

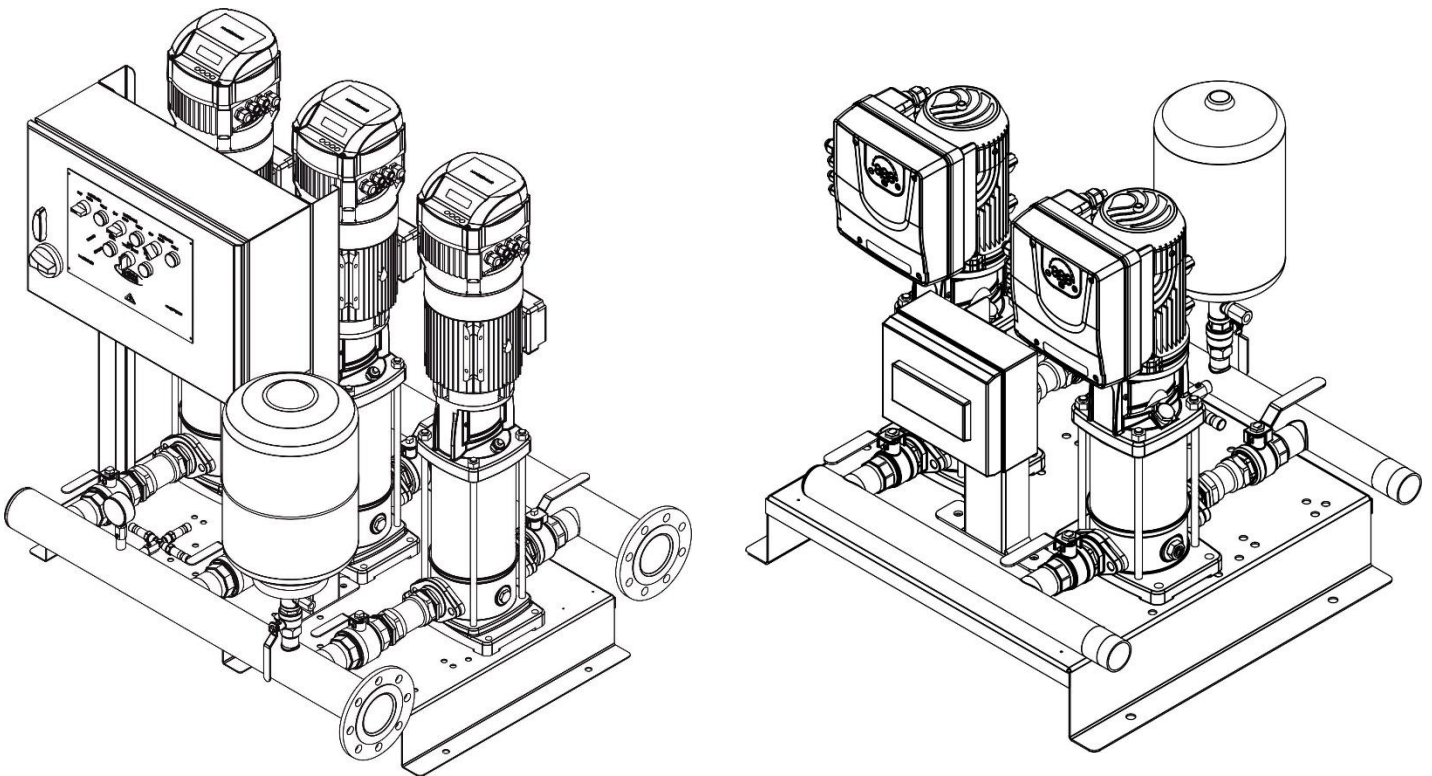


AV & EV PRESSURE BOOSTER SETS

Operating & Maintenance

Original Instructions

Dated: 10.09.2020 – Revision: 1



Ref: OM0001



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Operating & Maintenance

AV & EV Booster Sets

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1). Introduction:

The information contained within this manual is intended for the installer/user of this equipment to safely install & operate the products mentioned.

The products are to be installed by a competent person who is familiar with all the required and relevant regulations.

Failure to install/operate or maintain the equipment in accordance with these instructions could cause harm, injury to persons or damage to property.

Failure to install/operate/maintain the equipment according to the Operating & Maintenance instructions could invalidate the warranty as provided by KGN Pillinger.

No liability can be accepted for damage or operation disorders due to neglect, misuse, modification or use of equipment other than for its intended application.

This information should be read in conjunction with the manufacturers O&M.



QR Code:

The codes are scannable via a smart phone or tablets camera to retrieve specific product details in support of these instructions.

2). Warnings for the Safety of People & Equipment:



DANGER:

Failure to observe this caution may result in injury and/or damage to equipment.



ELECTRIC SHOCK:

Failure to observe this warning may result electric shock.

WARNING

WARNING:

Failure to observe this warning may cause damage/injury to property, environment or person(s).



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3). Overview:

KGN Pillinger's EV, AV pressure booster sets are designed to transfer and boost clean (potable) water in water systems for domestic, commercial and industrial applications.

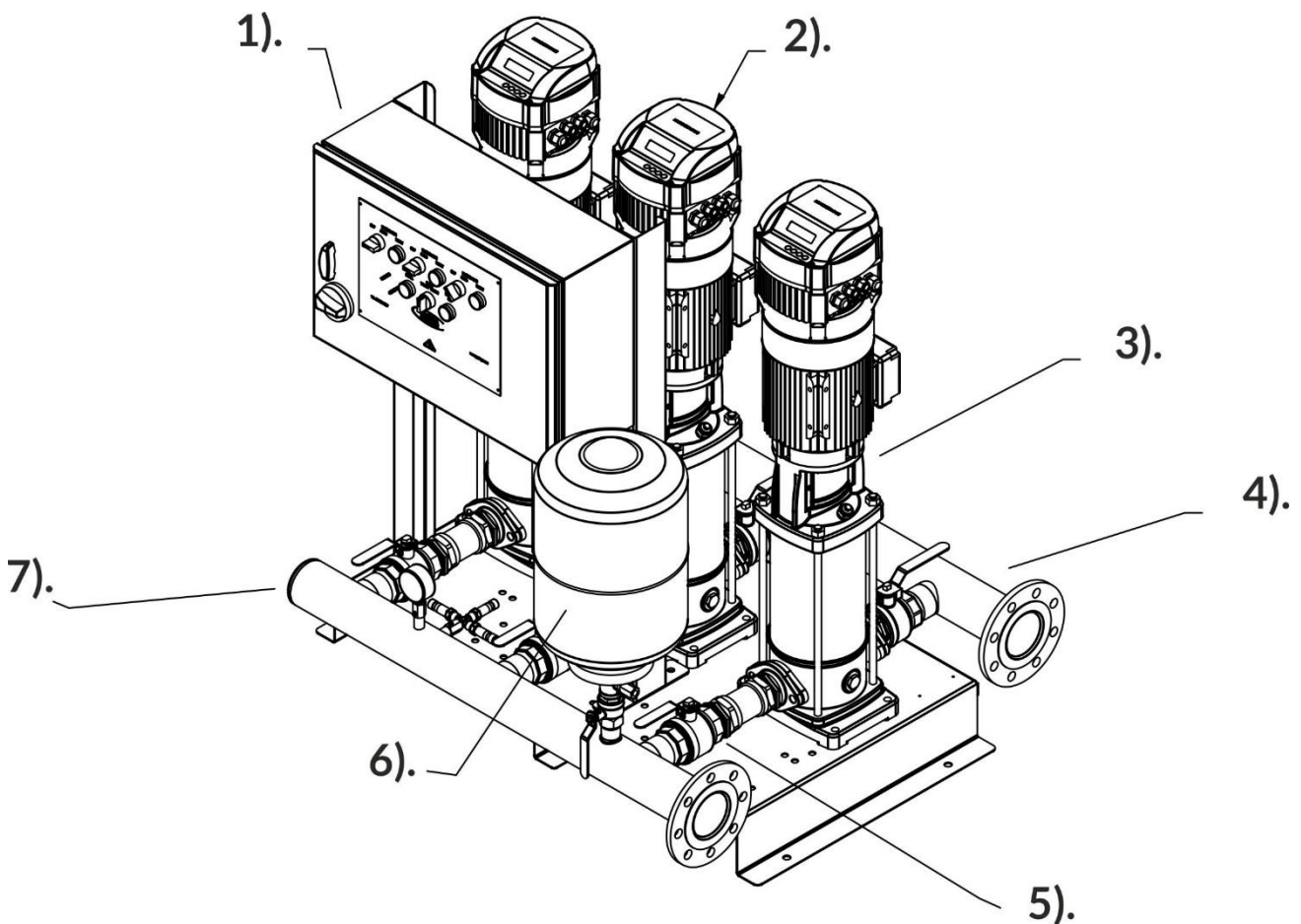
Basic Operation:

- The pumps are controlled via the variable speed drives (VSD) according to the system requirements.
- The pressure vessel(s) will supply the initial demand.
- Once the pressure has dropped to the set control value, the VSD will start the first pumps operation.
- If a greater water demand is placed upon the first pump, it will speed up until the subsequent pumps are required to reach the demand.
- If/when the demand reduces, the speed of the pumps reduces until they stop.
- If the demand is reduced further, the last pump will fill the pressure vessel and then shut down.

The pressure booster sets are built with identical pumps and controllers in parallel, mounted on a common stand with suction & discharge manifolds, On-off valves, check valves, pressure gauge, pressure transmitters and single or three phase control panel. The system must be installed with pressure vessels. These are preinstalled, sized membrane vessels.

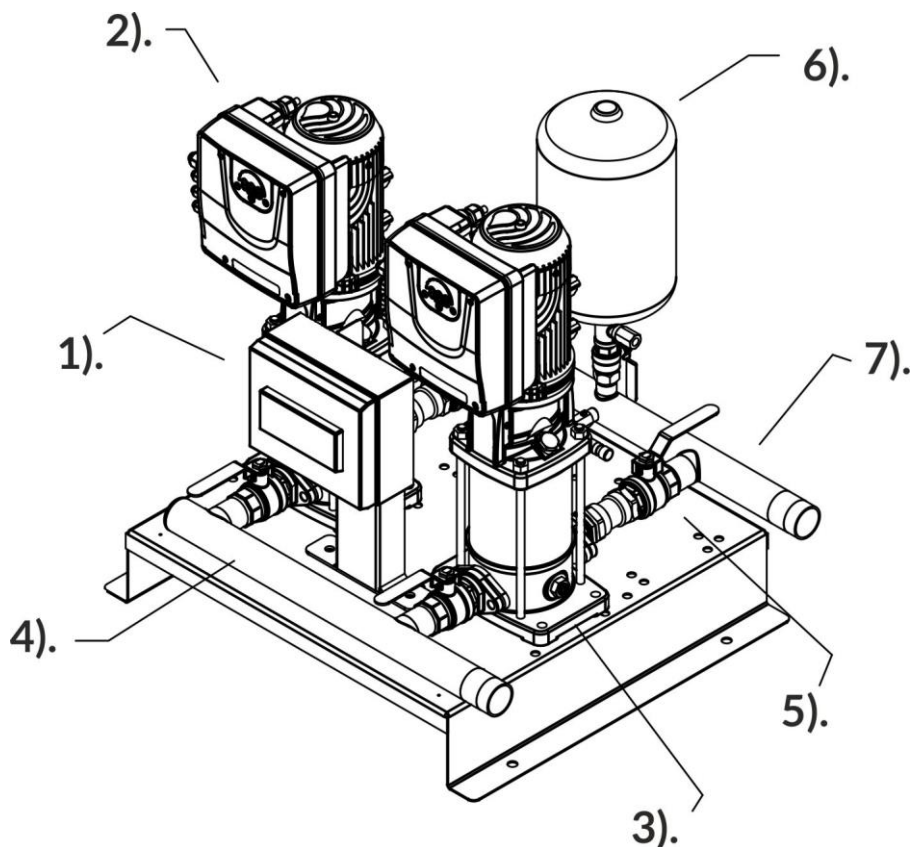
4). Main Component Listing - AV Booster Range.

<u>Ref</u>	<u>Component</u>
1	Control Panel
2	Variable Speed Drive (VSD)
3	Electric Pump
4	Suction Manifold
5	Isolator Valve
6	Pressure Vessel
7	Discharge Manifold



Main Component Listing – EV Booster Range.

<u>Ref</u>	<u>Component</u>
1	Control Panel
2	Integrated Variable Speed Drive (VSD)
3	Pump
4	Suction Manifold
5	Isolator Valve
6	Pressure Vessel
7	Discharge Manifold



5). Storage & Handling:



Assembled units are heavy. Failure to properly lift & support these sets can result in serious personal injury and/or equipment damage. The appropriate rated lifting devices and methods must be used for & during lifting operations.

- The booster set is covered in a protective film (this is to remain in place until ready for install).
- The product must be stored in a covered and dry location, free from dirt, heat and vibrations.
- The product must be stored at an ambient temperature between: 5°C to 40°C.
- Do not place heavy weights on packaged products as this may cause damage.
- If the equipment is to be stored for any length of time all liquids within the pumps should be drained and the vent and bleed plugs removed and safely stored.

6). Operating Limits:

FLUID TEMPERATURE	5°C to 80°C
AMBIENT TEMPERATURE	5°C to 40°C
OPERATING PRESSURE	8 Bar, 10bar, 16Bar (dependent on model)
PROTECTION CLASS (MOTOR, PANEL, VSD)	IP55
STARTS PER HOUR	See below table 1.1

Table 1.1

Kw	0.25 – 3	4 – 7.5	11 – 15	18.5 – 22	30 – 37	45	55
Starts per Hour	60	40	30	24	16	8	4

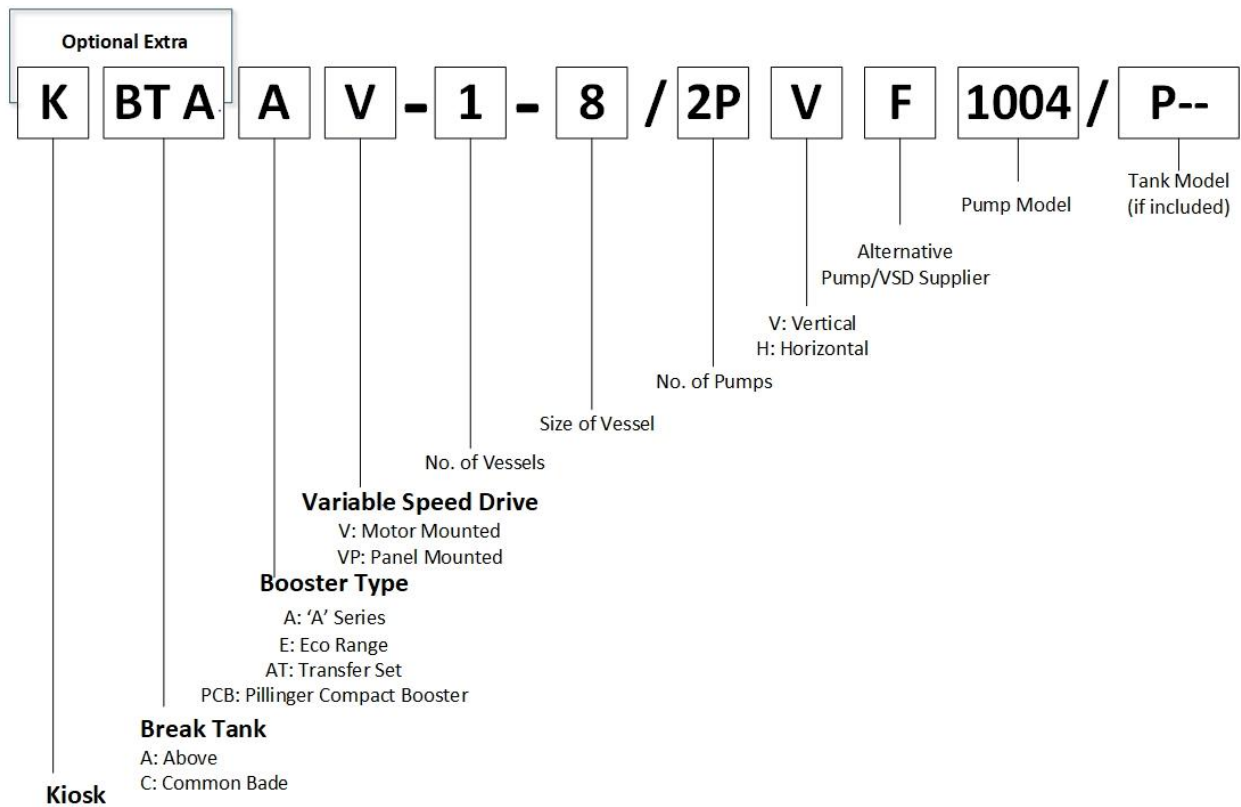
Noise emissions:



Exposure to excessive noise can cause permanent hearing damage. It is the end users' responsibility to identify the required legal requirements, ensuring the appropriate safety equipment (PPE) is applied and noise control is in place.

7). Product Identification Code(s).

All KGN Pillinger AV, EV water pressure boosting sets are identified by the below coding, each product will have this clearly affixed to the set:



8). Installation

- Use the appropriate lifting equipment to handle the booster set, **DO NOT** use the eyelets on the motors to for this purpose.
- Prior to installation the booster set should be thoroughly checked for any damage during transportation and reported immediately to KGN Pillinger and not installed.
- The pressure booster set requires install in a ventilated, dry frost-free position, allowing 0.5m clearance on all sides and front to enable general maintenance.
- The pressure set should be installed on a level structurally sound surface, with the anti-vibration mounts having free movement.

Protection against Dry Running

- KGN offer as an extra the option to protect against running the booster set dry and causing catastrophic damage to the set.
- Using a low voltage relay. Where applicable, this should be wired to a float switch or electrodes in the suction break tank.

Joining Pipe Work

- The connection pipework must be adequality sized and well supported to not cause stress on the booster set manifolds.
- All pipe work should match or be greater than the diameter of the manifold.
- Pipework should be flushed out before connecting the unit.
- Connect the suction and discharge manifolds to the suction supply tank and rising main.
- Verify that all pipe joints are sealed and water tight to prevent leaks.

WARNING

The weight of the booster set and associated pipework increases when they are filled with water.

Electrical Connections



All electrical connections must be made by a qualified electrical in accordance with all local regulations and standards.

- Connect incoming *electrical mains supply to the panel and low voltage connections to the low water cut off device.
- The incoming supply must be sized to carry the motor full load current of all pumps (as all can be in operation at any one time).
- All electrical connections are to be made against the relevant product wiring diagrams See page 12 of this manual for further product specific details.
- All electrical connections should be sized, installed and protected in accordance with the requirements of the latest safety standards and any other current local rules and regulations.
- Ensure the cable & fuse/MCB protection is suitably rated.
- **It's essential that this equipment is earth bonded to the building earth system.**

9). Commissioning

If the pumping equipment is not installed, operated and maintained correctly it can lead to failure, void warranty and cost time and money.

The commissioning of the set assures all systems and components of the equipment supplied are installed, tested, operated and maintained according to the operational requirements of the system.

The commissioning process comprises of a set of engineering philosophies and procedures that inspect and test every operational component of the equipment, from individual functions such as instrumentation and control logic, through to the full operation of the system.

The main objective of commissioning is to provide the safe and orderly handover of the unit to the customer, guaranteeing its operability in terms of performance, reliability and safety.



We recommend the unit is commissioned and subsequently serviced biannually by a fully trained KGN Pillinger engineer.

Pre-start up

Accumulator Pressure Vessel

The accumulator expansion pressure vessel is designed to act as a hydraulic buffer between the pumps and the system helping to reduce the number of starts per hour of the pumps.

During commissioning the pressure vessel/s will be pre-charged with either dry clean air or oxygen free nitrogen gas. This must be checked and adjusted if necessary, on a regular basis to maintain the correct operation of the system.

Pumps

Ensure the pump/s have been filled with liquid, primed and bled before operation and are running in the correct direction and rotation as indicated on the pump/s.

[See page 12](#) of this manual for further product specific details



10). Operation

- The unit is a pressure transducer controlled single or multi-pump booster set, with the potential to operate two or more pumps simultaneously, giving duty/assist or duty/assist/standby operation.
- As the pressure in the system changes, the internal software programming of the variable speed drive will adjust the speed of the pump to match the required duty of the system.
- If the demand on the system exceeds the capacity of the 'Duty' pump the 'Assist' will automatically become enabled via the RS 485 data link or the control logic within the panel.
- This procedure will be repeated to activate the assist/standby pump (if available) if the duty and assist pump fails to meet the demand of the system.
- The pump/s will run on under the control of the transducers which will continue to send a signal to the inverters to increase speed, decrease speed or to stop at zero demand.
- Overload, over current, under current, over voltage and under voltage protection of the set is accommodated within the variable speed drive.
- On multi-pump sets the 'Duty' pump is normally determined via the internal electronic programming of the drive. The drive will automatically rotate duty of pumps normally every 24 hours but can be pre-programmed to a different time period if required.
- All units have one or more pressure vessels built in to provide a positive pressure to the system to aid control of the pumps.
- All standard units are fitted with a low water cut-off circuit, using a low voltage relay. Where applicable, this should be wired to a float switch or electrodes in the suction break tank.

- On sets with twin suction break tanks, KGN Pillinger offer the option of an additional set of electrodes and a 'Twin Tank Selector Switch' fitted either through the control panel fascia, adjacent to the control panel, or local to the tanks, to enable the operator to select the 'Live' tank for low water protection whilst the other tank is isolated and emptied for cleaning or maintenance purposes.
- Dependent upon specification, volt free contacts for the remote indication of pumps running, pumps tripped and low water cut-off may be fitted for connection to clients BMS system.
- Pressure switches may be fitted for high- and low-pressure monitoring or control.

Variable Speed Drive Adjustment (VSD)

- If you need to modify the settings, refer to the designated manual as laid out on [page 11](#) of this manual.



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Slow Fill - Anti Surge (AV units only)

- In the event of a power failure or when starting the pump/s on an empty system, the pump/s can quickly run to full speed in order to meet the required pressure. This can cause a pressure shock wave to travel through the system.
- The Slow Fill system will manage an acceptable level of water to fill the system at a reduced pressure and the variable speed drive will operate the pump/s to achieve a set pressure before running at full capacity.
- The Slow Fill system is currently only available on boosters fitted with Hydrovar variable speed drives but can be designed and fitted to any new or existing system.

11). Product Specific Manuals

For further details please refer to the specific manufacturer product manual available via QR code(s) below or via <https://kgnpillinger.co.uk/download-centre/>

Manufacturers/ products are identifiable by their product name plates located on the individual product



12). Maintenance



Do not touch any live parts for at least 8 minutes after switching off the power.

The electrical system must be isolated prior to carrying out any works.

WARNING

Failure to maintain the unit(s) may result in partial or complete failure and cause damage to property.

- The unit is constructed using low maintenance components throughout and should not require any day to day maintenance. The following is the recommended frequency for various maintenance tasks.
- Other items, such as security of fixings, terminations, plant room mechanisms and accessories are not specified, but should be carried out as a matter of course, as on any other piece of equipment.

We recommend the unit is inspected frequently and serviced biannually by a fully trained and qualified - KGN Pillinger engineer.

Monthly checks:

1. Pumps for leakage and quiet running.
2. Operation of set and test auto duty rotation.
3. Pipework and installation for condition and leakage.

Six monthly checks (in addition to monthly schedule):

1. Pre-charge pressure in the vessel and top up if necessary.
2. Operating points of pressure switches and adjust if necessary.
3. Exercise valves to prevent seizure.
4. Control panel - test trips, check contactors, lamps etc.



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13). General Fault-Finding Guidance:

FAULT	POSSIBLE CAUSE	RECOMMENDED ACTION
<u>No power, the set is off:</u>	1). Power supply disconnected. 2). Switch is in the off position.	Connect power supply. Switch set to on.
<u>Pump(s) fail to start:</u>	1). Power supply issue. 2). Low water level.	Reinstate incoming power supply. Reinstate incoming water supply.
<u>Pump leaks water:</u>	1). Defective mechanical seal. 2). Mechanical stress on pump.	Replace the seal. Support the pipe work.
<u>Pumps start frequently:</u>	1). If newly installed, air may still be present within pipework. 2). Vessel pre-charge is set incorrect.	The system requires bleeding to remove air. The vessels pre-charge requires adjustment to appropriate level.

Disposal:

This product and its associated parts must be disposed of in accordance with local regulations, including all packaging.



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14). EC Declaration of Conformity



EC DECLARATION OF CONFORMITY

We hereby declare that the following KGN Pillinger (KG Norman Ltd)
manufactured products:

Type A, AV, EV, SE, FSA, CAT5 & UPOD

are produced in accordance with the below provisions laid down by the:

MACHINERY Directive (2006/42/EC)
LOW VOLTAGE Directive (2014/30/EU)
EMC Directive (2014/65/EU)

& conforms to the below technical standards:

EN ISO 12100:2010 - EN 809+A1:2009 – EN 61000-6-1:2007 – EN 61000-6-2:2005
EN 61000-6-3:2007+A1:2011 - EN 60204-1:2006+A1:2009

Christopher Norman
Director

For & on behalf of
KGN Pillinger
CROYDON
03/01/2020