Flow-temperature controller for heating / cooling

User's Manual, part 1
RDT 300 F001

7000927003 R4

About these operating instructions

Together with the RDT 300 controller for ventilation and air-conditioning, you receive two documents:
Part 1 (7000927) of the Operating Instructions, which contains all the necessary information on manual and automatic modes. This part is intended for the user.
Part 2 (7000928) of the Operating Instructions, which describes how to put the controller into operation for the first time for specialists. This Part also contains further information for project engineers and interested users.

The operating procedures have been described in this manual with the aid of illustrations. When entering numerical values, all positions must be filled, including preceding noughts.

Example: 20.5 °C Enter: 0205

In manual and automatic modes, incomplete entries are aborted automatically after two minutes. The value that you have already entered will remain unchanged. Entries are accepted only if they are in the permissible range, or if they are restricted to that range.
The position requiring an input flashes in the display (user prompting) and it is marked by an arrow in this manual .
Follow the various input stations, press the corresponding keys and observe the result on the display.

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General information

Notes on starting operation

As soon as the RDT 300 controller for ventilation and air-conditioning has been switched on, it is ready for operation.
Please make sure that the voltage supply is correct:
version F001 = 230 VAC

The stored factory settings (default settings) for the parameters on the control model permit immediate control operations.
In order to make these instructions easier to understand, they are specially identified by a grey background at the relevant points; these should be understood as examples, and they are applicable to the normal operating mode of control model 0.

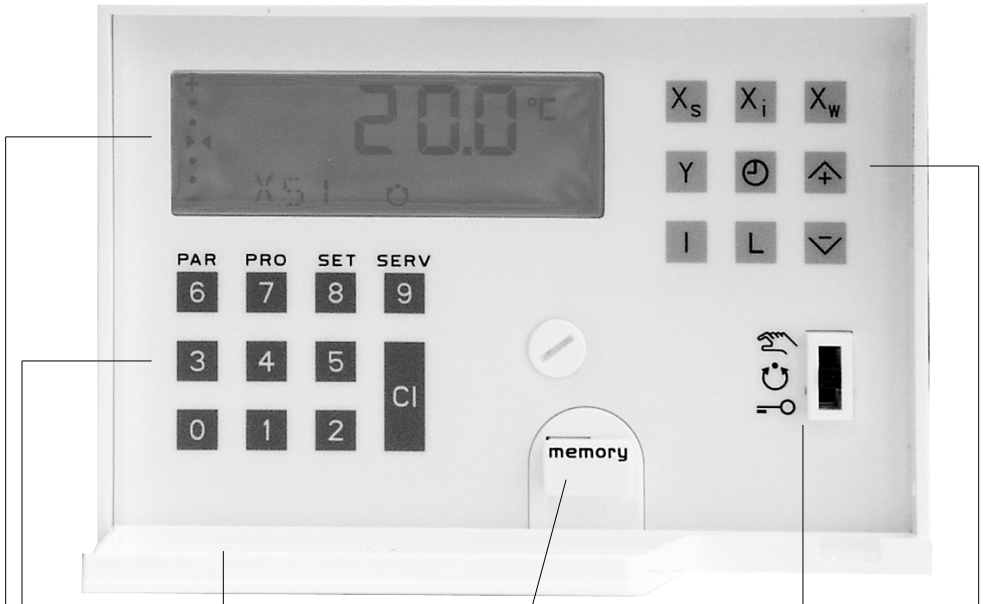
Recommended procedure

- Familiarise yourself with the controller's operating methods. Refer to the description of the front view and the ‘information centre’.
- Depending on the technical remit (such as the flow diagram), enter the appropriate configuration values in the service level. The measured value inputs must also be coded with the help of jumpers. All the other entries can be made from the keypad. In the service level, it is advisable to make the entries in the right order.
- Set the mode switch to ‘Automatic’. The controller will start with the default values for the setpoints, P-band (proportional band) etc.
- Watch the installation; if necessary, match the parameters to the specific values for the installation.

Reaction in the event of a power failure

All data and parameters are captive. In the event of a power failure, the continuous outputs drop to 0 Volt, the relay outputs cut out and the display goes blank. When power has been restored, the controller re-starts with the stored parameters. This also applies for lengthy power failures.

Front view of controller



Flap holds instructions **Memory (option)** **Mode switch**

- Manual mode
- Automatic mode
- Service level

Service and adjustment keys

- 0 . . . 9 Numerical keys
- PAR Control parameters
- SERV Service
- Cl Clear
- PRO Weekly programme
- SET Time, date...

User keys with function keys

- X_s Setpoint
- X_i Actual value
- X_w Control deviation
- Y Positioning signal
- I Input
- L Limit
- Date and time
- Forwards
- Backwards and minus sign

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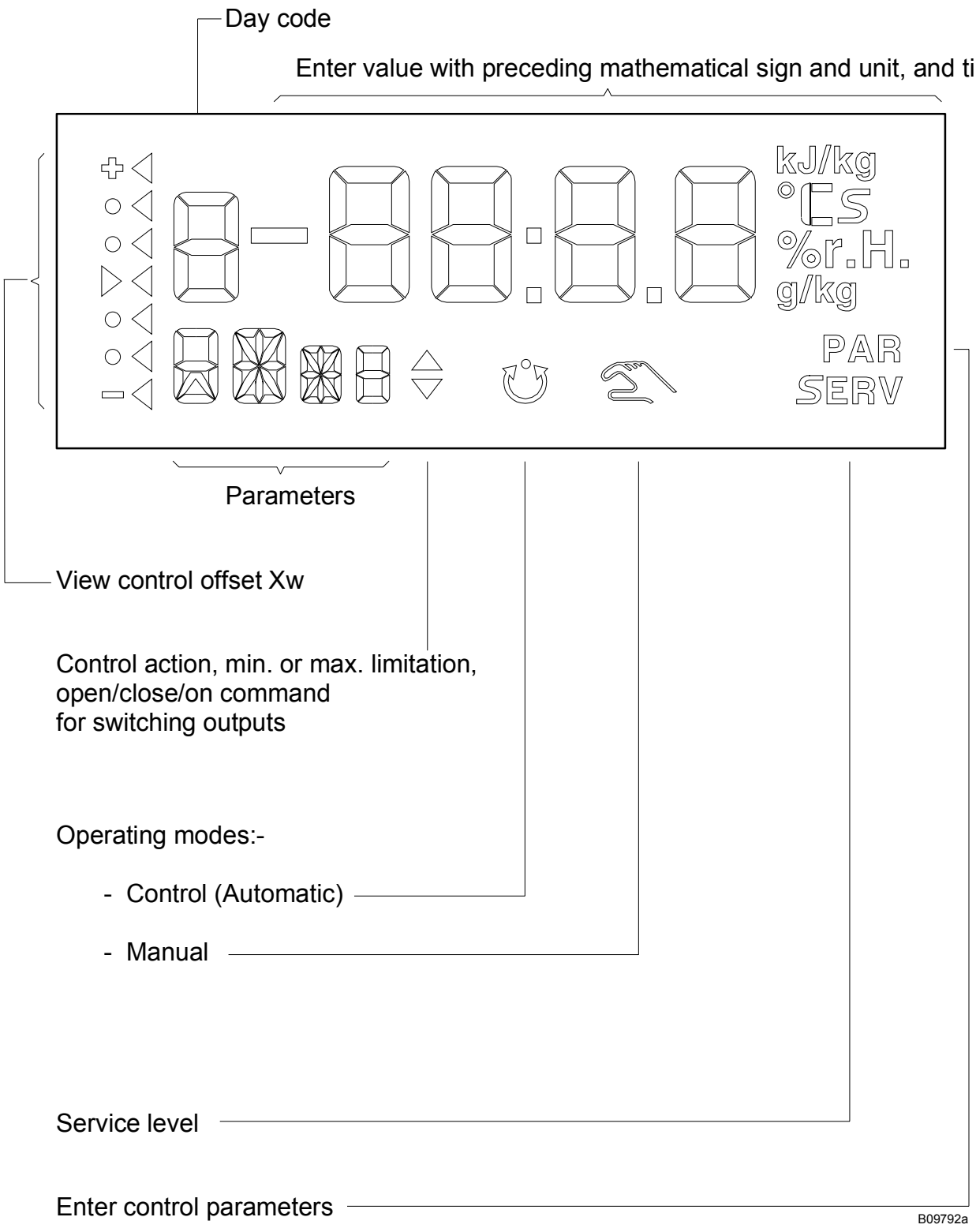
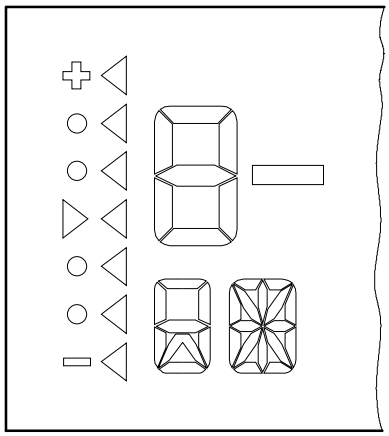
Information centre

The information centre

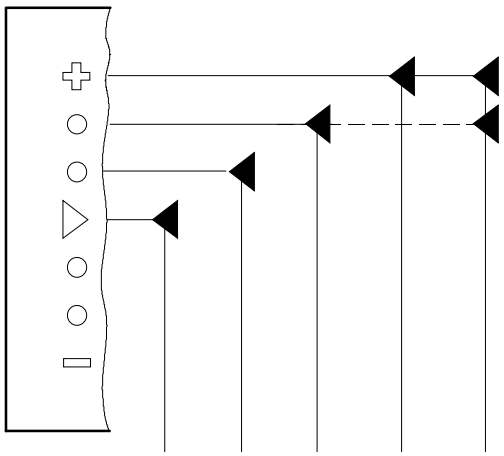


Display for control deviation Xw

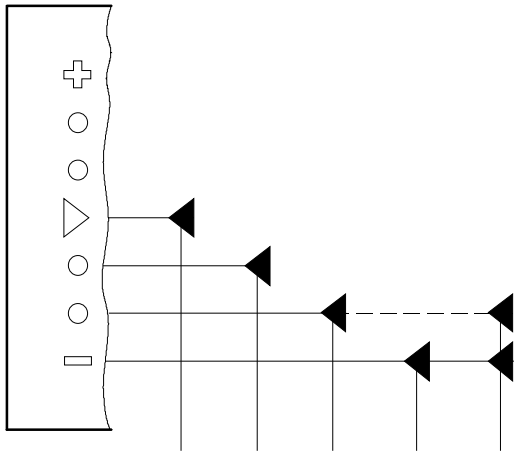


Definition:
Control deviation = actual value – setpoint
Xw = Xi – Xs

Positive control deviation



Negative control deviation



Control deviation Xw					Unit of meas.	Control deviation Xw				
≤	>					≤	<			
1,5	1,5	3,0	7,5	15,0	°C	-1,5	-1,5	-3,0	-7,5	-15,0
1,0	1,0	2,0	5,0	10,0	%, % r.H., kJ/kg	-1,0	-1,0	-2,0	-5,0	-10,0
0,2	0,2	0,4	1,0	2,0	g/kg	-0,2	-0,2	-0,4	-1,0	-2,0
50	50	100	250	500	- [1]	-50	-50	-100	-250	-500

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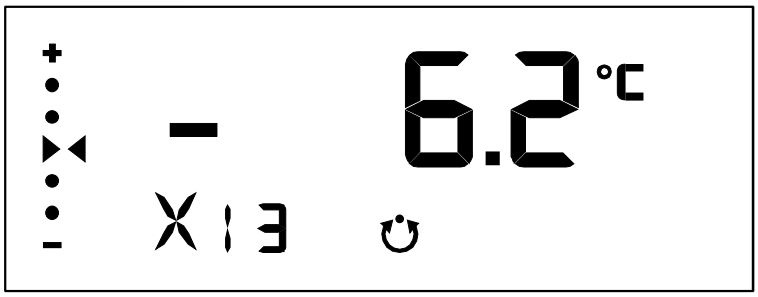
[1] Free unit of measurement: with respect to displayed range 0...4999.

Examples of displays

- automatic mode
- actual value Xi3 with unit of measurement
- Xw display



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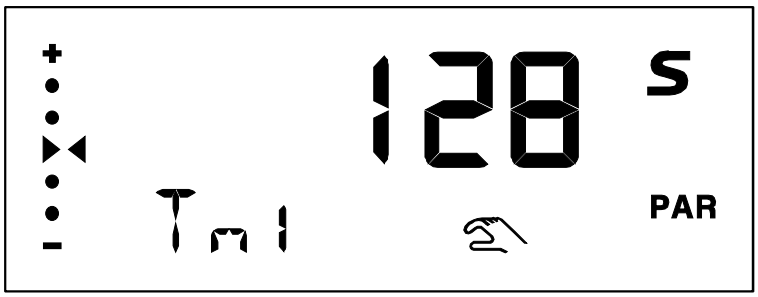
- Manual mode
- Input for control parameters
- Reset time for controller 1
- View Xw



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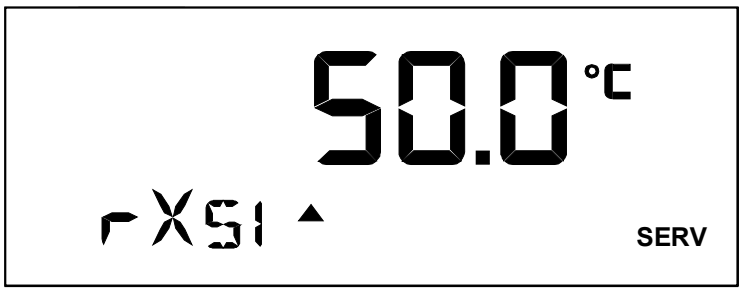
- Service level
- Upper setpoint limit 50.0 °C



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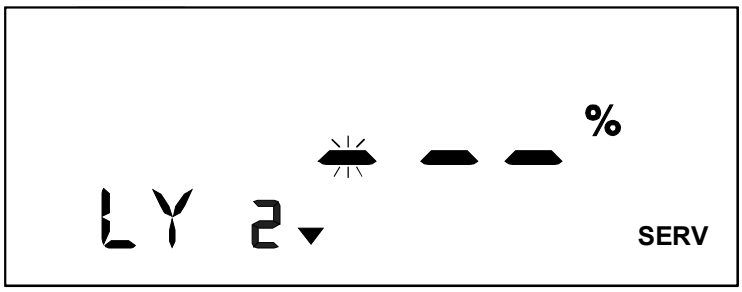
- Service level
- Minimum limitation Y2 ready for the input of the first position



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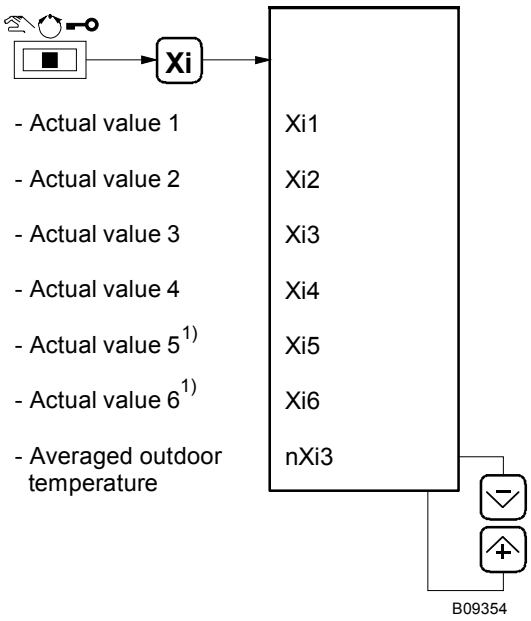
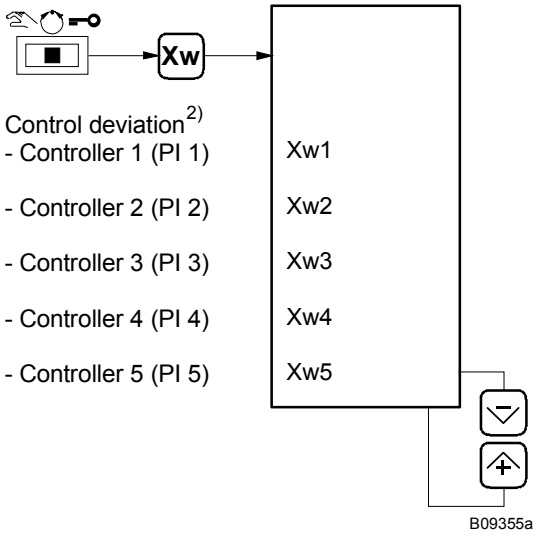
Automatic mode

Control based on the setpoint

View actual values Xi

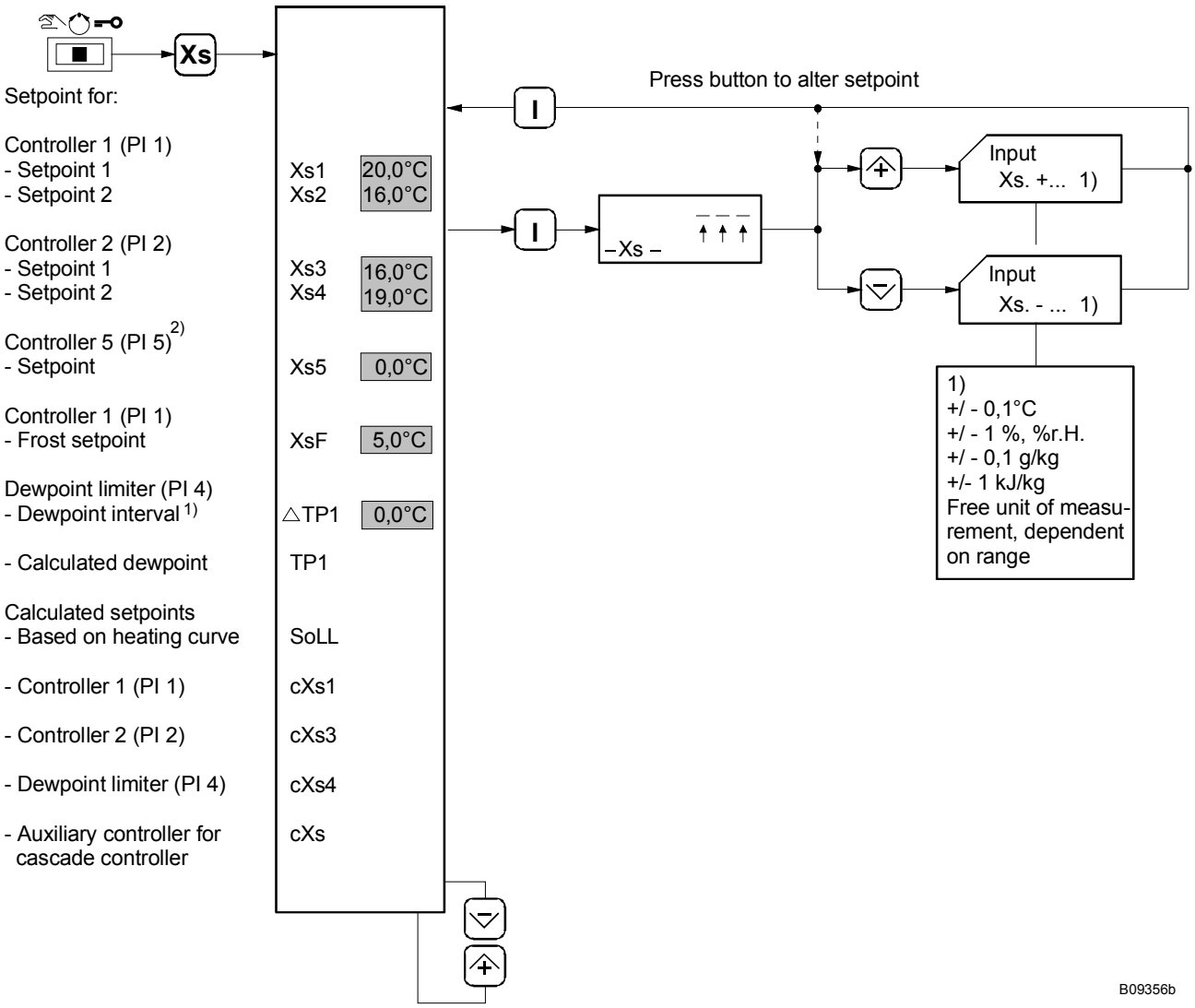


View control deviations Xw



1) Input Ni1000 only.
2) Depends on the model, sometimes hidden.

View and alter setpoints

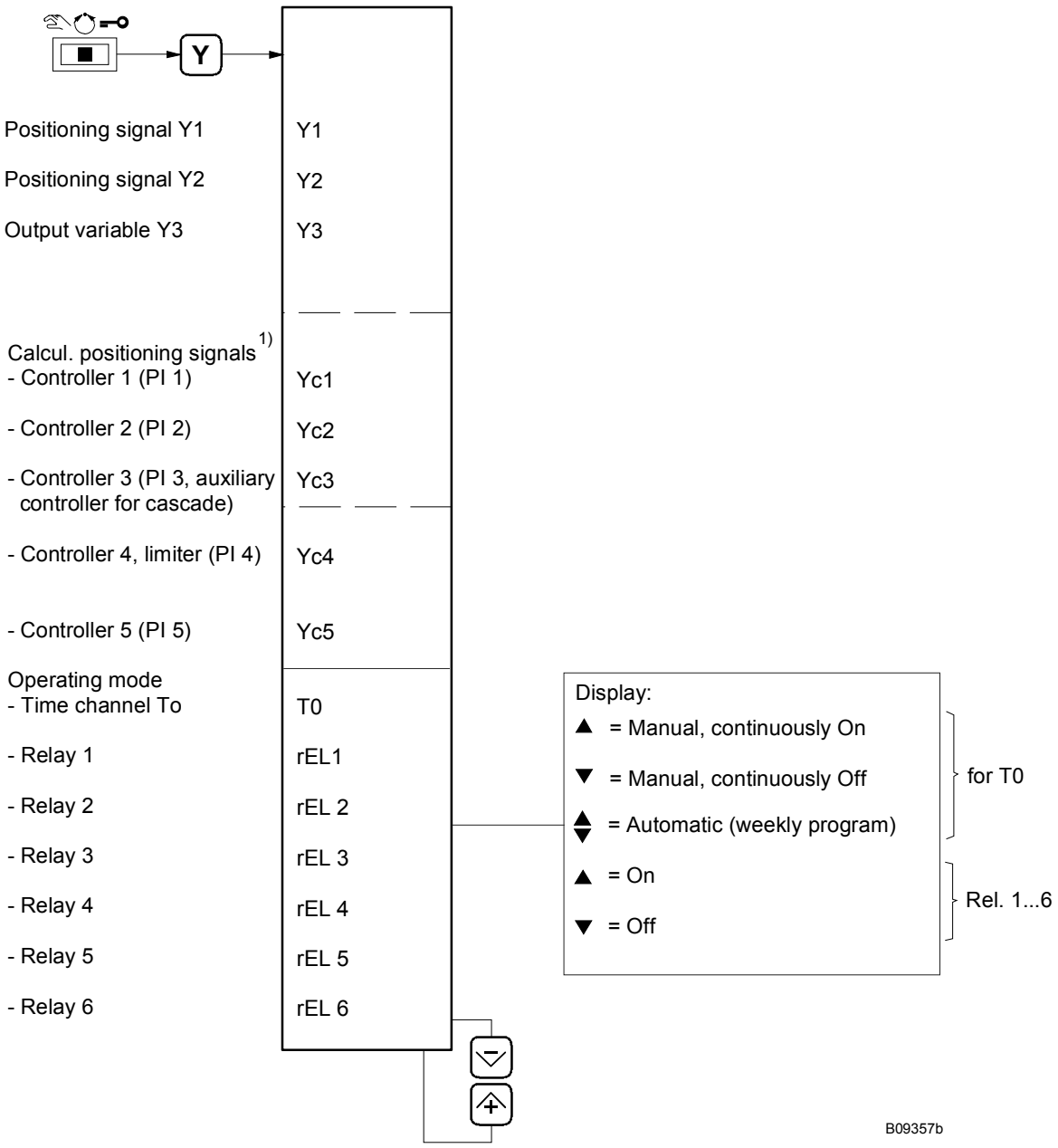


1) The dew-point interval can be changed only in the manual level.

   – In ‘heating only’ mode:
     Setpoints for cooling, Xs3 and Xs4, fixed as per the upper input limit for the ‘cooling’ setpoint that was set in service mode.
   – In ‘cooling only’ mode:
     Setpoints for heating, Xs1 and Xs2, fixed at the frost-protection setpoint that was set in service mode.
   – In ‘OFF’ mode:
     Xs1 = Xs2 = XsF (frost protection)
     Xs3 = Xs4 as per the upper input limit for the ‘cooling’ setpoint.

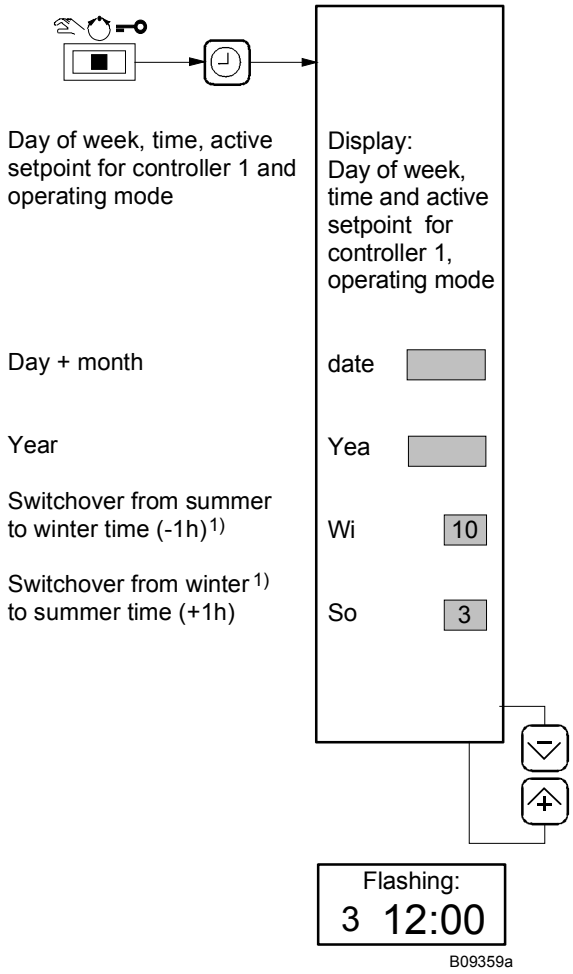
2) Depends on the model, sometimes hidden.

View positioning signals and operating mode of the time channel and the relays



1) Depends on the model, sometimes hidden.

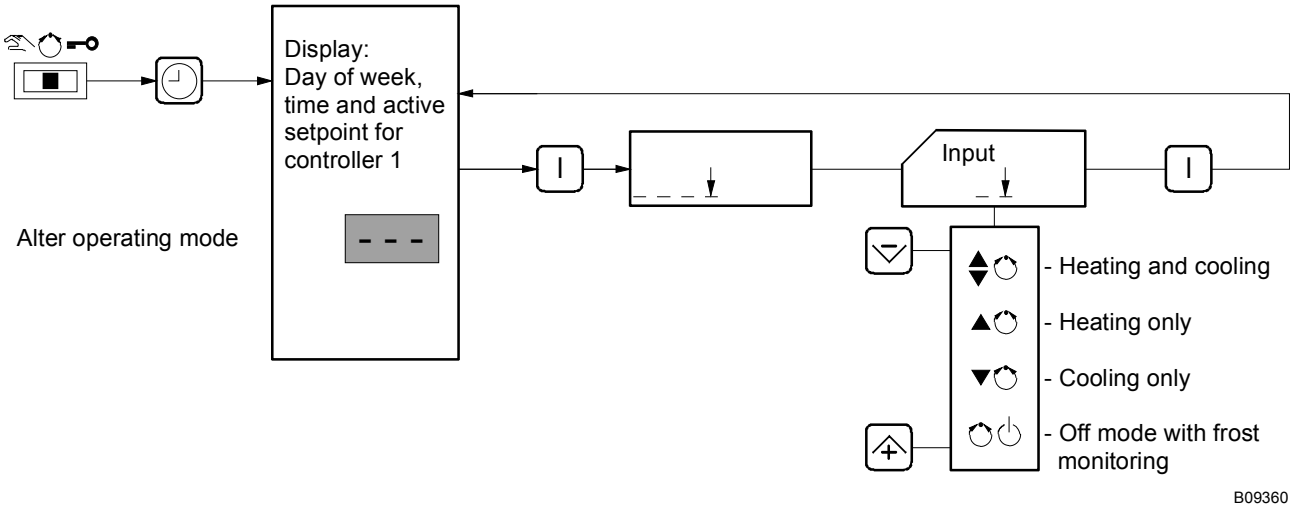
View date and time



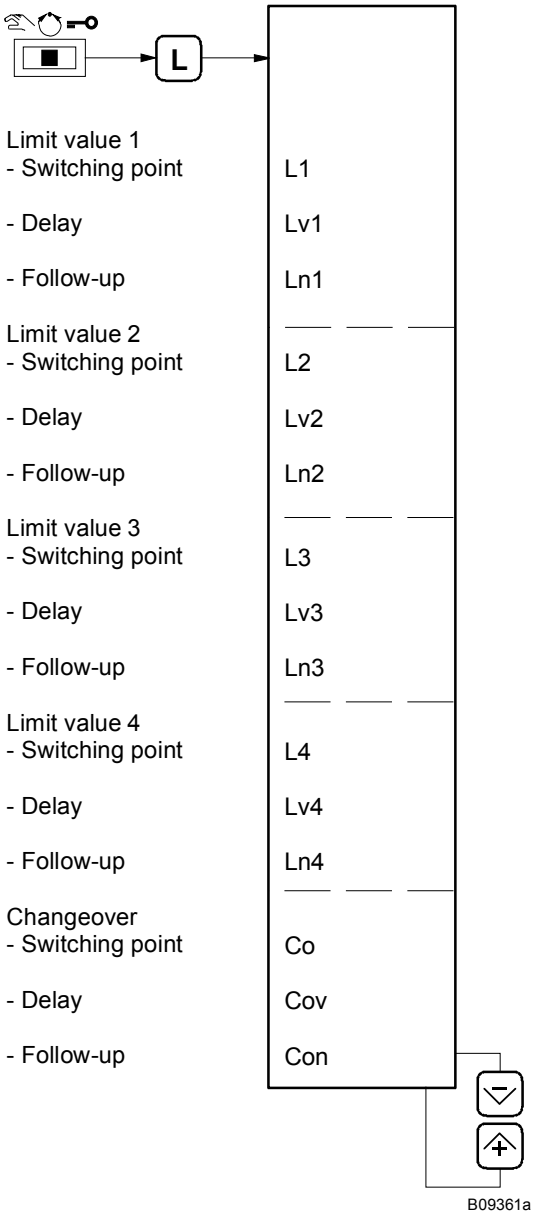
If the power failure reserve is exhausted, the time will be lost.
This status is signalled by the flashing display: "Wednesday 12:00". Time-dependent switching operations will only be executed after the time has been corrected.

1) The automatic changeover between summer and winter time occurs on the last Sunday of the month that is entered, between 02:00 and 03:00.

Change operating mode



View limit values

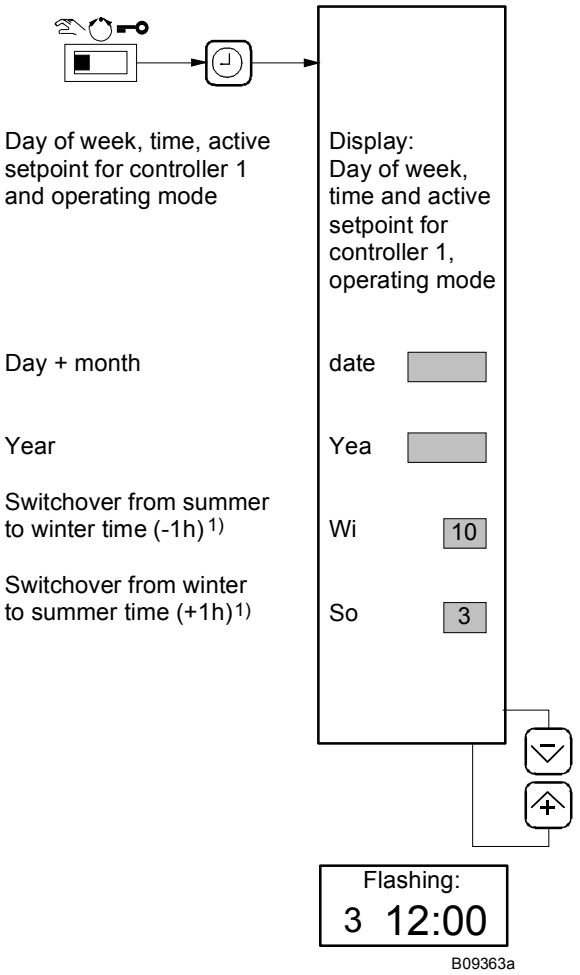


Functions and values vary according to the model, so some might not be shown.

Manual mode

In this mode, you can:-
– set the positioning signals between 0...100 %
– alter the setpoints, and
– set the control parameters

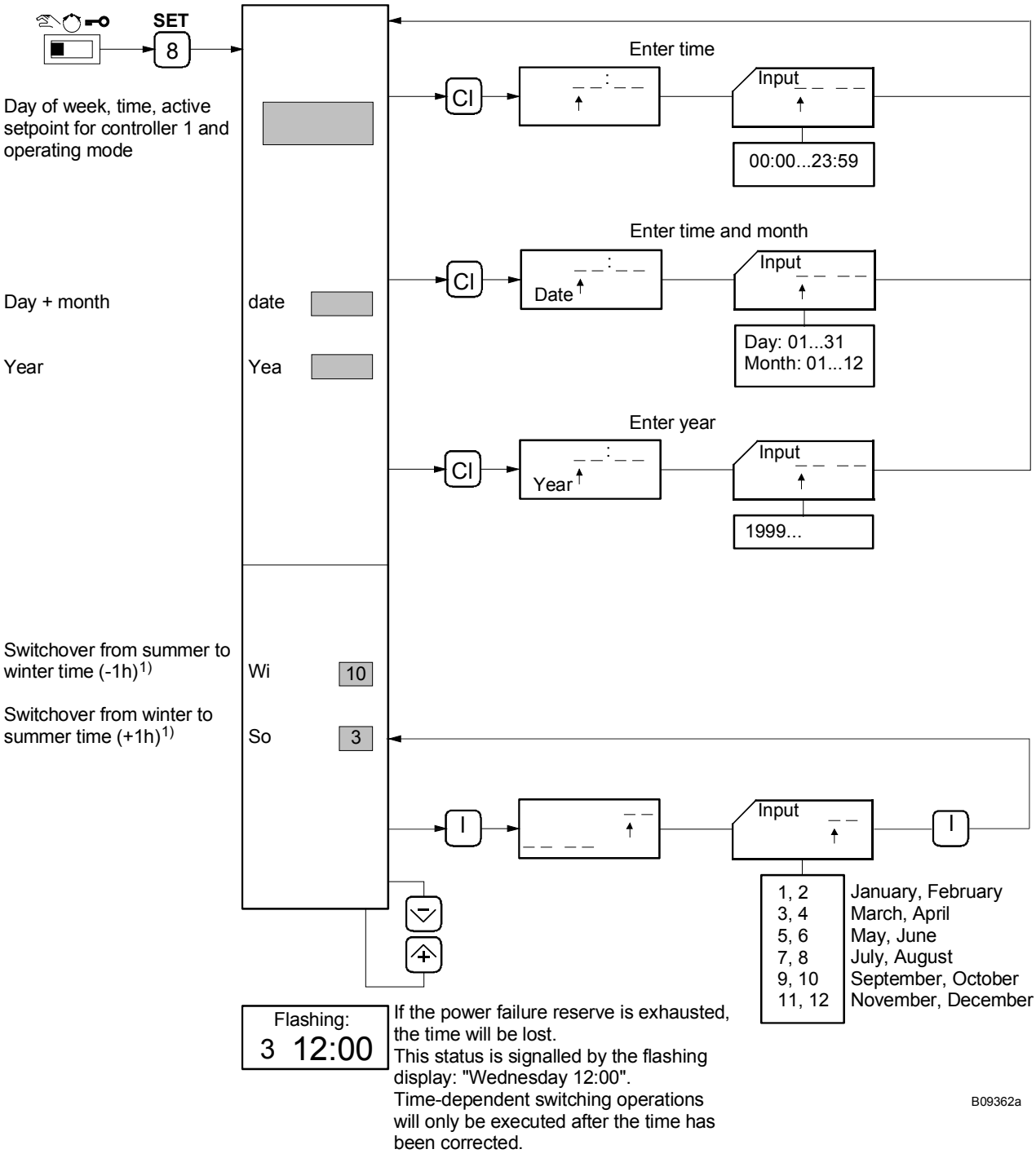
View date, time and months for summertime/wintertime change-over



If the power failure reserve is exhausted, the time will be lost. This status is signalled by the flashing display: "Wednesday 12:00". Time-dependent switching operations will only be executed after the time has been corrected.

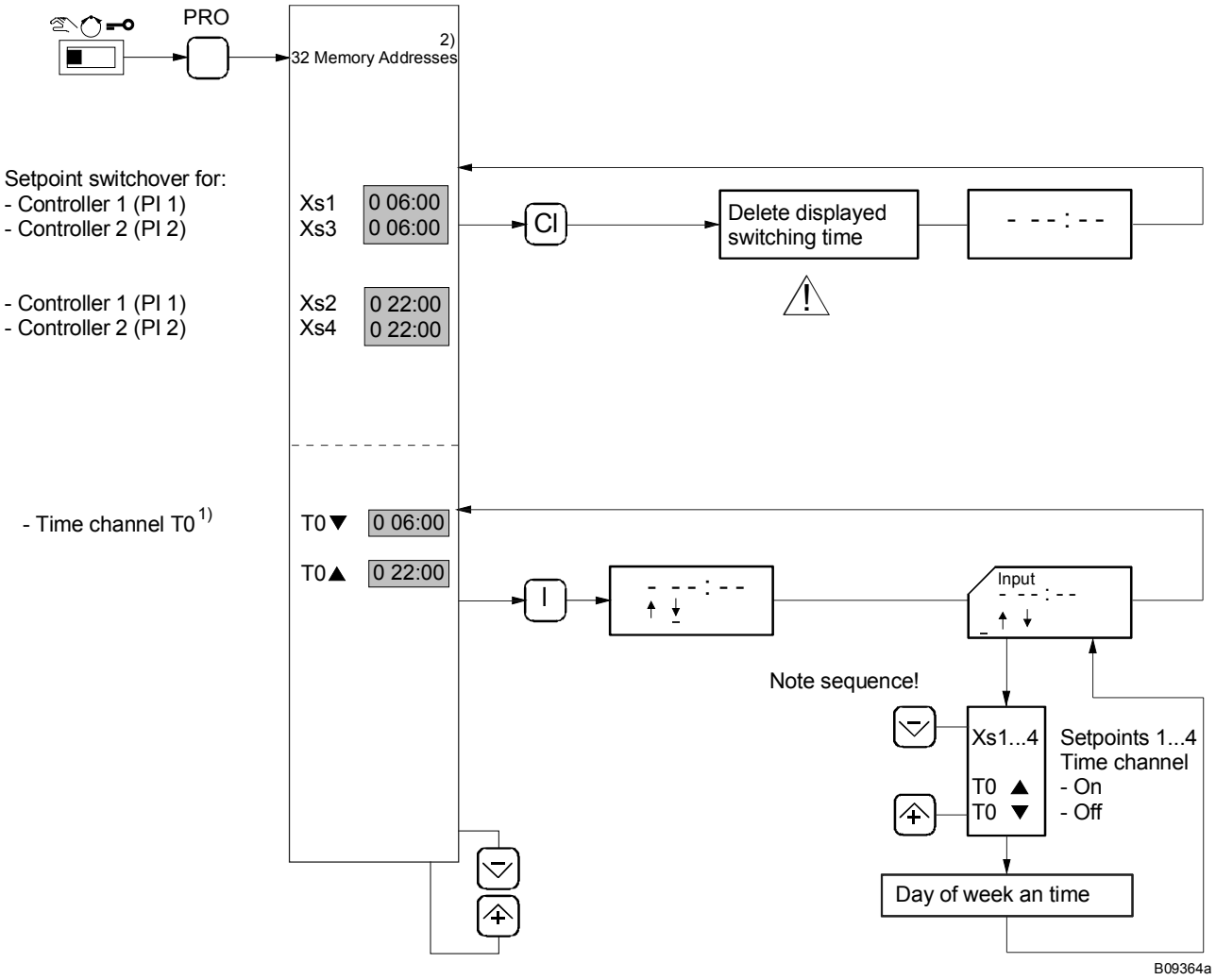
1) The automatic changeover between summer and winter time occurs on the last Sunday of the month that is entered, between 02:00 and 03:00.

Set time, date and months for automatic summertime/wintertime change-over



1) The automatic changeover between summer and winter time occurs on the last Sunday of the month that is entered, between 02:00 and 03:00.
To deactivate the changeover from summer to winter time, enter identical months such as WiSo = 3 and SoWi = 3.

View and alter week program



Day of the week:

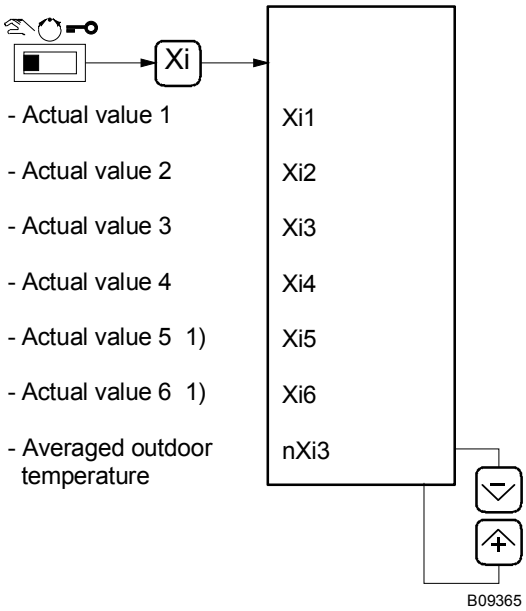
1 = Monday	5 = Friday
2 = Tuesday	6 = Saturday
3 = Wednesday	7 = Sunday
4 = Thursday	0 = daily

The daily switching commands (0__:__) are not executed on special days, e.g. 7__:__).

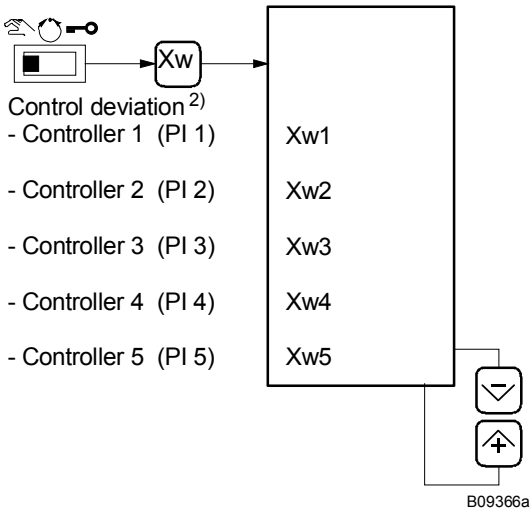
If all the switching times are deleted, or if the time is lost (power failure reserve is exhausted) control operation will use setpoints Xs1 and Xs3.

1) Is shown only if at least one additional switching command is entered.
2) The fill level of the tank is indicated on the bar chart for the control offset.

View actual values Xi

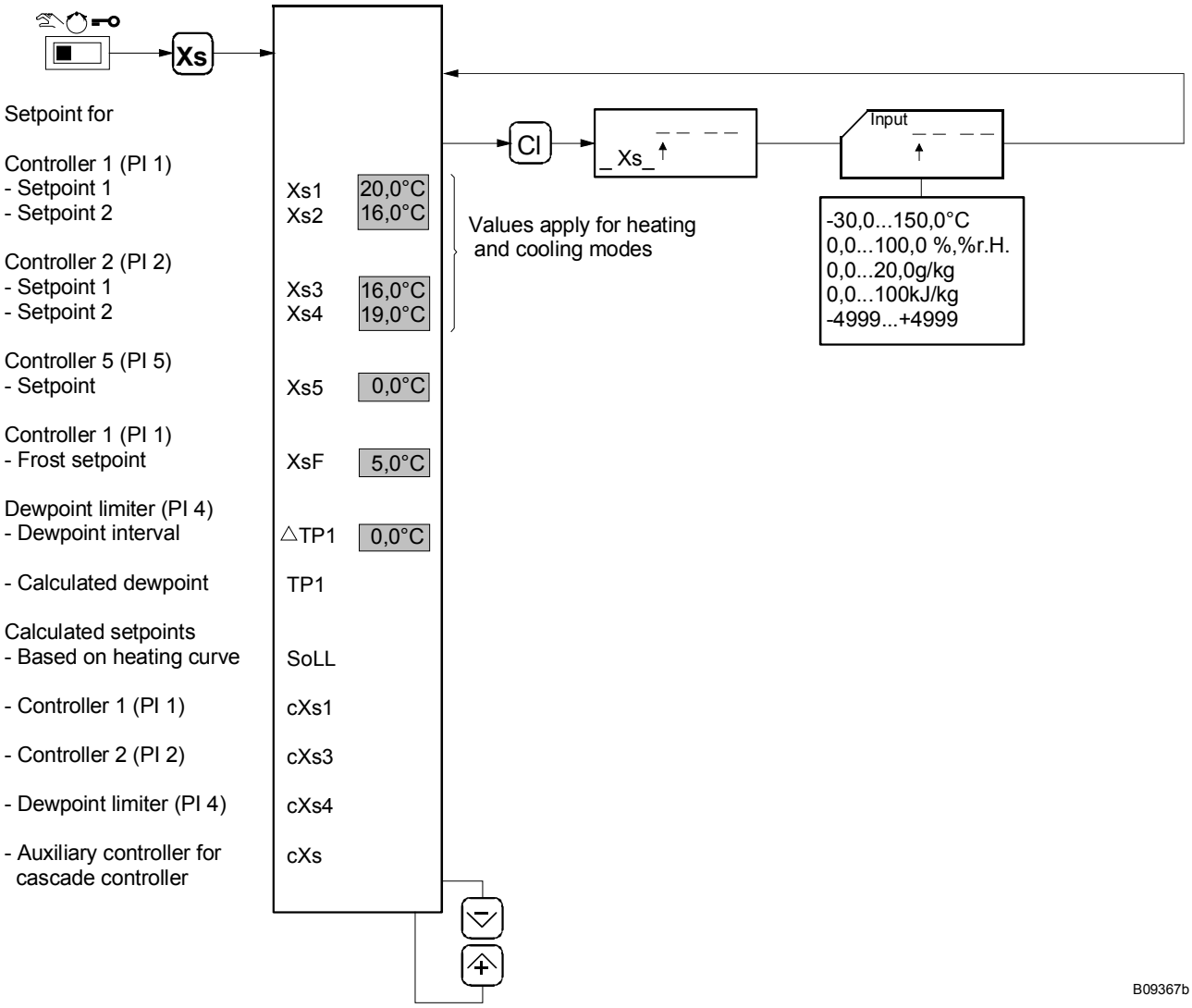


View control deviations Xw



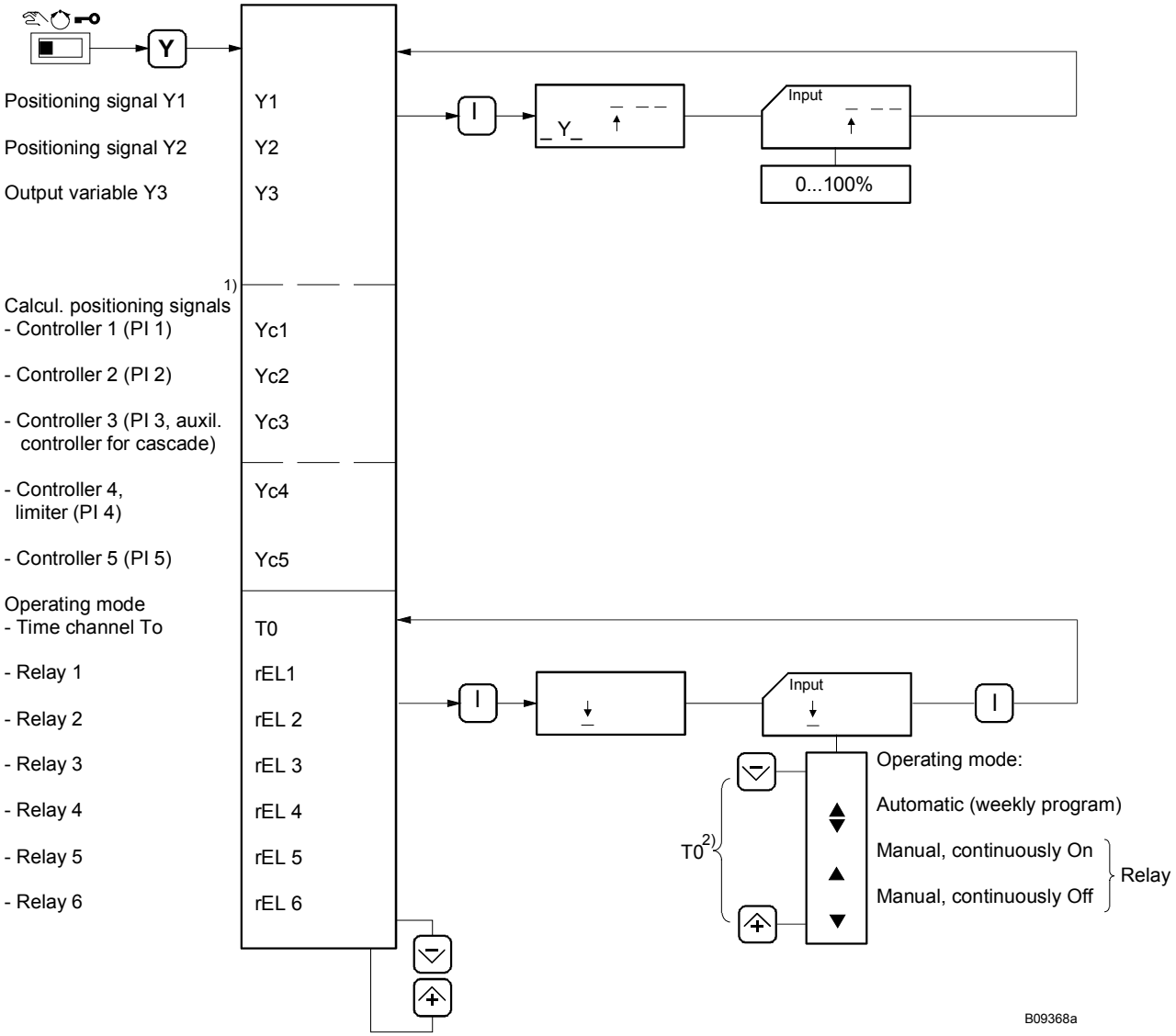
1) Inputs for Ni1000 only; display ...°C.
2) Depends on the model, sometimes hidden.

View and alter setpoints



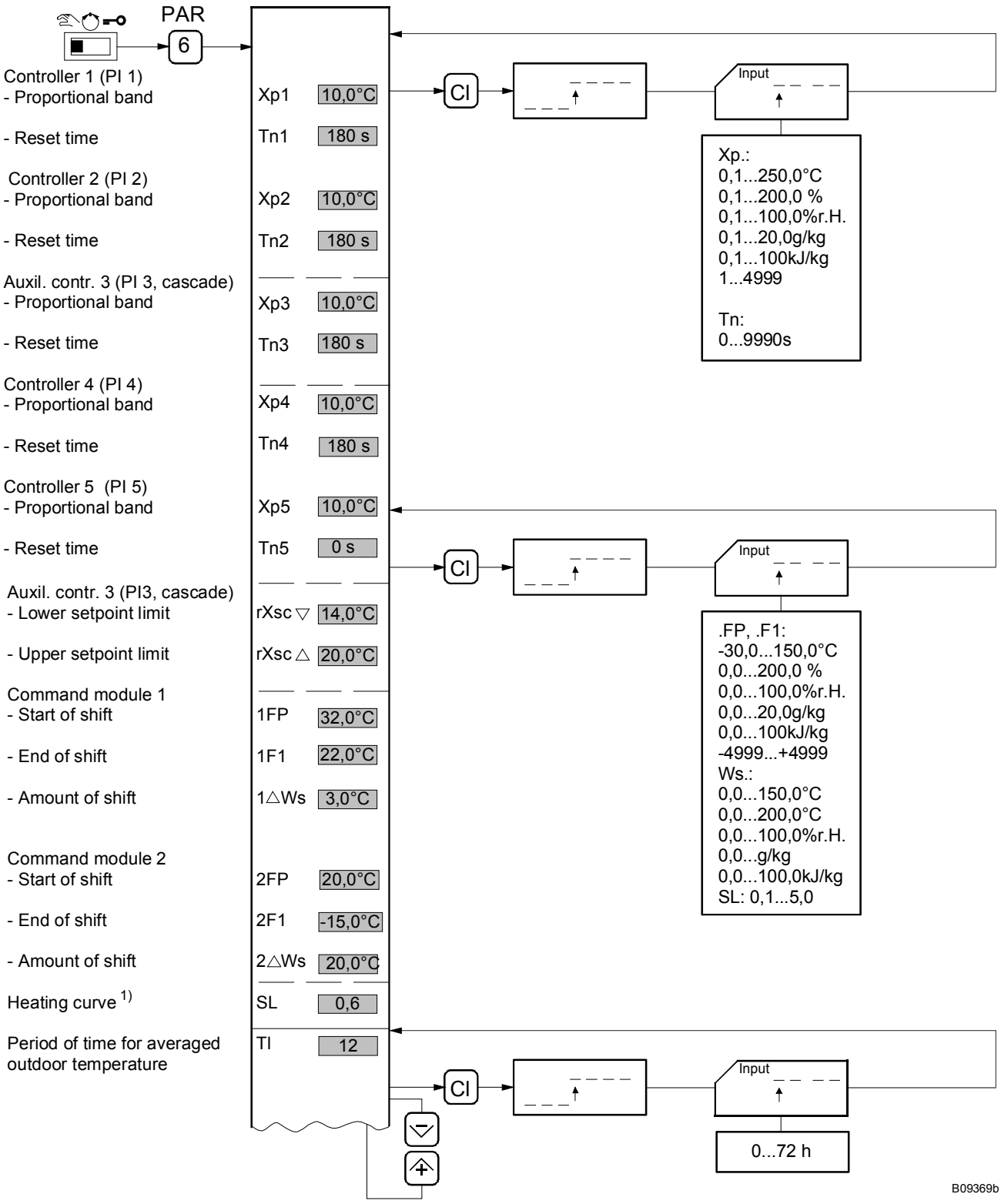
– In ‘heating only’ mode:
  Setpoints for cooling, Xs3 and Xs4, fixed as per the upper input limit for the ‘cooling’ setpoint that was set in service mode.
– In ‘cooling only’ mode:
  Setpoints for heating, Xs1 and Xs2, fixed at the frost-protection setpoint that was set in service mode.
– In ‘OFF’ mode:
  Xs1 = Xs2 = XsF (frost protection)
  Xs3 = Xs4 as per the upper input limit for the ‘cooling’ setpoint.

View and alter positioning signals; view and alter operating mode of the time channel and the relays



1) Depends on the model, sometimes hidden.
2) Setting for T0 is adopted in automatic mode.

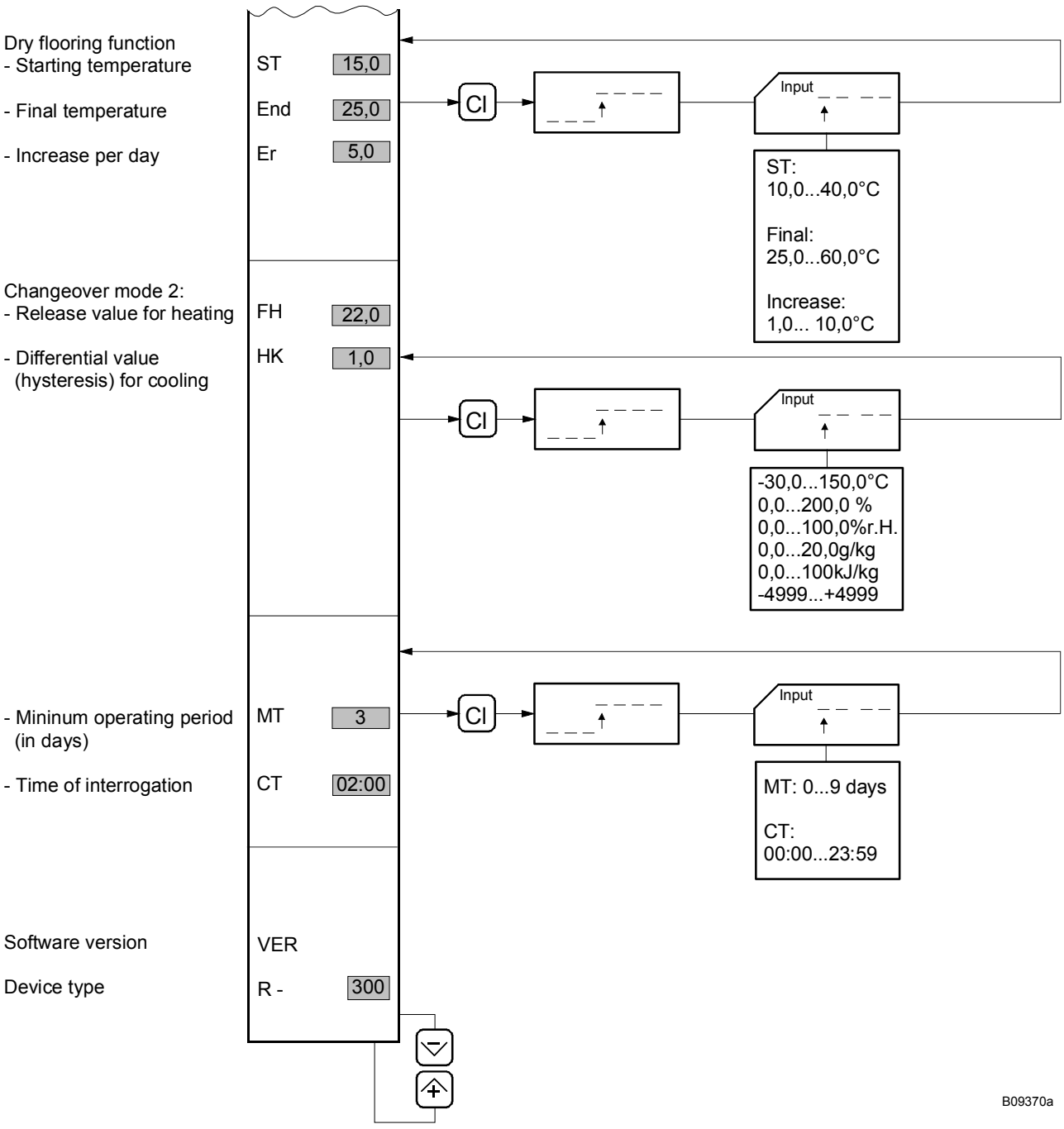
View and alter control parameters



Value depend depends on the model, sometimes hidden.

1) Diagram of heating characteristic: see page 27.

View and alter control parameters; view software version



Floor-drying function:
When this function has been activated in service mode, heating begins with the setpoint entered at *ST* (starting temperature).

In the following night at 02.00 hrs, the setpoint is raised by the value set using *Er*.

This daily increase is carried out as long as the end temperature that was set using End has been reached. The floor-drying function is then concluded.

View and alter limit values

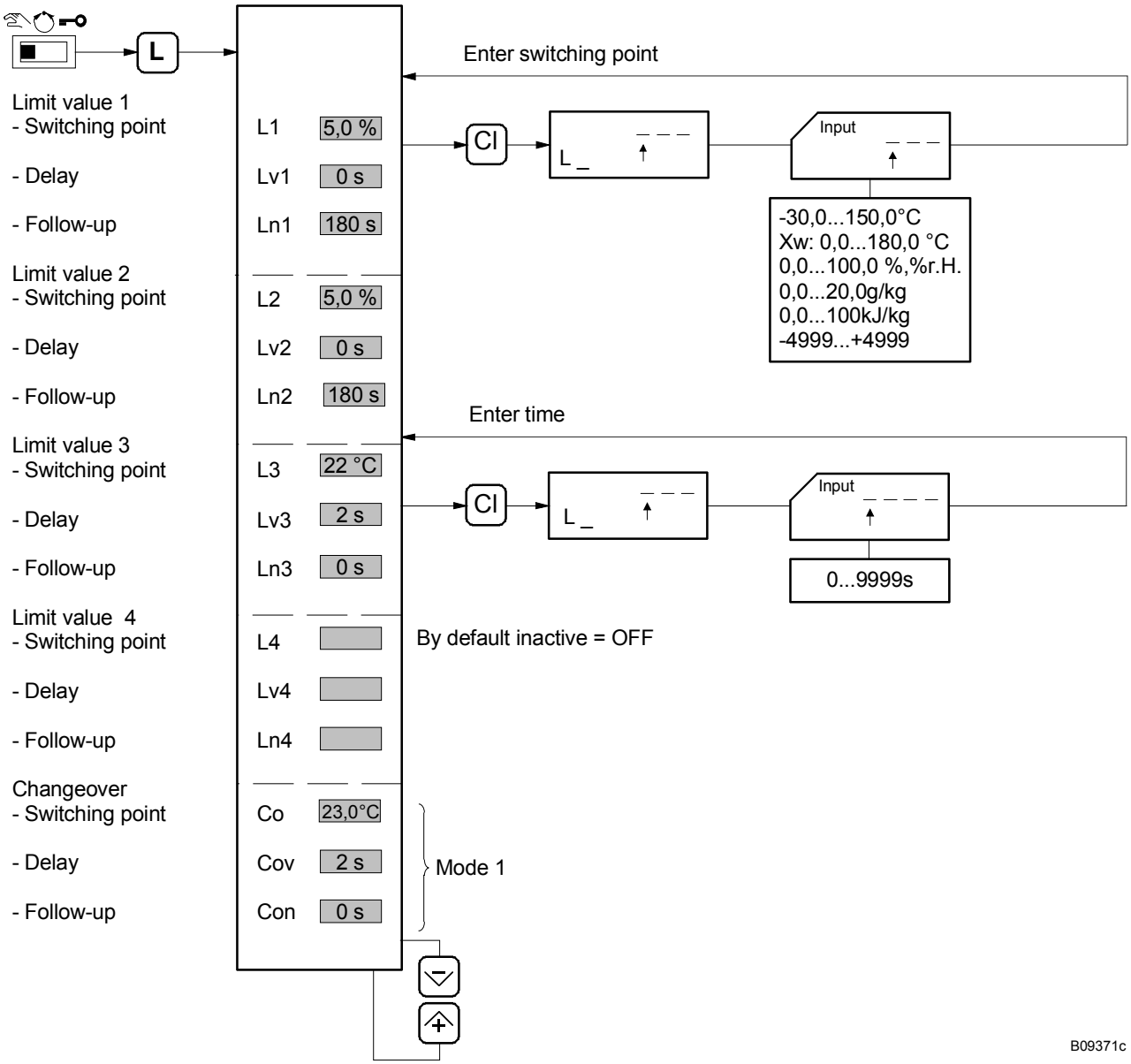
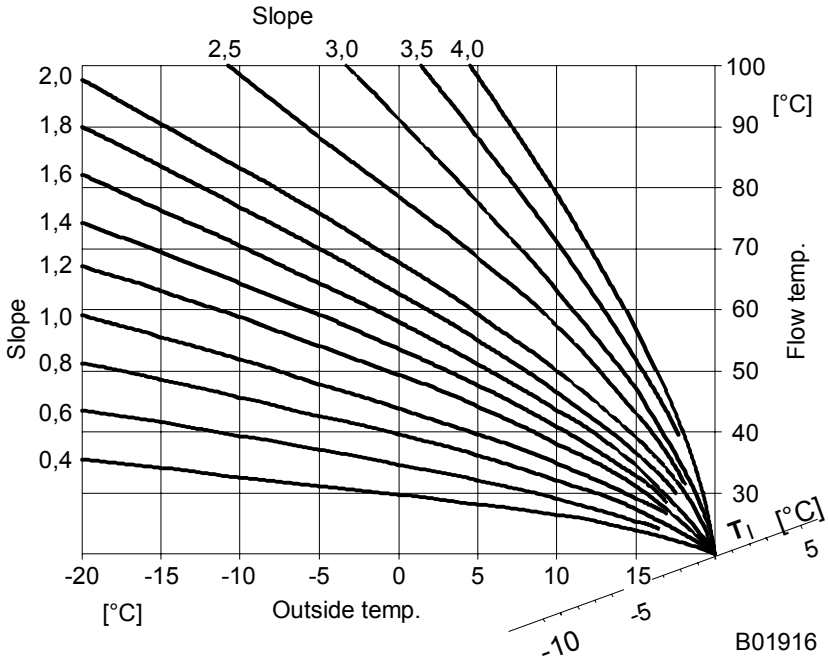


Diagram of heating characteristic

The heating characteristic determines the setpoint of the secondary supply temperature as a function of the outside temperature. The heating characteristic is determined in the main by the base point T_I ☼ (= X_{S1}) and the slope.



Spread of heating characteristics for T_I = 20 °C and curvature factor = 0.5

The following applies: small heating surfaces require higher supply temperatures and large heating surfaces require lower supply temperatures in order to be able to provide a certain heating output.

Recommended values for slopes:

Hot-water radiator heating	1.4
Low-temperature heating	1.0
Underfloor heating	0.6

After the base point or the slope has been amended, the building (and possibly the heating system) needs time to adapt itself to the new value. For this reason, no more than one adjustment per day should be made.