evoqua
WATER TECHNOLOGIES

WALLACE & TIERNAN® ACTIVATED POWDER CARBON DOSING SYSTEM

JETPAK

INSTRUCTION MANUAL

Note

Original manual!

Contents

1. Introduction

1.1 Documentation

1.1.1 Target groups

This instruction manual is intended to provide assembly, operating, and maintenance personnel with the information they need for running and servicing the JETPAK system.

This instruction manual is intended for the operating personnel. It contains important information which will enable the operator to run the system in a safe, reliable, trouble-free, and economical way. Carefully observing these instructions will help to avoid dangers, reduce repair costs and down times, improve the system's reliability, and prolong its service life.

The entitled „Installation and commissioning“ and „Maintenance...“ chapters are intended exclusively for Evoqua-authorized technicians. These sections contain important information on assembling, configuring, and commissioning the system and on maintenance and repair work.

All persons working with the system must have read and understood the instruction manual, in particular the safety instructions it contains.

Please consult the table of contents to quickly find the information you require.

1.2 Conventions

Notes This Instruction manual contains a number of notes with different priorities marked with symbols.

Picto-gram	Note	Meaning
	*Warning!*	Danger to life and limb! If the situation is not handled properly, death or serious injury may be the result.
	*Caution!*	If this warning is not observed, medium or slight injury or damage to the equipment may the result.
	*Warning!*	Electrical hazard.
	*Warning!*	Risk of injury! Corrosive substances!
	*Note*	These notes assist in the operation of the system.

2. Safety

2.1 Intended use

The plant may be used for the preparation and dosing of a water and activated carbon suspension for the treatment of swimming, drinking, cooling, process and waste water. Other or excess use is not intended.

The operational safety of the system can only be guaranteed if it is used in accordance with its intended purpose. It may only be used for the purpose defined in the contract and under the installation, operating and environmental conditions stated in this operating manual. No substances (chemicals) may be used other than those described in this operating manual. All inspection and maintenance work must be carried out at the prescribed intervals.

Compliance with the intended use also includes reading this operating manual and observing all the instructions it contains.

The operator bears full and sole responsibility if this unit is put to any use which does not comply strictly and exclusively with this intended use.

2.2 General safety instructions

Evoqua Water Technologies GmbH attaches great importance to the safety of all work relating to the system. This was already taken into account in the design of the system, by the integration of safety features.

Safety instructions

The safety instructions in this documentation must always be observed. These do not affect the validity of any additional national or company safety instructions.

Safety instructions printed on the system

All safety instructions attached to the system must be observed. They must always be complete and easily legible.

Technical standard

The system has been constructed using the best available technology and according to the accepted safety regulations. However, danger to the life and limbs of users or third parties or damage to the system or other property cannot be ruled out if the system, if the system is used by unqualified persons. Installation and maintenance, as well as any work that is not described in this operating manual may only be performed by authorized personnel.

Personnel

The operator of the overall system must ensure that only authorized and qualified technicians can work on or with the system, and within their specified area of responsibility.

"Authorized and qualified personnel" include:

Operation

by the operator, by Evoqua or by personnel who have been trained and instructed by the service partner.

Installation, Commissioning and Maintenance level 2

Only Evoqua service personnel or by personnel who have been trained and authorized by Evoqua.

Electrical work

Authorized and qualified electrical technicians

Spare parts / components

The trouble-free operation of the system can only be guaranteed, if original spare parts and components are used in the combination described in this instruction manual. Otherwise there is a danger of malfunction or damage to the system.

Modifications and extensions

Never attempt to rebuild, modify or extend the system without written approval from the manufacturer!

Electrical power

During normal operation, the control cabinet must remain closed.

Connect cables in accordance with the terminal diagram in chapter 10.

Waste disposal

Ensure safe and environmentally-friendly disposal of agents and replaced parts.

2.3 Safety instructions specific to the JETPAK system

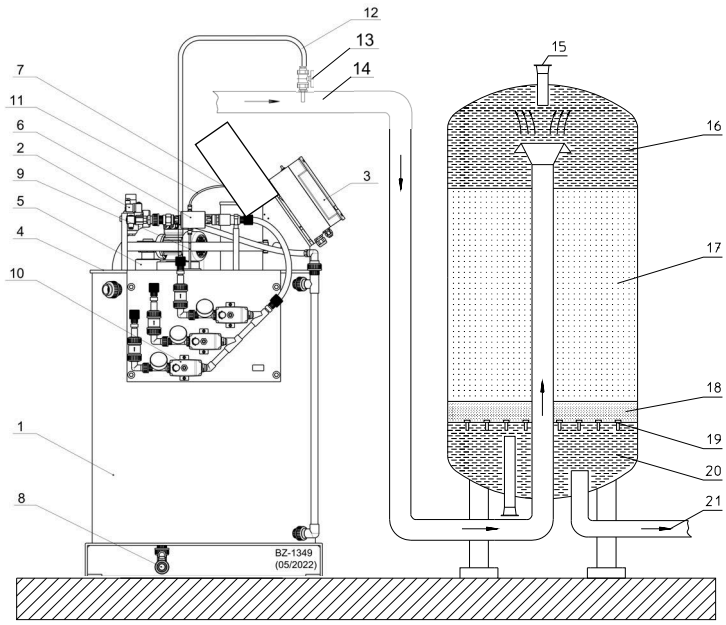
Warning of caustic substances!

Danger due to chemicals!
The solution contains sulphuric acid that is dangerous to the skin and face, particularly the eyes!
During all work involving acid keep an eye-bath close at hand!
To avoid acid burns put on closely sealing protective goggles and protective clothing before starting any work involving sulphuric acid.
Avoid splashes and spillages.
Rinse away spilt solution and splashes at once using plenty of water.
Clean the protective clothing immediately after use.

3. Description

3.1 Structure

The system consists of preparation tank with a stirrer, injector, one to three dosage lines to move the suspension into the untreated water pipe and a control panel with the system control.



1 Suspension tank
2 Flow through assembly
3 Operating panel with main switch
4 Filling hole
5 Stirrer
6 Injector
7 Level sensor
8 Drain
9 Suction line
10 Diaphragm valve
11 Vent line with solenoid valve
12 Dosing line
13 Injection point with ball valve
14 Unfiltered water inlet
15 Filter ventilation
16 Untreated water
17 Filter layer
18 Support layer
19 Filter nozzles
20 Pure water
21 Pure water outlet

The items 14 - 21 are not supplied by Evoqua.

For requirements concerning the filter refer to the annex.

3.2 Technical data

Dimensions (W x D x H)	1.10 m x 0.85 m x 1.5 m
Space	1.5 m x 1.5 m
Weight, installed, empty operative	approx. 56 kg (with 3 dosage lines) approx. 516 kg
Tank volume	460 ltr up to overflow
Usible volume	300 ltr
Remaining volume	20 ltr, cannot be pumped out
Electric connection	1/N/PE, AC 230 V 50 Hz, 1 kVA
Fuse	max. 10 A
Operating water	potable water min. 6 bar (g) 700 ltr/h
Counter pressure at the point of application	max. 1.5 bar (g)
System of protection	IP 54
Ambient temperature	5 ... 40°C
Humidity	without condensation

Capacity

Concentration	20 g/ltr	30 g/ltr	40 g/ltr
Desired concentration in the brute water	Circulation max.		
0.5 g/m³	2200 m³/h	3300 m³/h	4400 m³/h
1.0 g/m³	1100 m³/h	1650 m³/h	2200 m³/h
1.5 g/m³	730 m³/h	1100 m³/h	1460 m³/h

3.3 Requirements to the activated carbon

- Only moistened and acidic powdered activated carbon (to EN 12903 (potable water), EN 15977 (swimming pool water), DIN 19643-2)
- Surface >900 m^2/g, calculated by BET
- Low fluctuations in quality depending on production
- Grain size distribution to be adhered to accurately (to DIN 19643-2):

Grain size range	Percentage mass of sieve fraction
> 0.071 mm	< 25%
< 0.045 mm	> 50%

- Only a low proportion of oversize particles (specially larger than 1 mm)
- Absence of foreign substances
- Filled into bags or cardboard with 3 kg weight portion of dry carbon.

Note

Suspensions which are produced with water vapour-activated powdered carbon can react in a strongly alkaline manner. This results in partial or entire precipitation of the hardening constituents in the suspension water.
Through a reduction in the pH value to below pH 2 by the use of sulphuric acid, the precipitation of hardening constituents and germination can both be prevented.
The necessary quantity of acid is already added to the moistened and acidic powdered activated carbon that should be used.
It is known that most adsorption processes are not negatively affected by a low pH value, but in fact tend to be assisted.

Warning of caustic substances!

Danger due to chemicals!
The solution contains sulphuric acid that is dangerous to the skin and face, particularly the eyes!
During all work involving acid keep an eye-bath close at hand!
To avoid acid burns put on closely sealing protective goggles and protective clothing before starting any work involving sulphuric acid.
Avoid splashes and spillages.
Rinse away spilt solution and splashes at once using plenty of water.
Clean the protective clothing immediately after use.

4. Installation

4.1 Transport and storage

- Protect the system from tilting during transport and storage.
- Remove the transport fixing devices only on arriving at the installation site.
- Load the system with an elevating truck or forklift.
- No pilot points are provided for lifting by crane.
- Cover the system if it is to be stored out in the open for any period of time.
- Protect system from penetration by damp and frost.

4.2 Unpacking and erection

Requirements of the site of installation:

- Carrying power at least 500 kg
- Frost-free
- Protected from rain or moisture
- Sink for drainage and overflow

The stirrer shaft has been removed for transport and is packed separately.

1 Remove packaging foil and transport fixing devices.
Take note of small components.

2 Check system for damage, foreign substances and soiling and clean if necessary.

3 Push the system off the pallet on to the prepared space, bring into the correct position and check that it is resting horizontally.

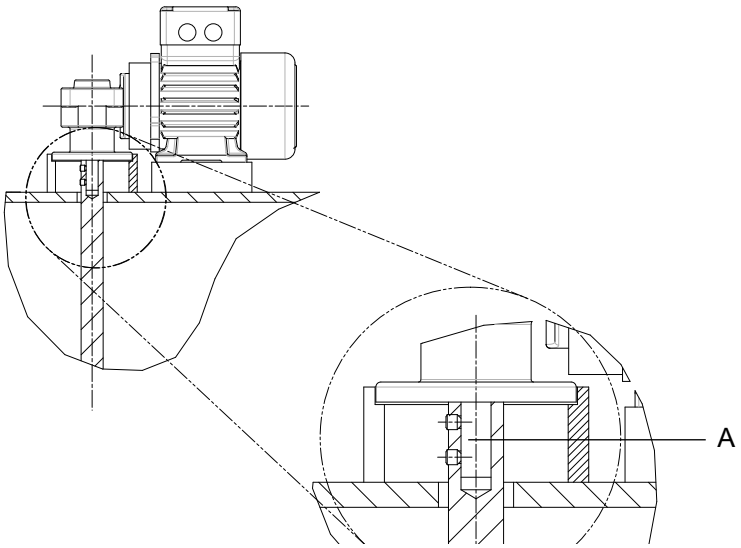
4 Fix the system to the floor. Fixing material is included.

4.3 Mounting the stirrer shaft

1 Open the filling hole of the tank.

2 Fix the stirrer shaft to the stirrer motor (see figure).

3 Fix the screws A with the Allen key 3 mm..



4.4 Connections

4.4.1 Mains connection

Also refer to the technical data in chapter 3.2 and the wiring diagrams enclosed.

Warning of dangerous voltage!

Risk of injury due to electric current!
Electrical work on the system may only be performed by qualified electricians.

In the case of all work on the system take into consideration the following:

- This Instruction Manual,
- The national regulations on the Erection of Power Installations with Nominal Voltages below 1000 V,
- Regulations for the "Coordination of Works" and/or the corresponding national and regional installation and safety regulations.
- Safety regulations at the installation site:

  - Get instructions from the operator!
  - Harmonise your work with the surroundings.
- Use only licensed and properly functioning tools and measuring equipment, and personal protection devices.
- The system must be properly earthed. No freely accessible part of the system may be under mains voltage or any other dangerous voltage.
- Once the system is connected, work may only be carried out on the system when the pre-fuse has been removed or the main switch on the system is secured in the OFF position using a lock.
- If work has to be carried out on the appliance when switched on, on no account touch the electrical contacts. One hand must always be free away from live or earthed parts of the system.

1 Check the mains for correct voltage and fuse.

2 Connect the system with a flexible cable 3x1,5 mm².
Install either a stationary connection to the mains supply or connect the mains cable via a not exchangeable 3-pole CEE plug (blue).
Install the wiring according to the nominal current of the fuse.

4.4.2 External release contacts

The system provides terminals for external release contacts to stop dosage during filter cleaning etc. For each dosing line there is one release contact.

At delivery the terminals are shortened. For details refer to the wiring diagrams.

Note

During dosage of activated powder carbon, flocculant dosage should not be switched off.
As long as hygiene parameters are met, it is not necessary to add activated powder carbon and flocculant after pool closure until the next morning.

4.5 Level measuring

Installed is a non-contact, contiuously measuring ultrasonic level sensor. The limit levels have been programmed at the factory and cannot be changed.

Level	Height	Reaction
EMPTY	approx. 50 mm	Failure
MIN	approx. 150 mm	Tank is filled
MAX	approx. 760 mm	Filling is stopped
OVERFLOW	approx. 895 mm	Failure

4.6 Connection of water supply

1 Connect the system to process water (potable water quality).

Attention!

Water temperature must not exceed the ambient temperature. Otherwise condensation and deposits of carbon in the tank can occur.

Note

Pay attention to the regulations for installations.
If necessary install a backflow preventer.
Tighten the plastic unions by hand only.

4.6.1 Connecting process water input

1 Connect the system to pipe or hose (connection EN ISO 228-1 - G½).
Max. inlet pressure 25 bar (g).
Min. inlet pressure 6 bar (g).

2 Secure with fitting hose brackets if a hose is used.

4.6.2 Tank overflow and drainage

1 Connect the tank overflow (DN25) and drainage (DN20) by a hose or pipe with a suitable outlet (for the disposal of the suspension refer to the national regulations and those of sewage disposal).

Note

The overflow must not be closed by a valve.
A shut-off valve is built into the tank drain.

4.7 Dosage lines

A sufficiently high flow velocity is necessary in the dosage lines for the activated carbon suspension to prevent separation and sedimentation of the activated carbon.

The flow velocity should therefore never drop below 1.5 m/s.

Dosage line dimensions:

Inside diameter: 13 mm, wall: 3.5 mm, max. length: 25 m
Material: Soft PVC hoses with textile reinforcement
Order no. W2T505422

Note

Install the system so that the length of the individual dosage lines does not exceed 25 m.
Do not install any backpressure valves or spring-loaded non-return valves in the dosage line (risk of activated carbon deposits)!

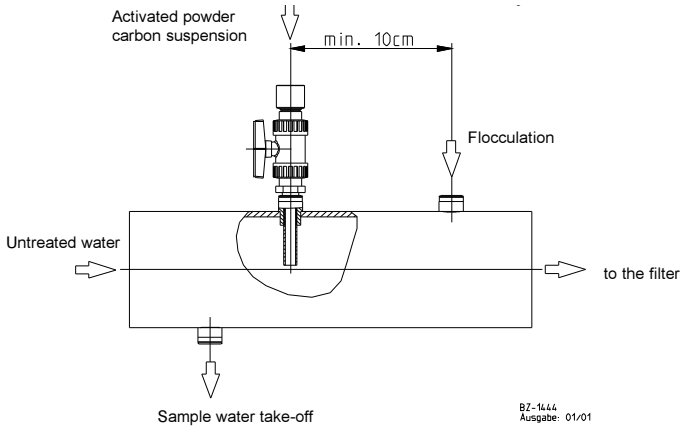
4.7.1 Installing dosage lines

- Install the pipes over the shortest possible route between the system and the injection point, maximum length 25 m.
- Do not install any tight bends.
- Ensure that the pipes do not sag!
- Prevent chafing!
- Only one injection point per dosage line (no branching)!

4.7.2 Injection point

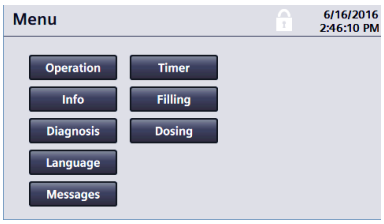
Correct selection of the injection point:

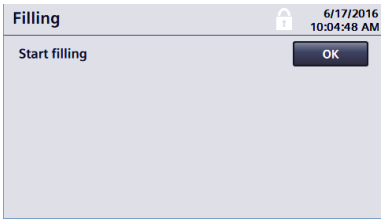
- The raw water pipe should be as horizontal as possible.
- Minimum distance of 10 cm upstream from the flocculant feed point
- Downstream from the sample water take-off point
- Only use original Evoqua - injection points!
  Order no. W3T166154
- If possible insert the injection pipe from above or diagonally from above, but not from the side or below (risk of blockage)
- Only use a ball valve, not a slide valve or non-return valve.



4.8 Commissioning

4.8.1 Switching-on





1 Open the operating water.

2 Switch-on the main switch.

3 Acknowledge the fault messages „Tank empty“ and „Power failure“ with ACK.

4 Enter the service code.

5 Touch F1 to start the automatic mode.

6 Touch F4, menu is displayed.

7 Touch „Filling”.

8 To start filling touch OK. The suspension tank is filled.

9 During filling:
Adjust the pressure reducing valve to 5-6 bar (g).

The operating water pressure of min. 6 bar (g) is valid for all dosing lines up to 25 m of length and a counter-pressure at the points of application up to 1.5 bar (g). This pressure is necessary to create the necessary flow speed in the dosing lines.

As soon as the level EMPTY is reached in the tank, the stirrer starts. When the level MAX is reached, filling stopps.

10 Check for leaks.

For filling the carbon powder and starting dosing refer to the Operation chapter 6.5 and 6.6.

4.8.2 Parameter settings

The following parameters must be modified or adjusted:

(refer to the operator and service menus)

- Date, time
- Switching times (chapter 6.10)
- Mode: AUTO, ON, OFF, chapter 6.6
- Activated carbon feed rate: (Factory setting1 g/m³), chapter dosing
- Volume flow for the injection points.
  The dosing period is calculated on the basis of this data.
- When commissioning is finished:
  Confirm in the maintenance chapter.

The following parameters can be modified:

These parameters are set to the standard values at the factory. They may only be modified in specific and necessary cases.

- Stipulated maintenance interval = 185 days (= ca. ½ year), chapter Setup I
- Flushing time = 60 sec.
  Can be reduced if the dosage lines are very short:
  e.g. 5 m at least 12 secs.
  10 m at least 24 secs.
  Chapter Setup II
- Suspension concentration: 20, 30 or 40 g/l
  (depending on this value 2, 3 or 4 bags of PAC must be added)
  Standard setting: 20 g/l
- Dosing: half hour
  chapter Setup III
- Feed rate range: factory setting 0.3 ... 3 g/m³
  chapter Setup III

Note

In the annex you can find a list of all the parameters to be set, together with the factory settings.
Enter the parameter setting after commissioning and hand over the list to the operator or owner.

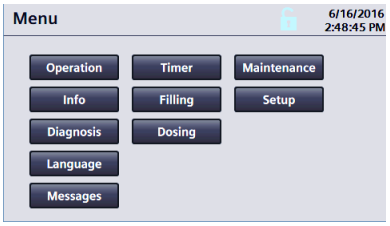
4.9 Service menus

4.9.1 Setup menus

The Setup menus are used for the setting of:

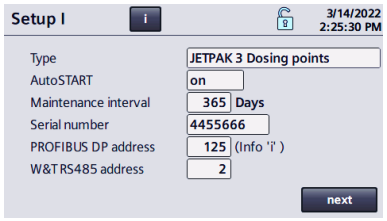
- AutoSTART, PROFIBUS address, W&T RS485 bus, maintenance interval
- Circulation capacity, flushing time
- Concentration, cycle duration, dosing range
- Ethernet interface (PROFINET-IO, MODBUS TCP)
- Reset to factory setting

1 Touch F4.



2 Select the Service menu.
If necessary enter the Service password.

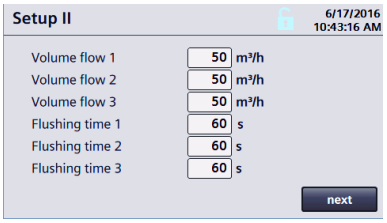
„Setup I" is displayed.



3 Set AutoSTART:
AutoSTART = on: After switching ON at the main switch or after a power failure dosing starts automatically when dosing was switched on before.
AutoSTART = off: Dosing must be started with the key F1 after switching ON or after a power failure.

4 If necessary modify the maintenance interval (not longer than 365 days)
Do not modify the serial number.

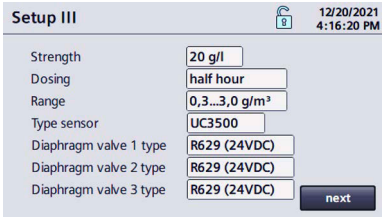
5 If you use the PROFIBUS DP interface:
Set the interface address.
For information touch the „i" box and refer to chapter 5.



6 Touch „next".

7 Set the volume flow and the flushing time for the individual dosing points.

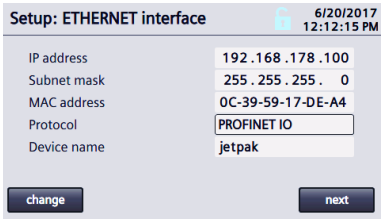
8 Touch „next".

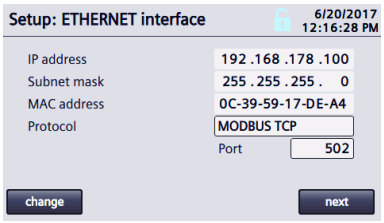


9 Set the concentration of the suspension (20, 30 or 40 g/l)
Set dosing period to half hour (every dosing point set to AUTO will be switched on twice per hour).
If set to „hourly" every dosing point set to AUTO will be switched on once per hour.
Set the range for the feed rate of carbon to 0,3...3 g/m³; the range 3...10 g/m³ should be used for special applications only
Depending on the built-in ultrasonic sensor, set the sensor type. As of software version 2.0, type UC3500 is installed. If

the control unit is replaced during servicing, set the previous type 3RG6013 if necessary.
Set diaphragm valve types 1 - 3 depending on the valves installed. As of software version 2.0, type R629 is installed.

10 Touch „next”.

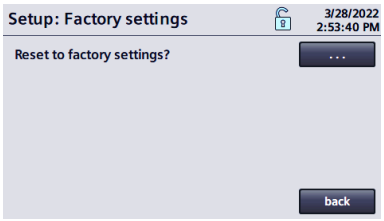




11 „Setup: ETERNET internet” is displayed.
Refer to chapter 5.
Set the ETHERNET protocol.

- PROFINET-IO
- MODBUS TCP

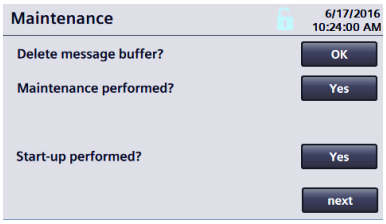
12 Touch „next”.



13 „Setup: Factory settings” is displayed.
To reset all settings to the factory default, press the key and confirm the displayed dialogue with "Yes".

14 Touch „back”, setup is finished.

15 Touch F4 and „Maintenance”.



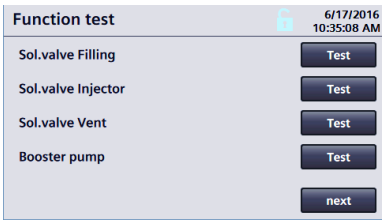
16 Confirm „Start-up performed?” by touching „Yes”.

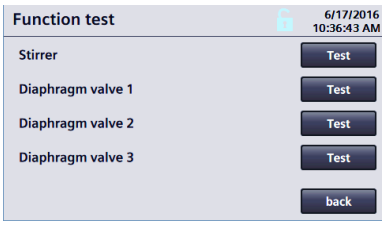
17 Return by touching F4.

4.9.2 Function test

The following menus serve to activate/deactivate or open/close the following components (service password necessary):

- Stirrer
- Solenoid valves injector, filling, venting
- Membrane valves 1, 2, 3
- Booster pump (when installed)





1 Touch F4.

2 If necessary enter the service password.

3 Touch „Maintenance”.

4 Touch „next” up to the menu „Function test”.

5 To open the solenoid valve filling: Touch „Test”.
To open the solenoid valve injector: Touch „Test”.
To open the solenoid valve vent: Touch „Test”.
The valve remains open as long as the key is touched.
To start the booster pump: Touch „Test”.
The booster pump runs as long as the key is touched.

6 Touch „next”.

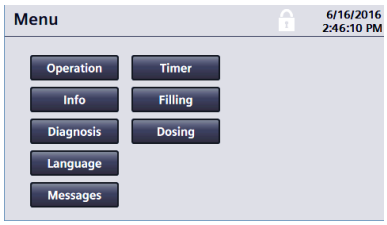
7 To start the stirrer: Touch „Test”.
The stirrer runs as long as the key is touched.

8 To open the diaphragm valves: Touch „Test”.
The valve remains open as long as the key is touched.

9 To leave the menu: Touch „back”.

4.10 Select the language

1 Touch F4.
If necessary enter the operator code.



2 Touch „Language”

3 Select the language.
The display is immediately switched to the new language.

4.11 Settings

Display	Factory setting (in bold)	Commissioning	Modification
Plant name	--		
Location	--		
AutoSTART	on		
Maintenance intervall	365 days = 1 year		
ETHERNET IP address	192.168.178.100		
PROFIBUS address	**125** (3-125)		
RS485 address	**2** (0-31)		
Circulation 1 2 3	**50 m³/h** (10-1500 m³/h) **50 m³/h** (10-1500 m³/h) **50 m³/h** (10-1500 m³/h)		
Flushing time 1 2 3	**60 s** (10-150 s) **60 s** (10-150 s) **60 s** (10-150 s)		
Concentration	**20 g/l** (20, 30, 40 g/l)		
Dosing	**half hour** hourly		
Dosing range	**0,3...3,0 g/m³** 3...10 g/m³		
Function signal relais	**Failure aktive** Maintenance Pressure MIN Tank MIN Dosing aktive Message aktive Delay **0 s** (0-120 s) Contact **NO** (NC)		
Dosing point name	1 [ASCII sign] 2 [ASCII sign] 3 [ASCII sign]		
Timer: Number of switching times per day	**1** (2)		
Sensor type	**UC3500** 3RG6013		

Display	Factory setting (in bold)	Commissioning	Modification
Diaphragm valve 1 type	**629 (24 V DC)** R613 (230 V AC)		
Diaphragm valve 1 type	**R629 (24 V DC)** R613 (230 V AC)		
Diaphragm valve 1 type	**R629 (24 V DC)** R613 (230 V AC)		

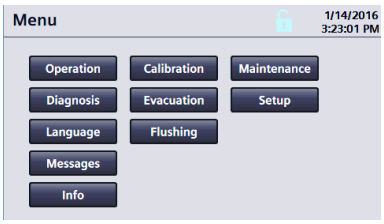
5. Interfaces

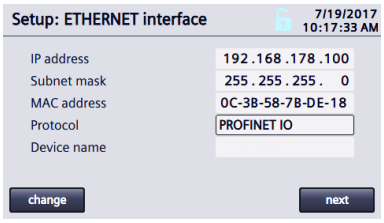
The controller provides interfaces for PROFINET IO-Device, PROFIBUS DP or MODBUS TCP. The corresponding hardware can be installed during commissioning or retrofitted later.

Note

The status LED „ERROR” on the SIMATIC S7 flashes if the system is not connected to a master fieldbus system (PROFIBUS DP or PROFINET IO). In such case, the communication partner (PROFIBUS master or IO-controller) is not available. This does not affect or interrupt the operation of the system.

5.1 Selecting the interface





1 Enter the service password, see chapter 6.1.5
2 Press F4 „Menu”.
3 Touch „Setup”.
4 Touch „next” until „Setup: ETHERNET interface” is displayed.
5 Touch the Protocol input box and select the desired interface.
6 Press F4 „Menu” to finish.

5.2 Connecting PROFINET IO-Device

(Optional)

This chapter provides software developers and assembly personnel with information on programming and installation for connection to a PROFINET system.

The control of the generator, the Siemens SIMATIC S7-1200, is geared for data exchange over PROFINET IO-Device on a superordinate PROFINET network. In this process, the control operates as a PROFINET IO-device and provides output data. (See chapter 5.8 Reference list). The superordinate automation system works as a PROFINET IO-controller.

Data transfer over PROFINET offers a standardized interface (EN 50170) for the transfer of process data.

If the default IP address can be used, no changes /adjustments to the system software need to be carried out for data exchange. To change the default IP address refer to chapter 5.2.3.

5.2.1 Technical data PROFINET IO-Device

Hardware	SIMATIC S7-1200 CPU 1214 C V4.2
Siemens part no	6ES7214-1AG40-0XB0
Transmission technology	Industrial Ethernet
Baud rate	Duplex automatic
IP address (default)	192.168.178.100 255.255.255.0
Physical interface	RJ45 integrated Ethernet switch (optional)
Communication	Cyclic I/O data exchange between IO-controller and IO-device(s)
Configuration	6 x 32 Byte,

Order number:

W3T351974 Retrofit kit ETHERNET
incl. Industrial Ethernet Switch with accessories

5.2.2 Wiring PROFINET

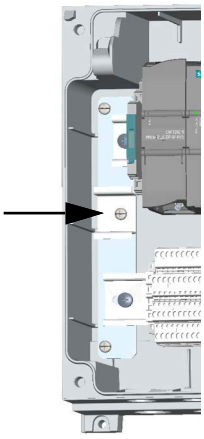
Note

Follow the setup guidelines for PROFINET networks such as on network topology, the properties of the bus lines, line termination, max. segment lengths, max. number of stations, transmission rate, use/number of repeaters etc. For information, contact the PROFINET User Organization, the manufacturer or the manufacturer of the automation system you are using.

Warning of dangerous voltage!

Risk of injury due to electric current!
Electrical work on the system may only be performed by qualified electricians.

Installing the Ethernet switch

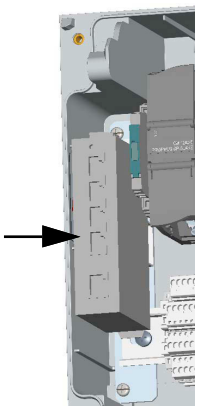


1 Switch off generation (press F1) and open the control housing.

2 Fix the 35 mm rail to the center hole (M5 thread) of the left mounting plate.

3 Snap the Ethernet switch onto the rail and connect to the power supply:

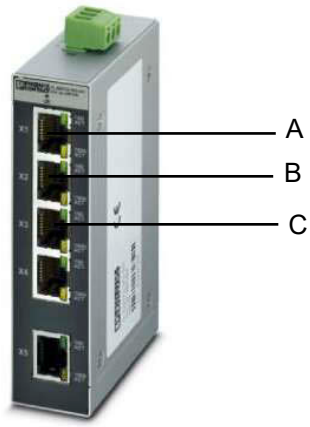
Prepare the three strands (2x black, 1x green/yellow) and connect them to the Ethernet switch. Connect the other strands to the potential terminal Plus (+), Minus (-) and PE.



4 Disconnect the RJ45 cable from the PLC and connect to the socket X1 of the Ethernet switch. Connect the socket X2 and the PLC using the supplied RJ45 cable.

5 For communication to the superordinate automation system use the sockets X3 to X5.

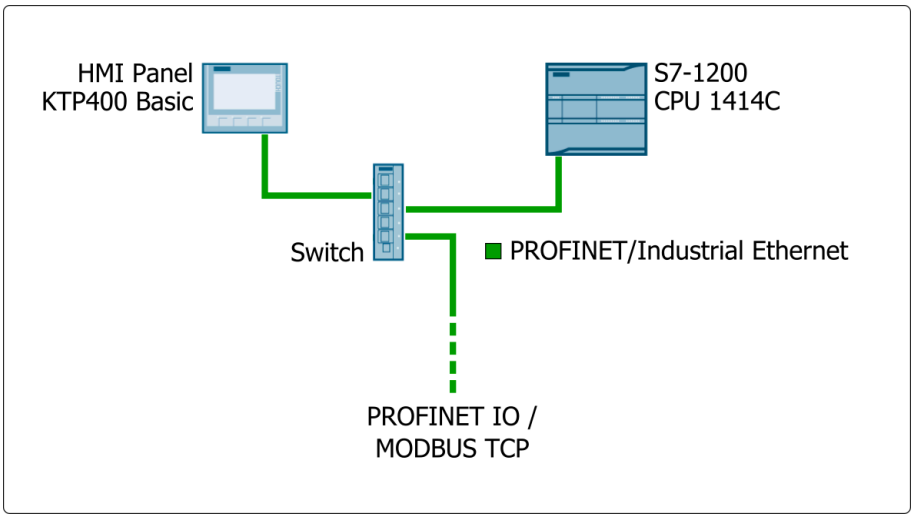
PROFINET IO-Device



A Display
B CPU
C Communication with IO-Master

Note

The status LED „ERROR" on the SIMATIC S7 flashes if the system is not connected to a master fieldbus system (PROFIBUS DP or PROFINET IO). In such case, the communication partner (PROFIBUS master or IO-controller) is not available. This does not affect or interrupt the operation of the system.



5.2.3 Configuring PROFINET-IO-Controller

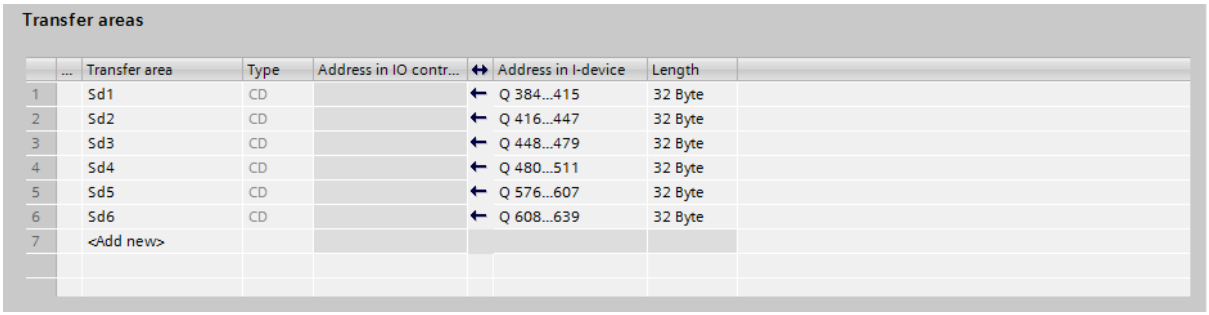
In order for the data on a automation system to be read, it must know the configuration for the data transfer.

Data exchange configuration:

The PROFINET IO-Controller is configured with the aid of the device master data file (GSDML file):

GSDML-V2.32-#Siemens-PreConf_Basic8880-V1-20180720-085016.xml

192 (6 x 32) bytes of user data are transferred over the PROFINET to the IO-controller.



Transfer areas

	...	Transfer area	Type	Address in IO contr...	↔	Address in I-device	Length
1		Sd1	CD		←	Q 384...415	32 Byte
2		Sd2	CD		←	Q 416...447	32 Byte
3		Sd3	CD		←	Q 448...479	32 Byte
4		Sd4	CD		←	Q 480...511	32 Byte
5		Sd5	CD		←	Q 576...607	32 Byte
6		Sd6	CD		←	Q 608...639	32 Byte
7		<Add new>					

5.3 Connecting PROFIBUS DP

(Optional)

The control of the generator, the Siemens SIMATIC S7-1200, is geared for data exchange over PROFIBUS DP on a superordinate PROFIBUS DP network. In this process, the control operates as a PROFIBUS DP slave and provides output data (see chapter 5.8 Reference list). The superordinate automation system works as a PROFIBUS DP master.

Data transfer over PROFIBUS DP offers a standardized interface (EN 50170) for the transfer of process data. The process data is available on the PROFIBUS DP page as output data.

If the default bus address is used, no changes /adjustments to the system software need to be carried out for data exchange. To change the default bus address refer to chapter 5.3.2.

This chapter provides software developers and assembly personnel with information on programming and installation for connection to a PROFIBUS DP system.

5.3.1 Technical data

Hardware	SIMATIC S7-1200 CPU1242-5 PROFIBUS DP Slave V1.0
Siemens part no	6GK7242-5DX30-0XE0
Transmission technology	RS-485 in accordance with the PROFIBUS specifications
Baud rate	1.5 MBit/s
Bus address	default 125
Bus connection	9 pin D-Sub socket on site: 9-pole PROFIBUS DP plug
Communication	Cyclic I/O data exchange between the DP master and the DP slave(s)
Configuration	6 x 32 Byte, data consistency over the unit

Order numbers:

W3T351973 Extension PROFIBUS DP Slave incl. communication module with accessories

5.3.2 Wiring PROFIBUS DP

Note

Follow the setup guidelines for PROFINET networks such as on network topology, the properties of the bus lines, line termination, max. segment lengths, max. number of stations, transmission rate, use/number of repeaters etc. For information, contact the PROFINET User Organization, the manufacturer or the manufacturer of the automation system you are using.

Warning of dangerous voltage!

Risk of injury due to electric current!
Electrical work on the system may only be performed by qualified electricians.

Installing the communication module

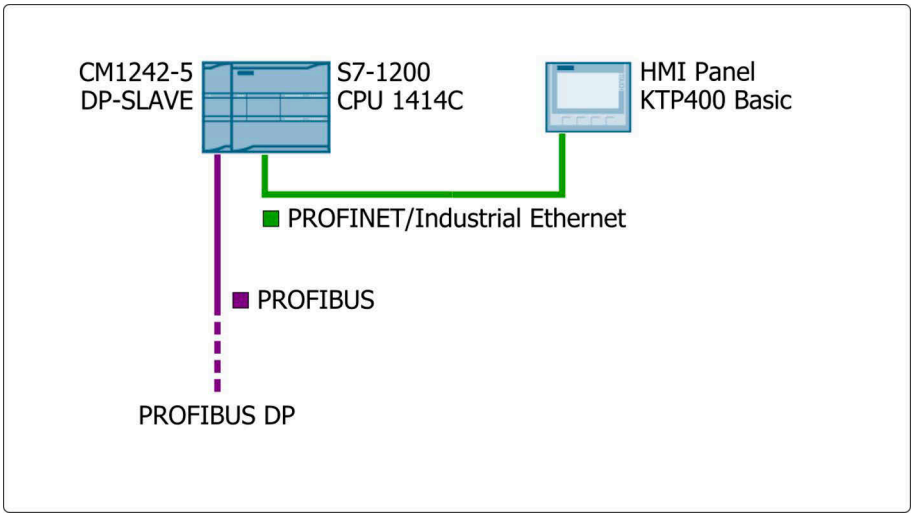
1 Shut-down the generator.

2 Open control cabinet.

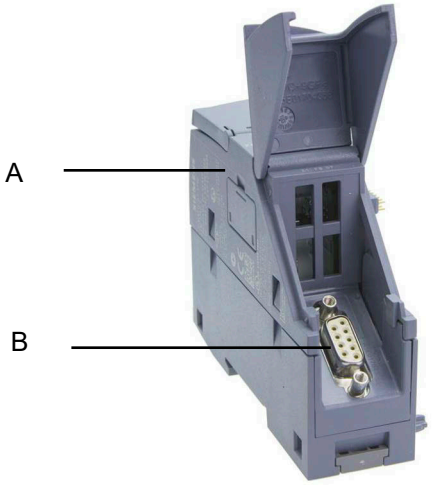
3 Remove the interface cover at the left side of the PLC using a screwdriver.

4 Snap the communication module CM1242-5 Slave onto the rail.

5 Connect the communication module by carefully moving it towards the PLC. A separate power supply is not necessary.



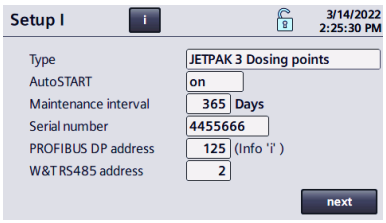
6 Connect the PROFIBUS DP bus cable to interface X1: PB DP on the CM 1242-5 using the bus system's 9-pin PROFIBUS DP plug connector.



A Communication module
B Interface socket

7 Restart the generator.

Setting the PROFIBUS DP address



1 Enter the Service password, see chapter 6.1.5.

2 Press F4 “Menu”.

3 Touch “Setup”. The present PROFIBUS DP address is displayed.

4 Enter the new PROFIBUS address.

The new address is active after a reboot of the system. To reboot, switch the main switch off and on (or separate the system from the mains).

Note

The status LED „ERROR” on the SIMATIC S7 flashes if the system is not connected to a master fieldbus system (PROFIBUS DP or PROFINET IO). In such case, the communication partner (PROFIBUS master or IO-controller) is not available. This does not affect or interrupt the operation of the system.

5.3.3 Configuring PROFIBUS DP-Master

In order for the data on a automation system to be read, it must know the configuration for the data transfer.

Data exchange configuration:

The PROFIBUS DP master is configured with the aid of the device master data (GSD-file) of the SIMATIC CM1242-5 PROFIBUS DP slave V1.0.

For development in foreign systems, a GSD file is available for the CM 1242-5 (6GK7242-5DX30-0XE0, Version 1.0).

192 bytes of user data is transferred over the PROFIBUS DP to the master. (6 x 32 byte with data consistency across the entire length).

Transfer areas

	...	Transfer area	Type	Master address	↔	Slave address	Length	Consistency
1		DP-Sd1	MS		←	Q 256...287	32 byte	Total length
2		DP-Sd2	MS		←	Q 288...319	32 byte	Total length
3		DP-Sd3	MS		←	Q 320...351	32 byte	Total length
4		DP-Sd4	MS		←	Q 352...383	32 byte	Total length
5		DP-Sd5	MS		←	Q 512...543	32 byte	Total length
6		DP-Sd6	MS		←	Q 544...575	32 byte	Total length
7		<Add new>						

5.4 Connecting MODBUS TCP

This chapter provides software developers and assembly personnel with information on programming and installation for connection to a MODBUS system.

The control of the generator, the Siemens SIMATIC S7-1200, is geared for data exchange over MODBUS on a superordinate MODBUS network.
In this process, the control operates as a MODBUS server and provides output data (see chapter 5.8 Reference list). The superordinate automation system works as a MODBUS client.

If the default IP address can be used, no changes /adjustments to the system software need to be carried out for data exchange. To change the default IP address refer to chapter 5.2.3.

5.4.1 Technical data MODBUS client

Hardware	SIMATIC S7-1200 CPU 1214 C V4.2
Siemens part no.	6ES7214-1AG40-0XB0
Transmission technology	Industrial Ethernet
Baud rate	Duplex automatic
IP address (default)	192.168.178.100 255.255.255.0
Physical interface	RJ45 integrated Ethernet switch
Communication	Cyclic I/O data exchange between the server and client
Configuration	192 Byte output data
Port ID	502 (adjustable) 1

Order information:

W3T351974 Retrofit kit ETHERNET incl. Industrial Ethernet switch with accessories

5.4.2 Connecting MODBUS

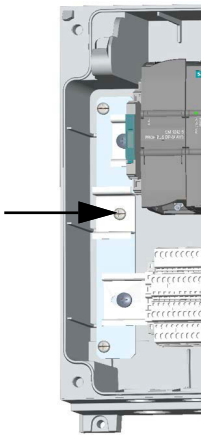
Note

Follow the setup guidelines for MODBUS networks such as on network topology, the properties of the bus lines, line termination, max. segment lengths, max. number of stations, transmission rate, use/number of repeaters etc. For information, contact the MODBUS User Organization, the manufacturer or the manufacturer of the automation system you are using.

Warning!

Risk of injury due to electric current!
Electrical work on the system may only be performed by qualified electricians.

Installing the Ethernet switch

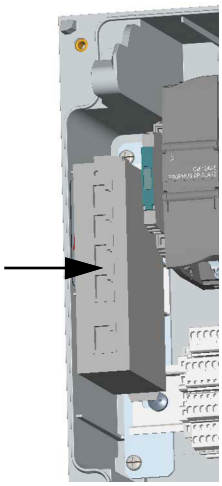


1 Switch off generation (press F1) and open the control housing.

2 Fix the 35 mm rail to the center hole (M5 thread) of the left mounting plate.

3 Snap the Ethernet switch onto the rail and connect to the power supply:

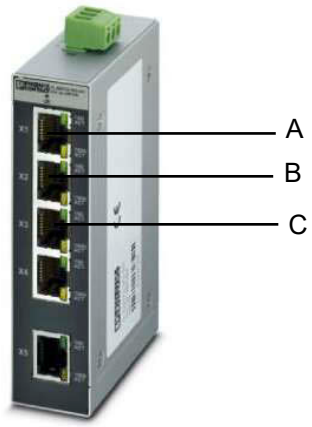
Prepare the three strands (2x black, 1x green/yellow) and connect them to the Ethernet switch. Connect the other strands to the potential terminal Plus (+), Minus (-) and PE.



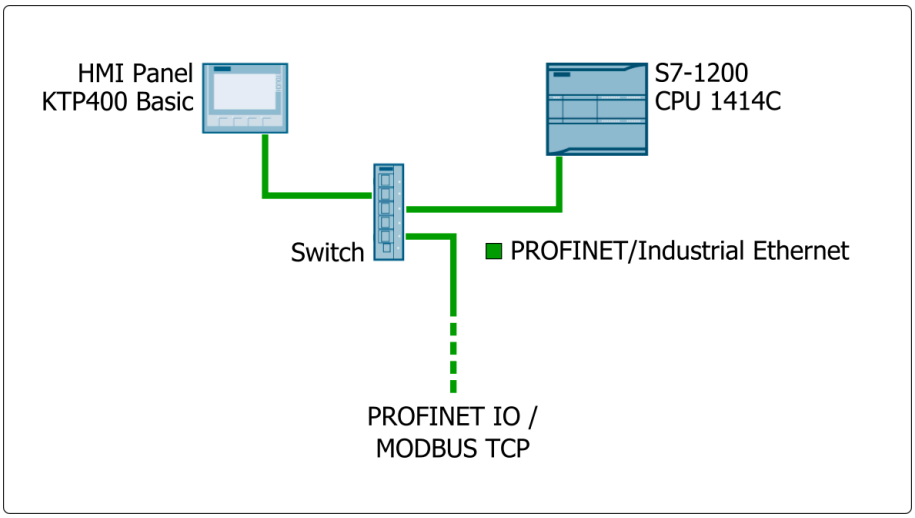
4 Disconnect the RJ45 cable from the PLC and connect to the socket X1 of the Ethernet switch. Connect the socket X2 and the PLC using the supplied RJ45 cable.

5 For communication to the superordinate automation system use the sockets X3 to X5.

PROFINET IO-Device



A Display
B CPU
C Communication with IO-Master



5.4.3 Configuring MODBUS client

In order for the data on a automation system to be read, it must know the configuration for the data transfer.

MODBUS functions for the data exchange:

MODBUS function	Data length (WORD)	Function and data type	Address register
03	1 to 125	read the holding register 1 to 125 WORD per call	40001 to 49999

Data exchange configuration:

Read: 192 bytes of user data are ready to be read by the MODBUS client (register 40001 to 40096).

5.5 Changing the IP address of the CPU

For PROFINET and MODBUS

Note

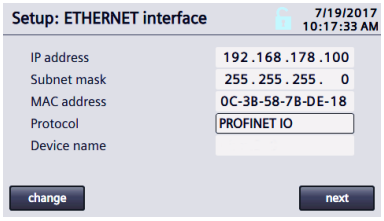
The Ethernet interface of the CPU is used for the communication with an external automation system.
This Ethernet interface of the CPU is also used for the communication with the HMI.
When the IP address of the CPU is changed, the IP address of the HMI has to be matched as well. Subsequently the HMI is connected to the CPU again.
Hence, for the connection of the system to an other IP address area two IP addresses are necessary.

1 Enter the Service password, see chapter 6.1.5.

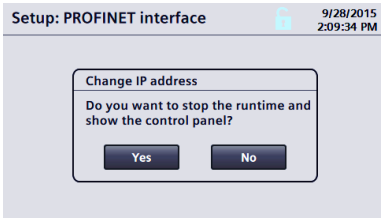
2 Press F4 “Menu”.

3 Touch “Setup”.

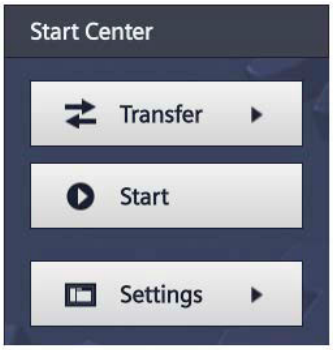
4 Touch “next” until “Setup: ETHERNET interface” is displayed. The current valid IP address is displayed.



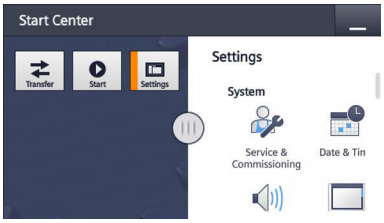
5 Touch „change“.



6 To change the IP address touch „Yes”.

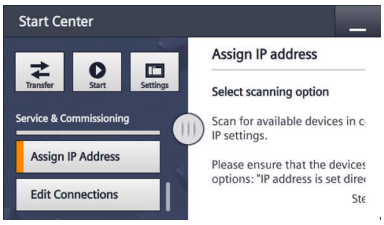


Runtime is finished and Start Center is displayed.



7 Touch „Settings“.

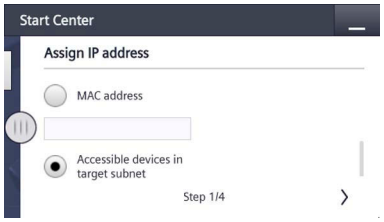
8 Touch the symbol „Service and Commissioning”.



9 Swipe until „Assign IP Address” is displayed.

10 Touch „Assign IP Address” and then .

11 Swipe upward until „Accessible devices in target subnet” is displayed.



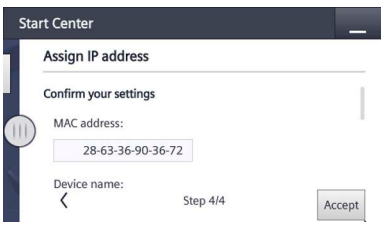
12 Touch to activate.

13 Touch „>” to go to the next step.

The search for the PLC starts automatically.

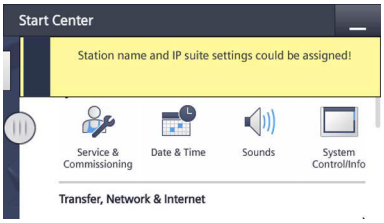
14 When the device is found touch „>” to go to the next step.

15 Edit device name, IP address, subnet mask and default gateway according to your needs.



16 Touch „>” to go to the next step.

17 Check your settings and touch „Accept”.



If the change was successful, „Station name and IP suite settings could be assigned!” is displayed.

In case of a failure: „Station name and IP suite settings could not be assigned!” is displayed.

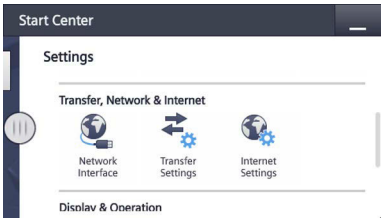
Touch „close” to close the message.

Touch  and  to close the window.

Enter the parameters again starting at step 7.

Changing the IP address of the HMI

18 Swipe upward and select „Network Interface”.

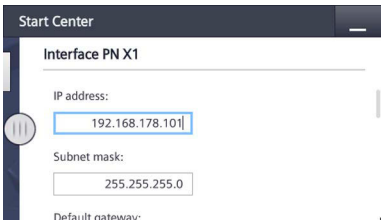


19 Move the slide switch DHCP to „OFF”.

20 Set the IP address that it corresponds to the 1st, 2nd and 3rd octet of the setting as of step 12.

Set the 4th octet to a free address.

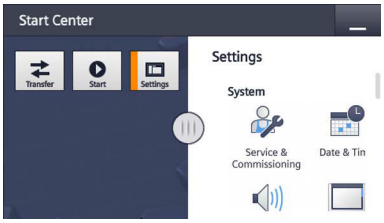
Set the subnet mask as of step 12.



21 If necessary adjust the Default gateway.

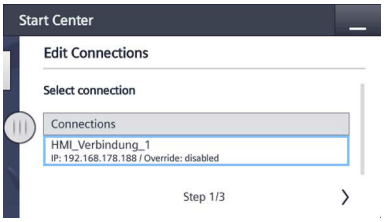
22 Touch  , touch „Settings”.

Re-connecting HMI and PLC



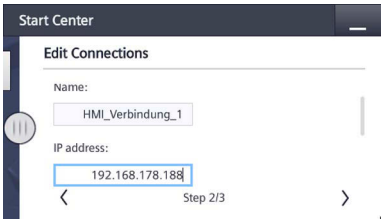
23 Touch „Service & Commissioning”.

24 Swipe the list under „Service & Commissioning” upward until „Edit Connections” is displayed.



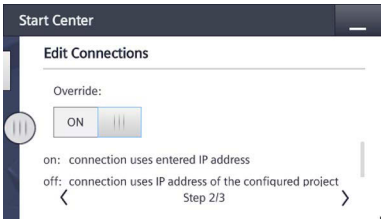
25 Touch „Edit Connections” and then  .

Wait until the search for the PLC is finished.



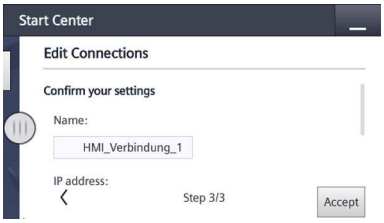
26 Touch „>” to go to the next step 2/3.

27 Enter the new IP address of the PLC as of step 12.



28 Swipe upward until the slide switch „Override” is displayed.

29 The slide switch must be set to „ON”, swipe if necessary.



30 Touch „>” to go to the next step 3/3.

31 Check the new settings and touch „Accept”.

32 Touch .

33 Touch „Start” to start runtime in the Start Center.

5.6 Connecting Process Monitoring System (PMS)

(Optional)

The serial RS485 bus interface is used for data transfer to the visualisation system Process Monitoring System (PMS).

The visualisation system Process Monitoring System is used for archiving and monitoring of process data, for remote diagnosis and remote access using a standard browser with internet and E-mail capability.

Further units can be connected to the PMS via RS485 bus interface.

For the PMS a separate instruction manual is available.

5.6.1 Technical data

Hardware	SIMATIC S7-1200 CB1241 RS485
Siemens part no	6ES7241-1CH30-1XB0
Transmission technology	symmetrical two-wires bus line (semi-duplex operation)
Baud rate	19200 Baud (up to 1200 m)
Bus address	default 2
Bus connection	terminal block

Order numbers:

W3T351975 Extension RS485-PMS
incl. communication module with accessories

5.6.2 Connecting RS485

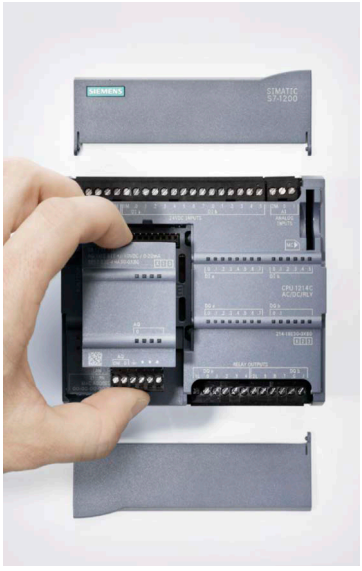
Installing the communication board

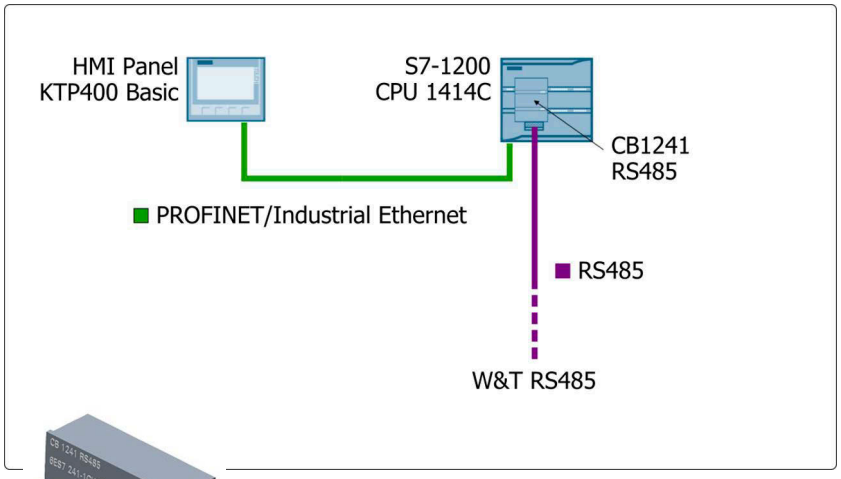
1 Shut-down the generator.

2 Open control cabinet.

3 Carefully remove the two terminal covers of the PLC and lift the blind covers.

4 Connect the communication board CB1241 RS485 from the top to the PLC and close the terminal covers. A separate power supply is not necessary.





Setting the RS485 address

1 Enter the Service password, see chapter 6.1.5.

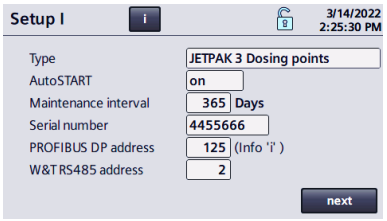
2 Press F4 “Menu”.

3 Touch “Setup”.

4 Touch “next”. The present RS485 address is displayed.

5 Enter the new RS485 address.

The new address is active immediately.



5.7 Data formats

The following table contains data formats used during the transfer of process data:

Data type	Size (Bit)	Typical names	Initials	Value range	
				min	max
BOOL	1	Bit, Bool	no	0	1
BYTE	8	unsigned Char, Byte	no	00_{HEX}	FF_{HEX}
WORD	16	unsigned Integer, Word	no	00_{HEX}	$FFFF_{HEX}$
STRING	(n*8) + 16	ASCII, String, Character string	no	---	---

n = number of characters

The byte sequence, in which the various data are saved into the memory or transmitted can be taken from the following chapters.

BYTE

Example: $7B_{hex} = 123_{dez}$

BYTE 0							
$7B_{hex}$							
7	Bit						0
0	1	1	1	1	0	1	1

WORD

Example: $3039_{hex} = 12345_{dez}$

BYTE 0								BYTE 1							
3039_{hex}															
15	Bit						8	7	Bit						0
0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	1

STRING

Example: ‚AB‘ STRING [2]

BYTE 0								BYTE 1								BYTE 2								BYTE 3							
Ab																															
max. length of string								actual length of string								ASCII value A								ASCII value b							
31	Bit						24	23	Bit						16	15	Bit						8	7	Bit						0
0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	1	0

5.8 Reference list

The following reference list contains the data that were made available by the generator.

„n" starting address of the master input area.
„R" read access right.

JETPAK (EN)

"n" starting address of the master input area
"R" read access right

MODBUS Register	Byte addr.	Bit addr.	Length (byte)	Format	Access	Description	Value Value range
40001	n		10	STRING[8]	R	Version for RS485 Bus-Scan	'JETPAK01'
40006	n+10		6	STRING[4]	R	Typ for RS485 Bus-Scan	'JP00'
40009	n+16		30	STRING[28]	R	Product type description mode	JETPAK 3 Dosing point
40024	n+46		8	STRING[6]	R	Software version	V**.**
40028	n+54		8	STRING[6]	R	Software date	MM/YY
40032	n+62		10	STRING[8]	R	Software article number	EAE****
40037	n+72		10	STRING[8]	R	Serial number	
40042	n+82		8	STRING[6]	R	Order number	
40046	n+90		26	STRING[24]	R	System name	
40059	n+116		26	STRING[24]	R	System location	
40072	n+142	0	1	BOOL	R	Mode automatic	Operating message
		1		BOOL	R	Filling tank active	Operating message
		2		BOOL	R	Failure	Operating message
		3		BOOL	R	Dosing point 1 ON/AUTO	Operating message
		4		BOOL	R	Dosing point 2 ON/AUTO	Operating message
		5		BOOL	R	Dosing point 3 ON/AUTO	Operating message
		6		BOOL	R	Dosing 1 active	Operating message
		7		BOOL	R	Dosing 2 active	Operating message
	n+143	0	1	BOOL	R	Dosing 3 active	Operating message
		1		BOOL	R	n.c.	Operating message
		2		BOOL	R	n.c.	Operating message
		3		BOOL	R	n.c.	Operating message
		4		BOOL	R	n.c.	Operating message
		5		BOOL	R	n.c.	
		6		BOOL	R	n.c.	
		7		BOOL	R	n.c.	
40073	n+144	0	1	BOOL	R	Power failure [Time]	1 =Failure message active
		1		BOOL	R	Unit OFF due to power failure	1 =Failure message active
		2		BOOL	R	Circuit breaker failure	1 =Failure message active
		3		BOOL	R	Input value not permitted	1 =Failure message active
		4		BOOL	R	Tank overfilled	1 =Failure message active
		5		BOOL	R	Tank Empty	1 =Failure message active
		6		BOOL	R	Filling time of tank exceeded	1 =Failure message active
		7		BOOL	R	Sensor ultrasonic	1 =Failure message active
	n+145	0	1	BOOL	R	n.c.	
		1		BOOL	R	n.c.	
		2		BOOL	R	n.c.	
		3		BOOL	R	n.c.	
		4		BOOL	R	n.c.	
		5		BOOL	R	n.c.	
		6		BOOL	R	n.c.	
		7		BOOL	R	n.c.	
40074	n+146	0	1	BOOL	R	n.c.	
		1		BOOL	R	n.c.	
		2		BOOL	R	n.c.	
		3		BOOL	R	n.c.	
		4		BOOL	R	n.c.	
		5		BOOL	R	n.c.	
		6		BOOL	R	n.c.	
		7		BOOL	R	n.c.	
	n+147		1	BYTE	R	n.c.	

JETPAK (continuation)

"n" starting address of the master input area
"R" read access right

MODBUS Register	Byte addr.	Bit addr.	Length (byte)	Format	Access	Description	Value Value range
40075	n+148	0	1	BOOL	R	Perform maintenance!	1 = Warning message active
		1		BOOL	R	Tank MIN!	1 = Warning message active
		2		BOOL	R	Confirm start-up!	1 = Warning message active
		3		BOOL	R	Set date / time!	1 = Warning message active
		4		BOOL	R	Pressure operating water MIN!	1 = Warning message active
		5		BOOL	R	Pre-warning Tank MIN!	1 = Warning message active
		6		BOOL	R	n.c.	
		7		BOOL	R	n.c.	
	n+149	0	1	BOOL	R	n.c.	
		1		BOOL	R	n.c.	
		2		BOOL	R	n.c.	
		3		BOOL	R	n.c.	
		4		BOOL	R	n.c.	
		5		BOOL	R	n.c.	
		6		BOOL	R	n.c.	
		7		BOOL	R	n.c.	
40076	n+150	0	1	BOOL	R	n.c.	
		1		BOOL	R	n.c.	
		2		BOOL	R	n.c.	
		3		BOOL	R	n.c.	
		4		BOOL	R	n.c.	
		5		BOOL	R	n.c.	
		6		BOOL	R	n.c.	
		7		BOOL	R	n.c.	
	n+151		1	BYTE	R	n.c.	
40077	n+152		4	REAL	R	Level [%]	0...999
40079	n+156		4	REAL	R	Operating hours Unit [h]	0...999999,9
40081	n+160		4	REAL	R	Operating hours Injector [h]	0...999999,9
40083	n+164		4	REAL	R	Dosing time 1 [h]	0...999999,9
40085	n+168		4	REAL	R	Dosing time 2 [h]	0...999999,9
40087	n+172		4	REAL	R	Dosing time 3 [h]	0...999999,9
40089	n+176		4	REAL	R	n.c.	
40091	n+180		2	INT	R	Next maintenance in [days]	0...999
40092	n+182		2	INT	R	Digital inputs IW0	
40093	n+184		2	INT	R	Digital outputs QW0	
40094	n+186		2	INT	R	Analog input IW64	0...27648 dez
40095	n+188		2	INT	R	Analog input IW66	0...27648 dez
40096	n+190		2	INT	R	n.c.	

= 192 Byte

6. Operation

6.1 HMI Control panel

6.1.1 General information

The default input unit on the controller is the touch screen. All of the control objects required for control after starting the controller are displayed on the touch screen.

Note

Damage to the system!
Never use pointed or sharp instruments to operate the touch screen or press it abruptly with hard objects, as this can severely shorten its operational life or cause it to stop working completely. Only touch the touch screen with your finger or a touch stylus.

Only touch one control object at a time. You should never touch more than one control object simultaneously, as doing so may trigger operations unintentionally.

6.1.2 Operating the control unit

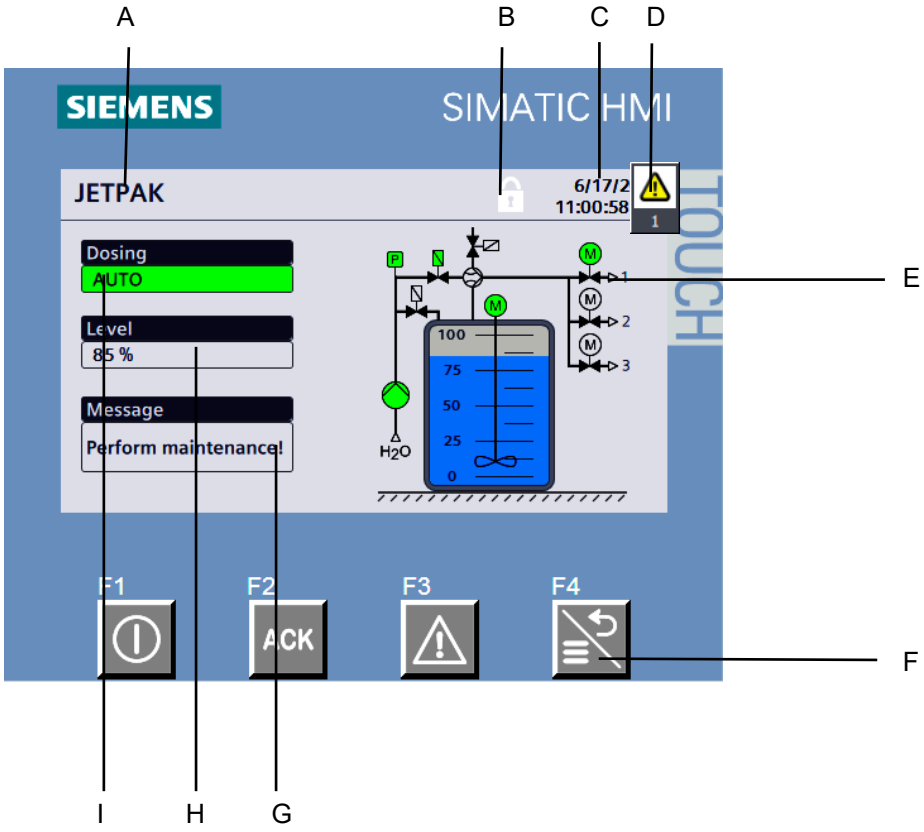


Fig. 1 Basic display

A Type of plant
B Login symbol
C Date, time
D Message indicator
E Scheme
F Function keys F1-F4
G Messages
H Level in the tank
I Status

Function keys

F1
Switch Dosing on and off (refer to 6.1.4).

F2:
Acknowledge fault messages.

F3
Display the present fault message when the message indicator is displayed.

F4
Select the menu, leave a menu, return to the menu level above.

Message indicator

The message indicator is displayed in case of a fault.
The number in the lower part of the indicator shows the number of fault messages currently pending.
As long as the fault has not been acknowledged the indicator is flashing white/yellow.

6.1.3 Switching main switch on

1 Switch on the main switch at the control box.
A „Power failure" message is displayed and must be acknowledged by pressing ACK.

- When AutoSTART = ON is selected:
  Dosing starts automatically when dosing was active.
- When AutoSTART = OFF is selected:
  „Unit OFF due to power failure" is displayed.
  Dosing must be started with F1.

6.1.4 Switching dosing on/off

1 Press F1.
„Dosing ON" is displayed.
The stirrer is turning.
The dosing of the suspension is active according to the switching times as soon as the individual dosing points are active.

As long as the activated carbon suspension is in the tank, the stirrer should not be switched off for longer than half an hour, as the activated carbon otherwise separates and settles.

6.1.5 Login, entering the password

The programme menus are protected against unauthorised operation by passwords.

- Operator password:
  Protects all operating functions.
  The operator password is 9040.
- Service password:
  Protects the specific system settings and is only given to authorised specialised personnel.

Note

If no key is touched for 15 minutes, the authorisation obtained with the password is cancelled. Then the password must be entered again.

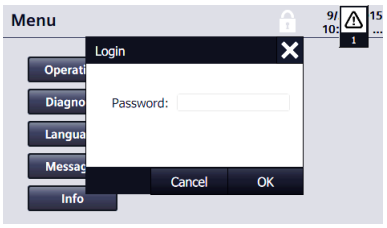
The login status is displayed:

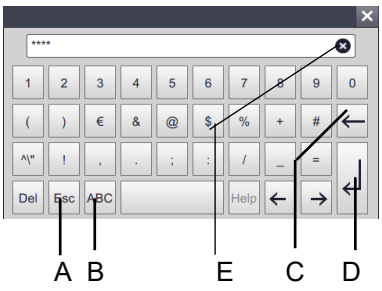
Locked, password has not been entered.

Open, password has been entered.
When the service password has been entered the lock symbol is displayed in blue.

To log out: Touch the open lock symbol.

To log in: Touch the closed lock and enter the password.





1 Touch the password input box.
A keyboard is displayed.

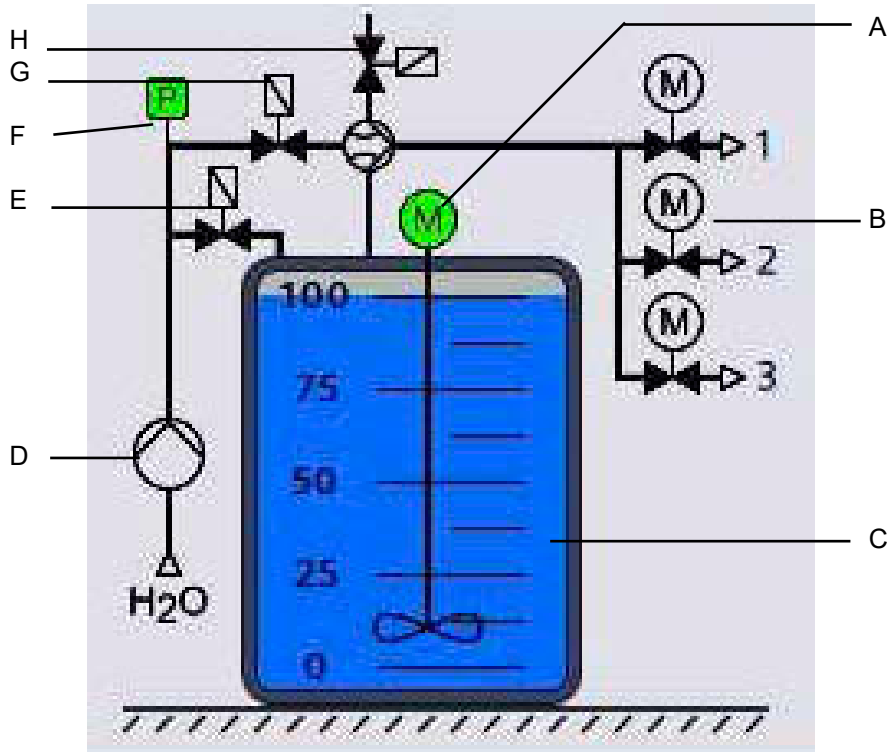
2 Touch „123” to switch to the numeric keyboard.

3 Enter the password for the level you wish to log in to using the keyboard displayed on the screen and then touch ENTER (D).

4 Touch OK.

A Esc: Escape
B ABC or 123: Switch between alpha keyboard and numeric keyboard
C BACKSPACE
D ENTER
E x: Delete input

6.2 System scheme

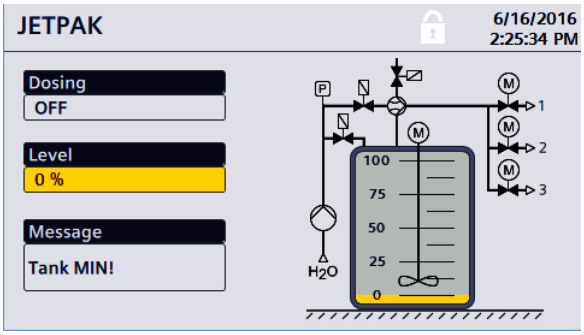


A Stirrer
green = operating
white = stopped
B Membrane valves
green = open
white = closed
C Filling level in the tank:
EMPTY 0%: orange, <50 mm
MIN <8%, blue, <150 mm
MAX ≤100%, blue, <760 mm
OVERFILLED >100%: red, >760 mm
D Booster pump
green = operating
white = stopped
E Solenoid valve filling water
green = open
white = closed
F Pressure sensor
G Solenoid valve injector operating water
green = open
white = closed
H Solenoid valve venting

Red symbols show failures.

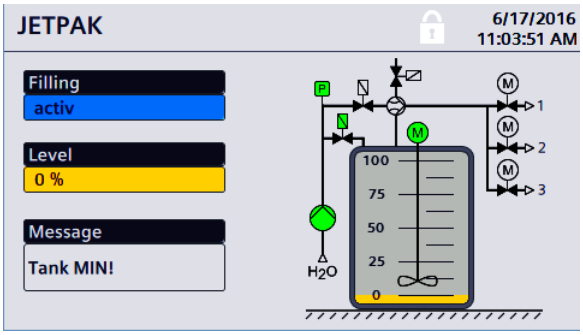
6.2.1 Displays

Suspension tank EMPTY



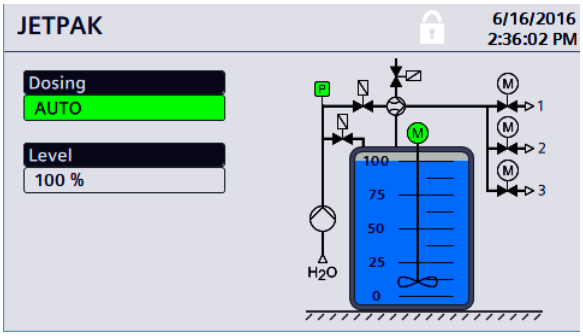
- Filling level 0%, < 50 mm
- Dosing OFF
- Stirrer OFF
- Message Tank MIN
- Add water and powdered activated carbon

Fill the suspension tank



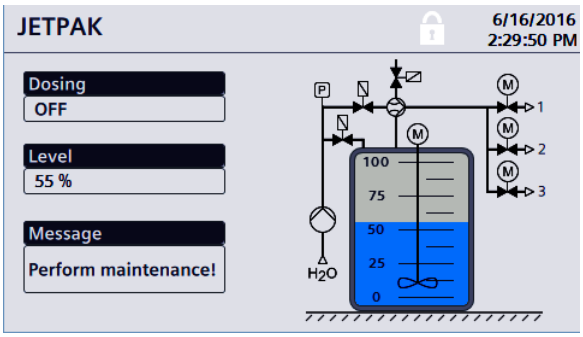
- Filling level 0%, < 50 mm
- Filling aktive, booster pump ON
- Water pressure OK
- Dosing OFF
- Stirrer ON
- Message Tank MIN
- Add powdered activated carbon

Suspension tank FULL



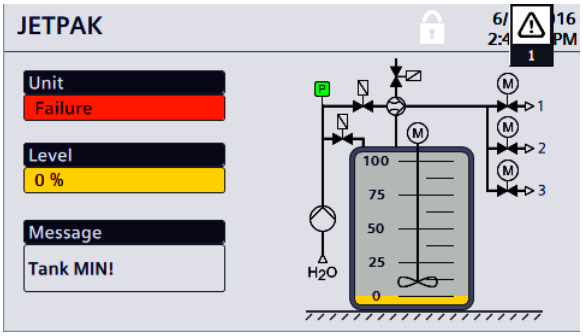
- Filling level 100%, < 760 mm
- Dosing in AUTO mode, presently dosing is not active
- Water pressure OK
- Stirrer ON

Operation off



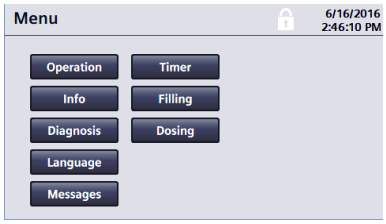
- Filling level 55%, < 760 mm
- Dosing OFF
- Stirrer OFF
- Note for necessary maintenance

Failure



- Filling level 0%, < 50 mm
- Failure acknowledged but not remedied
- Message Tank MIN

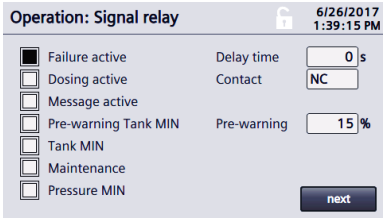
6.3 Operator menus



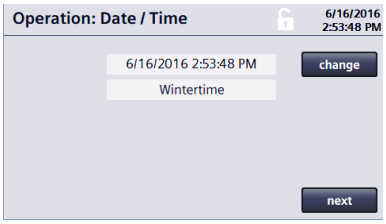
1 Touch F4.
The operator menus are displayed.
If necessary enter the operator password.

6.3.1 Operating menus

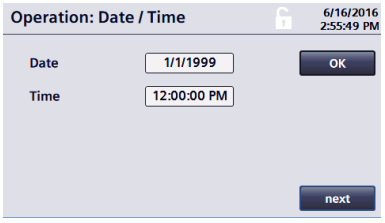
1 Touch „Operation”.



2 The operation menu „Signal relay” is displayed.
Activate the function(s) of the signal relay.
Select the function by pressing the symbol.
☐: Function is not active.
■: Function is active.
One or more functions can be activated.
For details refer to 6.11.



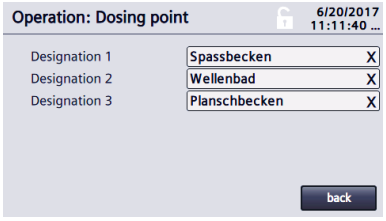
3 Touch „next”.
The operation menu „Date / Time” is displayed.
Date is displayed as mm/dd/yyyy.
To change the setting press „change”.



Press the „Date” or „Time” box. The keyboard is displayed.
Move the cursor to the number to change using the arrow keys.
To enter numbers press „123” to switch to the numeric keyboard. Use the DEL key and BACKSPACE to delete numbers. Enter the correct numbers. To store press ENTER.
To terminate press „OK”.

„Daylight saving time” or „Wintertime” is set automatically.

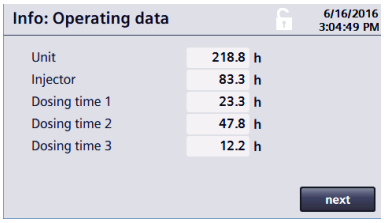
Date and time should be set for correct dosing times.

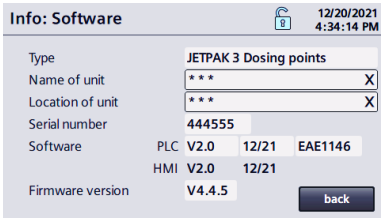


4 Touch „next”.
This menu is used to enter the individual dosing point names.

5 To return to the main menu touch „back”.

6.3.2 Info menu





1 Touch „Info”.
The Info menus are displayed.

Info: Operating data

- Operating hours of JETPAK (switched on with F1),
- Operating hours of the injector (corresponding to dosing hours),
- Dosing times of the individual dosing points

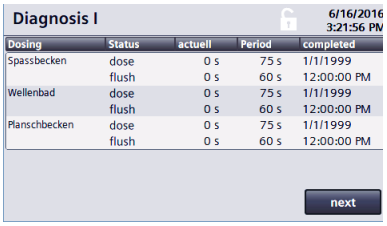
2 Touch „next”.
„Info: Maintenance” is displayed.

- Next maintenance in 365 days
- Dates of the last three maintenances
- Date of commissioning

3 Touch „next”.
„Info: Software” is displayed.
Name and location of the plant
Serial number
Version of the software
Name and location of the plant can be modified.
These data are transferred via interface.

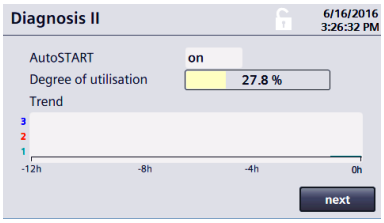
4 To return to the main menu touch „back”.

6.3.3 Diagnosis menu



1 Touch „Diagnosis”.
The Diagnosis menus are displayed.

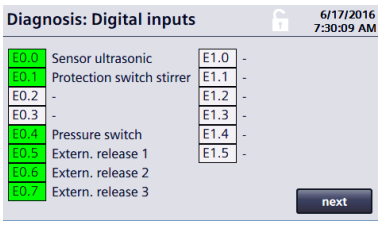
Diagnosis I
Passed and calculated dosing and flushing times of the individual dosing points are displayed as well as the time of the last finished dosing.



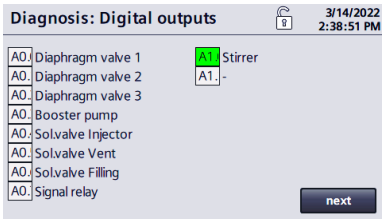
2 Touch „next”.

Diagnose II:

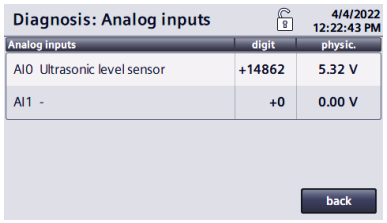
- Setting AutoSTART on/off
- Degree of utilisation
- Time diagram of dosing at the individual dosing points.



3 Touch „next”.
„Diagnosis Digital inputs” is displayed.
The active inputs are displayed in green.



4 Touch „next”.
„Diagnosis Digital outputs” is displayed.
The active switched digital outputs are displayed in green.



5 Touch „next“.

"Diagnosis: Analog inputs" is displayed. The analog value of the UC3500 ultra-sonic sensor is displayed.

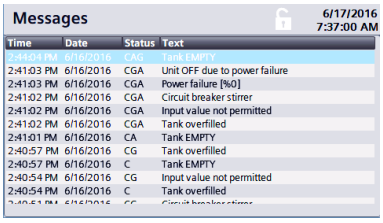
6 To return to the main menu touch „back”.

6.3.4 Message menu

All the messages are stored in the message buffer.

1 Touch F4.

2 Touch „Messages”.



3 Display of the saved messages with date and time
C: Message has **c**ome
A: Message has been **a**cknowledged
G: Message has **g**one
Scroll in the message buffer by moving your finger on the screen.

For other messages refer to 6.12

4 To leave the menu press F4.

6.4 Calculation of the dosage quantity

Depending on the internal surface of the activated carbon (900 to over 1200 m^2/g, calculated by BET) and the concentrations of trihalogen methanes, chloramines and AOX present in the water, a dosage of 1...3 g powdered activated carbon per m^3 of water has to be treated. This value must be entered into the control. The control calculates the dosing time for the 1-3 dosing lines.

Example: Volume of water to be treated 240 m³/h

Feed rate of carbon into the water: 1 g/m³

Concentration of the suspension in the tank:
12000 g (dry portion) in 300 ltr. water = 40 g/ltr.

Required carbon: 240 m³/h x 1 g/m³ = 240 g/h

Required suspension: 240 g/h : 40 g/ltr. = 6 ltr./h

Dosing capacity of the injectors: 60 ltr./h

Dosing time per hour: 6 ltr. : 60 l/h = 0.1 h

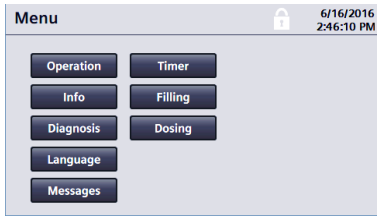
Dosing time per dosing periode (½ hour): 0.05 h = 3 min.

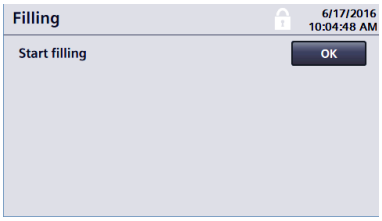
This point of application will operate for 3 minutes every ½ hour.

6.5 Replenishing activated carbon

When the suspension has been consumed to a remainder of approx. 70 l (filling level approximately 150 mm), “Level MIN, fill tank!” appears on the display.

Dosage is automatically switched off, the injector and the used dosage line are flushed through.





1 To fill the suspension tank
Touch the tank on the display
or
Touch F4, touch „Filling”, confirm with OK.
The tank fills with water.
“Filling active” appears on the display.
When the tank is full, the solenoid valve closes and the message “Activated carbon powder refilled?” is displayed.

2 Put on protective clothing and goggles.

Warning!

Risk of injury by the rotating stirrer shaft!
Do not put your hands through the tank opening!

Note

A corresponding warning sign is fixed near the opening. When the sign is missing or no longer readable: Replace the sign (order no. W3T171940).

Warning of caustic substances!

Danger due to chemicals!
The solution contains sulphuric acid that is dangerous to the skin and face, particularly the eyes!
During all work involving acid keep an eye-bath close at hand!
To avoid acid burns put on closely sealing protective goggles and protective clothing before starting any work involving sulphuric acid.
Avoid splashes and spillages.
Rinse away spilt solution and splashes at once using plenty of water.
Clean the protective clothing immediately after use

3 Open and remove the cover on the filling opening.

4 Pour activated powder carbon into the suspension tank:

for a concentration of

20 g/ltr.: 2 portion bags = 6 kg weight content of dried powder carbon

30 g/ltr.: 3 portion bags = 9 kg weight content of dried powder carbon

40 g/ltr.: 4 portion bags = 12 kg weight content of dried powder carbon

5 Replace the cover and lock in place.

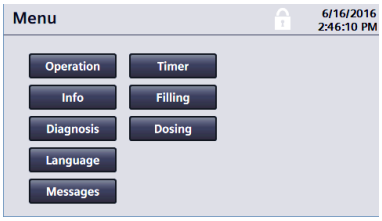
6 The message “Activated carbon powder refilled?” is displayed. Confirm by touching “YES”.
Dosage starts automatically at the beginning of the next full or half hour.

Note

As long as the activated carbon suspension is in the tank, the stirrer should not be switched off for longer than half an hour, as the activated carbon otherwise separates and settles.

6.6 Switching on the dosing points

The parameters of the automatic control are set in the menu Dosing and Timer.



1 Touch F4.
Touch „Dosing”.
If necessary enter the operator password.

or

Touch the symbol of the membrane valve  .

2 Touch the „Mode” box of the individual dosing point:.

ON: Permanently on
OFF: Permanently off
AUTO: Dosing according to the timer setting.
Switched on dosing points are displayed in green.

Set the desired feed rates.

Dosage starts automatically every full or half hour.

3 Only with service password:
For immediate start: Press F4.
At the beginning of the next full hour dosing continues in its usual half hour cycle.

Dosage only starts

- when dosing is switched on with the F1 key,
- when the filling level is above “0%”,
- when at least one injection point is selected (ON or AUTO),
- if dosage is enabled by the timer programme (when AUTO is selected)
- if external release is activated (option).

Dosage starts with dosing point 1 (if selected).
The dosing time depends on the selected feed rate.
When the dosing time has elapsed the dosage line is flushed (standard flushing time 60 secs.).
Dosage then starts at injection point 2 etc.

Also refer to the diagrams in the annex.

Note

During dosage of activated powder carbon, flocculant dosage should not be switched off.
As long as hygiene parameters are met, it is not necessary to add activated powder carbon and flocculant after pool closure until the next morning.

6.7 Switching off dosage

- In the dosing menu set the corresponding mode to OFF.

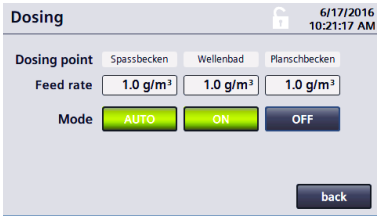
When switching off during dosage: The dosage line is flushed (flushing period preset to 60 secs.).

6.8 Interruptions to operation

Note

As long as the activated carbon suspension is in the tank, the stirrer should not be switched off for longer than half an hour, as the activated carbon otherwise separates and settles.
Schedule longer phases of having the system switched off so that you can empty the system during normal operation (if necessary mix in small quantities of activated carbon or increase dosage).

6.8.1 Interruptions up to about half an hour



The system can be switched off for up to a half an hour even though there is still some suspension left in the vessel.

1. Select Dosing points = OFF and wait until the end of the flushing period.
2. Then turn the main switch to “OFF" if need be or touch F1.
3. After the interruption the system must be switched on again immediately. Before dosing is restarted the suspension must be evenly mixed.

Note

Systems with more than 1 dosing point:
If one or more dosing lines must be stopped, whereas others still operate:
Switch-off the dosing points concerned. If need be shut the stop valve at the dosing points.
Do not shut the stop valve only, otherwise there is danger that the tank gets overfilled.

6.8.2 Interruptions lasting several days

1. Empty the mixing tank (via injection points and/or via outlet).
2. Switch off dosing and and wait for the flushing time.
3. Main switch “OFF".
4. Allow the remaining suspension to drain off via the drain outlet.
5. Hose out the tank.
6. Close the drain outlet.

6.8.3 A longer period, e.g. passing the winter

1 Empty the tank (via injection and/or via outlet).
2 Switch off dosing and and wait for the flushing time.
3 Close ball valves at the dosing points.
4 Main switch “O”.
5 Drain the remains of the suspension.
6 Hose out the tank and drain completely.
7 Empty hose pipes, injectors and valves.

Note

Protect the system against frost!

6.9 Setting the operational parameters

All operational parameters were set by Evoqua personnel during commissioning.

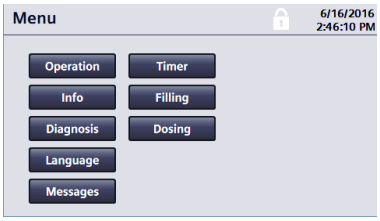
The following operational parameters can be modified by the operator if required:

- Name of the individual dosing points
- Mode ON, OFF, AUTO of the individual dosing points
- Time and date
- Feed rate of activated carbon in g/m³
- Start and end of automatic dosage

6.10 Weekly switching programme (Timer)

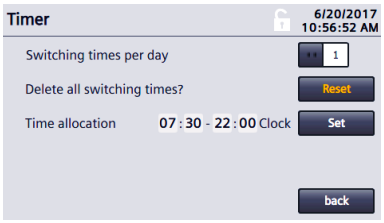
The control unit contains a weekly programme for control of PAC dosage.
One or two times can be set for each weekday for automatic activation and deactivation of activated carbon dosage.

1 Touch F4.



2 Touch „Timer”.

3 Setting the timer:



Touch „Performance”:

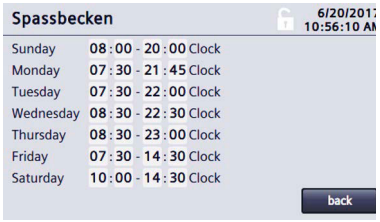
- Select one or two dosing times per day
- To delete all set times touch „Reset”.
- The time entered at „Time allocation” is set as first dosing time to all dosing points and can subseqiuently modified individually.

  When the timer symbol is displayed in green  the timer is in the switched on state.

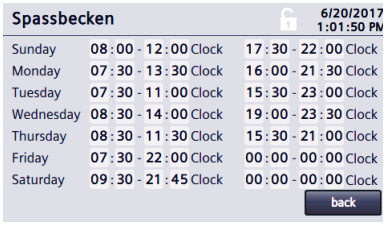
4 To enter the dosing times:
Touch the boxes 1, 2, 3

If a dosing time is not needed: Enter 0:00 - 0:00

for one dosing time:



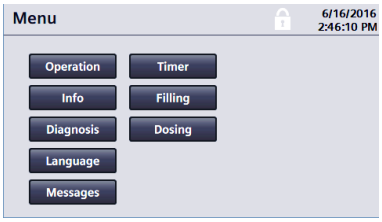
for two dosing times:



The second dosing time must be entered individually by hand.

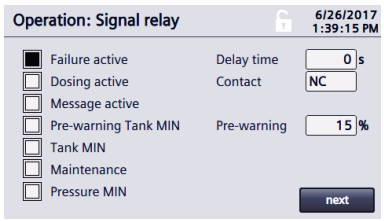
6.11 Setting the signal relay

This menu is used to set when the signal relay is activated.



1 Touch F4.

2 Touch „Operation".
„Operation: Siganl relay" is displayed.



3 Set the function of the signal relay:
Touch symbol or text drückento activate/deactivate the functions.
☐: Function is not active
■: Function is active.
NO: Normally open.
NC: Normally closed.

Any number of functions can be activated to make the signal relay switch.
Set delay and switching function.

Pre-warning before the tank is empty:
Enter the corresponding filling level in % for Tank MIN.

4 Return with F4 or
continue to the next menu.

6.12 Messages and fault messages

6.12.1 Messages

Example:

Messages are displayed on the lower display line.
Several messages are displayed alternatingly.

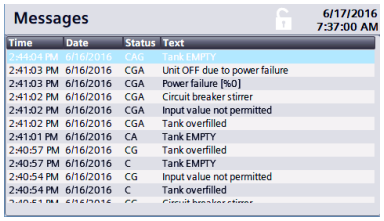
Fault	Reaction of the system	Cause	What is to do?
Effect maintenance	The LED ⚠ is on until maintenance has been performed and confirmed	Service interval is over	Inform the Evoqua service personnel.
Pre-warning Tank MIN	-	Filling level below set level	Fill the tank
Tank MIN	Dosing is stopped	Tank almost empty	Fill the tank
Pressure operating water MIN	Dosing is stopped	Operating water pressure too low	Check the operating water pressure
Set time/date	-	Time and date not set	Set time/date
Confirm setup	-	Setup not confirmed	Confirm setup
Water pressure MIN	Dosing at this dosing point is stopped	Water pressure too low *)	Check water pressure. Acknowledge with ACK.

*) If the water pressure falls below 5 bar (g):
Dosing is stopped, flushing is started.
After flushing, dosing starts at the next dosing point.

6.12.2 Fault messages

Fault messages are displayed in plain text, the message indicator  is displayed.

Exemple:



Display of the stored messages with date and time.

C: Fault has **c**ome
A: Fault **a**cknowledged
G: Fault has **g**one

Scroll in the messages by moving the finger up/down on the touch panel.

 *flashing white/yellow*

Fault is pending, but has not been acknowledged.
To acknowledge press ACK.
The fault message is no longer displayed.
The message indicator is displayed until the cause of the fault has been remedied.

 *is permanently on*

The fault has been acknowledged, but not remedied.

If you want the fault message to be displayed again touch  .

Dosing restarts as soon as all faults have been acknowledged and remedied.

Prior to performing any repair work always deactivate the dosing points, if applicable wait until the flushing time has elapsed.
Always set the main switch to OFF!

The measures marked with “electrician” may only be performed by a qualified electrician!

Warning!

Risk of injury by the rotating stirrer shaft!
Do not put your hands through the tank opening!
Switch off the main switch before any repair or maintenance work or before opening the tank cover.

Warning of dangerous voltage!

Risk of injury due to electric current!
Electrical work on the system may only be performed by qualified electricians.
If a repair is necessary commission Evoqua to perform the repair.

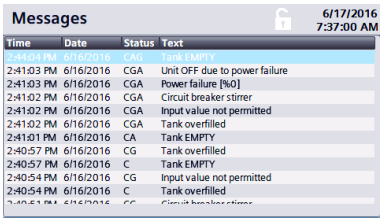
Fault	Possible causes	Fault rectification
Filling time of tank exceeded	Supply too low	Check supply
	Drain open	Close drain
Tank overfilled	Level sensor dirty or defect	Clean the sensor, replace if necessary
	Solenoid valve not tight	Check the valve, replace if necessary
Entered value not allowed	Value out of limits	correct the value
Ultra-sonic sensor	Level sensor defect	Check the sensor, replace if necessary (electrician)
Motor protection switch stirrer	Protection switch tripped caused by stirrer motor overload	Check the stirrer: Main switch off. Check the suspension for low viscosity and foreign material. Close the tank cover again. Main switch on. Activate the motor protection switch (at the upper side of the control cabinet). When the protection switch trips again, have the motor checked by electrician.
Tank empty	Drain open	Close the drain
	Level sensor dirty or defect	Clean the sensor, replace if necessary (electrician)
Power failure	Power failure Mains switched on	Dosing in automatic mode continues Acknowledge the message. (AutoSTART = ON)
Unit off due to power failure	Power failure	Dosing in automatic mode stopped Restart by touching F1. (AutoSTART = OFF)

1 Remedy the cause of the fault.

2 Then press ACK to switch off the message.

6.13 Message buffer

All the messages are stored in the message buffer.



1 Press F4.

2 Press „Messages”.

Display of the saved messages with date and time
C: Message has **c**ome
A: Message has been **a**cknowledged
G: Message has **g**one
Scroll in the message buffer by moving your finger on the screen.

3 To leave the menu touch F4.

6.14 Power failure

The **stirre**r starts automatically after a power failure.
Dosage starts with the next dosage period when AutoSTART = ON is set.
When AutoSTART = OFF is set dosing must be started by touching F1.

7. Maintenance

Warning!

Risk of injury by the rotating stirrer shaft!
Do not put your hands through the tank opening!
Switch off the main switch before any repair or maintenance work or before opening the tank cover.

Warning of dangerous voltage!

Risk of injury due to electric current!
Electrical work on the system may only be performed by qualified electricians.

Warning of caustic substances!

Danger due to chemicals!
The solution contains sulphuric acid that is dangerous to the skin and face, particularly the eyes! During all work involving acid keep an eye-bath close at hand! To avoid acid burns put on closely sealing protective goggles and protective clothing before starting any work involving sulphuric acid. Avoid splashes and spillages. Rinse away spilt solution and splashes at once using plenty of water. Clean the protective clothing immediately after use.

Maintenance- /Inspection plan for JETPAK

Period / Interval	Maintenance level *	Required work	Auxiliaries	o.k.	not o.k.	Remedied
daily	1	Daily optical check of the system: • - Function • - Leaks				
monthly	1	• Clean the suction line and the sieve	clean with a fine brush (e.g. tooth brush)			
every three months	1	• Clean the ultra-sonic level sensor • Clean the transparent level sight tube • Clean the tank • Check the ball check valves on the dosing plate for leaks, if necessary clean or replace the gasket	bottle brush Gasket W2T506107			
every half year	1	• Replace the sieve in the suction line • Replace the injector discharge line • Replace the gasket in the check valves • Check the dosing line for wear and deposits • Clean the filter in the pressure reducer	Maintenance kits: System with one dosing point: W3T420458 System with two dosing points: W3T420632 System with three dosing points: W3T420636			

* Maintenance degree 2 may be carried out by Evoqua personnel or personnel specially trained by Evoqua .

Before performing additional work, always contact the Evoqua customer service

Document all modifications or other work performed in the logbook!

Period / Interval	Maintenance level *	Required work	Auxiliaries	o.k.	not o.k.	Remedied
yearly	1	• Replace the balls in the check valves • Replace the filter in the pressure reducer • Replace the O-rings	Maintenance kits: System with one dosing point: W3T420459 resp. W3T420640 System with two dosing points: W3T420633 resp. W3T420643 System with three dosing points: W3T420637 resp. W3T420646			
	2	• Replace the diaphragms in the diaphragm valves				
	1	• Replace the hose from the injector to the dosing plate • Replace the suction line • Replace the vent line from the injector to the solenoid valve • Replace the vent line from the solenoid valve to the tank • Replace the buffer battery				
	1	• Replace the dosing lines	PVC-reinforced hose: W2T505422			

* Maintenance degree 2 may be carried out by Evoqua personnel or personnel specially trained by Evoqua .

Before performing additional work, always contact the Evoqua customer service

Document all modifications or other work performed in the logbook!

7.2 Maintenance by the operator

7.2.1 Replace the sieve at the end of the suction line

1 Switch-off the injection points.
Wait for the end of the flushing time.

2 Switch off the main switch.

3 Remove the suction line from the injector and pull it out of the tank.

4 Unscrew the flange arround the suction line from the tank.

5 Lift the protection pipe.

6 Unscrew the sieve and clean it (e.g. with a tooth brush).

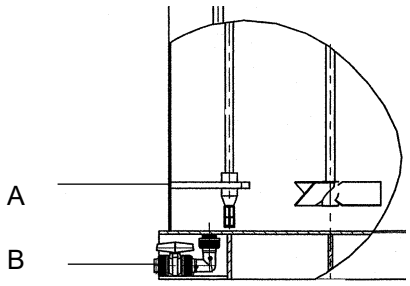
7 If the sieve is damaged, replace it (spare part W2T505968)

8 Hose out the protection tube.

9 Mount the sieve.
Tighten all plastic connections by hand only.

10 Put the protection tube back into the tank, pay attention that it fits into the guide. Fix the screws.

11 Mount the suction line.



A Guide of the protection tube
B Drain

7.2.2 Clean the tank, clean the ultra-sonic level sensor

1 Remove the two screws at the level switch cover. Lift the level switch together with the cover.

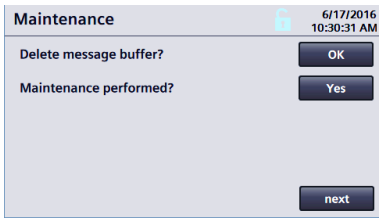
2 Wipe the active surface of the sensor (within the colored ring) with a clean dry cloth.
The surface must not be damaged with any sharp or hard object!

3 Hose out the tank, remove deposits.

4 Open drain to remove the water.

5 Put the level switch in place again, tighten the screws.

7.3 Confirm maintenance



When the maintenance has been performed:

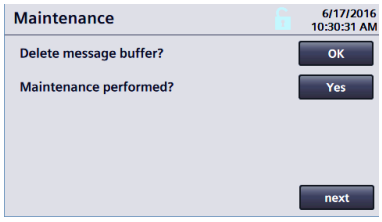
1 Touch F4 „Menu“.
Enter the service password, see chapter 6.1.5.

2 Touch „Maintenance”.

3 When the maintenance is finished:
Touch „Maintenance performed? Yes”.

4 Touch F4 or „next”.

7.4 Delete message buffer



To delete the message buffer:

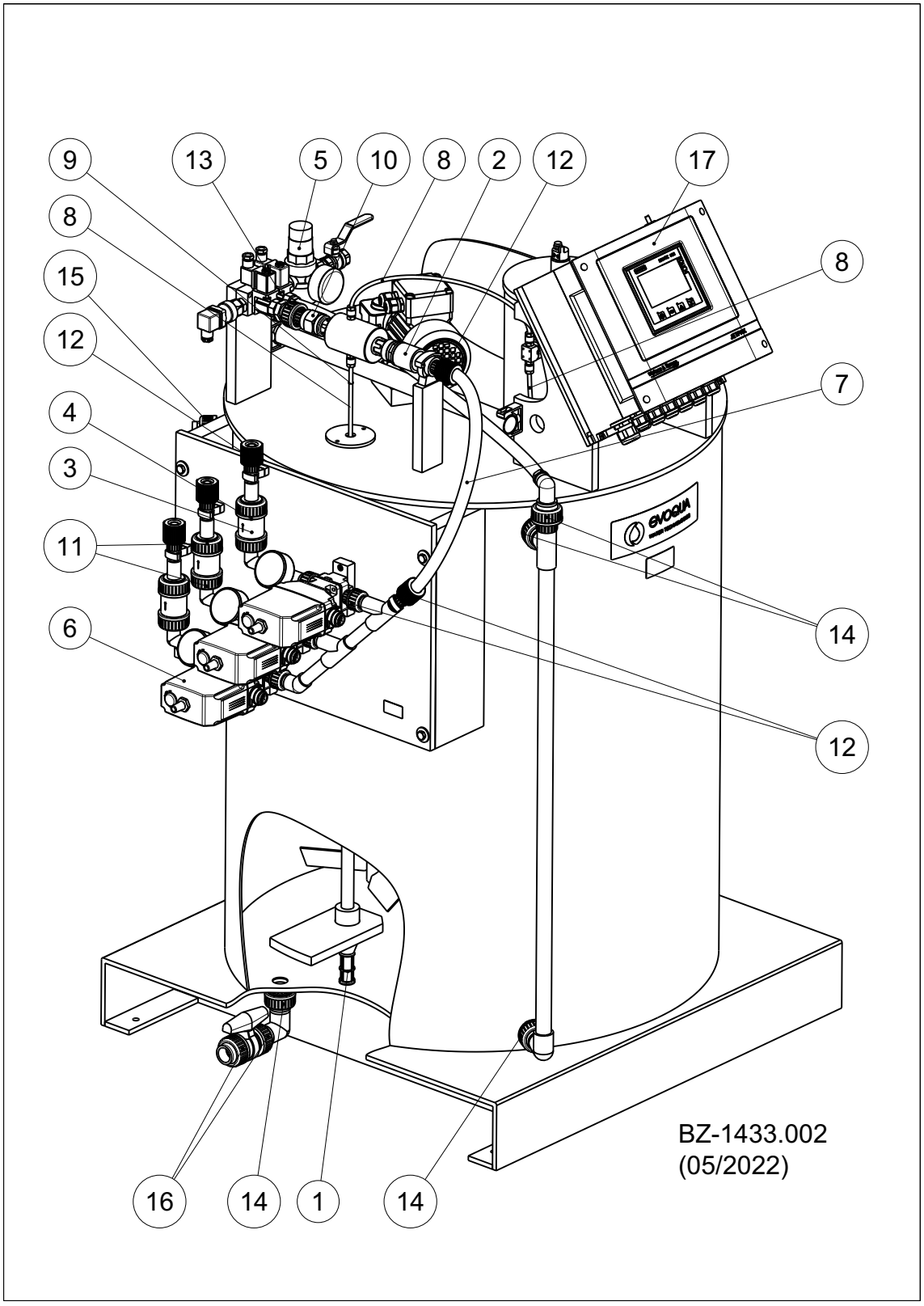
1 Touch F4.
Enter the service password.

2 Touch „Maintenance”.

3 To delete the message buffer:
Touch „Delete the message buffer? Yes”.

4 Touch F4 or „next”.

7.5 Maintenance parts kits



7.5.1 Maintenance parts for 6 months (SIMATIC S7-200)

Pos	Item no.	Description	W3T420458 system with one dosing point	W3T420632 system with two dosing points	W3T420636 system with three dosing points
1	W2T505968	Filter	1 each	1 each	1 each
2	W3T158491	Injector outlet	1 each	1 each	1 each
3	W3T419151	Ball seat	1 each	2 each	3 each

7.5.2 Maintenance parts for 1 year (SIMATIC S7-200)

Pos	Item no.	Description	W3T420459 system with one dosing point	W3T420633 system with two dosing points	W3T420637 system with three dosing points
1	W2T505968	Filter	1 each	1 each	1 each
2	W3T158491	Injector outlet	1 each	1 each	1 each
3	W3T419151	Ball seat	1 each	2 each	3 each
4	W2T856121	Ball for ball check valve	1 each	2 each	3 each
5	W3T169348	Spare sieve for pressure reducer	1 each	1 each	1 each
6	W3T171965	Spare diaphragm	1 each	2 each	3 each
7	W2T505422	Hose, PVC, 13 x 3,5	0,6 m	0,6 m	0,6 m
8	W2T507155	Hose PE-LD, 4 x 1	1,8 m	1,8 m	1,8 m
9	W3T168876	O-ring, FKM, 5 x 1,5	1 each	1 each	1 each
10	W3T169068	O-ring, FKM, 13,94 x 2,62	1 each	1 each	1 each
11	W3T169088	O-ring, FKM, 18 x 2,5	2 each	4 each	6 each
12	W3T172718	O-ring EPDM, 15,54 x 2,62	6 each	10 each	14 each
13	W3T172719	O-ring, EPDM, 20,22 x 3,53	1 each	1 each	1 each
14	W3T172720	O-ring, EPDM, 28,17 x 3,53	4 each	4 each	4 each
15	W3T172721	O-ring, EPDM, 32,92 x 3,53	1 each	1 each	1 each
16	W2T507095	O-ring, EPDM, 25,07 x 2,62	2 each	2 each	2 each
17	W2T504632	Battery-module, S7-200, 6ES7291-8BA20-0XA0	1 each	1 each	1 each

7.5.3 Maintenance parts for 2 years (SIMATIC S7-200)

Pos	Item no.	Description	W3T420460 system with one dosing point	W3T420634 system with two dosing points	W3T420638 system with three dosing points
1	W2T505968	Filter	2 each	2 each	2 each
2	W3T158491	Injector outlet	2 each	2 each	2 each
3	W3T419151	Ball seat	2 each	4 each	6 each
4	W2T856121	Ball for ball check valve	2 each	4 each	6 each
5	W3T169348	Spare sieve for pressure reducer	2 each	2 each	2 each
6	W3T171965	Spare diaphragm	2 each	4 each	6 each
7	W2T505422	Hose, PVC, 13 x 3,5	1,2 m	1,2 m	1,2 m
8	W2T507155	Hose PE-LD, 4 x 1	3,6 m	3,6 m	3,6 m
9	W3T168876	O-ring, FKM, 5 x 1,5	2 each	2 each	2 each
10	W3T169068	O-ring, FKM, 13,94 x 2,62	2 each	2 each	2 each
11	W3T168864	O-ring, FKM, 25 x 3	4 each	8 each	12 each
12	W3T172718	O-ring EPDM, 15,54 x 2,62	12 each	20 each	28 each
13	W3T172719	O-ring, EPDM, 20,22 x 3,53	2 each	2 each	2 each
14	W3T172720	O-ring, EPDM, 28,17 x 3,53	8 each	8 each	8 each
15	W3T172721	O-ring, EPDM, 32,92 x 3,53	2 each	2 each	2 each
16	W2T507095	O-ring, EPDM, 25,07 x 2,62	4 each	4 each	4 each
17	W3T168179	2/2-Way Solenoid Valve G1/8, 24 V DC, NC	1 each	1 each	1 each
18	W2T504632	Battery-module, S7-200, 6ES7291-8BA20-0XA0	2 each	2 each	2 each

7.5.4 Maintenance parts for 1 year (SIMATIC S7-1200)

Pos	Item no.	Description	W3T420640 system with one dosing point	W3T420643 system with two dosing points	W3T420646 system with three dosing points
1	W2T505968	Filter	1 each	1 each	1 each
2	W3T158491	Injector outlet	1 each	1 each	1 each
3	W3T419151	Ball seat	1 each	2 each	3 each
4	W2T856121	Ball for ball check valve	1 each	2 each	3 each
5	W3T169348	Spare sieve for pressure reducer	1 each	1 each	1 each
6	W3T171965	Spare diaphragm	1 each	2 each	3 each
7	W2T505422	Hose, PVC, 13 x 3,5	0,6 m	0,6 m	0,6 m
8	W2T507155	Hose PE-LD, 4 x 1	1,8 m	1,8 m	1,8 m
9	W3T168876	O-ring, FKM, 5 x 1,5	1 each	1 each	1 each
10	W3T169068	O-ring, FKM, 13,94 x 2,62	1 each	1 each	1 each
11	W3T169088	O-ring, FKM, 18 x 2,5	2 each	4 each	6 each
12	W3T172718	O-ring EPDM, 15,54 x 2,62	6 each	10 each	14 each
13	W3T172719	O-ring, EPDM, 20,22 x 3,53	1 each	1 each	1 each
14	W3T172720	O-ring, EPDM, 28,17 x 3,53	4 each	4 each	4 each
15	W3T172721	O-ring, EPDM, 32,92 x 3,53	1 each	1 each	1 each
16	W2T507095	O-ring, EPDM, 25,07 x 2,62	2 each	2 each	2 each

7.5.5 Maintenance parts for 2 years (SIMATIC S7-1200)

Pos	Item no.	Description	W3T420641 system with one dosing point	W3T420644 system with two dosing points	W3T420647 system with three dosing points
1	W2T505968	Filter	2 each	2 each	2 each
2	W3T158491	Injector outlet	2 each	2 each	2 each
3	W3T419151	Ball seat	2 each	4 each	6 each
4	W2T856121	Ball for ball check valve	2 each	4 each	6 each
5	W3T169348	Spare sieve for pressure reducer	2 each	2 each	2 each

Pos	Item no.	Description	W3T420641 system with one dosing point	W3T420644 system with two dosing points	W3T420647 system with three dosing points
6	W3T171965	Spare diaphragm	2 each	4 each	6 each
7	W2T505422	Hose, PVC, 13 x 3,5	1,2 m	1,2 m	1,2 m
8	W2T507155	Hose PE-LD, 4 x 1	3,6 m	3,6 m	3,6 m
9	W3T168876	O-ring, FKM, 5 x 1,5	2 each	2 each	2 each
10	W3T169068	O-ring, FKM, 13,94 x 2,62	2 each	2 each	2 each
11	W3T168864	O-ring, FKM, 25 x 3	4 each	8 each	12 each
12	W3T172718	O-ring EPDM, 15,54 x 2,62	12 each	20 each	28 each
13	W3T172719	O-ring, EPDM, 20,22 x 3,53	2 each	2 each	2 each
14	W3T172720	O-ring, EPDM, 28,17 x 3,53	8 each	8 each	8 each
15	W3T172721	O-ring, EPDM, 32,92 x 3,53	2 each	2 each	2 each
16	W2T507095	O-ring, EPDM, 25,07 x 2,62	4 each	4 each	4 each
17	W3T168179	2/2-Way Solenoid Valve G1/8, 24 V DC, NC	1 each	1 each	1 each

7.6 Spares

Pos	itemt no.	description	system with one injec-tion point	system with two injec-tion points	system with three injec-tion points
6	W3T166600	Diaphragm valve complete with unions	1 each	2 each	3 each
2	W3T158498	Injector complett	1 each	1 each	1 each
13	W2T504658	Solenoid valve (without coil)	2 each	2 each	2 each

8. Dismantling and disposal

8.1 Dismantling

Note

Only authorized, qualified and trained technicians may dismantle the system for disposal.

1. Prior to disposal, delete any personal data stored on the old equipment.
2. Disconnect the system from the power supply.
3. Dismantle the system into practical units.
4. Where possible, remove batteries or storage batteries from the equipment and hand them over to a separate collection point for old batteries.

8.2 Disposal

8.2.1 General information

Ensure safe and environment-friendly disposal of old equipment, replacement parts, auxiliary materials, chemicals and their containers. Disposal must be effected in compliance with local, regional, national and international regulations.

Note

The symbol with the crossed-out garbage can indicates that the product - electrical and electronic equipment, batteries and storage batteries - must not be disposed of with household waste. At the end of its service life, the product must be disposed of appropriately or recycled. The statutory requirements of the country in which the product is put into use apply here.

8.2.2 Used electrical/electronic equipment

Electrical or electronic equipment is labeled with the symbol showing a crossed-out garbage can and must not be disposed of with household waste, but must be collected and disposed of separately. The statutory requirements of the country in which the product is put into use apply.

Before handover to a collection point, old batteries, storage batteries and lamps must be removed from the old equipment and turned over to the corresponding collection points.

Where such central collection systems are not available, used equipment purchased from us can be returned to us.

Please see our website at www.evoqua.com. for details. You can access the necessary information directly via the QR code.

8.2.3 Packaging

Packaging is reusable waste which must not be disposed of with household waste, but must be collected and disposed of separately, e.g. at public collection points.

If necessary, contact your regional or local authorities for details of collection points and options for separating and collecting waste.

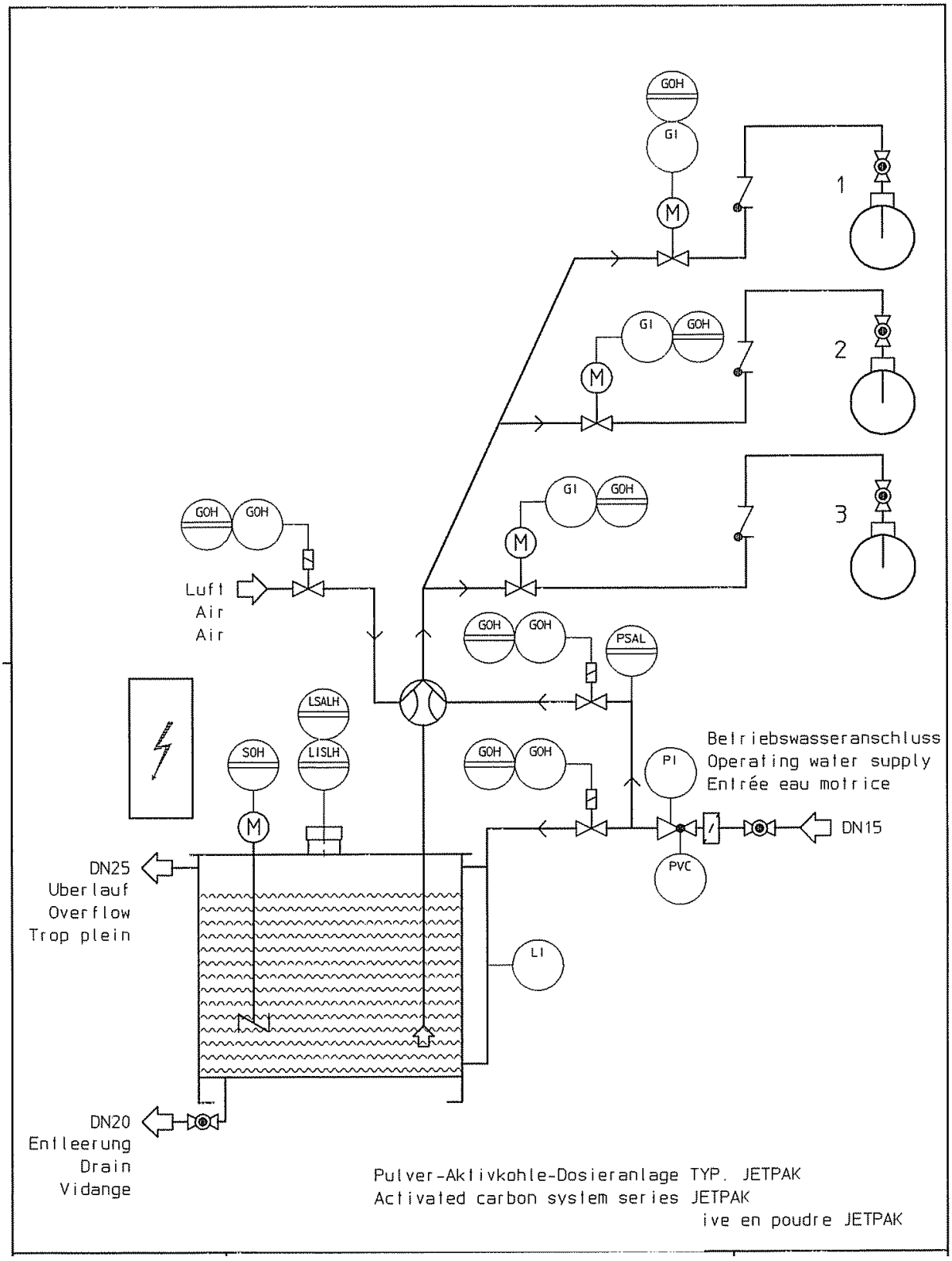
8.2.4 QR code

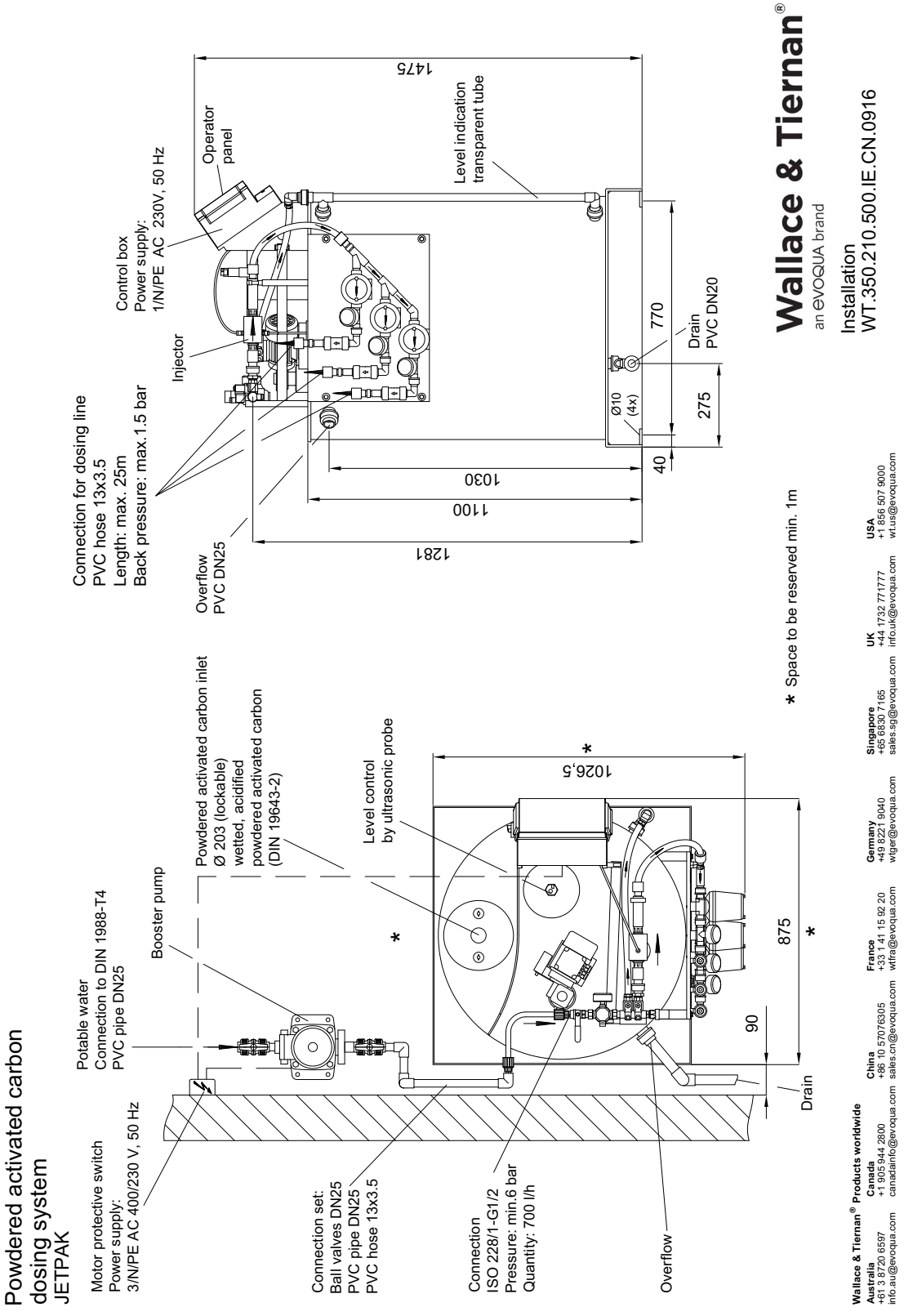
The QR code takes you directly to our “Recycling“ website, http://qr.evoqua.com/bdYxgi.

Here, you will find detailed information on the disposal and return of used electrical/electronic equipment, used batteries and packaging.

You can also download the request form for returning electrical/electronic equipment to us via this QR code.

9. Typical installation




Powdered activated carbon dosing system
JETPAK
Motor protective switch
Power supply:
3/N/PE AC 400/230 V, 50 Hz
Potable water
Connection to DIN 1988-T4
PVC pipe DN25
Booster pump
Powdered activated carbon inlet
Ø 203 (lockable)
wetted, acidified
powdered activated carbon
(DIN 19643-2)
Level control
by ultrasonic probe
Connection set:
Ball valves DN25
PVC pipe DN25
PVC hose 13x3.5
Connection
ISO 228/1-G1/2
Pressure: min.6 bar
Quantity: 700 l/h
Overflow
Drain
1026,5
875
90
Connection for dosing line
PVC hose 13x3.5
Length: max. 25m
Back pressure: max.1.5 bar
Overflow
PVC DN25
Injector
Control box
Power supply:
1/N/PE AC 230V, 50 Hz
Operator
panel
Level indication
transparent tube
1475
1281
1100
1030
40
275
770
Ø10
(4x)
Drain
PVC DN20
* Space to be reserved min. 1m
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Australia
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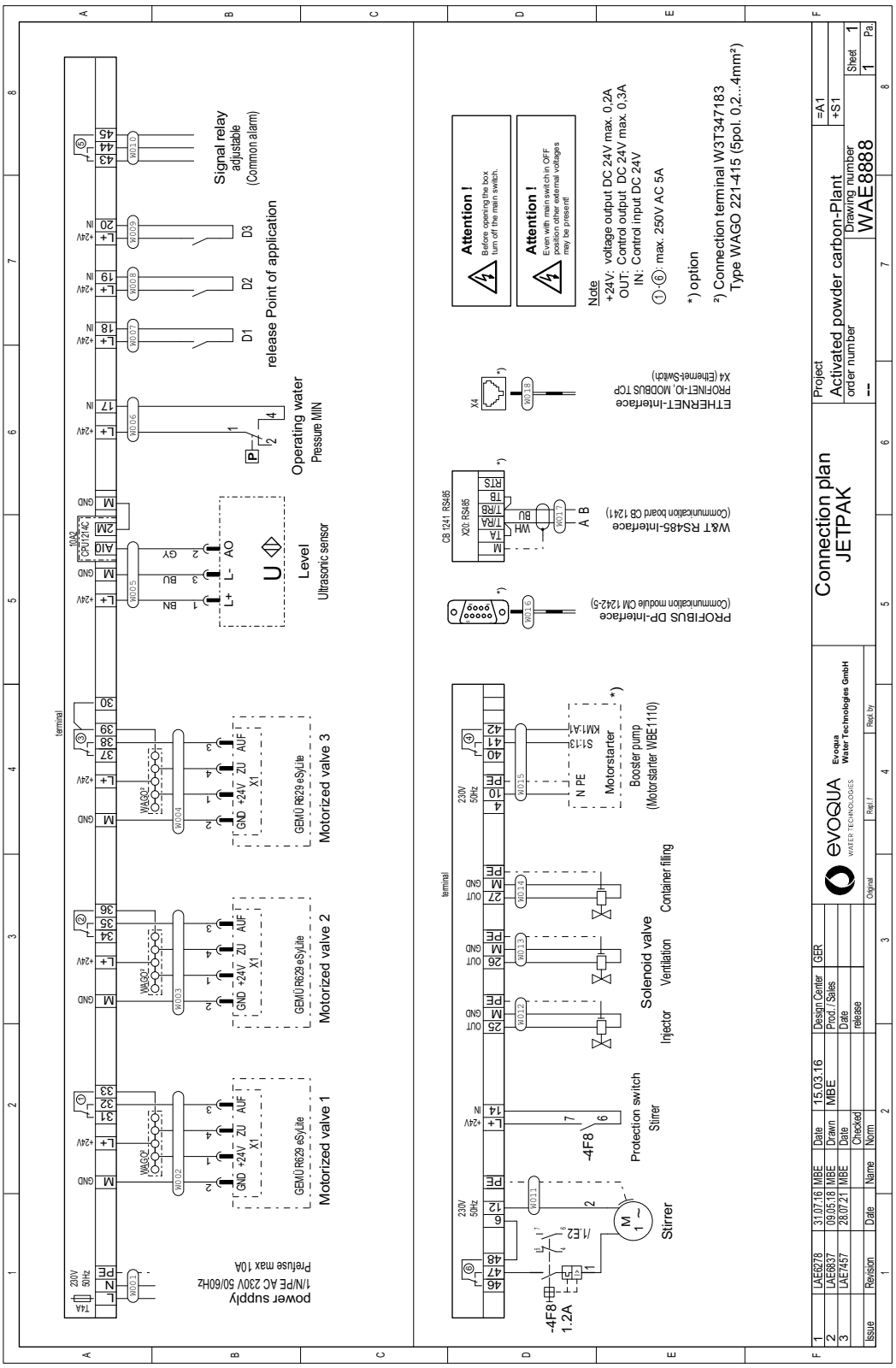
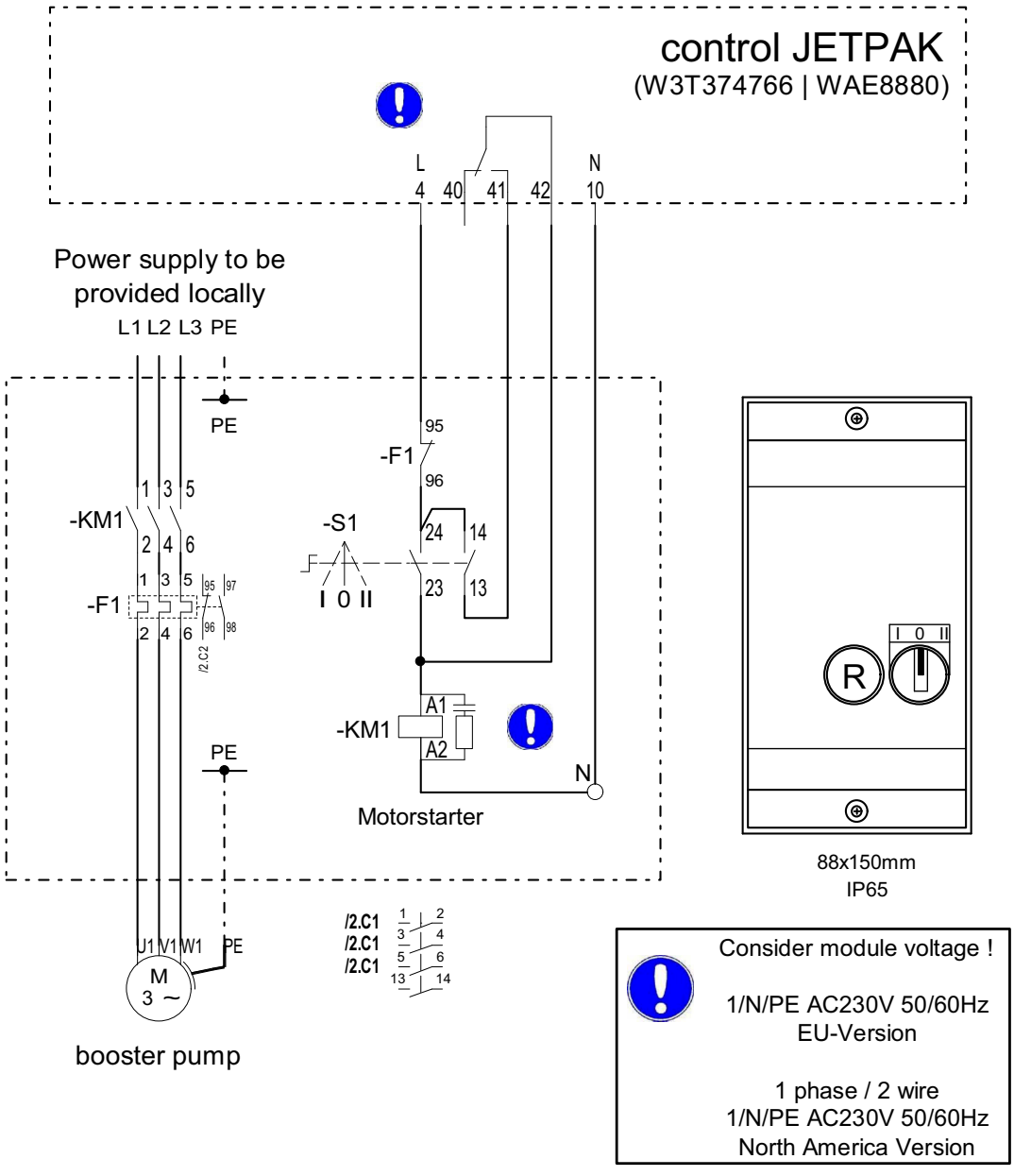
info.au@evoqua.com
Canada
+1 905 944 2800
canadainfo@evoqua.com
China
+86 10 57076305
sales.cn@evoqua.com
France
+33 1 41 15 92 20
wtfra@evoqua.com
Germany
+49 8221 9040
wtger@evoqua.com
Singapore
+65 6830 7165
sales.sg@evoqua.com
UK
+44 1732 771777
info.uk@evoqua.com
USA
+1 856 507 9000
wt.us@evoqua.com

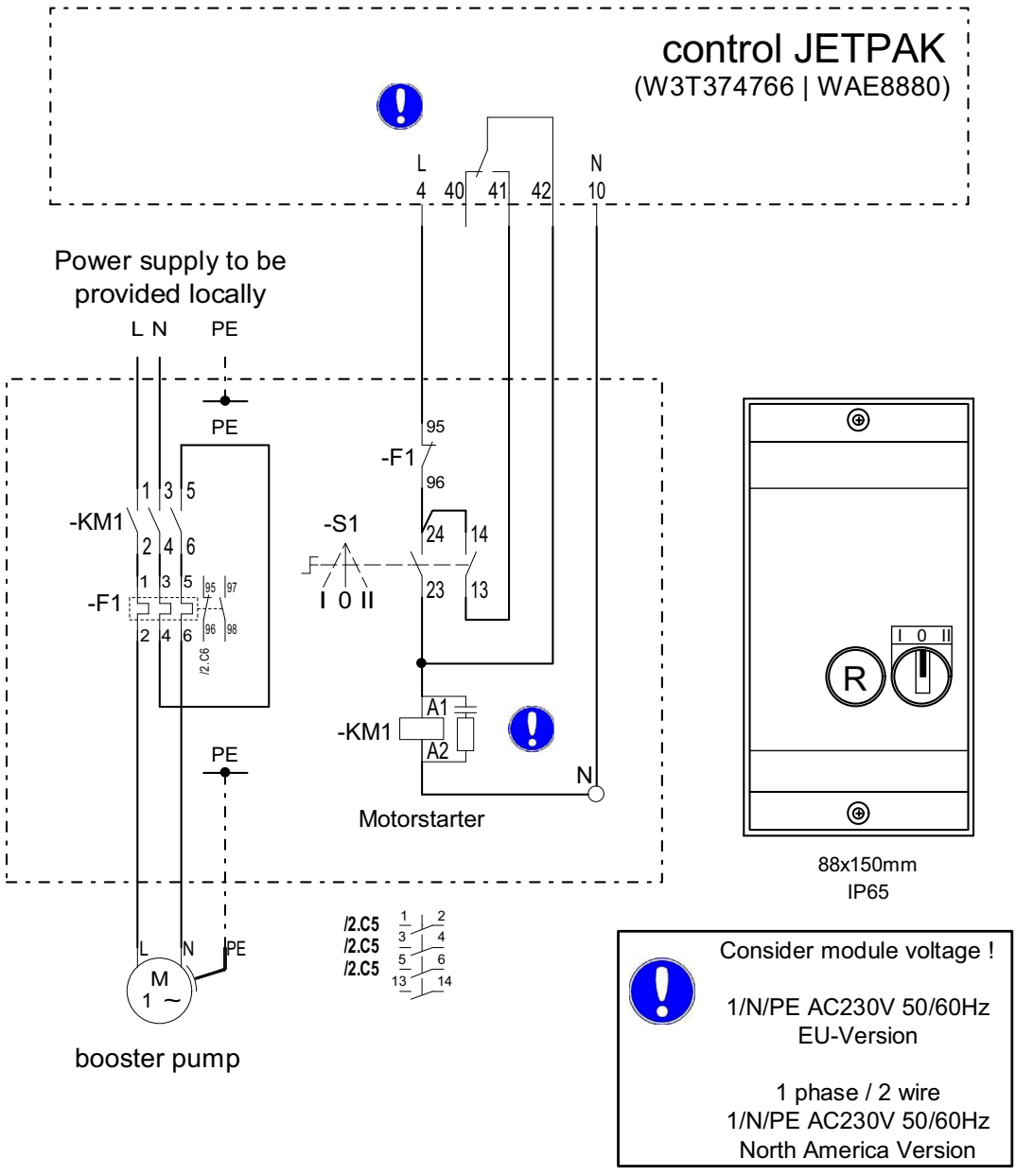
10.Wiring diagrams



example application Booster pump
Three-phase motor



example application Booster pump
Single-phase motor



11.Annex

11.1 Requirements to the filter

Filtration is used to remove the added powdered carbon and the flocculated dirt out of the water.

11.1.1 Quick-run filters according DIN 19605

For filtration, quick-run filters according DIN 19605 are used or precoated filters.

One-layer filters

For one-layer filters with filter sand to DIN EN 12904 refer to the following table for the requirements for grain size, layer thickness and rate of filtration.

Grain size, layer thickness and rate of filtration for one-layer filters with filter sand used with powdered carbon to DIN 19643-2.

Parameters	open quick-run filters	closed quick-run filters
grain size	0.71 to 1.25 mm	
layer thickness	> 0.9 m	> 1.2 m
freeboard	> 25 % of the layer thickness of the filter material + 0.2 m	
rate of filtration - for fresh water - for salt water or brackish water with a salt concentration > 2000 mg/l	< 12 m/h < 12 m/h	< 30 m/h < 20 m/h

For filtration, only the grain size 0,71 to 1,25 mm may be used. Take care that the permitted portion of undersized and oversized grain is not higher than 5% each.

Multi-layer filters

To remove activated carbon, multi-layer filters can also be used. The requirements are listed in the following table:

Grain size, layer thickness and rate of filtration for multi-layer filters with filter sand used with powdered carbon to DIN 19643-2.

Parameters	**open quick-run filters**	**closed quick-run filters**
grain size sand anthrazit-N	0.71 to 1.25 mm 1.4 to 2.5	
layer thickness sand upper material layer anthrazit-N	 > 0.6 m > 0.4 m	 > 0.6 m > 0.6 m
freeboard	> 25% of the layer thickness of the filter material + 0,2 m	
rate of filtration - for fresh water - for salt water or brackish water with a salt concentration > 2000 mg/l	 < 12 m/h < 12 m/h	 < 30 m/h <2 0 m/h

Statement of the DIN 19643-2 concerning the flushing of one- and multi-layer filters:

For the back-wash of the filter, the fluidization of the filtering layers is necessary at a filter bed extension of at least 10%, to remove all the substances hold back in the filter, especially the microbes that affect the pool water. After the end of backwash, the filter bed must be deaerated.

The backwash runs program-controlled and must not be interrupted.

When the backwash is started, the water required for the backwash must be available. Also the drain of the polluted water must be guaranteed, in some cases, a basin for the polluted water can be necessary.

Closed quick-run filters to DIN 19605 shall be equipped with an automatic degassing device.

Standard values for the air-water back-wash of one-layer filters with filter sand, examples for the grain size 0,71 mm to 1,25 mm.

Program sequence		**time in minutes**	**speed in m/h**
1st phase	venting of the filter vessel and reducing of the water level down to the upper edge of the drain funnel		
2nd phase	flushing with water	approx. 3	60 to 65
3rd phase	flushing with air	approx. 5	approx. 60
4th phase	flushing with water	3 to 5	60 to 65
5th phase	draining of the first filtrate		
6th phase	restart of normal operation		

It is also possible to backwash only with water to remove the powdered carbon and dirt out of the one-layer filter. In this case increase the water flushing (2nd phase) to 6 - 7 min and leave out the flushing with air (3rd and 4th phase).

The principles for the backwash of multi-layer filters apply also for one-layer filters.

When flushing with air is used, it is recommended to have a pause of about 2 min. after flushing with air and before flushing with water to deaerate the filter material.

The combined water and air flushing should not be used, unless recommended in the operation manual of the manufacturer.

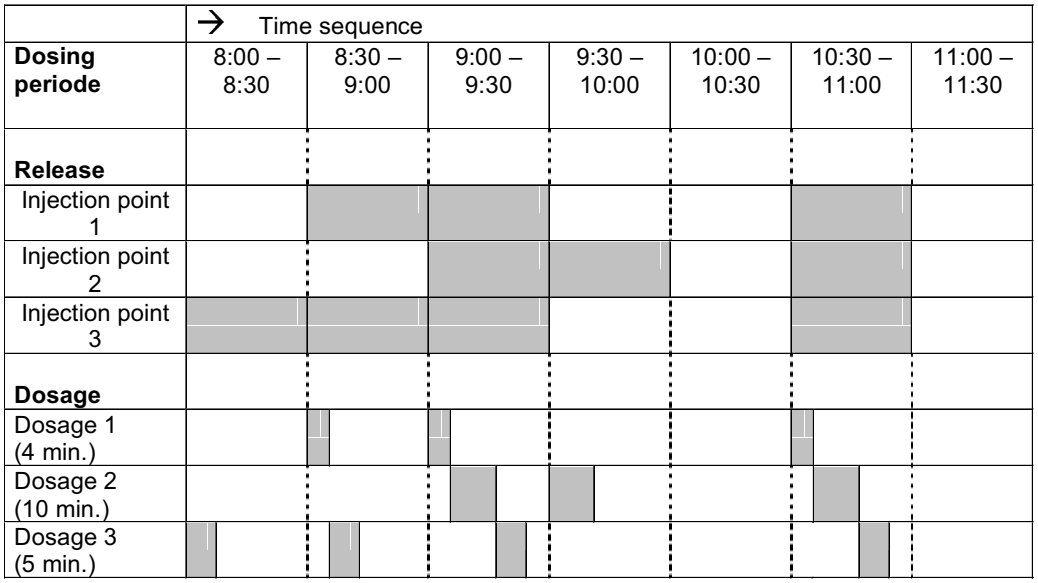
11.2 Dosage diagram

The following diagram shows the timing sequence of dosage on dosage lines 1 ... 3.

Within one dosage period all enabled injection points are served once consecutively.

The respective diaphragm valve opens to this purpose.
The dosage periods start at each full and half hour.

Example
(the times are randomly selected for clarity):
Enabling injection point 1: 8:30 - 9:30 a.m. and 10:30 - 11:00 a.m.
Enabling injection point 2: 9:00 - 10:00 a.m. and 10:30 - 11:00 a.m.
Enabling injection point 3: 8:00 - 9:30 a.m. and 10:30 - 11:00 a.m.



Dosage can be enabled in the menu „Dosing points“ or by an external enabling contact.
Dosage does not begin in each case until the beginning of the next dosage period.
For example, if dosage is enabled at 9:05 a.m. dosage does not start until 9:30 a.m., in this case with injection point 2.

Functional diagram: 1 injection point

	→ Time sequence						
	Period for 1 injection point (factory setting = 30 minutes)						
Diaphragm valve 1	Running time open 17 s	open: calculated dosing time 1 z.B. 850 s	open: flushing time 60 s	Laufzeit close 17 s	closed (Dosage break)		
Solenoid valve vent	closed		open		closed		
Solenoid valve Betriebswasser	Lead time 15 s	open		Time delay 12 s	closed		
Booster pump	pump running			waiting	10 s	pump off	

Functional diagram: 2 injection points

	→ Time sequence											
	Period for 2 injection points (factory setting = 30 minutes)											
Diaphragm valve 1	running time open 17 s	open: calculated dosing time 1 z.B. 850 s	open: flushing time 60 s	running time close 17 s	closed						closed	
Diaphragm valve 2	closed				running time open 17 s	open: calculated dosing time 2 z.B. 850 s	open: flushing time 60 s	running time close 17 s	closed			
Solenoid valve vent	closed		open		closed			open			closed	
Solenoid valve Betriebswasser	Lead time 15 s	solenoid valve operating water open		Time delay 12 s	closed	Lead time 15 s	solenoid valve operating water open			Time delay 12 s	closed	
Booster pump	pump running								waiting	10 s	pump off	

Sequence for 3 injection points corresponding.

12.Declaration of conformity

EVOQUA WATER TECHNOLOGIES

EG-Konformitätserklärung
EC Declaration of Conformity
Déclaration CE de conformité

No. MAE1077

Ausgabe/*issue*/**édition** 4

Hersteller/*Manufacturer*/**Constructeur**:	Evoqua Water Technologies GmbH
Anschrift/*Address*/**Adresse**:	Auf der Weide 10, D-89312 Günzburg
Produktbezeichnung: *Product description:* **Description du produit:**	Pulver-Aktivkohle-Dosieranlage JETPAK *Activated powder carbon dosing system JETPAK* **Doseur de charbon actif en poudre JETPAK**

Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender europäischer Richtlinien überein:
The product described above in the form as delivered is in conformity with the provisions of the following European Directives:
Le produit désigné est conforme, dans la version que nous avons mise en circulation, avec les prescriptions des directives européennes suivantes :

2006/42/EG	Richtlinie des Europäischen Parlaments und des Rates vom 17. Mai 2006 über Maschinen und zur Änderung der Richtlinie 95/16/EG (Neufassung). *Directive of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/ED (recast).* **Directive du Parlement européen et du Conseil du 17 mai 2006 relative aux machines et modifiant la directive 95/16/CE (refonte).**
2014/30/EU	Richtlinie des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit. *Directive of the European Parliament and of the Council of 26 February 2014 on the approximation of the laws of the Member States relating to electromagnetic compatibility.* **Directive du Parlement européen et du Conseil du 26 février 2014 relative au rapprochement des législations des Etats membres concernant la compatibilité électromagnétique.**
2014/35/EU	Richtlinie des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen. *Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.* **Directive du Parlement européen et du Conseil du 26 février 2014 concernant le rapprochement des législations des Etats membres relatives au matériel électrique destiné à être employé dans certaines limites de tension.**

CE-Kennzeichnung / *CE marking* / **Marquage CE**: 2017

Ersteller : SR
Ausgabe : 13.05.2014
Dokument: VD130-1_CE_Konformitätserklärung.doc

Evoqua Water Technologies GmbH
Auf der Weide 10
89312 Günzburg
Deutschland

Tel.: +49 (8221) 904-0
Fax: +49 (8221) 904-203
www.evoqua.com

Seite 1 von 2

Die Konformität mit den Richtlinien wird nachgewiesen durch die Einhaltung der in der Nachweisdokumentation aufgelisteten Normen.
Evidence of conformity to the Directives is assured through the application of the standards listed in the relevant documentation.
La conformité avec les directives est assurée par le respect des normes listés dans la documentation technique correspondante.

Benannte Person für technische Unterlagen:
Authorized person for the technical file:
Personne désignée pour la documentation technique:

Name / *name* / **nom:** Evoqua Water Technologies GmbH

Adresse / *address* / **adresse:** Auf der Weide 10, D-89312 Günzburg

Günzburg, den / *the* 2017-04-10

Evoqua Water Technologies GmbH

i.V. Klaus Andre

Klaus Andre
Technischer Leiter / *Director Engineering*

Unterschrift
signature / **signature**

i.V. Helmut Fischer

Helmut Fischer
Leiter QM / *Quality Manager*

Unterschrift
signature / **signature**

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
This declaration certifies the conformity to the specified directives but does not imply any warranty for properties. The safety documentation accompanying the product shall be considered in detail..
La présente déclaration atteste de la concordance avec les directives citées, elle n'offre cependant pas de garantie quant à la nature ou la durabilité selon l'article 443 du code civil allemand. Les consignes de sécurité de la documentation du produit fournie sont à respecter.

Wallace & Tiernan® Products worldwide

Australia
+61 1300 661 809
sales.au@evoqua.com

China
+86 21 5118 3777
sales.cn@evoqua.com

Canada
+1 905 944 2800
wtoe.can@evoqua.com

France
+33 1 82 20 01 81
wtfra@evoqua.com

Germany
+49 8221 9040
wtger@evoqua.com

India
+91 44 6136 3100
sales.in@evoqua.com

Korea
+82 10 8596 4111
sales.kr@evoqua.com

Singapore
+65 6559 2600
sales.sg@evoqua.com

UK
+44 300 124 0500
info.uk@evoqua.com

USA
+1 800 524 6324
wtsupport.us@evoqua.com

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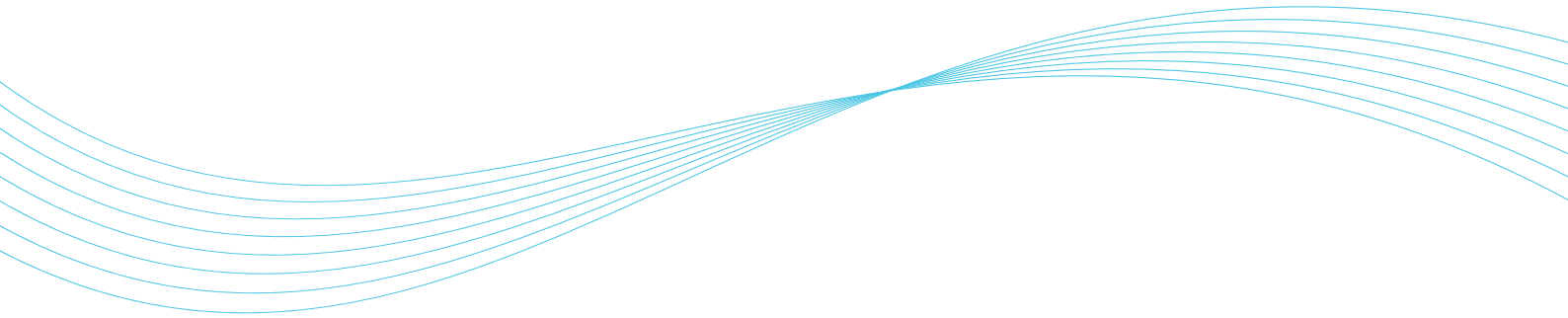

EVOQUA
WATER TECHNOLOGIES

Auf der Weide 10, 89312 Günzburg, Germany

+49 (8221) 904-0 www.evoqua.com

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W3T166831 Issue 14-0223