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Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

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FM3170
0620
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1019

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FLEX®

MODEL 540

WATER-POWERED EMERGENCY BACKUP SUMP PUMP SYSTEM INSTALLATION INSTRUCTIONS

1. **Inspect your pump.** Occasionally, products are damaged during shipment. If the unit or any of the parts are damaged, contact your dealer before using.
2. **Read all the installation instructions** regarding installing and start up before performing any of the work described within. Retain for future reference.



⚠ WARNING

SEE BELOW FOR LIST OF WARNINGS

1. **For your protection always disconnect the power supply** from its power source before handling the components of your primary pump.
2. Sump water is non-potable. To reduce the risk of contamination of the potable water supply, the FLEX® must be installed with a listed backflow device suitable for the installation, in accordance with the local plumbing code, such as a reduced pressure principle backflow preventer (RP). Alternately, consult the local plumbing and health codes or the authority having jurisdiction for guidance on cross-connection and backflow protection requirements.

⚠ CAUTION Turbulence caused by high velocity incoming water can negatively affect the on/off action of the float mechanism. If this condition exists, the incoming water must be baffled to avoid excessive turbulence.

⚠ CAUTION

SEE BELOW FOR LIST OF CAUTIONS

1. This pump is designed for handling clear water. Do not use in septic tanks to pump effluent or sewage pits to pump sewage.
2. Repair and service of your backup system should be performed by an authorized service station.
3. The installation of this backup pump requires the use of a variable level float switch for operation. It is the responsibility of the installing party, to ensure that the float switch will not hang up on the pump apparatus or pit peculiarities and is secured so the pump will turn "on" and "off". It is recommended that the pit be 18" in diameter or larger to accommodate both a primary and a backup pump.
4. Check the installation of the primary and backup pump floats to ensure that both move freely and are not being encroached upon where the float cannot move. Adequate space between the floats must be maintained.
5. The pump should be manually activated once a month by lifting the float. Let the pump run for at least 15 seconds to prevent the pump from building up calcium deposits and debris, which could harm the pump.

REFER TO WARRANTY ON PAGE 2.

LIMITED WARRANTY

Manufacturer warrants, to the purchaser and subsequent owner during the warranty period, every new product to be free from defects in material and workmanship under normal use and service, when properly used and maintained, for a period of three years from the date of purchase. Proof of purchase is required. Parts that fail within the warranty period, that inspections determine to be defective in material or workmanship, will be repaired, replaced or remanufactured at Manufacturer's option, provided however, that by so doing we will not be obligated to replace an entire assembly, the entire mechanism or the complete unit. No allowance will be made for shipping charges, damages, labor or other charges that may occur due to product failure, repair or replacement.

This warranty does not apply to and there shall be no warranty for any material or product that has been disassembled without prior approval of Manufacturer, subjected to misuse, misapplication, neglect, alteration, accident or act of nature; that has not been installed, operated or maintained in accordance with Manufacturer's installation instructions; that has been exposed to outside substances including but not limited to the following: sand, gravel, cement, mud, tar, hydrocarbons, hydrocarbon derivatives (oil, gasoline, solvents, etc.), or other abrasive or corrosive substances, wash towels or feminine sanitary products, etc. in all pumping applications. The warranty set out in the paragraph above is in lieu of all other warranties expressed or implied; and we do

not authorize any representative or other person to assume for us any other liability in connection with our products.

Contact Manufacturer at, 3649 Cane Run Road, Louisville, Kentucky 40211, Attention: Customer Service Department to obtain any needed repair or replacement of part(s) or additional information pertaining to our warranty.

MANUFACTURER EXPRESSLY DISCLAIMS LIABILITY FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES OR BREACH OF EXPRESSED OR IMPLIED WARRANTY; AND ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND OF MERCHANTABILITY SHALL BE LIMITED TO THE DURATION OF THE EXPRESSED WARRANTY.

Some states do not allow limitations on the duration of an implied warranty, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

In instances where property damages are incurred as a result of an alleged product failure, the property owner must retain possession of the product for investigation purpose.

Helpful Hints For Easy Installation

1. The system is designed for installation in sumps with a minimum diameter of 18" and depth of 22". For smaller applications, consult factory.
2. Remove all debris from the pit before installation.
3. Be sure that the pump is screwed securely to floor joist or clamped securely to the primary pump discharge/pipe and that the two pumps do not interfere with each other.
4. Install a serviceable check valve in the discharge line.
5. Install a filter or strainer in the water supply line before the pump. Size the filter/strainer properly to minimize pressure drop, while retaining particles 0.020" (0.5 mm) in diameter and larger.
6. Test the unit immediately after installation. Refer to STEP 7 (page 4).
7. Check the float ON/OFF levels per STEP 3 (page 3).
8. Keep the model number, date code, and installation instructions in a convenient location for future reference.

Do's And Don'ts For Installing A Unit

1. DO read all installation materials supplied with the pump.
2. DO inspect unit for any visible damage caused by shipping. Contact dealer if unit appears to be damaged.
3. DO clean all debris from the pit before installation.
4. DO install a union check valve in the discharge line. DO NOT use a discharge pipe smaller than the recommended pump discharge sizes.
5. DO install a filter or strainer in the water supply line before the pump to prevent small particles from clogging the operating valve.
6. DO test the pump immediately after installation to be sure that the system is working properly.
7. DO review all applicable local and national codes and verify that the installation conforms to each of them.
8. DO NOT use the FLEX® with hot water.
9. DO NOT use the FLEX® to remove wastewater, sewage, effluent, or water with debris in it.
10. DO NOT use a garden hose. Garden hose is not designed to hold municipal pressure indefinitely and could leak or burst causing flooding. The FLEX® requires a permanent piping method such as copper, PEX, or CPVC.
11. DO install the FLEX® pump only with a 3/4" supply line.
12. DO install a union or other quick-disconnect fitting to make the pump accessible for servicing on both the water supply and discharge piping.
13. DO install a dedicated shut-off valve on the water supply line within 6 ft. (1.8 m) of the FLEX®.

INSTALLATION

⚠ WARNING

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STEP 1: Placement of the Pump in the Pit

Note: If your pit has a cover, it will have to be modified to accommodate the FLEX® pump.

- 1.1) Inspect the pit for debris and clean as necessary.
- 1.2) **For horizontal installation:** the FLEX®'s elbow is already set to the correct orientation from the factory. Mount the FLEX® to a floor joist directly above the sump using the included lag bolts (see SK3220 on page 5).
- 1.3) **For vertical installation:** rotate the elbow 180 degrees. Clamp the FLEX® securely to the primary pump discharge pipe while ensuring that the inlet fitting of the pump is at least 6" above the basement floor or top of the sump pit (see SK3219 on page 5).

⚠ IMPORTANT This pump is to be used as a backup to your primary pump. Make certain that there is no interference between the two pumps, especially between the float systems.

STEP 2: Installation of Suction Pipe

- 2.1) The desired location of the suction pipe's foot valve is approximately 2-3" off the bottom of the sump pit.
- 2.2) Measure the distance between the rotating elbow of the FLEX® and the desired location of the suction pipe foot valve.
- 2.3) Cut 1-1/4" PVC piping (or 1-1/2" using the supplied elbow adapters) to measured length.
- 2.4) Tip: Dry fit piping to foot valve and FLEX® to ensure PVC piping length is correct.
- 2.5) Using PVC cement, cement suction pipe foot valve to PVC piping (as well as included elbow adapter if utilizing) and place into pit at desired location.
- 2.6) Cement opposite end of piping to the rotating elbow of FLEX (using included elbow adapter if utilizing).

STEP 3: Float Valve Installation

- 3.1) With the float valve (A) in the OFF (down) position, the float valve should be placed so that the bottom of the float is a few inches above the primary pump's ON position. **Note: The FLEX® will continue to run for a few seconds after the float's OFF position has been reached.**
- 3.2) Securely clamp the float valve to the FLEX® suction pipe, using the metal float bracket and included hose clamp.
- 3.3) Ensure that the float valve's ON and OFF positions are free from any obstructions.

STEP 4: Installation of Tubing

- 4.1) Fully insert 5/32" tubing (included) to quick connect fitting on top of float valve (A) and ensure connection is secure.
- 4.2) Route tubing to the available opening of T quick connect on the diaphragm valve (B).
- 4.3) Trim to desired length, ensuring a square cut and insert into quick connect. Ensure connection is secure.

STEP 5: Installation of Discharge Piping

- 5.1) Install 1-1/2" thread to slip fitting (C) from hardware pack. Utilize PTFE (Teflon) sealing tape to prevent leakage.
- 5.2) Cement 1-1/2" PVC pipe to discharge.
- 5.3) Per the Uniform Plumbing Codes and IAPMO PS119, the discharge of the water-powered sump pump should not be connected to the discharge of the primary sump pump. The discharge piping for water-powered sump pumps must have an air gap and extend outside of the building, with the end of the pipe between 6 and 24 in. (150 and 610 mm) above the ground or the flood level of point of discharge.
- 5.4) A check valve must be installed onto the discharge line. Some local codes require a union check with ball valve. Check your local code requirements to ensure that the installation complies.

INSTALLATION, continued

STEP 6: Installation Of Source Water Piping

- 6.1) The FLEX® includes a field installed Push-to-Connect fitting (D), a 1" x 3/4" reducer fitting (E), as well as an optional 1"x1" street elbow for vertical installations. The Push-to-Connect is designed to be used with 3/4" PEX, CPVC, or copper pipe. For horizontal installations, install the reducer fitting, followed by the Push-to-Connect. For vertical installations, the street elbow may be used before the reducer. The reducer or street elbow must be installed on the 1" NPT thread of the diaphragm valve inlet. Caution must be used when installing the fitting to not over tighten and crack the body. Using a backup wrench, hold the inlet fitting while tightening the reducer and Push-to-Connect fittings. If the Push-to-Connect fitting is not used, the same precaution must be used when installing any other fitting to the inlet fitting. A union or quick-connect fitting should be installed to make the pump accessible for servicing.
-

STEP 7: Testing of Pump Operation

- 7.1) Verify that pump is functioning properly. Raise the float to ensure the pump activates and that water visibly flows from the float valve (A) before releasing the float. As a rule of thumb, the FLEX® should continue to run for ~5 seconds after the float valve reaches the OFF position and will then deactivate. If this amount of time varies greatly, the control valve may need to be adjusted. See instructions below.

Control Valve Adjustment

The FLEX®'s control valve (located on the diaphragm valve (B)) is preset and threadlocked from the factory for ideal performance at most municipal water pressures/installation heights. Depending on the available water pressure and height of installation, the control valve may need to be adjusted to achieve optimal performance. This is an uncommon occurrence and is not advised unless experiencing issues. If necessary, the following is provided for this adjustment:

1. Check the FLEX®'s pump time after the float valve reaches the OFF position and water stops flowing through the float valve. This should be ~5 seconds. This can be checked by raising the float to actuate the pump and then releasing the float. The pump should continue to run for ~5 seconds.
 2. If this time is significantly longer, the control valve is overtightened and needs to be loosened. If this time is significantly shorter, the control valve is under tightened and needs to be tightened.
 3. Unscrew lock nut so that the thumb screw may be adjusted. Note: Thumb screw is threadlocked and must be broken free for adjustment.
 4. Make adjustment to thumbscrew (In half-turn increments, clockwise to tighten, counterclockwise to loosen) and recheck pump's run time after the float reaches the OFF position.
 5. Tighten lock nut to secure thumbscrew's position.
- If pump will not start – Control valve is under tightened. Refer to control valve adjustment for adjustment instructions.
 - If pump will not shut off – Control valve is over tightened. Refer to control valve adjustment for adjustment instructions.

INCOMING WATER PRESSURE:

40 PSI minimum with valve open.

80 PSI maximum with valve open.

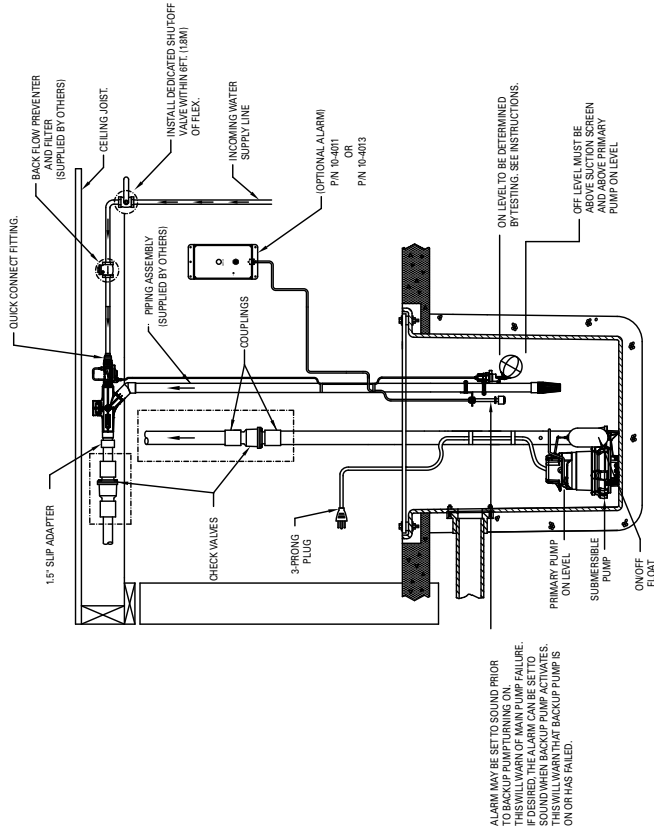
100 PSI maximum with valve closed.

EFFICIENCY:

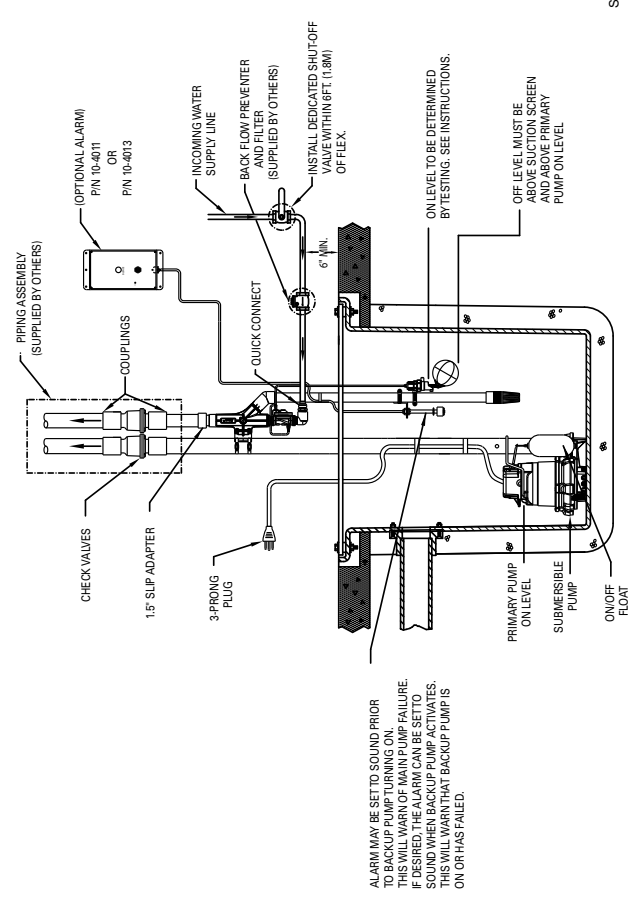
The pumping capacity increases with an increase in household water pressure and flow.

At an eight foot static head and a supply pressure of 40 PSI at water supply inlet with water flowing, it takes one (1) gallon of supply water to remove one and a half gallons from the sump. As the supply pressure increases with the static head constant, less supply water is required.

TYPICAL INSTALLATION WITH SUBMERSIBLE PUMP AND SEPARATE DISCHARGE PIPE

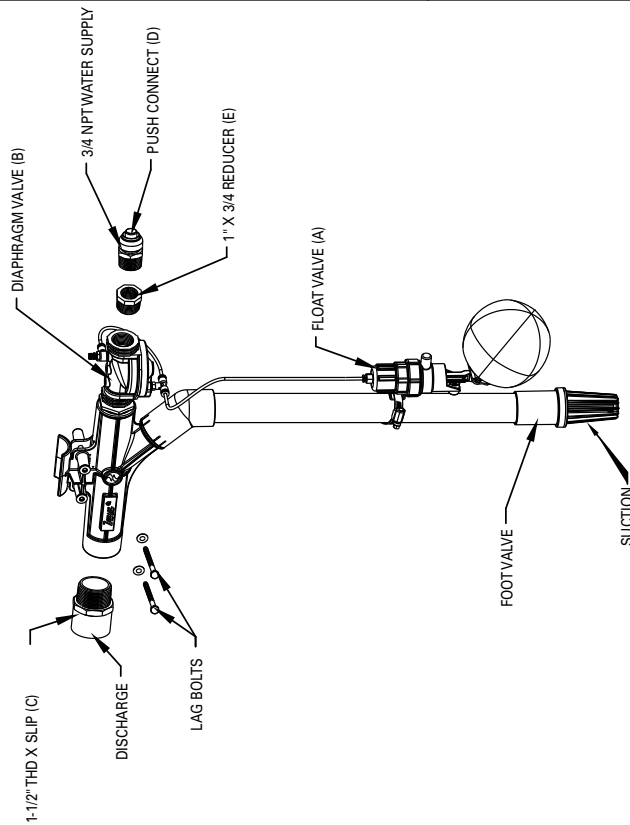


SK3220



SK3219

PUMP DETAILS

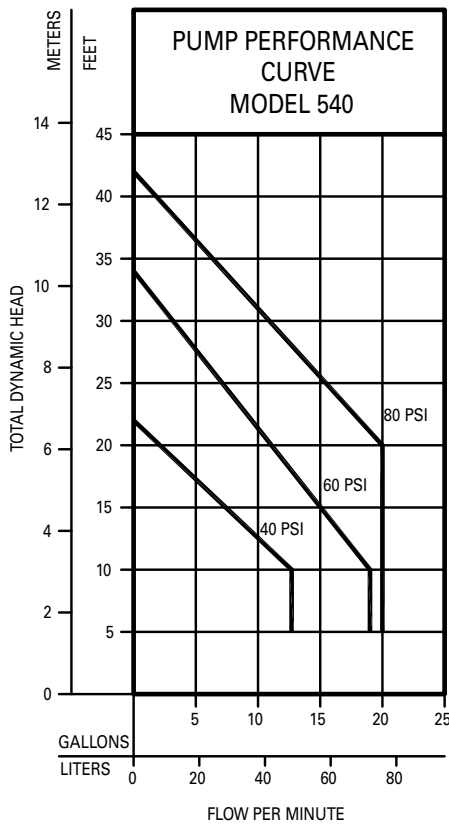


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SK3221

PERFORMANCE CHARACTERISTICS

TOTAL DYNAMIC HEAD/FLOW PER MINUTE DEWATERING ONLY



MODEL		540					
		40 PSI		60 PSI		80 PSI	
Feet	Meters	Gal.	Liters	Gal.	Liters	Gal.	Liters
5	1.5	12.7	48.1	19.0	72.0	20.0	75.7
10	3.0	12.7	48.1	19.0	72.0	20.0	75.7
15	4.6	7.4	28.0	15.0	56.8	20.0	75.7
20	6.1	2.0	7.6	11.1	42.0	20.0	75.7
25	7.6	-	-	7.1	26.9	15.3	57.9
30	9.1	-	-	3.2	12.1	10.9	41.3
35	10.7	-	-	-	-	6.4	24.2
40	12.2	-	-	-	-	1.8	6.8
Shut-off Head:		22.0 ft. (6.7m)		34.0 ft. (10.4m)		42.0 ft. (12.8m)	

155980

Pump capacity varies due to: Inlet water pressure, working water pressure, discharge elevation, number of pipe fittings, inlet and outlet pipe size, fluid viscosity, degree of water clarity, water temperature. The flow rates in the chart are approximate values.

NOTE: Some districts may require a reduced pressure principle backflow preventer per ASSE Standards 1013. Check local codes.

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Troubleshooting Guide

CONDITION	POSSIBLE CAUSE	REMEDY
A PUMP WILL NOT START OR RUN	Inadequate incoming water pressure.	Check incoming water line for closed valve, low water pressure or clogged filter/strainer.
	Excessive incoming water pressure.	Install regulator and reduce pressure below 100 PSI with valve closed.
	Debris around intake.	Clear debris from pit and foot valve strainer.
	Float hung up on pit or primary pump	Move pumps so that the floats move freely and do not contact pit, piping or each other.
	Control valve is under tightened	Control valve adjustment on page 4.
B PUMP STARTS TOO SOON	Float valve is positioned too low.	Refer to STEP 3.
C PUMP WILL NOT SHUT OFF	Float is obstructed.	Inspect float operation and correct problem.
	Internal valve diaphragm vent hole is plugged with debris.	Turn off water supply to pump and back on repeatedly to dislodge debris. If this process does not remedy the problem, service pump to clear debris or replace valve assembly.
	Control valve is overtightened	Control valve adjustment on page 4.
D PUMP OPERATES BUT DELIVERS LITTLE OR NO WATER	Debris around intake.	Clear debris from pit and foot valve strainer.
	Inadequate incoming water pressure.	Check incoming water line for closed valve or low water pressure.
	Blockage in discharge pipe.	Remove pipe and flush out debris.
	Foot valve above water level.	Adjust float - Refer to STEP 3 on page 3.
	Vertical lift too high.	Change discharge piping or contact technical service.

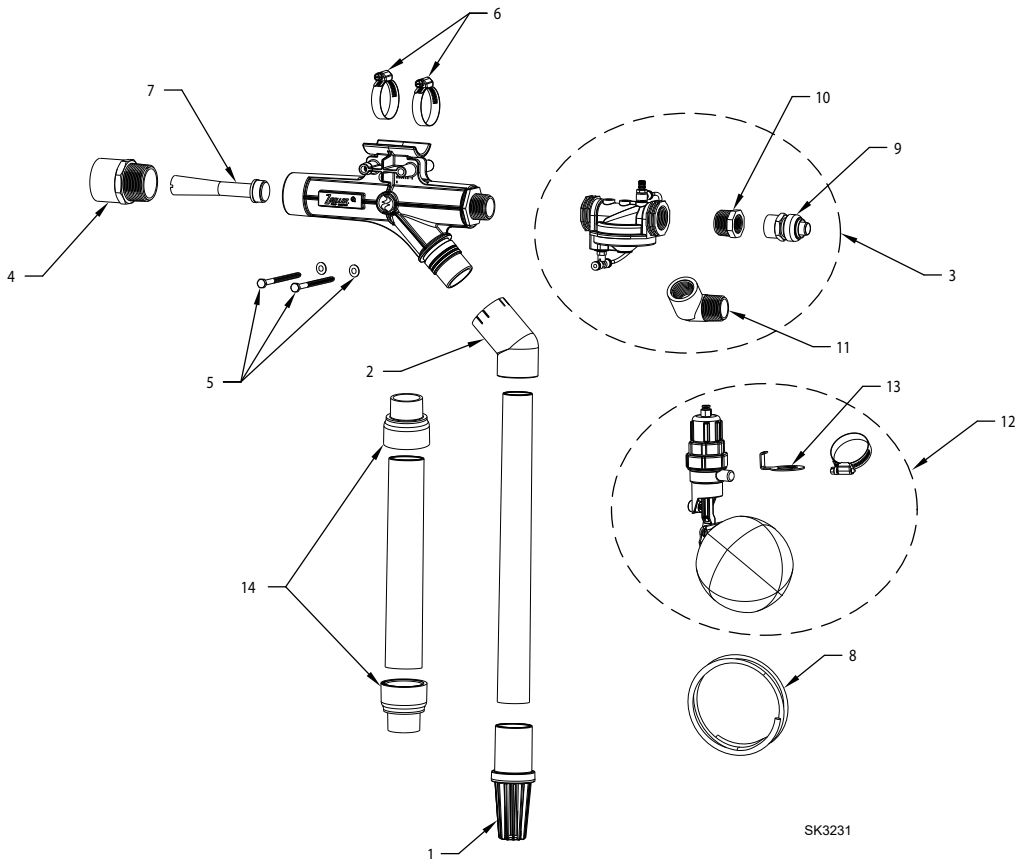
ILLUSTRATED PARTS BREAKDOWN

Flex Service Parts - Model 540				540-A
ITEM	DESCRIPTION	QTY	NOTES	02/19 thru Current
1	Foot Valve	1	2,4	150260
2	Fitting, Elbow	1		155508
3	Diaphragm Valve Kit	1		156059
4	Fitting, Adapter / MPTxSlip	1	4	155716
5	Lag Bolts & Washers	2	4	156078
6	Clamps	3	3,4	001766
7	Venturi	1		4C5534
8	Tubing	1	4	156343
9	Fitting, Push Connect	1	1,4	155718
10	Fitting, Reducer Bushing	1	1,4	155799
11	Fitting, Elbow / FPTxMPT	1	1,4	155715
12	Float, Kit	1		156077
13	Float, Bracket	1	3	155721
14	Elbow Adapter	2	4	156358
*	Hardware Pak 540	1		156131

* Not shown in illustration

Notes:

1. Items included in Diaphragm Valve Kit.
2. Foot valve will need to be cut off as close to top of valve as possible and a new one glued in place.
3. Items included in float kit
4. Items included in hardware pak





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