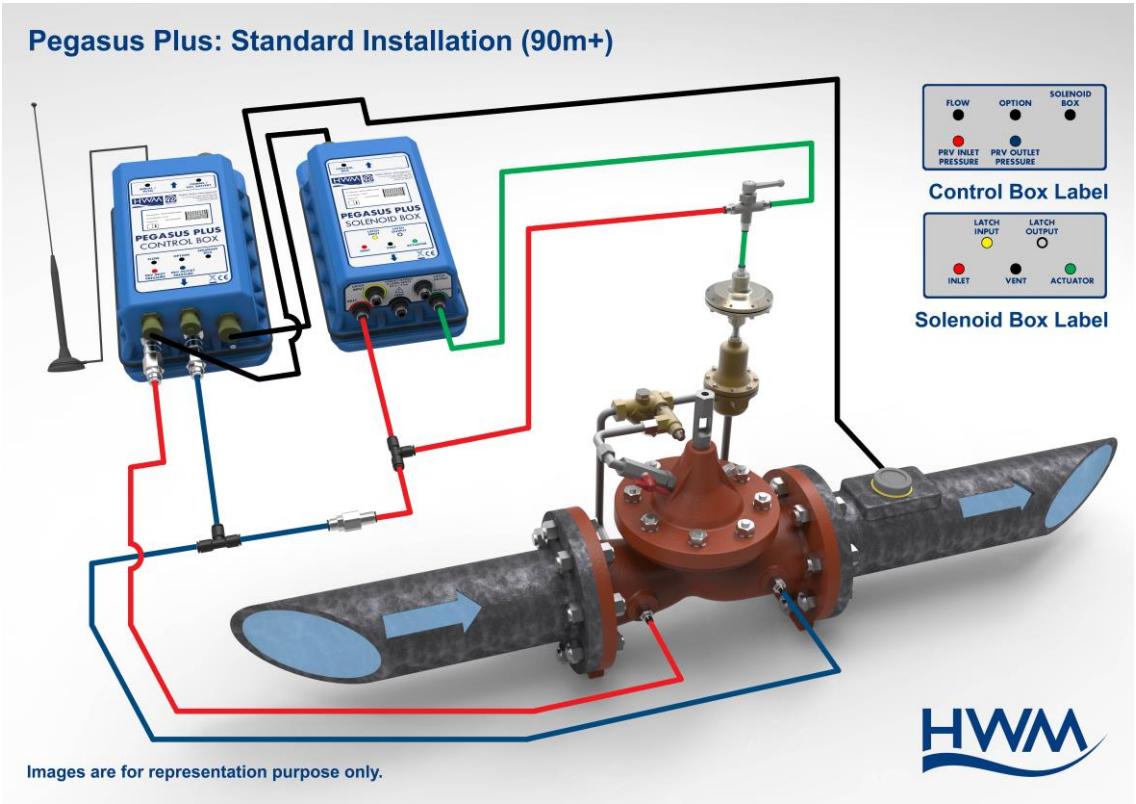
Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers



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Contents

Note – This guide is only meant for quick start up installation, for more in-depth notes please down load the complete Pegasus+ manual from www.hwmglobal.com

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

Equipment Checklist

Before installation check you have the following equipment:-

- Pegasus+ control box
- Pegasus+ solenoid box
- Connecting cable (CABA8830)
- Flow cable (RAG R93) (if connecting to flow)
- Red tubing
- Blue tubing
- Green tubing
- Yellow & Grey tubing (only required if using the “latch option”)
- Installation kit of fittings(ACT002/XT)
- Actuator (ACT001)
- Aerial (if connecting via remote communication)(AER6000)
- External battery (if requiring more frequent call in than twice a day)
- External battery cable (RAG R147) (if requiring more frequent call in than twice a day)
- PC communication cable

Installation

1- Connect flow cable (RAG R93) to flow meter pulse unit cable, using the green cable as ground and the blue cable as signal.
2- Tighten the flow cable connector (RAG R93) into the Pegasus+ Control Box where labelled flow.
3- Use installation diagrams to cut relevant coloured pipe work depending on type of installation required (see list and diagrams below). Pipe up as show in the relevant diagram, making sure the 3 way tee handle is pointing to the green pipe, before connecting the inlet and outlet pressures on the PRV. At this stage don’t connect the green pipe to the actuator.

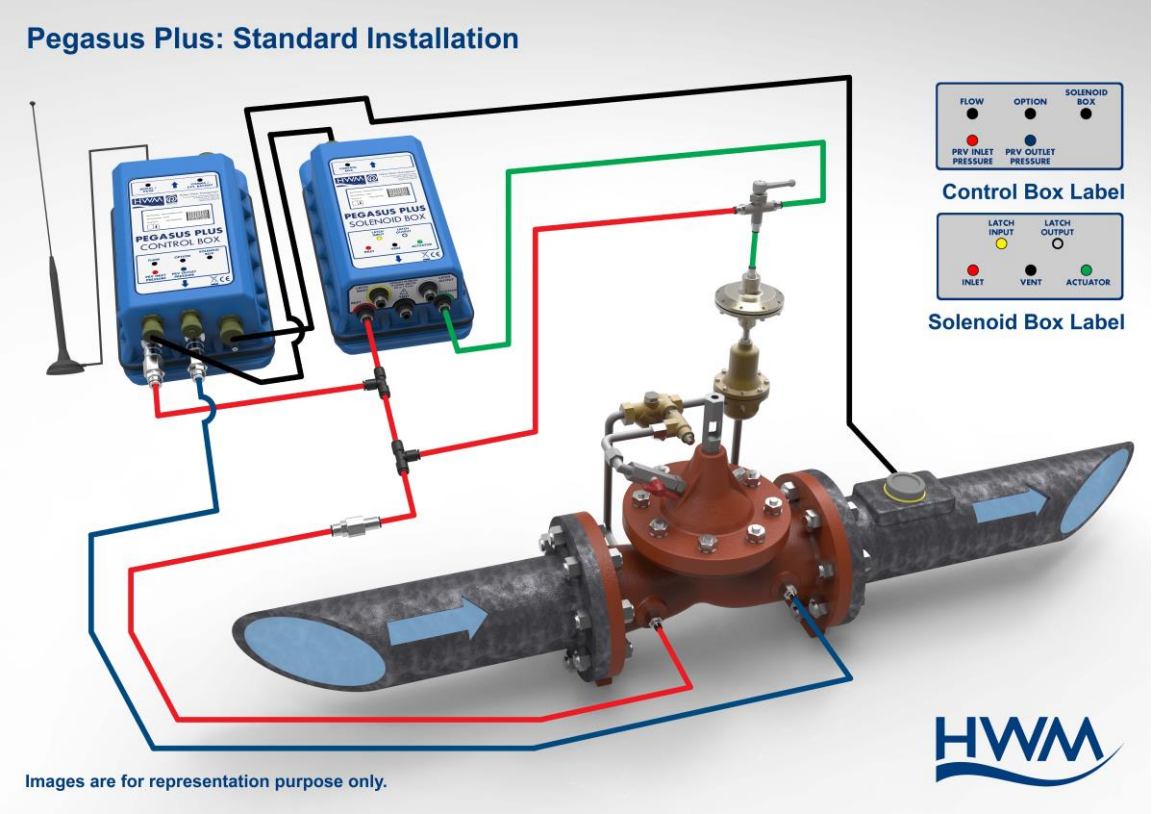
There are 6 possible piping configurations depending upon your desired operation:-

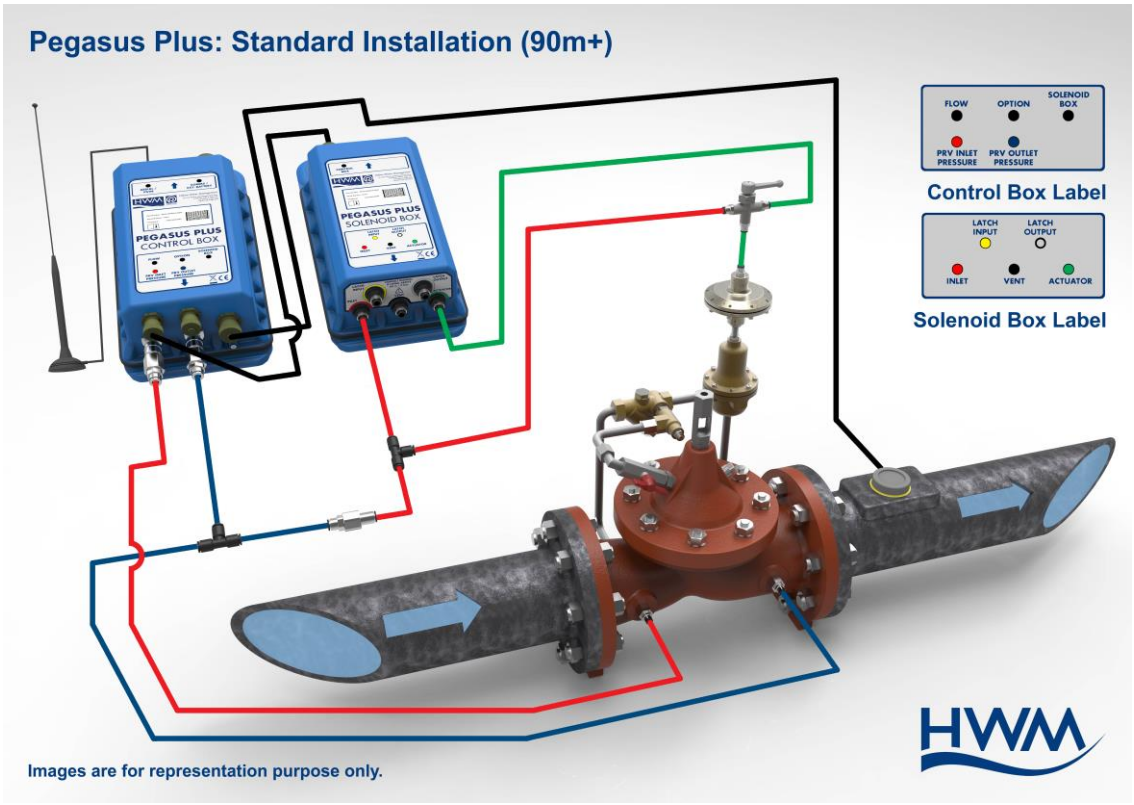
- Standard installation where inlet pressure to PRV is less than 90m.
- Standard installation where inlet pressure to PRV is more than 90m
- Installation for using latching solenoid for high pressure unreachable where the inlet to the PRV is less than 90m

- Installation for using latching solenoid for high pressure unreachable where the inlet to the PRV is more than 90m
- Installation for using latching solenoid for low pressure unreachable where the inlet to the PRV is less than 90m
- Installation for using latching solenoid for low pressure unreachable where the inlet to the PRV is more than 90m

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

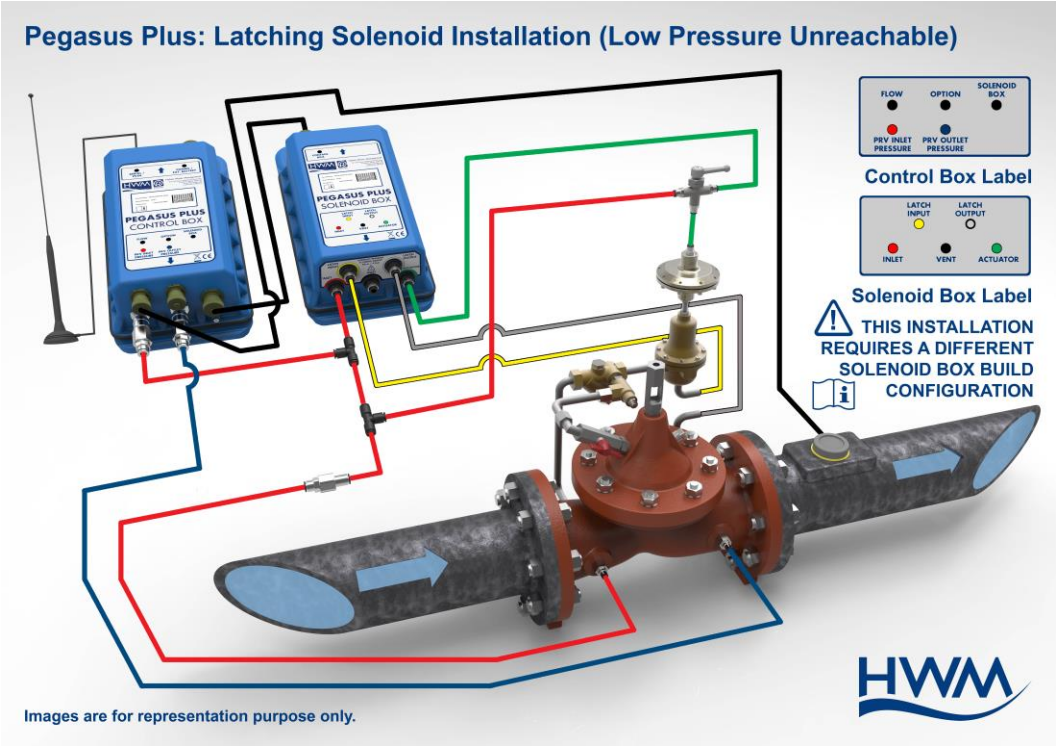
Installation drawings for standard installations

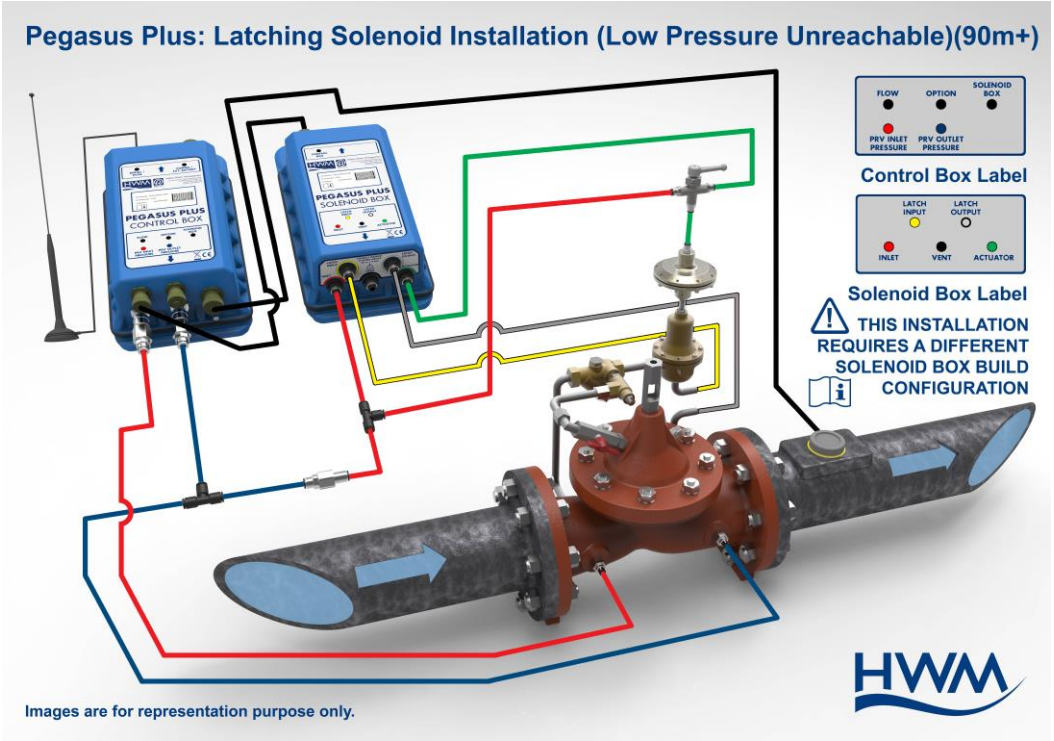




Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

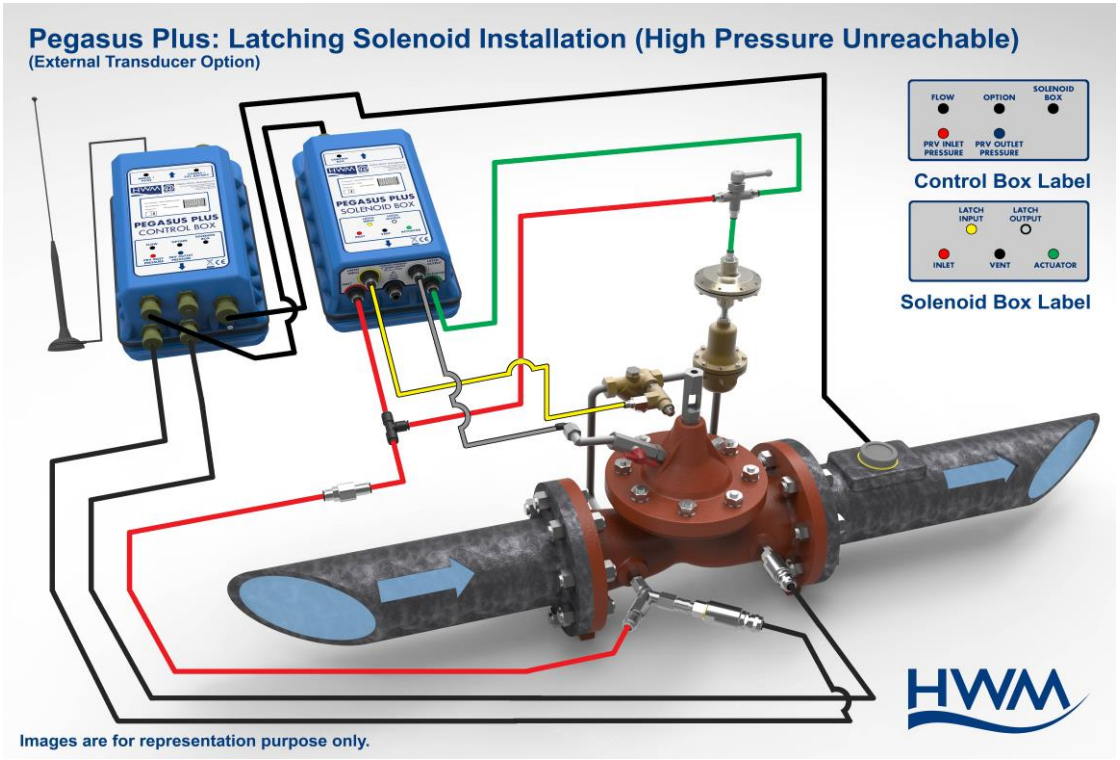
Installation drawings for latching low on unreachable pressures

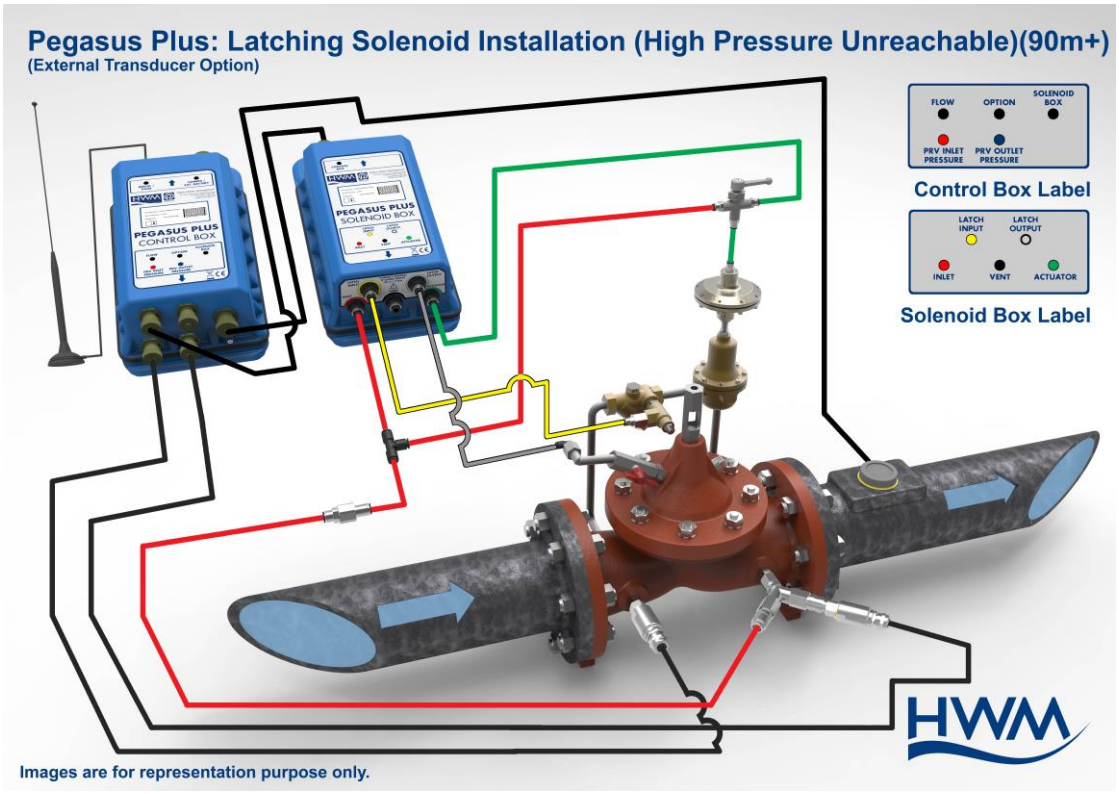




Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

Installation drawings for latching high on unreachable pressures





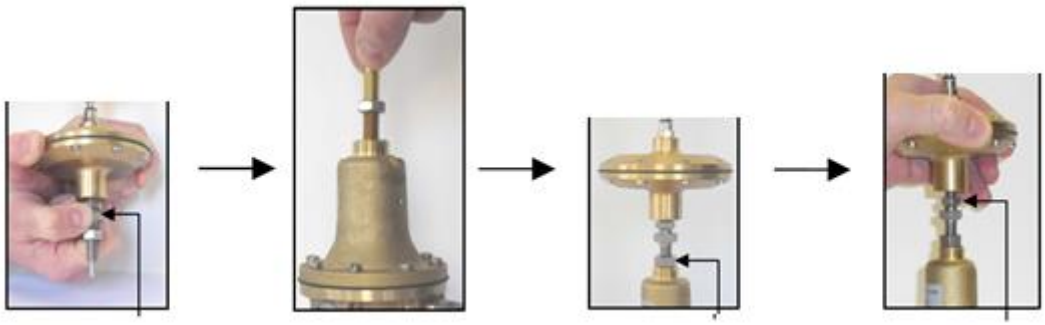
Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

Actuator Setting

Ensure that the valve is working properly before connecting to the actuator, if not, it is essential to repair the PRV control before fitting. Use the Pegasus+ software (or pressure gauge) to help set the actuator pressure settings.

1. Lock the PRV top chamber by closing the valve to the top chamber if possible. This will maintain a constant pressure on the outlet of the PRV whilst installing the actuator.

2. Ensure that the thread of the actuator being used is the same type of thread as the existing PRV pilot that is about to be removed. (HWM can supply alternate threads)
3. Screw the actuator thread into the Actuator head until finger tight. The top nut, middle fixed nut and bottom nut should all be screwed together. (see picture 3)
4. Unscrew and take out the PRV pilot adjustment screw. Checking the outlet pressure reading whilst removing, the reading shouldn't change. (see picture 4)



3 4 8 10

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

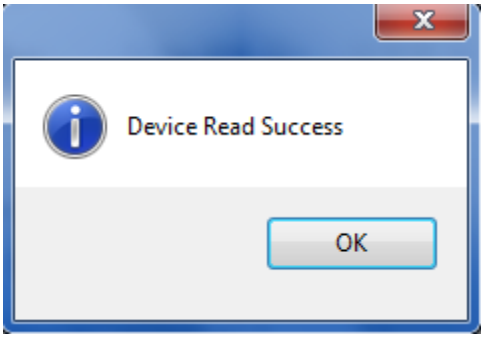
5. Screw the actuator into the pilot of the PRV approx the same distance that the pilot screw in step 4 had just been removed.
6. Slowly open the PRV top chamber valve from step 1, the PRV will now return to pilot control via the actuator setting, minor adjustment may be required when you do this.
7. Check the outlet pressure of the PRV and set the maximum pressure required on the actuator. To do this use the middle fixed adjusting nut on the actuator thread. Screwing it clockwise / inwards to increase pressure, or anticlockwise / outwards to decrease pressure. The pressure to be set should be +2m above the maximum pressure value calculated for your table of control operation.

8. Once the maximum pressure is achieved tighten the bottom lock-nut on the actuator screw thread against the PRV pilot to secure the maximum outlet pressure. (see picture 8)
9. Check the outlet pressure of the PRV and set the minimum pressure required on the actuator. To do this hold the middle fixed adjusting nut on the actuator thread with a spanner and screw out the actuator head anticlockwise / outwards to decrease pressure. The pressure will begin to reduce, you should set the minimum pressure -2m below the minimum pressure value calculated for your table of control operation.
10. Once the minimum pressure is achieved tighten the top lock-nut on the actuator screw thread against the underside of the actuator to secure the minimum outlet pressure. (see picture 10)
11. Lastly insert the green pipe into the top of the actuator head which connects the 3 way tee.
12. The Pegasus is now ready to set up for flow or time modulation via PC software.

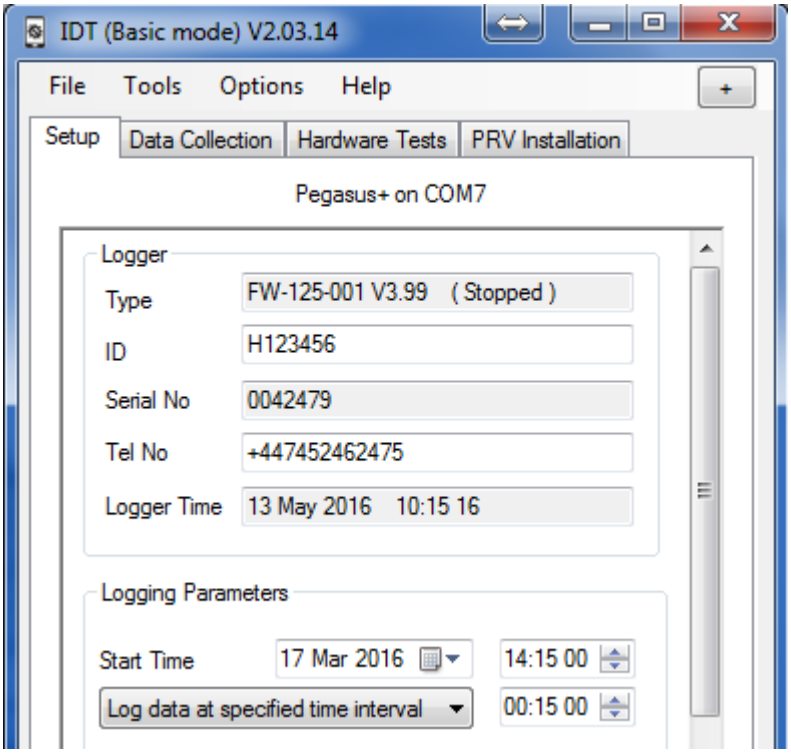
Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

Quick set up guide using IDT software

1) Connect Pegasus+ control box via COMAE or COMAEUSB cable to PC or tablet
2) Open IDT software
3) Click ‘Read Device’, a progress bar will show across the top of the page and the ‘Setup’ tab will be displayed along with a pop up box stating ‘Device Read Success’.



4) The ‘Logger’ section details the firmware information about the Pegasus + and the mode that the logger is in.
5) Insert the site ‘ID’ which can be up to a 7 digit reference number.
6) The ‘Logging Parameters’ section displays the current time, date and logging interval which will be defaulted to 15 minutes as standard, this can be altered if required.



Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

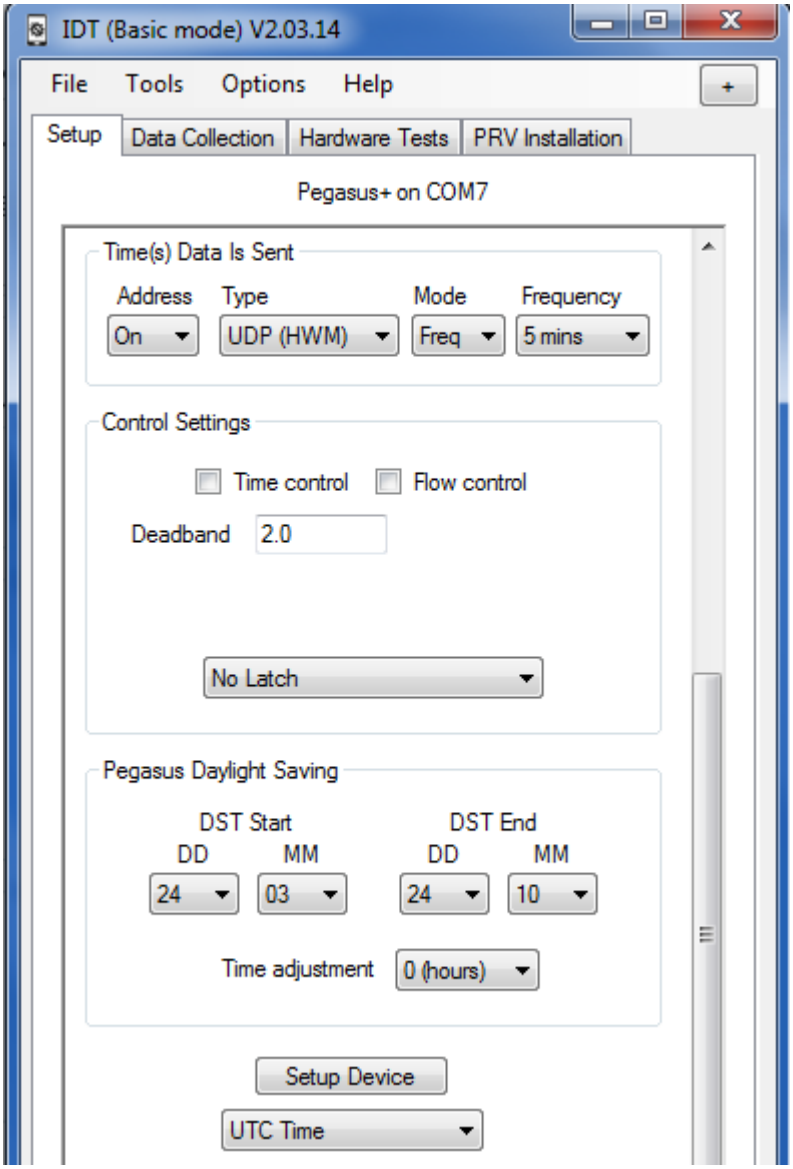
7) In the ‘Time(s) Data is Sent’ section, when remote communication is required, make sure the ‘Address’ drop down box is set to ‘ON’, the ‘Type’ box is set to ‘UDP (HWM)’, and the ‘Mode’ drop down box is set to either ‘Freq’ or ‘Time’ depending on which call in type is required. Please note that if more than 2 call ins are required

per day, an external battery pack will be required, without this the logger will only call in twice a day maximum.

If no remote communication is require just leave the ‘Address’ drop box as ‘OFF’

8) Leave the ‘Control Settings’ section at this stage, making sure neither the ‘Time control’ or ‘Flow control’ is ticked as shown below.

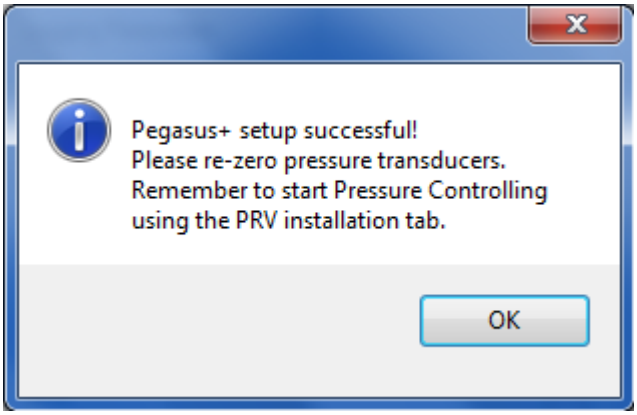
Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers



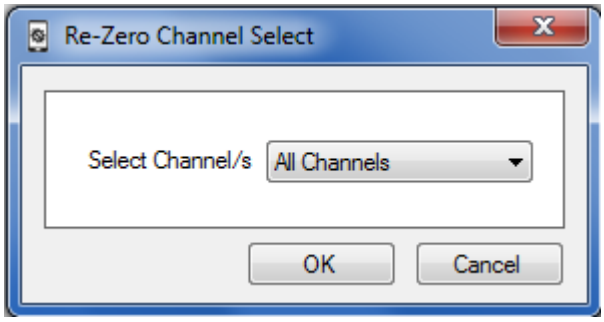
9) In the 'Pegasus Daylight Savings' section, the DST start and end times with 1 hour adjustment will be default for UK. Pegasus+ uses the last Sunday after the dates shown to calculate the correct time/date for adjustment between BST/GMT so no need to change these dates if you require this function. Leave UTC time as it is. If you wish the controller not to change the times between BST/GMT, change the time adjustment box to say zero hours.

10) Click 'Setup Device', the green progress bar across the top of the page will scroll and the following pop box will appear, click 'OK'.

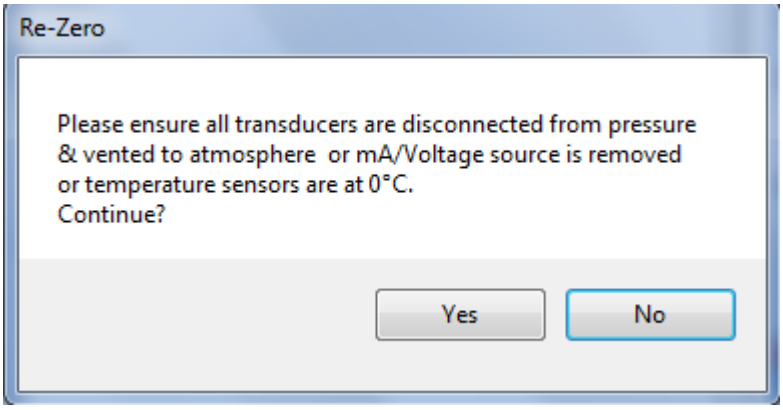
Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers



11) We now need to zero the pressure transducers to atmosphere before we connect to water pressure. To do this click the 'Hardware Tests' tab at the top of the screen. Click the box 'Re-Zero' and a pop up box will appear as below asking you to select which channels you would like to re-zero, choose from the dropdown box and click 'OK'.

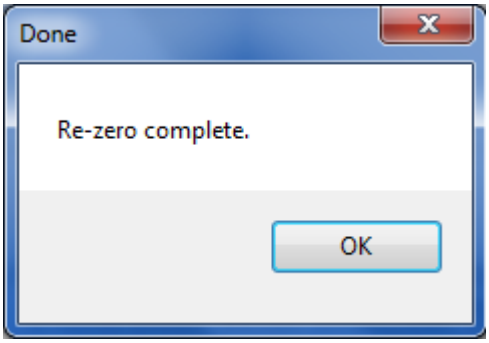


12) The following pop up box will appear, click 'Yes' when ready.



13) Note – the 'Re-zero' button will turn orange for a short while until the following pop up box appears. Click 'OK'.

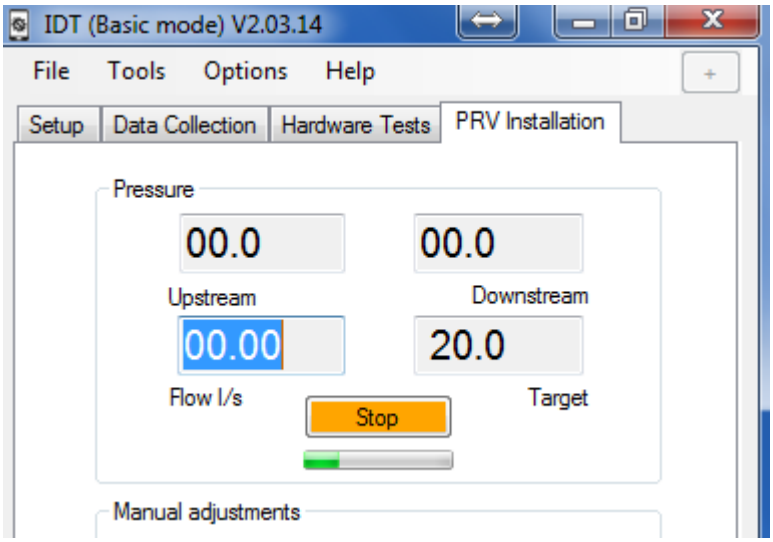
Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers



14) Click on the ‘PRV Installation’ Tab at the top of the screen and click on the ‘Live Values’ button. The controller will now display the Upstream and Downstream pressures, which if calibrated correctly should be showing zero or a very small deviation from zero.

15) Now connect the transducers to the water pressure, ensuring that Channel 1 is on the Upstream and Channel 3 is on the Downstream, the live pressure readings should now be viewed as expected before continuing with any further installation.

16) Click the ‘Stop’ button.

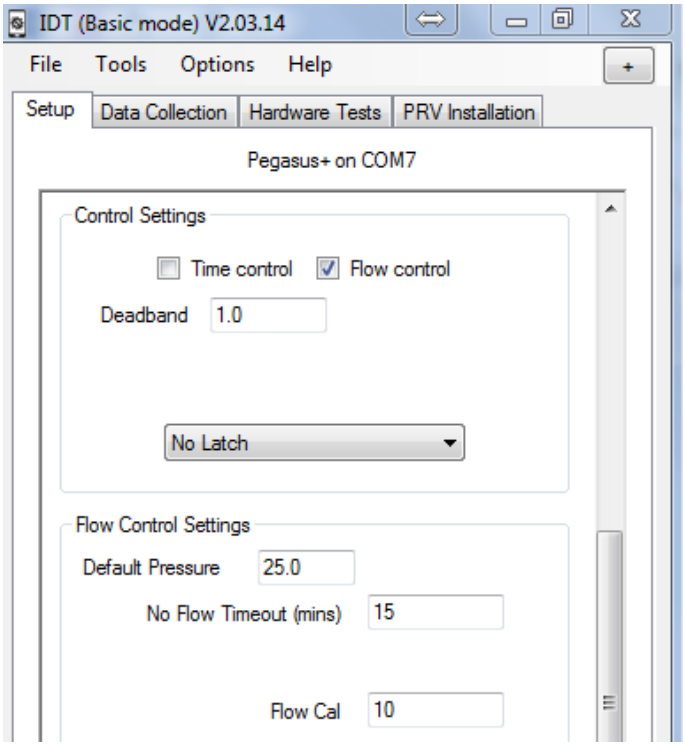


17) Click the ‘Setup’ tab at the top of the screen and return to the section headed ‘Control Settings’.

The mode of control and table entry can now be selected.

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

18) **For FLOW Mode**, tick ‘Flow Control’, make sure the ‘Deadband’ is set to 1.0m and ‘No Latch’ is selected as below.



19) The default pressure must be set. This is the pressure the controller will go to as a fixed output should the unit see no flow pulses (ie the meter/pulse unit fails)

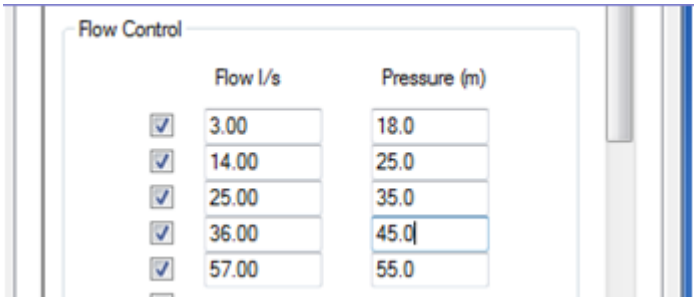
20) Set the ‘No Flow Timeout (mins)’ to the period required before the default pressure takes control, suggest 15mins

21) Insert correct flow calibration for the pulse unit being connected too. This value will be entered in the units you have selected from the “Options” “Settings” drop down menu at the top of the software page.

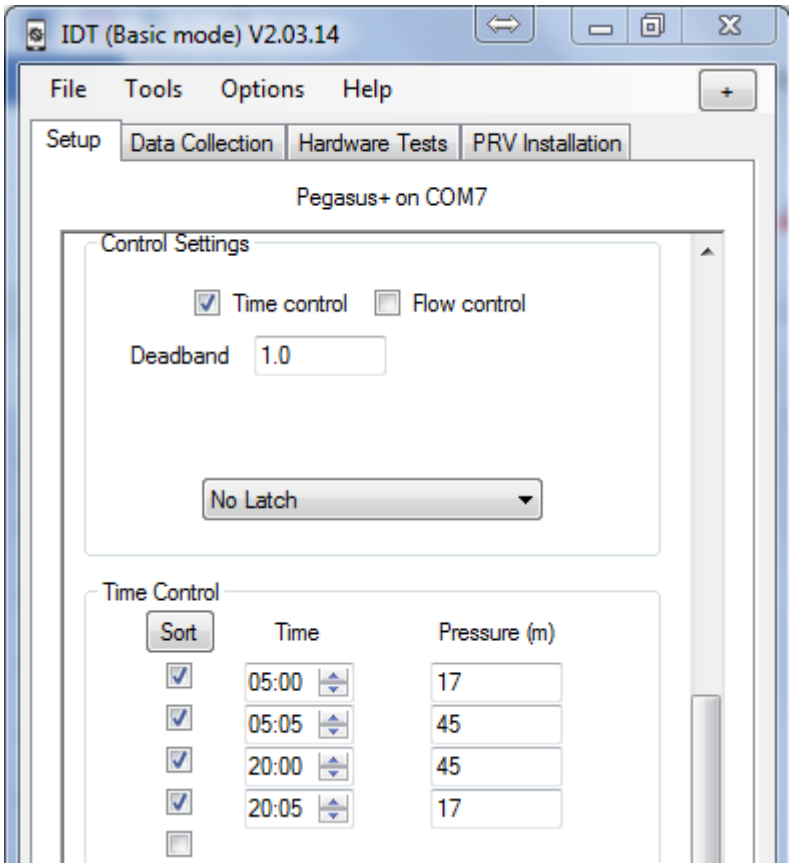
22) Go to the ‘Flow Control’ section and enter the values required for the flow table, up to 32 table entries can be used.

Note if flow goes above or below the first or last values in the table, pressure will maintain constant. So in the example below, if flow goes below 3l/s then pressure will maintain at 18m or if flow goes above 57l/s pressure will maintain at 55m.

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers



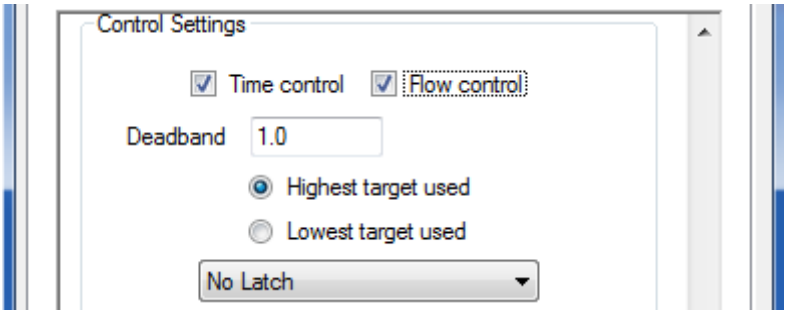
23) **For Time Mode**, tick 'Time Control', in the 'Control Settings' section and make sure the 'Deadband, is set to 1.0m and 'No Latch' is selected.



24) Enter times required, up to 32 entries can be used. Note the controller interpolates a diagonal straight line of pressure for the times between two points in the table.

In the example above it takes 5mins between 5am and 5.05am for pressure to increase from 17m to 45m

25) **For Time & Flow Mode**, tick ‘Time Control’ and ‘Flow Control’, make sure the ‘Deadband’ is set to 1.0m and ‘No Latch’ is selected.



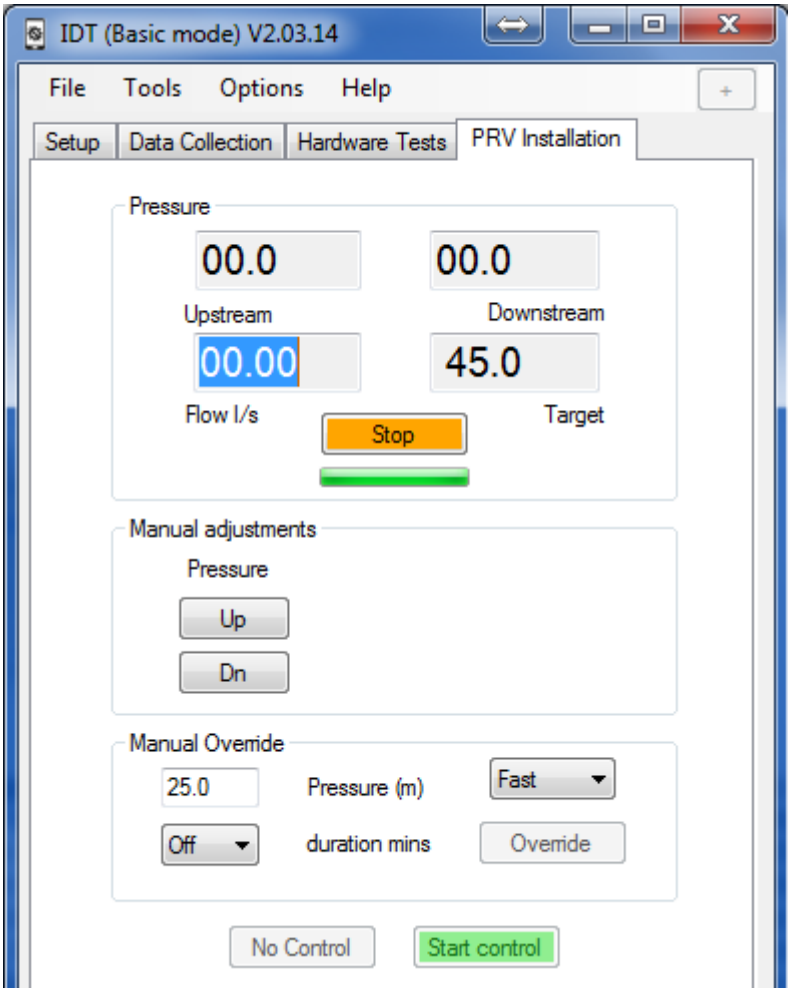
26) When selecting both time and flow control both sets of tables can be input as explained previously, however an extra option of either Highest or Lowest target used must be selected.

Highest target allows the controller to switch control mode to the highest pressure shown in either flow or time table, based on the flow demand or time at that particular moment. Example table were set, flow@5 l/s=20m, time@14:00=28m, if the controller has a flow of 5l/s at 14:00 then the controller will set it’s output to be 28m.

Lowest target allows the controller to switch control mode to the lowest pressure shown in either flow or time table, based on the flow demand or time at that particular moment. Example table were set, flow@5 l/s=20m, time@14:00=28m, if the controller has a flow of 5l/s at 14:00 then the controller will set it’s output to be 20m.

27) After the tables for operation are complete remember to click ‘Setup Device’ at the bottom of the page above the ‘UTC Time’.

28) By clicking the ‘PRV Installation’ tab at the top of the screen and clicking ‘Live Values’, the current pressure readings can be displayed. The target pressure should now be showing based on the table settings you have just setup.



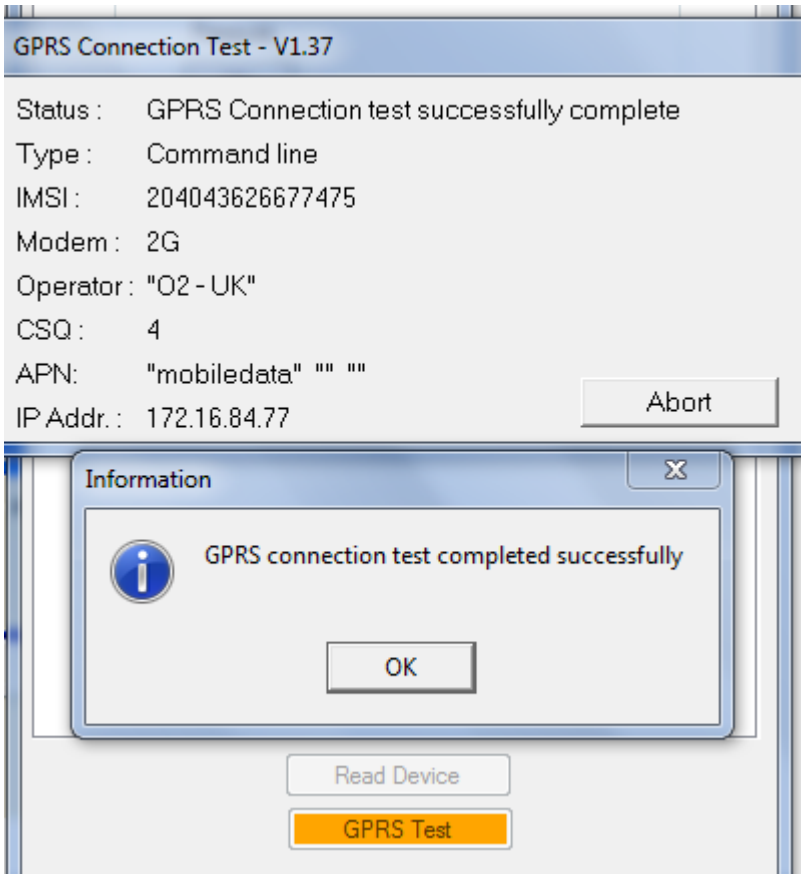
29) Click ‘Stop’ to come out of ‘Live Values’ and do a manual override to check that the controller is working or the actuator settings.

30) **For Manual Override Mode**, to check the controller works and the actuator settings, you need to complete a Manual Override. Go to the ‘Manual Override’ section as shown above and select the pressure required for this test, the duration you wish the device to be in manual override mode for and the speed which you wish it to achieve this pressure - ‘Fast’ or ‘Normal’. (We recommend ‘Fast’, for actuator setting tests). Click ‘Start control’ to make sure you are in control mode before clicking the ‘Override’ button. After clicking the ‘Override’ button, this will turn orange and a message will appear saying ‘complete’, click ‘OK’. Click ‘Live Values’ again and you will see the ’Target’ box will change to your manual override setting. The solenoid box should now start clicking to try and achieve the desired pressure.

31) **Remember after any control mode change or new installation, you must click ‘Start Control’ from this screen for the controller to start controlling in the mode you require**

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

32) To complete the install finally click the ‘GPRS Test’ button via any of tabs at the bottom of the screen. This should be done after the aerial has been placed in its final mounting position in the chamber. Upon clicking, a box will appear for around 1 minute as it selects the best network to roam and make communication with the server. If it was successful a message will to tell you, just click ‘OK’. If it failed repeat the test, you may need to move the aerial to a new location, make a note of the CSQ level as the test progresses, typically below 7 is poor signal and the unit may struggle to call in frequently. An alternate external aerial location may then be required.

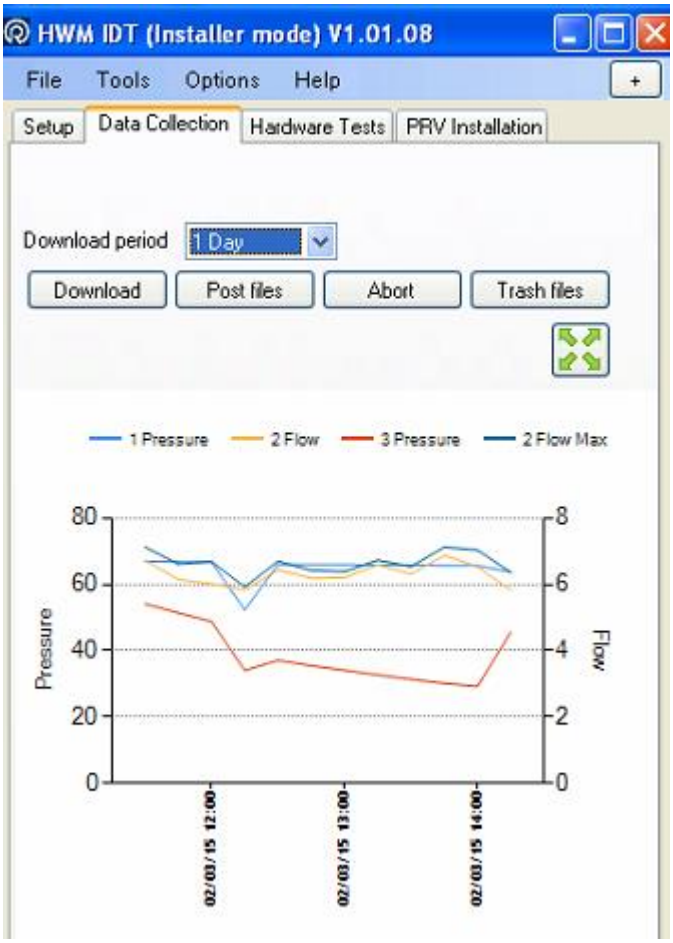


Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

Manual downloaded graph

33) To download a quick view of the data logged click on the 'Data Collection' tab. Select the download period and click 'Download'. A graph will be displayed of the channels being logged. To zoom to specific times/dates, click and drag over the part of the screen required. Click the green arrow button to reset the zoom.

34) If you have manually collected data for further analysis, this data can be posted up to Datagate. Simply after downloading a graph, once your PC has an internet connection, click' Post' and the files will automatically be sent to Datagate for web graph viewing.



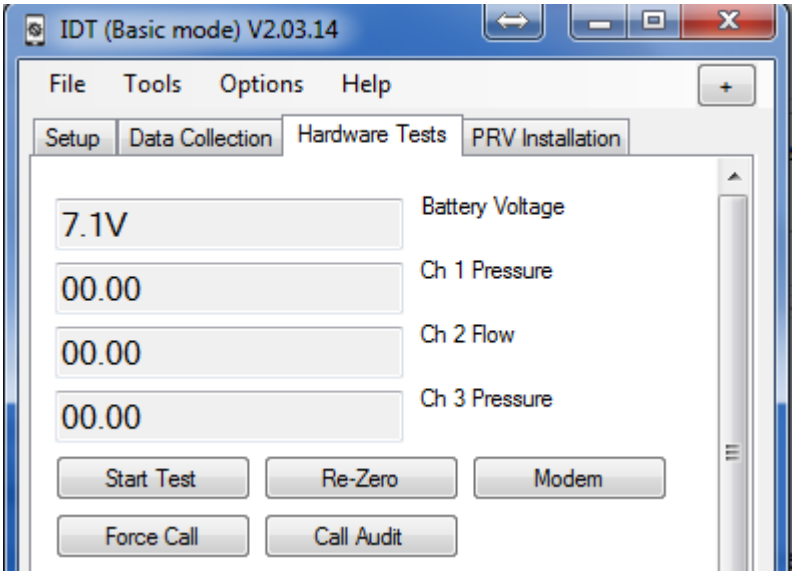
Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

Additional Useful Information

Addition Hardware Tests from the Software

35) From the software open up the Hardware Test tab.

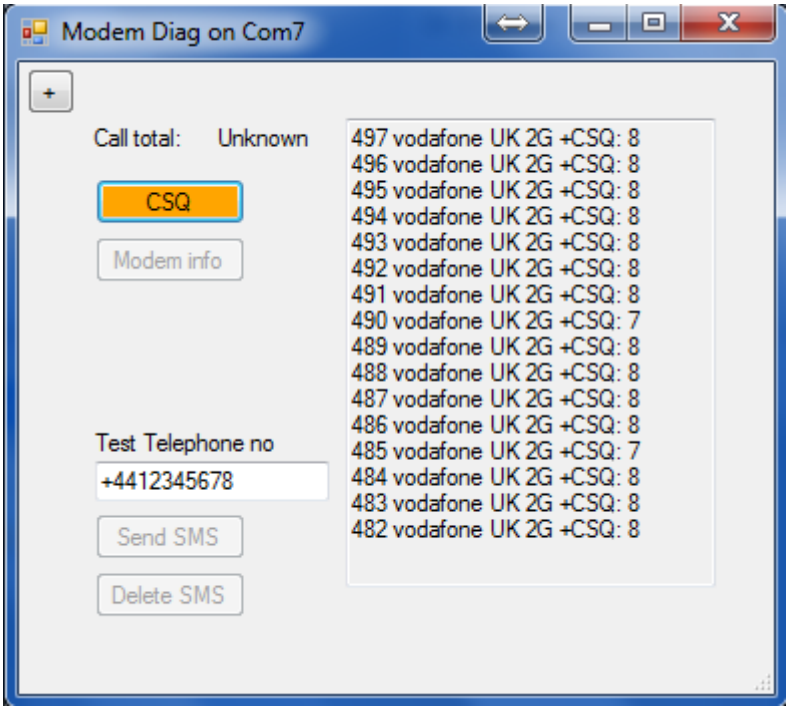
36) Once opened click the ‘Start Test’ button. Instantaneous readings can be seen across the logging channels currently in use. The battery voltage can also be seen. Providing the voltage says 8v+ then this means the Pegasus+ is receiving external power (i.e battery pack or mains) and can make more frequent calls to the server. Power showing below 8v means only twice daily calls to the server can be made. If an external battery pack is connected and the power is showing below 8v then please exchange the external battery pack or check your connecting power cable.



37) Click the ‘Stop’ button

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

38) Clicking on the ‘Modem’ button, this opens up further signal tests and sim card/modem check.



39) Click the ‘CSQ’ button; after a short period instantaneous signal levels will appear, this can be used to position your aerial in the best location to send data from CSQ ranges from 1 to 33. We always recommend CSQ be at least 7 or above for a chance of communication. To stop the test click the ‘CSQ’ button again.

40) To check the sim card number or modem is working, enter your phone number in the ‘Test Telephone no’ box in international format as shown above. Click ‘Send SMS’, this will then send a text to your phone confirming phone number of the sim and that calls can be made from the modem. If you fail to receive a text message this could indicate a sim or modem fault.

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

Manual override of the controller at the PRV

In normal control operation the 3 way tee handle on the pipe installation will point to the green pipe, indicating the Pegasus+ is controlling the PRV.

To override the Pegasus+ controller and place the PRV into a fixed outlet pressure, at the maximum pressure set on the actuator turn the handle on the 3 way tee 180 degrees to point the handle at the red pipe. This will give a 24/7 fixed outlet pressure.

Quick Installation Guide For Pegasus+ Pressure Controller With Internal Transducers

Installation brackets

Installation brackets are available, each with a single screw. One bracket per solenoid and control box is required. For remote coms the aerial can then be mounted on top of the bracket. For best communication place the aerial vertical (if possible), typically 10cm below lid level

Frost Protection

The coloured tubing can be protected from frost with foam insulating pipe covers. These can be supplied upon request at additional cost or sourced locally from a DIY store.

To protect transducers from frost, Pegasus+ has the option of being supplied with external transducers. This negates the column of water found in a pressure hose between the pressure connection on the PRV and the transducer on the controller from freezing and potentially damaging any unit supplied with internal transducers.

Maintenance Recommendations

It is recommended (although not necessary) that the following checks be made on a maintenance program, typically annually.

- All pressure transducers zero to atmosphere annually using the steps shown in this guide
- Check for any damaged tubing pipe work for leaks and replaced where necessary
- Clean the inline filter on the installation pipe work
- Manual check the controller can achieve the actuator pressure settings based on the table values being used
- Check manual override 3 way tee works as expected to the maximum actuator setting
- Check CSQ level for poor signal areas
- Re-try GPRS test

For any spare replacement parts required, please refer the Pegasus+ catalogue of parts.

APPENDIX

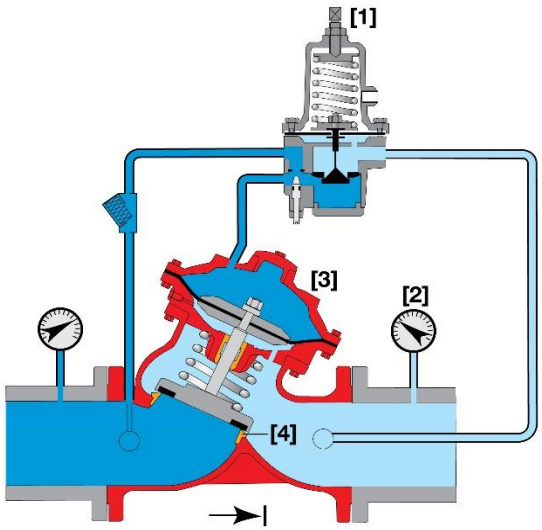
Pilot operated pressure reducing valve

A pilot operated pressure reducing valve automatically and accurately reduces downstream water pressure to a specific, adjustable value.

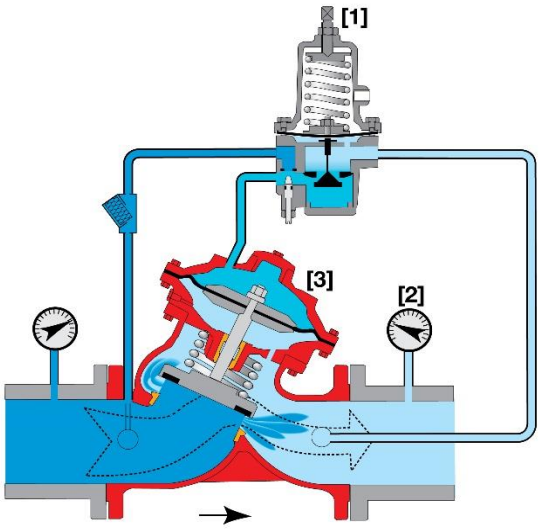
The Pressure Reducing Pilot [1] senses downstream pressure [2] and in real time modulates the top chamber of main valve [3] to maintain a constant downstream pressure. In no-flow static conditions, should the downstream pressure start rising above pilot setting, the pilot closes, shutting the main valve [4] to maintain the allowable downstream pressure.

The upstream water is connected to the Pressure Reducing Pilot [1], which is subsequently connected to the top chamber of the main valve [3]. If this pressure is such that the Pilot remains closed, the upstream pressure is the same as the top chamber of main valve pressure. The pressure is balanced and the valve is closed by the tension in the spring.
Note that the pilot set point is adjusted by turning the pilot bolt and is not dependant on upstream pressure.

However, if the upstream water pressure in the Pressure Reducing Pilot [1], does allow the Pilot to open, the water exits the valve and becomes downstream water, but more importantly, the pressure in the top chamber of the main valve [3] is now less than the upstream pressure. This pressure differential causes the valve to open.



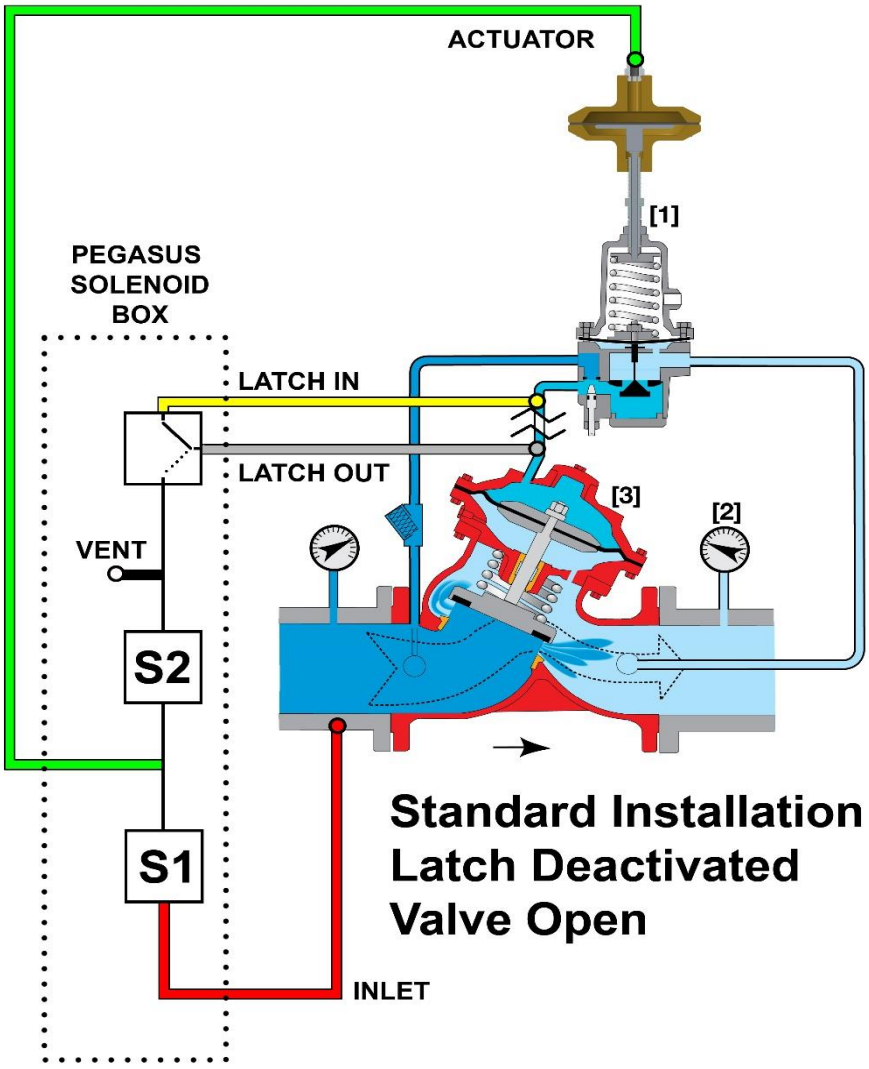
Valve Closed (static condition)



Valve Open (flowing condition)

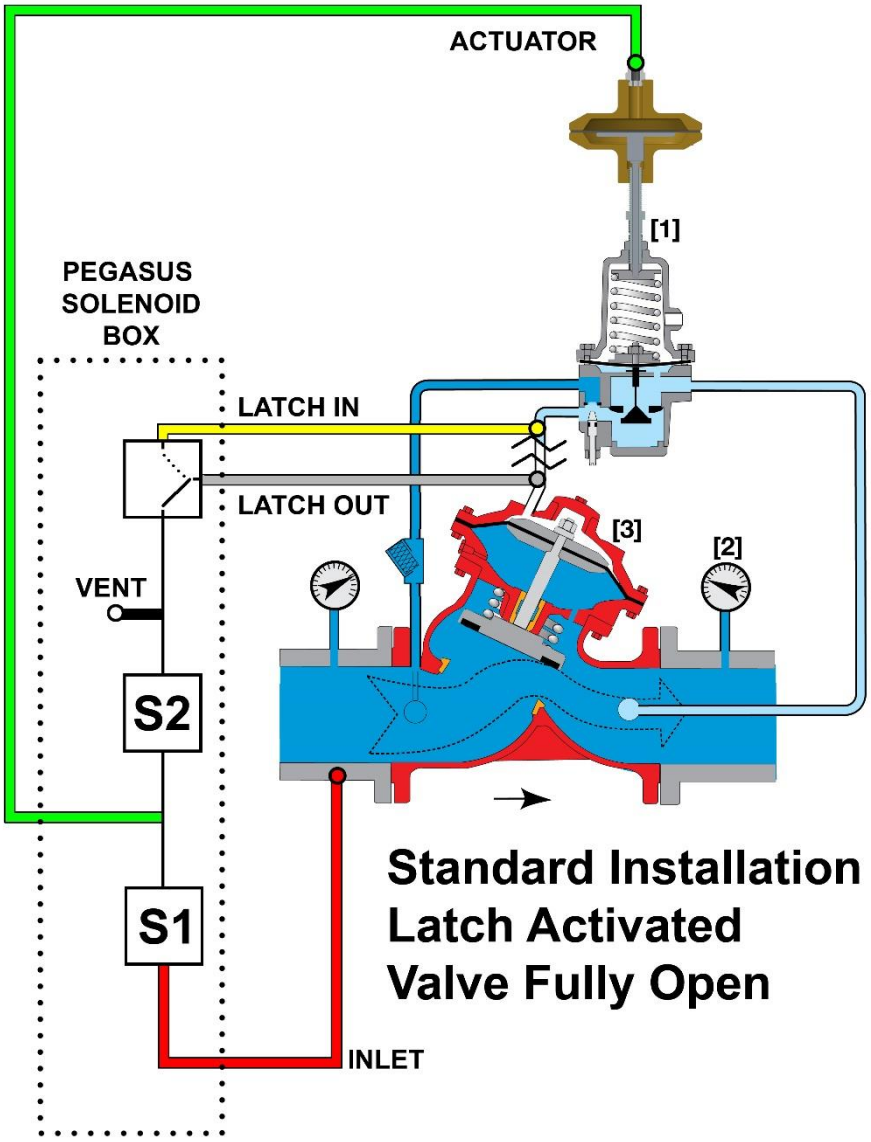
The HWM Pegasus Plus includes the HWM actuator which attaches to the top of the Pilot. This controls the pilot setting, and can be operated automatically and remotely, therefore controlling the downstream water pressure.

Standard Installation, Latch Deactivated, Valve Open



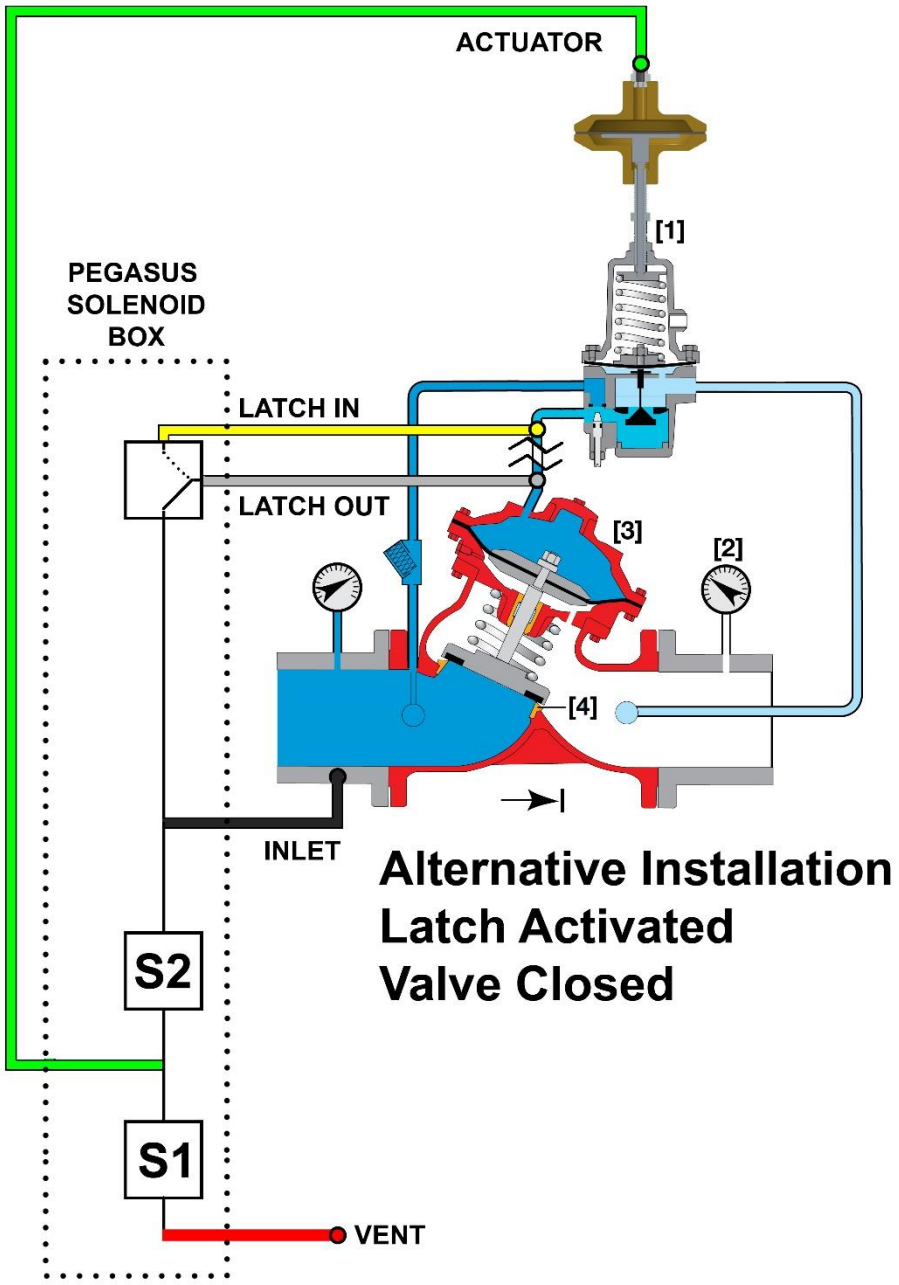
In the above configuration, the upstream water is connected to the Pressure Reducing Pilot [1]. The Latch is deactivated, connecting the pilot to the top chamber of the main valve [3]. The actuator is adjusting the spring in the pilot and therefore adjusting the pressure in the top chamber of the main valve [3], thus controlling how much the main valve opens.

Standard Installation, Latch Activated, Valve Fully Open



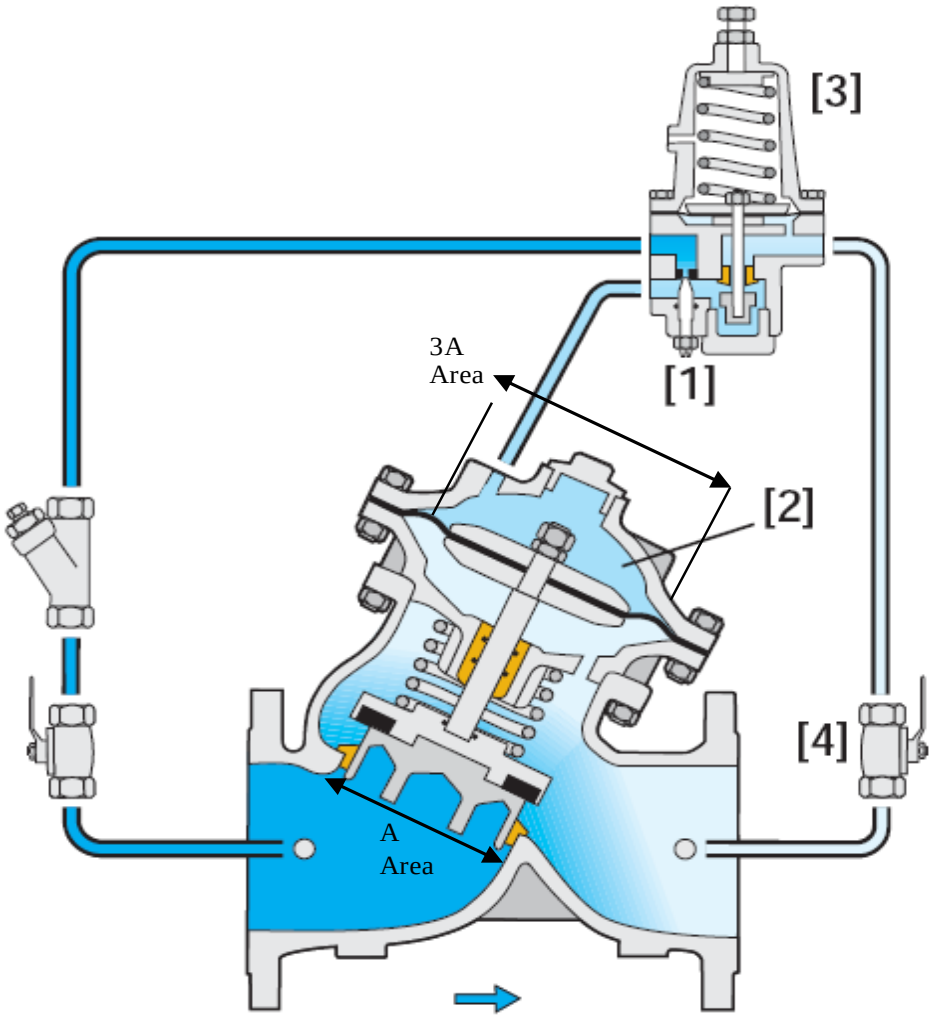
If the Latch is activated, water pressure in the top chamber of the main valve [3] vents to atmosphere and empties, allowing the main valve to fully open.

Alternative Installation, Latch Activated, Valve Fully Closed



In the above alterative installation, the INLET and VENT connections are swapped around. When the Latch is activated, the upstream water is directly connected to the top chamber of the main valve [3], which fully closes the main valve.
Due to the mechanical stops on the actuator, there will still be a small amount of flow through the pilot which enters as downstream water.

PRV Formulae



Opening process (Atmospheric chamber)

P_1 (A) – P_2 (A) + P_2 (3A) – F_{spring} > 0

Closing Process (Spring Necessary)

P_1 (A) – P_2 (A) + P_2 (3A) – P_1 (3A) = 0

SIMPLIFIED DECLARATION OF CONFORMITY

This simplified EU declaration of conformity referred to in article 10(9) shall be provided as follows:

Hereby, HWM Ltd declares that the radio equipment type transceiver is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at www.hwmglobal.com

HWM-Water Ltd
Ty Coch House
Llantarnam Park Way
Cwmbran
NP44 3AW
United Kingdom
+44 (0)1633 489479
www.hwmglobal.com