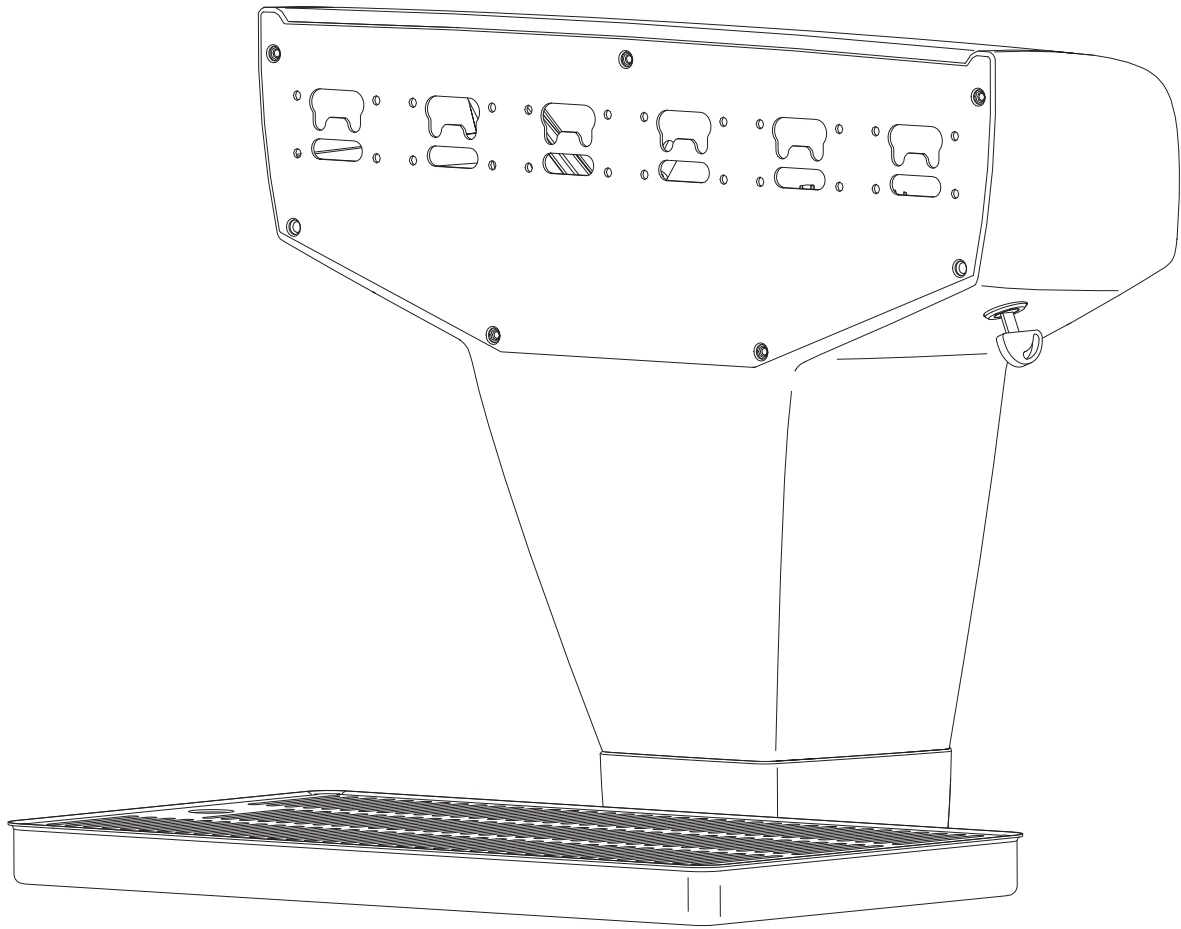


# Installation and service manual



Tower

Nueva Style



## Legal notice

Installation and service manual (Original)

Document no. TD0004100

Tower

Unit ID no. 221000250

Nueva Style

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### NOTICE!

This unit comes with a complete installation and service manual for the dispensing valves used in the unit. The manual may also be downloaded from the website below or requested as a printed copy from the address below.

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# Installation and service manual

## Tower

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# 1 Safety

## 1.1 Intended use

By using the unit as intended you will not only protect yourself, but also prevent damage occurring to the unit and its components! You can find further information about the intended use of the unit in the tower operator manual, document no. TD0004000.

## 1.2 Improper use

Improper use of the unit and unauthorised modifications to the unit and its components may cause personal injury and equipment damage for which Cornelius Deutschland GmbH shall assume no liability. Improper use of the unit is prohibited.

You can find further information about the improper use of the unit – and the meaning of improper use – in the tower operator manual, document no. TD0004000.

## 1.3 Staff

There is a clear definition as to what group of people is permitted to carry out what type of work on the unit. You can find further information about who is authorised to carry out what type of work on the unit in the tower operator manual, document no. TD0004000.

## 1.4 Presentation of warnings

The documents supplied with the unit provide warnings regarding any dangers or hazards that might exist. You can find more information about the design and presentation of warnings in the tower operator manual, document no. TD0004000.

## 1.5 Safety information

### 1.5.1 Safety information to prevent personal injury and equipment damage

Any work on the unit and its components which goes beyond operation and beyond the servicing and maintenance tasks that the operator is authorised for, may only be performed by **experts** (for a definition of experts, see the tower operator manual, document no. TD0004000). Furthermore, it is crucial that when performing work on the unit all safety information is observed; this information is set out in the following sections. Some of the tasks may have additional safety information which highlights the specific dangers or hazards associated with such work.

### 1.5.2 Safety information for using electrical assemblies



#### **DANGER!**

To prevent risks to health and safety, please always observe the following five safety rules:

These five safety rules are to be applied before carrying out work on the electrical system and in the order stated below. Once work is completed, the safety rules are to be undone again in reverse order.

- 1. Disconnect from power.
- 2. Secure against reconnection.
- 3. Check that the system is disconnected from power.
- 4. Ground and short-circuit the system.
- 5. Cover or separate adjacent live parts.



#### **WARNING!**

##### **Risk of burns when touching hot parts of the unit!**

Touching parts of the unit after it has been in continuous use over an extended period of time will result in a risk of burns.

- Take appropriate safeguard measures, such as by wearing heat-resistant protective gloves.



#### **NOTICE!**

- Make sure that the cable markers are not removed from the cables and/or mark or label the cables such that they can be correctly assigned during installation.



#### **ATTENTION!**

##### **Cables must be fixed in place using cable ties.**

When fixing cables in place using cable ties, observe the following points:

- Once work on the unit is completed, return the area to the same state that you found it in.
- Using cable ties, combines cables in a meaningful way.
- When installing cables, be mindful of any bending radiuses that the manufacturer may have specified.
- To fix cables in place using cable ties, use the mounting bases provided.

## 2 Transport and packaging

Choose a suitable packaging when returning the unit itself or one of its components to Cornelius Deutschland GmbH, e.g. for repairs. In particular, make sure that the unit and any components are protected from shock/impact, moisture, dirt and electrostatic discharge (ESD). This will prevent transport damage to the unit and to the components, for which the manufacturer shall assume no liability.



### ATTENTION!

#### Component damage due to freezing liquids!

Ambient temperatures that are below freezing will lead to the freezing of any water or cleaning agent residue remaining inside the unit. This will lead to damage to internal components.

- Before shipment, storage or relocation of the unit, the unit is to be cleaned and the cleaning solution is to be fully drained from the unit.
- 

### 2.1 Storage

Avoid excessive temperature fluctuations as condensate may form, which in turn may cause damage to the unit or to the components.

The permissible storage temperature is -10 °C to +50 °C.

The acclimatisation period is 6 hours.



### ATTENTION!

#### Damage due to improper storage!

Dirt or moisture entering a unit, as well as certain weather conditions (e.g. condensate forming in the unit, sunlight) will cause damage to the unit and its components.

- Protect the unit and its components by storing the unit in a clean and dry place, and by ensuring stable ambient conditions.
  - If possible, store the unit in its original packaging. Unpacked units must be covered with a dustproof cover. No condensate must form under the cover.
- 



### ATTENTION!

#### Risk of electrostatic charge!

Improper handling or storage may result in electrostatic charges.

- If possible, store units and/or any electronic components in their original packaging.
  - Keep units and/or electronic components away from charged objects, fields and insulators.
  - Avoid electrostatic charges when removing packaging and/or handling electronic assemblies and components by working at an ESD-protected workstation or work area.
  - When working at the unit or its components, wear a grounding (antistatic) wrist strap at the very least and wear antistatic gloves if necessary.
- 



### ATTENTION!

#### Component damage due to material ageing!

Material can age due to long storage periods, thereby affecting the material's properties (e.g. plastics and seals may become brittle). The properties of lubricants may change due to long storage periods.

- Check the assemblies and components for damage before each use/before installing them. Do not install assemblies or components that show visible signs of ageing.
- 

### 2.2 Disposal

Disposal of the units must be carried out in compliance with the applicable local and/or national and international regulations. Units must not be disposed of with household waste.

If the unit contains fuels or lubricants in liquid, paste-like or gaseous form, such as oil, grease, cooling agents etc., such fuels or lubricants are to be collected using appropriate measures and disposed of in compliance with the applicable local and/or national and international regulations. Such fuels or lubricants must always be prevented from seeping into the ground, the sewage system and any bodies of water, and must always be prevented from entering the atmosphere.

### 3 Description

#### 3.1 Tower

The unit comprises the following assemblies:

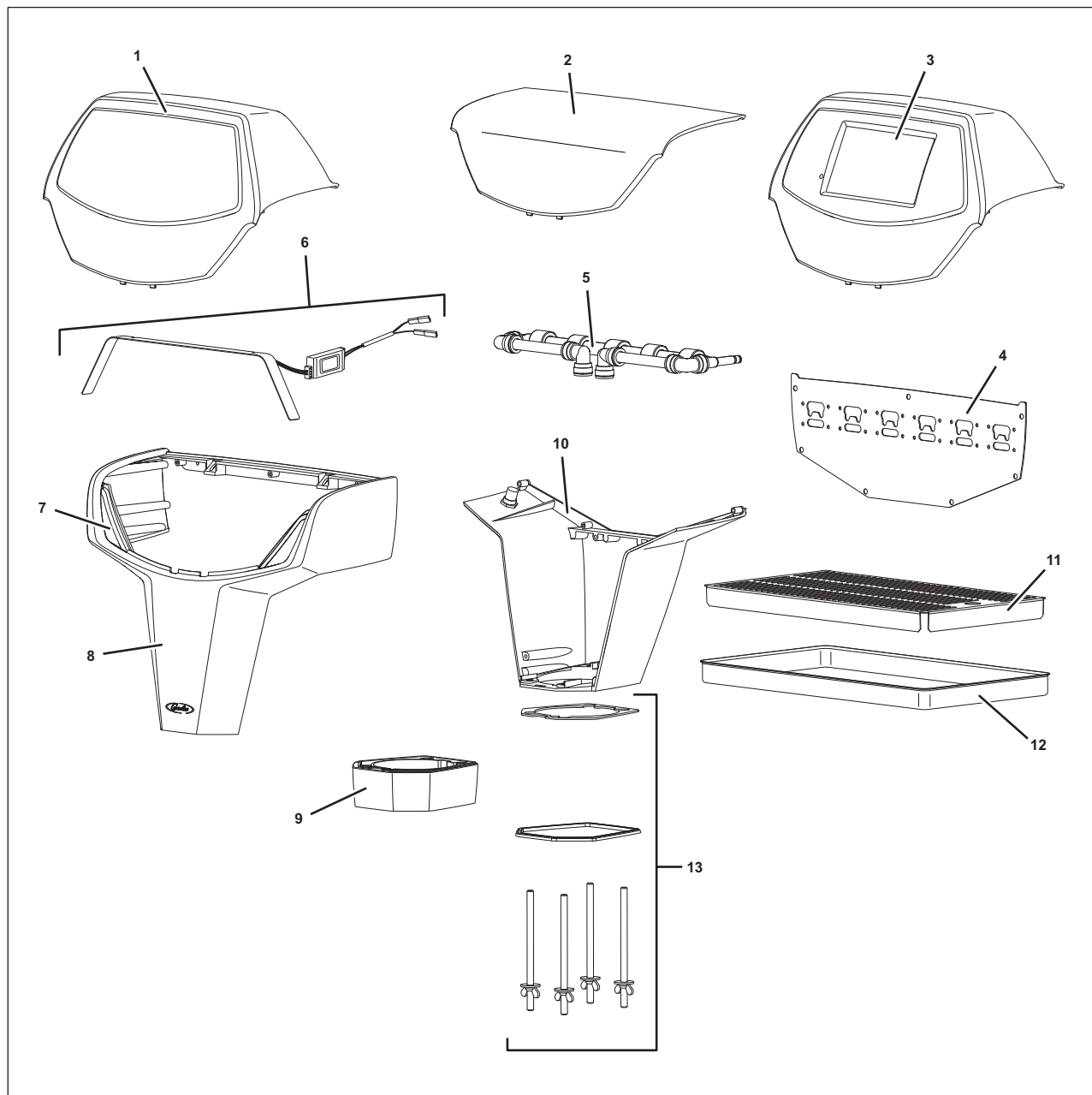


Fig. 1

- |                                       |                         |
|---------------------------------------|-------------------------|
| 1 Taxi cab hood with promotional sign | 8 Front panel           |
| 2 Hood                                | 9 Stand booster         |
| 3 Taxi cab hood with display          | 10 Rear panel           |
| 4 Dispensing valve support            | 11 Drip tray            |
| 5 Soda dispenser (optional)           | 12 Grill                |
| 6 Lighting kit                        | 13 Counter mounting kit |
| 7 Front insert                        |                         |

#### 3.2 Dispensing valves



##### NOTICE!

Information on the dispensing valves installed on your unit can be found in the binding documentation for the respective dispensing valve.

### 3.3 Functions within the dispensing system


**NOTICE!**

The description of how the unit works within the dispensing system is included in the relevant operator manual for this unit; see the document "Tower operator manual", document no. TD0004000.

### 3.4 Functions of the unit

Each individual beverage type is dispensed by opening the valve assigned to the respective beverage component in each respective dispensing valve.

The valves are controlled in accordance with the buttons on the control panels, which are pressed on the respective dispensing valve, or the dispensing lever.


**NOTICE!**

Information on the dispensing valves installed on your unit can be found in the binding documentation for the respective dispensing valve.

### 3.5 Technical data

#### 3.5.1 Tower

Description	Parameter	Value	Unit
Dimensions	Height	325 – 470 (12.8 – 18.5)	mm (inches)
	Width	420 – 552 (16.5 – 21.7)	mm (inches)
	Depth incl. drip tray	365 (14.4)	mm (inches)
Ambient temperature		-10 to +50	°C
Power supply	Supply voltage	24	V AC
	Frequency	50 – 60	Hz
Power input <sup>1</sup>	max.	100	W
Current consumption <sup>1</sup>	max.	4	A
Supply requirements	Max. pressure	0.35 (water) 0.49 (syrup, sugar) 0.25 (syrup, diet)	MPa
	Min. pressure	0.17 (water) 0.42 (syrup, sugar) 0.21 (syrup, diet)	MPa
Protection class		III / IP 21	
Flow rate	Depending on dispensing valve design		
Python length <sup>2</sup>	max.	50	m
Postmix	Depending on unit type	5 – 8	pcs.
Still water	Depending on unit type	1 – 4	pcs.
Key switch		I/O	

1. Dispensing to four dispensing valves simultaneously

2. Depending on the refrigerating unit

#### 3.5.2 Connections

Connection	Type/connection assignment	
Carbonated water inlet	10 mm ID <sup>1</sup> , 15 mm OD <sup>2</sup>	3/8 inch ID, 1/2 inch OD
Carbonated water return	10 mm ID, 15 mm OD	3/8 inch ID, 1/2 inch OD
Still water inlet	6 mm ID, 9.5 mm OD	1/4 inch ID, 3/8 inch OD
Postmix inlets	6 mm ID, 9.5 mm OD	1/4 inch ID, 3/8 inch OD
Cable 220097434	Power supply to the tower	
Cable 220046597	Power supply to the voltage transformer for the lighting kit	

1. ID = inside diameter

2. OD = outside diameter



## 4 Preparing the unit



### DANGER!

#### Risk of personal injury and equipment damage due to non-compliance with safety information!

Failure to observe the safety information will result in a risk of bringing about operating conditions at the unit, which may cause personal injury or equipment damage.

- Please always strictly observe all safety measures and information/instructions; see chapter 1.

This chapter describes the tasks that may be required before carrying out any actual maintenance or repair work.



### DANGER!

You may only continue working on the unit if the unit carries no voltage.

If the unit still carries a voltage after you have disconnected it from power, this indicates a defect. Resolve this defect before continuing the checks/inspections or any work.

### 4.1 Disconnecting the unit from power

Required tools/materials	ID/reference	Qty/ amount	Comment
Tower cable diagram	220046720	1	see chapter 10.1
Undercounter cooler cable diagram	Various	1	

1. Turn the key switch (Fig. 2/1) to position "0".
2. Disconnect the electrical cable (Fig. 2/4) (cable no. 220097434) on the transformer (Fig. 2/3) in the undercounter cooler.
3. **Only for units with a display:** Pull the electrical cable (Fig. 2/2) of the display out of the earthed socket.
4. Wait 1 minute before continuing your work on the unit.

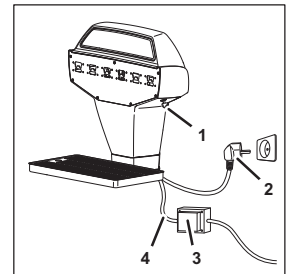


Fig. 2

## 5 Installation/removal



### DANGER!

#### Risk of personal injury and equipment damage due to non-compliance with safety information!

Failure to observe the safety information will result in a risk of bringing about operating conditions at the unit, which may cause personal injury or equipment damage.

- Please always strictly observe all safety measures and information/instructions; see chapter 1.



### NOTICE!

All installation, maintenance and repair work at the unit is to be carried out by an expert only.



### WARNING!

#### Risk of personal injury and equipment damage due to operation by non-qualified staff!

It is dangerous for non-qualified staff to operate the unit!

- Service operations on this unit may only be carried out by trained and certified experts who have been trained in carrying out service operations on this unit.
- All wiring and plumbing must be carried out in compliance with national and local laws, regulations and guidelines. Non-compliance with these laws, regulations and guidelines may result in death, serious injury or equipment damage.

## 5.1 Installation location



### NOTICE!

Observe all rules and regulations regarding installation rooms and electric connections as applicable in the individual countries, as well as accident prevention regulations.



### WARNING!

#### Risk of death due to insufficient load capacity!

If the unit is installed in a location with insufficient load capacity, this can result in serious injuries and damages!

- Install the unit at or on an installation location that offers a load capacity of min. 100 lbs (approx. 45 kg) remaining for this unit.



### NOTICE!

Many units include additional equipment, such as an ice maker. When using additional equipment, it is mandatory to check with the equipment manufacturer as to how much additional weight the product can accommodate while still ensuring safe installation.

The unit must be set up and installed close to an earthed mains socket. The electric circuit must be fuse-protected, and no additional units or devices must be connected to the electric circuit.

All connections and outlets/drains must comply with the applicable local and/or national and international regulations.

## 5.2 Preparing the installation location

Prerequisites	References		
The load capacity of the supporting structure must be at least that of the weight of the unit.			
There must be no objects at the installation location that might get in the way.			
The installation location must offer easy access to the unit, assemblies and components.			
Required tools/materials	ID/reference	Qty/amount	Comment
Drill template	143532200	1	
Pen/pencil		1	
Scissors or knife		1	
Hole punch		1	
Compass saw		1	
Power drill		1	
Drill bit	Ø 10 mm	1	
Hole saw	Ø 100 mm	1	
Socket spanner		1	
Silicone RTV		1	

1. Use drill templates only in their original size.
2. Draw the drill template onto the supporting structure.
3. Drill the holes for the threaded bolts into the supporting structure as indicated on the drill template.
4. Saw the opening for the tubes and cables into the supporting structure as indicated on the drill template.
5. Remove any dirt or dust from the supporting structure.

### 5.3 Installing the unit

Prerequisites		References	
The unit has been unpacked.		See the document "Tower operator manual", document no. TD0004000	
Preparation of the installation location is complete.		see chapter 5.2	
Required tools/materials	ID/reference	Qty/amount	Comment
Threaded bolts	143579150	4	
Washers	135916008	4	
Wing nuts	135891000	4	
Flat seal	220107136	1	Only when mounted <b>without</b> a stand booster
Sealing lip	220107137	1	Only when mounted <b>with</b> a stand booster
Stand booster	220107459	1	Neutral
	220107460	1	Red
	220107461	1	Blue
Tower cable diagram	220046720	1	see chapter 10.1
Undercounter cooler cable diagram	Various	1	
Operator manual Tower	Document no. TD0004000	1	
Undercounter cooler installation and service manual	Document no. Various	1	



#### DANGER!

#### Risk of personal injury and equipment damage due to non-compliance with rules and regulations!

Risk of death in the case of non-compliance with rules and regulations regarding connection of the water supply!

- In accordance with the current state of the art, install the water supply on the product using an air gap protection back flow system, a vacuum control valve or some other method that has proved effective during tests. Installation must be carried out in compliance with all federal, state and local laws.
- Water pipe connections and fixtures that are directly connected to the drinking water supply must be installed and serviced in compliance with federal, state and local laws.

#### Mounting the unit without a stand booster

1. Attach the threaded bolts (Fig. 3/1), on the stand (Fig. 3/2) of the unit, by screwing the threaded bolts into the stand (Fig. 3/2).

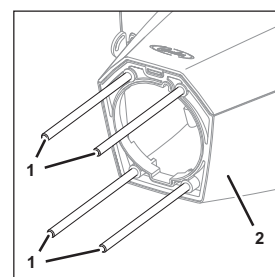


Fig. 3

2. Position the flat seal (Fig. 4/2) on the stand (Fig. 4/1) of the unit.

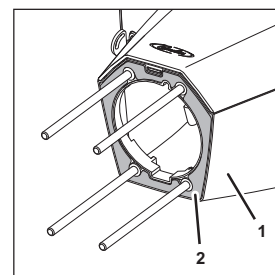


Fig. 4

3. Feed the tubes and cables through the opening into the supporting structure in a downward motion.
4. Place the unit onto the prepared supporting structure.

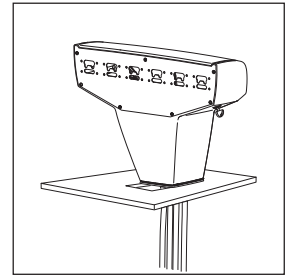


Fig. 5

5. Attach the unit to the supporting structure using threaded bolts (Fig. 6/3), wing nuts (Fig. 6/1) and washers (Fig. 6/2), and tighten the wing nuts evenly. Check that the unit is properly attached. After attachment, the unit must not tilt or overturn.

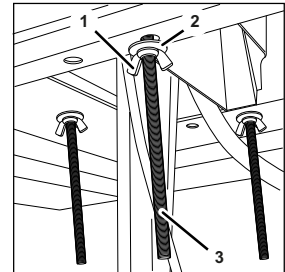


Fig. 6

6. Remove the caps from all tubes.
7. Connect all tubes (Fig. 7/1) to the python (Fig. 7/2). Observe the labels on each individual tube as you connect the tubes.
8. Properly insulate the tubes.

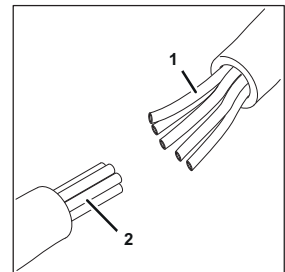


Fig. 7

9. Position the drip tray (Fig. 8/6) with grill on the unit; see chapter 7.2.
10. Connect the electrical cable (Fig. 8/5) (cable no. 220097434) to the transformer (Fig. 8/4) in the undercounter cooler.
11. **Only for units with a display:** Plug the electrical cable (Fig. 8/1) into an earthed socket.
12. **Only for units with a display:** Connect a player (Fig. 8/2) with the USB connection (Fig. 8/3) of the unit.
13. Put the unit into service ("commissioning"); see chapter 8.1.

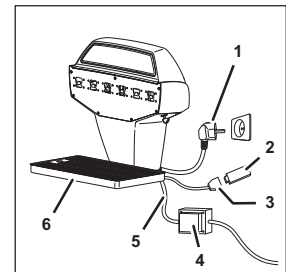


Fig. 8

#### Mounting the unit with a stand booster

1. Attach the threaded bolts (Fig. 9/1), on the stand (Fig. 9/2) of the unit, by screwing the threaded bolts into the stand (Fig. 9/2).

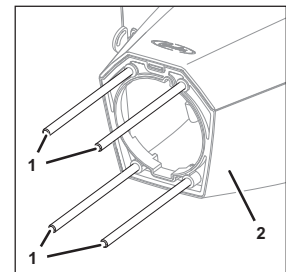


Fig. 9

- Position the stand booster (Fig. 10/2) on the stand (Fig. 10/1) of the unit.

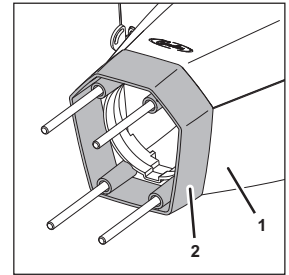


Fig. 10

- Position the sealing lip (Fig. 11/1) on the stand booster (Fig. 11/2).
- Proceed with step 3 of "Mounting the unit without a stand booster".

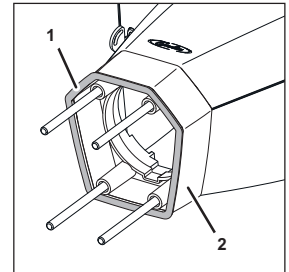


Fig. 11

## 5.4 Removing the unit

Prerequisites		References	
The undercounter cooler has been shut down.		See the document "Undercounter cooler installation and service manual"	
The unit has been shut down.		see chapter 4.1	
The drip tray has been removed.		see chapter 7.2	
Required tools/materials	ID/reference	Qty/amount	Comment
Tower cable diagram	220046720	1	see chapter 10.1
Undercounter cooler installation and service manual	Document no. Various	1	

### Removing the unit without a stand booster

- Only for units with a display:** Pull the electrical cable (Fig. 12/1) out of the earthed socket.
- Only for units with a display:** Pull the player (Fig. 12/2) from the USB connection (Fig. 12/3) of the unit.
- Disconnect the electrical cable (Fig. 12/5) (cable no. 220097434) on the transformer (Fig. 12/4) in the undercounter cooler.

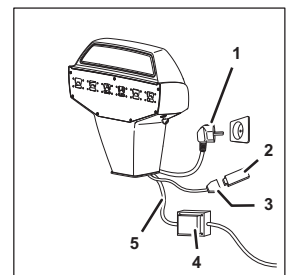


Fig. 12

- Disconnect all tubes (Fig. 13/1) from the python (Fig. 13/2).
- Attach a cap to each tube.

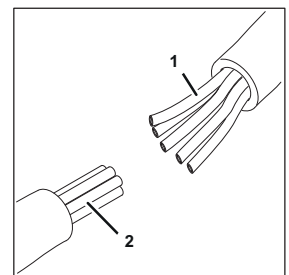


Fig. 13

5. Remove the wing nuts (Fig. 14/1) and washers (Fig. 14/2) on the threaded bolts (Fig. 14/4) used to attach the unit to the supporting structure.

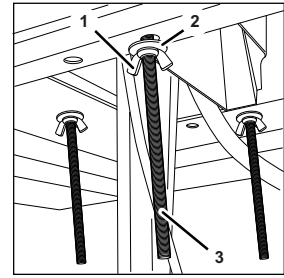


Fig. 14

6. Lift and remove the unit from the supporting structure.
7. Pull out the tubes and cables through the opening of the supporting structure in an upward motion.

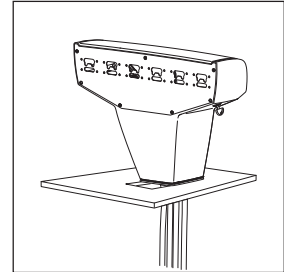


Fig. 15

8. Remove the flat seal (Fig. 16/2) from the stand (Fig. 16/1) of the unit.

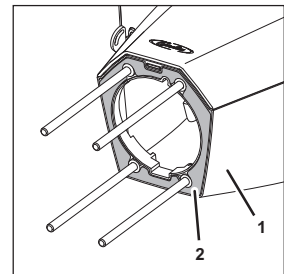


Fig. 16

9. Remove the threaded bolts (Fig. 17/1), on the stand (Fig. 17/2) of the unit, by unscrewing the threaded bolts from the stand (Fig. 17/2).
10. Pack the unit as described in chapter 2.

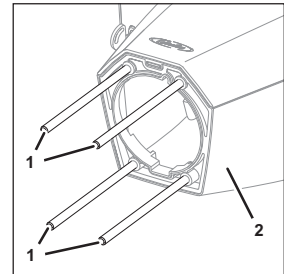


Fig. 17

### Removing the unit with a stand booster

1. Carry out step 1 to step 8 of "Removing the unit without a stand booster".
2. Remove the sealing lip (Fig. 18/1) from the stand booster (Fig. 18/2).

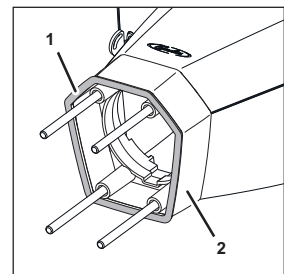


Fig. 18

- Remove the stand booster (Fig. 19/2) from the stand (Fig. 19/1) of the unit.

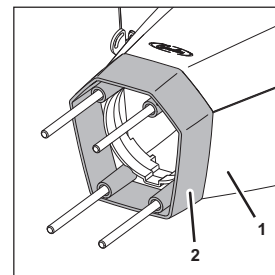


Fig. 19

- Remove the threaded bolts (Fig. 20/1), on the stand (Fig. 20/2) of the unit, by unscrewing the threaded bolts from the stand (Fig. 20/2).
- Pack the unit as described in chapter 2.

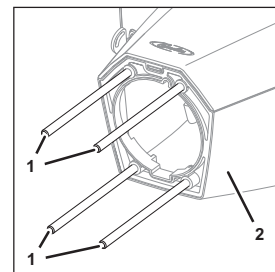


Fig. 20

## 5.5 Still water option

For units with built-in soda dispensers, there is an option of converting the soda dispensers to still water in order to dispense non-carbonated beverages at individual dispensing valves.

The procedure is described here using the connection of a soda dispenser as an example.

Prerequisites	References
The front panel has been removed.	see chapter 7.9
The dispensing valve to be assigned the still water option has been removed.	See dispensing valve documentation

Spare parts	ID/reference	Qty/amount	Comment
Cap	000000850	a. n. <sup>1</sup>	
Nozzle	149837500	a. n.	Metric connections
Nozzle	318971000	a. n.	Inch-based connections
Tubing clamp	440000306	a. n.	
U-clip	000000649	a. n.	

1. a. n. = as needed

- Remove the insulation from the soda dispenser.
- Turn the connection (Fig. 21/1) of the soda dispenser so that it faces down.
- Close the connection (Fig. 21/1) of the soda dispenser using the cap (Fig. 21/3) and the U-clip (Fig. 21/2).
- If available, attach a nozzle (Fig. 22/1) to an unused tube (Fig. 22/3) of the python and attach the tube (Fig. 22/3) to the nozzle (Fig. 22/1) using a clamp (Fig. 22/2).  
Otherwise, install a new tube (Fig. 22/3) in the python.
- Position the still water tube within the dispensing valve support.
- Insulate the soda dispenser and the still water tube.
- If applicable, connect the still water tube to the undercounter cooler; see the document "Undercounter cooler installation and service manual".

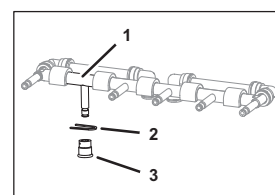


Fig. 21

### Finishing tasks

- Install the front panel; see chapter 7.9.
- Mount the dispensing valve; see the dispensing valve documentation.

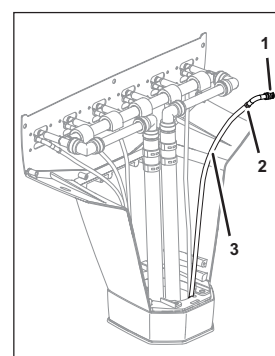


Fig. 22

## 6 Maintenance



### DANGER!

#### Risk of personal injury and equipment damage due to non-compliance with safety information!

Failure to observe the safety information will result in a risk of bringing about operating conditions at the unit, which may cause personal injury or equipment damage.

- Please always strictly observe all safety measures and information/instructions; see chapter 1.



### NOTICE!

All installation, maintenance and repair work at the unit is to be carried out by an expert only.



### WARNING!

#### Risk of personal injury and equipment damage due to operation by non-qualified staff!

It is dangerous for non-qualified staff to operate the unit!

- Service operations on this unit may only be carried out by trained and certified experts who have been trained in carrying out service operations on this unit.
- All wiring and plumbing must be carried out in compliance with national and local laws, regulations and guidelines. Non-compliance with these laws, regulations and guidelines may result in death, serious injury or equipment damage.

### 6.1 Maintenance table



### NOTICE!

The following table provides information on recommended maintenance intervals to be adapted to the relevant installation situation.

Interval	Components	Action
Daily	Tower, outside	Perform a visual inspection. See the document "Tower operator manual", document no. TD0004000
Daily	Tower, outside	Clean. See the document "Tower operator manual", document no. TD0004000
Every 3 months	Tower, inside	Clean the tubes/valves; see chapter 6.2



## 6.2 Cleaning the tubes and valves

Prerequisites		References	
The outside of the unit has been cleaned.		See the document "Tower operator manual", document no. TD0004000	
Required tools/materials	ID/reference	Qty/amount	Comment
Disinfectant	103050300	a. n. <sup>1</sup>	TM DesanaMay fp – Alkaline (syrup) - active oxygen - chlorine-free – Powder 45 g (1 sachet) per 4.5 litres of water – Dyed
Disinfectant	220112962	a. n.	TM Desanacid fp – Acid (water) - active oxygen - chlorine-free – Powder 45 g (1 sachet) per 4.5 litres of water – Dyed
Disinfectant	Hydrogen peroxide	a. n.	– Acid (water) – Max. 3% solution – 135 ml per 4.5 litres of water – Colourless
Test strips	220100192	a. n.	For testing the content of hydrogen peroxide
Clear water			
Cleaning container		1	
Tower operator manual	Document no. TD0004000	1	
Undercounter cooler installation and service manual	Document no. Various	1	
Dispensing valve documentation	Document no. Various	1	

1. a. n. = as needed

- Fill the cleaning container (Fig. 23) with water.
- Disconnect all basic ingredient tubes/beverage tubes from the input of the undercounter cooler; see the document "Undercounter cooler installation and service manual".
- Connect all basic ingredient tubes/beverage tubes to the cleaning container (Fig. 23).
- Rinse all tubes with water, one after the other, by requesting a beverage from the respective dispensing valve; see dispensing valve documentation.
  - Continue requesting a beverage until the water coming out of the dispensing valve runs clear.

You can only continue to the next step if and when all tubes have been rinsed with water.

In the next step, the tubes will be rinsed with a disinfectant solution.

- Fill the cleaning container with a suitable disinfectant solution.
  - For syrup tubes: TM DesanaMax fp.
  - For water lines: either TM Desanacid fp or hydrogen peroxide.
- Vent the carbonator tank; see the document "Undercounter cooler installation and service manual".
- Rinse all tubes with the disinfectant solution, one after the other, by requesting a beverage from the respective dispensing valve; see dispensing valve documentation.
  - Continue requesting a beverage for the syrup tubes until you can see the disinfectant solution, recognisable by its dye, coming out of the dispensing valve.
  - Using TM Desanacid fp as a disinfectant for the water lines, continue requesting a beverage until you can see the disinfectant solution, recognisable by its dye, coming out of the dispensing valve.
  - Using hydrogen peroxide as a disinfectant for the water lines, continue requesting a beverage until you can determine hydrogen peroxide levels using a test strip.

Make sure that the tubes remain exposed to the disinfectant solution for a minimum of 15 minutes.

You can only continue to the next step if and when all tubes have been rinsed with the disinfectant solution.

In the next step, the tubes will be rinsed with clear water.

- Depressurise the cleaning container and the tubes by using the pressure relief valve on the cleaning container.

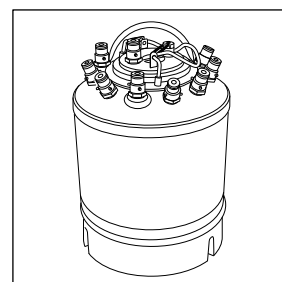


Fig. 23

9. Fill the cleaning container with clear water.
10. Rinse all tubes with water, one after the other, by requesting a beverage from the respective dispensing valve; see dispensing valve documentation.
  - Continue requesting a beverage for the syrup tubes until the water coming out of the dispensing valve runs clear.
  - Using TM Desanacid fp as a disinfectant for the water lines, continue requesting a beverage until the water coming out of the dispensing valve runs clear.
  - Using hydrogen peroxide as a disinfectant for the water lines, continue requesting a beverage until you can no longer detect any hydrogen peroxide levels using test strips.

You can only continue to the next step if and when all tubes have been rinsed with water.  
In the next step, the tubes of the unit will either be filled, see step 11, or the unit will be shut down, see chapter 8.2.
11. Depressurise the cleaning container and the tubes by using the pressure relief valve on the cleaning container.
12. Disconnect all basic ingredient/beverage tubes of the undercounter cooler from the cleaning container.
13. Connect all basic ingredient/beverage tubes to the undercounter cooler; see the document "Undercounter cooler installation and service manual".
14. Fill the tubes by requesting a beverage from the respective dispensing valve until the beverage is being dispensed; see dispensing valve documentation.

## 7 Repairs



### DANGER!

#### **Risk of personal injury and equipment damage due to non-compliance with safety information!**

Failure to observe the safety information will result in a risk of bringing about operating conditions at the unit, which may cause personal injury or equipment damage.

- Please always strictly observe all safety measures and information/instructions; see chapter 1.
- 



### NOTICE!

All installation, maintenance and repair work at the unit is to be carried out by an expert only.

---



### WARNING!

#### **Risk of personal injury and equipment damage due to operation by non-qualified staff!**

It is dangerous for non-qualified staff to operate the unit!

- Service operations on this unit may only be carried out by trained and certified experts who have been trained in carrying out service operations on this unit.
  - All wiring and plumbing must be carried out in compliance with national and local laws, regulations and guidelines. Non-compliance with these laws, regulations and guidelines may result in death, serious injury or equipment damage.
- 

### 7.1 Replacing the dispensing valves



### NOTICE!

Information regarding the replacement of the dispensing valves installed on your unit can be found in the binding documentation for the respective dispensing valve.

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## 7.2 Replacing the drip tray and the grill

Spare parts	ID/reference	Qty/amount	Comment
Drip tray incl. grill	149854401	1	Dimensions (L x W x H) 400 mm x 220 mm x 28 mm
	149854601	1	Dimensions (L x W x H) 600 mm x 220 mm x 28 mm

1. Remove the grill from the drip tray.
2. Remove the drip tray from the unit.

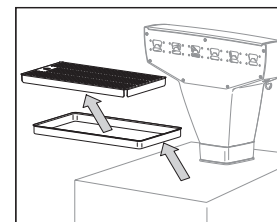


Fig. 24

3. Position the new drip tray.
4. Insert the new grill in the drip tray.

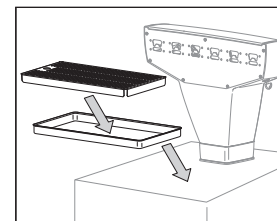


Fig. 25

## 7.3 Replacing the taxi cab hood, promotional panes and promotional sheets

Prerequisites	References
The unit has been disconnected from the power supply.	see chapter 4.1

Spare parts	ID/reference	Qty/amount	Comment
Promotional sheet, front	220110205	1	Neutral
Promotional sheet, rear	220110204	1	Neutral
Promotional pane, front	220107491	1	
Promotional pane, rear	220107490	1	
Taxi cab hood	220107126	1	
Retaining plate	220107144	1	
Mounting bracket	220110202	2	

1. Remove the fastening bolts (Fig. 26/1) of the front panel (Fig. 26/2).

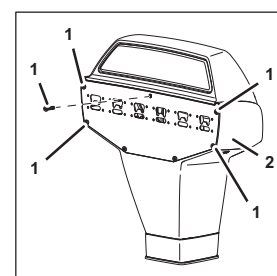


Fig. 26

2. Lift and remove the front panel (Fig. 27/4) with taxi cab hood (Fig. 27/1) from the rear panel (Fig. 27/2) in a forward motion.
3. Disconnect the electrical cables on the voltage transformer (Fig. 27/3).

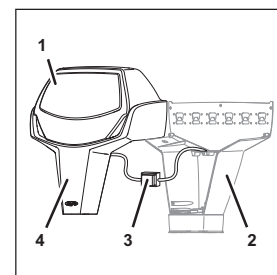


Fig. 27

4. Remove the fastening bolts (Fig. 28/1) from the taxi cab hood (Fig. 28/2).

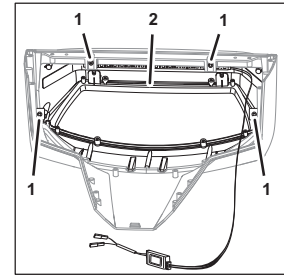


Fig. 28

5. Lift and remove the taxi cab hood (Fig. 29/1) from the front panel (Fig. 29/2).

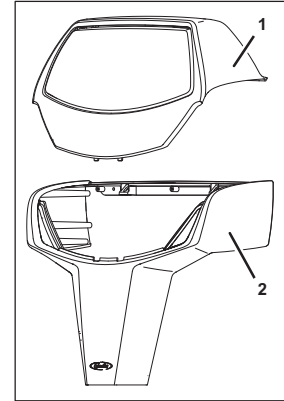


Fig. 29

6. Remove the fastening bolts (Fig. 30/1) from the rear promotional pane (Fig. 30/2).

7. Remove the fastening bolts (Fig. 30/3) from the front promotional pane (Fig. 30/4).

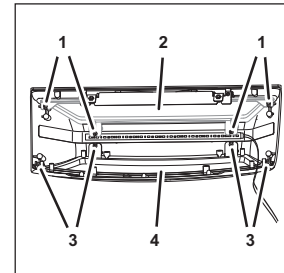


Fig. 30

8. Remove the front and rear promotional pane (Fig. 31/1 and 3) from the taxi cab hood (Fig. 31/2).

9. Remove the promotional sheet from the front and rear promotional pane (Fig. 31/1 and 3).

10. Position the new promotional sheet on the front and rear promotional pane (Fig. 31/1 and 3).

11. Position the front and rear promotional pane (Fig. 31/1 and 3) within the new taxi cab hood (Fig. 31/2).

12. Attach the front promotional pane (Fig. 30/4) using the fastening bolts (Fig. 30/3).

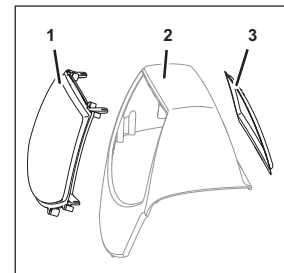


Fig. 31

13. Attach the rear promotional pane (Fig. 30/2) using the fastening bolts (Fig. 30/1).

14. Position the retaining plate (Fig. 32/2) on taxi cab hood.

15. Attach the retaining plate (Fig. 32/2) using the fastening bolts (Fig. 32/1).

16. Position the taxi cab hood (Fig. 29/1) on the front panel (Fig. 29/2).

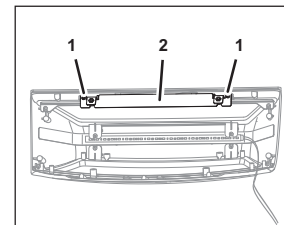


Fig. 32

17. Position the mounting brackets (Fig. 33/1) on the taxi cab hood.
18. Attach the taxi cab hood (Fig. 28/2) using the fastening bolts (Fig. 28/1).
19. Connect the electrical cables to the voltage transformer (Fig. 27/3).
20. Position the front panel (Fig. 27/4) with taxi cab hood (Fig. 27/1) on the rear panel (Fig. 27/2).
21. Attach the front panel (Fig. 26/2) using the fastening bolts (Fig. 26/1).

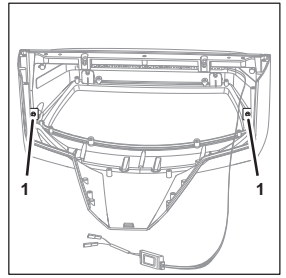


Fig. 33

## 7.4 Replacing the display

Prerequisites		References	
The unit has been disconnected from the power supply.		see chapter 4.1	
Spare parts	ID/reference	Qty/amount	Comment
Display	220116341	1	
Retaining plate	220116283	1	
Adapter piece	220116282	1	

1. Remove the fastening bolts (Fig. 34/1) of the front panel (Fig. 34/2).

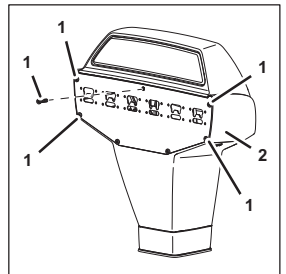


Fig. 34

2. Disconnect the electrical cables (Fig. 35/3).
3. Lift and remove the front panel (Fig. 35/5) with taxi cab hood (Fig. 35/1) from the rear panel (Fig. 35/2) in a forward motion.
4. Disconnect the electrical cables (cable no. 220046597) on the voltage transformer (Fig. 35/4).

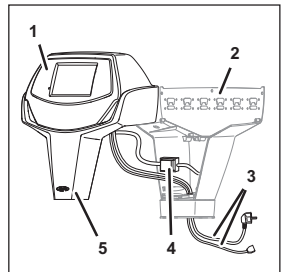


Fig. 35

5. Disconnect the electrical cables (Fig. 36/1 and 5) on the display.
6. Remove the fastening bolts (Fig. 36/2) from the retaining plate (Fig. 36/3).
7. Remove the retaining plate (Fig. 37/3) with display from the taxi cab hood (Fig. 37/4)

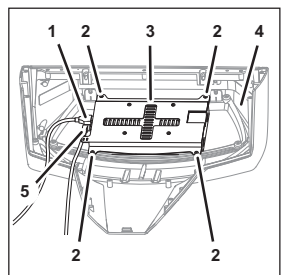


Fig. 36

8. Remove the fastening bolts (Fig. 37/3) of the display (Fig. 37/1).
9. Remove the retaining plate (Fig. 37/2) from the display (Fig. 37/1).

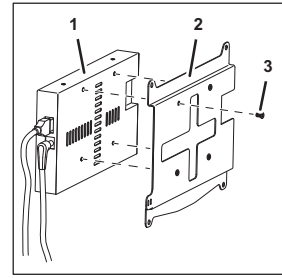


Fig. 37

10. Remove the fastening bolts (Fig. 38/1) from the taxi cab hood (Fig. 38/2).

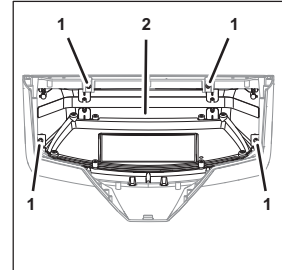


Fig. 38

11. Lift and remove the taxi cab hood (Fig. 39/1) from the front panel (Fig. 39/2).

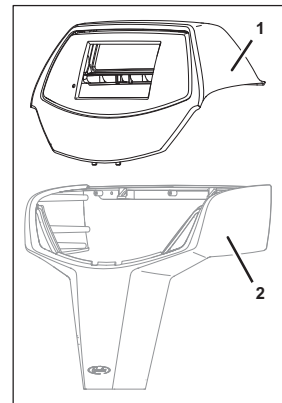


Fig. 39

12. Remove the fastening bolts (Fig. 40/1) from the rear promotional pane (Fig. 40/2).

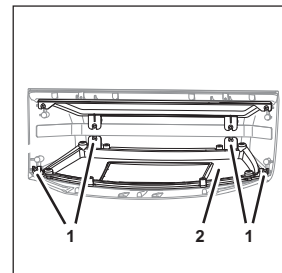


Fig. 40

13. Remove the rear promotional pane (Fig. 41/1) from the taxi cab hood (Fig. 41/2).

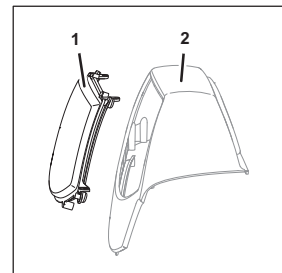


Fig. 41

14. Remove the fastening bolts (Fig. 42/1) of the adapter piece (Fig. 42/2).
15. Remove the adapter piece (Fig. 42/2) from the front promotional pane (Fig. 42/3), if applicable.
16. Position the new adapter piece (Fig. 42/2) within the front promotional pane (Fig. 42/3).
17. Attach the adapter piece (Fig. 42/2) using the fastening bolts (Fig. 42/1).
18. Position the rear promotional pane (Fig. 41/1) within the taxi cab hood (Fig. 41/2).
19. Attach the rear promotional pane (Fig. 40/2) using the fastening bolts (Fig. 40/1).
20. Position the taxi cab hood (Fig. 39/1) on the front panel (Fig. 39/2).
21. Attach the taxi cab hood (Fig. 38/2) using the fastening bolts (Fig. 38/1).
22. Position the retaining plate (Fig. 37/2) on the new display (Fig. 37/1).
23. Attach the display (Fig. 37/1) using the fastening bolts (Fig. 37/3).
24. Position the retaining plate (Fig. 36/3) with display within the taxi cab hood (Fig. 36/4)
25. Attach the retaining plate (Fig. 36/3) using the fastening bolts (Fig. 36/2).
26. Connect the electrical cables (Fig. 36/1 and 5).
27. Connect the electrical cables (cable no. 220046597) to the voltage transformer (Fig. 35/4).
28. Position the front panel (Fig. 35/5) with taxi cab hood (Fig. 35/1) on the rear panel (Fig. 35/2).
29. Attach the front panel (Fig. 34/2) using the fastening bolts (Fig. 34/1).
30. Connect the electrical cables (Fig. 35/3).

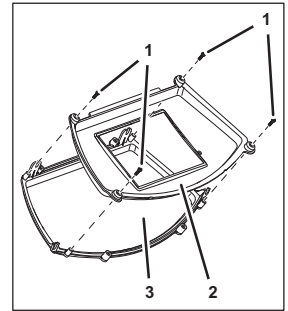


Fig. 42

## 7.5 Replacing the hood

Prerequisites		References	
The unit has been disconnected from the power supply.		see chapter 4.1	
Spare parts	ID/reference	Qty/amount	Comment
Hood	220107123	1	

1. Remove the fastening bolts (Fig. 43/1) of the front panel (Fig. 43/2).

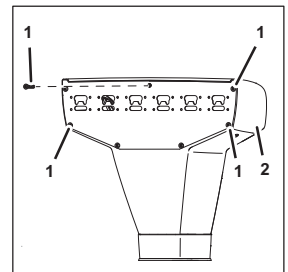


Fig. 43

2. Lift and remove the front panel (Fig. 44/3) with hood (Fig. 44/1) from the rear panel (Fig. 44/2) in a forward motion.

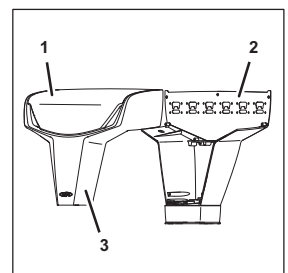


Fig. 44

3. Remove the fastening bolts (Fig. 45/1) from the hood (Fig. 45/2).
4. Remove the hood (Fig. 45/2) from the front panel (Fig. 45/3).
5. Position the new hood (Fig. 45/2) within the front panel (Fig. 45/3).
6. Attach the hood (Fig. 45/2) using the fastening bolts (Fig. 45/1).
7. Position the front panel (Fig. 44/3) with hood (Fig. 44/1) on the rear panel (Fig. 44/2).
8. Attach the front panel (Fig. 43/2) using the fastening bolts (Fig. 43/1).

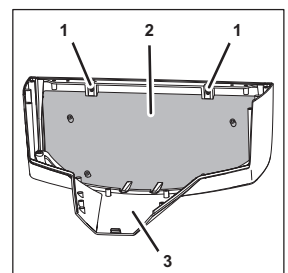


Fig. 45

## 7.6 Replacing the lighting kit

Prerequisites		References	
The taxi cab hood has been removed.		see chapter 7.3.	
Spare parts	ID/reference	Qty/amount	Comment
Lighting kit Includes:	220112124	1	
Velcro tape	Various		

1. Remove the fastening bolts (Fig. 46/2) from the retaining plate (Fig. 46/1).
2. Remove the retaining plate (Fig. 46/1) with LED strip from the taxi cab hood.
3. If necessary, replace the LED strip and the voltage transformer; see chapter 7.7.
4. Position the retaining plate (Fig. 46/1) with LED strip within the taxi cab hood.
5. Attach the retaining plate (Fig. 46/1) using the fastening bolts (Fig. 46/2).

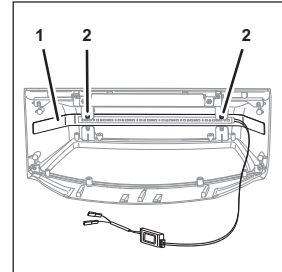


Fig. 46

### Finishing tasks

1. Install the taxi cab hood; see chapter 7.3.

## 7.7 Replacing the LED strip and the voltage transformer

Prerequisites		References	
The lighting kit has been removed.		see chapter 7.6.	
Spare parts	ID/reference	Qty/amount	Comment
– LED strip (length: 450 mm)	220112038	1	
– Retaining plate	220112035	1	
– Voltage transformer	141647698	1	
Velcro tape	Various		

2. Remove the LED strip (Fig. 47/2) from the retaining plate (Fig. 47/1).
3. Remove any adhesive residue from the retaining plate (Fig. 47/1).
4. Disconnect the electrical cables (Fig. 47/3) (cable no. 220112038) on the voltage transformer (Fig. 47/4).
5. Apply Velcro tape to the new voltage transformer (Fig. 47/4).
6. Connect the electrical cables (Fig. 47/3) (cable no. 220112038) of the new LED strip (Fig. 47/2) to the voltage transformer (Fig. 47/4).
7. Apply the LED strip (Fig. 47/2) to the adhesive area on the retaining plate (Fig. 47/1).

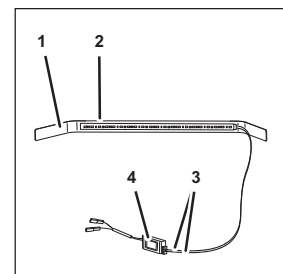


Fig. 47

### Finishing tasks

1. Install the lighting kit; see chapter 7.6.



## 7.8 Replacing the key switch

Prerequisites		References	
The front panel has been removed.		see chapter 7.9.	
Spare parts	ID/reference	Qty/amount	Comment
Key switch with electrical cable	070000005	1	

1. Disconnect the electrical cable (Fig. 48/2) on the key switch (Fig. 48/1).
2. Remove the nut (Fig. 48/3).
3. Remove the key switch (Fig. 48/1)

### Finishing tasks

1. Install the front panel; see chapter 7.9.

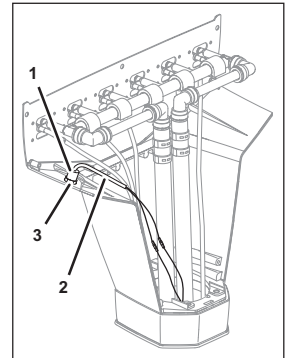


Fig. 48

## 7.9 Replacing the front panel

Prerequisites		References	
The unit has been disconnected from the power supply.		see chapter 4.1	
Spare parts	ID/reference	Qty/amount	Comment
Front panel	220107120	1	5 + 6 dispensing valves
	220107133	1	8 dispensing valves

1. Remove the fastening bolts (Fig. 49/1) of the front panel (Fig. 49/2).

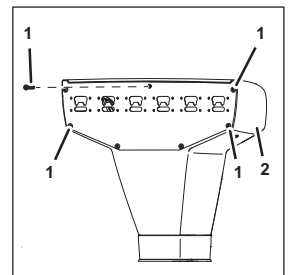


Fig. 49

2. Lift and remove the front panel (Fig. 50/2) from the rear panel (Fig. 50/1) in a forward motion.
3. Disconnect any electrical cables, if applicable.
4. Remove the hood or promotional displays, if applicable.
  - a) Hood; see chapter 7.5.
  - b) Taxi cab hood; see chapter 7.3.
5. Install the hood or promotional displays, if applicable.
  - a) Hood; see chapter 7.5.
  - b) Taxi cab hood; see chapter 7.3.
6. Connect any electrical cables, if applicable.
7. Position the front panel (Fig. 50/2) on the rear panel (Fig. 50/1).
8. Attach the front panel (Fig. 49/2) using the fastening bolts (Fig. 49/1).

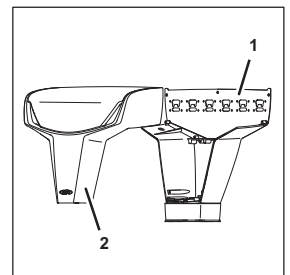


Fig. 50

## 7.10 Replacing the left/right front inserts and wrap film

Prerequisites		References	
The hood has been removed.		see chapter 7.5	
The taxi cab hood has been removed.		see chapter 7.3	
Spare parts	ID/reference	Qty/amount	Comment
Front insert, left	220107124	1	
Wrap film, left front insert	220107450	1	White
Wrap film, left front insert	220107452	1	Red
Wrap film, left front insert	220107454	1	Blue
Front insert, right	220107125	1	
Wrap film, right front insert	220107451	1	White
Wrap film, right front insert	220107453	1	Red
Wrap film, right front insert	220107455	1	Blue



### NOTICE!

The procedure for replacing the front inserts and wrap film is identical and is described here using an example.

1. Remove the fastening bolts (Fig. 51/1) of the front insert (Fig. 51/2).
2. Remove the front insert (Fig. 51/2) from the front panel (Fig. 51/3).
3. Position the new wrap film on the new front insert.
4. Position the front insert (Fig. 51/2) within the front panel (Fig. 51/3).
5. Attach the front insert (Fig. 51/2) using the fastening bolts (Fig. 51/1).

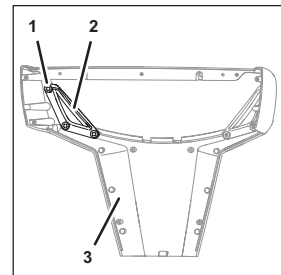


Fig. 51

### Finishing tasks

1. Install the hood; see chapter 7.5.
2. Install the taxi cab hood; see chapter 7.3.

## 7.11 Replacing the soda dispenser (optional)

Prerequisites		References	
The front panel has been removed.		see chapter 7.9	
The dispensing valves have been removed.		See dispensing valve documentation	
Spare parts	ID/reference	Qty/amount	Comment
Soda dispenser	220099020S002	1	5 dispensing valves
Soda dispenser	220099020	1	6 dispensing valves
Soda dispenser	220099021	1	8 dispensing valves



### NOTICE!

Multiple soda dispenser variants are available for the unit. Replacing the soda dispenser is identical for all variants and is described here using an example.

1. Remove the large insulation from the soda dispenser.
2. Remove the tubes (Fig. 52/3) on the soda dispenser (Fig. 52/1).
3. Lift and remove the soda dispenser (Fig. 52/1) from the dispensing valve support (Fig. 52/2) and from the unit in an upward motion.
4. Position the new soda dispenser (Fig. 52/1) within the dispensing valve support (Fig. 52/2) and the unit.
5. Attach the tubes (Fig. 52/3) to the soda dispenser (Fig. 52/1).
6. Insulate the soda dispenser using the large insulation; see chapter 7.12.

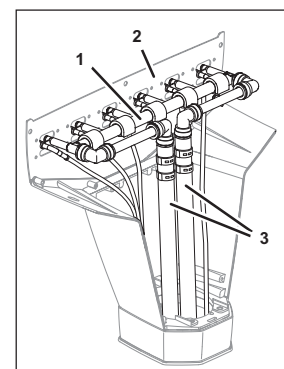


Fig. 52

### Finishing tasks

1. Install the front panel; see chapter 7.9.
2. Mount the dispensing valves; see dispensing valve documentation.

## 7.12 Replacing the dispensing valve support

Prerequisites		References	
The soda dispenser (optional) has been removed.		see chapter 7.11	
Spare parts	ID/reference	Qty/amount	Comment
Dispensing valve support	220115050	1	5 dispensing valves
Dispensing valve support	220115051	1	6 dispensing valves
Dispensing valve support	220115053	1	8 dispensing valves
Insulation, small	220107476	1	5 dispensing valves
Insulation, small	220107474	1	6 dispensing valves
Insulation, small	220107478	1	8 dispensing valves
Insulation, large	220107477	1	5 dispensing valves
Insulation, large	220107475	1	6 dispensing valves
Insulation, large	220107479	1	8 dispensing valves



### NOTICE!

Multiple dispensing valve support variants are available for the unit. Replacing the dispensing valve support is identical for all variants and is described here using an example.

1. Remove the syrup tubes (Fig. 53/2) from the dispensing valve support (Fig. 53/1).

**Only for units without a soda dispenser:** Remove the soda tubes from the dispensing valve support.

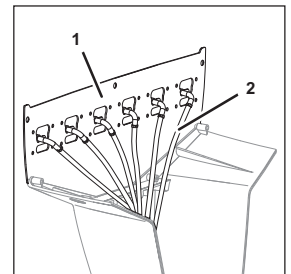


Fig. 53

2. Remove the fastening bolts (Fig. 54/3) from the dispensing valve support (Fig. 54/1).
3. Lift and remove the dispensing valve support (Fig. 54/1) from the stand (Fig. 54/2) in an upward motion.
4. Insulate the new dispensing valve support using the small and large insulation.
5. Position the dispensing valve support (Fig. 54/1) on the stand (Fig. 54/2).
6. Attach the dispensing valve support (Fig. 54/1) using the fastening bolts (Fig. 54/3).
7. Position the syrup tubes (Fig. 53/2) within the dispensing valve support (Fig. 53/1).

**Only for units without a soda dispenser:** Position the soda tubes within the dispensing valve support.

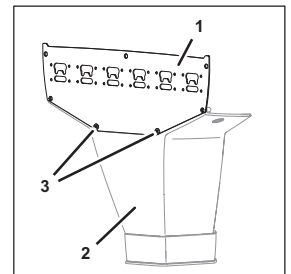


Fig. 54

### Finishing tasks

1. Install the soda dispenser (optional), if required; see chapter 7.11.

## 8 Commissioning/shutdown



### DANGER!

#### Risk of personal injury and equipment damage due to non-compliance with safety information!

Failure to observe the safety information will result in a risk of bringing about operating conditions at the unit, which may cause personal injury or equipment damage.

- Please always strictly observe all safety measures and information/instructions; see chapter 1.



### NOTICE!

All installation, maintenance and repair work at the unit is to be carried out by an expert only.



### WARNING!

#### Risk of personal injury and equipment damage due to operation by non-qualified staff!

It is dangerous for non-qualified staff to operate the unit!

- Service operations on this unit may only be carried out by trained and certified experts who have been trained in carrying out service operations on this unit.
- All wiring and plumbing must be carried out in compliance with national and local laws, regulations and guidelines. Non-compliance with these laws, regulations and guidelines may result in death, serious injury or equipment damage.

## 8.1 Commissioning



### NOTICE!

The following describes how the unit is put back into service by an expert following a longer shutdown period (> 24 hours).

If the unit is to be put back into operation after a temporary shutdown (< 24 hours), this may be carried out by the operator or user; see the document "Tower operator manual", document no. TD0004000.

Prerequisites	References
The undercounter cooler has been put into service.	See the document "Undercounter cooler installation and service manual".
The unit has been installed correctly.	see chapter 5.3
The unit has been connected to the mains supply.	see chapter 5.3

Required tools/materials	ID/reference	Qty/amount	Comment
Undercounter cooler installation and service manual	Document no. Various	1	
Operator manual Undercounter cooler	Document no. Various	1	
Operator manual Tower	Document no. TD0004000	1	



### NOTICE!

Maximum operating pressure of the valves is 100 PSI (689.48 kPa).

1. Turn the key switch (Fig. 55/1) to position "1".  
The unit will power up.  
If the unit does not power up, see chapter 9.
2. Clean the tubes and valves; see chapter 6.2.
3. Clean the outside of the unit; see the document "Tower operator manual", document no. TD0004000.
4. If applicable, carry out the configuration settings for the dispensing valves; see dispensing valve documentation.

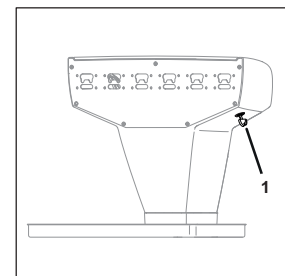


Fig. 55

## 8.2 Shutdown



### NOTICE!

The following describes how the unit is shut down by an expert for a longer period (> 24 hours). If the unit is to be shut down temporarily (< 24 hours), this may be carried out by the operator or user; see the document "Tower operator manual", document no. TD0004000.

Required tools/materials	ID/reference	Qty/amount	Comment
Operator manual Tower	Document no. TD0004000	1	
Operator manual Undercounter cooler	Document no. Various	1	

1. Clean the tubes and valves as described in chapter 6.2 up to and including step 11.
2. Drain the unit as follows:
  - a) Empty the cleaning container.
  - b) Connect the valve of the water supply; see documentation on the water system.
  - c) Keep dispensing beverages for each brand until only CO<sub>2</sub> comes out of the dispensing nozzle.
  - d) Disconnect all basic ingredient/beverage tubes of the undercounter cooler from the cleaning container.
  - e) Connect all basic ingredient/beverage tubes to the undercounter cooler; see the document "Undercounter cooler installation and service manual".
  - f) Shut down the undercounter cooler; see the document "Undercounter cooler operator manual".
3. Clean the outside of the unit; see the document "Tower operator manual", document no. TD0004000.
4. Disconnect the unit from power; see chapter 4.1.

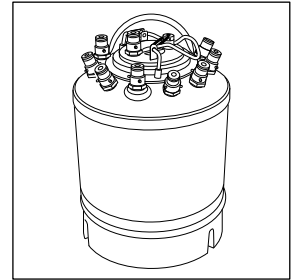


Fig. 56

## 9 Errors and malfunctions



### DANGER!

#### Risk of personal injury and equipment damage due to non-compliance with safety information!

Failure to observe the safety information will result in a risk of bringing about operating conditions at the unit, which may cause personal injury or equipment damage.

- Please always strictly observe all safety measures and information/instructions; see chapter 1.



### NOTICE!

All installation, maintenance and repair work at the unit is to be carried out by an expert only.



### WARNING!

#### Risk of personal injury and equipment damage due to operation by non-qualified staff!

It is dangerous for non-qualified staff to operate the unit!

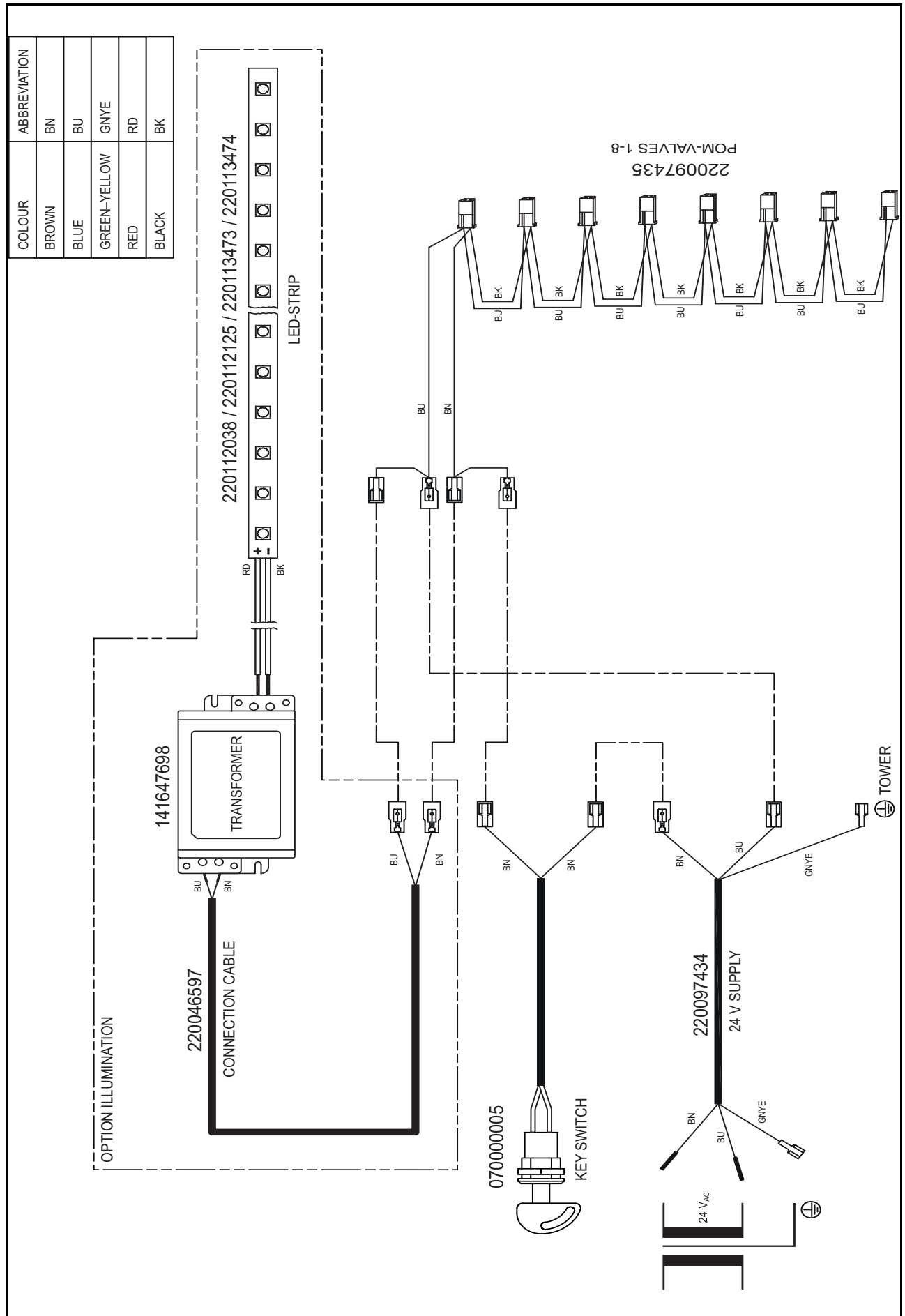
- Service operations on this unit may only be carried out by trained and certified experts who have been trained in carrying out service operations on this unit.
- All wiring and plumbing must be carried out in compliance with national and local laws, regulations and guidelines. Non-compliance with these laws, regulations and guidelines may result in death, serious injury or equipment damage.

## 9.1 Troubleshooting table

Fault	Probable cause	Remedy
Unable to dispense	No mains/power supply connected	Connect the mains/power supply; see chapter 5.3
	Tower is not switched on	Turn the key switch to position "I"; (see chapter 8.1)
	Fault or error on the dispensing valve	See dispensing valve documentation
Beverage is too warm	Fault or error on the undercounter cooler	See undercounter cooler documentation
Beverage foams for all products	Soda water is too warm	See undercounter cooler documentation
	CO <sub>2</sub> feed pressure for the soda circuit is too high on the relevant pressure-reducing valve	Adjust the CO <sub>2</sub> feed pressure to the required value (see documentation on the CO <sub>2</sub> system)
	Syrup has been stored too long and has had CO <sub>2</sub> added (stainless steel tanks only)	Connect a new syrup container (see undercounter cooler documentation)
	Contaminated tubes	Clean the tubes (see chapter 6.2)
Only soda is being dispensed	Syrup container is empty	Connect a new syrup container (see undercounter cooler documentation)
	Connections on the syrup container are not properly connected	Connect the connections on the syrup container properly (see documentation on the syrup container)
	CO <sub>2</sub> feed pressure for the syrup tube is set incorrectly on the relevant pressure-reducing valve	Adjust the CO <sub>2</sub> feed pressure to the required value (see documentation on the CO <sub>2</sub> system)
	Syrup tube is contaminated	Clean the tubes (see chapter 6.2)
	Fault or error on the undercounter cooler	See undercounter cooler documentation
	Fault or error on the dispensing valve	See dispensing valve documentation
Only syrup is being dispensed	Shut-off valve or pressure-reducing valve for the fresh water supply is closed	Open the shut-off valve and pressure-reducing valve for the fresh water supply (see documentation on the drinking water system)
	Fault or error on the undercounter cooler	See undercounter cooler documentation
Soda/syrup ratio is incorrect	Fault or error on the dispensing valve	See dispensing valve documentation
	CO <sub>2</sub> feed pressure for the syrup tube is set incorrectly on the relevant pressure-reducing valve	Adjust the CO <sub>2</sub> feed pressure to the required value (see documentation on the CO <sub>2</sub> system)
Insufficient amount of CO <sub>2</sub> in the beverage	CO <sub>2</sub> pressure for soda is set incorrectly on the relevant pressure-reducing valve	Correctly adjust the CO <sub>2</sub> pressure for soda on the relevant pressure-reducing valve (see documentation on the CO <sub>2</sub> system)
	Fault or error on the undercounter cooler	See undercounter cooler documentation
	CO <sub>2</sub> supply too low	Change the CO <sub>2</sub> bottle

## 10 Applicable documents

### 10.1 Tower cable diagram





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