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Improving every farm we touch

Portable ACRsmart

Control

Technician and User Instruction Manual

Summary

1 GENERAL INFORMATION

1.1 Manufacturer

InterPuls S.p.A.
Albinea – Via F. Maritano 11
42020 – Reggio Emilia – Italy
Tel. +39 0522 347511
Fax. +39 0522 348516
E-mail Sales.Albinea@milkrite-interpuls.com
Web www.milkrite-interpuls.com

1.2 Copyright

2 GENERAL WARNINGS

2.1 General information and safety warnings

2.1.1 Important warnings

To safeguard the operator and prevent any damage to the equipment, before carrying out any kind of operation it is important to have read and fully understood the instruction manual.

2.1.2 Symbol used in this manual

The following symbols are used in this manual to highlight indications and warnings which are of particular importance:

WARNING
This symbol indicates health and safety regulations designed to protect operators and/or any exposed persons.

CAUTION
This symbol indicates that there is a risk of causing damage to the equipment and/or its components.

NOTE
This symbol is used to highlight useful information.

2.1.3 Rules and regulations for the user

WARNING
Any failure to observe the warnings provided in this manual may lead to equipment malfunctions or damage to the system.

2.1.4 Limitation of liability

InterPuls S.p.A. declines all liability for damage to persons, animals and/or things caused by incorrect use of the equipment.

2.2 Prior using the product

2.2.1 Requirements and rules for personnel and Safety Rules

WARNING
This appliance can be used by person aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved

WARNING
Before using the device, the operator must carefully read the manual.

During the assembly and activation of the device, follow the instructions in the manual and rules and regulations applying to health and safety at the workplace.

WARNING
Children shall not play with the appliance.
Cleaning and user maintenance shall not be made by children without supervision.

2.2.2 Connection

WARNING
Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules

2.3 Disposal

2.3.1 General regulation

The appliances must be disposed of only and exclusively by specially authorized waste disposal companies in accordance with all relative legislation and prescriptions.
The packaging must be consigned to the relative authorized companies to be recycled.

2.4 Fire prevention

2.4.1 Fire prevention

NOTE
The machine is not equipped with fire extinguishers.
The operator must make sure that the place in which the appliance is installed is equipped with an adequate number of suitable fire extinguishers. The extinguishers must be positioned where they are clearly visible and protected from damage and improper use.

2.4.2 Safety regulations

WARNING
It is strictly prohibited to extinguish fires involving electrical equipment with water!

2.4.3 Characteristic of extinguishers

Use powder, foam or halogen extinguishers which must be positioned next to the device.
Operating personnel must receive adequate instruction on how to use the extinguishers.

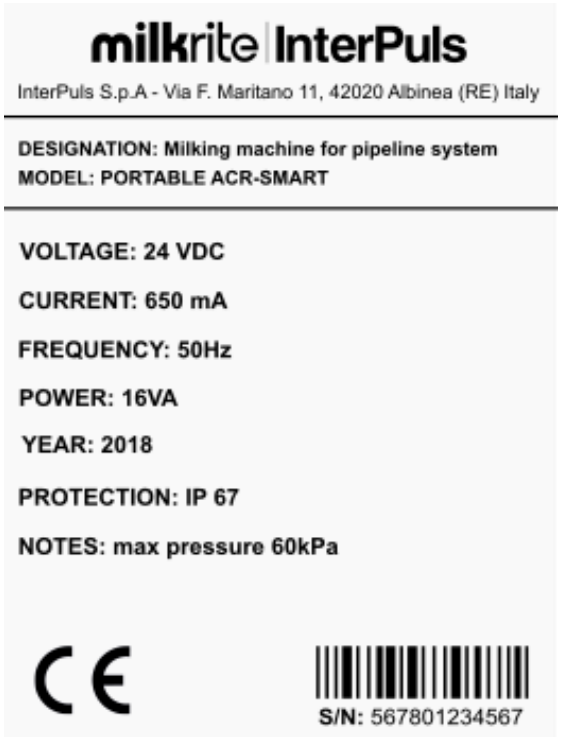
2.5 Normative references applied

Europe:

- Directive no. 2006/42/EC Machinery Safety
- Directive no. 2014/30/EU Electromagnetic Compatibility (EMC)

2.6 Marking

2.6.1 Dataplates affixed to the machine



2.7 Safety decals

	Generic danger

WARNING
The removal or damaging of safety decals is strictly prohibited.

3 DESCRIPTION OF THE MACHINE

3.1 General features

The Portable ACR-Smart is a portable milking device with automatic shut-off, with pulse control, designed for milk transport systems for tied animals.

The device is moved by the operator from one milking location to another in 2 possible ways:

- Hand transport
- Track transport

The package includes (already assembled):

- Plastic frame with built in 1.5 lt (0.05 ft^3). vacuum tank to have a constant vacuum reserve and reduce vacuum fluctuations (ref. 1)
- ACR-Smart Panel for milking management (ref. 2)
- DVC 1000 Cylinder for automatic removal of the unit (ref.3)
- Sensor for measuring ON-OFF type flow with direct passage with built in shut off valve functions (ref.4)
- 1 LE 30 pulsator for generating the pulse signal (ref.5)
- 1 LE 30 control valve to control the Shut off valve and automatic shut off cylinder (ref.6)
- The cover for the pulsators (ref.7)
- Indicator light to indicate end of the milking process (ref.8)
- The Brackets to clamp the components (ref.9-10-11)
- A piece of pipe with twin quick connection terminals (ref. 12)
- Bracket with a terminal to fix the milk tube (ref.13)

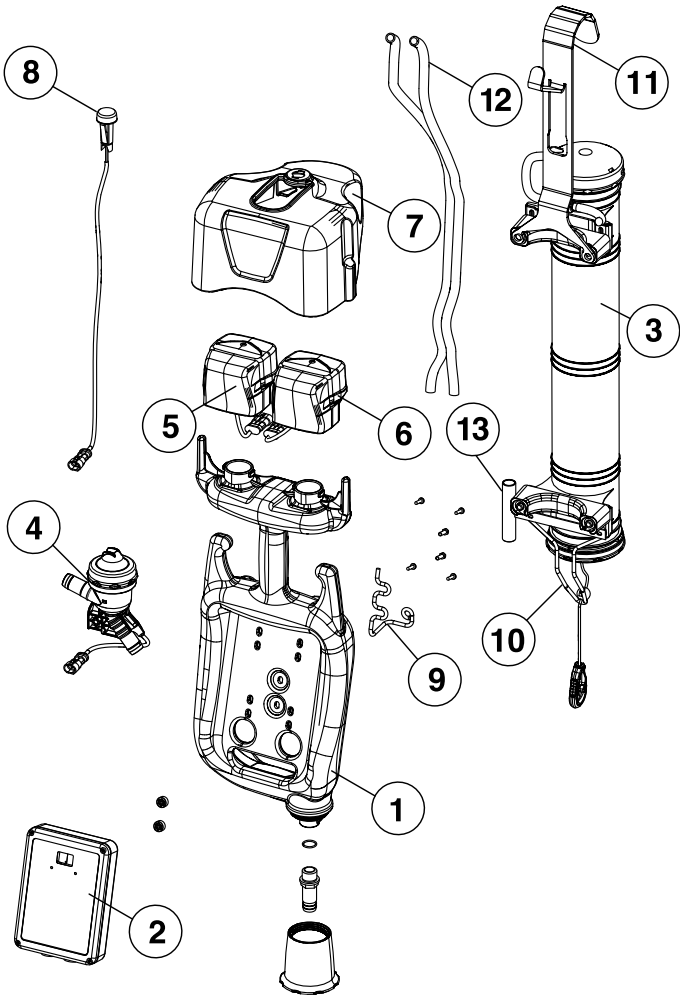


Figure 1

The package does not include the following components necessary for the final commissioning that are supplied separately:

- Combifast fixed part (ref.16)
- Combifast mobile part (ref.15)
- Milking cluster (ref.21)
- Milk pipe, twin pipe, vacuum pipe and pipe clamp rings (ref.17, 18, 19, 20)

The following are the features of the pipes to be used:

- Milk pipe 16x29 mm (0.63x 1.14 in), preferably black
- Vacuum pipe 13x23 mm (0.51x 0.9 in), preferably black
- Twin pipe 7.6x14.5 mm (0.3x 0.57 in), preferably black

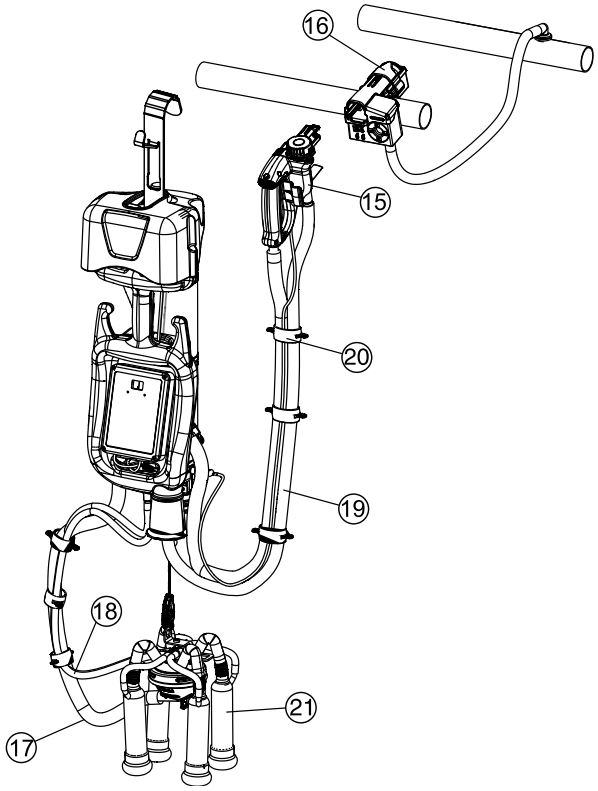


Figure 2

WARNING
The Portable ACR-Smart has been designed to work with Interpuls components to complete the installation: the milking cluster design is a milking cluster with Lunik 350 collector and IPL11 sheath and the 3way connection device is the Combifast. For any other installation with non Interpuls material, the system engineer will be responsible for ensuring proper system commissioning.

WARNING
The Portable ACR-Smart has been designed to operate with the aforementioned pipe sizes. Do not use different sized pipes as such use would compromise the operation of the system.

WARNING
All assembly diagrams and explanations in this manual refer to the use of Interpuls components (Pulsators, Cylinder, Control Valve, Combifast and milking clusters with Lunik 350); Interpuls declines any liability for any malfunction, if the system engineer replaces components not explicitly mentioned in this manual with competitive devices.

4 TECHNICAL CHARACTERISTICS

Technical Specifications		
Input voltage	24 VDC -10% / +20% Inverse polarity protection	
Protective devices	Inverse polarity protection Inputs and outputs are protected from current overload	
Power consumption	ACR-Smart Panel	100 mA
	Indicator light to signal the end of the milking process	30 mA
	Control Valve CV 30	260 mA
	LE 30 Pulsator	260 mA
	TOTAL	650 mA
Operating vacuum	from 36 to 60 kPa (from 10.63 to 17.71 ‘’Hg) typically 48-50 kPa (14.17- 14.76 ‘’Hg)	
Operating temperatures (environment)	-5ºC ÷ +40ºC (23°F ÷ 104°F)	
Transport/storage temperatures	-20ºC ÷ +50ºC (-4°F ÷ 122°F)	
Temperature of the washing mixture	Min 60°C (140°F); Max 90°C (194°F)	
Effective stroke of the cylinder	1230 mm (48.42 in)	
Protection class (cover and cables installed correctly)	IP67	
Dimensions (HxLxD)	960x230x240 mm (37.79x9.05x9.44 in)	
Device weight	4.6 kg (10.14 lb)	
Weight of the complete device ready for milking operations *	9.7 kg (21.38 lb)	
Maximum weight admissible by the milking clusters **	3.0kg (6.61 lb)	
Sound pressure	< 70 db	

**: The weight of the device is considered to be set up with InterPuls unit (composed of Lunik 350 and IPL11 sheaths) and with the 3 way Combifast connecting device for which the system has been explicitly designed*

***: in the event you wish to apply a unit supplied by the competition; weight refers to that of the collector, channels and sheaths.*

5 FORESEEN AND UNFORESEEN USE

5.1 Foreseen use

The Portable ACR-Smart is a portable milking device with automatic shut-off, with pulse control designed for milk transport systems for tied animals (cows)

The device is moved by the operator from one milking location to another in 2 possible ways:

- Hand transport
- Track transport

WARNING
The Portable ACR-Smart is a portable machine that must work under supervision.

WARNING
The machine must be used only for appropriately lit milk transport systems (at least 300 lux)

5.2 Unforeseen use

Use of the Portable ACR-Smart is not intended for use in milking sheds.

Use of the Portable ACR-Smart is not intended for milking animals other than cows.

No other handling of the machine is intended other than the aforementioned

WARNING
Any use other than the one covered in this manual is considered improper use and is therefore forbidden. InterPuls S.p.A. declines any liability associated with any use of the machine other than the one covered in this manual.

6 RESIDUAL RISKS

WARNING
ELECTRICAL AND FIRE-PROTECTION SAFETY

The machine must be powered by 24VDC through SELV and PELV circuits in compliance with applicable regulations.
The electrical system to which the machine is to be connected must have the following protection:
For protection against indirect contact:
the machine must be supplied by means of an electrical system having a differential circuit breaker connected to the earthed system according to the standards and laws in force.
For protection from machine overloads:
a suitable overload protection device and overload cut-out circuit breaker must be installed, which interrupts the circuits once the machine's nominal current has been exceeded.

WARNING
ACCIDENTAL IMPACTS

In the event of failure or sudden start during milking detachment cluster operations, the operator may be involved in accidental impacts with the milking clusters.
In the temporary interruption to power during milking, the machine is designed to start the milking detachment procedures of the milking cluster; the operator may be involved in accidental impacts with the milking clusters. To overcome this residual risk, the operator must wear P.P.E. indicated in the manual.

WARNING
HANDLING

During handling operations of the Portable ACR-Smart, the device may fall and accidentally hit the operator.
To overcome the residual risk, the operator must wear the P.P.E. indicated in the manual.

WARNING
WASHING

During system washing, the operator may come into contact with the washing mixture that can reach 90°C (194°F) and with washing acids.
To overcome the residual risk, the operator must wear the P.P.E. indicated in the manual.

WARNING
MAINTENANCE

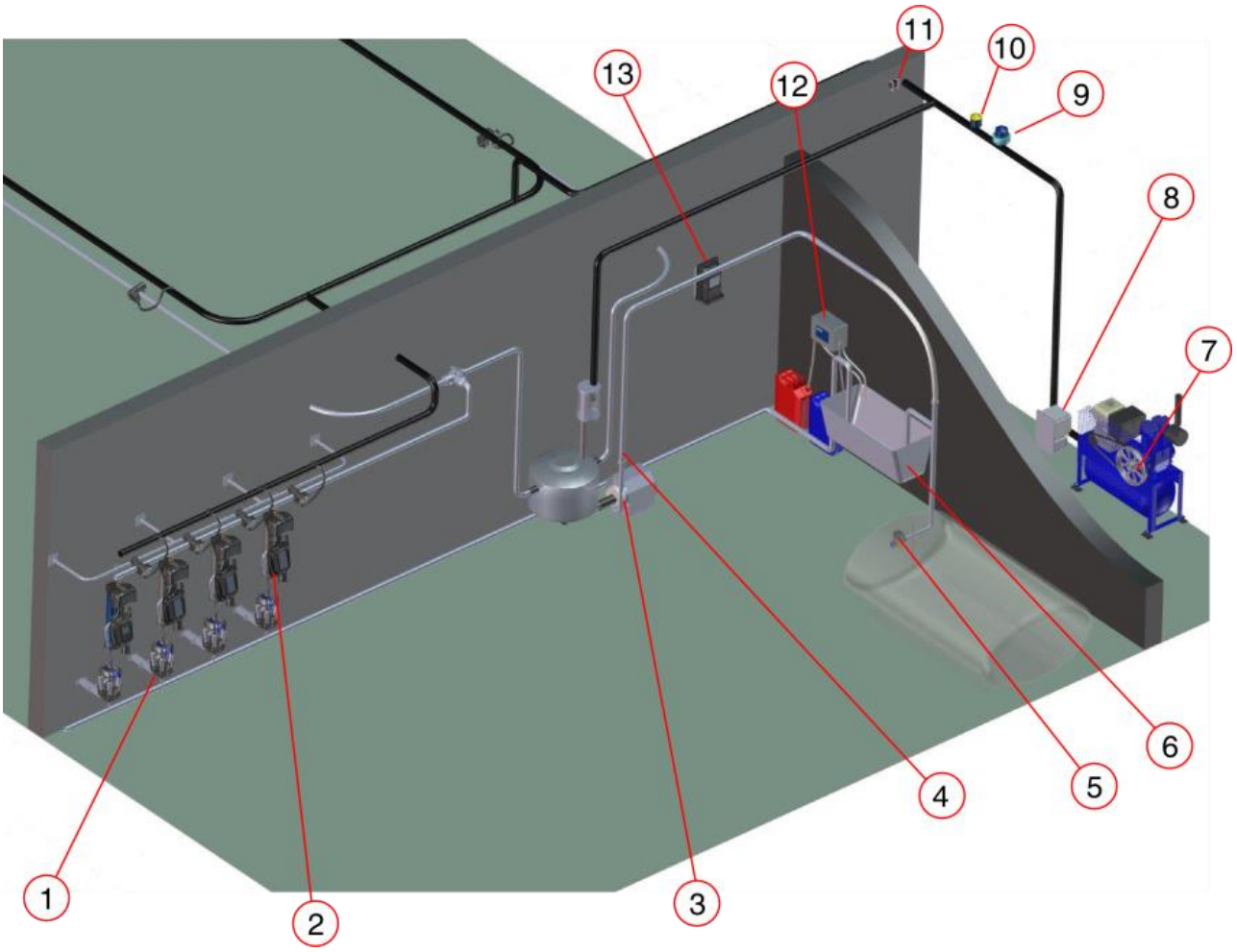
During pulsator and CV maintenance operations, the operator may come into contact with the coils that can reach 80°C (176°F).

WARNING
PERSONAL PROTECTIVE EQUIPMENT

	**Use safety shoes for machine handling**
	**Use gloves for safer handling of the machine and maintenance operations**
	**Use safety glasses and gloves during the washing phase, where it is possible to come into contact with washing acids.**

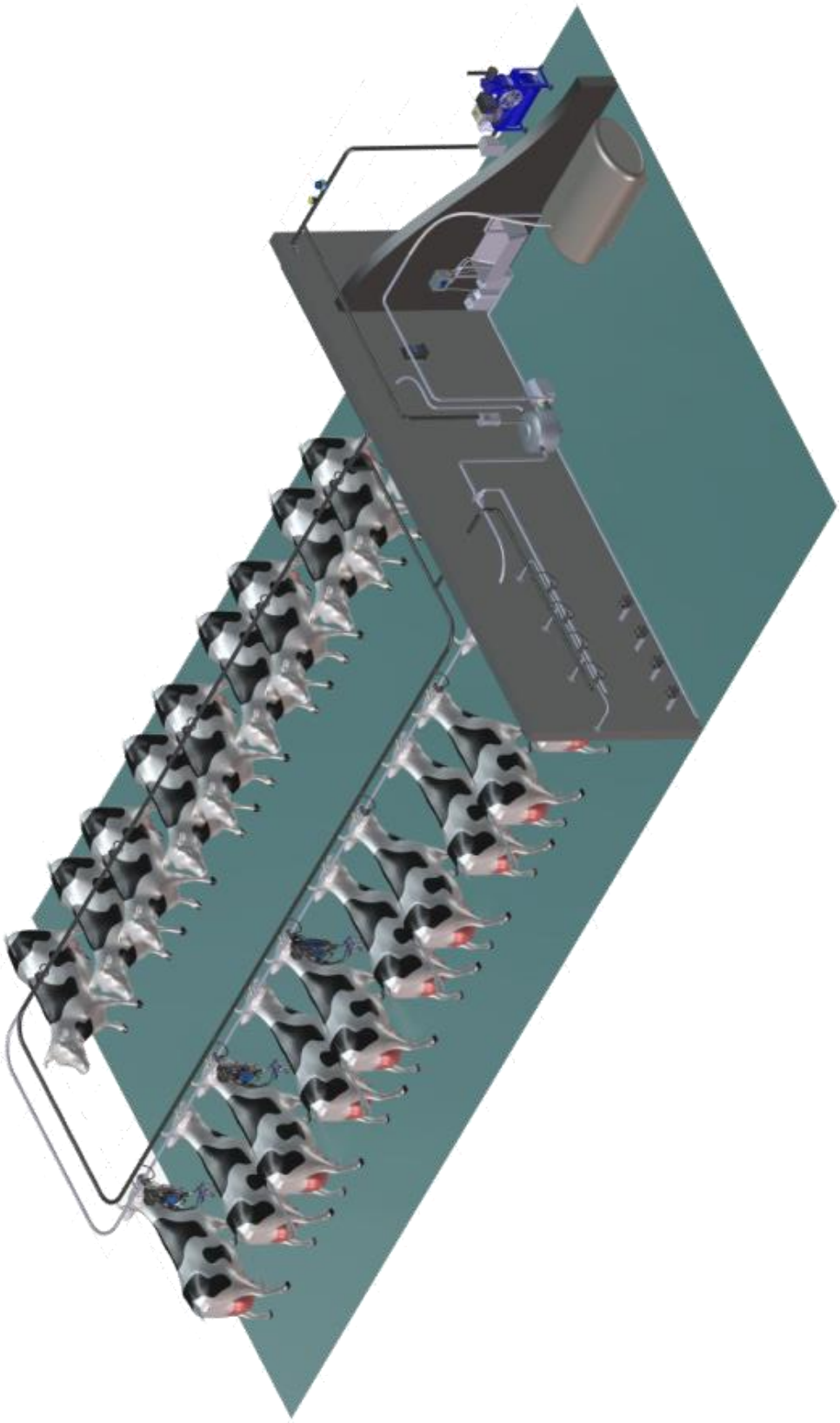
7 SYSTEM

7.1 Washing



1	Washing plates
2	Portable ACR.SMART
3	Milk pump
4	Milk filter
5	Drainage valve
6	Water tank
7	Vacuum pump
8	Inverter (iDrive100)
9	Vacuum adjustment valve (Stabilvac)
10	Sanivac
11	Vacuum gauge (DVG500)
12	Washing machine (Top Wash III)
13	Power unit (IUP)

7.2 Milking



8 FIRST USE OF THE MACHINE

8.1 General description

Before using the machine, you need to make some pneumatic and electrical connections and know the correct uses of the Portable ACR-Smart

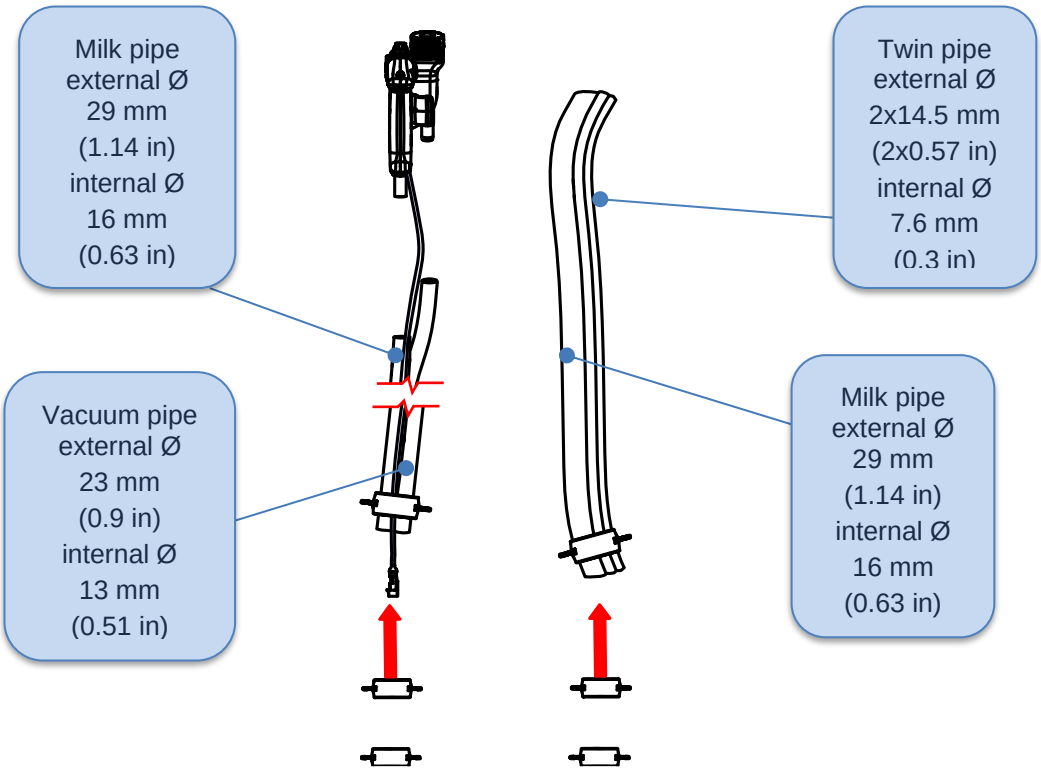
This paragraph illustrates:

1. How to carry out pneumatic connection between portable and combifast mobile part.
2. How to carry out pneumatic connection between the portable and milking clusters.
3. Pneumatic connection diagram
4. ACR-Smart panel connection diagram
5. How to connect the Combifast tap
6. How to handle the Portable ACR-Smart
7. Adjustment for first use

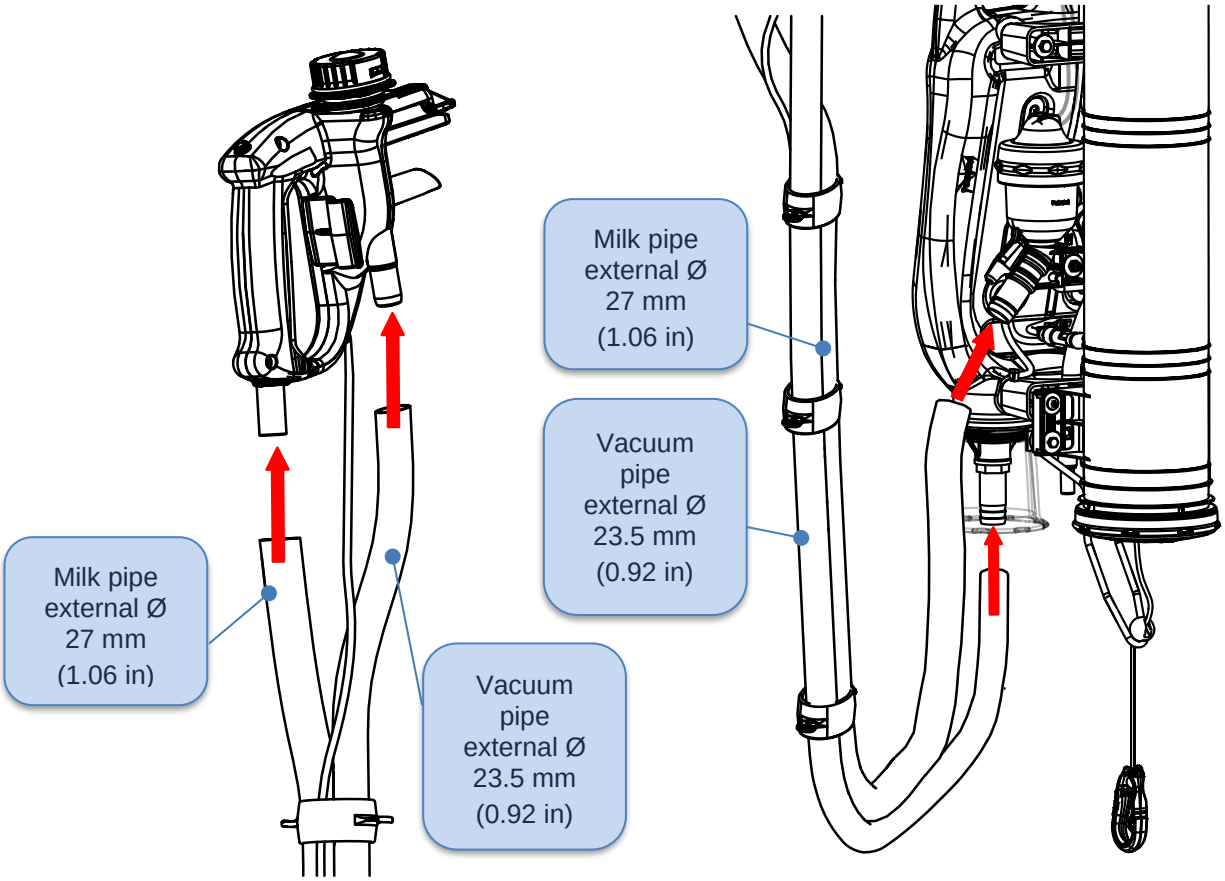
8.2 Pneumatic Connections

The following is the assembly sequence of the Combifast mobile part, milking cluster, long milk pipe, vacuum pipe and twin pipe.

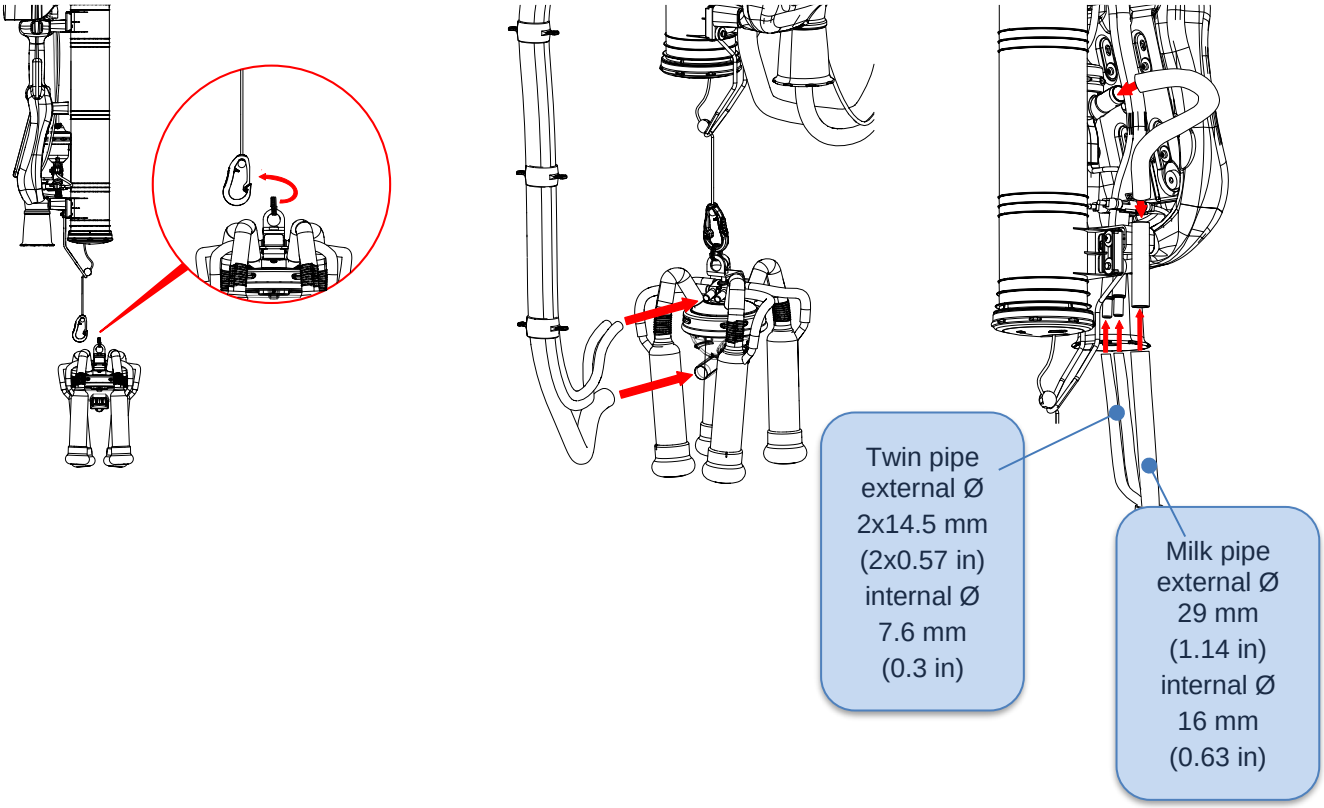
1. How to insert pipe clamp rings



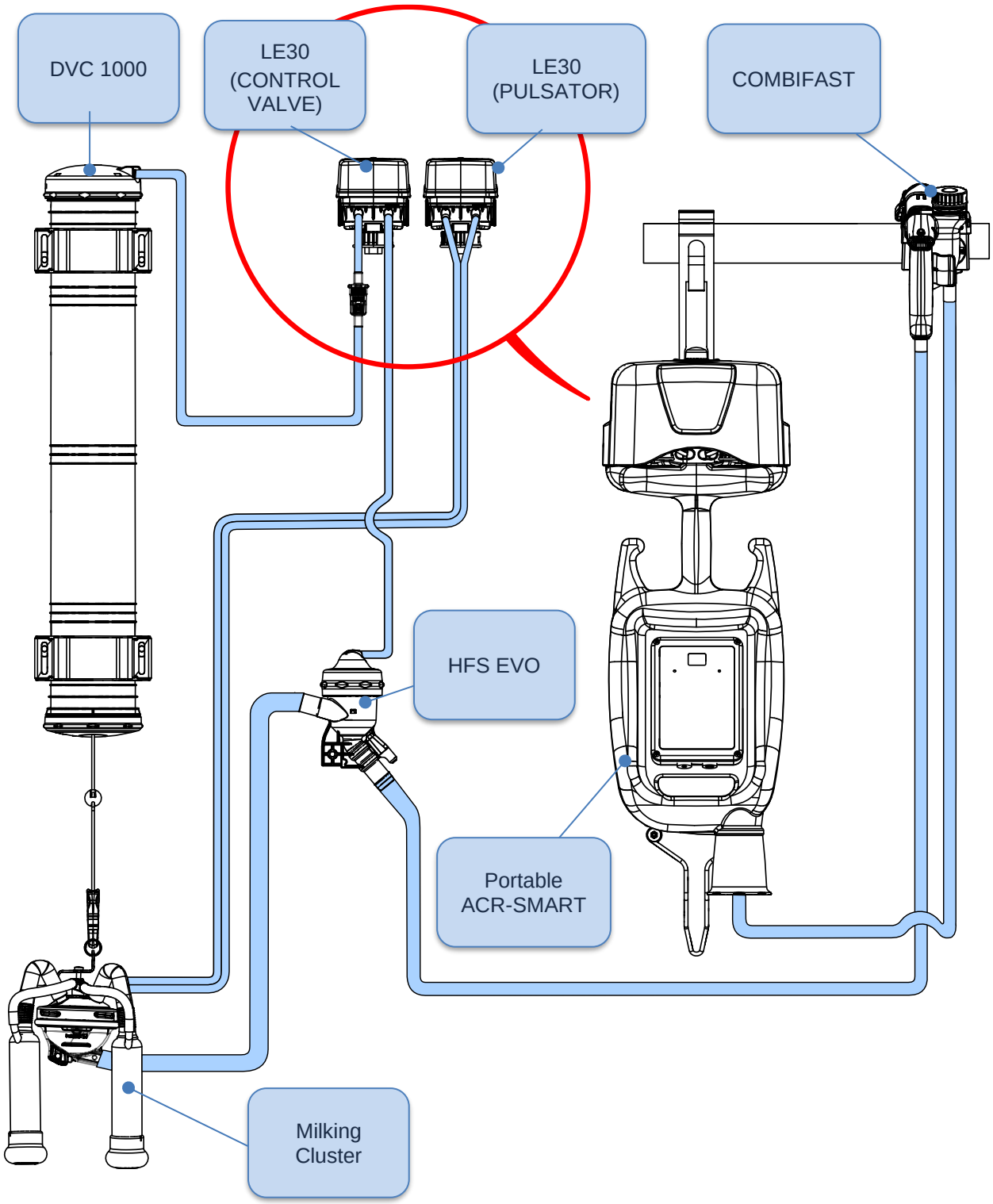
2. How to carry out pneumatic connection between portable and combifast mobile part



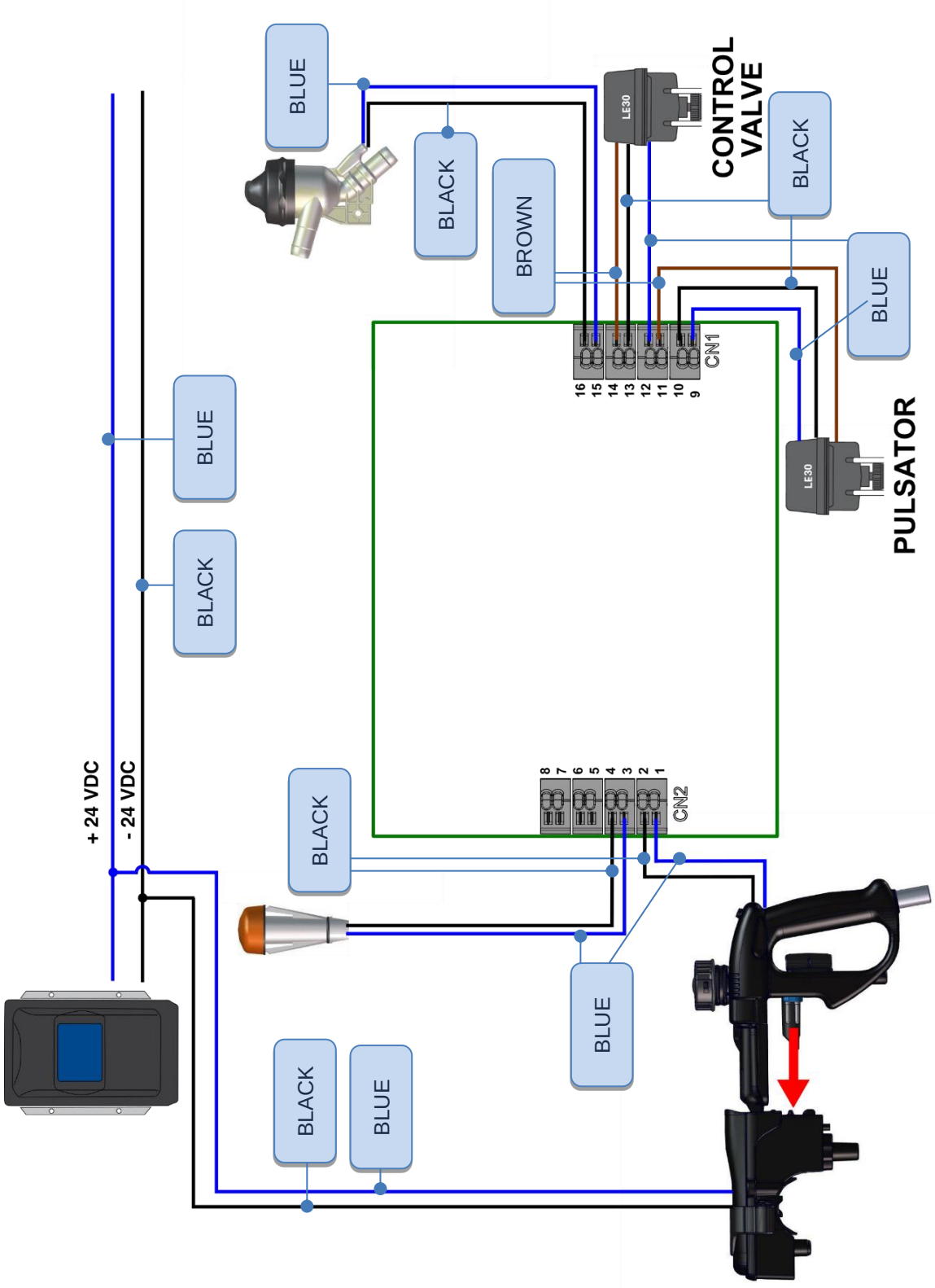
3. How to carry out pneumatic connection between the portable and milking clusters



4. Pneumatic connection diagram



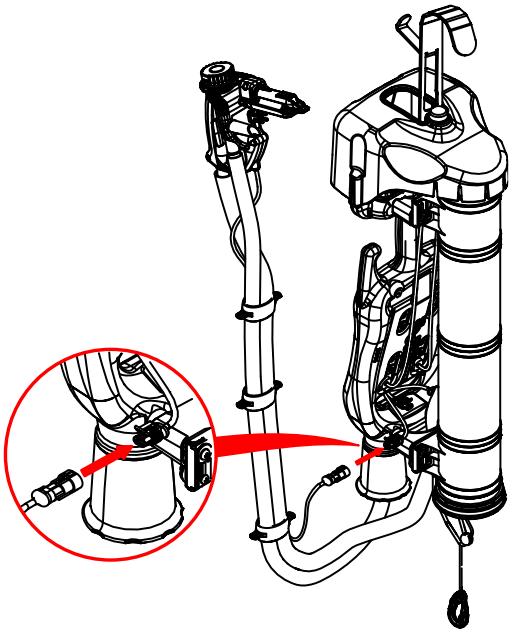
5. ACR-Smart panel electrical connection diagram



	CN2 Terminal	Description	Cable Colour
POWER SUPPLY	1	24VDC (+)	Blue
	2	24VDC (-)	Black
GLOBE	3	GLOBE	Blue
	4		Black
	CN1 TERMINAL	**Description**	**Cable Colour**
LE30 PULSATOR	9	Rear Pulsations	Blue
	10	Common	Black
	11	Front Pulsation	Brown
LE30 CONTROL VALVE	12	Shut-off Valve	Blue
	13	CV20 Common	Black
	14	DVC 1000	Brown
SENSOR	15	HFS SENSOR	Blue
	16		Black

8.3 Connector connection ACR – Smart – Combifast mobile part

Connect the male 2-pin connector coming from the Combifast mobile part to the female connector coming out of the ACR-Smart panel. Power will be supplied to the panel through this connection.



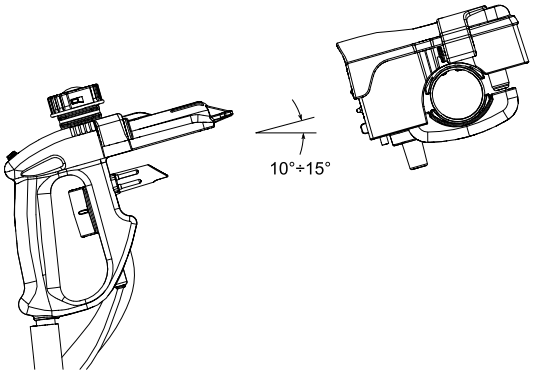
8.4 Combifast

The Combifast is a coupling system that allows you to temporarily connect to the milk line, vacuum line and the power supply. It consists of a fixed part (ref.A) mounted on the milk line and a mobile one (ref.B) connected directly to the Portable ACR-Smart.

NOTE
This manual only shows how to connect the Combifast mobile part to the Portable ACR-Smart and how to make the electrical connection. For details on mounting the Combifast refer to the specific product manual.

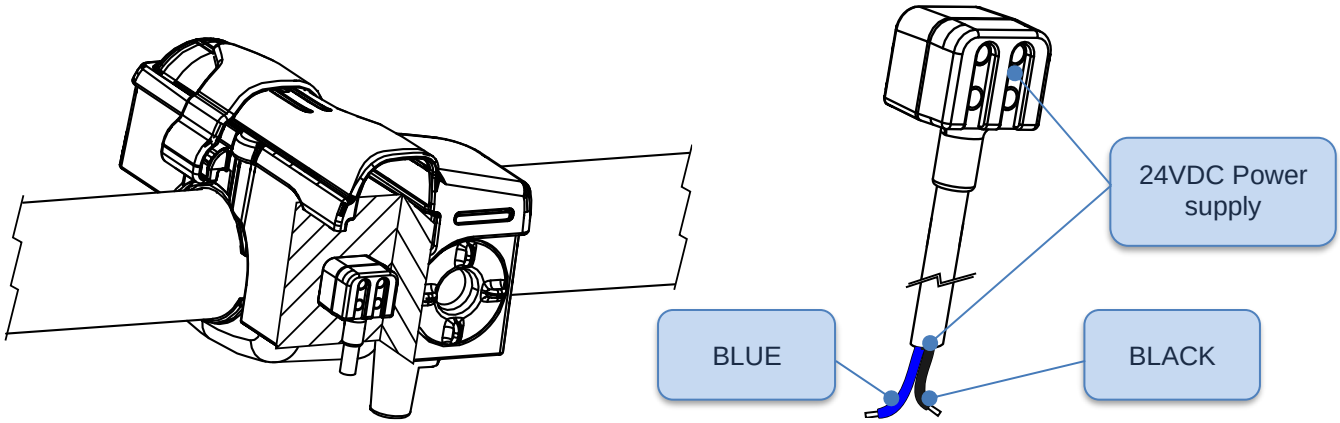
NOTE
This manual shows how to properly connect the milking cluster to the ACR-Portable Smart. The procedure for milking cluster assembly is left to the system engineer as it is not covered by this manual.

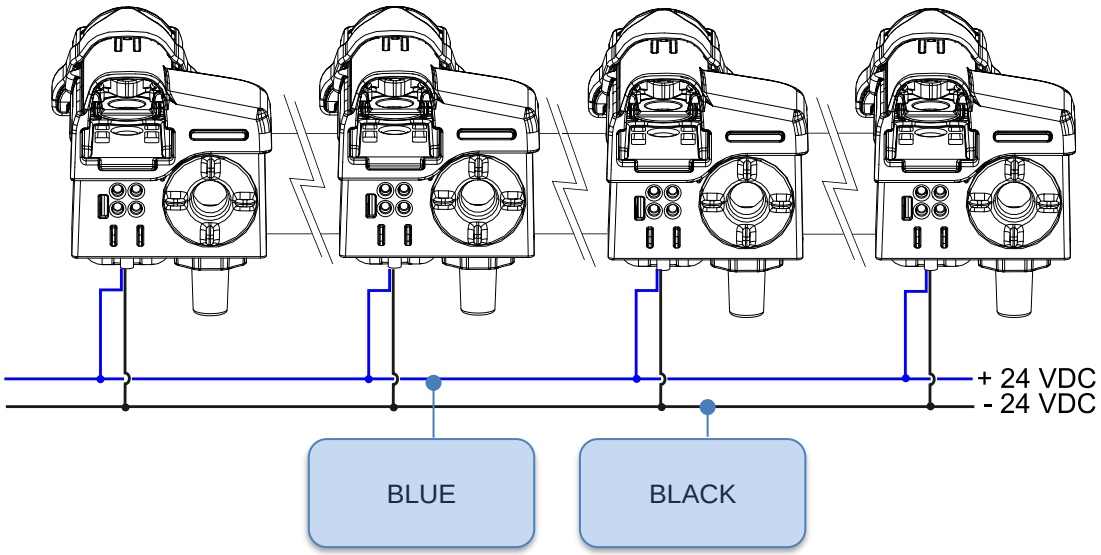
NOTE
An inclination of 10 ~ 15 ° for the mobile part with respect to the horizontal plane, in order to facilitate insertion.



8.4.1 Connection of the Combifast fixed part during washing

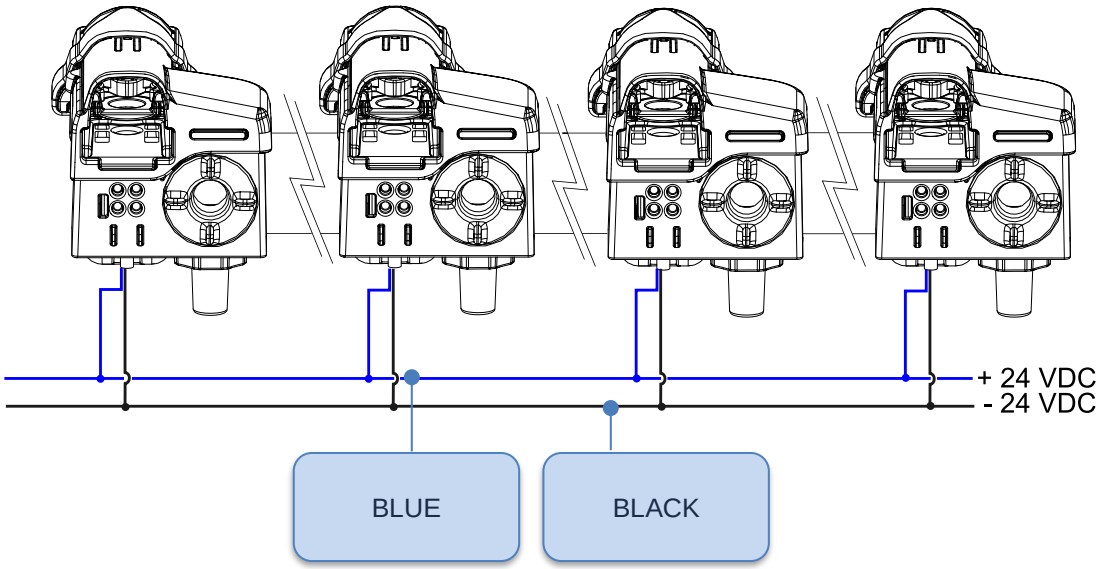
During washing a fixed part should be prepared for each Portable ACR-Smart to enable washing of each milking cluster.

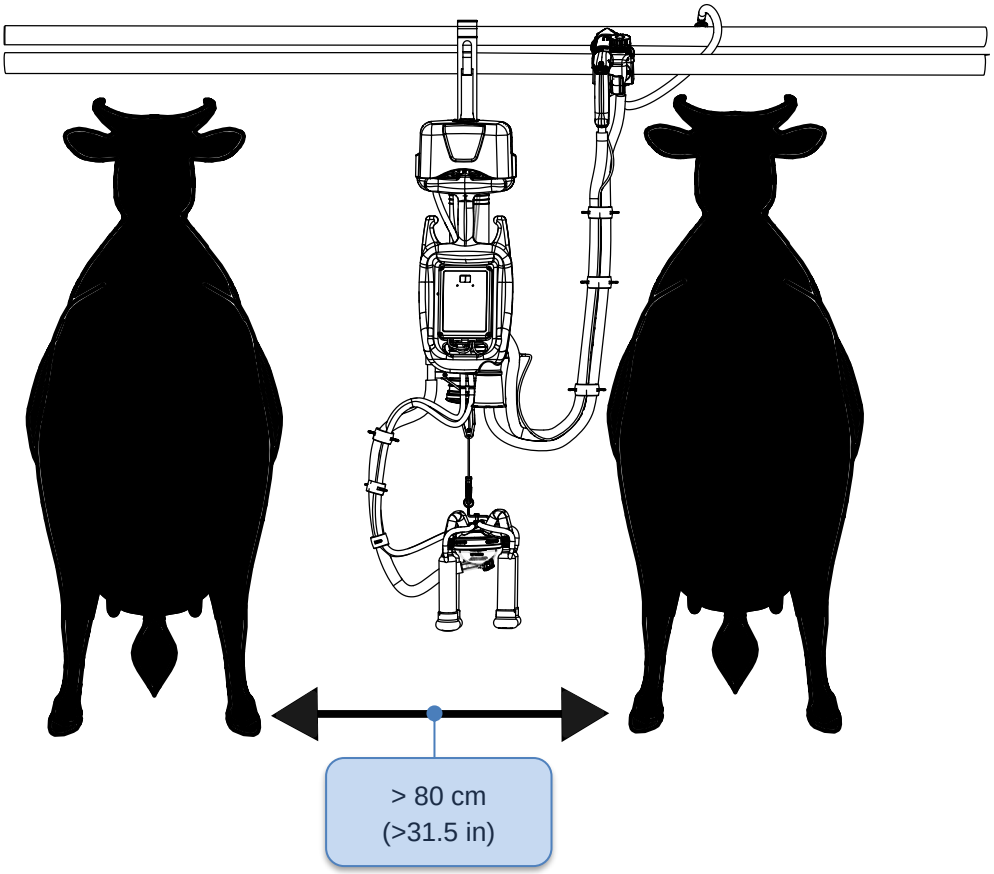




8.4.2 Connection of the Combifast fixed part in milking

A fixed part on the milking line needs to be installed in the milking area every two animals and it is advisable for a Portable ACR-Smart to be used every 5 fixed stations for approximately 2 hours of milking. If you wish to speed up the milking, it is necessary to increase the number of Portable ACR-Smart in relation to the number of fixed parts.





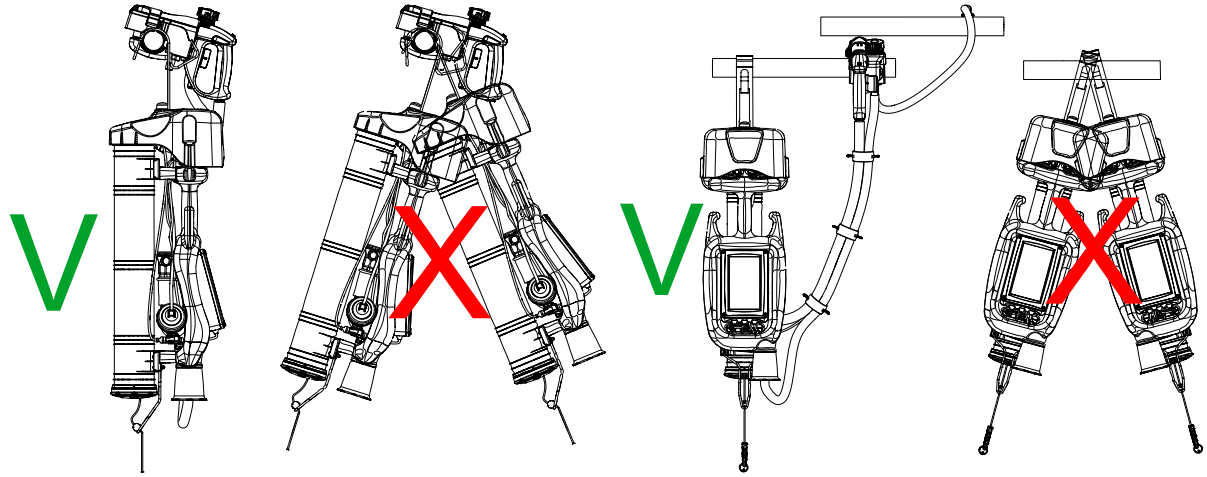
NOTE
For correct positioning of the Portable ACR-Smart in milking, it is necessary to position the Combifast fixed part towards the cow on the right.

8.5 Positioning of the Portable ACR-Smart during milking

For proper operation of the Portable ACR-Smart device, it is normally clamped on the milk pipe between one animal and the following one. If the system is on tracks, the Portable ACR-Smart must be left on the tracks between one animal and another.

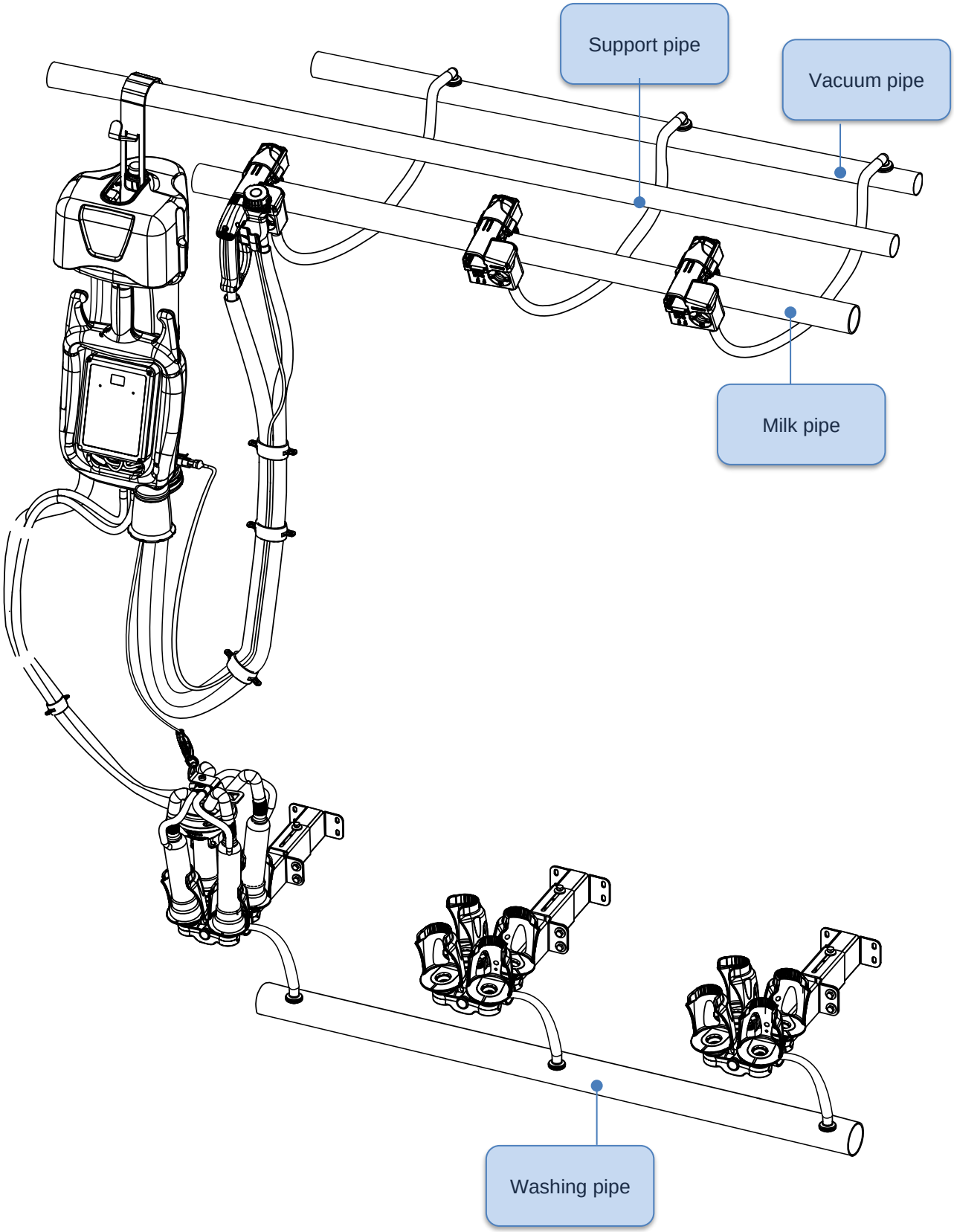
WARNING
During milking, ensure that:

- **The system is vertical and is not pulled in a sloping position by the animal. If the system works in a sloping position, it may experience accuracy problems when reading the quantity of milk obtained in milking.**
- **The useful length of the rope in the removal phase is 123cm (48.42in). If, due to the system structure, the animals are too far away with respect to the position of the Portable ACR-Smart, so that the portable ACR-Smart is milking in a sloping position, the system engineer must adapt the Portable ACR-Smart supports so that the system works in vertical position.**



WARNING
The portable ACR-Smart is designed with a quick release system to the piping to facilitate milking, and is designed to withstand accidental falls; if such falls occur frequently (i.e. once per milking, for example, due to the animals causing the cluster to fall accidentally from the support system), the system may be exposed to damage. It is the engineer's task to check that the system is not continually knocked to the ground by the animal and, if necessary, to prevent the animal doing so.

8.6 Positioning the Portable ACR-Smart during washing



8.7 Handling of the Portable ACR-Smart

Transporting the Portable ACR-Smart from one milking point to another may be carried out:

- By hand by the operator
- Using track transport systems

WARNING

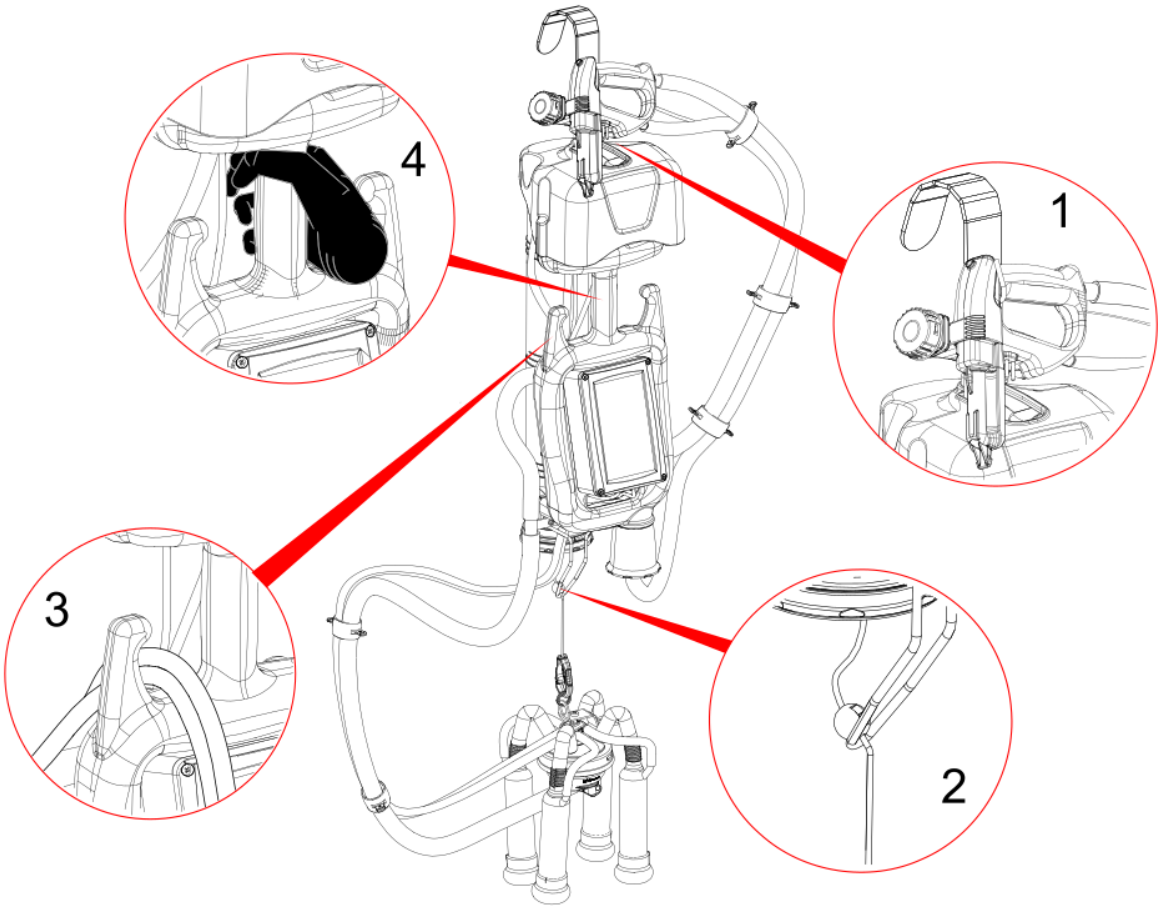
The Portable ACR-Smart is designed for attachment to a track system, however Interpuls does not provide such a system, therefore, it is engineer's task is to ensure that the track system is safe and does not cause system malfunctions.

WARNING

During device transport between one milking and another:

- **Position the combifast in the special transport support (ref 1)**
- **Ensure that the milking cluster has the locking ball positioned in the special transport bracket (ref. 2)**
- **Ensure that the milk and vacuum pipe do not impede the operator from walking. To do this, position the milk pipe and cluster pipe as shown in figure (ref. 3)**
- **Hold the device as shown in the figure (ref. 4)**

Failure to follow these safety instructions could result in injury to people.



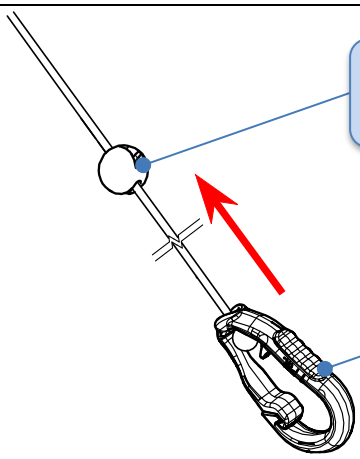
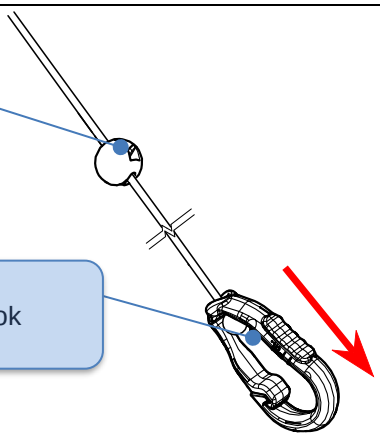
8.8 Adjustment for first use

Before using the machine for the first time, the following adjustments need to be made:

- Adjustment of the milking vacuum acting on the control valve (typically for milk transport systems, set to 50kPa - 14.76‘’Hg)
- Cut the rope to the ideal length for the milking system

NOTE
The cylinder rope is left at a length of 2.7m (8.85ft) to allow it to be shortened.

- Adjust the distance between hook and ball to prevent the cluster from touching the ground or the Portable ACR-Smart from being too tight during milking

If the cluster touches the ground during removal	If the cluster is too tight
	

WARNING

It is forbidden to change the position of the lock ball. Distance adjustment must be made by changing the position of the hook.

- Adjust the parameters of the panel, the main parameters to be adjusted for correct milking are:
  - **DETACHMENT DELAY** (Par **dd**): reduce the parameter value in order to prevent the cluster from touching the ground during detachment operations. Increase the parameter value in cases where it appears that the cluster is torn from the animal's teats.
  - **CONTINUOUS FLOW TIME** (Par **cF**): defines the time for which the sensor detects the continuous flow of milk. Decrease the value for longer milking (increased emptying of the udder) or increase it for shorter milking.
  - **FINAL DELAY** (Par **Fd**): if the sensor does not detect the "Continuous flow" milk after this amount of time, the detachment procedure begins. Increase the value for longer milking (increased emptying of the udder) or increase it for shorter milking.

9 DESCRIPTION OF THE DEVICE

A) Display

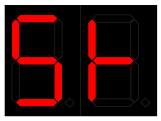
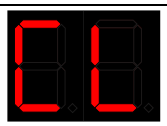
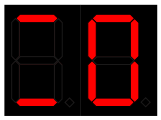
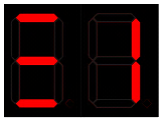
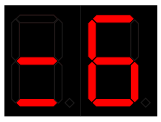
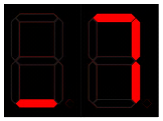
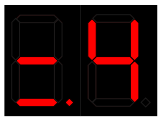
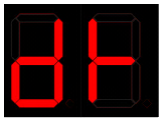
B) LEDs (green LED, red LED)

C) Stop key

D) Milking process start button with automatic detachment, continuous pressure for 3”, stimulation start

E) Combination of keys for accessing the washing or programming mode

9.1 Display during operation

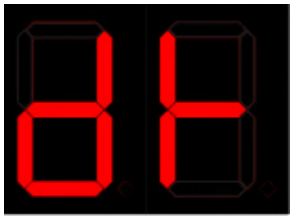
Display	Indication	Meaning
	Code **St**	Stimulation in progress
	Code **CL**	Panel in washing mode
	Left digit: the first segment at the top indicates the initial delay count Right digit: milking time	Initial delay without continuous flow
	Left digit: when all the horizontal segments are lit-up, it means that there is continuous flow during the initial delay Right digit: milking time	Initial delay with continuous flow
	Left digit: when the central segment lights up it means that there is continuous milk flow Right digit: milking time	Milking with continuous flow
	Right digit: milking time Left digit: only the bottom segment lit-up indicates the final delay count	- Milking without continuous flow (final delay count) - Detachment operations
	The central point flashing indicates manual milking	- Manual milking
	Code **dt**	Detachment
	Code **AL** (flashing)	Milking without continuous flow alarm

9.2 DESCRIPTION OF THE FUNCTIONS

Upon start-up the panel display indicates the software version installed. Depending on the configured parameters, the panel may then restart during:

- washing
- detachment (default)
- last active stage

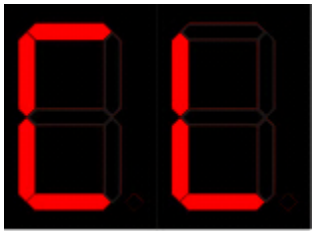
9.2.1 Detachment stage (stand-by)



The display features the code dt (Detachment) with the green LED switched on. During this stage the panel waits for the commands from the operator.
The S/O valve therefore stays closed, while the unit may switch from the release position to the removal position or vice versa via the STOP key or via the Quick Lift control

Key	Function
AUT	Start automatic milking
STOP	Removal or release of the milking unit
AUT + STOP	Start washing
AUT + STOP x 5”	Access programming mode

9.2.2 Wash



The wash function may be operated

- manually, when the system is in the detachment position, by pressing the two STOP + AUT keys instantaneously
- automatically if pre-set as a start-up function on the programming menu (parameter **I.P.** set on **L.p.**).

The display features the code **CL** and the green LED starts flashing. The unit is released and the count relating to the shut-off closure delay starts (parameter **c.S.**). When it has elapsed, the valve is opened and the washing stage starts.
You can set a different frequency during the washing cycle (parameter **U.F.**).
Press the STOP key to stop the washing cycle and retract the unit.

WARNING

Do not press the STOP key and do not press the quick-lift switch during the washing cycle: the unit would be removed from the washing plate.

9.2.3 Milking with automatic unit removal

To start the milking process with automatic detachment, press the AUT key during the detachment stage or operate the Auto-Start contact.

NOTE

Terminals 11-12 may be used to connect a REMOTE KEY or an AUTO-START device to start the milking process without having to press the key on the panel.

When the automatic milking process starts:

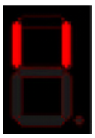
- the cylinder releases the unit.
- after the vacuum/pulsation delay (parameter **P.d.**), the pulsator is activated and the valve (shut-off) of the flow sensor is opened.

The display then starts counting the milking time. The upper horizontal segment indicates the initial delay count (parameter **I.d.**). At the same time, the two vertical segments indicate the opening of the pulsator channels, flashing alternately.

When the milk presence signal constantly exceeds the value defined by the position of the jumpers, the panel detects a continuous flow and the horizontal segment of the left-hand display lights up.

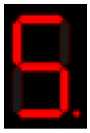
When the initial delay has elapsed (parameter **I.d.**), the upper horizontal segment switches off.

When there is no longer any milk flow, the central segment switches off and the final delay count starts (parameter **F.d.**). The detachment operations start when the delay has elapsed.

	The upper line indicates the initial delay count The central line switched off indicates the absence of milk
	The upper line indicates the initial delay count The central line indicates the presence of milk
	The upper line switched off indicates the end of the initial delay The central line indicates the presence of milk
	The sole lower line indicates the absence of milk and therefore the final delay count
	In each milking stage, the two vertical lines flash following the frequency of the pulsator

During all milking stages, press the 

key to switch from automatic milking to manual milking and vice versa.
Throughout milking, the right-hand display indicates the duration of the milking process in minutes. The lit-up dot indicates that milking has exceeded 10 minutes.

 >> 15 minutes

Press the 

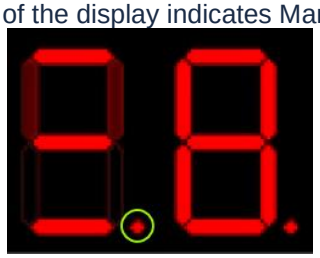
key (or activate the quick-lift button) to immediately stop the milking operations and start the detachment operations.

9.2.4 Manual milking

To start milking with manual unit removal, press the 

key after the system has been started in automatic milking mode:

- The dot flashing in the left-hand digit of the display indicates Manual Milking.



Manual milking LED

The panel stays in the manual milking mode as long as:

- the 

button is pressed to switch to the automatic milking mode
- or the 

button is pressed to start the detachment operations

Press the 

key to switch from the manual milking mode to the automatic milking mode and vice versa, at any time.

9.2.5 Indication of milk presence

During milking, the left-hand display indicates the current milking stage and the presence/absence of milk.
The central horizontal segment indicates if milk is going through the sensor at that time. If the milk presence signal lasts for a period equal to the continuous flow time (parameter **c.F.**), the panel detects that there is an actual continuous flow.

9.2.6 Maximum milking time

WARNING
You can envisage a maximum milking time, which can be set or disabled in the programming menu (parameter E.t.)
If this limit is reached, the unit detachment operations start automatically and, in the event of no flow during the milking process, the anomaly is signalled via an alarm

WARNING
If parameter Alarm AL = oFF, milking will only stop when the maximum milking time elapses (E.t.), regardless of the flow. Use this setting for timed milking without sensor

9.2.7 Detachment operation

When the initial delay has elapsed, if the panel does not detect a continuous flow of milk, the final delay count starts (parameter **F.d.**).
If the continuous flow of milk is resumed, the delay is reset. The unit removal operations start when the final delay has elapsed.

The removal procedure can also be started manually by pressing the STOP key

- The pulsator stops
- the S/O Valve closes the vacuum passage
- the detachment delay time count starts (parameter **d.d.**), in order to wait for a certain amount of air to leak through the collection unit hole, lowering the vacuum level under the nipples before removing the unit
- when the delay has elapsed, the cylinder gently removes the unit
- if the suction function has been activated (parameter **S.L.**), when the suction delay time has elapsed (parameter **S.d.**) the residue milk in the collection unit and in the milk pipe is aspirated through the flow meter
- if the automatic unit release function has been activated, when the automatic release delay has elapsed (parameter **A.r.**) the unit is released automatically to start a new milking session.

During the detachment stage the green LED flashes and the display features:

- the milking time in the right-hand digit
- the sole lower segment in the left-hand digit

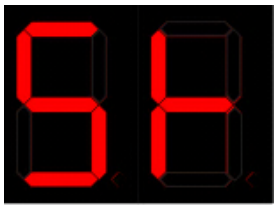
Absence of continuous flow and indication of milking time

After the detachment operation the green LED stays fixed on and the display features  .
At the end of the milking operations, the pair of terminals **3-4** is powered at 24VDC; the pair of terminals can be connected to a flashing light for indicating the end of milking.

Press the STOP key to switch off the flashing light and switch to the actual detachment condition (stand-by); press the AUT key to start a new milking session.

9.2.8 Stimulation

During the stimulation stage, the display features the code **St** and the LEDs start flashing.



On the programming menu you can define the type of stimulation (parameter **t.S.**) which may be:

- Forced (**F.S.**)
- Automatic (**A.S.**)
- OFF (**oF**) – can only be activated manually

- **FORCED STIMULATION**

  During programming you can set a forced stimulation cycle at the beginning of each milking process. For a certain period of time (“stimulation time”, which can be set via parameter **S.t.**) the frequency and pulsation ratio are gradually modified in order to reach the set values (stimulation frequency **S.F.**, stimulation ratio **S.r.**)

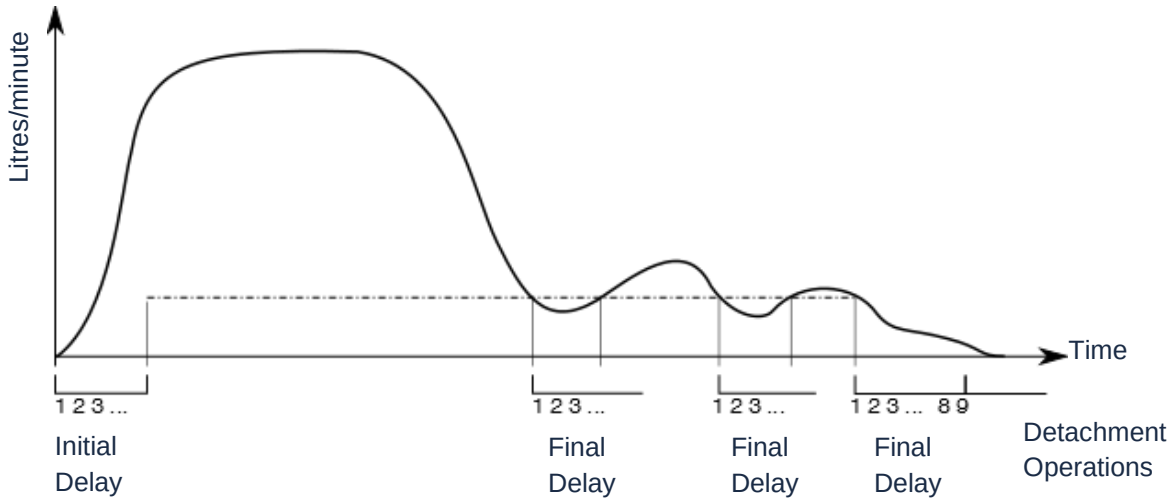
- **AUTOMATIC STIMULATION**

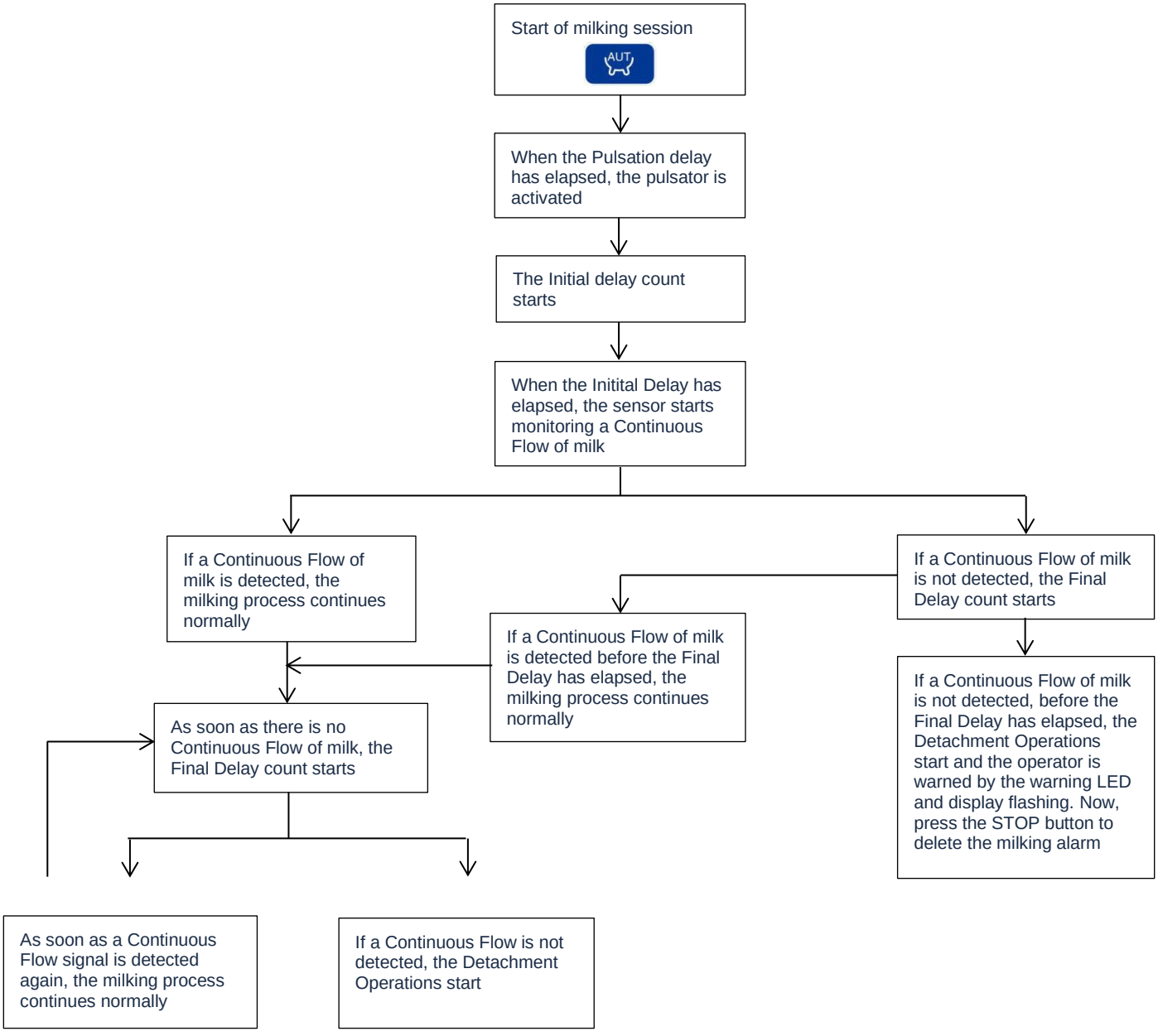
  Stimulation starts if the function is enabled and if during milking the s/o valve does not detect a “Continuous Flow” for a certain period of time (called “**neutral time**”, which can be set via parameter **n.t.**).
  Therefore the frequency and pulsation ratio vary gradually until reaching the values set for stimulation (stimulation frequency **S.F.**, stimulation ratio **S.r.**)
  Stimulation stops when the flow meter starts detecting a “Continuous Flow” again or when the stimulation time elapses (parameter **S.t.**)

- **MANUAL STIMULATION**

  Press and hold the 

key for 3” during the milking cycle (with any value set for parameter **t.S.**) to start the manual stimulation process: the frequency and pulsation ratio vary gradually until reaching the values set for stimulation (stimulation frequency **S.F.**, stimulation ratio **S.r.**). Stimulation stops when the stimulation time has elapsed (parameter **S.t.**) and the frequency and pulsation ratio gradually go back to the values set for milking.

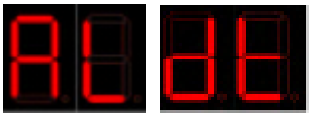




9.2.9 Alarm

If parameter Alarm AL = on, if a continuous flow is not detected during the milking process, when the initial delay has elapsed and during the subsequent final delay time count, code AL and the red LED start flashing on the display.

The unit removal procedures start automatically, after which code AL still appears alternately with code dt on the display, and the red LED keeps flashing.



Press the STOP key to reset the alarm and switch to the detachment mode (stand-by).

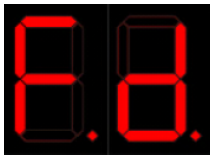
9.3 PROGRAMMING MODE

9.3.1 Accessing the programming mode

To access the Programming menu, press the STOP + AUT key for 10” while the system is in detachment mode.
The display features the first parameter identified by its code and the LEDs start flashing alternately.

9.3.2 Programming mode

In the programming menu you can edit the values associated to the parameters in order to optimise the milking, stimulation, detachment and washing operations.
The display features the code of the selected parameter.



Press the STOP or AUT keys to scroll the available parameters, each identified by its code.

Press the STOP + AUT keys to access the parameter and modify it. The current value of the selected parameter is displayed.

Press the STOP or AUT keys to scroll the parameter values.

Press the STOP + AUT keys to confirm the value assigned to the parameter and go back to the previous menu. If the parameter has been modified, the display flashes.

To exit the programming mode press and hold the STOP + AUT keys for 5”; the panel is then automatically restarted and the version of the software currently installed in displayed.

9.3.3 Programming parameter table

Parameter name	Code	Description	Range	Unit of measure	Default
SHUT-OFF SOLENOID VALVE	ES	Select the type of solenoid valve used for shut-off, NO - normally open (vac channel) or NC - normally closed (atm channel)	N.O. – N.C.	//	N.O.
CYLIDER SOLENOID VALVE	EC	Select the type of solenoid valve used for DVC, NO - normally open (vac channel) or NC - normally closed (atm channel)	N.O. – N.C.	//	N.O.
INITIAL DELAY	Id	Time at the beginning of the milking process in which milk presence is not checked	0÷19 (corresponds to 0÷190)	Seconds (10x)	8 (= 80 seconds)
FINAL DELAY	Fd	If the panel does not detect a continuous flow of milk throughout the entire delay, it starts the detachment operations	0÷30	Seconds	9
DETACHMENT DELAY	dd	At the end of the milking process, it is the delay between the closure of the s/o valve and the unit removal	0÷9	Seconds	7
AUTOMATIC RELEASE DELAY	Ar	When the delay has elapsed, after detachment, the unit is released	of - 5 - 15 - 30 - 45 - 60	Seconds	of
CONTINUOUS FLOW TIME	cF	If the sensor detects the presence of milk for a period equal to the continuous flow time, then there is an actual flow of milk	0÷4.0	Seconds	0.6
PULSATION FREQUENCY	Fr	Pulsation frequency during the milking process	50÷180 LP	Ppm	60
REAR PULSATION RATIO	Pr	Pulsation ratio of the hindquarters during the milking process	10:90 ÷ 90:10	Pulsation ratio	60 (= 60:40)
FRONT PULSATION RATIO	PF	Pulsation ratio of the forequarters during the milking process	10:90 ÷ 90:10	Pulsation ratio	60 (= 60:40)
START-UP STAGE	Ip	Select in which stage the panel must start - dt: start in detachment mode - CL: start in washing mode - LP: start from the last active stage	dt - CL - LP	//	LP
FINAL SUCTION DELAY	Sd	Delay between the end of the milking session and the opening of the s/o valve for suction	0÷9	Seconds	0
FINAL SUCTION DELAY	SL	During opening of the s/o valve to drain the pipe completely at the end of the milking session	0f ÷ 9	Seconds	of
STIMULATION FREQUENCY	SF	Pulsation frequency during the stimulation stage	3÷25 (corresponding to 30÷250)	Ppm	12 (= 120ppm)
STIMULATION TIME	St	Duration of stimulation	10÷90	Seconds	15
STIMULATION RATIO	Sr	Pulsation ratio during stimulation	0:100 ÷ 100:0	Pulsation ratio	30 (= 30:70)
NEUTRAL TIME	nt	When this time has elapsed, if there has not been a continuous flow of milk, automatic stimulation starts if it has been set	0÷24 (corresponding to 0÷240)	Seconds (10x)	2 (=20 seconds)

TYPE OF STIMULATION	tS	Selection of type of stimulation - FS: forced stimulation - AS: automatic stimulation - oF: stimulation that can only be activated manually	FS - AS - oF	//	AS
PULSATION DELAY	Pd	Delay between the beginning of the milking process and the pulsation starting	0÷9	Seconds	0
FREQUENCY IN WASHING MODE	UF	Pulsation frequency during the washing cycle	0÷15 (corresponding to 0÷150)	ppm	2 (= 20ppm)
MAXIMUM MILKING TIME	Et	The detachment operations always start when this time has elapsed	Of ÷ 99	Seconds (10x)	60 (= 600 seconds)
SHUT OFF CLOSURE DELAY	cS	Before starting the washing cycle, the s/o valve stays closed throughout the delay period, in order for the system to create vacuum	Of ÷ 90	Seconds	of
TYPE OF SYSTEM	dt	Definition of the type of system in which the panel is used: – CY: Standard system – SO: Swing-Over	CY - S0	//	CY
ALARM	AL	Deactivate this parameter with timed milking for which the panel will not control the milk flow **WARNINGS** **It will only detach when the maximum milking time elapses (E.t.)**	oF - on	//	On

9.3.4 Parameter reading

Shut-Off Solenoid Valve – E.S. and Cylinder Solenoid Valve– E.C.:

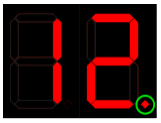
- With CV30 inversa set:
  - E.S. = N.C. (atm channel)
  - E.C. = N.O. (vac channel)
- With CV30 set:
  - E.S. = N.C.
  - E.C. = N.C.
- With CV20 set:
  - E.S. = N.O.
  - E.C. = N.O.

Start-up stage – IP:

- dt upon start-up the panel retracts the unit and goes into detachment mode (stand-by)
- CL upon start-up the panel releases the unit and goes into washing mode
- LP upon start-up the panel starts from the last active stage (if it is switched off during the milking cycle it will restart in detachment mode)

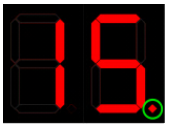
Initial delay – Id:

- 10 second steps
- The parameter values must be multiplied by 10 (the dot lit-up indicates the x10 multiplication)

 >> 120 seconds

Pulsation frequency in milking mode – Fr:

- LP indicates that the panel is not controlling pulsation and that it is only powering the pulsator
- The dot lit-up indicates that the value must be added to 100

 >> 115ppm

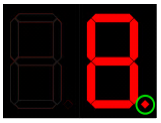
Pulsation frequency in stimulation mode – SF:

- The dot lit-up indicates that the value must be multiplied by 10

 >> 150ppm

Neutral time – nt :

- The dot lit-up indicates that the value must be multiplied by 10

 >> 80 seconds

Stimulation time – tS:

- FS forced stimulation
- AS automatic stimulation
- Of no stimulation

NOTE
It is always possible to activate manual stimulation with any value set in parameter tS.

Maximum milking time – Et:

- 10 second steps
- The dot lit-up indicates that the value must be multiplied by 10

>> 900 seconds (15 minutes)

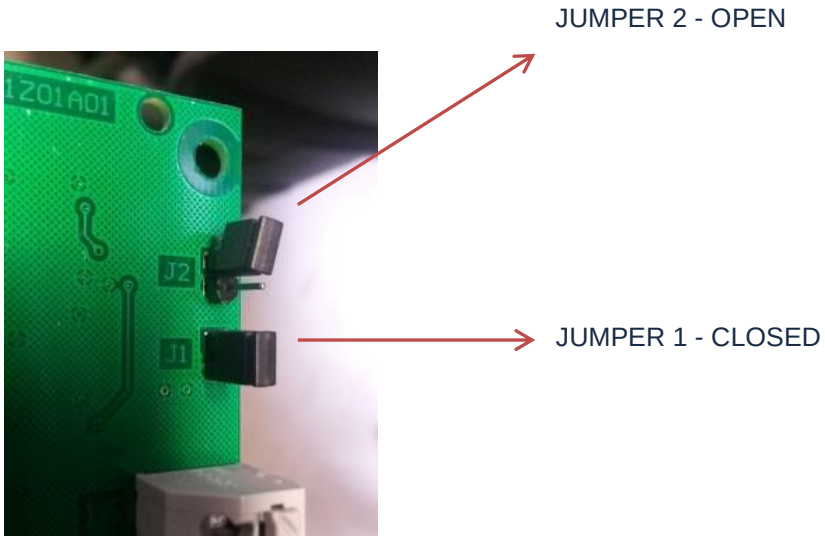
Type of system – dt:

- CY system with cylinder-operated detachment
- SO system with detachment via movement of the Swing-Over arm (the CV channel controls a piston that moves the arm from right to left and vice versa)

9.3.5 Sensitivity

The ACR panel is designed to detect milk flows below the 100 gr/min (3.52 oz/min) limit (preferably with the HFS sensor).
It is possible (but NOT recommended) to increase or decrease this threshold via the jumpers on the board.

Milk Flow	OHM	Volt	ACR Jumpers
> 500 gr/min (>17.63 oz/min)	700	6.10 +/- 0.07	JUMPER 1 CLOSED JUMPER 2 CLOSED
300 gr/min (10.58 oz/min)	1270	6.20 +/- 0.07	JUMPER 1 OPEN JUMPER 2 CLOSED
100 gr/min (3.52 oz/min)	2000	6.32 +/- 0.07	JUMPER 1 CLOSED JUMPER 2 OPEN
< 100 gr/min (<3.52 oz/min)	2660	6.42 +/- 0.07	JUMPER 1 OPEN JUMPER 2 OPEN



10 GENERAL MAINTENANCE

WARNING
Do not carry out any maintenance if the Portable ACR-Smart is connected to the mains.
Before performing any maintenance to the Portable ACR-Smart disconnect the machine from the mains
The only daily maintenance that must be performed with the device connected to the mains is washing the milking system.

WARNING
Perform maintenance of the Portable ACR-Smart positioning it on a solid base (table) and perform maintenance with the Portable ACR-Smart in milking or washing position.

CAUTION
It is forbidden to clean the device with a pressure washer.

10.1 Component maintenance

10.1.1 LE30 e CV 30 Pulsators

- It is recommended to clean the filter cartridge every 6 months for correct pulsator and Control Valve operation. Proceed as follows:
  - Remove the filter as is and rinse it with clean water and liquid soap (e.g. dishwashing detergent - ref. fig. 1).

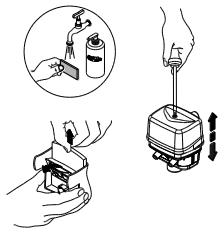
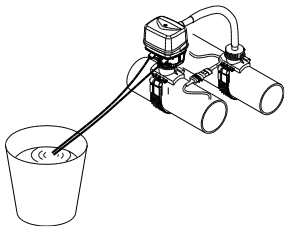
WARNING
In very humid and dusty environments, cleaning should be performed every 3 months.

WARNING
It is forbidden to lubricate the filter with oil

- If milk enters the pulsator, cleaning must be carried out immediately (e.g. because a sheath breaks).
  - Wash the pulsator (see Figure 2) only with lukewarm water, disconnecting the filter cartridge or filtered air piping. Alternate 5 seconds of water intake and 5 seconds of air intake; if water starts coming out of the hood, allow only air intake to prevent the water from affecting the electrical part. Therefore, leave the pulsator operating for approximately 30 minutes to eliminate excess water.

WARNING
It is recommended not to wash the pulsator more than once every 6 months, except in case of sheath breakage.

- Once a year, check the frequency and the pulsation ratio. Request the intervention of specialized personnel.
- After 5000 hours of operation at 60 ppm, it is necessary to carry out a general review of the pulsator; request the intervention of your dealer.

Fig 1 - Filter cleaning	Fig 2 - Pulsator washing
	

10.1.2 DVC1000 Cylinder

For the DVC 1000 cylinder, we recommend general cleaning every 6 months to ensure proper operation. Maintenance is also required should cylinder piston sliding problems or leaks be detected. Act in the following manner:

1. disassemble the bottom cover and the piston unit
2. Carefully clean the piston gasket
3. Lubricate the inside of the cylinder with silicone spray

If the problem persists, replace the gasket and re-lubricate the inside of the cylinder with silicone spray.

WARNING
To lubricate the cylinder gasket, only use silicone lubricant spray and not silicone grease.

10.1.3 HFS EVO valve

Replacement of the rubber shutter is recommended every 12 months (ref. 28 diagram) for optimal operation

10.2 Periodical maintenance

10.2.1 Daily

Adequate washing of the milk pipes to remove the bacteria left in the line and in the equipment after milking is essential as these could contaminate the milk, damage the equipment and cause the detachment of the cluster, intercepting the flow of milk incorrectly.
Wash every surface of the milk line in contact with milk and the milking units after each milking as follows:

1. Fasten the sheaths to the washing jets or put the milking unit in the washing tank
2. Put each ACR-Smart panel into washing mode
3. Start rinsing and the washing procedure
4. Before the next milking, sanitise surfaces in contact with the milk according to normal washing instructions
5. To end the washing phase and start the next milking phase, disable washing mode on the milking unit.

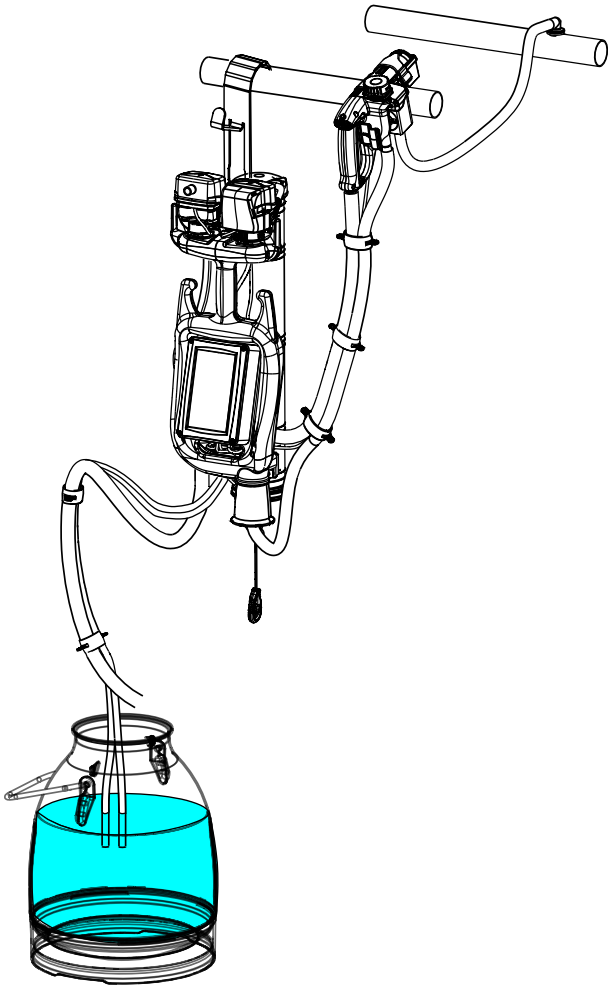
10.2.2 Weekly

Three times a week, wash with a solution of water + nitric or phosphonitric acid, in concentrations NOT exceeding 3%.

10.3 Extraordinary maintenance

In the event that, following the breakage of a sheath, milk goes directly into the Portable ACR-Smart tank and into the pulsator, proceed as follows:

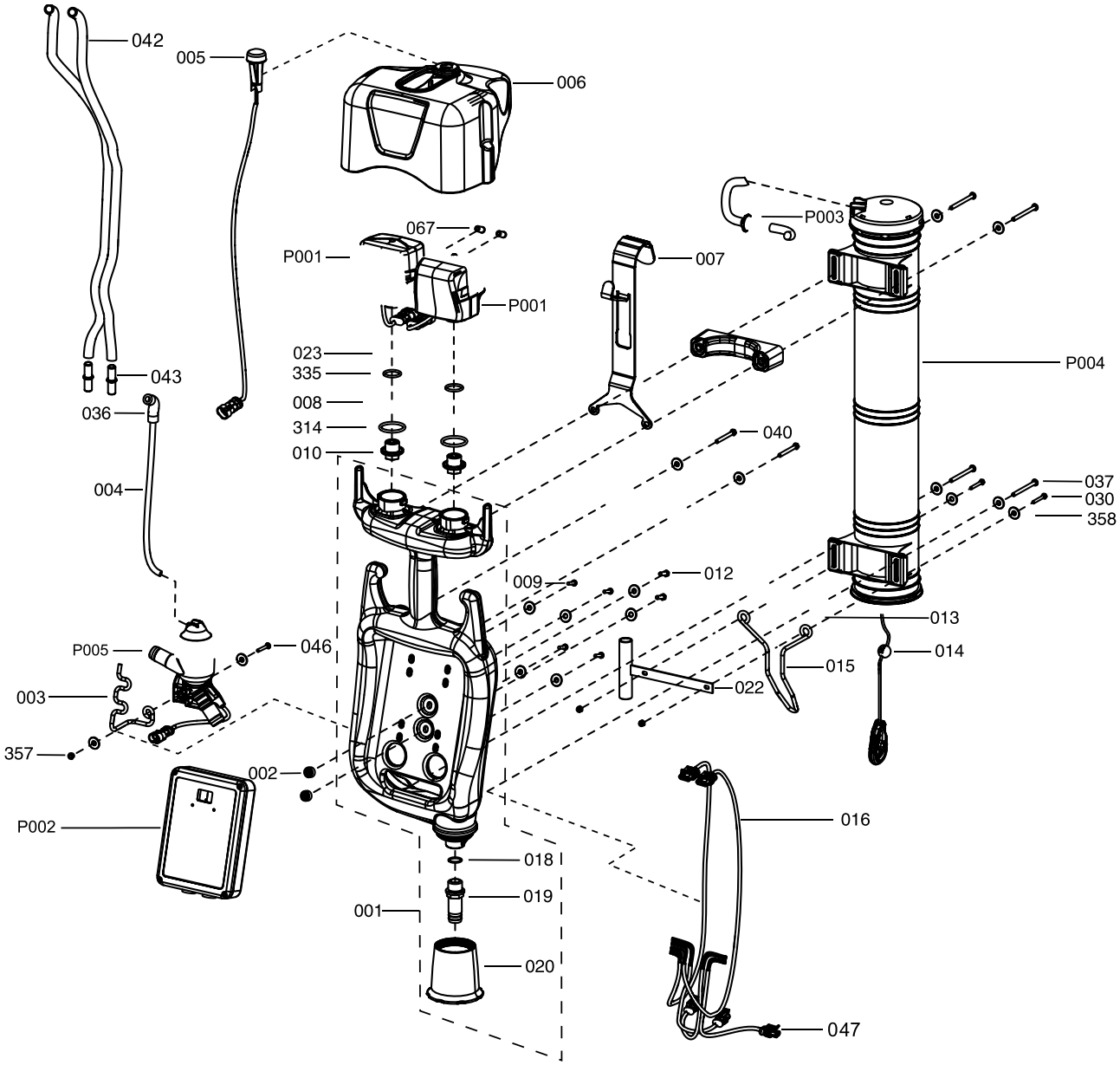
- Suspend milking and replace the damaged sheath.
- Wash the Portable ACR-Smart after replacing the broken sheath with lukewarm water only, disconnecting the pulsator's filter cartridge and allowing warm water to be sucked up from the pulsator's twin pipe.
  Alternate 5 seconds of water intake and 5 seconds of air intake; if water starts coming out of the hood, allow air intake only to prevent the water from affecting the electrical part.
- Therefore, leave the pulsator operating for approximately 10 minutes to eliminate excess water and dry the device



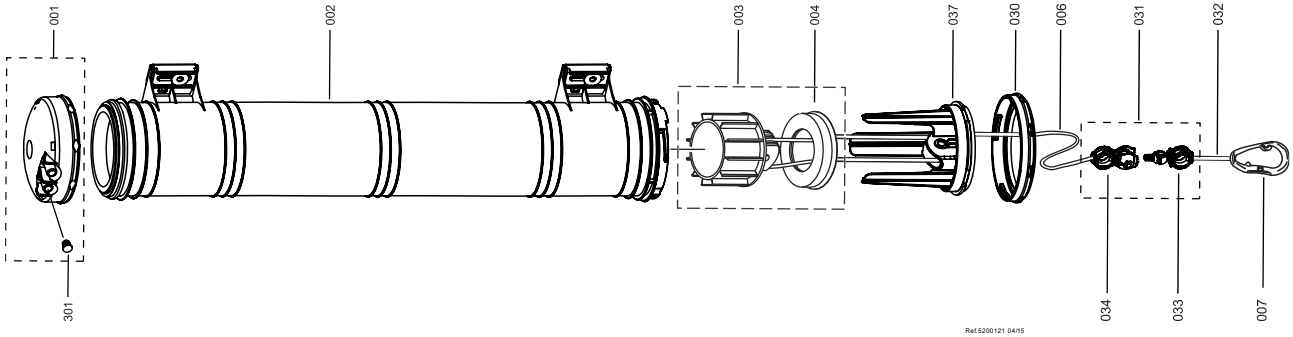
WARNING
After the device has been washed it is recommended to drain the washing water from the vacuum pipeline.

11 SPARE PARTS DIAGRAM

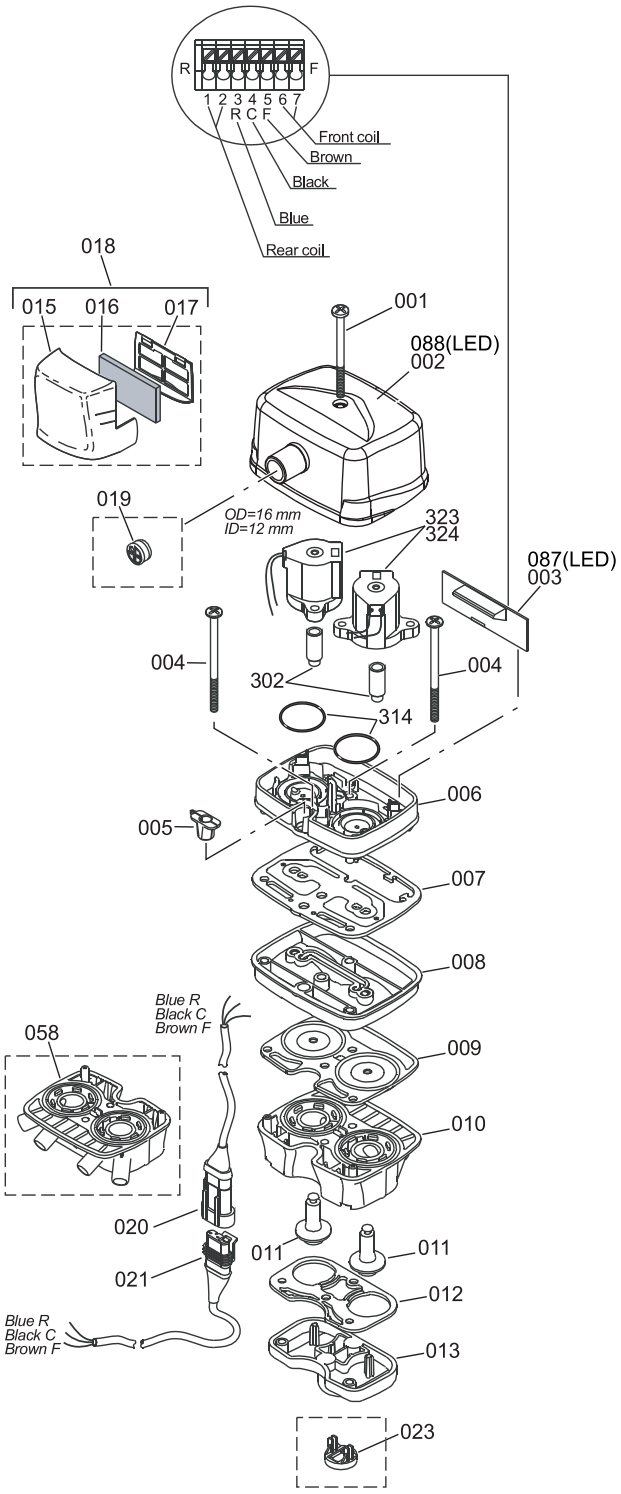
11.1 PORTABLE ACR



11.2 DVC1000



11.3 LE30



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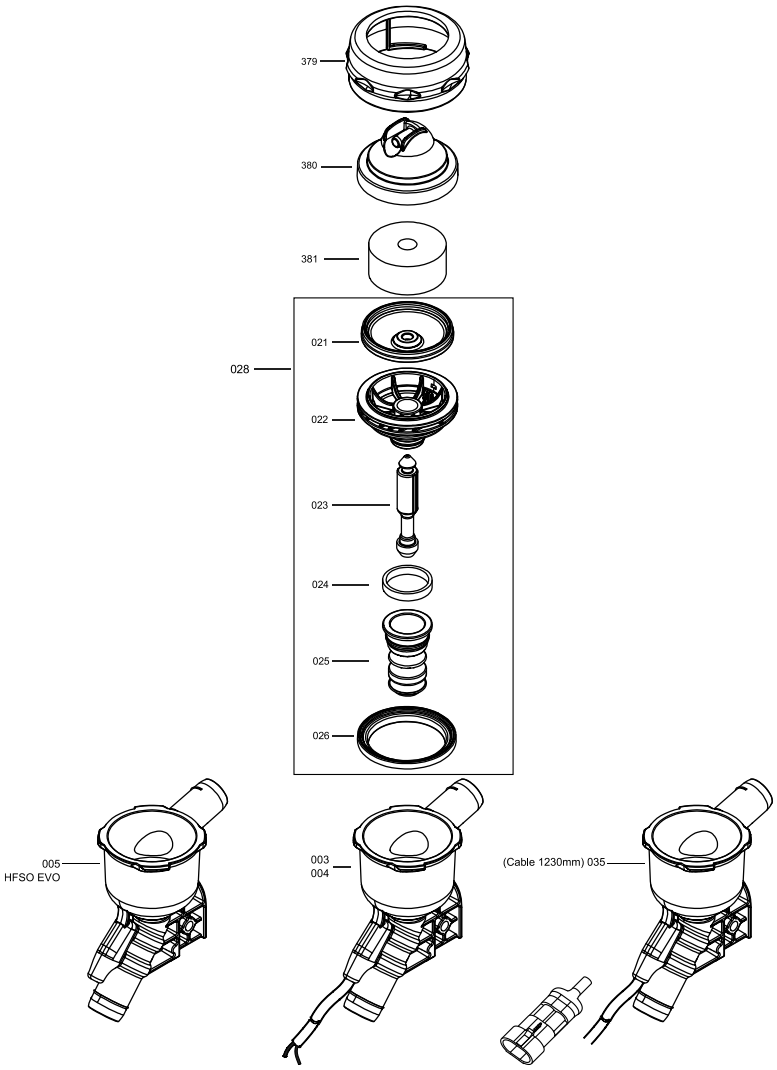
11.4 HFS EVO



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12 TROUBLESHOOTING

PROBLEM DETECTED	POSSIBLE CAUSE	SOLUTION
Milk enters the Portable ACR-SMART tank	Sheath breakage	Replace the damaged sheath. Wash the tank following the procedure contained in chapter *10.3 - Extraordinary maintenance*
The unit is detached too soon	1 -Foreign bodies inside the sensor	Check that there are no foreign bodies, such as straw, inside the sensor
	2 -Incorrect setting of the ***Final Delay*** and/or ***Continuous Flow*** parameters	Increase the **F.d.** (***Final Delay***) parameter and/or decrease the **c.F.** (***Continuous Flow***) parameter
	3- Sensitivity of the sensor set incorrectly	Adjust the sensitivity of the sensor to a lower detachment threshold (see Chap *9.3.5 - Sensitivity*)
The unit is detached too late	1 -Foreign bodies inside the sensor	Check that there are no foreign bodies, such as straw, inside the sensor
	2 -Incorrect setting of the ***Final Delay*** and/or ***Continuous Flow*** parameters	Decrease the **F.d.** (***Final Delay***) parameter and/or increase the **c.F.** (***Continuous Flow***) parameter
	3 - Sensitivity of the sensor set incorrectly	Adjust the sensitivity of the sensor to a higher detachment threshold (see Chap *9.3.5 - Sensitivity*)
The LED indicator does not flash at the end of the milking process	Connection problem	- Make sure it is connected correctly - LED burnt out, must be replaced
The cylinder does not remove or delays removal of the cluster	1 - The sealing gasket of the cylinder is dirty or deformed	- Proceed with the lubrication of the gasket as per the maintenance chapter. - If the problem persists, replace the gasket
	2 - The control valve has a channel that is not working correctly	- Check the CV connection - Ensure that the plunger in the CV coil is not glued to the coil insert. If necessary, replace - Ensure that the hole in the CV under the plunger is not blocked → If so, clean it
The Shut off does not open or close the vacuum	1 - HFS EVO shutter is worn or damaged	- Replace the entire shutter
	2 - The control valve has a channel that is not working correctly	- Check the CV connection - Ensure that the plunger in the CV coil is not glued to the coil insert. If necessary, replace - Ensure that the hole in the CV under the plunger is not blocked → If so, clean it
The cluster touches the ground during detachment operations	The distance between the limit switch ball and hook is not correctly adjusted	Bring the hook closer to the limit switch ball (see Chap *8.8 - Adjustment for first use*) Attention: leave the ball fixed and change the position of the hook
	DD Parameter - Detachment delay incorrectly set	Reduce the parameter: Detachment delay (dd)
The cluster does not reach the correct position for attachment of the cluster	The distance between the limit switch ball and hook is not correctly adjusted	Distance the hook from the limit switch ball (see Chap *8.8 - Adjustment for first use*) Attention: leave the ball fixed and change the position of the hook

13 CE DECLARATION OF CONFORMITY

EU DECLARATION OF CONFORMITY
Original Statement

Product model/product	Portable ACRsmart
Serial Number	.....
Name and address of the manufacturer or his authorised representative:	InterPuls S.p.A Via Maritano, 11 42020 Albinea (Reggio Emilia) Italy

This declaration of conformity is issued under the sole responsibility of the manufacturer

Object of the declaration:

A portable milking machine for pipeline systems with semi-automatic cluster removal

Machine Designation: Milking machine for pipeline systems

Function: Semi-automatic milking

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:
- Directives 2006/42/EC – Machinery
- Directives 2014/30/UE - Electromagnetic Compatibility (EMC)

References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:
- UNI EN ISO 12100:2010
- EN 60335-2-70
- EN 61326-1:2013-01

Person authorised to compile the technical file of the machine: InterPuls S.p.A.

Albinea, …

InterPuls S.p.A.
Craig Sage
Managing Director

InterPuls S.p.A. I Via F. Maritano, 11 I 42020 Albinea RE - Italy I T +39 0522 347 511 I F +39 0522 348 516 I sales.albinea@milkrite-interpuls.com I www.milkrite-interpuls.com
Codice Fiscale e Partita IVA 01259470357 I Cap. Soc. € 980.400,00 i.v I R.E.A. n. 171931/RE I Registro Imprese di RE n. 01259470357
Import/Export M. RE. 009360 Società con socio unico.