Honeywell | Industrial & Commercial Thermal

krom schroder

Heating Controller Lago 0321

Technical Information · GB
10 Edition 06.13l

- For boiler installation or wall mounting (with wall mount)
- Simple operation and programming via selector switch and rotary knob
- Suitable for a very wide range of system configurations thanks to multiple setting possibilities
- Integrated CAN bus for integration into cascade systems or as a system expansion
- Thanks to switchable sensor characteristic, suitable as a replacement for old controllers

CE

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= To be continued

1 Application

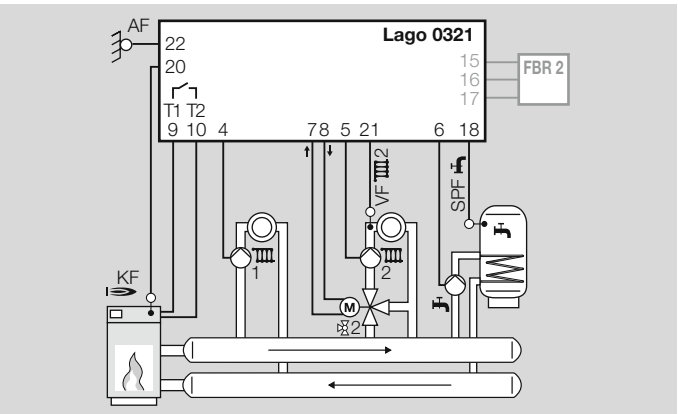
Weather and room-controlled heating controller for control of a single-stage heat source with a direct heating circuit and a mixed heating circuit with hot water preparation.

The Lago 0321 can be employed as an extension to a heating system controller for control of a mixed heating circuit or as a controller for a heat source in a cascade. For this purpose the heating controller is equipped with a CAN bus interface. The integrated multifunction relay allows the connection of a feed pump, circulation pump or return flow booster.

Each heating boiler in a cascade is controlled by a dedicated heating controller.

1.1 Typical applications

1.1.1 Control of boiler, direct heating circuit, mixer circuit and storage circuit



The heating controller controls the boiler, the mixer, the pump for the direct heating circuit (1st heating circuit) and the mixed heating circuit (2nd heating circuit), and the storage charging pump.

Connected sensors measure the outdoor, boiler, feed, storage or room temperature and enable the functions weather-dependent control, control of the heat source, mixed heating circuit and hot water preparation at the heating controller.

The optional analogue remote control FBR 2 is assigned to the mixer circuit. It allows various operating functions to be activated and the desired room temperature to be set.

Sensors used

AF	Outside sensor	With weather-dependent control
KF	Boiler sensor	In combination with heat source control
VF	Flow sensor	For mixed heating circuit
SPF	Storage sensor	For hot water preparation

Sensors, see page 42 (Sensors).

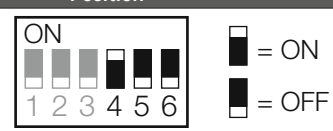
Accessories

FBR 2	Analogue remote control with room sensor

Further information, see page 45 (Analogue remote control, external room sensor).

DIP switch setting

Switch No.	Position
1 to 3	random
4	ON
5	OFF
6	OFF



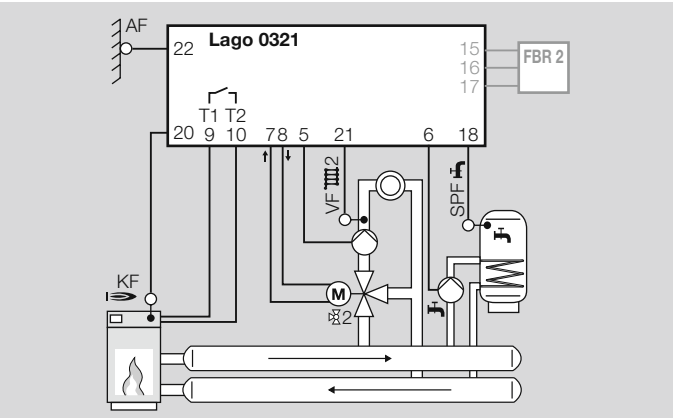
Further information, see page 27 (DIP switches).

Necessary parameters

No.	Parameter	Range	Factory setting
08	Operating mode direct heating circuit (HC1)	----, ⏻, 🕒1, 🕒2, ☀, ☽	----
09	Heat slope direct heating circuit	0.20 – 3.00	1.20
10	Room sensor influence direct heating circuit	OFF, 0 – 20	10
11	Room sensor correction direct heating circuit	-5 to +5 K	0
13	Operating mode mixer circuit (HC2)	----, ⏻, 🕒1, 🕒2, ☀, ☽	----
14	Heat slope mixer circuit	0.20 – 3.00	1.20 ⚠
⚠	With underfloor heating set parameter 14 < 1, with radiator heating > 1.		
15	Room sensor influence Mixer circuit	OFF, 0 – 20	10
16	Room sensor correction Mixer circuit	-5 to +5 K	0
18	Hot water according to program	0, 1, 2, 3, 4	1
23	CAN bus ID mixer circuit	1 – 15 (2 – 15 with direct heating circuit)	2
With connected boiler sensor (KF)			
30	Maximum heat source temperature	30.0 – 110.0°C	85.0°C
31	Minimum heat source temperature	10.0 – 80.0°C	40.0°C
32	Warm Up Temp	10.0 – 80.0°C	35.0°C
33	Minimum limit heat source	0, 1, 2	1
34	Dyn. switching hysteresis	5.0 – 20.0 K	10.0 K
35	Hysteresis time	0 – 30 min	0 min
36	Burner starts	Display only	
37	Burner running time	Display only	
38	Address heating module (only for cascade operation)	----, 1 – 8	----
With connected storage sensor (SPF)			
50	DHW Relief	0, 1	1
51	Parallel pump operation	0, 1	0
52	Antilegion function	0, 1	1
53	Temperature increase during hot water preparation	0.0 – 50.0 K	20.0 K

No.	Parameter	Range	Factory setting
With DIP switch position 4 = ON			
60	Maximum flow temperature direct heating circuit	20.0 – 110.0°C	80.0°C
61	Minimum flow temperature direct heating circuit	10.0 – 110.0°C	10.0°C
With connected flow sensor (VF)			
69	Additional mixer functions	0, 1	0
70	Maximum flow temperature mixer circuit	20.0 – 110.0°C	80.0°C ⚠
⚠	With underfloor heating, set parameter 70 according to manufacturer's specifications.		
71	Minimum flow temperature mixer circuit	10.0 – 110.0°C	10.0°C
72	Mixer dynamic OPEN	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	16.0 Parameter 69=1: 50)
73	Mixer dynamic CLOSED	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	12.0 (Parameter 69=1: 20)
74	Flow temperature cooling	0, 1, 15.0 – 25.0°C	15.0°C
75	Room temperature guided cooling	----, 20.0 – 40.0°C	25.0°C
76	Weather-guided cooling	----, 0.0 – 40.0°C	27.0°C
77	Mixer scan time	10 – 200 s	100 s
78	Mixer operating time limit	----, 0 – 30 min	----
79	Mixer start seconds	0 – 30 s	0 s

1.1.2 Control of boiler, mixer circuit and storage circuit



The heating controller controls the boiler, the mixer and the storage charging pump.

Connected sensors measure the outdoor, boiler, feed, storage or room temperature and enable the functions weather-dependent control, control of the heat source, mixed heating circuit and hot water preparation at the heating controller.

The optional analogue remote control FBR 2 is assigned to the direct heating circuit. It allows various operating functions to be activated and the desired room temperature to be set.

Sensors used

AF	Outside sensor	With weather-dependent control
KF	Boiler sensor	In combination with heat source control
VF	Flow sensor	For mixed heating circuit
SPF	Storage sensor	For hot water preparation

Sensors, see page 42 (Sensors).

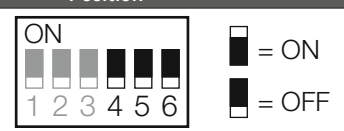
Accessories

FBR 2	Analogue remote control with room sensor

Further information, see page 45 (Analogue remote control, external room sensor).

DIP switch setting

Switch No.	Position
1 to 3	random
4	OFF
5	OFF
6	OFF



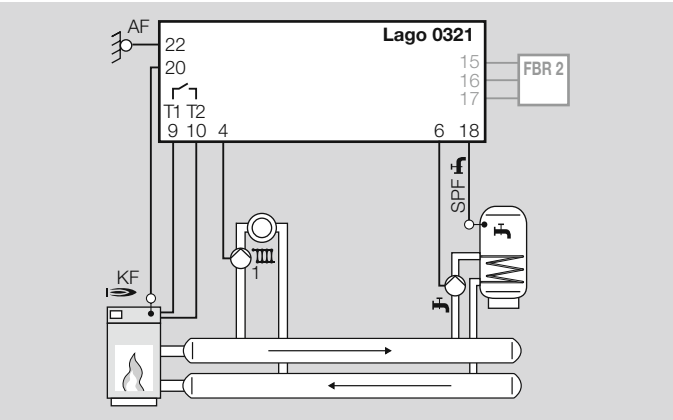
Further information, see page 27 (DIP switches).

Necessary parameters

No.	Parameter	Range	Factory setting
13	Operating mode mixer circuit (HC2)	Display only	----
14	Heat slope mixer circuit	0.20 – 3.00	1.20 ⚠
⚠	With underfloor heating set parameter 14 < 1, with radiator heating > 1.		
15	Room sensor influence Mixer circuit	OFF, 0 – 20	10
16	Room sensor correction Mixer circuit	-5 to +5 K	0
18	Hot water according to program	0, 1, 2, 3, 4	1
23	CAN bus ID mixer circuit	1 – 15 (2 – 15 with direct heating circuit)	2
With connected boiler sensor (KF)			
30	Maximum heat source temperature	30.0 – 110.0°C	85.0°C
31	Minimum heat source temperature	10.0 – 80.0°C	40.0°C
32	Warm Up Temp	10.0 – 80.0°C	35.0°C
33	Minimum limit heat source	0, 1, 2	1
34	Dyn. switching hysteresis	5.0 – 20.0 K	10.0 K
35	Hysteresis time	0 – 30 min	0 min
36	Burner starts	Display only	
37	Burner running time	Display only	
38	Address heating module (only for cascade operation)	----, 1 – 8	----
With connected storage sensor (SPF)			
50	DHW Relief	0, 1	1
51	Parallel pump operation	0, 1	0
52	Antilegion function	0, 1	1
53	Temperature increase during hot water preparation	0.0 – 50.0 K	20.0 K

No.	Parameter	Range	Factory setting
With connected flow sensor (VF)			
69	Additional mixer functions	0, 1	0
70	Maximum flow temperature mixer circuit	20.0 – 110.0°C	80.0°C ⚠
⚠	With underfloor heating, set parameter 70 according to manufacturer's specifications.		
71	Minimum flow temperature mixer circuit	10.0 – 110.0°C	10.0°C
72	Mixer dynamic OPEN	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	16.0 (Parameter 69=1: 50)
73	Mixer dynamic CLOSED	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	12.0 (Parameter 69=1: 20)
74	Flow temperature cooling	0, 1, 15.0 – 25.0°C	15.0°C
75	Room temperature guided cooling	----, 20.0 – 40.0°C	25.0°C
76	Weather-guided cooling	----, 0.0 – 40.0°C	27.0°C
77	Mixer scan time	10 – 200 s	100 s
78	Mixer operating time limit	----, 0 – 30 min	----
79	Mixer start seconds	0 – 30 s	0 s

1.1.3 Control of boiler, direct heating circuit and storage circuit



The heating controller controls the boiler, the direct heating circuit and the storage charging pump.

Connected sensors measure the outdoor, boiler, feed, storage or room temperature and enable the functions weather-dependent control, control of the heat source, direct heating circuit and hot water preparation at the heating controller.

The optional analogue remote control FBR 2 is assigned to the direct heating circuit. It allows various operating functions to be activated and the desired room temperature to be set.

Sensors used

AF	Outside sensor	With weather-dependent control
KF	Boiler sensor	In combination with heat source control
SPF	Storage sensor	For hot water preparation

Sensors, see page 42 (Sensors).

Accessories

FBR 2	Analogue remote control with room sensor

Further information, see page 45 (Analogue remote control, external room sensor).

DIP switch setting

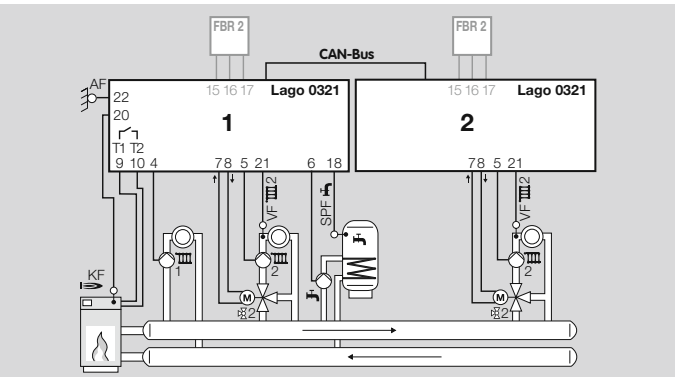
Switch No.	Position	
1 to 3	random	
4	ON	
5	ON	
6	OFF	

Further information, see page 27 (DIP switches).

Necessary parameters

No.	Parameter	Range	Factory setting
08	Operating mode direct heating circuit (HC1)	Display only	
09	Heat slope direct heating circuit	0.20 – 3.00	1.20
10	Room sensor influence direct heating circuit	OFF, 0 – 20	10
11	Room sensor correction direct heating circuit	-5 to +5 K	0
18	Hot water according to program	0, 1, 2, 3, 4	1
With connected boiler sensor (KF)			
30	Maximum heat source temperature	30.0 – 110.0°C	85.0°C
31	Minimum heat source temperature	10.0 – 80.0°C	40.0°C
32	Warm Up Temp	10.0 – 80.0°C	35.0°C
33	Minimum limit heat source	0, 1, 2	1
34	Dyn. switching hysteresis	5.0 – 20.0 K	10.0 K
35	Hysteresis time	0 – 30 min	0 min
36	Burner starts	Display only	
37	Burner running time	Display only	
38	Address heating module (only for cascade operation)	----, 1 – 8	----
With connected storage sensor (SPF)			
50	DHW Relief	0, 1	1
51	Parallel pump operation	0, 1	0
52	Antilegion function	0, 1	1
53	Temperature increase during hot water preparation	0.0 – 50.0 K	20.0 K
With DIP switch position 4 = ON			
60	Maximum flow temperature direct heating circuit	20.0 – 110.0°C	80.0°C
61	Minimum flow temperature direct heating circuit	10.0 – 110.0°C	10.0°C

1.1.4 Control of boiler, direct heating circuit, mixer circuit, storage circuit and extended mixer circuit



Heating controller 1 controls the boiler, the direct heating circuit, the mixed heating circuit and the storage charging pump. Heating controller 2 controls the extended mixed heating circuit. The heating controllers are linked via the CAN bus interfaces.

With heating controller 1, connected sensors measure the outdoor, boiler, feed, storage and room temperature and enable the functions weather-dependent control, control of the heat source, mixed heating circuit and hot water preparation at the heating controller. With heating controller 2, connected sensors measure the feed and room temperature and enable the function mixed heating circuit at the heating controller.

With both heating controllers, the optional analogue remote controls FBR 2 are assigned to the mixed heating circuit.

Sensors used

Heating controller 1		
AF	Outside sensor	With weather-dependent control
KF	Boiler sensor	In combination with heat source control
VF	Flow sensor	For mixed heating circuit
SPF	Storage sensor	For hot water preparation
Heating controller 2		
VF	Flow sensor	For mixed heating circuit

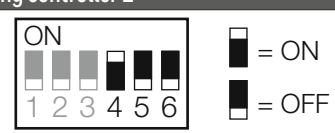
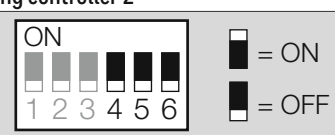
Sensors, see page 42 (Sensors).

Accessories

Heating controllers 1 and 2	
1× FBR 2 each	Analogue remote control with room sensor

Further information, see page 45 (Analogue remote control, external room sensor).

DIP switch setting

Switch No.	Position	
Heating controller 1		
1 to 3	random	
4	ON	
5	OFF	
6	OFF	
Heating controller 2		
1 to 3	random	
4	OFF	
5	OFF	
6	OFF	

Further information, see page 27 (DIP switches).

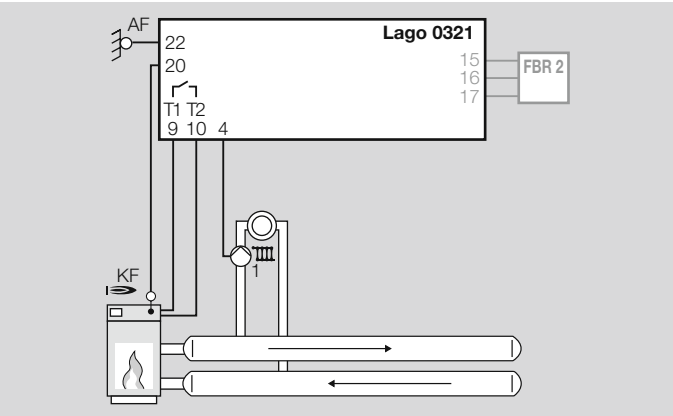
Necessary parameters

No.	Parameter	Range	Factory setting
Heating controller 1			
08	Operating mode direct heating circuit (HC1)	----, ⏻, 🕘1, 🕘2, ❄, ☽	----
09	Heat slope direct heating circuit	0.20 – 3.00	1.20
10	Room sensor influence Direct heating circuit	OFF, 0 – 20	10
11	Room sensor correction Direct heating circuit	-5 to +5 K	0
13	Operating mode mixer circuit (HC2)	Display only	----
14	Heat slope mixer circuit	0.20 – 3.00	1.20 ⚠
⚠	With underfloor heating set parameter 14 < 1, with radiator heating > 1.		
15	Room sensor influence Mixer circuit	OFF, 0 – 20	10
16	Room sensor correction Mixer circuit	-5 to +5 K	0
18	Hot water according to program	0, 1, 2, 3, 4	1
23	CAN bus ID mixer circuit	1 – 15 (2 – 15 with direct heating circuit)	2
With connected boiler sensor (KF)			
30	Maximum heat source temperature	30.0 – 110.0°C	85.0°C
31	Minimum heat source temperature	10.0 – 80.0°C	40.0°C
32	Warm up temp	10.0 – 80.0°C	35.0°C
33	Minimum limit heat source	0, 1, 2	1
34	Dyn. switching hysteresis	5.0 – 20.0 K	10.0 K
35	Hysteresis time	0 – 30 min	0 min
36	Burner starts	Display only	
37	Burner running time	Display only	
38	Address heating module (only for cascade operation)	----, 1 – 8	----
With connected storage sensor (SPF)			
50	DHW Relief	0, 1	1
51	Parallel pump operation	0, 1	0
52	Antilegion function	0, 1	1
53	Temperature increase during hot water preparation	0.0 – 50.0 K	20.0 K

No.	Parameter	Range	Factory setting
With DIP switch position 4 = ON			
60	Maximum flow temperature direct heating circuit	20.0 – 110.0°C	80.0°C
61	Minimum flow temperature direct heating circuit	10.0 – 110.0°C	10.0°C
With connected flow sensor (VF)			
69	Additional mixer functions	0, 1	0
70	Maximum flow temperature mixer circuit	20.0 – 110.0°C	80.0°C ⚠
⚠	With underfloor heating, set parameter 70 according to manufacturer's specifications.		
71	Minimum flow temperature mixer circuit	10.0 – 110.0°C	10.0°C
72	Mixer dynamic OPEN	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	16.0 (Parameter 69=1: 50)
73	Mixer dynamic CLOSED	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	12.0 (Parameter 69=1: 20)
74	Flow temperature cooling	0, 1, 15.0 – 25.0°C	15.0°C
75	Room temperature guided cooling	----, 20.0 – 40.0°C	25.0°C
76	Weather-guided cooling	----, 0.0 – 40.0°C	27.0°C
77	Mixer scan time	10 – 200 s	100 s
78	Mixer operating time limit	----, 0 – 30 min	----
79	Mixer start seconds	0 – 30 s	0 s
Heating controller 2			
13	Operating mode mixer circuit (HC2)	----, ⏻, 🕘1, 🕘2, ❄, ☽	----
14	Heat slope mixer circuit	0.20 – 3.00	1.20 ⚠
⚠	With underfloor heating set parameter 14 < 1, with radiator heating > 1.		
15	Room sensor influence Mixer circuit	OFF, 0 – 20	10
16	Room sensor correction Mixer circuit	-5 to +5 K	0
23	CAN bus ID mixer circuit	1 – 15 (2 – 15 with direct heating circuit)	2

No.	Parameter	Range	Factory setting
With connected flow sensor (VF)			
69	Additional mixer functions	0, 1	0
70	Maximum flow temperature mixer circuit	20.0 – 110.0°C	80.0°C ⚠
⚠	With underfloor heating, set parameter 70 according to manufacturer's specifications.		
71	Minimum flow temperature mixer circuit	10.0 – 110.0°C	10.0°C
72	Mixer dynamic OPEN	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	16.0 (Parameter 69=1: 50)
73	Mixer dynamic CLOSED	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	12.0 (Parameter 69=1: 20)
74	Flow temperature cooling	0, 1, 15.0 – 25.0°C	15.0°C
75	Room temperature guided cooling	----, 20.0 – 40.0°C	25.0°C
76	Weather-guided cooling	----, 0.0 – 40.0°C	27.0°C
77	Mixer scan time	10 – 200 s	100 s
78	Mixer operating time limit	----, 0 – 30 min	----
79	Mixer start seconds	0 – 30 s	0 s

1.1.5 Control of boiler and direct heating circuit



The heating controller controls the boiler and the pump for the direct heating circuit.

Connected sensors measure the outdoor and boiler temperature and enable the functions weather-dependent control and control of the heat source at the heating controller.

The optional analogue remote control FBR 2 is assigned to the direct heating circuit. It allows various operating functions to be activated and the desired room temperature to be set.

Sensors used

AF	Outside sensor	With weather-dependent control
KF	Boiler sensor	In combination with heat source control

Sensors, see page 42 (Sensors).

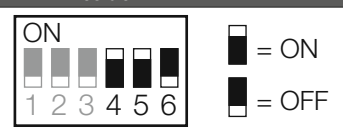
Accessories

FBR 2	Analogue remote control with room sensor

Further information, see page 45 (Analogue remote control, external room sensor).

DIP switch setting

Switch No.	Position
1 to 3	random
4	ON
5	ON
6	OFF

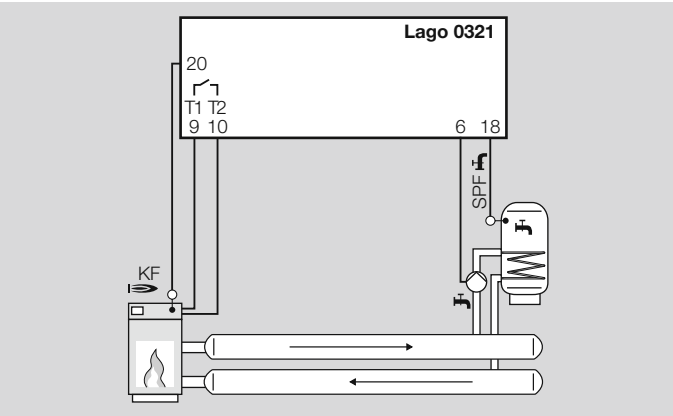


Further information, see page 27 (DIP switches).

Necessary parameters

No.	Parameter	Range	Factory setting
08	Operating mode direct heating circuit (HC1)	Display only	
09	Heat slope direct heating circuit	0.20 – 3.00	1.20
10	Room sensor influence direct heating circuit	OFF, 0 – 20	10
11	Room sensor correction direct heating circuit	-5 to +5 K	0
With connected boiler sensor (KF)			
30	Maximum heat source temperature	30.0 – 110.0°C	85.0°C
31	Minimum heat source temperature	10.0 – 80.0°C	40.0°C
32	Warm up temp	10.0 – 80.0°C	35.0°C
33	Minimum limit source generator	0, 1, 2	1
34	Dyn. switching hysteresis	5.0 – 20.0 K	10.0 K
35	Hysteresis time	0 – 30 min	0 min
36	Burner starts	Display only	
37	Burner running time	Display only	
38	Address heating module (only for cascade operation)	----, 1 – 8	----
With DIP switch position 4 = ON			
60	Maximum flow temperature direct heating circuit	20.0 – 110.0°C	80.0°C
61	Minimum flow temperature direct heating circuit	10.0 – 110.0°C	10.0°C

1.1.6 Control of boiler and storage circuit



The heating controller controls the boiler and the storage charging pump.

Connected sensors measure the boiler and storage temperature and enable the control of the heat source and hot water preparation at the heating controller.

Sensors used

KF	Boiler sensor	In combination with heat source control
SPF	Storage sensor	For hot water preparation

Sensors, see page 42 (Sensors).

DIP switch setting

Switch No.	Position	
1 to 3	random	
4	OFF	
5	random	
6	OFF	

Further information, see page 27 (DIP switches).

Necessary parameters

No.	Parameter	Range	Factory setting
18	Hot water according to program	0, 1, 2, 3, 4	1
With connected boiler sensor (KF)			
30	Maximum heat source temperature	30.0 – 110.0°C	85.0°C
31	Minimum heat source temperature	10.0 – 80.0°C	40.0°C
32	Warm up temp	10.0 – 80.0°C	35.0°C
33	Minimum limit heat source	0, 1, 2	1
34	Dyn. switching hysteresis	5.0 – 20.0 K	10.0 K
35	Hysteresis time	0 – 30 min	0 min
36	Burner starts	Display only	
37	Burner running time	Display only	
38	Address heating module (only for cascade operation)	----, 1 – 8	----
With connected storage sensor (SPF)			
50	DHW Relief	0, 1	1
51	Parallel pump operation	0, 1	0
52	Antilegion function	0, 1	1
53	Temperature increase during hot water preparation	0.0 – 50.0 K	20.0 K
With DIP switch position 4 = OFF			
80	MF Relay function	0 – 34	0
81	MF Relay switching temperature	30.0 – 90.0°C	30.0°C
82	Hysteresis of the MF Relay	2.0 – 10.0 K	5.0 K

2 Certification

CE

Satisfies the requirements of

Directives:

– 2004/108/EC,

– 2006/95/EC.

Standards:

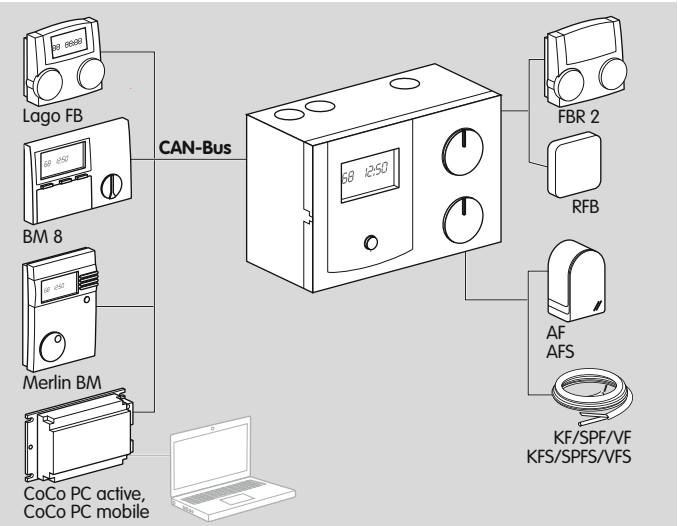
– EN 60730-1,

– EN 60730-2-9,

– EN 55014-1,

– EN 55014-2.

3 Function



The Lago 0321 heating controller can control one direct heating circuit and one mixer circuit with a 3-way mixer at the same time. The connection possibility for the direct heating circuit can be used alternatively for a multifunction relay, e.g. for connection of a circulation pump, return flow booster or header pump.

The CAN bus interface allows the connection of operating modules (e.g. BM 8, Merlin BM) or a digital remote control (e.g. Lago FB) to be connected with which apart from various operating functions, the system parameters in the living room can be monitored. The PC adapters CoCo PC active and CoCo PC mobile in conjunction with the ComfortSoft program allow all system-specific parameters to be transmitted to a PC where they can be edited and displayed graphically. The PC adapter CoCo PC active in conjunction with a modem allows error messages to be sent by SMS and controller data to be checked remotely. The Lago 0321 also offers connection possibilities for outside sensors (e.g. AF), boiler sensors (e.g. KF), flow sensors (e.g. VF) and room sensor (e.g. RFB), and for a remote control (e.g. FBR 2) with which various operating functions can be activated and the desired room temperature controlled from the living room.

A selector switch and rotary knob allow parameters for comfortable heating operation to be set at the Lago 0321. Every 10 minutes the Lago 0321 checks automatically whether the set values are within the specified limits. If a value is found to be out-of-range, it is substituted by the corresponding default value and the error message E81 is displayed.

3.1 Heating circuit control

3.1.1 Weather-dependent control

The heat source and flow temperature is determined by the Lago 0321 via the set heat slope to suit the measured outside temperature in such a way that the set value for the room is approximately set if the heating system is configured correctly.

3.1.2 Room sensor influence

The current room temperature is included in the computation of the required flow temperature via an installed room temperature sensor. The influence of the room temperature can be set from pure weather-dependent control, through room temperature control with outside temperature influence up to pure room temperature control.

3.2 Hot water preparation

The desired target temperature for hot water is achieved by switching a storage charging pump and a burner. Storage tank charging starts when the storage tank temperature drops below the temperature setting by 5 K. Storage tank charging stops when the temperature setting is reached. The mixer circuit, the direct heating circuit and a multifunction relay can be used.

3.3 Frost protection function

The frost protection function prevents the heating system from freezing during standby operation by automatically switching on the heating operation. If the measured outside temperature drops below the set front protection temperature, the heating circuits are activated, the pumps are switched on and the heat request is sent to the heat source. The function stops when the outside temperature increases to 1 K above the set frost protection temperature. If the temperature of the heat source drops below 5°C, the heat source is switched on via the Lago 0321 until its temperature is again above the set minimum temperature plus the hysteresis. If the flow or storage temperature drops below 7°C, the pump for the flow or storage is switched on. If the flow or storage temperature rises above 9°C, the pump is switched off. If the room temperature drops below 5°C, the heating circuits are activated, the pumps are switched on and a heat request is sent to the heat source.

3.4 Demand-dependent circulation pump control

The demand-dependent circulation pump control switches the circulation pumps off when there is no heating requirement. At the same time the mixers are closed.

Switching conditions, see page 41 (Circulation pump).

3.5 Pump run-on time

If the circulation pumps are switched off, they continue to run for 5 minutes if the burner was on during the last 5 minutes before the switch-off.

3.6 Pump blocking protection

The pump blocking protection effectively prevents the pumps from blocking due to prolonged periods out of operation. The integrated protection function switches on all the pumps that have not been in operation during the past 24 hours for 5 seconds at 12:00 h every day.

3.7 Mixer blocking protection

If the mixer has not moved for 24 hours, it is fully opened once shortly after 02:00 h. The heating circuit pump is switched off during this time. The maximum flow temperature is monitored. The function is aborted if the flow temperature rises to the maximum flow temperature minus 5 K.

3.8 Cascade operation

In conjunction with a cascade manager, the Lago 0321 can control a single heat source in a cascade if a boiler sensor (e.g. KF) is installed. An address is assigned at the Lago 0321 via the parameter 38. As soon as the address has been set at the Lago 0321, the controller is reconfigured as a heating module for cascade operation. The mixer circuit can continue to be used.

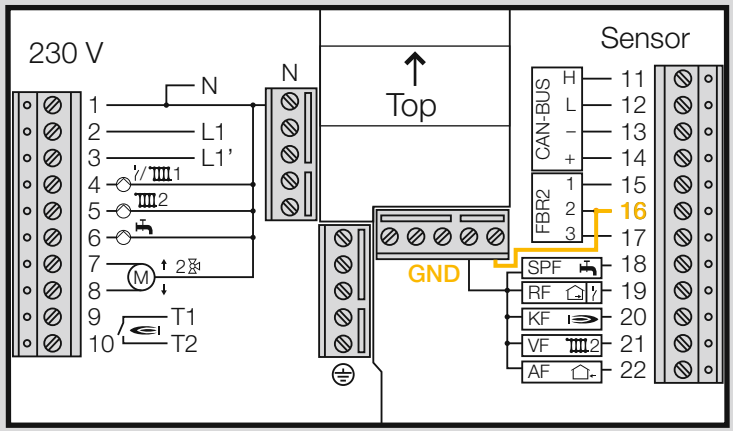
3.9 Operation as a mixer module

Operation as controller for a mixer circuit to extend a heating system is possible. If an outside sensor is connected, it is possible to activate zone control. The multifunction relay can be used.

3.10 Telephone switch

A telephone switch can be used to switch the heating to heating mode. The telephone switch is connected to the terminals for the remote control (terminals 16 and 17). As soon as a short-circuit is detected at the terminals, the heating circuits are switched to heating mode. Hot water preparation is also activated. When the short circuit has been remedied, the Lago 0321 heats again on the basis of the previously set heating program.

3.11 Connection diagram



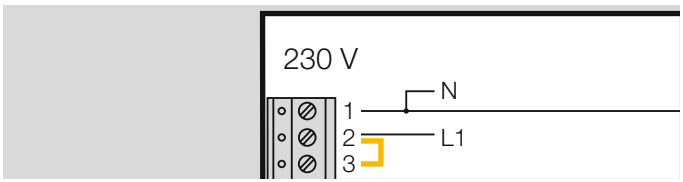
Terminals			
~230 V (relay switching capacity 2(2) A, ~250 V)		SELV, safety extra low voltage	
No.	**Connection for**	**No.**	**Connection for**
1	Neutral conductor mains	11 – 14	CAN-BUS
2	Mains voltage heating controller L1	15 – 17	Remote control FBR2 alternatively:
3	Mains voltage for the outputs L1‘	15 – 16	Room thermostat
4	Pump direct circuit or multifunction relays	16 – 17	Phone switch
5	Mixer circuit pump	18	Storage sensor
6	Storage charging pump	19	Room sensor or multifunction sensor
7	Mixer Open	20	Boiler sensor
8	Mixer Close	21	Flow sensor
9 – 10	Burner electrically isolated	22	Outside sensor

Insert a jumper between terminal 16 and GND bus terminal. If the jumper between terminal 16 and GND is omitted, the sensor values will not be displayed.

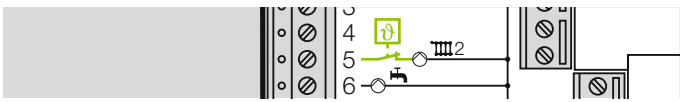
3.11.1 Options

Power supply to the relays

For the power supply to the relays, **a jumper** (link) must be installed between terminals 2 and 3 if no separate regulations exist for the protection of the relays.



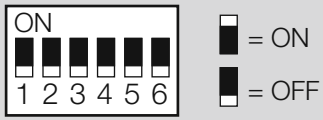
Maximum limiter



If a **maximum limiter** is required for the mixed heating circuit, e.g. in combination with underfloor heating, the limiter must be connected between terminal 5 and the heating circuit pump.

4 DIP switches

Delivery condition: All switches are set to OFF.



Switch No.	Function
1 to 3	None
4	Switching over the output at terminal 4 between "Pump of direct heating circuit (heating circuit 1)" and "Multifunction relay". ON = Direct heating circuit (heating circuit 1) OFF = Multifunction relay[1)]
5	Assignment of a remote control FBR2 to the direct heating circuit (heating circuit 1) or mixer circuit (heating circuit 2). ON = Assignment to direct heating circuit OFF = Assignment to mixer circuit
6	Adaptation of the sensor characteristic ON = 1 kΩ PTC thermistor OFF = 5 kΩ NTC thermistor

1) *If the output at terminal 4 is used as a multifunction relay, parameters 80 to 82 must be set, see page 38 (When using the output at terminal 4 as a multifunction relay (MF relay)).*

5 Parameters

5.1 Overview table

No.	Parameter	Range	Factory setting
01	Heating program 2 for Monday	00:00 – 24:00	06:00 – 08:00 16:00 – 22:00
02	Heating program 2 for Tuesday	00:00 – 24:00	
03	Heating program 2 for Wednesday	00:00 – 24:00	
04	Heating program 2 for Thursday	00:00 – 24:00	
05	Heating program 2 for Friday	00:00 – 24:00	
06	Heating program 2 for Saturday	00:00 – 24:00	07:00 – 23:00
07	Heating program 2 for Sunday	00:00 – 24:00	
08	Operating mode direct heating circuit (HC1)	----, ⏻, 🕘1, 🕘2, ❄, ☽	----
09	Heat slope direct heating circuit	0.20 – 3.00	1.20
10	Room sensor influence direct heating circuit	OFF, 0 – 20	10
11	Room sensor correction direct heating circuit	-5 to +5°C	0
13	Operating mode mixer circuit (HC2)	----, ⏻, 🕘1, 🕘2, ❄, ☽	----
14	Heat slope mixer circuit	0.20 – 3.00	1.20
15	Room sensor influence Mixer circuit	OFF, 0 – 20	10
16	Room sensor correction Mixer circuit	-5 to +5 K	0
18	Hot water according to program	0, 1, 2, 3, 4	1
19	Indication of heating program at the lower margin of the display	0, 1)	0
20	Code no. input	0000 – 9999	0000
21	Code no.	0000 – 9999	0000
22	Outside temperature Frost protection	----, -15.0 to +5.0°C	0.0°C
23	CAN bus ID mixer circuit	1 – 15 (2 – 15 with direct heating circuit)	2
30	Maximum heat source temperature	30.0 – 110.0°C	85.0°C
31	Minimum heat source temperature	10.0 – 80.0°C	40.0°C
32	Warm up temp	10.0 – 80.0°C	35.0°C
33	Minimum limit heat source	0, 1, 2	1
34	Dyn. switching hysteresis	5.0 – 20.0 K	10.0 K
35	Hysteresis time	0 – 30 min	0 min
36	Burner starts	Display only	

No.	Parameter	Range	Factory setting
37	Burner running time	Display only	
38	Address heating module (only for cascade operation)	----, 1 – 8	----
50	DHW Relief	0, 1	1
51	Parallel pump operation	0, 1	0
52	Antilegion function	0, 1	1
53	Temperature increase during hot water preparation	0.0 – 50.0 K	20.0 K
60	Maximum flow temperature direct heating circuit	20.0 – 110.0°C	80.0°C
61	Minimum flow temperature direct heating circuit	10.0 – 110.0°C	10.0°C
69	Additional mixer functions	0, 1	0
70	Maximum flow temperature mixer circuit	20.0 – 110.0°C	80.0°C
71	Minimum flow temperature mixer circuit	10.0 – 110.0°C	10.0°C
72	Mixer dynamic OPEN	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	16.0 (Parameter 69=1: 50)
73	Mixer dynamic CLOSED	5.0 – 25.0 (Parameter 69=1: 5.0 – 200.0)	12.0 (Parameter 69=1: 20)
74	Flow temperature cooling	0, 1, 15.0 – 25.0°C	15.0°C
75	Room temperature guided cooling	----, 20.0 – 40.0°C	25.0°C
76	Weather-guided cooling	----, 0.0 – 40.0°C	27.0°C
77	Mixer scan time	10 – 200 s	100 s
78	Mixer operating time limit	----, 0 – 30 min	----
79	Mixer start seconds	0 – 30 s	0 s
80	MF Relay function	0 – 34	0
81	MF Relay switching temperature	30.0 – 90.0°C	30.0°C
82	Hysteresis of the MF Relay	2.0 – 10.0 K	5.0 K
97	PC enable (0000 = disabled)	0000 – 9999	0000
98	Relay Test	0, 1 – 6	0
99	Software version and index (63.XX)	63.00 – 63.99	Display only

5.2 General settings for ultimate users

Using these parameters, the ultimate user can set the desired heating time, the heating curve, the room sensor influence and the operating mode for the direct heating circuit and the mixer circuit and define which heating program is to be displayed.

5.2.1 Heating program 2 (parameters 01 to 07)

Defining the heating times for the individual days of the week (Mo, Tu, We, Th, Fr, Sa and Su).

5.2.2 Operating mode of direct heating circuit (parameter 08), operating mode of mixer circuit (parameter 13)

Can only be set when no FBR2 is connected. One of the operating modes can be selected individually for the direct heating circuit (heating circuit 1) and the mixed heating circuit (heating circuit 2): ⏻Standby/OFF, ◴1 Automatic mode 1, ◴2 Automatic mode 2. ☼Day mode, ☽ Night mode (reduced night mode).

5.2.3 Heat slope of direct heating circuit (parameter 09), heat slope of mixer circuit (parameter 14)

Only active when an outside sensor is connected. Selecting the correct heat slope saves energy because the heat sources only heat to the point required by the respective outside temperature.

The heat slope specifies the number of K by which the flow temperature changes when the outside temperature rises or falls.

Typical values:
Underfloor heating: 0.4 to 0.8
Radiators: > 1.0

5.2.4 Room sensor influence of direct heating circuit (parameter 10), room sensor influence of mixer circuit (parameter 15)

Only active if a room sensor is connected or an FBR2 remote control with integrated room sensor is used. It is possible to adjust the influence of the room sensor on the control process.

Parameter 10, 15 = OFF:
Purely weather-dependent control,

Parameter 10, 15 = 0:
Purely weather-dependent control,

Parameter 10, 15 = 1 – 19:
Weather-dependent and room temperature control (ratio can be varied in 5% steps),

Parameter 10, 15 = 20:
Purely room temperature control.

Within the range 0 – 20 the heating circuit pump operates up to the next heating time if there is a heating requirement during the period of the reduced night mode (e.g. frost protection or when the temperature drops below the setback temperature). This prevents the rooms from becoming too cool.

5.2.5 Room sensor correction of direct heating circuit (parameter 11), room sensor correction of mixer circuit (parameter 16)

Only active if a room sensor is connected or an FBR2 remote control with integrated room sensor is used. This setting can be used to correct measurement errors of the connected room sensor, e.g. when the room sensor is influenced by incorrect positioning.

5.2.6 Hot water according to program (parameter 18)

This parameter can be used to define the heating times for hot water.

5.2.7 Indication of heating program at the lower margin of the display (parameter 19)

Only active when both heating circuits in the controller are active. The heating program for the direct heating circuit or for the mixed heating circuit can be shown at the bottom of the display

Parameter 19 = 0: For direct heating circuit,

Parameter 19 = 1: For mixed heating circuit.

5.3 General settings for qualified personnel

5.3.1 Code no. input (parameter 20)

Input of the four-digit code number defined with parameter 21 to enable qualified personnel to change parameters.

5.3.2 Code no. definition (parameter 21)

Definition of a four-digit code number which has to be entered via parameter 20 so that parameters 21 – 99 can be changed. The code number set at the factory is 0000.

5.3.3 Outside temperature frost protection (parameter 22)

This parameter defines the outside temperature limit value (-15 to +5°C) below which the heating controller automatically switches on the heating circuit pumps. The frost protection can also be deactivated.

5.3.4 CAN bus ID for mixer circuit (parameter 23)

Where there are several Lago 0321 in a heating system, an address from 1 to 15 can be assigned to the mixer circuit via this parameter.

If the direct heating circuit is activated, an address from 2 – 15 must be set for the mixer circuit as the direct heating circuit is automatically assigned the address 1 (only one direct heating circuit is permitted).

5.4 With connected boiler sensor (KF)

5.4.1 Maximum heat source temperature (parameter 30)

The heat source is heated up to the maximum temperature set with parameter 30 in order to protect the heat source against overheating and prevent the tripping of the safety temperature limiter (STB). This also allows energy to be saved.

The parameter setting also has an effect on the hot water preparation.

We recommend that the temperature is set according to the boiler manufacturer's specifications.

5.4.2 Minimum heat source temperature (parameter 31)

The temperature is set with the parameter so that the formation of condensation in the heat source is prevented when there is a low heating requirement. The heat source does not switch off until the defined temperature plus the switching hysteresis (parameter 34) is reached during heating.

We recommend that the temperature is set according to the boiler manufacturer's specifications.

5.4.3 Warm-up temperature (parameter 32)

The heating controller switches off the heating circuit pumps and the storage charging pump and closes the mixers until the heat source has reached the temperature set with this parameter during heating in order to shorten the period of operation within the condensation range.

We recommend that the temperature is set according to the boiler manufacturer's specifications.

5.4.4 Minimum heat source limit (parameter 33)

Reduces the formation of condensation in the heat source when there is a low heating requirement. The heating controller does not switch off the heat source until the minimum temperature set with parameter 31 plus the switching hysteresis (parameter 34) has been reached.

P33 = 0: The minimum limit is switched off.

P33 = 1: The heat source maintains at least the set minimum temperature (P31) + switching hysteresis (P34) during a heat request.

P33 = 2: The heat source permanently maintains the set minimum temperature (P31) + switching hysteresis (P34) (even during setback mode).

5.4.5 Dynamic switching hysteresis (parameter 34)

The switching hysteresis is added to the calculated temperature of the heat source to calculate the actual switch-off value.

5.4.6 Hysteresis time (parameter 35)

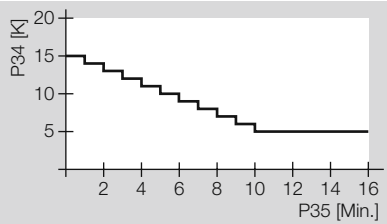
This function optimises heat source operation when subjected to varying loads.

P35 = 0: The switching hysteresis (parameter 34) is not reduced.

P35 = 1 – 30 min: The switching hysteresis (parameter 34) is reduced in steps to a hysteresis of 5 K after the heat source is switched on and the time set with parameter 35 has elapsed.

With low heat consumption, we recommend that the time defined with parameter 35 is set as long as possible in order to prevent frequent starting and stopping of the heat source. With high heat consumption, set parameter 35 short. This avoids heating up the heat source to unnecessarily high temperatures. The energy consumption of the heating system is optimised.

Example:
Parameter 34 = 15, Parameter 35 = 10.



The initial switching hysteresis is reduced from 15 K to 5 K after 10 minutes.

5.4.7 Burner starts (parameter 36)

Displays the number of burner starts (no setting possible).

5.4.8 Burner running times (parameter 37)

Displays the total burner operating time in hours (no setting possible).

5.4.9 Heating module address (parameter 38)

For cascade operation only.

The parameter define whether the heating controller controls a single heat source outside a cascade or whether the heating controller is activated in a cascade below the set address.

P38 = ----: Single heat source (no cascade)

P38 = 1 – 8: Address of the heating module in a cascade

5.5 With connected storage sensor (SPF)

5.5.1 DHW relief (parameter 50)

This parameter defines that the heating controller switches on the storage charging pump only when the temperature of the heat source has exceeded the storage temperature by 5 K. The controller switches the pump off as soon as the heat source temperature drops below the storage temperature. This prevents the storage from being cooled by the heat source at the beginning of hot water preparation.

The DHW relief can also be switched off.

5.5.2 Pump parallel running (parameter 51)

This parameter defines whether the heating circuit pumps are switched off and the mixers are closed during hot water preparation (hot water priority mode) or whether the heating controller bars the direct heating circuit and continues to heat the mixer circuit (pump parallel running), as a result of which hot water preparation is slower.

5.5.3 Antilegion function (parameter 52)

This parameter allows you to select whether the protection function is switched off or whether the hot water storage tank is heated to 65 °C with every 20th heating-up process or at least once per week on Saturday at 01:00 h as protection against thermoresistant bacteria

5.5.4 Temperature increase during hot water preparation (parameter 53)

The heat source is operated at increased temperature (between 0 and 50 K) relative to the desired temperature during hot water preparation to ensure that the hot water temperature in the storage tank can be reached quickly via the heat exchanger.

5.6 With active direct heating circuit (DIP switch 4 = ON)

5.6.1 Maximum flow temperature direct heating circuit (parameter 60)

The heating controller limits the calculated desired flow temperature of the direct heating circuit to the value set with parameter 60 to protect the consumer against overheating.

The heating controller switches off the heating circuit pump of the direct heating circuit only when the temperature of the heat source has exceeded the defined value by 8 K. The heating controller switches the heating circuit pump on again as soon as the heat source temperature drops below the value set with parameter 60 plus 5 K.

5.6.2 Minimum flow temperature of direct heating circuit (parameter 61)

The heating controller increases the calculated desired flow temperature of the direct heating circuit to the defined parameter value (10 to 110 °C), e.g. when air heating is installed.

5.7 With connected flow sensor (VF)

5.7.1 Maximum flow temperature of mixer circuit (parameter 70)

The heating controller limits the calculated desired flow temperature of the mixed heating circuit to the defined parameter value (between 20 and 110°C) to protect the consumer from overheating, e.g. when an underfloor heating system is installed.

5.7.2 Maximum flow temperature of mixer circuit (parameter 71)

The heating controller increases the calculated desired flow temperature of the mixed heating circuit to the defined parameter value (10 to 110°C), e.g. when air heating is installed.

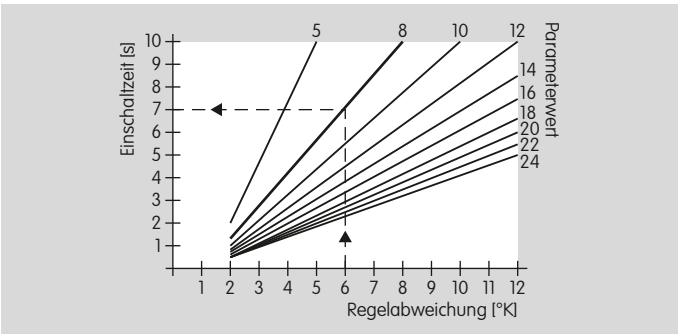
5.7.3 Mixer dynamic OPEN (parameter 72)/ Mixer dynamic CLOSED (parameter 73)

The mixer dynamic determines the ratio between switch-on and switch-off times of the mixer when opening (parameter 72) or closing (parameter 73) the mixer. Depending on the deviation between desired and actual flow temperature, the mixer is actuated for a longer or a shorter period. The ratio is based on a scan rate of 10s.

Extremely low values cause fast mixer movement and can result in vibration.

Example:

Parameter 72 = 8



In the case of a controller deviation of 6 K, the mixer is actuated for 7 s and remains switched off for 3 s.

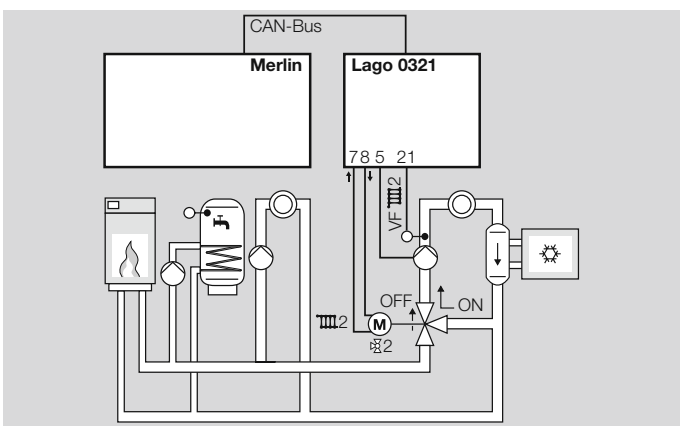
5.8 For cooling mode in conjunction with central controller

Cooling mode is only possible in conjunction with a central controller (e.g. Merlin). For cooling mode, the central controller must activate the “Cooling” operating mode.

5.8.1 Flow temperature cooling (parameter 74)

P74 = 0: The heating circuit is not cooled. The mixer in the heating circuit remains closed, the heating circuit pump is switched off.

P74 = 1:



The mixer in the heating circuit functions as a valve. The mixer opens (ON). The heating circuit pump is switched on.

P74 = 10.0 – 25.0°C: The mixer controls to the set flow temperature P74 of the heating circuit.

5.8.2 Room temperature-controlled cooling (parameter 75)

This parameter defines whether the heating controller starts cooling mode in relation to the room temperature. Furthermore, the desired room temperature (15 to 25°C) is defined with this parameter. Cooling mode starts as soon as the set desired room temperature is exceeded. Cooling mode stops when the temperature drops below the defined desired room temperature by 2 K.

The conditions defined in parameters 75 and 76 must be satisfied for the heating controller to start cooling mode.

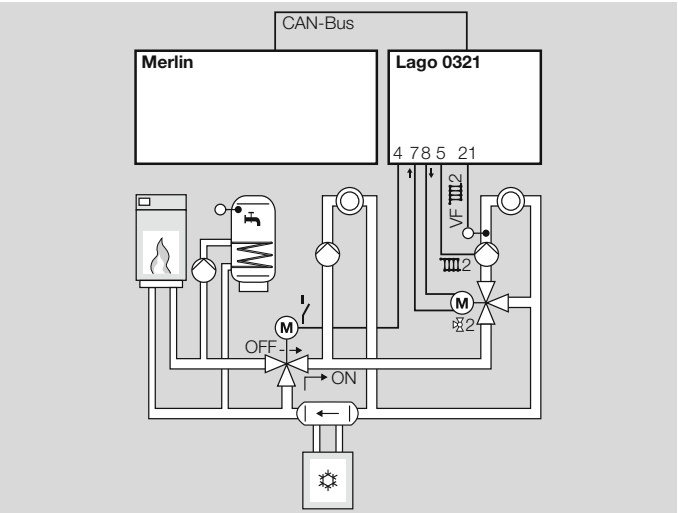
5.8.3 Weather-controlled cooling (parameter 76)

This parameter defines whether the heating controller starts cooling mode in relation to the outside temperature.

The heating controller starts cooling mode as soon as the outside temperature defined in parameter 76 is exceeded. Cooling mode stops when the temperature drops below the set outside temperature by 1 K.

The conditions defined in parameters 75 and 76 must be satisfied for the heating controller to start cooling mode.

Example:



The central controller (e.g. Merlin) activates the "Cooling" operating mode via the CAN bus and controls the heat source, the refrigerating machine, the hot water preparation and the direct heating circuit. The Lago 0321 heating controller controls the bypass valve and the mixed heating circuit.

If, for example, parameter 80 = 34 and parameter 74 = 20 °C are selected and the central controller activates cooling mode, the multifunction relay in the Lago 0321 switches and opens the bypass valve (ON) so that the cooling circuit is isolated from the heat source.

The mixer 2 is regulated to the flow temperature set with parameter 74.

5.8.4 Mixer scanning time (parameter 77)

The mixer is driven cyclically, as required, on expiry of the time defined with parameter 77 (10 to 200 s).

The longer the pipework is, the longer the time defined with parameter 77 should be set.

5.8.5 Mixer running time limit (parameter 78)

The value defined in parameter 78 specifies the maximum length of time that the mixer is operated in one direction (OPEN or CLOSED). After the mixer has moved in one direction for the specified period, the mixer will not be controlled in the same direction until there has been a control process in the opposite direction. This function is important if the mixer is not equipped with a slip clutch or limit switches.

We recommend that the time is set according to the mixer manufacturer's specifications.

5.8.6 Mixer starting seconds (parameter 79)

The first stroke of a closed mixer does not immediately effect a change in the flow temperature. Parameter 79 defines the time (0 – 30 s) by which a flow temperature change must be measurable. Increase this time if the flow temperature changes too slowly during the initial phase.

5.9 When using the output at terminal 4 as a multifunction relay (MF relay)

DIP switch position 4 = OFF.

The use of the output at terminal 4 as a multifunction relay allows auxiliary functions to be controlled. The sensor at terminal 19 is assigned to the relay.

5.9.1 Function of the MF relay (parameter 80)

The function of the multifunction relay is defined with this parameter.

P80 = 0: The MF relay has no function.

P80 = 1: For control of a header pump (only if the Lago 0321 is used as a heating system controller). The header pump is switched on when a consumer requests heat. When there is no heat request, the pump is switched off. The pump runs on for 5 minutes after the heat source has been switched off.

P80 = 2: For control of a circulation pump. The circulation pump is switched on simultaneously with the hot water program. A storage sensor must be installed in the system.

P80 = 3: For control of a feed pump. The feed pump is switched on when an internal consumer requests heat. When there is no heat request, the pump is switched off. The pump runs on for 5 minutes after the heat source has been switched off.

P80 = 5: For control of a heat source pump. The multifunction relay switches in combination with the burner relay (T1 – T2), run-on = 5 min

P80 = 20: For control of a temperature-controlled circulation pump. The circulation pump is switched on when the return temperature of the circulation line (measured with the multifunction sensor) is lower than the switching temperature of the multifunction relay (set via parameter 81).

The pump is switched off when the return temperature is higher than the switching temperature of the multifunction relay (parameter 81) plus the hysteresis (parameter 82).

The pump can only be switched on during the switch-on times of the hot water program (parameter 18).

P80 = 21: For control of the pulsed circulation pump. The circulation pump is switched on for 5 minutes when there is a short-circuit between terminal 19 and GND. The pump can only be switched on during the switch-on times of the hot water program (parameter 18).

P80 = 24: Control of the heat source return flow booster

The return flow booster pump is switched on when the return temperature of the system (measured with the multifunction sensor) is lower than the switching temperature of the multifunction relay (set via parameter 81).

The pump is switched off when the return temperature is higher than the switching temperature of the multifunction relay (parameter 81) plus the hysteresis (parameter 82).

P80 = 34: Control of a bypass valve in cooling mode.

The multifunction relay switches as soon as a central controller, e.g. Merlin, activates the operating mode "Cooling".

During cooling mode,hot water preparation is possible by means of conventional heat sources.

Example, see page 36 (Weather-controlled cooling (parameter 76)).

5.9.2 Switching temperature (parameter 81)

Parameter The switching temperature (30 to 90°C) of the MF relay is defined with this parameter.

Switching conditions, see page 38 (Function of the MF relay (parameter 80)).

5.9.3 Hysteresis (parameter 82)

The hysteresis (2 to 10K) is defined with this parameter.

The multifunction relay is switched off when the measured temperature is higher than the accumulated values defined with parameter 81 and this parameter.

5.10 For Service

5.10.1 PC enable (parameter 97)

This parameter defines a four-digit unlock code that can be used to retrieve data from the mixed heating circuit using the "ComfortSoft" PC software.

5.10.2 Relay test (parameter 98)

The relay test is used to check the electrical connection. Each relay output is actuated one after the other by changing the parameter value. The corresponding output is shown in the display.

5.10.3 Software version and index (parameter 99)

This parameter displays the software version and the index that must be quoted in the event of enquiries to the manufacturer.

6 Project planning information

6.1 Installation

The minimum distance from surrounding heat sources is to be chosen so that the permitted ambient temperature is not exceeded during operation.

6.2 Electrical connection

For fixed devices, an isolating mechanism must be installed for shutting off from the network, in accordance with the installation guidelines and EN 60335.

The insulation of the line conductors must be protected against damage by overheating.

6.3 Boiler/flow/outside/storage sensors

When connecting several sensors, pay attention that the sensors have the same resistance rating (1K-PTC or 5K-NTC).

We recommend the use of Kromschröder sensors, see page 42 (Sensors).

6.4 Room sensor

The room sensor influence is only active when a room sensor (e.g. RFB) or a remote control with integrated room sensor (e.g. FBR 2) is connected.

Only sensors with a resistance rating of 5K-NTC can be used for the connection of the room sensor RFB to the Lago 0321.

The influence of a room sensor can be set for calculation of the flow temperature for the direct heating circuit (parameter 10) and the mixer heating circuit (parameter 15).

6.5 Mixer blocking protection

If the mixer has not moved for 24 hours, it is fully opened once shortly after 02:00 h. The heating circuit pump is switched off during this time. The maximum flow temperature is monitored. The function is aborted if the flow temperature rises to the maximum flow temperature minus 5 K.

6.6 Cascade operation

The connection of the sensor, e.g. boiler sensor KF, is absolutely essential for this in order to be able to measure the temperature for the limiter function/max. monitoring.

The address (BUS-ID) for the heat source is set with parameters and the heating controller is automatically reconfigured as a heating module for cascade operation.

The internal hot water function remains enabled (only if a storage sensor for hot water preparation via the internal heat source is connected. only with the address BUS-ID = 1).

The mixer circuit, the direct heating circuit (only 1×) and the multifunction relay can be used.

6.7 Mixer module

Operation as controller for a mixer circuit to extend a heating system is possible.

If an outside sensor is connected (e.g. AF), it is possible to activate zone control.

The direct heating circuit (only 1×) and the multifunction relay can be used.

6.8 Circulation pump

If there is no heating requirement, the demand-dependent circulation pump control bars heating operation by switching off the circulation pumps for the direct heating circuit (heating circuit 1) and the mixer circuit (heating circuit 2). If the mixer circuit is active, barring results in the mixing valve closing.

The burners on the boiler are switched off if none of the heating circuits reports a heat requirement.

Switching conditions for circulation pump

Temperature	Control of heating controller
Room-dependent control (parameter 10, 15 = 1-20)	
Roomact > Roomset + 1 K	Pump OFF, mixer "CLOSED".
Roomact < Roomset	Back to heating mode
Weather-dependent control (parameter 10, 15 = 0) in heating mode	
Outside > Roomset + 1 K	Pump OFF, mixer "CLOSED".
Outside < Roomset	Back to heating mode
Weather-dependent control (parameter 10, 15 = 0) in reduced mode (reduced night mode)*	
Roomact < Roomset	Back to heating mode
Weather-dependent control (parameter 10, 15 = OFF) in heating mode	
Outside > Roomset + 1 K	Pump OFF, mixer "CLOSED".
Outside < Roomset	Back to heating mode
Weather-dependent control (parameter 10, 15 = OFF) in reduced mode (reduced night mode)	
Flowset < 20°C	Pump OFF, mixer "CLOSED".
Flowset > 21°C	Back to heating mode

* *The circulation pump is switched off when switching to reduced mode (reduced night mode).*

If the circulation pumps are switched off, they continue to run for 5 minutes if the burner was on during the last 5 minutes before the switch-off.

Thanks to an integrated protection function (pump blocking protection), all the pumps that have not run in the last 24 hours are switched on every day at 12:00 h for 5 seconds to prevent blocking of the pumps due to prolonged standstill times.

6.9 Telephone switch

The telephone switch is connected to terminals for the remote control FBR, see page 25 (Connection diagram).

If a Merlin BM, BM 8 operating module or a Lago FB remote control is connected to the heating controller, the telephone switch must be connected to the operating module or the remote control.

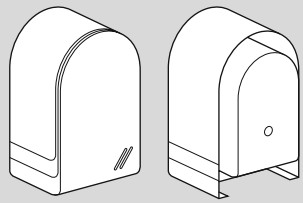
7 Accessories

7.1 Sensors

Sensor values

Temp. [°C]	5 kΩ NTC: AF, KF, SPF, VF [Ω]	1 kΩ PTC: AFS, KFS, SPFS, VFAS [Ω]
-60	698961	470
-50	333908	520
-40	167835	573
-30	88340	630
-20	48487	690
-10	27648	755
0	16325	823
10	9952	895
20	6247	971
25	5000	1010
30	4028	1050
40	2662	1134
50	1801	1221
60	1244	1312
70	876	1406
80	628	1505
90	458	1607
100	339	1713
110	255	1823
120	194	1936

7.1.1 Outside sensor AF

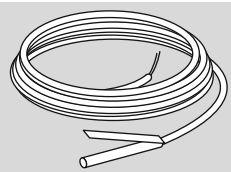


For measurement of the outside temperature. Installation on a north or north-east facing wall, approx. 2.5 m above the ground.

Package contents: Outside sensor, screw and dowel.

Order no. AF, 5 kΩ: 99 679 030

7.1.2 Boiler sensor KF, storage sensor SPF

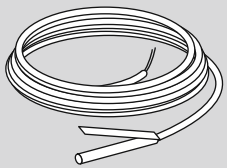


For measuring the boiler or storage temperature. Installation in the immersion pipe of the hot water storage tank.

5 kΩ, 3 m, ∅ 6.0×50 mm

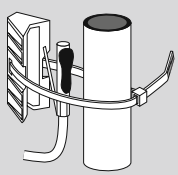
Order no. 99 676 769

7.1.3 Flow sensor VF, multifunction sensor MF



For measuring the flow or multifunction temperature. Installation for heating system control as close as possible behind the boiler on the heater flow pipe, for mixer operation approx. 0.5 m behind the heating circuit pump instead of a boiler sensor KF.

Package contents: Flow sensor, thermal compound, retaining strap, pressure cap.



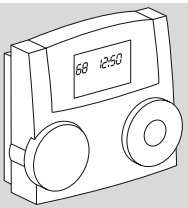
5 kΩ, 3 m, ∅ 6.0×50 mm

Order no. 99 679 073

7.2 Digital remote control and operating modules

7.2.1 Lago FB

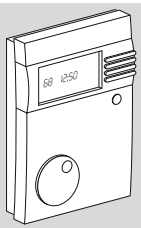
The remote control allows various operating functions, e.g. heating based on heating program, setting of the individual room temperature and monitoring of the boiler data, to be shifted to the living room. Interface for CAN bus.



Order no. 99 678 860

7.2.2 Merlin BM

For display of the specialist personnel parameters, input of the user parameters, room temperature control and for automatic adaptation of the heat slope in the living room. With illuminated, 4-line plain text display in the national language. Interface for CAN bus.

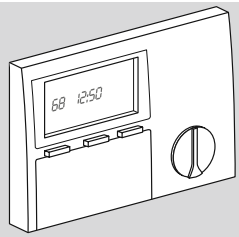


Instructions in German: Order no. 99 778 201

With instructions in language of your choice: Order no. 99 778 202

7.2.3 BM 8

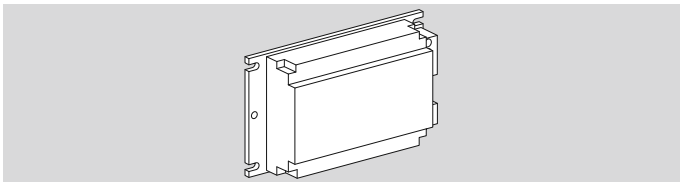
For display of the specialist personnel parameters, input of the user parameters, room temperature control and for automatic adaptation of the heat slope in the living room. With plain text display in the national language and party button. Simple operation with three buttons and rotary knob. Interface for CAN bus.



Instructions in German: Order no. 99 678 736

With instructions in language of your choice: Order no. 99 678 738

,PC Adapter



For the communication between heating controller and a PC. The ComfortSoft program can be used to set and retrieve all system parameters. In the PC the parameters can be saved, graphically displayed and evaluated within a specified time periods. The software can be downloaded under www.kromschroeder.de ➔ Products ➔ Downloads. To connect to a PC, you need the CoCo PC active, which also supports the sending of error messages by SMS and the remote interrogation of controller data. The CoCo PC mobile is an alternative without remote retrieval or error messages via SMS.

7.2.4 CoCo PC active

Supports the sending of error messages by SMS and the remote retrieval of controller data via the telephone/mobile telephone network in conjunction with a modem.

Package contents: CoCo PC active, instructions.

Order no. 99 678 288

The connecting cable for the RS232 interface must be ordered separately: Order no.: 99 676 894.

7.2.5 CoCo PC mobile

Connection via USB cable for setting parameters at the heating controller and calling up diagnostic data.

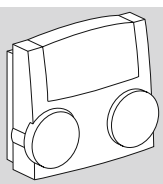
Package contents: CoCo PC mobile, instructions, connecting cable to USB mini-B for CAN bus or eBus.

Order no. 99 677 961

7.3 Analogue remote control, external room sensor

7.3.1 Remote control with room sensor FBR 2

For selection of the operating mode and adjustment of the desired room temperature in the range ± 5 K.



Order no. 99 679 161

7.3.2 Room sensor RFB

Order no. 99 676 857

8 Technical Specifications

Mains voltage according to DIN IEC 60 038: 230 V~, ±10%

Power consumption: max. 5 W

Switching capacity of the relays: 250 V~, 2 (2) A

Max. current via terminal L1': 6.3 A

Protection class according to DIN EN 60529: IP 40

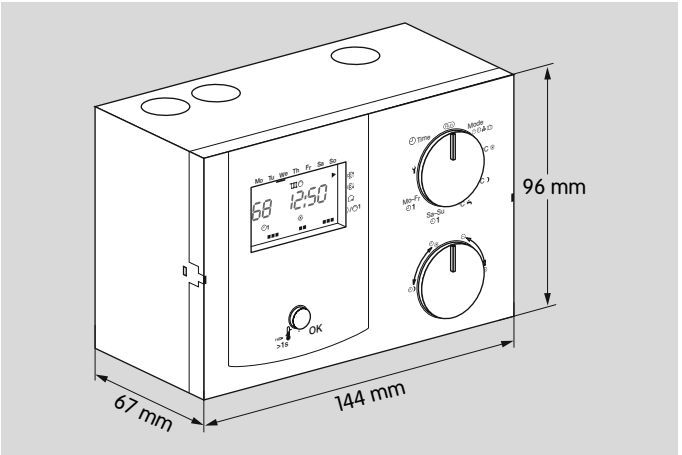
Protection class according to DIN EN 60730: I

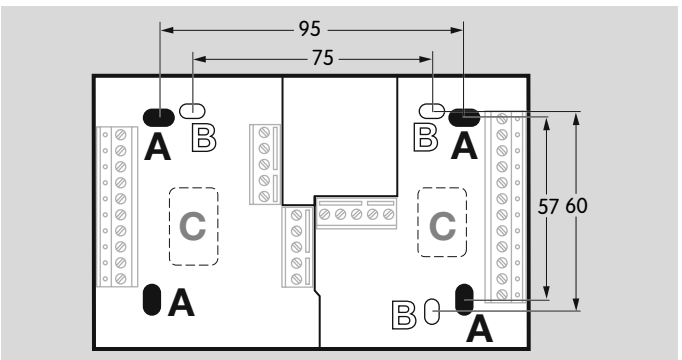
Reserve power of clock: >10 h.

Admissible ambient temperature:
During operation: 0 to 50 °C
During storage: -20 to 60 °C,
Admissible humidity, non-condensing: 95 % r. H.

Sensor resistances:
NTC 5 kΩ (AF, KF/SPF, VF):
Tolerance in ohms: ±1% at 25 °C,
Temperature tolerance: ±0.2 K at 25 °C;
PTC 1010 Ω, (AFS, KFS, SPFS, VFAS):
Tolerance in ohms: ±1% at 25 °C,
Temperature tolerance: ±1.3 K at 25 °C.

8.1 Dimensions





A = Mounting holes,
B = Mounting holes, for assembly on switch box,
C = Opening for cable leadthrough.

9 Glossary

9.1 Flow and return flow temperature

The flow temperature is the temperature to which the heat source heats the water that transfers the heat to the consumer (e.g. radiator).

The return flow temperature is the temperature of the water that flows back from the consumer to the heat source.

9.2 Desired and actual temperature

The desired temperature (or setpoint temperature) describes the desired temperature for a room or for domestic water.

The actual temperature denotes the actual temperature that prevails.

The heating controller has the task to adjust the actual temperature to the desired temperature.

9.3 Setback temperature

The setback temperature is the desired temperature to which the heating system heats outside heating times (e.g. at night). It should be set so that the rooms do not cool down too much while saving energy.

9.4 Heat source

The boiler is referred to as the heat source. It may also be a buffer storage tank however.

9.5 Circulation pump

The circulation pump ensures that hot domestic water is constantly available directly at the tapping point. The hot domestic water is held in the storage tank. The circulation pump circulates it via the fresh water pipes in accordance with the heating program.

9.6 Return flow booster

The return flow booster prevents the temperature difference at the heat source between flow and return becoming too great. A mixing valve is here used to add a portion of the hot flow water to the return flow to prevent condensation of the steam from the heating gas against the cold heat carrier inside the heating boiler. The minimum temperature required for this process inside the heating boiler depends on the type of fuel (oil 47 °C, gas 55 °C). The risk of corrosion inside the heating boiler is thereby reduced significantly.

9.7 Direct heating circuit

In the direct heating circuit (heating circuit 1) the flow temperature is identical to the heat source temperature, i.e. the direct heating circuit is operated with the maximum temperature.

9.8 Mixed heating circuit/Mixer circuit

In the mixed heating circuit (heating circuit 2) a three-way valve is used to add cooled water from the return flow to the hot flow water. The flow temperature is thus reduced. This is important for underfloor heating systems, for example, because they must only be operated with low flow temperatures.

9.9 Heating time

During the heating time, a room or the domestic water is heated to the desired temperature. Between the heating times the room is heated to the setback temperature and the domestic water is heated to 10 °C.

9.10 Header pump

A header pump is used to pump the hot water in a system with one or several heat sources. It is switched on as soon as a consumer in the system requests heat.

9.11 Feed pump

A feed pump functions like a header pump. It is switched on as soon as an internal consumer in the system requests heat.

9.12 Antilegion function

Legionella are bacteria that live in fresh water. As a protective measure against legionella, the hot water storage tank is heated to 65 °C every 20th heating period or at least once a week.

Feedback

Finally, we are offering you the opportunity to assess this “Technical Information (TI)” and to give us your opinion, so that we can improve our documents further and suit them to your needs.

Clarity

- ○ Found information quickly
- ○ Searched for a long time
- ○ Didn’t find information

  What is missing?
- ○ No answer

Comprehension

- ○ Coherent
- ○ Too complicated
- ○ No answer

Scope

- ○ Too little
- ○ Sufficient
- ○ Too wide
- ○ No answer

Use

- ☐ To get to know the product
- ☐ To choose a product
- ☐ Planning
- ☐ To look for information

Navigation

- ○ I can find my way around
- ○ I got “lost”
- ○ No answer

My scope of functions

- ○ Technical department
- ○ Sales
- ○ No answer

Remarks

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