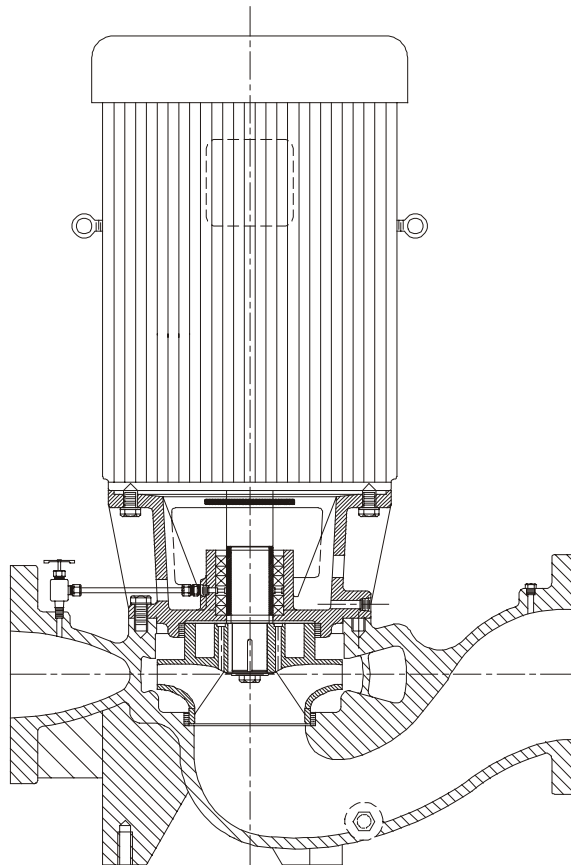


FILE NO.:	F43.160
DATE:	February 9, 2001
SUPERSEDES:	F43.160
DATE:	April 30, 2000

INSTALLATION AND OPERATING INSTRUCTIONS

ARMSTRONG®

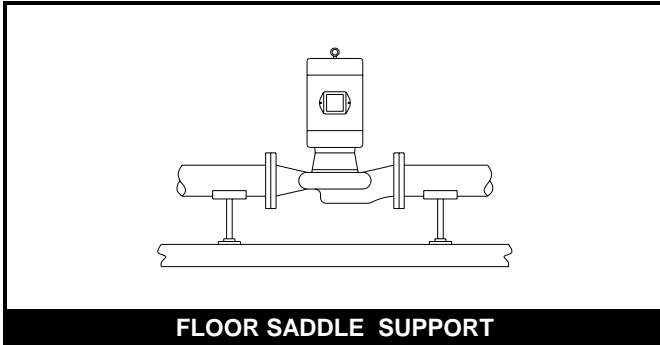
VERTICAL IN-LINE FIRE PUMPS AND FIREPAKS INSTALLATION AND OPERATING MANUAL



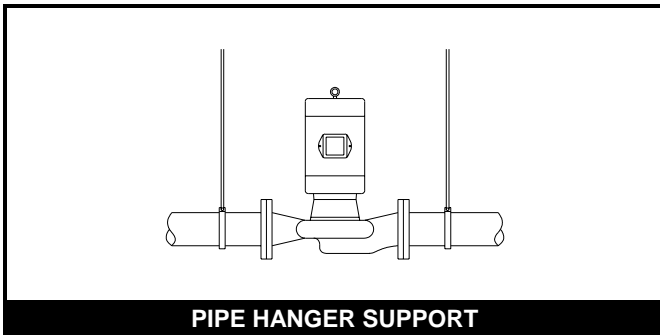
INSTALLATION AND OPERATING MANUAL VERTICAL IN-LINE FIRE PUMPS AND FIREPAKS

Firepak fire booster systems are completely self-contained package pumping units, factory assembled, wired, tested and pre-adjusted before shipment to suit the specified conditions. These systems are ready to receive suction and discharge piping and to be connected to power supply. The Vertical In-Line pump is designed to be mounted vertically in the pipe line with the motor above the pump. Center line suction and discharge keep weight evenly balanced and directly down upon the piping. When properly installed and given reasonable care and maintenance, Vertical In-Line pumps and Firepak units will provide many years of reliable trouble-free fire protection.

Firepak and Vertical In-Line pump fire pumps are thoroughly tested and inspected before shipment but should be carefully examined for possible damage during transit. Contact your Armstrong Darling representative and the Transport Company immediately if there is any evidence of mishandling.



FLOOR SADDLE SUPPORT



PIPE HANGER SUPPORT

INSTALLATION

1. LOCATION

- ❑ Locate the unit in a dry place as near the city water entrance as practical with a short, direct suction pipe

REMINDER

Assure sufficient space above the pump to give clearance for lifting the pump assembly from the casing and around the pump for general accessibility and ventilation.

2. FOUNDATION FOR FIREPAK ASSEMBLY

- ❑ Foundation should be sufficiently substantial to absorb any vibration and to form a permanent, rigid support for the base plate
- ❑ Foundation bolts of suitable size should be embedded in the concrete, located by a drawing or template

3. PUMP MOUNTING & PIPING

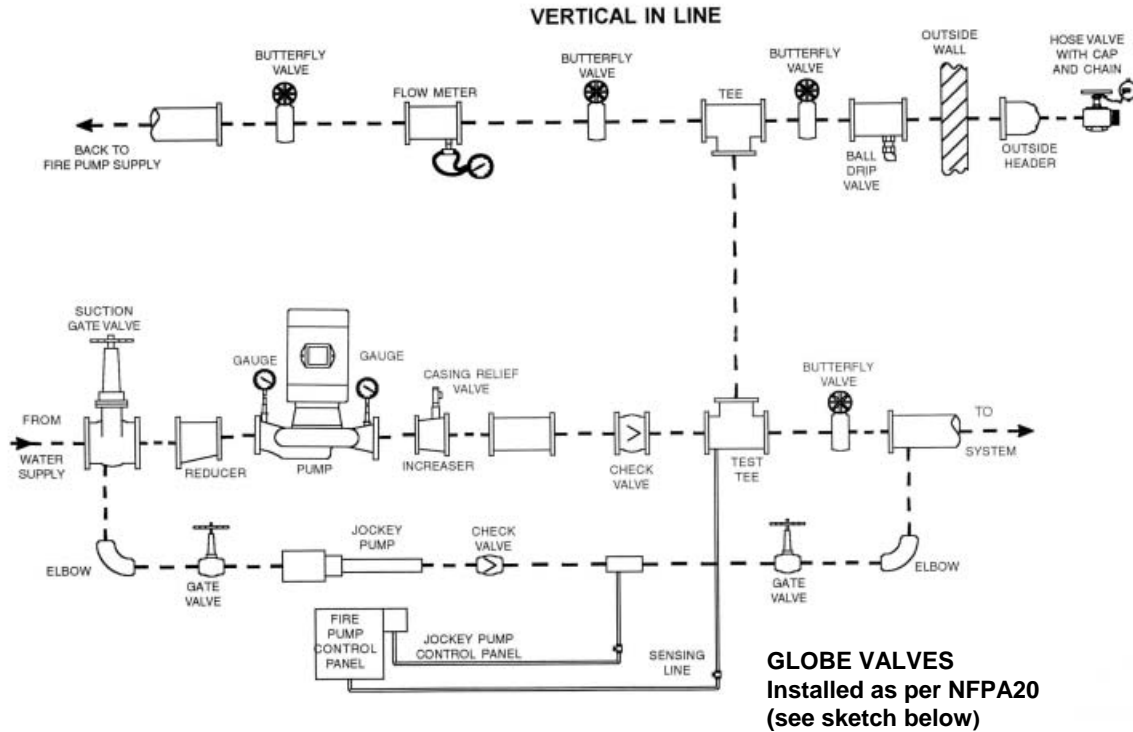
No flexible connections to take up pipe misalignment are necessary since pump is not permanently connected to anything but the piping and is free to move with the expansion and contraction of the piping system.

- ❑ Never connect a Firepak to piping, always start piping from unit
- ❑ Use as few bends as possible and preferably long radius ones
- ❑ Support of the piping at the pump may be made by two pipe hangers, floor saddles or floor flanges, placed on line close to the pump
- ❑ Install good supports under suction and discharge piping with anchors near but independent of the pump
- ❑ Make sure piping exerts no strain on pump as this would distort the casing
- ❑ Layout the suction line with a continual rise towards the pump without high points, thus eliminating possibility of air pockets
- ❑ Test suction line for air leaks before starting; this becomes essential with long suction line
- ❑ Install, at pump suction, a straight pipe of a length equivalent to 4 to 6 times its diameter

REMINDER

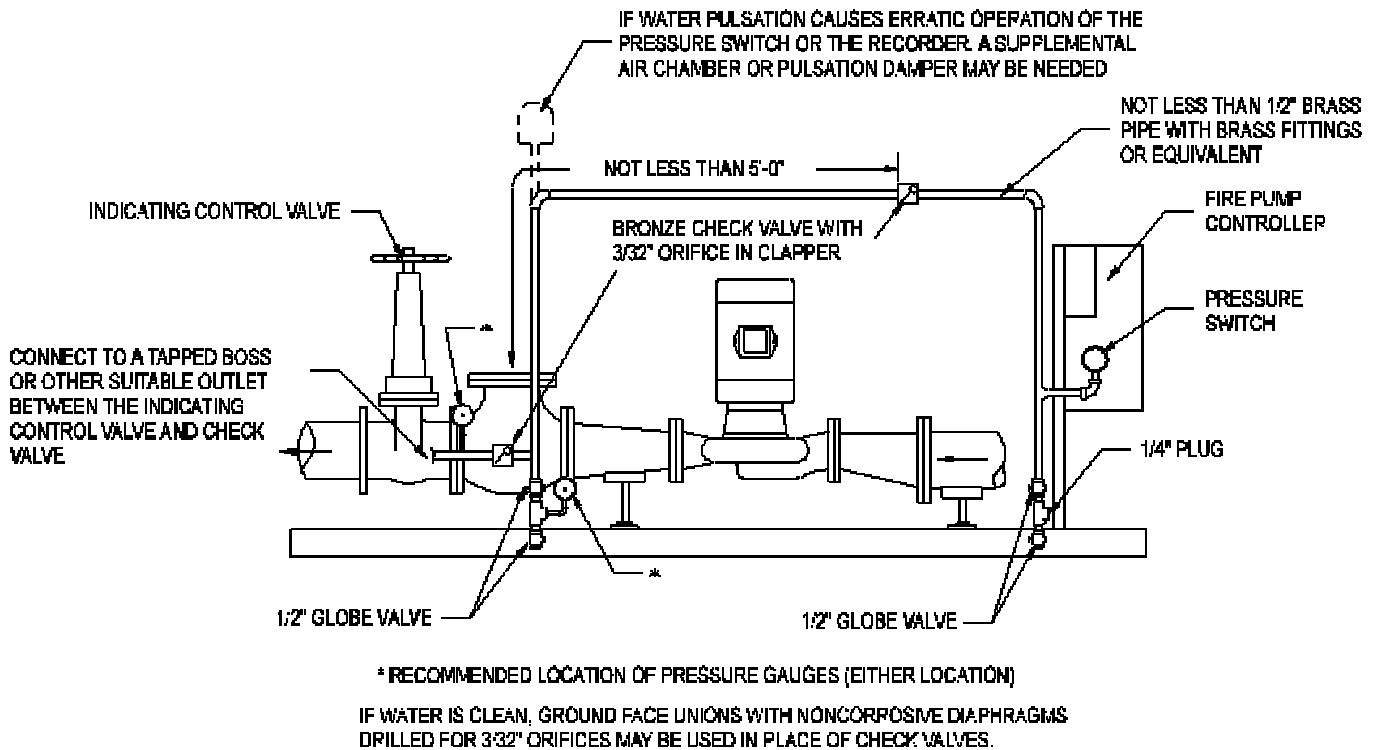
- Discharge valve only must be used to shut-off the pump
- If Fire Pump unit is not packaged by the pump manufacturer, installation needs to be done as per N.F.P.A. 20 recommendations.
(see "TYPICAL FIRE PUMP & CONTROLLER ARRANGEMENT" drawing)

**TYPICAL FIRE PUMP & CONTROLLER ARRANGEMENT
VERTICAL IN-LINE FIRE PUMP**



NOTE: ALL VALVES SHALL BE LISTED FOR FIRE APPLICATION. This drawing is a suggested arrangement and is issued for information purposes only

PRESSURE SENSING LINE CONNECTION FOR FIRE PUMP CONTROLLERS



4. MINIMUM FITTINGS

If minimum fittings recommended by N.F.P.A. 20 are supplied loose, they should be installed as follows:

CASING OR CIRCULATION RELIEF VALVE

- Install Casing Relief Valve at the casing discharge
- Set in the field at pressure to the lowest suction pressure plus the rated pressure of the unit raised to the next higher 5 lb. increment
- The casing relief valve should be piped to drain
- Connect drain pipe to drain pump gland (UL/FM only)

AUTOMATIC AIR RELEASE VALVE

- Install Automatic air release valve at pump discharge to vent casing and suction piping of air and vapor before start-up.

SUCTION AND DISCHARGE GAUGES

- The following gauges are required to measure both suction and discharge pressures, and must be supplied with all fire pumps to ensure close check on pump performance:
 - a) 3 1/2" dial combination pressure and vacuum suction gauge
 - b) 3 1/2" dial discharge pressure gauge
 - c) 1/4" cocks with lever handle

OPERATION

Set pressure switches to the following values:

PRESSURE SWITCH SETTINGS			
◇ Fire Pump Stop Point (FSP)	⇒ FSP	=	Fire Pump Shut Off Pressure + MIN. Static Suction Pressure
◇ Jockey Pump Stop Point (JSP)	⇒ JSP	=	FSP
◇ Jockey Pump Start Point (JSTRT)	⇒ JSTRT	=	JSP - 10 PSI
◇ Fire Pump Start Point (FSTRT)	⇒ FSTRT	=	JSTRT - 5 PSI

1. PRESTART-UP

Fill out "PRESTART-UP CHECK LIST"

2. PRESSURE SWITCH SETTING

Fire pump pressure switch and Jockey pump pressure switch

The pressure switch to start the fire pump is normally located in the lower left-hand side of fire pump controller. Similarly the pressure switch to start the Jockey pump is located in the Jockey pump controller.

Make sure that pump shutoff + MAX. suction pressure does not exceed system rated pressure or its components. If it does, a main relief valve should be installed at the pump discharge.

3. CASING RELIEF VALVE

The casing relief valve should be set in the field at pressure to the lowest suction pressure, plus the rated pressure of the unit raised to the next higher 5 lbs increment.

4. START-UP PROCEDURE - (PUMP SEQUENCE)

CAUTION

- In case of any electrical control circuit problem use the emergency disconnect lever to by pass all control circuits

- Open suction gate valves
- Check that pump is full of water and that all air contained in pump has been allowed to escape through the air release valve
- Compress packing evenly with gland (Gland nut should be finger tight)
- Set differential pressure switch to 15 PSI between pump start (low setting) and pump stop (high setting) and adjust as required
- Lower setting of pressure switch (senses discharge pressure) to prevent pump from starting
- Place the main disconnect switch in the "ON" position
- Place circuitry breaker in the "ON" position and check if "POWER ON" light is illuminated
- Check direction of driver rotation by pressing momentarily the "Start" and then "Stop" push buttons on

the controller (proper direction is indicated by arrow on pump casing). If rotation is wrong interchange motor leads in panel per instructions in panel

- Bring the timer setting down to one minute for automatic start test purpose
- Open system butterfly valve
- Bleed the system by opening a valve on the pressure sensing line to create a pressure drop
- If fire pump does not start, decrease the pressure setting of pressure switch until it starts (assuming no electrical trouble)
- As soon as fire pump starts check if current full load value is within the electric motor nameplate rating with service factor taken into account
- Check packing adjusting pressure of packing gland so as to obtain slight leak of 6 to 8 drops per minute
- After running for one minute (time set on the running period timer), the pump will stop (to stop otherwise, open circuit breaker)
- Bleed again until desired start-up pressure is attained
- Allow Jockey Pump to run to stop pressure setting

START-UP PROCEDURE - (FLOW TEST PROCEDURE IF REQUIRED BY AUTHORITIES)

- Leave system gate valve closed. Open gate valve to hose header for flow test
- Press start button to start pump
- Take gauge and ammeter readings
- When test is finished, close gate valve

POST START-UP PROCEDURE

- Leave the disconnect switch "ON" and the circuit breaker "ON" (The "Power On" light must be lit)
- Bring timer setting back to required value (1) minute for each 10HP

5. AUTOMATIC OPERATION

- Turn all the isolating valves to the fully open position and place the main disconnect switch on the "ON" position
- Switch fire pump circuit breaker to the "ON" position
- Switch the jockey pump to "AUTO" (the "Power On" light must be lit)

REMINDER

- Valve on pump suction must be fully open as throttling on suction side is harmful to the pump
- Make sure pump will not run dry. Most centrifugal pumps have close clearances and cannot run dry without serious damage resulting

NOTES

- When the operating differential of pressure switches do not permit these settings, the settings should be as close as equipment will permit
- The settings should be established by pressures observed on test gauges
- All devices are preset at the factory and should normally require no further adjustment
- A final adjustment may be made on any control to match the exact system requirements

MAINTENANCE

VIL pumps are built to operate without periodic maintenance with the exception of lubrication of motor bearings. A systematic inspection made at regular intervals, giving special attention to the following, will ensure years of trouble-free operation.

1. GENERAL CARE

- Keep unit clean
- Provide the motor with adequate overload protection
- Keep flying chips or other loose particles away from the ventilating openings of the motor
- Avoid operating the unit in overheated surroundings

2. BEARINGS

- LIFE LUBRICATED BEARINGS are heavy duty permanently lubricated, sealed type and require no maintenance.
- GREASE LUBRICATED BEARINGS require very little attention. More trouble can be caused by overcharging than undercharging with grease. Approximately every month, inject a small quantity of grease (Esso Andok No. 280 or equal).

3. STUFFING BOX WITH MECHANICAL SEAL (ULC pumps only)

- Before installing seal, make certain there is 1/32" minimum radius on the edge of the housing cavity which holds seat and seat ring
- Oil the outer surface of the seat ring (use light oil, not grease) and push the assembly into the cavity, seating it firmly and squarely
- Clean lapped face
- Clean, polish and oil shaft sleeve over which seal is to pass
- Make sure there is 1/32" minimum radius on leading edge

- Make certain that all edges of any keyway or snap ring grooves are smooth and broken
- Clean and oil lapped sealing faces using clean light oil
- Place the sealing washer assembly on the shaft sleeve and slide the assembly in until it meets the seat
- Make sure all flushing connections are properly attached
- Bleed all air and vapor from unit prior to start up
- Make sure there is liquid in seal housing to ensure proper initial lubrication for seal faces

MAXIMUM RECOMMENDED OPERATING TEMPERATURES AND PRESSURES

MOTOR HP SPEED	SUCTION PRESSURE PSIG	MAXIMUM TEMPERATURE °F
UP TO 15 HP 3500 RPM	125	120
20 TO 75 HP 3500 RPM	115	120

Standard mechanical seals have niresist seat, carbon washer and viton bellow

CAUTION

- A mechanical seal is a precision product "HANDLE IT WITH CARE"
- Special care must be taken with the sealing washer and seat "DO NOT LET THEM DROP"
- Take particular care not to scratch the lapped faces
- Never run seals dry
- Follow seal manufacturer's instructions

4. STUFFING BOX WITH PACKING (UL/FM pumps only)

- Adjust pressure of packing gland to obtain a slight leak of 6 to 8 drops per minute for suction pressures up to 20 PSIG (The increase in suction pressure causes proportional increase in leakage through the stuffing box)
- When removing old packing, make sure bottom rings are completely removed
- Clean thoroughly the stuffing box and check condition of shaft sleeve (A badly worn or corroded shaft sleeve will never seal properly)
- Cut packing into lengths allowing 1/8" between ends when installed
- Place first ring around shaft and press firmly and evenly into stuffing box
- Continue in the same manner staggering ring joints one quarter of a turn until stuffing box is filled
- Make certain lantern ring is in correct position under pipe connection
- Compress packing evenly with gland and leave gland nut finger tight

CAUTION

Packing should not be pressed too tight, as this may result in burning the packing and scoring the shaft sleeve.

PUMP DISASSEMBLY

It is unnecessary to disconnect piping or casing to service Series 43 MF pumps. All service and maintenance can be performed by removing pump assembly from casing.

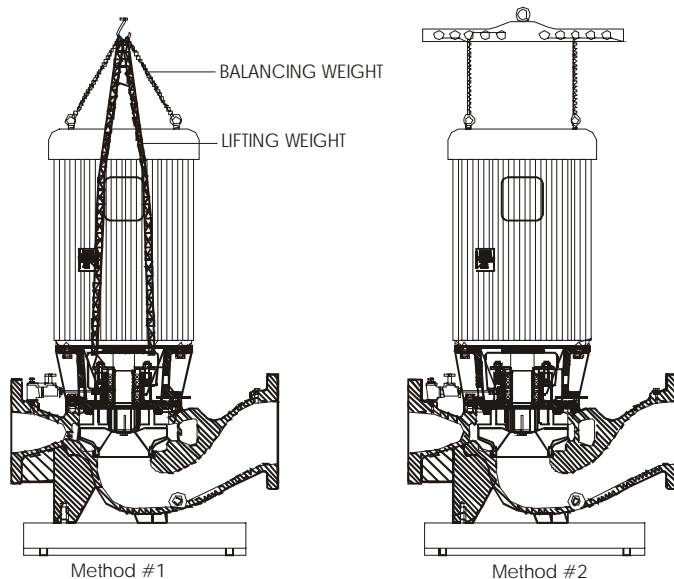
1. Disconnect wiring to the motor
2. Remove casing bolts connecting casing and spacer
3. Entire pump assembly can be withdrawn from casing by lifting the motor
4. Remove impeller bolt by turning it counter clockwise
5. Pull off the impeller by wedging around its periphery and slip out the impeller key from its shaft groove
6. Slide spring loaded carbon rotating face off impeller shaft (ULC pumps only)
7. Remove bolts connecting motor to adapter to lift off adapter
8. If wear ring is to be replaced, split with cold chisel to remove from its recess
9. Replace ring after smoothing and lightly lubricating recess and tap the new ring with a lead hammer
10. If motor shaft sleeve is to be replaced, it is important that no pressure be placed upon the motor bearings

11. All force must be directly against the motor shaft only as the sleeve is removed and replaced.

PUMP RE-ASSEMBLY

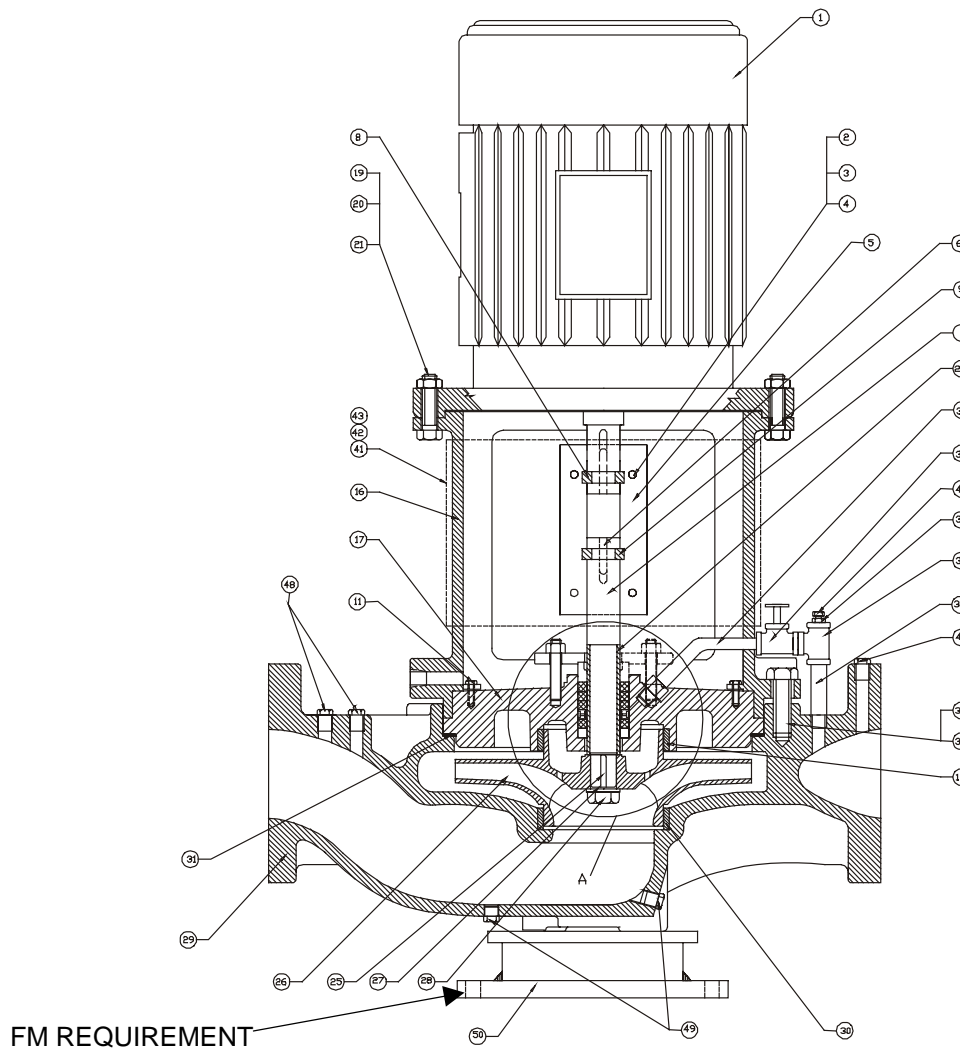
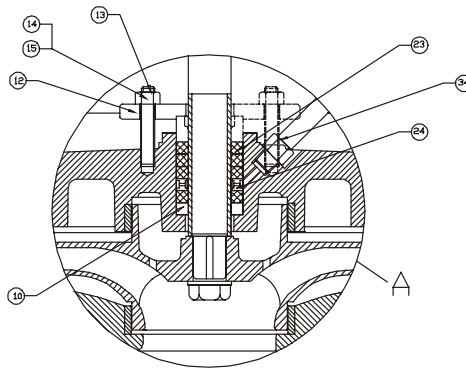
1. Clean seal recess of adapter
2. Lightly check lubricate seat ring and press stationary seal assembly and adapter (ULC only)
3. Bolt motor to adapter (use caution not to bump the motor shaft against the mechanical seal)(ULC pumps only)
4. Replace impeller key in shaft groove
5. Slip on spring loaded carbon seat (ULC pumps only) and impeller on shaft
6. Replace impeller cap screw and tighten by turning clockwise
7. Remove old casing and adapter gasket and clean off any pieces that may have broken off on the castings
8. Put new gasket on adapter
9. Lower pump assembly into casing (use caution to properly align impeller into casing so that it will not be damaged)
10. Tighten up cap screws evenly and in rotation
11. Fill pump casing with water and vent all air
12. Re-connect motor wiring
13. Check motor rotation to insure proper operation

PUMP HANDLING



PUMP SIZE	HP	FRAME
2 x 1.5 LA-F	7.5	184 JP
	10	213 JP
	15	215 JP
	20	254 JP
	25	256 JP
4 x 3 LA-F	30	284 JP
	40	286 JP
	50	324 JP
6 x 4 LA-F	50	324 JP
	60	326 JP
	75	364 JP
8 x 8 x 13 (43PF)	40	324-16
	50	326-16
	60	364-16

- * FM approved vertical inline Fire Pumps shall be lifted by method #1 as shown on the above drawing. Most of the weight of the pump-motor assembly shall be lifted by the slings through the motor bracket. Slings through the motor eye bolts should only balance the pump-motor assembly.
- * Pump-motor assemblies as per the chart above may be lifted by method #2 as per NEMA MG2-1983 2.16.7 'Lifting of Motors and Generators'.

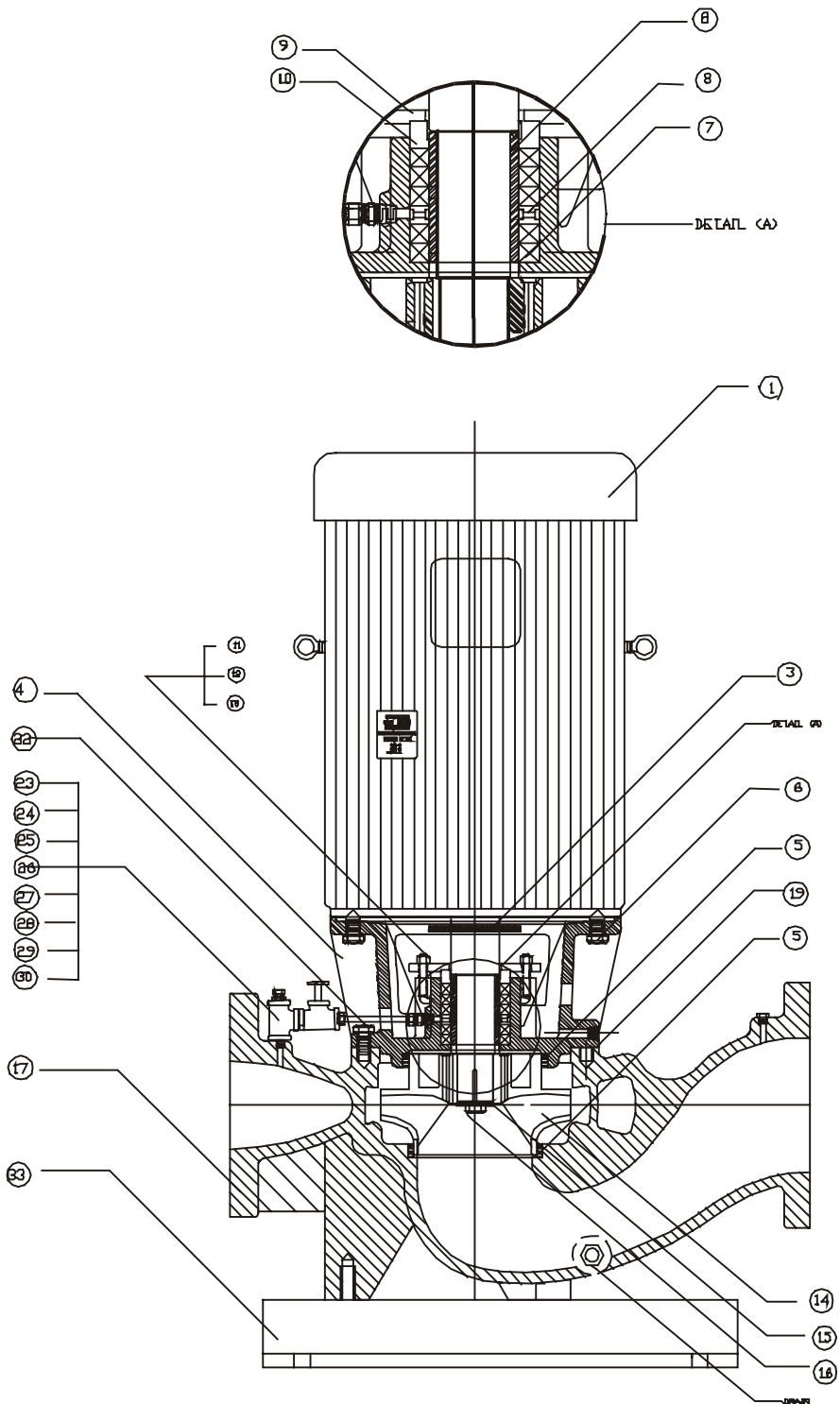


PARTS LIST

ITEM NUMBER	DESCRIPTION	MATERIAL
-------------	-------------	----------

1	MOTOR	
2	CAPSCREW	STEEL
3	LOCKWASHER	STEEL
4	NUT-HEX	STEEL
5	COUPLING-SPLIT	ALUMINUM
6	KEY	STAINLESS STEEL
7	SHAFT	STAINLESS STEEL
8	COLLAR	STEEL
9	COLLAR	STEEL
10	BUSHING CARBON	CARBON
11	CAPSCREW-STUFFING BOX COVER	STEEL
12	GLAND – SPLIT	BRONZE
13	STUD	STAINLESS STEEL
14	WASHER	STAINLESS STEEL
15	NUT-HEX	STAINLESS STEEL
16	PEDESTAL-DRIVER	CAST IRON
17	STUFFING BOX COVER	DUCTILE IRON
18	WEARING RING-STUFFING BOX	BRONZE
19	LOCKWASHER	STEEL
20	CAPSCREW	STEEL
21	NUT-HEX	STEEL
22	SHAFT SLEEVE	BRONZE
23	PACKING	GRAPHITE
24	LANTERN-RING	TEFLON
25	IMPELLER KEY	STAINLESS STEEL
26	IMPELLER	BRONZE
27	IMPELLER WASHER	STAINLESS STEEL
28	IMPELLER CAPSCREW SELF-LOCK	STAINLESS STEEL
29	CASING	125# FLGD = CAST IRON 250# FLGD = DUCTILE IRON
30	WEARING RING-CASING	BRONZE
31	GASKET CASING	FIBRE-NITRILE
32	LOCKWASHER	STEEL
33	CAPSCREW	STEEL
34	CONNECTOR	BRONZE
35	VALVE	BRASS
36	TUBING	SOFT COPPER
37	TEE	BRONZE
38	BUSHING-HEX	BRONZE
39	NIPPLE	BRASS
40	VENT-AIR	BRASS
41	GUARD-COUPLING	STEEL
42	SCREW-COUPLING	STEEL
43	NUT-HEX COUPLING	STEEL
44	NAMEPLATE – SAA (NOT SHOWN)	ALUMINUM
45	BRACKET NAMEPLATE (NOT SHOWN)	STEEL
46	SCREW-DRIVE (NOT SHOWN)	STEEL
47	NAMEPLATE FM, UL(C) (NOT SHOWN)	ALUMINUM
48	PIPE PLUG-GAUGE	STEEL
49	PIPE PLUG-DRAIN	STEEL
50	BASEPLATE-CASING SUPPORT	STEEL

* RECOMMENDED SPARES



PARTS LIST

ITEM NUMBER	DESCRIPTION	MATERIAL
1	MOTOR	
2	SLEEVE	STAINLESS STEEL
3	SLINGER	RUBBER
4	SPACER – BRACKET	CAST IRON
5	WEARING RING	BRONZE
6	CAPSCREW	STEEL
7	PACKING	GRAPHITE
8	LANTERN RING	TEFLON
9	GLAND OUTER	BRONZE
10	GLAND INNER	BRONZE
11	HOOK BOLT	S. BRONZE
12	WASHER	BRONZE
13	NUT	BRONZE
14	IMPELLER	BRONZE
15	WASHER IMPELLER	STAINLESS STEEL
16	CAPSCREW IMP-SELFLOCKING	STAINLESS STEEL
17	CASING	CAST IRON
18	ADAPTER RING	NOT SHOWN
19	GASKET	FIBRE NITRILE
20	GASKET ADAPTER	NOT SHOWN
21	DRIVE SCREW	NOT SHOWN
22	CAPSCREW	STEEL
23	NIPPLE	BRASS
24	TEE	BRONZE
25	VALVE NEEDLE	BRASS
26	CONNECTOR	BRASS
27	COUPLING	BRASS
28	BUSHING	BRONZE
29	AIR VENT	BRASS
30	TUBING	SOFT COPPER
31	BRACKET NAMEPLATE	NOT SHOWN
32	NAMEPLATE CAPACITY – SAA	NOT SHOWN
33	BASE PLATE	STEEL
34	NAMEPLATE – FM	NOT SHOWN

* RECOMMENDED SPARES

CAUSES		REMEDY	
PUMP WILL NOT START			
Faulty electrical circuit		<ul style="list-style-type: none"> • Make sure both circuit breaker and disconnect switch are in the "ON" position • If the circuit breaker trips when the pump tries to start check horsepower and voltage specified on the schematic and wiring diagram inside the starter door with the pump motor nameplate • Ensure that the pressure switch is working properly and is responding to changes in pressure 	
Stuffing box too tight or packing improperly installed		<ul style="list-style-type: none"> • Loosen gland swing bolts and remove stuffing box gland halves; replace packing 	
Impeller locked		<ul style="list-style-type: none"> • Remove obstruction 	
Excess bearing friction due to wear and dirt		<ul style="list-style-type: none"> • Remove bearings and clean, lubricate, or replace as necessary 	

PUMP IS NOISY OR VIBRATES	
Stuffing box too tight or packing improperly installed	<ul style="list-style-type: none"> • Loosen gland swing bolts and remove stuffing box gland halves; replace packing
Impeller obstructed	<ul style="list-style-type: none"> • Pressures fall off rapidly when an attempt is made to draw a large amount of water, remove obstruction from impeller
Excess bearing friction due to wear and dirt	<ul style="list-style-type: none"> • Remove bearings and clean, lubricate, or replace as necessary
Foundation not rigid	<ul style="list-style-type: none"> • Tighten foundation bolts or replace foundation if necessary

NO WATER DISCHARGE	
Air pocket or air leakage in suction line	<ul style="list-style-type: none"> • Uncover suction pipe and locate and re-arrange
Suction connection obstructed	<ul style="list-style-type: none"> • Examine suction intake, screen, and suction pipe and remove obstruction
Impeller obstructed	<ul style="list-style-type: none"> • Pressures fall off rapidly when an attempt is made to draw a large amount of water, remove obstruction from impeller
Pump not primed	<ul style="list-style-type: none"> • First warning is a change in pitch of the sound of the driver; shut down the pump

DISCHARGE PRESSURE TOO LOW	
Air leakage in suction line	<ul style="list-style-type: none"> • Uncover suction pipe and locate and re-arrange
Suction connection obstructed	<ul style="list-style-type: none"> • Examine suction intake, screen, and suction pipe and remove obstruction
Stuffing box too tight or packing improperly installed	<ul style="list-style-type: none"> • Loosen gland swing bolts and remove stuffing box gland halves; replace packing
Water seal or pipe to seal obstructed or air leak into pump through stuffing boxes	<ul style="list-style-type: none"> • Loosen gland swing bolt and remove stuffing box gland halves along with the water-seal ring and packing. • Clean the water passage to and in the water seal-ring. Replace water seal-ring, packing gland and packing in accordance with manufacturer's instructions
Impeller obstructed	<ul style="list-style-type: none"> • Pressures fall off rapidly when an attempt is made to draw a large amount of water, remove obstruction from impeller
Speed too low	<ul style="list-style-type: none"> • Check that rated motor speed corresponds to rated speed of pump, voltage is correct, and starting equipment is operating properly
Wrong direction of rotation	<ul style="list-style-type: none"> • With polyphase electric motor drive two wires must be reversed; where two sources of electrical current are available, the direction of rotation produced by each should be checked
Rated motor voltage different from line voltage i.e., 220 or 440 volt motor on 208 or 416 volt line	<ul style="list-style-type: none"> • Obtain motor of correct rated voltage or larger size motor

TROUBLESHOOTING

CAUSES	REMEDY
PUMP WILL NOT STOP	
* Faulty electrical circuit	<ul style="list-style-type: none"> • Is the pressure switch inside the starter properly piped up to the water system? (system side) • Is the stop valve in the piping to the pressure switch open? • Check that pressure switch is working properly by disconnecting one of the pressure switch leads to simulate open contact position • Ensure that pressure switch connection lines have been flushed to clear dirt in piping • Make sure that pressure switch set point is correct according to suction and working pressure • Change manual start handle to automatic
Run period timer defective	<ul style="list-style-type: none"> • Remove jumper if applicable
Pressure too low	<ul style="list-style-type: none"> • Verify pressure switch setting compared to system pressure

* Note: Refer to control panel manufactures installation instructions for other controller related problems.

WARRANTY

Armstrong Darling pumps are guaranteed against defective workmanship and material for a period of twelve months from date of shipment. Should the Armstrong Darling pump fail within the warranty period, our responsibility is limited to the repair or replacement of defective parts provided such are returned to our Plant, transportation prepaid. We do not accept liability

for damage or break-down from causes beyond our control, or the result of reasonable wear nor for repair made, or date attempted to be made without prior sanction, nor for any consequential damage resulting from the failure of a pump. The customer will assume all labor charges incurred in our making the replacement of adjustment of the part.

PLEASE NOTE THAT THERE IS NO GUARANTEE ON MECHANICAL SHAFT SEALS

PRE START-UP / POST START-UP CHECK LIST CENTRIFUGAL PUMPS

START-UP DATE:		ORDER No.:		SERIAL No.:	
PUMP SIZE	MIN. SUCT.PRESS.	FLOW	HEAD	VOLT _____ PHASE _____ Hz _____	
CHECK THE FOLLOWING AT PRESTART-UP			OK	REMARKS / CORRECTIVE ACTIONS	
1. STORAGE Verify equipment for improper storage or mishandling.			<input type="checkbox"/>		
2. INSTALLATION Compare electrical supply to one indicated on motor nameplate. Compare current rating of overload relays and fuses in controller against full load current value on motor nameplate.			<input type="checkbox"/> <input type="checkbox"/>		
3. ALIGNMENT Verify the alignment of driver to pump. (Horizontal Pumps Only) Verify suction and discharge for pipe strain. Do the flanges meet squarely?			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Indicate alignment reading _____	
4. ROTATION Manually turn coupling to assure free rotation of pump and motor.			<input type="checkbox"/>		
5. SYSTEM Insure system is free of foreign matter which could damage the pump. Responsible parties present when equipment is energized.			<input type="checkbox"/> <input type="checkbox"/>		
6. DIESEL DRIVEN FIRE PUMP ONLY Engine coolant filled to the proper level? Engine oil filled to proper level? Fuel line from the tank connected to engine (supply and return)? Fuel tank filled with proper diesel fuel? Silencer properly connected to engine and outside? Engine controller wiring connected to engine junction box? Is engine jacket water heater connected to AC power? Batteries charged (<u>MIN.24 HRS PRIOR TO START-UP</u>) and connected to engine?			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
CHECK THE FOLLOWING AT POST START-UP			OK	REMARKS / CORRECTIVE ACTIONS	
6. VIBRATION Upon the occurrence of excessive vibration or noise, was equipment immediately shut down?			<input type="checkbox"/>		
7. FLOW Has flow been established? Take gauge and amperage readings (if motor driven) ? Packing been adjusted to a slight leakage? If pumps are equipped with mechanical seals, has the establishment of a clear source of water to lubricate the seals been made? Is the lubricating seal water pressure a constant 10 to 15 PSI above the discharge of the pump?			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
8. READINGS Flow, pressure and amperage readings taken immediately after correction of all problems and restart.			<input type="checkbox"/>		

CUSTOMER'S REPRESENTATIVE(S) WITNESSING TESTS:

ARMSTRONG PUMP DIV., REPRESENTATIVE CONDUCTING TESTS:

WITNESS _____

WITNESS _____

DATE: _____

DATE: _____

S.A. Armstrong Limited
23 Bertrand Avenue
Toronto, Ontario
Canada, M1L 2P3
Tel: (416) 755-2291
Fax: (416) 759-9101

Visit us at www.armstrongpumps.com

Armstrong Pumps Limited
Peartree Road, Stanway
Colchester, Essex
United Kingdom, C03 5JX
Tel: 01206-579491
Fax: 01206-760532



Armstrong Pumps Inc.
93 East Avenue
Buffalo, New York
U.S.A. 14120-6594
Tel: (716) 693-8813
Fax: (716) 693-8970

Armstrong Darling Inc.
2200 Place Transcanadienne
Montreal, Quebec
Canada, H9P 2X5
Tel: (514) 421-2424
Fax: (514) 421-2436

© S.A. Armstrong Limited 1996; 2000

