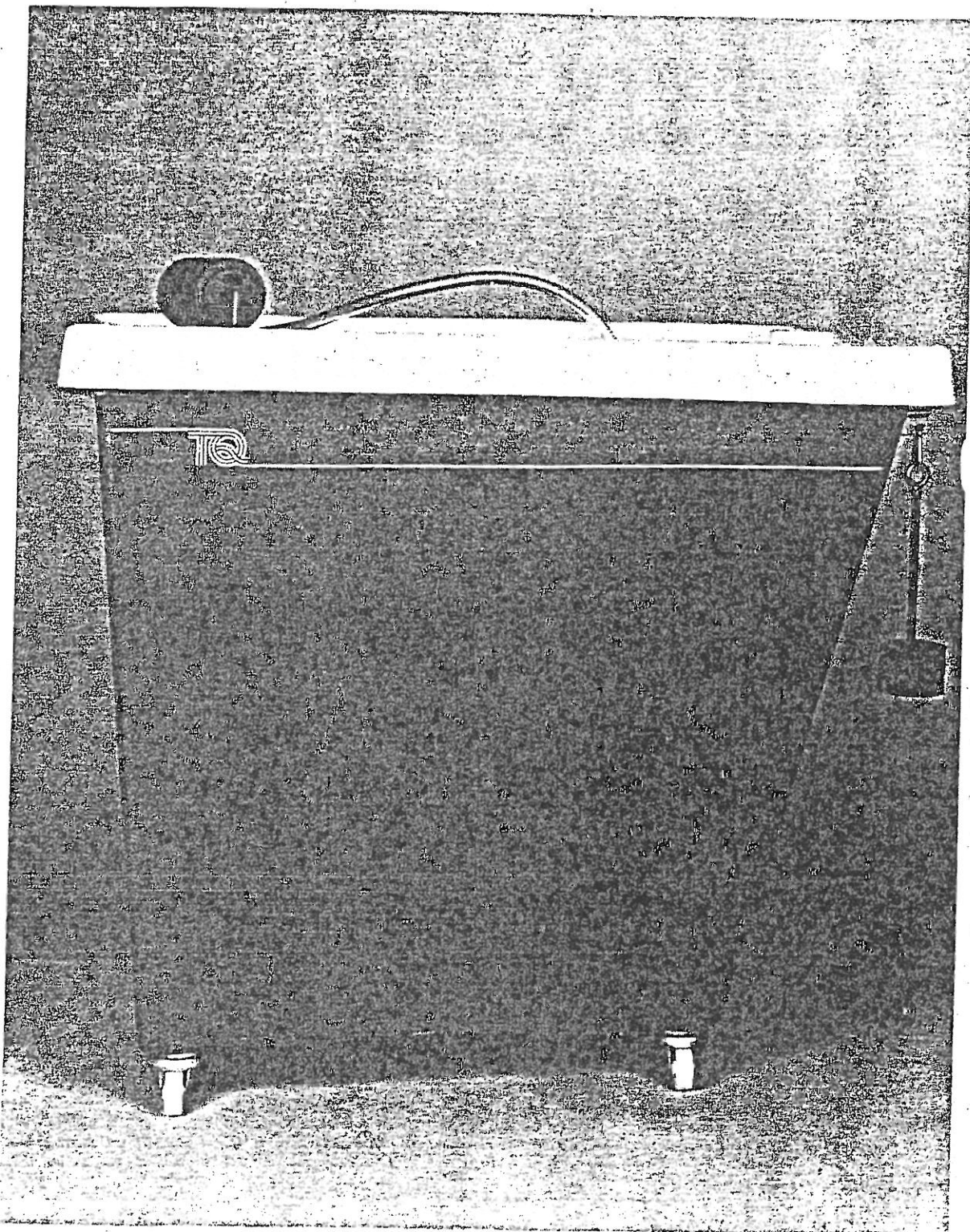


INSTALLATION, OPERATION AND SERVICING
INSTRUCTIONS FOR THE HYDRAULIC BENCH



1. INSTALLATION INSTRUCTIONS

The Hydraulic Bench is usually despatched in its assembled condition with the exception of the drain valve. This is packed inside the sump tank. The weight carrier and weights are packed separately.

1.1 Assembling the Drain Valve

- (a) Remove and discard the straps securing the bench top to the sump tank.
- (b) Remove the bench top and lift it off on to a suitable support. Do not stand or drop the top on its edge.
- (c) Assemble the drain valve into the hole in the weigh tank as shown in fig 1.1.

1.2 Electrical Mains Connection

- (a) Check that the voltage engraved on the manufacturer's plate is the same as the mains electrical supply, to which the equipment will be connected.
- (b) - A three-core cable is fitted to the bench as standard. The customer is required to supply a suitable 3-pin plug to meet the local legal requirements when supplied to Canada, the USA and some South American markets.

1.3 Checking, Weighing and Draining Operations

With the bench top removed, ensure that both sump and weigh tank are clean and free from dust and that the pump passage-way is not blocked.

- (a) Fill the sump tank with cold water to the level label (160 litres).
- (b) Mix the stain/deposit preventer in the correct proportion to the contents of the sump tank. This solution will prevent impurities depositing in the manometer tubing and other parts of the hydraulic range of equipment. The solution is especially desirable in hard water areas.

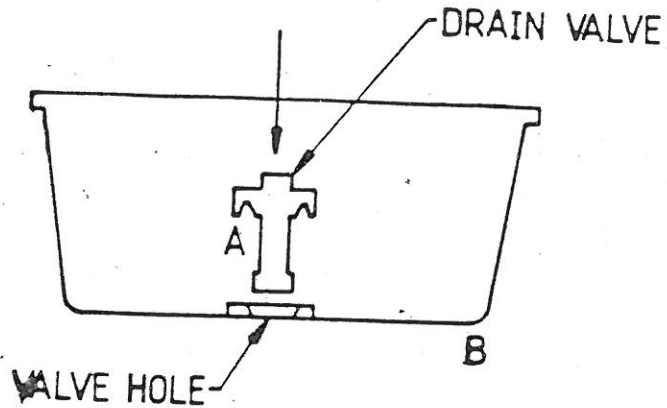


Fig 1.1 Assembly of Water Valve into Weigh Tank

The valve assembly (A) is dropped into the hole in the weigh tank (B). The rubber seal, plus the weight of the valve assembly, ensures a good seal.

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- (c) Close bench supply valve.
 - (d) Connect bench to the mains and start pump motor by twisting the red button on the starter. Check hose clips for leaks.
 - (e) Direct supply hose into weigh tank and slide weigh beam stop over beam. No weights need be added for this test.
 - (f) Open bench supply valve and fill the weigh tank with water to approximately 25 mm from the top.
 - (g) Close the bench supply valve, and check that the drain valve is closed and not leaking.
 - (h) To drain the weigh tank, depress the weigh beam above the weight hanger and slide the beam stop away. Gently release the weigh beam and the water will commence to drain. To finish draining lift the weigh beam for 10 or 15 seconds.

Note: There will always be water in the drain valve tube and some residual water in the bottom of the weigh tank after draining.

2. WEIGHING TECHNIQUE

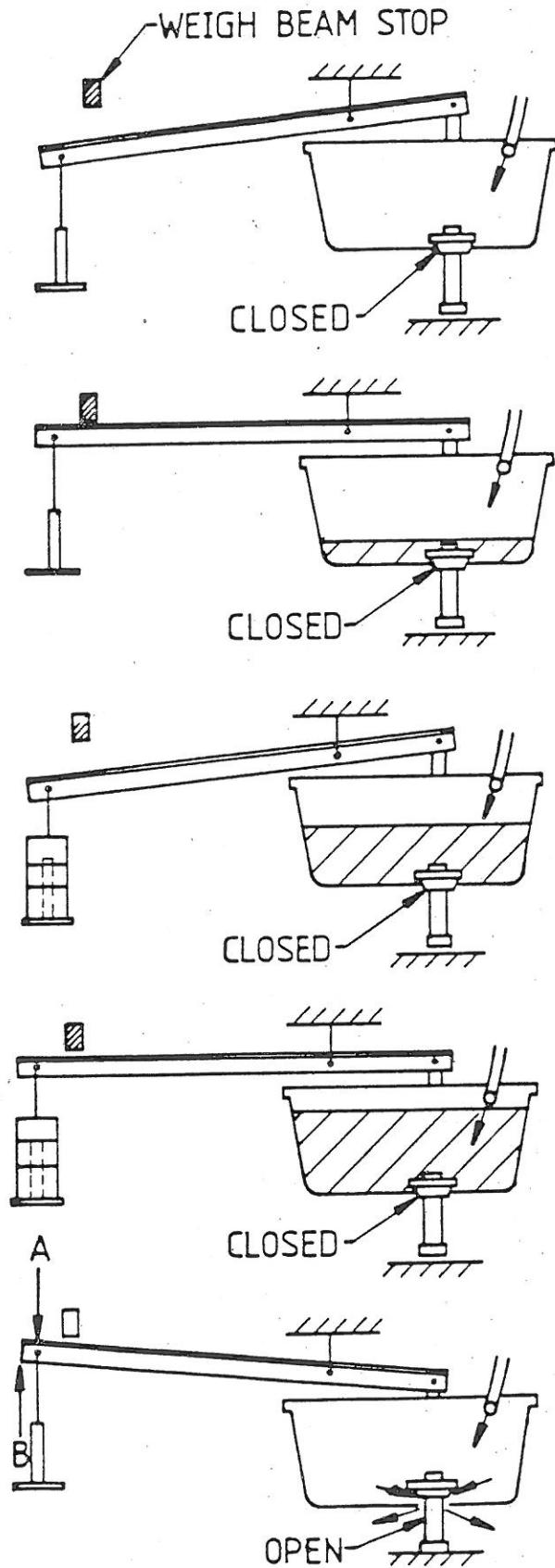
The precision weighing unit of the TecQuipment Hydraulic Bench, which has a 3:1 arm ratio, is designed for accurate measurement of relatively large quantities of water up to a maximum of 36kg.

Before proceeding with any experimental work on the bench, students should familiarise themselves with the following technique:

- (a) Close the bench supply valve and direct the supply hose into the weigh tank via the centre of the bench top.
- (b) Slide the weigh beam stop out of line of the beam and lift the beam for 10-15 seconds to ensure the weigh tank is empty.
- (c) The weigh beam will be in its lower position with only the weight carrier on (fig 2a). Slide the weigh beam stop above the weigh beam.
- (d) Switch on the pump.
- (e) Open the bench supply valve.
- (f) Start timing the instant the weigh beam comes horizontal and place selected mass immediately on to the weight hanger. (See figs 2b and 2c).
- (g) When the mass of water collected balances the mass of the weight hanger, the beam will rise again to the horizontal position (fig 2d). At this instant, stop the timer and record the timing interval.

Note: The mass of water collected is three times the mass used on the weight hanger.

- (h) Close supply valve or switch off the pump.
- (i) To drain weigh tank, depress weigh beam above weight hanger and slide weigh beam stop away. Gently let weigh beam rise until it stops against the sump tank. Remove weights and tank will continue draining. As the weigh beam returns to the horizontal, lift it for 10-15 seconds to drain final amount from weigh tank (fig 2e).



- (a) (i) Stop positioned over beam
(ii) Start pump
(iii) Drain valve closed

- (b) (i) Beam moves to horizontal
(ii) Start clock

- (c) (i) Add required weights

- (d) (i) Beam moves to horizontal
(ii) Stop clock

- (e) (i) Drain
(ii) Press down on A
(iii) Slide stop away
(iv) Release arm gently; remove weights
(v) Lift at B to complete draining for 10-15 s

Fig 2

Note: With the supply valve fully open, a flow of 30 kg in 38 s is usual and is the acceptable test at the factory.

The mass of water collected should be chosen to give a time interval of approximately 60 s for best results.

3. ADDITIONAL SUMP OUTLET

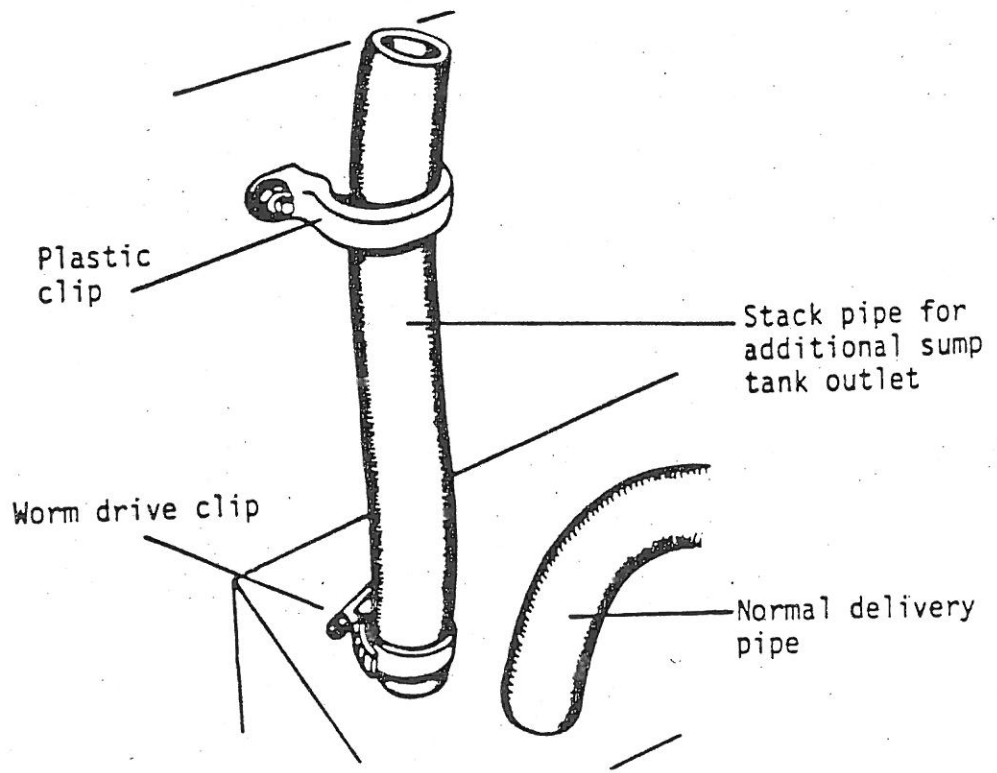
An additional sump outlet is provided so that the pump can be by-passed and the water directed through any hydraulic circuit required. The procedure for connection is as follows:-

- (a) Remove the bench top.
- (b) A stack pipe from the outlet is located adjacent to the normal delivery pipe. It is secured with a plastic clip and a worm drive hose clip.
- (c) Remove the worm drive clip and slide the pipe through the hole in the tank and out of the plastic clip. The stack pipe can now be connected to the external circuit.

Note The outlet can be connected with the sump tank full of water if the connection can be made above the level of the sump tank water.

- (d) Replace the bench top.

The replacement of the stack pipe is the reverse of the above procedure.



4. ROUTINE CARE AND MAINTENANCE

4.1 General

- The sump and weigh tanks should be drained, wiped clean with a damp lint-free cloth and refilled with clean water once a term.
- Stain/deposit preventer should be added to the water in the sump tank in the prescribed proportions to prevent scaling.
- Where heavy contamination has taken place on the tanks a proprietary household cleanser may be used if applied sparingly. (It is advisable to try the chosen cleanser on a small area before applying all over).
- When wheeling the bench around it is advisable to remove the weight hanger from the weigh beam to avoid damage to bench paintwork and injury to personnel.

4.2 Specific Faults

- PUMP OVERHEATS: Check that there is sufficient water in the sump tank and that the pump is not running dry.
- PUMP OUTPUT LOW: Check the following points:-
 1. The water level in the sump tank. This is usually noticed by excessive noise coming from the pump section. Refill tank if necessary.
 2. Blockage of the bench supply valve. Remove the bench top and the flexible plastic supply pipe at the valve and it will then be possible to visually check this.
 3. Foreign matter in the pump and suction pipe. To dismantle the pump:
 - (a) Remove the bench top.
 - (b) Drain the sump tank.
 - (c) Disconnect the hose connections on the pump.

- (d) Disconnect the electrical wiring switch.
- (e) Lift the pump free of the location bracket.
- (f) Remove the bottom inlet filter and check for any foreign matter.

- BENCH SUPPLY VALVE LEAK: This valve is a commercial gate valve, the internal details of which are shown (see diagram). Slight gland leakage can be rectified as follows:-

1. Remove the handwheel retaining nut (A) and the handwheel (B).
2. Slacken the nut (C) and remove. The gland packing ferrule (D) will now be exposed. The head of the ferrule should be about 2 mm clear of the thread.

If this is not the case the leak may be rectified by refitting and tightening nut (C). However, if the ferrule is flush with the thread, then the gland requires re-packing. To do this:-

- (a) Remove the existing packing and re-pack with either replacement nylon 'O' rings or asbestos cord.
- (b) Refit the gland ferrule and nut, ensuring that the gland ferrule has sufficient clearance to tighten the packing when the nut is re-fitted.

