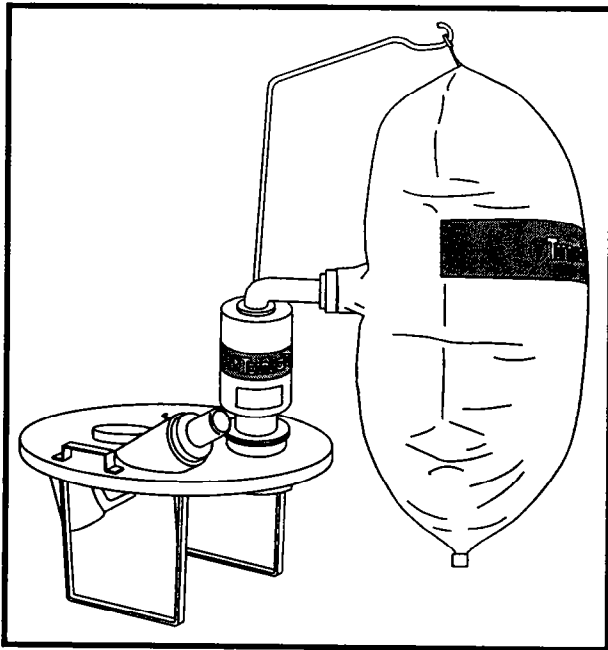


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Tornado®

Operation & Maintenance Manual For Commercial Use Only



**MODEL
95955 (SINGLE)**



**MODEL
95962 (DUAL)**

SINGLE AND DUAL EXTERNAL FILTER AIR HEAD ASSEMBLIES

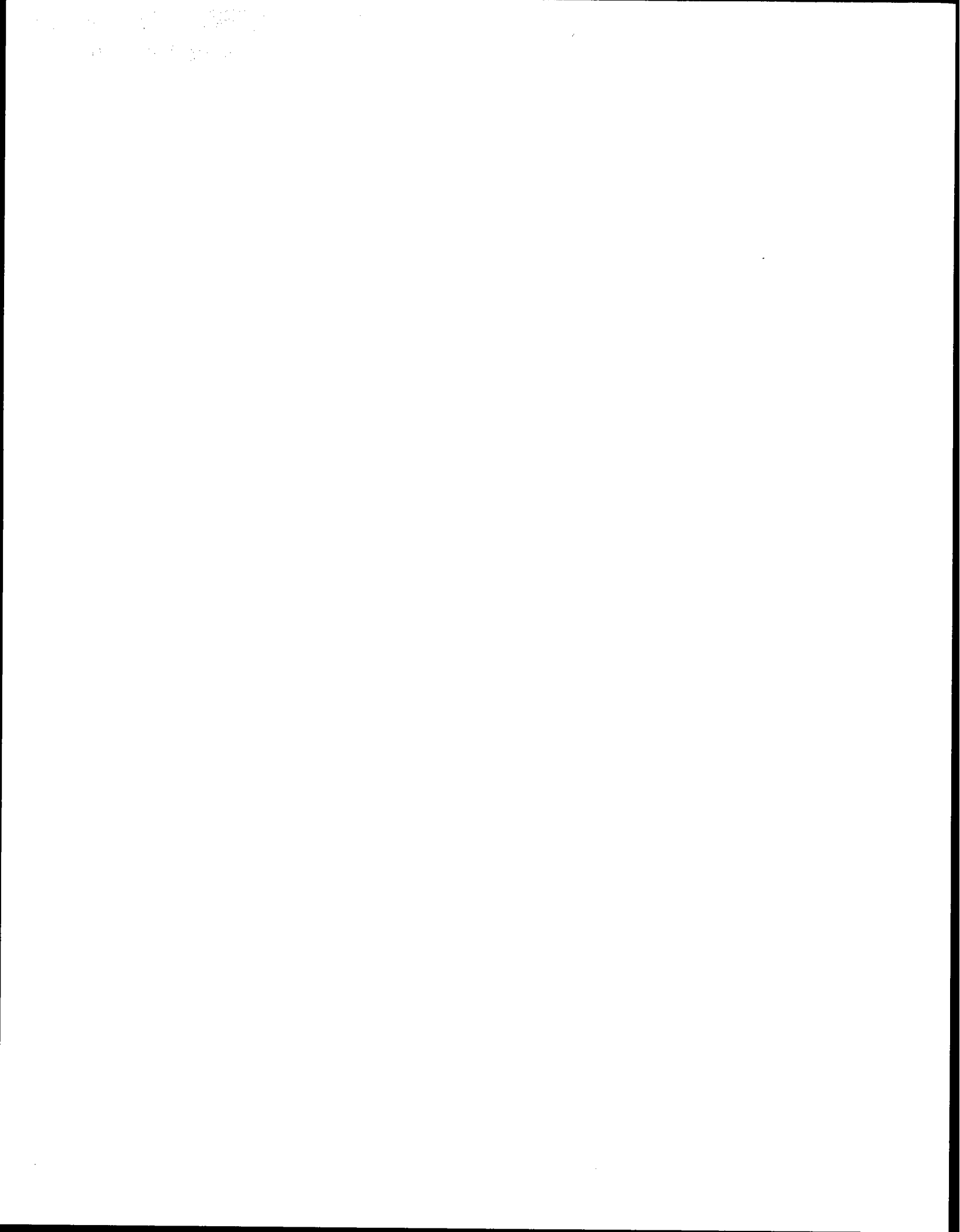


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Features:

- Capable of simultaneous wet/dry pickup when using external filter(s).
- 3/16" (5mm) jets installed. 7/32" (5.5mm) and 1/4" (6mm) jets are included for heavier debris.
- Ideal for materials from powder to oily metal chips, grindings and shavings.
- Recovers fluids from water to heavy weight oils.
- External filter(s) collect lighter particles and resist clogging.
- A heavy duty 55-gallon rolled top drum is required, and is available from Tornado.

Tornado Single and Dual External Filter Air Head Assemblies

General Specifications

The Single and Dual External Head Assemblies are heavy duty wet/dry industrial vacuums. They pick up wet and dry waste simultaneously without the need to change any filters. These compressed air vacuums have no moving parts and have tremendous suction for portable units. Both units are designed to fit onto a 55-gallon rolled top steel drum (Tornado # 95942) for volume pick-up with maximum efficiency. Virtually all dry and liquid recovered products go into the drum, therefore maintaining peak performance. Both units handle a wide variety of waste, ranging from fine powders to heavy-grade viscosity products. Designed to perform at maximum efficiency with 1.5" and 2" hoses and attachments (refer to attachments section of this manual).

Unit Specifications

95955 SINGLE INCLUDES:

- 95993 Venturi Powerhead (External Filter) (1)
- 90378 Large Poly External Filter (1)
- 95995 Support Rod for Large Filter (1)
- 95000 Jumbo Cover (1)
- 90442 Deflector (1)
- 90331 1.5" Hose Adaptor (1)
- 95991 Single Head Line Connector (1)

95962 DUAL INCLUDES:

- 95993 Venturi Powerhead (External Filter) (2)
- 90378 Large Poly External Filter (2)
- 95995 Support Rod for Large Filter (2)
- 95000 Jumbo Cover (1)
- 90442 Deflector (1)
- 90332 2" Hose Adaptor (1)
- 95992 Dual Head Line Connector (1)

	SINGLE	DOUBLE
EXTERNAL FILTER AREA	1874 sq. in.	1874 sq. in. (Per Head)
HORIZONTAL RECOVERY (reach)	30 ft.	50 ft.
VERTICAL RECOVERY (lift)	15 ft.	25 ft.
REQUIRED COMPRESSOR	15 h.p.	25 h.p.
AIR LINE AND COUPLINGS	1/2" I.D. (minimum)	5/8" to 3/4" (minimum)
HOSE ADAPTOR	1.5" Included	2" Included
COLOR	Tornado Grey	Tornado Grey
WEIGHT	65 lbs.	79 lbs.
3/16" JET (installed) w/1.5" HOSE	82 CFM/185" Static Waterlift	152 CFM/179" Static Waterlift
3/16" JET w/2" HOSE	79 CFM/185" Static Waterlift	158 CFM/179" Static Waterlift
COMPRESSOR CFM	47 @ 90 p.s.i.	94 @ 90 p.s.i.
7/32" JET (included) w/1.5" HOSE	73 CFM/223" Static Waterlift	144 CFM/217" Static Waterlift
7/32" JET w/2" HOSE	74 CFM/223" Static Waterlift	152 CFM/217" Static Waterlift
COMPRESSOR CFM	61 @ 90 p.s.i.	122 @ 90 p.s.i.
1/4" JET (included) w/1.5" HOSE	70 CFM/242 Static Waterlift	134 CFM/239" Static Waterlift
1/4" JET w/2" HOSE	67 CFM/242 Static Waterlift	151 CFM/239" Static Waterlift
COMPRESSOR CFM	76 @ 90 p.s.i.	152 @ 90 p.s.i.

Tornado Single and Dual External Filter Air Head Assemblies

Tornado® Standard Warranty Program*

10 Years: All plastic tanks and rotationally-molded bodies

2 Years: Parts and Labor on all Tornado and Tornado/Karcher cleaning equipment **

1 Year: Warranty on batteries, one full year, not pro-rated.

Warranties do not cover components subject to normal wear or abuse and misuse, and have other limitations not specified here. For full details, contact your Authorized Tornado Distributor, Service Center, or the Tornado Technical Service Department.

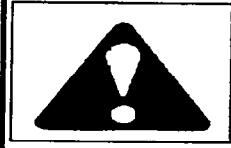
* Effective January 1st, 2000. Terms subject to change without notice.

** Windshear™ Blower-Dryer, Insulation Blowers, CW 50, CW 100, and Duo Upright Carpetkeepers™ are warranted for 1 (one) year for parts and labor.

Tornado Single and Dual External Filter Air Head Assemblies

Safety Instructions

When using this unit, basic precautions should always be followed. Read all instructions before using this unit.



WARNING: To reduce the risk of fire, electric shock or injury:

- Do not leave machine unattended when running. Turn off when not in use.
- Before attempting any maintenance or adjustment, disconnect air lines.
- Do not expose to rain.
- Do not allow to be used as a toy. Close attention is necessary when used by or near children.
- Use only as described in this manual. Use only manufacturer's recommended attachments.
- If machine is not working as it should, has been dropped, damaged, left outdoors, or dropped into water, return it to a service center.
- Keep hair, loose clothing, fingers, and all parts of body away from openings and moving parts.
- Turn off all controls before disconnecting air lines.
- Do not put any object into openings. Do not use with any opening blocked. Keep openings free of dust, lint, hair, and anything that may reduce air flow.
- Do not pick up anything that is burning or smoking, such as cigarettes, matches, or hot ashes.
- Do not pick up flammable or combustible liquids, such as gasoline, or use machine where they may be present.
- Do not use without filters in place.
- Use extra care when cleaning on stairs.
- Always replace worn or torn external filters immediately. This will prevent possible injury due to flying objects.
- Never operate with intake unguarded. Strong suction will pull fingers and/or clothing into hose and other parts.
- Always point exhaust port in safe direction. Air exits venturi at very high velocity.
- Always wear safety glasses when in vicinity of this unit.
- Never operate above 100 p.s.i. (8 BAR) pressure.
- Always turn off your air line supply at the drop before disconnecting the air line.

Tornado Single and Dual External Filter Air Head Assemblies



WARNING: Failure to adhere to these instructions could result in serious bodily injury or property damage.

BEFORE OPERATING MACHINE:

Read this manual completely before attempting to operate machine. This manual has important information for the use and safe operation of the machine. Keep this manual on file and handy. If additional information is needed, please contact your local distributor or write to:

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Tornado Single and Dual External Filter Air Head Assemblies

Head Assembly Setup and Operation

ASSEMBLY OF HEAD UNIT AND DRUM

1. Remove all components from package.
2. The venturi powerhead(s) come already attached to the Jumbo Covers. To detach, remove the external filters from the venturi powerheads, then turn power head (s) counterclockwise and they will unlock from the Jumbo Cover. When attached, make sure the exhaust nozzle(s) are facing outward.
3. Install external filter support rod(s) by placing in access hole(s) located in Jumbo Cover.
4. Attach external filter(s) by attaching to filter support rod(s) and installing inlet collars onto exhaust nozzle(s). Turn collar(s) clockwise to lock. Do not twist filter.
5. Install hose adaptor onto Jumbo housing. Lock in place by lining up adaptor indent with lock screw and tightening lock screw.
6. Place head unit onto drum (required accessory). The weight and suction power of the head unit will form a seal on the drum.

STARTING/STOPPING MACHINE

1. Connect air supply line to head line connector.
2. Start vacuum by turning air valve located on line connector to its ON position.
3. Stop vacuum by turning air valve located on line connector to its OFF position.

MAINTENANCE OF EXTERNAL FILTER

For maximum operating efficiency and to insure longer wear, remove filter(s) and empty by detaching the bottom clamp after every use.

Empty and clean vacuum, filter(s), and attachments after each days use for maximum performance.

OPERATING RULES

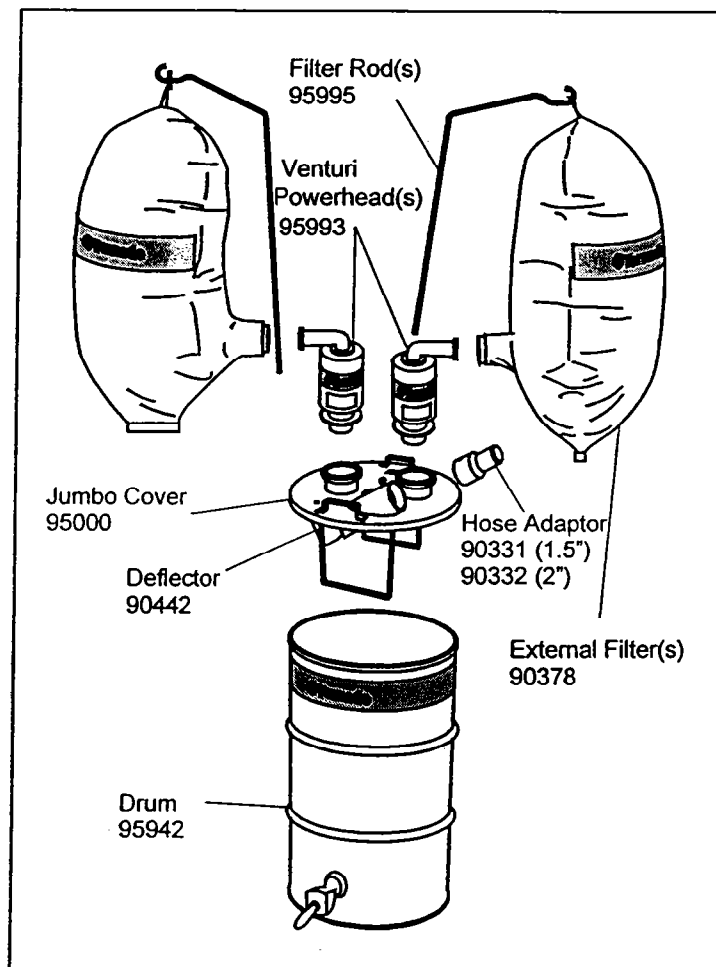
Use 1.5" to 2" I.D. hoses and attachments.

Use 1/2" to 3/4" air line hose and flow-thru quick connects (do not use ball style fittings).

90 p.s.i. (7 BAR) at gauge (valve open) for maximum pickup power, 60 p.s.i. (5 BAR) at gauge (valve open) for lighter debris recovery.

Use to recover water, heavy oils, powders, grindings, and metal shavings.

Use Tornado #94655 Add-A-Tank system when recovering fine dry powders. Grounding and static discharge are required when recovering powders. Use TORNADO brand static conductive hoses (urethane or neoprene), and ground vacuum head and tank assembly to an earth ground.



Tornado Single and Dual External Filter Air Head Assemblies

Troubleshooting Guidelines

<u>Problem</u>	<u>Remedy</u>
1. Machine does not operate	<p>Make sure air line valve is in ON position.</p> <p>Inspect air regulators for interference of air flow.</p> <p>Inspect air compressor for adequate size, and that proper air pressure is available (60 to 90 p.s.i.)</p> <p>Inspect air line for proper size and/or damage.</p> <p>Always use flow thru connectors.</p>
2. Machine stops running	<p>Inspect drum level.</p> <p>Inspect air line for damage.</p> <p>Inspect air pressure.</p>
3. Machine has no suction	<p>Inspect for clogged hose, collapsed hose, defective drum, material too heavy for unit.</p>
4. Air pressure drops at gauge	<p>Inspect air compressor for proper free air consumption and resistance in air line size or connections.</p>
5. Machine has poor recovery	<p>Inspect for correct size hose and attachments, poor sealing, defective drum, material too heavy for unit.</p> <p>Inspect external filter(s). Empty and clean if necessary.</p> <p>Inspect for proper drum cover seal (gasket).</p> <p>Inspect for damage and/or wear to hose and accessories.</p> <p>Inspect locked position(s) of venturi powerhead(s) to Jumbo Cover.</p> <p>Inspect locked position(s) of external filter(s) to venturi powerhead(s).</p> <p>Inspect all seals for wear and/or damage.</p>

Tornado Single and Dual External Filter Air Head Assemblies

Things To Know

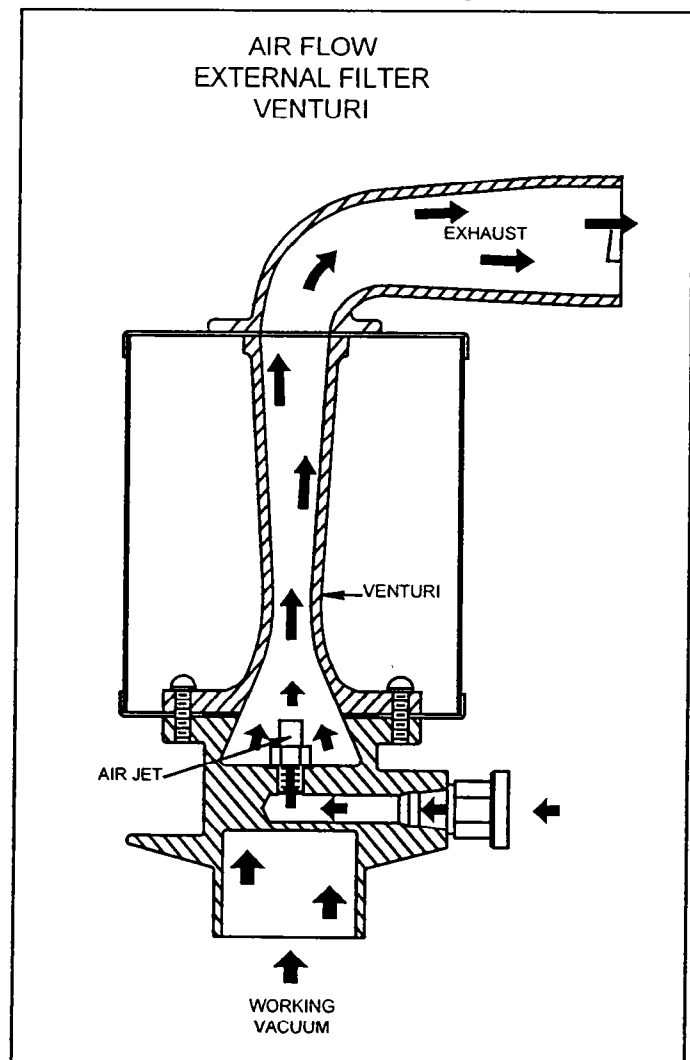
FACTS OF COMPRESSED AIR VACUUMS

1. Use the smallest air jet possible to do the job. The smaller the jet, the lower the compressed air C.F.M. required.
2. Use a single venturi unit where liquid recovery is the primary application. A single venturi will recover liquids as fast as a double venturi will, yet consumes only one half as much compressed air.
3. Use a double venturi or quad venturi unit where higher volume of vacuum air is required. Remember, compressor overload is more likely to occur with a quad than a double venturi.
4. Use the lowest air line pressure possible per the given jet size to do the job. The lower the line pressure, the lower the compressed air consumption.
5. Air line pressure **must** be maintained at the valve of the venturi unit. If pressure is not maintained at the unit, vacuum performance **will not** be reached. Remember, low line pressure for dry recovery, high line pressure for liquids, sludge, and other heavy debris.
6. The air line hose should be as short as possible, and of maximum inside diameter (single 1/2", double 3/4", quad 1" recommended). Line air losses that occur are related to hose length and diameter, thus reducing performance.
7. Any air line moisture (condensation) should be eliminated. Using a water trap in the air line to the venturi unit will help maintain peak performance.
8. Air line components can reduce performance. Quick disconnect couplings and line filters, for example, may reduce compressed air delivery.
9. Factors that affect compressed air supply are compressor horsepower rating, compressor C.F.M. rating, and system resistance of installed air lines.

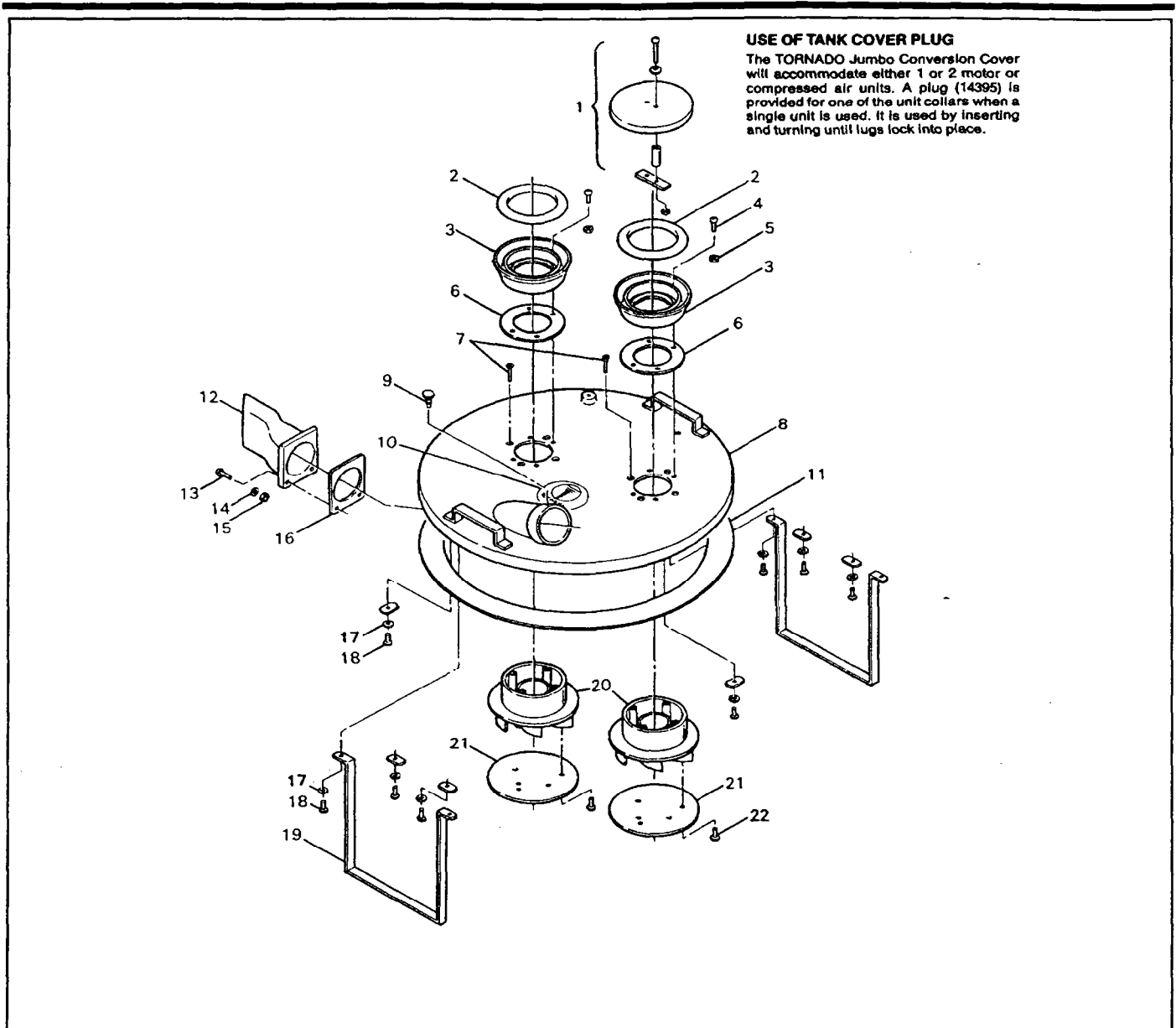
AIR COMPRESSOR EVALUATION

Independent of high horsepower or high compressor C.F.M. rating claims, the final evaluation in determining if a compressor is capable of supplying enough compressed air, is with a pressure gauge at the venturi unit. This will show the actual pressure being maintained while the unit is operating (refer to fact #5). This approach will also compensate for air line system resistance losses. If the compressor cannot maintain the free air consumption necessary, the line pressure will drop. Consequently, the compressed air C.F.M. will also drop, thus reducing the vacuum or suction performance.

NOTE: The compressed air C.F.M. is not the same as the vacuum air C.F.M.



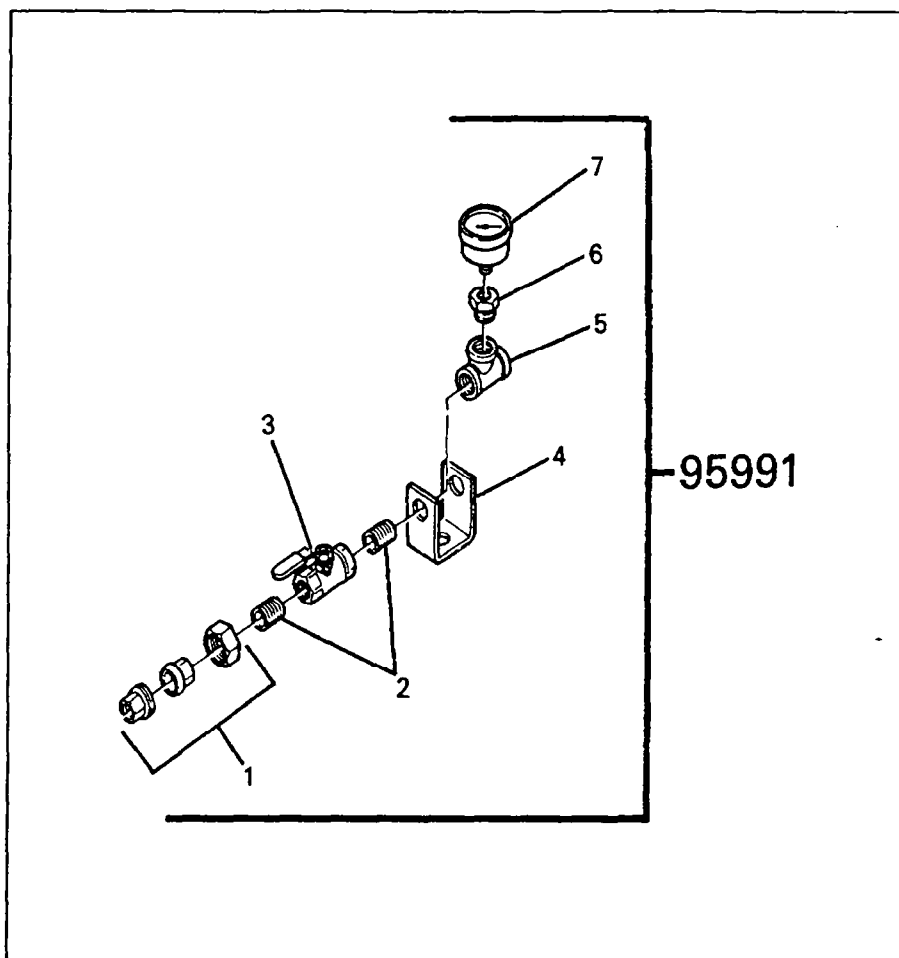
Tornado Single and Dual External Filter Air Head Assemblies



ITEM NO.	QTY.	PART NO.	DESCRIPTION	ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	14395	TANK COVER PLUG ASSY.	14	2	01574	LOCKWASHER
2	2	08004	MOUNTING GASKET	15	2	01497	NUT
3	2	14415	ADAPTOR	16	1	04908	FLANGE GASKET
4	8	02053	SCREW	17	10	00851	WASHER
5	8	—	Nut	18	10	00086	SCREW
6	2	11386	GASKET	19	2	04997	STAND
7	8	11394	SCREW	20	2	11358	INTAKE GUIDE
8	1	13832	TANK COVER S/A	21	2	14731	TOP PLATE
9	1	08057	THUMB SCREW	22	6	11390	SCREW
10	1	07648	NAME PLATE				
11	1	17131	TANK COVER GASKET (6.5 FT.)				
12	1	90442	DEFLECTOR				
13	2	02038	SCREW				

Figure No. 3 Jumbo Cover Assembly

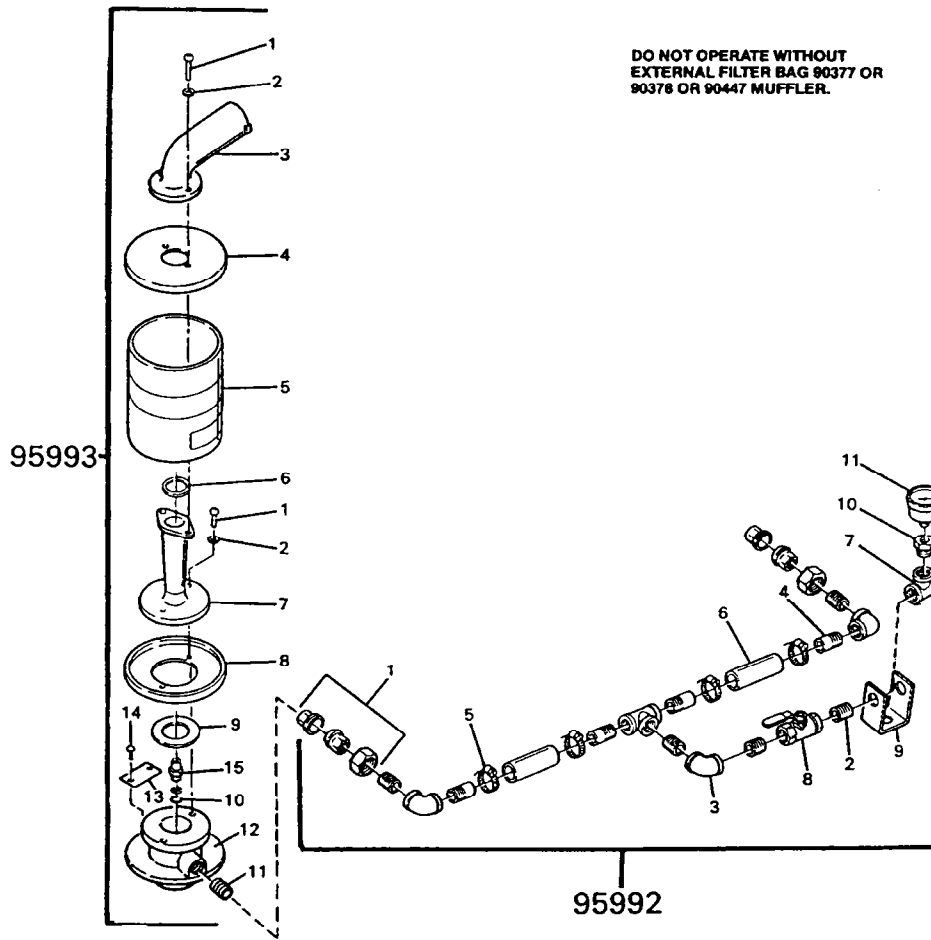
Tornado Single and Dual External Filter Air Head Assemblies



(95991) CONNECTOR ASSY. SINGLE HEAD

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	06384	JOINT UNION
2	2	05730	NIPPLE
3	1	04985	VALVE
4	1	15163	BRACKET
5	1	05731	PIPE TEE
6	1	05733	PIPE BUSHING
7	1	05732	AIR PRESSURE GAUGE

Tornado Single and Dual External Filter Air Head Assemblies



(95993) EXTERNAL FILTER AIR VAC

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	4	02038	SCREW
2	4	01574	LOCKWASHER
3	1	05734	ELBOW-CONNECTING
4	1	05735	MUFFLER COVER
5	1	05736	MUFFLER SHELL
6	1	05737	GASKET
7	1	05723	NOZZLE
8	1	04927	MUFFLER BASE
9	1	05724	GASKET
10	3	02481	"O" RING
11	1	05730	NIPPLE
12	1	11407	BASE
13	1	04924	NAMEPLATE
14	2	02573	DRIVESCREW
15	1	04982	JET (3/16 DIA.) INSTALLED
	1	04983	JET (7/32 D1A.)
	1	04984	JET (1/4 DIA.)

(95992) CONNECTOR ASSY. DOUBLE HEAD

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	2	06384	JOINT UNION
2	5	05730	NIPPLE
3	3	05729	90 ELBOW
4	4	05726	MALE ADAPTOR-HOSE TO PIPE
5	4	05727	CLAMP
6	2	11561	HOSE
7	2	05731	PIPE TEE
8	1	04985	VALVE
9	1	15163	BRACKET
10	1	05733	PIPE BUSHING
11	1	05732	AIR PRESSURE GAUGE