



## Room Sensors Room Operating Units

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## Data-Pool General Notes

- General information**
- The device supports the MP Data-Pool functional profile. All available data points are managed in a data pool and accessible with MP read/write commands.
  - This document describes all public data pool values of the device. It's divided into process values and configuration values.
  - The MP Data-Pool functional profile is specified in the MP Cooperation Documentation. The document is provided to Belimo MP-Partners.
  - See the technical datasheet for technical information about the device itself.

**Power-on behaviour** The initialization of sensor data takes up to 10 seconds. The sensor values remain 0 during power-on.

**Identification** The connected type can be identified by its series number:

Prefix	Profile Type	Profile Category	Type	Remark
2	2	11	22RT-19-1	Room sensors from legacy series (before May 2022); see appendix
2	3	11	22RTH-19-1	
2	4	11	22RTM-19-1	
2	5	11	22RT-19-1	Room sensors (RS) (from May 2022)
2	6	11	22RTH-19-1	
2	7	11	22RTM-19-1	
2	6	11	P-22RTH-1900A-1	Room operating units (ROU) without display
2	7	11	P-22RTM-1900A-1	
2	5	12	P-22RT-1900D-1	Room operating units (ROU) with display
2	6	12	P-22RTH-1900D-1	
2	7	12	P-22RTM-1900D-1	

**Configuration** Configuration data are not password protected

**Timing of MP-Bus queries** Master implementations typically poll the slaves in cycles (MP1, MP2, MP3, ...). Reading all data pool values of a node in one cycle is not recommended, because it would reduce the overall MP-Bus performance

Recommendation:

- Split up the queries into several cycles (e.g. 3 queries per cycle).
- Adjust repetition rates (reading values) according to the rate of change of the value
- Prevent from reading unused data pool values

**Signed integer** Signed integers are represented as two's complement.

Example Value of ID40 = 1111'1101'1111'0010<sub>2</sub> = -526<sub>10</sub>

Actual Value = Value \* Scaling factor \* Unit = -526 \* 0.01 \* °C = **-5.26 °C**

**Remark** All writeable data-pool values > 100 are persistent.

## Data-Pool Values Overview

	ID	Name	R/W	RS	ROU
Process	11	Error State	R	●	●
	14	Room temperature [°C]	R	●	●
	16	Relative humidity [%]	R	●	●
	17	CO2 value [ppm]	R	●	●
	21	Air quality status	R	●	●
	30	Status Device	R	●	●
	33	Dew point temperature [K]	R	●	●
	38	<b>Display warning icon</b>	RW		●
	39	<b>Display window icon</b>	RW		●
	Configuration	70	<b>Room temperature setpoint [°C]</b>	RW	
71		<b>Ventilation stage [%]</b>	RW		●
72		<b>System operation mode</b>	RW		●
73		<b>Ventilation stage control mode</b>	RW		●
74		<b>Heating/Cooling application status</b>	RW		●
77		<b>Enable local adjustment</b>	RW		●
80		<b>Relative room temperature setpoint [°C]</b>	RW		●
110		<b>Offset Temperature [°C]</b>	RW	●	●
111		<b>Offset Humidity [%]</b>	RW	●	●
112		<b>Offset CO2 [ppm]</b>	RW	●	●
126		<b>CO2 limit "Good"</b>	RW	●	●
127		<b>CO2 limit "Moderate"</b>	RW	●	●
128		<b>Air quality indication</b>	RW	●	●
154		<b>Unit for temperature on display</b>	RW		●
200		<b>Display background color</b>	RW		●
201		<b>Display room temperature</b>	RW		●
202		<b>Display relative humidity</b>	RW		●
203		<b>Display CO2 value</b>	RW		●
204		<b>Display heating/cooling icon</b>	RW		●
205		<b>Warning icon function</b>	RW		●
206		<b>Window icon function</b>	RW		●
208		<b>Temperature display mode</b>	RW		●
209		<b>Display ventilation stages</b>	RW		●
210		<b>Eco button mode</b>	RW		●
211	<b>Display boost button</b>	RW		●	
212	<b>On/Off button mode</b>	RW		●	
220	<b>Temperature setpoint type</b>	RW		●	
221	<b>Default room temperature setpoint</b>	RW		●	
222	<b>Temperature setpoint range</b>	RW		●	
223	<b>Ventilation stage configuration</b>	RW		●	
224	<b>Ventilation control mode</b>	RW		●	

Room sensors (RS) provide only a subset of the data-pool values supported by room operating units (ROU). Values not marked as supported are not functional but can still be read/written. This allows to use the same template for integration of RS and ROU into BACS.

## Data-Pool Values

## Sensor values

The various measured values can be read out via the data-pool values below.

Nr	Description	Unit	Scaling	Values	Size	R/W
14	Room temperature in °C	°C	0.01	0 ... 50	2	R
16	Relative humidity in %	%	0.01	0 ... 100	2	R
17	CO2 value in ppm	ppm	1	0 ... 2'000	2	R
33	Dew Point Temperature in °C	°C	0.01	-50 ... 50	2	R

## Data-Pool Values

## Offset/Correction values

These data-pool values can be used to specify offset/correction values for the individual measured values.

Nr	Description	Unit	Scaling	Values	Size	R/W
110	<b>Room temperature offset in K</b> Offset applied to measured temperature K	K	0.01	-15 ... 15	2	RW
111	<b>Relative humidity offset in %</b> Offset applied to measured relative humidity in percent	%	0.01	-20 ... 20	2	RW
112	<b>CO2 offset in ppm</b> Offset applied to measured CO2 content in ppm	ppm	1	-500 ... 500	2	RW

## Data-Pool Values

## Temperature unit selection

Nr	Description	Unit	Scaling	Values	Size	R/W
154	<b>Unit for temperature on display</b>	-	1	0: °C 1: - 2: °F	1	RW

## Data-Pool Values

## Temperature setpoint

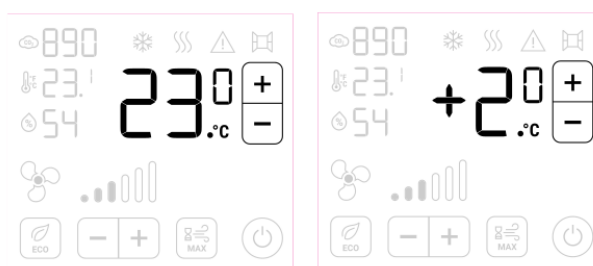


Figure 1: Left: Room temperature setpoint, right: Relative room temperature setpoint

Nr	Description	Unit	Scaling	Values	Size	R/W
70	<b>Room temperature setpoint [°C]</b>	°C	0.01	5 ... 45	2	RW
80	<b>Relative room temp. setpoint [°C]</b>	°C	0.01	-5.6 ... 5.6	2	RW
220	<b>Temperature setpoint type</b> Set the temperature setpoint type between absolute setpoint (e.g., 23°C) and the relative setpoint or setpoint shift (e.g. + 3°C)	-	1	0: Absolut 1: Relative	1	RW

221	<b>Default room temp. setpoint [°C]</b> Set the base temperature for the Display App	°C	0.01	15 ... 35	2	RW
222	<b>Temperature setpoint range [°C]</b> Set the adjustable temperature setpoint range around the base temperature for the Display App	°C	1	0 ... 10	1	RW

## Data-Pool Values

## Ventilation setpoint



Figure 2: Ventilation setpoint

Nr	Description	Unit	Scaling	Values	Size	R/W
71	<b>Ventilation stage</b> Set desired ventilation stage in room/zone in percent	°C	0.01	0 ... 100	2	RW
73	<b>Ventilation stage control mode</b> Set ventilation mode to automatic control or manual control (applies if hybrid control mode is activated, see ID 224)	-	1	0: Manual ventilation stages control 1: Automatic ventilation stages control	1	RW
223	<b>Ventilation stage configuration</b> Set the number of adjustable ventilation stages on the display	-	1	0: - 1: - 2: 3 stages 3: 4 stages 4: 7 stages	1	RW
224	<b>Ventilation control mode</b> Set the ventilation control functionality between manual mode only and automatic and manual mode combined	-	1	0: Manual mode only 1: Hybrid control mode, setpoint invisible in auto mode	1	RW

## Data-Pool Values

## Display configuration

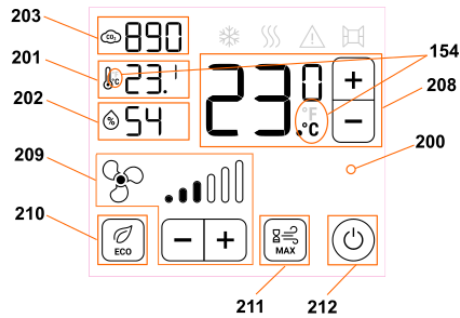


Figure 3: Display configuration options

Nr	Description	Unit	Scaling	Values	Size	R/W
77	<b>Enable local adjustment</b> Allow or prohibit the room occupant to adjust settings on the room operating unit	-	1	0: Disabled 1: Enabled	1	RW
200	<b>Display background color</b> Set the display background color either white or black	-	1	0: white on black 1: black on white	1	RW
201	<b>Display room temperature</b>	-	1	0: Invisible 1: Visible	1	RW
202	<b>Display relative humidity</b>	-	1	0: Invisible 1: Visible	1	RW
203	<b>Display CO2 value</b>	-	1	0: Invisible 1: Visible	1	RW
208	<b>Temperature display mode</b> Set the functionality of the large temperature indicator on the display	-	1	0: Invisible 1: Actual room temperature 2: Room temperature setpoint	1	RW
209	<b>Display ventilation stages</b> Set/ reset the display of the ventilation stages	-	1	0: Invisible 1: Visible	1	RW
210	<b>Eco button mode</b> Set the functionality of the Eco mode icon on the display	-	1	0: Invisible 1: Status (no user interaction) 2: Setpoint	1	RW
211	<b>Display Boost button</b> Set/ reset Boost/ Max icon on the display	-	1	0: Invisible 1: Visible	1	RW
212	<b>On/off button mode</b> Set the functionality of the on/ off icon on the display	-	1	0: Invisible 1: Status (no user interaction) 2: Setpoint	1	RW

Data-Pool Values

Status icons on display

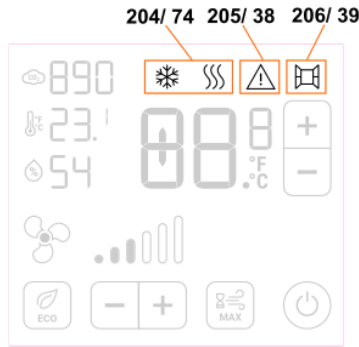


Figure 4: Status icons configuration options

Nr	Description	Unit	Scaling	Values	Size	R/W
38	<b>Display warning icon</b> (Applies if ID 205 is set to 1)	-	1	0: Invisible 1: Visible	1	RW
39	<b>Display window icon</b> (Applies if ID 206 is set to 1)	-	1	0: Invisible 1: Visible	1	RW
74	<b>Heating/Cooling application status</b> Appearance of heating or cooling icons on the display	-	1	0: None 1: Heating 2: Cooling	1	RW
204	<b>Display heating/cooling icon</b> Set/ reset the display of the heating and cooling icons	-	1	0: Invisible 1: Visible	1	RW
205	<b>Warning icon function</b> Set the functionality of the warning icon on the display	-	1	0: Invisible 1: According to "Display warning icon" 2: According to Device Error Status	1	RW
206	<b>Window icon function</b> Set the functionality of the window icon on the display	-	1	0: Invisible 1: According to "Display window icon" setting 2: -	1	RW

Data-Pool Values

Building operation mode



Figure 5: Switching between modes using the "ECO", "MAX" and on/ off button

Nr	Description	Unit	Scaling	Values	Size	R/W
72	<b>System operation mode</b> Set HVAC building operation mode	-	1	0: Off/Protection 1: On/ Comfort 2: Eco Mode 3: Boost Mode	1	RW

## Data-Pool Values

## Air quality traffic light



Figure 6: CO2 traffic light for different models.

Nr	Description	Unit	Scaling	Values	Size	R/W
21	Air quality status Status of measured air quality in the room/ zone	-	1	0: Deactivated 1: Ok 2: Warning 3: Alarm	1	R
126	<b>CO2 limit for good air quality</b> Set threshold value of CO2 concentration to switch between "good" (green) and "warning" (yellow) state.	ppm	1	600 ... 1'249	2	RW
127	<b>CO2 limit for moderate air quality</b> Set threshold value of CO2 concentration to switch between "warning" (yellow) and "alarm" (red) state.	ppm	1	1'250 ... 2000	2	RW
128	<b>Air quality indication</b> Enable/ disable CO2 traffic light	-	1	0: Disabled 1: Enabled	1	RW

## Data-Pool Values

## Device state

Nr	Description	Unit	Scaling	Values	Size	R/W
11	Error State Error status of the device	-	1	Bit 0: Temperature sensor error Bit 1: Humidity sensor error Bit 2: CO <sub>2</sub> sensor error Bit 3: Dewpoint calculation error  The flag is reset automatically if the condition disappears.	1	R
30	Status Device	-	1	Bit0: reserved Bit1: reserved Bit2: Sensor summary error (see ID11 for details) Bit3: reserved Bit4: reserved Bit5: reserved Bit6: Sensors initializing (up to 10 s after power-up)  The flag is reset automatically if the condition disappears.	2	R



**Appendix: Data-Pool Values for legacy room sensor series**

This section contains the data-pool description for 22RT-19-1, 22RTH-19-1 and 22RTM-19-1 produced before May 2022

Nr	Description	Unit	Scaling	Values	Size	R/W
11	Error State Error status of the device	-	1	Bit 0: temperature sensor fault Bit 1: rH sensor fault Bit 2: CO <sub>2</sub> sensor fault  The flag is reset automatically if the condition disappears.	1	R
14	SensTemp [UnitSel] Temperature in unit selected (ID 153)	UnitSel	0.01	0 ... 50 (32...122 °F)	2	R
16	SensRelHumid Relative humidity in percent	%	0.01	0 ... 100	2	R
17	SensCO2 CO2 content in ppm	ppm	1	0 ... 2'000	2	R
23	DigitalIn Digital input (e.g. presence detector)	-	-	0: (open) 1: (closed)	1	R
30	Status Device	-	1	Bit0: reserved Bit1: reserved Bit2: Sensor summary error (see ID11 for details) Bit3: reserved Bit4: reserved Bit5: reserved Bit6: Sensors initializing (up to 20 s after power-up)  The flag is reset automatically if the condition disappears.	2	R
33	DewPointTemp [UnitSel] Temperature of calculated dew point in unit selected (ID 153)	UnitSel	0.01	0 ... 50 (32 ... 122 °F)	2	R
100	<b>Position</b> Alphanumeric character string to store the location of the device (optional, helpful for maintenance and troubleshooting)	-	-	One byte per character The string is not null terminated. Fill up unused bytes with 0x20 (space character).	64	RW
110	<b>OffsetTemp [UnitSel]</b> Offset applied to measured temperature in unit selected	UnitSel	0.01	-15 ... 15 (-27 ... 27 °F)	2	RW
111	<b>OffsetHumidity [%]</b> Offset applied to measured relative humidity in percent	%	0.01	-20 ... 20	2	RW
112	<b>OffsetCO2 [ppm]</b> Offset applied to measured CO2 content in ppm	ppm	1	-500 ... 500	2	RW
113	<b>OffsetDewPointTemp [UnitSel]</b> Offset applied to calculated dew point temperature in unit selected	UnitSel	0.01	-15 ... 15 (-27 ... 27 °F)	2	RW
153	<b>Unit Selection Temp Communication</b> Unit applied for temperature values	-	1	0 = °C 1 = °F Default: 0 = °C	1	RW