.
- Ensure oil level is at the center of the sight glasses.
- Driveline installed correctly with fasteners and lockwires secured; and blower can be rotated by hand.
- Air inlet filter is connected and mounted away from tractor exhaust.
- Remove camlock dust cap, discharge pipework open to atmosphere.
- Tractor engine at idle. Slowly engage P.T.O. Check for correct rotation and airflow.
- Slowly take blower up to operating speed.
- Confirm material "push" does not exceed 100' [30.5m] vertical or 150' [46m] combined horizontal and vertical.
- Hopper butterfly valves open 50%-60% (one at a time) during offload procedure.
- Check for oil leaks and mounting integrity.
- Stop blower. Connect blower discharge hose to trailer and run blower at operating pressure of trailer (15 psi) [1.03 BAR] for 15 minutes at normal speed.
- Does relief valve allow 15 psi [1.03 BAR] tank pressure?
- Does engine maintain correct rpm throughout the test?
- Turn off truck engine, wait for blower to stop turning. Check filter and pipework for integrity.
- Is correct engine speed label visible in cab?

# Blower Specifications

Passenger side mount (shown below)



**Top View**



# Blower Specifications (continued)

Blower	Air Flow C.F. M	Max Pressure	Blower Speed RPM	Bare Weight
603	225 [382 m <sup>3</sup> /h]	36 psi [2.48 BAR]	Maximum 1100	396 lbs [180 kg]

Blower Speed RPM	Pressure, Performance, and Horsepower									
	12 PSIG		16 PGIG		20 PSIG		25 PSIG		30 PSIG	
	CFM	HP	CFM	HP	CFM	HP	CFM	HP	CFM	HP
1000	225	21	220	24	215	26	207	28.5	197	31.5

Blower Speed RPM	Pressure, Performance, and Horsepower									
	0.8 BAR		1.1 BAR		1.4 BAR		1.7 BAR		2.1 BAR	
	m <sup>3</sup> /h	kW	m <sup>3</sup> /h	kW	m <sup>3</sup> /h	kW	m <sup>3</sup> /h	kW	m <sup>3</sup> /h	kW
1000	382	15.6	374	17.8	365	19.4	352	21.2	335	23.5

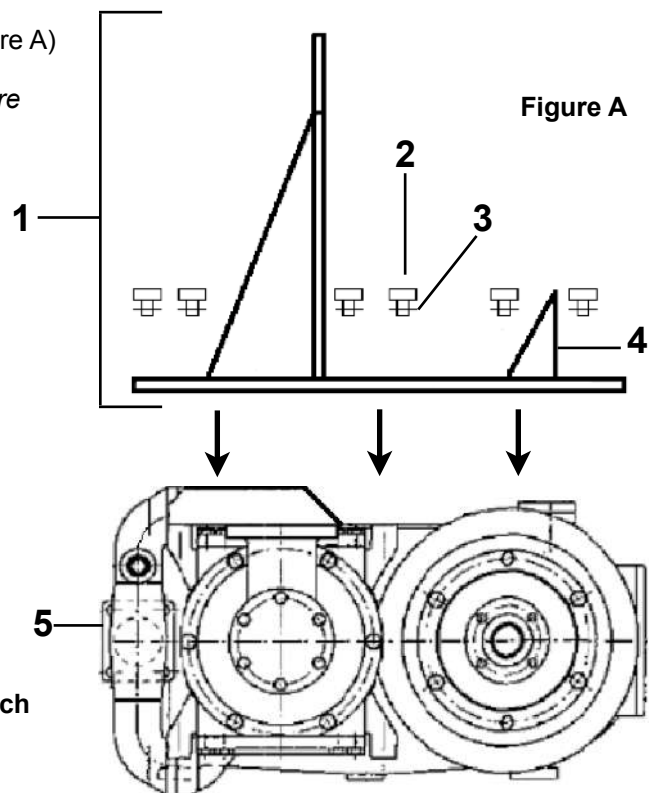
## Mounting the Blower (Passenger Side Mount Shown in Figure A)

- Mount the mounting bracket to the blower. (Figure A)

*Mounting Tip: Make sure inner bracket holes are drilled before mounting bracket to the blower (see image on next page).*

Item #	Description
1	Mounting Bracket
2	Capscrew hex hd - M14 x 40mm plated (6 each)*
3	Washer, Nord-Lock M14 (6 each)
4	Inner Bracket (connecting piece)
5	603 Blower

**\*Tighten (6) M14 x 40mm bolts with torque wrench to 51 ft/lbs [69.15 N·m].**



# Mounting the Blower (continued)

- Mount mounting bracket and blower to **truck frame rail**. (Figure B)

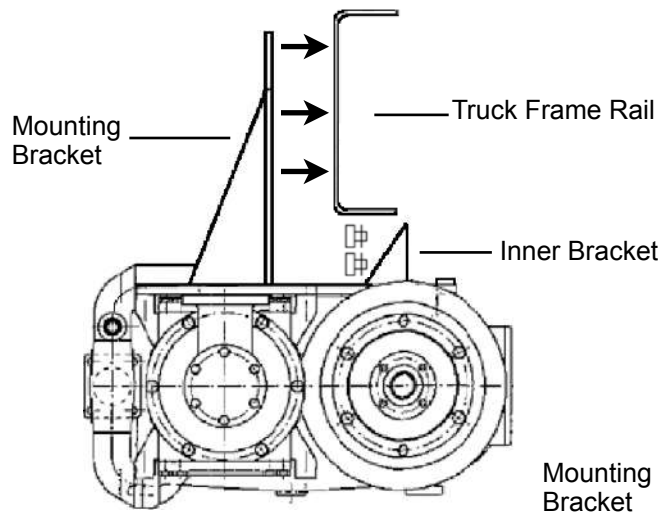
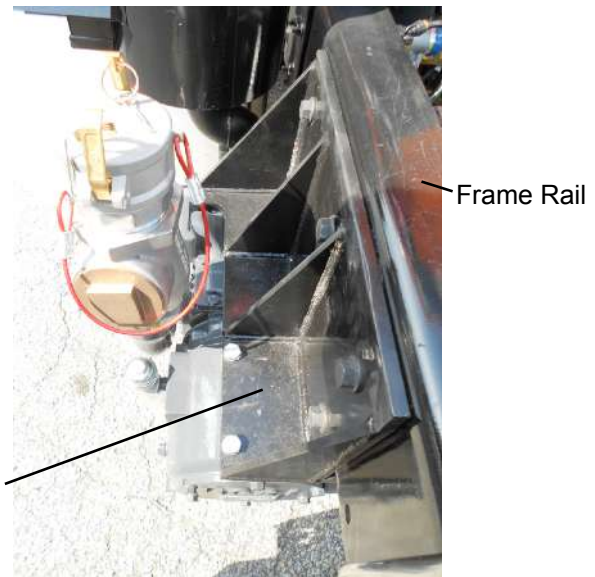


Figure B

Top View



- Bolt **chassis stabilizing bracket** to inner bracket and truck frame. (Figure C & Figure D)

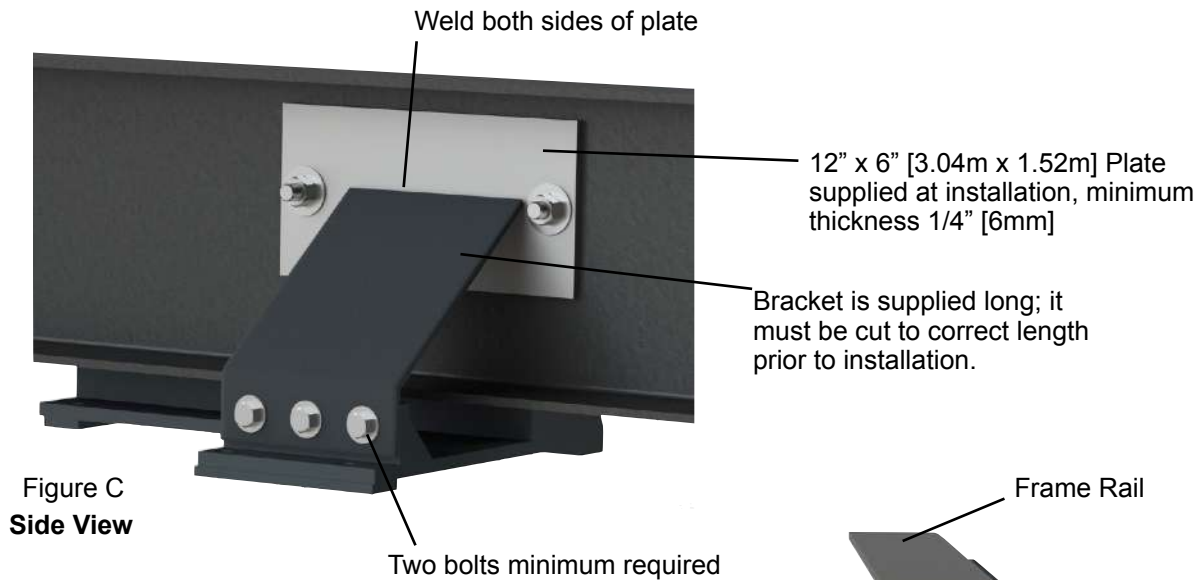


Figure C  
Side View

Two bolts minimum required

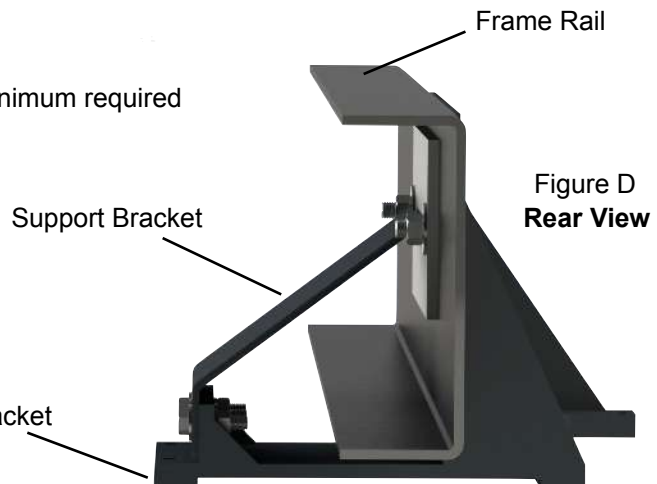
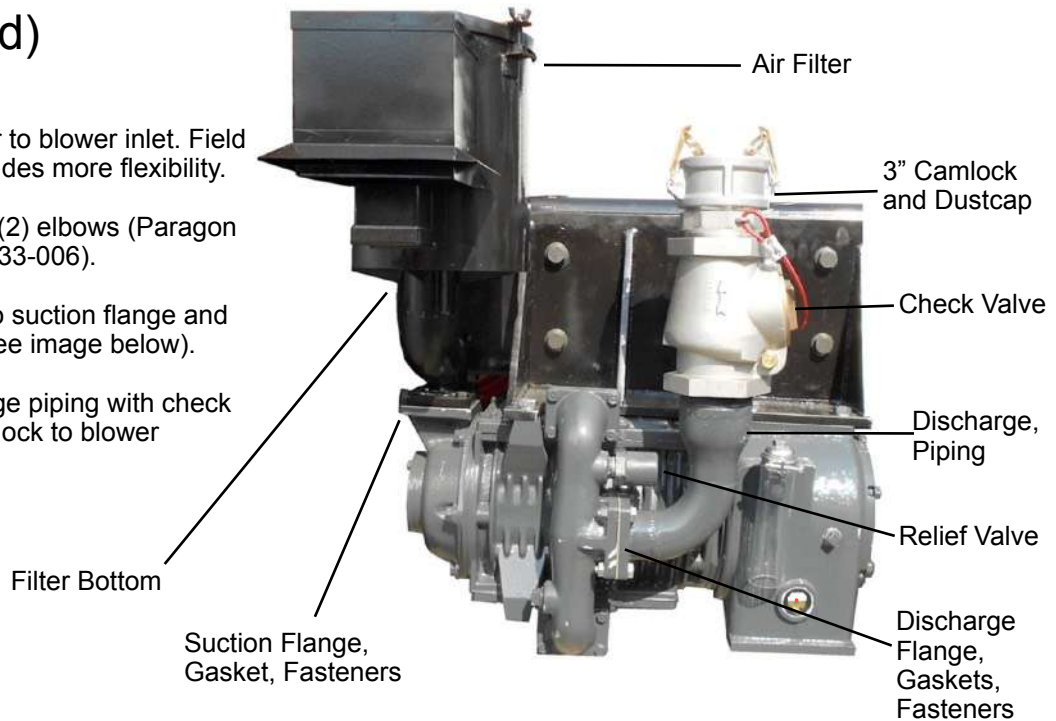


Figure D  
Rear View



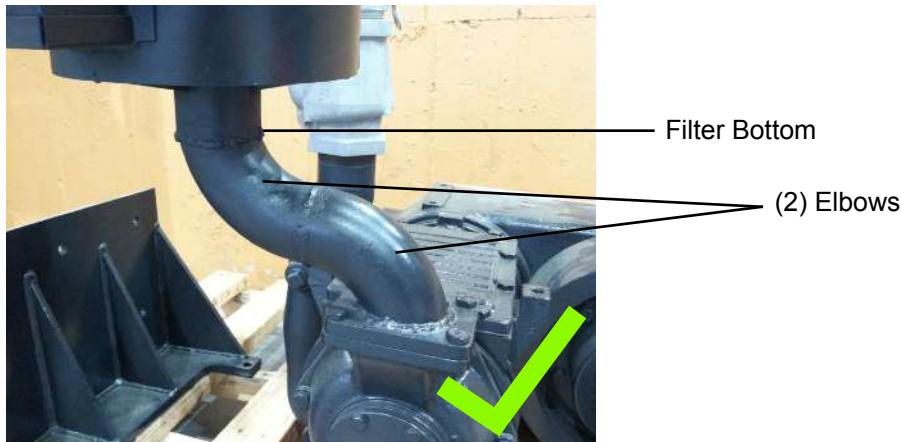
# Mounting the Blower (continued)

- Mount air Filter to blower inlet. Field assembly provides more flexibility.
- Weld together (2) elbows (Paragon Part Number 533-006).
- Weld elbows to suction flange and filter bottom (see image below).
- Mount discharge piping with check valve and camlock to blower discharge.



## Important:

- **Do not** use a straight pipework between suction flange and filter.
- Keep distance between suction flange and filter bottom as short as possible by welding together (2) elbows.
- Distance between suction flange and filter bottom should be no more than 11" [279.4mm].

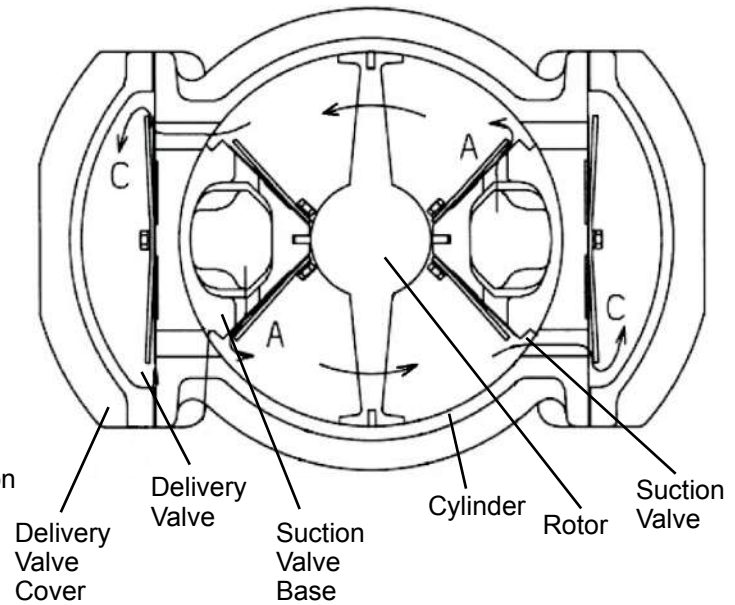


# Blower Operation

*Rotor oscillates clock and counter clockwise*

**As the rotor turns counter clockwise:**

1. Suction valve (A) is opened.
2. Air enters cylinder.
3. Compressed air is discharged through Discharge Valve (C).
4. The valves operate in reverse when the rotor turns clockwise.
5. Each turn of the crankshaft provides suction and discharge twice.



## Lubrication

- Use 30 weight synthetic oil (Paragon part number 409-002)
- Replace oil every 12 months (3 quarts), under normal conditions.
- Oil should be above the red center dot and visible in the sight glass.

Sight Glass  
Filling  
Instructions



Correct Level



Over filled



Under Filled



**Caution** Mixing or incorrect oil can result in gear and bearing failure.



# 603 Blower Electric Package - Part Number 630-003

Stationary blower package with blower, electric motor, V-belt, and frame pre-assembled

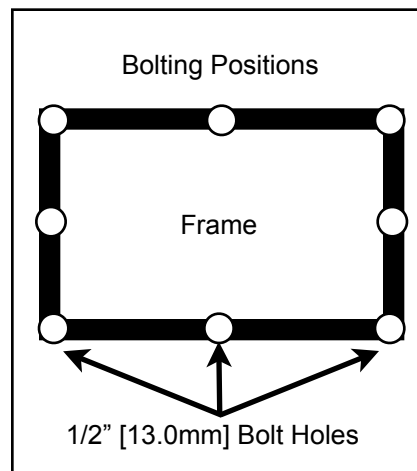
## Wiring

- Wiring from starter box to motor will vary by location.
- Always use lockable switch between power source and starter box.

*\*Recommendation: contact local electrician for wiring instructions from starter box to motor.*

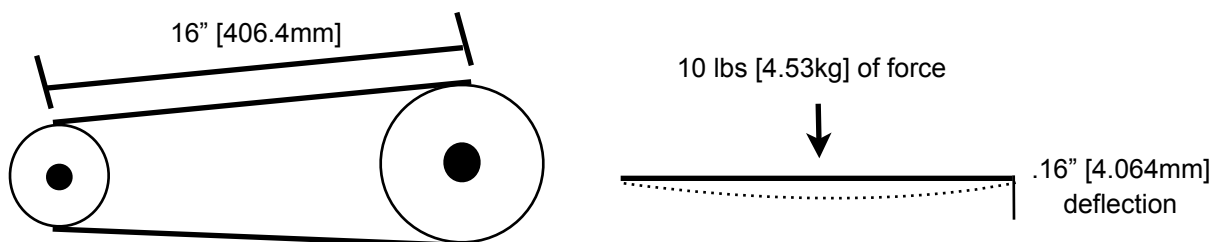
## Bolting

- Bolt frame to a concrete surface, drill (8) 1/2" [13.0mm] bolt holes around the perimeter. Use 1/2" [13.0mm] bolts with a minimum 6" [155mm] deep anchor.

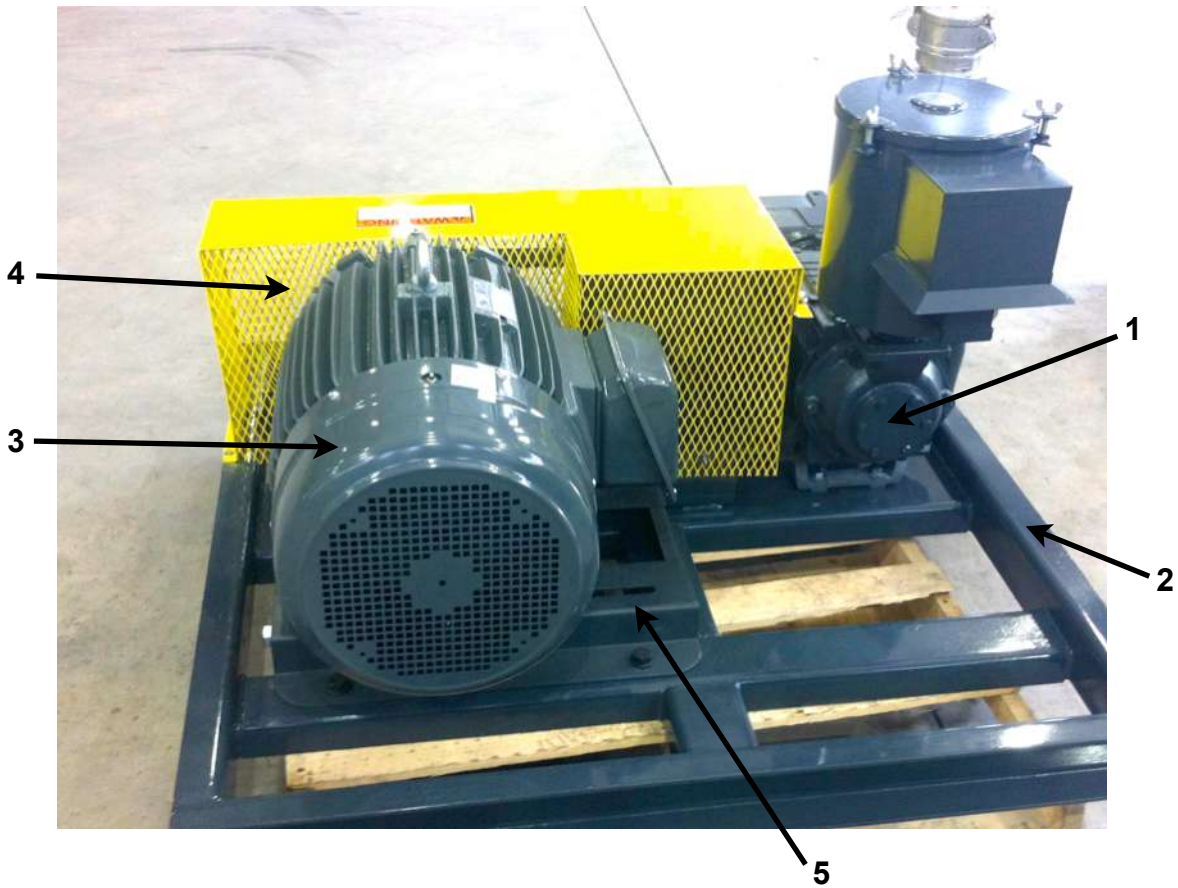


## Checking belt tension

Correct tension is 0.16" [4.064mm] of deflection (when pressed down with 10 lbs [4.53kg] of force) for every 16" [406.4mm] distance between pulley centers (see image below).



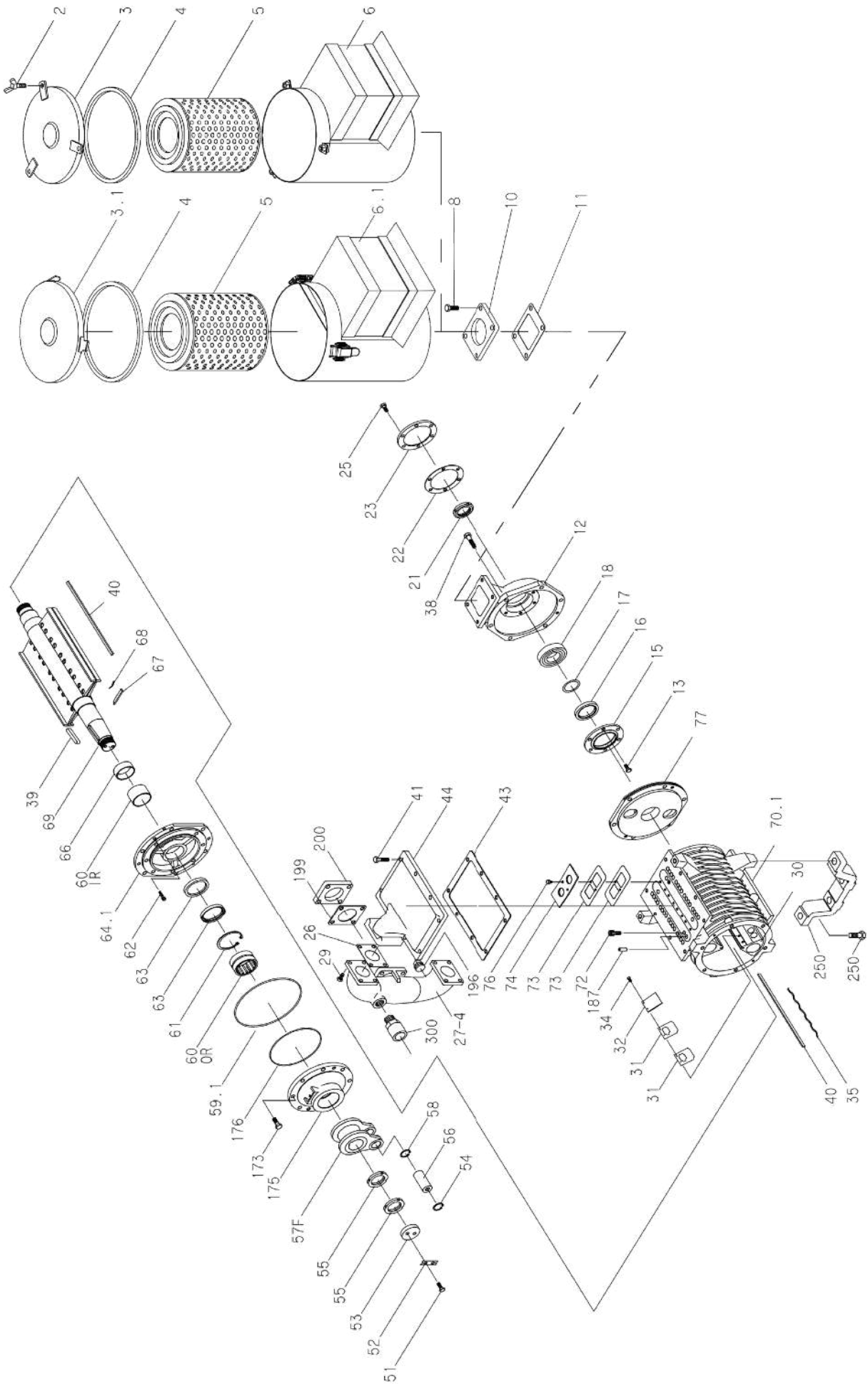
# 603 Blower Electric Package - Parts List

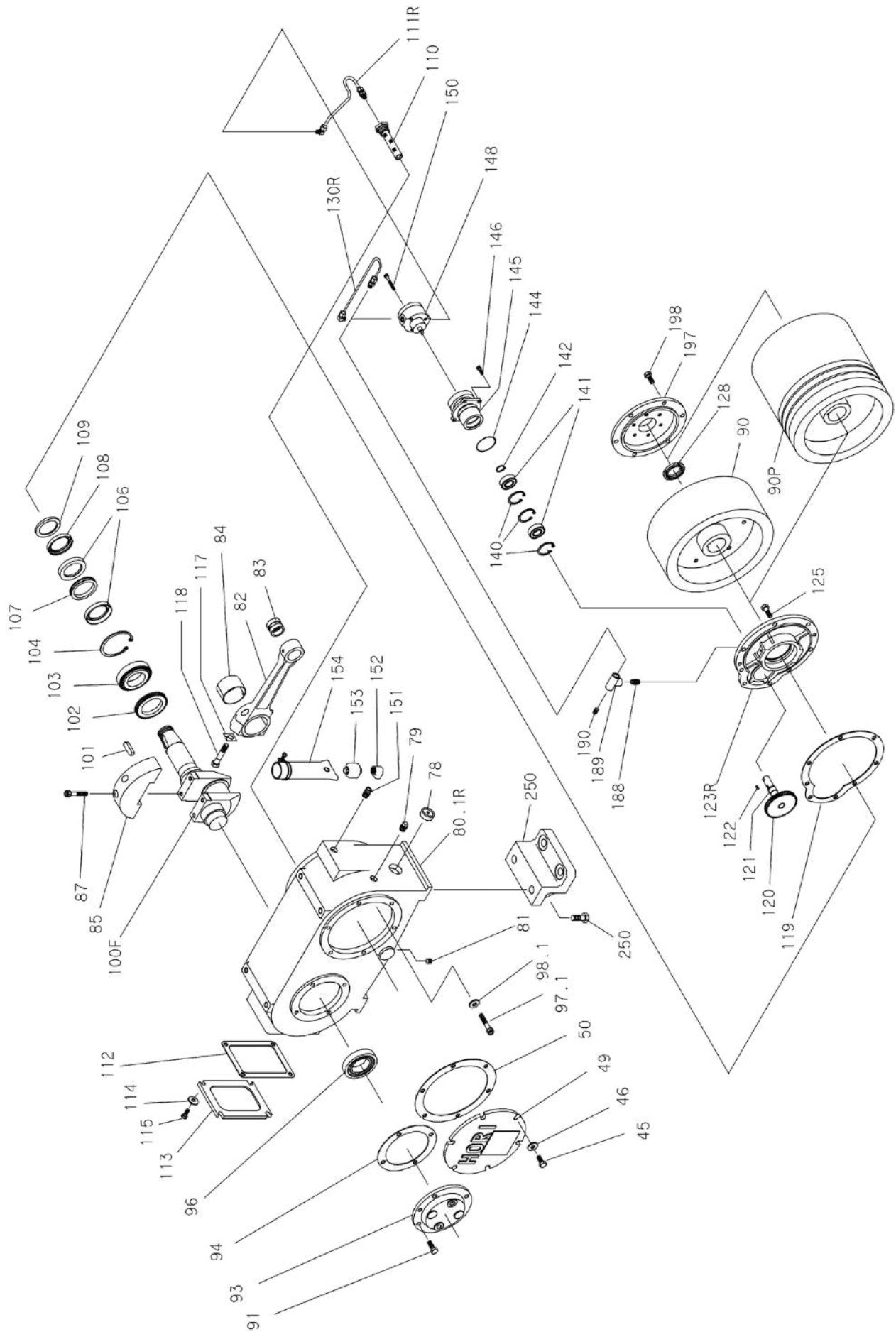


Item #	QTY	Part Number	Description
1	1	601-001	603 Blower (no PTO), assembled with Filter and Discharge components
N/A	1	562-012	V Belt Sheave from 603 Blower
N/A	1	508-053	Feet for 603 Blower
2	1	500-025	Frame
3	1	718-001	40 HP [29.83kw] TEFC Electric Motor (1800 RPM)
4	1	562-017	3 V-Belt Sheave for Motor
N/A	1	562-047	V-Belt
5	1	508-052	Sliding Base
N/A	1	736-016	Soft Start Starter Switch 40 HP [29.83kw], 1800 RPM, 460v, 110v

## Maintenance Schedule

Interval	Item
<p><b>Daily</b></p>	<p>Ensure there is no abnormal noise or vibration</p> <p>Inspect machine for any leaks</p> <p>Check oil level</p>
<p><b>Weekly</b></p>	<p>Clean suction filter element from the inside using forced air.</p> <p>Check drive belt tension prior to operation (Stationary Unit Only)</p>
<p><b>Yearly</b></p>	<p>Change the suction filter element</p> <p>Change the lubricant oil (Part# 409-002)</p>
<p><b>Every 5 Years</b></p>	<p>Replace all carbon seal bars (wing assembly)</p>





## Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION	
2	3	HBBM1035	WING BOLT; M10×35	
3	1	HCFD1-02	COVER; FILTER CASE	
3.1	1	HDF41-02	COVER; FILTER CASE : CATCH CLIP	
4	1	HCFD1-03	GASKET; FILTER CASE COVER	
5	1	575-006	FILTER ELEMENT	
6	1	HDF2-01	FILTER CASE	
6.1	1	HDF41-01	FILTER CASE : CATCH CLIP	
8	4	H11TM1030	BOLT; 11TM10×30	
10	1	H1832AH-27	FLANGE; INLET	
11	1	H1832AH-27P	GASKET; INLET PORT FLANGE 1.0mm	
12	1	H1832BH-04	REAR COVER	▲ ■
13	6	HHXM0820	BOLT; M8×20	
15	1	H1832BH-10	RETAINER; REAR OIL SEAL	
16	1	HOSTC50689	OIL SEAL; TC50689	
17	N/A	HTP0805	SEAM LINER 0.05mm	
17	N/A	HTP0810	SEAM LINER 0.1mm	
18	1	HBG6208VV	BEARING; 6208VVS7	
21	1	HLNFUAN08	LOCK NUT	
22	1	H2020-11P	GASKET; REAR BEARING COVER 0.5mm	▲ ■
23	1	H1832BH-11	COVER; REAR BEARING	
25	6	HHXM0820	BOLT; M8×20	
26	2	H2020-28P	GASKET; OUTLET PIPE 1.0mm	▲ ■
27-4	1	509-006	PIPE; OUTLET: 1832BHR-M	
29	8	H11TM0830	BOLT; 11TM8×30	
30	2	H1832BH-14	SUCTION VALVES BASE ( See Ref #70 Sold as set )	
31	40	583-001	SUCTION VALVE	
32	20	H2020-26	SUCTION VALVE BACK PLATE	
34	40	HHXSWM0512	BOLT; M5×12	
35	2	H2020-46-01	SPRING; SEAL BAR(LONG)	
38	6	HHXM1045	BOLT; M10×45	
39	1	H1832BH-90	KEY; ROTOR 12×8×56	
40	2	H1930FH-45-01	SEAL BAR(LONG); 4×8×299.9	
41	16	HHXM1035	BOLT; M10×35	
43	2	H0832BH-08P	GASKET; DELIVERY VALVES COVER 1.0mm	▲ ■
44	2	H1832BH-08	COVER; DELIVERY VALVES	
45	6	HHXM1025	BOLT; M10×25	
49	1	H1832BH-06	FRONT COVER; CRANK CASE	
50	1	H1832BH-06P	GASKET; FRONT COVER-CRANKCASE 0.5mm	▲ ●
51	2	H11TM0825	BOLT; 11TM8×25	
52	1	H1832AH-33	LOCK WASHER	
53	1	H1832AH-31	CAP; LOCK NUTS	
54	1	HSRH28	SNAP RING; H28	
55	2	HLNAN08	LOCK NUT; AN08	
56	1	H1832AH-16	PISTON PIN	
57R	1	H1832BHR-15	DRIVING ARM; FOR 1832BHR	
57F	1	H1832BHF-15	DRIVING ARM; FOR 1832BHF	
58	1	HSRH28	SNAP RING; H28	
59*	1	H1832BH-02P	Gasket; Side Wall - Crankcase 0.2mm	▲ ■ ●
59.1	1	HORS190	O RING	▲ ■ ●
60OR	1	HBGNK55-35R	NEEDLE BEARING; TAFI50683	
60IR	1	HIRIR505535	INNER RING; IR505535	
61	1	HSRH70	SNAP RING; H70	

\* Not Shown on Diagram

Included in: ▲ 620-003 Repair Kit ■ 620-005 Repair Kit ● 620-006 Repair Kit



## Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
62	2	HCSM0612	HEXAGON SOCKET HEAD BOLT; M6×12
63	2	HOSSB55709	OIL SEAL; CRANK CASE SB55709
64*	1	H1832BH4-02-02	SIDEWALL; CRANK CASE SIDE
64.1	1	H2-02-0201	SIDEWALL; CRANK CASE SIDE - O RING SEAL
65	6	HORP12	O RING; P12
66	1	HIRIR505520	INNER RING; IRT5020-1
67	4	H1832BH-45-02	SEAL BAR(SHORT); 4×8×57
68	4	H2020-46-02	SPRING; SEAL BAR(SHORT)
69	1	H1930FH-12	ROTOR
70*	1	H1930FH-01	CYLINDER ( 10 mm, DS )
70*	1	H1930RH-01	CYLINDER ( 10 mm, PS )
70.1	1	H1930FH-01-12	CYLINDER ( 12 mm, DS )
70.1	1	H1930RH-01-12	CYLINDER ( 12 mm, PS )
72	8	HCSM1030	HEXAGON SOCKET HEAD BOLT; M10×30
73	16	H2020-23	DELIVERY VALVE
74	8	H2020-24	BACK PLATE; DELIVERY VALVE
76	16	HHXSM0612	BOLT; M6×12
77	1	H1832BH-02-01	SIDEWALL; REAR COVER SIDE
78	1	HOGOG35	OIL LEVEL GAUGE; 35φ ▲●
79	1	H1832BH-02-01	PLUG; 1/2B
80R	1	H1832BHR4-03	CRANKCASE;1832BHR4 ( 10 mm, PS )
80F	1	H1832BHF-03	CRANKCASE;1832BHF4 ( 10 mm, DS )
80.1R	1	H1832BHR4-03-12	CRANKCASE;1832BHR4 ( 12 mm, PS )
80.1F	1	H1832BHF-03-12	CRANKCASE;1832BHF4 ( 12 mm, DS )
81	1	HHHP15A	PLUG; 1/2B
82	1	H1832BH-17	ROD; CONNECTING
83	1	H1832AH-17-03	BEARING
84	1	H2020A-17-04	BEARING; I.D60×40W
85	2	H1832BH-22	COUNTER WEIGHT
87	4	HCSM1060	HEXAGON SOCKET HEAD BOLT; M10×60
90	1	H1832BH-3705	FLYWHEEL
91	4	HHXM1025	BOLT; M10×35
93	1	H1830BH-05	BEARING RETAINER
94	2	H1832BH-0502P02	GASKET; BEARING RETAINER 0.2mm ◆●
94	2	H1832BH-0502-P03	GASKET; BEARING RETAINER 0.3mm ◆●
94	2	H1832BH-0502P05	GASKET; BEARING RETAINER 0.5mm ◆●
96	6	HBG30210	BEARING; 30210
97*	6	HCSM1055	HEXAGON SOCKET HEAD BOLT; M10×55
97.1	6	HCSM1255	HEXAGON SOCKET HEAD BOLT; M12×55
98.1	6	HWF-12-19-2	SEAL WASHER
100F	1	H1832BHF-21	CRANK SHAFT; 1832BHF
101	1	H1832BH-91	KEY; COUPLING FLANGE; 12×8×38
102	1	H1832BH-71	CRANK GEAR
103	1	HBG30210	BEARING; 30210
104	1	HSRH75	RING; SNAP H75
106	2	HOSTCV507212	OIL SEAL; TCV507212
107	1	H1832BH-78	SPACER 1
108	1	HOSTC50689	OIL SEAL; TC50689
109	1	HOSVC50687	OIL SEAL; VC50687
110	1	H1832BH-48	OIL STRAINER
111R	1	H1832BHR3-85	OIL PIPE; SUCTION 8φ ( PS )
112	1	H2020A-19P	GASKET; CRANK CASE SIDE COVER 0.5mm

\* Not Shown on Diagram

Included in: ▲ 620-003 Repair Kit ■ 620-005 Repair Kit ● 620-006 Repair Kit

## Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
113	1	H1832BH-19	SIDE COVER; CRANK CASE
114	4	HPWM10	M10 FLAT WASHER
115	4	HHXM1025	BOLT; M10×25
117	2	H1832BH-17-02	LOCK WASHER; CONNECTING ROD
118	2	H1832BH-17-01	BOLT; CONNECTING ROD
119	1	H1832BH-09P	GASKET; REAR BEARING RETAINER 0.5mm ▲●
120	1	H1832BH-72	GEAR; OIL PUMP
122	1	H1832BH-89	KEY; DRIVING SHAFT - OIL PUMP 3×3×9
123R	1	H1832BHR-09	RETAINER; REAR BEARING ( PS )
123R	1	H1832BHF-09	RETAINER; REAR BEARING ( DS )
125	8	HHXM1025	BOLT; M10×25
128	1	HLNFUAN08	LOCKNUT
130R	1	H1832BHR-86	OIL PIPE; DELIVERY 8φ
140	3	HSRH42	RING; SNAP H42
141	2	HBG6004ZZ	BEARING; 6004ZZ
142	1	HSRS20	RING; SNAP S20
144	1	HORG50	O RING; G50 ▲●
145	1	H1832BHF-07	BASE; OIL PUMP
146	4	HCSM0618	HEXAGON SOCKET HEAD BOLT; M6×18
148R	1	HTOP-11R	OIL PUMP; CLOCK WISE
150	3	HCSM0615	HEXAGON SOCKET HEAD BOLT; M6×15
151	1	HNP15A	NIPPLE; 15A
152	1	HEB15A	ELBOW; 8A×15A
153	1	H1832BH-49	AIR BREATHER
154	1	H1832BH-49-01	COVER; AIR BREATHER
173	8	H11TM1030	BOLT; M10×30
175	1	H1832BH4-09	BEARING RETAINER
176	1	HORS150	O RING; S150 ▲■
188	1	HNP8A	NIPPLE; 8A
189	1	HT18A	TEE; 8A
190	1	HHP8A	PLUG; 8A
196	1	HHP20A	PLUG; 20A
197	1	560-034	POWER INPUT FLANGE
198	6	H11TM1025	BOLT; M10×25
199	1	526-020	GASKET; DELIVERY FLANGE
200	1	509-012	COMPANION; DELIVERY FLANGE
250	1	508-053	BRACKET; MOUNTING FEET (COMPLETE SET W/ BOLTS)
300	1	HSV16	PROTECTION VALVE

\* Not Shown on Diagram

Included in: ▲ 620-003 Repair Kit ■ 620-005 Repair Kit ● 620-006 Repair Kit

## Specialty Tools

633-001 KIT - COMPLETE 603 REPAIR TOOL SET

INCLUDES THE FOLLOWING TOOLS

QTY	PART NUMBER	DESCRIPTION
1	564-001	TORQUE WRENCH 6FT-LBS
1	564-002	TORQUE WRENCH 50-80FT-LBS
1	564-003	COMBINATION WRENCH SET 6mm-19mm
1	564-004	TOOL SET - SPECIALTY TOOL FOR 603 ( see pg 2 )

## Service Kits

621-018	SERVICE KIT - 603 PTO YEARLY		
QTY	PART NUMBER	DESCRIPTION	
1	575-006	Element - 603 Filter	
3	409-002	Oil, Quart - 603 Blower	

621-019	SERVICE KIT - 603 ELECTRIC BELT DRIVE YEARLY		
QTY	PART NUMBER	DESCRIPTION	
2	575-006	Element - 603 Filter	
3	409-002	Oil, Quart - 603 Blower	
2	562-047	V belt 3 groove single piece	

## Repair Kits

620-003	REPAIR KIT, FULL SEAL KIT 603		
QTY	PART NUMBER	DESCRIPTION	
1	526-020	Gasket, Delivery flange (Single) - 603	
2	H0832BH-08P	Gasket; Delivery Valves Cover - 603 Blower	
1	H1832AH-27P	Gasket; Inlet Port Flange - 603 Blower	
1	H1832BH-02P	Gasket; Side Wall - Crankcase - 603 Blower	
1	H2020-11P	Gasket; Rear Bearing Cover - 603 Blower	
2	H2020-28P	Gasket; Outlet Pipe - 603 Blower	
1	HORS150	O-ring - 603 Blower	
2	H1832BH-0502-P03	Gasket; Bearing Retainer .3mm - 603 Blower	
2	H1832BH-0502P02	Gasket; Bearing Retainer .2mm - 603 Blower	
2	H1832BH-0502P05	Gasket; Bearing Retainer .5mm - 603 Blower	
1	H1832BH-06P	Gasket; Front Cover - Crankcase - 603 Blower	
1	H1832BH-09P	Gasket; Rear Bearing Retainer - 603 Blower	
1	H2020A-19P	Gasket; Crankcase Side Cover - 603 Blower	
1	HOGOG35	Oil Level Gauge - 603 Blower	
1	HORG50	O Ring - 603 Blower	
1	H2-02-0201	Sidewall; Crankcase Side - O Ring Seal	
1	HORS190	O-ring; S190	
6	HWF-12-19-2	Seal Washer	

620-005	REPAIR KIT, SEAL (CYLINDER)		
QTY	PART NUMBER	DESCRIPTION	
1	HORS150	O-ring - 603 Blower	
1	H1832BH-02P	Gasket; Side Wall - Crankcase - 603 Blower	
2	H0832BH-08P	Gasket; Delivery Valves Cover - 603 Blower	
2	H2020-28P	Gasket; Outlet Pipe - 603 Blower	
1	H2020-11P	Gasket; Rear Bearing Cover - 603 Blower	
1	H1832AH-27P	Gasket; Inlet Port Flange - 603 Blower	
1	526-020	Gasket, Delivery flange (Single) - 603	
1	H2-02-0201	Sidewall; Crankcase Side - O Ring Seal	
1	HORS190	O-ring; S190	
6	HWF-12-19-2	Seal Washer	

620-006	REPAIR KIT, SEAL (CRANKCASE)		
QTY	PART NUMBER	DESCRIPTION	
1	H2020A-19P	Gasket; Crankcase Side Cover - 603 Blower	
2	H1832BH-0502P05	Gasket; Bearing Retainer .5mm - 603 Blower	
2	H1832BH-0502-P03	Gasket; Bearing Retainer .3mm - 603 Blower	
2	H1832BH-0502P02	Gasket; Bearing Retainer .2mm - 603 Blower	
1	H1832BH-06P	Gasket; Front Cover - Crankcase - 603 Blower	
1	H1832BH-09P	Gasket; Rear Bearing Retainer - 603 Blower	
1	H1832BH-02P	Gasket; Side Wall - Crankcase - 603 Blower	
1	HORG50	O Ring - 603 Blower	
1	HOGOG35	Oil Level Gauge - 603 Blower	
1	H2-02-0201	Sidewall; Crankcase Side - O Ring Seal	
1	HORS190	O-ring; S190	
6	HWF-12-19-2	Seal Washer	

# WARRANTY - TRUCK BLOWERS

Subject to the terms and conditions hereinafter set forth and set forth in General Terms of Sale, Paragon Tank Truck Equipment LLC (the seller) warrants products and parts of its manufacture, when shipped and its work (including installation and start-up) when performed, will be of good quality and will be free from defects in material and workmanship. This warranty applies only to Seller's equipment, under use and service of products, for a period as stated in the table below. Due to the varying condition of installation and operation, all performance claims are subject to a plus or minus 5% variation. (Non-standard materials are subject to a plus or minus 10% variation)

**THIS WARRANTY EXTENDS ONLY TO BUYER AND/OR ORIGINAL END USER, AND IN NO EVENT SHALL THE SELLER BE LIABLE FOR THE PROPERTY DAMAGE SUSTAINED BY A PERSON DESIGNATED BY THE LAW OF ANY JURISDICTION AS A THIRD PARTY BENEFICIARY OF THIS WARRANTY OR ANY OTHER WARRANTY HELD TO SURVIVE SELLER'S DISCLAIMER.**

All accessories furnished by seller but manufactured by others bear only that manufacturer's standard warranty

All claims for defective products, parts, or work under this warranty must be made in writing immediately upon discovery and, in any event within one year from the date of shipment of the applicable item and all claims for defective work must be made in writing immediately upon discovery and in any event within one year from date of completion thereof by Seller. Unless done with prior written consent of Seller, any repairs, alterations, or disassembly of Seller's inspection and warranty. Installation and transportation costs are not included and defective items must be held for Seller's inspection and returned to Seller's Ex-works upon request.

**THERE ARE NO WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PURPOSE.**

After Buyer's submission of claim as provided above and its approval, Seller shall either repair or replace its product, part, or work at the original Ex-works point of shipment, or refund an equitable portion of the purchase price

The products and parts sold hereunder are not warranted for operation with erosive or corrosive materials or those which may lead to build up of material within the product supplied, nor those which are incompatible with the materials of construction. The Buyer shall have no claim whatsoever and no product or part shall be deemed to be defective by reason of failure to resist erosive or corrosive action nor for problems resulting from build-up of material within the unit nor for

Product Type	Warranty Duration
New	18 months from date of shipment, or 12 months after initial startup date, whichever occurs first.
Remanufactured	12 months from date of shipment, or 12 months after initial startup date, whichever occurs first.
Repair	12 months from date of shipment, or remaining warranty period, whichever is greater

Any improper use, operation beyond capacity, substitution of parts not approved by Seller, or any alteration or repair by others in such manner as in Seller's judgment affects the product materially and adversely shall void this warranty.

No employee or representative of Seller other than an Officer of the Company is authorized to change this warranty in any way or grant any other warranty. Any such change by an Officer of the Company must be in writing.

The foregoing is Seller's only obligation and Buyer's only remedy for breach of warranty, and except for gross negligence, willful misconduct and remedies permitted under the General Terms of Sale in the sections on **CONTRACT PERFORMANCE, INSPECTION AND ACCEPTANCE**, and the **PATENTS** Clause hereof, the forgoing is **BUYER'S ONLY REMEDY HEREUNDER BY WAY OF BREACH OF CONTRACT TORT OR OTHERWISE, WITHOUT REGARD TO WHETHER ANY DEFECT WAS DISCOVERED OR LATENT AT THE TIME OF DELIVERY OF THE PRODUCT OR WORK**. In no event shall Buyer be entitled to incidental or consequential damages. Any action for breach of this agreement must commence within one year after the cause of action has occurred.

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