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1.0 INTRODUCTION

1.1 General

1.1.1 The Farr TENKAY is an aspirated cartridge, self-cleaning dust collector. Incoming air passes from the outside to the inside of the cartridges; enters the upper or clean air plenum; and exits through the clean air outlet. Cartridges are sequentially cleaned by back flushing with air from the clean air plenum. This momentary airflow reversal is induced by short bursts of compressed air and is limited to only one of the cartridges at a time. As a result, the unit continues to collect dust even as its cartridges are being cleaned.

1.2 Control Systems

1.2.1 MANUAL CONTROLS consist of a group of button bleeder valves --- one for each diaphragm valve. A diaphragm valve is operated whenever and for as long as its button bleeder valve is pressed. Manual controls are not available on sizes 8D and 10D.

1.2.2 AUTOMATIC CONTROLS include a separate, electrically-operated pilot solenoid valve for each diaphragm valve. The solenoid valves are controlled by either a P3 or T3 Control Box, each of which encloses a solid-state Sequential Controller that determines the order in which the solenoid valves are operated; the length of time that the valves remain open; and the time interval between such valve openings. The T3 Control Box operates continuously whenever electrical power is supplied to it. The P3 Control Box, on the other hand, only operates when the Photohelic Pressure Switch/Gage mounted in its door indicates that the cartridges have collected sufficient dust to raise their pressure drop above the set point of the Photohelic. When the differential pressure across the cartridges once again drops below the set point of the Photohelic, the cleaning cycle stops after the last valve has pulsed.

1.3 Compressed Air Requirements

1.3.1 Air reservoir pressure must be set between 90 psig (the minimum pressure which will assure truly effective cleaning of the cartridges) and 105 psig (the maximum allowable working pressure of the valves and air reservoir).

1.3.2 The total consumption of compressed air is a variable that is dependent upon the amount and type of dust being collected; the size of the dust collector; the condition of the filter cartridges; the set points of the OFF and ON timers in the Sequential Controller; the pressure in the air reservoir; and the set point of the Photohelic, if a P3 Control Box is used. When the ON timer is set at its normally recommended time of 0.1 second and the air reservoir pressure is at 100 psig, approximately 0.9 cubic feet of free air will be used per pulse.
1.3.3 While the cartridges are being cleaned, the average usage rate in CFM of free air depends upon the setting of the OFF timer. If set at 20 seconds (3 pulses per minute), for example, the average usage rate during a cleaning cycle would be: 
\(0.9 \text{ cu.ft.}/\text{pulse} \times 3 \text{ pulses/minute} = 2.7 \text{ CFM of free air.}\)

1.4 Safety Precautions

1.4.1 Farr Company relies on the skills and expertise of its customer and any consulting engineers and/or installing contractor hired by that customer to properly design and install the dust collection system of which the Farr TENKAY Dust Collector is a part. Take precautions as necessary to minimize the inherent risk of dust combustion, fires, and explosions. Read this manual thoroughly and comply with the precautionary statements relative to worker safety.

1.5 Warnings

1.5.1 Take special care when the door of the control box is open. When power is ON, the full line voltage can appear from any electrical point on the circuit board to the metal enclosure or to ground.

1.5.2 Do not collect combustible materials along with dust from ferrous grinding or other spark-generating operations. Sparks caused by such operations may start a fire in the combustible dust.

1.5.3 Under no circumstances should anyone be allowed to discard a lighted cigarette or other burning material into an inlet hood or ducting of the dust collection system.

1.5.4 It is the responsibility of the user to comply with all applicable national or local fire and safety codes.

1.5.5 TENKAY Dust Collectors do not contain explosion vents except on special order. Refer to NFPA 68 "Guide for Explosion Venting" or your insurance underwriter for recommendations regarding the sizing and installation of explosion vents.

1.6 Blast Gate or Fan Damper

1.6.1 Provide a blast gate, fan damper or other means of restricting airflow to the design value during the run-in period. The initial pressure drop of the TENKAY Dust Collector prior to dust cake accumulation is approximately 0.50 to 0.75 inch w.g. Since the fan is selected for the steady state resistance of 2 to 3 inches w.g., the initial airflow volume through the collector will be much too high unless it is somehow restricted. Failure to restrict airflow while clean new cartridges are being run-in will result in dust being impacted on them at too high a velocity for the first several hours to several weeks of operation. This could seriously reduce cartridge life and could also overload the motor.
2.0 ASSEMBLY AND INSTALLATION

2.1 General

2.1.1 Figures 1 and 2 of the Appendix illustrate the MODEL C and MODEL D Dust Collector Assemblies respectively. A "Dust Collector Assembly" consists of an upper section called a "Bin Vent Section", a hopper, and one or two 30-gallon drums. When the Bin Vent Section is furnished alone (i.e., without the hopper and drums), it is called a "Bin Vent Assembly". Assembly and installation of Dust Collectors is covered in Section 2.2. Installation of Bin Vent Assemblies is covered in Section 2.3.

2.2 Dust Collector Assembly

2.2.1 Apply a continuous bead of caulking tape all around the top flange of the hopper just inside the bolt hole pattern. Place the Bin Vent Section on top of the hopper and bolt the two together with the 5/16" - 18NC x 3/4" hex head bolts, 5/16" flat washers, and 5/16" flanged lock nuts provided.

2.2.2 Position the assembly in the desired location and anchor it securely to the floor.

2.2.3 Place the Drum Top Adapter on top of the 30-gallon drum with the gasketed surface contacting the top of the drum. Slip one end of the 16" Flexible Hose over the collar of the adapter and fasten in place with one of the band clamps. Slide this sub-assembly under the hopper outlet, slip the top end of the flexible hose over the collar of the hopper outlet, and fasten it to the hopper with another band clamp. Repeat for the second drum, if any.

2.3 Bin Vent Assembly

2.3.1 Install the Bin Vent Assembly in accordance with the plans. If installed on a bin or special hopper, make sure the joint is water- and air-tight. Use the caulking tape provided with the unit plus appropriate fasteners (by others).

2.4 Duct Connections

2.4.1 The air inlet opening of the MODEL C and the air outlet opening of the MODEL D are raw-edged holes to which a duct adapter (by the ducting supplier) must be attached. The recommended method of attachment is by means of blind rivets or sheet metal screws. Drill mounting holes around the openings as required. Seal the adapter to the TENKAY with some of the caulking tape used to seal the Bin Vent Section to the hopper.

2.4.2 If the unit is a Bin Vent Assembly and if it is intended that the air enter the unit from below, seal-off the existing air inlet opening. MODEL C Bin Vent Assemblies are furnished with a blank-off plate for this purpose together with #10-32 x 1/2" Type F Sheet metal screws. These require that a #18 (.169") hole be drilled for each screw. Seal with caulking tape.
2.4.3 The air outlet opening of the MODEL C is surrounded by threaded holes which can be used to attach either the air outlet ducting adapter (by the ducting supplier) or the optional fan assembly. If the fan was ordered, install it per Section 2.5.

2.5 Fan Option (Model C Only)

2.5.1 The optional Fan Assembly is furnished complete with a Fan Mounting Adapter by means of which it is face-mounted directly to the clean air outlet opening. If the Safety Monitoring Filter option has also been provided, the fan should be installed with its discharge pointing downwards as shown in Figure 1. If the Safety Monitoring Filter option was not ordered, then the discharge of the fan may be rotated in 45° increments to any desired position.

2.5.2 The fan scroll or housing is made up of two aluminum castings bolted together. Remove the scroll-half which includes the fan inlet from the remainder of the fan/motor/wheel sub-assembly.

2.5.3 Refer to Figure 3A or 3B as applicable. Apply a bead of caulking to the flange of the Fan Mounting Adapter which matches the holes surrounding the inlet of the fan. Fasten the adapter to the fan scroll with the eight flat head screws and flanged lock nuts as shown.

2.5.4 Apply a second bead of caulking to the remaining flange of the Fan Mounting Adapter. Orientate the discharge of the fan to the desired angle and then bolt the Fan Mounting Adapter to the clean air outlet opening in the end wall of the Bin Vent Section.

2.5.5 Re-assemble the fan/motor/wheel sub-assembly to the inlet-half of the fan scroll, thus completing the installation of the Fan Assembly.

2.6 Safety Monitoring Filter Option (Model C Only)

2.6.1 The housing of the Safety Monitoring Filter is furnished with an "inlet adapter" as shown in Figure 4A. If a Size 15 Fan has been furnished, an 8" O.D. adapter is required and has been factory-welded to the housing. If a Size 10, 12, or 14 Fan was furnished, the inlet adapter was shipped loose for field installation to the housing as shown. Apply a bead of caulking before installation so as to make the joint air- and water-tight. Use the self-tapping screws provided. The tap drill holes in the top of the housing were punched at the factory.

2.6.2 Slide the bottom end of the "Flexible Rubber Coupling" over the end of the inlet adapter for a distance of 1-1/2" as shown and band clamp it in place.
2.6.3 Now lift the entire housing into position slipping the top end of the Flexible Rubber Coupling over the air outlet of the fan as shown in Figure 4A. Making sure that the housing is properly aligned with the end wall of the Bin Vent Section and the discharge of the Fan, match-mark the end wall of the unit. Drill .221" diameter holes (No. 2 tap drill) in the end wall and mount the housing to the wall with the self-tapping screws provided. Install the second band clamp at the top of the flexible rubber coupling.

2.6.4 Install the Type C-80 Fasteners in the fastener mounting lances of the holding frame as shown in Figure 4B. 12" x 24" Riga-Flo filters use two fasteners and the larger 24" x 24" filters use four fasteners. Install the fasteners at the front and back sides of the holding frame as illustrated in Figure 1.

2.6.5 Do not install the Riga-Flo Filter Cartridge at this time. Store it in a clean, dry, weather-protected area until needed.

2.7 Compressed Air Supply

2.7.1 Run a 3/4" pipe size compressed air supply line to the TENKAY. Purge the air line to remove any debris before connecting it to the air reservoir of the unit. The air line should be equipped with a manual shut-off valve, a filter/separater, an air regulator, and a pressure gage, all located close to the TENKAY. If the unit is to be installed in an area where freezing temperatures are to be expected, an air dryer capable of drying the compressed air to below the dew point must also be provided. Make provisions for draining any condensate from the air reservoir with an automatic tank drain or by other means.

2.8 Pneumatic Tubing Connections

2.8.1 Pneumatic tubing connections between diaphragm valves and solenoid valves or manual push-button valves are made with 1/4" O. D. black plastic tubing and quick-connect brass fittings. With this type of fitting, simply insert the tubing until you feel resistance and then push harder so that the tubing pushes past the internal O-ring and seats at full depth (about 3/4"). To remove the tubing from the fitting, push in on the release collar while pulling on the tubing.

2.8.2 Pneumatic connections from pressure taps to P3 Control Box or Magnehelic Pressure Gage (options) are made with fittings which utilize a knurled nut and a plastic ferrule. When installing tubing into this type of fitting, tighten the nut finger-tight and then tighten it one-half additional turn with a wrench.
2.9 Automatic Controls, Type T3 (Option)

2.9.1 Install the solenoid valve assembly as shown in Figures 5 and 6 of the Appendix. Connect to the diaphragm valves per Section 2.8.1. Take care not to use the special restrictor elbows described in Section 2.10.2.

2.9.2 Mount the control box in a convenient location and wire it to the solenoid valves per the appropriate wiring diagram (Figure 7 or 8).

2.10 Automatic Controls, Type P3 (Option)

2.10.1 Install in the same manner as for T3 Controls per Section 2.9 except select a control box mounting location which is also convenient to the routing of pneumatic tubing from the bottom of the box to the pressure taps in the back wall adjacent to the door hinges.

2.10.2 Locate the two 1/8" pipe-to-1/4" tubing elbows which incorporate built-in restrictors that provide surge protection for the Photohelic. Install these elbows in the pressure taps on the TENKAY and connect to the control box. Connect the lower pressure tap to the "High" pressure connection of the gage and connect the upper pressure tap to the "Low" pressure connection in accordance with Section 2.8.2.

2.10.3 Open the cartridge access door and locate the 3/4" pipe thread protruding into the cartridge plenum at the lower pressure tap. Install the Pamic Filter (the small pleated-paper filter) at this pressure tap by screwing it onto the 3/4" pipe thread as far as it will go.

2.11 Manual Pulse Controls Option (Sizes 2C-5C, 4D & 6D Only)

2.11.1 Install the button bleeder valve assemblies as shown in the lower right view of Figure 9. The illustration shows the five valves of a Size 5C. Sizes 4C and 4D are supplied with two double-valve assemblies. Two triple-valve assemblies are furnished with the 6D. Sizes 2C and 3C utilize a single assembly containing either two or three valves. Take care to provide adequate clearance for the door latches. Do not install the button bleeder valves farther away from the diaphragm valves than shown or the diaphragm valves may not operate properly.

2.11.2 Install the 90 elbow fittings, 1/4" plastic tubing, and cable ties as shown. Connect tubing per Section 2.8.1.

2.12 Magnehelic Pressure Gage Option

2.12.1 This gage, which is for use with Manual or T3 Controls, should be connected in the same manner as the Photohelic of the P3 Control Box. See Sections 2.10.2 and 2.10.3.
2.13 Cartridge Installation

2.13.1 Inspect the TENKAY Cartridges to make sure that they have not been damaged during shipment or storage. Install the cartridges as illustrated in Figure 10. While sliding the cartridge into place, make sure that the clamp bar arms are vertical as shown in Figure 10A and that they do not scrape against the pleats of the cartridges and damage them during installation. WARNING! ALWAYS PUSH CARTRIDGES BY THEIR TOP FLANGES --- NEVER BY THE MEDIA PACK! ALWAYS PUSH THEM INTO PLACE SLOWLY AND GENTLY. FAILURE TO HEED THIS WARNING CAN CAUSE THE BACK EDGE OF THE TOP PAN TO LIFT UP AND SLIDE OVER THE FRONT EDGE OF THE CARTRIDGE BEYOND WHICH WILL RESULT IN A DUST LEAK PAST THE GASKET OF THE CARTRIDGE.

2.13.2 Close the left clamp bar and then the right clamp bar. Note that the hook on the handle of the right clamp bar supports the tip of the handle of the left clamp bar and vice-versa.

2.13.3 Close and fasten the access door.

2.13.4 If the Riga-Flo Safety Monitoring Filter (an option for the Model C) was furnished, install the Riga-Flo Cartridge.

2.14 Initial Check-Out & Start-Up

2.14.1 Power to fan and control box, if any, should be off. Air reservoir should not be pressurized.

2.14.2 Partially close the blast gate or fan damper so as to avoid exceeding the design airflow when the TENKAY cartridges are new and clean. Turn on power to the fan. Verify that it is rotating in the correct direction. Adjust the blast gate as necessary to achieve the specified flow. Airflow volume can be determined by means of a pitot tube, a suitable anemometer, or by comparing the pressure drop of the clean, new TENKAY cartridges with Figure 11. For future reference, record both the initial airflow volume and the initial, clean pressure drop of the cartridges. Physically mark the blast gate's position at the initial flow. The fan may now be turned OFF, if preferred.

2.14.3 Pressurize the air reservoir at 90 to 105 psig. Check for and fix leaks, if any.

2.14.4 If MANUAL PULSE CONTROLS per Section 2.11 were installed, briefly press each of the button bleeder valves, one at a time, to verify that they operate the diaphragm valves properly. Then skip to Section 3.0.

2.14.5 If AUTOMATIC CONTROLS (Type P3 or T3) were installed, open the door of the control box. Set the OFF timer at its minimum set point. Set the ON timer for 0.10 second.
2.14.6 If you have a P3 Control Box, set the red pointer of its Photohelic Pressure Switch/Gage at or below the position of the black pointer.

2.14.7 If you have a P3-10 or T3-10 Control Box, flip its toggle switch to the ON position.

2.14.8 Turn power to the control box ON. The line pilot lamp should light. Several seconds later the output load lamp at Terminal Number 1 should light for 0.1 second and the first diaphragm valve should "pulse". Several seconds after that the lamp at Terminal Number 2 should light and the second valve should open for 0.1 second, etc. Keep watching to make certain that lamps at all terminals thru the terminal to which the reset wire is connected light and that all the diaphragm valves are heard to pulse. Several seconds after the lamp at the terminal to which the reset wire is connected has lighted, the lamp at Terminal Number 1 should light once again and the cycle should start over. If you have a T3 Control Box, this cleaning cycle will continue to repeat so long as the power to the box is left ON.

2.14.9 If you have a P3 Control Box, reset the red pointer of the Photohelic to 1.5" w.g. while the unit is in the middle of a cleaning cycle. This time the cycle should stop after the last diaphragm valve has pulsed.

2.14.10 Reset the OFF timer to the time interval recommended for your particular installation. The time interval that is usually recommended for P3 Control Boxes is 20 seconds while 120 seconds is normally recommended for the T3. Check the ON timer — it should still be set at 0.1 second. Be sure to leave the internal toggle switch of P3-10 and T3-10 Control Boxes in the ON position. Close the door of the control box and tighten all door clamps.

2.14.11 This completes the check-out of the unit. If it is not to be put into immediate operation, turn power to the control box OFF and de-pressurize the air reservoir.
3.0  OPERATION & MAINTENANCE

3.1  Normal Operation & Maintenance

3.1.1 Lubrication or other routine periodic preventative maintenance is not required. All that is needed is an occasional visual check to make sure that nothing has gone wrong, and replacement of the TENKAY Cartridges when necessary. The set point of the photohelic in the P3 Control box should be changed when indicated. With the T3 control box, re-adjust the RATE ("OFF") timer if experience proves it to be advisable.

3.1.2 Always empty the dust storage drum before it fills completely. Do NOT allow the dust to collect to the point where it begins to fill the flexible hose and enter the bottom of the hopper, since this would result in the dust being re-entrained in the airstream, re-depositing on the cartridges and shortening their life.

3.2  Re-adjusting the Photohelic (P3 Controls only)

3.2.1 The pressure drop at the end of the cleaning cycle (the "cleaned resistance") will gradually increase over time. Accordingly, the difference between the Photohelic set point and the cartridge pressure drop will become less and less, thus increasing the cleaning frequency. Unless the Photohelic set point is re-adjusted, the unit will eventually go into a continuous cleaning mode (i.e., the same as the normal operation of the Type T3 control box). To avoid this and thus save compressed air, it is recommended that the Photohelic set point be increased by 0.5" w.g. whenever the cleaned resistance of the cartridges remains within 0.25" w.g. of the existing set point.

3.2.2 It may be tempting to simply set the Photohelic to a high value in the first place or to reset it in larger steps so as to reduce the number of times it must be re-adjusted. If this is done, however, the life of the cartridges will be reduced. On the other hand, if the Photohelic set point is not gradually increased as described in the paragraph above and the unit begins to cycle continuously, the usage of compressed air will be increased with only a small gain in cartridge life.

3.3  Cartridge Replacement

3.3.1 The pressure drop across the cartridges will eventually climb to the point where the airflow is reduced to an unacceptable level even with the blast gate wide open. At this point the TENKAY cartridges should be replaced as described below. If a P3 Control Box or Magnehelic pressure gage was installed, the Pamic Filter should also be replaced as described in Section 2.10.3.
3.3.2 Shut off electrical power to the fan and control box. Open the cartridge access door. Refer to Figure 10 in the Appendix. Unlatch the right-hand clamp bar handle and swing it downward to the open position. Swing the left-hand clamp bar handle to the open position. Grasp the top pan of the dirty cartridge and slide the cartridge out the door opening. Repeat for remaining cartridge(s). Install new cartridges per Section 2.13.

3.3.3 Reset the blast gate to the position marked at startup (see Section 2.14.2).
4.0 TROUBLESHOOTING MANUALY CONTROLLED UNITS

4.1 Diaphragm Valve Stays Closed

4.1.1 Verify that the air reservoir is pressurized at 90 to 105 psig. Operate the button bleeder valve several times to see if this clears the problem. Examine the black plastic tubing for kinks and for length in excess of that illustrated in Figure 9.

4.1.2 Disconnect the black plastic tubing from the elbow fitting in the top of the diaphragm valve. If the valve now operates, the problem is a blockage in the black plastic tubing or the button bleeder valve. Locate and clear the obstruction. If the diaphragm valve remained closed when the plastic tubing was disconnected from it, the problem is an obstruction within the valve itself or the tubing fitting on top of it. De-pressurize the air reservoir and then remove the five cap screws which hold the cover of the diaphragm valve to the main body of the valve. Remove the cover, the diaphragm, the spring, and any dirt or foreign matter that may have entered the valve. Check the small, short bleed tube that goes thru the small hole in the diaphragm in the outer clamping area and clear it of any dirt and debris. Re-assemble the valve and once again pressurize the air reservoir.

4.2 Diaphragm Valve Stays Open

4.2.1 Check for leaks in the black plastic bleed tubing or the fittings which connect the tubing between the diaphragm valve and the button bleeder valve. Check to see if the button bleeder valve is stuck in the open position.

4.2.2 If no leaks are found in the step above, feel around the diaphragm valve to determine if there may be a leak in or around the body of the valve itself. If no such external leak is found, depressurize the air reservoir and then remove the five cap screws which hold the cover of the diaphragm valve to the main body of the valve. Remove the cover, the diaphragm, the spring, and any dirt or foreign matter that may have entered the valve. Check the small, short bleed tube that goes thru the small hole in the diaphragm in the outer clamping area and clear it of any dirt and debris. Examine the diaphragm and the nylon disc attached to it for holes or cracks, since such a hole or crack will result in the valve staying open. Eventually, the diaphragm or its disc may fail, at which time a valve rebuilding kit (consisting of a new diaphragm and a new spring) must be installed so as to restore the valve to new condition. Re-assemble the valve and pressurize the air reservoir once again.
5.0 TROUBLESHOOTING AUTOMATICALLY CONTROLLED UNITS

5.1 Cleaning Cycle Will Not Start or Will Not Repeat

5.1.1 If you have a P3 Control Box, check the Photohelic Pressure Switch/Gage. The cleaning cycle is not supposed to start or repeat unless the pressure drop is higher than the set point of the Photohelic. During the following tests make sure that the set point is below the gage reading.

5.1.2 Check the pressure in the air reservoir. It should be 90 to 105 psig. Open the door of the control box and see if the line pilot lamp is lit. If it is not lit, check the line input for proper supply voltage and check the line input fuse. If the fuse must be replaced, be sure to use one of the same capacity.

5.1.3 Check the RESET wire. It should be connected to the same terminal as the last one to which a solenoid valve is connected. Turn power to the control box off; set the OFF timer for minimum; and then turn power to the control box on again while watching the load output lamps. The lamps should light in the sequence described in section 2.14.8.

5.1.4 If the unit begins to operate, but the fuse blows at the time a particular load output lamp starts to light, the wiring from that terminal to the solenoid valve connected to it must be shorted. If such a short has occurred, it is possible that the circuitry to that particular terminal has been damaged to the point where that terminal will no longer operate even though the external short has been found and corrected. If so, follow instructions under "One Load Output Terminal Not Working" (Section 5.5).

5.1.5 If proper sequential operation of the load lamps indicates that the controller is okay, but the diaphragm valves still do not operate, check the continuity of the wiring from the controller to the solenoid valves --- particularly the "common" wire from the terminal marked "SOL COM" in the T3-3 and T3-6 Control Boxes or "C" in the P3-10 and T3-10 Control Boxes.

5.1.6 If the unit will not even begin to operate as described in Step 5.1.4 and you have a P3-10 Control Box, disconnect the black wire from the Photohelic at Terminal "X" on the board. If you have either a P3-10 or T3-10 Control Box, make sure that nothing is shorted across Terminals "X" and "Z". If the unit still won't operate, the timer board is defective. If the unit does begin to operate, however, and you have a P3-10 control box, reconnect the black wire to Terminal "X" and then unplug the 4-wire cable at the Photohelic. If the unit once more works okay, then the Photohelic is defective. If the unit does not work, then the 4-wire cable is shorted --- probably at the plug.
5.2 Cleaning Cycle Never Stops (P3 Controls Only)

5.2.1 If the set point of the Photohelic is below the pressure indicated by the black pointer of the gage, set it higher. The cycle should now stop after the last valve has pulsed. If not, go to Step 5.2.2.

5.2.2 Open the door of the control box and make sure that the RESET wire is connected to the last terminal used. If it is, check to make sure that the color-coded wires of the 4-wire cable from the Photohelic are connected to the proper terminals of the control board as shown on the wiring diagram (Figure 8). If wired correctly, place a jumper across Terminals "X" and "Z". This should stop the cycling after the last valve has been pulsed. If not, the control board is defective.

5.2.3 If installing the jumper per Step 5.2.2 stopped the cycling, remove the jumper and unplug the 4-wire cable from the back of the Photohelic. Look closely at both sides of the plug and locate the tiny letters identifying each of the pins. Check each of the color-coded wires to make sure they are connected to the correct pin as indicated by the wiring diagram (Figure 8). Check the electrical continuity of each wire from the pin to the control board. If the cable is faulty, fix it or replace it.

5.2.4 If the cable and its connections to the control board are okay, connect a DC voltmeter across Terminals "V" and "U". With the power to the board turned on, the voltage across these two terminals should be at least 1.2VDC. If not, the control board is defective and should be repaired or replaced. If the voltage checks out okay, then the Photohelic is faulty and must be repaired or replaced.

5.3 One of the Diaphragm Valves Stays Closed

5.3.1 Do the test described in section 5.1.3. If the load output lamp for the inoperative diaphragm valve does not light, follow instructions under "One Load Output Terminal Not Working" (Section 5.5).

5.3.2 If the load output lamp lights at the proper time but the diaphragm valve still does not operate, follow the instructions under "Pneumatic Troubles" (Section 5.5). If the valves check out pneumatically, then the problem must be in the wiring to the coil of the solenoid valve or a fault in the coil itself. Locate the trouble spot by means of a continuity check.
5.4 One of the Diaphragm Valves Stays Open

5.4.1 Turn off power to the control box. If the valve stays open, follow instructions under "Pneumatic Troubles (Section 5.6). If turning off the power caused the valve to close, open the door of the control box, turn the power on, and look at the load output lamp for the terminal controlling that particular valve. If the lamp stays on, the output stage for that terminal has shorted out. Follow instructions under "One Load Output Terminal Not Working" (Section 5.5).

5.5 One Load Output Terminal Not Working

5.5.1 Most control boxes contain more load output terminals than are required. That is, they are provided with built-in spares. For example, units having only 4 diaphragm valves may be provided with a 6-terminal control box. Such a box, therefore, contains 2 spare terminals. In such a case, simply skip the bad output and move all remaining solenoid connecting wires down one terminal. If no spare terminals are available, then the program control board must be repaired or replaced.

5.6 Pneumatic Troubles

5.6.1 If the electrical circuit checks out but a diaphragm valve still either won't open or won't close, the problem must be in the diaphragm valve or in its solenoid valve or in the tubing connecting them. Turn off the power to the control box. If an open diaphragm valve still doesn't close, go to Section 5.6.2. If the problem was that it wouldn't open, skip to Section 5.6.4.

5.6.2 If the diaphragm valve will not close, check for leaks in the black plastic bleed tubing or the fittings which connect it to the solenoid valve. If no leaks are found, skip ahead to Section 5.6.3. If leaks are found, tighten, repair, or replace parts as necessary.

5.6.3 Hold a finger over the small bleed port at the end of the solenoid valve. If the air is coming out of this port, go to Section 5.6.4. If air is neither coming out of this port nor leaking elsewhere around the solenoid valve, feel around the diaphragm valve to determine if there may be a crack or leak in or around that valve. If a crack or leak is found which cannot be repaired, the entire valve will have to be replaced. If no such external leak is found, go to Section 5.6.5.

5.6.4 Depressurize the air reservoir. Remove the three screws holding the body of the solenoid valve to the ferrule retainer. Remove the plunger and the small spring above it and examine all parts. If dirt was the problem, clean parts and reassemble. If the plunger is excessively worn to where it hangs-up in the ferrule tube, or if the rubber seat disc is excessively worn to where it will not seal on the seat, use Solenoid Valve Rebuilding Kit No. 84415-011 to repair the valve.
5.6.5 Depressurize the air reservoir, if you have not already done so. If there was nothing wrong with the solenoid valve, remove the bleed tubing between it and the diaphragm valve. Check the tubing for kinking or plugging.

5.6.6 Remove the bolts and take off the cover or "bonnet" of the diaphragm valve. Remove the diaphragm and spring and any dirt or foreign matter that may have entered the valve. Check the small, short bleed tube that goes thru the diaphragm in the outer clamping area and clear it of any dirt and debris.

5.6.7 Examine the diaphragm and the nylon disc attached to it, if any. A hole thru the diaphragm or disc will result in the valve staying open. Eventually, the diaphragm or its disc may fail, at which time a diaphragm valve rebuilding kit must be used to restore the valve to new condition. Reusing the old diaphragm and spring or using a rebuilding kit if necessary, reassemble the valve.
6.0 HIGH PRESSURE DROP OR SHORT CARTRIDGE LIFE

6.1 If the unit has MANUAL Controls, are they being operated often enough? If AUTOMATIC Controls were provided, is the control box operating and are its ON and OFF timers set properly? If a P3 control box was provided, has its Photohelic been set too high?

6.2 Is the air in the reservoir at a pressure of 90 to 105 psig? Cleaning effectiveness is significantly reduced below 90 psig and substantially reduced below 80 psig.

6.3 Is the compressed air contaminated with oil or water? Oil or water can blind a cartridge. Water in the compressed air supply can freeze in a solenoid valve during cold weather.

6.4 Has the level of the dust collected been allowed to build-up past the top of the drum? If the dust gets too high, turbulence can re-entrain it and create an apparent inlet concentration much higher than actual.

6.5 Are the inlet transitions and elbows properly designed or are they likely to result in excessive turbulence and reentrainment of dust.

6.6 Were cartridges pre-blinded during start-up due to lack of proper airflow volume control? See Section 1.6.1.
7.0 SPARE AND REPLACEMENT PARTS

7.1 Filters and Cartridges

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>72518-001</td>
<td>TENKAY Type STL (Standard)</td>
</tr>
<tr>
<td>72518-002</td>
<td>TENKAY Type MTL (Medium Temperature)</td>
</tr>
<tr>
<td>72518-003</td>
<td>TENKAY Type SSL (Stainless Steel)</td>
</tr>
<tr>
<td>84404-000</td>
<td>Pamic Cartridge</td>
</tr>
<tr>
<td>60558-006</td>
<td>Riga-Flo 200, Size 12 x 24</td>
</tr>
<tr>
<td>60558-003</td>
<td>Riga-Flo 200, Size 24 x 24</td>
</tr>
</tbody>
</table>

7.2 Valves & Control Components

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>76501-001</td>
<td>Control Board (only) for T3-3</td>
</tr>
<tr>
<td>76501-002</td>
<td>Control Board (only) for T3-6</td>
</tr>
<tr>
<td>74683-001</td>
<td>Control Board (only) for P3-10 or T3-10</td>
</tr>
<tr>
<td>71153-000</td>
<td>Photohelic Pressure Switch/Gage</td>
</tr>
<tr>
<td>71241-000</td>
<td>Button Bleeder Valve (Manual Controls)</td>
</tr>
<tr>
<td>84415-002</td>
<td>Solenoid Pilot Valve Assembly</td>
</tr>
<tr>
<td>84415-011</td>
<td>Solenoid Valve Rebuild Kit (Core, Tube, Spring)</td>
</tr>
<tr>
<td>84415-022</td>
<td>Solenoid Valve Coil (only)</td>
</tr>
<tr>
<td>84416-001</td>
<td>Diaphragm Valve Assembly, 3/4&quot;</td>
</tr>
<tr>
<td>84416-011</td>
<td>Diaphragm Valve Rebuilding Kit, 3/4&quot;</td>
</tr>
<tr>
<td>73113-001</td>
<td>Diaphragm Valve Connecting Hose, 3/4&quot;</td>
</tr>
<tr>
<td>48624-005</td>
<td>1/4&quot; Plastic Tubing (Specify length in ft)</td>
</tr>
</tbody>
</table>

7.3 Access Door Latches & Gaskets

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>76488-000</td>
<td>Door Latch (For Model C)</td>
</tr>
<tr>
<td>79036-000</td>
<td>Door Latch (For Model D)</td>
</tr>
<tr>
<td>70414-001</td>
<td>Gasket Stripping* (Specify length in feet)</td>
</tr>
</tbody>
</table>

7.4 30-Gallon Drum & Associated Items

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>76495-001</td>
<td>30-Gallon Drum (no cover)</td>
</tr>
<tr>
<td>76486-000</td>
<td>Drum Top Adapter</td>
</tr>
<tr>
<td>76496-000</td>
<td>Flexible Hose, 16&quot; I.D.</td>
</tr>
<tr>
<td>76504-001</td>
<td>Band Clamp</td>
</tr>
</tbody>
</table>

7.5 Safety Monitoring Filter Couplings & Fastener

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>61180-000</td>
<td>Type C-80 Fastener</td>
</tr>
<tr>
<td>15094-046</td>
<td>Flexible Rubber Coupling, 4-1/2&quot; I.D.</td>
</tr>
<tr>
<td>15094-011</td>
<td>Flexible Rubber Coupling, 5-1/2&quot; I.D.</td>
</tr>
<tr>
<td>15094-018</td>
<td>Flexible Rubber Coupling, 6&quot; I.D.</td>
</tr>
<tr>
<td>15094-021</td>
<td>Flexible Rubber Coupling, 8&quot; I.D.</td>
</tr>
</tbody>
</table>

*Install Gasket Stripping (Line 7.3.3) with adhesive purchased locally. Use 3M Company Adhesive No. EC-1300 or equal.
<table>
<thead>
<tr>
<th>UNIT SIZE</th>
<th>NUMBER OF CARTRIDGES AND VALVES</th>
<th>DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>2C</td>
<td>2</td>
<td>33-3/4</td>
</tr>
<tr>
<td>3C</td>
<td>3</td>
<td>49-3/4</td>
</tr>
<tr>
<td>4C</td>
<td>4</td>
<td>65-3/4</td>
</tr>
<tr>
<td>5C</td>
<td>5</td>
<td>81-3/4</td>
</tr>
</tbody>
</table>

FARR TENKAY DUST COLLECTORS -- SIZES 2C THRU 5C

FIGURE 1
FARR TENKAY DUST COLLECTORS -- SIZES 4D THRU 10D

**FIGURE 2**
SECTIONAL VIEW THRU CLEAN AIR OUTLET OPENING, FAN MOUNTING ADAPTER, AND THE AIR INLET HALF OF THE FAN SCROLL

FIGURE 3A
FAN ASSEMBLY MOUNTING (MODEL C OPTION)
FAN SIZES 10, 12, AND 14

REDUCED SIZE SECTIONAL VIEW SIMILAR TO FIGURE 3A ABOVE. BOTH FLANGES OF ADAPTER ARE TURNED OUTWARDS. THIS SIZE FAN HAS A PLAIN INLET OPENING WITHOUT AN INLET COLLAR.

FIGURE 3A
FAN ASSEMBLY MOUNTING (MODEL C OPTION)
FAN SIZE 15
FIGURE 4A
SAFETY MONITORING FILTER (MODEL C OPTION)
(MOUNTING THE HOUSING)

FIGURE 4B
SAFETY MONITORING FILTER (MODEL C OPTION)
(INSTALLING THE C-80 FASTERNERS)
FIGURE 5
SOLENOID VALVE INSTALLATION
(PLAN VIEW OF ROOF AND ROOF-MOUNTED ITEMS)
NOTES TO FIGURES 5 & 6:

1. Position the solenoid valve assembly on the roof of the Tenkay where shown in Fig. 5. Drill four matching pilot holes with a #18 drill (.169" Dia) and fasten the valve assembly to the roof with the #10-32 sheetmetal screws provided.

2. Connect the solenoid valves to the diaphragm valves with the tubing and fittings provided. See Fig. 6 for details.

3. Wire the solenoid valves to the control box so that the diaphragm valves are operated in sequence from right to left and front (end closest to the access door) to back. Wiring, conduit and conduit fittings to be furnished by the installer.
FIGURE 7
WIRING DIAGRAM, TYPE T3-3 & T3-6 CONTROL BOXES

NOTES:

1. A T3-6 PROGRAM CONTROL BOARD, WHICH IS USED WITH THE 4C, 5C, 4D, & 6D TENKAY DUST COLLECTORS, IS ILLUSTRATED ABOVE. THE T3-3 BOARD, WHICH IS USED WITH SIZES 2C AND 3C IS SIMILAR, BUT HAS ONLY 3 OUTPUT TERMINALS.

2. IF A PRESSURE SWITCH IS ADDED TO CONTROL THE STARTING AND STOPPING OF THE CLEANING CYCLE, ITS N.O. CONTACTS SHOULD BE CONNECTED TO THE TERMINALS PROVIDED AT THE UPPER-LEFT CORNER OF THE BOARD AFTER FIRST REMOVING THE EXISTING JUMPER ACROSS THOSE TERMINALS.
FIGURE 8
WIRING DIAGRAM, TYPE P3-10 & T3-10 CONTROL BOXES

NOTES:

1. CONNECT THE RESET WIRE TO THE LAST TERMINAL USED.

2. THE PHOTOHELIC PRESSURE SWITCH/GAGE AND ITS 4-WIRE, COLOR-CODED CONNECTING CABLE ARE INCLUDED IN THE P3-10 CONTROL BOX ONLY. THESE ITEMS ARE NOT A PART OF THE T3-10 CONTROL BOX.
FIGURE 9
INSTALLATION OF MANUAL PULSE CONTROLS
FIGURE 10A
CLAMP BARS OPEN FOR CARTRIDGE
INSTALLATION OR REMOVAL

FIGURE 10B
COMPRESSING CARTRIDGE GASKET

FIGURE 10C
CLAMP BARS IN LOCKED POSITION
FIGURE 11

THE ABOVE CURVE COVERS THE INITIAL PRESSURE DROP OF NEW, CLEAN, UNCOATED TENKAY CARTRIDGES (TYPES STL, MTL, & SSL) IN THE MODEL C & MODEL D TENKAY DUST COLLECTORS. THESE PRESSURE DROP VALUES CAN BE USED TO DETERMINE THE INITIAL AIRFLOW ThRU THE DUST COLLECTOR, BUT MUST NOT BE USED ONCE THE CARTRIDGES BEGIN TO COLLECT THEIR DUST CAKE.