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Assembly recommendations, manual and spare parts list

Manual No. 224/0219
Serial No. 98-224-02

Milking unit KOMPAS 500 IC
with milk meter PULSAMETER2

Bydgoszcz, February 2019

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Introduction

General information

- installation manual contains important information, that should be obeyed, in order to ensure reliable and safe work of the device,
- before starting the installation, check the conformity of received items to your order and their purpose,
- gather the proper set of tools and materials,
- mind not to damage the components during installation,
- device reliability depends on carefully and properly made installation,
- installation should be carried out by employee of POLANES Ltd., authorized dealer or trained employee of dealer,
- improperly and carelessly performed installation may invalidate the warranty of milking unit.

Disregarding these instructions will automatically void the manufacturer's warranty.

Regarding to pictures, technical data, dimensions, technological solutions – the producer reserves the right to bring the changes following the technical progress.

Tools and additional materials necessary during installation of milking plant / receiver jar:

- hammer drill SDS minimum 800W,
- drill 230W,
- grill and screwdriver 12V,
- angle grynder 1500W (disc 125 mm),
- heat stripping gun 1600W,
- manual or electrical pipe die for steel pipes, with replaceable threading heads ½", 1½", 2",
- soldering gun, power: 75W / 45W, soldering tips,
- solder suction device,
- gluing gun, glue,
- multimetr with pincers,
- s/s pipe reling machine Ø 40,50,
- conical drill bit HSS 16-30, 5 mm,
- conical drill HSS 5-20 mm,
- concrete drills 6, 8, 10, 12, 14, 16 mm SDS,
- metal grill bits 2-13, 5 mm, 16, 17 mm,
- crown grill bits Ø22, Ø33 for metal with a drill chuck SDS,
- wiertarka udarowa SDS minimum 800W,
- screw taps for metal, a kit from 6 to 12mm,
- kit of tips for spiral ratchet screwdriver – with cross tips, flat tips and Allen keys,

- kit of screwdrivers – with cross and flat tips,
- kit of open-end and box-end wrenches from 7 to 24 mm,
- kit of socket wrenches,
- kit of round and flat files,
- sleeve camping pilers 1.5 mm, 2.5 mm,
- terminal camping pliers F 2.5,
- cable stripper,
- side cutting pilers – cable cutters,
- hammers,
- lineman's pilers, end-cutting nippers,
- cutter knife,
- level, measure, marker pen, pencil,
- insulating tape, Teflon tape, silicone sealant, SCHNEID-SPRAY cooling-lubricating agent,
- electric power extension cord on reel in a closed housing,
- portale lighting.

1. Safety rules and accident prevention

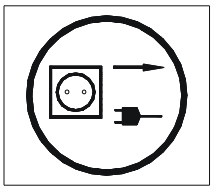
1.1. General safety rules

Before each start, an appliance should be checked as regards its safe operation.

- connect the appliance to a power supply according to the rules and only to the recommended electrical equipment,
- the connection has to be done only by an authorized electrical workshop or an authorized electrician,
- all metal parts in a cowshed and the rooms, where components of a milking parlour (e.g. receiver jar, vacuum installation, dairy installation, wash installation, vacuum pump unit etc.) are located, should have equalized electric potentials and be earthed by an authorized electrical workshop or electrician,
- exercise a special caution while connecting the appliance to the electrical system or while disconnecting it,
- the appliance can be started only when all the protective devices are set on their protective positions,
- before starting the appliance, check it against the loosened parts,
- functional disturbances of the appliance elements should be removed only while the power is off,
- use the appliance only for its intended purpose.

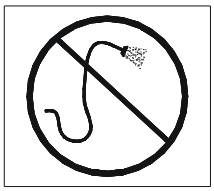
1.2. Safety rules during maintenace

- any repair of electrical system or its inspection and maintenance must be carried out only by authorized electrical workshop or electrician,



All repairs, maintenance or clearing work must be handled while power is off.

- opening the protecting covers must be carried out only when the appliance is turned off and secured,
- entering the room where the appliance is situated can be done only by the employees trained in servicing and repairing of appliance, after immobilizing and securing against starting up.



Do not use high pressure cleaners to wash the appliances or any components connected to the power.

- use suitable tools and gloves while replacing damaged parts,
- remove carefully any stains of oil and grease from working parts,
- protective devices that are consumable should be systematically revised, controlled and change in due time,
- spare parts must comply with technical requirements set by manufacturer (original spare parts).

1.3. Residual risk

Description of residual risk

Residual risk is a result of incorrect behaviour of the appliance operator. The biggest risk appears when the following activities occur:

- staying unauthorized people, especially under 18, near the appliance during operation,
- clearing the appliance during operation,
- operating appliance with covers opened,
- manipulating with drive unit and movable elements of appliance, during operation,
- checking the appliance technical condition,
- checking the driving gears during appliance operation,
- servicing the appliance by people who are intoxicated with alcohol or drugs.

Residual risk evaluation

The residual risk of danger for people or environment can be eliminated while using the appliance by obeying the following rules:

- read the service manual carefully,
- don't put your hands into inaccessible and prohibited places,
- don't turn the appliance on with the presence of unauthorized people, especially the ones under 18,
- remember, that maintenance and repair must be made only by authorized people,
- remember, that operating the appliance must be handled by people, who were trained before and read up the service manual,
- secure the appliance against the unauthorized people, especially the ones under 18,
- wear tight-fitting clothes only (without loose elements).

CAUTION!!! The residual risk occurs in case the above mentioned recommendations and instructions are not obeyed.

2. Waste disposal

- all materials used for packaging are safe for environment and can be disposed,
- cardboard packaging is made of recycled paper, wooden parts are not impregnated, the pallets can be resale in the nearest pallet purchase center,
- spare parts and components should be dismantled, cleaned from stains of petroleum origin and passed to professional disposal,
- if the components are in running order, they can be resale,
- oil and its container should be stored in places adapted for this..

3. Milking unit K500 IC

3.1. General remarks

The milking controller K500 IC applied in the milking unit is designed for milking parlours. The appliance is particularly helpful at the plants, where the milker handles greater number of units simultaneously. The milking unit K500 IC has been created the way, so the handling would be as easy as it possible, thanks to the modern keypad, that lets to control the milking process.

The controller enables to control the milking in both automatic and manual modes.

In automatic mode, the controller basing on the milk flow, decides about starting stimulation, finishing the milking and removing the cluster. In manual mode, the handling person is the one who decides when the milking should be finished or at which moment the stimulation should be started.

Standard controller is equipped with interface that allows to cooperate with herd management system INFODEX. Combination of herd management system and milking parlour, based on the controller K500 IC, in connection with feed station PASZOTEC allows to increase milking efficiency of the cows.
Charge-And-Hold technology allows to extend the running time of pulsator coils and valves.

3.2. System characteristics

- separate pulsation on each milking stand,
- stimulation developed automatically while milk flow is low or manually by pressing the pushbutton,
- the display that indicates milk yield and optionally - milking time and current flow
- milk meter PULSAMETER2 based on technology of measurement of milk portion quantity,
- low flow alert,
- automatic milking finishing and cluster removal – in case, when minimal milk flow level (50 - 400 ml – set by authorized service) is not reached within 5-30 s (set by authorized service),
- LED indicators for milking and alert status,
- readable and user-friendly control panel of K500 IC controller,
- possibility of linkage with herd management system INFODEX, that enables to record the history of each cow milking,
- pneumatic gates control (connected to INFODEX program or independent),
- ***Charge-And-Hold*** technology for coils supply
- ICAR certificate.

3.3. Technical data

Milking unit K500 IC is supplied with 24V DC. Maximum power consumption is 32W per unit. For supplying the milking units applies impulse power supply, provided by manufacturer and selected according to the number of milking units.

Power supply fitting: **number of milking units * 32 W + 10%.**

There should be chosen the proper wires according to standards **PN-IEC 60364-5-523: 2001.** The wires length should be fitted according to the assembly conditions.

Operation temperature: from 0°C to +50°C.

International Protection rating of controller K500 IC: IP65.

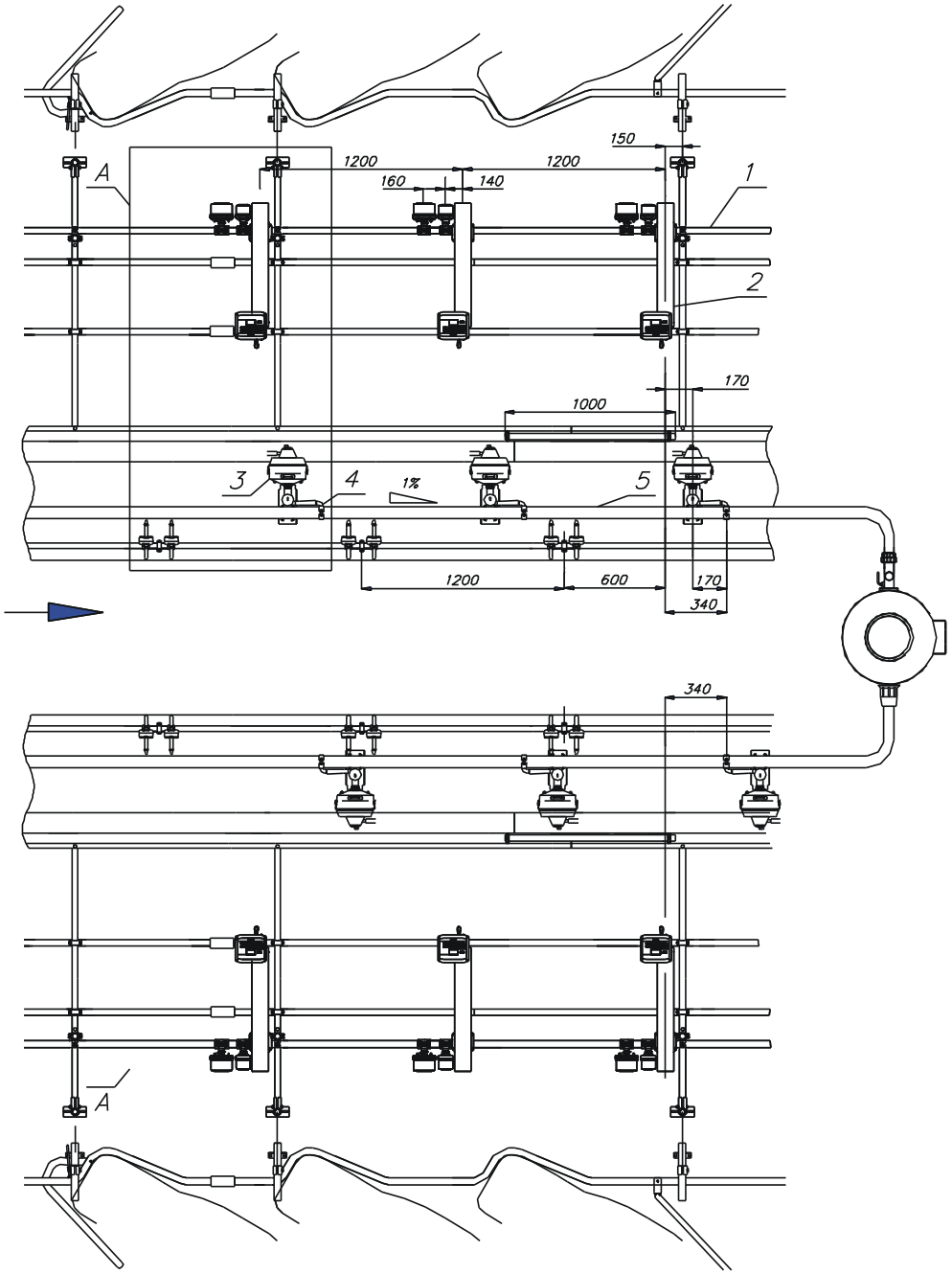
4. Assembling of milking unit K500 IC

The assembly of milking unit K500 IC should be handled by an employee of POLANES, its authorized dealer or a trained employee of authorized dealer.

If the assembly is handled improperly, it can cause a damage of the appliance and warranty expiration.

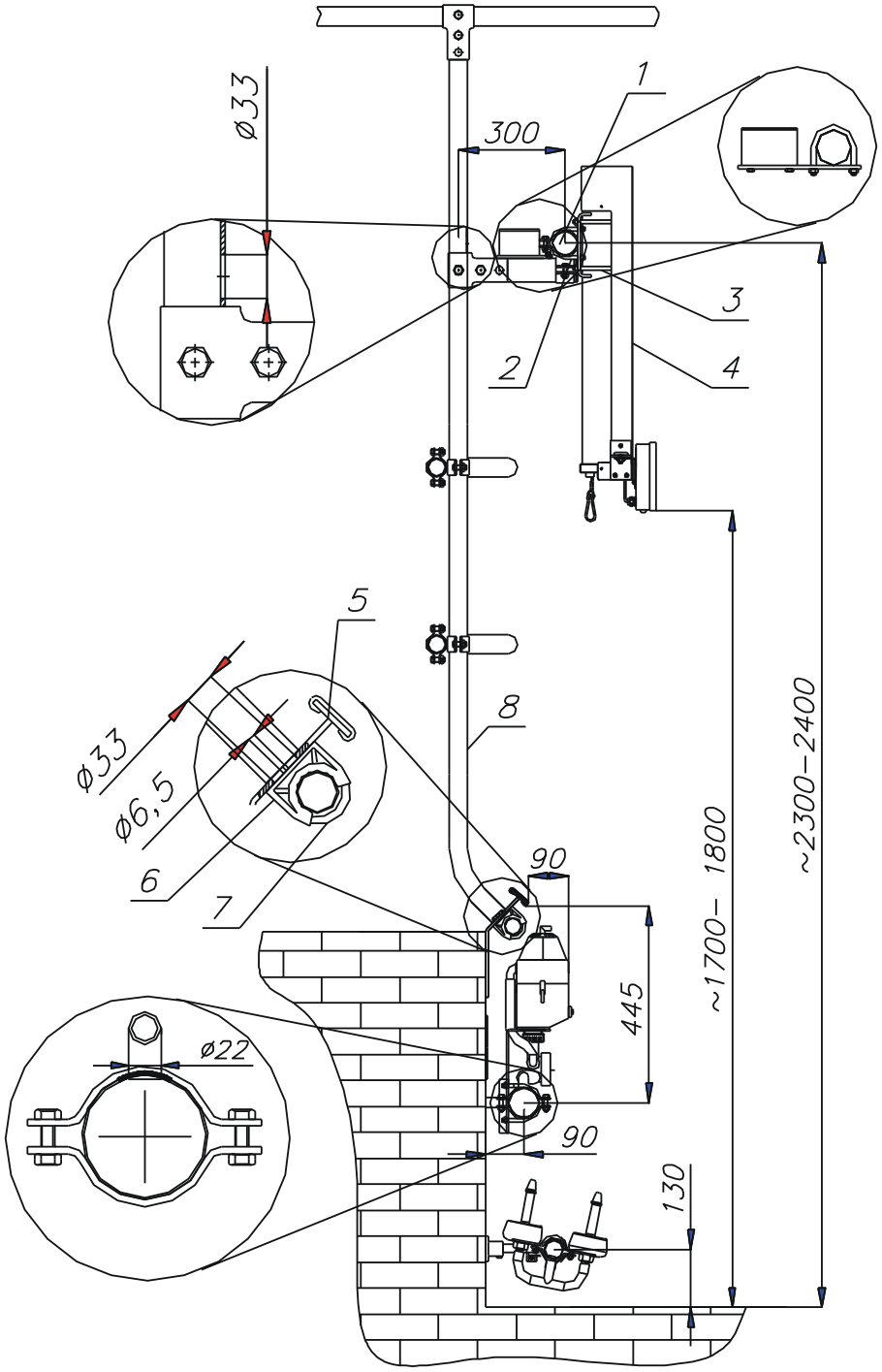
Improper installation of milk plant may cause a short circuit or even fire setting of the devices.

4.1. Assembly schemes of milking stands K500 IC at milking parlour



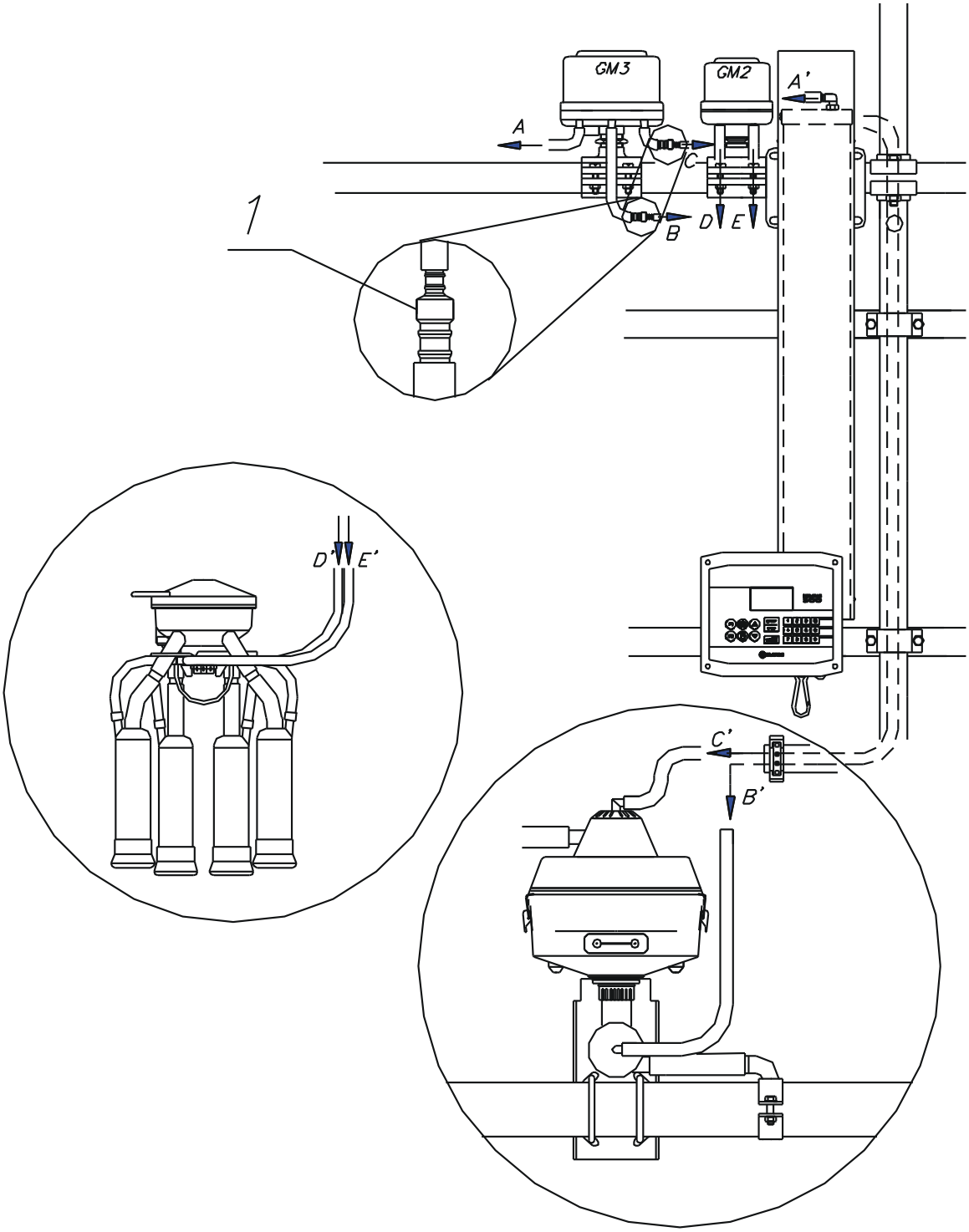
No.	Table
1	Vacuum pipe 11/2” - 2”
2	Milking unit K500 IC
3	Milk meter PULSAMETER2
4	Inlet connection Ø52 – 70
5	Milk pipe Ø52- 70

P ic. 1 Arrangement of milking unit components



No.	Table
1	Vacuum pipe 11/2” - 2”
2	Shackle 11/2” - 2”
3	Shackle 90
4	Milking unit K500 IC
5	The edge of milking pit
6	Clamping ring PVC ∅40mm
7	Pipe PVC ∅40mm
8	Retaining pipe 1 ½”

Pic. 2 Arrangement of milking unit components



No.	Table
1	Reducer connection 6-8
A-A'	**Valve GM3** – rubber hose 7x14 – **Remover of milking cluster**
B–B'	**Valve GM3** – rubber hose 7x14 – connection 8/6 - rubber hose 5x2 – connection 8/6 – rubber hose 7x14 – **Milk meter PULSAMETER2**
C-C'	**Valve GM3** – rubber hose 7x14 – connection 8/6 – rubber hose 5x2 – **Shut-off valve of milk hose**

Pic. 3 Connection of control hoses of milking unit

4.2. Electric installation of control units K500 IC at milking parlour

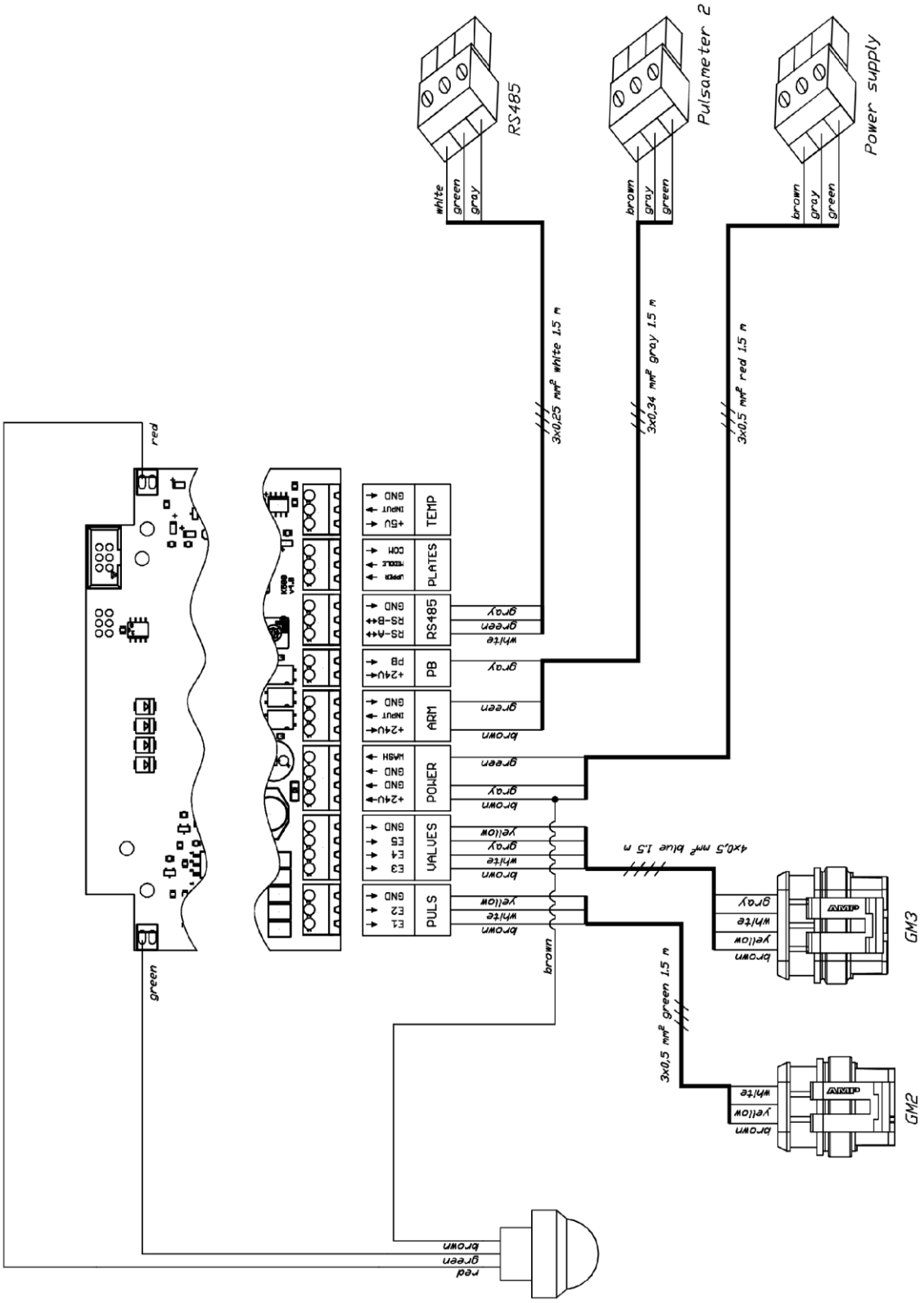


Diagram of internal connections of controller K500 IC

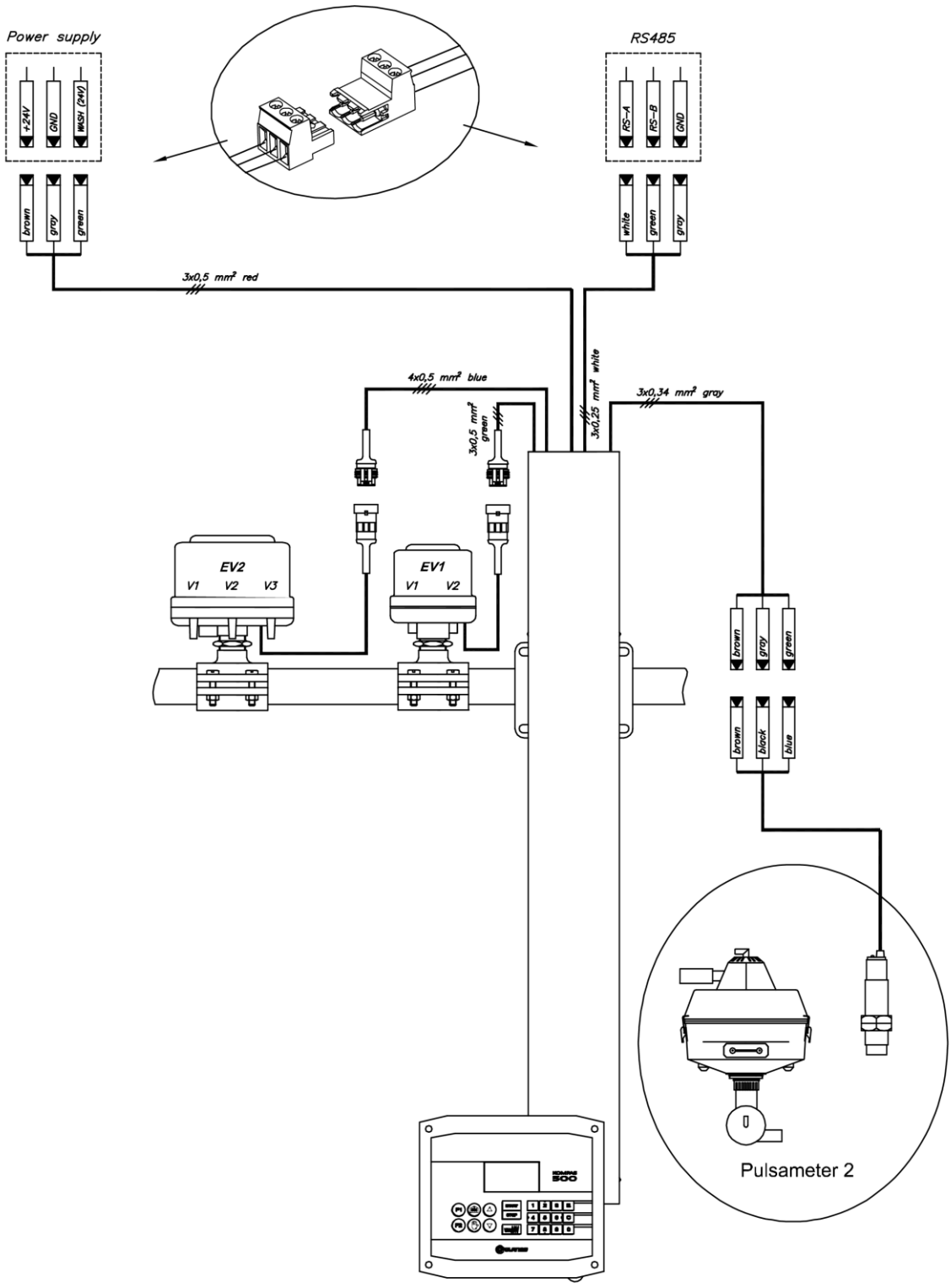


Diagram of external connections of controller K500 IC

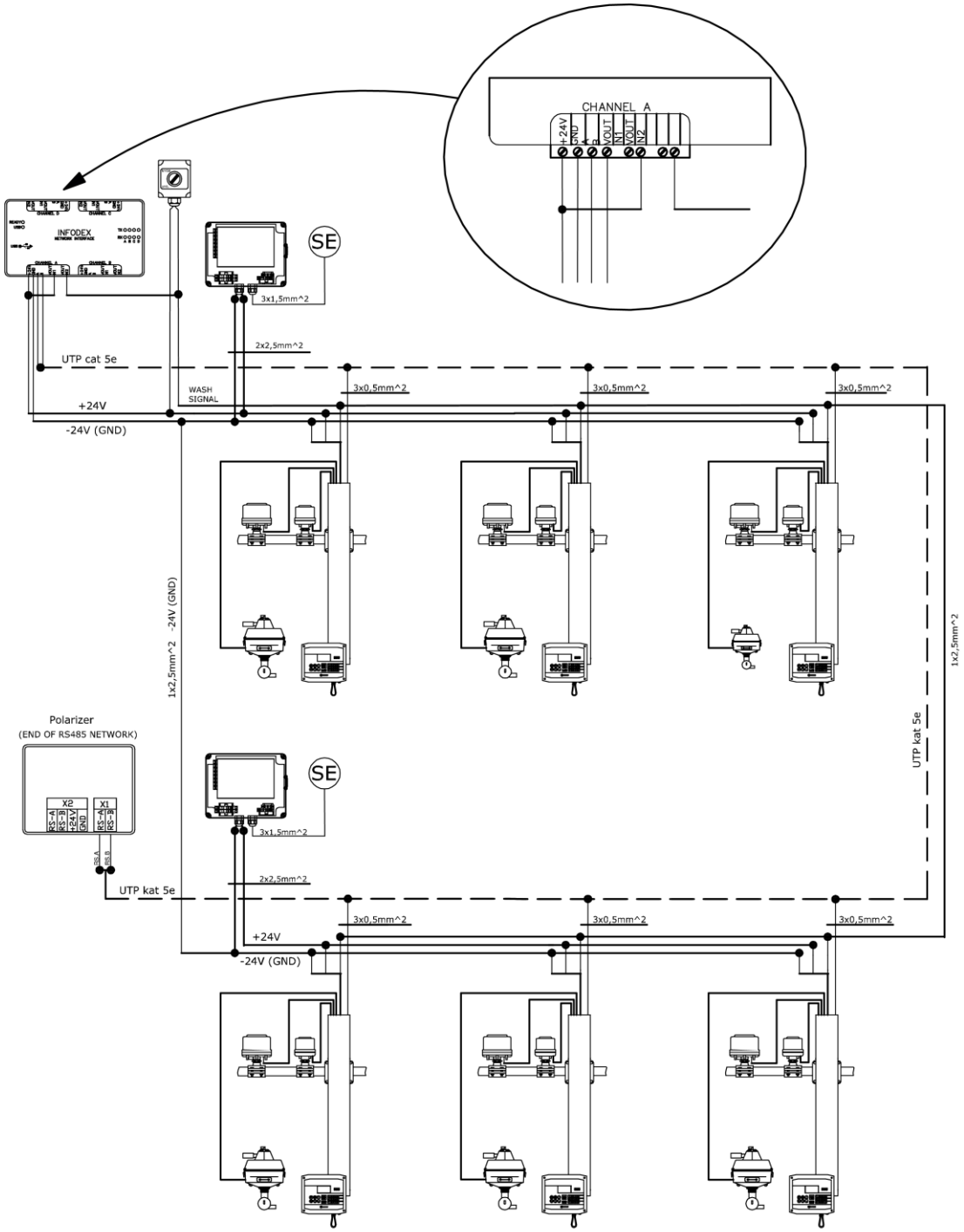


Diagram of power supply and RS 485 net connections of controller K500 IC

5. Starting the system K500 IC

5.1. Assembly control before starting

Before starting the system, check carefully whether the assembly was made properly in order to avoid any danger to the operator or any damage of components, caused by so called: human factor.

Before starting the system, check carefully whether there were left any tools or assembly materials at the plant elements, such as pipeline, receiver, vacuum pump unit etc.

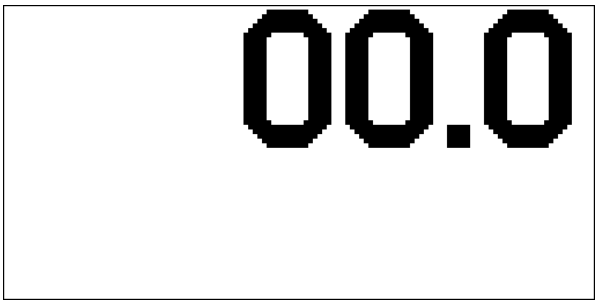
It is recommended to start with only one milking stand powered on and check whether the system works properly. After such first checking, if it went correctly, the rest of milking stands can be connected to the power.

- check the correctness of assembly of all fixings,
- regarding the operational safety, check all elements with movable parts,
- check whether all valves, flaps etc., are open,
- check the correctness of connections of all tubes, hoses and wires,
- remove all dirtiness, file dust and leftovers after assembly operation,
- set all components, such as, shut-off valves of receiver jar and sanitary tank, milk outlet bow, 3-way valves etc. in the equal position of "milking" status and proceed with test run of plant.

5.2. Starting the system procedure

After making sure that assembly was made properly, turn on the power supply of milking plant and switch the washing automat on milking mode.

When power is on, each stand display will show the view as at the Pic.4.



Pic. 4 Display view after switching the power on

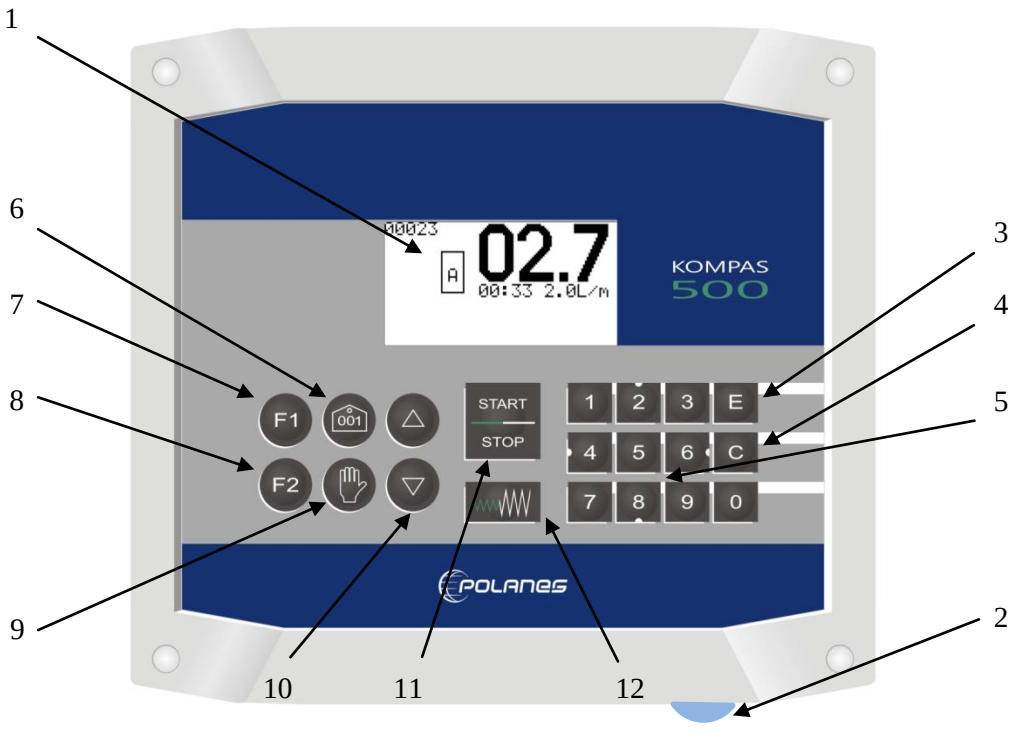
In order to test the milking stand, press Start/Stop button once. The milking cluster is released and simultaneously pulsator starts its work. Next, after 2 seconds (time set by service worker) the shut-off valve is being opened, what causes that the operation vacuum is appeared in the system, which makes the liners start to work.

If the controller display shows any milk yield, though there is a lack of milk flow, it means that the milk meter PULSAMETER2 is improperly connected.

After handling all above mentioned operations and making sure, that everything works properly, check the valve of milk meter and the cluster remover. In order to do that, push quickly twice the Start/Stop button, which is the manually way of finishing the milking. After the milking is stopped, the vacuum shut-off valve is closed and the milking cluster is lifted up. If everything works correctly, repeat checking procedure with the rest of milking stands. In case of any irregularities, check the connections. The valve of milk meter can be checked during washing process.

6. Milking stand handling

The controller K500 IC allows to monitor the milking stand operation, the milk yield. LCD display shows data about milk yield and milking mode. If the controller is connected with herd management system INFODEX, it's possible to enter the instructions about separation or lack of milking using the controller, like also to revise the cow number on the stand. The signal lamp of controller indicates the milking status whereas the keypad allows to control the milking stand completely. During milking, the controller monitors the milk flow and if it drops under fixed level in automatic mode, the controller starts stimulation, but if the low flow lasts longer (30 s – set by authorized service worker), then the controller stops the milking however, in manual mode the low flow is signalized with blinking lamp. Restarting the milk measurement follows after pushing **START/STOP** key.



1	LCD display	7	Function key 1 **F1**
2	Signal lamp	8	Function key 2 **F2**
3	Enter key **E**	9	Cluster remover releasing key **ACR**
4	Cancel key **C**	10	Arrow keys (moving the cursor) **UP/DOWN**
5	Numeric keypad **0-9**	11	**START/STOP** key
6	Cow number modification key **NUM**	12	Stimulation key **STIM**

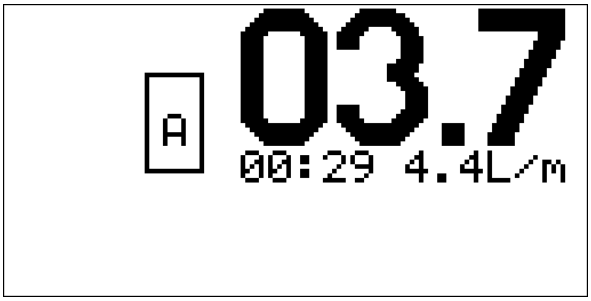
Pic. 5 Front panel of milking controller K500 IC

7. Keypad handling

Milking control:

- starting the milking – press **START/STOP** key on standby mode,

Starting the milking in automatic mode



- restarting the milking – hold (1 s) **START/STOP** key in standby mode,
- mode change auto/manual – press **START/STOP** key during milking,

Milking in manual mode

- stopping the stimulation – hold (1 s) **STIM** key during manual milking,
- stopping the milking (standard option) –hold (3 s) **START/STOP** key during milking,
- stopping the milking (modified option) – press **START/STOP** key twice quickly during milking
- emergency stopping the milking – hold (2s) **ACR** key.

ATTENTION!!! The options of stopping the milking are set by authorized service worker only!!!

Releasing the milking cluster:

- releasing the milking cluster – press **ACR** key during standby mode.

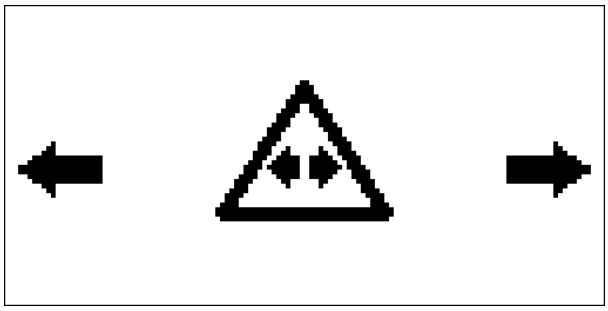
Controlling of entry and exit pneumatic gates:

Each controller enables to control the gates on the side of parlour where it's installed or on both sides (parameter 241A).

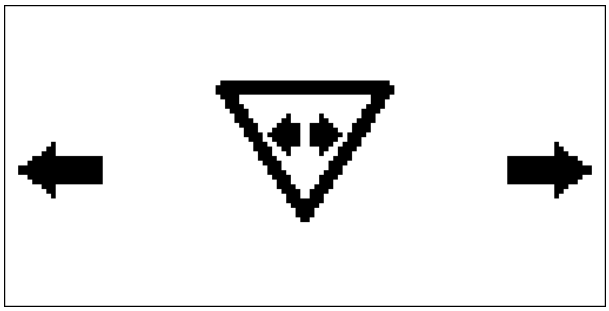
- changing the gate 1 status – push **UP** button (arrow up) – confirmation (**E**) – cancelation (**C**),
- changing the gate 2 status – push **DOWN** button (arrow down) – confirmation (**E**) – cancelation (**C**).

NOTICE!!! Independent controlling of the gates (not by herd management system) is possible only after appropriate programming of parameters 2417, 2418 and 241A.

Changing the status of gate 1

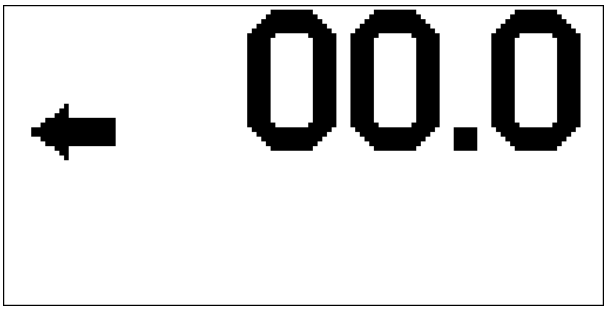


Changing the status of gate 2



Swing Over arm position:

The arrow shows the swing over arm is active /option/



Entering / changing the cow number:

- display the cow number – press **NUM** key (doesn't work in washing mode),
- shift the cursor – press **UP** or **DOWN** key,
- change the number – press the numeric key **0-9**,
- save the number and escape – press **E** key,
- reset the number – press **C** key,
- escape without changing the number – press **C** key twice,
- shift the cow and escape – press **F1** key.

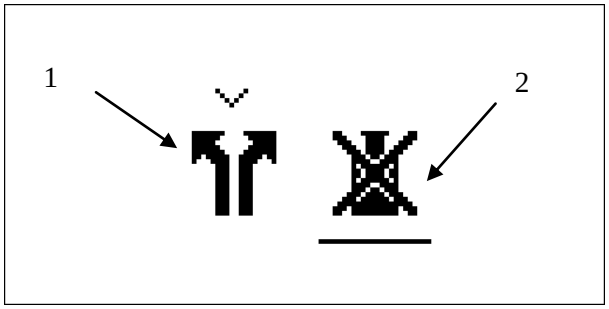
Event display

Enables to add the instructions to Infodex program about the separation of the certain cow and the fact, that the cow shouldn't be milked during the next milking.

- show the event display – press **F1** key (doesn't work during washing mode),
- shift the cursor – press **UP** or **DOWN** key (arrow up or down),
- turn on/turn off the event – press **E** key, while cursor indicates the event,
- save the event and escape – hold (1s) **E** key,
- escape without saving the event - press **C** key.

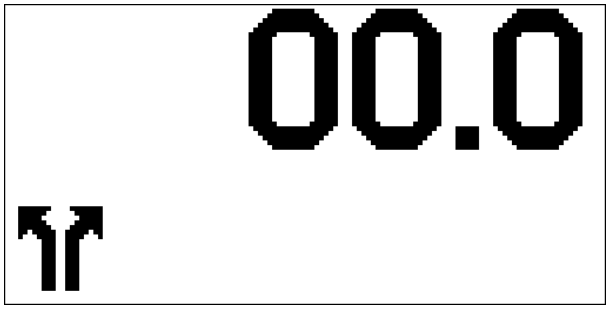
Event display

(1-separation, 2-don't milk)



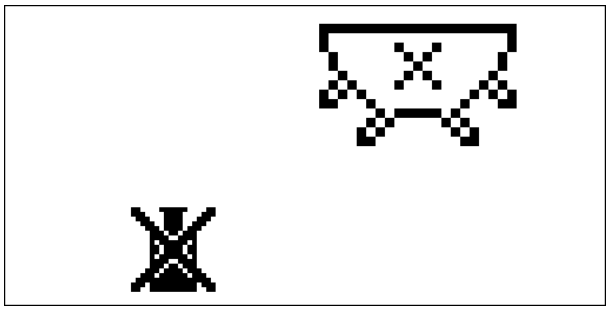
Active event

- separation



Active event

- milking lock



Milking lock:

If the event "don't milk" is on, the milking lock is activated, which is shown by appropriate icon.

In order to deactivate the milking lock, cancel „don't milk" event manually (on event display) or via computer. It can be deactivated also only for the following milking by pressing and holding **F1** key and entering 555 code with numeric keypad.

Information display:

- show the information display for 3 seconds – press **F2** key.

Diagnostic display:

- turn on/turn off the diagnostic display – press and hold **F1** key and enter code 101 with numeric keypad.

Valve testing display:

- turn on/turn off the valve testing display – press and hold F1 key and enter code 102 with numeric keypad (only while the controller is on standby mode), just when the testing mode is on all other functions of the controller are not active,
- choose the valve (shift the cursor) – use arrow keys **UP/DOWN**,
- change the voltage (0 V, 12 V, 24 V) for the chosen valve – press **E** key.

Test of external memory chipset:

- choose the option "MEMORY TEST" on the valve testing display, then press **E** key.

ATTENTION!!!
The test resets the whole content of the external memory chipset!!!

Restoring the factory defaults:

- restore factory defaults of the controller – select option „RESTORE DEFAULTS" on the vale testing display, then press **E** key.

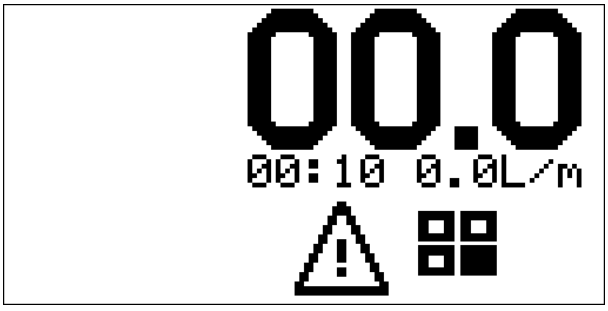
ATTENTION!!!
Restoring the factory defaults resets irrevocably current settings – in order to set the parameters again, call authorized service worker.

Changing the RS485 network address:

- show the address changing display – press and hold **F1** key and enter the code 103 with numeric keypad,
- shift the cursor – use arrow keys **UP/DOWN**,
- change the number – press a numeric key **0-9**,
- save the address and escape – press **E** key,
- escape without saving the number – press **C** key.

ATTENTION!!!
Changing RS485 address my cause the communication loss with herd management system INFODEX.

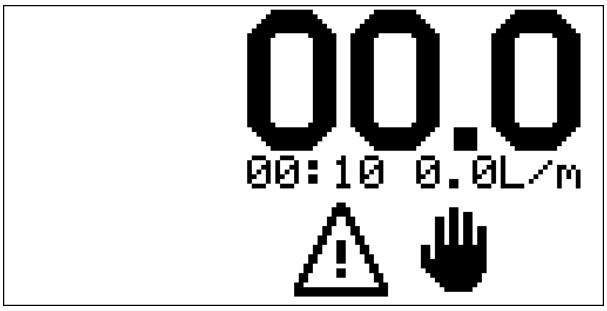
Keypad failure:



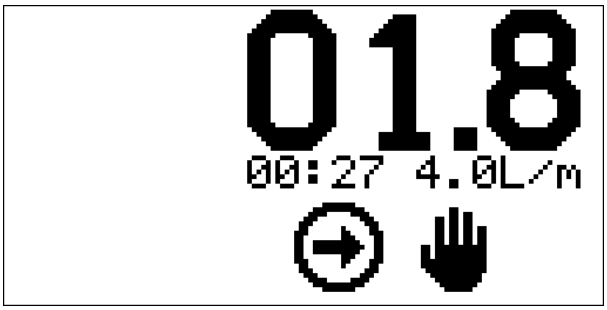
Calibration of milk meter PULSAMETER2:

- show the calibration display – press and hold **F1** key and enter code 104 with numeric keypad,
- move the cursor – with arrow keys **UP/DOWN**,
- save the address and escape – press **E** key,
- escape without saving the number – press **C** key.

Emergency stop of milking:



Milking resumed:



8. Main modes of system

Operation mode	Pulsation	Signal lamp	Description
Stand by	Off	On **(green/red)**	The controller stands by until the operator starts the milking. The milking of the next cow can be started.
Automatic milking	On	Fast blinking during low milk flow **(green)**	The controller monitors the level of the milk flow and initiates the stimulation if needed. Low flow is indicated by blinking of the signal lamp. The milking can be finished manually or automatically.
Manual milking	On	Slow blinking / Fast blinking during low milk flow **(red)**	The controller monitors the level of the milk flow. The low flow is indicated by fast blinking of signal lamp. The operator decides about starting the stimulation. The milking should be stopped manually.
End of milking	Off	On **(green/red)**	The milking cluster is lifted by the remover. The measurement and pulsation are stopped.
Washing	On	Blinking **(green)**	The proper control line starts the controller in washing mode, which is kept that way until the next switching on of power supply.

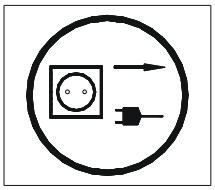
9. Terms of proper operation of milk meter PULSAMETER2

In order to guarantee the optimal and precise operation of milk meter PULSAMETER2, make sure that it operates in proper conditions. Strictly obey the following rules:

- make sure the milk meter PULSAMETER2 is installed vertically on the milk pipe (acceptable deviation from vertical position must not be larger than 3^{o}),
- make sure the system is maximally leak proof at each milking stand,
- make sure the vacuum inflow from the vacuum pump is stable,
- make sure the air flow to the milk claw is constant – inlet diameter should be from 0.8 to 1.5 mm (8 - 10 l/m of air), avoid application of milking clusters with air inlet out-of control.

Soil, cracks and leaks in particular parts of milking cluster have their influence on proper work of milk meter PULSAMETER2.

10. Disturbances in operation

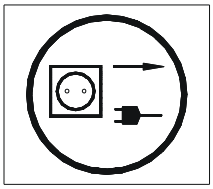


All repairs, maintenances, clearing works and troubleshooting should be handled while power is off.
Disconnect the impulse power supply 24 V with voltage of 230 V.

DEFECT	POSSIBLE CAUSE	TROUBLESHOOTING
The appliance can not be started.	The wash automat is broken.	In order to start the milking omitting the faulty washing automat, turn in controller box the lever marked with ***!!!*** to the position I (lever is down). **Call the service technician!**
	The wiring system is damaged.	Check the correctness of wiring system – all connections, power supply. In case of broken power supply, replace with new one.
The display is not highlighted, no symbols are displayed.	The power is off.	Check the correctness of wiring system and the connection of power plug of controller K500 IC.
The controller is on, but does not respond to the control button.	The keypad is damaged or disconnected.	Check the correctness of keypad connection or replace it with a new one.

DEFECT	POSSIBLE CAUSE	TROUBLESHOOTING
The controller is turned on properly, but after the milking is started the valves or/and pulsator don't/ doesn't work.	Imprecise connection between controller and pulsator or valve.	Check the connection in accordance to the instruction.
	The control transistors at PCB of controller are damaged.	Replace PCB of controller.
	The coil of GM2 or GM3pulsator is dirty or burnt.	Clean the coil of valve or replace it with a new one.
The control doesn't response while communicating to the computer.	Incorrect connection of RS485 net, lack of polarizer, terminator of the net.	Check the connection according to RS485 net scheme.

11. Maintenance



All repairs, maintenances, clearing works and troubleshooting should be handled with power off.
Disconnect the impulse power supply 24 V with voltage of 230 V.

During cleaning and maintenance do not use any sharp tools or objects, which could damage the front board of controller KOMPAS 500 IC.

International Protection (IP) rating of controller KOMPAS 500 IC is 65, which means that it shouldn't be flooded with water, because electronic components could be damaged by that!

- **Valve GM3**

Maintenance every 3 months

The valve should be disconnected from the vacuum. Take off the plug of valve lid (71/031-01). Unscrew the screws (71/031-02). In order to prevent the pistons from falling out, before taking off the lid, turn the valve upside down. Check for dirt and dust (patency of the holes in the coils).

Maintenace every 6 months

Perform actions like with 3 months maintenance (above) and additionally clean the valves and their socket.
The valve should be disconnected from the vacuum. Take of the plug of the valve lid (71/031-01). Unscrew the screws (71/031-02). In order to prevent the pistons from falling out, before taking off the lid, turn the valve upside down. Then take off the pistons (71/031-07 together with the gaskets).
The pistons and the body should be cleaned with water and the interior of the pistons base should be cleaned with damp cloth. Check the condition of the rubber parts on the pistons and the rubber rings on the lower body and replace with new in case of deformation.

After finishing the maintenance make sure, that the valves are put in the sockets properly (the big cap seal should be down).

Maintenace every 12 months

Perform actions like with 6 months maintenance and additionally replace the upper and lower gasket of the valve with new (71/031-06 and 08) like also the gaskets (71/031-05). Changing the gaskets provides the proper operation of the valve.

- **Controller and milk meter**

Maintenance every 3 months

- clean the controller and mounting bracket with clear and dump cloth,
- check the milk meter PULSAMETER2 for dirt, in case of finding some, clean the milk meter again using more detergent.

Maintenance every 6 months

- perform actions like with 3 months maintenance (above),

Maintenance every 12 months

- perform actions like with 3 months maintenance (above),
- replace the consumables, like diaphragm 31/700-06, 31/700-17 with the new ones, **otherwise the warranty for milking unit K500 IC shall be not valid any more**.

Maitenance every 24 months

- perform the same as above.

- **Pulsator**

Maintenance every 3 months

The valve should be disconnected from the vacuum. Take off the plug of valve lid (71/032-01). Unscrew the screw (71/031-02). In order to prevent the pistons from falling out, before taking off the lid, turn the valve upside down. Check for dirt and dust (patency of the holes in the coils).

Maintenance every 6 months

Perform actions like with 3 months maintenance (above) and additionally clean the valves and their socket.
The valve should be disconnected from the vacuum. Take off the plug of valve lid (71/032-01). Unscrew the screw (71/031-02). In order to prevent the pistons from falling out, before taking off the lid, turn the valve upside down. Then take off the pistons (71/031-07 together with the gaskets).
The pistons and the body should be cleaned with water and the interior of the pistons base should be cleaned with damp cloth. Check the condition of the rubber parts on the pistons and the rubber rings on the lower body and replace with new in case of deformation.

After finishing the maintenance make sure, that the valves are put in the sockets properly (the big gasket down).

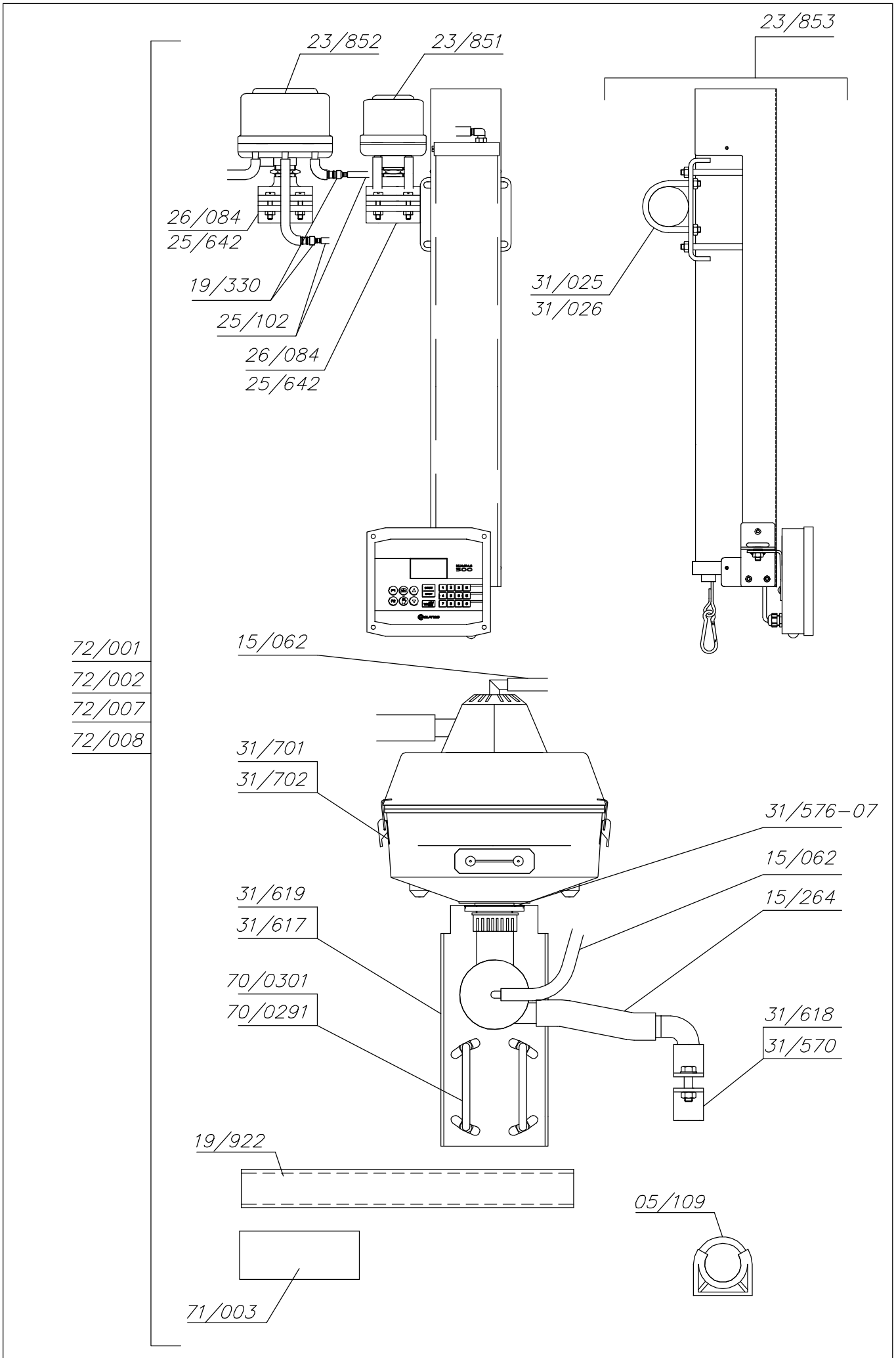
Maintenance every 12 months

Perform actions like with 6 months maintenance (above) and additionally replace the upper and lower gasket of the valve with new (71/031-06 and 08) like also the gaskets (71/031-05). Changing the gaskets provides the proper operation of the valve.

12. Spare parts list

12.1. Milking unit K500 IC Ø 52 / 11/2" - Ø 70 / 2", set

Cat. no.	Part name	U.M.	Qnty	Qnty	Qnty	Qnty
Qnty	**Controller K500 IC 1 1/2" / 52 L, set**		**72/001**			-
72/002	**Controller K500 IC 1 1/2" / 52 R, set**			**72/002**		
72/007	**Controller K500 IC 2" / 70 L, set**				**72/007**	
72/008	**Controller K500 IC 2" / 70 R, set**				-	**72/008**
05/109	Clamping ring ø 40mm with catch	pc.	1	1	1	1
15/062	Rubber single hose POLANES 7x14 (m)	m	2	2	2	2
19/330	Connector GRS 8-6	pc.	3	3	3	3
15/264	Rubber milk hose 18x28 (m)	m	0,25	0,25	0,25	0,25
19/922	Pipe PP 40x2000	pc.	0,25	0,25	0,25	0,25
23/851	2-channel valve GM2, set	pc.	1	1	1	1
23/852	3-channels valve GM3, set	pc.	1		1	1
23/853	Control unit K500, set	pc.	1	1	1	1
25/102	Rubber hose 5x2 (m)	m	8	8	8	8
25/642	PVC clamping ring 63 x 1/2"	pc.	-	-	2	2
26/084	PVC clamping ring 52 x 1/2"	pc.	2	2	-	-
31/025	S/s shackle 1 1/2" (2pcs.), set	pc.	1	1	-	-2
31/026	S/s shackle 2" (2 pcs.), set	pc.	-	-	1	1
31/570	Connection terminal s/s 70/20/90º set	pc.	-	-	1	1
31/617	Bracket of milk meter PULSAMETER2 / 70	pc.	-	-	1	1
31/618	Connection terminal s/s 52/20/90º set	pc.	1	1	-	-
31/619	Bracket of milk meter PULSAMETER2 / 52	pc.	1	1	-	-
31/701	Milk meter PM2 right	pc.	1	-	1	-
31/702	Milk meter PM2 left	pc.	-	1	-	1
70/0291	S/s shackle 70, set	pc.	-	-	2	2
70/0301	S/s shackle 52, set	pc.	2	2	-	-
71/003	Rubber brake 60x70mm	pc.	1	1	1	1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26/084
25/642
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72/002
72/007
72/008
15/062
31/701
31/702
31/576-07
15/062
15/264
31/619
31/617
70/0301
70/0291
31/618
31/570
19/922
05/109
71/003

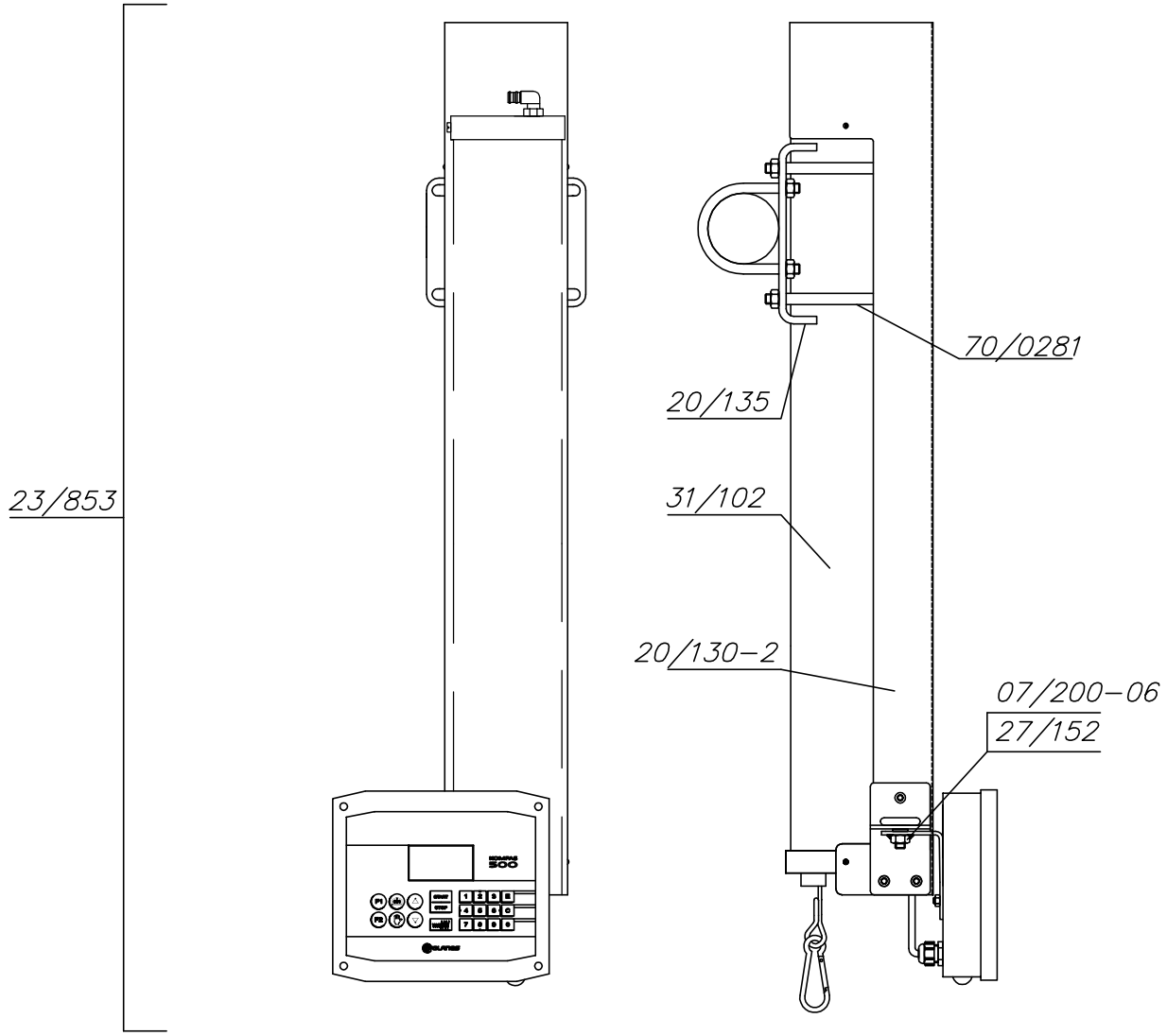
12.2. Control unit K500 IC

Cat. no.	Part name	U.M.	Qnty
23/853	**Control unit K500, set**		
07/200-06	Handwhell of holder M6 (32x15)	pc.	1
20/130-2	S/s cover of M-PANEL K500	pc.	1
20/135	Base plate of M-PANEL 1 1/2"-2" holder	pc.	1
23/843	Control unit K500	pc.	1
27/152	Gasket ø 8 of jet set	pc.	1
31/102	Cluster removing cylinder	pc.	1
70/0281	S/s shackle 90 (2 pcs.), set	pc.	1

12.3. Controller K500 IC

Cat. no.	Part name	U.M.	Qnty
23/843	**Control unit K500**		
23/464	Casing of K500/K200 controller	pc.	1
23/687	Choke 7 /black/	pc.	5
23/788	Keyboard of K500 controller LCKL792-6	pc.	1
23/842	Control light 24V DC, set	pc.	1

Cat. no.	PCB of K200/K500 controller set	U.M.	Qnty
23/724	LCD display with socket 20pin K200/K500	pc.	
23/722	PCB of K200/K500 controller without display	pc.	1
23/723	Control unit K500	pc.	1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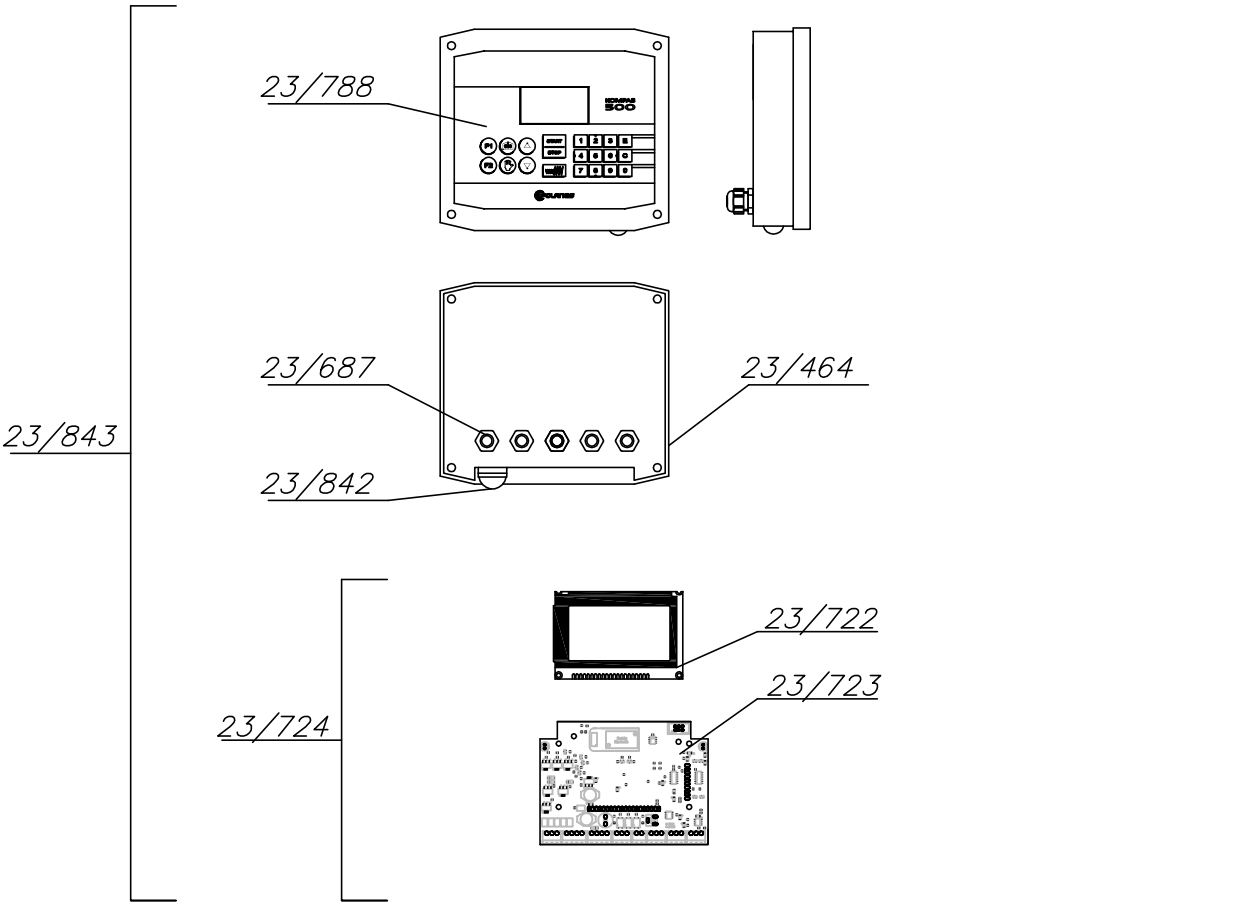
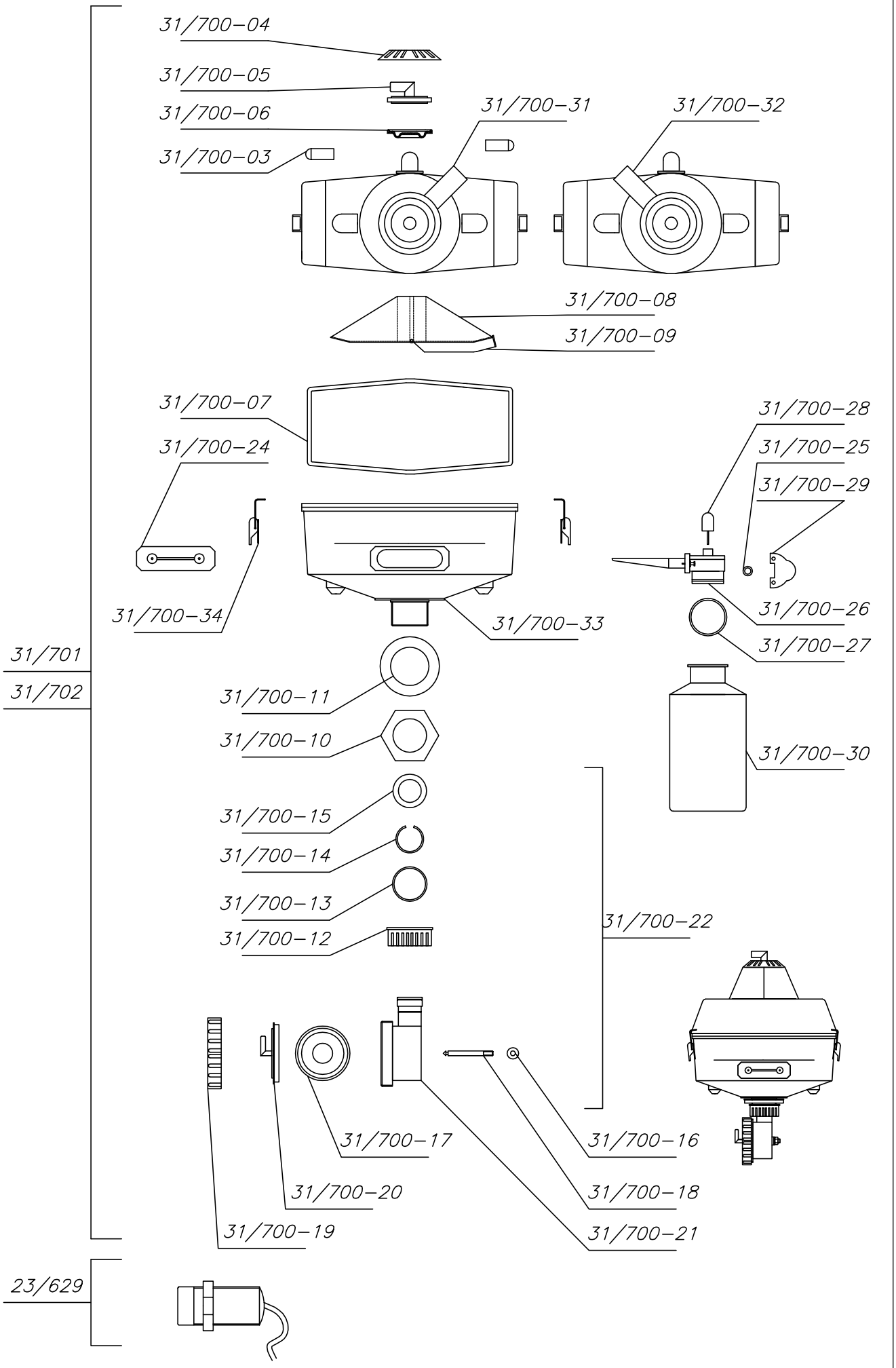
70/0281
20/135
31/102
20/130-2
07/200-06
27/152


23/843
23/788
23/687
23/464
23/842
23/724
23/722
23/723

12.4. Milk meter PULSAMETER2

Cat. no.	Part name	U.M.	Qnty
31/701	**Milk meter PM2 right**		
31/702	**Milk meter PM2 left**		
31/700-03	Valve flap	pc.	2
31/700-04	Sleeve nut M55x2	pc.	1
31/700-05	Valve lid	pc.	1
31/700-06	Membrane D48	pc.	1
31/700-07	Sealing	pc.	1
31/700-08	Tipping scale, without sample drain	pc.	1
31/700-09	Sample drain	pc.	1
31/700-10	Nut M40x3	pc.	1
31/700-11	Washer 42x65	pc.	1
31/700-12	Cap I	pc.	1
31/700-13	Retaining ring	pc.	1
31/700-14	Spring fixing ring A28	pc.	1
31/700-15	Gasket I	pc.	1
31/700-16	Gasket II	pc.	1
31/700-17	Membrane D63	pc.	1
31/700-18	Valve lifter	pc.	1
31/700-19	Cap II	pc.	1
31/700-20	Valve cover	pc.	1
31/700-21	Valve body, set	pc.	1
31/700-22	Cleaning valve, set	pc.	1
31/700-24	Blank flange	pc.	1
31/700-25	O-ring 3x2	pc.	1
31/700-26	Sampling, set	pc.	1
31/700-27	O-ring 28x3 N-NBR 70	pc.	1
31/700-28	Valve hoodwith cylindrical pin	pc.	1
31/700-29	Air admission plate	pc.	1
31/700-30	Bottle for sampling	pc.	1
31/700-31	Case upper part, right	pc.	1
31/700-32	Case upper part, left	pc.	1
31/700-33	Case lower part, set	pc.	1
31/700-34	Locking with screws	pc.	2
23/629	Inductive sensor DC24V	pc.	1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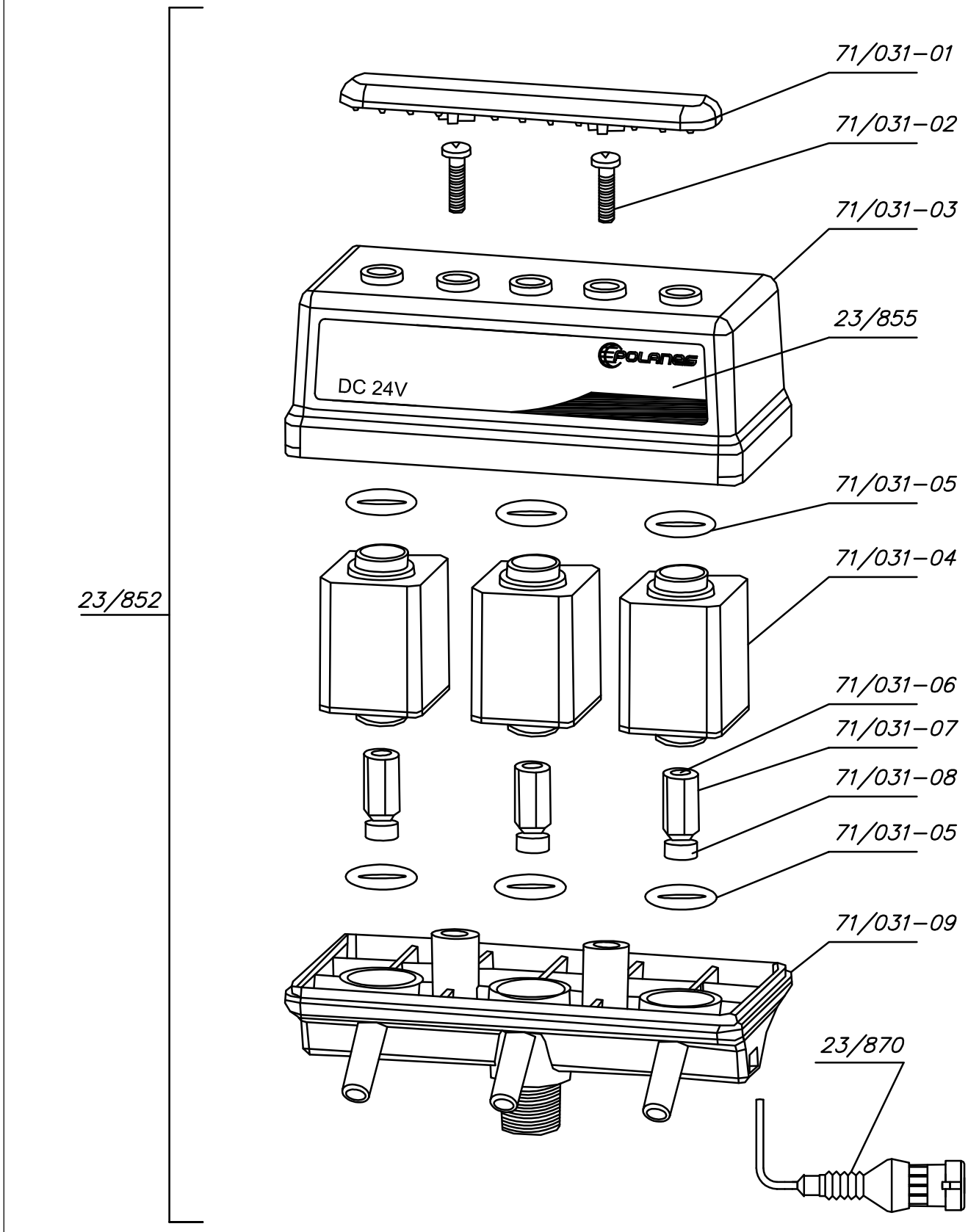
31/700–21
23/629

12.5. Control valve GM3

Cat. no.	Part name	U.M.	Qnty
23/852	**3-channels valve GM3, set**		
71/031-01	Air filter of valve GM3	pc.	1
71/031-02	Screw of cover valve GM2/GM3	pc.	2
71/031-03	Cover of valve GM3	pc.	1
23/855	Label of valve GM3	pc.	1
71/031-05	O-ring of solenoid valve GM2	pc.	6
71/031-04	Solenoid of valve GM2	pc.	3
71/031-06	Upper gasket of valve GM2 piston	pc.	3
71/031-07	Piston of valve GM2/GM3	pc.	3
71/031-08	Bottom gasket of valve GM2 piston	pc.	3
71/031-09	Lower body of valve GM3	pc.	1
23/870	S/s plug/electric of valve GM3	pc.	1

Cat. no.	Part name	U.M.	Qnty
71/031-10	**Repair kit for valve GM3**		
71/031-05	O-ring of solenoid valve GM2	pc.	6
71/031-06	Upper gasket of valve GM2 piston	pc.	3
71/031-08	Bottom gasket of valve GM2 piston	pc.	3


71/031–01
71/031–02
71/031–03
23/855
DC 24V
71/031–05
71/031–04
23/852
71/031–06
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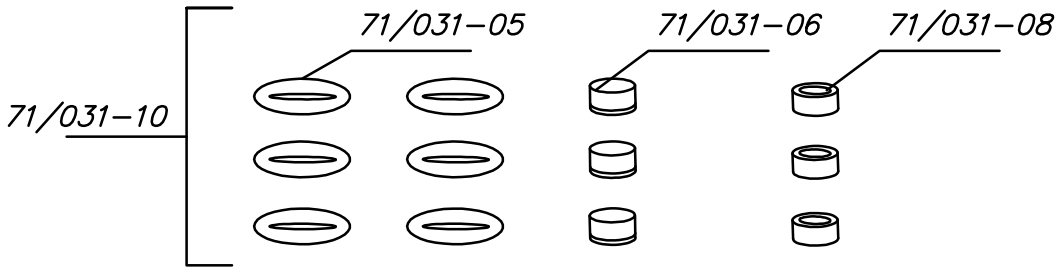
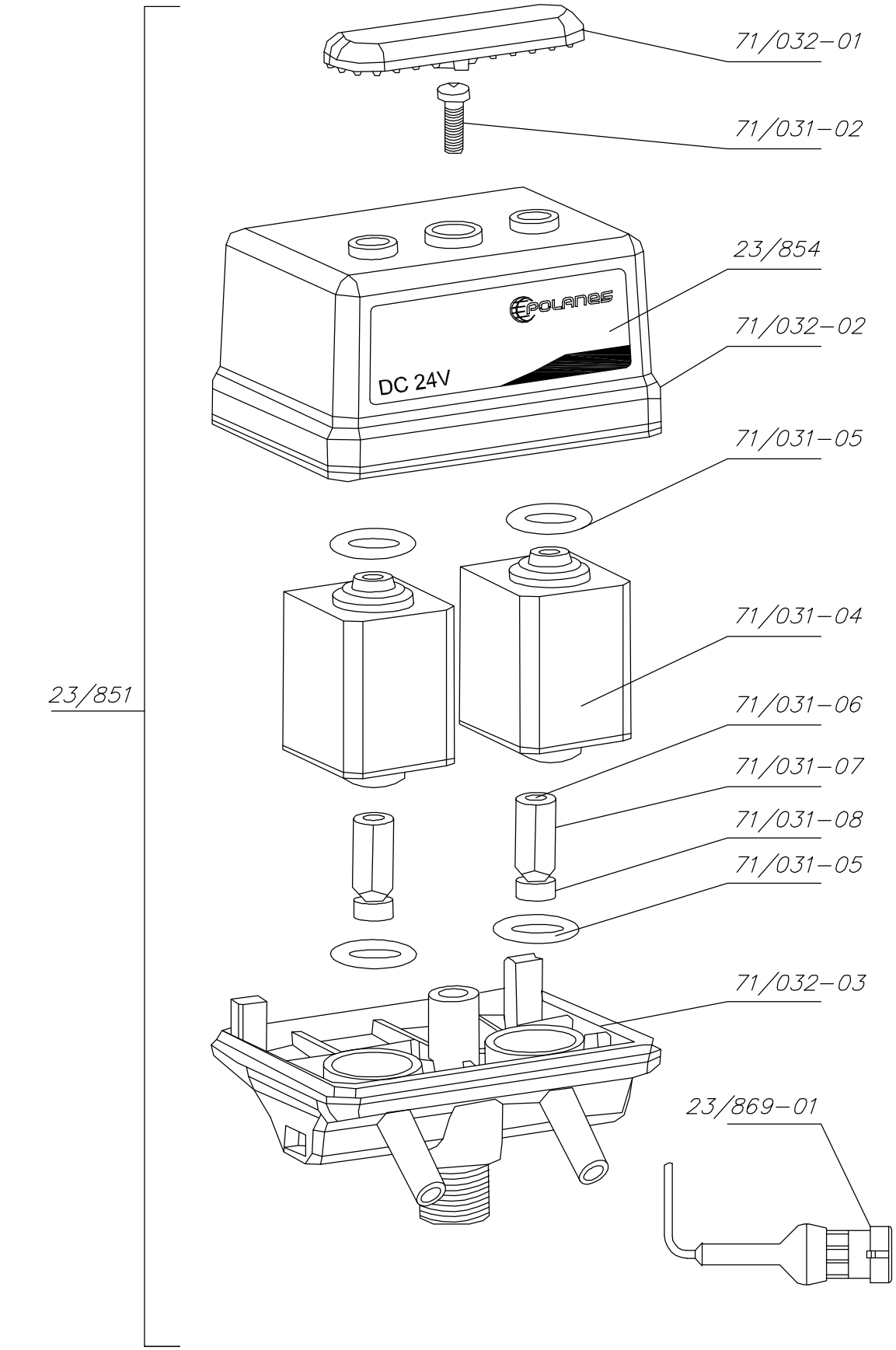
71/031–08
71/031–05
71/031–09
23/870


71/031–05
71/031–06
71/031–08
71/031–10

12.6. Control valve - pulsator GM2

Cat. no.	Part name	U.M.	Qnty
23/851	**2-channel valve GM2, set**		
71/032-01	Air filter of valve GM2	pc.	1
71/031-02	Screw of cover valve GM2/GM3	pc.	1
23/854	Label of valve GM2	pc.	1
71/032-02	Cover of valve GM2	pc.	1
71/031-05	O-ring of solenoid valve GM2	pc.	4
71/031-04	Solenoid of valve GM2	pc.	2
71/031-06	Upper gasket of valve GM2 piston	pc.	2
71/031-07	Piston of valve GM2/GM3	pc.	2
71/031-08	Bottom gasket of valve GM2 piston	pc.	2
71/032-03	Lower body of valve GM2	pc.	1
23/869-01	S/s plug/electric of valve GM2	pc.	1

Cat. no.	Part name	U.M.	Qnty
71/032-04	**Repair kit for valve GM2/GM3**		
71/031-05	O-ring of solenoid valve GM2	pc.	4
71/031-06	Upper gasket of valve GM2 piston	pc.	2
71/031-08	Bottom gasket of valve GM2 piston	pc.	2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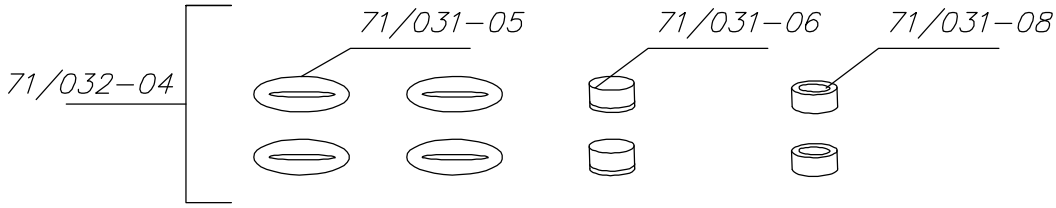
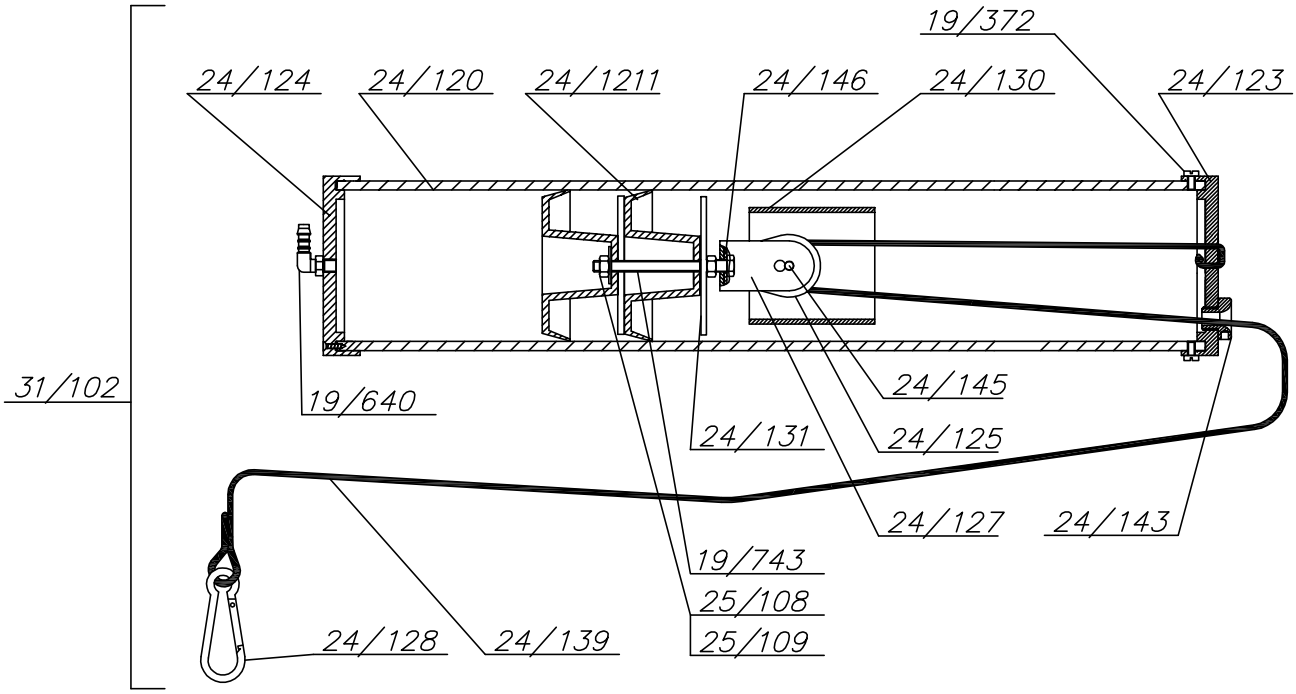

71/032-04
71/031-05
71/031-06
71/031-08

12.7. Cluster removing cylinder

Cat. no.	Part name	U.M.	Qnty
31/102	**Cluster removing cylinder**		
19/372	Screw s/s 2,9x13 steeple head	pc.	6
19/640	Angular end WES 10/R 1/4"	pc.	1
19/743	Bolt M6x60 DIN 933	pc.	1
24/120	Pipe of cluster removing cylinder 90x600	pc.	1
24/1211	Gasket of cluster removing cylinder	pc.	2
24/123	Bottom lid of cluster removing cylinder	pc.	1
24/124	Upper lid of cluster removing cylinder	pc.	1
24/125	Cord wheel	pc.	1
24/127	Pulley holder	pc.	1
24/128	S/s snap hook 6x60	pc.	1
24/130	Fender of cluster rem,oving cylinder	pc.	1
24/131	PVC disc 74x3/6	pc.	2
24/139	Cord ø 5 mm of cluster removing cylinder	m	1,9
24/143	Fairlead with thread of cluster removing cylinder	pc.	1
24/145	Axis of pulley	pc.	1
24/146	Washer of pulley	pc.	1
25/108	Nut s/s M 6 self-locking	pc.	1
25/109	S/s washer 6 DIN 9021, enlarged	pc.	1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