

V-Series Air Control Devices

User Instructions for 3M™ Vortex Cooling Assembly V-100, 3M™ Vortemp™ Heating Assembly V-200, 3M™ Air Regulating Valve Assembly V-300 and 3M™ Low Pressure Connector Assembly V-400.

IMPORTANT: Keep these *User Instructions* for reference



⚠ WARNING

This product helps protect against certain airborne contaminants. **Misuse may result in sickness or death.** For proper use, see supervisor, or *User Instructions*, or call 3M™ in U.S.A.

3M SPEEDGLAS 27 5702 30SW FRESH AIR 3 SUPPLIED AIR RESPIRATOR
3M SPEEDGLAS 27 5702 20SW FRESH AIR 3 SUPPLIED AIR RESPIRATOR
3M SPEEDGLAS 27 5702 10SW FRESH AIR 3 SUPPLIED AIR RESPIRATOR
3M SPEEDGLAS 27 5702 00SWSR FRESH AIR 3 SUPPLIED AIR RESPIRATOR
3M SPEEDGLAS 27 5902 30SW FRESH AIR 3 SUPPLIED AIR RESPIRATOR
3M SPEEDGLAS 27 5902 20SW FRESH AIR 3 SUPPLIED AIR RESPIRATOR
3M SPEEDGLAS 27 5902 10SW FRESH AIR 3 SUPPLIED AIR RESPIRATOR
3M 26 5802 20SW SPEEDGLAS FRESH AIR III AIR SYSTEM
3M 26 5802 10SW SPEEDGLAS FRESH AIR III AIR SYSTEM
3M 26 5702 10SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR
3M 26 5702 20SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR
3M 26 5702 30SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR
3M 25 5802 30SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR
3M 25 5802 20SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR
3M 25 5802 10SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR
3M 25 5702 10SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR
3M 25 5702 20SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR
3M 25 5702 30SW SPEEDGLAS FRESH AIR III WELDING RESPIRATOR

GENERAL SAFETY INFORMATION

Intended Use

The 3M™ V-Series Air Control Devices are designed to be used with certain 3M headgear, breathing tube and supplied air hose to form a complete NIOSH approved respiratory system. When used in accordance with its NIOSH approval, these systems can provide positive pressure, supplied air respiratory protection.

3M headgear (respiratory inlet covering) may include a tight fitting facepiece, loose fitting facepiece, hood, helmet or some combination of these that serves as a respiratory protective covering for the nose and mouth area. Refer to the enclosed 3M™ V-Series Air Control Device NIOSH approval label for approved system configurations.

List of Warnings and Cautions within these *User Instructions*



This product helps protect against certain airborne contaminants. **Misuse may result in sickness or death.** For proper use, see supervisor, *User Instructions*, or call 3M in U.S.A.

The length of compressed air hose W-3020 used depends on the specifications of the low-pressure air pump utilized. Some pumps specify a minimum of 50 or 100 feet of hose to allow adequate cooling of the air heated by the pump's mechanism. Read the pump's instructions thoroughly before selecting the compressed air hose W-3020 length that will be used. **NO PUMP IS TO BE USED WHICH COULD CAUSE AIR HOTTER THAN 160° F (71° C) TO ENTER THE COMPRESSED AIR HOSE W-3020.** Air hotter than 160° F (71° C) will cause the hose to degrade, which would adversely affect respirator performance and **may result in sickness or death.**

To meet the NIOSH requirement in 42 CFR 84, subpart 84.150 for minimum and maximum airflow (6 to 15 scfm, 170 to 425 lpm), the air control devices approved for use with 3M headgear must be operated within the supply pressure ranges and hose lengths stated in the Special or Critical Use Instructions. Failure to do so may adversely affect respirator performance and **result in sickness or death.**

You must comply with OSHA Standard 29 CFR 1910.134, which states that, "Airline couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of airline respirators with nonrespirable gases or oxygen." In Canada, refer to the requirements of CSA Standard Z180.1 or the authority having jurisdiction in your region. **Failure to do so may result in sickness or death.**

Your employer must provide breathing air that meets at least the requirements of the specification for Grade D breathing air, as described in the Compressed Gas Association Commodity Specification G-7.1-1997 in the United States. In Canada, refer to CSA Standard Z180.1, table for the quality of compressed breathing air. **Failure to do so may result in sickness or death.**

The line pressure must be kept within safe limits, 125 psig (8.75 kg/cm²) maximum. Dirt, oil and water, unless trapped or filtered out, may continue downstream in concentrated form and adversely affect the performance of the respirator and **result in sickness or death.**

Use of equipment described in these *User Instructions* must be in accordance with applicable health and safety standards, respirator selection tables contained in such publications as ANSI Z88.2-1992, CSA Standard Z94.4, or pursuant to the recommendations of an industrial hygienist. Before occupational use of these respirators, a written respiratory protection program must be implemented meeting all the requirements of OSHA 29 CFR 1910.134 such as training, fit testing, medical evaluation, and applicable OSHA substance

specific standards. In Canada, CSA standard Z94.4 requirements must be met and/or requirements of the applicable jurisdiction, as appropriate.

Each person using this respirator must read and understand the information in these *User Instructions* before use. Use of this respirator by untrained or unqualified persons, or use not in accordance with these *User Instructions* may adversely affect product performance and **result in sickness or death**.

Do not use if any parts are missing or damaged.

Do not use with parts or accessories other than those approved by 3M as described in these *User Instructions* or on the NIOSH approval label for the respirator that you are using. Failure to do so may adversely affect respirator performance **and result in sickness or death**.

Use of this respirator in atmospheres for which it is not NIOSH certified or designed **may result in sickness or death**. Do not wear this respirator where:

- Atmospheres are oxygen deficient
- Contaminant concentrations are unknown
- Contaminant concentrations are Immediately Dangerous to Life or Health (IDLH)
- Contaminant concentrations exceed the maximum use concentration (MUC) determined using the assigned protection factor (APF) recommended for the applicable headgear or the APF mandated by specific government standards, whichever is lower. Refer to the *User Instructions* provided with the applicable headgear.

Contaminants that are dangerous to your health include those that you may not be able to see or smell. Leave the contaminated area immediately if any of the following conditions occur. **Failure to do so may result in sickness or death**.

- Any part of the system becomes damaged
- Airflow into the respirator decreases or stops
- Breathing becomes difficult
- You feel dizzy or your vision is impaired
- You taste or smell contaminants
- Your face, eyes, nose or mouth become(s) irritated
- You suspect that the concentration of contaminants may have reached levels at which this respirator may no longer provide adequate protection.

Never alter or modify this assembly.

Air supply piping, fittings, and compressors must have the capacity to deliver sufficient air volume (6 to 15 scfm, 170 to 425 lpm) to operate the air control device at the recommended pressure.

USE INSTRUCTIONS AND LIMITATIONS

IMPORTANT

Before use, the wearer must read and understand these *User Instructions*. Keep these *User Instructions* for reference.

General Description

The 3M™ Air Control Device Assemblies, when used in conjunction with certain 3M headgear, create a positive pressure atmosphere inside the headgear. The positive pressure helps to prevent airborne contaminants from entering the headgear. Refer to the V-Series NIOSH approval label enclosed with the V-Series Air Control Device for a list of approved headgear, breathing tubes and supplied air hoses for use with the V-Series devices.

The air control devices, when used in a complete system (supplied air hose, breathing tube and headgear), are classified as a Type C or CE supplied air respirator by NIOSH.

3M™ Vortex Cooling Assembly V-100

The 3M™ Vortex Cooling Assembly is designed to provide those 3M headgear which are approved for use with it, a continuous airflow ranging between 6 and 15 cfm (170 to 425 lpm). This air control device also provides the ability to cool the compressed air supply by as much as 50° F (28° C). The device cools the air as supplied by the compressed air source – not the ambient air. The control knob may be adjusted manually between upper and lower limits to suit the cooling comfort requirements of the user.

3M™ Vortemp™ Heating Assembly V-200

The 3M™ Vortemp Heating Assembly is designed to provide those 3M headgear which are approved for use with it, a continuous airflow ranging between 6 and 15 cfm (170 to 425 lpm). This air control device also provides the ability to warm the compressed air supply by as much as 50° F (28° C). The device warms the air as supplied by the compressed air source – not the ambient air. The control knob is set manually between upper and lower limits to suit the warming comfort requirements of the user.

3M™ Air Regulating Valve Assembly V-300

The 3M™ Air Regulating Valve Assembly is designed to provide those 3M headgear which are approved for use with it, a continuous airflow ranging between 6 and 15 cfm (170 to 425 lpm). The control knob (airflow) is set manually between upper and lower limits to suit the comfort requirements of the user.

3M™ Low Pressure Connector Assembly V-400

The 3M™ Low Pressure Connector Assembly is designed to provide those 3M headgear which are approved for use with it, a continuous airflow ranging between 6 and 15 cfm (170 to 425 lpm). When used as part of an approved system with the 3M™ Supplied Air Hose W-3020, the V-400 will provide airflow within the specified range when the air pressure at the point of connection for the hose is between 4 and 15 psig (0.28 to 1.05 kg/cm²), dependent on hose length.

Assigned Protection Factor (APF)

Refer to the *User Instructions* for the specific headgear to be used to determine the APF for the 3M™ Supplied Air System using V-Series Air Control Devices. Consult 3M™ Technical Data Bulletin #175 for additional information on APFs and supporting test data.

NIOSH Approval

For a listing of the components of NIOSH approved 3M respirator systems using 3M™ V-Series Air Control Devices, refer to the NIOSH approval label.

NIOSH Cautions and Limitations

- A– Not for use in atmospheres containing less than 19.5 percent oxygen.
- B– Not for use in atmospheres immediately dangerous to life or health.
- C– Do not exceed maximum use concentrations established by regulatory standards.
- D– Air-line respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1 Grade D or higher quality.
- E– Use only the pressure ranges and hose lengths specified in the *User's Instructions*.
- J– Failure to properly use and maintain this product could result in injury or death.
- M– All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.
- N– Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by the manufacturer.
- O– Refer to *User's Instructions*, and/or maintenance manuals for information on use and maintenance of these respirators.
- S– Special or critical *User's Instructions* and/or specific use limitations apply. Refer to *User's Instructions* before donning.

S- Special or Critical Use Instructions

Each 3M™ V-Series Air Control Device Assembly includes an air regulating device or connector with a quick disconnect plug, a belt clip, and a belt. The W-2963 cotton fiber belt may be adjusted to accommodate waist sizes between 25 and 42 inches (64 and 107 centimeters). The W-3217, 520-02-23 and GVP-117 belts may accommodate waist sizes up to 50 inches (127 centimeters).

Air Control Device	Quick Disconnect Plug Type
V-100	Industrial Interchange, 1/4" MPT, 1/4" Body Size, Steel
V-200	Industrial Interchange, 1/4" MPT, 1/4" Body Size, Steel
V-300	Industrial Interchange, 1/4" MPT, 1/4" Body Size, Steel
V-400	Industrial Interchange, 1/4" MPT, 3/8" Body Size, Steel

3M™ Supplied Air Hose and Pressure Requirements

All approved 3M headgear except: L-501, L-503, L-505, L-701, L-703, L-705, L-901 and L-905.

3M™ Supplied Air Respirator System approvals allow you to combine up to three W-9435 or W-9445 hoses (25, 50 or 100 feet) in any combination not to exceed 300 feet. Refer to Table 1 for the supply air pressure requirements for all 3M approved headgear except those listed above.

For all 3M headgear, the W-3020 and W-2929 (coiled) hoses can only be used in single lengths of 25, 50, or 100 feet (7.62, 15.24, or 30.48 meters). No connections are allowed.

Table 1: Pressure Schedule Table for 3M™ V-Series Air Control Devices

(All approved 3M headgear except L-501, L-503, L-505, L-701, L-703, L-705, L-901, L-905)

Air Control Device	High Pressure Hoses W-9435 and W-9445 (3/8" ID)	High Pressure Hose W-2929 (Coiled, 3/8" ID)	Low Pressure Hose W-3020 (1/2" ID)	Supply Pressure Range
V-100	25 - 100 ft	25, 50 or 100 ft of hose	N/A	62 - 72 psig (4.4 - 5.0 kg/cm ²)
	125 - 200 ft	N/A	N/A	69 - 82 psig (4.9 - 5.7 kg/cm ²)
	225 - 300 ft	N/A	N/A	75 - 91 psig (5.3 - 6.4 kg/cm ²)
V-200	25 - 100 ft	25, 50 or 100 ft of hose	N/A	64 - 68 psig (4.5 - 4.8 kg/cm ²)
	125 - 200 ft	N/A	N/A	71 - 78 psig (5.0 - 5.5 kg/cm ²)
	225 - 300 ft	N/A	N/A	77 - 88 psig (5.4 - 6.2 kg/cm ²)
V-300	25 - 100 ft	25, 50 or 100 ft of hose	N/A	30 - 35 psig (2.1 - 2.5 kg/cm ²)
	125 - 200 ft	N/A	N/A	33 - 50 psig (2.3 - 3.5 kg/cm ²)
	225 - 300 ft	N/A	N/A	38 - 63 psig (2.7 - 4.4 kg/cm ²)
V-400	N/A	N/A	25 ft (7.6 m)	6 - 11 psig (0.4 - 0.8 kg/cm ²)
	N/A	N/A	50 ft (15.2 m)	7 - 13 psig (0.5 - 0.9 kg/cm ²)
	N/A	N/A	100 ft (30.5 m)	8 - 15 psig (0.6 - 1.0 kg/cm ²)

3M headgear: L-501, L-503, L-505, L-701, L-703, L-705, L-901 and L-905

3M™ Supplied Air Respirator System approvals allow you to combine up to three 100-foot lengths of W-9435 or W-9445 hoses. The total combined hose length not to exceed 300 feet. You may not combine 25 or 50-foot lengths of W-9435 and W-9445 hoses. Refer to Table 2 for the supply air pressure requirements for these approved headgear.

For all 3M headgear, the W-3020 and W-2929 (coiled) hoses can only be used in single lengths of 25, 50, or 100 feet (7.62, 15.24, or 30.48 meters). No connections are allowed.

Table 2: Pressure Schedule Table for 3M™ V-Series Air Control Devices Used With 3M Headgear L-501, L-503, L-505, L-701, L-703, L-705, L-901, L-905

Air Control Device	High Pressure Hoses W-9435 and W-9445 (3/8" ID)	High Pressure Hose W-2929 (Coiled, 3/8" ID)	Low Pressure Hose W-3020 (1/2" ID)	Supply Pressure Range
V-100	25 ft (7.6 m)	25 ft (7.6 m)	N/A	60-65 psig (4.2-4.6 kg/cm ²)
	50 ft (15.2 m)	50 ft (15.2 m)	N/A	65-70 psig (4.6-4.9 kg/cm ²)
	100 ft (30.5 m)	100 ft (30.5 m)	N/A	70-75 psig (4.9-5.3 kg/cm ²)
	200 ft (60.9 m)	N/A	N/A	80-85 psig (5.6-6.0 kg/cm ²)
	300 ft (91.4 m)	N/A	N/A	85-90 psig (6.0-6.3 kg/cm ²)
V-200	25 ft (7.6 m)	25 ft (7.6 m)	N/A	60-65 psig (4.2-4.6 kg/cm ²)
	50 ft (15.2 m)	N/A	N/A	60-68 psig (4.2-4.8 kg/cm ²)
	100 ft (30.5 m)	N/A	N/A	70-72 psig (4.9-5.1 kg/cm ²)
	200 ft (60.9 m)	N/A	N/A	75-80 psig (5.3-5.6 kg/cm ²)
	300 ft (91.4 m)	N/A	N/A	85-90 psig (6.0-6.3 kg/cm ²)
V-300	25 ft (7.6 m)	25 ft (7.6 m)	N/A	25-30 psig (1.8-2.1 kg/cm ²)

	50 ft (15.2 m)	50 ft (15.2m)	N/A	30-35 psig (2.1-2.5 kg/cm ²)
	100 ft (30.5 m)	100 ft (30.5 m)	N/A	35-40 psig (2.5-2.8 kg/cm ²)
	200 ft (60.9 m)	N/A	N/A	45-50 psig (3.2-3.5 kg/cm ²)
	300 ft (91.4 m)	N/A	N/A	50-55 (3.5-3.9 kg/cm ²)
V-400	N/A	N/A	25 ft (7.6 m)	6-11 psig (0.4-0.8 kg/cm ²)
	N/A	N/A	50 ft (15.2 m)	7-13 psig (0.5-0.9 kg/cm ²)
	N/A	N/A	100 ft (30.5 m)	8-15 psig (0.6-1.0 kg/cm ²)

Compressor Volume

Requirements – Approximately 20 CFM per 3M™ Air Control Device

Noise Level – Less than 80 dBA within the headgear; excluding external noise

⚠ WARNING

The length of compressed air hose W-3020 used depends on the specifications of the low-pressure air pump utilized. Some pumps specify a minimum of 50 or 100 feet of hose to allow adequate cooling of the air heated by the pump's mechanism. Read the pump's instructions thoroughly before selecting the compressed air hose W-3020 length that will be used. **NO PUMP IS TO BE USED WHICH COULD CAUSE AIR HOTTER THAN 160° F (71° C) TO ENTER THE COMPRESSED AIR HOSE W-3020.** Air hotter than 160° F (71° C) will cause the hose to degrade, which would adversely affect respirator performance and **may result in sickness or death.**

Discussion on Respirable Air

Many older compressed air systems may provide air that is unfit for human respiration without secondary air treatment. This is due largely to the presence of objectionable oil vapors and odors. Rules and regulations governing air quality when using compressed air for respiration are quite specific.

Precautions must be observed when using compressed air for breathing purposes.

Oil mist from the compressor lubricating oil must not be present when the air reaches the air control device. Excessive amounts of water vapor and any particulate matter should also be removed as they may affect performance of the air control devices. The schematic diagram of the air purifier and pressure regulator equipment shows what should be installed in the main airline ahead of the connection for the breathing air hoses (Fig. 1).

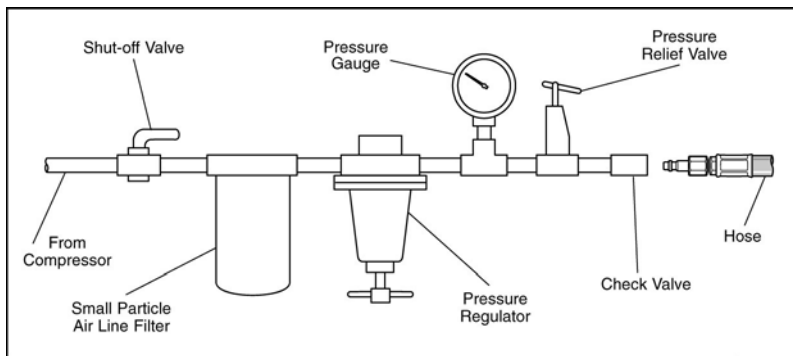


Fig. 1: Air purification and regulation equipment.

If a pre-assembled air filtering and regulating device is desired, 3M offers several compressed air filter and regulator panel assemblies. These assemblies contain a specially designed filter cartridge to help remove oil mist and vapors, condensed moisture, particulates, odors and vapors. They come completely assembled and are ready for connection between the compressor and supplied air respirator system. These air filtering and regulating devices do not ensure Grade D breathing air as required.

Note: Carbon monoxide- Although it is theoretically possible that oil lubricated compressors can create carbon monoxide (CO) if the compressor overheats, studies have shown that the location of the compressor's air intake is the most likely source of carbon monoxide contamination.¹ According to OSHA regulation [29 CFR (1910.134)(i)], periodic CO monitoring, rather than continuous CO monitoring with an alarm, is acceptable if the oil lubricated compressor is equipped with a high temperature alarm and automatic shut-down. In Canada, follow CSA Z180.1 regarding oil lubricated compressors.

¹Formation of carbon monoxide in air compressors, Am. Ind. Hyg. Assoc. J (40), June 1979, pp. 548-551

! WARNING

To meet the NIOSH requirement 42 CFR 84, subpart 84.150 for minimum and maximum airflow (6 to 15 cfm, 170 to 425 lpm), the air control devices approved for use with 3M headgear must be operated within the supply pressure ranges and hose lengths stated in the Special or Critical Use Instructions. Failure to do so may adversely affect respirator performance and **result in sickness or death.**

You must comply with OSHA standard 29 CFR 1910.134, which states that, "Airline couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of airline respirators with nonrespirable gases or oxygen." In Canada, refer to the requirements of CSA Standard Z180.1 or the authority having jurisdiction in your region. **Failure to do so may result in sickness or death.**

Your employer must provide breathing air that meets at least the requirements of the specification for Grade D breathing air, as described in the Compressed Gas Association Commodity Specification G-7.1 in the United States. In Canada, refer to CSA standard Z180.1, table for the quality of compressed breathing air. **Failure to do so may result in sickness or death.**

The line pressure must be kept within safe limits, 125 psig (8.75 kg/cm²) maximum. Dirt, oil and water, unless trapped or filtered out, may continue downstream in concentrated form and adversely affect the performance of the respirator and **may result in sickness or death.**

SYSTEM COMPONENTS AND REPLACEMENT PARTS

3M™ V-100 Illustrated Parts List

Item Number	Part Number	Description	Quantity Required
1	V-111	Vortex muffler kit	1
2	---	Retainer (included in item 1)	1
3	---	Turbine cap**	1
4	---	O-ring	1
5	---	Special washer	1
6	---	Generator	1
7	---	Screw 6/32 x 3/16	1
8	---	Washer-lock #6	1
9	W-1279-2	Plug-quick disconnect (Ind. Interchange)	
	W-3186-2	Plug-quick disconnect (Schrader)	
10	W-1403	Elbow connector	1
11	---	Foam pad and fastener	1
12	---	Body tube**	1
13	---	Control knob**	1
14	---	Tube assembly**	1
15	---	O-ring	1
16	W-2963	Waist belt, cotton 42 in x 1.5 in	
	W-3217	Waist belt, decontaminable 54 in x 1.5 in	
17	---	Holder	1
18	---	Cable tie	1
19	---	Slide	1
20	---	O-ring	1
21	V-150	Vortex Cooling Tube (no belt)	
---	V-115	Vortex spare parts kit-includes item 4, 5, 6, 7, 8, 11, 15	

**Cannot be ordered. Must be returned to distributor for factory repair.

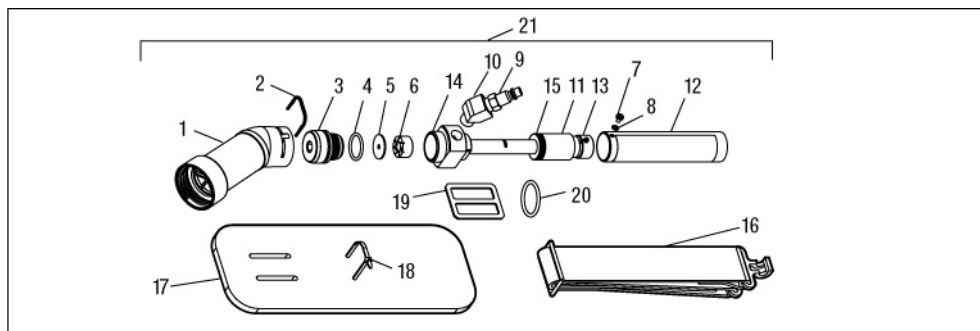


Fig. 2: V-100

3M™ V-200 Illustrated Parts List

Item Number	Part Number	Description	Quantity Required
1	V-211	Vortemp™ muffler kit	1
2	---	Retainer (included in item 1)	1
3	---	Tube housing**	1
4	---	Screw 6/32 x 3/16	1
5	---	Washer - lock #6	1
6	---	O-ring	1
7	---	Tube assembly**	1
8	W-1403	Elbow connector	1
9	W-1279-2	Plug-quick disconnect (Ind. Interchange)	
	W-3186-2	Plug-quick disconnect (Schrader)	
10	---	Generator	1
11	---	Special washer	1
12	---	O-ring	1
13	---	Turbine cap**	1
14	---	Valve-ball**	1
15	---	Vortemp™, cold muffler	1
16	W-2963	Waist belt, cotton 42 in x 1.5 in	
	W-3217	Waist belt, decontaminable 54 in x 1.5 in	
17	---	Holder	1
18	---	Cable tie	1
19	---	Slide	1
20	V-250	Vortemp™ Heating Tube (no belt)	
---	V-215	Vortemp™ spare parts kit-includes item 4, 5, 6, 10, 11, 12, 15	

**Cannot be ordered. Must be returned to distributor for factory repair.

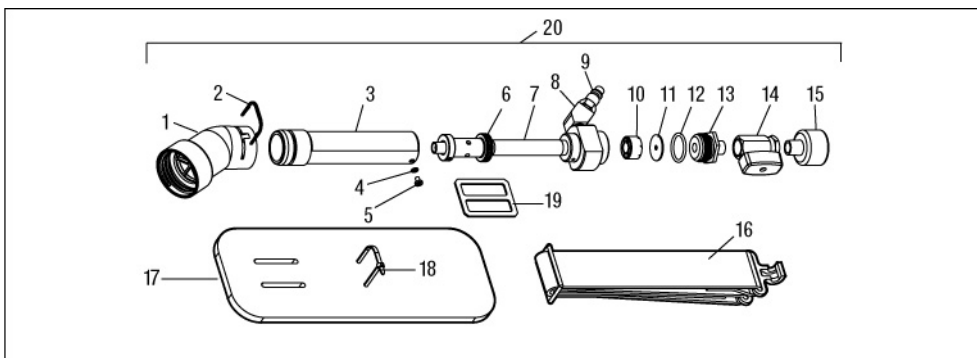
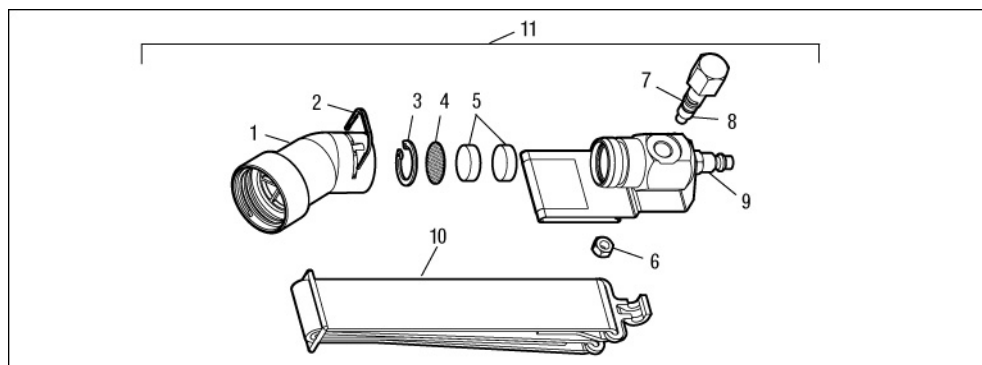


Fig. 3: V-200

3M™ V-300 Illustrated Parts List

Item Number	Part Number	Description	Quantity Required
1	V-211	Vortemp™ muffler kit	1
2	---	Retainer (included in item 1)	1
3	---	Retaining ring	1
4	---	Screen	1
5	W-3135-10	Muffler Disc	2
6	---	Nut	1
7	---	O-ring	1
8	---	O-ring	1
9	W-1279-2	Plug-quick disconnect (Ind. Interchange)	
	W-3186-2	Plug-quick disconnect (Schrader)	
10	W-2963	Waist belt, cotton 42 in x 1.5 in	
	W-3217	Waist belt, decontaminable 54 in x 1.5 in	
	520-02-23	Waist belt, decontaminable 50 in x 2 in	
	GVP-117	Waist belt, decontaminable 50 in x 2 in	
11	V-350	Air regulating valve (no belt)	
---	W-3036	Spare parts kit-includes Item 3, 4, 5, 6, 7, 8	

**Fig. 4:** V-300**3M™ V-400 Illustrated Parts List**

Item Number	Part Number	Description	Quantity Required
1	V-211	Vortemp™ muffler kit	1
2	---	Retainer (included in item 1)	1
3	---	Retaining Ring	1
4	---	Screen	1
5	W-3135-10	Muffler Disc (10 pk)	2
6	W-3252-2	Plug-quick disconnect (Ind. Interchange)	

	W-3251-2	Plug-quick disconnect (Schrader)
7	W-2963	Waist belt, cotton 42 in x 1.5 in
	W-3217	Waist belt, decontaminable 54 in x 1.5 in
	520-02-23	Waist belt, decontaminable 50 in x 2 in
	GVP-117	Waist belt, decontaminable 50 in x 2 in
8	---	Low pressure connector (no belt)
---	W-3036	Spare parts kit-includes item 3, 4, 5

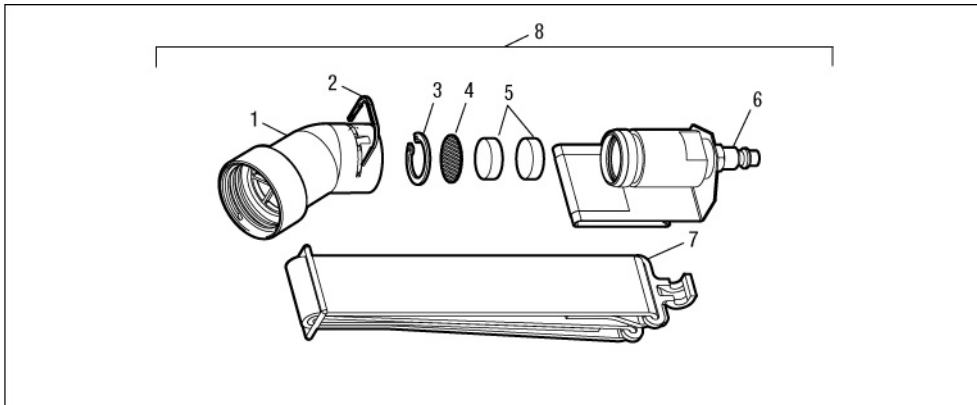


Fig. 5: V-400

3M™ V-Series Air Control Devices – optional parts not shown

- Adapter V-199 for approved BT series breathing tubes

OPERATING INSTRUCTIONS



Use of equipment described in these *User Instructions* must be in accordance with applicable health and safety standards, respirator selection tables contained in such publications as ANSI Z88.2, CSA Standard Z94.4, or pursuant to the recommendations of an industrial hygienist. Before occupational use of these respirators, a written respiratory protection program must be implemented meeting all the requirements of OSHA 29 CFR 1910.134 such as training, fit testing, medical evaluation, and applicable OSHA substance specific standards. In Canada, CSA standard Z94.4 requirements must be met and/or requirements of the applicable jurisdiction, as appropriate.

Each person using this respirator must read and understand the information in these *User Instructions* before use. Use of this respirator by untrained or unqualified persons, or use not in accordance with these *User Instructions* may adversely affect product performance and **result in sickness or death**.

Do not use if any parts are missing or damaged.

Do not use with parts or accessories other than those manufactured by 3M™ as described in these *User Instructions* or on the NIOSH approval label for the respirator that you are using. Failure to do so may adversely affect respirator performance and **result in sickness or death**.

Use of this respirator in atmospheres for which it is not NIOSH certified or designed **may result in sickness or death**. Do not wear this respirator where:

- Atmospheres are oxygen deficient
- Contaminant concentrations are unknown
- Contaminant concentrations are Immediately Dangerous to Life or Health (IDLH)
- Contaminant concentrations exceed the maximum use concentration (MUC) determined using the assigned protection factor (APF) recommended for the applicable headgear or the APF mandated by specific government standards, whichever is lower. Refer to the *User instructions* provided with the applicable headgear.

Contaminants that are dangerous to your health include those that you may not be able to see or smell. Leave the contaminated area immediately if any of the following conditions occur. **Failure to do so may result in sickness or death**.

- Any part of the system becomes damaged
- Airflow into the respirator decreases or stops
- Breathing becomes difficult
- You feel dizzy or your vision is impaired
- You taste or smell contaminants
- Your face, eyes, nose or mouth become(s) irritated

- You suspect that the concentration of contaminants may have reached levels at which this respirator may no longer provide adequate protection.

Never alter or modify this assembly.

Air supply piping, fittings, and compressors must have the capacity to deliver sufficient air volume (6 to 15 cfm, 170 to 425 lpm) to operate the air control device at the recommended pressure.

If you have any doubts about the applicability of the equipment to your job situation, consult your supervisor, an industrial hygienist or call 3M™'s Occupational Health and Environmental Safety Division Technical Service Department.

V-100, V-200, and V-300

To use these 3M air control devices with approved 3M headgear, breathing tube and supplied air hose proceed as follows:

1. Connect one end of the breathing tube to the selected headgear. (Follow the directions in the specific headgear *User Instructions*.)
Note: If the H-115 Breathing Tube Assembly is used, the tube length may be trimmed to suit the user. Trim only the end that will be connected to the headgear. The tube must not be adjusted to a length less than 12 inches (30.5 cm).
2. Connect the breathing tube to the air control device. Connect the threaded end of the breathing tube to the threaded outlet on the air control device by screwing the two units together.

Note: If using a BT series breathing tube, first screw the 3M V-199 adapter into the outlet port of the air control device. Position the breathing tube so that the two locking studs are aligned with the openings of the two L-shaped slots on the adapter outlet. Press in straight and twist so that the locking studs are engaged at the end of the L-shaped slots (Fig. 6).

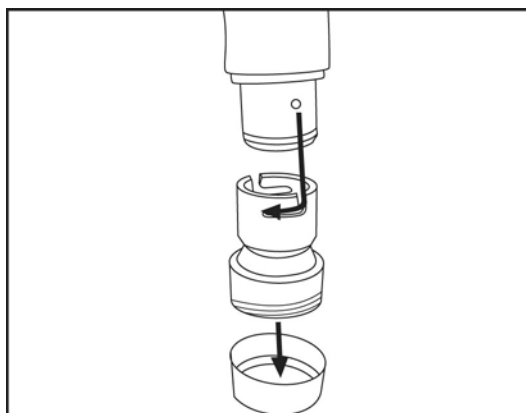


Fig. 6: V-199 Adapter

3. Adjust and buckle the waist belt with air control device comfortably around your waist.
4. Connect the supplied air hose to the air supply and the 3M™ air control device. Adjust the air pressure to within the acceptable range for the appropriate air control device, hose, and headgear. See the Special or Critical Use Instructions section of this *User Instruction* for acceptable air pressure ranges.
5. Don the headgear and adjust for maximum comfort in a non-contaminated area per the specific headgear *User Instructions*.
6. Adjust the airflow for maximum comfort by rotating the control knob on the air control device.
7. Recheck the air pressure setting to ensure it is still in the acceptable range.

V-400

To use this 3M air control device with approved 3M headgear, breathing tube and supplied air hose proceed as follows:

1. Connect one end of the breathing tube to the selected headgear. (Follow the directions in the specific headgear *User's Instructions*.)
 Note: If the H-115 Breathing Tube Assembly is used, the tube length may be trimmed to suit the user. Trim only the end that will be connected to the headgear. The tube must not be adjusted to a length less than 12 inches (30.5 cm).
2. Connect the breathing tube to the air control device. Connect the threaded end of the breathing tube to the threaded outlet on the air control device by screwing the two units together.
 Note: If using a BT series breathing tube, first screw the 3M V-199 adapter into the outlet port of the air control device. Position the breathing tube so that the two locking studs are aligned with the openings of the two L-shaped slots on the adapter outlet. Press in straight and twist so that the locking studs are engaged at the end of the L-shaped slots (Fig. 6).
3. Adjust and buckle the waist belt with low pressure connector assembly comfortably around your waist.
4. Connect the supplied air hose W-3020 between the air pump and the 3M™ Low Pressure Connector Assembly. Adjust the pressure to within the acceptable range as per the Special or Critical Use Instructions Pressure section of this *User Instructions*.
5. Don the headgear and adjust for maximum comfort in a non-contaminated area per the specific headgear *User Instructions*.
6. Recheck the air pressure setting to ensure it is still in the acceptable range.

CLEANING, INSPECTION AND STORAGE

These air control devices have no moving parts except the control knob, so there is little to wear out. If proper filtration of compressed air is maintained, the muffler will stay clean and maintain its acoustic efficiency.

Additional maintenance and care of respirators should be followed per ANSI Standard Z88.2-1992, Practices for Respiratory Protection. In Canada, follow CSA Standard Z94.4 or the requirements of the authority having jurisdiction in your region.

Cleaning**Waist Belt (W-2963) and Decontaminable Waist Belts (W-3217, 520-02-23, and GVP-117)**

The waist belt may be hand laundered with a mild detergent, a clean rinse and air-drying.

V-100

DUE TO THE NEED FOR INSTRUMENTATION TO CALIBRATE FOR PROPER AIRFLOW, THE VORTEX AIR COOLER IS TO BE DISASSEMBLED ONLY TO THE EXTENT SHOWN IN FIG. 2. DO NOT LOOSEN OR REMOVE THE SET SCREWS IN THE CONTROL KNOB (ITEM 13) BECAUSE OF CRITICAL POSITIONING OF THE VALVE AND THE NEED TO USE INSTRUMENTATION FOR PROPER ADJUSTMENT OF THE AIRFLOW. RETURN TO THE FACTORY FOR REPAIR IF THE CONTROL KNOB COMES OFF.

To clean the tube assembly, simply flush with soap and water followed with a water rinse. Do not insert a brush in the tube.

It is important to keep the slots of the generator (item 6) clean.

Over tightening of the turbine cap (item 3) on re-assembly can cause the generator slots to restrict, thereby reducing airflow.

To replace the acoustic foam pad (item 11) proceed as follows:

- Remove the machine screw (item 7) and slide off the body tube (item 12) from the vortex air cooler with a slight twisting motion.
- Remove the acoustic foam pad (item 11).
- Position one end of new acoustic foam pad halfway between the exhaust holes and wrap it around the 3M™ Scotchmate™ strips. Make sure that the ends of the acoustic foam pad do not overlap, but rather form a snug butt fit.
- Holding the acoustic foam pad in place with two fingers of one hand, use the other hand to carefully slide the body tube over acoustic foam and the tube assembly with a slight twisting motion. Apply a small amount of medium strength thread locker to the machine screw. Secure the body tube with the machine screw.

V-200

DUE TO THE NEED FOR INSTRUMENTATION TO CALIBRATE FOR PROPER AIRFLOW, THE VORTEMP™ HEATING TUBE IS TO BE DISASSEMBLED ONLY TO THE EXTENT SHOWN IN FIG. 3. DO NOT LOOSEN OR REMOVE THE SET SCREWS IN THE TUBE ASSEMBLY (ITEM 7) BECAUSE OF CRITICAL POSITIONING OF THE VALVE AND THE NEED TO USE INSTRUMENTATION FOR PROPER ADJUSTMENT OF THE AIRFLOW. RETURN TO THE FACTORY FOR REPAIR.

To clean the tube assembly, simply flush with soap and water followed with a water rinse. Do not insert a brush in the tube.

It is important to keep the slots of the generator (item 10) clean.

Over tightening of the turbine cap (item 13) on reassembly can cause the generator slots to restrict, thereby reducing airflow.

V-300 and V-400

Daily cleaning should be performed on the exterior of the air control device. Blow clean with compressed air.

After extended use, the two disks (item 5, Fig. 4 and 5) inside of the low pressure adapter may become dirty from contaminants in the compressed air supply. They may be replaced by removing the retaining ring with the proper tool.

Storage

All 3M air control devices should be stored at ambient temperature in a dry environment that is protected against atmospheric contaminants.

DISPOSAL

3M™ V-Series Air Control Devices can be disposed of as normal waste or scrap metal unless contaminated with a hazardous material as a result of use. If contaminated, the air control device must be disposed of according to local environmental regulations.

TROUBLESHOOTING

Troubleshooting Chart V-100 and V-200

Symptom	Possible Causes	Remedy
Vortex freezes up	Excessive water in compressor air line	Add air drier to compressor
Inadequate airflow Inadequate warming or cooling	Not enough air pressure Dirty on inside Compressed airline pipe too small Compressor has insufficient capacity Incoming air temperature too high or too low	Increase air pressure within appropriate pressure schedule in this <i>User Instruction</i> Clean and provide adequate filtration of supplied air Increase airline pipe size Use larger compressor Check compressor for overheating Insulate or move any hoses or pipes, which are heating up due to ambient conditions.
Too much warming or cooling	Control knob not adjusted Air pressure too high	Adjust control knob Lower air pressure within appropriate pressure schedule in this <i>User Instruction</i>
Excessive airflow to headgear	Air pressure too high	Lower air pressure within appropriate pressure schedule in this <i>User Instruction</i>

Troubleshooting Chart V-300

Symptom	Possible Causes	Remedy
Inadequate airflow	Compressor filters plugged Muffler plugged with oil Air pressure too low F&R panel filter plugged Kink in air hose	Change filters Replace muffler discs Increase air pressure within appropriate pressure schedule in this <i>User Instruction</i> Change filter Straighten hose out and inspect for damage
Control knob won't turn	Valve mechanism dirty	Clean with blast of air

No airflow	Compressor off F&R panel valve closed F&R panel closed Compressed air hose not connected	Turn compressor on Open F&R panel valve Open F&R panel regulator Connect compressed air hose
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Troubleshooting Chart V-400

Symptom	Possible Causes	Remedy
Inadequate airflow	Compressor filters plugged Muffler plugged with oil Air pressure too low F&R panel filter plugged Kink in air hose	Change filters Replace muffler discs Increase air Change filter Straighten hose out
No airflow	Compressor off F&R panel valve closed F&R panel closed Compressed air hose not connected	Turn compressor on Open F&R panel valve Open F&R panel regulator Connect compressed air hose

IMPORTANT NOTICE

WARRANTY: In the event any 3M OH&ESD product is found to be defective in material, workmanship, or not in conformation with any express warranty for a specific purpose, 3M's only obligation and your exclusive remedy shall be, at 3M's option, to repair, replace or refund the purchase price of such parts or products upon timely notification thereof and substantiation that the product has been stored, maintained and used in accordance with 3M's written instructions.

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