Flow-temperature controller for heating / cooling

User's Manual, part 2
RDT 300 F001

7000928003 R4

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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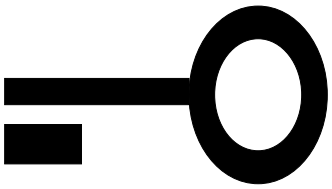
Information centre

Table of contents

Service



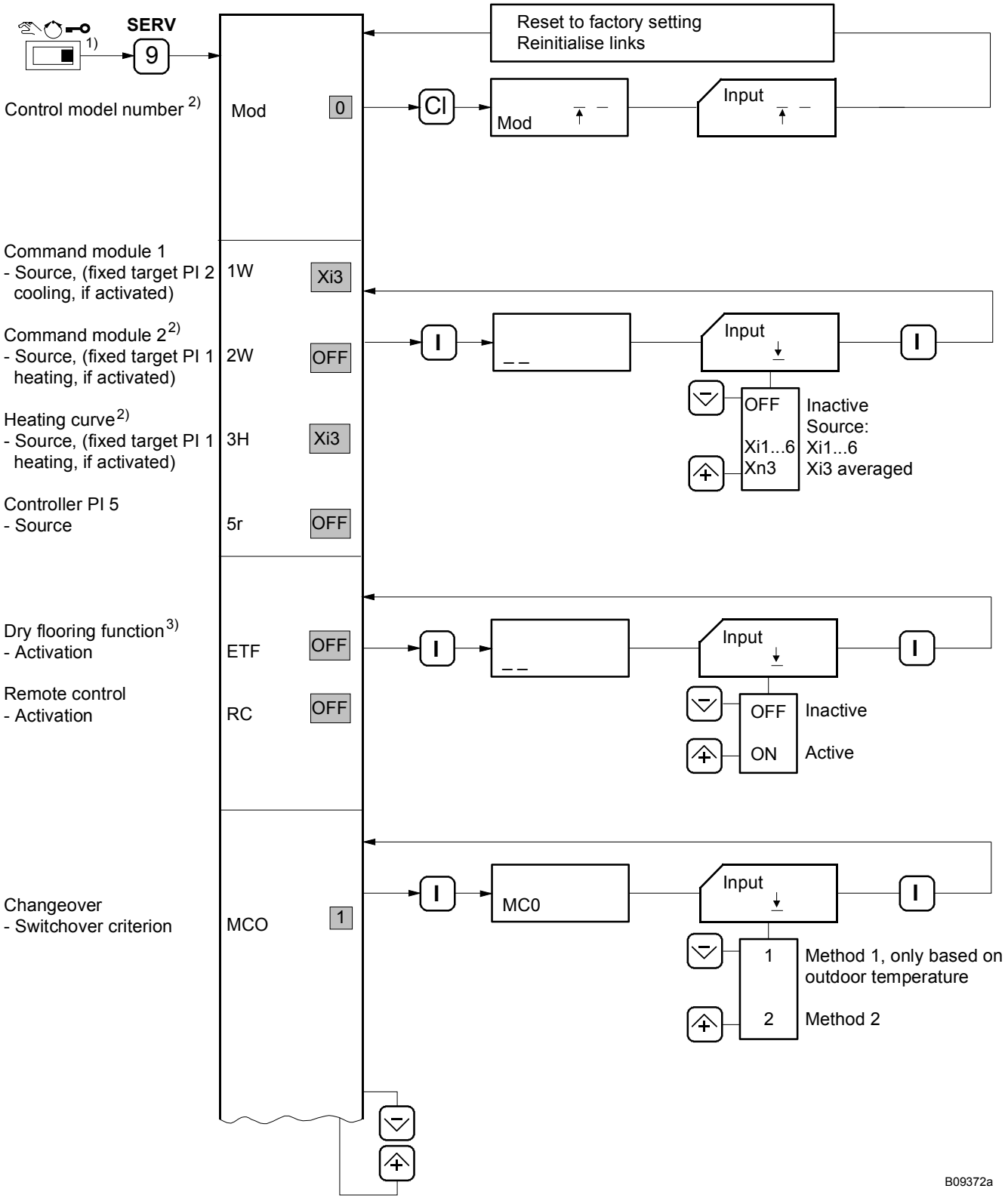
To gain access to the service level, you have to enter a password (code). It is 6-7-8-9, and it cannot be changed.
Access to the service level can be prevented by sealing the mode switch.

In the service level, the controller is matched to the task in hand by making these entries, amongst others:
- configure and (if necessary) adjust the measured-value inputs
- set the control actions and modes of action
- configure the control outputs

In the parameterising procedure described below, the grey fields contain the values that have been entered at the factory (default values).
They should be considered as examples and apply for control model 0.

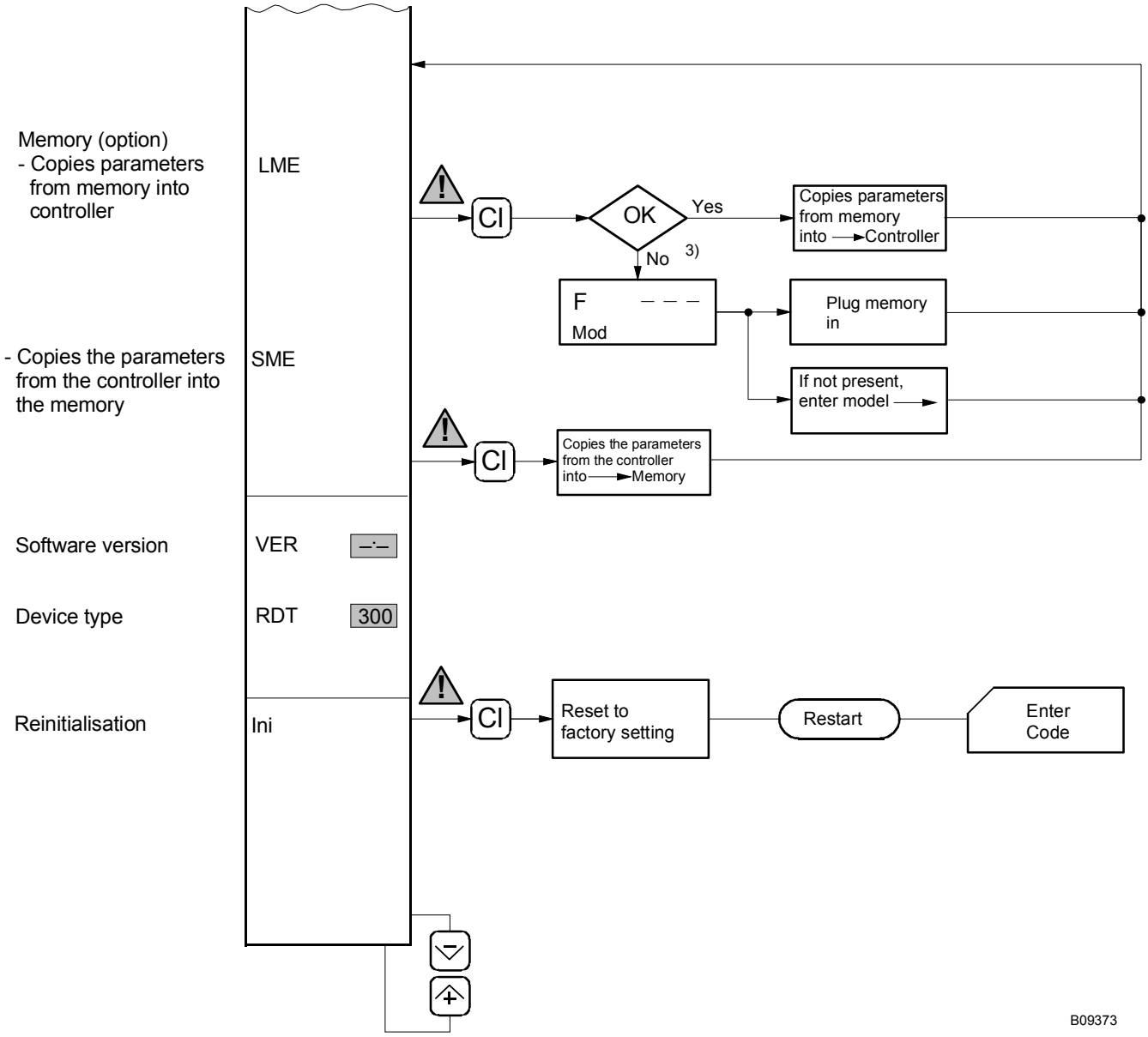
All entries and changes should be performed with great care. If the controller fails to work properly, the cause is often incorrect configuration, e.g. the wrong mode of action or the wrong type of transmitter.

Choice of model; memory; equipment data; re-start



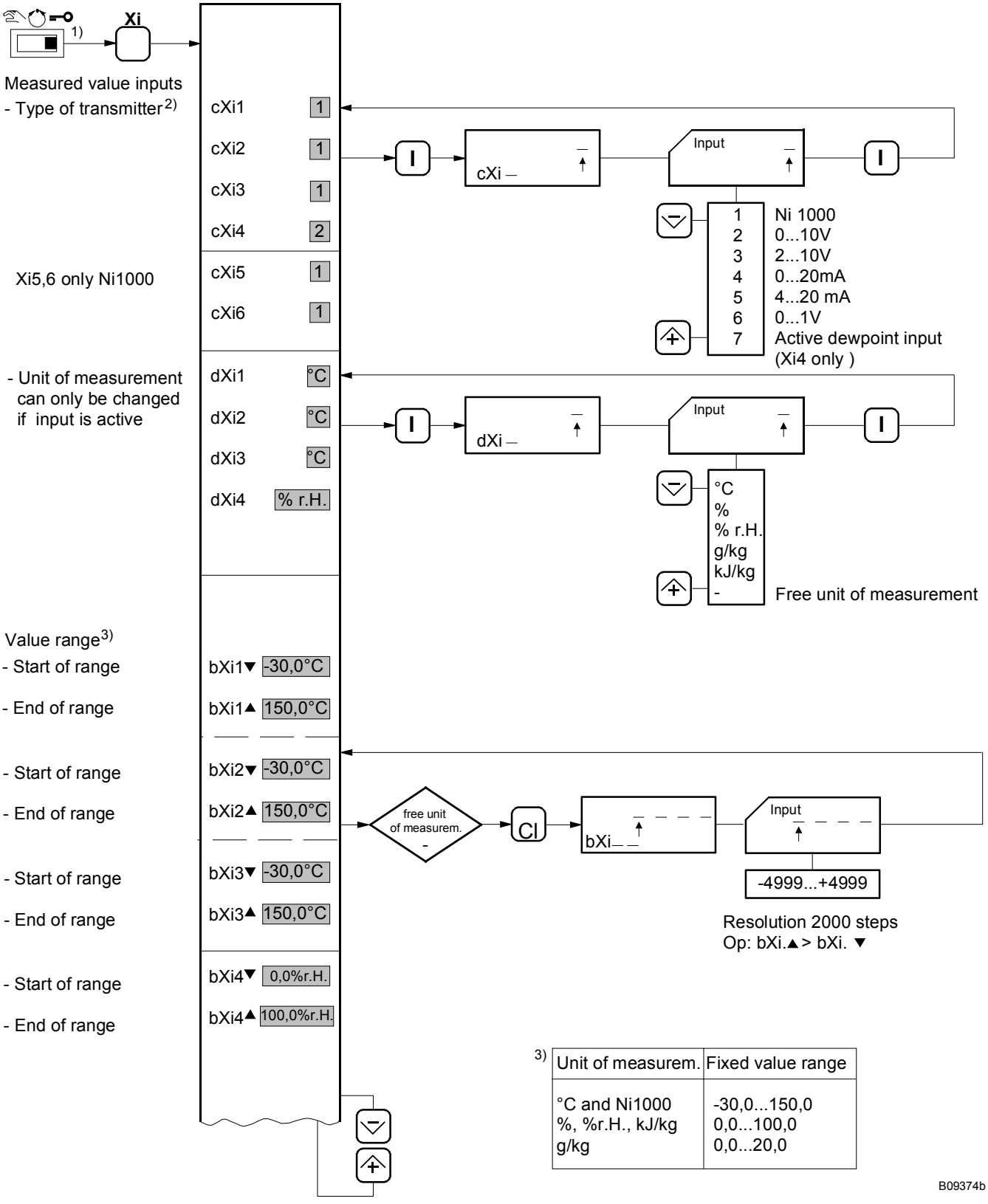
1) Enter code.
2) Only command module or heating curve are possible.
3) If the "dry flooring" function is activated, the Automatic symbol will flash during automatic mode.

Choice of model; memory; equipment data; re-start



1) Enter code.
3) An 'F' in the display stands for 'Fault'. This also appears when there is an internal memory failure after a reset, e.g. due to a power failure. The controller then uses the default values and control model 0.

How to parameterise the measured value inputs



3)

Unit of measurem.	Fixed value range
°C and Ni1000	-30,0...150,0
%, %r.H., kJ/kg	0,0...100,0
g/kg	0,0...20,0

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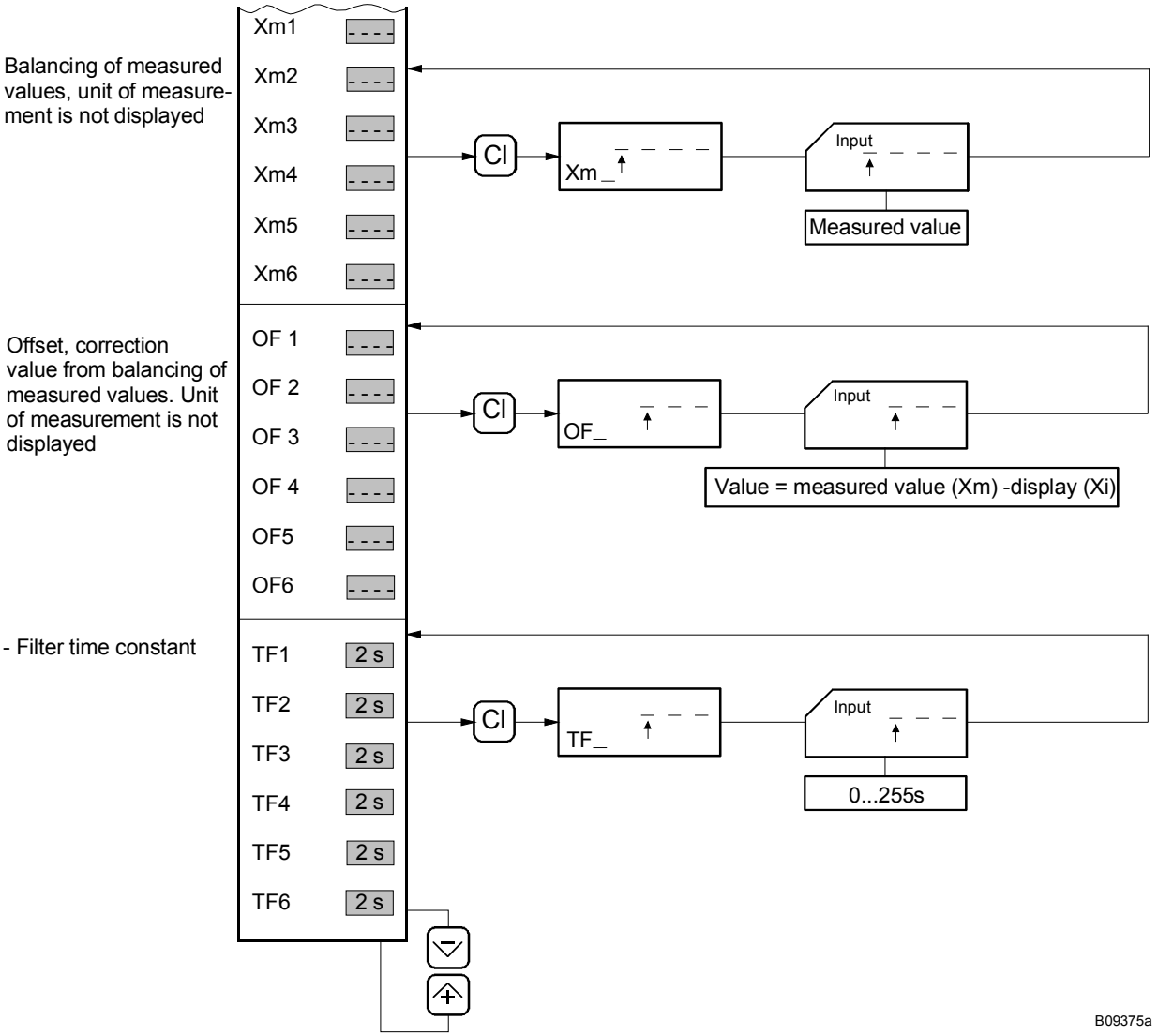
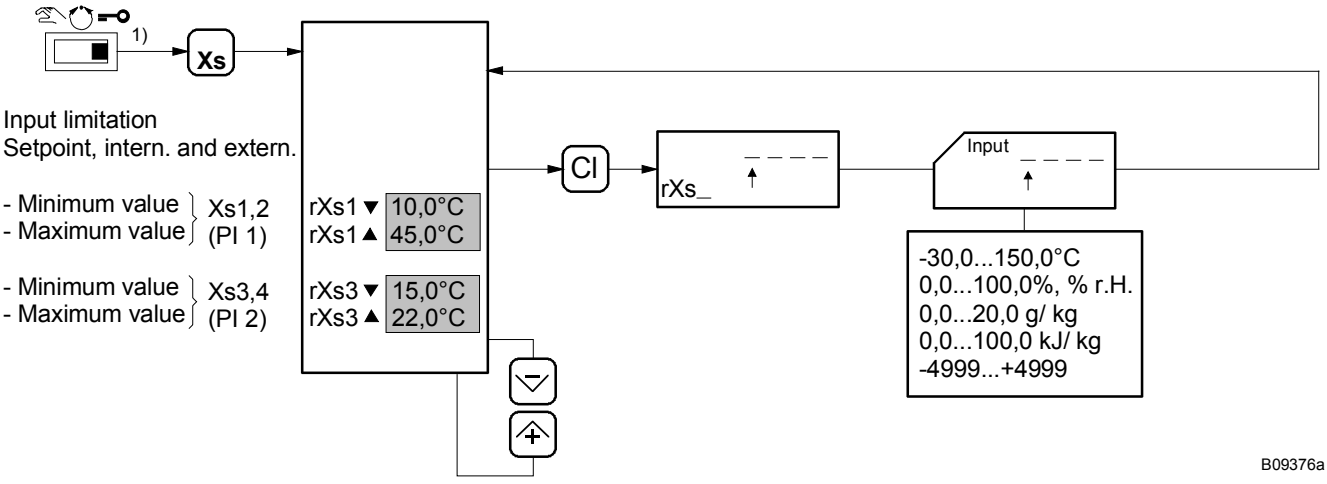
1) Enter code.
2) Also insert jumper at rear of unit.

How to parameterise the measured value inputs

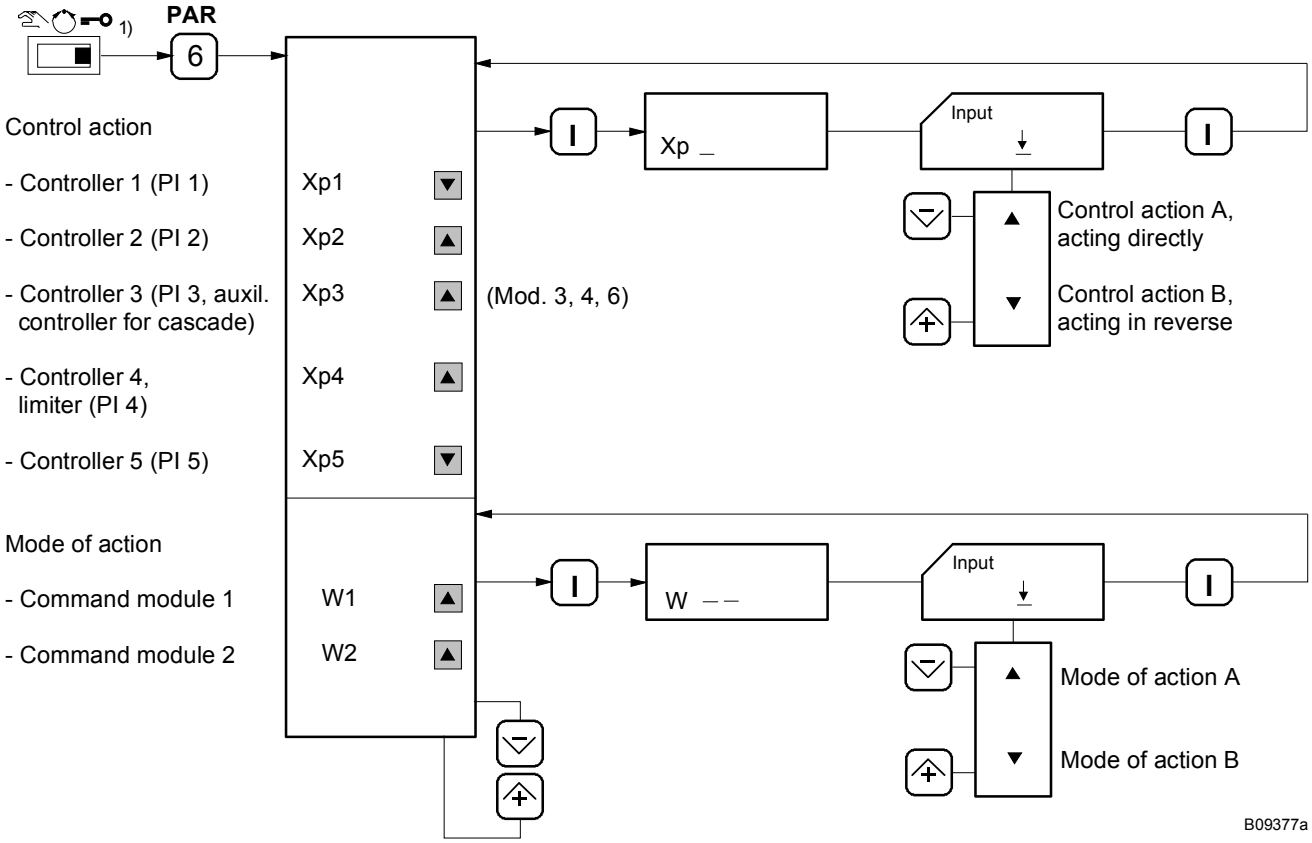


How to set the setpoint ranges

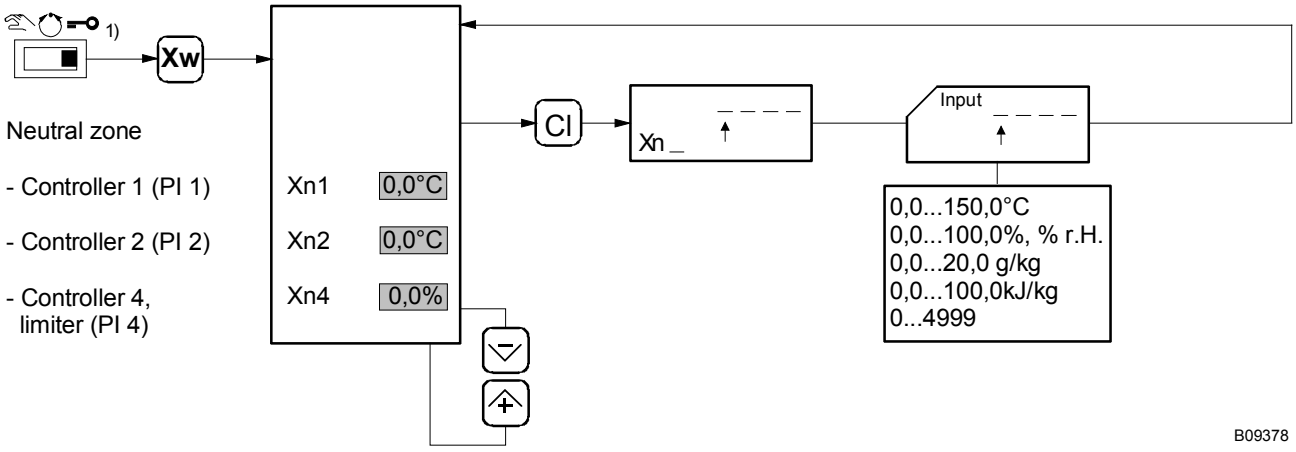


1) Enter code.

How to set the control action and the mode of action

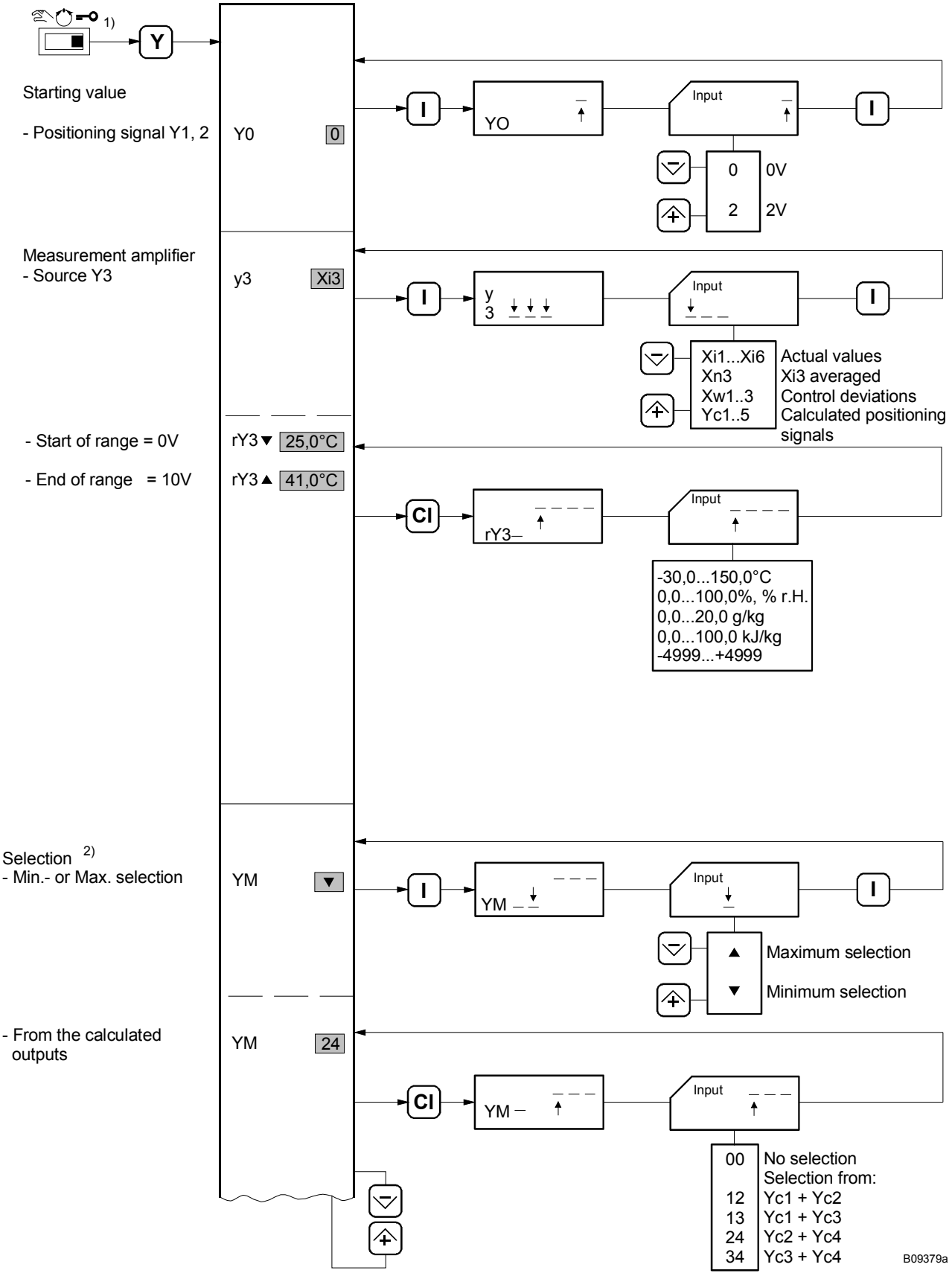


Neutral zone



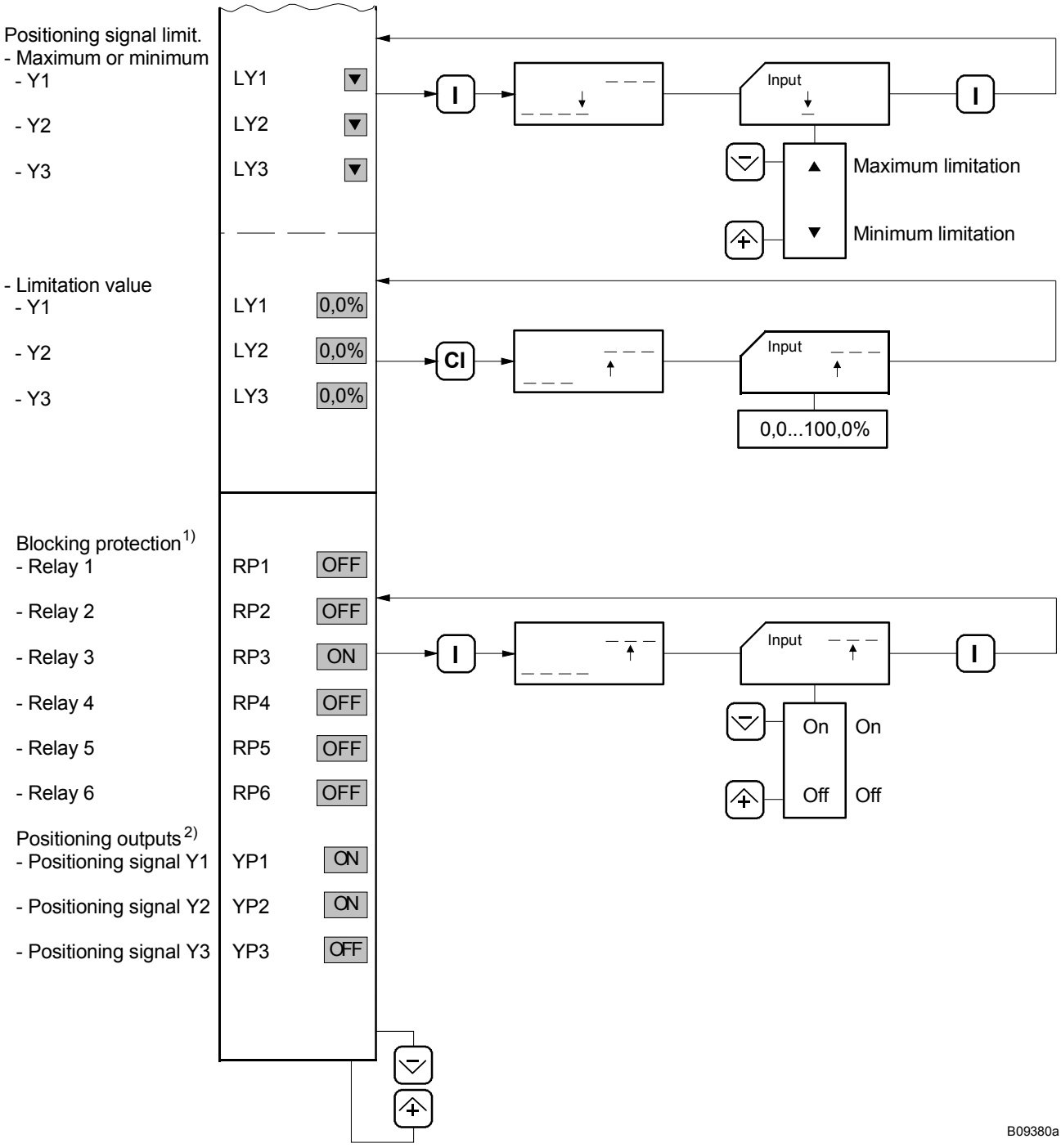
1) Enter code.

How to parameterise the constant control outputs



1) Enter code.
2) If Yc2 is not linked by selection, Yc2 = Y2.

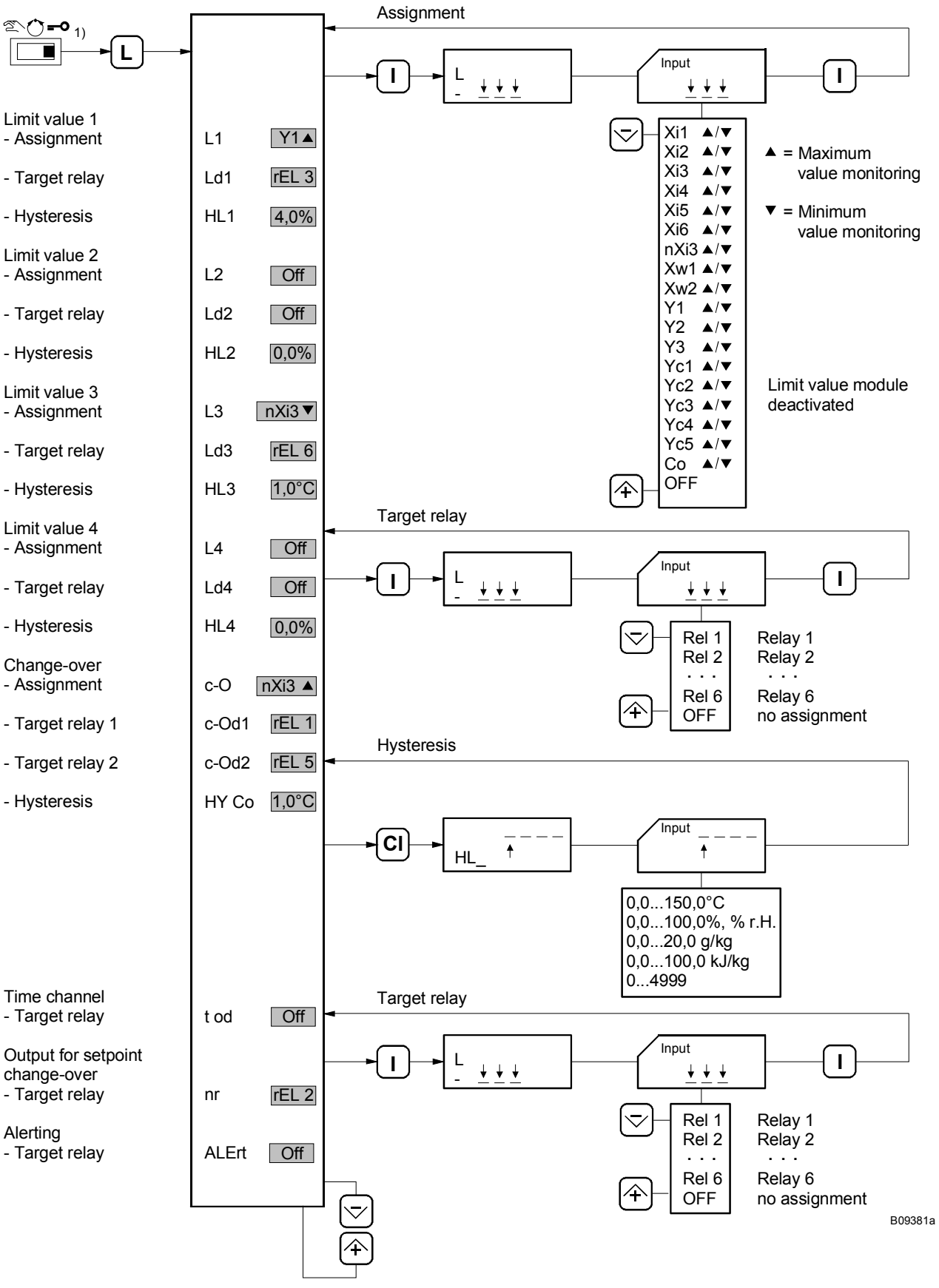
How to parameterise the constant control outputs, blocking protection



1) if on: 2 07:10 on
2 07:12 off

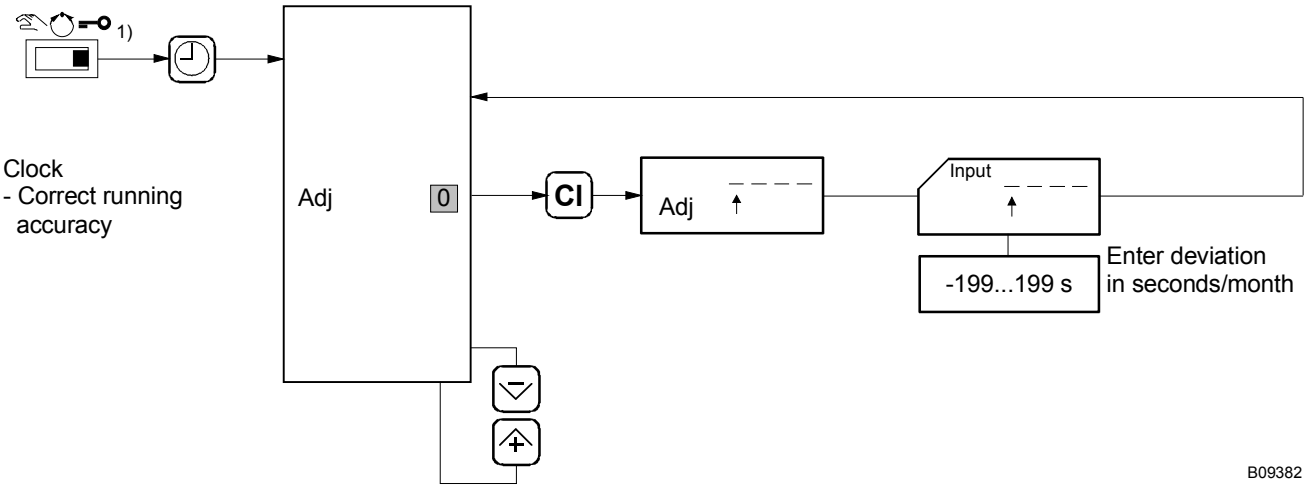
2) if on: 2 07:12, if Y. > 90 %, Y –10 %
2 07:14, if Y. < 90 %, Y +10 %

Limit value functions



1) Enter code.

Clock function



1) Enter code.

Overview of models

Description of functions: RDT 300

Control model 0

Installation:

– dual pipe system, heating or cooling

Features:

– separate PI controllers for heating and cooling with 2 setpoints per controller

– free PI controller, e.g. for dehumidification

– switchover between heating and cooling by means of change-over signal

– change-over output to switch the room controllers over

– outdoor temperature averaged and damped, can be switched off

– flow temperature for heating is controlled by outdoor temperature, based on heating curve

– flow temperature for cooling with shift

– operating mode changeover is internal, or via external system remote control, off mode with frost protection

– flooring function as per DIN 4725 part 4

– valve anti-jamming function

– pump blocking protection

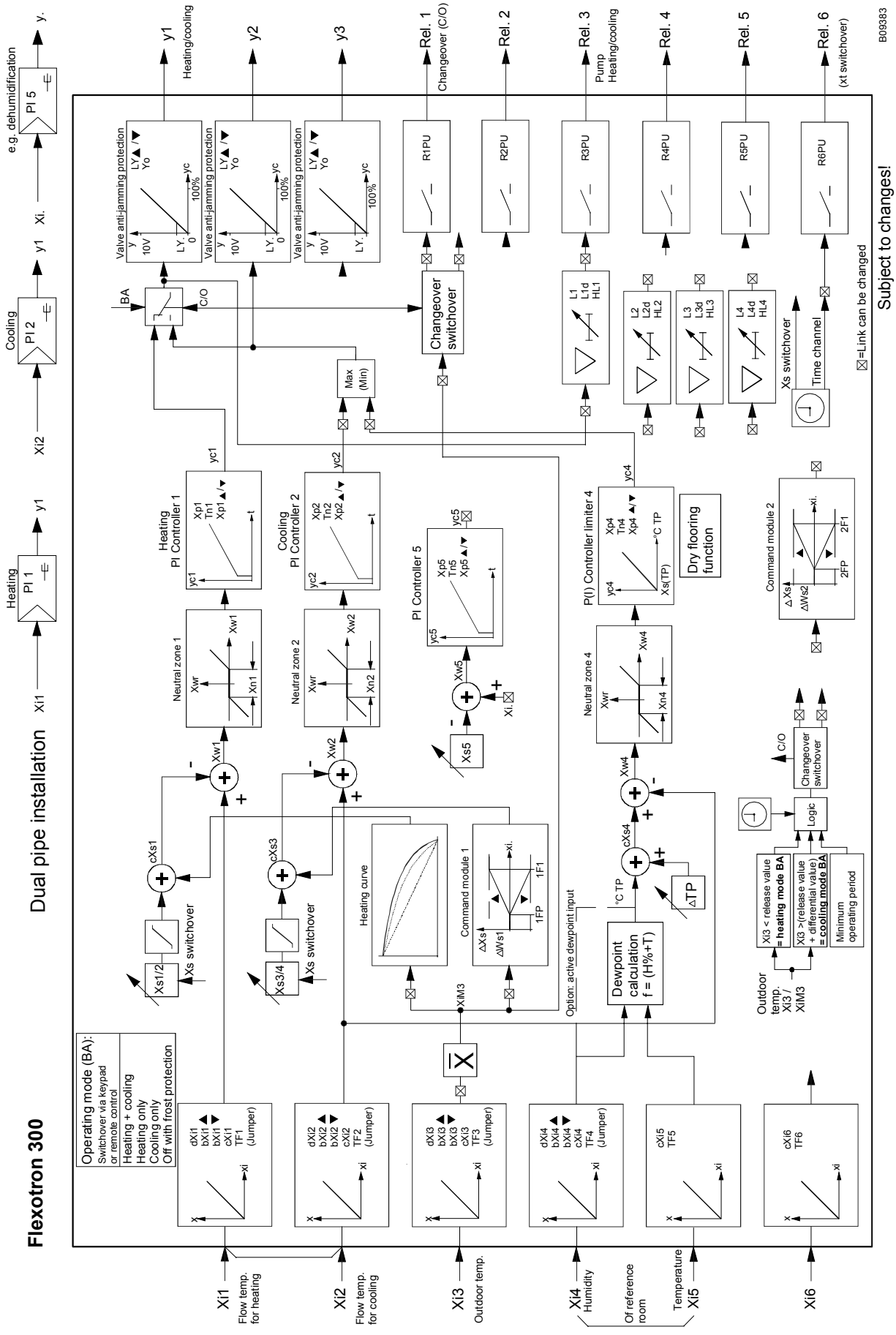
– active dewpoint prevention using dewpoint controller (limiter), internal dewpoint calculation, optional active dewpoint input

– change-over signal derived:
  from outdoor temperature or
  from the averaged outdoor temperature or
  time-limited as a function of reference and outdoor temperature

– shift output can be parameterised, e.g. to room controllers

– week clock with automatic summer/winter time switchover

Block diagram RDT 300 Model 0



Description of functions: RDT 300

Control model 1

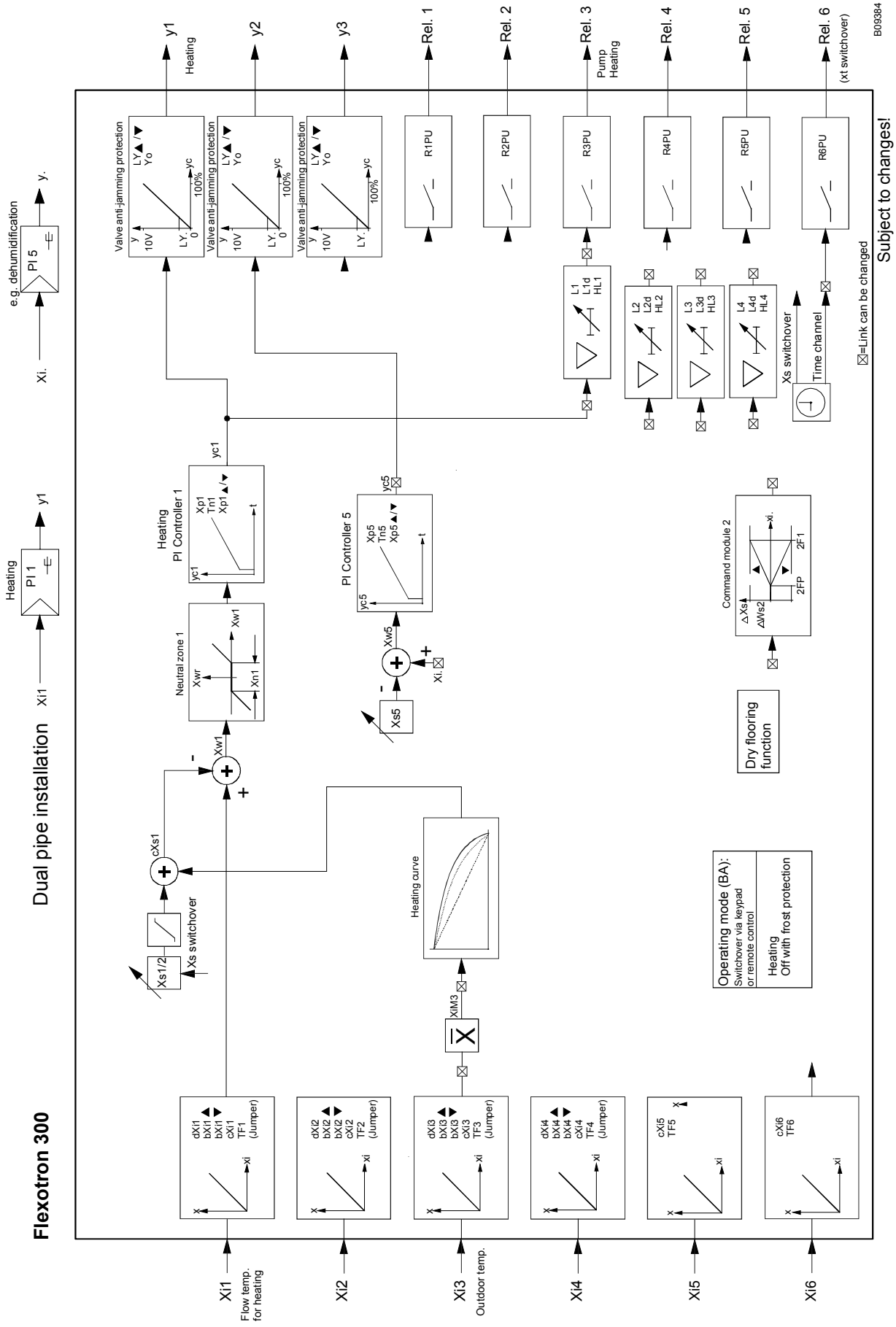
Installation:

- dual pipe installation, heating only

Features:

- PI controllers for heating with 2 setpoints
- free PI controller, e.g. for dehumidification
- outdoor temperature averaged and damped, can be switched off
- flow temperature for heating controlled by outdoor temperature, based on heating curve
- operating mode changeover: internal, or by external system remote control, off mode with frost protection
- flooring function as per DIN 4725 part 4
- valve anti-jamming function
- pump blocking protection
- shift output can be parameterised, e.g. to room controllers
- week clock with automatic summer/winter time switchover

Block diagram RDT 300 Model 1



Description of functions: RDT 300

Control model 2

Installation:

– dual pipe installation, cooling only

Features:

– PI controllers for cooling with 2 setpoints

– free PI controller, e.g. for dehumidification

– flow temperature for cooling with shift

– operating mode changeover: internal, or via external system remote control

– valve anti-jamming function

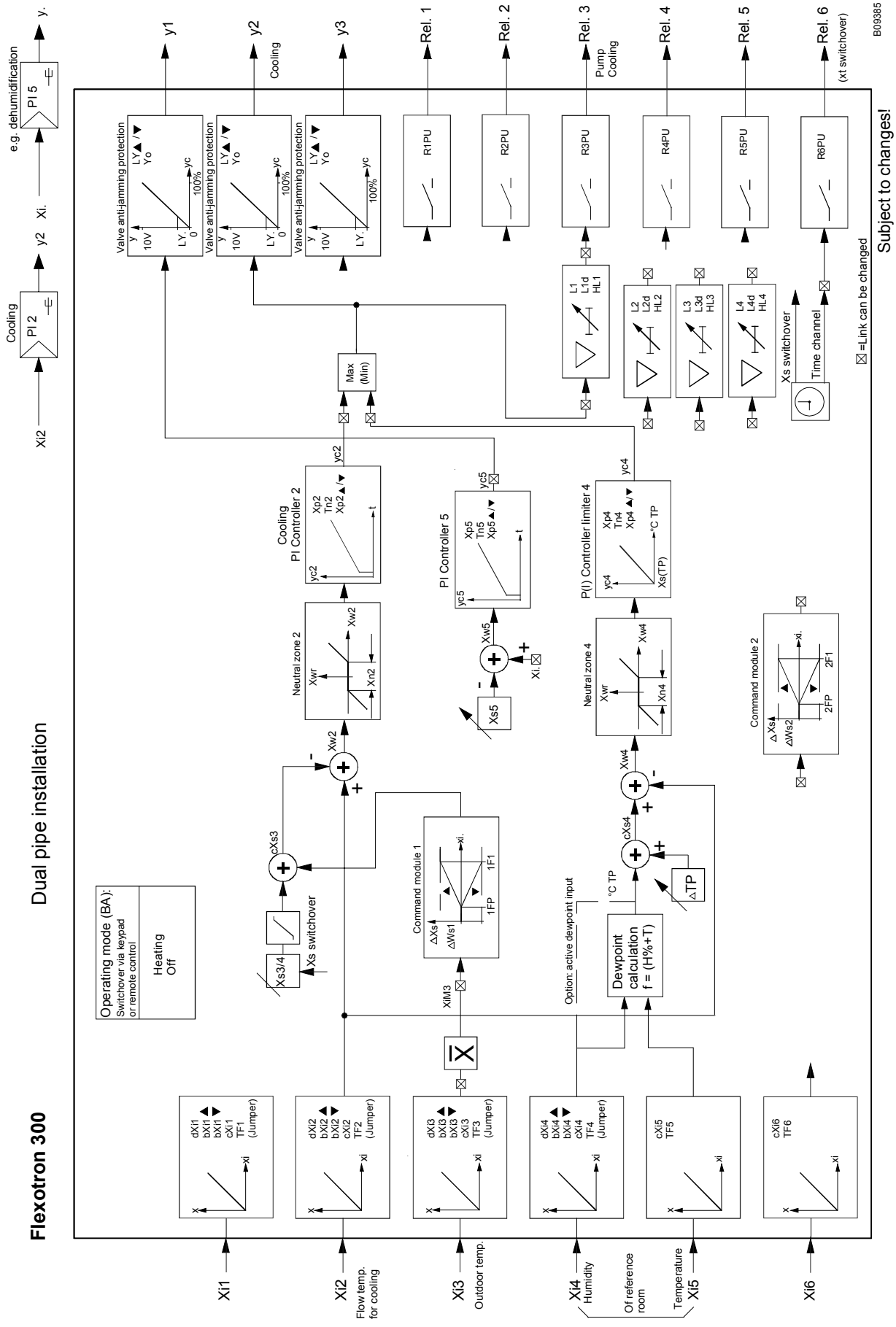
– pump blocking protection

– active dewpoint prevention using dewpoint controller (limiter), internal dewpoint calculation, optional active dewpoint input

– shift output can be parameterised, e.g. to room controllers

– week clock with automatic summer/winter time switchover

Block diagram RDT 300 Model 2



Description of functions: RDT 300

Control model 3

Installation:

– dual pipe installation, heating or cooling

Features:

– PI controller for heating and cascade controller for cooling, each with 2 setpoints per controller

– free PI controller, e.g. for dehumidification

– switchover between heating and cooling by means of change-over signal

– change-over output to switch the room controllers over

– outdoor temperature averaged and damped, can be switched off

– flow temperature for heating controlled by outdoor temperature, based on heating curve

– flow temperature for cooling with ground temperature input, corresponds to a cascade control

– operating mode changeover: internal or via external system remote control, off mode with frost protection

– flooring function as per DIN 4725 part 4

– valve anti-jamming function

– pump blocking protection

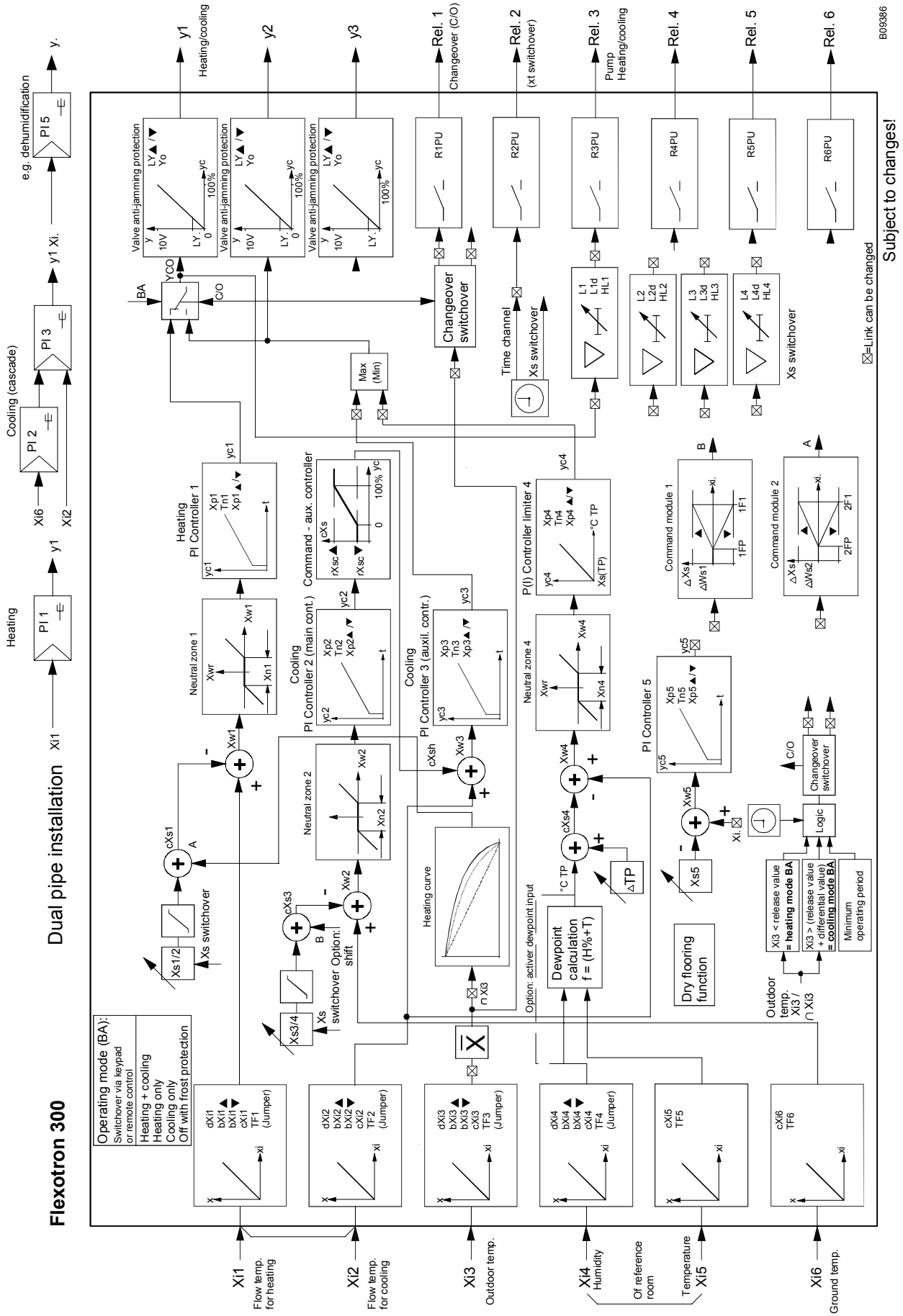
– active dewpoint prevention using dewpoint controller (limiter), internal dewpoint calculation, optional active dewpoint input

– change-over signal derived:
  from outdoor temperature or
  from averaged outdoor temperature or
  time-limited, as a function of reference and outdoor temperature

– shift output can be parameterised, e.g. to room controllers

– week clock with automatic summer/winter time switchover

Block diagram RDT 300 Model 3



Description of functions: RDT 300

Control model 4

Installation:

– dual pipe installation, cooling only

Features:

– cascade controller for cooling with 2 setpoints

– free PI controller, e.g. for dehumidification

– flow temperature for cooling with ground temperature input, corresponds to cascade control

– operating mode changeover: internal or via external system remote control

– valve anti-jamming function

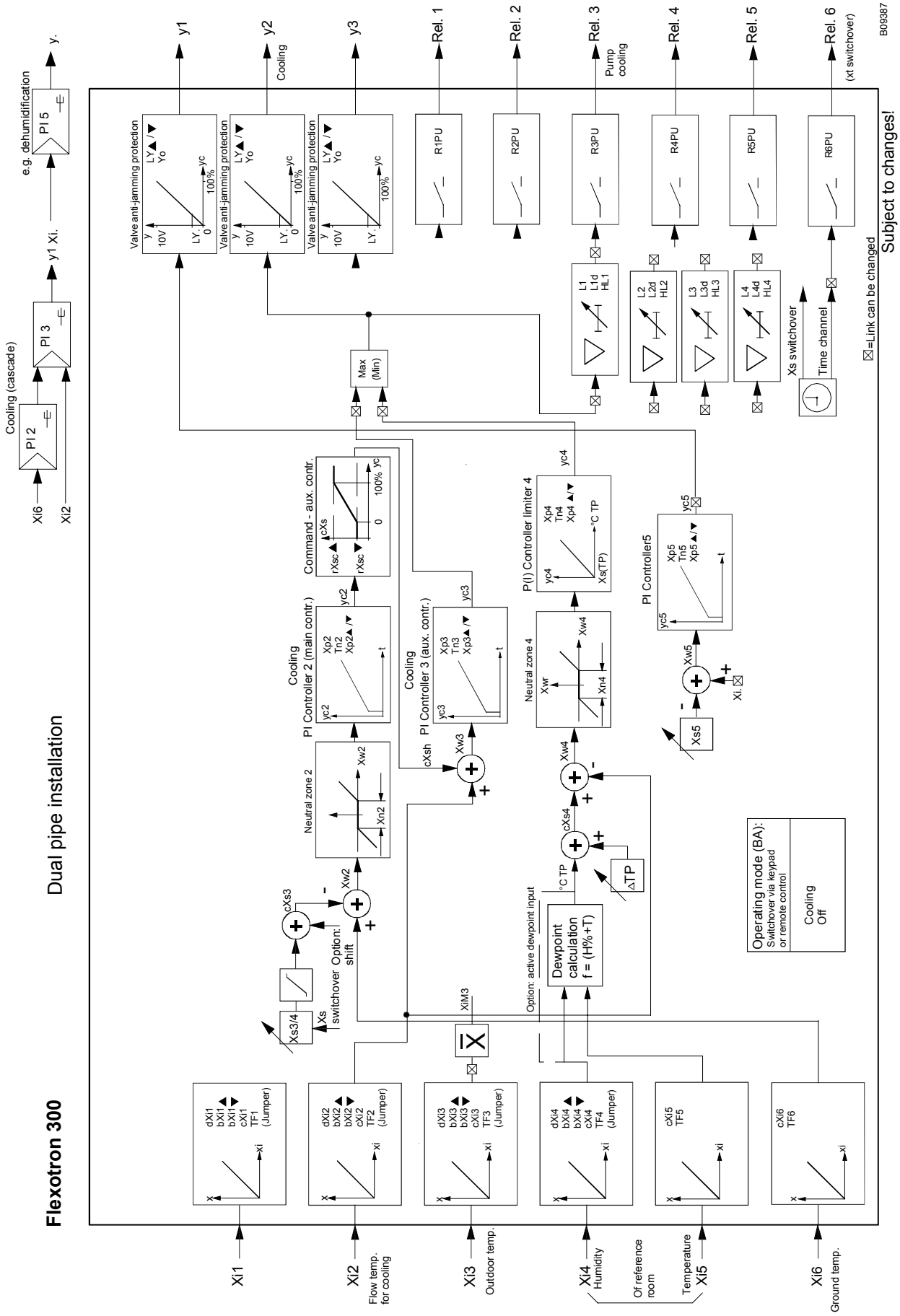
– pump blocking protection

– active dewpoint prevention using dewpoint controller (limiter), internal dewpoint calculation, optional active dewpoint input

– shift output can be parameterised, e.g. to room controllers

– week clock with automatic summer/winter time switchover

Block diagram RDT 300 Model 4



Description of functions: RDT 300

Control model 5

Installation:

– four-pipe installation, heating and cooling

Features:

– separate PI controllers for heating and cooling with 2 setpoints per controller

– free PI controller, e.g. for dehumidification

– change-over output for switchover or signalling

– outdoor temperature averaged and damped, can be switched off

– flow temperature for heating controlled by outdoor temperature, based on heating curve

– flow temperature for cooling with shift

– operating mode changeover: internal, or via external system remote control, off mode with frost protection

– flooring function as per DIN 4725 part 4

– valve anti-jamming function

– pump blocking protection

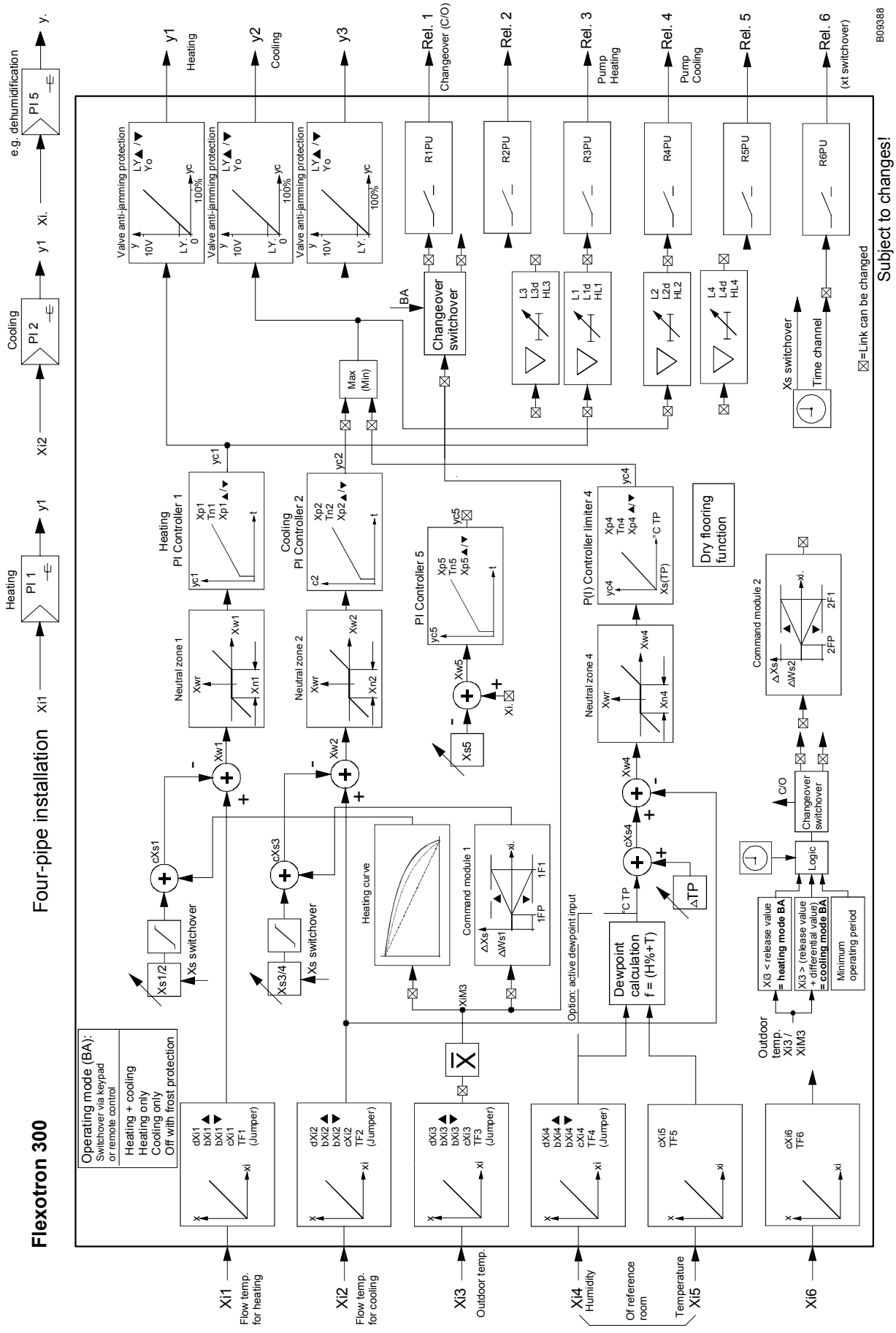
– active dewpoint prevention using dewpoint controller (limiter), internal dewpoint calculation, optional active dewpoint input

– change-over signal derived:
  from outdoor temperature or
  from averaged outdoor temperature or
  time-limited as a function of reference and outdoor temperature

– shift output can be parameterised, e.g. to room controllers

– week clock with automatic summer/winter time switchover

Block diagram RDT 300 Model 5



Description of functions: RDT 300

Control model 6

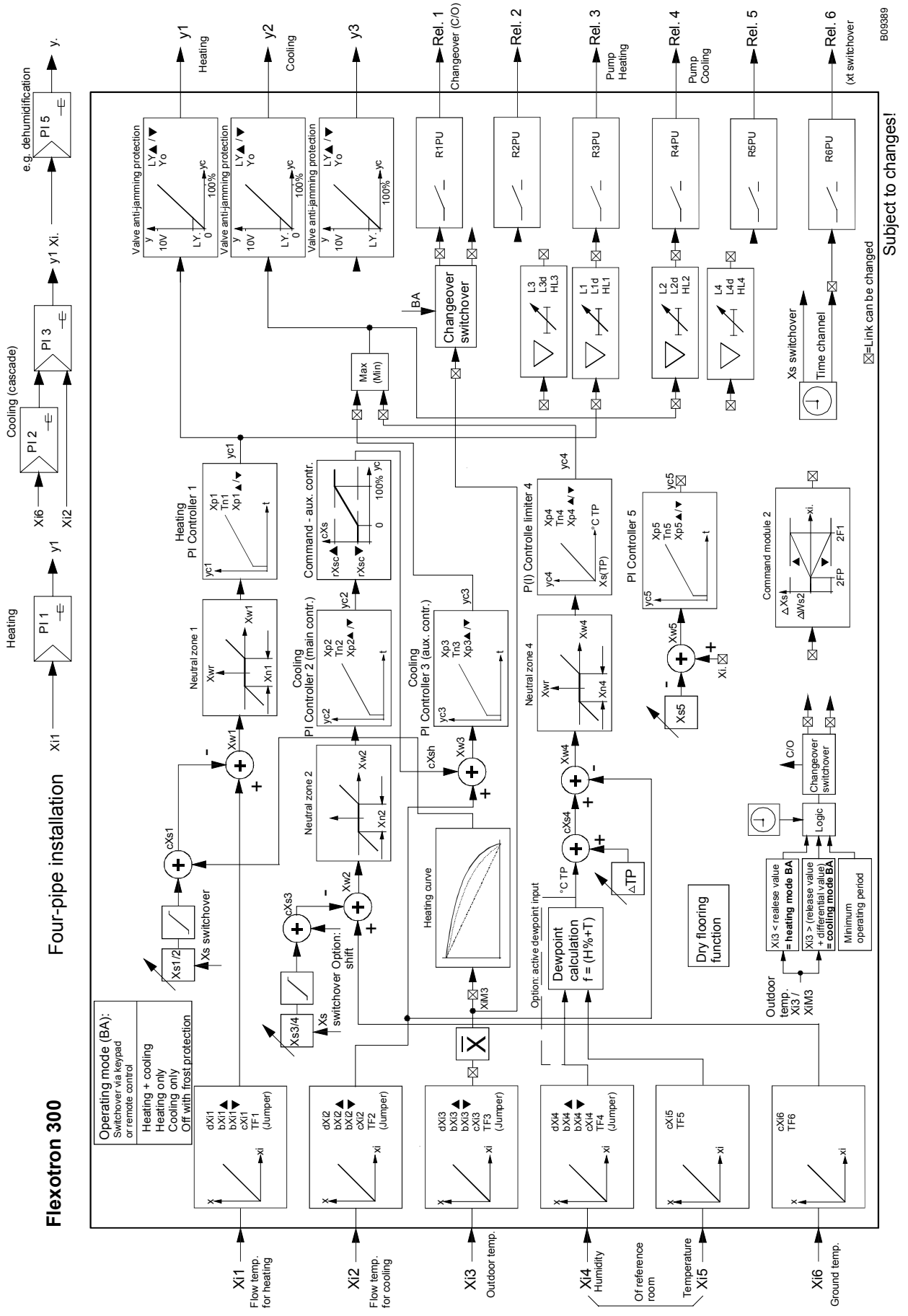
Installation:

- four-pipe installation, heating and cooling

Features:

- PI controller for heating and cascade controller for cooling, each with 2 setpoints per controller
- free PI controller, e.g. for dehumidification
- change-over output for switchover or signalling
- outdoor temperature averaged and damped, can be switched off
- flow temperature for heating controlled by outdoor temperature, based on heating curve
- flow temperature for cooling with ground temperature input, corresponds to cascade control
- operating mode changeover: internal or via external system remote control, off mode with frost protection
- flooring function as per DIN 4725 part 4
- valve anti-jamming function
- pump blocking protection
- active dewpoint prevention using dewpoint controller (limiter), internal dewpoint calculation, optional active dewpoint input
- change-over signal derived:
  from outdoor temperature or
  from averaged outdoor temperature or
  time-limited as a function of reference and outdoor temperature
- shift output can be parameterised, e.g. to room controllers
- week clock with automatic summer/winter time switchover

Block diagram RDT 300 Model 6



Description of parameters

Description of parameters

1W — **1**st shift (**W**), input

Access: Service level

Source for the first shift module. The source denotes the Xi input that is used for the shift. This Xi input determines the unit of measurement for parameters "Start of shift" and "End of shift". Every Xi input can be used for a shift. Enter OFF to deactivate the shift module. On activation, the shift acts on controller PI 2 (cooling).

2W — **2**nd shift (**W**), input

Access: Service level

Source for the second shift module. The source denotes the Xi input that is used for the shift. This Xi input determines the unit of measurement for parameters "Start of shift" and "End of shift". Every Xi input can be used for a shift. Enter OFF to deactivate the shift module. On activation, the shift acts on controller PI 1 (heating), or the heating curve can also be assigned as an alternative.

3H — **H**eating curve - input

Access: Service level

Source for the heating curve. The source denotes the Xi input that is used to calculate the heating curve. Every Xi input can be used. Enter OFF to deactivate the heating curve. On activation, the heating curve acts on controller PI 1 (heating), or shift 2 can also be assigned as an alternative.

5r — Input - **c**ontroller **5**

Access: Service level

Assignment of Xi input for controller PI 5. This controller can be used freely, e.g. to control a dehumidifier or a refrigeration machine.

ALErt — Forwarding an **a**larm

Access: Service level

Parameter for issuing an alarm. If a short circuit is detected at input Xi6, e.g. due to a closed relay, then the output relay - which is selected using the ALErt parameter - will be closed. This makes it possible to forward an alarm.

bXi.▲, bXi.▼ **R**ange **Xi** for free unit of measurement and active transducer

Access: Service level

Indicates the associated value ranges for the selected unit of measurement.

Cod **Cod**e number

Access: Service level

To gain access to the service level, a password (code) has to be entered. It is 6-7-8-9, and it cannot be changed. Access to the service level can also be prevented by sealing the mode switch.

cXi. **c**onfig Xi

Access: Service level

Settings for the type of sensor connected. In addition, the jumpers should be inserted at the rear of the unit.

Possibilities:

Type	Sensor	Type	Sensor
1	Ni1000	4	Current 0...20 mA
2	Voltage 0...10 V	5	Current 4...20 mA
3	Voltage 2...10 V	6	Voltage 0...1 V
7	Active dewpoint input, only Xi4		

cXs. **C**alculated **s**etpoint

Access: manual, automatic

Calculated setpoint, e.g. for summer compensation. The setpoint cXs is calculated from setpoint Xs, shifted by amount ▲WS. It has an adding or subtracting effect, depending on the configuration.

dXi. Unit of **m**easurement **Xi**

Access: Service level

The actual value's unit of measurement for the display. This stipulation applies simultaneously for all associated parameters, such as setpoint, proportional band and shift parameters.

Possibilities:

Unit of measurement	
°C	g/kg
%	kJ/kg
% r.h.	- (free unit of measurement)

N.B.: If ‘free unit of measurement’ is selected, no unit-of-measurement symbol is shown in manual and automatic modes.

End **End** value for the flow temperature when the ETF is on

Access: Manual

End value for the setpoint for the flow temperature when the ETF is on

ER Daily **in**crease in flow temperature when the ETF is on

Access: Manual

Amount by which the setpoint for the flow temperature is increased each day when the ETF is active.

ETF **Dry f**looring **f**unction

Access: Service level

Activates the dry flooring function; indicated by a flashing symbol in automatic operation. When the ETF has been started, the controller initially regulates a flow temperature that is set using the ST parameter. At 02:00 hrs, the setpoint for the flow temperature is raised by the amount that has been selected using the Er parameter. The flow temperature is raised each day until the value that was selected using the End parameter has been attained. On the following day at 02:00 hrs, the ETF finishes and the controller changes to automatic mode. If, because of the values of the ST and Er parameters, the setpoint for the flow temperature is higher than the value for the End parameter, then the value of the End parameter is used in order to control the flow temperature.

.F1 End of shift

Access: Manual

This determines the end point of the shift on the command module. Also see FP and ▲WS.

.FP Start of shift

Access: Manual

Determines the shift's starting point on the command module. See also F1 and ▲WS.

HL. **H**ysteresis of **l**imit

Access: Service level

Enter the hysteresis (switching difference) for the limit value.

I**ni** **Ini**tialisation

Access: Service level

Resets the controller's EEPROM (parameter memory) to the default values. Default values are shown with a grey background in the operating instructions.

L. **L**imit

Access: Service level

Specifies the source for the limit value module. The "Off" setting completely deactivates the limit value module.

L. Switching point for **L**imit

Access: Manual, automatic

Ld. Target of limit

Access: Service level

Specifies the target relay for the alarm output. If set to "Off", no relay is assigned.

LME — **L**oad **me**mory

Access: Service level

Loads the contents of the external parameter memory (‘memory’) into the controller's internal parameter memory. If any faults are found, an ‘F’ appears in the display. The memory, which is optional, is not necessary in order to run the controller.

Lv. — **D**elay time of **l**imit

Access: Manual, automatic

Acts as a cut-in delay.

Ln. — **F**ollow-up time for **l**imit

Access: Manual, Automatic

Acts as a cut-out delay; e.g. used as follow-up for triggering heating pumps.

LY. — **L**imit **Y.**

Access: Service level

Value and mode of action of the Y-limitation. This limitation can be set for positioning signals only, and it only works in automatic mode. The arrow ▲/▼ shows the limitation's mode of action, while the value shows the minimum or maximum positioning signal as a percentage.
Application: e.g. for setting the minimum fresh-air content.

MCO — **C**hange**o**ver **c**riterion

Access: Service level

Specifies the switchover criterion for the changeover function (heating or cooling mode).

Method 1: based on outdoor temperature.
Method 2: specified as a function of the outdoor temperature, interrogation time, changeover difference and minimum runtime

Mod **Mod**el number

Access: Service level

The control model number determines the basic function of the controller.

nXi3. Averaged outdoor temperature

Access: Manual, automatic

The averaged outdoor temperature is averaged over period Ti .

OF. **Of**fset

Access: Service level

Shows the amount of correction due to balancing of measured values:-
Example: Measured value 20.0 °C; preferred display (balancing of measured value) 20.5 °C = offset –0.5.

RC **R**emote **C**ontrol

Access: Service level

Activates the connected remote control.

RDT Type of unit (designation)

Access: Manual, service level

Indicates unit type RDT 300.

rXs.▲ **R**ange (setpoint range) **Xs**

Access: Service level

Specifies the maximum input value for controllers 1+2, separately. The inputted value must be larger than or equal to rXs▼. If parameters rXs▲ and rXs▼ are set to the same value, no Xs adjustment is possible. Parameter rXs1▲ acts as a maximum limitation of the flow temperature on the heating curve.

rXs.▼ **R**ange (setpoint range) **Xs**

Access: Service level

Specifies the maximum input value for controllers 1+2 separately. The inputted value must be less than or equal to rXs▲.

rY3▲ **R**ange **Y3** output

Access: Service level

Specifies the end of the range for the measurement amplifier, with 10 Volt output: e.g. 40 °C.

rY3▼ **R**ange **Y3** output

Access: Service level

Specifies the start of the range for the measurement amplifier, with 0 Volt output: e.g. –20 °C.
If you enter rY3▲ < rY3▼, for example, a P-controller can be configured with mode of action B.

▲ **WS** shift (**W**)

Access: Manual

Amount of shift. The command module has a shift effect on the active setpoint. In conjunction with the parameters FP and F1 (with preceding mathematical signs), a shift is possible in all 4 quadrants. See also .FP and .F1.

SL Slope of heating curve

Access: Manual, automatic

Definition: SL= ∆ flow temperature/ ∆ outdoor temperature.

SME **W**rite into **me**mory

Access: Service level

Writes (copies) the controller's parameters in the external parameter memory.

ST Start value for the flow temperature when the ETF is on

Access: Manual

Start value for the setpoint for the flow temperature, after the ETF has been activated.

TI Period of time for the averaged outdoor temperature

Access: Manual, automatic

Period used for the calculation of the averaged outdoor temperature.

TF. **T**ime **f**ilter (filter time constant)

Access: Service level

Filter time constant for measuring input. The range is 0 (off) to 255 seconds. The filter represents a mathematically approximated delay of the first degree. For fast controlled networks, it is important not to set the filter time constant too large. The delay causes an additional phase shift in the control loop, which can lead to hunting.
This function is intended (for example) for use in room-pressure control for arresting pressure surges. Do not use for attenuating fluctuating measured values, caused by disturbance, etc. In this case, the source of the interference should be attenuated directly.

Tn. Integral action time (reset time) (standardised term)

Access: Manual

When Tn = 0, the I component is switched off; the controller then has a purely P characteristic.

Ver **Ver**sion

Access: Manual, service level

The software version is shown. This is needed when making technical enquiries.

W.▲/▼ **S**hift (**W**)

Access: Service level

The command module's control action. The command module has a shift effect on the active setpoint. In conjunction with the parameters FP and F1 (with preceding mathematical signs), a shift is possible in all 4 quadrants.

Xi. Actual value (standardised term)

Access: Manual, Automatic

Xm. Balancing of **m**easured value **X**i

Access: Service level

Balancing of measured value by entering the desired display value. The corrected value can be shown with parameter OF.

Xn. **X n**eutral

Access: Service level

Sets the neutral zone for the relevant control module. The controller's output is frozen within this zone. If Xw stays within the amount of (Xn/2), the control deviation is considered to be 0. The function has no influence on the Xw display.

Xp. **P**roportional **b**and (standardised term)

Access: Manual

Xp. ▲/▼ Control action: controller **Xp**

Access: Service level

Use ▲ or ▼ to set the controller's control action. ▲ provides control action A (works directly); ▼ provides control action B (works inversely).

Xs. Setpoint (standardised term)

Access: Manual, Automatic

XsF Setpoint with risk of frost

Access: Manual, automatic

This setpoint becomes effective in off-mode and if there is a risk of frost. If the value falls below the specified level, the heating controller is activated.

SoLL Calculated **s**etpoint based on heating curve

Access: Manual, automatic

Specifies the flow temperature in relation to the outdoor temperature.

Xw. Control deviation (standardised term)

Access: Manual, automatic

Difference between controlled variable (Xi) and setpoint (Xs).

Y. Positioning signal (standardised term)

Access: Manual, automatic

Controller output; voltage signal 0 or 2...10 V.

Y0. **Y-0** point

Access: Service level

Stipulates the starting value for Y-outputs 1+2, (0 = 0 Volt, 2 = 2 Volt). Output Y3 always works from 0...10 Volt.

Y3. **Y3. source**

Access: Service level

Output Y3 can be used as a measuring amplifier. This parameter determines the input and is used (for example) to transmit the actual value. If (for example) a P-controller is parameterised accordingly, it can also be configured as a simple anti-frost system.

Yc. Calculated positioning signal

Access: Manual, automatic

Calculated controller output in 0...100 %; this is converted into a positioning signal of either 0...10 V or 2...10 V.

YM **Ym**in-selection / **Ym**ax-selection

Access: Service level

Positioning signals Yc2 and Yc3 are only available if they are linked by selection. Maximum selection can also be achieved by externally connecting control outputs in parallel. By connecting an EXG100 active potentiometer in parallel with a control output, the minimum fresh-air content (for example) can be set externally.

List of parameters

List of parameters, RDT 300

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Mod	Control model number	0...6	S	SERV	0		•	•	•	•	•	•	•
RC	Remote control – activation	On/Off	S	SERV	Off		•	•	•	•	•	•	•
LME	Copy values to controller	–	S	SERV			•	•	•	•	•	•	•
SME	Copy values to memory	–	S	SERV			•	•	•	•	•	•	•
VER	Software version	–	H/S	PAR/SERV			•	•	•	•	•	•	•
RDT...	Device type	–	H/S	PAR/SERV			•	•	•	•	•	•	•
Input 1	Flow temperature – heating												
Xi1	Actual value	Depends on transmitter and unit of meas'm't	A/H	Xi			•	•	•	•	•	•	•
cXi1	Type of transmitter Note code plug position	1 - Ni 1000 2 - 0...10 V 3 - 2...10 V 4 - 0...20 mA 5 - 4...20 mA 6 - 0...1 V	S	Xi	1		•	•	•	•	•	•	•
dXi1	Unit of measurement	°C % %r.h. g/kg kJ/kg - No unit of measure-ment	S	Xi	°C		•	•	•	•	•	•	•
bXi1▲	End of range	Depends on transmitter and unit of meas'm't	S	Xi	150 °C		•	•	•	•	•	•	•
bXi1▼	Start of range	Depends on transmitter and unit of meas'm't	S	Xi	-30 °C		•	•	•	•	•	•	•
Xm1	Calibration	–	S	Xi			•	•	•	•	•	•	•
OF1	Offset value	–	S	Xi			•	•	•	•	•	•	•
TF1	Filter time constant	0...255 s	S	Xi	2 s		•	•	•	•	•	•	•

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Input 2	**Flow temperature – cooling (for models 0, 1, 2, 3 and 4, parallel connection of sensor Xi1)**												
Xi2	Actual value	Depends on transmitter and unit of meas'm't	A/H	Xi			•	•	•	•	•	•	•
cXi2	Type of transmitter Note code plug position	1 - Ni 1000 2 - 0...10 V 3 - 2...10 V 4 - 0...20 mA 5 - 4...20 mA 6 - 0...1 V	S	Xi	1		•	•	•	•	•	•	•
dXi2	Unit of measurement	°C % %r.h. g/kg kJ/kg - No unit of measurement	S	Xi	°C		•	•	•	•	•	•	•
bXi2▲	End of range	Depends on transmitter and unit of meas'm't	S	Xi	150 °C		•	•	•	•	•	•	•
bXi2▼	Start of range	Depends on transmitter and unit of meas'm't	S	Xi	-30 °C		•	•	•	•	•	•	•
Xm2	Calibration	–	S	Xi			•	•	•	•	•	•	•
OF2	Offset value	–	S	Xi			•	•	•	•	•	•	•
TF2	Filter time constant	0...255 s	S	Xi	2 s		•	•	•	•	•	•	•

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Input 3	Outdoor temperature												
Xi3	Actual value	Depends on transmitter and unit of meas'm't	A/H	Xi			•	•	•	•	•	•	•
cXi3	Type of transmitter Note code plug position	1 - Ni 1000 2 - 0...10 V 3 - 2...10 V 4 - 0...20 mA 5 - 4...20 mA 6 - 0...1 V	S	Xi	1		•	•	•	•	•	•	•
dXi3	Unit of measurement	°C % %r.h. g/kg kJ/kg - No unit of measure-ment	S	Xi	°C		•	•	•	•	•	•	•
bXi3▲	End of range	Depends on transmitter and unit of meas'm't	S	Xi	150 °C		•	•	•	•	•	•	•
bXi3▼	Start of range	Depends on transmitter and unit of meas'm't	S	Xi	-30 °C		•	•	•	•	•	•	•
Xm3	Calibration	–	S	Xi			•	•	•	•	•	•	•
OF3	Offset value	–	S	Xi			•	•	•	•	•	•	•
TF3	Filter time constant	0...255 s	S	Xi	2 s		•	•	•	•	•	•	•
nXi3	Averaged value	–	A/H	Xi	–		•	•	•	•	•	•	•
TI	Period of time for averaged out-door temperature	–	H	PAR	12		•	•	•	•	•	•	•

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Input 4	Humidity for dewpoint calculation or active dewpoint sensor												
Xi4	Actual value	Depends on transmitter and unit of meas'm't	A/H	Xi			•	•	•	•	•	•	•
cXi4	Type of transmitter Note code plug position	1 - Ni 1000 2 - 0...10 V 3 - 2...10 V 4 - 0...20 mA 5 - 4...20 mA 6 - 0...1 V 7 - active dewpoint	S	Xi	2		•	•	•	•	•	•	•
dXi4	Unit of measurement	%r.h.	S	Xi	% r.h.		•	•	•	•	•	•	•
bXi4▲	End of range	Depends on transmitter and unit of meas'm't	S	Xi	100 %		•	•	•	•	•	•	•
bXi4▼	Start of range	Depends on transmitter and unit of meas'm't	S	Xi	0.0 %		•	•	•	•	•	•	•
Xm4	Calibration	–	S	Xi			•	•	•	•	•	•	•
OF4	Offset value	–	S	Xi			•	•	•	•	•	•	•
TF4	Filter time constant	0...255 s	S	Xi	2 s		•	•	•	•	•	•	•
Input 5	Temperature for dewpoint calculation												
Xi5	Actual value	–	A/H	Xi			•	•	•	•	•	•	•
cXi5	Type of transmitter	1 - Ni1000	S	Xi	1		•	•	•	•	•	•	•
Xm5	Calibration	–	S	Xi			•	•	•	•	•	•	•
OF5	Offset value	–	S	Xi			•	•	•	•	•	•	•
TF5	Filter time constant	0...255 s	S	Xi	2 s		•	•	•	•	•	•	•
Input 6													
Xi6	Actual value	–	A/H	Xi			•	•	•	•	•	•	•
cXi6	Type of transmitter	1 - Ni1000	S	Xi	1		•	•	•	•	•	•	•
Xm6	Calibration	–	S	Xi			•	•	•	•	•	•	•
OF6	Offset value	–	S	Xi			•	•	•	•	•	•	•
TF6	Filter time constant	0...255 s	S	Xi	2 s		•	•	•	•	•	•	•

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Command module 1 **Cooling**, target depends on model													
1W	Source if active target is fixed PI 2	Off, Xi1...6	S	SERV	Xi3		•		•	•	•	•	•
W1	Control action ▲▼	▲▼	S	PAR	▲		•		•	•	•	•	•
1FP	Start of shift	–	H	PAR	32.0 °C		•		•	•	•	•	•
1F1	End of shift	–	H	PAR	22.0 °C		•		•	•	•	•	•
1∆Ws	Amount of shift	–	H	PAR	3.0 °C		•		•	•	•	•	•
Command module 2 **Heating, alternative to heating curve**, target for controller 1													
2W	Source if active target is fixed PI 1	Off, Xi1...6	S	SERV	Off		•	•		•		•	•
W2	Control action ▲▼	▲▼	S	PAR	▲		•	•		•		•	•
2FP	Start of shift	–	H	PAR	20.0 °C		•	•		•		•	•
2F1	End of shift	–	H	PAR	-15.0 °C		•	•		•		•	•
2∆Ws	Amount of shift	–	H	PAR	20.0 °C		•	•		•		•	•
Heating curve, alternative to command module 2													
3H	Source if active target is fixed PI 1	Off, Xi1...6	S	SERV	Xi3		•	•		•		•	•
SL	Slope	–	H	PAR	0.6		•	•		•		•	•

Code	Parameter	Range	Level	Operating key	Default value		Value set	Model						
								0	1	2	3	4	5	6
Controller 1 (PI 1) Heating														
Xn1	Neutral zone	-30.0...150.0 °C	S	Xw	0.0 °C			•	•		•		•	•
Xp1 ▲▼	Direction of operation Xp1 ▲▼	▲▼	S	PAR	▼			•	•		•		•	•
Xs1	Main setpoint	Depends on transmitter and unit of meas'm't	A/H	Xs	20.0 °C			•	•		•		•	•
Xs2	Setback setpoint	Depends on transmitter and unit of meas'm't	A/H	Xs	16.0 °C			•	•		•		•	•
XsF	Frost protection setpoint	-5...10 °C	A/H	Xs	5.0 °C			•	•		•		•	•
Xp1	Proportional band	0.1...250 °C	H	PAR	10.0 °C			•	•		•		•	•
Tn1	Integral action time	0...9999 s	H	PAR	180 s			•	•		•		•	•
Xw1	Control deviation	–	A/H	Xw				•	•		•		•	•
rXs1▲	Maximum value Xs1.2	-30.0...150.0 °C	S	Xs	45.0 °C			•	•		•		•	•
rXs1▼	Minimum value Xs1.2	-30.0...150.0 °C	S	Xs	10.0 °C			•	•		•		•	•
cXs1	Flow temp. setpoint – heating	–	A/H	Xs				•	•		•		•	•
Soll	Calculated values as per heating curve	–	A/H	Xs				•	•		•		•	•
Controller 2 (PI 2) Cooling					0, 2, 5	3, 4, 6								
Xn2	Neutral zone	-30.0...150.0 °C	S	Xw	0.0 °C	0.0 °C		•		•	•	•	•	•
Xp2 ▲▼	Direction of operation Xp2 st	▲▼	S	PAR	▲	▼		•		•	•	•	•	•
Xs3	Main setpoint	Depends on transmitter and unit of meas'm't	H	Xs	16.0 °C	20.0 °C		•		•	•	•	•	•
Xs4	Setback setpoint	Depends on transmitter and unit of meas'm't	H	Xs	19.0 °C	23.0 °C		•		•	•	•	•	•
Xp2	Proportional band	0.1...250 °C	H	PAR	10.0 °C	4.0 °C		•		•	•	•	•	•
Tn2	Integral action time	0...9999 s	H	PAR	180 s	0 s		•		•	•	•	•	•
Xw2	Control deviation	–	A/H	Xw				•		•	•	•	•	•
rXs3▲	Maximum value Xs3.4	-30.0...150.0 °C	S	Xs	22.0 °C	24.0 °C		•		•	•	•	•	•
rXs3▼	Minimum value Xs3.4	-30.0...150.0 °C	S	Xs	15.0 °C	17.0 °C		•		•	•	•	•	•
cXs3	Setpoint	–	A/H	Xs	Fl. temp. Cooling	Ground temp.		•		•	•	•	•	•

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Controller 3 (PI 3) Auxiliary controller for cascade													
Xp3 ▲▼	Direction of operation Xp3 ▲▼	▲▼	S	PAR	▲					•	•		•
Xp3	Proportional band	0.1...250 °C	H	PAR	10.0 °C					•	•		•
Tn3	Integral action time	0...9999 s	H	PAR	180 s					•	•		•
rXSc ▼	Lower setpoint limit	-30.0...150.0 °C	H	PAR	14.0 °C					•	•		•
rXSc ▲	Upper setpoint limit	-30.0...150.0 °C	H	PAR	20.0 °C					•	•		•
cXsh	Flow temp. setpoint – cooling	–	A/H	Xs						•	•		•
Controller 4 (PI 4) Dew-point limiter													
Xn4	Neutral zone	-30.0...150.0 °C	S	Xw	0.0 °C								
Xp4 ▲▼	Direction of operation Xp4 ▲▼	▲▼	S	PAR	▲				•	•	•	•	•
cXs4	Calculated dewpoint	°C TP	A/H	Xs					•	•	•	•	•
Xp4	Proportional band	0.1...250 °C	H	PAR	10.0 °C				•	•	•	•	•
Tn4	Integral action time	0...9999 s	H	PAR	180 s				•	•	•	•	•
∆TPI	Dewpoint interval	-5...5 °C	H	Xs	0.0 °C				•	•	•	•	•
Yc4	Calculated dewpoint	–	A/H	Xs					•	•	•	•	•
Xw4	Control deviation	–	A/H	Xw					•	•	•	•	•
TPI	Calculated positioning signal	–	A/H	Y					•	•	•	•	•
Controller 5 (PI 5)													
5r	Source – actual value	Off, Xi1...Xi6, Xin	S	SERV	Off		•	•	•	•	•	•	•
Xs5	Setpoint	–	A/H	Xs	0.0 °C		•	•	•	•	•	•	•
Xp5 ▲▼	Direction of operation Xp5 ▲▼	▲▼	S	PAR	▼		•	•	•	•	•	•	•
Xp5	Proportional band	0.1...250 °C	H	PAR	10.0 °C		•	•	•	•	•	•	•
Tn5	Integral action time	0...9999 s	H	PAR	0 s		•	•	•	•	•	•	•
Xw5	Control deviation	–	A/H	Xw			•	•	•	•	•	•	•
Yc5	Calculated positioning signal	–	A/H	Y			•	•	•	•	•	•	•
Positioning signals													
Y0	Starting point Y1 + Y2	0/2 V	S	Y	0		•	•	•	•	•	•	•

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Positioning signal Y1													
LY1	Limitation ▲▼ Limitation value	▲▼ 0.0...100.0 %	S	Y	▼ 0.0 %		•	•	•	•	•	•	•
Y1	Positioning signal	0...100 %	H	Y			•	•	•	•	•	•	•
Yc1	Calculated positioning signal	–	A/H	Y			•	•	•	•	•	•	•
YP1	Anti-jamming function for regulating unit	On/Off	S	Y	On		•	•	•	•	•	•	•
Positioning signal Y2													
LY2	Limitation ▲▼ Limitation value	▲▼ 0.0...100.0 %	S	Y	▼ 0.0 %		•	•	•	•	•	•	•
Y2	Positioning signal	0...100 %	H	Y			•	•	•	•	•	•	•
Yc2	Calculated positioning signal	–	A/H	Y			•	•	•	•	•	•	•
YP2	Valve anti-jamming function	On/Off	S	Y	On		•	•	•	•	•	•	•
Positioning signal Y3													
LY3	Limitation ▲▼ Limitation value	▲▼ 0.0...100.0 %	S	Y	▼ 0.0 %		•	•	•	•	•	•	•
Y3	Source (measurement amplifier)	Off, Xi1...Xi6, Xin	S	Y	Xi3		•	•	•	•	•	•	•
rY3 ▲	End of range (10 V)	Depends on transmitter and unit of meas'm't	S	Y	41.0 °C		•	•	•	•	•	•	•
rY3 ▼	Start of range (0 V)	Depends on transmitter and unit of meas'm't	S	Y	25.0 °C		•	•	•	•	•	•	•
Y3	Output variable	–	A/H	Y			•	•	•	•	•	•	•
Yc3	Calculated positioning signal	–	A/H	Y			•	•	•	•	•	•	•
YP3	Valve anti-jamming function	On/Off	S	Y	Off		•	•	•	•	•	•	•
Selecting the positioning signal													
YM	Type of selection ▲▼ Selection from Y..	Max./Min. Y1...3	S	Y	▼ (Min.) 24		•	•	•			•	
YM	Type of selection ▲▼ Selection from Y..	Max./Min. Y1...3	S	Y	▼ (Min.) 34					•	•		•

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Anti-jamming function for relays													
RP1	Relay 1	On/Off	S	Y	Off		•	•	•	•	•	•	•
RP2	Relay 2	On/Off	S	Y	Off		•	•	•	•	•	•	•
RP3	Relay 3	On/Off	S	Y	On		•	•	•	•	•	•	•
RP4	Relay 4	On/Off	S	Y	Off		•	•	•	•	•	•	•
RP5	Relay 5	On/Off	S	Y	Off		•	•	•	•	•	•	•
RP6	Relay 6	On/Off	S	Y	Off		•	•	•	•	•	•	•
Operating modes													
	Choice of operating mode	Auto/Cooling/Heating/ Off with frost monitor- ing	A		▲▼ Auto		•	•	•	•	•	•	•
T0	Time channel	Auto/On/Off	A/H	Y	Auto ▲▼		•	•	•	•	•	•	•
Rel1	Relay 1	On/Off	A/H	Y	In Manual: OFF ▼		•	•	•	•	•	•	•
Rel2	Relay 2	On/Off	A/H	Y	In Manual: OFF ▼		•	•	•	•	•	•	•
Rel3	Relay 3	On/Off	A/H	Y	In Manual: OFF ▼		•	•	•	•	•	•	•
Rel4	Relay 4	On/Off	A/H	Y	In Manual: OFF ▼		•	•	•	•	•	•	•
Rel5	Relay 5	On/Off	A/H	Y	In Manual: OFF ▼		•	•	•	•	•	•	•
Rel6	Relay 6	On/Off	A/H	Y	In Manual: OFF ▼		•	•	•	•	•	•	•
Limit value 1 Heating circulation pump, heating/cooling													
L1	Assignment of source	–	S	L	Y1▲		•	•	•	•	•	•	•
Ld1	Target relay	Rel. 1...6	S	L	Rel. 3		•	•	•	•	•	•	•
L1	Limit value	see Xs	A/H	L	5.0 %		•	•	•	•	•	•	•
HL1	Hysteresis	see Xs	S	L	4.0 %		•	•	•	•	•	•	•
Lv1	Delay time	0...9999 s	A/H	L	0 s		•	•	•	•	•	•	•
LN1	Follow-up time	0...9999 s	A/H	L	180 s		•	•	•	•	•	•	•

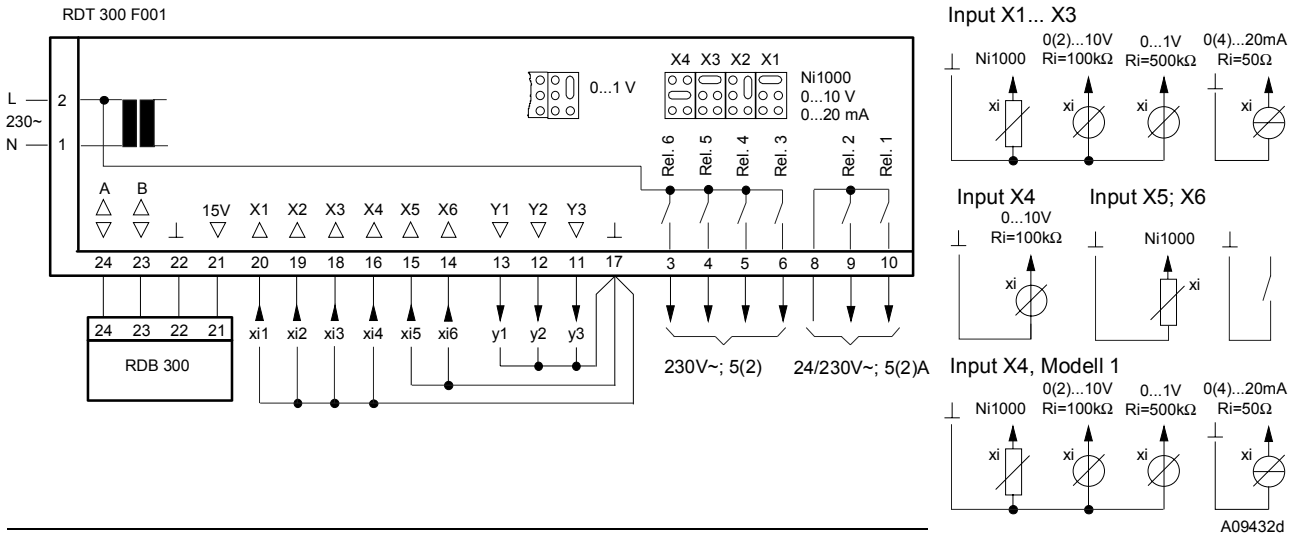
Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Limit value 2 Cooling circulation pump													
L2	Assignment of source	–	S	L	Y2▲							•	•
Ld2	Target relay	Rel. 1...6	S	L	Rel. 4							•	•
L2	Limit value	see Xs	A/H	L	5.0 %							•	•
HL2	Hysteresis	see Xs	S	L	4.0 %							•	•
Lv2	Delay time	0...9999 s	A/H	L	0 s							•	•
LN2	Follow-up time	0...9999 s	A/H	L	180 s							•	•
Limit value 3													
L3	Assignment of source	–	S	L	∩Xi3▼		c/o			c/o			
Ld3	Target relay	Rel. 1...6	S	L	Rel. 6		•			•			
L3	Limit value	see Xs	A/H	L	22.0 °C		•			•			
HL3	Hysteresis	–	S	L	1.0 °C		•			•			
Lv3	Delay time	–	A/H	L	2 s		•			•			
LN3	Follow-up time	–	A/H	L	0 s		•			•			
Limit value 4													
L4	Assignment of source	–	S	L	Off								
Ld4	Target relay	Rel. 1...6	S	L	Off								
L4	Limit value	see Xs	A/H	L	0.0 °C								
HL4	Hysteresis	see Xs	S	L	0.0 °C								
Lv4	Delay time	0...9999 s	A/H	L	0 s								
LN4	Follow-up time	0...9999 s	A/H	L	0 s								

Code			Parameter	Range	Level	Operating key	Default value	Value set	Model						
									0	1	2	3	4	5	6
Change-over															
MCO	=1	=2	Change-over criterion	1 – based on outdoor temp. 2 - based on outdoor temp., limit value and time criterion	S	SERV	1		•			•		•	•
c-O	x	x	Assignment of source	–	S	L	∩Xi3▲		•			•		•	•
c-Od1	x	x	Target relay 1	–	S	L	Rel. 1		•			•		•	•
c-Od2	x	x	Target relay 2	–	S	L	Rel. 5		•			•		•	•
c-Od3		x	Target relay 3	–	S	L	OFF		•			•		•	•
HYCo	x		Hysteresis	–	S	L	1.0 °C		•			•		•	•
Co	x		Switching point	–	A/H	L	23 °C		•			•		•	•
Cov	x		Delay time	–	A/H	L	2 s		•			•		•	•
Con	x		Follow-up time	–	A/H	L	0 s		•			•		•	•
FH		x	Release value: heating	–	H	PAR	22 °C		•			•		•	•
HK		x	Hysteresis: cooling change-over	–	H	PAR	1 °C		•			•		•	•
MT		x	Minimum operating time	0...9 days	H	PAR	3		•			•		•	•
CT		x	Interrogation time	00:00...23:59	H	PAR	02:00		•			•		•	•
nXi5		x	Average value over 15 min	–	A/H	Xi	–		•			•		•	•
∆xi5		x	Slope over 1h, updated every 15 min	–	A/H	Xi	–		•			•		•	•
Output of setpoint change-over, normal/reduced															
nr			Target relay	Off, Rel. 1...6	L	SERV	Rel. 2		•	•	•	•	•	•	•
Activation of alarm output															
ALErt			Target relay	Off, Rel. 1...6	L	SERV	OFF		•	•	•	•	•	•	•

Code	Parameter	Range	Level	Operating key	Default value	Value set	Model						
							0	1	2	3	4	5	6
Floor-drying function													
ETF	Activate	On/Off	S	SERV	Off		•	•	•	•	•	•	•
ST	Start temperature	10.0...40.0 °C	H	PAR	15.0 °C		•	•	•	•	•	•	•
End	Final temperature (switch off)	25.0...60.0 °C	H	PAR	25.0 °C		•	•	•	•	•	•	•
Er	Temperature increase per day	0.0...10.0 °C	H	PAR	5.0 °C		•	•	•	•	•	•	•
Clock functions													
Xs_ - - -:- -	Setpoint change-over for contr. 1	Xs1/2 + Day of week + time	H	PRO	Xs1 0 06:00 Xs2 0 22:00		•	•	•	•	•	•	•
Xs_ - - -:- -	Setpoint change-over for contr.2	Xs3/4 + Day of week + time	H	PRO	Xs3 0 06:00 Xs4 0 22:00		•	•	•	•	•	•	•
tod	Target relay	–	S	L	OFF		•	•	•	•	•	•	•
date	Day + month	–	A/H	SET/ ⊘			•	•	•	•	•	•	•
Yea	Year	–	A/H	SET/ ⊘			•	•	•	•	•	•	•
So	Change-over month: wintertime to summertime	1...12 (month)	A/H	SET/ ⊘	3		•	•	•	•	•	•	•
Wi	Change-over month: summertime to wintertime	1...12 (month)	A/H	SET/ ⊘	10		•	•	•	•	•	•	•
	Day of week + time	–	A/H	⊘			•	•	•	•	•	•	•
Adj	Correct running accuracy	-199...199s/month	S	⊘	–		•	•	•	•	•	•	•

Appendix

Wiring diagram



Key

X1	Supply temperatures, heating	X6	Floor temperature
X2	Supply temperatures, cooling	Y1	Heating or heating/cooling
X3	Outside temperature	Y2	Cooling
X4	Relative humidity or universal input	Y3	E.g. measuring amplifier
X5	Temperature for calculating the dew point		