

OPERATING INSTRUCTION



Milking Automation System Milan and milk measurement for MILAN milking parlours

(Herringbone, Side by Side and Rotary System)

0. Preamble

Thank you for purchasing a milking automation of the Milan GmbH. You have acquired a high quality product.

The Milking Automation System Milan is a universally applicable electronic control for all milking parlours e.g. herringbone system, Side by Side or rotary system.

The use of modern microelectronic components ensures an optimum milking procedure which is gentle to the udder for all various equipments.

The well arranged multilingual operator guidance of programming makes the work of the milker easier and helps to reduce operating errors to a minimum. Flexible solutions combined with the PC allow the use of modern management systems. Coupling with the milk meter (Pulsameter 2) and the use of the automatic removal system or a high-quality milking-arm releases the farmer from the supervision in the end of milking.

The milking automation system Milan allows

- the milking of high-quality milk in all types of milking parlours
- the using of a high level of automation concerning the milking procedure
- the well arranged multilingual operator guidance during milking
- optimal stimulation before milking
- special program for cows that are slow-milked
- the selection of a milking-out program in the end of milking to get an empty udder
- the monitoring of milking procedure in combination with the milk measurement for a automatic cluster removal in the end of milking
- the controlling of a gentle cluster removal
- the collection and transfer of data from milking to the computer for further use
- the combination with animal identification and herd management
- the use of different milking programs for cows with problems or blocking milk
- the support of disinfection of way of milk and cluster
- the intermediate storage of the milk datas
- the outputting of signals for selecting the cows

The equipment of a milking place consists of a milk measurement „Pulsameter 2“, a valve group and a cluster removal or milking arm. The wiring and pneumatic tubing have to adapt to the respective application.

The documentation at hand corresponds to the state of the art on the date of issue. The manufacturer reserves the right to make any technical modifications for the purpose of further development.

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1. Safety instructions

Please note for your own security and for guarantee claims:

- The electric installation has to be done by a authorized workshop. Likewise all repairs which exceed the recommended servicing schedule of this operating instruction as well as steps for fault clearance have to be done by skilled workers. Please ask your competent dealer.
- Only persons which are informed about the operating instruction are entiteled for putting into operation. The knowledge about general instructions of accident prevention and other safety measures are provided.
- Maintenance and repair work may only be carried out when the equipment is disconnected from voltage.
- During cleaning, it is to be ensured that no water is splashed on the milking automation system Milan.
- Milan GmbH is not liable for damages caused by inexpert handling or unauthorized interference.

2. Operating conditions

The milking automation system Milan can be installed and retrofitted in all types of milking parlours. For that purpose, the electrical supply 24V DC has to be retrofitted. In order to adjust the parameter, an adequate variety of combinations is preset in the setup. An proper adjustment with an appropriate equipment ensures a fast and gentle milking for the udder. The milking automation system Milan is programmed for the use of the milk meter „Pulsameter 2“.

3. Technical data

➤ input voltage	220V AC ±10%
➤ working voltage	24V DC
➤ voltage tolerance	0,85 – 1,1V
➤ current consumption	100mA (without valves)
➤ max. current consumption	5A (with valves)
➤ max. output current valve driver	2A
➤ display	2 lines, 16 symbols with background lighting
➤ ambient temperature	0°C to 50°C
➤ degree of protection	IP 54
➤ pulsation	adjustable in the setup
➤ milk measurement	adjustable in the setup
➤ dimension (without connection)	length / wide / height 200mm / 120mm / 60mm
➤ weight	0,650 kg

4. Equipment construction and connection plan

The electronic control with display and keyboard foil is in the top of the milking automation system Milan. The lower part contains the cable entries, their position can be different according to the place of installation. The number of cables and connectors depend on the installed equipment.

Appendix 1 contains the necessary connection plans for the milk place controller Milan and for the milk place controller Milan-Plus (with milking arm).

5. Function description

5.1 Settings Setup and Calibration

The program steps for the setting in the setup and for adjusting the milkmeter are documented in appendix 2.

The default settings should be made by the dealer. It can be defined a code for customer access. Furthermore occur the classification to the gate control units of the doors (rows) and to the peripheral equipment in this setting. The set-point for the milk meter are determined and documented at each milk-place. These values are independent from the setup which the customer has made.

If a PC is used in the milking installation, the data of the customer's setup are additionally stored in PC.

adjustment of setup

To call the settings in the setup you must be in the program step „milking stand-by mode“. The display shows

MILKING ?
CLEANING ? (+)

By continuously and simultaneously pressing the button (-) and button (+) appears the inscription

JUSTAGE (+)
SET UP (-)

Using the button (+) , the respective settings are displayed. The operator is now ask to enter the access code to carry through the adjustment in the set-up. If no specific code has been agreed the valid code is 00.

ENTER CODE
00

By using the keypad or pressing the button (+) and button (-) the corresponding code can be entered.

The selected coding is acknowledged by pressing the button ENTER. If the entered code is correct, the first menu item appears. In case that a wrong code is entered the milking automation system returns to the milking stand-by mode automatically.

In the adjusting mode the selection of the set-up parameters is done through the button (+) and button (-). The receipt of the selected parameters is made by pressing the button ENTER.

The newly adjusted parameters are updated in the program step „Milking stand-by“ by pressing the button (-) and START simultaneously till the milking automation system is switched off. (approx. 5s).

01. The following parameters can be adjusted in the dealer set-up:

02. Software version – not adjustable
03. Program 01 / Program 02
04. Change Code – change affects code in customer set-up
05. Contrast 100%
06. Gate Control Number 001 – Determining the stand-row if management exist
07. Without Milking Arm / With Milking Arm
08. Without Farm Number / With Farm Number
09. Cylinder for cluster removal does not negate / Cylinder for cluster removal negate
10. Blocking valve does not negate / Blocking valve negate
11. Cleaning valve does not negate / Cleaning valve negate
12. Without Automatic Start / Static Automatic Start / Dynamic Automatic Start / Swing Over

The following parameters can be adjusted in the set-up:

1. Language: German / English / e.g. russian / turkey /
2. Date
3. Time
4. With management / Without management
5. With animal number / Without animal number
6. Device number

The device number is required in case of using the milking automation system with herd management. Max. 254 device numbers are possible. The device numbers should be allocated in an area as close as possible. Double device numbers may not be set.

7. With selection (only by management) / Without selection
8. Program MS / Program MM
9. Vacuum stabilization 0/15/30/45/60s
10. With cows that are slowly milked / Without cows that are slowly milked
11. Milking S 1,6/1,8/2,0/2,2/2,4 kg/min
12. Attaching 10/15/20s
13. Stimulation 0/15/30/45/60s
14. Stimulation A / B
15. Pulse number PVB Stimulation 200/220/240 DT/min
16. Suction phase PVB Stimulation 20/25/30/35/40/45/50%
17. Two-frequency / Common mode
18. Pulse number PV1 50/55/60/65/70/80/90/100/110/120DT
19. Suction phase PV1 50/55/60/65/70%
20. Suction phase PV1 -20/-15/-10/-5/0/+5/+10/+15/+20ms
21. Pulse number PV2 50/55/60/65/70/80/90/100/110/120DT
22. Suction phase PV2 50/55/60/65/70%
23. Suction phase PV2 -20/-15/-10/-5/0/+5/+10/+15/+20ms
24. With milking-out / Without milking-out
25. Milking-out 600/800/1000 g/min
26. Milking-out A(50/50) / B(40/60) / C* / D(30/70) / E*
27. Milking-out C time: 0,6/0,8/1,0/1,2/1,4/1,6/1,8/2,0/2,2/2,4/2,6s
28. Timed approach movement of the milking arm (E*)
 - 28.1 Milking-out E T1: 0,4/0,6/.../2,8/3,0s (turn in, rotary cylinder during attaching)
 - 28.2 Milking-out E T2: 0,0/0,1/0,2/.../0,9/1,0s (turn in, pivoting cylinder during attaching)Milking L and Milking S after blocking time (180s) – optimization of the position from the cluster by moving forward
 - 28.3 Milking-out E T3: 0,0/0,1/0,2/.../0,9/1,0s (puls forward by rotary cylinder – break 30s)
 - 28.4 Milking-out E T4: 0,0/0,1/0,2/.../0,9/1,0s (Rotary cylinder during milking-out)
 - 28.5 Milking-out E T5: 0,0/0,1/0,2/.../0,9/1,0s (lift cylinder during milking-out)
 - 28.6 Milking-out E T6: 0,4/0,6/.../1,8/2,0s (cluster-removal, rotary cylinder pull cluster forwards - cylinder for removal lift the cluster)
 - 28.7 Milking-out E T7: 0,4/0,6/.../1,8/2,0s (cluster removal, lift cylinder turn the cluster)
 - 28.8 Milking-out E T8: 0,5/1,0/.../9,5/10,0s (cluster removal, Rotary cylinder turn the cluster outside)
29. Cluster removal with automatic end of milking / control without cluster removal
30. Delay of cluster removal 1/1,5/2,0/2,5/... /9,5/10,0s

31. End of milking 100/150/200/.../450/500 g/min
32. With position of cluster / Without position of cluster
33. Without intermediate disinfection / With intermediate disinfection /
Milking arm and intermediate disinfection (Z*)
34. Delay Y4: 0/30/60/90 s
35. Floating time 60/90/120s
36. Stand by manual / Stand by automatic
37. Without infomenu / With infomenu
38. Without Devitation /10/15/20/25/30% Devitation
39. Without milk control / With milk control (only with herd management)

The program point (milking-out C*) has to be chosen by the milking automation system Milan only with milking-out device with tail.

The program point (milking-out E*) has to be chosen only with using the milking arm. The intermediate disinfection (Z*) with milking arm is also only to activate by using the milking arm.

Milan GmbH recommends the following parameters for milking cows:

- With management (animal identification is available)
- Device No 000 (milking place number must be adjusted)
- Without selection (if no selection is available)
- Program MS
- Vakuum stabilization 15s
- With milking slowly
- Milking S 2,0s
- Putting on 15s
- Stimulation 45s
- Stimulation A (with milking arm E)
- Alternating cycle
- Pulse number PV1 60PPM
- Suction phase PV 1 60%
- Suction phase PV 1 0ms
- Pulse number PV2 60PPM
- Suction phase PV 2 60%
- Suction phase PV 2 0ms
- With stripping
- Stripping 800
- Stripping E
- Stripping E T1 1,8s
- Stripping E T2 0,4s
- Stripping E T3 0,4s
- Stripping E T4 0,3s

- Stripping E T5 0,5s
- Stripping E T6 2,0s
- Stripping E T7 2,0s
- Stripping E T8 3,0s
- Taking-off with automatic end
- Delay of removal 6,0s
- End of milking 250g
- Without intermediate disinfection
- Delay Y4 0s
- Stand by manual
- Without infomenu
- Without devitation
- Without milk control

Adjusting of the milk meter (attachement 2)

In this program item the adjustment value of the milk meter can be defined. The program is called up from the program item "Milking stand by" by continuously and simultaneously pressing (3s) the (-) and (+) keys. It appears on the display the inscription

ADJUSTMENT (+)
SET UP (-)

By means of the (+) key the adjustment of the set-point is selected. The user is now asked to enter the access code in order to adjust the set-point. If no specific code has been agreed the valid code is 000.

ENTER CODE
000

The selected coding is confirmed with the key Enter. In case that a wrong code has been entered the milking automation system returns automatically to the "Milking stand-by" mode. The correction value can be chosen in the adjusting mode from 70.....130.

ADJUSTMENT VALUE
100

The acknowledgement of the set-point is done by means of the ENTER key. **The new adjustment value is updated in the „Milking stand-by“ mode by switching off the milking automation system (pressing approximately 5s simultaneously (-) key and START key till the display switch off).**

5.2 Information about the programflow and the milk measurement

Activation of the information program is shown in **appendix 3**. In this program the last data from setup and milking will be presented . Changing the data is here not possible.

The program is called up from the program item „Milking stand-by mode“ by continuously pressing (3seconds) the (-) key until the next inscription.

PROGRAM	(+)
MILK QUANTITY	(-)

Using the (-) key, the total milk quantity and the separate milk quantities are called up. In the memory you can call the milk quantities from the last 3 days.

After the last reading the control returns automatically to the milking stand-by mode. By pressing the (+) key, the inscription appears

PROGRAM	(+)
SERVICE	(-)

Using the (+) key, the respective settings are displayed. By pressing the (-) key, the valves and sensors of the milking place can be tested. The test is made by pressing the (+) and (-) keys or by pressing the respective sensors. By means of using ENTER key, the next program step is reached. After the last adjusted value the control declines in the milking stand-by mode automatically.

5.3 Program flowchart (attachement 4-8)

In the program flowcharts typical applications for the function and operation of the milking automation system are documented.

To activate the lift-function (additional lift of the cluster in case that only 2 or 3 teats are milked) of the milking arm (attachement 8) you need additional the valve Y7 with the appropriate air-compressed system.

6. Operation and functioning

In the following sections, the program steps are explained.

6.1 Vacuum stabilization

The milking automation system Milan goes to this program step if the operating voltage is switched on. The vacuum stabilization caused that the vacuum system will be closed to the atmosphere. Thereby the operating vacuum can reach the needed level for the functions. The cluster are located on the rinsing reception.

Program transition:

The vacuum stabilization is time-controlled and switched over automatically to the program step „CLEANING/FLUSHING“. The duration of the vacuum stabilization is adjustable between 0, 15, 30, 45 and 60s in the setup.

By pressing the (+) key, the program switches over to the program step “CLEANING”, by pressing ENTER key to program step “MILKING STAND-BY”.

6.2 Cleaning / Flushing

The clusters are located on the rinsing receptions. The pulse valves 1 and 2 work in the predefined pulsation. Thereby, the balance chamber is emptied and flushed alternately. The quantity of dish-water during cleaning is displayed.

Program transition:

By pressing (+) key, the program switches over to the program step “Residual water discharge”. By pressing ENTER key, the program switches over to the program step „MILKING STAND-BY“.

6.3 Residual water discharge

After the vacuum stabilization and the cleaning before milking the clusters are still on the rinsing receptions. The clusters have to be taken away for each milking place from the rinsing reception by hand. If in the setup the automatic stand-by is switched on, then all the clusters are pulled to the starting position. A time delay setting is also possible. At the same time the (+) key must be pressed. The cluster removal or the milking arm are activated and pull the cluster to the starting position. At this time the blocking valve open for a short time. The residual water is sucked off from the cluster by the incoming air. You always start at the milking place which is furthest removed from the milk releaser.

Program transition:

This program step change automatically to the milking stand-by mode after 4 seconds.

6.4 Milking stand-by

The cluster removal or milking arm lifts the cluster from the rinsing reception. The cluster are now in the park-position. The MILKING STAND-BY mode is now activated.

Program transition:

By pressing the START key the transition is carried out to „MILKING 1 / ATTACHING (milking without management).

By pressing ENTER you will be ask for the input of the animal number. The assignment of the animal data (with management) to the respective milking place is done automatically if the cows enter the milking parlour (program step “Identification”). By pressing the (+) key the transition to program step „CLEANING” is carried out.

6.5 Identification

By using the management the animal identification is carried out during a new drifting-in to the stand row of the milking parlour. The animal numbers are recorded automatically and assigned to the milking place together with the information stored for this purpose in the PC.

Program transition:

By pressing the ENTER key the program informations („don't use milk“ and „don't milk“) are confirmed. Missidentifications and only partial filled stand rows lead to the program step “Correction” (shift (+)).

6.6 Correction

The program step „Correction“ consists of the parts „Shift+“; “Animal Number +/-” and “Milking”. Changing between these program parts is carried out by the ENTER key.

Program part „Shift +“

- Incomplete stand row or animals not identified in the stand row
- Button (+) causes that the animal data are postponed to the following milking places
- Button (-) causes that the animal data of the following milking places are fetched back
- At a complete data acquisition the transition is carried out automatically to the partial step “Milking”

Program p. “Animal Number +/-”

- The correction of the animal number or placing a new number is done with the keyboard or with buttons (+) and (-)
- If buttons (+) and (-) are used, the changing to the next column is carried out by button
- The new button is confirmed with the button ENTER

Program part „Milking“

- This program part signals the complete identification of the stand row
- Operating with selection, the animals can be separated with the subordinate selection gate by using the buttons of the milking place (+) (selection – yes) or (-) (selection – no)

Program transition:

By using the START key the transition to program step „Attaching“ is carried out. By pressing simultaneously the (-) key and ENTER key the program step „Milking stand-by“ is activated.

6.7 Milking 1 Attaching

With START or with setting AUTOMATIC START works the pulsation. The cluster removal or the milking arm give the signal that the cluster is free for attaching. The inlet for milk from the milk meter opened after 2s.

Program transition:

The phase Milking 1 Attaching is time-controlled and changes into stimulation automatically. The duration of this phase is to be preset in the set-up between 10, 15 or 20 seconds. By pressing the START key transition to program step M2 MILKING Q. By pressing the (+) key the program jumps to the following program step. By pressing ENTER key the program goes to the program step “End of milking”.

6.8 Milking 1 Stimulation

The milk controller switched off the value 1 and 2 for stimulation. If the stimulation program (A) is active the pulse repetition frequency changes between 200-250 double strokes/min with a special share on the suction phase. The stimulation consists of 4 sections each of them for a duration of 15 seconds. The stimulation time (0, 15, 30, 45, 60s) is selected in the set-up. The user can choose the duration, frequency and duration of the suction phase by themselves, if the stimulation program (B) is active.

The milk measurement is activated automatically by itself.

Program transition:

Following the end of stimulation time, the system switches over automatically to the program step „MILKING S“ (cows that are slowly milked)

By pressing the (-) key the stimulation time is shortened by 15 seconds each time. After coming to 0s the stimulation time goes back to 60s by pressing the (-) key for the next time.

By pressing the START key, the program changes to “MILKING 2 Q”.

By means of (+) key you can jump to the following program step.

By means of ENTER to the program step “End of Milking”.

6.9 Cows that are slowly milked (Milking S)

The valves 1 and 2 work with the pulsation for cows that are slowly milked. The frequency increased to 70 double strokes/min. The milk flow is controlled and is displayed.

Program transition:

The transition to the next program step is controlled by the milk flow.

By means of (+) key you can jump to the following program step possible.

The change to "Milking 2 Q" is carried out by pressing START key

With an increasing of the milk flow the program switches over from "cows that are slowly milked 1" to "cows that are quickly milked 1" (limiting value is preset in the set-up with 1,6; 1,8; 2,0; 2,2 or 2,4 kg/min).

If the time after the program start is >2,5min and the milk flow is < 0,8kg/min, than transition to STRIPPING according to the setup.

By means of (+) key or (-) key change to the following or preceding program step.

By means of ENTER key to the program step "End of Milking".

6.10 Cows that are quickly milked (Milking Q)

The valves 1 and 2 operate in the fixed pulsation mode. To achieve an optimum position of the cluster during the milking the cluster would be adjust. The milking arm makes this automatically. After a specified blocking time the cluster justage works every 30 seconds for an optimal position to the udder. The milking arm pulls the cluster forward and that's why the position of the cluster is steady during the milking. All other conditions correspond to those of the program step "Milking S".

Program transition:

The transition to the next program step is controlled by the milk flow. If the time after starting the program step is >2,5min and the milk flow is < 0,8kg/min than the system will switch over automatically to STRIPPING. Limiting value is preset in the set-up (0,6; 0,8 or 1,0kg/min).

By means of (+) key or (-) key change the following or preceding program step.

By pressing the START key change to "Cows that are quickly milked 2" and "Cows that are quickly milked 3".

By means of ENTER key to the program step "End of milking".

6.11 Milking out

The function MILKING OUT only exists in the program MILKING 1. You have to adjust in the setup milking out A, B, C, D or E. The pulse valves 1 and 2 work in the variants fast milking or slow milking pulsation.

The milk flow is controlled 15s after to the start of this program step. The milk measurement is active. The milking automation Milan can works with 5 different milking out programs.

In the milking out E the cylinder pulls the cluster with various pressures. Simultaneously the cluster pull rhythmical forward with the milking arm.

MILKING OUT A: The pulse valves 1 and 2 work with a changed pulsation.

- The sucking phase is reduced down to 50% in order to prevent that the teat cups "climp up" on the teats
- The reduction of the suction phase means a prolongation of the balance phase and that means a better milking-out and reducing the stress for the cow.

MILKING OUT B: The pulse valves 1 and 2 work with a changed pulsation.

- The sucking phase is reduced down to 40% in order to prevent that the teat cups „climp up“ on the teats.
- The reduction of the suction phase reduces the stress for the udder.

MILKING OUT C:

- The „Milking out C“ needs an additional milking out device (for example tail pulley with vacuum sucker and prolonged cylinder). Therefore it can be used only if you operate with this milking-out device.
- The interval times needed for the after milking impulses have to be selected in the setup.

MILKING OUT D: The pulse valves 1 and 2 work with a changed pulsation.

- The sucking phase is reduced down to 30% in order to prevent that the teat cups „climp up“ on the teats.
- The reduction of the suction phase reduces the stress for the udder.

MILKING OUT E: The pulse valves 1 and 2 work with a unchanged pulsation.

- The program step is only used if you use a milking arm
- You can choose the intervals for the required impulse for milking out you in the setup.

Program transition:

The transition into the next program step is milk flow controlled.

If the time after the beginning of this program step > 15s and the milk flow < 0,25kg/min than the transision from „Milking 1“ to „Cluster removal with automatic end of milking“ is carried out. If the program step „Checking without cluster removal“ has been agreed, the program step „Udder checking“ follows.

The limiting value for the milk flow is adjusted in the set-up (200, 250, 300, 350, 400, 450 or 500 g/min). By means of (+) key or (-) key change to the following or preceding program step. By means of ENTER key to the program step "End of milking".

6.12 M2 Milking Q with milk flow supervision

This step is activated by pushing the start button two times. The pulse valves work with the adjusted normal pulsation.

Program transition:

The transition to the end of milking is milk flow controlled. Skip with the start button between the program steps M1 Milking Q, M2 Milking Q and M3 Milking Q. Go with the button ENTER into the program step End of milking“

6.13 M3 Milking Q without milk flow supervision

This step is activated by pushing three times the START button. The pulse valves work with the the adjusted normal pulsation. The end of milking is now not monitored. The control lamp flashes.

The time T3 (rotary cylinder forward – 30s break) to optimize the position of the cluster does not exist in this program step.

Program transition:

By pushing the start button going back into the program step „M1 Milking Q“. Go with the button ENTER into the program step “End of Milking”.

6.14 Udder control

In this program step the pulse valves 1 and 2 switch off. The cluster is on the udder. The control lamp flashes.

Program transition:

By pressing the (+) key transition to „Stripping by machine“.

Go with the button ENTER into the program step “End of Milking”.

6.15 Stripping by machine

The stripping by machine is done in this program step with manual support. The pulse valves 1 and 2 operate in the fixed pulsation. The milk measurement is active again. The control lamp flashes. There is no automatic end of the program.

Program transition:

By means of ENTER key to the program step „End of Milking“.

6.16 Cluster removal with automatic end of milking

This program step is milk flow controlled and carried out in „Milking 1“ and „Milking 2“or is caused becomes by pressing the button ENTER. The cluster is removed from the udder.

This means for the milking arm that the removal of the cluster is carried out according to the program. The milking arm goes to parking position. The end of milking will be automatically confirmed and the final quantity of the milk is displayed. The pulse valves 1 and 2 are not activate.

Program transition:

The duration of the program step is 10s long.

6.17 Display for milk control (box, bottle, quantity of sample)

If the program step milk control is active then the data concerning the box, the bottle and the quantity of sample are displayed on each milking place after the end of milking. Precondition is that all data are stored in the PC. The control lamp is on and shows the end of milking.

Program transition:

By means of ENTER key to the program step „Milking stand-by“.

6.18 Intermediate disinfection

If the program step „Intermediate disinfection“ is activated in the set-up, then it is displayed after the end of milking. By pressing the START key or a signal of the sensor starts the intermediate disinfection. With using a cylinder for cluster removal the cluster are free for the disinfection time. The cluster can manually dipped now into the bucket with the disinfection solution. The action time is adjustable in the set-up (15, 30, 45, 60, 75, 90s etc.). In addition, there is a setting that sets the time unlimited and the disinfection process only stops by switching the sensor. Depending on the used milking parlour, you have to adjust in the setup either rotary system or herringbone milking parlour.

Program transition:

The transition into the „Milking stand-by“ is carried out automatically.

By pressing ENTER key transition to program step “Milking stand-by”.

6.19 Information menu

It is possible to choose in the end of milking if the information menu should be shown in the end of milking. For using the info menu you need the management system and you must activate the info menu in the setup.

The following informations are displayed:

- Number of days since last calving
- Number of days since last insemination
- Animal number
- Percentage deviation from the average of the last 7 days

Program transition:

The transition into the “Milking stand-by” is done automatically.

With the ENTER key in the program step “Milking stand-by”.

The difference relates to the average milk amount of the last 7 days.

Two variants are adjustable:

- Milking without determining the deviation
- With determination of deviation (10, 15, 20, 25% deviation is adjustable)

If the deviation bigger than the adjusted amount in the setup, the signal light shines on the control.

6.20 Milking stand-by

After the end of milking the program step „Milking stand-by“ is active like described in section 6.4.

6.21 Cluster put on, Cleaning

In this program step, the preparation for the cleaning is provided. The cluster is unblocked from the cluster removal or milking arm and can be connected to the rinsing reception.

Program transition:

By pressing the START button, the transition take place to program “Cleaning/Flushing”.

With using ENTER key you come back to the previous program.

6.22 Cleaning / Flushing

The pulse valve 1 and 2 works in the adjusted pulsation. The cleaning valve of the milk measurement (tipping scale) works according to the program. Here the milk meter is emptied and flushed periodically by the cleaning valve Y4. A staggering to reduce the water requirement can be set in the setup.

Program transition:

By turning off the power, the milking automation goes out from the program step “Cleaning”.

With the ENTER key you go in the program step “Milking stand-by”.

6.23 Stand-by (manuel or automatic)

There is a manual or automatic readiness for milking adjustable in the setup. The selection determines how the milker has to adjust the program step “Milking stand-by”.

Manuel adjustment means that the milker must adjust each device by the ENTER key. Automatic adjustment means that all control devices go to the program step by pressing the ENTER key of any control.

6.24 Program flowchart for milking arm in herringbone system (appendix 8)

The sequence of motion of the milking arm during milking is described in appendix 8. The movement is carried out by the valves Y1-6 and the associated air cylinders.

To lift the cluster an additional valve Y7 is active. Here, the cluster is additionally relieved if the adhesion is low. Lift-function is used if the cow has only 2 or 3 teats for milking. The lift-function can be switched over in active or inactive by the key „3“.

The milking-out with additional load for the cluster is not applicable.

6.25 Re-entry into the milking

Re-entry into the milking is used, if the milking operation (for example, the cluster is dropped down) was interrupted. The program step allows a further milking of the same animal number and quantity of milk. In this case the amount of milk is accumulated.

Program transition:

By pressing the arrow button in the program step „M3 Milking Q“ all milking programs are available again and can be set by the START button.

6.26 Cluster position

The program step “milking position” supports the milking arm to find the right position in the end of milking by an additional reciprocation. The next program step is automatically called.

7. Gate control at the milking place

An adaption of the gate control to the management and gate system must be done. After this matching, the gate control must be activated in the setup of Milan. The setting of the gate control allows users to operate the door control from any milking place. The milkers can open and close the gate according to the description in the operating instruction.

If you press the button “7” for approximately 3s, the gate control is displayed. The signal remains on the display for 10s and then it will be automatically hidden. During this time the milker can operate the gates from this device.

Program transition:

By pressing the button „7“ (approx. 3s) on the control of any milking place the door control is activated at this place. The display shows the gate control for 10 seconds. After the 10s appears automatically the actual program step of the milking.

If the gate control works with a rotating rapid exit, then after opening the door 3, the control switch automatically to the program step “rapid exit”.

In herringbone milking parlour without rapid exit you press the button ENTER after the animals have left the stand row in order to close the outlet gate 1/2.

8. Maintenance and care

The milking automation system Milan is maintenance free. For the outside cleaning of the milking automation system Milan a moist cloth should be used for cleaning. At the jointly used device and milk meter (Pulsameter) is it possible, that, because of the permanent change between vacuum and fresh air, humidity can come to the valves. Therefore it is very important that the sleeve nut on the milkmeter has always a solid seat. The valve which is located at the top of the milk meter should be checked monthly and dried if necessary. For this purpose, if no vacuum is in the plant, the control hose has to be solved and the control chamber checked for humidity. If the sleeve nut was removed, then the sleeve nut has to be tightened after the vacuum was switched on.

9. Malfunctions

In case of failure of the valves or sensors the milking place control can support the fault diagnosis by its service program.

The activation of the service program is described in section 5.2. An overview for this you can find in the attachment 3.

9.1 Failures

Attention! The replacing of functional assemblies may only be done if the equipment is disconnected from voltage!

Error	Possible solutions
Milking system does not indicate Anything on the display	<ul style="list-style-type: none">• Check the current supply 24V• Check the plug• Short circuit of a solenoid valve of the valve assembly• Change the milking automation system Milan

Attention! Before the installation of a new Milan printed circuit board is done the solenoid valves of the attached valve assembly has to be checked if there is a short circuit.

Device doesn't start	<ul style="list-style-type: none">• Control on humidity• Check seat of the plug• Exchange equipment
No counting of the milk quantity	<ul style="list-style-type: none">• Check the Namur-switch on the milk meter• Check the plug

Pulse valves doesn't work	<ul style="list-style-type: none"> • Check the valves and if necessary change • Exchange equipment
An arbitrary valve doesn't work	<ul style="list-style-type: none"> • Check the valves • Check the plug • Exchange equipment
Milk meter does not flow	<ul style="list-style-type: none"> • Check the valves • Check the plug • Exchange equipment
No vacuum at the cluster	<ul style="list-style-type: none"> • Locking valve doesn't work • Water in the solenoid valve (coming from the milk meter) • Removing water, lock sleeve nut of the milk meter tightly, change solenoid valve, check the device
No data transfer	<ul style="list-style-type: none"> • Control of the electrical connections • Check attitude control (with management, check device number)
The label appears in the display „FATAL ERROR (CAN KONFLIKT)“	<ul style="list-style-type: none"> • Check the device number (device numbers were allocated repeatedly) • Adjusting device numbers newly
The label appears in the display „FATAL ERROR (MEMORY!)“	<ul style="list-style-type: none"> • The internal memory is overcrowded • Push an arbitrary button for continue work • Carrying out data transfer • Data are partly rejected

Milking without compressed air

Is there an undefined reason for not enough pressure for the cylinder there are no problems for milking the cows. For the milking you can remove the cluster from the milking arm and the milking can be performed. The functions of the milking system Milan is not limited.

9.2 Check of the valves and sensors

For the fault diagnosis is the service program of Milan activated. The program is called up in the program step "Milking stand-by" by pressing continuously the (-) key (3s) until the inscription

PROGRAM (+)
MILK QUANTITY (-)

appears. By the button (+) to be pressed then till the inscription

PROGRAM (+)
SERVICE (-)

appears. The service program is activated by pressing the (-) key. The inputs and outputs are called up one by one by pressing ENTER key. The sensor signals are checked by pressing (+) or (-) keys.

10. Readjustment of the milk measurement in milking automation system

The milking automation system Milan is delivered from the factory with the set-point 100. There are 2 possibilities for the first putting into operation and the annual readjustment.

10.1 Checking with water and adjusting

For the check with water, 10 litres are weighted and sucked over from a bucket via the adjusting set (Passage approx. ca. 3l/min with air inlet nozzle) and the milk meter. Therby, the taking-up of the water is started 10s after starting the milking automation system. This measurement is repeated 2-3 times. With the help of the determined values, the set-point is adjusted. The following table may be used to help by the adjustment. This table for the milk meter contains a cut of possible scope of readjustment and will only apply, if the set-point was set to 100 prior to the measurement.

Correction table (set-point prior to measurement 100; 10l water)

Average value of the displayed amount of water	New set-point to be preset	Average value of the displayed amount of water	New set-point to be preset
9,0	110	10,1	99
9,1	109	10,2	98
9,2	108	10,3	97
9,3	107	10,4	96
9,4	106	10,5	95
9,5	105	10,6	94
9,6	104	10,7	93
9,7	103	10,8	92
9,8	102	10,9	91
9,9	101	11,0	90
10,0	100		

10.2 Check with milk during milking

For the check with milk, a control milk can is placed between the milking automation system Milan and the milk line in order to collect the milk during the milking. The displayed and the weighted amounts of milk are determined for the readjustment and are set off against each other as follows

$$\text{Set-point} = \frac{\text{Weighed value} \times \text{preset set-point}}{\text{Displayed value}}$$

Example for the determination of the new set-point:

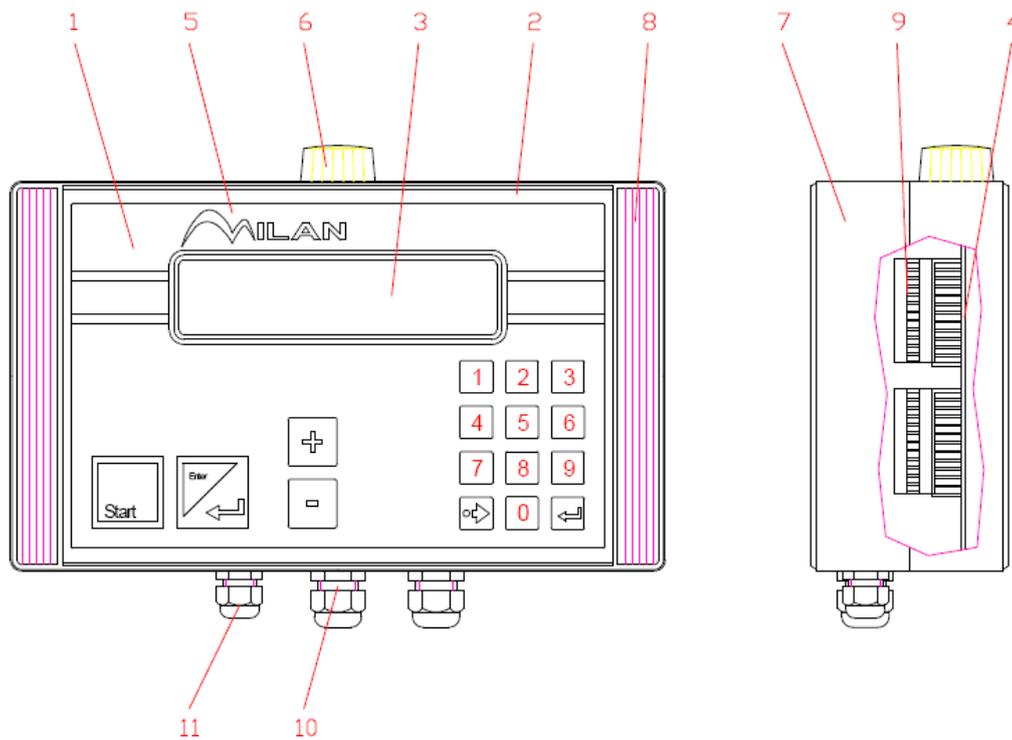
The preset-point is 102. The values measured in the examination are as follow:

weighed milk	7,95 Kg	-	Displayed value	8,2 Kg
weighed milk	12,55 Kg	-	Displayed value	12,9 Kg

$$\frac{7,95 \times 102}{8,2} = 98,9 \qquad \frac{12,55 \times 102}{12,9} = 99,2$$

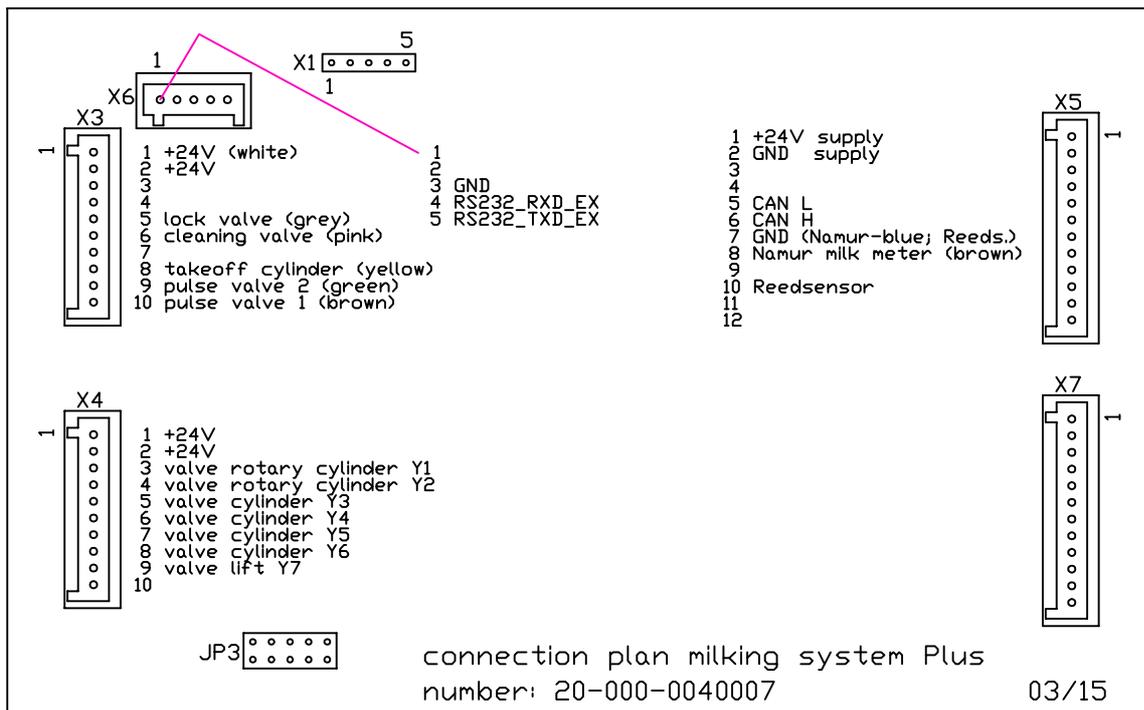
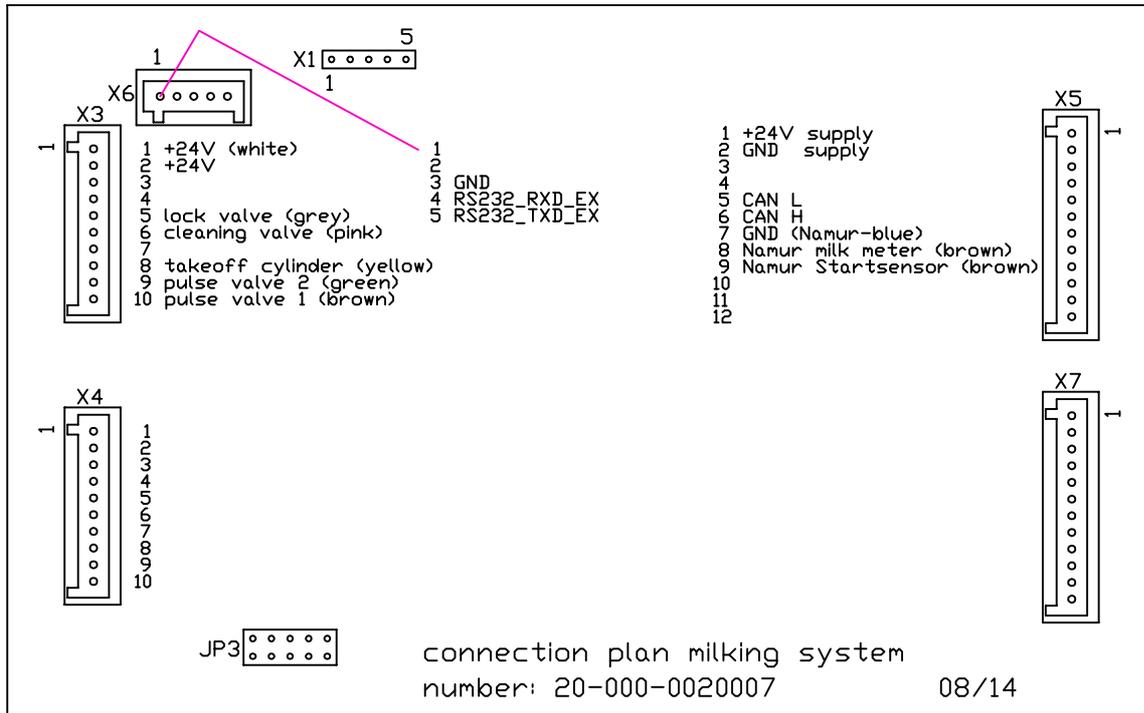
The calculation shows a mean average value of 99,05. This value is to be rounded down to 99 and to be re-entered into the milking automation system.

11. List of spare parts milking automation Milan

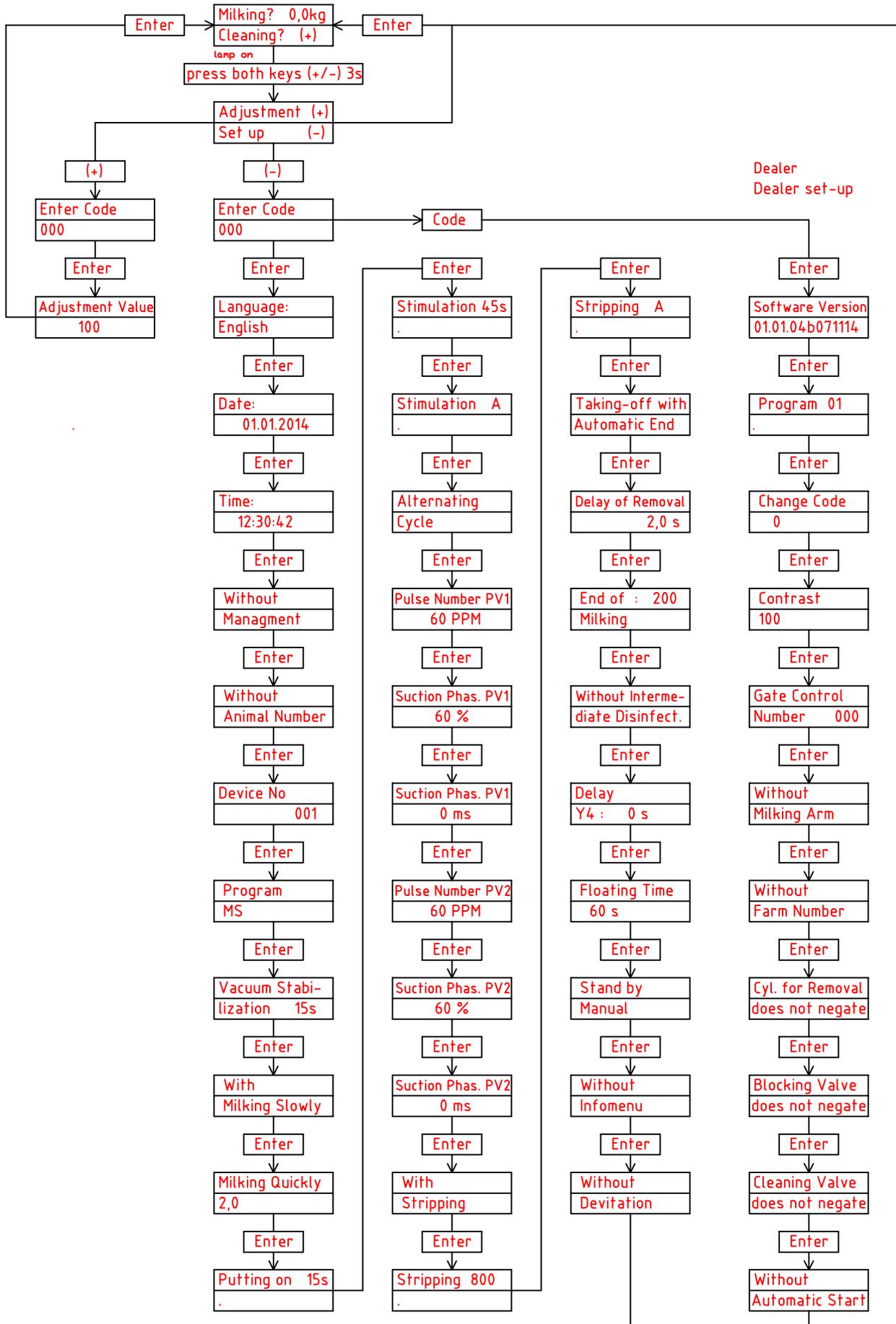


Item number	description	Pos.-Nr.
20-000-0021000	Upper part Milan	1
20-000-0021100	Upper part Milan with keyboard foil	2
03-10371	Display for Milan	3
03-10364	Printed circuit board Milan-V01	4
20-000-0021102	Keyboard foil Milan	5
03-00504	Screwed in diaphragm, white	6
20-000-0020001	Case, lower part worked	7
20-000-0030001	Case, lower part - SbS	7.1
20-000-0040001	Case, lower part - Plus	7.2
10-10911	Top strip control, grey	8
03-10222	Multiple contact strip 2,5mm 12 pol. grey	9
03-10221	Multiple contact strip 2,5mm 10 pol. grey	9.1
03-10223	Multiple contact strip 2,5mm 5 pol. grey	9.2
03-10115	Cable screw connection 16 x 1,5	10
03-10117	Cable screw connection M12x1,5	11

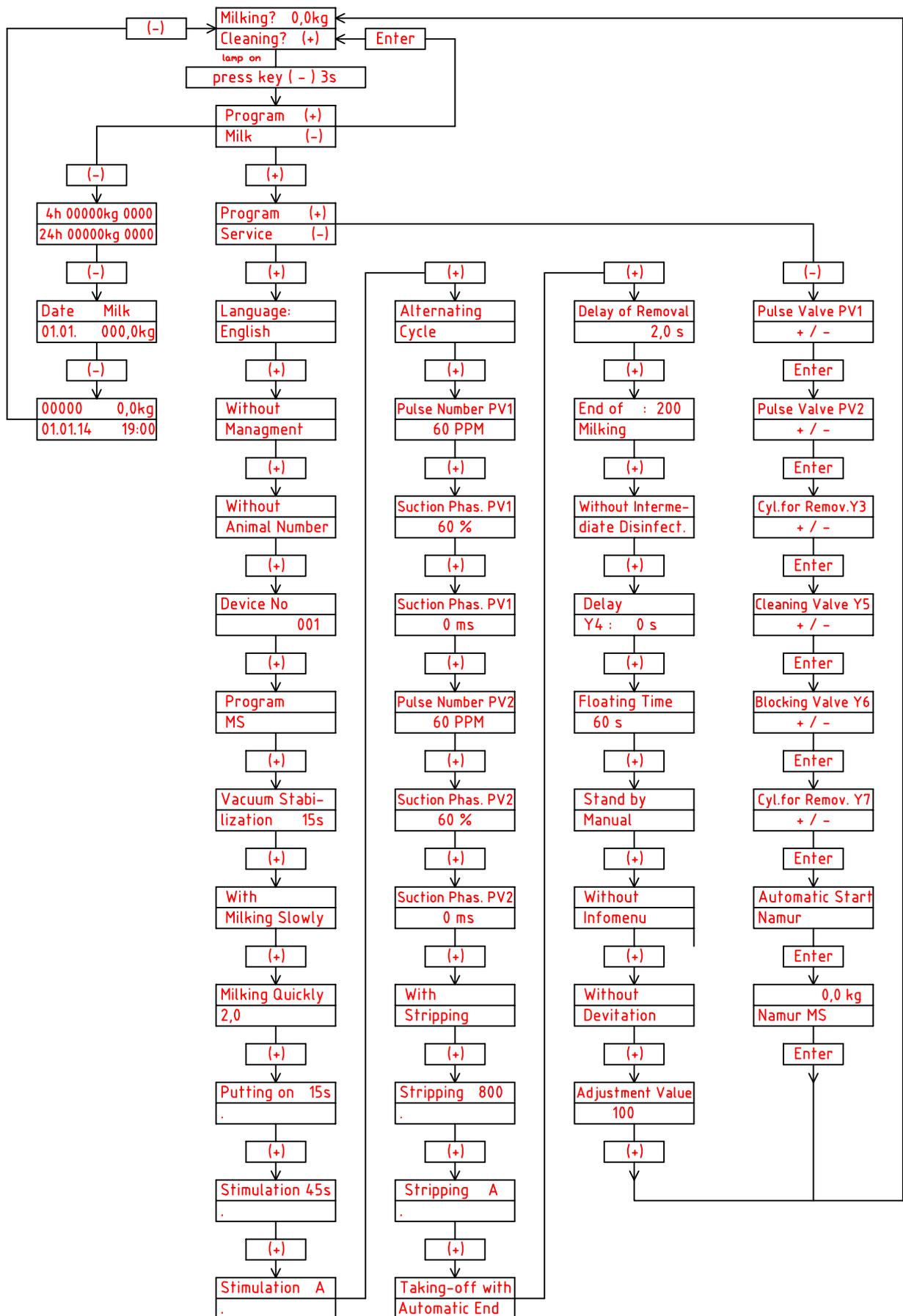
connection plan milking system



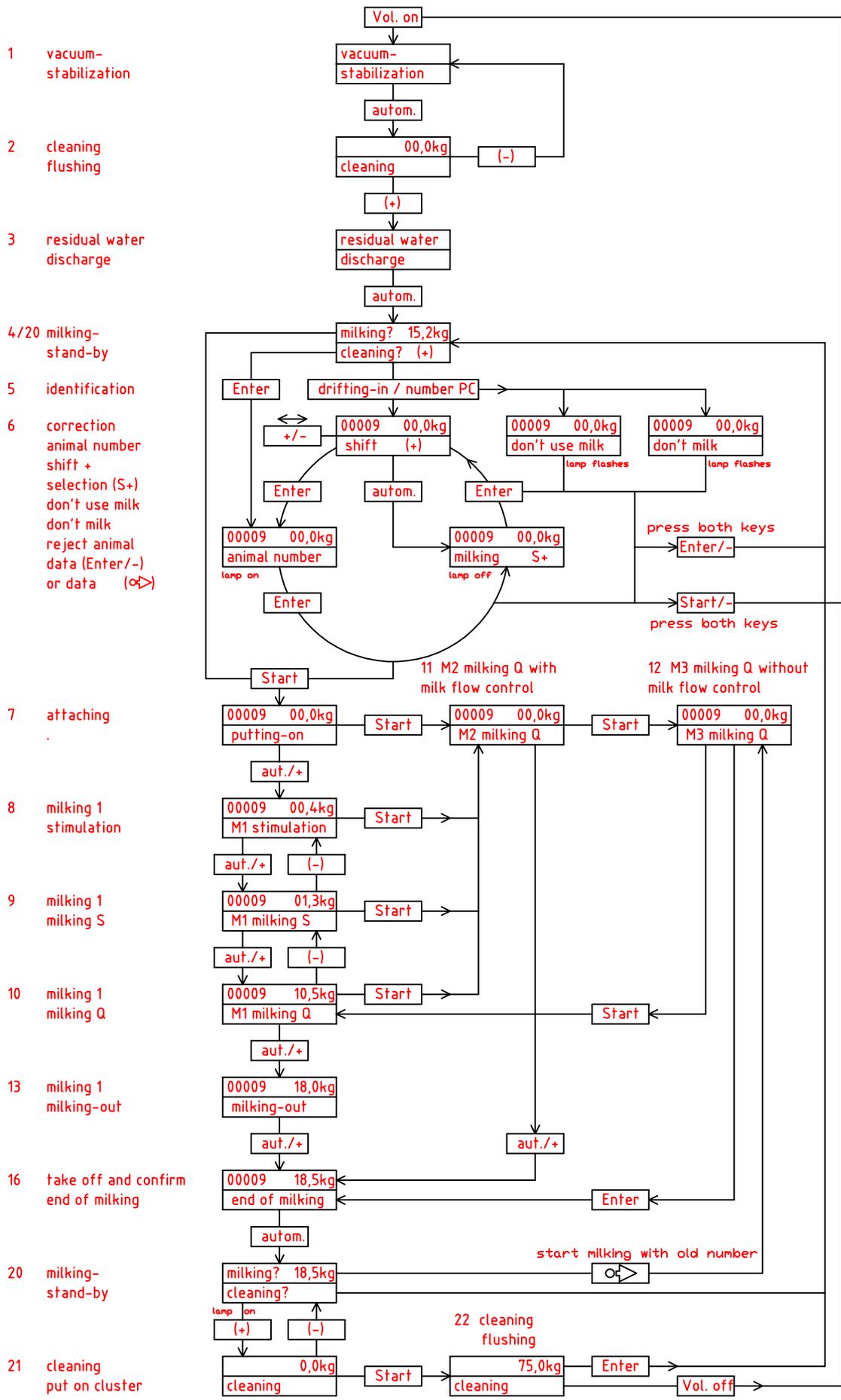
Setting setup and adjustment milk meter



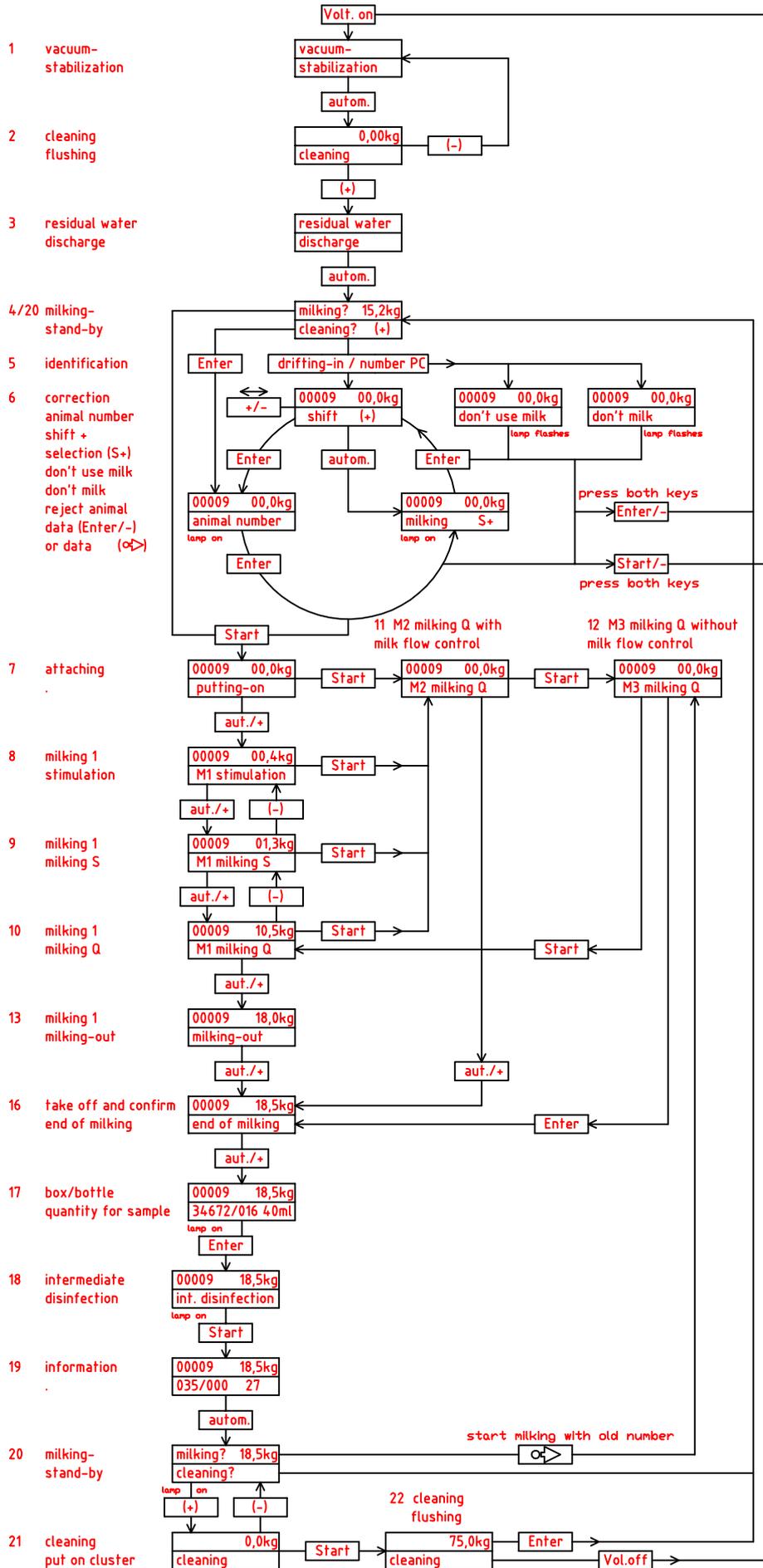
Information set-up setting, milk quantity and service



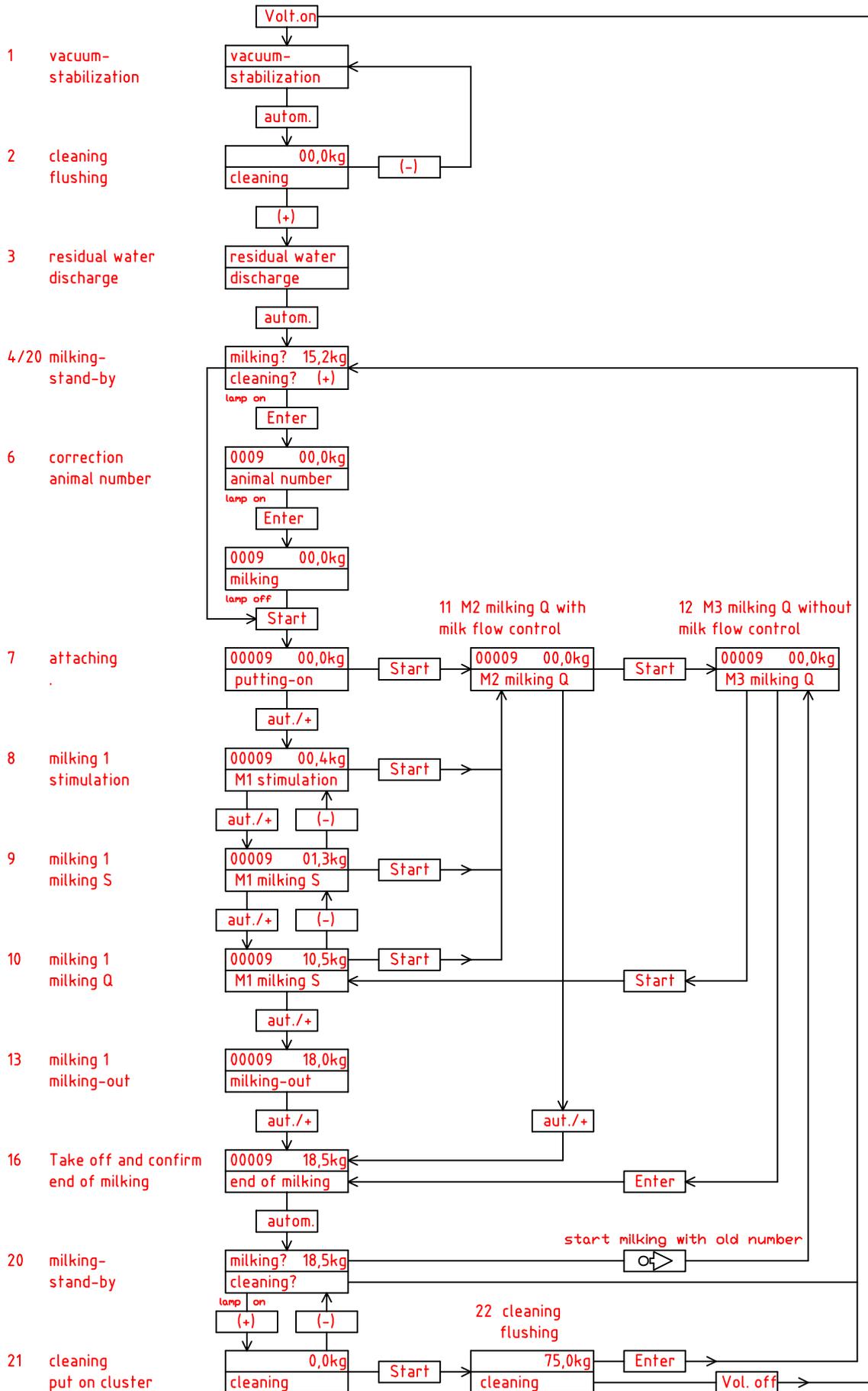
Program flowchart with herd management (cows)



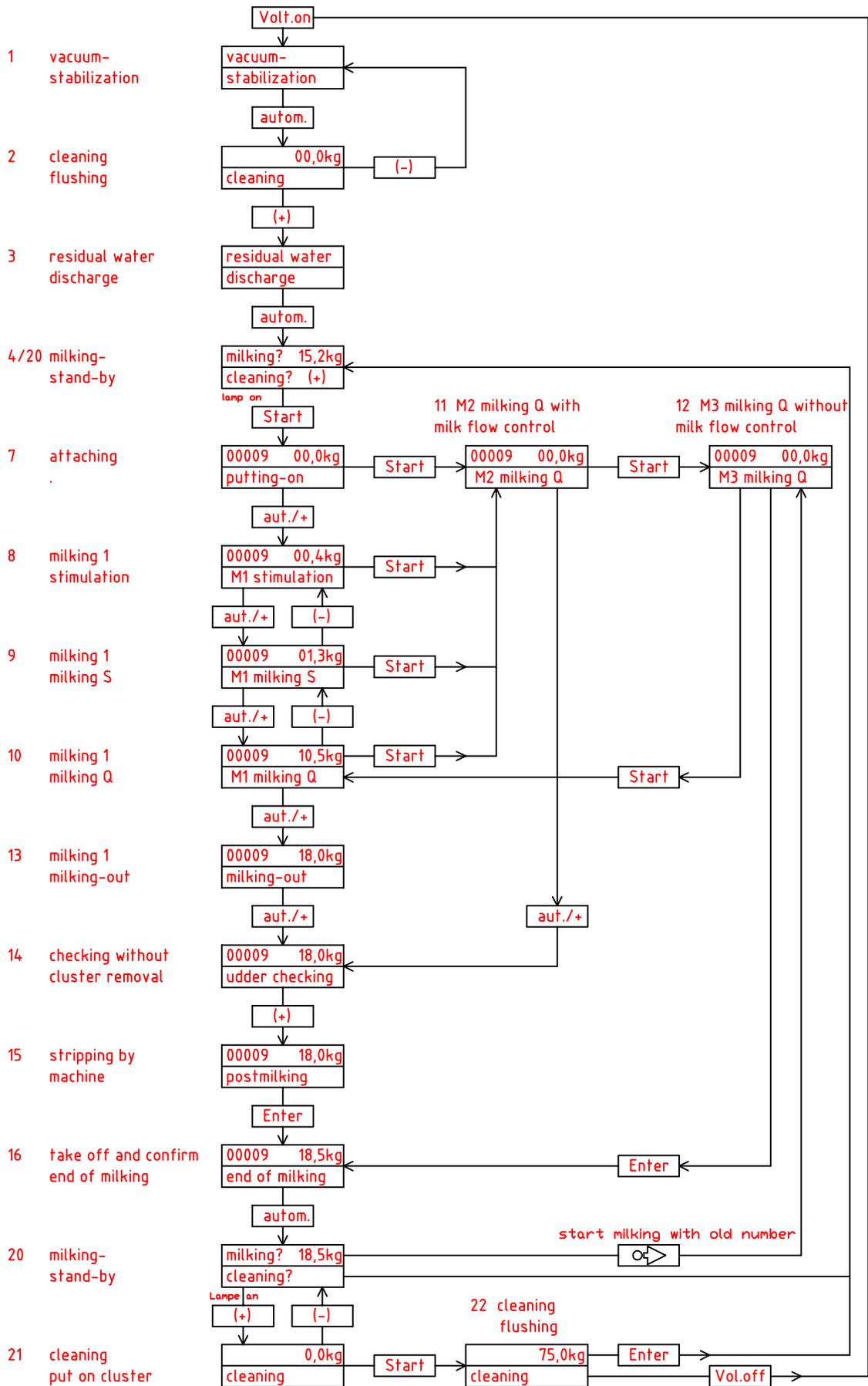
Program flowchart with herd management, milk sample and intermediate disinfection



Program flowchart with animal number



Program flowchart milking parlour with udder control



program flow, milking parlour with milking arm

valve	putting on (Start)		milking		milking-out		end of milking				milking cluster position yes/no 35			
	turning on	swing in	lower milking cluster counterbalance	milking stimulation M1-M3	milking a	milking S	optimal positioning milking cluster after 30s	pressure phase	discharge (1,6s)	delay (1-10s) pulse valves work		preturning lift	swing off	turning off
Y1	1 T1 (0,4-3s)	0	0	0	1 T3 (0,0-1s)	1 T4 (0,0-1s)	0	1	1 T6 (0,4-2s)	1	0	0	0	0
Y2	1	0	0	0	0	0	0	0	0	0	1 T8 (0,5-10s)	1	1	1
Y3	0	0	0	0	0	1 T5 (0,0-1s)	0	0	0	0	0	0	0	0
Y4	1	1	0	0	0	0	0	1	1	1	1	1	1	1
Y5	0	1 T2 (0,0-1s)	0	0	0	0	0	0	0	0	0	0	0	0
Y6	1	1	0	0	0	0	0	0	0	1 T7 (0,4-2s)	1	1	1	0
Y7	0	0 <1>	0 <1>	0 <1>	0 <1>	0 <1>	0 <1>	0 <1>	0 <1>	0 <1>	0 <1>	0 <1>	0 <1>	0

Y1 and Y2 - valve rotary cylinder

Y3 and Y4 - valve cylinder

Y5 and Y6 - valve cylinder

Y7 - valve lift milking cluster (press key number 3 or signal PC)