



# AquaTech Pressmain

## INSTRUCTIONS FOR

0. GENERAL SAFETY INFORMATION, WARNINGS & CAUTIONS
1. GENERAL USE
2. OPERATION
3. SERVICING
4. DISPOSAL

## TWIN PUMPSET CHANGEOVER PANEL WITH SMART RELAY CONTROL

MODEL: LG2-CP








CE

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## 0.0 GENERAL SAFETY INFORMATION

- These instructions are intended for the installer/operator/user/maintenance of this equipment and must be kept with the equipment, for the life of the equipment and made available to all persons. Please read GENERAL SAFETY INFORMATION 0.0, WARNINGS 0.1 and CAUTIONS 0.2, 0.3 & 0.4 before doing anything else, and then follow them carefully.
- The unit must only be installed/operated/used/maintained by a competent person; *A competent person is someone who is technically competent and familiar with safety practices and the hazards involved.*
- Hydraulic Accumulators/Expansion Vessels installed as part of/in conjunction with this equipment, with Pressure x Volume above 250 Bar-litres, require regular formal inspection by a *competent person*. This is a Legal Requirement under the “Pressure Systems Safety Regulations” (PSSR) and the Owner/User should be made aware of their responsibility for this. (see section 3. Servicing).
- Failure to install/operate/use/maintain the equipment as recommended below could cause damage to the equipment any anything subsequently connected to it, and invalidate the warranty provided by AquaTech-Pressmain to the buyer.
- Any damage caused to the equipment by misapplication, mishandling or misuse could lead to risk of **Electrocution, Burns, Fire, Flooding or injury to people or property** dependent upon the circumstances involved.
- This equipment may contain moving/rotating parts that must remain guarded. Removal of or missing guards could lead to serious personal injury.
- This equipment automatically restarts after a power interruption.
- We accept no responsibility or liability for any consequences or damage/losses due to misapplication, mishandling or misuse of the equipment.
- It should be noted that the assembly of pressure equipment on site under the responsibility of the user (or his representative) is not subject to the Pressure Equipment Directive 97/23/EC. (National legislation covering assembly on site will apply)
- The latest version of this instruction manual with up to date safety information can be downloaded from our website at [www.aquatechpressmain.co.uk](http://www.aquatechpressmain.co.uk)

### 0.1 WARNINGS

- 0.1.1 **Do not touch any live parts for at least 5 minutes after switching off the electricity supply. Failure to observe this will constitute a severe Electric shock and/or Burns hazard and may be lethal.**
- 0.1.2 **The equipment is only suitable for earth referenced supplies and must be permanently earthed to avoid Electric shock hazard.**
- 0.1.3 **With equipment isolator OFF, mains voltage may still be present from BMS system. This constitutes an Electric shock hazard.**
- 0.1.4 **Emergency stop button does not remove dangerous voltages from control panel/pump motor assemblies. This constitutes an Electric shock hazard.**
- 0.1.5 **Metal parts (e.g. heat sinks) may reach temperatures of 90 degrees centigrade and will constitute a Burns hazard.**
- 0.1.6 **Some equipment is designed to operate with liquid temperatures up to 150 degrees centigrade and will constitute a Burns/scalding hazard.**

- 0.1.7 The equipment must not be pressurised beyond the maximum working pressure as stated on pumps/pipework/vessels/control panel otherwise serious mechanical damage/destruction could occur causing injury to people or property.
- 0.1.8 The equipment must not be heated/chilled beyond the maximum/minimum working temperature as stated on pumps/pipework/vessels/control panel otherwise serious mechanical damage/destruction could occur causing injury to people or property.
- 0.1.9 Any damage to equipment, pumpset, vessels, pipework or system components caused by misapplication, mishandling or misuse could lead to Electric shock hazard, Burns hazard, Fire hazard, Flooding hazard or cause injury to people or property.
- 0.1.10 This equipment may contain moving/rotating parts that must remain guarded. Removal of or missing guards could lead to serious personal injury.
- 0.1.11 Pressure vessels must never be disassembled whilst in use, they contain high pressure air/gas charge which could cause injury to people or property.
- 0.1.12 Pump motors with lifting eyes; the lifting eyes are only suitable for lifting motors NOT the entire pump assembly. This could cause injury to people or property.
- 0.1.13 Ensure the base/foundation/plinth/wall to which the equipment is to be attached is sufficiently strong enough to carry the entire mass of the equipment including the water that it will contain under worst-case fault conditions. E.g. fully saturated pressure vessel with no air charge, break tank full to overflowing, etc. Failure to observe this could cause serious mechanical damage/destruction resulting in injury to people or property.



## 0.2 CAUTIONS FOR INSTALLATION

- 0.2.1 READ GENERAL SAFETY INFORMATION 0.0, WARNINGS 0.1 and CAUTIONS 0.2, 0.3 & 0.4
- 0.2.2 The unit should only be installed/operated by a competent person; *A competent person is someone who is technically competent and familiar with safety practices and the hazards involved.*
- 0.2.3 Read the manuals supplied with other equipment (e.g. cold water pressure booster sets) associated with this control panel.
- 0.2.4 Store in a dry place to avoid damp conditions deteriorating the equipment.
- 0.2.5 The equipment is only suitable for installation in a clean, dust free indoor environment, with adequate protection from heat and frost, and sufficient ventilation to ensure cooling. Ambient air temperature should be between 5 and 40 degrees centigrade, non-condensating. Operation outside of these conditions could seriously damage the equipment.
- 0.2.6 Ensure the electrical supply is the correct voltage, current, frequency and type for the equipment supplied and that suitable circuit protection equipment is installed in the supply. Incorrect electrical installation could be an electric shock/burns/fire hazard.
- 0.2.7 When accessing the control panel to make electrical connections adopt anti-static procedures e.g. wear anti-static earthed wristband, to avoid risk of damaging the controller.
- 0.2.8 Do not operate this equipment/pumpset prior to commissioning. This could cause irreparable damage to equipment/pumpset/pipework/system components.
- 0.2.9 The installer/user is responsible for the installation of the correct earthing and protection according to valid national and local standards. All operations must be carried out by a suitably qualified person.
- 0.2.10 The equipment is only suitable for earth referenced supplies and must be permanently earthed to avoid electric shock hazard.
- 0.2.11 The equipment must be permanently earthed with appropriate sized Earthing.
- 0.2.12 Equipment containing variable speed drives/motors has high earth leakage current >3.5mA and will require additional earth bonding whereby a single conductor of increased size or duplicate earth conductors must be provided.

- 0.2.13** Never perform high voltage resistance tests on control panels, variable speed drives/motors without first disconnecting the panel/drive/motor from the circuit being tested as this will damage the built in electronic components.
- 0.2.14** Metal parts (e.g. heat sinks) may reach temperatures of 90 degrees centigrade.



### **0.3 CAUTIONS FOR OPERATION/USER**

- 0.3.1** READ GENERAL SAFETY INFORMATION 0.0, WARNINGS 0.1 and CAUTIONS 0.2, 0.3 & 0.4
- 0.3.2** The unit should only be operated/used by a competent person; *A competent person is someone who is technically competent and familiar with safety practices and the hazards involved.*
- 0.3.3** Read the manuals supplied with other equipment (e.g. cold water pressure booster sets) associated with this control panel.
- 0.3.4** The Owner/User of this equipment has a Legal Responsibility to ensure that it is subject to regular formal inspections. See Section 3. Servicing, for details.
- 0.3.5** The set must not be run until commissioned by an authorised AquaTech-Pressmain agent, this could irreparably damage the pump set and/or system components/pipework connected to it.
- 0.3.6** The equipment should be left switched ON and switched to AUTO for normal operation.
- 0.3.7** Portable telephones or other electro-magnetic equipment must not be used near the set to avoid corruption of program and unpredictable operation of unit.



### **0.4 CAUTIONS FOR MAINTENANCE**

- 0.4.1** READ GENERAL SAFETY INFORMATION 0.0, WARNINGS 0.1 and CAUTIONS 0.2, 0.3 & 0.4
- 0.4.2** The unit should only be operated/maintained by a competent person; *A competent person is someone who is technically competent and familiar with safety practices and the hazards involved.*
- 0.4.3** Read the manuals supplied with other equipment (e.g. cold water pressure booster sets) associated with this control panel.
- 0.4.4** Where the set is fitted with Building Management Services (BMS) interconnections, notify the appropriate persons before switching OFF for maintenance or adjustments, to avoid unnecessary alarm conditions occurring. **WARNING:** With pumpset isolator OFF, mains voltage may still be present from BMS system. This constitutes an Electric shock hazard.
- 0.4.5** Switch OFF before accessing control panel.

## 1.0 GENERAL USE

This unit is designed to change the duty between **Two** cold water booster pumpsets. This is achieved via a 'Smart relay' controller. The changeover of these pumpsets is controlled by the 'smart relay's clock timer, which is fully adjustable 7 days a week, 24 hours a day. So, at the given set time, eg, 2:00am every morning, the booster set which has been running will power down and activate the standby pumpset.

On initial power up, the changeover panel will power up both pumpsets for 15 minutes (this delay is adjustable), to ensure that the system gets up to pressure without any faults occurring. After the 15 minute delay, one of the pumpsets will power down and leave the other set operating as the duty set. In the event of a fault or changeover period, the duty set will be powered down and the other set will be powered up, to operate on the system.

The changeover of the pumpsets can also be changed over via the 'Pumpset changeover selector switch'. This has 'Three' positions, which are:

- Pumpset 1
- Auto
- Pumpset 2

If it is required to override the time clock and switch from one pumpset to the other, this can be done by manually selecting the pumpset required via the 'Pumpset changeover switch'. But, by doing this, and leaving the switch on one of the pumpsets, the duty will no longer switch over at the programmed time. For normal operation, the switch must be left in 'Auto' to allow the time clock to switch the pumpsets over.

**Both pumpsets main electrical isolators MUST be switched ON and have power available to operate via the time clock. If one of the sets is switched off, ensure that the selector switch has been adjusted to the only available working set, otherwise nuisance tripping could occur**

In the event of a fault occurring on the duty pumpset, the changeover panel will change over to the standby pumpset, to ensure that a faultless unit is always in operation.

But in the event of both pumpsets having faults, the changeover panel will keep switching between the two, which will allow the 'Audible alarm' to sound repeatedly. This would be the case until at least one of the faults is diagnosed and rectified. When one of the pumpsets is in a faultless condition, the changeover panel will automatically allow that unit to run.

## 1.1 ELECTRICAL

All wiring must comply with the latest edition of local wiring regulations e.g. **IEE Wiring Regulations**.

**Wear anti-static wrist strap at all times** to avoid static discharge causing problems with the built in electronic program.

Protection for the mains supply line to the unit - Recommended circuit breaker 16Amp Type B or 10 Amp Type C.

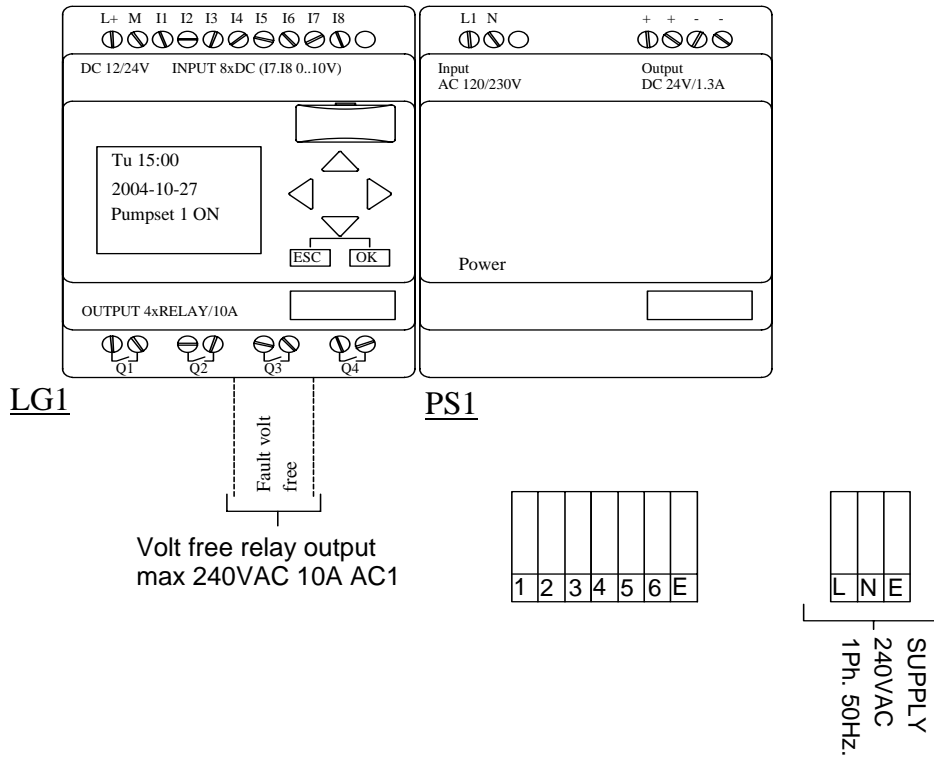
Connect incoming electrical mains supply to identified terminals in the changeover panel (see wiring diagram supplied).

Ensure voltages and frequency indicated are correct and wiring diagrams correspond with supply mains data and that the supply fuse ratings are correct for the total current rating of the equipment provided.

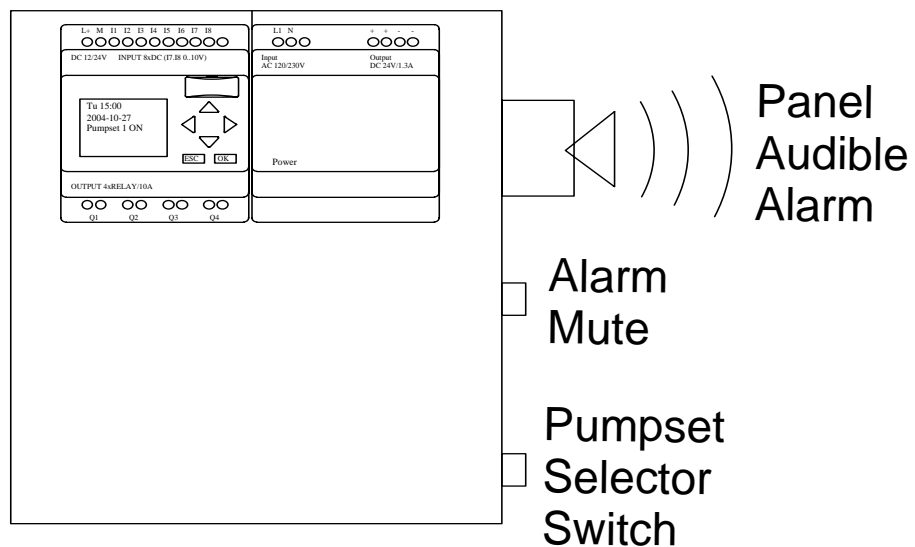
Complete any required earth bonding.

## Example of wiring connections inside Control Panel and external layout

### Internal wiring connections



### External layout



For full details on wiring connections, refer to the circuit diagram supplied with the changeover panel (eg A11101)

## 2.0 OPERATING INSTRUCTIONS

### 2.1 NORMAL OPERATION

This unit is controlled by a SMART RELAY controller, which displays the pumpset that is currently in operation, along with the time and date.

When switched on, the display shows an alarm free condition like this >

```
Su 14:30
2004-10-27
Pumpset 1 ON
```

Or, if an alarm condition is present upon switching on the unit, the display will read whichever alarm is present, similar to this > (the system alarm displays are explained later in this manual)

```
Su 14:31
2004-10-27
Pumpset 1
*TRIP ALARM*
```

#### To access the stop/set parameters/clock menu

To access the stop/set parameters/clock menu etc, press the <ESC> key and <up arrow> key at the same time

```
Press V to
Clock then
ESC for Stop/
Params Menu
```

Or,

press the <down arrow> repeatedly ,(this scrolls through any fault messages) until the clock is displayed.

Note: to get to the clock, it may require pressing <left> or <right> arrows if Inputs, Outputs, Markers or Cursor screens are displayed, as shown below

```
I:
0.. 123456789
1.. 0123456789
2.. 01234
```

```
Q:
0.. 123456789
1.. 0123456
```

```
M:
0.. 123456789
1.. 0123456789
2.. 01234
```

```
ESC+C ^
< >
v
```

When the clock is displayed press <ESC> key. The stop/set parameters/clock Menu is now displayed. **Note:** if the clock is not set then it will flash. The time/date is retained for approximately 80 hours during power down

```
Su 14:32
2004-10-27
```

The display shown here is the stop/set parameters/clock menu >

```
>Stop
Set Param
Set Clock
Prg Name
```

### To identify the Program Name

To identify program name, access the stop/set parameters/clock menu (as explained on page 4), then press the <down arrow> until the cursor points to ">Prg Name"

```
Stop
Set Param
Set Clock
>Prg Name
```

then press the <OK> key to display program name. Press <ESC> repeatedly until the clock is again displayed, followed by the <up arrow> to return to the main system screen.

```
A11099 iss:2
```

### To Stop/Start the Program Running

To stop/start the program running, access the stop/set parameters/clock menu (as explained on page 4) then press the <down arrow> until the cursor points to ">Stop"

```
>Stop
Set Param
Set Clock
Prg Name
```

to start program press the <down arrow> repeatedly until the cursor points to ">Start". Then press <OK>

```
Program
Card
Clock
>Start
```

### To set or view the change over time

To view the change over period from the main system screen, press the <down Arrow> once, then to return to the main system screen, press the <up arrow>

```
Pumpset
Changeover @
MTWTFSS=Day
02:00 =Time
```

to set the change over period, access the stop/set parameters/clock menu, then press the <down arrow> until the cursor points to ">set Param"

```
Stop
>Set Param
Set Clock
Prg Name
```

then press the <OK> key to display the timer parameter screen. Press <OK> to set the change over time and day etc

```
24H7day 1
D =MTWTFSS
On = 02:00
Off = 02:01
```

e.g. to SET the CHANGE OVER time parameter, press the <OK> key to display parameter values. Press <left/right arrow> to select the digit to alter, followed by the <up/down arrow> to alter value. Press <OK> to set the parameter.

**Note:**The **Off** parameter must be set to a **higher time** than the **On** Parameter. It is the **On** parameter which switches the booster sets over.

```
24H7day 1
D =MTWTFSS
On = 02:00
Off = 02:01
```

The clock timer has up to **3** programmable timers, so that the auto change over of the two booster pumpsets can be varied, as shown > (ie, at different times on different days)

```
24H7day 2
D = -TWT---
On = 13:00
Off = 13:01
```

```

24H7day 3
D = ----FSS
On = 17:00
Off = 17:01

```

but for normal operation, it is best to have only **1** change over period, at a time of low demand for water (eg, 2:00am every morning)

Once the parameters have been adjusted to suit the site conditions, press <ESC> until the clock is displayed, followed by the <up arrow> to return to the main system screen, similar to the screen shown > then select 'Auto' on the side of the unit for automatic changeover control.

```

Su 14:30
2004-10-27
Pumpset 1 ON

```

**Important Note: Only the timer parameters should be adjusted. Ignore all other Parameters (shown below), as they are preset to allow the program to operate normally. However, these parameters can be adjusted to suit site conditions if necessary.**

**P1/P2 Trip delay** – Allows a pumpset to power up and energise the health relay, because on power up, the fault relay is energised until the unit has run through its software check, which takes around 5 seconds to complete.

```

P1TripDI
T =10:00s
Ta =00:00

```

Without this Trip delay, or the delay being less than 10 seconds, neither of the pumpsets would operate, due to a trip signal permanently being registered on the changeover panel.

```

P2TripDI
T =10:00s
Ta =00:00

```

\* **P1/P2 Off delay** – Allows the duty set to stay switched on for a longer period of time during power down, while the standby set is powered up, to ensure that one pumpset is always in operation.

```

P1off Dly
T =90:00s
Ta =00:00

```

Without this Off delay, or the off delay being less than 10 seconds, it would be possible for the water supply to be interrupted (ie, both pumpsets being turned off) for a short period of time.

```

P2off Dly
T =90:00s
Ta =00:00

```

\* **Important note: P1/P2 Off delay timers MUST be left set to 90 seconds to allow the changeover of the pump sets during a fault condition to work correctly.**

This is the Power Off delay timer, which on power up allows both pumpsets to power up for the delay period (set to 15 minutes), and get the system up to pressure. Once the delay has expired, one of the pumpsets will power down and run on the duty pumpset, until a fault or changeover period occurs. This parameter is adjustable, but it is **strongly recommended to leave it set at 15 minutes.**

```

PowrDelay
T =15:00m
Ta =00:00

```

## 2.2 SYSTEM ALARMS

Display giving type of fault and volt-free output signal (where fitted). Automatic reset of alarms is provided. Note: fault messages are scrolled through automatically. If more than 1 fault message is activated then all messages will be scrolled through.

For example, if **Pumpset 1** is running, and then trips, the 'Smart relay' will cycle through **2** displays. The first is shown here >

Su 14:37  
2004-10-27  
**Pumpset 1**  
**\*TRIP ALARM\***

Then, the display will show which pumpset is operating normally >

Su 14:37  
2004-10-27  
**Pumpset 2 ON**

The 'Audible alarm' and 'Fault volt free' would both now be active. When the Audible alarm is then 'Muted', by pressing the momentary 'Mute' push button on the side of the unit, the display will show this > and then would continue to cycle through the above screens.

Su 14:37  
2004-10-27  
**PLEASE NOTE:**  
**Alarm muted!**

The audible alarm is now muted, but the 'Fault volt free' will not be reset until the fault present has been diagnosed and cured. Both of the pumpsets 'Main isolators' must be **Switched on** at all times.

***** Alarm *****	Cause
Pumpset 1 *TRIP ALARM *	The 'System Healthy' relay on <b>Pumpset 1</b> has energised, due to a fault on 1 or more of the volt free relays (eg, Low Pressure or Pump Trip) Or <b>Pumpset 1</b> is switched off at main isolator. Diagnose fault to cure.
Pumpset 2 *TRIP ALARM *	The 'System Healthy' relay on <b>Pumpset 2</b> has energised, due to a fault on 1 or more of the volt free relays (eg, Low Pressure or Pump Trip) Or <b>Pumpset 2</b> is switched off at main isolator. Diagnose fault to cure.
PLEASE NOTE: Alarm muted!	This is not an alarm message. This is purely to show that the 'Audible alarm' has been muted.

**If a problem persists, contact AQUATECH-PRESSMAIN service department on Telephone: 01206 215121 or Facsimile: 01206 215131**

quoting the serial number WN:\_\_\_\_\_ (on control panel fascia)

## 3.0 SERVICING

### 3.1 MAINTENANCE AND CARE OF YOUR EQUIPMENT

The AquaTech-Pressmain equipment that is described in this instruction booklet has been manufactured and tested to the highest standards of design and quality. It will give trouble free operation over many years provided it is maintained regularly from when it is commissioned. To keep it operating efficiently in a safe, economical and environmentally friendly condition, regular maintenance is an essential part.

AquaTech-Pressmain Limited along with its' sister company, and fellow AGM Group member, Acorn Pressurisation Services Ltd are the official providers of commissioning and maintenance services. (see below).

Several companies operating under the Aquatronic Group Management structure are available to fulfil a wide range of servicing and maintenance requirements, as detailed below.

### 3.2 LEGAL REQUIREMENTS

Hydraulic Accumulators/Expansion Vessels installed as part of/in conjunction with this equipment, with Pressure x Volume above 250 Bar-litres, require formal inspection in accordance with a "Written Scheme of Examination". This is a Legal Requirement on the part of the Owner/User under the "Pressure Systems Safety Regulations" (PSSR). A "Written Scheme" and regular inspection can be provided by either Acorn Pressurisation Services (combined maintenance and inspection) or ESIS Ltd (inspection only), see details below.

#### Plant Servicing & Inspection



**ACORN PRESSURISATION SERVICES LIMITED,**  
**AGM House, Essex, CO6 1GT. Ph: 01206 215151**  
**130 Princess Rd, Manchester, M16 7BY. 0161 226 4727**

Acorn provides maintenance and installation of all types of packaged water pumping equipment for building services. Its specialist fields are Pressure booster equipment and sealed systems for heating and chilled water distribution systems.

Regular servicing of any plant for essential services is vital because wear and tear are very gradual processes. With preventative maintenance, the costs are small and benefits in reliability, safety and economy can be significant. Acorn Pressurisation Services Ltd can provide a complete package of schemes for preventative maintenance on all AquaTech-Pressmain and other makes of equipment.

#### Pressure Vessel Inspection



**ESIS ENGINEERING SAFETY & INSPECTION SERVICES LTD,**  
**AGM House, London Rd, Copford, Colchester, Essex, CO6 1GT.**  
**Phone: 01206 215141 Fax: 01206 215142**

Under the Pressure Systems Safety Regulations, expansion vessels and hydraulic accumulators, generally 250 bar-litres and greater, and protection devices, require a Written Scheme of Examination before they can be operated. ESIS Inspection and Insurance Services Limited specifications can provide the means to comply with these regulations. These services can be extended to cover other units e.g. air pressure receivers etc.

### 3.3 SERVICE CONTACTS

**For service during warranty period contact: AQUATECH-PRESSMAIN Service Department**  
**Head Office Tel: 01206 215121 Manchester Office Tel: 0161 226 4727**

**For regular servicing, contact their service agents: ACORN PRESSURISATION SERVICES LTD**  
**Head Office Tel: 01206 215151 Manchester Office Tel: 0161 226 4727**

who will be pleased to give you expert advice on this or any other servicing matter.

## 4.0 DISPOSAL

Disposal of this product or parts of it must be carried out in accordance with the following guidelines:

Use the local public or private recycling/waste collection service.

In case such a recycling/waste collection service does not exist or cannot handle the materials used in this product, please deliver the product or any hazardous material from it to your nearest AquaTech-Pressmain office.

### **EC Declaration of Conformity**

We, AquaTech-Pressmain Limited, declare this Equipment Assembly:

**CONTROL PANEL  
MODEL: LG2-CP**

Complies with the following standards:

**BS EN 60204-1:2006  
EN61000-6-3:2001, EN61000-6-1:2001**

and meets the requirements of EEC Directives:

**Low Voltage Directive 73/23/EEC and 93/68/EEC  
Electro Magnetic Compatability Directive 89/336/EEC with amendments  
92/31/EEC.**



7.4.2010

I.D.Taylor, I.Eng. MIET, Director, AquaTech-Pressmain Limited.

**AquaTech-Pressmain Limited**  
AGM House, London Rd, Copford, Colchester, Essex CO6 1GT UK  
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## OPERATING PARAMETERS

**SERIAL No.** ..... **MODEL**.....  
 THE SERIAL & MODEL NUMBERS MUST BE QUOTED WHEN REQUESTING ASSISTANCE

### ELECTRICAL DATA:

Supply ..... volts ..... Ph ..... Hz  
 Full load current of pumpset ..... Amps

### SETTINGS:

#### AS FACTORY SET

Time clock settings:

24 H 7 day 1	24 H 7 day 2	24 H 7 day 3
D = MTWTFSS	D = -----	D = -----
ON = 02:00	-----	-----
OFF = 02.01	-----	-----

P1 Trip delay (P1TripDL) 10 seconds

P2 Trip delay (P2TripDL) 10 seconds

P1 Off delay (P1OffDL) 90 seconds **Do not adjust**

P2 Off delay (P2OffDL) 90 seconds **Do not adjust**

❖ AMENDED AT COMMISSIONING	

❖ On commissioning it may be found necessary to modify these settings. Providing this information is left with the equipment, the figures will be updated by the commissioning engineer.

Updated by commissioning engineer ..... Date .....