From: Louis Rossouw

Distribution: LHA development, Rickard engineering, Rickard support

Topic: Implementing the CO2 WS operation

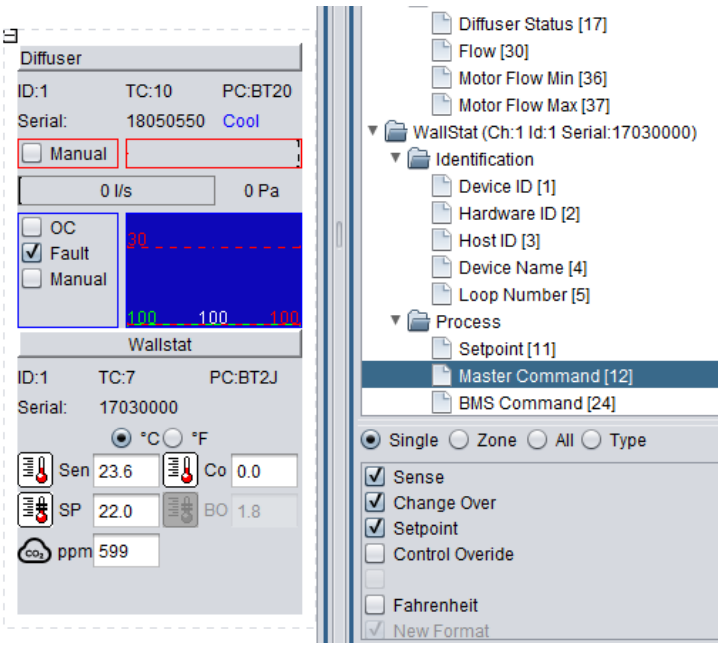
Description: This document describes the operating procedure for the CO2 WS as implemented on the mlm 24 system. As much as possible use is made of the existing functionality in the mlm system. 'CO2 operation' will be implemented as a secondary control function, i.e. when a CO2 threshold is reached the control system will enter manual override to open the control disk. Should the CO2 level reduce to an acceptable level the system will revert to 'normal operation'.

The following software code revisions and hardware version must be used:

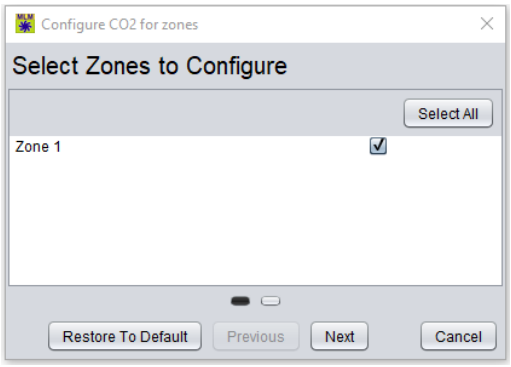
- Mlm Tool – V8.17 U12
- WS 2 CO2 variant – V04.36(.zip)
- BT2J11-2S with CO2 sense (Rickard stock code CONT/0100/00350)
- MCU 2 BW2011-2B firmware rev 6.35K

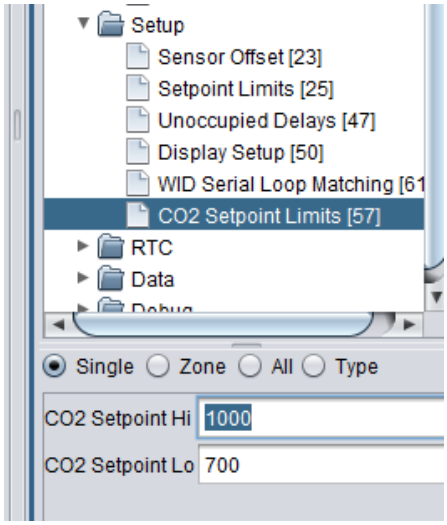
Setup:

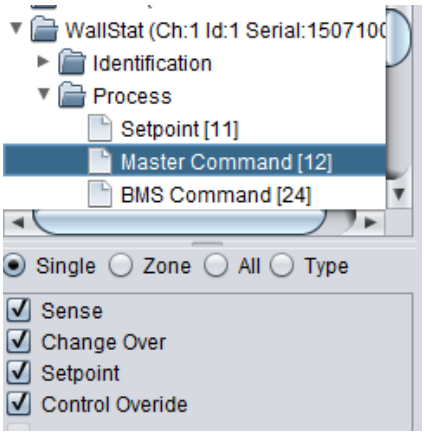
i. Ensure the CO2 WS is configured and zoned for normal operation as indicated. Note the CO2 display at bottom.



ii. Select and run the CO2 wizard. Set the CO2 high and low thresholds.
Press Apply.



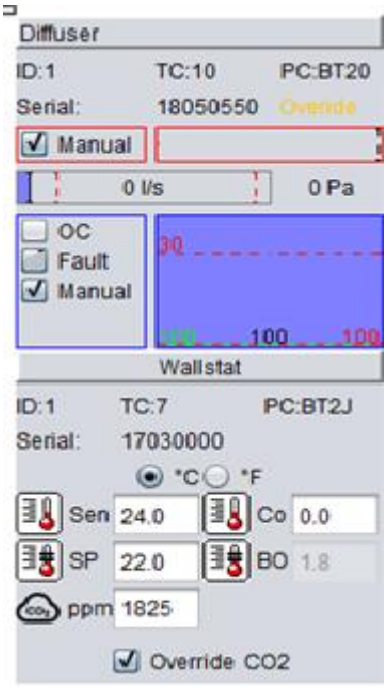




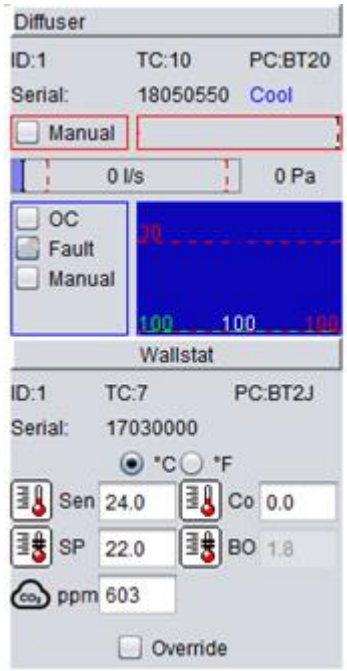
iii. The Setup tab will now contain the CO2 high and CO2 low threshold values. These two values will trigger levels for the CO2 operation to activate and to deactivate respectively. Note: The wizard also enables the control override feature.

Operation: When the CO2 high level is exceeded, the system will enter the control override state and the diffuser plate will drive open to let in more fresh air. The plate will drive to the Motor Max position as set in the Diffuser Controller Setup tab, normally 100%. Once the CO2 operation is entered, the LCD will flash 'CO2' in the top left corner of the wallstat LCD.

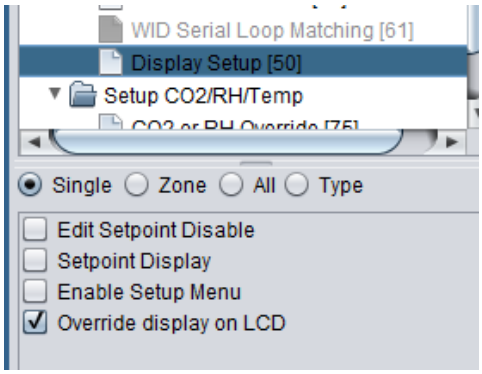
Shown here is the CO2 level exceeding 1000ppm and entering control override. Note the manual control on and the diffuser drive to maximum open.



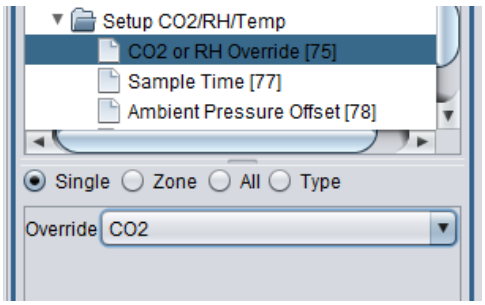
Once the CO2 level is reduced to below the CO2 low threshold, i.e. 700ppm, as set in our example, the diffuser control will revert to normal operation. Manual will be off.



Wallstat LCD display: To select the CO2 for permanent display on the LCD, click on the wallstat icon and write in following two commands:



and..



Normal LCD Temperature display

CO2 display

Should the occupancy sense feature be enabled, the CO2 operation will take precedence, e.g. if the zone is unoccupied with control override driving the control disk closed, exceeding the CO2 high level threshold (unlikely) will force the control disk open.

Manual clear: Once the CO2 operation is activated, the user has the option to manually exit this action. Press and hold the enter button on the WS for a few seconds. The buzzer will sound and the diffuser will revert to normal operation. Note that now the CO2 level must reduce to below the CO2 low threshold level before it is enabled to enter the CO2 backoff operation again.

Deactivation: To deactivate CO2 mode, the CO2 high and CO2 low fields must be set to zero. The Master Command/Control Override could also be unticked.

Note the Master Command/Control Override function enables any external (BMS) or internal (occupancy, CO2 and RH) control override function and should be disabled only when these functions are not in play. See the chapter Control Override Handling Procedure in LHA Doc BW0070 Issue 4, MLM Integration with BMS.

BACnet BMS:

The CO2 ppm values can be read at BACnet analog value points AV420 through AV479. Note that depending on the type of sensor fitted to the wallstat, the same data point is used for either CO2 or RH (humidity).

The AO (120..179) writes the high level threshold to the wallstat. The low level threshold will then be set at 200ppm below the high level threshold. Writing zero to that point will disable the CO2 control override operation. Should the user need to set a different lower threshold, both the high and low thresholds can be set by mlm Tool (wizard) as described in the previous section.

Object Type	Instance #	VAV Parameter	Value
Analog Value	420..479	CO2 value 1..60 / R-H (humidity) 1..60	400..2000ppm / 0..100 %
Analog Output	120..179	CO2 Setpoint 1..60 / R-H Setpoint 1..60	400..2000ppm / 0..100 %
Multi-State Input	0..59	Mode 1..60	See table

The multi-state input (0..59) can be monitored on the BMS for value 6 to indicate CO2 control override.

Decimal Value	Multi-state input Mode Description
1	System Idle (in control temperature band)
2	Initializing
3	Heating mode
4	Cooling mode
5	Actuator in manual operate mode
6	BMS control override mode