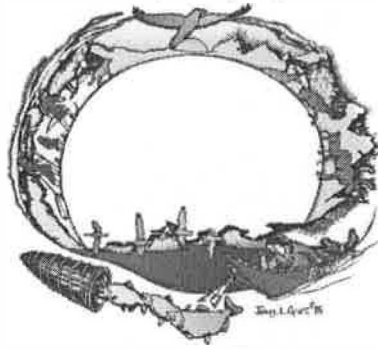




TANANA CHIEFS CONFERENCE

JULY 28, 2026

**TANANA CHIEFS CONFERENCE WIL BE ACCEPTING PROPOSALS
FOR PREFORMING NFPA 72 AND NFPA 25 AT THE UPPER
TANANA HEALTH CENTER LOCATED IN TOK ALASKA**

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I. Solicitation

Tanana Chiefs Conference (TCC) is soliciting quotes from qualified Contractors to perform annual Service and Testing per NFPA 72 and NFPA 25 at the Upper Tanana Health Center (UTHC). Questions or queries shall be emailed to Aaron Heath at aaron.heath@tananachiefs.org no later than 1:00 PM AST August 14, 2026. The final Addendum responding to questions shall be released no later than 1:00 PM AST August 19, 2026. Proposals shall be submitted to Aaron Heath at the above email no later than 1:00 PM AST August 31, 2026.

II. Scope of Work

Provide all labor, materials and equipment to perform required annual Service and Testing per NFPA 72 NFPA 25. The Contractor shall be required to provide Inspection Reports for each system inspected no later than Ten (10) working days of completion of each individual inspection. The Contractor must also report any deficiencies found within 10 working days after inspections occur. The system inspection reports and deficiency reports are to be submitted to Aaron Heath at aaron.heath@tananachiefs.org.

III. Contract Period

The contract start date shall be September 21, 2026 and expire on September 30, 2026, with the option to renew this contract for an additional One (1) year renewable options under the same Terms and Conditions.

IV. Residency Requirements

NA

V. Work Considerations/Restrictions

- A. Work Hours/Days:** Contractor shall work within the normal work hours of 8:00 AM to 5:00 PM Monday through Friday. Alternative hours and days will be considered by TCC upon request.
- B. Electrical:** Contractor shall not disrupt or shut down electrical power without providing a Forty-eight (48) hour prior notification to TCC Project Manager.
- C. Excessive Disruptions:** Coordinate work with the Project Manager a minimum of Seventy-two (72) hours in advance. If during normal operations, it is determined by building personnel that there is excessive disruption, the Contractor may be

asked to cease work and reschedule to a new time by mutual agreement between TCC designee and the Contractor.

- D. Debris:** All debris generated by the Contractor during the inspection and servicing of the Fire Alarm systems shall be the Contractors responsibility to remove and dispose of.
- E. Restrooms:** Restroom(s) in the building shall be available for Contractor use during performance of this contract.
- F. Protection:** Contractor shall be responsible for protecting and maintaining cleanliness of interior finishes and surrounding exterior areas from equipment damage for the duration of the project.
- G. Permits:** Contractor shall be responsible for procuring any required City, State, or Federal permit(s), including permit fees, prior to start of contract. The Project Manager shall receive a copy of all applicable permits required.
- H. Inspections:** Contractor shall be responsible for coordinating any required City, State, or Federal inspections during performance of this contract. Provide the Project Manager a minimum of Three (3) days advance notice prior to any Fire Alarm panel inspections.
- I. Contractor Access:** Contractor access to the building shall be coordinated with the Project Manager after award of the contract.
- J. Coordination Meetings:** A kick-off meeting shall be scheduled and conducted by the Contractor prior to the start of any work to discuss the schedule, submittals, etc... to assure a mutual understanding of the work between the Contractor and the Owner. Contractor shall provide weekly progress reports during servicing of all locations.
- K. Reports and Deficiencies:** All reports and any deficiencies noted by the Contractor must be submitted to the Project Manager no later than 10 working days after inspections have been completed.
- L. Hardware:** Purchase and installation of any new hardware must be approved by the Project Manager prior to purchase and\or installation. Cost proposals for materials must be provided.
- M. Repairs:** If repairs are required, the Contractor shall provide a quote, that includes cost, detailed scope of work, and a time schedule for the repair for any new deficiencies found.

VI. Schedule

The anticipated project schedule is as follows:

Deadline for Proposals	August 31, 2026
Issue Notice of Intent to Award (NOITA)	September 4, 2026
Execute Service Contract	September 18,2026
Contract Start Date	September21, 2026

Contract Expiration Date (initial term)	September 30,2026
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All dates are approximated and contingent upon completion of the previous activities. Contractor shall submit a work schedule for approval prior to the beginning of any services.

VII. Locations

The Upper Tanana Health Clinic is located on the Tok Cutoff, Mile 124.5 Tok Alaska.

VIII. Terms and Conditions

- A. Waiver of Minor Informalities:** TCC expressly reserves the right to waive minor informalities, negotiate changes or reject any and all proposals, and to not award the proposed contract, if doing so is in the best interest of TCC. "Minor informalities" means matters of form rather than substance which are evident from the submittal or are insignificant matters that have negligible effect on price, quantity, quality, delivery or contractual conditions and can be waived or corrected without prejudice to the other Proposal

IX. AN/AI (Alaska Native or American Indian) Requirements

- A. The Contractor and its subcontractors are required to employ AN/AI workers in sufficient numbers to equal, at a minimum, 25% of the firm's workforce for this project.
- B. TCC recognizes that not all contractor and subcontractor firms will be able to comply with the 25% AN/AI hire requirement. In this case, the Contractor shall be required to demonstrate an effort of good faith.

X. Appendices

- A. Construction Documents - Panel and sprinkler tree information.
- B. Contract Insurance Requirements
- C. Bid Schedule

Yukon Fire Protection Services, Inc.

UPPER TANANA HEALTH CLINIC

Fire Suppression Operations and Maintenance



YUKON INDUSTRIAL

A DIVISION OF YUKON FIRE PROTECTION

907-274-7973



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- Valves and Alarm Assemblies
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- Test Certificates
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- Wet Pipe System 2-Pump House
- Dry Pipe System

21 30 00 Fire Pump

- Peerless 8MAF Vertical Turbine Fire Pump Operation and Maintenance
- Fire Pump Test Procedure and Record
- Fire Pump Test Certificate

WET PIPE SPRINKLER SYSTEM
PREVENTATIVE MAINTENANCE
TESTING
OPERATION: SHUTDOWN & STARTUP PROCEDURES

1. PREVENTIVE MAINTENANCE

A. Monthly inspect the main control valve.

1. It should open and close smoothly. Leave fully open.

NOTE: Tamper alarms will sound when the valve is moved from fully open.
They will cease when the valve is again fully open.

B. Monthly inspect the monitor switch.

1. Close the control valve 2 turns and verify operation of the appropriate alarms.
2. Re-open the control valve 2 turns and verify the cessation of the alarms.

C. Monthly inspect all trim valves.

1. Main drain should be closed.
2. Gauge valves should be open.

D. Monthly inspect the Fire Department Connection.

1. Remove caps and verify that the waterway is clean and clear, the clapper swings freely, and the threads are in good condition. Replace caps.
2. Verify that the ball drip is in working order.
3. Verify that the check valve is not leaking.

E. Quarterly inspect the sprinklers.

1. Sprinklers should be free from corrosion, foreign material, paint, and other obstructions to discharge.
2. Sprinklers should not be bent or damaged in any way.
3. A complete stock of spare sprinklers and a sprinkler wrench should be available.

F. Semi-annually inspect all the pipe and hangers.

1. Piping and hangers should be in good condition and free from mechanical injury.

2. TESTING

A. Annual test - system operation.

1. Fully open inspectors test valve.
2. Check for full, unobstructed flow from test orifice.
3. Verify operation of appropriate alarms.
4. Close inspectors test valve.
5. Verify stabilization of supply and system pressure gauges.
6. Verify cessation of appropriate alarms.

3. OPERATION: SYSTEM SHUTDOWN & STARTUP

A. Shutdown

1. Close main control valve.
2. Silence tamper alarm.
3. Open main and auxiliary drains to drain system piping if repair work or sprinkler replacement is required.

NOTE: Wait until the sound of draining water has stopped and/or the inlet and outlet pressure gauges read zero pressure, before performing any maintenance work.

B. Startup

1. Close main drain valve. Leave auxiliary drain valves, or other vent connections open.
2. Open the 1/4" gauge test valves for the supply and system pressure gauges.
3. Slowly open main control valve until the sound of flowing water just starts, then open the valve one more turn.
4. Observe auxiliary drain valves and close after a solid flow of water (not aerated), has continued for at least 15 seconds.
5. Fully open main control valve.
6. Reset tamper alarm.
7. Verify stabilization of supply and system pressure gauges.
8. Verify that water ceases to flow from alarm drain line.
9. Silence fire alarm and verify alarm panel has been reset to normal condition.

DRY SPRINKLER SYSTEM

OPERATION: SHUTDOWN & STARTUP PROCEDURES

A. Shutdown

1. Close main control valve.
2. Close supply control valve to priming line.
2. Silence tamper alarm.
3. Open the main and auxiliary drains to drain all water from system.

B. Startup

After the DV-1 Valve has operated, the clapper will not automatically reseal. The valve must then be reset and the system restored to service as soon as possible. The procedure is as follows:

1. Close all auxiliary drains.
2. Push the plunger of the automatic drain valve (ball drip) to be sure it is open and that the DV-1 has drained.
- 3.*If the system has operated-replace any activated sprinklers.
4. Open bypass on air maintenance device and restore system air pressure.
5. Close bypass on air maintenance device and open restricted orifice for air supply.
6. Partially open the main supply control valve and slowly close main drain control valve. When the system gauge begins to climb, fully open main supply control valve.
7. Verify alarm line trim valves are in the open position.
8. Inspect drain connections from the manual control station, actuation trim, and alarm trim for leaks. Leaks, if any, must be corrected before the system is restored to service.
9. Silence fire alarm and verify alarm panel has been reset to normal condition.

(system is now in service)

Model BFV-N Butterfly Valve Grooved End

General Description

The Model BFV-N Grooved End Butterfly Valves (Ref. Figure 1) are indicating type valves designed for use in fire protection systems where a visual indication is required as to whether the valve is open or closed. They are used, for example, as system, sectional, and pump water control valves. They have cut groove inlet and outlet connections that are suitable for use with grooved end pipe couplings that are listed and approved for fire protection systems.

For applications requiring supervision of the open position of the valve, the Gear Operators for the Model BFV-N Butterfly Valves are provided with two sets of factory installed internal switches each having SPDT contacts (Ref. Figure 3). The supervisory switches transfer their electrical contacts when there is movement from the valve's normal open position during the first two revolutions of the handwheel.

NOTICE

The Model BFV-N Grooved End Butterfly Valves described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Technical Data

Approvals

UL and C-UL Listed
FM Approved

Listed by California State Fire Marshall
under Listing No. 7770-1670:100

All laboratory listings and approvals are for
indoor and outdoor use.

Sizes

2-1/2 thru 10 Inch (DN65 thru DN250)

Maximum Working Pressure

2-1/2 to 8 Inch (DN65 to DN200)

300 psi (20,7) bar

10 Inch (DN250)

175 psi (12,0 bar)

Materials of Construction

Body

Ductile iron conforming to ASTM A395

Body Coating

Polyamide

Disc

Ductile iron conforming to ASTM A395

Disc Seal

Grade EPDM "E" encapsulated rubber
conforming to ASTM D2000

Upper & Lower Stem

Type 416 Stainless Steel conforming to
ASTM 582

Lower Plug

PVC

Operator

Gear operator with iron housing



Nominal Valve Sizes Inches (DN)	Pipe OD Inches (mm)	Nominal Installation Dimensions Inches (mm)								Weight Lbs. (kg)
		A	B	C	D	E	F	G	H	
2-1/2 (65)	2.88 (73,0)	3.85 (98,0)	11.94 (303,3)	3.25 (83,0)	5.67 (144,0)	5.90 (149,9)	5.82 (147,8)	2.13 (54,1)	0	22 (10,0)
76,1mm (65)	3.00 (76,1)	3.85 (98,0)	11.94 (303,3)	3.25 (83,0)	5.67 (144,0)	5.90 (149,9)	5.82 (147,8)	2.13 (54,1)	0	22 (10,0)
3 (80)	3.50 (88,9)	3.85 (98,0)	12.48 (317,0)	3.54 (90,0)	5.94 (150,9)	5.90 (149,9)	5.82 (147,8)	2.13 (54,1)	0	23 (10,4)
4 (100)	4.50 (114,3)	4.56 (116,0)	14.18 (360,2)	4.35 (110,0)	6.31 (160,3)	5.90 (149,9)	7.64 (194,1)	2.13 (54,1)	0	28 (12,7)
5 (125)	5.56 (141,3)	5.86 (149,0)	15.17 (385,3)	4.84 (123,0)	7.32 (185,9)	5.90 (149,9)	7.64 (194,1)	2.13 (54,1)	0	31 (14,1)
165,1mm (150)	— (165,1)	5.86 (149,0)	17.54 (445,5)	5.93 (151,0)	8.62 (218,9)	5.90 (149,9)	7.64 (194,1)	2.13 (54,1)	0.67 (17,0)	41 (18,6)
6 (150)	6.63 (168,3)	5.86 (149,0)	17.54 (445,5)	5.93 (151,0)	8.62 (218,9)	5.90 (149,9)	7.64 (194,1)	2.13 (54,1)	0.67 (17,0)	41 (18,6)
8 (200)	8.63 (219,1)	5.26 (134,0)	19.42 (493,3)	6.87 (174,0)	9.80 (248,9)	9.80 (248,9)	7.91 (200,9)	2.13 (54,1)	5.86 (148,8)	53 (24,1)
10 (250)	10.75 (273,1)	6.29 (160,0)	24.03 (610,4)	9.17 (233,0)	11.61 (294,9)	18.00 (457,2)	9.49 (241,0)	3.03 (77,0)	7.41 (188,2)	88 (40,0)

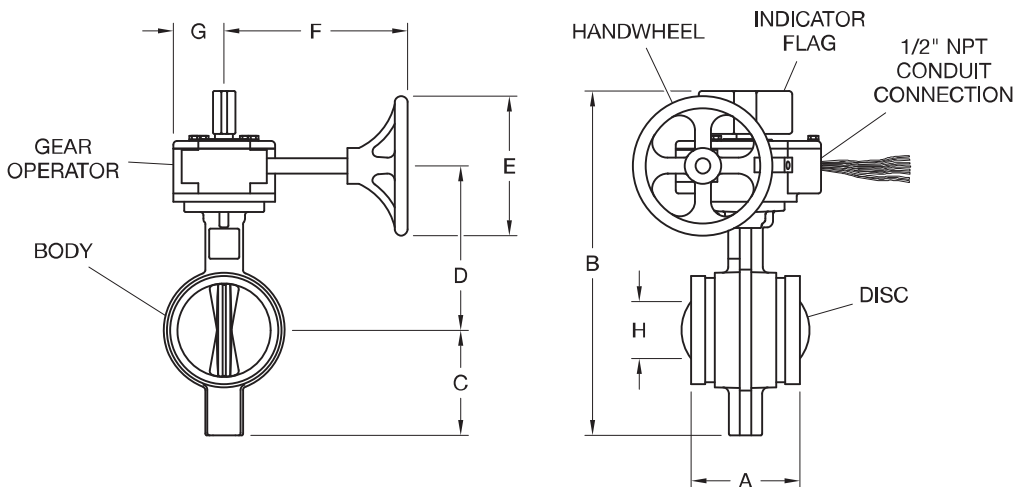


FIGURE 1
MODEL BFV-N GROOVED END BUTTERFLY VALVE
NOMINAL DIMENSIONS

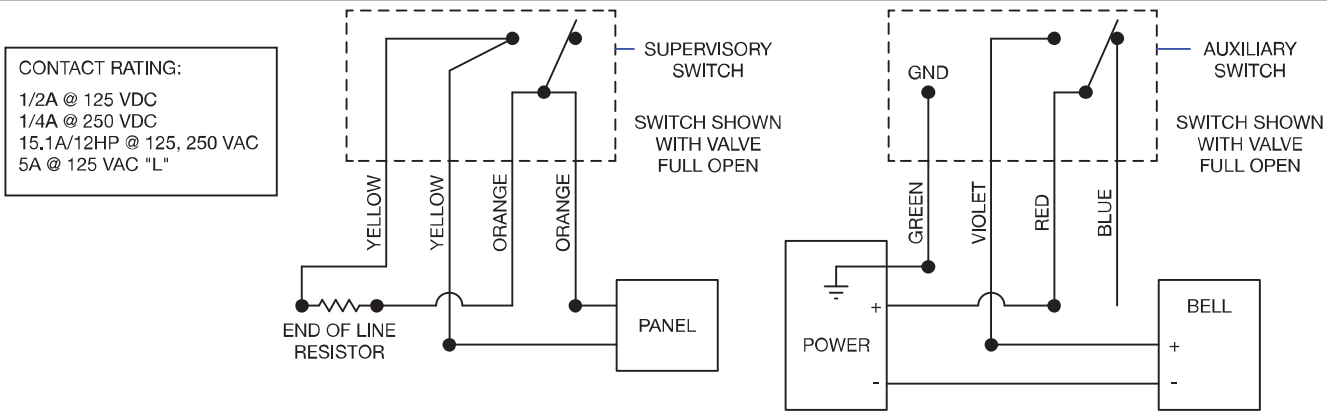
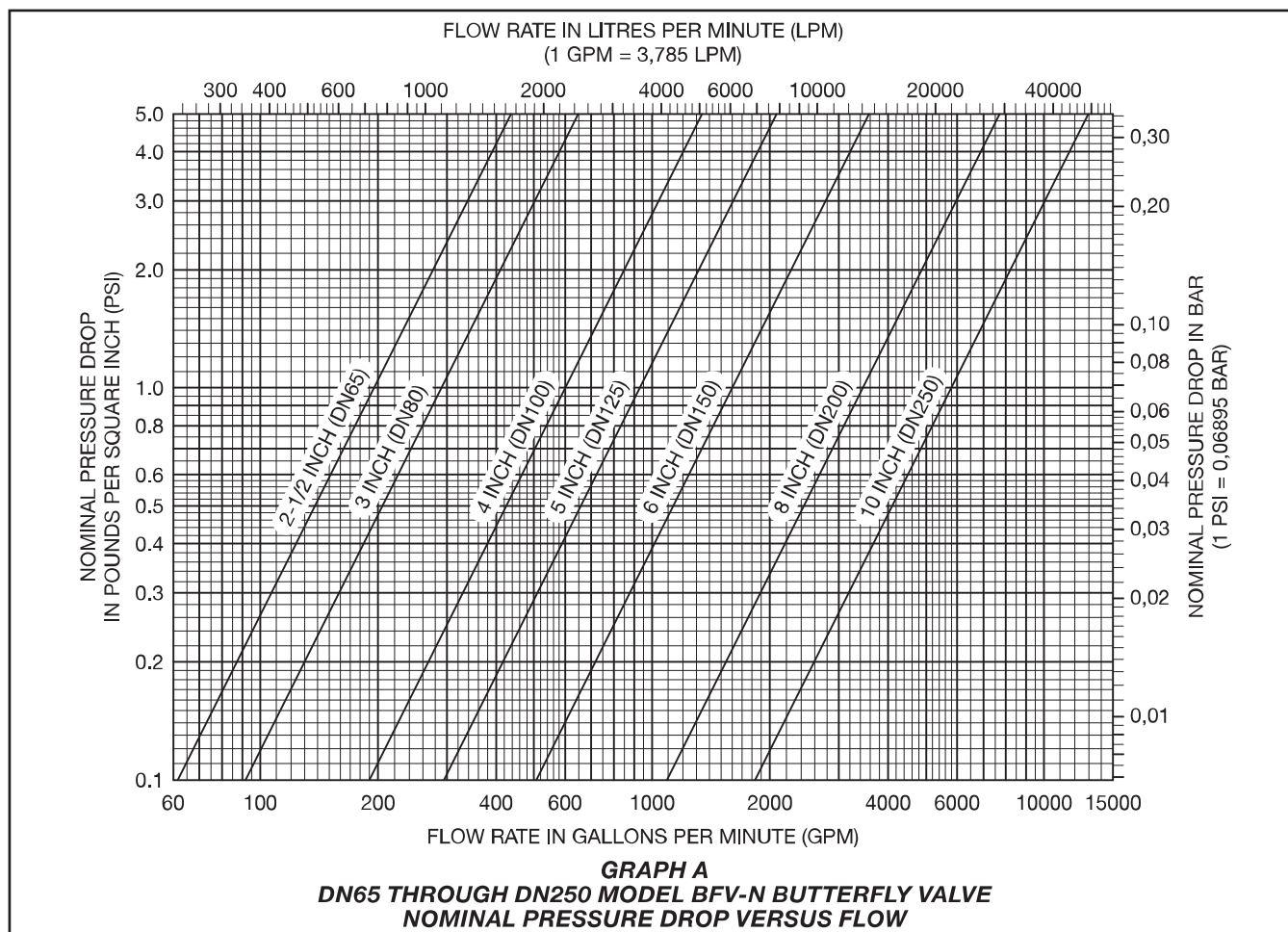


FIGURE 2
MODEL BFV-N BUTTERFLY VALVE
INTERNAL SWITCH WIRING DIAGRAM WITH VALVE IN OPEN POSITION



Installation

The Model BFV-N Grooved End Butterfly Valves may be installed with flow in either direction and can be positioned either horizontally or vertically.

The grooved end pipe couplings used with the Model BFV-N must be listed or approved for fire protection service and installed in accordance with the manufacturers instructions.

The Model BFV-N Butterfly Valve may be installed with any schedule of pressure class of pipe or tubing that is listed or approved for fire protection.

As applicable, refer to Figure 2 for the internal switch wiring diagram.

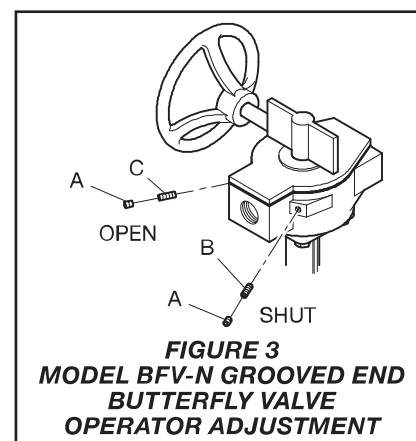
Conduit and electrical connections are to be made in accordance with the authority having jurisdiction and/or the National Electrical Code. With reference to Figure 2, the supervisory switch is intended for connection to the supervisory circuit of a fire alarm control panel in accordance with NFPA 72. The auxiliary switch is intended for the unsupervised connection to auxiliary equipment in accordance with NFPA 70, National Electric Code.

NOTE: For outdoor applications with internal supervisory switches, it is recommended that wiring connections be made at a temperature above 15°F (-9°C), in order to insure sufficient flexibility of the wire lead insulation.

Stop Adjustment Procedure

The gear operator's OPEN and SHUT position have been factory set. The following procedure should be used if slight adjustments are needed. Refer to Figure 3.

- Step 1.** Turn the Handwheel until the valve is fully closed.
- Step 2.** Remove two lockscrews (A) from the gear operator body.
- Step 3.** Turn the Shut Stop Screw (B) clockwise until snug.
- Step 4.** Turn the Handwheel until the valve is fully open.
- Step 5.** Turn the Open Stop Screw (C) clockwise until snug.



Step 6. Close the valve by turning the Handwheel until the valve is fully in the closed position. Ensure the disc has returned to the fully closed position and the disc is centered in the seat area. Readjust the Shut Stop Screw if necessary.

Step 7. Replace two lockscrews (A) into the gear Operator body locking the stops into position.

Care and Maintenance

Before closing a fire protection system control valve for maintenance or inspection work on either the valve or fire protection system which it controls, permission to shut down the affected fire protection systems must be obtained from the proper authorities and all personnel who may be affected by this decision must be notified.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in accordance with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. Contact the installing contractor or product manufacturer with any questions. Any impairment must be immediately corrected.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified inspection service.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Grooved End Butterfly Valves
Specify: (specify inch size) Model BFV-N Grooved End Butterfly Valve with internal supervisory switches, P/N (specify):

2-1/2 inch (DN65)	59-300-F-025N
76,1mm (DN65)*	59-300-F-076N
3 inch (DN80)	59-300-F-030N
4 inch (DN100)	59-300-F-040N
5 inch (DN125)	59-300-F-050N
165,1mm (DN150)*	59-300-F-165N
6 inch (DN150)	59-300-F-060N
8 inch (DN200)	59-300-F-080N
10 inch (DN250)	59-300-F-100N

*Available for EMEA and APAC markets only

Model CV-1FR Grooved-End Riser Check Valves 2 to 12 Inch (DN50 to DN300)

General Description

The TYCO Model CV-1FR Grooved-End Riser Check Valve is a compact and rugged swing-type unit that allows water flow in one direction and prevents flow in the opposite direction. A resilient elastomer seal facing on the spring-loaded clapper ensures a leak-tight seal and non-sticking operation. The Model CV-1FR Riser Check Valves are designed to minimize water hammer caused by flow reversal.

The Model CV-1FR Riser Check Valve is furnished with grooved ends and can be installed using GRINNELL Grooved Couplings or GRINNELL Figure 71 Flange Adapters. The Model CV-1FR Riser Check Valves have been designed with a removable cover for ease of field maintenance. These valves can be installed horizontally (with cover in the upward position) or vertically with the flow in the upward direction. Refer to Figure 6.

To facilitate their use in wet-type automatic sprinkler system risers, the Model CV-1FR Riser Check Valves are provided with threaded outlets for pressure gauges and a drain connection. They provide a more compact and economical alternative to an alarm check valve where a water motor alarm is not required. Provisions must be made for a local alarm using an approved flow switch (not included).

The Model CV-1FR Riser Check Valve is also Listed for use in conjunction with the TYCO DV-5 Deluge Valve in Preaction Systems under air pressure without the use of prime water.

The Model CV-1FR Riser Check Valves are a redesign for the Central Figure 590FR and GRINNELL Figure 590FR.

NOTICE

The Model CV-1FR Riser Check Valve described herein must be installed and maintained in compliance with this document and with the applicable standards of the National Fire Protection Association, in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of this device.

Never remove any piping component nor correct or modify any piping deficiencies without first de-pressurizing and draining the system. Failure to do so may result in serious personal injury, property damage, and/or impaired device performance.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or manufacturer with any questions.

Technical Data

Approvals

UL, C-UL Listed
FM Approved

Sizes

2 to 12 Inch (DN50 to DN300)

Maximum Working Pressure

300 psi (20,7 bar)

Valve Assembly Finish

Red, non-lead paint

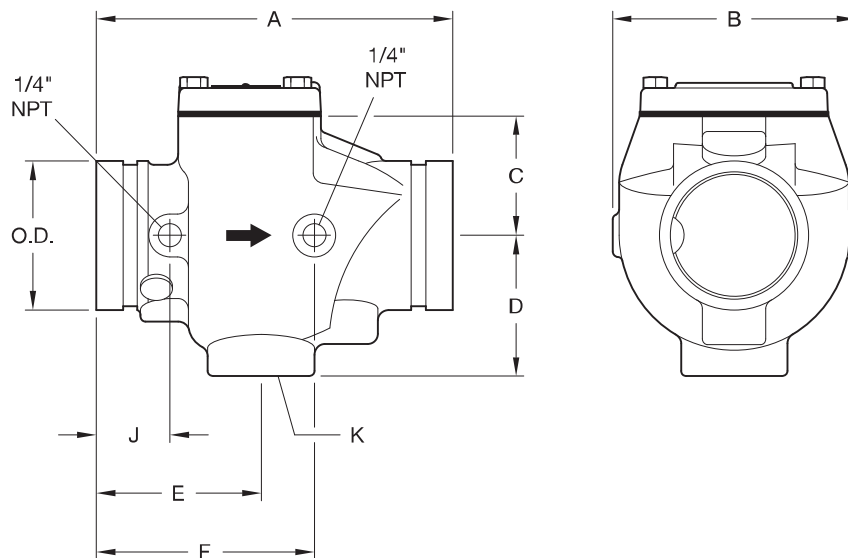


Installation

The Model CV-1FR Riser Check Valves are to be installed in accordance with this section:

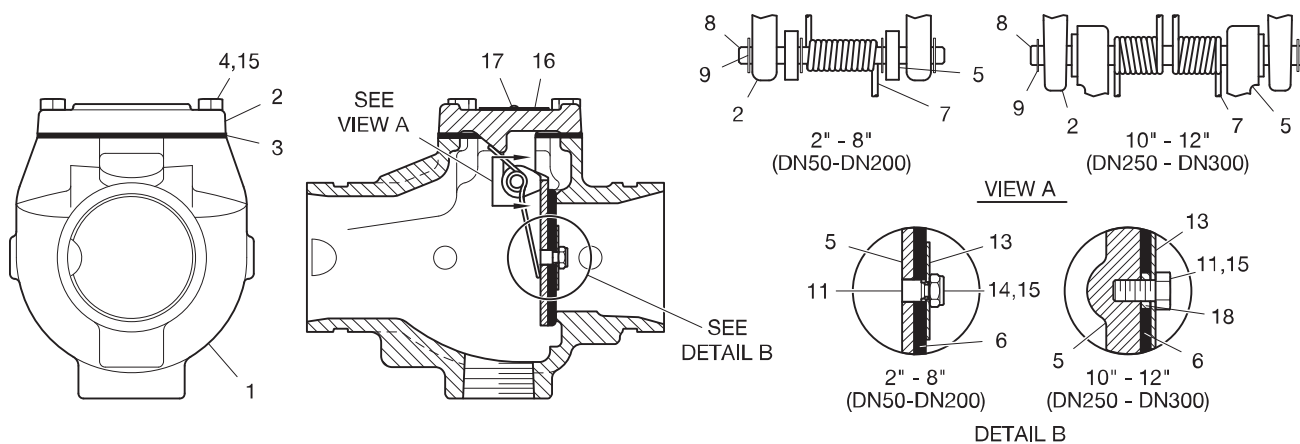
1. The arrow cast on the Body must point in the direction of the flow.
2. Valves installed vertically must be positioned with the flow in the upward direction.
3. Valves installed horizontally must be positioned with the Cover facing up. Refer to Figure 6.
4. Grooved-end pipe couplings used with the Model CV-1FR Riser Check Valve must be installed in accordance with manufacturer's instructions.

NOTE: Valves should be installed a reasonable distance downstream from pumps, elbows, expanders, reducers, or other similar devices to extend the valve life. Standard piping practices call for a minimum of five (5) times the pipe diameter for general use.



Nominal Pipe Size		Nominal Dimensions Inches (mm)								Cover Bolt Torque Lbs.-ft. (Nm)	Approx. Weight Lbs. (kg)
ANSI Inches DN	O.D. Inches (mm)	A	B	C	D	E	F	J	K Inches NPT		
2 DN50	2.375 (60,3)	6.75 (171,5)	4.38 (111,3)	1.96 (49,8)	2.57 (65,3)	3.25 (82,3)	4.37 (111,0)	1.56 (39,6)	1	18 (25)	9.0 (4,5)
2-1/2 DN65	2.875 (73,0)	8.00 (203,2)	5.38 (136,7)	2.63 (66,8)	3.09 (78,5)	3.87 (98,3)	5.12 (130,0)	1.73 (43,9)	1-1/4	39 (54)	10.0 (4,5)
76,1 DN65	- (76,1)	8.00 (203,2)	5.38 (136,7)	2.63 (66,8)	3.09 (78,5)	3.87 (98,3)	5.12 (130,0)	1.72 (43,7)	1-1/4	39 (54)	10.0 (4,5)
3 DN80	3.500 (88,9)	8.37 (212,6)	5.72 (145,3)	2.81 (71,4)	3.31 (84,1)	3.87 (98,3)	5.12 (130,0)	1.72 (43,7)	1-1/4	39 (54)	11.0 (5,0)
4 DN100	4.500 (114,3)	9.63 (245,6)	6.68 (169,7)	3.80 (96,5)	3.63 (92,2)	4.53 (115,4)	5.78 (146,8)	2.12 (53,8)	2	50 (69)	25.0 (11,3)
139.7 DN125	- (139,7)	10.50 (266,7)	7.40 (188,0)	4.46 (113,2)	4.13 (104,9)	4.90 (124,5)	7.00 (177,8)	2.09 (53,1)	2	39 (54)	29.0 (13,2)
5 DN125	5.563 (141,3)	10.50 (266,7)	7.40 (188,0)	4.46 (113,2)	4.13 (104,9)	4.90 (124,5)	7.00 (177,8)	2.09 (53,1)	2	39 (54)	29.0 (13,2)
165.1 DN150	- (165,1)	11.50 (292,1)	8.00 (203,2)	4.62 (117,4)	4.50 (114,3)	5.00 (127,0)	7.25 (184,2)	2.00 (50,8)	2	60 (82)	47.0 (21,3)
6 DN150	6.625 (168,3)	11.50 (292,1)	8.00 (203,2)	4.62 (117,4)	4.50 (114,3)	5.00 (127,0)	7.25 (184,2)	2.00 (50,8)	2	60 (82)	47.0 (21,3)
8 DN200	8.625 (219,1)	14.00 (355,6)	10.14 (257,6)	6.67 (169,4)	5.52 (140,2)	5.46 (138,7)	10.50 (266,7)	2.43 (61,7)	2	120 (164)	66.0 (30,0)
10 DN250	10.750 (273,1)	18.00 (457,2)	12.38 (314,5)	8.62 (218,9)	6.41 (162,8)	7.50 (190,5)	10.75 (273,1)	3.38 (85,9)	2	130 (178)	109.7 (49,4)
12 DN300	12.750 (323,9)	21.0 (533,4)	14.28 (362,7)	9.93 (252,2)	7.27 (184,7)	7.62 (193,5)	10.00 (254,0)	3.13 (79,5)	2	130 (178)	151.0 (68,0)

FIGURE 1
MODEL CV-1FR RISER CHECK VALVES
NOMINAL DIMENSIONS



Detail	Part	Material	Qty.	Detail	Part	Material	Qty.	Detail	Part	Material	Qty.
1	Body	Ductile Iron	1	6	Clapper Facing	EPDM Grade "E"	1	14	Locknut	Stainless Steel	1
2	Cover	Ductile Iron	1	7	Spring	Stainless Steel	1	15	Adhesive	Thread Sealer	AR
3	Cover Gasket	Nitrile Rubber	1	8	Hinge Shaft	Stainless Steel	1	16	Nameplate	Aluminum	1
4	Hex Cap Screw	Steel, Zinc Plated	AR	9	Retaining Ring	Stainless Steel	AR	17	Rivet	Steel	2
5	Clapper 2" - 8" (DN50-200)	Stainless Steel	1	11	Retention Bolt	Stainless Steel	1	18	Spacer	Stainless Steel	1
	Clapper 10" - 12" (DN250-300)	Ductile Iron		13	Retaining Disc	Stainless Steel	1				

FIGURE 2
MODEL CV-1FR RISER CHECK VALVES
ASSEMBLY

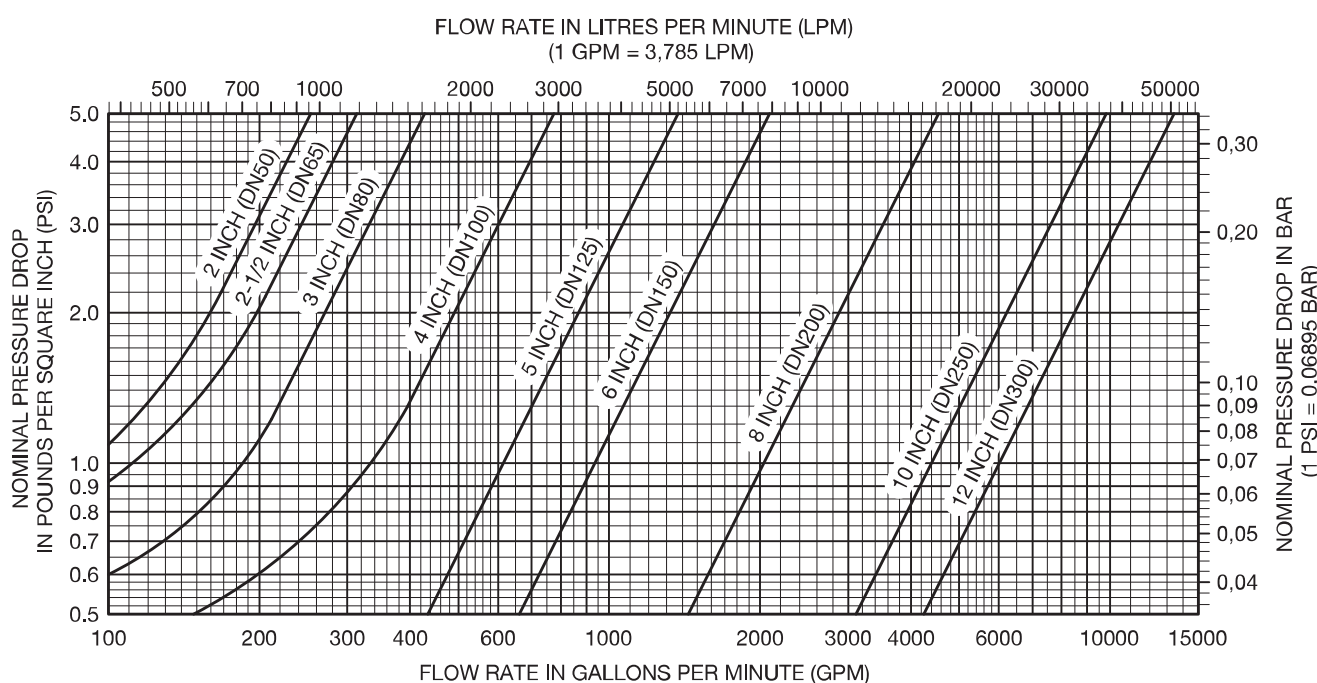
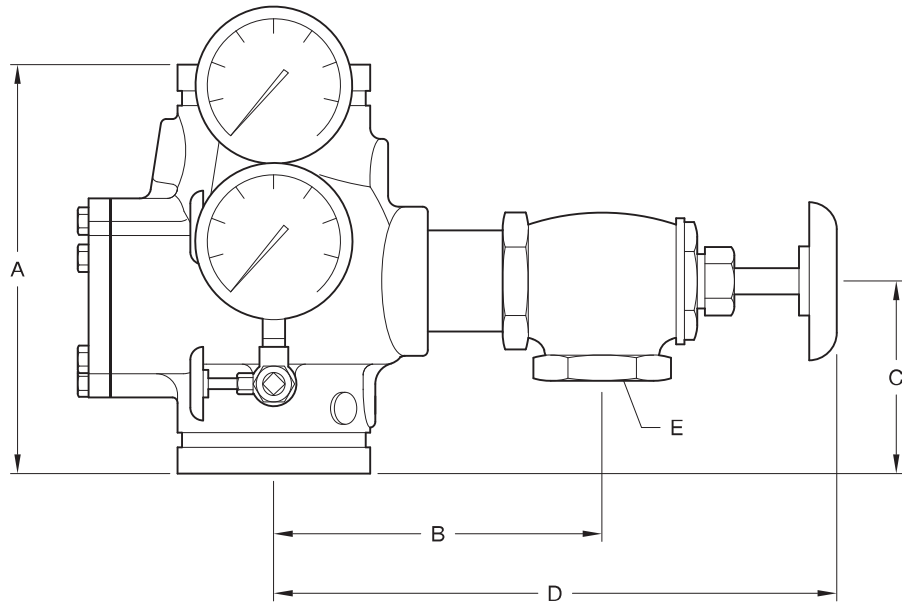


FIGURE 3
MODEL CV-1FR RISER CHECK VALVES
PRESSURE LOSS DATA



Nominal Pipe Size		Nominal Dimensions Inches (mm)				
ANSI Inches DN	O.D. Inches (mm)	A	B	C	D	E Inches NPT
2 DN50	2.375 (60,3)	6.75 (171,5)	5.87 (149,1)	3.25 (82,6)	9.52 (241,9)	1
2-1/2 DN65	2.875 (73,0)	8.00 (203,2)	6.66 (169,2)	3.87 (98,3)	10.80 (274,3)	1-1/4
76,1 DN65	— (76,1)	8.00 (203,2)	6.66 (169,2)	3.87 (98,3)	10.80 (274,3)	1-1/4
3 DN80	3.500 (88,9)	8.37 (212,6)	6.88 (174,8)	3.87 (98,3)	11.02 (279,9)	1-1/4
4 DN100	4.500 (114,3)	9.63 (244,6)	7.63 (193,7)	4.53 (115,1)	11.92 (302,7)	2
139,7 DN125	— (139,7)	10.50 (266,7)	8.13 (206,4)	4.90 (124,5)	12.42 (315,4)	2
5 DN125	5.563 (141,3)	10.50 (266,7)	8.13 (206,4)	4.90 (124,5)	12.42 (315,4)	2
165,1 DN150	— (165,1)	11.50 (292,1)	8.50 (215,8)	5.00 (127,0)	12.79 (324,8)	2
6 DN150	6.625 (168,3)	11.50 (292,1)	8.50 (215,8)	5.00 (127,0)	12.79 (324,8)	2
8 DN200	8.625 (219,1)	14.00 (355,6)	9.52 (241,7)	5.46 (138,7)	13.81 (350,7)	2
10 DN250	10.750 (273,1)	18.00 (457,2)	10.41 (264,3)	7.50 (190,5)	14.70 (373,3)	2
12 DN300	12.750 (323,9)	21.00 (533,4)	11.27 (286,1)	7.62 (193,5)	15.56 (395,2)	2

FIGURE 4
MODEL CV-1FR RISER CHECK VALVE WITH TRIM COMPONENTS
NOMINAL DIMENSIONS

P/N 59-591-1-020

2 Inch (DN50)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-002
3	1/4" Plug	2	CH
4	1" Angle Valve	1	46-048-1-006
5	1/4" x 2" Nipple	1	CH
6	1/4" x 5" Nipple	1	CH
7	1" x 3" Nipple	1	CH

P/N 59-591-1-030

2-1/2 Inch (DN65) through 3 Inch (DN80)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-002
3	1/4" Plug	2	CH
4	1-1/4" Angle Valve	1	46-048-1-007
5	1/4" x 2" Nipple	1	CH
6	1/4" x 5" Nipple	1	CH
7	1-1/4" x 3" Nipple	1	CH

P/N 59-591-1-080

4 Inch (DN100) through 12 Inch (DN300)

NO.	DESCRIPTION	QTY.	P/N
1	300 psi/ 2000 kPa Water Pressure Gauge	2	92-343-1-005
2	1/4" Gauge Test Valve	2	46-005-1-002
3	1/4" Plug	2	CH
4	2" Angle Valve	1	46-048-1-009
5	1/4" x 2" Nipple	1	CH
6	1/4" x 5" Nipple	1	CH
7	2" x 3" Nipple	1	CH

NOTES:

1. All Fittings and Nipples are galvanized (Standard Order).
2. CH: Common Hardware.

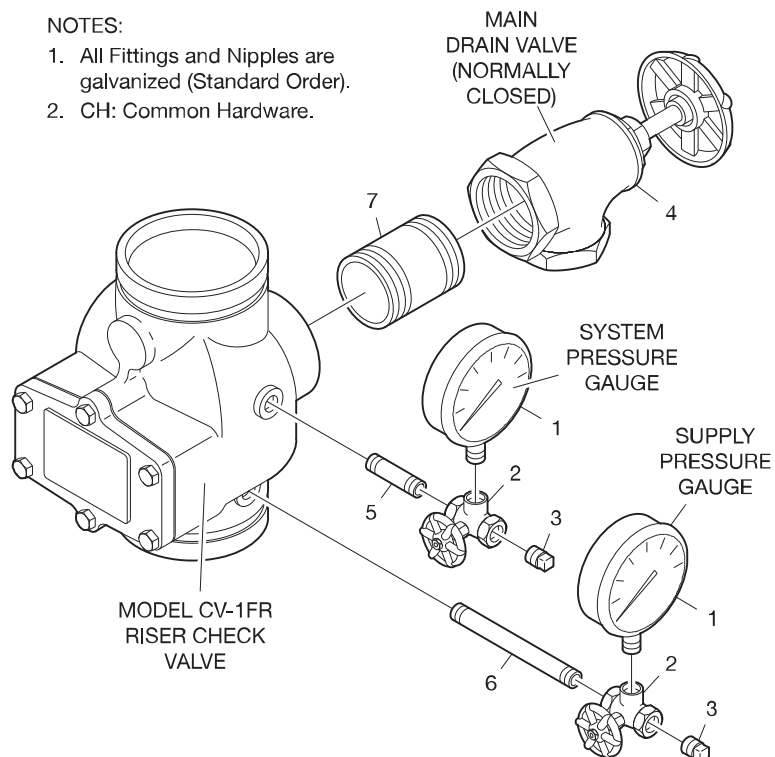


FIGURE 5
MODEL CV-1FR RISER CHECK VALVES
TRIM PARTS LIST

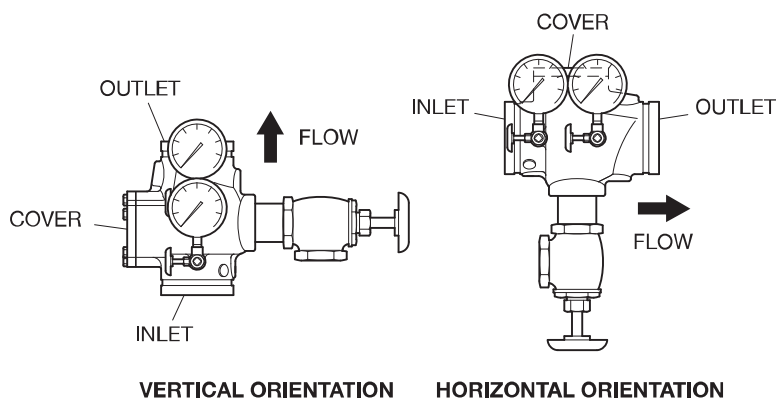


FIGURE 6
MODEL CV-1FR RISER CHECK VALVES
INSTALLATION

Care and Maintenance

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection system from the proper authorities and notify all personnel who may be affected by this decision.

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. Contact the installing contractor or product manufacturer with any questions. Any impairments must be immediately corrected.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Model CV-1FR Check Valves

Specify: Size and P/N (below).

2" (DN50)	P/N 59-590-1-020
2-1/2" (DN65)	P/N 59-590-1-025
76,1 mm (DN65)	P/N 59-590-1-076
3" (DN80)	P/N 59-590-1-030
4" (DN100)	P/N 59-590-1-040
139,7 mm (DN125)	P/N 59-590-1-139
5" (DN125)	P/N 59-590-1-050
165,1 mm (DN150)	P/N 59-590-1-165
6" (DN150)	P/N 59-590-1-060
8" (DN200)	P/N 59-590-1-080
10" (DN250)	P/N 59-590-1-100
12" (DN300)	P/N 59-590-1-120

Model CV-1FR

Riser Check Valve Trim Assembly

Specify: Size and P/N (below).

2" (DN50)	P/N 59-591-1-020
2-1/2" (DN65)	P/N 59-591-1-030
76,1 mm (DN65)	P/N 59-591-1-030
3" (DN80)	P/N 59-591-1-030
4" (DN100)	P/N 59-591-1-080
139,7 mm (DN125)	P/N 59-591-1-080
5" (DN125)	P/N 59-591-1-080
165,1 mm (DN150)	P/N 59-591-1-080
6" (DN150)	P/N 59-591-1-080
8" (DN200)	P/N 59-591-1-080
10" (DN250)	P/N 59-591-1-080
12" (DN300)	P/N 59-591-1-080

Model 513 (13) Riser Manifold **1-1/2 thru 6 Inch (DN40 thru DN150)** **For NFPA 13 Sprinkler Systems**

General Description

The Figure 513 (13) Riser Manifolds described in this technical data sheet provide the necessary waterflow alarm, pressure gauge, alarm test orifice, drain, and sight glass equipment in a single assembly for use in NFPA 13 sprinkler systems as follows:

NFPA 13*

- 1-1/2 Inch (DN40)
Male Thread x Female Thread
- 1-1/2 thru 6 Inch (DN40 thru DN150)
Groove x Groove

*Although the Riser Manifold described in this data sheet is intended for NFPA 13 sprinkler systems, it may be used for NFPA 13D or 13R residential sprinkler systems, where a test orifice of 5.6K (80K) is acceptable.

The variety of sizes and grooved end connections allow cost effective and easy transition to check valves, control valves, and system piping. The Riser Manifolds may be installed in either the horizontal (flow switch on top) or vertical (flow going up) for both single sprinkler rises and floor control in high rises.

WARNING

The Riser Manifolds described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.

Technical Data

Approvals

The Figure 513 (13) Riser Manifolds with a cover tamper switch for the waterflow alarm switch are UL Listed, ULC Listed, and FM Approved.

The Figure 513 (13) Riser Manifolds without a cover tamper switch for the waterflow alarm switch are UL Listed and FM Approved.

Maximum Working Pressure

175 psi (12,1 bar)

Test Orifice

5.6K (80K)

Assembly

The manifold body of the Figure 513 is ductile iron, whereas the manifold body of the Figure 13 is cast iron. The two assemblies are completely interchangeable in function, application, and end-to-end laying length.

Finish

Red painted.

Installation

The Riser Manifolds may be installed in either the horizontal (flow switch on top) or vertical (flow going up). The inlet of the Riser Manifold may be directly connected to a shut-off control valve.

NOTES

Where applicable pipe thread sealant is to be applied sparingly. Use of a non-hardening pipe thread sealant is recommended.

Never remove any piping component nor correct or modify any piping deficiencies without first depressurizing and draining the system.

Step 1. Install the manifold body with the flow arrow pointing in the downstream position using threaded con-



nections and/or listed mechanical grooved connections, as applicable

Step 2. Connect the drain line, and then close the drain valve.

Step 3. Refer to Figure 3 for wiring guidance. All wiring must be performed in accordance with the Authority Having Jurisdiction and/or the National Electrical Code.

Step 4. Refer to Figure 4 for optional relief valve.

Step 5. Place the system in service by filling the system with water. When filling the system, partially open the control valve to slowly fill the system. *Filling the system slowly will help avoid damaging the waterflow alarm switch.*

After the system is fully pressurized, completely open the control valve.

Step 6. Secure all supply valves open.

NO.	DESCRIPTION	QTY.	P/N
1	1-1/2" Manifold Body, Male x Female NPT	1	N/A
	Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSR-SF with Paddle, UL/FM	1	971-096-00
	VSR-SF with Paddle and Cover Tamper Switch, ULC/FM	1	976-519-02
3	300 psi/2000 kPa Water Pressure Gauge . . .	1	2341

- NOTES:
- 1. Approximate weight, 11.2 lbs. (5,1 kg).
 - 2. ULC Listed Manifolds are equipped with Cover Tamper Switches installed internal to the Waterflow Alarm Switches.
 - 3. CH: Common Hardware

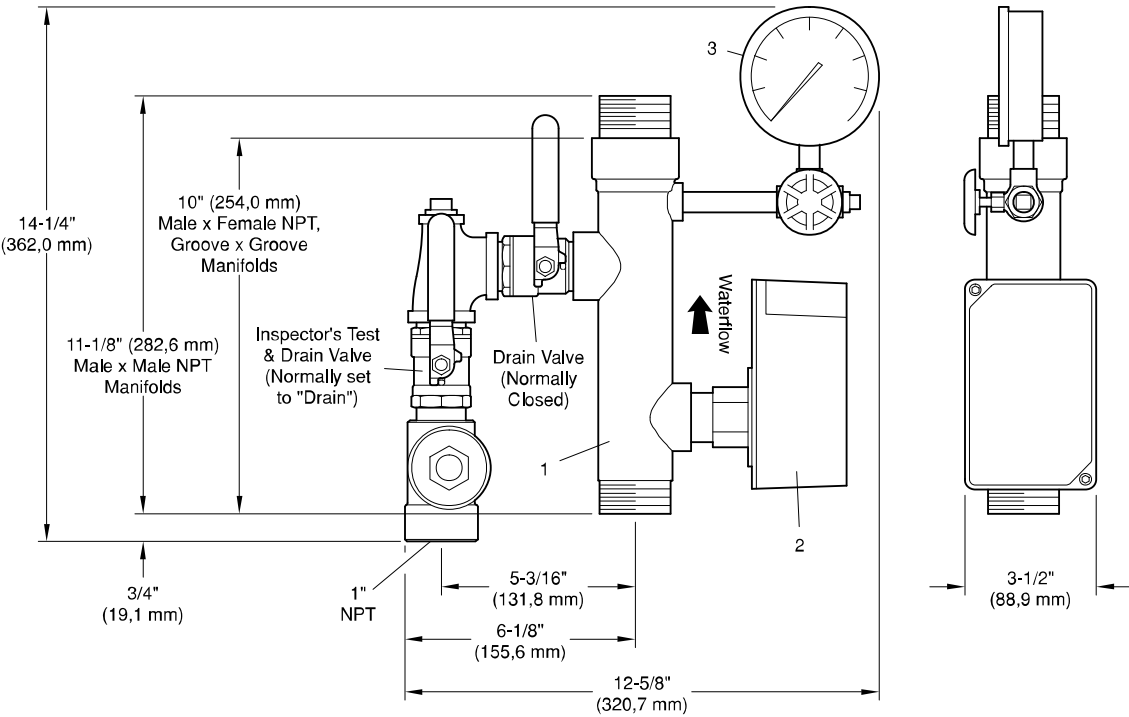


FIGURE 1
1-1/2 INCH (DN40) RISER MANIFOLD ASSEMBLY AND DIMENSIONS

2 INCH (DN50) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	2" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-01
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-01
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

4 INCH (DN100) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	4" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-04
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-04
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

6 INCH (DN150) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	6" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-05
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-05
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

2-1/2 INCH (DN65) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	2-1/2" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-02
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-02
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

Manifold Size	Nominal Installation Dimensions in Inches and (mm)							Drain Size	Weight lbs. (kg)
	A	B	C	D	E	F	G		
2 Inch (DN50)	16-3/4 (425,5)	13 (330,2)	9/16 (14,3)	5-3/8 (136,5)	6-3/8 (161,9)	13-1/16 (331,8)	3-1/2 (88,9)	1" NPT	13.5 (6,1)
2-1/2 Inch (DN65)	17-3/16 (436,6)	13 (330,2)	1 (25,4)	5-3/4 (146,1)	6-7/8 (174,6)	13-3/4 (349,3)	3-1/2 (88,9)	1-1/4" NPT	16.8 (7,6)
3 Inch (DN80)	17-3/16 (436,6)	13 (330,2)	1 (25,4)	6 (152,4)	7-1/8 (181,0)	14-1/4 (362,0)	3-1/2 (88,9)	1-1/4" NPT	18.7 (8,5)
4 Inch (DN100)	20-1/2 (520,7)	13 (330,2)	4-5/16 (109,5)	7-9/16 (192,1)	9-1/16 (230,2)	16-5/8 (422,3)	4-1/2 (114,3)	2" NPT	32.7 (14,8)
6 Inch (DN150)	20-1/2 (520,7)	13 (330,2)	4-5/16 (109,5)	8-1/2 (215,9)	10 (254,0)	18-1/2 (469,9)	6-5/8 (168,3)	2" NPT	41.6 (18,9)

3 INCH (DN80) MANIFOLD			
NO.	DESCRIPTION	QTY.	P/N
1	3" Manifold Body, Groove x Groove	1	N/A
2	Waterflow Alarm Switch: VSC with Paddle, UL/FM	1	976-357-03
	VSC with Paddle and Cover Tamper Switch, ULC/FM	1	976-520-03
3	300 psi/2000 kPa Water Pressure Gauge . .	1	2341

- NOTES:
1. ULC Listed Manifolds are equipped with Cover Tamper Switches installed internal to the Waterflow Alarm Switches.
 2. CH: Common Hardware

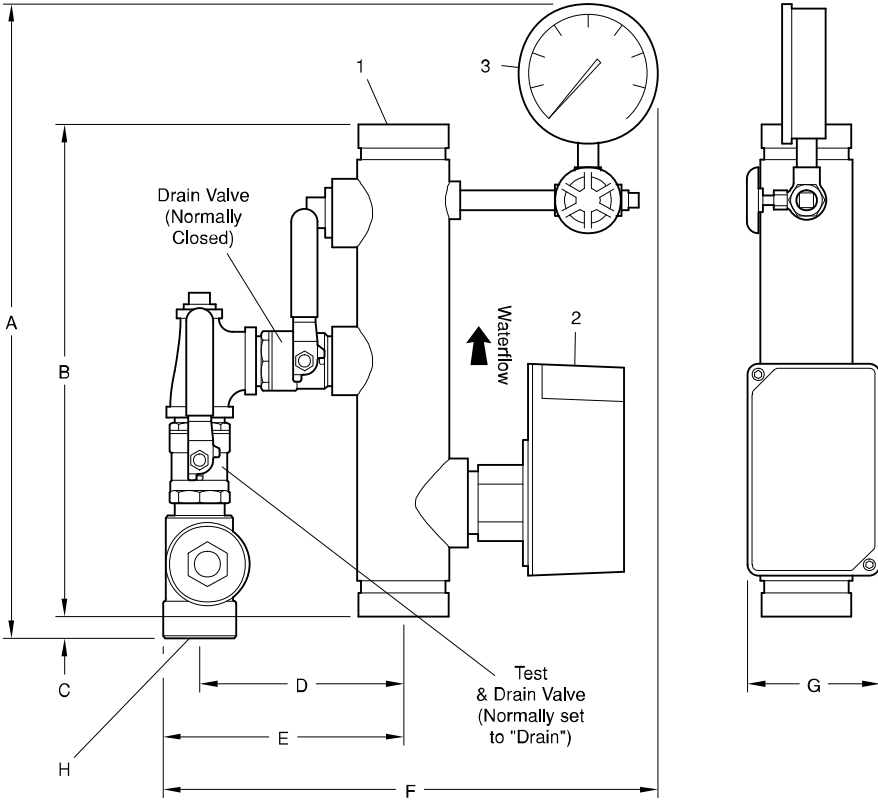
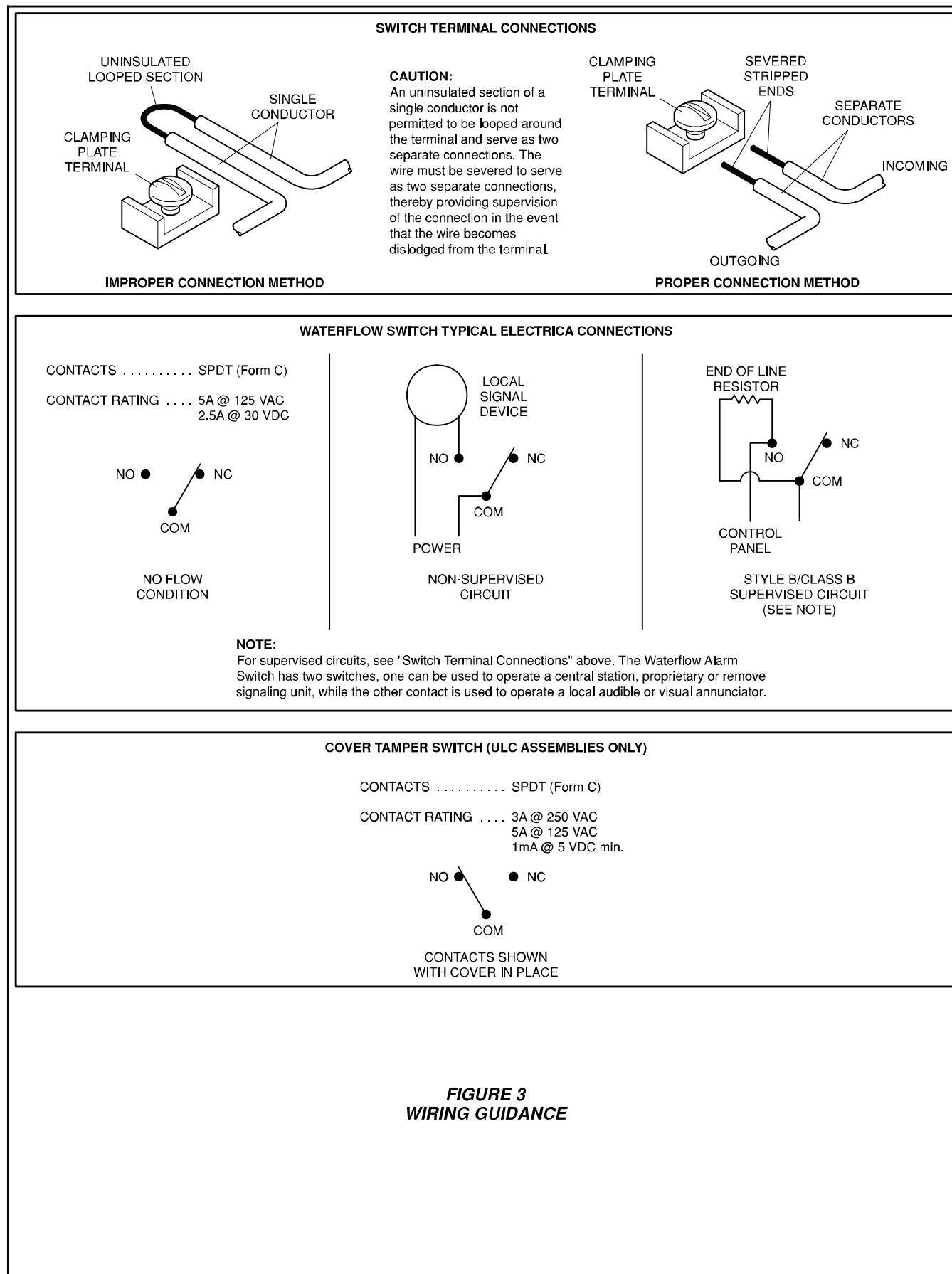
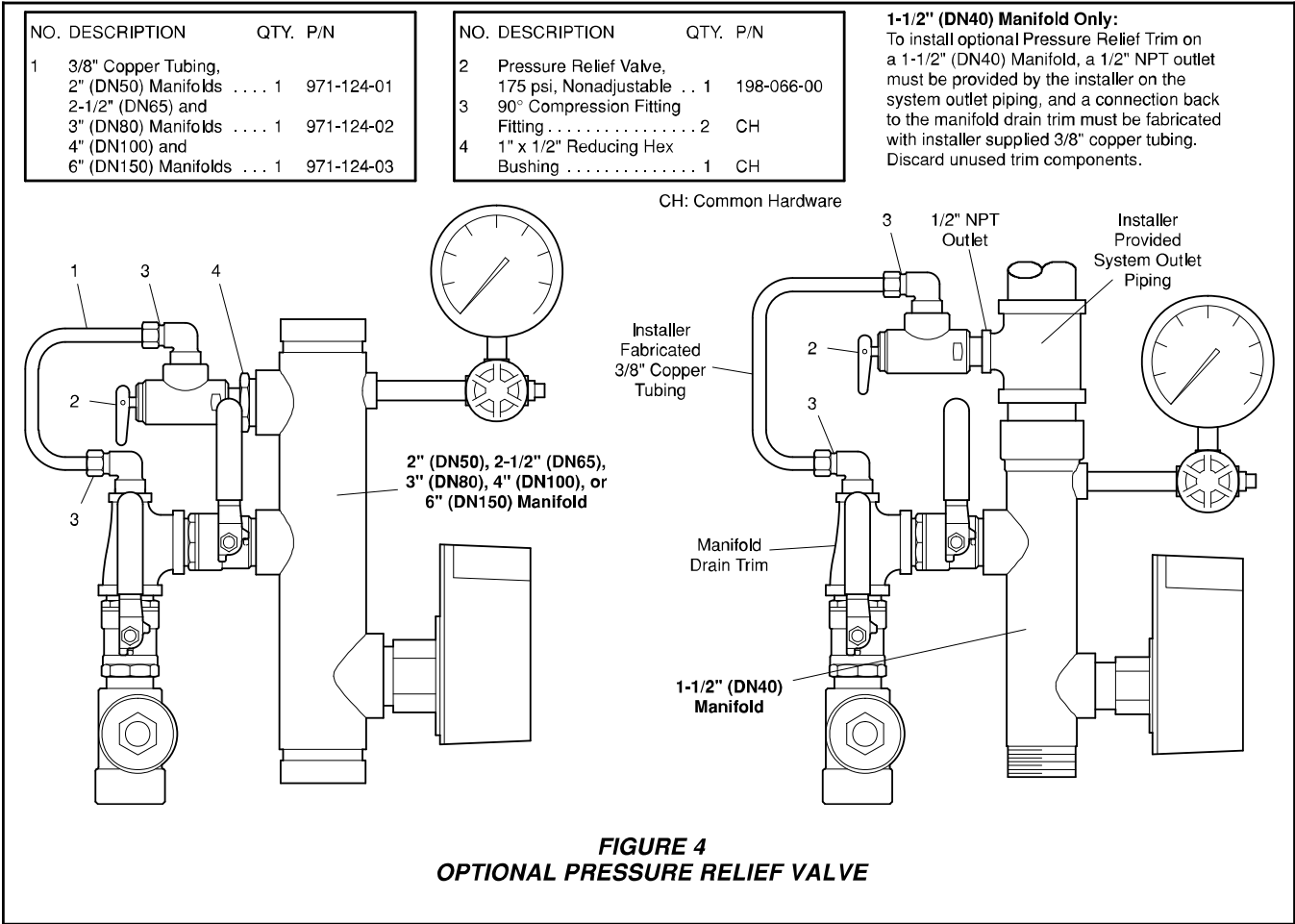


FIGURE 2
2 thru 6 INCH (DN50 thru DN150) RISER MANIFOLD ASSEMBLY AND DIMENSIONS



**FIGURE 3
WIRING GUIDANCE**



Care and Maintenance

The following inspection procedure must be performed as indicated, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. The installing contractor or product manufacturer should be contacted relative to any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

NOTES

No attempt is to be made to repair any

Riser Manifold component in the field. Only the pressure gauge, waterflow alarm switch, or relief valve can be replaced. If any other problems are encountered the entire riser manifold must be replaced.

The alarm/flow test procedure will result in operation of the associated alarms. Consequently, notification must be given to the owner and the fire department, central station, or other signal station to which the alarms are connected, and notification must be given to the building occupants.

Before closing a fire protection system control valve for inspection or maintenance work on the fire protection system that it controls, permission to shut down the effected fire protection system must first be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

Alarm/Flow Test Procedure

- Step 1.** Place the test & drain Valve in the "test" position.
- Step 2.** Fully open the drain valve. Make certain that drainage water will not cause any damage or injury.
- Step 3.** Verify operation of associated alarms.
- Step 4.** Close the drain valve.
- Step 5.** Place the test & drain Valve in the "drain" position.
- Step 6.** Verify that the residual (flowing) pressure indicated by the pressure gauge is no less than originally recorded for the system when it was first installed.
- Step 7.** Close the drain valve.
- Step 8.** Verify that the static (not flowing) pressure indicated by the pressure gauge is no less than originally recorded for the system when it was first installed.

Limited Warranty

Products manufactured by Tyco Fire & Building Products (TFBP) are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by TFBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFBP or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by TFBP to be defective shall be either repaired or replaced, at TFBP's sole option. TFBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFBP shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

In no event shall TFBP be liable, in contract, tort, strict liability or under any other legal theory, for incidental, indirect, special or consequential damages, including but not limited to labor charges, regardless of whether TFBP was informed about the possibility of such damages, and in no event shall TFBP's liability exceed an amount equal to the sales price.

The foregoing warranty is made in lieu of any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

Ordering Information

Riser Manifold:

Specify; Size (specify), Figure 513, (specify connection type inlet x outlet) Riser Manifold (specify - without or with) a cover tamper switch for the waterflow alarm switch, P/N (specify).

NOTES

Orders for Figure 513 may be filled with a Figure 13. The two assemblies are completely interchangeable in function, application, and end-to-end laying length.

If a ULC Listing is required, the Riser Manifold must be ordered with a cover tamper switch for the waterflow alarm switch.

UL/ULC/FM Assemblies

With Cover Tamper Switch

1-1/2 Inch (DN40)	
MT x FT	P/N 4086
1-1/2 Inch (DN40)	
MT x MT	P/N 4087
2 Inch (DN50)	
G x G	P/N 4090
2-1/2 Inch (DN65)	
G x G	P/N 4091
3 Inch (DN80)	
G x G	P/N 4092
4 Inch (DN100)	
G x G	P/N 4095
6 Inch (DN150)	
G x G	P/N 4096

UL/FM Assemblies

Without Cover Tamper Switch

1-1/2 Inch (DN40)	
MT x FT	P/N 4055
1-1/2 Inch (DN40)	
MT x MT	P/N 4056
2 Inch (DN50)	
G x G	P/N 4060
2-1/2 Inch (DN65)	
G x G	P/N 4061
3 Inch (DN80)	
G x G	P/N 4062
4 Inch (DN100)	
G x G	P/N 4065
6 Inch (DN150)	
G x G	P/N 4066

Optional Pressure Relief Valve:

Specify: Operational Pressure Relief Valve and Trim for use with (specify size) Figure 513 or 13 Series Riser Manifold, P/N (specify).

1-1/2" or 2"	P/N 4063
2-1/2" or 3"	P/N 4072
4" or 6"	P/N 4073

Replacement Parts:

Specify: (description) for use with Figure 513 or 13 Riser Manifold, P/N (Ref. Figure 1 or 2, as applicable).



Specifications subject to change without notice.

Ordering Information			
Nominal Pipe Size		Model	Part Number
2"	DN50	VSR-2	1144402
2 1/2"	DN65	VSR-2 1/2	1144425
3"	DN80	VSR-3	1144403
3 1/2"	-	VSR-3 1/2	1144435
4"	DN100	VSR-4	1144404
5"	-	VSR-5	1144405
6"	DN150	VSR-6	1144406
8"	DN200	VSR-8	1144408

Optional: Cover Tamper Switch Kit, stock no. 0090148

Replaceable Components: Retard/Switch Assembly, stock no. 1029030

UL, CUL and CSFM Listed, FM Approved, LPCB Approved, For CE Marked (EN12259-5) / VdS Approved model use VSR-EU

Service Pressure: 450 PSI (31 BAR) - UL

Flow Sensitivity Range for Signal:

4-10 GPM (15-38 LPM) - UL

Maximum Surge: 18 FPS (5.5 m/s)

Contact Ratings: Two sets of SPDT (Form C)
10.0 Amps at 125/250VAC
2.0 Amps at 30VDC Resistive
10 mAmps min. at 24VDC

Conduit Entrances: Two knockouts provided for 1/2" conduit.
Individual switch compartments suitable for dissimilar voltages.

Environmental Specifications:

- NEMA 4/IP54 Rated Enclosure suitable for indoor or outdoor use with factory installed gasket and die-cast housing when used with appropriate conduit fitting.
- Temperature Range: 40°F - 120°F, (4.5°C - 49°C) - UL
- Non-corrosive sleeve factory installed in saddle.

Service Use:

Automatic Sprinkler	NFPA-13
One or two family dwelling	NFPA-13D
Residential occupancy up to four stories	NFPA-13R
National Fire Alarm Code	NFPA-72

WARNING

- Installation must be performed by qualified personnel and in accordance with all national and local codes and ordinances.
- Shock hazard. Disconnect power source before servicing. Serious injury or death could result.
- Risk of explosion. Not for use in hazardous locations. Serious injury or death could result.

CAUTION

Waterflow switches that are monitoring wet pipe sprinkler systems shall not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems. Waterflow switches used for this application may result in unintended discharges caused by surges, trapped air, or short retard times.

Important: This document contains important information on the installation and operation of the VSR waterflow switches. Please read all instructions carefully before beginning installation. A copy of this document is required by NFPA 72 to be maintained on site.

General Information

The Model VSR is a vane type waterflow switch for use on wet sprinkler systems. It is UL Listed for use on a steel pipe; schedules 5 through 40, sizes 2" - 6" and is UL Listed and FM Approved for use on steel pipe; schedules 10 through 40, sizes 2" thru 8" (50 mm thru 200 mm). LPC approved sizes are 2" thru 8" (50 mm thru 200 mm). See Ordering Information chart.

The VSR may also be used as a sectional waterflow detector on large systems. The VSR contains two single pole, double throw, snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 GPM (38 LPM) or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

Enclosure

The VSR switches and retard device are enclosed in a general purpose, die-cast housing. The cover is held in place with two tamper resistant screws which require a special key for removal. A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover. See bulletin number 5401103 for installation instructions of this switch.

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Installation (see Fig. 1)

These devices may be mounted on horizontal or vertical pipe. On horizontal pipe they shall be installed on the top side of the pipe where they will be accessible. The device should not be installed within 6" (15 cm) of a fitting which changes the direction of the waterflow or within 24" (60 cm) of a valve or drain.

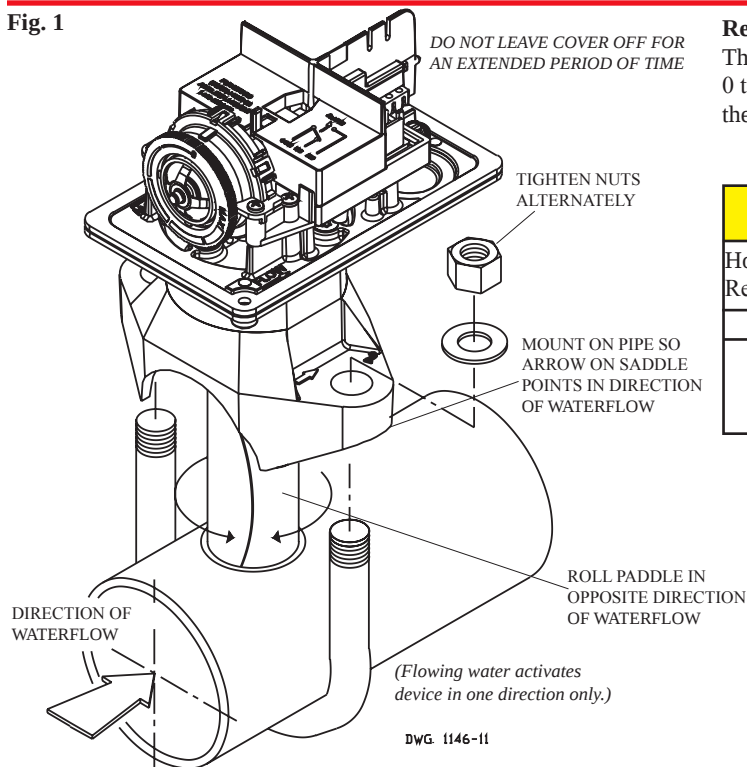
NOTE: Do not leave cover off for an extended period of time.

Drain the system and drill a hole in the pipe using a hole saw in a slow speed drill (see Fig. 1). Clean the inside pipe of all growth or other material for a distance equal to the pipe diameter on either side of the hole. Roll the vane so that it may be inserted into the hole; do not bend or crease it. Insert the vane so that the arrow on the saddle points in the direction of the waterflow. Take care not to damage the non-corrosive bushing in the saddle. The bushing should fit inside the hole in the pipe. Install the saddle strap and tighten nuts alternately to required torque (see the chart in Fig. 1). The vane must not rub the inside of the pipe or bind in any way.

CAUTION

Do not trim the paddle. Failure to follow these instructions may prevent the device from operating and will void the warranty. Do not obstruct or otherwise prevent the trip stem of the flow switch from moving when water flows as this could damage the flow switch and prevent an alarm. If an alarm is not desired, a qualified technician should disable the alarm system.

Fig. 1

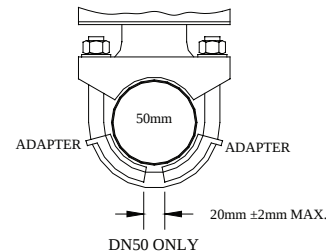
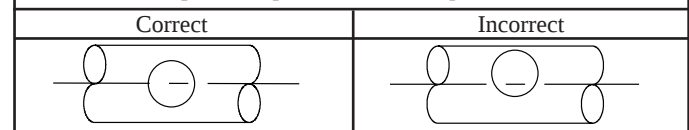


Retard Adjustment

The delay can be adjusted by rotating the retard adjustment knob from 0 to the max setting (60-90 seconds). The time delay should be set at the minimum required to prevent false alarms

CAUTION

Hole must be drilled perpendicular to the pipe and vertically centered. Refer to the Compatible Pipe/Installation Requirements chart for size.



USE (2) 5180162 ADAPTERS AS SHOWN ABOVE

DWG# 1146-1F

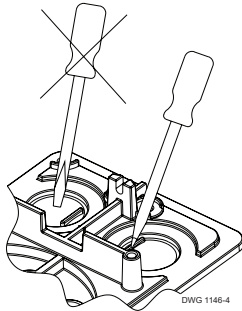
Compatible Pipe/ Installation Requirements

Model	Nominal Pipe Size		Nominal Pipe O.D.		Pipe Wall Thickness										Hole Size		U-Bolt Nuts Torque	
					Lightwall		Schedule 10 (UL)		Schedule 40 (UL)		BS-1387 (LPC)		DN (VDS)					
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	ft-lb	n-m
VSR-2	2	DN50	2.375	60.3	.065	1.651	0.109	2.77	0.154	3.91	0.142	3.6	0.091	2.3	1.25 ± .125/- .062	33.0 ± 2.0	20	27
VSR-2 1/2	2.5	-	2.875	73.0	.084	2.134	0.120	3.05	0.203	5.16	-	-	-	-				
VSR-2 1/2	-	DN65	3.000	76.1	-	-	-	-	-	-	0.142	3.6	0.102	2.6				
VSR-3	3	DN80	3.500	88.9	.083	2.108	0.120	3.05	0.216	5.49	0.157	4.0	0.114	2.9	2.00 ± .125	50.8 ± 2.0		
VSR-3 1/2	3.5	-	4.000	101.6	-	-	0.120	3.05	0.226	5.74	-	-	-	-				
VSR-4	4	DN100	4.500	114.3	.084	2.134	0.120	3.05	0.237	6.02	0.177	4.5	0.126	3.2				
VSR-5	5	-	5.563	141.3	-	-	0.134	3.40	0.258	6.55	-	-	-	-				
VSR-6	6	DN150	6.625	168.3	.115	2.921	0.134	3.40	0.280	7.11	0.197	5.0	0.157	4.0				
VSR-8	8	DN200	8.625	219.1	-	-	0.148	3.76	0.322	8.18	0.248	6.3	0.177	4.5				

NOTE: For copper or plastic pipe use Model VSR-CF.

Fig. 2

To remove knockouts: Place screwdriver at inside edge of knockouts, not in the center.



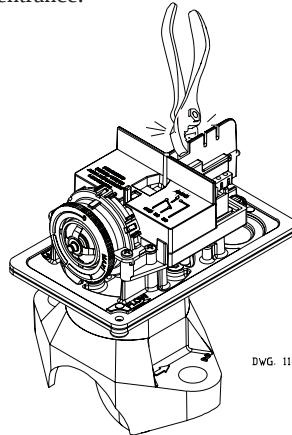
DWG. 1146-4

NOTICE

Do not drill into the base as this creates metal shavings which can create electrical hazards and damage the device. Drilling voids the warranty.

Fig. 3

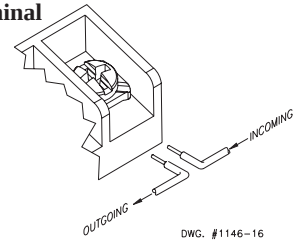
Break out thin section of cover when wiring both switches from one conduit entrance.



DWG. 1146-13

Fig. 4

Switch Terminal Connections Clamping Plate Terminal



DWG. #1146-16

WARNING

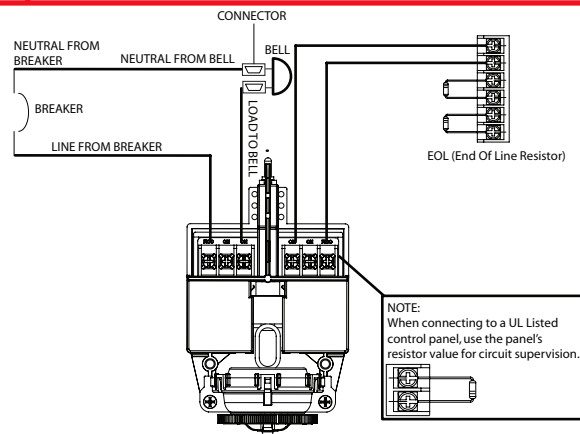
An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire become dislodged from under the terminal. Failure to sever the wire may render the device inoperable risking severe property damage and loss of life.

Do not strip wire beyond 3/8" of length or expose an uninsulated conductor beyond the edge of the terminal block. When using stranded wire, capture all strands under the clamping plate.

Fig. 5 Typical Electrical Connections

Notes:

1. The Model VSR has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other contact is used to operate a local audible or visual annunciator.
2. For supervised circuits, see "Switch Terminal Connections" drawing and warning note (Fig. 4).



NOTE:
When connecting to a UL Listed control panel, use the panel's resistor value for circuit supervision.

Testing

The frequency of inspection and testing for the Model VSR and its associated protective monitoring system shall be in accordance with applicable NFPA Codes and Standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).

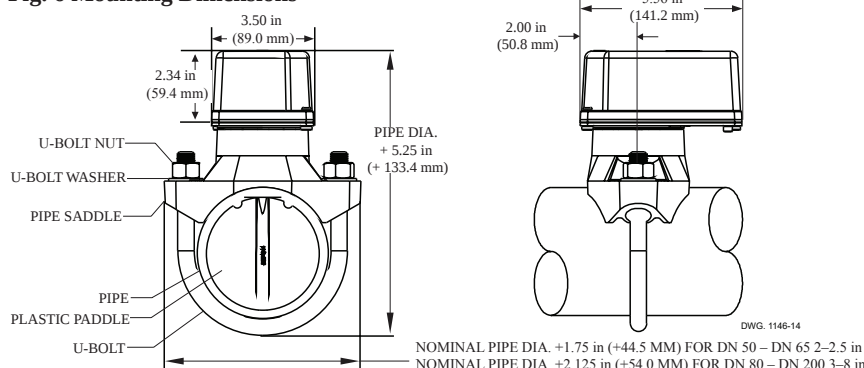
If provided, the inspector's test valve shall always be used for test purposes. If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR is not recommended or advisable.

A minimum flow of 10 GPM (38 LPM) is required to activate this device.

NOTICE

Advise the person responsible for testing of the fire protection system that this system must be tested in accordance with the testing instructions.

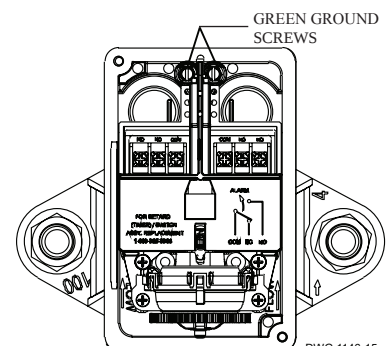
Fig. 6 Mounting Dimensions



DWG. 1146-14

NOMINAL PIPE DIA. +1.75 in (+44.5 MM) FOR DN 50 - DN 65 2-2.5 in
NOMINAL PIPE DIA. +2.125 in (+54.0 MM) FOR DN 80 - DN 200 3-8 in

Fig. 7



DWG. 1146-15

Maintenance

Inspect detectors monthly. If leaks are found, replace the detector. The VSR waterflow switch should provide years of trouble-free service. The retard and switch assembly are easily field replaceable. In the unlikely event that either component does not perform properly, please order replacement retard switch assembly stock #1029030 (see Fig. 8). There is no maintenance required, only periodic testing and inspection.

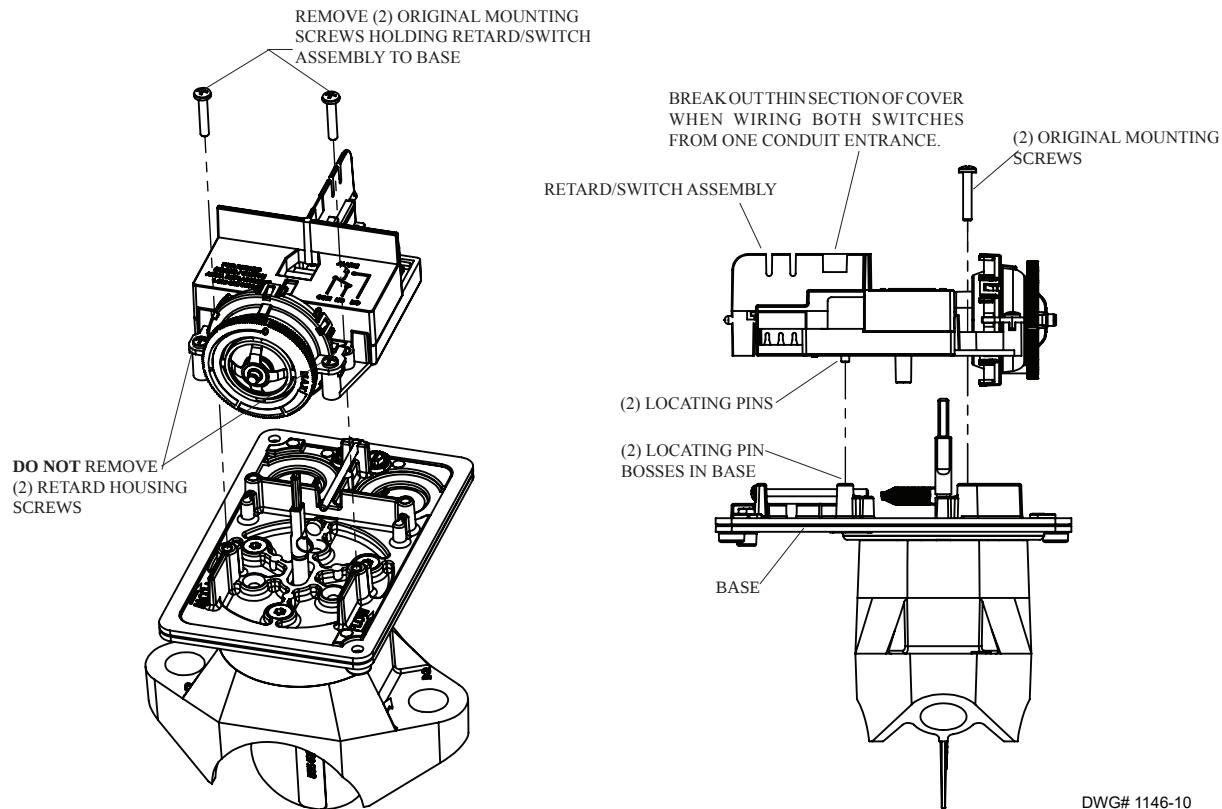
Retard/Switch Assembly Replacement (See Fig. 8)

NOTICE

The Retard/Switch Assembly is field-replaceable without draining the system or removing the waterflow switch from the pipe.

1. Make sure the fire alarm zone or circuit connected to the waterflow switch is bypassed or otherwise taken out of service.
2. Disconnect the power source for local bell (if applicable).
3. Identify and remove all wires from the waterflow switch.
4. Remove the (2) mounting screws holding retard/switch assembly to the base. **Do not** remove the (2) retard housing screws.
5. Remove the retard assembly by lifting it straight up over the tripstem.
6. Install the new retard assembly. Make sure the locating pins on the retard/switch assembly fit into the locating pin bosses on the base.
7. Re-install the (2) original mounting screws.
8. Reconnect all wires. Perform a flow test and place the system back in service.

Fig. 8



Removal of Waterflow Switch

- To prevent accidental water damage, all control valves should be shut tight and the system completely drained before waterflow detectors are removed or replaced.
- Turn off electrical power to the detector, then disconnect wiring.
- Loosen nuts and remove U-bolts.
- Gently lift the saddle far enough to get your fingers under it. With your fingers, roll the vane so it will fit through the hole while continuing to lift the waterflow detector saddle.
- Lift detector clear of pipe.

Model DPV-1 Dry Pipe Valve External Resetting

General Description

The TYCO Model DPV-1 Dry Pipe Valves are differential valves used to automatically control the flow of water into dry pipe fire protection sprinkler systems upon operation of one or more automatic sprinklers. The DPV-1 also provides for actuation of fire alarms upon system operation. The Model DPV-1 features are as follows:

- External reset.
- 250 psi (17,2 bar) pressure rating.
- Unique offset single clapper design enabling a simple compact valve to minimize installation labor.
- Ductile iron construction to ensure a lightweight valve to minimize shipping cost.
- A variety of inlet and outlet connections.
- Compact, Pre-Trimmed, and Semi-Assembled, easy to operate valve trim.
- Simple reset procedure through the elimination of priming water.

Dry pipe sprinkler systems are used in unheated warehouses, parking garages, store windows, attic spaces, loading docks, and other areas exposed to freezing temperatures, where water filled pipe cannot be utilized. When set for service, the dry pipe sprinkler system is pressurized with air (or nitrogen). The loss of pressure through an operated automatic sprinkler in response to heat from a fire permits the DPV-1 Dry Pipe Valve to open and allow a flow of water into the sprinkler system piping. Table B establishes the minimum required system air pressure that includes a safety factor to help prevent false operations that might occur due to water supply fluctuations.



Available Sizes and End Connections

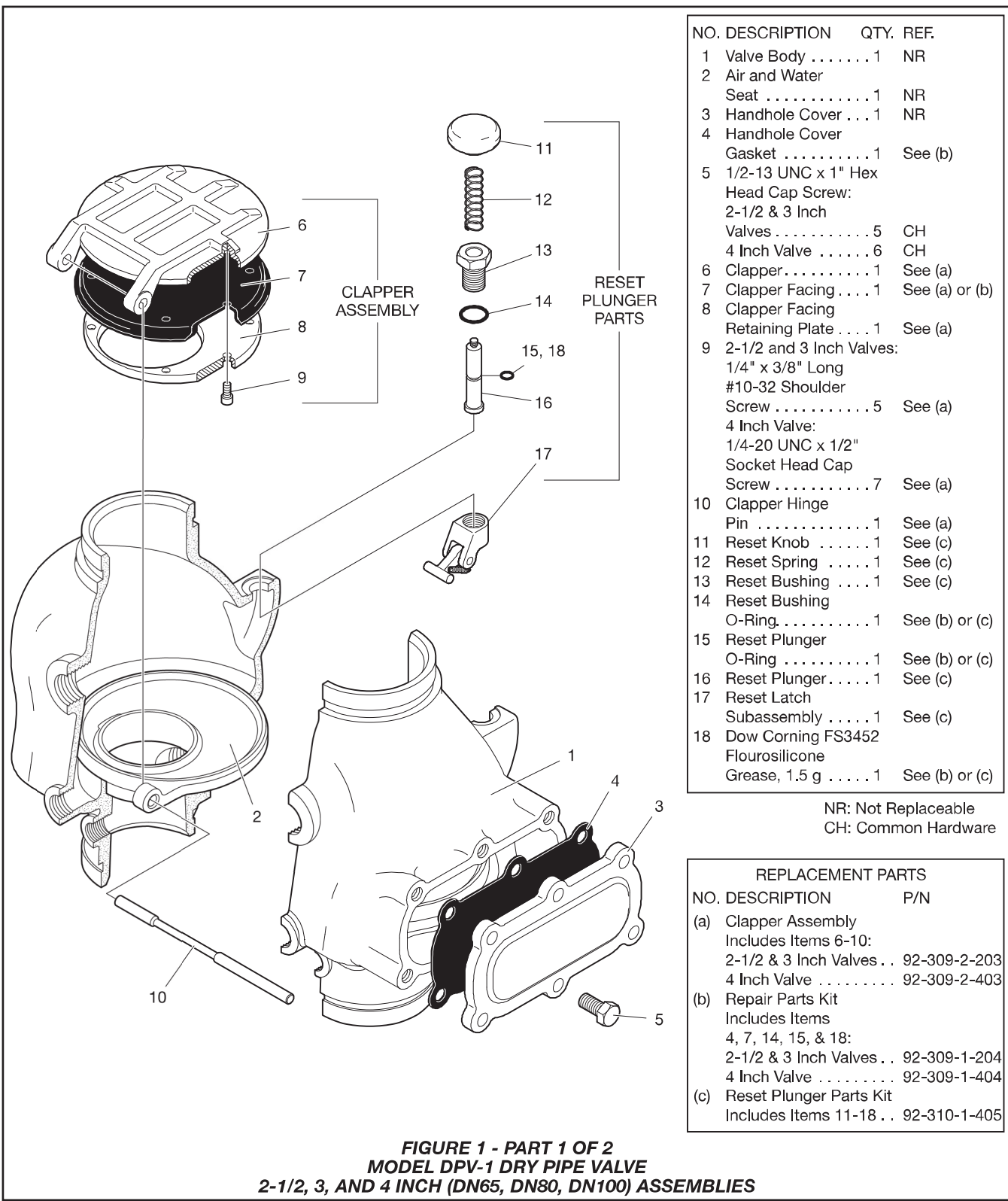
End Connection	Nominal Valve Size			
	2-1/2 Inch (DN65)	3 Inch (DN80)	4 Inch (DN100)	6 Inch (DN150)
Flange x Flange	N/A	N/A	•	•
Flange x Groove	N/A	N/A	•	•
Groove x Groove	•	•	•	•

• = Available
N/A = Not Available

NOTICE

The Model DPV-1 Dry Pipe Valves described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.



Technical Data

Approvals

UL and C-UL Listed. FM Approved. NYC under MEA 172-02-E (4 and 6 inch).

Dry Pipe Valve

The TYCO Model DPV-1 Dry Pipe Valves are for vertical installations (flow going up), and they are rated for use at a maximum service pressure of 250 psi (17,2 bar). The Valve dimensions are shown in Figure 7.

Flanged connections are available and drilled per ANSI, ISO, AS, and JIS specifications (Ref. Table A). The grooved outlet connections, as applicable, are cut in accordance with standard groove specifications for steel pipe. They are suitable for use with grooved end pipe couplings that are listed or approved for fire protection system service. Available combinations of inlet and outlet connections are detailed in the Ordering Procedure section. They are also noted in the "Available End Connection and Sizes" table located on Page 1.

Threaded port connections of valves having flanges drilled to ANSI, AS, or JIS specifications are NPT threaded per ANSI Standard B1.20.1. Threaded port connections of valves having flanges drilled to ISO are available either threaded per ISO 7-1 or NPT threaded per ANSI Standard B1.20.1. Valves with NPT threaded ports will readily accept the trim arrangements detailed in Parts 2 and 3 of Figures 4, 5, and 6.

Components of the DPV-1 Valves are shown in Figure 1. The Body and Handhole Cover are ductile iron. The Handhole Cover Gasket is neoprene, and the Clapper Facing is EPDM. The Air/Water Seat Ring is brass, the Clapper is bronze or aluminum bronze,

and both the Clapper Retaining Plate and Latch are bronze. The Hinge Pin is aluminum bronze, and the fasteners for the Handhole Cover are carbon steel.

Valve Trim

Installation dimensions are given in Figure 7, and the Valve Trim and Pre-Trimmed Valve Assemblies are illustrated in Figures 4, 5, and 6. The Valve Trim and Pre-Trimmed Valve forms a part of the laboratory listings and approval of the DPV-1 Valve and is necessary for the proper operation of the DPV-1 Valve. Each package of trim and pre-trimmed includes the following items:

- Water Supply Pressure Gauge
- System Air Pressure Gauge
- Air Supply Connections
- Main Drain Valve
- Low Body Drain Valve
- Alarm Test Valve
- Automatic Drain Valve
- Drip Funnel
- Connections For Optional Quick Opening Device (Accelerator)

Also included in the Pre-Trimmed Valve Assembly, which can be ordered separately for the Valve Trim, includes the following items:

- Model BFV-N butterfly valve
- Figure 577 grooved coupling
- PS10-2 waterflow alarm switch
- PS40-2 low air pressure alarm switch

Note: When the system pressure is greater than 175 psi (12,1 bar), provision is to be made to replace the standard order 300 psi (20,7 bar) Water Pressure gauge with a separately ordered 600 psi (41,4 bar) Water Pressure Gauge.

Air Supply

Table B shows the system air pressure requirements as a function of the water supply pressure. The air (or nitrogen) pressure in the sprinkler system is recommended to be automatically maintained by using one of the following pressure maintenance devices, as appropriate:

- Model AMD-1 Air Maintenance Device (pressure reducing type).
- Model AMD-2 Air Maintenance Device (compressor control type).
- Model AMD-3 Nitrogen Maintenance Device (high pressure reducing type).

The Pressure Relief Valve provided with the valve trim is factory set to relieve at a pressure of approximately 45 psi (3,1 bar). If the normal system air pressure is less than or exceeds 40 psi (2,8 bar), then the pressure Relief Valve must be reset to relieve at a pressure that is in accordance with the authority having jurisdiction.

Quick Opening Device

As an option, the Model DPV-1 Dry Pipe Valve may be equipped with the VIZOR Electronic Dry Pipe Valve Accelerator (4 and 6 inch sizes) as detailed in Technical Data Sheet TFP1105 or the Model ACC-1 Mechanical Dry Pipe Valve Accelerator (2-1/2, 3, 4, and 6 inch sizes) as detailed in Technical Data Sheet TFP1112.

The VIZOR or the ACC-1 is used to reduce the time to valve actuation following the operation of one or more automatic sprinklers. In some cases the use of a quick opening device such as the VIZOR or the ACC-1 may be required to meet the requirements of the National Fire Protection Association to meet water delivery times.

Nominal Valve Size	Flange Drilling Specification											
	Nominal Dimensions in Inches and (mm)											
	ANSI B16.1 ¹ (Class 125)			ISO 7005-2 (PN16) ²			JIS B 2210 (10K)			AS 2129 (Table E)		
	Dim. A	Dim. B	Qty. N	Dim. A	Dim. B	Qty. N	Dim. A	Dim. B	Qty. N	Dim. A	Dim. B	Qty. N
4 Inch (DN100)	7.50 (190,5)	0.75 (19,0)	8	7.09 (180,0)	0.75 (19,0)	8	6.89 (175,0)	0.59 (15,0)	8	7.00 (178,0)	0.71 (18,0)	8
6 Inch (DN150)	9.50 (241,3)	0.88 (22,2)	8	9.45 (240,0)	0.91 (23,0)	8	9.45 (240,0)	0.75 (19,0)	8	9.25 (235,0)	0.87 (22,0)	8

1. Drilling same as ANSI B16.5 (Class 150) and ANSI B16.42 (Class 150).

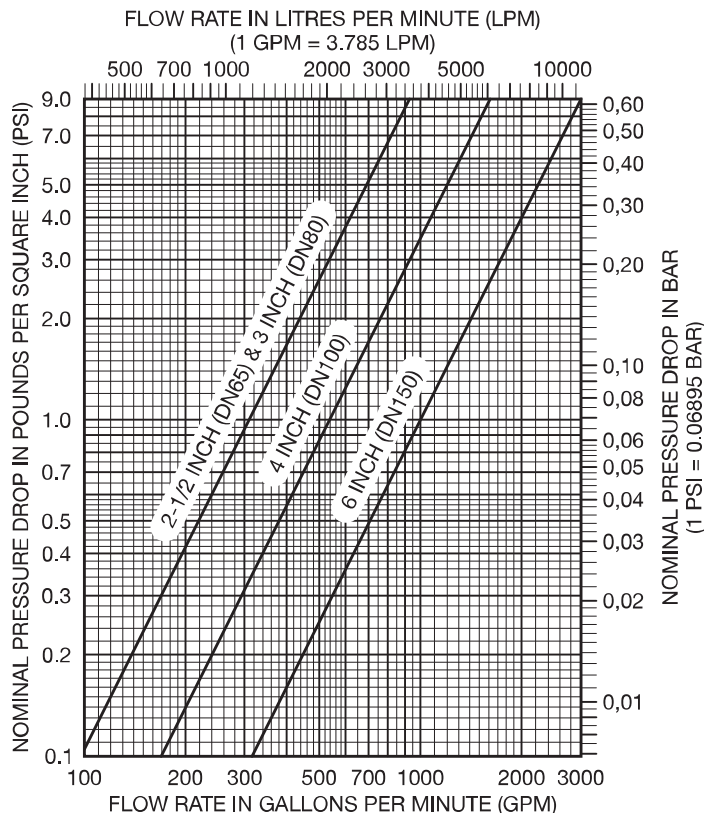
2. Drilling same as BS 4504 Section 3.2 (PN16) and DIN 2532 (PN16).

TABLE A
DIMENSIONAL SPECIFICATIONS
FOR SELECTION OF FLANGE DRILLING

Dim. A Bolt Circle Diameter

Dim. B Bolt Hole Diameter

Qty. N Number of Bolt Holes



The approximate friction losses, based on the Hazen and Williams formula and expressed in equivalent length of Schedule 40 pipe with C=100 are as follows:

- 2.2 feet for the 2-1/2 inch valve at a typical flow rate of 250 GPM
- 4.9 feet for the 3 inch valve at a typical flow rate of 350 GPM
- 8.9 feet for the 4 inch valve at a typical flow rate of 600 GPM
- 22 feet for the 6 inch valve at a typical flow rate of 1500 GPM

FIGURE 2
MODEL DPV-1 DRY PIPE VALVES
NOMINAL PRESSURE LOSS VS. FLOW

Operation

The TYCO Model DPV-1 Dry Pipe Valve is a differential type valve that utilizes a substantially lower system (air or nitrogen) pressure than the supply (water) pressure, to maintain the set position shown in Figure 3A. The differential nature of the DPV-1 is based on the area difference between the air seat and the water seat in combination with the ratio of the radial difference from the Hinge Pin to the center of the Water Seat and the Hinge Pin to the center of the Air Seat. The difference is such that 1 psi (0,07 bar) of system air pressure can hold approximately 5.5 psi (0,38 bar) of water supply pressure.

Table B establishes the minimum required system air pressure that includes a safety factor to help prevent false operations that occur due to water supply fluctuations.

The Intermediate Chamber of the DPV-1 is formed by the area between the Air Seat and Water Seat as shown in

Figure 3B. The Intermediate Chamber normally remains at atmospheric pressure through the Alarm Port connection and the valve trim to the normally open Automatic Drain Valve (Fig. 4, 5, or 6). Having the Intermediate Chamber, Figure 3B, open to atmosphere is critical to the DPV-1 Valve remaining set, otherwise the full resulting pressure of the system air pressure on top of the Clapper Assembly cannot be realized.

For example, and assuming a water supply pressure of 100 psi (6,9 bar), if the system air pressure is 25 psi (1,7 bar) and there was 15 psi (1,0 bar) pressure trapped in the Intermediate Chamber, the resulting pressure across the top of the Clapper would only be 10 psi (0,7 bar). This pressure would be insufficient to hold the Clapper Assembly closed against a water supply pressure of 100 psi (6,9 bar). It is for this reason that the plunger of the Automatic Drain Valve must be depressed during several of

Maximum Water Supply Pressure psi	System Air Pressure Range psi
20	10
60	15 - 23
80	20 - 28
100	25 - 33
120	30 - 38
145	35 - 43
165	40 - 48
185	45 - 53
205	50 - 58
225	55 - 63
250	60 - 68

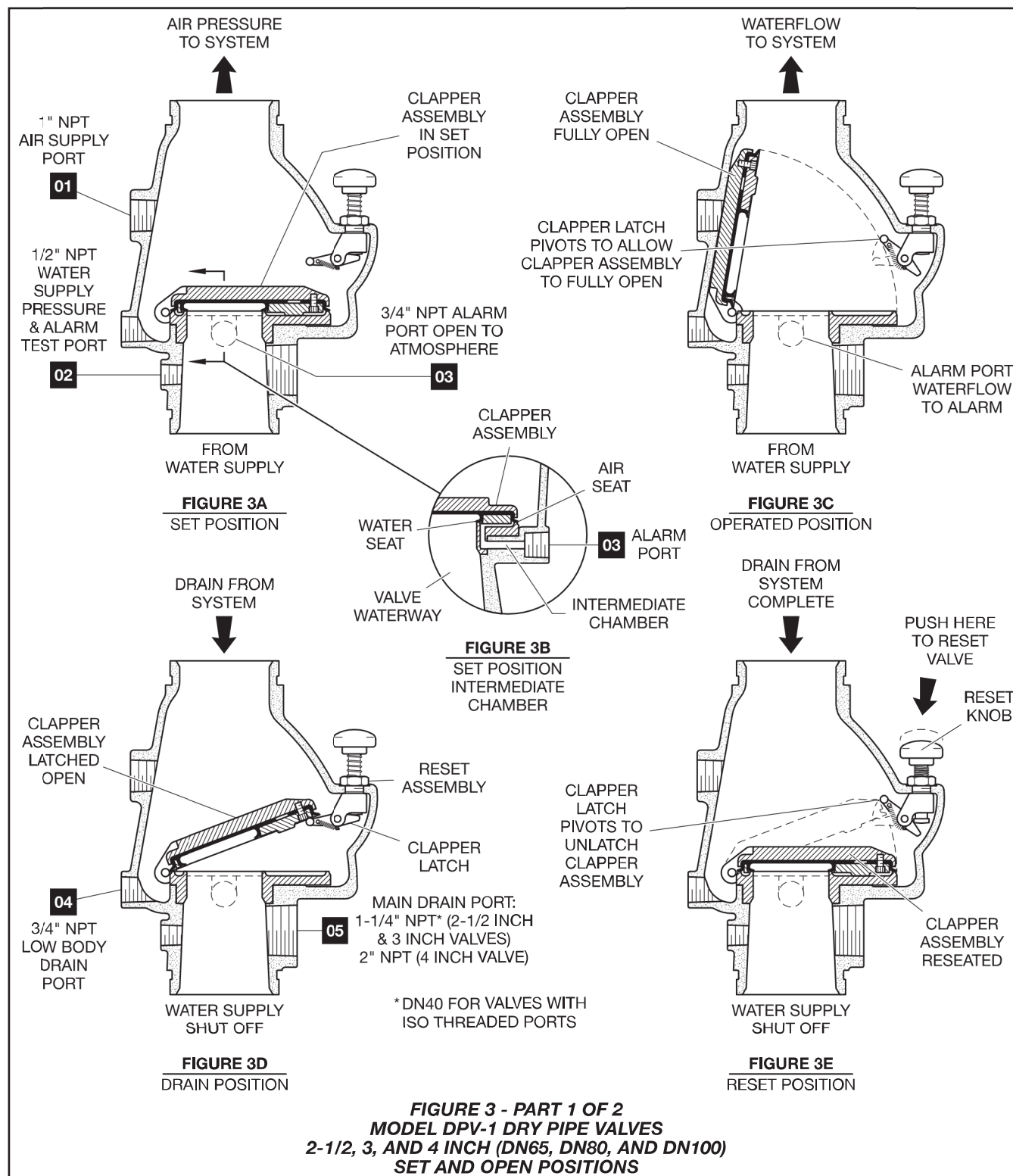
TABLE B
SYSTEM AIR PRESSURE REQUIREMENTS

the resetting steps, as well as during inspections, making certain that the Automatic Drain Valve is open.

When one or more automatic sprinklers operate in response to a fire, air pressure within the system piping is relieved through the open sprinklers. When the air pressure is sufficiently reduced, the water pressure overcomes the differential holding the Clapper Assembly closed and the Clapper Assembly swings clear of the water seat, as shown in Figure 3C. This action permits water flow into the system piping and subsequently to be discharged from any open sprinklers. Also, with the Clapper Assembly open, the intermediate chamber is pressurized and water flows through the alarm port (Ref. Figure 3B) at the rear of the DPV-1 Valve to actuate system water flow alarms. The flow from the alarm port is also sufficient to close the otherwise normally open Automatic Drain Valve in the valve trim.

After a valve actuation and upon subsequent closing of a system main control valve to stop water flow, the Clapper Assembly will latch open as shown in Figure 3D. Latching open of the DPV-1 will permit complete draining of the system (including any loose scale) through the main drain port.

During the valve resetting procedure and after the system is completely drained, the external reset knob can be easily depressed to externally unlatch the Clapper Assembly, as shown in Figure 3E. As such, the Clapper Assembly is returned to its normal set position to facilitate setting of the dry pipe sprinkler system, without having to remove the Handhole Cover.



NOTES:

1. SEE FIGURE 4 PART 3 FOR TRIM ARRANGEMENT WITH BILL OF MATERIALS AND COMPONENT PART NUMBERS.
2. TRIM SHOWN FULLY ASSEMBLED; COMPONENTS SUCH AS GAUGES AND SWITCHES MAY REQUIRE ASSEMBLY IN TRIM AT INSTALLATION.

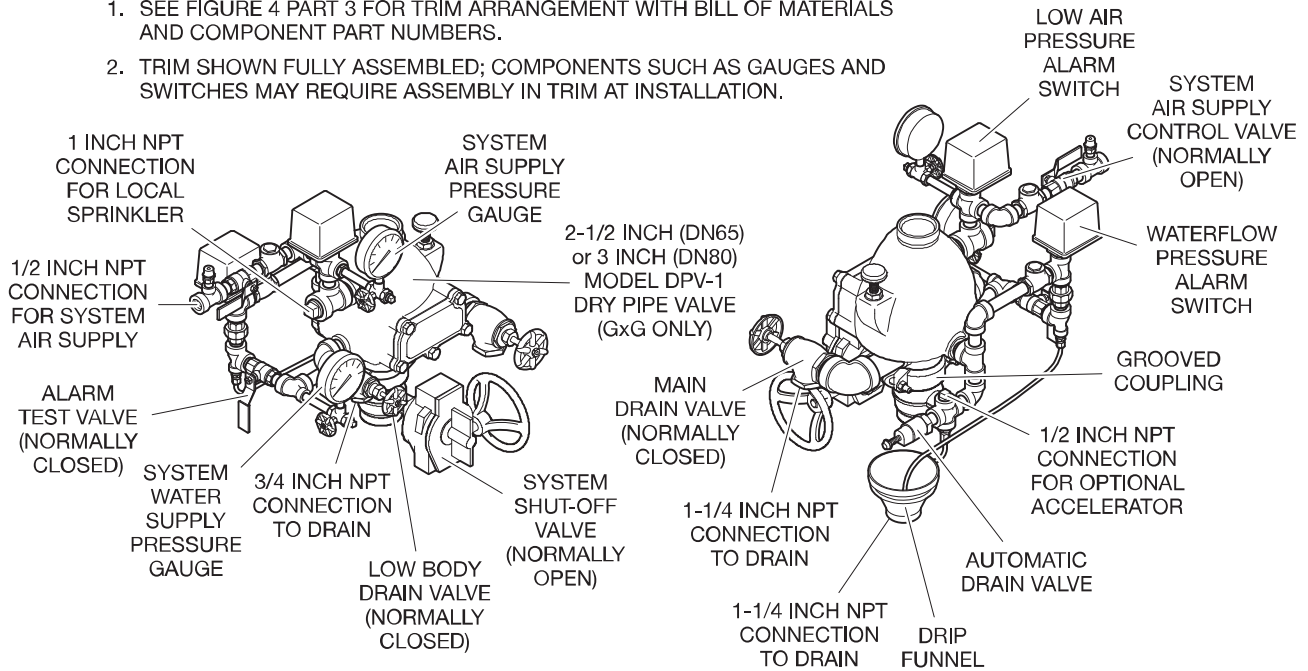
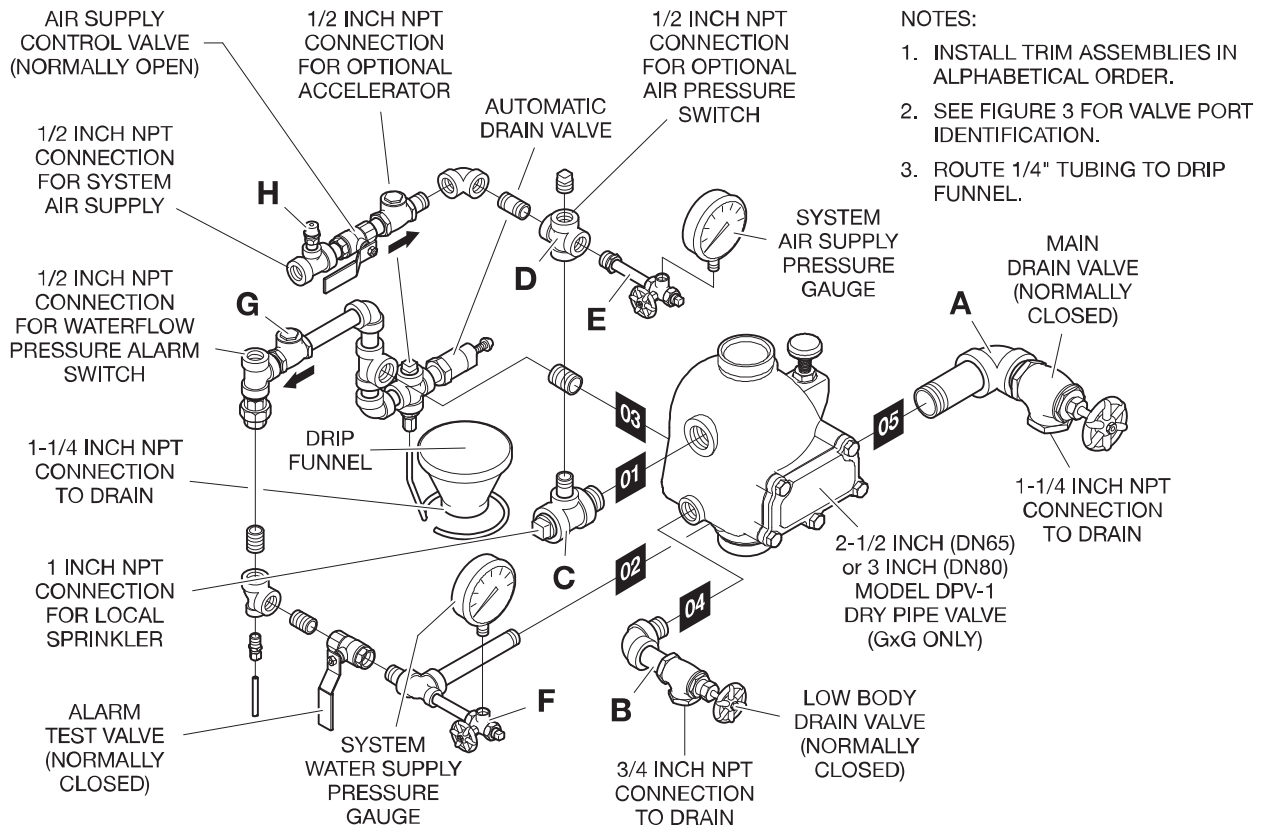


FIGURE 4 - PART 1 OF 3
2-1/2 AND 3 INCH (DN65 AND DN80) MODEL DPV-1 DRY PIPE VALVE
PRE-TRIMMED ASSEMBLY



NOTES:

1. INSTALL TRIM ASSEMBLIES IN ALPHABETICAL ORDER.
2. SEE FIGURE 3 FOR VALVE PORT IDENTIFICATION.
3. ROUTE 1/4" TUBING TO DRIP FUNNEL.

FIGURE 4 - PART 2 OF 3
2-1/2 AND 3 INCH (DN65 AND DN80) MODEL DPV-1 DRY PIPE VALVE
EXPLODED ARRANGEMENT OF SEMI-ASSEMBLED TRIM

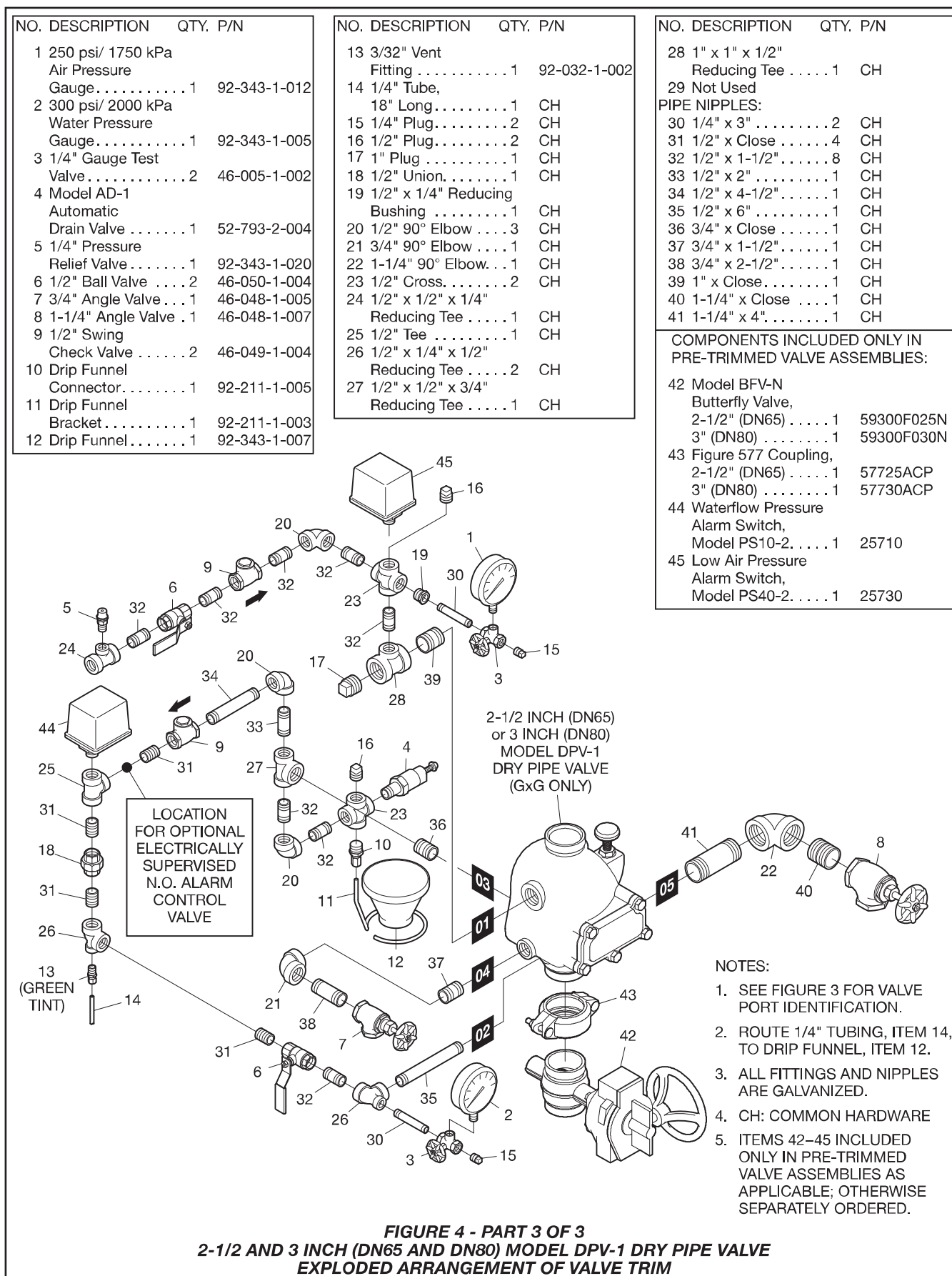


FIGURE 4 - PART 3 OF 3
2-1/2 AND 3 INCH (DN65 AND DN80) MODEL DPV-1 DRY PIPE VALVE
EXPLODED ARRANGEMENT OF VALVE TRIM

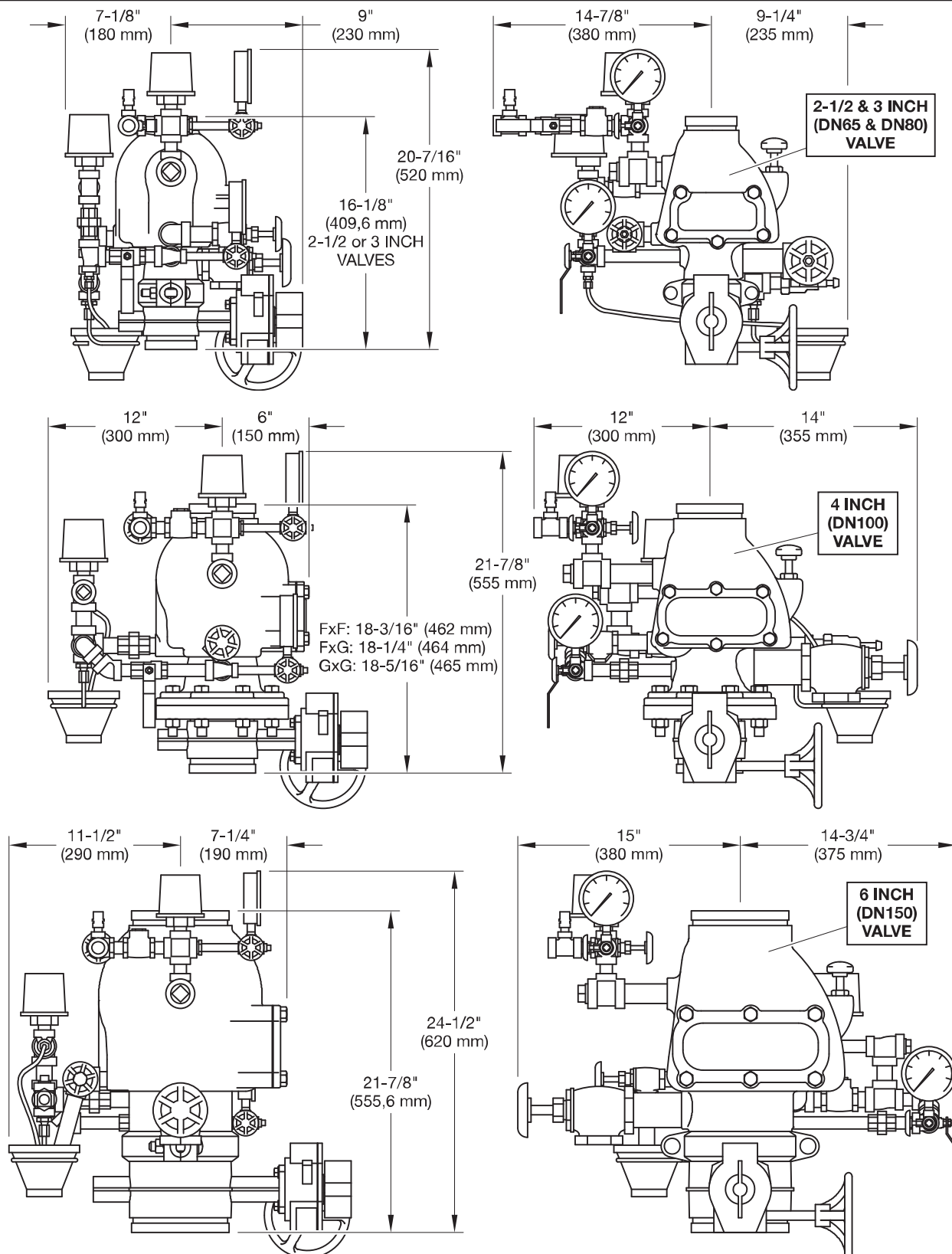


FIGURE 7 - PART 1 OF 2
MODEL DPV-1 DRY PIPE VALVE
INSTALLATION DIMENSIONS, PRE-TRIMMED VALVE

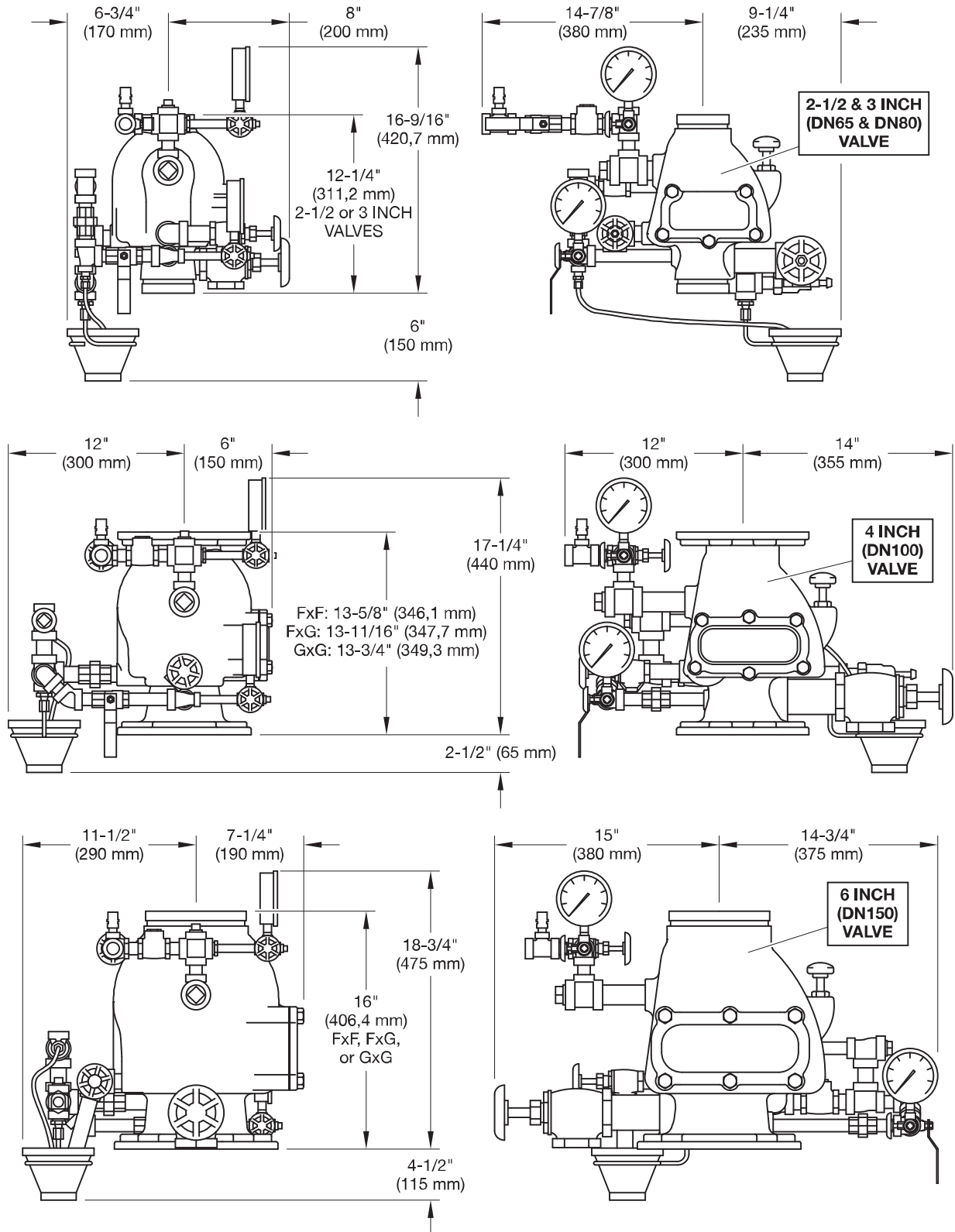


FIGURE 7 - PART 2 OF 2
MODEL DPV-1 DRY PIPE VALVE
INSTALLATION DIMENSIONS, VALVE AND SEMI-ASSEMBLED TRIM

Installation

General Instructions

Proper operation of the Model DPV-1 Dry Pipe Valve depends upon its trim being installed in accordance with the instructions given in this Technical Data Sheet. Failure to follow the appropriate trim diagram may prevent the DPV-1 Valve from functioning properly, as well as void listings, approvals, and the manufacturer's warranties.

Failure to latch open the Clapper Assembly prior to a system hydrostatic test may result in damage to the Clapper Assembly.

The DPV-1 Valve must be installed in a readily visible and accessible location.

The DPV-1 Valve and associated trim must be maintained at a minimum temperature of 40°F (4°C).

Heat tracing of the DPV-1 Valve or its associated trim is not permitted. Heat tracing can result in the formation of hardened mineral deposits that are capable of preventing proper operation.

The Model DPV-1 Dry Pipe Valve is to be installed in accordance with the following criteria:

- All nipples, fittings, and devices must be clean and free of scale and burrs before installation. Use pipe thread sealant sparingly on male pipe threads only.
- The DPV-1 Valve must be trimmed in accordance with Figures 4, 5, or 6, as applicable. If the DPV-1 is to be equipped with a Dry Pipe Valve Accelerator, refer to the Technical Data Sheet TFP1105 for the VIZOR Electronic Dry Pipe Valve Accelerator or TFP1112 for the Model ACC-1 Mechanical Dry Pipe Valve Accelerator.
- Care must be taken to make sure that check valves, strainers, globe valves, etc. are installed with the flow arrows in the proper direction.
- Drain tubing to the drip funnel must be installed with smooth bends that will not restrict flow.
- The main drain and drip funnel drain may be interconnected provided a check valve is located at least 12 inches (300 mm) below the drip funnel. The Low Body Drain Valve (Figure 4, 5, or 6) may be piped so as to discharge into the Drip Funnel or to a separate drain.
- Suitable provision must be made for disposal of drain water. Drainage water must be directed such that it will not cause accidental damage to property or danger to persons.

- Unused pressure alarm switch and/or water motor alarm connections must be plugged.
- The Pressure Relief Valve provided with the Valve Trim is factory set to relieve at a pressure of approximately 45 psi (3,1 bar), which can typically be used for a maximum normal system air pressure of 40 psi (2,8 bar). The Pressure Relief Valve may be reset to a lower or higher pressure; however, it must be reset to relieve at a pressure which is in accordance with the requirements of the authority having jurisdiction.

To reset the Pressure Relief Valve, first loosen the jam nut and then adjust the cap accordingly — clockwise for a higher pressure setting or counter-clockwise for a lower pressure setting. After verifying the desired pressure setting, tighten the jam nut.

- Installation of an Air Maintenance Device, as described in the Technical Data Section, is recommended.
- An Inspector's Test Connection as required By NFPA 13 must be provided on the system piping at the most remote location from the Model DPV-1 Valve.
- Conduit and electrical connections are to be made in accordance with the requirements of the authority having jurisdiction and/or the National Electric Code.
- Before a system hydrostatic test is performed in accordance with NFPA 13 system acceptance test requirements, the Clapper Assembly is to be manually latched open (Ref. Figure 3D); the Automatic Drain Valve (Figure 4, 5, or 6) is to be temporarily replaced with a 1/2 inch NPT plug, the 3/32 inch Vent Fitting (Item 13, Figure 4; Item 15, Figure 5; or Item 15, Figure 6) is to be temporarily replaced with a 1/4 inch NPT plug, and the Handhole Cover Bolts are to be tightened using a cross-draw sequence.

Valve Setting Procedure

Steps 1 through 11 are to be performed when initially setting the Model DPV-1 Dry Pipe Valve; after an operational test of the fire protection system; or, after system operation due to a fire.

NOTES: *If the DPV-1 is equipped with a Dry Pipe Valve Accelerator, refer to its resetting instructions before resetting the DPV-1. Refer to TFP1105 for the VIZOR or TFP1112 for the ACC-1.*

Based on the instructions provided, reset the Accelerator at the appropriate time during the resetting of the DPV-1.

Unless otherwise noted, refer to Figure 4, 5, or 6 to identify functional trim components.

Step 1. Close the Main Control Valve, and close the Air Supply Control Valve. If the DPV-1 is equipped with a Dry Pipe Valve Accelerator, remove the Dry Pipe Valve Accelerator from service in accordance with its Technical Data Sheet (Refer to TFP1105 for the VIZOR or TFP1112 for the ACC-1).

Step 2. Open the Main Drain Valve and all auxiliary drains in the system. Close the auxiliary drain valves after water ceases to discharge. Leave the Main Drain Valve open.

Step 3. Depress the plunger of the Automatic Drain Valve to verify that it is open and that the DPV-1 Valve is completely drained.

Step 4. Open the Optional Alarm Control Valve, as applicable, if it was closed to silence local alarms.

Step 5. As necessary, replace all sprinklers that have operated. Replacement sprinklers must be of the same type and temperature rating as those which have operated.

NOTICE

In order to prevent the possibility of a subsequent operation of an over-heated solder type sprinkler, any solder type sprinklers which were possibly exposed to a temperature greater than their maximum rated ambient must be replaced.

Step 6. Push down on the Reset Knob (Figure 3E) to allow the Clapper Assembly to re-seat.

Step 7. Pressurize the system with air (or nitrogen) to 10 psi (0,7 bar), and then individually open all auxiliary drain valves in the system piping to drain any remaining water in trapped sections. Close each drain valve as soon as water ceases to discharge.

Also partially open the Low Body Drain Valve to assure that the riser is completely drained. Close the Low Body Drain Valve as soon as water ceases to discharge.

Step 8. Refer to Table B and then restore the system to the normal system air pressure as necessary to hold the DPV-1 Valve closed.

Step 9. Depress the plunger on the Automatic Drain Valve to make sure it is open and that there is no air discharging.

The absence of air discharging from the Automatic Drain Valve is an indication

of a properly set air seat within the DPV-1 Valve. If air is discharging, refer to the Care and Maintenance section under Automatic Drain Valve Inspection to determine/correct the cause of the leakage problem.

Step 10. Partially open the Main Control Valve. Slowly close the Main Drain Valve as soon as water discharges from the drain connection.

Depress the plunger on the Automatic Drain Valve to make sure that it is open and that there is no water discharging. The absence of water discharging from the Automatic Drain Valve is an indication of a properly set water seat within the DPV-1 Valve. If water is discharging, refer to the Care and Maintenance section under the Automatic Drain Valve Inspection to determine/correct the cause of the leakage problem.

If there are no leaks, the DPV-1 Valve is ready to be placed in service and the Main Control Valve must then be fully opened.

Note: After setting a fire protection system, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

Step 11. Once a week after a valve is reset following an operational test or system operation, the Low Body Drain Valve (and any low point drain valves) should be partially opened (and then subsequently closed) to relieve drain-back water. Continue this procedure until drain-back water is no longer present.

Care and Maintenance

The following procedures and inspections should be performed as indicated, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and notify all personnel who may be affected by action.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any authority having jurisdiction. Contact

the installing contractor or sprinkler manufacturer regarding any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

The operational test procedure and waterflow pressure alarm test procedure will result in operation of the associated alarms. Consequently, notification must first be given to the owner and the fire department, central station, or other signal station to which the alarms are connected.

Annual Operation Test Procedure

Note: Unless otherwise noted, refer to Figure 4, 5, or 6 to identify functional trim components.

Proper operation of the DPV-1 Valve (i.e., opening of the DPV-1 Valve during a fire condition) should be verified at least once a year as follows:

Step 1. If water must be prevented from flowing beyond the riser, perform the following steps.

- Close the Main Control Valve.
- Open the Main Drain Valve.
- Open the Main Control Valve one turn beyond the position at which water just begins to flow from the Main Drain Valve.
- Close the Main Drain Valve.

Step 2. Open the system's Inspector's Test Connection.

Step 3. Verify that the DPV-1 Valve has operated, as indicated by the flow of water into the system and that all waterflow alarms operate properly.

Step 4. Close the system's Main Control Valve.

Step 5. Reset the DPV-1 Valve in accordance with the Valve Setting Procedure.

Note: It is recommended that the requirement of NFPA 25 to annually inspect the inside of the valve be performed at this time and prior to resetting the DPV-1 Valve. Refer to the Automatic Drain Valve Inspection subsection Steps 2 through 5 for instructions with regard to the inspection of the Clapper Facing.

Quarterly Waterflow Alarm Test Procedure

Testing of the system waterflow alarms should be performed quarterly. To test the waterflow alarm, open the Alarm Test Valve, which will allow a flow of water to the Waterflow Pressure Alarm Switch and/or Water Motor Alarm. Upon satisfactory completion of the test, close the Alarm Test Valve.

Water Pressure Inspection

The Water Pressure Gauge is to be inspected monthly (per NFPA 25) to ensure that normal system water pressure is being maintained.

Air Pressure Inspection

The Air Pressure Gauge is to be inspected monthly (per NFPA 25) to ensure that normal system air pressure is being maintained.

Automatic Drain Valve Inspection

The Automatic Drain Valve should be inspected monthly (per NFPA 25) by depressing the plunger and checking to ensure that the Automatic Drain Valve is not discharging water and/or air. A discharge of water and/or air is an indication that the air and/or water seats are leaking, which could subsequently cause a false operation should the intermediate chamber become inadvertently pressurized.

If leakage is present, take the DPV-1 Valve out of service (i.e., close the main control valve, open the main drain valve, close the air supply control valve, remove the Dry Pipe Valve Accelerator from service, as applicable, in accordance with its Technical Data Sheet (Refer to TFP1105 for the VIZOR or TFP1112 for the ACC-1), and open the Inspector's Test Connection to relieve the system air pressure to 0 psig as indicated on the System Air Pressure Gauge), and then after removing the Handhole Cover, perform the following steps:

Step 1. Make sure that the Seat Ring is clean and free of any nicks or significant scratches.

Step 2. Remove the Clapper Assembly from the valve by first pulling out the Hinge Pin.

Step 3. Disassemble the Clapper Facing Retainer from the Clapper so that the Clapper Facing can be removed and inspected. Make sure that the Clapper Facing does not show signs of compression set, damage, etc. Replace the Clapper Facing if there is any signs of wear.

Step 4. Clean the Clapper Facing, Clapper, and Clapper Facing Retainer, and then reassemble the Clapper Assembly.

Step 5. Reinstall the Clapper Assembly with its Hinge Pin and then reinstall the Handhole Cover.

Limited Warranty

For warranty terms and conditions, visit
www.tyco-fire.com.

Ordering Procedure

Refer to Table A for Flange Drilling
Specifications.

Standard DPV-1 Dry Pipe Valve (American Standard Flange Drill- ing, Threaded Ports, and Groove Outside Diameter, as applicable)

Specify: (specify size) Model DPV-1 Dry
Pipe Valve with (specify Inlet x Outlet)
end connections, P/N (specify).

2-1/2 Inch (DN65)

GxG,
2.88 inch (73,1 mm) O.D.
Groove x 2.88 inch (73,1 mm)
O.D. Groove P/N 52-310-1-925

3 Inch (DN80)

GxG,
3.50 inch (88,9 mm) O.D.
Groove x 3.50 inch (88,9 mm)
O.D. Groove P/N 52-310-1-930

4 Inch (DN100)

GxG,
4.50 inch (114,3 mm) O.D.
Groove x 4.50 inch (114,3 mm)
O.D. Groove P/N 52-310-1-940

FxG,
ANSI Drilled Flange
x 4.50 inch (114,3 mm)
O.D. Groove P/N 52-310-1-440

FxF,
ANSI Drilled Flange x ANSI
Drilled Flanged P/N 52-310-1-040

6 Inch (DN150)

GxG,
6.62 inch (168,3 mm) O.D.
Groove x 6.62 inch (168,3 mm)
O.D. Groove P/N 52-310-1-960

FxG,
ANSI Drilled Flange
x 6.62 inch (168,3 mm)
O.D. Groove P/N 52-310-1-460

FxF,
ANSI Drilled Flange x ANSI
Drilled Flanged P/N 52-310-1-060

Pre-Trimmed DPV-1 Assemblies with Butterfly Valve

Specify: 2-1/2 Inch DPV-1 Pre-Trimmed
Valve Assembly, P/N 52-310-3-925

Specify: 3 Inch DPV-1 Pre-Trimmed
Valve Assembly, P/N 52-310-3-930

Specify: 4 Inch DPV-1 Pre-Trimmed
Valve Assembly, P/N (specify)

FxF P/N 52-310-3-040

FxG P/N 52-310-3-440

GxG P/N 52-310-3-940

Specify: 6 Inch DPV-1 Pre-Trimmed
Valve Assembly, P/N (specify)

FxF P/N 52-310-3-060

FxG P/N 52-310-3-460

GxG P/N 52-310-3-960

Pre-Trimmed DPV-1 Assemblies without Butterfly Valve

Specify: 4 Inch DVP-1 Pre-Trimmed
Valve Assembly without Butterfly, P/N
(specify)

FxF P/N 52-310-4-040

FxG P/N 52-310-4-440

Specify: 6 Inch DVP-1 Pre-Trimmed
Valve Assembly without Butterfly, P/N
(specify)

FxF P/N 52-310-4-060

FxG P/N 52-310-4-460

Standard Galvanized Semi-Assembled DPV-1 Trim

Specify: 2-1/2 and 3 Inch DPV-1 Semi-
Assembled Galvanized Trim, P/N
52-309-2-005.

Specify: 4 Inch DPV-1 Semi-Assembled
Galvanized Trim, P/N 52-309-2-001

Specify: 6 Inch DPV-1 Semi-Assembled
Galvanized Trim, P/N 52-309-2-002

Optional Accelerator VIZOR Electronic Dry Pipe Accelerator (with Trim) (Details provided in TFP1105)

Specify: VIZOR Electronic Dry Pipe
Accelerator for use with the 4 or 6
inch TYCO Model DPV-1 Dry Pipe
Valve trim, P/N 52-312-3-001

Model ACC-1 Mechanical Accelerator (Details provided in TFP1112)

Specify: Model ACC-1 Dry Pipe
Accelerator, P/N 52-311-1-001, and

Galvanized Accelerator Trim for
Model DPV-1 Dry Pipe Valve,
P/N 52-311-2-010

Optional 600 PSI Water Pressure Gauge

Specify: 600 PSI Water Pressure
Gauge, P/N 92-343-1-004

Accessories

Order the Technical Data Sheets for the
following, as applicable, for details and
additional accessories:

Model PS10-2
Potter Electric Waterflow
Pressure Alarm Switch
. P/N 25710

Model PS40-2
Potter Electric Low Air Pressure Alarm
Switch P/N 25730

Model WMA-1
Water Motor Alarm
. P/N 52-630-1-001

Model AMD-1
Air Maintenance Device
. P/N 52-324-2-002

Model AMD-2
Air Maintenance Device
. P/N 52-326-2-001

Model AMD-3
Nitrogen Maintenance Device
. P/N 52-328-2-001

Replacement Valve Parts

Specify: (description) for use with
(specify size) Model DPV-1 Dry Pipe
Valve, P/N (see Figure 1 Parts 1 and 2
as applicable).

Replacement Trim Parts

Specify: (description) for use with
(specify size) Model DPV-1 Dry Pipe
Valve, P/N (Figures 4, 5, or 6, Part 3 as
applicable).

Weights

The following are the nominal weights
for the valves and trim:

Pre-Trimmed DPV-1 Valve Assemblies:

2-1/2 Inch (DN65)
GxG Dry Pipe Valve. 87lbs.(40kg)

3 Inch (DN80)
GxG Dry Pipe Valve 90lbs.(42kg)

4 Inch (DN100)
GxG Dry Pipe Valve 121lbs.(56kg)

4 Inch (DN100)
FxG Dry Pipe Valve. 135lbs.(64kg)

4 Inch (DN100)
FxF Dry Pipe Valve 145lbs.(69kg)

6 Inch (DN150)
GxG Dry Pipe Valve 175lbs.(81kg)

6 Inch (DN150)
FxG Dry Pipe Valve. 195lbs. (90kg)

6 Inch (DN150)
FxF Dry Pipe Valve 208lbs. (96kg)

Standard Galvanized Semi-Assembled DPV-1 Trim:

2-1/2 Inch (DN65)
Valve Trim 23lbs. (11kg)

3 Inch (DN80)
Valve Trim 23lbs. (11kg)

4 Inch (DN100)
Valve Trim 30lbs. (14kg)

6 Inch (DN150)
Valve Trim 30lbs. (14kg)

DPV-1 Valve:

2-1/2 Inch (DN65)	
GxG Dry Pipe Valve	37lbs. (17kg)
3 Inch (DN80)	
GxG Dry Pipe Valve	38lbs. (18kg)
4 Inch (DN100)	
GxG Dry Pipe Valve	57lbs. (26kg)
4 Inch (DN100)	
FxG Dry Pipe Valve.	67lbs. (31kg)
4 Inch (DN100)	
FxF Dry Pipe Valve	77lbs. (36kg)
6 Inch (DN150)	
GxG Dry Pipe Valve	95lbs. (44kg)
6 Inch (DN150)	
FxG Dry Pipe Valve.	108 lbs. (50kg)
6 Inch(DN150)	
FxF Dry Pipe Valve	121lbs. (56kg)

Other DPV-1 Dry Pipe Valves

Notes: Other DPV-1 Dry Pipe Valves are valves ordered with a any combination of flange, threaded ports, or groove outside diameter not offered under "Standard DPV-1 Dry Pipe Valve" offerings.

Valves with NPT threaded ports are intended for use with the "Standard Galvanized Semi-Assembled DPV-1 Valve Trim" offered and detailed in this document. Valves with ISO threaded ports are intended for use with special order trim that is provided by local distributors to meet the specific needs of certain localities. Please contact your local distributor regarding valves and valve trim for specific localities.

Specify: (specify size) Model DPV-1 Dry Pipe Valve with (specify inlet x outlet) connections with (specify NPT or ISO) threaded ports, P/N (specify).

Part Numbers For Other 2-1/2 Inch (DN65) Dry Pipe Valves

Valves with NPT Ports

GxG,	
3.00"(76,1 mm) Outside Dia.	
Groove x 3.00" (76,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-930

Valves with ISO Ports

GxG,	
2.88"(73,0 mm) Outside Dia.	
Groove x 2.88" (73,0 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-920

GxG,	
3.00"(76,1 mm) Outside Dia.	
Groove x 3.00" (76,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-940

Part Numbers For Other 3 Inch (DN80) Dry Pipe Valves

Valves with ISO Ports

GxG,	
3.50"(88,9 mm) Outside Dia.	
Groove x 3.50" (88,9 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-922

Part Numbers For Other 4 Inch (DN100) Dry Pipe Valves

Valves with NPT Ports

FxG,	
ISO Flange x 4.50" (114,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-253

FxG,	
AS Flange x 4.50" (114,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-613

FxG,	
JIS Flange x 4.50" (114,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-813

FxF,	
ISO Flange x ISO Flange	
.....	P/N 52-309-1-133

FxF,	
AS Flange x AS Flange	
.....	P/N 52-309-1-513

FxF,	
JIS Flange x JIS Flange	
.....	P/N 52-309-1-713

Valves with ISO Ports

GxG,	
4.50"(114,3 mm) Outside Dia.	
Groove x 4.50" (114,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-923

FxG,	
ISO Flange x 4.50" (114,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-213

FxF,	
ISO Flange x ISO Flange	
.....	P/N 52-309-1-113

Part Numbers For Other 6 Inch (DN150) Dry Pipe Valves

Valves with NPT Ports

GxG,	
6.50"(165,1 mm) Outside Dia.	
Groove x 6.50" (165,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-935

FxG,	
ANSI Flange x 6.50" (165,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-435

FxG,	
ISO Flange x 6.62" (168,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-255

FxG,	
ISO Flange x 6.50" (165,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-335

FxG,	
AS Flange x 6.62" (168,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-615

FxG,	
AS Flange x 6.50" (165,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-635

FxG,	
JIS Flange x 6.62" (168,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-815

FxG,	
JIS Flange x 6.50" (165,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-835

FxF,	
ISO Flange x ISO Flange	
.....	P/N 52-309-1-135

FxF,	
AS Flange x AS Flange	
.....	P/N 52-309-1-515

FxF,	
JIS Flange x JIS Flange	
.....	P/N 52-309-1-715

Valves with ISO Ports

GxG,	
6.62"(168,3 mm) Outside Dia.	
Groove x 6.62"(168,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-925

GxG,	
6.50"(165,1 mm) Outside Dia.	
Groove x 6.50"(165,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-945

FxG,	
ISO Flange x 6.62"(168,3 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-215

FxG,	
ISO Flange x 6.50"(165,1 mm)	
Outside Dia. Groove	
.....	P/N 52-309-1-315

FxF,	
ISO Flange x ISO Flange	
.....	P/N 52-309-1-115



OL *Plus* **& OLT *Plus* Series**

Riser and Tank Mounted Oilless Air Compressors
**Installation, Operation and
Maintenance Manual**



Call **1-800-345-8207**
or visit our web site for our complete product listing
www.GeneralAirProducts.com

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If there are any questions regarding installation, operation, or maintenance of this compressor, please call 800-345-8207

**IMPORTANT: ALL INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE.
Consult factory for the most up to date version of this manual - 1-800-345-8207.**

Section 1 - Safety & Warnings

1.1 Safety Guidelines

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.



- Danger indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



- Warning indicates a potentially hazardous situation which, if not avoided **COULD** result in death or serious injury.



- Caution indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury.



- Notice indicates important information, that if not followed may cause damage to equipment.

1.2 General Information

This compressor is intended for installation indoors for use on dry sprinkler systems in accordance with the Standard for Installation of Sprinkler Systems, NFPA 13 and the National Electrical Code, NFPA 70. The compressor should be sized to restore and maintain the air pressure in the sprinkler system in accordance with the requirements in NFPA 13.

1.3 General Safety Information

1. Read all manuals included with this product carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
2. Follow all local electrical and safety codes as well as National Electrical Codes (NEC), Occupational Safety and Health Act (OSHA), and National Fire Protection Association (NFPA).
3. Only persons familiar with these rules of safe operation should be allowed to use the equipment.
4. Keep visitors away and NEVER allow children in the work area.
5. Wear safety glasses and use hearing protection when operating the unit.
6. Do not stand on or use the unit as a handhold.
7. **Periodic inspection and test of this equipment is required.** Consult your installer and local codes to meet all requirements.
8. Check all fasteners at frequent intervals for proper tightness.

1.4 Safety Notes



- This compressor is not equipped and should NOT be used “as is” to supply breathing quality air.



- Motors, electrical equipment and controls can cause electrical arcs that will ignite flammable gas or vapor. Never operate or repair in or near flammable gas or vapor. Never store flammable liquids or gasses near the compressor.



- These compressors are suitable for pumping only atmospheric air. As defined in Compressed Gas Association Pamphlet G-7, page 3, atmospheric air is a mixture of elements and compounds where nitrogen and oxygen comprise more than 99% with all other trace gasses comprising less than 1%. **Do not use this compressor in contaminated environments or for pumping mixtures other than atmospheric air.**



- Compressed air contains liquid water and is saturated with water vapor, which can freeze when surrounding temperatures are lower than 32°F (0°C). Component selection to minimize the effects of water vapor must be considered.

Section 2 - Receiving

Your compressor is inspected at the factory and packaged to protect against shipping damage. When the compressor is unpacked, inspect for damage or missing parts. All claims should be settled directly with the freight company.



- Do not operate this compressor if damaged during shipment, handling or use. Any damage may result in failure and cause injury or property damage.

Section 3 - Installation Location

Locate the compressor in a clean, well ventilated area where air is relatively cool, clean and dry. A 110°F (43°C) maximum and 40°F (4.5°C) minimum temperature for surrounding and inlet air are recommended. Provide at least 12 to 18 inches of clearance from any wall or other obstruction that will interfere with airflow over and through the compressor. Blocking airflow through the fan may cause the compressor to overheat. Do not place the compressor in an area of excessive heat, such as near a boiler.

Section 4 - Mounting

OL Plus Series (Riser mounted units) may be mounted to a firm level floor, wall or system riser. A mounting bracket and straps are provided. Tank mounted units must be leveled and anchored to the floor; the vibration isolators (P/N KVP4X4) supplied with the unit must be used. Both tank and riser mounted units are shipped with a flex hose and union. The flex hose (P/N P3002MP) is recommended to be installed between the compressor or tank outlet and service piping.

Section 5 - Lubrication



- This compressor is designed for non-lubricated service. Bearings are permanently lubricated. **Do not lubricate any part of the compressor or motor.**

Section 6 - Piping

6.1 Piping Instructions



- Compressed air contains liquid water and is saturated with water vapor, which can freeze when surrounding temperatures are lower than 32°F (0°C). Component selection to minimize the effects of water vapor must be considered.

Piping between the compressor, accessory items and the sprinkler system must be at least ½" internal diameter to minimize pressure drop from the compressor to system. Larger pipe size may be required by code and may be substituted with no adverse effects.



- Smaller line size must not be used and will restrict the compressor flow, lowering capacity and causing the compressor/motor to work harder, which shortens compressor/motor life. All piping connected to the compressor must be fully supported and not transfer any loads to the compressor.

If an AMD-1 is used, allow sufficient distance between the compressor and AMD-1 to ensure that the maximum temperature at the AMD-1 is 200°F or less.



- When an AMD is used with riser mounted units, a riser mounted tank kit (P/N OLR-TK) is recommended to prevent short cycling the compressor.

All oilless compressors include a relief valve. For riser mounted models, the relief valve is installed on the compressor. For tank mounted models, an ASME Code relief valve is mounted on the compressor tank. This valve will open at a preset value above the pressure switch setting to prevent excess tank pressure in the event of a switch failure.



- Do not attempt to change the safety relief valve setting.

A manual drain is provided on the bottom of each tank mounted compressor. Moisture accumulated in the tank must be drained weekly. An automatic drain, P/N DVA-2T, is recommended in areas of high humidity.

The compressor outlet piping should contain an accessible drain. As a minimum a manual drain may be used, but an automatic drain is recommended to remove excess water.



- Accumulation of condensed water in the system can cause corrosion of components and reduction of system capacity.



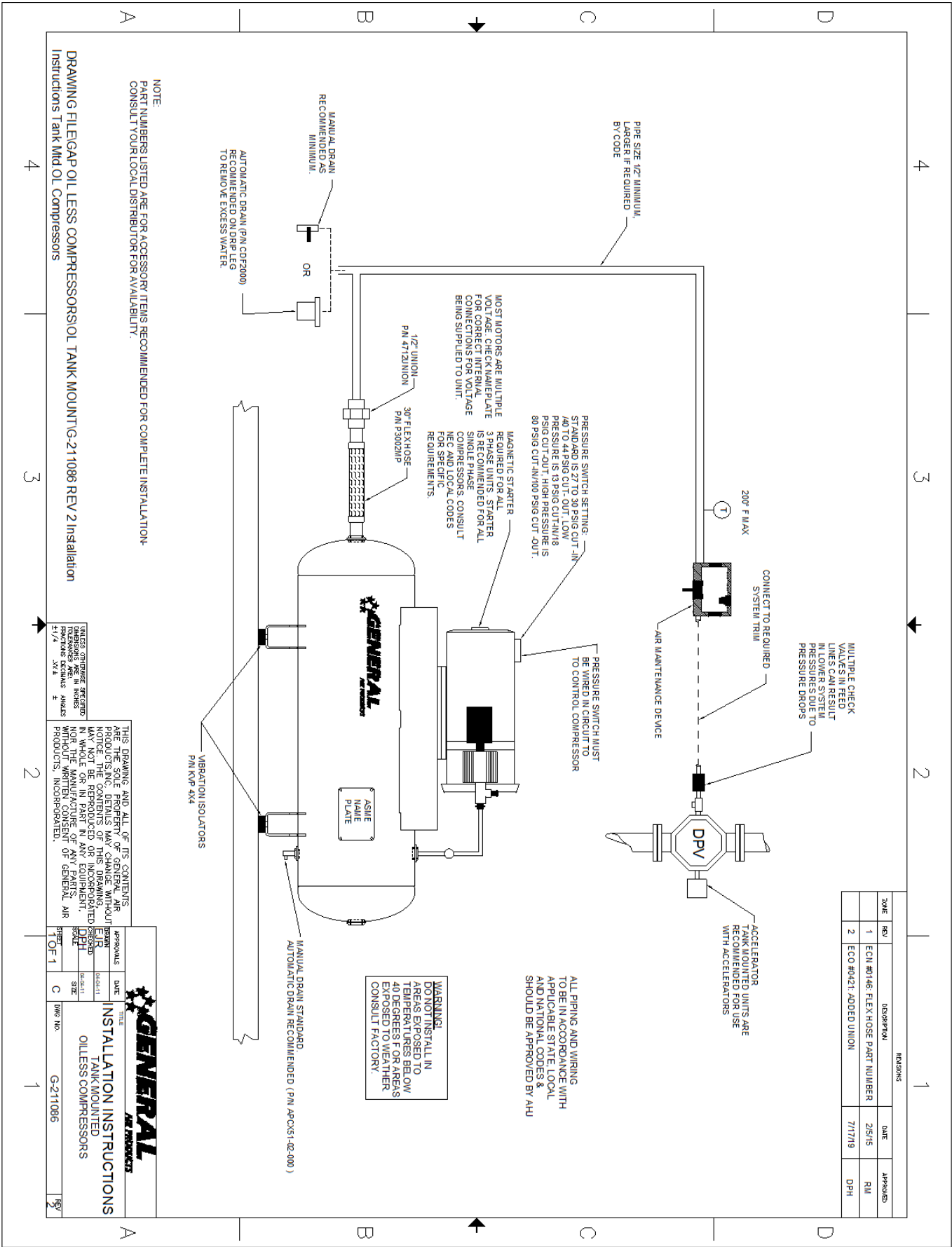
- Warranty is void if a separate check valve is not installed to prevent water backflow to compressor.

6.2 OL Plus Series Riser Mounted Oilless Air Compressor Installation Drawing



Section 6 - Piping

6.3 OLT Plus Series Tank Mounted Oilless Air Compressor Installation Drawing



Section 7 - Wiring

7.1 Wiring Instructions



- Wiring should be in accordance with the national electrical code and any local codes or regulations. Have a licensed and competent electrician ensure that the voltage supplied matches the compressor voltage.



- Inadequate wiring size can cause insufficient voltage at the compressor during start-up. Overheating and damage can result to the motor and controls.



- Failure to use the pressure switch may result in overpressure of the compressor or other components in the system. Overpressure of the compressor can result in blown head gaskets or other damage.



- Grounding Instructions: This product must be connected to a grounded, metallic, permanent wiring system, or an equipment grounding terminal or lead on the product.

The supply wire must be of adequate size and no other equipment should be connected to the same line. The adjacent table lists the recommended wire size for each model based on a 100' run and lowest operating voltage. Consult factory for longer runs. The motors supplied are multiple voltage motors. A label on the pressure switch cover indicates the voltage the motor is pre-wired for. If the supply voltage, on site, is different from the voltage indicated on this label, change the internal motor voltage connections to match the supply voltage. To change internal voltage connections, remove the cover plate located on the rear or side of the motor and reconnect the wire leads as shown on the motor's wiring diagram.

On all three phase compressors an arrow on the motor indicates the required direction of rotation of the compressor. If the compressor rotates in the opposite direction, reverse the rotation of the motor. Interchanging any two incoming supply wires reverses rotation of three phase motors.

Minimum Recommended Wire Size		
Model #	1 Phase	3 Phase
OL(T)12516**	12	N/A
OL(T)25033**	12	N/A
OL(T)36550**	12	12
OL(T)43075**	10	12
OL(T)615100**	6	12
OL(T)915150**	6	12
OL(T)1225200**	10	10
OL(T)32016**-LP	12	N/A
OL(T)55033**-LP	12	N/A
OL(T)86050**-LP	12	12
OL(T)99075**-LP	10	12



- Single-phase motors include internal thermal overload protection, which has an automatic reset device.



- Disconnect electrical power before servicing to disable reset devices. Thermal protection can automatically start the motor when the protector resets.

On single phase models, the motor is pre-wired to the pressure switch provided, which controls starting (cut in pressure) and stopping (cut out pressure) of the motor. The pressure switch is factory set. Standard models switch is set at 27 to 30 psig cut in and 40 to 44 psig cut out. Low pressure models ("-LP") switch is set at 13 psig cut in and 18 psig cut out. Consult General Air Products before adjusting the pressure switch.

On three-phase compressors, the motor is not pre-wired to the pressure switch. Refer to the three phase wiring instruction drawing for recommended wiring. **A motor starter is required, for all three phase models, to protect the motor from overload conditions to meet NEC, NFPA70, Article 430. A motor starter is recommended, for all single phase models.** Consult the National Electric Code and local codes for motor starter requirements. Refer to the proper wiring instruction drawing for recommended wiring to a starter.



- Do not run two phases of a three phase supply through the pressure switch. Serious damage can result. Warranty is voided if connected this way.

Section 7 - Wiring

Convert Pressure Switch from 115V to 230V



1. Identification of wires.



2. Remove line contact jumper and HOT wire placeholder.



3. Remove motor contact jumper, leaving motor HOT in terminal. Retighten motor HOT wire in terminal.



4. Remove yellow wire nut from motor NEUTRAL.



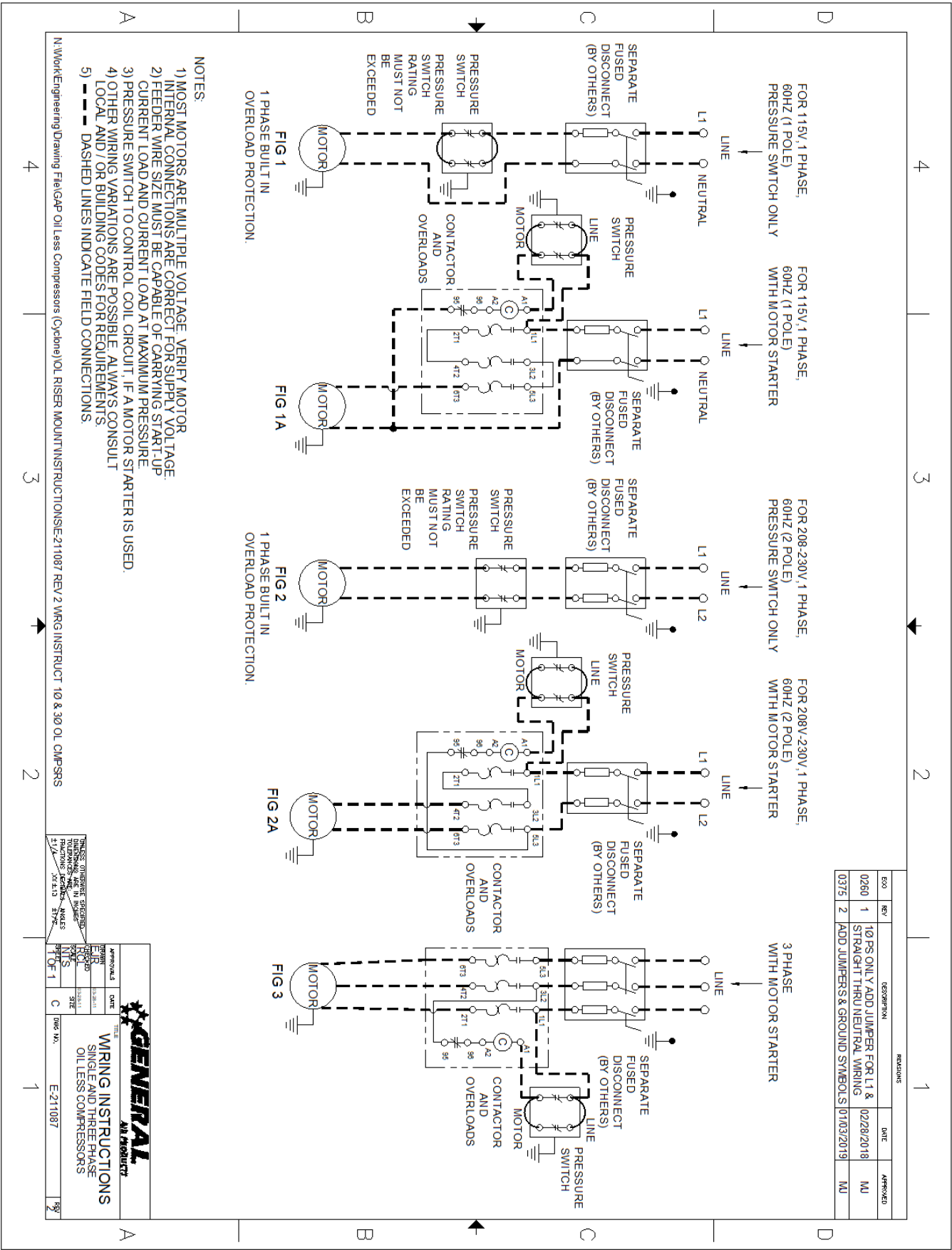
5. Crimp a spade connector onto NEUTRAL wire.



6. Insert spade connector into other motor terminal. Use wiring diagram on side of motor to wire it for 230V.
7. Wire supply line 1 and line 2 to line contacts of pressure switch.

Section 7 - Wiring

7.2 Oilless Air Compressor Single & 3 Phase Wiring Drawing



Section 8 - Maintenance Instructions



- Disconnect, tag, and lock out power source then release all pressure from the system before attempting to install, service, relocate, or perform any service.

The following instructions are based on normal operation. If the compressor is in an excessively dusty area, increase frequency of maintenance checks.

Weekly:

- Drain condensate from receiver and traps
- Check for unusual noise or vibration
- Clean air filters (only with non-petroleum based products)
- Clean all external parts of the compressor and motor

Monthly:

- Manually test safety relief valve
- Inspect air system for leaks
- Tighten fitting, nuts, and screws as required

Quarterly:

- Change filters

Warranty can be voided if modifications or adjustments are made without consultation and approval from factory personnel.

If there are any questions regarding installation, operation, or maintenance of this compressor, please call 800-345-8207

Section 9 - Troubleshooting Guide

Symptom	Possible Cause(s)	Corrective Action
Motor hums and runs slowly or not at all.	1. Low or no voltage 2. Shorted or open motor winding 3. Defective check valve 4. Defective pressure switch - contacts will not close	1. Check voltage during start. Voltage must be within +/- 10% of nominal voltage to start motor. Increase wire size if necessary, to lower voltage drop. 2. Replace compressor 3. Replace check valve 4. Repair or replace pressure switch
Reset mechanism cuts out or fuses blow repeatedly	1. Insufficient voltage to motor 2. Pressure switch set too high 3. Wrong fuse size 4. Piping too restrictive 5. Defective motor	1. Check voltage during start. Voltage must be within +/- 10% of nominal voltage to start motor. Increase wire size if necessary, to lower voltage drop. 2. Consult factory, adjust or replace 3. Be sure fuses, heaters and/or overloads are properly rated or set 4. Add receiver vessel or increase pipe volume after compressor 5. Consult factory
Unit short cycles repeatedly	1. Piping too restrictive 2. Air leaks	1. Add receiver vessel or increase pipe volume after compressor 2. Repair leaks
Compressor overheating	1. Dirty intake filter 2. Wrong motor rotation 3. Air flow to fan blocked	1. Clean intake filter 2. Correct rotation 3. Clean air flow to fan or relocate unit
Excessive noise in operation	1. Damaged bearings 2. Worn piston cup 3. Broken valves 4. Loose fan 5. Damaged fan guard	Contact General Air Products for technical support by calling 1-800-345-8207
System pressure builds slowly	1. Compressor sized incorrectly 2. Leaks or restrictions in piping 3. Dirty intake filter	1. Check system size and compressor sizing 2. Correct leaks and remove restrictions 3. Clean intake filter

Section 10 - Warranty Policy

GENERAL PROVISIONS & LIMITATIONS

General Air Products, Inc. (the "Company") warrants to each original purchaser ("Purchaser") of its new products from the Company or its Authorized Distributor that such products are, at the time of delivery to the Purchaser, made with good materials and workman- ship. No warranty is made with respect to:

1. Any product, which has been repaired or altered in such a way, in the Companies judgment, as to affect the product adversely.
2. Any product, which has, in the Companies judgment been subjected to negligence, accident, improper storage, improper installation or application.
3. Any product, which has not been operated or maintained in accordance with the recommendations of the Company.
4. Components or accessories manufactured, warranted and serviced by others.
5. Any reconditioned or prior owned product.

Claims for items described in 4. above should be submitted directly to the manufacturer.

WARRANTY PERIOD

The Company's obligation under this Warranty is limited to repair or, at its option, replacing during normal business hours at the designated facility of the Company, any part that in its judgment proved not to be as warranted within the applicable Warranty Period as follows.

COMPONENTS

All non-consumable components are warranted for 12 months from the date of purchase. Consumables are not covered under warranty. The unit must have been installed by either a factory authorized distributor or agent in accordance with the factory recommendations taking into account all other local site conditions not originally noted to the factory. The unit must be operated and maintained in accordance with the Factory recommendations and original design conditions. Failure to provide such proof of the above may void warranty.

LABOR TRANSPORTATION & INSPECTION

The Company will repair or replace any product or part thereof which in the Companies judgment is proved to be not as warranted. Labor costs are not covered under warranty.

All costs of transportation of product, labor or parts claimed not to be as warranted and, of repaired or replaced parts to or from factory shall be borne by purchaser. The Company may require the return of any part claimed not to be as warranted to one of its facilities as designated by the Company, transportation prepaid by Purchaser, to establish a claim under this warranty.

Replacement parts provided under the terms of the warranty are warranted for the remainder of the Warranty Period of the product upon which installed to the same extent as if such parts were original components.

DISCLAIMER

THE FOREGOING WARRANTY IS EXCLUSIVE AND IT IS EXPRESSLY AGREED THAT, EXCEPT AS TO TITLE, THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OR MERCHANTABILITY.

THE REMEDY PROVIDED UNDER THIS WARRANTY SHALL BE THE SOLE, EXCLUSIVE AND ONLY REMEDY AVAILABLE TO THE PURCHASER AND IN NO CASE SHALL THE COMPANY BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES. UNDER NO CIRCUMSTANCES SHALL THE COMPANY BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, LOSSES OR DELAYS HOWSOEVER CAUSED.

No statement, representation, agreement, or understanding, oral or written, made by any agent, distributor, representative or employee of the Company which is not contained in this Warranty will be binding upon the company unless made in writing and executed by an officer of the Company.

This warranty shall not be effective as to any claim which is not presented within 30 days after the date upon which the product is claimed not to have been as warranted. Any action for breach of this warranty must be commenced within one year after the date upon which the cause of action occurred.

Any adjustment made pursuant to this warranty shall not be construed as an admission by the Company that any product was not as warranted.

PROMPT DISPOSITION & RETURNS POLICY

The Company will make a good faith effort for prompt correction or other adjustment with respect to any product, which proves to be defective within the warranty period. Before returning any product, write or call the distributor, agent or authorized company from which the product was purchased, describing defect and giving date and number of original invoice, as well as proof of Factory supplied consumables and proof of scheduled maintenance. No products will be accepted for return without the Company issuing a "Returned Goods Authorization" (RGA) to the Purchaser and unless accompanied by a properly authorized RGA request form initiated by the Purchaser. Return freight must be prepaid and each returned product must have the RGA number clearly marked on the product. Title and risk of loss pass to buyer upon delivery to the common carrier.

PRODUCT SUITABILITY

Many States, Localities and Countries have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While General Air Products, Inc. attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used? Before purchase and use of a product, please review the product application, and national and local codes and regulations, and be sure that the product, installation, and use will comply with them.

General Air Products, Inc.
118 Summit Drive
Exton, PA 19341
P: 610-524-8950
F: 610-524-8965

REV: 4/22/11

Series TY-FRB, 5.6 K-factor Upright, Pendent, and Recessed Pendent Sprinklers Quick Response, Standard Coverage

General Description

The TYCO Series TY-FRB, 5.6 K-factor, Upright (TY313) and Pendent (TY323) Sprinklers described in this data sheet are quick response, standard coverage, decorative 3 mm glass bulb-type spray sprinklers designed for use in light or ordinary hazard, commercial occupancies such as banks, hotels, and shopping malls.

The recessed version of the Series TY-FRB Pendent Sprinkler, where applicable, is intended for use in areas with a finished ceiling. This recessed pendent sprinkler uses one of the following:

- A two-piece Style 15 Recessed Escutcheon with recessed adjustment up to 5/8 in. (15,9 mm) from the flush pendent position.
- A two-piece Style 20 Recessed Escutcheon with recessed adjustment up to 1/2 in. (12,7 mm) from the flush pendent position.

The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut.

Intermediate level versions of Series TY-FRB Sprinklers are described in Technical Data Sheet TFP357. Sprinkler guards and shields are described in Technical Data Sheet TFP780.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

NOTICE

The TYCO Series TY-FRB Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Sprinkler Identification Number (SIN)

TY313 . . . Upright 5.6K, 1/2 in. NPT
TY323 . . . Pendent 5.6K, 1/2 in. NPT

Technical Data

Approvals

Refer to Table A

Maximum Working Pressure

175 psi (12.1 bar)

250 psi (17.2 bar)*

* The maximum working pressure of 250 psi (17.2 bar) only applies to the listing by Underwriters Laboratories, Inc. (UL).

Discharge Coefficient

K=5.6 GPM/psi^{1/2} (80,6 LPM/bar^{1/2})

Temperature Rating

Refer to Table A

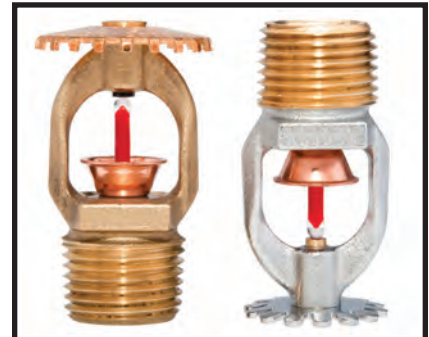
Finishes

Sprinkler: Refer to Table B

Recessed Escutcheon: White Coated, Black Coated, Chrome Plated, or Brass Plated

Physical Characteristics

Frame	Bronze
Button	Brass/Copper
Sealing Assembly	Stainless Steel w/TEFLON
Bulb	Glass
Compression Screw	Bronze
Deflector	Bronze

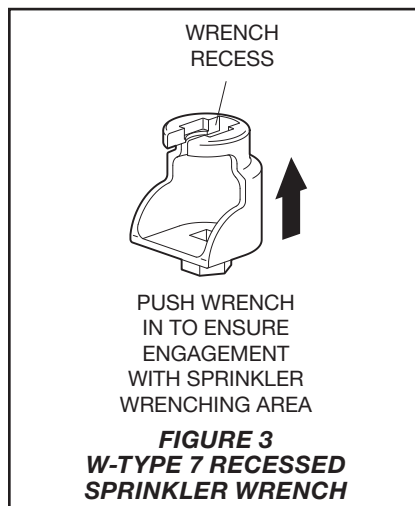
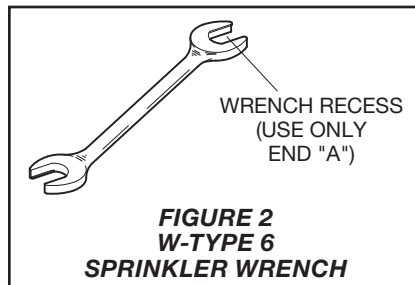
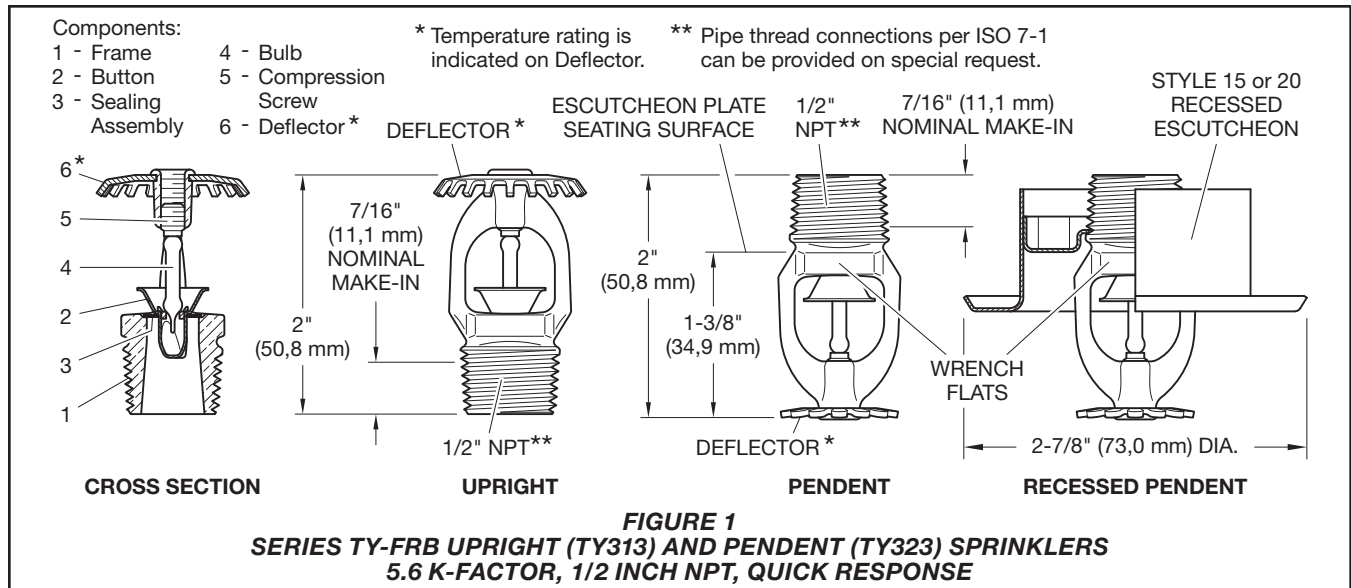


Operation

The glass bulb contains a fluid which expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, allowing the sprinkler to activate and water to flow.

Design Criteria

The TYCO Series TY-FRB, 5.6 K-factor, Upright (TY313) and Pendent (TY323) Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (such as, UL Listing is based on the requirements of NFPA 13, and FM Approval is based on the requirements of FM's Loss Prevention Data Sheets). Only the Style 15 or Style 20 Recessed Escutcheon is to be used for recessed pendent installations.



Installation

The TYCO Series TY-FRB, 5.6 K-factor, Upright (TY313) and Pendent (TY323) Sprinklers must be installed in accordance with this section.

General Instructions

Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) and 3/32 in. (2,4 mm) for the 286°F (141°C) temperature ratings.

A leak-tight 1/2 in. NPT sprinkler joint should be obtained by applying a minimum to maximum torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). Higher levels of torque can distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in the Escutcheon Plate by under- or over-tightening the sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Upright and Pendent Sprinklers

The Series TY-FRB Upright and Pendent Sprinklers must be installed in accordance with the following instructions.

Step 1. Install Pendent sprinklers in the pendent position. Install upright sprinklers in the upright position.

Step 2. With pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (Figure 2). With reference to Figure 1, apply the W-Type 6 Sprinkler Wrench to the wrench flats. Torque sprinklers 7 to 14 lb-ft (9,5 to 19,0 N·m).

Recessed Pendent Sprinklers

The Series TY-FRB Recessed Pendent Sprinklers must be installed in accordance with the following instructions.

Step A. After installing the Style 15 or Style 20 Mounting Plate over the sprinkler threads, and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step B. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (Figure 3). With reference to Figure 1, apply the W-Type 7 Recessed Sprinkler Wrench to the sprinkler wrench flats. Torque sprinklers 7 to 14 lb-ft (9,5 to 19,0 N·m).

Step C. After ceiling installation and finishing, slide on the Style 15 or Style 20 Closure over the Series TY-FRB Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the ceiling.

Care and Maintenance

The TYCO Series TY-FRB, 5.6 K-factor, Upright (TY313) and Pendent (TY323) Sprinklers must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection systems from the proper authorities and notify all personnel who may be affected by this action.

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, can delay sprinkler operation in a fire situation.

The owner must assure that the sprinklers are not used for hanging any objects and that the sprinklers are only cleaned by means of gently dusting with a feather duster; otherwise, non-operation in the event of a fire or inadvertent operation may result.

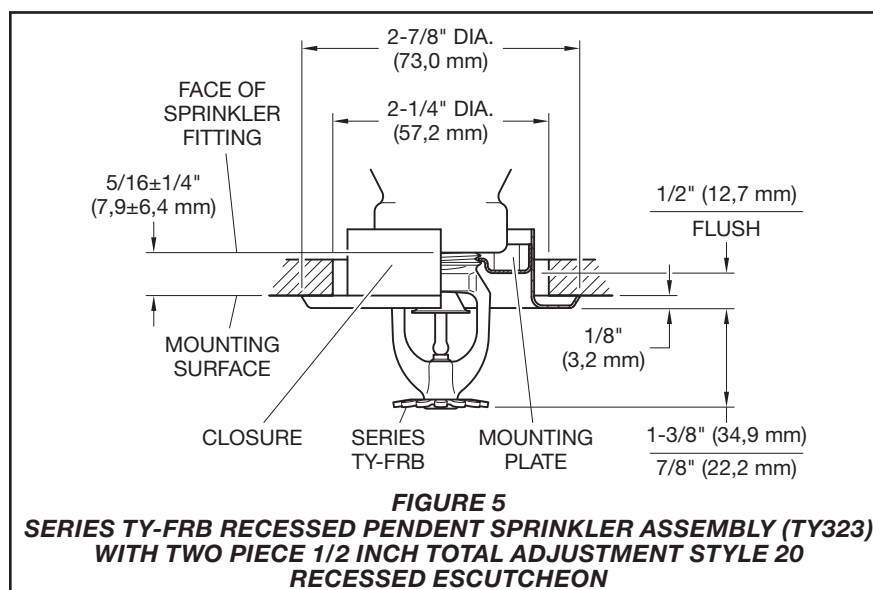
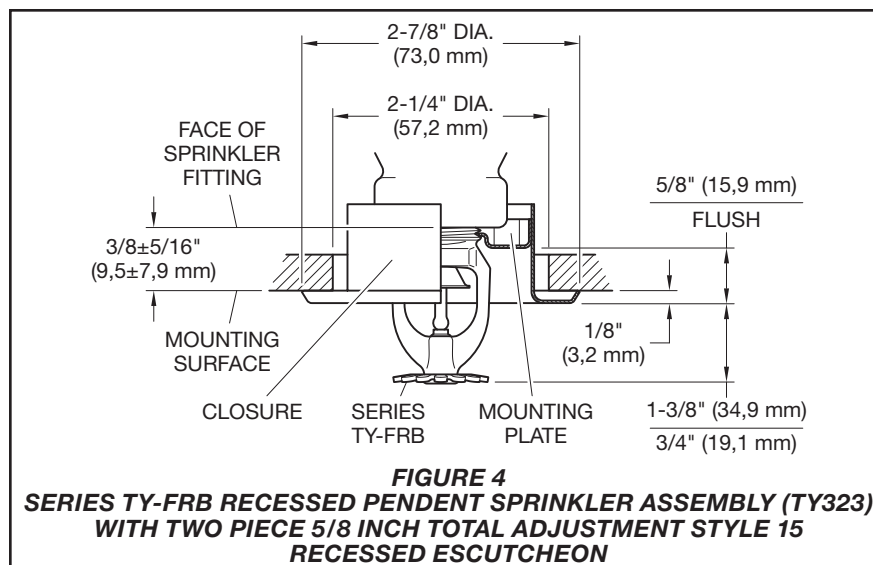
Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (Ref. Installation Section.)

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.



Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler Assemblies with NPT Thread Connections

Specify: Series TY-FRB Upright or Pendent (specify) Sprinkler, SIN (specify), K=5.6, Quick Response, (specify) temperature rating, (specify) finish, P/N (specify, refer to Table A).

Recessed Escutcheon

Specify: Style 15 Recessed Escutcheon with (specify*) finish, P/N (specify*)

Specify: Style 20 Recessed Escutcheon with (specify*) finish, P/N (specify*)

* Refer to Technical Data Sheet TFP770

Sprinkler Wrench

Specify: W-Type 6 Sprinkler Wrench, P/N 56-000-6-387

Specify: W-Type 7 Sprinkler Wrench, P/N 56-850-4-001

K FACTOR	TYPE	TEMPERATURE	SPRINKLER FINISH (See Note 7)			
			BULB LIQUID COLOR	NATURAL BRASS	CHROME PLATED	POLYESTER ^c
5.6 1/2 in. NPT	UPRIGHT (TY313) and PENDENT (TY323)	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	RECESSED PENDENT (TY323) Figures 4 ^a and 5 ^b	135°F (57°C)	Orange	1, 2, 3, 4		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			

Notes:

1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the City of New York under MEA 354-01-E.
5. VdS Approved (For details, contact Johnson Controls, Enschede, Netherlands, Tel. 31-53-428-4444/Fax 31-54-428-3377.)
6. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06) as Quick Response Sprinklers.
7. Where Polyester Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers.
- a. Installed with Style 15 (1/2 in. NPT) 5/8 in. Total Adjustment Recessed Escutcheon, as applicable.
- b. Installed with Style 20 (1/2 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon, as applicable.
- c. Frame and Deflector only. Listings and approvals apply to color (Special Order).

TABLE A
LABORATORY LISTINGS AND APPROVALS FOR
5.6 K-FACTOR SPRINKLERS

P/Na 77 – XXX – X – XXX

		SIN	SPRINKLER FINISH		TEMPERATURE RATINGS	
370	5.6K UPRIGHT (1/2 in.NPT)	TY313	1	NATURAL BRASS	135	135°F (57°C)
371	5.6K PENDENT (1/2 in.NPT)	TY323	3	PURE WHITE (RAL9010) ^a POLYESTER	155	155°F (68°C)
			4	SIGNAL WHITE (RAL9003) POLYESTER	175	175°F (79°C)
			5	JET BLACK (RAL9005) POLYESTER	200	200°F (93°C)
			9	CHROME PLATED	286	286°F (141°C)

Notes:

- a. Use suffix "I" for ISO 7-1 connection; for example, 77-370-4-175-I

Notes:

- a. Eastern Hemisphere sales only

TABLE B
SERIES TY-FRB UPRIGHT AND PENDENT SPRINKLERS
PART NUMBER SELECTION

Series TY-FRB — 5.6 K-factor Horizontal and Vertical Sidewall Sprinklers Quick Response, Standard Coverage

General Description

The Series TY-FRB, 5.6 K-factor, Horizontal and Vertical Sidewall Sprinklers described in this data sheet are quick response -standard coverage, decorative 3 mm glass bulb type spray sprinklers designed for use in light and ordinary hazard, commercial occupancies such as banks, hotels, shopping malls, etc. They are designed for installation along a wall or the side of a beam and just beneath a smooth ceiling. Sidewall sprinklers are commonly used instead of pendent or upright sprinklers due to aesthetics or building construction considerations, where piping across the ceiling is not desirable.

The recessed version of the Series TY-FRB Horizontal Sidewall Sprinkler is intended for use in areas with a finished wall. It uses a two-piece Style 10 Recessed Escutcheon with 1/2 in. (12,7 mm) of recessed adjustment or up to 3/4 in. (19,1 mm) of total adjustment from the flush sidewall position, or a two-piece Style 20 Recessed Escutcheon with 1/4 in. (6,4 mm) of recessed adjustment or up to 1/2 in. (12,7 mm) of total adjustment from the flush sidewall position. The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe nipples to the sprinklers must be cut.

Corrosion resistant coatings, where applicable, are utilized to extend the life

of copper alloy sprinklers beyond that which would otherwise be obtained when exposed to corrosive atmospheres. Although corrosion resistant coated sprinklers have passed the standard corrosion tests of the applicable approval agencies, the testing is not representative of all possible corrosive atmospheres. Consequently, it is recommended that the end user be consulted with respect to the suitability of these coatings for any given corrosive environment. The effects of ambient temperature, concentration of chemicals, and gas/chemical velocity, should be considered, as a minimum, along with the corrosive nature of the chemical to which the sprinklers will be exposed.

NOTICE

The Series TY-FRB Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Sprinkler Identification Numbers

TY3331..... Horizontal
TY3431..... Vertical



Technical Data

Approvals

UL and C-UL Listed
FM Approved
LPCB Approved
NYC Approved

(Refer to Table A for complete approval information including corrosion resistant status.)

Maximum Working Pressure

Refer to Table B

Discharge Coefficient

K=5.6 GPM/psi^{1/2} (80,6 LPM/bar^{1/2})

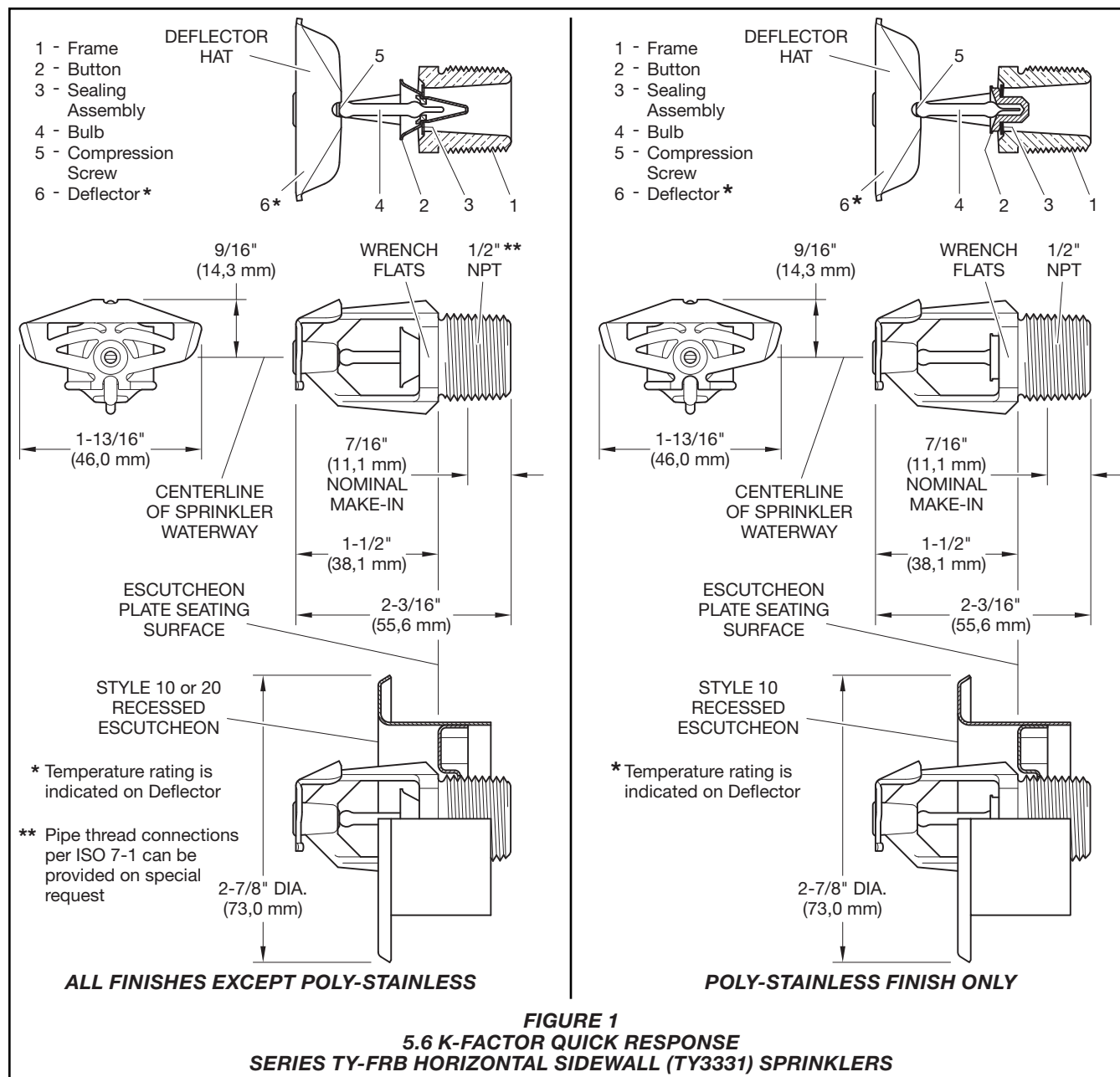
Temperature Ratings

Refer to Table A

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.



Finishes

Sprinkler: Refer to Table C

Recessed Escutcheon: Signal or Pure White, Jet Black, Grey Aluminum, Chrome Plated, or Brass Plated

Physical Characteristics

Frame	Bronze
Button	Brass/Copper
Sealing Assembly	Beryllium Nickel w/TEFLON
Bulb	Glass
Compression Screw	Bronze
HSW Deflector	Bronze
VSW Deflector	Copper

Poly-Stainless

Physical Characteristics

Frame	Bronze
Button	L316 Stainless Steel*
Bulb	Glass
Compression Screw	L316 Stainless Steel*
HSW Deflector	Copper/Bronze
Sealing Assembly	Gold Plated Beryllium Nickel w/TEFLON

*Type L316 stainless steel (UNS 31603) per ASTM A479/479M or BS EN 1008 WN1.4404.

Operation

The glass bulb contains a fluid which expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, allowing the sprinkler to activate and water to flow.

Design Criteria

The Series TY-FRB, 5.6 K-factor, Horizontal and Vertical Sidewall Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (e.g., UL Listing is based on the requirements of NFPA 13, and FM Approval is based on the requirements of FM's Loss Prevention Data Sheets). Only the Style 10 or 20 Recessed Escutcheon, as applicable, is to be used for recessed horizontal installations.

Installation

The Series TY-FRB, 5.6 K-factor, Horizontal and Vertical Sidewall Sprinklers must be installed in accordance with this section.

General Instructions

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) to 3/32 in. (2,4 mm) for the 286°F (141°C) temperature ratings.

A leak tight 1/2 in. NPT sprinkler joint should be obtained with a torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). Higher levels of torque may distort the sprinkler and cause leakage or impairment of the sprinkler.

Do not attempt to make-up for insufficient adjustment in the escutcheon plate by under- or over-tightening the sprinkler. Readjust the position of the sprinkler fitting to suit.

Series TY-FRB Horizontal and Vertical Sidewall Sprinkler Installation

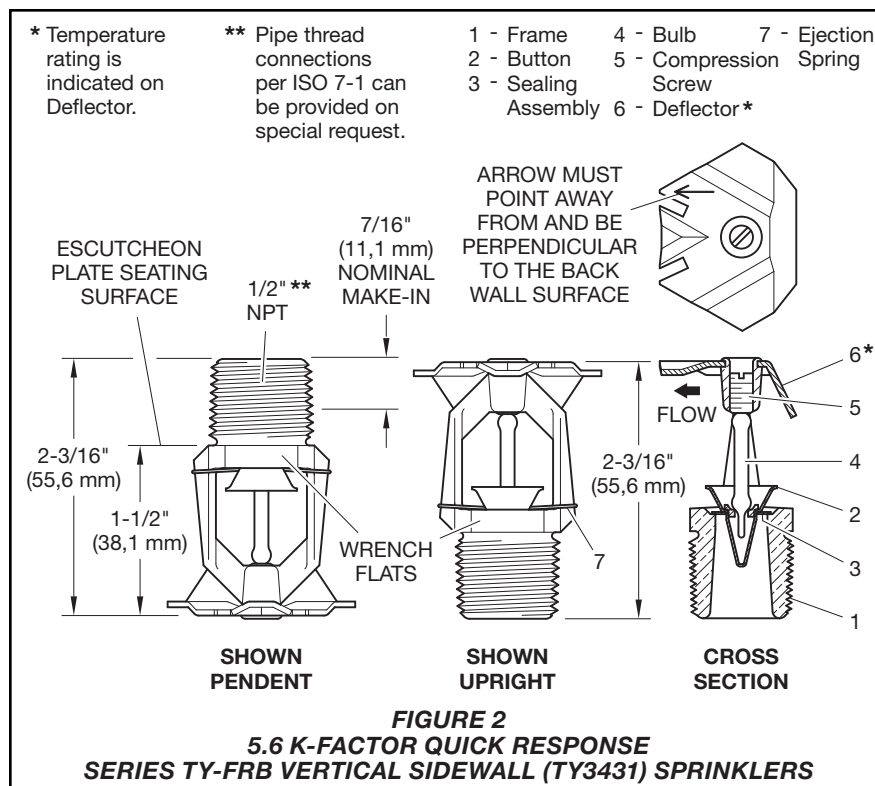
The Series TY-FRB Horizontal and Vertical Sidewall Sprinklers must be installed in accordance with the following instructions.

Step 1. Horizontal sidewall sprinklers are to be installed in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. The word "TOP" on the Deflector is to face towards the ceiling.

Vertical sidewall sprinklers are to be installed in the pendent or upright position with the arrow on the Deflector pointing away from the wall.

Step 2. With pipe thread sealant applied to the pipe threads, hand tighten the sprinkler into the sprinkler fitting.

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (Ref. Figure 5), With reference to Figure 1 or 2, the W-Type 6 Sprinkler Wrench is to be applied to the wrench flats.



Series TY-FRB Recessed Horizontal Sidewall Sprinkler Installation

The Series TY-FRB Recessed Horizontal Sidewall Sprinklers must be installed in accordance with this section.

Step A. Recessed horizontal sidewall sprinklers are to be installed in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. The word "TOP" on the Deflector is to face towards the ceiling.

Step B. After installing the Style 10 or 20 Mounting Plate over the sprinkler threads, hand tighten the sprinkler into the sprinkler fitting.

Step C. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (Ref. Figure 6). With reference to Figure 1, the W-Type 7 Recessed Sprinkler Wrench is to be applied to the sprinkler wrench flats.

Step D. After the ceiling has been installed or the finish coat has been applied, slide on the Style 10 or 20 Closure over the Series TY-FRB Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the ceiling.

Care and Maintenance

The Series TY-FRB, 5.6 K-factor, Horizontal and Vertical Sidewall Sprinklers must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

Absence of an escutcheon, which is used to cover a clearance hole, may delay the time to sprinkler operation in a fire situation.

Sprinklers that are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers before, during, and after installation. Sprinklers

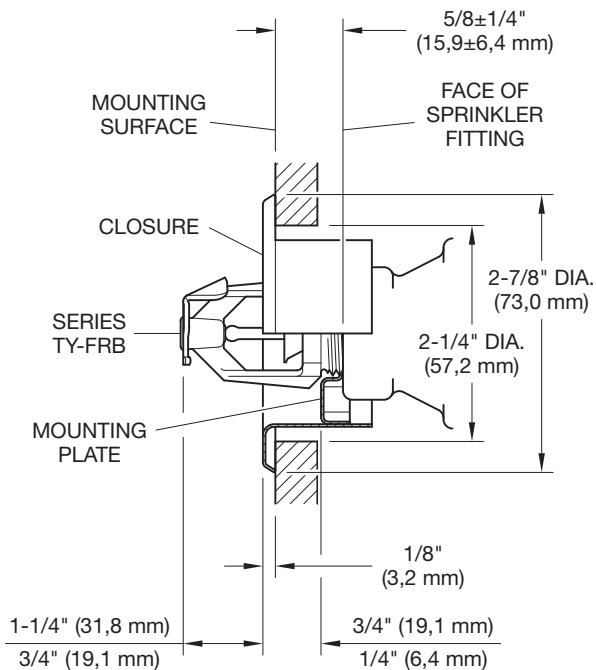


FIGURE 3
SERIES TY-FRB RECESSED HORIZONTAL SIDEWALL SPRINKLER
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON

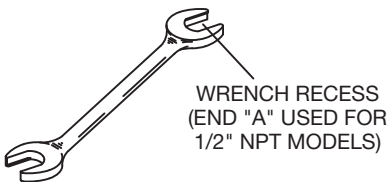
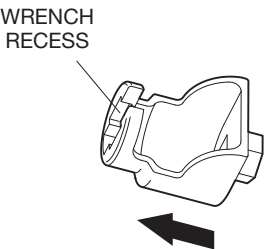


FIGURE 5
W-TYPE 6
SPRINKLER WRENCH



PUSH WRENCH
IN TO ENSURE
ENGAGEMENT
WITH SPRINKLER
WRENCHING AREA

FIGURE 6
W-TYPE 7 RECESSED
SPRINKLER WRENCH

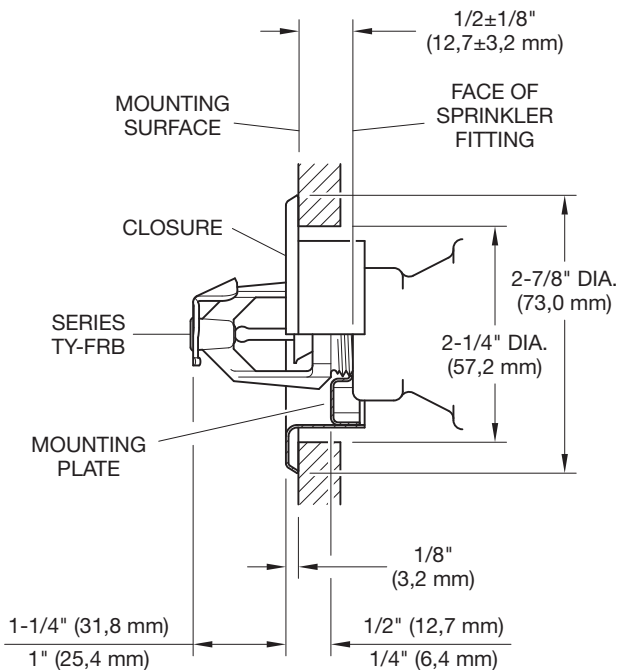


FIGURE 4
SERIES TY-FRB RECESSED HORIZONTAL SIDEWALL SPRINKLER
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON

				SPRINKLER FINISH (See Note 11)				
K	TYPE	TEMP.	BULB LIQUID	NATURAL BRASS	CHROME PLATED	POLYESTER ^c	POLY-STAINLESS ^c	LEAD COATED
5.6 1/2 in. NPT	HORIZ. SIDEWALL (TY3331)	135°F (57°C)	Orange	1, 2, 3, 4, 9, 10		1, 2, 3, 9	1, 2	1, 2, 3, 9
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	RECESSED HORIZ. SIDEWALL (TY3331) ^a Figure 3	135°F (57°C)	Orange	1, 2, 4, 9, 10		1, 2, 9	1, 2	N/A
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
	RECESSED HORIZ. SIDEWALL (TY3331) ^b Figure 4	135°F (57°C)	Orange	1, 2, 3, 4, 9			N/A	N/A
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
5.6 1/2 in. NPT	VERTICAL SIDEWALL (TY3431) Installed Pendent or Upright	135°F (57°C)	Orange	5, 6, 7, 8, 9			N/A	5, 6, 7, 9
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					

NOTES:

1. Listed by Underwriters Laboratories, Inc. (UL) as Quick Response Sprinklers for use in Light and Ordinary Hazard Occupancies at a 4 to 12 in. (100 to 300 mm) top of deflector to ceiling distance.

2. Listed by Underwriters Laboratories Inc. for use in Canada (C-UL) as Quick Response Sprinklers for use in Light and Ordinary Hazard Occupancies at a 4 to 12 in. (100 to 300 mm) top of deflector to ceiling distance.

3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers for use in Light Hazard Occupancies at a 4 to 12 in. (100 to 300 mm) top of deflector to ceiling distance.

4. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 007a/04) at a 4 to 6 in. (100 to 150 mm) top of deflector to ceiling distance. The LPC does not rate the thermal sensitivity of horizontal sidewall sprinklers.

5. Listed by Underwriters Laboratories, Inc. as Quick Response Sprinklers for use in Light and Ordinary Hazard Occupancies.

6. Listed by Underwriters Laboratories for use in Canada (C-UL) as Quick Response Sprinklers for use in Light and Ordinary Hazard Occupancies.

7. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers for use in Light Hazard Occupancies.

8. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06 & 007a/04) as Quick Response Sprinklers.

9. Approved by the City of New York under MEA 354-01-E.

10. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06) at a 4 to 6 in. (100 to 150 mm) top of deflector to ceiling distance. The LPC does not rate the thermal sensitivity of horizontal sidewall sprinklers.

11. Where Polyester Coated and Lead Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion Resistant Sprinklers. Where Lead Coated Sprinklers are noted to be FM Approved, the sprinklers are FM Approved as Corrosion Resistant Sprinklers.

a. Installed with Style 10 (1/2 in. NPT) 3/4 in.Total Adjustment Recessed Escutcheon.

b. Installed with Style 20 (1/2 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon.

c. Frame and deflector only.

TABLE A
LABORATORY LISTINGS AND APPROVALS

damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (Ref. Installation Section).

The owner must assure that the sprinklers are not used for hanging any objects and that the sprinklers are only cleaned by means of gently dusting with a feather duster; otherwise, non-operation in the event of a fire or inadvertent operation may result.

Frequent visual inspections are recommended to be initially performed for corrosion resistant coated sprinklers, after the installation has been completed, to verify the integrity of the corrosion resistant coating.

Thereafter, annual inspections per NFPA 25 should suffice; however, instead of inspecting from the floor level, a random sampling of close-up visual inspections should be made, so as to better determine the exact sprinkler condition and the long term integrity of the corrosion resistant coating, as it may be affected by the corrosive conditions present.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any other authorities having jurisdiction. Contact the install-

ing contractor or product manufacturer with any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

		SPRINKLER FINISH			
K	TYPE	NATURAL BRASS	CHROME PLATED	POLYESTER	LEAD COATED
5.6 1/2 in. NPT	HORIZONTAL SIDEWALL (TY3331)	250 PSI (17,2 BAR) or 175PSI (12,1 BAR) (SEE NOTE 1)			
	RECESSED HORIZ. SIDEWALL (TY3331)				
	VERTICAL SIDEWALL (TY3431)	175 PSI (12,1 BAR)			

NOTES:

1. The maximum working pressure of 250 psi (17,2 bar) only applies to the Listing by Underwriters Laboratories, Inc. (UL); the Listing by Underwriters Laboratories, Inc. for use in Canada (C-UL); and, the Approval by the City of New York.

TABLE B
MAXIMUM WORKING PRESSURE

P/N 57 – XXX – X – XXX

		SIN
378	HORIZONTAL SIDEWALL	TY3331
375	VERTICAL SIDEWALL	TY3431

	SPRINKLER FINISH
1	NATURAL BRASS
2	POLY-STAINLESS GREY ALUMINUM (RAL9007) ¹ POLYESTER
3	PURE WHITE (RAL9010) ² POLYESTER
4	SIGNAL WHITE (RAL9003) POLYESTER
5	JET BLACK (RAL9005) ³ POLYESTER
7	LEAD COATED
9	CHROME PLATED

	TEMPERATURE RATINGS
135	135°F (57°C)
155	155°F (68°C)
175	175°F (79°C)
200	200°F (93°C)
286	286°F (141°C)

NOTES:

1. Available for TY3331 only.
2. Eastern Hemisphere sales only.
3. Available in 155°F (68°C) or 200°F (93°C temperature rating only.

TABLE C
PART NUMBER SELECTION
SERIES TY-FRB HORIZONTAL AND VERTICAL SIDEWALL SPRINKLERS

NOTES:

1. Available for TY3331 only.
2. Eastern Hemisphere sales only.
3. Available in 155°F (68°C) or 200°F (93°C) temperature rating only.

TABLE C
PART NUMBER SELECTION
SERIES TY-FRB HORIZONTAL AND VERTICAL SIDEWALL SPRINKLERS

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler Assemblies with NPT

Thread Connections:

Specify: Series TY-FRB (specify SIN), (specify K-factor), (specify) Horizontal Sidewall or Vertical Sidewall Sprinkler, Standard Response, Standard Coverage, (specify) temperature rating, (specify) finish or coating, P/N (specify from Table C)

Recessed Escutcheon

Specify: Style (10 or 20) Recessed Escutcheon with (specify*) finish, P/N (specify*)

* Refer to Technical Data Sheet TFP770

Sprinkler Wrench

Specify: W-Type 6 Sprinkler Wrench, P/N 56-000-6-387

Specify: W-Type 7 Sprinkler Wrench, P/N 56-850-4-001

Series DS-1 Dry-Type Sprinklers 5.6K Pendent, Upright, and Horizontal Sidewall Quick Response, Standard Coverage

General Description

TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage are decorative glass bulb automatic sprinklers designed for commercial use. Dry-type sprinklers are typically used where:

- pendent sprinklers are required on dry pipe systems that are exposed to freezing temperatures (for example, sprinkler drops from unheated portions of buildings)
- sprinklers and/or a portion of the connecting piping are exposed to freezing temperatures; for example, sprinkler drops from wet systems into freezers, sprinkler sprigs from wet systems into unheated attics, or horizontal piping extensions through a wall to protect an unheated area such as loading docks, overhangs, and building exteriors
- sprinklers are used on systems that are seasonally drained to avoid freezing (for example, vacation areas)

NOTICE

The Series DS-1 Dry-Type Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), in addition to the standards of any

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

The Series DS-1 Dry-Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section.

Sprinkler Identification Numbers (SINs)

3/4 in. NPT:

TY3935 – Pendent
TY3735 – Horizontal Sidewall

1 in. NPT:

TY3235 – Pendent
TY3135 – Upright
TY3335 – Horizontal Sidewall

Technical Data

Approvals

UL and C-UL Listed
FM Approved
NYC Approved under MEA 352-01-E

Previous New York City Approval and MEA certification numbers apply to product as shown in this data sheet. In accordance with Section BC 3502 of the Construction Code, current NYC Approvals for use in the City of New York apply to all products that contain UL or FM Approvals and Listings; therefore, not all products currently Approved for use in the City of New York will carry an actual MEA Certification number.

See Tables A and B.

Maximum Working Pressure

175 psi (12,1 bar)

Inlet Thread Connections

3/4 in. NPT

1 in. NPT or ISO 7-R 1

Discharge Coefficient

K=5.6 gpm/psi^{1/2} (80,6 lpm/bar^{1/2})



Temperature Ratings

See Tables A and B

Finishes

Sprinkler: Natural Brass, Chrome Plated, or Signal White

Escutcheon: Signal White, Chrome Plated, or Brass Plated

Physical Characteristics

Inlet	Copper
Plug	Copper
Yoke	Stainless Steel
Casing	Galvanized Carbon Steel
Insert	Bronze
Bulb Seat	Stainless Steel
Bulb	Glass
Compression Screw	Bronze
Deflector	Bronze
Frame	Bronze
Guide Tube	Stainless Steel
Water Tube	Stainless Steel
Spring	Stainless Steel
Plug Spring*	Stainless Steel
Sealing Assembly	Beryllium Nickel w/TEFLON
Escutcheon	Carbon Steel or Stainless Steel

* For 3/4 in. NPT only

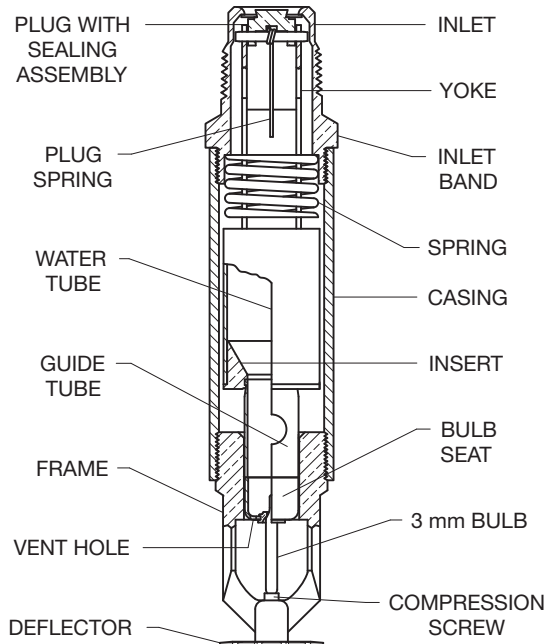


FIGURE 1
SERIES DS-1, 3/4 IN. NPT, DRY-TYPE SPRINKLER ASSEMBLY

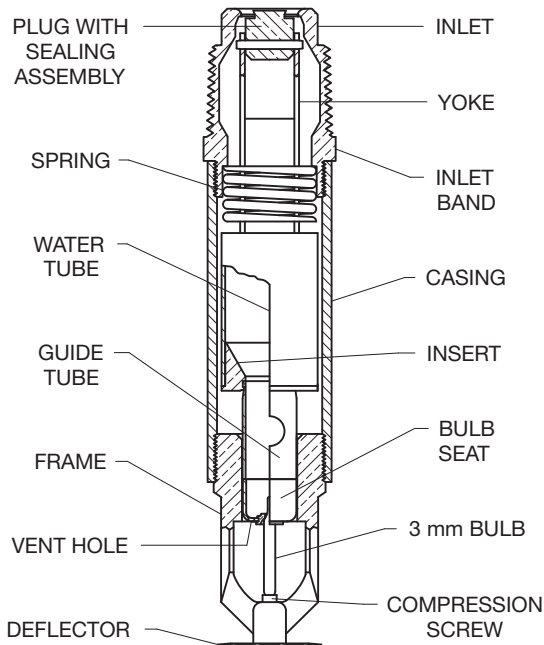


FIGURE 2
SERIES DS-1, 1 IN. NPT AND ISO 7-R 1 DRY-TYPE SPRINKLER ASSEMBLY

Operation

When the TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage are in service, water is prevented from entering the assembly by the Plug with Sealing Assembly in the Inlet of the Sprinkler. See Figures 1 and 2.

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass Bulb, and the Bulb Seat is released.

The compressed Spring is then able to expand and push the Water Tube as well as the Guide Tube outward. This action simultaneously pulls inward on the Yoke, withdrawing the Plug with Sealing Assembly from the Inlet and allowing the sprinkler to activate and flow water.

Design Criteria

The TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage are intended for use in fire sprinkler systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency; for example, UL Listing is based on NFPA 13 requirements.

Sprinkler Fittings

Install the 3/4 or 1 in. NPT Series DS-1 Dry-Type Sprinklers in the 3/4 or 1 in. NPT outlet or run of the following fittings:

- malleable or ductile iron threaded tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150)
- cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125)

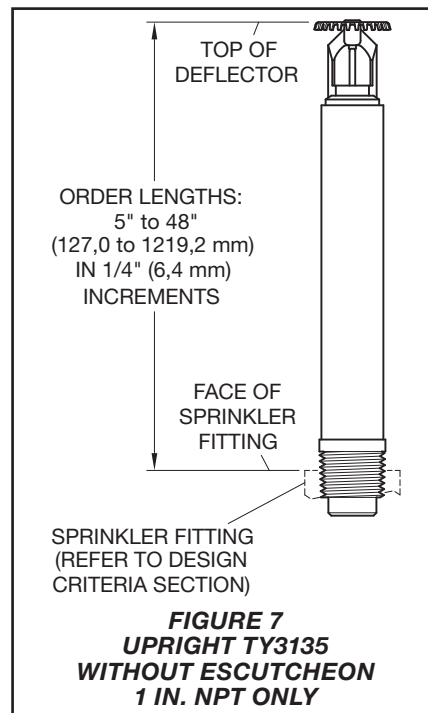
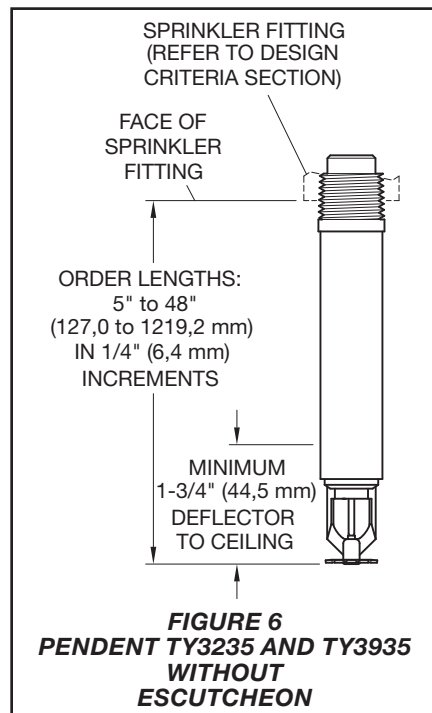
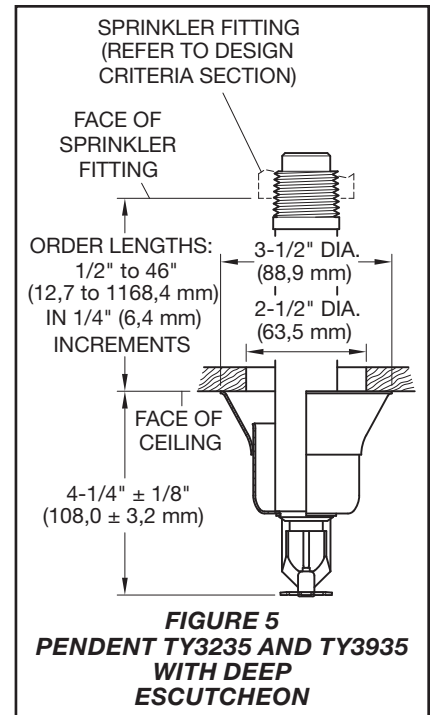
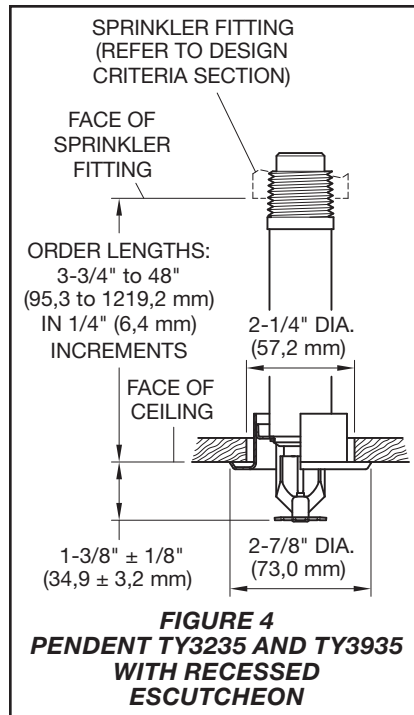
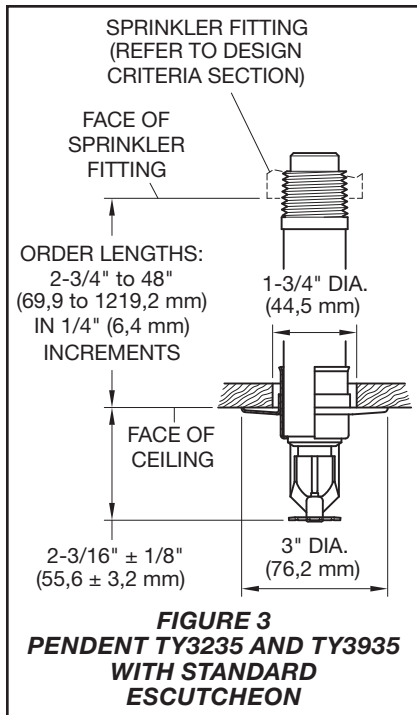
Do not install the DS-1 Sprinklers into an elbow fittings. The Inlet of the sprinkler can contact the interior of the elbow, potentially damaging the Inlet seal.

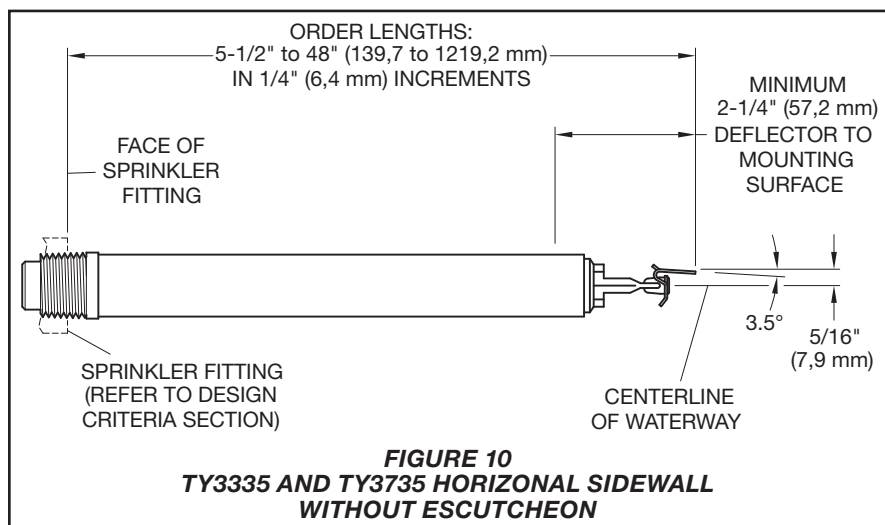
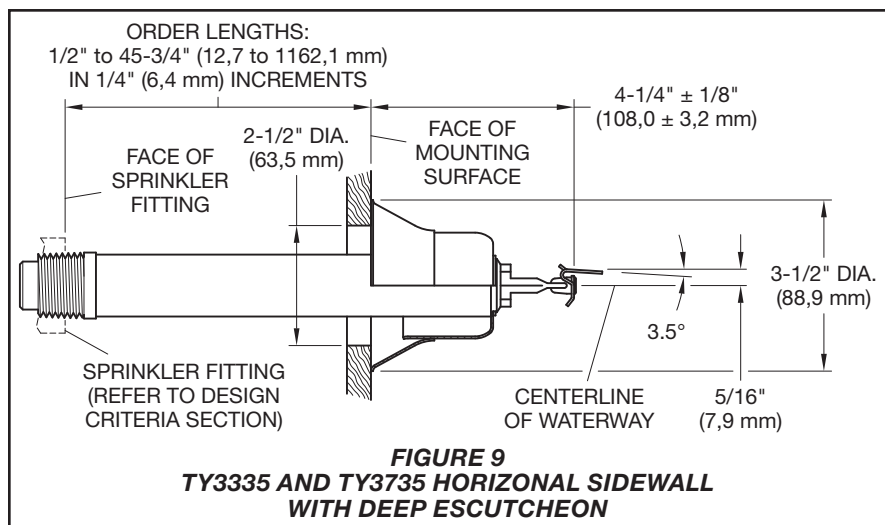
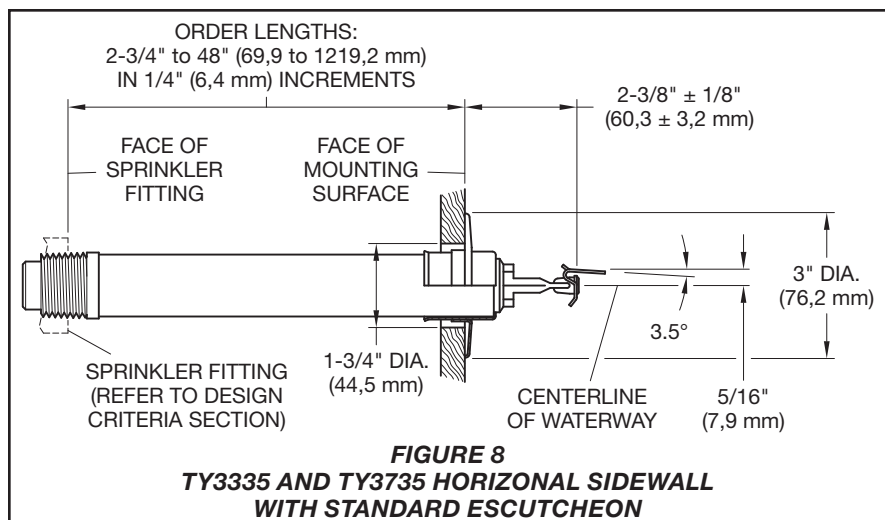
The unused outlet of the threaded tee is plugged as shown in Figure 13.

You can also install the Series DS-1 Dry-Type Sprinklers in the 3/4 or 1 in. NPT outlet of a GRINNELL Figure 730 Mechanical Tee. However, the use of the Figure 730 Tee for this arrangement is limited to wet pipe systems.

TABLE A
3/4 IN. NPT SERIES DS-1 QUICK RESPONSE, STANDARD COVERAGE DRY-TYPE SPRINKLERS
LABORATORY LISTINGS AND APPROVALS

TABLE B
1 IN. NPT (AND ISO 7-R 1) SERIES DS-1 QUICK RESPONSE, STANDARD COVERAGE DRY-TYPE SPRINKLERS
LABORATORY LISTINGS AND APPROVALS





The configuration shown in Figure 12 is only applicable for wet pipe systems where the sprinkler fitting and water-filled pipe above the sprinkler fitting are not subject to freezing and where the length of the Dry-Type Sprinkler has the minimum exposure length depicted in Figure 11. See the Exposure Length section.

For wet pipe system installations of the 1 in. NPT Series DS-1 Dry-Type Sprinklers connected to CPVC piping, use only the following TYCO CPVC fittings:

- 1 in. x 1 in. NPT Female Adapter (P/N 80145)
- 1 in. x 1 in. x 1 in. NPT Sprinkler Head Adapter Tee (P/N 80249)

For wet pipe system installations of the 3/4 in. NPT Series DS-1 Sprinklers connected to CPVC piping, use in the 3/4 in. x 3/4 in. NPT Female Adapter (P/N 80142).

For dry pipe system installations, use only the side outlet of maximum 2-1/2-in. reducing tee when locating the Series DS-1 Sprinklers directly below the branch line. Otherwise, use the configuration shown in Figure 13 to assure complete water drainage from above the Series DS-1 Dry-Type Sprinklers and the branch line. Failure to do so may result in pipe freezing and water damage.

NOTICE

Do not install the Series DS-1 Dry-Type Sprinkler into any other type fitting without first consulting the Technical Services Department. Failure to use the appropriate fitting may result in one of the following:

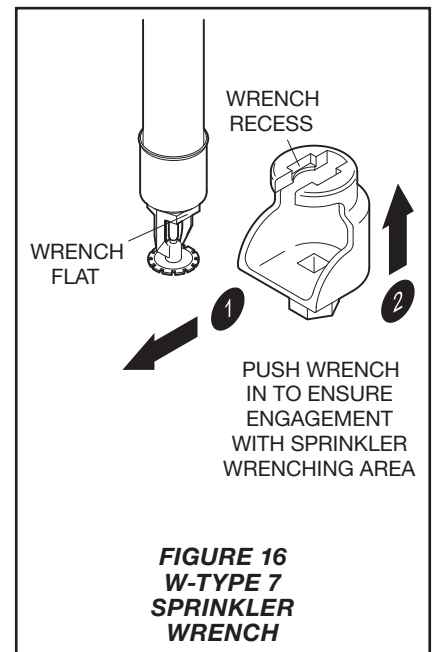
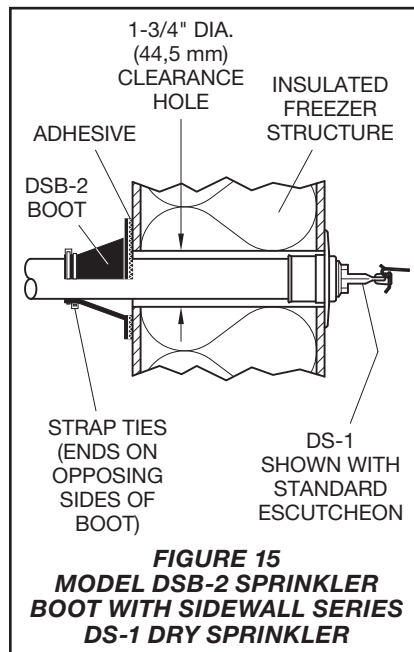
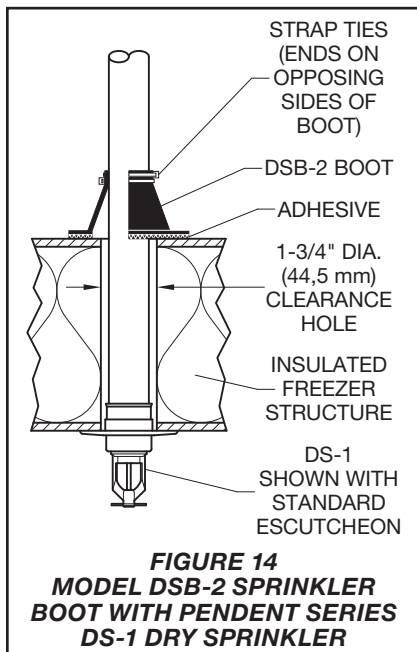
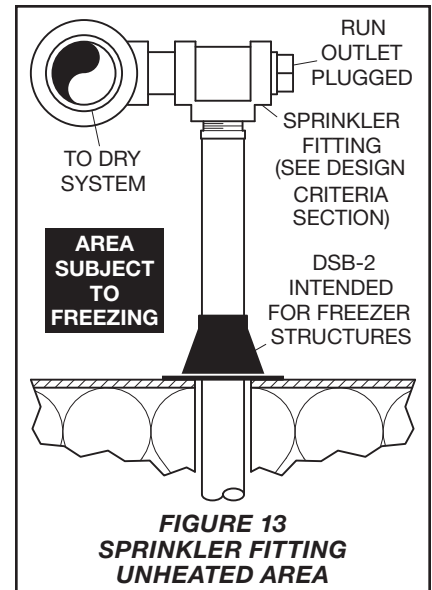
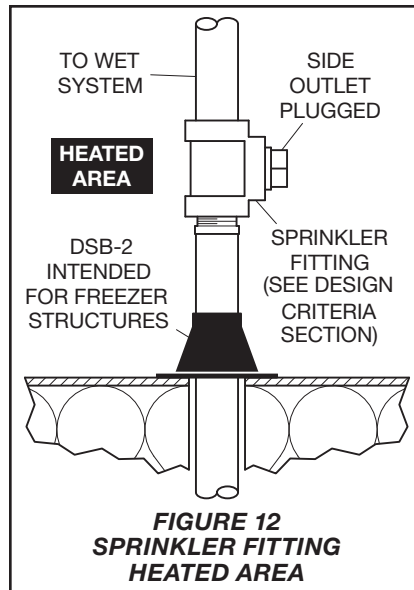
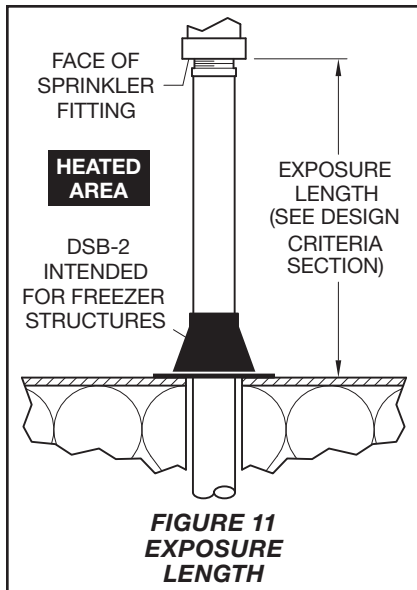
- *failure of the sprinkler to operate properly due to formation of ice over the inlet Plug or binding of the Inlet Plug*
- *insufficient engagement of the Inlet pipe threads with consequent leakage*

Drainage

In accordance with the minimum requirements of the NATIONAL FIRE PROTECTION ASSOCIATION for dry pipe sprinkler systems, branch, cross, and feed-main piping connected to Dry Sprinklers and subject to freezing temperatures must be pitched for proper drainage.

Exposure Length

When using Dry Sprinklers in wet pipe sprinkler systems to protect areas subject to freezing temperatures, use



Ambient Temperature Exposed to Discharge End of Sprinkler	Temperatures for Heated Area ¹		
	40°F (4°C)	50°F (10°C)	60°F (16°C)
	Minimum Exposed Barrel Length ² , in. (mm)		
40°F (4°C)	0	0	0
30°F (-1°C)	0	0	0
20°F (-7°C)	4 (100)	0	0
10°F (-12°C)	8 (200)	1 (25)	0
0°F (-18°C)	12 (305)	3 (75)	0
-10°F (-23°C)	14 (355)	4 (100)	1 (25)
-20°F (-29°C)	14 (355)	6 (150)	3 (75)
-30°F (-34°C)	16 (405)	8 (200)	4 (100)
-40°F (-40°C)	18 (455)	8 (200)	4 (100)
-50°F (-46°C)	20 (510)	10 (255)	6 (150)
-60°F (-51°C)	20 (510)	10 (255)	6 (150)

Notes:

1. For protected area temperatures that occur between values listed above, use the next cooler temperature.
2. These lengths are inclusive of wind velocities up to 30 mph (18,6 kph).

TABLE C
EXPOSED SPRINKLER BARRELS IN WET PIPE SYSTEMS
MINIMUM RECOMMENDED LENGTHS

Table C to determine a sprinkler's appropriate exposed barrel length to prevent water from freezing in the connecting pipes due to conduction. The exposed barrel length measurement must be taken from the face of the sprinkler fitting to the surface of the structure or insulation that is exposed to the heated area. See Figure 11 for an example.

Clearance Space

In accordance with NFPA 13, when connecting an area subject to freezing and an area containing a wet pipe sprinkler system, the clearance space around the sprinkler barrel of Dry-Type Sprinklers must be sealed. Due to temperature differences between two areas, the potential for the formation of condensation in the sprinkler and subsequent ice build-up is increased. If this condensation is not controlled, ice

build-up can occur that might damage the dry-type sprinkler and/or prevent proper operation in a fire situation.

Use of the Model DSB-2 Dry Sprinkler Boot, described in Technical Data Sheet TFP591 and shown in Figures 14 and 15, can provide the recommended seal.

Installation

The TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage must be installed in accordance with this section.

General Instructions

The Series DS-1 Dry-Type Sprinklers must only be installed in fittings that

meet the requirements of the Design Criteria section. See the Design Criteria section for other important requirements regarding piping design and sealing of the clearance space around the Sprinkler Casing.

Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) rating to 1/8 in. (3,2 mm) for the 286°F (141°C) rating.

- A leak-tight 3/4 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 10 to 20 lb-ft (13,4 to 26,8 N·m).
- A leak-tight 1 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 20 to 30 lb-ft (26,8 to 40,2 N·m).

Higher levels of torque can distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in an Escutcheon Plate by under or over-tightening the sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Step 1. Install pendent sprinklers only in the pendent position, and install upright sprinklers only in the upright position. The deflector of a pendent or upright sprinkler must be parallel to the ceiling.

Install horizontal sidewall sprinklers in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. Ensure the word "TOP" on the Deflector faces the ceiling.

Step 2. With a non-hardening pipe-thread sealant such as TEFLON tape applied to the Inlet threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 3. Wrench-tighten the sprinkler using either:

- a pipe wrench on the Inlet Band or the Casing (see Figures 1 and 2)
- the W-Type 7 Sprinkler Wrench on the Wrench Flat (see Figure 16)

Apply the Wrench Recess of the W-Type 7 Sprinkler Wrench to the Wrench Flat.

Note: If sprinkler removal becomes necessary, remove the sprinkler using the same wrenching method noted above. Sprinkler removal is easier when a non-hardening sealant was used and torque guidelines were followed. After removal, inspect the sprinkler for damage.

Step 4. After installing the ceiling or wall and applying a ceiling finish, slide on the outer piece of the escutcheon until it comes in contact with the ceiling or wall. Do not lift the ceiling panel out of its normal position.

When using the Deep Escutcheon, hold the outer piece in contact with the mounting surface (ceiling or wall). Then rotate the inner piece approximately 1/4 turn with respect to the outer piece, to hold the Deep Escutcheon firmly together.

Care and Maintenance

The TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection systems from the proper authorities and notify all personnel who may be affected by this action.

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, can delay the time to sprinkler operation in a fire situation.

A Vent Hole is provided in the Bulb Seat (see Figures 1 and 2) to indicate if the Dry-Type Sprinkler is remaining dry. Evidence of leakage from the Vent Hole indicates potential leakage past the Inlet seal and the need to remove the sprinkler to determine the cause of leakage (for example, an improper installation or an ice plug). Close the fire protection system control valve and drain the system before removing the sprinkler.

Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but

have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. See the Installation Section.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION, for example, NFPA 25, in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

DS-1 Dry-Type Sprinklers

When ordering TYCO Series DS-1 Dry-Type Sprinklers, 5.6K Pendent, Upright, and Horizontal Sidewall, Quick Response (3 mm bulb) and Standard Coverage, specify the following information:

- SIN:
Pendent – TY3935 or TY3235
Sidewall – TY3735 or TY3335
Upright – TY3135
- 5.6 K-factor
- Deflector Style:
Upright, Pendent, or Horizontal Sidewall
- Quick Response, Standard Coverage, Dry-Type Sprinkler
- Order Length:
Dry-Type Sprinklers are furnished based upon Order Length as measured per Figures 3 through 10. After taking the measurement, round it to the nearest 1/4 in. increment.
- Inlet Connections:
3/4 in. NPT, 1 in. NPT, or ISO 7-R 1
- Temperature Rating
- Sprinkler Finish
- Escutcheon Style and Finish, as applicable
- Part Number (P/N) from Table D

The Upright Sprinkler without an Escutcheon (TY3135) is available in 1 in. NPT only.

Part Numbers are for 3/4 in. and 1 in. NPT standard order sprinklers. Orders for all other sprinkler assemblies must be accompanied by a complete description. Refer to the Price List for a complete listing of Part Numbers.

Sprinkler Wrench

Specify: W-Type 7 Sprinkler Wrench, P/N 56-850-4-001

Sprinkler Boot

Specify: Model DSB-2 Dry Sprinkler Boot, P/N 63-000-0-002

This Part Number includes one (1) Boot, two (2) Strap Ties, and 1/3 oz of Adhesive (a sufficient quantity for installing one boot).

P/N* 60 – XXX – X – XXX

		SIN
01	Pendent with Standard Escutcheon (3/4 in. NPT)	TY3935 (Figure 3)
02	Pendent with Deep Escutcheon (3/4 in. NPT)	TY3935 (Figure 5)
03	Pendent with Recessed Escutcheon (3/4 in. NPT)	TY3935 (Figure 4)
04	Pendent without Escutcheon (3/4 in. NPT)	TY3935 (Figure 6)

05	Sidewall with Standard Escutcheon (3/4 in. NPT)	TY3735 (Figure 8)
06	Sidewall with Deep Escutcheon (3/4 in. NPT)	TY3735 (Figure 9)
07	Sidewall without Escutcheon (3/4 in. NPT)	TY3735 (Figure 10)

36	Pendent with Standard Escutcheon (1 in. NPT)	TY3235 (Figure 3)
33	Pendent with Deep Escutcheon (1 in. NPT)	TY3235 (Figure 5)
37	Pendent with Recessed Escutcheon (1 in. NPT)	TY3235 (Figure 4)
32	Pendent without Escutcheon (1 in. NPT)	TY3235 (Figure 6)

34	Sidewall with Standard Escutcheon (1 in. NPT)	TY3335 (Figure 8)
43	Sidewall with Deep Escutcheon (1 in. NPT)	TY3335 (Figure 9)
44	Sidewall without Escutcheon (1 in. NPT)	TY3335 (Figure 10)

38	Upright without Escutcheon (1 in. NPT)	TY3135 (Figure 7)
----	--	-------------------

	SPRINKLER FINISH	ESCUTCHEON FINISH ¹
0	CHROME PLATED	SIGNAL WHITE (RAL9003)
1	NATURAL BRASS	SIGNAL WHITE (RAL9003)
2	NATURAL BRASS	BRASS PLATED
4	SIGNAL WHITE (RAL9003)	SIGNAL WHITE (RAL9003)
8	CHROME PLATED	STAINLESS STEEL
9	CHROME PLATED	CHROME PLATED

	TEMPERATURE RATINGS
0	135°F (57°C)
1	155°F (68°C)
2	175°F (79°C)
3	200°F (93°C)
4	286°F (141°C)

	SAMPLE ORDER LENGTHS ²
055	5.50 in.
082	8.25 in.
180	18.00 in.
187	18.75 in.
372	37.25 in.
480	48.00 in.

Notes:

- Escutcheon Finish applies to sprinklers provided with escutcheons.
- Dry-Type Sprinklers are furnished based upon "Order Length" as measured per Figures 3 through 10, as applicable, and for each individual sprinkler where it is to be installed. After the measurement is taken, round it to the nearest 1/4 in. increment.

* Use Prefix "I" for ISO 7-R 1 Connection (for example, I-60-360-4-055).

TABLE D
SERIES DS-1 DRY-TYPE SPRINKLERS
PART NUMBER SELECTION

MAIN BLDG (WET)

Contractor's Material and Test Certificate for Aboveground piping

PROCEDURE

Upon completion of work inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME: UPPER TANANA HEALTH CLINIC DATE: 9/18/2020

PROPERTY ADDRESS: Jon Sumner Drive 124.4 TOK CUTOFF

PLANS

ACCEPTED BY APPROVING AUTHORITIES (NAMES):

INSTALLATION CONFORMS TO ACCEPTED PLANS

EQUIPMENT USED IS APPROVED

IF NO, EXPLAIN DEVIATIONS:

☒ YES

☐ NO

☒ YES

☐ NO

INSTRUCTIONS

HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? ☒ YES ☐ NO
IF NO, EXPLAIN

HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES:

1. SYSTEM COMPONENTS INSTRUCTIONS

2. CARE AND MAINTENANCE INSTRUCTIONS

3. NFPA 25

☒ YES

☐ NO

☒ YES

☐ NO

☒ YES

☐ NO

☒ YES

☐ NO

LOCATION OF SYSTEM

SUPPLIES BUILDINGS:

SPRINKLERS

MAKE	MODEL	YEAR OF MANUFACTURE	ORIFICE SIZE	QUANTITY	TEMPERATURE RATING
Tyco					

PIPE AND FITTINGS

Type of Pipe: SCH 40 BLACK STEEL
Type of Fitting: CAST IRON

ALARM VALVE OR FLOW INDICATOR

ALARM DEVICE			MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION	
TYPE	MAKE	MODEL	MIN	SEC
<u>Pressure Sw.</u>	<u>Potter</u>	<u>PS10</u>	<u>4</u>	<u>30</u>
<u>Flow Switch</u>				<u>45</u>

DRY PIPE OPERATING TEST

DRY VALVE			Q.O.D.						
MAKE		MODEL	SERIAL NO.	MAKE		MODEL		SERIAL NO.	
Reliable		EX		Reliable					
	TIME TO TRIP THROUGH TEST CONNECTION		WATER PRESSURE	AIR PRESSURE	TRIP POINT AIR PRESSURE	TIME WATER REACHED TEST OUTLET		ALARM OPERATED PROPERLY	
	MIN	SEC	PSI	PSI	PSI	MIN	SEC	YES	NO
Without Q.O.D.									
With Q.O.D.									

IF NO, EXPLAIN

MAIN BUDG (WET)

DELUGE AND PREACTION VALVES N/A	OPERATION ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC							
	PIPING SUPERVISED ☐ YES ☐ NO				DETECTING MEDIA SUPERVISED ☐ YES ☐ NO			
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS ☐ YES ☐ NO							
	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING ☐ YES ☐ NO				IF NO, EXPLAIN			
PRESSURE REDUCING VALVE TEST N/A	MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM?		DOES EACH CIRCUIT OPERATE VALVE RELEASE?		MAXIMUM TIME TO OPERATE RELEASE	
			YES	NO	YES	NO	MIN.	SEC.
TEST DESCRIPTION	LOCATION & FLOOR	MAKE & MODEL	SETTING	STATIC PRESSURE		RESIDUAL PRESSURE (FLOWING)		FLOW RATE
				INLET (PSI)	OUTLET (PSI)	INLET (PSI)	OUTLET (PSI)	FLOW (GPM)
HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (10.2 bars) for two hours. Differential dry-pipe valve clappers shall be left open during test to prevent damage. All aboveground piping leakage shall be stopped. PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop which shall not exceed 1-1/2 psi (.01 bars) in 24 hours. Test pressure tanks at normal water level and air pressure and measure air pressure drop which shall not exceed 1-1/2 psi (.01 bars) in 24 hours.								
TEST	ALL PIPING HYDROSTATICALLY TESTED AT <u>200</u> PSI		FOR <u>2</u> HRS		IF NO, STATE REASON			
	DRY PIPING PNEUMATICALLY TESTED ☐ YES ☐ NO							
	EQUIPMENT OPERATES PROPERLY ☐ YES ☐ NO							
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☒ YES ☐ NO							
	DRAIN TEST	READING OF GAGE LOCATED NEAR WATER. SUPPLY TEST CONNECTION: <u>140</u> PSI				RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE <u>120</u> PSI		
BLANK TESTING GASKETS	UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MAKE TO SPRINKLER PIPING. N.A.							
	VERIFIED BY COPY OF THE U FORM NO. 85B ☒ YES ☐ NO OTHER EXPLAIN							
	FLUSHED BY INSTALLER OF UNDER- GROUND SPRINKLER PIPING ☒ YES ☐ NO							
	IF POWDER-DRIVEN FASTENERS ARE USED IN CONCRETE, HAS REP- RESENTATIVE SAMPLE TESTING BEEN SATISFACTORILY COMPLETED? ☐ YES ☐ NO IF NO, EXPLAIN							
WELDING	NUMBER USED	LOCATIONS					NUMBER REMOVED	
	<u>0</u>							
WELDING	WELDED PIPING ☐ YES ☐ NO							
	IF YES ...							
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☐ YES ☐ NO							
	DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☐ YES ☐ NO							
CUTOUTS (DISCS)	DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO ENSURE THAT ALL DISCS ARE RETRIEVED. THAT OPENINGS IN PIPING ARE SMOOTH. THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT THE INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED? ☐ YES ☐ NO							
	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE THAT ALL CUTOUTS (DISCS) ARE RETRIEVED? ☐ YES ☐ NO							
HYDRAULIC DATA NAMEPLATE	NAME PLATE PROVIDED ☐ YES ☐ NO		IF NO, EXPLAIN					
REMARKS	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN:							
SIGNATURES	<u>9/18/2020</u>							
	NAME OF SPRINKLER CONTRACTOR Yukon Fire Protection Services 5601 Silverado way, Anchorage, AK 99518							
	TESTS WITNESSED BY							
	FOR PROPERTY OWNER (SIGNED)		TITLE		DATE			
FOR SPRINKLER CONTRACTOR (SIGNED)		TITLE		DATE				
		<u>FOREMAN</u>		<u>9/18/2020</u>				
ADDITIONAL EXPLANATION AND NOTES								
Inspector: <u>T. ROW</u> <u>13-044</u> Date <u>9/18/2020</u>								
Name Printed: <u>TREVOR ROW</u>								

(WET)

FIRE PUMP HOUSE SPRINKLER SYSTEM

Contractor's Material and Test Certificate for Aboveground piping

PROCEDURE

Upon completion of work inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME: UPPER TANANA HEALTH CLINIC

DATE: 9/18/2020

PROPERTY ADDRESS: Jon Sumner Drive 124.4 TOK CUTOFF

PLANS

ACCEPTED BY APPROVING AUTHORITIES (NAMES):

INSTALLATION CONFORMS TO ACCEPTED PLANS

☒ YES

☐ NO

EQUIPMENT USED IS APPROVED

☐ YES

☐ NO

IF NO, EXPLAIN DEVIATIONS:

INSTRUCTIONS

HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? ☒ YES ☐ NO
IF NO, EXPLAIN

HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES:

1. SYSTEM COMPONENTS INSTRUCTIONS

☐ YES

☐ NO

2. CARE AND MAINTENANCE INSTRUCTIONS

☒ YES

☐ NO

3. NFPA 25

☒ YES

☐ NO

LOCATION OF SYSTEM

SUPPLIES BUILDINGS:

SPRINKLERS

MAKE	MODEL	YEAR OF MANUFACTURE	ORIFICE SIZE	QUANTITY	TEMPERATURE RATING
Tyco					

PIPE AND FITTINGS

Type of Pipe: SCHED 40 BLACK STEEL
Type of Fitting: CAST IRON

ALARM VALVE OR FLOW INDICATOR

ALARM DEVICE			MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION	
TYPE	MAKE	MODEL	MIN	SEC
Pressure Sw.	Potter	PS10		30
<u>Flow Sw.</u>				

DRY PIPE OPERATING TEST

DRY VALVE			Q.O.D.							
MAKE		MODEL	SERIAL NO.	MAKE			MODEL		SERIAL NO.	
Reliable		EX		Reliable						
	TIME TO TRIP THROUGH TEST CONNECTION		WATER PRESSURE	AIR PRESSURE	TRIP POINT AIR PRESSURE	TIME WATER REACHED TEST OUTLET		ALARM OPERATED PROPERLY		
	MIN	SEC	PSI	PSI	PSI	MIN	SEC	YES	NO	
Without Q.O.D.										
With Q.O.D.										

IF NO, EXPLAIN

(WET)

FIRE PUMP HOUSE SPRINKLER

DELUGE AND PREACTION VALVES N/A	OPERATION							
	☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC							
	PIPING SUPERVISED ☐ YES ☐ NO				DETECTING MEDIA SUPERVISED ☐ YES ☐ NO			
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS ☐ YES ☐ NO							
PRESSURE REDUCING VALVE TEST N/A	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING							
	☐ YES ☐ NO IF NO, EXPLAIN							
	MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM?		DOES EACH CIRCUIT OPERATE VALVE RELEASE?		MAXIMUM TIME TO OPERATE RELEASE	
			YES	NO	YES	NO	MIN.	SEC.
TEST DESCRIPTION	LOCATION & FLOOR	MAKE & MODEL	SETTING	STATIC PRESSURE		RESIDUAL PRESSURE (FLOWING)		FLOW RATE
				INLET (PSI)	OUTLET (PSI)	INLET (PSI)	OUTLET (PSI)	FLOW (GPM)
HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (10.2 bars) for two hours. Differential dry-pipe valve clappers shall be left open during test to prevent damage. All aboveground piping leakage shall be stopped.								
PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop which shall not exceed 1-1/2 psi (.01 bars) in 24 hours. Test pressure tanks at normal water level and air pressure and measure air pressure drop which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.								
TEST	ALL PIPING HYDROSTATICALLY TESTED AT <u>200</u> PSI FOR <u>2</u> HRS IF NO, STATE REASON							
	DRY PIPING PNEUMATICALLY TESTED ☐ YES ☐ NO							
	EQUIPMENT OPERATES PROPERLY ☐ YES ☐ NO							
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☒ YES ☐ NO							
	DRAIN TEST	READING OF GAGE LOCATED NEAR WATER. SUPPLY TEST CONNECTION: <u>140</u> PSI					RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE <u>120</u> PSI	
	UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MAKE TO SPRINKLER PIPING. N.A.							
	VERIFIED BY COPY OF THE U FORM NO. 85B ☒ YES ☐ NO OTHER EXPLAIN FLUSHED BY INSTALLER OF UNDER- ☒ YES ☐ NO GROUND SPRINKLER PIPING							
	IF POWDER-DRIVEN FASTENERS ARE USED IN CONCRETE, HAS REPRESENTATIVE SAMPLE TESTING BEEN SATISFACTORILY COMPLETED? ☐ YES ☐ NO IF NO, EXPLAIN							
BLANK TESTING GASKETS	NUMBER USED		LOCATIONS				NUMBER REMOVED	
	<u>0</u>							
WELDING	WELDED PIPING ☐ YES ☐ NO							
	IF YES ...							
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☐ YES ☐ NO							
	DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☐ YES ☐ NO							
CUTOUTS (DISCS)	DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO ENSURE THAT ALL DISCS ARE RETRIEVED. THAT OPENINGS IN PIPING ARE SMOOTH. THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT THE INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED? ☐ YES ☐ NO							
	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE THAT ALL CUTOUTS (DISCS) ARE RETRIEVED? ☐ YES ☐ NO							
HYDRAULIC DATA NAMEPLATE	NAME PLATE PROVIDED				IF NO, EXPLAIN			
	☐ YES ☐ NO							
REMARKS	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN: <u>9/18/2020</u>							
SIGNATURES	NAME OF SPRINKLER CONTRACTOR							
	Yukon Fire Protection Services 5601 Silverado way, Anchorage, AK 99518							
	TESTS WITNESSED BY							
	FOR PROPERTY OWNER (SIGNED)		TITLE		DATE			
FOR SPRINKLER CONTRACTOR (SIGNED)		TITLE		DATE				
		<u>FOREMAN</u>		<u>9/18/2020</u>				
ADDITIONAL EXPLANATION AND NOTES								
Inspector: <u>T. CROW</u> <u>13-044</u> Date <u>9/18/2020</u>								
Name Printed: <u>TREVOR CROW</u>								

MAIN BLDG (Dry)

Contractor's Material and Test Certificate for Aboveground piping

PROCEDURE

Upon completion of work inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME: UPPER TANANHEALTH CLINIC DATE: 9/18/2020

PROPERTY ADDRESS: Jeff Sumner Drive 124.4 TOL LUTOFF

PLANS

ACCEPTED BY APPROVING AUTHORITIES (NAMES):

INSTALLATION CONFORMS TO ACCEPTED PLANS
EQUIPMENT USED IS APPROVED
IF NO, EXPLAIN DEVIATIONS:

☒ YES ☐ NO
☒ YES ☐ NO

INSTRUCTIONS

HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? ☒ YES ☐ NO
IF NO, EXPLAIN

HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES:

1. SYSTEM COMPONENTS INSTRUCTIONS
2. CARE AND MAINTENANCE INSTRUCTIONS
3. NFPA 25

☐ YES ☐ NO
☒ YES ☐ NO
☒ YES ☐ NO
☒ YES ☐ NO

LOCATION OF SYSTEM

SUPPLIES BUILDINGS:

SPRINKLERS

MAKE	MODEL	YEAR OF MANUFACTURE	ORIFICE SIZE	QUANTITY	TEMPERATURE RATING
Tyco					

PIPE AND FITTINGS

Type of Pipe: SCHED 40 BLACK STEEL
Type of Fitting: CAST IRON

ALARM VALVE OR FLOW INDICATOR

ALARM DEVICE			MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION	
TYPE	MAKE	MODEL	MIN	SEC
Pressure Sw.	Potter	PS10	<u>1</u>	<u>15</u>

DRY PIPE OPERATING TEST

DRY VALVE			Q.O.D.							
MAKE		MODEL	SERIAL NO.		MAKE		MODEL		SERIAL NO.	
Reliable Tyco		EX BVI			Reliable					
TIME TO TRIP THROUGH TEST CONNECTION		WATER PRESSURE		AIR PRESSURE	TRIP POINT AIR PRESSURE	TIME WATER REACHED TEST OUTLET		ALARM OPERATED PROPERLY		
MIN		SEC	PSI	PSI	PSI	MIN	SEC	YES	NO	
Without Q.O.D.	0	10	140	42	25	0	12	1		
With Q.O.D.										

IF NO, EXPLAIN

DELUGE AND PREACTION VALVES N/A	OPERATION ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC								
	PIPING SUPERVISED ☐ YES ☐ NO				DETECTING MEDIA SUPERVISED ☐ YES ☐ NO				
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS ☐ YES ☐ NO								
	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING ☐ YES ☐ NO				IF NO, EXPLAIN				
PRESSURE REDUCING VALVE TEST N/A	MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM? YES NO		DOES EACH CIRCUIT OPERATE VALVE RELEASE? YES NO		MAXIMUM TIME TO OPERATE RELEASE MIN. SEC.		
	LOCATION & FLOOR	MAKE & MODEL	SETTING	STATIC PRESSURE INLET (PSI) OUTLET (PSI)		RESIDUAL PRESSURE (FLOWING) INLET (PSI) OUTLET (PSI)		FLOW RATE FLOW (GPM)	
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (10.2 bars) for two hours. Differential dry-pipe valve clappers shall be left open during test to prevent damage. All aboveground piping leakage shall be stopped. PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop which shall not exceed 1-1/2 psi (.01 bars) in 24 hours. Test pressure tanks at normal water level and air pressure and measure air pressure drop which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.								
TEST	ALL PIPING HYDROSTATICALLY TESTED AT <u>200</u> PSI FOR <u>2</u> HRS IF NO, STATE REASON								
	DRY PIPING PNEUMATICALLY TESTED ☐ YES ☐ NO EQUIPMENT OPERATES PROPERLY ☐ YES ☐ NO								
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☒ YES ☐ NO								
	DRAIN TEST	READING OF GAGE LOCATED NEAR WATER. SUPPLY TEST CONNECTION: <u>140</u> PSI					RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE <u>120</u> PSI		
	UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MAKE TO SPRINKLER PIPING. N.A.								
	VERIFIED BY COPY OF THE U FORM NO. 85B ☒ YES ☐ NO FLUSHED BY INSTALLER OF UNDER- GROUND SPRINKLER PIPING ☒ YES ☐ NO OTHER EXPLAIN								
BLANK TESTING GASKETS	NUMBER USED <u>0</u>		LOCATIONS				NUMBER REMOVED		
WELDING	WELDED PIPING ☐ YES ☐ NO								
	IF YES ...								
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☐ YES ☐ NO								
	DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☐ YES ☐ NO								
CUTOUTS (DISCS)	DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO ENSURE THAT ALL DISCS ARE RETRIEVED. THAT OPENINGS IN PIPING ARE SMOOTH. THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT THE INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED? ☐ YES ☐ NO								
HYDRAULIC DATA NAMEPLATE	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE THAT ALL CUTOUTS (DISCS) ARE RETRIEVED? ☐ YES ☐ NO								
REMARKS	NAME PLATE PROVIDED ☐ YES ☐ NO IF NO, EXPLAIN								
SIGNATURES	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN: <u>9/18/2020</u>								
	NAME OF SPRINKLER CONTRACTOR Yukon Fire Protection Services 5601 Silverado way, Anchorage, AK 99518								
	TESTS WITNESSED BY								
	FOR PROPERTY OWNER (SIGNED)				TITLE		DATE		
FOR SPRINKLER CONTRACTOR (SIGNED)				TITLE <u>FOREMAN</u>		DATE <u>9/18/2020</u>			
ADDITIONAL EXPLANATION AND NOTES									
Inspector: <u>T. ROW</u> <u>13-044</u> Date <u>9/18/2020</u>									
Name Printed: <u>TREVOR ROW</u>									



Capitol Pump Resources

5891 Mullen Road SE • Lacey, WA 98503

(360) 493-1830

Fax: (360) 923-1841

Email: hcaulfield@capitolpump.com

Project: TOK School

Contractor: Yukon Fire Protection
Anchorage, AK

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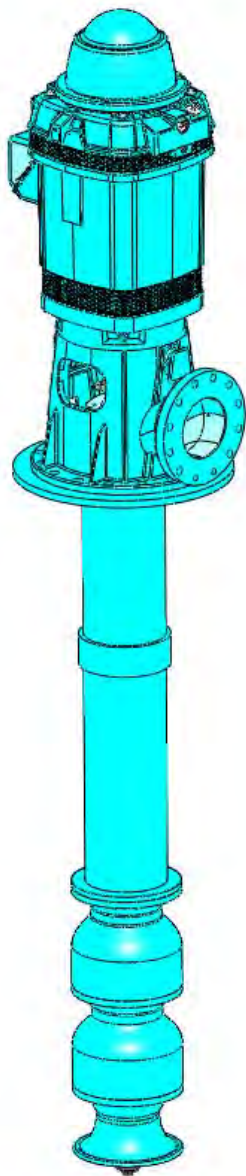
10MAF – 500 GPM @ 135 PSI – 50 HP

2-31 Peerless 10MAF Fire Pump
32-55 Electric Motor

Submitted by Capitol Pump Resources



Peerless Pump Company



Vertical Turbine Industrial Pumps Open Line Shaft (OLS)

Installation, Operation and Maintenance Manual

Pump No.: _____
Serial Number: _____
Invoice No.: _____
Item No.: _____
PO. No.: _____



OLS Vertical Turbine Installation, Operation and Maintenance Manual

Original installation and operating instructions

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Warning

Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.

1. Symbols used in this document



Warning If these safety instructions are not observed, it may result in personal injury.



Warning If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.



Warning When pumping hazardous liquids, special attention must be paid to the risk of personal injury.



Warning

The surface of the product may be so hot that it may cause burns or personal injury.



Warning The sound pressure level is so high that hearing protection must be used.



Warning

These instructions must be observed for explosion-proof pumps. It is advisable also to

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follow these instructions for standard pumps.

Caution

If these safety instructions are not observed, it may result in malfunction or damage to the equipment.

Note

Notes or instructions that make the job easier and ensure safe operation.

2. General information

These instructions should be retained for reference regarding maintenance and operation near the pump. Additional copies can be found at www.peerlesspump.com.

These are general instructions and may not take into account local regulations. The user should ensure such regulations are observed by all parties.

Information in this manual is believed to be reliable. In spite of all the efforts to provide sound and all necessary information, the content of this manual may appear insufficient and is not guaranteed to be complete or accurate in all instances.

2.1 Warranty

This unit is manufactured under a quality management system standard as certified and audited by external quality assurance organizations. Genuine parts and accessories have been designed, tested and incorporated into the products to help ensure their continued product quality and performance in use.

Damage or failure caused by misuse, abuse or failure to follow these instructions are not covered by our warranty.

Any modification of our products or removal of original components may impair the safety of these products in their use.

Standard warranty conditions can be found at www.PeerlessPump.com.

2.2 Personnel qualification

All operations must be carried out by qualified personnel.

2.3 Warnings



Warning

If the site is left unattended before the installation is complete, all openings must be covered to prevent entry of children, animals, stones or any other foreign objects. Use unbreakable covers that cannot be removed without tools.



Warning

When a pump has experienced temperatures over 400 °F (205 °C), skin contact must be avoided with components. Additionally, partial decomposition of fluoro-elastomers (when fitted) will occur.



Warning

Many precision parts have sharp corners and the wearing of appropriate safety gloves and equipment is required when handling these components.



Warning

Hot or freezing components or auxiliary heating supplies can present a danger to

operators and persons entering the immediate area.

Action must be taken to avoid accidental contact. If complete protection is not possible, the machine access must be limited to maintenance staff only, with clear visual warnings and indicators to those entering the immediate area.



Warning

Rapid changes in the liquid temperature can cause thermal shock that can result in damage of pump components and should be avoided.



Warning

When the pump is handling hazardous liquids, care must be taken to avoid exposure to the liquid by appropriate setting of the pump, limiting personnel access and by operator training. If the liquid is flammable and/or explosive, strict safety procedures must be applied.

Gland packing must not be used when pumping hazardous liquids.

Caution

Do not use pump as a support for piping.

Do not mount expansion joints, unless allowed by Peerless in writing, so that their force, due to internal pressure, acts on the pump flange.

Caution

Products used in potentially explosive atmospheres. Special consideration must be taken when pumps are installed in these applications. Contact Peerless for more information.

2.4 Material safety data sheet

As a general practice, material safety data sheets (MSDS) are not supplied with pumps unless required. They may be requested from Peerless.

2.4.1 Noise level

Caution

Whenever pump noise level exceeds 85 dBA, attention must be given to the prevailing health and safety legislation to limit the exposure of plant operating personnel to the noise. The usual approach is to control exposure time to the noise or to enclose the machine to reduce emitted sound.

3. Transport and storage

3.1 Transport and handling requirements

The pump has been prepared for shipment at the factory in such a way as to minimize potential damage due to handling and transport.

Caution

The equipment should not be subjected to excessive g-forces during the handling or transport.

3.2 Receipt and inspection

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Receiver should report any shortage or damage to the transport company handling the shipment and to Peerless Pump.

Prior to installation, take inventory of the shipment to ensure that the parts received match the list of parts on your order.

Note the extent of damage or shortage on the freight bill and bill of lading. Failure to note damage or missing parts may result in declined warranty or replacement of parts.

Note

If the shaft sections were shipped crated, one end or the top of the crate may be opened for a count. Leave the rest of the crate intact to protect the shaft sections during unloading.

It is important that all the components for a pump unit be identified and properly stored until installation is to be done. There may be many small parts (such as line shaft couplings or hardware) that are best left in their shipping container until installation.

Do not unpack any more than required to verify that the equipment is complete and undamaged unless installation is to be done immediately. Check all packaging material that is to be discarded to verify that no parts or instructions are being accidentally discarded. In some shipments, small boxes containing additional parts are bound to pump skids. Leave small parts in their shipping container until installation so they don't get lost. Upon unpacking make certain that accessories with a pump unit are clearly marked showing which pump unit they are to be used with.

3.3 Rigging and lifting

For a pump with an overall length up to 30 feet (9 m) it may be convenient to install the column and shaft sections directly from the transporting vehicle (block and brace).

When pumps are received unassembled, all the parts should be located close to the location where the pump will be installed.

Arrange timbers parallel on the ground to support the pump column and shafts.

Caution

Pump parts that are too heavy to be lifted by hand must be lifted from the transporting vehicle with a suitable hoist. Lifting chains or cables must not contact machined surfaces.

Crated shaft sections should be unloaded from the vehicle in the crate and not be uncrated until ready for installation.

Caution

Parts which are provided with lifting lugs, lifting ears or eyebolts should be lifted by these points only. They may not be used for lifting the entire pump.

When lifting the entire pump, use the lifting lugs on the discharge head.

Caution

Column, tube and shaft sections should be handled with extreme care to prevent misalignment and pump malfunction. Shafts are especially sensitive. Bent or dropped shafts should not be used as they are certain to cause pump failure.

Certain extra-long, relatively small-diameter bowl assemblies may be shipped attached to skids bearing a special notation such as:

CAUTION - DO NOT REMOVE THIS PROTECTIVE SKID UNTIL THE BOWL ASSEMBLY IS IN A VERTICAL POSITION, READY TO BE INSTALLED IN THE WELL OR SUMP. RETAIN THIS SKID FOR USE WHEN REMOVING THE BOWL ASSEMBLY FROM THE WELL OR SUMP.

Caution

Remove suction accessory (such as strainer or vortex plate), if installed, from the suction manifold or case prior to lifting the pump assembly. This action will prevent damage to the suction accessory, ensuring the device is not used as a pivot point during lifting. It is very important to observe this precaution when handling these units.



Warning

Do not work under a suspended object unless you have taken precautions to stop its fall in event of sling or hoist failure.

3.4 Storage

Standard factory packaging is suitable for protection during shipment and during covered storage at jobsite for a short period between installation and startup. The preservatives applied at the factory have an effective life of two to three months from date of shipment from factory, depending on the severity of the environment in which the equipment is exposed. For international destination this will vary depending on the sea worthiness of export boxing.

3.4.1 Controlled storage

Storage facilities should be maintained at an even temperature of at least 10 °F (5.5 °C) above the dew point with relative humidity lower than 50 % and little or no dust. The equipment is to be inspected weekly to ensure that all preservatives are intact and internals are protected.

Inspect and recoat periodically the equipment with water displacement rust inhibitors (VPCI-368-021, Rust-Ban 392 or equal), crusting grease (Rust-Ban 326 or equal), vapor phase inhibitor (Shell VPI-260 or equal) or rust preventative coating (Rust-Ban 373 or equal).

Protect the equipment from flooding or from harmful chemical vapors.

Storage should be free from ambient vibration. Excessive vibration can cause bearing damage.

Caution

Precautions should be taken to prevent rodents, snakes, birds or insect from nesting inside the equipment.

3.4.2 Uncontrolled storage

For uncontrolled storage periods of three months or less, the equipment is to be inspected weekly to ensure that all preservatives are intact and internals are protected.

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Inspect and recoat periodically the equipment with water displacement rust inhibitors (Rust-Ban 392 or equal), crusting grease (Rust-Ban 326 or equal), vapour phase inhibitor (Shell VPI-260 or equal) and/or rust preventative coating (Rust-Ban 343 or equal).

All pipe threads and flanged pipe covers are to be sealed with tape. Furthermore you should place 10 pounds (4.5 kg) of moisture-absorbing desiccant or 5 pounds (2.3 kg) of vapor phase inhibitor crystals near the centre of pump.

If the pump is assembled, place an additional one pound in the discharge of the pump securely fastened.

Install a moisture indicator near the perimeter of the pump. Cover the equipment with black polyethylene or equal with a minimum thickness of 0.006 (0.15 mm). Provide a small ventilation hole approximately the size of a small coin.

Provide a roof or shed shelter to protect from direct exposure to the elements.

If equipped, connect space heaters on equipment such as motors, engines or controls.

3.4.3 Standard short-term storage

The pump and equipment, as shipped, have adequate protection for short-term (two to three months) storage in a covered, dry and ventilated location at the job site prior to installation.

For packed-type pumps, remove stuffing box packing and place it in a sealed plastic bag. Apply a film of compatible lube oil over the water displacement rust preventative (Rust-Ban 632 or equal). Seal the end of the stuffing box with rolled vapor phase inhibitor paper and seal with weatherproof tape. For packed-type pumps the packing gland may be left on the pump shaft, but should be securely fastened in position.

If mechanical seals are to be used, the annular opening between gland plate and shaft should be closed to exclude airborne dust.

Additionally, all connections in the seal cartridge must be plugged or sealed.

All exposed machined surfaces should be thoroughly coated with a firm film rust preventative material (Rust-Ban 373 or equal) that is readily removable with a petroleum distillate product.

All exposed painted surfaces should be dry, clean and free of grease and other contaminants.

After pump has been thoroughly drained, cover the pump suction and discharge flanges with a cover (typically cardboard or wood) to blank off these openings.

Rotate pump shaft per the rotation arrow on pump several revolutions at least once per week to coat the bearing with lubricant and to retard oxidation and corrosion, flat spots and staining. Shaft should end up 90 ° from starting point.

To place the pump in operation, all protective coverings and coatings should be properly removed. For packed-type pumps, repack the stuffing box with the proper number of packing rings from bag. If the packing appears to be damaged or otherwise unfit, it should be replaced.

See section 3.4.4 Long-term storage when the startup of equipment is made over three months from the date of shipment from the factory.

3.4.4 Long-term storage

Long-term storage protection from the factory does not extend the warranty in any manner. Warranty policy is twelve months from startup or eighteen months from time of shipment, whichever occurs first. This warranty is valid only if equipment has been properly handled and stored as per the stated requirements.

Should the equipment be stored or handled improperly, then the warranty is invalid and may be reinstated only after a factory representative is allowed to inspect the equipment prior to startup. Expenses for the representative will be billed in accordance with the latest schedule for field service engineer.

Any repairs or repair parts needed will be billed to the customer at prices in effect at time of shipment of these repairs/parts.

At the time of pump specification and/or order placement Peerless Pump should be advised about the extended storage duration so that special long-term storage protection can be provided for the equipment prior to shipping to the job site.

Inspection of the equipment by a factory representative prior to startup is normally required to ensure equipment integrity and compliance with warranty requirements.

In addition to complying with the standard short-term and storage atmosphere conditions, the following considerations are required:

Dry pump internals and spray the liquid end with a water displacement rust inhibitor (Rust-Ban 392 or equal).

Enclose vapor inhibitor in pump internals (Shell VPI 260 or equal).

Apply a film of compatible lube oil over the water displacement rust preventative (Rust-Ban 632 or equal).

After pump has been thoroughly drained, cover the pump suction and discharge flanges with full natural rubber gasket material and blank off these openings with metal blank flanges and a minimum of four full sized bolts. Cover the pump stuffing box opening with a non-hygroscopic tape.

Cover the equipment with black polyethylene or equal with a minimum thickness of 0.006 (0.15 mm) and seal it with tape. Provide a small ventilation hole approximately the size of a small coin.

The pump should be inspected at regular periods.

Rotate the pump shaft per the rotation arrow on the pump several revolutions at least once per week to coat the bearing with lubricant and to retard oxidation and corrosion, flat spots and staining. The shaft should end up 90 ° from starting point.

To place the pump in operation, all protective coverings and coatings should be properly removed. For packed-type pumps, repack the stuffing box with the proper number of packing rings from bag. If the packing appears to be damaged or otherwise unfit, it should be replaced.

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3.4.5 Accessories storage

Store accessories according to the manufacturer's instructions.

Long-term storage should not be undertaken without written understanding from manufacturer.

3.5 Disposal of packaging materials

See section 10. Disposal

4. Identification

4.1 Nameplate

Each pump has a nameplate which list serial number. See fig. 1 and 2. The serial number is needed when contacting Peerless Pump with questions or service request.

When a driver is supplied, there will also be a nameplate on the driver. When requesting information about the driver, both the driver serial number and the pump serial number will be required.

Information on the discharge head nameplate includes the following:

- serial number
- rated flow rate
- rated speed
- rated head
- pump size/model
- pump manufacturer and location.
- certification mark (UL fire or other), if any.

Information of the bowl assembly nameplate includes the following:

- pump size/model
- serial number
- pump manufacturer and location.

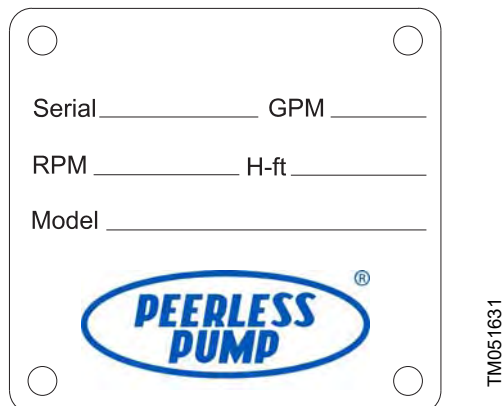


Fig. 1 Nameplate of discharge head

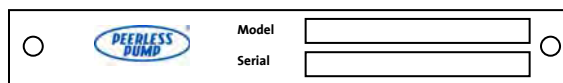


Fig. 2 Nameplate of bowl assembly

4.1.1 Certifications

If the product carries an industry certification (UL fire or other), it will be noted on the pump nameplate. Contact Peerless Pump for additional information.

4.1.2 Pump

The pump size/model is given with a number, letter(s) followed by a number such as 12MB-4. These would represent the nominal bowl diameter or well size the bowl assembly would go into, the pump model and the number of stages.



4.2 Type key for vertical turbine pump

Code Example 10HH 12MB-5 L4-O -1/8 -F-8-1.50 -G -P -H

	10HH	12MB	-5	-L4	-O	-1	/8	- F	-8	-1.5	-G	-P	-H
Special First Stage Bowl (if supplied): Bowl Size and Hydraulic Design													
Bowl Size and Hydraulic Design													
Total # of Stages													
Configuration Code													
L1 – Suction Case / Threaded Discharge Bowl													
L2 – Suction Case / Threaded Discharge Case													
L3 – Suction Case / Flanged Column													
L4 – Suction Bell / Threaded Bowl													
L5 – Suction Bell / Threaded Case													
L6 – Suction Bell / Flanged Column													
Shaft Enclosure Type													
O- OLS													
E - ELS													
Bowl/Casing Material													
1 – Cast Iron													
2 – Ductile Iron													
4 – 316LSS													
5 – CD4MCu													
9 – Nickel-Aluminium Bronze													
Z – Special													
Impeller Material													
1 – Cast Iron													
4 – 316LSS													
5 – CD4MCu													
8 – Aluminium Bronze													
9 – Nickel-Aluminium Bronze													
Z – Special													
Column Connection													
T – Threaded													
F – Flanged													
Column Diameter (inches)													
Line Shaft Diameter (inches)													
Head Type													
B – Bowl Only													
S – "S" Type													
C – "C" Type													
G – "G" Type													
U – "UG" Type													
R – "FRA" Type													
A – "FA" Type													
Z – Special													
Type of Sealing													
P – Packing													
S- Seal													
Motor Type													
H – VHS													
S – VSS													
T – Thrust Pod & VSS													
Z – Special													



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4.3 Type key for vertical turbine fire pump

Code Example 12MBF-9-L4-UF-1/8-8-O-G-US-F-N

	12MB F	-9	-L4	-UF	-1	/8	-8	-O	-G	-US	-F	-N
Bowl Size and Hydraulic Design												
Total # of Stages												
Configuration Code												
L1 – Suction Case / Threaded Discharge Bowl												
L2 – Suction Case / Threaded Discharge Case												
L3 – Suction Case / Flanged Column												
L4 – Suction Bell / Threaded Bowl												
L5 – Suction Bell / Threaded Case												
L6 – Suction Bell / Flanged Column												
Fire Listing												
UF – UL/FM												
UL – UL Only												
FM – FM Only												
NF – NFPA Compliant												
ZZ - Special												
Bowl/Casing Material												
1 – Cast Iron												
2 – Ductile Iron												
4 – 316LSS												
5 – CD4MCu												
9 – Nickel-Aluminium Bronze												
Z – Special												
Impeller Material												
1 – Cast Iron												
4 – 316LSS												
5 – CD4MCu												
8 – Aluminium Bronze												
9 – Nickel-Aluminium Bronze												
Z – Special												
Column Diameter (inches)												
Shaft Enclosure Type												
O- OLS												
E - ELS												
Head Type												
B – Bowl Only												
S – "S" Type												
C – "C" Type												
G – "G" Type												
U – "UG" Type												
R – "FRA" Type												
A – "FA" Type												
Z – Special												
Driver Type:												
BO - By Other												
US - USEM												
GR - Grundfos												
GE - General Electric												
MA - Marathon												
WE - WEG												
ZZ - Special												
CL - Clarke												
CU - Cummins												
Controller Type:												
N - None By other												
G - Grundfos												
F - Firetrol												
T - Tornatech												
M - Master												
Gear Type:												
N - None By other												
D- DeRan												
A- Amarillo												
R- Randolph												

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5. Installation

5.1 Factory support

For customized products, we recommend that you have a Peerless Pump service engineer supervise installation and startup.

This is to ensure that the machinery is properly installed. You will then also have the opportunity to review, and see implemented, factory-recommended instructions.

5.2 Location

Note

Locate pump discharge piping (and suction piping when applicable) as well as auxiliary equipment, control and starting panels so that adequate access is provided for maintenance. Adequate floor space and working room should also be provided for maintenance.

Note

To minimize frictional head loss, locate the pump so that it can be installed with a short and direct discharge pipe and with the least number of elbows and fittings. If practical, it should be placed so that it will be accessible for inspection during operation. Pumps, drivers and controls should be protected against flooding.

5.2.1 Checking wells

Inspect the well before beginning installations. See fig. 3.

A crooked well may bind and distort the pump column or pump-motor assembly resulting in potential malfunction.

Well straightness should be in accordance with local standards such as AWWA-A100. If straightness is in doubt, the well should be checked prior to installation by lowering a dummy assembly, slightly longer and larger on the diameter than the actual pump or pump-motor assembly, on a cable. This is also important when a stepped well casing is used, with the lower part of the well casing having a smaller inside diameter.

Caution

Wells that have not been properly constructed or developed, or which produce sand, can be detrimental to a pump. If a well is suspected of producing an excessive amount of sand, a unit other than the production pump should be used to clear the well.

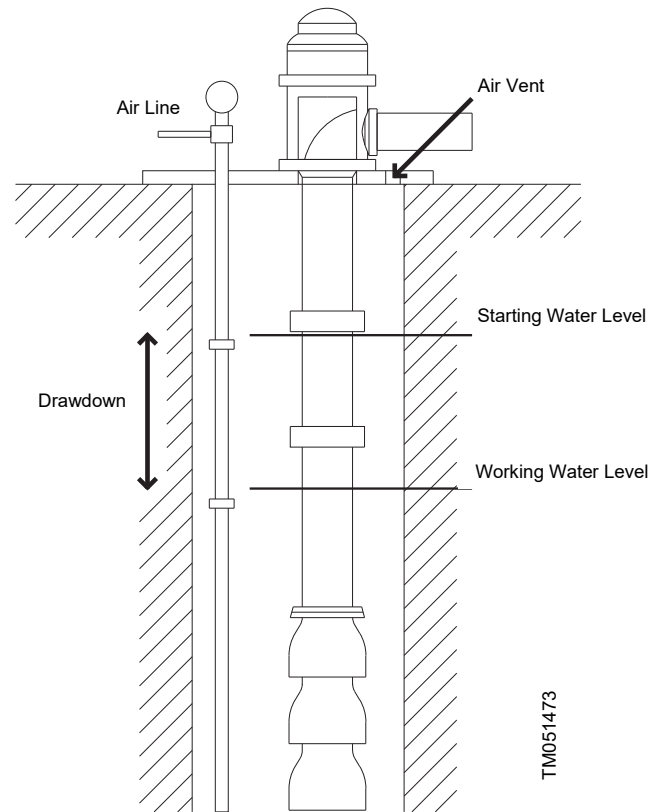


Fig. 3 Typical deep well installation

5.2.2 Checking wet pits

The configuration of the intake structure should be in accordance with industrial standards, such as HI 9.8, Pump Intake Design.

Dimensional checks should be made as follows to prevent installation and servicing problems.

1. Length of pump versus depth of sump.
2. Correct fit of anchor bolts sole plate (if supplied) or discharge head. If sole plate is supplied, check fit of holes from sole plate to discharge head.
3. Satisfactory angular location of anchor bolts or correct alignment of discharge head to discharge piping.
4. Proper conduit location provided for driver.
5. Sufficient head room for handling.

5.3 Foundation

The pump must be installed on a foundation rigid enough to support the entire weight of the pump plus the weight of the fluid contained in it. Weak foundations or foundations on unstable ground can cause misalignment, vibration, and even total foundation failure.

The mass of the foundation should be sufficient, preferably five times that of the rotating element of the pumping equipment, to form a permanent and rigid support for the base plate or discharge head. This is equally important whether the pump is installed over a pit, over a well or into a suction barrel.



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Foundation and base plate bolt sizing is critical, particularly on high-pressure pumps, to adequately restrain reaction forces such as from directional flow change, system transients and sudden valve closure. Concrete foundations may have anchor bolts installed in sleeves that are two times the diameter of the bolt to allow alignment and should be located by a drawing or template.

Caution

Steel support structures may not be stiff enough even if their mass exceeds five times that of the rotating element. A civil engineer should review and approve a steel support structure before pump installation.

A barrier or frame (dam) to retain the grout between the pump base and the foundation must be provided around the hole for the pump column.

Some pumps are provided with a base plate or suction barrel that fits between the discharge head and the foundation. In this case, the foundation bolts must align with the holes in the base plate or suction barrel rather than those in the discharge head. The base plate is normally installed with the pump, but can be installed before the pump.

Whether the base plate is installed prior to the pump installation or at the same time, the discharge head must be attached to the base plate. Check that the bottom of the discharge head has been machined over its entire surface and is clean and free of burrs and nicks. The machined surface of the base plate is installed against the machined surface of the discharge head.

Failure to have each component's surface machined will result in excessive vibration.

Follow the instructions in sections 5.4.1 Leveling and 5.4.2 Grouting. After the grout is cured (a minimum of 48 hours), the discharge head may be removed to start the pump installation. Peerless Pump does not recommend installation of the base plate without the discharge head. If, however, there is no choice except to install the base plate alone, use the machined surface at the top of the base plate (the discharge mounting surface) for leveling.

Caution

Position the foundation and the foundation bolts so that the discharge head will be in accurate alignment with the discharge piping.

5.3.1 Seismic analysis

When pumps are located in seismically active areas and for certain critical installations the pumps, supports and accessories should be earthquake-resistant. The design specifications to achieve earthquake resistance vary, depending upon geographical area, class of the equipment (defining how critical the survival of the equipment is) and the characteristics (acceleration response) of the structure or foundation supporting the pump.

Complete specifications for earthquake-resistance requirements should be supplied by the customer. This includes the following:

- the seismic criteria, such as acceleration, magnitudes, frequency spectrum, location and direction relative to pump
- the qualification procedure required, i.e., analysis, testing or a combination of these, and requirements for operability during and/or after test.

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5.4 Rigging and lifting

For typical installations, suitable overhead lifting equipment of adequate capacity to lift the driver, the entire pump (without driver) or the heaviest subassembly of the pump should be available at the job site when installing or removing the pump.

Adequate headroom should be provided to accommodate the longest section of the pump to be handled, including rigging.

Properly sized slings, chains and shackles should be available for attaching to the lifting lugs (eyes). Eyebolts are required for handling pump sections when lifting lugs are not provided.

Caution

I-beams or column clamps for supporting pump subassemblies at the foundation should be available when it is necessary to install the pump in sections. Common tools are used for this type of work, including a machinist level to ensure proper leveling of the foundation plate.

5.4.1 Leveling

1. Remove the supporting timbers, rope and any other equipment from the top of the foundation.
2. Cover the discharge head to protect it from dust, and sweep the foundation clean.

Note

If the base plate is not already grouted in place, be certain that the grouting dam around the foundation opening is in place before lowering the pump assembly onto the foundation.

3. Lower the pump until the base of the discharge head or base plate is just above the foundation bolts.
4. Orient the pump so that the discharge outlet is in the desired direction and the holes in the base align with the foundation bolts.
5. Continue to lower the pump until the bolts just enter the holes in the base.
6. If the foundation is concrete, place the wedges (furnished with the pump) under the discharge head or base plate, adjacent to the bolt holes, one under each of the four sides. For structural foundations (made up of I-beams or H-beams), use shims under the corners.
7. Continue to slowly lower the pump until the base of the discharge head or base plate rests on the shims or anchor bolts with washers and nuts.

Caution

Accurate alignment of the discharge head in relation to the pump shaft is absolutely essential for smooth and trouble-free operation.

8. By using the wedges or washers and nuts on the anchor bolts, adjust the discharge head flange centre line to the correct elevation.
9. While maintaining the correct elevation, adjust the nuts and washers or shims to achieve the specified levelness of 0.005" per foot (0.4 mm per meter) in both directions as shown in fig. 4. The levelness should be measured by placing a precision level on the machined face of the discharge head motor register.

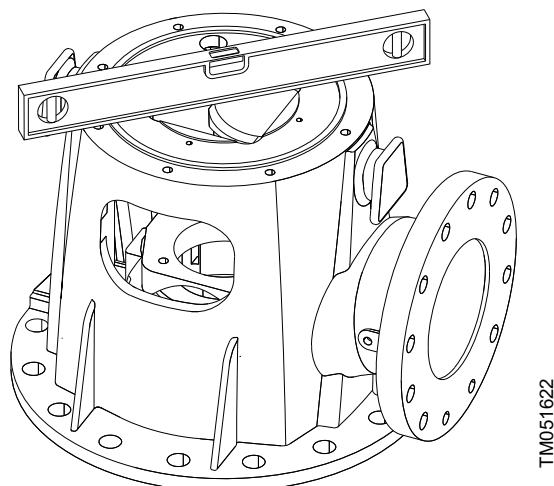


Fig. 4 Check for levelness in two directions

Caution

Never attempt to align the discharge head of a well pump using a spirit (carpenter's) level. If the pump column does not hang freely in the well, as might be the case when the well is drilled at a slight slant, leveling the discharge head will not ensure the necessary shaft alignment and clearance in the driver spindle. The discharge head base must be square with the pump shaft regardless of the result indicated by a spirit level. A bent shaft could occur, causing early pump failure and expensive repair.

10. For other applications, place a machinist's level on the driver mounting surface of the discharge head, orienting it parallel with one of the edges of the base.
11. Move the wedges or add more shims until the level reading reaches 0.005" per foot (0.4 mm per meter).
12. Reorient the level on the same surface, 90 ° from the original position.
13. Again adjust the wedges or shims until a 0.005" (0.12 mm) level reading is reached, taking care not to upset the levelness in the first direction.
14. After each adjustment, check for levelness in both directions.
15. Push in or add to any loose shims to distribute the weight evenly.
16. Fit nuts on the foundation bolts and tighten them gradually and uniformly.
17. Check the level readings in both directions.
18. If necessary, loosen the foundation bolts and readjust the wedges or shims, tighten the bolts again and check the level readings.

5.4.2 Grouting

After the discharge head is at the correct location and leveled with a precision level, the discharge head and/or base plate need to be grouted to the foundation.

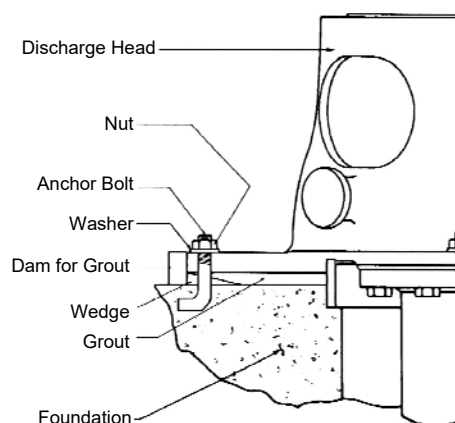


Fig. 5 Typical foundation without base plate

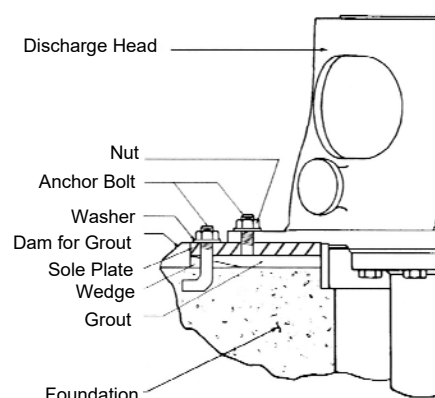


Fig. 6 Typical foundation with base plate

Use only non-shrinking grouting material for grouting the discharge head, base plate or suction barrel to the foundation

1. Build a dam on the foundation, enclosing an area around the discharge head that includes all alignment wedges. The top of the dam should be approximately 1/2 inch (12 mm) above the bottom of the discharge head base. See fig. 5 and
2. Pour the grouting material into the dammed-in area and force it between the discharge head and the foundation all around.
3. Level off the grout flush with the top of the dam.
4. Allow the grout to cure at least 48 hours before tightening the foundation bolts or starting the pump.

5.5 Installation preparations

5.5.1 Inspection

All pump parts were carefully inspected before leaving the factory, but may have become soiled or damaged in shipping and handling or storage at site. The installer must therefore check that all parts are clean and undamaged before installing them.

Caution

Do not step or walk on the shafts. Do not place other parts or equipment on the shafts.



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Use appropriate solvent to wash off any protective coating from the shaft sections and wipe thoroughly clean and dry. Clean the shaft coupling threads using a wire brush and solvent, cover both ends, and store couplings in a clean place until ready for use.

Unless the pump is less than 30 feet (9 m) and was shipped from the factory pre-assembled, all installation and assembly must be done vertically. If the unit was shipped assembled from the factory, check all pump, tube (if applicable) and column joints for tightness with the pump in the vertical position and with its weight borne by support clamps around the well or sump opening.

Caution

Do not attempt to assemble the bowl, column, shaft and discharge head horizontally on the ground. This could cause bending and damage the shaft sections, tubing (if applicable) and possibly the column pipe and lead to malfunction of the pump.

The well or sump must be thoroughly cleaned of dirt, debris and contaminants before installing the pump. After the installation, the well or sump should again be inspected for foreign matter and cleaned, if necessary. If it is suspected that the fluid will contain sizable solid particles or that foreign objects may enter the sump or well, a suction strainer should be installed with the pump and cleaned periodically. Your Peerless Pump dealer will be glad to advise you on the need for a suction strainer. Dirt, sand, etc. in the sump or well will cause premature wear on the critical pump internal surfaces, resulting in reduced pump performance.

Check that shaft sections are straight and have not been bent in shipping or handling.

1. Set a pair of rollers or V-blocks on a firm base next to the pump site to support one shaft section. See fig. 7.
2. Provide a solid mounting for a dial indicator at points 1, 2 and 3.
3. Place a shaft on the rollers or V-blocks and rotate it slowly by hand while checking the eccentricity (runout) at points 1, 2 and 3. It should not exceed 0.005 inches (0.12 mm).
4. Check all shaft sections in this manner. Do not use any shaft section that exceeds the limits given. Shafts that do not meet the runout may be straightened.

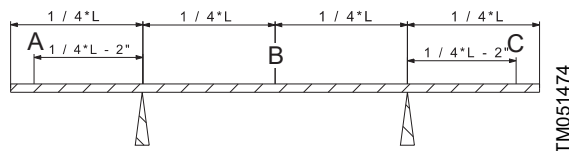


Fig. 7 Checking the shaft straightness

The shaft may be re-straightened by either the heating and cooling technique or bending it back to straight by use of a press. All re-straightened shaft sections must have a cleanup cut machined on both ends and must be checked for eccentricity.

Larger shafts and shafts for non-threaded (split-ring) couplings may have an internal threaded hole on one end; this end goes up.

In a flanged column pump, the intermediate column sections have identical ends; either end may be upward. However, the top and bottom sections may not have identical ends. See the assembly drawing for the proper orientation. If the flanged

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column has an integral bearing retainer, that end faces upward.

5.5.2 Assembling the pump

The preferred method is to install the shaft and couple it, then install the column over the shaft, provided that head room permits.

Caution

When inserting the shaft sections into the column section, take care not to bend the shaft or damage the threads.

1. Check the total length of the bowl assembly, suction pipe and strainer (if any) to see whether the hoist clearance is sufficient to handle these parts as a unit. If the clearance is sufficient, fit the strainer to the suction pipe and the suction pipe to the bowl assembly. Lay this assembly across the timbers, close to the sump, ready for installation.

If head room is limited, pre-assemble all the standard shaft and column sections. Alternatively the unit may be assembled over the well. Do not insert the top shaft section into the top column section at this time.

2. Before proceeding with the actual installation, check to see that all the pump parts and equipment have been prepared according to the directions given in this section.

5.5.3 Installing the bowl assembly

1. Place two eyebolts diametrically opposite in the upper flange of the bowl assembly.
2. Attach a sling to the eyebolts using suitable shackles and pass the looped end of the sling over the hoist hook.
3. Lift the bowl assembly in such a way so that it is not dragged or bumped in order to prevent damage to any part of the pump.
4. While the bowl is in the vertical position, install the strainer, if provided.
5. Fasten a box-type clamp or elevator clamp to the bowl assembly, just below the upper flange. See fig. 8.

Caution

Never attempt to handle or lift the bowl assembly by the shaft protruding from the upper end. This could result in bending of the shaft.

6. Lower the bowl assembly until it rests securely on the support beams. See fig. 8.

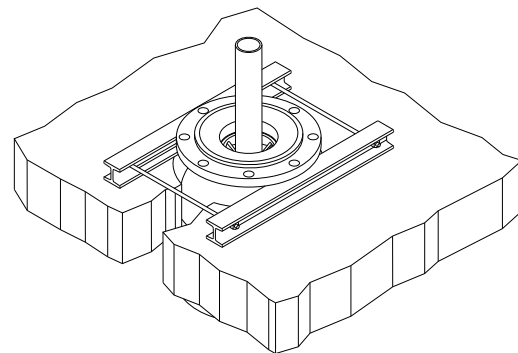


Fig. 8 Bowl assembly supported by a box-type clamp

7. Place over the top of the bowl assembly a specially made wood or metal apron that covers the opening and fits closely around the impeller shaft. Wrap a clean rag tightly around the

shaft, over the apron. This will prevent entry of foreign matter into the bowl assembly.

Caution

Take care not to drop tools, screws, nuts or any other foreign objects into the bowl assembly or sump. Such an object could impair pump performance or ruin the impellers. If passed by the pump into the discharge piping, a solid object could cause serious damage to downstream components.

Any foreign object dropped into the pump column must be retrieved before proceeding with the pump installation. If any foreign object is dropped into the sump, it must be retrieved prior to starting the pump.

5.5.4 Installing the column and shaft

1. Head room permitting, lift the appropriate-length shaft into a vertical and plumb position. Check shaft threads for any foreign materials or damage, and clean threads with a wire brush and solvent as required.

Caution

Shaft threads are left-hand and must be clean and deburred.

2. Coat the shaft face and threads with anti-seize compound.
3. Check the shaft coupling for any damage or foreign material and clean, if necessary.
4. Screw the coupling onto shaft for half its distance. Approximately 1 1/2 shaft threads will be visible when coupling is in half-way position. Another check for correct positioning of the coupling on the shaft is to insert a fine wire into the drilled hole in the centre of the coupling.
5. Visually inspect the shaft threads and face of the mating shaft. Coat them with antiseize compound.
6. Lower the shaft and coupling onto the lower (bowl assembly) shaft.
7. Manually screw coupling until tight. If resistance is encountered, remove the coupling and shaft, and inspect the threads at both the coupling and shaft to determine the problem. Because the threads of the shaft and coupling are straight (not tapered), one should be able to tighten them by hand until the two faces mate.
8. Check the tightness of the mating by using two pipe wrenches as shown in fig. 9. No noticeable movement should occur when the pipe wrenches are used to check the tightness of the hand-mating. If movement is noticed, it would be an indication that foreign material has gotten between the faces of the two shafts and, by using the wrenches, you are causing movement by compressing the foreign material. Separate the shafts, remove the foreign material and correct any scoring on the shaft faces.

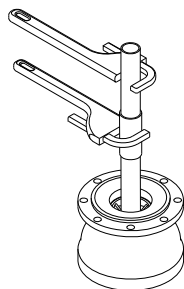


Fig. 9 Making a shaft joint

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9. Connect a dragline to the lower end of the column flange, to be used in guiding and aligning the column over the shaft. See fig. 10. The use of the dragline will prevent accidental bumping of the shaft by the column that could bend the shaft.
10. If gaskets or O-rings are used between the flange joint, fit the appropriate gasket/O-ring on the bowl flange.
11. If the column pipe is threaded and coupled, the threads should be thoroughly cleaned and lubricated. With column supported, start the threads by hand to be sure the no cross-threading occurs. Then completely tighten the pipe against the discharge bowl using a chain wrench.
12. With the column aligned over the shaft-bowl assembly, lower it onto the bowl flange.
13. Check that the two flanges are properly registered, and fit and cross-tighten fasteners.

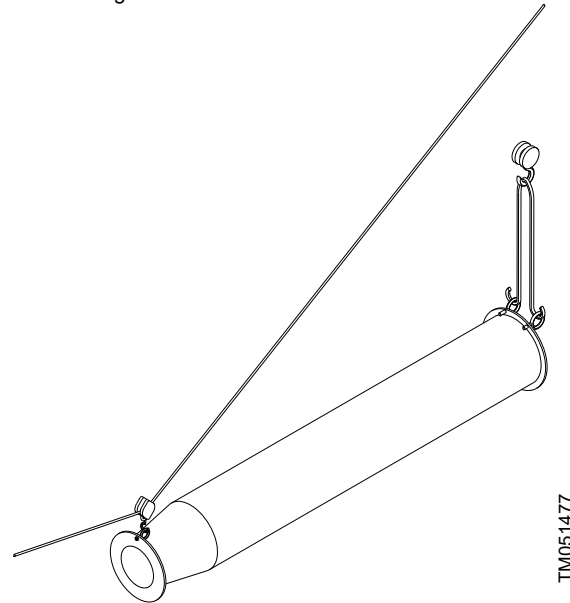


Fig. 10 Column section with dragline attached

5.5.5 Installing the bearing retainer

Note

Keep rubber bearings free of any lubricant or sealing compound.

1. If using a flanged column, nest the rim of the bearing retainer into the counter bore in the column flange. See fig. 11.
2. Fit a column flange O-ring or gasket.
3. Slide the bearing retainer assembly over the protruding shaft section.
4. If the pump has only one column section, continue the installation procedure as described in section 5.5.6 installing the discharge head.

If the pump has additional column sections, proceed with the following instructions.

5. Fit a removable shaft sleeve, if supplied, over the shaft and into the bearing bore. The sleeve should be centered axially in the bearing.
6. Tighten the sleeve set screw. Apply a seizing compound, such as Loctite, on the set screw threads to prevent loosening of screw.

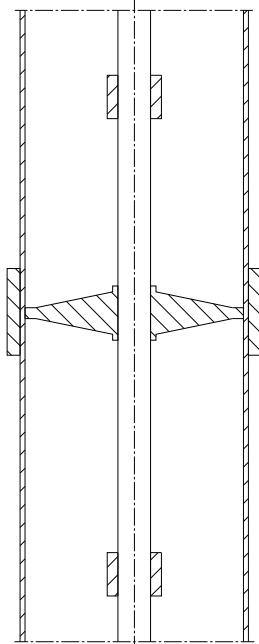
Additional column sections

1. Fit the bearing retainer with bearing over the extending shaft and onto the female register of the column flange.



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2. Fit the O-ring over the bearing retainer resting in the chamfered part of the lower column flange.
3. Install the remaining shaft and column sections, including the top sections, bearing retainers and removable sleeves, if applicable.
4. For pumps having a head shaft (second top shaft) just below the top shaft, install it with the top column section. The top shaft is to be installed after the driver.
5. When the column section has been bolted into place, replace the box clamp under the newly made flange joint and allow the unit to rest on the clamp.
6. Do not lower the top column section into the sump yet, to facilitate installation of the discharge head.
7. Remove eyebolts and sling.



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Fig. 11 Column cross-section showing placement of bearing retainer

5.5.6 Installing the discharge head

With the pump and all the standard-length column and shaft sections installed in the well or sump, the next step is to prepare the discharge head and top column section for installation.



Warning
Exceeding the load limitations of the hoist may result in failure of the discharge head, serious damage to other parts of the pump and grave injury to nearby personnel. See the construction drawing for weights of pump components.

The size designation of the discharge head is given in raised numbers cast on the side or top of the mounting plate for cast heads. Fabricated heads may have it stamped on the base.

The discharge head will be shipped from the factory without the driver assembled to it.

1. Place the discharge head on a clean work surface near the sump.
2. If the discharge head has become soiled in shipping and handling, clean it thoroughly, inside and outside.

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3. If a base plate is to be used and has not yet been installed and grouted, check the mounting surface at the top of the base plate for possible damage or debris. Remove any burrs and clean the surface thoroughly.
4. If the base plate has been painted, remove the paint from both the machined and the non-machined sides.
5. Mount the discharge head on the machined side of the sole plate and fasten it with the bolts or screws provided.
6. When the discharge outlet of the pump is a plain pipe (no threads or flange) and a flexible discharge coupling is to be used, the parts of the coupling must be installed on the pump outlet and/or discharge piping before locating the discharge head in its final position.
7. Install the top shaft (head shaft) and the top column section in the same manner as for the standard sections.

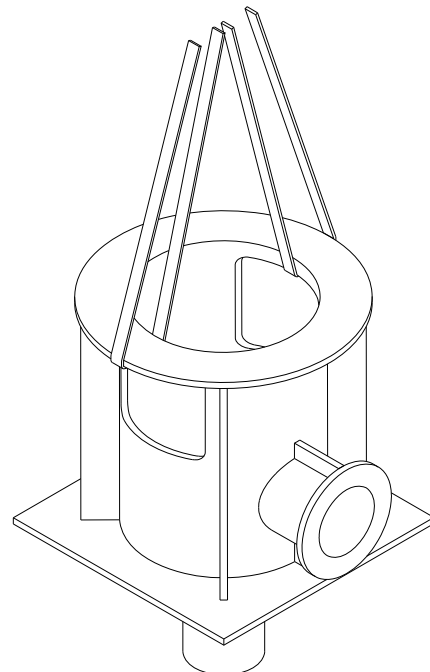
Note

Do not lower the top column section into the sump at this time.

Caution

When lowering the top column section over the top shaft (or head shaft), take care not to bump or scrape the shaft. This could bend the shaft and/or damage the shaft threads.

8. Fit eyebolts in two of the driver mounting holes on the top of the discharge head. For proper balance, use the hole over the discharge opening and the hole diametrically opposite.
 9. Attach the sling to the eyebolts and hoist the discharge head over the pump (the lifting ears are not used to lift the discharge head when not attached to the pump because the discharge head is heavier on the discharge side and would tip).
- Very large discharge heads that are too heavy to lift by the driver mounting holes may be lifted via slings through the hand holes or by passing a bar through the hand holes. See fig. 12.



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Fig. 12 Lifting large discharge heads using slings

10. Place gaskets or O-ring on the upper flange of the top column section. If gaskets or O-rings are not required, coat the mating surfaces of the column flange and the discharge head flange with flange sealant.



11. Lower the discharge head slowly, centering the shaft in the discharge head so that there will no bumping or scraping as the shaft enters and passes through the hole.
12. Continue to lower the discharge head until the studs enter the holes in the flange of the top column section and the discharge head is correctly seated in place.
13. Fit the nuts on the studs, tightening them gradually and uniformly.
14. Raise the entire unit a few inches and remove the box clamp.
15. After the discharge head is installed on the pump column, always use the lifting ears on the discharge head for hoisting the pump. If the discharge head does not have lifting ears, pass the slings through the hand holes, taking care that the slings do not interfere with the shaft.



Warning

Never attempt to lift the pump by means of eyebolts screwed into the driver mounting holes because the bolts are not strong enough to carry the weight of the entire pump.

5.6 Base plate or pump

5.6.1 Leveling

The discharge head may be mounted on a base plate or sub-base grouted to a concrete foundation or on the suction barrel, if provided. In other applications it is mounted on the foundation.

Flat surfaces that might capture air during grouting should be vented to prevent voids between the surface and the grout.

The discharge head, base plate or sub-base should be leveled by use of wedges (see section 5.4.1 Leveling) or by use of leveling screws supported on rectangular metal blocks. The leveling screw threads should be covered with a non-binding material such as grease, putty or tape before grouting, to facilitate their removal.

If shims are used, they should be placed to isolate from the initial application of grout. After the initial grout has cured, the forms and shims may be removed and the void filled with a second application of grout.

A gap of about 1 to 2 inches (25 to 50 mm) should be allowed between the base plate and the foundation for grouting. Some well pump installations may require a slightly tilted base plate for correct positioning of the pump in the well. See section 5.2 Location.

5.6.2 Grouting

The grout material that supports the base plate is a critical element of the pump support structure and should be carefully selected. If the grout cracks or fails, the structure will be compromised. When the alignment is correct, the foundation bolts should be tightened evenly but not too firmly. The unit can then be grouted to the foundation. It is not recommended to grout leveling pieces, shims or wedges in place because they introduce discontinuities and stress concentrations that may cause the grout to crack. Foundation bolts should not be fully tightened until the grout is hardened, usually about 48 to 72 hours after pouring. Jacking screws should be removed after the grout has hardened and the holes filled with an appropriate sealing material.

Caution

Do not distort the base plate by over tightening the foundation bolts.

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5.7 Piping and connections

5.7.1 Pipe supports, anchors or joints

Suction and discharge piping should be anchored, supported and restrained near the pump to avoid application of forces and moments to the pump in excess of those permitted by Peerless Pump.

In order to achieve optimum operation and minimum noise and vibration, consider vibration dampening of the pump.

Noise and vibration are generated by the revolutions of the motor and pump and by the flow in pipes and fittings. The effect on the environment is subjective and depends on correct installation and the state of the remaining system.

Elimination of noise and vibrations is best achieved by means of a concrete foundation, vibration dampers and expansion joints.

5.7.2 Vibration dampers

To prevent the transmission of vibrations to buildings, we recommend you to isolate the pump foundation from building parts by means of vibration dampers.

The selection of the right vibration damper requires the following data:

- forces transmitted through the damper
- motor speed considering speed control, if any
- required dampening in %.

The selection of vibration damper differs from installation to installation. In certain cases, a wrong damper may increase the vibration level. Vibration dampers should therefore be sized by the supplier of the vibration dampers.

If you install the pump on a foundation with vibration dampers, always fit expansion joints on the pump flanges. This is important to prevent the pump from "hanging" in the flanges.

5.7.3 Suction piping

A vertical pump in a suction barrel performs properly only if it is supplied with a steady flow of liquid with a uniform velocity profile and with sufficient pressure to provide adequate NPSH to the pump.

Failure of the suction piping to deliver the liquid to the pump in this condition can lead to noisy operation, swirling of liquid around the suspended pump assembly, premature bearing failure and cavitation damage to the impeller and inlet portions of the casing.

Contact Peerless Pump for further information.

5.7.4 Suction valves and manifolds

Block valves may be installed to isolate the pump for maintenance or dry pit applications.

Foot valves are specially designed non-return valves sometimes used at the inlet to bowl assemblies for well pumps to keep the column water filled and to prevent backspin and well disturbance caused by rapidly draining water.

5.7.5 Discharge valves

A non-return valve and an isolation valve should be installed in the discharge pipe. The non-return valve serves to protect the pump from backflow and excessive backpressure. The isolation valve is used when starting and stopping the pump.



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Except on axial-flow and mixed-flow pumps, we recommend to close the isolation valve before stopping or starting the pump. Operating some pumps at shutoff may cause a dangerous increase in pressure or power. If increasers are used on the discharge side of the pump to increase the size of piping, they should be placed between the non-return valve and the pump.

If expansion joints are used, they should be placed between the pipe anchor and the non-return valve.

5.7.6 Air and vacuum release valves for wet pit and well pumps

Vertical wet pit pumps discharging into a pressurized system, an automatic air and vacuum release valve is recommended. The valve should be located on the pump discharge nozzle or between the pump discharge nozzle and the discharge valve or non-return valve, whichever is closest.

The release valve prevents a large volume of air from being compressed and then setting up a severe shock wave when suddenly released, with potential for serious equipment damage.

It also prevents air from entering the pressurized system.

The valve also relieves the vacuum that might otherwise be generated in the discharge during shutdown when the liquid recedes in the column pipe to the sump or well standing level. Vacuum release valves may be critically important to prevent equipment damage upon restarting flow into an evacuated column.

5.7.7 Siphons

When a siphon is used in the pump discharge line, for the purpose of reducing the head requirement for applications such as pumping over a levee, additional equipment requirements are imposed for the system to function satisfactorily.

To clear the siphon of air and make it operational, either a vacuum pump or an air ejector should be provided, or the pump and driver should be suitable for handling the higher head with adequate flow until the siphon is cleared. For high-specific-speed pumps, this may result in a significant increase in required brake horsepower. Additionally, if the height of the siphon above the discharge water level is substantial, then the flow from the pump at the increased head requirement may not be sufficient to clear the siphon, and a vacuum pump assist is required.

A siphon breaker should be mounted at the high point of the siphon to prevent backflow when the pump is stopped.

5.7.8 Nozzle loads

The piping should be aligned with the pump nozzles to minimize pump nozzle loads. Contact Peerless Pump for allowable nozzle loading for your given design.

5.7.9 Non-return valves

Non-return valves may be installed in the discharge pipe to prevent backflow. In some applications, non-return valves may be provided with dashpots to mitigate the slamming effect of the valve during closing.

Pump backspin and hydraulic shock can cause severe damage to pump and motor. Install at least one non-return valve in the discharge pipe, not more than 25 feet (7.5 m) after the discharge flange to help prevent this.

5.7.10 Strainer

To keep unwanted solids out of the pump, a strainer may be installed at the suction bell or case. Accumulation of debris can induce a moderate pressure drop. The strainer typically clears itself by backflow in the pump column when the unit is stopped.

If a pressure drop occurs, check the strainer for debris buildup.

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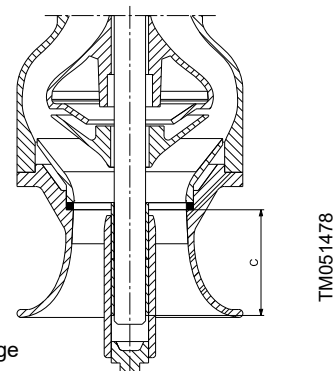


5.8 Setting the impeller clearance

The rotating element (shaft and impeller) should be raised axially before startup. An adjusting nut or pump-to-driver shaft coupling is provided for this purpose, and the pump shaft should be raised according to the table below (column "Best lateral"). The table also shows the most efficient bearing and impeller clearances.

For deep-set well pumps or high thrust load pumps, where shaft elongation and accumulation of column shaft joint tolerances could affect the clearance between the impeller and the bowl, it is important that an accurate estimate of shaft stretch be determined to prevent interference during pump operation.

- B Distance from bottom of impeller to end of shaft (suction case)
- C Distance from bottom of impeller to end of shaft (suction bell)
- D Nominal diametrical clearance between shaft and bearings
- E Nominal diametrical clearance between impeller skirt and bowl side seal



The values are dimensional references only. No guarantees implied. Information subject to change without notice.

All dimensions are inches (mm).

Size	Model	Shaft Diameter	B	C	D (max.)	E (max)	E (min.)	Best Lateral
4	LE	0.75 (19.05)	5.19 (131.83)		0.004 (0.1)	0.006 (0.15)	0.01 (0.25)	0.125 (3.18)
6	HXB	0.88 (22.35)	4.56 (115.82)		0.005 (0.13)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
6	LB	0.88 (22.35)	3.38 (85.85)	3.38 (85.85)	0.005 (0.13)	0.007 (0.18)	0.011 (0.28)	0.125 (3.18)
6	MA	0.88 (22.35)	6.56 (166.62)	3.69 (93.73)	0.005 (0.13)	0.01 (0.25)	0.015 (0.38)	0.063 (1.6)
7	HXB	1 (25.4)	5.63 (143)		0.005 (0.13)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
7	LA	1 (25.4)	6.5 (165.1)	4.06 (103.12)	0.005 (0.13)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
7	LB	1 (25.4)	7 (177.8)	7 (177.8)	0.005 (0.13)	0.012 (0.3)	0.018 (0.46)	0.125 (3.18)
8	HDX	1.19 (30.23)	6.38 (162.05)		0.006 (0.15)	0.012 (0.3)	0.018 (0.46)	0.063 (1.6)
8	HDX (w/o ring)	1.19 (30.23)	6.13 (155.7)		0.006 (0.15)	0.012 (0.3)	0.018 (0.46)	0.063 (1.6)
8	HXB	1.19 (30.23)	5.44 (138.18)		0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.063 (1.6)
8	LB	1.19 (30.23)	4.38 (111.25)	4.38 (111.25)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
8	MA	1.19 (30.23)	7.63 (193.8)	3.94 (100.08)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
8	MFH	1.19 (30.23)	0.006 (0.15)		0.006 (0.15)			0.012 (0.3)
8	M8LB	1.19 (30.23)	4.5 (114.3)	4.5 (114.3)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
8	M8MA	1.19 (30.23)	4.5 (114.3)	4.5 (114.3)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
9	LA	1.19 (30.23)	8 (203.2)	4.75 (120.65)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
10	HH	1.5 (38.1)	8.88 (225.55)	8.88 (225.55)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.063 (1.6)
10	HXB	1.5 (38.1)	8.25 (209.55)	4.81 (122.17)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.188 (4.78)
10	LB	1.19 (30.23)	8.19 (208.03)	8.19 (208.03)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
10	MA	1.19 (30.23)	8 (203.2)	4.31 (109.47)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
10	MF	1 (25.4)	Keyed	Keyed	0.006 (0.15)			0.012 (0.3)
10	MFH	1.5 (38.1)	Keyed	Keyed	0.006 (0.15)			0.012 (0.3)
10	PL	1.19 (30.23)	Keyed	Keyed	0.006 (0.15)			Middle (*)
10	M10LA	1.19 (30.23)	5.75 (146.05)	5.75 (146.05)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
10	M10LB	1.19 (30.23)	5.75 (146.05)	5.75 (146.05)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
10	M10MA	1.19 (30.23)	5.81 (147.57)	5.81 (147.57)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
11	MB	1.94 (49.28)	9.25 (234.95)		0.007 (0.18)	0.011 (0.28)	0.015 (0.38)	0.125 (3.18)
12	HD	1.94 (49.28)	8.88 (225.55)		0.007 (0.18)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)

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Size	Model	Shaft Diameter	B	C	D (max.)	E (max)	E (min.)	Best Lateral
12	HD (w/o ring)	1.94 (49.28)	8.63 (219.2)		0.007 (0.18)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
12	HXB	1.5 (38.1)	9.75 (247.65)	2.25 (57.15)	0.006 (0.15)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
12	HXH	1.94 (49.28)	8.44 (214.38)	8.44 (214.38)	0.007 (0.18)	0.008 (0.2)	0.012 (0.3)	0.063 (1.6)
12	LB	1.5 (38.1)	7.81 (198.37)	7.81 (198.37)	0.006 (0.15)	0.008 (0.2)	0.013 (0.33)	0.125 (3.18)
12	LD	1.5 (38.1)	7.06 (179.32)	7.06 (179.32)	0.006 (0.15)	0.01 (0.25)	0.015 (0.38)	0.063 (1.6)
12	LD (w/op ring)	1.5 (38.1)	6.75 (171.45)	6.75 (171.45)	0.006 (0.15)	0.01 (0.25)	0.015 (0.38)	0.063 (1.6)
12	LDT	1.5 (38.1)	7.13 (181.1)	7.13 (181.1)	0.006 (0.15)	0.01 (0.25)	0.015 (0.38)	0.125 (3.18)
12	LDT (w/o ring)	1.5 (38.1)	6.88 (174.75)	6.88 (174.75)	0.006 (0.15)	0.01 (0.25)	0.015 (0.38)	0.125 (3.18)
12	MB	1.5 (38.1)	9.38 (238.25)	3.13 (79.5)	0.006 (0.15)	0.011 (0.28)	0.015 (0.38)	0.188 (4.78)
12	MF	1.19 (30.23)	Keyed	Keyed	0.006 (0.15)			0.012 (0.3)
12	PL	1.19 (30.23)	Keyed	Keyed	0.006 (0.15)			Middle (*)
12	M12HXB	1.5 (38.1)	7.56 (192.02)	7.56 (192.02)	0.006 (0.15)	0.01 (0.25)	0.015 (0.38)	0.063 (1.6)
12	M12LD	1.5 (38.1)	7.06 (179.32)	7.06 (179.32)	0.006 (0.15)	0.01 (0.25)	0.015 (0.38)	0.063 (1.6)
12	M12LDT	1.5 (38.1)	7.06 (179.32)	7.06 (179.32)	0.006 (0.15)	0.01 (0.25)	0.015 (0.38)	0.125 (3.18)
12	M12MB	1.5 (38.1)	7.5 (190.5)	7.5 (190.5)	0.006 (0.15)	0.01 (0.25)	0.015 (0.38)	0.188 (4.78)
14	HH	1.69 (42.93)	9 (228.6)	9 (228.6)	0.007 (0.18)	0.011 (0.28)	0.015 (0.38)	0.063 (1.6)
14	HXB	1.94 (49.28)	9.72 (246.89)	3.44 (87.38)	0.007 (0.18)	0.01 (0.25)	0.016 (0.41)	0.125 (3.18)
14	LA	1.94 (49.28)	10.38 (263.65)	7.06 (179.32)	0.007 (0.18)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
14	LC	1.94 (49.28)	9.56 (242.82)	9.56 (242.82)	0.007 (0.18)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
14	LD	1.94 (49.28)	8.38 (212.85)	8.38 (212.85)	0.007 (0.18)	0.013 (0.33)	0.017 (0.43)	0.063 (1.6)
14	LD (w/op ring)	1.94 (49.28)	8.06 (204.72)	8.06 (204.72)	0.007 (0.18)	0.013 (0.33)	0.017 (0.43)	0.063 (1.6)
14	MC	1.94 (49.28)	9.75 (247.65)	9.75 (247.65)	0.007 (0.18)	0.012 (0.3)	0.018 (0.46)	0.125 (3.18)
14	MD	1.94 (49.28)	9.88 (250.95)	9.88 (250.95)	0.007 (0.18)	0.012 (0.3)	0.018 (0.46)	0.125 (3.18)
14	MF	1.5 (38.1)	Keyed	Keyed	0.006 (0.15)			0.015 (0.38)
14	MFAH	1.5 (38.1)	Keyed	Keyed	0.006 (0.15)			0.015 (0.38)
14	PL	1.5 (38.1)	Keyed	Keyed	0.006 (0.15)			Middle (*)
14	M14HXB	1.94 (49.28)	7.5 (190.5)	7.5 (190.5)	0.007 (0.18)	0.012 (0.3)	0.018 (0.46)	0.125 (3.18)
14	M14LD	1.94 (49.28)	6.19 (157.23)	6.19 (157.23)	0.007 (0.18)	0.012 (0.3)	0.018 (0.46)	0.063 (1.6)
14	M14MC	1.94 (49.28)	7.38 (187.45)	7.38 (187.45)	0.007 (0.18)	0.012 (0.3)	0.018 (0.46)	0.063 (1.6)
15	LC	2.19 (55.63)	9.25 (234.95)	9.81 (249.17)	0.007 (0.18)	0.008 (0.2)	0.012 (0.3)	0.125 (3.18)
15	MA	2.19 (55.63)	9.81 (249.17)		0.007 (0.18)	0.011 (0.28)	0.015 (0.38)	0.125 (3.18)
16	HH	1.94 (49.28)	9.75 (247.65)	9.75 (247.65)	0.007 (0.18)	0.011 (0.28)	0.015 (0.38)	0.063 (1.6)
16	HXB	1.94 (49.28)	9.5 (241.3)	9.5 (241.3)	0.007 (0.18)	0.011 (0.28)	0.015 (0.38)	0.125 (3.18)
16	MC	1.94 (49.28)	9.75 (247.65)	9.75 (247.65)	0.007 (0.18)	0.012 (0.3)	0.018 (0.46)	0.063 (1.6)
16	MF	1.69 (42.93)	Keyed	Keyed	0.007 (0.18)			0.018 (0.46)
16	PL	1.5 (38.1)	Keyed	Keyed	0.007 (0.18)			Middle (*)
18	HXB	1.94 (49.28)	8.38 (212.85)	8.38 (212.85)	0.007 (0.18)	0.011 (0.28)	0.015 (0.38)	0.063 (1.6)
18	MA	1.94 (49.28)	11.13 (282.7)	6.31 (160.27)	0.007 (0.18)	0.015 (0.38)	0.021 (0.53)	0.063 (1.6)
18	HH	2.19 (55.63)	Keyed	Keyed	0.007 (0.18)	0.012 (0.3)	0.019 (0.48)	0.063 (1.6)
18	MF	1.94 (49.28)	Keyed	Keyed	0.007 (0.18)			0.018 (0.46)
18	MFAL	1.94 (49.28)	Keyed	Keyed	0.007 (0.18)			0.018 (0.46)
18	PL	1.5 (38.1)	Keyed	Keyed	0.007 (0.18)			Middle (*)
20	HH	2.19 (55.63)	Keyed	Keyed	0.007 (0.18)	0.015 (0.38)	0.019 (0.48)	0.063 (1.6)
20	HXB	2.19 (55.63)	10.56 (268.22)	10.56 (268.22)	0.007 (0.18)	0.014 (0.36)	0.018 (0.46)	0.063 (1.6)
20	MA	2.19 (55.63)	11.75 (298.45)	11.75 (298.45)	0.007 (0.18)	0.01 (0.25)	0.015 (0.38)	0.063 (1.6)
20	MF	1.69 (42.93)	Keyed	Keyed	0.007 (0.18)			0.02 (0.51)
20	MFAL	2.19 (55.63)	Keyed	Keyed	0.007 (0.18)			0.02 (0.51)

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Size	Model	Shaft Diameter	B	C	D (max.)	E (max)	E (min.)	Best Lateral
20	PL	1.5 (38.1)	Keyed	Keyed	0.007 (0.18)			Middle (*)
24	HH	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)	0.015 (0.38)	0.019 (0.48)	0.125 (3.18)
24	HHOH	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)			0.031 (0.79)
24	HXB	2.19 (55.63)	Keyed	Keyed	0.007 (0.18)	0.015 (0.38)	0.019 (0.48)	0.125 (3.18)
24	HXC	2.19 (55.63)	Keyed	Keyed	0.007 (0.18)	0.015 (0.38)	0.019 (0.48)	0.125 (3.18)
24	MA	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)	0.014 (0.36)	0.018 (0.46)	0.063 (1.6)
24	MF	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)			0.02 (0.51)
24	MFH	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)			0.02 (0.51)
24	PL	1.69 (42.93)	Keyed	Keyed	0.007 (0.18)			Middle (*)
26	HH	2.94 (74.68)	Keyed	Keyed	0.01 (0.25)	0.015 (0.38)	0.019 (0.48)	0.125 (3.18)
26	HHOH	2.94 (74.68)	Keyed	Keyed	0.01 (0.25)			0.031 (0.79)
26	HXB	2.94 (74.68)	Keyed	Keyed	0.01 (0.25)	0.015 (0.38)	0.019 (0.48)	0.063 (1.6)
27	MA	2.94 (74.68)	Keyed	Keyed	0.01 (0.25)	0.016 (0.41)	0.02 (0.51)	0.063 (1.6)
28	HXB	2.94 (74.68)	Keyed	Keyed	0.01 (0.25)	0.017 (0.43)	0.021 (0.53)	0.031 (0.79)
30	HH	2.94 (74.68)	Keyed	Keyed	0.01 (0.25)	0.018 (0.46)	0.022 (0.56)	0.125 (3.18)
30	HHOH	2.94 (74.68)	Keyed	Keyed	0.01 (0.25)			0.031 (0.79)
30	LA	2.69 (68.33)	Keyed	Keyed	0.009 (0.23)	0.015 (0.38)	0.021 (0.53)	0.063 (1.6)
30	MF	1.69 (42.93)	Keyed	Keyed	0.007 (0.18)			0.026 (0.66)
30	MFAH	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)			0.026 (0.66)
30	MFH	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)			0.026 (0.66)
30	PL	2.19 (55.63)	Keyed	Keyed	0.007 (0.18)			Middle (*)
32	HXB	3.69 (93.73)	Keyed	Keyed	0.012 (0.3)	0.017 (0.43)	0.021 (0.53)	0.031 (0.79)
36	HH	3.69 (93.73)	Keyed	Keyed	0.012 (0.3)	0.015 (0.38)	0.025 (0.64)	0.125 (3.18)
36	HHOH	3.69 (93.73)	Keyed	Keyed	0.012 (0.3)			0.031 (0.79)
36	HXB	3.94 (100.08)	Keyed	Keyed	0.012 (0.3)	0.018 (0.46)	0.022 (0.56)	0.125 (3.18)
36	MA	3.69 (93.73)	Keyed	Keyed	0.012 (0.3)	0.014 (0.36)	0.018 (0.46)	0.125 (3.18)
36	MF	3.44 (87.38)	Keyed	Keyed	0.01 (0.25)			0.029 (0.74)
36	MFH	3.44 (87.38)	Keyed	Keyed	0.01 (0.25)			0.029 (0.74)
36	PL	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)			Middle (*)
42	HH	3.94 (100.08)	Keyed	Keyed	0.012 (0.3)	0.015 (0.38)	0.025 (0.64)	0.125 (3.18)
42	HXB	3.94 (100.08)	Keyed	Keyed	0.012 (0.3)	0.018 (0.46)	0.022 (0.56)	0.125 (3.18)
42	MF	3.44 (87.38)	Keyed	Keyed	0.01 (0.25)			0.036 (0.91)
42	MFH	3.44 (87.38)	Keyed	Keyed	0.01 (0.25)			0.036 (0.91)
42	PL	2.44 (61.98)	Keyed	Keyed	0.011 (0.28)			Middle (*)
48	HH	3.94 (100.08)	Keyed	Keyed	0.012 (0.3)	0.019 (0.48)	0.028 (0.71)	0.125 (3.18)
48	HHOH	3.94 (100.08)	Keyed	Keyed	0.012 (0.3)			0.047 (1.19)
48	HXB	3.94 (100.08)	Keyed	Keyed	0.012 (0.3)	0.019 (0.48)	0.025 (0.64)	0.125 (3.18)
48	MF	3.44 (87.38)	Keyed	Keyed	0.01 (0.25)			0.042 (1.07)
48	PL	2.69 (68.33)	Keyed	Keyed	0.009 (0.23)			Middle (*)
54	MF	3.94 (100.08)	Keyed	Keyed	0.012 (0.3)			0.048 (1.22)
54	PL	3.19 (81.03)	Keyed	Keyed	0.01 (0.25)			Middle (*)
56	HH	4.25 (107.95)	Keyed	Keyed	0.012 (0.3)			0.125 (3.18)
56	HHOH	4.25 (107.95)	Keyed	Keyed	0.012 (0.3)			0.047 (1.19)
60	PL	3.94 (100.08)	Keyed	Keyed	0.012 (0.3)			Middle (*)
66	HH		Keyed	Keyed	0.012 (0.3)			0.125 (3.18)
66	MF	4.94 (125.48)	Keyed	Keyed	0.012 (0.3)			0.054 (1.37)

* Measure the lateral movement of the impeller and set the impeller at half of that distance.

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5.9 Alignment

Vertical line-shaft pumps are automatically aligned through registered fits between mating parts. However, we recommend to check the alignment of the head shaft to the driver at the time of final installation.

After the grout has set and the foundation bolts have been properly tightened, the unit alignment should be checked. After the discharge piping of the unit has been connected, the alignment should be checked again. Alignment may be checked by mounting a dial indicator to measure shaft movement before and after tightening flange bolts. If the unit does not stay in alignment after being properly installed, the following are possible causes:

- setting, seasoning or springing of the foundation
- excessive pipe strain distorting or shifting the machine.

5.9.1 Auxiliary (driver, coupling, etc)

Vertical solid-shaft drivers

1. If an existing motor is to be utilized, before mounting the driver on the discharge head/driver stand, check the register fit, if furnished, and the mounting face on the driver for acceptable tolerance on runout and perpendicularity, respectively, using a dial indicator mounted on the driver shaft.
 2. Check the perpendicularity of the face of the driver coupling half, mounted on the shaft with a tight fit and seated against a split ring, using a dial indicator on a firm base.
 3. Mount the driver on the discharge head using proper lifting equipment.
 4. With the driver bolted to the discharge head, mount a dial indicator on the driver shaft above the coupling half and sweep the bore of the stuffing box. If the excess runout exists, some adjustment can be made at the driver mounting fit and the stuffing box mounting fit.
 5. Before installing any additional coupling parts, check the driver for correct rotation (counter-clockwise when viewed from above).
 6. Mount the pump half coupling, shaft adjusting nut and coupling spacer, if applicable, and raise the impeller in accordance with the table in section 5.8 Setting the impeller clearance.
 7. Secure the coupling bolts.
 8. Make a final check of the shaft runout below the pump half coupling with a dial indicator.
 9. If the runout is within acceptable tolerances, check the tightness of the driver hold-down bolts.
- If dowels are used to secure the driver location, then it should be noted that redowelling is required after dismantling and assembly, since tolerance buildup in the multiple vertical joints results in alignment variation.

Vertical hollow-shaft drivers

1. Remove the clutch or coupling from the top of the hollow shaft driver, and mount the driver on top of the discharge head/driver stand.
2. For designs requiring the pump head shaft to be installed prior to mounting the driver, lower the hollow shaft driver with care over the head shaft to be sure the latter is not damaged.
3. Check the driver for correct rotation (counter-clockwise when viewed from above).
4. Install the head shaft, if not already done, and check it for centering in the hollow shaft. If off-centre, check for runout in head shaft, misalignment from discharge head to driver or out of plumbness of the suspended pump. Shims can be placed under the discharge head to centre the head shaft, but shims should not be placed between the motor and the discharge head unless recommended by Peerless Pump.

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Steady bushings may be provided for vertical hollow shaft drivers and should be installed in the field prior to startup.

5. Install the driver coupling or clutch, and check the non-reverse ratchet for operability, if furnished.

6. Install the coupling gib key and the adjusting nut, and raise the shaft assembly with the impeller(s) to the correct running position in accordance with the above table.

7. Secure the adjusting nut to the clutch, and double-check the driver hold-down bolts for tightness.

If the maximum expected shaft elongation at any point on the performance curve is bigger than 1/2 the suggested lateral setting from bowl table, increase the setting by the amount of maximum elongation.

Most hollow shaft drivers have register fits. Further centering of these drivers is therefore normally not required, nor are dowels recommended.

5.10 Lubrication, priming and cooling systems

If supplied, please see additional documents attached to the pump or contact Peerless Pump.

5.11 Electrical installation

Electrical conduit and boxes should be located to avoid obstruction of the windows of the discharge head.

A plot of speed versus torque requirements during the starting phase of a pump can be checked against the speed versus torque curve of the driving motor. Contact the drive manufacture for curve availability. The driver should be capable of supplying more torque at each speed than required by the pump in order to accelerate the pump up to rated speed. This condition is generally easily attainable with standard induction or synchronous motors, but under certain conditions, such as high-specific-speed pumps over 5000 US units (100 metric units) or reduced voltage starting, a motor with high pull-in torque may be required. To achieve a smooth start for the pumping equipment, autotransformers may be connected to the starting panel or solid state starters used. These provide a gradual increase in voltage up to rated voltage, ensuring even acceleration.

5.12 Control, monitoring and alarm equipment

All control and alarm systems should be checked for correct installation and functioning in accordance with the manufacturer's instructions. All alarm point settings should be checked.

Once pumping starts, the water level in the well will draw down.

However, excessive drawdown may cause the pump to break suction, with resulting potential pump damage. Installation of undercurrent relays in the power supply lines will normally provide protection against this occurrence.

5.12.1 Stopping the unit/reverse runaway speed

A sudden power and/or discharge valve failure during pump operation against a static head will result in a flow reversal, and the pump will operate as a hydraulic turbine in a direction opposite to that of normal pump operation. Vertical pump drivers can be equipped with non-reverse ratchets to prevent reverse rotation. However, their application is not always desirable and a review should always be made with Peerless Pump prior to installing.

If the driver offers little resistance while running backwards, the rotational speed may approach the pump-specific speed.



This condition is called runaway speed and causes mechanical problems. Contact Peerless Pump for aid in preventing this condition.

6. Startup, operation and shutdown



Warning

The pump must not be operated beyond the parameters specified for the application. If there is any doubt as to the suitability of the product for the application intended, have the serial number ready and contact Peerless Pump for advice.

If the conditions of service on your purchase order are going to be changed, (for example liquid pumped, temperature or duty), seek written agreement from Peerless Pump.

6.1 Frost protection

If the pump is to be used in an area where there is a potential of freezing or frost, necessary steps should be taken to protect pump and cooling systems from freezing and bursting.

6.2 Lubrication

Before attempting to start the pump, check the following items:

- lubrication fitting at packing (if applicable)
- settings over 50 °F (10 °C) require prelubrication of the line shaft bearings (see section 6.6.4 Lubrication system)
- lubrication of the driver
- oil-cooling connections for the driver (if applicable).

6.2.1 Recommended products

The products listed in the following tables are recommended for the applications mentioned. Other lubricants of equal quality may also be used.

Greases for line shaft bearings, suction manifold bearings and shaft packings

Maximum 3600 rpm. -20 ° to +120 °F (-29 ° to 50 °C).

Manufacturer	Product
American Oil Co.	AMOCO Lithium Grease All-Weather
Atlantic Richfield Co.	ARCO Multipurpose Grease
Cato Oil & Grease Co	Mystik JT-6
Cities Service Oil Co.	Citgo H-2
Continental Oil Co.	EP Conolith No. 1 -20 ° to +40 °F (-28 ° to +4 °C)
Continental Oil Co.	EP Conolith No. 2 +40 ° to +120 °F (+4 ° to +50 °C)
Gulf Oil Co	Gulf Crown No. 2 or Ep 2
E.F. Houghton & Co.	Cosmolube No. 2
Exxon	Lidok Ep 2
Hydrotex	Deluxe No. M-33 Super Shield
Imperial Oil & Grease Co.	Molub-Alloy No. 1
Keystone Div., Pennwalt Corp.	80 X LT
Mobil Oil Corp	Mobilux Ep No. 2
The Pennzoil Co.	Pennzoil 705 HDW
Phillips Petroleum Co.	Philube IB & RB
Shell Oil Co.	Alvania EP Grease Alvania EP Grease 1 (for prolonged ambient temperature below 0 °F (-18 °C))
Sun Oil Co.	Sunaplex No. 2 EP Prestige 42
Texaco, Inc.	Novatex Grease No. 2
Union Oil Co	Unoba Ep-2

Food grade (H-1 rated) greases for line shaft bearings, suction manifold bearings and similar applications

Maximum 3600 rpm.

Manufacturer	Product
Husk-Itt	Huskey Lube "0" Seal
Texaco	Cygnus
Royal	FG 32

Sealants for use on low-pressure flanged joints and similar applications

Manufacturer	Product
Loctite Corporation	Loctite #515

6.3 Rotation

Nonreverse ratchets are typically furnished as an integral part of the motor or right-angle gear when reverse rotation from backflow in the pump may cause damage.

1. While the motor or gear is disconnected from the pump, rotate the motor or gear by hand in both directions to check proper functioning of the ratchet. The rotation of the complete drive train should also be checked at this time.
2. Before starting the pump, check the direction of rotation. The correct direction of rotation is counter-clockwise when viewed from the top and is usually indicated by a direction arrow on the discharge head or on the driver stand when the discharge is located below the mounting level.



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6.4 Guards



Warning

All guards must be in place on the pump discharge head prior to startup. Read and follow all recommended guarding and safety instructions for accessories, if any.



Guards must not be removed while the pump is operational

6.5 Check list

6.5.1 System flushing

When the pump is installed in the completed piping system, we recommend to backflush the system to remove debris such as stubs of welding rod, welding slag and loose scale. The pump and other sensitive part should be protected with startup strainers, which should in turn be removed upon completion of the flushing cycle. For barrel-mounted pumps, we recommend to remove the pump and let the barrel become the receptacle for the debris for subsequent cleanout.

6.5.2 System decontamination

After the system has been flushed to remove debris, determine if your system needs to be decontaminated. If so, do that before priming and filling.

6.5.3 Priming

The pump should not be run unless it is completely filled with liquid or is submerged at the minimum required depth, as there is danger of damaging some of the pump components.

Pumps mounted in a suction barrel (can) should have a vent line from the highest point in the barrel to the suction pipe to remove air. This prevents inadvertent vapour locking and dry-running of the shaft seal. The vent line should be continuously rising to preclude liquid traps and also be fully airtight.

All pump bearings above static water level must be prelubricated with clean water. When the required submergence is provided, most vertical turbine pumps can be started without concern for the non-submerged part of the pump. For vertical line shaft pumps, however, this depends on the column length and bearing construction. Most vertical pumps have the first stage below the liquid level. Therefore, they are automatically primed by proper venting. When required, as for barrel pumps, priming may be accomplished by use of an ejector or vacuum pump.

6.5.4 Shaft sealing

Stuffing box

If the stuffing box is not packed from factory, it should be packed once the motor is mounted. Instructions may be found with the box of packing. If not, the following may be used as a guide.

1. Clean the stuffing box.
2. Check that the packing rings are of proper cross-section and length.
3. Stagger the joints 90 ° apart.
4. The rings should butt tightly but not overlap at the joints.
5. Tamp down the individual packing rings, but not too tightly, as this may result in burning the packing and scoring the shaft or shaft sleeve.
6. Where compatible, lightly lubricate the inner and outer packing diameter with a suitable lubricant. When a lantern ring is required, make sure that sufficient packing is placed in below the lantern ring so that the bypass line intersects the packing container bore adjacent to the lantern ring and is not blocked by the packing.

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7. The pipe supplying sealing liquid should be fitted tightly so that no air enters. This is particularly important for vertical barrel pumps mounted in a system where a vacuum must be maintained. See fig. 13. If the liquid to be pumped is dirty or gritty, clean sealing liquid should be piped to the stuffing box in order to prevent damage to the packing and shaft sleeves. Clear sealing liquid is also required if the stuffing box materials are not completely compatible with the pump liquid. The sealing liquid should be at a pressure sufficient to ensure a flow of clean liquid into the pump but not so high as to require excessive tightening of the packing.

Caution

The stuffing box gland must not be too tight during startup in order to let sufficient liquid lubricate the shaft and the packing.

8. Once the stuffing box housing and stuffing box gland have reached approximately the same temperature as that of the pump parts, the running-in of the stuffing box gland has been completed. If the stuffing box leaks too much, retighten slightly and evenly while the pump is running. To ensure continuous lubrication, a few drops should always drop from the stuffing box to protect the packing or shaft sleeve against damage. 20 to 40 drops/minute are recommended.

When the leakage can no longer be controlled by adjusting the gland, all rings of packing should be replaced. The addition of a single ring to restore gland adjustment is not recommended.

If the pump is to be left idle for a long period of time, we recommend to replace the packing prior to restarting the pump.

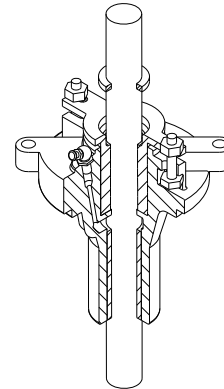


Fig. 13 Stuffing box

Mechanical seal

Prior to installing and setting mechanical seal, it is important to establish the lateral setting of the pump. Lateral movement after seal installation could damage seal by reducing seal gap or opening which will increase leakage.

Mechanical seals normally require no adjustment during operation. Except for possible slight initial leakage, the seal should operate with negligible leakage.

Caution

Mechanical shaft seals should not run dry.

Shaft seals may require a continuous supply of flush and/or cooling liquid. Where seal damage due to system uncleanliness is expected, it may be advisable to operate the pump with packing or temporary seals and sleeves until the system is clean.

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6.6 Startup, operation and shutdown

Caution

Start the pump with outlet valve partly opened unless otherwise instructed at a specific point in these instructions.

Inlet valves must be fully open when pump is running.

Caution

Running the pump at zero flow or below the recommended minimum flow rate continuously will cause damage to the seal, bearings, rotating element and other equipment.

Operating the pump outside its allowable operating range as indicated on performance curves will reduce the overall pump life.

Caution

Operating at a flow rate higher than normal or at a flow rate with no backpressure on the pump may overload the motor and cause cavitation.

Low flow rates may cause a reduction in pump/bearing life, overheating of the pump, instability and cavitation/vibration.

6.6.1 Air in system

Entrained air reduces pump total head and flow rate. To avoid air in the system, take these precautions:

- Avoid cascading water.
- For well pumps, locate the perforated casing below the pump suction.
- Return lines into sumps or tanks should terminate a minimum of two pipe diameters below the low liquid level.
- Install strainers and trash racks of sufficient size.
- Make adequate provisions for cleaning rotating screen and trash racks.

6.6.2 Minimum continuous flow

See Peerless Pump performance curves.

6.6.3 Minimum thermal flow

See Peerless Pump performance curves.

6.6.4 Lubrication system

Before running the drivers, either separately or connected to the pump, check lubrication requirements in the instructions of the driver. Check that the following points have been fulfilled:

- Grease-lubricated bearings have been properly greased with the driver manufacturer's recommended grade.
- Oil-lubricated bearings on drivers and gears, as well as oil sumps on gears, have been filled to the required level with the recommended oil.
- All automatic oilers are functioning properly.

When it is necessary to inject water for lubrication of the pump bearings, use clean filtered water. When liquids other than water are handled, they can similarly be filtered and used for injection.

The pressure drop across the filter should be monitored to ensure that the required injection pressure is available.

Additional bearing protection can be provided by installing a flow switch in the injection line, set for the minimum flow requirement.

Vertical pumps with open line-shaft construction are furnished with product-lubricated sleeve bearings. The following provisions should be made for the respective bearings: For bearings lubricated by the pumped liquid) prelubrication with clean water should be provided for all pump bearings above static water level when the distance from the mounting floor to the minimum water level exceeds 15 meters (50 feet).

6.6.5 Driver settings

Follow the instructions of the manufacturer.

6.6.6 Valve settings and operation

Direct-on-line starting

When squirrel-cage induction motors with line starting controls are used, it is permissible to have the discharge valve open when the pump is being started. However, the length of time of the high starting current may be shortened if the discharge valve remains closed until the pump comes up to full speed.

Except for axial-flow and mixed-flow pumps, pumps using squirrel cage induction motors with reduced voltage starting control should always be started with the discharge valve closed or only partially opened.

Warning against closed-valve operation

Warning

Discharge and suction valves should not be closed during operation. The liquid in the pump may boil, with risk of explosion and steam burns to anyone near.



Operation with both valves closed for even brief periods of time is an unacceptable and dangerous practice. It can rapidly lead to a violent pump failure.

If there is any danger of the pump running against a closed discharge valve, install a pressure relief or bypass valve in the discharge pipe to allow for minimum liquid flow through the pump.

Minimum liquid flow through the pump is needed for cooling and lubrication of the pump.

However, brief shut-off operation of most vertical pumps may be necessary. The necessity may arise from system startup or shutdown requirements and is normally met by closure of the discharge valve for the minimum possible time.

Prolonged operation of the pump under this condition may prove harmful to the structural integrity of the pump because of these factors:

- Heat buildup resulting in a dangerous temperature rise of the liquid being handled and pump components in contact with it.
- Increased vibration levels affecting the stuffing boxes, mechanical seals and areas with close-running fits.
- Increased axial thrust and resultant stresses in the shafts and bearings.
- Damage resulting from internal recirculation and flow separation.

When a pump has been started against a closed discharge valve, it should be opened slowly as soon as pressure develops at the pump side of the valve. Abrupt valve opening can result in surges damaging to the pump and piping.



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Pumps with specific speed over 5000 US units (100 metric units) often have high zero flow horsepower. Running such pumps with the discharge valve closed can result in serious mechanical overloads as well as motor overload.

Water hammer

If there is a risk of water hammer, regulate valve closure time or use relief valves or surge chambers. We recommend to engage specialized engineering services for water hammer analysis.

6.6.7 Parallel and series operation

For parallel operation, the pumps should have approximately matching shut off heads. Otherwise, the system operating head may exceed the shut-off head of one or more pumps, resulting in the pump(s) operating with zero output flow. This would have the same effect as operating against a closed discharge valve.

Mismatched shut off heads could also cause one pump to operate below the allowable operating region. For series operation, the pumps should have approximately the same rate of flow characteristics. Since each pump takes suction from the preceding pumps, the stuffing-boxes and all pressure containing components should be designed for the corresponding pressure, and the thrust bearing requirements may also change.

Valve setting at startup

The discharge valve should be set so that the least pump load is imposed upon the driver.

Reduced flow rate/minimum flow discharge bypass

When operating at reduced flow rate, noise levels as well as vibration levels typically increase. This may lead to reduced bearing life and mechanical seal life as well as potential damage to other components.

If it becomes necessary to operate a pump for prolonged periods at flows below the rate specified by Peerless Pump as permissible continuous minimum flow, then a bypass line should be installed from the pump discharge to the suction source. The bypass line should be sized so that the system flow plus the bypass flow is equal or larger than the minimum value specified by Peerless Pump.

Maximum flow

Certain pumps will operate in an upthrust condition beginning at some flow rates greater than the flow rate at best efficiency point. This operating condition should be avoided. Contact Peerless Pump for further information.

Caution

Valve setting during operation

The suction valve should be fully opened during operation.

Valve setting at shutdown

The discharge valve should be in the same position as when starting up so that less power is dropped from the line and any sudden pressure surges in the pipe system are avoided.

6.6.8 Condition monitoring

Contact Peerless Pump for more information.

6.6.9 Vibration

Vibration is normally created by the pump driver and flow in the pump, piping and fittings. Contact Peerless Pump for more information on methods of reducing vibration concerns.

It is the policy of Peerless Pump to continually seek ways to improve its products and reserves the right to alter documentation without prior notice.

Vibration levels should be checked at startup and periodically during operation

6.6.10 Performance testing

Once the unit is energized, check operating speed, flow rate, suction and discharge pressure, and power input. While it may not be possible to exactly repeat the factory performance, initial field test data becomes a valuable baseline for future checking to determine possible wear and need to perform maintenance. Vibration levels should be checked for the same reason. Auxiliary piping and gasketed joints should be checked for leaks and proper makeup.

7. Maintenance



Warning

Never do maintenance work when the unit is connected to power.



Warning

Do not attempt to lift the entire pump by the lifting lugs (eyes) of the driver.



Warning

Do not work under suspended object unless you have taken precautions to stop its fall in the event of sling failure

7.1 Schedule

To ensure satisfactory operation of the pumping equipment, frequent inspection and periodic maintenance are required. An inspection and maintenance log should be kept and the inspector is to immediately report any problems. A suggested guide for preventative maintenance for normal applications is given below. Unusual applications with abnormal heat, moisture, dust, etc., may require more frequent inspection and service.

Item	Action	Frequency
Packing, packing box	Inspect for excessive leakage	First 150 hours of operation, then every 2000 hours of operation or quarterly
Packing, packing box	Adjust gland and replace packing	As necessary
Pump-motor alignment	Check for change in alignment	Annually
Vibration	Check for change in vibration	Annually
Bearings	Lubricate (grease)	Every 2000 hours or at least once a year
Fasteners	Check for loose fasteners	Annually

7.2 Wear rings

If specified, wear rings can be fitted in bowls and impellers. These wear rings provide a close-running, renewable clearance to reduce the quantity of liquid leaking from the high-pressure side to the suction side. These rings depend on the liquid in the pump for lubrication. They will eventually wear so that the clearance becomes greater and more liquid passes into the suction. This rate of wear depends on the characteristics of the liquid pumped. Badly worn wear rings will result in severe degradation of pump head and flow rate,



particularly on small pumps. Examination of wear patterns can provide valuable information in diagnosing pump problems and determining their origin.

7.3 Recommended spare parts

The list of recommended spare parts will depend on factors such as the following:

- Normal supplier lead time when ordering parts.
- If pumping equipment is for use as normal duty or severe duty, and if there is backup pumping while a unit is down for maintenance and parts replacement.

Below is a suggested list of spare parts.

For intermittent or non-critical service

- Stuffing box packing or mechanical seal
- Gaskets and O-rings (complete set)
- Packing gland and studs or gland bolts.

For continuous or critical service (in addition to above)

- Stuffing-box sleeve bearing
- Head shaft (if used)
- Line shaft (1 set)
- Line shaft coupling (1 set)
- Sleeve bearings, stuffing box, line shaft and pump shaft
- Pump shaft
- Impeller lock collets (1 set)
- Bowl and/or impeller wear rings (1 set)
- Lateral bowl wear rings.

7.4 Consumables

Items normally used in the maintenance of pumping equipment may include the following, but depending on the type of unit some items may vary:

- Lubricant (grease or oil)
- Cleaning materials
- Touch-up coating.

7.5 Required tools and fixtures

Removal of packing is aided by the use of a packing removal tool with a hook or threaded end.

Tools and fixtures for pump disassembly and rebuilding, in addition to the above, may include these items:

- Lifting devices (crane, hoist, lifting chains or straps)
- Impeller beater (to fit the impeller lock collet into impellers on shaft)
- die grinder (to cut out wear rings or remove shaft sleeves)
- work table or fixture for holding pump
- torch (to heat parts to aid in removal)
- measuring equipment (feeler gauges, dial indicator, etc.)
- hot oil bath (or method to heat bearings and coupling hubs for installation).

7.6 Tightening torques

Proper tightening of fasteners is very important. The torque values depend on the size and grade of the fasteners used. The values in the table below apply to non-lubricated parts.

Torque	Fastener size [lb-ft] ([Nm])
5/16-18	11 (15)
3/8-16	20 (30)
7/16-14	32 (45)
1/2-13	47 (65)
9/16-12	69 (95)
5/8-11	96 (130)
3/4-10	155 (210)
7/8-9	206 (280)
1-8	310 (420)
1 1/8-7	480 (650)
1 1/4-7	675 (915)
1 3/8-6	900 (1220)
1 1/2-6	1100 (1495)

When assembling a pump, cross-tighten the screws in order to avoid misalignment, binding and leakage.

7.7 Pump decontamination

Prior to dismantling a pump, make sure that the unit is thoroughly cleaned and there is no remaining contamination left that could cause injury or illness. This is particularly true with pumps used for pumping chemicals and sewage.

The method of cleaning pumps will vary with the design and construction of the pump. In general, the pump should be properly drained and flushed out, and any evidence of contamination removed. Contents of the pump, cleaning materials and washdown materials should be properly disposed of. In addition to thorough cleaning, disinfecting of all surfaces to protect from injury and illness is recommended. During the decontamination and disassembly work to the pump, workers are required to wear protective clothing and equipment to protect from exposure to potentially harmful materials.

7.8 Dismantling



Warning

Drain the pump and isolate pipework before dismantling the pump.

Warning

There may be occasions when a part such as the impeller has either been shrunk-fit onto the pump shaft or has become difficult to remove due to products that are corrosive in nature. If you elect to use heat to remove the part, it must be applied with great care. Before applying heat, ensure any residual hazardous liquid trapped between the two parts is thoroughly drained out to prevent an explosion or emission of toxic vapour. Impeller design varies and so does the amount heat and the duration of heat application required to loosen the impeller.



Contact Peerless Pump for help in removal of impellers.

1. Clear a large area adjacent to the pump as a storage space for pump parts as they are dismantled.
2. Arrange parallel timbers on the ground in the cleared area to support the pump column and shaft sections horizontally.
3. Disconnect the discharge pipe from the discharge head.



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4. If the driver is equipped with an oil-cooling system, remove the external tubing or piping used for this purpose.
5. On pumps equipped with an air-pressure water level testing system, remove the gauge and disconnect the tubing connection inside the discharge head. Some pumps have this connection below the base, in which case the tubing will be disconnected later.



Warning
Before opening the terminal box of an electric motor, make sure that the power supply has been switched off.

6. Remove the electrical connection of the motor at the terminal box.
7. For vertical hollow shaft (VHS) drives, remove the driver from the discharge head in the following manner:
 1. Remove the driver cover.
 2. Remove the lock screws, the top shaft adjusting nut, the gib key and the top drive coupling.
 3. Some configuration will require loosening of the coupling from the head shaft to the motor shaft.
 4. Remove the driver mounting screws.
5. Attach the hoist sling to the lifting eyes of the driver and lift it off the discharge head and top shaft as applicable.
6. Place the driver on clean wooden blocks.

For vertical solid shaft (VSS) drives, remove the driver from the discharge head in the following manner:

1. Remove coupling from motor to head shaft.
2. Remove the driver mounting screws.
3. Attach the hoist sling to the lifting eyes of the driver and lift it off the discharge head and top shaft as applicable.
4. Place the driver on clean wooden blocks.
8. Remove the deflector from the pump shaft by sliding it up over the top.
9. Disassemble the packing. Remove the gland retaining bolts or nuts and the two gland clamps, if supplied. Lift off the split gland. Pull out the packing rings, using a packing removal tool or a hooked pointed wire.
10. If the packing assembly includes a lantern ring, a compression spring and a washer, or a bushing, remove these. Be sure to remove any packing rings that might be below the lantern ring.
11. If the packing container is a separate casting (not integral with the discharge head), remove the fasteners in the packing container flange, and lift off the packing container.
12. Remove the gasket.
13. Remove the fasteners or nuts holding the discharge head to the base plate or to the foundation.
14. Attach the sling to the lifting ears of the discharge head or through the handholes if the head is fabricated, and hoist the entire pump straight upward to bring the discharge head base to a comfortable working height.

If the pump has an air line with a connection point below the base, disconnect the line at this time.

Follow the instructions given in the following manner:

1. Remove the discharge head.
2. Remove the top column section using an elevator clamp.
3. Remove the bearing retainer.
4. Remove the head shaft section.
5. Remove the other column sections, shaft sections and bearing retainers.
6. Pull the bowl assembly from the well or sump.

15. Clean and check all parts.
16. Check the bearing clearance according to the table in section 5.8 Setting the impeller clearance.

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17. Recondition or replace worn parts.
18. If a pump shaft is bent beyond acceptable limits, it should be replaced or straightened. See section 5.5.1 Inspection

7.8.1 Wear ring

Worn wear rings can be replaced to restore hydraulic performance. Lift up the pump and disassemble the bowl assembly to do this.

7.9 Assembly

Caution

Take care not to damage any components and avoid contamination (dirt, debris, moisture, etc.) of the unit.

See section 7.6 Tightening torques for torque values.

1. Arrange parallel timbers on the ground in the cleared area to support the pump column and shaft sections horizontally.
2. Support pump shaft in blocks and rails to protect it from bending or being damaged during the re-assembly process.
3. Check that the shaft is straight and free of nicks and scratches. Remove with a fine file all burrs and scratches. See dimensions B or C in the table in section 5.8 Setting the impeller clearance for its first impeller setting per pump size. Check that the scribe line is visible or scribe new line on shaft.
4. If impeller and or bowl wear rings are required, fit wear rings into the bowl or onto the impeller skirt. Contact Peerless Pump if rings should be pressed or secured to part as needed. Rings final dimension should provide the clearance E shown in the table in section 5.8 Setting the impeller clearance. If clearance is not achieved, machine rings prior to proceeding.
5. Slide the impeller marked 1 (first stage impeller) or the last impeller removed during dismantling along the shaft. The skirt of the impeller should align with the scribe mark within $\pm 1/8"$ (3 mm).

Note

In performance-tested and multipump assemblies, impeller hubs are to be stamped or paint-marked alphabetically/numerically for relocation purposes. All pumps should be re-assembled in the same position as tested, unless otherwise recommended by a Peerless Pump.

6. Spread the impeller lock collet with a screwdriver or wedge inserted in the split at the wide end (top) and slide it with the tapered end first along the shaft and into the impeller (opposite end of the impeller skirt).
7. Remove the wedge or screwdriver and remove any burrs left by the spreading tool.
8. Drive the impeller lock collet nut tightly into place with a taper lock hammer/beater. Check that the impeller skirt is still aligned with scribe mark.
9. Fit all lateral seal rings (if supplied or required) into the suction manifold and each intermediate bowl.
10. Slide the sand collar, if supplied, over the bottom of the shaft (larger diameter facing the direction of the bell suction), using the bell suction to push the loose sand collar up towards the eye of the impeller until the impeller skirt is seated firmly against the rubber lateral seal ring, positioning the sand collar in its designated location.
11. Remove the bell suction, leaving the sand collar in position on the shaft.
12. Slide the sand collar an additional $1/8"$ (3 mm) towards the impeller eye, and tighten the set screw in the sand collar. This additional adjustment prevents the sand collar from rubbing on top of the bell suction bearing while in operation.
13. Refit the suction onto the shaft until it the first stage impeller contacts the lateral seal ring.



14. For flanged bowls, place the first bowl on the shaft from the top using care not to damage the threads at the top of the shaft. Move the bowl into position, mating with the suction's male register, matching bolt patterns to fasten bolt flanges together. Check to see if rotating element spins freely.

15. For threaded bowls, place the first bowl on the shaft from the top using care not to damage the threads at the top of the shaft. Slide bowl and slowly engage threads into suction.

Thread bowl into suction until tight. Use a chain wrench to ensure complete engagement. Check to see if the rotating element spins freely.

Caution

Failure to tighten the bowls sufficiently can result in loosening of the bowl assembly during operation. This may lead to damage of parts and pump failure.

16. Gently push the pump shaft down until the impeller skirt has bottomed out on the lateral seal ring.

Note

Do not force the pump shaft.

17. Scribe a mark on the pump shaft at the very top of the bowl bearing.

18. Gently pull the pump shaft up in the opposite direction.

19. Measure the distance from bearing to scribe line and compare lateral movement of bowl conforms to the table in section 5.8 Setting the impeller clearance. If lateral is not achieved, dismantle the bowl assembly to determine the issue or contact Peerless Pump.

20. Using a bolt or all-thread and washer, firmly lock shaft and impeller into place on the suction lateral seal ring.

21. Once it is confirmed that the shaft will not spin or travel, repeat above for installation of intermediate impeller, taper lock bushing and bowls.

22. Every three to four stages, loosen bolt holding pump shaft in place to check that lateral movement has not changed.

23. Make sure that the pump shaft spins freely.

24. Slide the discharge bowl into position and fasten it to the bowl assembly.

25. Fit the upper sand collar, if supplied, onto the pump shaft until the discharge bowl bearing just contacts.

26. Slide the sand collar about 1/8" (3 mm) away from the discharge bearing and tighten the set screw. The additional movement prevents the sand collar from rubbing on the upper bowl bearing while in operation.

27. Check that the lateral movement for bowl assembly conforms to the table in section 5.8 Setting the impeller clearance.

28. Make sure that the pump shaft spins freely. See section 5.5 Installation preparations for assembly of line shaft, column, packing container, discharge head and driver.

7.10 Accessories

See the manuals supplied with the accessories.



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8. Fault finding (Trouble Shooting)

Note

When direct-connected to electric motors, determine whether or not the motor is direct-on-line and receives full voltage.

Fault	Cause	Remedy
1. Discharge pressure too low	a) Speed too low	Check speed/rotation.
	b) System pressure lower than anticipated.	Check the system curve.
	c) Air or gas in liquid.	Check liquid to remove air.
	d) Impeller clearance too large.	• Check lateral setting. See section 5.8 Setting the impeller clearance. • Check clearance between wear surfaces.
	e) Impeller damaged.	Check that parts are not damaged.
	f) Impeller diameter too small.	Check specified diameter.
	g) Wrong direction of rotation.	Check rotation.
	h) Excessive clearance between wear surfaces on semi-open impellers.	Check lateral setting. See section 5.8 Setting the impeller clearance.
	i) Leaking joints (well application)	Tighten joints.
2. Insufficient suction head.	a) Suction line drawing air.	Tighten line connections.
	b) Suction lift too high or insufficient NPSH.	Check NPSHA.
	c) Air or gas in liquid.	Remove air/gas from liquid.
	d) Bowl gasket defective.	Check gaskets, tighten fasteners, replace
	e) Clogged strainer.	Clean the strainer.
	f) Excessive well drawdown.	Check well conditions.
3. Noise level increased.	a) Poor alignment of pump. Suction and discharge pipe clamps loose.	• Ensure proper alignment of the pump and the driver. • Support the suction and discharge piping. • Check vibration dampers, flexible piping and conduit connectors.
	b) Hydraulic resonance.	• Alter the resonant piping. • Change the pump speed. • Insert a pulsation damper on the pump/piping system. • Insert flow straighteners.
4. Insufficient flow.	Pump not primed	Check suction conditions.
	a) System head exceeds shut off head	Check system head curve vs. performance curve.
	b) Speed too low	Check rotation speed
	c) Suction lift too high or insufficient NPSH.	Check NPSHA.
	d) Clogged strainer or impeller.	Clean the strainer and impeller passages.
	e) Wrong direction of rotation.	Check rotation.
	f) Leaking joints (well application)	Tighten joints.
	g) Broken shafting or coupling	Rotate shaft and inspect.
	h) Closed suction valve.	Check suction valve.
	i) Not enough suction head for hot or volatile liquids	Check NPSHA
	j) Foot valve too small;	Check foot valve
	k) Worn or damaged hydraulic parts	Inspect part.
	l) Excessive clearance between wear surfaces on semi-open impellers.	Check lateral setting. See section 5.8 Setting the impeller clearance.
5 Excessive power required.	a) Speed too high	Check rotation speed
	b) Pump operating outside of the allowable operating region (AOR)	• Check system curve • Check valve settings
	c) Specific gravity or viscosity of liquid pumped is too high	Check predicted performance based on liquid conditions
	d) Bent shaft or rotating element	Check parts and straighten as needed.
	e) Stuffing-boxes too tight	Check drip rate of liquid from packing
	e) Impeller clearance too small casing rubbing or worn wear surfaces.	• Check lateral setting. See section 5.8 Setting the impeller clearance. • Check clearance between wear surfaces.
	f) Electrical or mechanical defect in motor	Contact local service center for diagnostics
	g) Undersized submersible cable	Check cable sizing
	h) Incorrect lubrication of driver	Check lubrication type and amount

It is the policy of Peerless Pump to continually seek ways to improve its products and reserves the right to alter documentation without prior notice.

9. Parts list and sectional drawing

Pos.	Description
2	Impeller
6	Shaft, pump
8	Ring, impeller (optional)
10	Shaft, head (VHS)
12	Shaft, line
13	Packing
15	Bowl, discharge
17	Gland, packing
29	Ring, lantern (optional)
39	Bearing, sleeve
40	Deflector
55	Bell, suction
63	Bearing, stuffing box
64	Collar, protecting
66	Nut, shaft adjusting
70	Coupling, shaft
83	Stuffing box
84	Impeller lock collet
101	Pipe, column
129	Base plate (not shown)
131	Guard, coupling (not shown)
187	Head, discharge
189	Flange, top column
191	Coupling, column pipe
193	Retainer, bearing, open line shaft
197	Case, discharge (not shown)
199	Bowl, intermediate (not shown)
203	Case, suction (optional, not shown)
205	Barrel or can, suction (optional, not shown)
209	Strainer (optional, not shown)
211	Pipe, suction (optional, not shown)
213	Ring, bowl
N/A	Lateral ring

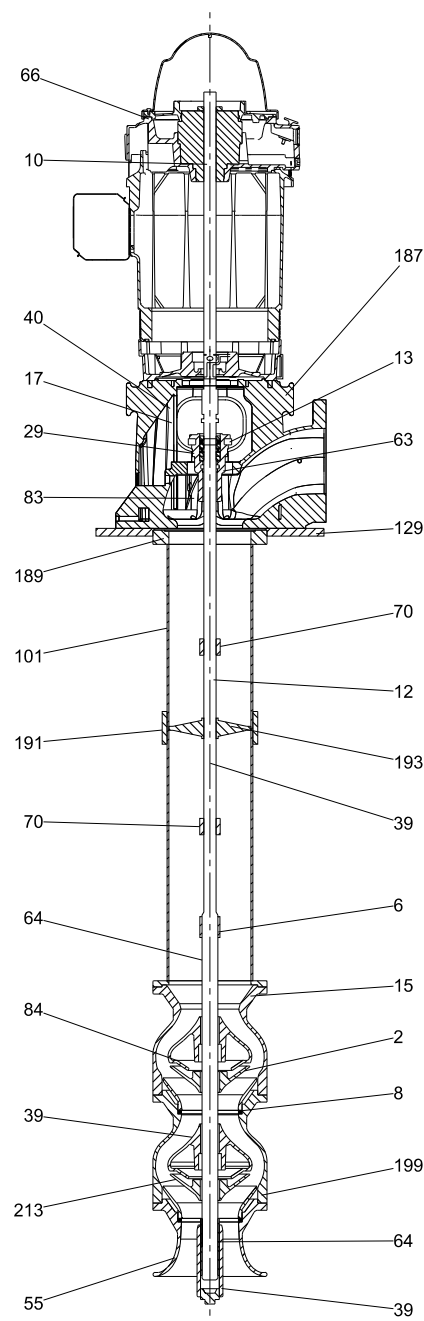


Fig. 14 Typical sectional drawing

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10. Disposal

This product or parts of it must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Peerless Pump service workshop.



OLS Vertical Turbine Installation, Operation and Maintenance Manual



Peerless Pump Company

2005 Dr. Martin Luther King Jr. Street
Indianapolis, IN • 46202

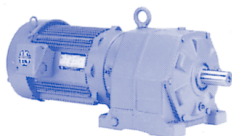
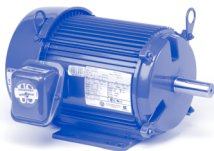
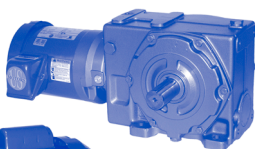
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Installation, Operation & Maintenance Instructions

ENGLISH

For your safety, read and retain this manual



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Rev. 01/04

SAFETY FIRST

⚠ DANGER

High voltage and rotating parts can cause serious or fatal injury. Safe installation, operation and maintenance must be performed by qualified personnel. Familiarization with, and adherence to, NEMA MG2, the National Electrical Code (NEC), and local codes is required. It is important to observe safety precautions to protect personnel from possible injury.

PERSONNEL SHOULD BE INSTRUCTED TO:

1. Be familiar with the equipment and read all instructions thoroughly before installing or working on equipment.
2. Avoid contact with energized circuits or rotating parts.
3. Disconnect all power sources before initiating any maintenance or repair.
4. Act with care in accordance with prescribed procedures in handling and lifting this equipment.
5. Be sure unit is electrically grounded in accordance with code requirements.
6. Be sure equipment is properly enclosed or protected to prevent access by children or other unauthorized personnel to prevent possible accidents.
7. Be sure shaft key is fully captive before unit is energized.
8. Avoid contact with capacitors until safe discharge procedures have been completed.
9. Provide proper guarding for personnel against rotating parts and applications involving high inertia loads which can cause overspeed.
10. Avoid extended exposure to equipment with high noise levels.

INSPECTION AND HANDLING

Inspect unit to make sure no damage has occurred during shipment. Check nameplate for correct speed, horsepower, voltage, hertz and phase for conformance with power supply and equipment.

⚠ WARNING

Units should be lifted using all eyebolts or lugs if provided. These eyebolts or lugs are provided for lifting this unit only and must not be used to lift any additional weight. Lifting angle, from shank of eyebolt, must not exceed 30 degrees for machines with single and 45 degrees for machines with multiple lifting means. Replacement eyebolts must be per ASTM A489 or equivalent. All eyebolts must be securely tightened. Be careful not to touch overhead power lines with lifting equipment. Failure to observe this warning may result in serious personal injury.

STORAGE

Units should be stored indoors, in a clean, dry location & winding should be protected from excessive moisture absorption. NOTE: If motors are to be stored for over one year, refer to Emerson Motor Company. If motors are to be stored for over one year and if gear and belt transmission units are to be stored for over six months, refer to Emerson Motor Company.

LOCATION

⚠ WARNING

Use only UL Listed Hazardous Location Motors for service in Hazardous Locations as defined in Article 500 of the NEC. Units should be located in a clean, well-ventilated area. Units should be located in a suitable enclosure or protected to prevent access by children or other unauthorized personnel to prevent possible accidents.

INSTALLATION / MOUNTING

Mount unit on a firm, flat surface sufficiently rigid to prevent vibration. Drive belts and chains should be tensioned in accordance with supplier recommendations. Couplings should be properly aligned and balanced. For belt, chain and gear drive selection refer to the drive or equipment manufacturer. For application of drive equipment refer to applicable information in NEMA MG1.

Motors have been dynamically balanced using a half key the same length as the full key shipped with the motor. If pulley length keyway is less than this length, rework long key by removing one-half of excess length between pulley and end of key to maintain balance.

Do not restrict motor ventilation. Unless otherwise specified on nameplate, motor is designed for operation in accordance with NEMA MG1 "Usual Service Conditions" which states an ambient temperature range of -15° C to 40° C (5° F to 104° F). Standard grease lubricated units are suitable for operation within this temperature range. Special lubricants may be required for ambient temperatures outside of this range. Note: Motors operating under rated load and allowable ambient conditions may feel hot when touched; this is normal and should not be cause for concern. When in doubt, measure frame surface temperature and confer with nearest office. Enclosed motors normally have condensation drain openings. Insure that drain openings are properly located and open (plugs removed) for the motor mounting position. Drain openings should be at lowest point of end brackets, frame housing and terminal housing when the motor is installed. This may require modification of motor to accomplish. If unit appears wet, and/or has been stored in a damp location, dry out thoroughly and check for adequate insulation resistance to ground before operating.

▲ WARNING

Guards should be provided for all exposed rotating parts to prevent possible personal injury. Keep fingers and foreign objects away from ventilation and other openings. Applications involving high inertia loads may damage this equipment due to motor overspeed during coast shutdown. Such applications should be referred to Emerson Motor Company.

▲ CAUTION

Do not force drive coupling or other equipment onto shaft, as bearing damage may result.

POWER SUPPLY AND CONNECTIONS

The power supply must agree with values on nameplate. Terminal voltage should not vary more than $\pm 10\%$ of nameplate voltage at rated frequency. Unbalanced line voltage, greater than one percent, can cause overheating. Do not exceed the rated load amperes on the nameplate. Starting controls and overload protection should be properly sized in accordance with the NEC and the control manufacturer's recommendations.

Motor connections should be made by following instructions on connection diagram. Determine direction of rotation before connecting driven equipment. If direction of rotation label is supplied, operate only in specified direction. Rotation may be reversed on three phase motors by interchanging any two line connections. On single phase motors interchange leads per connection diagram on motor. Wiring of units, controls and grounding shall be in accordance with local and NEC requirements.

▲ WARNING

Failure to properly ground unit may cause serious injury to personnel. Where unexpected starting could be hazardous to personnel, do not use automatic reset starting devices.

USE OF VARIABLE FREQUENCY DRIVES

Electric motors can be detrimentally affected when applied with variable frequency drives (VFD's). The non-sinusoidal waveforms of VFD's have harmonic content which causes additional motor heating; and high voltage peaks.

Other effects of VFD's on motor performance include reduced efficiency, increased load current, vibration and noise. Standard motors utilized with VFD's must be limited to those application considerations defined in NEMA MG-1 Part 30. Refer to PDS #811-215 available at www.usmotors.com.

NEMA MG-1 Part 31 defines performance and application considerations for Definite-Purpose Inverter Fed Motors. To insure satisfactory performance and reliability, U.S. Electrical Motors offers and recommends nameplated inverter duty motor products which meet the requirements of NEMA MG-1 Part 31. The use of non-inverter duty motors may result in unsatisfactory performance or premature failure, which may not be warrantable under the Terms and Conditions of Sale. Contact your Emerson Motor Company Field Sales Engineer for technical assistance for motor selection, application and warranty details.

OIL LUBRICATION

Most oil lubricated units are shipped without oil. Refer to Instruction Manual with unit for specific type and grade of oil to be used, change interval and level. If lubrication instructions specify synthetic oil, do not substitute.

▲ WARNING

For applications in the food and drug industry (including animal food), consult the petroleum supplier for lubricants that are acceptable to the Food and Drug Administration and other governing bodies.

MAINTENANCE

Inspect units at regular intervals. Keep units clean and ventilation openings clear of dust, dirt or other debris. Lubricate units per this operating instruction folder and instruction plate on unit. Excessive lubrication may damage the unit. Do not over grease.

▲ WARNING

Disconnect all power sources to the unit and discharge all parts which may retain an electrical charge before attempting any maintenance or repair. Screen and covers must be maintained in place when unit is in operation. Failure to observe this warning may result in personal injury.

U.L. Listed Motors for use in Hazardous Locations: Repair of these motors must be made by the manufacturer or manufacturer's authorized service station approved to repair U.L. Listed Motors. The U.L. listing applies to the electric motor only and not the belt or gear transmissions or other devices that may be connected to the motor.

COOLING TOWER DUTY MOTORS

During installation, insure drain plugs are removed from lower drain holes in bracket and outlet box. All upper drain holes must be plugged at all times. External umbrella seal must be in place for shaft up applications. Motors with Bearing numbers "XXXX-2RS" are double sealed and not to be relubricated.

VARIDRIVE UNITS

Do not turn speed control hand wheel while unit is not operating; this may cause damage to the unit. Hand wheel position is a relative speed indication only. Use direct speed sensing accessory for precise speed indication. Units equipped with electric remote speed indicator accessory are not calibrated at the factory and must be calibrated at site. Refer to calibration instructions with the unit.

VARIDRIVES equipped with ENDOLUBE construction do not require lubrication of the sliding Varidisc. Operate VARIDRIVE through its entire speed range weekly.

⚠ WARNING

Do not force control wheel beyond speed limits shown on the nameplate. The mechanism and belt are designed for the rated speed and horsepower shown on the nameplate. Operation beyond these limits may result in damage to the belt and mechanism and possible injury to personnel. The covers on the frame case must not be removed or left off while unit is in operation. Do not attempt to disassemble or repair the driven pulley discs because high spring tension may be released causing injury to personnel. Refer to authorized Service Center. Refer to VARIDRIVE Installation and Maintenance Manual for complete belt changing instructions. For additional detailed information, request specific product installation and maintenance manual.

GREASE LUBRICATION INSTRUCTIONS

Units are prelubricated at the factory and do not require initial lubrication. Relubricating interval depends upon speed, type of bearing and service. Refer to Table 1 for suggested regreasing intervals. Operating conditions may dictate more frequent lubrication. Motor must be at rest and electrical controls should be locked open to prevent energizing while motor is being serviced (refer to section on Safety). If motor is being taken out of storage, refer to storage procedures.

To relubricate bearings, remove the drain plug. Inspect grease drain and remove any blockage with a mechanical probe taking care not to damage bearing.

⚠ CAUTION

Under no circumstances should a mechanical probe be used while the motor is in operation. Add new grease at the grease inlet, refer to Table 1 for replenishment quantities. New grease must be compatible with grease in the motor (See Caution Note). Run the motor for 15 to 30 minutes with the drain plug removed to allow purging of any excess grease. Shut off unit and replace the drain plug. Return motor to service. Some motors have sealed bearings and are not regreasable.

Over greasing can cause excessive bearing temperatures, premature lubricant breakdown and bearing failure. Care should be exercised against over greasing.

Table 1
Recommended Grease Replenishment Quantities & Intervals
(For lubrication of units in service)

Bearing Number-Common		Bearing Number-AFBMA		Grease FL Oz.	Lubrication Interval		
62XX	63XX	XXBC02	XXBC03		3600 RPM	1800 RPM	1200 RPM
6203-6207	6303-6306	17-35	17-30	0.2	2 Years	3 Years	3 Years
6208-6212	6307-6309	40-60	35-45	0.4	1 Year	2 Years	2 Years
6213-6215	6310-6311	65-75	50-55	0.6	1 Year	2 Years	2 Years
6218-6220	6312-6315	80-100	60-75	1.0	6 Mos.	1 Year	2 Years
6221-6228	6316-6320	105-140	80-100	1.8	6 Mos.	1 Year	1 Year

For motors mounted vertically or in hostile environments, reduce intervals shown by 50 percent.

Refer to motor nameplate for bearings provided on a specific motor.

For bearings not listed in table above, the amount of grease required may be calculated by the formula:

$$G=0.11 \times D \times B$$

Where;

G = Quantity of grease in fluid ounces.

D = Outside diameter of bearing in inches.

B = Width of bearing in inches.

Table 2
RECOMMENDED GREASES

THE FOLLOWING GREASES ARE INTERCHANGEABLE WITH THE GREASE AS PROVIDED IN UNITS SUPPLIED FROM FACTORY (UNLESS STATED OTHERWISE ON A LUBRICATION NAMEPLATE PROVIDED ON MOTOR).

MANUFACTURER	GREASE (NLGI No. 2)
EXXON CORP.	POLYREX - EM
CHEVRON U.S.A. INC.	SRI NO. 2

⚠ CAUTION *Greases of different bases (lithium, polyurea, clay, etc.) may not be compatible when mixed. Mixing such greases can result in reduced lubricant life and premature bearing failure. When necessary, prevent such intermixing by disassembling the motor, removing all old grease from bearings and housings (including all grease fill and drain holes). Inspect and replace damaged bearings. Fill bearing housings and bearing approximately 30% full of new grease. Remove any excess grease extending beyond the edges of the bearing races and retainers. Refer to Table 2 for recommended greases.*

WARRANTY

LIMITED WARRANTY

All U.S.E.M. products are warranted against defects in workmanship and materials for 12 months from date of installation, not to exceed 18 months from date of shipment from EMC. Some of U.S.E.M.'s products carry a warranty period longer than 12 months. Please refer to the current price catalog or to EMC for details on specific products. This limited warranty does not apply to any product which has been subject to misuse, misapplication, neglect (including without limitation, inadequate maintenance), accident, improper installation, modification, adjustment, or repair. This constitutes EMC's only warranty in connection with this sale and is in lieu of all other warranties, expressed or implied, written or oral. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE THAT APPLY TO THIS SALE. No employee, agent, dealer or other person is authorized to give any warranties on behalf of EMC nor to assume for EMC any other liability in connection with any of its products.

EXCLUSIVE REMEDY

EMC's liability shall be limited exclusively to repairing or replacing any product found by EMC to be defective, or at EMC's option, to refund the purchase price of its product. Such product shall be returned, freight prepaid, to the nearest U.S.E.M. authorized service station or EMC factory. It is agreed that such replacement, repair, or refund be the sole and exclusive remedies available from EMC. EMC shall not be liable for damages of any sort whatsoever beyond these exclusive remedies including incidental and consequential damages regardless of whether any claim is based upon contract, negligence, strict liability, tort, warranty, or other basis. The repair or replacement of the product, or the refund of the purchase price, at EMC's option, constitutes fulfillment of all liabilities of EMC to the buyer for defective products.

RENEWAL PARTS AND WARRANTY SERVICE

When inquiring for renewal parts, call the nearest U.S. Electrical Motors Parts Stocking Distributor. For warranty service, call the nearest U.S. Electrical Motors Authorized Service Station. Give them complete Nameplate data, including identification number, etc.

Request installation and maintenance manuals by product name.

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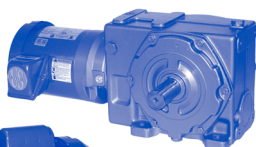
Notes

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Instrucciones de Instalación, Operación y Mantenimiento

Para su seguridad, lea y conserve este manual

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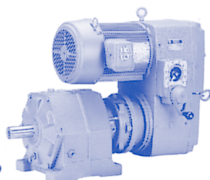


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Rev. 01/04

LA SEGURIDAD ES PRIMERO

PELIGRO

Las piezas de alto voltaje y giratorias pueden ocasionar lesiones graves o mortales. Las tareas de instalación, operación y mantenimiento seguro deberán ser realizadas por personal técnico profesional. Es requisito conocer y cumplir las disposiciones de NEMA MG2, el Código Eléctrico Nacional de EE.UU. (NEC) y los códigos locales. Es importante respetar las medidas de precaución apropiadas para proteger al personal contra posibles accidentes.

EL PERSONAL DEBE:

1. Familiarizarse con el equipo y leer con detenimiento todas las instrucciones antes de instalarlo o ponerlo en marcha.
2. Evitar el contacto con circuitos energizados y piezas giratorias.
3. Desconectar todas las fuentes de alimentación antes de llevar a cabo tareas de mantenimiento o reparación.
4. Manejar y trasladar el equipo con cuidado y de conformidad con los procedimientos indicados.
5. Asegurarse que la unidad se haya aterrizado eléctricamente, de acuerdo con los códigos vigentes.
6. Asegurarse que el equipo esté debidamente cerrado o protegido para evitar el acceso a niños o personal no autorizado y prevenir posibles accidentes.
7. Asegurarse que el candado de la flecha está debidamente sujeto antes de energizar la unidad.
8. Evitar el contacto con los capacitores hasta tanto se hayan realizado los procedimientos seguros de descarga.
9. Brindar al personal protección adecuada contra piezas giratorias y aplicaciones con grandes cargas de inercia que pueden generar velocidades excesivas.
10. Evitar la exposición prolongada a equipos que emiten altos niveles de ruido.

INSPECCION Y MANEJO

Inspeccione la unidad para asegurarse que no se hayan producido daños durante el envío. Verifique que la velocidad, potencia, voltaje, frecuencia y fases que se indican en la placa de datos sean adecuados para el equipo y la fuente de alimentación en cuestión.

ADVERTENCIA

Las unidades deben ser levantadas utilizando todas las armellas o argollas si es que éstas son suministradas. Estos accesorios se proveen sólo para levantar esta unidad y no deben ser utilizados para levantar peso adicional. El ángulo de elevación, desde la espiga de la armella, no debe exceder los 30 grados en máquinas con medios de elevación simples, y 45 grados en máquinas con medios de elevación múltiples. Las armellas de repuesto deben ser del tipo ASTM A489 o equivalentes. Todas las armellas deben ir perfectamente ajustadas. El no observar esta advertencia puede dar como resultado serias lesiones.

ALMACENAMIENTO

Las unidades deben almacenarse en recintos cerrados, limpios y secos, y el embobinado debe estar protegido contra excesiva absorción de humedad. AVISO: Si necesita almacenar los motores durante más de un año, comuníquese con Emerson Motor Company. Si necesita almacenar los motores durante más de un año, y los mecanismos de engranaje y correas de transmisión durante más de seis meses, comuníquese con Emerson Motor Company.

UBICACION

ADVERTENCIA

Tal como lo dispone el artículo 500 de NEC, para realizar tareas en sitios de alto riesgo utilice sólo los motores para ubicaciones peligrosas incluidos en el listado de U.L. Las unidades deben ubicarse en un área limpia y con buena ventilación. Las unidades deben ubicarse en un recinto adecuado o ser protegidas para evitar el acceso de niños o personal no autorizado y prevenir posibles accidentes.

INSTALACION/MONTAJE

Montar la unidad en una superficie firme, plana y lo suficientemente rígida para prevenir vibraciones. Las correas y cadenas de transmisión pueden ser tensionadas de acuerdo con las recomendaciones del proveedor. Los acoplamientos deben estar correctamente alineados y balanceados. Consulte al fabricante del mecanismo de transmisión o equipo respecto de la selección de correas, cadenas y engranajes adecuados. Para obtener información acerca de las aplicaciones correspondientes del equipo, consulte NEMA MG1.

Los motores han sido balanceados dinámicamente usando un candado de flecha de la mitad de la longitud que el candado embarcado con el motor. Si la longitud del cuñero de la polea es menor a esta longitud, elimine la mitad de la longitud excedida del candado entre la polea y el extremo del mismo para mantener el balance.

No obstruya la ventilación del motor. A menos que se indique lo contrario en la placa de datos, el motor está preparado para funcionar de conformidad con las "Condiciones de servicio habituales" de NEMA MG1, que establecen una temperatura ambiente de -15°C a 40°C (5°F a 104°F). Las unidades lubricadas con grasa estándar funcionan adecuadamente a estas temperaturas. Para temperaturas que se encuentren fuera de estos márgenes, se requerirán lubricantes especiales. Aviso: Cuando se opera con cargas y en condiciones ambientales adecuadas, es normal que el motor se sienta caliente al tacto y no deberá ser motivo de preocupación. En caso de duda, mida la temperatura de la superficie del cuerpo y consulte a la oficina más cercana. Los motores totalmente cerrados suelen contar con orificios de drenaje de la condensación. Cerciórese de que los orificios de drenaje estén correctamente ubicados y abiertos (sin los tapones), de acuerdo con la posición en que se encuentre el motor. Cuando el motor se encuentre instalado, estos orificios deberán hallarse en el punto más bajo de los brackets, el cuerpo del motor y la caja de terminales. De ser necesario, modifique la posición del motor para cumplir con estas especificaciones. Si la unidad está húmeda y/o ha permanecido en un lugar húmedo, séquela minuciosamente y asegúrese que la resistencia de aislamiento a tierra esté en buenas condiciones antes de accionar la unidad.

ADVERTENCIA

Se debe contar con protecciones para todas las piezas giratorias que se encuentren expuestas a fin de evitar posibles lesiones personales. Mantenga los dedos y objetos extraños alejados de las zonas de ventilación y otros orificios. Las aplicaciones con altas cargas de inercia pueden ocasionar daño al equipo como consecuencia de un exceso de velocidad en el motor durante la interrupción por efecto de inercia. En tales casos, comuníquese con Emerson Motor Company.

PRECAUCION

No fuerce los acoplamientos del mecanismo de transmisión ni otros equipos hacia la flecha, pues podrían dañarse los baleros.

FUENTE DE ALIMENTACION Y CONEXIONES

La fuente de alimentación debe corresponder con los valores en la placa de datos. El voltaje de las terminales no debe variar más de $\pm 10\%$ del voltaje indicado en la placa de datos a la frecuencia especificada. Un voltaje de línea desequilibrado, mayor a un uno por ciento, puede ocasionar sobrecalentamiento. No exceda los amperios de carga especificados en la placa de datos. Los controles de arranque y la protección de sobrecarga deben cumplir las especificaciones del NEC y las recomendaciones de control del fabricante.

Las conexiones del motor deben llevarse a cabo siguiendo las instrucciones en el diagrama de conexión. Determine la dirección de la rotación antes de conectar el equipo impulsado por el motor. Si se incluye la etiqueta de dirección de la rotación, haga funcionar únicamente en la dirección especificada. La rotación puede invertirse en motores trifásicos intercambiando cualesquiera dos conexiones de línea. En motores monofásicos intercambie los cables según el diagrama de conexión en el motor. El cableado de las unidades, controles y las conexiones a tierra se deberá realizar de conformidad con las disposiciones locales y de NEC.

ADVERTENCIA

El no aterrizar la unidad de la manera apropiada podría causar lesiones graves al personal. No utilice dispositivos de reinicio automático donde el arranque inesperado del equipo podría ser peligroso para el personal.

USO DE MECANISMOS DE TRANSMISION DE FRECUENCIA VARIABLE

Los motores eléctricos pueden resultar seriamente afectados cuando se utilizan con mecanismos de transmisión de frecuencia variable (VFD, por sus siglas en inglés), puesto que sus ondas no sinusoidales contienen un conjunto de armónicas que producen recalentamiento en el motor y picos de alta tensión.

Otros de los efectos de estos mecanismos de transmisión en el desempeño del motor incluyen menor eficiencia, mayor corriente de carga, vibraciones y ruido. Los motores estándar que se utilicen con estos mecanismos deben limitarse a las aplicaciones definidas en el artículo 30 de NEMA MG-1. Consulte PDS # 811-215 en www.usmotors.com.

El artículo 31 de NEMA MG-1 define una serie de pautas de funcionamiento y aplicación para los motores alimentados por inversor con fines específicos. A efectos de garantizar un desempeño satisfactorio y confiable, U.S. Electrical Motors ofrece y recomienda el uso de productos con motor para trabajo con inversor que cumplan con las disposiciones del mencionado artículo. El uso de motores sin inversor puede ocasionar fallas prematuras o desempeño insatisfactorio no cubiertos por la garantía conforme las cláusulas y condiciones de venta. Comuníquese con su ingeniero de ventas especializado de Emerson Motor Company a fin de solicitar asistencia técnica para elegir el motor y obtener información acerca de sus aplicaciones y los detalles de la garantía.

LUBRICACION CON ACEITE

Generalmente, las unidades de lubricación con aceite se proveen sin el aceite. Consulte el Manual de instrucciones de la unidad para obtener información acerca del tipo y calidad de aceite que debe utilizar, la frecuencia con que debe cambiarlo y los niveles indicados. Si las instrucciones especifican el uso de aceite sintético, no lo sustituya por otros tipos de aceite.

ADVERTENCIA

Para aplicaciones en la industria de alimentos y medicamentos (incluidos los alimentos veterinarios), consulte al proveedor de lubricantes para obtener información acerca de los lubricantes autorizados por la Administración de Alimentos y Drogas de los Estados Unidos (FDA) y otras entidades gubernamentales.

MANTENIMIENTO

Inspeccione las unidades con regularidad. Manténgalas limpias y con los orificios de ventilación sin polvo, suciedad ni residuos. Lubrique las unidades de conformidad con estas instrucciones de operación y las que se indican en la placa. Recuerde que el exceso de lubricación puede causar daños en la unidad. No la engrase demasiado.

⚠ ADVERTENCIA

Desconecte todas las fuentes de alimentación de la unidad y descargue todas las piezas que puedan retener carga eléctrica antes de proceder a realizar tareas de mantenimiento o reparaciones. Las pantallas de protección y cubiertas deben permanecer colocadas en el lugar correcto cuando la unidad se encuentra en funcionamiento. El no observar esta advertencia podría ocasionar lesiones.

Motores del listado de U.L. para uso en ubicaciones peligrosas: La reparación de estos motores debe ser realizada sólo por el fabricante o los centros de servicios de reparación autorizados por el fabricante para reparar motores de U.L. El listado de U.L. se aplica únicamente a motores eléctricos, no a los mecanismos de engranaje y correa u otros dispositivos que pudieran estar conectados al motor.

MOTORES PARA TRABAJO EN COLUMNAS DE ENFRIAMIENTO

Durante la instalación, cerciórese de que los orificios de drenaje inferiores en el bracket y de la caja de conexiones se encuentren destapados. Los orificios de drenaje superiores deben permanecer cerrados en todo momento. En las aplicaciones con la flecha hacia arriba se debe colocar un sello externo como paraguas. Los motores con baleros con números "XXXX-2RS" van doblemente sellados y no deben volverse a lubricar.

UNIDADES VARIDRIVE

No gire la rueda de control de velocidad manual cuando la unidad está detenida, pues podría dañarla. La posición de la rueda manual indica sólo una velocidad relativa. Utilice el sensor de velocidad directo para obtener la velocidad precisa. Las unidades equipadas con dispositivos eléctricos indicadores de velocidad remota no se calibran en fábrica y por tanto deben calibrarse en el sitio donde se utilizará la unidad. Consulte las instrucciones de calibración incluidas con la unidad.

Los VARIDRIVES equipados con ENDOLUBE no requieren la lubricación del disco de deslizamiento Varidisc. Una vez por semana, accione el VARIDRIVE en todas las velocidades disponibles.

⚠ ADVERTENCIA

No exceda el límite de velocidad de la rueda de control que se indica en la placa de datos, pues el mecanismo y la correa están diseñados para funcionar a la velocidad y potencia indicados en la placa. De rebasarse estos límites, podrían dañarse la correa y el mecanismo y ocasionar posibles lesiones al personal. Las cubiertas en el cuerpo no deben extraerse ni dejarse abiertas cuando la unidad esté en funcionamiento. No intente desmontar ni reparar los discos de la transmisión de poleas pues resortes altamente tensionados se podrían liberar y ocasionar lesiones al personal. Comuníquese con un centro de servicio técnico autorizado. Consulte las instrucciones de cambio de correas incluidas en el Manual de instalación y mantenimiento de VARIDRIVE. Si desea obtener más información acerca de un producto específico, solicite el manual de instalación y mantenimiento correspondiente.

INSTRUCCIONES DE LUBRICACION CON GRASA

Las unidades se prelubrican en fábrica y, por lo tanto, no requieren lubricación inicial. La frecuencia de relubricación dependerá de la velocidad, los rodamientos y el tipo de funcionamiento. La Tabla 1 ofrece las frecuencias de reengrasado sugeridas, pero cabe destacar que ciertas condiciones de operación podrían demandar lubricaciones con mayor regularidad. El motor debe permanecer desactivado y los controles eléctricos abiertos y trabados para evitar que se accionen mientras se realizan las tareas de servicio técnico (consulte la sección de Seguridad). Si necesita sacar el motor de su lugar de almacenamiento, consulte los procedimientos pertinentes.

Para volver a lubricar los baleros, retire el tapón de drenaje. Inspeccione el drenaje de grasa y elimine toda obstrucción con una sonda mecánica con cuidado para no dañar los baleros.

⚠ PRECAUCION

Nunca utilice sondas mecánicas mientras el motor se encuentra en funcionamiento. Aplique grasa nueva en el orificio de entrada; consulte las cantidades de reengrasado adecuadas que se indican en la Tabla 1. La grasa nueva debe ser compatible con la que se encuentra en el motor (vea el aviso de Precaución). Accione el motor durante 15 a 30 minutos con el drenaje destapado para facilitar la salida del exceso de grasa. Apague la unidad y coloque nuevamente el tapón. A continuación, ponga en marcha el motor. Algunos motores cuentan con baleros sellados que no deben volver a engrasarse.

El exceso de grasa puede elevar demasiado las temperaturas de los baleros, dañar el lubricante y provocar fallas en los baleros. Por lo tanto, evite el engrasado excesivo.

Tabla 1

**Frecuencia y cantidades de reengrasado sugeridas
(Para lubricar unidades que se encuentran en servicio)**

Número de balero común		Número de balero AFBMA		Grasa (onzas) FL Oz.	Frecuencia de lubricación		
62XX	63XX	XXBC02	XXBC03		3600 RPM	1800 RPM	1200 RPM
6203-6207	6303-6306	17-35	17-30	0.2	2 años	3 años	3 años
6208-6212	6307-6309	40-60	35-45	0.4	1 año	2 años	2 años
6213-6215	6310-6311	65-75	50-55	0.6	1 año	2 años	2 años
6218-6220	6312-6315	80-100	60-75	1.0	6 meses	1 año	2 años
6221-6228	6316-6320	105-140	80-100	1.8	6 meses	1 año	1 año

Para motores montados en sentido vertical o que se encuentran en entornos hostiles, reduzca la frecuencia indicada en un 50 por ciento.

Consulte la placa de datos del motor para obtener información sobre los baleros provistos para un motor específico.

Si el balero no se encuentra en esta lista, utilice la siguiente fórmula para calcular la cantidad de grasa requerida:

$$G = 0.11 \times D \times R$$

Donde;

G = cantidad de grasa en onzas.

D = diámetro externo de los baleros en pulgadas.

R = ancho de los baleros en pulgadas.

**Tabla 2
GRASAS RECOMENDADAS**

LAS SIGUIENTES GRASAS PUEDEN UTILIZARSE EN REEMPLAZO DE LA GRASA PROVISTA EN LAS UNIDADES DESDE FABRICA (A MENOS QUE SE INDIQUE LO CONTRARIO EN LA PLACA DE LUBRICACION DEL MOTOR).

FABRICANTE	GRASA (NLGI No. 2)
EXXON CORP.	POLYREX - EM
CHEVRON U.S.A. INC.	SRI NO. 2

PRECAUCION

Las grasas que disponen de bases diferentes (litio, poliurea, arcilla, etc.) pueden ser incompatibles al mezclarse. Además, podrían reducir la vida útil del lubricante y ocasionar fallas prematuras en los baleros. Para evitar que se mezclen, desarme el motor y retire toda la grasa de los baleros y carcasas (incluso los rellenos y orificios de drenaje). Inspeccione y reemplace los baleros que se encuentren dañados. Llene un 30% tanto las carcasas como los baleros con de grasa nueva. Retire el exceso de grasa de los bordes de los anillos y retenes de los baleros. Consulte las grasas recomendadas en la Tabla 2.

GARANTIA**GARANTIA LIMITADA**

U.S.E.M. le garantiza al usuario que sus productos están libres de defectos en la mano de obra y el material por un período de 12 meses contados a partir de la fecha de instalación, sin exceder 18 meses a partir de la fecha de envío desde EMC. Algunos productos U.S.E.M. gozan de una garantía de más de 12 meses. Sírvase consultar el catálogo de precios vigentes o comuníquese con EMC para obtener información detallada sobre productos específicos. Quedan excluidos de la presente garantía todos aquellos productos que hayan sido sometidos a uso indebido, aplicaciones inadecuadas, negligencia (incluso, de forma no taxativa, mantenimiento inadecuado), accidentes, instalación incorrecta, modificaciones, ajustes y reparaciones. La presente constituye la única garantía de EMC en relación con esta venta y prevalecerá sobre toda otra garantía expresa o tácita, escrita o verbal. NO SE OFRECEN GARANTIAS TACITAS RESPECTO DE QUE EL PRODUCTO SE ENCUENTRA APTO PARA LA VENTA NI DE QUE SE ADECUA A LOS FINES PARA LOS CUALES FUE ADQUIRIDO. Ningún empleado, representante, distribuidor ni otras personas se encuentran autorizados a ofrecer garantías en nombre de EMC ni a asumir otras responsabilidades legales en relación con sus productos.

REMEDIO EXCLUSIVO

Las obligaciones de EMC se limitarán exclusivamente a reparar o sustituir aquellos productos que EMC encuentre defectuosos o, si EMC lo considera pertinente, a reintegrar el precio de compra abonado por el producto. Dicho producto deberá ser devuelto, con franqueo prepago, al centro de servicio técnico autorizado de U.S.E.M. más cercano o a la fábrica de EMC. La sustitución, reparación o reembolso serán el único resarcimiento por parte de EMC. EMC no será responsable de daños y perjuicios directos o indirectos de ninguna clase que no se encuentren incluidos entre estos recursos legales exclusivos, aun cuando se efectúen reclamos en virtud de un contrato, actos de negligencia, responsabilidad objetiva, hechos civiles ilícitos, garantías u otros. La reparación o sustitución del producto, o el reembolso del precio de compra, según lo decida EMC, constituirá el cumplimiento absoluto de sus obligaciones hacia el comprador en caso de adquirirse productos defectuosos.

PIEZAS DE REPUESTO Y SERVICIO DE GARANTIA

Para solicitar piezas de repuesto, comuníquese con el distribuidor de piezas de U.S. Electrical Motors más cercano. Para solicitar servicio técnico de garantía, comuníquese con el centro de servicio técnico autorizado de U.S. Electrical Motors más cercano. Deberá suministrar los datos completos que se indican en la placa de datos, incluso el número de identificación, etc.

Solicite manuales de instalación y mantenimiento por nombre de producto.

EL CENTRO DE SERVICIO TECNICO AUTORIZADO DE U.S.E.M. MAS CERCANO, O EL SER-
VICIO TECNICO DE PRODUCTOS U.S.E.M. DE ST. LOUIS, MO, 1-800-566-1418

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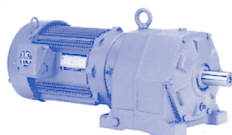
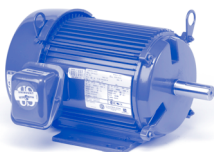
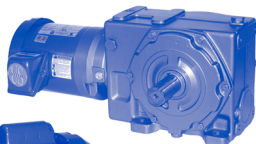
REGION DE VENTAS	TELEFONO	NUMERO GRATUITO	FAX
EMERSON MOTOR COMPANY			
ST. LOUIS, MO		888 - 637 - 7333	314 - 553 - 2087
VENTAS INTERNACIONALES	314 - 553 - 4157	N/A	314 - 553 - 2135
MONTREAL, QUEBEC/CAN.	514 - 332 - 1880	800 - 361 - 5509	514 - 332 - 5912
MARKHAM, ONTARIO/CAN.	905 - 475 - 4670	N/A	905 - 475 - 4672
MONTERREY, MEXICO	011 - 52818 - 389 - 1300	N/A	011 - 52818 - 389 - 1310
CARACAS, VENEZUELA	582 - 237 - 7522	N/A	582 - 232 - 9727
BOGOTA, COLOMBIA	571 - 439 - 5420	N/A	571 - 439 - 5417

Notas

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Instructions d'installation, d'utilisation et d'entretien

Pour votre sécurité, veuillez lire et conserver le présent manuel

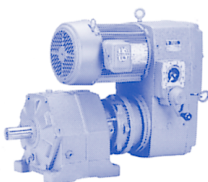


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SÉCURITÉ D'ABORD

DANGER

La haute tension ou les pièces rotatives peuvent causer des blessures graves ou mortelles. L'installation, l'utilisation et l'entretien sécuritaire du moteur doivent être effectués par un personnel compétent, familier avec la norme NEMA MG2, le National Electrical Code (NEC) et les codes locaux et s'y conformer. Il est important d'observer des mesures de sécurité afin de protéger le personnel contre la possibilité de blessures.

LES MEMBRES DU PERSONNEL DOIVENT :

1. Se familiariser avec le matériel et lire attentivement toutes les directives avant d'installer l'équipement ou d'y travailler.
2. Éviter le contact avec les circuits alimentés ou les pièces rotatives.
3. Débrancher toutes les sources d'alimentation avant de commencer l'entretien ou les réparations.
4. Agir avec précaution, conformément aux procédures prescrites pour la manutention et le levage du matériel.
5. S'assurer que l'appareil comporte une mise à la masse, conformément aux exigences réglementaires.
6. S'assurer que le matériel se trouve dans un boîtier fermé ou protégé, afin d'éviter que des enfants ou toute autre personne non autorisée n'y aient accès, et réduire ainsi les risques d'accident.
7. S'assurer que la clavette d'arbre est bien en place avant d'alimenter l'appareil.
8. Éviter le contact avec les condensateurs tant que les procédures sécuritaires de décharge ne sont pas complètement terminées.
9. Fournir aux membres du personnel un équipement de protection approprié vis-à-vis des pièces rotatives et des applications utilisant une importante charge d'inertie pouvant entraîner une survitesse.
10. Éviter une exposition prolongée au matériel générant des niveaux élevés de bruit.

INSPECTION ET MANUTENTION

Inspecter l'appareil pour s'assurer qu'aucun dommage n'est survenu lors du transport. Vérifier la plaque signalétique afin de savoir si la vitesse, la puissance nominale en CV, la tension, la fréquence en hertz et de phases sont conformes à l'alimentation et au matériel.

AVERTISSEMENT

Les appareils doivent être levés à l'aide des anneaux de levage à œil ou de plateaux, si fournis. Ces anneaux ou plateaux ne sont prévus que pour le levage de cet appareil et ne doivent pas être utilisés pour soulever des poids supplémentaires. L'angle de levage, de l'anneau de levage, ne doit pas dépasser 30° pour une machine équipée d'un seul moyen de levage et 45° pour une machine équipée de plusieurs moyens de levage. Les anneaux de levage de rechange doivent être conformes à la norme ASTM A489 ou l'équivalent. Tous les anneaux de levage doivent être serrés solidement. S'assurer de ne pas toucher les lignes aériennes d'électricité. Négliger de suivre cet avertissement peut entraîner des blessures graves.

ENTREPOSAGE

Les appareils doivent être entreposés à l'intérieur dans un endroit propre et sec, et les bobinages doivent être protégés contre une absorption excessive d'humidité. REMARQUE : Si les moteurs sont entreposés pendant plus d'un an, consulter Emerson Motor Company. Si les moteurs sont entreposés pendant plus d'un an et que les appareils avec engrenages et courroie de transmission sont entreposés pendant plus de six mois, consulter Emerson Motor Company.

EMPLACEMENT

AVERTISSEMENT

Conformément à l'article 500 du NEC, n'utiliser que les moteurs conçus pour des emplacements dangereux qui figurent dans la liste UL pour une utilisation dans de tels endroits. Ces appareils doivent se trouver dans un endroit propre et bien ventilé. Les appareils doivent être installés dans une enveloppe qui convient ou protégés afin d'éviter que des enfants ou toute autre personne non autorisée ne puisse y avoir accès, afin de prévenir les risques d'accident.

INSTALLATION / MONTAGE

Monter l'appareil sur une surface ferme et plane suffisamment rigide pour éviter les vibrations. Les courroies de transmission et les chaînes doivent être tendues selon les recommandations du fournisseur. Les raccords doivent être alignés et équilibrés correctement. Pour le choix de la courroie, de la chaîne et de l'entraînement par engrenages, se reporter aux directives du fabricant de l'équipement ou de l'entraînement. Pour connaître l'utilisation du matériel de commande, se reporter à l'information pertinente de la norme NEMA MG1.

Les moteurs ont été équilibrés dynamiquement à l'aide d'une demi-clé de même longueur que la pleine clé expédiée avec le moteur. Si la longueur de la rainure de clavette de la poulie est inférieure à cette longueur, réusinier la longue clé en retirant la moitié de la longueur excédentaire entre la poulie et l'extrémité de la clé pour conserver l'équilibrage.

Ne pas bloquer la ventilation du moteur. À moins d'indication contraire sur la plaque signalétique, ce moteur est conçu pour fonctionner conformément à la norme NEMA MG1 dans des « conditions générales d'utilisation », ce qui signifie qu'il doit être utilisé dans une plage de température ambiante de -15 °C à 40 °C (5 °F à 104 °F). Les appareils lubrifiés avec un lubrifiant standard sont conçus pour être utilisés dans cette plage de température. Des lubrifiants spéciaux pourront cependant être requis pour des températures ambiantes hors de cette plage. Remarque : les moteurs qui fonctionnent avec une charge nominale et une température inférieures aux conditions de fonctionnement permises pourront sembler chauds au toucher; ceci est normal et ne nécessite aucune intervention particulière. En cas de doute, mesurer la température sur la surface du châssis et communiquer avec le bureau le plus proche pour savoir si elle est appropriée. Les moteurs avec enveloppe comportent normalement des orifices d'évacuation d'eau. S'assurer que ces orifices s'ouvrent sur un endroit approprié et qu'ils sont libres de toute obstruction (les bouchons doivent avoir été retirés) en fonction de la position de montage du moteur. Ces orifices doivent se trouver au point le plus bas des supports d'extrémité, de l'enveloppe du châssis et de celles des bornes une fois le moteur installé. Ceci pourra exiger l'apport de certaines modifications au moteur. Si l'appareil semble humide et (ou) si il a été entreposé dans un endroit humide, le faire sécher entièrement et vérifier si sa résistance d'isolement à la masse est appropriée avant de l'utiliser.

AVERTISSEMENT

Toutes les pièces rotatives doivent être protégées afin d'éviter les blessures. Garder les doigts et les corps étrangers à une distance sécuritaire des orifices de ventilation et des autres ouvertures. Les applications à forte charge d'inertie peuvent endommager cet appareil en raison de la survitesse du moteur au moment de son arrêt en roue libre. Pour obtenir plus de détails, veuillez communiquer avec Emerson Motor Company.

ATTENTION

Ne pas forcer l'accouplement de commande ou de tout autre équipement sur l'arbre, ce qui pourrait endommager les paliers.

ALIMENTATION ÉLECTRIQUE ET CONNEXIONS

L'alimentation électrique doit être conforme aux valeurs indiquées sur la plaque signalétique. La tension aux bornes du moteur ne devrait pas varier de plus de $\pm 10\%$ de la tension indiquée sur la plaque signalétique, à la fréquence prévue. Une ligne électrique dont le déséquilibre est supérieur à un pour cent, peut entraîner une surchauffe. Ne pas excéder l'ampérage de la charge nominale indiqué sur la plaque signalétique. Les commandes de démarrage et la protection contre la surcharge doivent être établies conformément aux normes du NEC et aux recommandations du fabricant de ces commandes.

Les connexions au moteur doivent être effectuées conformément aux directives indiquées sur le schéma de connexion. Déterminer le sens de rotation avant de brancher l'accouplement de commande. Si un sens de rotation est indiqué, ne faire fonctionner le moteur que dans ce sens. La rotation peut être inversée sur les moteurs triphasés en interchangeant deux raccords de fils. Sur les moteurs monophasés, interchanger les fils selon le schéma de connexion du moteur. Le câblage des appareils, les commandes et à la mise à la masse doivent être conformes aux exigences locales et du NEC.



AVERTISSEMENT

Négliger de mettre à la masse cet appareil de façon appropriée peut entraîner de graves blessures. Lorsqu'un démarrage intempestif pourrait s'avérer dangereux pour les membres du personnel, ne pas utiliser d'installations de démarrage avec remise à zéro automatique.

UTILISATION DES MÉCANISMES D'ENTRAÎNEMENT À FRÉQUENCE VARIABLE

L'utilisation de mécanismes d'entraînement à fréquence variable peut nuire au fonctionnement des moteurs électriques. Les formes d'ondes non sinusoïdales de ces mécanismes comportent des résidus harmoniques qui entraînent une surchauffe du moteur et des pointes de tension.

Les mécanismes d'entraînement à fréquence variable peuvent également réduire l'efficacité du moteur, augmenter le courant de charge, les vibrations et le bruit. Les moteurs standard utilisés avec des mécanismes d'entraînement à fréquence variable doivent se limiter aux types d'applications définis dans la partie 30 de la norme NEMA MG-1. Se reporter au PDS 811-215 disponible sur le site www.usmotors.com.

La partie 31 de la norme NEMA MG-1 définit les éléments connexes au rendement et à l'utilisation des moteurs à usage déterminé qui sont alimentés par inverseur. Pour assurer un rendement et une fiabilité satisfaisants, U.S. Electrical Motor offre et recommande des produits de moteur de service à inverseur avec plaque signalétique qui satisfont les exigences de la partie 31 de la norme NEMA MG-1. L'utilisation de moteurs de service sans inverseur pourra entraîner un piètre rendement ou une panne prématurée qui ne seront peut-être pas garantis dans le cadre des modalités de la vente. Communiquer avec l'ingénieur chargé des ventes pour Emerson Motor Company afin d'obtenir de l'assistance technique sur le choix du moteur, sur son utilisation et sur les détails connexes à la garantie.

LUBRIFICATION À L'HUILE

La plupart des appareils lubrifiés à l'huile sont expédiés sans huile. Se reporter au manuel d'instructions inclus avec l'appareil pour connaître le type et la qualité d'huile à utiliser, les intervalles de vidange et le niveau de l'huile. Si les directives de lubrification précisent qu'il faut utiliser de l'huile synthétique, ne faire aucune substitution.



AVERTISSEMENT

Lorsque le moteur est utilisé dans les secteurs de l'alimentation et des médicaments (y compris ceux de la nourriture pour animaux), consulter le fournisseur d'huile pour connaître les lubrifiants acceptés par la Food and Drug Administration et les autres organismes réglementaires.

ENTRETIEN

Inspecter les appareils à intervalles réguliers. Garder les appareils propres et les ouvertures de ventilation libres de toute poussière, saleté ou autres débris. Lubrifier les appareils selon les directives d'utilisation du manuel d'instructions et de la plaque signalétique. Une lubrification excessive pourrait endommager l'appareil. Ne pas graisser de façon excessive.

⚠ AVERTISSEMENT *Débrancher toute source d'alimentation de l'appareil et décharger toute pièce pouvant conserver une charge électrique avant l'entretien ou la réparation. L'écran et les couvercles doivent rester en place pendant le fonctionnement de l'appareil. Négliger de respecter cet avertissement peut entraîner des blessures.*

Norme U.L. pour les moteurs conçus pour des emplacements dangereux : La réparation de ces moteurs doit être effectuée par le fabricant ou par un centre de réparation autorisé par le fabricant pour la réparation des moteurs indiqués sur la liste U.L. Cette liste s'applique aux moteurs électriques seulement et non à la courroie ou aux entraînements par engrenages qui peuvent être raccordés au moteur.

MOTEUR DE SERVICE AVEC TOUR DE REFROIDISSEMENT

Pendant l'installation, s'assurer que les bouchons des orifices de vidange ont été retirés des drains inférieurs, du support et de la boîte à prises. Les orifices d'évacuation supérieurs doivent être bouchés en tout temps. Dans les applications avec arbre vers le haut, un joint parapluie externe doit être installé. Les moteurs portant les numéros « XXXX-2RS » comportent un joint double et n'ont pas à être lubrifiés de nouveau.

APPAREILS AVEC VARIDRIVE

Ne pas tourner le volant de commande de vitesse lorsque l'appareil ne fonctionne pas, ce qui pourrait l'endommager. La position du volant n'offre qu'une indication relative de la vitesse. Utiliser un détecteur direct de la vitesse afin d'obtenir une lecture précise. Les appareils équipés d'un détecteur à distance de la vitesse ne sont pas calibrés en usine et doivent donc être calibrés sur place. Se reporter aux directives sur le calibrage incluses avec l'appareil.

Les appareils avec VARIDRIVE équipés avec ENDOLUBE n'exigent aucune lubrification du Varidisc coulissant. Faire fonctionner le VARIDRIVE dans toute sa plage de vitesse à chaque semaine.

⚠ AVERTISSEMENT *Ne pas forcer le volant de commande au-delà des limites de vitesse indiquées sur la plaque signalétique. Le mécanisme et la courroie sont conçus pour la vitesse et la puissance en chevaux-vapeur indiquées sur la plaque signalétique. Faire fonctionner l'appareil au-delà de ces limites peut endommager la courroie et le mécanisme et même blesser le personnel. Les couvercles sur le boîtier du cadre ne doivent pas être retirés ou soulevés pendant que l'appareil fonctionne. Ne pas tenter de désassembler ou de réparer les disques de la poulie d'entraînement car la forte tension du ressort pourrait être relâchée et risquer de blesser les membres du personnel. Consulter un centre de réparation autorisé à ce sujet. Se reporter au manuel d'installation et d'entretien du VARIDRIVE pour obtenir toutes les instructions pertinentes au changement de la courroie. Pour obtenir plus de détails, demander le manuel d'installation et d'entretien connexe à un produit particulier.*

DIRECTIVES DE LUBRIFICATION

Les appareils ont été prélubrifiés en usine et n'exigent aucune lubrification initiale. L'intervalle de lubrification varie selon la vitesse, le type de paliers et l'entretien. Se reporter au tableau 1 pour les intervalles de lubrification suggérés. Les conditions d'utilisation peuvent exiger une lubrification plus fréquente. Le moteur doit être arrêté et les commandes électriques verrouillées en position ouverte pour couper toute alimentation pendant l'entretien du moteur (se reporter à la section sur la sécurité). Si le moteur sort d'un entreposage, se reporter aux procédures suivant l'entreposage.

Pour lubrifier de nouveau les paliers, retirer le bouchon de vidange. Inspecter l'orifice de vidange pour la lubrification et en retirer toute obstruction avec une sonde mécanique en veillant à ne pas endommager le palier.

⚠ ATTENTION

La sonde mécanique ne doit en aucun cas être utilisée pendant que le moteur fonctionne. Ajouter du nouveau lubrifiant dans le point d'entrée pour lubrification (se reporter au tableau 1 pour connaître les quantités). Le nouveau lubrifiant doit être compatible avec celui déjà installé dans le moteur (voir la remarque ci-dessous). Faire fonctionner le moteur pendant 15 à 30 minutes sans remettre le bouchon sur l'orifice de vidange afin de purger le lubrifiant excédentaire. Arrêter l'appareil puis remettre en place le bouchon. Remettre ensuite le moteur en service. Certains moteurs comportent des paliers scellés qui n'exigent aucune nouvelle lubrification.

L'ajout d'une trop grande quantité de lubrifiant peut entraîner une surchauffe des paliers, la séparation prématurée du lubrifiant et une panne. Veiller à ne pas trop lubrifier l'appareil.

Tableau 1

**Quantités et intervalles recommandés pour la nouvelle lubrification
(Lubrification des appareils en service)**

Numéro du palier - commun		Numéro du palier AFBMA		Lubrifiant (onces)	Intervalles de lubrification		
62XX	63XX	XXBC02	XXBC03		3600 tr/min	1800 tr/min	1200 tr/min
6203-6207	6303-6306	17-35	17-30	0,2	2 ans	3 ans	3 ans
6208-6212	6307-6309	40-60	35-45	0,4	1 an	2 ans	2 ans
6213-6215	6310-6311	65-75	50-55	0,6	1 an	2 ans	2 ans
6218-6220	6312-6315	80-100	60-75	1,0	6 Mos.	1 an	2 ans
6221-6228	6316-6320	105-140	80-100	1,8	6 Mos.	1 an	1 an

Pour les moteurs montés à la verticale ou dans des milieux hostiles, réduire les intervalles indiqués de 50 pour cent.

Se reporter à la plaque signalétique pour les paliers installés sur un moteur particulier.

Pour les paliers non indiqués dans ce tableau, la quantité de lubrifiant requise peut être calculée à l'aide de la formule suivante :

$$L = 0,11 \times D \times P$$

Où ;

L = quantité de lubrifiant en onces liquides

D = diamètre extérieur du palier, en pouces

P = largeur du palier, en pouces

Tableau 2 LUBRIFIANTS RECOMMANDÉS

LES LUBRIFIANTS CI-DESSOUS PEUVENT ÊTRE INTERCHANGÉS AVEC LES LUBRIFIANTS INCLUS DANS LES APPAREILS FOURNIS PAR L'USINE (À MOINS D'INDICATION CONTRAIRE SUR UNE PLAQUE SIGNALÉTIQUE APPOSÉE SUR LE MOTEUR).

FABRICANT	LUBRIFIANT (NLGI N° 2)
EXXON CORP.	POLYREX - EM
CHEVRON U.S.A. INC.	N° SRI 2

A ATTENTION

Des lubrifiants préparés dans des bases (lithium, polyurique, argile, etc.) pourraient ne pas être compatibles. Un tel mélange de lubrifiants pourra entraîner une réduction de la durée de vie du lubrifiant et une panne prématurée des paliers. Au besoin, empêcher un tel mélange en démontant le moteur, en retirant tout le vieux lubrifiant des paliers et des boîtiers (y compris de tous les orifices pour lubrification et orifices de vidange). Inspecter et remplacer les paliers endommagés. Remplir les corps de paliers et les paliers à environ 30 % de leur capacité avec du nouveau lubrifiant. Retirer tout lubrifiant excédentaire se trouvant au-delà des bordures des chemins de roulement et des disques de retenue. Se reporter au tableau 2 pour les lubrifiants recommandés.

GARANTIE

GARANTIE LIMITÉE

Tous les produits U.S.E.M. sont garantis contre les défauts de fabrication et de matériaux pendant 12 mois à compter de la date d'installation et ce, sans dépasser 18 mois après la date d'expédition de chez EMC. Certains des produits de U.S.E.M. comportent une période de garantie de plus de 12 mois. Veuillez vous reporter au catalogue actuel des prix ou communiquer avec EMC pour obtenir des détails sur des produits particuliers. Cette garantie limitée ne s'applique pas aux produits qui ont fait l'objet d'une mauvaise utilisation, d'une utilisation malveillante, de négligence (y compris, mais sans s'y limiter, un entretien inadéquat), d'un accident, d'une installation inappropriée, d'une modification, d'un ajustement ou d'une réparation. Cette garantie constitue la seule garantie offerte par EMC à l'égard de cette vente et remplace toute autre garantie, expresse ou implicite, écrite ou verbale. AUCUNE GARANTIE IMPLICITE DE QUALITÉ MARCHANDE OU D'ADAPTATION À DES FINS PARTICULIÈRES NE S'APPLIQUE À LA PRÉSENTE VENTE. Aucun employé, représentant, concessionnaire ou autre n'est autorisé à donner une quelconque garantie au nom d'EMC ni à assumer, pour EMC, toute autre responsabilité à l'égard d'un de ses produits.

RECOURS EXCLUSIF

La responsabilité d'EMC se limite exclusivement à réparer ou remplacer tout produit jugé défectueux par EMC ou, au choix d'EMC, à rembourser le prix d'achat de ce produit. Ce produit doit être renvoyé, frais de transport prépayés, au centre de service autorisé le plus près de U.S.E.M. ou à l'usine d'EMC. Il est convenu que ce remplacement, cette réparation ou ce remboursement sera le seul et unique recours offert par EMC. EMC ne sera pas responsable des dommages de quelque sorte que ce soit au-delà de ce recours exclusif, y compris les dommages accessoires et indirects, que la demande soit fondée sur le contrat, la négligence, la responsabilité stricte, la faute, la garantie ou tout autre élément. La réparation ou le remplacement du produit, ou le remboursement de son prix d'achat, au choix d'EMC, constitue l'exécution complète de toutes les obligations d'EMC envers l'acheteur pour des produits défectueux.

Pour obtenir des pièces de rechange, veuillez communiquer avec le distributeur de pièces de U.S. Electrical Motors le plus près. Pour obtenir du service couvert par la garantie, appeler le centre de service de U.S. Electrical Motors le plus près. Mentionner toutes les données indiquées sur la plaque signalétique, y compris le numéro d'identification, etc.

POUR OBTENIR DU SERVICE, APPELER:

VISITER NOTRE SITE WEB AU

FRANÇAIS

RÉGION DE VENTES	TÉLÉPHONE	SANS FRAIS	TÉLÉCOPIEUR
EMERSON MOTOR COMPANY ST. LOUIS, MO		888 637-7333	314 553-2087
VENTES INTERNATIONALES	314 553-4157	N/D	314 553-2135
MONTRÉAL, QUÉBEC/CAN.	514 332-1880	800 361-5509	514 332-5912
MARKHAM, ONTARIO/CAN.	905 475-4670	N/D	905 475-4672
MONTERREY, MEXICO	011 52818 389-1300	N/D	011 52818 389-1310
CARACAS, VENEZUELA	582 237-7522	N/D	582 232-9727
BOGOTÁ, COLOMBIE	571 439-5420	N/D	571 439-5417

Notes

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

NFPA 13 Sprinkler Installation Certification

Permit #: 2020 ANCH 1089

Date: 9/18/2020

	Property Protected	System Installer	System Supplier
Business Name:	<u>UPPER TANANA HEALTH CLINIC</u>	<u>YUKON FIRE</u>	
Address:			
Representative:			
Telephone:			

Location of Plans: _____

Location of Owner's Manual: _____

1. Certification of System Installation: Complete this section after system is installed, but prior to conducting operational acceptance tests.

This system installation was inspected and found to comply with the installation requirements of:

☒ NFPA 13
☒ IFC and IBC
☒ Manufacturer's Instructions
☐ Other (specify; FM, UL, etc) _____

Print Name: TREVOR GROW
Signed: _____ Date: 9/18/2020
Organization: YUKON FIRE PROTECTION

2. Certification of System Operation: All operational features and functions of this system were tested and found to be operating properly in accordance with the requirements of:

☒ NFPA 13
☒ IFC and IBC
☒ Manufacturer's Instructions
☐ Other (specify) _____

Print Name: TREVOR GROW 13-044
Signed: _____ Date: _____
Organization: YUKON FIRE PROTECTION

5601 SILVERADO WAY • ANCHORAGE, AK • 99518
TEL: (907) 563-3608 • FAX (907) 561-2352
LICENSE # AA-8308

FIRE PUMP PERFORMANCE TESTING (N.F.P.A. 20)

OWNER UPPER TANANA HEALTH (N.I.L) ADDRESS 124.4 TOK CUTOFF
INSPECTOR T. ROW 13-044 DATE 9/18/2020
PUMP MFR. PEERLESS MODEL # 8MAF
SIZE 4" I.D. # 50010616 RATED GPM. 250
DRIVER: ELECTRIC / DIESEL / RATED HP. ~~31~~ 31
TOTAL PUMP RUN TIME 35 min

{FLOW METER RESULTS}

	DISCHARGE	SUCTION	NET	AMPS	RPM	VOLTS
CHURN:	<u>158</u> PSI	<u>0</u> PSI	<u>158</u> PSI	<u>55</u> PSI	<u>1786</u> PSI	<u>209</u> PSI
<u>0 GPM</u>						
100%	<u>104</u> PSI	<u>0</u> PSI	<u>104</u> PSI	<u>83</u> PSI	<u>1776</u> PSI	<u>207</u> PSI
<u>282 GPM</u>						
150%	<u>64</u> PSI	<u>0</u> PSI	<u>64</u> PSI	<u>85</u> PSI	<u>1773</u> PSI	<u>206</u> PSI
<u>378 GPM</u>						

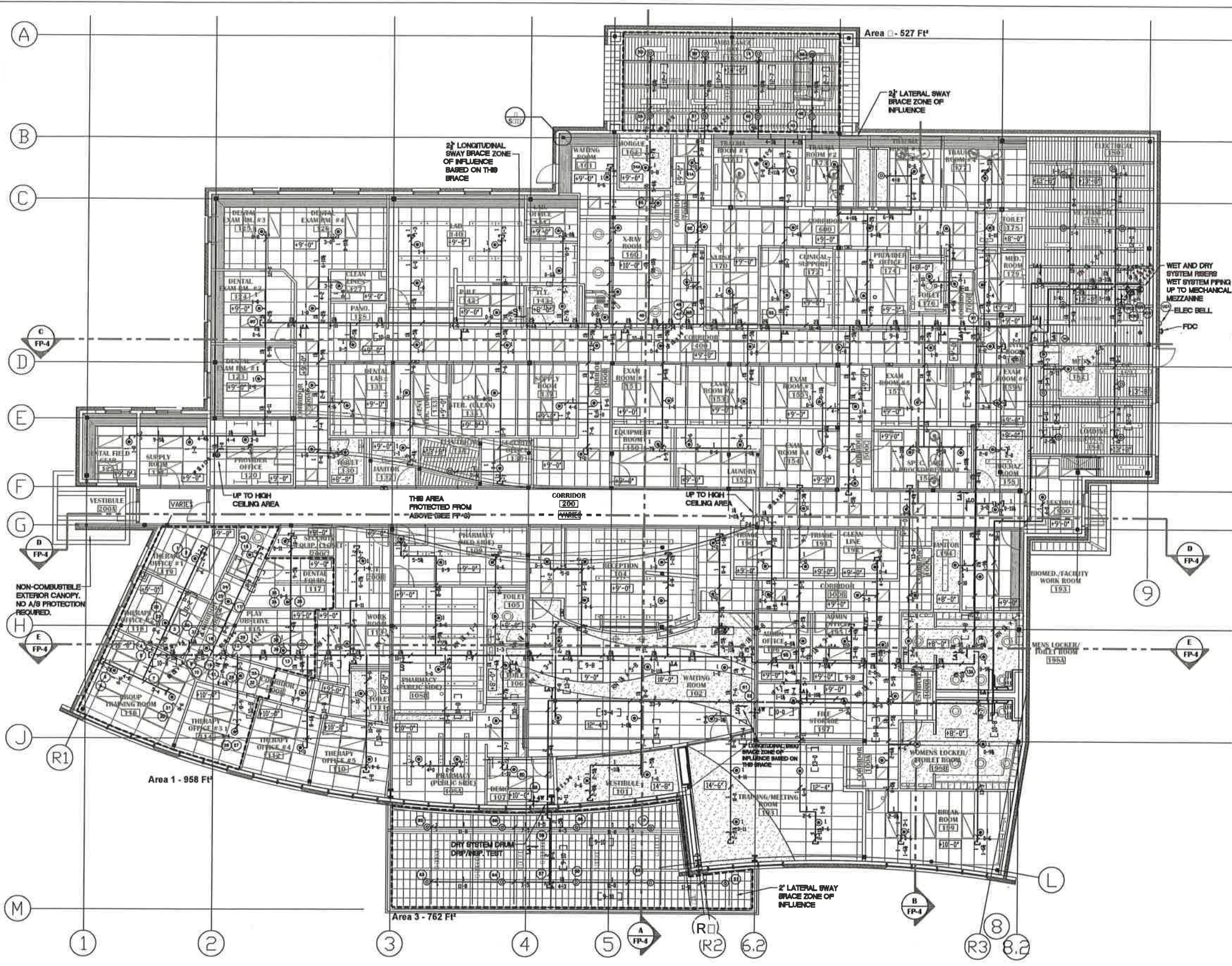
JOCKEY PUMP SET PRESSURES: ON 135 PSI OFF 145 PSI

MAIN PUMP SET PRESSURES: ON 125 PSI OFF N/A PSI

- A. DO ALL VALVES APPEAR TO BE IN THE PROPER OPEN OR CLOSED POSITION Y / N / N/A /
- B. DOES CONTROL PANEL FUNCTION NORMALLY Y / N / N/A /
- C. IS PUMP TIMER SET TO AUTO SHUTDOWN (MIN. N/A) Y / N / N/A /
- D. DOES PUMP RUN ALARM OPERATE PROPERLY Y / N / N/A /
- E. DOES PUMP POWER OFF ALARM OPERATE PROPERLY Y / N / N/A /
- F. DOES JOCKEY PUMP CONTROL FUNCTION NORMALLY Y / N / N/A /
- G. IS JOCKEY PUMP LOCATED AT LEAST 12' OFF THE FLOOR Y / N / N/A /
- H. DO PRESSURE RELIEF VALVES OPERATE NORMALLY Y / N / N/A /
- I. DO WATER COOLED BEARINGS SEEP WATER Y / N / N/A /
- J. IS WATER STORAGE FILLED TO CAPACITY Y / N / N/A /
- K. DO ALL VALVES REPORT TO FIRE ALARM PANEL Y / N / N/A /
- L. FUEL TANK STORAGE CAPACITY 1/4 / 1/2 N/A 3/4 / FULL /

COMMENTS:

FIRE PUMP INSTALL TESTING IS COMPLETE
TREVOR ROW 13-044



FIRE PROTECTION LEGEND	
⊙	AUTOMATIC SPRINKLER SYSTEM RISER
⊙	HYDRAULIC REFERENCE POINT
—	LONGITUDINAL SWAY BRACE
+	LATERAL SWAY BRACE
—	END OF LINE SEISMIC RESTRAINT
—	PIPE HANGER
—	GROOVED FLEXIBLE COUPLING
—	PIPE ABOVE FINISH FLOOR
—	RISER NOZZLE
⊙	GROOVE CAP
—	PIPE DIAMETER AND LENGTH
⊙	GROOVE TEE
⊙	GROOVE EL
⊙	GROOVE COUPLING

Volume of System		
Diameter (in)	Volume (gal)	Approx. Len (ft)
1	4.97	110
1 1/4	1.25	16
1 1/2	.82	8
2	33.32	192
Total	40.36	

DRY SYSTEM NOTE:
 • MAIN PIPING TO SLUPE A MINIMUM OF 1/4" EVERY 10'-0"
 • BRANCHING PIPING TO SLUPE A MINIMUM OF 1/8" EVERY 10'-0"
 • CAPACITY OF DRY SYSTEM IS 40 GALLONS

Sprinkler Head Schedule					
Symbol	Count	Thread	K-Factor	Description	Note
⊙	148	1/2"	5.6	TY3231 1/2 QR 155 CP PD	on Drop
⊙	28	1/2"	5.8	TY3131 1/2 QR 200 B UP	
⊙	1	1/2"	5.8	TY3131 1/2 QR 200 B UP	on Sprig

178 = Total Number of Heads This Floor

HYDRAULIC DESIGN DATA	
A.H.J.	STATE OF ALASKA
HZD CLASS	LIGHT HAZARD
PIPE TYPES	SCH. 40 BLACK STEEL
MAINS	SCH. 40 BLACK STEEL
BRANCHES	SCH. 40 BLACK STEEL (48" FLEX DROPS)
SPRINKLER DRIFTE	1/2" K=5.60
AREA LOCATION	REMOTE AREA #1 OFFICES
# OF FLOWING SPRINKLERS	11
DENSITY	.10 GPM/SQFT.
REMOTE AREA	REDUCED PER NEPA 908 SQFT.
DEMAND AT BASE OF RISER	
FLOW	210 GPM
PRESSURE	62.1 P.S.I.
INSIDE HOSE STREAM	N/A GPM
DEMAND AT SOURCE CONNECTION	
FLOW	210 GPM
PRESSURE	63.5 P.S.I.
OUTSIDE HOSE STREAM	N/A GPM

HYDRAULIC DESIGN DATA	
A.H.J.	STATE OF ALASKA
HZD CLASS	ORDINARY HAZARD GROUP 1
PIPE TYPES	SCH. 40 BLACK STEEL
MAINS	SCH. 40 BLACK STEEL
BRANCHES	SCH. 40 BLACK STEEL
SPRINKLER DRIFTE	1/2" K=5.60
AREA LOCATION	REMOTE AREA #2 AMBULANCE BAY
# OF FLOWING SPRINKLERS	8
DENSITY	.15 GPM/SQFT.
REMOTE AREA	ENTIRE AREA SQFT.
DEMAND AT BASE OF RISER	
FLOW	129.6 GPM
PRESSURE	29.8 P.S.I.
INSIDE HOSE STREAM	N/A GPM
DEMAND AT SOURCE CONNECTION	
FLOW	129.6 GPM
PRESSURE	30.4 P.S.I.
OUTSIDE HOSE STREAM	N/A GPM

HYDRAULIC DESIGN DATA	
A.H.J.	STATE OF ALASKA
HZD CLASS	LIGHT HAZARD DRY SYSTEM C=1000
PIPE TYPES	SCH. 40 BLACK STEEL
MAINS	SCH. 40 BLACK STEEL
BRANCHES	SCH. 40 BLACK STEEL
SPRINKLER DRIFTE	1/2" K=5.60
AREA LOCATION	REMOTE AREA #3 ENTRANCE CANOPY
# OF FLOWING SPRINKLERS	9
DENSITY	.10 GPM/SQFT.
REMOTE AREA	ENTIRE AREA SQFT.
DEMAND AT BASE OF RISER	
FLOW	156.4 GPM
PRESSURE	75.3 P.S.I.
INSIDE HOSE STREAM	N/A GPM
DEMAND AT SOURCE CONNECTION	
FLOW	156.3 GPM
PRESSURE	82.2 P.S.I.
OUTSIDE HOSE STREAM	N/A GPM

RECORD DRAWING
 MAIN LEVEL FIRE PROTECTION PLAN
 SCALE: 1/8" = 1'-0"



YUKON FIRE PROTECTION SERVICES INCORPORATED
 5601 SILVERADO WAY
 ANCHORAGE, ALASKA 99518-1215
 (907) 563-3608 FAX: 561-2352

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REVISIONS				
NO.	DATE	DESCRIPTION	DRAWN	CHECKED/APPROVED
00	1-15-20	PRELIMINARY	NS	

DESIGNED BY	N. STEPHENS
CHECKED BY	SEAN J GUILLORY, CET. LISC. NO. 04-037
PROJECT MANAGER	SEAN J GUILLORY, CET. LISC. NO. 04-037
LISC. NO.	

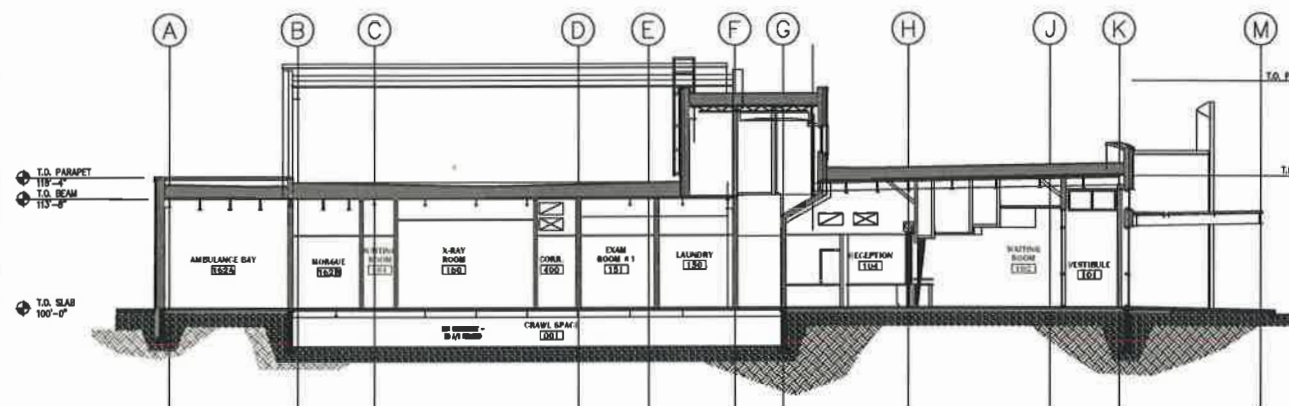
UPPER TANANA HEALTH CLINIC
 TOK, ALASKA

M-74

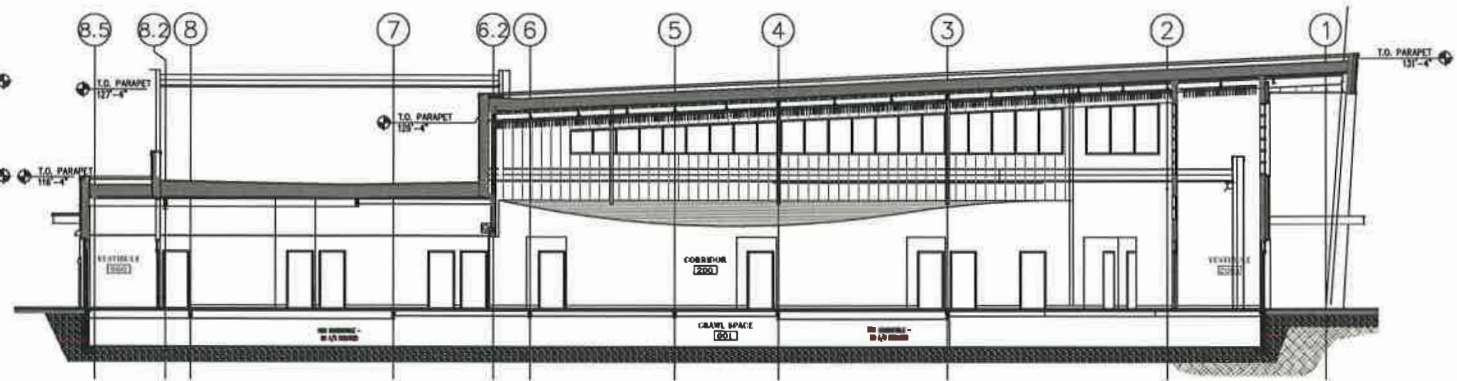
MAIN LEVEL FIRE PROTECTION PLAN

DATE: 1/15/20

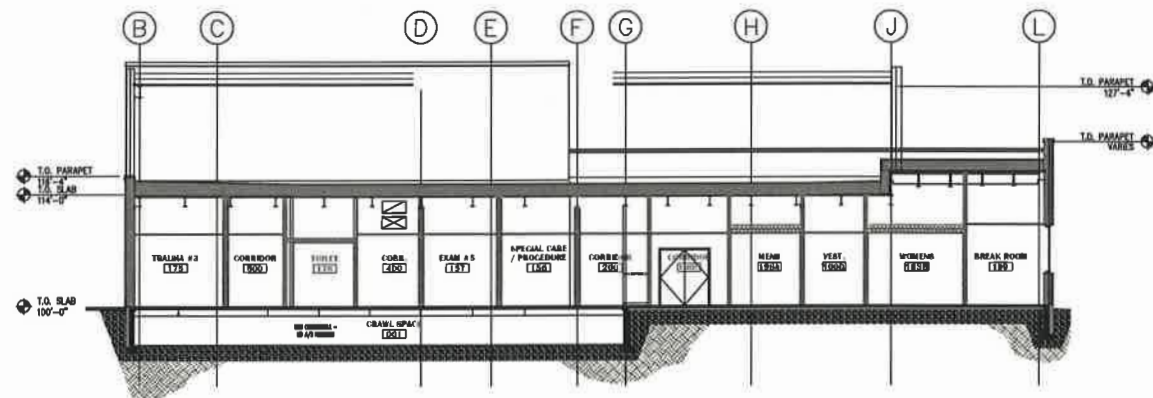
2 SHEET OF 5



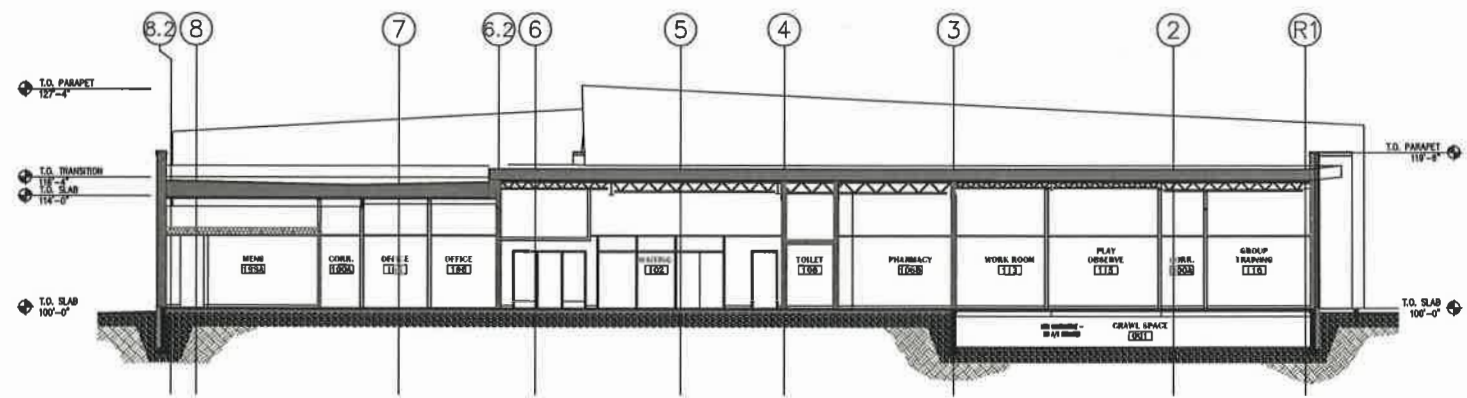
CROSS SECTION "A"
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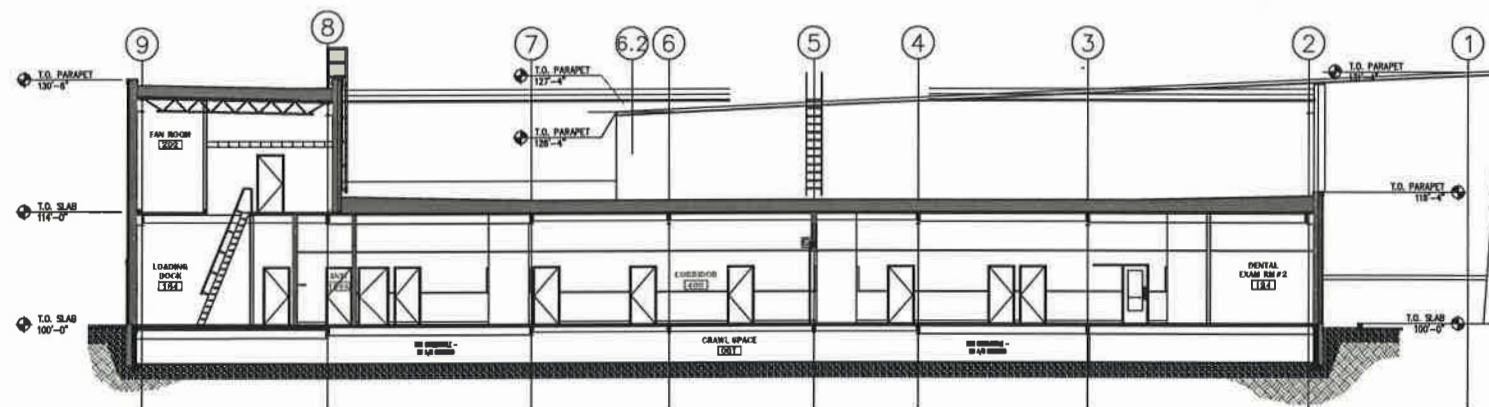
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SCALE: 3/32" = 1'-0"



CROSS SECTION "B"
SCALE: 3/32" = 1'-0"



CROSS SECTION "E"
SCALE: 3/32" = 1'-0"



CROSS SECTION "C"
SCALE: 3/32" = 1'-0"

RECORD DRAWING



**YUKON
FIRE PROTECTION SERVICES
INCORPORATED**
5601 SILVERADO WAY
ANCHORAGE, ALASKA 99516-1218
(907) 563-5608 FAX: 561-2552

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REVISIONS			
NO.	DATE	DESCRIPTION	DRAWN
00	1-15-20	PRELIMINARY	NS

DESIGNED BY
N. STEPHENS
CHECKED BY
SEAN J. GUILLORY, CET. LISC. NO. 04-037
PROJECT MANAGER
SEAN J. GUILLORY, CET. LISC. NO. 04-037
LISC. NO.

UPPER TANANA HEALTH CLINIC
TOK, ALASKA

CROSS SECTION PLAN

DATE 1/15/20

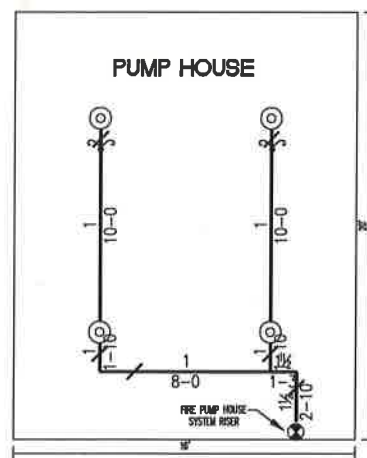
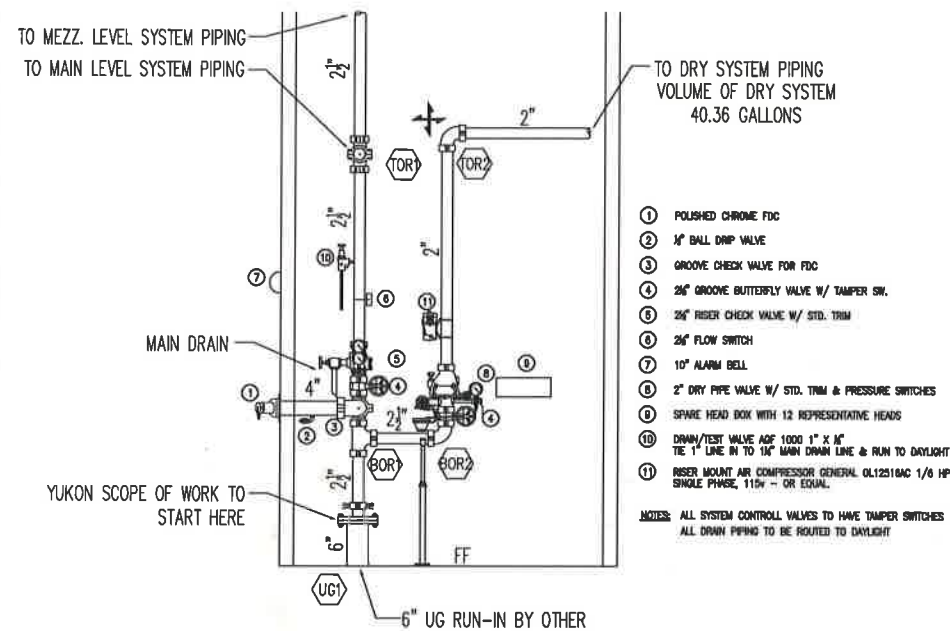
JOB #

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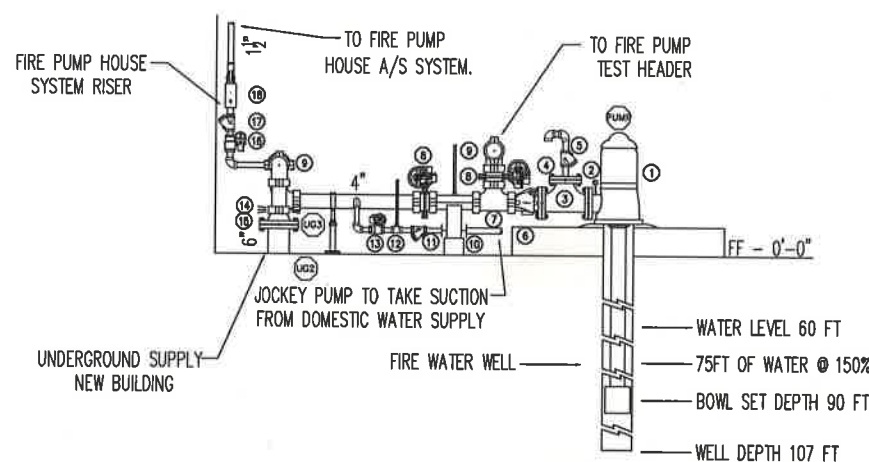
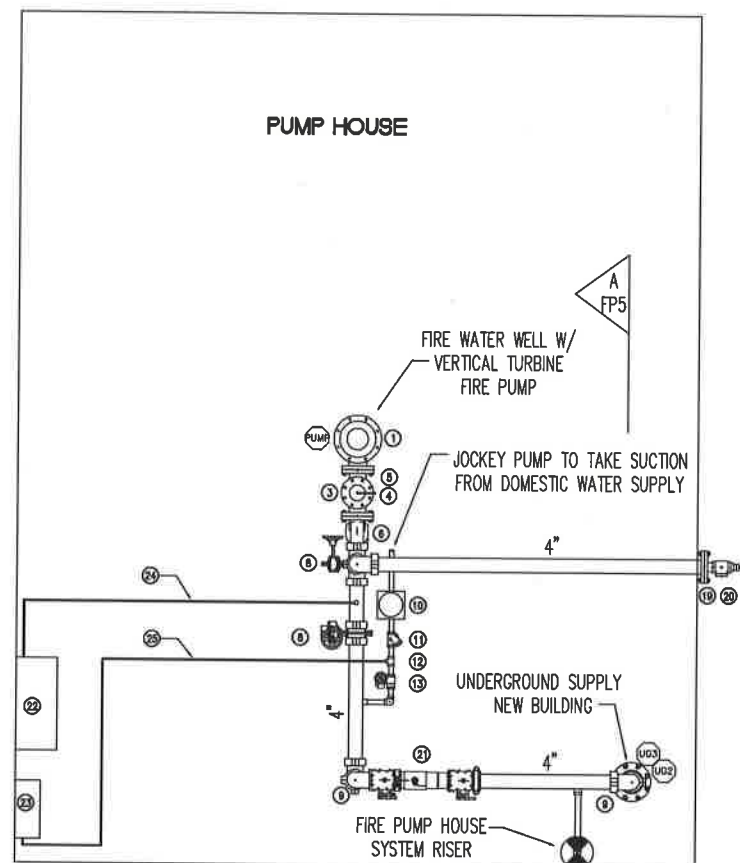
4 SHEET
OF 5

SYSTEM AREA
17,299 SF



PUMP HOUSE FIRE PROTECTION PLAN
SCALE: 1/4" = 1'-0"

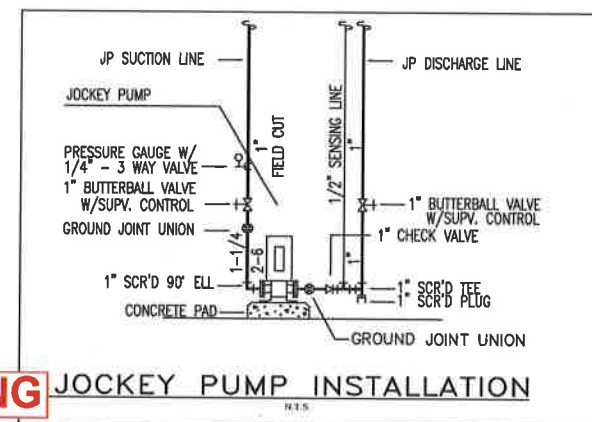
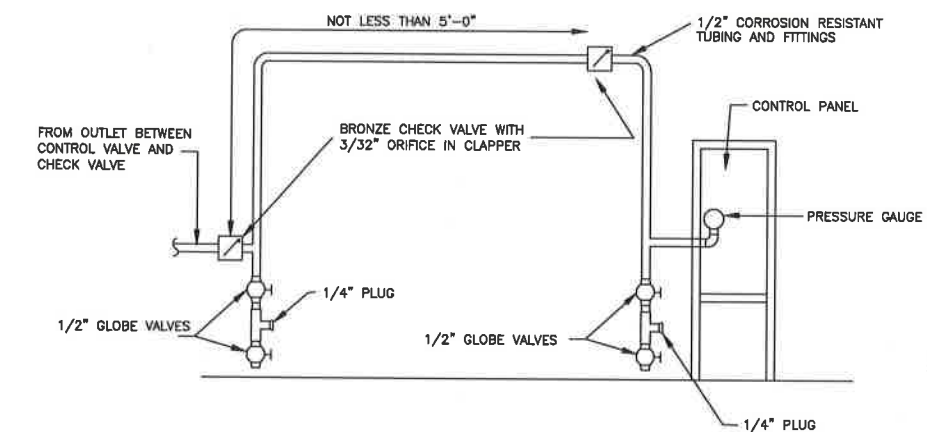
Sprinkler Head Schedule					
Symbol	Count	Thread	K-Factor	Description	Note
⊙	4	1/2"	5.6	TY3131 1/2 QR 200 B UP	
4 = Total Number of Heads This Floor					



FIRE PUMP SECTION VIEW "A"
SCALE: 1/2" = 1'-0"

FIRE PUMP LEGEND

- 250 GPM @ 140 PSI VERTICAL TURBINE FIRE PUMP
30 HP, 208V 3 PHASE
- PUMP DISCHARGE PRESSURE GAUGE
- 4" FLANGE TEE
- 9" X 1.5" COMPANION FLANGE
- AUTOMATIC AIR RELEASE VALVE
- 4" GROOVE CHECK VALVE
- 4" GROOVE TEE
- 4" GROOVE BUTTERFLY VALVE W/ TAMPER SWITCH
- 4" GROOVE ELL
- JOCKEY PUMP - 1.5 HP, 208V 3 PHASE
- 1" THIRD CHECK VALVE
- 1 X 1" X 1/2" TEE FOR SENSING LINE
- 1" THREADED BUTTERBALL VALVE
- 6" X 4" GROOVE CONCENTRIC REDUCER
- 6" GROOVE FLANGE
- 1 1/2" THREADED BUTTERBALL VALVE W TAMPER SWITCH
- 1 1/2" THREADED CHECK VALVE
- 1 1/2" THREADED RISER MANIFOLD
- 6" X 2.5" COMPANION FLANGE
- 2 1/2" ANGLE HOSE VALVE
- 4" DERIVATOR DOWN GND W/ TAMPER SWITCH
- FIRE PUMP CONTROL PANEL
- JOCKEY PUMP CONTROL PANEL
- FIRE PUMP SENSING LINE
- JOCKEY PUMP SENSING LINE



JOCKEY PUMP INSTALLATION
N.T.S.



YUKON
FIRE PROTECTION SERVICES
INCORPORATED

5801 SILVERADO WAY
ANCHORAGE, ALASKA 99518-1215
(907) 563-3608 FAX: 561-2352

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REVISIONS				
NO.	DATE	DESCRIPTION	DRAWN	CHECKED
00	1-15-20	PRELIMINARY	NS	

DRAWN BY
N. STEPHENS

CHECKED BY
SEAN J GUILLORY, CET. LISC. NO. 04-037

PROJECT MANAGER
SEAN J GUILLORY, CET. LISC. NO. 04-037

LISC. NO.

UPPER TANANA HEALTH CLINIC
TOK, ALASKA

FIRE PUMP/ RISER DETAIL PLAN

DATE 1/15/20

JOB #

M-77

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INDEMNITY AND INSURANCE

Article 1. Indemnification

The contractor shall indemnify, hold harmless, and defend the contracting agency from and against any claim of, or liability for error, omission or negligent act of the contractor under this agreement. The contractor shall not be required to indemnify the contracting agency for a claim of, or liability for, the independent negligence of the contracting agency. If there is a claim of, or liability for, the joint negligent error or omission of the contractor and the independent negligence of the contracting agency, the indemnification and hold harmless obligation shall be apportioned on a comparative fault basis. "Contractor" and "contracting agency", as used within this and the following article, include the employees, agents and other contractors who are directly responsible, respectively, to each. The term "independent negligence" is negligence other than in the contracting agency's selection, administration, monitoring, or controlling of the contractor and in approving or accepting the contractor's work.

Article 2. Insurance

Without limiting contractor's indemnification, it is agreed that contractor shall purchase at its own expense and maintain in force at all times during the performance of services under this agreement the following policies of insurance. Where specific limits are shown, it is understood that they shall be the minimum acceptable limits. If the contractor's policy contains higher limits, TCC shall be entitled to coverage to the extent of such higher limits. Certificates of Insurance must be furnished to the contracting officer prior to beginning work and must provide for a notice of cancellation, non-renewal, or material change of conditions in accordance with policy provisions. Failure to furnish satisfactory evidence of insurance or lapse of the policy is a material breach of this contract and shall be grounds for termination of the contractor's services. All insurance policies shall comply with and be issued by insurers licensed to transact the business of insurance under Alaska Statute.

Workers' Compensation Insurance: The Contractor shall provide and maintain, for all employees engaged in work under this contract, coverage as required by the State of Alaska, and; where applicable, any other statutory obligations including but not limited to Federal U.S.L. & H. and Jones Act requirements.

Commercial General Liability Insurance: covering all business premises and operations used by the Contractor in the performance of services under this agreement with minimum coverage limits of \$1,000,000 per occurrence and \$2,000.00 in the aggregate.

Commercial Automobile Liability Insurance: covering all vehicles used by the Contractor in the performance of services under this agreement with minimum coverage limits of \$1,000,000 combined single claim

Waiver of Subrogation. Contractor waives all rights against TCC and its agents, officers, directors and employees for recovery of damages to the extent these damages are covered by the above policies maintained pursuant to this agreement. Contractor shall obtain an endorsement to the above policies to affect this waiver.

Service and Inspections Per NFPA 72 and NFPA 25
Bid Schedule

Description	UOM	Quantity	Total Cost
Service and Inspections Per NFPA 72 and NFPA 25	Lump Sum	All Required	\$ _____

Contractor Name _____
Contractor Address _____

Contractor Phone Number _____
Contractor Email _____

Authorized Signature _____
Printed Name _____