Innovation In and
Out of Parlour

Powerflush Manual

Version - 1.6

Date - July 2018

Part Number - 39-0410

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About the Powerflush System

The ATL Powerflush backflush system reduces labour by automating the cluster cleaning process after each and every cow is milked. The system flushes the liner, claw and long milk tube and provides every cow with a clean cluster to keep contamination to a minimum. The system is available either as 'stand-alone' or fully integrated into the ATL system.

How does it work?

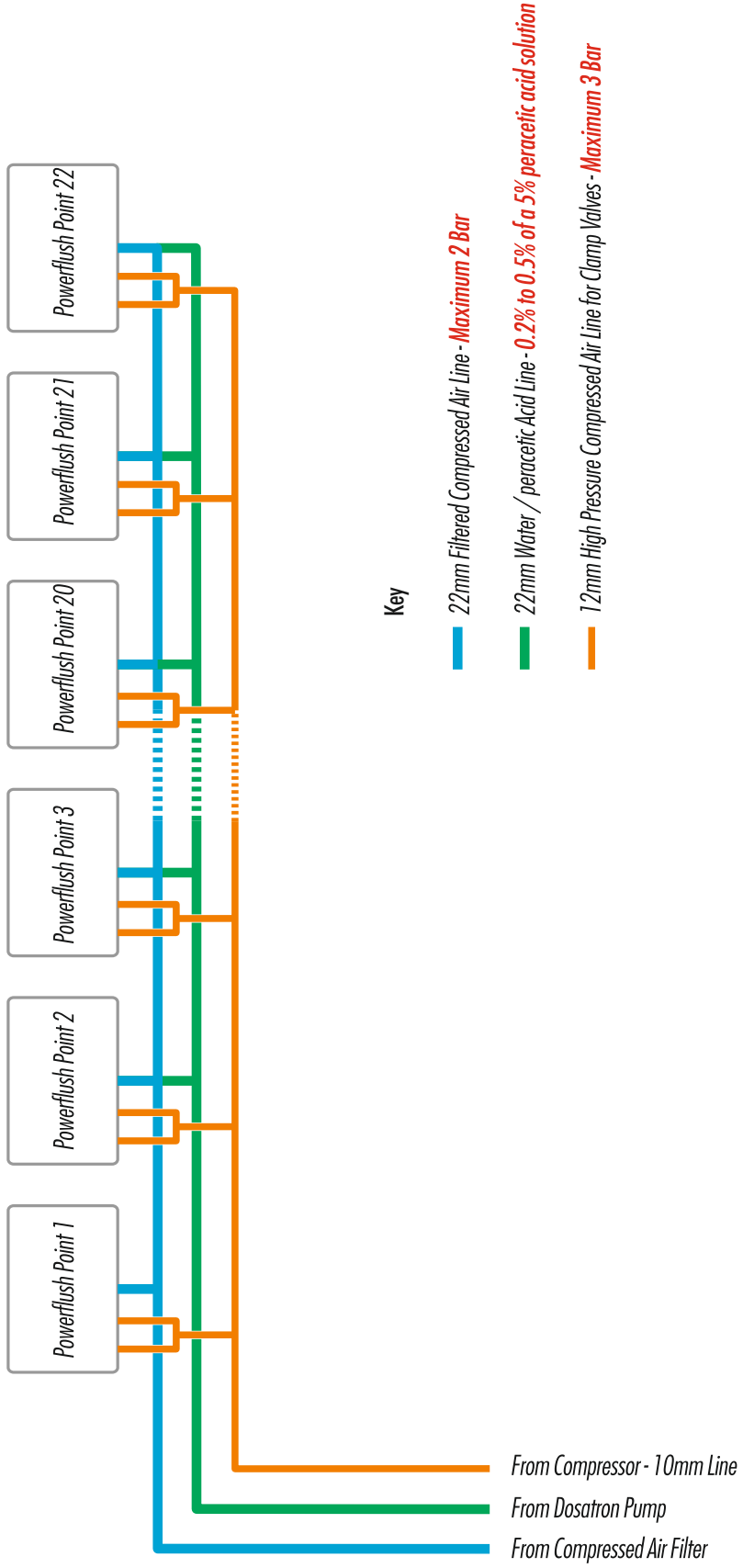
- The Powerflush is a backflush system that helps prevent cross contamination by automatically cleaning the long milk tube, claw and liners after each cow has been milked.
- The system is triggered when the cluster is removed by the ACR using either an electronic signal or a vacuum sensor.
- A water/peracetic acid solution is then introduced into the long milk tube, followed by a blast of compressed air. This provides a vigorous flushing action cleaning the long milk tube, claw and liners.
- The system does not require a change to the liners.
- The system does not change operator routine or extend milking times as the process occurs automatically without operator intervention.

What's Different?

- The system can be set to lower the cluster during and post flushing to minimise water spray and give better draining. **IMPORTANT** - This is only possible on electronic systems which use the ACR signal as the trigger.
- The system is fully programmable via the LCD display allowing the system to be set up quicker and changes to be made more easily.
- The system can ignore manual ACR operations so the flush does not occur unnecessarily.
- The system includes frost purge to remove water from the pipework to prevent freezing issues in cold weather.
- The system includes a master control that allows the system to be turned off during milk recording, to choose between 2 and 3 flushes and to flush all points.
- An input is provided so the system can link to an automatic plant washer.
- Two compressed air pinch valves completely shut-off the milk line during flushing and the flush line during milking.

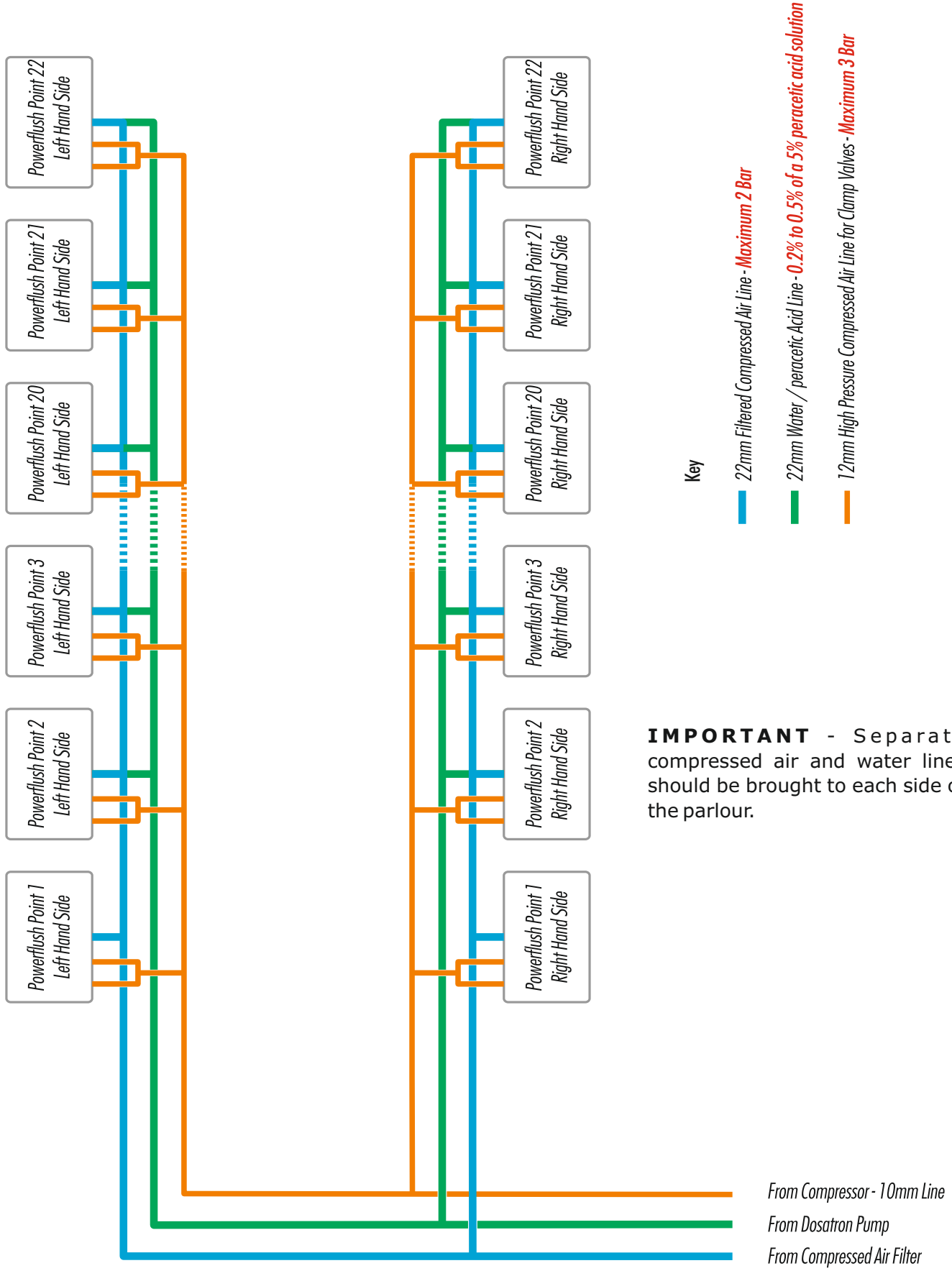
Plumbing the Powerflush System on a Swingover Parlour

The Powerflush system plumbing on a swingover milking parlour is shown below.



Plumbing the Powerflush System on a High Level Doubled Up Parlour

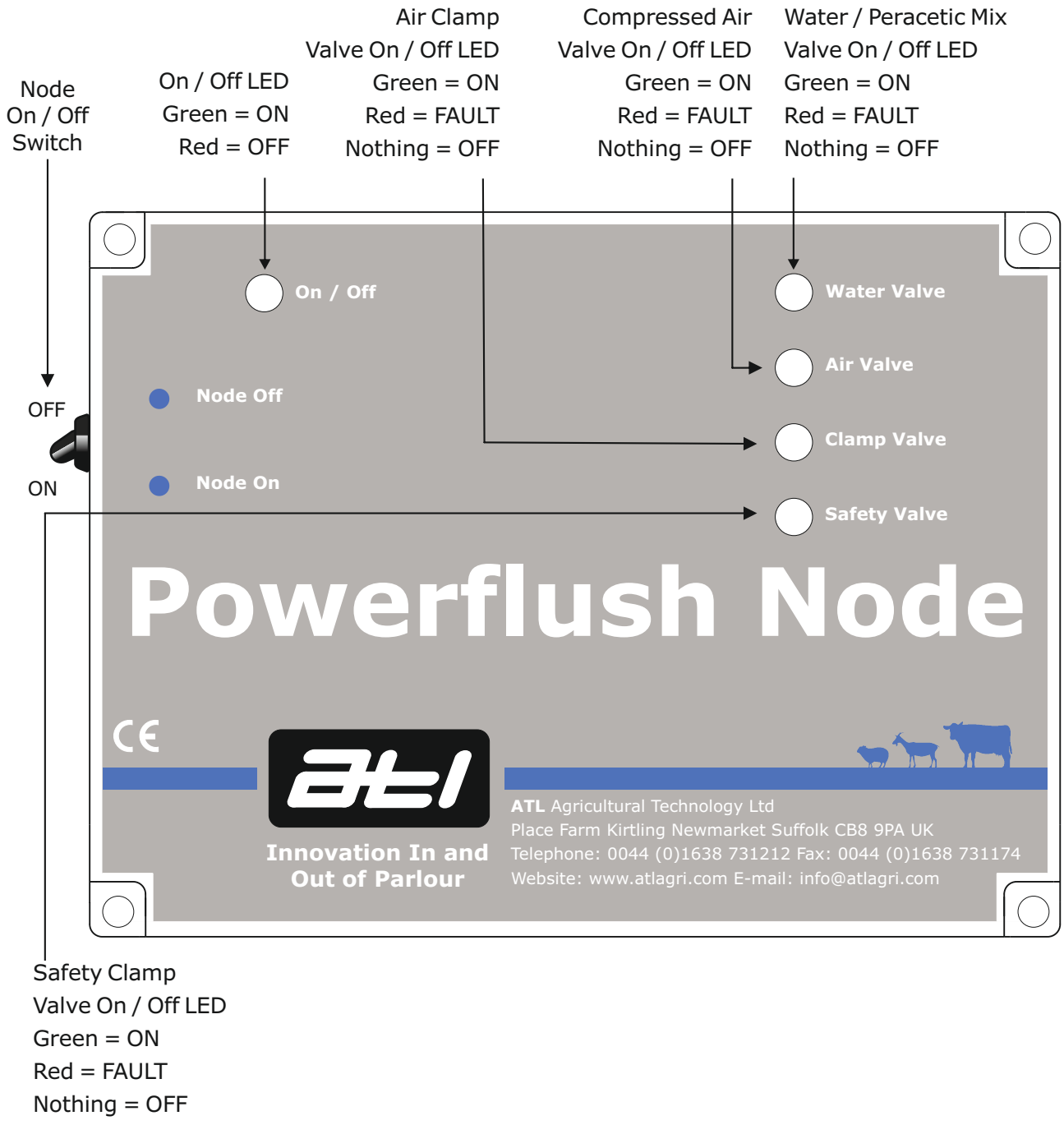
The Powerflush system plumbing on a high level doubled up milking parlour is shown below.



IMPORTANT - Separate compressed air and water lines should be brought to each side of the parlour.

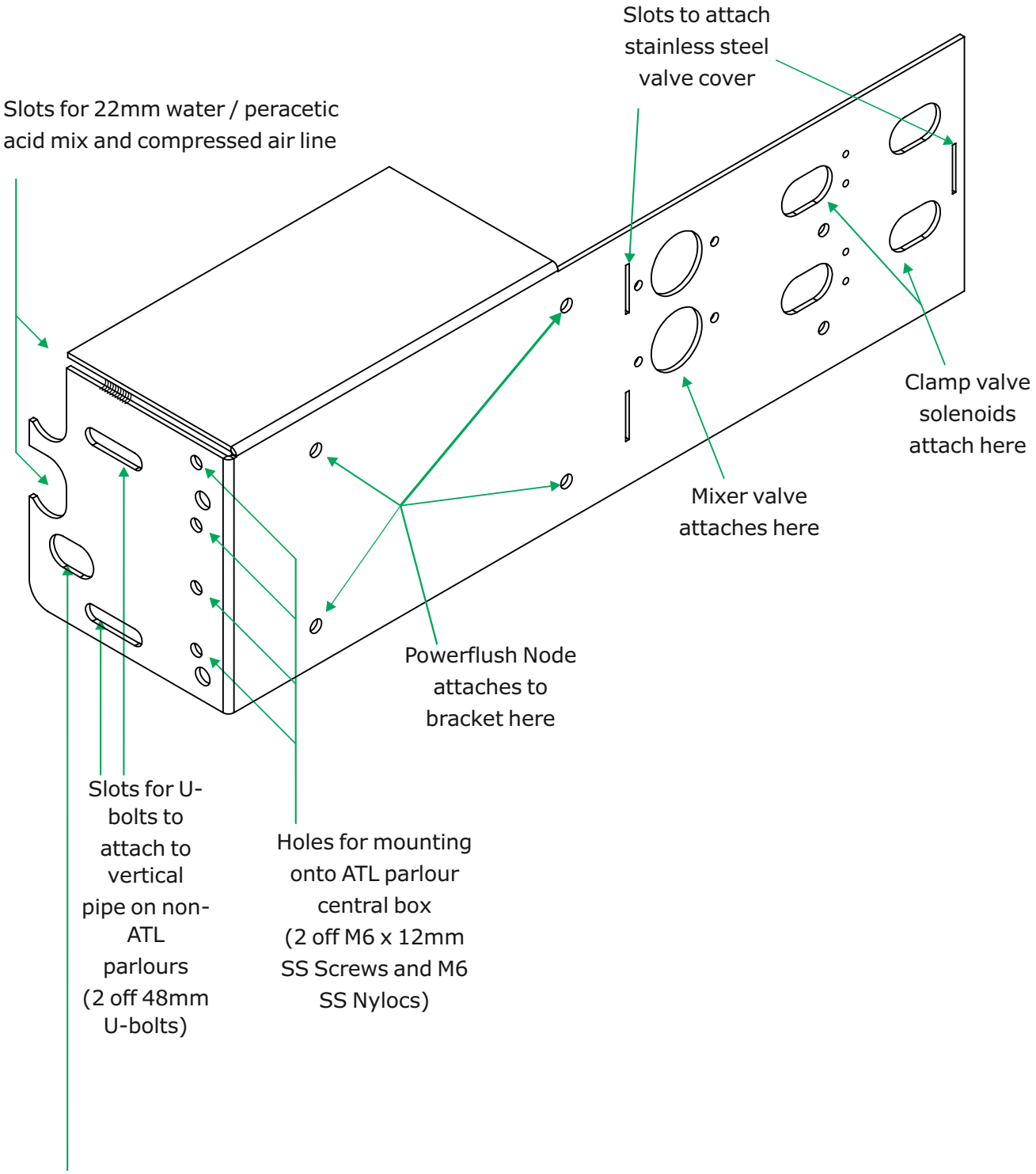
The Powerflush Node

The Powerflush Node is installed at each milking point and incorporates the PCB, compressed air and solenoid valves for controlling the flushing at each point.



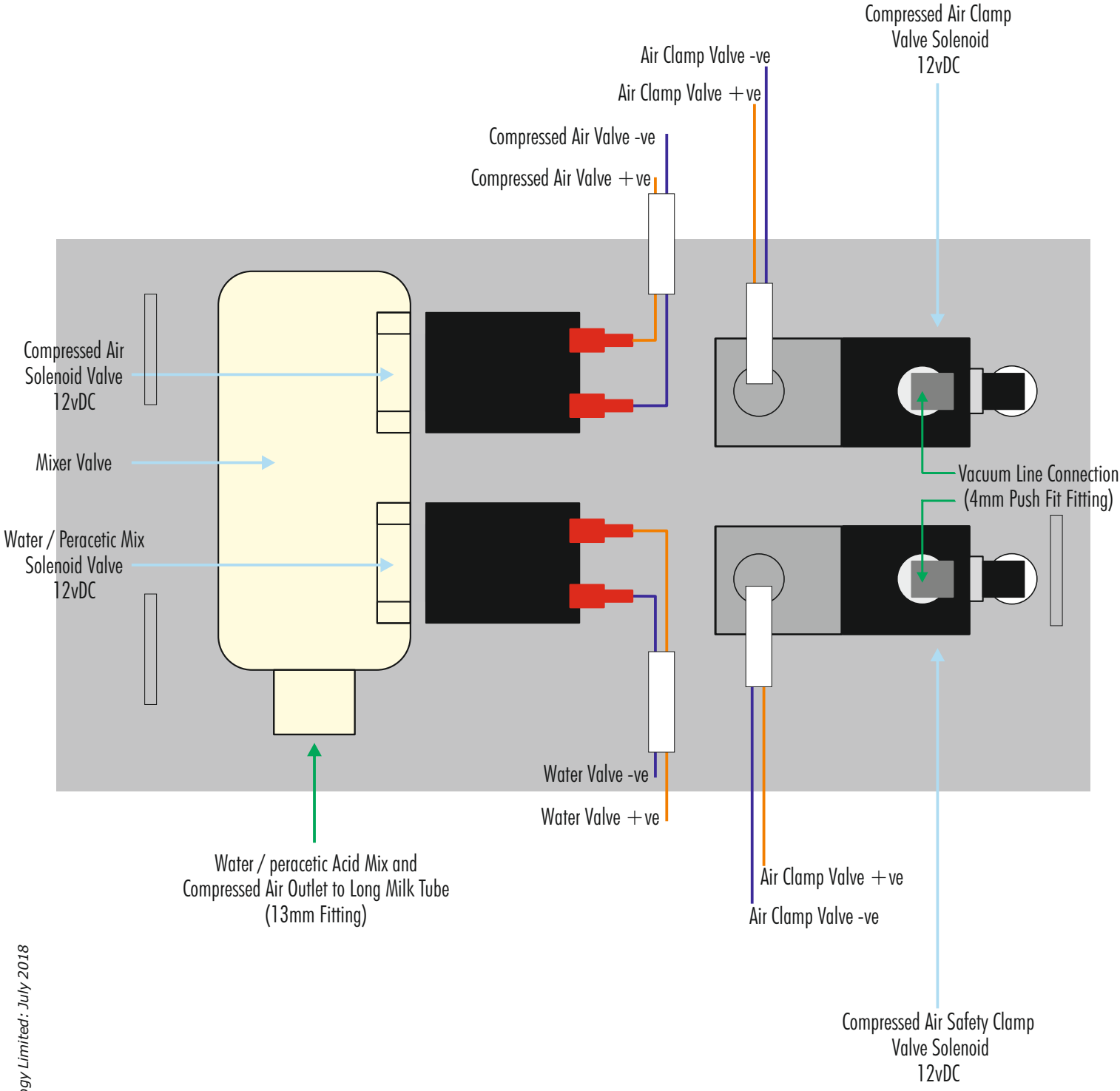
The Powerflush Node Mounting Bracket

Each Powerflush node / point is attached to the parlour frame using the mounting bracket shown in the diagram below.



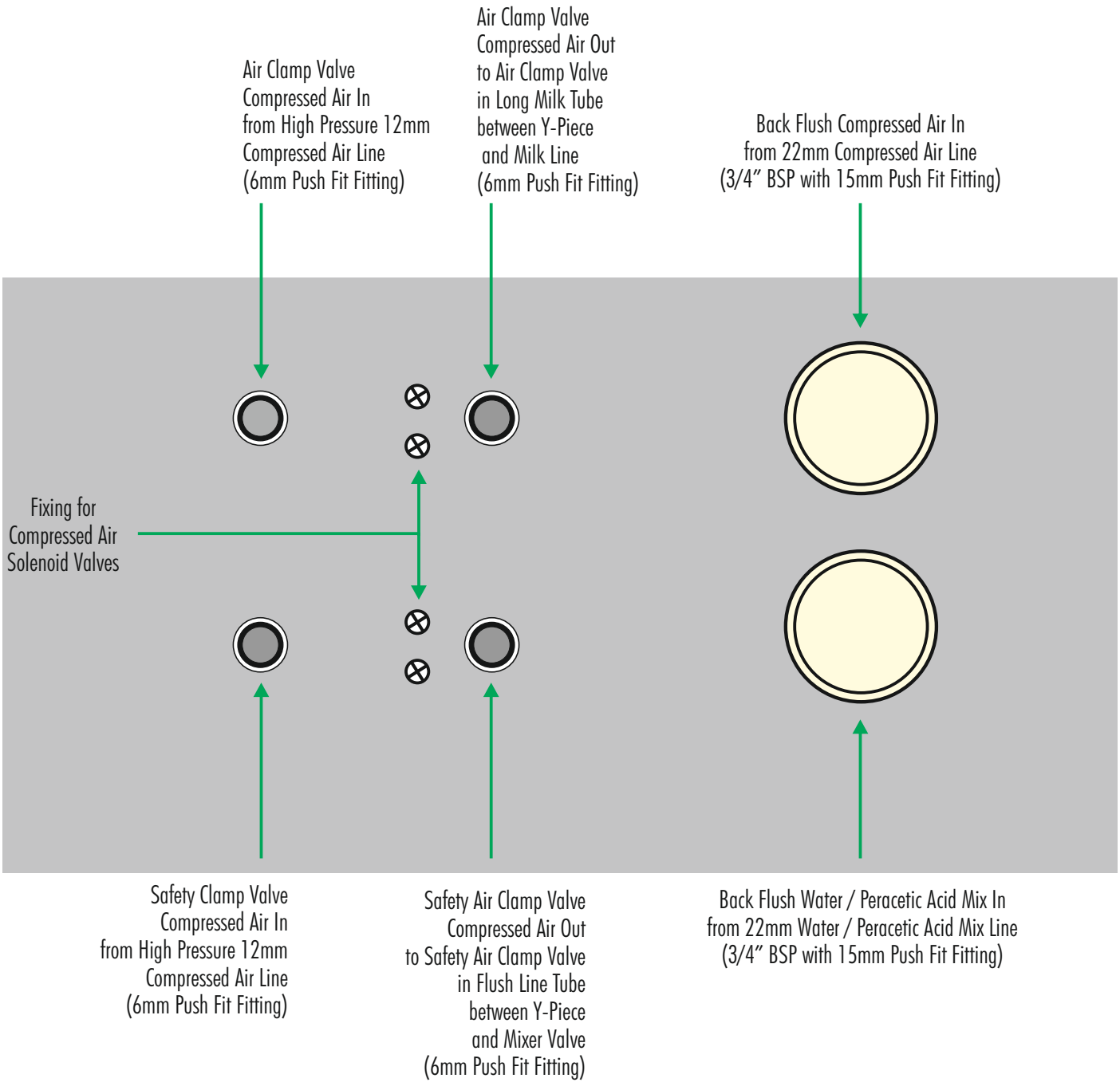
The Powerflush Node Valve Wiring

The Powerflush Node valve wiring connections are shown in the diagram below.



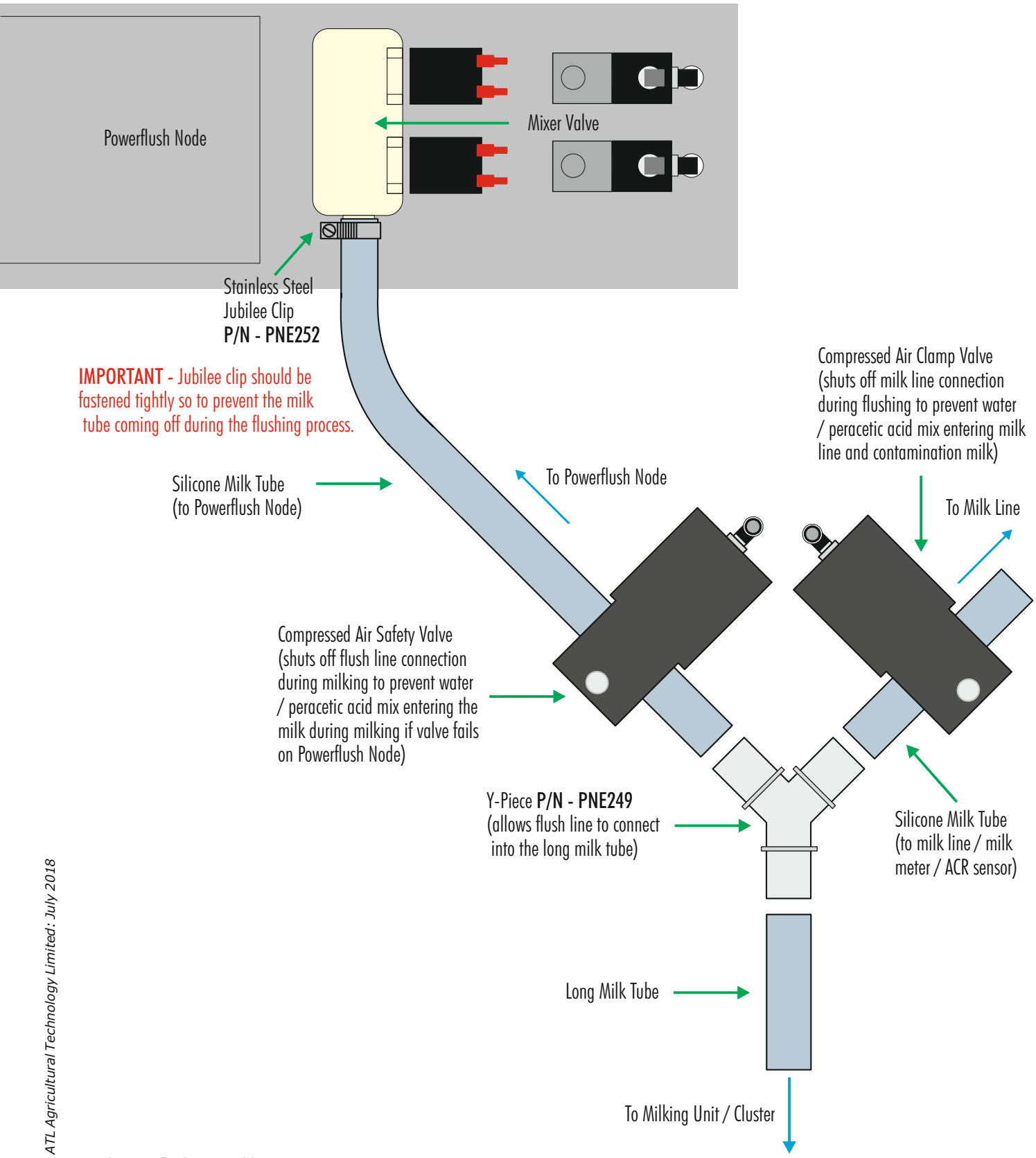
The Powerflush Node Water and Compressed Air Connections - On Rear of Bracket

The Powerflush Node water valve and compressed air valve connections are shown in the diagram below.



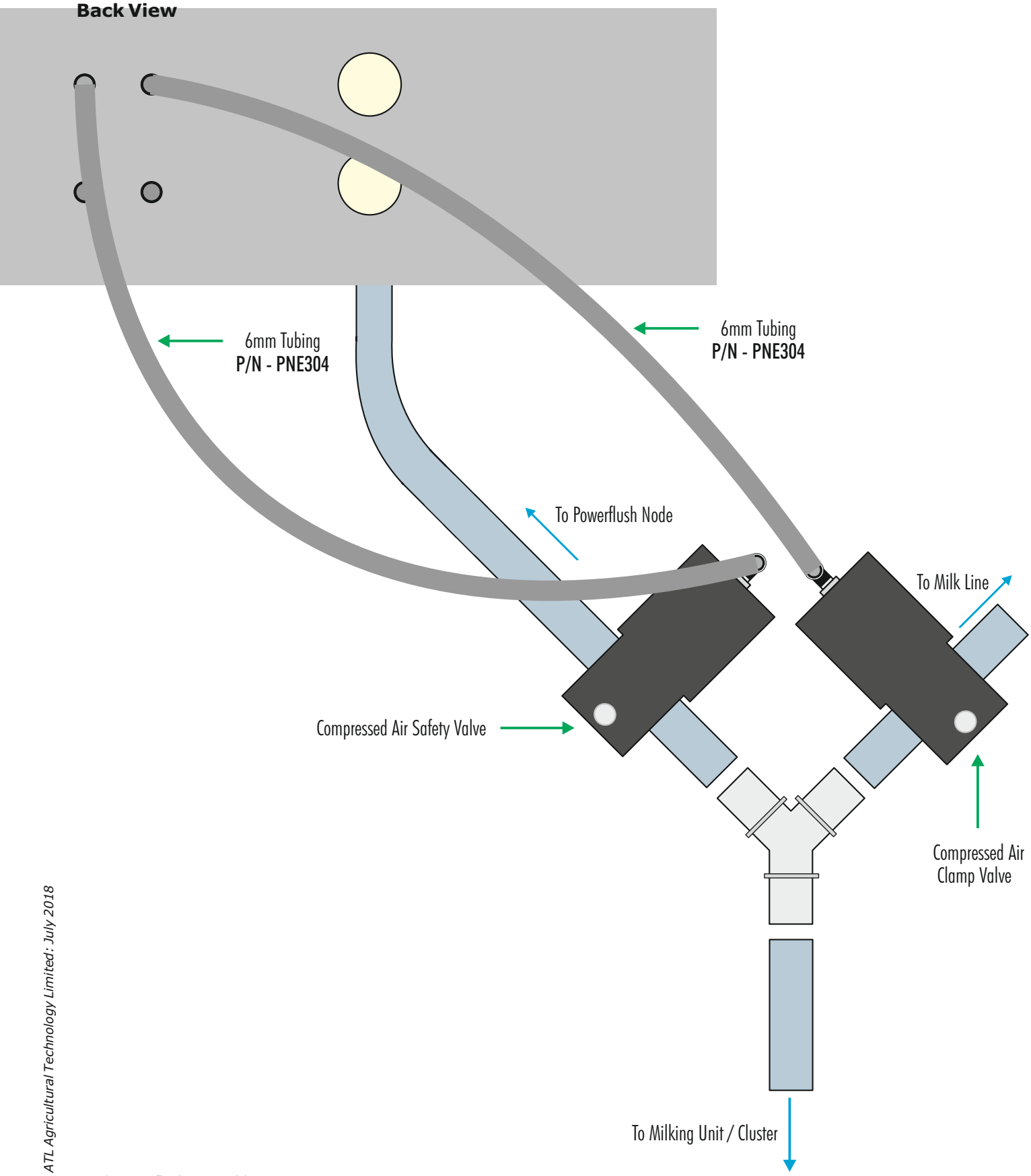
The Powerflush Node Connection to Long Milk Tube

The Powerflush Node connection to the long milk tube is shown in the diagram below.



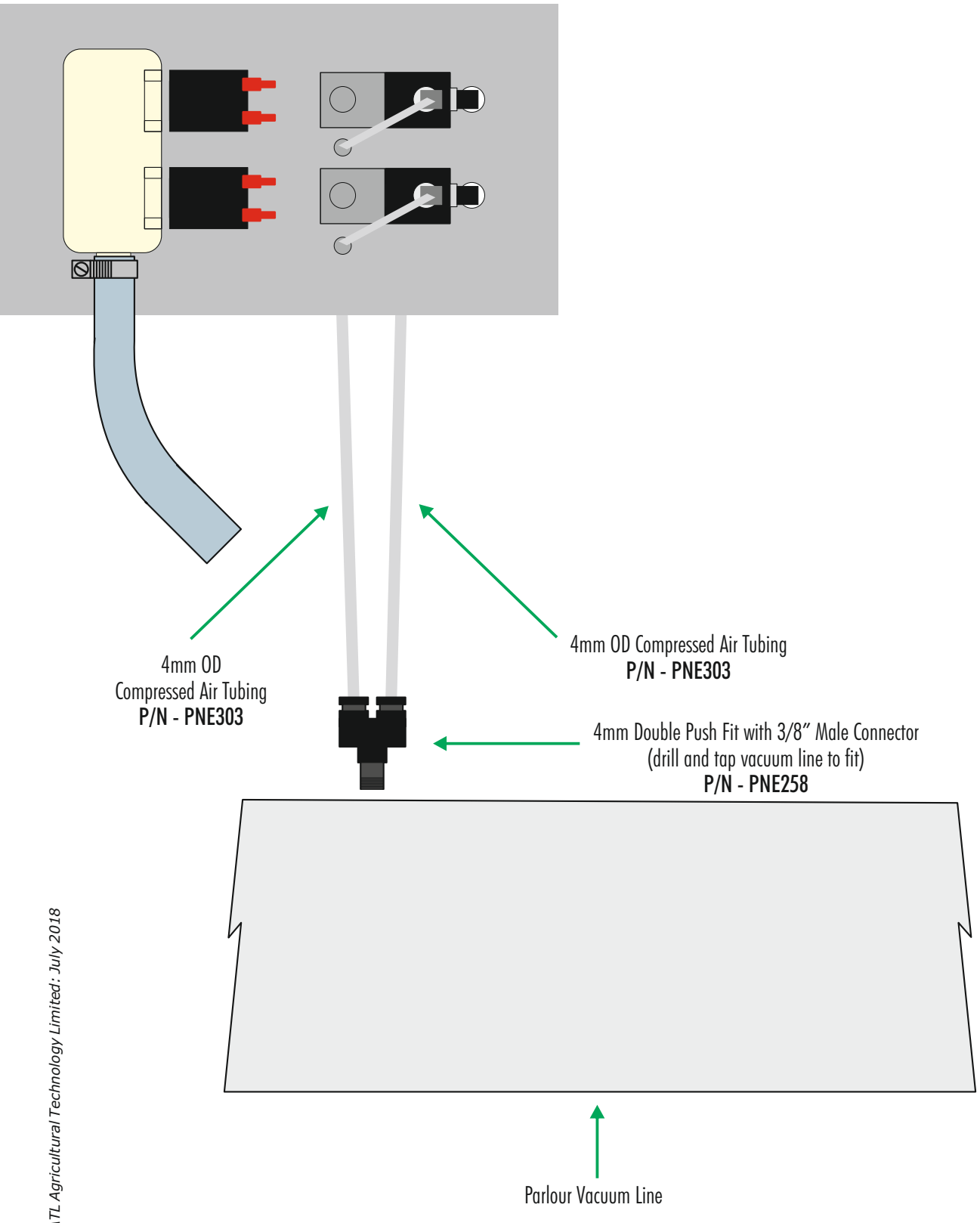
Connecting the Powerflush Node to the Clamp Valves

Back View



The Powerflush Node Clamp and Safety Valve Vacuum Connections

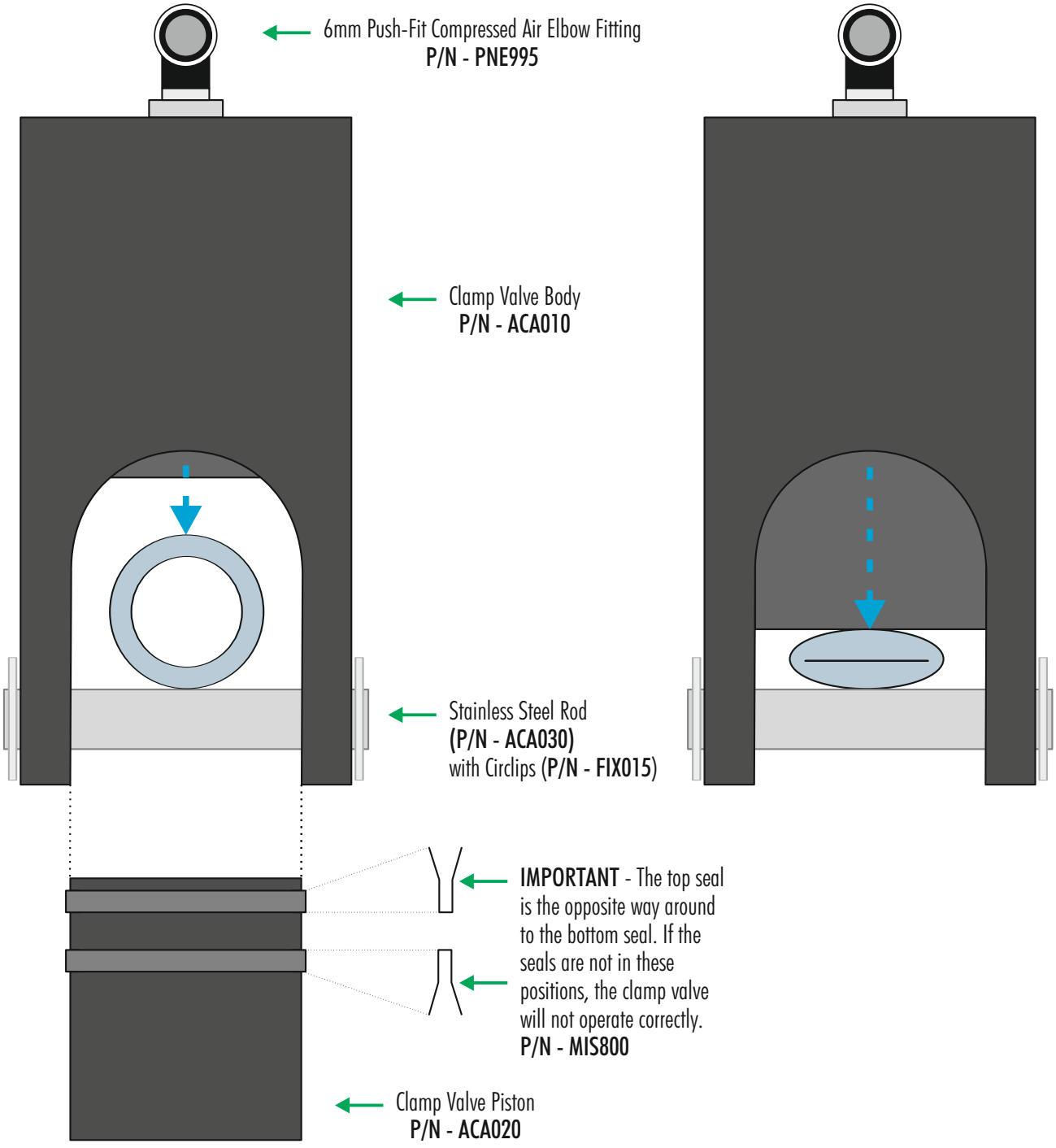
The Powerflush Node clamp and safety valve vacuum connections are shown in the diagram below. The vacuum connections allow the clamp valves to be pulled off using vacuum and therefore the tube they are clamping should return to its original shape. This helps to prevent the long milk tube becoming deformed over time and interrupting the milk / vacuum flow.



The Clamp Valve - 26-0020

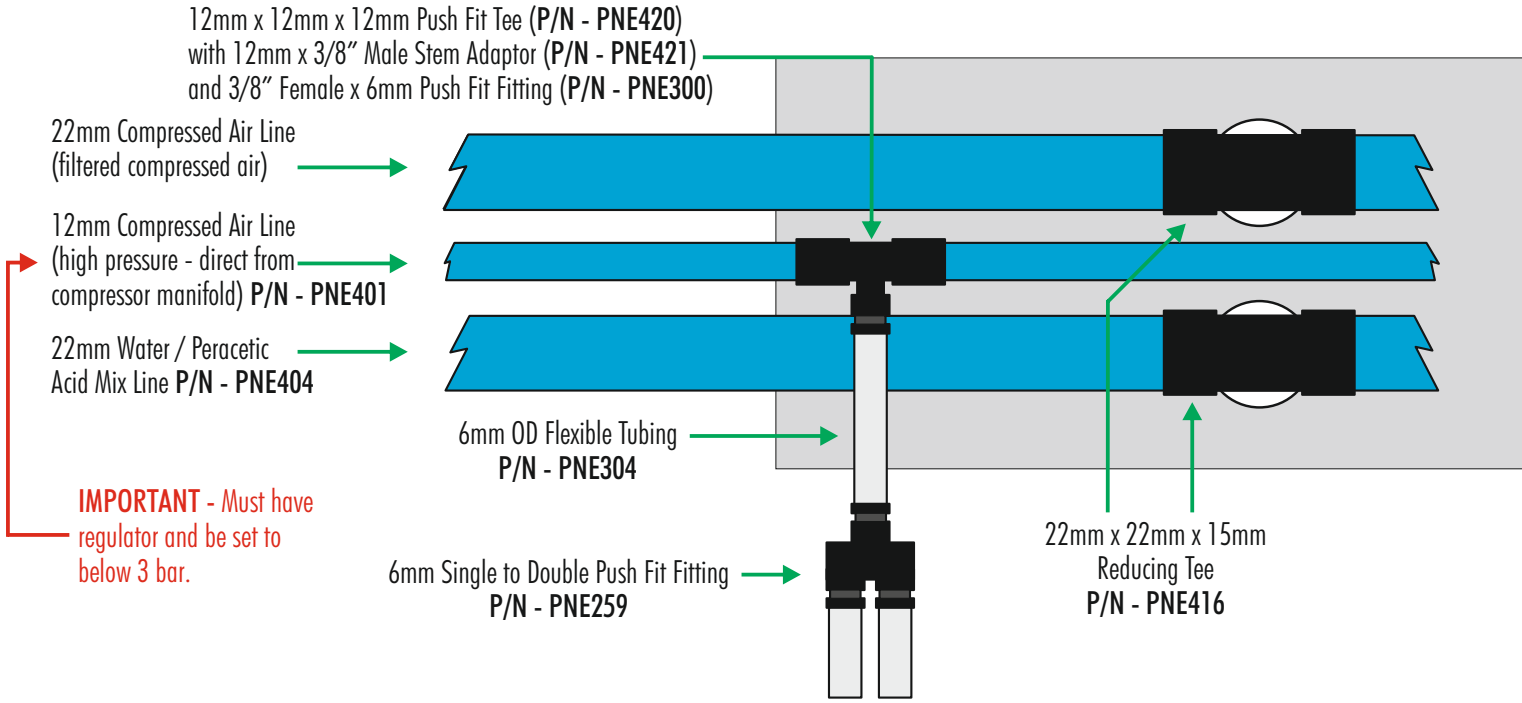
The Compressed Air Clamp Valve is shown in the diagram below. The clamp valve uses compressed air to clamp the pipe shut between the stainless steel rod and the piston. This is referred to as either the Air Clamp Valve or the Safety Clamp Valve - they are the same valve just used in different places within the Powerflush system.

Clamp Valve Unpressurised **Clamp Valve Pressurised**



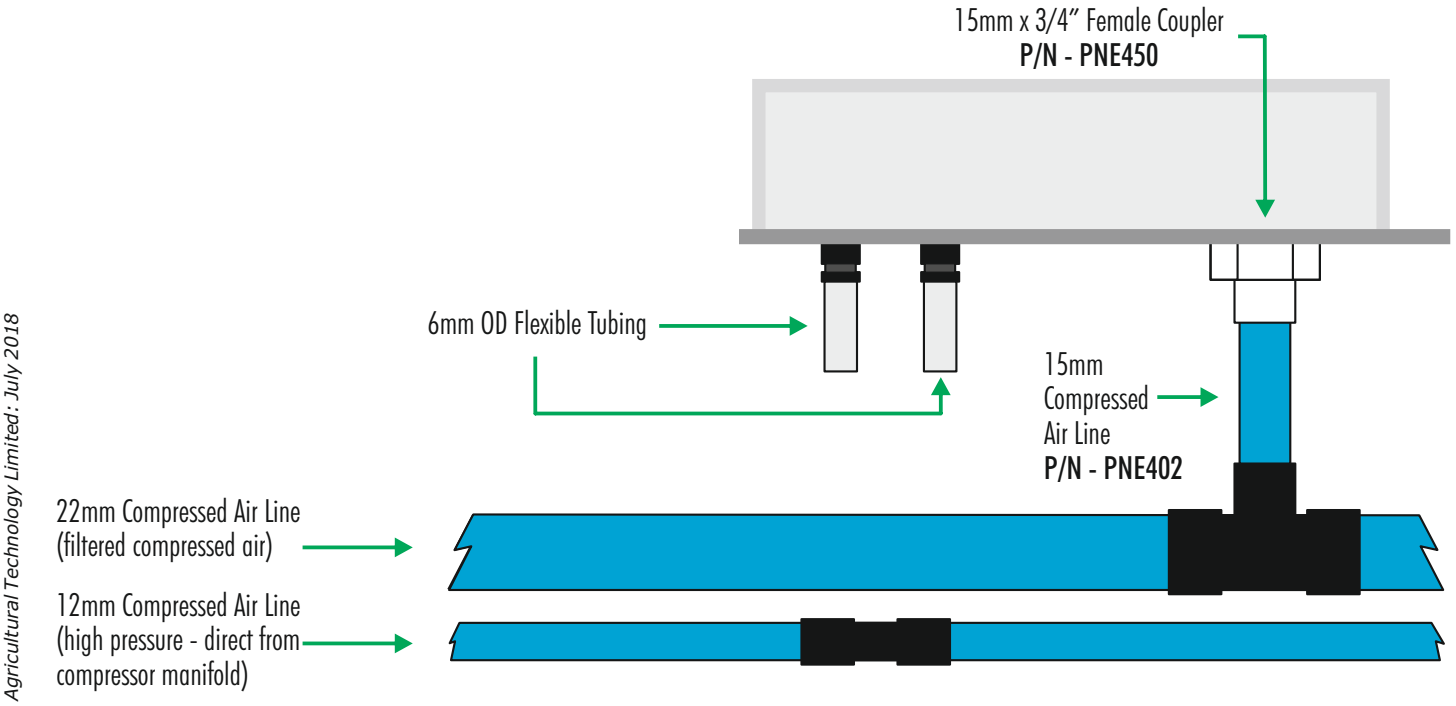
Connecting the Powerflush Node to the Compressed Air and Water Lines

Back View



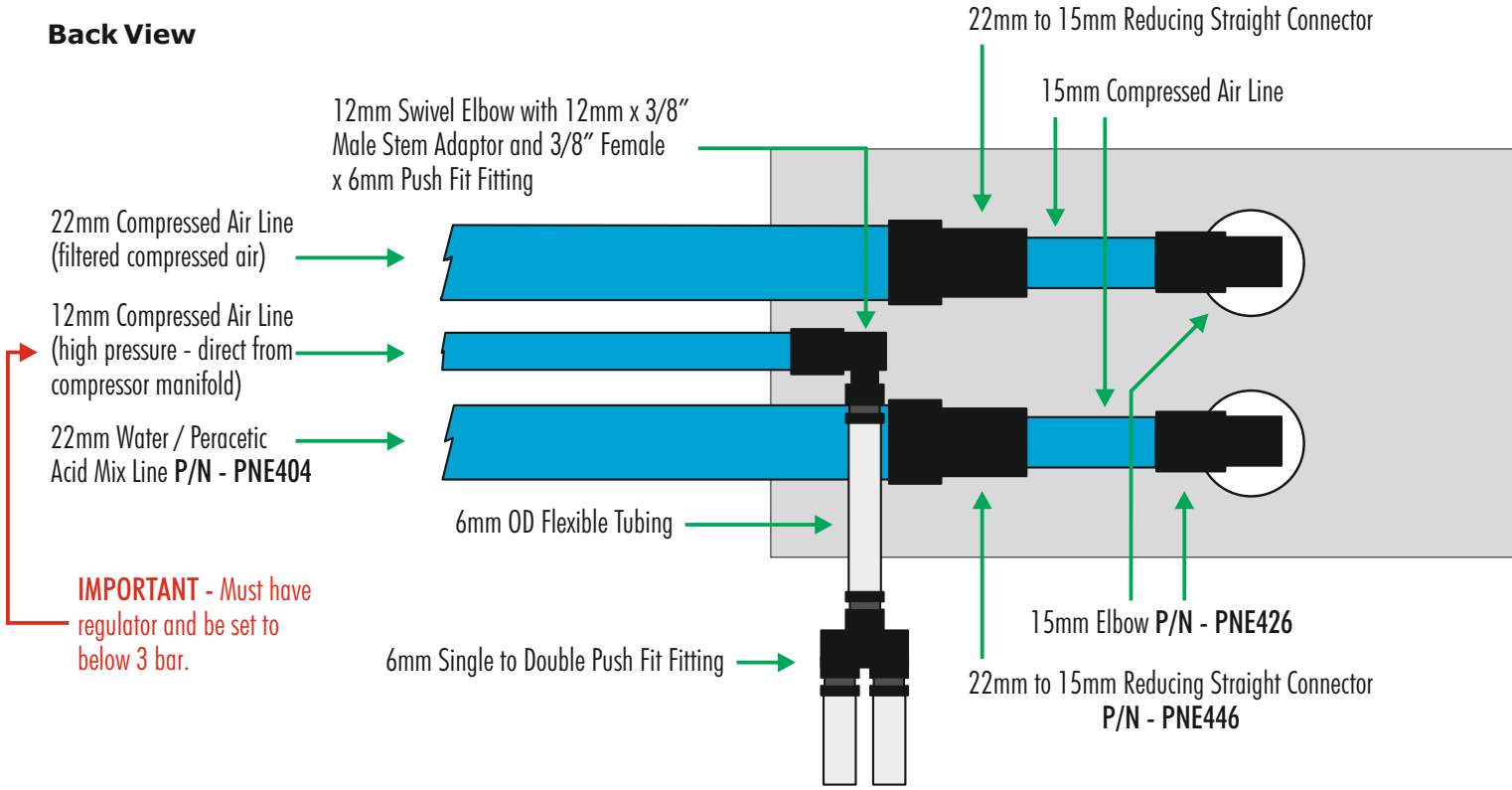
IMPORTANT - The 22mm compressed air line must use filtered (clean, dry and oil free) compressed air. If unfiltered compressed air is used, ATL is not responsible for any issues this may cause.

Top View



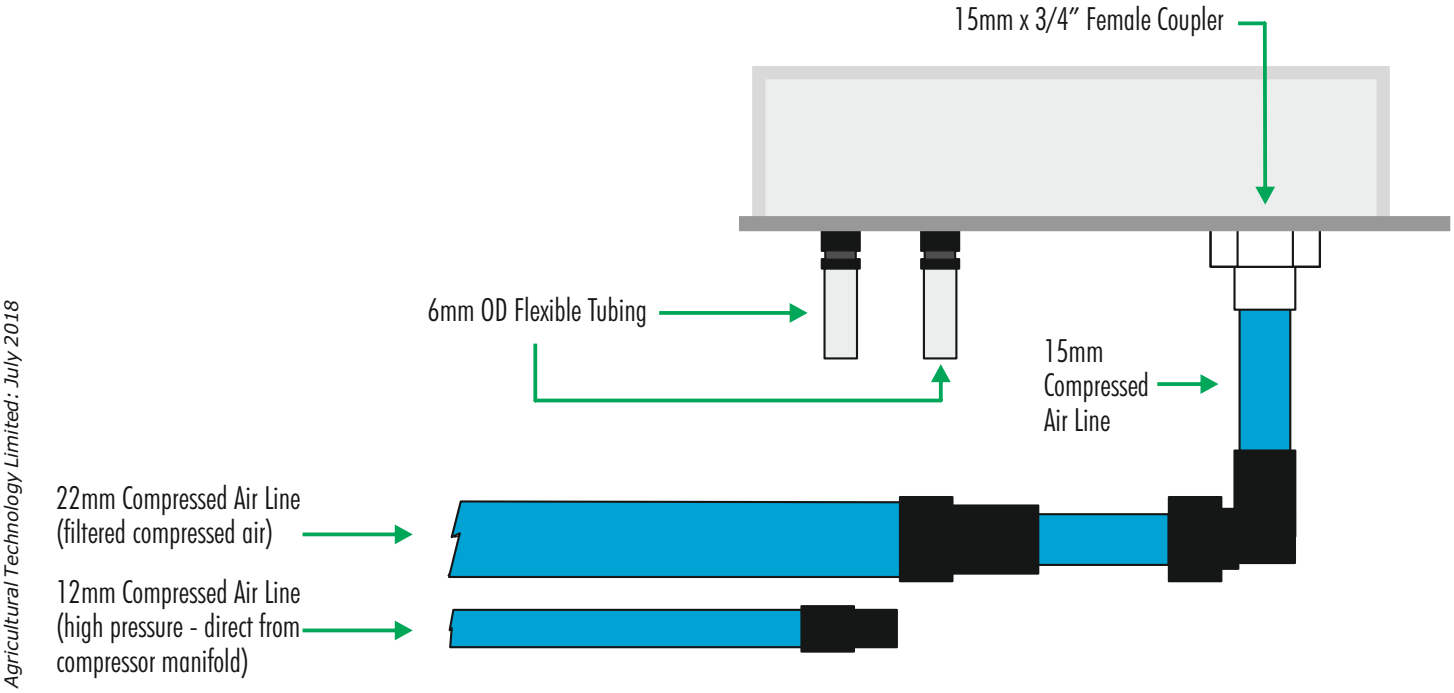
Connecting the Powerflush Node to the Compressed Air and Water Lines - End Points

Back View

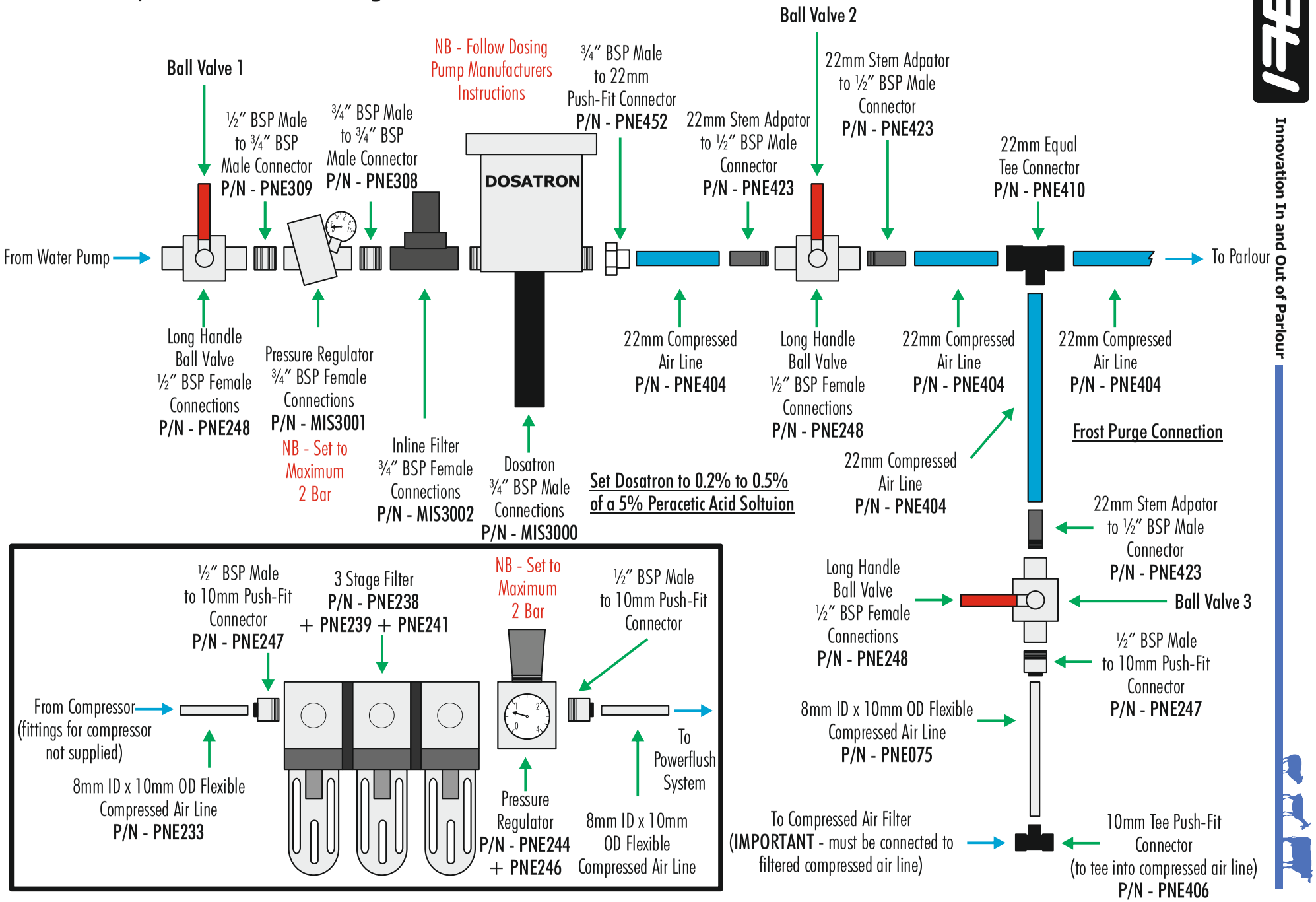


IMPORTANT - The 22mm compressed air line must use filtered (clean, dry and oil free) compressed air. If unfiltered compressed air is used, ATL is not responsible for any issues this may cause.

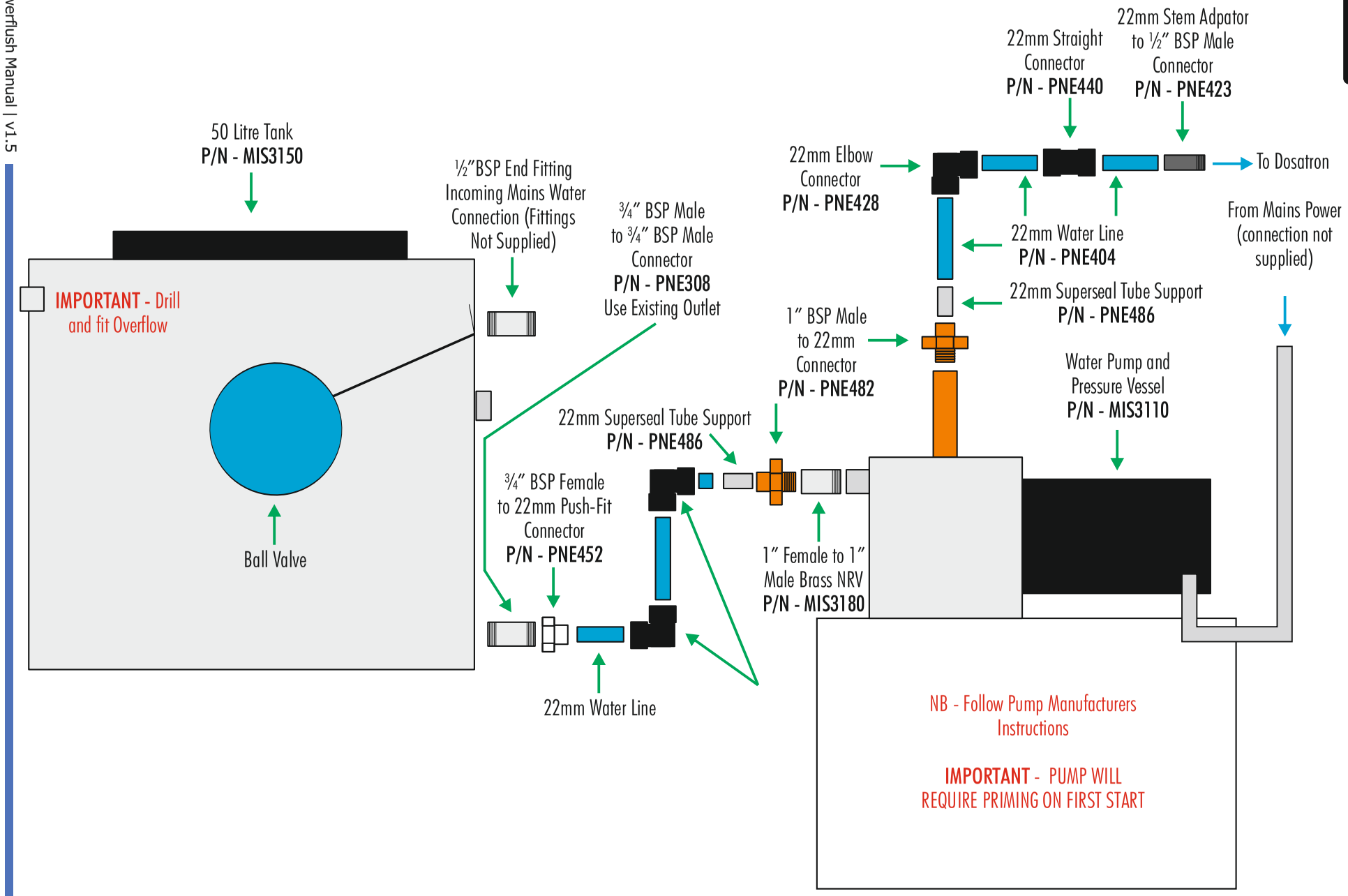
Top View



Mains Water, Dosatron and Frost Purge Connections

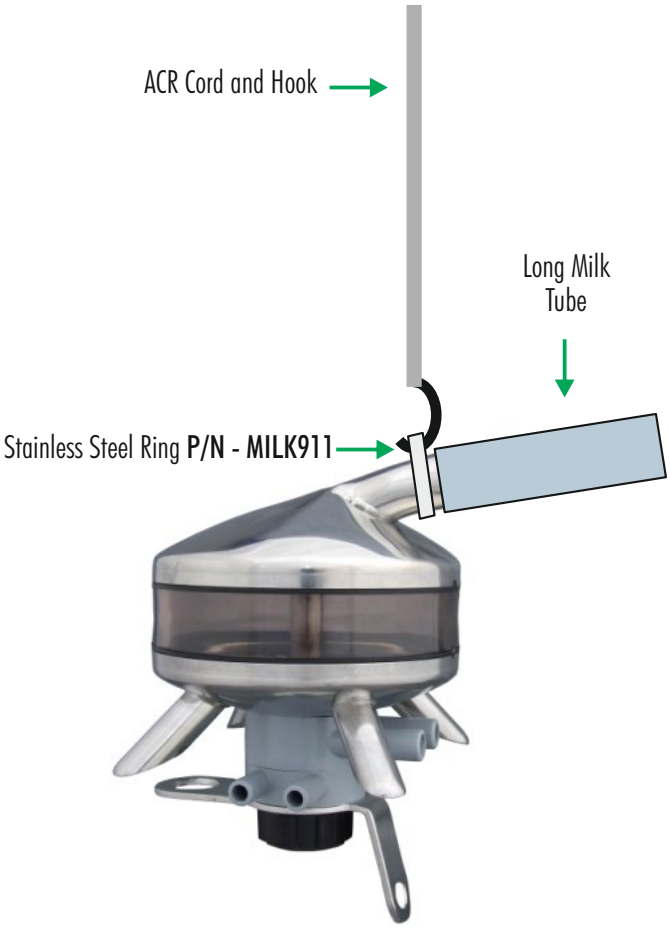


Water Pump Connections



Ring Attachment to the Cluster

The following diagram shows how to hang the cluster upside down so the flushing system can operate and drain correctly.

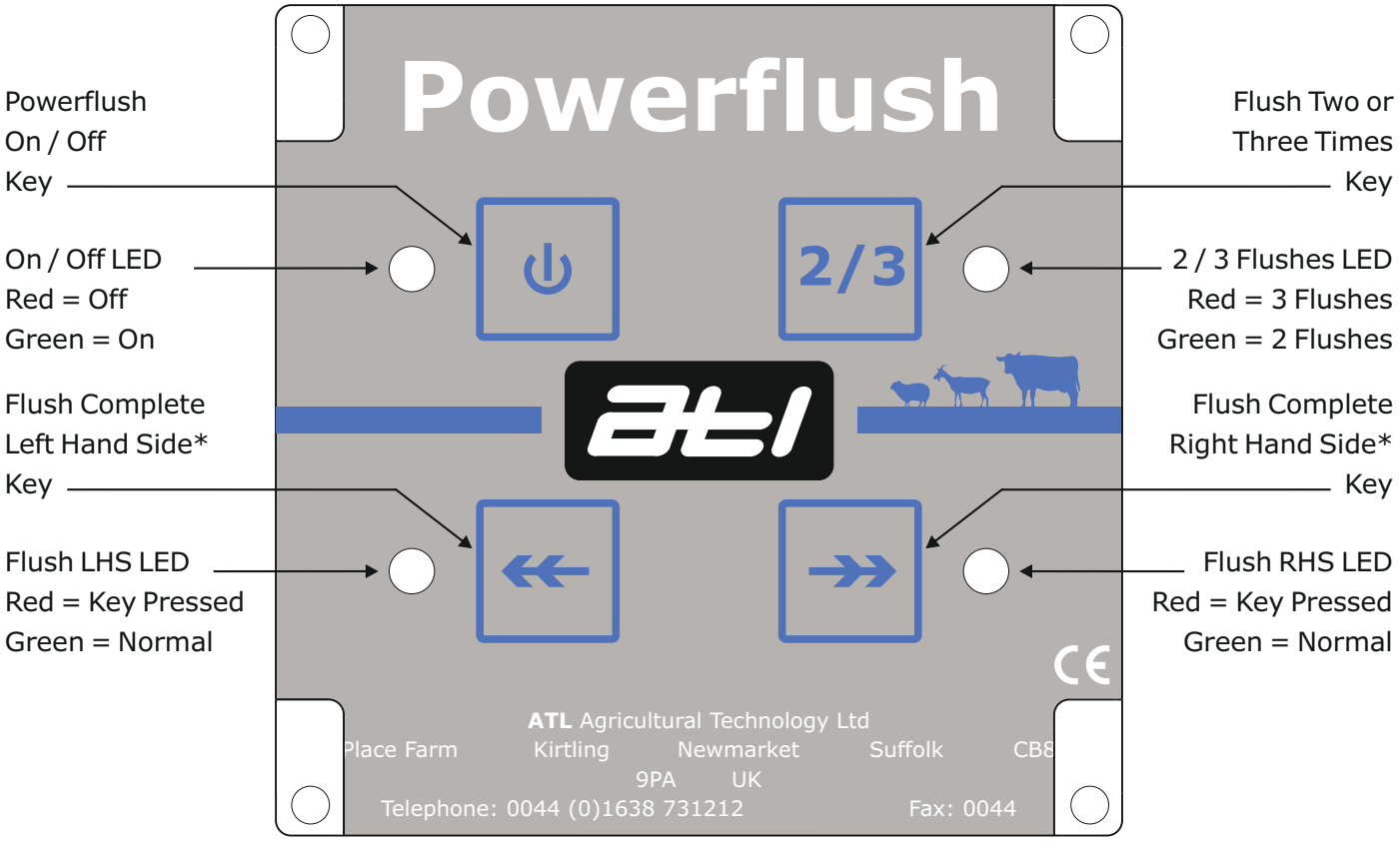


IMPORTANT - If the long milk tube comes off the claw or the swingarm during flushing, please reduce the pressue of the compressed air.

About the Powerflush Control

The Powerflush Control provides a central, easy to use control unit for the Powerflush back flush system. It allows the operator to turn the back flush system off for milk sampling, switch between 2 or 3 times flushing, and a complete side flush.

Front Cover



* On a swingover parlour, either the flush complete left hand side key or flush complete right hand side key can be pressed to flush all the units. This is set from the Master PCB in the power supply.

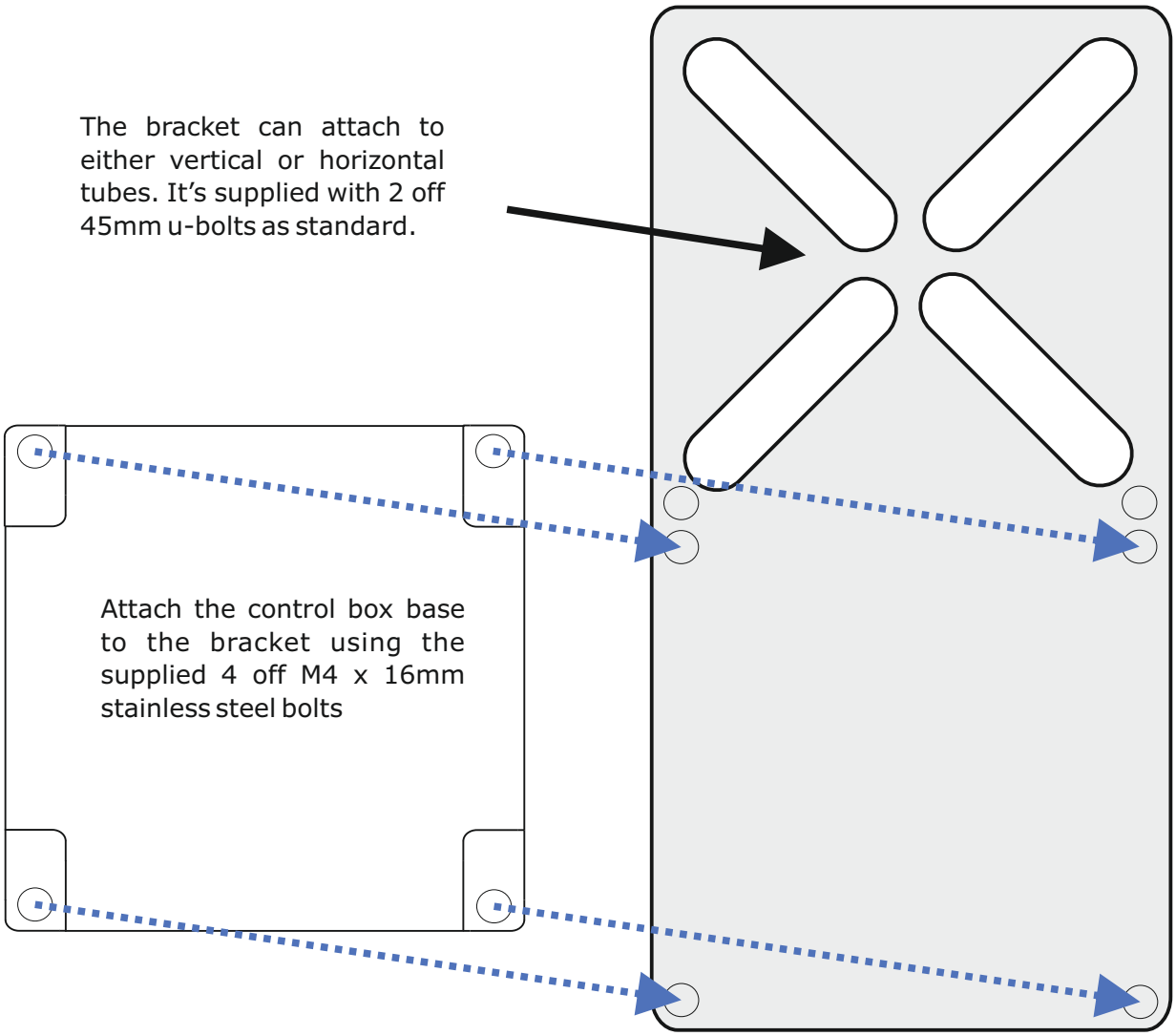
Milk Sampling

During milk sampling, the Powerflush system should be turned off. Please note that if the flushing system is not turned off, the system could damage the sampler.

Wash Overide

If the wash override input on Master PCB is connected, when the override is in use, all 4 of the LEDs will be red. When the system exits the wash, the On / Off LED will be red and the system will be switched off for 60 seconds. Once this 60 second period is completed, the On / Off LED will change to green.

Installing the Powerflush Control Enclosure

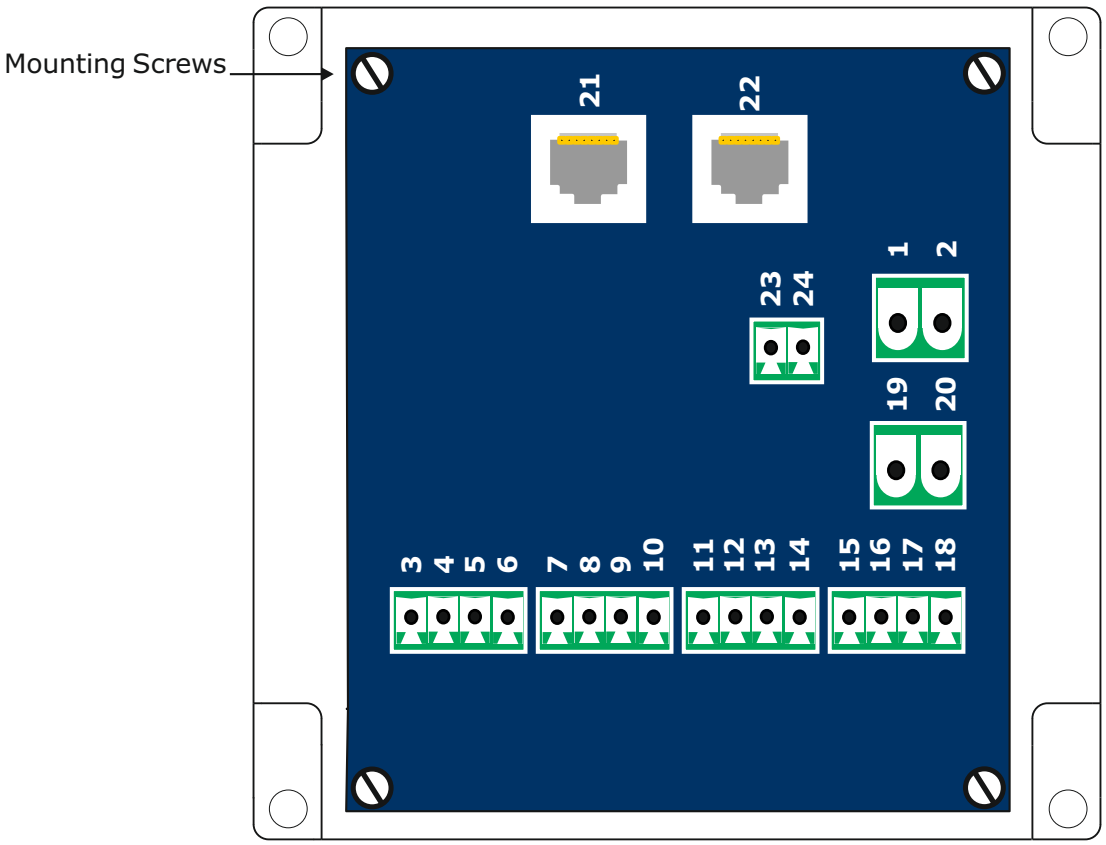


Notes

Mounting screws have washer between printed circuit board (PCB) and lid mount. If not installed, buttons will not function.

Wiring the Powerflush Control - Issue B PCB Version

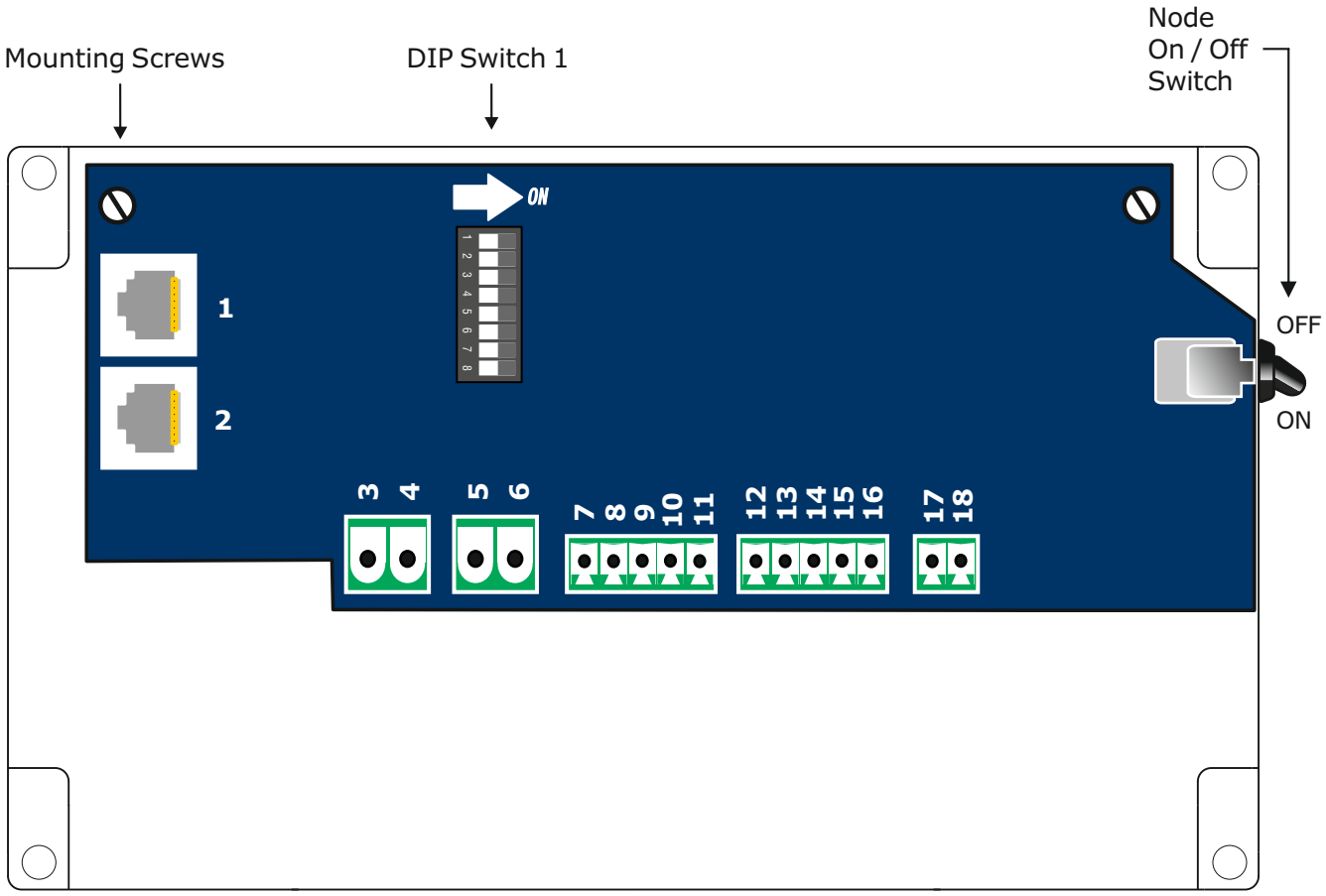
The Powerflush wiring connections are shown in the diagram and corresponding table below.



Number	Connects To	Cable Specification
1	Power In +12vDC	2.5mm CSA
2	Power In -12vDC	2.5mm CSA
3	Unused	Unused
4	Unused	Unused
5	Unused	Unused
6	Unused	Unused
7	Unused	Unused
8	Unused	Unused
9	Unused	Unused
10	Unused	Unused
11	Unused	Unused
12	Unused	Unused
13	Unused	Unused
14	Unused	Unused
15	Unused	Unused
16	Unused	Unused
17	Unused	Unused
18	Unused	Unused
19	Unused	Unused
20	Unused	Unused
21	Communications In	Cat5e Cable
22	Communications Out	Cat5e Cable
23	Unused	Unused
24	Unused	Unused

Wiring the Powerflush Node - Issue C PCB Version

The Powerflush Node wiring connections are shown in the diagram and corresponding table below.



Number	Connects To	Cable Specification
1	Communications In	Cat5e Cable
2	Communications Out	Cat5e Cable
3	12vDC +ve Out	2.5mm CSA
4	12vDC -ve Out	2.5mm CSA
5	12vDC +ve In	2.5mm CSA
6	12vDC -ve In	2.5mm CSA
7	Air Clamp 12vDC +ve Common	1.0mm CSA Red (Factory Wired)
8	Air Clamp 12vDC -ve	1.0mm CSA Black (Factory Wired)
9	Compressed Air 12vDC +ve Common	1.5mm CSA Red (Factory Wired)
10	Compressed Air 12vDC -ve	1.5mm CSA Black (Factory Wired)
11	Water 12vDC +ve Common	1.5mm CSA Red (Factory Wired)
12	Water 12vDC -ve	1.5mm CSA Black (Factory Wired)
13	Safety Clamp 12vDC +ve Common	1.0mm CSA Red (Factory Wired)
14	Safety Clamp 12vDC -ve	1.0mm CSA Black (Factory Wired)
15	ACR 12vDC +ve	Farm Fitted
16	ACR 12vDC -ve	Farm Fitted
17	Electronic Start 12vDC +ve	Farm Fitted
18	Electronic Start 12vDC -ve	Farm Fitted

Wiring the Powerflush Power Supply

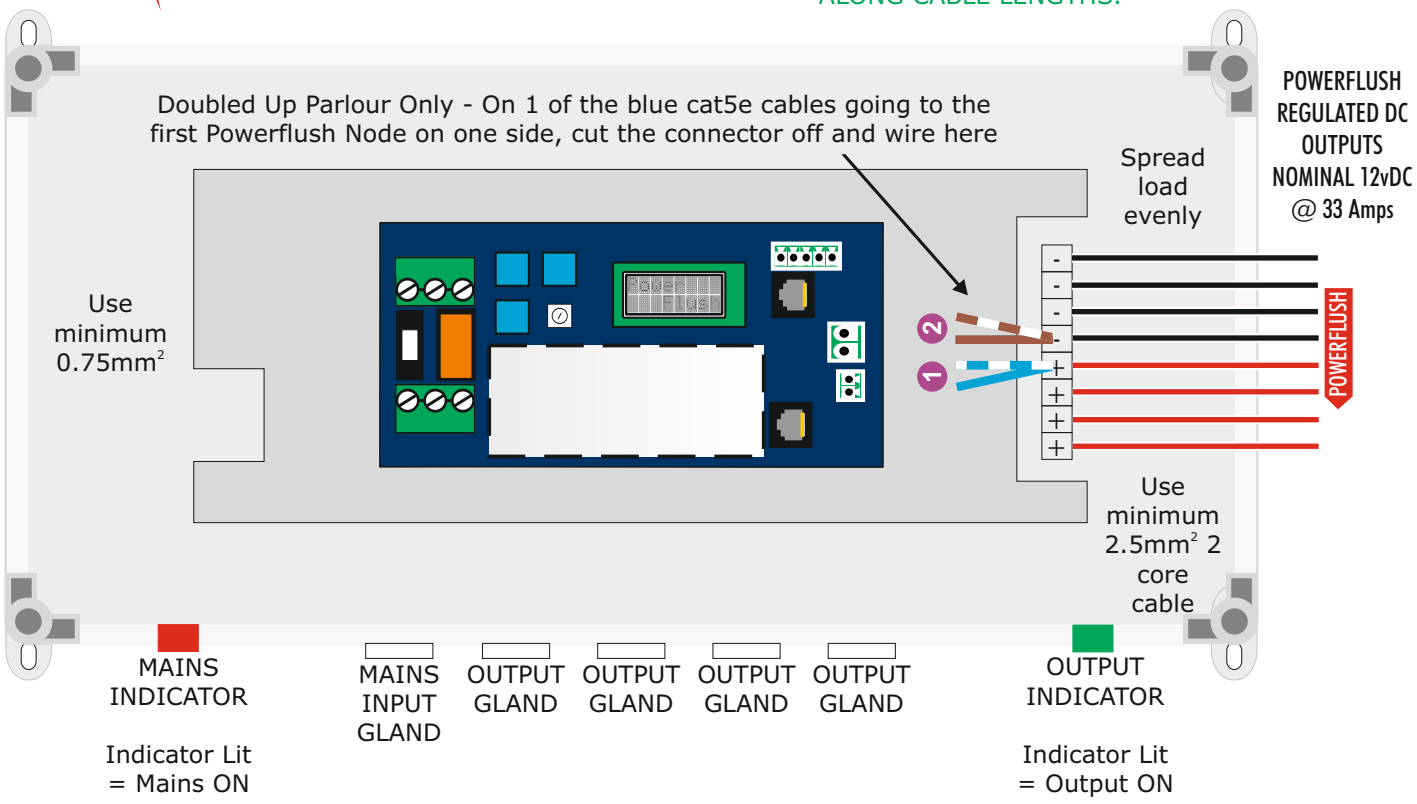
The Powerflush Controller wiring connections are shown in the diagram and corresponding table below.

- Mains Voltage: 100-240volt AC
- Output Voltage: Nominal 13.6volt DC
- Mains Fuse: 5 Amp
- Automatic Over Current Protection
- Maximum Number Of Powerflush Nodes (Points): 20

- Ensure the loading on each power supply is as even as possible (i.e. If a Powerflush system has a total of 36 points, 2 power supplies will be supplied and each should be set to run 18 PowerFlush points).

WARNING: DISCONNECT THE MAINS SUPPLY BEFORE REMOVING THE POWER SUPPLY COVER

IMPORTANT - OUTPUT FACTORY SET TO 13.6vDC TO ACCOUNT FOR VOLTAGE DROP ALONG CABLE LENGTHS.



POWERFLUSH

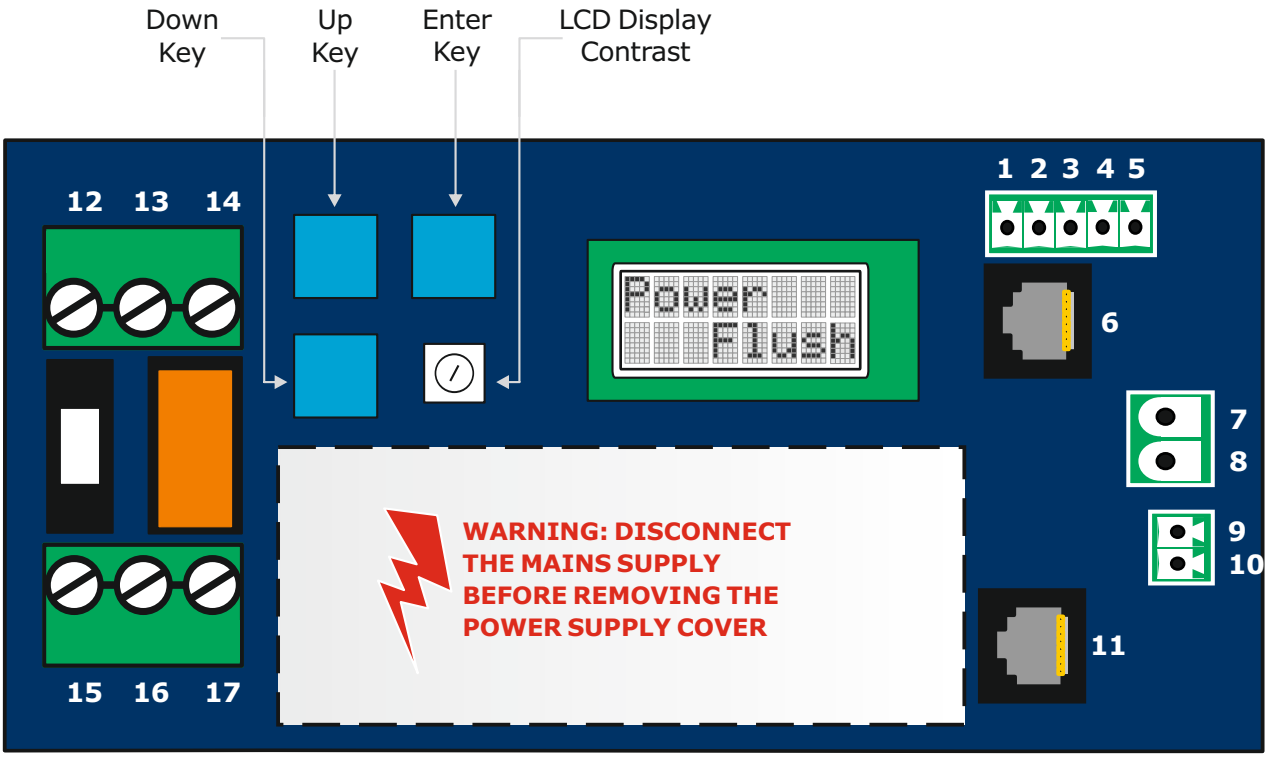
Connect to Powerflush Nodes.

Output Specification: Nominal 12vDC @ 33 Amps

IMPORTANT - Use different cable for every 4 Powerflush Nodes to provide for current requirements of system.

Wiring the Powerflush Controller - Issue C PCB Version

The Powerflush Controller PCB can be found in the Powerflush power supply and the wiring connections are shown in the diagram and corresponding table below.

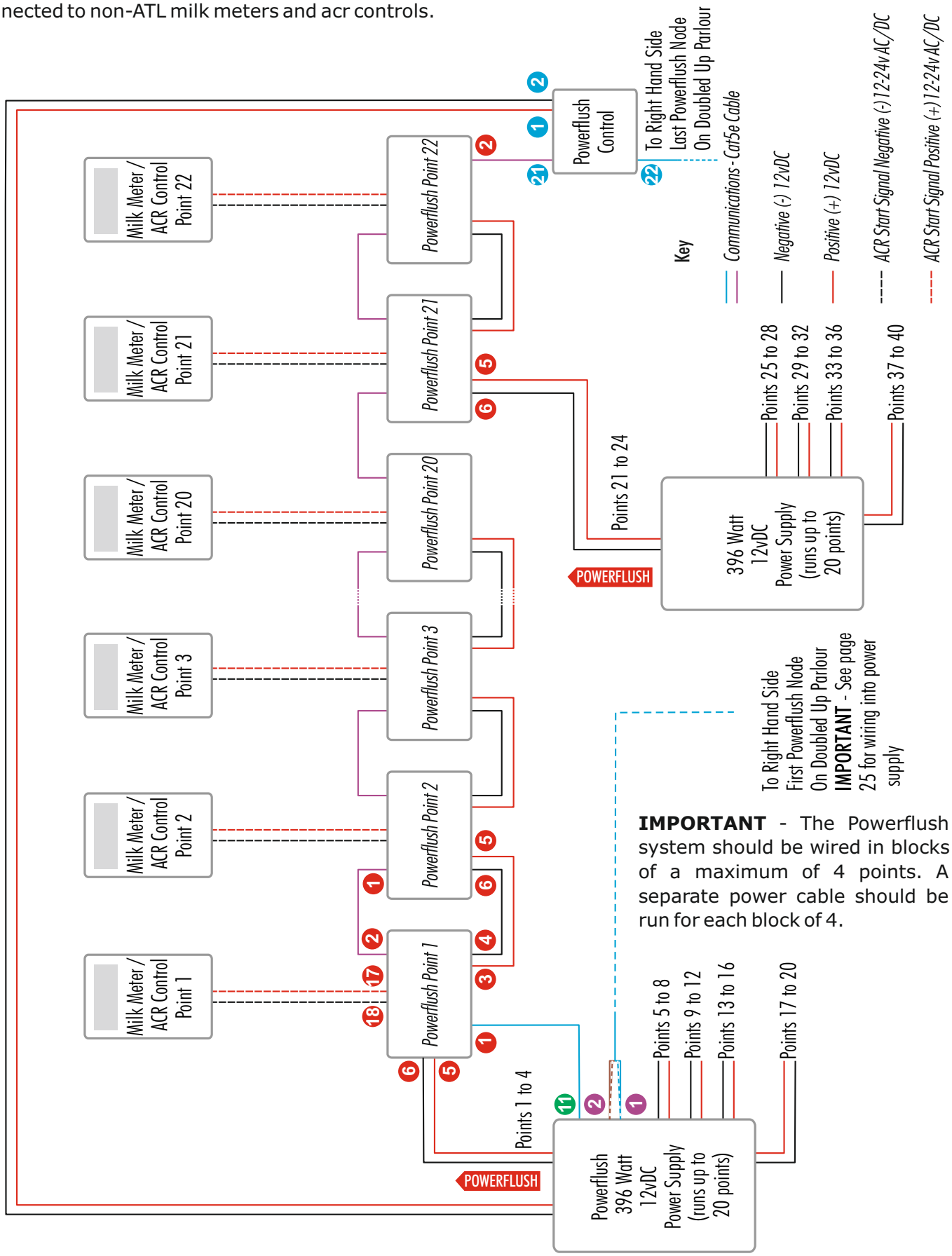


Number	Connects To	Cable Specification
1	Meridian Data -ve	Unused
2	Meridian Data 0v	Twisted Pair - 2 x Black
3	Meridian Data Out	Twisted Pair - Red
4	Meridian Data In	Twisted Pair - White
5	Meridian Data +ve	Unused
6	Meridian Data Communications	Cat5e Cable
7	12vDC +	2.5mm CSA (Factory Wired)
8	12vDC -	2.5mm CSA (Factory Wired)
9	Disable B	Unused
10	Disable A	Unused
11	Rs485 Data Communications	Cat5e Cable
12	Live (Brown) to Power Supply	Factory Wired
13	Earth (Yellow/Green) to Power Supply	Factory Wired
14	Neutral (Blue) to Power Supply	Factory Wired
15	Live (Brown) from Mains	Mains Rated Cable
16	Earth (Yellow/Green) from Mains	Mains Rated Cable
17	Neutral (Blue) from Mains	Mains Rated Cable

IMPORTANT - Connections 12 to 17 (highlighted red) are 230vAC mains connections. Please treat with caution.

Wiring the Powerflush System - Electronic Connection for Non-ATL Milk Meters or ACR Controls

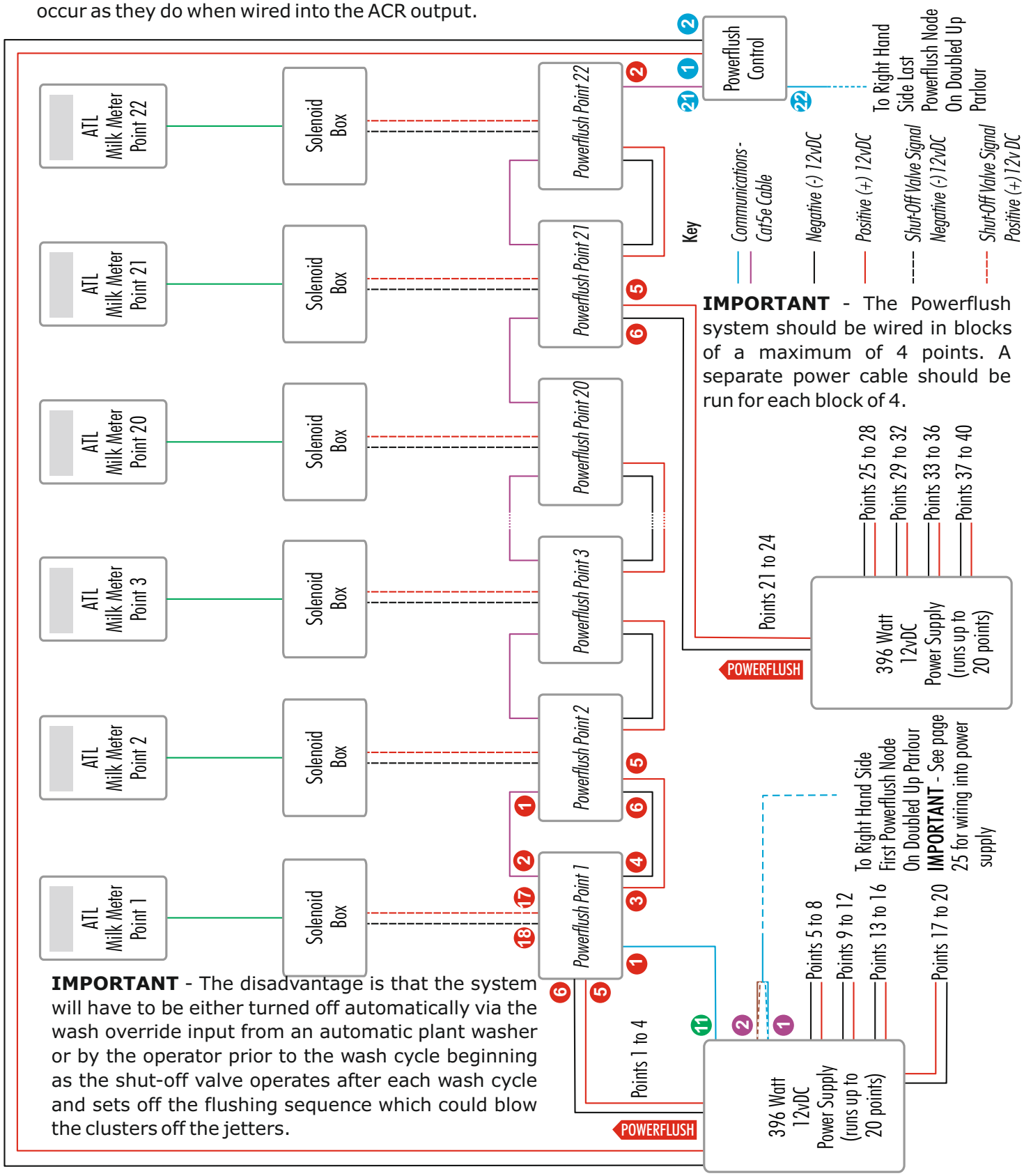
The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to non-ATL milk meters and acr controls.



IMPORTANT - The Powerflush system should be wired in blocks of a maximum of 4 points. A separate power cable should be run for each block of 4.

Wiring the Powerflush System - Electronic Connection for ATL Milk Meters - Shut-Off Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL milk meters and the shut-off valve output. The advantage of wiring into the shut-off valve is that the operator is free to operate the ACR ram whenever they choose and unnecessary flushes will not occur as they do when wired into the ACR output.

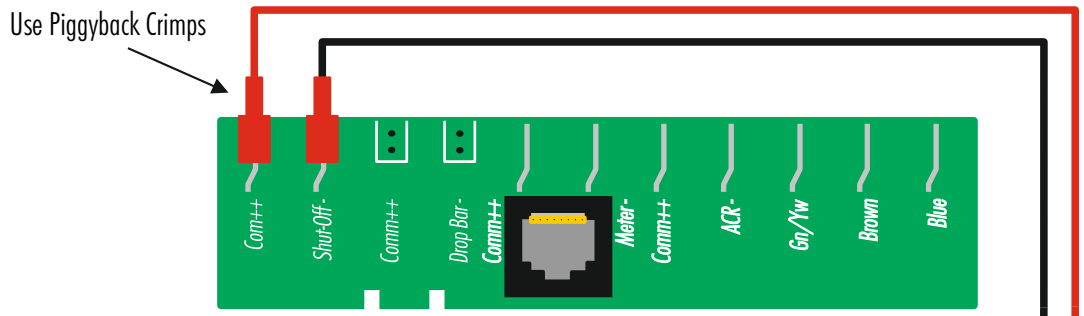


IMPORTANT - The disadvantage is that the system will have to be either turned off automatically via the wash override input from an automatic plant washer or by the operator prior to the wash cycle beginning as the shut-off valve operates after each wash cycle and sets off the flushing sequence which could blow the clusters off the jetters.

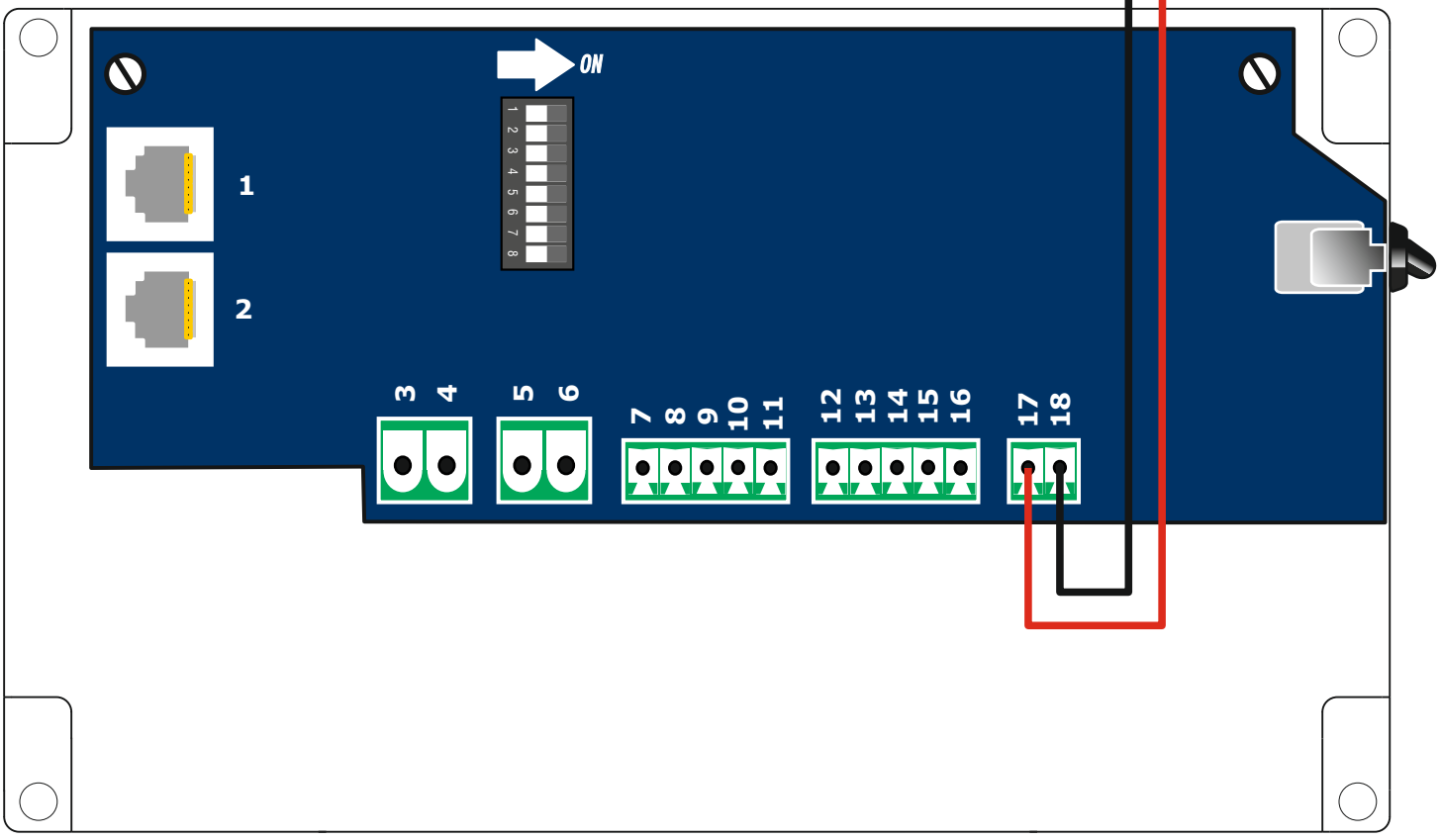
Wiring the Powerflush System into the ATL Milk Meter Solenoid Box Shut-Off Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL milk meters and the shut-off valve output.

The ATL Milk Meter Solenoid Box



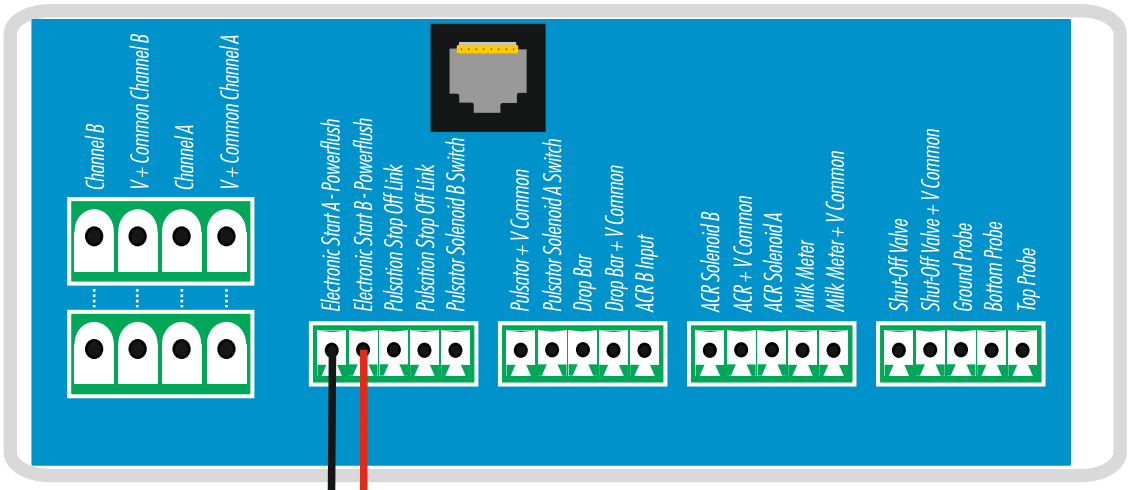
The ATL Powerflush Node



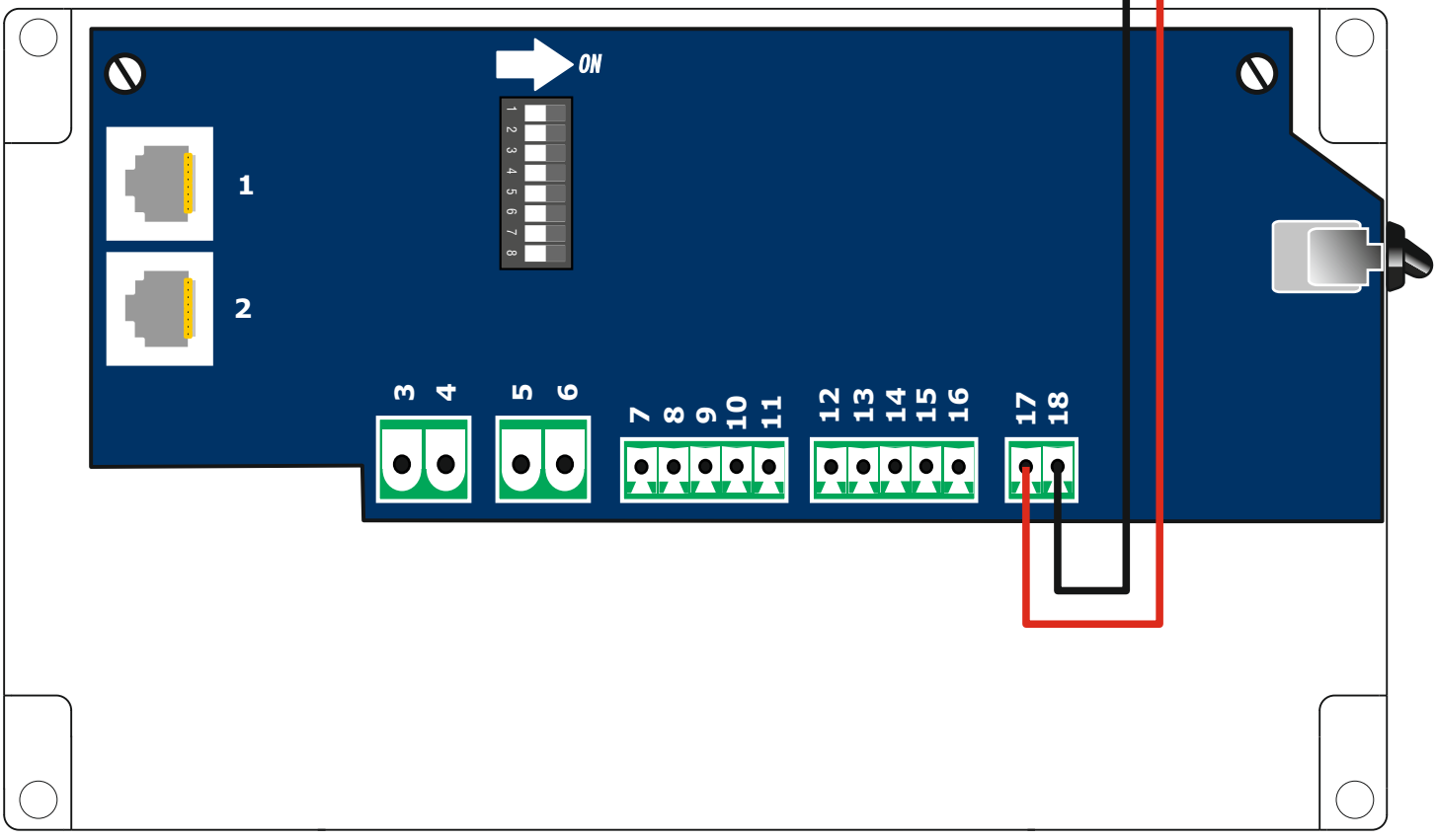
Wiring the Powerflush System into the ATL Milk Meter Solenoid Box Shut-Off Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL milk meters and the electronic start output.

The ATL Milk Meter Solenoid Box with Pulsation Stop

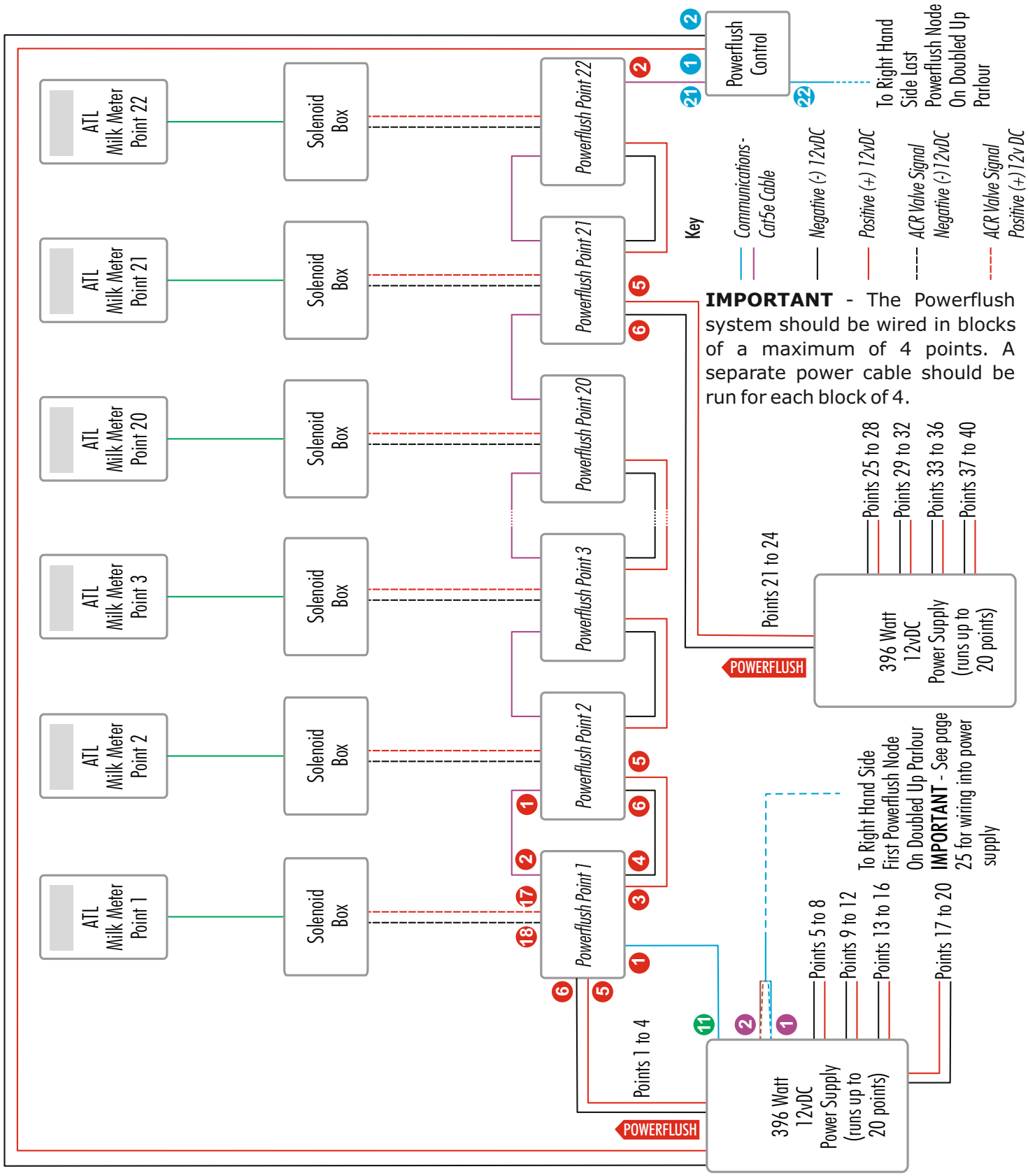


The ATL Powerflush Node



Wiring the Powerflush System - Electronic Connection for ATL Milk Meters - ACR Valve Output

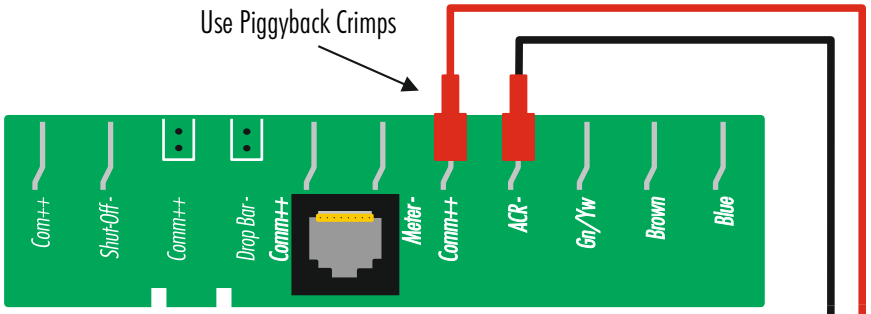
The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL milk meters and the ACR valve output. This is for ATL milk meter software versions



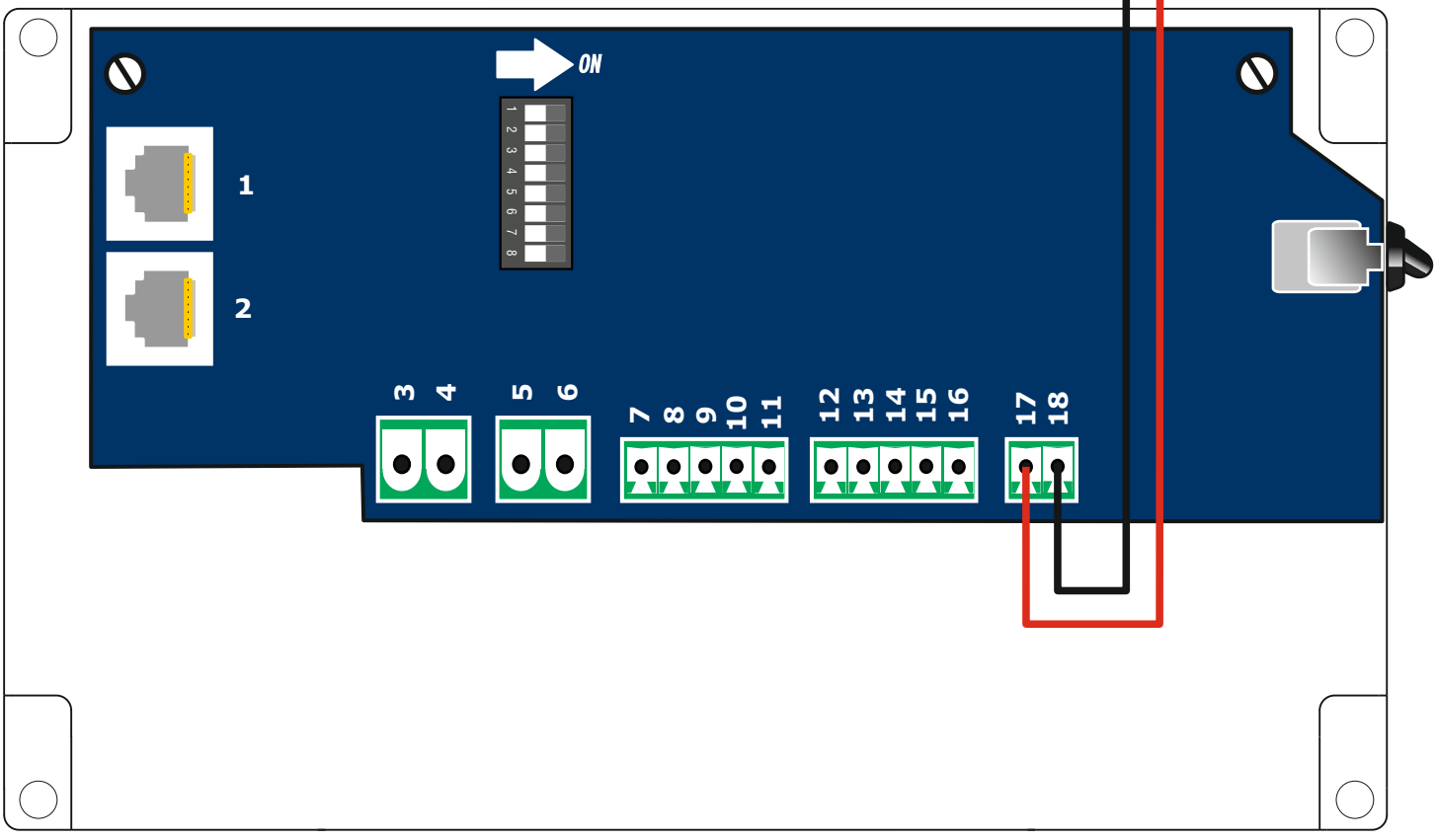
Wiring the Powerflush System into the ATL Milk Meter Solenoid Box ACR Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL milk meters and the ACR valve output.

The ATL Milk Meter Solenoid Box



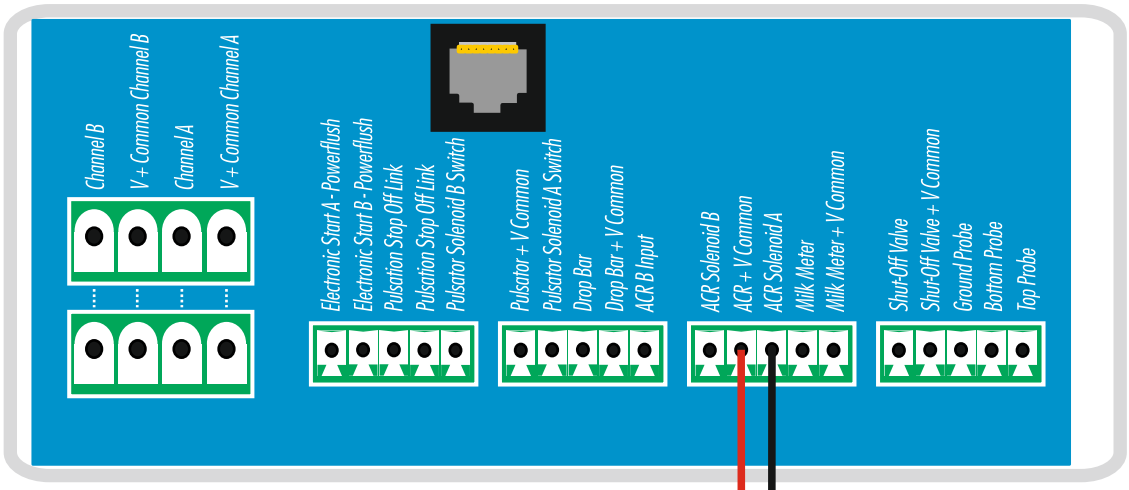
The ATL Powerflush Node



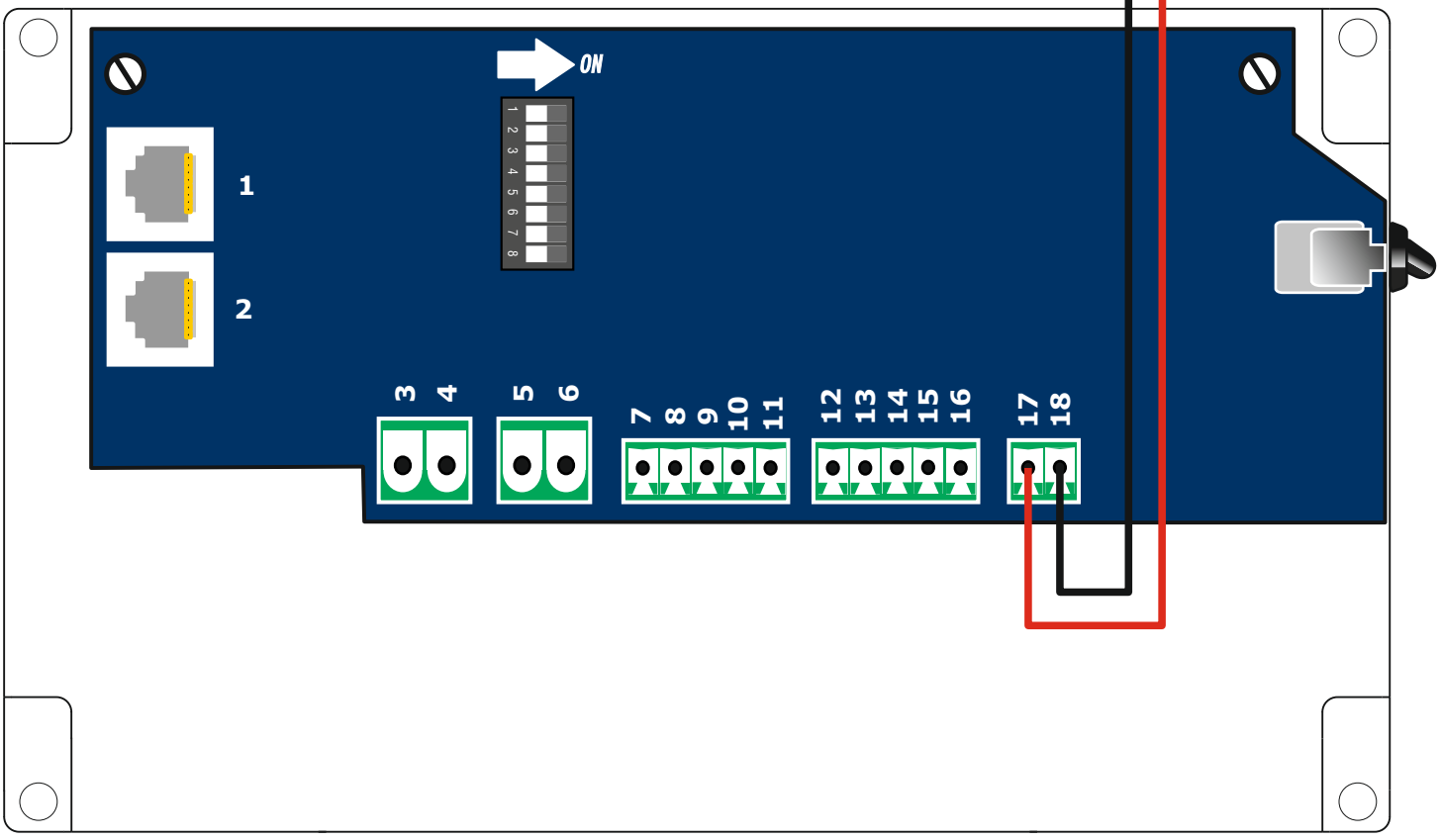
Wiring the Powerflush System into the ATL Milk Meter Solenoid Box ACR Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL milk meters and the ACR valve output.

The ATL Milk Meter Solenoid Box with Pulsation Stop

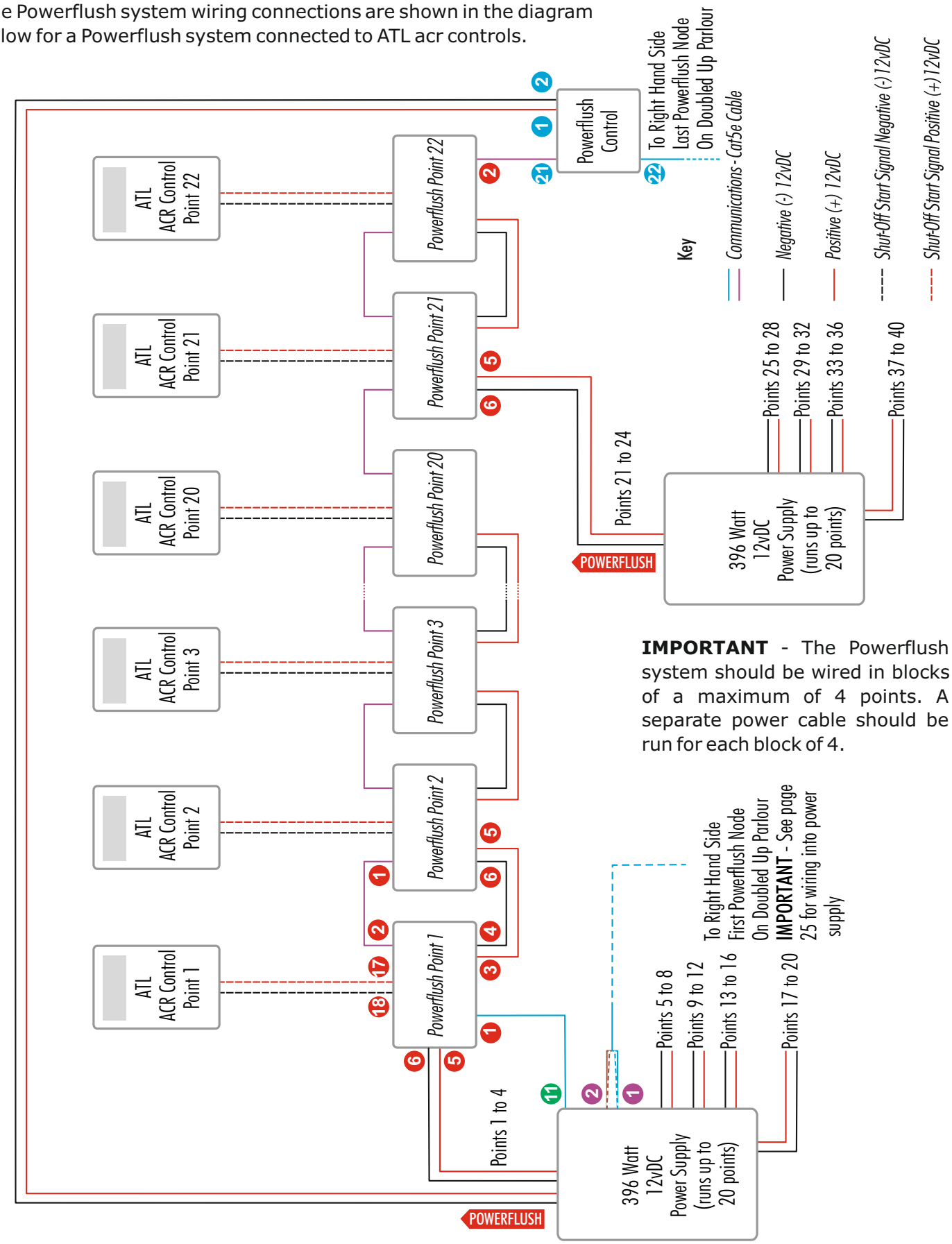


The ATL Powerflush Node



Wiring the Powerflush System - Electronic Connection for ATL ACR Controls - Shut-Off Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL acr controls.

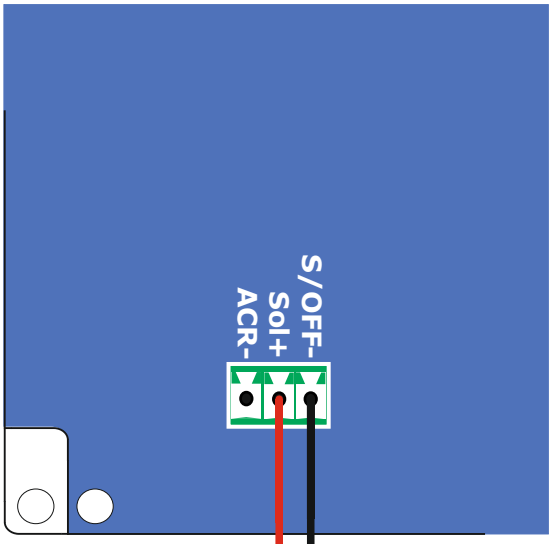


IMPORTANT - The Powerflush system should be wired in blocks of a maximum of 4 points. A separate power cable should be run for each block of 4.

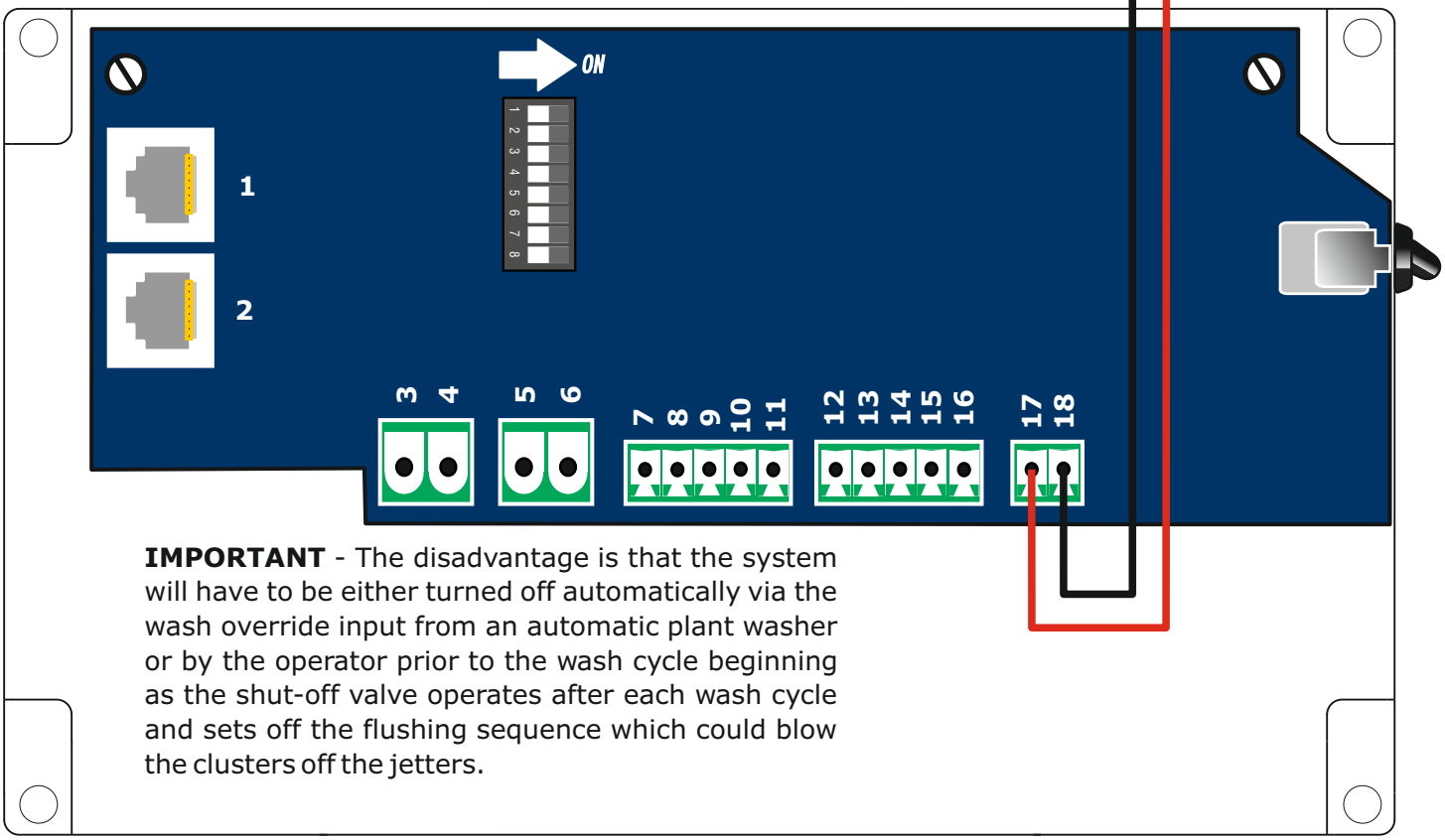
Wiring the Powerflush System into the ATL ACR Control Shut-Off Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL ACR controls and the shut-off valve output. The advantage of wiring into the shut-off valve is that the operator is free to operate the ACR ram whenever they choose and unnecessary flushes will not occur as they do when wired into the ACR output.

ATL CR Range Cluster Remover Controls



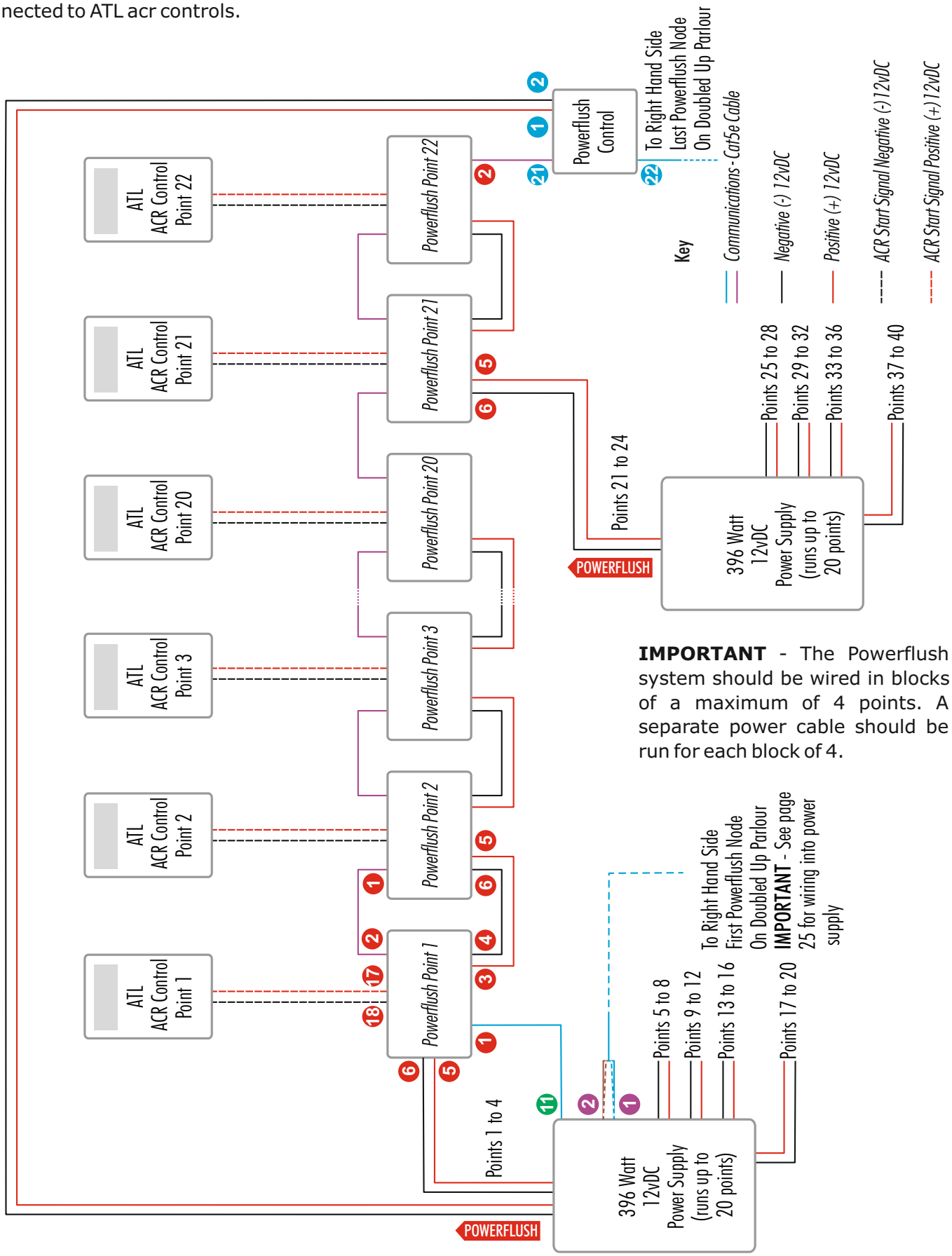
The ATL Powerflush Node



IMPORTANT - The disadvantage is that the system will have to be either turned off automatically via the wash override input from an automatic plant washer or by the operator prior to the wash cycle beginning as the shut-off valve operates after each wash cycle and sets off the flushing sequence which could blow the clusters off the jetters.

Wiring the Powerflush System - Electronic Connection for ATL ACR Controls - ACR Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL acr controls.

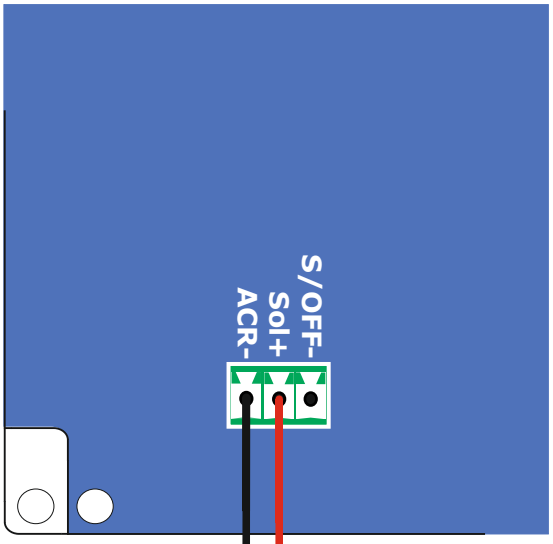


IMPORTANT - The Powerflush system should be wired in blocks of a maximum of 4 points. A separate power cable should be run for each block of 4.

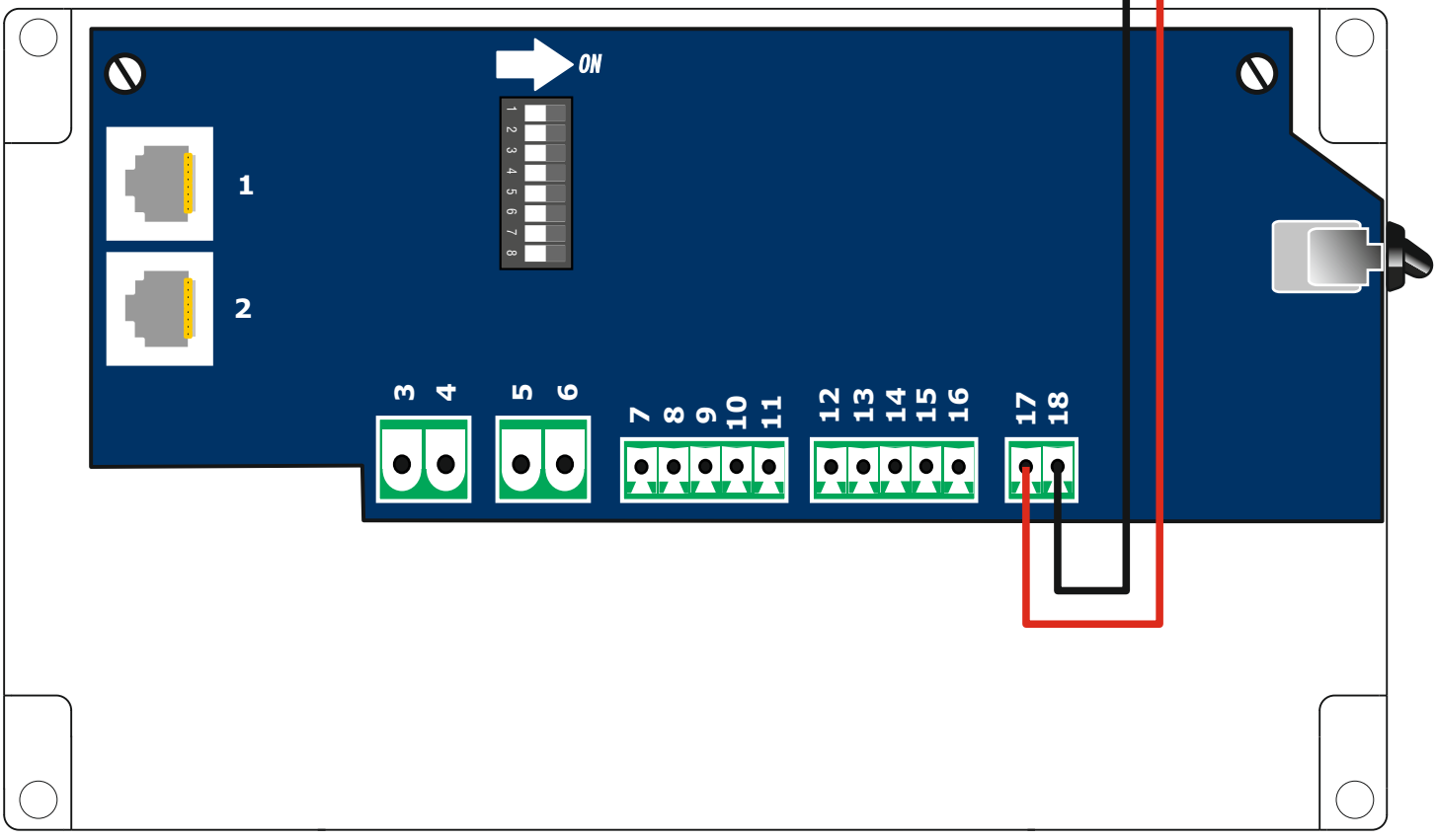
Wiring the Powerflush System into the ATL ACR Control ACR Valve Output

The Powerflush system wiring connections are shown in the diagram below for a Powerflush system connected to ATL ACR controls and the ACR valve output.

ATL CR Range of Cluster Remover Controls



The ATL Powerflush Node



Setting the Address of the Powerflush Node - Swingover Parlours - 1/2 to 48/96 - The Powerflush Node address is set using the 8 pin DIP switch on the Powerflush Node PCB (DIP switch 1 is shown on diagram on page 24).

Address of 0

If all the DIP switches are turned off, the Node will enter a self-test mode which is used during the production of the unit to test the outputs and LEDs are functioning correctly.

Please note that this will alternate all the outputs ON and OFF.

Point Number	DIP Switch							
	1	2	3 (4)	4 (8)	5 (16)	6 (32)	7 (64)	8 (EOL)
1	On	Off	Off	Off	Off	Off	Off	Off
2	Off	On	Off	Off	Off	Off	Off	Off
3	On	On	Off	Off	Off	Off	Off	Off
4	Off	Off	On	Off	Off	Off	Off	Off
5	On	Off	On	Off	Off	Off	Off	Off
6	Off	On	On	Off	Off	Off	Off	Off
7	On	On	On	Off	Off	Off	Off	Off
8	Off	Off	Off	On	Off	Off	Off	Off
9	On	Off	Off	On	Off	Off	Off	Off
10	Off	On	Off	On	Off	Off	Off	Off
11	On	On	Off	On	Off	Off	Off	Off
12	Off	Off	On	On	Off	Off	Off	Off
13	On	Off	On	On	Off	Off	Off	Off
14	Off	On	On	On	Off	Off	Off	Off
15	On	On	On	On	Off	Off	Off	Off
16	Off	Off	Off	Off	On	Off	Off	Off
17	On	Off	Off	Off	On	Off	Off	Off
18	Off	On	Off	Off	On	Off	Off	Off
19	On	On	Off	Off	On	Off	Off	Off
20	Off	Off	On	Off	On	Off	Off	Off
21	On	Off	On	Off	On	Off	Off	Off
22	Off	On	On	Off	On	Off	Off	Off
23	On	On	On	Off	On	Off	Off	Off
24	Off	Off	Off	On	On	Off	Off	Off
25	On	Off	Off	On	On	Off	Off	Off
26	Off	On	Off	On	On	Off	Off	Off
27	On	On	Off	On	On	Off	Off	Off
28	Off	Off	On	On	On	Off	Off	Off
29	On	Off	On	On	On	Off	Off	Off
30	Off	On	On	On	On	Off	Off	Off
31	On	On	On	On	On	Off	Off	Off
32	Off	Off	Off	Off	Off	On	Off	Off
33	On	Off	Off	Off	Off	On	Off	Off
34	Off	On	Off	Off	Off	On	Off	Off
35	On	On	Off	Off	Off	On	Off	Off
36	Off	Off	On	Off	Off	On	Off	Off
37	On	Off	On	Off	Off	On	Off	Off
38	Off	On	On	Off	Off	On	Off	Off
39	On	On	On	Off	Off	On	Off	Off
40	Off	Off	Off	On	Off	On	Off	Off
41	On	Off	Off	On	Off	On	Off	Off
42	Off	On	Off	On	Off	On	Off	Off
43	On	On	Off	On	Off	On	Off	Off
44	Off	Off	On	On	Off	On	Off	Off
45	On	Off	On	On	Off	On	Off	Off
46	Off	On	On	On	Off	On	Off	Off
47	On	On	On	On	Off	On	Off	Off
48	Off	Off	Off	Off	On	On	Off	Off

End of Line (EOL) Switch

Turn this DIP switch on the last point (i.e. where the comms cable comes into but does not go out of to another unit).

If you have more than one (1) point on the system where comms only comes into and does not go out of to another unit, turn the DIP switches ON on all these last points.

Setting the Address of the Powerflush Node - Swingover Parlours - 49/98 to 96/192 - The Powerflush Node address is set using the 8 pin DIP switch on the Powerflush Node PCB (DIP switch 1 is shown on diagram on page 24).

Point Number	DIP Switch							
	1	2	3 (4)	4 (8)	(16)	6 (32)	7 (64)	8 (EOL)
49	On	Off	Off	Off	On	On	Off	Off
50	Off	On	Off	Off	On	On	Off	Off
51	On	On	Off	Off	On	On	Off	Off
52	Off	Off	On	Off	On	On	Off	Off
53	On	Off	On	Off	On	On	Off	Off
54	Off	On	On	Off	On	On	Off	Off
55	On	On	On	Off	On	On	Off	Off
56	Off	Off	Off	On	On	On	Off	Off
57	On	Off	Off	On	On	On	Off	Off
58	Off	On	Off	On	On	On	Off	Off
59	On	On	Off	On	On	On	Off	Off
60	Off	Off	On	On	On	On	Off	Off
61	On	Off	On	On	On	On	Off	Off
62	Off	On	On	On	On	On	Off	Off
63	On	On	On	On	On	On	Off	Off
64	Off	Off	Off	Off	Off	Off	On	Off
65	On	Off	Off	Off	Off	Off	On	Off
66	Off	On	Off	Off	Off	Off	On	Off
67	On	On	Off	Off	Off	Off	On	Off
68	Off	Off	On	Off	Off	Off	On	Off
69	On	Off	On	Off	Off	Off	On	Off
70	Off	On	On	Off	Off	Off	On	Off
71	On	On	On	Off	Off	Off	On	Off
72	Off	Off	Off	On	Off	Off	On	Off
73	On	Off	Off	On	Off	Off	On	Off
74	Off	On	Off	On	Off	Off	On	Off
75	On	On	Off	On	Off	Off	On	Off
76	Off	Off	On	On	Off	Off	On	Off
77	On	Off	On	On	Off	Off	On	Off
78	Off	On	On	On	Off	Off	On	Off
79	On	On	On	On	Off	Off	On	Off
80	Off	Off	Off	Off	On	Off	On	Off
81	On	Off	Off	Off	On	Off	On	Off
82	Off	On	Off	Off	On	Off	On	Off
83	On	On	Off	Off	On	Off	On	Off
84	Off	Off	On	Off	On	Off	On	Off
85	On	Off	On	Off	On	Off	On	Off
86	Off	On	On	Off	On	Off	On	Off
87	On	On	On	Off	On	Off	On	Off
88	Off	Off	Off	On	On	Off	On	Off
89	On	Off	Off	On	On	Off	On	Off
90	Off	On	Off	On	On	Off	On	Off
91	On	On	Off	On	On	Off	On	Off
92	Off	Off	On	On	On	Off	On	Off
93	On	Off	On	On	On	Off	On	Off
94	Off	On	On	On	On	Off	On	Off
95	On	On	On	On	On	Off	On	Off
96	Off	Off	Off	Off	Off	On	On	Off

End of Line (EOL) Switch

Turn this DIP switch on the last point (i.e. where the comms cable comes into but does not go out of to another unit).

If you have more than one (1) point on the system where comms only comes into and does not go out of to another unit, turn the DIP switches ON on all these last points.

Setting the Address of the Powerflush Node - Swingover Parlours - 97/194 to 127/254 - The Powerflush Node address is set using the 8 pin DIP switch on the Powerflush Node PCB (DIP switch 1 is shown on diagram on page 24).

Point Number	DIP Switch							
	1	2	3 (4)	4 (8)	(16)	6 (32)	7 (64)	8 (EOL)
97	On	Off	Off	Off	Off	On	On	Off
98	Off	On	Off	Off	Off	On	On	Off
99	On	On	Off	Off	Off	On	On	Off
100	Off	Off	On	Off	Off	On	On	Off
101	On	Off	On	Off	Off	On	On	Off
102	Off	On	On	Off	Off	On	On	Off
103	On	On	On	Off	Off	On	On	Off
104	Off	Off	Off	On	Off	On	On	Off
105	On	Off	Off	On	Off	On	On	Off
106	Off	On	Off	On	Off	On	On	Off
107	On	On	Off	On	Off	On	On	Off
108	Off	Off	On	On	Off	On	On	Off
109	On	Off	On	On	Off	On	On	Off
110	Off	On	On	On	Off	On	On	Off
111	On	On	On	On	Off	On	On	Off
112	Off	Off	Off	Off	On	On	On	Off
113	On	Off	Off	Off	On	On	On	Off
114	Off	On	Off	Off	On	On	On	Off
115	On	On	Off	Off	On	On	On	Off
116	Off	Off	On	Off	On	On	On	Off
117	On	Off	On	Off	On	On	On	Off
118	Off	On	On	Off	On	On	On	Off
119	On	On	On	Off	On	On	On	Off
120	Off	Off	Off	On	On	On	On	Off
121	On	Off	Off	On	On	On	On	Off
122	Off	On	Off	On	On	On	On	Off
123	On	On	Off	On	On	On	On	Off
124	Off	Off	On	On	On	On	On	Off
125	On	Off	On	On	On	On	On	Off
126	Off	On	On	On	On	On	On	Off
127	On	On	On	On	On	On	On	Off

End of Line (EOL) Switch

Turn this DIP switch on the last point (i.e. where the comms cable comes into but does not go out of to another unit).

If you have more than one (1) point on the system where comms only comes into and does not go out of to another unit, turn the DIP switches ON on all these last points.

Setting the Address of the Powerflush Node - Doubled Up Parlours - Left Hand Side - The Powerflush Node address is set using the 8 pin DIP switch on the Powerflush Node PCB (DIP switch 1 is shown on diagram on page 24).

Address of 0

If all the DIP switches are turned off, the Node will enter a self-test mode which is used during the production of the unit to test the outputs and LEDs are functioning correctly.

Please note that this will alternate all the outputs ON and OFF.

Point Number	DIP Switch							
	1	2	3 (4)	4 (8)	5 (16)	6 (32)	7 (64)	8 (EOL)
1 Left	On	Off	Off	Off	Off	Off	Off	Off
2 Left	Off	On	Off	Off	Off	Off	Off	Off
3 Left	On	On	Off	Off	Off	Off	Off	Off
4 Left	Off	Off	On	Off	Off	Off	Off	Off
5 Left	On	Off	On	Off	Off	Off	Off	Off
6 Left	Off	On	On	Off	Off	Off	Off	Off
7 Left	On	On	On	Off	Off	Off	Off	Off
8 Left	Off	Off	Off	On	Off	Off	Off	Off
9 Left	On	Off	Off	On	Off	Off	Off	Off
10 Left	Off	On	Off	On	Off	Off	Off	Off
11 Left	On	On	Off	On	Off	Off	Off	Off
12 Left	Off	Off	On	On	Off	Off	Off	Off
13 Left	On	Off	On	On	Off	Off	Off	Off
14 Left	Off	On	On	On	Off	Off	Off	Off
15 Left	On	On	On	On	Off	Off	Off	Off
16 Left	Off	Off	Off	Off	On	Off	Off	Off
17 Left	On	Off	Off	Off	On	Off	Off	Off
18 Left	Off	On	Off	Off	On	Off	Off	Off
19 Left	On	On	Off	Off	On	Off	Off	Off
20 Left	Off	Off	On	Off	On	Off	Off	Off
21 Left	On	Off	On	Off	On	Off	Off	Off
22 Left	Off	On	On	Off	On	Off	Off	Off
23 Left	On	On	On	Off	On	Off	Off	Off
24 Left	Off	Off	Off	On	On	Off	Off	Off
25 Left	On	Off	Off	On	On	Off	Off	Off
26 Left	Off	On	Off	On	On	Off	Off	Off
27 Left	On	On	Off	On	On	Off	Off	Off
28 Left	Off	Off	On	On	On	Off	Off	Off
29 Left	On	Off	On	On	On	Off	Off	Off
30 Left	Off	On	On	On	On	Off	Off	Off
31 Left	On	On	On	On	On	Off	Off	Off
32 Left	Off	Off	Off	Off	Off	On	Off	Off
33 Left	On	Off	Off	Off	Off	On	Off	Off
34 Left	Off	On	Off	Off	Off	On	Off	Off
35 Left	On	On	Off	Off	Off	On	Off	Off
36 Left	Off	Off	On	Off	Off	On	Off	Off
37 Left	On	Off	On	Off	Off	On	Off	Off
38 Left	Off	On	On	Off	Off	On	Off	Off
39 Left	On	On	On	Off	Off	On	Off	Off
40 Left	Off	Off	Off	On	Off	On	Off	Off
41 Left	On	Off	Off	On	Off	On	Off	Off
42 Left	Off	On	Off	On	Off	On	Off	Off
43 Left	On	On	Off	On	Off	On	Off	Off
44 Left	Off	Off	On	On	Off	On	Off	Off
45 Left	On	Off	On	On	Off	On	Off	Off
46 Left	Off	On	On	On	Off	On	Off	Off
47 Left	On	On	On	On	Off	On	Off	Off
48 Left	Off	Off	Off	Off	On	On	Off	Off

End of Line (EOL) Switch

Turn this DIP switch on the last point (i.e. where the comms cable comes into but does not go out of to another unit).

If you have more than one (1) point on the system where comms only comes into and does not go out of to another unit, turn the DIP switches ON on all these last points.

Setting the Address of the Powerflush Node - Doubled Up Parlours - Left Hand Side - The Powerflush Node address is set using the 8 pin DIP switch on the Powerflush Node PCB (DIP switch 1 is shown on diagram on page 24).

Point Number	DIP Switch							
	1	2	3 (4)	4 (8)	(16)	6 (32)	7 (64)	8 (EOL)
49 Left	***On***	Off	Off	Off	***On***	***On***	Off	Off
50 Left	Off	***On***	Off	Off	***On***	***On***	Off	Off
51 Left	***On***	***On***	Off	Off	***On***	***On***	Off	Off
52 Left	Off	Off	***On***	Off	***On***	***On***	Off	Off
53 Left	***On***	Off	***On***	Off	***On***	***On***	Off	Off
54 Left	Off	***On***	***On***	Off	***On***	***On***	Off	Off
55 Left	***On***	***On***	***On***	Off	***On***	***On***	Off	Off
56 Left	Off	Off	Off	***On***	***On***	***On***	Off	Off
57 Left	***On***	Off	Off	***On***	***On***	***On***	Off	Off
58 Left	Off	***On***	Off	***On***	***On***	***On***	Off	Off
59 Left	***On***	***On***	Off	***On***	***On***	***On***	Off	Off
60 Left	Off	Off	***On***	***On***	***On***	***On***	Off	Off
61 Left	***On***	Off	***On***	***On***	***On***	***On***	Off	Off
62 Left	Off	***On***	***On***	***On***	***On***	***On***	Off	Off
63 Left	***On***	***On***	***On***	***On***	***On***	***On***	Off	Off
64 Unused	Off	Off	Off	Off	Off	Off	***On***	Off

End of Line (EOL) Switch

Turn this DIP switch on the last point (i.e. where the comms cable comes into but does not go out of to another unit).

If you have more than one (1) point on the system where comms only comes into and does not go out of to another unit, turn the DIP switches ON on all these last points.

Setting the Address of the Powerflush Node -Doubled Up Parlours - Right Hand Side - The Powerflush Node address is set using the 8 pin DIP switch on the Powerflush Node PCB (DIP switch 1 is shown on diagram on page 24).

Point Number	DIP Switch							
	1	2	3 (4)	4 (8)	(16)	6 (32)	7 (64)	8 (EOL)
1 Right	On	Off	Off	Off	Off	Off	On	Off
2 Right	Off	On	Off	Off	Off	Off	On	Off
3 Right	On	On	Off	Off	Off	Off	On	Off
4 Right	Off	Off	On	Off	Off	Off	On	Off
5 Right	On	Off	On	Off	Off	Off	On	Off
6 Right	Off	On	On	Off	Off	Off	On	Off
7 Right	On	On	On	Off	Off	Off	On	Off
8 Right	Off	Off	Off	On	Off	Off	On	Off
9 Right	On	Off	Off	On	Off	Off	On	Off
10 Right	Off	On	Off	On	Off	Off	On	Off
11 Right	On	On	Off	On	Off	Off	On	Off
12 Right	Off	Off	On	On	Off	Off	On	Off
13 Right	On	Off	On	On	Off	Off	On	Off
14 Right	Off	On	On	On	Off	Off	On	Off
15 Right	On	On	On	On	Off	Off	On	Off
16 Right	Off	Off	Off	Off	On	Off	On	Off
17 Right	On	Off	Off	Off	On	Off	On	Off
18 Right	Off	On	Off	Off	On	Off	On	Off
19 Right	On	On	Off	Off	On	Off	On	Off
20 Right	Off	Off	On	Off	On	Off	On	Off
21 Right	On	Off	On	Off	On	Off	On	Off
22 Right	Off	On	On	Off	On	Off	On	Off
23 Right	On	On	On	Off	On	Off	On	Off
24 Right	Off	Off	Off	On	On	Off	On	Off
25 Right	On	Off	Off	On	On	Off	On	Off
26 Right	Off	On	Off	On	On	Off	On	Off
27 Right	On	On	Off	On	On	Off	On	Off
28 Right	Off	Off	On	On	On	Off	On	Off
29 Right	On	Off	On	On	On	Off	On	Off
30 Right	Off	On	On	On	On	Off	On	Off
31 Right	On	On	On	On	On	Off	On	Off
32 Right	Off	Off	Off	Off	Off	On	On	Off
33 Right	On	Off	Off	Off	Off	On	On	Off
34 Right	Off	On	Off	Off	Off	On	On	Off
35 Right	On	On	Off	Off	Off	On	On	Off
36 Right	Off	Off	On	Off	Off	On	On	Off
37 Right	On	Off	On	Off	Off	On	On	Off
38 Right	Off	On	On	Off	Off	On	On	Off
39 Right	On	On	On	Off	Off	On	On	Off
40 Right	Off	Off	Off	On	Off	On	On	Off
41 Right	On	Off	Off	On	Off	On	On	Off
42 Right	Off	On	Off	On	Off	On	On	Off
43 Right	On	On	Off	On	Off	On	On	Off
44 Right	Off	Off	On	On	Off	On	On	Off
45 Right	On	Off	On	On	Off	On	On	Off
46 Right	Off	On	On	On	Off	On	On	Off
47 Right	On	On	On	On	Off	On	On	Off
48 Right	Off	Off	Off	Off	On	On	On	Off

End of Line (EOL) Switch

Turn this DIP switch on the last point (i.e. where the comms cable comes into but does not go out of to another unit).

If you have more than one (1) point on the system where comms only comes into and does not go out of to another unit, turn the DIP switches ON on all these last points.

Setting the Address of the Powerflush Node - Doubled Up Parlours - Right Hand Side - The Powerflush Node address is set using the 8 pin DIP switch on the Powerflush Node PCB (DIP switch 1 is shown on diagram on page 24).

Point Number	DIP Switch							
	1	2	3 (4)	4 (8)	(16)	6 (32)	7 (64)	8 (EOL)
49 Right	*On*	Off	Off	Off	*On*	*On*	*On*	Off
50 Right	Off	*On*	Off	Off	*On*	*On*	*On*	Off
51 Right	*On*	*On*	Off	Off	*On*	*On*	*On*	Off
52 Right	Off	Off	*On*	Off	*On*	*On*	*On*	Off
53 Right	*On*	Off	*On*	Off	*On*	*On*	*On*	Off
54 Right	Off	*On*	*On*	Off	*On*	*On*	*On*	Off
55 Right	*On*	*On*	*On*	Off	*On*	*On*	*On*	Off
56 Right	Off	Off	Off	*On*	*On*	*On*	*On*	Off
57 Right	*On*	Off	Off	*On*	*On*	*On*	*On*	Off
58 Right	Off	*On*	Off	*On*	*On*	*On*	*On*	Off
59 Right	*On*	*On*	Off	*On*	*On*	*On*	*On*	Off
60 Right	Off	Off	*On*	*On*	*On*	*On*	*On*	Off
61 Right	*On*	Off	*On*	*On*	*On*	*On*	*On*	Off
62 Right	Off	*On*	*On*	*On*	*On*	*On*	*On*	Off
63 Right	*On*	*On*	*On*	*On*	*On*	*On*	*On*	Off

End of Line (EOL) Switch

Turn this DIP switch on the last point (i.e. where the comms cable comes into but does not go out of to another unit).

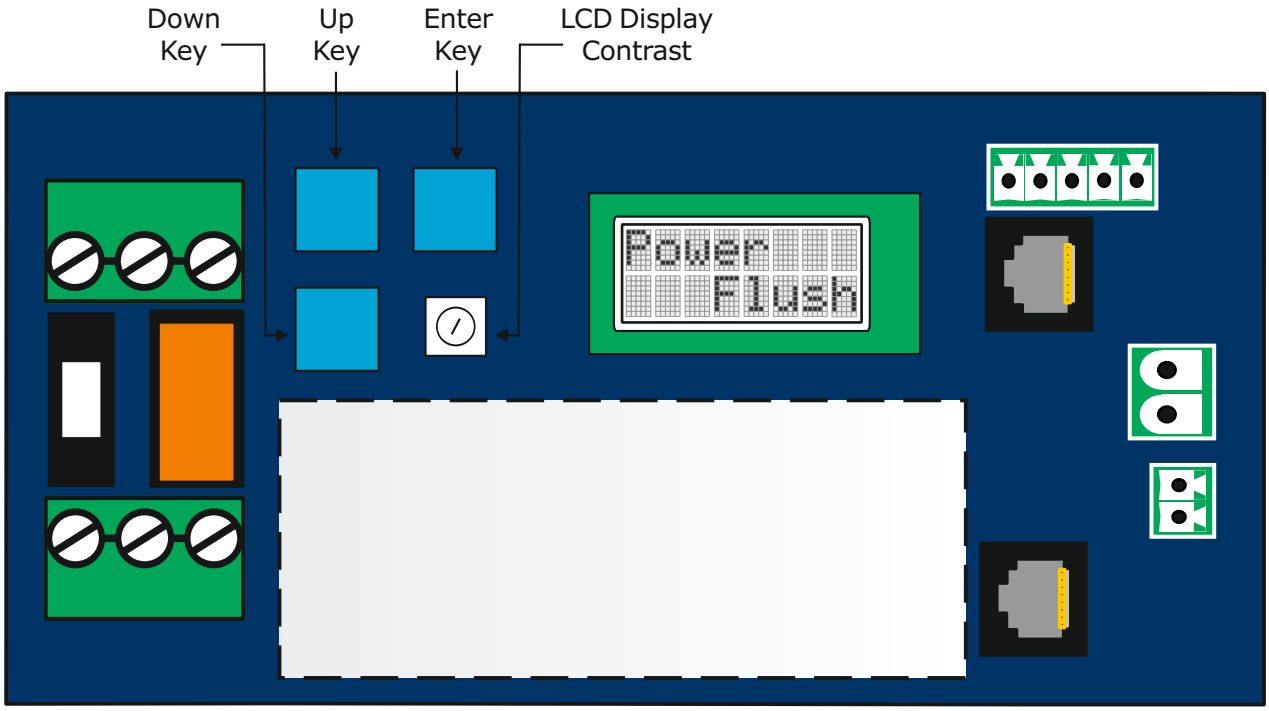
If you have more than one (1) point on the system where comms only comes into and does not go out of to another unit, turn the DIP switches ON on all these last points.

Setting up the Powerflush Controller PCB

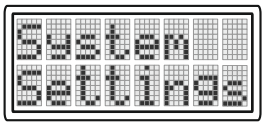
Before it can be used, the Powerflush system must be set up using the Powerflush Controller PCB which is located in the Powerflush power supply. This is outlined in the following pages:

Accessing the Settings

Press and hold the UP, DOWN and ENTER keys for 5 seconds.

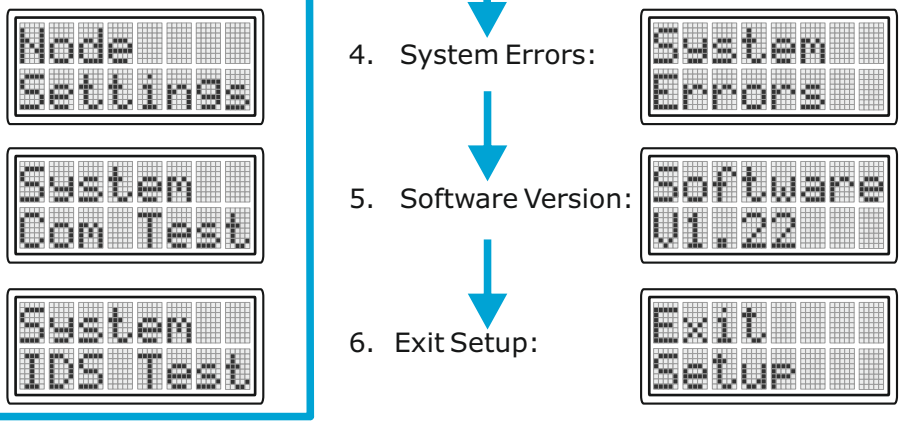


A countdown will appear on the LCD screen during the holding of the keys and then System Settings will be displayed once accessed.



The DOWN or UP keys can be pressed to scroll through the settings. If the DOWN key is pressed, the settings are as follows:

1. Node Settings:
2. System Communications Test:
3. System IDS Test:
4. System Errors:
5. Software Version:
6. Exit Setup:



Powerflush System Settings Map

Below is a map of the Powerflush settings.

1. System Settings
    1.A. Parlour: Swg Over / Double
    1.B. Nodes: 5
    1.C. Max Flush: 4
    1.D. En/Ex Fl: None

2. Node Settings
    2.A. Invert: Normal / Inverted
    2.B. ACR DDF: No Drop / Drop
    2.C. Clamp: 1.0 Sec
    2.D. Water On: 6.0 Sec
    2.E. Air On: 2.0 Sec
    2.F. ACR Dly: 3.0 Sec
    2.G. Pause: 3.0 Sec
    2.H. Cycles: 2
    2.I. Ex Cycle: 3
    2.J. Air PF: No Air / Air
    2.K. ACR DPF: No Drop / Drop

3. System Com Test

4. System IDS Test

5. Software Version

6. Exit Setup

Powerflush System Settings

The system settings are outlined below:

To access the settings, follow the instructions on page 45.

Scroll through the settings until System Settings is reached, press the ENTER key and the parlour type setting will be shown.

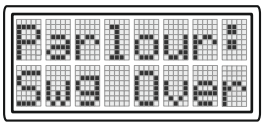
The Parlour Type Setting

This setting selects the type of parlour the Powerflush System is being installed on. The setting allows for doubled-up and swingover.

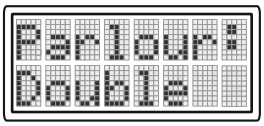
To select the parlour type press the UP or DOWN keys and then press the ENTER key.

The number of nodes (points) setting is now displayed.

Factory Default - Swingover



OR



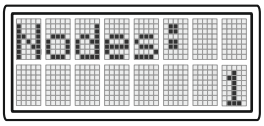
The Number of Nodes (points) Setting

This setting sets the number of nodes (points) on the Powerflush System.

To select the number of nodes press the UP or DOWN keys and then press the ENTER key.

The maximum number of nodes (points) to flush at once setting is now displayed.

Factory Default - 1



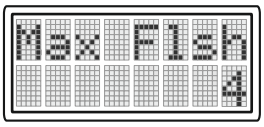
The Maximum Number of Nodes (points) to Flush At Once Setting

This setting sets the number of nodes (points) to flush at once. We recommend this is set to 2 nodes.

To select the number of nodes press the UP or DOWN keys and then press the ENTER key.

The En/Ex Fl setting is now displayed.

Factory Default - 4



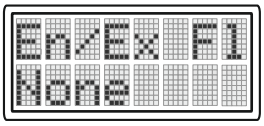
The En/Ex Fl Setting

This setting is not used.

Press the ENTER key.

The system settings routine is exited.

Factory Default - None



Powerflush Node Settings

The node settings are outlined below:

To access the settings, follow the instructions on page 45.

Scroll through the settings until Node Settings is reached, press the ENTER key and the flush trigger signal setting will be shown.

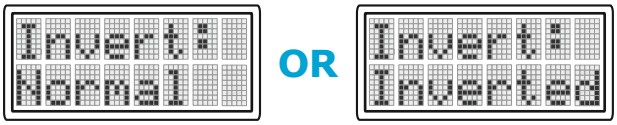
The Flush Trigger Signal Type Setting

This setting selects the trigger signal that the Powerflush System is uses to initiate the flushing process. The setting allows for normal (shut-off valve) or inverted (ACR).

To select the trigger signal type press the UP or DOWN keys and then press the ENTER key.

The ACR drop during flush setting is now displayed.

Factory Default - Normal



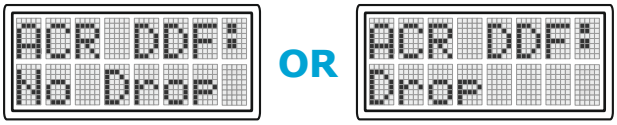
The ACR Drop During Flushing Setting

This setting selects whether the ACR should drop during flushing. This setting allows for no drop or drop during flushing. Please note that this will only work if the flush trigger signal is set to inverted (ACR).

To set the ACR drop during flushing setting press the UP or DOWN keys and then press the ENTER key.

The clamp delay setting is now displayed.

Factory Default - No Drop



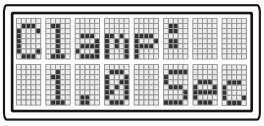
The Clamp Delay Setting

This setting sets the delay before the flushing process starts to allow the clamp valve to activate and clamp off the long milk tube. Minimum setting 0.1 seconds - maximum setting 25.5 seconds.

To set the clamp delay time press the UP or DOWN keys and then press the ENTER key.

The water valve on setting is now displayed.

Factory Default - 1.0 seconds



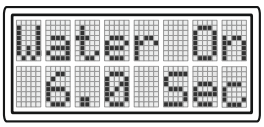
The Water Valve On (Open) Setting

This setting sets the time the water valve is on (open) during each of the flushing cycles. Minimum setting 0.1 seconds - maximum setting 25.5 seconds.

To set the water valve on time press the UP or DOWN keys and then press the ENTER key.

The air valve on setting is now displayed.

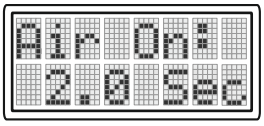
Factory Default - 6.0 seconds



The Air Valve On (Open) Setting

This setting sets the time the compressed air valve is on (open) during each of the flushing cycles. Minimum setting 0.1 seconds - maximum setting 25.5 seconds.

To set the air valve on time press the UP or DOWN keys and then press the ENTER key.



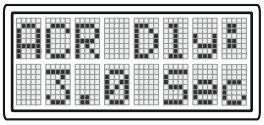
The ACR delay setting is now displayed.

Factory Default - 2.0 seconds

The ACR Delay Setting

This setting sets the time delay before the flushing process starts. Minimum setting 0.1 seconds - maximum setting 25.5 seconds.

To set the ACR delay time press the UP or DOWN keys and then press the ENTER key.



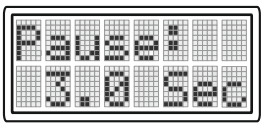
The pause between flush cycles setting is now displayed.

Factory Default - 3.0 seconds

The Pause between Flushing Cycles Setting

This setting sets the pause in seconds between each flushing cycle. Minimum setting 0.1 seconds - maximum setting 25.5 seconds.

To set the pause time press the UP or DOWN keys and then press the ENTER key.



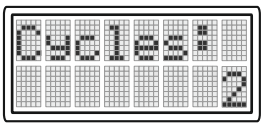
The number of cycles setting is now displayed.

Factory Default - 3.0 seconds

The Number of Cycles Setting

This setting sets the number of flushing cycles. Minimum setting 1 cycle - maximum setting 10 cycles.

To set the pause time press the UP or DOWN keys and then press the ENTER key.

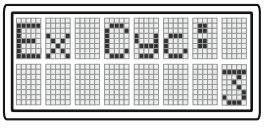


The ex cyc setting is now displayed.

Factory Default - 2 cycles

The Ex Cyc Setting

This setting is not used.



Press the ENTER key.

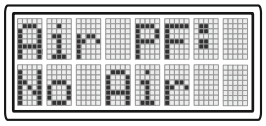
The compressed air post flush settings is now displayed.

Factory Default - 3

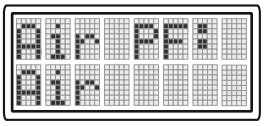
The Compressed Air Post Flush Setting

This setting enables an additional blast of compressed air after the flushing cycles have completed to help clear the claw of leftover flushing fluid. This setting will not be displayed if ACR drop during flushing is enabled.

To set the compressed air post flush setting ON press the UP or DOWN keys and then press the ENTER key.



OR



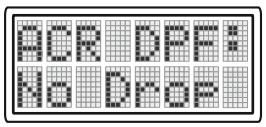
The ACR drop post flushing setting is now displayed.

Factory Default - No Air

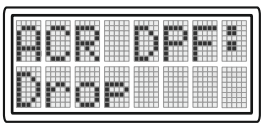
The ACR Drop Post Flush Setting

This setting selects whether the ACR should drop after flushing. This setting allows for no drop or drop after flushing. Please note that this will only work if the flush trigger signal is set to inverted (ACR) and this setting will not be displayed if ACR drop during flushing is enabled.

To set the ACR drop during flushing setting press the UP or DOWN keys and then press the ENTER key.



OR



The system settings routine is exited.

Factory Default - No Drop

Powerflush System Communications Test

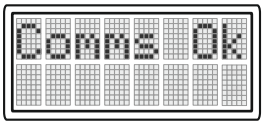
To access the settings, follow the instructions on page 45.

Scroll through the settings until System Com Test is reached, press the ENTER key and the system communications test routine will be shown.

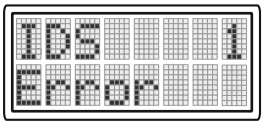
The System Com Test

This sends a packet of data to each of the nodes (points) on the system and displays the identity of the first node that fails to respond.

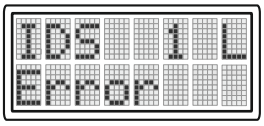
If the communications is OK, the LCD on the Powerflush Controller PCB in the Powerflush Power Supply will display Comms OK.



If there is an error with the communications, the information displayed on the LCD will depend upon whether the system is setup as a swingover (left graphic) or doubled up (right graphic) parlour.



OR



If an error message is displayed, check the communications cable and connections.

Powerflush System IDS Routine

To access the settings, follow the instructions on page 45.

Scroll through the settings until System IDS Test is reached, press the ENTER key and the system IDS test routine will be shown.

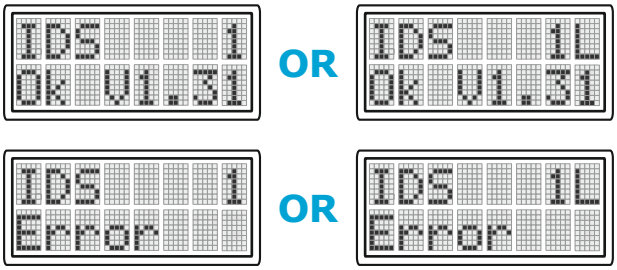
The System IDS Routine

This sends a packet of data to a specific nodes on the system and displays the node (point) number and it's software version.

Press the UP or DOWN keys to change the node (point).

If the communications is OK, the LCD on the Powerflush Controller PCB in the Powerflush Power Supply will display the node (point) number in the top right and then Ok and the node (point) software version.

If there is an error with the communications to the selected node, Error will be displayed.



The information displayed on the LCD will display depend upon whether the system is setup as a swingover (left graphic) or doubled up (right graphic) parlour.

If an error message is displayed, check the communications cabled and connections.

Powerflush System Errors

To access the settings, follow the instructions on page 45.

Scroll through the settings until System Errors is reached, press the ENTER key and the system errors routine will be shown.

The System Errors Routine

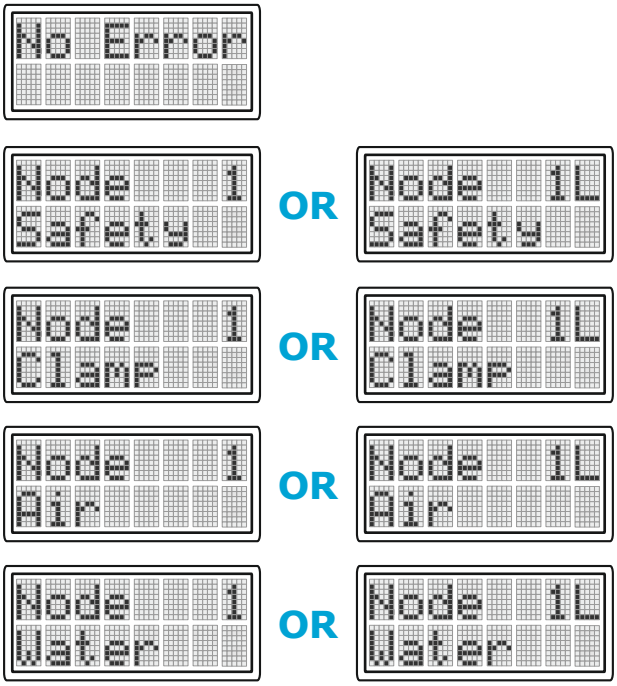
This routine displays the node (point) number and if there are any output errors for the solenoid valves (i.e. safety valve, clamp valve, water valve and air valve.

If there are no output errors, the LCD on the Powerflush Controller PCB in the Powerflush Power Supply will display No Error.

If there is an output error, the LCD on the Powerflush Controller PCB in the Powerflush Power Supply will display the node (point) number and either Safety, Clamp, Air or Water message.

The information displayed on the LCD will depend upon whether the system is setup as a swingover (left graphic) or doubled up (right graphic) parlour.

If an error message is displayed, check the relevant solenoid valve.

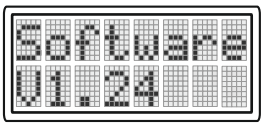


Powerflush Controller Software Version

To access the settings, follow the instructions on page 45.

Scroll through the settings until Software is reached.

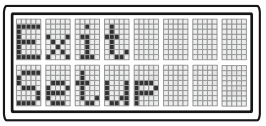
This displays the software version of the Powerflush controller.



Exit Setup

Press the ENTER key to exit the setup routine.

The display will show Power Flush when the routine has been exited.



The Powerflush Operating Routine

The Powerflush system follows a routine when each point is initiated to start the back flush process. The cycle is as follows:

- Signal received for point to flush;
- Initial ACR delay (farm settable);
- Request to flush sent to master board - waits for other units to finish flushing;
- Close clamp valve;
- Wait 1.0 second for clamp valve to close (farm settable);
- Open safety valve;
- Wait 1.0 second for safety valve to open (farm settable);
- Optional milk purge / sweep delay of 2 seconds;
- Open water valve (farm settable)
- Close water valve with delay 1.5 seconds to allow it to close;
- Open compressed air valve (farm settable);
- Close compressed air valve with delay for 1.5 seconds to allow it to close;
- If number of flushes not complete;
  - Pause for period of time between flushes (farm settable);
  - Repeat above from open water valve;
- If number of flushes complete;
  - Close safety valve;
  - Wait for 1 second for safety valve to close;
  - Open clamp valve.

NB - If the system is left idle for 30 minutes, the system will turn off all the solenoid valves.

How to Purge the System of Water to prevent Frost Damage (Frost Purge)

- Turn ball valve 2 to the closed position so water is turned off (see page 18);
- Press the LEFT  key and RIGHT  key together and then the POWER  key to open all the water valves on eachPowerflush Node (point);
- The 4 lights will show both red and green LEDs to show that the system is in frost purge mode;
- Turn ball valve 3 to the open position to allow compressed air into the system and all water is blown out of the lines (see page 18);
- Once all the water is blown out of the lines, turn ball valve 3 back to the closed position so the compressed air is turned off (see page 18);
- The water valves on each Powerflush Node (point) will automatically close after 10 minutes (NB - the lights will still show both red and green LEDs after the outputs have automatically turned off);
- Press the POWER  key to exit frost purge mode;
- **IMPORTANT -** Please remember to turn ball valve 2 to the open position just before the next milking so water is available for flushing (see page 18).

Weekly Routine Maintenance

- Check and drain the compressed air filter bowls;
- Check the air compressor and drain down its tank;
- Check dosing chemical is available.

Monthly Routine Maintenance

- Visually inspect the Powerflush Node and Control boxes for damage. Any damage will admit water causing the premature failure of the electronics and should be fixed as soon as possible;
- Inspect the water and compressed air lines for signs of damage. Any damaged lines should be replaced to ensure the system works to it's optimum;
- Check the pump and water tank are in good order and all connections are correctly fitted.

Six Monthly Routine Maintenance

- In addition to the above monthly checks, remove and clean the water filter;
- Replace compressed air filters.

Yearly Routine Maintenance

- In addition to the above monthly and six monthly checks, we recommend thoroughly inspect the mixer valve, making sure it is clean and operates correctly. Service as required.

Parlour Wash Down

- The Powerflush Node and Control Unit enclosures are IP65 rated. However, no indirect or direct pressure washing should be used to wash the enclosures, as this will cause the seals to fail and water to ingress and damage the electronic components. Please note that water damage is not covered under warranty.