

Installation, Operating, Maintenance and Safety Instructions *for* **TWIN-MAX-SYSTEM** Pressurised water systems for boats

CW427	<i>Twin-Max 3+8</i>	<i>12 volt d.c.</i>
CW428	<i>Twin-Max 3+8</i>	<i>24 volt d.c.</i>
CW429	<i>Twin-Max 4+8</i>	<i>12 volt d.c.</i>
CW430	<i>Twin-Max 4+8</i>	<i>24 volt d.c.</i>
CW435	<i>Twin-Max 4+2</i>	<i>12 volt d.c.</i>
CW436	<i>Twin-Max 4+2</i>	<i>24 volt d.c.</i>



To obtain the best performance from your Maxi-System please read these instructions carefully



Failure to observe the recommended procedures may result in early and severe damage, and may also invalidate the supplier's guarantee.

Your TWIN-MAX system incorporates two JABSCO 'PAR-MAX' electric pumps. Please familiarise yourself with the manufacturer's instructions for these pumps, a copy of which is supplied with your TWIN-MAX system.

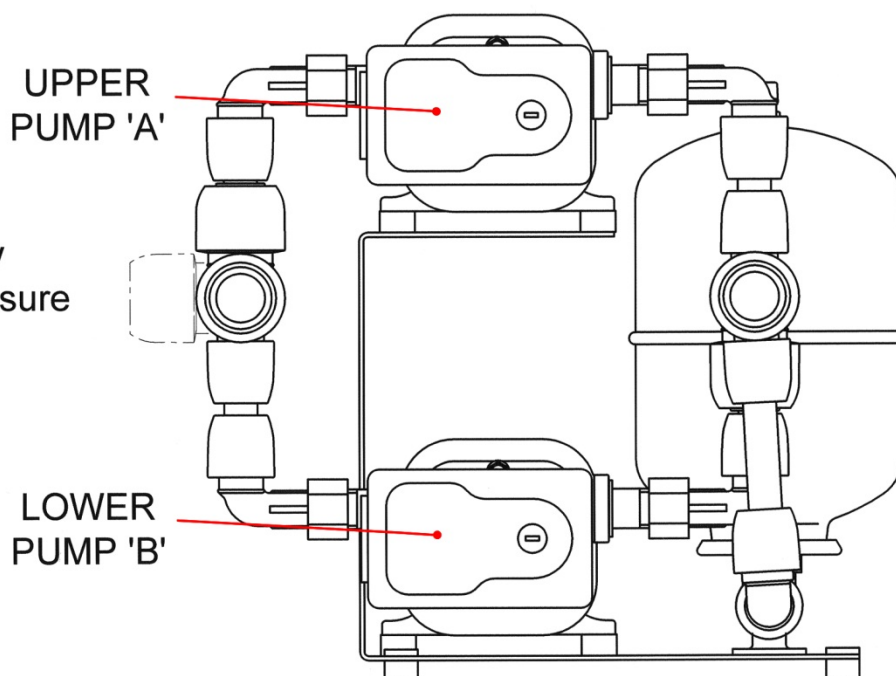


YOUR ATTENTION IS DRAWN PARTICULARLY TO THE WARNINGS AND SAFETY PRECAUTIONS GIVEN IN THE MANUFACTURER'S INSTRUCTIONS

1. HOW TWIN-MAX WORKS

TWIN-MAX is a demand-operated pressure system

The system is controlled by adjustable heavy-duty pressure switches on each pump



	CUT-IN PRESSURE	CUT-OUT PRESSURE
UPPER PUMP A	18 psi	25 psi
	1.2 bar	1.7 bar
LOWER PUMP B	15 psi	30 psi
	1.0 bar	2.0 bar

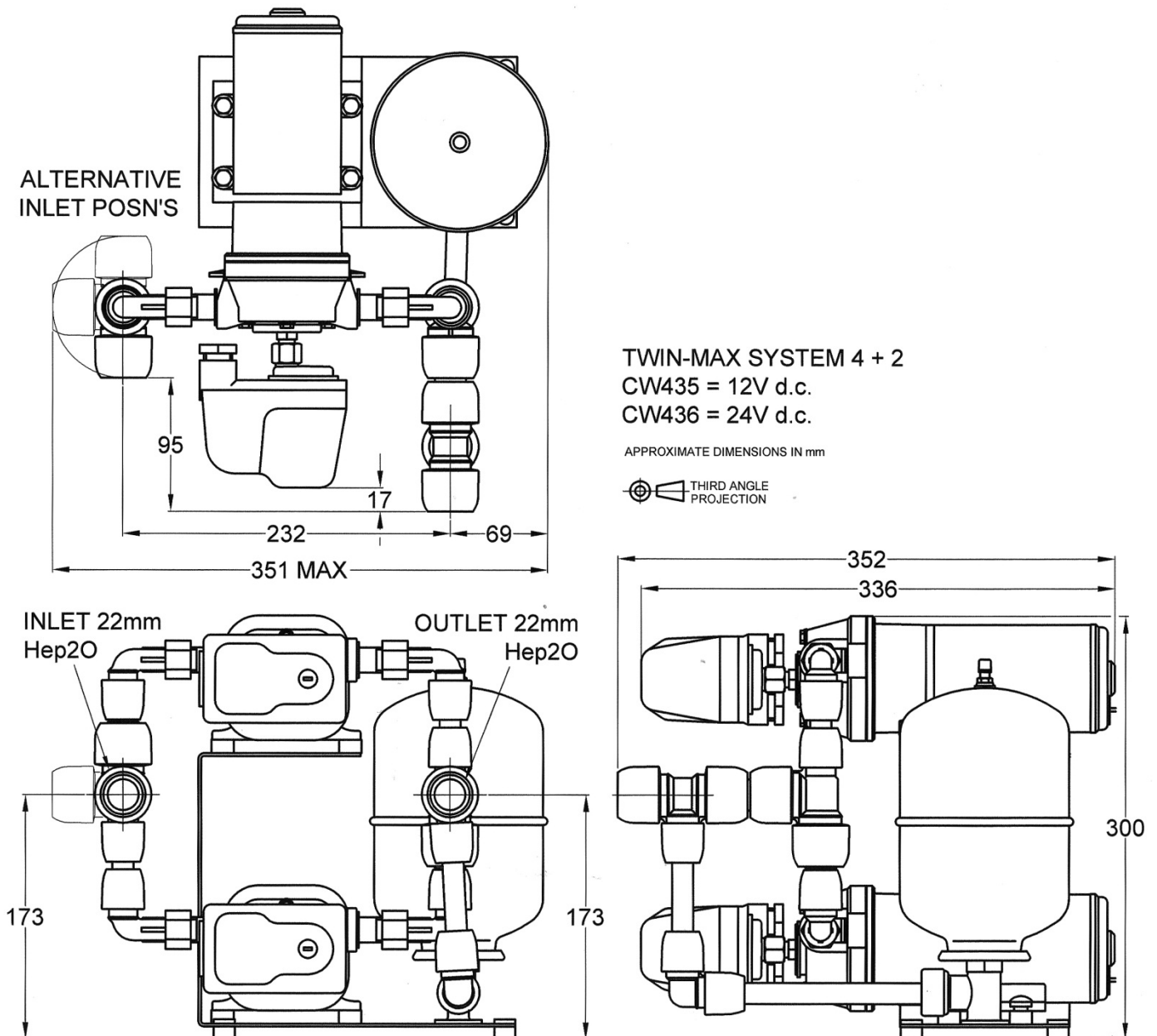
When an outlet is opened, 'PUMP A' starts first as the pressure falls below its cut-in pressure. If demand increases beyond PUMP A's capacity, and the pressure falls further, 'PUMP B' also starts. As outlets are closed and demand is reduced, PUMP A stops first, followed by PUMP B as the pressure in the system rises to its cut-out pressure.

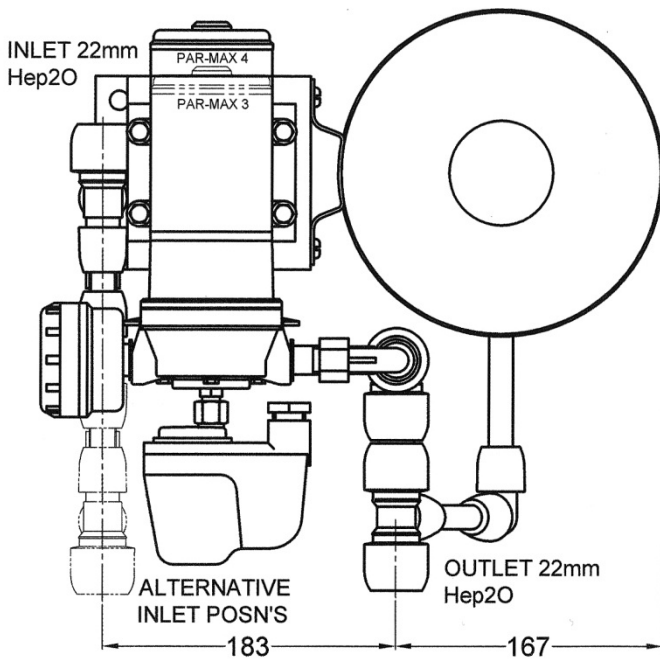
2. INSTALLING TWIN-MAX

1. Locate TWIN-MAX on a firm base in a dry, well-ventilated place with adequate access for inspection and maintenance, as close as practicable to the water supply tank and not more than 2 metres above it.
2. Fasten the unit down securely, using the rubber mounting grommets in the stainless steel base. **Do not** compress the rubber grommets that act as shock absorbers.
3. Connect the inlet and outlet ports to your Hep₂O push-fit pipework system, using **22mm** pipe. **15 mm pipework is too small, and is not recommended.**

Alternatively, use Hep₂O socket adapters HX30/22 (3/4" BSP internal thread) or HX31/22 (3/4" BSP external thread) for connection to rigid pipework. Make the connection via a short length of 22mm Hep₂O pipe to provide a flexible connection into the rigid pipework system, preventing loading on the pump ports and absorbing vibration from the pumps.

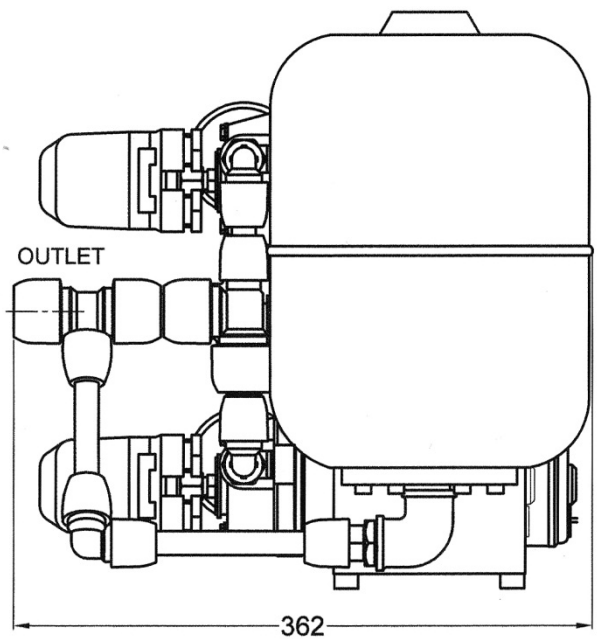
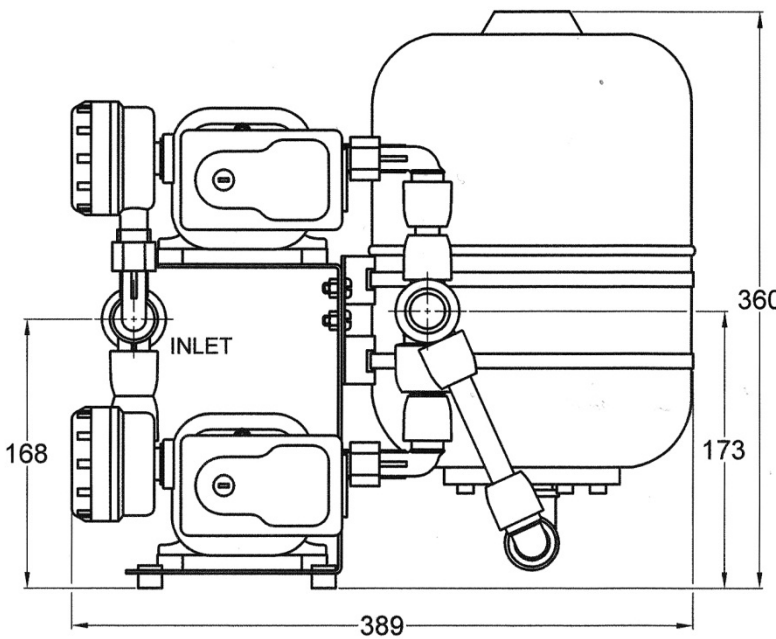
Or use short (minimum 50mm) lengths of 22mm Hep₂O pipe fitted with support sleeves, for connection to 3/4" (minimum) flexible hose systems. Use 2 hose clips to secure each hose connection. Inlet hose must be of the reinforced type that will not collapse or deform under suction conditions.





TWIN-MAX SYSTEM 3 + 8
 CW427 = 12V d.c.
 CW428 = 24V d.c.
 TWIN-MAX SYSTEM 4 + 8
 CW429 = 12V d.c.
 CW430 = 24V d.c.

APPROXIMATE DIMENSIONS IN mm



HEP₂O PUSH-FIT PIPEWORK IS STRONGLY RECOMMENDED

- ◆ light-proof to discourage growth of algae
- ◆ tough, flexible, ultra-simple to install
- ◆ joints remain fully watertight, even when rotated under pressure
- ◆ suitable for hot and cold water
- ◆ frost protected to -10°C
- ◆ quiet, non-reverberating
- ◆ low heat loss



4. TWIN-MAX 4+8 models are fitted with an inlet strainer on each pump. Fit a suitable ¾" strainer in the inlet line of TWIN-MAX 4+2 models. JABSCO inlet strainer part no **36300-1000** with 20-mesh stainless steel screen and easy-to-clean transparent screw-threaded housing is strongly recommended. This strainer is simple to install in Hep₂O pipework systems, using 2 x HX31/22 socket adaptors
5. Connect the electric cable to the power supply, observing the correct polarity (red positive, black negative). Use the correct conductor sizes, according to the length of cable required. If in doubt, use the next larger wire size.

	Conductor cross-section area		
	Cable length, Metres		
	0 - 6	6 - 11	11 - 17
12 VOLT	4mm ²	6mm ²	10mm ²
24 VOLT	2.5mm ²	4mm ²	6mm ²

Install a fuse or suitable circuit breaker in the power supply:

	Fuse rating, amps	Full load current, pump amps
12 VOLT	15	10
24 VOLT	10	6

Fit a suitable isolation switch able to handle at least 20 amps.

6. Check that the battery is in good condition. The battery must be able to maintain 12 (or 24) volts across the pump connecting leads WHEN THE MOTOR IS RUNNING.

WARNING

Low voltage can lead to motor overheating and eventual failure. If the battery generates less than 12 (or 24), volts, measured across its terminals **with both pumps running**, recharge or replace it.

3. STARTING TWIN MAX

1. Open all taps and other outlets. Check that the water supply tank is full. Fully open the isolating valve in the supply line from the tank.
2. Switch on TWIN-MAX. Both pumps will start and run. The system should prime itself within a few seconds, and water should start to flow from the outlets. Allow water to flow for a few seconds to clear air from the pipework, then close the outlets one by one. The upper pump (A) should stop first, followed by the lower pump (B).
3. If priming does not occur within 30 seconds after starting, **SWITCH OFF** the unit and check:
 - water level in supply tank
 - one or more outlets open
 - no blockages or closed valves in the inlet line
 - if self-priming is required, the inlet line must be fully airtight.

IMPORTANT NOTE

Pressure Switch Settings

The pressure switches have been correctly pre-set by your pump supplier, and should require no adjustment before use. At the pre-set pressures, both pumps will cut in and out smoothly and in the correct order.

IF YOU WISH TO ALTER THE CUT-IN AND CUT-OUT PRESSURES, PLEASE READ THESE NOTES CAREFULLY FIRST. INCORRECT ADJUSTMENT CAN LEAD TO ERRATIC PERFORMANCE, WITH INCREASED BATTERY DRAIN AND PUMP WEAR.

To preserve the correct SEQUENCE of pump switching, the pressure settings on each pump must always remain in the same relation to each other, as indicated below

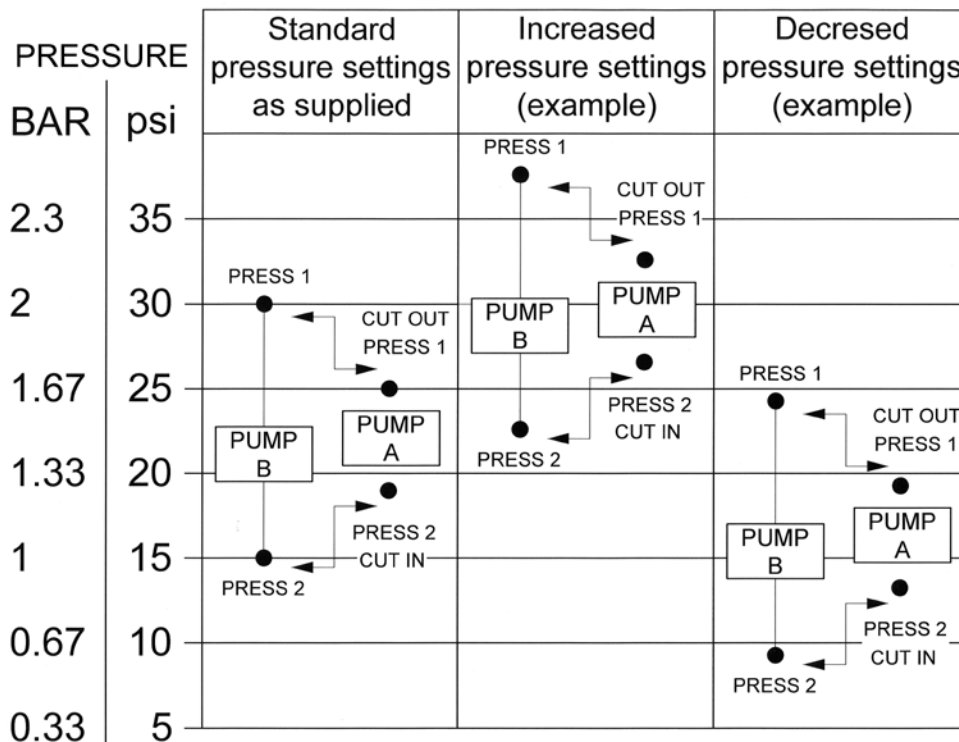


FIG 1

4. ALTERING PUMP PRESSURE SETTINGS

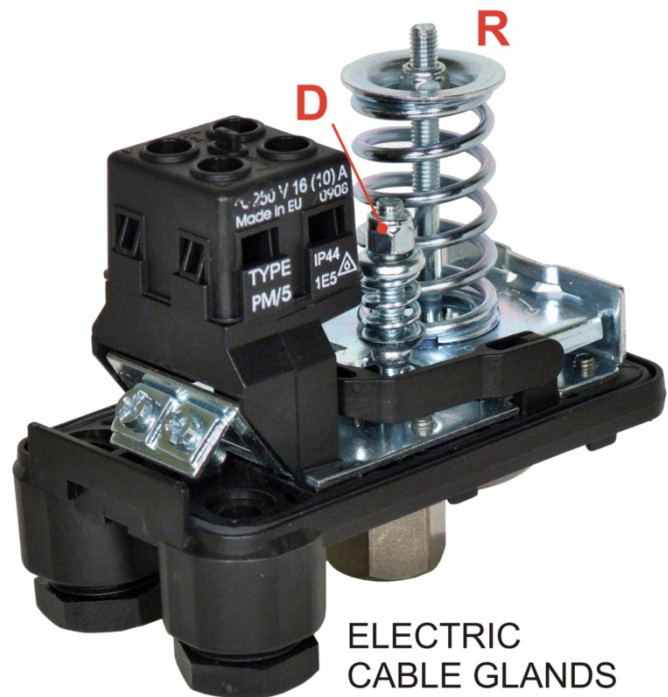
If you need to change pressure settings, proceed as follows: **NEVER** try to alter settings without a pressure gauge (see below) or with both pumps working

1. Disable **PUMP B** by disconnecting one of its leads from the pressure switch to the motor.
2. Switch on system and allow PUMP A to start by opening an outlet. Close all outlets. Remove the cap from the Schrader valve on the top of the accumulator tank. Use a car tyre pressure gauge to measure the pressure (PRESS1) in the accumulator tank. Alternatively fit a 0-4 bar pressure gauge into the cold water discharge line from the TWIN-MAX pressure system. Cleghorn Waring can supply a suitable gauge complete with Hep₂O connection for this duty.
3. Open one outlet slightly, allowing water to escape gradually. Measure the pressure PRESS2 in the accumulator tank just before PUMP A cuts in. The pressure should rise to PRESS1 before PUMP A cuts out. If the pump does not cut out reduce the flow of water from the outlet until it does. See FIGURE 1.
4. Using adjusting screw (D) on the pressure switch, raise or lower the cut out pressure of PUMP A as required. Start pump as in 3. above. Measure PRESS1. Repeat this sequence until PRESS1 reaches the cut-out pressure you require.

5. Using adjusting screw (R) on pressure switch, increase or decrease the pressure differential between cut in PRESS2 and cut out PRESS1. Start the pump as in 3. above. Measure PRESS2. Repeat this sequence until PRESS1 and PRESS2 are set at the pressures you require.

6. Reconnect **PUMP B**. Disconnect **PUMP A**. Repeat stages 2 to 5, to obtain your required cut in and cut out pressures for PUMP B. The new pressure settings for PUMP B must remain **in the same relation** to those of PUMP A as shown in FIGURE 1. For reliable operation the difference between the two cut in pressures should not be less than 3psi (0.2bar).

7. Reconnect PUMP A. Operate the system. When correctly set, PUMP A should start first, followed by PUMP B as demand increases. As demand is reduced, PUMP A should stop first, followed by PUMP B. If this sequence is not followed, or if either pump cuts in and out erratically, the pressures are incorrectly set and need to be readjusted as indicated above. **If in doubt or difficulty, consult your pump supplier.**



5. THE ACCUMULATOR TANK

TWIN-MAX is equipped with an accumulator tank, pressurised with dry non-toxic nitrogen gas. It contains an internal membrane: a rubber bag that holds water. The tank acts as a pressure buffer, absorbing the flow from the pumps when demand is low and smoothing outlet pressure. By removing the need for the pumps to run immediately an outlet is opened, it extends pump life and reduces battery drain. The pressure in the tank has been pre-set by the manufacturer to approx. 3psi (0.2bar) below the cut-in pressure of PUMP A. It should not need to be adjusted prior to first use of TWIN-MAX.

If the pumps start and stop instantly on opening or closing an outlet, or if they start and stop rapidly and repeatedly, the accumulator tank is not working efficiently. Check the internal pressure and adjust it if necessary.

If adjustment of the accumulator tank pressure should become necessary (e.g. when altering working pressure settings on the pressure switches or when fitting a replacement tank) follow this procedure:

- Switch off the power supply to the pressure system and open a tap, allowing water to flow until it stops.
- Remove the valve cover to expose the valve.
- Using a tyre pressure gauge, release nitrogen from the tank until the pressure is approximately 3psi below the cut-in pressure of PUMP A. This operation should be carried out in a well-ventilated space.
- If the tank has been de-pressurised, or if too much nitrogen has been released from it, pump in air with a car or cycle tyre pump until the correct pressure has been achieved.

Once the correct pressure is established, replace the valve cover and restart the pressure system by the method advised earlier in these instructions.

If the internal tank membrane has ruptured, the accumulator tank will become inefficient. A ruptured membrane will also release water into the 'dry' volume of the tank. Water or bubbles emerging from the tank valve are signs of a ruptured membrane. Traces of rust may eventually appear in the water coming out of the tap. **The accumulator tank will need to be replaced.**

6. MAINTENANCE

Your TWIN-MAX system needs no regular maintenance, and will give long and trouble free service if correctly installed and used.

- Check the strainer in the inlet line regularly. Clean it if necessary.
- Check at intervals to ensure that both pumps are working. If the flow rate with several outlets open seems low, one pump may have stopped. Investigate the cause. Use the troubleshooting guide in the manufacturer's instructions for the pump.

7. SERVICE AND WARRANTY

In the unlikely event that your TWIN-MAX system develops a fault during its 12 month warranty period, notify your pump supplier within 48 hours and arrange to return the unit to him for inspection.

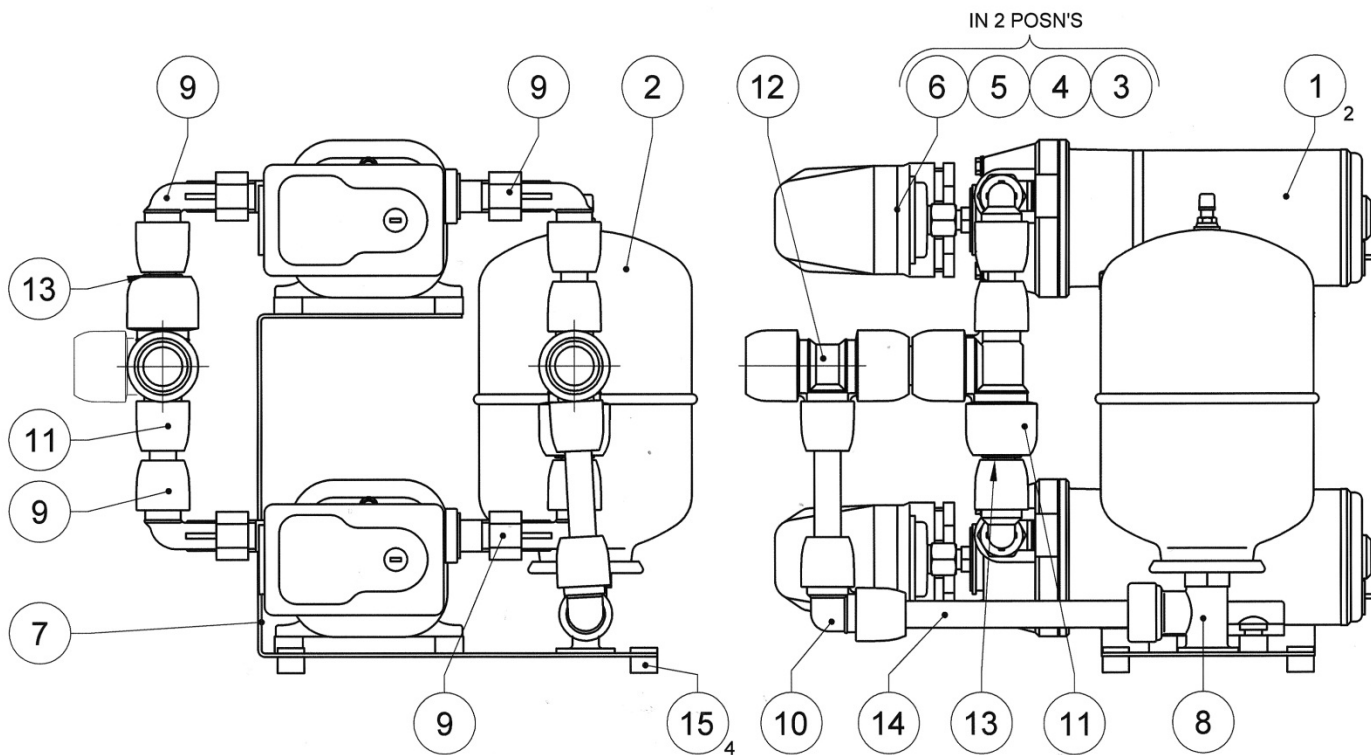
A comprehensive repair service is available if required. Check with your pump supplier for details.

SUPPLIED BY:



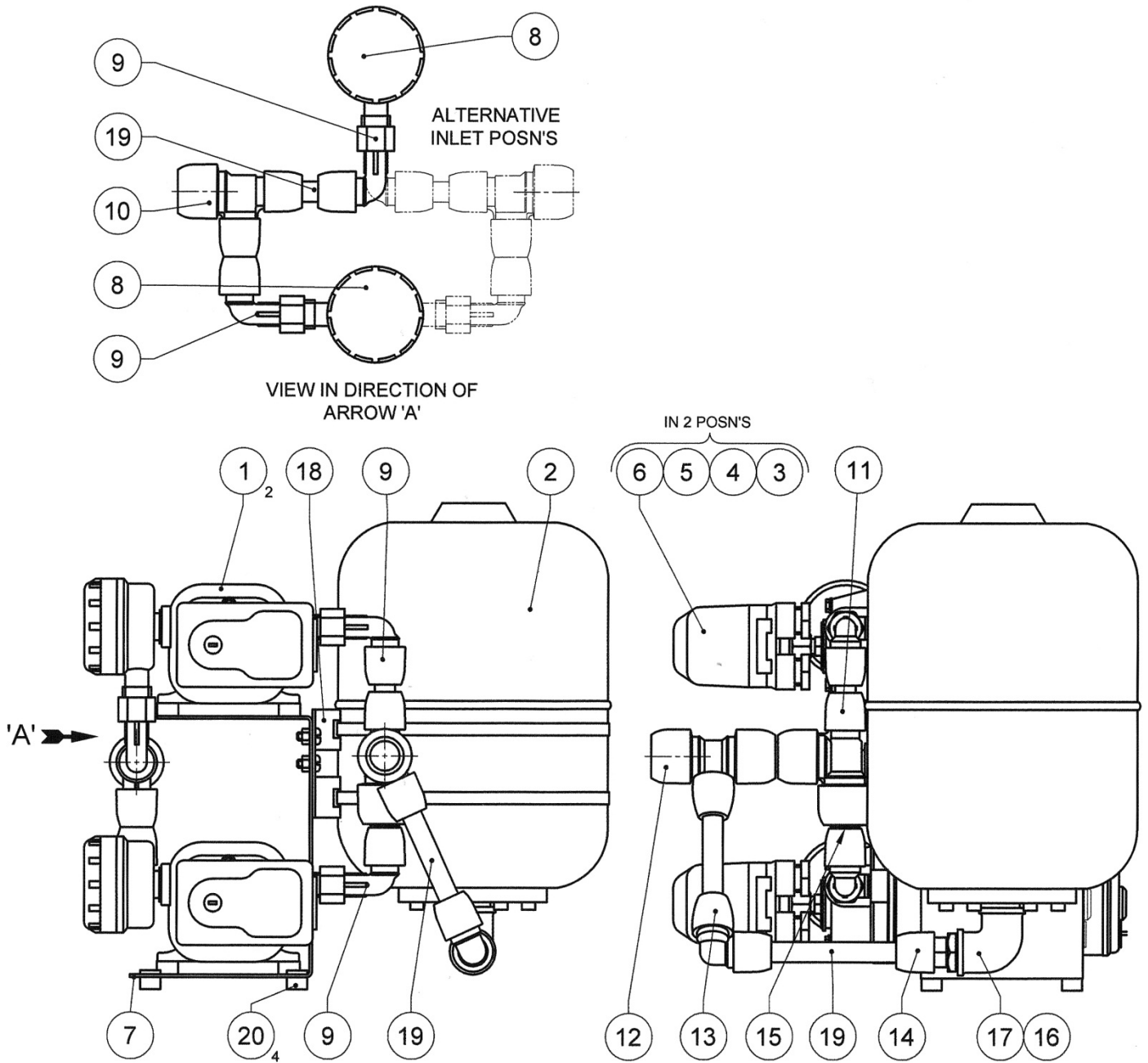
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TWIN-MAX PARTS REFERENCE – TWIN-MAX 4 + 2



ITEM	DESCRIPTION	QTY	PART NUMBER
1	PAR-MAX 4 DIAPHRAGM PUMP	2	31620-0292 – 12 VOLT 31620-0294 – 24 VOLT
2	2 LITRE ACCUMULATOR TANK	1	CW269
3	PRESSURE SWITCH	2	CW4-A
4	ADAPTOR	2	CW3
5	ADAPTOR FLANGE	2	Z/20244-020
6	WASHER	2	CW267
7	BASE	1	CW321
8	ACCUMULATOR TANK BRACKET	1	CW431
9	ADAPTOR HEP20/PAR	4	CW194W
10	90° ELBOW	1	HD5/15W
11	END REDUCED TEE	2	HD12/22W
12	BRANCH REDUCED TEE	1	HD13/22W
13	SPIGOT REDUCER 22/15	2	PB822
14	PIPE	0.18M	HXP03/15W
15	FEET	4	SP2900-0380

TWIN-MAX PARTS REFERENCE – TWIN-MAX 3 + 8 and TWIN-MAX 4 + 8



ITEM	DESCRIPTION	QTY	PART NUMBER
1	PAR-MAX <u>3</u> DIAPHRAGM PUMP	2	31600-0292 – 12 VOLT 31600-0294 – 24 VOLT
	PAR-MAX <u>4</u> DIAPHRAGM PUMP	2	31620-0292 – 12 VOLT 31620-0294 – 24 VOLT
2	8 LITRE ACCUMULATOR TANK	1	CW288
3	PRESSURE SWITCH	2	CW4-A
4	ADAPTOR	2	CW3

5	ADAPTOR FLANGE	2	Z/20244-020
6	WASHER	2	CW267
7	BASE	1	CW321
8	STRAINER	2	46400-0014
9	ADAPTOR HEP20/PAR	4	CW194W
10	BRANCH AND 1 END REDUCED TEE	1	HD14/22W
11	END REDUCED TEE	1	HD12/22W
12	BRANCH REDUCED TEE	1	HD13/22W
13	90° ELBOW	1	HD5/15W
14	MALE BSP ADAPTOR	1	HX29/15W
15	SPIGOT REDUCER 22/15	2	PB822
16	ELBOW	1	Z/72520
17	REDUCING BUSH	1	Z/73210
18	ACCUMULATOR TANK BRACKET	1	Z/EXVMB-P
19	PIPE	0.18M	HXP03/15W
20	FEET	4	SP2900-0380