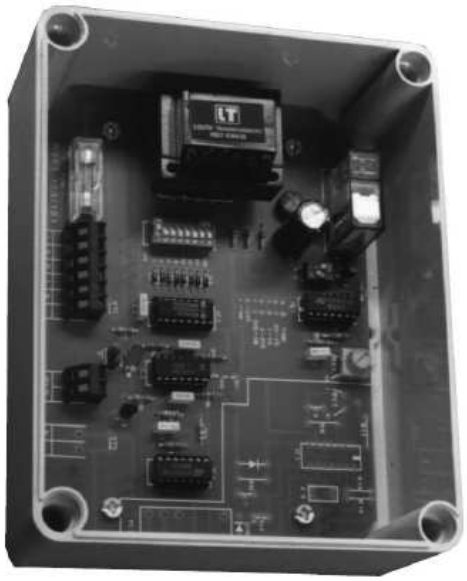
AQUA
WATER SYSTEMS

Operating instructions for the
T100
T101
Controllers



Aqua Water Systems Impulse-Timer Control Units series 100/101 are designed to provide simple and convenient control of Water Treatment programmes in a wide variety of Dosing and Control applications. In operation, the Control Units accept pulses either from an external source - e.g.: an impulse or 'contact-head' Flow Meter - or generate their own impulses at a fixed rate of 1 pulse per minute. The pulses are 'divided' in the control circuit in any ratio from 1:1 to 1:255 before conversion to the Output phase, where they are utilised to initiate any one of 4 adjustable timed outputs. The output pulse duration may then be infinitely adjusted within the time range selected, and is transmitted to the controlled equipment - e.g.: Dosing Pump or Automatic Valve - via volt-free relay contacts, circuit board track-rated at max. 3 Amps at 250VAC.

Thus the Water Treatment Dosing/Control system may be simply programmed to operate intermittently over long periods in direct proportion to flow rate and/or time as required.

Installation

1. Mechanical

Mount the Control Unit enclosure on a suitable wall or bulkhead as near as possible to the equipment to be controlled. Although protected to IP65 - water and dust-resistant - the unit should not be sited where it is liable to be sprayed with water or in direct sunlight.

2. Electrical

Connect to a suitable locally isolatable power supply and to the controlled equipment, using stranded cables or flex.
IMPORTANT: Pulse or signal cables should not be run in the same conduit as, or parallel to power or 'mains' cables.
Refer to Fig. 1 at the end of this document for detailed wiring/connection diagrams::

2.1 Power Supply

220-240/1/50 supply should be connected to Terminals 1 & 2
LIVE Terminal 1
NEUTRAL Terminal 2

Note: 110-120V can be supplied to order, when the links shown in Fig. l will be factory fitted before despatch.

2.2 External Impulse Source

If this option is to be used, connect the external impulse source - e.g.: contact-head water meter - to terminals 7 & 8 - 'Pulse Input'. Polarity is not critical except for certain types of fast-pulse generators. Refer to Aqua if in doubt

2.3 Controlled Equipment

Connect the equipment to be controlled -e.g.: Dosing Pump, Solenoid Valve, Motor Starter Coil, etc - to the 'Output' terminals 3 - 6 as follows:

2.3.1 Equipment having the *same* power supply requirement as the Control Unit - e.g: 220-240/1/50:

i. Fit Link - using a small piece of insulated wire -between Terminal 4 (L) and Terminal 5 (NO).

ii. Connect L (Line) of the controlled equipment to Terminal 6 (C)

iii. Connect N (Neutral) of the controlled equipment to Terminal 3 (N)

2.3.2 Equipment having a *different* power supply requirement to the Control Unit - e.g.: 24V dc:

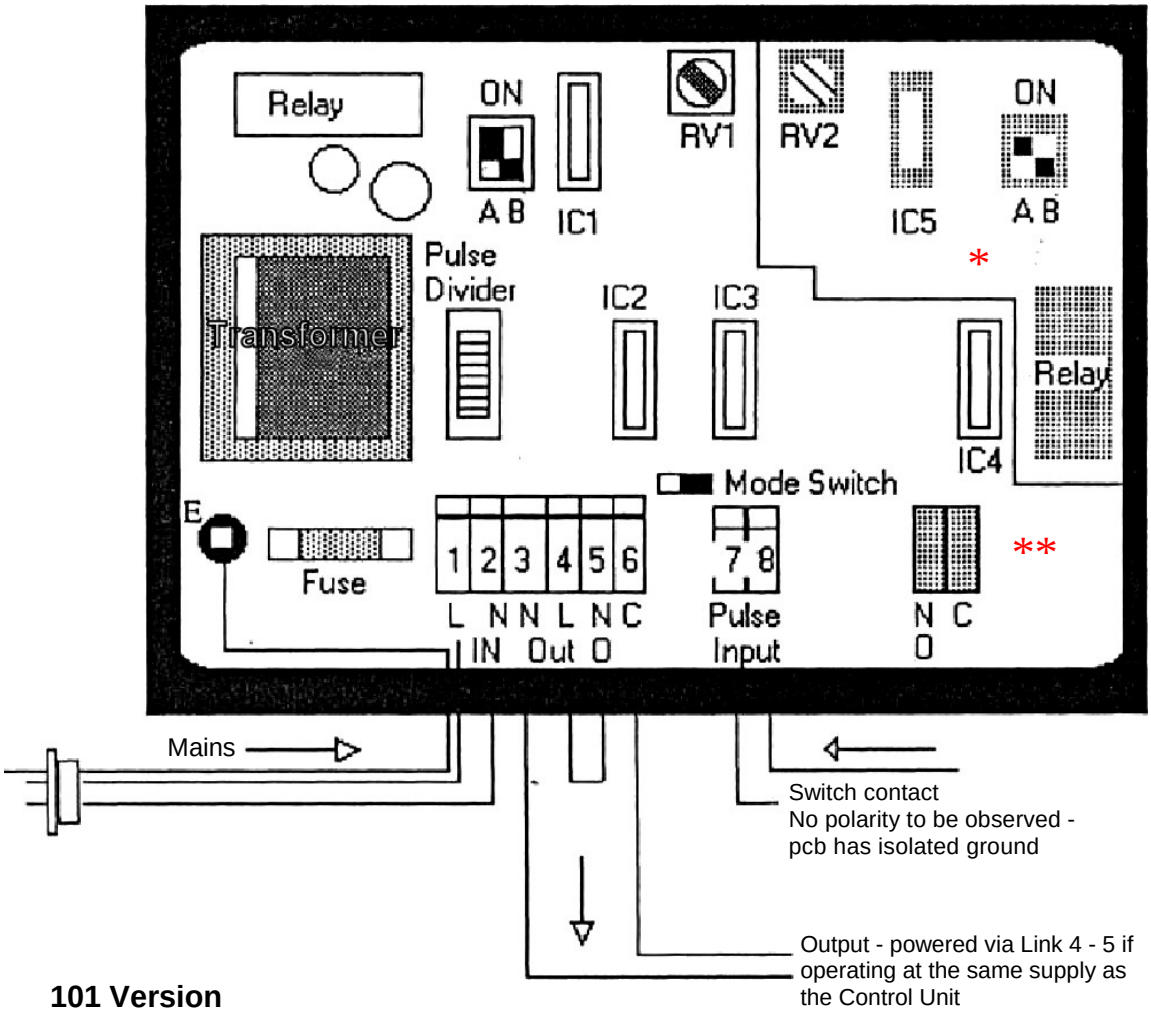
i. Connect the +ve of the 24V remote supply to Terminal 6 (C)

ii. Connect the + ve of the controlled equipment to Terminal 5 (NO)

iii. Connect the -ve of the 24V remote supply direct to -ve of the controlled equipment.

NOTE: Output relay contacts are Volt-free. Hence, if the controlled equipment has the same power supply requirement as the Control Unit a link is necessary between Terminals 4 and 5 (L and NO) to 'power' the relay contacts. (See 2.3.1 (i) above).

Fig.1 - PCB Layout



101 Version

* This section of the pcb is only 'populated' with components as shown when supplied as a 101 version

** Output terminals for second controlled equipment when supplied as a 101 version

Figure 2 Connections

Figure 2a Typical T100 Connections

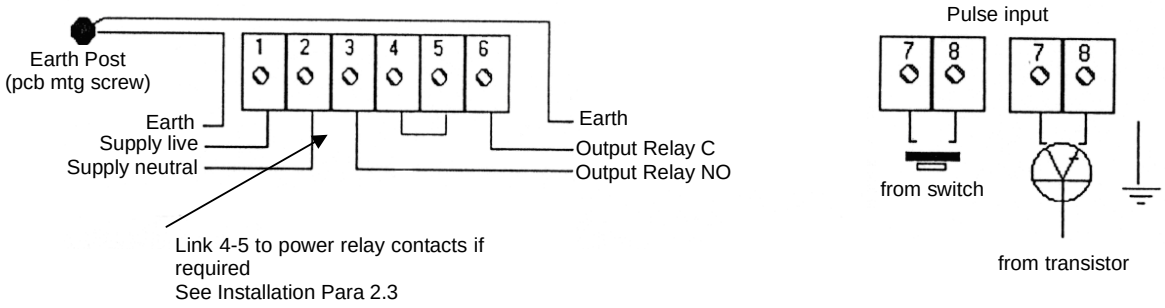
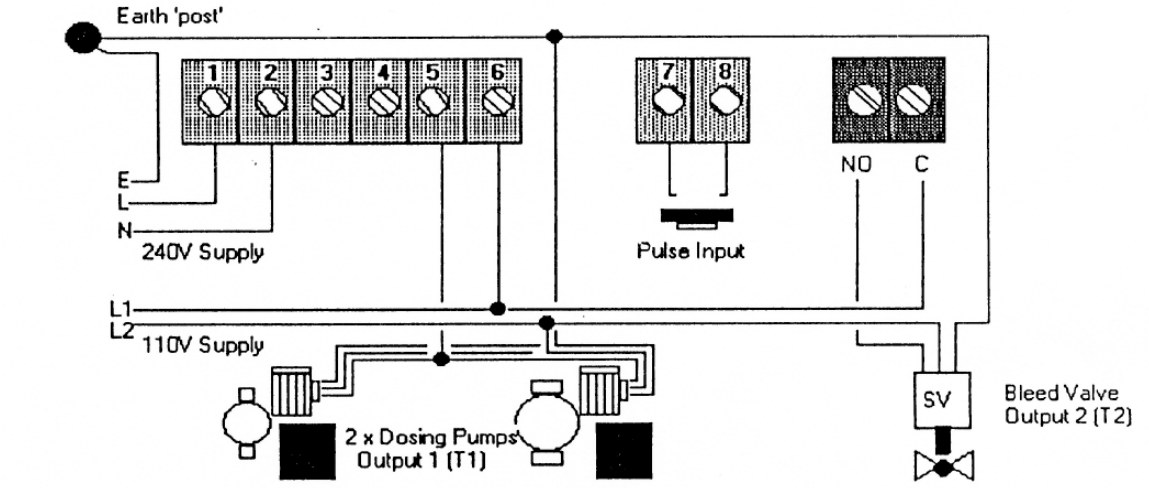


Figure 2b Typical T101 Connections



Setting-up & Commissioning

2.

1. Setting the Operating Mode

Select the mode of operation required by positioning the **MODE SWITCH** Jumper' - see Fig.l.
If an external pulse source is to be used - e.g.* contact-head water meter - position the jumper' across the CENTRE and LH pins - link marked *P' on the circuit board.
If the internally generated pulse mode is required - fixed rate pulses at 1 minute intervals -position the 'jumper' across the CENTRE and RH pins - link marked '1M' on the circuit board

2. Setting the Impulse Divider

Calculate the maximum number of incoming pulses (from the external pulse source) and select the division ratio to obtain the required performance from the controlled equipment. E.g:

An impulse water meter generates 30 impulses per litre of water. The max. flow rate in this application is 1200 Litres/hr /(20 Litres/minute). The Motor-driven Dosing Pump is required to run 6 times per minute at maximum water flow rate for 5 seconds each 'run' to achieve the necessary ratio of chemical to water.

To achieve 5 'Pump runs' for every 20 litres of water the division ratio is

$20 \div 5 = 4$

The Divider Switch is BINARY, hence:

Switch 1	divides by 1
Switch 2	divides by 2
Switch 3	divides by 4
Switch 4	divides by 8
Switch 5	divides by 16
Switch 6	divides by 32
Switch 7	divides by 64
Switch 8	divides by 128

The divide ratios are additive, so when Switches 1, 3 and 4 are closed, the unit will divide by 1 + 4 + 8 = 13. When all switches are closed, the unit will divide by 255.

For this example, the division ratio required is 4, so all that is necessary is to close Switch 3
NOTE: If all switches are left open, the output relay will be permanently energised and any controlled equipment will run continuously

Setting the Output Timer

(i) Set the Relay ON Switch (see Fig 1) for the Time Range required by selecting the combination of Switches A & B on/off as required:

A	B	Range
Off	On	0.5 – 2 Seconds
On	Off	1 - 5 seconds
Off	Off	3 – 30 seconds
On	On	20 seconds to 5 minutes

In this example each pump run' is 5 seconds so Switch A is set to ON and Switch B set to OFF.

Finally, adjust the fine-setting pre-set RV1 (see Fig. 1) to the exact time required within the range selected. In this example 5 seconds = 100% of the range so that Pre-Set can be turned *fully clockwise .*

NOTE:
Care should be taken to ensure that the output time selected is shorter than the time period for the incoming pulses. If time periods do inadvertently overlap, no damage will result, but the controlled equipment will operate continuously for as long as the overlap condition exists

4. Putting into operation

The Control Unit should now be switched on and checked for correct operation. The LED on the circuit board will flash in time with the incoming pulses and the relay should energise and de-energise in accordance with the time range/setting selected.

Small adjustments to the fine-setting timer Pre-Set RVI may be made as required, and/or the mechanical output setting (stroke control) of the Dosing Pump re-positioned as necessary.

Series 101 Control Units

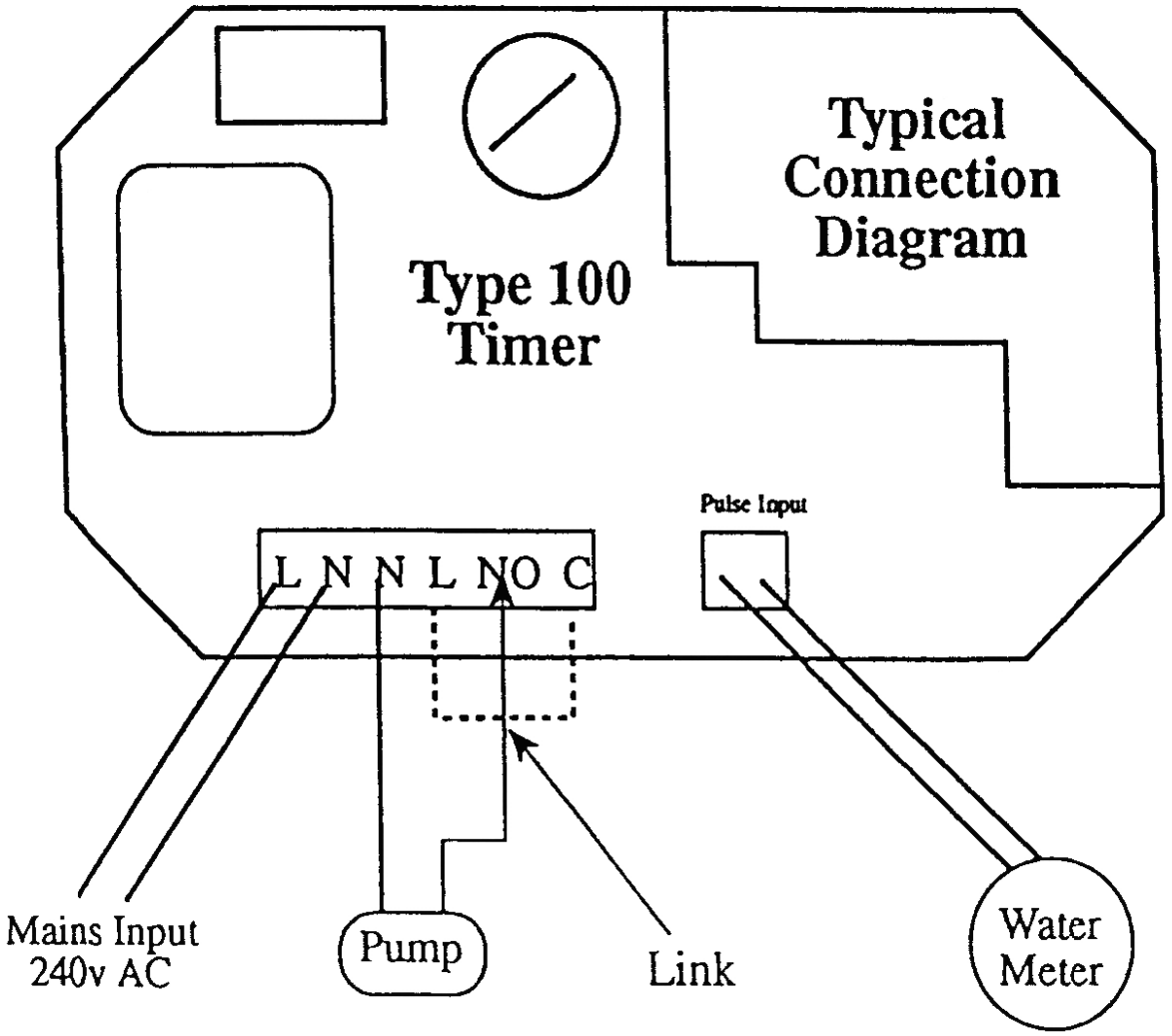
Procedures for installation, setting-up and commissioning of the 2-output Series 101 version are the same as described for the single output Series 100 above.

The second Output Timer and separate Mode Selector Switch are mounted on the top RH side of the circuit board (see Fig. l) and the output relay terminals at the lower RH corner.

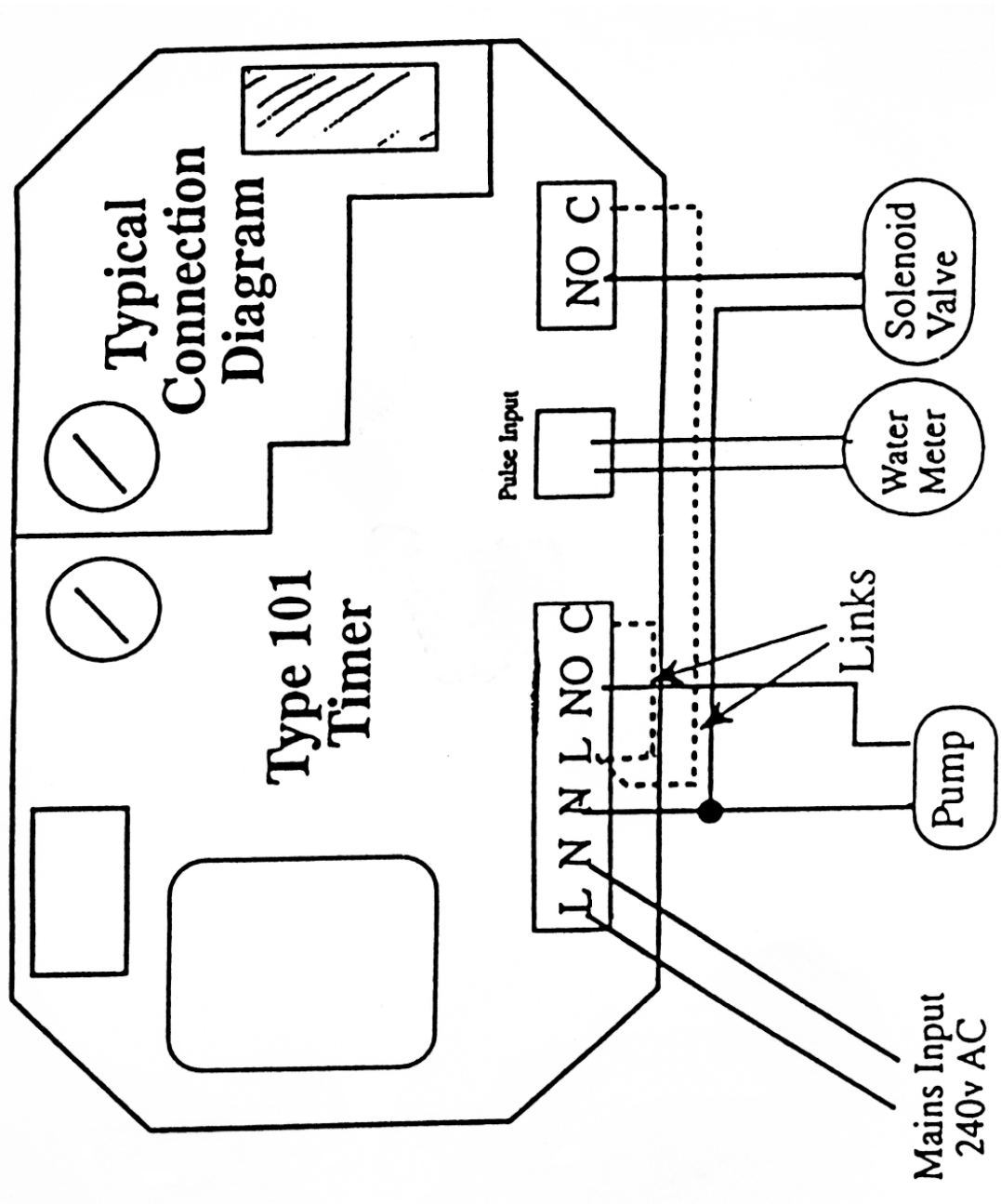
5. Maintenance

No maintenance is necessary to the Control Units other than routine adjustments to settings which may be required as dictated by the water treatment programme

Typical Connections for the T100 Controller



Typical Connections for the T101 Controller



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