PARLOUR HYGIENE

PLANTWASH

Installation & Operation Manual iss 6

CE

davlec Ltd.
Electronic Engineering

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SECTION 1.0 - SAFETY CRITICAL DATA

Please read carefully

To prevent fire or an electric shock, please follow the safety procedures below:

Make sure the unit is installed to comply with the instructions given in this manual.

The cover of the unit carries a danger warning message instructing the operator to isolate the mains supply before attempting to remove the cover. For your own safety, make sure that the moulded plug is removed from the mains socket before you attempt to remove the lid. **Part of the circuit is used to remotely control the vacuum pump and milk pump. This means that part of the unit will be "live" unless the vacuum pump and milk pump circuits are also isolated.**

Do not install the unit in hot, humid or excessively dusty places.

Do not install the unit where it will be subject to mechanical vibration.

Install the unit so that there is a minimum of 10 cm. clearance on all sides and the front, between it and any other object.

A moulded plug complying with BS1363 is fitted to this equipment for your safety and convenience. Should the fuse in the plug supplied need to be replaced, a 5 AMP fuse approved to BS1362 must be used. To replace the fuse, open the fuse compartment with a blade screwdriver.

In the exceptional circumstance where the plug supplied is not suitable for the socket outlets available, it should be cut off and an appropriate plug fitted in accordance with the following instructions: The wires in this mains lead are coloured in accordance with the following code.

Blue - Neutral Brown - Live Green/Yellow - Earth

Any alternative mains connection must allow the operator to isolate the supply effectively. The plug which has been cut off from the mains lead must not be inserted into a socket outlet.

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The unit contains no user serviceable parts with the exception of ten fuses. See the instructions above relating to the mains plug fuse. The other fuses are as follows:

An input fuse located on the left hand side of the unit below the transformer (vertical fuse holder - black). This must be replaced with a 20 x 5mm. 1 AMP Quick-blow (Type F) fuse.

A low voltage fuse located to the right of the transformer (horizontal fuse holder with clear cover). This must be replaced with a 20 x 5mm. 1 AMP Quick-blow (Type F) fuse.

A row of 8 output fuses located above the output connectors (vertical fuse holders - black). These must be replaced with a 20 x 5mm. 3 AMP Quick-blow (Type F) fuses.

If the unit can not be made to function correctly by replacing fuses as outlined above, the unit should be returned to the manufacturer for repair and test.

Safety critical components:

Description	Manufacturers Part No.
20 x 5mm. 1 AMP Quick-blow (Type F) fuse	FUSE 20MM 1A
20 x 5mm. 3 AMP Quick-blow (Type F) fuse	FUSE 20MM 3A
Moulded plug fuse.	FUSE MAINS 5A

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SECTION 2.0 - PRODUCT SPECIFICATION

OVERVIEW

The Plantwash Control Box is designed to automatically control the process of washing your milking parlour equipment. It will control your vacuum pump, milk pump, a dump valve, hot and cold water solenoids and up to three peristaltic pumps which can be used to accurately control the amount of chemicals used.

PROGRAMMING

The Plantwash has been designed so that all programming can be done at the control box using a very simple coded menu system. The Plantwash has four separate programs for morning wash, afternoon wash, evening wash and milk stone wash. Within each wash program the user can select up to 28 different control cycles.

All programs are stored on non-volatile memory that does not require battery back up in the event of power failure.

MILKING MODE

Additional to the wash programs the Plantwash has a milking mode that can be selected allowing operation of the vacuum pump. A milking timer gives indication of total milking time on the display.

OUTPUTS

The Plantwash provides control for a vacuum pump, milk pump, a dump valve, hot and cold water solenoids and up to three peristaltic pumps. In addition to these are two auxiliary outputs described in detail in chapter 3.4.

INPUTS

Some parlours may have very variable water pressure, and opening the cold water solenoid valve for a fixed period of time may produce a wide variation in the amount of water placed in the wash trough. To overcome this, the Plantwash has the facility to connect up to three switches, i.e. float switches. Another input switch is provided for connection to a wash line switch and therefore the unit will only commence washing when this switch is closed.

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SECTION 3.0 - OPERATION

SETTING THE TIME AND DAY

When the mains supply is applied to the unit, the control box display will show the following message:

Davlec Plantwash Time 00.00 Mon

The red power l.e.d. will also be illuminated. Before the unit can be used, the time needs to be entered together with the wash cycle programmes. In order to do this, you need to enter programming mode. This can be accomplished by pressing and holding the ***left arrow*** and also pressing and releasing the ***right arrow***, and then releasing the ***left arrow***. If you have done this correctly, the green program l.e.d. will now be illuminated.

The ***up*** and ***down arrow*** keys can now be used to change the minutes setting. If you press and hold the ***left arrow***, the ***up*** and ***down arrow*** keys can be used to change the hours setting. For minutes or hours, pressing the ***up arrow*** will increase the setting by one, and pressing the ***down arrow*** key will reduce the setting by one. Please note that this is a 24 hour format. Pressing the ***enter*** key will step through the days of the week.

Leaving the programming mode can be accomplished be pressing and holding the ***left arrow*** and also pressing and releasing the ***right arrow***, and then releasing the ***left arrow***. If you have done this correctly, the green program l.e.d. will now be switched off.

CLEAR DOWN MEMORY

It is highly recommended that before you start programming wash programs the Plantwash memory is cleared by pressing the ***left arrow*** and ***stop*** keys together.

NAVIGATING PLANTWASH SCREENS

To view any of the wash programs press the ***left arrow*** to find the program selection screen and then the ***up arrow*** to choose a wash program. When you have found your desired wash program to view press the ***left arrow*** to view each cycle. To view the return temperature screen for a cycle press the ***down arrow***, to return to the input/output screen press the ***up arrow***.

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PROGRAMMING WASH CYCLES

Before attempting to enter the wash cycle programmes, it is recommended that you plan out your cycles on the planning sheets provided. The following is an example of a simple program.

Plantwash programming sheet												
Morning		X	Afternoon		Evening		Milk Stone					
CYCLE	INPUTS			TIME	VACUUM	MILK	DUMP	COLD	HOT	PERISTALTICS		
	1	2	3	00:00	PUMP	PUMP	VALVE	VALVE	VALVE	X	Y	Z
1				01:30				X				
2				02:30	X	X						
3				01:00	X	X	X					

This very simple program has only three cycles. The first cycle would open the cold water valve for 1 minute and 30 seconds to allow water to fill the wash trough. In the second cycle, which lasts for 2 minutes and 30 seconds, the vacuum and milk pumps are switched on to circulate this rinse water around the plant. In the third cycle, which lasts for 1 minute, the vacuum and milk pumps remain on, but the dump valve is also opened to dump the water into the drain. If water pressure is a problem, opening the cold water valve for 1 minute and 30 seconds may not give consistent results. An alternative method is to fit a magnetic level switch to the wash trough so that it is activated at the required level. This switch can then be connected to the two terminals labelled I/P1. The program should be modified as following:

Plantwash programming sheet												
Morning		X	Afternoon		Evening		Milk Stone					
CYCLE	INPUTS			TIME	VACUUM	MILK	DUMP	COLD	HOT	PERISTALTICS		
	1	2	3	00:00	PUMP	PUMP	VALVE	VALVE	VALVE	X	Y	Z
1	X			02:30				X				
2				02:30	X	X						
3				01:00	X	X	X					

Notice that we keep a time limit for cycle 1 in case the level switch does not operate for some reason so the wash program can continue.

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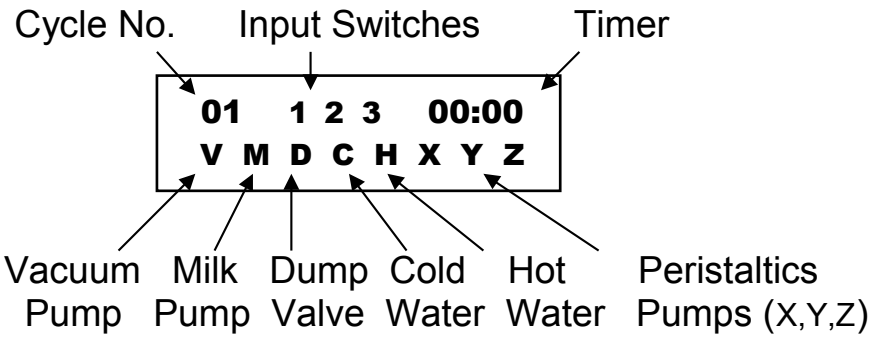
To enter this simple program into the Plantwash memory enter program mode as outlined in section 3.1 and check time and day. Press the ***right arrow*** key. The unit will now display the message:

Morning Wash? **Use ^ to change**

Pressing the ***up arrow*** allows you to step through the program options of "Morning", "Afternoon", "Evening" and "Milk stone" wash programs. Select "*Morning*" and press the ***right arrow***. The unit will now display the current program settings for cycle 1 of the morning wash program.



To the right of the cycle number, the numbers 1, 2 and 3 are displayed. These represent the settings for the three switch inputs I/P1, I/P2 and I/P3. The space to the left of the number indicates the current condition. If the space to the left of number 1 is a blank space the switch is not selected. If the space to the left of number 1 is a *right pointing arrow* the switch is selected.

Only one switch should be selected for a particular cycle. If a switch is selected, the cycle will end when that particular switch closes. If no switch is selected, then the cycle time will be the time set in the section at the top right of the display.

To change the setting for I/P1, press the ***down arrow***. A cursor line will now appear under the number 1. Pressing ***start*** will select the switch and pressing ***stop*** will de-select the switch. Pressing the ***down arrow*** will result in the cursor moving to the next option. When the cursor is under the cycle time, pressing ***start*** will increase the cycle time and pressing ***stop*** will reduce the cycle time.

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All that remains in the process to program this cycle is the settings of the controlled outputs. These are shown on the second line of the display. The character to the left of “V” indicates whether the vacuum pump output is selected. Similarly, “M” indicates milk pump, “D” indicates dump valve, “C” and “H” indicate cold and hot water valves, and “X”, “Y” and “Z” indicate the three peristaltic pumps used to pump chemicals into the wash trough. As with the switch inputs, the outputs can be selected or de-selected using the ***start*** and ***stop*** keys. The ***down arrow*** moves the cursor to the next selection, and the ***up arrow*** can be used to move back if you have gone too far.

Pressing the ***down arrow*** to move the cursor beyond the "Z" peristaltic pump will now display the “Return Temperature” display for that cycle. **If a temperature sensor is not connected please make sure that the temperature set is 00ºC.** To return to the previous screen press the ***up arrow*** key.

Pressing the ***right arrow*** will select the next cycle, otherwise the ***left arrow*** allows you to step back through the cycles.

If we are entering a three cycle program as outlined previously, we need to program a 4th cycle to indicate to the Plantwash that the program is complete. This last cycle must have all switches and outputs de-selected and the cycle time must be zero seconds. If you wish to carry on to program the other wash programs, use the ***left arrow*** to step back to the program selection screen, select your program using the ***up arrow***, use the ***right arrow*** to select cycle 1 and begin programming.

When entering large programs a short-cut for getting back to the first screen is to hold down the ***left arrow*** key for longer than half a second.

To **insert a cycle** within a program select a cycle where the new cycle will be inserted after and then press the ***up arrow*** and ***start*** **keys** together.

To **delete a cycle** within a program press the ***up arrow*** and ***stop*** together.

Times for the wash programs are,

Morning	–	00:00 to 09:59
Afternoon	–	10:00 to 17:59
Evening	–	18:00 to 23:59

All times are in the 24 hour clock format.

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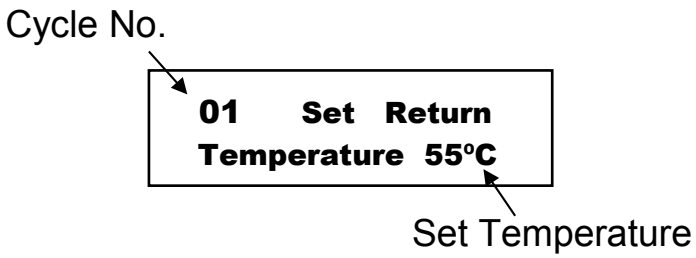
RETURN TEMPERATURE SENSOR

The Plantwash has the capability of being connected to an external temperature sensor to monitor the hot water temperature. This enables program cycles to start only when a predefined temperature has been reached and also to record maximum temperatures reached during a wash.



With the external temperature sensor module connected a return temperature can be set by going into program mode and selecting a wash program to edit. Within the wash program you will find that each wash cycle has a return temperature screen associated with it which can be accessed by moving the cursor beyond the "Z" peristaltic pump. The default temperature value is 00ºC, to change this value either press the ***start*** key to increment the temperature or the ***stop*** key to decrement the temperature.

If for example you have set a return temperature of 60ºC on cycle 1 and on cycle 2 you have enabled the hot water valve to come on, then when the external temperature sensor reads 60ºC cycle 2 will commence and the hot water valve will switch on.

It is highly recommended that whichever cycle has a return temperature set that you also set a time delay greater than what it will take for the temperature to reach its desired value. This allows a wash program to continue in the event that the water temperature cannot reach your desired value because of extra demand on the hot water or because of a faulty heating element.

Taking this into consideration with the example above, if the hot water takes 5 minutes to reach 60ºC on average then it would be recommended that a time delay of 7 minutes be entered into cycle 1 as a safeguard. Then in the event that the hot water cannot reach 60ºC, cycle 2 will still start after 7 minutes.

At the end of each wash a maximum temperature recorded screen will be displayed which can be cleared by pressing either the ***left*** or ***right arrow*** keys.

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AUXILIARY OUTPUTS

Located on the top right hand corner of the output card are two auxiliary output connectors labelled “AUX 1” and “AUX 2”. Both auxiliary outputs are relay controlled therefore they have make or break contact connections only.

“AUX 1” output will switch on during a wash program and then switch off when a wash program has finished.

“AUX 2” output is a timed output which can be enabled by programming a wash cycle with all outputs disabled except the timer. If for example 5 seconds is selected on the timer then “AUX 2” contacts will close for 5 seconds.

PLANTWASH INPUTS

The Plantwash is equipped with a number of input connections to allow the facility of using level sensors to control the outputs of the Plantwash. This facility can be quite useful in areas where water pressure is erratic and therefore a timed output will give varied quantities. The first three input connections "I/P1", "I/P2" and "I/P3" can be enabled and disabled in the software of the Plantwash as described in chapter 3.2. The inputs require a closed contact switch to enable them. Do not connect any voltage sources to the input connections as this will damage the Plantwash.

The input connection "I/P5" is used for a wash line switch and is factory fitted with a link for the Plantwash to function. If no connection is made to "I/P5" the Plantwash will not wash.

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STARTING A WASH CYCLE

To start a wash cycle, make sure the unit is not in program mode and press the ***start*** key. The unit will look at the time and day and suggest which program it should run. If you are not happy with the selection, use the ***up arrow*** to change it. When the selection is correct, press the ***start*** key again.

The following screen should now be displayed if the "Morning" program is selected.

Morning Wash **Cycle 01**

As the wash cycles progress the display will inform you what cycle is currently running.

If for any reason you need to stop a wash program press the ***stop*** button.

MILKING MODE

The Plantwash can be put into milking mode by choosing "Milking Mode" in the program options screen. Use the ***up arrow*** to scroll through the program options to find "Milking Mode" and then press the ***start*** key to commence milking. The vacuum pump output will be switched on in milking mode and the following screen will be displayed.

Milking Mode **Duration: 000min**

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SECTION 4.0 - INSTALLATION

The Plantwash control box is housed in a splash proof enclosure. However, the control box should be fitted to a dry wall, well away from the wash trough, and in a position where it is not likely to be washed with a hose. It should never be fitted in the milking parlour itself. Please see section 1.0 “Safety Critical Data” for further important information.

The unit requires a mains supply from a standard 13 amp socket. The output printed circuit board has six, three way terminal blocks to enable connection of mains voltage to a dump valve, hot and cold water solenoids and three peristaltic pumps. Standard three core mains flex cable can be used for this purpose.

The output printed circuit board also has two relays, the normally open contacts of which are each connected to a two way terminal block. These are used to control the vacuum and milk pumps respectively. On three-phase installation, the mains supply to the coil of the contactor for each of the pumps may be derived from any of the phases. A two-core cable can be connected from the relay contact, in parallel with the existing control device. In the case of a milk pump, the existing milk pump controller will contain a contactor or relay and a manual over-ride switch. The two-core from the relay can be connected to this switch. Alternatively, one conductor can be connected to the coil of the contactor or relay and the other conductor connected to the live supply to the milk pump controller. Great care must be taken to ensure that there is no possibility of the relay contacts being connected across two phases of the mains supply. If the milk pump controller and the Plantwash were to switch on at the same time, 440 volts would be applied to the relay contacts. The same is true of the control circuit for the vacuum pump.

WARNING: ALL MAINS WIRING MUST BE CARRIED OUT BY A **QUALIFIED ELECTRICIAN.**

Since the vacuum and milk pump control circuits are effectively connected to their own mains supply, these circuits together with the mains supply to the Plantwash, must be isolated before the lid is removed.

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SECTION 5.0 - ROUTINE MAINTENANCE AND SERVICE

The Plantwash control box requires no routine maintenance. If the lid to the control box needs to be cleaned then a damp cloth may be used.

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APPENDIX A

Plantwash programming sheet												
Morning		Afternoon		Evening		Milk Stone						
CYCLE	INPUTS			TIME	VACUUM	MILK	DUMP	COLD	HOT	PERISTALTICS		
	1	2	3	00:00	PUMP	PUMP	VALVE	VALVE	VALVE	X	Y	Z
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Plantwash programming sheet												
Morning		Afternoon		Evening		Milk Stone						
CYCLE	INPUTS			TIME	VACUUM	MILK	DUMP	COLD	HOT	PERISTALTICS		
	1	2	3	00:00	PUMP	PUMP	VALVE	VALVE	VALVE	X	Y	Z
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Plantwash programming sheet												
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CYCLE	INPUTS			TIME	VACUUM	MILK	DUMP	COLD	HOT	PERISTALTICS		
	1	2	3	00:00	PUMP	PUMP	VALVE	VALVE	VALVE	X	Y	Z
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Plantwash programming sheet												
Morning		Afternoon		Evening		Milk Stone						
CYCLE	INPUTS			TIME	VACUUM	MILK	DUMP	COLD	HOT	PERISTALTICS		
	1	2	3	00:00	PUMP	PUMP	VALVE	VALVE	VALVE	X	Y	Z
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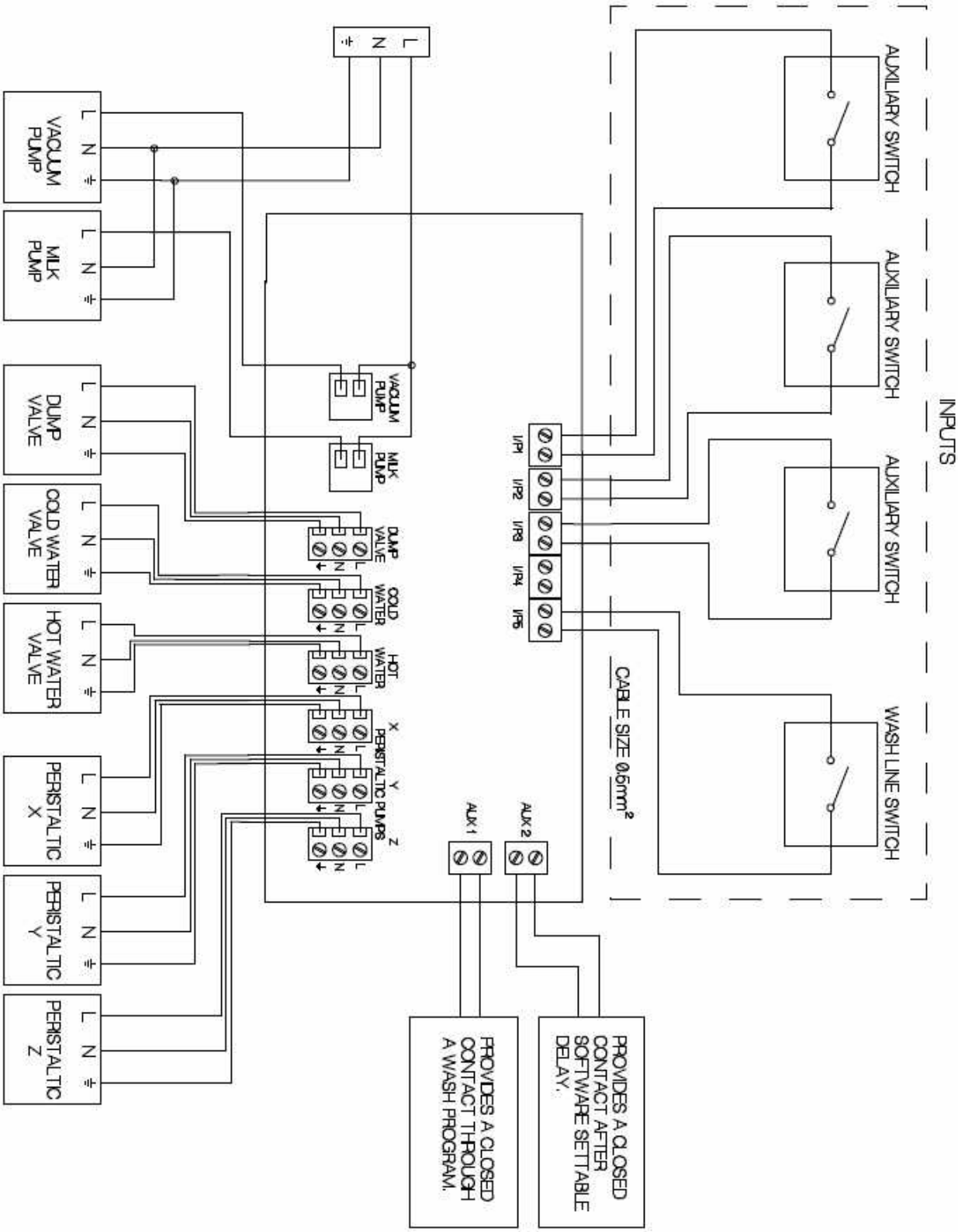
APPENDIX B



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