

# Cascade function

Commissioning, settings and process description

## General functional description

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With the cascade function, it is possible to connect two or more fresh water stations together to create a fresh water cascade. The fresh water stations are installed and connected hydraulically in a cascade circuit. The individual controllers of the fresh water stations must be connected to each other in series using a CAN connection set.

Depending on the flow rate and the selected switch-on or switch-off limits, individual stations are switched on or off in order to achieve the selected tap temperature for the current tap volume (flow rate).

## Commissioning the cascade function

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The control of a cascade of fresh water systems is a special function and is activated via the hidden menu.



To open the cascade function in the menu, you must press the ESC button for 10 seconds when switching on! The next time the device is switched on, the function will remain visible if it has been activated.



For cascade operation, all controllers in the cascade must be connected via the enclosed CAN bus cable. The controllers are looped through for this, i.e. the connection is made in series from one controller to the next; a terminating resistor must be plugged in at the beginning (1st controller) and at the end (2nd controller).

## Activating the function

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The cascade function is activated by assigning a free relay to the cascade in the special functions.



A relay must always be assigned, even if no changeover valve for the cascade is connected to this relay. This may be the case if the cascade is operated with a fixed base station.

Select a free relay in the 'Special functions' menu and assign the cascade function, e.g. relay 3. If the function is activated, all the necessary parameters can be configured.

## Cascade function settings

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### Fixed base station

If the cascade is operated with a fixed base station, you can set this controller as the base. This station is then always in operation or on standby.



If a controller does not have a shut-off valve, you still need to use a relay to activate the function. The "fixed base" setting must always be switched on in this controller!

### DF station+

The upper flow limit in % of the VFS is set here. If this is exceeded, another station from the cascade is requested.

### DF station-

The lower flow rate limit in % of the VFS is set here. If the flow rate falls below this limit, the station switches off again. If it is the base station, this lower limit is ignored.

### Delay

This parameter is used to define the delay time. This parameter is used to define the delay time. After switching on or off, the delay time is waited for before switching or requesting again.

This value mainly depends on the running time of the used cascade valves (time to open and close).

## Process description

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The controllers cyclically transmit CAN messages. This takes place at least every 10 seconds. The cycle is shortened if the flow rate changes or if changes to the settings that need to be transferred are detected. Each controller creates a list of the entire cascade network. The controllers are numbered consecutively. Each controller knows the flow rate and the valve status of all controllers in the network. The total is calculated from all the flow rate values and displayed in each controller next to the symbol for the valve.

The sensor values S1 to S6 are transmitted via CAN. The system first checks whether a local sensor is connected. If so, this sensor is used and its value is transmitted to the connected controllers via the CAN bus. If not, a value is taken from the CAN bus if available.

## Special features

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1. The circulation pump is not controlled via the cascade yet. If a circulation pump is connected, all necessary settings must be made on the controller to which the pump is connected.



If the fresh water cascade is operated with a circulation pump, ensure that the circulation pump is correctly hydraulically integrated. In this case, the circulation pump must be hydraulically integrated outside the cascade.

2. If no fixed base is defined, the cascade stations switch to base operation. The total running time of the individual stations is logged to ensure an even distribution of operating times.

## Functional description

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Example:

### Condition 1. Connection of a station

Example: Set DF+ value 70%, Flow sensor maximum 40 l/m

If the flow sensor detects more than 28 l/m, the next controller with a closed valve is searched in the list of controllers. This controller is prompted to open its valve. If the flow rate is still too high after the selected delay, another station is added. The newly added station is prevented from closing its own valve for the duration of the selected delay.

### Condition 2. Switching off a station

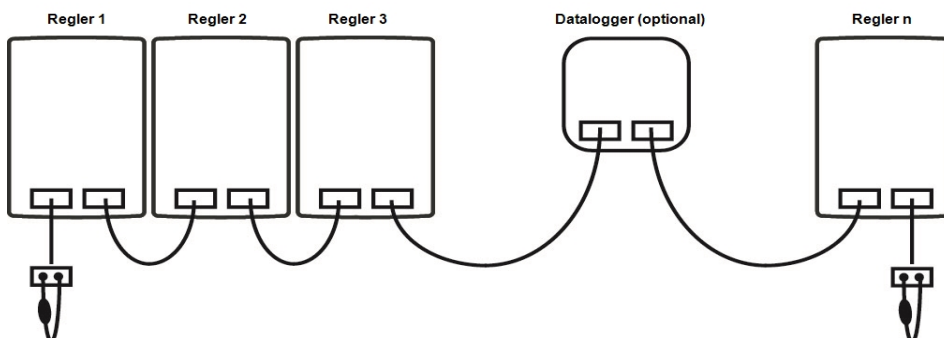
Example: Set DF- value 40%, Flow sensor maximum 40 l/m

If the flow sensor detects less than 16 l/m and this station has not just been switched on (delay time is waited for), the valve is closed.

## CAN bus

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Two or more controllers can be connected to each other or to the data logger via the CAN bus and exchange data with each other.



1. The controllers are connected in series with the CAN bus cable.
2. The first and last controller in this series connection must be fitted with a terminating resistor..

**The wiring of the two CAN sockets is optional.**

3. Optionally, the data logger can also be integrated into a CAN bus.