AirWash®

TECHNICAL MANUAL

Edition 1.3

PUBLICATION INFORMATION

1. COPYRIGHT

2. DISCLOSURE

3. LIMITATIONS OF USE

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CONTENTS

WARNING

BEFORE OPENING ANY ELECTRICAL EQUIPMENT, ALWAYS DISCONNECT FROM THE MAINS SUPPLY.

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE ANY OF THE ELECTRICAL EQUIPMENT TO WATER OR MOISTURE.

THE WIRES IN THE MAINS LEAD OF THE POWER SUPPLIES ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

BLUE to N (Neutral)
BROWN to L (Live)
YELLOW/GREEN TO E (Ground)

DO NOT ALLOW LARGE SURGES OF ELECTRICAL CURRENT TO MAKE CONTACT WITH THIS EQUIPMENT - E.G. WELDING ON STALLWORK.

ALWAYS ISOLATE ALL ELECTRONIC EQUIPMENT TOTALLY FROM THE MAINS SUPPLY IF LARGE CURRENTS ARE APPLIED TO THE MILKING MACHINE.

IF A STAND-BY GENERATOR IS USED TO SUPPLY MAINS VOLTAGE, FIRST DISCONNECT ALL ELECTRONIC EQUIPMENT TOTALLY FROM THE MAINS. START THE GENERATOR AND CHECK THE STABILITY OF THE GENERATED CURRENT BEFORE CONNECTING THE ELECTRONIC EQUIPMENT.

THE EXCLAMATION MARK WITHIN A TRIANGLE IS INTENDED TO ALERT THE USER TO IMPORTANT OPERATING AND MAINTENANCE OR SERVICE INSTRUCTIONS IN THIS LITERATURE.

WARNING

DRI bv. USE HIGH PERFORMANCE, MODERN ENGINEERING PLASTICS IN THE CONSTRUCTION OF MILKING EQUIPMENT. THE MATERIALS CHOSEN ARE THE BEST AVAILABLE FOR ANY GIVEN APPLICATION.

THE PLASTICS USED IN THE AIR WASH SYSTEM HAVE GOOD RESISTANCE TO HOT WATER, ACID AND ALKALI MILKING MACHINE DETERGENTS AND DISINFECTANTS EVEN AT HIGH TEMPERATURES.

HOWEVER, CHEMICAL RESISTANCE CAN BE AFFECTED BY PRODUCTS CONTAINING KETONES, CHLORINATED HYDROCARBONS, AROMATIC HYDROCARBONS AND HIGHER ALCOHOLS, WHICH ARE ALWAYS PRESENT IN PETROL, PARAFFIN, METHYLATED SPIRITS, DIESEL FUEL ETC. THEY ARE ALSO PRESENT IN VARYING CONCENTRATIONS IN PRODUCTS SUCH AS FLY SPRAYS, SOME TEAT DIP SOLUTIONS AND ARE SOMETIMES USED AS PROPELLANTS IN AEROSOL CANS.

GREAT CARE MUST BE TAKEN TO ENSURE THESE PRODUCTS DO NOT COME INTO CONTACT WITH PLASTIC COMPONENTS ON MILKING MACHINES.

DRI bv. WILL NOT ACCEPT RESPONSIBILITY FOR EQUIPMENT DAMAGED BY CHEMICALS.

Chapter 1 -Airwash Introduction

The Airwash system is a back flush system that flushes the liners between the milking of each cow.

Cow to cow infection of contagious bacteria like Staphylococcus Aureus mainly occurs during milking. Without Airwash, after milking a Staphylococcus Aureus infected cow, bacteria will still be present in the liners during at least the next 6 milkings. With Airwash the number of bacteria in the liner is significantly reduced (75 - 95%) before the next cow is milked.

Airwash is a major contribution to the reduction in the spread of mastitis bacteria and therefore reduces the number of mastitis cases as part of a mastitis control program.

The system operates with compressed air and cold water. The water/air is injected into the liner via an injector mounted in the short milk tube. The water/air is injected in cycles that create an aerosol of mixed air and water.

The system can be operated by a central controller for each side in herringbone or side by side parlours or as stand-alone for rotary / tandem stalls and one cluster - two point stalls.

The main features of the Airwash system are : -

- ❏ Hygienic liners for each individual cow
- ❏ Reduction in the spread of contagious mastitis
- ❏ Easy to install
- ❏ Fully automatic operation
- ❏ Minimum use of cold or hot water
- ❏ No disturbance of normal milking routines
- ❏ Can be used with circulation wash or acidified boiling water (ABW) systems
- ❏ Applicable in every type / brand of milking parlour

INSTALLING THE WATERPUMP AND WATER RESERVOIR

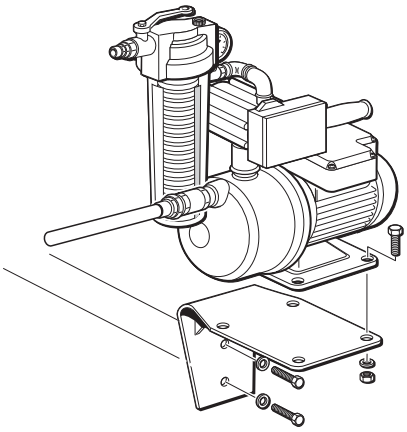
Before installing the water pump and its accessories its position must be clearly thought out. The following requirements must be attended to :

The water pump must installed in a dry location.

It must be mounted in such a way that it is easy to service and check.

If possible, within the area of the milking parlour (a good place may be the vacuum pump room if it is not to far away).

SITING OF THE PUMP AND RESERVOIR BRACKETS



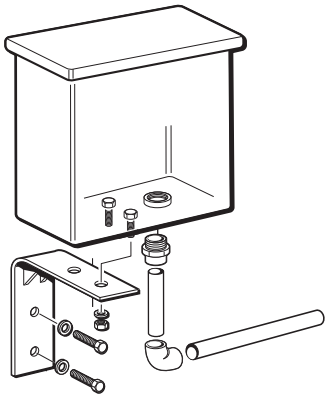
Pump + Bracket (A)

When a suitable place for the pump and water reservoir has been found, draw a horizontal line using a spirit level on which the brackets (A and B) should be fitted.

Bracket B must always be mounted to the left of bracket A.

Do not mount the brackets too far apart (maximum distance 2 metres). The two brackets must be mounted at the same height. The 4 fixing holes are drilled 70 mm deep with a 14 mm Vidia drill

IMPORTANT : Remove the drilling-dust carefully. Drive the plug straight into the drill holes and secure the brackets with the aid of the M8x60 screws, and take care to make them level. NOTE : The brackets can be mounted either way up.



Water tank + Bracket (B)

MOUNTING OF THE PUMP AND RESERVOIR ON THE BRACKETS

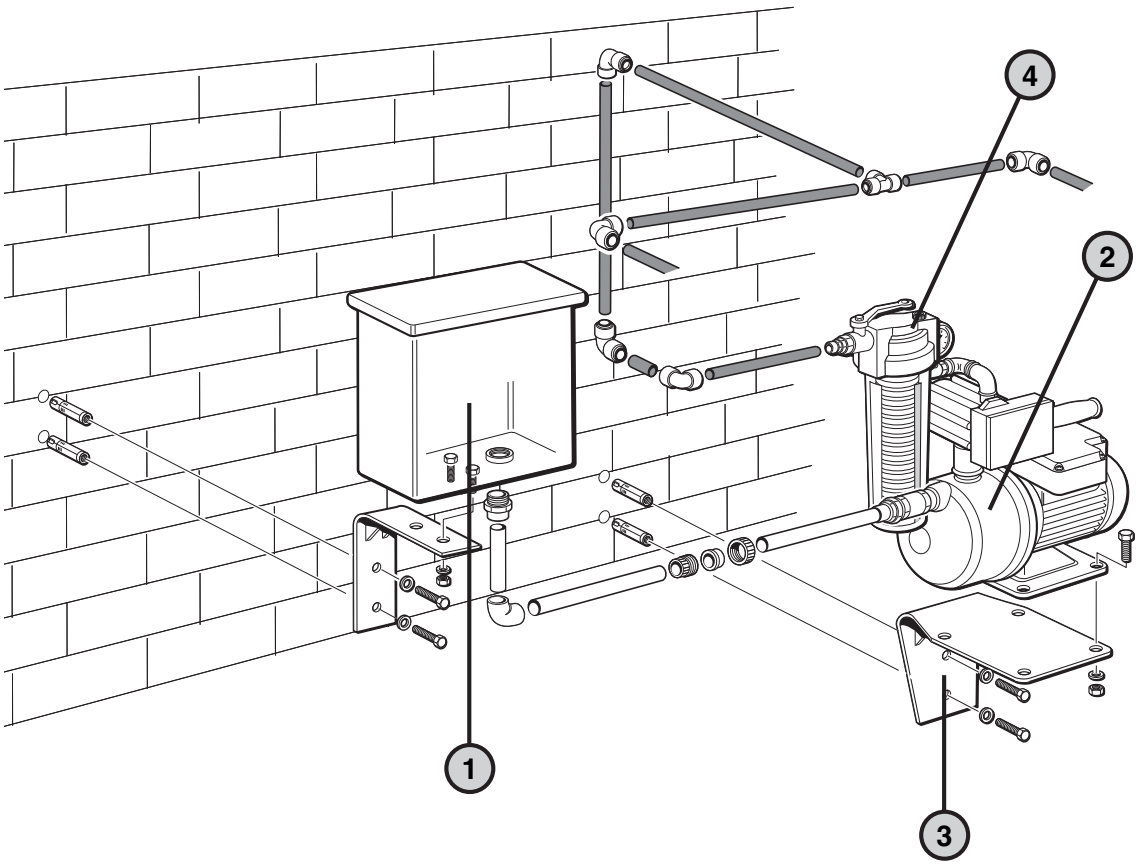
The drill holes in the brackets are rough drilled, so that you can begin with securing the pump on the bracket (A).

Please ensure that the:

- ~ pressure can be checked at all times.
- ~ reset button is accessible.
- ~ pump suction pipe always points towards the reservoir.
- ~ manometer can be read.

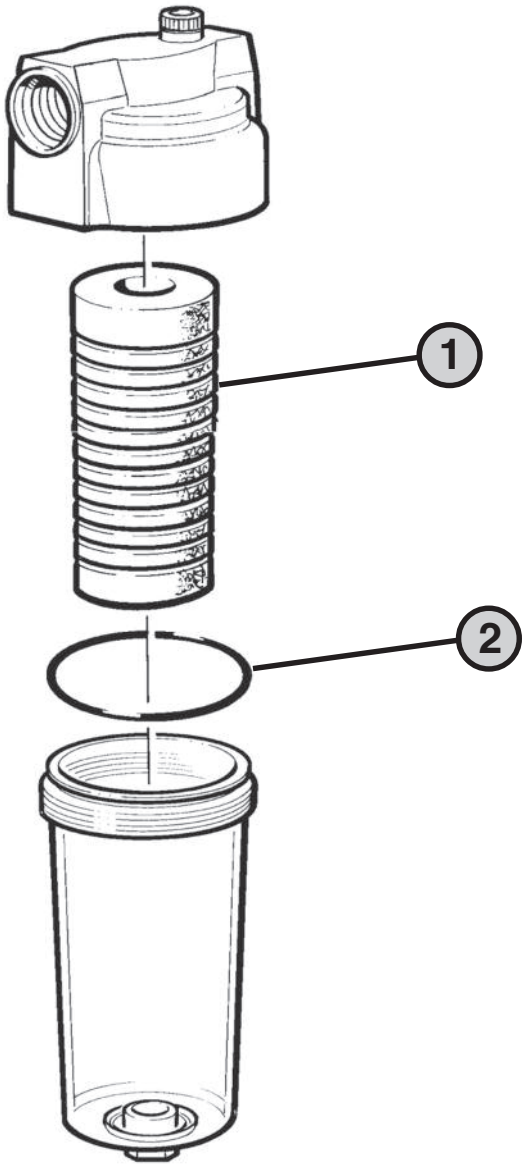
The pump is secured to the bracket using M8 x 20 machine screws and washers.

CONNECTION FROM PUMP TO RESERVOIR



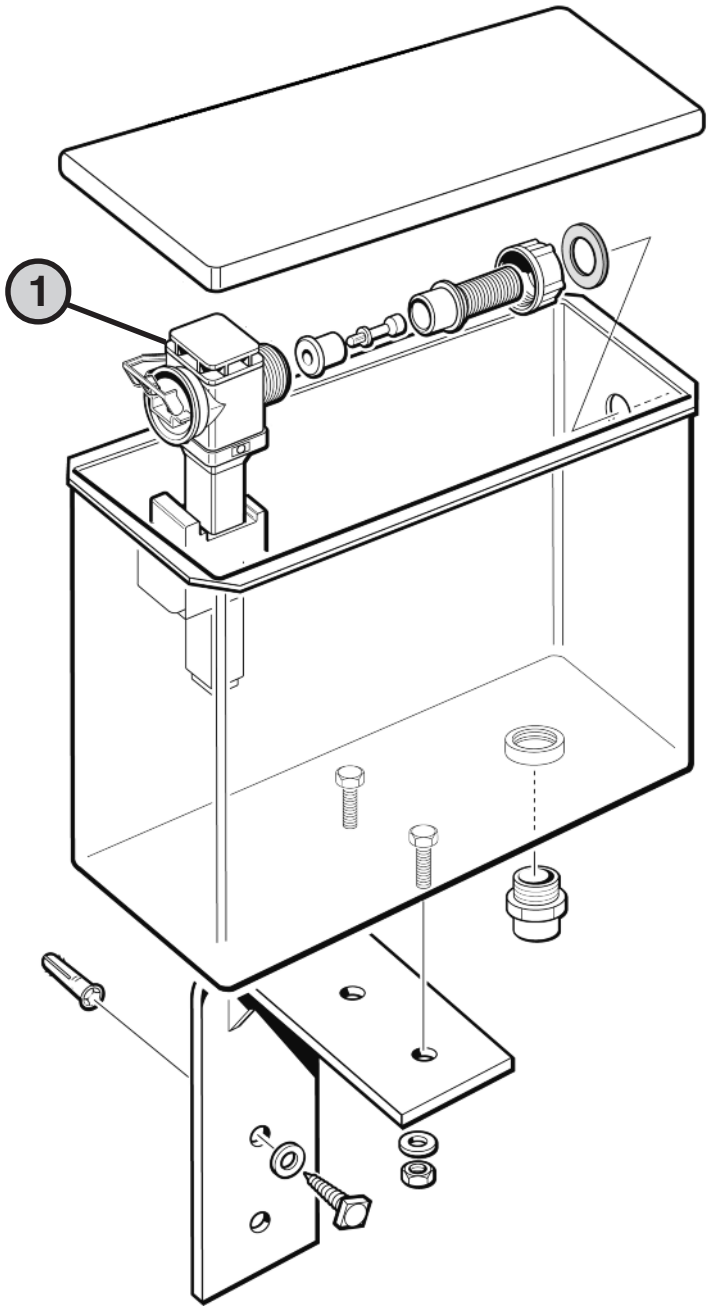
	Description	DRI nr.
1.	Airwash Water Reservoir 10 l. Herringbone	905
2.	Airwash Water Pump 220V Complete Herringbone	910
3.	Airwash 220V Pump Bracket Herringbone	940
4.	Airwash Filter Housing Water	926

AIRWASH FILTER HOUSING WATER



	Description	DRI nr.
	Airwash Filter Housing Water	**926**
1.	Airwash Water-Filter cartridge (exchange)	352
2.	Airwash O-Ring Filter Housing Water	348

AIRWASH WATERRESERVOIR 10 L. HERRINGBONE



	Description	DRI nr.
	Airwash Waterreservoir 10 l. Herringbone	**905**
1.	Float Valve	4023

Four important points.

- ❏ There is a standard pipe assembly on the pump inlet side. The ball-cock must be fitted to the water outlet side of the tank.
- ❏ Do not fit reducing bends or elbows because they give rise to unnecessary resistance in the supply.
- ❏ The screw coupling between pump and water reservoir must be positioned in such a way that the pump can be removed. Check whether the rubber gasket is present.
- ❏ The non return valve must be fitted in the direction of the flow. Check the arrow on the housing, it indicates the direction of the flow.

ELECTRIC CONNECTION OF THE PUMP

After the pump has been fitted the electrical supply must be provided.

This is :

* 220 Volt
* 50 Hertz
* 16 Amp. fused

Connect the pump to the electrical supplies using a mains plug and socket.

WATER SUPPLY TO THE WATER RESERVOIR

After the water reservoir has been fitted please check the following points :

1. Is the float present/correctly fitted

2. Is the float functioning.

3. Is the hose-connection correctly fitted.

NOTE The water supply of the water reservoir must be a separate line which can be shut off. For good results with AIRWASH, drinking water quality is a prerequisite.

PRESSURE REGULATOR OPERATION AND FUNCTION

The electrical connector is inside the regulator body. The connector diagram can be found inside the cover and also on the reverse of the body. The connector is for power supply to the regulator and connection between regulator and water pump.

The cables must have a minimum diameter of 6 mm and a maximum of 9 mm to keep the body waterproof. For that reason it is also important to tighten the 6 screws on the cover.

When the pressure regulator has been installed, connect it to the mains. The “Power on” light is lit. This indicates that there is power at the regulator.

The “On” light indicates that the pump is running. When the system has the right pressure, approx. 4-5 Bar, the pump will turn off automatically, and the light will go out.

The pressure regulator gives the water pump a certain time to build up the pressure. If the pressure is not right after this time, the red “Failure” light will be lit.
If this happens, press the “Reset” button and hold it pressed until the red “Failure” light goes out; then, release the button. The pressure regulator now stops the pump when the right pressure has been reached.

SITING OF CABLE DUCTS, WATER AND AIR CIRCUIT AND AIR FILTER

POSITIONING OF CABLE DUCTS

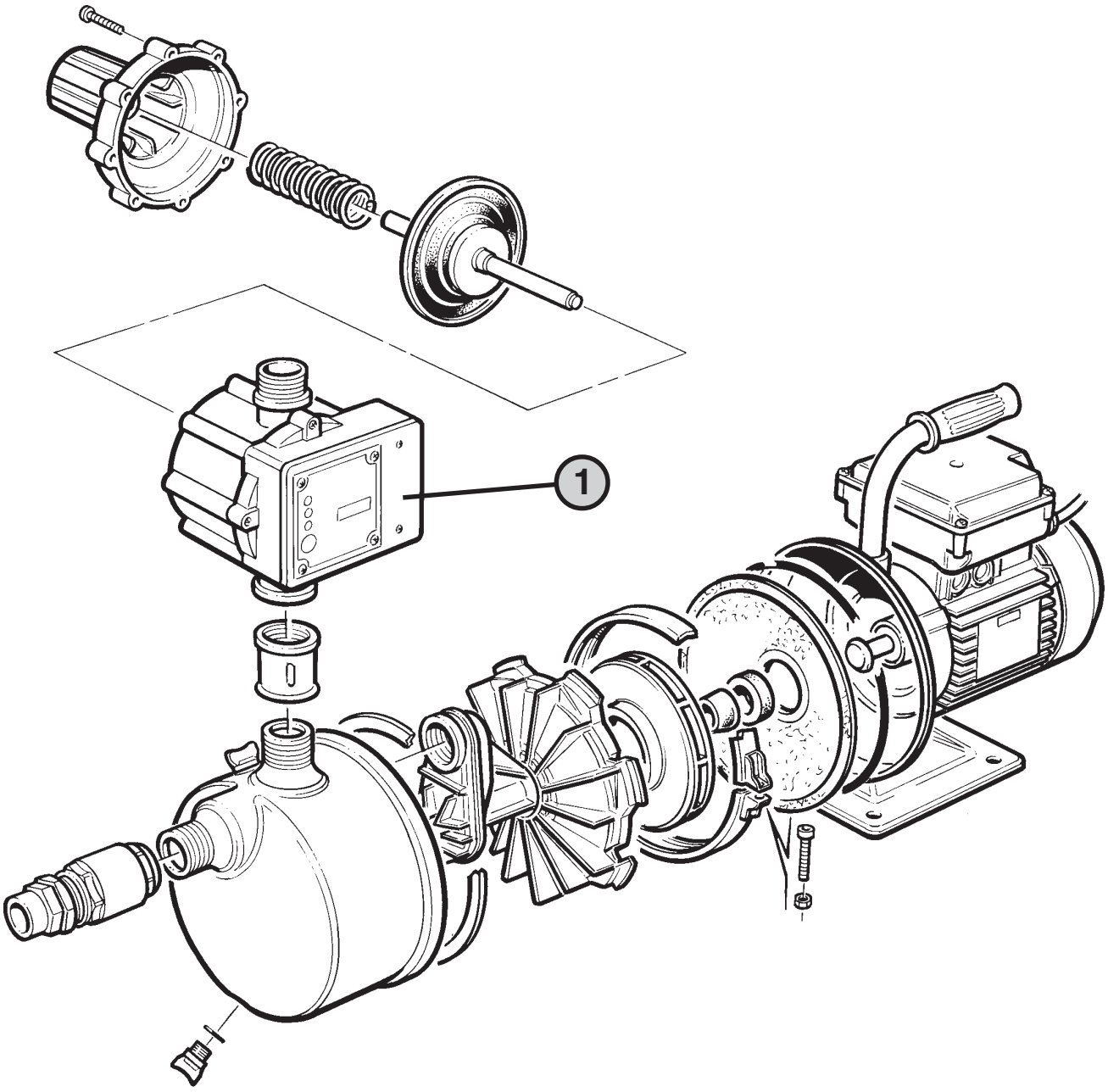
In the cable ducts on the upper side, drill two 15 mm holes per milking point, this is for the water and air supply to the herringbone or tandem control boxes.

The precise siting of the drill holes is determined when it’s clear where the control boxes can be placed.

The electric supply to the control boxes is provided from the underside of the cable duct.

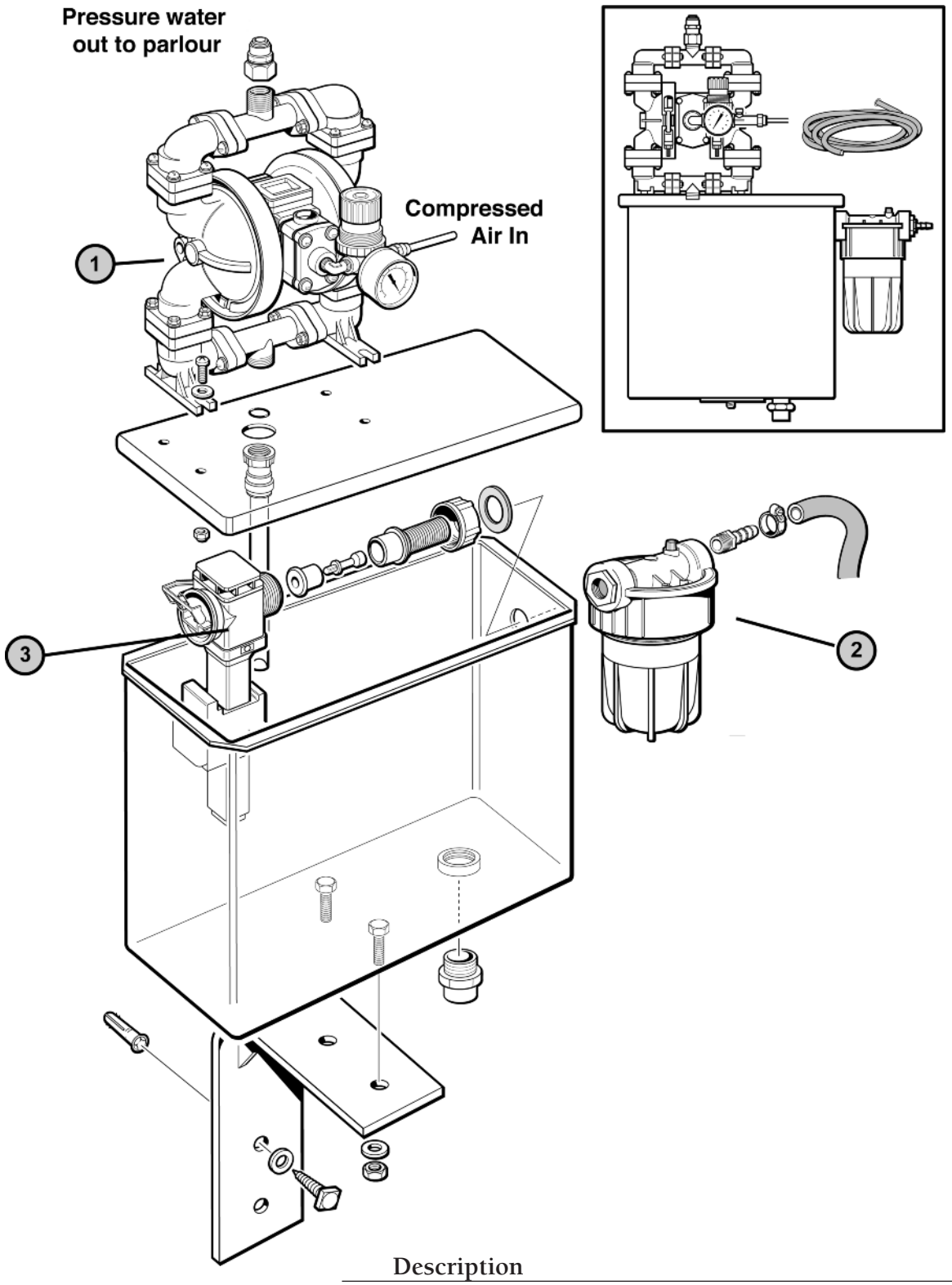
The 2 holes for the electric cables are drilled from below. For the last two sockets, only 1 hole is required.

AIRWASH WATER PUMP 220V COMPLETE HERRINGBONE



	Description	DRI nr.
	Airwash Water Pump 220V Complete Herringbone	**910**
1.	Press Control	3500

AIRWASH WATER PUMP MEMBRANE 1/4” COMPLETE



	Description	DRI nr.
	Airwash Water Pump Membrane ¼" Complete Indiv.	**900**
1.	Airwash Membrane Pump ¼"	983
2.	Airwash Filter Housing Water	926
3.	Airwash Float Valve	4023

WATER AND AIR RING CIRCUIT

NOTE : DUTCH RESEARCH & INNOVATIONS DOES NOT SUPPLY THE AIR COMPRESSOR NECESSARY FOR THE AIRWASH SYSTEM TO WORK. THE MINIMUM REQUIREMENTS FOR THE CAPACITY OF THE AIR COMPRESSOR ARE : -

Up to 12 points batch controlled and all individual controlled systems : 250 litres per minute

Over 12 points batch controlled : 350 litres per minute

WATER RING CIRCUIT

The water ring circuit from milk point to pump is connected using PE/PA hose. The length of the 10 x 12 mm hose between the milking points depends on the size of the parlour.

Do not saw the PE/PA hose.

It is extremely difficult to remove the resulting shavings from the line system and these may lead to blockages and malfunctioning in operation. **A special pipe cutter must be used to cut the pipe.**

It is important that the pipe sections for the push fit joints in particular are cut precisely at right angles because otherwise there may be leaks.

Important : The line should always be laid in a circuit.

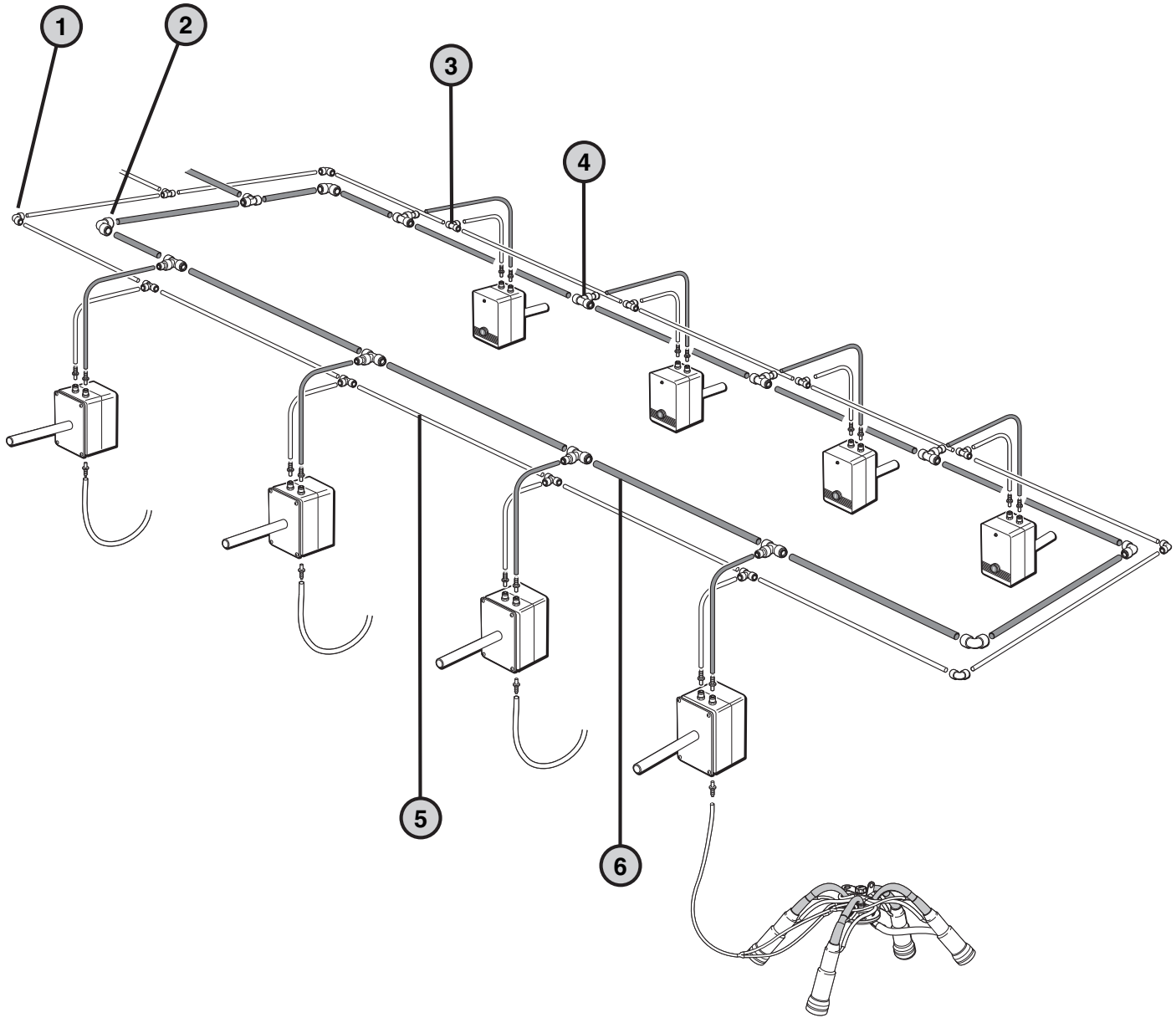
NOTE : Take great care with sealing when installing the unit as the smallest leakage's lead to malfunctioning in view of the relatively high pressures. All push-fit joints should be carefully and properly made.

NOTE : The PE/PA line should be laid as far as possible in the cable duct because this also provides good protection of the line.

After the installation of the ring circuit has been completed the T-pieces (12mm with 8 mm reducing pieces) are fitted in the correct position after the line has been separated at the appropriate points (special cutter).

Please also refer to the diagram on the next page.

RING CIRCUIT SYSTEM IN A HERRINGBONE 2 X 4 STALL

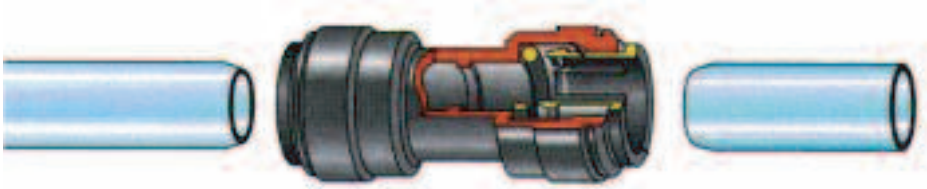


	Description	DRI nr.
1.	Airwash Angle Air 8 mm.	889
2.	Airwash Angle Water 12 mm.	969
3.	Airwash T-Piece Air 8 mm.	888
4.	Airwas T-Piece Water 12 mm.	968
5.	Airwash Air-Supply Line 8 mm. (100 m.)	886
6.	Airwash Water-Supply Line 12 mm. (100 m.)	966

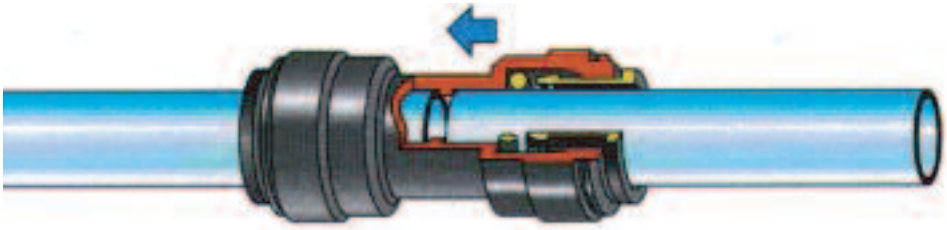
PUSH-FIT JOINTS

To make a connection, the tube is simply pushed in by hand; the collet locking system then holds the tube firmly in place without deforming it or restricting flow.

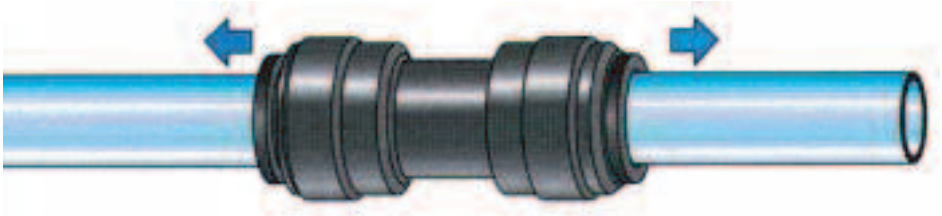
1. CUT PIPE SQUARE : Cut the pipe square. It is essential that the outside diameter be free of score marks and that burrs and sharp edges be removed before inserting into fitting.



2. PUSH UP TO PIPE STOP : Push the pipe into the fitting, to the pipe stop. The collet (gripper) has stainless steel teeth which hold the tube firmly in position whilst the 'O' ring provides a permanent leak proof seal.

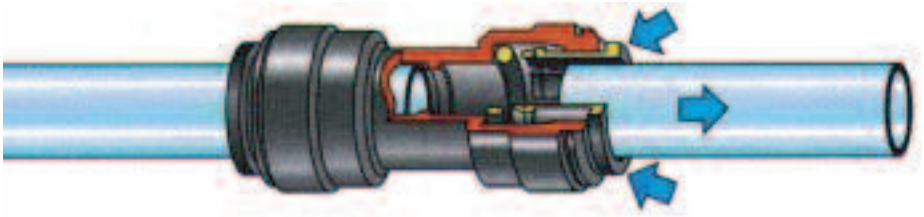


3. PULL TO CHECK SECURE : Pull on the pipe to check it is secure. It is good practice to test the entire system before first use.



DISCONNECTING

PUSH IN COLLET AND REMOVE PIPE : Ensure that the system is depressurised before removing fitting. To disconnect push in the collet squarely against the face of the fitting. With the collet held in this position, the pipe can be removed. The fitting can then be reused.



AIR RING CIRCUIT

For the air ring circuit PA piping with a diameter of 8 x 6 mm is used. It runs from the compressor to the milking parlour via the air filter. The following material is required for the air circuit :

- ❏ PA hose 8 x 6 mm, length depending on the size of the milking parlour.
- ❏ Angle 8 mm
- ❏ T-pieces 8 mm

The number of bends and T-pieces depends on the size of the milking parlour.

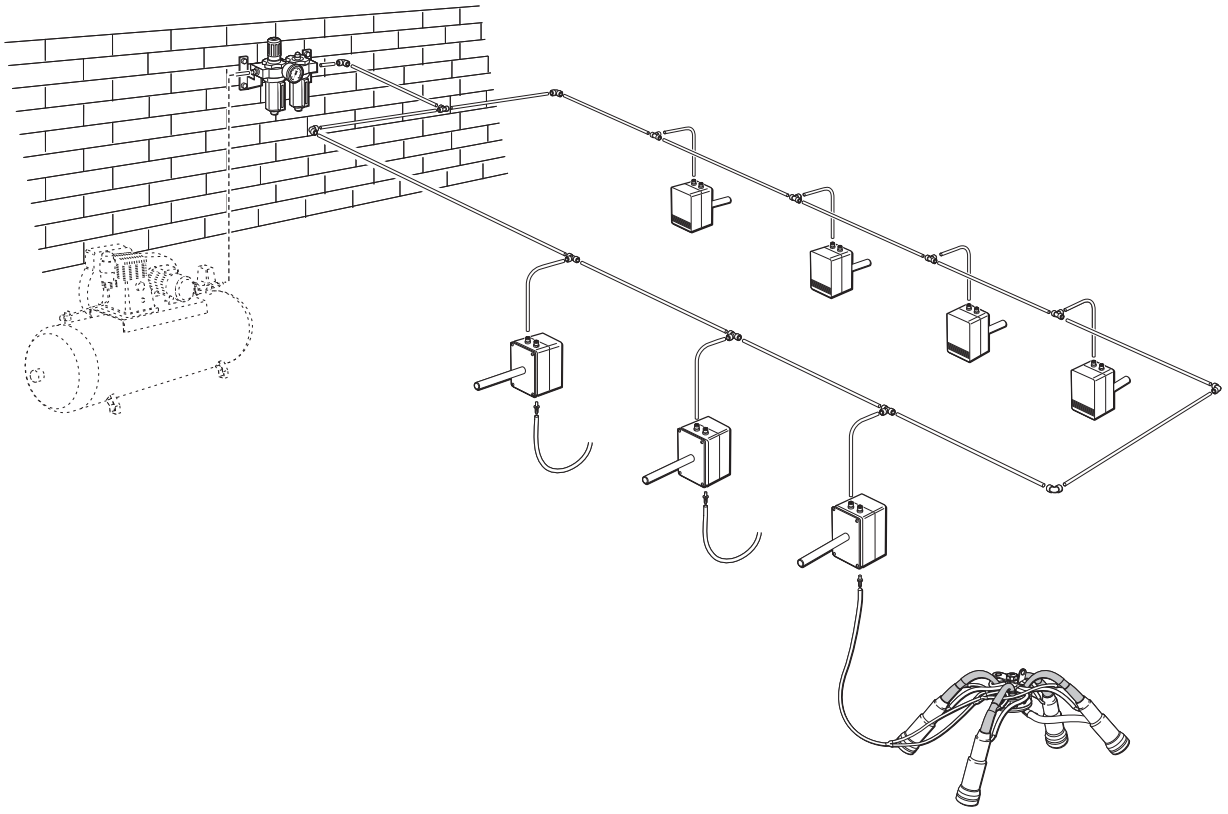
Do not saw the PE/PA hose. It is extremely difficult to remove the resulting shavings from the line system and these may lead to blockages and malfunctioning in operation. **A special pipe cutter must be used to cut the pipe.**

It is important that the pipe sections for the push fit joints in particular are cut precisely at right angles because otherwise there may be leaks.

First the line is laid from compressor to the air filter unit. The air filter unit is installed within easy reach at a favourable point in the milking parlour so that it cannot impede milking.

The air filter unit drains itself automatically.

Attention : See the marking on the housing for the direction of the flow.



Chapter 4 - Airwash Transformer

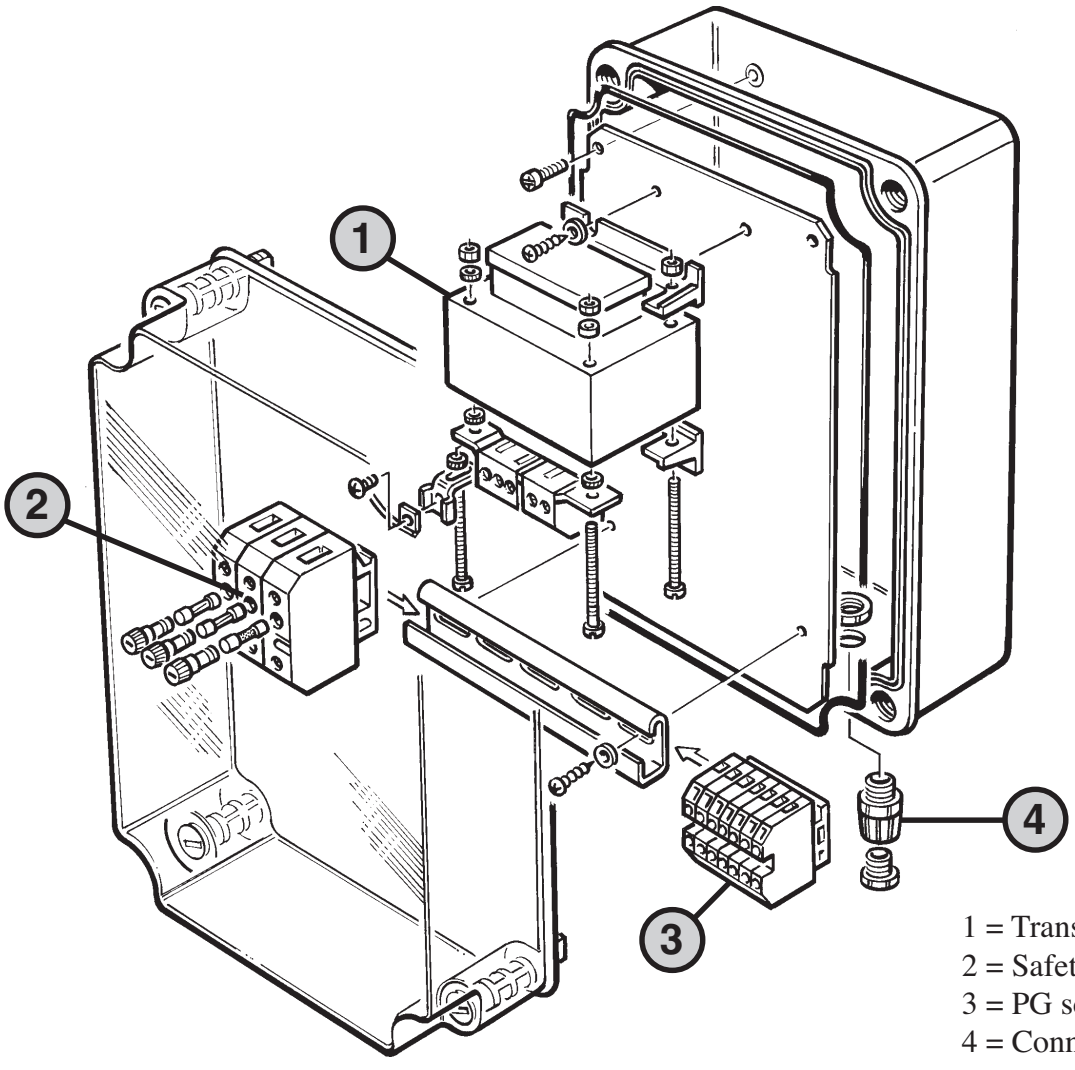
The following parts are required for installing the transformer :

- ❏ Screws and plugs for fixing it in place
- ❏ Triple core cable and plug
- ❏ Wiring diagram in the cover

The siting of the transformer is important. It is best sited near the batch controller.

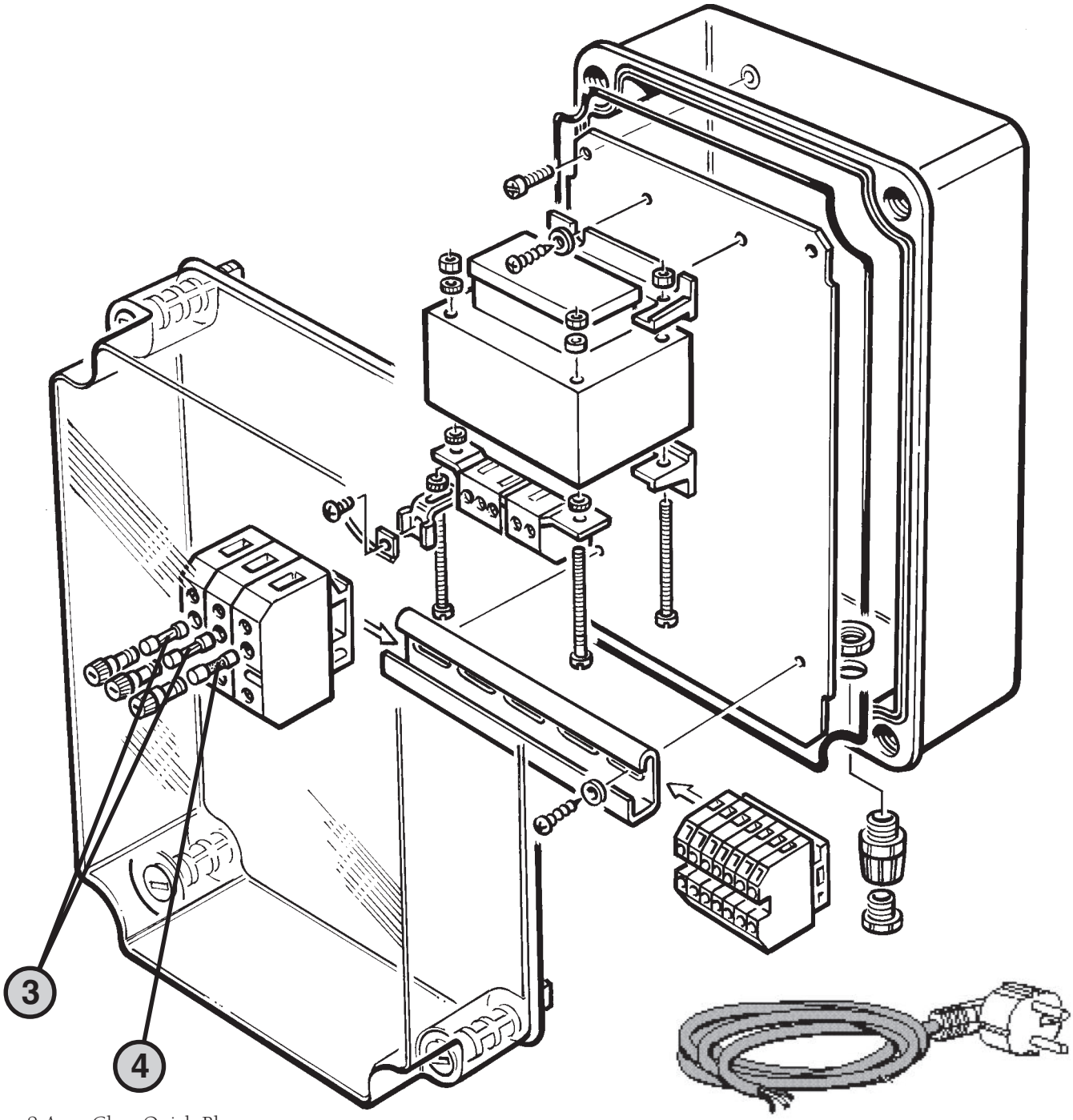
The transformer is secured by means of screws and plugs after its position has been decided on and the unit has been levelled using a spirit level. The holes drilled should be 45 mm deep, Ø 8 mm. Follow the wiring diagram in the cover of the unit. The transformer is connected to 220V, 50/60 Hz and fused with a 16 Amp. fuse.

For simple maintenance work, a plug and socket connection should be provided.



1 = Transformer 220-24V
2 = Safety fuse connections
3 = PG screw connections
4 = Connector terminal

TRANSFORMER 250 VA



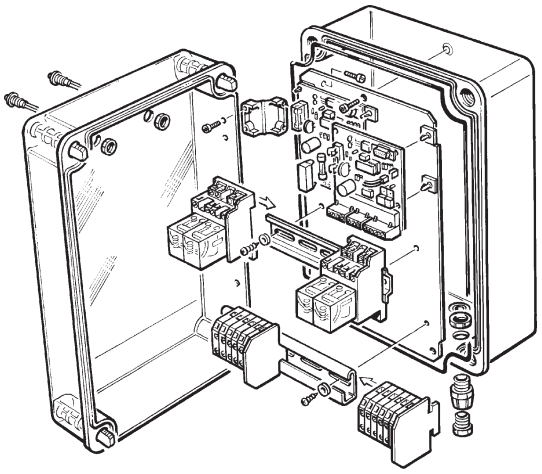
3. Fuse 8 Amp Glass Quick Blow
4. Fuse 6.3 Amp Ceramic Quick Blow

	Description	DRI nr.
1.	Transformer 220/24V 250 VA	644

CONNECTION OF THE AIRWASH CENTRAL OPERATING UNIT HERRINGBONE AND THE TRANSFORMER

The following materials are required for the installation of the batch controller :

- ❏ Fixing materials (screws and plugs)
- ❏ Power cable from transformer to batch controller, 2x left/right
- ❏ Wiring diagram in the cover



The batch controller is made up of the following parts :

- ❏ 2 PCB boards
- ❏ 4 relays
- ❏ 6 screw couplings
- ❏ wiring diagram

The ideal place for the batch controller is :

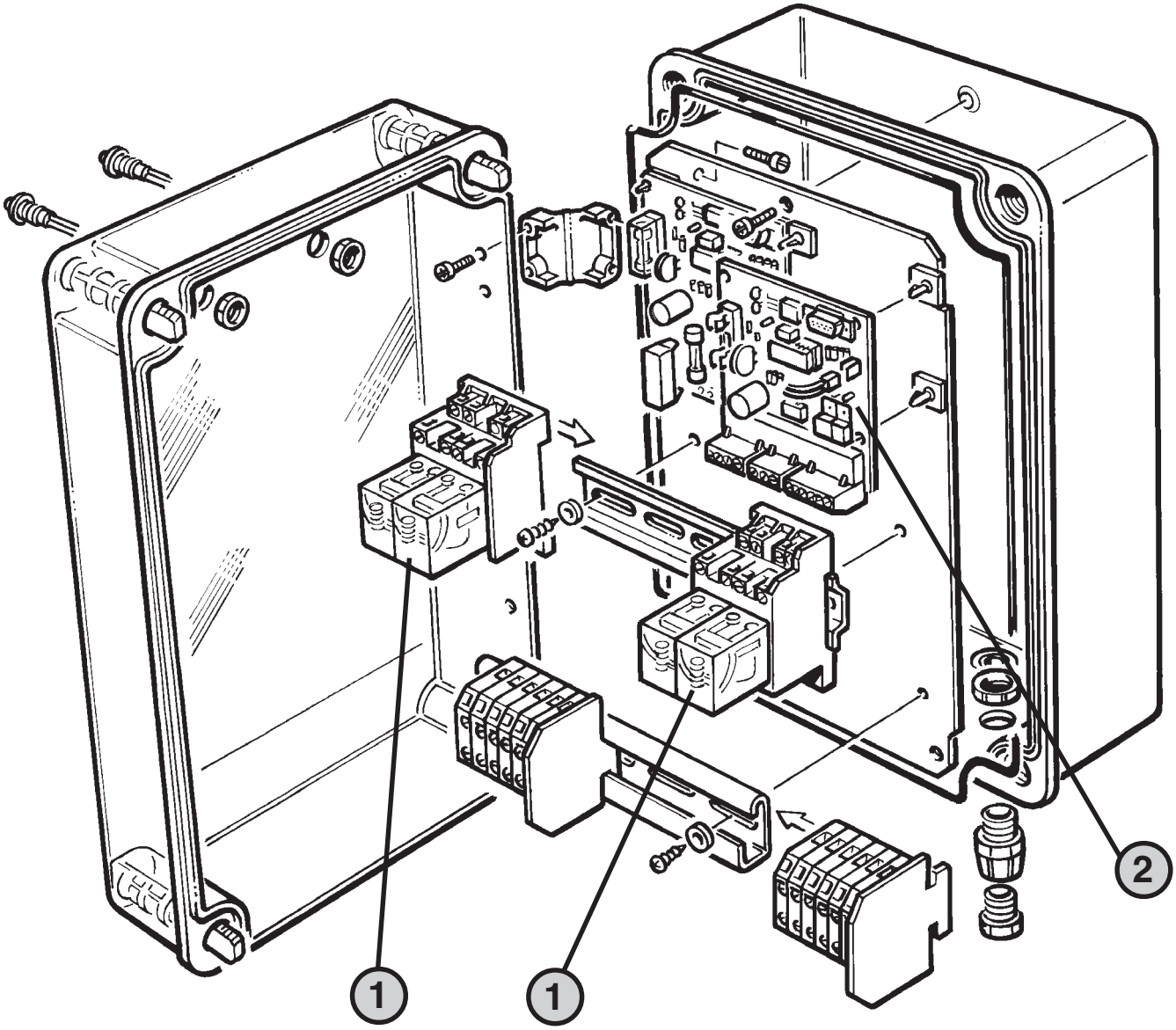
- ❏ in the direct vicinity of the milking parlour
- ❏ in a dry location, even during cleaning operations.

The batch controller is secured by means of screws and plugs after its position has been decided on and the unit has been levelled with the aid of a spirit level. The holes drilled should be 45 mm deep, ⁻ 8 mm. Follow the wiring diagram in the cover of the unit.

1 = Air (brown)
2 = 24 VAC Output (black)
3 = Water (grey)
4 = Limit switch or push button
5 = Limit switch or push button
6 = 24 VAC Input
7 = 24 VAC Input

8 = 24 VAC Input
9 = 24 VAC Input
10 = Limit switch or push button
11 = Limit switch or push button
12 = Air (brown)
13 = 24 VAC Output (black)
14 = Water (grey)

AIRWASH CENTRAL OPERATING UNIT HERRINGBONE



ATTENTION : IF THE CONNECTOR ON THE BLACK/ ORANGE LEAD TO THE SERVICE LED IS DISCONNECTED - ENSURE THAT THE CONNECTOR IS RECONNECTED IN THE CORRECT POSITION. E.G. THE BLACK WIRE ON THE RIGHT AND THE ORANGE WIRE ON THE LEFT SIDE.

1 = Orange
2 = Black

	Description	DRI nr.
	Airwash Centr. Operating Unit Herringbone	**799**
1.	Relay Operating Unit	540
2.	Airwash PCB	609

POSITION OF THE PUSH BUTTON OR LIMIT SWITCH

The following may be connected to the Airwash system :

A: push buttons
B: limit switches

The Airwash process can be started up manually by means of a push button

OR

Airwash can be started up automatically by means of a limit switch if an opening exit gate activates the switch, as for example in a herringbone milking parlour. The switches pass the signal to the batch controller which then starts up the Airwash system.

Fitting the push-button

The push button is a normally open connection, and is fitted by means of the brackets supplied. The following should be taken into account in selecting its position :

- ❏ The button must be easily accessible
- ❏ The button must be fitted outside the spray water area

Fitting the limit switch

The following points should be taken into account in fitting the limit switch :

- ❏ The sensor must point upwards in order to prevent the entry of water via the cable gland.
- ❏ In a neutral position (resting position) no switching should take place.

By fitting 2 push buttons or 2 limit switches (one each side), it is possible for the left hand and right hand side to be started up independently of each other. Follow the wiring diagram in the cover of the batch controller.

Electrical connection of the push button or limit switch

Push button and limit switch are connected to the batch controller by way of a 2 core cable.

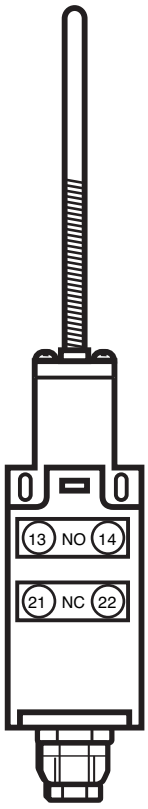
There are two possibilities for the connection of the limit switch:

NO 13-14 (= contact normally open) or **NC** 21-22 (= contact normally closed)

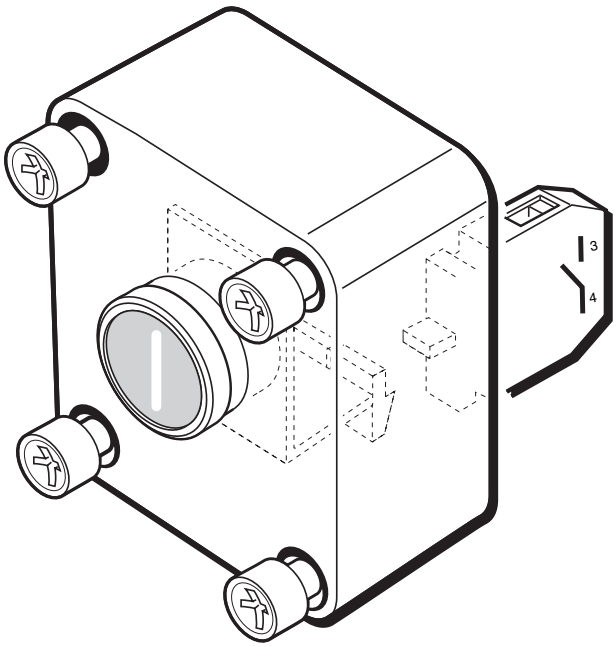
In the herringbone milking-parlour the **NO** contact arrangement is used.

The push button is a normally open connection.

NOTE : Make sure the housing seal of both switches is good and that no moisture can enter.

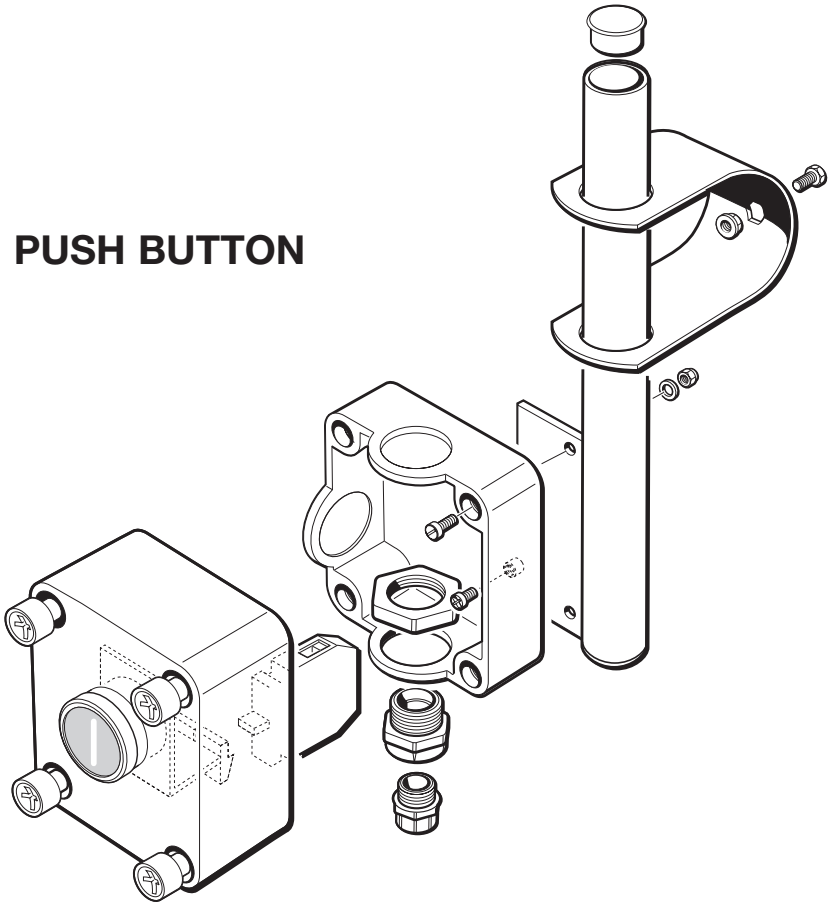


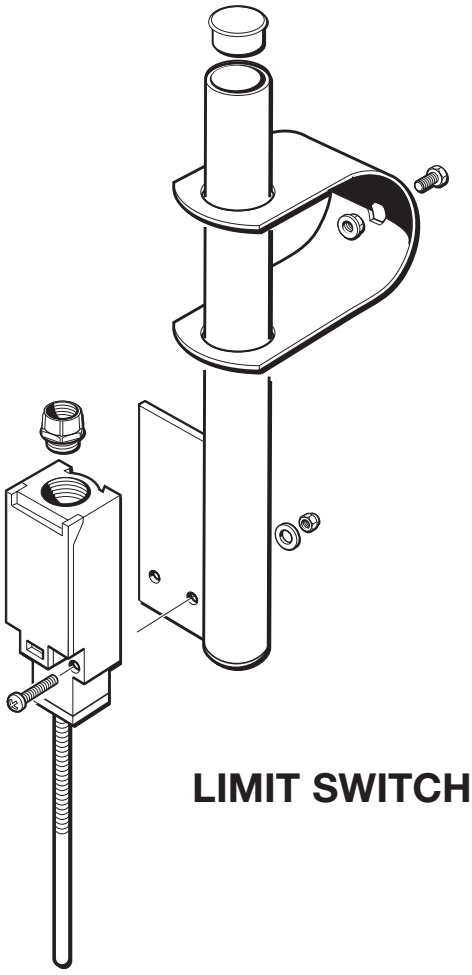
Limit switch



Push button

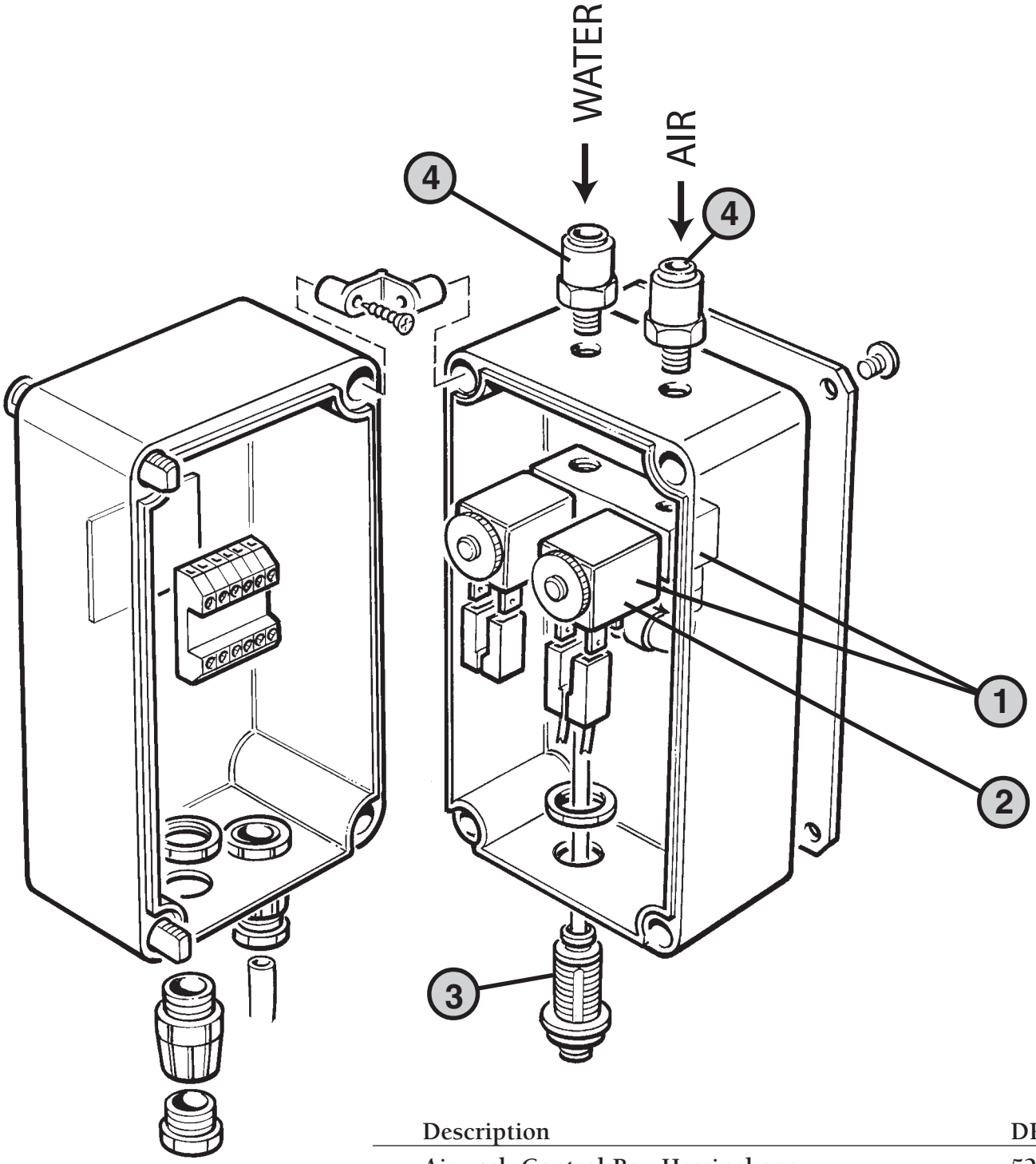
PUSH BUTTON / LIMIT SWITCH





Description	DRI nr.
Push Button Assembly	612
Limit Switch Assembly	502

AIRWASH CONTROL BOX HERRINGBONE



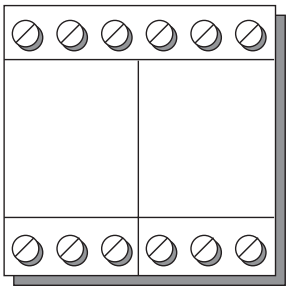
	Description	DRI nr.
	Airwash Control Box Herringbone	**528**
1.	Solenoid-Valve **Stainless Steel** (double) incl. adapters	272
2.	Solenoid Coil 24V-AC	273
3.	Outlet Connector 6 mm.	30
4.	Airwash Input Coupling St. Steel 8 x ¼"	31

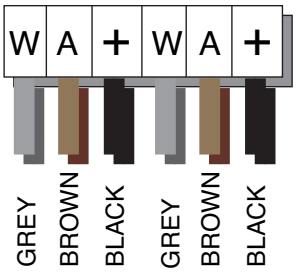
AIRWASH BATCH CONTROL BOX - ELECTRICAL CONNECTION

The next step is to provide the electrical connections to the control boxes. A 3 x 0.75mm^2 cable is fitted from the Airwash batch controller to the first batch control box in the milking parlour on the relevant milking parlour side. Observe here the left and right outlets of the Airwash batch controller. The left exit signal of the batch controller connects up the left hand side of the milking parlour etc.

The cable code is

Grey	=	Water
Brown	=	Air
Black	=	24 VAC





Place the orange coloured plug (present in the box) in the correct position. Follow the wiring diagram in the milking unit.

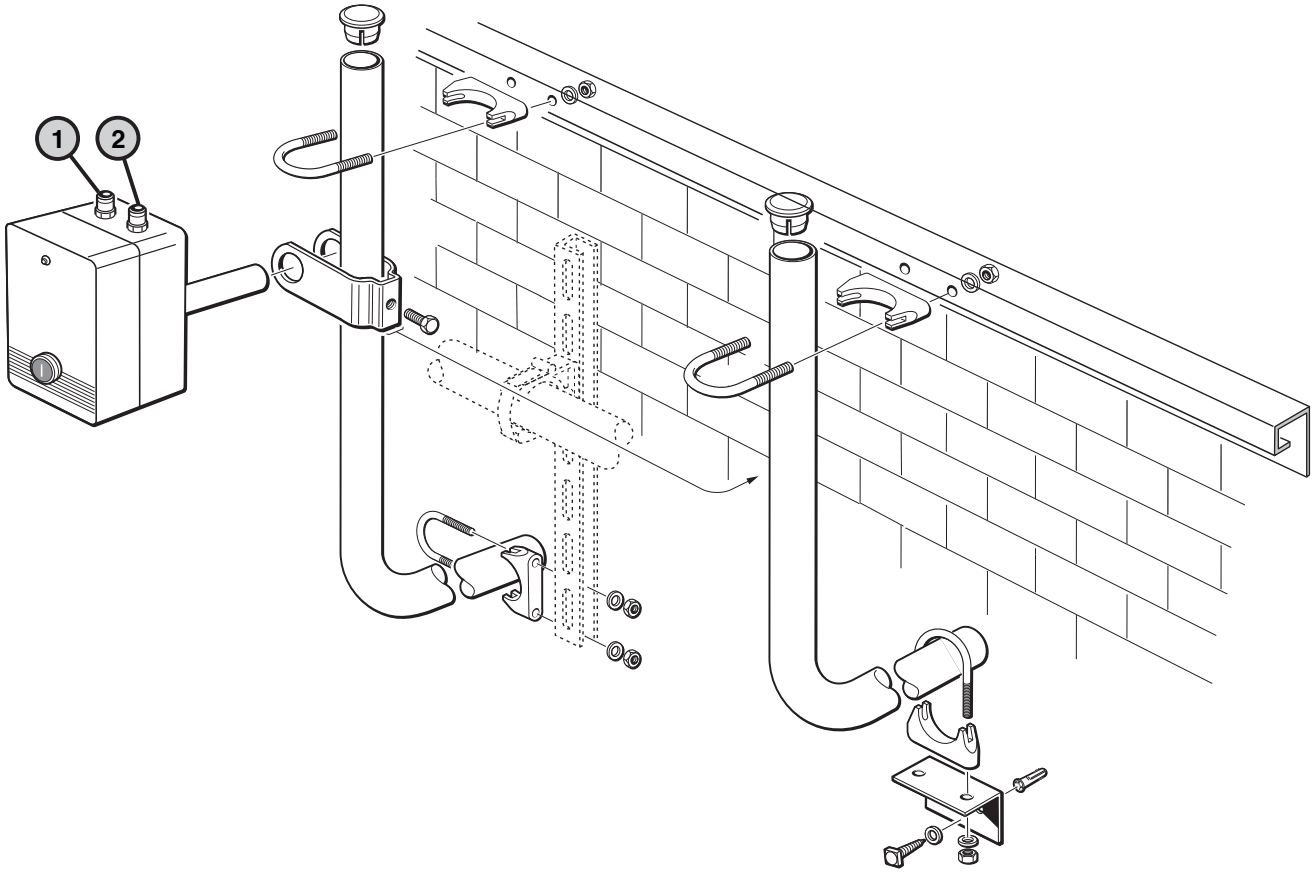
The output signal of the first box is then connected to the next box etc.

Lay the cable as far as possible in the cable duct. Adopt the same procedure with the opposite side of the milking parlour.

INSTALLATION OF THE BATCH AIRWASH CONTROL BOXES

Positioning of the control box

After the installation of the ring circuits is completed, the batch control boxes are installed.



1. Push-fit joint 8 mm (Water)
2. Push-fit joint 8 mm (Air)

The cover side of the control box must point towards the parlour pit. It is secured to the milking parlour frame with the aid of clips (1 $^{1}/_{2}$") and should be made level using a spirit level.

All the control boxes are connected to the air and water ring circuits with 8 x 6 hose.

Attention : Do not confuse the water valves with the air valves in the milking units.

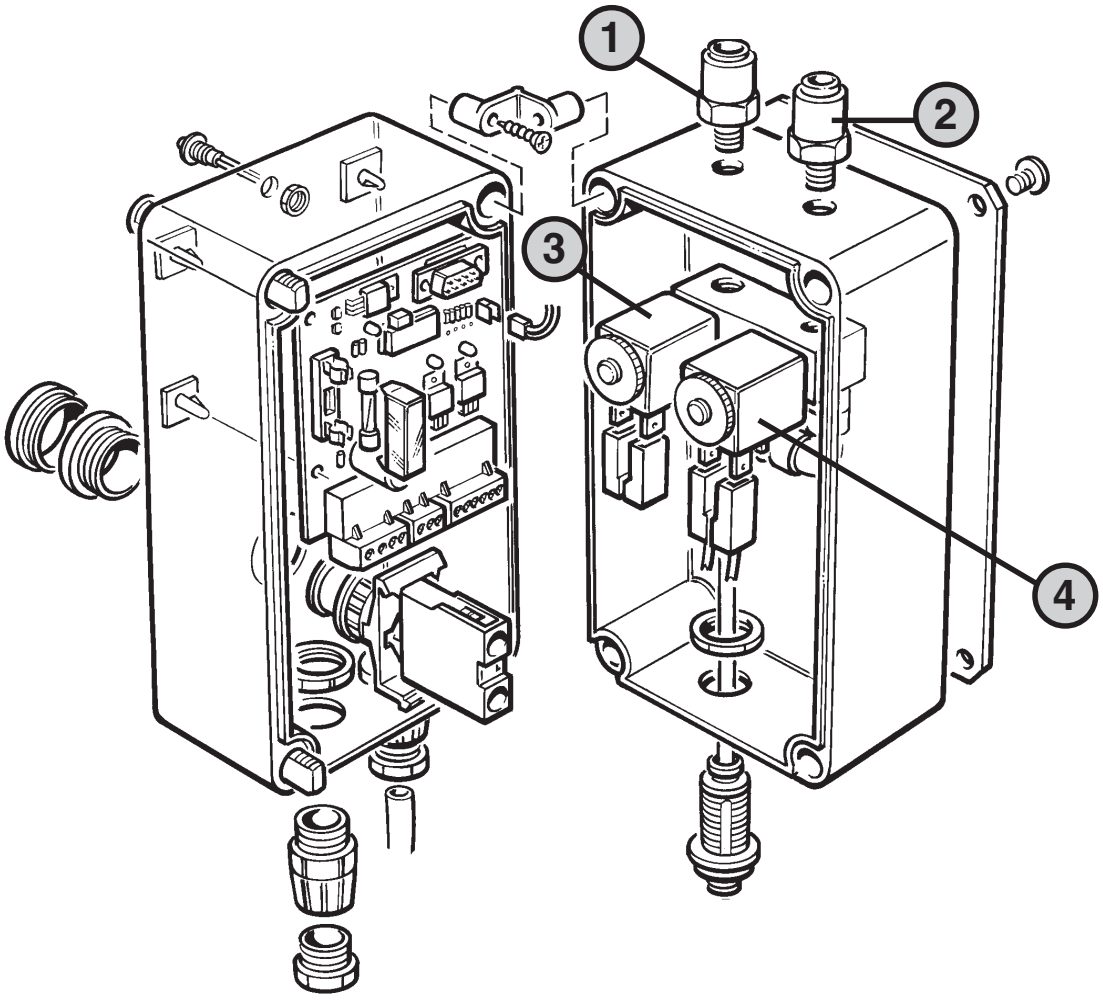
TRANSFORMER INSTALLATION

The transformer is installed in the same manner as for the batch control system.

INSTALLATION OF THE INDIVIDUAL AIRWASH CONTROL BOXES

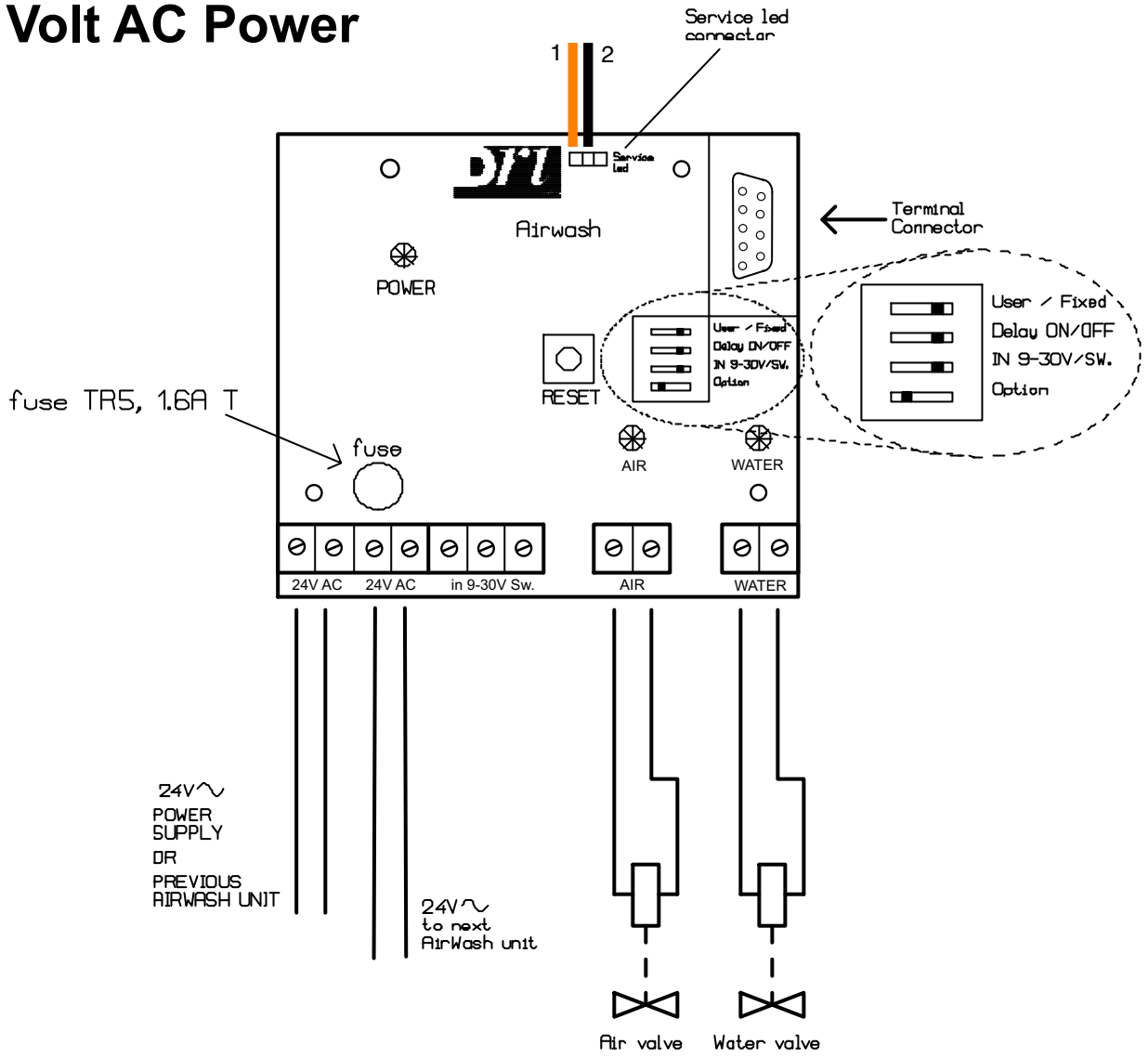
The electrical connection of these units is made with a 2 x 0.75mm^2 cable from the transformer to the first Airwash individual control box.

The boxes are connected according to the electrical diagram shown on the following page. After having connected the first unit, continue with the 2 x 0.75mm^2 cable from the first unit to the next.



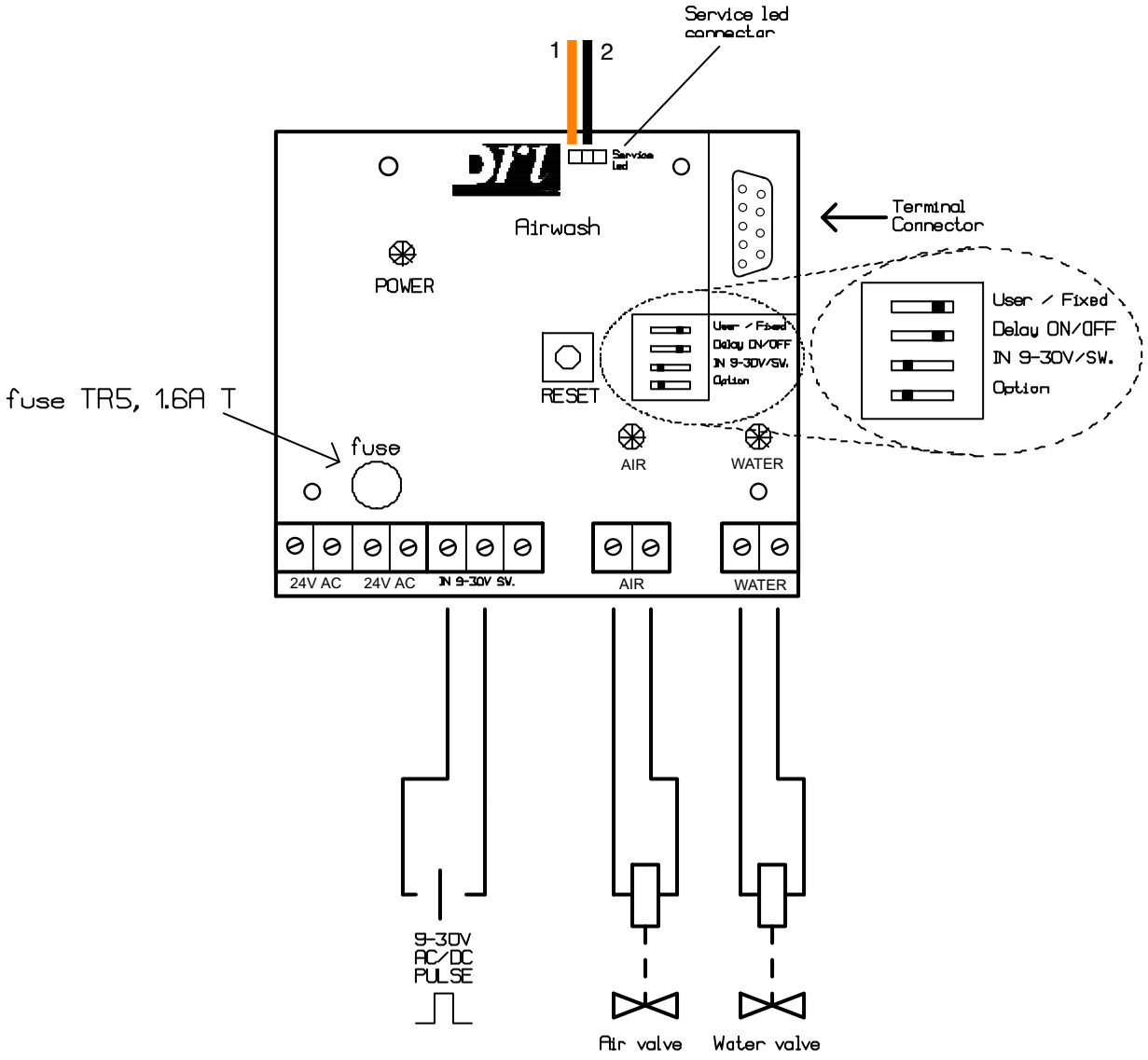
1. Push-fit joint 8 mm (Water)
2. Push-fit joint 8 mm (Air)
3. Solenoid valve (Water)
4. Solenoid valve (Air)

Connection Diagram AirWash PCB
24 Volt AC Power



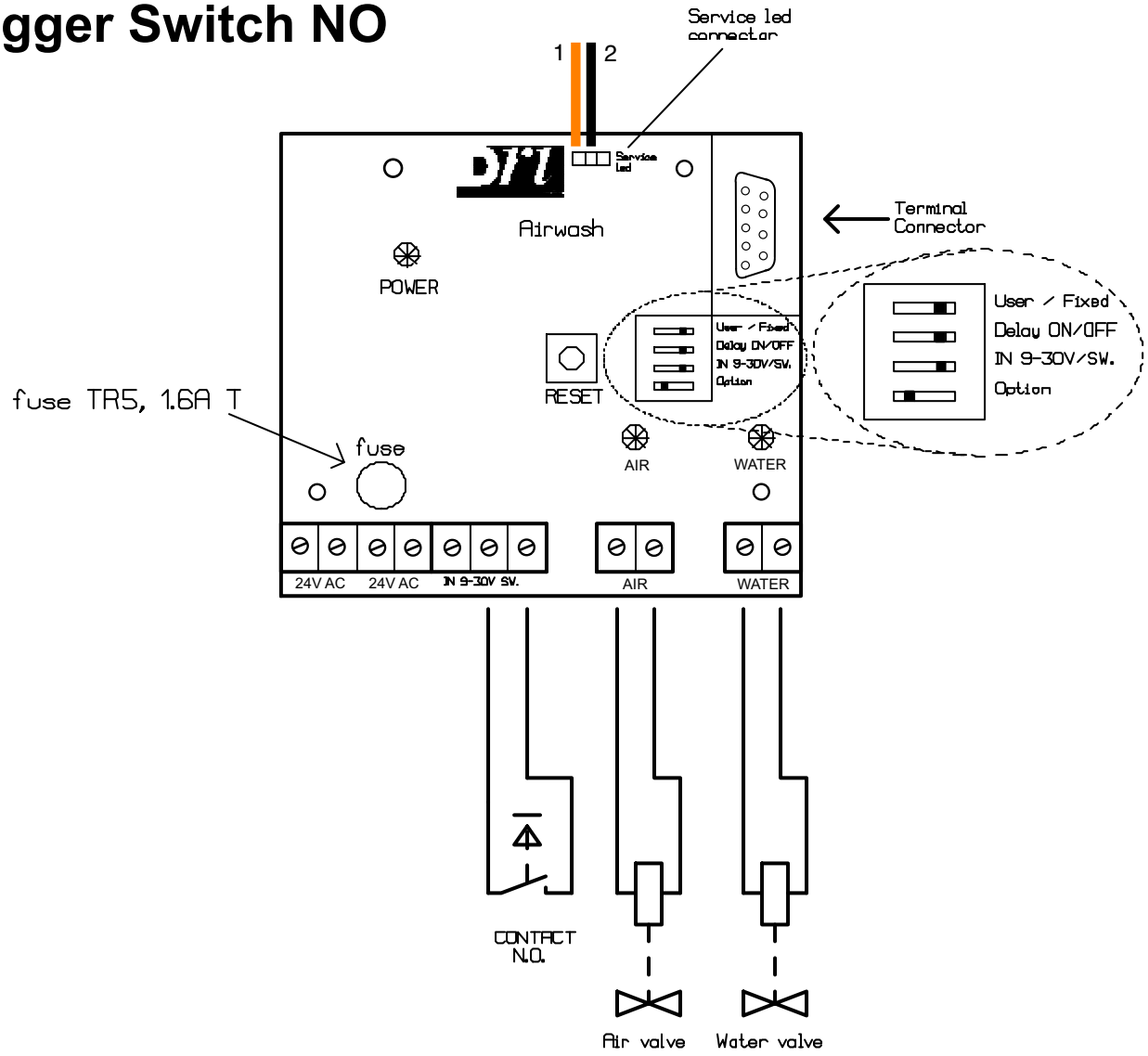
ATTENTION : IF THE CONNECTOR ON THE BLACK/ORANGE LEAD TO THE SERVICE LED IS DISCONNECTED - ENSURE THAT THE CONNECTOR IS RECONNECTED IN THE CORRECT POSITION. E.G. THE BLACK WIRE ON THE RIGHT AND THE ORANGE ON THE LEFT SIDE.

Connection Diagram AirWash PCB
AC/DC (9 - 30V) Contact/Pulse



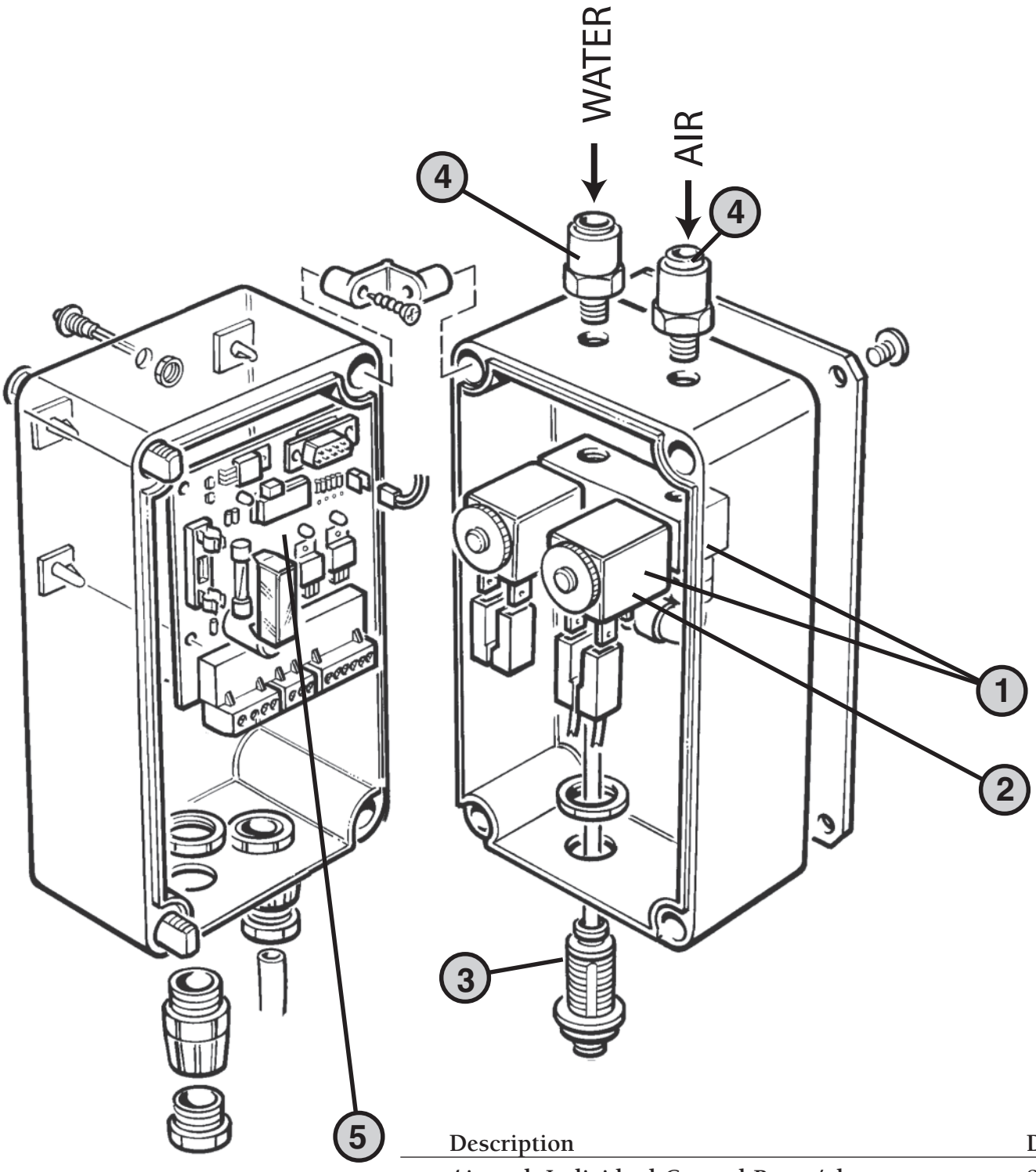
ATTENTION : IF THE CONNECTOR ON THE BLACK/ORANGE LEAD TO THE SERVICE LED IS DISCONNECTED - ENSURE THAT THE CONNECTOR IS RECONNECTED IN THE CORRECT POSITION. E.G. THE BLACK WIRE ON THE RIGHT AND THE ORANGE ON THE LEFT SIDE.

Connection Diagram AirWash PCB
Trigger Switch NO



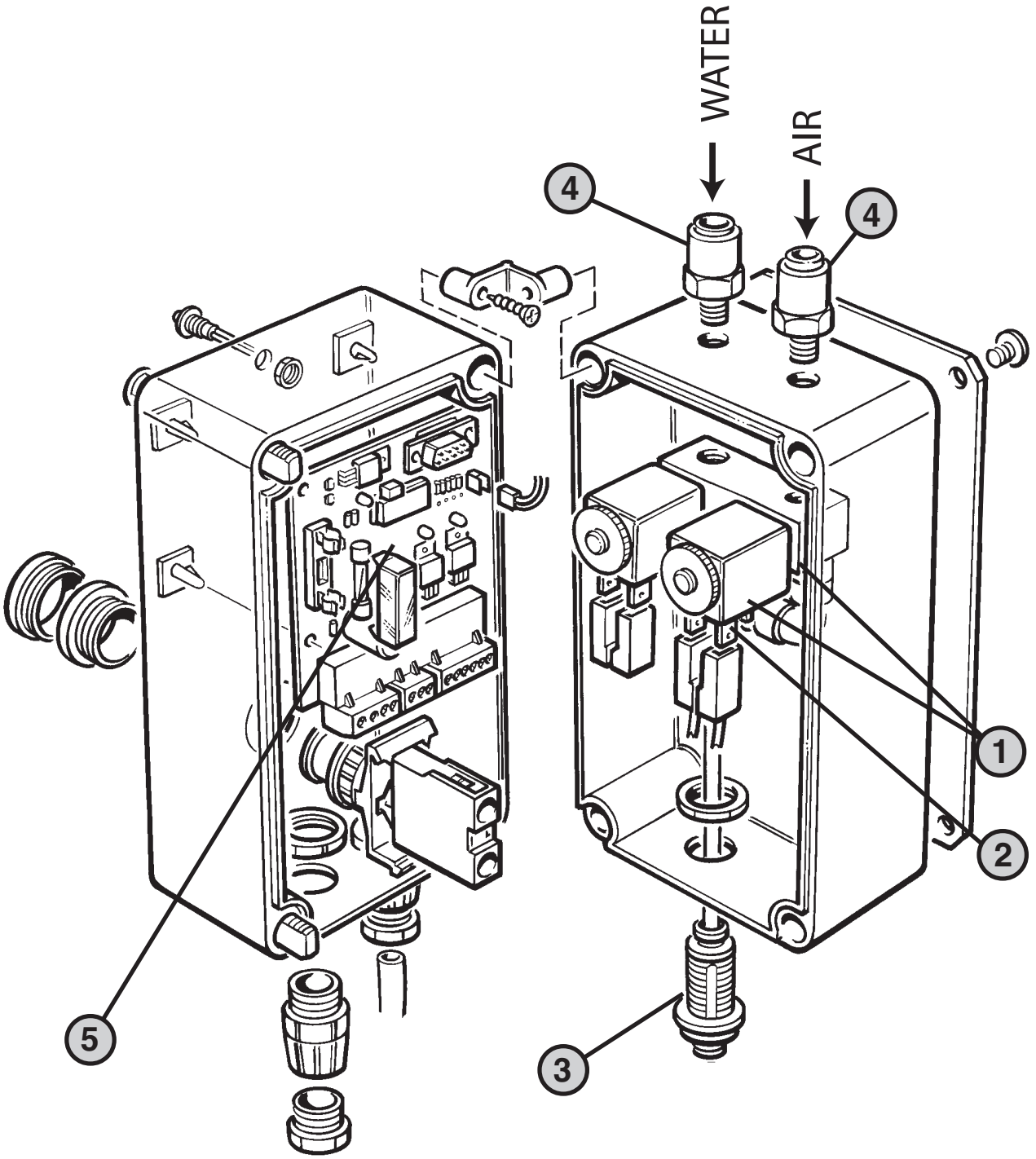
ATTENTION : IF THE CONNECTOR ON THE BLACK/ORANGE LEAD TO THE SERVICE LED IS DISCONNECTED - ENSURE THAT THE CONNECTOR IS RECONNECTED IN THE CORRECT POSITION. E.G. THE BLACK WIRE ON THE RIGHT AND THE ORANGE ON THE LEFT SIDE.

AIRWASH INDIVIDUAL CONTROL BOX



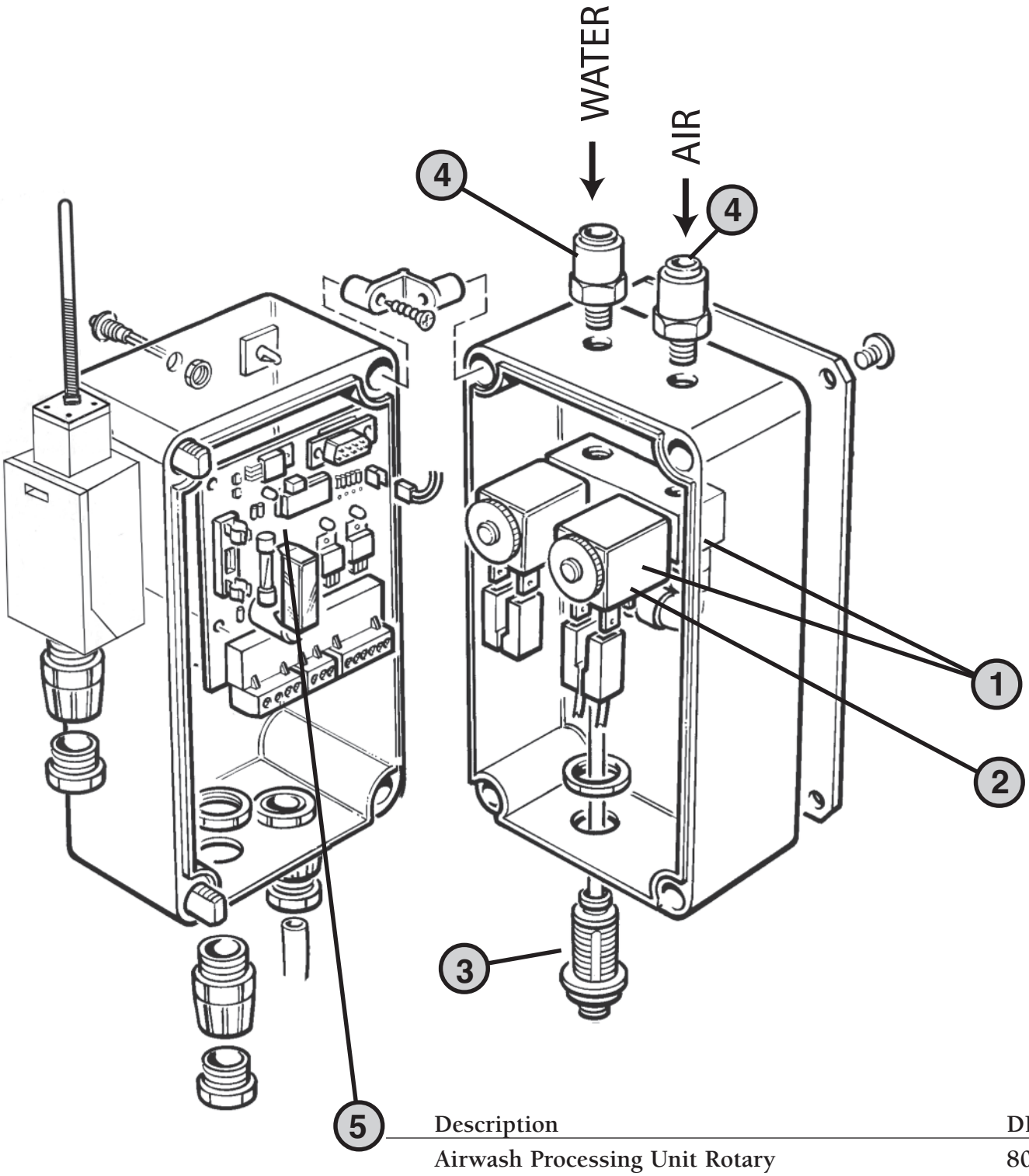
	Description	DRI nr.
	Airwash Individual Control Box p/place	**808**
1.	Solenoid-Valve **Stainless Steel** (double) incl. adapters	272
2.	Solenoid Coil 24V-AC	273
3.	Outlet Connector 6 mm.	30
4.	Airwash Input Coupling St. Steel 8 x ¼"	31
5.	Airwash PCB	609

AIRWASH INDIVIDUAL CONTROL BOX
PUSH BUTTON



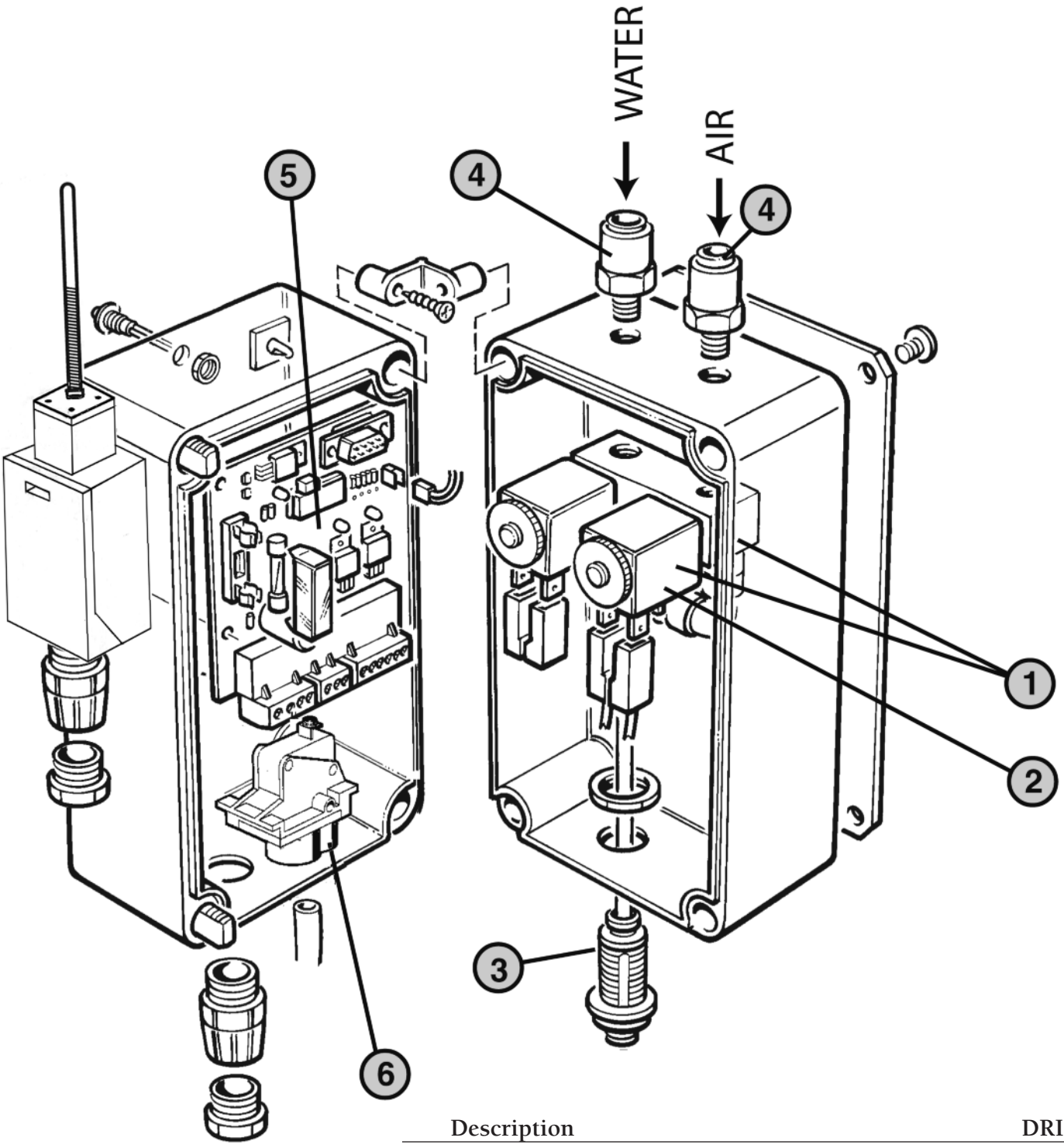
	Description	DRI nr.
	Airwash Individual processing unit operating p/place	**812**
1.	Solenoid-Valve **Stainless Steel** (double) incl. adapters	272
2.	Solenoid Coil 24V-AC	273
3.	Outlet Connector 6 mm.	30
4.	Airwash Input Coupling St. Steel 8 x ¼"	31
5.	Airwash PCB	609

AIRWASH INDIVIDUAL CONTROL BOX ROTARY LIMIT SWITCH

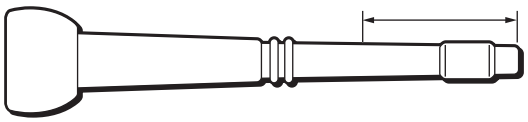


	Description	DRI nr.
	Airwash Processing Unit Rotary	**805**
1.	Solenoid-Valve **Stainless Steel** (double) incl. adapters	272
2.	Solenoid Coil 24V-AC	273
3.	Outlet Connector 6 mm.	30
4.	Airwash Input Coupling St. Steel 8 x ¼"	31
5.	Airwash PCB	609

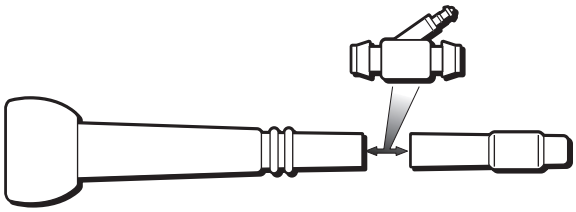
AIRWASH INDIVIDUAL CONTROL BOX
LIMIT / VACUUM SWITCH



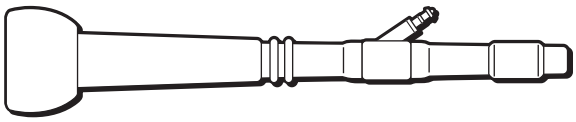
	Description	DRI nr.
	Airwash Processing Unit Rotary + Vacuum Switch	**806**
1.	Solenoid-Valve **Stainless Steel** (double) incl. adapters	272
2.	Solenoid Coil 24V-AC	273
3.	Outlet Connector 6 mm.	30
4.	Airwash Input Coupling St. Steel 8 x ¼"	31
5.	Airwash PCB	609
6.	Airwash Vacuum Switch	670



Standard liner.
With the liner already inserted into the shell cut the end-piece (see diagram on the left).



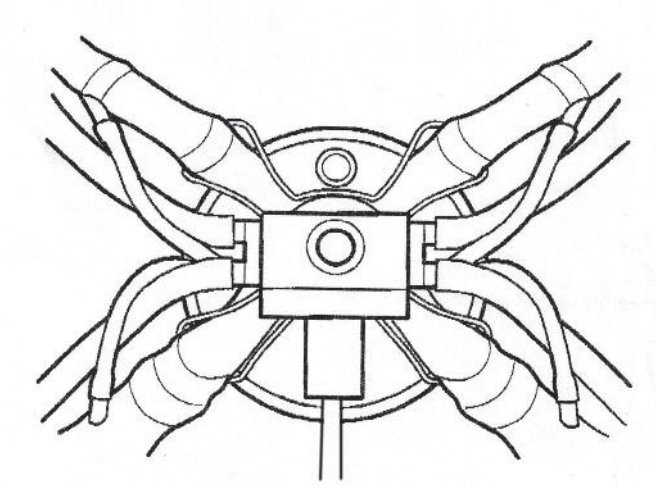
Insert the injector into the liner so that the nozzle is aligned with the pulsation nozzle on the shell. We advise for installing the injector into the liner to use injector spray, a non-toxic spray on water base.



Push the end piece of the liner onto the injector, connect a short pulsation tube to the shells pulsation nozzle.

Connect the assembled teat cup (liner + shell + short pulsation tube) to the cluster in such a way that the pulsation nozzle on the shell is aligned approximately 45° to the corresponding pulsation nozzle on the cluster.

Arrangement of hoses (end connection cluster)



The distribution should be so arranged that the Airwash supply line is fed parallel to the clusters long milk tube and twin pulsation tube. The right-hand and left-hand branch should be so arranged that they pass between the short milk tube and the short pulsation tubes. Other branching should be fitted around the short pulse tube to the short milk tube of the liner.

Before assembly 3 points should be checked

That the injector connecting piece points towards the clawpiece.

That the pulsation and injector pieces are level and are both turned 45° towards the pulsation nozzles of the clawpiece.

That the liners are thoroughly cleaned before the injectors are fitted.

CAUTION ! Do not connect up the injector hoses yet

FITTING THE INJECTORS

General

There are three Airwash injector types:

8 mm for liners with 8 mm diameter in the short milk tube.

10 mm for liners with 10 mm diameter in the short milk tube.

12 mm for liners with 12 mm diameter in the short milk tube.

All of the injectors are 22.7 mm long in the recess area. We recommend not cutting out this piece. In order not to have a negative effect on the cutout function at the present bend point in the short milk tube *and also* to prevent air entering the cup sleeve as result of the sealing rim slipping inwards, the positioning of the injector in the short milk tube is very important.

Important

Only cut the short milk tube with a suitable (sharp) hose shears. **Never ever use a knife !** If the cut is not smooth, the ends of the liner may tear. The cut must be at right angles. But only cut the short milk tube after fitting the liner in the shell.

LINER SHUT OFF FUNCTION / CONNECTION OF INJECTOR

The bending angle and thus the shut-off function of the liner in the area of the short milk tube may be affected by the length of the short pulsation tubes and the injector hoses. It is therefore important that the bending angle is not restricted by injector hoses which are too short. This is the best way to proceed :

❑ Hold the cluster in the milking position with the teat cups hanging downwards.

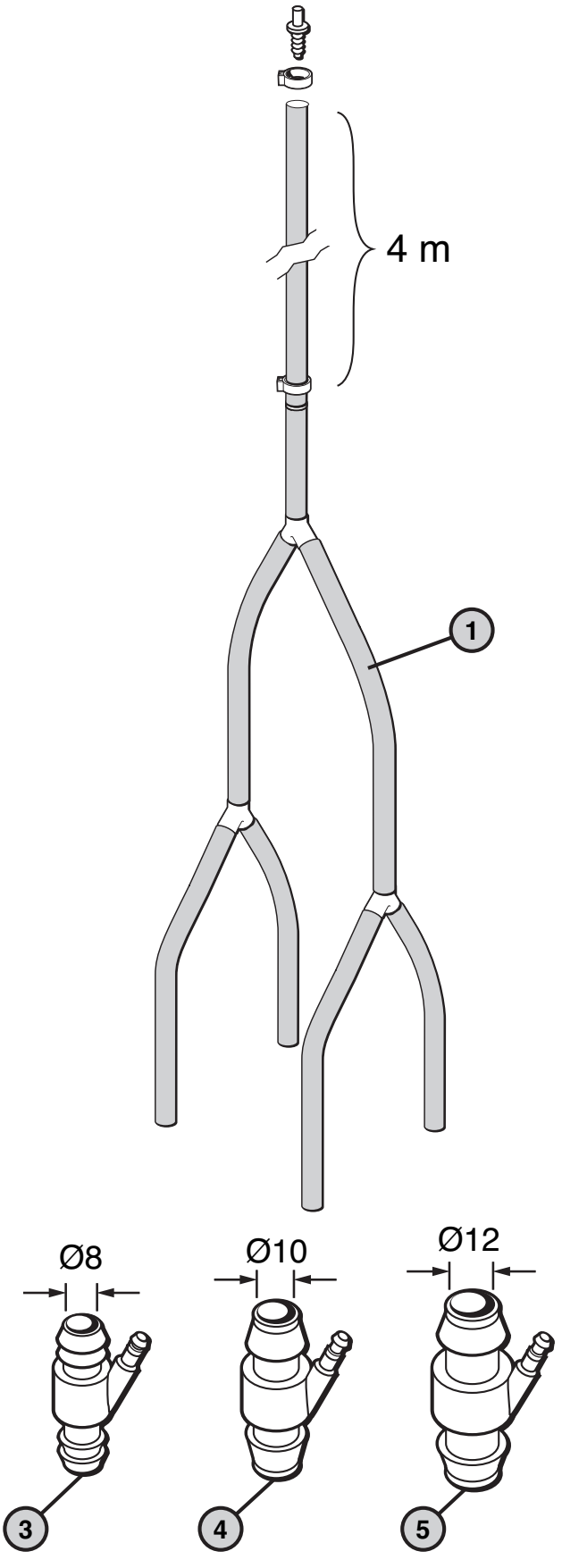
❑ Fit the short pulsation tubes to the cluster nozzles.

Now connect the injector connecting pieces with the injector hoses in such way that they do not touch the pulsation tubes.

TIP It may be necessary not to push the short pulsation tubes completely on to the pulsation nozzles. In each case, however, the injector hoses must always be pushed on to the injector connecting piece up to the stop.

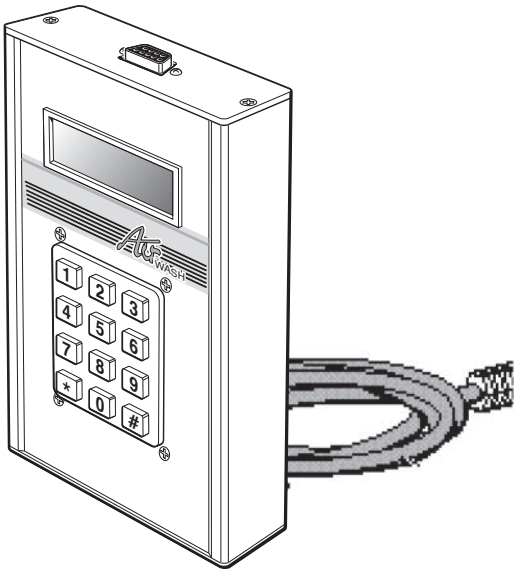
Attach the milk line to the long milk hose and the pulsator to the long pulsation tubes and then connect the tubes to the cluster.

CLUSTER TUBE AND INJECTORS



	Description	DRI nr.
1.	Airwash End Connection 4m.	1770
2.	Airwash End Piece Cluster Exchange.	1771
3.	Airwash Injector ø 8 mm INOX	526
4.	Airwash Injector ø 10 mm INOX	522
5.	Airwash Injector ø 12 mm INOX	524

AIRWASH PROGRAMMER TRM 149E



TRM 149e COMMANDS

= enter; confirm
* = cancel

0#	reset Airwash
1#	? serial number
3#	? total counter
4#	? service counter
5#	service counter reset
6#	input time tables
7#	input start delay
8#	test PCB-Board and coils
9#	? version number
10#	? program (fixed / user)
11#	? service limit
13#	read Airwash data
14#	program Airwash data

READING THE AIRWASH PCB INFORMATION

1. Connect the Airwash test terminal 149e to the PCB with the supplied cable.
2. The following text will show on the display: "Airwash busy please wait".
3. After 10 seconds the terminal is in "Command" mode.
4. Reset the PCB with Command "0" and confirm with "#".
5. Read the version number with "9#". (write this down on the service-form)
6. Read the serial number with "1#". (write this down on the service-form)
7. Read the total counter with "3#". (write this down on the service-form)
8. Read the service counter with "4#". (write this down on the service-form)
9. When service is due or has been done, we can reset the service-counter with "5#".
10. Read the service counter with "4#". (counter must now show 0)
11. Reset the PCB with "0#" and check if the service-LED is switched off.
12. Write the new service counter on the service-form.
13. Remove the cable and close the cover of the box.

Description	DRI nr.
Airwash Programmer TRM 149e	8002

TABLE 1	
WATER AND AIR 2 x 16 TIMERS	
DIGIT	TIME (SEC.)
0	NO TIMER
1	1.00
2	1.25
3	1.50
4	1.75
5	2.00
6	2.25
7	2.50
8	2.75
9	3.00 (max.)

TABLE 2	
STARTING DELAY (0-9)	
DIGIT	TIME (SEC.)
0	NO TIMER
1	3
2	6
3	9
4	12
5	15
6	18
7	21
8	24
9	27 (max.)

TABLE 3		
PROGRAM ADVICE		
TIMER	DIGIT	TIME (SEC.)
1 W	9	3.00
A	1	1.00
2 W	9	3.00
A	1	1.00
3 W	9	3.00
A	1	1.00
....	...	...
....	...	...
15 W	9	2.00
A	1	1.00
16 W	9	2.00
A	1	1.00

PROGRAMMING THE TIMERS IN THE PCB (6#)

Reading and editing the variable timers for WATER (W) and Air (A).

1. Connect the test terminal to the PCB using the supplied cable.

2. The timers can be edited with a figure between 0 .... and 9, according to table 1.

DRI bv. advises to edit the program as in table 3, where as the first 3 timers and the last 2 timers are fixed.

The intermediate timers can be edited depending on milking parlour size, water quantity per cluster.

3. With "#" the edited time can be confirmed and the next timer will appear on the display

4. There are 2 x 16 variable timers which sequentially control water and air.

5. A timer can be edited with the figure 0, it will be skipped, this allows you to edit longer timers than the maximum 3 seconds as shown in table 1.

6. Use the "*" key to return directly to the main menu.

7. You can step through the program by first pressing 6 and # and then repeatedly pressing #. When timer 16 has been reached the next step brings you back to the main menu (command:)

8. The edited program will only function when the dipswitch is being positioned as shown in the diagram.

Standard timers

User / Fixed
Delay ON/OFF
In 9 - 30V / Switch
Option

Programmed timers

User / Fixed
Delay ON/OFF
In 9 - 30V / Switch
Option

STARTING-DELAY (7#)

1. With "7#" we can read the current starting-delay.

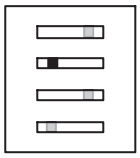
2. In the display we can see: "Edit Start-delay", we can now edit (if necessary) the figure according to table 2 and confirm with "#".

3. The edited starting delay will only function when the dipswitch is being positioned as shown in the diagram.

No start delay

User / Fixed
Delay ON/OFF
In 9 - 30V / Switch
Option

Programmed start delay



User / Fixed
Delay ON/OFF
In 9 - 30V / Switch
Option

TEST FUNCTION (8#)

1. With "8#" the PCB and connected valves/relays will be tested for correct electrical functioning.

2. The display can show the 3 following messages:

   ~ **No errors found :** everything electrical correct

   ~ **Connect valves :** coils/relays not connected or defective

   ~ **Defect device :** PCB defect.

PROGRAM CHOICE (10#)

1. With "10" we can read the active program, this can be :

   ~ Fixed : standard program with 11 fixed timers, dipswitch positioned as shown on previous page.

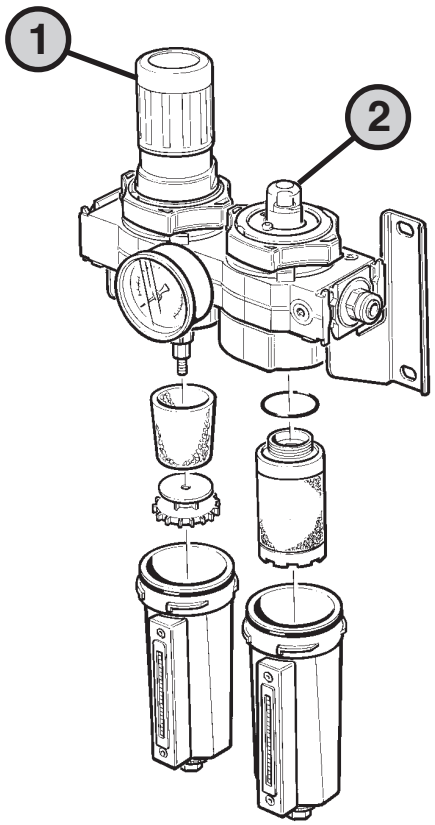
   ~ User : by your programmed timers ("6#")

SERVICE LIMIT (11#)

With "11#" we can read the service limit, when the service counter exceeds this value the service LED on the cover will light up.

This service LED can only be switched off when service has been done, and following the service counter is reset ("5#") and the PCB is reset with "0#".

The air filter element has a indicator (2). When the filter element is full up, the indicator will turn **purple**. When this occurs both filter elements should be changed.



How to change filter elements :

Shut of the air supply compressor.

Depressurise the Airwash system, by lifting the pressure adjustment knob (1) to unlock and then turning it anticlockwise. Turn the metal filter element holders anti-clockwise (quick disconnect system).

Replace both filter elements.

Clean the reservoirs on the inside, and install the reservoirs again.

After installation of the filter element we can put some pressure on the filter set, by turning the pressure adjustment knob clockwise.

Adjust the air pressure with the knob until 7 bar air pressure can be checked using the pressure gauge. When the air pressure is adjusted correctly push the knob to lock the system.

BACTERIA PREVENTION IN WATER TANK

Poor environmental conditions, high temperatures and low water throughput can lead to bacteria forming in the water line and water tank. To prevent bacteria forming we can put some calcium-hypochlorite or Mikropur in the water.

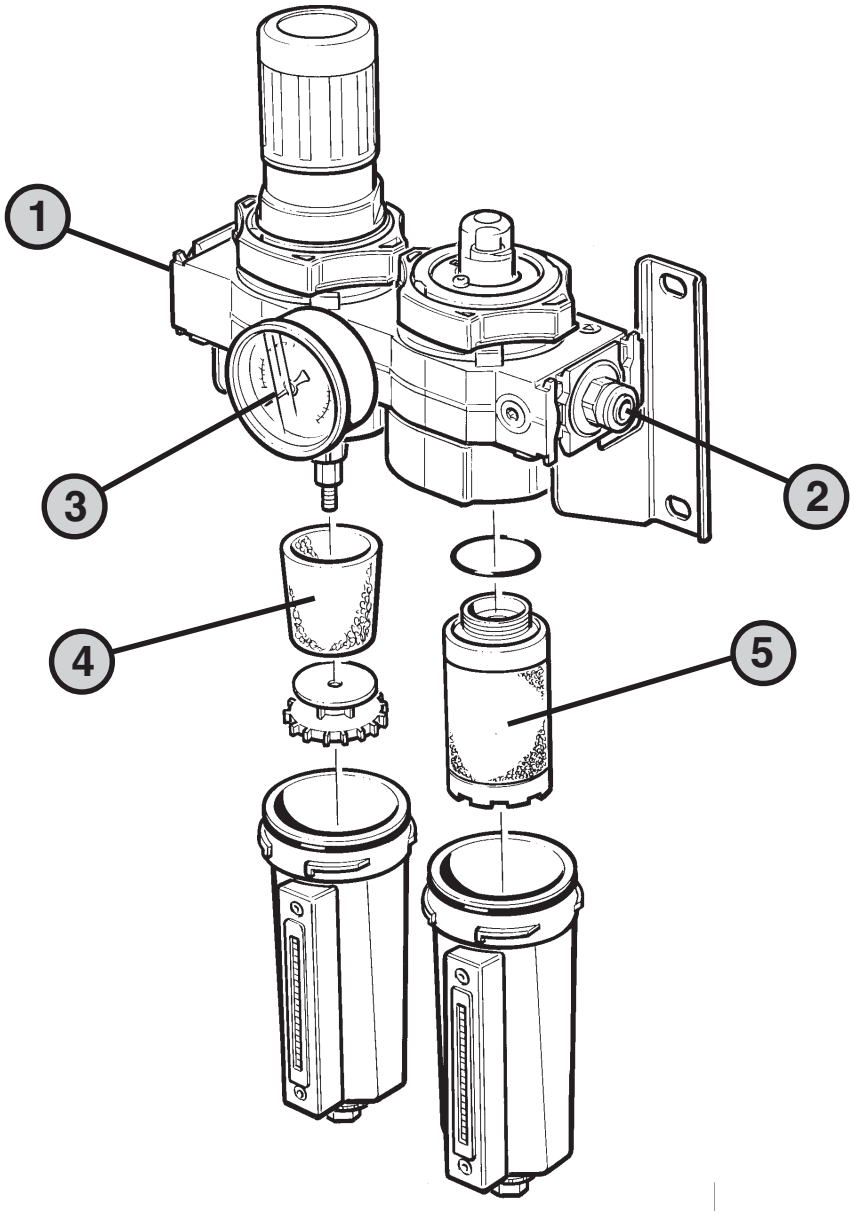
Dosing : 1 gram of calcium-hypochlorite to 10 litres of water

or

1 gram of Mikropur to 100 litres of water

Both prevention powders are absolute harmless. Mikropur requires at least two hours to act.

AIRWASH AIR FILTER / REDUCER UNIT



	Description	DRI nr.
	Airwash Air Filter / Reducer	**1800**
1.	Inlet Adapter 8 x ¼"	31
2.	Outlet Adapter 8 x ¼"	31
3.	Airwash Pressure Gauge ⅛"	1812
4.	Air Filter	1818
5.	Coalescing Filter	1814

PREPARATION FOR PUTTING AIRWASH INTO OPERATION

Begin with filling water into the water reservoir and in the water pump housing via the PVC filling connection piece.

It is important to check before switching on the pump that the water stopcock (ball-cock) is closed.

Now switch the pump on (put plug in the socket).

The pump starts and builds up pressure in the pump housing. The pump switches itself off by way of the pressure-switch when the pressure has risen to approximately 5 Bar. The pump stopcock is then opened very slowly. The pump starts up again and immediately the pressure in the ring circuit builds up.

Now check whether there are any leaks. If necessary, these should be repaired and the stopcock is then fully opened. After the set pressure has built up in the pump and the ring circuit, the pump switches off - the water system is ready for operation.

Before switching the compressor on, check that the main stopcock to the system is shut-off. Then switch on the compressor, and wait until the cutout pressure is reached. When the compressor cuts out, the main stop cock to the system (air ring circuit) should be opened.

The interposed filter element with the reduction valve must be closed at this time, i.e. the pressure reduction screw must be at zero or completely turned off. After checking the pressure system once again the system pressure for the ring circuit may be turned up slowly, care still being taken to ensure there are no leaks.

Air filter element ISO classification:

Oil filter ISO 8573-1 class 1.7.1
solid contaminants: 0.01 µm
oil content: < 0.003 p.p.m at 21°C

Water filter ISO 8573-1 class 1.7.2.
solid contaminants: 0.01 µm
oil content: < 0.001 p.p.m at 21°C

If air is escaping, the pressure should be switched off again and the line sealed. Once the line is airtight we can slowly turn on the pressure regulating valve again. For this it must be first be pulled out of the stop position. By turning it to the right (turning it inwards) the pressure is slowly increased.

It will now be possible to hear the air passing through the ring circuit. Turn the pressure up to a maximum. of 2 Bar, then check the ring circuit for leaks and make these good if necessary. If everything is in order the pressure can be increased to approximately 6 Bar.

NOTE : Do not forget to secure the control knob again by pressing it down.

After a further check the compressor should be switched on. The system is now in “stand-by” mode. If either the push button or the limit switch is activated the Airwash will be put into operation.

CAUTION : The Airwash system is based on water/air injection. Chemical water additives, apart from those indicated in this system book, are prohibited because they may attack the metal parts.

WATER PUMP AND WATER FILTER MAINTENANCE

Every 6 months, or sooner according to soiling, the filter insert must be changed.

WATER FILTER

1. Shut off the water supply pump.
2. Disconnect the water pump electrical power supply.
3. Turn the white pressure relief valve (on the top of water filter housing) anticlockwise; the water pressure will go down to zero.
4. Start to disconnect the view glass from the filter housing. Turn the view glass anticlockwise.
5. Now change the filter element for a new one.

Note Clean the view glass on the inside for a clear view.

6. Replace the filter element and turn the view glass clockwise in the filter housing. Check if the rubber 'O' ring is in good shape.
7. Turn the white pressure relief valve clockwise (hand tighten).
8. Connect the electrical power again. The water pump will turn on, until the water pressure reaches 4.5 bar.
9. Return the system to pressure by turning the water supply valve on.

SERVICE INSTRUCTIONS

Service has to be done in :

A. Herringbone parlours after : ~ 10000 program runs (service LED)
or ~ a half year.

B. Tandem/Rotary parlours after : ~ 10000 program runs (service LED)
or ~ a half year.

Advised is in herringbone/tandem and rotary parlours to :

- ❏ fill in service form
- ❏ renew all injector tube end pieces
- ❏ renew all injectors
- ❏ renew filter elements
- ❏ check air filter and when necessary (indicator turned purple), renew both filters
- ❏ empty water reservoir, clean it and fill it again.
- ❏ maintenance to compressor according to suppliers instructions.

SYSTEM	PROBLEM	SOLUTION
WATER PUMP	THE WATER PUMP PRESSURE CONTROL DOES NOT SWITCH ON	CHECK THE ELECTRICITY SUPPLY
	THE WATER PUMP PRESSURE CONTROL DOES NOT SWITCH OFF	CHECK SUCTION LINE CONNECTIONS
	PRESSURE CONTROL "FAILURE" LIGHTS UP	THE WATER RING CIRCUIT IS VERY LARGE, PRESS THE "RESET" BUTTON UNTIL THE RED LIGHT HAS GONE OUT
		PUMP DOES NOT PUMP ANY WATER; MAKE SURE THAT THE WATER TANK IS FILLED AND FILL THE BODY OF THE PUMP
		CHECK IF BODY OF THE PUMP IS FULL WITH WATER
	THE 'FAILURE' LIGHT IS ALSO A PREVENTION FOR DRY RUNNING OF THE PUMP. IF THE "FAILURE" LIGHT IS STILL ON AFTER CHECKING THE ABOVE POINTS, THE CAUSE IS PROBABLY A DEFECTIVE PUMP. - REMOVE THE PUMP AND CHECK THE IMPELLER AND THE OTHER PARTS.	
AIRWASH CONTROL BOX IN PARLOUR	WATER-AIR VALVE IS LEAKING	CLEAN INSIDE OF WATER-AIR VALVE, AND CHECK FOR PROPER FUNCTIONING.
	NO WATER IS COMING OUT OF THE FOUR INJECTORS	CHECK IF THE CHECKVALVE IS INSTALLED IN THE CORRECT ORIENTATION, (ARROW POINTING DOWNWARDS)
	WATER-AIR VALVE DOESN'T OPEN	CHECK IF WIRING IS CORRECTLY INSTALLED. THE WIRING DIAGRAM ON THE INSIDE OF THE CONTROL BOX SHOULD BE FOLLOWED.
	PUSH-IN CONNECTION IS LEAKING	CHECK IF THE PUSH-IN COUPLING IS PROPERLY TIGHTENED
		CLOSE THE WATER AND AIR SUPPLY, RELEASE THE PRESSURE OF WATER AND AIR
		DISMOUNT THE PUSH IN COUPLING AND CHECK IF THE RUBBER O-RING IS STILL PRESENT AND/OR DAMAGED
		CHECK TO SEE IF THE SECURE CLIP IS DAMAGED
		CHECK TO SEE IF THE TUBING HAS BEEN CUT STRAIGHT AND CHECK THE EDGES OF THE TUBING
	WHEN THESE STEPS HAVE BEEN FOLLOWED, PUSH THE TUBE FIRMLY INTO THE COUPLING	
WATER/AIR RING CIRCUIT	LEAKAGE IN THE PUSH-IN COUPLINGS	CHECK TO SEE IF THE O-RING IS PRESENT
		CHECK TO SEE IF THE TUBING HAS BEEN CUT STRAIGHT
	WATER AND AIR SUPPLY NOT SUFFICIENT	CHECK TO SEE IF THE WATER / AIR TUBES ARE NOT BENT, TWISTED OR LEAKING
TRANFORMER	24 VOLT OUTPUT NOT PRESENT	CHECK FUSES
AIR FILTER ELEMENT	AIR PRESSURE IS NOT ADJUSTABLE	CHECK TO SEE IF THE ARROW ON THE FILTER HOUSING IS POINTING IN THE FLOW DIRECTION

SYSTEM	PROBLEM	SOLUTION
WATER RESERVOIR	NO WATER IS COMING INTO THE RESERVOIR	CLOSE WATER TAP AND CLEAN THE INSIDE OF THE FLOAT VALVE
INJECTORS	UNEQUAL WATER QUANTITY BETWEEN THE INJECTORS ON ONE CLUSTER	CHECK TO SEE IF THE AIR PRESSURE IS AT 8 BAR (MANOMETER ON AIR FILTER ELEMENT)
		ENSURE THAT THE WATER PRESSURE SWITCHES OFF AT 4.5 BAR (MANOMETER ON WATER PUMP)
		CHECK THAT THE VALVE INSIDE THE INJECTOR IS FUNCTIONING CORRECTLY AND FREE OF DISTURBANCES (CLEAN IF NECESSARY)
	NOTE : IF IT IS NECESSARY TO REPLACE AN INJECTOR, IT IS IMPORTANT TO REPLACE THE COMPLETE SET (4 PIECES). THIS IS TO AVOID DIFFERENT SPRING PRESSURES ON THE INJECTORS.	
	NO WATER/AIR FROM ALL 4 INJECTORS ON ONE CLUSTER	CHECK TO SEE IF THE AIR PRESSURE IS AT 8 BAR (MANOMETER ON AIR FILTER ELEMENT)
		ENSURE THAT THE WATER PRESSURE SWITCHES OFF AT 4.5 BAR (MANOMETER ON WATER PUMP)
		CHECK THAT THE TUBING BETWEEN THE CONTROL BOX AND THE CLUSTER IS NOT BENT OR TWISTED
		CHECK THAT THE NON-RETURN VALVE INSIDE THE CONTROL BOX IS INSTALLED CORRECTLY (ARROW POINTS DOWNWARDS)
		ENSURE THE VALVES ARE WIRED CORRECTLY (SEE THE WIRING DIAGRAM INSIDE THE CONTROL BOX COVER)
	NO WATER/AIR FROM SEVERAL CLUSTERS	CHECK TO SEE IF THE AIR PRESSURE IS AT 8 BAR (MANOMETER ON AIR FILTER ELEMENT)
		ENSURE THAT THE WATER PRESSURE SWITCHES OFF AT 4.5 BAR (MANOMETER ON WATER PUMP)
		WATER/AIR RING CIRCUIT IS BENT OR TWISTED
		CHECK THE ELECTRICITY SUPPLY BETWEEN THE WORKING AND NOT WORKING CLUSTERS
	NO WATER/AIR ON ONE SIDE OF THE HERRINGBONE	ENSURE THAT THE DETECTION SWITCH / PUSH BUTTON IS CONNECTED CORRECTLY
		CHECK THAT THE PCB BOARD IN THE CENTRAL PROCESSING UNIT OF THE NON FUNCTIONING SIDE HAS POWER
		CHECK THAT THE FIRST HERRINGBONE PROCESSOR BOX HAS AN ELECTRICAL SIGNAL