Lindab **Control equipment**

Regula Combi 1.5

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Regula Combi 1.5

Overview

Use

Customized control equipment for water and airborne climate systems with individual regulation.

Regula Combi can control heating and cooling in sequence, VAV in combination with heating and cooling, Change-Over systems, as well as communicate with Modbus/EXOline/Bacnet Master systems.

Regula Connect Basic, Multi and Pascal are connection cards for the flexible connection of facade systems and chilled beams. For further informations on the Regula connect Pascal, please see the Lindab Pascal documents.

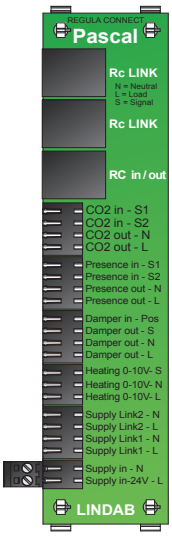
Regula Secura is a condensation guard for installation in façade systems and chilled beams, which prevents condensation forming.

Regula Combi is available for installation on the wall. Regula Combi can be integrated in a chilled beam directly also. Regula Secura and the Regula Connect cards are integrated in or on our products.

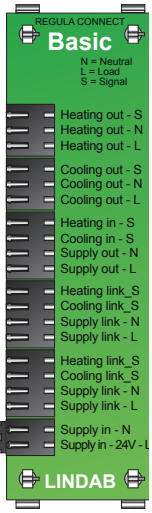
Worth noting

- Regula Combi is a microprocessor-based PI controller with pulsing ON/OFF signal.
- Regula Combi can control with ON/OFF and/or 0-10 V signal.
- Regula Combi can control chilled beams in combination with VAV devices.
- Regula Combi has 8 pre-defined operating programs.
- Regula Combi is provided with 4 inputs and 3 outputs.
- Regula Combi communicates via Modbus, EXOline or Bacnet.
- Regula Secura prevents condensation.

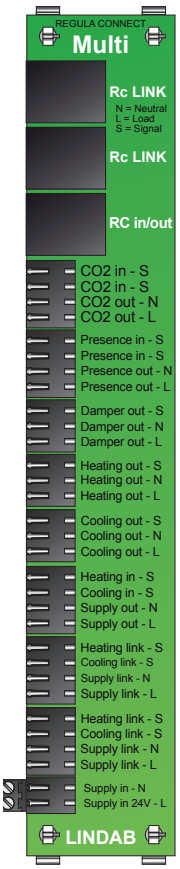
Regula Combi



Regula Connect Pascal



Regula Connect Basic



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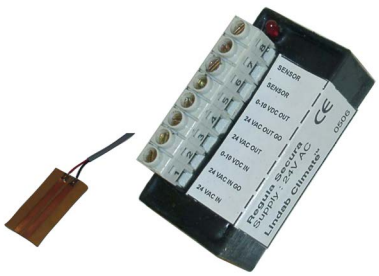

Regula Secura

Regula Combi 1.5

Description

Regula Combi is a zone controller for integrated installation in products or directly on the wall. Regula Combi has a built-in temperature sensor and can use input from presence sensor, CO2 sensor, condensation detector and an external temperature sensor (for Change Over systems).

For thermal on/off actuators Regula Combi controls digitally with time proportional pulses. By pulsing, the opening degree of the actuator (and its valve) is varied. The period time (60s) is the sum of the on and off output times on the output.

The controller varies the on and off output times proportionally depending on the output signal demand to the actuator. Alternatively 0-10V output can be chosen. A maximum of 10 actuators can be connected to the same controller. Through its three outputs, Regula Combi can control only heating and/or cooling, as well as heating, cooling and forced cooling in sequence. The controller has four inputs. One for presence sensor, one for CO2 (0-10V), one for condensation detector and one for an external temperature sensor (PT1000).

Regula Combi has 8 predefined programs which can be selected in the Service menu in the display.

The temperature setpoint value can be adjusted up and down from the basic set point values via the display (default +/-3°C) in steps of 0.5 °C. On cooling demand it will control according to the cooling set point, and on heating demand it will control according to the heating set point. The set point change takes place halfway between the set points with a hysteresis of 0.1°C.

Regula Combi can also be set to operate Change Over systems, where the change over happens either via a digital signal or via an external temperature sensor in the heating/cooling media.

The display has indications for heating/cooling state, actual temperature and set point temperature when pressing increase/decrease buttons, and icons for the operating modes.

Regula Secura

Function

Regula Secura is a condensation guard for both chilled beams and facade systems, which works together with electronic control systems such as Regula Combi or any other equipment with thermoelectric actuators. If there is condensation on the supply pipe, Regula Secura's humidity sensor gives a signal that cuts the power to the cooling.

Regula Connect Basic, Multi and Pascal

Function

Regula Connect Basic and Multi are two connection cards that provides flexible connection for chilled beams or facade systems. Regula Connect Basic and Multi consists of a connection card with connectors for main cables, thermostat cables and terminal blocks for actuator cables. Regula Connect Multi also offer connectors for CO2 and presence sensors plus a damper output for air flow regulation.

For further informations on the Regula connect Pascal, please see the Lindab Pascal documents.

Program descriptions

1. Water

The regulation of temperature takes place in sequences with heating, cooling and forced (cooling) ventilation by signals from the universal outputs UO1 (heating), UO2 (cooling). The proportional part of the temperature regulation is shown diagram 1. Set points are adjustable.

The universal outputs for UO1 and UO2 are default set to thermal on/off actuators. Heating and cooling actuators (UO1 and UO2) are exercised every 23 h.

The universal output UO3 (forced cooling ventilation) will be activated with 100% signal by pressing the Occupancy button (Bypass operating mode).

Bypass will also occur if:

- The UO2 cooling has reached 100% (this can be deactivated by changing P76).

- Connecting a CO2 sensor to AI2 and configuring it (P81=5), which will activate Bypass if CO2 level is more than the set level in P97 (default 800 ppm).

Operating mode Standby occurs after 30 min (adjustable) if a presence sensor is connected and signal is given, then the temperature will be regulated against standby temperature setpoints, 20°C and 24°C (both adjustable).

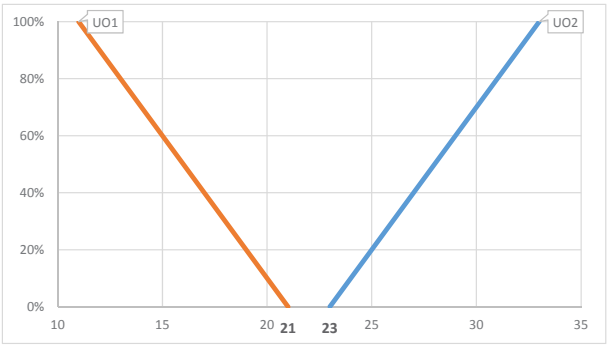

Diagram 1.

Water program variants

a) Water Heating/Cooling and separate VAV forced Cooling

Parameter changes: P11 to value 8 = Heating/Cooling/VAV.

UO3 is default 0-10V but with Min flow at Y3 output P48 = 20%, so the signal is 2…10V.

If UO3 ascends to 100% signal, Bypass operating mode will be activated for 45 min (adjustable). Bypass can also be activated by pressing the Occupancy button once. Off

Regula Combi 1.5

mode will result in 0% signal and thus closing the damper.

If connecting a CO2 sensor (CTRT2 or another 0-10V modulating Co2 sensor) then activate the analogue input AI2 by changing P81 to value 5 = CO2-sensor.

UO3 will be affected according to the CO2 sequence. CO2 levels are set with P112 and P113. The major requirement from the second part of the cooling sequence and the CO2 sequence will control the UO3 signal.

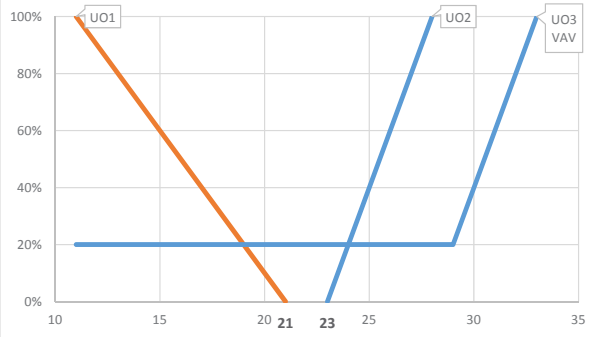

Diagram 1a.

b) Water Heating/Cooling and separate on/off damper

Parameter changes: P22 to value 1=Forced vent. Digital, P45 to value 3=Occupied and P77 to 4=Bypass.

By connecting a relay sensor (presence, switch or CO2RT-R) to digital input DI1, Regula Combi will switch between Occupied and Bypass. (For CO2RT-R CO2 levels are set in the sensor). At Bypass UO3 will open the on/off damper with 24V AC. (Note that Neutral and Load on the on/off damper must be switched). Bypass can also be activated by pressing the Occupancy button once.

c) Water Heating/Cooling with VAV as first Cooling sequence

Parameter changes: P11 to value 8=Heating/Cooling/VAV, P49 to the desired max UO3 output at heating e.g. 60% and P75 to 1=Y3 activates before Y2.

With a VAV damper mounted on the supply duct to an active chilled beam, it is recommendable to have VAV as the first cooling sequence. The VAV damper could also be on a separate duct.

UO3 is default 0-10V but with Min flow at Y3 output P48=20%, so the signal is 2…10V.

When there is heating on UO1, the VAV output UO3 will follow the UO1 signal to the desired max output at heating, e.g. 60%.

If UO3 ascends to 100% signal, Bypass operating mode will be activated for 45 min (adjustable). Bypass can also be activated by pressing the Occupancy button once. Off mode will result in 0% signal and thus closing the damper.

If connecting a CO2 sensor (e.g. CTRT2) then activate the analogue input AI2 by changing P81 to value 5=CO2-sensor.

UO3 will be affected according to the CO2 sequence. CO2 levels are set with P112 and P113. The major requirement from the second part of the cooling sequence and the CO2 sequence will control the UO3 signal.

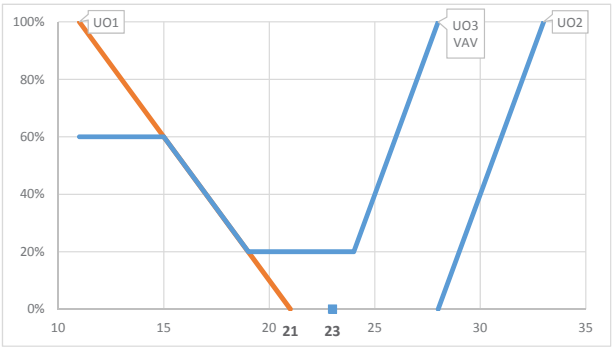

Diagram 1c

2. VAV

The regulation of temperature takes place in sequences with heating and cooling by signals from the universal outputs UO1 (heating) and UO2 (cooling). The proportional part of the temperature regulation is shown in diagram 2. Set points are adjustable.

The universal outputs UO2 and UO3 will be activated with 100% signal by pressing the Occupancy button (Bypass operating mode) for 45 min (can be changed in Parameter 12).

The universal outputs for UO1, UO2 and UO3 are default set to 0-10V. Heating and cooling actuators (UO1 and UO2) are exercised every 23 h.

The min flow at cool output (UO2) is set to 20% (default), so the cooling sequence will result in signals from 20-100%. By pressing the Occupancy button for more than 5 seconds operating mode Off will occur, that will change the UO2 signal to 0% regardless of cooling or heating demands. This match Lindab volume flow regulator functions.

Operating mode Standby occurs after 30 min (adjustable) if a presence sensor is connected and signal is given, then the temperature will be regulated against standby temperature setpoints, 20°C and 24°C (both adjustable).

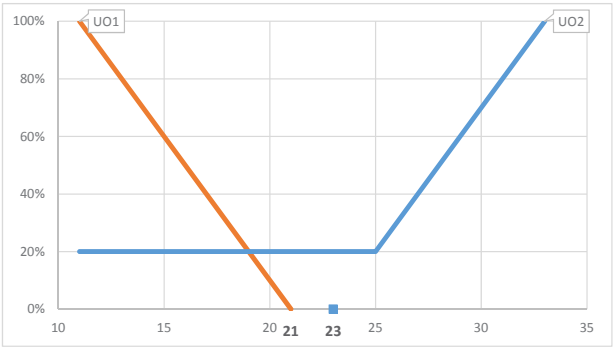

Diagram 2

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VAV program variants
a) VAV with CO2 sensor
Parameter changes: P81 to value 5 = CO2-sensor.

When connecting a CO2 sensor (e.g. CTRT2) activation of the analogue input AI2 is needed.

Both UO2 and UO3 will be affected according to the CO2 sequence. CO2 levels are set with P112 and P113. The major requirement from the cooling sequence and the CO2 sequence will control the UO2 signal.

b) VAV with air duct heating
Parameter changes: P49 to the desired max UO2 output at heating e.g. 60%.

This will activate a heating function for UO2. It will allow UO2 to follow the heating signal UO1 to a free chosen max level (P49) when there is heating demand. This should only be used when having heated air (above room temperature) in the duct by connecting UO1 to a duct heater.

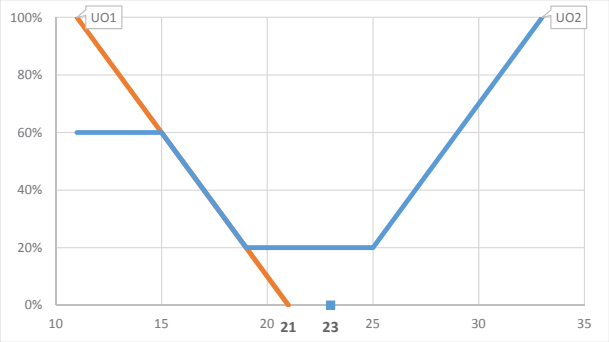

Diagram 2b

c) RCW-1 blade control
Parameter changes: P1 to value 15C, P2 to value 16°C, P7 to value 12°C, P8 to value 0s and P15 to value 1=External sensor
(P2 is used to set the lowest temperature, however P1 must always be set to a value lower than P2).

Regula Combi can control the RCW-1 blade angles when connecting the 2-10V modulating motor to UO2.

A duct sensor (TG-K3/PT1000 or TG-KH/PT1000) must be mounted in the supply duct and connected to the analogue input AI1.

The blade angles will then be controlled according to diagram 2c.

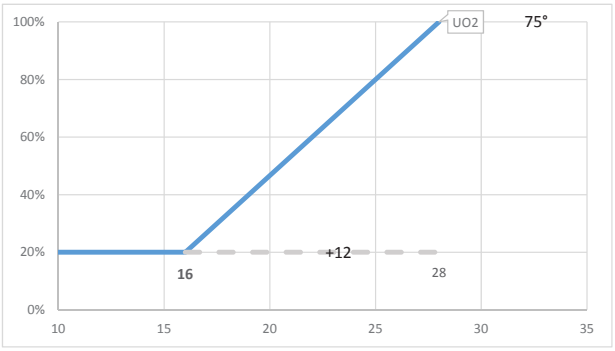

Diagram 2c

3. eHybrid
The regulation of temperature takes place in sequences with heating and cooling by signals from the universal outputs UO1 (heating) and UO2 (cooling). The sequence of UO3 is depending on whether there is occupancy or not. At operating mode Occupied UO3 = 100%. At Standby UO3 is following the cooling signal UO2 and the heating signal UO1 to a changeable max limit (default is 60%, so as default the UO3 damper will stay half open at full heating demand). See the proportional part of the temperature regulation sequences in the diagrams. Set points are adjustable.

The universal outputs for UO1 and UO2 are default set to thermal on/off actuators. UO3 is default set to 0-10V. Heating and cooling actuators (UO1 and UO2) are exer¬cised every 23 h.

Operating mode Standby occurs after 20 min (adjustable) if a presence sensor is connected and signal is given, then the temperature will be regulated against standby temperature setpoints, 20°C and 24°C (both adjustable).

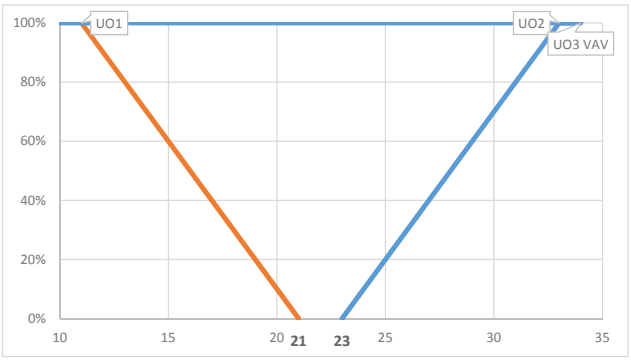

Diagram 3 (Occupied)

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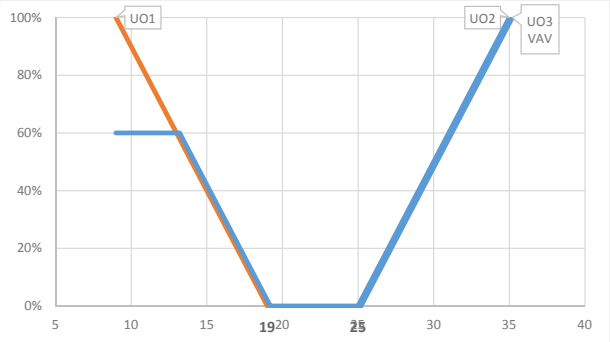

Diagram 3 (Standby)

4. Change Over digital

Change-over is a function, which makes it possible to use the same pipe/duct for both heating and cooling, depending on requirements during for example summer (cooling output) and winter (heating output).

Sequences for temperature, CO2 and occupancy functions are as Program 1 Water, though universal outputs for UO1, UO2 and UO3 are default set to 0-10V.

UO1 and UO2 will act alike with same output level.

At Bypass mode, only UO3 will go to 100% output signal.

When using the digital signal input DI2 (potential-free contact), closing the contact switches the change-over function and sets the output UO1 to cooling sequence. On open contact, the change-over function sets the output UO1 to heating.

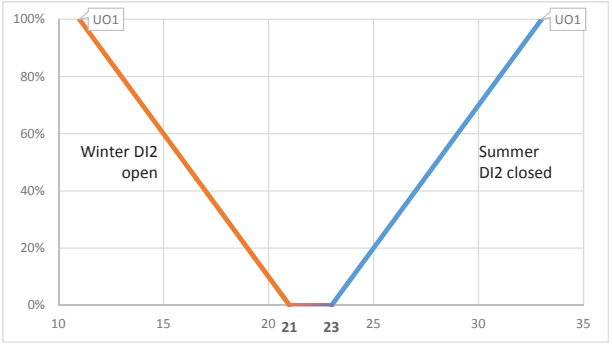

Diagram 4

5. Change Over sensor

Change-over is a function, which makes it possible to use the same pipe/duct for both heating and cooling, depending on requirements during for example summer (cooling output) and winter (heating output).

Sequences for temperature, CO2 and occupancy functions are as Program 1 Water, though universal outputs for UO1, UO2 and UO3 are default set to 0-10V.

UO1 and UO2 will act alike with same output level.

At Bypass mode, only UO3 will go to 100% output signal.

A sensor (PT1000) must be connected to the analogue input AI1.

The Pt1000-sensor connected to AI1 must be mounted so that it senses the temperature in/on the heating/cooling media.

The change-over function will measure the difference between the room and media temperature. As long as the heat valve is more than 20 % open, or every time a valve exercise is performed, the difference between the media and room temperature will be calculated. If the temperature difference is lower than the configured value (differs for Heating and Cooling mode), the control mode will change. The default settings for the difference between Heating and Cooling change-over are 3K (P9) and 4K (P10) respectively.

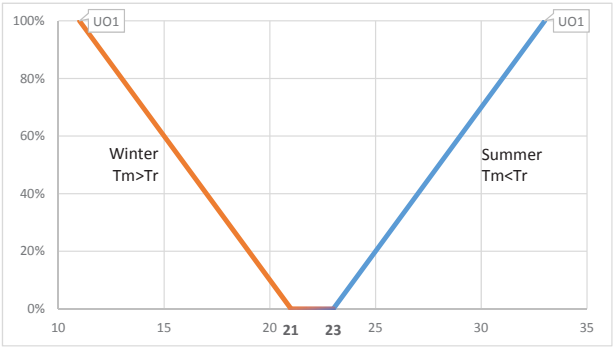

Diagram 5

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6. Pascal VAV Supply (SRC)
The regulation of temperature takes place in sequences with heating and cooling by signals from the universal outputs UO1 (heating) and UO2 (cooling), and the volume flow regulator (MBBV or VRU) must be connected to the cooling output.

Heating output UO1 is exercised every 23 h (P36). Cooling output UO2 is exercised every 23 h (P37) for 30 s, i.e. opening (10 V) for 15 s and closing (2,5 V) for 15 s (P34).

For easy commissioning all air flow settings for ventilation in the room are set in Regula Combi (and not in the volume flow regulator). The cooling part of the temperature sequence will then result in variable output signals, which depend on four different air flow settings:

Minimum air flow at presence/occupied (*AirflowMinOcc*)

Maximum air flow at presence/occupied (*AirflowMaxOcc)*

Standby air flow (AirflowStandby) when there is no presence, and a size dependable air flow (*AirflowNominal*). Normally *AirflowNominal* should not be changed manually.

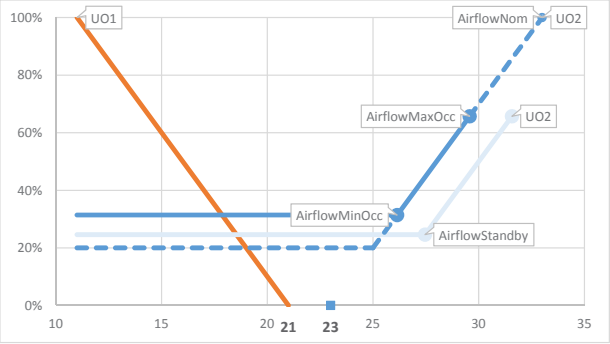

Diagram 6

A CO2 sensor with modulating 0-10V output (e.g. CTRT2(D) or CTDT2) can be used in Pascal together with Regula Pulse, if actual CO2 values are to be registered in a top level system via Regula Combi (SRC).

CTRT2 must be connected to Regula Combi via Regula Pulse, which transforms the 0-10V signal into digital pulses read by DI2 in Regula Combi (through Regula Connect Pascal).

Alternatively an external CO2 sensor with relay (CO2RT-R) or any other kind of sensor with potential free relay output can be connected at DI2 and C+. When the limit for CO2 level is exceeded, and the relay connects DI2 with C+ the UO2 (cooling) signal will increase successively (by 0.5V, 5%, for every minute) until the CO2 level is beneath the lower limit with hysteresis. When it reaches this level the UO2 will decrease successively (by 0.5V, 5%, for every minute) until the output UO2 is controlled by temperature again.

Damper position is registered in Regula Combi as a 2-10V (DC) signal through AI2, and via EXOline it is used in Regula Master for fan optimization.

Also the air flow set point from Regula Combi is collected in Regula Master (via EXOline) and is used for exhaust regulation.

In program 6 the modes Off, Unoccupied, Standby, Occupied and Bypass are used. The preset operating mode can be set to Standby or Occupied (default Occupied).

Off can be reached by pressing the occupancy button for more than 5 sec. This will close the volume flow regulator damper (with 0 V).

In mode Unoccupied Regula Combi will use the setpoints Heating setpoint at Unoccupied (default 15°C) and cooling setpoint at Unoccupied (default 30°C). Any setpoint displacement is not active in Unoccupied mode. So if the actual temperature is lower than cooling setpoint at Unoccupied (default 30°C) AirflowMinOcc is transmitted from the cooling output.

By connecting a presence detector to Regula Combi at DI1 and C+, Standby will occur if there is no presence in the room. Requirement for Standby function is that the preset operating mode must be set to Standby and DI1 to Normally Open (P60=0). When Standby is active a signal corresponding to the airflow setting AirflowStandby will be transmitted from the cooling output, however if the room temperature exceeds the standby cooling setpoint set in P306 (default 24°C) + setpoint displacement + Neutral zone at Standby (default 2°), the cooling output will vary between AirflowStandby and AirflowMaxOcc.

If no presence detector is connected or if the presence detector indicates presence, mode Occupied will occur. In Occupied mode cooling output will vary between AirflowMinOcc and AirflowMaxOcc.

Bypass can be reached by pressing the occupancy button, and a signal corresponding to AirflowMaxOcc will be transmitted from the cooling output UO2.

The mode (state) of a SRC can be changed from Regula Master and by EXOline / Modbus commands via Regula Master.

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All air flows are set in the Service parameter menu (in l/s).

Product	System	Size of damper	Size	Airflow Standby MBBV (0,4m/s; 2,46V) VRU (0,7m/s; 2,80V)	Airflow MinOcc (1m/s; 3,14V)	Airflow MaxOcc (4m/s; 6,57V)	Airflow Nominal (7m/s,10V)
Other	Supply / Exhaust	0	Unknown	0,01	0,01	0,01	0,01
MBBV-S-125	Supply	3	125	5	12	49	86
MBBV-S-160	Supply	4	160	8	20	80	141
MBBV-S-200	Supply	5	200	13	31	126	220
MBBV-S-250	Supply	6	250	20	49	196	344
MBBV-S-315	Supply	7	315	31	78	312	546
VRU-100	Supply / Exhaust	22	100	5	8	31	55
VRU-125	Supply / Exhaust	23	125	9	12	49	86
VRU-160	Supply / Exhaust	24	160	14	20	80	141
VRU-200	Supply / Exhaust	25	200	22	31	126	220
VRU-250	Supply / Exhaust	26	250	34	49	196	344
VRU-315	Supply / Exhaust	27	315	55	78	312	546
VRU-400	Supply / Exhaust	28	400	88	126	503	880
VRU-500	Supply / Exhaust	29	500	137	196	785	1374
VRU-630	Supply / Exhaust	30	630	218	312	1247	2182

Table 1: Default values for Airflows. Note! Flow per MBBV/VRU.

Note: *If more than one volume flow regulator is controlled by the same Regula Combi, the size of the volume flow regulators must be the same. Every volume flow regulator size has predefined default values for AirflowNominal, AirflowMaxOcc, AirflowMinOcc and AirflowStandby. These values can of course be changed, but are reset to default values if the parameter for size is changed.*

Pascal VAV supply program variants
a) Pascal VAV supply and CO2 Pulse sensor
Parameter changes: P18 to value 6 = CO2 Pulse sensor.

If actual CO2 values are to be registered in a top level system then a Regula Pulse together with the modulating CO2 sensor (e.g. CTRT2, CTRT2D or CTDT2) has to be connected to Regula Combi via Regula Connect Pascal. More Regula Pulse sensors must not be parallel connected with linked Regula Connect Pascal cards.

Actual CO2 values will be registered in steps of 5 ppm.

b) Pascal VAV supply with air duct heating
Parameter changes: P49 to the desired max UO2 output at heating e.g. 60%.

This will activate a heating function for UO2. It will allow UO2 to follow the heating signal UO1 to a free chosen max level (P49) when there is heating demand. The set percentage will correspond to the set AirflowMinOcc (0%) and AirflowMaxOcc (100%). This should only be used when having heated air (above room temperature) in the duct by connecting UO1 to a duct heater. When the heating function on UO2 is activated, forced cooling ventilation (Bypass) by pressing the Occupancy button will lead to AirflowMaxOcc on UO2.

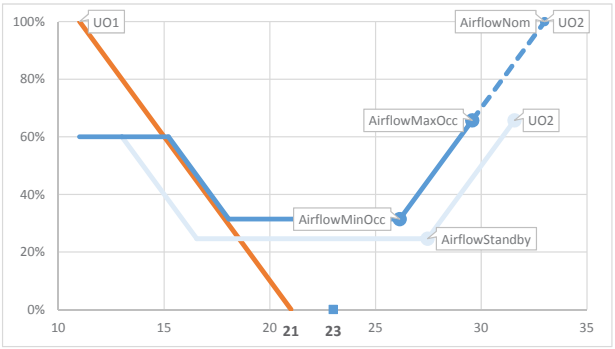

Diagram 6b

c) Pascal VAV supply with Change Over digital
Parameter changes: P18 to value 4 = Change-over sensor. (This will automatically also change P11 to value 2 = Heating or Cooling via change-over).

Then it is possible to use Pascal for a change over system, where the same duct for both heating and cooling is used, depending on requirements during for example summer (Cooling) and winter (Heating).

When using the digital signal input DI2 (potential-free contact), closing the contact switches the change-over

function and sets the output UO2 to Heating sequence. On open contact, the change-over function sets the output UO1 to Cooling. Sequences are shown in the diagram.

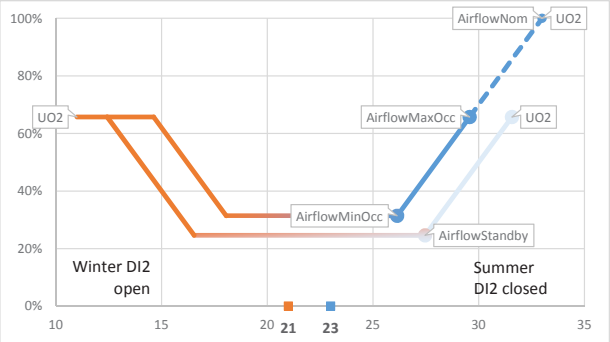

Diagram 6c

d) Pascal VAV supply with Change Over sensor
Parameter changes: P15 to value 2 = Change-over sensor.

Then it is possible to use Pascal for a change over system, where the same duct for both heating and cooling is used, depending on requirements during for example summer (Cooling) and winter (Heating).

A duct sensor (e.g. TG-K3/PT1000 or TG-KH/PT1000) must be mounted in the supply duct and connected to the analogue input AI1. The sensor must be able to sense the supply temperature in the duct.

The change-over function will measure the difference between the room and supply temperature. As long as the damper is more than 20 % open, or every time an exercise is performed, the difference between the supply temperature and room temperature will be calculated. If the temperature difference is lower than the configured value (differs for Heating and Cooling mode), the control mode will change. The default settings for the difference between Heating and Cooling change-over are 3K (P9) and 4K (P10) respectively.

Sequences are shown in the diagram.

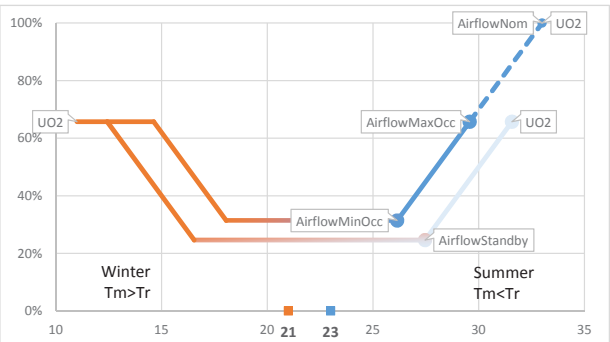

Diagram 6d

7. Pascal VAV exhaust (ERC)
The Pascal VAV exhaust program is quite simple, since there is no regulation of room temperature. This program simply collects the exhaust air flow value sent by Regula Master via EXOline and translates it to a corresponding 2-10V air flow control signal for the exhaust volume flow regulator at UO2.

In program 7 there is no temperature regulation.

The controller serves as a translator for the exhaust flow signal that is send from Regula Master (via EXOline). The exhaust flow signal is converted and transmitted to the cooling output depending on number of dampers (P138) and the chosen volume flow regulator size (P139). Every volume flow regulator size has predefined default values for AirflowNominal (P143). This value can be changed, but is reset to default value if the parameter for size is changed.

The exhaust damper position is registered (via EXOline) and used in Regula Master for fan optimization.

8. Pascal VAV water (SRC)
The Pascal VAV water program is identical with program 6 but with the cooling sequence split in two, with the first half (UO2) for VAV and the second half (UO3) for cooling actuator. The program is designed to make it possible to combine Pascal VAV functionality with an active chilled beam, and making sure that there will be full (max) air flow on the active chilled beam before the cooling water is active.

The cooling actuator for the chilled beam on UO3 is 0-10V as default.

The proportional part of the temperature regulation is shown in diagram 8.

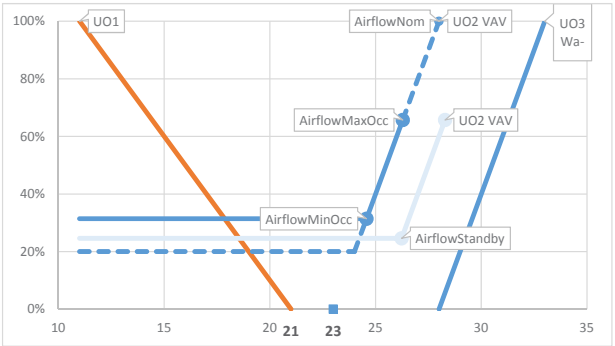

Diagram 8

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Pascal VAV water program variants
a) Pascal VAV water with heating actuators in beam

If there is heating in the (chilled) beam, it can be necessary to increase the air flow to the beam at heating need.

Parameter changes: P49 to the desired max UO2 output at heating e.g. 60%.

This will activate a heating function for UO2. It will allow UO2 to follow the heating signal UO1 to a free chosen max level (P49) when there is heating demand. The set percentage will correspond to the set AirflowMinOcc (0%) and AirflowMaxOcc (100%).

This function should only be used when having heating coil in the active chilled beam and connecting UO1 to the heating actuator.

When the heating function on UO2 is activated, forced cooling ventilation (Bypass) by pressing the Occupancy button will lead to AirflowMaxOcc on UO2.

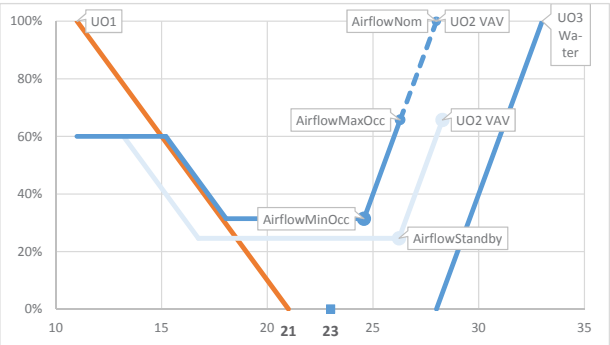

Diagram 8b

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Operating modes

Regula Combi is based on Regin Regio Midi RC-CDOC which has five different operating modes: Off, Unoccupied, Standby, Occupied and Bypass.

Operating mode Off
Operating mode off means that the controller is not heating or cooling. However, the temperature must not drop below a set minimum temperature (8°C). If it does, the controller will start heating. In the display the background lighting is not lit, and only OFF is shown in the display. (Off can be reached by pressing the Occupancy button for more than 5 seconds.)

Operating mode Unoccupied
Operating mode Unoccupied means that the room where the controller is placed is not used for an extended period of time, for example during holidays or long weekends. Both heating and cooling are deactivated within a temperature interval with configurable min/max temperatures (default min = 15°C, max = 30°C). In the display the background lighting is not lit, but the current room temperature (or setpoint depending on the configuration) is shown in the display. OFF is also shown in the display.

Operating mode Standby
Operating mode Standby means that the room is in energy save mode. The controller is prepared to change operating mode to Occupied (comfort) if someone enters the room (presence). As default the room temperature is controlled around the standby heating and cooling set points (default 20°C and 24°C, P305 and P306). Alternatively by changing P304, the room temperature will be controlled around the basic temperature setpoints (default 21°C and 23°C, P1 and P2) with an extended temperature interval (default +/-2°C, P3). In the display the background lighting is lit (dimmed). STANDBY and the current room temperature (or set point depending on the configuration) are shown in the display.

In programs (1-5) with Standby as default the digital input DI1 for presence sensor is set default to NC (normally closed) in Regula Combi, so the controller will immediately change to Occupied if no presence sensor is connected or if the presence sensor indicates occupancy.

Operating mode Occupied
Operating mode Occupied means that the room is in use and is therefore in a comfort mode. The controller regulates the room temperature around the heating set point (default 21°C) and the cooling setpoint (default 23°C). The set points can be adjusted +/- 3°C locally with the increase/decrease buttons. In the display the background lighting is lit (dimmed), and the occupancy indication is shown (see Display handling and indications). The current room temperature (or set point depending on the configuration) is also shown in the display.

Operating mode Bypass
Operating mode Bypass means that the controller controls the room temperature in the same way as in operating mode Occupied, but the output for forced ventilation is active with full signal (100%). After a configurable time (default 45 min) in Bypass, the controller automatically returns to the preset operating mode. Bypass is activated when the Occupancy button is pressed once (for less than 5 sec), or if 100% cooling signal is needed (because of too high room temperature or CO2 level). The operating mode is useful for example in conferencerooms, where many people are present at the same time for a certain period of time. In the display the background lighting is lit (dimmed). The occupancy indication and the symbol for forced ventilation are shown (see Display handling and indications).The current room temperature (or setpoint depending on the configuration) is shown in the display.

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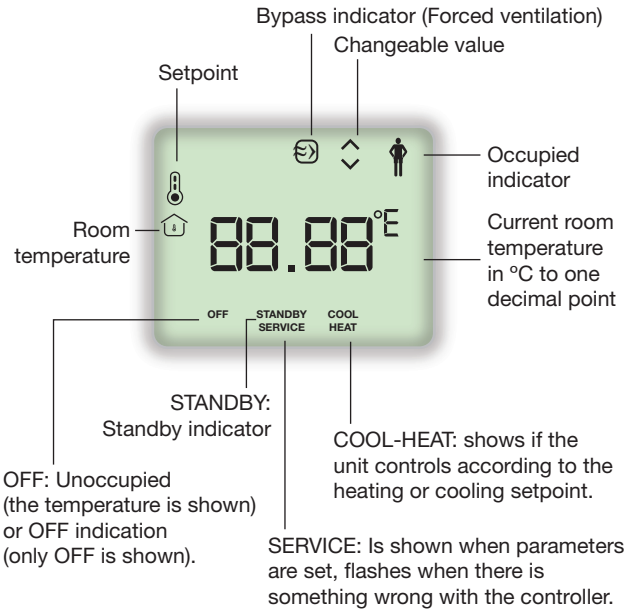
Display handling and indications

Regula Combi has an Occupancy button, as well as an INCREASE button and a DECREASE button to increase and decrease the set point.

Example:
The control setpoint is 22°C and the added displacement is +1.5°C. This means that the value 23.5°C will be shown in the display. ”HEAT” or ”COOL” will flash depending on which of the setpoint values is the control setpoint when you enter the set point menu, i.e. depending on which set point you are changing. The displacement is added to both the heating and cooling set point.



There are numerous possibilities of what to be shown in the display (with parameter 42), also at setpoint adjustment (with parameter 74).

User limitations of the buttons can be set with parameter 43, 44, 108 and 109.
Note: changing parameter 109 will block re-entry of parameter menu via display. Parameter access will then only be possible using Regio Tool.

Parameter menu

It is possible to set different parameter values in the parameter menu. The parameter menu is accessed by simultaneously holding the INCREASE and DECREASE buttons depressed for about 5 seconds and then pressing the INCREASE button twice. The Service indication will be displayed. First the display will show the parameter number 0 (which chooses program). Scroll between parameters by using the INCREASE and DECREASE buttons. Press the Occupancy button to select the desired parameter. The parameter number will be replaced by the parameter value. The value can be changed using the INCREASE and DECREASE buttons. If a button is held depressed the value will start scrolling, first slowly and then with increasing speed in 3 – 4 steps with 2 – 3 seconds between steps.

To retrieve the original value, i.e. the value before change, press the INCREASE and DECREASE buttons at the same time. The original value is shown on the display.

To acknowledge and store a set parameter value, press the Occupancy button again, the display then returns to showing the parameter number.

After a certain time, about 1 minute, or when the INCREASE and DECREASE buttons are pressed at the same time while in the menu, the display returns to the normal view. Exit is shown on the display after the last parameter. The parameter menu is exited by pressing the Occupancy button while in Exit. Pressing INCREASE goes to the first parameter and pressing DECREASE goes to the last parameter. In the Parameter list the numbers of selectable parameters will vary depending on which program is activated. The defaults for all programs are shown in the parameter list. Not all parameters are selectable in all programs.

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Parameterlist

N/A: ”Not Available” or “Not Applicable”
Grey: ”Not Selectable”

Par no	Description	0 FS Regin	1	2	3	4	5	6	7	8
0	Lindab Program	N/A	1	2	3	4	5	6	7	8
1	Basic heating setpoint	22°C	21	21	21	21	21	21	N/A	21
2	Basic cooling setpoint	24°C	22	22	22	22	22	22	N/A	22
3	Neutral zone at standby, Heating setpoint = Basic sp. heating-2 Cooling setpoint = Basic sp. cooling+2. Only active when P310 = 1	3°C	2	2	2	2	2	2	N/A	2
4	Heating setpoint at Unoccupied	15°C	15°C	15°C	15°C	15°C	15°C	15°C	N/A	15°C
5	Cooling setpoint at Unoccupied	30°C	30°C	30°C	30°C	30°C	30°C	30°C	N/A	30°C
6	Frost protection setpoint	8°C	8°C	8°C	8°C	8°C	8°C	8°C	N/A	8°C
7	P-band for room controller	10°C	10	10	10	10	10	10	N/A	10
8	I-time for room controller	300 s	300	300	300	300	300	300	N/A	300
9	The difference between the temperature in the room and the media temperature for change-over to cooling	3K	N/A	N/A	N/A	N/A	3	3	N/A	N/A
10	The difference between the temperature in the room and the media temperature for change-over to heating	4K	N/A	N/A	N/A	N/A	4	4	N/A	N/A
11	Control mode: 0=Heating 1= Heating / Heating 2= Heating or Cooling via change-over 3= Heating / Cooling 4= Heating / Cooling with VAV-control and forced ventilation 5= Heating / Cooling with VAV-control 6= Cooling 7= Cooling / Cooling 8= Heating / Cooling/VAV 9=Heating / Heating or Cooling via change-over (only available on models with fan control)	3	3	4	21	2	2	4	N/A	8
12	Time in Bypass mode	120 min	45	45	45	45	45	45	N/A	45
13	Disconnect timer with Occupancy/Unoccupancy	10 min	30	30	20	30	30	30	N/A	30
14	Switch-on delay for Occupancy	0 min	0	0	0	0	0	0	N/A	0
15	State connected sensor on AI1: 0=Internal sensor 1=External room sensor 2=Change-over sensor	0	0	0	0	0	2	0	N/A	0
16	State connected sensor on UI1: (All models except RC-C3DOC/C3DFOC) 0=None 1=Change-over digital 2=Change-over analogue	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	State connected sensor on DI1: 1=Window contact 2= No function 3= Presence detector 4=Change-over sensor	1	3	3	3	3	3	3	N/A	3
18	State connected sensor on DI2: 1=Window contact 2=Condensation detection 3=No function 4=Change-over sensor 5=Relay sensor (CO2) 6=CO2 Pulse sensor	2	2	2	2	4	2	0	N/A	0
20	State connected function on UO1: 0=None 1=Thermal actuator heat 2= None 3=Heating actuator 0...10 V 4= None 5=On/off actuator heat 6= None	3	1	3	1	3	3	3	N/A	3
21	State connected function on UO2: 0= None 1= None 2=Thermal actuator cool 3= None 4=Cooling actuator 0…10 V 5= None 6=On/off actuator cool	4	2	4	2	1	1	4	N/A	4

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Par no	Description	0 FS Regin	1	2	3	4	5	6	7	8
22	State connected function on UO3: 0= None 1=Forced vent. digital 2=Analogue output (OEM) 3=None 4=Ordinary analogue output 5=None 6=Control of EC fan (RC-C3-models)	1	4	4	4	4	4	4	N/A	4
24	Y3 output in manual mode (only if Y3 is configured as an analogue output	0	0	0	0	0	0	0	N/A	0
28	State output signal range for Y3-actuators: 0=0…10 V 1=2…10 V 2=10…2 V 3=10…0 V	0	0	0	0	0	0	0	N/A	0
29	State output signal range for heating actuators: 0=0…10 V 1=2…10 V 2=10…2 V 3=10…0 V	0	0	0	0	0	0	0	N/A	0
30	State output signal range for cooling actuators: 0=0…10 V 1=2…10 V 2=10…2 V 3=10…0 V	0	0	0	0	0	0	0	N/A	0
31	Period time for heating actuators with thermal actuator	60 s	60	60	60	60	60	60	N/A	60
32	Period time for cooling actuators with thermal actuator	60 s	60	60	60	60	60	60	N/A	60
33	Run time for heating actuators with increase/decrease actuators (used for exercising)	120 s	120	120	120	120	120	120	N/A	120
34	Run time for cooling actuators with increase/decrease actuators (used for exercising)	120 s	120	120	120	120	120	15	N/A	15
35	Neutral zone for increase/decrease actuators	0,02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
36	Time in hours between exercise of heating actuators	23h	23	23	23	23	23	23	N/A	23
37	Time in hours between exercise of cooling actuators	23h	23	23	23	23	3	23	N/A	23
38	Hysteresis for on/off actuators and heating	2K	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
39	Hysteresis for on/off actuators and cooling	2K	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
40	Minimum limit for the heat output	0,2	0	0	0	0	0	0	N/A	0
41	The fan will never stop 0=OFF 1=ON	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
42	Select if setpoint or actual value is to be shown in the display. 0=Actual value 1=Heat setpoint 2=Cool setpoint 3=Average value of heating and cooling setpoint 4=Only setpoint offset 5= CO2 concentration in the room in ppm (RC-C3DOC/C3DFOC) 6=Heating setpoint +setpoint offset 7=cooling setpoint+setpoint offset 8=Average of heating and cooling setpoint+setpoint offset 9=The calculated flow in the duct in l/s (RC-C3DOC/C3DFOC)	0	0	0	0	0	0	0	N/A	0
43	Highest permitted setpoint adjustment upwards	3°C	3	3	3	3	3	3	N/A	3
44	Highest permitted setpoint adjustment downwards	3°C	3	3	3	3	3	3	N/A	3
45	Preset operating mode: 0=Off 1=Unoccupied 2=Stand-by 3=Occupied. Forced ventilation is not set in Occupied mode.	3	2	2	2	2	2	3	N/A	3
46	State operating mode by pressing the occupancy button for 5 s: 0=Off 1=Unoccupied.	1	0	0	0	0	0	0	N/A	0
47	Select operating mode for central control: 0=Off 1=Unoccupied 2=Stand-by 3=Occupied 5=No central control	5	5	5	5	5	5	5	N/A	5
48	Min flow at cool output when control mode Heating/Cooling with VAV-control is selected. Min flow at Y3 output when control mode Heating/Cooling/VAV is selected.	20%	20	20	N/A	N/A	N/A	31*	N/A	31*

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Par no	Description	0 FS Regin	1	2	3	4	5	6	7	8
49	Max flow on Y2 output when control mode Heating / Cooling with VAV-control is selected and in heating mode. Max flow on Y3 output when control mode Heating/Cooling/VAV is selected and in heating mode.	0	0	0	60	N/A	N/A	0	N/A	0
50	Configuration of fan control: 0=No control 1=Fan is controlled by heating demand 2=Fan is controlled by cooling demand 3=Fan is controlled by both heating and cooling demand	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
51	Start signal in % for fan speed 1 on heating or cooling control	0,05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
52	Start signal in % for fan speed 2	0,6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
53	Start signal in % for fan speed 3	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
54	Hysteresis for start/stop of fans	0,05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
55	State number of speeds for the fan (1, 2 or 3)	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
56	Temperature compensation on AI1	0°C	0	0	0	0	0	0	N/A	0
57	Temperature compensation on UI1	0°C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
58	Temperature compensation on internal room sensor	0°C	0	0	0	0	0	0	N/A	0
59	Filter factor for analogue temperature inputs	0,2	0,2	0,2	0,2	0,2	0,2	0,2	N/A	0,2
60	State NO/NC digital input 1: 0=NO (Normally open) 1=NC (Normally closed)	0	1	1	0	1	1	0	N/A	0
61	State NO/NC digital input 2: 0=NO (Normally open) 1=NC (Normally closed)	1	1	1	1	0	1	1	N/A	1
62	State NO/NC universal input 1: 0=NO (Normally open) 1=NC (Normally closed)	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
63	Manual/Auto Heating output: 0=Off 1=Manual 2=Auto	2	2	2	2	2	2	2	N/A	2
64	Manual/Auto cooling output: 0=Off 1=Manual 2=Auto	2	2	2	2	2	2	2	N/A	2
65	Manual/Auto Y3 forced ventilation output: 0=Off 1=Manual 2=Auto For C3 models (except C3DFOC), manual mode means that Y3 puts out what is stated in parameter 24 if Y3 is configured as an analogue output. When Y3 is configured as a Digital output (including for C3 models) or does not exist, this parameter constitutes the Manual/Auto mode for the forced ventilation.	2	2	2	2	2	2	2	N/A	2
66	Manual/Auto control of change over mode: 0=Heat control 1=Cool control 2=Automatic change over depending on analogue sensor input or digital input	2	N/A	N/A	N/A	2	2	2	N/A	N/A
67	Heating output in manual mode	0	0	0	0	0	0	0	N/A	0
68	Cooling output in manual mode	0	0	0	0	0	0	0	N/A	0
69	Controller Modbus address	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	N/A	N/A	N/A
70	Parity but Modbus communication: 0=No parity 1=Odd parity 2=Even parity	2	2	2	2	2	2	N/A	N/A	N/A
71	Modbus time out for character (t1.5), in ms. Should be 1,5 times a character, i.e. at least 2 ms.	3 ms	3	3	3	3	3	N/A	N/A	N/A
72	Answer delay in Modbus (t3.5), in ms. Should be 3,5 times a character, i.e. at least 5 ms.	5 ms	5	5	5	5	5	N/A	N/A	N/A
73	Selection of heating output function (NO/NC): 0=NC (Normally closed) 1=NO (Normally opened)	0	0	0	0	0	0	0	N/A	0

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Par no	Description	0 FS Regin	1	2	3	4	5	6	7	8
74	Setpoint display at setpoint adjustment.: 0=The offset is shown in the display 1=The active setpoint + offset is shown in the display. Heat or Cool is shown depending on whether heat or cool is active when entering the menu 2=Heat setpoint + offset is shown in the display 3=Cooling setpoint + offset is shown in the display	0	1	1	1	1	1	1	N/A	1
75	Sequence order for Y2 and Y3: 0=Y2 activates before Y3 1=Y3 activates before Y2	0	0	0	0	0	0	0	N/A	1
76	Forced ventilation, control function: 0=Not active 1=Forced ventilation at 100% output of heat or cool 2=Forced ventilation at 100% Cool output	0	2	0	0	2	2	0	N/A	0
77	Operating mode at presence detection (DI1): 3=Occupied 4=Bypass	4	3	3	3	3	3	3	N/A	3
78	EXOline PLA-address	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set
79	EXOline ELA-address	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set
80	Selection of cooling output functions (NO/NC): 0=NC 1=NO	0	0	0	0	0	0	0	N/A	0
81	State the connected sensor at AI2: (Only RC-C3DOC/C3DFOC) 0=None 1– 4=No function 5= CO2-sensor 6=No function 7=0…100% (Damper position) 8=Flow calculation 9=0…10 V	5	0	0	0	0	0	7	N/A	7
82	Flow at 0 V input in AI2	0 l/s	0	0	0	0	0	0	N/A	0
83	Flow at 10 V input in AI2	100 l/s	100	100	100	100	100	100	N/A	100
84	Minimum runtime when calculating for change over	600s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
86	Alarm limit for high room temperature	40°C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
87	Alarm limit for low room temperature	15°C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
97	Activate presence (Bypass) if CO2 level is higher than the set value. Only active if P11=3/21.	800 ppm	800	N/A	800	N/A	N/A	N/A	N/A	N/A
98	Deactivate presence (Bypass) if the CO2 level is lower than the limit minus this hysteresis. Only active if P11=3/21.	160 ppm	160	N/A	160	N/A	N/A	N/A	N/A	N/A
100	Filter factor for CO2-input	0.2	0,2	0,2	0,2	0,2	0,2	0,2	N/A	0,2
104	CO2-level at 0 V	0 ppm	0	0	0	0	0	0	N/A	0
105	CO2-level at 10 V	2000 ppm	2000	2000	2000	2000	2000	2000	N/A	2000
108	"Button function configuration: 0 = No button is active 1 = Only Occupancy button active 2 = Only INCREASE/DECREASE buttons active 3 = Occupancy and INCREASE/DECREASE buttons active 4 = Only fan button active 5 = Occupancy and fan buttons active 6 = INCREASE/DECREASE and fan buttons active 7 = All buttons active"	7	7	7	7	7	7	7	N/A	7
109	"Deactivation of parameter menu access via display: 0 = Parameter menu is active in display 1 = Parameter menu is deactivated in display NOTE: Deactivating the parameter menu in display will prevent re-entry! If so, parameter menu access may be activated again using Regio tool©."	0	0	0	0	0	0	0	0	0

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Par no	Description	0 FS Regin	1	2	3	4	5	6	7	8
110	"Activate manual bypass timer setting. When the function is active, the user may step through bypass time in 1 hour increments. 0 = Not active 1 = Active"	0	0	0	0	0	0	0	N/A	0
111	"Controller mode when pressing the On/Off button 3 = Presence 4 = Bypass (forced ventilation)"	4	4	4	4	4	4	4	N/A	4
112	Min limit for VAV-damper at CO2-control	600 ppm	800	800	N/A	800	800	800	N/A	800
113	Max limit for VAV-damper at CO2-control	800 ppm	1000	1000	N/A	1000	1000	1000	N/A	1000
114	This parameter defines the protocol to be used: 0=EXOline/Modbus 1=BACnet MS/TP	0	0	0	0	0	0	N/A	N/A	N/A
115	BACnet MS/TP MAC address: 0-127=master address 128-254=slave address	Fact. set (00-99)	Fact. set (00-99)	Fact. set (00-99)	Fact. set (00-99)	Fact. set (00-99)	Fact. set (00-99)	N/A	N/A	N/A
116	Low 4 figures of the BACnet device ID. 0-9999	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	N/A	N/A	N/A
117	High 3 figures of the device ID.	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	Fact. set	N/A	N/A	N/A
118	BACnet MS/TP Max master.	127	127	127	127	127	127	N/A	N/A	N/A
119	COMbus speed: 0=9600 1=19200 2=38400 3=76800 (only BACnet)	0	0	0	0	0	0	1	1	1
120	COMbus reset. When activated (1) it resets the communication to default settings	0 (deactivated)	0	0	0	0	0	N/A	N/A	N/A
121	Min limit for EC fan (%)	0,1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
122	Max limit for EC fan (%)	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
125	Model	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)
126	Version Major	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)
127	Version Minor	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)
128	Version Branch	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)
129	Revision	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)	Fact. set (read only)
138	Number of dampers	N/A	N/A	N/A	N/A	N/A	N/A	1	1	1
139	Size of damper (default 3= MBB-S-125)	N/A	N/A	N/A	N/A	N/A	N/A	3	3	3

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Par no	Description	0 FS Regin	1	2	3	4	5	6	7	8
140	AirflowStandby (Value changes when P139 size of damper is changed)	N/A	N/A	N/A	N/A	N/A	N/A	5 l/s	N/A	5
141	AirflowMinOcc (Value changes when P139 size of damper is changed)	N/A	N/A	N/A	N/A	N/A	N/A	12 l/s	N/A	12
142	AirflowMaxOcc (Value changes when P139 size of damper is changed)	N/A	N/A	N/A	N/A	N/A	N/A	49 l/s	N/A	49
143	AirflowNominal (Value changes when P139 size of damper is changed) (Should NOT be changed manually)	N/A	N/A	N/A	N/A	N/A	N/A	86 l/s	86	86
300	Pin Switch for UO2 (pin 24) and UO3 (pin 22): 0=No pin switch 1=output signals on pin 24 and pin 22 are switched	N/A	0	0	N/A	N/A	N/A	0	N/A	1
301	Y3 Period time	N/A	60 s	N/A	N/A	N/A	N/A	N/A	N/A	60
302	Y3 Selection of cooling output functions (NO/NC)	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	0
303	CO2 pulse function, Period time	N/A	N/A	N/A	N/A	N/A	N/A	10 s	N/A	10
304	Activate two setpoints in standby mode: 0=Not activated 1=Activated	0	1	1	1	1	1	1	N/A	1
305	Heating setpoint in standby mode. Active when P304=1	20°C	20	20	20	20	20	20	N/A	20
306	Cooling setpoint in standby mode. Active when P304=1	24°C	24	24	24	24	24	24	N/A	24
307	Max limitation % water, cooling sequence	1	100	100	100	100	100	100	N/A	100
308	Max limitation % VAV cooling sequence	1	100	100	100	100	100	N/A	N/A	N/A
309	RH-level at 0 V	0	0	0	0	0	0	0	N/A	0
310	RH-level at 10 V	100%	100%	100%	100%	100%	100%	100%	N/A	100%
311	Min limit for VAV-damper at RH-control	60%	60%	60%	60%	60%	60%	60%	N/A	60%
312	Max limit for VAV-damper at RH-control	80%	80%	80%	80%	80%	80%	80%	N/A	80%

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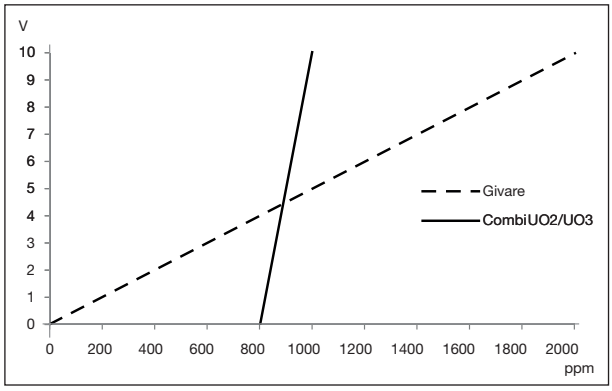
All the Regio Midi parameters (with Regin defaults) can be accessed by selecting the value 0 at parameter 0.

Furthermore all parameters can be accessed and changed via RegioTool or Modbus/EXOline/Bacnet communication.

CO2 Sequence

A CO2 sensor CTRT2(-D) can be used as input for Regula Combi. The signal from the CO2 sensor to the Regula Combi is 0-10 V corresponding to 0-2000 ppm. In the Regula Combi a lower and upper limit of CO2 is set (default 800 and 1000 ppm). These limits will affect the output signal (UO2 or UO3) from Regula Combi. The CO2 limits are adjustable (parameter 112 and 113).

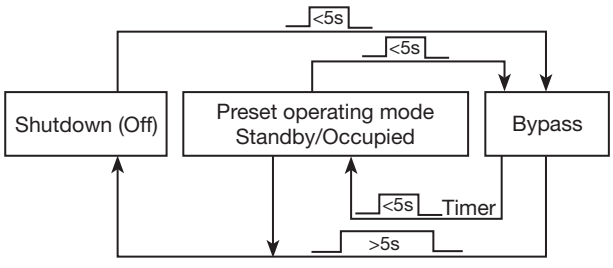
Output signal actuator/signal from CO2 sensor



For programs 1-6, AI2 is used for the CO2 0-10 V modulating sensor. In program 1 the CO2 control of the damper can either be on/off or modulating depending on controller mode (P11).
For programs 6 and 8, the CO2 0-10V modulating sensor has to be connected to Regula Pulse, which then is connected to DI2. (See Pascal documentation for connection of Regula Pulse.)

Occupancy button

When pressing the occupancy button for less than 5 sec, the controller is set to forced ventilation (Bypass). If the button is pressed again when forced ventilation is active, the controller will go to the Preset operating mode (default: Standby/Occupied).



When the Occupancy button is held depressed for more than 5 seconds, the controller changes operating mode to Off, regardless of the current operating mode.

If you press the Occupancy button for less than 5 seconds when the controller is in Off, Standby or Occupiedmode, the controller changes to Bypass mode. If you press the button for less than 5 seconds when the controller is in Bypass mode, it changes operating mode to the Preset operating mode (default: Standby/Occupied).

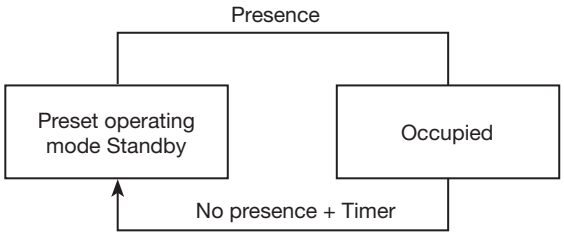
After a configurable time in Bypass (default 45 min), the controller returns to the preset operating mode (default: Standby/Occupied).

Presence detector

For local control of the operating mode between the preset operating mode (Standby) and Occupied, a presencey detector can be connected.

When presence is indicated, the controller changes operating mode to Occupied.

In Occupied, there is a switch-off timer, which means that if there is no presence indication during this time (default 30 min), the controller will return to the preset operating mode (Standby).
The off-delay must be at least 1 minute.



Condensation detector

For programs 1-5 the digital input DI2 is as default configured for condensation sensor.

When condensation is detected, the signal from the room controller to the cooling actuator is blocked.

Lindab recommends using the condensation input only when the Regula Combi unit is integrated into the beam and thereby only one cooling actuator is controlled by the Regula Combi.

If the Regula Combi unit is placed on the wall Lindab recommends using the Regula Secura instead that not involves the special input (CI) on the Regula Combi.

Window contact

If configuring DI1 or DI2 (via parameter 17 or 18) to a window contact, and the window is open, RC will set cooling outputs to minimum and regulate the heating according to the frost protection setpoint set in parameter 6 (default 8C).

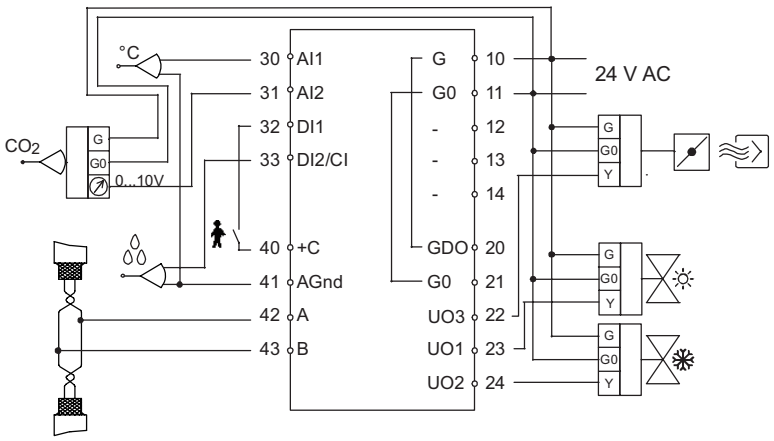
Regula Combi 1.5

Electrical wiring diagram

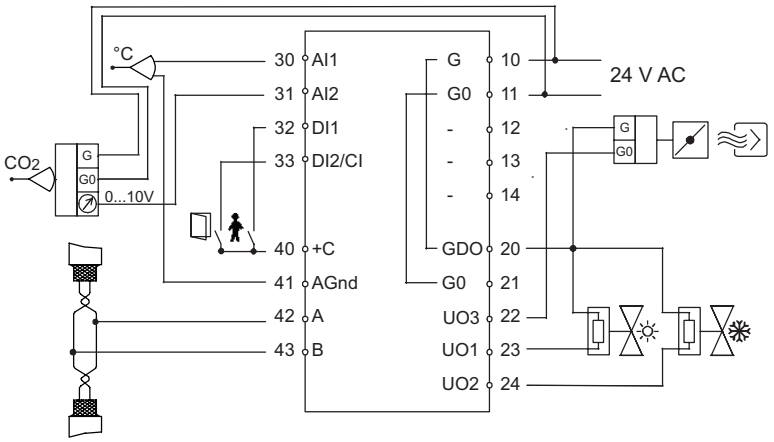
Connection descriptions

The maximum number of actuators that can be connected to the digital output (ON/OFF) is 10 for cooling and heating, respectively. When more than 4 on/off actuators for cooling or heating are connected, terminal blocks 10 and 20 must be connected with a cable because the Regula Combi print card can not handle the output power for more than 4 on/off actuators.

0 -10 V

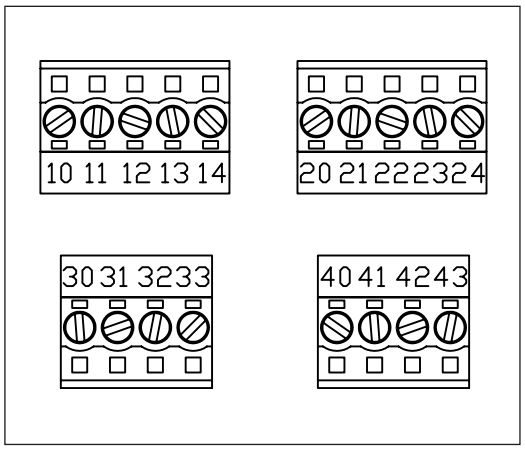


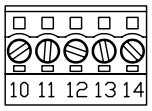
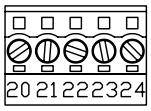
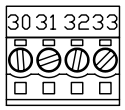
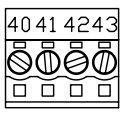
On/Off



Regula Combi 1.5

Connection descriptions



	**10** G Supply voltage 24 V AC **11** G0 Supply voltage 0 V **12-14** No function.
	**20** GDO 24 V AC out common for DO. Internally connected to terminal 10, G. **21** G0 0 V common for UO. Internally connected to terminal 11, G0. **22** UO3 Control output forcing (cooling). For a 0…10 V DC actuator, max 5 mA. The actuator's 0…10 V control signal terminal is connected to terminal 22 and its supply terminals to terminals 20 and 21. Make sure that the reference pole G0 is connected to the correct terminal on the actuator. Alternatively for a 24 V AC thermal actuator, max 2.0 A. The thermal actuator is connected between terminals 22 and 20, GDO. **23** UO1 Control output heating. For a 0…10 V DC actuator, max 5 mA. The actuator's 0…10 V control signal terminal is connected to terminal 23 and its supply terminals to terminals 20 and 21. Make sure that the reference pole G0 is connected to the correct terminal on the actuator. Alternatively for a 24 V AC thermal actuator, max 2.0 A. The thermal actuator is connected between terminals 23 and 20, GDO. **24** UO2 Control output cooling. For a 0…10 V DC actuator, max 5 mA. The actuator's 0…10 V control signal terminal is connected to terminal 24 and its supply terminals to terminals 20 and 21. Make sure that the reference pole G0 is connected to the correct terminal on the actuator. Alternatively for a 24 V AC thermal actuator, max 2.0 A. The thermal actuator is connected between terminals 24 and 20, GDO.
	**30** AI1 For temperature sensor, PT1000. Measuring range 0…50°C. The sensor is connected between terminals 30 and 41, AGnd. **31** AI2 For a 0...10 V CO2 sensor. Alternatively for a 0...10 V Damper position. **32** DI1 Presence sensor. A potential-free contact is connected between terminals 32 and 40, +C. Alternatively for a Window contact. **33** DI2/CI Condensation detector. The sensor is connected between terminals 33 and 41, AGnd. Alternatively for a Change Over indicator, CO2 Relay sensor or CO2 Pulse sensor.
	**40** +C 24 V DC out common for DI **41** AGnd Analogue ground, reference for AI **42** A RS485-communication A **43** B RS485-communication B

Analogue and digital inputs
If changing the setting for an analogue or digital input (AI1, AI2, DI1 or DI2), it is recommended to take the Regula Combi out of its console, making it powerless for a moment.

Regula Combi 1.5

Technical data

Model	Regula Combi
Supply voltage	18…30 V AC, 50…60 Hz
Communication	RS485, EXOline/Modbus/Bacnet. 8 data bits, even parity, 1 or 2 stop bit. 9600, 19200, 38400 bps.
Outputs	3 UO (either AO or pulsating DO) heating, cooling and forcing (cooling)
Inputs	2 AI for Temperature and CO2/Damper position. 2 DI for Presence/Window-contact and Condensation/Change-Over/CO2-relay/CO2-pulse.
Installation	In equipment box or surface mounted.
Analog Output signal	0-10 V, max 5 mA.
Digital Output signal	24 V, max 2.0 A (time proportional pulse output signal) **
Temperature range	5-40 ºC
Temperature setpoint	Heating 21, Cooling 22 ± 3°C ***
Dead zone	1 ºC (set by h/c setpoints)
Power consumption	2.5 VA
Electrical connection	Screw-in plinth
Size, controller	95 × 95 × 31 mm
Casing	Polycarbonate, RAL 9010
Protection class	IP 20
Certification	CE
Ambient temperature	0…50 °C
Storage temperature	-2…70 °C
Ambient humidity	Max 90 % RH
Actuator exercise	Yes. 5 min once every 23 hours
Indication, heating	”Heat” in display
Indication, cooling	”Cool” in display
Adjustment of desired valve	±3 °C (adjustable)

* Max 10 actuators for heating or cooling stages.
** Max 10 actuators for heating or cooling stages. When more than 4 on/off actuators for cooling or heating are connected, terminal blocks 10 and 20 must be connected with a cable.
*** Basic heating setpoint 5…40 °C, Basic cooling setpoint 5…50°C, Setpoint displacement +/-0…10°C

Regula Combi 1.5

Regula Secura

Security against condensation

Lindab has a condensation guard for both chilled beams and facade systems. The condensation guard is called Regula Secura. Since the control exercised by Regula Secura is based on actual condensation, a greater effect is obtained than with conventional humidity control. Conventional humidity control usually measures the mean humidity and sets aside a safety margin for the water temperature, to avoid condensation. With Regula Secura, no margins are required for either the sensor settings or the thermal resistance in the piping.

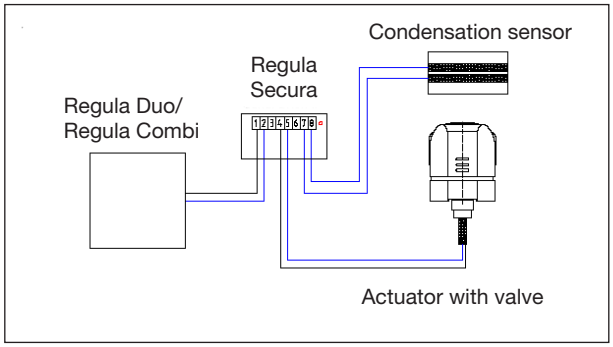
When condensation is formed on the supply pipes, the cooling valve temporarily shuts down the water flow through the affected product. The protection provided by Regula Secura is separate for each individual chilled beam or facade system. This prevents damp damage caused by condensation. The condensation guard continues to regulate the effect even below the dew point, so the performance of the chilled beam or the façade system is kept to the optimum. An example of a control sequence is shown in the diagram below.

The use of Regula Secura on all beams and facade systems increases the protection against condensation for each individual product. This means that only units where condensation forms will be shut down until the condensation dries out, while all other units will continue working. This is particularly beneficial for room environments with variable climatic conditions, or where there is a risk of external moisture entering the room, for example through open windows.

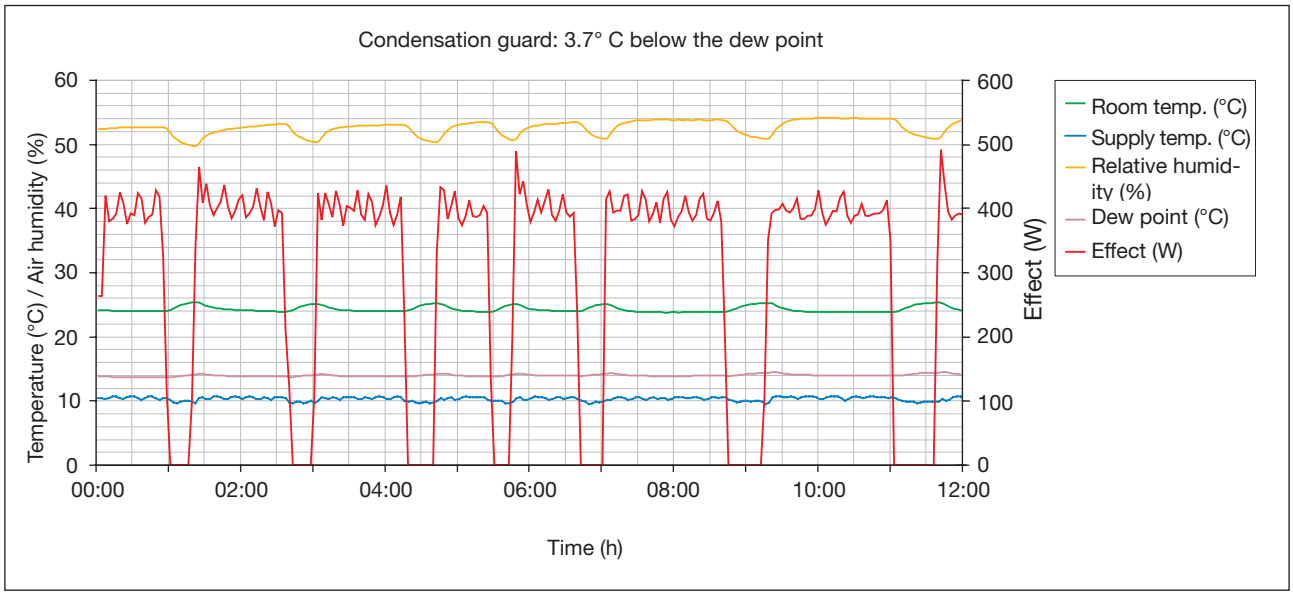
Function

Regula Secura exercises control through the output signal to the actuator and is only active when there is a signal to the actuator to open the valve. When the control signal does not ask for cooling, there is no need to activate Regula Secura. Regula Secura has a sensor mounted on the supply pipe of the beam or the façade system. When the sensor indicates that condensation has formed on the supply pipe, Regula Secura closes the valve until the condensation has dried out.

Regula Secura is compatible with electronic control devices such as Regula Combi or any other equipment with thermoelectric actuators. It is important to note that the valve and the actuator need to be closed in the event of a power cut.



Schematic showing how to connect Regula Secura.



The diagram shows a control sequence where the water temperature is 3.7 °C below the dew point. Throughout the whole process, the control centre asks for cooling. It can be seen how Regula Secura controls using the ON/OFF feature.

Regula Combi 1.5

Regula Connect Basic

Regula Connect Basic is a connection card that provides flexible connection for chilled beams or façade systems. Regula Connect Basic consists of a connection card with connectors for mains cables, thermostat cables and terminal blocks for actuator cables. The card has alternatives for the mains cable outputs, so the control signal can be transmitted to the next chilled beam or facade system in both directions or terminated at any point. A transformer is also connected to a free port.

Regula Connect Multi

In addition to the connectors available in Regula connect Basic, the Regula Connect Multi also offers connectors for CO2 and Presence sencors. Further more it is also possible to connect a damper on the Regula Connect Multi, for air flow control. The damper option is used to for forced ventilation and for the Lindab eHybrid system.

Reconnecting control cables
When moving, building new, or removing existing partitions, the control system can be reconnected (see picture below). This to allow the control centre to control the products in the room where it is installed.

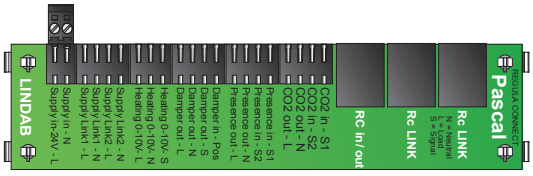
The unit's cable consists of four conductors, two for the supply voltage and two for the control signal to the heating and cooling actuators.

The figures refer to the picture below.

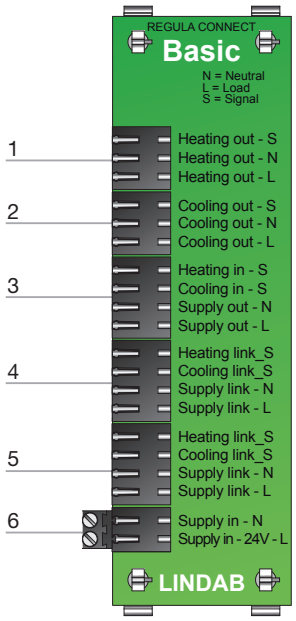
1 Connectors for heating output devices, such as heating circuit actuators.
2 Connectors for cooling output devices, such as cooling circuit actuators.
3 Connector for power and communication input from Regula Combi.
4-5 Connector for power and communication link between one or more beams.
6 Connector for direct power via external transformer.
7 Connector for CO2 sensor input.
8 Connector for Presence sensor input.
9 Connector for damper output.
10 RC link.
11 RC in/out.

Regula Connect Pascal

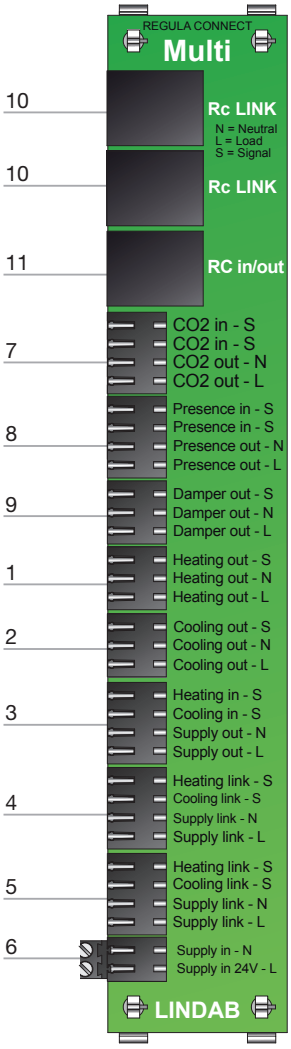
For further information about Regula Connect Pascal please see the Pascal documents.



Regula Connect Pascal



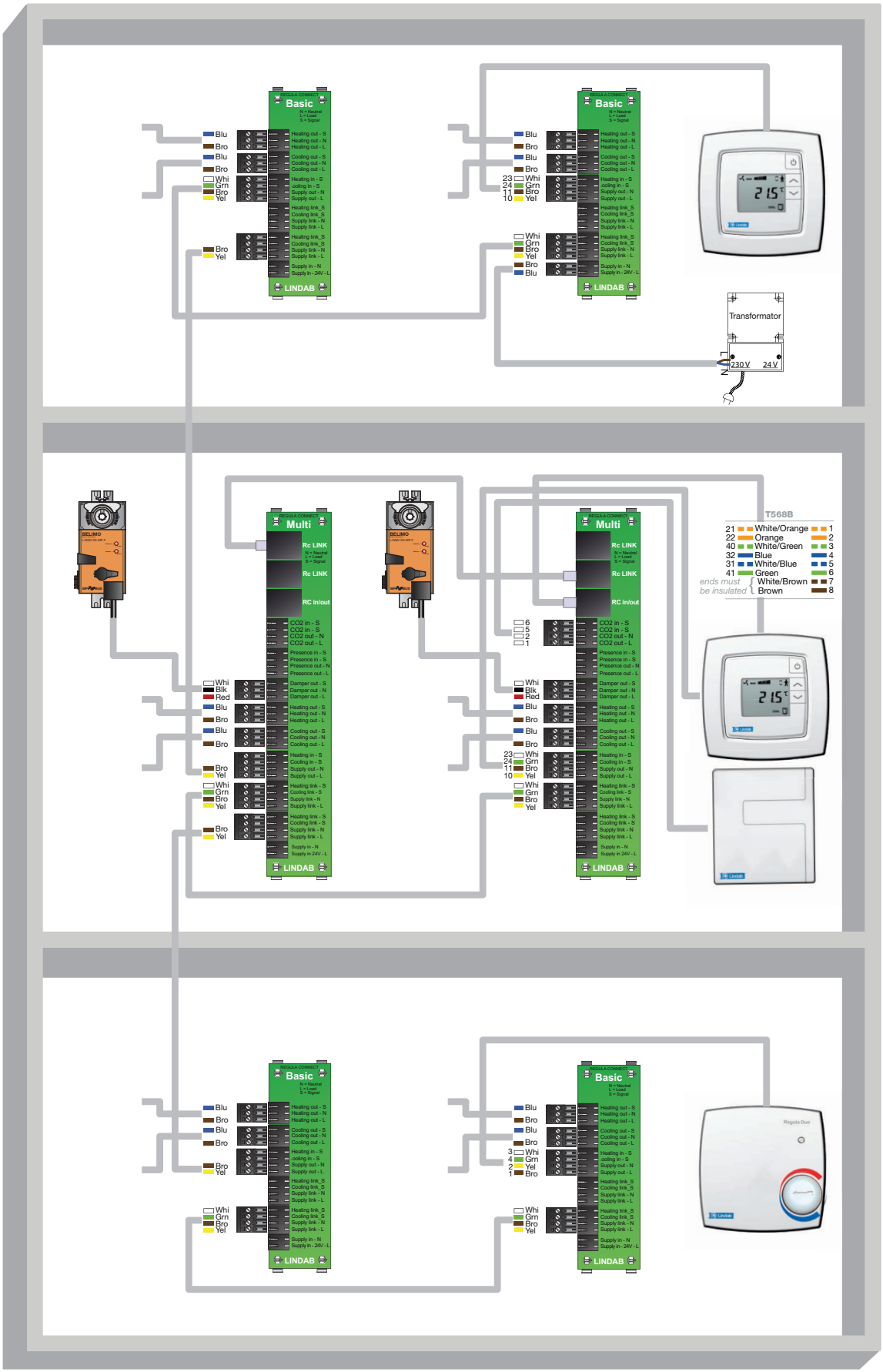
Regula Connect Basic



Regula Connect Multi

Regula Combi

1.5



Regula Combi 1.5

Accessories

CO2 sensor	**CTRT2(-D)**
Supply voltage:	24 V AC +/- 15 %
Power consumption:	3 W
Protection class:	IP30
CO2:	0…2,000 ppm
Temperature:	0…50° C

Outputs

CO2:	0…0.10 V DC refers to 0…2,000 ppm
Temperature:	0…10 V DC refers to 0…50° C

Regula Pulse
A small accessory which transforms a 0-10V signal into digital pulses.
For Pascal programs 6 and 8 the digital input DI2 in Regula Combi is used for CO2. If using CTRT2 together with Regula Pulse and configuring the DI2 in Regula Combi for Regula Pulse, it is possible to read the actual CO2 level in steps of 5 ppm.

CO2 relay sensor CO2RT-R
Same as above (CTRT2(-D), but with a relay instead of a modulating output signal. Coupling difference and level is set in the relay sensor.

Presence sensor IR24-P

Supply voltage:	24 V AC +/- 2 V
Power consumption:	5 m A
Monitoring area:	15 x 15 m at 25° C
Installation height:	1.8…3.6 m
Detectable movement:	0,1…0.3 m/s

Outputs

Output relay:	24 V AC/DC, 0.2 A max

Integrated presence sensor
As an alternative to the IR24-P, Lindab can also offer a small presence sensor integrated in the front plate of Pascal diffusers. A translation unit Regula Convert is included. Regula Convert can be combined with a lighting relay Regula Lux.
Please see the documentation of Pascal products or contact Lindab for information.

External temperature sensor R5/PT1000

Protection class:	IP30
Sensor element:	PT1000
	Accuracy better than +/- 0.5° C
Colour:	Lid: Polar white, RAL 9010
	Bottom part: Dark grey

Besides, there is also a strap-on sensor, immersion sensor and duct sensor. Please contact Lindab for additional information.

Calculation of the transformer size

Prerequisites

- The size of the transformer is calculated with regard to greatest number of heating or cooling actuators in the building or the zone.
- Consumption is 6 W on opening and 1.8 W in continuous operation. The calculation needs to take into consideration whether the total power consumption is higher/lower on opening or in continuous operation.

Example:
15 cooling actuators and 25 heating actuators are installed in the building/zone. Number of heating actuators dimensioned: 25.

Consumption at start-up will then be 6 W x 25 actuators and 1.8 W x 25 actuators in continuous operation.

With the formula P = U x I, we calculate, as follows:
6 W/24 V = 0.25 A per actuator
25 x 0.25 A = 6.25 A

The transformer size is then = 6.25 A x 24 V = 150 VA

Remember that, for example, if NO actuators are used for heating and NC actuators for cooling, all actuators need to be added together.