

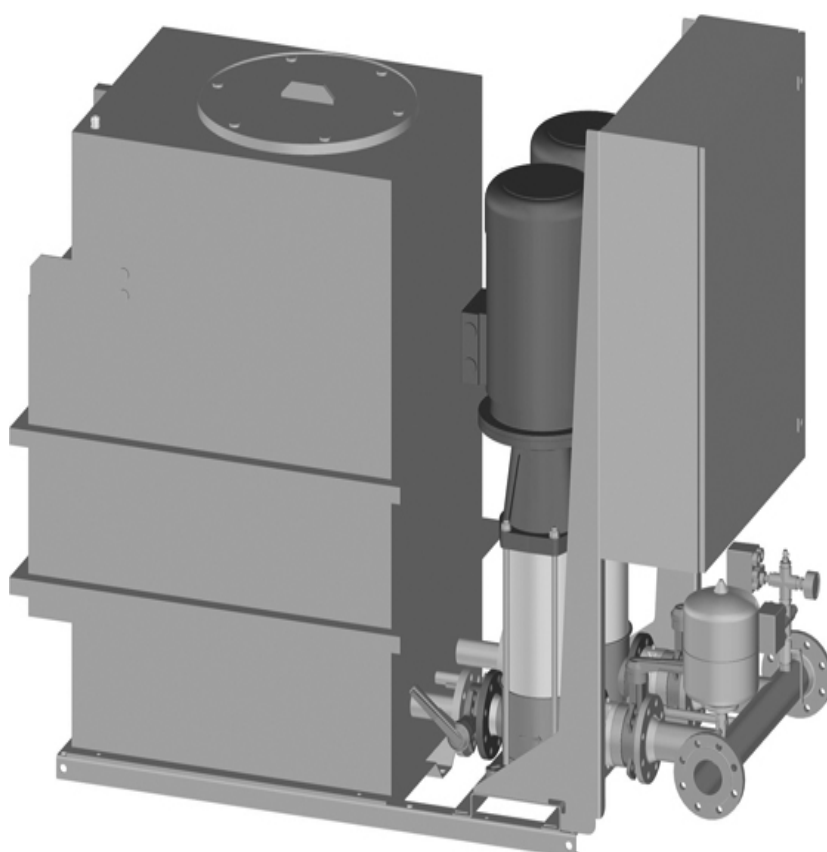
# Braukmann

## CBU145

Compact Booster Unit - double pump

To ensure the quality of potable water according to EN1717

### Instructions







## Contents


<b>1. Safety Guidelines.....</b>	<b>3</b>	<b>Assembly.....</b>	<b>12</b>
1.1 Safety instructions in this manual .....	3	6.1 General safety instructions.....	12
1.2 Safety instructions in the system .....	3	6.2 Installation according to DIN 14462 .....	12
1.3 General safety instructions.....	3	6.3 Installation according to DIN 1988 .....	12
1.4 Further safety regulations.....	3	6.4 Inspection before assembly.....	13
1.5 Unauthorised operation types.....	3	6.4.1 Installation site .....	13
1.6 Residual dangers in handling the compact booster unit .....	3	6.5 Installing the compact booster unit.....	13
1.6.1 Mechanical residual dangers.....	3	6.6 Installing the pipelines.....	13
1.6.2 Residual dangers pertaining to fluids.....	4	6.6.1 Connecting the overflow .....	13
1.6.3 Residual electrical hazards .....	4	6.6.2 Installing the compensator (optional) .....	13
1.6.4 Thermal hazards.....	4	6.7 Buffer tank.....	13
1.6.5 Residual biological hazards.....	4	6.8 Protection against dry running.....	13
1.6.6 Residual chemical hazards .....	4	6.9 Installing valves.....	13
1.6.7 Consequences and dangers that result from not observing the manual.....	4	6.10 Electrical connection.....	13
1.7 Basic Safety Measures .....	5	6.10.1 Safety instructions.....	14
1.7.1 Keep information available .....	5	6.10.2 Connection specifications.....	14
1.7.2 For environmental protection.....	5	6.10.3 Connecting electrical accessories .....	14
1.7.3 Modifications to the compact booster unit .....	5	6.10.4 Connecting the limit switch .....	14
1.8 Duty of due care of the operator.....	5	6.10.5 Potential-free contacts.....	14
1.9 Safety instructions for the operator/operating personnel .....	5	6.11 Standby indicator.....	15
1.10 Safety instructions for maintenance, inspections and assembly work .....	5	<b>7. Start-up.....</b>	<b>15</b>
1.11 Requirements for operating personnel .....	5	7.1 Safety instructions for start-up.....	15
1.11.1 Operating personnel.....	5	7.2 Start-up requirements .....	15
1.12 Personal safety equipment.....	5	7.3 Initial operation.....	15
<b>2. General information.....</b>	<b>6</b>	7.3.1 Settings .....	16
2.1 Conformity with the following norms .....	6	7.4 Switching the system on .....	16
2.1.1 Warranty and liability .....	6	7.5 Start-up checklist.....	16
2.1.2 Storage and perfect condition.....	6	<b>8. Maintenance .....</b>	<b>17</b>
2.1.3 Illustrations.....	6	8.1 Safety instructions for maintenance .....	17
2.1.4 Symbols.....	6	8.2 Inspection .....	17
2.2 Other applicable documents.....	6	8.2.1 Buffer tank .....	17
2.3 Glossary.....	6	8.2.2 Monitoring Operation .....	18
<b>3. Description.....</b>	<b>7</b>	8.2.3 Mode of operation in the event of power loss .....	18
3.1 Intended use.....	7	8.2.4 Checklist for Inspection.....	18
3.2 Non-intended use .....	7	8.3 Maintenance .....	19
3.3 Version.....	7	8.3.1 Setting the precharge pressure for the membrane pressure vessel .....	19
3.3.1 Structure .....	7	8.3.2 Cleaning the dirt trap .....	19
3.4 Function .....	8	8.3.3 Checklist for maintenance work.....	19
3.4.1 Installation type .....	8	<b>9. Troubleshooting.....</b>	<b>19</b>
3.4.2 Inlet side .....	8	9.1 Possible malfunctions / Errors .....	19
3.4.3 Outlet side.....	8	9.2 Possible causes / Elimination .....	20
3.4.4 Switch cabinet.....	8	<b>10. Shut-down, restart.....</b>	<b>21</b>
3.5 Mode of operation.....	9	10.1 Shutting down the compact booster unit .....	21
3.5.1 Mode of automatic operation.....	9	10.2 Restarting the compact booster unit .....	21
3.5.2 Mode of manual operation .....	9	<b>11. Storage .....</b>	<b>21</b>
3.5.3 Mode of operation for testing.....	9	11.1 Short-term storage.....	21
3.5.4 Mode of operation for protection against dry running.....	9	11.2 Storage/Preservation.....	21
3.5.5 Mode of operation for temperature monitoring.....	9	11.3 Storage conditions.....	21
3.5.6 Mode of operation for refilling.....	9	<b>12. Disassembly, disposal .....</b>	<b>21</b>
3.5.7 Mode of operation for flushing.....	9	12.1 Safety instructions for disassembly.....	21
3.5.8 Mode of operation for separation of potable water.....	9	<b>13. Spare parts .....</b>	<b>22</b>
3.5.9 Mode of operation in the event of power loss .....	9	13.1 Parts index CBU145.....	22
3.6 Options.....	9	<b>14. Start-up protocol .....</b>	<b>23</b>
<b>4. Technical data.....</b>	<b>10</b>	<b>15. Declaration of no objection .....</b>	<b>24</b>
4.1 Construction dimensions.....	11	<b>16. Proof of Maintenance .....</b>	<b>25</b>
4.2 Noise expectancy values.....	11		
4.3 Authorised environmental conditions .....	11		
<b>5. Shipping.....</b>	<b>12</b>		
5.1 Check condition upon delivery.....	12		
5.2 Transportation .....	12		


## 1. Safety Guidelines

### 1.1 Safety instructions in this manual



	<b>Danger</b>
Places with this sign signify that death, severe bodily injury or significant property damage will occur if the appropriate precautionary measures are not followed!	
	<b>Warning</b>
Places with this sign signify that death, severe bodily injury or significant property damage may occur if the appropriate precautionary measures are not followed!	
	<b>Caution</b>
Places with this sign signify that small bodily injury or slight property damage may occur if the appropriate precautionary measures are not followed!	

 Places with this sign provide technical information and tips on usage that damage to the machine must be avoided. This symbol is not a safety indication.

 Places with this sign provide information about possible hazards to the environment

 Please notice that a safety symbol never can replace the text of the safety instruction itself - the text of the safety instruction must be read entirely!

### 1.2 Safety instructions in the system

	Danger of burning on hot surfaces of pump housing
	

### 1.3 General safety instructions

This manual contains basic instructions which are to be observed in transport, assembly, start-up, operation, maintenance, shut-down, storage and waste disposal.

The following safety instructions have to be observed while operating the compact booster unit:

- When using the compact booster unit, the data, operation and usage conditions specifically authorised in the technical data sheet and the operating manual have to be observed.
- Never exceed the permissible limits pertaining to pressure, temperature, etc. as stated in the documentation.
- Observe all safety instructions as well as the operating instructions of the manual.
- Instructions that are directly attached to the system have to be observed and must be kept completely legible. This applies for example to:
  - Safety instructions
  - Arrow for rotation direction
  - Connection labels
  - Type label
- Before assembly and start-up, the manual has to be read by the operator as well as by the responsible technical/operating personnel and has to be stored at the site of the compact booster unit at all times.
- Installation and maintenance work may only be performed by authorised specialist personnel with the appropriate tools.
- The technical condition of the compact booster unit has to be checked regularly (at least once a year) by the operating company.
- The local safety and accident regulations have to be observed when operating the compact booster unit.
- The general technical rules must be observed when planning the usage and operating the device.
- Modification of the compact booster unit is not permitted and leads to the loss of warranty.
- After an interruption of the electrical or fluid supply, a defined or controlled re-run of the process must be ensured.
- The operator is responsible for complying with local regulations that are not covered by the manual.

### 1.4 Further safety regulations

Besides the safety instructions presented in this manual and its intended use, the following safety regulations are valid:

- Accident prevention regulations, safety and operating regulations
- Safety regulations for handling hazardous substances
- Applicable standards and laws

### 1.5 Unauthorised operation types

The limits that are stated in the documentation have to always be complied with. The delivered system is only guaranteed to operate reliably when it is used as intended.

### 1.6 Residual dangers in handling the compact booster unit

Danger and adverse effects may result from use of the compact booster unit

- for the body and life of the operator or third person
- for the compact booster unit itself
- to other property.

The basis for safe and error-free operation of the compact booster unit is knowledge of the instructions for safety and operation in this manual.

#### 1.6.1 Mechanical residual dangers

During normal operation, no danger is threatened from mechanical components.

### 1.6.2 Residual dangers pertaining to fluids

During normal operation, no danger is threatened by hydraulic components.

Hazards might result solely under the following conditions.

Danger area	Type of hazard	Reduction of hazard
Pipelines	Injury through high pressure	Clear pipelines of pressure and medium prior to assembly, maintenance, shut-down!

### 1.6.3 Residual electrical hazards

During normal operation, no danger results from the electrical equipment of the compact booster unit.

Hazards might result solely under the following conditions.

Danger area	Type of hazard	Reduction of hazard
Injury from cables	Danger to life ! Electric shock of 230/400V from electric voltage	Connect up protective earth system!
		Always switch off power supply and secure against switching on again during maintenance and servicing work!
		Comply with the valid accident prevention and safety regulations for electrical devices!
Electrostatically endangered components / subassemblies	The device contains electronic componental elements that react sensitively to electrostatic discharge (ESD). Contact with electrostatically charged persons or objects endangers these componental elements. Worst case scenario: they will be immediately destroyed or fail after start-up.	Comply with requirements according to EN 100 015 - 1, in order to minimise or avoid damage through shock-type electrostatic discharge!
		Do not touch electronic componental elements when the power supply is on!

### 1.6.4 Thermal hazards

Danger area	Type of hazard	Reduction of hazard
Hot surfaces of the pump housing	Contact can cause burning	Wear personal safety equipment!

### 1.6.5 Residual biological hazards

During normal operation, no biological danger results from the compact booster unit.

Hazards might result solely under the following conditions.

Danger area	Type of hazard	Reduction of hazard
Buffer tank	Danger of microbial contamination	Set the automatic rinsing device according to local conditions! Clean the buffer tank regularly!
Inlet lines from the potable water network	Danger of contamination caused by stagnant water	Make sure the inlet lines from the potable water network are equipped with a rinsing device!

### 1.6.6 Residual chemical hazards

During normal operation, no chemical danger results from the compact booster unit.

Hazards might result solely under the following conditions.

Danger area	Type of hazard	Reduction of hazard
Use of detergents	Danger through contact with or breathing in dangerous fluids, gases, fumes, vapours or dust	Wear personal safety equipment!
		Pay attention to the safety specifications sheet of detergent manufacturers!

### 1.6.7 Consequences and dangers that result from not observing the manual

- Not observing this manual will lead to loss of the warranty and make damage claims invalid.
- Failure to observe the manual can lead, for example, to the following dangers:
  - Hazard to persons caused by electrical, thermal, mechanical, and chemical influences
  - Loss of important product functions
  - Failure to perform required maintenance and service measures
  - Environmental hazard caused by leakage of hazardous substances

## 1.7 Basic Safety Measures

### 1.7.1 Keep information available

This manual has to be stored. It has to be ensured that all persons who operate the compact booster unit have access to the manual at all times.

### 1.7.2 For environmental protection



When operating or servicing the compact booster unit, the regulations concerning waste avoidance and the proper recycling or disposal of waste must be observed.

Particular attention must be paid that materials and agents dangerous to the groundwater such as fats, oils, coolants, solvent-based liquid detergents, etc. do not pollute the ground or access the sewage system. These materials must be caught in suitable tanks, stored, transported and properly disposed of.

### 1.7.3 Modifications to the compact booster unit

When using externally procured parts, there is no guarantee that these are designed and constructed to tolerate demands made upon them or whether they comply with safety regulations.

For safety reasons, no unauthorised modifications may be made to the compact booster unit.

Parts and special equipment not delivered by Resideo are also not authorised by Resideo for use.

## 1.8 Duty of due care of the operator

This compact booster unit was designed and constructed according to a risk assessment and after careful selection of the harmonised standards that apply, as well as according to further technical specifications. It thus complies with best practice and guarantees the highest safety standard.

This level of safety can only be attained during operational practice if all required safety measures have been taken. It is the duty of care of the operator of the compact booster unit to plan these measures and enforce their implementation.

In particular, the operator must ensure that

- the compact booster unit is only operated as intended
- the compact booster unit is only operated in perfect working condition.
- the required personal safety gear for operating, maintenance and repair personnel is available and is used
- the manual has to be kept legible at all times and stored on-site with the compact booster unit.
- the compact booster unit is assembled, commissioned, operated, maintained, and shut down solely by sufficiently qualified and authorised personnel.
- this personnel is regularly instructed on all relevant questions of work safety and environmental protection, and has also read and understood the manual and particularly the safety instructions it contains.
- none of the safety and warning signs attached to the compact booster unit are removed and all remain legible.
- a hazard assessment (according to the Safety at Work Act § 5) is conducted to detect further hazards that may arise from the particular working conditions on-site where the compact booster unit is operated.
- all further information and safety instructions which arise from the hazard assessment process shall be summarised in operating instructions (according to the work equipment regulation § 6).
- measures for the decontamination of systems that pump hazardous medium are stated in the operating manual
- the drain output lines are sufficiently dimensioned

## 1.9 Safety instructions for the operator/operating personnel

- Provide on-site protection against contact for hot, cold, and moving parts and check if they function properly.
- Do not remove the protection against contact during operation of the pump.
- Eliminate hazards caused by electrical energy (for details refer to the country specific regulations and/or local power supply companies).

## 1.10 Safety instructions for maintenance, inspections and assembly work

- Alterations or modifications of the system are only permitted with the consent of the manufacturer.
- Use only original parts or parts authorised by the manufacturer.
- Use of parts other than those authorised may lead to loss of liability for any damage they may cause.
- Perform service on the system only when the machine is off.
- The pump housing has to be at ambient temperature.
- The pump housing has to be depressurised and empty.
- The procedures described in the manual for shutting down the system have to be observed under all circumstances.
- Decontaminate systems that pump hazardous medium.
- Reinstall safety equipment and protective devices and activate them again immediately after work on the system has been completed. Before starting up again, observe the start-up checklist.
- Keep unauthorised persons (e.g. children) away from the system.

## 1.11 Requirements for operating personnel

### 1.11.1 Operating personnel

This compact booster system may only be assembled, started, operated, maintained, and shut down by persons who have been trained, instructed and authorised to do so.

In some cases, training can be arranged by the manufacturer if asked by the operator.

Training or personnel to operate system may only be conducted under the supervision of specialised technicians.

The relevant authorisations of the personnel are to be specified by the operating company in the form of an operating instruction.

Over and above this, special qualifications are required for the following tasks:

- Only electricians may perform work on electrical equipment.
- Assembly, maintenance, servicing and repair work may only be performed by qualified, specialist personnel

The basic regulations on work safety and accident prevention are to be observed.

### 1.11.1.1 Qualified personnel

Qualified personnel are persons who on account of their training, experience and instruction also their knowledge of the relevant norms, regulations, accident prevention regulations and operating conditions, including those persons responsible for the safety of the system, have been authorised to perform the relevant and required tasks, meanwhile being able to recognise and avoid dangers. This includes required knowledge of First Aid measures and the local ambulance services and facilities.

## 1.12 Personal safety equipment

No personal safety equipment is required to operate the compact booster unit.

## 2. General information

The manual is a part of the series and the versions as mentioned on the title page. The manual describes the safe and proper use in all modes of operation.

The type label indicates the series and size, the most important operating data and the order number. The factory number/serial number describes the identifies the system uniquely and serves this purpose for all further business transactions.

In order to maintain the warranty, in the event of damage immediately contact the nearest Resideo service centre.

### 2.1 Conformity with the following norms

Pump unit: Machinery Directive 2006/42/EG

Pump unit: EMC Directive 2004/108/EG

#### 2.1.1 Warranty and liability

As a matter of principle, the general sales and delivery terms of the Honeywell Company apply. Warranty and liability claims for injury to persons and damage to property are ruled out if they arise from one or more of the following causes.

- Non-intended use of the compact booster unit
- Improper assembly, start-up, operation and maintenance of the compact booster unit
- Failure to comply with the instructions in the manual concerning transport, storage, assembly, start-up, operation, maintenance, and service of the compact booster unit
- Unauthorised constructional modifications of the compact booster unit
- Negligent monitoring of components subject to stress
- Improperly performed repairs
- Catastrophes through effect of a foreign object or force majeure

#### 2.1.2 Storage and perfect condition

This instruction manual is a part of the compact booster unit and has to be complete and accessible at all times. Any instruction or page that is missing has to be replaced immediately.

#### 2.1.3 Illustrations

The illustrations used are examples of one possible version of the compact booster unit and might differ in individual cases from the actual compact booster unit version.

#### 2.1.4 Symbols

1. Start of a task description

2. Next work step

- Result of an action

List of several options

☒ Reference to other documents

Pictogram	Danger classification
	☐ Danger source
	☒ Consequence of non-compliance
	☒ Avoidance

## 2.2 Other applicable documents

- ☒ Data sheet CBU145
- ☒ Operating instructions of the operating company
- ☒ Data sheets
- ☒ Documentation for the switch cabinet/circuit diagram
- ☒ Wiring scheme for the external remote on/off control
- ☒ Instructions for the pump
- ☒ Instructions for the pressure switch
- ☒ Instructions for the throttle valve
- ☒ Instructions for the membrane pressure vessel
- ☒ Instructions for the check valves
- ☒ Instructions for magnetic valves
- ☒ Declaration of Conformity

## 2.3 Glossary

### Pump requirements

Pump actuation means that a pump starts up when a start signal is sent by a pressure switch, from a wall hydrant (limit switch), by remote on/off, or from the wire breakage and short circuit monitoring relays.

### Automatic operating mode

The pump is switched on and off either by pressure control or by a contact on the wall hydrant.

### EN 1717

European standard that specifies technical regulations for potable water installations.

### DIN 14462

German standard that pertains to extinguishing water equipment and with which fire extinguisher systems have to comply.

### Membrane pressure vessel

The membrane pressure vessel is for compensating pressure drops in the pipeline network behind the compact booster unit, that can occur because of loss of minimal quantities.

That minimises the frequency of operation of the compact booster.

### Noise expectancy values

The expected noise emission, stated here as sound pressure level (SPL) in dB(A).

### Manual operation

During manual operation, the compact booster unit is connected directly to the mains and independent of the control unit.

### Certificate of no objection

A certificate of no objection is a declaration that the system has been cleaned properly so that parts that have been in contact with medium are not dangerous for health and environment.

### 3. Description

Resideo Compact Booster Unit - double pump CBU145 as a safety device to separate potable water from category 5 fluids according to DIN EN 1717 for fire extinguisher applications according to DIN 14462 and DIN1988-600 with free outlet type AB and vertical high-pressure pumps.

Fully automatic, fully wired Compact Booster Unit-double pump with modular design comprising a double pump system with redundant operation and a buffer tank for the hygienic separation of potable water and category 5 fluids according to DIN EN 1717, on a common base frame. The modular design makes it possible to disconnect modules for installation in buildings with limited space. The system is switched on and off regulated by pressure. Separation of systems as a means to protect potable water from being contaminated by fluids of the category 5 according to EN 1717

Pump medium	Non-potable water
	Without aggressive, abrasive and solid components
Flow rate	max. 48 m <sup>3</sup> /h (13,3 l/s)
Pumping head	up to 125 m
Medium temperature	up to 30 °C
Ambient temperature	up to 40 °C
Pressure rating	PN16
Inlet pressure	
up to 18 m <sup>3</sup> /h	min. 1,5 bar, max. 8 bar
up to 36 m <sup>3</sup> /h	min. 3 bar, max. 8 bar
up to 48 m <sup>3</sup> /h	min. 4 bar, max. 8 bar
Supply voltage	2 x 3/N/PE, AC 400 V, 50 Hz

#### 3.1 Intended use

The compact booster unit may only be operated in such areas as described in the other applicable documents.

Non-intended operation of the compact booster unit can result in danger to persons, systems, the surroundings and the environment.

- Operate the compact booster unit only if it is in perfect working condition.
- Do not operate the compact booster unit if it is only partially assembled.
- The compact booster unit may only be used to pump the medium as described in the documentation of the respective version.
- Never operate the compact booster unit without pump medium.
- Observe the values for minimum pumping rates (avoiding damage because of overheating, storage damage, ...).
- Observe the values for maximum pumping rates (to avoid damage due to overheating, floating ring seal damage, cavitation damage, storage damage, ...).
- Do not throttle the input of the compact booster unit (to avoid cavitation damage).
- Other modes of operations, if not mentioned in the documentation, have to be coordinated with the manufacturer.

#### 3.2 Non-intended use

The compact booster unit is not designed for operation outside. Temperature, light and moisture can lead to malfunctions and damaging devices.

- Do not operate the compact booster unit outside.
- Operate the compact booster unit only as intended.
- Do not fill aggressive or flammable medium into the medium lines of the system.
- No mechanical stress on housings (e.g. by depositing objects or as a step).
- Do not perform any external modifications on the device housing. Do not paint housing parts and screws!
- Do not disassemble the compact booster unit more than is necessary for purposes of installation and maintenance.

### 3.3 Version

The Compact Buster Unit comprises the following modules, that can be disassembled (for example for transport purposes).

- The double pump booster unit has two pumps, a control unit, valves and connected piping. The pressure switch and temperature sensor are installed, wired and preset with standard default values in the factory.
- Buffer tank with inlet and flushing apparatus as well as level, overflow and dry running monitor. The components are assembled and preset in the factory. The electrical components are connected to the control unit of the booster station with plug connections. Thus if required an electric separation can be made.
- A common base frame for the double pump booster unit and the supply container that allows transportation with a standard pallet hand forklift. The pumps and base frame are equipped with vibration dampers.

#### 3.3.1 Structure

Double pump system with redundant operation, including back-up pump unit, made up of:

- two normal sucking, vertical high-pressure rotary pumps with all components in contact with the medium made of stainless steel
- Standard-motor each pump, energy efficiency class IE2
- Check valves for each pump
- Shut-off valves on the inlet and outlet sides of each pump
- Diaphragm expansion vessel on the outlet side as vessel
- Vibration damper for each pump
- Pressure gauge display
- Isolation valves, lockable
- Pump protection through temperature related minimum flow
- Piping made of chrom-nickel-steel alloy
- The system is connected to the installation pipeline with circular flanges
- Base frame made of coated steel

**Two complete, electrically independent electrical switching apparatus each with an electro-mechanical control unit comprising:**

- Power supply via 3/N/PE, 400V AC, 50Hz
- Main switch that is protected against unauthorised operation
- Control transformer 400V / 230V-24V
- Green indicator light for standby
- Red indicator light for water shortage
- Yellow indicator light for malfunction
- White indicator light for operation on demand
- Manual/automatic switch
- Timer for 24 hour functional operation and weekly flushing cycle
- Remote on/off, protected against wire breakage and short circuit
- Phase monitor relays with rotation monitoring and phase failure protection
- Smooth operated start-up
- Motor protection device, in case of failure only indicates an alarm
- Terminal strip with markings for all connections
- Plug connectors for easy connection of electrical equipment on the buffer tank

**Terminal strip for potential-free contact for time-delayed potable water separation (adjustable)**

- Control voltage 230V, AC 6A

**Buffer tank made of polyethylene with:**

- Non-circular, free overflow according to EN 13077, Type AB
- Drainage connection DN 100 (nozzles) with integrated siphon trap
- Usable volume 540 litres
- Refilling of potable water via float valve
- Automatic flushing device via solenoid valve
- Sensors for monitoring of dry running and overflow

### 3.4 Function

The system comprises two multi-speed high-pressure rotary pumps with inlet and outlet shut-off valves. They can be locked with padlocks against unauthorised closing. They make it possible to disassemble the pumps or the check valves without having to empty the pipeline system. The check valve on the pumping side prevents liquid from backing up on the pump and flowing backwards through it, and it relieves the floating ringseal.

The fully automatic Compact Booster Unit with compact design comprising:

- vertical high-pressure pumps
- electro-mechanical control unit to ensure the required supply pressure is provided for the consumers
- buffer tank with automatic refilling

construction and operation is according to DIN 1988, DIN 14462, EN 1717 and EN 13077.

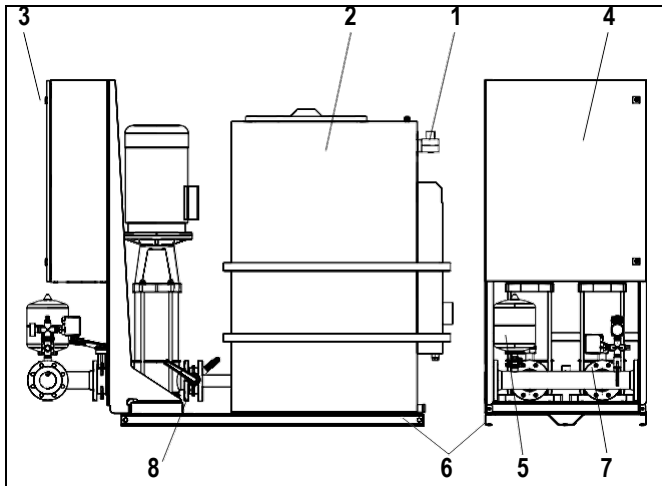


Figure 1: CBU145 Structure

- |                       |                         |
|-----------------------|-------------------------|
| 1 Inlet               | 2 Buffer tank           |
| 3 Display             | 4 Switch cabinet        |
| 5 Pump                | 6 Base frame            |
| 7 Temperature monitor | 8 Outlet shut-off valve |
| 9 Bypass              |                         |

#### 3.4.1 Installation type

- Fixed installation

#### 3.4.2 Inlet side

On the inlet side there is a buffer tank with a float valve to refill water. Additionally the Compact Booster Unit has a solenoid valve for hygienic flushing of the inlet pipe. In the buffer tank there are two float switches with which the water level is measured and in the case of water shortage and overflow messages are sent.

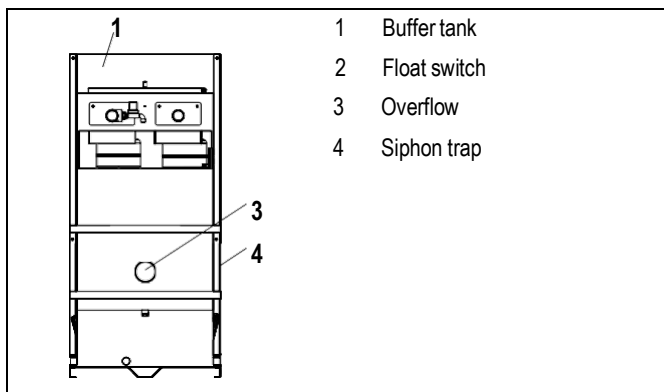


Figure 2: CBU145 Inlet side

#### 3.4.3 Outlet side

On the outlet side there is a diaphragm expansion vessel as well as two pressure switches and a pressure gauge.

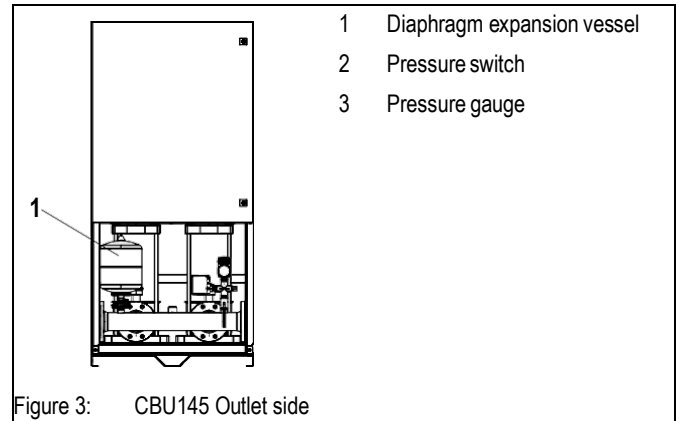


Figure 3: CBU145 Outlet side

#### 3.4.4 Switch cabinet

The switch cabinet is connected to the pump base frame and completely wired with the Compact Booster Unit. Power supply for water level measurement and solenoid valve is made possible via a plug connection to the switch cabinet.

##### 3.4.4.1 Automation

- Electro-mechanical control unit
- Timer for 24 hour functional operation and weekly flushing cycle
- Manual/automatic switch
- Phase monitor relays with rotation monitoring and phase failure protection
- Protection against dry running and Motor protection switching, only as a message during automatic operating mode
- Terminal strip/clamps with labels for all connections
- Easy starter
- Remote on/off, protected against wire breakage and short circuit

##### 3.4.4.2 Messages given out by indicator lights

- Red: Water shortage
- Yellow: Malfunction
- Green: Normal operation
- White: Operation triggered by remote on/off

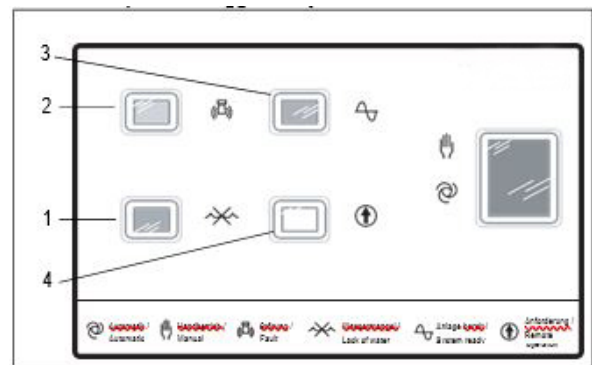


Figure 4: CBU145 Indicator lights

- |                    |  |
|--------------------|--|
| 1 Water shortage   | 2 Malfunction                          |
| 3 normal operation | 4 Operation triggered by remote on/off |

##### 3.4.4.3 Messages sent via potential-free terminal clamps to, for example, the central building control system

- Water shortage
- Switch to position manual/automatic
- Buffer tank overflow
- Remote actuation via remote on/off
- Collective error message
- Separation of potable water



### 3.5 Mode of operation

#### 3.5.1 Mode of automatic operation

The system is switched on and off by a pressure regulated electro-mechanical control unit. If the preset pressure  $p_E$  is not reached, the pump is activated via the pressure switch. If water consumption decreases, the pump shuts off after a preset follow-up time (up to 10 minutes).

The system can be controlled by remote on/off independently of the pressure switch (for example by switches in wall hydrants for fire extinguisher systems). Pressure switch and remote on/off inputs are monitored for wire breakage and short circuits. If wire breakage or a short circuit is detected, the system is automatically turned on and the yellow indicator light signals a malfunction.

**i** In automatic mode, all system safety equipment (dry running protection, motor protection) are disabled because pumping has the priority during a fire. The motor is still monitored, but once the motor protection switch has been activated, the motor remains unmonitored in the network and an error message is displayed.

The required amount of water is fed into the system via the inlet valve. For this purpose, the float valve on the potable water inlet opens and closes fully automatically.

#### 3.5.2 Mode of manual operation

Manual operation is also possible in addition to automatic mode as an exception.

A manual/automatic switch for the pump is on the switch cabinet. In the position **Manual** the pump is connected to the network, independent of the automatic mode (pressure switch or remote on/off).

**i** Manual operation is only for emergency!  
Continuous operation of the system in manual mode can lead to excessive water and energy consumption due to the bypass line.

To keep the pump and the pump medium from overheating during manual operation in the case of zero delivery, a minimum amount has to be pumped. If not, the magnetic valve in the bypass is opened when the pump mantle reaches a programmable temperature, in order to ensure that a minimum amount of medium is pumped.

Pump	Minimum amount discharged per pump for manual operation [l/h]
Movitec 15	2400
Movitec 25	2800
Movitec 40	4000

#### 3.5.3 Mode of operation for testing

There is a digital timer in the switch cabinet with which testing is parametrised. In testing mode, the pump is connected to the network, independent of the automatic mode (pressure switch or remote on/off).

#### 3.5.4 Mode of operation for protection against dry running

Protection against dry running is active in the manual and testing modes, as long as the pressure does not fall below the switch-on pressure  $p_E$  or the system is actuated by remote on/off, because the situation is interpreted as a case of fire that has to be extinguished and for which the system safety equipment has to be disabled. The connection for the dry running protection is a digital input. If it is open, the control unit registers dry running and shuts the system off after approx. 10s (default setting).

#### 3.5.5 Mode of operation for temperature monitoring

There is a temperature monitor on the pump mantle that opens the magnetic valve on in the bypass, if a programmable temperature is registered (default 90 °C) to protect the pump against overheating when operated without a minimum amount discharge. Temperature monitoring is activated in the automatic and manual modes.

#### 3.5.6 Mode of operation for refilling

Refilling is done automatically via a float valve. Water shortage and overflow are indicated as an error by the switch cabinet.

**i** Refilling has to be done with 25 m<sup>3</sup>/h (for design flow 18 m<sup>3</sup>/h) and with 50 m<sup>3</sup>/h (for design flow 36 m<sup>3</sup>/h and 48 m<sup>3</sup>/h) and system pressures of 1.5 bar (at 18 m<sup>3</sup>/h), 3.0 bar (at 36 m<sup>3</sup>/h) and 4.0 bar (at 48 m<sup>3</sup>/h) and a maximum of 8 bar.

The flow rate has to be set by a throttle valve on the system. If refilling works properly, the tank is filled up to just below the overflow hole in the middle after the refilling valve is closed. The overflow with integrated siphon trap is designed corresponding to the refilling. The system operator is responsible for ensuring the drain outlet lines are sufficiently dimensioned.

**i** According to DIN 1988-600, the maximum flow rate in a single inlet line to the extinguishing water transfer point may not exceed a calculated flow rate of 5 m/s.

#### 3.5.7 Mode of operation for flushing

Flushing of the potable water pipeline connected upstream can be activated by setting the digital timer in the switching cabinet via the solenoid valve. The flushing water is discharged through the integrated overflow. The flushing time is estimated with respect to the required flushing volume (refer to the following figure). For larger flushing volumes (more than 200 l), it can be increased by 7 l (25 m<sup>3</sup>/h) and 14 l (50 m<sup>3</sup>/h) with each further second.

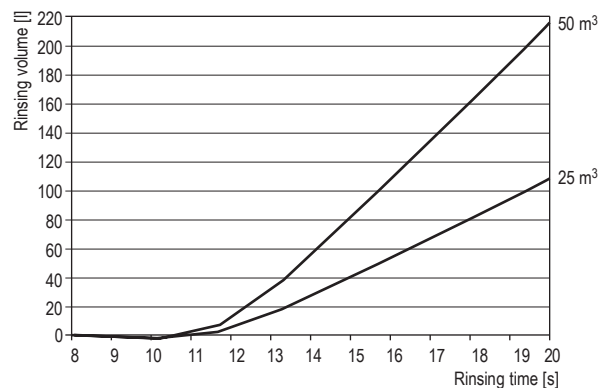


Figure 5: Determining the flushing time

#### 3.5.8 Mode of operation for separation of potable water

The Compact Booster Unit can be supplied with water exclusively by sending a potential free message "potable water separation" to close the supply of potable water to other consumers at a branch upstream from the system. The message is sent with a time delay (default 30 s) when actuated by pressure switch or remote on/off.

#### 3.5.9 Mode of operation in the event of power loss

In the event that the mains power supply of the entire system fails standby is no longer functional.

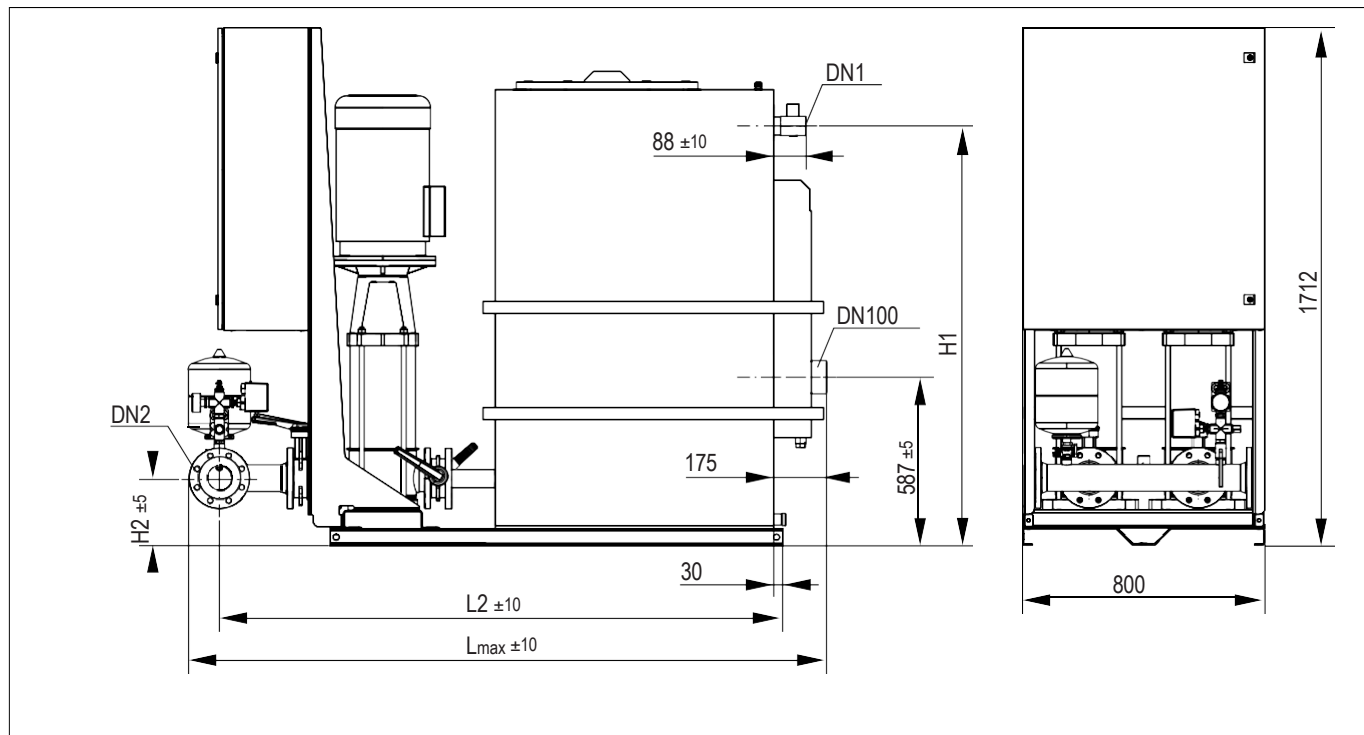
### 3.6 Options

CBU145-50A-...	refer to technical data for type selection
CBU145-65A-...	refer to technical data for type selection
CBU145-80B-...	refer to technical data for type selection

#### 4. Technical data

Type	Volumetric flow rate Q design	max. pump head*	Connection		Switch-on pressure pE and maximum pressure increase ⊗p up to switch-off pressure pA						Nominal performance	Nominal current 3~400 V
					18 m³/h (5,0 l/s)			36 m³/h (10,0 l/s)				
	[m3/h]	[m]	Inlet	Pump	pE[bar]	⊗p [bar]	pA[bar]	pE[bar]	⊗p [bar]	pA[bar]	P2 [kW]	[A]
CBU145-50A-042	18	42	G2	DN50	4,2	1,3	5,5	-	-	-	4	7,29
CBU145-50A-052	18	52	G2	DN50	5,2	1,7	6,9	-	-	-	5,5	10,07
CBU145-50A-063	18	63	G2	DN50	6,3	2,1	8,4	-	-	-	5,5	10,07
CBU145-50A-074	18	74	G2	DN50	7,4	2,4	9,8	-	-	-	7,5	13,6
CBU145-50A-085	18	85	G2	DN50	8,5	2,7	11,2	-	-	-	7,5	13,6
CBU145-50A-095	18	95	G2	DN50	9,5	3,2	12,7	-	-	-	11	19,47
CBU145-50A-105	18	105	G2	DN50	10,5	3,6	14,1	-	-	-	11	19,47
CBU145-65A-128	18	125	G2	DN65	12,5	1,5	14	-	-	-	15	26,7
CBU145-80B-052	36	51	G2 1/2	DN80	-	-	-	5,1	1	6,1	11	19,47
CBU145-80B-063	36	62	G2 1/2	DN80	-	-	-	6,2	1,1	7,3	11	19,47
CBU145-80B-073	36	72	G2 1/2	DN80	-	-	-	7,2	1,3	8,5	15	26,35
CBU145-80B-084	36	82	G2 1/2	DN80	-	-	-	8,2	1,5	9,7	15	26,35
CBU145-80B-094	36	92	G2 1/2	DN80	-	-	-	9,2	1,8	11	18,5	32,1
CBU145-80B-104	36	102	G2 1/2	DN80	-	-	-	10,2	1,9	12,1	18,5	32,1
CBU145-80B-114	36	112	G2 1/2	DN80	-	-	-	11,2	2,2	13,4	18,5	32,1
CBU145-80B-125	36	122	G2 1/2	DN80	-	-	-	12,2	2,3	14,5	22	38,1

## 4.1 Construction dimensions



Type	DN1	DN2	H1	H2	L2	Lmax	Weight [kg]
CBU145-50A-042	G2"	DN50	1372	208	1720	2000	404
CBU145-50A-052	G2"	DN50	1372	208	1720	2000	506
CBU145-50A-063	G2"	DN50	1372	208	1720	2000	508
CBU145-50A-074	G2"	DN50	1372	208	1720	2000	518
CBU145-50A-085	G2"	DN50	1372	208	1720	2000	523
CBU145-50A-095	G2"	DN50	1372	208	1720	2000	691
CBU145-50A-105	G2"	DN50	1372	208	1720	2000	693
CBU145-65A-128	G2"	DN65	1372	223	1860	2000	773
CBU145-80B-052	G2 1/2"	DN80	1425	257	1885	2095	665
CBU145-80B-063	G2 1/2"	DN80	1425	257	1885	2135	666
CBU145-80B-073	G2 1/2"	DN80	1425	257	1885	2135	675
CBU145-80B-084	G2 1/2"	DN80	1425	257	1885	2135	703
CBU145-80B-094	G2 1/2"	DN80	1425	257	1885	2135	748
CBU145-80B-104	G2 1/2"	DN80	1425	257	1885	2135	778
CBU145-80B-114	G2 1/2"	DN80	1425	257	1885	2135	783
CBU145-80B-125	G2 1/2"	DN80	1425	257	1885	2135	855

All dimensions in mm unless stated otherwise.

## 4.2 Noise expectancy values

Refer to pump manual for noise value of the pump.

## 4.3 Authorised environmental conditions

Ambient temperature 5°C ...40°C

Relative air humidity max. 80% r.h.

## 5. Shipping

### 5.1 Check condition upon delivery

1. Check the contents of each package for damage upon delivery.
2. In the case of transport damage estimate the extent, document the damage and notify Resideo immediately in writing.

### 5.2 Transportation

<b>Danger</b>
<input type="checkbox"/> Overturning the system <input checked="" type="checkbox"/> Danger of being crushed by system! ⌚ Never get the system tangled in electrical lines. ⌚ Observe the local safety regulations. ⌚ Observe the weight and mass centre. ⌚ Only use appropriate and authorised means of transportation, for example fork lift or hand lift.
<b>Warning</b>
<input type="checkbox"/> Installation on non-level and non-structural installation sites <input checked="" type="checkbox"/> Personal and property damage! ⌚ Ensure sufficient compressive strength according to class C12/15 for concrete in the exposition class X0 according to EN 206-1. ⌚ The installation site has to be solid, level and horizontal. ⌚ Observe the weight information.

**i** The compact booster unit is attached to wooden rails and wrapped in foil for transport and temporary storage. All connection interfaces have protective lids.

The system can be divided into three parts, as illustrated, to facilitate transportation if necessary. For this purpose, the plug connections of the system to the switch cabinet have to be disconnected, the hydraulic connections of the pump suction side of the flange have to be disconnected, and the buffer tank has to be disconnected from the base frame.

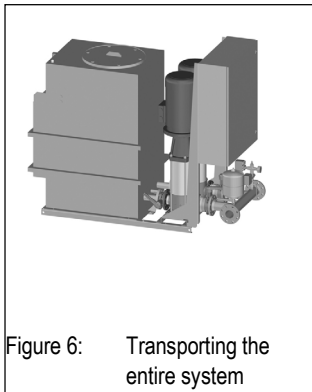


Figure 6: Transporting the entire system

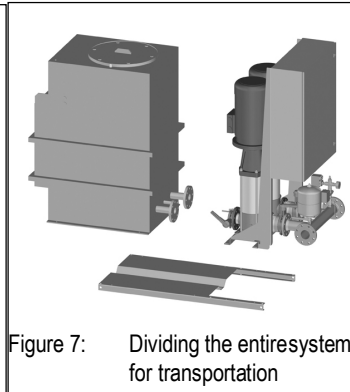


Figure 7: Dividing the entire system for transportation

1. Selecting the adequate transportation device for the weight class.
2. Transporting the system to the installation site.  
- divide into three parts if necessary.
3. Detach the wooden rails of the system and dispose of them.
4. Lift the system with a suitable lifting device and place it carefully at the installation site.
5. Reassemble the divided system and restore the mechanical and electrical connections.

## 6. Assembly

### 6.1 General safety instructions

<b>Danger</b>
<input type="checkbox"/> Danger for persons, near-by systems and the environment that arises from the non-intended use of the compact booster unit. ⌚ Operate the compact booster unit only as intended. <input type="checkbox"/> Injury through high pressure in the system. ⌚ Pipelines have to be depressurised and emptied before assembling the compact booster unit. <input type="checkbox"/> Danger through uncontrolled start-up of the system ⌚ Secure the system against unintentional operation during installation. ⌚ After an interruption of the electrical or fluid supply, a defined or controlled re-run of the process must be ensured.
<b>Warning</b>
<input type="checkbox"/> The compact booster unit is not designed for operation outside. <input checked="" type="checkbox"/> Temperature, light and moisture influences can lead to malfunctions and damage to devices. ⌚ Do not use the compact booster unit outside. <input type="checkbox"/> Danger through improper installation <input checked="" type="checkbox"/> Personal and property damage! ⌚ Performance of tasks only by qualified personnel (see section 1.11). <input type="checkbox"/> Installation on non-level and non-structural installation sites <input checked="" type="checkbox"/> Personal and property damage! ⌚ Ensure sufficient compressive strength according to class C12/15 for concrete in the exposition class X0 according to EN 206-1. ⌚ The installation site has to be solid, level and horizontal. ⌚ Observe the weight information.
<b>Caution</b>
<input type="checkbox"/> Damaged or improperly installed compact booster unit. <input checked="" type="checkbox"/> Malfunctions ⌚ Do not damage the compact booster unit and only install it if it is clean and fully functional. ⌚ Install the compact booster unit according to the described instructions. ⌚ Install free of voltage and of bending moments. <input type="checkbox"/> Individual housing parts are to be removed for the installation process, which means that the IP protection of the device is no longer complete. ⌚ No water is to enter into the device interior during assembly.

### 6.2 Installation according to DIN 14462

**i** The requirements made by DIN 14462 regarding installation have to be observed.

### 6.3 Installation according to EN1717

Accommodate the compact booster unit in a technical centre or in a frost-free, well ventilated, lockable room that is not used for anything else. Hazardous gases should never enter the installation room. A sufficiently dimensioned dewatering connection (drain connection or similar) is required (observe EN 12056).

Usable volume tank	Dewatering capacity
540 l	25 m³/h (50 m³/h)

Table 6: Usable volume/dewatering capacity

**i** Do not operate the compact booster unit near living rooms and bedrooms.

**i** If compensators are used to damper vibrations, their durability has to be ascertained.

Compensators have to be able to be easily replaced.

## 6.4 Inspection before assembly

### 6.4.1 Installation site

- i** Sufficient noise insulation for the building is ensured due the compact booster unit's safety store.
- The system has to be installed above the flood level. Provide a suitable lifting device for underfloor installation.

1. Inspect the building architecture.
  - The architecture of the building has to be prepared according to the data sheets.
  - The concrete foundation is true to size and completely solid.

## 6.5 Installing the compact booster unit

### **Warning**

- ☐ The system is top heavy
- ☒ **Danger of injury!**
  - Secure the system so that it cannot tip over before it has been permanently anchored.
  - Anchor the system securely to the foundation.

- i** Make allowance for space for operating and maintenance tasks.

1. Remove the packaging before installing the system.
2. Connect the system refilling and discharge pressure lines with the distribution lines on the refilling and discharge side (DIN 1988).
3. Mark the installation holes on the floor as described in the datasheet.
4. Drill holes (maximum Ø12 mm).
5. Insert suitable, proper sized dowels.
6. Position the system for installation.
7. Anchor the system solidly to the foundation with adequate bolts.

- i** To avoid the transfer of pipeline forces and structure-borne sound to the compact booster unit, it is recommended to install compensators with a tie bar.

## 6.6 Installing the pipelines

- i** Always install pipelines so that they are free of tension. The use of compensators with tie bars (refer to the accessories section) is recommended.

### 6.6.1 Connecting the overflow

#### **Caution**

- ☐ Overflow not connected
- ☒ **Danger of flooding the installation room!**
  - Lead the overflow line to a drain with adequate dewatering capacity (connection DN100).

1. Lead the pipeline to the drain.

## 6.6.2 Installing the compensator (optional)

- i** If compensators are used to damper vibrations, their durability has to be ascertained.
- Compensators have to be able to be easily replaced.

### **Danger**

- ☐ Sparks and radiant heat
- ☒ **Fire hazard!**
  - Take appropriate measures to protect the compensator during welding work in the vicinity.

### **Caution**

- ☐ Leaky compensator
- ☒ **Danger of flooding the installation room!**
  - Check regularly for rips and blisters, exposed material or other defects.

1. Install the compensator in the pipeline without tension.
  - Never correct misalignment and offset pipes with the compensator.
2. Fasten bolts equally cross-wise.
  - The bolt ends should not protrude from the flange.

- i** Do not paint the compensator and always protect it against oil. The compensator has to be accessible on the compact booster unit at any time for inspection purposes and for this reason should not be included in the pipe insulation.
- The compensator is subject to wear.

## 6.7 Buffer tank

### **Danger**

- ☐ Contamination of potable water
- ☒ **Danger to life!**
  - If the inlet line from the house connection to the buffer tank is longer than 10x DN and/or the maximum volume is larger than 1.5l, then the inlet has to be rinsed at least once a week with three times the pumped volume at a minimum flow rate of 0.2 m/s and a nominal width of over DN50 and 0.1 m/s at anominal width of over DN50.
  - Setting the rinsing duration

### **Caution**

- ☐ Dirt in the system
- ☒ **Damage to the pumps!**
  - Rinse the tank before filling it.
  - Rinse the tank and the integrated odour trap regularly.

- i** The DIN 1988 allows for the installation of a pressure-free buffer tank together with the compact booster unit. The same regulations apply for their installation as for the compact booster unit.
- The buffer tank made of polyethylene fulfils the requirements of EN 1717 and EN 13077, with free drain type AB.

## 6.8 Protection against dry running

- i** The protection against dry running is only active in manual and testing modes. In the automatic operation mode only one message is sent, the pump continues to run.

The switch cabinet has a digital input for this purpose. It is hard-wired with a floating switch in the buffer tank. The power-off delay can be set from 5 to 100s on the relay. The default setting is 10s.

## 6.9 Installing valves

All additional valves in the terminal lines such as sliders, water meters and check valves have to be dimensioned according to the values stipulated by the competent water distribution company.

## 6.10 Electrical connection

### 6.10.1 Safety instructions

<b>Danger</b>
<input type="checkbox"/> Danger of injury from electric voltage. <input checked="" type="checkbox"/> High shock currents and burns from direct and indirect contact with live parts. Turn off the power supply before assembling the compact booster unit and secure it from being turned on.
<input type="checkbox"/> Non- or erroneously-connected cables <input checked="" type="checkbox"/> Malfunctions, which endanger the safety of operating personnel. Work on electrical equipment may only be performed by specialist electric technicians. Observe regulation IEC 30364 (DIN VDE 0100) and for explosion protection IEC 60079 (DIN VDE 0165).
<input type="checkbox"/> Faulty mains connection <input checked="" type="checkbox"/> Damage to the electricity network, short circuit! Observe the conditions for technical connections of the local power supply companies.
<input type="checkbox"/> Wrongly wired connections <input checked="" type="checkbox"/> Destruction of electrical / electronic components. Work on electrical equipment may only be performed by specialist electric technicians.
<input type="checkbox"/> Improperly connected wiring and lines (e.g. too small bend radius) <input checked="" type="checkbox"/> Smouldering and fires from cables. Work on electrical equipment may only be performed by specialist electric technicians.
<input type="checkbox"/> Live cable ends and components Make sure the protective earth system is connected throughout.

**i** Always observe DIN 14462 for electrical connections.

### 6.10.2 Connection specifications

Power supply connection 3/N/PE, AC 400V, 50Hz  
 Control transformer 400V / 230V- 24V

**i** The circuit diagrams of the respective systems are kept in the switching device and should always remain there. The documentation included with the switch cabinet contains a list of electronic parts. Please always specify the circuit diagram number when ordering spare electronic parts.

- ☒ The diameter of the electrical supply line has to be determined according to the total connection value.
- ☒ The customer required protection measures for the electrical connection of the system is defined in DIN 14462.

### 6.10.3 Connecting electrical accessories

<b>Caution</b>
<input type="checkbox"/> Terminal resistor for the connection of the remote on/off is missing or not connected properly <input checked="" type="checkbox"/> Danger of system malfunction! There is a 10kOhm terminal resistor connected to the connector clamps for remote on/off (limit switch). If multiple messaging lines have been connected, it has to be positioned behind the last limit switch. The relay for monitoring wire breakage and short circuit evaluates the following resistances: >10.3kOhm: Wire breakage 10kOhm: Fully operational 1kOhm: Pump start through use of a limit switch <300Ohm: Short circuit A wiring scheme for the external remote on/off switch is included with the system. The external messaging line has to be wired according to the values specified above.

The switch cabinet is equipped with the following clamps for connecting electrical accessories:

- Remote on/off for connecting limit switches

The clamps are labelled in the diagram and in the cabinet.

### 6.10.4 Connecting the limit switch

Connect the limit switch to the remote on/off connecting clamps as follows:

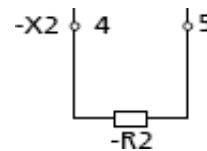


Figure 8: Setting without limit switch

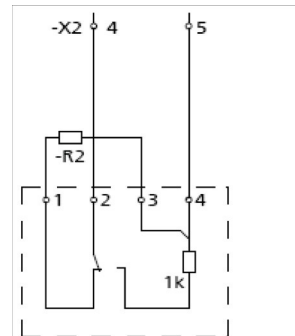


Figure 9: Setting with limit switch

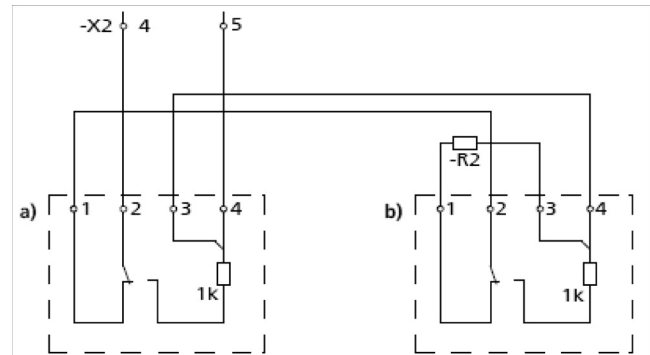


Figure 10: Setting for two limit switches

a) First limit switch

b) Last limit switch

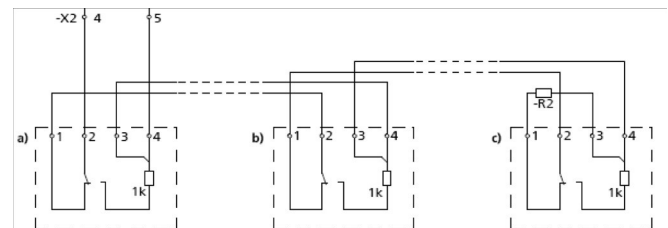


Figure 11: Setting for more than two limit switches

a) First limit switch

b) Second limit switch

c) Last limit switch

### 6.10.5 Potential-free contacts

Potential-free contacts are available for the following messages:

- Motor protection warning
- Collective error message for pump requirements, pump overheating, control voltage missing, mains power failure and short circuit/wire breakage
- Buffer tank overflow
- Water shortage
- Switch to position manual/automatic
- Separation of potable water
- Failure of power supply from backup battery

The clamps are labelled in the diagram and in the cabinet.

**i** Forward alert messages to the control unit.  
 Potential-free collective error message can be created by looping through of potential-free single messages.


## 6.11 Standby indicator

The system standby mode has to be registered by the operator or their contractors at the responsible authority (most commonly WVU or factory inspectorate). Before starting the system, the author has to certify that the prerequisites for connection are fulfilled.

Before the system is connected to the mains power supply, the operator has to read the relevant VDE regulations.




The electrical supply lines must only be installed by companies that are authorised to do such work.

## 7. Start-up

 Performance of tasks only by qualified personnel (see section 1.11).

### 7.1 Safety instructions for start-up

#### Warning


- ☐ Danger from improper operation.
  - ☒ Malfunctions
    -  Before starting, the manual has to be read by the operator as well as by the responsible technical/operating personnel and has to be stored at the site of the compact booster unit at all times.
    -  Adhere to local safety and accident regulations when starting the compact booster unit.
- ☐ Damaged or improperly installed compact booster unit.
  - ☒ Malfunctions
    -  Check the compact booster unit for obvious signs of damage; eliminate any defects immediately or alert the supervising personnel. The compact booster unit may only be operated in perfect working order.


Inform yourself sufficiently about

- the equipment of the compact booster unit
- the functionality of the compact booster unit
- the close surroundings of the compact booster unit
- the measures to be taken in an emergency

### 7.2 Start-up requirements

#### Caution

- ☐ Dry running pump
  - ☒ Damage to the pump/system!
    -  If water shortage occurs during start-up, in manual or testing mode, the compact booster unit shuts off after approx. 10s. If the dry running protection is deactivated, then the operator takes responsibility in the case of dry running.

 The responsible authorities have to be informed before start-up and before testing.


Before start-up of the compact booster unit, the following points have to be ensured:

- The compact booster unit has to be connected to all protective equipment according to the regulations.
- The relevant VDE and country-specific regulations have to be adhered to and fulfilled.
- The buffer tank has to be full of water.
- The refilling has to function properly.
- Flange connections have to be checked if they are fastened tightly.
- Pipe fittings between pump and pipeline have to be tightened.
- In and output openings for air-cooling of the motor are free.
- The precharge pressure of the membrane pressure vessel is checked.
- All shut-off valves in the system are open.


## 7.3 Initial operation


The initial start-up should be performed by Resideo technical staff.


#### Caution

- ☐ The pipeline must be free of residue
  - ☒ Danger of damaging the pump/compact booster unit!
    -  Before start-up (and testing) make sure that pipelines and compact booster unit are free of residues.

#### Caution

- ☐ No pressure on the output side
  - ☒ Pump starts when main switch is turned on!
    -  During start-up and also during automatic mode, the pump starts as soon as the main switch is turned on, because the system receives a start command from the pressure switch due to the lack of pressure on the output side. This is not even prevented if the motor protection switch is also activated.

 The start-up, or testing mode, of the compact booster unit may only be initiated if all VDE regulations have been fulfilled.


 Floating ring seals may briefly show signs of leakage during start-up, but no longer after a short period of operation.  
The protection against dry running is only active in manual and testing modes.

1. Connect electrical circuit on-site.
2. Main switch set to **0** and manual/automatic switch to **automatic**.
3. Connect water supply for refilling on-site.
4. Open or loosen the ventilation screws on the pump (refer to operating/assembly instructions).
5. Slowly open the shut-off valves on the input side and fill the system until pump medium runs out of every ventilation borehole.
  - To do so, loosen the setting screw to open the refilling valve and fill the tank after connecting the system to the water supply.
  - Set the amount of refilling water with the throttle valve. (refer to Chapter 7.3.1.2).
6. Close the ventilation screws, tighten pump ventilation lightly.
7. Set main switch to **I**.
8. Set system with manual/automatic switch to **manual operation** and check in which direction the pump is rotating.
  - The direction of rotation has to be the same as the direction shown by the arrow on the motor. If it is rotating in the wrong direction, two phases of the inlet have to be exchanged.
9. Set system with manual/automatic switch to **automatic operation**.
10. Slowly open the shut-off valve of the output and use the pressure gauge to check if the system starts if the switch-on pressure is reached (refer to Chapter 4.).
  - If the switch-on pressure is set to the wrong value, it has to be changed as described in the pressure switch manual.
11. Slowly close the shut-off valve of the output and use the pressure gauge to check if the system shuts off when the switch-off pressure is reached (refer to Chapter 4.).
  - If the switch-off pressure is set to the wrong value, it has to be changed as described in the instructions of the pressure switch.
  - The follow-up time has to be set on the relay to the maximum number of operating cycles that are permissible for the motor by turning the setting screw until it reaches a value between 3 and 10 minutes. Up to 7.5kW = 20 cycles/hour, from 11 to 22kW = 10 cycles /ho, from 30kW = 6 cycles/hour)
12. Let the pump run again with the output shut-off valve open, loosen the ventilation screw and let the rest of the air out.
13. Close the ventilation screw tightly.
14. Check if the pump runs smoothly.
15. By closing the shut-off valve on the output line, check if the pump reaches its maximum pumping head in the zero point.

16. Parameterise the time and duration of the test run on the digital timer in the switch cabinet (refer to Chapter 7.3.1.1).
17. If a rinsing device is necessary, set the time and duration for rinsing the inlet line. To do so, parameterise the second channel of the digital timer.

### 7.3.1 Settings

#### 7.3.1.1 Parameterise the time and duration of the test run

 Refer to the description in the instructions included for the timer.

1. First check date and time (item "Setting date and time").
2. Then proceed as described under the item "Programming short operation cycles (impulses)" and in "Program example impulses". (default setting: Monday 0.00h, duration 59s).

#### 7.3.1.2 Set the amount of refilling water with the throttle valve

For systems with a pump volume of 18 m<sup>3</sup>/h, the amount of inlet water has to be set to 25 m<sup>3</sup>/h on the throttle valve as a function of the supply pressure. For systems with a pump volume of 36 m<sup>3</sup>/h, the amount of inlet water has to be set to 50 m<sup>3</sup>/h on the throttle valve as a function of the supply pressure.

#### 7.3.1.3 Setting the power-off delay

The power-off delay can be set to values from 5 to 100 s (refer to documentation of cabinet).

#### 7.3.1.4 Setting the rinsing duration

Flushing of the potable water pipeline connected upstream can be activated by setting the digital timer in the switching cabinet via the solenoid valve. The flushing water is discharged through the integrated overflow. The flushing time is estimated with respect to the required flushing volume (refer to the following figure). For larger flushing volumes (more than 200 l), it can be increased by 7 l (25 m<sup>3</sup>/h) and 14 l (50 m<sup>3</sup>/h) with each further second.

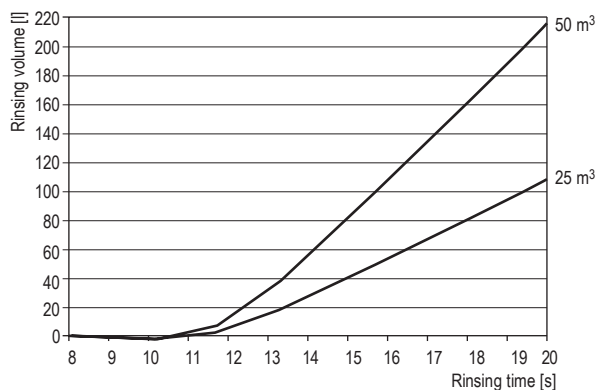


Figure 12: Determining the flushing time

#### 7.3.1.5 Check if the water shortage/dry running protection is functioning

 The shut-off valve of the input line has to be closed for testing.

### 7.4 Switching the system on


1. Secure the shut-off valves of the in and output against being closed.
2. Operate the main switch to supply the system with voltage.
  - The green light goes on to signal standby mode.

### 7.5 Start-up checklist








Work steps		finished
1	Read instructions.	
2	Check the voltage supply and compare with the values on the type label.	
3	Check the grounding system (by measurement).	
4	Check the mechanical connection to the water supply system. Tighten the flanges and the screws.	
5	Fill and ventilate the compact booster unit from the input side.	
6	Check the refilling.	
7	Check the switching device to see if all electrical lines are still securely plugged into the clamps.	
8	Check the rotation direction.	
9	Check the switch-on and switch-off pressure, correct if necessary.	
10	Check if the water shortage/dry running protection is functioning.	
11	Venting the pump a second time, after it has been running for a few minutes (5 to 10).	
12	Set the switch to automatic.	
13	Check the precharge pressure (refer to Chapter 8.3.1).	
14	Secure the shut-off valves of the in and output lines against being closed	
15	Circumstances regarding the system that are not the same as stated in our documentation or ordering data, have to be noted in the start-up protocol.	
16	Fill out the start-up protocol with the operator and show the operator how the machine functions.	



## 8. Maintenance

-  Maintenance should be performed by Resideo technical staff.
- If necessary contact the service department at Resideo.
- Performance of tasks only by qualified personnel (see section 1.11).

### 8.1 Safety instructions for maintenance


 <b>Danger</b>
<input type="checkbox"/> Unintentionally switching on the compact booster unit <input checked="" type="checkbox"/> <b>Danger to life!</b> <ul style="list-style-type: none"> <li>⌘ The compact booster unit has to be voltage free for all repairs and maintenance work. Turning off the system with the motor protection switch does not securely shut off the motor inlet lines.</li> <li>⌘ Only perform maintenance work on the compact booster unit if you are sure that the compact booster unit is free of power.</li> <li>⌘ Secure the compact booster unit against being switched on unintentionally.</li> </ul>
 <b>Danger</b>
<input type="checkbox"/> Danger of injury from electric voltage. <input checked="" type="checkbox"/> <b>High shock currents and burns from direct and indirect contact with live parts.</b> <ul style="list-style-type: none"> <li>⌘ Turn off the power supply before maintaining the compact booster unit and secure it from being turned on.</li> </ul>
 <b>Warning</b>
<input type="checkbox"/> Components and lines under pressure <input checked="" type="checkbox"/> <b>Personal and property damage!</b> <ul style="list-style-type: none"> <li>⌘ Before work is done on pressure-retaining components, the pump has to be depressurised!</li> <li>⌘ Disconnect the pump from the power supply!</li> </ul>
 <b>Warning</b>
Hot surfaces of the pump housing <input checked="" type="checkbox"/> <b>Danger of burning!</b> <ul style="list-style-type: none"> <li>⌘ The pump housing has to be at ambient temperature!</li> </ul>
 <b>Warning</b>
<input type="checkbox"/> Inappropriate lifting/moving of heavy modules or components <input checked="" type="checkbox"/> <b>Personal and property damage!</b> <ul style="list-style-type: none"> <li>⌘ When moving heavy modules or components, use suitable transport devices, lifting devices and lifting accessories.</li> </ul>
 <b>Warning</b>
<input type="checkbox"/> Unqualified persons working on the compact booster unit <input checked="" type="checkbox"/> <b>Danger of injury!</b> <ul style="list-style-type: none"> <li>⌘ Only let specially qualified personnel perform repair and maintenance work.</li> </ul>
 <b>Warning</b>
<input type="checkbox"/> Using the pump after a fire/malfunction <input checked="" type="checkbox"/> <b>Functional disorder, danger of system malfunction!</b> <ul style="list-style-type: none"> <li>⌘ Check the system thoroughly after operation during a fire.</li> </ul>

#### **Caution**


- ☐ Inappropriately maintained compact booster unit
  - ☒ **The proper function of the compact booster unit can no longer be ensured!**
    - ⌘ Maintain the compact booster unit regularly.
    - ⌘ Set up a maintenance schedule for the compact booster unit that focuses especially on the pump lubrication, shaft seal and clutch.

☒ Always observe the safety regulations and instructions.



☒ Observe the instructions for working on the pumps.

-  In case of damage, please contact our service department. Setting up a maintenance schedule reduces the effort for maintenance to a minimum and helps you avoid expensive repairs and you can work on your compact booster unit reliably and without any problems.

### 8.2 Inspection









-  To ensure that the compact booster unit can be operated reliably, the required inspections have to be conducted on time.

#### 8.2.1 Buffer tank

 <b>Danger</b>
<input type="checkbox"/> Contamination of potable water <input checked="" type="checkbox"/> <b>Danger to life!</b> <ul style="list-style-type: none"> <li>⌘ If the inlet line from the house connection to the buffer tank is longer than 10x DN and/or the maximum volume is larger than 1.5l, then the inlet has to be rinsed at least once a week with three times the pumped volume at a minimum flow rate of 0.2 m/s and a nominal width of over DN50 and 0.1 m/s at a nominal width of over DN50.</li> <li>⌘ Setting the rinsing duration</li> </ul>
 <b>Caution</b>
<input type="checkbox"/> Dirt in the system <input checked="" type="checkbox"/> <b>Damage to the pumps!</b> <ul style="list-style-type: none"> <li>⌘ Rinse the tank before filling it.</li> <li>⌘ Rinse the tank and the integrated odour trap regularly.</li> </ul>

1. Rinse the inlet to the buffer tank if necessary.
2. Rinse the tank and the integrated odour trap regularly.
3. Check the buffer tank as well as the shut-off valve and the floating switch.
  - For this purpose, the floating switch holder can be pulled up out of the tank.
  - Make sure it locks properly back into place when returned to its position.
4. Check if the overflow is sealed and clean.

### 8.2.2 Monitoring Operation


	<b>Danger</b>
<input type="checkbox"/>	Filling wrong gas in expansion vessel
<input checked="" type="checkbox"/>	Danger of poisoning!
	Only fill the pressure pad with nitrogen.
	<b>Caution</b>
<input type="checkbox"/>	Dry running causes increased wear
<input checked="" type="checkbox"/>	Damage to the pump unit!
	Never operate the pump unit when it is empty.
	Never close the shut-off valve in the suction line and/or supply line during operation.
	<b>Caution</b>
<input type="checkbox"/>	Exceeding the permissible temperature for the pumped medium
<input checked="" type="checkbox"/>	Damage to the pumps!
	Operation is not permitted with closed shut-off valves over longer periods of time (overheating of pump medium).
	Observe the temperature values as stated in the data sheet and under technical data.

During operation observe and check the following points:

1. Check the functional operation.
2. Check switch-on/off pressure when operating the pump and compare to the values on the type label.
3. Compare the precharge pressure of the membrane pressure vessel to the recommended values (refer to Chapter 8.3.1).
  - Close the shut-off valves under the tank and empty the tank with the drain valve.
  - Unscrew the protective cap of the valve on the membrane pressure vessel and check the precharge pressure with a tire gauge.
  - Refill nitrogen if necessary.
4. Check the running noise of the roller bearings.
  - Vibrations, noise, and increase in power consumption for consistent operating conditions are a sign of wear.
5. Check the function of any additional connections.

### 8.2.3 Mode of operation in the event of power loss

In the event that the mains power supply of the entire system fails (standby is no longer functional), the inlet shut-off valve is closed by the battery powered voltage supply.



-  Check the batteries yearly, replace if necessary.  
Observe the manufacturer's manual on how to use the rechargeable backup battery.

### 8.2.4 Checklist for Inspection


If you conduct inspections on your own, they have to be done at least once a year according to the following criteria:

Work steps		finished
1	Read instructions.	
2	The pump and drive motor should run smoothly, the floating ring seals should not leak.	
3	Check the elastic transmission elements.	
4	Check if the shut-off, drain and check valves function properly and don't leak.	
5	Clean the dirt trap in the pressure reducing valve (if applicable).	
6	Check the compensators for wear (if applicable).	
7	Check the precharge pressure and, if necessary, check if the membrane pressure vessel leaks (refer to Chapter 8.3.1).	
8	Check automatic switching.	
9	Check the switch-on/off points of the system.	
10	Check if functional operation is performed properly.	
11	Check if the entire system is functioning properly and compare values to those on the type label.	
12	Check the water supply, precharge pressure, water shortage monitoring, and pressure reducing valve.	
13	Check the buffer tank, shut-off valve and floating switch (refer to Chapter 8.2.1).	

### 8.3 Maintenance

-  Maintenance should be performed by Resideo technical staff.
-  Alterations or modifications of the system are only permitted with the consent of the manufacturer.  
Use only original parts or parts authorised by the manufacturer.  
Use of parts other than those authorised may lead to loss of liability for any damage they may cause.  
Reinstall safety equipment and protective devices and activate them again immediately after work on the system has been completed.  
Before starting up again, observe the start-up checklist.

#### 8.3.1 Setting the precharge pressure for the membrane pressure vessel

-  Observe the instructions for the membrane pressure vessel.

<b>⚠ Danger</b>
<input type="checkbox"/> Filling wrong gas in expansion vessel <input checked="" type="checkbox"/> Danger of poisoning! <i>☞ Only fill the pressure pad with nitrogen.</i>
<b>⚠ Caution</b>
<input type="checkbox"/> Precharge pressure too high <input checked="" type="checkbox"/> Danger of damaging the tank! <i>☞ Observe the values as stated by the manufacturer of the tank (refer to type label or the tank manual).</i>

The precharge pressure for the pressure vessel should be set to a value that is lower than the programmed switch-on pressure.

This setting can be made with a valve under the cover hood on the top of the tank.

**Example: Precharge pressure 10% below the switch-on pressure**

Precharge pressure of the membrane pressure vessel  $p = 0.9 \times p_E$

$p_E$  = switch-on pressure of the compact booster unit

**Recommendation**

These are average values. Experiments conducted on tanks have shown that the best storage volumes were achieved for pressures  $>3\text{bar}$  with a factor of 0.9 and pressures of  $<3\text{bar}$  with a factor of 0.8.

Example:

$p_E = 5\text{ bar}$ : Precharge pressure  $5 \times 0.9 = 4.5\text{ bar}$

$p_E = 2\text{ bar}$ : Precharge pressure  $2 \times 0.8 = 1.6\text{ bar}$

**8.3.2 Cleaning the dirt trap**

1. Remove the lid
2. Take out the sieve
  - blow out if necessary
3. Insert sieve
4. Replace lid
  - use new seal if necessary

**8.3.3 Checklist for maintenance work**

Work steps	Interval
Setting the precharge pressure for the membrane pressure vessel	yearly
Cleaning the dirt trap	yearly

## 9. Troubleshooting

**i** During the warranty period consult the manufacturer before performing maintenance work on the system (only work that is required for start-up and maintenance).

Our customer service department is at your service. Failure to comply will lead to loss of any liability claims.

### 9.1 Possible malfunctions / Errors


	Possible malfunctions / Errors
<b>A</b>	The pump shuts off after brief manual operation. Water shortage is indicated by red light.
<b>B</b>	The compact booster unit does not start.
<b>C</b>	The pump is running but doesn't pump water.
<b>D</b>	The compact booster unit doesn't pump enough.
<b>E</b>	The pump pressure is too low.
<b>F</b>	Pump pressure is too high.
<b>G</b>	The floating ring seal leaks.
<b>H</b>	Overheating of the motor/pump.
<b>I</b>	The motor protection switch is activated. The yellow light is on.
<b>J</b>	The pump does not shut off.
<b>K</b>	The pump operates too often (more than 30 times per hour).
<b>L</b>	Green and yellow lights are both on and the pump is running.
<b>M</b>	Yellow and red lights are on
<b>N</b>	Overflow of the dewatering connection

## 9.2 Possible causes / Elimination


A	B	C	D	E	F	G	H	I	J	K	L	M	N	Possible cause	Elimination	refer to
		x	x				x		x					The pump or pipelines are not completely ventilated or not filled	Fill or ventilate them	Instructions for the pump
x	x	x	x	x			x							Shut-off valves are only opened partially or not at all	check and open if necessary	-----
x			x	x					x					The dirt trap is clogged	clean	Chapter 8.3.2
		x	x	x	x									The shut-off valve of the input is closed or defective	check and open if necessary	-----
							x		x					The shut-off valve of the output is closed or defective	check and open if necessary	-----
x	x		x	x	x		x		x					Pressure switch is set wrong	Check the set value	Instructions for the pressure switch
									x					Switch-on pressure is too high	Check the set value	Chapter 4.
							x			x				Membrane pressure vessel is not precharged enough	Set the precharge pressure	Chapter 8.3.1
															Renew the pressure pad	Instructions for the membrane pressure vessel
							x			x				The membrane pressure vessel is defective	check the seal, replace if necessary	Instructions for the membrane pressure vessel
						x								The floating ring seal is defective	replace	Instructions for the pump
x														Buffer tank is not full	Check the water level in the buffer tank	-----
		x	x	x			x	x	x					The system check valve is defective	check and replace if necessary	Instructions for the check valves
x				x				x	x	x				More water is removed than stated in the ordering data	Consult the manufacturer	-----
								x						The motor protection switch is activated, it is set wrong or the pump is stuck	Compare the values with those stated on the type label	Type label/Pump instructions
										x				The set delay is too short	Check the set value	Chapter 7.3.1.3
	x													The main power supply is interrupted	check or eliminate the defect, check the fuse	-----
	x							x						The main fuse in the distributor of the system is loose or burned, perhaps too small or too fast-acting fuses were used	Check the fuses, renew if necessary, measure the motor current	-----
	x													Phase failure	check individual phases, replace if necessary	-----
							x							Magnetic valve for the minimum pumping amount does not switch	check or eliminate the defect	Instructions for magnetic valves
										x				Leak on the output side	check	-----
												x		Electrical connection between the buffer tank control unit and the switch cabinet is interrupted	check or renew the electrical connection	-----
													x	The refilling is too large, odour trap is clogged	Check the refilling, check if the odour trap is clogged, clean if necessary	-----

## 10. Shut-down, restart

### 10.1 Shutting down the compact booster unit

 Water is supplied during the period in which the system is shut down directly with  $p_{\text{before}}$ . Water flows through the compact booster unit in the process.

1. Set main switch to 0.
2. Secure the system against unintentional operation

 Empty the compact booster unit if it is shut down for a longer period of time.

### 10.2 Restarting the compact booster unit



Please note the procedures in chapter 7.

## 11. Storage

### 11.1 Short-term storage

Short-term storage is possible without further preparation under the specified environmental conditions.

### 11.2 Storage/Preservation

 <b>Caution</b>
<input type="checkbox"/> Damage during storage caused by frost, humidity, dirt, UV radiation or pests <input checked="" type="checkbox"/> Corrosion/Contamination of the system! <input type="checkbox"/> Protect the system against frost, do not store outside.
 <b>Caution</b>
<input type="checkbox"/> Damp, dirty or damaged openings and junctions <input checked="" type="checkbox"/> Danger of leaks and damaging the system! <input type="checkbox"/> Uncover openings in the system only during installation.

### 11.3 Storage conditions








Storage location          closed room, dry and dust-free


Ambient temperature 5°C to 40°C (incl. power pack)

Relative air humidity max. 80% r.h.

## 12. Disassembly, disposal

### 12.1 Safety instructions for disassembly

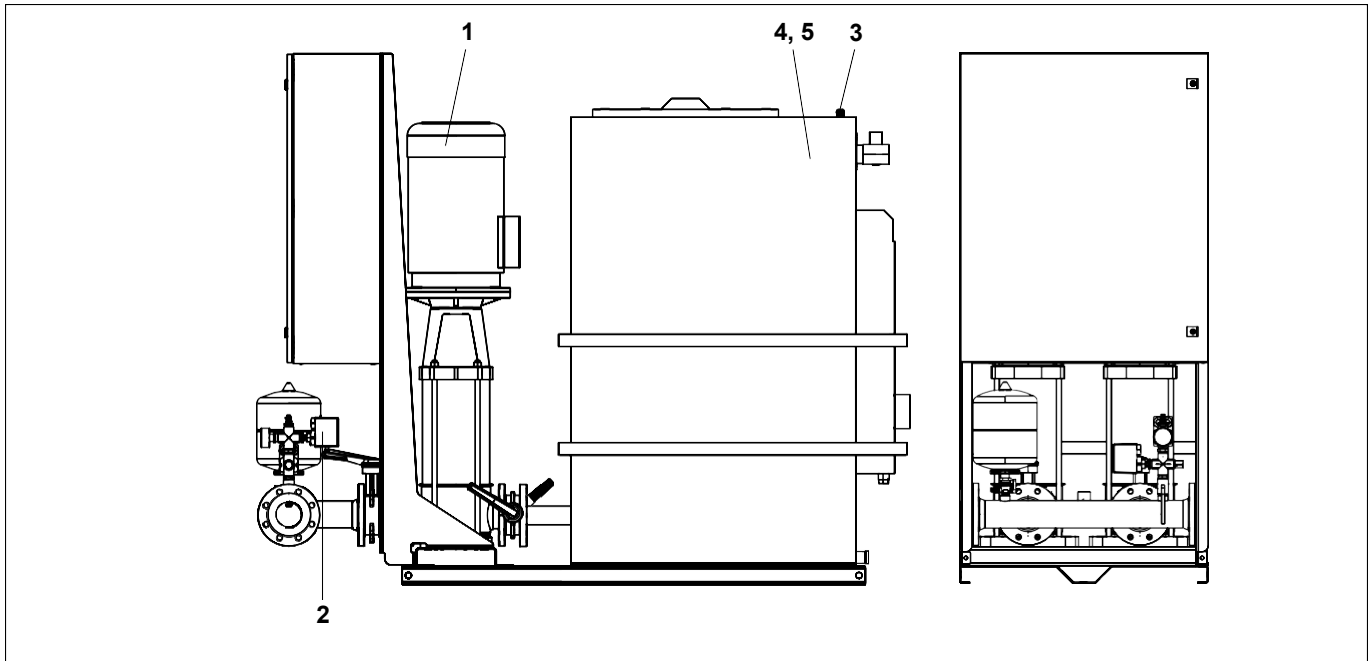
 <b>Danger</b>
<input type="checkbox"/> Unintentionally switching on the compact booster unit <input checked="" type="checkbox"/> Danger to life! <input type="checkbox"/> The compact booster unit has to be voltage free during disassembly. Turning off the system with the motor protection switch does not securely shut off the motor inlet lines. <input type="checkbox"/> Only perform maintenance work on the compact booster unit if you are sure that the compact booster unit is free of power. <input type="checkbox"/> Secure the compact booster unit against being switched on unintentionally.
 <b>Danger</b>
<input type="checkbox"/> Danger of injury from electric voltage. <input checked="" type="checkbox"/> High shock currents and burns from direct and indirect contact with live parts. <input type="checkbox"/> Turn off the power supply before disassembling the compact booster unit and secure it from being turned on.
 <b>Warning</b>
<input type="checkbox"/> Components and lines under pressure <input checked="" type="checkbox"/> Personal and property damage! <input type="checkbox"/> Before work is done on pressure-retaining components, the pump has to be depressurised! <input type="checkbox"/> Disconnect the pump from the power supply!
 <b>Warning</b>
Hot surfaces of the pump housing <input checked="" type="checkbox"/> Danger of burning! <input type="checkbox"/> The pump housing has to be at ambient temperature!
 <b>Warning</b>
<input type="checkbox"/> Inappropriate lifting/moving of heavy modules or components <input checked="" type="checkbox"/> Personal and property damage! <input type="checkbox"/> When moving heavy modules or components, use suitable transport devices, lifting devices and lifting accessories.
 <b>Danger</b>
<input type="checkbox"/> Hazardous or hot pump medium <input checked="" type="checkbox"/> Hazardous for humans and environment! <input type="checkbox"/> Collect and dispose of rinsing fluid as well as any residual fluids. <input type="checkbox"/> Wear protective clothing and mask if necessary. <input type="checkbox"/> Observe the legislature concerning disposal of hazardous fluids.
 <b>Warning</b>
<input type="checkbox"/> Danger through improper disassembly <input type="checkbox"/> Performance of tasks only by qualified personnel (see section 1.11).

 It is imperative to observe the laws and regulations on waste disposal of materials that are detrimental to the environment. Such materials include old oils, coolants, paint, plastics and chemicals. If in doubt, consult the manufacturer.

1. Disassembly of the system.
  - Collect grease and lubricants during disassembly.
2. Separate the pump materials for example according to:
  - Metal
  - Plastic
  - Electronic junk
  - Grease and lubricants
3. Dispose according to local regulations or have them disposed of according to regulations.

## 13. Spare parts

### 13.1 Parts index CBU145



CBU145 from 04/2014 onwards

Nr.	Ordering text	Nennweite	OS.-No.
1	Motitec 1504B	DN50	0904088
	Motitec 1505B	DN50	0904089
	Motitec 1506B	DN50	0904090
	Motitec 1507B	DN50	0904091
	Motitec 1508B	DN50	0904092
	Motitec 1509B	DN50	0904093
	Motitec 1510B	DN50	0904094
	Motitec 2507	DN65	0904095
	Motitec 4003-2	DN80	0904130
	Motitec 4003	DN80	0904131
	Motitec 4004-2	DN80	0904132
	Motitec 4004	DN80	0904133
	Motitec 4005-2	DN80	0904134
	Motitec 4005	DN80	0904135
	Motitec 4006-2	DN80	0904136
	Motitec 4006	DN80	0904137
2	Pressure switch MCS 22	alle	0904106
3	Solenoid valve 1/2"	alle	0904107
4	Float valve	DN50, DN65	VR170-2A
		DN80	VR170-21/2A
5	Float switch	alle	0904116

Spare parts for older models on request

## 14. Start-up protocol

The following so-called Resideo Compact Booster Unit was commissioned today by the signatories, authorised Resideo customer service staff, and this protocol was written.

### 1 Compact booster unit

Series .....  
 Size .....  
 Serial number .....  
 Order number .....

### 2 Customer/Operating site

#### Customer

Name .....  
 Address .....  
 .....

#### Operating site

.....  
 .....  
 .....

### 3 operating data refer to circuit diagram for additional data

Switch-on pressure      pE bar .....  
 Monitoring the precharge pres- pbefore - X .....  
 sure  
 Setting value for the precharge  
 pressure switch  
 Switch-off pressure      pA bar .....  
 Precharge pressure      pbefore .....  
    bar  
 Precharge pressure tank      pbefore .....  
    bar

### 4 Important notes

According to the DVGW Process Sheet W 314, the company operating the system is obligated to inform the competent water distribution company of the commissioning of the system.

If the system is additionally operated with group III/IV pressure vessels according to the regulation for pressure vessels, then the TÜV has to be informed also.

The operating company or their customer herewith certifies to be fully trained in operation and maintenance of the compact booster unit. The circuit diagrams and instructions were also delivered.

#### Defects determined during start-up

Defect 1 .....  
 .....  
 .....  
 .....

#### Scheduled elimination

.....  
 .....  
 .....  
 .....

#### Name of Resideo customer

.....  
 City .....  
 .....

#### Name of supplier and contractor

.....  
 Date .....  
 .....

## 15. Declaration of no objection

Type

Order number/Order item number<sup>3)</sup>

Delivery date

Range of application

Pumped medium<sup>3)</sup>

Make a check mark if applicable<sup>3)</sup>:



☐ radioactive



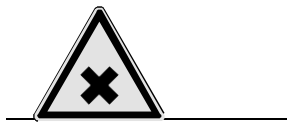
☐ explosive



☐ corrosive



☐ poisonous



☐ hazardous to health



☐ biohazard



☐ flammable



☐ harmless

Reasons for the return<sup>3)</sup>

Notes:

The system/the accessories has to be carefully emptied and cleaned on the exterior as well as the interior.

☛ No special safety precautions are required for further handling.

☛ The following safety precautions regarding rinsing medium, residual fluids and their disposal are required:

.....  
 .....

We ensure that the above information is correct and complete and delivery will be made according to statutory requirements.

.....  
 City, date and signature

.....  
 Address

.....  
 Company stamp



## 16. Proof of Maintenance

[illegible]

