
CC3020

Controller for conductivity measurement



Instruction manual

Software version 2.00

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General description

The controller CC3020 is used for the fully automatic monitoring of the conductivity and if necessary also the automatic start of the regeneration via an external controller

The base values which are programmed into the controller can be changed at any time; in the event of a power failure the set values will be retained.

Depending on the set mode, the controller recognises 1 or 7 switch steps, which are indicated as follows: "Monitoring", "Pre Flush", "Regeneration start", "Regeneration wait", "Regeneration", "Flush" en "Flush alarm".

Two modes are available inside the controller. From this, a choice can be made as to which programme should be launched by the controller.

Mode “CM”

In this mode, only the conductivity is monitored. The controller will always remain in the step “Monitoring” and alarms can be set in case the conductivity drops below the set minimum limit value and/or the conductivity exceeds the maximum limit value.

Mode “CMR”

In this mode, the conductivity is monitored and in case the conductivity is too high during a set time, a regeneration can be started via an external controller (e.g. FCS3000, ES2030CV,.....). Preceding the regeneration, a flush may take place if necessary. If the conductivity drops below the set minimum limit value during this flush, the monitoring phase will start up again. In the other case, a regeneration will be started. Whether the external controller has indeed started the regeneration will be checked via the input “Regeneration” .

If the regeneration is actually started within a certain time, the CC3020 will be switched to the “Regeneration” step.

If the regeneration is blocked for any reason, the CC3020 will eventually arrive at the step “Regeneration wait” and wait until the regeneration actually takes place. The “Regeneration” step will be abandoned in case the regeneration has stopped (via input “regeneration detection”) and it can be set whether another flush should be activated. If this is not the case then the conductivity is once again monitored via the “Monitoring” step. In the other case a flush will be done until the conductivity drops beneath the set limit value (step 7.2).

Attention: This is another value than the conductivity to start a regeneration! (step 3.4 / 3.5)!

If the conductivity remains above the set value during the flush, than the step “Flush alarm” will be activated and can be chosen to open or close the flush valve. If the conductivity drops below the set limit, then the “Monitoring” step will be automatically activated.

Step "Monitoring"

During "Monitoring" the conductivity of the water is monitored.
The flush valve and the output "regeneration start" are not activated.
The input "regeneration" is monitored if the mode is set at "CMR".

The following values are monitored :

- The minimum conductivity (step 3.2 / 3.3)
- The maximum conductivity (step 3.4 / 3.5)
- Input "regeneration detection" (only in case of mode "CMR")

If the mode "CMR" is selected a flush or a regeneration will be started if a too high level of conductivity occurs. If a regeneration is started via the external controller than the CC3020 will be switched to the step "regeneration" (via input "regeneration detection").

Step "Pre Flush"

During "Pre Flush" the conductivity of the water is monitored.
The flush valve is open and the output "regeneration start" is not activated.

The following values are monitored :

- The minimum conductivity (step 3.2 / 3.3)
- The maximum conductivity (step 3.4 / 3.5)
- Input "regeneration detection"

In case conductivity remains above the set limit value during the flush time, a regeneration will be started. If a regeneration is started via the external controller than the CC3020 will be switched to the step "regeneration" (via input "regeneration detection").

Step "Regeneration start"

In case the conductivity remains too high, eventually the regeneration will be started via an external controller. The CC3020 controller will emit a signal via the output "Regeneration start" (AL) to indicate that a regeneration needs to be started.

The flush valve is closed

Via the input "Regeneration" (LP) it is monitored whether the external controller has actually switched to regeneration. For as long as this is not the case, the controller will activate the output "regeneration" during a maximum amount of time of 960 seconds. If no regeneration is started after this time has expired, the controller will switch to the step "Regeneration wait".

If a regeneration was in fact started the controller will switch to the step "Regeneration".

The step "Regeneration start" can also be interrupted manually by pressing the external key for about 2 seconds.

The following values are monitored :

- Input "regeneration detection"

Step "Regeneration wait"

This step only appears in case the external controller has not started a regeneration within 960 seconds. The controller will wait for a signal that regeneration has been started by the external controller.

The flush valve is closed.

The step "Regeneration start" can also be manually interrupted by pressing the external key for about 2 seconds.

The following values are monitored :

- Input "regeneration detection"

Step "Regeneration"

In case the external controller has started the regeneration and also indicates this via the input "regeneration detection, the step "Regeneration" will be active. The flush valve and the output "regeneration start" are not activated.

The controller will remain in this step as long as the input "regeneration detection" is on.

As soon as the input is no longer active, it will monitor whether another flush is necessary or that it can be returned to the step "Monitoring". The flush function can be activated in step 7.1.

The following values are monitored :

- Input "regeneration detection"

Step "Flush"

During step 7.1 it can be set whether after the regeneration, another flush needs to take place. During "Flush" the conductivity of the water is monitored

The flush valve is open and the output "regeneration start" is not activated.

The following values are monitored :

- The minimum conductivity (step 3.2 / 3.3)
- The maximum conductivity (step 7.2 / 7.3)
- Input "regeneration detection"

In case conductivity remains above the set limit value during flush time, the step "Flush alarm" will be returned to.

Step "Flush alarm"

During step 7.4 it can be set whether the flush valve should remain open and/or should be closed during this step.

The following values are monitored:

- The Maximum conductivity (step 7.2 / 7.3)
- Input "regeneration detection"

In case the conductivity drops below the set limit value the step "Monitoring" will be returned to.

The step "Flush alarm" can also be manually interrupted by pressing the external key for about 2 seconds.

The alarm output can be activated in case of a flush alarm. During step 8.1 a vertical line should be programmed behind "FL".

Value and function display

First LCD line


The current status of the system is shown in the first line of the LCD display: "Monitoring", "Pre flush", "Regeneration start", "Regeneration wait", "Regeneration", "Flush" and "Flush alarm".

In case of an alarm situation, an alternating message appears.

Second LCD line

The measured conductivity is shown in the second line of the LCD display. ATTENTION! If the message "OFL" appears in the second line, the value falls outside the measurement range.

Example:

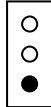


The image shows a rectangular LCD display with a black border. It contains two lines of text. The first line is "Monitoring" in a bold, black, sans-serif font. The second line is "CM 40.0uS/cm" in the same font, with "CM" on the left and "40.0uS/cm" on the right.

Monitoring	
CM	40.0uS/cm

Info display

Various information can be called up by pressing the information key.
Pressing the key again changes the information shown.



Input positions

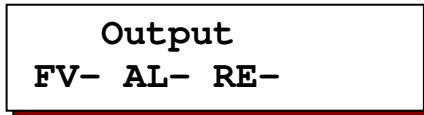


The current switch positions of the input functions are shown here.

RW = Regeneration busy

RS = Reset alarm

Output positions



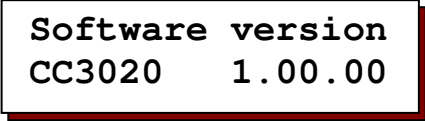
The current switch positions of the outputs FV, AL and RE are shown here.

FV = Flush valve

AL = Alarm

RE = Regeneration start

Software version

A rectangular box with a white background and a thick dark red border. Inside the box, the text "Software version" is on the top line and "CC3020 1.00.00" is on the bottom line, both in a bold, black, sans-serif font.

Software version	
CC3020	1.00.00


The software is regularly updated to ensure that the product complies with the latest insights and needs.

The number of the operational version is indicated.

Alarm

If the alarm relay is activated, it can be deactivated by pressing the external key. Although this deactivates the relay, the message is still shown in the LCD display. Press the key again to remove the message.

CM MIN

A rectangular LCD display with a black border and a dark red shadow on the right and bottom. The text is in a monospaced font, with 'Limit CM Min' on the first line and 'under valued' on the second line.

**Limit CM Min
under valued**

The conductivity value of the conductivity meter has dropped below the set minimum limit value. The system remains operational.

The message in the LCD display can be switched off as soon as the minimum limit value is again exceeded. The alarm relay can be activated.

CM MAX

A rectangular LCD display with a black border and a dark red shadow on the right and bottom. The text is in a monospaced font, with 'Limit CM Max' on the first line and 'exceeded' on the second line.

**Limit CM Max
exceeded**

The conductivity value of the conductivity meter has exceeded the set maximum limit value. The system remains operational.

The message in the LCD display can be switched off as soon as the conductivity drops below the maximum limit. The alarm relay can be activated. This message can only appear in the LCD display if the “CM” mode is selected.

Power failure

Signal
Supply failure

It is possible to program an alarm in case a power failure occurs while the controller is operational.

Flush Alarm

Signal
Flush

This message appears in case the conductivity is still above the set limit value after the set flush time (flush). This message only appears if the “CMR” mode is selected and in case the alarm output for this situation is activated .

Input functions

The inputs 'Regeneration busy' (EM) and 'Alarm reset' (IN) are included as standard.

Regeneration busy

The input function "Regeneration detection" is used to verify whether the external controller has activated the installation in "Regeneration".

The input function is only monitored in case the mode is set to "CMR". If the input is activated the controller will always switch to the step "Regeneration".

The input function is active in a closed circuit.

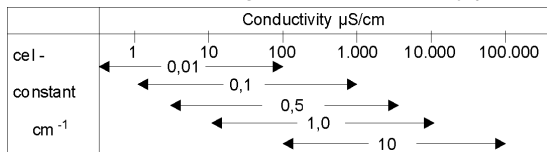
Alarm reset

No further programming possible. The input is connected to the built-in switch on delivery.

Conductivity probe

The connection for the conductivity probe is indicated by 'CC'.

The measurement range of the conductivity probe depends on the cell constant.

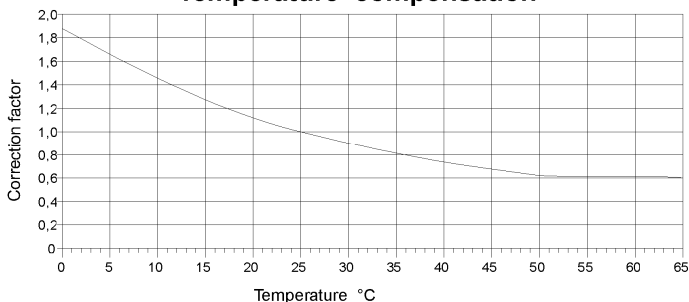


The cell constant can be programmed in step 2.1.

Also, it is possible to set the minimum and maximum limit values with a programmable delay time. Whether the alarm relay should be activated in the case of a specific message can be set in step 9.1.

It is also possible to compensate for the temperature factor in the conductivity measurement. The water temperature can be programmed in step 3.

Temperature compensation



Example:

Set/measured water temperature:

Measured conductivity value:

Applicable correction factor:

Shown conductivity value:

$$T = 11\text{ }^{\circ}\text{C}$$

$$C_{11} = 100\text{ }\mu\text{S/cm}$$

$$K = 1.4$$

$$C_{25} = 140\text{ }\mu\text{S/cm}$$

Output functions

The outputs 'Flush valve (FV on terminal IV), 'Alarm' (AL on terminal PU) and 'Regeneration start' (RE on terminal AL) are included as standard.

Flush valve

The flush valve is opened in case conductivity is above the set limit value, during a set time. For this purpose both the "CMR" mode and the flush function (step 6.1 = Yes) must be activated

The maximum power consumption on this output is 8A (secured).

Alarm

The alarm relay can be activated under certain conditions, such as:

- minimum conductivity value
- maximum conductivity value exceeded
- power failure
- flush alarm
- switch to filter 2
- system switch off

Energizing of the alarm relay in case of a failure can also be programmed.

Attention : This output is powered !

Regeneration start

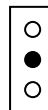
Via this output, it can be indicated that an external controller has to activate a regeneration.

Changing and calling up the basic parameters

On taking the controller into operation, the operating values of the conductivity measurement are set by entering the basic parameters.

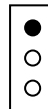
These values can be changed at any time, but will not be lost in the event of a power failure.

To prevent accidental program changes, the key must be pressed for four seconds before gaining access to the programming mode. Simply press the same key to navigate the programming mode.



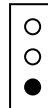
The programming mode is automatically exited approx. 2 minutes after the last key operation or by entering the indicated key combination.

Press the top key to move the cursor.



Use the bottom key to change numerical values, which you have selected with the cursor, within the available range.

Also use this key to switch between '-' and '|' in case of option questions.



1. Language

Step no.:	1.1
D	<u>N</u> 1 E F

The language can be set in the step.

2. Mode

Step no.:	2.1
<u>C</u> M	CMR

Enter the program mode :

CM = Only conductivity monitoring

CMR = Conductivity monitoring + Regeneration start

3. Conductivity meter

Step no.:	3.1
Constant	0.1 <u>0</u>

A measurement cell with a specific cell constant must be selected depending on the required conductivity of the water. Here, a cell constant of 0.01 to 10.00 cm^{-1} can be programmed for the conductivity meter.

Step no.:	3.2
Value Min	1.0

An electronic interruption of the measurement cell, electronic defects in the system or air in the measurement cell can erroneously result in very low conductivity values. For monitoring purposes, a limit value of 0.0 to 999,9 $\mu\text{S}/\text{cm}$ can be entered.

Step no.:	3.3
Delay	60s

After a programmed delay time of 1 to 999 seconds, a drop below the limit value will result in the error message 'Limit CM Min under valued' being shown in the LCD display.

Step no.:	3.4
Value Max	100.0

A change in the quality of the supply water can lead to change in conductivity. For monitoring purposes, a limit value of 0,2 to 6500,0 $\mu\text{S}/\text{cm}$ can be entered.

Step no.:	3.5
Delay	180s

If, after a programmed delay time of 1 to 999 seconds, the maximum conductivity value is exceeded, there will be an alarm (mode = CM) or a regeneration will be started.

4. Temperature

Step no.:	4.1
Temperature	2<u>5</u>°C

By entering the water temperature, the indicated conductivity value can be compensated to allow for the current temperature.

The conductivity measurement is based on a water temperature of 25 °C. In case of a higher or lower temperature, this can be compensated by hand.

5. Compensation correction factor

Step no.:	5.1
Factor	1.<u>00</u>*

Other measuring errors, which may arise through valorisation or cable capacities, for example, can be compensated here by entering a correction factor, varying from 0.10 to 5.0.

Take a water sample and measure the conductivity using an accurate conductivity meter: this results in the calibration value. Record the controller reading as the measurement value.

Use the formula below to calculate the correction factor:

$$\frac{\text{Reference value}}{\text{Measured value}} = \text{Correction factor}$$

6. Pre flush

Step no.:	6.1
Flush before	<u>Y</u>/N

Enter whether the flush before function needs to be activated
These steps are only programmable in case the mode “CMR” has been selected.

Step no.:	6.2
Delay	30<u>s</u>

Enter the maximum pre flush time (1-999 sec.).

7. Flush

Step no.:	7.1
Flush after	<u>Y</u>/N

Enter whether the flush after function needs to be activated

These steps are only programmable in case the mode "CMR" has been selected

Step no.:	7.2
Limit	20.<u>0</u>

Enter the limit value of the conductivity whereupon the flush after is interrupted and is returned to the monitoring step (0,5 - 6500,0 $\mu\text{S/cm}$).

Step no.:	7.3
Delay	30<u>s</u>

Enter the maximan flush after time (1-999 sec.).

Step no.:	7.4
Valve open	<u>Y</u>/N

Enter whether the flush valve will remain open or closed during the step "Flush alarm".

8. Alarm

Step no.: 8.1

MI-MA-PF-FL-

In this step, you can program the events that will activate the alarm relay (“-“ = not activated, “|“ = activated).

MI = minimum conductivity

MA = maximum conductivity

PF = power failure

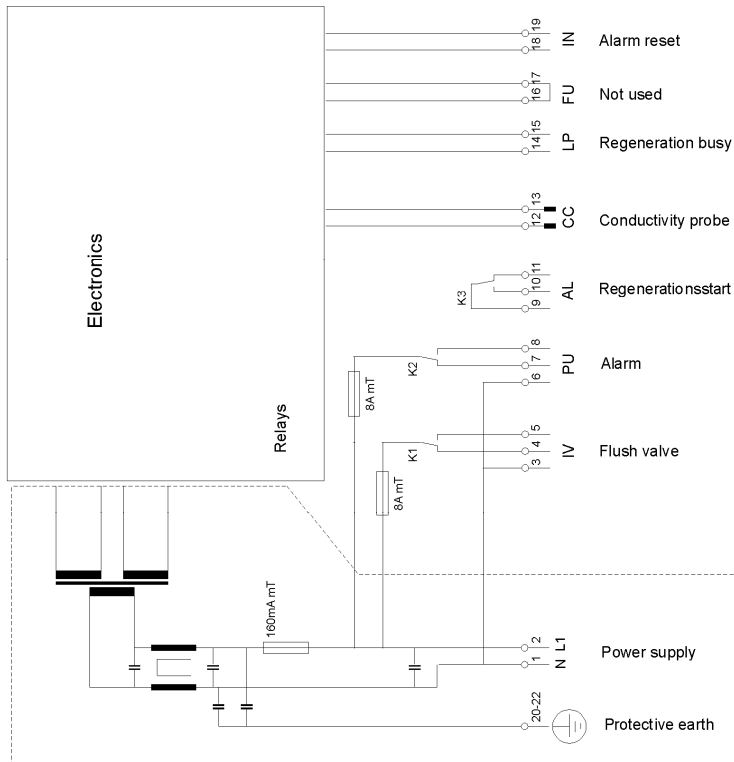
FL = flush alarm

Step no.: 8.2

Rel.energ. Y/N

Here, you can program whether the alarm relay should be energized (Yes) or not (No) in case of a failure.

Connection terminals CC3020



Installation and commissioning

General

Installation and commissioning of the control system may only be carried out by trained specialists who are familiar with these operating instructions and the applicable regulations on safe working practices and accident prevention. The instructions given in this manual must always be observed and followed.

To guarantee functional operation and safety, the instructions in this manual must be followed. The manufacturer accepts no liability for damage resulting from failure to follow the instructions.

Assembly

- Do not install under damp pipes. Fit shielding if necessary.
- Install device at eye level and easily accessible to the user.

Connection

- Before carrying out connection work, always ensure the control unit is first disconnected from the power supply. Make sure that the power supply remains disconnected during connection work.
- Make electrical connections. Observe local regulations. Connect supply voltage and ground to the terminals shown in the wiring diagram.
- Make sure that the ground connection is faultless.
- The front panel is connected to ground via a plug connection which must not become disconnected during operation.
- If possible, keep all extra low voltage cabling (digital inputs, measurements) separate from the power supply cable.

- It is not permitted to connect the potential-free relays with a combination of 230 VAC and extra low voltage.
- Some external relays, magnetic switches, solenoid valves, etc. can cause unwanted interference pulses when switched off.
For this reason, it is recommended that the components mentioned should be equipped with a so-called RC network in advance.
Ask the supplier of the mentioned components for the correct type of RC network.

Maintenance

The control system does not contain any user-serviceable parts. Unauthorised modifications and/or repairs to the control unit will void all warranty claims and the manufacturer's liability.

Commissioning

After installation and commissioning the control system may only be switched on if it is completely closed and all connections have been made correctly.

Technical specifications

Power connection:	230V, 50-60 Hz, fuse 160 mA 115V, 50-60 Hz, fuse 315 mA 24V, 50-60 Hz, fuse 1A
Power consumption:	4 VA
Flush valve:	Voltage is equal to supply voltage, 8AT fuse max. current load 250V, Ohm = 8A, Inductive = 3A
Alarm :	Voltage is equal to supply voltage, 8AT fuse max. current load 250V, Ohm = 8A, Inductive = 3A
Regeneration start:	max. current load 250V, Ohm = 8A, Inductive = 3A
Inputs:	loaded with 9V, 8mA
Protection class:	IP 65
Ambient temperature:	0 – 40 °C
Weight:	0,65 kg
Dimensions:	122 x 120 x 57 mm
Special features:	protected against zero voltage

Declaration of conformity

Declaration of conformity of the product with the essential requirement of the EMC directive 89 / 336 / EEC.

Product description

Product name : Controller for conductivity measurement
Product type : CC3020
Manufacturer : EWS Equipment for Water treatment Systems International B.V.
Australiëlaan 12
NL-5232 BB 's-Hertogenbosch
The Netherlands

Product environment

This product is intended for use in residential en light industrial environments.

Emission standard : EN 61000-6-3
Immunity standard : EN 61000-6-2
Low voltage directive : 2006/95/EG

Report

Report number : EWS_OS3020_02

This declaration was issued by :

Date : 12-03-2020
Name : V. Naeber

Signature :

A handwritten signature in black ink, appearing to be 'V. Naeber', written over a horizontal line.



FIVE-YEAR CONTROLLER LIMITED WARRANTY

LIMITED WARRANTY

EWS International (hereafter EWS) warrants her products free from defects in material and workmanship under the following terms.

In this warranty, "Products" shall be taken to mean all devices that are supplied pursuant to the contract with exception of software.

VALIDITY OF THE WARRANTY

Labour and parts are warranted for five years from the date of the first customer purchase. This warranty is only valid for the first purchase customer.

Notwithstanding the warranty period of five years as mentioned above - while upholding the remaining provisions – a warranty period of three months applies to the supply of software.

COVER OF THE WARRANTY

Subject to the exceptions as laid down below, this warranty covers all defects in material or workmanship in the EWS products. The following are not covered by the warranty:

- 1) Any product or part not manufactured nor distributed by EWS. EWS will pass on warranty given by the actual manufacturer of products or parts that EWS uses in the product.
- 2) Any product, on which the serial number has been defaced, modified or removed.
- 3) Damage, deterioration or malfunction resulting from:
 - a) Accident, misuse, neglect, fire, water, lightning or other acts of nature.
 - b) Product modification or failure to follow instructions supplied by the products.
 - c) Repair or attempted repair by anyone not authorized by EWS.
 - d) Any shipment of the product (claims must be presented to the carrier)
 - e) Removal or installation of the product
 - f) Any other cause, which does not relate to a product defect.
 - g) Cartons, equipment enclosures, cables or accessories uses in conjunction with the product.



FINANCIAL CONSEQUENTES

EWS will only pay for labour and material expenses for covered items, proceed from repairs and updates done by EWS at the EWS location. EWS will not pay for the following:

- 1) Removal or installations charges at customers and/or end user location.
- 2) Costs for initial technical adjustments (set-up), including adjustment of user controls or programming.
- 3) Shipping charges proceed from returning goods by the customer. (Shipping charges for returning goods to the customer are for the account of EWS).

All the costs which exceed the obligations of EWS under this Warranty, such as, but not limited to, travel and accommodation costs and costs for assembly and dismantling are for the account and risk of the customer.

WARRANTY SERVICE

In order to retain the right to have a defect remedied under this warranty, the customer is obliged to:

- 1) Submit complaints about immediately obvious errors related to the products delivered, in writing within eight days of the delivery of the products and submit complaints about shortcomings relating to the products delivered, which are not visible, within eight days of their being discovered.
- 2) Return defected products for account and risk of the customer. Costs for this shipment will not be reimbursed by EWS. The products may only be returned following express, written permission from EWS. Returning the products does not affect the obligation to pay the invoiced amounts.
- 3) Present the original dated invoice (or a copy) as proof of warranty coverage, which must be included in any [of the] return shipment of the product. Please include also in any mailing a contact name, company, address and a description of the problem(s).



LIMITATION OF IMPLIED WARRANTIES

Except where such disclaimers and exclusions are specifically prohibited by applicable law, the foregoing sets forth the only warranty applicable to the product, and such warranty is given expressly and in lieu of all other warranties, express or implied, or merchantability and fitness for a particular purpose and all such implied warranties which exceed or differ from the warranty set forth herein are hereby disclaimed by EWS.

EXCLUSION OF DAMAGES

EWS' liability for any defective products is limited to the repair or replacement of the product at our option. Except where such limitations and exclusions are specifically prohibited by applicable law EWS shall not be liable for:

- 1) Damage to other property caused by defects in the EWS product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss or:
- 2) Any damages, whether incidental, [consequential or otherwise] special, indirect or consequential damages, injury to persons or property, or any other loss.

Under no circumstances whatsoever shall EWS be obliged to provide compensation beyond the direct damage incurred by customer up to an amount not exceeding the payment receivable from the insurer of EWS in connection with the damage.

APPLICABLE LAW AND DISPUTES

- 1) Dutch law shall govern all offers made by EWS and all agreements concluded between EWS and customer. This warranty explicitly excludes application of the Vienna Sales Convention (CISG).
- 2) All disputes which may arise between the parties shall be dealt with exclusively by the competent court of law in the Netherlands under whose jurisdiction EWS falls. However, EWS reserves the right to submit any disputes to the competent court in the customer's location