

COMPRESSED AIR FILTERS

Filter Types KFS, KPF, KOR, KOX, and KVF

1000 - 21250

2805HP - 28380HP

INSTRUCTION MANUAL



General Safety Information

1. Pressurized devices

WARNING

- Do not exceed maximum operating pressure indicated on serial number tag.
- Make certain filter is fully depressurized before servicing.

2. Breathing Air

- Air treated by this equipment may not be suitable for breathing without further purification. Refer to OSHA standard 1910.134 for breathing air requirements.

3. Flammable gases

WARNING

The materials of construction used in this product are compatible physically with flammable gases, however, there are application limitations for this product when used with flammable gases. Each application (other than air or inert gas) should be carefully reviewed to minimize the chances of creating a fire or explosion hazard.

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IMPORTANT

Tighten cartridges before use. Cartridges may have loosened during transit. To ensure a tight seal between the cartridge end cap(s) and inlet manifold, open vessel and turn cartridge clockwise (as seen from bottom) until hand tight. See Section 3.0, B for instructions on entering vessel.

Type Identification

Type	Description	Function	Outer foam color
KFS	Separator/filter	Mechanical separator and 3 micron coalescer	none
KPF	General purpose air line filter	1 micron coalescer	none
KOR	High efficiency oil removal filter	High efficiency (99.99+%) coalescer	Red
KOX	Ultra high efficiency oil removal filter	Ultra high efficiency (99.999+%) coalescer	Blue
KVF	Oil vapor removal filter	Activated carbon adsorber	Green

1.0 Installation

A. Where Used/Air Quality After Filtration

Type	Where used	Solid particle removal (maximum size in microns)	Liquid removal efficiency (at rated conditions)	Maximum inlet liquid loading ppm w/w	Remaining oil content ppm w/w
KFS	Separator - downstream of an aftercooler Point-of-use - where no aftercooler is installed upstream	3	99+% of water	25,000	5 aerosols
KPF	Prefilter - • Alone ahead of desiccant dryers if no oil is present • Ahead of KOR, KOX Afterfilter - downstream of pressure-swing (heatless) desiccant dryers Point-of-use - where aftercooler is installed upstream	1	100% of water	2,000	1 aerosols
KOR	Prefilter - alone ahead of desiccant and membrane dryers if oil is present Afterfilter • Downstream of refrigerated dryer • Downstream of pressure-swing (heatless) desiccant dryers for finer solid particle removal	0.01	99.99+% of oil	1,000	0.01 aerosols
KOX	Prefilter - ahead of desiccant and membrane dryers if oil is present (use after KPF to reduce liquid and solids load, prolong element life and ensure filtration efficiency) Afterfilter - downstream of refrigerated dryer	0.01	99.999+% of oil	100	0.001 aerosols
KVF	Use a KPF, KOR, or KOX ahead of KVF to remove any liquid present	0.01	Removes vapors only	No liquid should be present	0.003 vapor

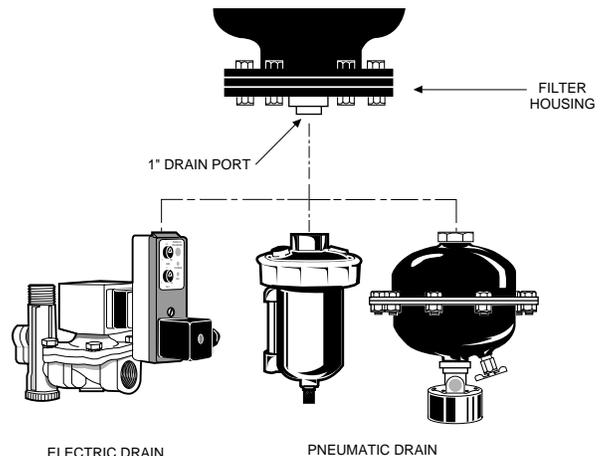
B. Piping

1. Before installing, blow out pipe line to remove scale and other foreign matter.
2. Mounting (Types KFS, KPF, KOR, KOX) - mount so that inlet and outlet connections are horizontal (filter bowl vertical) to ensure proper liquid drainage.
3. Flow Direction - install so that the air flow is in the direction indicated on filter. Flow through the element is inside to outside.
4. Isolation valves and by-pass piping - For ease of service, isolation and by-pass valves are desirable. In critical applications, two filters installed in parallel may be necessary to avoid interruption of air supply.

- C. Drain Provisions (Types KFS, KPF, KOR, KOX) - The bottom of the pressure vessel is provided with a drain plug for shipping purposes. Provision for manual or automatic draining is necessary for proper operation.

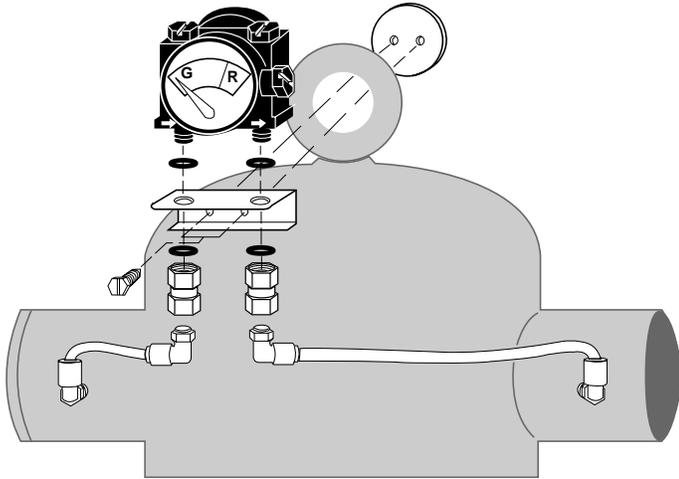
WARNING: Do not attempt to remove drain plug if the unit is pressurized.

1. Manual Drain - When draining is performed manually on a regular, periodic basis, a simple (open/shut) valve may be used to drain the vessel. When draining manually, the valve should be opened slowly to avoid rapid depressurization and possible element damage.
2. Automatic Drain - Where regular manual draining is not performed, an automatic condensate drain should be used. A variety of drains is available from the manufacturer.



D. Differential Pressure Gauge (DPG) - Types KFS, KPF, KOR, and KOX

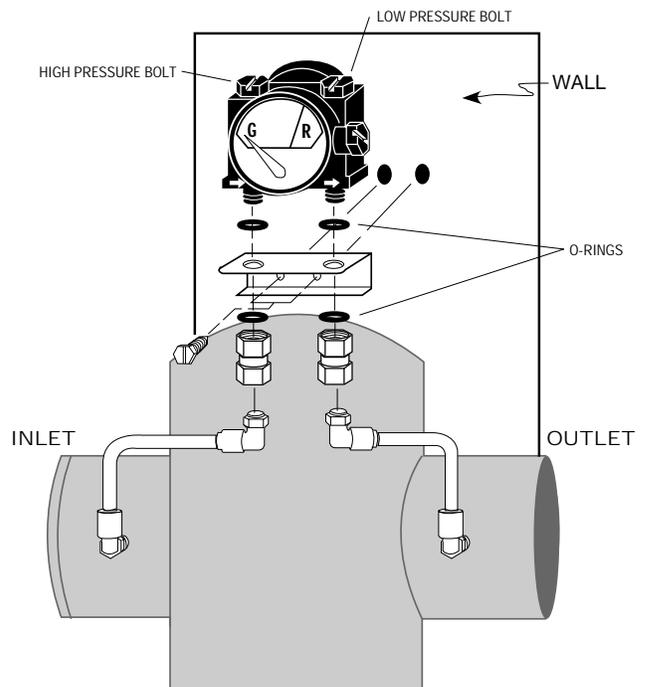
Types KFS, KPF, KOR, and KOX - On standard units, a gauge and installation kit are shipped separately packaged for field installation. Refer to diagram for proper installation. Gauge may be installed on filter housing or on a nearby wall using the wall mounting bracket supplied.



1000 scfm and Larger - Equipment Mounted

NOTES:

- 1) Make certain o-rings are in place on the bottom of the gauge body.
- 2) Connect the low pressure transmission bolt (bolt next to RED band on gauge) to the gauge port at the filter outlet (down-stream side of filter).
- 3) Connect the high pressure transmission bolt (bolt next to GREEN band on gauge) to the gauge port at the filter inlet (upstream side of filter).
- 4) Torque bolts to 25 +/- 5 inch oz. DO NOT OVER TIGHTEN.



All Models - Wall Mounted

2.0 Operation

WARNING: Do not operate filter at pressures in excess of Maximum Working Pressure indicated on Serial Number Tag.

NOTE: Maximum Operating Temperature - 150°F, 66°C. Liquid filtration above 120°F, 49°C is not recommended since there is typically oil present in a vapor state which passes through the filter and condenses downstream.

NOTE: Type KVF - If operated above 100°F, 38°C, a Grade 1 filter may experience less than 1000 hours of life because of greater oil vapor content.

A. Operational Checkpoints

Types KFS, KPF, KOR, and KOX

1. Check pressure drop across the filter
 - a. Pressure differential in excess of 10 psi (0.7 kgf/cm²) - pressure indicator in red area - indicates that the filter sleeve or element should be replaced.

NOTE: Element should be changed annually or when indicator changes to red, whichever occurs first.

NOTE: Pressure drop should never exceed 50 psi (3.5 kgf/cm²).

NOTE: Pressure drop may temporarily increase when flow is resumed after flow stoppage. Pressure drop should return to normal within one hour.

- b. Check for sudden reduction in pressure drop. This might indicate:
 - (1) Possible leak across element o-ring seal
 - (2) Leak through the element due to physical damage
2. Check flow, pressure, and temperature to make certain filter is being operated within design conditions.
3. Check to see that filter is installed level to insure proper drainage.
4. Check that manual drains are drained periodically or that automatic drains are functioning.

Type KVF

1. Check for an oily smell by opening the manual valve. If an oily smell exists, the following should be checked:
 - a. Filter element adsorption capacity exhausted
 - b. Leak across element o-ring seal
 - c. Leak through element due to physical damage
 - d. Presence of liquids because of lack of or failure of prefilters

- e. Flow, pressure and temperatures outside design conditions
- f. Presence of gaseous impurities which cannot be adsorbed by activated carbon

CAUTION: Methane, carbon monoxide, carbon dioxide and various inorganic gases cannot be removed by a Type KVF filter.

C. Flow Capacity

Maximum air flow for the various filters at 100 psig (7 kgf/cm²) is indicated in Table 1. To determine maximum air flows at inlet pressures other than 100 psig (7 kgf/cm²), multiply flow from Table 1 by air flow correction factor from Table 2 that corresponds to the minimum operating pressure at the inlet of the filter.

NOTE: Filters should not be selected by pipe size. Select using flow rate and operating pressure only.

Table 1 - Maximum Flow @100 psig [7 kgf/cm²]

Types KFS, KPF, KOR, KOX, KVF Model Number	scfm [m ³ /min]
1000	1000 [29]
1250	1250 [36]
1875	1875 [54]
2500	2500 [72]
3125	3125 [89]
5000	5000 [143]
6875	6875 [197]
8750	8750 [250]
11875	11875 [340]
16250	16250 [465]
21250	21250 [608]

Table 2 - Air Flow Correction Factor

Minimum Inlet Pressure	psig	20	30	40	60	80	100	120	150	200	250	300
	kgf/cm ²	1.4	2.1	2.8	4.2	5.6	7.0	8.4	10.6	14.1	17.6	21.1
Correction Factor		0.30	0.39	0.48	0.65	0.82	1.00	1.17	1.43	1.87	2.31	2.74

Minimum Inlet Pressure	psig	350	400	450	500	550	600	650	700
	kgf/cm ²	24.6	28.1	31.6	35.2	38.7	42.2	45.7	49.2
Correction Factor		3.18	3.62	4.05	4.49	4.92	5.36	5.80	6.23

3.0 Maintenance

A. When to Replace Filter Element

NOTE: Types KPF, KOR, KOX, and KVF - complete element is replaced; Type KFS - unless separator core is damaged outer sleeve only may be replaced.

1. Types KFS, KPF, KOR, and KOX
 - a. Initial (dry) pressure drop: 1 psi (0.07 kgf/cm²) to 2 psi (0.14 kgf/cm²)
 - b. Operating pressure drop: As filter becomes liquid loaded (wetted), pressure drop will increase to 2 to 6 psi (0.14 to 0.42 kgf/cm²). Further pressure drop occurs as element loads with solid particles.

FOR MAXIMUM FILTRATION EFFICIENCY, REPLACE ELEMENT WHEN PRESSURE DROP REACHES 10 PSI (0.7 KGF/CM²) (INDICATOR IN RED AREA) OR ANNUALLY, WHICHEVER OCCURS FIRST.

NOTE: Pressure drop may temporarily increase when flow is resumed after flow stoppage. Pressure drop should return to normal within one hour.

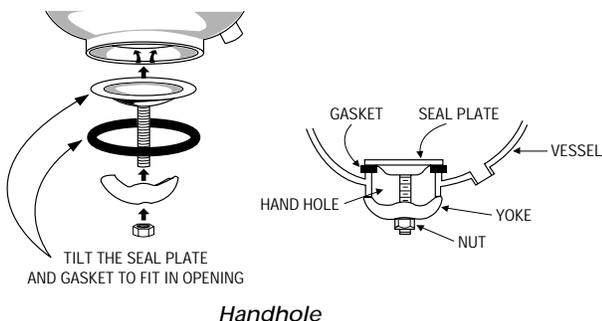
NOTE: Types KOR and KOX - During normal operation bottom of foam sleeve will have a band of oil. Spotting above the band indicates that liquids are accumulating faster than they can be drained and that prefiltration is required.

2. Type KVF
 - a. Adsorption capacity - 1000 hours at rated capacity. Element life is exhausted when odor can be detected downstream of the filter.

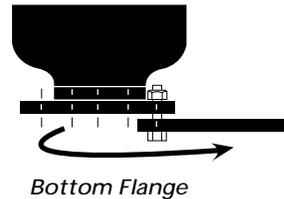
B. Procedure for Element Replacement

WARNING: THIS FILTER IS A PRESSURE CONTAINING DEVICE. DEPRESSURIZE BEFORE SERVICING.

1. By-pass the filter to permit servicing.
2. Depressurize the filter assembly slowly by opening blowdown valve.
3. Open pressure vessel
- 3A. Models with handhole
 - a. Remove nut and yoke
 - b. Lift seal plate and turn so that seal plate and seal plate gasket can be removed.

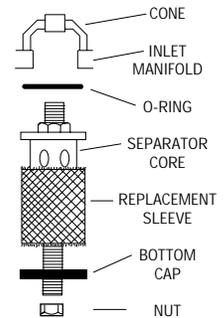


- 3B. Models with flanged bottom
 - a. Loosen bottom blind flange bolts.
 - b. Remove all but one bolt.
 - c. Swing flange to one side.
4. Starting in the center, unscrew the filter elements and remove the filter elements and element o-rings.



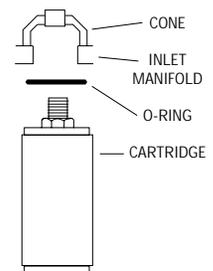
5. Types KPF, KOR, KOX, KVF - Discard old elements and o-rings.

- 5A. Type KFS
 - a. Remove nylon nut and bottom cap
 - b. Slide disposable filter sleeve down over separator core.
 - c. If necessary, clean separator core with soap and water.
 - d. Slide new filter sleeve over separator core and replace bottom cap and nylon nut.



Type KFS - Sleeve Replacement

6. Clean face of inlet manifold with a mild detergent using a long-handled brush or clean rag attached to a rod. Manifold face must be free of all dirt and grease to insure proper o-ring seal between new filter element top cap and inlet manifold.



All Types - Element Replacement

7. Install new o-rings in the o-ring groove in each filter element top cap.
8. Starting from the outside (filter element closest to the vessel wall), screw new filter elements into inlet manifold connections. A cone in the manifold will guide the element bolt into the female threads.

NOTE: It is only necessary to finger tighten the filter element to insure a seal. **DO NOT WRENCH TIGHTEN**

9. Close vessel
- 9A. Models with hand hole
 - a. Reinsert seal plate and seal plate gasket into vessel and position on lip as shown in drawing.

NOTE: Do not reuse gasket if gasket is torn or gasket surface is damaged.

- b. Reinstall yoke and nut.
- c. Tighten nut making sure that gasket is properly positioned under seal plate.
- 9B. Models with flanged bottom
 - a. Swing blind bottom flange into position.
 - b. Rebolt after inspecting flange gasket to ensure its integrity.
10. Pressurize unit slowly by slowly opening inlet valve, then opening outlet valve, and finally closing by-pass valve.

Dimensions and Weights

Standard		1000	1250	1875	2500	3125	5000	6875	8750	11875	16250	21250
KFS, KPF, KOR, KOX, KVF Connection		3" NPT 225 psig	3" NPT 225 psig	3" NPT 225 psig	4" ANSI Fig. 225 psig	4" ANSI Fig. 225 psig	6" ANSI Fig. 225 psig	6" ANSI Fig. 225 psig	6" ANSI Fig. 225 psig	8" ANSI Fig. 225 psig	8" ANSI Fig. 225 psig	10" ANSI Fig. 225 psig
Maximum Working Pressure		DN 80 Fig. 15.8 kgf/cm ²	DN 80 Fig. 15.8 kgf/cm ²	DN 80 Fig. 15.8 kgf/cm ²	DN 100 Fig. 15.8 kgf/cm ²	DN 100 Fig. 15.8 kgf/cm ²	DN 150 Fig. 15.8 kgf/cm ²	DN 150 Fig. 15.8 kgf/cm ²	DN 150 Fig. 15.8 kgf/cm ²	DN 200 Fig. 15.8 kgf/cm ²	DN 200 Fig. 15.8 kgf/cm ²	DN 250 Fig. 15.8 kgf/cm ²
Connection		DN 80 Fig. 15.8 kgf/cm ²	DN 80 Fig. 15.8 kgf/cm ²	DN 80 Fig. 15.8 kgf/cm ²	DN 100 Fig. 15.8 kgf/cm ²	DN 100 Fig. 15.8 kgf/cm ²	DN 150 Fig. 15.8 kgf/cm ²	DN 150 Fig. 15.8 kgf/cm ²	DN 150 Fig. 15.8 kgf/cm ²	DN 200 Fig. 15.8 kgf/cm ²	DN 200 Fig. 15.8 kgf/cm ²	DN 250 Fig. 15.8 kgf/cm ²
Maximum Working Pressure		35.0 kgf/cm ²	49.0 kgf/cm ²	31.5 kgf/cm ²	30.8 kgf/cm ²	30.8 kgf/cm ²	25.2 kgf/cm ²	23.1 kgf/cm ²	23.1 kgf/cm ²	18.2 kgf/cm ²	18.2 kgf/cm ²	18.2 kgf/cm ²
No. of Elements (1)		1	2 (1)	3	4	5	8	11	14	19	26	34
Models	2805HP	4000HP	1000 1250	1875	2500 3125	9900HP 12375HP	5000	16350HP	6875 8750	20695HP 26340HP	11875	28380HP
Dimensions in (mm)												
"A" w/thread	10.25 (260)	16.00 (406)	16.00 (406)	16.25 (413)	16.25 (413)	20.00 (508)	24.00 (610)	24.00 (610)	28.00 (711)	28.00 (711)	33.00 (838)	39.00 (991)
"A" w/flange	11.63 (295)	17.38 (441)	17.38 (441)	17.63 (448)	17.63 (448)	20.00 (508)	24.00 (610)	24.00 (610)	28.00 (711)	28.00 (711)	33.00 (838)	39.00 (991)
"B"	40.88 (1038)	40.44 (1027)	48.00 (1219)	46.38 (1178)	54.44 (1383)	52.25 (1327)	55.50 (1410)	56.38 (1432)	62.56 (1589)	63.88 (1622)	69.13 (1756)	66.25 (1683)
"C"	4.88 (124)	8.31 (211)	9.69 (246)	10.63 (270)	11.69 (297)	11.63 (295)	13.44 (341)	14.69 (373)	16.88 (429)	18.19 (462)	19.63 (498)	19.69 (500)
"D"	32.25 (819)	29.5 (749)	38.31 (973)	33.13 (841)	40.50 (1029)	40.63 (1032)	41.19 (1046)	39.44 (1002)	45.69 (1160)	43.44 (1103)	49.50 (1257)	44.31 (1126)
Weight lb (kg)												
w/thread	36.5 (16.6)	128 (58)	90 (41)	270 (123)	118 (54)	294 (133)	—	—	—	—	—	—
w/flange	52.5 (23.8)	154 (70)	106 (48)	296 (135)	134 (61)	320 (145)	(2)	271 (123)	524 (238)	(4)	709 (322)	980 (445)
Vessel Connection	1/4"	3/4"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
Vessel Type	I	II	III	IV	III	V	III	V	III	V	III	V

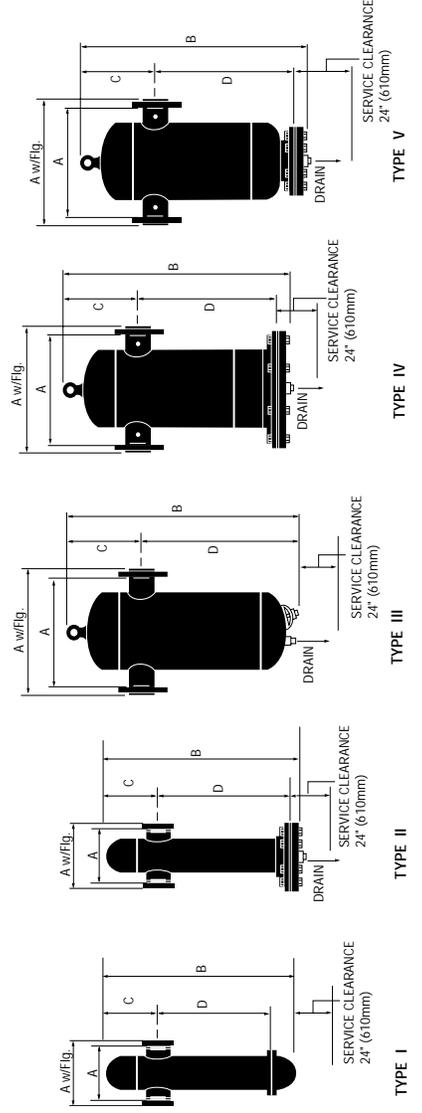
(1) FS, PF, OR, OX, VF-PV; Models 1000 and 4050HP - FS, PF, OR, OX, VF-500

(2) 2500: 178 (81); 3125: 180 (82);

(3) 9900HP: 403 (183); 12375HP: 405 (184)

(4) 6875: 518 (235); 8750: 525 (238);

(5) 20695HP: 693 (314); 26340HP: 700 (318).



WARRANTY

The manufacturer warrants the product manufactured by it, when properly installed, operated, applied, and maintained in accordance with procedures and recommendations outlined in manufacturer's instruction manuals, to be free from defects in material and workmanship for a period of one (1) year from date shipment to the buyer by the manufacturer or manufacturer's authorized distributor provided such defect is discovered and brought to the manufacturer's attention within the aforesaid warranty period.

The manufacturer will repair or replace any product or part determined to be defective by the manufacturer within the warranty period, provided such defect occurred in normal service and not as a result of misuse, abuse, neglect or accident. Normal maintenance items requiring routine replacement are not warranted. The warranty covers parts and labor for the warranty period. Repair or replacement shall be made at the factory or the installation site, at the sole option of the manufacturer. Any service performed on the product by anyone other than the manufacturer must first be authorized by the manufacturer.

Unauthorized service voids the warranty and any resulting charge or subsequent claim will not be paid.

Products repaired or replaced under warranty shall be warranted for the unexpired portion of the warranty applying to the original product.

The foregoing is the exclusive remedy of any buyer of the manufacturer's product. The maximum damages liability of the manufacturer is the original purchase price of the product or part.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR STATUTORY, AND IS EXPRESSED IN LIEU OF THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. THE MANUFACTURER SHALL NOT BE LIABLE FOR LOSS OR DAMAGE BY REASON OF STRICT LIABILITY IN TORT OR ITS NEGLIGENCE IN WHATEVER MANNER INCLUDING DESIGN, MANUFACTURE OR INSPECTION OF THE EQUIPMENT OR ITS FAILURE TO DISCOVER, REPORT, REPAIR, OR MODIFY LATENT DEFECTS INHERENT THEREIN.

THE MANUFACTURER, HIS REPRESENTATIVE OR DISTRIBUTOR SHALL NOT BE LIABLE FOR LOSS OF USE OF THE PRODUCT OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES INCURRED BY THE BUYER, WHETHER ARISING FROM BREACH OF WARRANTY, NEGLIGENCE OR STRICT LIABILITY IN TORT.

The manufacturer does not warrant any product, part, material, component, or accessory manufactured by others and sold or supplied in connection with the sale of manufacturer's products. 1/96

AUTHORIZATION FROM THE SERVICE DEPARTMENT IS NECESSARY BEFORE MATERIAL IS RETURNED TO THE FACTORY OR IN-WARRANTY REPAIRS ARE MADE.



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