

# *Co-Operation mode on pressurisation automats with Flextronic control*



ENG Co-Operation mode  
Installation and operating instruction  
- Application for Flamcomat pressurisation automats

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This document is intended as a supplement to the product Installation and Operating instructions. This instruction specifically supports the Flamcomat G4, in terms of safety, use and operation.

For installation instructions and further documentation in various languages, visit [www.flamcogroup.com/manuals](http://www.flamcogroup.com/manuals). Further production information can be requested from the relevant Flamco branch office..

## 1 Intended area of application

Flamco expansion automats for sealed central heating systems and cooling and air-conditioning installations, have an application area related to system size. To be able to facilitate operation in larger systems, the standard products can be provided as duo version (1 automat with two pumps/compressors) or coupled as a network of 2-10 automats to perform on a load-dependent base. The combination of any type and models of the Flamcomat G4 is possible. A virtual master will be regulating the automats and appoint activities in turn, to achieve an efficient combination and only use automats when needed to save energy.

## 2 Installation of the equipment

Please note that automats first need to be commissioned as a standalone automat, before the Co-Operation mode can be initiated. Make sure the automats intended for the Co-Operation mode are connected hydraulically to the same system.

All automats must be wired and connected via the same network. According to the Connectivity Guide the total cable length should not exceed 500m. Flamco does not provide a cable (Flamco recommends twisted single pair shielded cable).

In the Flextronic controller, the CAN-bus interface is used for the Co-Operation network. The termination resistor (120Ω) is provided by default on each Flextronic. The resistor should be installed only at the ends of the line as illustrated in the image below.

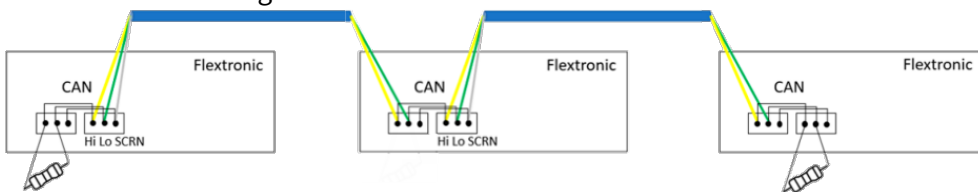


Figure 1 Connection example of CAN-bus interface

## 3 Initialisation procedure of the Co-Operation mode

Now that the automats are physically connected, the Co-Operation mode needs to be activated in the Accessories menu on each automat one-by-one:

Main menu > Settings > General > Accessories → scroll through the list for “Co-Operation mode” and switch “OFF” to “ON”.

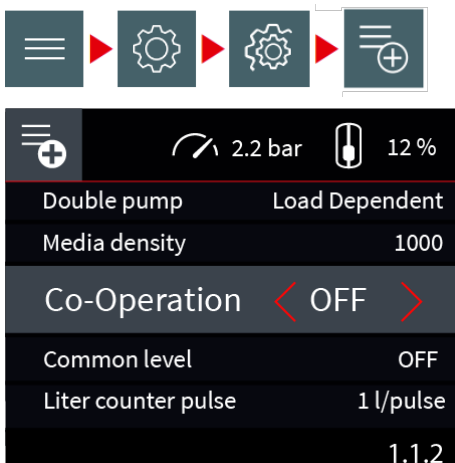
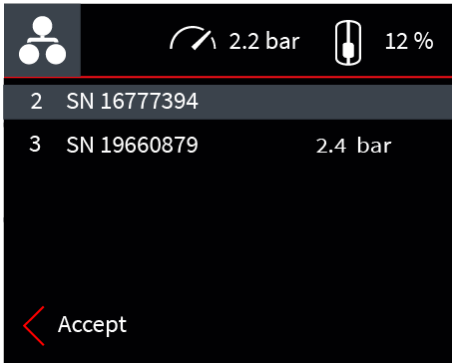


Figure 2 Co-Operation mode can be switched ON in the accessories menu

The next display shows all previously activated automats and their actual measure pressure. The current automat highlighted by a gray ribbon. The local pressure is available as usual on the top line of the screen.



Each automat in the list has a number. This is a unique identifier of the automat in the network (node number) provided automatically.

The SN-number is the unique device number of the Flextronic. It is available in the system info as “Device ID” and it is also written on the label of the automats.

Figure 3 Acknowledge the visible nodes and their pressures, taking static height differences into account


When you can see all activated nodes in this list and acknowledge the corresponding pressures, please accept by pressing the **V-button** to proceed.

**NOTE:** The **Back-button** cancels the initialization and hides this overview screen, and returns to the “Accessories list” screen. The Co-Operation mode state is turned OFF.

When acknowledging with the V-button is then used to initialize the mode, by pressing it the automat is initializing the Co-Operation mode:



Figure 4 Initialization screen

The initialization takes up to 10 sec. The pop-up  Co-Operation is set indicates when the initialization is complete. Use the **V-button** or **Back-button** to hide this pop-up. The Co-operation mode is already running on the activated automats.

The Co-Operation icon is now shown on the Home screen. The node number of the local automat is available on the top bar.

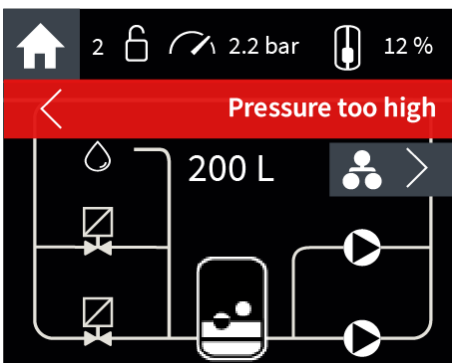


Figure 5 Example of Operational (Home) screen with enabled Co-Operation and active error "pressure too high". This is node 2 in the network, indicated by the 2 in the top bar.

From the home screen, use the **Right arrow-button** to move to the Co-Operation Status screen.

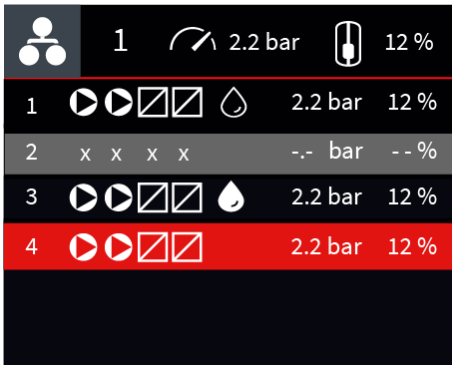


Figure 6 Co-Operation Status screen

This Co-Op status screen is an overview where all connected automats are listed. Each row is an automat (or node) showing its available actuators and if they're activated or not. From left to right it reads:

Node number, 1 or 2 motors, 1 or 2 valves, refill enabled and/or active, the current pressure measurement, the automats current vessel-level percentage. This particular screen shows all possible statuses of the nodes:

1. Node 1 is in a normal idle state.
2. Node 2 is offline. The co-operation mode was not de-activated on this node, but currently this node is not available for duty. Usually this means a cable issue. The node will be automatically re-integrated to the network when the cable issue is gone.
3. Node 3 is currently refilling. The active actuators have the same appearance in this list as on the Home screen.
4. Node 4 is in error state. The resources of the node are not available for the Co-Op mode. The node will be automatically re-integrated to the network when the error is locally resolved on node 4.

## 4 Settings in the Co-Operation mode

### 4.1 Changing parameters

Parameters can be changed in multiple ways:

1. Locally via the GUI on the automat itself;
2. Locally using the Flamconnect Service Toolbelt smartphone application
3. Remotely using the Flamconnect Remote Service

#### 4.1.1 Changing the Pressure set-point (by user)

When changing and accepting a new set-pressure for an automat in a Co-Op network, this set-point is communicated over the network to all automats and each automat will set its target pressure set-point with static height differences in mind.

#### 4.1.2 Degassing

The degassing feature can be enabled or disabled on each Flamcomat. When enabled, there are multiple sub-settings that can be selected for each Flamcomat if needed. For instance one Flamcomat may start degassing whenever possible, the other(s) is/are only allowed within a certain time frame each day. This is the exclusion time of the degassing.

The other setting is "Normal" or "Fast". The virtual master will check which Flamcomat is available for degassing according to the local settings of each automat, to run a degassing cycle. All Automats with degassing enabled, will be handed a turn after one another to perform a degassing run. If one automat is set to "Fast", all automats will be used in the Fast setting. The Fast setting will be active for 24 hours, after that, the "Normal" setting will be used just like it works on a standalone automat.

#### 4.1.3 Refill (top-up)

The "refill" or "top-up" feature can be enabled on individual automats connected to the mains water system. System refill means, that the automat adds water from the water mains into its vessel. This will start (by default) at 9% fill level at the lower level and stop at 12%. Each node can have the refill option installed (valve 3). It's also possible to delegate the refilling to another automat, but is controlled by this automat. Either way, the feature can

be enabled on none, one, or more automats within the same Co-Op network. It is recommended to extend the refill volume if the option is enabled in one automat (3% per each node). For example if there is one automat with enabled refill option in the network of 4 nodes then the Refill start remains at 9% and Refill stop should be set to 21%. The level of the vessels will be equalized while the automats are not performing the pressure maintenance. If this feature is enabled on a specific automat, this is shown as an available actuator by means of a water-droplet next to the pumps and valves. Initiated by the master when topping-up of water in the system is needed. To avoid overfilling the existing configuration and parameter settings per unit apply.

#### 4.1.4 Drain (overflow spill)

Similar to the refill feature, the “drain” feature is also available to the Co-Op network when enabled on an automat. The drain feature is only possible when the **Drain set option** (article number 17653) is connected to the Flamcomat. When a Flamcomat is fitted with the optional drain, the master can initiate it’s drain function, in order to drain water from the system if the collective vessels can’t take in the water anymore. The Flamcomat can also use the drain (self-monitored) to avoid overfilling in its vessel. The existing configuration and parameter settings per unit apply in both cases. Please note that this feature is not shown in the Co-Op overview screen as a pictogram, but can still be used by the virtual master.

#### 4.1.5 Pump settings in Dual pump Flamcomat

When a dual pump Flamcomat is used in Co-Operation mode, where the second pump is used as reserve unit (set in the accessories list as “Change-Over” instead of the default setting “Load-dependent”), the Co-op mode will use it the same way as the standalone automat would do. In that case this particular Flamcomat is treated as a single pump automat and won’t run both pumps at the same time.

#### 4.1.6 Interconnected vessels

In some installations the Flamcomats are interconnected on the low pressure side. In this case the activity of one automat will change the level in another automat. To avoid the generation of the leakage alarms please activate the option “Common level” in the accessories menu on each interconnected automat.

### 4.2 Adding / removing automats in the Co-operation mode

An additional node can be added to the network at any time. Please run the same initialization procedure on the newly added node. The information from the new node will be send to all other nodes in the network.

Any automat can be excluded from the network by disabling of the Co-operation mode.

Main menu > Settings > General > Accessories → scroll through the list for “Co-Operation mode” and switch from “ON” to “OFF”.



Figure 7 Co-Operation mode can be switched OFF in the accessories menu

The node will send a “good bye” message to the network and will be forgotten. While the network is re-calculating, the pop-up will be displayed:



Figure 8 Deinitialization screen

## 5 Self-diagnostics in the Co-Operation mode

The Co-operation mode continuously monitor the network and will detect any malfunctions. There are 3 additional messages available in the Co-operation mode, when active appearing on each automat in the network:

- 76. Co-Operation: Node Offline
- 77. Co-Operation: Network Down
- 79. Co-Operation: Unknown Node

**Node offline.** The network is no longer complete. One or more nodes are not responding to the network commands. Most likely it is a cable issue or the node has been powered off. This warning is self-resolving.

**Network down.** The network is no longer complete. All nodes are not responding to the network commands. Most likely it is a cable issue or the node has been powered off. This warning is self-resolving.

**Unknown node.** There is a unknown traffic detected. Most likely the Co-operation node was initialized when the network was not complete. Please disable the mode on any automat and re-enable it. The network will be re-calculated.

### 5.1 In the event of maintenance / disabled automat

In the event of maintenance and an automat is **switched off** or set **in manual mode**, this node is unavailable in the network. When the user switches the automat on, or exits the manual-mode, the automat is re-joined in the network and can be used by the master to perform actions.

### 5.2 Replacing of the controllers in the Co-operation mode

In case the Flextronic is broken on one automat in the network and requires replacement no special actions needed.

The exchanging of the controller is an equivalent of the adding of the new node.

## 6 Limitations in the Co-Operation mode

- The Co-operation mode can be activated only on commissioned automat which is up and running. The predecessor steps like the initial fill of a vessel or the system fill cannot be synchronized by the Co-operation mode.
- Changing of the pressure setpoint on any automat, will result in the distribution of this setpoint through the network. In case of significant static pressure difference, the setpoint of one automat may exceed the design limits of another automat. Please mind the pressure setpoint adjustment accordingly.
- The accessories will effect only the automat on which are connected. For example the Bimetallic Temperature Switch (17659) disables the degassing if the temperature is too high only on one automat.
- The networked Flamcomats will be connected to the same hydraulic system. The hydraulic system must be working correctly and not have sections shut off, so that all Flamcomats are able to measure the same pressure changes.
- Expansion automats (all types of Flamcomat) are utilizing the same size main expansion vessel (or 1 size smaller/larger). In case two automats are used to replace 1 automat, the vessel volume can be chosen half the size (e.g. 2 Flamcomat M20 single pump units combined with a 200 liter vessel each, instead of 1 Flamcomat D20 duo pump with 400 liter vessel);
- As height difference between automats one floor is acceptable per standard. When greater static height differences are applied, please make sure the pressure differences won't exceed the pressure range for each automat! Please contact Flamco Technical Service for advice.
- Within the combination, there is 1 measure difference (larger or smaller) in vessel size possible. Main and auxiliary vessel must be equal per automat. Also see cross table below.

		Vessel automat 1															
		FG 200	FG 300	FG 400	FG 500	FG 600	FG 800	FG 1000	FG 1200	FG 1600	FG 2000	FG 2800	FG 3500	FG 5000	FG 6500	FG 8000	FG 10000
Vessel automat 2	FG 200	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FG 300	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-
	FG 400	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-
	FG 500	-	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-
	FG 600	-	-	-	x	x	x	-	-	-	-	-	-	-	-	-	-
	FG 800	-	-	-	-	x	x	x	-	-	-	-	-	-	-	-	-
	FG 1000	-	-	-	-	-	x	x	x	-	-	-	-	-	-	-	-
	FG 1200	-	-	-	-	-	-	x	x	x	-	-	-	-	-	-	-
	FG 1600	-	-	-	-	-	-	-	x	x	x	-	-	-	-	-	-
	FG 2000	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-	-
	FG 2800	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-	-
	FG 3500	-	-	-	-	-	-	-	-	-	-	x	x	x	-	-	-
	FG 5000	-	-	-	-	-	-	-	-	-	-	-	x	x	x	-	-
	FG 6500	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x	-
	FG 8000	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x
	FG 10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x

Table 1 Allowed vessel-size difference in the network





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