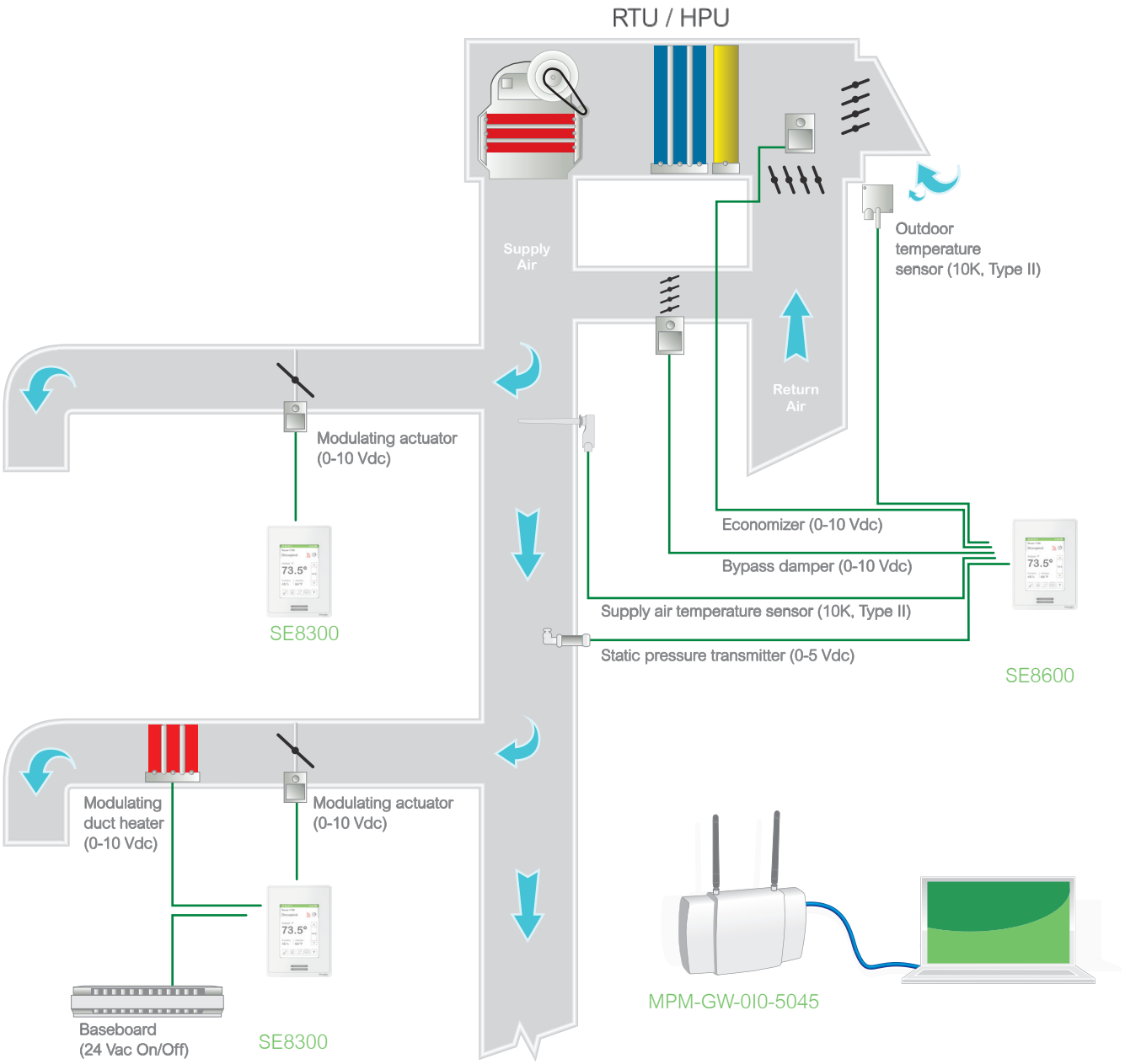
# VVT Zoning

Application for Variable Volume and Temperature Control




Schneider Electric

## INTRODUCTION

This application is for a pressure dependant VVT zoning system using one SE8600 Series Room Controller, for the heat pump or rooftop, multiple SE8300 Series Room Controllers (2-20) for the zones and one Gateway Multi-purpose Manager (MPM-GW).

The SE8600 can be set for 1C/1H, 2C/2H, modulating heat, economizer and $CO_2$, and will control the static pressure using a bypass damper or a VFD. This can be accomplished directly from the interface of the SE8600 Room Controller. It is also used to set the occupancy schedule, configurable on the Room Controllers HMI.

The SE8300 Series Room Controller can control a 0-10 Vdc modulating damper, a 0-10 Vdc duct heater and a baseboard. Added parameters include the following:

- damper Min_Pos
- damper Heat_Pos
- PI_Heat_Weight
- PI_Cool_Weight

In order to facilitate system balancing, it is possible to force all zone dampers to the fully open position for a specific time duration (between 1 and 240 minutes).

A built-in comfort feature will override the damper minimum position if the Room_Temperature deviates too far from setpoint. All configurations are done on the Room Controller.

The MPM-GW is used to calculate the highest zone PI_Heat & PI_Cool demands, transfer the Occupancy, System_Mode and to coordinate all ZigBee communication. The database includes one SE8600 Room Controller and 20 SE8300 Room Controllers according to the following:

- Integrator sets up the ZigBee network and then discovers the Room Controllers
- any unused Room Controllers should not be deleted
- other MPM-GW functionality such as trending, scheduling, and dashboards can be used

## HARDWARE REQUIREMENTS

| Qty | Part Number | Description |
|---|---|---|
| As required | SE8300 | SE8300 Series Room Controller running FW version 1.4.2 or higher |
| 1 | SE8600 | SE8600 Series Room Controller running FW version 1.4.2 or higher |
| 1 | MPM-GW-0I0-5045 | MPM Gateway running FW version 2.19.1 or higher |

## SOFTWARE REQUIREMENTS

| Filename | Version | Comment |
|---|---|---|
| SEZ8600-RTU-HPU_controller_R00 lua | 1.0 | For SE8600 RTU Room Controller* |
| SEZ8300-VVT_Zone_stat_R00.lua | 1.0 | For SE8300 Zone Room Controller* |
| SEZ8000_MPM_DB_R00.db | 1.0 | MPM-GW database* |

* Refer the SE8000 Uploader Tool for instructions on how to upload a Lua Script to the SE8000 Series Room Controllers.

## SE8600 SEQUENCE OF OPERATION

The SE8600 will control the RTU/HPU based on the “Highest Heating or Cooling demand” and the “Global Combined Cool & Heat demand” from the SE8300 Zone Room Controllers. If Cool and Heat demands are equal, the cooling demand takes precedence the heating demand. There is a 2-minute delay (adjustable) between Cool/Heat and Heat/Cool System_Mode change. The output for Static Pressure Control is direct acting (0-10 Vdc = 0-100%), which is ideal for VFD applications. For a bypass damper it is important to have the damper “open-to-bypass” at 0 Vdc and “closed” at 10 Vdc.

## SE8300 SEQUENCE OF OPERATION

The SE8300 controls a modulating (0-10 Vdc) damper actuator, according to the SE8600 System_Mode. The Room Controller does not require a changeover temperature sensor, however it does controls a modulating (0-10Vdc) duct heater and an On/Off baseboard.

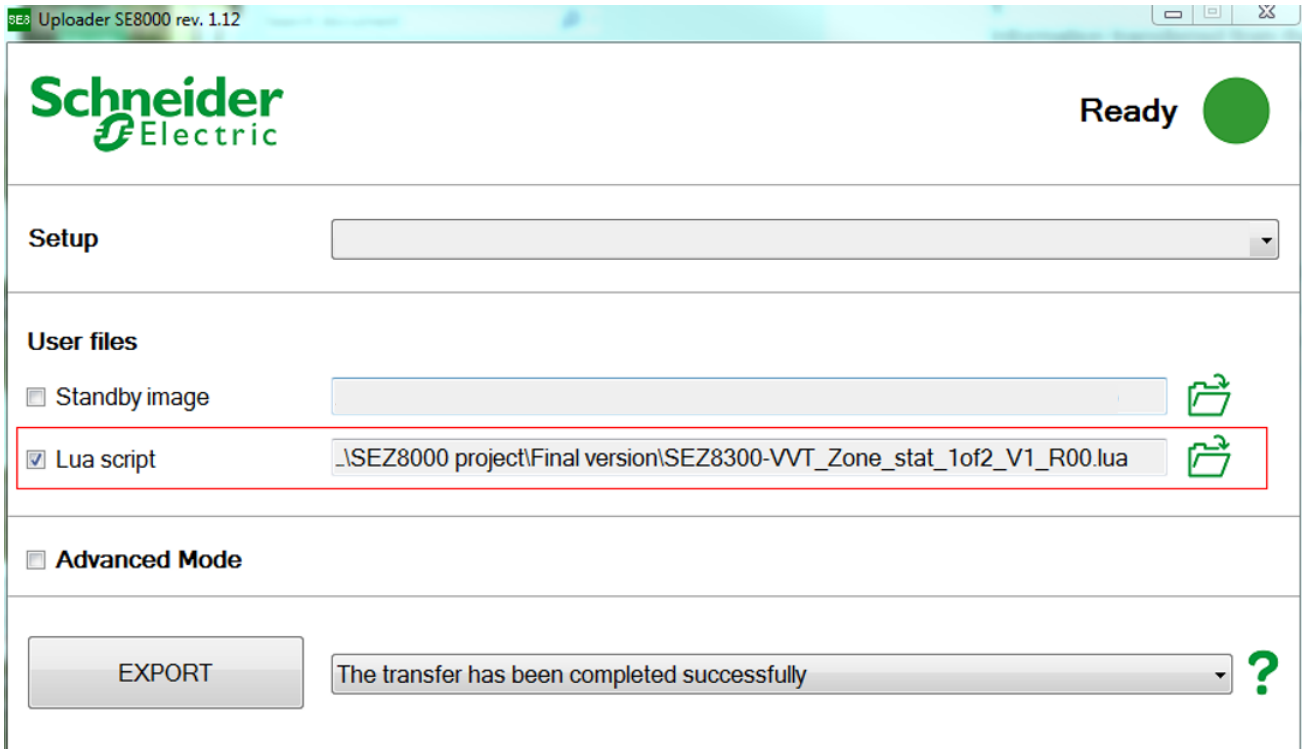
When the system is Unoccupied, pressing the Override key of a Zone Room Controller will only Override the Zone. To Override the RTU/HPU, the Override key of the SE8600 must be pressed.

Information transferred from the SE8600 RTU/HPU controller to the SE8300 Zone Room Controllers is as follows:

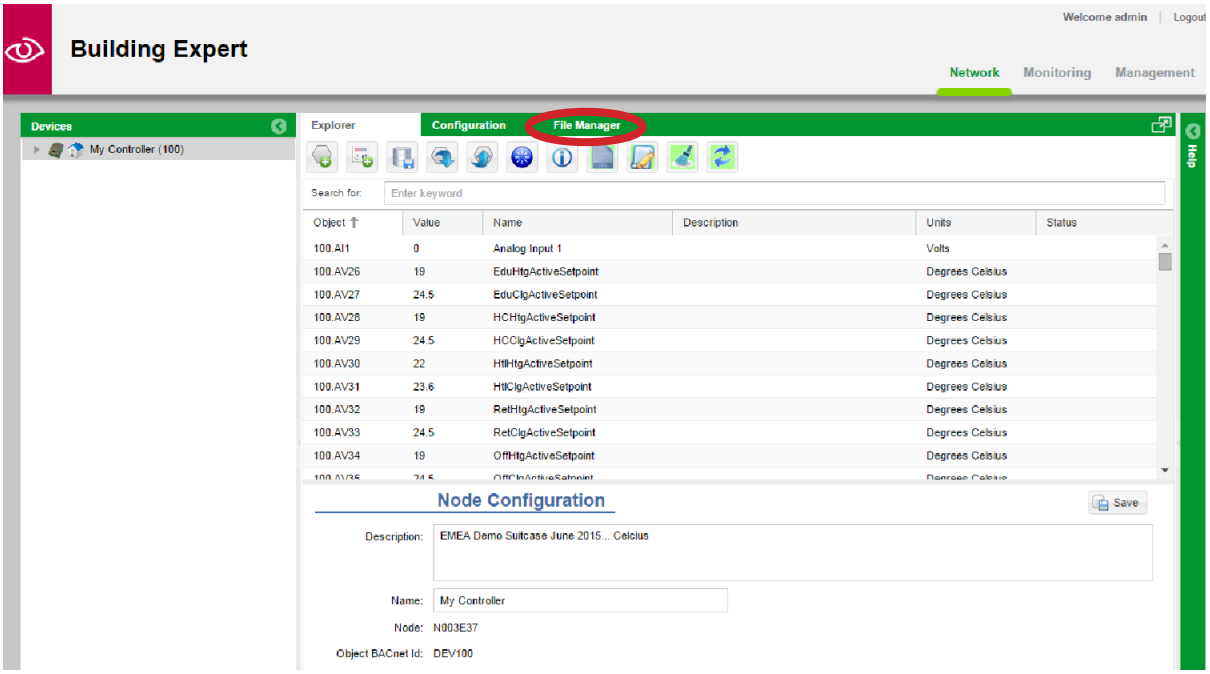
- Occupied/Unoccupied command
- Heat or Cool system mode
- Damper Override, 100% open, for balancing purpose

## SETUP INSTRUCTIONS

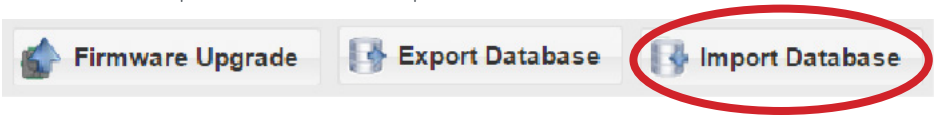
1. Using Uploader Tool, upload two Lua scripts to each SE8300 Room Controller and each SE8600 Room Controller.
   **NOTE**: it is essential to upload the Lua scripts in the correct sequence. Upload file 1 of 2 first and 2 of 2 last.



2. Login to MPM-GW using default IP 10.50.80.3
3. Enter Username: admin
4. Enter Password: vvtzoning



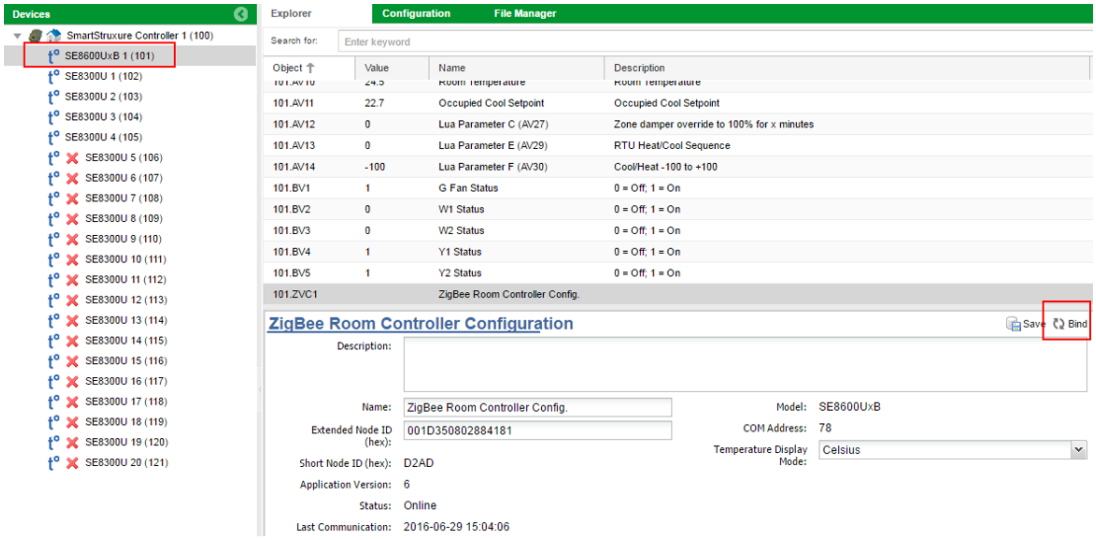

5. Click File Manager tab and then Import Database and import file SEZ8000_MPM_DB_V1_R00.db to MPM-GW.



6. Bind Room Controllers to MPM-GW in the following order:

   i). SE8600
   ii). SE8300 for first zone
   iii). SE8300 for second zone

   **NOTE:** refer to Building Expert User guide to bind Room Controllers to MPM-GW on ZigBee network.
   **NOTE:** do not delete any unused Room Controllers.




7. On SE8600 model, navigate to Lua screens to configure Room Controller.
   **NOTE:** refer to SE8600 User Interface Guide for details.

8. Repeat step 5 for SE8300 model.
   **NOTE:** refer to SE8300 User Interface Guide for details.

## User Variables SE8600

| Variable | Name | Description | Min | Max | Increment |
|---|---|---|---|---|---|
| AV25 | Prs Spt(x100) | Static Pressure Setpoint (x100) in inch wc. EX: 35 = 0.35" wc | 10 (0.1") | 90 (1") | 5 (0.05") |
| AV26 | Prs Rng(x100) | Static Pressure Transmitter pressure range (x100). Ex:150 = 0~1.5" wc | 100 (0-1") | 500 (0-5") | 25 (0.25") |
| AV27 | Zn Dmpr Ovr(m) | Override all zone dampers to 100% open for defined minutes ( 1-240 minutes ) | 0 | 240 | 1 |
| AV28 | Pressure(x100) | Display Static Pressure reading (x100) so 0.35" w.c. will display as 35 | N/A | N/A | N/A |
| AV29 | Cool/Heat: 0/1 | Used to transfer system mode to zone thermostats | N/A | N/A | N/A |
| AV30 | HiDmd -100/100 | Highest cool or heat demand from the zone thermostats | N/A | N/A | N/A |

## User Variables SE8300

| Variable | Name | Description | Min | Max | Increment |
|---|---|---|---|---|---|
| AV25 | Min Dmp Pos% | Minimum damper position in % | 0 | 100 | 1 |
| AV26 | ReHeat Pos% | Damper position for the duct heater when the main system is in Cool mode | 0 | 100 | 1 |
| AV27 | Heat PI Wei% | Factor applied on Heat demand, 100% = Real demand, 50% = ½ demand | 0 | 100 | 1 |
| AV28 | Cool PI Wei% | Factor applied on Cool demand, 100% = Real demand, 50% = ½ demand | 0 | 100 | 1 |
| AV29 | Cool/Heat: 0/1 | System mode from SE8600 RTU-HPU controller | N/A | N/A | N/A |
| AV30 | Dmnd -100/100 | Cool & heat demand transferred to RTU-HPU controller | N/A | N/A | N/A |

## SE8300 Wiring Input and Output Terminals

| Output | Description |
|---|---|
| BO1 | N/A |
| BO2 | Not used |
| BO3 | Not used |
| BO4 | Not used |
| BO8 | Baseboard On/Off (24 Vac) |
| UO9 | Not used |
| U10 | Not used |
| U11 | Duct heater SCR (0-10 Vdc) |
| U12 | Zone damper actuator (0-10 Vdc) |
| U16 | Not used |
| U17 | Not used |
| U19 | Not used |
| U20 | Remote temperature sensor, (10K, Type 2) |
| U22 | Not used |
| U23 | Not used |
| U24 | Not used |

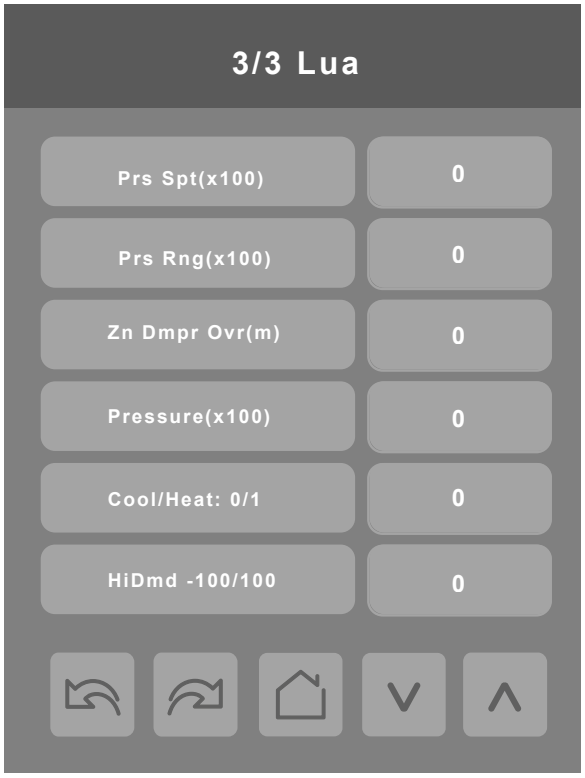
## SE8600 Wiring Input and Output Terminals

| Output | Description |
|---|---|
| BO1 | Auxiliary contact |
| BO2 | Y2 - Cool stage 2 / Compressor 2 |
| BO3 | Y1 - Cool stage 1 / Compressor 1 |
| BO4 | G - Fan |
| BO8 | W1 - Heat stage 1 / Auxiliary Heat |
| UO9 | W2 – Heat stage 2 / Reversing valve |
| U10 | Economizer |
| U11 | Modulating heat (0-10 Vdc) |
| U12 | Bypass damper / VFD (0-10 Vdc) |
| U16 | Not used |
| U17 | Not used |
| U19 | Not used / $CO_2$ |
| U20 | Return air temperature sensor, (10K, Type 2) |
| U22 | Supply air temperature sensor, (10K, Type 2) |
| U23 | Outdoor temperature sensor, (10K, Type 2) |
| U24 | Static Pressure Transmitter (0-5 Vdc) |

***Refer to SE8300 Installation Guide for complete wiring instructions.**

## SE8600 ROOM CONTROLLER CONFIGURATION

Always set parameters per application and system requirements found in the SE8600 User Interface Guide. Also, set parameters in thermostat page “3/3 Lua” as shown below.

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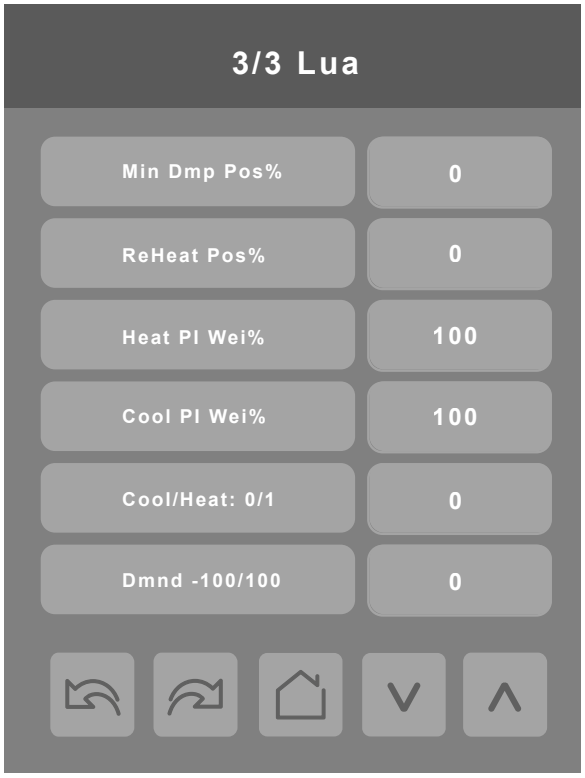

# Feedback and References

## Disclaimer

We value your feedback about your experience using this application in a real world environment, and invite you to send us your comments about your implementation

## References

Client name and/or description, location, commissioning date

Implementation description

## Notes

There may be objects within the MPM database that are NOT used in this application
This application has only been tested in a Lab condition; therefore we cannot accept any responsibility for its accuracy.

# Technical Support

For any issues with SmartStruxure Solution or SmartStruxure Lite, contact Schneider Electric Technical Support according to your region.

## North America (NAM) Product Support

Building Management Systems (BMS): productsupport.NAM-BMS@schneider-electric.com
Field Devices: productsupport.NAM-HVAC@schneider-electric.com

## Global Product Support

Building Management Systems (BMS): productsupport.NAM-BMS@schneider-electric.com
Field Devices: productsupport.NAM-HVAC@schneider-electric.com

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