

Operating manual



Circuit carbonator CN 80/160

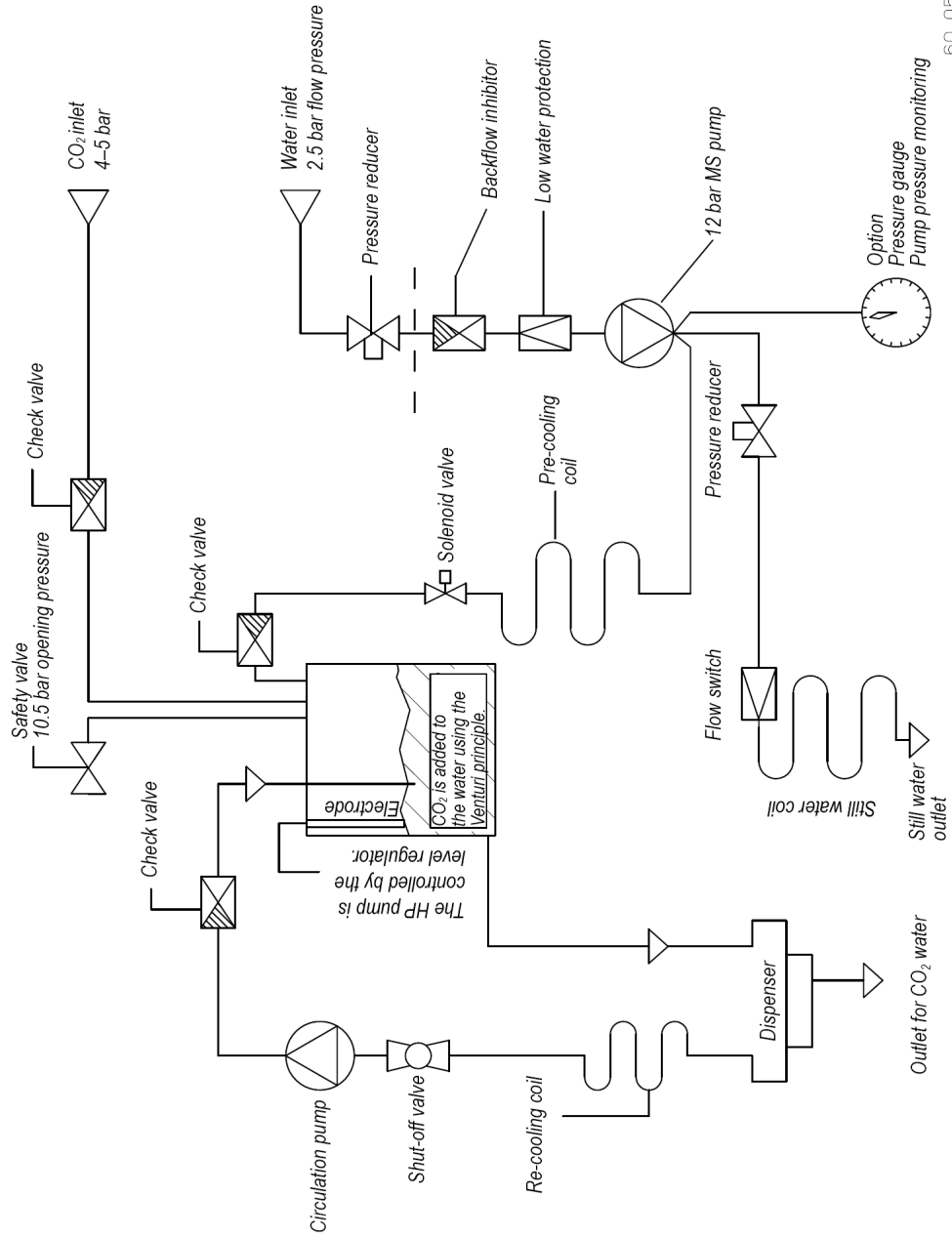
The appliance described in this manual may be put into operation only if the operators are sufficiently trained and operating and maintenance personnel have thoroughly studied the operating manual.

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1.00 Circuit diagrams

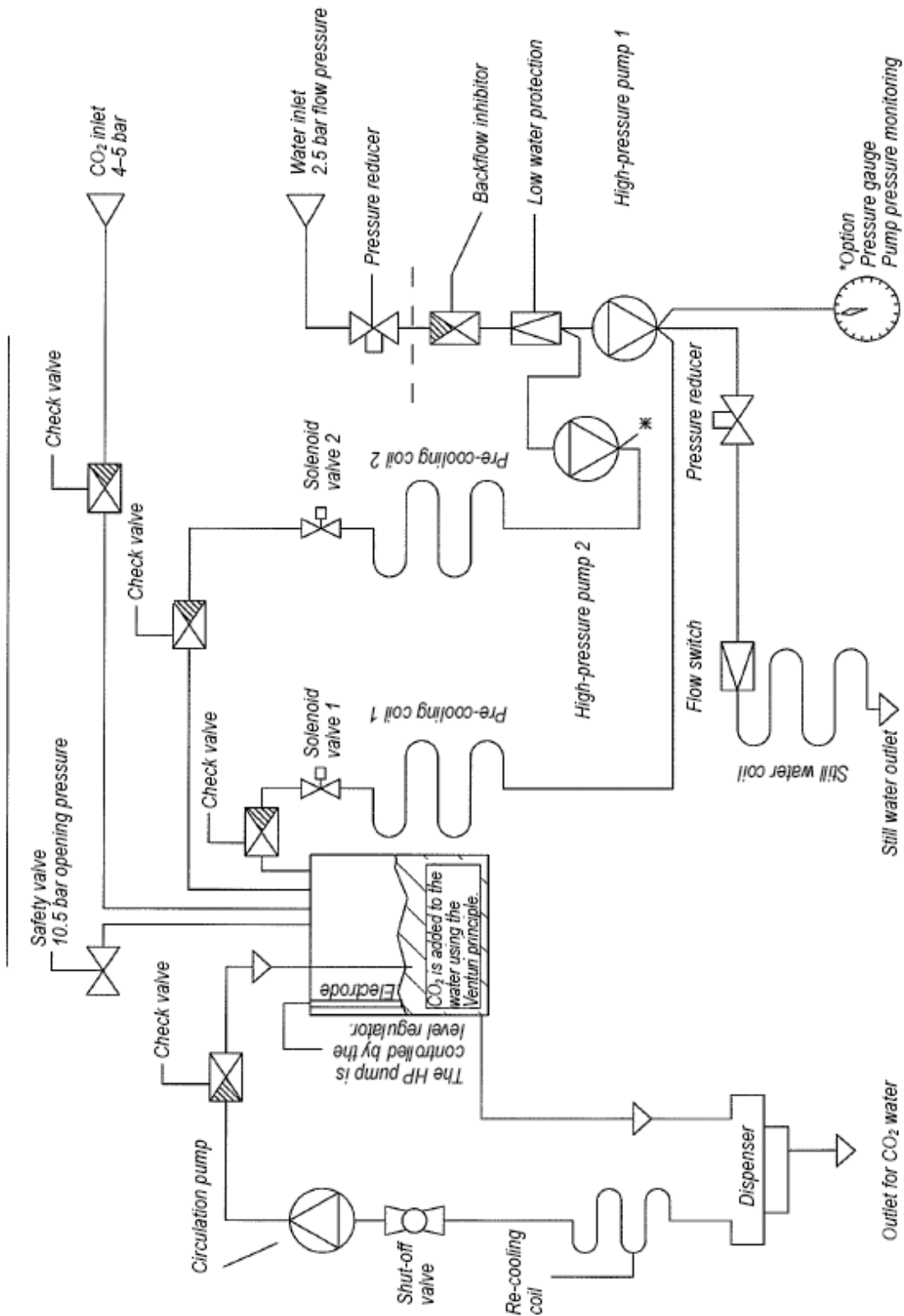
1.10 Flow chart

Flow chart for circuit carbonator CN80 / CN80 "RO"

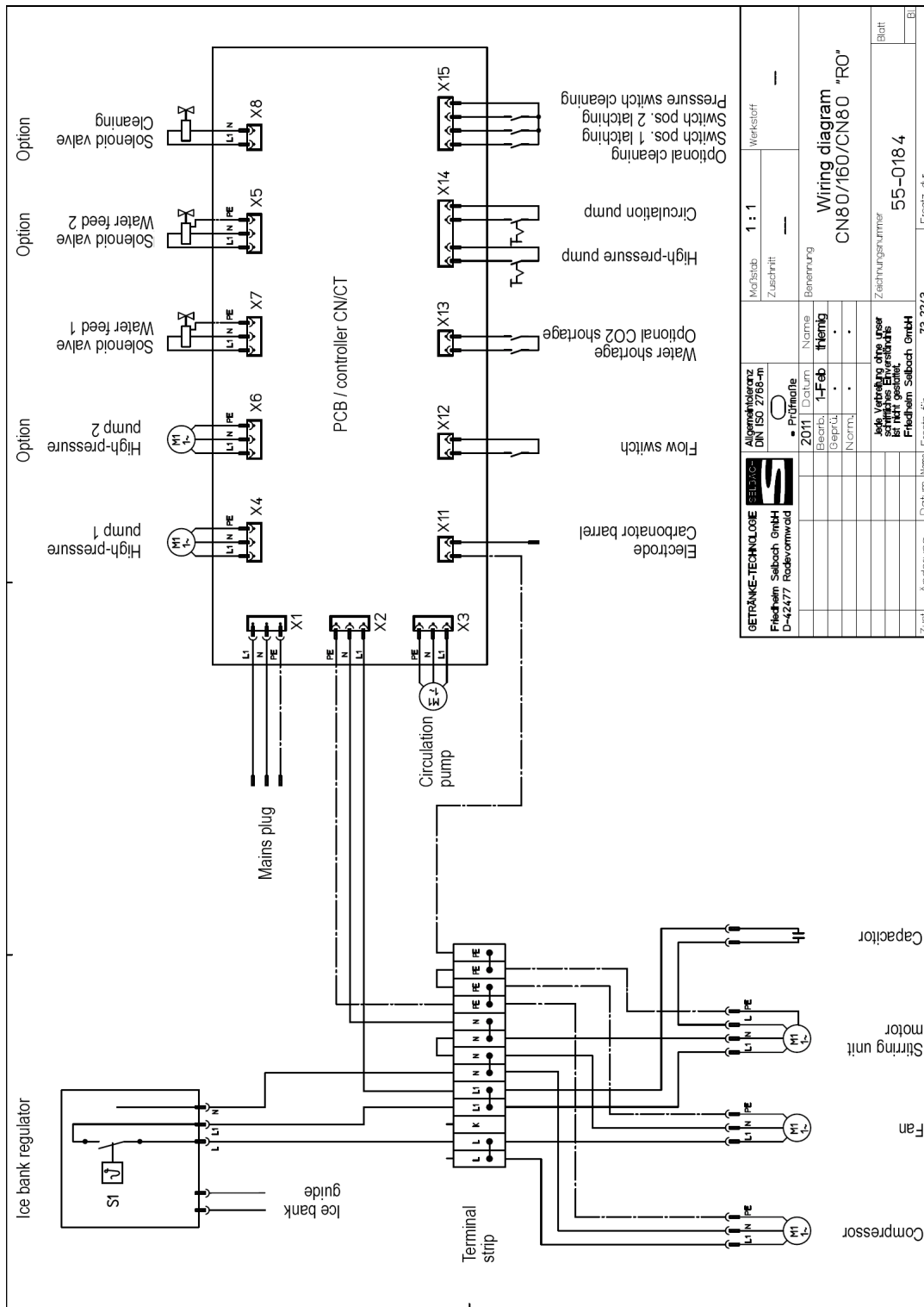


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Flow chart for circuit carbonator CN160



1.12 Wiring diagram



GETRÄNKE-TECHNOLOGIE Friedhelm Selbach GmbH D-42477 Radevormwald	Allgemeine Norm DIN ISO 2768-m	Maßstab 1 : 1	Werkstück -
	Datum 2011	Zeichnung 1 : 1	Blatt -
Name Planung	Zeichnung CN80/160/CN80 "RO"	Blatt 55-018.4	
Bearb. 1-Feb	Zeichnung CN80/160/CN80 "RO"	Blatt 55-018.4	
Gepr. Norm	Zeichnung CN80/160/CN80 "RO"	Blatt 55-018.4	
Norm	Zeichnung CN80/160/CN80 "RO"	Blatt 55-018.4	
Jede Veränderung ohne unsere schriftliche Genehmigung ist nicht gestattet. Friedhelm Selbach GmbH	Zeichnung CN80/160/CN80 "RO"	Blatt 55-018.4	
Zust. Änderung	Datum 79-2243	Ersatz d.r. -	

2.00 Safety information

2.10 Setup / putting the appliance into operation

Place the appliance on a level, dry and clean surface. Ensure that the power cord has a direct path to the electrical outlet. Never allow the power cord to become kinked or crushed.

Use only original hoses or approved beverage hoses for supplying the appliance.

Strictly ensure that the appliance is adequately ventilated! The exhaust air openings and intake air openings must not be blocked!

The ventilation of the installation rooms must be appropriate to the appliance's performance.

Insufficient ventilation of the appliances leads to overheating and destruction of the appliance.

Make sure that the intake air and exhaust air openings are not covered.

	CN 80	CN 160
Waste heat in watts	2000	4000
Required air volume in m³/h	390	570

Always comply with the following safety measures:

- Temperature in the work area +5 to +32 degrees Celsius
- Prevent grime (dust, fibres, etc.) from getting into the appliance
- Only connect the appliance to the specified supply voltage
- Protect the appliance from moisture, especially from penetrating liquids
- Comply with the warnings and safety notices on the electrical components and in this operating manual

2.20 Safety notices

The appliance described here must only be connected and operated by persons with the appropriate training. Settings, maintenance and repairs on an opened appliance or a live appliance may only be carried out by a specially trained technician.

As with all technical devices, correct functioning and safe operation of this appliance require compliance with general standard safety practices and the special safety information in this operating manual.

Severe injuries and material damage can result from:

- Improper use
- Incorrect installation or operation
- Unauthorised removal of the required safety covers or the housing
- Unauthorised opening of the appliance during operation

2.21 Safety information for the electrical connection

Electric shock can be fatal or result in severe injuries.

Unauthorised interventions in the electrical system are therefore strictly forbidden.

Before carrying out any cleaning work in the vicinity of the appliance or on the appliance itself, always disconnect from the mains.

The appliance is delivered with a moulded safety plug and must only be connected to an earthed shockproof socket.

If there is no appropriate shockproof socket available, the connection must be carried out by authorised personnel, complying with the requirements applicable at the installation site.

Work may only be carried out if:

- The electrical system has been de-energised and is safeguarded against being switched on again unintentionally
- The de-energised status has been verified
- You have ensured that additional monitoring and protective devices provided for operation of this controller are correctly installed

When establishing connections, ensure compliance with the applicable standards and regulations. As a piece of stationary electrical equipment, this product is subject to DIN EN 60335-1 (VDE 0700-1) and must be checked for electrical safety at regular intervals (every two years) (periodic inspections; BGV A2; VDE 0701 / 0702).

The appliance must only be operated with a correctly designed protective conductor.

2.22 Safety information for CO₂



Proceed with caution when using gas cylinders!

- When they are connected, always position the containers vertically and secure them to prevent them toppling over.
- Containers must be stored in a cool, well ventilated location and must be protected against heat and direct sunlight.
- The country-specific requirements for maximum permitted CO₂ concentrations must be complied with when it comes to the size of the room (installation site). If necessary, forced ventilation must be provided for the room or a gas warning device must be installed.
- Keep at a minimum distance of 0.5 m from the heaters.
- Escaping CO₂ is heavier than air. If larger quantities collect in enclosed spaces, there is a risk of asphyxiation.

**Note that parts of the appliance are pressurised to operating pressure.
Do not loosen or dismantle any parts that are under operating pressure.**

2.23 Impairment of safety

If for any reason it can be assumed that safety is impaired, take the appliance out of operation and affix a "Do not use" sign so that it is not inadvertently put into operation by others. Customer service must be notified as well.

Safety can be impaired, for example, if the appliance does not operate as specified or shows visible signs of damage.

2.30 Spare parts

If assemblies or components are replaced, use only identical assemblies or components.

2.40 Transport/storage

Damage detected after delivery must be reported to the transport company immediately. Take measures to prevent the possibility of operating the appliance, if necessary. Only store the appliance in a dry, dust-free environment at temperatures between 0 and 60°C.

2.50 Operation

If there are deviations from normal operation or if in doubt, take the device out of operation and affix a "Do not use" sign so that it is not inadvertently placed into operation by others. Customer service must be notified as well.

2.60 Service

All information in the operating manual concerning service tasks must be strictly complied with.

3.00 Intended use

Selbach beverage cooling and dispensing systems are suitable for serving cooled beverages. These systems are used in restaurants and leisure facilities.

Selbach cooling appliances are approved only for the application specified above and therefore are not suitable for cooling hot liquids, chemicals etc.

4.00 Functionality

Carbonator with and without still water

The carbonator essentially consists of the circulation pump, the carbonator barrel with CO₂ and the water inlet, as well as the CO₂ water outlet. A level-controlled high-pressure pump with low water protection provides the necessary water injection (the CN 160 has two pumps). The water inlet is monitored by a pressure control. If the pressure falls below a set level, the machine switches off. The supply of CO₂ is controlled by the main pressure reducer and it should be set to the required pressure. Both inputs are secured by check valves. The high-pressure pump that generates the necessary water pressure of 12 bar is controlled by the level regulation in the carbonator barrel. There is a solenoid valve upstream of the carbonator barrel that is connected in parallel with the pump motor to prevent the carbonator chamber filling up when there is no CO₂. Inside the carbonator barrel, the water is swirled and CO₂ is added to it.

4.10 Safety functions

- This appliance has been designed and built in accordance with the present state of the technology. If the appliance is used in accordance with the instructions in this operating manual it is operationally reliable.
- Never remove or modify any safety devices, or render them inoperable.
- Ensure that only authorised persons operate the appliance and that operating personnel are trained.
- Ensure that only original spare parts are installed and used.
- Selbach carbonators are protected by multiple safety devices:

Water inlet

Backflow inhibitor:	the backflow inhibitor only allows water to flow towards the pump.
Low water protection:	monitors the minimum pressure of 2 bar flow pressure for the high-pressure pump.
Solenoid valve:	connected in parallel to the pump motor. Prevents the carbonator from filling up when there is no CO ₂ .
Check valve:	prevents CO ₂ water flowing into the MS pump.

CO₂ inlet

Check valve:	prevents CO ₂ water flowing back.
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Carbonator

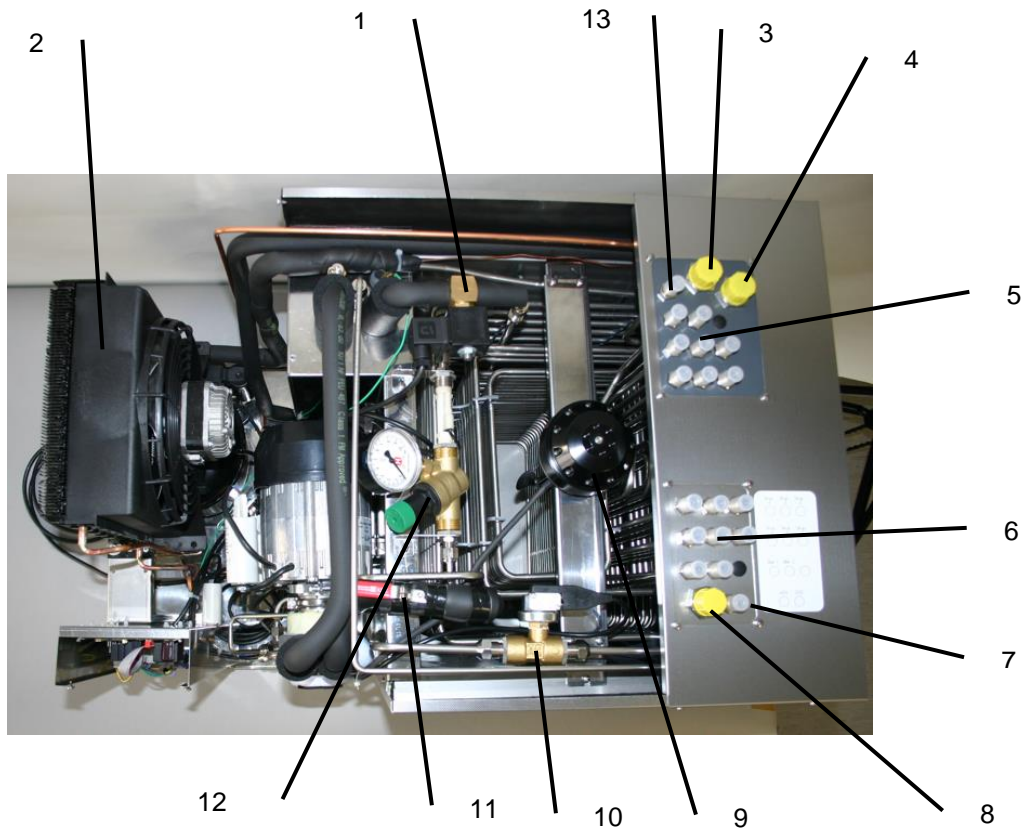
Safety drain valve:	opens automatically at 12 bar.
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5.00 Setting up the appliances

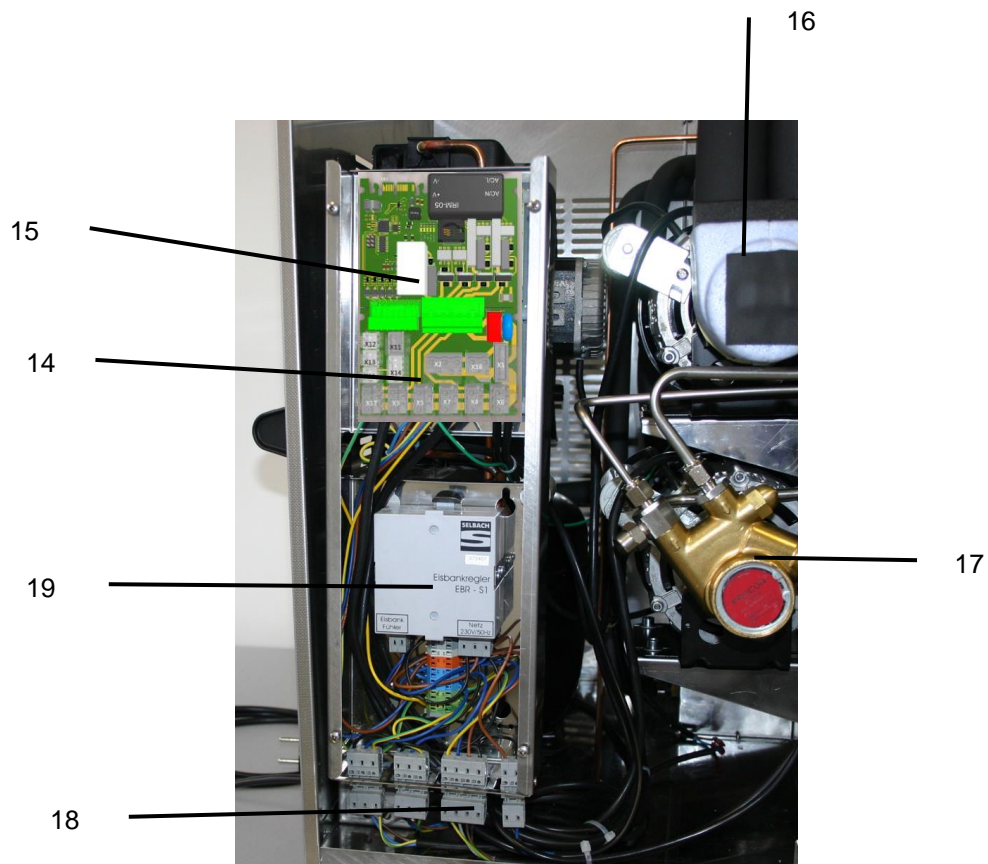
To ensure trouble-free function, it is necessary to set up the Selbach appliances on a level substrate. Make sure that there is sufficient space available to connect the beverage lines. The appliances must always be well ventilated to prevent heat accumulation. Ensure proper flow for intake air and exhaust air. Do not cover the air slots!

Select an installation site where the equipment is protected against wet conditions. Also make sure that the connection cable is not kinked or pinched and goes straight to the socket. The mains plug must be easily accessible at all times. The appliances must only be stored and operated where they are protected against freezing temperatures.

6.00 View

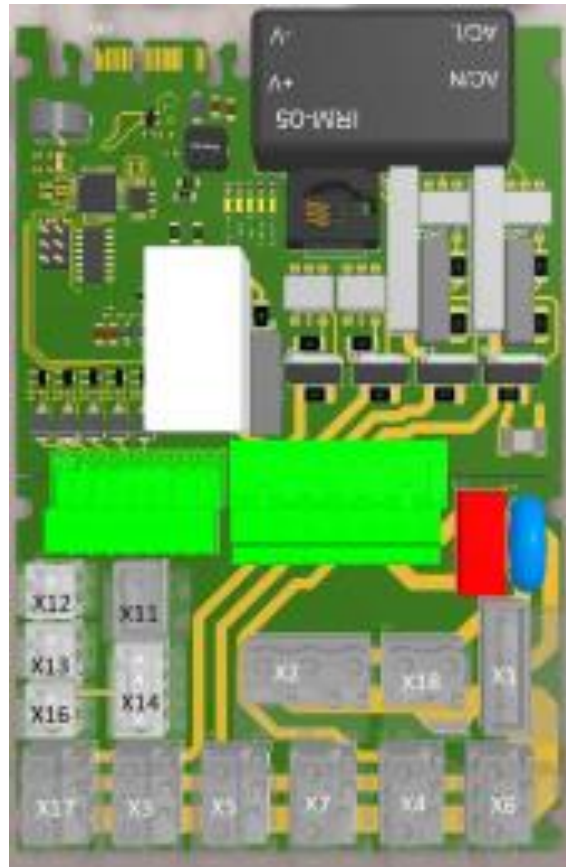


1. Solenoid valve (CN 160 two items)
2. Air routing with fan motor
3. CO₂ water circuit
4. CO₂ water circuit
5. Cooling coils outlet
6. Cooling coils inlet
7. CO₂ inlet
8. Water inlet
9. Stirring unit motor
10. Backflow inhibitor
11. Circulation shut-off valve
12. Still water pressure reducer
13. Still water outlet



- 14. Distributor board
- 15. Level regulator
- 16. Circulation pump
- 17. MS high-pressure pump (two pumps for CN 160)
- 18. Component plug
- 19. Ice bank regulator

Level regulator / Distributor board



- X1 Main supply
- X2 Ice bank controller/thermostat
- X3 circulation pump 1
- X4 Carbonator pump 1
- X5 Solenoid valve1
- X6 Carbonator pump 2
- X7 Solenoid valve 2
- X11 Level sensor
- X12 Flow switch
- X13 Water shortage pressure switch
- X14 Carbonator pump switch / Circuit pump switch
- X16 CO2 deficiency pressure switch
- X17 circulation pump 2
- X18 Refrigerator switch

6.10 Connection conditions

6.20 Electrical connection

220–240 V 50 Hz. The connection line must be routed directly to the shockproof socket. Extension cables and multi-plug connectors are not permitted.

6.30 Water connection

- Drinking water supply with 2.5 bar flow pressure.

An approved water pressure reducer must always be provided. Connection materials appropriate to local conditions must be used. Preferably, permanent piping should be installed.

Turn off the CO₂ and water when the appliance is not in operation!

- CN 80: Water consumption under full load with one pump 220 l/h
- CN 160: Water consumption under full load with two pumps 440 l/h

For safety reasons, the appliance automatically switches off when the water pressure is too low.

The tank overflow is located on the front face of the appliance. This overflow allows water from the ice bank installation and condensation from the air to drain out. Use a hose to discharge the water into a drain or a collecting container.

6.40 CO₂ connection

To ensure optimum CO₂ saturation in the water, set the pressure between 3.5 and 4.5 bar.

Excessive CO₂ pressure will not increase the CO₂ saturation.

7.00 Manual performance adjustment

CN 160: If the water supply is inadequate, it is possible to switch off one carbonator pump manually. This reduces the carbonator performance by 50%.

1. Pull out the mains plug.
2. Remove the cover.
3. Remove the side panel.
4. Unscrew the cover of the electrical box.
5. Pull out the plug for carbonator pump 2.
6. Screw on the cover of the electrical box.
7. Close the side panel.
8. Close the cover.
9. Plug in the mains plug.

8.00 Disposal

For the most part, Selbach appliances are made of VA 1.4301 / 1.4016 / ST 12-ZE and consequently for the most part they can be recycled. Refrigeration components can be easily disposed of through established recycling companies. The appliances are insulated CFC-free.

9.00 Maintenance

Maintenance must only be performed by specialised personnel!

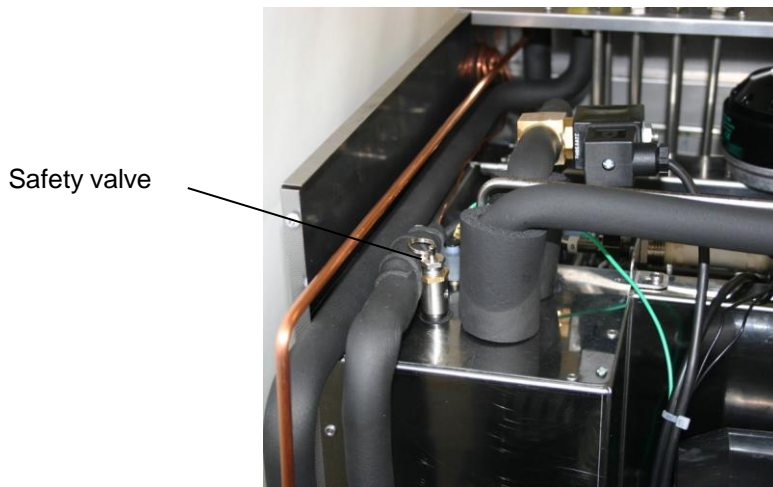
Never operate the appliance with the housing open!

10.00 Initial start-up

Before putting the appliance into operation, comply with the cleaning and disinfection regulations.

1. Remove the cover and fill the tank with water to just under the overflow level.
2. Connect the beverage lines, water line, gas line and tank overflow in accordance with the labelling and check for leaks.
3. Set the CO₂ supply on the canister pressure reducer to the required flow pressure of 4 bar.
4. Vent the carbonator tank by pulling on the safety valve for approx. 2 seconds.
5. Set the water inlet on the external pressure reducer to 2.5 bar flow pressure.
6. Connect to the mains.
7. The level regulation automatically controls the CO₂ water treatment in the carbonator.
8. Open the taps to flood the circulation system.
9. Venting
 - Switch off the circulation motor.
 - Switch on the high-pressure pump.
 - Vent the system at the tap.
 - Switch on the circulation pump.
 - Turn the slotted screw on the bleeder valve downstream of the circulation pump to open the valve and vent the VA pump.
 - Close the valve.
10. If present, set the post-mix taps according to the manufacturer's specifications.
11. Once the ice bank is complete (ice bank regulator), the appliance is ready for use.

A filter system should be provided for the mains water.



10.10 Description of the activation devices

There are off-switches on the side panel of the Selbach carbonators. These switches can be used to switch the high-pressure and circulation pumps.



11.0 Troubleshooting

Fault	Possible cause	Troubleshooting
The appliance does not start up	No mains connection	Connect to the mains
	Water pressure too low	Set pressure to at least 2.5 bar flow pressure
	Pump stuttering (not enough water)	Set pressure to at least 2.5 bar flow pressure
The appliance does not cool	No water in the tank (only for wet appliances)	Top up water
	Soiling of the condenser	Carefully clean the condenser
	Failure of the condenser fan	Replace fan ⁸
	Leaks in the refrigerant system	Repair leak, evacuate the system and fill with refrigerant ⁹
	Compressor fault	Replace compressor ⁹
Appliance does not switch off	Ice bank regulator faulty	Replace ice bank regulator ⁸
	Level regulator faulty	Replace level regulator
	Electrode connection interrupted	Check connection, replace electrodes
Appliance freezing up	Ice bank regulator faulty ⁷	Replace ice bank regulator ⁸

⁸ Only have qualified electricians perform these tasks.

⁹ Only have a refrigeration specialist perform these tasks.

12.00 Maintenance tasks

- Clean the condenser vanes at regular intervals with a brush or compressed air and remove airborne dust.
- Check the water level in the tank at regular intervals.
- Change the water in the tank at regular intervals (6 months).
- Replace the filter cartridges at regular intervals in accordance with the manufacturer's specifications.

13.00 Taking the appliance out of operation

1. Interrupt the water supply.
2. Completely drain the table water system through the taps until CO₂ gas comes out of the outlet.
3. Shut off the CO₂ supply.
4. Pull out the mains plug.
5. Drain the water from the tank.



To ensure flawless water quality when the appliance is put back into operation, a service technician must first intensively clean and disinfect it in order to safely remove any biofilm that may have formed during storage.

The water supply must always be shut off at the end of operation.

14.00 Cleaning

Housing:

Before cleaning the equipment, disconnect the mains plug!

Do not bring the appliance into direct contact with water, only clean it with a damp cloth and a little dishwashing detergent.

14.10 Cleaning the dispensing system

- **To ensure hygienic operation of the system, comprehensive personal hygiene is essential. Always disinfect your hands before and during work using a suitable disinfectant and wear clean and appropriate work clothing.**

The minimum statutory requirements for cleaning of beverage systems are specified in DIN 6650. In this standard cleaning “as needed” is always prescribed. “Needed” is based on discharge, beverage type, dispensing pauses and the type of system.

Where parts of the dispensing system alternately come into contact with beverage and air, germs that are present everywhere in the ambient air can multiply. Therefore, it is necessary to keep these areas of the dispensing system clean by cleaning them daily (especially the tap and the drip tray). It is not possible to keep the dispensing system entirely free of germs during operation. However, regular and thorough cleaning can prevent germs from multiplying, which will have a negative effect on product quality (odour and flavour) of the product, and turbidity will occur. Of course, the area around the dispensing system must also be kept clean. Observe the national requirements that apply at the installation site regarding the cleaning of dispensing systems. Before connecting and changing a new type of beverage, the connection parts and tap fittings must be cleaned.

Note the instructions from the cleaning agent manufacturer. When handling cleaning fluids, there is a risk of severe chemical burns. When carrying out cleaning work, always wear protective goggles and appropriate clothing. Note the instructions from the cleaning agent manufacturer.



Never clean the carbonator mechanically! The sponge balls can permanently block the beverage lines!

14.20 Chemical cleaning*



During cleaning work, a clearly visible sign must be attached to the system clearly indicating that the table water system must not be used during at this time.

Observe the safety instructions from the cleaning agent manufacturer!

1. Pull out the mains plug.
2. Shut off the CO₂ supply.
3. Connect the water supply to the appliance and install the cleaning container in the supply line with a cleaning and disinfectant solution mixed in. All cleaning and disinfectant agents used must comply with the requirements of DIN 6650-6. Solutions with 2% hydrogen peroxide are permitted. Cleaning and disinfectant agents containing chlorine must not be used. The processing instructions from the manufacturer of the cleaning and disinfectant agent must be complied with.
4. Open the water supply and apply a maximum CO₂ positive pressure of 2 bar at the cleaning container.
5. Plug in the mains plug.
6. Open the taps until cleaning fluid flows out of each tap.
7. Disconnect the electrode plug at the top on the carbonator tank so that it can be completely flooded with cleaning fluid.
8. Pull the pressure relief valve at the top of the cooling block so that the remaining CO₂ can escape from the carbonator tank – the cleaning fluid will overflow.
9. Immediately reconnect the electrode plug. Pull out the mains plug.
10. Shut off the water supply.
11. Allow the cleaning fluid to take effect (for the length of time needed, consult the instructions from the cleaning and disinfectant agent manufacturer).
12. Remove the cleaning container and connect the water supply.
13. Plug in the mains plug and open the water supply.
14. Rinsing: Open the taps and leave flowing until clear water flows out, at least 5 litres of still water and 10 litres of CO₂ water.
15. Also allow water to flow out of the safety valve in order to fully rinse the headspace in the carbonator tank. Make sure that no cleaning agent remains in the system! For information about effective verification methods, consult the manufacturer of the cleaning and disinfectant agent.
16. Normal operation can resume.

* Only allow a specialist to perform this work

14.30 Cleaning agents

Chemical cleaning and disinfectant agents must be suitable for the removal of beverage and raw material residue, microbes and deposits in components that dispense beverages. The effectiveness of a cleaning and disinfectant agent must be matched to the degree of contamination. Effectiveness must be checked in the individual case.

All cleaning and disinfectant agents used must comply with the requirements of DIN 6650-6. Solutions with 2% hydrogen peroxide are permitted. Cleaning and disinfectant agents containing chlorine must not be used. Special cleaning and disinfectant agents for carbonators are particularly suitable. The processing instructions from the manufacturer of the cleaning and disinfectant agent must be complied with.

The cleaning and disinfectant agents used must be compatible with the following materials:

- Stainless steel mat. no. 1.4301
- Stainless steel mat. no. 1.4305
- Drinking water quality brass
- Medium grade ethylene vinyl acetate
- Ethylene propylene diene monomer EPDM
- Acetal
- Polypropylene
- Polyoxymethylene POM
- Polybutylene terephthalate PBT

For information and addresses for the cleaning agent manufacturers, consult Fachverband Getränkeschankanlagen e. V. and Bundesverband für Schankanlagen- und Gastronomietechnik e.V BvSG.

15.00 Technical data

	CN 80	CN 160
Electrical connected loads	230 V / 50 Hz / 5.2 A / 1000 W	230 V / 50 Hz / 9.3 A / 1850 W
Tap is ready in	200 minutes	300 minutes
Tap output	48 l/h with delta t of 19 K	100 l/h with delta t of 19 K
Water bath	69 l	93 l
Ice bank weight	18 kg	30 kg
W/D/H	980/515/360 mm	1050/540/630 mm
Weight	67 kg	90 kg

16.00 Spare parts

Art. no.	Description
50-0087-0003	RPM pump motor with 3-pin header
12-0054-0000	MS pump 300 l with valve
12-0003-0000	VA pump
12-0002-0000	Fastening clip for pump
26-0307-0000	O-ring 14x1.78 for plug nipple
52-0162-0000	Still water controller
50-0371-0000	Solenoid valve with plug
50-0082-0000	Stirring unit motor with ebm plug
51-0559-0000	Complete electrode 125 mm
11-0104-0002	Danfoss SC18GX compressor pre-assembled (CN 80)
11-1471-0001	NT6217Z compressor pre-assembled (CN 160)
11-0105-0001	Danfoss SC 21 GX compressor (CN 160)
50-0224-0000	Air baffle for FCEV 139 with motor and vanes 230 D (CN 80)
50-0225-0003	Air baffle for FCEV 194U (CN 160)
50-0356-0000	Level regulator controller board
50-0357-0000	Large I/O board for level regulator
50-0134-0000	Ice bank regulator EBR-S1

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