



Armstrong Double Duty™ 6 Steam Trap/Pump Combination Installation and Maintenance

IB-119

This bulletin should be used by experienced personnel as a guide to the installation and maintenance of the Armstrong DD6 or DD6 package. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Armstrong or its local representative if further information is required.

Application

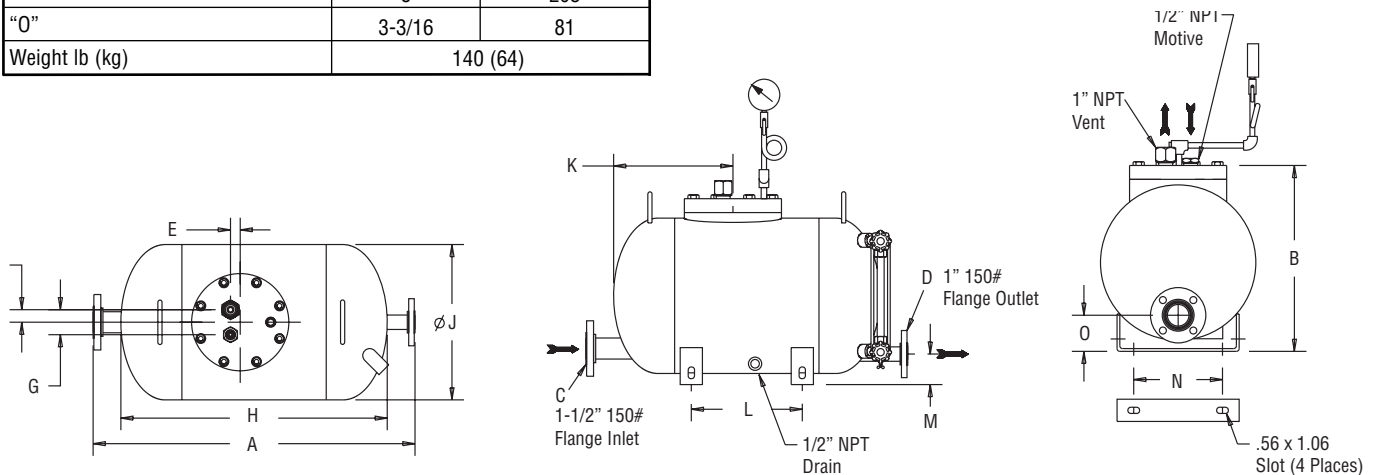
When there is modulating control on heat exchange equipment there is a possibility that the system will stall (no longer be able to drain condensate). If only a steam trap is used condensate could flood the heat exchange equipment causing corrosion, water hammer, and poor temperature control. The Double Duty™ has a steam trap with an integral pump to prevent the system from stalling. If the condensate floods the body of the Double Duty™ and reaches its upper trip point high pressure steam will enter the body and push the condensate out. This prevents condensate from accumulating in the heat exchange equipment.

Suggested Accessories

- Inlet and discharge check valves
- Gauge glass assembly for pump
- Gauge glass assembly for receiver
- Pressure gauge assembly pump body
- Pressure gauge assembly receiver
- Pressure gauge assembly motive steam
- Pressure gauge assembly discharge piping
- Pressure gauge assembly heat exchange equipment
- Receiver

Double Duty™ 6 Physical Data		
	in	mm
"A"	29	737
"B"	16-11/16	424
"C"	1-1/2	38
"D"	1	25
"E"	7/8	22
"F"	1-1/8	48
"G"	2-1/4	57
"H"	24	610
"J"	14	356
"K"	10-13/16	275
"L"	10	254
"M"	2-13/16	71
"N"	8	203
"O"	3-3/16	81
Weight lb (kg)	140 (64)	

Double Duty™ 6 Specifications	
Model	DD6
Motive Fluid	Steam
Maximum Operating Pressure	200 psi
Minimum Motive Differential	10 psi
Maximum Operating Temperature	400°F
Body	Carbon Steel
Mechanism	Stainless Steel
Float	Stainless Steel
Connections (condensate)	150# Flange
Inlet Check Valve	Optional 1-1/2"
Discharge Check Valve	Optional 1"
Springs	Inconel X-750



Features

1. The trap body has an integral pump to prevent flooding of the heat exchange equipment. It uses steam motive with no electricity or special mechanical seals required.
2. The pump mechanism is attached to the cap which can be removed from the body without taking it out of the condensate line, and the steam trap mechanism can be accessed through the cap opening.

Operation

Operating as a trap (system pressure greater than back pressure)

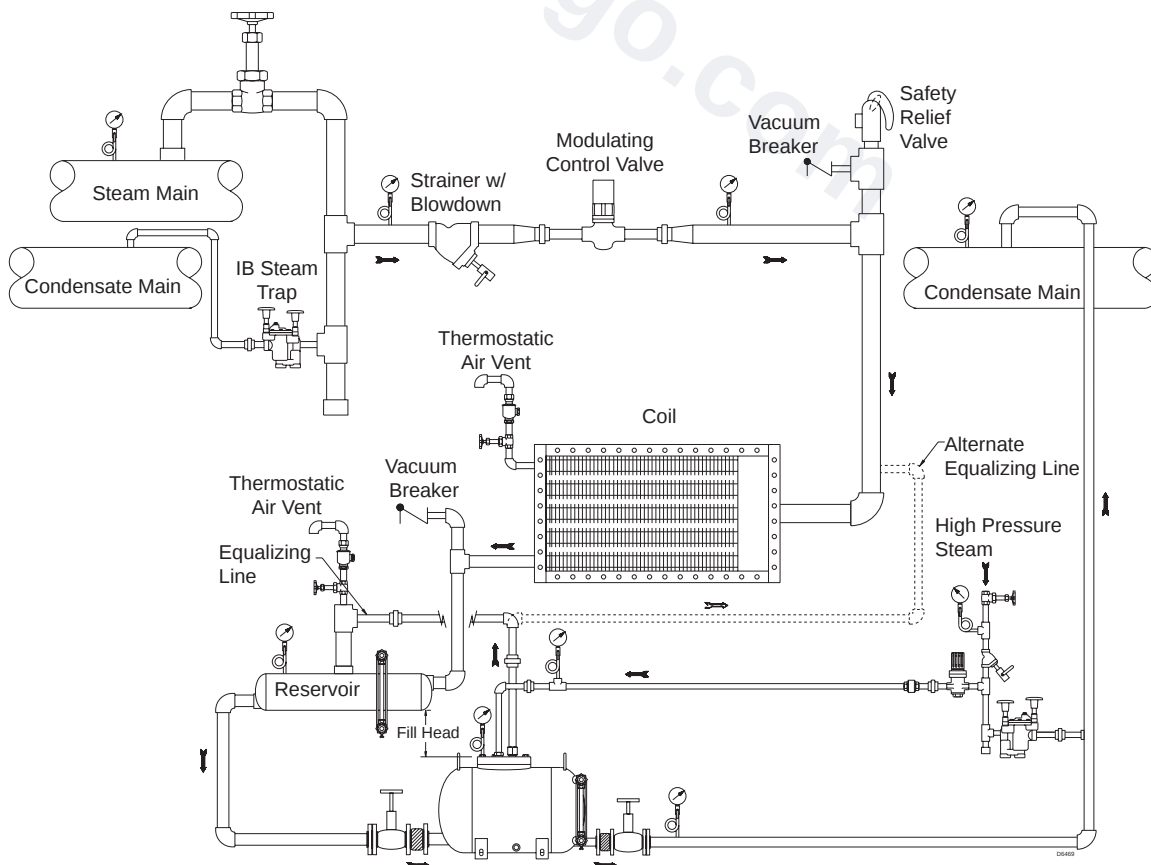
As the condensate flows through the inlet check valve, the trap and pump floats become buoyant and rise with the fluid level. The upward movement of the float causes the trap valve to open. If the system pressure is greater than the back pressure the condensate will flow through the steam trap valve into the condensate return.

Operating as a pump (system pressure less than or equal to back pressure)

If the system pressure is less than the back pressure liquid floods the body. When the condensate reaches the upper trip point of the pump mechanism the motive inlet valve opens and the vent valve closes. The open motive valve allows the motive fluid to enter and pressurize the body. The pressure inside the body shuts the inlet check valve and when it is greater than the back pressure pushes the water through the discharge check valve into the condensate return line. The float lowers with the water level and when it reaches the lower pump trip point the motive inlet valve closes and the vent valve opens. This relieves the pressure in the body and allows it to fill again.

Installation

1. Filling head: Install the DD6 below the equipment being drained. Fill head is the distance from the top of the cap to the bottom of the receiver. The standard fill head for the DD6 is 6 inches.
2. Liquid reservoir: Liquid flowing from the heat exchange equipment must be stored during the pump discharge cycle. A liquid reservoir or receiver should be installed above the unit to prevent flooding the equipment
3. Vent piping: The vent pipe must be pitched to self drain. The vent connection is 1" npt.
4. Replace any temporary plastic plugs with appropriate fittings.
5. Gauge glass connections are 1/2" npt and 10" center to center.



Instructions

1. Before installing make sure the piping is clean and free of debris. When installing take care to not allow pipe tape or similar items to enter the product.
*** Debris can affect proper operation and performance**
2. Check the condensate inlet, condensate outlet, motive inlet, and vent outlet ports before connecting piping.
3. The DD6 must be installed with the vent and motive vertical and the condensate inlet and outlet horizontal.
*** The product will not function properly if not installed in the correct orientation**
4. Connect pipes securely
5. When connecting pipes unions or flanges should be used close to the DD6 connections. This reduces the amount of time needed for maintenance and repair.
6. Avoid water hammer. If water hammer is experienced it could injure personnel or damage the equipment.
7. Do not disassemble product. If the product is disassembled the function or performance of the unit could be compromised.
8. Attach strainer with blow down valve on motive steam inlet.
9. Attach check valve on condensate inlet and discharge.
10. Attach the motive drip trap to the steam motive line.
11. Provide clearance for future maintenance.

Start-up procedures

Caution

Make sure all connections are secure before opening valves. Open valves slowly to reduce the chance of water hammer

1. Open isolation valve(s) in condensate discharge.
2. Open isolation valve in equalizing line.
3. Open motive isolation valve. Confirm that the steam does not flow into the pump body or equalizing line by checking pressure gauges.
4. Open the isolation valve on the thermostatic air vent.
5. Open the isolation valve on the condensate inlet.
6. The start-up is complete if the Double Duty Six performs trap operation or pump operation and is confirmed by use of the gauge glasses and pressure gauges.

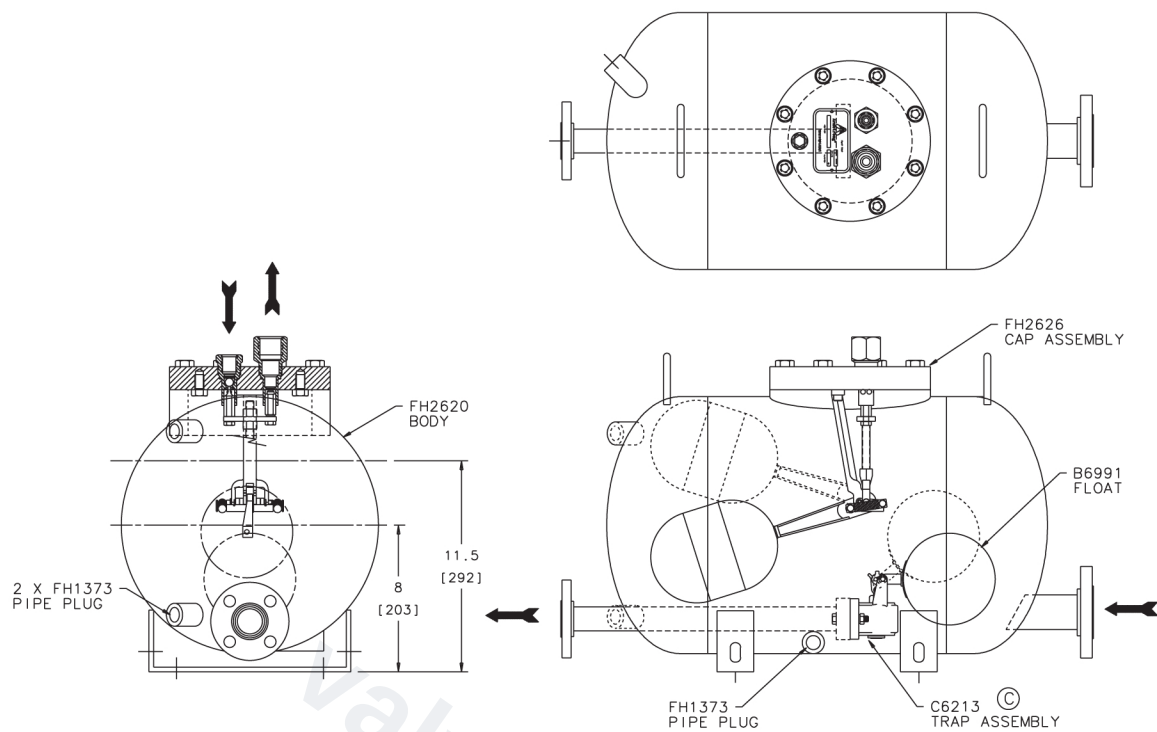
Maintenance and Inspection

Most failures occur because of debris in the piping.

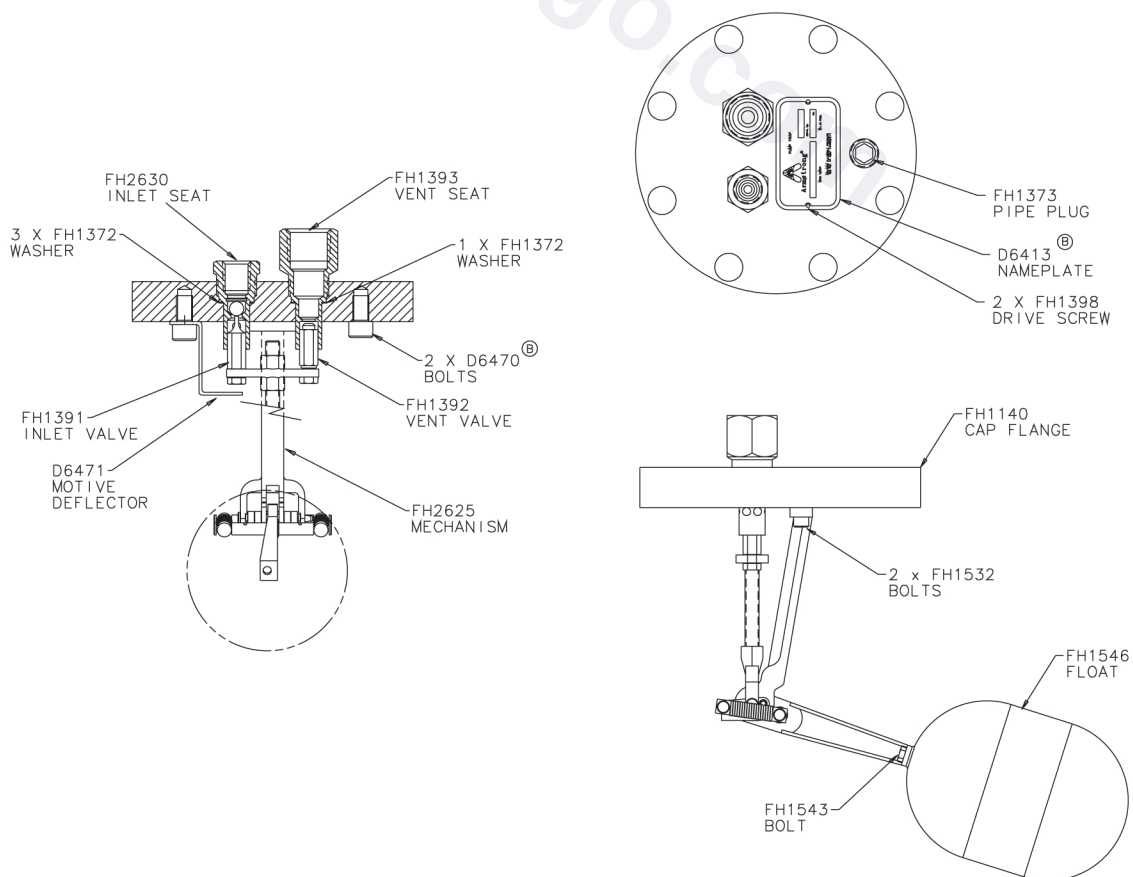
Caution

Before starting any maintenance make sure the Double Duty™ 6 is completely isolated from the system. Make sure the system is at atmospheric pressure

Tank Assembly



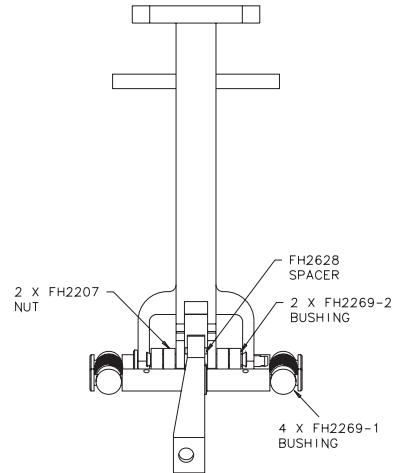
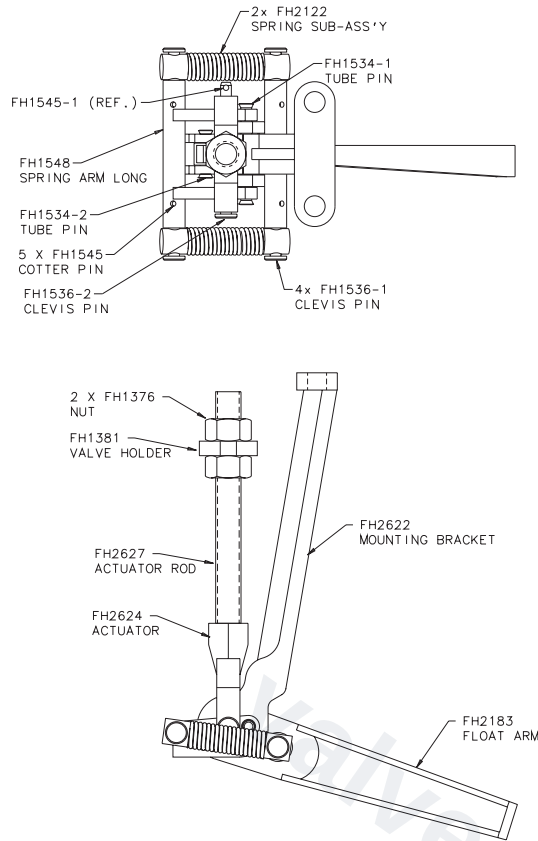
Cap Assembly



Trouble shooting

Problem	Diagnosis	Solution
Condensate not discharging	Inlet isolation valve closed	Open valve
	Pump inlet and outlet switched	Re-pipe
	Motive inlet and vent switched	
	Discharge isolation valve closed	Open valve
	Equalizer line isolation valve closed	
	Motive pressure not adequate	Adjust pressure
	Motive inlet isolation valve closed	Open valve
	Motive strainer clogged	Clean or replace
	Air vent damaged	Replace air vent
	Motive pressure exceeds pump rating	Adjust pressure
	Outlet check valve installed backward	Install check valve properly
	Outlet check valve does not open	Replace
	Inlet check valve does not open	Confirm lack of pressure in body
	Inlet check valve is not completely closed	Disassemble and clean check valve
	Vent valve leaks	Disassemble, clean and inspect - replace defective parts
	Motive steam valve leaks	Disassemble and replace inlet valve
	Float damaged	Disassemble and replace float
Motive steam remains on	Motive steam valve leaks	Disassemble and clean or replace
	Mechanism not assembled properly	Assemble so the motive valve is inserted in motive seat
Steam leaks out of body	Body gasket leaks	Replace gasket
	Plugs leak	Remove, add thread sealer and reinstall

Mechanism Assembly



Adjustment Procedure

NOTES:

1. ALL ADJUSTMENTS MUST BE MADE WHILE MECHANISM SECURED TO CAP
2. BE SURE ALL LOCK NUTS ARE TIGHTENED
3. USE DIAL CALIPER TO SET DIMENSIONS

STEP 1

ADJUST LOCK NUTS TO ACHIEVE THE .55" DIMENSION

MOVING THE LOCK NUTS UP TOWARD THE CAP WILL REDUCE THE .55" DIMENSION

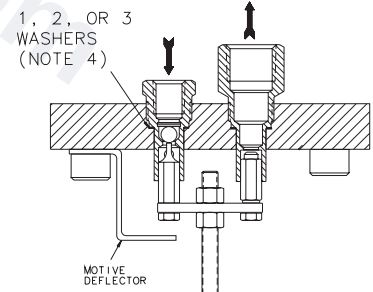
.55 ± .03

- NOTES:
1. MEASURE WHEN MECH IS FULLY TRIPPED WITH THE VENT VALVE SEATED AND THE MOTIVE VALVE FULL OPEN
 2. SPRING ARM SHOULD BE MANUALLY LIFTED THRU ITS ENTIRE RANGE TO MAKE SURE NO BINDING OCCURS ON THE MOTIVE AND VENT VALVES
 3. IF BINDING IS FELT LOOSEN LOCK NUTS AND STRAIGHTEN VALVE HOLDER AND RETIGHTEN (START PROCESS AGAIN)
 4. RECOMMEND THAT COMPRESSED AIR BE PLUMBED TO THE MOTIVE AND THE MECH TRIPPED AGAINST AIR SEVERAL TIMES

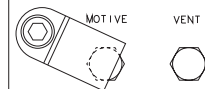
STEP 2

.25 ± .03

- NOTES:
1. MEASURE THE POINT AT WHICH THE MOTIVE VALVE STARTS TO LIFT THE MOTIVE BALL
 2. AIR SHOULD BE PLUMBED TO MOTIVE SO POINT OF VALVE CONTACT CAN BE FELT
 3. SPRING ARM SHOULD BE MANUALLY LIFTED UNTIL THE VALVE CONTACTS MOTIVE BALL. THIS WILL BE EVIDENT BY THE INCREASED EFFORT AND THE SOUND OF LEAKING AIR
 4. THE DIMENSION IS ADJUSTED BY ADDING OR SUBTRACTING WASHERS UNDER THE MOTIVE SEAT



STEP 3



- NOTES:
1. POSITION MOTIVE DEFLECTOR TO COVER THE TOP OF THE MOTIVE VALVE
 2. PLUMB AIR TO MOTIVE AND TRIP MECHANISM MAKING SURE THAT THE AIR DOES NOT BYPASS THE DEFLECTOR
 3. TIGHTEN RETAINING BOLT