



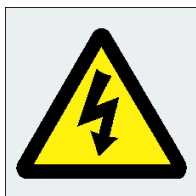
PUK EV RANGE. TWIN & SINGLE PUMP CONTROLLER

INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS

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IMPORTANT NOTES



**Caution – Risk of
Electrical Shock**



**Caution – Risk of
Danger**

- **Please read these instructions fully before starting the installation:**
- **The installation must comply with the relevant water supply, electrical and building regulations and be installed by a competent person.**
- **If in doubt, consult Pumps UK Ltd.**

APPLICATION

The Twin & Single Pump Controller is specifically designed to work with a Honeywell Pressure Sensor, by monitoring pressure within a sealed system and controlling the pump(s) to come on and off, in order to maintain a desired cold fill pressure.



Caution – Risk of Danger

WARNING AGAINST MISUSE

This pump controller must not be used for any other application without the written consent of Pumps UK Limited and, in particular, must not be connected directly to the mains water supply or used outside the conditions specified in the limits of application.

PRODUCT DESCRIPTION

The electronics have been developed to work with a Honeywell Pressure Sensor which measures the pressure within a sealed system. The pressure is relayed back to the system which then maintains a desired pressure within the system according to the capability of the pump used. The unit has volt free relays for giving alarms if system goes below a set pressure; above a set pressure; general alarm indicating one of following: perceived pump failure; introduction of pre-determined volume of water; low level of water in supply tank.

The system keeps count of how many times the pump(s) is activated, how long in total the pump(s) has been pumping, the volume of water introduced into the system since start, and the volume of water introduced into the system since last reset.

You can set pump minimum and maximum run times, and a duty cycle can be set up so that the pump(s) is run from time to time to prevent seizure. There is also a minimum cycle time that can be set to prevent hunting should this be an issue.

There is also a Fill function which can be used to fill a system, which disables all the counters, whilst operating the pump(s) for 6 hours or until pre-determined pressure is achieved.

The unit comes in an IP65 rated enclosure, with LCD display. Wiring is provided for via cable glands.

LIMITS OF APPLICATION

Power Supply	230V Single Phase 50Hz, 690W
Minimum Cut in Pressure	0.5 Bar
Maximum Cut out Pressure	6.0 Bar
Minimum Ambient Temperature	4°C
Maximum Ambient Temperature	65°C

SITING OF UNIT

Whilst the electronics are housed within an IP65 rated enclosure, the unit does provide voltage to the sensor. The sensor must therefore be suitably sited with adequate warnings that power must be removed before access is made to either the housing or the sensor itself.

ELECTRICAL INSTALLATION



Caution – Risk of Electrical Shock

- **The electrical installation must be carried out in accordance with the current local electrical regulations and installed by a competent person.**
- **In the interests of electrical safety a 30mA. residual current device (R.C.D.) should be installed in the supply circuit. This may be part of a consumer unit or a separate unit.**
- **A separate switch must be installed within 1 metre of the unit, allowing the power to be switched off to the unit.**
- **Note that the unit must be treated as carrying mains voltage to both the low level switch and the pressure sensor. Therefore appropriately rated level switch and sensor and cabling/switching must be used which also complies with local regulations**

The unit runs off 230V single phase 50Hz mains supply and rated at 690W. The unit must be connected via a 13Amp fused socket which shall be no more than 1 metre away from the controller. When live, the unit provides voltage to the sensor and therefore the connection with the sensor must be suitably protected with a warning advising that the mains supply must be switched off to the controller before obtaining access to either the unit itself or to the sensor. Voltage is also supplied to the low level sensor (if fitted) and therefore wiring to and from the sensor must also be adequately protected, and again a suitable warning placed by this sensor.

Warning: When live the connector to the pressure sensor is supplied with voltage and provision must be made to prevent access to these connections without the mains having been disconnected first. Voltage is also supplied to the water level sensor, if fitted, and this must also be suitably protected.

CONNECTION

The unit must only be wired up by a qualified or competent person. Power should never be established until the unit has been correctly wired up and the box closed and access to the sensor connection restricted. Refer to picture on the following page and wire up accordingly, taking into account items mentioned above in **Electrical Information**. Units supplied as part of a package (e.g. on pressurisation unit) will already be completely pre-wired, and will contain the necessary electrical warnings to ensure power is disconnected

prior to obtaining access to either the sensor connection, the low level sensor (if fitted) or the internals of the controller.



Connectors 1 and 2 are for the water level sensor and can be wired either way. The electronics use a 24V DC current for this purpose. **If this option is not required then a loop of wire across these terminals is required. Please note however that the wires going to and from the level sensor must be protected in accordance to local regulations.**

Connectors 3 to 5 are Low Pressure Alarm volt free relay – 3 Normally Closed, 4 Normally Open and 5 Common. **Suitable for up to 230V 0.5amp connection.**

Connectors 6 to 8 are High Pressure Alarm volt free relay – 6 Normally Closed, 7 Normally Open and 8 Common. **Suitable for up to 230V 0.5amp connection.**

Connectors 9 to 11 are General Alarm volt free relay – 9 Normally Closed, 10 Normally Open and 11 Common. **Suitable for up to 230V 0.5amp connection.**

Connectors 12 and 13 are for mains supply to Pump Two (if fitted) – 12 Pump Two Neutral connection and 13 Pump Two Live connection. **Pump to be suitable for supply of 230V single phase 50Hz.**

Connectors 14 and 15 are for mains supply to Pump One – 14 Pump One Live connection and 15 Pump One Neutral connection. **Pump to be suitable for supply of 230V single phase 50Hz.**

Connectors 16 and 17 are for mains power coming in to power electronics – 16 Neutral connection and 17 Live connection. **Supply to be 230V single phase 50Hz.**

The unit comes with sensor cable fitted already and has been calibrated, and therefore must not be adjusted in any way.



Caution – Risk of Electrical Shock

Warning: The presence of bared flexible cord is hazardous, and the unit MUST not be operated under such circumstances. Please replace such cables before putting the unit into operation.

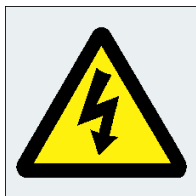
OPERATION OF UNIT

Once wired, cover closed, and cable fitted to pressure sensor, the unit is ready for operation. When the mains supply is switched on the unit becomes operational with factory settings applying.

After a few seconds the unit will become operational and will start the pump(s) until pre-set pressure has been achieved or until an alarm is displayed (other than Low Pressure Alarm). Please note, however, there is a fill function in the Maintenance menu designed to bring the system up to pre-set pressure which will ignore counters such as volume of water introduced, pump cycle count, hours run meter etc. See Maintenance menu (Page 9) for more information.

Once system is in normal operation mode the word ‘Auto’ appears, to indicate that the unit is in working mode. The display will always revert to this unless it is in alarm condition.

MAINTENANCE



Caution – Risk of Electrical Shock

The unit MUST be checked for any wiring that may have deteriorated or where cable may have become bared. This should be done on an annual basis. Any defective cabling MUST be replaced before the unit is put back into operation.

No other maintenance other than this is required.

TROUBLE-SHOOTING

In the event of the unit not coming on when mains is applied, then please return the unit for full investigation.

Once powered up, the unit will become operational. Again if the unit is not operating as you believe it should, then please contact us for further assistance.

Help Number 08707 505 247.

STANDARD MENU

By pressing the up and the down keys you can scroll up and down the standard menu in the order detailed below. All items in normal menu are view only, except for P2 [cut-out pressure] which can be altered by user between 0.7 Bar and 6.0 Bar in 0.1 Bar steps. By altering the P2 pressure, P1 (cut-in pressure) and A1 (low pressure alarm setting) will move by same amount as P2 is moved either up or down, unless they hit their minimum. A2 (high pressure alarm setting) will move upwards once P2 is 0.2 Bar below A2, but will not move downwards if P2 is brought down.

Structure of menu is as follows and can be scrolled through by using the up and down keys:-

- P0: This is current pressure reading of system in Bar and is displayed as **X.X**.
- P2: This is the pump cut-out pressure in Bar and is displayed as **X.X**.
- L0: This is volume of water introduced into system in Litres since the unit was last reset and is displayed as **XXXX** after a short pause.
- L1: This is Alarm setting of volume of water introduced since L2 was last reset in 10's of Litres [i.e. 23 would mean 230 Litres] and is displayed as **XX**.
- L2: This is volume of water introduced into system in Litres since L2 was last reset and is displayed as **XXX.X** after a short pause.
- C1: This is the total number of pump cycles since C1 was last reset and is displayed as **XXXX** after a short pause.
- H1: This is Pump 1 hours run since H1 was last reset and is displayed as **XX:XX** [HH:MM] after a short pause.
- H2: This is Pump 2 hours run since H2 was last reset and is displayed as **XX:XX** [HH:MM] after a short pause.

MAINTENANCE MENU

This is obtained by switching off power to the unit, making sure screen has gone blank and then pressing down left hand button whilst reconnecting power to the unit.

Under Maintenance Menu you obtain access to normal menu, plus added functions, with the facility to make adjustments where appropriate. Structure of menu is as follows and can be scrolled through by using the up and down keys:-

- P0: This is current pressure reading of system in Bar and is displayed as **X.X**.
This item is non adjustable – view only.
- P2: This is the pump cut-out pressure in Bar and is displayed as **X.X**.
This is settable from 0.7 to 6.0.
When moving P2, P1 and A1 will move in line and will always keep same differential (e.g. if P2 starts at 1.8, P1 at 1.4 and A1 at 1.2, and then P2 was moved to say 2.5, then P1 would become 2.1 and A1 1.9), except when P1 and A1 reach their minimum.
When moving P2 upwards, A2 will also move upwards, but only once 0.2 Bar above the current setting (e.g. if P2 was moved to 4.1 then A2 will automatically become 4.3 if not already higher). A2 will not move downwards when P2 is moved down.
- L0: This is volume of water introduced into system in Litres since the unit was last reset and is displayed as **XXXX**.
This item is non adjustable – view only.
- L1: This is Alarm setting of volume of water introduced since L2 was last reset in 10's of Litres [i.e. 23 would mean 230 Litres] and is displayed as **XX**.
This is settable from 1 (10) to 99 (990).
This is used to set off General Alarm to warn that the unit has introduced a certain amount of water. For instance if set to 23, the alarm will go off once the system has introduced 230 Litres of water since L2 was last reset and the unit will be frozen and will not resume its normal function until L2 is reset or L1 is moved higher than L2 reading [divided by 10].
- L2: This is volume of water introduced into system in Litres since L2 was last reset and is displayed as **XXX.X** after a short pause.
By pressing the enter button this will be reset to 000.0.
- C1: This is the total number of pump cycles since C1 was last reset and is displayed as **XXXX** after a short pause.
By pressing the enter button this will be reset to 0000.
- H1: This is Pump 1 hours run since H1 was last reset and is displayed as **XX:XX** [HH:MM] after a short pause.
By pressing the enter button this will be reset to 00:00.

- H2: This is Pump 2 hours run since H2 was last reset and is displayed as **XX:XX** [HH:MM] after a short pause.
By pressing the enter button this will be reset to 00:00.
- P1: This is Pump cut-in pressure in Bar and is displayed as **X.X**.
This is settable from 0.5 to 5.8.
P1 automatically moves up and down when P2 is moved and will always keep same differential it had before P2 was moved, except when P1 reaches minimum.
However P1 can be adjusted here. It will only go upwards until 0.2 Bar below P2 setting. When moving the setting down, A1 will automatically move downwards once 0.2 Bar below P1.
- A1: This is Low Pressure Alarm setting in Bar and is displayed as **X.X**.
This is used to set off Low Pressure Alarm Relay to warn that system is below desired minimum pressure.
This is settable from 0.0 to 5.6.
A1 automatically moves up and down when P2 is moved and will always keep same differential it had before P2 was moved, except when A1 reaches minimum. A1 will also move down when 0.2 Bar below P1, when P1 is moved downwards and will keep 0.2 Bar difference once this has been reached.
However A1 can be adjusted here but can never move higher than 0.2 Bar below P1 setting.
- A2: This is High Pressure Alarm setting in Bar and is displayed as **X.X**.
This is used to set off High Pressure Alarm Relay to warn that system is above desired maximum pressure.
This is settable from 0.9 to 6.2.
A2 will move up when 0.2 Bar above P2, when P2 is moved upwards and will keep 0.2 Bar difference once this has been reached. However A2 can be adjusted here but can never move lower than 0.2 Bar above P2 setting.
- t1: This is Pump Minimum run time in seconds and is displayed as **X.X**.
This is settable from 1.0 to 9.9.
This function can be used to stop hunting when P1 and P2 are very close together.
- t2: This is Pump Maximum run time in minutes and is displayed as **XX**.
This is settable from 01 to 99.
- t3: This is Pump minimum cycle time in minutes and is displayed as **XX**.
This is settable from 00 to 99.
By entering a setting in here it will prevent the pumps cycling until desired time has elapsed.

- t4: This is Pump Duty cycle time in days and is displayed as **XX**.
This is settable from 00 to 99.
This function will run the pump for 1 second every XX days. This function is used to run the pumps periodically.
- FI: This is Pump Selection function and is displayed as **XX**.
There are three settings:-
1 Will only call on Pump 1 to operate [cuts out Pump 2].
2 Will only call on Pump 2 to operate [cuts out Pump 1].
Au Will automatically cycle from Pump to Pump taking into consideration the t3 setting. In the event of a Pump failure, unit will keep on working with one working pump when in Au mode.
- SC: This is Passcode function and is displayed as **X**.
This is settable to y or n.
When set to y, any changes wishing to be made to any setting will need the pass number entered in.
- F2: This is pump failure setting in seconds and is displayed as **XX**.
This is settable from 10 to 30.
This is used by electronics to determine whether a pump has 'failed'. The electronics will monitor the pressure when the pumps are on and if the pressure is not seen to rise by 0.05 Bar during this F2 setting then it will declare the pump as having failed. This doesn't actually mean the pump is not working as there may be other reasons for the pump not increasing the pressure, but indicates that the unit/system should be checked.
- FILL This is a Fill function and is activated by pressing the enter key.
This function is used for final top up to bring up system to required pressure whilst disabling all counters (i.e. L0, L2, C1, H1, H2 will not be altered). The system will bring up the system to P2 pressure if reached within 6 hours and the unit will then stop and FILL will flash on the screen. To return the unit back to normal operation the enter key needs to be pressed again.

Once any required modifications have been made under Maintenance menu, it is advisable to revert back to the normal menu by switching off the power to the unit, making sure screen has gone blank and switching power back on. No information is lost by doing this and all last entered settings will remain. This will then restrict amendments again to P2 setting (see Standard Menu).

RESET MENU

The unit can be completely reset to factory default settings, clearing all changes made by switching off the power to the unit, making sure screen has gone blank, then pressing both the left hand and middle buttons whilst re-establishing power. **PLEASE NOTE THAT BY DOING THIS ALL SETTINGS AND COUNTERS WILL BE LOST AND THE UNIT WILL REVERT BACK TO FACTORY DEFAULT SETTINGS.**

When carrying out a full reset, the normal and maintenance menus appear along with two further settings as follows:-

- r1:xx This is pressure reading raw data in hexadecimal steps and is not adjustable. It is used for setting the pressure offset and span potentiometers. This will have already been set at factory and there should be no requirement to use this reading.

- r2:xx This is pump current draw data in hexadecimal steps and is not adjustable. This is used by the electronics to establish a pump failure and there should be no requirement to use this reading.

Once the unit has been reset for normal operation, it is advisable to revert back to the standard menu by switching off the power to the unit, making sure screen has gone blank and switching it back on. No information is lost by doing this and all last entered settings will remain. This will then restrict amendments again to P2 setting (see Standard Menu).

ALARMS

There are a number of alarms and the unit will always default to alarm display when one is in activation. The unit will flash when in alarm mode to indicate that there is a problem. If more than one alarm is tripped then the system will display the first alarm to set off [if fault is still applicable]. When the condition has been rectified the unit will then display any other alarms that still affect the system. The alarms are as follows:-

- E:A1 This indicates that A1 (Low Pressure Alarm) has been breached. The unit will continue to operate under this alarm function, but invariably the alarm will be caused by some other problem (e.g. too long a t3 setting).

- E:A2 This indicates that A2 (High Pressure Alarm) has been breached. The pump control will be discontinued until the alarm fault has been rectified.

- E:L1 This indicates that L1 (Leakage Volume Limit) has been breached. The pump control will be discontinued until the alarm fault has been rectified. This can be done by resetting L2 (Leakage Volume) to 0, or by increasing L1 above L2.

- E:L3 This indicates that the water level in the water tank is too low. The pump control will be discontinued until the alarm fault has been rectified. Investigate reasons why water content of tank is low.

- E:P1 This indicates that Pump 1 has drawn over the allowed current and is possibly at fault. You can press enter when this displays, and the pump will come back into service if it is working. It is worth running pump 1 to ascertain if it is faulty or not.

- E:P2 This indicates that Pump 2 has drawn over the allowed current and is possibly at fault. Same remedy as for Pump 1 P1 alarm.

- E:F1 This indicates that Pump 1 has not increased the pressure in the system within the allowed time setting (F2). You can press enter when this displays, and the pump will come back into service if it is working. It is worth running pump 1 to ascertain if it is faulty or not. If this problem persists and the pump is still working, then F2 setting should be increased.

- E:F2 This indicates that Pump 2 has not increased the pressure in the system within the allowed time. Same remedy as for Pump 1 F1 alarm.

There are volt free relays on the unit to give audible, visual or BMS signals that the unit has gone into alarm mode. The Low and High Pressure Alarms have their own circuits, with all other conditions setting off General Alarm relay.

FACTORY DEFAULT SETTINGS

The unit is supplied with the following default settings, which will also be reverted to if the unit is completely reset:-

P2	1.8
L0	0000
L1	10
L2	000.0
C1	0000
H1	00:00
H2	00:00
P1	1.4
A1	1.2
A2	3.6
t1	1.0
t2	99
t3	00
t4	30
F1	Au
SC	n
F2	15

TECHNICAL SUMMARY

Voltage Supply: 230V single phase 50Hz Mains Current rated at 690W

Maximum Working Voltage: 250V

Fuse Rating: 13Amps

Temperature Range: 4°C to 65°C

Housing Classification: IP65