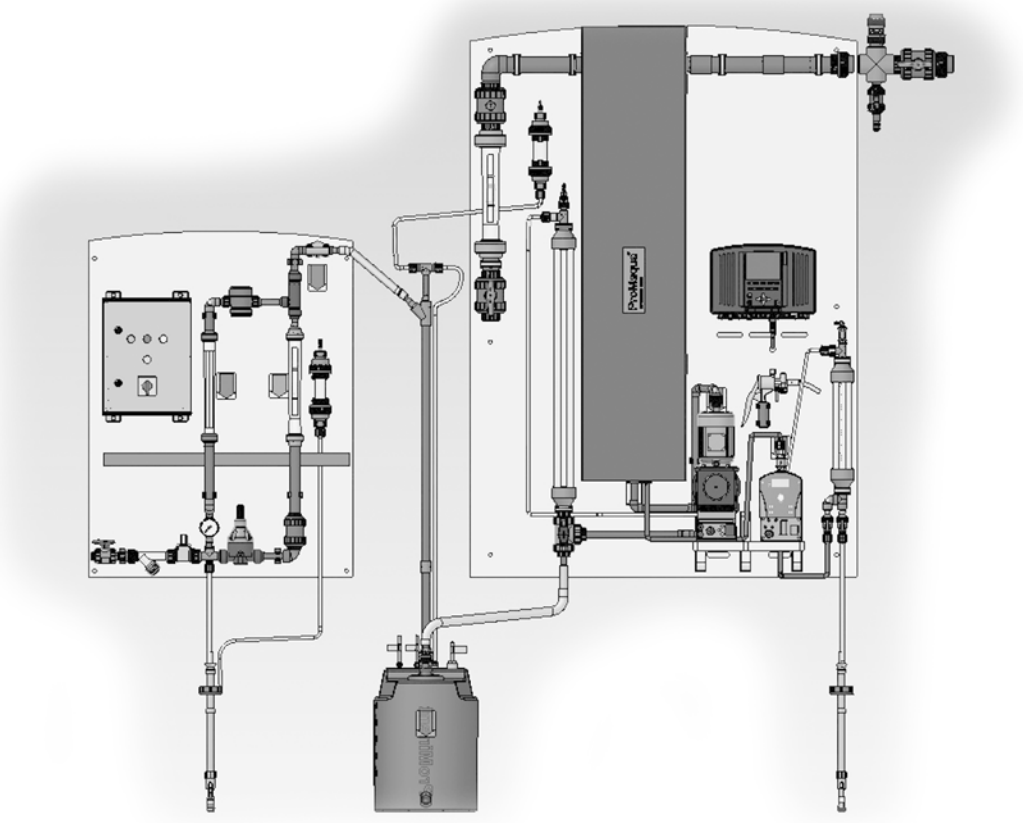
Assembly and Installation Instructions

Chlorine Dioxide Systems

Bello Zon® Type CDKc with Pre-dilution Module



The assembly and installation instructions as well as the operating instructions are necessary to ensure safe and correct operation of the Bello Zon® system. Both sets of operating instructions are only valid when read together.

The assembly and installation instructions are only intended for ProMinent service technicians or competent persons authorised by ProMinent.

Please carefully read these operating instructions before use! · Do not discard!
The operator shall be liable for any damage caused by installation or operating errors!
Technical changes reserved.

Supplementary information

Fig. 1: Please read!

Read the following supplementary information in its entirety! Should you already know this information, you will benefit more from referring to the operating instructions.

The following are highlighted separately in the document:

- Enumerated lists

- refer to references

⟶ Handling instructions

⇨ Results

'User interface text'

[Keys]

Information

This provides important information relating to the correct operation of the device or is intended to make your work easier.

Safety notes

Safety notes are identified by pictograms - see Safety Chapter.

WARNING!

Risk of explosion due to chlorine dioxide

If the system is started up and connected to the mains voltage without using qualified personnel, poisonous chlorine dioxide may accumulate and explode.

– You should only have the system commissioned by a ProMinent authorised service team/technician, in accordance with the operating instructions.

Notes for the System Operator

This document includes notes and quotes from German guidelines relating to the system operator's scope of responsibility. This information does not discharge operators from their responsibility as an operator and is intended only to remind him or make him aware of specific problem areas. This information does not lay claim to being complete, nor applicable to every country and every type of application, nor to being unconditionally up-to-date.

Table of contents

1 Identitycode ... 4
2 Safety chapter ... 6
3 Storage and Transport ... 11
4 Requirements relating to the installation site ... 13
5 Assembly ... 14
6 Installation ... 18
6.1 Installation, hydraulic ... 18
6.1.1 Pre-dilution module ... 20
6.1.2 Suction lines to the Bello Zon® metering pumps ... 21
6.1.3 Ventilated feed ... 21
6.1.4 Bypass line ... 22
6.1.5 Safety equipment bypass line ... 23
6.1.6 Flushing assembly with vacuum relief valve ... 25
6.1.7 Back pressure valve ... 26
6.1.8 Flow generator bypass line ... 26
6.1.9 Point of injection ... 27
6.1.10 Protective filter ... 27
6.1.11 Inclined seat valve ... 27
6.1.12 Chlorine dioxide detection kit ... 28
6.2 Acid and chlorite suction lances / suction assemblies ... 28
6.3 Installation, electrical ... 29
6.3.1 Connecting the level switch ... 30
6.3.2 Install the minimum contact flow meter ... 31
6.3.3 Wiring the Bello Zon® control ... 31
6.3.4 Wiring the pre-dilution control ... 33
6.3.5 Installing the bypass pump ... 33
6.3.6 Installing the gas detector (accessories) ... 33
6.3.7 Installing an emergency stop switch ... 34
6.3.8 Prepare the mains connection in line with EN 60204 ... 34
7 EC Declaration of Conformity for Machinery ... 36
8 Dimensions sheets ... 37
9 Technical data ... 40
10 Wiring diagrams ... 43
11 Ordering Information ... 48
12 Decontamination declaration ... 51
13 Index ... 52

1 Identitycode

CDK product range, version c								
CDKc	**Type**	**Capacity**						
20	CDKc 150	150 g/h						
21	CDKc 400	400 g/h						
22	CDKc 900	900 g/h						
23	CDKc 2000	2000 g/h						
24	CDKc 2800	2800 g/h						
25	CDKc 7300	7300 g/h						
26	CDKc 12000	12000 g/h						
	Design							
	P	ProMaqua						
	N	Neutral						
		Operating voltage:						
		D	230 V + 10 %, 50/60 Hz (for versions with "bypass" 04)					
		B	100-115 V + 10 %, 50/60 Hz (not available for versions with "bypass" 04 or 06)					
			Bypass version, bypass monitoring					
			02	Bypass PVC-U with float flow meter and pump				
			04	Bypass PVC-U with float flow meter and pump (VA) only with "Operating voltage" - "A" (only CDKc 150 ... 900)				
				Calibration device				
				1	with a calibration device			
					Suction lance, suction fitting for chemicals			
					0	None		
					2	Suction lance for 200 l drum (only CDKc 150 ... 2800)		
					3	Flexible suction assembly 5 m (only CDKc 150 ... 2800)		
						Mechanical design		
						0	Standard	
							Preset language	
							DE	German
							EN	English
							FR	French
							IT	Italian
							ES	Spanish
							JP	Japanese
							CZ	Czech
							PL	Polish

CDK product range, version c																
							SV	Swedish								
							NL	Dutch								
							HU	Hungarian								
							FI	Finnish								
								Control								
								0	Basic version with 4 contact inputs for leakage, external errors, high dosage and pause; 3 contact outputs for operation, warning and alarm; either 1 digital or frequency input for flow							
								1	With measurement and control features (only in conjunction with "extended inputs and outputs" = 1 or 3)							
								2	With measurement and control features with data logger and screen writer (only in conjunction with "extended inputs and outputs" = 1 or 3)							
									Extended inputs and outputs							
									0	none						
									1	2 analog inputs for control variables and flow freely configurable						
									2	1 analog output, freely configurable						
									3	2 analog inputs, 1 analog output, freely configurable						
										Communication interfaces						
										0	None					
											Certifications					
											01	CE mark				
												Temperature monitoring				
												0	No temperature monitoring			
													Hardware			
													0	Standard		
														Software		
														0	Standard	

2 Safety chapter

Labelling of safety information

The following signal words are used in these operating instructions to denote different levels of danger:

Identification of safety notes

The following signal words are used in these operating instructions to denote different severities of danger:

Signal word	Meaning
DANGER	Denotes a possibly hazardous situation. If this is disregarded, it will result in serious injuries.
WARNING	Denotes a possibly dangerous situation. If this is disregarded, you are in a life-threatening situation and this can result in serious injuries.
CAUTION	Denotes a possibly dangerous situation. If this is disregarded, it could result in slight or minor injuries or material damage.

Warning signs denoting different types of danger

The following warning signs are used in these operating instructions to denote different types of danger:

Warning signs	Type of danger
	Warning – corrosive substances.
	Warning – high-voltage.
	Warning – explosive substances.
	Warning – toxic substances.
	Warning – danger zone.

The three basic rules

1. - **The two components acid (HCl) and chlorite (dilute $NaClO_2$) must never be brought into contact except in the reactor! Otherwise poisonous ClO_2 gas forms abruptly and can then decompose explosively!**
2. - **Never fill the 5% HCl receiver tank with chemicals directly, only ever via the pre-dilution module! Otherwise toxic ClO_2 gas can form caused by another fault on the Bello® system.**
3. - **Never allow the bypass to become empty when the system is connected to the mains voltage and never allow the bypass water to become under vacuum pressure! Otherwise the ClO_2 solution in the reactor is placed under vacuum pressure, the ClO_2 outgasses, builds up and can decompose explosively!**

Intended use

- The Bello Zon® CDK system is intended solely for producing a ClO_2 containing disinfectant solution from hydrochloric acid, sodium chlorite solution and thinning water, used in conjunction with the pre-dilution facility, and then for dosing it into a bypass line together with water.
- Any other uses or modifications to the system are prohibited!
- The Bello Zon® system is not designed for treating liquids (other than water) nor gaseous media and solids with ClO_2!
- The Bello Zon® CDK system must not be operated with concentrated hydrochloric acid without a pre-dilution facility.
- Do not operate the system under conditions other than those described in the technical data!
- Do not allow untrained personnel to operate the Bello Zon® system! Only trained and authorised personnel should perform all other work – refer to the following table!
- You have a duty to observe the information contained in the operating instructions at the different phases of the system's service life!
- Please observe the relevant national regulations and guidelines at every phase of the device's service life!

Qualification of personnel

WARNING!

According to accident statistics, holiday replacements present a safety risk.

– Holiday replacements should also be qualified, as outlined below, and have been instructed accordingly.

Task	Qualification
Assembly, installation of hydraulic system	Trained qualified personnel
Electrical installation	Electrical technician
Initial commissioning	Service - authorised by ProMinent
Start up	Technical experts
Operation, canister replacement	Instructed person
Maintenance, repair	Service - authorised by ProMinent
Decommissioning, disposal	Technical experts
Troubleshooting	Service - authorised by ProMinent, technical experts, instructed personnel (depending on the fault)

Explanation of the terms:

Technical expert

A technical expert is deemed to be a person who is able to assess the tasks assigned to him and recognise possible dangers based on his/her technical training and experience, as well as knowledge of applicable regulations.

Note:

A technical qualification is typically proved by the required completion of a technical training course, e.g. as an engineer or craftsman. The assessment of a person's technical training can also be based on several years of work in the relevant field.

Qualified employee

A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognise possible dangers based on his/her technical training, knowledge and experience, as well as knowledge of pertinent regulations.

Note:

A qualification of equal validity to a technical qualification can also be gained by several years of employment in the relevant field of work.

Instructed person

An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.

Service

The Service department refers to service technicians, who have received proven training and have been authorised by ProMinent to work on the system.

Safety equipment

The safety equipment available and instructions for testing are contained in the "Start up" chapter.

Instructions for entering a room in which chlorine dioxide systems are installed

- Access only for trained personnel.
- If there is a smell of chlorine dioxide (pungent, chlorine-like smell) access is only permitted to personnel wearing the specified protective equipment.
- Should you notice a smell of chlorine dioxide, immediately switch off the system from a safe position, e.g. emergency stop switch, installed at a distance from the system.

Safety information

WARNING!

Danger from incorrect operation

Incorrect operation can result in dangerous conditions for the system and its surroundings.

- All operating personnel should be instructed by a ProMinent service technician! (Undertaken during initial commissioning.)
- The operating instructions should be kept to hand adjacent to the system.

WARNING!

Danger due to hazardous ClO_2 gas

Under rare fault conditions toxic ClO_2 solution and gas can escape via a leak.

- A gas detector should be installed if no other measure is provided to ensure personnel safety in the event of ClO_2 escaping.
- The gas detector should reliably switch off the system if ClO_2 gas escapes and trigger an alarm that is readily apparent from a distance.

WARNING!

Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.

WARNING!

Danger due to hazardous substances

By operating this system the operator generates hazardous substances.

The operator is responsible for adapting the operating instructions to their system in the event that more recent knowledge about the dangers associated with a hazardous substance and its avoidance become available or national regulations prescribe something else to that stated in the supplied operating instructions.

Warning against illegal operation

Observe the regulations that apply where the device is installed.

Note for the system operator

Keywords when searching for the necessary regulations:

- Chlorine dioxide systems
- Chlorine dioxide (possibly chlorination as well)
- Potable water
- Hydrochloric acid
- Sodium chlorite
- Storage
- Hazardous substances
- Personal protective equipment

Personal protective equipment

- Face mask
- Rubber or plastic boots
- Protective gloves (ClO_2-resistant design!)
- Protective apron
- Full-face protective mask
- 1 replacement filter per protective mask

The required type and configuration of personal protective equipment may vary from country to country and change over time.

Information in the event of an emergency

- You have come into contact with acid: Refer to the "EC material safety data sheet for acid" provided by the supplier!
- You have already come into contact with chlorite: See the "EC material safety data sheet for chlorite" provided by the supplier!
- You have come into contact with ClO_2 solution or ClO_2 gas: Refer to the "Chlorine dioxide hazardous substance" data sheet: Properties of chlorine dioxide and instructions for handling aqueous solutions" in the operating instructions, part 2, appendix!
- An orange-yellow ClO_2 gas has escaped: Clear the room immediately and disconnect the power supply, for example using the emergency stop switch! Wear complete personal protective equipment and ensure the gas is precipitated out of the atmosphere using a water spray! Refer also to the "Chlorine dioxide hazardous substance data sheet: Properties of chlorine dioxide and instructions for handling aqueous solutions" in the operating instructions, part 2, appendix!
- An orange-yellow ClO_2 solution has escaped: Clear the room immediately and disconnect the power supply, for example using the emergency stop switch! Wear complete personal protective equipment and pour sodium thiosulphate solution over the ClO_2 solution, then dilute with plenty of water and wash away down the drain. Refer also to the "Chlorine dioxide hazardous substance data sheet: Properties of chlorine dioxide and instructions for handling aqueous solutions" in the appendix to the operating instructions!
- The Bello Zon® system was started after incorrect dilution or using concentrated HCl in the 5% HCl receiver tank and the metering pumps have already pumped concentrated chemicals as far as the reactor: Clear the room immediately and disconnect the power supply, for example using the emergency stop switch! Inform the fire service, explaining about the risk of explosion due to concentrated ClO_2 gas! ClO_2 gas can still explode after several hours in the event of a further fault! Refer also to the "Chlorine dioxide hazardous substance data sheet: Properties of chlorine dioxide and instructions for handling aqueous solutions" in the appendix to the operating instructions!
- The Bello Zon® system was started after incorrect dilution or using concentrated HCl in the 5% HCl receiver tank and the metering pumps have not yet started to pump: immediately switch the Bello Zon® system to *'Metering OFF'* (*[Start/Stop]*)! Only start the system when you are sure that the pre-dilution module is operating correctly.

The information required in the event of an emergency may vary from country to country and change over time.

Sound pressure level

Sound pressure level LpA < 70 dB according to EN ISO 20361

at maximum stroke length, maximum stroke rate, maximum back pressure (water)

3 Storage and Transport

Safety information

WARNING!

Only return the device for repair in a cleaned state and with flushed hydraulic components - refer to the "Decommissioning" chapter!

Only send the unit together with a completed Decontamination Declaration. The Decontamination Declaration constitutes an integral part of an inspection / repair order. A unit can only be inspected or repaired when a Decontamination Declaration is submitted that has been completed correctly and in full by an authorised and qualified person on behalf of the operator.

The "Decontamination Declaration" can be found in the Appendix or at www.prominent.com.

NOTICE!

Danger of material damage

The device can be damaged by incorrect or improper storage or transportation!

- The device should only be stored or transported in a well packaged state - preferably in its original packaging.
- The packaged unit should also only be stored or transported in accordance with the stipulated storage conditions.
- The packaged unit should be protected from moisture and the ingress of chemicals.

Packaging

The chlorine dioxide Bello Zon® system is supplied with wooden packaging.

Ambient conditions for the Bello Zon® system

Data	Value	Unit
Minimum storage and transport temperature	-10	°C
Maximum storage and transport temperature	+40	°C
Maximum air humidity *	92	% relative humidity

* non-condensing

Miscellaneous: Protect against sunlight

Scope of delivery

In addition to the identity code options, the scope of delivery includes:

- A flushing assembly with a vacuum relief valve - see chapter "Installation" - "Hydraulic Installation"
- The mounting kit (mounting equipment and threaded cable connectors)
- Labels for suction lances / suction assemblies
- Warning signs - refer to "Assembly" chapter
- Plate, pre-dilution facility
- Diluting container
- Hose material

Weight

Weight in kg, without packaging:

CDKc	150	400	900	2000	2800	7300	12000
Main plate	50	80	95	160	160	175	175
Pre-dilution facility	35	35	35	40	40	40	40

4 Requirements relating to the installation site

Safety information

CAUTION!

Warning against illegal operation

Observe the regulations that apply where the device is installed.

Requirements relating to the chlorine dioxide system installation site

- Do not locate the chlorine dioxide system outdoors.
- Secure the chlorine dioxide system against unauthorised access.
- Protect the site of the chlorine dioxide system against sunlight and ensure that it is frost-proof and well ventilated.
- The relative humidity should not exceed 92 %.
- The atmosphere should be non-condensing and non-corrosive.
- The room temperature should not exceed 35 °C.
- Below 10 °C room temperature (15 °C for the CDKc 2800 and 7300; 18 °C for the CDKc 12000) heating systems may have to be used for the suction lines of the metering pumps.
- It should be possible to transport the component storage tanks to the system without obstruction.
- Provide for emergency escape route.
- Provide a flat, vertical and load-bearing wall on which to install the Bello Zon® system.
- Provide a water tap.
- Provide a drain in the floor.
- If a gas detector is needed, it should be possible to fit it.
- It should be possible to install emergency stop switches for the mains voltage outside the installation room.

Requirements relating to the installation site for the pre-dilution equipment

In addition to the requirements relating to the chemical store, ensure that the following requirements are fulfilled:

- Do not site the pre-dilution equipment outdoors.
- Ensure that the site of the pre-dilution equipment is frost-proof.
- Ensure that the relative humidity does not exceed 95 %.
- Ensure that the atmosphere is non-corrosive and non-condensing.
- Ensure that the room temperature does not exceed 40 °C.
- Ensure that a smooth, vertical and load-bearing wall is available on which to fix the pre-dilution equipment.
- Ensure that there is a mains connection with an emergency stop switch outside the installation room.

Note for the system operator

Below are some of the regulations which apply within Germany:

- The Accident Prevention Regulation (UVV) "Chlorination of Water", [in German] GUV-V D5 (previously GUV 8.15), April 1979
- "Chlorine Dioxide Metering Systems", [in German] DVGW (German Gas and Water Association) Data Sheet W 624, DVGW e.V., Eschborn, 10/1996 "Chlorine Dioxide in Water Treatment", [in German] DVGW Data Sheet W 224, DVGW e.V., Eschborn, 02/2010, ISSN 0176-3504
- The directives for the protection of ground water against pollution [in German] (section 19 of the German Federal Water Act (WHG) Edition 31.07.2009)
- The German Ordinance on Hazardous Substances (GefStoffV) - especially section 17 (General Duty of Protection) and section 20 (Operating Instructions; see also Accident Prevention Regulation section 9) [in German]

5 Assembly

Safety information

WARNING!

Danger due to the sudden unexpected escape of toxic chlorine dioxide solution

The seals, which are exposed to the chlorine dioxide solution, will start to leak if they are not replaced early enough.

– Set the system up so that it can be accessed easily for maintenance.

Ventilated feed

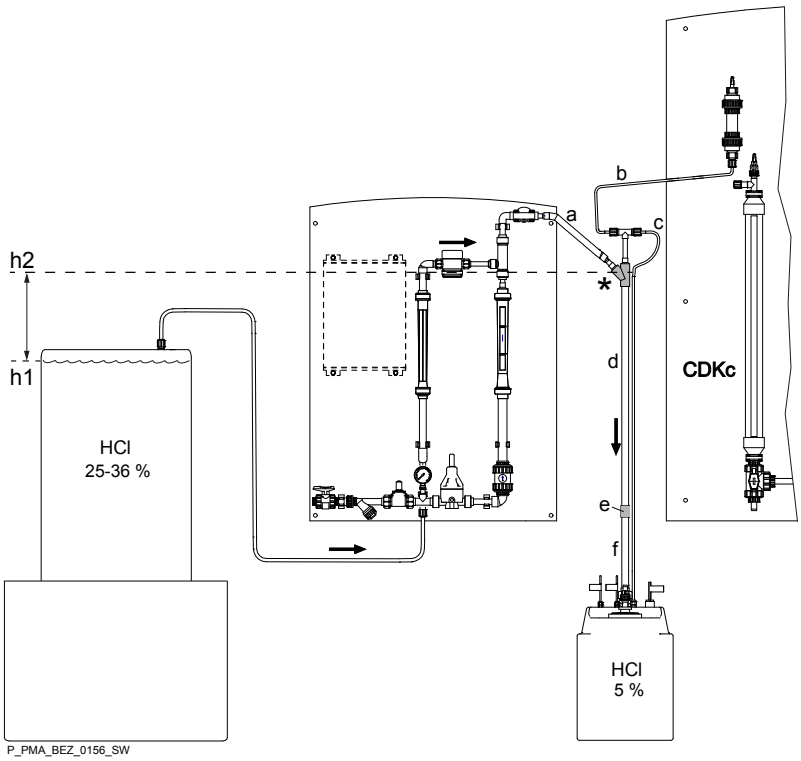


Fig. 2: Assemble the ventilated feed correctly between the pre-dilution module and the CDKc

1. Ensure that the ventilated feed (with the 5% HCl receiver tank) is no further than 25 m away from the CDKc plate
2. Cut the upper half of the tube of the ventilated feed in such a way that the Y-section (*, h2) lies guaranteed above the maximum possible level of the storage tank for concentrated acid (h1) – see Fig. 2! At the same time observe further information - refer to the section *'Pre-dilution module bracket' on page 15*.
3. Stick the upper half of the ventilated feed (d) into the straight union (e) of the lower half (f) (using Tangit adhesive).
4. Fit the ventilated feed into the opening provided in the 5% HCl receiver tank.
5. Use a clamp to fasten the upper section of the ventilated feed at a suitable point.
6. Connect the one ventilation connector of the T-piece with a hose (b) to the acid vapour separator on the plate of the CDKc.
7. Connect the other ventilation connector of the T-piece with a hose (c) to the 5% HCl receiver tank.

Pre-dilution module bracket

The bracket of the pre-dilution equipment should be:

- Set up close to the chemical store
- Suspended in such a way that the outlet of the pre-dilution module can be connected with ease to the Y-piece (*) of the ventilated feed using a hose or a PVC pipe – see Fig. 2
- Suspended in such a way that the minimum fluid level of the storage tank for concentrated hydrochloric acid is at most 1.40 m below the lower edge of the bracket of the pre-dilution module

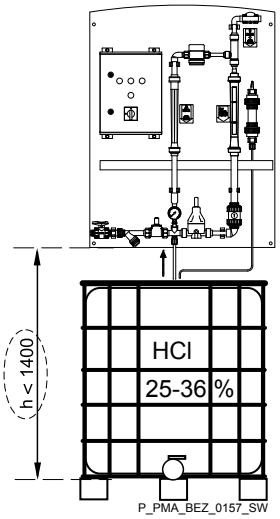


Fig. 3: Maximum height of the minimum fluid level in the storage tank for concentrated hydrochloric acid

Bello Zon® bracket

The mounting kit supplied contains the necessary hangar bolts, rawlplugs, washers and nuts (mounting kit = plastic bag with fixings and threaded cable connectors...).

Secure the Bello Zon® system as close as possible to the point of injection.

Select the mounting height of the Bello®Zon bracket so that:

- The LCD screen of the control can be easily read
- The fluid level of the full chlorite component storage tank is below the level of the metering pumps
- The fluid level of the full HCl receiver tank (diluted acid) is below the level of the metering pumps
-
- The maximum priming lift of the metering pumps is not exceeded, see "Technical data" table in the appendix
- If possible locate the component storage tank below the bracket.

Personnel: ■ Technical personnel

1. Secure the Bello Zon® system on a suitable, smooth and vertical wall. Dimensional drawings - see appendix
2. After fitting, apply Vaseline to the metallic fastenings as a corrosion inhibitor.
3. Attach the warning signs in line with national regulations at the entrance to the chlorine dioxide system and the chemical store or any other locations so that they are clearly visible (Warning signs in compliance with German regulations, see - in the scope of delivery).

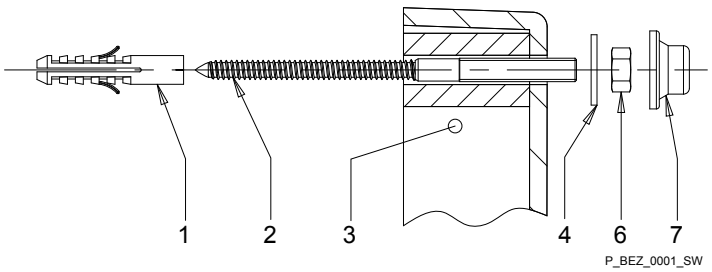


Fig. 4: Fixing the deep-drawn bracket

1 Rawlplug
2 Hanger bolt
3 Bracket
4 Washer (plastic)
6 Hexagonal nut
7 Protective cap

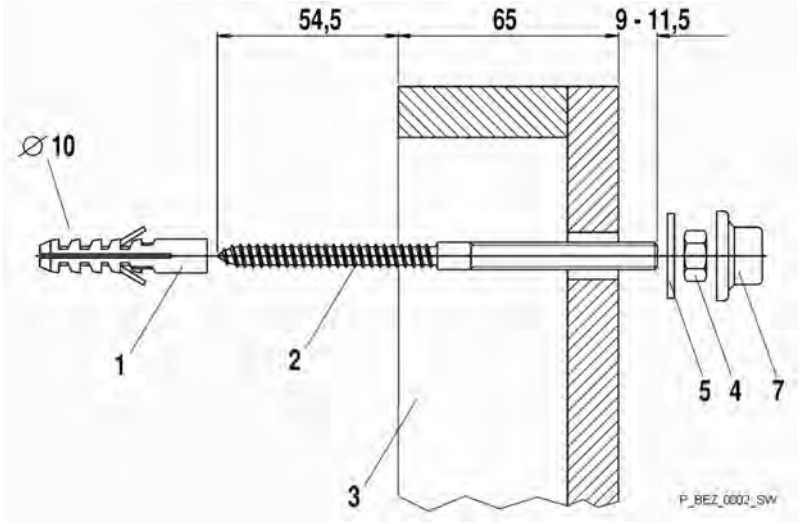


Fig. 5: Fastening of welded bracket

1 Rawlplug
2 Hanger bolt
3 Bracket
4 Hexagonal nut
5 Washer (metal)
7 Protective cap

Warning labels

CAUTION!

Warning against illegal operation

Observe the regulations that apply where the device is installed.

Use signs, the shape and type of which are given below, provided national regulations do not require otherwise.

a) Attach both these signs together at the entrances to rooms in which Bello Zon® chlorine dioxide systems are located:

Warning sign *	Warning label *	Included text
	Chlor. dioxide equipment Access only for trained personnel P_BEZ_0004_SW	Chlorine dioxide system. Access only for trained personnel.
* Mandatory in Germany		

b) Attach both these signs together at the entrances to rooms in which sodium chlorite is stored or used:

Warning sign *	Warning label *	Included text
	Sodium chlorite $NaClO_2$ P_BEZ_0003_SW	Sodium chlorite $NaClO_2$
* Mandatory in Germany		

c) Attach this sign in rooms in which sodium chlorite is handled:

Warning label *	Included text
Do not use storage tank and devices alternately Sodium chlorite + acid = highly toxic chlor. dioxide gas DANGER TO LIFE! P_BEZ_0005_SW	Do not swap storage tanks and devices. Sodium chlorite + acid = highly toxic chlorine dioxide gas. Danger to life!
* Mandatory in Germany	

This applies to stores and dispensing rooms in which the chemical storage tanks are installed, which are connected to the Bello Zon® systems.

Installation location of gas detector (accessory)

If a gas detector is needed, fit it in line with instructions given by a competent person. Select the location of a sensor so that it is coordinated to the installation site and surroundings.

6 Installation

CAUTION!

Warning against illegal operation

Observe the regulations that apply where the device is installed.

6.1 Installation, hydraulic

Safety information

DANGER!

Warning of hazardous chlorine dioxide vapours

Hazardous chlorine dioxide vapours can escape through to a broken bypass line.

- Only use PVC or PVDF pipes for the bypass line. Chlorine dioxide corrodes other materials too strongly.
- Only use PVC pipes of pressure stage PN 16 for the bypass line to allow for long-term scaling of the PVC.
- Do not exceed the maximum permissible system operating pressure - see "Safety equipment bypass line" - "PVC bypass line specifications"). Do not allow pressure surges to occur.

WARNING!

The reactor can explode

During operation, there can be uncontrolled siphoning of chemicals if the bypass line of the Bello Zon® system becomes subject to negative pressure. Consequently, if a high vacuum pressure exists together with the simultaneous formation of gas/water mixed phases, chlorine dioxide can gas out. Under unfavourable circumstances, the critical gas concentration of 300 g/m^3 is exceeded and the reactor can explode.

- Take appropriate measures to ensure that the Bello Zon® system's bypass line is not subject to vacuum pressure.
- Take appropriate measures to ensure that the Bello Zon® system's bypass line is always completely full.
- Install equipment to switch the system to a voltage-free state whenever the bypass line is not completely full.

Qualification

Personnel: ■ Technical personnel

Main components

The hydraulic installation of the following components is required:

- Pre-dilution assembly
- Ventilated feed
- Bypass line
- Safety equipment bypass line
- Additional safety fittings
- Flow generator bypass line
- Hydraulic module "water supply"
- Point of injection

- Flushing assembly with vacuum relief valve
- Acid and chlorite suction lances / suction assemblies
- Suction lance and level switch for dilute acid

Installation examples

Installation example A

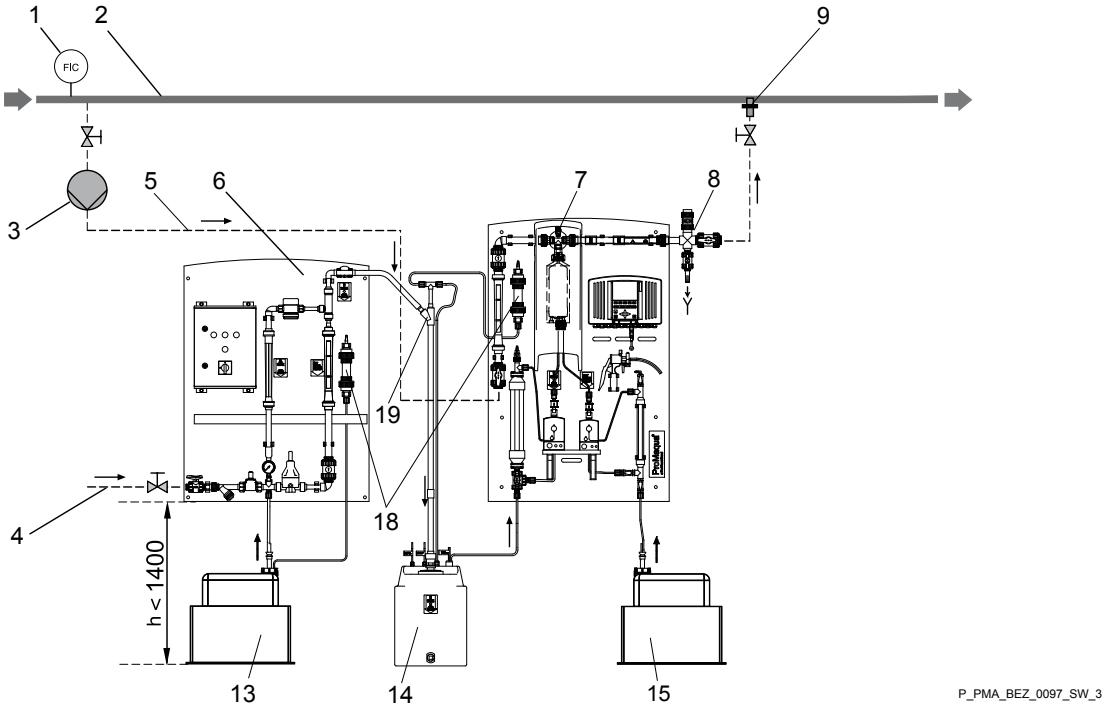


Fig. 6: Installation example A: constant back pressure greater than 1.5 bar

1 Water meter (frequency or analogue signal)
2 Main water line
3 Bypass pump
4 Water connection for pre-dilution module
5 Bypass line
6 Pre-dilution module
7 Reactor outlet valve
8 Flushing assembly with vacuum relief valve
9 Point of injection (flange and immersion pipe)
10 Delay tank
11 Sample water line
12 Chlorine dioxide measuring point (e.g. with CDE sensor)
13 Canister for concentrated acid in safety tank
14 5% HCl receiver tank
15 Chlorite canister in the safety tray
16 Back pressure valve
17 Pre-storage module for temporary storage of ClO_2 solution
18 Acid vapour separator
19 Ventilated feed

Installation example B

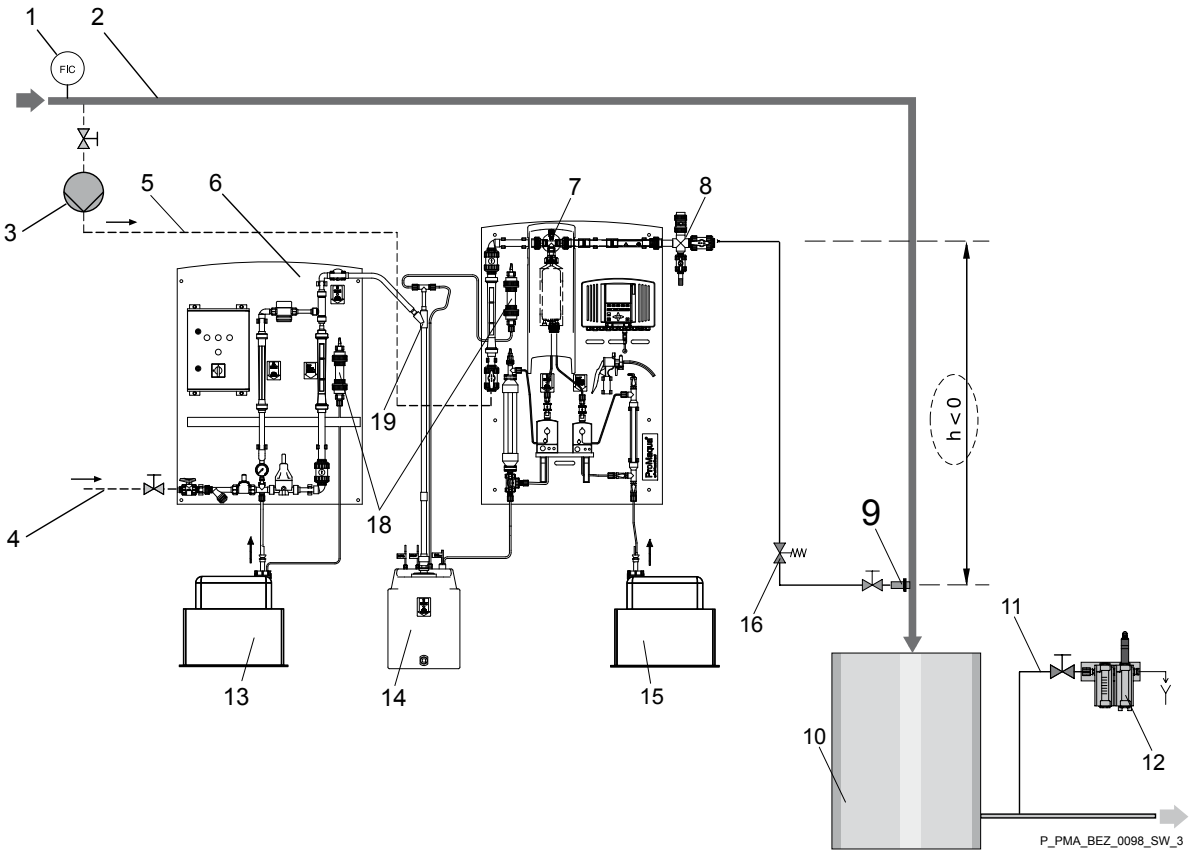


Fig. 7: Installation example B: Back pressure less than 1.5 bar or fluctuating: Back pressure valve (16) required in the bypass line.

6.1.1 Pre-dilution module

WARNING!

The reactor can explode.

If concentrated hydrochloric acid comes into contact with chlorite in the reactor, the resulting ClO_2 can explode.

– Only operate the CDKc system with a pre-dilution module connected upstream.

Connect the outlet of the pre-dilution module to the angled inlet of the "ventilated feed" using a hose or a PVC pipe.

Parameter	Value
Max. water temperature	40 °C
Water quality	Potable water

Pre-dilution module specifications for CDKc 150 ... 2800

Data	Value	Unit
Nominal width	DN15	

Data	Value	Unit
Diameter	20	mm
Operating pressure, min.	3.5	bar
Operating pressure, max.	6	bar
Pressure stage*	PN16	
Water flow	250	l/h
Acid flow	40 ... 55	l/h

Pre-dilution module specifications for CDKc 7300, 12000

Data	Value	Unit
Nominal width	DN15	
Diameter	20	mm
Operating pressure, min.	3.5	bar
Operating pressure, max.	6	bar
Pressure stage*	PN16	
Water flow	500	l/h
Acid flow	80 ... 110	l/h

6.1.2 Suction lines to the Bello Zon® metering pumps

Keep the suction lines as short as possible and do not exceed the suction lift of the pumps to ensure that the pumps and flow controls do not fail.

Arrange the chemical storage tanks under the Bello Zon® system so that the suction lines always rise towards the pump. This will prevent pump malfunction due to the formation of gas bubbles. Select the diameter of the suction line in accordance with the pump data. A foot valve is needed at the end of the suction line (in the tank).

If the tanks cannot be installed underneath the Bello Zon® system, or if large volumes of chemicals are to be connected, then the supply lines will need to be hydraulically separated from the tank storage by the use of interim tanks.

Otherwise, there will be positive priming pressure in the suction line - caused by the liquid level in the tank storage - which could result in siphoning and/or result in incorrect metering volumes caused by differing liquid levels.

The back pressure valve (1.5 bar) on the reactor outlet is not an absolutely tightly sealing shut-off device and cannot prevent uncontrolled siphoning.

WARNING!
For safety reasons, fit interim tanks in the above cases.

6.1.3 Ventilated feed

1. Connect the one ventilation connector of the T-piece with a hose to the acid vapour separator on the plate of the CDKc.
2. Connect the other ventilation connector of the T-piece with a hose to the 5% HCl receiver tank.

6.1.4 Bypass line

DANGER!

Warning of hazardous chlorine dioxide vapours

Hazardous chlorine dioxide vapours can escape through to a broken bypass line.

- Only use PVC or PVDF pipes for the bypass line. Chlorine dioxide corrodes other materials too strongly.
- Only use PVC pipes of pressure stage PN 16 for the bypass line to allow for long-term scaling of the PVC.
- Do not exceed the maximum permissible system operating pressure - see "Safety equipment bypass line" - "PVC bypass line specifications"). Do not allow pressure surges to occur.

WARNING!

Warning of toxic chlorine dioxide vapours

Toxic chlorine dioxide vapours can escape through a leaking bypass line. Some threaded connectors are loosened in the factory prior to transport.

- Check whether all threaded connectors on the bypass line on the bracket are correctly tightened.

WARNING!

Danger of an explosion in the bypass line

Particles in the bypass water could block a flow meter. This can then lead to an unacceptably high concentration of chlorine dioxide in the bypass line. If the bypass line is not completely filled with water, a critical gas phase can form, resulting in an explosion in the bypass line.

- If necessary, install a dirt-trap filter in the bypass line.
- The site operator should ensure that the bypass line is always fed with water.

Protect transparent pipes carrying water containing ClO_2 against light radiation (direct sunlight, fluorescent tubes, ...). Otherwise the photochemical breakdown of the ClO_2 in the pipes will cause the ClO_2 concentration to fall unexpectedly at the place of consumption.

The bypass line is either fed from the main water supply or separately. The purpose of the bypass line is to dilute the chlorine dioxide concentration of the chlorine dioxide solution from the reactor from approximately 20 g/l (= 20,000 ppm) to approximately 0.1 - 1 g/l (= 100 - 1000 ppm) and to transport this solution to the point of injection.

6.1.5 Safety equipment bypass line

WARNING!

The reactor can explode

If the chlorine dioxide solution in the reactor is subjected to a vacuum, it can explode.

– Therefore, install the bypass line so that a vacuum can never form nor can the line be filled incompletely, not even if the system is idle or there is a fault or malfunction.

WARNING!

Risk of explosion in the bypass line

If the dosing remains switched on when there is no water flow, it can then lead to an unacceptably high concentration of chlorine dioxide in the bypass line. If additionally the bypass line is not completely full with water, a critical gas phase can form, resulting in an explosion in the bypass line.

– Ensure on site that the bypass line is always filled with water.
– Incorporate the chlorine dioxide system in the installation environment so that, even in the event of unplanned chlorine dioxide production, a concentration of greater than 3 g/l cannot be produced.
– Route the lowest part of the bypass line over the reactor output valve.
– If this is not possible then: Install a back pressure valve at the end of the bypass line.

WARNING!

Outgassing ClO_2 solution can still vaporize in the bypass line

With Bello Zon® systems that are ordered without a bypass line, a flow control and a rinse valve with a vacuum relief valve must be installed that are technically equivalent to the original parts.

Bypass line specifications for CDKc 150 ... 400

Data	Value	Unit
Nominal width	DN25	
Diameter	32	mm
Operating pressure, min.	1.5	bar
Operating pressure, max.	8	bar
Pressure stage*	PN16	
Flow with bypass version 02 or 04	500 ... 2000	l/h

* with PVC lines

Bypass line specifications for CDKc 900

Data	Value	Unit
Nominal width	DN25	
Diameter	32	mm
Operating pressure, min.	1.5	bar
Operating pressure, max.	8	bar
Pressure stage*	PN16	
Flow with bypass version 02 or 04	500 ... 2000	l/h
Flow with bypass version 06 or 07	500 ... 1000	l/h

* with PVC lines

Bypass line specifications for CDKc 2000 and 2800

Data	Value	Unit
Nominal width	DN40	
Diameter	50	mm
Operating pressure, min.	1.5	bar
Operating pressure, max.	5	bar
Pressure stage*	PN16	
Flow with bypass version 02 or 04	2000 ... 10 000	l/h

* with PVC lines

Bypass line specifications for CDKc 7300

Data	Value	Unit
Nominal width	DN40	
Diameter	50	mm
Operating pressure, min.	1.5	bar
Operating pressure, max.	3	bar
Pressure stage*	PN16	
Flow with bypass version 02 or 04	6000 ... 10 000**	l/h

* with PVC lines

** only approved for bypass version 02

Bypass line specifications for CDKc 12000

Data	Value	Unit
Nominal width	DN40	
Diameter	50	mm
Operating pressure, min.	1.5	bar
Operating pressure, max.	2	bar
Pressure stage*	PN16	
Flow with bypass version 02 or 04	10 000 ... 15 000**	l/h

* with PVC lines

** only approved for bypass version 02

There is a particular risk of a vacuum, especially if the water is stationary, where:

- The flow direction reverses in the main water supply pipe (with a large diameter) - non-return valves are never 100 % watertight!
- The main water supply line runs below the reactor outlet valve of the Bello Zon® system
- The bypass line is very long, especially if it runs downwards, i.e. the reactor outlet valve (7) of the Bello Zon® system lies above the point of injection (9) (h less than "0" *'Installation examples' on page 19*, installation example B). Then install a vent valve at the highest point on the bypass line, as shown in figure . This ensures that there is always at least atmospheric pressure in the bypass line.

Supplement the chlorine dioxide system with safety-relevant accessories, depending on the application and the particular conditions of the installation site.

6.1.6 Flushing assembly with vacuum relief valve

Install the flushing assembly complete with vacuum relief valve in the bypass line downstream of the Bello Zon® system, see *'Installation examples' on page 19*, so that during start up the reactor fills safely at atmospheric pressure and so that the reactor can be safely rinsed and emptied ready for maintenance work.

In addition, the valve acts as a vacuum relief valve should the bypass line be subject to vacuum pressure.

WARNING!

Gaseous ClO_2 solution can vaporise in the bypass line

If the vacuum relief valve becomes blocked due to dirt, then it cannot prevent the ClO_2 solution outgassing if the bypass line is under vacuum.

– Provide the vacuum relief valve with a protective cover if dirt can enter from above.

WARNING!

Toxic ClO_2 solution can escape

– Protect the flushing valve from being opened unintentionally, for example by a cable connector or lock.

WARNING!

Outgassing ClO_2 solution can still vaporize in the bypass line

With Bello Zon® systems that are ordered without a bypass line, a flow control and a rinse valve with a vacuum relief valve must be installed that are technically equivalent to the original parts.

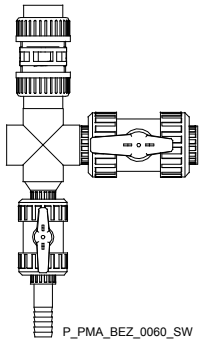


Fig. 8: Flushing assembly with vacuum relief valve

6.1.7 Back pressure valve

If it is is impossible to ensure in any other way that the back pressure is > 1.5 bar and constant:

Back pressure valve

Install a back pressure valve at the end of the bypass line, just upstream of the point of injection (opening pressure > 1.5 bar) see fig. 5!

Use the design with no back pressure to ensure that this function is maintained even at high levels of back pressure!

Fig. 9: Back pressure valve DHV-RM, back pressure effect-free

Type	Nominal width	Connector	Material	Part no.
DHV-U	DN25	G 1 1/2″	PCB	1037774
DHV 712-R	DN40	G 2 1/4″	PCB	1000052

6.1.8 Flow generator bypass line

To create a flow in the bypass line, an alternative is to install:

- A choke valve in the main water supply line, e.g. gate, spring or weight-loaded non-return valve or
- A bypass water pump in the bypass line upstream of the Bello Zon® system The bypass pump can then be locked by the Bello Zon® system's control.

When installing a bypass pump, we recommend fitting an inclined seat valve to regulate the flow at the inlet to the Bello Zon® system.

Accessories	Part no.
Inclined seat valve	1001877

6.1.9 Point of injection

Install an "immersion pipe" at the point of injection in the main water supply line (for improved mixing of the ClO_2 in the main water flow):

Tangit cleaner, Tangit adhesive plus a DN25 ball valve to be used as a shut-off valve are contained in the scope of delivery should the immersion pipe require shortening.

1. Shorten the immersion pipe to the required length.
2. Glue the ball valve to the shortened end.
3. Fit the immersion pipe using a DN50 DIN flange supplied by others.

Fig. 10: Immersion pipe

Accessories	Part no.
Point of injection up to nominal width DN80*, with ball valve	1018754
Point of injection above nominal width DN100*, with ball valve	1018753
*** Main water line**	

6.1.10 Protective filter

Fit a protective filter upstream if solid particles are present in the bypass water.

For instance, the filter DULCOFILT® protective filter G1" can be used with the CDKc 150. With larger systems, select an appropriate filter type according to the level of dirt.

Accessories	Part no.
DULCOFILT® protective filter G1", mesh size 100 µm	791547

6.1.11 Inclined seat valve

An inclined seat valve is used to adjust the bypass flow when there is a bypass pump installed.

Accessories	Part no.
Inclined seat valve, DN 25	1001877

6.1.12 Chlorine dioxide detection kit

The DPD method can be used simply and reliably to determine the concentration of chlorine dioxide. An appropriate photometer is available for this purpose.

Accessories	Part no.
DULCOTEST® DT1 photometer	1003473
DULCOTEST® DT4 photometer	1022736

6.2 Acid and chlorite suction lances / suction assemblies

Safety information

WARNING!

Warning of toxic chlorine dioxide gas

Toxic chlorine dioxide gas can be produced outside the reactor.

– Assign parts correctly to the acid and chlorite sides.

WARNING!

Warning of corrosive acid or toxic chlorite solution

Corrosive acid or toxic chlorite can escape through the connectors.

– Only use suitable hoses and connector kits.

Only use suction lances or suction assemblies with two-stage level switches. Other suction lances do not fit.

Installing suction hoses

Do not plug the suction lances into the component storage tanks or pre-dilution tanks yet!

1. Adjust the length of each suction lance - the foot valve should subsequently float in the container just above the base.
2. Stick the "Acid" and "Chlorite" labels (in the scope of delivery) onto the suction lance heads or suction hoses so that they are clearly legible.

The concentrated acid, red, is at the pre-dilution module.

The dilute acid, black, is left on the CDKc.

The concentrated chlorite, blue, is right on the CDKc.

3. On the storage tank, suspend the "FULL" level monitor (grey cable) slightly below the tank opening, so that during automatic filling it is impossible for the water to overflow.
4. Shorten the suction hoses so that they subsequently rise continuously and are free from tension.
5. Pull the union nut (4) and clamp ring (3) over the suction hose (5) - see figure Fig. 11.
6. Push the hose end over the nozzle (2) until it will go no further (it may be necessary to slightly widen the hose end).
7. Fit the nozzle on the pump suction valve (1).
8. Press the suction hose (5) onto the nozzle (3) and tighten the union nut (4).
9. Pull briefly on the suction hose (5) and tighten the union nut (4).

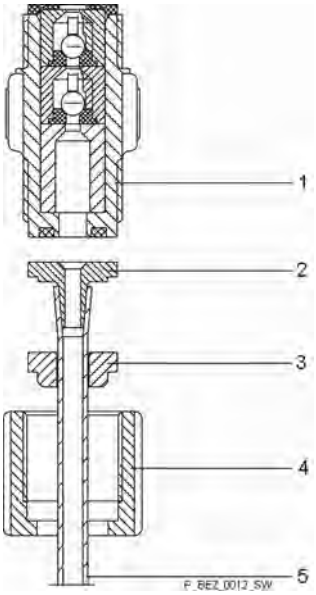


Fig. 11: Installing the hose

1 Pump suction valve
2 Nozzle
3 Clamp ring
4 Union nut
5 Hose

Installing bleed hoses

1. Install the bleed hose for the suction lance for the concentrated acid on the acid vapour separator of the pre-dilution assembly.
2. Install one bleed hose of the ventilated feed to the acid vapour separator of the CDKc.
3. Fit the other bleed hose of the ventilated feed to the HCl receiver tank.

6.3 Installation, electrical

Note for the system operator

Please observe the local regulations for electrical installation work!

Attach different identification rings to the two essentially identical cables (e.g. supply voltage to the acid metering pump and the chlorite metering pump) to differentiate between them. ("A" for acid, "C" for chlorite).

Qualification

Personnel:
- Electrician

Main components

In essence, electrical installation involves the following work:

- Connecting the level switch
- Installing the minimum contact flow meter
- Wiring the Bello Zon® control
- Wiring the pre-dilution control
- Installing the bypass pump
- Installing the gas detector
- Installing an emergency stop switch upstream of the Bello Zon® control
- Preparing the mains connection

6.3.1 Connecting the level switch

Refer to this wiring table!

You'll save yourself a lot of trouble.

Level switch wiring table

From level switch ...	... to device	Wiring diagram
for the 5% HCl receiver tank (orange cable)	Pre-dilution module	black to X2:7 and 9, brown to X2:8, blue to X2:10
LSH of the 5% HCl receiver tank	Pre-dilution module	X2:11 and 12
LSAHH of the 5% HCl receiver tank	Pre-dilution module	X2:13 and 14
of the storage tank for concentrated HCl (orange cable)	CDKc	Insert the plug into the "Level" socket of the acid pump

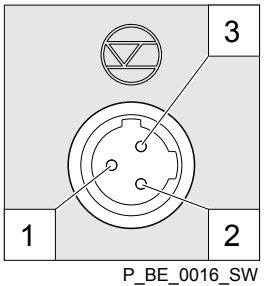


Fig. 12: Pump "level" input

6.3.2 Install the minimum contact flow meter

WARNING!

Risk of explosion in the bypass line

If the dosing remains switched on when there is no water flow, it can then lead to an unacceptably high concentration of chlorine dioxide in the bypass line. If additionally the bypass line is not completely full with water, a critical gas phase can form, resulting in an explosion in the bypass line.

– In addition to the hydraulic measures, switch the system to a zero-volts condition if the flow is too low via the minimum contact of a flow meter.

→ Electrically install the minimum contact of the flow meter.

6.3.3 Wiring the Bello Zon® control

1. Loosen the 4 screws on the housing and place the front part in the parked position.
2. Feed cables into the threaded cable connectors. Where there are multiple sealing inserts (see figure below, "Fitting a threaded connector"), observe the permitted cable cross-section, see "Clamping Range Table" at the very end of the appendix.
3. Further steps can be found in *Chapter 6.3.3 'Wiring the Bello Zon® control' on page 31*.

   Thereafter please continue with the following steps:
4. Tighten the union nuts (see Fig. 13, item 4) of the threaded connectors so that they are leak-tight.
5. Fit the front part onto the rear part.

WARNING!

Danger of electric shock

An electric shock may occur if moisture penetrates into the control.

– Once again check the seating of the seals to ensure that IP 65 degree of protection is correctly achieved.

6. Check the seating of the seal once again.
7. Manually tighten the housing screws until hand-tight.

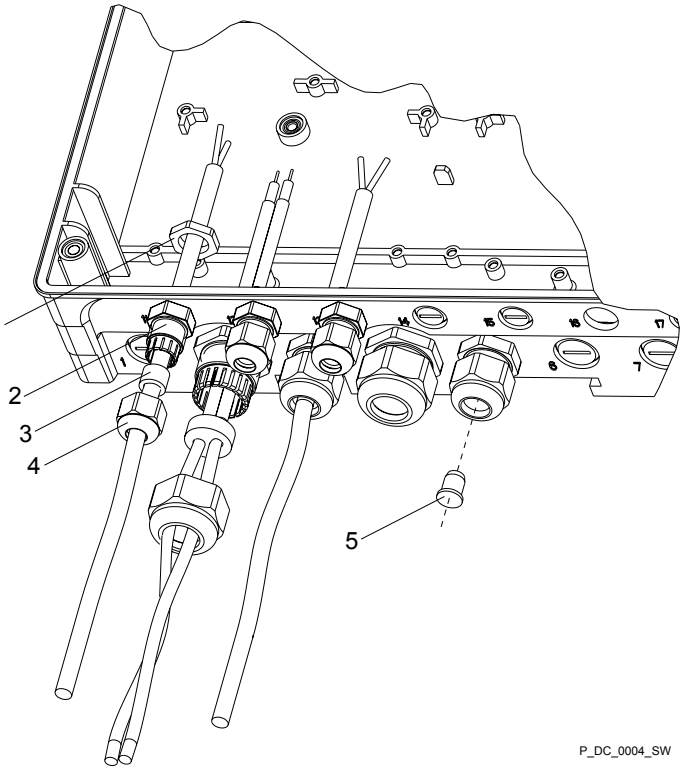


Fig. 13: Fitting the threaded connector

1 Lock nut
2 Threaded connector
3 Multiple sealing insert
4 Union nut
5 Blanking plug

6.3.3.1 Connecting the terminals

1. Remove the cable insulation as per and crimp on the corresponding cable end sleeves.
2. Connect the cables according to the wiring diagram.
3. Check all the cabling against the wiring diagram.
4. Tighten the clamping screws of the threaded connectors until they are leak-tight.

- *Simply insert the leads into the terminals to install the leads for terminals XE1 to XA1.*
- *To release the leads for terminals XK1 to X2 again, simply press on the white button of the required terminal using the tip of a ball-point pen and pull the lead out.*
- *For wiring diagram - see appendix.*

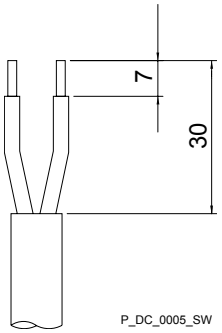


Fig. 14: Removing wiring insulation

6.3.4 Wiring the pre-dilution control

1. Connect the terminals, as described in the preceding chapter. There is a separate wiring diagram for the pre-dilution control.
2. Always close the door of the control box carefully so that no moisture can penetrate.

The pre-dilution control supplies the control of the Bello Zon® with mains voltage.

6.3.5 Installing the bypass pump

WARNING!
Control faults possible
– Fit the RC member supplied in line with the wiring diagram between the bypass pump and the control.

CAUTION!
– The control can supply mains voltage for a bypass pump with a power rating up to the limit rating (see the table below). Consequently the bypass pump is simultaneously locked with the chlorine dioxide generator.
– For bypass pumps with electrical ratings greater than the limit rating, use a contactor relay.

Data	Value	Unit
Limit rating at 230 VAC	1.1	kVA
Limit rating at 115 VAC	0.55	kVA

6.3.6 Installing the gas detector (accessories)

It makes sense to install a chlorine dioxide gas detector to detect an escape of ClO_2 at the installation site of the chlorine dioxide system .

Also install a gas detector if no other measure is provided to ensure personnel safety in the event of ClO_2 escaping.

Install and start up the gas detector according to its documentation.

WARNING!

The reactor can explode

Even if the gas detector detects chlorine dioxide and switches off the system, this does not prevent the possibility of the reactor exploding.

Observe the warnings and notes in these instructions.

6.3.7 Installing an emergency stop switch

WARNING!

It may be dangerous to approach the system after specific incorrect operations or faults. Then switch off using an emergency stop switch, located at a safe distance.

- Install an emergency stop switch in the mains supply line.
- Install the emergency stop switch in an easily accessible, invulnerable position in the vicinity of the door to the operation room of the chlorine dioxide system and label it as such.
- The emergency stop switch should disconnect the electrical supply equipment connected to the system from the mains.

6.3.8 Prepare the mains connection in line with EN 60204

WARNING!

Risk of explosion due to chlorine dioxide

Toxic chlorine dioxide can accumulate and explode if the system is started up and connected to the mains voltage without the presence of qualified personnel.

- Ensure that the system is only started up by a Service team authorised by ProMinent in accordance with the operating instructions.

CAUTION!

Warning against illegal operation

Observe the regulations that apply where the device is installed.

1. Connect the power supply lines for the control to the pre-dilution control, see the wiring diagram.
2. CDKc 7300 and 12000 only: Connect the power supply lines for the metering pumps to the pre-dilution control, see the wiring diagram.
3. The customer should wire a bypass pump (accessories) to the Bello Zon® distribution box and from there onwards to the Bello Zon® control on site.

- - - Preparation of the chlorine dioxide system is now sufficient to permit its starting up by a ProMinent service technician, see the operating instructions for Bello Zon® chlorine dioxide systems. - - -

7 EC Declaration of Conformity for Machinery

In accordance with DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, Appendix I, BASIC HEALTH AND SAFETY REQUIREMENTS, section 1.7.4.2. C.

We,

- ProMinent Dosiertechnik GmbH
- Im Schuhmachergewann 5 - 11
- D - 69123 Heidelberg,

hereby declare that the product specified in the following, complies with the relevant basic health and safety requirements of the EC Directive, on the basis of its functional concept and design and in the version distributed by us. This declaration loses its validity in the event of a modification to the product not agreed with us.

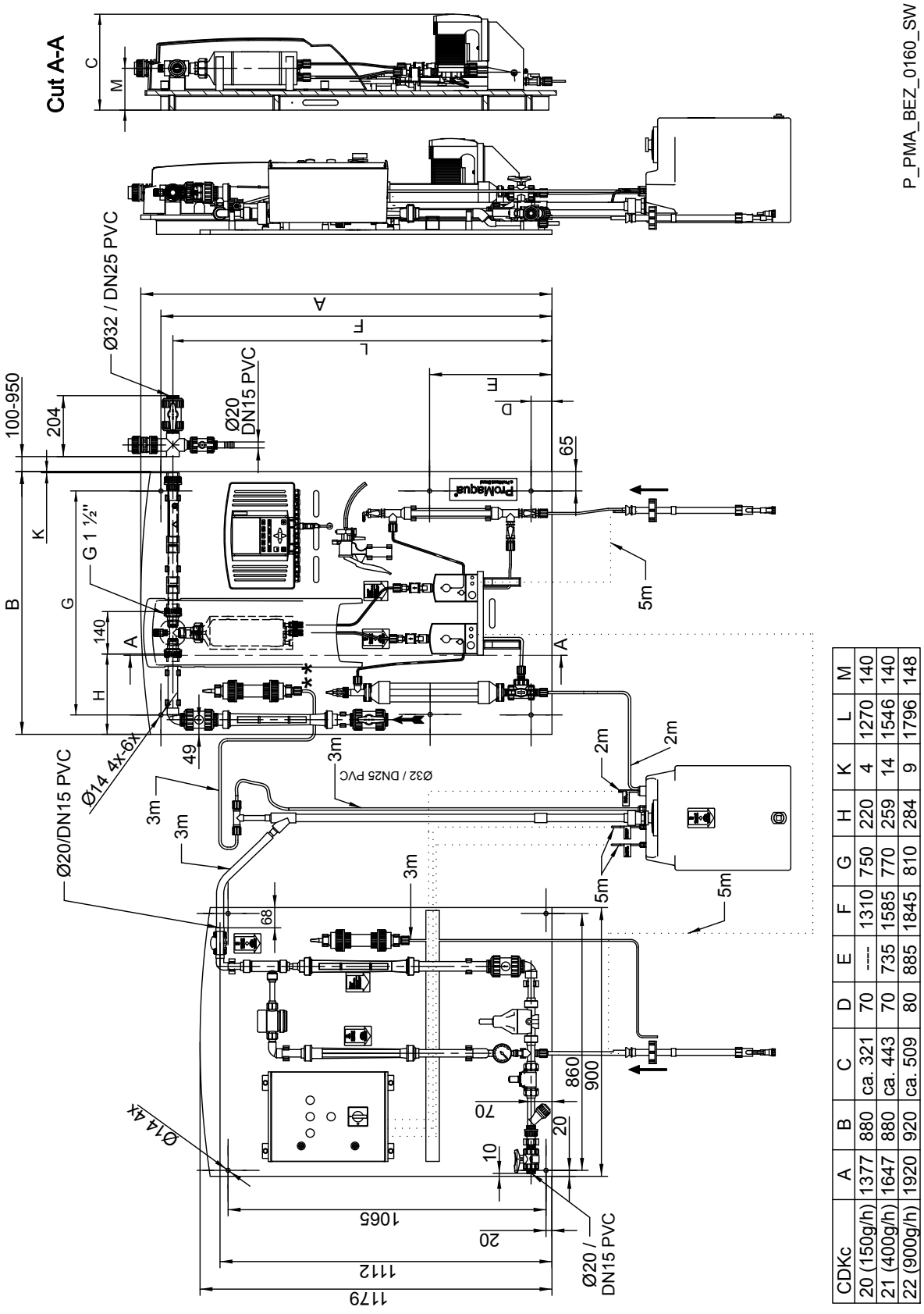
Extract from the EC Declaration of Conformity

Designation of the product:	Bello Zon® chlorine dioxide generation system
Product type:	CDKc…
Serial number:	See nameplate on the unit
Relevant EC directives:	EC Machinery Directive (2006/42/EC) EC EMC Directive (2004/108/EC) EC Pressurised Equipment Directive (97/23/EC) Compliance with the protection targets of the Low Voltage Directive 2006/95/EC according to Appendix I, No. 1.5.1 of the Machinery Directive 2006/42/EC
Harmonised standards applied, in particular:	EN ISO 12100:2010 EN 809 EN 60204-1 EN 60529 EN 61000-6-1/2/3/4
Applied national standards and other technical specifications in particular:	DVGW regulations, Worksheet W 224 and W 624
Date:	2.1.2013

You can find the EC Declaration of Conformity as a download under *http://www.prominent.de/Service/Download-Service.aspx*

8 Dimensions sheets

Dimensional drawing for the CDKc 150 ... 900



CDKc	A	B	C	D	E	F	G	H	K	L	M
20 (150g/h)	1377	880	ca. 321	70	----	1310	750	220	4	1270	140
21 (400g/h)	1647	880	ca. 443	70	735	1585	770	259	14	1546	140
22 (900g/h)	1920	920	ca. 509	80	885	1845	810	284	9	1796	148

Fig. 15: Dimension sheet CDKc 150 ...900 - dimensions in mm

Dimension sheet CDKc 2000 ... 2800

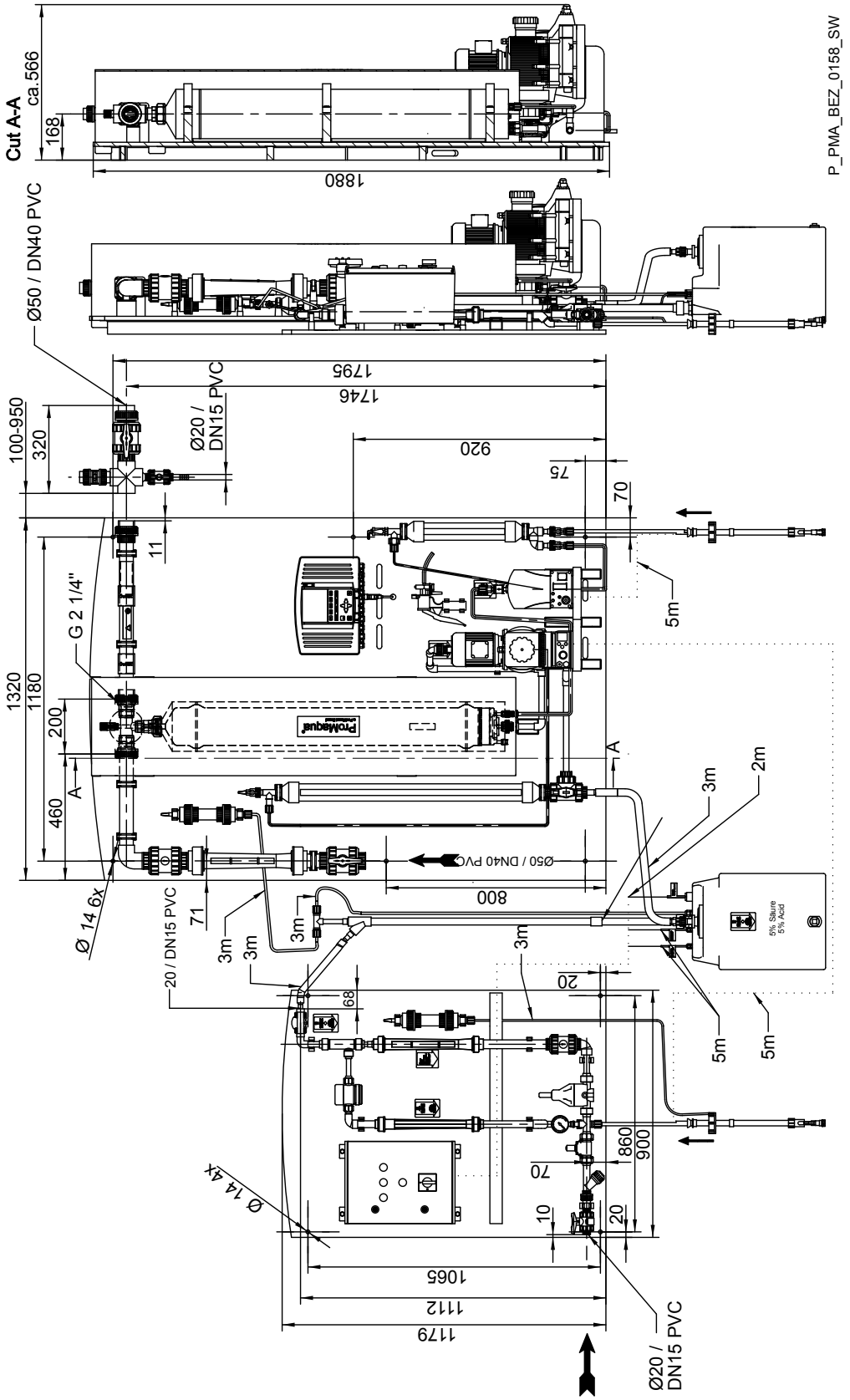


Fig. 16: Dimension sheet CDKc 2000 ... 2800 - dimensions in mm

Dimension sheet CDKc 7300 ... 12000

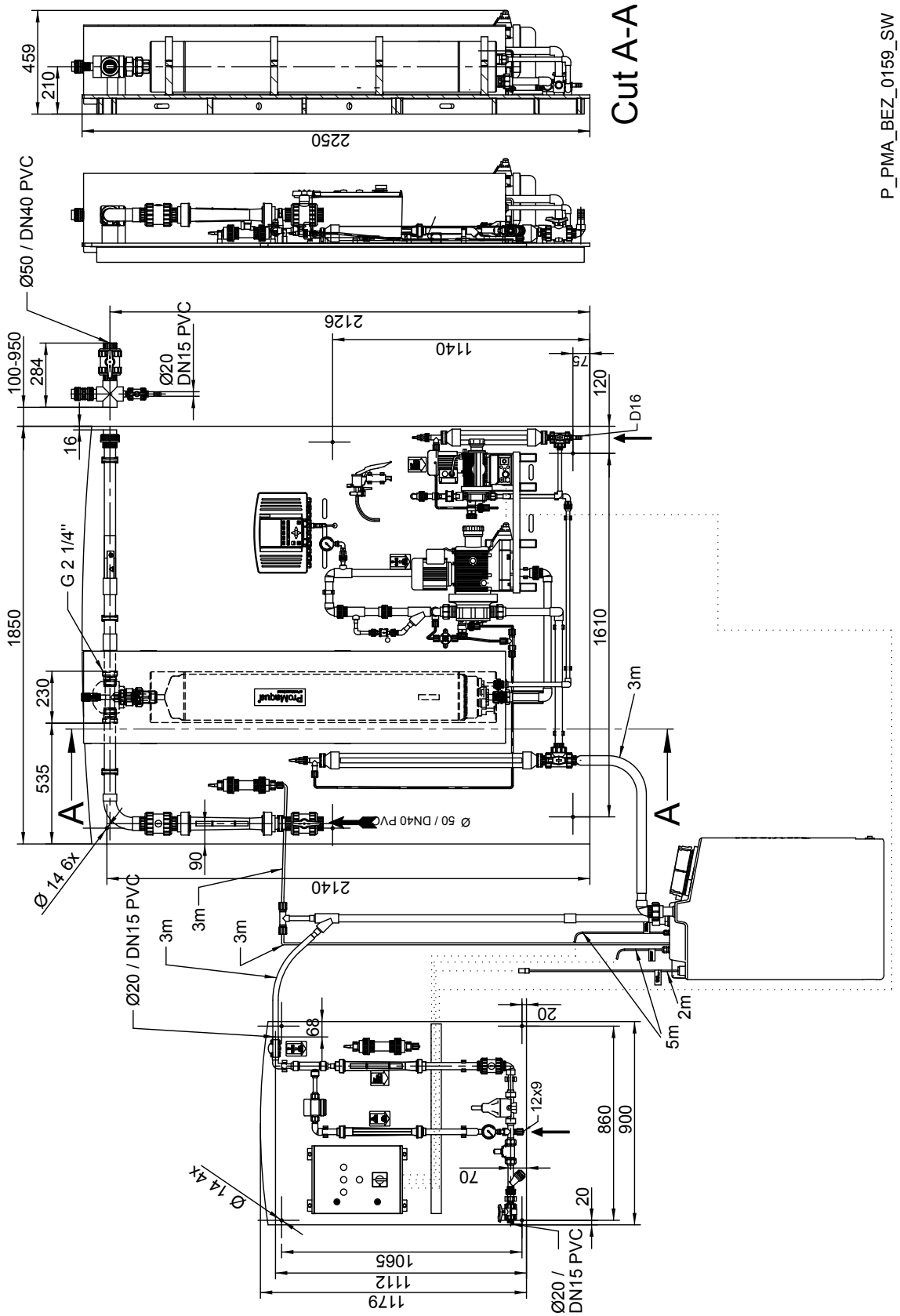


Fig. 17: Dimension sheet CDKc 7300 ... 12000 - dimensions in mm

9 Technical data

System

Type	Chlorine dioxide capacity*		Max. operating pressure	Operating temperature	Max. priming lift metering pumps**
	min.-max./hour	min./day			
	g/h	g/d	bar	°C	mWS
CDKc 150	9 ... 150	56	8	10 ... 40	2.0
CDKc 400	21 ... 400	140	8	10 ... 40	3.0
CDKc 900	45 ... 900	300	8	10 ... 40	1 ... 2 #
CDKc 2000	105 ... 2000	700	5	10 ... 40	1 ... 2 #
CDKc 2800	150 ... 2800	700	5	15 ... 40	1 ... 2 #
CDKc 7300	375 ... 7300	1750	3	15 ... 40	1 ... 2 #
CDKc 12000	600 ... 12000	1750	2	18 ... 40	1 ... 2 #

* The metering figures relate to 5 bar back pressure and an ambient temperature of 20 °C. The minimum capacity per hour is based on the fact that when the system is operating at below 5 % of the nominal capacity, continuous metering is no longer possible, due to the then low pumping frequency of the metering pumps. When systems are not operating continuously, the reactor contents must be changed at least twice a day. The plant should not, therefore, be operated below the stated minimum capacity / day.

** Suction length at 100% stroke length.

*** without bypass pump, flushing equipment and "water supply" module.

With water, with moist valves, without back pressure.

Max. power consumption			
	115 V	230 V	230 V with bypass pump
	A	A	A
CDKc 150	1.2	0.7	2.7
CDKc 400	1.5	0.9	2.8
CDKc 900	2.5	1.4	2.9
CDKc 2000	3.5	2.2	
CDKc 2800	3.5	2.2	
CDKc 7300	4.5	2.7	
CDKc 12000	4.5	2.7	

Weight

Weight in kg, without packaging:

CDKc	150	400	900	2000	2800	7300	12000
Main plate	50	80	95	160	160	175	175
Pre-dilution facility	35	35	35	40	40	40	40

Control main plate

Power supply

Data	Value	Unit
Nominal voltage, ± 10 %	90 ... 240	V*
Nominal voltage, ± 10 %	230	V*
Nominal voltage, ± 10 %	100 ... 115	V*
Mains supply frequency	50 / 60	Hz*

* dependent on version

Permitted fuses for the Bello Zon® control (230 V AC or 115 V AC)

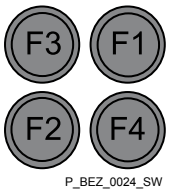


Fig. 18: Fuse layout in the control

Description	Type	Supplied ...	Terminals	Part no.
F1	0.4 ATT	Control	XP	712060
F2	10 AT	Bypass pump	X12:1, 5, 9	712073
F3	1.0 AT	Solenoid valves	X12:2, 6, 10; X12:3, 7, 11	732409
F4	10 AT	Metering pumps	X11:1 ... 12	712073
Micro fuse 5 x 20 mm:				

The fuses are each contained in a fuse holder with a bayonet coupling. They are located in the terminal box of the control, on the right above the mains voltage terminals. For the layout, see figure.

Inputs

Digital inputs for contact water meter with reed-contact or Namur water meter with pulse width > 5 ms (XK8:3 and XK8:4):

Frequency range: 0.25 ... 20 Hz

Inputs: based on DIN 19 234 (Namur)

Supplied open circuit voltage: 8.2 V

Switch point: 4 kΩ

Contact input for contact water meter with Hall sensor or IDM with frequency output (XK8:2 and XK8:3):

Hall sensor:

Integrated supply voltage: +5 V, 10 mA

Contact gap: 0.1 ... 10 l / pulse

IDM (open collector):

Frequency range: 10 ... 10000 Hz

Pulse width: > 20 µs

Contact inputs (XK3 ... XK6):

for contacts or switching transistors:

Open circuit voltage: 12 V ± 1 V

Short circuit current: 5 mA

Contact: open, R > 100 kΩ

Contact: closed, R > 1 kΩ

Standard signal outputs (mA) (XE1 and XE2):

0/4 ... 20 mA, isolated

Insulation voltage: 500 V

Input resistance: 50 Ω

Load capacity: 30 mA

Inputs with 2 conductors

Connector (sliding supply): Supply voltage 22.0 V ... 25.0 V

Measuring accuracy: ± 1 % of the measuring range (at 25 °C)

Outputs

Switched mains outputs:

X12:1, 5, 9: "Bypass pump" max. 6 A constant current

Alarm relay (XR1:2 and XR1:1):

Type of contact: Changeover contact

Load capacity: 250 V AC / 3 A / 100 VA

Warning relay (XR2:1 and XR1:1):

Type of contact: NOC

Load capacity: 250 V AC / 3 A / 100 VA

Operating indicator relay (XR2:2 and XR1:1):

Type of contact: NOC

Load capacity: 250 V AC / 3 A / 100 VA

Standard signal outputs (mA) (XA1):

0/4...20 mA, potential-free

Maximum load: 600 Ω

10 Wiring diagrams

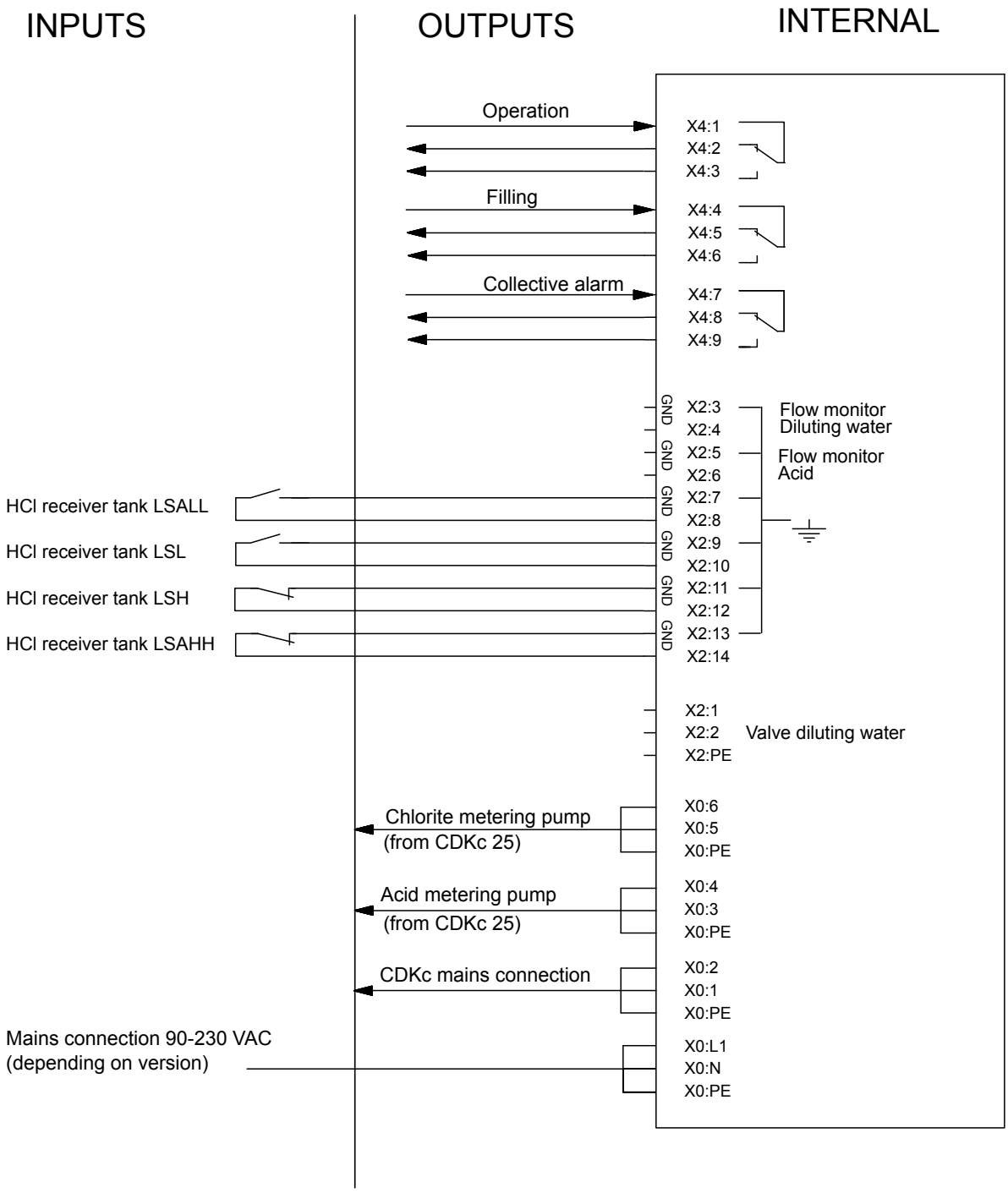


Fig. 19: Dilution control terminal diagram

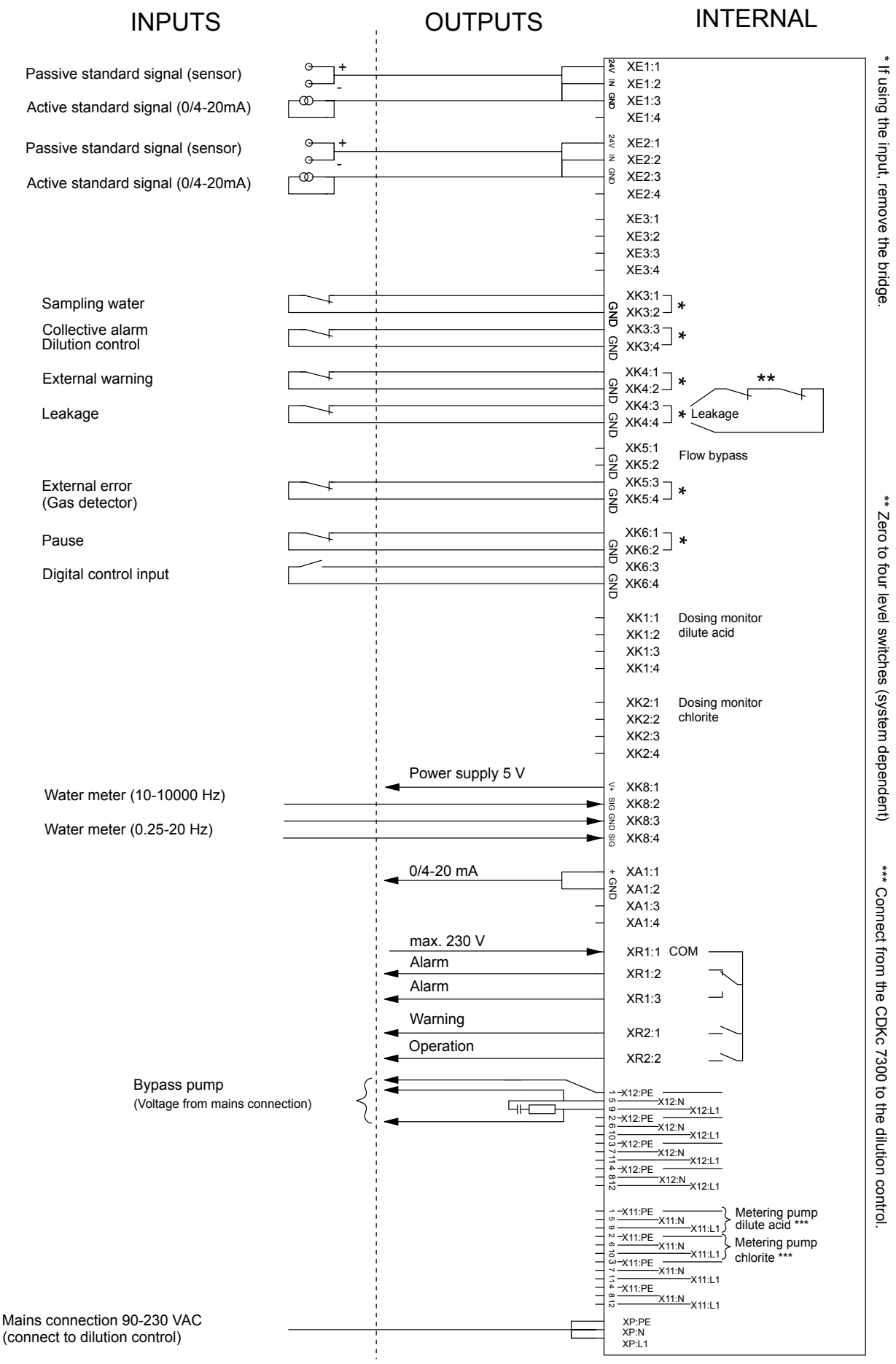


Fig. 20: CDKc wiring diagram

Clamping ranges

Cable feed-through	Terminal	Cable use	Threaded connector	Number of cables	Leads per cable	Cable Ø min.-max.
Lower/rear row						
1	XE1/1,2,3	Flow, control variable, interference variable, ClO2 or chlorite	M 16	1	2	2xØ4
	XE2/1,2,3	Flow, control variable, interference variable, ClO2 or chlorite	M 16	1	2	2xØ4
2	XK3/3,4	Collective alarm pre-dilution control	M 20	1	2	3xØ4
	XK4/1,2	External warning	M 20	1	2	3xØ4
	XK5/1,2	Flow bypass	M 20	1	2	3xØ4
3	XK4/3,4	Leakage, acid chemicals tank	M 16	1	2	2xØ4
	XK4/3,4	Leakage, chlorite chemicals tank	M 16	1	2	2xØ4
4	XK1/1,2	Acid dosing monitor	M 20	1	2	3xØ4
	XK2/1,2	Chlorite dosing monitor	M 20	1	2	3xØ4
5	XK8/1,2	Water meter (open collector) (10 - 10000 Hz)	M 16	1	2	Ø4.5-Ø10
	XK8/3,4	Water meter (Namur) (0.25 - 20 Hz)	M 16	1	2	Ø4.5-Ø10
6	XR1/1	Relay: root	M 16	1	5	Ø4.5-Ø10
	XR1/2.3	Relay: Alarm	M 16	1	5	Ø4.5-Ø10
	XR2/1	Relay: Warning	M 16	1	5	Ø4.5-Ø10
	XR2/2	Relay: Operation	M 16	1	5	Ø4.5-Ø10
7	X11	Power supply to acid metering pump	M 16	1	3	Ø4.5-Ø10
9	X11	Power supply to chlorite metering pump	M 16	1	3	Ø4.5-Ø10
10	X11	Power supply to control	M 16	1	3	Ø4.5-Ø10
Top/front row						
11	XK4/3,4	Leakage, e.g. safety collection trays or other vessels	M12	1	2	Ø3.5-Ø6.5

Cable feed-through	Terminal	Cable use	Threaded connector	Number of cables	Leads per cable	Cable Ø min.-max.
12	XK3/1,2	Sample water	M12	1	2	Ø3.5-Ø6.5
13	XK5/3,4	External error	M12	1	2	Ø3.5-Ø6.5
14	XK6/1,2	Digital control input	M12	1	2	Ø3.5-Ø6.5
15	XA1/1,2	Standard signal output	M12	1	2	Ø3.5-Ø6.5
16		CAN	M12	1	5	-
17	X12/1,5,9	Bypass pump	M12	1	2	Ø3.5-Ø6.5

11 Ordering Information

Function extensions Bello Zon® control

With the Bello Zon® control, certain identity code features such as "Control" and "Extended inputs and outputs" can be expanded with certain features such as analog inputs or measurement and control features. To enable this, a suitable release code must be ordered from ProMinent®, suitable for the serial number of the control. A separate installation and configuration guide describes how the identity code features are enabled.

Back pressure valve

In installations with long bypass lines, especially when these are routed downwards and the point of injection lies below the Bello Zon® system, as well as with installations with fluctuating back pressure, a back pressure valve which is free from back pressure effects must be fitted.

Type	Nominal width	Connector	Material	Part no.
DHV-U	DN25	G 1 1/2″	PCB	1037774
DHV 712-R	DN40	G 2 1/4″	PCB	1000052

Acid vapour separator for acid canisters

To bind the HCl vapours which may arise during filing and drainage processes, an acid vapour separator is fitted to both the acid canister and the corresponding calibration device. Their padding is replaceable.

Accessories	Part no.
Acid vapour separator, 130 ml	1034692
Binding agent type 1, 150 ml	1035854

Chlorine dioxide point of injection from PVC-U

For homogeneous distribution of the chlorine dioxide enriched bypass water in the main water supply pipe an immersion pipe is to be used, so that the mixing and distribution of the chlorine dioxide is optimized.

The immersion pipe must be shortened on-site to the desired length. Accordingly, included in the scope of supply is Tangit cleaner and glue as well as a DN 25 ball valve as a shut-off valve.

The immersion pipe is installed using a site supplied DN 50 DIN flange.

Accessories	Part no.
Point of injection up to nominal width DN80*, with ball valve	1018754
Point of injection from nominal width DN100*, with ball valve	1018753
* Main water supply	

Gas detector GMA 36 chlorine dioxide

The type GMA 36 chlorine dioxide gas detector is designed as a compact measuring and switching unit for monitoring the ambient air for dangerous concentrations of chlorine dioxide.

Accessories	Part no.
Gas detector GMA 36 chlorine dioxide	1023156
Replacement sensor for chlorine, chlorine dioxide, ozone	1023314

Safety bund for chemical tanks

Useful capacity	Design	Part no.
40 l	without leakage monitoring	791726
70 l	without leakage monitoring	740309
140 l	without leakage monitoring	740723

Leakage monitoring for Bello Zon® systems

Leakage monitoring comprising 1 level switch which is inserted in the 40, 70 or 140 l safety bund and connected to the control of the Bello Zon® system.

Accessories	Part no.
Level switch with 5 m lead	1003191

Acid metering pumps

For system type CDKc	Part no.
150	1043034
400	1043035
900	1043036
2000	1043037
2800	1043037
7300	1043039
12000	1043040

Chlorite metering pumps

For system type CDKc	Part no.
150	1028044
400	1034729
900	1034710
2000	1035868
2800	1035666
7300	1036062
12000	1039860

Bypass pump

The required bypass flow should be considered when selecting a suitable bypass pump. The following flow data is recommended for the different systems:

System types	Bypass line	Diameter	Flow
		mm	m³/h
CDKc 150 - 900	DN 25	32	0.5 ... 2
CDKc 2,000 - 2,800	DN 40	50	2 ... 10
CDKc 7,300	DN 40	50	6 ... 10
CDKc 12,000	DN 40	50	10 ... 15

PVC should be used as the material for the bypass. The thickness should at least correspond to the pressure range PN 10, or even better PN 16 (bar).

Accessories

Accessories	Part no.
Bypass pump panel	791474
Inclined seat valve PVC DN 25 for throttling the bypass pump	1001877

Maintenance sets for CDKc systems

The maintenance sets contain all wear parts which are to be exchanged within the scope of regular system maintenance.

Maintenance set, complete for	Part no.
CDKc 150	1043841
CDKc 400	1043842
CDKc 900	1043843
CDKc 2000	1043864
CDKc 2800	1043865
CDKc 7300	1043866
CDKc 12000	1043867

12 Decontamination declaration

Declaration of Decontamination

(see download: www.prominent.com)

Because of legal regulations and for the safety of our employees and operation equipment, we need the „declaration of decontamination", with your signature, before your order can be handled.
Please make absolutely sure to include it with the shipping documents, or – even better – attach it to the outside of the packaging.

Please return your products to:	

Type of instrument / sensor: _____ **Serial number:** _____
Gerätetyp: Seriennummer:

Process data: Temperature: _____ [°C] Pressure: _____ [bar]
Prozessdaten: Temperatur: Druck:

Mediums and warnings:
Warnhinweise zum Medium:

	Medium/ Concentration Medium/ Konzentration	**Identification** CAS No.	**flammable** entzündlich	**toxic** giftig	**corrosive** ätzend	**harmful/ irritant** gesundheitsschädlich/reizend	**other*** sonstiges*	**harmless** unbedenklich
Process medium Medium im Prozess								
Medium for process-cleaning Medium zur Prozessreinigung								
Returned part cleaned with Medium zur Endreinigung								

* explosive; oxidising; dangerous for the environment; biological risk; radioactive
* explosiv; brandfördernd; umweltgefährlich; biogefährlich; radioaktiv

Please tick should one of the above be applicable, include security sheet and, if necessary, special handling instructions.

Reason for return:

Company data:

Company:	_____	Phone number:	_____
Contact person:	_____	Fax:	_____
Street:	_____	E-Mail:	_____
Address:	_____	Your order No:	_____

"We hereby certify that the returned parts have been carefully cleaned. To the best of our knowledge they are free from any residues in dangerous quantities."

_____ _____
Place, date Company stamp and legally binding signature

13 Index

A
Ambient conditions 11
Applied harmonised standards 36
Assembly 14

B
Back pressure valve 26
Basic rules 6
Bello Zon control 31
Bleed hoses 29
Bypass line 22
Bypass line, flow generator 26
Bypass line, safety equipment 23
Bypass pump 33

C
Chlorine dioxide detection 28
Chlorine dioxide detection kit 28

D
Decontamination declaration 51
Designation of the product 36
Dimensions sheets 37

E
Emergency stop switch 34

F
Feed, ventilated 21
Flow generator bypass line 26
Flushing assembly with vacuum relief valve 25

G
Gas detector 17, 33

H
Handling instructions 2

I
Identification of safety notes 6
Identitycode 4
Inclined seat valve 27
Information 2
Information in the event of an emergency 10
Installation location 13
Installation, electrical 29
Installation, hydraulic 18
Instructions for entering... 8
Intended use 7

L
Labelling of safety information 6
Level switch 30

M
Minimum contact 31

N
Notes for the System Operator 2

P
Performance data 40
Personal protective equipment 9
Point of injection 27
Pre-dilution control 33
Preparing the mains connection 34
Protective equipment 9
Protective filter 27

Q
Qualification of personnel 7

R
Relevant EC directives 36
Requirements relating to the installation location 13

S
Safety chapter 6
Safety equipment bypass line 23
Scope of delivery 11
Serial number 36
Sound pressure level 10
Storage and Transport 11
Suction assemblies 28
Suction lances 28
Suction lines 21
Supplementary information 2

T
Technical data 40
Terminals 32
Transport 11

V
Vacuum relief valve, flushing assembly with 25
Ventilated feed 21

W
Warning sign 6
Weight 12, 40
Wiring diagrams 43, 44

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