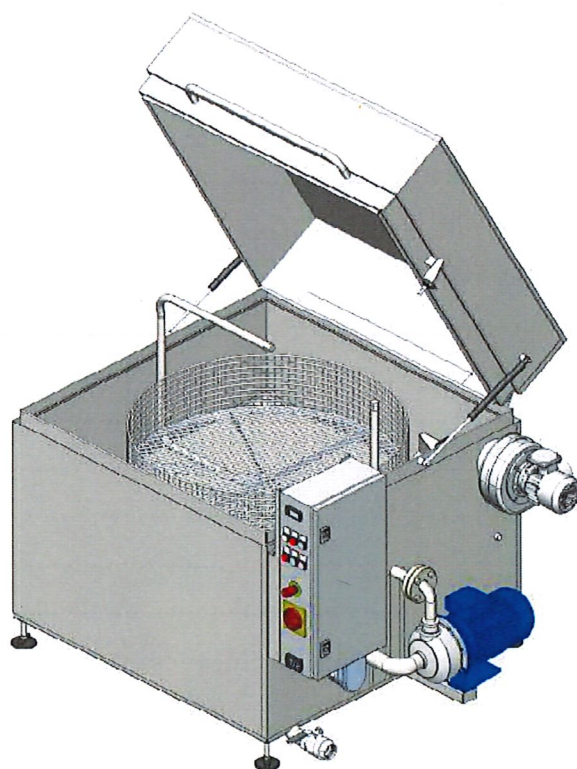


## **TOP-LOADED INDUSTRIAL CLEANING MACHINES**

**TL-650SS TL-900SS TL-1150SS**



### **INSTRUCTIONS FOR USE, INSTALLATION AND MAINTENANCE**

**Manufacturer:**  
**TEIJO Cleaning Machines Ltd.**  
**Harjuntie 8, FI-29250 Nakkila**  
**FINLAND**  
**Phone + 358 2 531 2200**  
[www.teijopesu.fi](http://www.teijopesu.fi)

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# 1. SAFETY INSTRUCTIONS FOR TEIJO CLEANING MACHINES

Read these Instructions for use, installation and maintenance carefully, because the right use of your cleaning machine prolongs its service life and decreases the risk of damages.

The manufacturer's responsibility is ceased, if the cleaning machine is equipped with accessories or spare parts not approved by the manufacturer.

## 1.1 STORAGE OF THE WASHING MACHINE BEFORE INSTALLATION

- Store the machine in its transport packaging in a clean, dry place, protected from direct UV radiation.
- The storage location of the machine must be chosen so that the machine is protected from external mechanical damage.
- Storage temperature 5–30°C.

## 1.2 PLACING THE CLEANING MACHINE

- Pay attention to other safety regulations concerning the site.
- Pay attention to the regulations concerning detergents.
- Notice the electrical connections for the cleaning machine.
- Notice the tube and water connections as well as sewerage.
- Pay attention to the regulations concerning sewages.
- If the cleaning machine is equipped with a steam extractor, notice the space for the extraction channel.
- Place the cleaning machine in a suitable position with respect to other work stages.
- Reserve enough space for the cleaning machine and the maintenance of the machine.
- Notice the space needed for the components to be cleaned and the components cleaned as well as the space required by possible transport and lifting equipment.
- Do not use the cleaning machine for storing components.
- Place the cleaning machine on a stable base.
- To decrease the risk of slipping, handle the detergent so that it is not spattered on the floor.

## 1.3 INSTALLATION OF THE CLEANING MACHINE

- The cleaning machine should be placed on the base carefully to avoid damages.
- When using a transport or lifting equipment, make sure that the forks reach long enough under the cleaning machine.
- Install the cleaning machine in a horizontal position.
- Make sure that the tube connections are tight.
- Electrical installation should be carried out only by an authorised enterprise or electrician.

## 1.4 USING THE CLEANING MACHINE

- Before using the cleaning machine, the Instructions for use should be studied carefully.
- It is not allowed to install accessories in the cleaning machine without the manufacturer's instructions and regulations.
- Be very careful when handling heavy components.
- The cleaning machine should be started and stopped only according to these instructions.
- Follow the detergent supplier's recommendation for the lowest cleaning temperature because there is excessive foaming if the temperature is too low.
- Do not use a temperature exceeding 80 °C because of the danger of cavitation in the pump.
- Make sure that your detergent is suitable to be used in a spray type cleaning machine.
- Make sure that your detergent is suitable for the components to be cleaned.
- When opening the door mind the hot steam coming out through the door.
- Do not use the machine out of order before repairing it.

## 1.5 REPAIR AND MAINTENANCE

- Be very careful during maintenance and repair works.
- The construction of the cleaning machine should be studied carefully by means of these instructions before you begin with any maintenance or repair work.
- The machine must be stopped and cleaning solution cold as well as the main switch in the 0 position during the maintenance or repair works.
- The cleaning machine must be emptied of cleaning solution for the demanding repair or maintenance works.
- Follow the instructions for regular maintenance.
- Do not use unsuitable tools or cleaning equipment.
- Only spare parts approved by the manufacturer should be used.
- Electrical equipment should be repaired only by an authorized electrician.

## 1.6 CLEANING MACHINE DECOMMISSIONING

### Dismantling

- Only qualified and authorized persons are allowed to disassemble and dispose of the machine when it has become obsolete. Follow the safety regulations for each part and the part manufacturer's instructions to avoid personal injury or property damage.
- Disconnect all power connections when decommissioning and dismantling the machine.
- Disconnect the water and compressed air connections.
- Make sure that it is not possible to start the machine accidentally and that the electrical connections have been disconnected. Ground and short-circuit them and otherwise cover or isolate all nearby power supplied parts.

**Failure to follow the safety instructions may in the worst-case lead to death or serious injury.**

### Disposal:

- All components and operating materials as well remaining wastes (e.g., chemicals in the machine) must be disposed of in accordance with local regulations and legislation by an organization specialized in waste handling.
- All metal, rubber and plastic parts must be separated and delivered for recycling.

## 1.7 ENVIRONMENT & RECYCLING

- Proper recycling of the electronic and electrical waste equipment will ensure safety of human health and environment.
- Follow the instructions regarding the collection of packaging materials (plastic, wood), sorting and recycling. In the EU area, packaging and packaging waste directive EPNDir 94/62/EC. Outside the EU area please contact your local city authorities.
- Comply with the waste electrical and electronic equipment legislation for the collection, sorting and recycling of malfunctioning products. In the EU area EPNDir 2012/19/ EU, WEEE directive. Outside the EU area please contact your local city authorities.
- Metal parts must be delivered to a specialized metal recycling organization.

---

**IN CASE OF EMERGENCY, STOP THE FUNCTIONS BY PRESSING  
THE EMERGENCY STOP -BUTTON**



**DO NOT PLACE ON THE LOAD BASKET COMPONENTS HEAVIER THAN  
RECOMMENDED IN THIS MANUAL.**

**DO NOT PLACE ON THE LOAD BASKET COMPONENTS WITH A DIAMETER EXCEEDING  
THE RECOMMENDATION IN THIS MANUAL**

**THE LID OF THE CLEANING CABINET OPENS AFTER 10 SECONDS THE PUMP HAS  
STOPPED.**

**DO NOT WEAR LOOSE CLOTHING OR JEWELRY THAT COULD GET CAUGHT BY  
MOVING PARTS.**



**WEAR A HAIRNET TO KEEP LONG HAIR IN PLACE.**



**MIND THE HOT STEAM WHEN OPENING THE LID AFTER THE CLEANING  
CYCLE IS COMPLETED.  
WEAR PROTECTIVE GOGGLES!**



**BE CAREFUL WHEN HANDLING THE CLEANED HOT COMPONENTS.  
WEAR PROTECTIVE GLOVES!**



**MIND YOUR HANDS AND FINGERS AS WELL CLOTHING ARTICLES WHEN  
CLOSING THE LID!**

## **2. GENERAL**

### **2.1 Range of applications**

Top-loaded cleaning machines Teijo TL-650SS, TL-900SS and TL-1150SS are designed for industrial cleaning and degreasing purposes. They can be used in machining shops, service workshops for engine remanufacture, garages and service stations for:

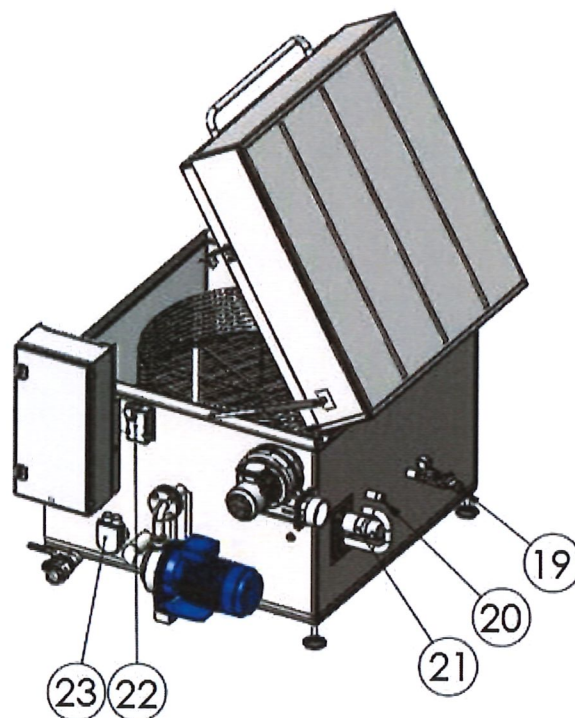
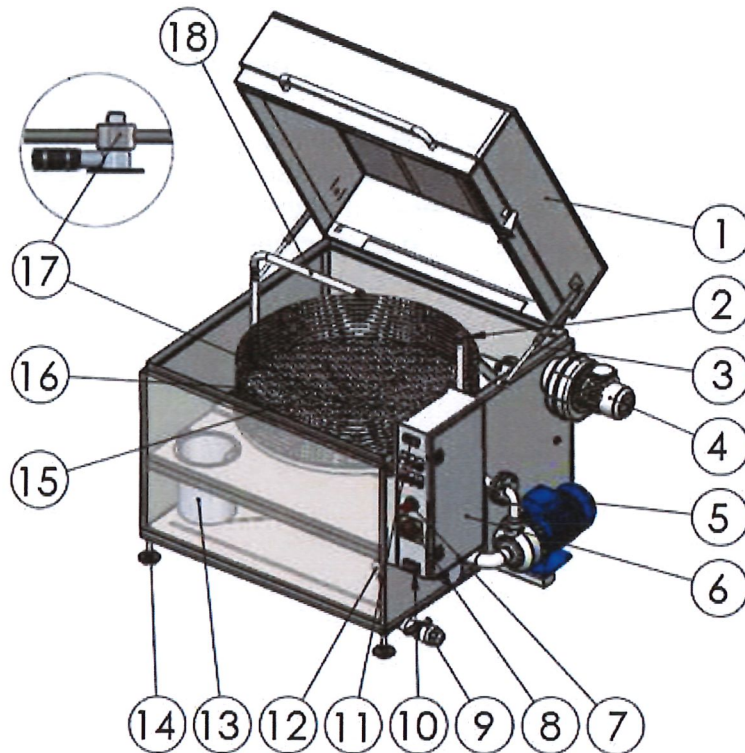
- cleaning and degreasing of metal components,
- degreasing of machined metal parts,
- cleaning of the tools and machine components of various industries.

The construction of a Teijo cleaning machine is simple and the machine is safe to operate. The use and maintenance are also simple if performed according to these instructions. If there should be such disturbances in operation of the machine that you cannot remedy by yourself, please contact the supplier or the manufacturer.

### 3. CLEANING MACHINE

#### 3.1 Main parts list

TL-650SS, TL-900SS, TL-1150SS



Pos	Description
1	Lid
2	Cleaning plug
3	Gas spring with one locking tube
4	Steam extractor *
5	Pump
6	Electric control panel
7	Emergency-Stop -button
8	Main switch
9	Emptying valve
10	Thermostat
11	Cleaning timer
12	Level guard
13	Filter basket
14	Adjustable leg
15	Load table
16	Load basket
17	Water chamber
18	Upper spray pipe
19	Water refill
20	Oil skimmer outlet
21	Oil skimmer *
22	Safety switch / electric lock, lid
23	Heating element

\*) Optional accessory

### 3.2 Operating principles

The cleaning cycle takes place in an enclosed cabinet, in which a rotating spray pipe (18) sprays cleaning solution onto the stationary load in the load basket. The cleaning solution flows back into the tank via the filter basket (13).

The rotating spray pipes spray the load being cleaned from all directions giving a good cleaning result whatever the shape of the load.

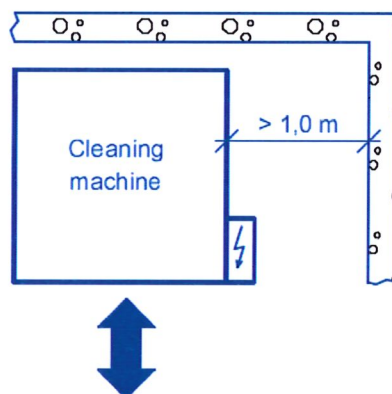
The rotation of the spray pipes is activated by reaction force created by the reaction nozzle. Rotational speed can be adjusted with a screw in the reaction nozzle.

## 4. INSTALLATION

### 4.1 Location

When installing the cleaning machine please note the following:

- location with respect to other work stages,
- power supply, water, mains and steam duct connection,
- space required for maintenance of the cleaning machine (min 1000 mm on the side of motor).



The cleaning machine must be lifted with the greatest care so that the bottom of the cleaning machine will not be damaged.

### 4.2 Installation of the machine

When the cleaning machine has been placed onto the right position and is horizontally checked with a spirit level, the adjustable legs (14) must be adjusted so that the lid is tightly sealed when closed.

Emptying valve (9) shall be closed.

### 4.3 Electrical installation

Electrical installation should be performed only by an authorized enterprise or electrician.

The electrical control panel (6) of the cleaning machine is connected to the mains 3 x 400 V 50 Hz (3 x 415V 50 Hz) according to the enclosed circuit diagram. A neutral (N-) conductor is necessary (TN-S –system). Special instructions will be supplied with other mains.

The necessary supply powers:

Model	Connection power (kW)	Fuse size (A, slow)
TL-650SS	8	16
TL-900SS	11	25
TL-1150SS	11	25

The connectors are intended for copper conductors. If the conductors are made of aluminum suitable connectors must be used.

The direction of rotation must be clockwise (CW).

#### 4.4 Water and drainage connections

The tank is filled with a hose connected to the water supply.

If the cleaning machine is equipped with a solenoid valve for automatic refill (19), the inlet R 3/4" is connected permanently to the water supply. A filter has been installed between the water inlet pipe and the solenoid valve for automatic refill.



**Before proceeding with the permanent connection to the water supply, install a ball valve between the filter and water inlet.**

Cleaning solution is discharged through the emptying valve (9). The emptying valve is with a threaded coupling R 1 1/2".

As the cleaning solution may contain oils or other impurities, local regulations on effluent disposal must be observed.

#### 4.5 Steam exhaust

The cleaning machine can be equipped with a steam extractor (4) to remove the steam out from the cleaning chamber.

The steam extractor will automatically start (when the pump stops) and it will run for the time set on the cleaning timer (11). Please see instructions at chapter > 5.3 Using the machine.

**The steam extraction fan (4) is installed in the connection flange of the machine.**

**The steam exhaust duct connected to the fan adapter, size Ø100 mm, is led out.**

**The channel must be watertight (note: spiral pipe is not watertight).**

**If there are any horizontal parts, they must be installed with necessary slopes (inclinations) so that the condensate (water) returns into the machine.**

**If a steam extraction fan is not installed in the machine, a pipe is led out from the steam extraction connection or it is left open.**

**Do not block the steam exhaust connection!**

## 4.6 Test run



**All accessories must be installed on the machine before the test run.  
All electrical and water connections must be connected.  
Do not start the pump dry, the shaft seal would be damaged!**

The test run is carried out as follows:

- Check that the emptying valve (9) is closed.
- Turn the motor protector switches and automatic fuses to position 1.
- Close the electric control panel (6).
- Turn the main switch (8) to position 1.
- Release the "EMERGENCY STOP" -button by turning it clockwise.
- Reset the emergency stop by pressing the blue signal lamp "EMERGENCY STOPPED / RESET".
- Fill the machine with water (2 - 4 cm below the upper edge of the filter basket.). If the machine is equipped with automatic water refill, the tank will be automatically filled up as the switch for heating is turned to position "M" – manual (please see chapter 5.1 Heating).
- Close the lid (1) by releasing the locking tube of gas spring (3).



**Mind your hands and fingers when closing the lid!**

- Start the machine by pushing the "START"-button and check the direction of rotation of the pump (5), marked with an arrow. If the direction of the rotation is wrong, interchange the two incoming supply wires.
- Check speed rotation of the spray pipe assembly by listening the turns in a minute. Recommended speed approx. 20 rotations per minute.
- If you like to adjust the speed of the spray pipe, stop the machine from "STOP"-button and open the lid. Notice that the spray pipe is equipped with a reaction nozzle in one of the vertical pipes. The rotational speed can be regulated by opening (increasing the speed) or closing (reducing the speed) the adjusting screw in the reaction nozzle.



**When above steps have been taken, add the detergent according to the dosage instructions given by the detergent supplier.**

**If the cleaning machine is equipped with a detergent dispenser, it will automatically dose the liquid detergent when the automatic water refill (19) is started (by turning the heating switch to position "M").**

## 5. OPERATION INSTRUCTIONS

### 5.1 Heating

Cleaning solution is heated by an electric heating element (23). The solution temperature is controlled by means of a thermostat (10). The recommended solution temperature is + 60 - + 80 °C. A temperature under + 60 °C should be avoided because of excessive foaming and a temperature exceeding + 80 °C because of danger of cavitation in the pump.

The heating system is equipped with a digital weekly timer (found inside the electrical control box) which switches on or off the heating element according to the pre-set programme. The programming of the weekly timer (Monday to Sunday) is carried out according to the instructions (see chapter 11. Weekly timer). Heating is controlled with channel 1 (CH1).

*Weekly timer*



**The weekly timer is not operating if the main switch is off. It has a spare running time of approx. 100 hours to handle short power failures.**

The operation of the heating system can be selected from the HEATING -switch. When the heating is on, the heater warning lights glow. Heating operates as follows:

- heating is under weekly timer control – switch position: “AUT”
- heating is continuously – switch position: “MAN”
- heating is off – switch position: “0”

MAN = Manual  
0 = Off  
AUT = Auto



There is a fluid level guard (12) in the tank which automatically switches the heating off and stops the pump if there is too little liquid in the machine. Heating will be automatically switched on when the liquid level has risen sufficiently.

Thermostat (10) settings:

- (short press) **set**: adjust the set point temperature.
- PRESS ▲ = up / ▼ = down: change the temperature setpoint (in setting mode the setpoint flashes).
- press **set** again: saves the temperature setpoint.



## 5.2 Detergents

It is recommended that low-foam, auto-decomposable alkaline detergent is used. It should be specially designed for use with spray type cleaning machines and should contain anti-rust agents.

When choosing a suitable detergent special attention should be paid to the material of the components to be cleaned; e.g. light metals are sensitive to alkalis.

Liquid detergents are dosed directly via the filters to the wash liquid. It is recommended that detergents in the form of powder are mixed with water in a vessel before dosing it to the cleaning machine.



**Follow the detergent supplier's dosing instructions. When adding water, add detergent according to the dosing instructions.  
Do not use solvent-based detergents in the cleaning machine!**




## 5.3 Using the machine

- Close the emptying valve (9).
- Add the detergent according to the dosage instructions given by the detergent supplier. If the cleaning machine is equipped with a detergent dispenser, it will automatically dose the liquid detergent when the water refill is started.
- Turned aside the top extension of the spray pipe assembly (18) to give more space when placing the components in the load basket (16). Remember to return the spray pipe in its initial position afterwards.
- Close the lid by releasing the locking tube from the gas spring (3).



**Mind your hands and fingers when closing the lid!**

- Set the cleaning, drainage and steam extraction times from the cleaning timer (11):

Recommended time settings	Cleaning timer display
<b>Cleaning time:</b> 5 – 10 min  Press <b>set</b> > LED ① flashes Press ▼ or ▲ for desired value	
<b>Drainage time:</b> 5 – 10 s  Press <b>set</b> > LED ② flashes Press ▼ or ▲ for desired value	
<b>Steam extraction time:</b> 30 – 60 s  Press <b>set</b> > LED ③ flashes Press ▼ or ▲ for desired value	
Press <b>set</b> >> to confirm all values.	

- Start the machine by pressing the “START” -button. The white signal of the “START”-button flashes for the whole time when the cleaning machine is running. The cleaning machine will conduct the washing, draining followed by steam extraction cycle automatically, accordingly to the time set in the cleaning timer (11).
- If the “STOP / LOW LEVEL”-signal lamp flashes -> fill the tank with water / washing liquid. To fill the tank, follow the instructions from chapter 4.4.



- When the cleaning machine and the steam extractor have stopped, the lid can be opened (10 s lock delay) and the cleaned object can be removed from the load basket.



**Mind the hot steam when opening the lid. Use protective goggles.**




**Use protective gloves.**



**There is an electric lock (22) connected to the lid and it cannot be opened when the machine is operating.  
Cabinet's lid will open 10s after the washing cycle.**

The lid locking time can be adjusted in time relay (inside the electrical control box), as follows:

Recommended time settings	Time relay
<p><b>Lid lock delay</b> The lid can be open after 10 s when the washing pump has stopped. The delay can be adjusted from the <b>K4</b> time relay found inside the electric cabinet.</p> <p><b>Factory settings:</b> <b>Delay 10 s</b></p> <ul style="list-style-type: none"> <li>• FUNCTION: Dr</li> <li>• TIME: x 10</li> <li>• RANGE: 1 s</li> </ul>	

## **6. MAINTENANCE AND SERVICE**

### **6.1 Regular maintenance**

#### Daily service

- Check solution level (2 - 4 cm below the upper edge of the filter basket).
- Check the filter and clean it when necessary.
- Check the temperature of the solution.
- Check that the spray pipe rotates freely and at the right speed 10 - 20 rpm).

#### Monthly service

- Check the nozzle holes of the spray pipes and clean them when necessary.
- Clean the spray pipe: open the cleaning plug (2) and start the pump for 10-15 seconds.

### **6.2 Maintenance as required**

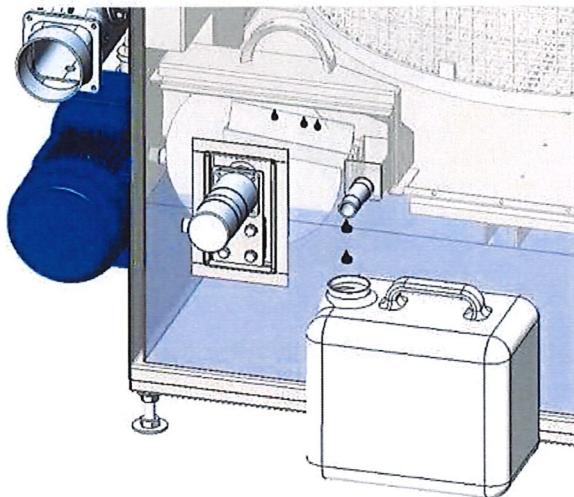
- Change the washing liquid when the cleaning result deteriorates and when adding more detergent fails to help.
- Clean the heating element (23).
- Clean the tank and the machine inside when changing the washing liquid.

### **6.3 Emptying the fluid tank**

- Turn off the main switch (8) (position 0).
- Open the emptying valve (9) and let the solution run off (see 4.4).
- Remove the filter basket (13), the basket (16) and the support. If needed, unwind and remove the load table.
- Rinse the bottom of the cleaning machine with fresh water. Be careful with the heating element (23) when cleaning the bottom.
- Sediments found on the bottom of the tank, can be scraped out.
- Clean the filter basket (13) and the level guard (12).
- After the tank has been cleaned, close the emptying valve (9), assemble the components back, and fill the tank with fresh water and add detergent.

## 7. ACCESSORIES

### 7.1 Automatic oil skimmer OS-3B (option)



The rotating disc of the oil skimmer (21) will collect oil from the fluid surface. The skimmer operates most efficiently when the fluid surface is stagnant, i.e. when the machine is not working.

The operation times for the oil skimmer are adjusted from the weekly timer (found inside the electrical control box) which switches on or off the oil skimmer according to the pre-set programme. The programming of the weekly timer (Monday to Sunday) is carried out according to the instructions (see chapter 11. Weekly timer).

Oil skimmer is controlled with channel 2 (CH2).

*Weekly timer*

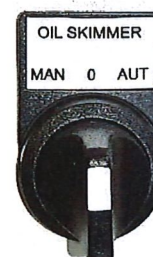


**The weekly timer is not operating if the main switch is off. It has a spare running time of approx. 100 hours to handle short power failures.**

The operation of the oil skimmer can be selected from the OIL SKIMMER -switch:

- under weekly timer – switch position “AUT”,
- operates continuously – switch position “MAN”,
- not operating - switch position “0”.

MAN = Manual  
0 = Off  
AUT = Automatic



**A recommendation for the operation period is approximately 0.5 - 1.5 hours before the heating is switched on.**

## 7.2 Steam extractor DF-1



The steam extractor (4) fan starts automatically after the cleaning cycle, removing the steam from the machine into the outside air.

## 7.3 Automatic water refill, AR-1 (option)

The device for automatic water refill maintains a constant fluid level in the tank. The device consists of solenoid valve connected to the water supply and a level guard. The level guard controls the solenoid valve according to the fluid level.

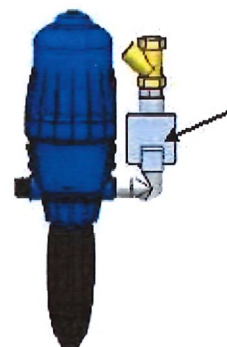
### Function

When the fluid surface falls below the level guard's indicator, the pump and heating will be switched off after a period of 10 secs. The measure prevents the pump from running dry and getting damaged, and the heating elements from burning out.

The disturbance is indicated by a red signal light "LOW LEVEL" whereafter the solenoid valve opens, allowing liquid to flow into the tank. When the disturbance is over the signal light switches off.

Optimal level is 2 - 4 cm below the upper edge of the filter basket.

When the liquid in the tank rises to the optimal level, the solenoid valve closes.



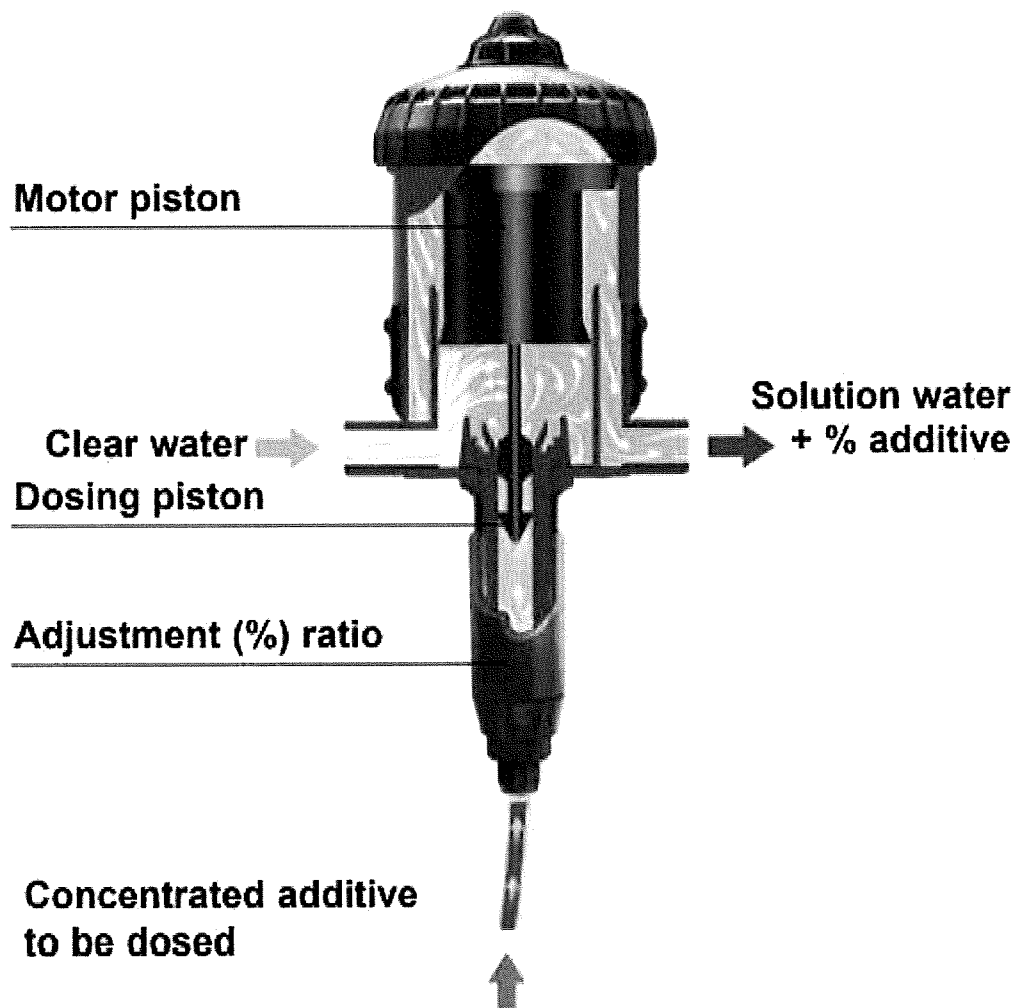
*Fig. Solenoid valve for automatic water refill*



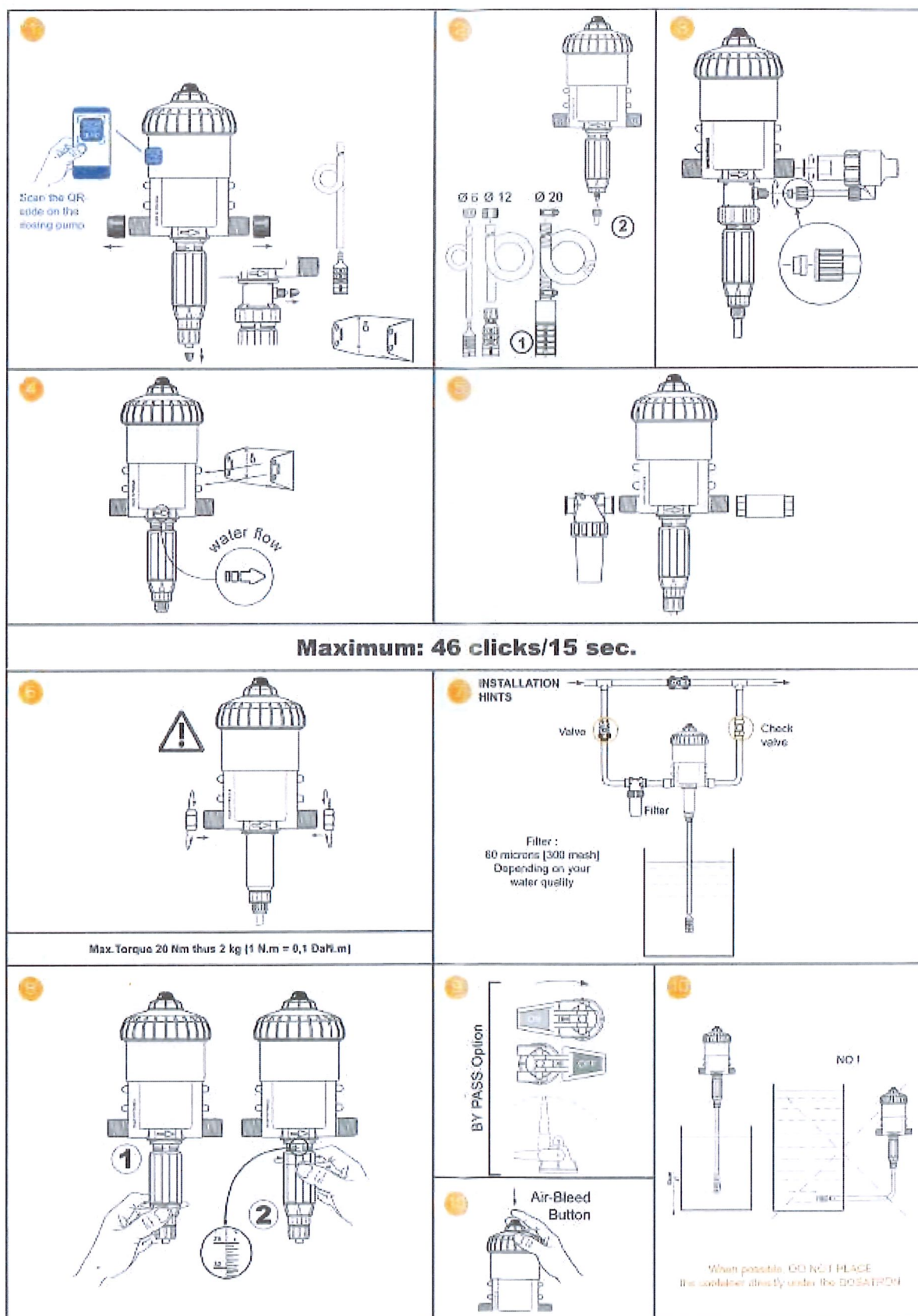
### **Important!**

- ✓ **When connecting the automatic refill to the water supply a stop valve must be installed.**
- ✓ **The mud filter is part of the inlet and must be checked periodically.**
- ✓ **The heating must be switched on for the automatic water filling to work ("HEATING"-switch in "M" or "A" position).**
- ✓ **Automatic water refill does not operate during the wash or drain cycle.**

#### 7.4 Dosing equipment for detergents AD-6 (option)



The automatic detergent device is installed directly in the water supply line and it operates by using water pressure as power source. Water activates the device, which takes up the required percentage of washing concentrate. Inside the device, the washing concentrate is mixed with water. Water pressure forces the solution downstream. The dose of washing concentrate will be directly proportional to the volume of water entering the device, regardless of variations in flow or pressure which may occur in the water line.



## 8. TECHNICAL DATA

	Unit	TL-650SS	TL-900SS	TL-1150SS
Connection power	kW	8	11	11
Heating element	kW	6	9	9
Load basket diameter	mm	630	850	1100
Filtration, load basket	µm	630	630	630
Load weight, max	kg	150	150	150
Pump				
- capacity	ℓ/min	200	230	280
- pressure	kPa	250	250	230
- motor	kW	1,85	1,85	1,85
Steam extractor				
- type		DF-1	DF-1	DF-1
- capacity	m <sup>3</sup> /h	500	500	500
- pressure	Pa	250	250	250
- motor	kW	0,18	0,18	0,18
Insulation	mm	15	15	15
Tank volume	ℓ	200	350	500
Machine weight	kg	220	260	330

## 9. SPARE PARTS

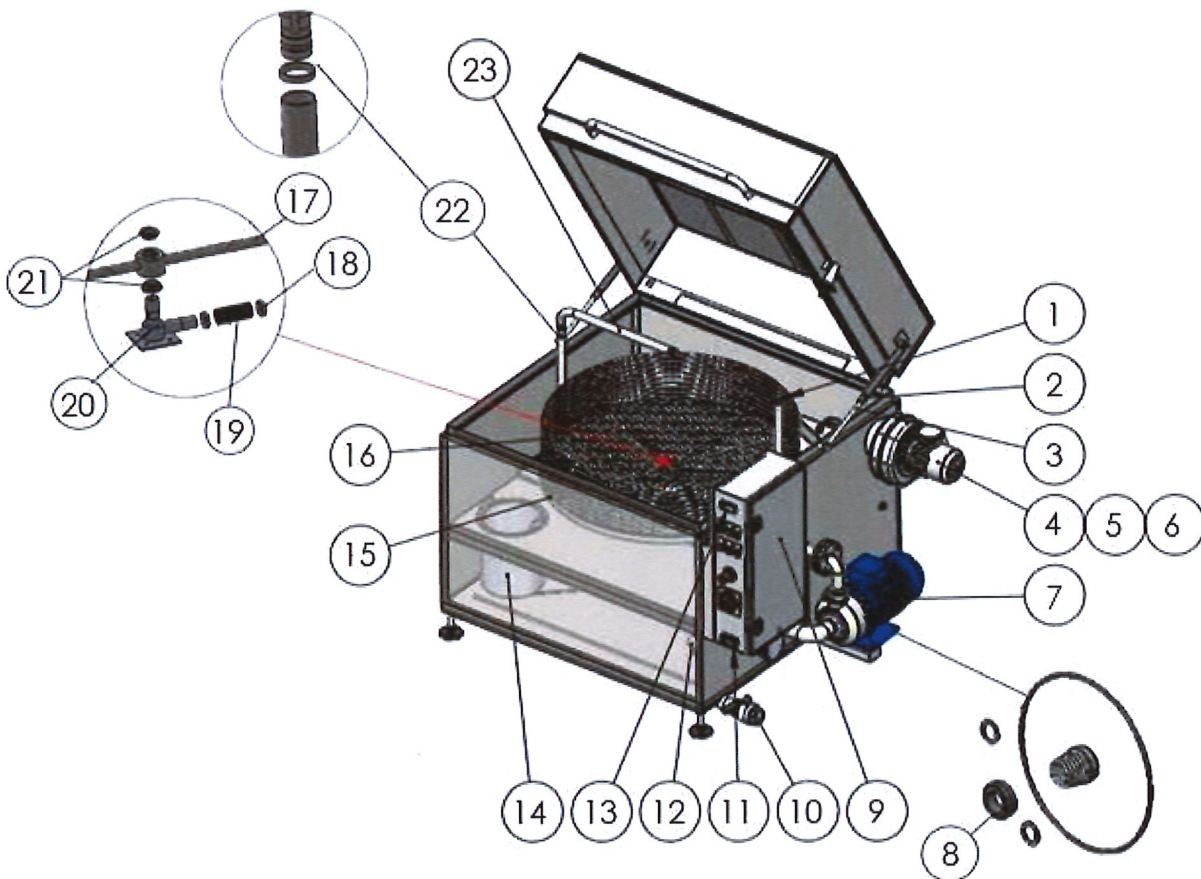


Please inform the serial number of the cleaning machine when ordering spare parts.

It is also possible to order spare parts not mentioned in the above list. Please contact the supplier.

### 9.1 Cleaning machines

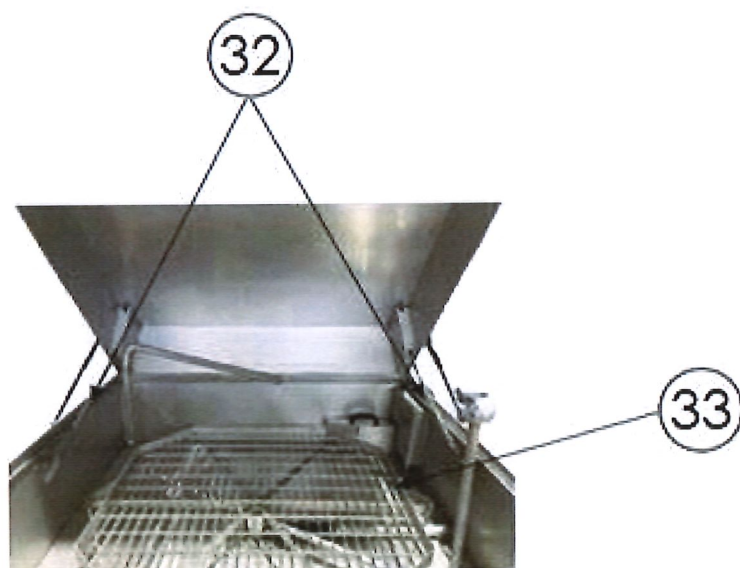
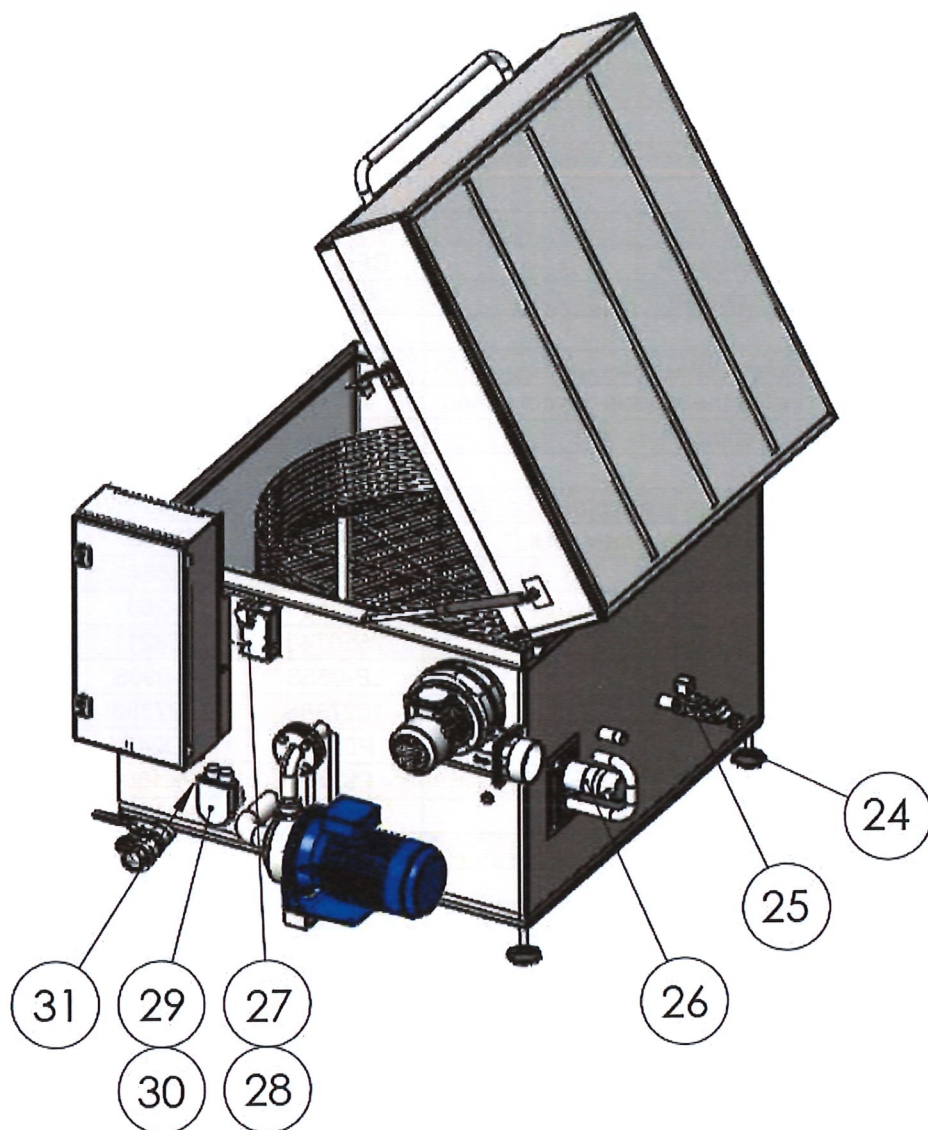
TL-650SS, TL-900SS, TL-1150SS



Pos.	Description	TL-650SS	TL-900SS	TL-1150SS	Qty.
		Order number	Order number	Order number	
1	Cleaning plug	PC102	PC102	PC102	2
2	Gas spring	PJ052	PJ052	PJ058	2
3	Locking tube	PJ057	PJ057	-	1
4	Steam extractor	DF-1	DF-1	DF-1	1
5	Adapter for steam extractor	DFO-100	DFO-100	DFO-100	1
6	Gasket for steam extractor	PK008	PK008	PK008	1
7	Pump	PI092	PI092	PI092	1
8	Shaft seal set	VPE027	VPE027	VPE027	1
9	Weekly timer (inside the electric control panel)	PI740	PI740	PI740	1
10	Ball valve, tank cleaning	PP026	PP026	PP026	1
11	Thermostat	PI651	PI651	PI651	1
12	Fluid level guard, standard equipment	PI030	PI030	PI030	1
12	Fluid level guard, automatic water refill (*)	PI030	PI030	PI030	1
13	Cleaning timer	PI684	PI684	PI684	1
14	Filter basket	H-250	H-250	H-250	1
15	Load table (stainless steel)	2550740	2558211	1028177	1
16	Load basket (stainless steel)	LB-065S	LB-090S	-	1
17	Lower spray pipe	1027385	1027388	1028183	1
18	Hose clip	PD045	PD045	PD045	2
19	Rubber hose	PK160	PK160	PK160	0,12 m
20	Water chamber shaft, stainless	2313341	2313341	2313341	1
21	Water chamber bushing, brass standard	4333022	4333022	4333022	2
21	Water chamber bushing, viskonite (*)	4525520	4525520	4525520	2
22	Nylon ring	PK193	PK193	PK193	1
23	Upper spray pipe	2308641	2308641	1028184	1

\* = Option.

- = Not available for the machine type in question.



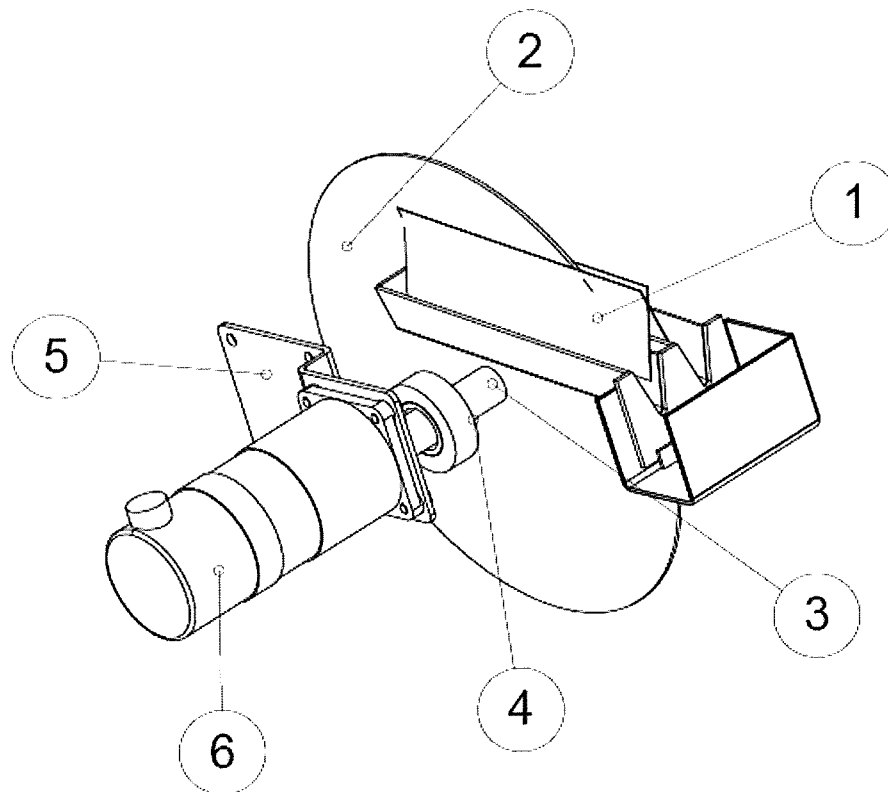
Pos.	Description	TL-650SS	TL-900SS	TL-1150SS	Qty.
		Order number	Order number	Order number	
24	Adjustable leg	PP228	PP228	PP228	4
25	Solenoid valve (automatic refill) (*)	CPI142	CPI142	CPI142	1
26	Oil skimmer (see chapter 9.2) (*)	OS-3B	OS-3B	OS-3B	1
27	Electrical lock	PI685	PI685	PI685	1
28	Actuator for electrical lock	PI686	PI686	PI686	1
29	Heating element 6 kW 230/400/415V	PI241	-	-	1
29	Heating element 6 kW 500V	PI243	-	-	1
29	Heating element 9 kW 230/400/415V	-	PI063	PI063	1
29	Heating element 9 kW 500V	-	PI065	PI065	1
30	Cover, heating element (*)	PI307	PI307	PI307	1
31	Temperature sensor	PI613	PI613	PI613	1
32	Chain	-	-	1041741	2
33	Load grating - stainless steel	-	-	LG-12S	1

\* = Option.

- = Not available for the machine type in question.

**Please state the serial number of the cleaning machine when ordering spare parts.**

## 9.2 Oil skimmer OS-3B



Pos.	Order no.	Description	Qty.
1	2420110	Scraper	1
2	4350990	Disc	1
3	1028492	Shaft	1
4	PK169	Shaft seal	1
5	1001817	Mounting bracket	1
6	PI073	Gear motor	1

Please state the serial number of the cleaning machine when ordering spare parts.

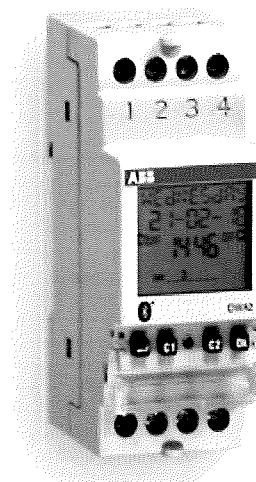
## 10. ELECTRIC PUMP

<p style="text-align: center;"><b>CEA 210/5</b></p> <p>Performance according to ISO 9906 - Annex A. The performance are valid for liquids with density 1,0 kg/dm<sup>3</sup> and kinematic viscosity 1 mm<sup>2</sup>/sec</p>	<table> <tr> <td colspan="2"><b>Operating Data Specification</b></td></tr> <tr> <td>Flow</td><td>0 l/min</td></tr> <tr> <td>Head</td><td>0 m</td></tr> <tr> <td>Fluid</td><td>Water, pure</td></tr> <tr> <td>Fluid temperature</td><td>20 °C</td></tr> <tr> <td colspan="2"><b>Hydraulic data (duty point)</b></td></tr> <tr> <td>Flow</td><td></td></tr> <tr> <td>Head</td><td></td></tr> <tr> <td colspan="2"><b>Pump data</b></td></tr> <tr> <td>Type</td><td>CEA 210/5</td></tr> <tr> <td>Speed</td><td>2900</td></tr> <tr> <td>Head H(Q=0)</td><td>29 m</td></tr> <tr> <td>Suction side</td><td>Rp 1 1/2</td></tr> <tr> <td>Discharge side</td><td>Rp 1 1/2</td></tr> <tr> <td>Types of installation</td><td>Standard</td></tr> <tr> <td>Product versions</td><td>Stainless steel AISI304</td></tr> <tr> <td>Weight</td><td>14,4 kg</td></tr> <tr> <td>Item no. of standard version</td><td>107330210</td></tr> <tr> <td>Family code</td><td></td></tr> <tr> <td colspan="2"><b>Materials / Shaft seal</b></td></tr> <tr> <td>Impeller</td><td>Stainless steel AISI 304 (1.4301)</td></tr> <tr> <td>Diffuser</td><td>Stainless steel AISI 304 (1.4301)</td></tr> <tr> <td>Seal housing</td><td>Stainless steel AISI 304 (1.4301)</td></tr> <tr> <td>Pump body</td><td>Stainless steel AISI 304 (1.4301)</td></tr> <tr> <td>Shaft Seal</td><td>V B P G G</td></tr> <tr> <td>Rotating assembly</td><td>V - ceramic</td></tr> <tr> <td>Fixed assembly</td><td>B - Carbon</td></tr> <tr> <td>Elastomers</td><td>P - NBR</td></tr> <tr> <td>Springs</td><td>G - AISI 316</td></tr> <tr> <td>Other components</td><td>G - AISI 316</td></tr> <tr> <td colspan="2"><b>Motor data</b></td></tr> <tr> <td>Rated power P2</td><td>1,85 kW</td></tr> <tr> <td>Nominal speed</td><td>2860 1/min</td></tr> <tr> <td>Frequency</td><td>50</td></tr> <tr> <td>Phase</td><td>3~</td></tr> <tr> <td>Rated voltage</td><td>400 V</td></tr> <tr> <td>Rated current</td><td>5,03 A</td></tr> <tr> <td>Degree of protection</td><td>IP 55</td></tr> <tr> <td>Insulation class</td><td>F</td></tr> <tr> <td>Permitted voltage tolerance +/- 10%</td><td></td></tr> <tr> <td colspan="2"><b>Remarks:</b></td></tr> <tr> <td>Project</td><td></td></tr> <tr> <td>Project no.</td><td></td></tr> <tr> <td>Date</td><td>31</td></tr> <tr> <td>note</td><td></td></tr> </table>	<b>Operating Data Specification</b>		Flow	0 l/min	Head	0 m	Fluid	Water, pure	Fluid temperature	20 °C	<b>Hydraulic data (duty point)</b>		Flow		Head		<b>Pump data</b>		Type	CEA 210/5	Speed	2900	Head H(Q=0)	29 m	Suction side	Rp 1 1/2	Discharge side	Rp 1 1/2	Types of installation	Standard	Product versions	Stainless steel AISI304	Weight	14,4 kg	Item no. of standard version	107330210	Family code		<b>Materials / Shaft seal</b>		Impeller	Stainless steel AISI 304 (1.4301)	Diffuser	Stainless steel AISI 304 (1.4301)	Seal housing	Stainless steel AISI 304 (1.4301)	Pump body	Stainless steel AISI 304 (1.4301)	Shaft Seal	V B P G G	Rotating assembly	V - ceramic	Fixed assembly	B - Carbon	Elastomers	P - NBR	Springs	G - AISI 316	Other components	G - AISI 316	<b>Motor data</b>		Rated power P2	1,85 kW	Nominal speed	2860 1/min	Frequency	50	Phase	3~	Rated voltage	400 V	Rated current	5,03 A	Degree of protection	IP 55	Insulation class	F	Permitted voltage tolerance +/- 10%		<b>Remarks:</b>		Project		Project no.		Date	31	note	
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## 11. WEEKLY TIMER PI740

Channel 1 (C1) for heating  
Channel 2 (C2) for oil skimmer

We recommend installing on your device the application from Google Play  
(Please see DWA2 at page 9).



# ABB

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## USER MANUAL

The digital time switches of DWA series are electronic devices for the management of the electrical utilities over time. They allow the time programming (periodicity: daily or weekly) or astronomical.

DWA1 is equipped with a relay (channel 1) while DWA2 is equipped with two relays (2 independent channels).

Each channel can be associated with a different programming (time or astronomical).

DWA time switches have a Bluetooth interface that allows it to be coupled with mobile devices (smartphone or tablet). Thanks to the free app that can be downloaded from the AppStore and Google Play stores, it is possible to program and make settings directly on your smartphone, and then transfer all the data to the time switch.

The reverse procedure is also possible, i.e. to copy the programming of a time switch on your mobile device.

The backup battery allows you to keep the settings even in case of black-out and can be replaced through the cover on the back of the time switch.

DWA time switches are devices of electronic type that perform actions of 1B type, intended to operate in environments with III overvoltage category and pollution degree 2 in accordance with EN 60730-1 standard.

Code	Model	Description
2CSM222511R1000	DWA1	Digital weekly astronomical/time switch 1 channel with Bluetooth
2CSM222501R1000	DWA2	Digital weekly astronomical/time switch 2 channels with Bluetooth

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User manual DWA

## TECHNICAL FEATURES

- Power supply: 230 Vac (-15% ÷ +10%) 50/60 Hz
- Power consumption:
  - DWA1: 2W (6 VA)
  - DWA2: 2W (6 VA)
- Lithium backup battery: 3V, CR2032 type (replaceable)
- Output:
  - DWA1: 1 monostable change-over relay with maximum switchable load of 16A / 250V
  - DWA2: 2 monostable change-over relays with maximum switchable load of 16A / 250V
- Terminal block for cables with maximum cables section of 2.5 mm<sup>2</sup>
- Display LCD with backlighting (active with AC power supply)
- Bluetooth BLE 4.2 communication interface (active with mains power supply)
- Storable programs:
  - DWA1: 120 events
  - DWA2: 120 events (divisible on 2 channels)
- Actions type: 1B
- Operating temperature: -20 ÷ +50 °C
- Operating humidity: 20 ÷ 90% non condensing
- Storage temperature: -25 ÷ +70 °C
- Operating frequency band: 2400-2483.5 MHz
- Maximum transmitted radiofrequency power: 4 dBm
- Container: 2 DIN modules
- Protection degree: IP20
- Insulation: reinforced between accessible parts (front) and all the other terminals

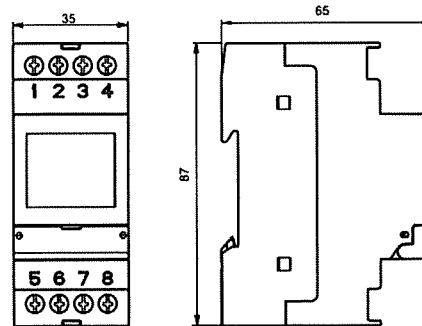
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User manual DWA

## SAFETY WARNINGS

■ During product installation and operation it is necessary to observe the following instructions:

- 1) The instrument must be installed by a qualified person, strictly in observance of the connection diagrams shown in this manual.
- 2) After installation inaccessibility to the terminals without using dedicated tools must be guaranteed.
- 3) Before accessing the connection terminals, make sure that the leads are not live.
- 4) Do not connect or feed the instrument if any part of it is damaged.
- 5) The product must be installed and activated in compliance with current electric systems standards.
- 6) Do not use the instrument for anything other than the indicated purpose.
- 7) In the electrical system upstream of the device must be installed a protection device against the overcurrents
- 8) The product can be used in environments with overvoltage Category III and Pollution degree 2, according to the Standard EN 60730-1
- 9) The access to the device must be limited and the default device PIN and Bluetooth password must be changed in order to avoid tempering of programs of relays.

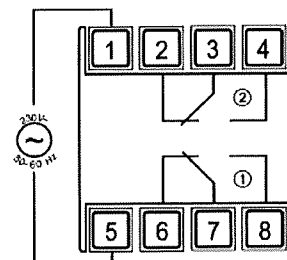
## DIMENSIONS (mm)



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User manual DWA

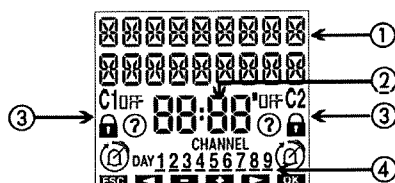
## WIRING DIAGRAMS

DWA2

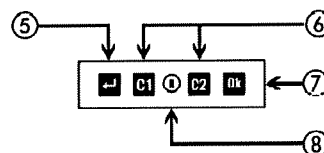


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User manual DWA

## DISPLAY AND KEYBOARD DESCRIPTION



- ① General indications
- ② Time indication
- ③ Channel 1/channel 2 status indication  
On/Off:  
○ : active manual program  
○ + ○ : blocked switchings  
○ + ② : active random switchings  
○ + On/Off (flashing) : active cycle switchings  
➤ : active holiday program  
□ : active pulse program
- ④ Day of the week (DAY) indication



- ⑤ Turn on the display  
Access the menu  
ESC (one level back)
  - ⑥ "C1": decrease datum/previous menu/ switching channel 1/  
lock channel 1  
"C2": increase datum/next menu/ switching channel 2/  
lock channel 2
  - ⑦ Confirm selection
  - ⑧ Hardware reset
- "OK" + "C1" (3 sec): active random switching on channel 1  
 "OK" + "C2" (3 sec): active random switching on channel 2  
 "ESC" + "C1" (3 sec): active cycle switching on channel 1  
 "ESC" + "C2" (3 sec): active cycle switching on channel 2

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User manual DWA

## INITIAL OPERATION

- Once out of the package, DWA is off: press the key **ESC** and wait a moment before activating the display
- The set language is English. To change it, press the key **ESC** for at least 3 seconds. Choose among: German, English, Spanish, French, Italian, Russian and confirm with **OK**.
- Make connections following the diagrams on page 5 of this manual
- Power DWA: the backlighting turns on permanently.
- The presence of the backup battery allows the DWA to have updated date and time.  
To make the other settings follow the following steps:

Date	- format: DD/MM/YY - 1 <sup>st</sup> day of the week: Monday
Astronomical coordinates	- country: France - city: Paris - latitude: North (48° 51' 36") - longitude: East (2° 21' 00")

Daylight Saving time (DST) - start of daylight saving time (DST):  
change: active

last Sunday of March at 02:00  
o'clock  
- end of daylight saving time (DST):  
last Sunday of October at 03:00  
o'clock

Time correction: - sunrise: +0:00  
- sunset: +0:00

Time zone: +1:00 UTC

Random switchings: - minimum: 1 minute  
- maximum: 5 minutes


Cycle switchings: - ON duration: 1 minute  
- OFF duration: 1 minute

PIN protection: disabled (---)

Bluetooth: disabled (Password: 000000)

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User manual DWA

**START PAGE (or main)**



← information messages  
← date  
← relay 2 status (only for DWA2)  
← hour  
← day of the week  
← relay 1 status



**Information messages**

- day of the week
- product identification code and serial number
- battery status (only if discharged)
- NO SUPPLY\*

\* Only if DWA is not powered by mains.  
In this condition the backlighting is not active and the relay is in off status.

**NOTE:** Bluetooth interface is active only when DWA displays the start page (main) and only if it's mains power supplied. Therefore, to transfer programs from and to the times witch it is necessary to respect these conditions.

- Press the key:  
**[F1]** to access the menu of DWA  
**[C1]** and **[C2]** to change channel 1 and channel 2 status (only for DWA2)  
**[0%]** to display the Bluetooth signal level or the calculated sunrise and sunset times\*\*


\*\* The displayed times take into account possible entered values of correction (see page 18)  
 if the display shows  means that the calculated sunrise time is after the sunset time if the display show  means that the calculated sunrise time is before 00:00 or that the calculated sunset is at 23:59

**NOTE:** The device is supplied with deactivated Bluetooth interface. To activate it, access Bluetooth menu (see page 46).


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User manual DWA

**Access the store of your device, install and start the free app DBT TIMER**

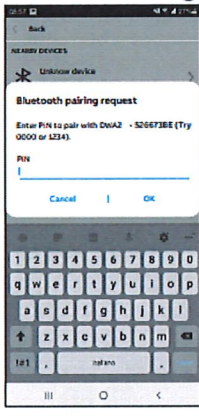
①




②




③



④




⑤



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User manual DWA

- ① Activate Bluetooth on DWA devices (see page 46).
- ② At the start the app displays the list of the associated DWA devices. To associate a new device, press the symbol "⌘" in the upper right corner.
- ③ All the Bluetooth devices detected nearby are displayed: select the device to be associated from the list.  
 Note: each device is identified by the product code (for example DWA) and by the serial number (for example 00000020). These informations can be viewed from the main page of the DWA  
 Warning: make sure that the DWA is mains powered, Bluetooth interface is activated and that the display shows the main page (initial). Otherwise the Bluetooth interface is not active and the device is not visible
- ④ Enter the password to associate the DWA with your device
- ⑤ After successfully completing the procedure, the DWA is added in the list of the associated devices.  
 Select the DWA on which you want to act from the list of the associated devices  
 Note: communication between the app and the DWA is point-to-point. This means that, even in the presence of multiple DWA, the app can communicate with one only at a time.  
 The DWA currently connected to the app displays the symbol \* immediately after the serial number
- ⑥ The app displays the initial page of the selected DWA. From this page you can:
  - a. Create new programs that will then be copied to the DWA
  - b. Change the settings of the DWA
  - c. View the parameters and associate an alias to the DWA
  - d. Manually control the relay output/s and activate the random switching function or cycle function.



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User manual DWA

## MANUAL SWITCHING

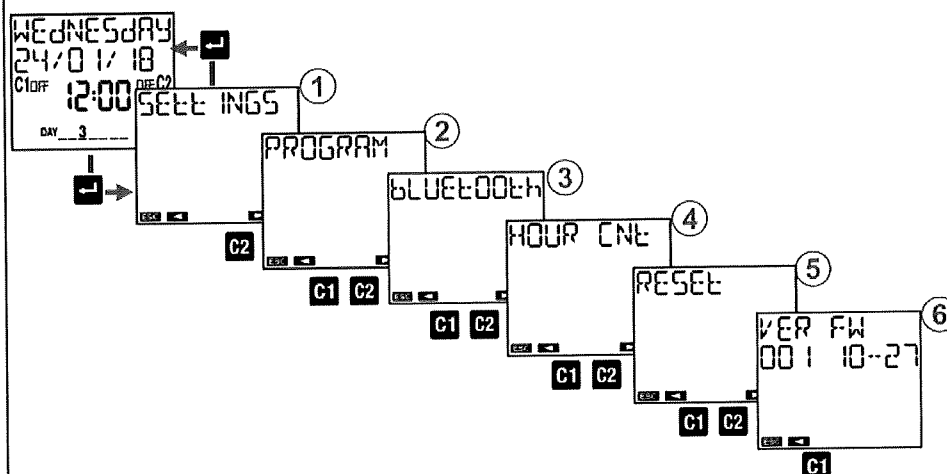
To manually take action on the channels of DWA time astronomical switches (activated with the combination described on page 6), carry out the operations described below:

- ① **SWITCHING CHANNEL:** press the key **C1** for channel 1 or **C2** for channel 2. If on becomes off and vice versa.  
 temporary on : the selected channel is set on until the next programmed off event  
 temporary off : the selected channel is set off until the next programmed on event
- ② **LOCK CHANNEL:** press for a long time (for 3 seconds at least) the key **C1** for channel 1 or **C2** for channel 2. The current state is locked until the unlocking (press again for a long time the key **C1** or **C2**).  
 permanent on : the selected channel is locked in on position until the manual unlocking  
 permanent off : the selected channel is locked in off position until the manual unlocking
- ③ **RANDOM SWITCHING:** press contemporary and for a long time (for 3 seconds at least) the key **OK** and **C1** for channel 1 or **C2** for channel 2. Press again simultaneously and for a long time the keys **OK** and **C1** or **C2** to disable the function.  
 random : the selected channel is set on and then will take place switching on/off at random intervals (the minimum and maximum interval can be set from "Settings → random" menu)
- ④ **CYCLE SWITCHING:** press contemporary and for a long time (for 3 seconds at least) the keys **OK** and **C1** for channel 1 or **C2** for channel 2. Press again simultaneously and for a long time the key **OK** and **C1** or **C2** to disable the function.  
 cycle (flashing) : the selected channel is set on and then will take place switching on/off (the on and off duration can be set from "Settings → cycle" menu).

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User manual DWA

## MENU DESCRIPTION

Press the key to access the menu



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User manual DWA

- ① **"Settings"** menu allows you to change: language, date, time, daylight saving time (DST), astronomical coordinates, minimum and maximum duration of the interval between two switchings with random program, ON and OFF duration of cycle switchings, PIN for keyboard lock.
- ② **"Programming"** menu allows you to set a new program or to check, to copy, to modify or to delete a set program.
- ③ **"Bluetooth"** menu allows you to configure the Bluetooth communication interface.
- ④ **"Hour counter"** menu allows you to check the operation hours (relay on) of the loads connected to the relays.
- ⑤ **"Reset"** menu allows you to reset settings, programmed settings, operating hour counter.
- ⑥ **"Ver FW"** menu allows you to check the firmware version installed on the device.

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User manual DWA

### SETTINGS MENU

"Settings" menu allows you to view and eventually to modify the the general operation settings of DWA, such as:

- ① language
- ② date
- ③ time
- ④ automatic daylight saving time (DST) change
- ⑤ position (astronomical coordinates)
- ⑥ interval duration between two random switchings
- ⑦ ON and OFF time duration for cycle switchings
- ⑧ keys protection by PIN

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### Language setting menu

Available languages:  
German, English, Spanish, French, Italian, Russian.

Quick access: from the main page it's possible to access the language setting by pressing the key for at least 3 seconds.

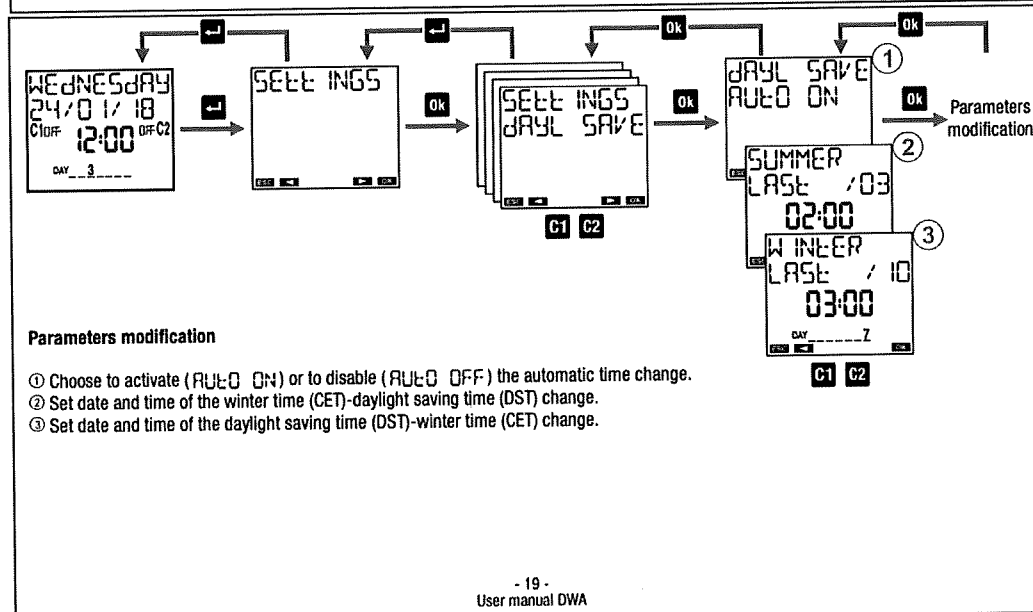
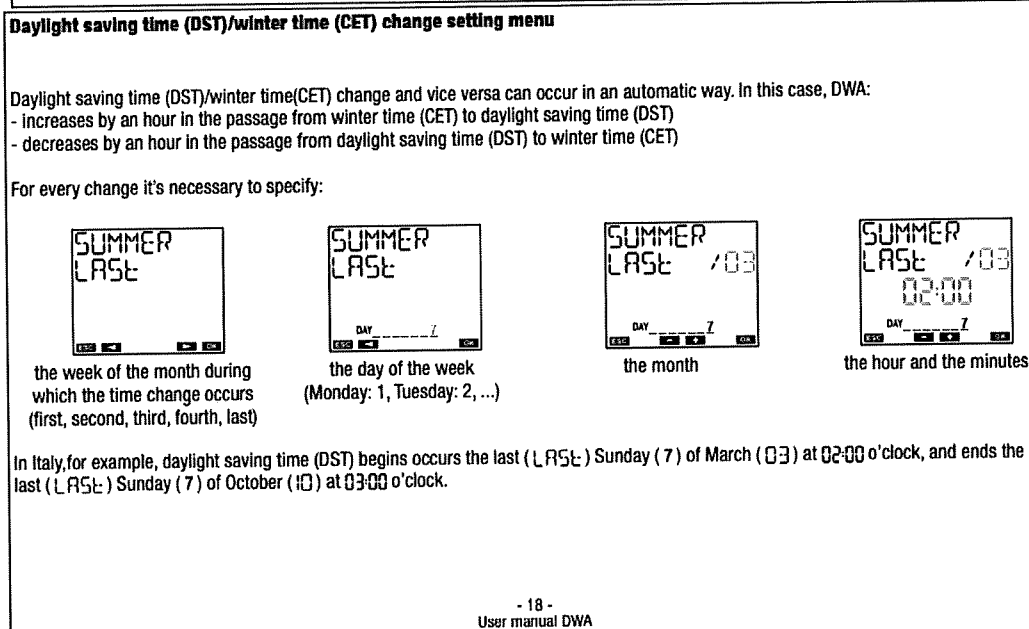
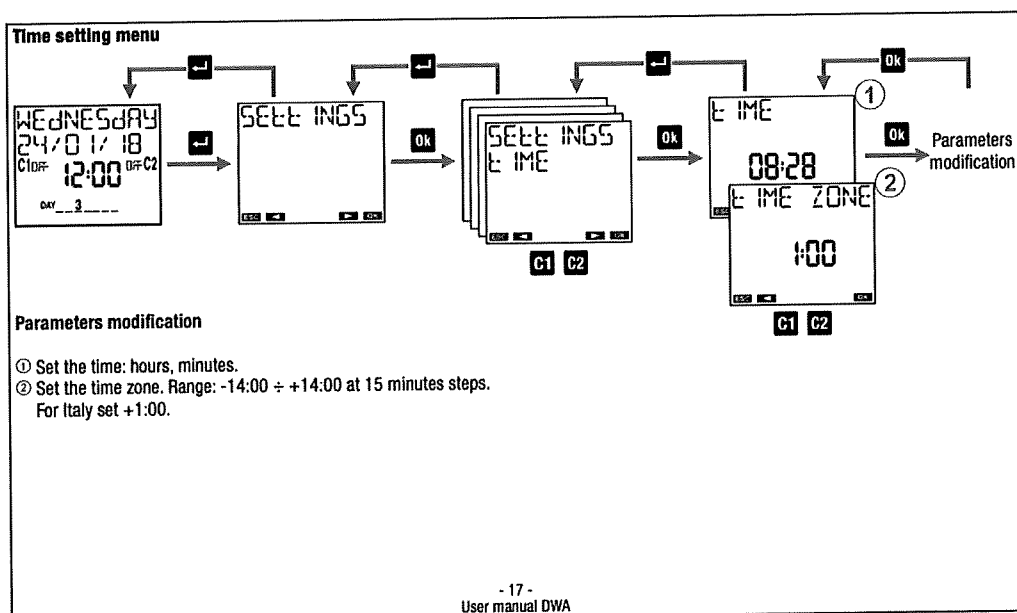
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### Date setting menu

**Parameters modification**

- ① Possible date formats: day-month-year (dd/MM/yy), year-month-day (yy/MM/dd), month-day-year (mm/dd/yy).
- ② Choose, by convention, the first day of the week. In Italy, for example, the first day of the week is Monday, in the UK it's Sunday.
- ③ Enter the date: day, month, year.

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## Astronomical coordinates setting menu

The setting of the geographical coordinates of the installation place allows DWA to calculate, for each day of the year, sunrise and sunset times.

To simplify the procedure, in the DWA are stored the coordinates of the locations listed below; if your location is among them you can select it from the menu ①, otherwise it's necessary to enter the coordinates of latitude and longitude (menu ② ③).

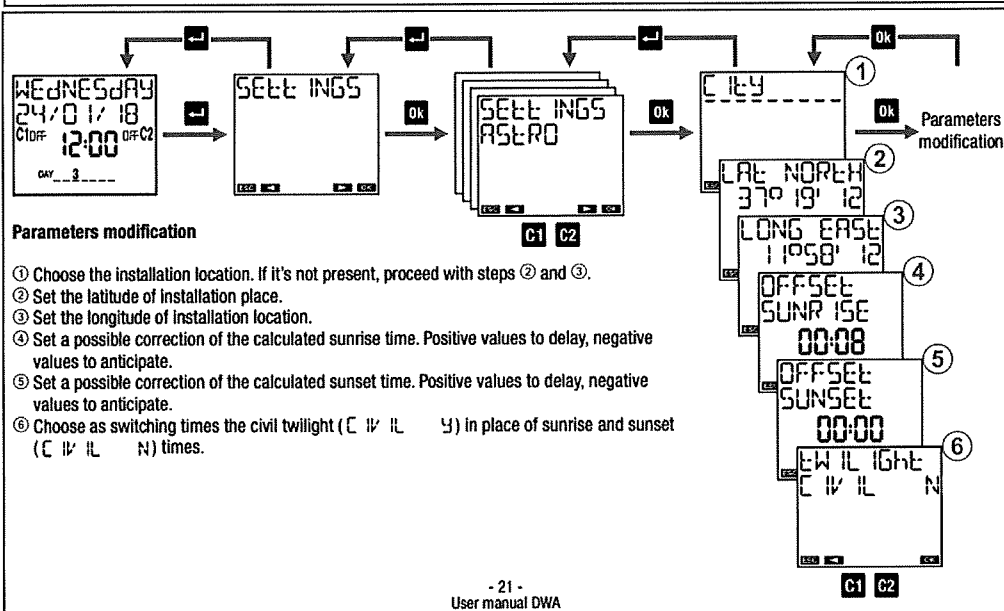
Note: the display on point ① shows "-----" if the coordinates have been entered.

Location stored in DWA: Major cities of France, Germany, Italy, Russia, Spain, United Kingdom and some other major cities in the rest of the world

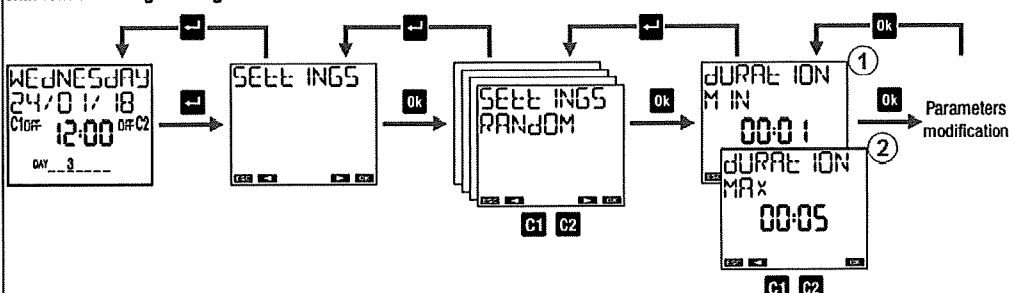
The correction of sunrise and sunset times is useful for applications that require the turning on of lights in particular localities. It's possible, in fact, that the presence of disturbing elements, such as the mountains, can influence actual times of sunrise and sunset, making it necessary to advance or delay of a few minutes the calculated times.

The twilight is the time interval before sunrise, or after sunset, characterized by the permanence of the light due to the spread by the atmosphere of the Sun light. During these time intervals it's possible to distinguish clearly objects and conduct outdoor activities without using additional lighting. Therefore, in some applications it is more interesting to take as times of switching on and off the twilight (civil) in place of sunrise and sunset. With DWA it's possible to choose to turn on/off the loads depending on the times of sunrise and sunset or the civil twilight. The calculated time correction also applies to the times of twilight. To view the calculated switching on time (sunset) and switching off time (sunrise), from the main page press the key **OK** (see page 8).

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## Random switchings setting menu



**Cycle switchings setting menu**

The "cycle switching" function (activated with the combination described on page 6) is a succession of on and off switching. The cycle programme always starts from the on status. In this menu it's possible to define the duration of on and off. The duration of the on and off duration cannot be less than one minute. Default on duration: 1minute, OFF duration: 1 minute

**Parameters modification**

① Set the ON duration. It's possible to set values between 1 minute and 99:59 hours.  
 ② Set the OFF duration. It's possible to set values between 1 minute and 99:59 hours.

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**Protection PIN setting menu**

The protection code (PIN) is used to lock the keyboard and prevent changes by unauthorized persons. With active PIN protection, pressing any key, it's necessary to enter the PIN: if PIN is correct the keyboard unlocks; after 3 minutes without pressing a key, the keyboard will lock automatically.

**To activate PIN protection:**  
 - set a value between 000 and 999

**To disable PIN protection:**  
 - set "---" (located before 000 or after 999)

Note: If you have forgotten your PIN code to unlock DWA it's necessary to carry out a hardware reset (see page 50).

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**PROGRAM MENU**

The menu "program" allows you to:

- ① create a new program
- ② check created programs
- ③ change or delete a created program
- ④ copy all created programs of channel 1 on the channel 2 and vice versa (only for DWA2)
- ⑤ delete all programs of a channel

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### Programs types

- Program ON/OFF: Is composed of a switching of the ON relay and of a subsequent switching of the OFF relay. It can have a daily period (everyday with the same modes), weekly (every week with the same modes)\*.
- PULSE ON Program: is an ON relay switching for a maximum duration of 59 seconds. It can have a daily period (everyday with the same modes), weekly (every week with the same modes)\*.
- PULSE OFF program: is a relay switching OFF for a maximum duration of 59 seconds. It can have daily period (everyday with the same modes), weekly (every week with the same modes)\*.
- HOLIDAY program: is a period of time defined by a start time and an end time within which all programmed switchings (of that channel) are disabled. The relay is in OFF position (OFF holiday) or in ON position (ON holiday).

### Channel types

- TIME channel: carries out programs of time type: ON / OFF, ON pulse, OFF pulse, holiday
- ASTRO channel: carries out programs of astronomical type, i.e. in the interval delimited by sunrise and sunset\*: ON/OFF, ON pulse, OFF pulse, holiday, night programs (see pages 34-35). ON switchings set before sunset are carried out at sunset, OFF switchings set after sunrise are carried out at sunrise (except for some night programs that can have switching on or switching off during the day. See on page 34).

\* times of sunrise and sunset are automatically calculated by DWA according to geographic coordinates set during installation. In place of sunrise and sunset times it's possible to use the times of civil twilight (see page 18).

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- ⚠ **Important:** on the same channel can't coexist ON pulses and OFF pulses (if an ON pulse is already present, it's not possible to save a holiday OFF program and vice versa).
- ⚠ **Important:** on the same channel can't coexist holiday ON programs and holiday OFF programs (if a holiday ON program is already present, it's not possible to save a holiday OFF program and vice versa).
- ⚠ **Important:** a channel may be either of clockwise or of astronomical type, but it can't be of both types simultaneously. It's not possible to save programs of astronomical type on a channel where are stored programs of time type (and vice versa). Messages of **ERROR 011** (astro program on channel astro) and **ERROR 012** (time program on astro channel). In this case to proceed it's necessary to delete the saved programs on that channel (see page 45).

### Programs priority

The priority programs defines how DWA manages the case in which programs with different period are running at the same time (1 indicates higher priority).

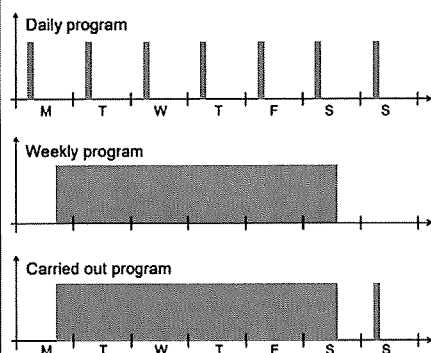
Program	Date*	Weekly	Daily
Holiday		1	
Pulse		2	
On/Off		3	4

\* Date: select day, month, year (program carried "only once in the life of the product"). If the month is not specified, the program is carried out all days xx of all months of the specified year.

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### Priority list on/off

In case in which, on the same channel, on/off programs are provided with different period (daily or weekly) to carry out in the same day, only the program with the highest priority is executed.

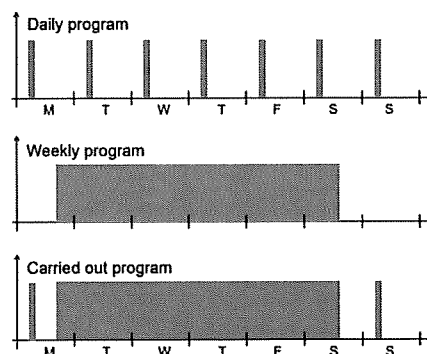


From this example it's possible to see that the daily event on Monday is not carried out because in the same day it is provided the beginning of the week program (even if the daily program

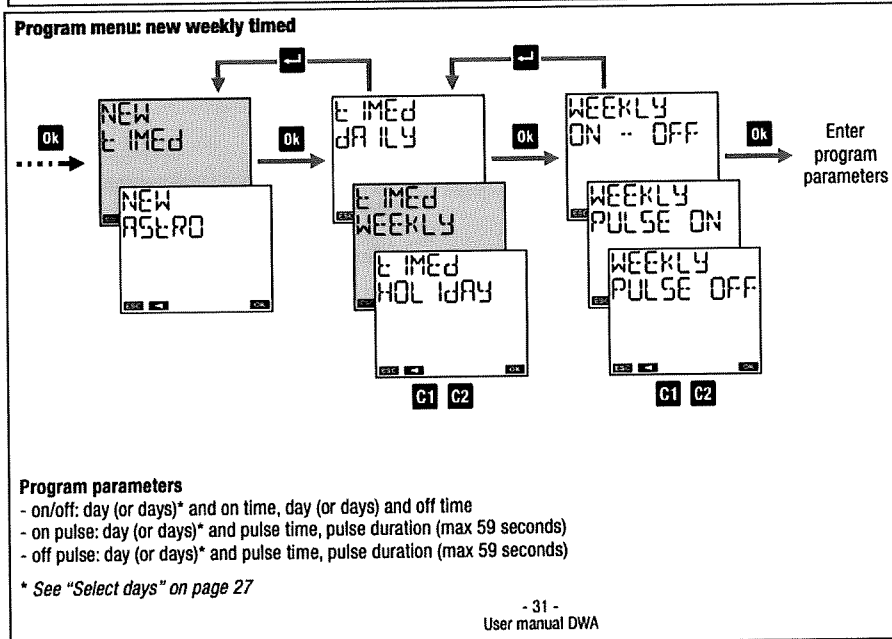
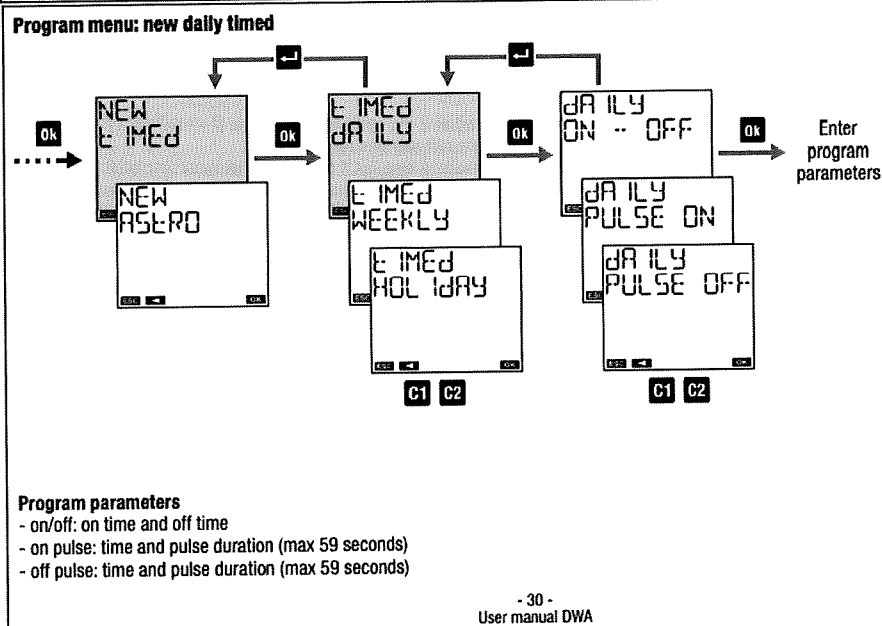
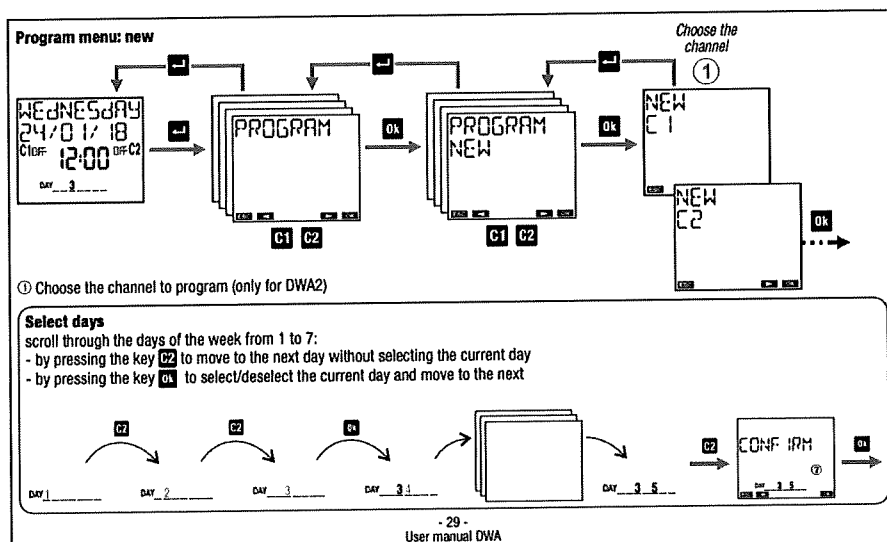
of Monday begins and ends before the beginning of the weekly program). Instead, the daily program of Sunday is carried out because it's the only one running for that day.

### Holiday program

The holiday program just begins and ends exactly at the specified times.



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### How to select nights

scroll through the nights of the week from the first (1-2) to the last (7-1):

- by pressing the key **⏮** key to move to the next night without selecting the current night
- by pressing the key **OK** to select/deselect the current night and move to the next



### How to interpret the selection

If the night between the days of A and B is selected, the day A is on and underlined while B is on (not underlined).

Examples of selection:

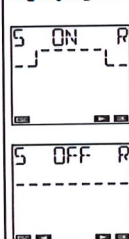
DAY 1 2 3 4 5 Selected nights: between day 1 and 2, between day 2 and 3, between day 3 and 4, between day 4 and 5

DAY 1 2 3 4 5 Selected nights: between day 1 and 2, between day 2 and 3, between day 4 and 5

DAY 1 2 3 4 7 Selected nights: between day 1 and 2, between day 3 and 4, between day 7 and 1

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### Night programs



① Turning on at sunset, turning off at sunrise.  
No parameter required.

② Off from sunset to sunrise.  
No parameter required.

\* If off time is before sunset, switching is not carried out. If on time is after sunrise, switching is not carried out.

\*\* Switching on continues for the entire set time interval (also if off time is after sunrise).

\*\*\* Switching on occurs before sunrise of the entire set time interval (also if on time is before sunset).



③ Turning on at sunset, turning off during the night. Turning on during the night, turning off at sunrise.

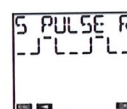
Choose one of the three following cases:



Turning on at sunset, turning off at a settable time.  
Turning on at a settable time, turning off at sunrise. (\*)

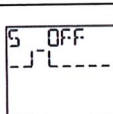


Turning on at sunset, turning off after a settable time interval.  
Turning on before sunrise of a settable time interval, turning off at sunrise.



Turning on at sunset for a settable short duration (pulse, max 59 seconds).  
Turning on at sunrise for a short settable duration (pulse, max 59 seconds).

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④ Turning on at sunset, turning off during the night.  
Choose one of the 3 following cases:



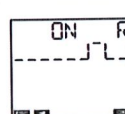
Turning on at sunset, turning off at a settable time. (\*) (\*\*)



Turning on at sunset, turning off after a settable time interval. (\*\*)



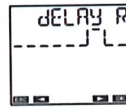
Turning on at sunset for a settable short duration (pulse, max 59 seconds).



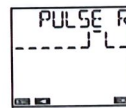
⑤ Turning on during the night, turning off at sunrise.  
Choose one of the three following cases:



Turning on at a settable time, turning off at sunrise. (\*) (\*\*)

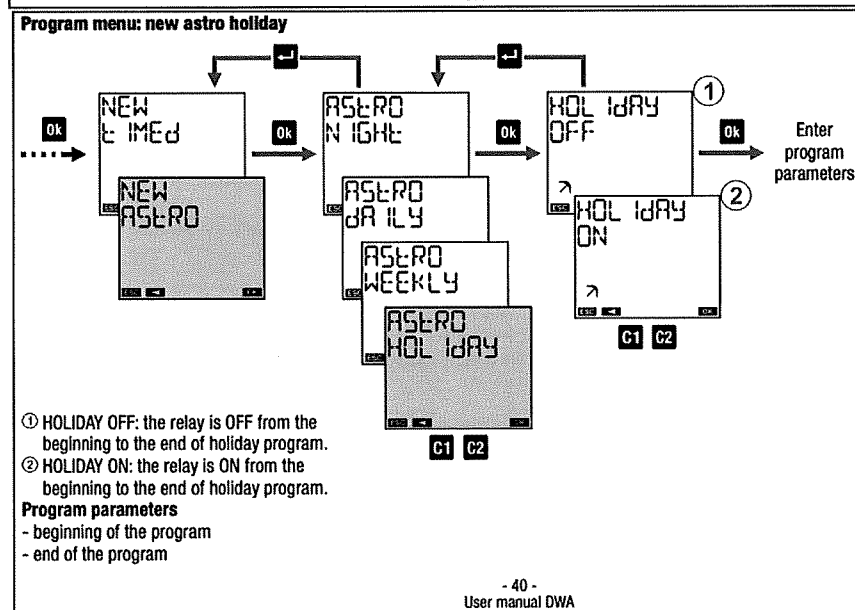
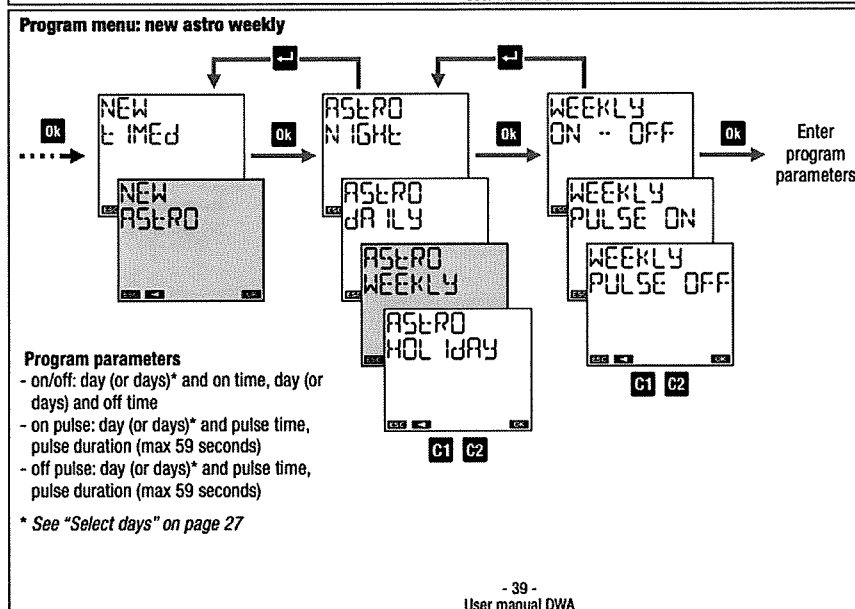
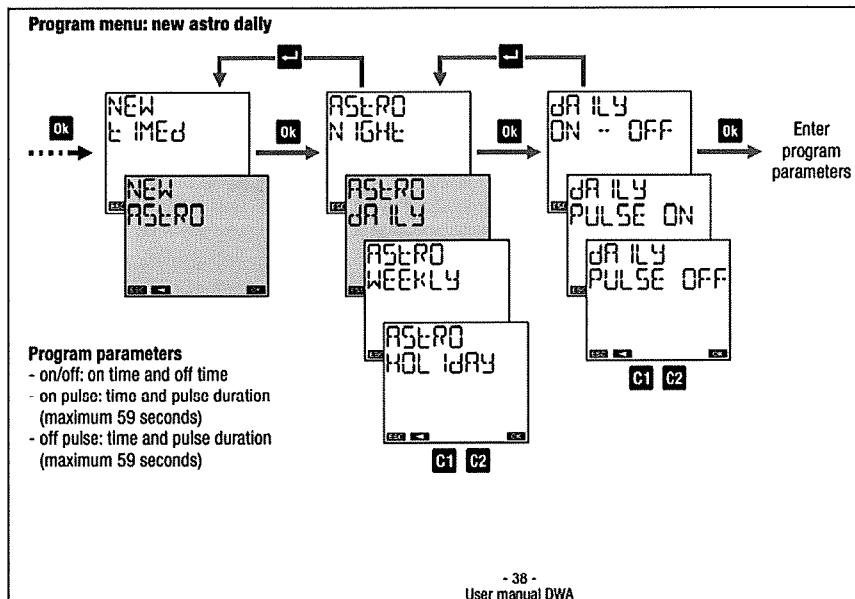


Turning on before sunrise of a settable time interval, turning off at sunrise. (\*\*)

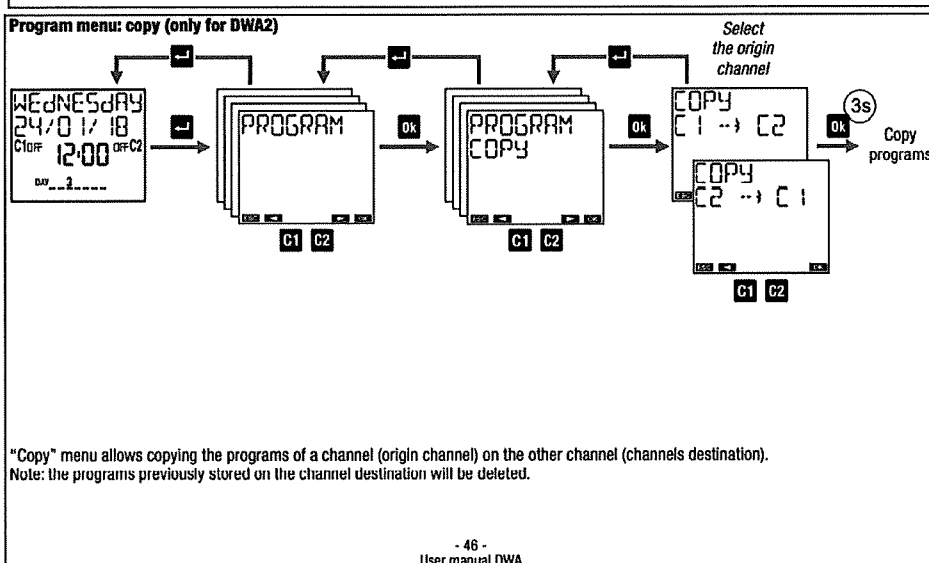
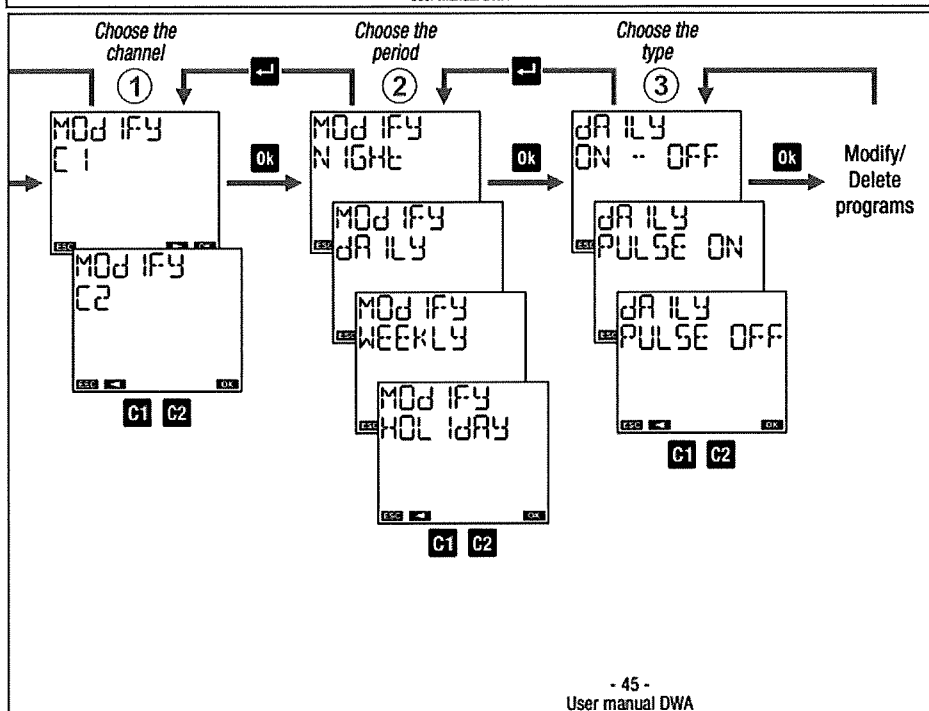
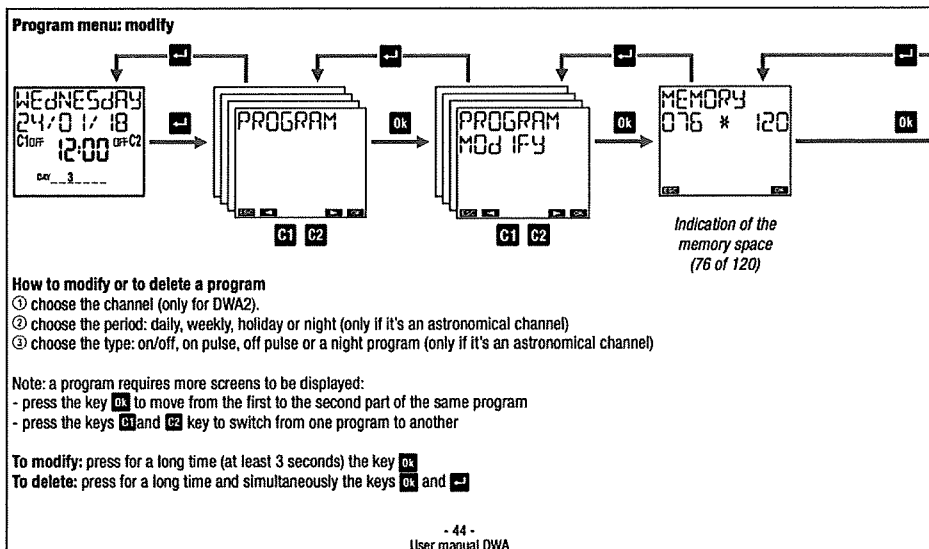


Turning on at sunrise for a settable short duration (pulse, max 59 seconds).

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## 

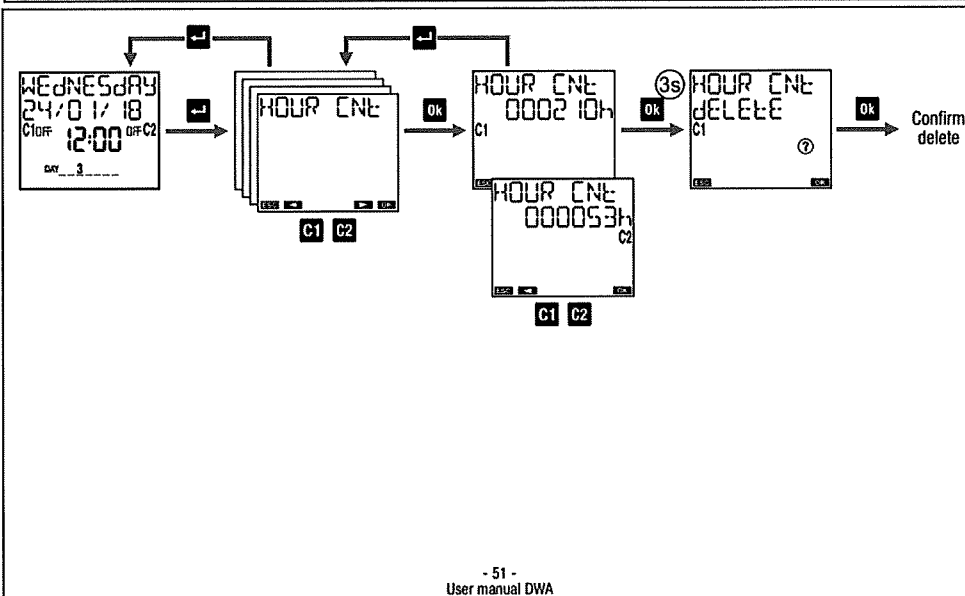
"Hour counter" menu allows you to display the hours of use (relay on) of connected loads. The maximum value of the counter is 99999 hours (about 11 years); reached the maximum limit, the counter resets automatically.

### 

1. select the desired channel (only for DWA2)
2. press the key **OK** for 3 seconds until the display shows "HOUR CNE DELETE ⑦"
3. confirm by pressing **OK** (press **ESC** to exit without zeroing)

Note: it's possible to reset all counters contemporary from the "Reset" menu (see page 50).

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## 

"Reset" menu allows you to restore the initial state of the device.

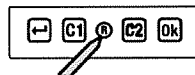
### 

- ① Settings reset: deletes all the carried out settings (except the language and the PIN)
- ② Time programs reset: deletes all saved time programs
- ③ Holiday programs reset: deletes all saved holiday programs
- ④ Astro programs reset: deletes all saved astronomical programs
- ⑤ Counter reset: resets the counters of all channels
- ⑥ Reset all: carries out all the above described resets and deletes the language and PIN protection

There is also another reset, of hardware type, which allows you to reset the device in case it responds to the pressing of the keys so unexpectedly, without losing the carried out settings/programs (only the date and the time are lost).

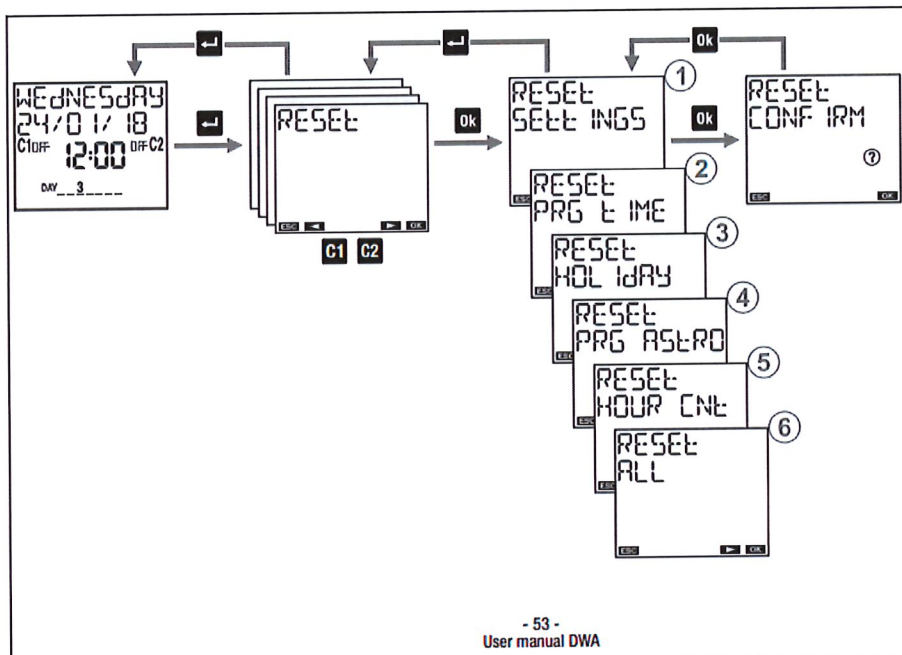
### 

1. press the key "R" with a sharp object



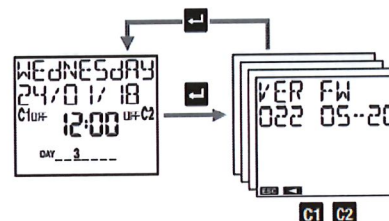
The hardware reset is also useful when you forget PIN protection. Reset, in fact, unlocks the keyboard for 3 minutes, the necessary time to access the appropriate menu and check/disable PIN.

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User manual DWA



### FIRMWARE MENU

This menu shows the firmware installed in the device, where:  
022 is the revision index  
05 is the month  
20 is the day




### ERROR SIGNALS

When setting up programs, in case of a discrepancy, the following error messages can occur:

- ERROR 001 on and off events with different frequency (each on event must have an off event)  
ERROR 002 on and off concomitant events of the same program  
ERROR 003 Two or more consecutive on events of the same program / Two or more consecutive off events of the same program  
ERROR 004 Invalid date  
ERROR 005 Insufficient memory  
ERROR 006 Attempt to set an on pulse on a channel where is already stored an off pulse (see page 25)  
ERROR 007 Attempt to set an off pulse on a channel where is already stored an on impulse (see page 25)  
ERROR 008 Attempt to set an on holiday program on a channel where is already stored an off holiday program (see page 25)  
ERROR 009 Attempt to set a holiday off program on a channel where a holiday on program is already stored (see page 25)

- ERROR 010 Attempt to set a holiday program of on and off events on different days of the week (see page 31)  
ERROR 011 Attempt to set an astro program on a channel of time (see page 25)  
ERROR 012 Attempt to set a time program on a channel of time type (see page 25)  
ERROR 030 Error accessing memory \*

\* In this case, carry out a hardware reset (see page 50).  
If the error persists, contact ABB technical support mobile

BATTERY MANAGEMENT	REFERENCE STANDARDS
<p>When the battery is close to empty, on the first line of the display appears <b>LOW BATT</b>. In this case, the battery must be replaced as soon as possible. <b>Use only batteries of CR2032.</b></p> <p>To replace the battery:</p> <ul style="list-style-type: none"> <li>- disconnect the mains</li> <li>- remove the battery slot cover, turning it anti-clockwise</li> <li>- replace the battery and remount the cover, turning it clockwise</li> <li>- connect the power supply</li> </ul> <p><b>Warning:</b> do not use metal objects (such as screwdrivers) to remove the battery because this may cause the power reserve to be canceled, resulting in a loss of date and time.</p> <p><b>Warning:</b> In order not to lose the programming steps and carried out settings, it is necessary to ensure that the time for the battery replacement doesn't exceed 60 seconds (in absence of power by means).</p> <p> Dispose of the used batteries observing the laws in force in relation to the disposal of hazardous waste.</p>	<p>EU CONFORMITY DECLARATION</p> <p>ABB declares that the device complies with the EU directive 2014/53/EU (RED) with reference to the following standards:</p> <ul style="list-style-type: none"> <li>• EN 60730-2-7</li> <li>• ETSI EN 301 489-1</li> <li>• ETSI EN 301 489-17</li> <li>• ETSI EN 300 328</li> </ul> <p>The complete text of EU conformity declaration is available at the Internet address ABB - <a href="http://www.abb.com">www.abb.com</a></p>

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User manual DWA

2CSM441044D0201



ABB S.p.A  
V.le dell'Industria 18  
20010 Vittuone (MI) - Italy  
Tel. +39 02 2415 0000  
<https://new.abb.com/low-voltage>

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10-2020

## 12. FAULT FINDING CHART

Fault	Cause	Remedy
Motor does not start	Main switch on (pos 0)	Turn on main switch (pos 1)
	One or more phase missing	Power wrong connected, rectify connection
	Lid not properly closed	Close lid
	Not enough solution	Add water and detergent
	Fluid level guard dirty	Clean level guard
	Pump safety switch triggered off	Reset safety switch
	Lid limit switch wrongly set/ faulty	Set correctly/change limit switch
	Fluid level guard faulty	Change level guard
	Cleaning time relay faulty	Change time relay
	Contactor faulty	Change contactor
Spray pipe assembly does not rotate	Pump rotating in the wrong direction	Power wrong connected, rectify connection
	Reaction nozzle blocked or adjustment screw closed	Clean or open reaction nozzle
	Water chamber worn	Change bearing bushes of water chamber
Poor cleaning result	Pump rotating in the wrong direction	Power wrong connected, rectify connection
	Not enough detergent	Add detergent
	Dirty solution	Change solution
	Spray pipe assembly does not rotate	See above
	Nozzle holes worn	Change spray pipes
	Pump impeller worn	Fit new impeller
Temperature too low	Temperature set wrong on thermostat	Set thermostat correctly
	Not enough solution; fluid level guard switched heating off	Add water and detergent
	Fluid level guard dirty	Clean level guard
	Fuse triggered off	Reset fuse
	Heating element dirty	Clean heating element
	Thermostat faulty	Change thermostat
	Contactor faulty	Change contactor
	Fluid level guard faulty	Change level guard
	Heating element burnt out	Change heating element
	One or more phase missing	Power wrong connected, rectify connection
Temperature too high	Temperature set wrong on thermostat	Set thermostat correctly
	Thermostat fails to switch heating off	Change thermostat
	Contactor faulty	Change contactor

Fault	Cause	Remedy
Excessive foaming	Too low temperature	Raise temperature
	Cavitation in pump	Reduce temperature
	Dirty solution	Change solution
	Wrong detergent	Change detergent or add anti-foam agent
Pump/motor noisy	Cavitation in pump	Reduce temp. below +80 °C
	Pump blocked up	Clean pump/filter
	Impeller dirty	Clean impeller
	Motor bearings faulty	Change bearings
	Impeller faulty	Change impeller
Motor overheats	Dirt between pump impeller and pump chamber	Clean pump
	Bearings faulty	Change bearings
Leaking pump seal	Defective shaft seal	Fit new shaft seal set
Motor fails to stop	Cleaning time relay faulty	Change time relay
	Contactors faulty	Change contactors

### 13. WARRANTY TERMS

**TEIJO Cleaning Machines Ltd.** guarantees the cleaning machine in respect of bad workmanship or faulty components for a period of one year from the date it has left the factory. During this time, the manufacturer must be informed for possible defects. The manufacturer either will repair the defective part or send a new part.

The warranty does not cover:

- defects due to the transport of the machine,
- defects due to negligence of the instructions for use, installation and maintenance,
- malfunctions and defects due to the reparations or changes in structure done by any other than authorized maintenance personnel,
- defects due to careless or faulty handling,
- defects due to corrosion in case the start-up and operation during the warranty period have not been carried out in a correct way,
- parts subject to normal wear and tear, e.g. filters, nozzles, bulbs, seals, hoses.



**If the machine is used in several shifts, the warranty time is limited.**

## 14. TO USER'S ATTENTION

### TO USER'S ATTENTION!

#### DAILY

- check washing liquid level
- clean and rinse filter basket
- check temperature of washing liquid (65 – 80 °C)
- check pump pressure
- check the free rotation of the spray pipe assemblies
- check and clean level guard

#### PERIODICALLY

- change washing liquid (1 – 4 weeks)
- clean and rinse interior of machine
- remove the dirt accumulated on machine bottom
- check pump operation

#### MONTHLY

- check rotation speed of spray pipe assembly (15 – 30 rpm)
- open clogged nozzles (Ø 2,5)
- rinse spray pipe assembly by removing plugs from pipe ends and by starting the pump

### READ THE INSTRUCTIONS OF USE AND MAINTENANCE!



EN Lid can be opened 10s after the pump has stopped.

SV Luckan kan öppnas 10s efter att pumpen stannat.

FI Kansi avattavissa 10s kuluttua pumpun  
pysähtymisestä

DE Deckel kann nach 10s geöffnet werden, nachdem die  
Pumpe gestoppt hat.

## 15. EC-Declaration of conformity



### EC Declaration of conformity for machinery

(Machinery Directive 2006/42/EC, Annex II., sub. A)

Manufacturer      TEIJO Pesukoneet Oy  
Address             Harjuntie 8, 29250 NAKKILA, Finland

Authorised to compile the technical file (to the authorities on request)

Herewith we declare that Teijo cleaning machine

#### Type

#### Serial No.

- is constructed and manufactured for the alkaline cleaning of components
- is in conformity with the relevant provisions of the Machinery Directive (2006/42/EC) and the applicable provisions of the following directives: 2014 / 35 EU, LVD and 2014/30 / EU, EMC and also insure

And furthermore, declare that

- the following parts of European harmonized standards have been used:

EN 60204-1:2018	Machine safety - Electrical equipment of machines Part 1: General requirements
EN ISO 13849-1:2016	Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design.
EN ISO 13849-2:2012	Safety of machinery - Safety-related parts of control systems - Part 2: Validation
SFS-EN 12921-1 + A1:en (2010)	Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours. Part 1: Common safety requirements
SFS-EN 12921-2 + A1:en (2009)	Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours. Part 2: Safety of machines using water based cleaning liquids

Nakkila DD.MM.YYY

**TEIJO Pesukoneet Oy**

.....

**ADDRESS**  
TEIJO Pesukoneet Oy  
Harjuntie 8  
FI-29250 NAKKILA  
FINLAND

**CONTACT**  
+358(2) 531 2200  
[teijo@teijopesu.fi](mailto:teijo@teijopesu.fi)  
[www.teijopesu.fi](http://www.teijopesu.fi)

**BANK**  
Nordea Bank Finland  
IBAN FI1424441800060517  
BIC NDEA FI HH

**VAT no.** FI06715648  
**Company ID:** 06715648  
Kmro 408.509  
**Reg. office:** Nakkila  
56 28 07-8

## **16. ELECTRICAL DIAGRAMS**

Electrical diagrams will be supplied separately.

## Notes

[illegible]

## Notes

[illegible]

## Notes

[illegible]

## Notes

[illegible]

## 17. INSTRUCTION MANUALS VERSIONS

TEIJO Cleaning Machines Ltd. reserves the right to update the instruction manual if necessary.

Please find below the latest update to the manual with the relevant modifications.

Version	Name of document	Details	Author / Approver	Date
1.0	TL-650SS...1150SS_2023_Eng_v-1.0	Official instructions manual.	Author: L.K. Approver: P.K.	20.11.2023
Version	Name of document	Details / Updates	Author / Approver	Date
1.1	TL-models_2024_EN_v-1.1	Official instructions manual. <u>Updates:</u> ➤ Chapter <a href="#">9.1</a> > Order code update, Pos.9: PI740 replaces PI670 ➤ Chapter <a href="#">11.</a> > Order code update, PI740 replaces PI670 ➤ Insertion of chapter <a href="#">17.</a>	Author: L.K.	27.03.2024
1.2	TL-models_2024_EN_v-1.2	Official instructions manual. <u>Updates:</u> ➤ Chapter <a href="#">4.5</a> Steam extractor exhaust duct 100 mm (was 110 mm)	Author: L.K.	19.06.2024

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TL-models\_2024\_EN\_v-1.2