

**ARMSTRONG**



## Vertical In-Line Duty/Standby Pumps

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# 4302/4382 *dualArm* Vertical In-Line pumps



Armstrong Vertical In-Line pumps, the best design for HVAC systems, were introduced in 1969. 4302/4382 *dualArm* pumps offer 100% standby with integral isolating valve.

The *dualArm* Series has given reliable service for over ten years. The 4302 & 4382 Series contain all features and advantages of two Vertical In-Line pumps in one casing.

## Adding value to hydronic systems

### ► Design Value

*dualArm* Vertical In-Line pumps, designed with a swing split-flapper valve in the discharge port, prevent liquid recirculating when only one pump is operating. Unique Armstrong isolation valves allow one pump to be isolated and removed for service with the second pump still operating.

### ► Installation Value

Vertical In-Line pumps become an integral component of the piping system. This configuration eliminates the need for flexible connectors, inertia bases, grouting and field alignment.

### ► Maintenance Value

Mechanical seals are the highest maintenance item in any pump. Service is performed on any Vertical In-Line pump without removing the casing from the piping. The 4302 Series split-spacer coupling design allows the mechanical seals to be serviced without disturbing the pump or motor connections.

### ► System Value

Standby and parallel pump systems may now be designed using only one pump piping set. Two pumps in a single large port casing allow both pumps to operate simultaneously, in true parallel fashion, with no loss in single pump efficiency.

### ► Floor Space Value

In a typical system, for example 60 L/s at 150 kPa, the *dualArm* needs only one quarter of the space required for two end suction base mounted pumps and one eighth of the space required for two split case horizontal pumps.

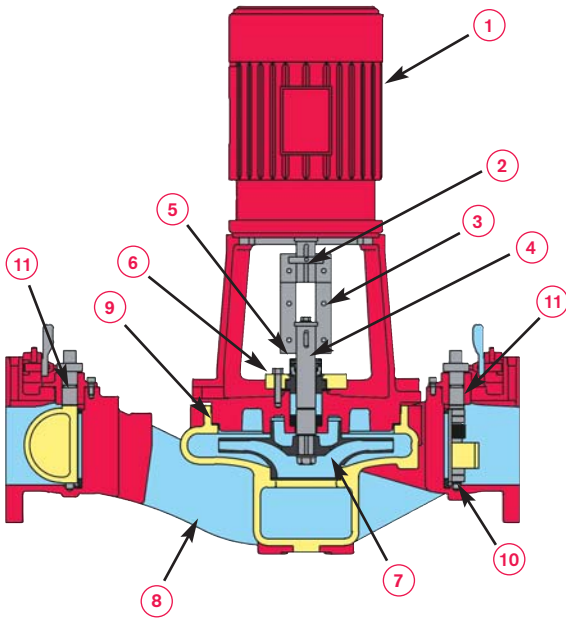
### ► 100% Standby

Built in isolation valve allows for isolation of standby pumps on *dualArm's*, enabling maintenance or repair without any interruption to flow.

# Life cycle value at every turn

## ► 4302 Split Coupled *dualArm*

Designed to incorporate two Armstrong standard 4300 Series Split Coupled Vertical In-Line in a single casing. All existing 4300 Series catalogue information and performance curves may be used, or doubled in the case of parallel operation for the 4302 Series Vertical In-Line pump.



1. MOTOR - IEC72 standard metric motor, designed for continuous in-line service.
2. MOTOR SHAFT - run-out limited to 0.03 mm TIR (Total Indicated Reading).
3. COUPLING - Axially split spacer type permits removal of seal without disturbing pump or motor.
4. SHAFT - Stainless Steel with deflection at mechanical seal limited to 0.05 mm TIR.
5. MECHANICAL SEAL - Outside balanced, accessible and easily replaced.
6. SEAL PLATE - Flush connection ensures lubrication at the seal faces and positive venting of seal chamber.
7. IMPELLER - Dynamically balanced to assure smooth vibration free operation.
8. VOLUTE - Radially split, with equal suction and discharge flange sizes. Separate tapped openings for gauge, flush and drain connections.
9. GASKET - Confined casing gasket to meet stringent industrial temperature and pressure applications.
10. FLAPPER VALVE - Hydraulically isolates casings preventing recirculation when only one pump operates.
11. ISOLATION VALVES - allow one unit to be isolated and removed for service with the second unit still operating.
12. COUPLING GUARDS - fully enclose all access openings (Not shown).

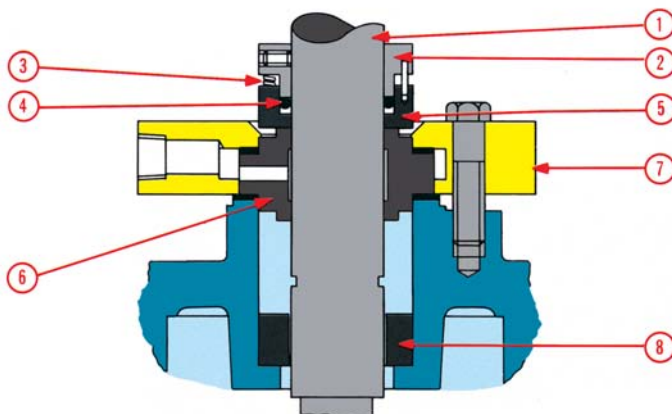
## ► Sealing arrangement

The Armstrong 4302 Series Split Coupled Vertical in-Line pump is available as standard with an outside balanced mechanical seal arrangement.

This may be removed quickly and easily for servicing without costly removal of the motor or rotating assembly from the pump casing.

The high performance outside seal combines the advantages of a balanced seal with premium quality.

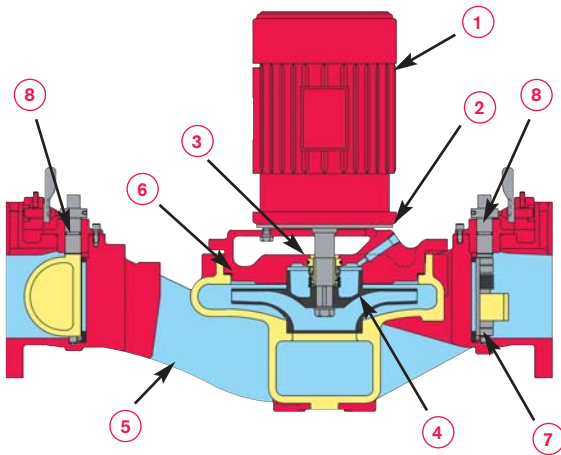
## ► Outside Balanced Mechanical seal arrangement



1. PUMP SHAFT
2. ROTATING HARDWARE
3. SPRING(S)
4. SECONDARY SEAL
5. ROTATING FACE
6. STATIONARY SEAT
7. GLAND PLATE
8. THROTTLE BUSHING

## ► 4382 Close Coupled *dualArm*

Designed to incorporate two Armstrong standard 4380 Series Close Coupled Vertical In-Line in a single casing. All existing 4380 Series catalogue information and performance curves may be used, or doubled in the case of parallel operation for the 4382 Series Vertical In-Line pump.

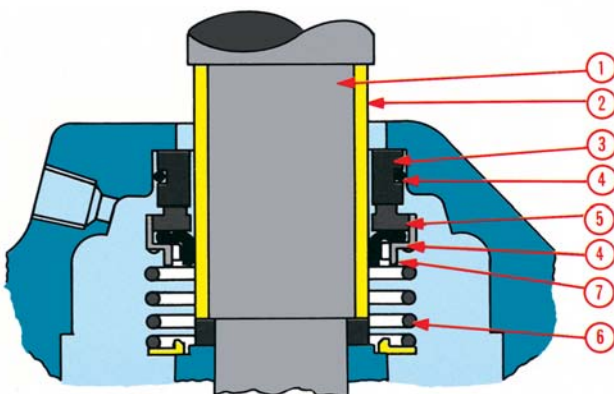


1. MOTOR - IEC72 standard metric motor, designed for continuous in-line service.
2. FLUSH AND VENT CONNECTION - removes entrained air ensuring lubricating liquid is at the seal faces at all times. Piped to pump suction.
3. MECHANICAL SEAL - Inside type, serviceable without disturbing the pipe connections.
4. IMPELLER - Dynamically balanced to assure smooth vibration free operation.
5. VOLUTE - Radially split, with equal suction and discharge flange sizes. Separate tapped openings for gauge, flush and drain connections.
6. GASKET - Confined casing gasket to meet stringent industrial temperature and pressure applications.
7. FLAPPER VALVE - Hydraulically isolates casings preventing recirculation when only one pump operates.
8. ISOLATION VALVES - allow one unit to be isolated and removed for service with the second unit still operating.

## ► Sealing arrangement

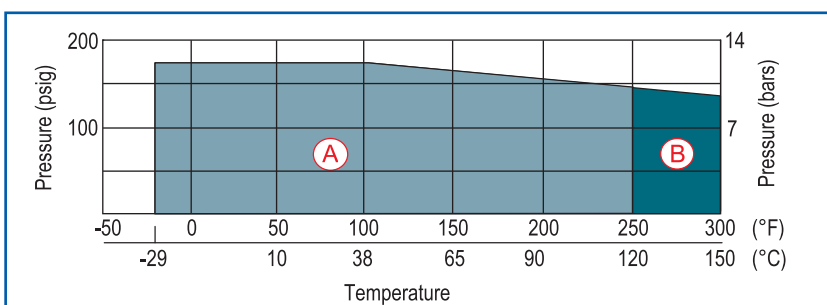
The 4382 Series Close Coupled Vertical In-Line pump is supplied with an economical internal, single spring unbalanced mechanical seal.

The seal is serviced by removing the rotating element from the casing, the pump casing typically remains in the piping.



1. MOTOR SHAFT
2. SHAFT SLEEVE
3. STATIONARY SEAT
4. SECONDARY SEAL
5. ROTATING FACE
6. SPRING
7. ROTATING HARDWARE

## ► Pressure/Temperature Parameters



- 4302 BF & DBF
- 4382 BF & DBF to 110°C (225°F)
- 4382 BF with TC seal and DBF
- 4302 BF & DBF

# 4392 Series Vertical In-Line pumps



## ► The 4392 Series offer:

- Technical excellence
- High efficiency selections for all popular duties
- Compact configuration
- Robust construction
- High specification
- World class manufacturing and test facility
- All made-to-order pumps labelled with test duties
- All pumps have unique serial number, ensuring traceability

## ► Applications

- Flows up to 180l/s, heads to 950 kPa
- Powers to 75kW
- 2, 4, 6 and 8 pole proprietary drives
- Suitable for LTHW, MTHW, Chilled and Condenser Water
- All bronze construction for secondary hot water/DHWS
- Static pressures up to 10 bar
- Temperatures up to 145°C

## ► Superior Components, Features and Benefits

- DIN 24960 mechanical seal with carbon versus silicon carbide faces for long life
- Impellers are trimmed to suit specified duties, to ensure efficient performance, low absorbed power and optimised motor selection
- IEC 72 standard motor for ease of supply and replacement
- Grade 260 cast iron casings for robustness
- Pressure gauge tappings on inlet/outlet flanges for ease of performance checks

## ► Long Life and Reliability

- Impeller back vanes provide hydraulic balance and reduce bearing loads, extending life times
- One piece gunmetal bronze impeller, when specified, resists corrosion, thus prevents seizure
- Solid stainless steel shaft resists corrosion and reduces possible leakage paths
- Impellers are statically balanced
- Substantial shaft diameters reduce deflection, increasing seal life

## 4392 Typical Specifications

### ► Certified Performance Testing

Pumps are tested to the customer's specified duty conditions in line with ISO 9960:2000 for performance.

### ► Installation and Servicing Notes

- In-line arrangement allows easy installation
- Suitable for horizontal pipelines
- Suitable for vertical pipelines up to 1.5kW motor size
- The 4392 range offers the most compact duty / standby arrangement
- 4392 provides lowest installed cost
- Chilled water pumps require suitable lagging on site against condensation
- Top pull-out gives easy access to internals
- Vertical In-Line and dualARM pumps with motors of 11.0kW and larger require motor lifting facilities in the plant room
- Single phase units are not suitable for domestic or silent applications

### ► Pressure and Temperature Limits

Pressure:           5 bar - 25-90 and 32-105  
                      6 bar - 32-120, 40-120 and 150-250  
                      10 bar - all other sizes

Temperature:     90°C    25-90 and 32-105  
                      120°C   32-120, 40-120, 50-250P,  
                                  80-250P  
                      125°C   200-315  
                      145°C   all other sizes  
                      65°C    maximum recommended for DHWS

### ► Ancillary Equipment Available

- Inertia bases with open springs for all sizes and types
- Neoprene in shear anti-vibration mounts with spreader plate
- Nylon reinforced flexible pipe connectors
- Blanking plate for 4392
- Suction guide/strainers and triple duty discharge valves

## 4392 Close Coupled Verticle In Line Pump

### ► Construction

Pump Body:           Close grained cast iron BS1452 GR 260 or 220. Bronze for HWS application Bronze BS1400 LG2C.

Impeller:             Gunmetal Bronze BS1400 LG2C or Cast Iron BS1452 GR 260 or 220.

Shaft:                 Stainless Steel BS970 431.S29

Mechanical Seal:    Carbon faces versus silicon carbide seat, EPDM flexible element, stainless steel metal parts.  
                          Austenitic cast iron seat for glycol application

Motor:                IEC 72 standard IP55, EFF2 motor. Thermistors are standard on D200 frame and larger. Suitable for Armstrong approved frequency inverter drives.  
                          Class F insulation with Class B temperature rise.

Motor Optional  
Extras:                Power factor correction capacitors,  
                          supplied loose. Thermistors on D180 and smaller frames. Premium efficiency EFF1. Explosion proof and increased safety, EEx d and EEx N, IP56/65/66 enclosure.  
                          Anti-condensation heaters.

## ► The Armstrong System

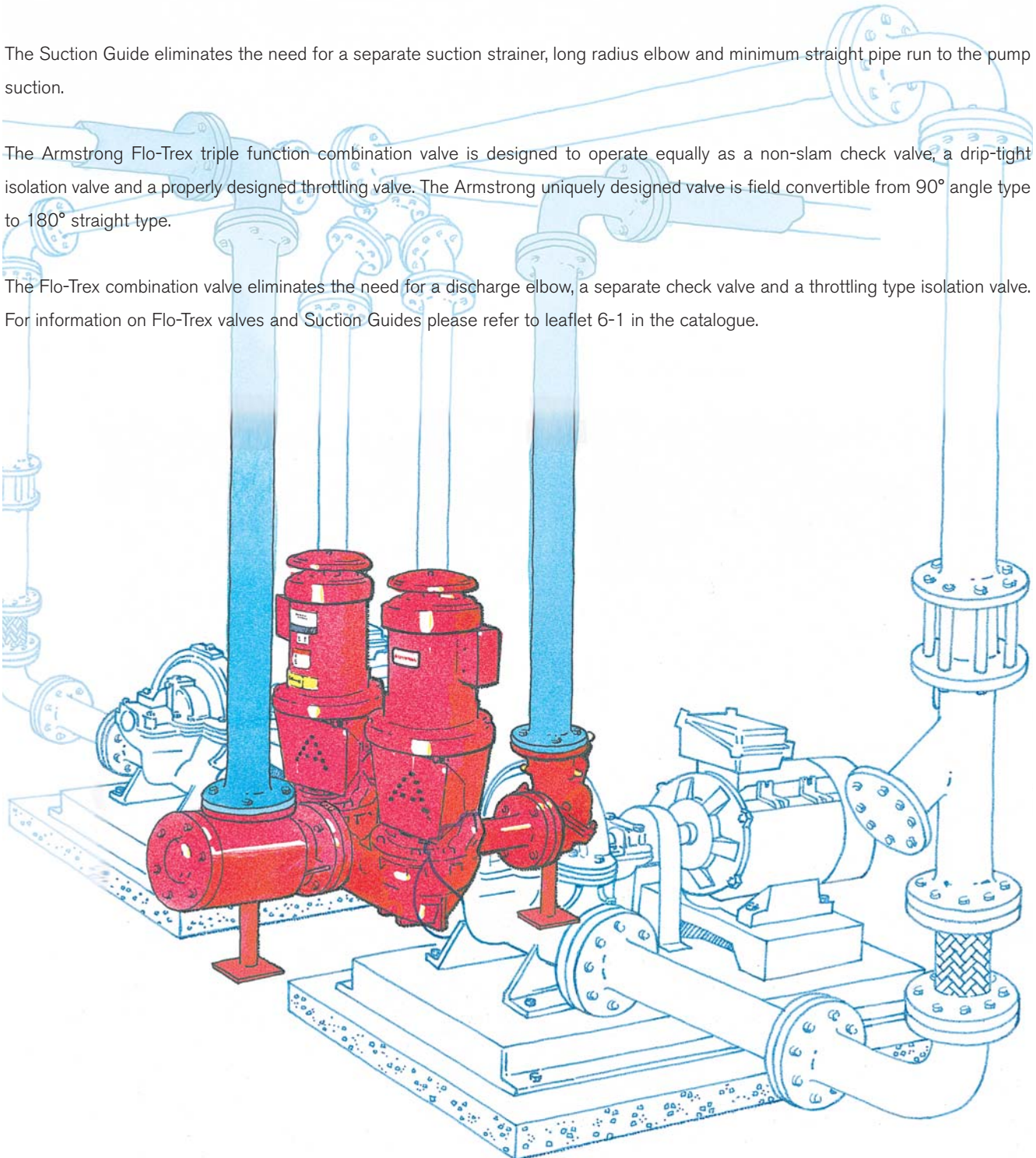
Armstrong Twin Vertical In-Line pumps, when installed with Armstrong Suction Guides and Armstrong Flo-Trex combination valves, result in greater added value and lower life cycle costs.

The Armstrong Suction Guide, designed with flow stabilizing plates in the outlet port, allows the guide to be bolted directly onto the pump suction flange, enabling the vertical piping to turn 90° into the pump. A disposable fine mesh start-up strainer and permanent perforated stainless steel strainer complete this valuable fitting.

The Suction Guide eliminates the need for a separate suction strainer, long radius elbow and minimum straight pipe run to the pump suction.

The Armstrong Flo-Trex triple function combination valve is designed to operate equally as a non-slam check valve, a drip-tight isolation valve and a properly designed throttling valve. The Armstrong uniquely designed valve is field convertible from 90° angle type to 180° straight type.

The Flo-Trex combination valve eliminates the need for a discharge elbow, a separate check valve and a throttling type isolation valve. For information on Flo-Trex valves and Suction Guides please refer to leaflet 6-1 in the catalogue.



## Typical Specifications

### ► 4302 Series Split Coupled Vertical In-Line pump

Supply and install as shown on the plans and specifications, 4302 Series *dualArm* split coupled Vertical In-Line centrifugal pumping unit. The cast casing with equal size suction and discharge flanges, having separate tapped flush line and pressure gauge connections, shall incorporate two radially split, single stage centrifugal pumps. Each pump shall have a cast bronze dynamically balanced impeller, stainless steel shaft, lower seal flush throttle bushing, outside balanced silicon carbide mechanical seal with stainless steel parts and EPDM secondary seal and bronze gland plate with stainless steel studs and nuts.

Each pump shall be fitted with a factory furnished flush line to the mechanical seal. The flush line is to be fitted with a manual air vent (if the pressure exceeds 2.0 bar, a Cyclone separator and a sight flow indicator may be specified). If the pressure is less than 2.0 bar, a filter can be fitted as an optional extra. The mechanical contractor shall change the filter cartridge after the system has been flushed and on a regular basis thereafter, until the building is turned over to the owner. Each driving motor shall be a metric IEC72 standard vertical solid shaft, squirrel cage induction type. The motor shall have TEFV or drip proof enclosure and be suitable for a \_\_\_\_\_ Hz, \_\_\_\_\_ Phase, \_\_\_\_\_ Volt power supply and shall be connected to the pump by means of a rigid split type spacer coupling that permits removal of the mechanical seal without disturbing the pump or motor connections. The inlet and outlet ports on the casing shall be at least one size larger than the single pump size, so that both units may operate in parallel with no loss of single pump efficiency.

Each port shall be fitted with an integral isolation valve that allow the units to operate in parallel, or standby, yet may be used to isolate one pumping unit for servicing or removal, with the other pump still operating.

### ► 4382 Series Close Coupled Vertical in-Line pump

Supply and install as shown on the plans and specifications, 4382 Series *dualArm* close coupled type Vertical In-Line centrifugal pumping unit. The cast casing with equal size suction and discharge flanges, having separate tapped flush line and pressure gauge connections, shall incorporate two radially split, single stage centrifugal pumps. Each pump shall have a cast bronze dynamically balanced impeller, bronze shaft sleeve and inside type single spring mechanical seal. Each pump shall be complete with a factory furnished flush and vent line.

Each driving motor shall be a metric IEC72 standard vertical solid shaft, squirrel cage induction type. The motor shall have TEFV or drip proof enclosure and be suitable for a \_\_\_\_\_ Hz, \_\_\_\_\_ Phase, \_\_\_\_\_ Volt power supply. The inlet and outlet ports on the casing shall be at least one size larger than the single pump size, so that both units may operate in parallel with no loss of single pump efficiency. Each port shall be fitted with an integral isolation valve that allow the units to operate in parallel, or standby, yet may be used to isolate one pumping unit for servicing or removal, with the other pump still operating.

### ► 4392 Series Vertical in-Line pump

For typical specifications see page 6.

Our policy is one of continuous improvement and we reserve the right to alter our dimensions and specifications without notice

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